



# RADIO TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the procedures in ANSI C63.10(2013).

Applicant / Manufacturer : Thinker-Tinker, Inc.

Address : 177 E Colorado Blvd, suite 200, Pasadena, CA 91105, USA

Factory : Thinker-Tinker, Inc.

Address : 177 E Colorado Blvd, suite 200, Pasadena, CA 91105, USA

E.U.T. : OCTOBO

Brand Name : Holyiot

Model No. : OCTO-001

FCC ID : 2AT7R2019OCTO1

Measurement Standard : FCC PART 15.225

Date of Receiver : August 14, 2019

Date of Test : August 14, 2019 to August 30, 2019

Date of Report : August 30, 2019

This Test Report is Issued Under the Authority of :

Prepared by

Approved / Authorized Signer

  
Rose Hu / Engineer

  
Lori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

## Table of Contents

|  |           |
|--|-----------|
| <b>1. GENERAL INFORMATION .....</b>                              | <b>4</b>  |
| 1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST .....           | 4         |
| 1.2 RELATED SUBMITTAL(S) / GRANT (S) .....                       | 5         |
| 1.3 TEST METHODOLOGY .....                                       | 5         |
| 1.4 EQUIPMENT MODIFICATIONS .....                                | 5         |
| 1.5 SUPPORT DEVICE .....   | 5         |
| 1.6 TEST FACILITY AND LOCATION .....                             | 6         |
| 1.7 SUMMARY OF TEST RESULTS .....                                | 7         |
| <b>2. SYSTEM TEST CONFIGURATION .....</b>                        | <b>8</b>  |
| 2.1 EUT CONFIGURATION .....                                      | 8         |
| 2.2 SPECIAL ACCESSORIES .....                                    | 8         |
| 2.3 DESCRIPTION OF TEST MODES .....                              | 8         |
| 2.4 EUT EXERCISE .....   | 8         |
| <b>3. CONDUCTED EMISSIONS TEST .....</b>                         | <b>9</b>  |
| 3.1 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....           | 9         |
| 3.2 TEST CONDITION .....   | 9         |
| 3.3 MEASUREMENT RESULTS .....                                    | 9         |
| <b>4. FREQUENCY TOLERANCE .....</b>                              | <b>10</b> |
| 4.1 MEASUREMENT PROCEDURE .....                                  | 10        |
| 4.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....           | 10        |
| 4.3 MEASUREMENT RESULTS .....                                    | 11        |
| <b>5. 20DB BANDWIDTH .....</b>                                   | <b>12</b> |
| 5.1 MEASUREMENT PROCEDURE .....                                  | 12        |
| 5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....           | 12        |
| 5.3 MEASUREMENT RESULTS .....                                    | 12        |
| <b>6. RADIATED SPURIOUS EMISSIONS AND RESTRICTED BANDS .....</b> | <b>14</b> |
| 6.1 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....           | 14        |
| 6.2 MEASUREMENT PROCEDURE .....                                  | 15        |
| 6.3 LIMIT .....  | 16        |
| 6.4 MEASUREMENT RESULTS .....                                    | 16        |
| <b>7. ANTENNA APPLICATION .....</b>                              | <b>23</b> |
| 7.1 ANTENNA REQUIREMENT .....                                    | 23        |
| <b>8. TEST EQUIPMENT LIST .....</b>                              | <b>24</b> |



---

## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment under Test

Product Name : OCTOBO  
Main model number : OCTO-001  
Additional Model number : N/A  
Brand Name : Holyiot  
Power Supply : DC 6.0V (come from 4\* DC 1.5V AA battery)  
Adapter : N/A  
Power Supply : DC 6.0V (come from 4\* DC 1.5V AA battery)  
Model difference : N/A  
Hardware version : V1.0  
Software version : V1.0  
Serial number : N/A

#### Technical parameters

NFC Operation Frequency : 13.56MHz  
Modulation : ASK  
Number of Channel : 1  
Antenna Type : Loop antenna

## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **2AT7R2019OCTO1** filing to comply with Section 15.247 of the FCC Part 15(2017), Subpart C Rule.

## 1.3 Test Methodology

The radiated emission measurement was performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters. All other measurements were made in accordance with the procedures in 47 CFR part 2.

## 1.4 Equipment Modifications

Not available for this EUT intended for grant.

## 1.5 Support Device

None

## 1.6 Test Facility and Location

Listed by CNAS, August 14, 2018  
The certificate is valid until August 13, 2024  
The Laboratory has been assessed and proved to be in compliance with  
CNAS/CL01  
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017  
The certificate is valid until December 31, 2019  
The Laboratory has been assessed and proved to be in compliance with ISO17025  
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017  
The Designation Number is CN1214  
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017  
The Certificate Registration Number. Is 46405-9743

Dongguan NTC Co., Ltd.  
(Full Name: Dongguan Nore Testing Center Co., Ltd.)

Building D, Gaosheng Science and Technology Park, Hongtu Road,  
Nancheng District, Dongguan City, Guangdong, China  
(Full Name: Building D, Gaosheng Science & Technology Park,  
Zhouxi Longxi Road, Nancheng District, Dongguan, Guangdong, China.

