

# **FCC REPORT**

## **(UNII)**

**Applicant:** Shenzhen UMIDIGI company Limited

**Address of Applicant:** 405-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen China

**Equipment Under Test (EUT)**

Product Name: Smartphone

Model No.: One

Trade mark: UMIDIGI

**FCC ID:** 2ALPL8ONE

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart E Section 15.407

**Date of sample receipt:** 09 Jul., 2018

**Date of Test:** 09 Jul., to 27 Jul., 2018

**Date of report issued:** 01 Aug., 2018

**Test Result:** PASS\*

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

Authorized Signature:



Bruce Zhang  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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## 2 Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | 01 Aug., 2018 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

**Tested by:**

*YT Yang*

**Test Engineer**

**Date:**

*01 Aug., 2018*

**Reviewed by:**

*Wimer Zhang*

**Project Engineer**

**Date:**

*01 Aug., 2018*

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## 4 Test Summary

| Test Item                                                                      | Section in CFR 47   | Test Result |
|--------------------------------------------------------------------------------|---------------------|-------------|
| Antenna requirement                                                            | 15.203 & 15.407 (a) | Pass        |
| AC Power Line Conducted Emission                                               | 15.207              | Pass        |
| Conducted Peak Output Power                                                    | 15.407 (a) (1) (iv) | Pass        |
| 26dB Occupied Bandwidth                                                        | 15.407 (a) (5)      | Pass        |
| 6dB Emission Bandwidth                                                         | 15.407(e)           | N/A         |
| Power Spectral Density                                                         | 15.407 (a) (1) (iv) | Pass        |
| Band Edge                                                                      | 15.407(b)           | Pass        |
| Spurious Emission                                                              | 15.205 & 15.209     | Pass        |
| Frequency Stability                                                            | 15.407(g)           | Pass        |
| <i>Pass: The EUT complies with the essential requirements in the standard.</i> |                     |             |
| <i>N/A: Not Applicable.</i>                                                    |                     |             |

## 5 General Information

### 5.1 Client Information

|              |                                                                                     |
|--------------|-------------------------------------------------------------------------------------|
| Applicant:   | Shenzhen UMIDIGI company Limited                                                    |
| Address:     | 405-407 Jinqi Zhigu Building, 4/F,1 Tangling Road, Nanshan District, Shenzhen China |
| Manufacturer | Shenzhen UMIDIGI company Limited                                                    |
| Address:     | 405-407 Jinqi Zhigu Building, 4/F,1 Tangling Road, Nanshan District, Shenzhen China |

### 5.2 General Description of E.U.T.

|                                       |                                                                                                             |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Product Name:                         | Smartphone                                                                                                  |
| Model No.:                            | One                                                                                                         |
| Operation Frequency:                  | Band 1: 5150MHz-5250MHz                                                                                     |
| Channel numbers:                      | Band 1: 802.11a/802.11n20: 4, 802.11n40: 2                                                                  |
| Channel separation:                   | 802.11a/802.11n20: 20MHz, 802.11n40: 40MHz                                                                  |
| Modulation technology (IEEE 802.11a): | BPSK, QPSK, 16-QAM, 64-QAM                                                                                  |
| Modulation technology (IEEE 802.11n): | BPSK, QPSK, 16-QAM, 64-QAM                                                                                  |
| Data speed (IEEE 802.11a):            | 6Mbps, 9Mbps,12Mbps,18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps                                                  |
| Data speed (IEEE 802.11n20):          | MCS0: 6.5Mbps, MCS1:13Mbps,MCS2:19.5Mbps, MCS3:26Mbps, MCS4:39Mbps, MCS5:52Mbps, MCS6:58.5Mbps, MCS7:65Mbps |
| Data speed (IEEE 802.11n40):          | MCS0:15Mbps, MCS1:30Mbps, MCS2:45Mbps, MCS3:60Mbps, MCS4:90Mbps, MCS5:120Mbps, MCS6:135Mbps, MCS7:150Mbps   |
| Antenna Type:                         | External Antenna                                                                                            |
| Antenna gain:                         | -0.8 dBi                                                                                                    |
| Power supply:                         | Rechargeable Li-ion Battery DC3.85V-3550mAh                                                                 |
| AC adapter:                           | Model: HJ-0502000W2-US<br>Input: AC100-240V, 50/60Hz, 0.3A<br>Output: DC 5.0V, 2A                           |

| Operation Frequency each of channel |           |           |           |   |   |
|-------------------------------------|-----------|-----------|-----------|---|---|
| Band 1                              |           |           |           |   |   |
| 802.11a/802.11n20                   |           | 802.11n40 |           | / |   |
| Channel                             | Frequency | Channel   | Frequency | / | / |
| 36                                  | 5180MHz   | 38        | 5190MHz   | / | / |
| 40                                  | 5200MHz   | 46        | 5230MHz   |   |   |
| 44                                  | 5220MHz   |           |           |   |   |
| 48                                  | 5240MHz   |           |           |   |   |

