



## Shenzhen Huaxia Testing Technology Co., Ltd

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# FCC Test Report

**Report No. :** CQASZ20180800081E-01

**Applicant:** SHENZHEN HUBSAN TECHNOLOGY CO., LTD.

**Address of Applicant:** 13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054

**Manufacturer:** SHENZHEN HUBSAN TECHNOLOGY CO., LTD.

**Address of Manufacturer:** 13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054

**Factory:** Dongguan Tengsheng Industrial Co., Ltd.

**Address of Factory:** A22# Luyi Street, Tianxin Village, Tangxia Town, Dongguan, China.

**Equipment Under Test (EUT):**

**Product:** Video Streaming

**Model No.:** F22

**Brand Name:** HUBSAN

**FCC ID:** 2AN75-F22RX

**Standards:** 47 CFR Part 15, Subpart C

**Date of Test:** 2018-08-23 to 2018-08-31

**Date of Issue:** 2018-09-05

**Test Result :** **PASS\***

**Tested By:**

*Tiny You*

(Tiny You)

**Reviewed By:**

*Aaron Ma*

(Aaron Ma)

**Approved By:**

*Jack Ai*

( Jack Ai)



\* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

## 2 Version

### Revision History Of Report

| Report No.           | Version | Description    | Issue Date |
|----------------------|---------|----------------|------------|
| CQASZ20180800081E-01 | Rev.01  | Initial report | 2018-09-05 |

### 3 Test Summary

| Test Item                                                         | Test Requirement                                    | Test method        | Result |
|-------------------------------------------------------------------|-----------------------------------------------------|--------------------|--------|
| Antenna Requirement                                               | 47 CFR Part 15, Subpart C Section 15.203            | ANSI C63.10 (2013) | PASS   |
| AC Power Line Conducted Emission                                  | 47 CFR Part 15, Subpart C Section 15.207            | ANSI C63.10 (2013) | N/A    |
| Field Strength of the Fundamental Signal                          | 47 CFR Part 15, Subpart C Section 15.249 (a)        | ANSI C63.10 (2013) | PASS   |
| Spurious Emissions                                                | 47 CFR Part 15, Subpart C Section 15.249 (a)/15.209 | ANSI C63.10 (2013) | PASS   |
| Restricted bands around fundamental frequency (Radiated Emission) | 47 CFR Part 15, Subpart C Section 15.249(a)/15.205  | ANSI C63.10 (2013) | PASS   |
| 20dB Occupied Bandwidth                                           | 47 CFR Part 15, Subpart C Section 15.215 (c)        | ANSI C63.10 (2013) | PASS   |

N/A: Not applicable, This EUT is battery power

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## 5 General Information

### 5.1 Client Information

|                          |                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------|
| Applicant:               | SHENZHEN HUBSAN TECHNOLOGY CO., LTD                                                                        |
| Address of Applicant:    | 13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054 |
| Manufacturer:            | SHENZHEN HUBSAN TECHNOLOGY CO., LTD                                                                        |
| Address of Manufacturer: | 13th Floor, Bldg 1C, Shenzhen Software Industry Base, Xuefu Road, Nanshan District, Shenzhen, China 518054 |
| Factory:                 | Dongguan Tengsheng Industrial Co., Ltd.                                                                    |
| Address of Factory:      | A22# Luyi Street, Tianxin Village, Tangxia Town, Dongguan, China.                                          |

### 5.2 General Description of EUT

|                       |                                 |
|-----------------------|---------------------------------|
| Name:                 | Video Streaming                 |
| Model No.:            | F22                             |
| Trade Mark :          | HUBSAN                          |
| Hardware Version:     | V1.0                            |
| Software Version:     | V1.0                            |
| Frequency Range:      | 2410 MHz ~ 2465MHz              |
| Modulation Type:      | GFSK                            |
| Number of Channels:   | 12 (declared by the client)     |
| Sample Type:          | Mobile Product                  |
| Test Software of EUT: | RF test (manufacturer declare ) |
| Antenna Type:         | Integral antenna                |
| Antenna Gain:         | 1.0dBi                          |
| Power Supply:         | LiPo battery, DC7.6V            |

| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| /                                   | /         | 4       | 2425MHz   | 8       | 2445MHz   | 12      | 2465MHz   |
| 1                                   | 2410MHz   | 5       | 2430MHz   | 9       | 2450MHz   | /       | /         |
| 2                                   | 2415MHz   | 6       | 2435MHz   | 10      | 2455MHz   | /       | /         |
| 3                                   | 2420MHz   | 7       | 2440MHz   | 11      | 2460MHz   | /       | /         |

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:

| Channel                   | Frequency |
|---------------------------|-----------|
| The Lowest channel(CH1)   | 2410MHz   |
| The Middle channel(CH6)   | 2435MHz   |
| The Highest channel(CH12) | 2465MHz   |

### 5.3 Test Environment and Mode

| Operating Environment: |                                                                                                                                       |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Temperature:           | 24.0 °C                                                                                                                               |
| Humidity:              | 52 % RH                                                                                                                               |
| Atmospheric Pressure:  | 1008 mbar                                                                                                                             |
| Test Mode:             | Use test software (RF test) to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT. |

### 5.4 Description of Support Units

The EUT has been tested with associated equipment below.

| Description | Manufacturer | Model No.      | Remark         | FCC certification |
|-------------|--------------|----------------|----------------|-------------------|
| PC          | Lenovo       | ThinkPad E450c | Provide by lab | FCC ID            |

### 5.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **CQA** laboratory is reported:

| Test                  | Range      | Uncertainty | Notes |
|-----------------------|------------|-------------|-------|
| Radiated Emission     | Below 1GHz | ±5.12dB     | (1)   |
| Radiated Emission     | Above 1GHz | ±4.60dB     | (1)   |
| Conducted Disturbance | 0.15~30MHz | ±3.34dB     | (1)   |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 5.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

## 5.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L5785)**

CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **ISED Registration No.: 22984-1**

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

- **A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

- **FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

## 5.8 Deviation from Standards

None.

## 5.9 Abnormalities from Standard Conditions

None.

## 5.10 Other Information Requested by the Customer

None.

## 5.11 Equipment List

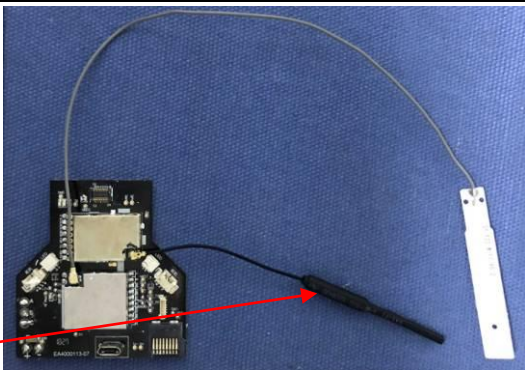
| Item | Test Equipment             | Manufacturer | Model No.              | Instrument No. | Calibration Due Date |
|------|----------------------------|--------------|------------------------|----------------|----------------------|
| 1    | EMI Test Receiver          | R&S          | ESR7                   | CQA-005        | 2018/9/24            |
| 2    | Spectrum analyzer          | R&S          | FSU26                  | CQA-038        | 2018/9/24            |
| 3    | Preamplifier               | MITEQ        | AFS4-00010300-18-10P-4 | CQA-035        | 2018/9/24            |
| 4    | Preamplifier               | MITEQ        | AMF-6D-02001800-29-20P | CQA-036        | 2018/9/24            |
| 5    | Loop antenna               | Schwarzbeck  | FMZB1516               | CQA-087        | 2019/3/21            |
| 6    | Bilog Antenna              | R&S          | HL562                  | CQA-011        | 2018/9/24            |
| 7    | Horn Antenna               | R&S          | HF906                  | CQA-012        | 2018/9/24            |
| 8    | Horn Antenna               | Schwarzbeck  | BBHA 9170              | CQA-088        | 2018/9/24            |
| 9    | Coax cable<br>(9KHz~40GHz) | CQA          | RE-low-01              | CQA-077        | 2018/9/24            |
| 10   | Coax cable<br>(9KHz~40GHz) | CQA          | RE-high-02             | CQA-078        | 2018/9/24            |
| 11   | Antenna Connector          | CQA          | RFC-01                 | CQA-080        | 2018/9/24            |
| 12   | RF cable(9KHz~40GHz)       | CQA          | RF-01                  | CQA-079        | 2018/9/24            |

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.

