

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Fingerprint Access Controller

Model No.:eNBioAccess-T2

FCC ID: XX2-T2

Trademark: NITGEN

Report No.: ES181203020E1

Issue Date: December 21, 2018

Prepared for

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Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, Korea**

Prepared by

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EMTEK(SHENZHEN) CO., LTD.**

VERIFICATION OF COMPLIANCE

| | |
|----------------------|--|
| Applicant: | UNION COMMUNITY CO.,LTD. Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, Korea |
| Manufacturer: | Union Community Co.,Ltd. Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, Korea |
| Product Description: | Fingerprint Access Controller |
| Model Number: | eNBioAccess-T2 |
| Trademark: | NITGEN |

We hereby certify that:

The above equipment was tested by EMTEK(SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.225(2018).

Date of Test : December 03, 2018 to December 19, 2018



Prepared/Tested by :

Yaping Shen/Editor



Reviewer :

Joe Xia/Supervisor



Approved & Authorized Signer :

Lisa Wang/Manager

Modified Information

| Version | Summary | Revision Date | Report No. |
|---------|-----------------|---------------|---------------|
| Ver.1.0 | Original Report | / | ES181203020E1 |
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Table of Contents

| | | |
|----------|--|-----------|
| 1 | GENERAL INFORMATION | 5 |
| 1.1 | PRODUCT DESCRIPTION | 5 |
| 1.2 | RELATED SUBMITTAL(S) / GRANT(S) | 5 |
| 1.3 | TEST METHODOLOGY | 6 |
| 1.4 | SPECIAL ACCESSORIES | 6 |
| 1.5 | EQUIPMENT MODIFICATIONS | 6 |
| 1.6 | TEST FACILITY | 6 |
| 2 | SYSTEM TEST CONFIGURATION | 7 |
| 2.1 | EUT CONFIGURATION | 7 |
| 2.2 | EUT EXERCISE | 7 |
| 2.3 | TEST PROCEDURE | 7 |
| 2.4 | CONFIGURATION OF TESTED SYSTEM | 8 |
| 3 | SUMMARY OF TEST RESULTS | 9 |
| 4 | TEST SYSTEM UNCERTAINTY | 10 |
| 5 | CONDUCTED EMISSIONS TEST | 11 |
| 5.1 | MEASUREMENT PROCEDURE | 11 |
| 5.2 | TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) | 11 |
| 5.3 | MEASUREMENT EQUIPMENT USED | 11 |
| 5.4 | CONDUCTED EMISSION LIMIT | 11 |
| 5.5 | MEASUREMENT RESULT | 11 |
| 5.6 | CONDUCTED MEASUREMENT PHOTOS: | 14 |
| 6 | RADIATED EMISSION TEST | 15 |
| 6.1 | MEASUREMENT PROCEDURE | 15 |
| 6.2 | TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) | 15 |
| 6.3 | MEASUREMENT EQUIPMENT USED | 16 |
| 6.4 | RADIATED EMISSION LIMIT | 16 |
| 6.5 | MEASUREMENT RESULT | 18 |
| 6.6 | RADIATED MEASUREMENT PHOTOS: | 23 |
| 7 | FREQUENCY STABILITY MEASUREMENT | 24 |
| 7.1 | FREQUENCY STABILITY LIMITS | 24 |
| 7.2 | MEASUREMENT INSTRUMENTS LIST | 24 |
| 7.3 | TEST PROCEDURE | 24 |
| 7.4 | EUT OPERATING CONDITIONS | 24 |
| 7.5 | TEST RESULTS | 25 |
| 8 | EMISSION BANDWIDTH | 32 |
| 8.1 | EMISSION BANDWIDTH LIMIT | 32 |
| 8.2 | TEST INSTRUMENTS | 32 |
| 8.3 | TEST PROCEDURE | 32 |
| 8.4 | TEST SETUP | 32 |
| 8.5 | TEST RESULT | 32 |
| 9 | ANTENNA REQUIREMENT | 34 |
| 9.1 | RESULT | 34 |

APPENDIX (Photos of EUT) (7 pages)

1 General Information

1.1 Product Description

| Characteristics | Description |
|-----------------------------|--|
| EUT: | Fingerprint Access Controller |
| Modulation: | ASK |
| Operating Frequency: | 13.56MHz |
| Number of Channels: | 1 channel |
| Antenna Type : | Internal Loop antenna |
| Input rating: | AC 100-240V, 50/60Hz, 1.2A |
| Power supply: | AC 120V/60Hz |
| Adapter: | MODEL: DSA-42PFB-12 1 120350 INPUT: 100-240V~50/60Hz 1.2A OUTPUT: DC12V, 3.5A |
| Antenna Gain: | The antenna is permanently attached on PCB, no consideration of replacement. Please refer to internal Photos for details. |

Note: for a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: XX2-T2 filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10-2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

There is a USB cable with two ferrite cores in this submission.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description
EMC Lab. :

Accredited by CNAS, 2016.10.24
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)
The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2016.5.19
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Accredited by FCC, August 03, 2017
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by Industry Canada, November 24, 2015
The Certificate Registration Number is 4480A.

Accredited by A2LA, July 31, 2017
The Certificate Number is 4321.01

Name of Firm : EMTEK(SHENZHEN)CO., LTD.
Site Location : Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

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 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was tested according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

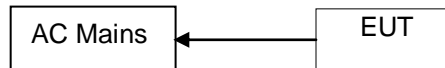


Table 2-1 Equipment Used in Tested System

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID | Series No. | Note |
|------|-------------------------------|-----------|--------------------------|--------|------------|-------------------------------|
| 1 | Fingerprint Access Controller | NITGEN | eNBioAccess-T2 | XX2-T2 | N/A | <i>EUT</i> |
| 2 | Switching Adapter | DVE | DSA-42PFB-12 1 120350 | N/A | N/A | <i>Support EUT</i> |

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

3 Summary of Test Results

| FCC Rules | Description Of Test | Result |
|--|-----------------------------|-----------|
| §15.207 | AC Power Conducted Emission | Complied* |
| §15.225(a)(b)(c), (d), §15.209 | Radiated Emission | Complied* |
| §15.225(e) | Frequency Stability | Complied* |
| §15.203 | Antenna Application | Complied* |
| Note: Complied*: All the test data was the same to the another report NO.: ES181203021E1 since their products are the same. The differences between them are the Applicant, Manufacturer, FCC ID, Product Name and model number. | | |

For Radiated: The EUT's antenna was pre-tested under the following modes:

| Test Mode | Description |
|---------------|-----------------|
| Mode A | X-Y axis |
| Mode B | Y-Z axis |
| Mode C | X-Z axis |

From the above modes, the worst case was found in Mode C. Therefore only the test data of the mode was recorded in this report.

4 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| Parameter | Uncertainty |
|--------------------------------|---------------------------|
| Radio Frequency | $\pm 1 \times 10^{-5}$ |
| Maximum Peak Output Power Test | $\pm 1.0\text{dB}$ |
| Conducted Emissions Test | $\pm 2.0\text{dB}$ |
| Radiated Emission Test | $\pm 2.0\text{dB}$ |
| Power Density | $\pm 2.0\text{dB}$ |
| Occupied Bandwidth Test | $\pm 1.0\text{dB}$ |
| Band Edge Test | $\pm 3\text{dB}$ |
| All emission, radiated | $\pm 3\text{dB}$ |
| Antenna Port Emission | $\pm 3\text{dB}$ |
| Temperature | $\pm 0.5^{\circ}\text{C}$ |
| Humidity | $\pm 3\%$ |

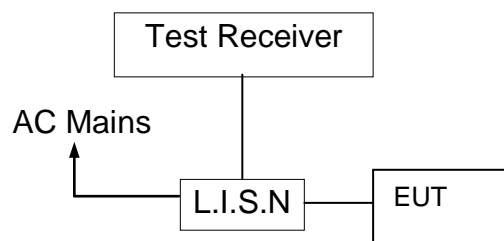
Remark: The coverage Factor ($k=2$), and measurement Uncertainty for a level of Confidence of 95%

5 Conducted Emissions Test

5.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used

| Conducted Emission Test Site | | | | | | |
|------------------------------|-----------------|--------------|---------------|-----------------|------------|---------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | Characteristics | Last Cal. | Cal. Interval |
| Test Receiver | Rohde & Schwarz | ESCS30 | 828985/018 | 9kHz~3GHz | 05/16/2018 | 05/15/2019 |
| Artificial Network | Schwarzbeck | 8126D | 8126D-211 | 9KHz-300MHz | 05/16/2018 | 05/15/2019 |
| RF Switching Unit | CDS | RSU-M2 | 38401 | 9KHz-300MHz | 05/16/2018 | 05/15/2019 |
| Coaxial Cable | CDS | 79254 | 46107086 | 9kHz~3GHz | 05/16/2018 | 05/15/2019 |

5.4 Conducted Emission Limit

Conducted Emission Frequency(MHz)

0.15-0.5
0.5-5.0
5.0-30.0

Quasi-peak

66-56
56
60

Average

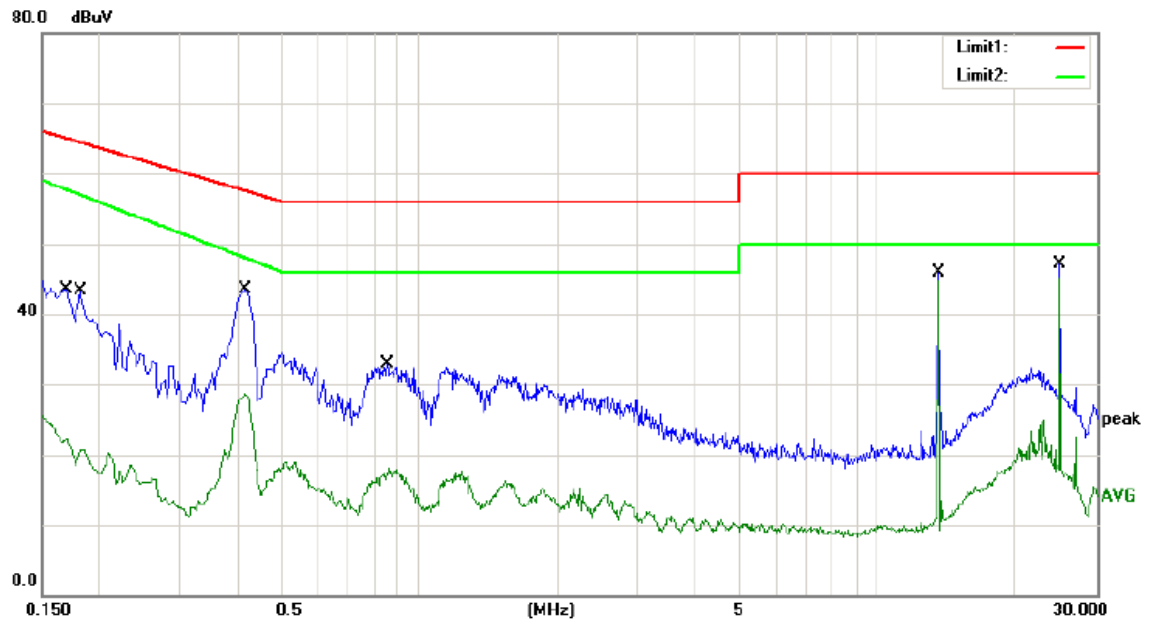
56-46
46
50

- Note:**
1. The lower limit shall apply at the transition frequencies
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.5 Measurement Result

Pass.

Please refer to the following.



Site site #1

Phase: L1

Temperature: 25

Limit: (CE)FCC PART 15C_QP

Power: AC 120V/60Hz

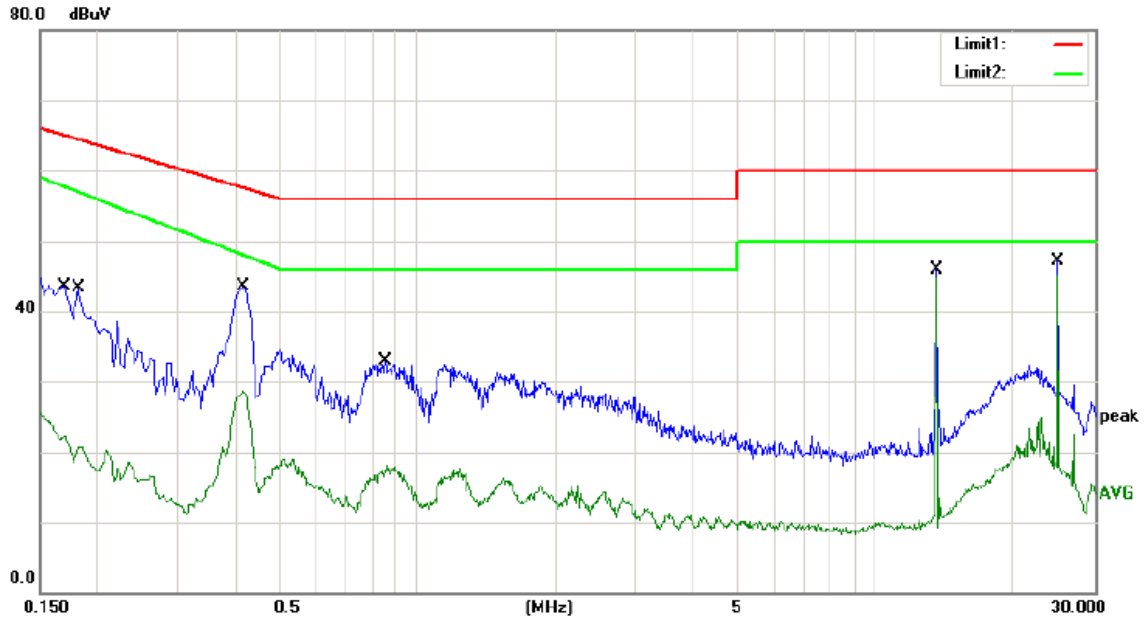
Humidity: 55 %

Mode: TX

Note:

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1 | | 0.1700 | 33.76 | 9.78 | 43.54 | 64.96 | -21.42 | QP | |
| 2 | | 0.1700 | 12.56 | 9.78 | 22.34 | 57.65 | -35.31 | AVG | |
| 3 | | 0.1820 | 33.53 | 9.79 | 43.32 | 64.39 | -21.07 | QP | |
| 4 | | 0.1820 | 10.88 | 9.79 | 20.67 | 56.91 | -36.24 | AVG | |
| 5 | | 0.4180 | 33.70 | 9.83 | 43.53 | 57.49 | -13.96 | QP | |
| 6 | | 0.4180 | 18.80 | 9.83 | 28.63 | 47.93 | -19.30 | AVG | |
| 7 | | 0.8500 | 23.06 | 9.84 | 32.90 | 56.00 | -23.10 | QP | |
| 8 | | 0.8500 | 8.19 | 9.84 | 18.03 | 46.00 | -27.97 | AVG | |
| 9 | | 13.5620 | 35.89 | 10.07 | 45.96 | 60.00 | -14.04 | QP | |
| 10 | | 13.5620 | 34.66 | 10.07 | 44.73 | 50.00 | -5.27 | AVG | |
| 11 | | 25.0020 | 36.64 | 10.37 | 47.01 | 60.00 | -12.99 | QP | |
| 12 | * | 25.0020 | 34.80 | 10.37 | 45.17 | 50.00 | -4.83 | AVG | |

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Yaping Shen

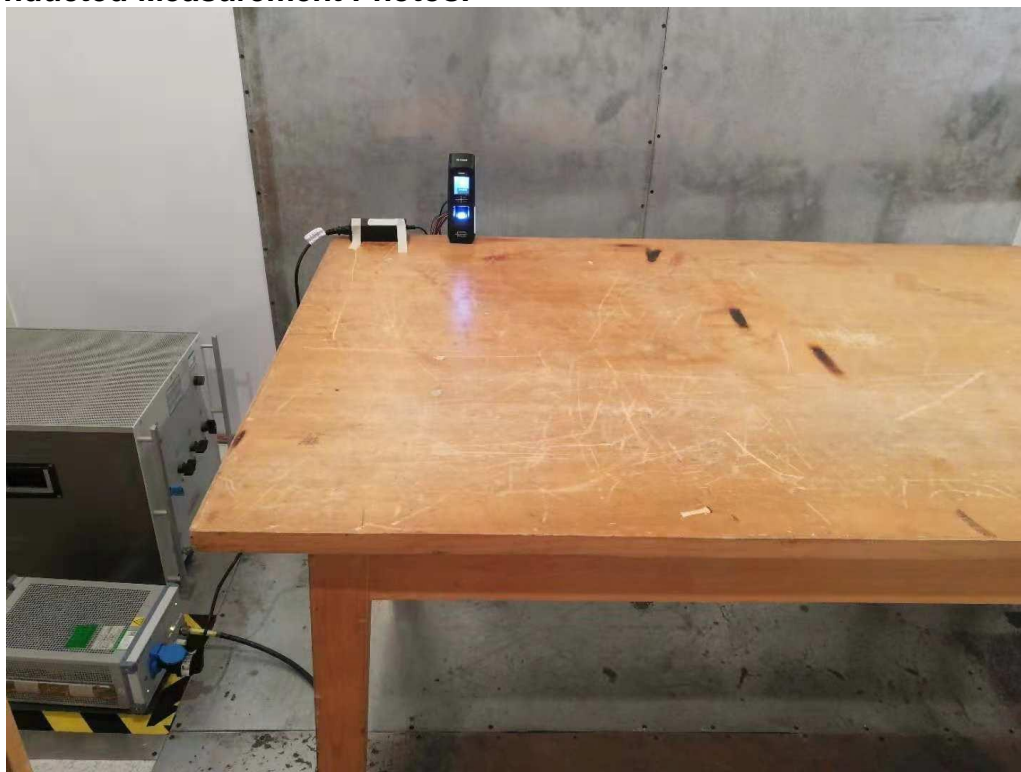


Site site #1 Phase: **N** Temperature: 25
 Limit: (CE)FCC PART 15C_QP Power: AC 120V/60Hz Humidity: 55 %
 Mode: TX
 Note:

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | | |
|-----|-----|---------|---------|---------|----------|-------|--------|----------|---------|
| | | MHz | dBuV | Factor | ment | dBuV | dB | Detector | Comment |
| 1 | | 0.1700 | 33.76 | 9.78 | 43.54 | 64.96 | -21.42 | QP | |
| 2 | | 0.1700 | 12.56 | 9.78 | 22.34 | 57.65 | -35.31 | AVG | |
| 3 | | 0.1820 | 33.53 | 9.79 | 43.32 | 64.39 | -21.07 | QP | |
| 4 | | 0.1820 | 10.88 | 9.79 | 20.67 | 56.91 | -36.24 | AVG | |
| 5 | | 0.4180 | 33.70 | 9.83 | 43.53 | 57.49 | -13.96 | QP | |
| 6 | | 0.4180 | 18.80 | 9.83 | 28.63 | 47.93 | -19.30 | AVG | |
| 7 | | 0.8500 | 23.06 | 9.84 | 32.90 | 56.00 | -23.10 | QP | |
| 8 | | 0.8500 | 8.19 | 9.84 | 18.03 | 46.00 | -27.97 | AVG | |
| 9 | | 13.5620 | 35.89 | 10.07 | 45.96 | 60.00 | -14.04 | QP | |
| 10 | | 13.5620 | 34.66 | 10.07 | 44.73 | 50.00 | -5.27 | AVG | |
| 11 | | 25.0020 | 36.64 | 10.37 | 47.01 | 60.00 | -12.99 | QP | |
| 12 | * | 25.0020 | 34.80 | 10.37 | 45.17 | 50.00 | -4.83 | AVG | |

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Yaping Shen

5.6 Conducted Measurement Photos:



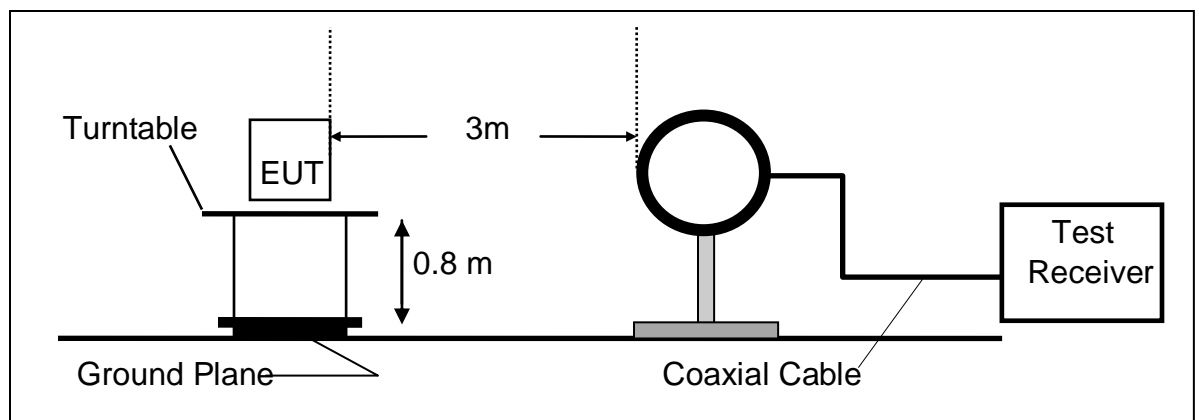
6 Radiated Emission Test

6.1 Measurement Procedure

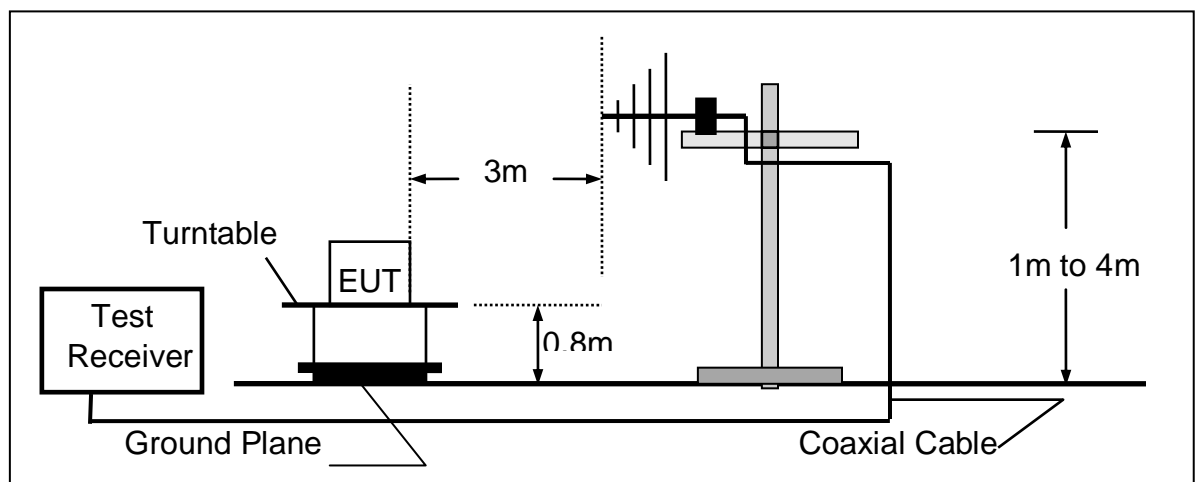
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

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



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used

| Item | Equipment | Manufacturer | Model No. | Serial No. | Characteristics | Last Cal. | Cal. Interval |
|------|--------------------------------|-----------------|-----------|--------------|-----------------|------------|---------------|
| 1. | Test Receiver | Rohde & Schwarz | ESCI | 1166.5950.03 | 9KHz-3GHz | 05/16/2018 | 1 Year |
| 2. | Loop Antenna | Schwarzbeck | FMZB 1519 | 012 | 9 KHz -30MHz | 05/16/2018 | 1 Year |
| 3. | Bilog Antenna | Schwarzbeck | VULB9163 | 000141 | 25MHz-2GHz | 05/16/2018 | 1 Year |
| 4. | Power Amplifier | HP | 8447F | OPT H64 | 9 KHz -1300MHz | 05/16/2018 | 1 Year |
| 5. | Color Monitor | SUNSCO | SP-140A | N/A | -- | 05/16/2018 | 1 Year |
| 6. | Single Line Filter | JIANLI | XL-3 | N/A | -- | 05/16/2018 | 1 Year |
| 7. | Single Phase Power Line Filter | JIANLI | DL-2X100B | N/A | -- | 05/16/2018 | 1 Year |
| 8. | 3 Phase Power Line Filter | JIANLI | DL-4X100B | N/A | -- | 05/16/2018 | 1 Year |
| 9. | DC Power Filter | JIANLI | DL-2X50B | N/A | -- | 05/16/2018 | 1 Year |
| 10. | Cable | Schwarzbeck | PLF-100 | 549489 | 9KHz-3GHz | 05/16/2018 | 1 Year |
| 11. | Cable | Rosenberger | CIL02 | A0783566 | 9KHz-3GHz | 05/16/2018 | 1 Year |
| 12. | Cable | Rosenberger | RG 233/U | 525178 | 9KHz-3GHz | 05/16/2018 | 1 Year |

6.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

| FCC Part 15.209 | | | | |
|-----------------|---------------------------|------|--|-------------------------|
| Frequency (MHz) | Field Strength Limitation | | Field Strength Limitation Frequency at 3m Measurement Distance | |
| | (uV/m) | Dist | (uV/m) | (dBuV/m) |
| 0.009 – 0.490 | 2400 / F(KHz) | 300m | 10000 * 2400/F(KHz) | 20log 2400/F(KHz) + 80 |
| 0.490 – 1.705 | 24000 / F(KHz) | 30m | 100 * 24000/F(KHz) | 20log 24000/F(KHz) + 40 |
| 1.705 – 30.00 | 30 | 30m | 100* 30 | 20log 30 + 40 |
| 30.0 – 88.0 | 100 | 3m | 100 | 20log 100 |
| 88.0 – 216.0 | 150 | 3m | 150 | 20log 150 |
| 216.0 – 960.0 | 200 | 3m | 200 | 20log 200 |
| Above 960.0 | 500 | 3m | 500 | 20log 500 |

| FCC Part 15.225(a)/(b)/(c) | | | | |
|----------------------------|---------------------------|------|---|----------|
| Frequency (MHz) | Field Strength Limitation | | Field Strength Limitation Frequency tion at 3m Measurement Dist | |
| | (uV/m) | Dist | (uV/m) | (dBuV/m) |
| 13.110 – 13.410 | 106 | 30 m | 106*100 | 80.5 |
| 13.410 – 13.553 | 334 | 30 m | 334*100 | 90.5 |
| 13.553 – 13.567 | 15,848 | 30 m | 15,848*100 | 124 |
| 13.567 – 13.710 | 334 | 30 m | 334*100 | 90.5 |
| 13.710 – 14.010 | 106 | 30 m | 106*100 | 80.5 |

15.205 Restricted bands of operation

| MHz | MHz | MHz | GHz |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | (²) |

Remark 1. Emission level in dBuV/m=20 log (uV/m)