### 1.7 Summary of Test Results

| FCC Rules          | Description Of Test                        | Uncertainty               | Result     |
|--------------------|--|---------------------------|------------|
| §15.207 (a)        | AC Power Conducted Emission                | N/A                       | N/A        |
| §15.225(a)(b)(c)   | Emission Mask                              | ±1.06dB                   | Compliance |
| §15.215            | 20dB Bandwidth                             | ±1.42 x10 <sup>-4</sup> % | Compliance |
| §15.225(e)         | Frequency tolerance                        | ±1.06dB                   | Compliance |
| §15.247(d)         | Band Edge and Conducted Spurious Emissions | ±1.70dB & ±2.51dB         | Compliance |
| §15.225(d),§15.209 | Radiated Spurious Emissions                | ±3.70dB                   | Compliance |
| §15.203            | Antenna Requirement                        | -----                     | Compliance |

Note: Due to this EUT is powered by button battery only, so the AC Power Conducted Emission is not applicable.

---

## 2. System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 Special Accessories

Not available for this EUT intended for grant.

### 2.3 Description of test modes

The EUT has been tested under continuous operating condition.

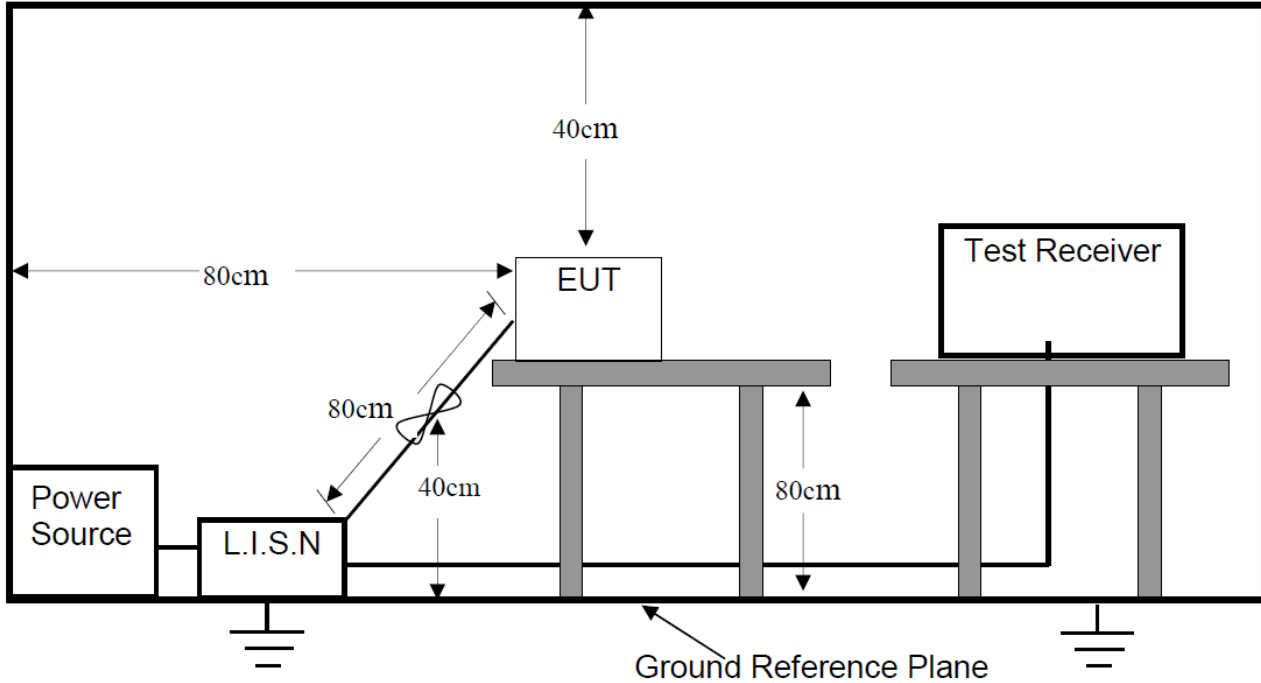
### 2.4 EUT Exercise

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.



### 3. Conducted Emissions Test

#### 3.1 Test SET-UP (Block Diagram of Configuration)



#### 3.2 Test Condition

Test Requirement: FCC Part 15.207

Frequency Range: 150KHz ~ 30MHz

Detector: RBW 9KHz, VBW 30KHz

Operation Mode: TX

#### 3.3 Measurement Results

Not Applicable.

## 4. Frequency Tolerance

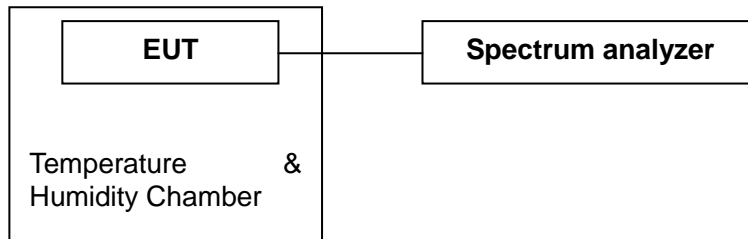
### 4.1 Measurement Procedure

Maximum Conducted Output power at Antenna Terminals, FCC Rules 15.225:

Limit:

- (a) The field strength of any emissions within the band 13.553-13.567MHz shall not exceed 15.848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553MHz and 13.567-13.710MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410MHz and 13.710-14.010MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010MHz band shall not exceed the general radiated emission limits in section 15.209.

### 4.2 Test SET-UP (Block Diagram of Configuration)



### 4.3 Measurement Results

Please refer to following table.

