# FCC TEST REPORT

| | | |
|---|---|---|
| Client Name | : | Casper Sleep Inc. |
| Address | : | 3 World Trade Center, 175 Greenwich St., 39th Floor, New York, NY 10007 USA |
| Product Name | : | Glow Night Light |
| Date | : | Jul. 16, 2021 |

**Shenzhen Anbotek Compliance Laboratory Limited**

# Contents

1. General Information....4
1.1. Client Information....4
1.2. Description of Device (EUT)....4
1.3. Auxiliary Equipment Used During Test....5
1.4. Description of Test Modes....5
1.5. List of Channels....6
1.6. Description of Test Setup....8
1.7. Test Equipment List....9
1.8. Measurement Uncertainty....10
1.9. Description of Test Facility....10
2. Summary of Test Results....11
3. Conducted Emission Test....12
3.1. Test Standard and Limit....12
3.2. Test Setup....12
3.3. Test Procedure....12
3.4. Test Data....13
4. Radiated Emission and Band Edge....16
4.1. Test Standard and Limit....16
4.2. Test Setup....17
4.3. Test Procedure....18
4.4. Test Data....19
5. 20dB Bandwidth Test....28
5.1. Test Standard and Limit....28
5.2. Test Setup....28
5.3. Test Procedure....28
5.4. Test Data....28
6. Antenna Requirement....31
6.1. Test Standard and Requirement....31
6.2. Antenna Connected Construction....31
APPENDIX I -- TEST SETUP PHOTOGRAPH....32
APPENDIX II -- EXTERNAL PHOTOGRAPH....34
APPENDIX III -- INTERNAL PHOTOGRAPH....37

# TEST REPORT

| | | |
|---|---|---|
| Applicant | : | Casper Sleep Inc. |
| Manufacturer | : | Casper Sleep Inc. |
| Product Name | : | Glow Night Light |
| Model No. | : | NL01A |
| Trade Mark | : | Casper |
| Rating(s) | : | Input: AC 120V, 60Hz, 2.3W |

| | | |
|---|---|---|
| **Test Standard(s)** | : | **FCC Part15 Subpart C, Paragraph 15.249** |
| **Test Method(s)** | : | **ANSI C63.10: 2020** |

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

| | |
|---|---|
| Date of Receipt | Jun. 11, 2021 |
| Date of Test | Jun. 11~Jul. 14, 2021 |
| Prepared by | (Ella Liang) |
| Approved & Authorized Signer | (Kingkong Jin) |

# 1. General Information

## 1.1. Client Information

| | | |
|---|---|---|
| Applicant | : | Casper Sleep Inc. |
| Address | : | 3 World Trade Center, 175 Greenwich St., 39th Floor, New York, NY 10007 USA |
| Manufacturer | : | Casper Sleep Inc. |
| Address | : | 3 World Trade Center, 175 Greenwich St., 39th Floor, New York, NY 10007 USA |
| Factory | : | Huizhou Light Engine Limited |
| Address | : | No. 9 Yuanhui Road, Chenjiang street, Zhongkai Hi-tech Industrial Development Zone, Huizhou, Guangdong Province, P.R.China |

## 1.2. Description of Device (EUT)

| | | | |
|---|---|---|---|
| Product Name | : | Glow Night Light | |
| Model No. | : | NL01A | |
| Trade Mark | : | Casper | |
| Test Power Supply | : | AC 120V/60Hz | |
| Test Sample No. | : | 1-2-1(Normal Sample), 1-2-2(Engineering Sample) | |
| Product Description | : | Operation Frequency: | 5850-5870MHz |
| | | Number of Channel: | 251 Channels |
| | | Channel Spacing: | 80KHz |
| | | Modulation Type: | ASK |
| | | Antenna Type: | PCB Antenna |
| | | Antenna Gain(Peak): | 2 dBi |
| **Remark:** 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. | | | |

## 1.3. Auxiliary Equipment Used During Test

| | | |
|---|---|---|
| N/A | | |

## 1.4. Description of Test Modes

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

TEST MODE:

| | | | |
|---|---|---|---|
| Mode 1 | ASK | CH01 | TX Only |
| Mode 2 | | CH126 | |
| Mode 3 | | CH251 | |

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.


Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

## 1.5. List of Channels

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5850 | 52 | 5854.08 | 103 | 5858.16 | 154 | 5862.24 | 205 | 5866.32 |
| 2 | 5850.08 | 53 | 5854.16 | 104 | 5858.24 | 155 | 5862.32 | 206 | 5866.4 |
| 3 | 5850.16 | 54 | 5854.24 | 105 | 5858.32 | 156 | 5862.4 | 207 | 5866.48 |
| 4 | 5850.24 | 55 | 5854.32 | 106 | 5858.4 | 157 | 5862.48 | 208 | 5866.56 |
| 5 | 5850.32 | 56 | 5854.4 | 107 | 5858.48 | 158 | 5862.56 | 209 | 5866.64 |
| 6 | 5850.4 | 57 | 5854.48 | 108 | 5858.56 | 159 | 5862.64 | 210 | 5866.72 |
| 7 | 5850.48 | 58 | 5854.56 | 109 | 5858.64 | 160 | 5862.72 | 211 | 5866.8 |
| 8 | 5850.56 | 59 | 5854.64 | 110 | 5858.72 | 161 | 5862.8 | 212 | 5866.88 |
| 9 | 5850.64 | 60 | 5854.72 | 111 | 5858.8 | 162 | 5862.88 | 213 | 5866.96 |
| 10 | 5850.72 | 61 | 5854.8 | 112 | 5858.88 | 163 | 5862.96 | 214 | 5867.04 |
| 11 | 5850.8 | 62 | 5854.88 | 113 | 5858.96 | 164 | 5863.04 | 215 | 5867.12 |
| 12 | 5850.88 | 63 | 5854.96 | 114 | 5859.04 | 165 | 5863.12 | 216 | 5867.2 |
| 13 | 5850.96 | 64 | 5855.04 | 115 | 5859.12 | 166 | 5863.2 | 217 | 5867.28 |
| 14 | 5851.04 | 65 | 5855.12 | 116 | 5859.2 | 167 | 5863.28 | 218 | 5867.36 |
| 15 | 5851.12 | 66 | 5855.2 | 117 | 5859.28 | 168 | 5863.36 | 219 | 5867.44 |
| 16 | 5851.2 | 67 | 5855.28 | 118 | 5859.36 | 169 | 5863.44 | 220 | 5867.52 |
| 17 | 5851.28 | 68 | 5855.36 | 119 | 5859.44 | 170 | 5863.52 | 221 | 5867.6 |
| 18 | 5851.36 | 69 | 5855.44 | 120 | 5859.52 | 171 | 5863.6 | 222 | 5867.68 |
| 19 | 5851.44 | 70 | 5855.52 | 121 | 5859.6 | 172 | 5863.68 | 223 | 5867.76 |
| 20 | 5851.52 | 71 | 5855.6 | 122 | 5859.68 | 173 | 5863.76 | 224 | 5867.84 |
| 21 | 5851.6 | 72 | 5855.68 | 123 | 5859.76 | 174 | 5863.84 | 225 | 5867.92 |
| 22 | 5851.68 | 73 | 5855.76 | 124 | 5859.84 | 175 | 5863.92 | 226 | 5868 |
| 23 | 5851.76 | 74 | 5855.84 | 125 | 5859.92 | 176 | 5864 | 227 | 5868.08 |
| 24 | 5851.84 | 75 | 5855.92 | 126 | 5860 | 177 | 5864.08 | 228 | 5868.16 |
| 25 | 5851.92 | 76 | 5856 | 127 | 5860.08 | 178 | 5864.16 | 229 | 5868.24 |
| 26 | 5852 | 77 | 5856.08 | 128 | 5860.16 | 179 | 5864.24 | 230 | 5868.32 |
| 27 | 5852.08 | 78 | 5856.16 | 129 | 5860.24 | 180 | 5864.32 | 231 | 5868.4 |
| 28 | 5852.16 | 79 | 5856.24 | 130 | 5860.32 | 181 | 5864.4 | 232 | 5868.48 |
| 29 | 5852.24 | 80 | 5856.32 | 131 | 5860.4 | 182 | 5864.48 | 233 | 5868.56 |
| 30 | 5852.32 | 81 | 5856.4 | 132 | 5860.48 | 183 | 5864.56 | 234 | 5868.64 |
| 31 | 5852.4 | 82 | 5856.48 | 133 | 5860.56 | 184 | 5864.64 | 235 | 5868.72 |
| 32 | 5852.48 | 83 | 5856.56 | 134 | 5860.64 | 185 | 5864.72 | 236 | 5868.8 |
| 33 | 5852.56 | 84 | 5856.64 | 135 | 5860.72 | 186 | 5864.8 | 237 | 5868.88 |
| 34 | 5852.64 | 85 | 5856.72 | 136 | 5860.8 | 187 | 5864.88 | 238 | 5868.96 |
| 35 | 5852.72 | 86 | 5856.8 | 137 | 5860.88 | 188 | 5864.96 | 239 | 5869.04 |
| 36 | 5852.8 | 87 | 5856.88 | 138 | 5860.96 | 189 | 5865.04 | 240 | 5869.12 |
| 37 | 5852.88 | 88 | 5856.96 | 139 | 5861.04 | 190 | 5865.12 | 241 | 5869.2 |

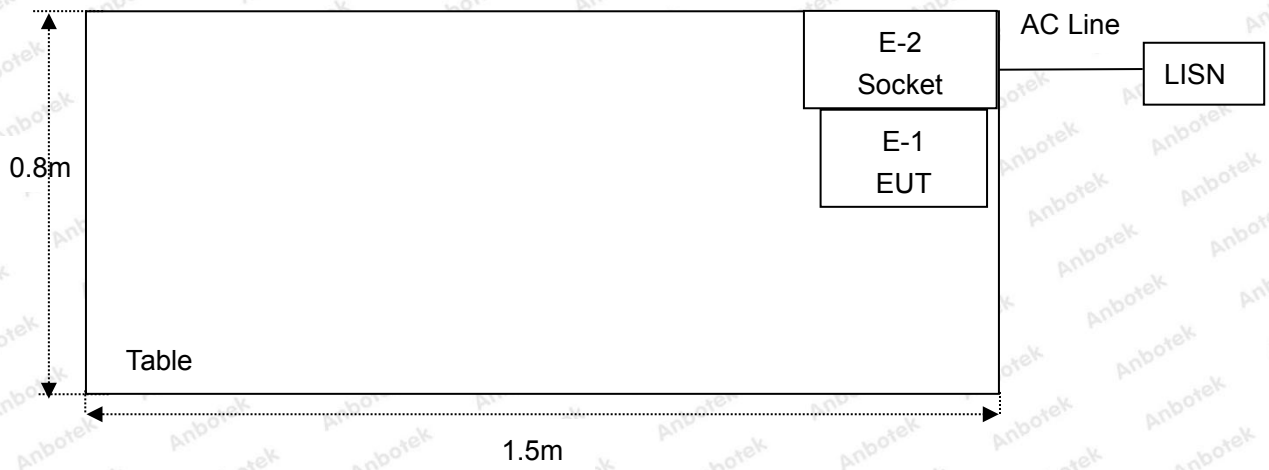

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 38 | 5852.96 | 89 | 5857.04 | 140 | 5861.12 | 191 | 5865.2 | 242 | 5869.28 |
| 39 | 5853.04 | 90 | 5857.12 | 141 | 5861.2 | 192 | 5865.28 | 243 | 5869.36 |
| 40 | 5853.12 | 91 | 5857.2 | 142 | 5861.28 | 193 | 5865.36 | 244 | 5869.44 |
| 41 | 5853.2 | 92 | 5857.28 | 143 | 5861.36 | 194 | 5865.44 | 245 | 5869.52 |
| 42 | 5853.28 | 93 | 5857.36 | 144 | 5861.44 | 195 | 5865.52 | 246 | 5869.6 |
| 43 | 5853.36 | 94 | 5857.44 | 145 | 5861.52 | 196 | 5865.6 | 247 | 5869.68 |
| 44 | 5853.44 | 95 | 5857.52 | 146 | 5861.6 | 197 | 5865.68 | 248 | 5869.76 |
| 45 | 5853.52 | 96 | 5857.6 | 147 | 5861.68 | 198 | 5865.76 | 249 | 5869.84 |
| 46 | 5853.6 | 97 | 5857.68 | 148 | 5861.76 | 199 | 5865.84 | 250 | 5869.92 |
| 47 | 5853.68 | 98 | 5857.76 | 149 | 5861.84 | 200 | 5865.92 | 251 | 5870 |
| 48 | 5853.76 | 99 | 5857.84 | 150 | 5861.92 | 201 | 5866 | | |
| 49 | 5853.84 | 100 | 5857.92 | 151 | 5862 | 202 | 5866.08 | | |
| 50 | 5853.92 | 101 | 5858 | 152 | 5862.08 | 203 | 5866.16 | | |
| 51 | 5854 | 102 | 5858.08 | 153 | 5862.16 | 204 | 5866.24 | | |