: 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

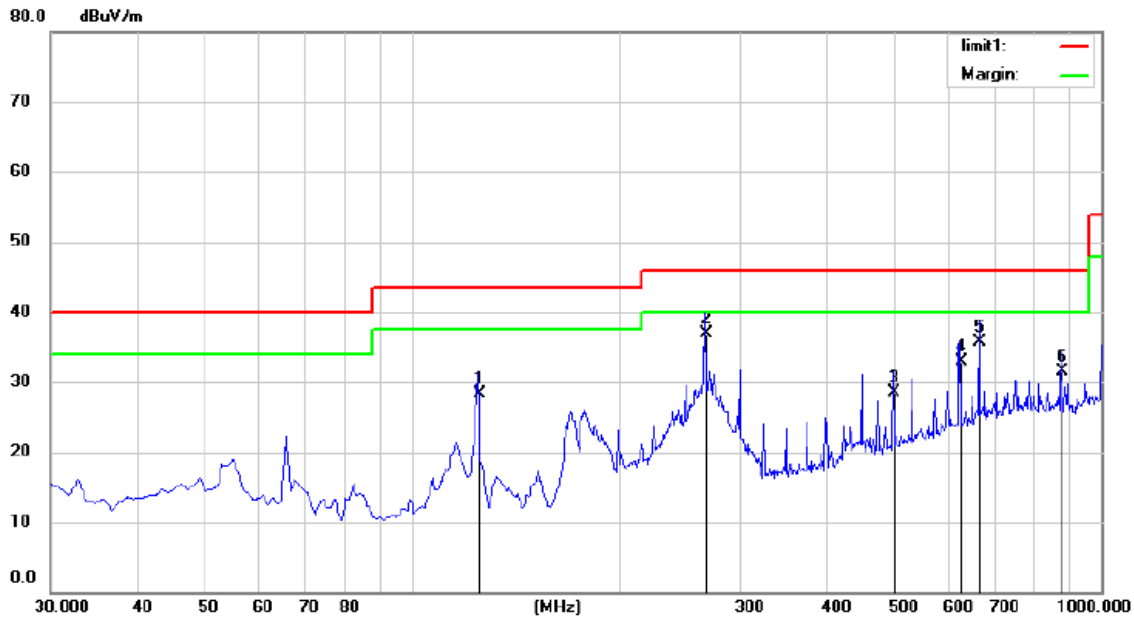
6.5 Measurement Result

| | | | |
|--------------------|------------|---------------|-------------------|
| Operation Mode: | TX Mode | Test Date : | December 10, 2018 |
| Frequency Range: | 9kHz~30MHz | Temperature : | 23℃ |
| Test Result: | PASS | Humidity : | 62 % |
| Measured Distance: | 3m | Test By: | Yaping Shen |

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV/m) | Limit 3m (dBuV/m) | Over (dB) | Note |
|----------------|-----------------|----------------------------|----------------------|--------------|------|
| 9.38 | V | 33.25 | 69.54 | -36.29 | QP |
| 12.34 | V | 31.14 | 69.54 | -38.4 | QP |
| 14.55 | V | 35.48 | 69.54 | -34.06 | QP |
| 16.32 | V | 34.15 | 69.54 | -35.39 | QP |
| 23.57 | V | 36.86 | 69.54 | -32.68 | QP |
| 27.42 | V | 40.53 | 69.54 | -29.01 | QP |
| | | | | | |
| 10.28 | H | 31.37 | 69.54 | -38.17 | QP |
| 11.56 | H | 32.69 | 69.54 | -36.85 | QP |
| 15.42 | H | 36.45 | 69.54 | -33.09 | QP |
| 20.68 | H | 37.96 | 69.54 | -31.58 | QP |
| 25.39 | H | 34.25 | 69.54 | -35.29 | QP |
| 27.63 | H | 48.63 | 69.54 | -20.91 | QP |

| | | | |
|--------------------|------------|---------------|-------------------|
| Operation Mode: | TX Mode | Test Date : | December 10, 2018 |
| Frequency Range: | 30~1000MHz | Temperature : | 23℃ |
| Test Result: | PASS | Humidity : | 62 % |
| Measured Distance: | 3m | Test By: | Yaping Shen |

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV/m) | Limit 3m (dBuV/m) | Over (dB) | Note |
|----------------|-----------------|----------------------------|----------------------|--------------|------|
| 125.0600 | V | 34.10 | 43.5 | -9.40 | QP |
| 177.5091 | V | 30.78 | 43.5 | -12.72 | QP |
| 266.6800 | V | 35.59 | 46 | -10.41 | QP |
| 533.4300 | V | 37.20 | 46 | -8.80 | QP |
| 625.5800 | V | 38.56 | 46 | -7.44 | QP |
| 667.2900 | V | 36.42 | 46 | -9.58 | QP |
| | | | | | |
| 125.0600 | H | 28.22 | 43.5 | -15.28 | QP |
| 266.6800 | H | 39.96 | 46 | -6.04 | QP |
| 500.4500 | H | 28.41 | 46 | -17.59 | QP |
| 625.5800 | H | 32.94 | 46 | -13.06 | QP |
| 667.2900 | H | 35.74 | 46 | -10.26 | QP |
| 875.8400 | H | 31.46 | 46 | -14.54 | QP |



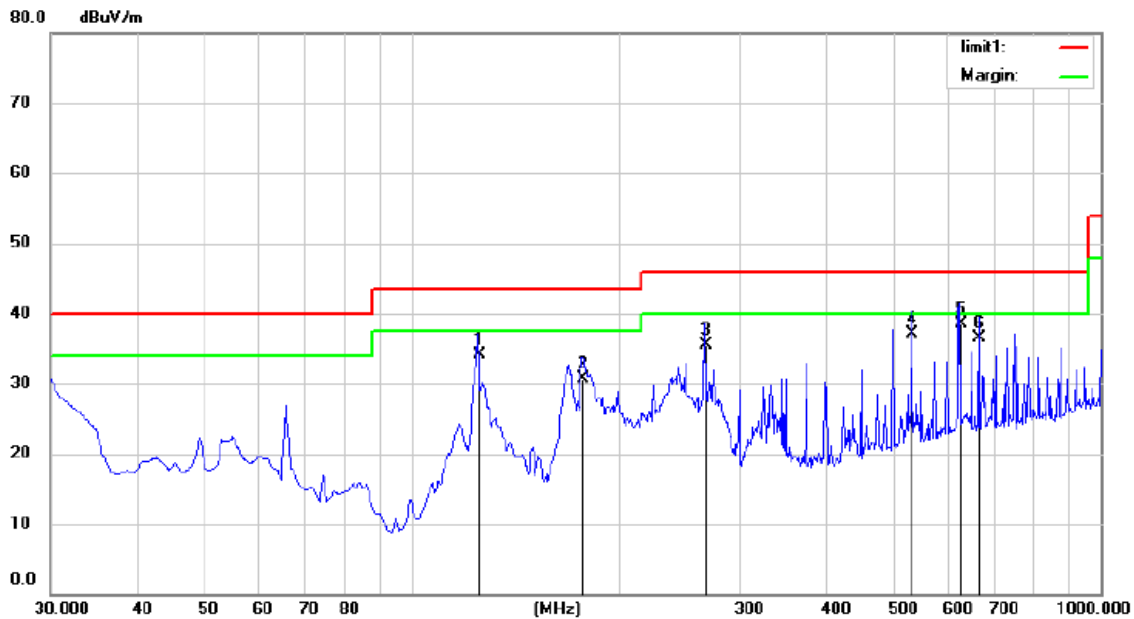
Site: Chamber #1
 Limit: (RE)FCC PART 15 C 3m
 Mode: TX
 Note:

Polarization: **Horizontal**
 Power: AC 120V/60Hz
 Temperature: 26
 Humidity: 55 %

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|---------------------------|---------|
| 1 | | 125.0600 | 49.31 | -21.09 | 28.22 | 43.50 | -15.28 | QP | | |
| 2 | * | 266.6800 | 51.81 | -14.85 | 36.96 | 46.00 | -9.04 | QP | | |
| 3 | | 500.4500 | 37.22 | -8.81 | 28.41 | 46.00 | -17.59 | QP | | |
| 4 | | 625.5800 | 38.83 | -5.89 | 32.94 | 46.00 | -13.06 | QP | | |
| 5 | | 667.2900 | 40.62 | -4.88 | 35.74 | 46.00 | -10.26 | QP | | |
| 6 | | 875.8400 | 35.19 | -3.73 | 31.46 | 46.00 | -14.54 | QP | | |

*:Maximum data x:Over limit !:over margin

Operator:Yaping Shen



Site: Chamber #1
 Limit: (RE)FCC PART 15 C 3m
 Mode: TX
 Note:

Polarization: **Vertical**
 Power: AC 120V/60Hz

Temperature: 26
 Humidity: 55 %

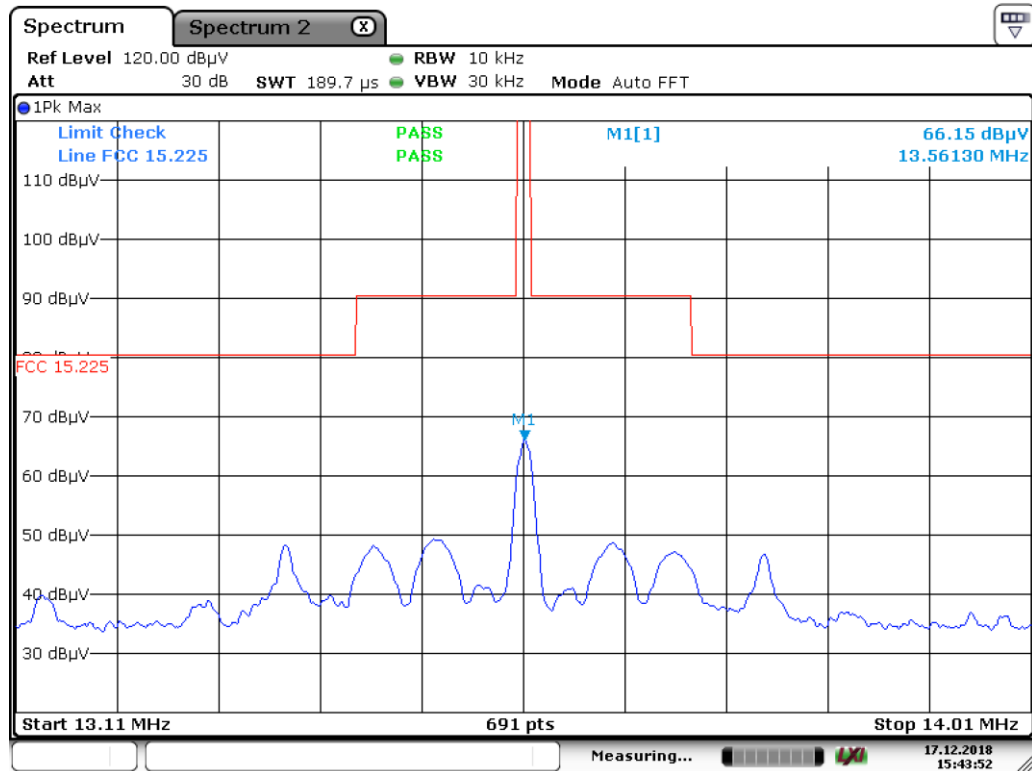
| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|-------------------------|---------------------------|---------|
| 1 | | 125.0600 | 53.69 | -19.59 | 34.10 | 43.50 | -9.40 | QP | | |
| 2 | | 177.5091 | 50.49 | -19.71 | 30.78 | 43.50 | -12.72 | QP | | |
| 3 | | 266.6800 | 51.64 | -16.05 | 35.59 | 46.00 | -10.41 | QP | | |
| 4 | | 533.4300 | 45.95 | -8.75 | 37.20 | 46.00 | -8.80 | QP | | |
| 5 | * | 625.5800 | 45.62 | -7.06 | 38.56 | 46.00 | -7.44 | QP | | |
| 6 | | 667.2900 | 42.80 | -6.38 | 36.42 | 46.00 | -9.58 | QP | | |

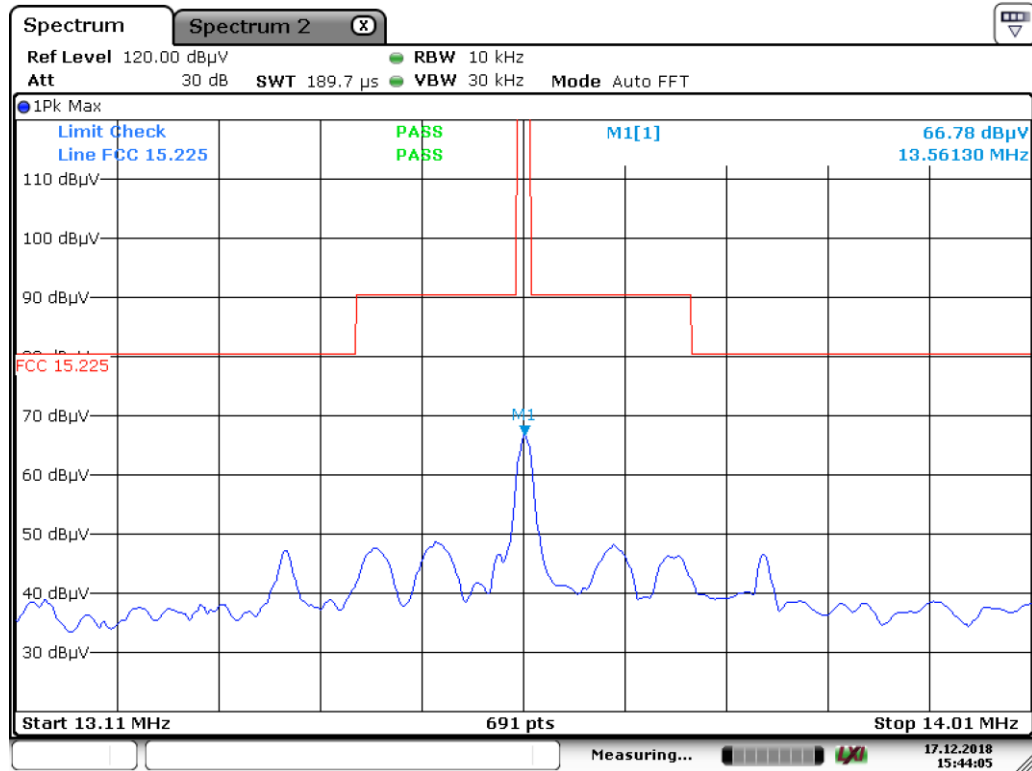
*:Maximum data x:Over limit !:over margin

