

# TEST REPORT

Report No.: BCTC2202463943-2E

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Applicant: shen zhen shi mai han de shi ye you xian gong si

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Product Name: Smart lock

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Model/Type  
reference: PCB10KEY32

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Tested Date: 2022-02-15 to 2022-02-19

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Issued Date: 2022-02-19

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**Shenzhen BCTC Testing Co., Ltd.**



**FCC ID: 2A4RN-PCB10KEY32**

Product Name: Smart lock

Trademark: WE.LOCK

Model/Type Ref.: PCB10KEY32  
PCB10KEY24, PCB10KEY31, PCB10KEY33, PCB10KEY34, PCB10EBL43,  
PB000KEY24, PBL20KEY32, PBL20KEY34, TouchEBL43

Prepared For: shen zhen shi mai han de shi ye you xian gong si

Address: Guangdong Province, Shenzhen, long hua xin qu, Silver Star Hi-Tech building, No 1301, Guanguang Rd. 6F B601-1, 518110, China

Manufacturer: shen zhen shi mai han de shi ye you xian gong si

Address: Guangdong Province, Shenzhen, long hua xin qu, Silver Star Hi-Tech building, No 1301, Guanguang Rd. 6F B601-1, 518110, China

Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Sample Received Date: 2022-02-15

Sample tested Date: 2022-02-15 to 2022-02-19

Issue Date: 2022-02-19

Report No.: BCTC2202463943-2E

Test Standards: FCC Part15.225  
ANSI C63.10-2013

Test Results: PASS

Remark: This is NFC radio test report.

Tested by:



Lei Chen/Project Handler

Approved by:



Zero Zhou/Reviewer

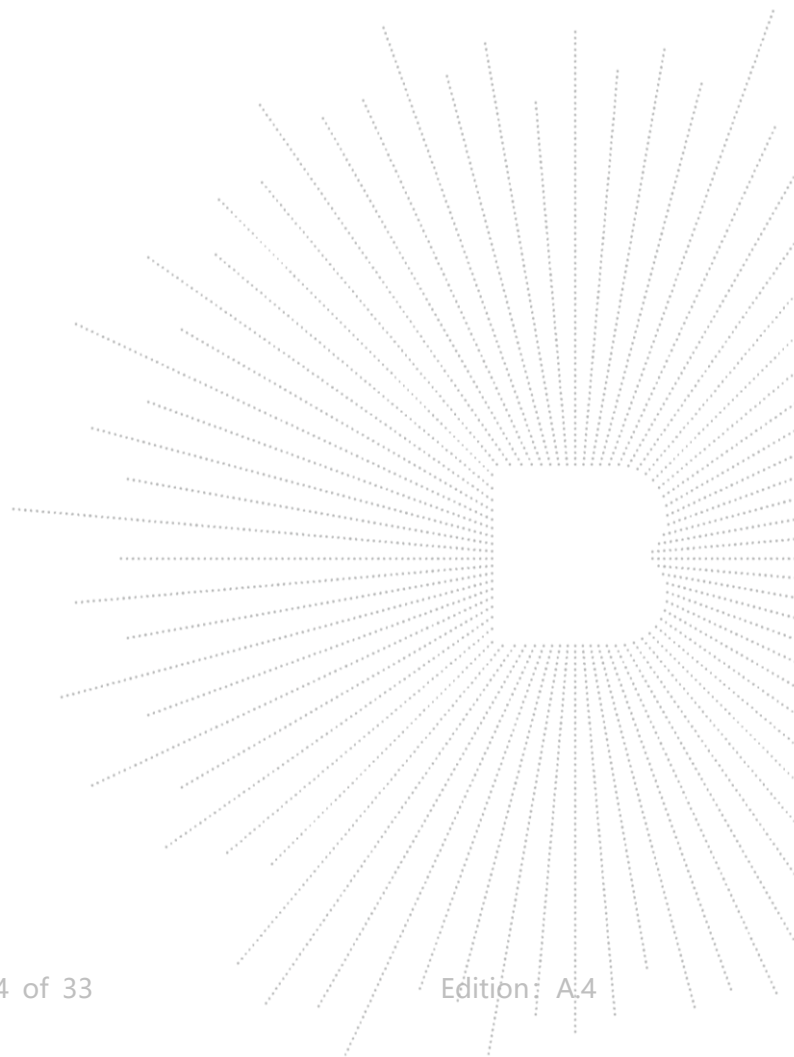
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(Note: N/A Means Not Applicable)



**1. Version**

| Report No.        | Issue Date | Description | Approved |
|-------------------|------------|-------------|----------|
| BCTC2202463943-2E | 2022-02-19 | Original    | Valid    |
|                   |            |             |          |

## 2. Test Summary

The Product has been tested according to the following specifications:

| No. | Test Parameter                     | Clause No                                                            | Results |
|-----|------------------------------------|----------------------------------------------------------------------|---------|
| 1   | 15.207                             | Conducted Emission                                                   | PASS    |
| 2   | Part 15.209(a), 15.225(d)          | Radiated Spurious Emission                                           | PASS    |
| 3   | 15.215                             | Bandwidth                                                            | PASS    |
| 4   | Part 15.209(a), 15.225(a)(b)(c)(d) | Band Edge Emission                                                   | PASS    |
| 5   | Part 15.225(e)                     | Transmitter Frequency Stability<br>(Temperature & Voltage Variation) | PASS    |
| 6   | 15.203                             | Antenna Requirement                                                  | PASS    |

### 3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

| No. | Item                                               | Uncertainty |
|-----|----------------------------------------------------|-------------|
| 1   | 3m chamber Radiated spurious emission(30MHz-1GHz)  | U=4.3dB     |
| 2   | 3m chamber Radiated spurious emission(9KHz-30MHz)  | U=3.7dB     |
| 3   | 3m chamber Radiated spurious emission(1GHz-18GHz)  | U=4.5dB     |
| 4   | 3m chamber Radiated spurious emission(18GHz-40GHz) | U=3.34dB    |
| 5   | Conducted Emission (150kHz-30MHz)                  | U=3.20dB    |
| 6   | Conducted Adjacent channel power                   | U=1.38dB    |
| 7   | Conducted output power uncertainty Above 1G        | U=1.576dB   |
| 8   | Conducted output power uncertainty below 1G        | U=1.28dB    |
| 9   | humidity uncertainty                               | U=5.3%      |
| 10  | Temperature uncertainty                            | U=0.59°C    |

## 4. Product Information And Test Setup

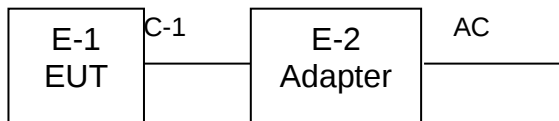
### 4.1 Product Information

|                       |                                                                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Model/Type Ref.:      | PCB10KEY32<br>PCB10KEY24, PCB10KEY31, PCB10KEY33, PCB10KEY34, PCB10EBL43,<br>PB000KEY24, PBL20KEY32, PBL20KEY34, TouchEBL43 |
| Model differences:    | All the model are the same circuit and RF module, except model names.                                                       |
| Hardware Version:     | N/A                                                                                                                         |
| Software Version:     | N/A                                                                                                                         |
| Operation Frequency:  | 13.56MHz                                                                                                                    |
| Modulation Type:      | ASK                                                                                                                         |
| Number Of Channel     | 1 CH                                                                                                                        |
| Antenna installation: | Coil Antenna                                                                                                                |
| Antenna Gain:         | 0dBi                                                                                                                        |
| Ratings:              | DC 6V from battery, DC 5V from USB                                                                                          |

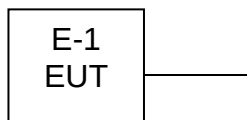
### 4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:



Radiated Spurious Emission



### 4.3 Support Equipment

| No. | Device Type | Brand | Model      | Series No. | Note      |
|-----|-------------|-------|------------|------------|-----------|
| E-1 | Smart lock  | N/A   | PCB10KEY32 | N/A        | EUT       |
| E-2 | Adapter     | N/A   | BCTC001    | N/A        | Auxiliary |

| Item | Shielded Type | Ferrite Core | Length | Note                |
|------|---------------|--------------|--------|---------------------|
| C-1  | NO            | NO           | 0.5M   | DC cable unshielded |

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

#### 4.4 Channel List

| Channel List |                |
|--------------|----------------|
| Channel      | Frequency(MHz) |
| 01           | 13.56          |

