



# FCC RADIO TEST REPORT

**FCC ID** : W22-ETAG75  
**Equipment** : Electronic Shelf Label E-paper 7.5" Display  
**Brand Name** : Store Intelligence Inc.  
**Model Name** : ETAG 750E5  
**Marketing Name** : ETAG 750E5 NFC LED BW (BWR)  
**Applicant** : Store Intelligence  
6700 Koll Center Parkway, Suite 109,  
Pleasanton, CA, 94566, USA  
**Manufacturer** : Team Precision Public Company Limited  
198 Moo 13 Suwansorn Rd., Dong-Khee-Lek,  
Muang Prachinburi 25000, Thailand  
**Standard** : FCC Part 15 Subpart C §15.249

The product was received on Dec. 17, 2021 and testing was started from Dec. 27, 2021 and completed on Feb. 09, 2022. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (USA) Inc., the test report shall not be reproduced except in full.

Approved by: Neil Kao

**Sporton International (USA) Inc.**  
1175 Montague Expressway, Milpitas, CA 95035



## Table of Contents

|  |           |
|--|-----------|
| <b>History of this test report.....</b>  | <b>3</b>  |
| <b>Summary of Test Result.....</b>   | <b>4</b>  |
| <b>1 General Description .....</b>   | <b>5</b>  |
| 1.1 Product Feature of Equipment Under Test.....   | 5         |
| 1.2 Modification of EUT .....  | 5         |
| 1.3 Testing Location .....   | 5         |
| 1.4 Applicable Standards.....  | 5         |
| <b>2 Test Configuration of Equipment Under Test .....</b>                                    | <b>6</b>  |
| 2.1 Carrier Frequency Channel .....  | 6         |
| 2.2 Test Mode.....   | 6         |
| 2.3 Connection Diagram of Test System.....   | 7         |
| 2.4 Support Unit used in test configuration and system .....                                 | 7         |
| 2.5 EUT Operation Test Setup .....   | 7         |
| <b>3 Test Result .....</b>   | <b>8</b>  |
| 3.1 99% Bandwidth Measurement.....   | 8         |
| 3.2 Field Strength of Fundamental/Harmonics and Radiated Spurious Emission Measurement ..... | 11        |
| 3.3 Antenna Requirements .....   | 15        |
| <b>4 List of Measuring Equipment.....</b>  | <b>16</b> |
| <b>5 Uncertainty of Evaluation .....</b>   | <b>17</b> |
| <b>Appendix A. Radiated Spurious Emission</b>  |           |
| <b>Appendix B. Radiated Spurious Emission Plots</b>  |           |
| <b>Appendix C. Duty Cycle Plots</b>  |           |
| <b>Appendix D. Setup Photographs</b>   |           |

## History of this test report

| Report No.  | Version | Description                                   | Issued Date   |
|-------------|---------|---|---------------|
| FR211110006 | 01      | Initial issue of report                       | Feb. 16, 2022 |
| FR211110006 | 02      | Revise Summary of Test Result and section 3.1 | Apr. 06, 2022 |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |
|             |         |   |               |

## Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items                    | Result (PASS/FAIL) | Remark                                   |
|---------------|-----------------|-------------------------------|--------------------|--|
| 3.1           | 2.1049          | 99% Occupied Bandwidth        | Reporting only     | -  |
| 3.2           | 15.249(a)       | Field Strength of Fundamental | Pass               | 11.67 dB under the limit at 2439.000 MHz |
| 3.2           | 15.249(d)       | Radiated Spurious Emission    | Pass               | 7.90 dB under the limit at 16821.000 MHz |
| -             | 15.207          | AC Conducted Emission         | Not Required       | See Note 1                               |
| -             | 15.249(b)       | Frequency Stability           | Not Required       | See Note 2                               |
| 3.2           | 15.203          | Antenna Requirements          | Pass               | -  |

**Note:**

1. The EUT is powered by batteries which is deemed DC power source, it does not operate from the AC power lines or contain provisions for operation while connected to the AC power lines, according to 47 CFR § 15.207(c), the conducted emission limits are not applicable to the device hence the test is not performed.
2. Only applicable to fixed point to point systems.

**Declaration of Conformity:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

**Comments and Explanations:**

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Proprietary hopping in 2.4GHz band

| Product Feature     |                                      |   |
|---------------------|--------------------------------------|---|
| Antenna Type        | Proprietary 2.4GHz: Internal Antenna |   |
| Antenna information |                                      |   |
| 2403 MHz ~ 2469 MHz | Peak Gain (dBi)                      | 0 |

**Remark:** The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

## 1.2 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.3 Testing Location

|                    |   |
|--------------------|---|
| Test Site          | Sporton International (USA) Inc.                                  |
| Test Site Location | 1175 Montague Expressway, Milpitas, CA 95035<br>TEL : 408 9043300 |
| Test Site No.      | Sporton Site No.  |
|                    | 03CH02-CA   |

**Note:** The test site complies with ANSI C63.4 2014 requirement.

## 1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.249
- ♦ ANSI C63.10-2013
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01

**Remark:**

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2 Test Configuration of Equipment Under Test

### 2.1 Carrier Frequency Channel

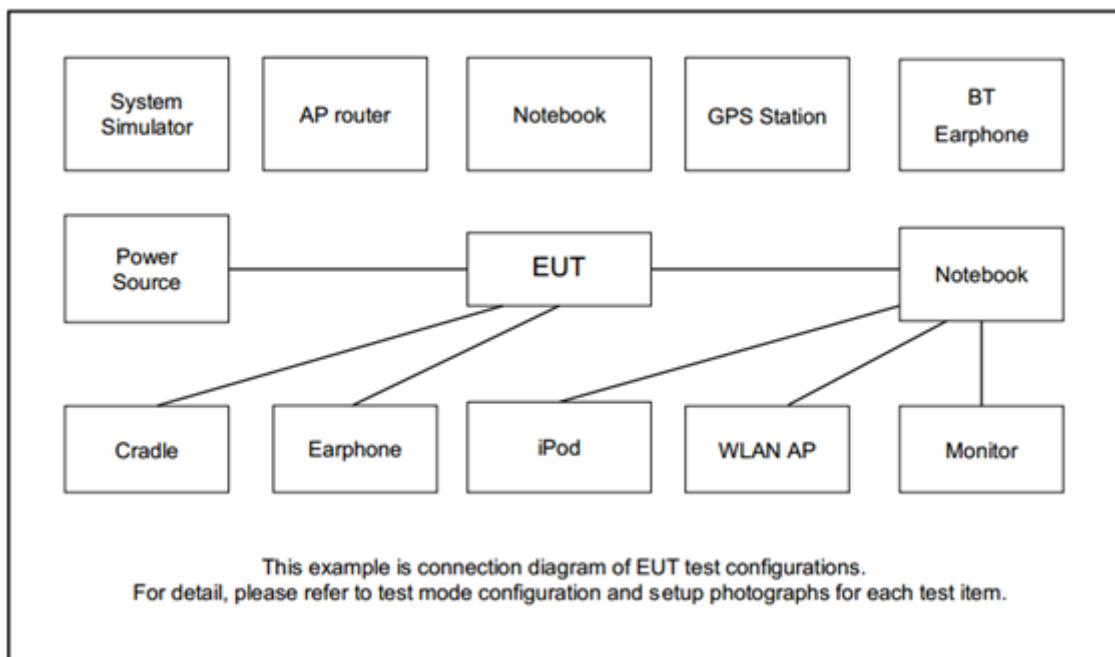
| Frequency Band  | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|-----------------|---------|-------------|---------|-------------|---------|-------------|
| 2400-2483.5 MHz | 0       | 2403        | 8       | 2427        | 16      | 2451        |
|                 | 1       | 2406        | 9       | 2430        | 17      | 2454        |
|                 | 2       | 2409        | 10      | 2433        | 18      | 2457        |
|                 | 3       | 2412        | 11      | 2436        | 19      | 2460        |
|                 | 4       | 2415        | 12      | 2439        | 20      | 2463        |
|                 | 5       | 2418        | 13      | 2442        | 21      | 2466        |
|                 | 6       | 2421        | 14      | 2445        | 22      | 2469        |
|                 | 7       | 2424        | 15      | 2448        |         |             |

### 2.2 Test Mode

- a. The EUT has been configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and find X plane as worst plane.

| Frequency Band  | Frequency (MHz) | Modulation |
|-----------------|-----------------|------------|
| 2400-2483.5 MHz | 2403            | GFSK       |
| 2400-2483.5 MHz | 2439            | GFSK       |
| 2400-2483.5 MHz | 2469            | GFSK       |