Operator:Yaping Shen

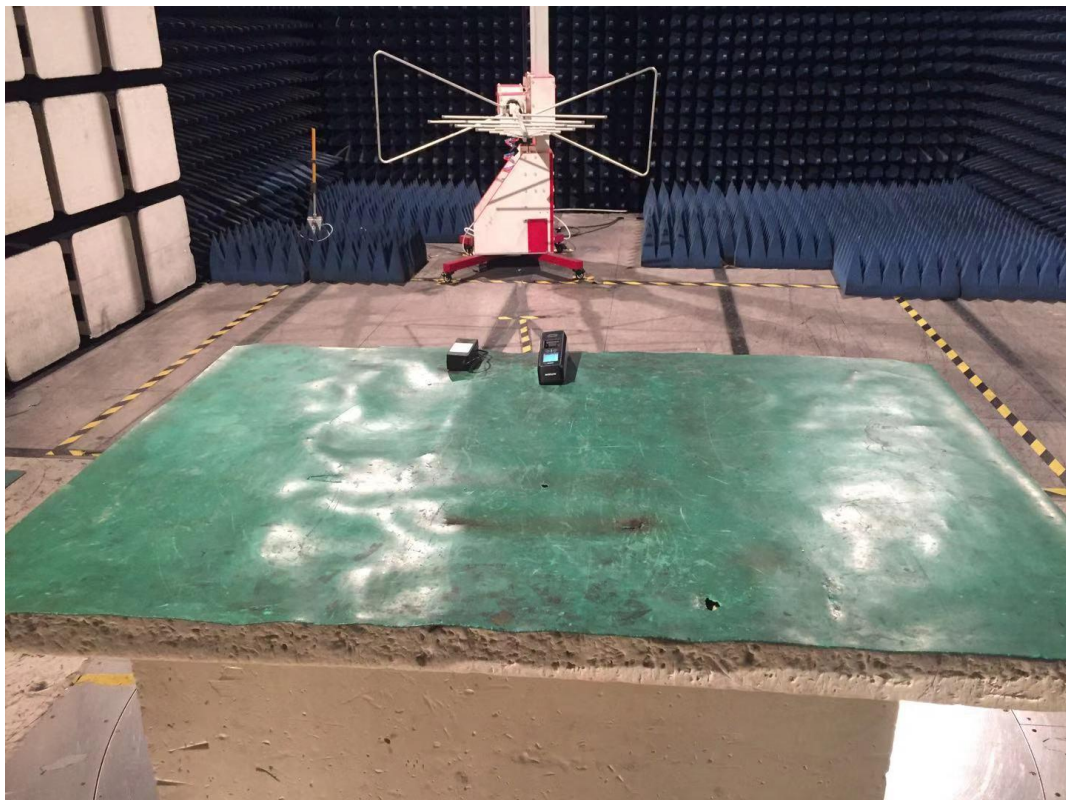
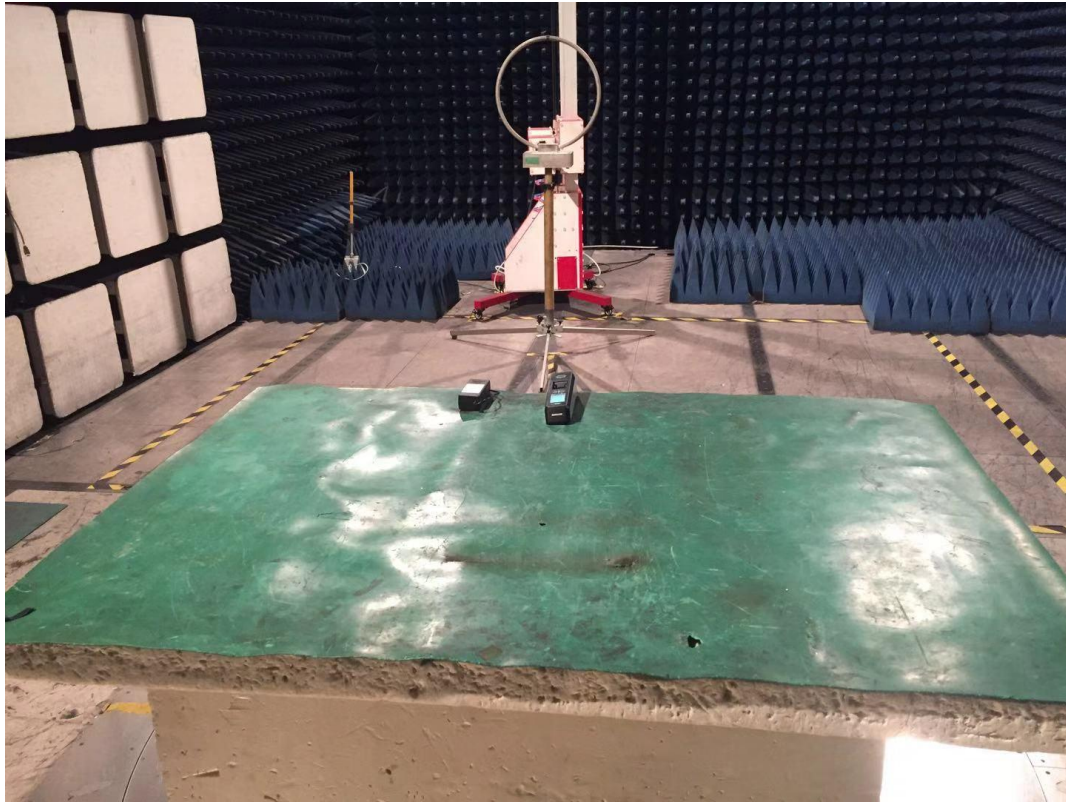
Operation Mode: TX Mode
 Frequency Range: 13.560 MHz
 Test Result: PASS
 Measured Distance: 3m

Test Date : December 17, 2018
 Temperature : 23°C
 Humidity : 65 %
 Test By: Yaping Shen





6.6 Radiated Measurement Photos:



7 FREQUENCY STABILITY MEASUREMENT

7.1 FREQUENCY STABILITY LIMITS

FCC Part 15.225(e)

the frequency tolerance of the carrier signal shall be maintained within +/-0.01% of the operating frequency over a temperature variation of –20 degrees to + 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.2 MEASUREMENT INSTRUMENTS LIST

| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | Characteristics | LAST CAL. | CAL DUE. |
|-------------------|-----------------|--------------|---------------|-----------------|------------|------------|
| Spectrum Analyzer | Rohde & Schwarz | FSV30 | 1321.3008K | 10Hz-30GHz | 05/16/2018 | 05/15/2019 |
| Coaxial Cable | CDS | 79254 | 46107086 | 10Hz-30GHz | 05/16/2018 | 05/15/2019 |
| Antenna Connector | ARTHUR-YAN G | 2244-N1TG1 | N/A | 10Hz-30GHz | 05/16/2018 | 05/15/2019 |

Remark: 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.

7.3 TEST PROCEDURE

- The equipment under test was connected to an external AC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.
- At room temperature ($25\pm5^{\circ}\text{C}$), an external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115%, 100% and 85% of the nominal operating input voltage.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

7.4 EUT OPERATING CONDITIONS

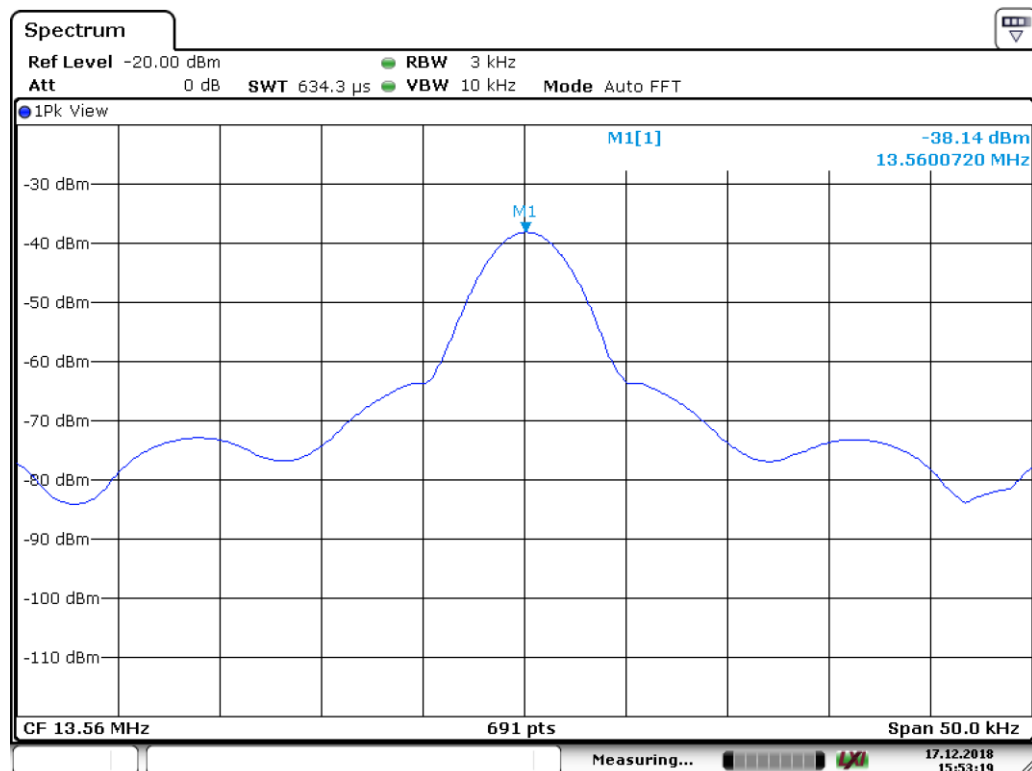
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise special operating condition is specified in the follows during the testing.

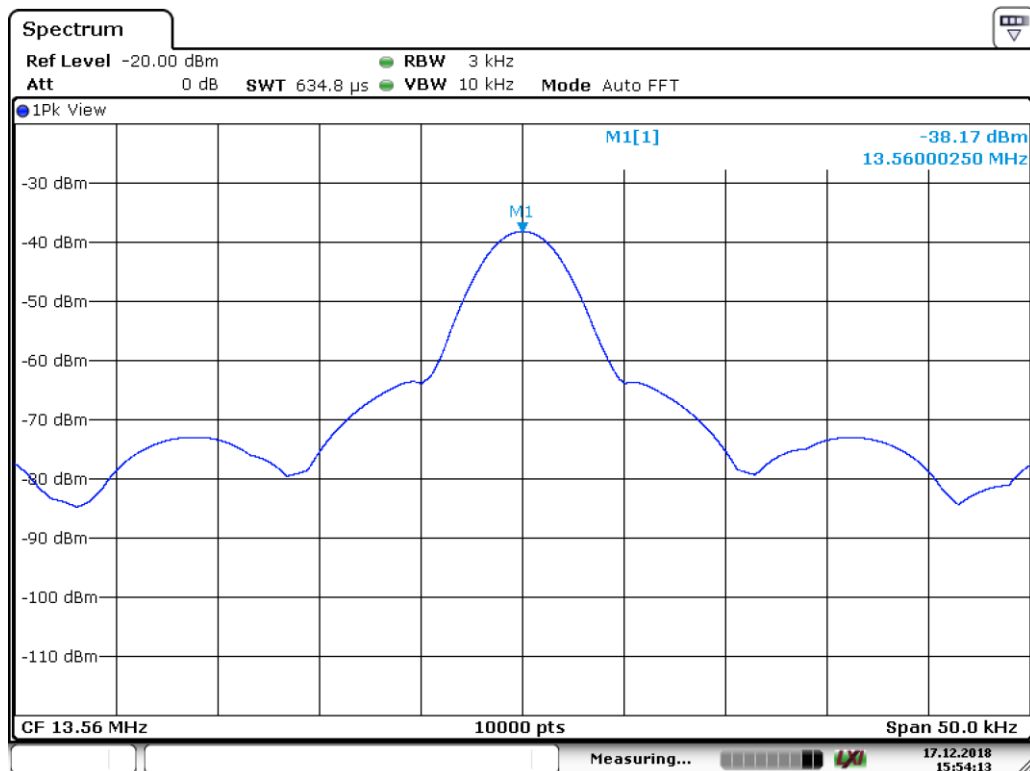
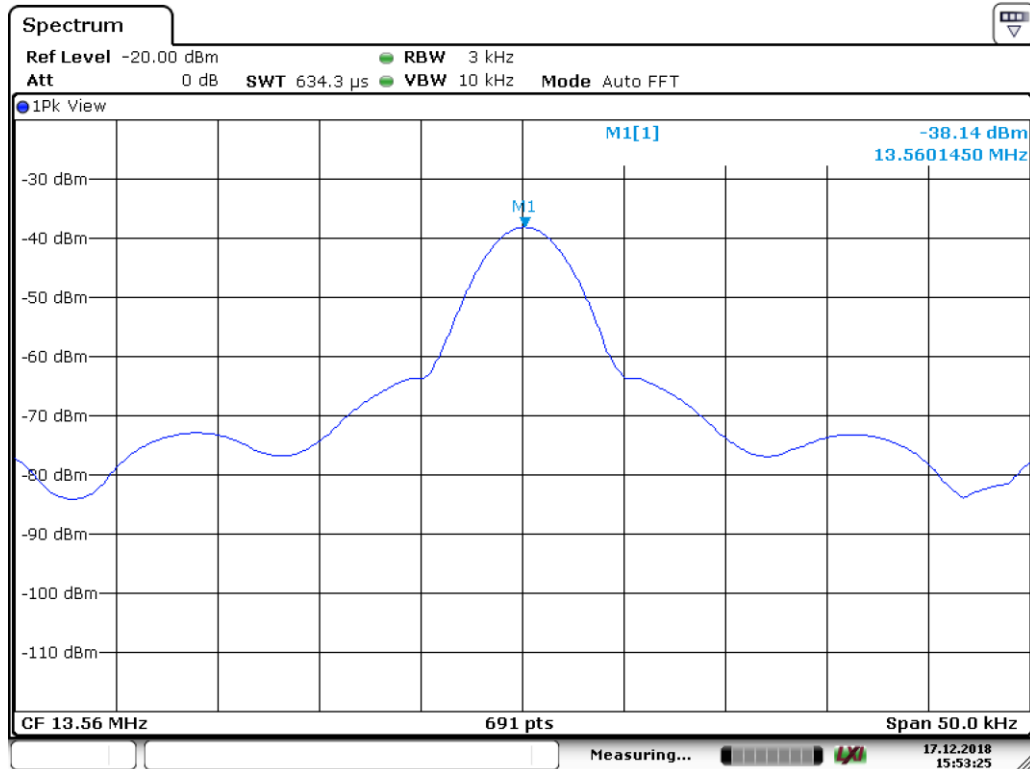
7.5 TEST RESULTS