#### 4.5 Test Mode

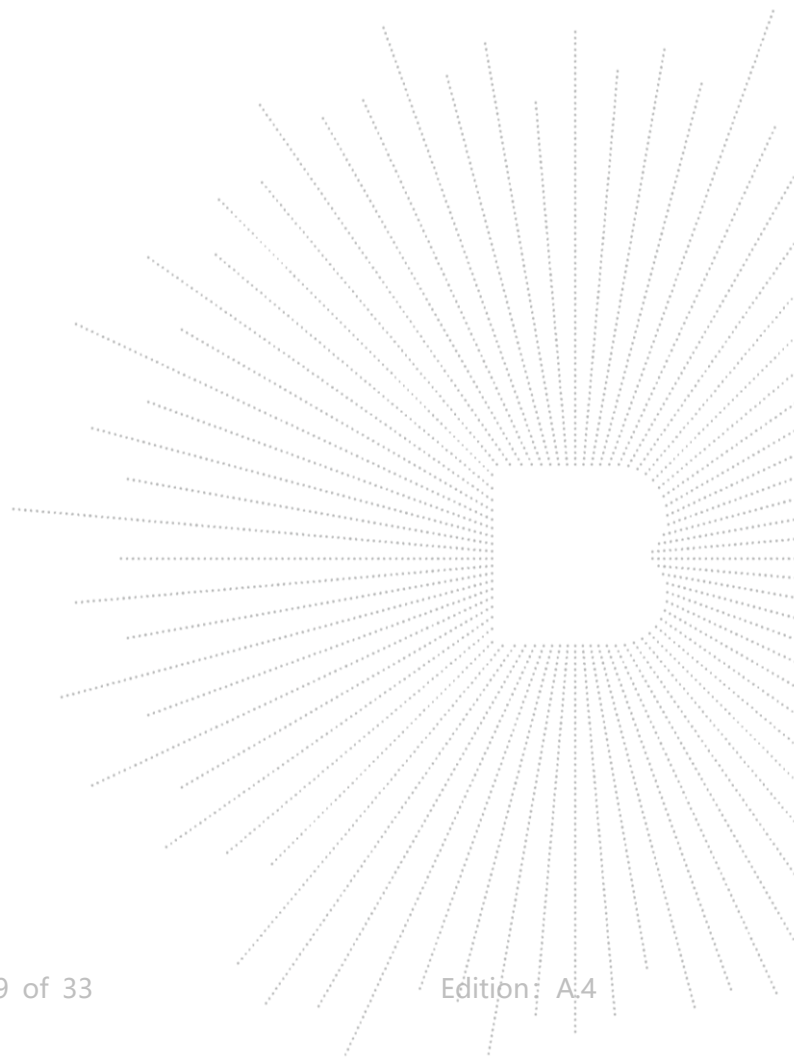
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration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

| For All Mode | Description |
|--------------|-------------|
| Mode 1       | TX Mode     |
|              |             |

| Link mode(conducted emission and Radiated emission) |             |
|-----------------------------------------------------|-------------|
| Final Test Mode                                     | Description |
| Mode 1                                              | TX Mode     |
|                                                     |             |

#### Notes:

(1) Fully-charged battery is used during the test.



## 5. Test Facility And Test Instrument Used

### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.  
FCC Test Firm Registration Number: 712850  
IC Registered No.: 23583

### 5.2 Test Instrument Used

| Conducted emissions Test |              |                 |                |              |              |
|--------------------------|--------------|-----------------|----------------|--------------|--------------|
| Equipment                | Manufacturer | Model#          | Serial#        | Last Cal.    | Next Cal.    |
| Receiver                 | R&S          | ESR3            | 102075         | May 28, 2021 | May 27, 2022 |
| LISN                     | R&S          | ENV216          | 101375         | May 28, 2021 | May 27, 2022 |
| Software                 | Frad         | EZ-EMC          | EMC-CON<br>3A1 | \            | \            |
| Attenuator               | \            | 10dB<br>DC-6GHz | 1650           | May 28, 2021 | May 27, 2022 |

| RF Conducted Test            |              |        |            |              |              |
|------------------------------|--------------|--------|------------|--------------|--------------|
| Equipment                    | Manufacturer | Model# | Serial#    | Last Cal.    | Next Cal.    |
| Power Metter                 | Keysight     | E4419  | \          | May 28, 2021 | May 27, 2022 |
| Power Sensor (AV)            | Keysight     | E9300A | \          | May 28, 2021 | May 27, 2022 |
| Signal Analyzer20kHz-26.5GHz | Keysight     | N9020A | MY49100060 | May 28, 2021 | May 27, 2022 |
| Spectrum Analyzer9kHz-40GHz  | R&S          | FSP40  | \          | May 28, 2021 | May 27, 2022 |

| Radiated emissions Test (966 chamber) |              |                      |                   |               |               |
|---------------------------------------|--------------|----------------------|-------------------|---------------|---------------|
| Equipment                             | Manufacturer | Model#               | Serial#           | Last Cal.     | Next Cal.     |
| 966 chamber                           | ChengYu      | 966 Room             | 966               | Jun. 06. 2020 | Jun. 05, 2023 |
| Receiver                              | R&S          | ESR3                 | 102075            | May 28, 2021  | May 27, 2022  |
| Receiver                              | R&S          | ESRP                 | 101154            | May 28, 2021  | May 27, 2022  |
| Amplifier                             | SKET         | LAPA_01G18<br>G-45dB | \                 | May 28, 2021  | May 27, 2022  |
| Amplifier                             | Schwarzbeck  | BBV9744              | 9744-0037         | May 28, 2021  | May 27, 2022  |
| TRILOG<br>Broadband<br>Antenna        | Schwarzbeck  | VULB9163             | 942               | Jun. 01, 2021 | May 31, 2022  |
| Horn Antenna                          | Schwarzbeck  | BBHA9120D            | 1541              | Jun. 02, 2021 | Jun. 01, 2022 |
| Horn<br>Antenn(18GHz<br>-40GHz)       | Schwarzbeck  | BBHA9170             | 00822             | Jun. 15, 2021 | Jun. 14, 2022 |
| Amplifier(18G<br>Hz-40GHz)            | MITEQ        | TTA1840-35-<br>HG    | 2034381           | May 28, 2021  | May 27, 2022  |
| Loop<br>Antenna(9kHz<br>-30MHz)       | Schwarzbeck  | FMZB1519B            | 00014             | Jun. 02, 2021 | Jun. 01, 2022 |
| RF<br>cables1(9kHz-<br>30MHz)         | Huber+Suhnar | 9kHz-30MHz           | B1702988-00<br>08 | May 28, 2021  | May 27, 2022  |
| RF<br>cables2(30MH<br>z-1GHz)         | Huber+Suhnar | 30MHz-1GH<br>z       | 1486150           | May 28, 2021  | May 27, 2022  |
| RF<br>cables3(1GHz-<br>40GHz)         | Huber+Suhnar | 1GHz-40GHz           | 1607106           | May 28, 2021  | May 27, 2022  |
| Power Metter                          | Keysight     | E4419                | \                 | May 28, 2021  | May 27, 2022  |
| Power Sensor<br>(AV)                  | Keysight     | E9300A               | \                 | May 28, 2021  | May 27, 2022  |
| Signal<br>Analyzer20kHz<br>-26.5GHz   | Keysight     | N9020A               | MY49100060        | May 28, 2021  | May 27, 2022  |
| Spectrum<br>Analyzer9kHz-<br>40GHz    | R&S          | FSP40                | \                 | May 28, 2021  | May 27, 2022  |
| Software                              | Frad         | EZ-EMC               | FA-03A2 RE        | \             | \             |

## 6. Conducted Emissions

### 6.1 Block Diagram Of Test Setup



### 6.2 Limit

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

Notes:

- \*Decreasing linearly with logarithm of frequency.
- The lower limit shall apply at the transition frequencies.

