# RADIO TEST REPORT
# FCC ID: WA5WH57E

**Product**： Lightning Sensor

**Trade Mark**： N/A

**Model Name**： WH57E

**Family Model**： WH31L

**Report No.**： S20042202606001

## Prepared for

Shenzhen Fine Offset Electronics Co., Ltd.

2/F., Building no.3, Ping Shan Minqi Industrial Park, Xili Town, Nanshan District, Shenzhen City, China

## Prepared by

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# TEST RESULT CERTIFICATION

| | | |
|---|---|---|
| **Applicant's name** | : | Shenzhen Fine Offset Electronics Co., Ltd. |
| Address | : | 2/F., Building no.3, Ping Shan Minqi Industrial Park, Xili Town, Nanshan District, Shenzhen City, China |
| **Manufacturer's Name** | : | Shenzhen Fine Offset Electronics Co., Ltd. |
| Address | : | 2/F., Building no.3, Ping Shan Minqi Industrial Park, Xili Town, Nanshan District, Shenzhen City, China |
| **Product description** | | |
| Product name | : | Lightning Sensor |
| Model and/or type reference | : | WH57E |
| Family Model | | WH31L |
| **Standards** | : | FCC Part15.249 |
| Test procedure | | ANSI C63.10-2013 |

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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| | | |
|---|---|---|
| **Date of Test** | : | |
| Date (s) of performance of tests | : | 22 Apr. 2020 ~ 29 May. 2020 |
| Date of Issue | : | 29 May. 2020 |
| Test Result | : | **Pass** |

Testing Engineer : Mary Hu

(Mary Hu)

Technical Manager : Jason Chen

(Jason Chen)

Authorized Signatory : Sam Chen

(Sam Chen)

Table of Contents Page

## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15, Subpart C (15.249) | | | |
|---|---|---|---|
| Standard Section | Test Item | Judgment | Remark |
| 15.207 | Conducted Emission | N/A | |
| 15.203 | Antenna Requirement | Pass | |
| 15.249<br>15.209 | Radiated Spurious Emission | Pass | |
| 15.249b(2) | Frequency Tolerance | N/A | |
| 15.249(a) | Fundamental Measurement | Pass | |
| 15.205 | Band Edge Emission | Pass | |
| 15.215 | Occupied Bandwidth | Pass | |

Note: “N/A” denotes test is not applicable in this Test Report.

## 1.1 FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at
1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District
Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

## 1.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

| | | |
|---|---|---|
| CNAS-Lab. | : | The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)<br>The Certificate Registration Number is L5516. |
| IC-Registration | | The Certificate Registration Number is 9270A.<br>CAB identifier:CN0074 |
| FCC- Accredited | | Test Firm Registration Number: 463705.<br>Designation Number: CN1184 |
| A2LA-Lab. | | The Certificate Registration Number is 4298.01<br>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories.<br>This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system<br>(refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009). |
| Name of Firm | : | Shenzhen NTEK Testing Technology Co., Ltd. |
| Site Location | : | 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District Shenzhen, Guangdong, China |

## 1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y±U, where expended 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 | Conducted Emission Test | ±2.80dB |
| 2 | RF power, conducted | ±0.16dB |
| 3 | Spurious emissions, conducted | ±0.21dB |
| 4 | All emissions, radiated(30MHz~1GHz) | ±2.64dB |
| 5 | All emissions, radiated(1GHz~6GHz) | ±2.40dB |
| 6 | All emissions, radiated(＞6GHz) | ±2.52dB |
| 7 | Temperature | ±0.5°C |
| 8 | Humidity | ±2% |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| Equipment | Lightning Sensor |
| Trade Mark | N/A |
| Model Name | WH57E |
| Family Model | WH31L |
| Model Difference | All the model are the same circuit and RF module,except the color. |
| Product Description | The EUT is a Lightning Sensor<br>Operation Frequency: 915MHz<br>Modulation Type: FSK<br>Antenna Designation: Spring antenna<br>Antenna Gain(Peak) 2.15dBi<br><br>Based on the application, features, or specification exhibited in User's Manual. More details of EUT technical specification, please refer to the User's Manual. |
| Channel List | Please refer to the Note 2. |
| Adapter | N/A |
| Battery | DC 3V From battery |
| Hardware version | N/A |
| Firmware version | N/A |
| Software version | N/A |

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.

| Channel | Frequency(MHz) |
|---|---|
| 01 | 915 |

3.

Table for Filed Antenna

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE |
|---|---|---|---|---|---|---|
| 1 | N/A | N/A | Spring antenna | N/A | 2.15 | Antenna |

## 2.2 DESCRIPTION OF TEST MODES

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

| Pretest Mode | Description |
|---|---|
| Mode 1 | CH01 TX |

| **For Radiated Spurious Emission** | |
|---|---|
| Pretest Mode | Description |
| Mode 1 | CH01 TX |

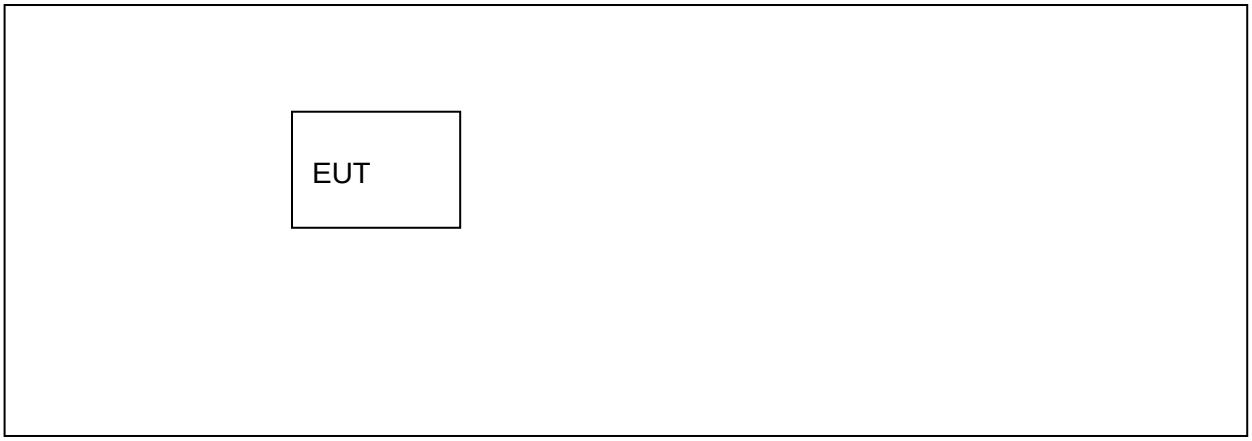
| **For Conducted Emission** | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | CH01 TX |