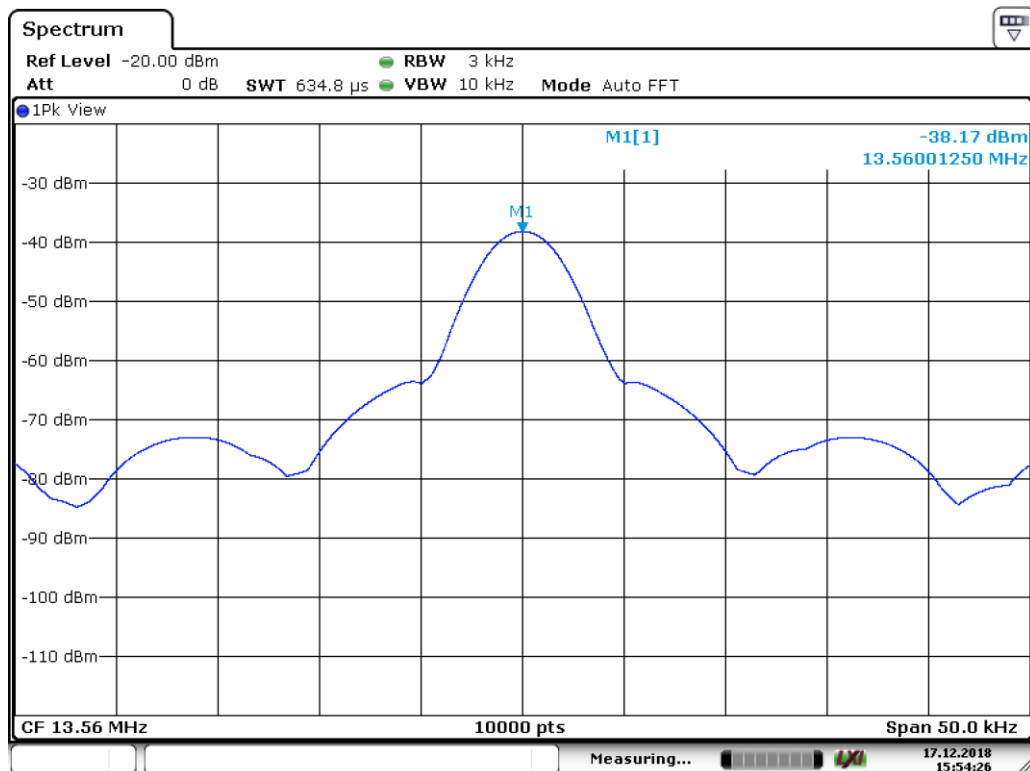
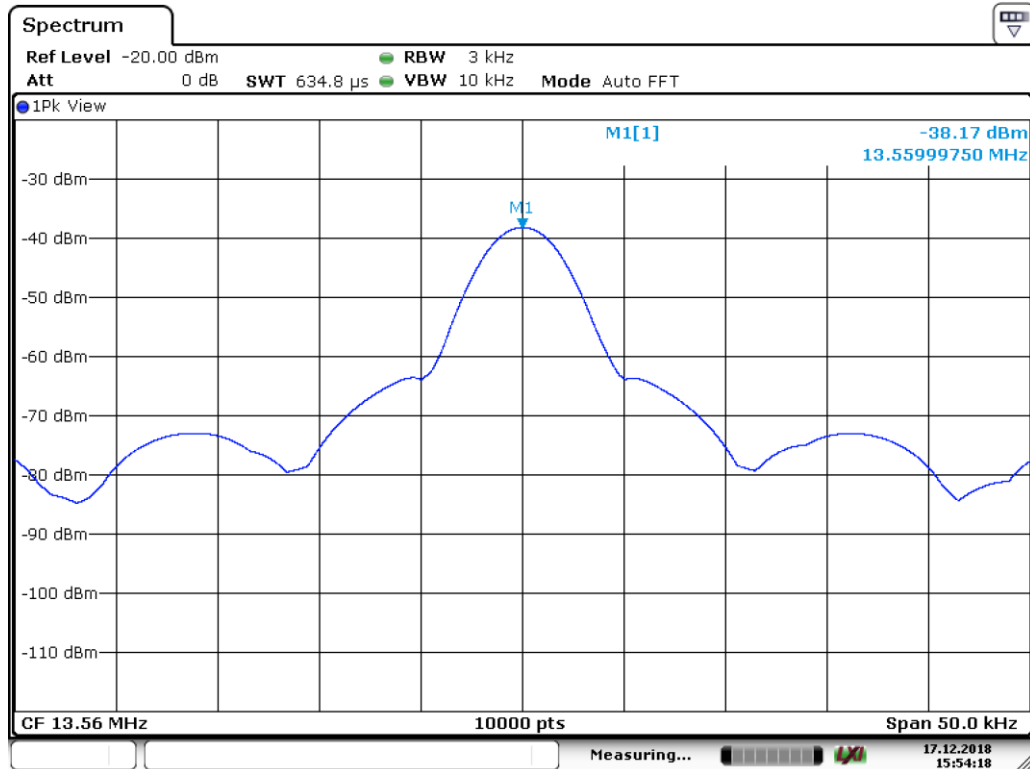
| | | | |
|----------------|---|-------------|---------|
| E.U.T : | Fingerprint Access Controller(Rev.A) | Test Mode : | TX Mode |
| Test Voltage : | AC 120V | | |

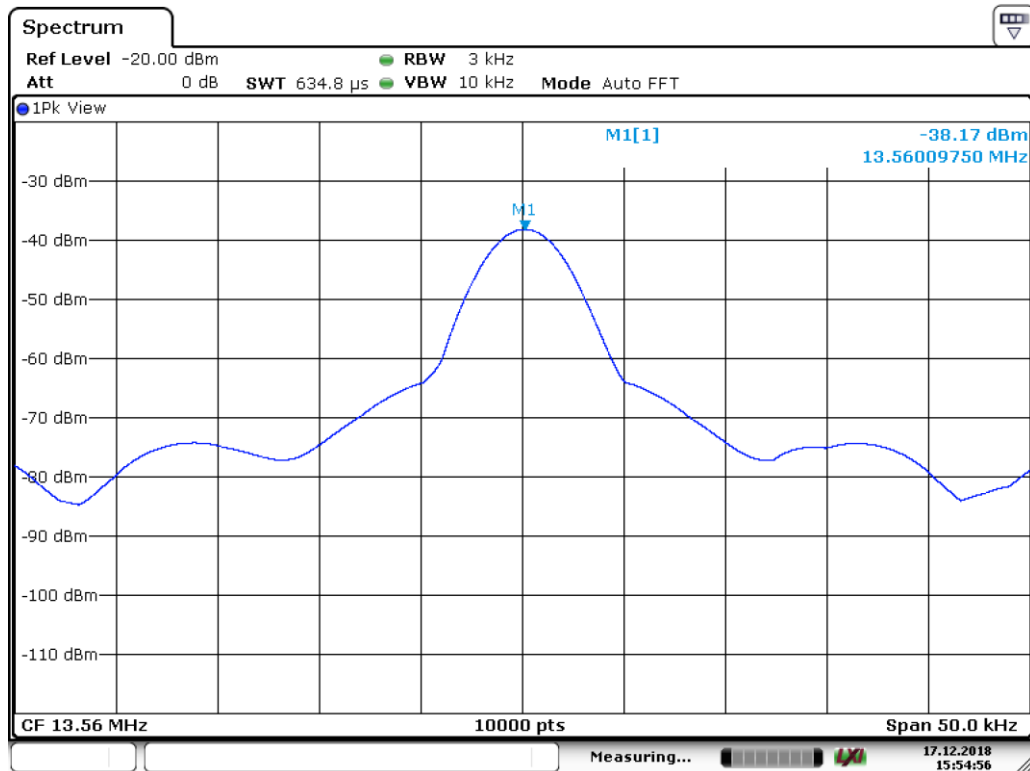
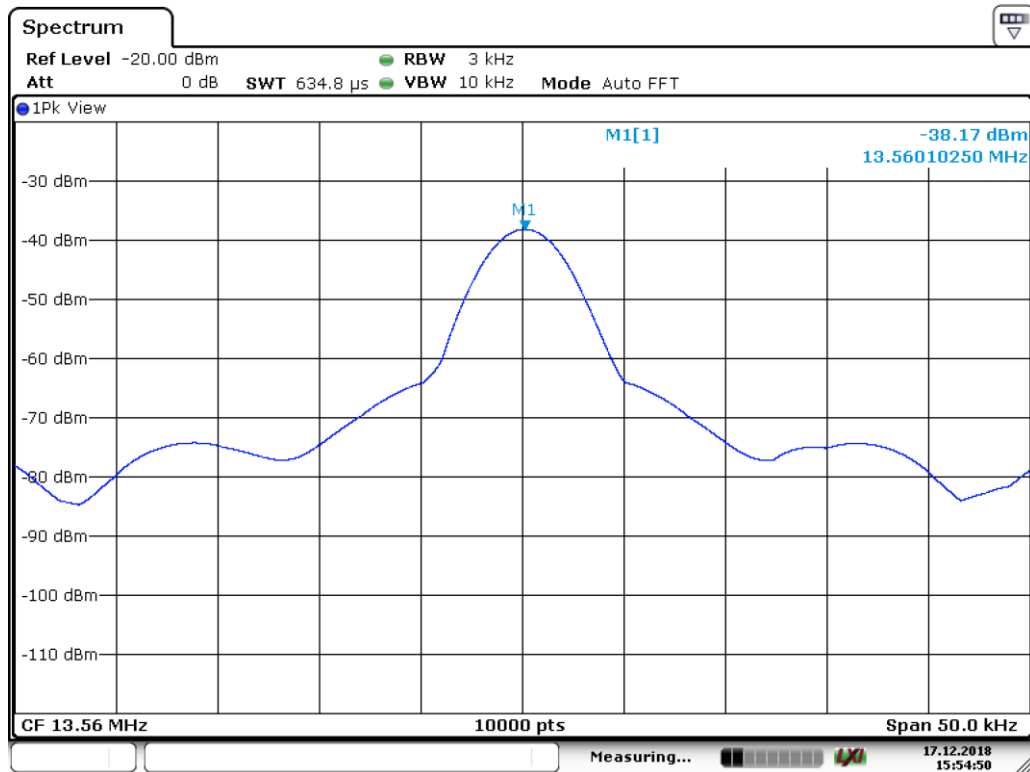
| Frequency Stability Versus Environmental Temperature | | | | | |
|--|---------------|-----------------|------------------|-------------|---------|
| Temperature (°C) | Voltage (Vac) | Frequency (MHz) | Freq Error (ppm) | Limit (ppm) | Results |
| -20 | AC120V | 13.56007200 | 5.31 | 100 | PASS |
| -10 | AC120V | 13.56014500 | 10.69 | 100 | PASS |
| 0 | AC120V | 13.56000250 | 0.18 | 100 | PASS |
| 10 | AC120V | 13.55999750 | -0.18 | 100 | PASS |
| 20 | AC120V | 13.56001250 | 0.92 | 100 | PASS |
| 30 | AC120V | 13.56010250 | 7.56 | 100 | PASS |
| 40 | AC120V | 13.56009750 | 7.19 | 100 | PASS |
| 50 | AC120V | 13.56009250 | 6.82 | 100 | PASS |

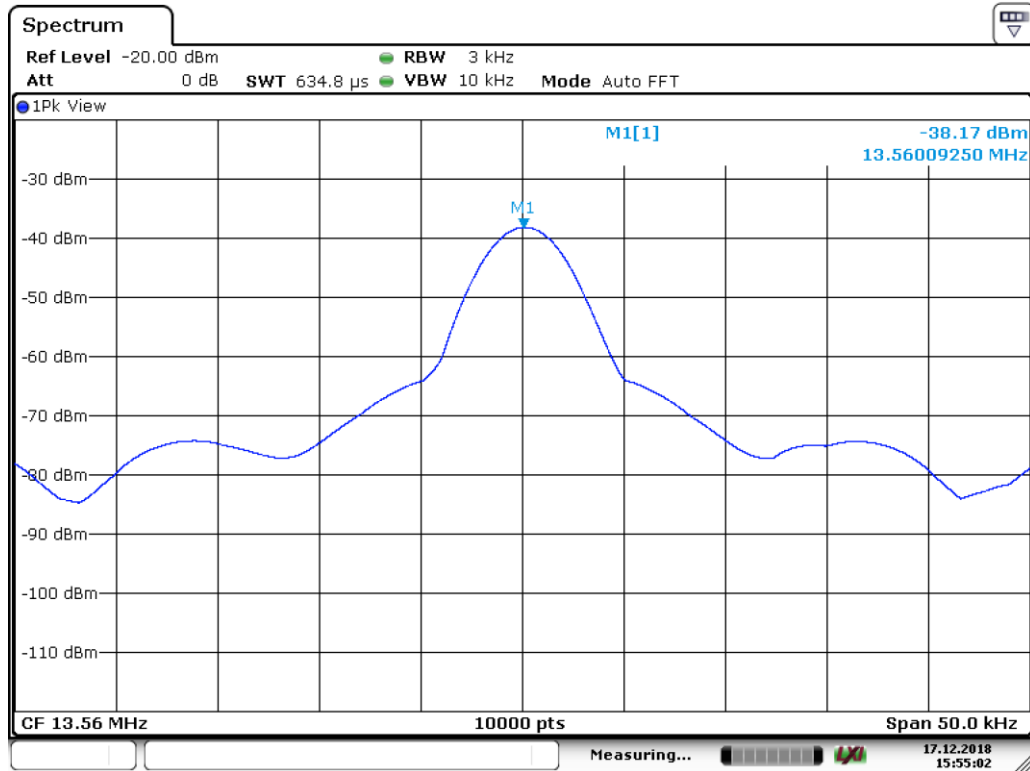
Frequency Stability Versus Environmental Temperature