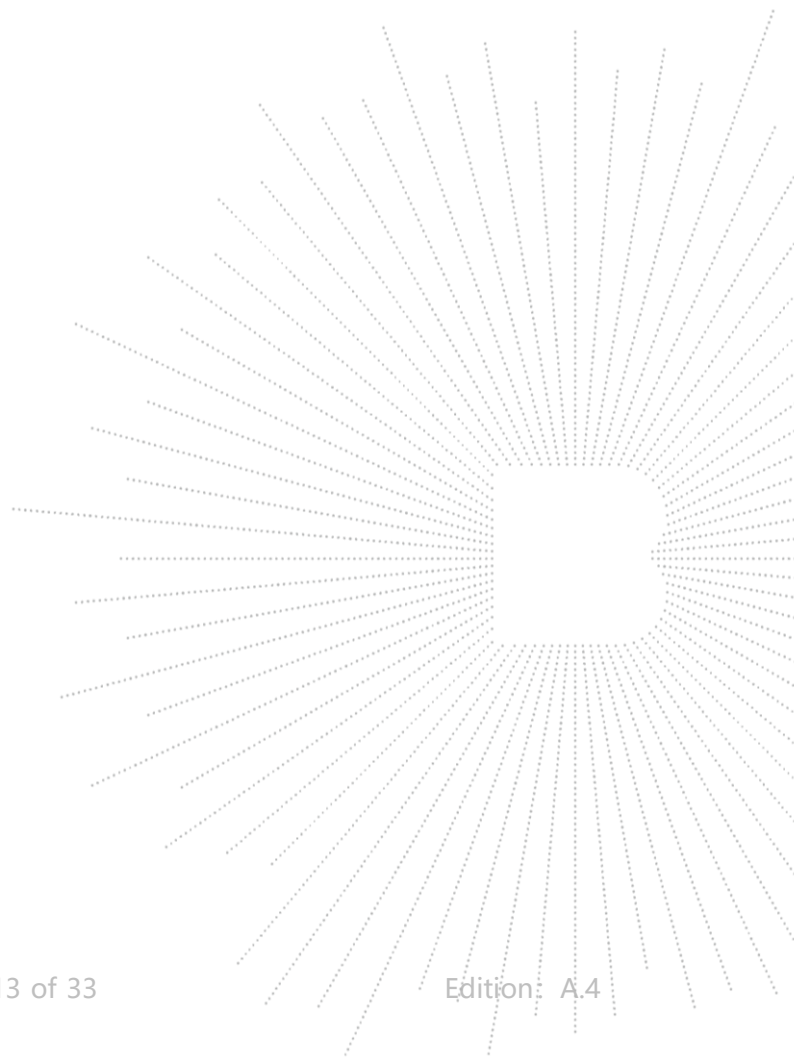
### 6.3 Test Procedure

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

- The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

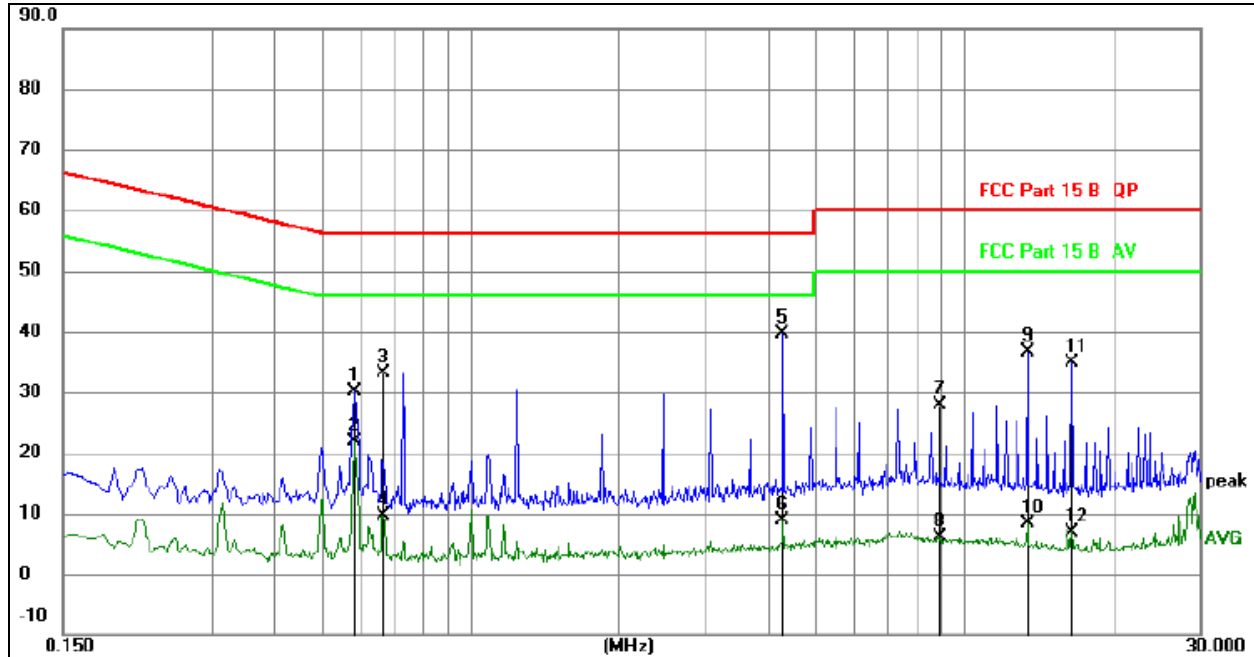
## 6.4 EUT operating Conditions

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



## 6.4 Test Result

|                |            |                    |        |
|----------------|------------|--------------------|--------|
| Temperature:   | 26 °C      | Relative Humidity: | 54%    |
| Pressure:      | 101kPa     | Phase :            | Line   |
| Test Voltage : | AC120/60Hz | Test Mode:         | Mode 1 |

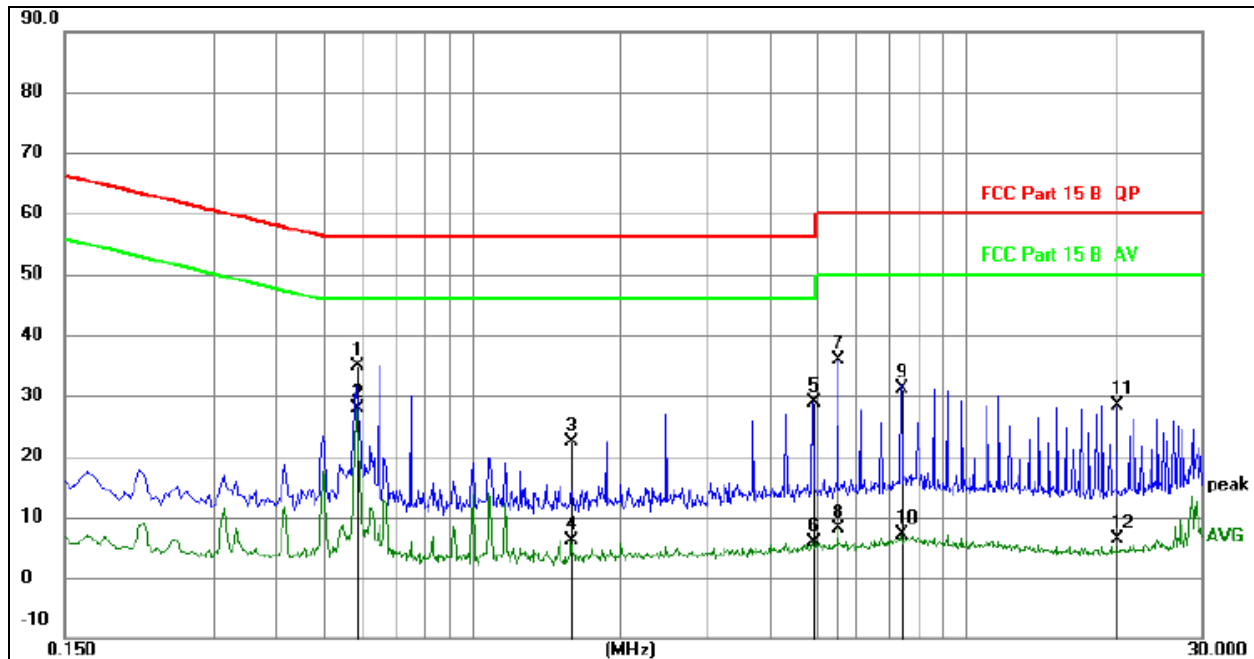


### Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement=Reading Level+ Correct Factor
4. Over= Measurement-Limit

| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dB | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector |
|-----|-----|--------------|------------------------|-------------------------|--------------------------|---------------|------------|----------|
| 1   |     | 0.5854       | 10.40                  | 19.61                   | 30.01                    | 56.00         | -25.99     | QP       |
| 2   |     | 0.5854       | 2.35                   | 19.61                   | 21.96                    | 46.00         | -24.04     | AVG      |
| 3   |     | 0.6648       | 13.61                  | 19.61                   | 33.22                    | 56.00         | -22.78     | QP       |
| 4   |     | 0.6648       | -9.89                  | 19.61                   | 9.72                     | 46.00         | -36.28     | AVG      |
| 5   | *   | 4.2918       | 20.03                  | 19.68                   | 39.71                    | 56.00         | -16.29     | QP       |
| 6   |     | 4.2918       | -10.76                 | 19.68                   | 8.92                     | 46.00         | -37.08     | AVG      |
| 7   |     | 8.9163       | 8.14                   | 19.77                   | 27.91                    | 60.00         | -32.09     | QP       |
| 8   |     | 8.9163       | -13.65                 | 19.77                   | 6.12                     | 50.00         | -43.88     | AVG      |
| 9   |     | 13.4080      | 16.86                  | 19.78                   | 36.64                    | 60.00         | -23.36     | QP       |
| 10  |     | 13.4080      | -11.43                 | 19.78                   | 8.35                     | 50.00         | -41.65     | AVG      |
| 11  |     | 16.4856      | 15.00                  | 19.76                   | 34.76                    | 60.00         | -25.24     | QP       |
| 12  |     | 16.4856      | -12.96                 | 19.76                   | 6.80                     | 50.00         | -43.20     | AVG      |

|                |            |                    |         |
|----------------|------------|--------------------|---------|
| Temperature:   | 26 °C      | Relative Humidity: | 54%     |
| Pressure:      | 101kPa     | Phase :            | Neutral |
| Test Voltage : | AC120/60Hz | Test Mode:         | Mode 1  |



Remark:

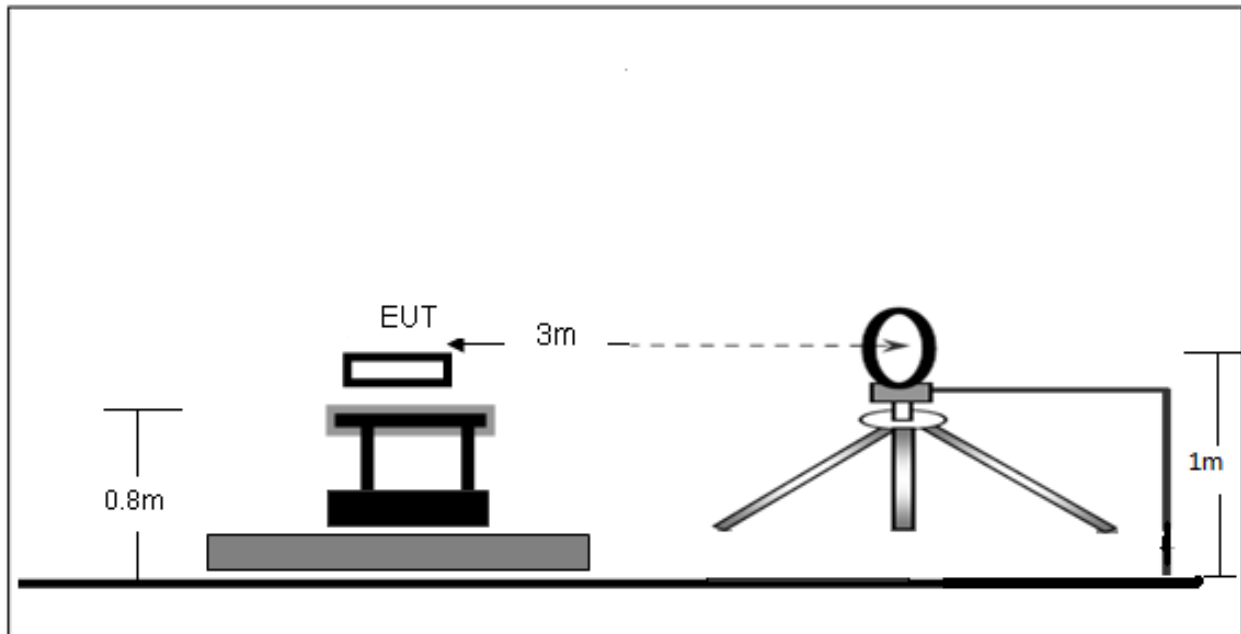
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement=Reading Level+ Correct Factor
4. Over= Measurement-Limit

| No. | Mk. | Freq.<br>MHz | Reading<br>Level | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector |
|-----|-----|--------------|------------------|-------------------------|--------------------------|---------------|------------|----------|
| 1   |     | 0.5865       | 15.19            | 19.61                   | 34.80                    | 56.00         | -21.20     | QP       |
| 2   | *   | 0.5865       | 8.22             | 19.61                   | 27.83                    | 46.00         | -18.17     | AVG      |
| 3   |     | 1.5900       | 2.66             | 19.62                   | 22.28                    | 56.00         | -33.72     | QP       |
| 4   |     | 1.5900       | -13.42           | 19.62                   | 6.20                     | 46.00         | -39.80     | AVG      |
| 5   |     | 4.9245       | 9.19             | 19.70                   | 28.89                    | 56.00         | -27.11     | QP       |
| 6   |     | 4.9245       | -13.93           | 19.70                   | 5.77                     | 46.00         | -40.23     | AVG      |
| 7   |     | 5.5319       | 16.24            | 19.71                   | 35.95                    | 60.00         | -24.05     | QP       |
| 8   |     | 5.5319       | -11.69           | 19.71                   | 8.02                     | 50.00         | -41.98     | AVG      |
| 9   |     | 7.3680       | 11.30            | 19.74                   | 31.04                    | 60.00         | -28.96     | QP       |
| 10  |     | 7.3680       | -12.58           | 19.74                   | 7.16                     | 50.00         | -42.84     | AVG      |
| 11  |     | 20.2155      | 8.69             | 19.74                   | 28.43                    | 60.00         | -31.57     | QP       |
| 12  |     | 20.2155      | -13.28           | 19.74                   | 6.46                     | 50.00         | -43.54     | AVG      |

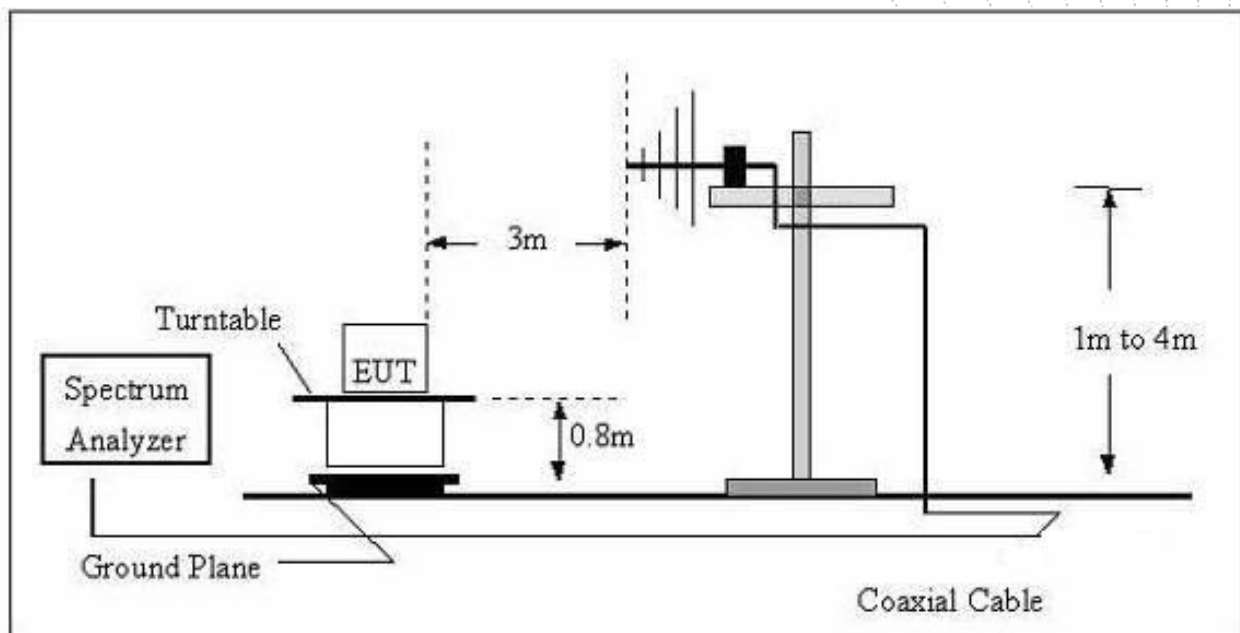
## 7. Radiated Emissions

### 7.1 Block Diagram Of Test Setup

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



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



## 7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequency     | Field Strength | Distance | Field Strength Limit at 3m Distance |                                       |
|---------------|----------------|----------|-------------------------------------|---------------------------------------|
| (MHz)         | uV/m           | (m)      | uV/m                                | dBuV/m                                |
| 0.009 ~ 0.490 | 2400/F(kHz)    | 300      | $10000 * 2400/F(\text{kHz})$        | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705 | 24000/F(kHz)   | 30       | $100 * 24000/F(\text{kHz})$         | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30    | 30             | 30       | $100 * 30$                          | $20\log^{(30)} + 40$                  |
| 30 ~ 88       | 100            | 3        | 100                                 | $20\log^{(100)}$                      |
| 88 ~ 216      | 150            | 3        | 150                                 | $20\log^{(150)}$                      |
| 216 ~ 960     | 200            | 3        | 200                                 | $20\log^{(200)}$                      |
| Above 960     | 500            | 3        | 500                                 | $20\log^{(500)}$                      |

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

Below 1GHz test procedure as below:

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

Above 1GHz test procedure as below:

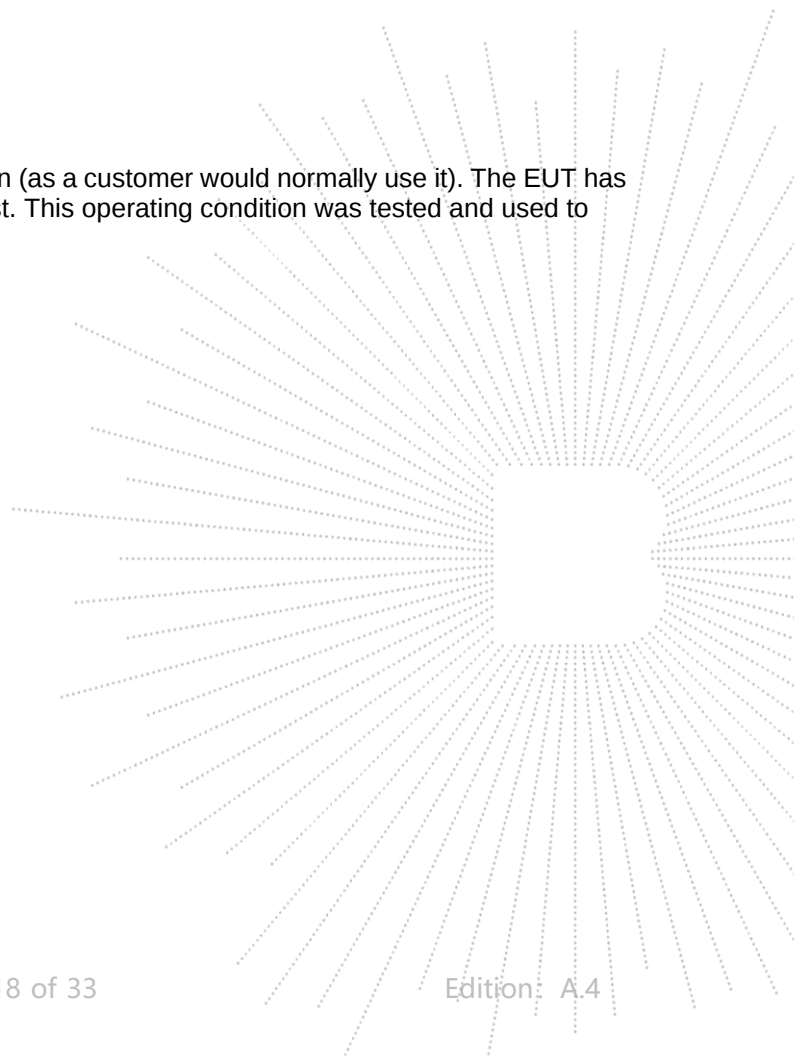
- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel.

