

# FCC REPORT

**Applicant:** Aduro Technologies LLC  
**Address of Applicant:** 700 N Valley St, Suite B, Anaheim, California 92801, United States  
**Manufacturer/Factory:** Shenzhen Adurolight Technology Co., Ltd.  
**Address of Manufacturer/Factory:** A3 Building, Fangxing Technology Park Longnan Industrial zone Longgang District, Shenzhen China  
**Equipment Under Test (EUT)**

Product Name: Zigbee Bulbs  
Model No.: 81809, 81813  
Trade mark:

ADUROS**SMART**,



**FCC ID:** 2APKV-81809  
**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247  
**Date of sample receipt:** March 20, 2018  
**Date of Test:** March 21, 2018-April 11, 2018  
**Date of report issued:** April 12, 2018  
**Test Result :** PASS \*

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

Authorized Signature:

A handwritten signature in black ink, appearing to read 'Robinson Lo', is written over a circular blue stamp. The stamp contains the text 'GLOBAL UNITED TECHNOLOGY SERVICES CO.' around the perimeter, 'GTS' in the center, and 'LABORATORY TESTING' below it. The date 'APR 12 2018' is also visible at the bottom of the stamp.

**Robinson Lo**

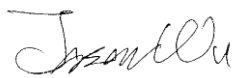
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

| Version No. | Date           | Description |
|-------------|----------------|-------------|
| 00          | April 12, 2018 | Original    |
|             |                |             |
|             |                |             |
|             |                |             |
|             |                |             |

**Prepared By:**

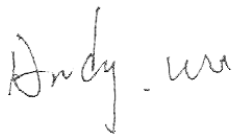


**Date:**

April 12, 2018

**Project Engineer**

**Check By:**



**Date:**

April 12, 2018

**Reviewer**

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## 4 Test Summary

| Test Item                        | Section in CFR 47 | Result |
|----------------------------------|-------------------|--------|
| Antenna requirement              | 15.203/15.247 (c) | Pass   |
| AC Power Line Conducted Emission | 15.207            | Pass   |
| Conducted Peak Output Power      | 15.247 (b)(3)     | Pass   |
| Channel Bandwidth                | 15.247 (a)(2)     | Pass   |
| Power Spectral Density           | 15.247 (e)        | Pass   |
| Band Edge                        | 15.247(d)         | Pass   |
| Spurious Emission                | 15.205/15.209     | Pass   |

*Pass: The EUT complies with the essential requirements in the standard.*

*Remark : Test according to ANSI C63.4:2014 and ANSI C63.10:2013*

*N/A means not applicable.*

### 4.1 Measurement Uncertainty

| Test Item                        | Frequency Range | Measurement Uncertainty | Notes |
|----------------------------------|-----------------|-------------------------|-------|
| Radiated Emission                | 9kHz ~ 30MHz    | ± 4.34dB                | (1)   |
| Radiated Emission                | 30MHz ~ 1000MHz | ± 4.24dB                | (1)   |
| Radiated Emission                | 1GHz ~ 26.5GHz  | ± 4.68dB                | (1)   |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | ± 3.45dB                | (1)   |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

|  |                                |
|--|--------------------------------|
| Product Name:  | Zigbee Bulbs                   |
| Model No.:   | 81809, 81813                   |
| Test Model No:   | 81809, 81813                   |
| <i>Remark: Only the model 81809 was tested fully, and the model 81813 was performed the AC Power Line Conducted Emission and Spurious Emission for discrepancy, since the electrical circuit design, PCB layout, functions, components used and internal wiring were identical for the above models, with only differences are appearance, LED PCB and model name.</i> |                                |
| Serial No.:  | 15031800002, 15031800001       |
| Test sample(s) ID:   | GTS201803000149-1              |
| Sample(s) Status   | Engineer sample                |
| Operation Frequency:   | 2405MHz~2480MHz                |
| Channel numbers:   | 16                             |
| Channel separation:  | 5MHz                           |
| Modulation type:   | O-QPSK                         |
| Antenna Type:  | Integral Antenna               |
| Antenna gain:  | 2.15 dBi(declare by Applicant) |
| Power supply:  | AC 120V 60Hz                   |

| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1                                   | 2405MHz   | 5       | 2425MHz   | 9       | 2445MHz   | 13      | 2465MHz   |
| 2                                   | 2410MHz   | 6       | 2430MHz   | 10      | 2450MHz   | 14      | 2470MHz   |
| 3                                   | 2415MHz   | 7       | 2435MHz   | 11      | 2455MHz   | 15      | 2475MHz   |
| 4                                   | 2420MHz   | 8       | 2440MHz   | 12      | 2460MHz   | 16      | 2480 MHz  |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2405MHz   |
| The middle channel  | 2440MHz   |
| The Highest channel | 2480MHz   |

## 5.2 Test mode

|  |   |
|--|---|
| Transmitting mode  | Keep the EUT in continuously transmitting mode. |
| <i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i> |   |

## 5.3 Description of Support Units

|      |
|------|
| None |
|------|

## 5.4 Test Facility

|  |
|--|
| <p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"><li>● <b>FCC —Registration No.: 381383</b><br/>Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383, January 08, 2018</li><li>● <b>Industry Canada (IC) —Registration No.: 9079A-2</b><br/>The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.</li></ul> |
|--|

## 5.5 Test Location

|   |
|---|
| All tests were performed at:  |
| Global United Technology Services Co., Ltd.<br>Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China<br>Tel: 0755-27798480<br>Fax: 0755-27798960 |

## 6 Test Instruments list

| Radiated Emission: |                               |                                |                             |               |                     |                         |
|--------------------|-------------------------------|--------------------------------|-----------------------------|---------------|---------------------|-------------------------|
| Item               | Test Equipment                | Manufacturer                   | Model No.                   | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                  | 3m Semi- Anechoic Chamber     | ZhongYu Electron               | 9.2(L)*6.2(W)* 6.4(H)       | GTS250        | July 03 2015        | July 02 2020            |
| 2                  | Control Room                  | ZhongYu Electron               | 6.2(L)*2.5(W)* 2.4(H)       | GTS251        | N/A                 | N/A                     |
| 3                  | Spectrum Analyzer             | Agilent                        | E4440A                      | GTS533        | June 28 2017        | June 27 2018            |
| 4                  | EMI Test Receiver             | Rohde & Schwarz                | ESU26                       | GTS203        | June 28 2017        | June 27 2018            |
| 5                  | BiConiLog Antenna             | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214        | June 28 2017        | June 27 2018            |
| 6                  | Double -ridged waveguide horn | SCHWARZBECK<br>MESS-ELEKTRONIK | 9120D-829                   | GTS208        | June 28 2017        | June 27 2018            |
| 7                  | Horn Antenna                  | ETS-LINDGREN                   | 3160                        | GTS217        | June 28 2017        | June 27 2018            |
| 8                  | EMI Test Software             | AUDIX                          | E3                          | N/A           | N/A                 | N/A                     |
| 9                  | Coaxial Cable                 | GTS                            | N/A                         | GTS213        | June 28 2017        | June 27 2018            |
| 10                 | Coaxial Cable                 | GTS                            | N/A                         | GTS211        | June 28 2017        | June 27 2018            |
| 11                 | Coaxial cable                 | GTS                            | N/A                         | GTS210        | June 28 2017        | June 27 2018            |
| 12                 | Coaxial Cable                 | GTS                            | N/A                         | GTS212        | June 28 2017        | June 27 2018            |
| 13                 | Amplifier(100kHz-3GHz)        | HP                             | 8347A                       | GTS204        | June 28 2017        | June 27 2018            |
| 14                 | Amplifier(2GHz-20GHz)         | HP                             | 8349B                       | GTS206        | June 28 2017        | June 27 2018            |
| 15                 | Amplifier (18-26GHz)          | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218        | June 28 2017        | June 27 2018            |
| 16                 | Band filter                   | Amindeon                       | 82346                       | GTS219        | June 28 2017        | June 27 2018            |
| 17                 | Power Meter                   | Anritsu                        | ML2495A                     | GTS540        | June 28 2017        | June 27 2018            |
| 18                 | Power Sensor                  | Anritsu                        | MA2411B                     | GTS541        | June 28 2017        | June 27 2018            |
| 19                 | Loop Antenna                  | ZHINAN                         | ZN30900A                    | GTS534        | June 28 2017        | June 27 2018            |


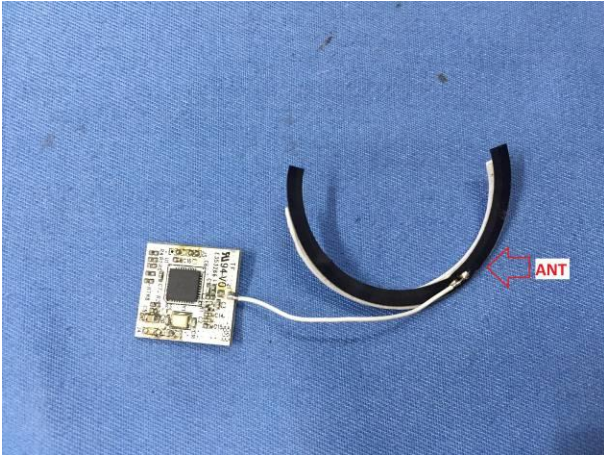
| Conducted Emission: |                          |                     |                      |               |                     |                         |
|---------------------|--------------------------|---------------------|----------------------|---------------|---------------------|-------------------------|
| Item                | Test Equipment           | Manufacturer        | Model No.            | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                   | Shielding Room           | ZhongYu Electron    | 7.3(L)x3.1(W)x2.9(H) | GTS252        | May 16 2014         | May 15 2019             |
| 2                   | EMI Test Receiver        | R&S                 | ESCI 7               | GTS552        | June 28 2017        | June 27 2018            |
| 3                   | Pulse Limiter            | R&S                 | ESH3-Z2              | GTS224        | June 28 2017        | June 27 2018            |
| 4                   | Coaxial Switch           | ANRITSU CORP        | MP59B                | GTS225        | June 28 2017        | June 27 2018            |
| 5                   | Artificial Mains Network | SCHWARZBECK<br>MESS | NSLK8127             | GTS226        | June 28 2017        | June 27 2018            |
| 6                   | Coaxial Cable            | GTS                 | N/A                  | GTS227        | June 28 2017        | June 27 2018            |
| 7                   | EMI Test Software        | AUDIX               | E3                   | N/A           | N/A                 | N/A                     |
| 8                   | Thermo meter             | KTJ                 | TA328                | GTS233        | June 28 2017        | June 27 2018            |

| General used equipment: |                |              |           |               |                     |                         |
|-------------------------|----------------|--------------|-----------|---------------|---------------------|-------------------------|
| Item                    | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1                       | Barometer      | ChangChun    | DYM3      | GTS257        | June 28 2017        | June 27 2018            |



## 7 Test results and Measurement Data

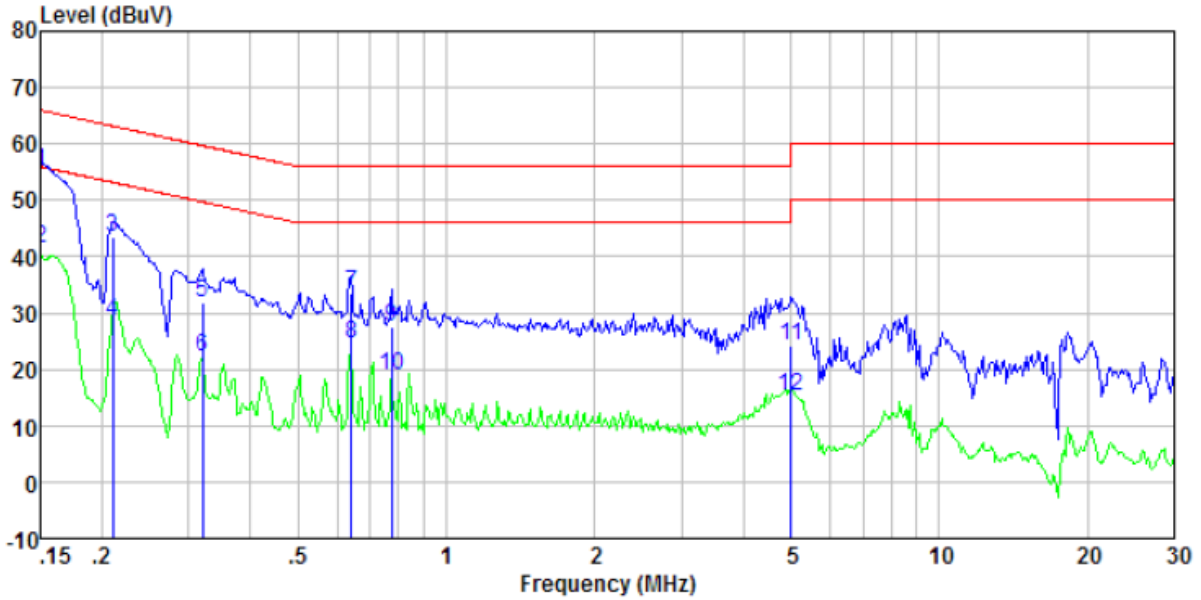
### 7.1 Antenna requirement

|  |                                     |
|--|-------------------------------------|
| <b>Standard requirement:</b>   | FCC Part15 C Section 15.203 /247(c) |
| <p><b>15.203 requirement:</b></p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p><b>15.247(c) (1)(i) requirement:</b></p> <p>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p> |                                     |
| <b>EUT Antenna:</b>  |                                     |
| <p><i>The antenna is Integral Antenna, the best case gain of the antenna is 2.15dBi</i></p> <p><i>Model number: 81809</i></p>  <p><i>Model number: 81813</i></p>   |                                     |