## 2.3 Connection Diagram of Test System



## 2.4 Support Unit used in test configuration and system

| Item | Equipment | Brand Name | Model Name | FCC ID     | Data Cable        | Power Cord   |
|------|-----------|------------|------------|------------|-------------------|--|
| 1.   | Laptop    | Lenovo     | TP00049A   | NPD97260SD | Unshielded, 1.0 m | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |

## 2.5 EUT Operation Test Setup

The RF test items, utility "Simplicity studio SV4.1.14.0" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

### 3 Test Result

#### 3.1 99% Bandwidth Measurement

##### 3.1.1 Limit of 99% Bandwidth

Reporting only

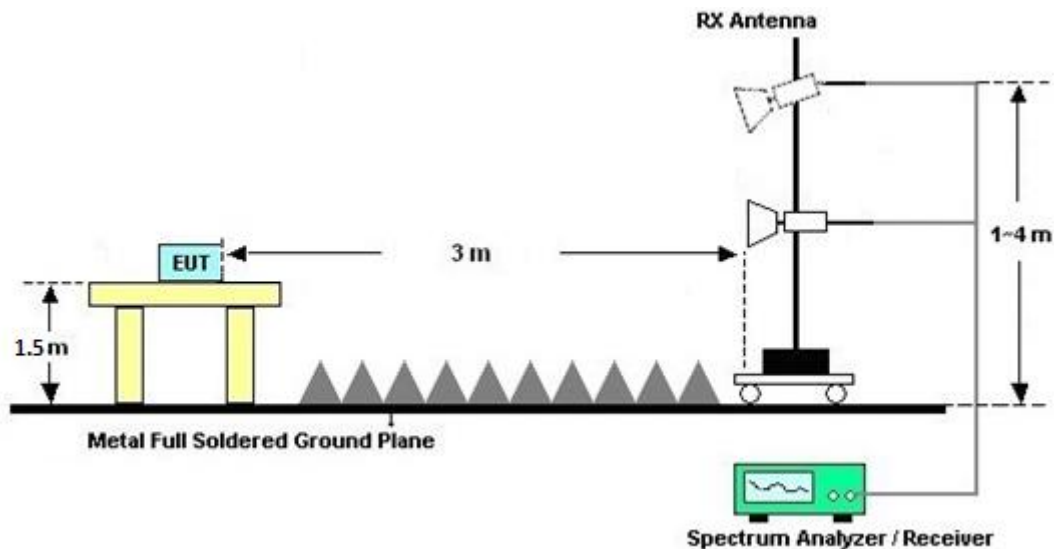
##### 3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

##### 3.1.3 Test Procedures

1. The EUT is placed on a turntable with 1.5 meter height above ground and 3 meter distance from receiving antenna.
2. Set the maximum power setting and enable the EUT to transmit continuously.
3. Use the following spectrum analyzer settings for 99 % occupied bandwidth measurement.  
Span = approximately 1.5 to 5 times the 99% occupied bandwidth, centered on a hopping channel; RBW = 1-5% of the 99% occupied bandwidth; VBW  $\geq 3 * RBW$ ; Sweep time = 1ms; Detector function = Peak; Trace = max hold.

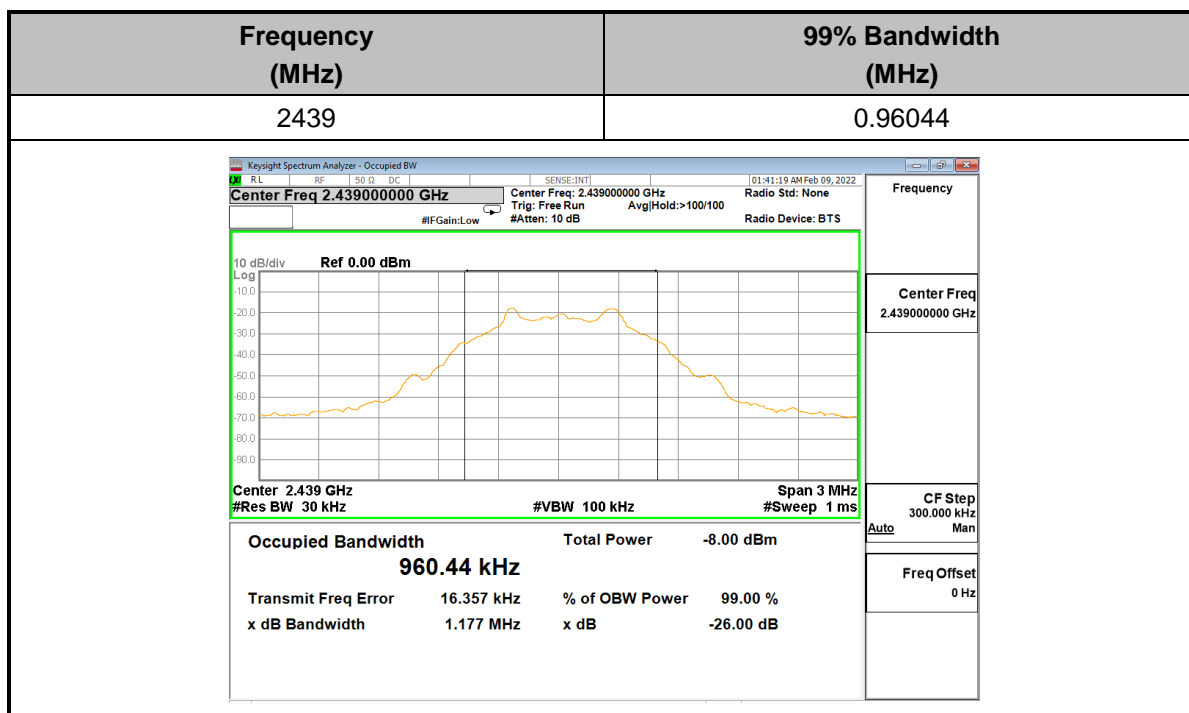
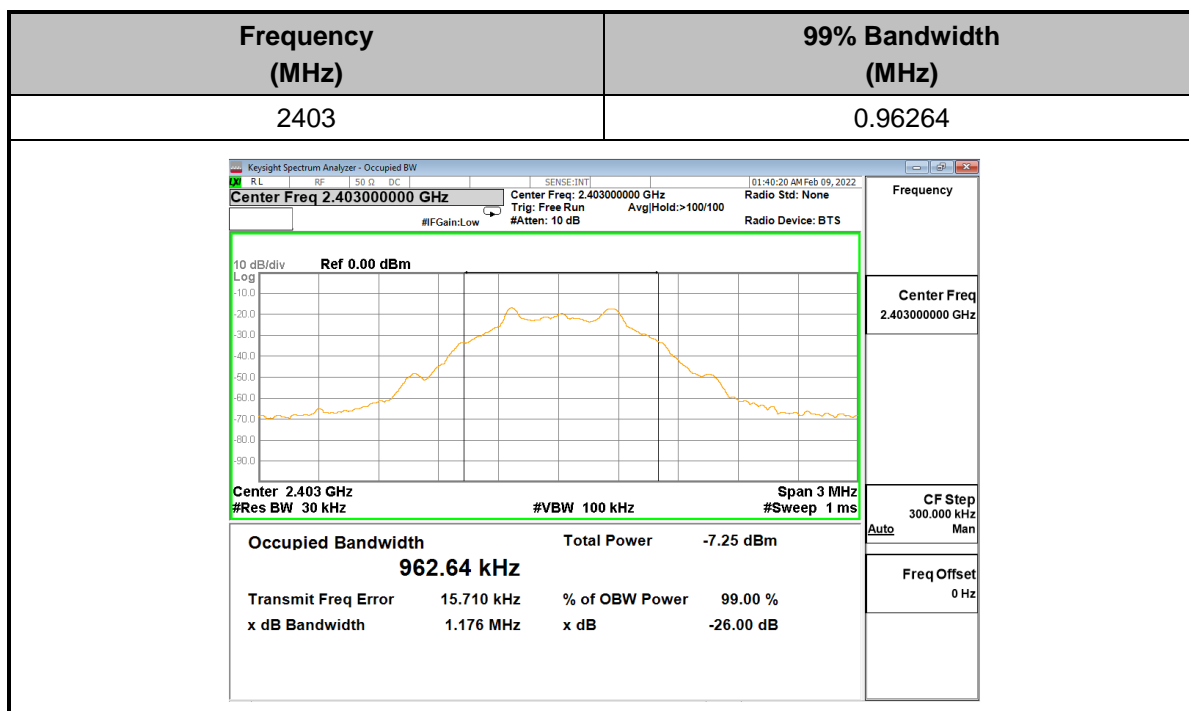
##### 3.1.4 Test Setup