## 6 Test results and Measurement Data

### 6.1 Antenna Requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 47 CFR Part 15C Section 15.203                                                                     |
| <p>15.203 requirement:</p> <p>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.</p> |                                                                                                    |
| <b>EUT Antenna:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  <p>Antenna</p> |
| <p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.0dBi.</p>                                                                                                                                                                                                                                                                                                                                                   |                                                                                                    |

## 6.2 Radiated Emission

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      |                                   |                 |               |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------|-----------------|---------------|--------------------------|
| Test Requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 47 CFR Part 15C Section 15.249 and 15.209 and 15.205 |                                   |                 |               |                          |
| Test Method:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ANSI C63.10: 2013                                    |                                   |                 |               |                          |
| Test Site:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Measurement Distance: 3m (Semi-Anechoic Chamber)     |                                   |                 |               |                          |
| Receiver Setup:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Frequency                                            | Detector                          | RBW             | VBW           | Remark                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.009MHz-0.090MHz                                    | Peak                              | 10kHz           | 30KHz         | Peak                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.009MHz-0.090MHz                                    | Average                           | 10kHz           | 30KHz         | Average                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.090MHz-0.110MHz                                    | Quasi-peak                        | 10kHz           | 30KHz         | Quasi-peak               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.110MHz-0.490MHz                                    | Peak                              | 10kHz           | 30KHz         | Peak                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.110MHz-0.490MHz                                    | Average                           | 10kHz           | 30KHz         | Average                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.490MHz -30MHz                                      | Quasi-peak                        | 10kHz           | 30kHz         | Quasi-peak               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30MHz-1GHz                                           | Quasi-peak                        | 100 kHz         | 300KHz        | Quasi-peak               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Above 1GHz                                           | Peak                              | 1MHz            | 3MHz          | Peak                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      | Peak                              | 1MHz            | 10Hz          | Average                  |
| Note: For fundamental frequency, RBW=5MHz, VBW=5MHz, Peak detector is for PK value, RMS detector is for Average value.                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                      |                                   |                 |               |                          |
| Limit:<br>(Spurious Emissions and band edge)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Frequency                                            | Field strength (microvolt/meter ) | Limit (dBuV/m ) | Remark        | Measurement distance (m) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.009MHz-0.490MHz                                    | 2400/F(kHz)                       | -               | -             | 300                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.490MHz-1.705MHz                                    | 24000/F(kHz)                      | -               | -             | 30                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1.705MHz-30MHz                                       | 30                                | -               | -             | 30                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30MHz-88MHz                                          | 100                               | 40.0            | Quasi-peak    | 3                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 88MHz-216MHz                                         | 150                               | 43.5            | Quasi-peak    | 3                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 216MHz-960MHz                                        | 200                               | 46.0            | Quasi-peak    | 3                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 960MHz-1GHz                                          | 500                               | 54.0            | Quasi-peak    | 3                        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Above 1GHz                                           | 500                               | 54.0            | Average       | 3                        |
| Note: 1) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.<br><br>2) 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. |                                                      |                                   |                 |               |                          |
| Limit:<br>(Field strength of the fundamental signal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Frequency                                            | Limit (dBuV/m @3m)                |                 | Remark        |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2400MHz-2483.5MHz                                    | 94.0                              |                 | Average Value |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                      | 114.0                             |                 | Peak Value    |                          |

Test Setup:

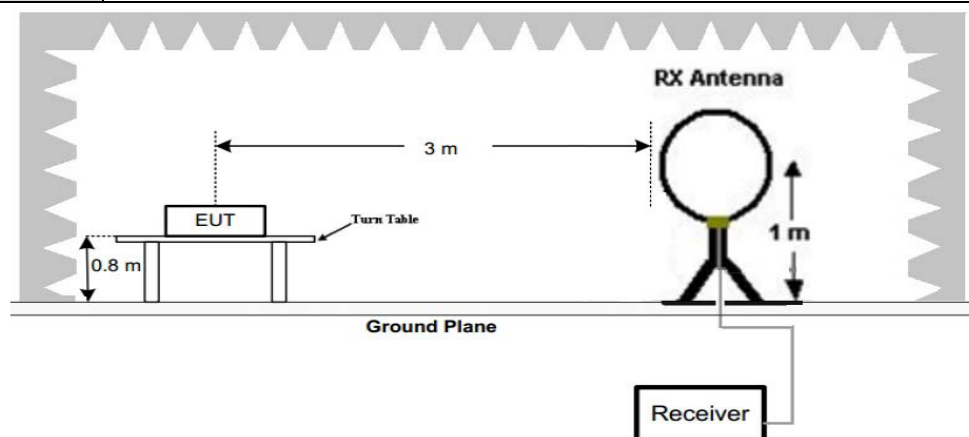


Figure 1. Below 30MHz

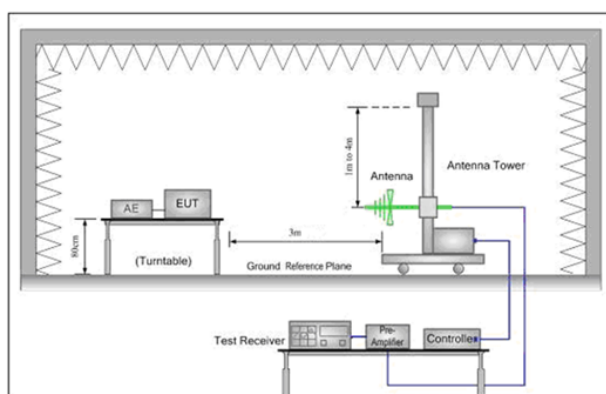


Figure 2. 30MHz to 1GHz

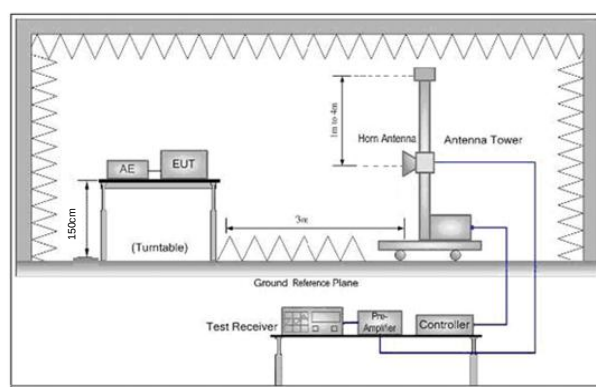


Figure 3. Above 1 GHz

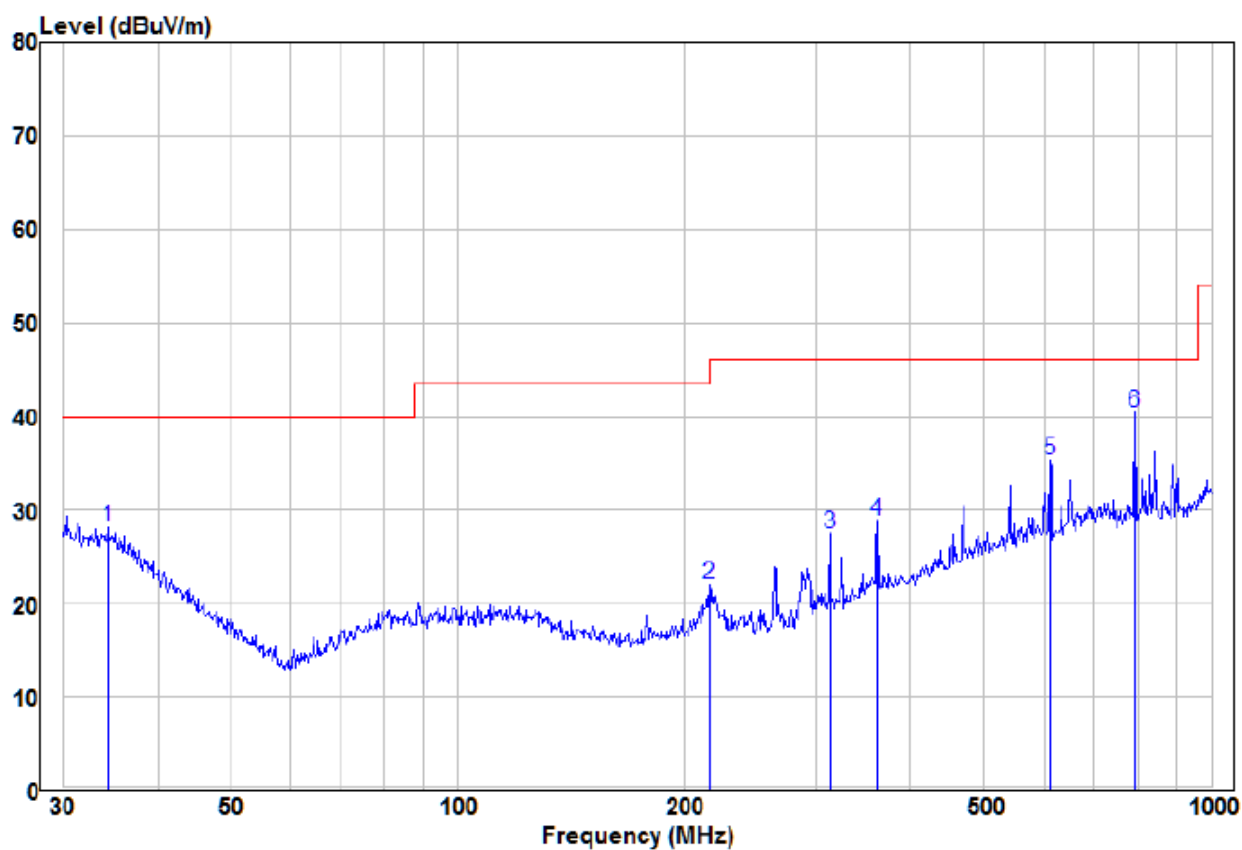
Test Procedure:

- a. 1) Below 1G: 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.  
 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 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.  
 Note: For the radiated emission test above 1GHz:  
 Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 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

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p> <p>g. Test the EUT in the lowest channel,the middle channel,the Highest channel</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> |
| Exploratory Test Mode: | Transmitting mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Final Test Mode:       | <p>Pretest the EUT at Transmitting mode, For below 1GHz part, through pre-scan, the worst case is the highest channel.</p> <p>Only the worst case is recorded in the report.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Test Voltage:          | DC7.6V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

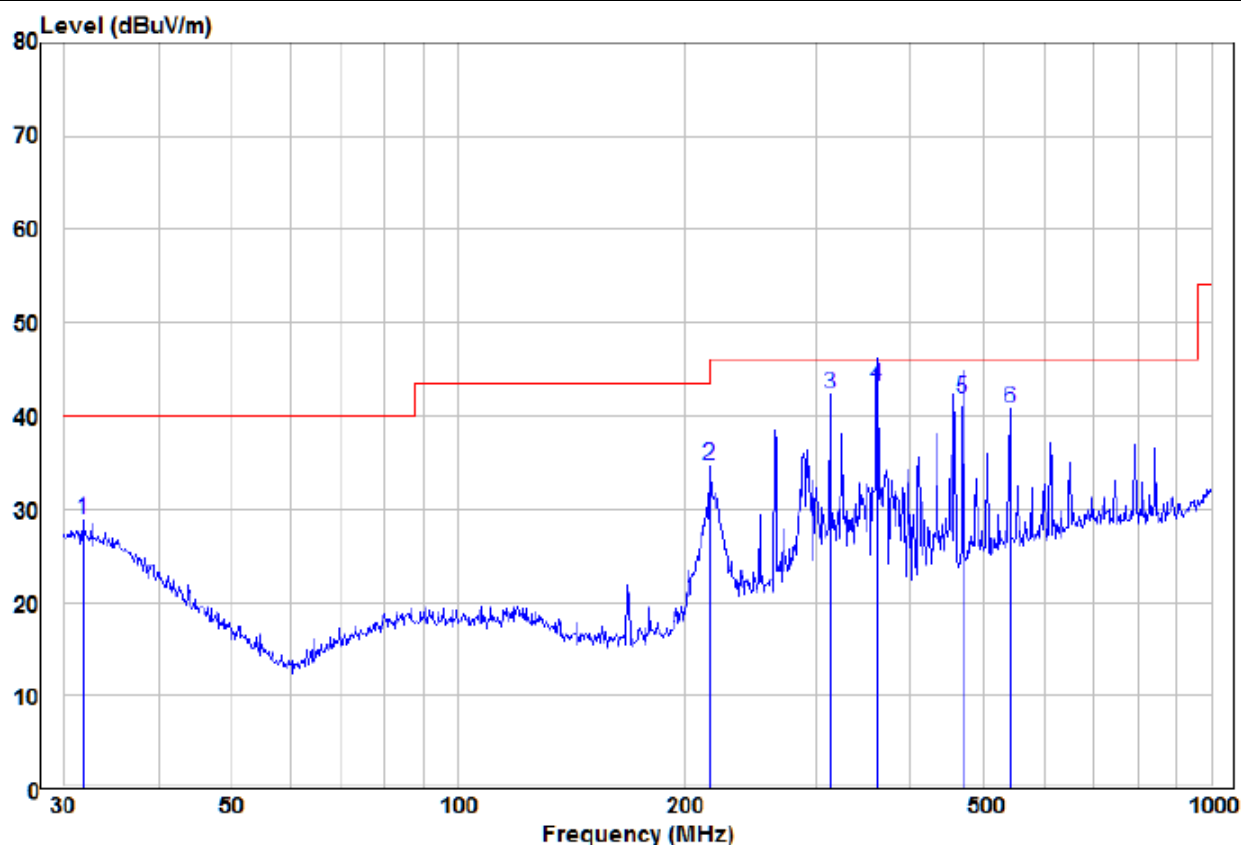
Measurement Data

| 30MHz~1GHz |              |          |
|------------|--------------|----------|
| Test mode: | Transmitting | Vertical |