Modulation: GFSK  
 Temperature : 24 °C  
 Test By: Sance  
 Test Result: PASS

Humidity : 50 %  
 Test Date : August 26, 2019

| Test conditions |                | Test result<br>MHz | Deviation<br>KHz | Limit<br>KHz          | Result |
|-----------------|----------------|--------------------|------------------|-----------------------|--------|
| Temp<br>(°C)    | Volt<br>(V AC) |                    |                  |                       |        |
| -20             | 120            | 13.56008           | 0.08             | ±0.01%<br>(1.3560KHz) | PASS   |
| -10             | 120            | 13.56007           | 0.07             |                       | PASS   |
| 0               | 120            | 13.56008           | 0.08             |                       | PASS   |
| 10              | 120            | 13.56008           | 0.08             |                       | PASS   |
| 20              | 120            | 13.56009           | 0.09             |                       | PASS   |
| 30              | 120            | 13.56007           | 0.07             |                       | PASS   |
| 40              | 120            | 13.56008           | 0.08             |                       | PASS   |
| 50              | 120            | 13.56009           | 0.09             |                       | PASS   |
| 20              | 102            | 13.56010           | 0.10             |                       | PASS   |
|                 | 138            | 13.56008           | 0.08             |                       | PASS   |

Note: Deviation (KHz)=(Test result-13.56MHz)\*1000

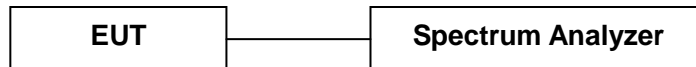
## 5. 20dB Bandwidth

### 5.1 Measurement Procedure

20dB Bandwidth, FCC Rule 15.215:

The antenna port of the EUT was connected to the input of a spectrum analyzer.

### 5.2 Test SET-UP (Block Diagram of Configuration)



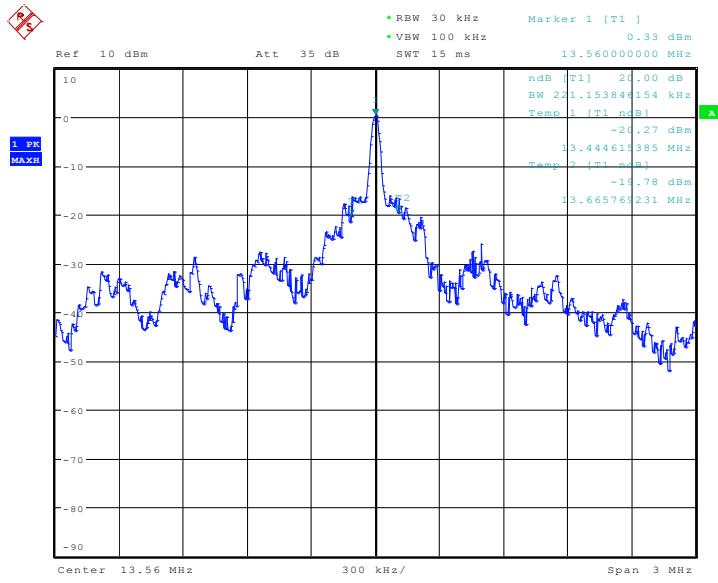
### 5.3 Measurement Results

Please refer to following table and plots.

|               |       |             |                 |
|---------------|-------|-------------|-----------------|
| Modulation:   | GFSK  | Humidity :  | 50 %            |
| Temperature : | 24 °C | Test Date : | August 29, 2019 |
| Test By:      | Sance |             |                 |
| Test Result:  | PASS  |             |                 |

| Frequency<br>MHz | 20dB Bandwidth<br>KHz |
|------------------|-----------------------|
| 13.56            | 221                   |