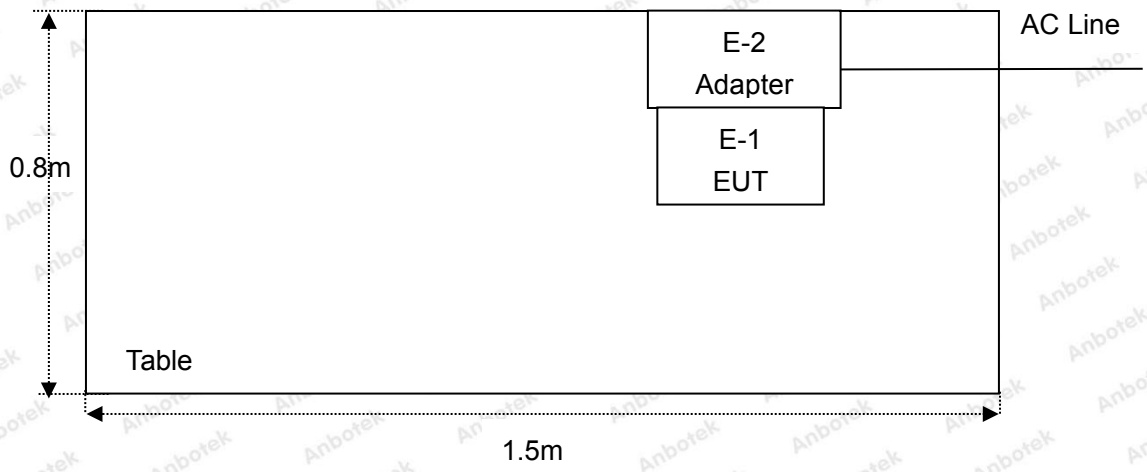

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

## 1.6. Description of Test Setup

CE




RE



## 1.7. Test Equipment List

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | L.I.S.N. Artificial Mains Network | Rohde & Schwarz | ENV216 | 100055 | Oct. 26, 2020 | 1 Year |
| 2. | EMI Test Receiver | Rohde & Schwarz | ESCI | 100627 | Oct. 26, 2020 | 1 Year |
| 3. | EMI Test Receiver | Rohde & Schwarz | ESR26 | 101481 | Oct. 26, 2020 | 1 Year |
| 4. | RF Switching Unit | Compliance Direction | RSU-M2 | 38303 | Oct. 26, 2020 | 1 Year |
| 5. | MAX Spectrum Analysis | Agilent | N9020A | MY51170037 | Oct. 26, 2020 | 1 Year |
| 6. | Preamplifier | SKET Electronic | BK1G18G30D | KD17503 | Oct. 26, 2020 | 1 Year |
| 7. | Double Ridged Horn Antenna | Instruments corporation | GTH-0118 | 351600 | Nov. 02, 2020 | 2 Year |
| 8. | Bilog Broadband Antenna | Schwarzbeck | VULB9163 | VULB 9163-289 | Nov. 02, 2020 | 2 Year |
| 9. | Loop Antenna | Schwarzbeck | FMZB1519B | 00053 | Nov. 02, 2020 | 2 Year |
| 10. | Horn Antenna | A-INFO | LB-180400-KF | J211060628 | Nov. 02, 2020 | 2 Year |
| 11. | Pre-amplifier | SONOMA | 310N | 186860 | Oct. 26, 2020 | 1 Year |
| 12. | EMI Test Software EZ-EMC | SHURPLE | N/A | N/A | N/A | N/A |
| 13. | RF Test Control System | YIHENG | YH3000 | 2017430 | Oct. 26, 2020 | 1 Year |
| 14. | Power Sensor | DAER | RPR3006W | 15I00041SN045 | Oct. 26, 2020 | 1 Year |
| 15. | Power Sensor | DAER | RPR3006W | 15I00041SN046 | Oct. 26, 2020 | 1 Year |
| 16. | MXA Spectrum Analysis | Agilent | N9020A | MY51170037 | Oct. 26, 2020 | 1 Year |
| 17. | MXG RF Vector Signal Generator | Agilent | N5182A | MY48180656 | Oct. 26, 2020 | 1 Year |
| 18. | Signal Generator | Agilent | E4421B | MY41000743 | Oct. 26, 2020 | 1 Year |
| 19. | DC Power Supply | IVYTECH | IV3605 | 1804D360510 | Oct. 26, 2020 | 1 Year |
| 20. | Constant Temperature Humidity Chamber | ZHONGJIAN | ZJ-KHWS80B | N/A | Oct. 26, 2020 | 1 Year |

## 1.8. Measurement Uncertainty

| | | |
|---|---|---|
| Radiation Uncertainty | : | Ur = 3.9 dB (Horizontal) |
| | | Ur = 3.8 dB (Vertical) |
| | | |
| Conduction Uncertainty | : | Uc = 3.4 dB |

## 1.9. Description of Test Facility

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

**FCC-Registration No.: 184111**

Shenzhen Anbotek Compliance Laboratory Limited, 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. 184111, September 30, 2020.

**ISED-Registration No.: 8058A**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

**Test Location**

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

# 2. Summary of Test Results

| Standard Section | Test Item | Result |
|---|---|---|
| 15.203 | Antenna Requirement | PASS |
| 15.207 | Conducted Emission | PASS |
| 15.249 | Radiated Emission | PASS |
| 15.215(c) | 20dB Bandwidth | PASS |
| 15.249(c) | Band Edge | PASS |
| **Remark:** “N/A” is an abbreviation for Not Applicable. | | |

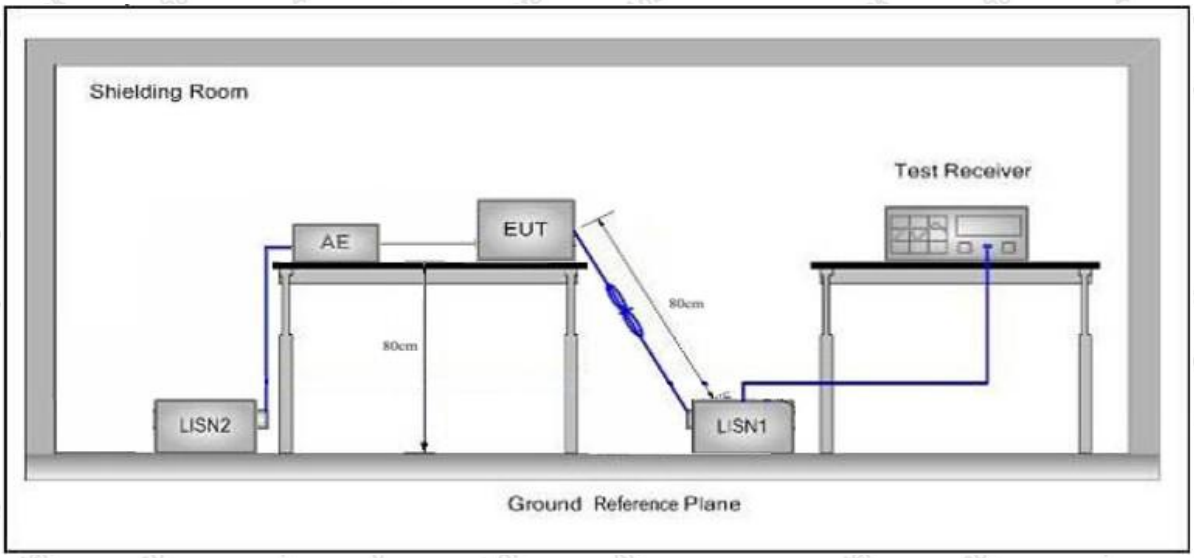

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

# 3. Conducted Emission Test

## 3.1. Test Standard and Limit

| Test Standard | FCC Part15 Section 15.207 | | |
|---|---|---|---|
| Test Limit | Frequency | Maximum RF Line Voltage (dBuV) | |
| | | Quasi-peak Level | Average Level |
| | 150kHz~500kHz | 66 ~ 56 * | 56 ~ 46 * |
| | 500kHz~5MHz | 56 | 46 |
| | 5MHz~30MHz | 60 | 50 |
| **Remark:** (1) *Decreasing linearly with logarithm of the frequency.<br>(2) The lower limit shall apply at the transition frequency. | | | |

## 3.2. Test Setup




## 3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

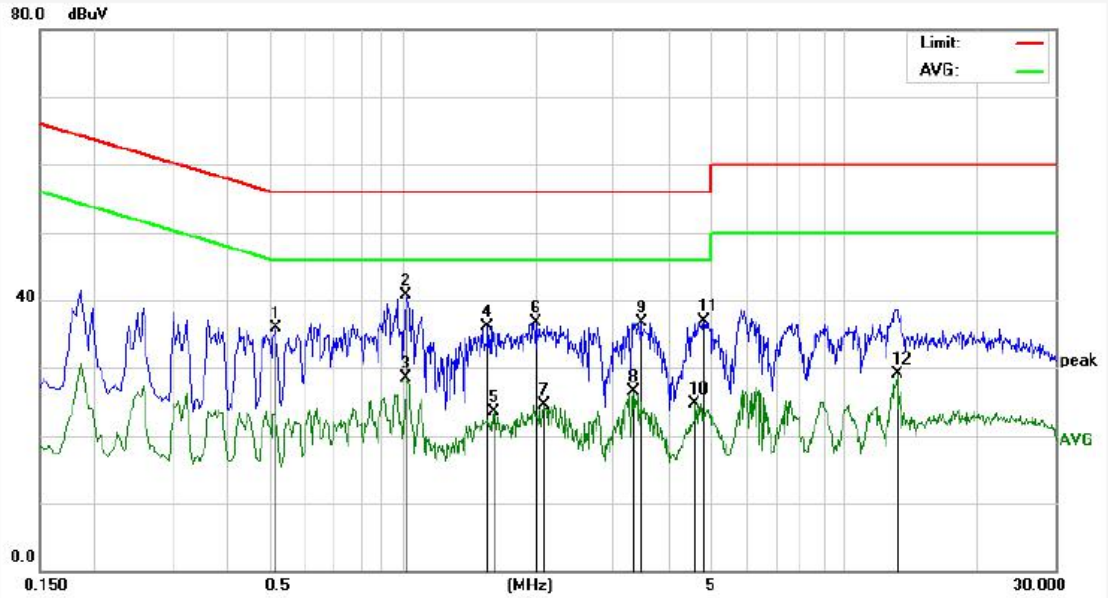
The frequency range from 150kHz to 30MHz is checked.

### 3.4. Test Data

During the test, pre-scan the Low, Middle, High channel, and found the Low channel(TX Mode) which is the worst case, only the worst case is recorded in the report.
Please to see the following pages.