## 7.2 Conducted Emissions

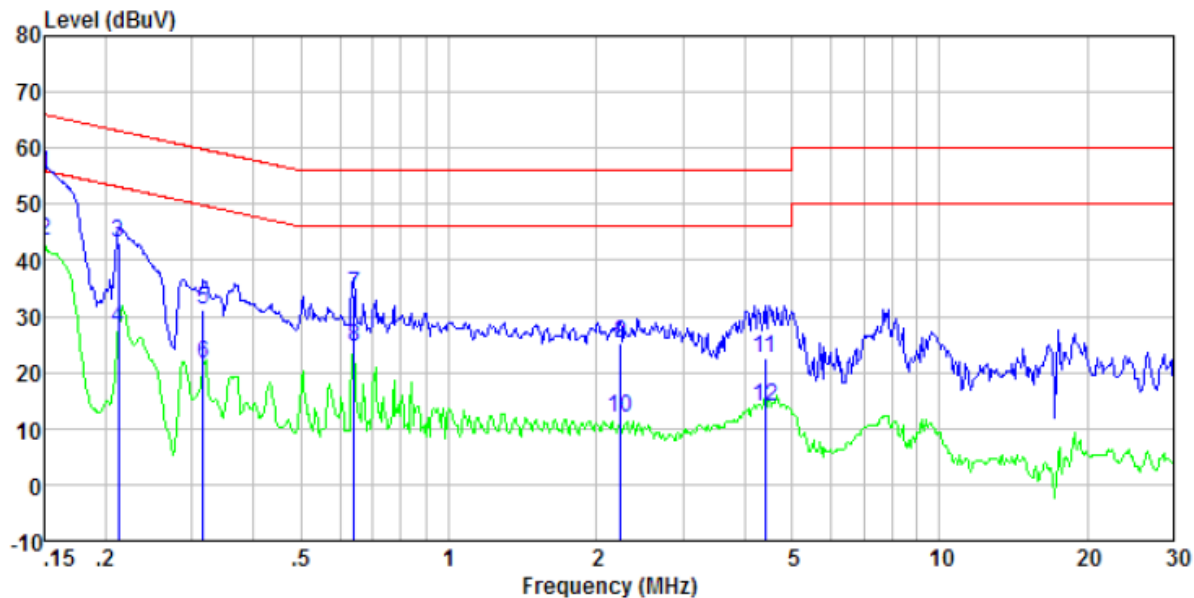
| Test Requirement:     | FCC Part15 C Section 15.207  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
|-----------------------|--|-----------------------|--------------|--|------------|---------|----------|-----------|-----------|-------|----|----|------|----|----|
| Test Method:          | ANSI C63.10:2013   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test Frequency Range: | 150KHz to 30MHz  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Class / Severity:     | Class B  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, Sweep time=auto   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Limit:                | <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>  | Frequency range (MHz) | Limit (dBuV) |  | Quasi-peak | Average | 0.15-0.5 | 66 to 56* | 56 to 46* | 0.5-5 | 56 | 46 | 5-30 | 60 | 50 |
| Frequency range (MHz) | Limit (dBuV)   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
|                       | Quasi-peak   | Average               |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 0.15-0.5              | 66 to 56*  | 56 to 46*             |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 0.5-5                 | 56   | 46                    |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 5-30                  | 60   | 50                    |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test setup:           | <p><i>Remark</i><br/> E.U.T: Equipment Under Test<br/> LISN: Line Impedance Stabilization Network<br/> Test table height=0.8m</p>  |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test procedure:       | <ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</li> </ol> |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test Instruments:     | Refer to section 6.0 for details   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test mode:            | Refer to section 5.2 for details   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test results:         | Pass   |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |

Measurement data  
 Model number: 81809  
 Line:



| Freq<br>MHz | Reading<br>level<br>dBuV | IISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark  |
|-------------|--------------------------|--------------------------|---------------------|---------------|------------------------|---------------------|---------|
| 0.150       | 54.63                    | 0.40                     | 0.07                | 55.10         | 66.00                  | -10.90              | QP      |
| 0.150       | 41.02                    | 0.40                     | 0.07                | 41.49         | 56.00                  | -14.51              | Average |
| 0.211       | 43.10                    | 0.40                     | 0.11                | 43.61         | 63.18                  | -19.57              | QP      |
| 0.211       | 27.89                    | 0.40                     | 0.11                | 28.40         | 53.18                  | -24.78              | Average |
| 0.320       | 31.26                    | 0.39                     | 0.10                | 31.75         | 59.71                  | -27.96              | QP      |
| 0.320       | 21.70                    | 0.39                     | 0.10                | 22.19         | 49.71                  | -27.52              | Average |
| 0.641       | 33.03                    | 0.27                     | 0.12                | 33.42         | 56.00                  | -22.58              | QP      |
| 0.641       | 24.03                    | 0.27                     | 0.12                | 24.42         | 46.00                  | -21.58              | Average |
| 0.775       | 27.07                    | 0.24                     | 0.14                | 27.45         | 56.00                  | -28.55              | QP      |
| 0.775       | 18.56                    | 0.24                     | 0.14                | 18.94         | 46.00                  | -27.06              | Average |
| 5.005       | 23.94                    | 0.20                     | 0.17                | 24.31         | 60.00                  | -35.69              | QP      |
| 5.005       | 14.80                    | 0.20                     | 0.17                | 15.17         | 50.00                  | -34.83              | Average |

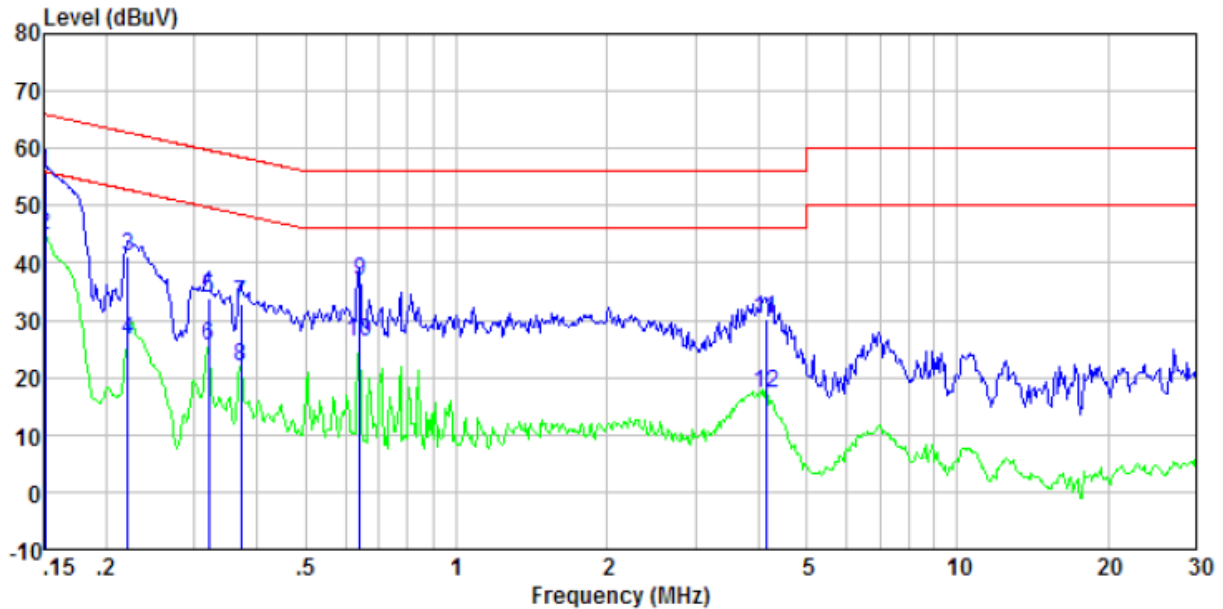
Neutral:



| Freq<br>MHz | Reading<br>level<br>dBuV | lISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark  |
|-------------|--------------------------|--------------------------|---------------------|---------------|------------------------|---------------------|---------|
| 0.150       | 54.79                    | 0.40                     | 0.07                | 55.26         | 66.00                  | -10.74              | QP      |
| 0.150       | 42.87                    | 0.40                     | 0.07                | 43.34         | 56.00                  | -12.66              | Average |
| 0.213       | 42.57                    | 0.40                     | 0.11                | 43.08         | 63.10                  | -20.02              | QP      |
| 0.213       | 27.48                    | 0.40                     | 0.11                | 27.99         | 53.10                  | -25.11              | Average |
| 0.317       | 30.73                    | 0.39                     | 0.10                | 31.22         | 59.80                  | -28.58              | QP      |
| 0.317       | 20.98                    | 0.39                     | 0.10                | 21.47         | 49.80                  | -28.33              | Average |
| 0.641       | 33.38                    | 0.27                     | 0.12                | 33.77         | 56.00                  | -22.23              | QP      |
| 0.641       | 24.12                    | 0.27                     | 0.12                | 24.51         | 46.00                  | -21.49              | Average |
| 2.237       | 24.83                    | 0.20                     | 0.18                | 25.21         | 56.00                  | -30.79              | QP      |
| 2.237       | 11.61                    | 0.20                     | 0.18                | 11.99         | 46.00                  | -34.01              | Average |
| 4.407       | 22.08                    | 0.20                     | 0.17                | 22.45         | 56.00                  | -33.55              | QP      |
| 4.407       | 13.50                    | 0.20                     | 0.17                | 13.87         | 46.00                  | -32.13              | Average |

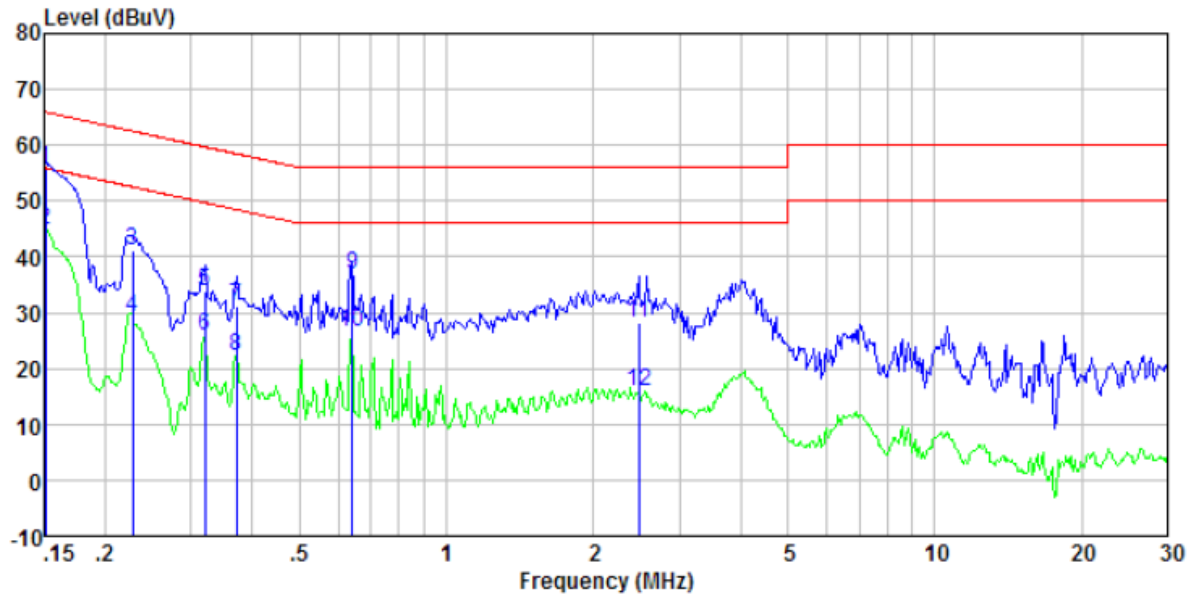
**Model number: 81813**

Line:



| Freq<br>MHz | Reading<br>level<br>dBuV | IISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark  |
|-------------|--------------------------|--------------------------|---------------------|---------------|------------------------|---------------------|---------|
| 0.151       | 55.13                    | 0.40                     | 0.07                | 55.60         | 65.96                  | -10.36              | QP      |
| 0.151       | 44.31                    | 0.40                     | 0.07                | 44.78         | 55.96                  | -11.18              | Average |
| 0.221       | 40.65                    | 0.40                     | 0.11                | 41.16         | 62.79                  | -21.63              | QP      |
| 0.221       | 26.04                    | 0.40                     | 0.11                | 26.55         | 52.79                  | -26.24              | Average |
| 0.320       | 33.32                    | 0.39                     | 0.10                | 33.81         | 59.71                  | -25.90              | QP      |
| 0.320       | 24.95                    | 0.39                     | 0.10                | 25.44         | 49.71                  | -24.27              | Average |
| 0.371       | 32.29                    | 0.36                     | 0.10                | 32.75         | 58.47                  | -25.72              | QP      |
| 0.371       | 21.33                    | 0.36                     | 0.10                | 21.79         | 48.47                  | -26.68              | Average |
| 0.641       | 36.32                    | 0.27                     | 0.12                | 36.71         | 56.00                  | -19.29              | QP      |
| 0.641       | 25.85                    | 0.27                     | 0.12                | 26.24         | 46.00                  | -19.76              | Average |
| 4.158       | 29.70                    | 0.20                     | 0.18                | 30.08         | 56.00                  | -25.92              | QP      |
| 4.158       | 16.73                    | 0.20                     | 0.18                | 17.11         | 46.00                  | -28.89              | Average |

Neutral:

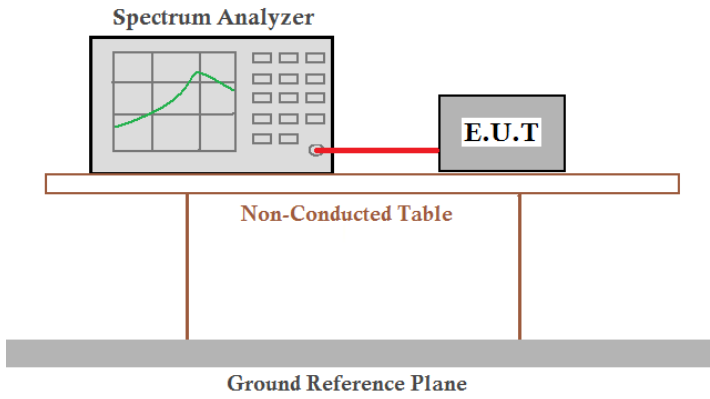


| Freq<br>MHz | Reading<br>level<br>dBuV | LISN/ISN<br>factor<br>dB | Cable<br>loss<br>dB | level<br>dBuV | Limit<br>level<br>dBuV | Over<br>limit<br>dB | Remark  |
|-------------|--------------------------|--------------------------|---------------------|---------------|------------------------|---------------------|---------|
| 0.151       | 55.43                    | 0.40                     | 0.07                | 55.90         | 65.96                  | -10.06              | QP      |
| 0.151       | 44.39                    | 0.40                     | 0.07                | 44.86         | 55.96                  | -11.10              | Average |
| 0.228       | 40.55                    | 0.40                     | 0.11                | 41.06         | 62.52                  | -21.46              | QP      |
| 0.228       | 28.79                    | 0.40                     | 0.11                | 29.30         | 52.52                  | -23.22              | Average |
| 0.320       | 33.31                    | 0.39                     | 0.10                | 33.80         | 59.71                  | -25.91              | QP      |
| 0.320       | 25.45                    | 0.39                     | 0.10                | 25.94         | 49.71                  | -23.77              | Average |
| 0.371       | 30.75                    | 0.36                     | 0.10                | 31.21         | 58.47                  | -27.26              | QP      |
| 0.371       | 21.80                    | 0.36                     | 0.10                | 22.26         | 48.47                  | -26.21              | Average |
| 0.641       | 36.33                    | 0.27                     | 0.12                | 36.72         | 56.00                  | -19.28              | QP      |
| 0.641       | 26.03                    | 0.27                     | 0.12                | 26.42         | 46.00                  | -19.58              | Average |
| 2.474       | 27.83                    | 0.20                     | 0.18                | 28.21         | 56.00                  | -27.79              | QP      |
| 2.474       | 15.46                    | 0.20                     | 0.18                | 15.84         | 46.00                  | -30.16              | Average |

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

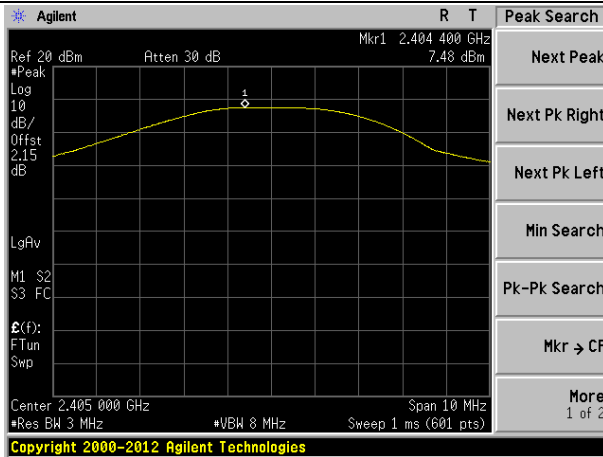
### 7.3 Conducted Peak Output Power

|                   |   |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(3)  |
| Test Method:      | ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V04  |
| Limit:            | 30dBm   |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 6.0 for details  |
| Test mode:        | Refer to section 5.2 for details  |
| Test results:     | Pass  |

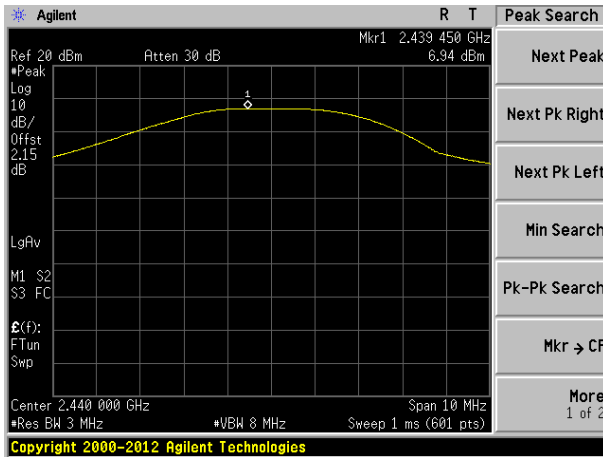
### Measurement Data

| Frequency (MHz) | Peak Output Power (dBm) | Limit(dBm) | Result |
|-----------------|-------------------------|------------|--------|
| 2405            | 7.48                    | 30         | PASS   |
| 2440            | 6.94                    |            |        |
| 2480            | 6.58                    |            |        |

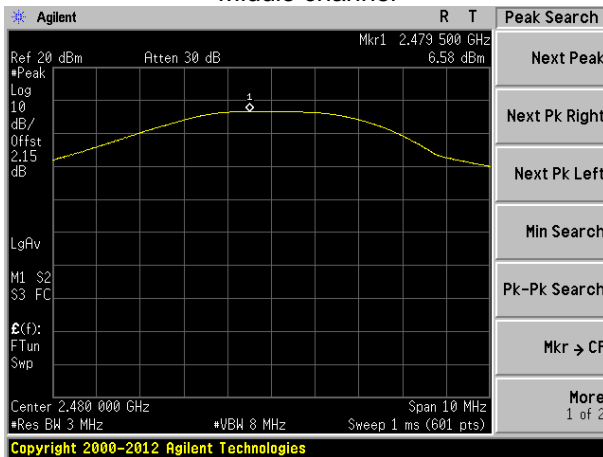
**Test plot as follows:**



Lowest channel



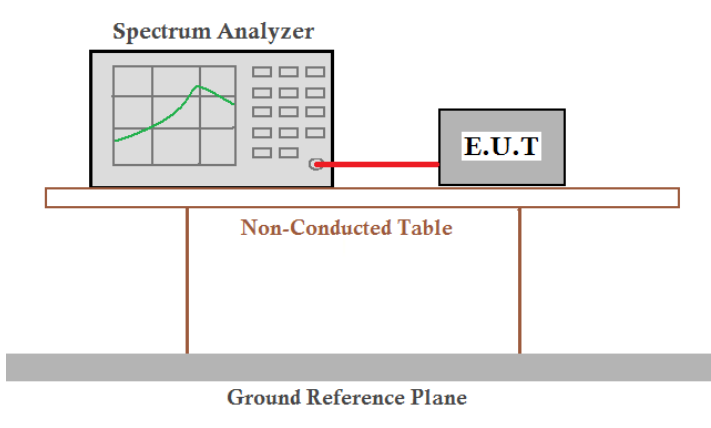
Middle channel



Highest channel



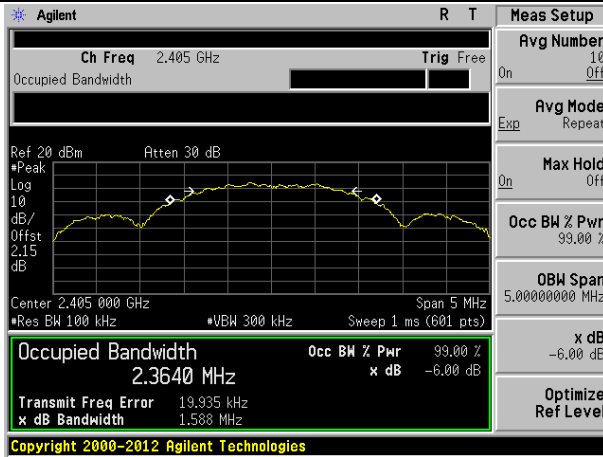
## 7.4 Channel Bandwidth

|                   |   |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(2)  |
| Test Method:      | ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V04  |
| Limit:            | >500KHz   |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is positioned above a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 6.0 for details  |
| Test mode:        | Refer to section 5.2 for details  |
| Test results:     | Pass  |

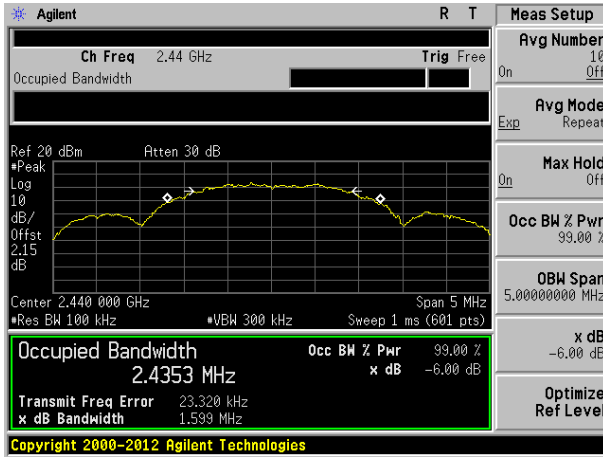
### Measurement Data

| Frequency (MHz) | Channel Bandwidth (MHz) | Limit(KHz) | Result |
|-----------------|-------------------------|------------|--------|
| 2405            | 1.588                   | >500       | Pass   |
| 2440            | 1.599                   |            |        |
| 2480            | 1.624                   |            |        |

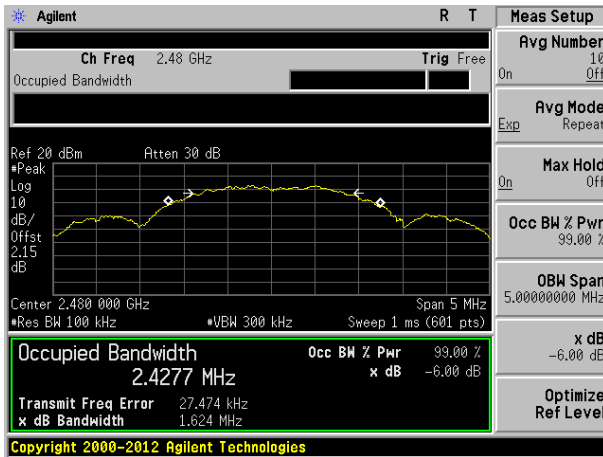
Test plot as follows:



Lowest channel

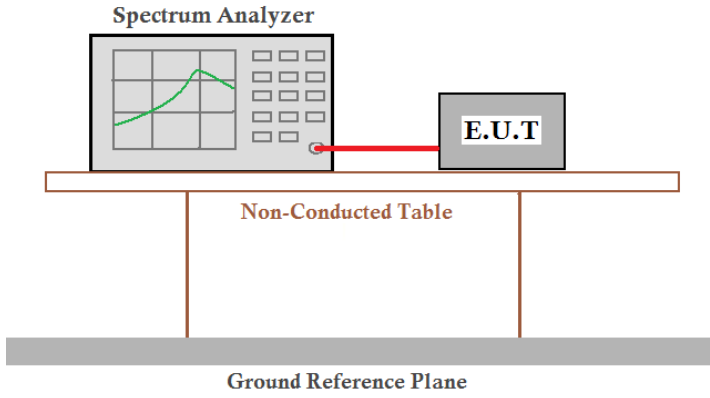


Middle channel



Highest channel

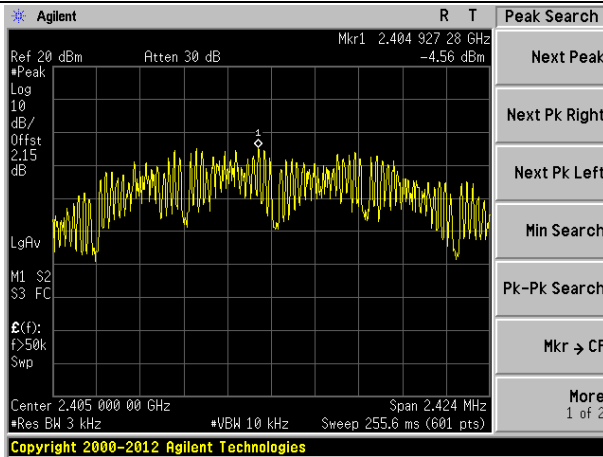
## 7.5 Power Spectral Density

|                   |  |
|-------------------|--|
| Test Requirement: | FCC Part15 C Section 15.247 (e)  |
| Test Method:      | ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V04   |
| Limit:            | 8dBm/3kHz  |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 6.0 for details   |
| Test mode:        | Refer to section 5.2 for details   |
| Test results:     | Pass   |

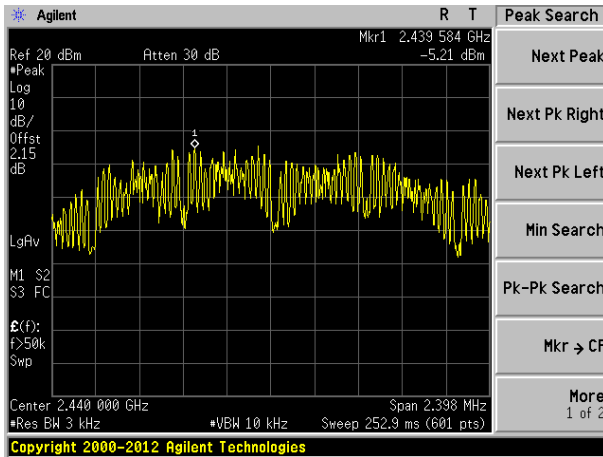
### Measurement Data

| Frequency (MHz) | Power Spectral Density (dBm) | Limit (dBm/3kHz) | Result |
|-----------------|------------------------------|------------------|--------|
| 2405            | -4.56                        | 8.00             | Pass   |
| 2440            | -5.21                        |                  |        |
| 2480            | -4.91                        |                  |        |