### 20dB bandwidth

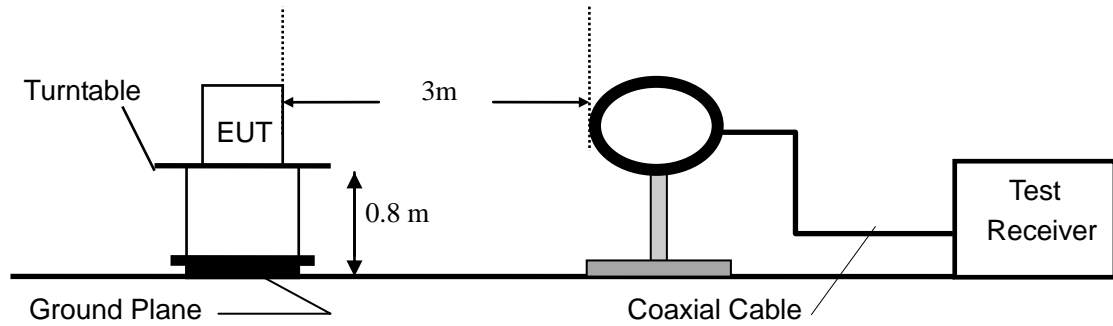


Date: 29.AUG.2019 16:20:41

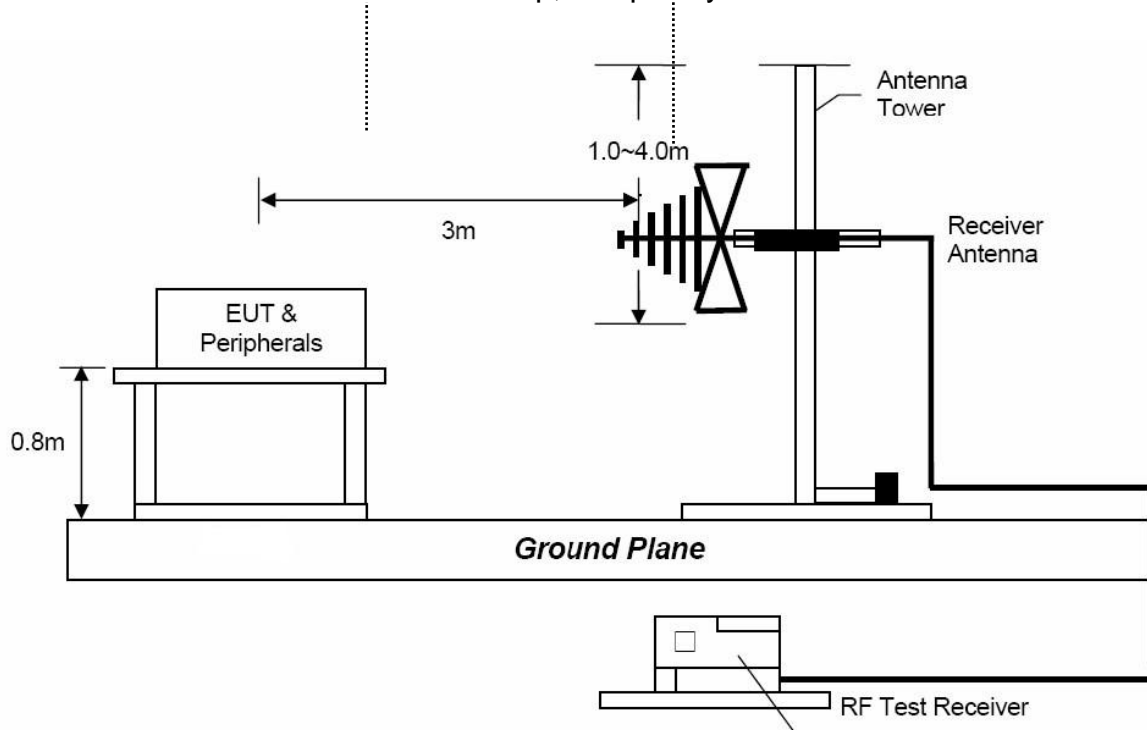
## 6. Radiated Spurious Emissions and Restricted Bands

### 6.1 Test SET-UP (Block Diagram of Configuration)

#### 6.1.1 Radiated Emission Test Set-Up, Frequency Below 30MHz



#### 6.1.2 Radiated Emission Test Set-Up, Frequency 30MHz-1000MHz



## 6.2 Measurement Procedure

- a. Blow 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.
- 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 height of antenna 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 and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.
- e. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. During the radiated emission test, the spectrum analyzer was set with the following configurations:

| Frequency Band (MHz) | Level | Resolution Bandwidth | Video Bandwidth |
|----------------------|-------|----------------------|-----------------|
| 30 to 1000           | QP    | 120 kHz              | 300 kHz         |

### 6.3 Limit

| Frequency range<br>MHz | Distance Meters | Field Strengths Limit (15.209) |
|------------------------|-----------------|--------------------------------|
|                        |                 | μV/m                           |
| 0.009 ~ 0.490          | 300             | 2400/F(kHz)                    |
| 0.490 ~ 1.705          | 30              | 24000/F(kHz)                   |
| 1.705 ~ 30             | 30              | 30                             |
| 30 ~ 88                | 3               | 100                            |
| 88 ~ 216               | 3               | 150                            |
| 216 ~ 960              | 3               | 200                            |

- Remark:
- (1) Emission level (dB)μV = 20 log Emission level μV/m
  - (2) The smaller limit shall apply at the cross point between two frequency bands.
  - (3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
  - (4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.
  - (5) §15.247(d) specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

### 6.4 Measurement Results

Please refer to following plots.

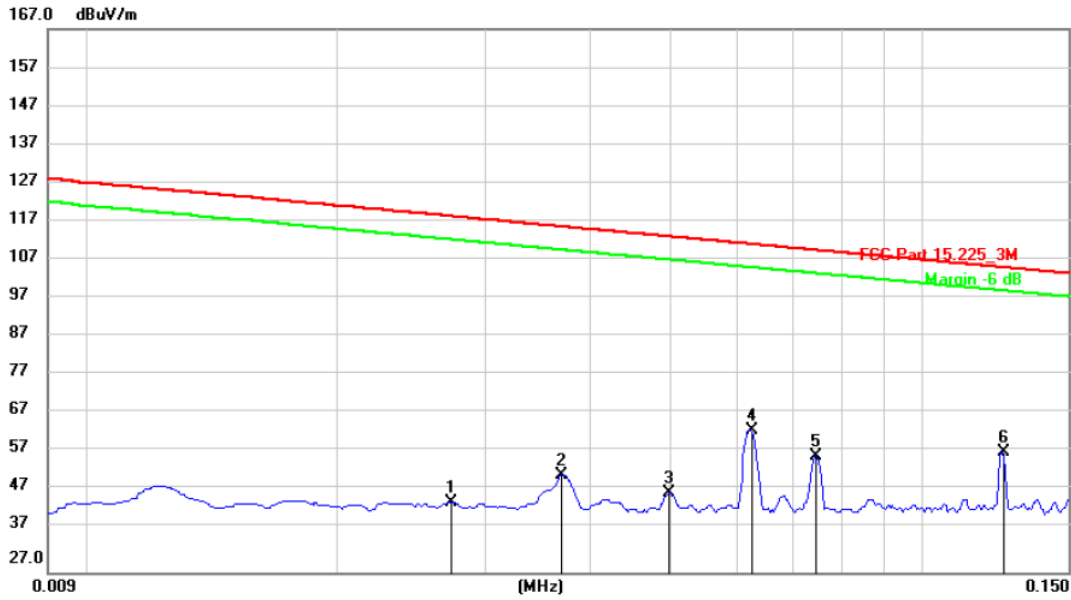




Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :M1 Data :#10 Date: 2019/8/20 Time: 9:18:24



