



# FCC Part 15C Test Report

## FCC ID:2ATM78009

Applicant: YoSmart Inc.  
Address: 25172 Arctic Ocean Drive, Suite 106, Lake Forest, California, United States 92630  
Manufacturer: YoSmart Inc.  
Address: 25172 Arctic Ocean Drive, Suite 106, Lake Forest, California, United States 92630  
EUT: Solar Soil Detector  
Trade Mark: N/A  
Model Number: YS8009-UC, YS8009-UA  
Date of Receipt: Sep. 29, 2025  
Test Date: Sep. 29, 2025 to Nov. 03, 2025  
Date of Report: Nov. 03, 2025  
Prepared By: Shenzhen DL Testing Technology Co., Ltd.  
Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road Baolong Industrial Zone, Baolong Street, Longgang Shenzhen, Guangdong, China.  
Applicable Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249  
ANSI C63.10:2020  
Test Result: Pass  
Report Number: DLE-251009024R

Prepared (Test Engineer):

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Reviewer (Supervisor):

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Approved (Manager):

Jade Yang



*This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.*

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## 1. VERSION

| Report No.     | Version | Description             | Approved      |
|----------------|---------|-------------------------|---------------|
| DLE-251009024R | Rev.01  | Initial issue of report | Nov. 03, 2025 |
|                |         |                         |               |



## 2. TEST SUMMARY

Test procedures according to the technical standards:

| FCC Part15 (15.249) , Subpart C |                                   |        |        |
|---------------------------------|-----------------------------------|--------|--------|
| Standard Section                | Test Item                         | Result | Remark |
| 15.203                          | Antenna Requirement               | PASS   |        |
| 15.207                          | AC Power Line Conducted Emission  | N/A    |        |
| 15.215 (c)                      | 20dB Occupied Bandwidth           | PASS   |        |
| 15.209/15.249                   | Radiated Emission and Fundamental | PASS   |        |
| 15.205/15.209                   | Restricted Band                   | PASS   |        |

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report



## 2.1 TEST FACILITY

Shenzhen DL Testing Technology Co., Ltd.

Add. : 101-201, Building C, Shuanghuan, No.8, Baoqing Roa Baolong Industrial Zone, Baolong Street, Longgang Shenzhen, Guangdong, China.

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: 27485

CAB ID.: CN0118

## 2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| No. | Item                                              | Uncertainty              |
|-----|---------------------------------------------------|--------------------------|
| 1   | 3m camber Radiated spurious emission(9KHz-30MHz)  | $U=4.5\text{dB}$         |
| 2   | 3m camber Radiated spurious emission(30MHz-1GHz)  | $U=4.8\text{dB}$         |
| 3   | 3m chamber Radiated spurious emission(1GHz-6GHz)  | $U=4.9\text{dB}$         |
| 4   | 3m chamber Radiated spurious emission(6GHz-40GHz) | $U=5.0\text{dB}$         |
| 5   | Conducted disturbance                             | $U=3.2\text{dB}$         |
| 6   | RF Band Edge                                      | $U=1.68\text{dB}$        |
| 7   | RF Occupied Bandwidth                             | $U=1.8\text{MHz}$        |
| 8   | humidity uncertainty                              | $U=5.3\%$                |
| 9   | Temperature uncertainty                           | $U=0.59^{\circ}\text{C}$ |



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                      |                                                                                                             |
|----------------------|-------------------------------------------------------------------------------------------------------------|
| Product Name:        | Solar Soil Detector                                                                                         |
| Model No.:           | YS8009-UC                                                                                                   |
| Serial model No.:    | YS8009-UA                                                                                                   |
| Model Different.:    | Only the model name is different.                                                                           |
| Sample(s) Status:    | Engineer sample                                                                                             |
| Channel numbers:     | 1 CH                                                                                                        |
| Operation Frequency: | 910.3MHz                                                                                                    |
| Type of Modulation:  | LoRa                                                                                                        |
| Antenna Type:        | Spring Antenna                                                                                              |
| Antenna gain:        | 0dBi                                                                                                        |
| Ratings:             | Input: 3.6V  (3*AA 1.2V) |
| AC/DC Adapter:       | N/A                                                                                                         |
| AC/DC Adapter Mode:  | N/A                                                                                                         |

#### Channel List

| CH | Frequency (MHz) |
|----|-----------------|
| 1  | 910.3           |

#### Note:

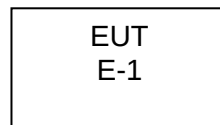
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Test channel | Frequency |
|--------------|-----------|
| 1            | 910.3MHz  |

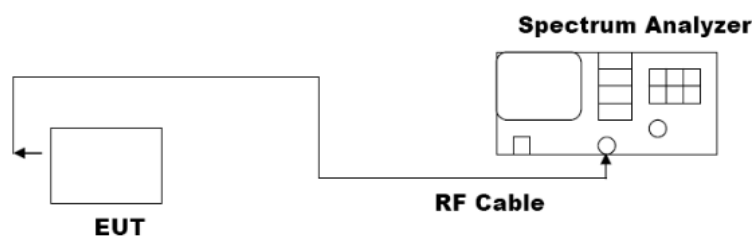


### 3.2 Test Setup Configuration

Operation of EUT during Conducted and Radiation testing:



Operation of EUT during RF Conducted testing:



### 3.3 Support Equipment

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment           | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|---------------------|-----------|----------------|------------|------|
| E-1  | Solar Soil Detector | N/A       | YS8009-UC      | N/A        | EUT  |
|      |                     |           |                |            |      |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
|      |               |              |        |      |
|      |               |              |        |      |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



### 3.4 Test Mode

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Test Mode | Test mode    |
|-----------|--------------|
| 1         | Transmitting |

|                                                                                                                                                                                                                                       |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                     | Keep the EUT in continuously transmitting mode. |
| Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. |                                                 |