|      | Freq   | Read Level | Factor | Level  | Limit Line | Over Limit | Remark | Pol/Phase |
|------|--------|------------|--------|--------|------------|------------|--------|-----------|
|      | MHz    | dBuV       | dB/m   | dBuV/m | dBuV/m     | dB         |        |           |
| 1    | 34.40  | 9.66       | 18.56  | 28.22  | 40.00      | -11.78     | Peak   | VERTICAL  |
| 2    | 216.02 | 11.96      | 9.98   | 21.94  | 46.00      | -24.06     | Peak   | VERTICAL  |
| 3    | 312.18 | 15.77      | 11.72  | 27.49  | 46.00      | -18.51     | Peak   | VERTICAL  |
| 4    | 360.45 | 15.17      | 13.69  | 28.86  | 46.00      | -17.14     | Peak   | VERTICAL  |
| 5    | 612.06 | 16.83      | 18.50  | 35.33  | 46.00      | -10.67     | Peak   | VERTICAL  |
| 6 pp | 793.40 | 19.76      | 20.66  | 40.42  | 46.00      | -5.58      | Peak   | VERTICAL  |

|            |              |            |
|------------|--------------|------------|
| Test mode: | Transmitting | Horizontal |
|------------|--------------|------------|



|      |        | Read  |        |        | Limit  | Over   |        |            |
|------|--------|-------|--------|--------|--------|--------|--------|------------|
|      | Freq   | Level | Factor | Level  | Line   | Limit  | Remark | Pol/Phase  |
|      | MHz    | dBuV  | dB/m   | dBuV/m | dBuV/m | dB     |        |            |
| 1    | 31.84  | 10.06 | 18.76  | 28.82  | 40.00  | -11.18 | Peak   | HORIZONTAL |
| 2    | 216.02 | 24.72 | 9.98   | 34.70  | 46.00  | -11.30 | Peak   | HORIZONTAL |
| 3 pk | 312.18 | 30.59 | 11.72  | 42.31  | 46.00  | -3.69  | Peak   | HORIZONTAL |
| 4 pp | 360.45 | 29.47 | 13.69  | 43.16  | 46.00  | -2.84  | QP     | HORIZONTAL |
| 5    | 468.88 | 25.61 | 16.25  | 41.86  | 46.00  | -4.14  | QP     | HORIZONTAL |
| 6    | 541.37 | 23.33 | 17.41  | 40.74  | 46.00  | -5.26  | Peak   | HORIZONTAL |

| Above 1GHz |               |              |                |               |        |               |           |
|------------|---------------|--------------|----------------|---------------|--------|---------------|-----------|
| Test mode: |               | Transmitting |                | Test channel: |        | Lowest        |           |
| Frequency  | Meter Reading | Factor       | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)      | (dBμV)        | (dB)         | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2390       | 59.00         | -9.2         | 49.80          | 74            | -24.20 | Peak          | H         |
| 2390       | 44.88         | -9.2         | 35.68          | 54            | -18.32 | AVG           | H         |
| 2400       | 59.28         | -9.39        | 49.89          | 74            | -24.11 | Peak          | H         |
| 2400       | 46.50         | -9.39        | 37.11          | 54            | -16.89 | AVG           | H         |
| 2410       | 104.32        | -9.33        | 94.99          | 114           | -19.01 | peak          | H         |
| 2410       | 97.65         | -9.33        | 88.32          | 94            | -5.68  | AVG           | H         |
| 4820       | 51.99         | -4.03        | 47.96          | 74            | -26.04 | peak          | H         |
| 4820       | 37.61         | -4.03        | 33.58          | 54            | -20.42 | AVG           | H         |
| 7230       | 50.26         | 1.66         | 51.92          | 74            | -22.08 | peak          | H         |
| 7230       | 37.90         | 1.66         | 39.56          | 54            | -14.44 | AVG           | H         |
| 2390       | 58.74         | -9.2         | 49.54          | 74            | -24.46 | peak          | V         |
| 2390       | 44.08         | -9.2         | 34.88          | 54            | -19.12 | AVG           | V         |
| 2400       | 60.06         | -9.39        | 50.67          | 74            | -23.33 | peak          | V         |
| 2400       | 46.40         | -9.39        | 37.01          | 54            | -16.99 | AVG           | V         |
| 2410       | 106.45        | -9.33        | 97.12          | 114           | -16.88 | peak          | V         |
| 2410       | 98.76         | -9.34        | 89.42          | 94            | -4.58  | AVG           | V         |
| 4820       | 53.33         | -4.03        | 49.30          | 74            | -24.70 | peak          | V         |
| 4820       | 37.47         | -4.03        | 33.44          | 54            | -20.56 | AVG           | V         |
| 7230       | 50.80         | 1.66         | 52.46          | 74            | -21.54 | peak          | V         |
| 7230       | 37.42         | 1.66         | 39.08          | 54            | -14.92 | AVG           | V         |

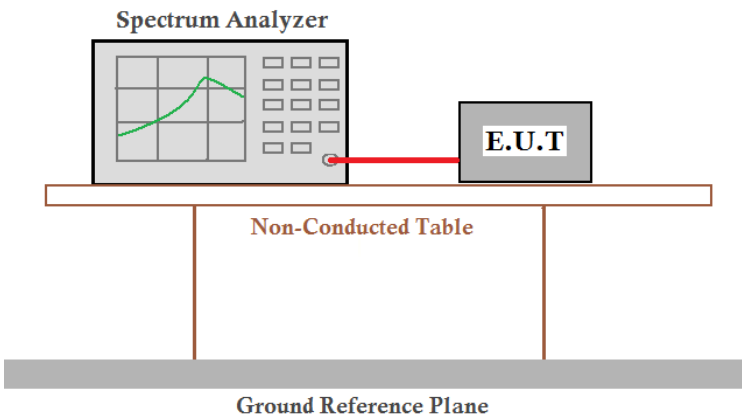
| Test mode: |               | Transmitting |                | Test channel: |        | Middle        |           |
|------------|---------------|--------------|----------------|---------------|--------|---------------|-----------|
| Frequency  | Meter Reading | Factor       | Emission Level | Limits        | Over   | Detector Type | Ant. Pol. |
| (MHz)      | (dBμV)        | (dB)         | (dBμV/m)       | (dBμV/m)      | (dB)   |               | H/V       |
| 2435       | 102.65        | -9.37        | 93.28          | 114           | -20.72 | peak          | H         |
| 2435       | 96.47         | -9.37        | 87.1           | 94            | -6.9   | AVG           | H         |
| 4870       | 52.48         | -4.26        | 48.22          | 74            | -25.78 | peak          | H         |
| 4870       | 36.03         | -4.26        | 31.77          | 54            | -22.23 | AVG           | H         |
| 7305       | 50.71         | 1.18         | 51.89          | 74            | -22.11 | peak          | H         |
| 7305       | 38.12         | 1.18         | 39.30          | 54            | -14.70 | AVG           | H         |
| 2435       | 106.39        | -9.36        | 97.03          | 114           | -16.97 | peak          | V         |
| 2435       | 97.16         | -9.36        | 87.8           | 94            | -6.2   | AVG           | V         |
| 4870       | 55.18         | -4.26        | 50.92          | 74            | -23.08 | peak          | V         |
| 4870       | 38.21         | -4.26        | 33.95          | 54            | -20.05 | AVG           | V         |
| 7305       | 51.07         | 1.18         | 52.25          | 74            | -21.75 | peak          | V         |
| 7305       | 35.40         | 1.18         | 36.58          | 54            | -17.42 | AVG           | V         |