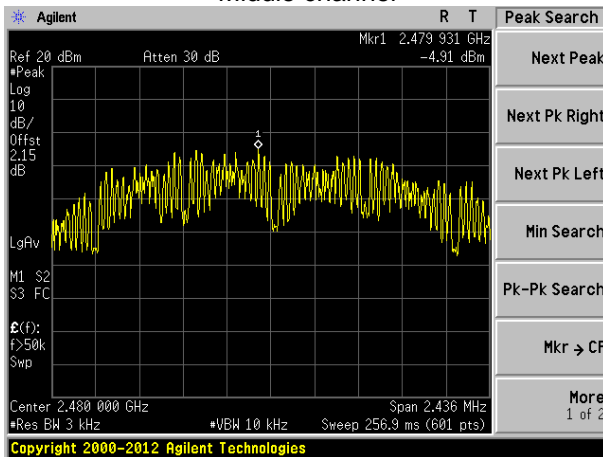
**Test plot as follows:**



Lowest channel



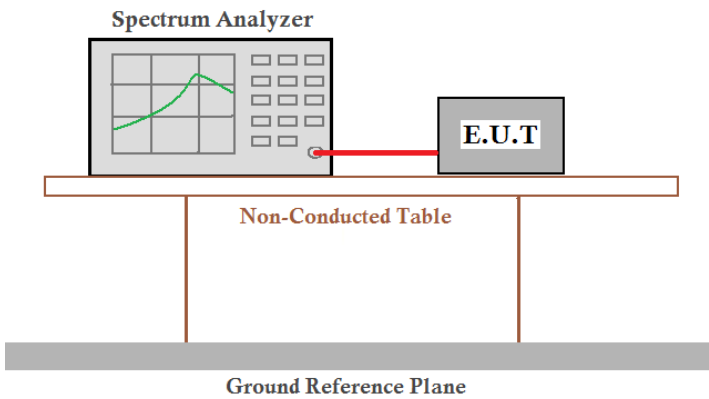
Middle channel



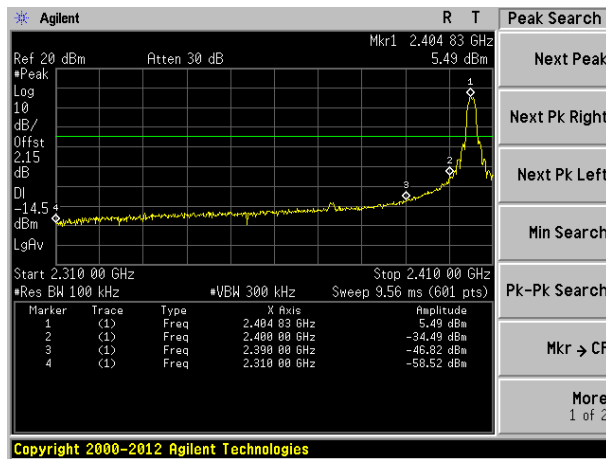
Highest channel

## 7.6 Band edges

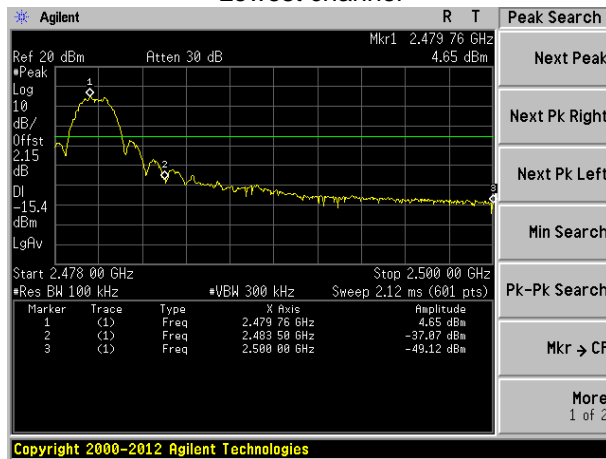
### 7.6.1 Conducted Emission Method

|                   |   |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d)   |
| Test Method:      | ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V04  |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.     |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a grey shaded area.</p> |
| Test Instruments: | Refer to section 6.0 for details  |
| Test mode:        | Refer to section 5.2 for details  |
| Test results:     | Pass  |

Test plot as follows:



Lowest channel



Highest channel

## 7.6.2 Radiated Emission Method

|                       |   |          |                    |      |         |
|-----------------------|---|----------|--------------------|------|---------|
| Test Requirement:     | FCC Part15 C Section 15.209 and 15.205  |          |                    |      |         |
| Test Method:          | ANSI C63.10:2013  |          |                    |      |         |
| Test Frequency Range: | All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.  |          |                    |      |         |
| Test site:            | Measurement Distance: 3m  |          |                    |      |         |
| Receiver setup:       | Frequency   | Detector | RBW                | VBW  | Value   |
|                       | Above 1GHz  | Peak     | 1MHz               | 3MHz | Peak    |
|                       |   | RMS      | 1MHz               | 3MHz | Average |
| Limit:                | Frequency   |          | Limit (dBuV/m @3m) |      | Value   |
|                       | Above 1GHz  |          | 54.00              |      | Average |
|                       |   |          | 74.00              |      | Peak    |
| Test setup:           |   |          |                    |      |         |
| Test Procedure:       | <ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. 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.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. 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.</li> <li>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</li> </ol> |          |                    |      |         |
| Test Instruments:     | Refer to section 6.0 for details  |          |                    |      |         |
| Test mode:            | Refer to section 5.2 for details  |          |                    |      |         |
| Test results:         | Pass  |          |                    |      |         |

**Measurement data:**

*Remark: The pre-test were performed on lowest, middle and highest frequencies, only the worst case's was showed.*

**Model number: 81809**

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2310.00         | 39.13             | 27.91                 | 5.30            | 24.64              | 47.70          | 74.00               | -26.30          | Vertical     |
| 2390.00         | 35.87             | 27.59                 | 5.38            | 24.71              | 44.13          | 74.00               | -29.87          | Vertical     |
| 2400.00         | 39.88             | 27.58                 | 5.39            | 24.72              | 48.13          | 74.00               | -25.87          | Vertical     |
| 2310.00         | 37.18             | 27.91                 | 5.30            | 24.64              | 45.75          | 74.00               | -28.25          | Horizontal   |
| 2390.00         | 35.54             | 27.59                 | 5.38            | 24.71              | 43.80          | 74.00               | -30.20          | Horizontal   |
| 2400.00         | 39.23             | 27.58                 | 5.39            | 24.72              | 47.48          | 74.00               | -26.52          | Horizontal   |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2310.00         | 29.91             | 27.91                 | 5.30            | 24.64              | 38.48          | 54.00               | -15.52          | Vertical     |
| 2390.00         | 26.35             | 27.59                 | 5.38            | 24.71              | 34.61          | 54.00               | -19.39          | Vertical     |
| 2400.00         | 30.69             | 27.58                 | 5.39            | 24.72              | 38.94          | 54.00               | -15.06          | Vertical     |
| 2310.00         | 27.60             | 27.91                 | 5.30            | 24.64              | 36.17          | 54.00               | -17.83          | Horizontal   |
| 2390.00         | 26.77             | 27.59                 | 5.38            | 24.71              | 35.03          | 54.00               | -18.97          | Horizontal   |
| 2400.00         | 29.04             | 27.58                 | 5.39            | 24.72              | 37.29          | 54.00               | -16.71          | Horizontal   |



|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 43.63             | 27.53                 | 5.47            | 24.80              | 51.83          | 74.00               | -22.17          | Vertical     |
| 2500.00         | 34.41             | 27.55                 | 5.49            | 24.86              | 42.59          | 74.00               | -31.41          | Vertical     |
| 2483.50         | 36.63             | 27.53                 | 5.47            | 24.80              | 44.83          | 74.00               | -29.17          | Horizontal   |
| 2500.00         | 27.69             | 27.55                 | 5.49            | 24.86              | 35.87          | 74.00               | -38.13          | Horizontal   |

Average value:

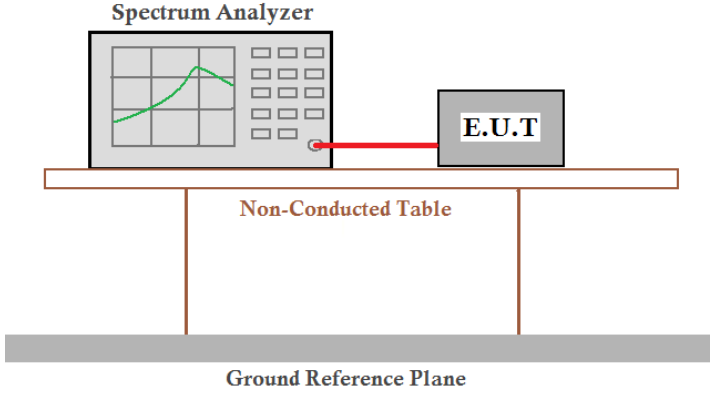
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2483.50         | 34.33             | 27.53                 | 5.47            | 24.80              | 42.53          | 54.00               | -11.47          | Vertical     |
| 2500.00         | 24.33             | 27.55                 | 5.49            | 24.86              | 32.51          | 54.00               | -21.49          | Vertical     |
| 2483.50         | 24.86             | 27.53                 | 5.47            | 24.80              | 33.06          | 54.00               | -20.94          | Horizontal   |
| 2500.00         | 18.33             | 27.55                 | 5.49            | 24.86              | 26.51          | 54.00               | -27.49          | Horizontal   |

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

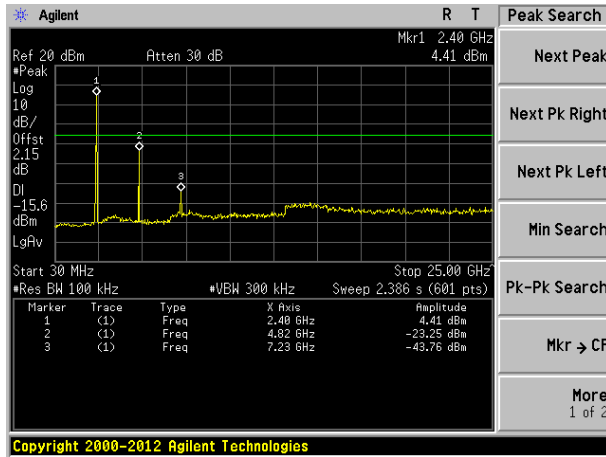
## 7.7 Spurious Emission

### 7.7.1 Conducted Emission Method

|                   |   |
|-------------------|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d)   |
| Test Method:      | ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V04  |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>  |
| Test Instruments: | Refer to section 6.0 for details  |
| Test mode:        | Refer to section 5.2 for details  |
| Test results:     | Pass  |