## 3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

## Radiation test, Band-edge test and 6db bandwidth test equipment

| Item | Equipment                        | Manufacturer    | Type No.  | Serial No. | Last calibration | Calibrated until |
|------|----------------------------------|-----------------|-----------|------------|------------------|------------------|
| 1    | Spectrum Analyzer (9kHz-26.5GHz) | Agilent         | E4408B    | MY50140780 | Nov. 01, 2024    | Oct. 31, 2025    |
| 2    | Test Receiver (9kHz-7GHz)        | R&S             | ESRP7     | 101393     | Nov. 01, 2024    | Oct. 31, 2025    |
| 3    | Bilog Antenna (30MHz-1GHz)       | R&S             | VULB9162  | 00306      | Nov. 01, 2024    | Oct. 31, 2025    |
| 4    | Horn Antenna (1GHz-18GHz)        | Schwarzbeck     | BBHA9120D | 02139      | Nov. 01, 2024    | Oct. 31, 2025    |
| 5    | Horn Antenna (18GHz-40GHz)       | A.H. Systems    | SAS-574   | 588        | Nov. 01, 2024    | Oct. 31, 2025    |
| 6    | Amplifier (9KHz-6GHz)            | Schwarzbeck     | BBV9743B  | 00153      | Nov. 01, 2024    | Oct. 31, 2025    |
| 7    | Amplifier (1GHz-18GHz)           | EMEC            | EM01G8GA  | 00270      | Nov. 01, 2024    | Oct. 31, 2025    |
| 8    | Amplifier (18GHz-40GHz)          | Quanjuda        | DLE-161   | 97         | Nov. 01, 2024    | Oct. 31, 2025    |
| 9    | Loop Antenna (9KHz-30MHz)        | Schwarzbeck     | FMZB1519B | 00014      | Nov. 01, 2024    | Oct. 31, 2025    |
| 10   | RF cables1 (9kHz-1GHz)           | ChengYu         | 966       | 004        | Nov. 01, 2024    | Oct. 31, 2025    |
| 11   | RF cables2 (1GHz-40GHz)          | ChengYu         | 966       | 003        | Nov. 01, 2024    | Oct. 31, 2025    |
| 12   | Antenna connector                | Florida RF Labs | N/A       | RF 01#     | Nov. 01, 2024    | Oct. 31, 2025    |
| 13   | Power probe                      | KEYSIGHT        | U2021XA   | MY55210018 | Nov. 01, 2024    | Oct. 31, 2025    |
| 14   | Signal Analyzer 9kHz-26.5GHz     | Agilent         | N9020A    | MY55370280 | Nov. 01, 2024    | Oct. 31, 2025    |
| 15   | Test Receiver 20kHz-40GHz        | R&S             | ESU 40    | 100376     | Nov. 01, 2024    | Oct. 31, 2025    |
| 16   | D.C. Power Supply                | LongWei         | PS-305D   | 010964729  | Nov. 01, 2024    | Oct. 31, 2025    |

## Conduction Test equipment

| Item | Equipment         | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|------|-------------------|--------------|----------|------------|------------------|------------------|
| 1    | 843 Shielded Room | ChengYu      | 843 Room | 843        | Nov. 01, 2024    | Oct. 31, 2025    |
| 2    | EMI Receiver      | R&S          | ESR      | 101421     | Nov. 01, 2024    | Oct. 31, 2025    |
| 3    | LISN              | R&S          | ENV216   | 102417     | Nov. 01, 2024    | Oct. 31, 2025    |
| 4    | 843 Cable 1#      | ChengYu      | CE Cable | 001        | Nov. 01, 2024    | Oct. 31, 2025    |

## Other

| Item | Name                         | Manufacturer | Model   | Software version |
|------|------------------------------|--------------|---------|------------------|
| 1    | EMC Conduction Test System   | FALA         | EZ_EM C | EMC-CON 3A1.1    |
| 2    | EMC radiation test system    | FALA         | EZ_EM C | FA-03A2          |
| 3    | RF test system               | MAIWEI       | MTS8310 | 2.0.0.0          |
| 4    | RF communication test system | MAIWEI       | MTS8200 | 2.0.0.0          |



#### 4. EMC EMISSION TEST

##### 4.1 Conducted emissions

|                       |                                      |
|-----------------------|--------------------------------------|
| Test Requirement:     | FCC Part15 C Section 15.207          |
| Test Method:          | ANSI C63.10:2020                     |
| Test Frequency Range: | 150KHz to 30MHz                      |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, Sweep time=auto |

##### 4.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Limit (dBuV) |           | Standard |
|-----------------|--------------|-----------|----------|
|                 | Quasi-peak   | Average   |          |
| 0.15 -0.5       | 66 - 56 *    | 56 - 46 * | FCC      |
| 0.50 -5.0       | 56.00        | 46.00     | FCC      |
| 5.0 -30.0       | 60.00        | 50.00     | FCC      |

Note:

(1) \*Decreases with the logarithm of the frequency.

##### 4.1.2 TEST PROCEDURE

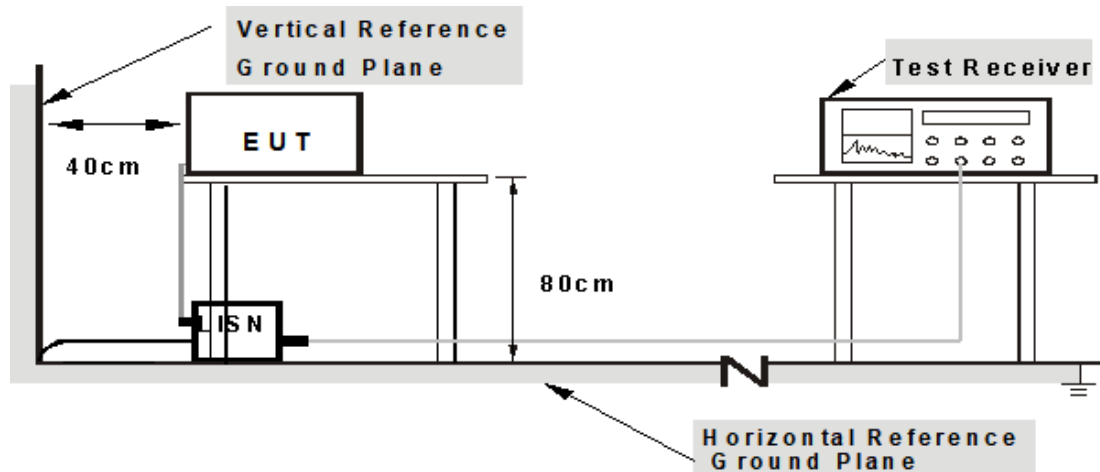
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.1.4 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes**

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### 4.1.6 Test Result

N/A

Only AC products need to test this item, DC products are not applicable.