Note:

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

### 7.3 EUT Operating Conditions

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



## 7.4 Test Result

|              |         |                    |              |
|--------------|---------|--------------------|--------------|
| Temperature: | 26°C    | Relative Humidity: | 54%          |
| Pressure:    | 101 kpa | Test Voltage :     | AC 120V/60Hz |
| Test Mode :  | Mode 1  | Polarization:      | -            |

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 0.0708    | 45.73         | 20.15  | 65.88          | 130.60   | -64.72 | PK            |
| 0.0708    | 42.21         | 20.15  | 62.36          | 110.60   | -48.24 | AV            |
| 0.2872    | 51.42         | 20.33  | 71.75          | 118.44   | -46.69 | PK            |
| 0.2872    | 45.31         | 20.33  | 65.64          | 98.44    | -32.80 | AV            |
| 0.3910    | 63.06         | 20.55  | 83.61          | 115.76   | -32.15 | PK            |
| 0.3910    | 61.73         | 20.55  | 82.28          | 95.76    | -13.48 | AV            |
| 0.9214    | 37.45         | 20.64  | 58.09          | 68.32    | -10.23 | QP            |
| 1.6625    | 36.62         | 21.26  | 57.88          | 63.19    | -5.31  | QP            |
| 1.7301    | 31.95         | 22.32  | 54.27          | 69.54    | -15.27 | QP            |

Note:

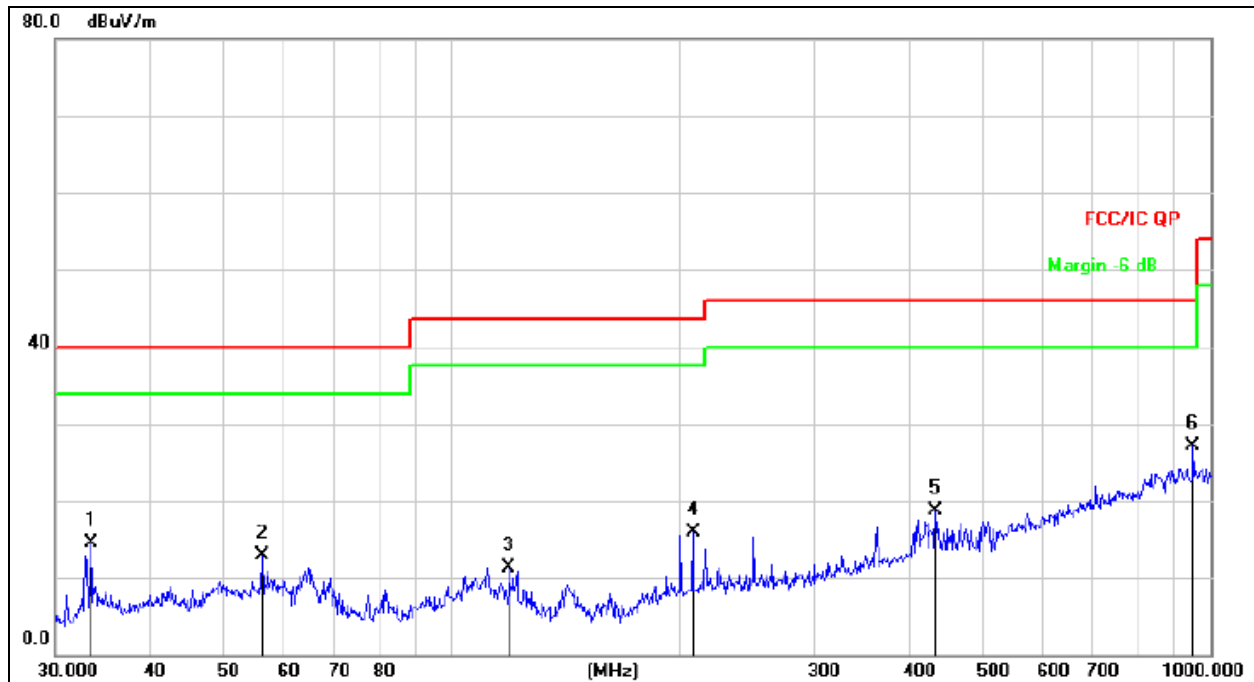
Pre-scan in the all of mode, the worst case in of was recorded.

Factor = antenna factor + cable loss – pre-amplifier.

Margin = Emission Level- Limit.

Between 30MHz – 1GHz

|              |        |                    |            |
|--------------|--------|--------------------|------------|
| Temperature: | 26 °C  | Relative Humidity: | 54%        |
| Pressure:    | 101KPa | Phase :            | Horizontal |
| Test Mode:   | Mode 1 | Remark:            | N/A        |

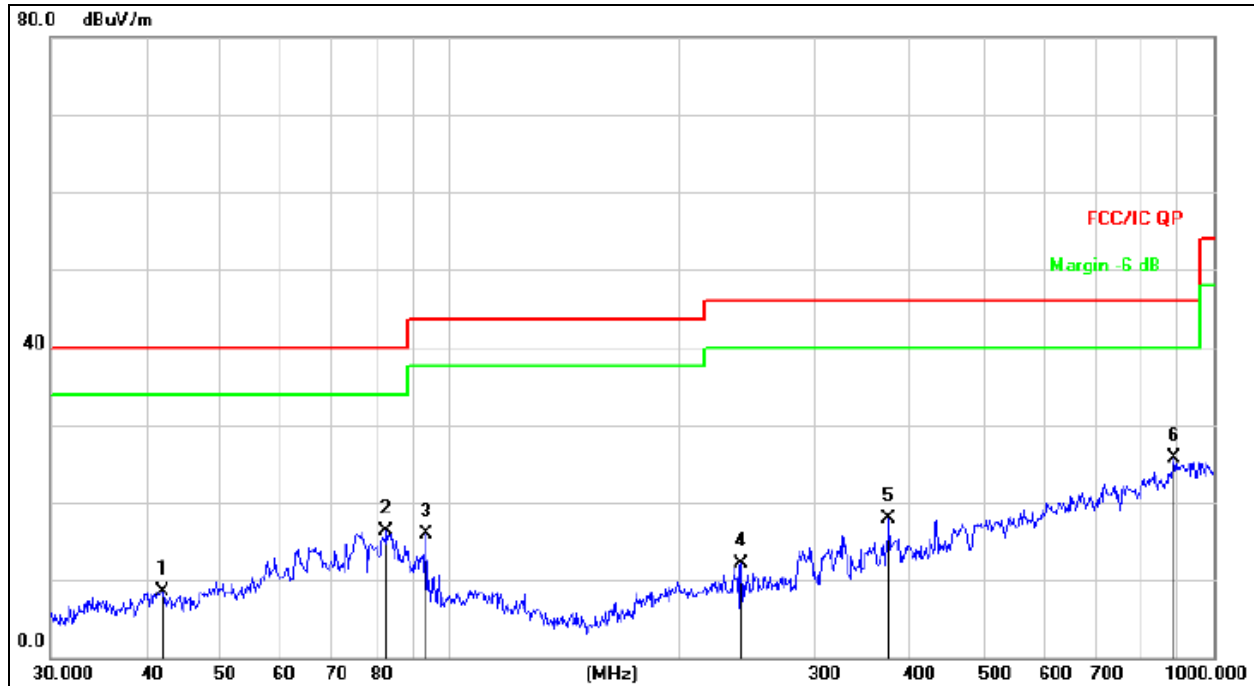


Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement=Reading Level+ Correct Factor
3. Over= Measurement-Limit

| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measure-ment | Limit | Over   | Detector |
|-----|-----|----------|---------------|----------------|--------------|-------|--------|----------|
|     |     | MHz      | dBuV          | dB             | dBuV/m       | dB/m  | dB     |          |
| 1   |     | 33.4449  | 32.51         | -17.91         | 14.60        | 40.00 | -25.40 | QP       |
| 2   |     | 56.1974  | 28.69         | -15.78         | 12.91        | 40.00 | -27.09 | QP       |
| 3   |     | 119.0180 | 28.80         | -17.41         | 11.39        | 43.50 | -32.11 | QP       |
| 4   |     | 207.8501 | 31.29         | -15.32         | 15.97        | 43.50 | -27.53 | QP       |
| 5   |     | 434.0651 | 28.74         | -9.98          | 18.76        | 46.00 | -27.24 | QP       |
| 6   | *   | 948.7610 | 26.73         | 0.43           | 27.16        | 46.00 | -18.84 | QP       |

|              |        |                    |          |
|--------------|--------|--------------------|----------|
| Temperature: | 26 °C  | Relative Humidity: | 54%      |
| Pressure:    | 101KPa | Phase :            | Vertical |
| Test Mode:   | Mode 1 | Remark:            | N/A      |