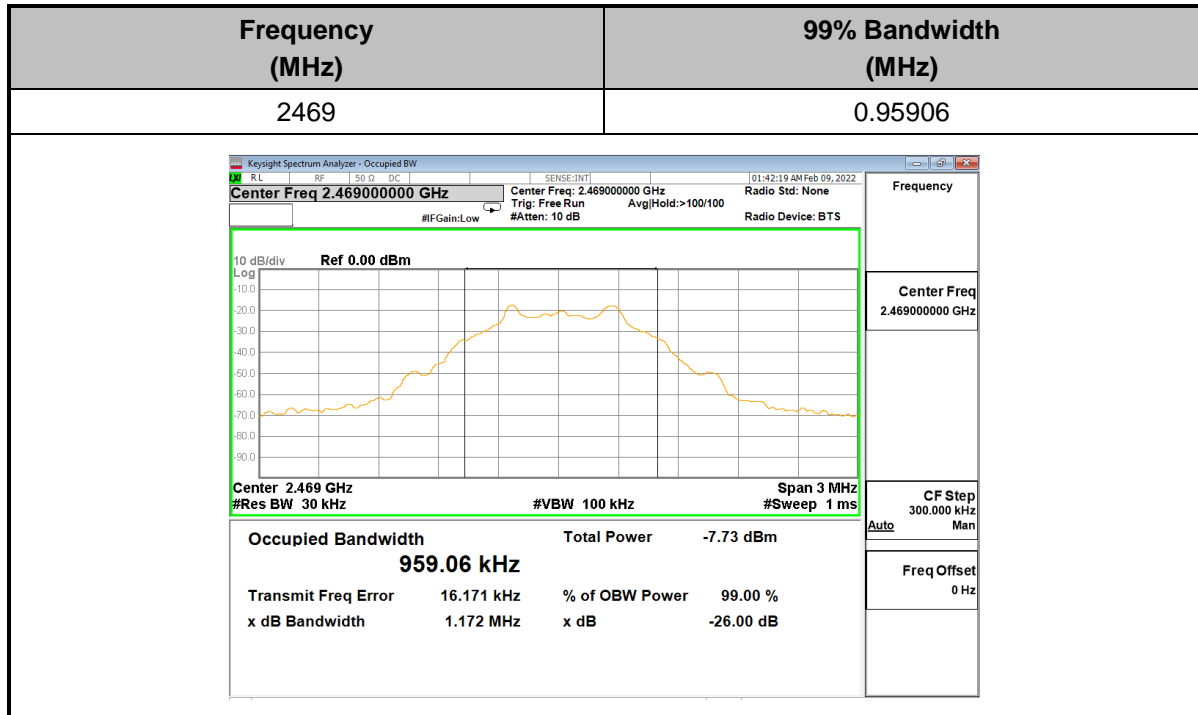






## 3.1.5 Test Result of 99% Occupied Bandwidth





## 3.2 Field Strength of Fundamental/Harmonics and Radiated Spurious Emission Measurement

### 3.2.1 Limit

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency (MHz) | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) | Measurement Distance (meters) |
|-----------------------------|--|--|-------------------------------|
| 902 – 928                   | 50   | 500  | 3                             |
| 2400 – 2483.5               | 50   | 500  | 3                             |
| 5725 – 5875                 | 50   | 500  | 3                             |
| 24000 – 24250               | 250  | 2500   | 3                             |

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

General radiated emission limits in § 15.209 is listed in the following table:

| 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                             |
| Above 960       | 500                               | 3                             |

### 3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

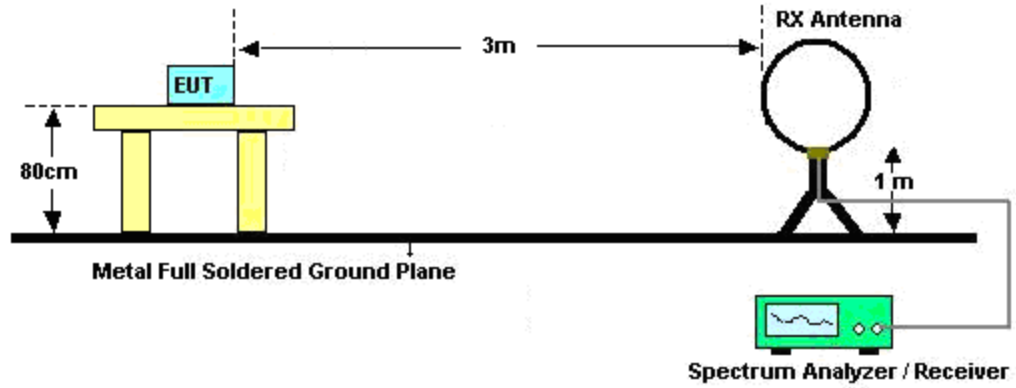
### 3.2.3 Test Procedures

1. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT is arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW = 100 kHz for  $f < 1$  GHz, RBW = 1 MHz for  $f > 1$  GHz ; VBW RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time / (signal cycle or 100 milliseconds, which is less)  
On time =  $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$   
Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level +  $20 * \log$  (Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-”.
8. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-”.

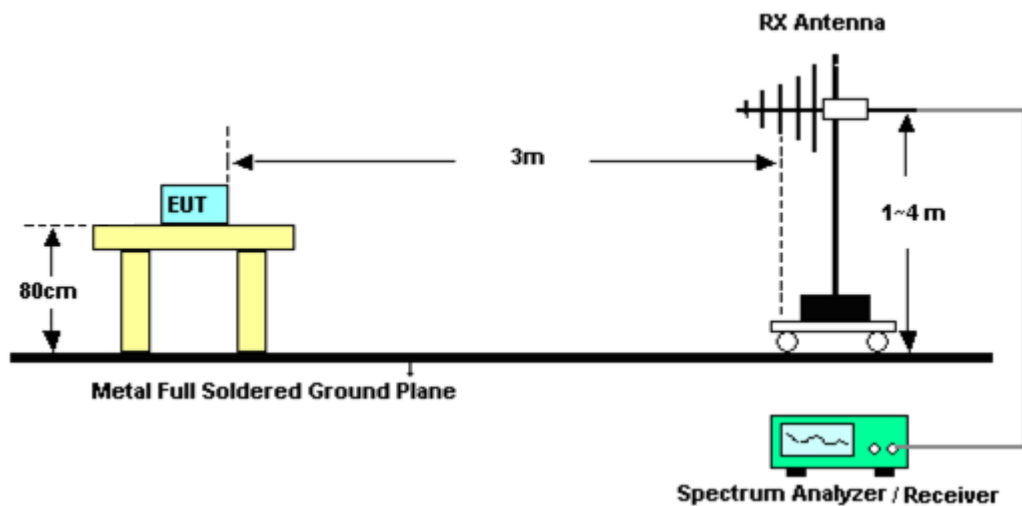
Note: The average levels are calculated from the peak level corrected with duty cycle correction factor (-52.40dB) derived from  $20 \log$  (dwell time/(signal cycle or 100 milliseconds, which is less)). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