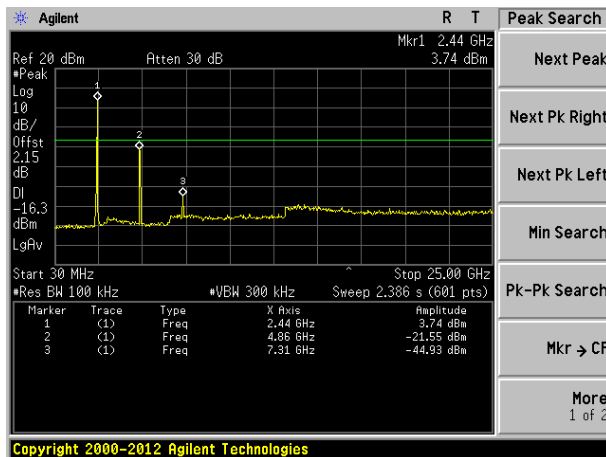
**Test plot as follows:**

Lowest channel



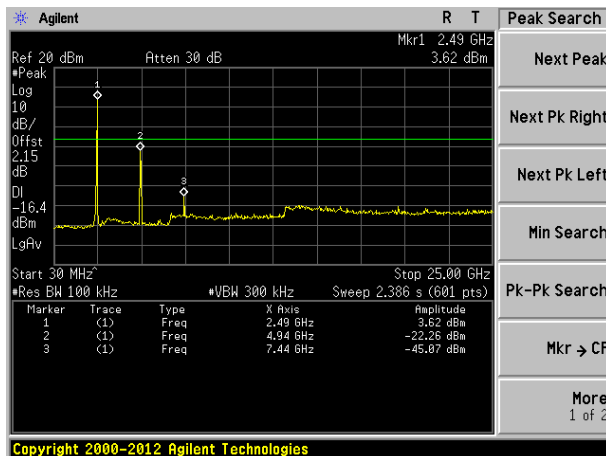
30MHz~25GHz

Middle channel



30MHz~25GHz

Highest channel



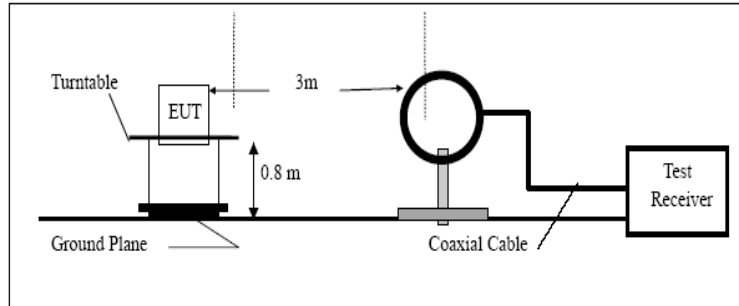
30MHz~25GHz

## 7.7.2 Radiated Emission Method

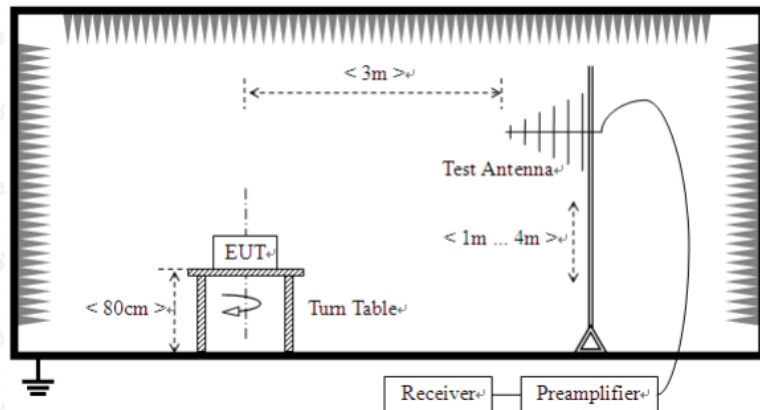
|  |  |                    |         |                      |            |
|--|--|--------------------|---------|----------------------|------------|
| Test Requirement:                                    | FCC Part15 C Section 15.209  |                    |         |                      |            |
| Test Method:   | ANSI C63.10:2013   |                    |         |                      |            |
| Test Frequency Range:                                | 9kHz to 25GHz  |                    |         |                      |            |
| Test site:   | Measurement Distance: 3m   |                    |         |                      |            |
| Receiver setup:                                      | Frequency  | Detector           | RBW     | VBW                  | Value      |
|  | 9KHz-150KHz  | Quasi-peak         | 200Hz   | 600Hz                | Quasi-peak |
|  | 150KHz-30MHz   | Quasi-peak         | 9KHz    | 30KHz                | Quasi-peak |
|  | 30MHz-1GHz   | Quasi-peak         | 100KHz  | 300KHz               | Quasi-peak |
|  | Above 1GHz   | Peak               | 1MHz    | 3MHz                 | Peak       |
| Peak   |  | 1MHz               | 10Hz    | Average              |            |
| Limit:<br>(Field strength of the fundamental signal) | Frequency  | Limit (dBuV/m @3m) |         | Remark               |            |
|  | 2400MHz-2483.5MHz  | 94.00              |         | Average Value        |            |
|  |  | 114.00             |         | Peak Value           |            |
| Limit:<br>(Spurious Emissions)                       | Frequency  | Limit (uV/m)       | Value   | Measurement Distance |            |
|  | 0.009MHz-0.490MHz  | 2400/F(KHz)        | QP      | 300m                 |            |
|  | 0.490MHz-1.705MHz  | 24000/F(KHz)       | QP      | 300m                 |            |
|  | 1.705MHz-30MHz   | 30                 | QP      | 30m                  |            |
|  | 30MHz-88MHz  | 100                | QP      | 3m                   |            |
|  | 88MHz-216MHz   | 150                | QP      |                      |            |
|  | 216MHz-960MHz  | 200                | QP      |                      |            |
|  | 960MHz-1GHz  | 500                | QP      |                      |            |
|  | Above 1GHz   | 500                | Average |                      |            |
| 5000   |  | Peak               |         |                      |            |
| Limit:<br>(band edge)                                | Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation. |                    |         |                      |            |

Test setup:

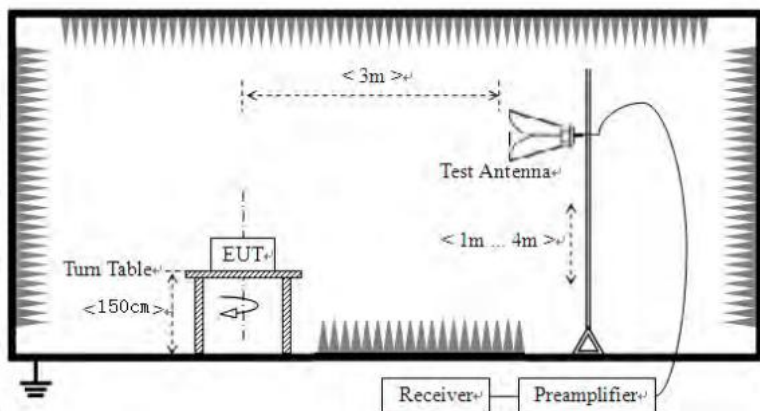
Below 30MHz



Below 1GHz



Above 1GHz



|                   |  |
|-------------------|--|
| Test Procedure:   | <ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. 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.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. 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.</li> </ol> |
| Test Instruments: | Refer to section 6.0 for details   |
| Test mode:        | Refer to section 5.2 for details   |
| Test results:     | Pass   |

**Measurement data:**

**9 kHz ~ 30 MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

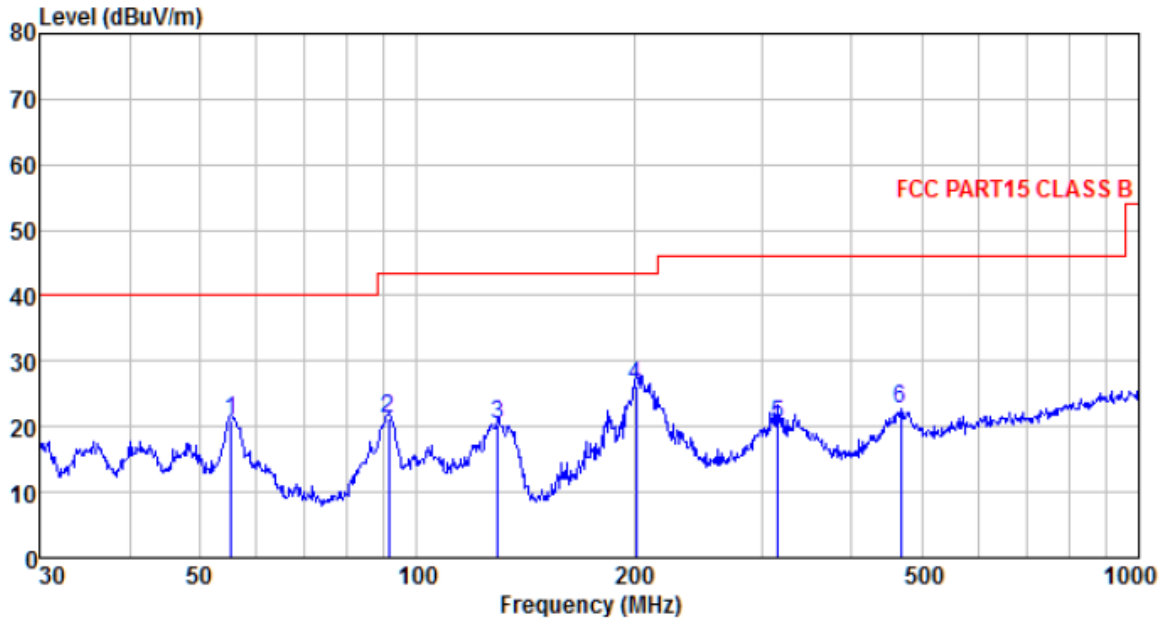
*Remark:*

*Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

■ Below 1GHz

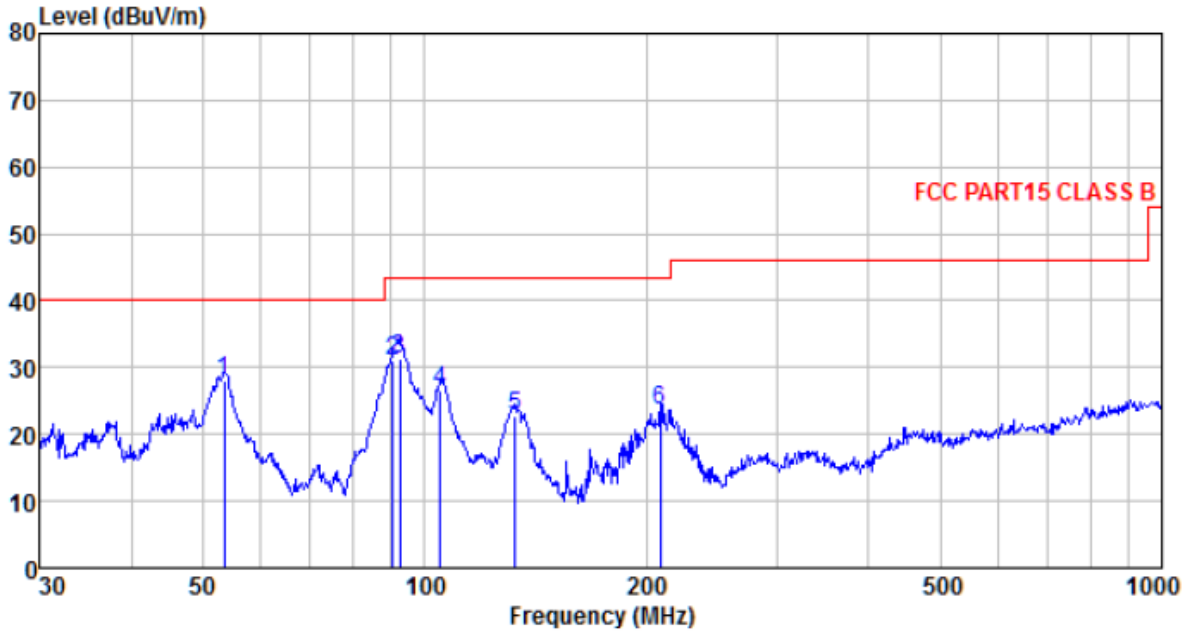
Model number: 81809

Horizontal:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|---------------|--------------------------|---------------------|--------|
| 55.221      | 44.48                    | 11.78                     | 0.82                | 36.26                  | 20.82         | 40.00                    | -19.18              | QP     |
| 91.495      | 45.83                    | 10.90                     | 1.12                | 36.65                  | 21.20         | 43.50                    | -22.30              | QP     |
| 129.468     | 47.62                    | 8.20                      | 1.43                | 36.95                  | 20.30         | 43.50                    | -23.20              | QP     |
| 201.393     | 51.35                    | 10.44                     | 1.85                | 37.33                  | 26.31         | 43.50                    | -17.19              | QP     |
| 316.589     | 41.49                    | 13.93                     | 2.45                | 37.44                  | 20.43         | 46.00                    | -25.57              | QP     |
| 467.235     | 40.31                    | 16.69                     | 3.17                | 37.51                  | 22.66         | 46.00                    | -23.34              | QP     |

Vertical:

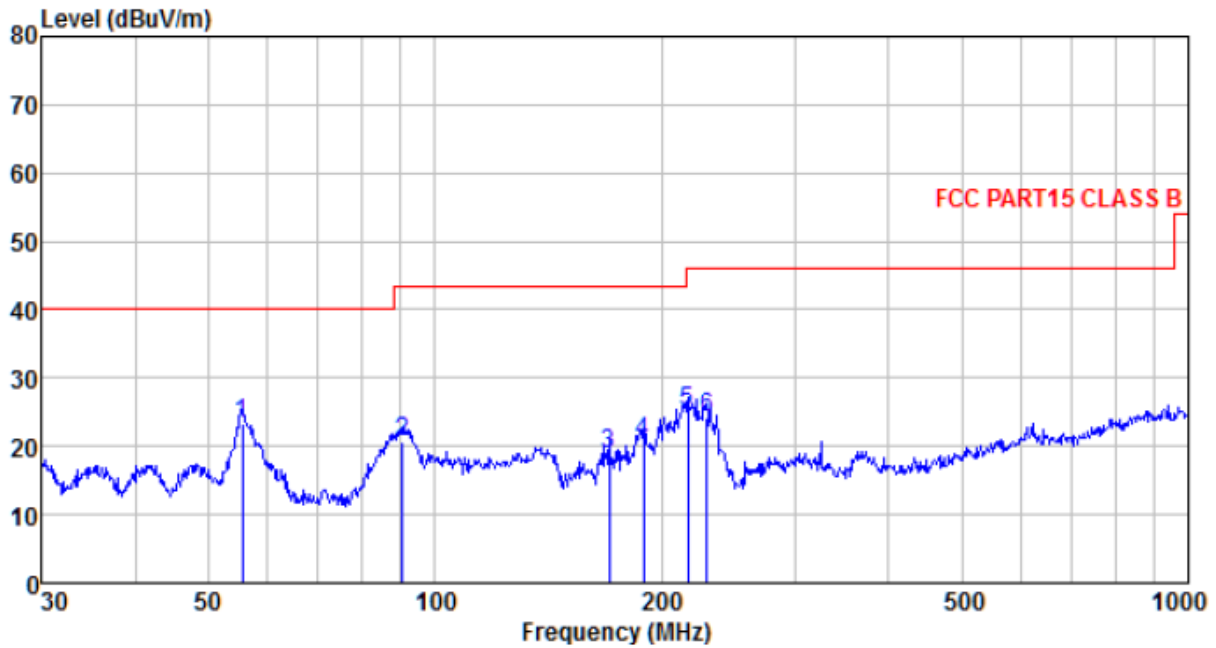


| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|---------------|--------------------------|---------------------|--------|
| 53.505      | 51.61                    | 11.93                     | 0.80                | 36.23                  | 28.11         | 40.00                    | -11.89              | QP     |
| 90.537      | 55.63                    | 10.77                     | 1.11                | 36.64                  | 30.87         | 43.50                    | -12.63              | QP     |
| 92.462      | 55.92                    | 11.04                     | 1.13                | 36.66                  | 31.43         | 43.50                    | -12.07              | QP     |
| 104.903     | 50.39                    | 11.62                     | 1.23                | 36.76                  | 26.48         | 43.50                    | -17.02              | QP     |
| 132.685     | 50.16                    | 7.96                      | 1.45                | 36.97                  | 22.60         | 43.50                    | -20.90              | QP     |
| 208.580     | 48.45                    | 10.73                     | 1.89                | 37.34                  | 23.73         | 43.50                    | -19.77              | QP     |