**Conducted Emission Test Data**

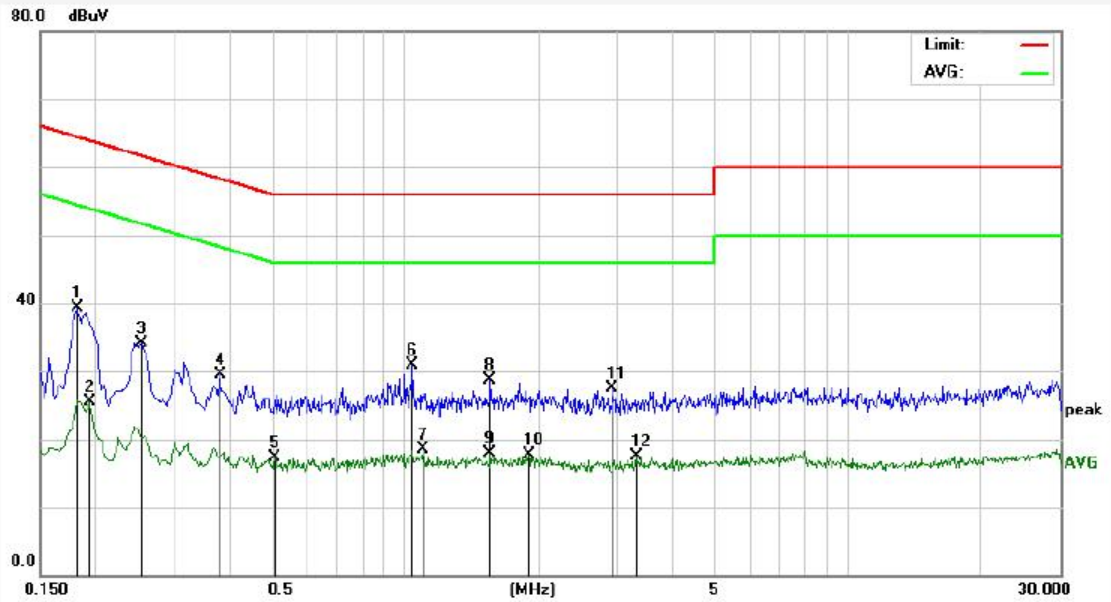
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V/60Hz
Comment: Live Line
Tem.: 21.6℃ Hum.: 50%




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit (dBuV) | Over Limit (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.5140 | 15.89 | 19.98 | 35.87 | 56.00 | -20.13 | QP | |
| 2 | 1.0180 | 20.60 | 20.12 | 40.72 | 56.00 | -15.28 | QP | |
| 3 | 1.0180 | 8.34 | 20.12 | 28.46 | 46.00 | -17.54 | AVG | |
| 4 | 1.5580 | 15.97 | 20.13 | 36.10 | 56.00 | -19.90 | QP | |
| 5 | 1.6100 | 3.34 | 20.13 | 23.47 | 46.00 | -22.53 | AVG | |
| 6 | 2.0059 | 16.66 | 20.14 | 36.80 | 56.00 | -19.20 | QP | |
| 7 | 2.0980 | 4.42 | 20.14 | 24.56 | 46.00 | -21.44 | AVG | |
| 8 | 3.3300 | 6.39 | 20.17 | 26.56 | 46.00 | -19.44 | AVG | |
| 9 | 3.4580 | 16.51 | 20.17 | 36.68 | 56.00 | -19.32 | QP | |
| 10 | 4.5939 | 4.51 | 20.20 | 24.71 | 46.00 | -21.29 | AVG | |
| 11 | 4.8220 | 16.68 | 20.20 | 36.88 | 56.00 | -19.12 | QP | |
| 12 | 13.1420 | 8.85 | 20.29 | 29.14 | 50.00 | -20.86 | AVG | |

**Conducted Emission Test Data**

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V/60Hz
Comment: Neutral Line
Tem.: 21.6℃ Hum.: 50%




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit (dBuV) | Over Limit (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.1819 | 19.44 | 19.90 | 39.34 | 64.39 | -25.05 | QP | |
| 2 | 0.1940 | 5.56 | 19.90 | 25.46 | 53.86 | -28.40 | AVG | |
| 3 | 0.2540 | 14.18 | 19.89 | 34.07 | 61.62 | -27.55 | QP | |
| 4 | 0.3820 | 9.67 | 19.93 | 29.60 | 58.23 | -28.63 | QP | |
| 5 | 0.5100 | -2.74 | 19.98 | 17.24 | 46.00 | -28.76 | AVG | |
| 6 | 1.0420 | 10.79 | 20.12 | 30.91 | 56.00 | -25.09 | QP | |
| 7 | 1.0980 | -1.58 | 20.12 | 18.54 | 46.00 | -27.46 | AVG | |
| 8 | 1.5540 | 8.57 | 20.13 | 28.70 | 56.00 | -27.30 | QP | |
| 9 | 1.5540 | -2.29 | 20.13 | 17.84 | 46.00 | -28.16 | AVG | |
| 10 | 1.8980 | -2.49 | 20.14 | 17.65 | 46.00 | -28.35 | AVG | |
| 11 | 2.9460 | 7.29 | 20.16 | 27.45 | 56.00 | -28.55 | QP | |
| 12 | 3.3140 | -2.68 | 20.17 | 17.49 | 46.00 | -28.51 | AVG | |

# 4. Radiated Emission and Band Edge

## 4.1. Test Standard and Limit

| Test Standard | FCC Part15 C Section 15.209 and 15.205 | | | | |
|---|---|---|---|---|---|
| Test Limit | Frequency (MHz) | 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~1000MHz | 500 | 54.0 | Quasi-peak | 3 |
| | Above 1000MHz | 500 | 54.0 | Average | 3 |
| | | - | 74.0 | Peak | 3 |

**Remark:**
(1)The lower limit shall apply at the transition frequency.
(2) 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.

| Test Standard | FCC Part15 C Section 15.249 | | | | | |
|---|---|---|---|---|---|---|
| Test Limit | Frequency (MHz) | Field Strength of fundamental ((millivolts /meter) | Field Strength of Harmonics (microvolts/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
| | 5725~5875 | 50 | - | 114.0 | Peak | 3 |
| | 5725~5875 | 50 | - | 94.0 | Average | 3 |
| | 5725~5875 | - | 500 | 74.0 | Peak | 3 |
| | 5725~5875 | - | 500 | 54.0 | Average | 3 |

**Remark:**
(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.

## 4.2. Test Setup

Figure 1. Below 30MHz

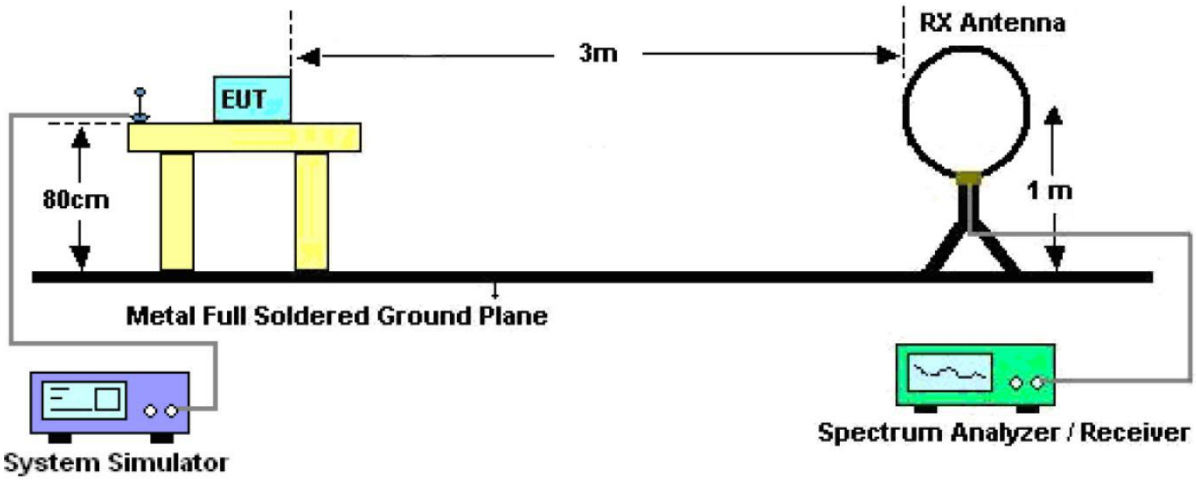



Figure 2. 30MHz to 1GHz

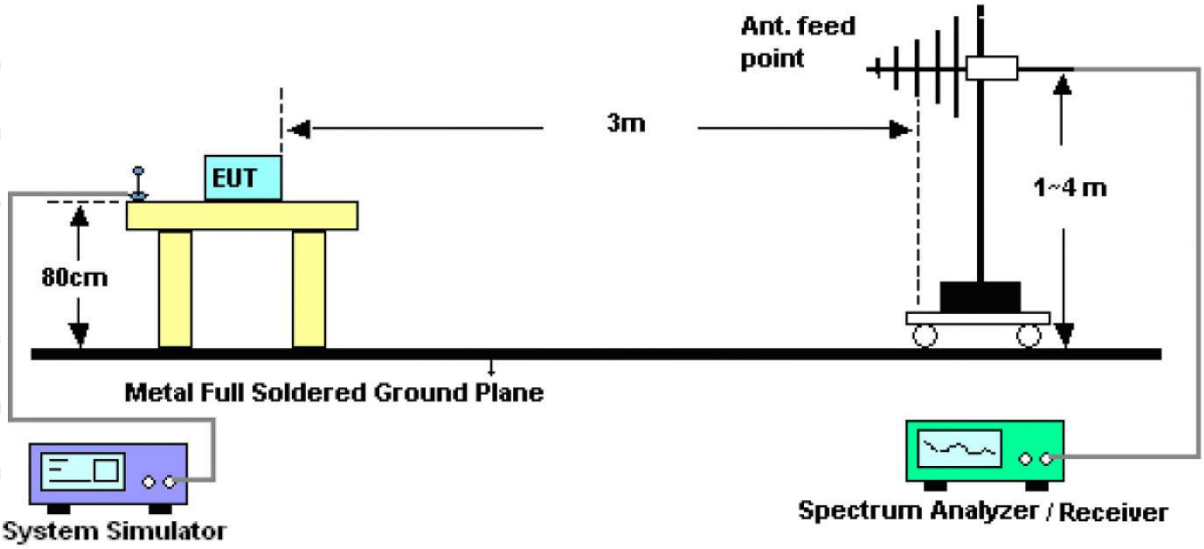
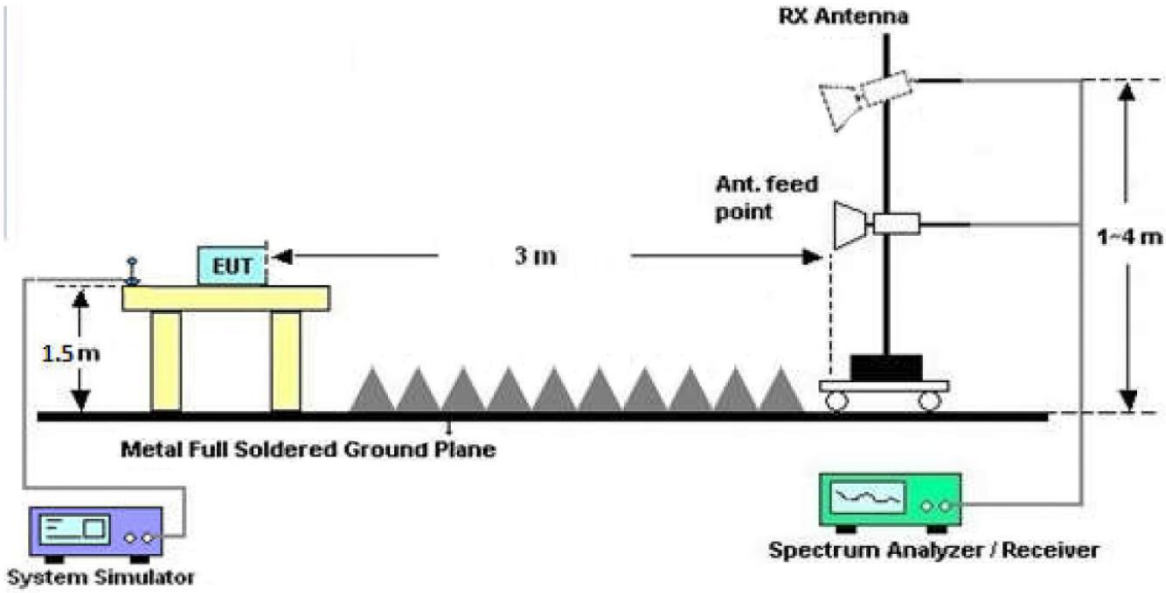



Figure 3. Above 1 GHz




## 4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

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.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

.