## 4.2 Radiated emissions

|                       |                                    |            |        |        |            |
|-----------------------|------------------------------------|------------|--------|--------|------------|
| Test Requirement:     | FCC Part15 C Section 15.209/15.249 |            |        |        |            |
| Test Method:          | ANSI C63.10:2020                   |            |        |        |            |
| Test Frequency Range: | 9kHz to 25GHz                      |            |        |        |            |
| Test site:            | Measurement Distance: 3m           |            |        |        |            |
| Receiver setup:       | Frequency                          | Detector   | RBW    | VBW    | Value      |
|                       | 9KHz-150KHz                        | Quasi-peak | 200Hz  | MX5Hz  | Quasi-peak |
|                       | 150KHz-30MHz                       | Quasi-peak | 9KHz   | 30KHz  | Quasi-peak |
|                       | 30MHz-1GHz                         | Quasi-peak | 100KHz | 300KHz | Quasi-peak |
|                       | Above 1GHz                         | Peak       | 1MHz   | 3MHz   | Peak       |
|                       |                                    | Peak       | 1MHz   | 10Hz   | Average    |

## 4.2.1 Radiated Emission Limits

| Frequencies (MHz) | Field Strength (micorvolts/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                             |

| FREQUENCY (MHz) | Limit (dBuV/m) (at 3M) |         |
|-----------------|------------------------|---------|
|                 | PEAK                   | AVERAGE |
| Above 1000      | 74                     | 54      |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

## LIMITS OF RADIATED EMISSION MEASUREMENT

| Fundamental Frequency | Field Strength of Fundamental @3m (millivolts/meter) | Average Limit @3m (dBuV/m) | Peak Limit @3m (dBuV/m) |
|-----------------------|------------------------------------------------------|----------------------------|-------------------------|
| 900-928MHz            | 50                                                   | 94                         | 114                     |
| 2400-2483.5MHz        | 50                                                   | 94                         | 114                     |
| 5725-5875MHz          | 50                                                   | 94                         | 114                     |
| 24.0-24.25GHz         | 250                                                  | 108                        | 128                     |



Note :

1. Average Limit (dB $\mu$ V/m)=20 $\times$ log[1000 $\times$ Field Strength (mV/m)].
2. Peak Limit (dB $\mu$ V/m)= Average Limit (dB $\mu$ V/m)+20dB

#### 4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

Both horizontal and vertical antenna polarities were tested  
and performed pretest to three orthogonal axis. The worst case emissions were reported