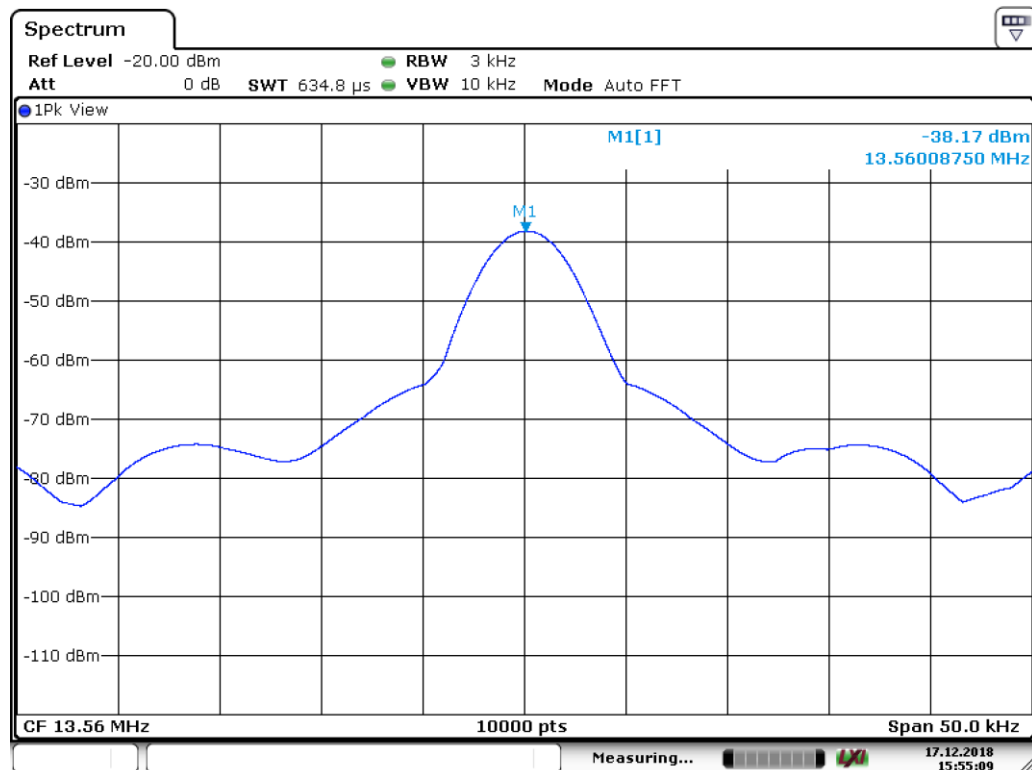


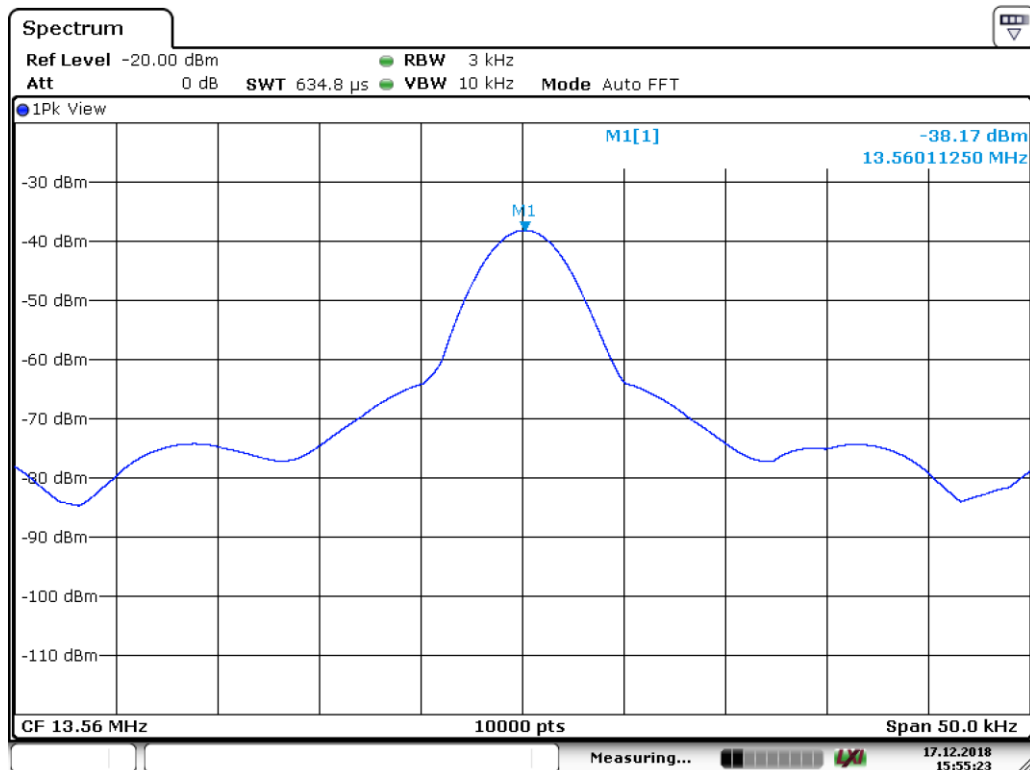
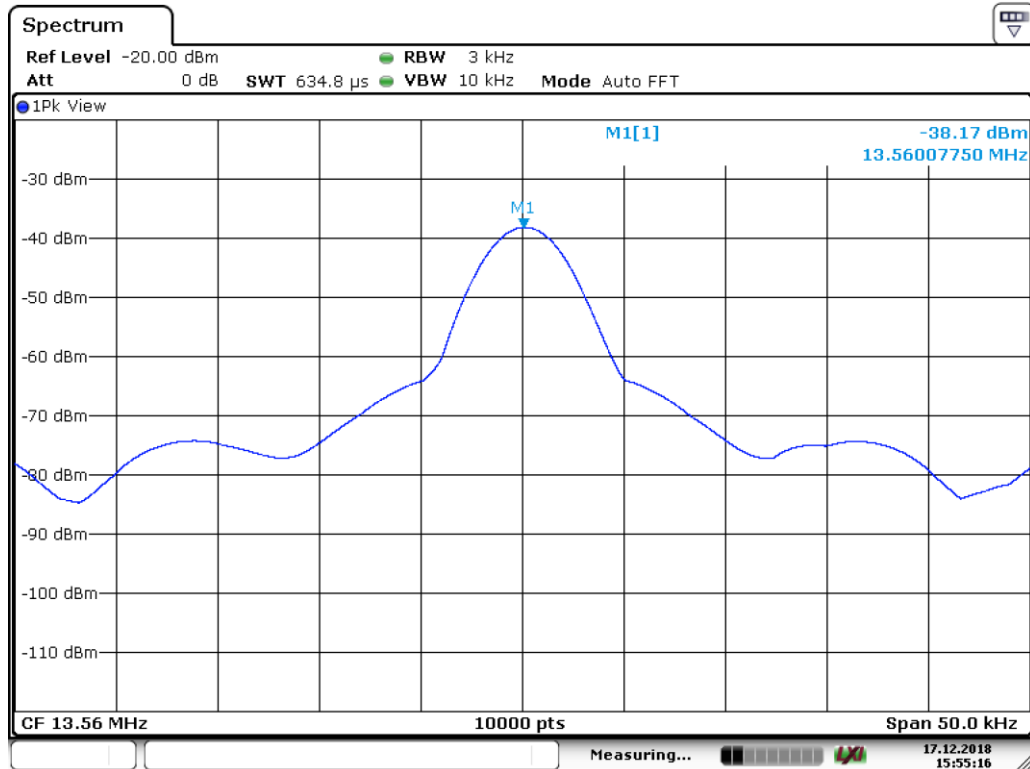




| Frequency Stability Versus Input Voltage | | | | | |
|--|---------------|-----------------|------------------|-------------|---------|
| Temperature (°C) | Voltage (Vac) | Frequency (MHz) | Freq Error (ppm) | Limit (ppm) | Results |
| 20 | 102V | 13.56008750 | 6.45 | 100 | PASS |
| 20 | 120V | 13.56007750 | 5.72 | 100 | PASS |
| 20 | 138V | 13.56011250 | 8.30 | 100 | PASS |

Frequency Stability Versus Input Voltage





8 EMISSION BANDWIDTH

8.1 Emission Bandwidth Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (13.553 – 13.567 MHz).

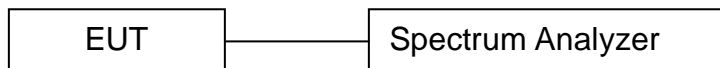
8.2 TEST INSTRUMENTS

Refer a test equipment and calibration data table in this test report.

8.3 TEST PROCEDURE

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

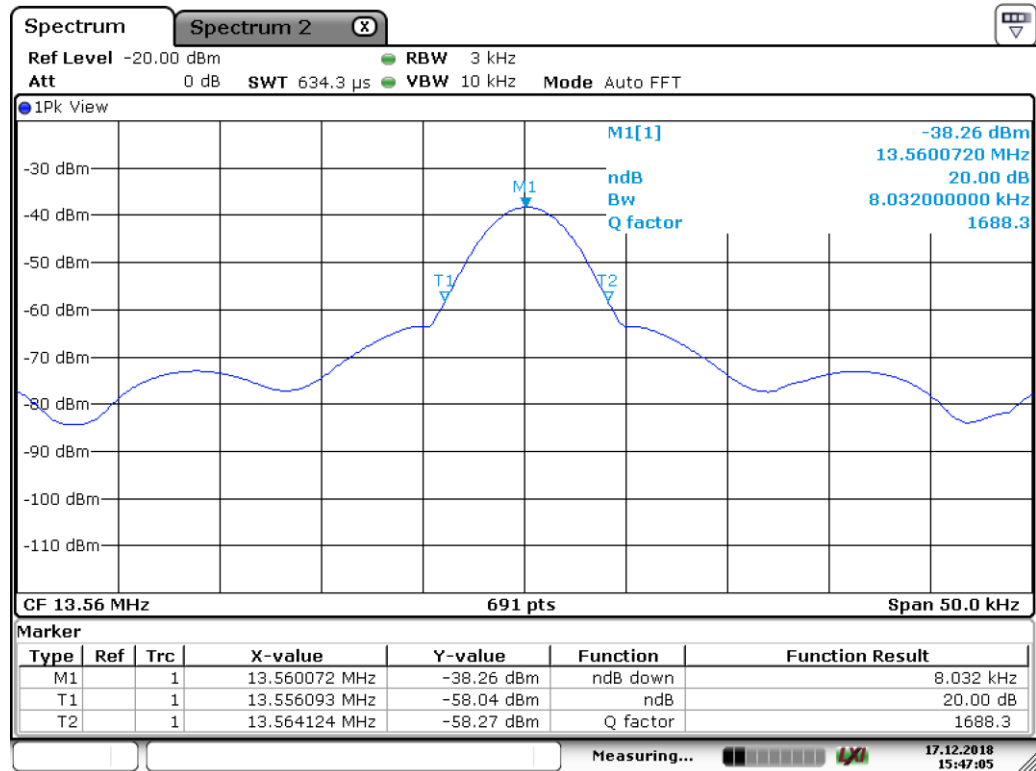
8.4 Test Setup



8.5 Test Result

| Frequency (MHz) | 20dB Bandwidth (kHz) | Results |
|--------------------|-------------------------|---------|
| 13.56 | 8.03 | PASS |

BANDWIDTH TEST PLOT



9 ANTENNA REQUIREMENT

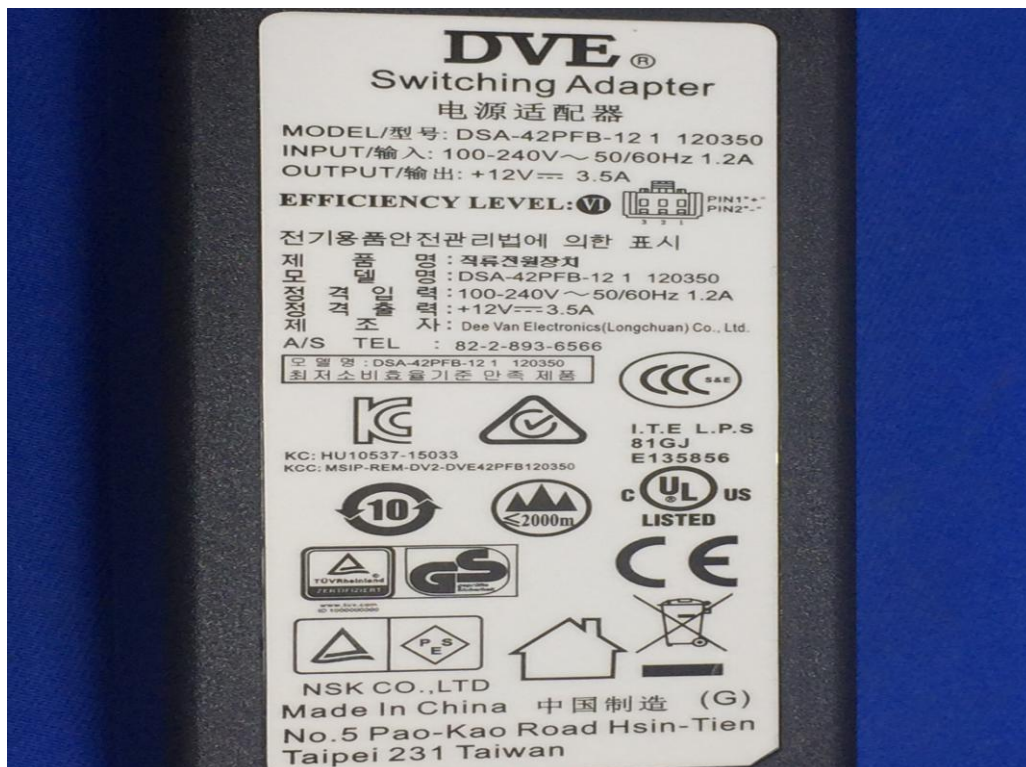
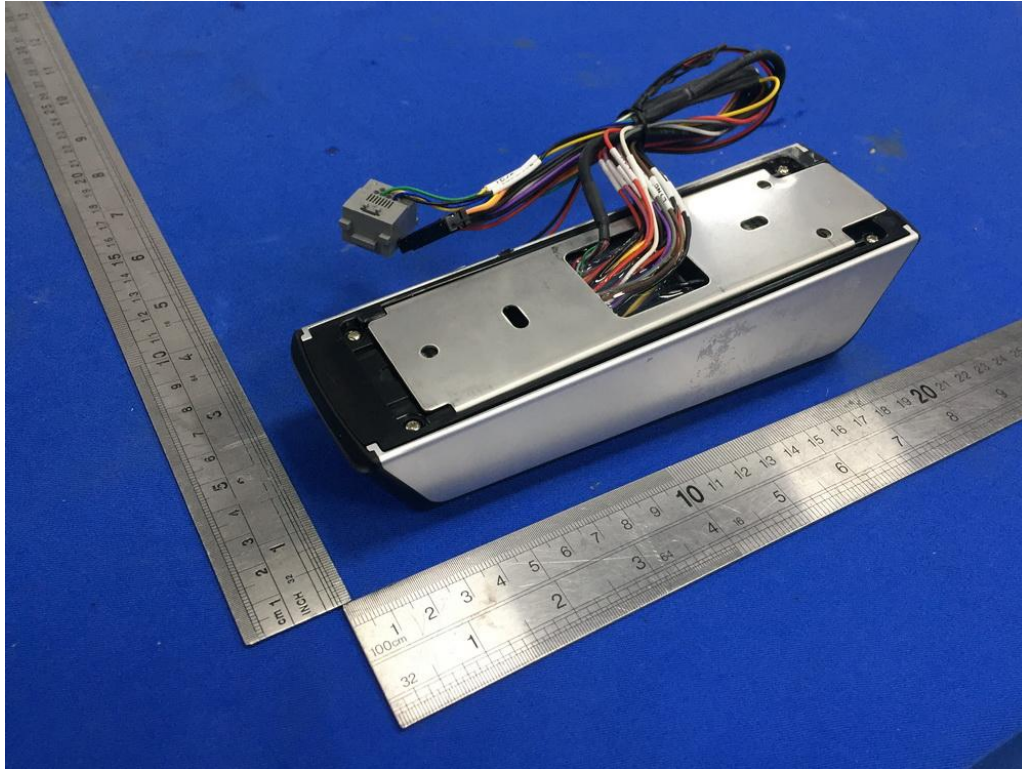
The EUT'S antenna is met the requirement of FCC part 15C section 15.203.