Remark:

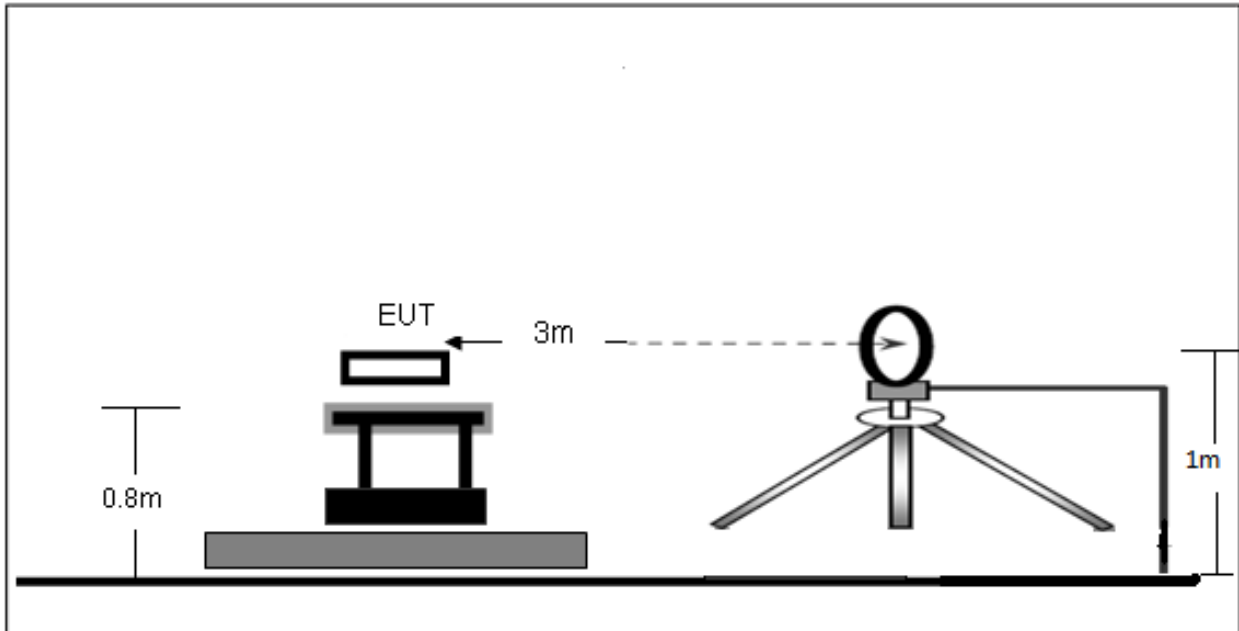
- Factor = Antenna Factor + Cable Loss – Pre-amplifier.
- Measurement=Reading Level+ Correct Factor
- Over= Measurement-Limit

| No. Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dB/m | Over<br>dB | Detector |
|---------|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|----------|
| 1       | 42.0065      | 25.11                    | -16.60                  | 8.51                       | 40.00         | -31.49     | QP       |
| 2       | 82.6482      | 36.22                    | -19.92                  | 16.30                      | 40.00         | -23.70     | QP       |
| 3       | 93.1132      | 33.83                    | -17.93                  | 15.90                      | 43.50         | -27.60     | QP       |
| 4       | 240.8300     | 26.98                    | -14.80                  | 12.18                      | 46.00         | -33.82     | QP       |
| 5       | 375.9384     | 29.47                    | -11.55                  | 17.92                      | 46.00         | -28.08     | QP       |
| 6 *     | 887.6099     | 25.55                    | 0.15                    | 25.70                      | 46.00         | -20.30     | QP       |

## 8. Radiated Band Emission Measurement

### 8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Below 30MHz



### 8.2 Limit

FCC Part15 C Section 15.209 and 15.225

LIMITS OF RADIATED EMISSION MEASUREMENT (Below 30MHz)

- 15.848 microvolts/m (84 dBμ V/m) at 30 m, within the band 13.553– 13.567 MHz.
- 334 microvolts/m (50.5 dBμ V/m) at 30 m, within the bands 13.410– 13.553 MHz and 13.567– 13.710 MHz.
- 106 microvolts/m (40.5 dBμ V/m) at 30 m, within the bands 13.110– 13.410 MHz and 13.710– 14.010 MHz.
- 30 microvolts/m (29.5 dBμ V/m) at 30 m, outside the band 13.110– 14.010 MHz.

Notes:

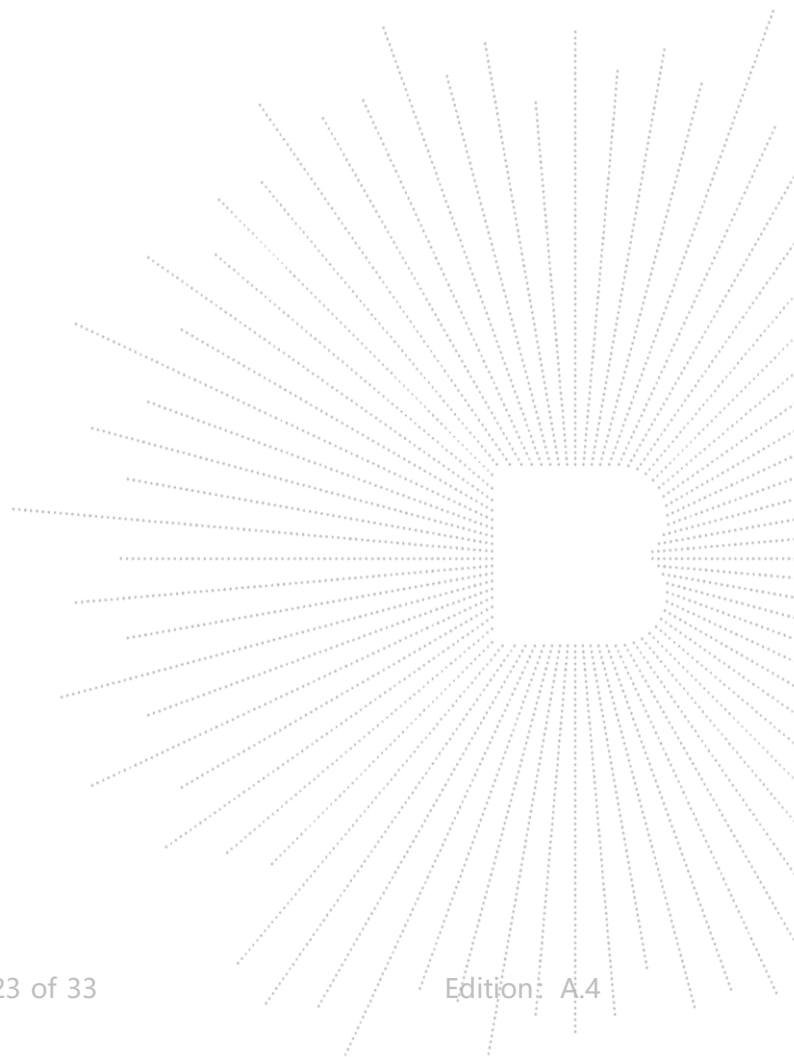
- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

### 8.3 Test Procedure

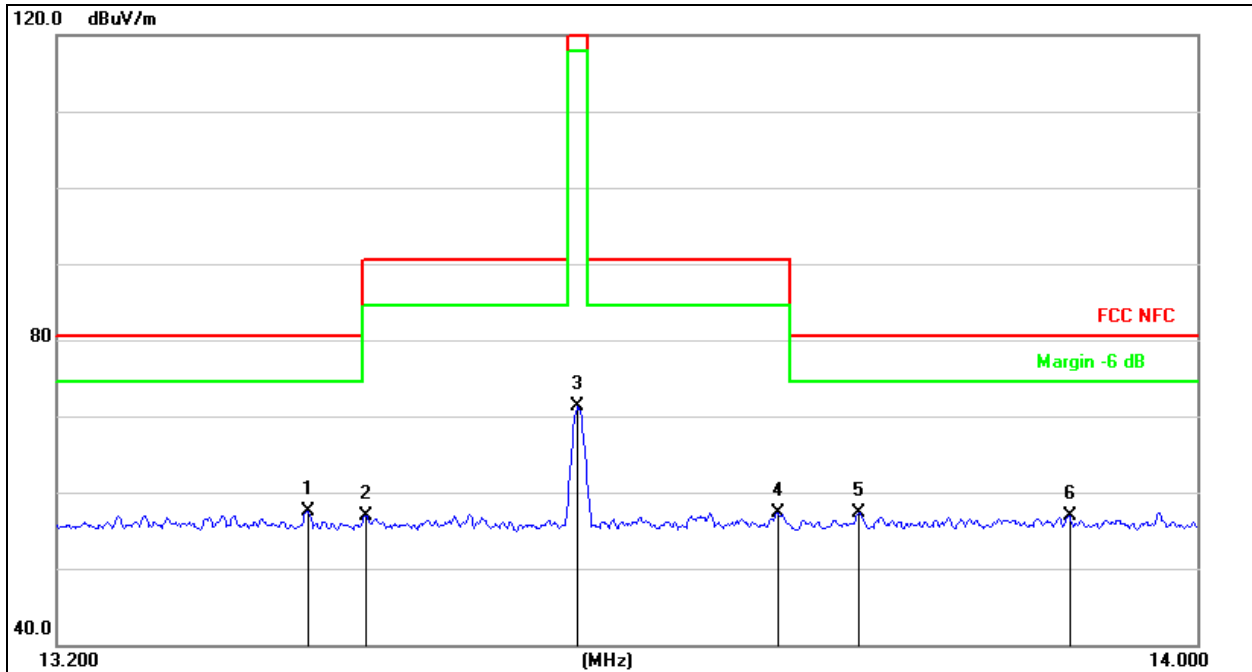
- a. The Product is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- b. For each suspected emission, the Product was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- c. The test frequency analyzer system was set to Peak Detect (300Hz RBW in 9kHz to 150kHz and 10kHz RBW in 150kHz to 30MHz) Function and Specified Bandwidth with Maximum Hold Mode.