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

## 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



## 2.4 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

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 |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Item | Cable Type | 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.

## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

**Radiation Test equipment**

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
|---|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | Aglient | E4407B | MY45108040 | 2019.05.13 | 2020.05.12 | 1 year |
| | | | | | 2020.05.11 | 2021.05.10 | |
| 2 | Spectrum Analyzer | Agilent | N9020A | MY49100060 | 2019.08.28 | 2020.08.27 | 1 year |
| 3 | EMI Test Receiver | Agilent | N9038A | MY53227146 | 2019.08.28 | 2020.08.27 | 1 year |
| 4 | Test Receiver | R&S | ESPI | 101310 | 2019.05.13 | 2020.05.12 | 1 year |
| 5 | Bilog Antenna | TESEQ | CBL6111D | 31216 | 2020.04.11 | 2021.04.10 | 1 year |
| 6 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200983705 | 2018.05.19 | 2020.05.18 | 2 year |
| | | | | | 2020.05.11 | 2023.05.10 | 3 year |
| 7 | Horn Antenna | EM | EM-AH-10180 | 2011071402 | 2019.05.13 | 2020.05.12 | 1 year |
| | | | | | 2020.05.11 | 2021.05.10 | |
| 8 | Horn Ant | Schwarzbeck | BBHA 9170 | 9170-181 | 2019.11.03 | 2020.11.02 | 1 year |
| 9 | Amplifier | EMC | EMC051835 SE | 980246 | 2019.08.06 | 2020.08.05 | 1 year |
| 10 | Amplifier | MITEQ | TTA1840-35-HG | 177156 | 2019.11.03 | 2020.11.02 | 1 year |
| 11 | Loop Antenna | ARA | PLA-1030/B | 1029 | 2019.08.06 | 2020.08.05 | 1 year |
| 12 | Power Meter | DARE | RPR3006W | 15I00041SNO84 | 2019.08.05 | 2020.08.04 | 3 year |
| 13 | Test Cable (9KHz-30MHz) | N/A | R-01 | N/A | 2018.04.21 | 2021.04.20 | 3 year |
| 14 | Test Cable (30MHz-1GHz) | N/A | R-02 | N/A | 2018.04.21 | 2021.04.20 | 3 year |
| 15 | High Test Cable(1G-40GHz) | N/A | R-03 | N/A | 2018.04.21 | 2021.04.20 | 3 year |
| 16 | High Test Cable(1G-40GHz) | N/A | R-04 | N/A | 2018.04.21 | 2021.04.20 | 3 year |
| 17 | temporary antenna connector (Note) | NTS | R001 | N/A | N/A | N/A | N/A |

Note:
The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

**Conduction Test equipment**

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
|---|---|---|---|---|---|---|---|
| 1 | Test Receiver | R&S | ESCI | 101160 | 2019.05.13 | 2020.05.12 | 1 year |
| | | | | | 2020.05.11 | 2021.05.10 | |
| 2 | LISN | R&S | ENV216 | 101313 | 2019.05.13 | 2020.05.12 | 1 year |
| | | | | | 2020.05.11 | 2021.05.10 | |
| 3 | LISN | SCHWARZBECK | NNLK 8129 | 8129245 | 2019.05.13 | 2020.05.12 | 1 year |
| | | | | | 2020.05.11 | 2021.05.10 | |
| 4 | 50Ω Coaxial Switch | ANRITSU CORP | MP59B | 6200983704 | 2018.05.19 | 2020.05.18 | 2 year |
| | | | | | 2020.05.11 | 2023.05.10 | 3 year |
| 5 | Test Cable (9KHz-30MHz) | N/A | C01 | N/A | 2018.04.21 | 2021.04.20 | 3 year |
| 6 | Test Cable (9KHz-30MHz) | N/A | C02 | N/A | 2018.04.21 | 2021.04.20 | 3 year |
| 7 | Test Cable (9KHz-30MHz) | N/A | C03 | N/A | 2018.04.21 | 2021.04.20 | 3 year |

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable which is scheduled for calibration every 3 years.

# 3. ANTENNA REQUIREMENT

## 3.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

## 3.2 EUT ANTENNA

The EUT antenna is permanent attached Spring antenna (Gain: 2.15dBi). It comply with the standard requirement.