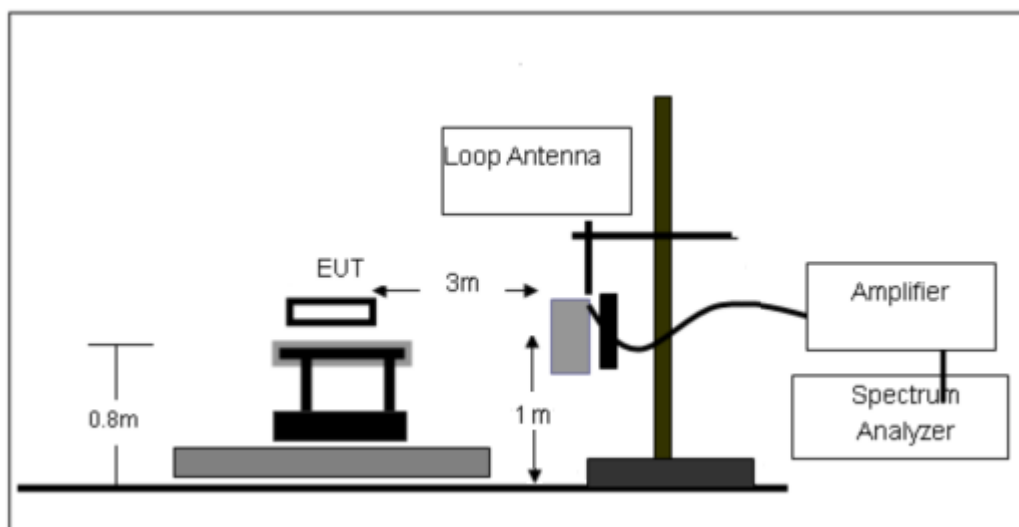
#### 4.2.3 DEVIATION FROM TEST STANDARD

No deviation

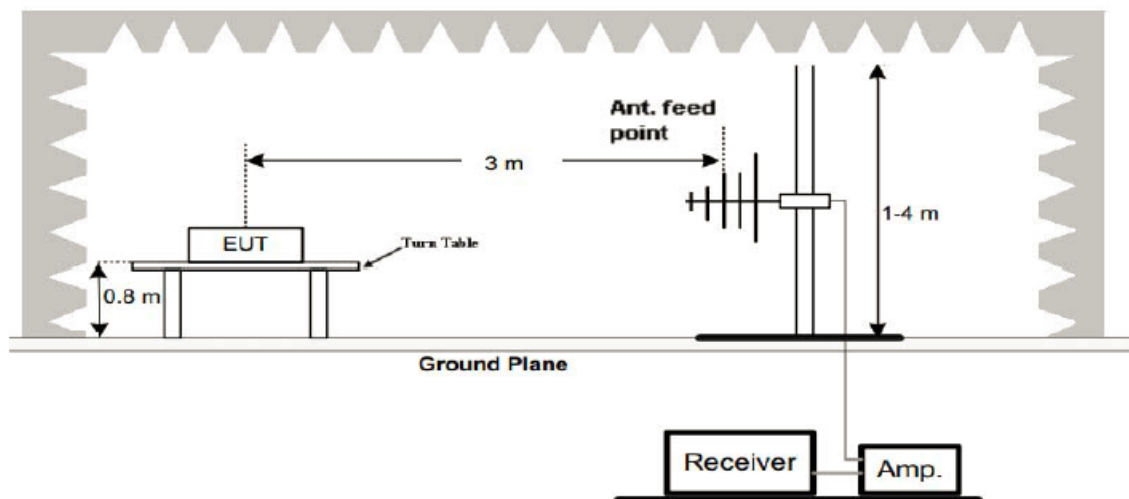
#### 4.2.4 TEST SETUP



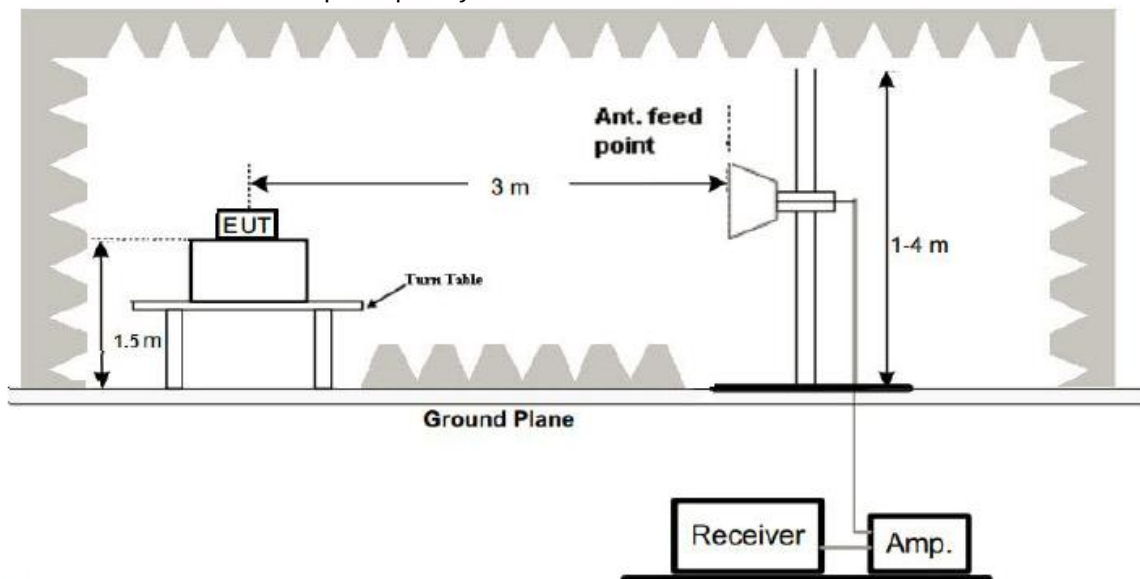
(A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



#### (C) Radiated Emission Test-Up Frequency Above 1GHz



#### 4.2.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### 4.2.6 TEST RESULTS

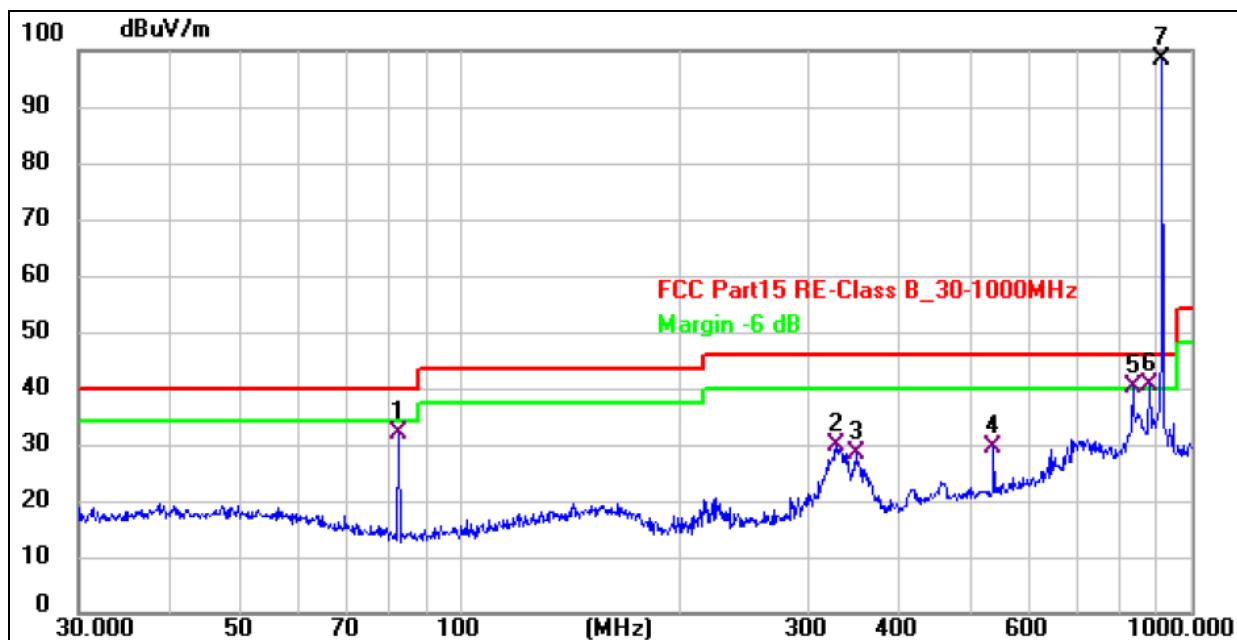
Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