Site: 3m Chamber  
 Limit: FCC Part 15.225\_3M  
 EUT: OCTOBO  
 M/N: OCTO-001  
 Mode: NFC  
 Note:

Polarization: **Horizontal** Temperature: 26  
 Power: DC6V Humidity: 60 %  
 Distance:

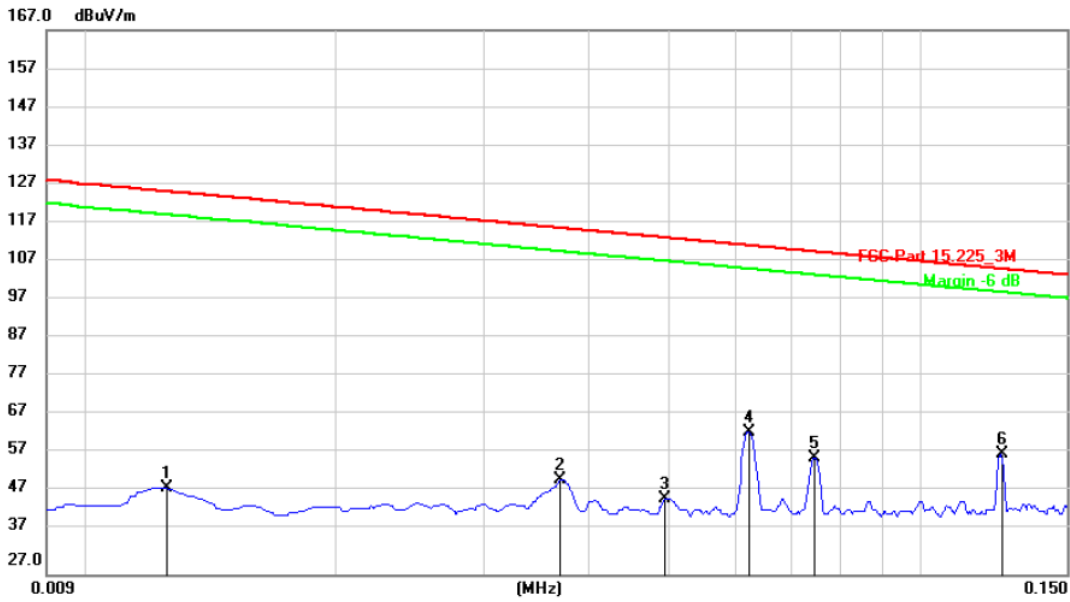
| No. Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |         |
|---------|--------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
|         | MHz    | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | cm             | degree       | Comment |
| 1       | 0.0273 | 12.83         | 32.26          | 45.09       | 118.74 | -73.65 | QP             |              |         |
| 2       | 0.0371 | 19.87         | 32.32          | 52.19       | 116.09 | -63.90 | QP             |              |         |
| 3       | 0.0498 | 15.13         | 32.36          | 47.49       | 113.55 | -66.06 | QP             |              |         |
| 4       | 0.0626 | 31.34         | 32.30          | 63.64       | 111.57 | -47.93 | QP             |              |         |
| 5       | 0.0747 | 24.55         | 32.30          | 56.85       | 110.05 | -53.20 | QP             |              |         |
| 6 *     | 0.1250 | 25.83         | 32.30          | 58.13       | 105.60 | -47.47 | QP             |              |         |



Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :M1                      Data :#9                      Date: 2019/8/20                      Time: 9:10:19



Site: 3m Chamber                      Polarization: **Vertical**                      Temperature: 26  
 Limit: FCC Part 15.225\_3M                      Power: DC6V                      Humidity: 60 %  
 EUT: OCTOBO                      Distance:  
 M/N: OCTO-001  
 Mode: NFC  
 Note:

| No. Mk. | Freq.  | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |
|---------|--------|---------------|----------------|-------------|--------|--------|----------------|--------------|
|         | MHz    | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | cm             | degree       |
| 1       | 0.0125 | 17.67         | 31.58          | 49.25       | 125.49 | -76.24 | QP             |              |
| 2       | 0.0371 | 19.08         | 32.32          | 51.40       | 116.09 | -64.69 | QP             |              |
| 3       | 0.0495 | 13.99         | 32.36          | 46.35       | 113.60 | -67.25 | QP             |              |
| 4       | 0.0623 | 31.34         | 32.30          | 63.64       | 111.61 | -47.97 | QP             |              |
| 5       | 0.0747 | 24.79         | 32.30          | 57.09       | 110.05 | -52.96 | QP             |              |
| 6 *     | 0.1250 | 25.55         | 32.30          | 57.85       | 105.60 | -47.75 | QP             |              |