### 3.3 CONDUCTED EMISSION MEASUREMENT

#### 3.3.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

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

| | | | | | |
|---|---|---|---|---|---|
| 0.15 -0.5 | | | 66 - 56 * | 56 - 46 * | LP002. |
| 0.50 -5.0 | | | 56.00 | 46.00 | LP002. |
| 5.0 -30.0 | | | 60.00 | 50.00 | LP002. |

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

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

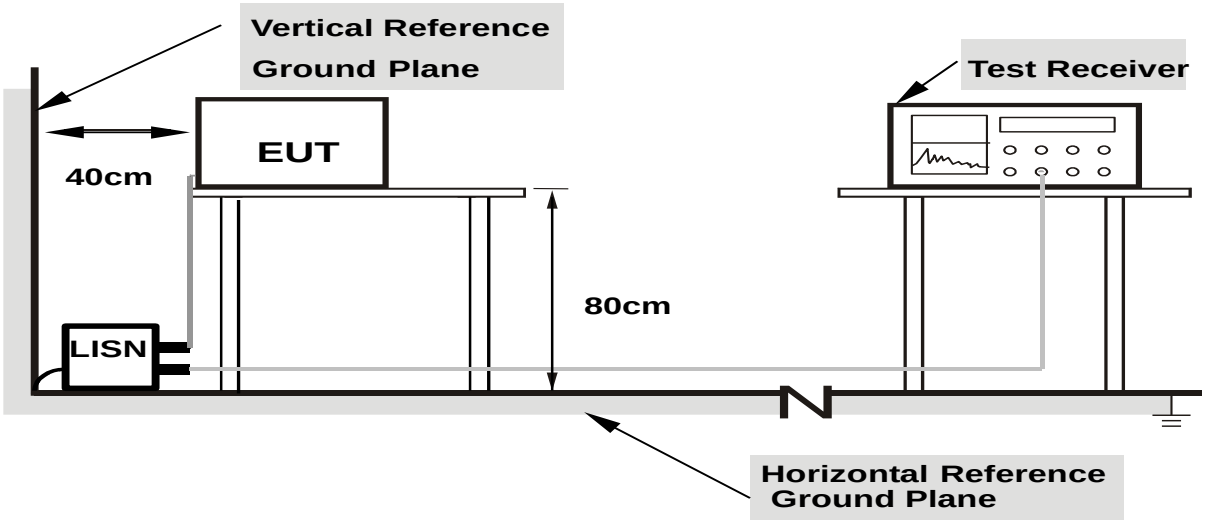
### 3.3.2 TEST PROCEDURE

a. The EUT was placed 0.4 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.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. 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.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.3.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.3.4 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 from other units and other metal planes**

### 3.2.5 TEST RESULT

| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name. ： | WH57E |
| Temperature： | 25 ℃ | Relative Humidity： | 55% |
| Pressure： | 1010hPa | Phase： | N/A |
| Test Voltage ： | N/A | Test Mode： | N/A |

Note: Not applicable

## 3.4 RADIATED EMISSION MEASUREMENT

### 3.4.1 Radiated Emission Limits ( FCC 15.209 )

| 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 |
| Frequency (MHz) | Limit (dBuV) | |
| 30~88 | 40 | 3 |
| 88~216 | 43.5 | 3 |
| 216~960 | 46 | 3 |
| 960 -10000 | 54.00 | 3 |
| 902-928 | 94 | 3 |

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBuV/m)=20log Emission level (uV/m).

(3) *Note: This is the limit for the fundamental frequency.

LIMITS OF RADIATED EMISSION MEASUREMENT ( FCC 15.249)

| Frequency of Emission (MHz) | Field Strength of fundamental (millivolts /meter) | Field Strength of Harmonics (microvolts/meter) |
|---|---|---|
| 902-928 | 50 | 500 |

Notes:

(1) 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 Section 15.209, whichever is the lesser attenuation.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (emission in restricted band) | 1MHz / 1MHz for Peak |

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

### 3.4.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

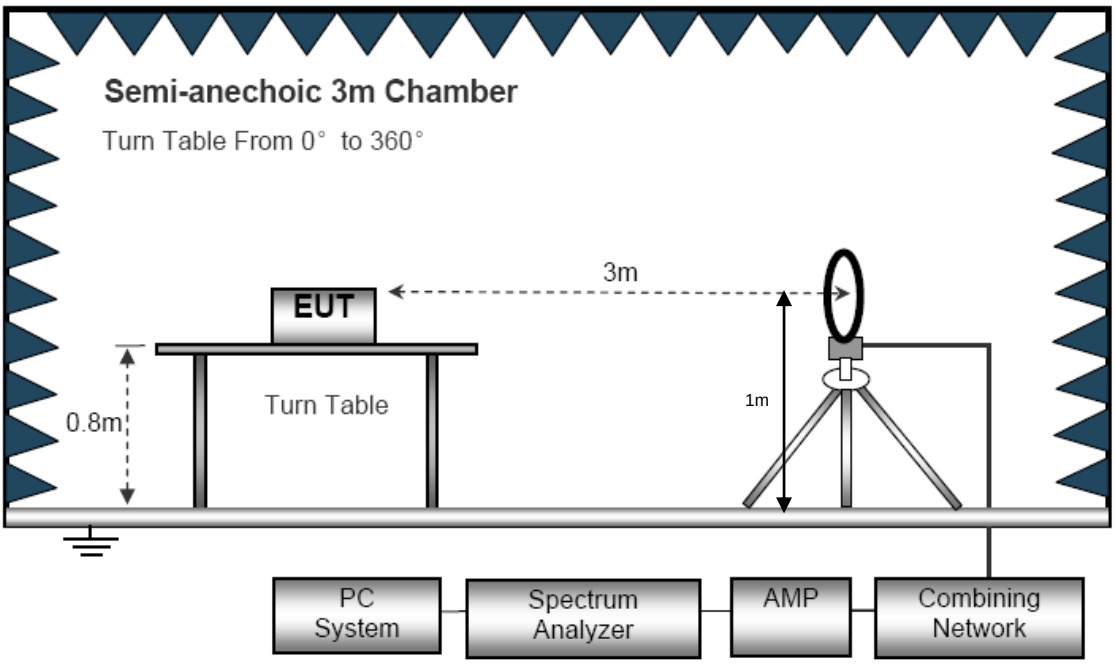
Note:

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

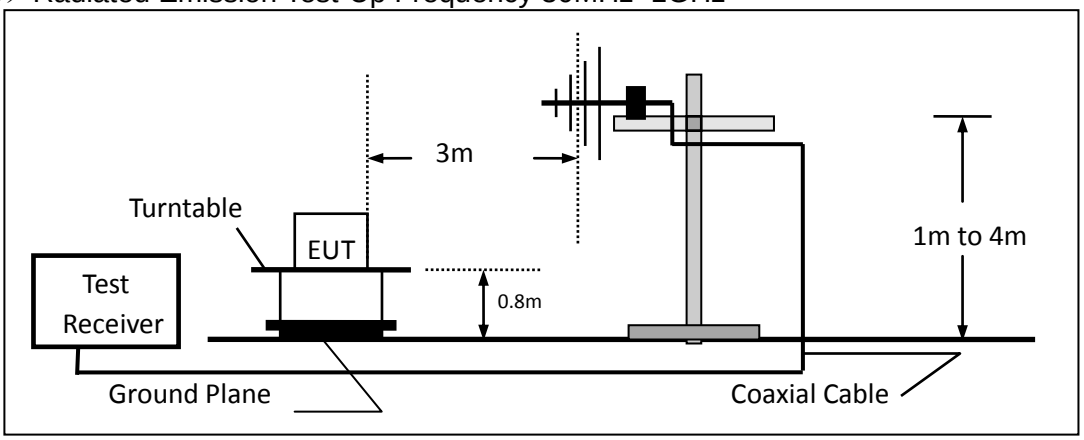
### 3.4.3 DEVIATION FROM TEST STANDARD

No deviation

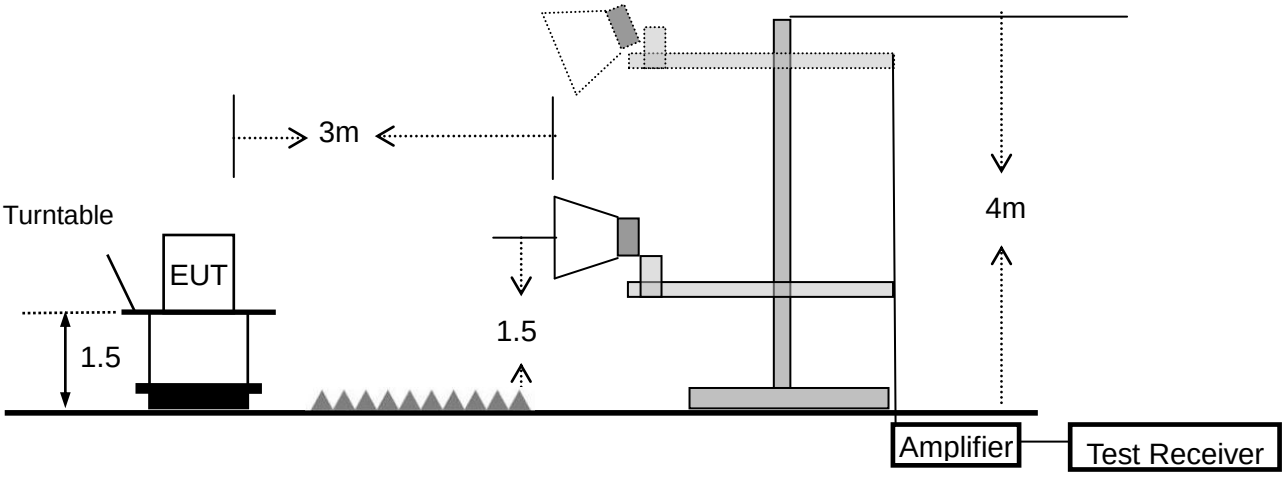
（A）Radiated Emission Test-Up Frequency Below 30MHz




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




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



### 3.4.4 TEST RESULTS (BELOW 30MHz)

| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name. ： | WH57E |
| Temperature： | 20 ℃ | Relative Humidtity： | 48% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | TX | Polarization : | -- |

| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | PASS |
| -- | -- | -- | -- | PASS |

**NOTE:**

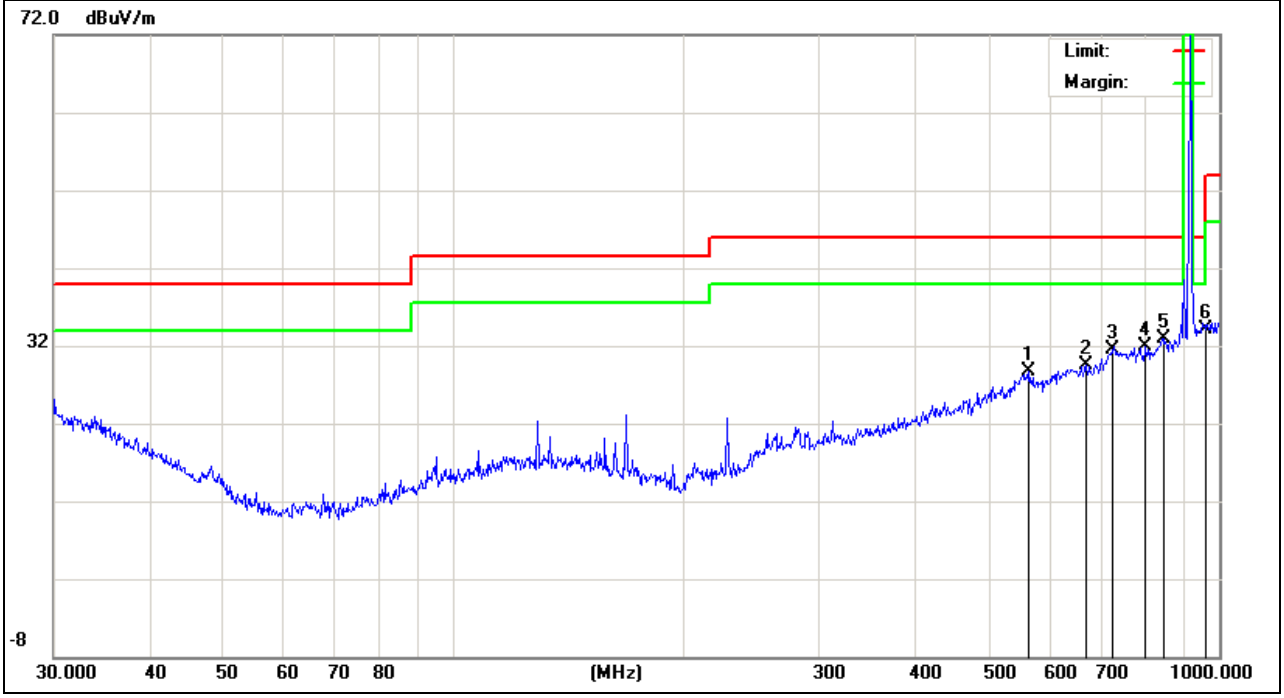
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =20 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