### 3.2.4 Test Setup

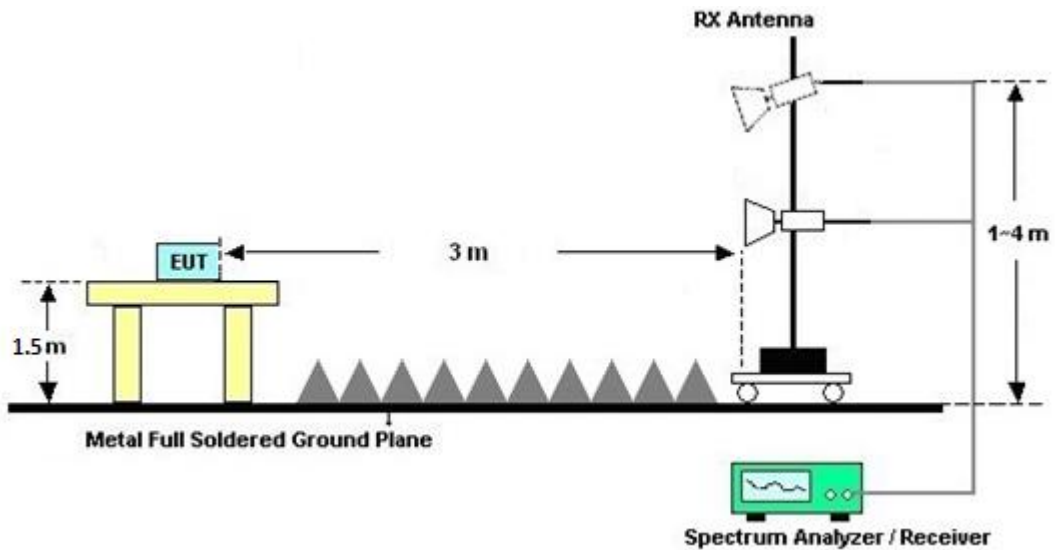
<For radiated emissions below 30MHz>



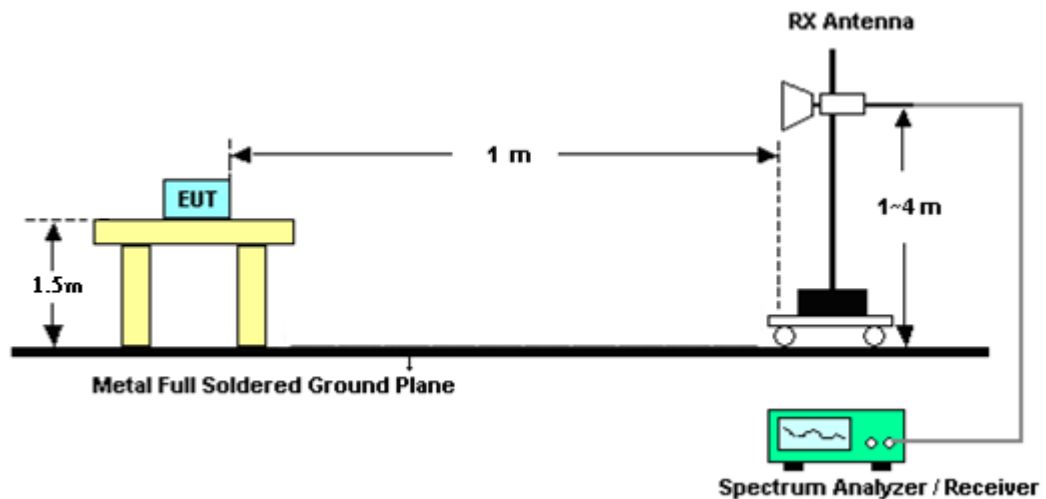
<For radiated emissions from 30MHz ~ 1GHz>



<For radiated emissions from 1 ~ 18GHz>



<For radiated emissions above 18GHz>



### 3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

### 3.2.6 Test Result of Field Strength of Fundamental and Radiated Spurious Emission

Please refer to Appendix A and B.

### **3.3 Antenna Requirements**

#### **3.3.1 Limit**

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

#### **3.3.2 Antenna Connector Construction**

Embedded in Antenna.



## 4 List of Measuring Equipment

| Instrument           | Brand Name      | Model No.                           | Serial No. | Characteristics | Calibration Date | Test Date                       | Due Date      | Remark                   |
|----------------------|-----------------|-------------------------------------|------------|-----------------|------------------|---------------------------------|---------------|--------------------------|
| Loop Antenna         | R&S             | HFH2-Z2E                            | 100840     | 9kHz~30MHz      | Jun. 21, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Jun. 20, 2022 | Radiation<br>(03CH02-CA) |
| Bilog Antenna        | TESEQ           | 6111D                               | 54683      | 30MHz~1GHz      | Oct. 15, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Oct. 14, 2022 | Radiation<br>(03CH02-CA) |
| Horn Antenna         | SCHWARZBE<br>CK | BBHA 9120D                          | 01895      | 1GHz~18GHz      | Aug. 25, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Aug. 24, 2022 | Radiation<br>(03CH02-CA) |
| Horn Antenna         | SCHWARZBE<br>CK | BBHA 9170D                          | 00842      | 18GHz~40GHz     | Jul. 20, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Jul. 19, 2022 | Radiation<br>(03CH02-CA) |
| Amplifier            | SONOMA          | 310N                                | 372240     | N/A             | Aug. 09, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Aug. 08, 2022 | Radiation<br>(03CH02-CA) |
| Preamplifier         | Keysight        | 83017A                              | MY53270323 | 1GHz~26.5GHz    | Jul. 27, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Jul. 26, 2022 | Radiation<br>(03CH02-CA) |
| Preamplifier         | E-instrument    | ERA-100M-18<br>G-56-01-A70          | EC1900251  | 1GHz~18GHz      | Mar. 30, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Mar. 29, 2022 | Radiation<br>(03CH02-CA) |
| Preamplifier         | EMEC            | EMC18G40G                           | 060725     | 18GHz~40GHz     | Jul. 21, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Jul. 20, 2022 | Radiation<br>(03CH02-CA) |
| Spectrum<br>Analyzer | Keysight        | N9010A                              | MY57420221 | 10Hz~44GHz      | Sep. 22, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Sep. 21, 2022 | Radiation<br>(03CH02-CA) |
| Filter               | Wainwright      | WHKX12-2700<br>-3000-18000-6<br>OST | SN10       | 3G Highpass     | Jul. 23, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Jul. 22, 2022 | Radiation<br>(03CH02-CA) |
| Filter               | Wainwright      | WLK12-1200-1<br>272-11000-40<br>SS  | SN1        | 1.2G Low Pass   | Jul. 23, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Jul. 22, 2022 | Radiation<br>(03CH02-CA) |
| Hygrometer           | TESEO           | 608-H1                              | 45142602   | N/A             | Aug. 04, 2021    | Dec. 27, 2021~<br>Feb. 09, 2022 | Aug. 03, 2022 | Radiation<br>(03CH02-CA) |
| Controller           | ChainTek        | EM-1000                             | 060876     | NA              | N/A              | Dec. 27, 2021~<br>Feb. 09, 2022 | N/A           | Radiation<br>(03CH02-CA) |
| Antenna Mast         | ChainTek        | MBS-520-1                           | N/A        | 1m~4m           | N/A              | Dec. 27, 2021~<br>Feb. 09, 2022 | N/A           | Radiation<br>(03CH02-CA) |
| Turn Table           | ChainTek        | T-200-S-1                           | N/A        | 0~360 Degree    | N/A              | Dec. 27, 2021~<br>Feb. 09, 2022 | N/A           | Radiation<br>(03CH02-CA) |
| Software             | Audix           | E3                                  | N/A        | N/A             | N/A              | Dec. 27, 2021~<br>Feb. 09, 2022 | N/A           | Radiation<br>(03CH02-CA) |



## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|  |        |
|--|--------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.7 dB |
|--|--------|

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

|  |        |
|--|--------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 6.2 dB |
|--|--------|

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

|  |        |
|--|--------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 6.4 dB |
|--|--------|



## Appendix A. Radiated Spurious Emission

|                 |                         |                     |         |
|-----------------|-------------------------|---------------------|---------|
| Test Engineer : | Fu Chen and Michael Bui | Temperature :       | 20~25°C |
|                 |                         | Relative Humidity : | 40~60%  |