Between 30MHz – 1GHz

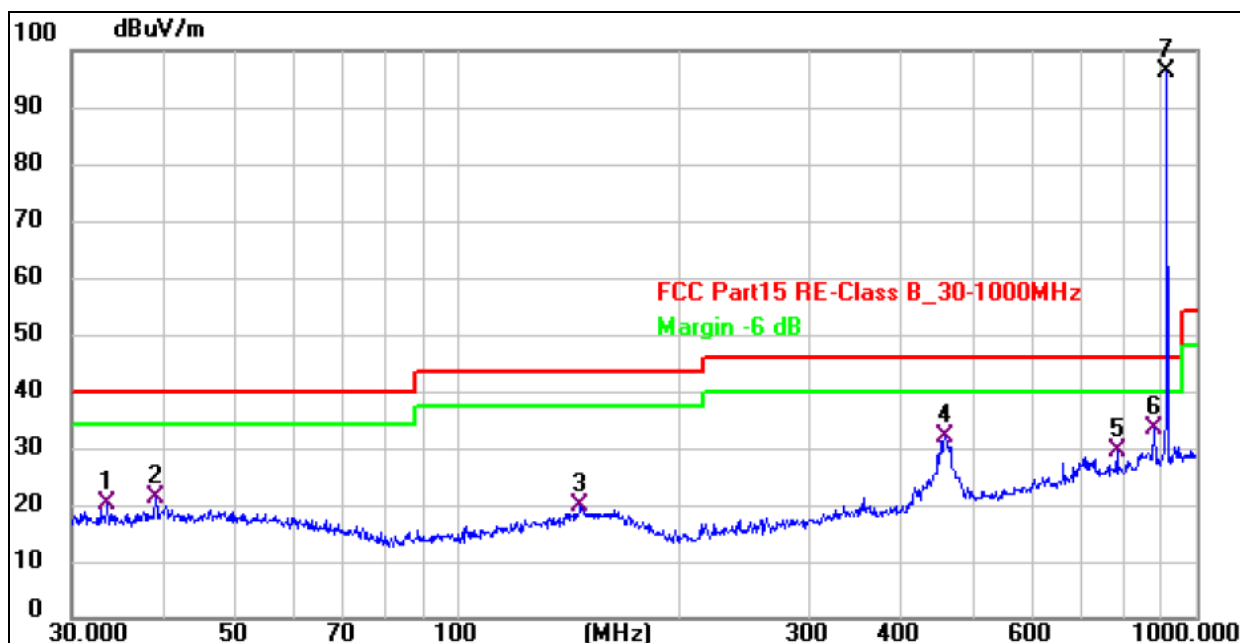
|               |         |                    |            |
|---------------|---------|--------------------|------------|
| Temperature:  | 26°C    | Relative Humidity: | 54%        |
| Pressure:     | 101 kPa | Polarization:      | Horizontal |
| Test Voltage: | DC 3.6V | Test Channel :     | 910.3MHz   |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 82.3588         | 49.83          | -17.95        | 31.88          | 40.00          | -8.12       | QP       |
| 2   | 327.8872        | 43.91          | -14.21        | 29.70          | 46.00          | -16.30      | QP       |
| 3   | 349.2500        | 42.44          | -13.92        | 28.52          | 46.00          | -17.48      | QP       |
| 4   | 537.5891        | 40.27          | -10.66        | 29.61          | 46.00          | -16.39      | QP       |
| 5 ! | 833.3171        | 46.32          | -6.13         | 40.19          | 46.00          | -5.81       | QP       |
| 6 ! | 878.3214        | 46.17          | -5.46         | 40.71          | 46.00          | -5.29       | QP       |
| 7 * | 910.3620        | 103.35         | -4.83         | 98.52          | 114.00         | -14.48      | peak     |



|               |         |                    |          |
|---------------|---------|--------------------|----------|
| Temperature:  | 26°C    | Relative Humidity: | 54%      |
| Pressure:     | 101kPa  | Polarization:      | Vertical |
| Test Voltage: | DC 3.6V | Test Channel :     | 910.3MHz |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 33.5624         | 33.89          | -13.88        | 20.01          | 40.00          | -19.99      | QP       |
| 2   | 39.0244         | 34.40          | -13.28        | 21.12          | 40.00          | -18.88      | QP       |
| 3   | 146.8876        | 33.19          | -13.35        | 19.84          | 43.50          | -23.66      | QP       |
| 4   | 457.5073        | 43.87          | -11.86        | 32.01          | 46.00          | -13.99      | QP       |
| 5   | 782.3453        | 36.24          | -6.68         | 29.56          | 46.00          | -16.44      | QP       |
| 6   | 878.3214        | 38.73          | -5.46         | 33.27          | 46.00          | -12.73      | QP       |
| 7 * | 910.3620        | 101.23         | -4.83         | 96.40          | 46.00          | -17.60      | peak     |

## Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.



(Above 1000 MHz)

## Normal Voltage 910.3MHz

| Polar<br>(H/V) | Frequency | Meter<br>Reading | Factor | Emission<br>Level | Limits   | Margin | Detector<br>Type |
|----------------|-----------|------------------|--------|-------------------|----------|--------|------------------|
|                | (MHz)     | (dBuV)           | (dB)   | (dBuV/m)          | (dBuV/m) | (dB)   |                  |
| V              | 1820.60   | 54.55            | -3.47  | 51.08             | 74       | -22.92 | Pk               |
| V              | 1820.60   | 45.86            | -3.47  | 42.39             | 54       | -11.61 | AV               |
| V              | 2730.90   | 49.47            | -3.74  | 45.73             | 74       | -28.27 | Pk               |
| V              | 2730.90   | 39.63            | -3.74  | 35.89             | 54       | -18.11 | AV               |
| V              | 3641.20   | 54.11            | -4.59  | 49.52             | 74       | -24.48 | Pk               |
| V              | 3641.20   | 42.18            | -4.59  | 37.59             | 54       | -16.41 | AV               |
| H              | 1820.60   | 51.79            | -3.47  | 48.32             | 74       | -25.68 | Pk               |
| H              | 1820.60   | 41.26            | -3.47  | 37.79             | 54       | -16.21 | AV               |
| H              | 2730.90   | 45.79            | -3.74  | 42.05             | 74       | -31.95 | Pk               |
| H              | 2730.90   | 31.62            | -3.74  | 27.88             | 54       | -26.12 | AV               |
| H              | 3641.20   | 54.51            | -4.59  | 49.92             | 74       | -24.08 | Pk               |
| H              | 3641.20   | 44.36            | -4.59  | 39.77             | 54       | -14.23 | AV               |

Remark:

Absolute Level= Reading Level+ Factor, Margin= Limit- Absolute Level

Other harmonics emissions are lower than 20dB below the allowable limit.