### 3.4.5 TEST RESULTS (BELOW 1000 MHz)

| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name ： | WH57E |
| Temperature： | 25 ℃ | Relative Humidity： | 51% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | Mode 1 | Polarization： | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 564.6389 | 6.6 | 22.12 | 28.72 | 46 | -17.28 | QP |
| 670.4891 | 7.16 | 22.4 | 29.56 | 46 | -16.44 | QP |
| 724.2611 | 7.15 | 24.38 | 31.53 | 46 | -14.47 | QP |
| 801.7862 | 6.85 | 24.97 | 31.82 | 46 | -14.18 | QP |
| 848.0561 | 6.76 | 26.23 | 32.99 | 46 | -13.01 | QP |
| 960 | 5.76 | 28.41 | 34.17 | 46 | -11.83 | QP |

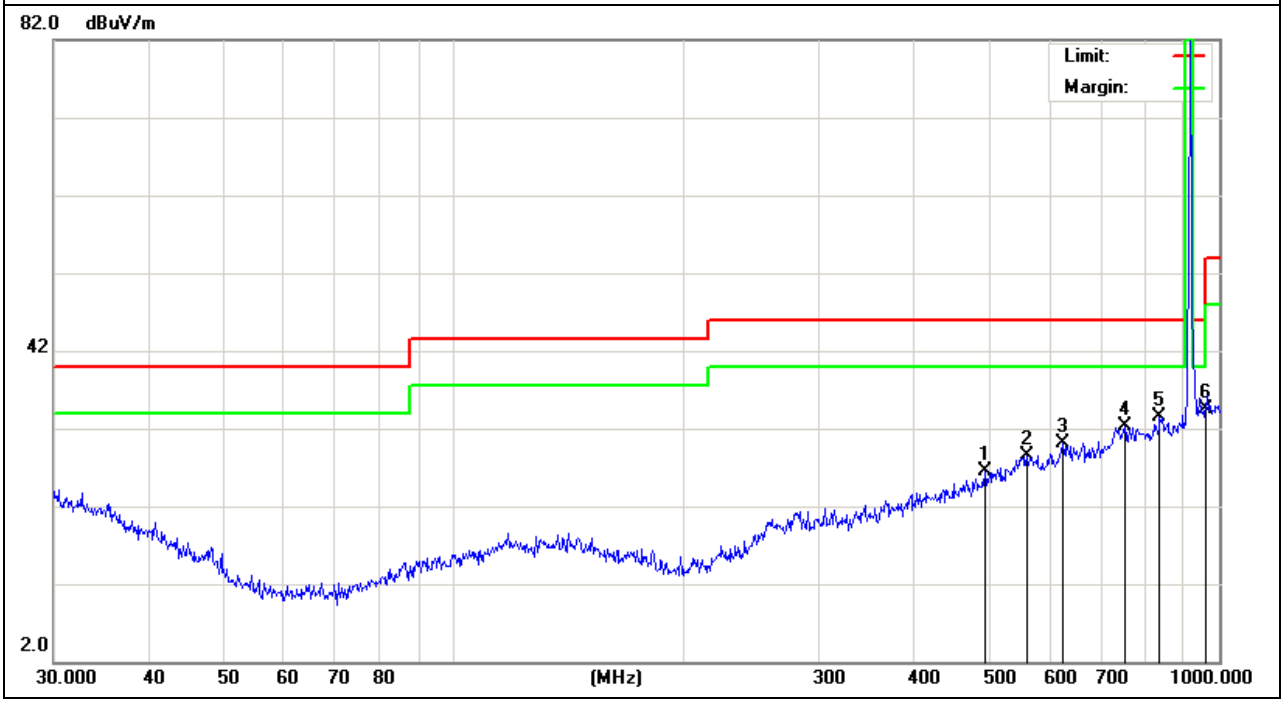
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



| EUT： | Lightning Sensor | Model Name ： | WH57E |
|---|---|---|---|
| Temperature： | 25 ℃ | Relative Humidity： | 51% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | Mode 1 | Polarization： | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 494.1983 | 6.45 | 20.11 | 26.56 | 46 | -19.44 | QP |
| 560.6928 | 6.11 | 22.32 | 28.43 | 46 | -17.57 | QP |
| 625.0778 | 7.9 | 22.3 | 30.2 | 46 | -15.8 | QP |
| 752.7432 | 7.42 | 24.92 | 32.34 | 46 | -13.66 | QP |
| 836.2441 | 7.65 | 25.95 | 33.6 | 46 | -12.4 | QP |
| 960 | 6.03 | 28.41 | 34.44 | 46 | -11.56 | QP |