For above 1GHz,Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

## 4.4. Test Data

**PASS**

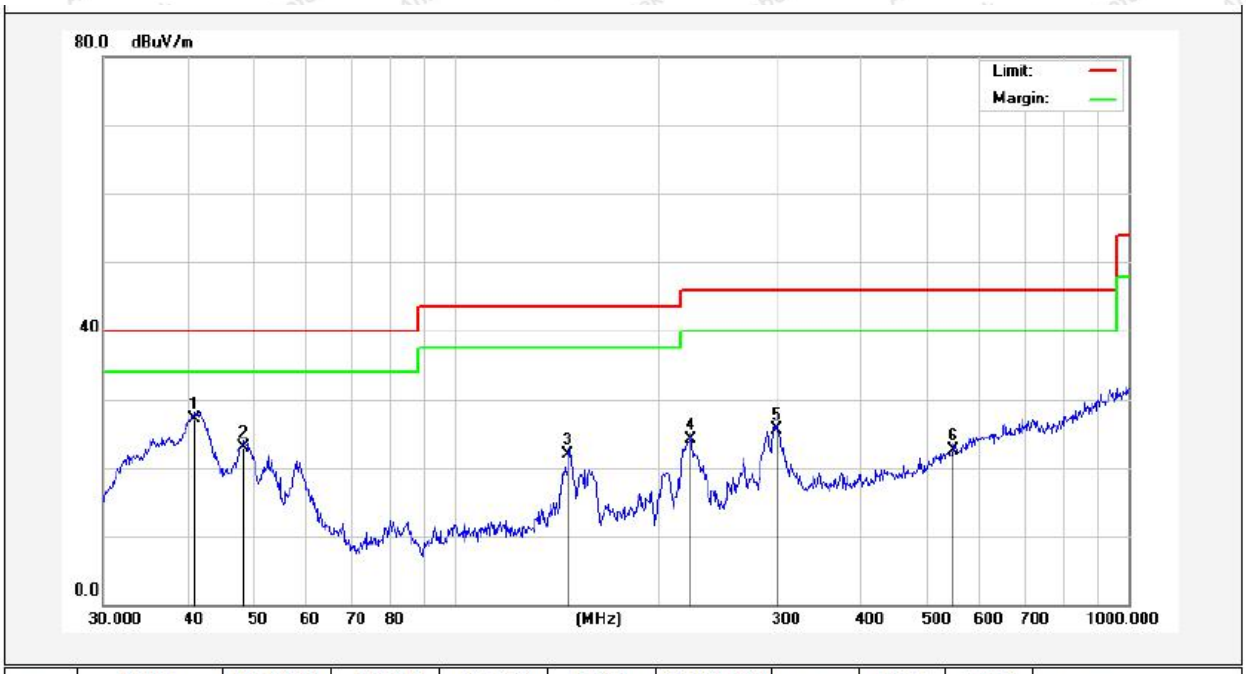
During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all the modes, and found the Low channel(TX Mode) which is the worst case, only the worst case is recorded in the report

**Test Results (30~1000MHz)**

| | |
|---|---|
| Test Mode: | Mode 1 |
| Power Source: | AC 120V/60Hz |
| Polarization: | Vertical |
| Temp.(℃)/Hum.(%RH): | 22.5℃/50%RH |




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 40.9881 | 40.75 | -13.68 | 27.07 | 40.00 | -12.93 | QP | 100 | 0 | |
| 2 | 48.3318 | 37.59 | -14.60 | 22.99 | 40.00 | -17.01 | QP | 100 | 360 | |
| 3 | 146.8877 | 41.81 | -19.95 | 21.86 | 43.50 | -21.64 | QP | 100 | 0 | |
| 4 | 222.9502 | 40.33 | -16.32 | 24.01 | 46.00 | -21.99 | QP | 100 | 360 | |
| 5 | 300.3672 | 38.89 | -13.39 | 25.50 | 46.00 | -20.50 | QP | 100 | 0 | |
| 6 | 547.0977 | 30.46 | -8.05 | 22.41 | 46.00 | -23.59 | QP | 100 | 360 | |

**Test Results (30~1000MHz)**

| | |
|---|---|
| Test Mode: | Mode 1 |
| Power Source: | AC 120V/60Hz |
| Polarization: | Horizontal |
| Temp.(℃)/Hum.(%RH): | 22.5℃/50%RH |

| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 55.2207 | 33.36 | -16.51 | 16.85 | 40.00 | -23.15 | QP | 100 | 0 | |
| 2 | 144.8418 | 36.92 | -20.81 | 16.11 | 43.50 | -27.39 | QP | 100 | 360 | |
| 3 | 213.7634 | 39.94 | -19.58 | 20.36 | 43.50 | -23.14 | QP | 100 | 0 | |
| 4 | 316.5890 | 38.38 | -13.86 | 24.52 | 46.00 | -21.48 | QP | 100 | 360 | |
| 5 | 520.8882 | 30.51 | -9.23 | 21.28 | 46.00 | -24.72 | QP | 100 | 0 | |
| 6 | 729.3583 | 32.11 | -5.56 | 26.55 | 46.00 | -19.45 | QP | 100 | 360 | |

**Test Results (1GHz-25GHz)**

| Test Mode: Low channel | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. | Detector |
| 5850.00 | 83.73 | 28.65 | 13.58 | 31.04 | 94.92 | 114.00 | -19.08 | V | Peak |
| 5850.00 | 69.36 | 28.65 | 13.58 | 31.04 | 80.55 | 94.00 | -13.45 | V | AVG |
| 11700.00 | 38.16 | 31.98 | 17.08 | 33.91 | 53.31 | 74.00 | -20.69 | V | Peak |
| 11700.00 | 24.61 | 32.65 | 20.03 | 34.85 | 42.44 | 54.00 | -11.56 | V | AVG |
| 17550.00 | 38.16 | 31.98 | 17.08 | 33.91 | 53.31 | 74.00 | -20.69 | V | Peak |
| 17550.00 | 24.80 | 32.65 | 20.03 | 34.85 | 42.63 | 54.00 | -11.37 | V | AVG |
| 23400.00 | * | | | | | | | | |
| 29250.00 | * | | | | | | | | |
| 35100.00 | * | | | | | | | | |
| 40950.00 | * | | | | | | | | |
| 5850.00 | 83.67 | 28.65 | 13.58 | 31.04 | 94.86 | 114.00 | -19.14 | H | Peak |
| 5850.00 | 69.39 | 28.65 | 13.58 | 31.04 | 80.58 | 94.00 | -13.42 | H | AVG |
| 11700.00 | 37.11 | 31.98 | 17.08 | 33.91 | 52.26 | 74.00 | -21.74 | H | Peak |
| 11700.00 | 26.21 | 32.65 | 20.03 | 34.85 | 44.04 | 54.00 | -9.96 | H | AVG |
| 17550.00 | 38.08 | 31.98 | 17.08 | 33.91 | 53.23 | 74.00 | -20.77 | H | Peak |
| 17550.00 | 24.41 | 32.65 | 20.03 | 34.85 | 42.24 | 54.00 | -11.76 | H | AVG |
| 23400.00 | * | | | | | | | | |
| 29250.00 | * | | | | | | | | |
| 35100.00 | * | | | | | | | | |
| 40950.00 | * | | | | | | | | |

**Note:**

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.


Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

| Test Mode: Middle channel | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. | Detector |
| 5860.00 | 84.79 | 28.95 | 14.02 | 31.53 | 96.23 | 114.00 | -17.77 | V | Peak |
| 5860.00 | 70.51 | 28.95 | 14.02 | 31.53 | 81.95 | 94.00 | -12.05 | V | AVG |
| 11720.00 | 40.38 | 32.44 | 17.18 | 33.91 | 56.09 | 74.00 | -17.91 | V | Peak |
| 11720.00 | 25.80 | 32.78 | 20.12 | 34.86 | 43.84 | 54.00 | -10.16 | V | AVG |
| 17580.00 | 37.07 | 32.44 | 17.18 | 33.91 | 52.78 | 74.00 | -21.22 | V | Peak |
| 17580.00 | 23.86 | 32.78 | 20.12 | 34.86 | 41.90 | 54.00 | -12.10 | V | AVG |
| 23440.00 | * | | | | | | | | |
| 29300.00 | * | | | | | | | | |
| 35160.00 | * | | | | | | | | |
| 41020.00 | * | | | | | | | | |
| 5860.00 | 85.72 | 28.95 | 14.02 | 31.53 | 97.16 | 114.00 | -16.84 | H | Peak |
| 5860.00 | 69.10 | 28.95 | 14.02 | 31.53 | 80.54 | 94.00 | -13.46 | H | AVG |
| 11720.00 | 39.64 | 32.44 | 17.18 | 33.91 | 55.35 | 74.00 | -18.65 | H | Peak |
| 11720.00 | 24.15 | 32.78 | 20.12 | 34.86 | 42.19 | 54.00 | -11.81 | H | AVG |
| 17580.00 | 36.29 | 32.44 | 17.18 | 33.91 | 52.00 | 74.00 | -22.00 | H | Peak |
| 17580.00 | 23.70 | 32.78 | 20.12 | 34.86 | 41.74 | 54.00 | -12.26 | H | AVG |
| 23440.00 | * | | | | | | | | |
| 29300.00 | * | | | | | | | | |
| 35160.00 | * | | | | | | | | |
| 41020.00 | * | | | | | | | | |

**Note:**

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.


Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

| Test Mode: High channel | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. | Detector |
| 5870.00 | 83.13 | 29.16 | 14.68 | 31.96 | 95.01 | 114.00 | -18.99 | V | Peak |
| 5870.00 | 70.40 | 29.16 | 14.68 | 31.96 | 82.28 | 94.00 | -11.72 | V | AVG |
| 11740.00 | 39.61 | 32.59 | 18.02 | 33.92 | 56.30 | 74.00 | -17.70 | V | Peak |
| 11740.00 | 24.10 | 32.87 | 20.15 | 34.88 | 42.24 | 54.00 | -11.76 | V | AVG |
| 17610.00 | 37.98 | 32.59 | 18.02 | 33.92 | 54.67 | 74.00 | -19.33 | V | Peak |
| 17610.00 | 21.38 | 32.87 | 20.15 | 34.88 | 39.52 | 54.00 | -14.48 | V | AVG |
| 23480.00 | * | | | | | | | | |
| 29350.00 | * | | | | | | | | |
| 35220.00 | * | | | | | | | | |
| 41090.00 | * | | | | | | | | |
| 5870.00 | 86.94 | 29.16 | 14.68 | 31.96 | 98.82 | 114.00 | -15.18 | H | Peak |
| 5870.00 | 68.37 | 29.16 | 14.68 | 31.96 | 80.25 | 94.00 | -13.75 | H | AVG |
| 11740.00 | 40.21 | 32.59 | 18.02 | 33.92 | 56.90 | 74.00 | -17.10 | H | Peak |
| 11740.00 | 26.10 | 32.87 | 20.15 | 34.88 | 44.24 | 54.00 | -9.76 | H | AVG |
| 17610.00 | 36.32 | 32.59 | 18.02 | 33.92 | 53.01 | 74.00 | -20.99 | H | Peak |
| 17610.00 | 21.65 | 32.87 | 20.15 | 34.88 | 39.79 | 54.00 | -14.21 | H | AVG |
| 23480.00 | * | | | | | | | | |
| 29350.00 | * | | | | | | | | |
| 35220.00 | * | | | | | | | | |
| 41090.00 | * | | | | | | | | |

**Note:**

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. "*" means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.


Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

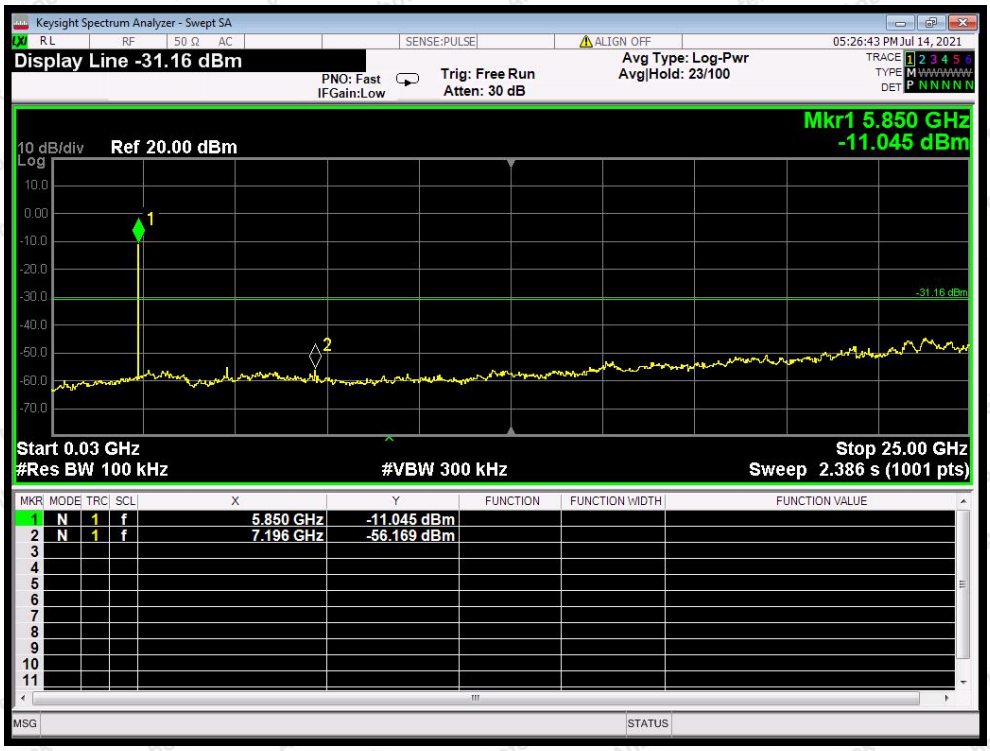
**Radiated Band Edge:**

| Test Mode: ASK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5725.00 | 46.48 | 28.65 | 13.58 | 31.04 | 57.67 | 74.00 | -16.33 | H |
| 5875.00 | 45.95 | 29.16 | 14.68 | 31.96 | 57.83 | 74.00 | -16.17 | H |
| 5725.00 | 46.66 | 28.65 | 13.58 | 31.04 | 57.85 | 74.00 | -16.15 | V |
| 5875.00 | 47.22 | 29.16 | 14.68 | 31.96 | 59.10 | 74.00 | -14.90 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5725.00 | 32.92 | 28.65 | 13.58 | 31.04 | 44.11 | 54.00 | -9.89 | H |
| 5875.00 | 32.91 | 29.16 | 14.68 | 31.96 | 44.79 | 54.00 | -9.21 | H |
| 5725.00 | 32.07 | 28.65 | 13.58 | 31.04 | 43.26 | 54.00 | -10.74 | V |
| 5875.00 | 33.84 | 29.16 | 14.68 | 31.96 | 45.72 | 54.00 | -8.28 | V |

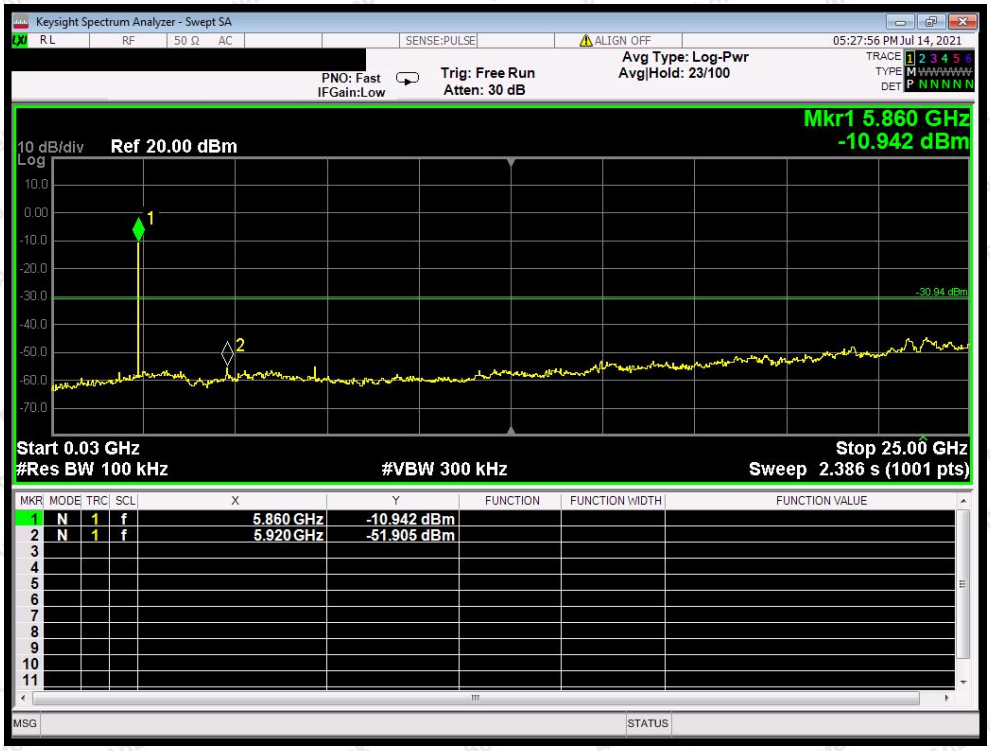
Remark:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

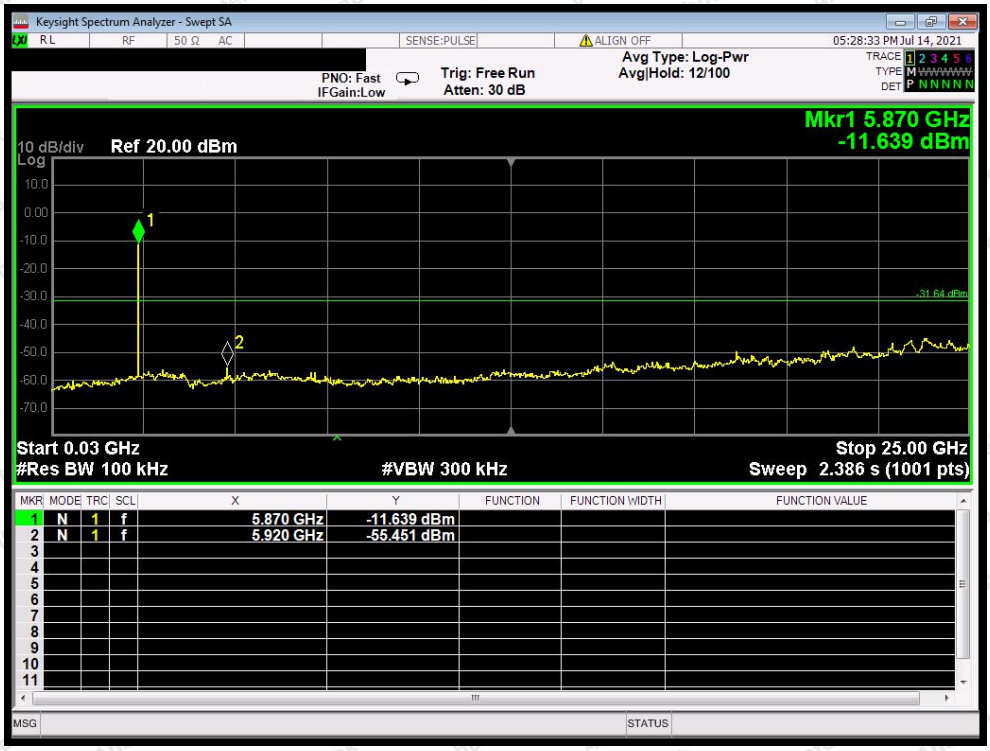
Conducted Emission Method




CH: Low




CH: Middle


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN OFF
05:28:33 PM Jul 14, 2021
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 12/100
Mkr1 5.870 GHz
-11.639 dBm
10 dB/div
Ref 20.00 dBm
Log
-31.64 dBm
Start 0.03 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.386 s (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 5.870 GHz -11.639 dBm
2 N 1 f 5.920 GHz -55.451 dBm
MSG
STATUS

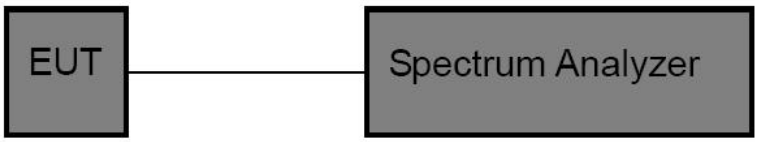
CH: High

# 5. 20dB Bandwidth Test

## 5.1. Test Standard and Limit

| | |
|---|---|
| Test Standard | FCC Part15 C Section 15.249 |

## 5.2. Test Setup




## 5.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:

RBW = 100kHz, VBW≥3*RBW =300kHz,

Detector= Average

Trace mode= Max hold.

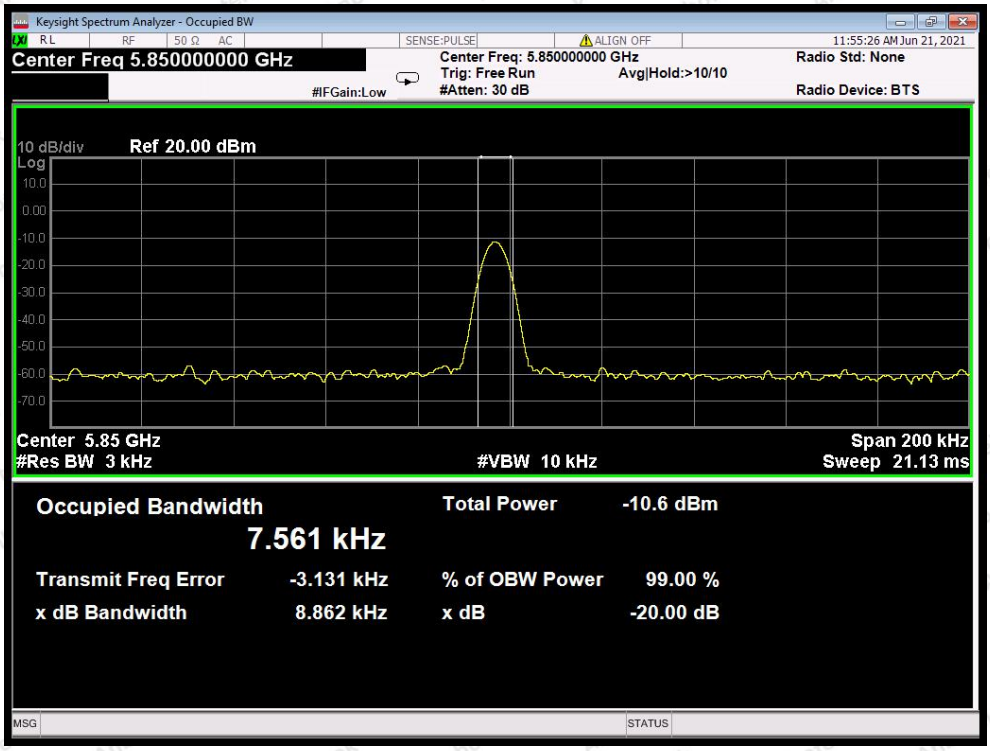
Sweep- auto couple.