## 4.2.7 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

|                      |                                          |
|----------------------|------------------------------------------|
| FS=Field Strength    | CL=Cable Attenuation Factor (Cable Loss) |
| RA=Reading Amplitude | AG=Amplifier Gain                        |
| AF=Antenna Factor    |                                          |

## Test Result:

|                |         |                    |            |
|----------------|---------|--------------------|------------|
| Temperature:   | 26°C    | Relative Humidity: | 54%        |
| Pressure:      | 101kPa  | Polarization :     | Horizontal |
| Test Voltage : | DC 3.6V |                    |            |
| Test Mode :    | Mode 1  |                    |            |

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 910.3     | 103.35        | -4.83  | 98.52          | 114.00   | -14.48 | Peak          |
| 910.3     | 98.52         | -4.97  | 93.55          | 94.00    | -0.45  | Average       |

## Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Average = Peak Emission Level (dBμV/m) - Duty Cycle Factor (dB)

All interfaces was connected, and TX mode

|                |         |                    |          |
|----------------|---------|--------------------|----------|
| Temperature:   | 26°C    | Relative Humidity: | 54%      |
| Pressure:      | 101kPa  | Polarization :     | Vertical |
| Test Voltage : | DC 3.6V |                    |          |
| Test Mode :    | Mode 1  |                    |          |

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 910.3     | 101.23        | -4.83  | 96.40          | 114.00   | -17.60 | Peak          |
| 910.3     | 96.40         | -4.97  | 91.43          | 94.00    | -2.57  | Average       |

## Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Average = Peak Emission Level (dBμV/m) - Duty Cycle Factor (dB)

All interfaces was connected, and TX mode



## 5. CALCULATION OF AVERAGE FACTOR

The output field strengths of specification in accordance with the FCC rules specify measurements with an average detector. During the test, a spectrum analyzer incorporating a peak detector was used. Therefore, a reduction factor can be applied to the resultant peak signal level and compared to the limit for measurement instrumentation incorporating an average detector.

The duty cycle is measured in 100 ms or the repetition cycle period, whichever is a shorter time frame. The duty cycle is measured by placing the spectrum analyzer to set zero span at 100kHz resolution bandwidth.

Averaging factor in dB =  $20\log(\text{duty cycle})$

The duration of one cycle = 100ms

The duty cycle is simply the on-time divided the duration of one cycle

Duty Cycle =  $56.4 / 100\text{ms}$

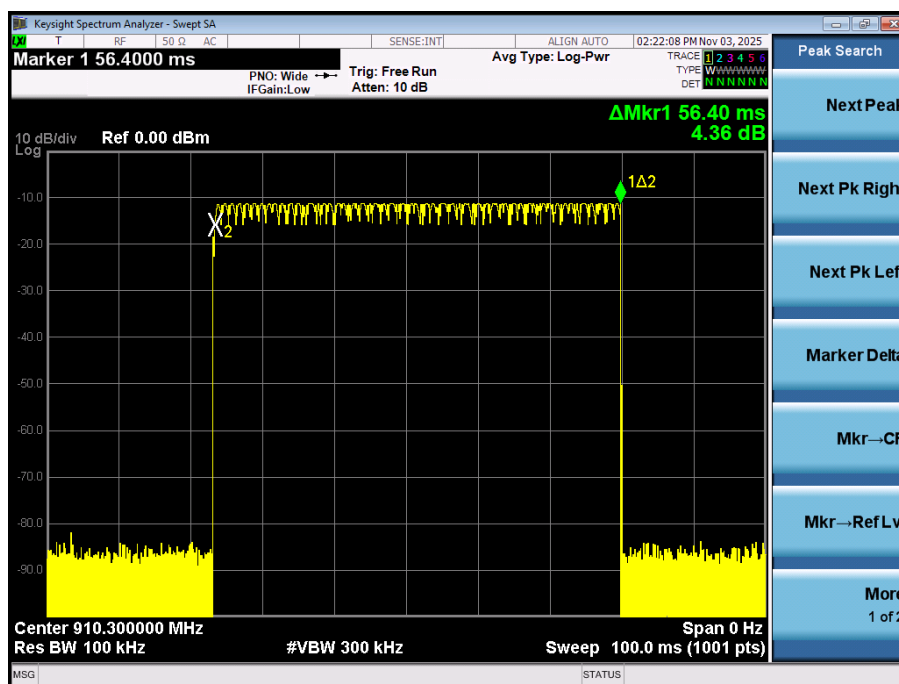
=0.564

Therefore, the averaging factor is found by  $20\log_{10}(0.564) = -4.97\text{dB}$

Test plot as follows:

Note: During the 100ms, the amount of pulse and on-time of pulse are the same for every pulse train.

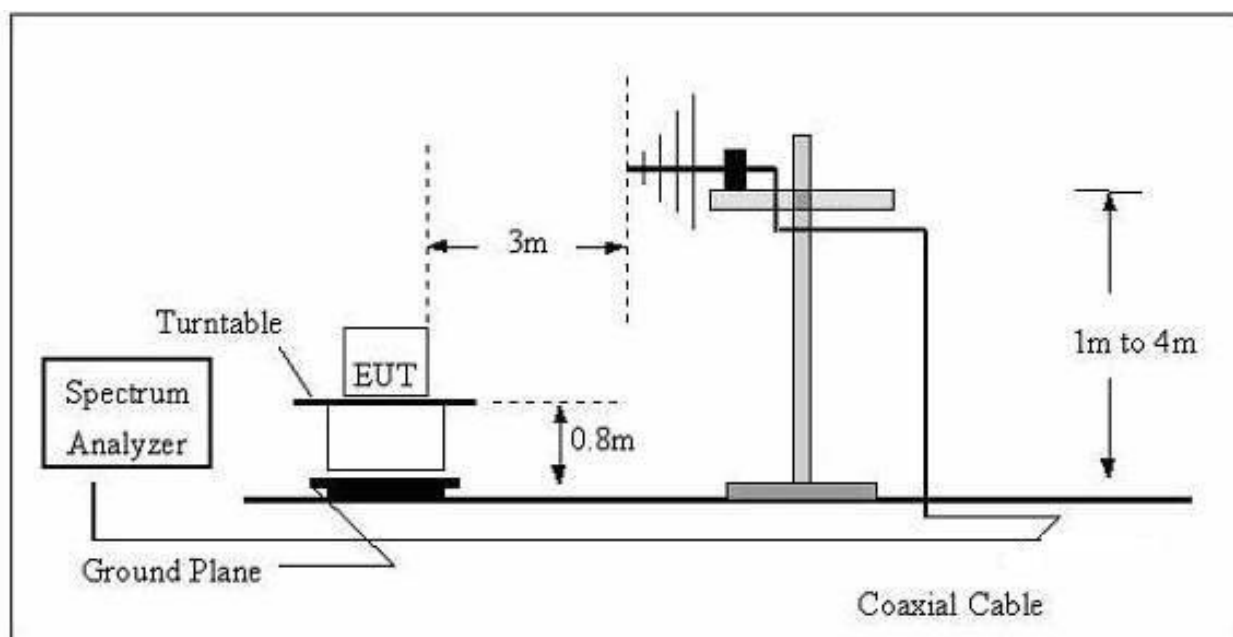
Cycle





## 6. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

### 6.1 Block Diagram Of Test Setup



### 6.2 Applicable Standard

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

### 6.3 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- VBW for Peak, Quasi-peak, or Average Detector Function:  $3 \times \text{RBW}$
- Repeat above procedures until all measured frequencies were complete.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