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

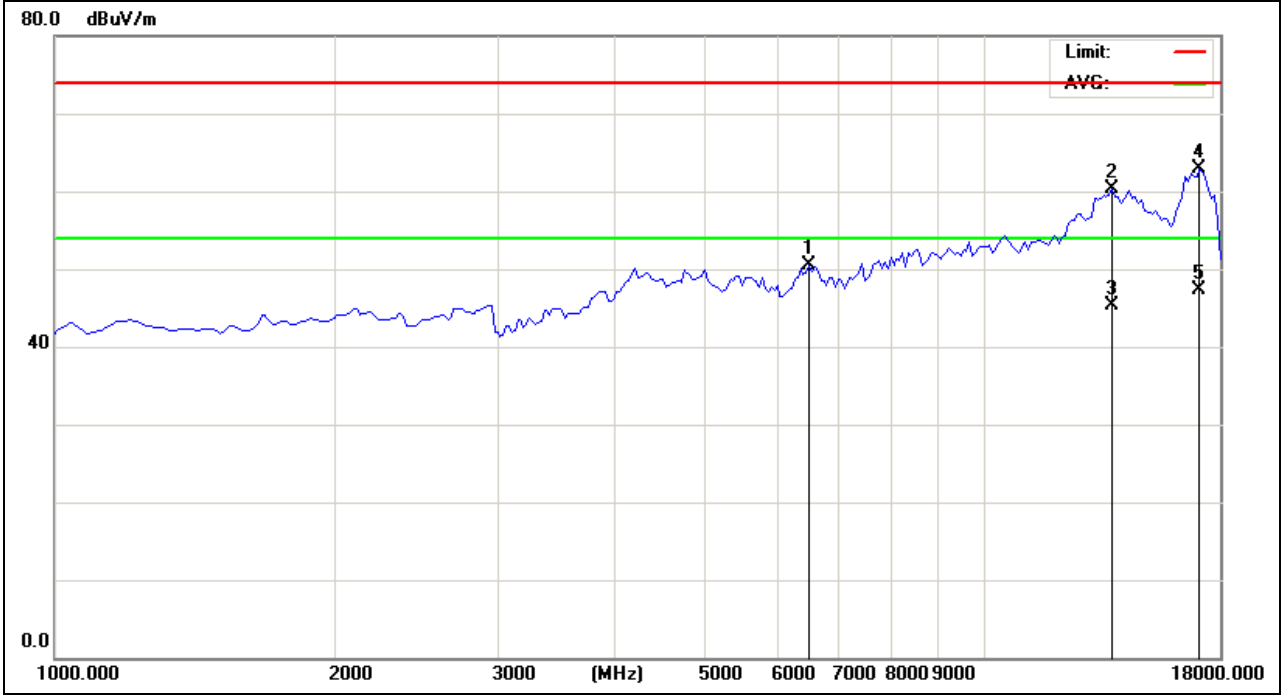


### 3.4.6 TEST RESULTS (ABOVE 1000 MHZ)

| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name ： | WH57E |
| Temperature： | 25 ℃ | Relative Humidity： | 51% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | Mode 1 | Polarization： | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 6525.000 | 34.89 | 15.66 | 50.55 | 74.00 | -23.45 | peak |
| 13792.500 | 35.84 | 24.43 | 60.27 | 74.00 | -13.73 | peak |
| 13792.500 | 20.88 | 24.43 | 45.31 | 54.00 | -8.69 | AVG |
| 17235.000 | 34.37 | 28.51 | 62.88 | 74.00 | -11.12 | peak |
| 17235.000 | 18.81 | 28.51 | 47.32 | 54.00 | -6.68 | AVG |

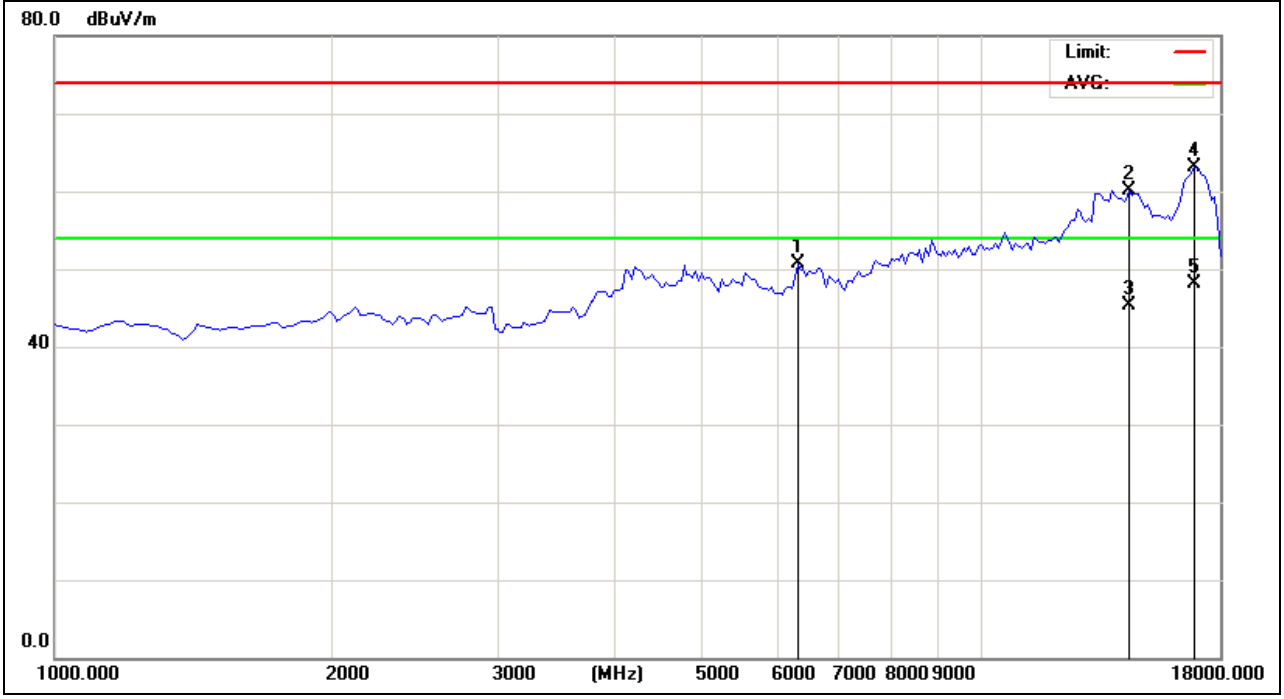
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name ： | WH57E |
| Temperature： | 25 ℃ | Relative Humidity： | 51% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | Mode 1 | Polarization： | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|
| 10775.000 | 34.76 | 20.11 | 54.87 | 74.00 | -19.13 | peak |
| 14515.000 | 36.01 | 24.43 | 60.44 | 74.00 | -13.56 | peak |
| 14515.000 | 21.83 | 24.43 | 46.26 | 54.00 | -7.74 | AVG |
| 17107.500 | 34.68 | 28.16 | 62.84 | 74.00 | -11.16 | peak |
| 17107.500 | 18.53 | 28.16 | 46.69 | 54.00 | -7.31 | AVG |