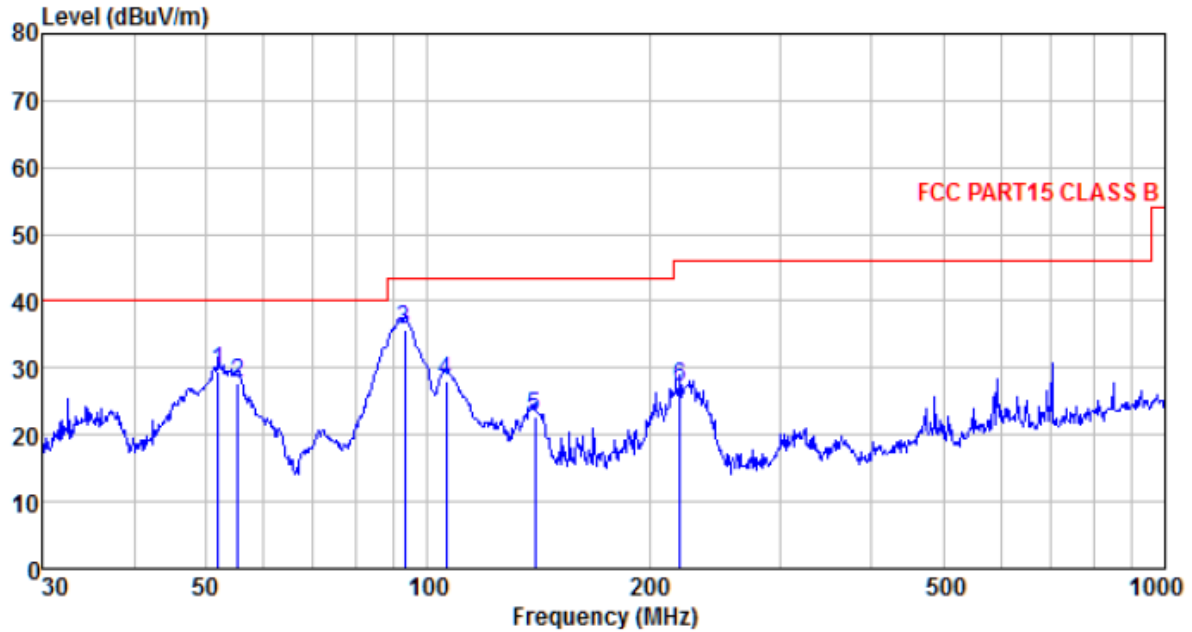
Model number: 81813

Horizontal:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|---------------|--------------------------|---------------------|--------|
| 55.415      | 47.11                    | 11.75                     | 0.82                | 36.26                  | 23.42         | 40.00                    | -16.58              | QP     |
| 90.537      | 45.55                    | 10.77                     | 1.11                | 36.64                  | 20.79         | 43.50                    | -22.71              | QP     |
| 170.195     | 46.01                    | 8.50                      | 1.69                | 37.19                  | 19.01         | 43.50                    | -24.49              | QP     |
| 189.074     | 46.34                    | 9.82                      | 1.78                | 37.28                  | 20.66         | 43.50                    | -22.84              | QP     |
| 216.783     | 49.60                    | 11.02                     | 1.94                | 37.35                  | 25.21         | 46.00                    | -20.79              | QP     |
| 229.293     | 48.04                    | 11.49                     | 2.01                | 37.36                  | 24.18         | 46.00                    | -21.82              | QP     |

Vertical:



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | level<br>dBuV | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark |
|-------------|--------------------------|---------------------------|---------------------|------------------------|---------------|--------------------------|---------------------|--------|
| 52.025      | 52.96                    | 12.07                     | 0.79                | 36.21                  | 29.61         | 40.00                    | -10.39              | QP     |
| 55.221      | 51.29                    | 11.78                     | 0.82                | 36.26                  | 27.63         | 40.00                    | -12.37              | QP     |
| 93.113      | 60.08                    | 11.18                     | 1.14                | 36.66                  | 35.74         | 43.50                    | -7.76               | QP     |
| 106.013     | 52.06                    | 11.52                     | 1.25                | 36.77                  | 28.06         | 43.50                    | -15.44              | QP     |
| 139.851     | 50.73                    | 7.45                      | 1.50                | 37.02                  | 22.66         | 43.50                    | -20.84              | QP     |
| 219.845     | 51.28                    | 11.13                     | 1.96                | 37.35                  | 27.02         | 46.00                    | -18.98              | QP     |

■ Above 1GHz

Model number: 81809

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 50.83             | 31.17                 | 8.60            | 37.66              | 52.94          | 74.00               | -21.06          | Vertical     |
| 7215.00         | 39.80             | 36.09                 | 11.66           | 35.69              | 51.86          | 74.00               | -22.14          | Vertical     |
| 9620.00         | 31.52             | 37.84                 | 14.14           | 34.91              | 48.59          | 74.00               | -25.41          | Vertical     |
| 12025.00        | 27.71             | 38.61                 | 15.03           | 36.13              | 45.22          | 74.00               | -28.78          | Vertical     |
| 4810.00         | 49.88             | 31.17                 | 8.60            | 37.66              | 51.99          | 74.00               | -22.01          | Horizontal   |
| 7215.00         | 42.09             | 36.09                 | 11.66           | 35.69              | 54.15          | 74.00               | -19.85          | Horizontal   |
| 9620.00         | 28.66             | 37.84                 | 14.14           | 34.91              | 45.73          | 74.00               | -28.27          | Horizontal   |
| 12025.00        | 27.93             | 38.61                 | 15.03           | 36.13              | 45.44          | 74.00               | -28.56          | Horizontal   |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 44.97             | 31.17                 | 8.60            | 37.66              | 47.08          | 54.00               | -6.92           | Vertical     |
| 7215.00         | 30.95             | 36.09                 | 11.66           | 35.69              | 43.01          | 54.00               | -10.99          | Vertical     |
| 9620.00         | 20.62             | 37.84                 | 14.14           | 34.91              | 37.69          | 54.00               | -16.31          | Vertical     |
| 12025.00        | 17.93             | 38.61                 | 15.03           | 36.13              | 35.44          | 54.00               | -18.56          | Vertical     |
| 4810.00         | 43.97             | 31.17                 | 8.60            | 37.66              | 46.08          | 54.00               | -7.92           | Horizontal   |
| 7215.00         | 31.84             | 36.09                 | 11.66           | 35.69              | 43.90          | 54.00               | -10.10          | Horizontal   |
| 9620.00         | 18.82             | 37.84                 | 14.14           | 34.91              | 35.89          | 54.00               | -18.11          | Horizontal   |
| 12025.00        | 18.14             | 38.61                 | 15.03           | 36.13              | 35.65          | 54.00               | -18.35          | Horizontal   |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*”, means this data is the too weak instrument of signal is unable to test.

|               |                |
|---------------|----------------|
| Test channel: | Middle channel |
|---------------|----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4890.00         | 50.38             | 31.26                 | 8.66            | 37.68              | 52.62          | 74.00               | -21.38          | Vertical     |
| 7335.00         | 40.66             | 36.32                 | 11.72           | 35.64              | 53.06          | 74.00               | -20.94          | Vertical     |
| 9780.00         | 29.88             | 38.01                 | 14.25           | 34.98              | 47.16          | 74.00               | -26.84          | Vertical     |
| 12225.00        | 26.19             | 38.64                 | 15.14           | 36.26              | 43.71          | 74.00               | -30.29          | Vertical     |
| 4890.00         | 49.08             | 31.26                 | 8.66            | 37.68              | 51.32          | 74.00               | -22.68          | Horizontal   |
| 7335.00         | 39.99             | 36.32                 | 11.72           | 35.64              | 52.39          | 74.00               | -21.61          | Horizontal   |
| 9780.00         | 28.99             | 38.01                 | 14.25           | 34.98              | 46.27          | 74.00               | -27.73          | Horizontal   |
| 12225.00        | 27.61             | 38.64                 | 15.14           | 36.26              | 45.13          | 74.00               | -28.87          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4890.00         | 42.86             | 31.26                 | 8.66            | 37.68              | 45.10          | 54.00               | -8.90           | Vertical     |
| 7335.00         | 32.95             | 36.32                 | 11.72           | 35.64              | 45.35          | 54.00               | -8.65           | Vertical     |
| 9780.00         | 22.89             | 38.01                 | 14.25           | 34.98              | 40.17          | 54.00               | -13.83          | Vertical     |
| 12225.00        | 15.99             | 38.64                 | 15.14           | 36.26              | 33.51          | 54.00               | -20.49          | Vertical     |
| 4890.00         | 40.20             | 31.26                 | 8.66            | 37.68              | 42.44          | 54.00               | -11.56          | Horizontal   |
| 7335.00         | 22.79             | 36.32                 | 11.72           | 35.64              | 35.19          | 54.00               | -18.81          | Horizontal   |
| 9780.00         | 21.80             | 38.01                 | 14.25           | 34.98              | 39.08          | 54.00               | -14.92          | Horizontal   |
| 12225.00        | 18.02             | 38.64                 | 15.14           | 36.26              | 35.54          | 54.00               | -18.46          | Horizontal   |

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*\*”, means this data is the too weak instrument of signal is unable to test.

|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00         | 50.68             | 31.36                 | 8.73            | 37.69              | 53.08          | 74.00               | -20.92          | Vertical     |
| 7440.00         | 39.97             | 36.59                 | 11.79           | 35.58              | 52.77          | 74.00               | -21.23          | Vertical     |
| 9920.00         | 29.41             | 38.22                 | 14.38           | 35.07              | 46.94          | 74.00               | -27.06          | Vertical     |
| 12400.00        | 27.02             | 38.68                 | 15.27           | 36.43              | 44.54          | 74.00               | -29.46          | Vertical     |
| 4960.00         | 48.98             | 31.36                 | 8.73            | 37.69              | 51.38          | 74.00               | -22.62          | Horizontal   |
| 7440.00         | 39.74             | 36.59                 | 11.79           | 35.58              | 52.54          | 74.00               | -21.46          | Horizontal   |
| 9920.00         | 29.03             | 38.22                 | 14.38           | 35.07              | 46.56          | 74.00               | -27.44          | Horizontal   |
| 12400.00        | 28.34             | 38.68                 | 15.27           | 36.43              | 45.86          | 74.00               | -28.14          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00         | 42.86             | 31.36                 | 8.73            | 37.69              | 45.26          | 54.00               | -8.74           | Vertical     |
| 7440.00         | 31.91             | 36.59                 | 11.79           | 35.58              | 44.71          | 54.00               | -9.29           | Vertical     |
| 9920.00         | 20.94             | 38.22                 | 14.38           | 35.07              | 38.47          | 54.00               | -15.53          | Vertical     |
| 12400.00        | 17.29             | 38.68                 | 15.27           | 36.43              | 34.81          | 54.00               | -19.19          | Vertical     |
| 4960.00         | 40.59             | 31.36                 | 8.73            | 37.69              | 42.99          | 54.00               | -11.01          | Horizontal   |
| 7440.00         | 32.10             | 36.59                 | 11.79           | 35.58              | 44.90          | 54.00               | -9.10           | Horizontal   |
| 9920.00         | 20.72             | 38.22                 | 14.38           | 35.07              | 38.25          | 54.00               | -15.75          | Horizontal   |
| 12400.00        | 18.68             | 38.68                 | 15.27           | 36.43              | 36.20          | 54.00               | -17.80          | Horizontal   |

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*\*”, means this data is the too weak instrument of signal is unable to test.

**Model number: 81813**

|               |                |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBUV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBUV/m) | Limit Line (dBUV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 50.49             | 31.17                 | 8.60            | 37.66              | 52.60          | 74.00               | -21.40          | Vertical     |
| 7215.00         | 39.46             | 36.09                 | 11.66           | 35.69              | 51.52          | 74.00               | -22.48          | Vertical     |
| 9620.00         | 31.00             | 37.84                 | 14.14           | 34.91              | 48.07          | 74.00               | -25.93          | Vertical     |
| 12025.00        | 27.50             | 38.61                 | 15.03           | 36.13              | 45.01          | 74.00               | -28.99          | Vertical     |
| 4810.00         | 49.54             | 31.17                 | 8.60            | 37.66              | 51.65          | 74.00               | -22.35          | Horizontal   |
| 7215.00         | 41.97             | 36.09                 | 11.66           | 35.69              | 54.03          | 74.00               | -19.97          | Horizontal   |
| 9620.00         | 28.35             | 37.84                 | 14.14           | 34.91              | 45.42          | 74.00               | -28.58          | Horizontal   |
| 12025.00        | 27.71             | 38.61                 | 15.03           | 36.13              | 45.22          | 74.00               | -28.78          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBUV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBUV/m) | Limit Line (dBUV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4810.00         | 44.64             | 31.17                 | 8.60            | 37.66              | 46.75          | 54.00               | -7.25           | Vertical     |
| 7215.00         | 30.72             | 36.09                 | 11.66           | 35.69              | 42.78          | 54.00               | -11.22          | Vertical     |
| 9620.00         | 20.35             | 37.84                 | 14.14           | 34.91              | 37.42          | 54.00               | -16.58          | Vertical     |
| 12025.00        | 17.70             | 38.61                 | 15.03           | 36.13              | 35.21          | 54.00               | -18.79          | Vertical     |
| 4810.00         | 43.75             | 31.17                 | 8.60            | 37.66              | 45.86          | 54.00               | -8.14           | Horizontal   |
| 7215.00         | 31.56             | 36.09                 | 11.66           | 35.69              | 43.62          | 54.00               | -10.38          | Horizontal   |
| 9620.00         | 18.55             | 37.84                 | 14.14           | 34.91              | 35.62          | 54.00               | -18.38          | Horizontal   |
| 12025.00        | 17.92             | 38.61                 | 15.03           | 36.13              | 35.43          | 54.00               | -18.57          | Horizontal   |