| Test mode:  |               | Transmitting |                | Test channel: |               | Highest       |           |
|-------------|---------------|--------------|----------------|---------------|---------------|---------------|-----------|
| Frequency   | Meter Reading | Factor       | Emission Level | Limits        | Over          | Detector Type | Ant. Pol. |
| (MHz)       | (dBμV)        | (dB)         | (dBμV/m)       | (dBμV/m)      | (dB)          |               | H/V       |
| 2465        | 103.54        | -9.23        | 94.31          | 114           | -19.69        | peak          | H         |
| 2465        | 97.15         | -9.23        | 87.92          | 94            | -6.08         | AVG           | H         |
| 2483.5      | 57.67         | -9.29        | 48.38          | 74            | -25.62        | Peak          | H         |
| 2483.5      | 44.44         | -9.29        | 35.15          | 54            | -18.85        | AVG           | H         |
| 4930        | 51.50         | -4.03        | 47.47          | 74            | -26.53        | peak          | H         |
| 4930        | 38.86         | -4.03        | 34.83          | 54            | -19.17        | AVG           | H         |
| 7395        | 50.50         | 1.66         | 52.16          | 74            | -21.84        | peak          | H         |
| 7395        | 37.44         | 1.66         | 39.10          | 54            | -14.90        | AVG           | H         |
| <b>2465</b> | <b>107.42</b> | <b>-9.23</b> | <b>98.19</b>   | <b>114</b>    | <b>-15.81</b> | <b>peak</b>   | <b>V</b>  |
| 2465        | 98.13         | -9.23        | 88.9           | 94            | -5.1          | AVG           | V         |
| 2483.5      | 57.84         | -9.29        | 48.55          | 74            | -25.45        | peak          | V         |
| 2483.5      | 46.36         | -9.29        | 37.07          | 54            | -16.93        | AVG           | V         |
| 4930        | 53.91         | -4.03        | 49.88          | 74            | -24.12        | peak          | V         |
| 4930        | 38.64         | -4.03        | 34.61          | 54            | -19.39        | AVG           | V         |
| 7395        | 51.09         | 1.66         | 52.75          | 74            | -21.25        | peak          | V         |
| 7395        | 36.58         | 1.66         | 38.24          | 54            | -15.76        | AVG           | V         |

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, The disturbance above 10GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

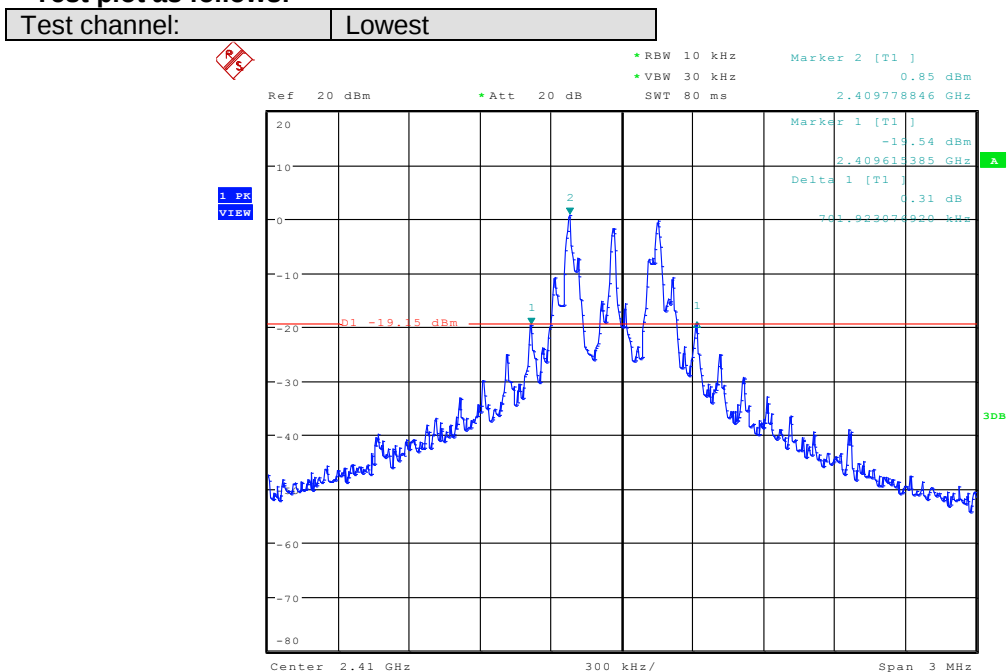
### 6.3 20dB Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.215                                                                                                                                                                                                                                                                                                                                                                 |
| Test Method:      | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                               |
| Test Setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.</p> |
| Test Mode:        | Transmitting with GFSK modulation.                                                                                                                                                                                                                                                                                                                                                             |
| Limit:            | N/A                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                           |

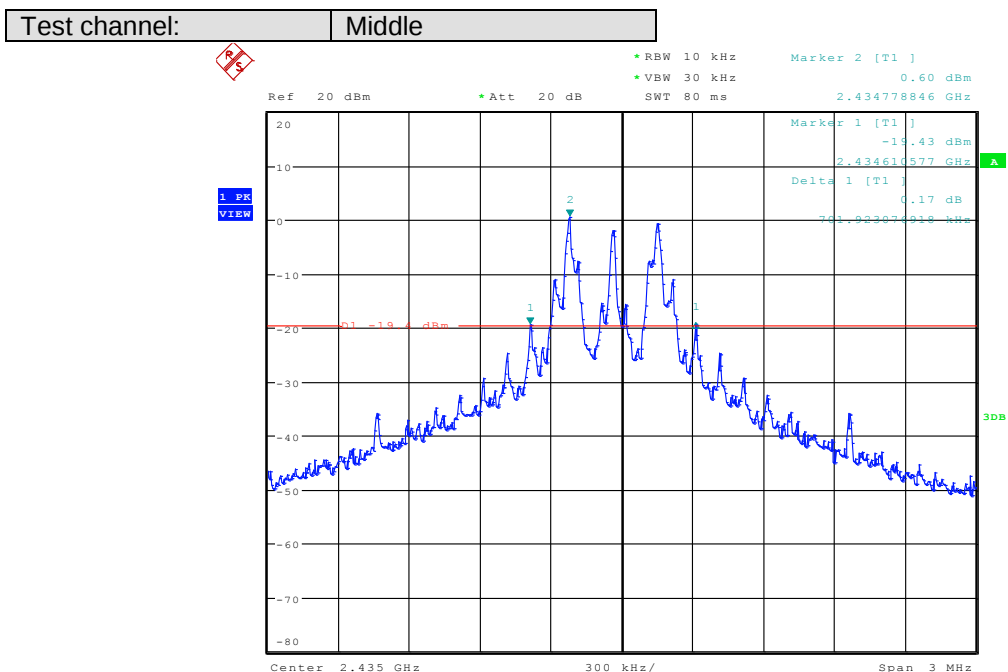
#### Measurement Data

| Test channel | 20dB bandwidth (MHz) | Results |
|--------------|----------------------|---------|
| Lowest       | 0.702                | Pass    |
| Middle       | 0.702                | Pass    |
| Highest      | 0.707                | Pass    |

Test plot as follows:

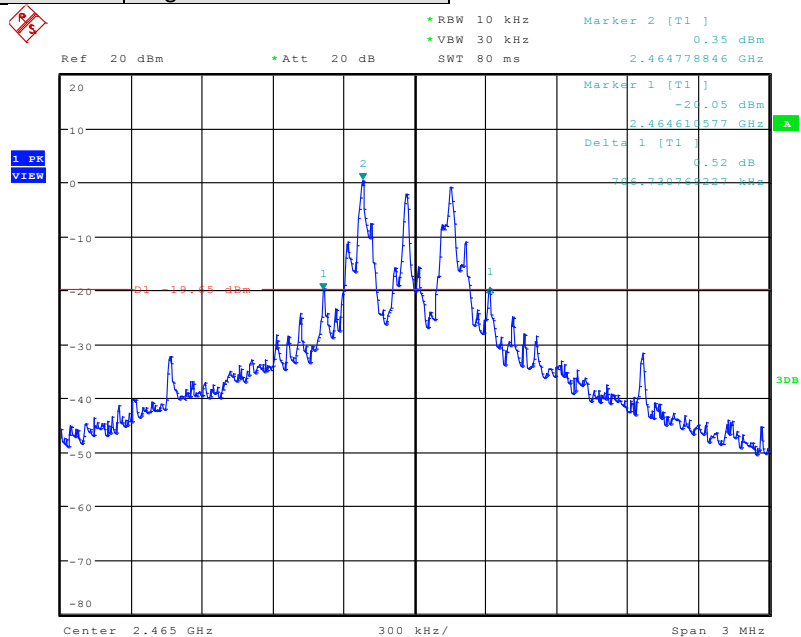


Date: 29.AUG.2018 11:00:13



Date: 29.AUG.2018 11:03:47

Test channel: Highest



Date: 29.AUG.2018 10:51:48

## 7 Photographs

### 7.1 Radiated Emission Test Setup

9KHz~30MHz



30MHz~1GHz:



Above 1GHz:

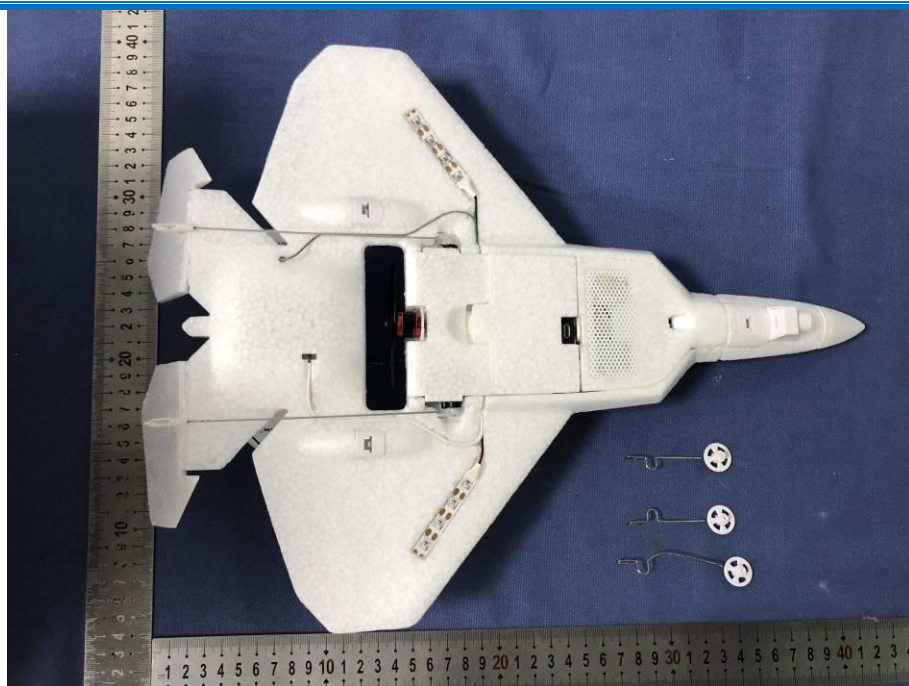


## 7.2 EUT Constructional Details

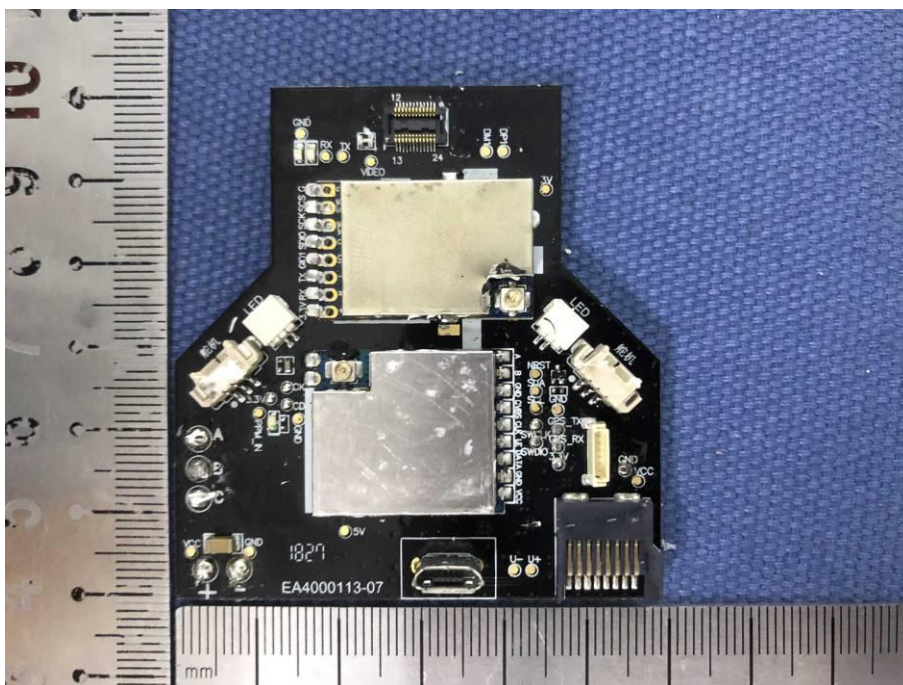
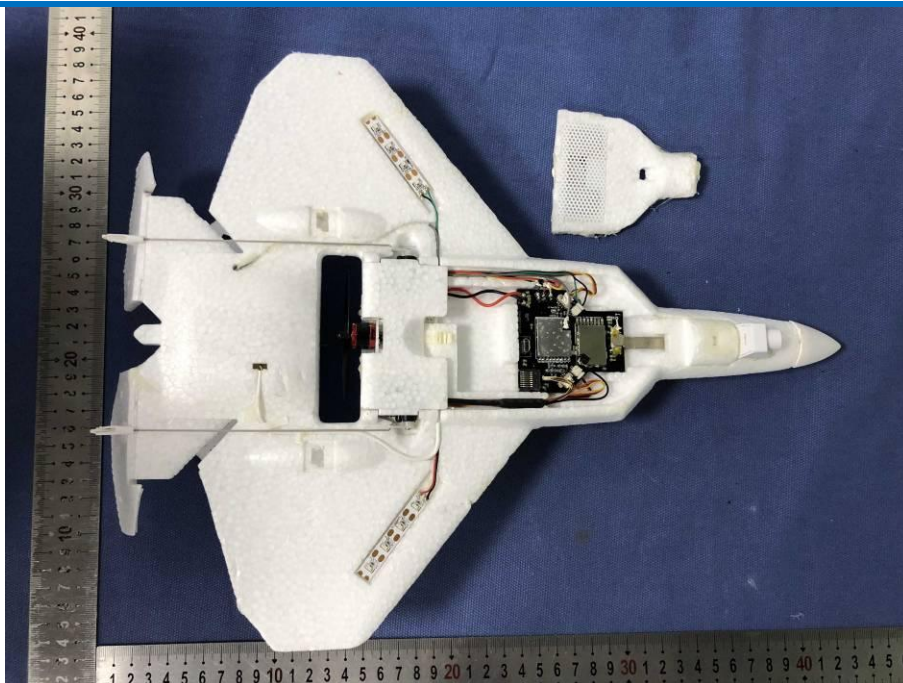