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



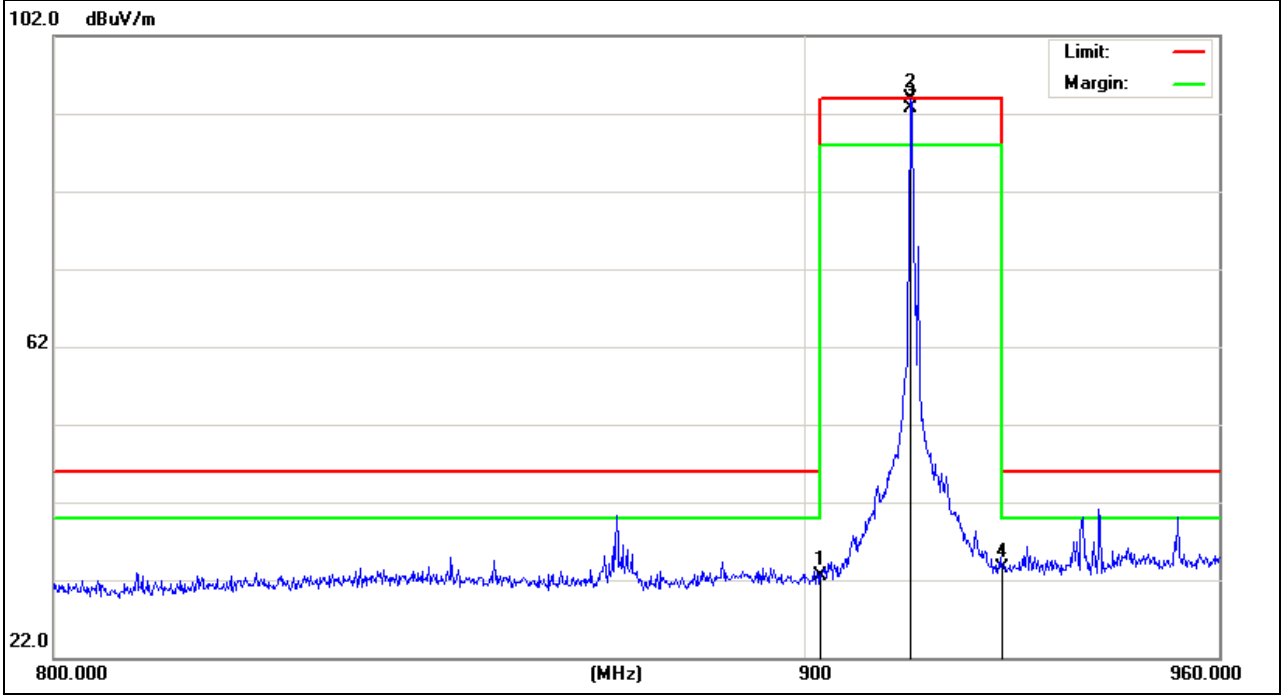

Note: EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report(X orientation).

### 3.4.7 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name ： | WH57E |
| Temperature： | 25 ℃ | Relative Humidity： | 51% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | TX-915MHz | Polarization： | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 902 | 6.31 | 26.23 | 32.54 | 46 | -13.46 | peak |
| 915 | 66.9 | 26.94 | 93.84 | 94 | -0.16 | peak |
| 915 | 65.71 | 26.94 | 92.65 | 94 | -1.35 | QP |
| 928 | 5.88 | 27.64 | 33.52 | 46 | -12.48 | peak |

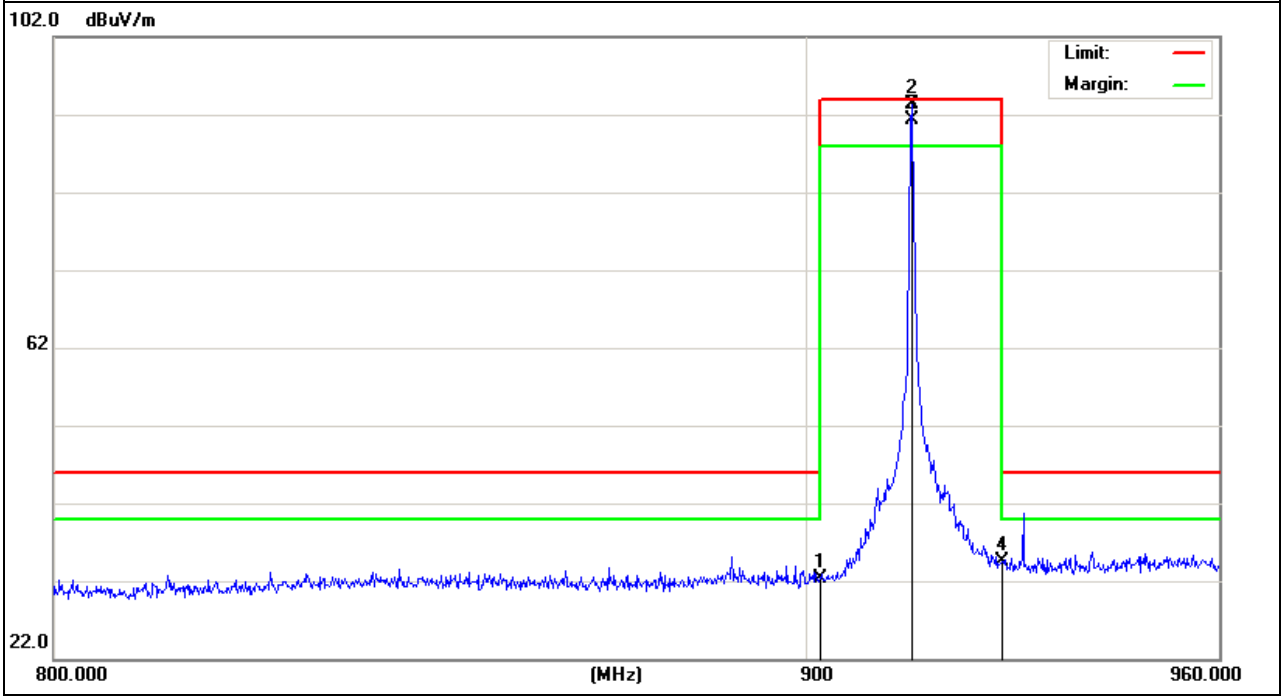
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