**Remark:**

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
5. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
6. *“\*\*”, means this data is the too weak instrument of signal is unable to test.*

|               |                |
|---------------|----------------|
| Test channel: | Middle channel |
|---------------|----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4890.00         | 50.21             | 31.26                 | 8.66            | 37.68              | 52.45          | 74.00               | -21.55          | Vertical     |
| 7335.00         | 40.50             | 36.32                 | 11.72           | 35.64              | 52.90          | 74.00               | -21.10          | Vertical     |
| 9780.00         | 29.64             | 38.01                 | 14.25           | 34.98              | 46.92          | 74.00               | -27.08          | Vertical     |
| 12225.00        | 26.09             | 38.64                 | 15.14           | 36.26              | 43.61          | 74.00               | -30.39          | Vertical     |
| 4890.00         | 48.92             | 31.26                 | 8.66            | 37.68              | 51.16          | 74.00               | -22.84          | Horizontal   |
| 7335.00         | 39.93             | 36.32                 | 11.72           | 35.64              | 52.33          | 74.00               | -21.67          | Horizontal   |
| 9780.00         | 28.84             | 38.01                 | 14.25           | 34.98              | 46.12          | 74.00               | -27.88          | Horizontal   |
| 12225.00        | 27.50             | 38.64                 | 15.14           | 36.26              | 45.02          | 74.00               | -28.98          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4890.00         | 42.61             | 31.26                 | 8.66            | 37.68              | 44.85          | 54.00               | -9.15           | Vertical     |
| 7335.00         | 32.77             | 36.32                 | 11.72           | 35.64              | 45.17          | 54.00               | -8.83           | Vertical     |
| 9780.00         | 22.69             | 38.01                 | 14.25           | 34.98              | 39.97          | 54.00               | -14.03          | Vertical     |
| 12225.00        | 15.81             | 38.64                 | 15.14           | 36.26              | 33.33          | 54.00               | -20.67          | Vertical     |
| 4890.00         | 40.03             | 31.26                 | 8.66            | 37.68              | 42.27          | 54.00               | -11.73          | Horizontal   |
| 7335.00         | 22.57             | 36.32                 | 11.72           | 35.64              | 34.97          | 54.00               | -19.03          | Horizontal   |
| 9780.00         | 21.60             | 38.01                 | 14.25           | 34.98              | 38.88          | 54.00               | -15.12          | Horizontal   |
| 12225.00        | 17.85             | 38.64                 | 15.14           | 36.26              | 35.37          | 54.00               | -18.63          | Horizontal   |

**Remark:**

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
5. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
6. *“\*\*”, means this data is the too weak instrument of signal is unable to test.*

|               |                 |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00         | 50.53             | 31.36                 | 8.73            | 37.69              | 52.93          | 74.00               | -21.07          | Vertical     |
| 7440.00         | 39.83             | 36.59                 | 11.79           | 35.58              | 52.63          | 74.00               | -21.37          | Vertical     |
| 9920.00         | 29.20             | 38.22                 | 14.38           | 35.07              | 46.73          | 74.00               | -27.27          | Vertical     |
| 12400.00        | 26.93             | 38.68                 | 15.27           | 36.43              | 44.45          | 74.00               | -29.55          | Vertical     |
| 4960.00         | 48.84             | 31.36                 | 8.73            | 37.69              | 51.24          | 74.00               | -22.76          | Horizontal   |
| 7440.00         | 39.69             | 36.59                 | 11.79           | 35.58              | 52.49          | 74.00               | -21.51          | Horizontal   |
| 9920.00         | 28.91             | 38.22                 | 14.38           | 35.07              | 46.44          | 74.00               | -27.56          | Horizontal   |
| 12400.00        | 28.25             | 38.68                 | 15.27           | 36.43              | 45.77          | 74.00               | -28.23          | Horizontal   |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00         | 42.63             | 31.36                 | 8.73            | 37.69              | 45.03          | 54.00               | -8.97           | Vertical     |
| 7440.00         | 31.74             | 36.59                 | 11.79           | 35.58              | 44.54          | 54.00               | -9.46           | Vertical     |
| 9920.00         | 20.74             | 38.22                 | 14.38           | 35.07              | 38.27          | 54.00               | -15.73          | Vertical     |
| 12400.00        | 17.12             | 38.68                 | 15.27           | 36.43              | 34.64          | 54.00               | -19.36          | Vertical     |
| 4960.00         | 40.43             | 31.36                 | 8.73            | 37.69              | 42.83          | 54.00               | -11.17          | Horizontal   |
| 7440.00         | 31.90             | 36.59                 | 11.79           | 35.58              | 44.70          | 54.00               | -9.30           | Horizontal   |
| 9920.00         | 20.53             | 38.22                 | 14.38           | 35.07              | 38.06          | 54.00               | -15.94          | Horizontal   |
| 12400.00        | 18.52             | 38.68                 | 15.27           | 36.43              | 36.04          | 54.00               | -17.96          | Horizontal   |

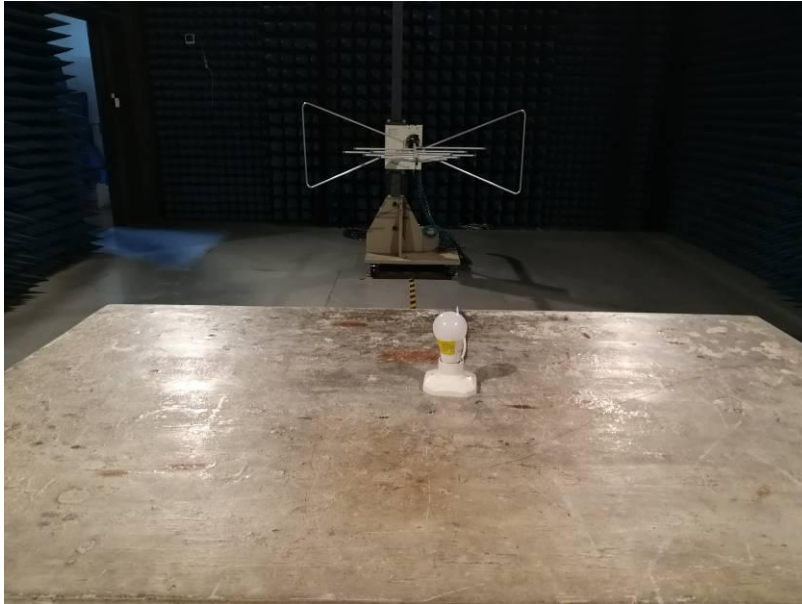
**Remark:**

4. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor*
5. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
6. *“\*\*”, means this data is the too weak instrument of signal is unable to test.*



## 8 Test Setup Photo

Model number: 81809  
Radiated Emission



## Conducted Emission



**Model number: 81813**  
Radiated Emission



## Conducted Emission



## 9 EUT Constructional Details



**Model number: 81809**

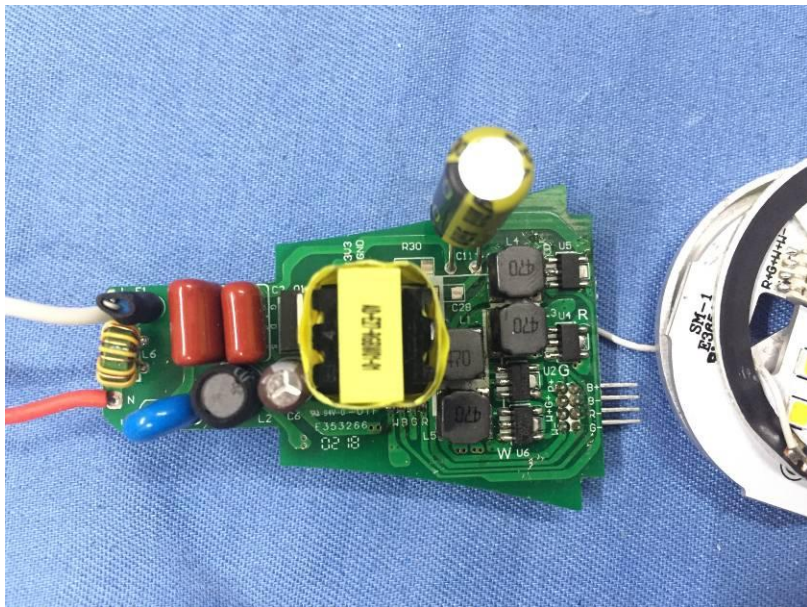
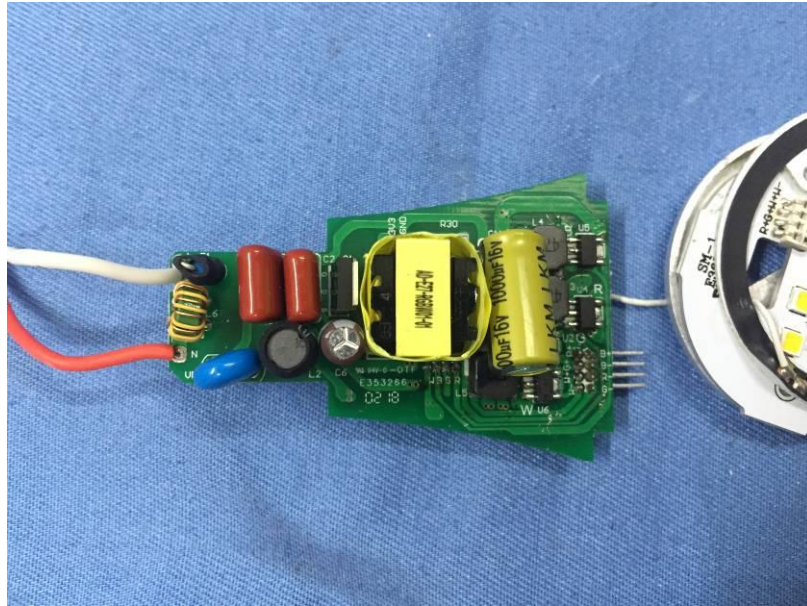


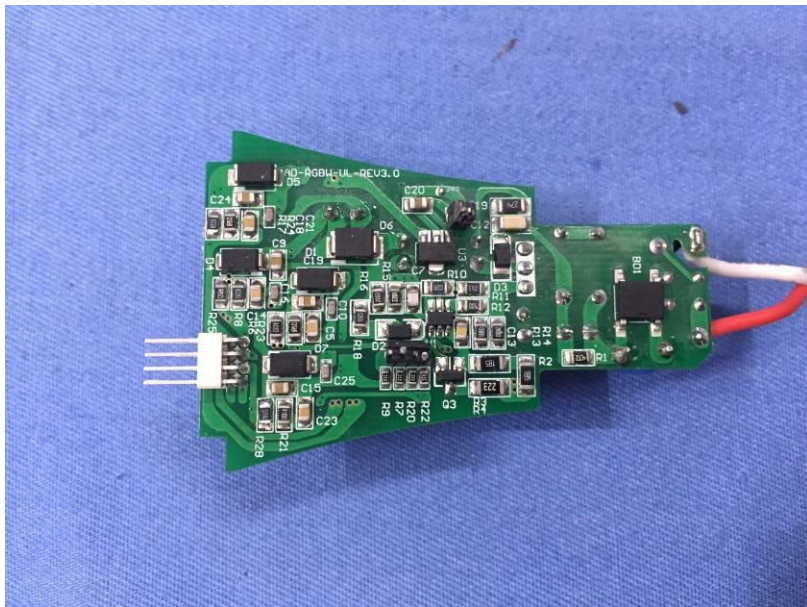
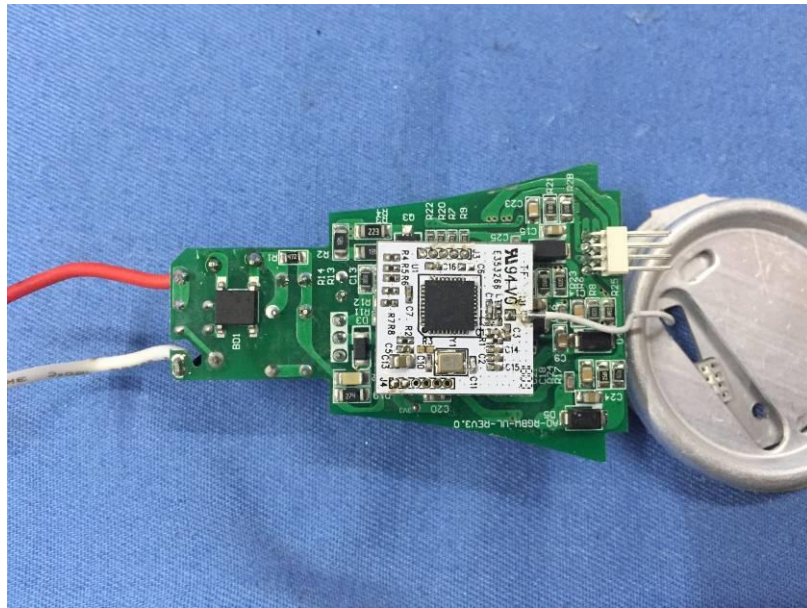




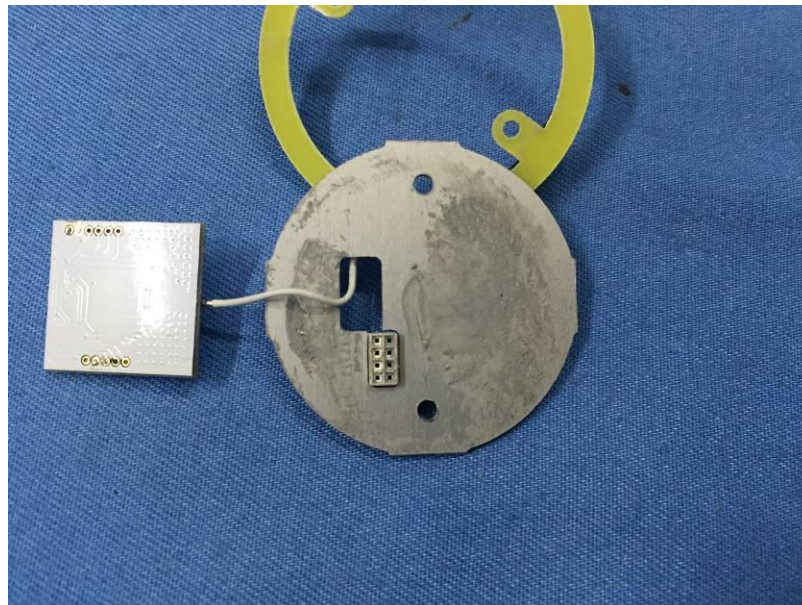
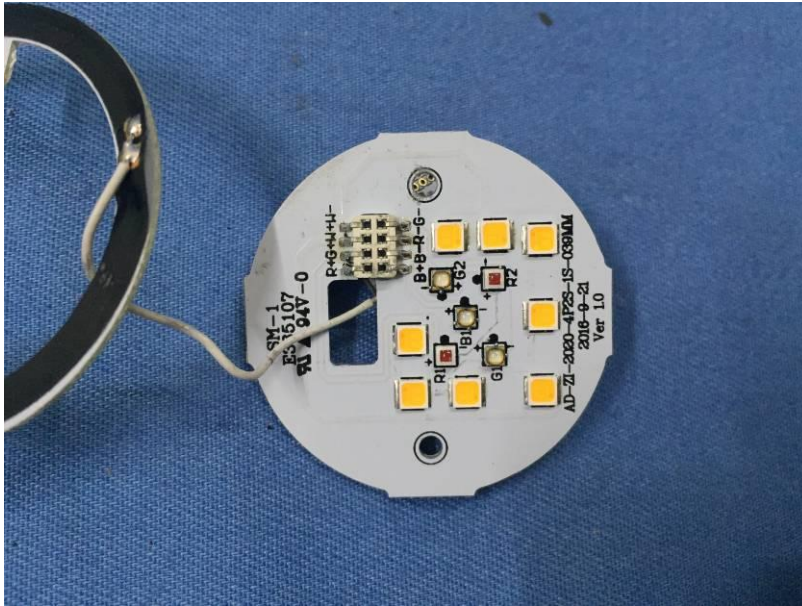