### 8.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.5 Unless otherwise a special operating condition is specified in the follows during the testing.  
The report only show the worst antenna Polarity's data.



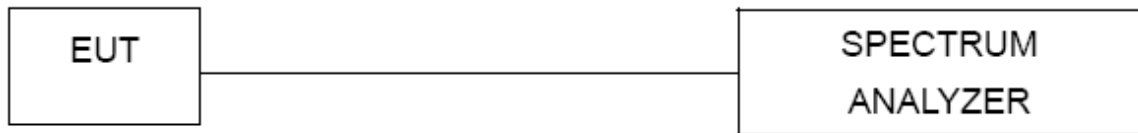
## 8.5 Test Result



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dB/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|----------|
| 1   | *   | 13.3719      | 37.11                    | 20.43                   | 57.54                      | 80.50         | -22.96     | peak     |
| 2   |     | 13.4128      | 36.55                    | 20.44                   | 56.99                      | 90.50         | -33.51     | peak     |
| 3   |     | 13.5600      | 50.83                    | 20.44                   | 71.27                      | 124.0         | -52.73     | peak     |
| 4   |     | 13.7015      | 36.79                    | 20.45                   | 57.24                      | 90.50         | -33.26     | peak     |
| 5   |     | 13.7576      | 36.75                    | 20.46                   | 57.21                      | 80.50         | -23.29     | peak     |
| 6   |     | 13.9079      | 36.43                    | 20.47                   | 56.90                      | 80.50         | -23.60     | peak     |

## 9. Bandwidth Test

### 9.1 Block Diagram Of Test Setup



### 9.2 Test Procedure

| FCC Part15 (15.215) |           |
|---------------------|-----------|
| Section             | Test Item |
| 15.215              | Bandwidth |

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

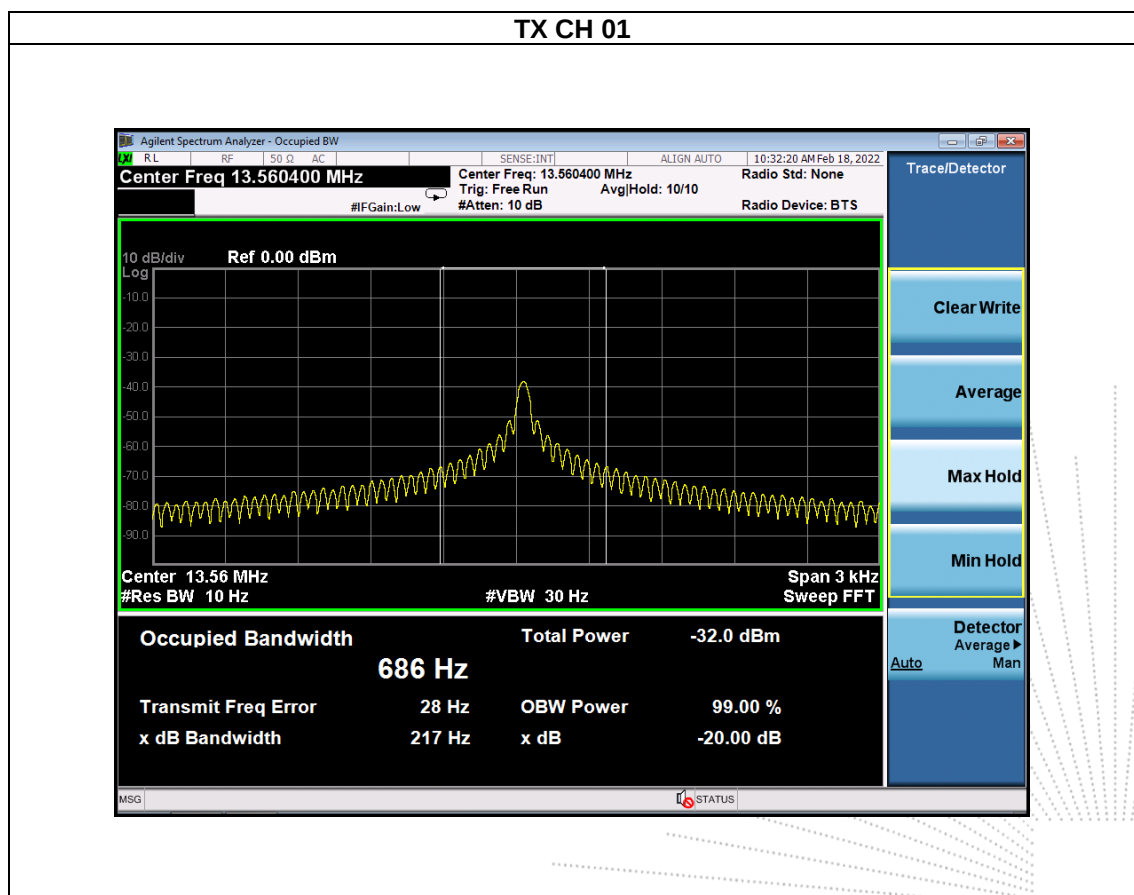
### 9.3 EUT Operation Conditions

The EUT tested system was configured as the statements of 4.2 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 9.4 Test Result

|               |      |                     |              |
|---------------|------|---------------------|--------------|
| Temperature : | 26°C | Relative Humidity : | 54%          |
| Test Mode :   | ASK  | Test Voltage :      | AC 120V/60Hz |

| Frequency (MHz) | 20dB bandwidth (kHz) |
|-----------------|----------------------|
| 13.56           | 0.217                |



## 10. Transmitter Frequency Stability

### 10.1 Block Diagram Of Test Setup



### 10.2 Limit

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  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.

Limit:  $\pm 0.01\%$  of 13.56MHz=1356Hz

### 10.3 Test Procedure

1. Set RBW = 10 kHz.
2. Set the video bandwidth (VBW)  $\geq$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. The transmitter output (antenna port) was connected to the spectrum analyzer.

### 10.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.5 Unless otherwise a special operating condition is specified in the follows during the testing.

## 10.5 Test Result

|               |         |                     |       |
|---------------|---------|---------------------|-------|
| Temperature : | 26°C    | Relative Humidity : | 54%   |
| Pressure :    | 101kPa  | Test Voltage :      | DC 6V |
| Test Mode :   | TX Mode |                     |       |

| Test Conditions |            |                  | Frequency Deviation |                     | Limit(Hz) | Result |
|-----------------|------------|------------------|---------------------|---------------------|-----------|--------|
| Frequency MHz   | Power(Vdc) | Temperature (°C) | Measured Freq.      | Frequency Error(Hz) |           |        |
| 13.56           | 6          | -20              | 13.56007            | 70                  | 1356      | PASS   |
|                 | 6          | -10              | 13.56004            | 40                  | 1356      |        |
|                 | 6          | 0                | 13.56002            | 20                  | 1356      |        |
|                 | 6          | 10               | 13.56005            | 50                  | 1356      |        |
|                 | 6          | 20               | 13.56003            | 30                  | 1356      |        |
|                 | 6          | 30               | 13.56001            | 10                  | 1356      |        |
|                 | 6          | 40               | 13.56008            | 80                  | 1356      |        |
|                 | 6          | 50               | 13.56009            | 90                  | 1356      |        |
|                 | 5.1        | 20               | 13.56004            | 40                  | 1356      |        |
|                 | 6.9        | 20               | 13.56007            | 70                  | 1356      |        |