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:

| Band 1            |           |                 |           |   |   |
|-------------------|-----------|-----------------|-----------|---|---|
| 802.11a/802.11n20 |           | 802.11n40       |           | / |   |
| Channel           | Frequency | Channel         | Frequency | / | / |
| Lowest channel    | 5180MHz   | Lowest channel  | 5190MHz   | / | / |
| Middle channel    | 5200MHz   | Highest channel | 5230MHz   |   |   |
| Highest channel   | 5240MHz   |                 |           |   |   |

## 5.3 Test environment and test mode

| Operating Environment:                                                                                                                                                                                       |                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Temperature:                                                                                                                                                                                                 | 24.0 °C                                                       |
| Humidity:                                                                                                                                                                                                    | 54 % RH                                                       |
| Atmospheric Pressure:                                                                                                                                                                                        | 1010 mbar                                                     |
| Test mode:                                                                                                                                                                                                   |                                                               |
| Continuously transmitting mode                                                                                                                                                                               | Keep the EUT in 100% duty cycle transmitting with modulation. |
| We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows: |                                                               |
| Per-scan all kind of data rate, and found the follow list were the worst case.                                                                                                                               |                                                               |
| Mode                                                                                                                                                                                                         | Data rate                                                     |
| 802.11a                                                                                                                                                                                                      | 6 Mbps                                                        |
| 802.11n20                                                                                                                                                                                                    | 6.5 Mbps                                                      |
| 802.11n40                                                                                                                                                                                                    | 13 Mbps                                                       |

## 5.4 Description of Support Units

| Manufacturer | Description       | Model           | Serial Number | FCC ID/DoC |
|--------------|-------------------|-----------------|---------------|------------|
| DELL         | PC                | OPTIPLEX745     | N/A           | DoC        |
| DELL         | MONITOR           | E178FPC         | N/A           | DoC        |
| DELL         | KEYBOARD          | SK-8115         | N/A           | DoC        |
| DELL         | MOUSE             | MOC5UO          | N/A           | DoC        |
| FLY POWER    | Switching Adapter | PS24A120K2000UD | N/A           | N/A        |

## 5.5 Measurement Uncertainty

| Parameters                          | Expanded Uncertainty |
|-------------------------------------|----------------------|
| Conducted Emission (9kHz ~ 30MHz)   | $\pm 2.22$ dB (k=2)  |
| Radiated Emission (9kHz ~ 30MHz)    | $\pm 2.76$ dB (k=2)  |
| Radiated Emission (30MHz ~ 1000MHz) | $\pm 4.28$ dB (k=2)  |
| Radiated Emission (1GHz ~ 18GHz)    | $\pm 5.72$ dB (k=2)  |
| Radiated Emission (18GHz ~ 40GHz)   | $\pm 2.88$ dB (k=2)  |

## 5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

## 5.7 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

## 5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China

Tel: +86-755-23118282, Fax: +86-755-23116366

Email: info@ccis-cb.com, Website: <http://www.ccis-cb.com>

## 5.9 Test Instruments list

| Radiated Emission: |                 |               |            |                      |                          |
|--------------------|-----------------|---------------|------------|----------------------|--------------------------|
| Test Equipment     | Manufacturer    | Model No.     | Serial No. | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
| 3m SAC             | SAEMC           | 9m*6m*6m      | 966        | 07-22-2017           | 07-21-2020               |
| Loop Antenna       | SCHWARZBECK     | FMZB1519B     | 00044      | 03-16-2018           | 03-15-2019               |
| BiConiLog Antenna  | SCHWARZBECK     | VULB9163      | 497        | 03-16-2018           | 03-15-2019               |
| Horn Antenna       | SCHWARZBECK     | BBHA9120D     | 916        | 03-16-2018           | 03-15-2019               |
| EMI Test Software  | AUDIX           | E3            | 6.110919b  | N/A                  | N/A                      |
| Pre-amplifier      | HP              | 8447D         | 2944A09358 | 03-07-2018           | 03-06-2019               |
| Pre-amplifier      | CD              | PAP-1G18      | 11804      | 03-07-2018           | 03-06-2019               |
| Spectrum analyzer  | Rohde & Schwarz | FSP30         | 101454     | 03-07-2018           | 03-06-2019               |
| EMI Test Receiver  | Rohde & Schwarz | ESRP7         | 101070     | 03-07-2018           | 03-06-2019               |
| Cable              | ZDECL           | Z108-NJ-NJ-81 | 1608458    | 03-07-2018           | 03-06-2019               |
| Cable              | MICRO-COAX      | MFR64639      | K10742-5   | 03-07-2018           | 03-06-2019               |
| Cable              | SUHNER          | SUCOFLEX100   | 58193/4PE  | 03-07-2018           | 03-06-2019               |