4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

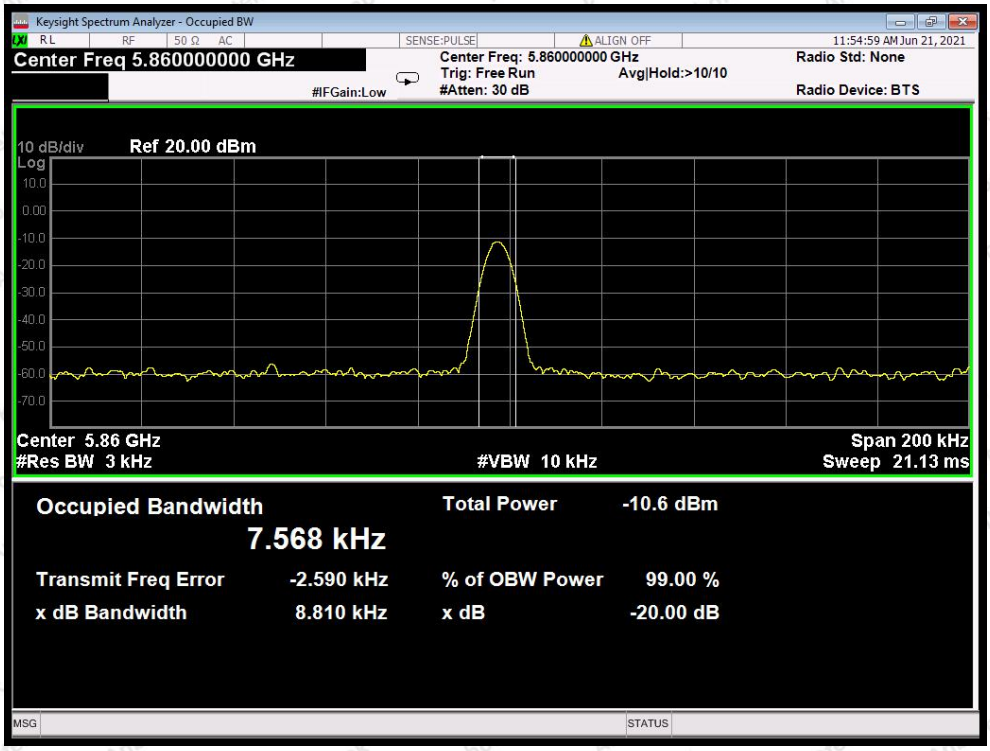
## 5.4. Test Data

| | | | | | |
|---|---|---|---|---|---|
| Test Voltage | : | AC 120V/60Hz | Temperature | : | 22.5℃ |
| Test Result | : | PASS | Humidity | : | 54%RH |

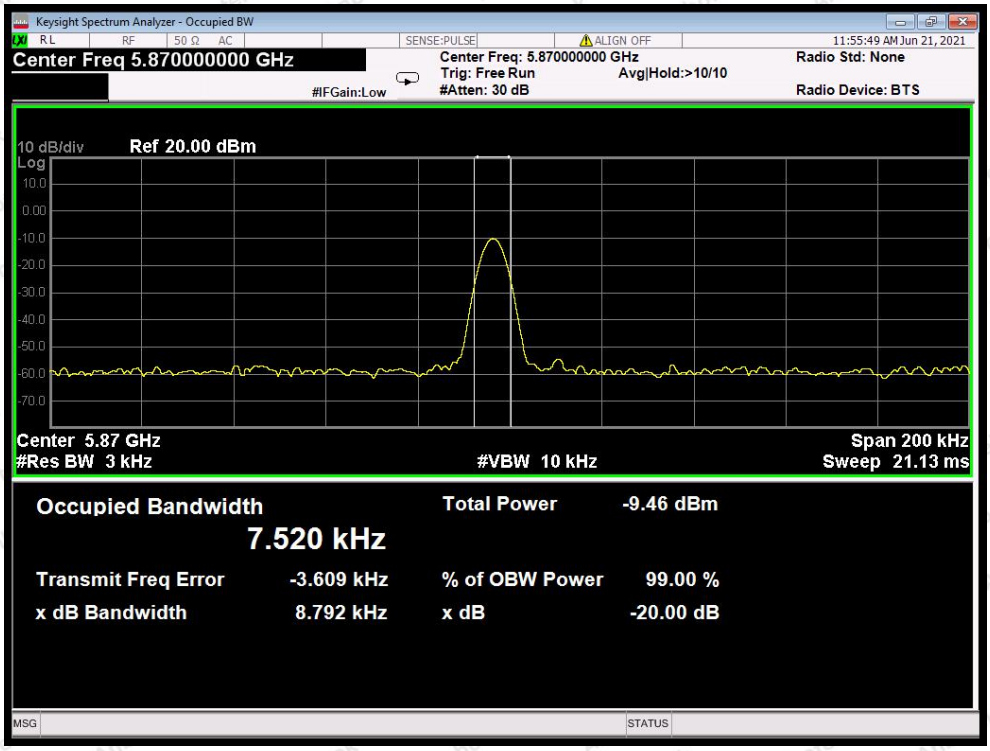
| Frequency (MHz) | Bandwidth (KHz) | Result |
|---|---|---|
| 5850 | 8.862 | PASS |
| 5860 | 8.810 | PASS |
| 5870 | 8.792 | PASS |




Test Mode: Low




Test Mode: Middle




Test Mode: High

# 6. Antenna Requirement

## 6.1. Test Standard and Requirement

| | |
|---|---|
| Test Standard | FCC Part15 Section 15.203 |
| Requirement | 1) 15.203 requirement:<br>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. |

## 6.2. Antenna Connected Construction

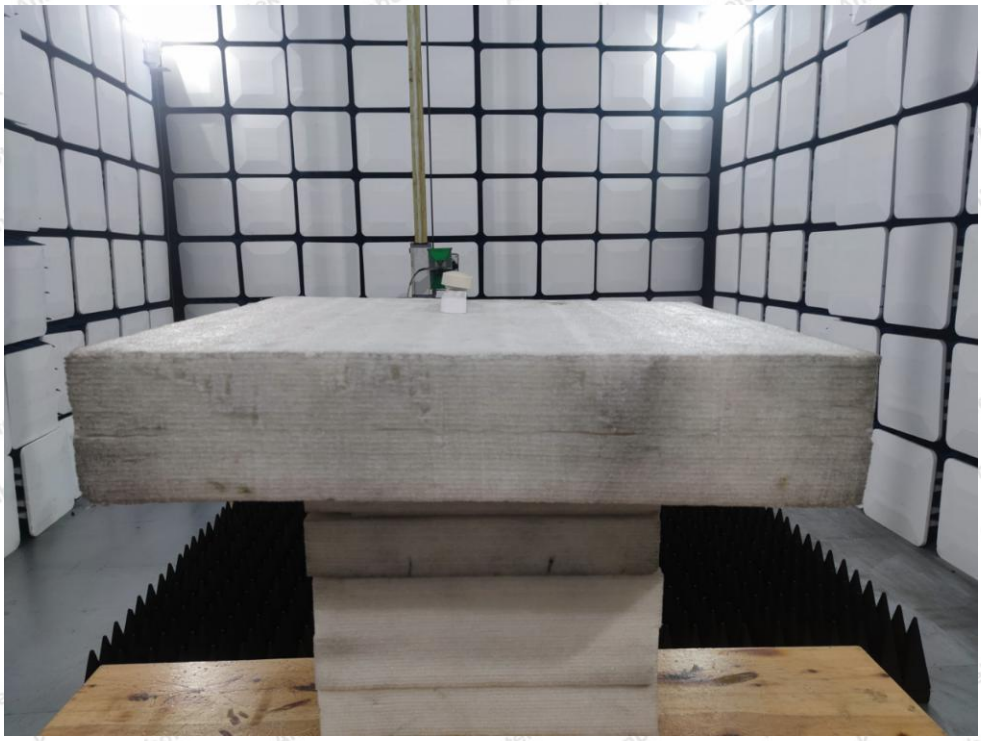
The antenna is a PCB Antenna which permanently attached, and the best case gain of the antenna is 2 dBi. It complies with the standard requirement.


Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

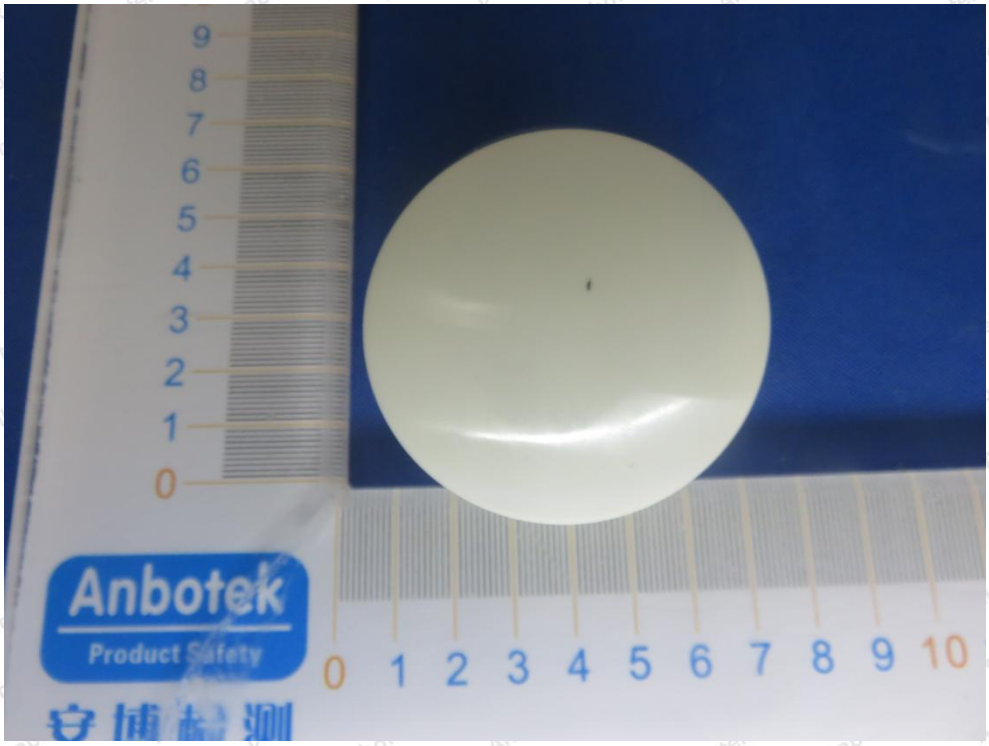
# APPENDIX I -- TEST SETUP PHOTOGRAPH

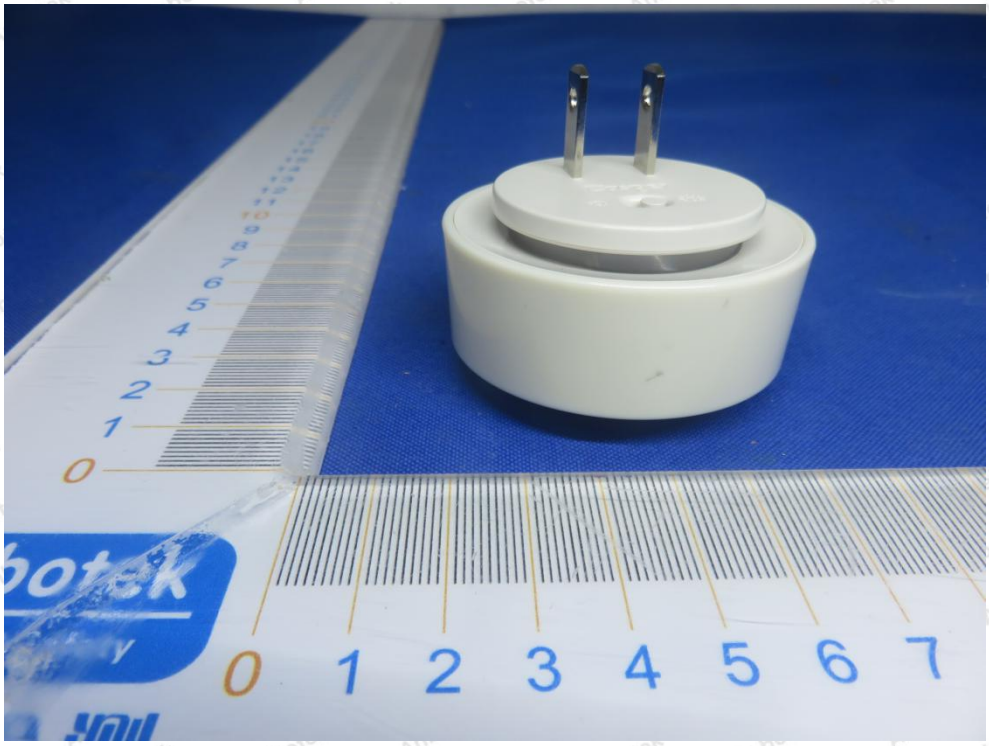
Photo of Conducted Emission Measurement

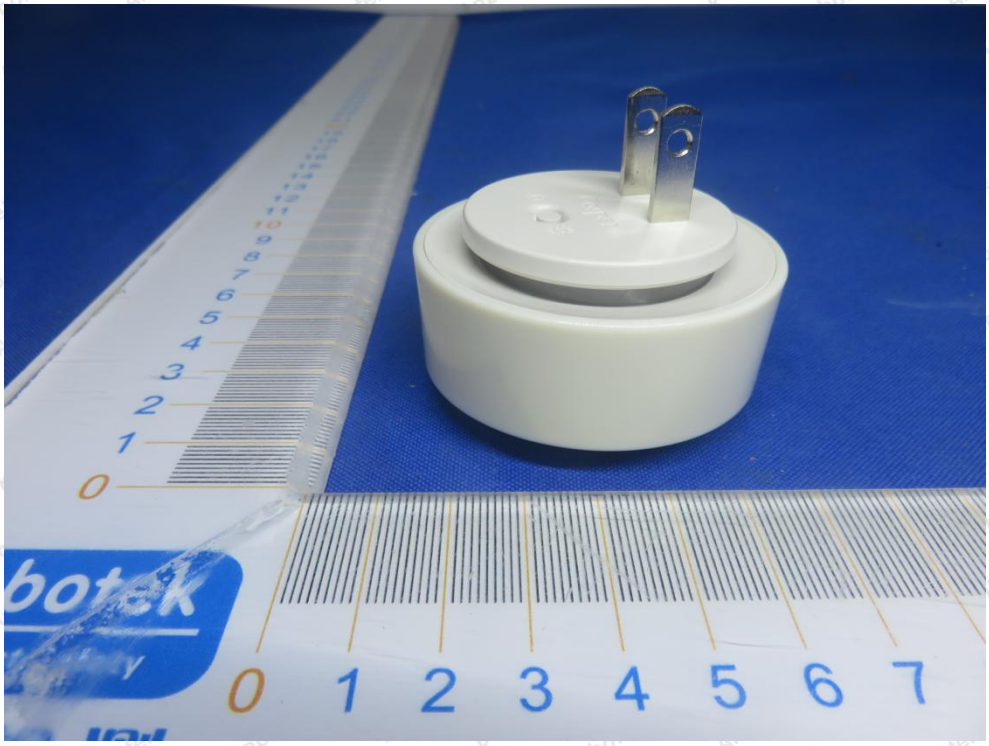
Photo of Radiation Emission Test

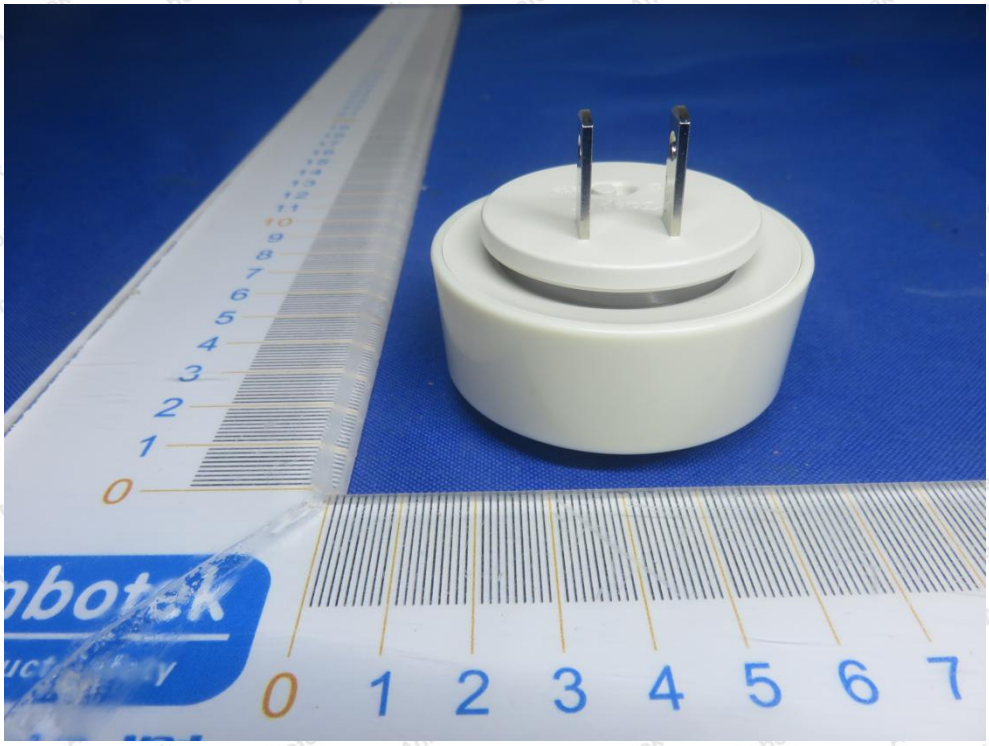


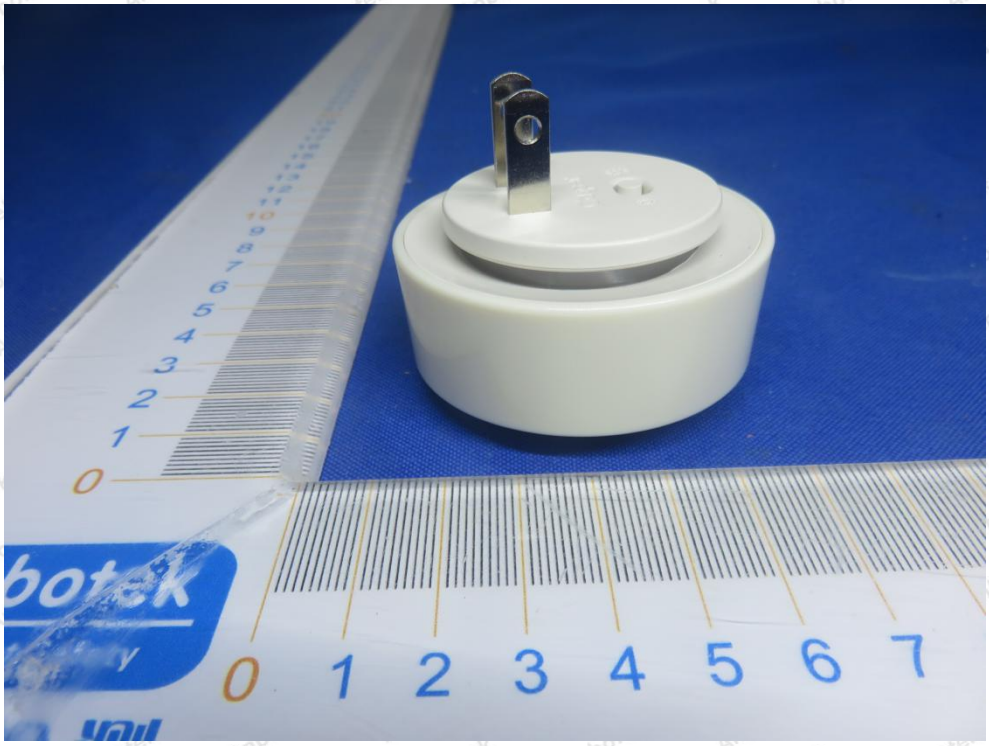
# APPENDIX II -- EXTERNAL PHOTOGRAPH



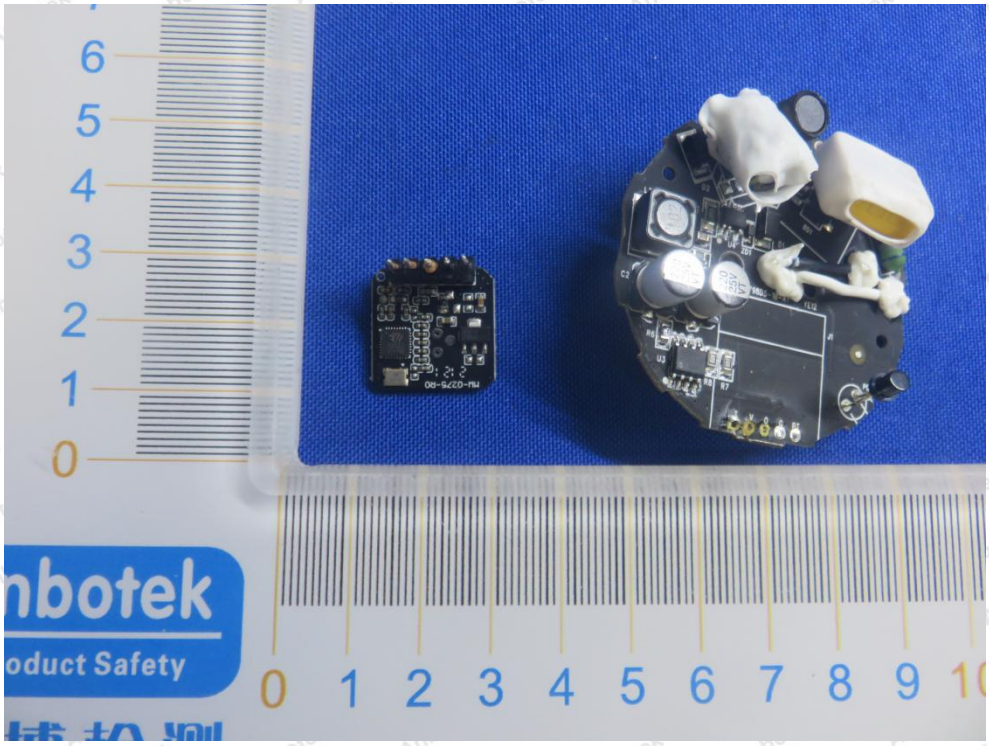