### 6.4 EUT Operating Conditions

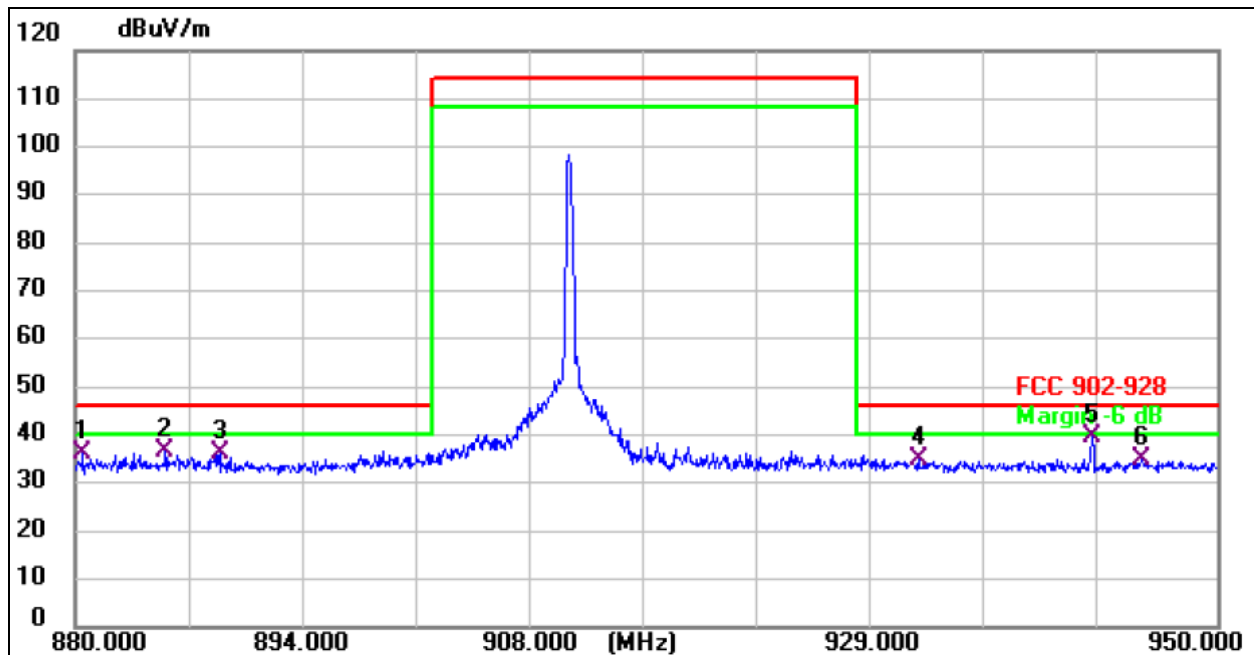
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



## 6.5 Test Result

|              |              |                    |         |
|--------------|--------------|--------------------|---------|
| Temperature: | 26 °C        | Relative Humidity: | 54%     |
| Pressure:    | 101 kPa      | Test Voltage :     | DC 3.6V |
| Test Mode :  | Transmitting |                    |         |