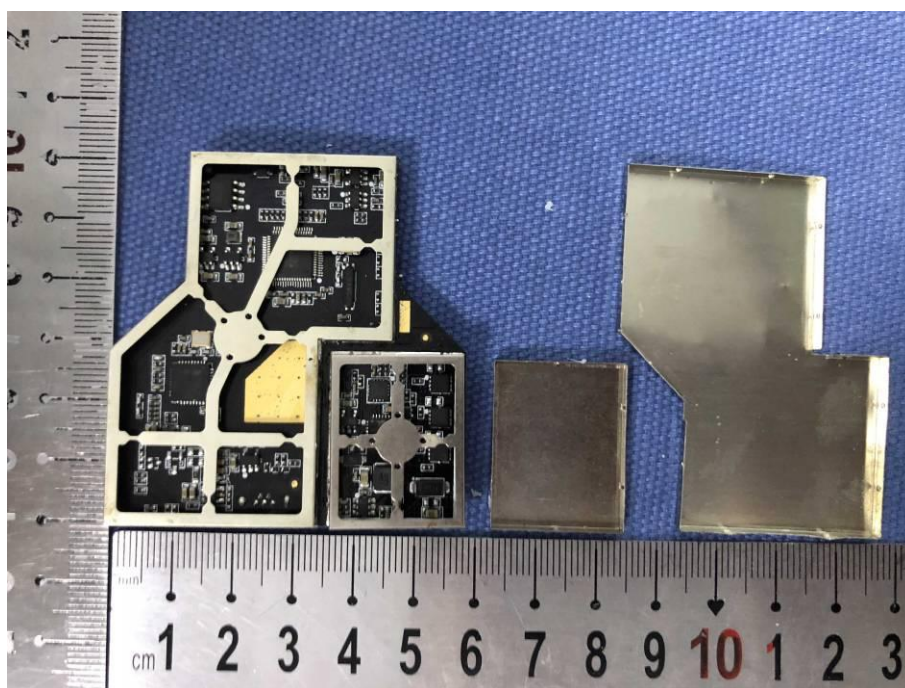
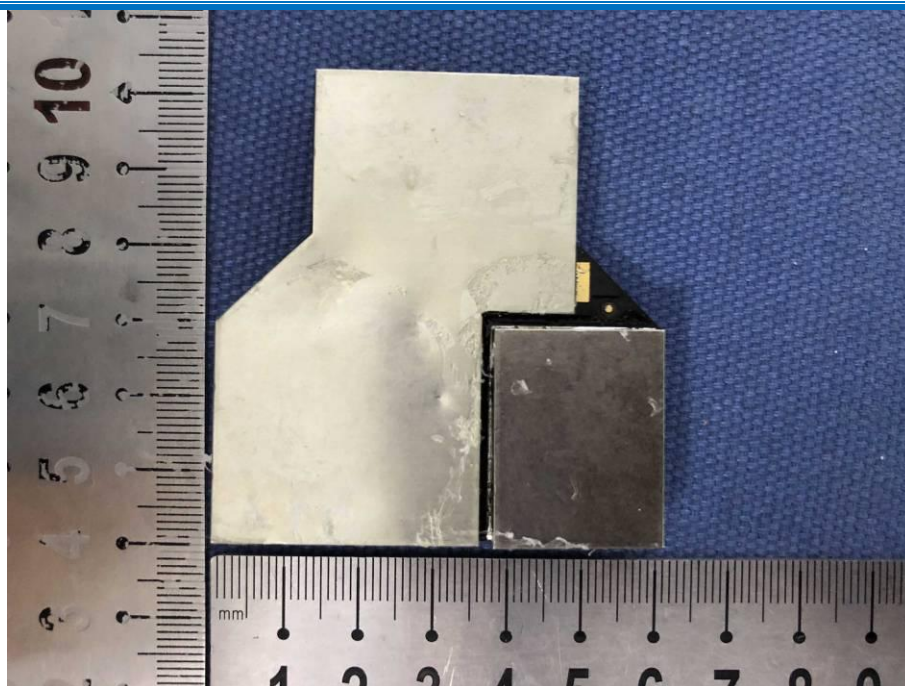


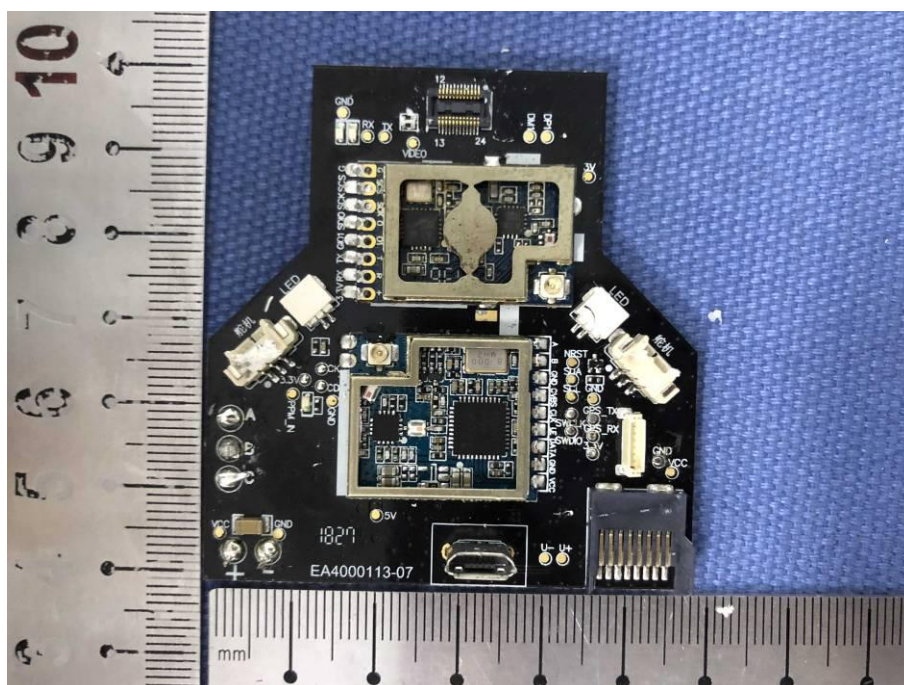
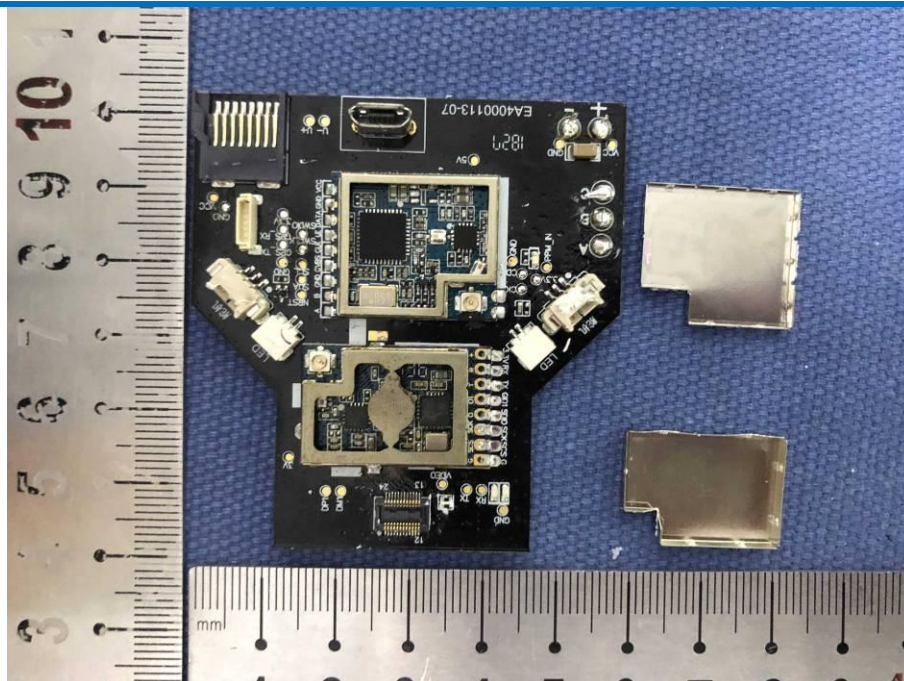