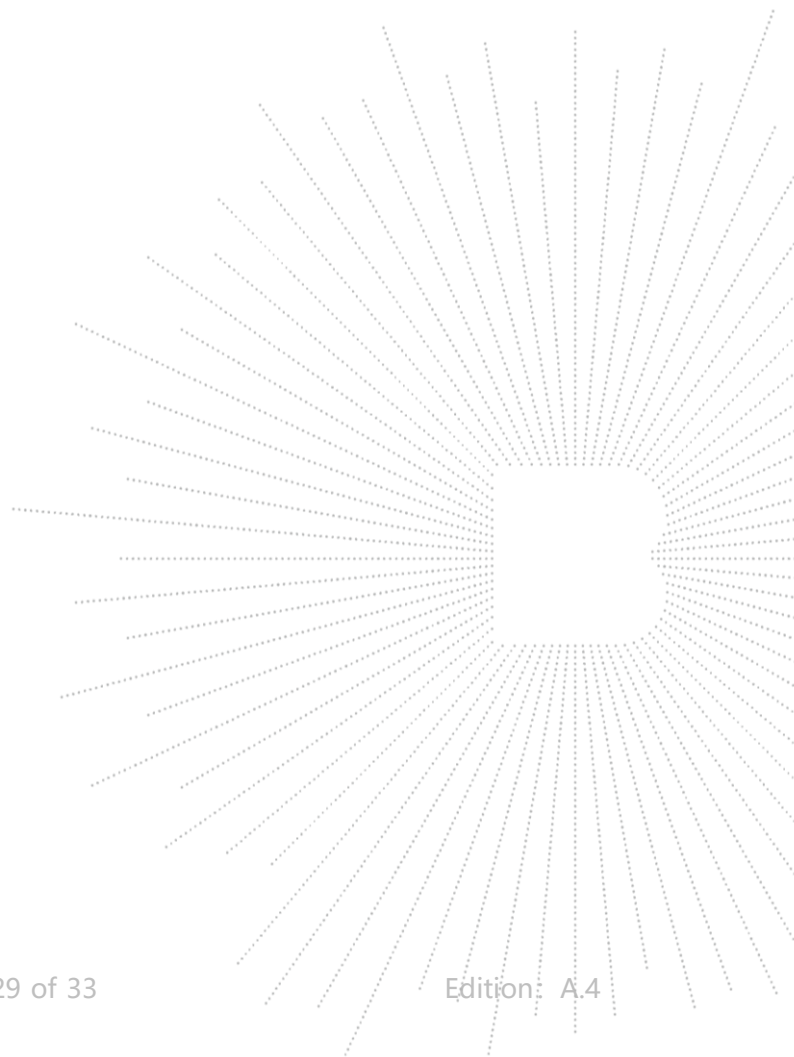
## 11. Antenna Requirement

### 11.1 Standard Requirement

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

### 11.2 EUT Antenna

The EUT antenna is Coil Antenna, It comply with the standard requirement.



## 12. EUT Photographs

EUT Photo 1



EUT Photo 2

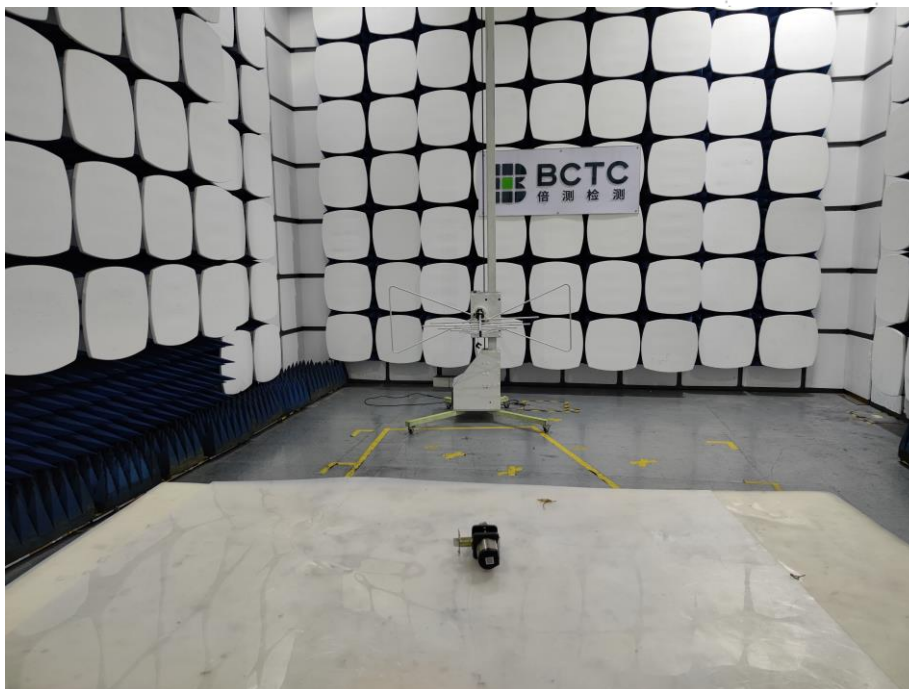


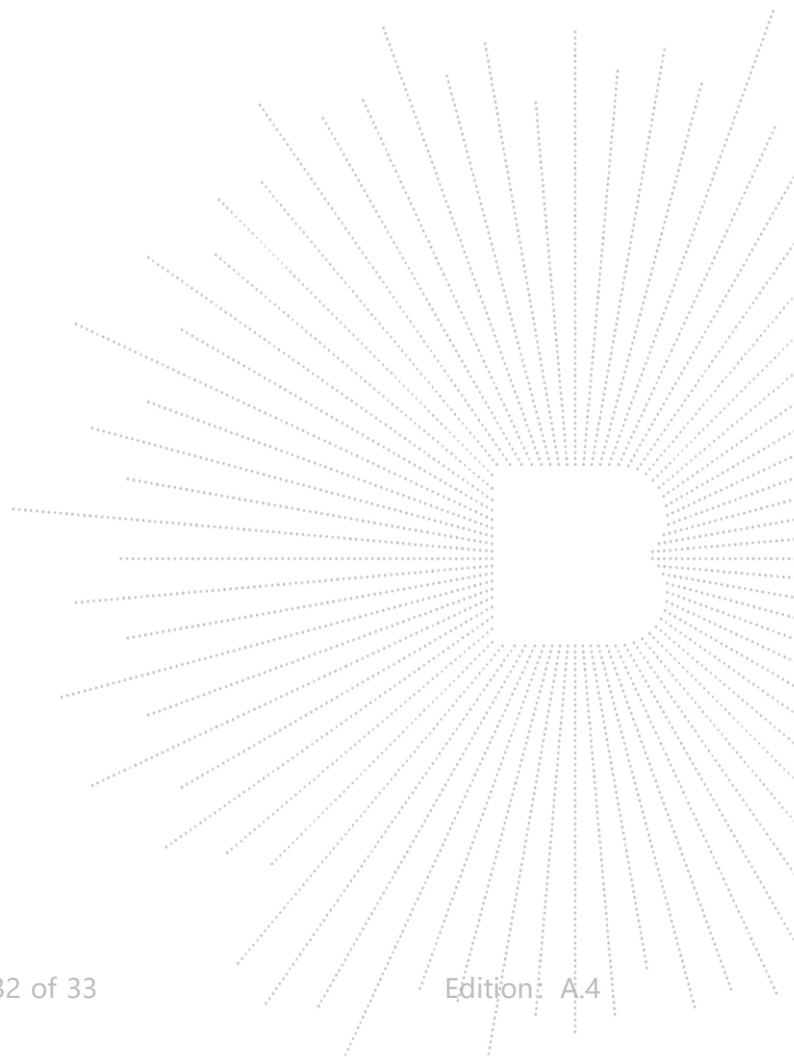
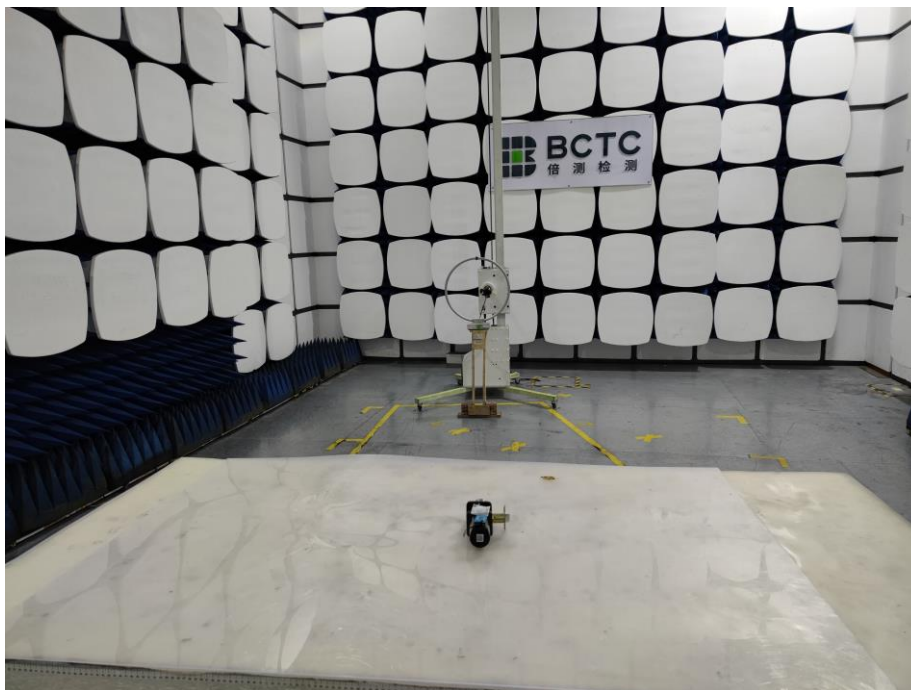
### 13. EUT Test Setup Photographs

#### Conducted Emission Photos



#### Radiated Measurement Photos





## STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: <http://www.chnbctc.com>

E-Mail: [bctc@bctc-lab.com.cn](mailto:bctc@bctc-lab.com.cn)

\*\*\*\*\* END \*\*\*\*\*