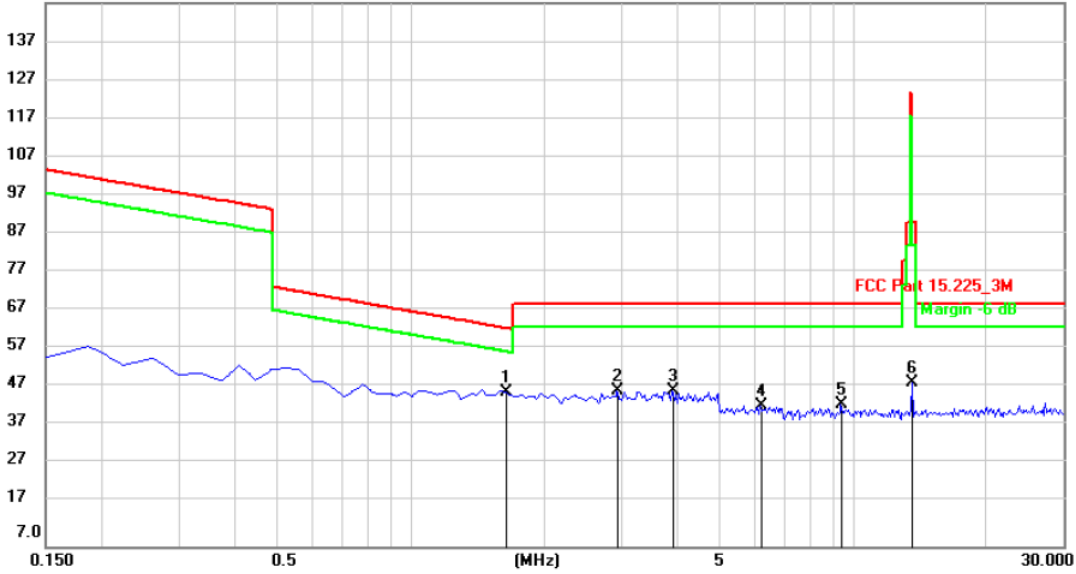


Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :M1                      Data :#7                      Date: 2019/8/20                      Time: 8:54:01

147.0 dBuV/m



Site: 3m Chamber  
 Limit: FCC Part 15.225\_3M  
 EUT: OCTOBO  
 M/N: OCTO-001  
 Mode: NFC  
 Note:

Polarization: *Horizontal*                      Temperature: 26  
 Power: DC6V                      Humidity: 60 %  
 Distance:

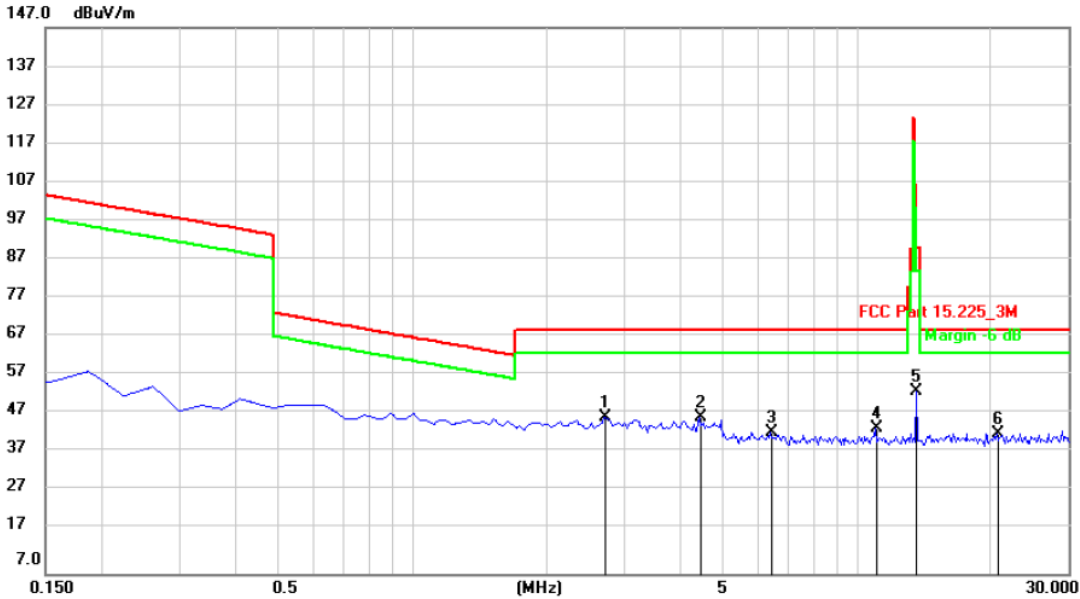
| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
|     |     | MHz     | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | cm             | degree       | Comment |
| 1   | *   | 1.6491  | 14.46         | 32.17          | 46.63       | 63.21  | -16.58 | QP             |              |         |
| 2   |     | 2.9483  | 14.81         | 32.17          | 46.98       | 69.54  | -22.56 | QP             |              |         |
| 3   |     | 3.9186  | 15.01         | 32.20          | 47.21       | 69.54  | -22.33 | QP             |              |         |
| 4   |     | 6.2318  | 11.03         | 32.24          | 43.27       | 69.54  | -26.27 | QP             |              |         |
| 5   |     | 9.4406  | 11.19         | 32.33          | 43.52       | 69.54  | -26.02 | QP             |              |         |
| 6   |     | 13.5600 | 16.89         | 32.33          | 49.22       | 124.00 | -74.78 | QP             |              |         |



Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :M1                      Data :#8                      Date: 2019/8/20                      Time: 9:02:54



Site: 3m Chamber  
 Limit: FCC Part 15.225\_3M  
 EUT: OCTOBO  
 M/N: OCTO-001  
 Mode: NFC  
 Note:

Polarization: **Vertical**                      Temperature: 26  
 Power: DC6V                      Humidity: 60 %  
 Distance:

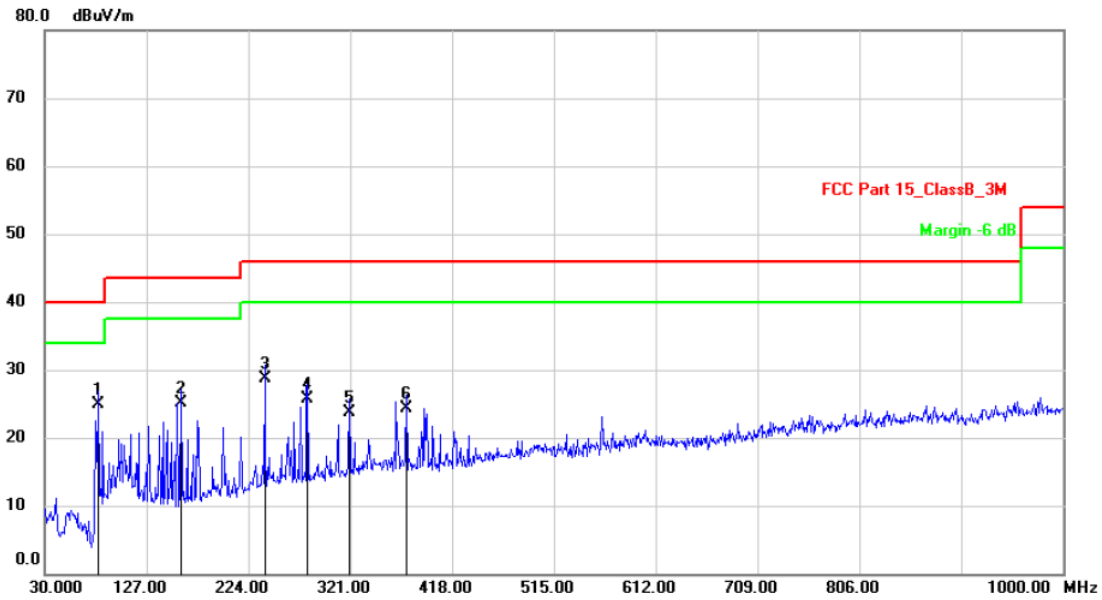
| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|---------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
|     |     | MHz     | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | cm             | degree       | Comment |
| 1   |     | 2.7246  | 14.81         | 32.17          | 46.98       | 69.54  | -22.56 | QP             |              |         |
| 2   | *   | 4.4408  | 14.82         | 32.21          | 47.03       | 69.54  | -22.51 | QP             |              |         |
| 3   |     | 6.4184  | 11.03         | 32.24          | 43.27       | 69.54  | -26.27 | QP             |              |         |
| 4   |     | 11.0824 | 11.81         | 32.36          | 44.17       | 69.54  | -25.37 | QP             |              |         |
| 5   |     | 13.5600 | 21.40         | 32.33          | 53.73       | 124.00 | -70.27 | QP             |              |         |
| 6   |     | 20.7836 | 10.72         | 32.30          | 43.02       | 69.54  | -26.52 | QP             |              |         |



Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :M1 Data :#3 Date: 2019/8/15 Time: 16:01:15



Site: 3m Chamber

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Part 15\_ClassB\_3M

Power: DC6V

Humidity: 47 %

EUT: OCTOBO

Distance: 3m

M/N: OCTO-001

Mode: NFC

Note:

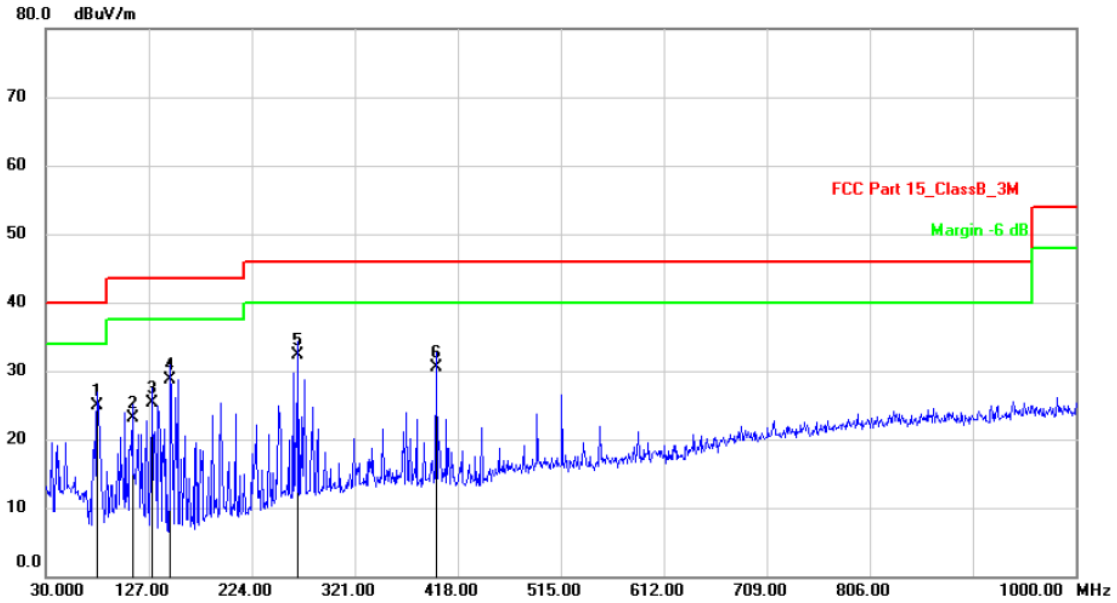
| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
|     |     | MHz      | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | cm             | degree       | Comment |
| 1   | *   | 81.4100  | 40.77         | -15.87         | 24.90       | 40.00  | -15.10 | QP             |              |         |
| 2   |     | 159.9800 | 40.26         | -15.16         | 25.10       | 43.50  | -18.40 | QP             |              |         |
| 3   |     | 239.5200 | 40.76         | -12.06         | 28.70       | 46.00  | -17.30 | QP             |              |         |
| 4   |     | 280.2600 | 36.77         | -10.97         | 25.80       | 46.00  | -20.20 | QP             |              |         |
| 5   |     | 320.0300 | 33.63         | -9.93          | 23.70       | 46.00  | -22.30 | QP             |              |         |
| 6   |     | 374.3500 | 33.48         | -9.18          | 24.30       | 46.00  | -21.70 | QP             |              |         |