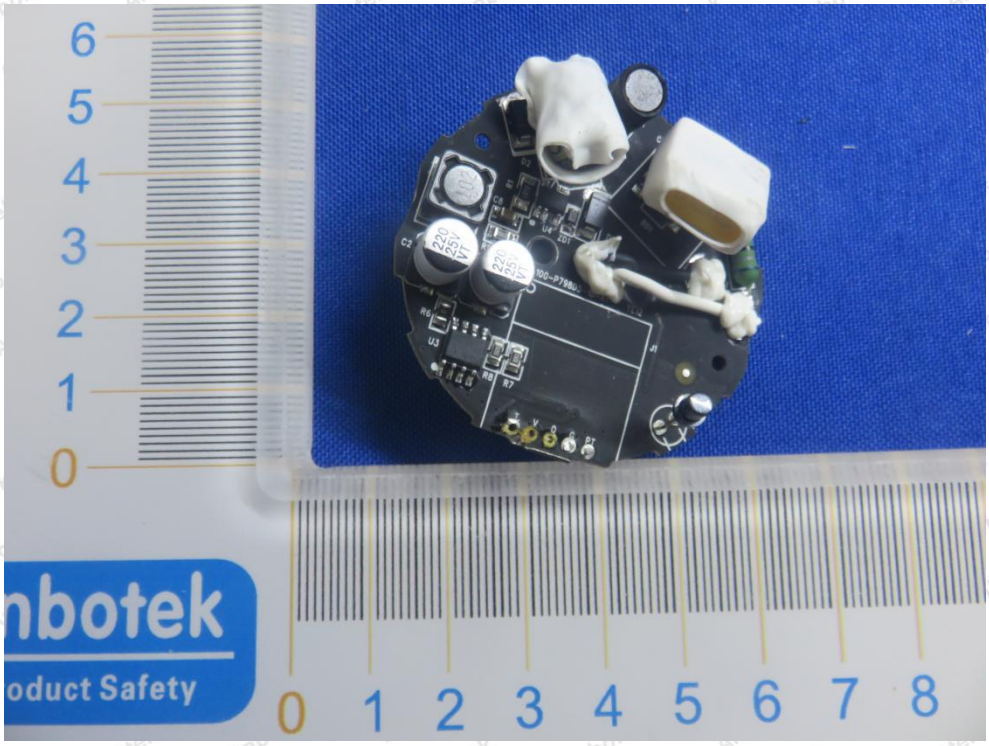




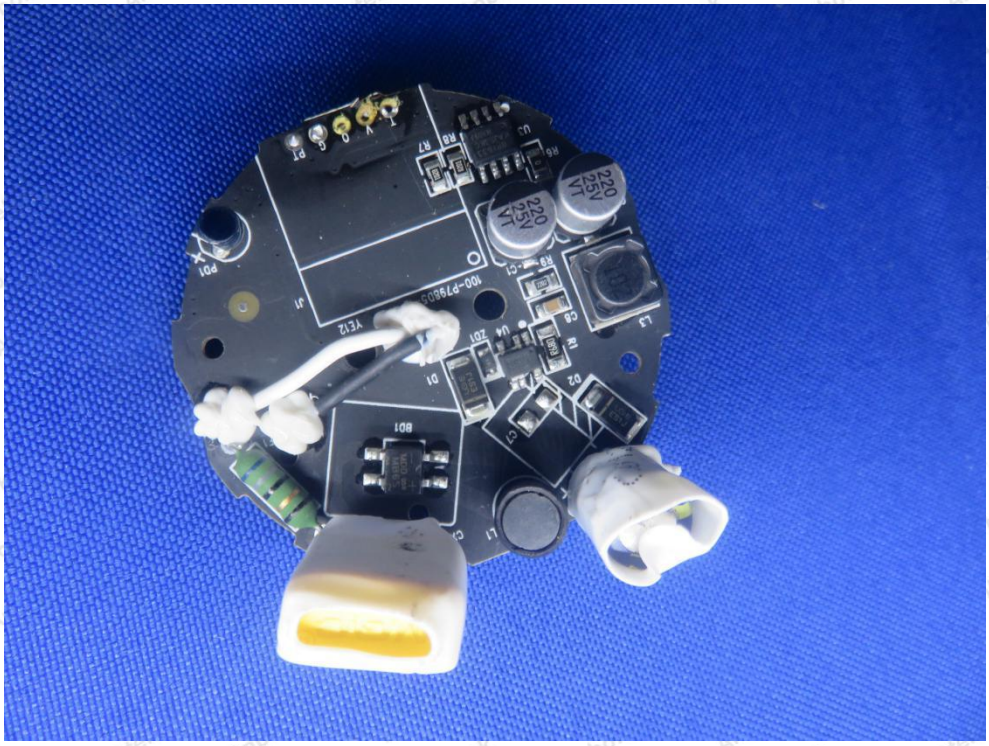


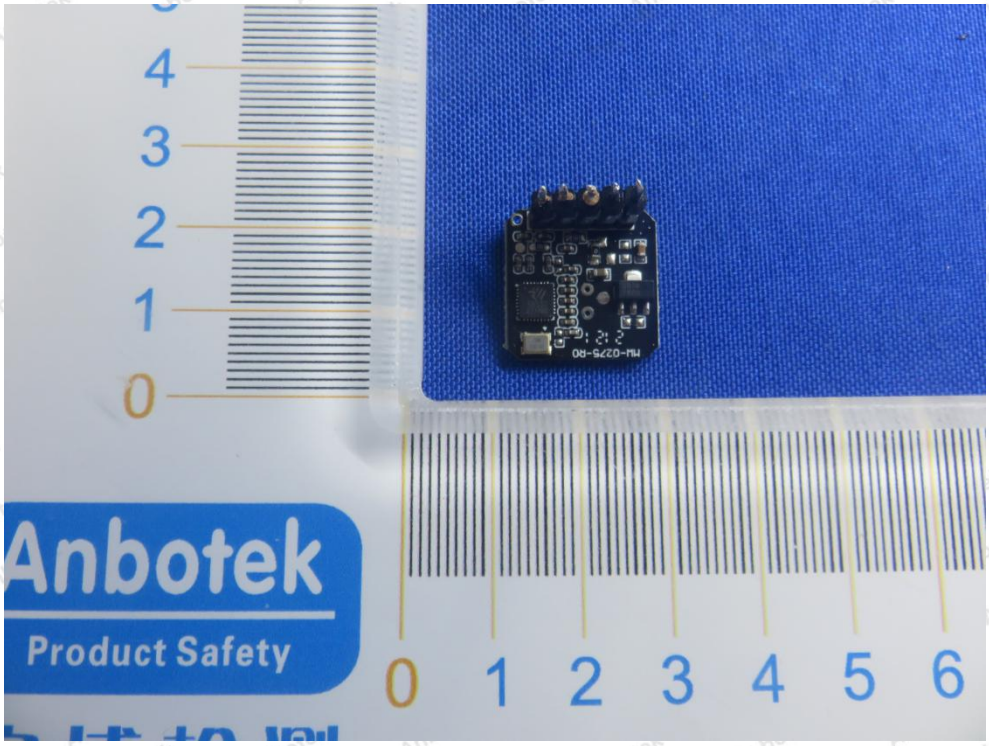
# APPENDIX III -- INTERNAL PHOTOGRAPH

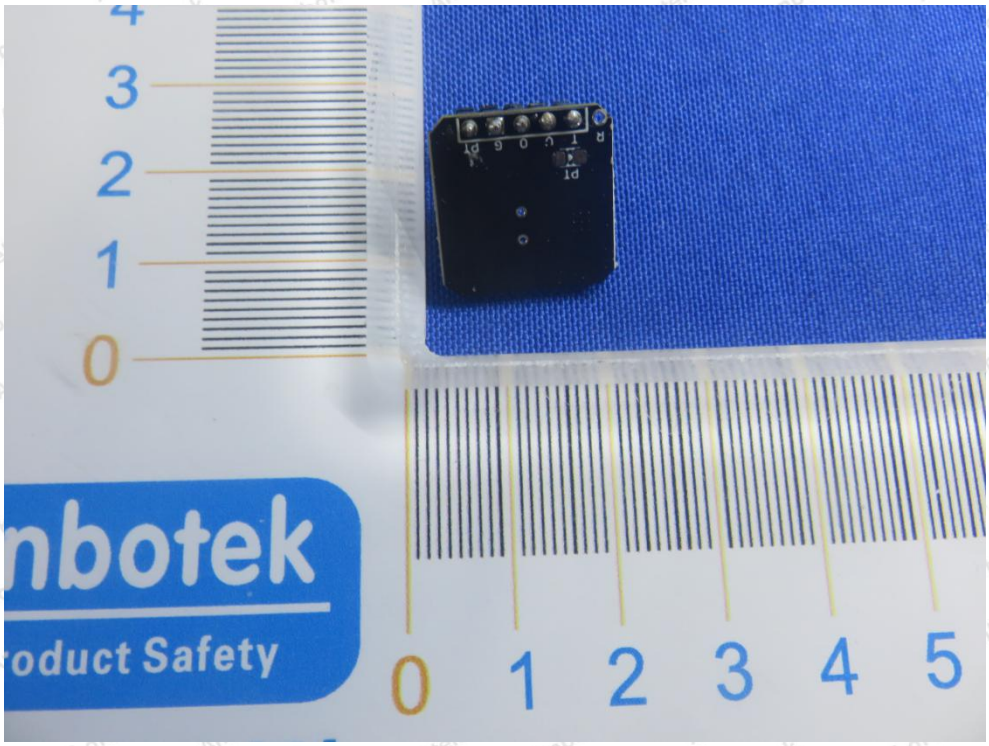


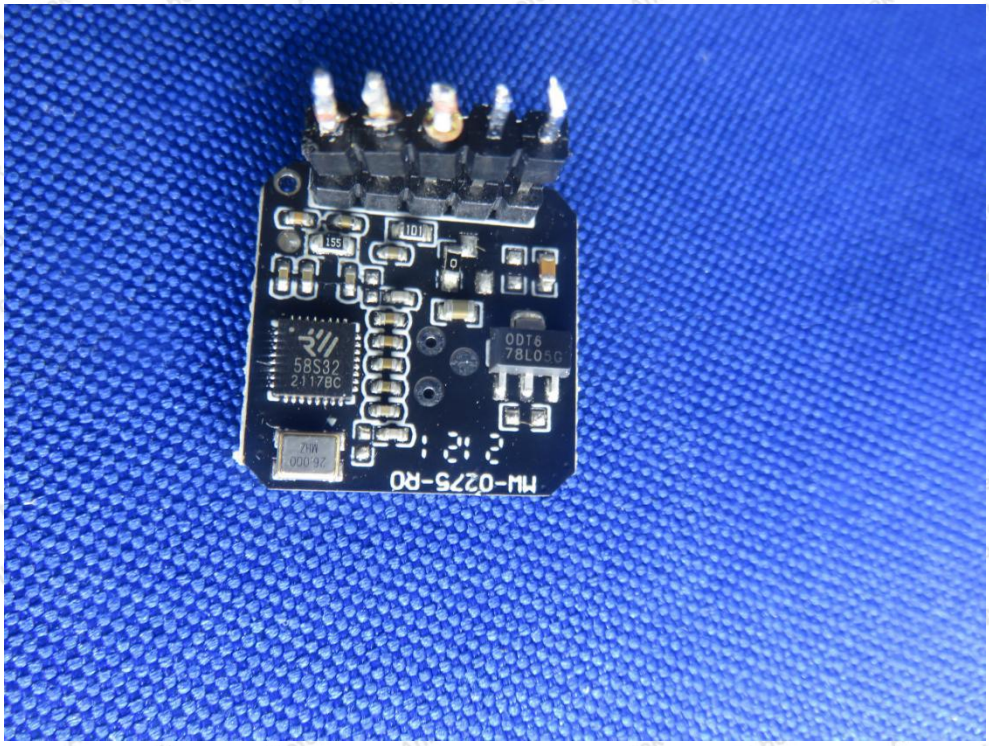


Anbotek
Product Safety

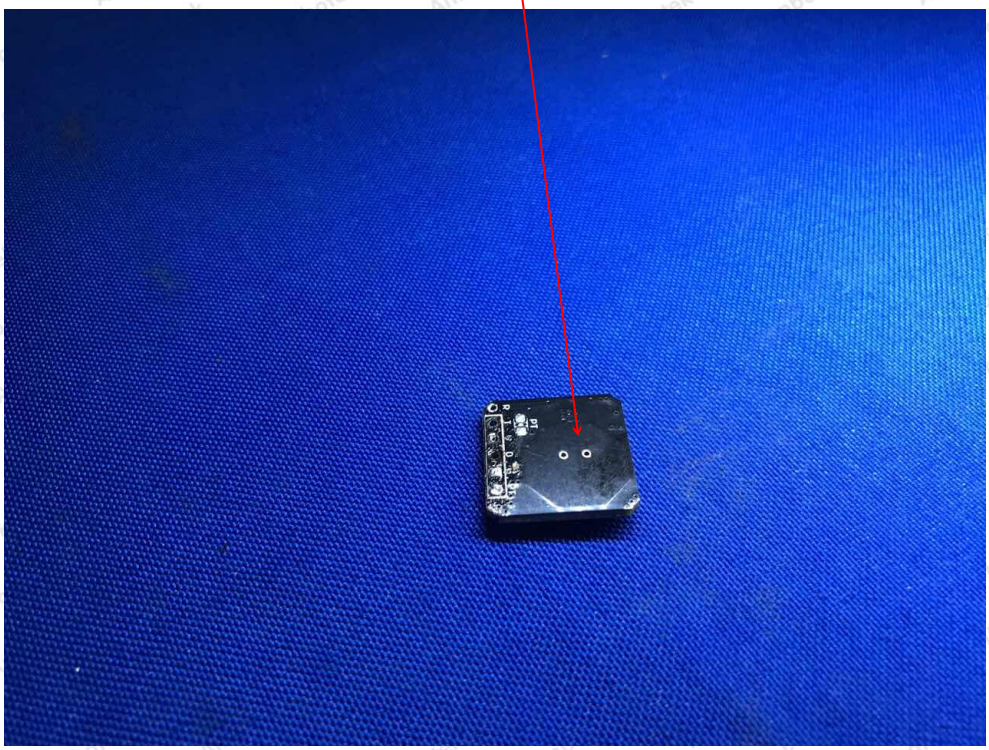



Anbotek
Product Safety


Product Safety




ANT



---------- End of Report ----------