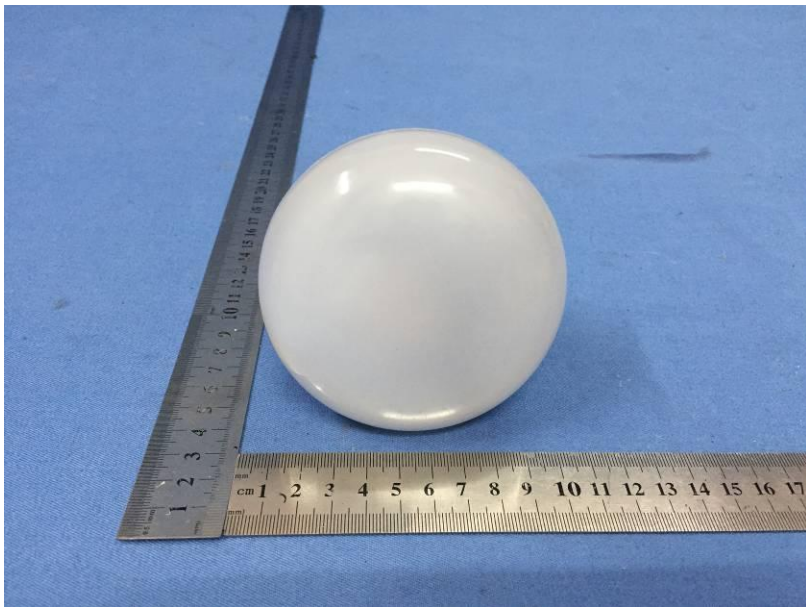


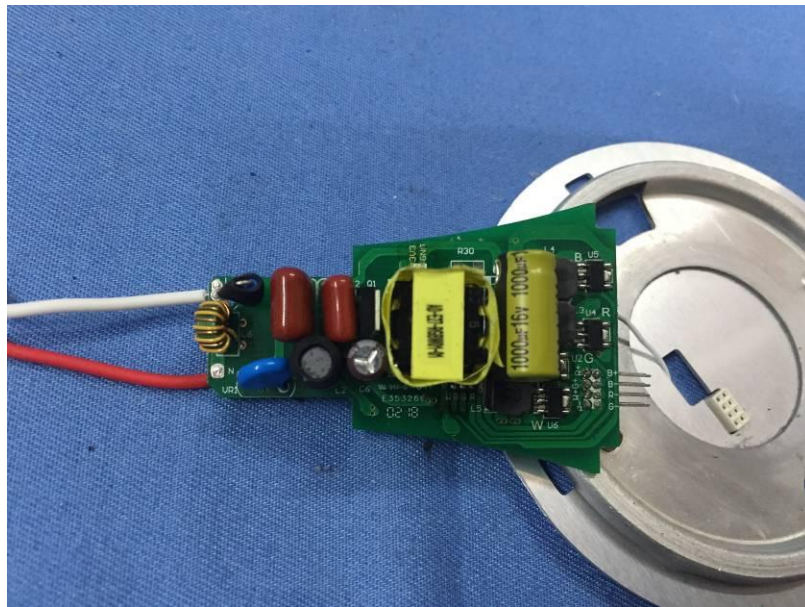


**Model number: 81813**

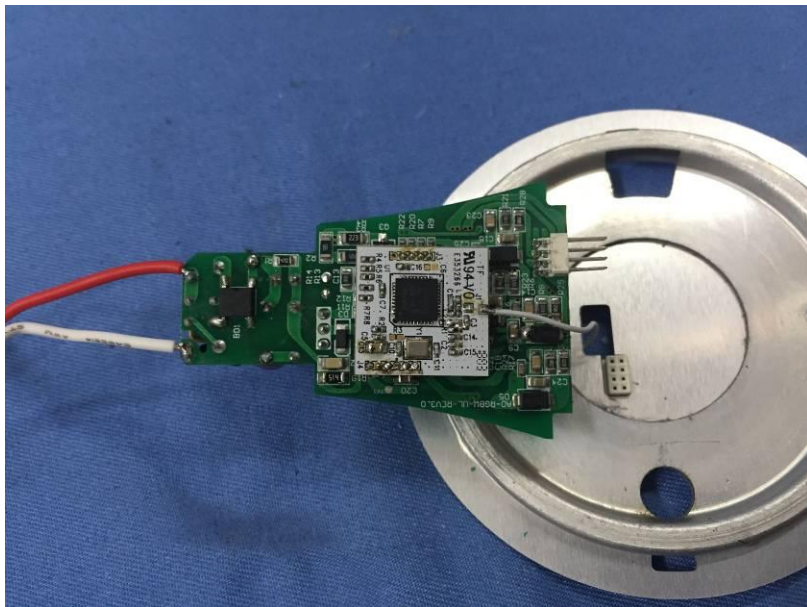
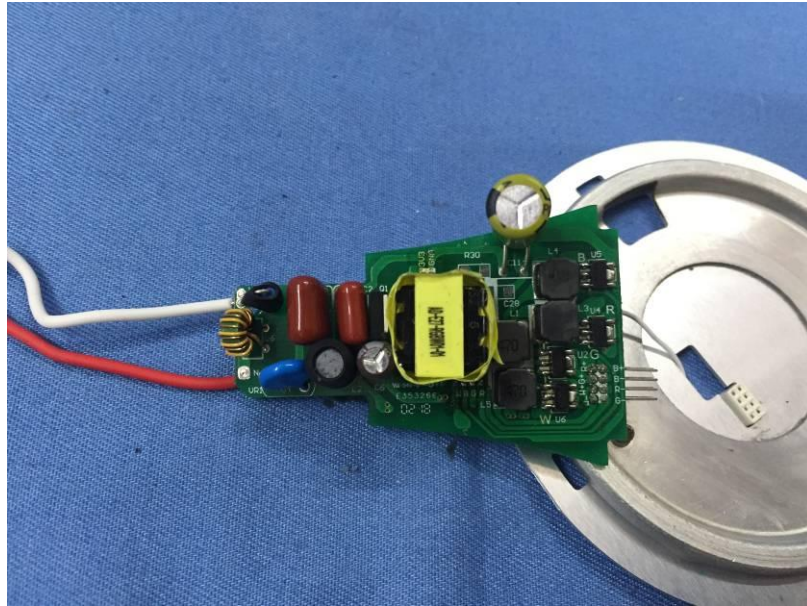


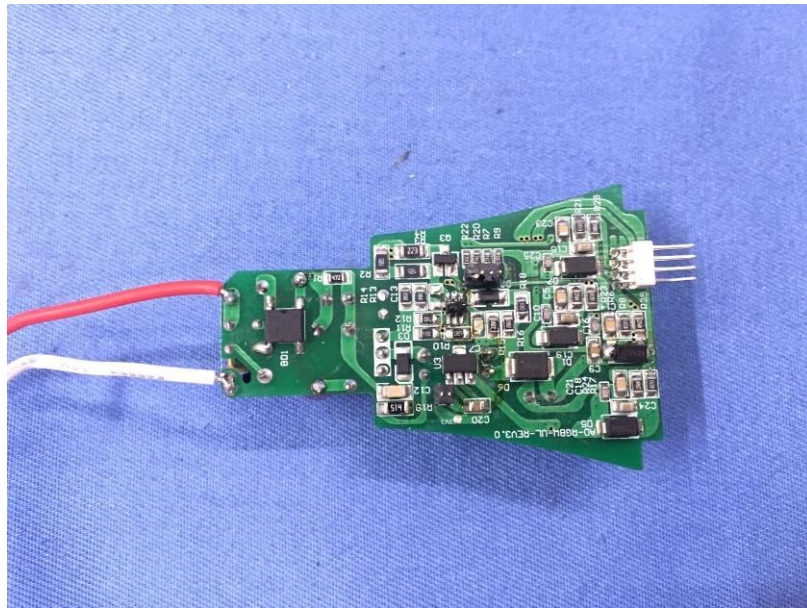


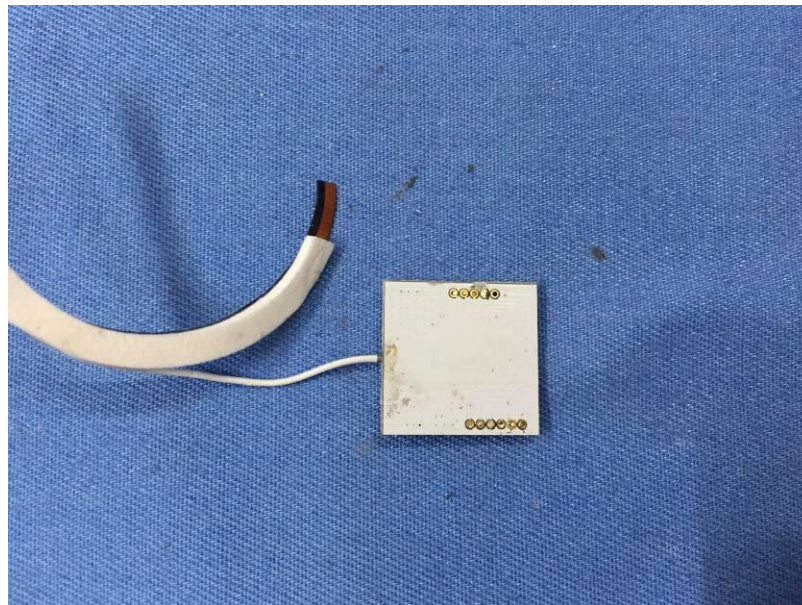
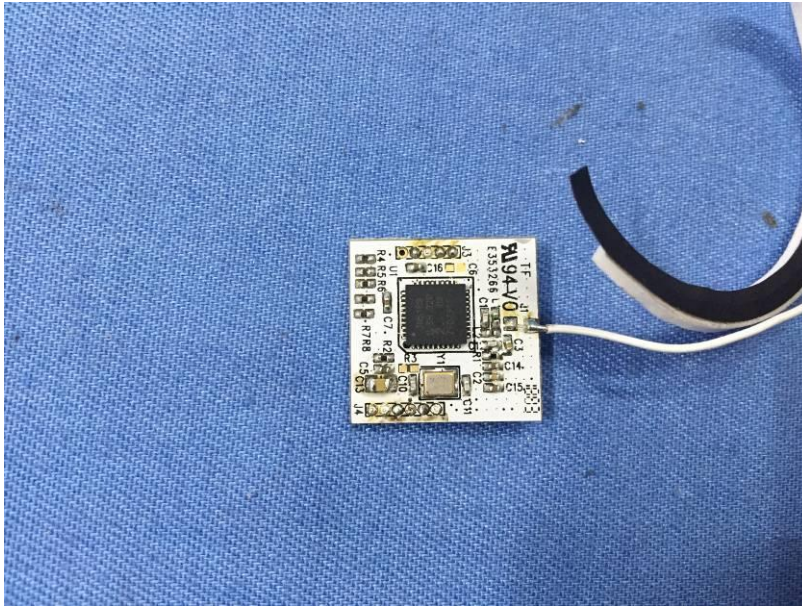




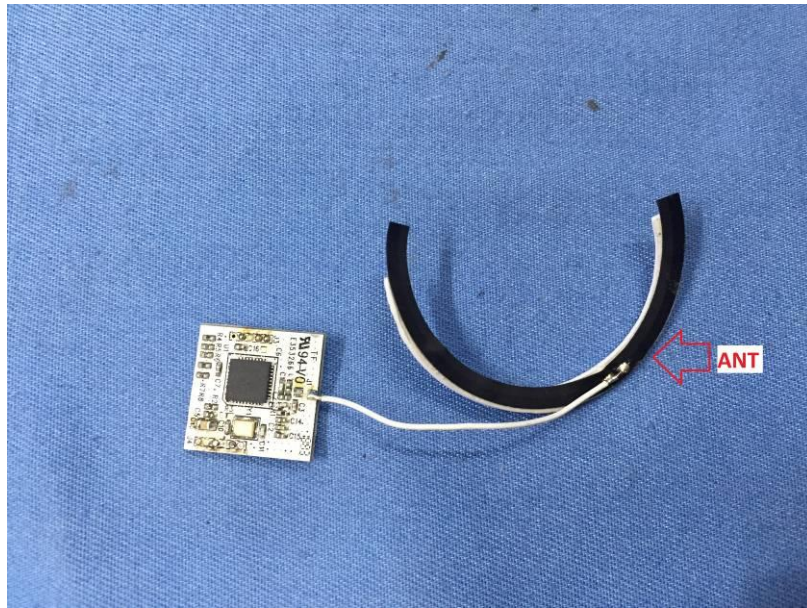












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