## 2.4GHz 2400~2483.5MHz

## 15.249 (Band Edge @ 3m)

| 15.249  | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
|         |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
|         |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 2403MHz |      | 2400      | 56.66      | -17.32 | 73.98      | 42.82    | 27.66    | 17.45  | 31.27  | 100    | 60      | P       | H       |
|         |      | 2400      | 4.26       | -49.72 | 53.98      | -        | -        | -      | -      | -      | -       | A       | H       |
|         | *    | 2403      | 101.23     | -12.75 | 113.98     | 87.39    | 27.66    | 17.45  | 31.27  | 100    | 60      | P       | H       |
|         | *    | 2403      | 48.83      | -45.15 | 93.98      | -        | -        | -      | -      | -      | -       | A       | H       |
|         |      |           |            |        |            |          |          |        |        |        |         |         | H       |
|         |      |           |            |        |            |          |          |        |        |        |         |         | H       |
|         |      | 2320.68   | 55.01      | -18.97 | 73.98      | 41.11    | 27.92    | 17.3   | 31.32  | 395    | 127     | P       | V       |
|         |      | 2320.68   | 2.61       | -51.37 | 53.98      | -        | -        | -      | -      | -      | -       | A       | V       |
|         | *    | 2403      | 98.31      | -15.67 | 113.98     | 84.39    | 27.74    | 17.45  | 31.27  | 395    | 127     | P       | V       |
|         | *    | 2403      | 45.91      | -48.07 | 93.98      | -        | -        | -      | -      | -      | -       | A       | V       |
|         |      |           |            |        |            |          |          |        |        |        |         |         | V       |
|         |      |           |            |        |            |          |          |        |        |        |         |         | V       |
| 2439MHz |      | 2314.48   | 55.53      | -18.45 | 73.98      | 41.6     | 27.96    | 17.29  | 31.32  | 115    | 62      | P       | H       |
|         |      | 2314.48   | 3.13       | -50.85 | 53.98      | -        | -        | -      | -      | -      | -       | A       | H       |
|         | *    | 2439      | 102.31     | -11.67 | 113.98     | 88.41    | 27.66    | 17.5   | 31.26  | 115    | 62      | P       | H       |
|         | *    | 2439      | 49.91      | -44.07 | 93.98      | -        | -        | -      | -      | -      | -       | A       | H       |
|         |      | 2490.32   | 54.86      | -19.12 | 73.98      | 40.89    | 27.62    | 17.58  | 31.23  | 115    | 62      | P       | H       |
|         |      | 2490.32   | 2.46       | -51.52 | 53.98      | -        | -        | -      | -      | -      | -       | A       | H       |
|         |      | 2387.92   | 56.27      | -17.71 | 73.98      | 42.33    | 27.79    | 17.43  | 31.28  | 378    | 129     | P       | V       |
|         |      | 2387.92   | 3.87       | -50.11 | 53.98      | -        | -        | -      | -      | -      | -       | A       | V       |
|         | *    | 2439      | 99.43      | -14.55 | 113.98     | 85.59    | 27.6     | 17.5   | 31.26  | 378    | 129     | P       | V       |
|         | *    | 2439      | 47.03      | -46.95 | 93.98      | -        | -        | -      | -      | -      | -       | A       | V       |
|         |      | 2491.6    | 54.97      | -19.01 | 73.98      | 41.12    | 27.5     | 17.58  | 31.23  | 378    | 129     | P       | V       |
|         |      | 2491.6    | 2.57       | -51.41 | 53.98      | -        | -        | -      | -      | -      | -       | A       | V       |



|                |   |         |        |        |        |       |       |       |       |     |     |   |   |
|----------------|---|---------|--------|--------|--------|-------|-------|-------|-------|-----|-----|---|---|
| <b>2469MHz</b> | *   | 2469    | 102.03 | -11.95 | 113.98 | 88.09 | 27.64 | 17.55 | 31.25 | 132 | 57  | P | H |
|                | *   | 2469    | 49.63  | -44.35 | 93.98  | -     | -     | -     | -     | -   | -   | A | H |
|                |   | 2499.68 | 54.61  | -19.37 | 73.98  | 40.64 | 27.61 | 17.59 | 31.23 | 132 | 57  | P | H |
|                |   | 2499.68 | 2.21   | -51.77 | 53.98  | -     | -     | -     | -     | -   | -   | A | H |
|                |   |         |        |        |        |       |       |       |       |     |     |   | H |
|                |   |         |        |        |        |       |       |       |       |     |     |   | H |
|                | *   | 2469    | 98.3   | -15.68 | 113.98 | 84.47 | 27.53 | 17.55 | 31.25 | 374 | 127 | P | V |
|                | *   | 2469    | 45.9   | -48.08 | 93.98  | -     | -     | -     | -     | -   | -   | A | V |
|                |   | 2494.92 | 54.68  | -19.3  | 73.98  | 40.84 | 27.49 | 17.58 | 31.23 | 374 | 127 | P | V |
|                |   | 2494.92 | 2.28   | -51.7  | 53.98  | -     | -     | -     | -     | -   | -   | A | V |
|                |   |         |        |        |        |       |       |       |       |     |     |   | V |
|                |   |         |        |        |        |       |       |       |       |     |     |   | V |
| <b>Remark</b>  | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |         |        |        |        |       |       |       |       |     |     |   |   |



## 15.249 (Harmonic @ 3m)

| 15.249  | Note | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|---------|------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| 2403MHz |      | 7209                 | 54.17               | -19.81                  | 73.98                       | 70.01                     | 36.17                         | 13.66                  | 65.67                      | -                    | -                       | P                       | H               |
|         |      | 7209                 | 1.77                | -52.21                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 12015                | 60.16               | -13.82                  | 73.98                       | 71                        | 39.19                         | 17.69                  | 67.72                      | -                    | -                       | P                       | H               |
|         |      | 12015                | 7.76                | -46.22                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 14418                | 53.32               | -20.66                  | 73.98                       | 59.65                     | 41.86                         | 19.54                  | 67.73                      | -                    | -                       | P                       | H               |
|         |      | 14418                | 0.92                | -53.06                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 16821                | 63.08               | -10.9                   | 73.98                       | 69.86                     | 40.4                          | 21.2                   | 68.38                      | 103                  | 66                      | P                       | H               |
|         |      | 16821                | 10.68               | -43.3                   | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 18000                | 59.61               | -14.37                  | 73.98                       | 57.77                     | 48.82                         | 22.44                  | 69.42                      | -                    | -                       | P                       | H               |
|         |      | 18000                | 50.06               | -3.92                   | 53.98                       | 48.22                     | 48.82                         | 22.44                  | 69.42                      | -                    | -                       | A                       | H               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|         |      | 7209                 | 56.8                | -17.18                  | 73.98                       | 72.64                     | 36.17                         | 13.66                  | 65.67                      | -                    | -                       | P                       | V               |
|         |      | 7209                 | 4.4                 | -49.58                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 12015                | 62.09               | -11.89                  | 73.98                       | 72.96                     | 39.16                         | 17.69                  | 67.72                      | -                    | -                       | P                       | V               |
|         |      | 12015                | 9.69                | -44.29                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 14418                | 56.59               | -17.39                  | 73.98                       | 62.95                     | 41.83                         | 19.54                  | 67.73                      | -                    | -                       | P                       | V               |
|         |      | 14418                | 4.19                | -49.79                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 16821                | 66.08               | -7.9                    | 73.98                       | 72.72                     | 40.54                         | 21.2                   | 68.38                      | 101                  | 81                      | P                       | V               |
|         |      | 16821                | 13.68               | -40.3                   | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 18000                | 60.68               | -13.3                   | 73.98                       | 58.62                     | 49.04                         | 22.44                  | 69.42                      | -                    | -                       | P                       | V               |
|         |      | 18000                | 50.18               | -3.8                    | 53.98                       | 48.12                     | 49.04                         | 22.44                  | 69.42                      | -                    | -                       | A                       | V               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |



| 15.249  | Note | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|---------|------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| 2439MHz |      | 7317                 | 54.84               | -19.14                  | 73.98                       | 71.51                     | 36.33                         | 13.79                  | 66.79                      | -                    | -                       | P                       | H               |
|         |      | 7317                 | 2.44                | -51.54                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 12195                | 62.7                | -11.28                  | 73.98                       | 72.63                     | 39.26                         | 17.82                  | 67.01                      | 100                  | 317                     | P                       | H               |
|         |      | 12195                | 10.3                | -43.68                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 14634                | 54.35               | -19.63                  | 73.98                       | 59.98                     | 42.12                         | 19.68                  | 67.43                      | -                    | -                       | P                       | H               |
|         |      | 14634                | 1.95                | -52.03                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 17073                | 60.82               | -13.16                  | 73.98                       | 67.8                      | 40.4                          | 21.4                   | 68.78                      | -                    | -                       | P                       | H               |
|         |      | 17073                | 8.42                | -45.56                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|         |      | 17970                | 60.4                | -13.58                  | 73.98                       | 59.71                     | 48.04                         | 22.41                  | 69.76                      | -                    | -                       | P                       | H               |
|         |      | 17970                | 49                  | -4.98                   | 53.98                       | 48.31                     | 48.04                         | 22.41                  | 69.76                      | -                    | -                       | A                       | H               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|         |      | 7317                 | 55.96               | -18.02                  | 73.98                       | 72.57                     | 36.39                         | 13.79                  | 66.79                      | -                    | -                       | P                       | V               |
|         |      | 7317                 | 3.56                | -50.42                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 12195                | 64.85               | -9.13                   | 73.98                       | 74.77                     | 39.27                         | 17.82                  | 67.01                      | 103                  | 239                     | P                       | V               |
|         |      | 12195                | 12.45               | -41.53                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 14634                | 58.69               | -15.29                  | 73.98                       | 64.34                     | 42.1                          | 19.68                  | 67.43                      | -                    | -                       | P                       | V               |
|         |      | 14634                | 6.29                | -47.69                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 17073                | 62.94               | -11.04                  | 73.98                       | 69.8                      | 40.52                         | 21.4                   | 68.78                      | -                    | -                       | P                       | V               |
|         |      | 17073                | 10.54               | -43.44                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|         |      | 17985                | 59.31               | -14.67                  | 73.98                       | 57.78                     | 48.7                          | 22.42                  | 69.59                      | -                    | -                       | P                       | V               |
|         |      | 17985                | 49.84               | -4.14                   | 53.98                       | 48.31                     | 48.7                          | 22.42                  | 69.59                      | -                    | -                       | A                       | V               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |
|         |      |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |



| 15.249        | Note | Frequency<br>( MHz )  | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|---------------|------|---|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| 2469MHz       |      | 7407  | 53.53               | -20.45                  | 73.98                       | 70.62                     | 36.44                         | 13.86                  | 67.39                      | -                    | -                       | P                       | H               |
|               |      | 7407  | 1.13                | -52.85                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|               |      | 12345   | 62.19               | -11.79                  | 73.98                       | 72.86                     | 38.79                         | 17.93                  | 67.39                      | 100                  | 317                     | P                       | H               |
|               |      | 12345   | 9.79                | -44.19                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|               |      | 14814   | 55.46               | -18.52                  | 73.98                       | 60.89                     | 41.93                         | 19.8                   | 67.16                      | -                    | -                       | P                       | H               |
|               |      | 14814   | 3.06                | -50.92                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|               |      | 17283   | 62.22               | -11.76                  | 73.98                       | 68.31                     | 41.04                         | 21.63                  | 68.76                      | -                    | -                       | P                       | H               |
|               |      | 17283   | 9.82                | -44.16                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | H               |
|               |      | 17970   | 59.43               | -14.55                  | 73.98                       | 58.74                     | 48.04                         | 22.41                  | 69.76                      | -                    | -                       | P                       | H               |
|               |      | 17970   | 48.9                | -5.08                   | 53.98                       | 48.21                     | 48.04                         | 22.41                  | 69.76                      | -                    | -                       | A                       | H               |
|               |      |   |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|               |      |   |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|               |      | 7407  | 55.33               | -18.65                  | 73.98                       | 72.38                     | 36.48                         | 13.86                  | 67.39                      | -                    | -                       | P                       | V               |
|               |      | 7407  | 2.93                | -51.05                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|               |      | 12345   | 64.89               | -9.09                   | 73.98                       | 75.56                     | 38.79                         | 17.93                  | 67.39                      | 101                  | 242                     | P                       | V               |
|               |      | 12345   | 12.49               | -41.49                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|               |      | 14814   | 59.27               | -14.71                  | 73.98                       | 64.66                     | 41.97                         | 19.8                   | 67.16                      | -                    | -                       | P                       | V               |
|               |      | 14814   | 6.87                | -47.11                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|               |      | 17283   | 63.33               | -10.65                  | 73.98                       | 69.23                     | 41.23                         | 21.63                  | 68.76                      | -                    | -                       | P                       | V               |
|               |      | 17283   | 10.93               | -43.05                  | 53.98                       | -                         | -                             | -                      | -                          | -                    | -                       | A                       | V               |
|               |      | 18000   | 59.45               | -14.53                  | 73.98                       | 57.39                     | 49.04                         | 22.44                  | 69.42                      | -                    | -                       | P                       | V               |
|               |      | 18000   | 50.17               | -3.81                   | 53.98                       | 48.11                     | 49.04                         | 22.44                  | 69.42                      | -                    | -                       | A                       | V               |
|               |      |   |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |
|               |      |   |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |
| <b>Remark</b> |      | 1. No other spurious found.   |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |
|               |      | 2. All results are PASS against Peak and Average limit line.  |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |
|               |      | 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |
|               |      | 4. The emission level close to 18GHz is checked that the average emission level is noise floor only.                                    |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |

## Emission above 18GHz

**15.249 (SHF)**

| 15.249 | Note  | Frequency | Level      | Over   | Limit      | Read   | Antenna  | Path   | Preamp | Ant    | Table   | Peak  | Pol.  |   |
|--------|---|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|---|
| Ant.   |   |           |            | Limit  | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |   |
| 1      |   | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |   |
| SHF    |   | 21627     | 49.98      | -24    | 73.98      | 49.42  | 38.25    | 14.52  | 52.21  | 150    | 336     | P     | H     |   |
|        |   | 21627     | -2.42      | -56.4  | 53.98      | -      | -        | -      | -      | -      | -       | A     | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | H     |   |
|        |   | 21627     | 56.64      | -17.34 | 73.98      | 56.2   | 38.13    | 14.52  | 52.21  | 150    | 173     | P     | V     |   |
|        |   | 21627     | 4.24       | -49.74 | 53.98      | -      | -        | -      | -      | -      | -       | -     | A     | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       |       | V |
|        |   |           |            |        |            |        |          |        |        |        |         |       | V     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | V     |   |
|        |   |           |            |        |            |        |          |        |        |        |         |       | V     |   |
| Remark | 1. No other spurious found.   |           |            |        |            |        |          |        |        |        |         |       |       |   |
|        | 2. All results are PASS against limit line.   |           |            |        |            |        |          |        |        |        |         |       |       |   |
|        | 3. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only. |           |            |        |            |        |          |        |        |        |         |       |       |   |

## Emission below 1GHz

**15.249 (LF)**

[illegible]





**Note symbol**

|     |  |
|-----|--|
| *   | <b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| !   | Test result is <b>over limit</b> line.   |
| P/A | <b>Peak</b> or <b>Average</b>  |
| H/V | <b>Horizontal</b> or <b>Vertical</b>   |

**A calculation example for radiated spurious emission is shown as below:**

| WIFI                            | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------------------------------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
|                                 |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
|                                 |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| Proprietary<br>CH 00<br>2403MHz |      | 4806      | 47.97      | -26.01 | 73.98      | 73.18    | 31.5     | 11.21  | 67.92  | -      | -       | P       | H       |
|                                 |      | 4806      | -4.43      | -58.41 | 53.98      | -        | -        | -      | -      | -      | -       | A       | H       |

**For Peak Limit @ 4806MHz:**

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 31.5(dB/m) + 11.21(dB) + 73.18(dBμV) – 67.92 (dB)

= 47.97 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 47.97(dBμV/m) – 73.98(dBμV/m)

= -26.01(dB)

**For Average Limit @ 4806MHz:**

1. Level(dBμV/m)

= Peak Level(dBμV/m) + 20 \* log(Duty)

= 47.97(dBμV/m) – 52.4

= -4.43(dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= -4.43(dBμV/m) – 53.98(dBμV/m)

= -58.41(dB)

**Both peak and average measured complies with the limit line, so test result is “PASS”.**



## Appendix B. Radiated Spurious Emission Plots

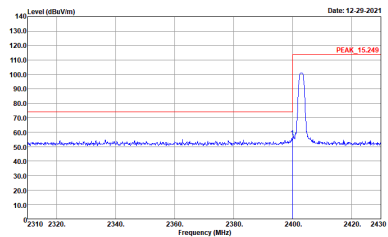
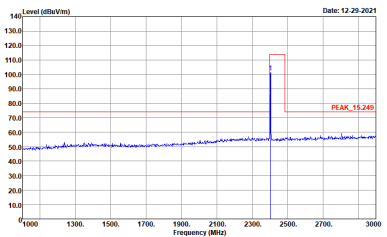
|                 |                         |                     |         |
|-----------------|-------------------------|---------------------|---------|
| Test Engineer : | Fu Chen and Michael Bui | Temperature :       | 20~25°C |
|                 |                         | Relative Humidity : | 40~60%  |

### Note symbol

|    |                       |
|----|-----------------------|
| -L | Low channel location  |
| -R | High channel location |

2.4GHz 2400~2483.5MHz

15.249 (Band Edge @ 3m)

| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m   |   |
|--------|--|---|
|        | 2403MHz  |   |
|        | Horizontal   | Fundamental   |
| Peak   |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p> |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p> |
|        |  |   |

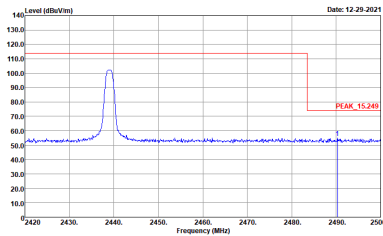


|        |   |   |
|--------|---|---|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |   |
|        | 2403MHz   |   |
|        | Vertical  | Fundamental   |
| Peak   | <div><p>Level (dBuV/m)</p><p>Date: 12-29-2021</p><p>PEAK 115.249</p><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p></div> | <div><p>Level (dBuV/m)</p><p>Date: 12-29-2021</p><p>PEAK 115.249</p><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p></div> |