Dongguan NTC Co., Ltd.  
 Tel:+86-769-22022444 Fax:+86-769-22022799  
 Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

**Radiated Emission Measurement**

File :M1 Data :#4 Date: 2019/8/15 Time: 16:08:32



Site: 3m Chamber Polarization: **Vertical** Temperature: 26  
 Limit: FCC Part 15\_ClassB\_3M Power: DC6V Humidity: 47 %  
 EUT: OCTOBO Distance: 3m  
 M/N: OCTO-001  
 Mode: NFC  
 Note:

| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   | Antenna Height | Table Degree |         |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
|     |     | MHz      | dBuV          | dB/m           | dBuV/m      | dBuV/m | dB     | cm             | degree       | Comment |
| 1   |     | 78.5000  | 44.00         | -19.10         | 24.90       | 40.00  | -15.10 | QP             |              |         |
| 2   |     | 111.4800 | 39.22         | -16.12         | 23.10       | 43.50  | -20.40 | QP             |              |         |
| 3   |     | 129.9100 | 43.55         | -18.15         | 25.40       | 43.50  | -18.10 | QP             |              |         |
| 4   |     | 147.3700 | 47.35         | -18.55         | 28.80       | 43.50  | -14.70 | QP             |              |         |
| 5   | *   | 267.6500 | 45.54         | -13.24         | 32.30       | 46.00  | -13.70 | QP             |              |         |
| 6   |     | 397.6300 | 41.73         | -11.13         | 30.60       | 46.00  | -15.40 | QP             |              |         |

---

## 7. Antenna Application

### 7.1 Antenna requirement

According to of FCC part 15C section 15.203 and 15.240:

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 loop antenna and no consideration of replacement.

## 8. Test Equipment List

| Description                    | Manufacturer    | Model Number | Serial Number | Characteristics | Calibration Date | Calibration Due Date |
|--------------------------------|-----------------|--------------|---------------|-----------------|------------------|----------------------|
| Test Receiver                  | Rohde & Schwarz | ESCI7        | 100837        | 9KHz~7GHz       | Mar. 13, 2019    | Mar. 12, 2020        |
| Antenna                        | Schwarzbeck     | VULB9162     | 9162-010      | 30MHz~7GHz      | Mar. 14, 2019    | Mar. 13, 2020        |
| Cable                          | Huber+Suhner    | CBL2-NN-1M   | 22390001      | 9KHz~7GHz       | Mar. 13, 2019    | Mar. 12, 2020        |
| Cable                          | Huber+Suhner    | CIL02        | N/A           | 9KHz~7GHz       | Mar. 13, 2019    | Mar. 12, 2020        |
| RF Cable                       | Huber+Suhner    | SF-104       | MY16559/4     | 9KHz~25GHz      | Apr. 25, 2019    | Apr. 25, 2020        |
| Power Amplifier                | HP              | HP 8447D     | 1145A00203    | 100KHz~1.3GHz   | Mar. 13, 2019    | Mar. 12, 2020        |
| Horn Antenna                   | Schwarzbeck     | BBHA9170     | 9170-242      | 15GHz~40GHz     | Mar. 13, 2019    | Mar. 12, 2020        |
| Horn Antenna                   | Com-Power       | AH-118       | 071078        | 1GHz~18GHz      | Mar. 14, 2019    | Mar. 13, 2020        |
| RF Cable                       | Huber+Suhner    | SF-104       | N/A           | 9KHz~40GHz      | Apr. 25, 2019    | Apr. 25, 2020        |
| Loop antenna                   | Daze            | ZA30900A     | 0708          | 9KHz~30MHz      | Apr. 25, 2019    | Apr. 25, 2020        |
| Spectrum Analyzer              | Rohde & Schwarz | FSU26        | 200409/026    | 20Hz~26.5GHz    | Apr. 25, 2019    | Apr. 25, 2020        |
| Spectrum Analyzer              | Rohde & Schwarz | FSV40        | 101003        | 10Hz~40GHz      | Apr. 06, 2019    | Apr. 05, 2020        |
| Pre-Amplifier                  | EMCI            | EMC 184045   | 980102        | 18GHz~40GHz     | Nov. 02, 2018    | Nov. 01, 2019        |
| Pre-Amplifier                  | Agilent         | 8449B        | 3008A02964    | 1GHz~26.5GHz    | Apr. 25, 2019    | Apr. 25, 2020        |
| L.I.S.N.                       | Rohde & Schwarz | ENV 216      | 101317        | 9KHz~30MHz      | Mar. 13, 2019    | Mar. 12, 2020        |
| Temporary antenna connector    | TESCOM          | SS402        | N/A           | 9KHz-25GHz      | N/A              | N/A                  |
| Power Meter                    | Anritsu         | ML2495A      | 1139001       | 100k-65GHz      | Nov. 02, 2018    | Nov. 01, 2019        |
| Temperature & Humidity Chamber | REMAFEE         | SYHR225L     | N/A           | N/A             | Apr. 24, 2019    | Apr. 23, 2020        |

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.

---End---