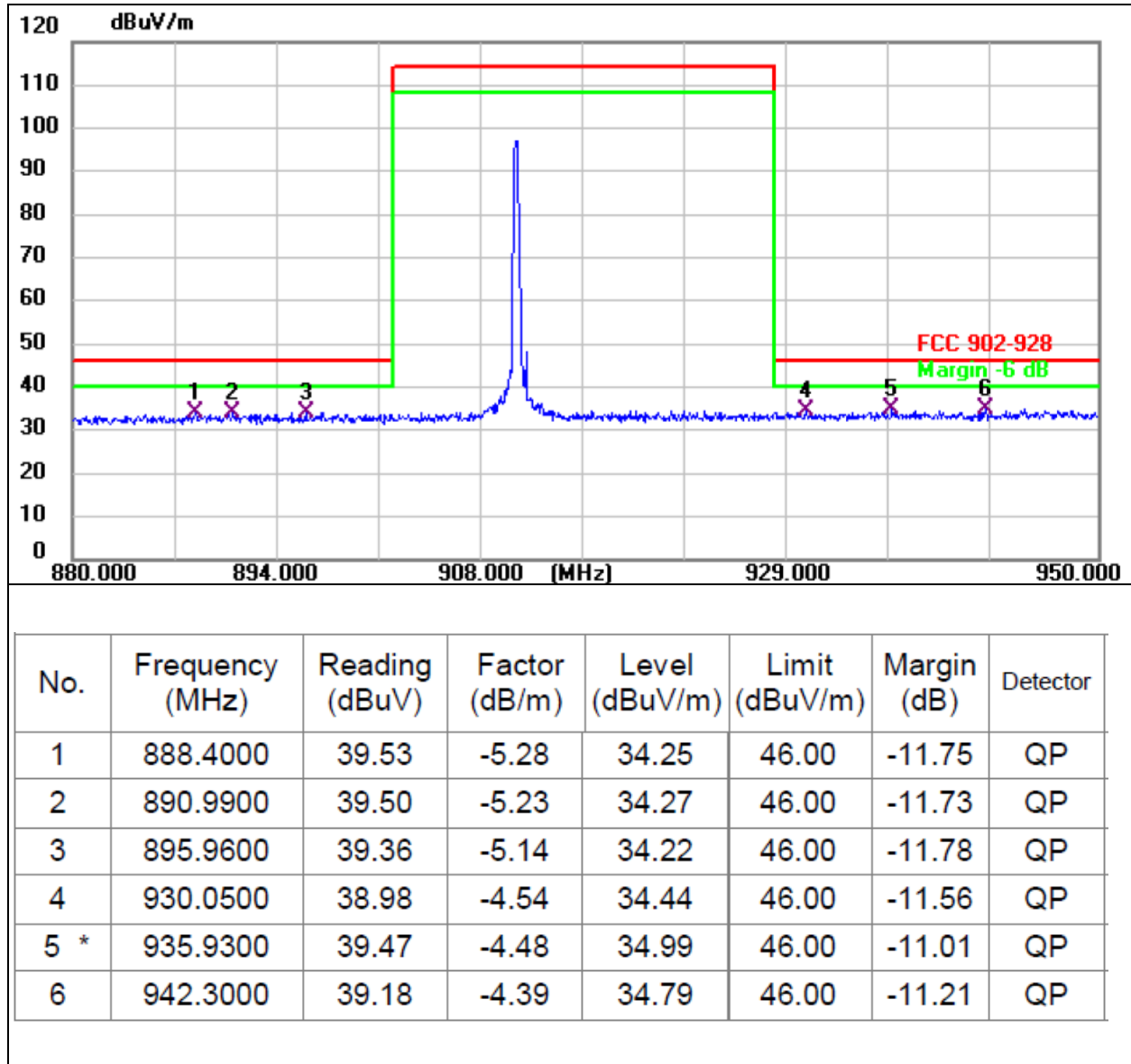
910.3MHz Horizontal



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 880.4900        | 41.67          | -5.42         | 36.25          | 46.00          | -9.75       | QP       |
| 2   | 885.5300        | 41.84          | -5.33         | 36.51          | 46.00          | -9.49       | QP       |
| 3   | 888.8900        | 41.55          | -5.27         | 36.28          | 46.00          | -9.72       | QP       |
| 4   | 931.7300        | 39.38          | -4.52         | 34.86          | 46.00          | -11.14      | QP       |
| 5 * | 942.3000        | 43.93          | -4.39         | 39.54          | 46.00          | -6.46       | QP       |
| 6   | 945.4500        | 39.30          | -4.36         | 34.94          | 46.00          | -11.06      | QP       |



## 910.3MHz Vertical

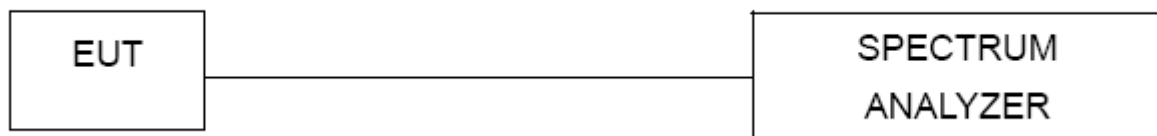




## 7. 20DB BANDWIDTH

|                   |                             |
|-------------------|-----------------------------|
| Test Requirement: | FCC Part15 C Section 15.215 |
| Test Method:      | ANSI C63.10:2020            |

### 7.1 Test Setup



### 7.2 Limit

| FCC Part15 (15.249) , Subpart C |           |                       |        |
|---------------------------------|-----------|-----------------------|--------|
| Section                         | Test Item | Frequency Range (MHz) | Result |
| 15.249(c)                       | Bandwidth | 902~928               | PASS   |

### 7.3 Test procedure

1. Set resolution bandwidth (RBW) = 1 ~ 5% of the OBW.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

### 7.4 EUT Operation Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

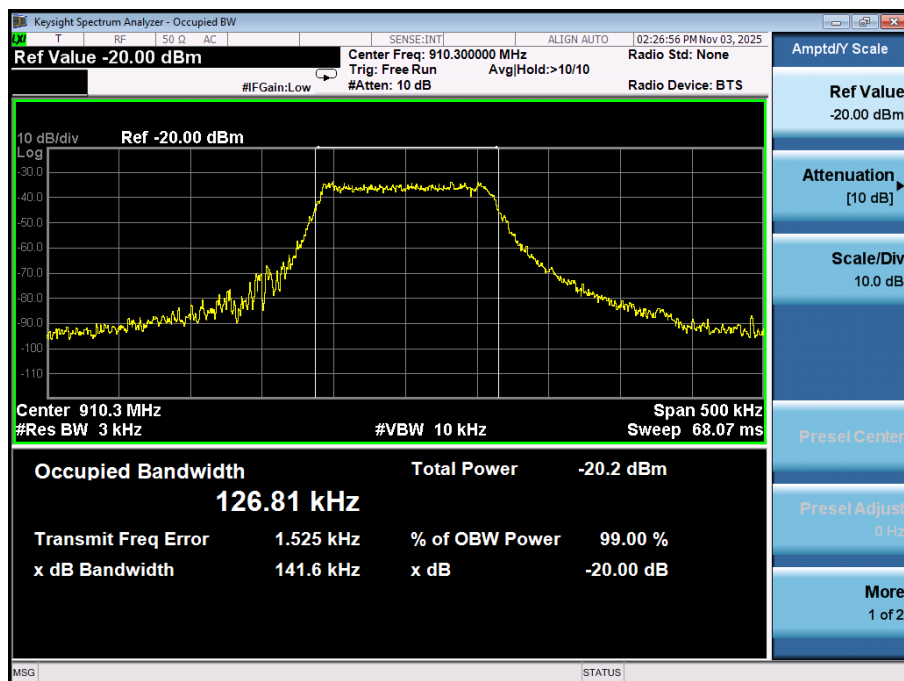


## 7.5 Test Result

|                |         |                     |     |
|----------------|---------|---------------------|-----|
| Temperature :  | 26°C    | Relative Humidity : | 54% |
| Test Voltage : | DC 3.6V | Remark              | N/A |

| Channel | Frequency (MHz) | 20dB bandwidth (KHz) |
|---------|-----------------|----------------------|
| 01      | 910.3           | 141.6                |

## CH01



**8. ANTENNA REQUIREMENT**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Standard requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FCC Part15 C Section 15.203 |
| 15.203 requirement:<br>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, 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. |                             |
| EUT Antenna:                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                             |
| The antenna is Spring Antenna, the best case gain of the antennas is 0dBi, reference to the appendix II for details                                                                                                                                                                                                                                                                                                                                                       |                             |



## 9. TEST SETUP PHOTO

Reference to the appendix I for details.

## 10. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

\*\*\*\*\* END OF REPORT \*\*\*\*\*