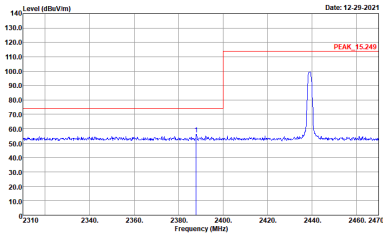
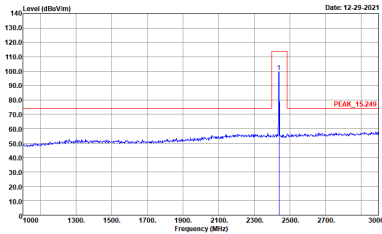


|        |   |   |
|--------|---|---|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |   |
|        | 2439MHz - L   |   |
|        | Horizontal  | Fundamental   |
| Peak   | <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p> | <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p> |

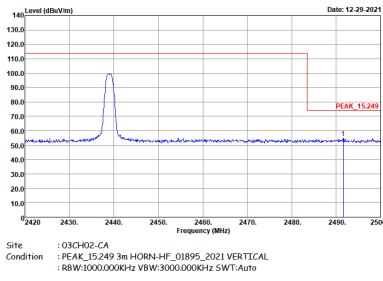


|        |   |              |
|--------|---|--------------|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |              |
|        | 2439MHz - R   |              |
|        | Horizontal  |              |
| Peak   | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HE_01895_2021 HORIZONTAL<br/>: 88W:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> | (Left blank) |



|        |   |  |
|--------|---|--|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |  |
|        | 2439MHz - L   |  |
|        | Vertical  | Fundamental  |
| Peak   | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> |



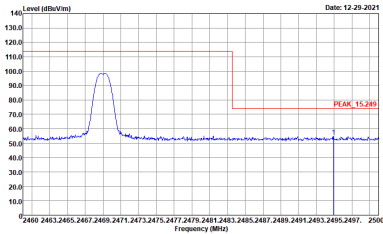
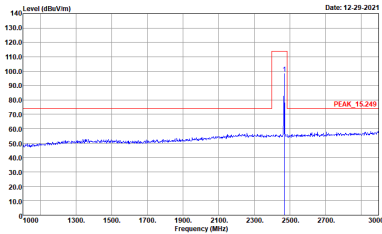
|        |  |              |
|--------|--|--------------|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m   |              |
|        | 2439MHz - R  |              |
|        | Vertical   |              |
| Peak   | <div></div> | (Left blank) |





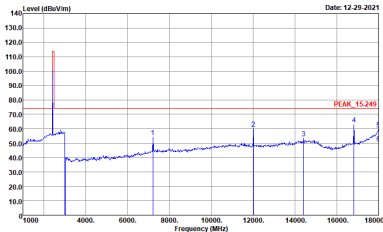
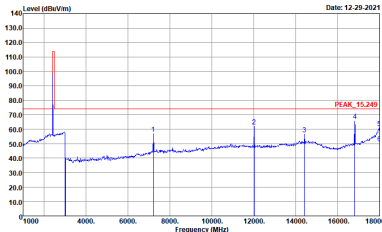
|        |   |   |
|--------|---|---|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |   |
|        | 2469MHz   |   |
|        | Horizontal  | Fundamental   |
| Peak   | <div><p>Level (dBuV/m)</p><p>Date: 12-29-2021</p><p>PEAK 115.249</p><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> | <div><p>Level (dBuV/m)</p><p>Date: 12-29-2021</p><p>PEAK 115.249</p><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> |



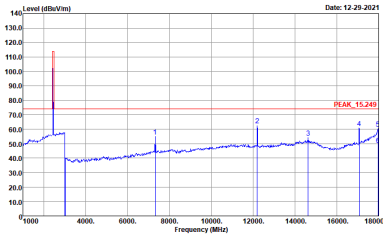
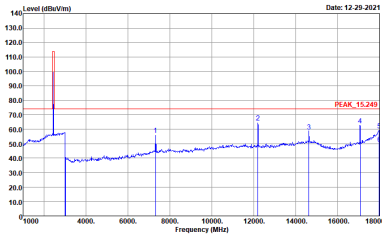
|        |   |  |
|--------|---|--|
| 15.249 | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |  |
|        | 2469MHz   |  |
|        | Vertical  | Fundamental  |
| Peak   | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> |



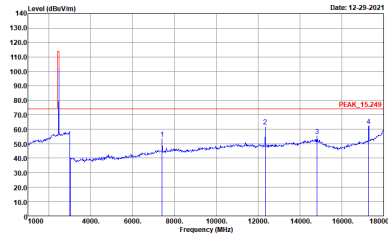
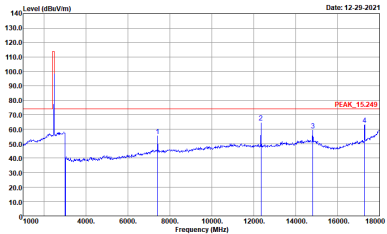
15.249 (Harmonic @ 3m)

| 15.249       | 2.4GHz 2400~2483.5MHz Harmonic @ 3m  |   |
|--------------|--|---|
|              | 2403MHz  |   |
|              | Horizontal   | Vertical  |
| Peak<br>Avg. |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>Detector : Peak</p> |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>Detector : Peak</p> |

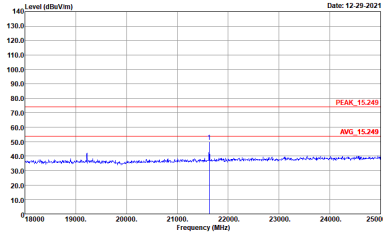
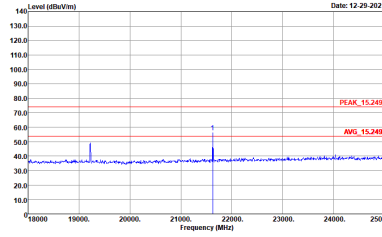


|              |   |  |
|--------------|---|--|
| 15.249       | 2.4GHz 2400~2483.5MHz Harmonic @ 3m   |  |
|              | 2439MHz   |  |
|              | Horizontal  | Vertical   |
| Peak<br>Avg. |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p> |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p> |

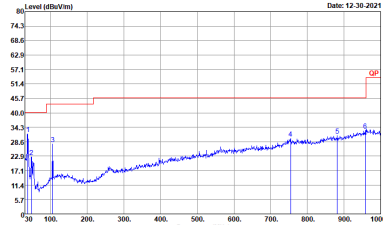
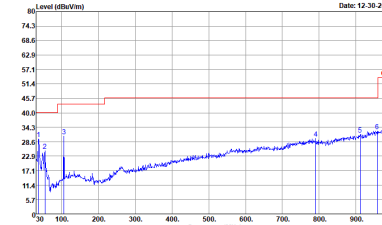


|              |   |  |
|--------------|---|--|
| 15.249       | 2.4GHz 2400~2483.5MHz Harmonic @ 3m   |  |
|              | 2469MHz   |  |
|              | Horizontal  | Vertical   |
| Peak<br>Avg. | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 HORIZONTAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> | <div><p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 3m HORN-HF_01895_2021 VERTICAL<br/>: RBW:3000.000KHz VBW:3000.000KHz SWT:Auto</p></div> |

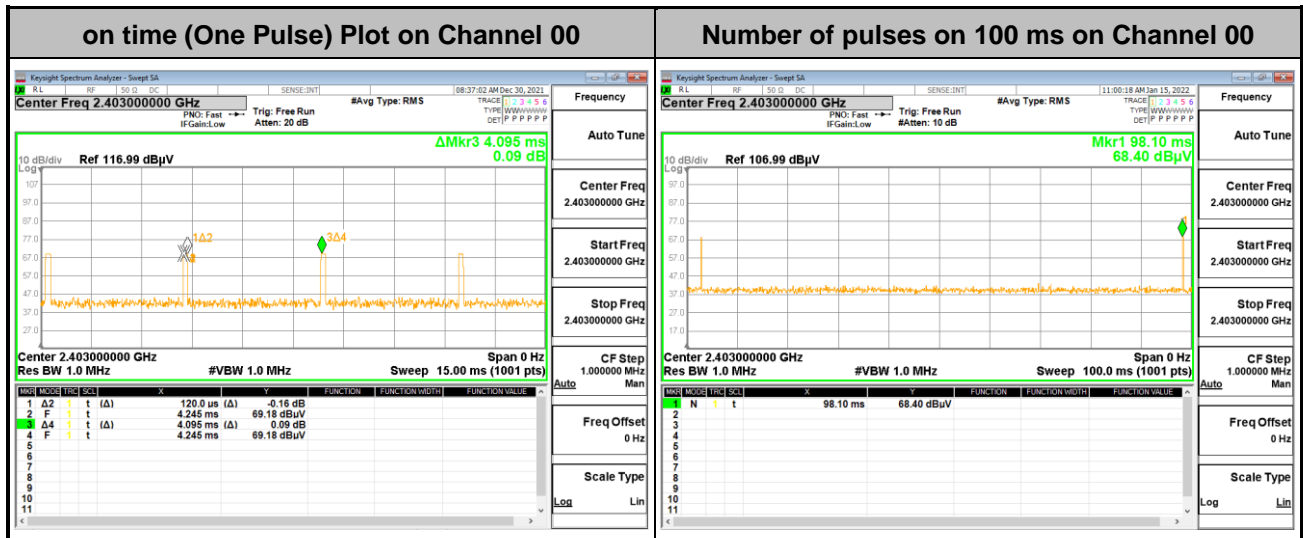
**Emission above 18GHz**
**15.249 (SHF @ 1m)**