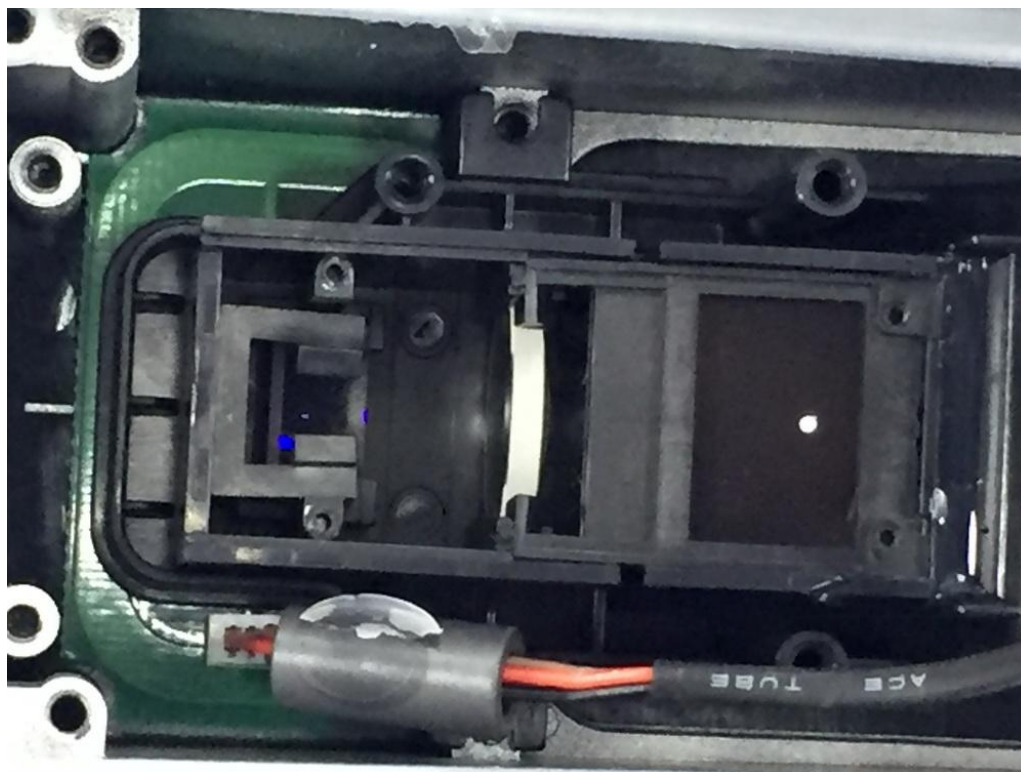
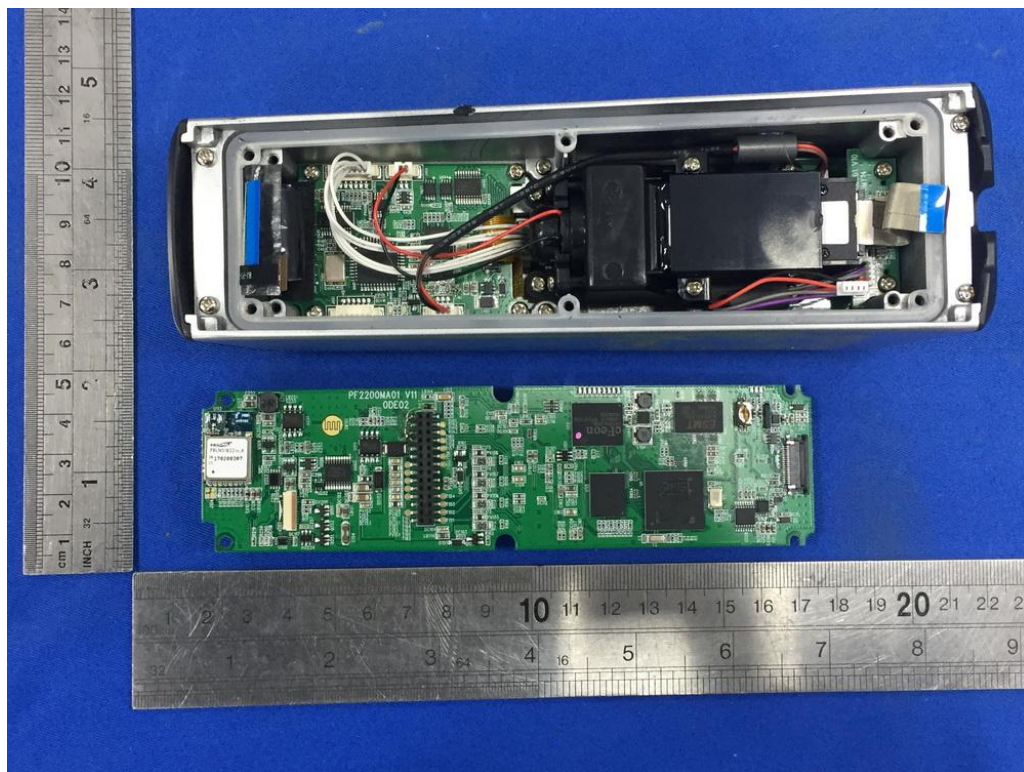
9.1 Result

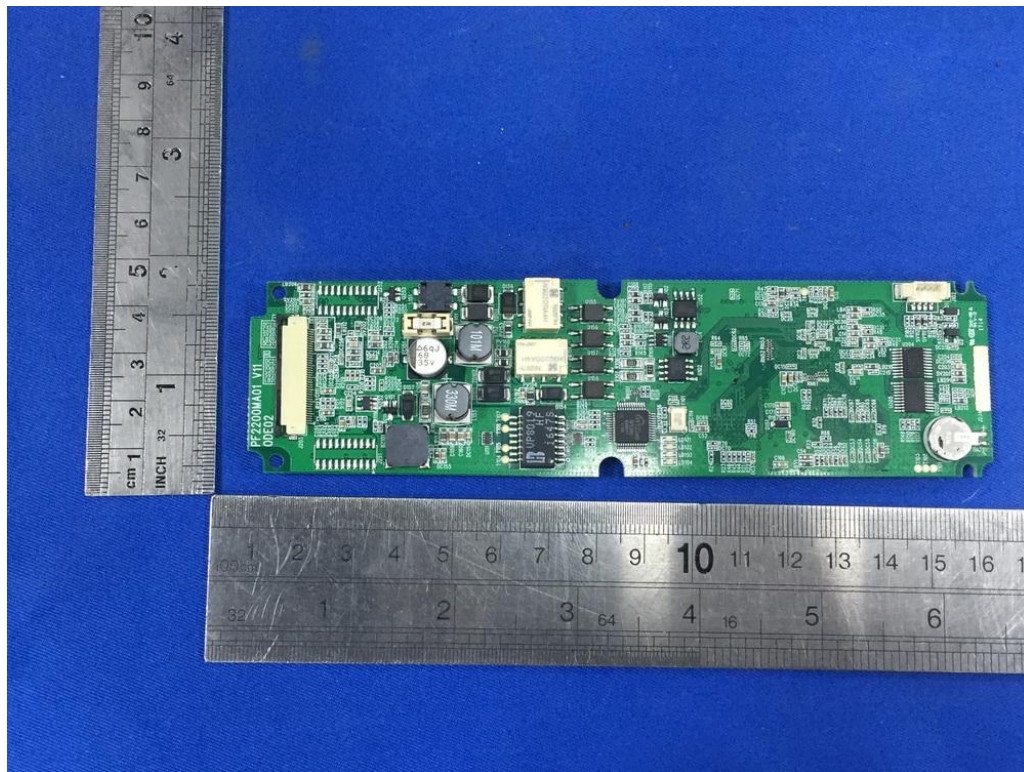
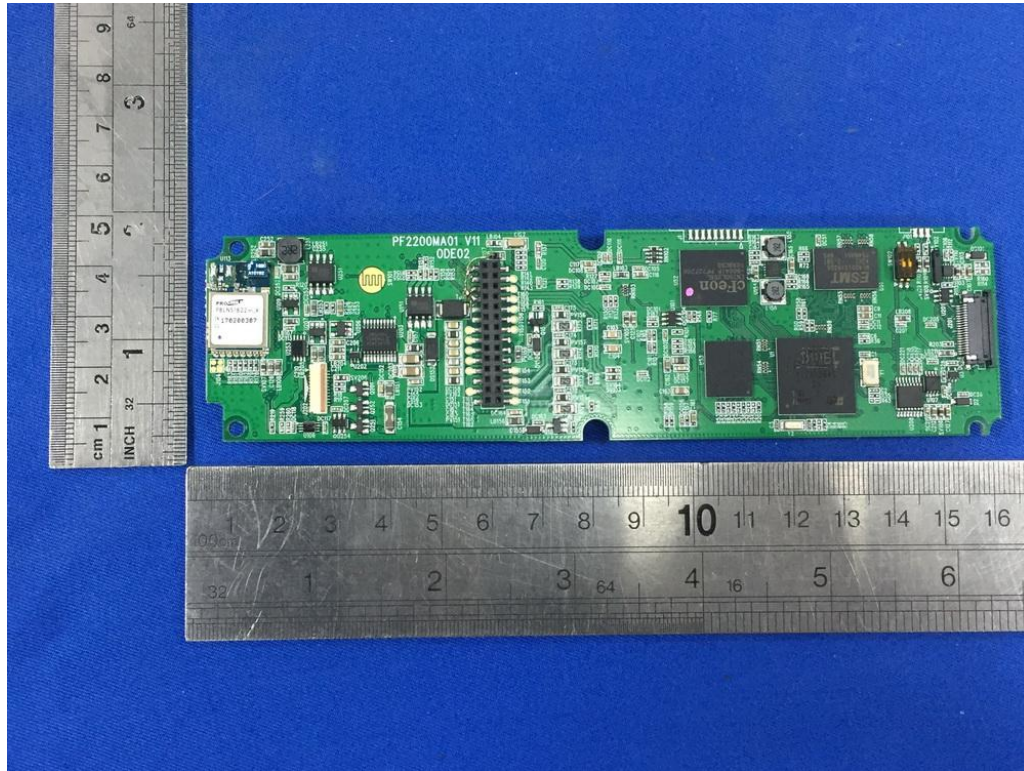
The EUT's antenna used an inter Loop Antenna and integral on the PCB.
The antenna is permanently attached on PCB, no consideration of replacement. Please refer to internal Photos for details. So it meets the requirement.