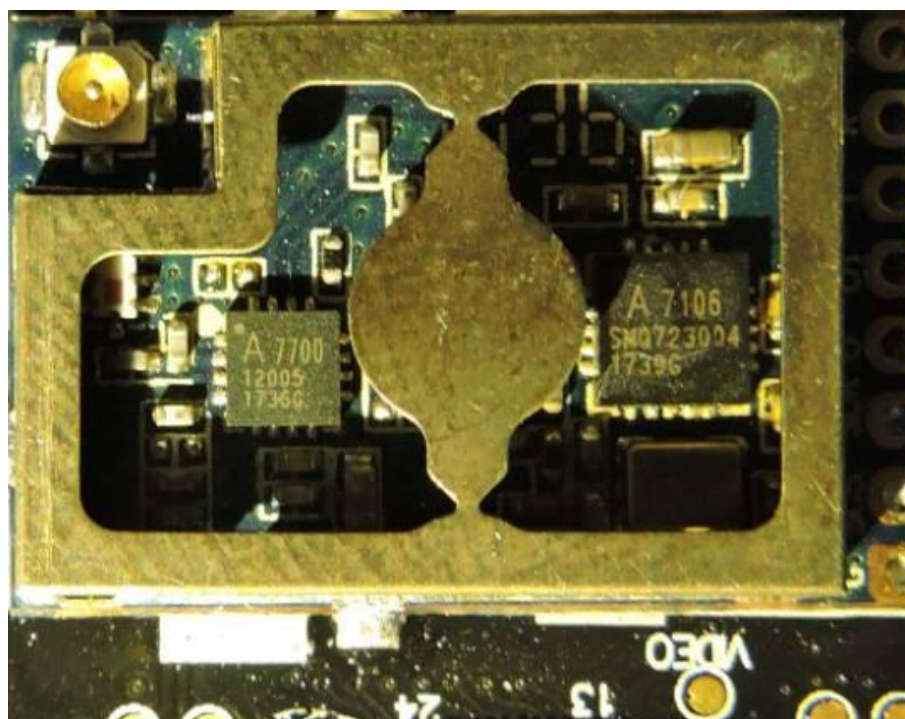




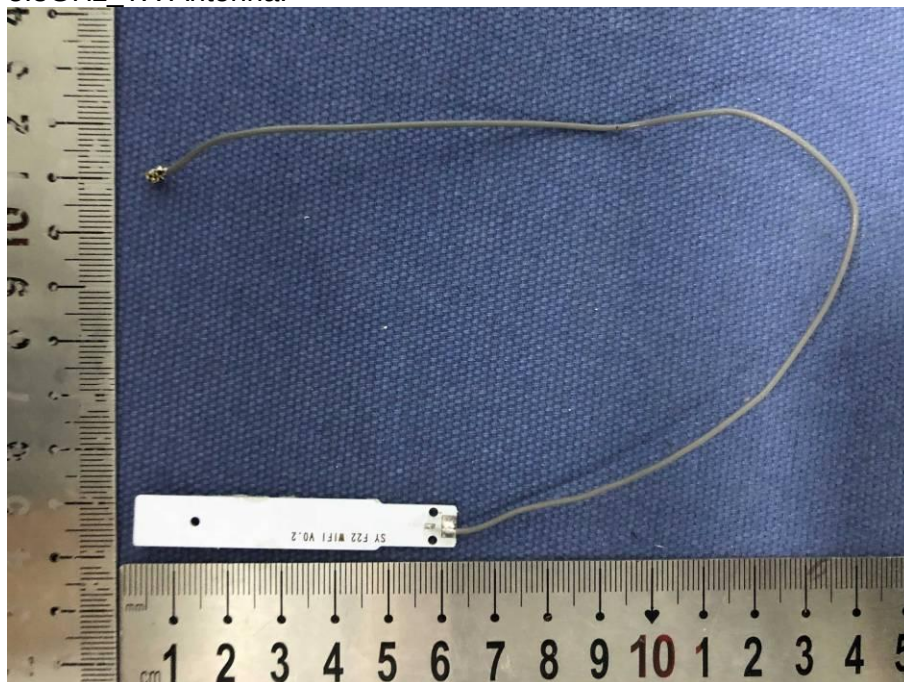




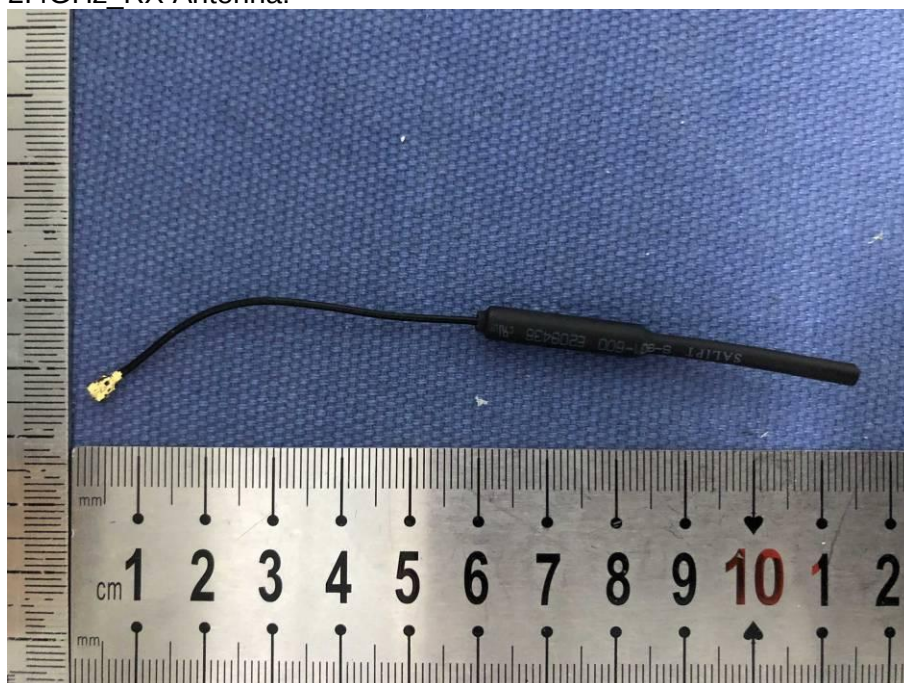




5.8GHz TX Antenna:



2.4GHz RX Antenna:



**END OF THE REPORT**