| 15.249                         | 2.4GHz 2400~2483.5MHz   |  |
|--------------------------------|---|--|
|                                | SHF   |  |
|                                | Horizontal  | Vertical   |
| <b>Peak</b><br><br><b>Avg.</b> |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 1m SHF_HORN_00842_2021 HORIZONTAL<br/>Detector : Peak</p> |  <p>Site : 03CH02-CA<br/>Condition : PEAK_15.249 1m SHF_HORN_00842_2021 VERTICAL<br/>Detector : Peak</p> |

**Emission below 1GHz**
**15.249 (LF)**

| 15.249       | 2.4GHz 2400~2483.5MHz   |  |
|--------------|---|--|
|              | LF  |  |
|              | Horizontal  | Vertical   |
| QP /<br>Peak |  <p>Site : 03CH02-CA<br/>Condition : QP 3m 81L06_50391_2021 HORIZONTAL<br/>Detector : Peak</p> |  <p>Site : 03CH02-CA<br/>Condition : QP 3m 81L06_50391_2021 VERTICAL<br/>Detector : Peak</p> |
|              |   |  |

## Appendix C. Duty Cycle Plots



### Note:

- On time of one pulse = 0.12 millisecond
- Number of pulses found in any 100 millisecond in worst case = 2
- Worst case Duty cycle = on time/100 milliseconds =  $2 * 0.12 / 100 = 0.24 \%$
- Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -52.40 \text{ dB}$

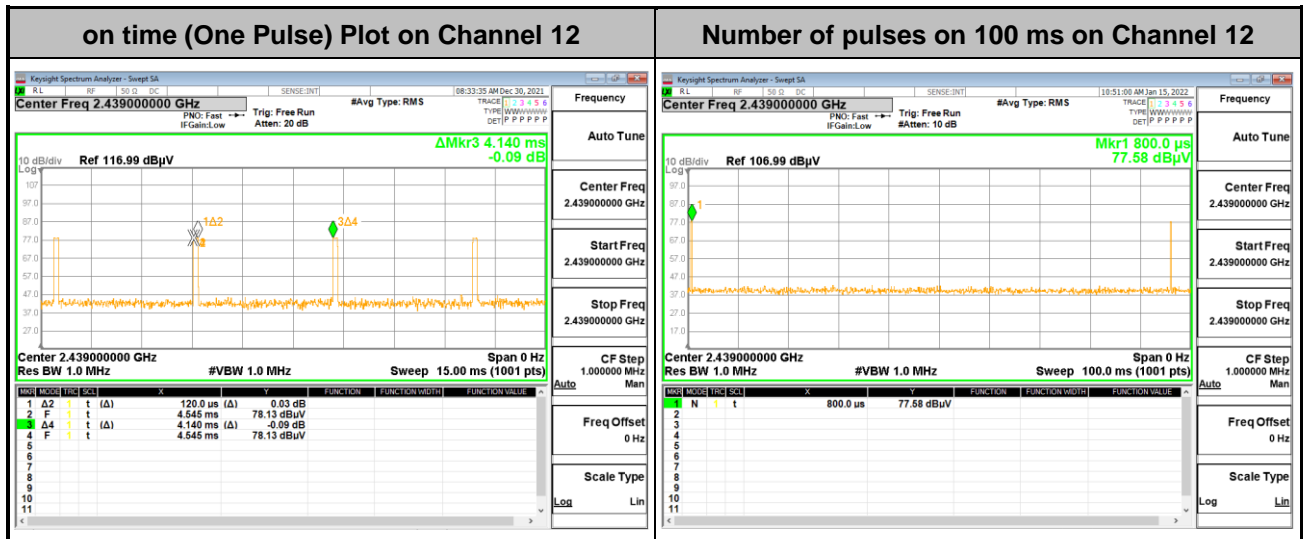
### Duty Cycle Correction Factor Consideration

The device is operating in hopping mode in its normal use condition.

In worst case, the device will have two pulses on certain channel in any 100 milliseconds.

In order to measure on time of one pulse, control tool "Simplicity studio SV4.1.14.0" was used to make the device get into the engineering modes to provide shorter signal cycle on certain channel.





### Note:

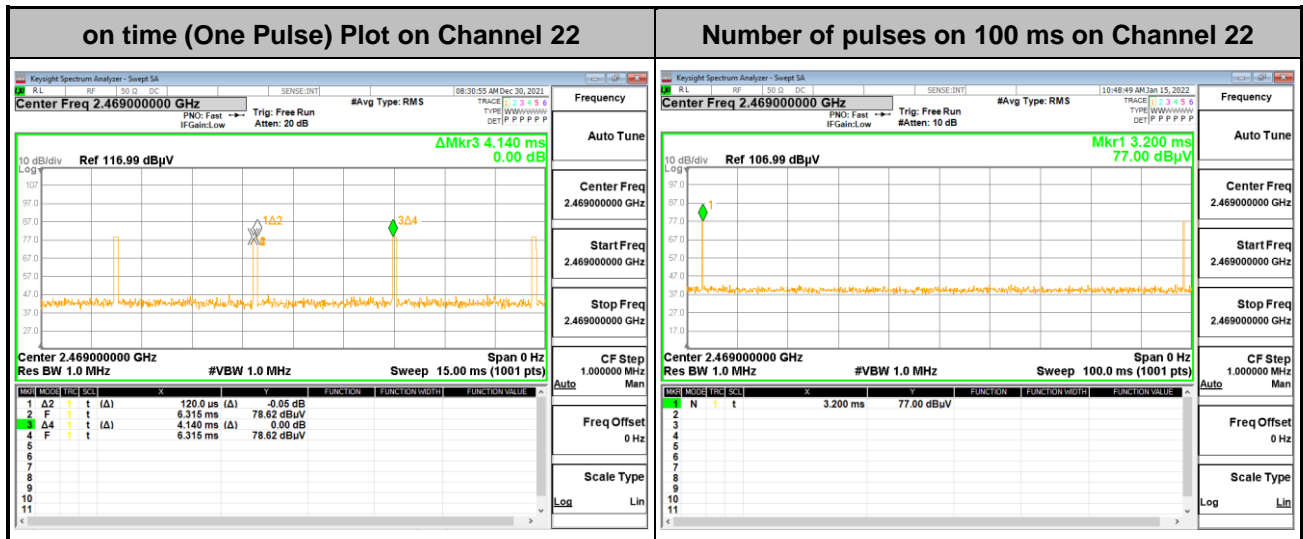
- On time of one pulse = 0.12 millisecond
- Number of pulses found in any 100 milliseconds in worst case = 2
- Worst case Duty cycle = on time/100 milliseconds =  $2 * 0.12 / 100 = 0.24 \%$
- Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -52.40 \text{ dB}$

### Duty Cycle Correction Factor Consideration

The device is operating in hopping mode in its normal use condition.

In worst case, the device will have two pulses on certain channel in any 100 milliseconds.

In order to measure on time of one pulse, control tool "Simplicity studio SV4.1.14.0" was used to make the device get into the engineering modes to provide shorter signal cycle on certain channel.


**Note:**

- On time of one pulse = 0.12 millisecond
- Number of pulses found in any 100 milliseconds in worst case = 2
- Worst case Duty cycle = on time/100 milliseconds =  $2 * 0.12 / 100 = 0.24 \%$
- Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -52.40 \text{ dB}$

**Duty Cycle Correction Factor Consideration**

The device is operating in hopping mode in its normal use condition.

In worst case, the device will have two pulses on certain channel in any 100 milliseconds.

In order to measure on time of one pulse, control tool "Simplicity studio SV4.1.14.0" was used to make the device get into the engineering modes to provide shorter signal cycle on certain channel.