| | | | |
|---|---|---|---|
| EUT： | Lightning Sensor | Model Name ： | WH57E |
| Temperature： | 25 ℃ | Relative Humidity： | 51% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 3.0V |
| Test Mode ： | TX-915MHz | Polarization： | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|---|---|---|---|---|---|---|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 902 | 6.11 | 26.23 | 32.34 | 46 | -13.66 | peak |
| 915 | 66.39 | 26.94 | 93.33 | 94 | -0.67 | peak |
| 915 | 64.42 | 26.94 | 91.36 | 94 | -2.64 | QP |
| 928 | 6.94 | 27.64 | 34.58 | 46 | -11.42 | peak |

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



# 4. BANDWIDTH TEST

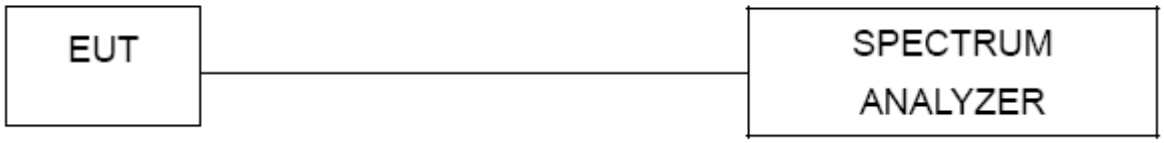
## 4.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
b. Spectrum Setting : The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value., Sweep time = Auto.

## 4.2 DEVIATION FROM STANDARD

No deviation.

## 4.3 TEST SETUP

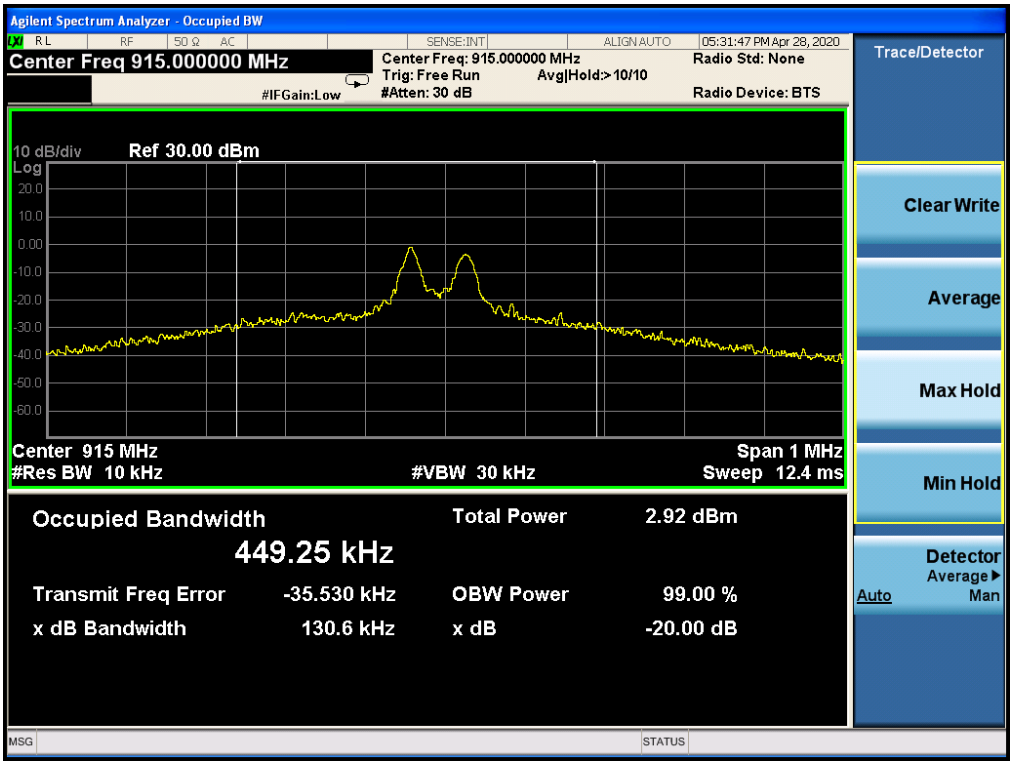


## 4.4. TEST RESULTS

| EUT： | Lightning Sensor | Model Name ： | WH57E |
|---|---|---|---|
| Temperature： | 26 ℃ | Relative Humidity： | 53% |
| Pressure： | 1020 hPa | Test Power ： | DC 3.0V |
| Test Mode ： | Mode 1 | | |

| Test Channel | Frequency (MHz) | 20 dBc Bandwidth (MHz) |
|---|---|---|
| CH01 | 915 | 0.1306 |

915 MHz




END OF REPORT