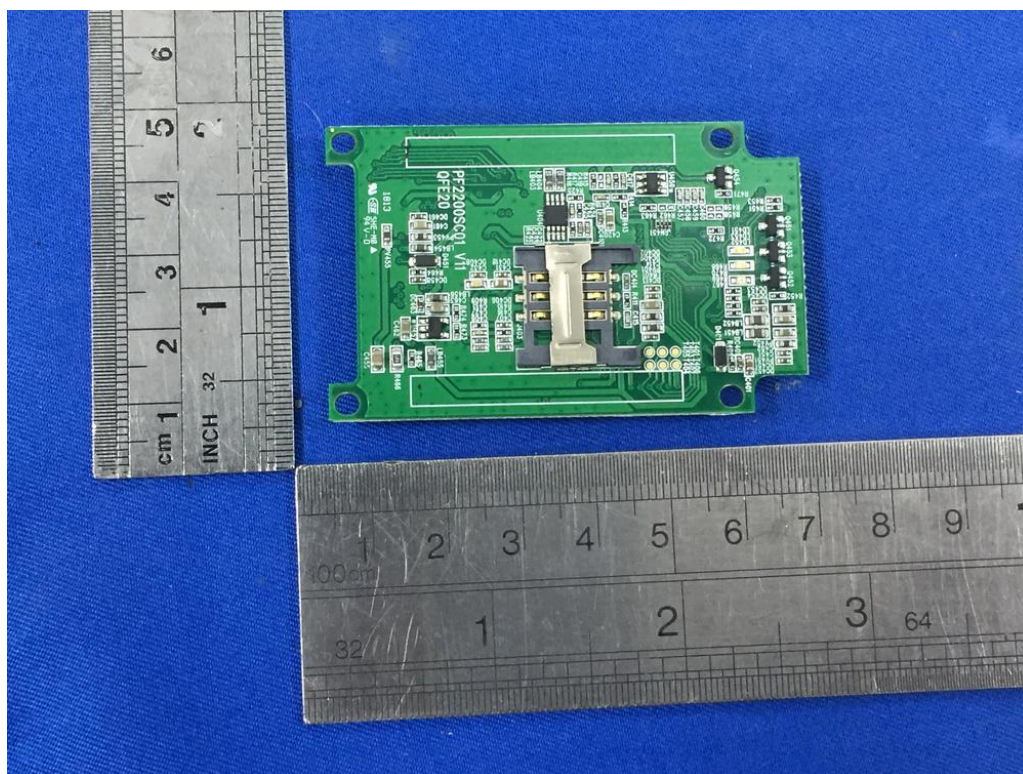
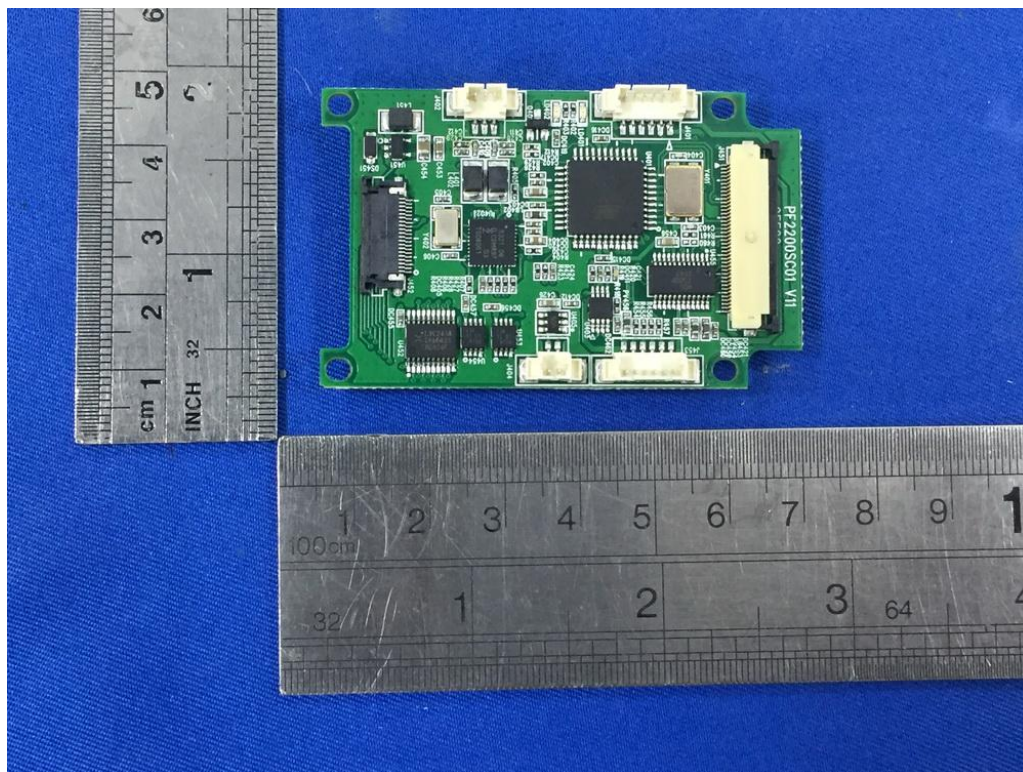
APPENDIX I (Photos of EUT)

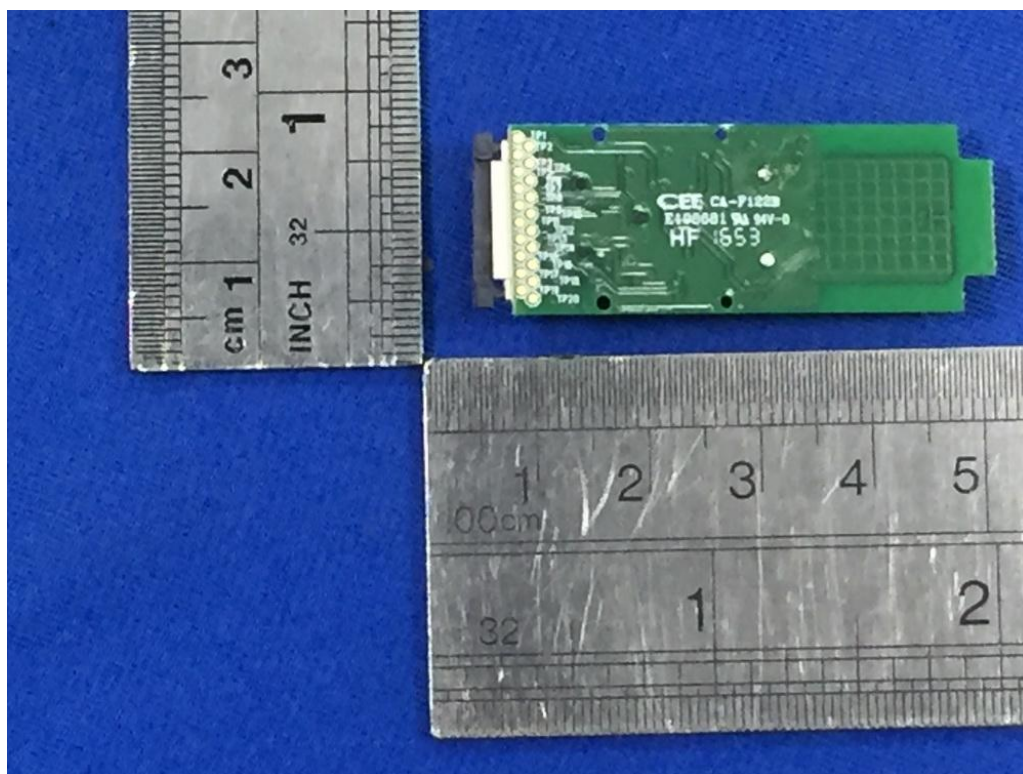
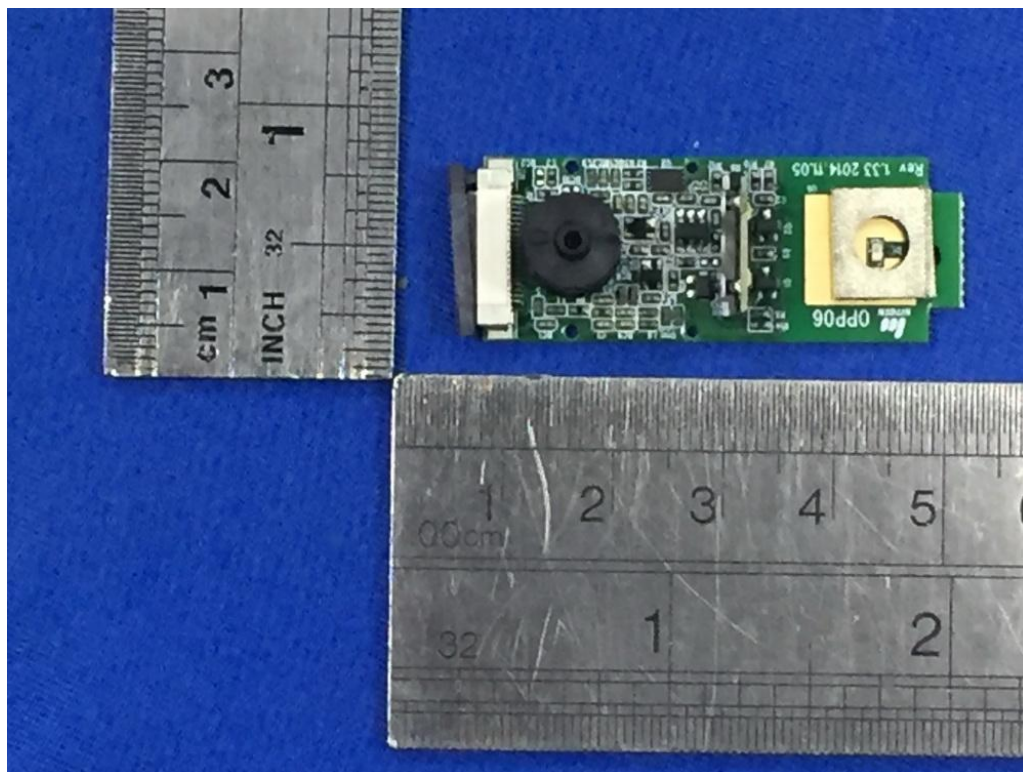


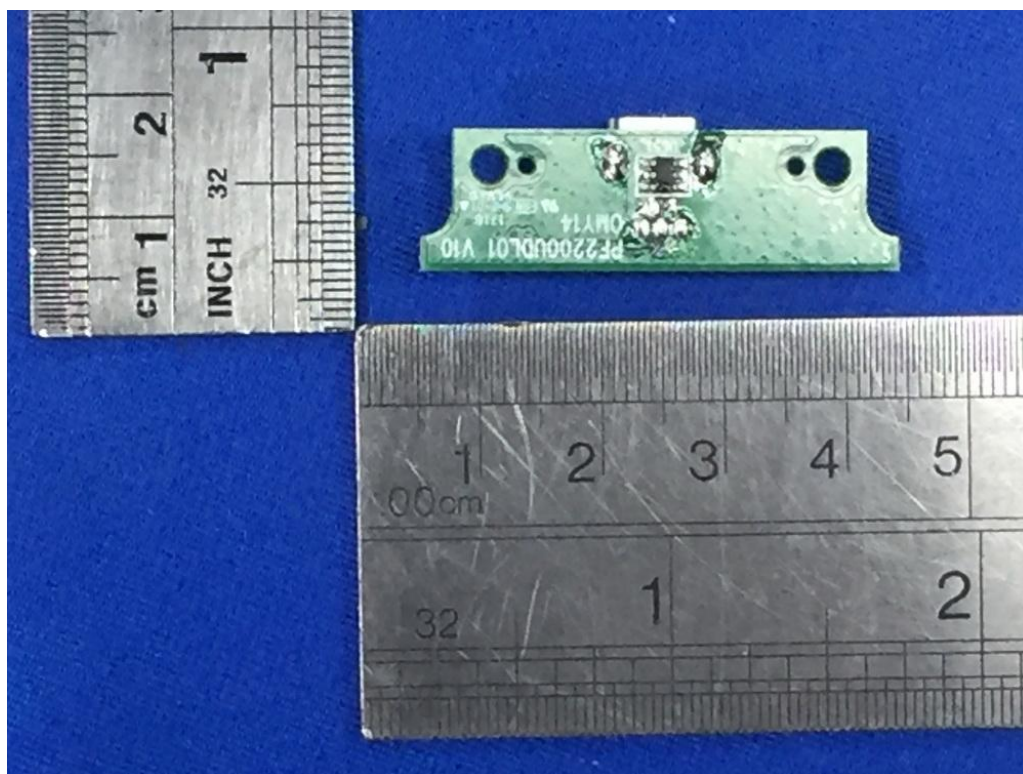
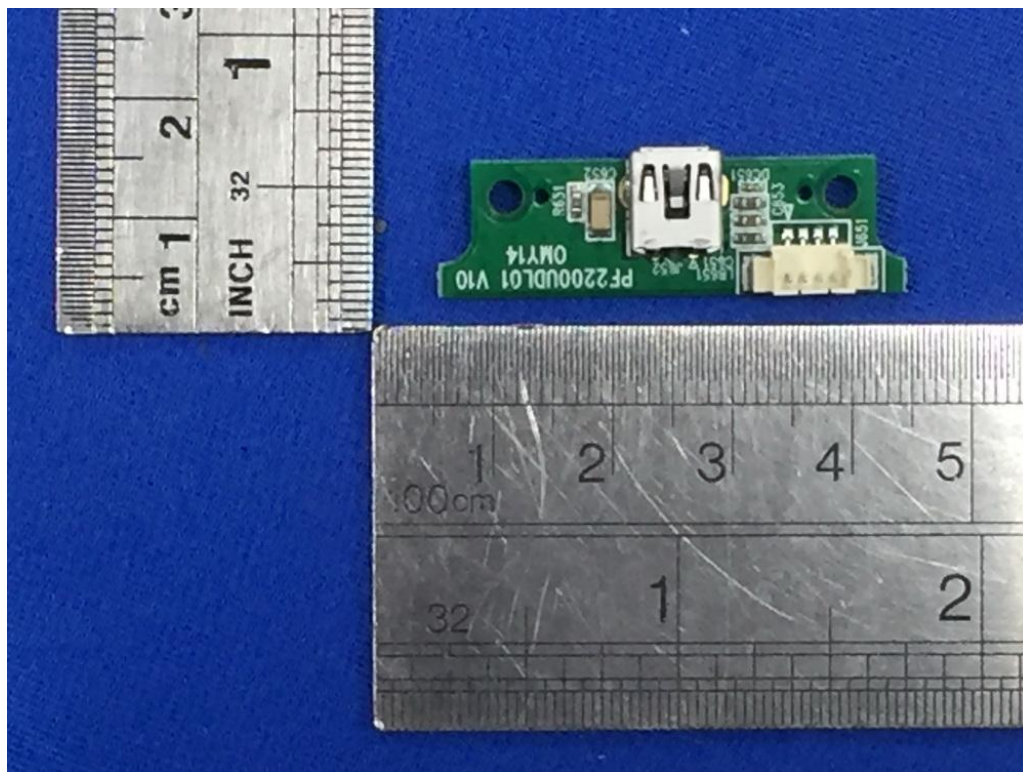












-----END OF REPORT-----