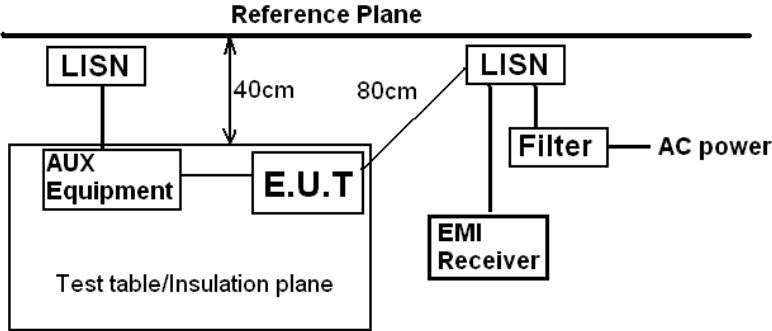
| Conducted Emission: |                 |            |             |                      |                          |
|---------------------|-----------------|------------|-------------|----------------------|--------------------------|
| Test Equipment      | Manufacturer    | Model No.  | Serial No.  | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
| EMI Test Receiver   | Rohde & Schwarz | ESCI       | 101189      | 03-07-2018           | 03-06-2019               |
| Pulse Limiter       | SCHWARZBECK     | OSRAM 2306 | 9731        | 03-07-2018           | 03-06-2019               |
| LISN                | CHASE           | MN2050D    | 1447        | 03-19-2018           | 03-18-2019               |
| LISN                | Rohde & Schwarz | ESH3-Z5    | 8438621/010 | 07-21-2018           | 07-20-2019               |
| Cable               | HP              | 10503A     | N/A         | 03-07-2018           | 03-06-2019               |
| EMI Test Software   | AUDIX           | E3         | 6.110919b   | N/A                  | N/A                      |

## 6 Test results and Measurement Data

### 6.1 Antenna requirement

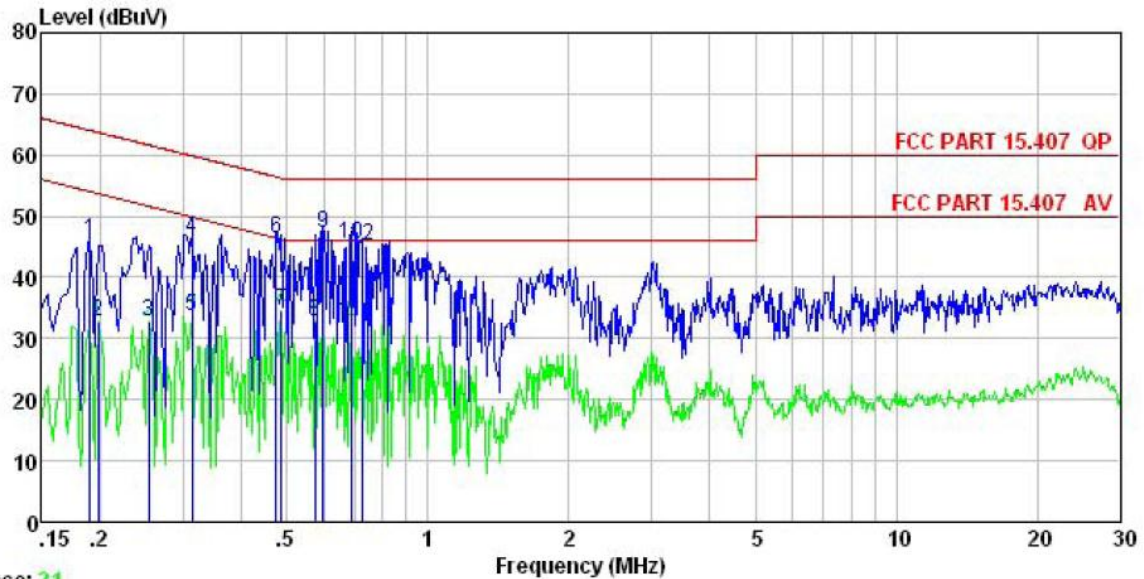
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FCC Part15 E Section 15.203 /407(a) |
| <p>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.<br/>This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</p> |                                     |
| <b>E.U.T Antenna:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |
| The WiFi antenna is an External antenna which cannot replace by end-user, the best case gain of the antenna is -0.8 dBi.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                     |

## 6.2 Conducted Emission

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |          |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |          |
| Limit:                                           | Frequency range (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Limit (dBuV) |          |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quasi-peak   |          |
|                                                  | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66 to 56*    | 0.15-0.5 |
|                                                  | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 56           | 0.5-5    |
|                                                  | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60           | 5-30     |
| * Decreases with the logarithm of the frequency. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |          |
| 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.). It 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 setup:                                      |  <p>Remark:<br/> E.U.T: Equipment Under Test<br/> LISN: Line Impedance Stabilization Network<br/> Test table height=0.8m</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |          |
| Test Instruments:                                | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |          |
| Test mode:                                       | Refer to section 5.3 for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |          |
| Test results:                                    | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |          |

## Measurement Data:

Test Phase: Line



Trace: 21

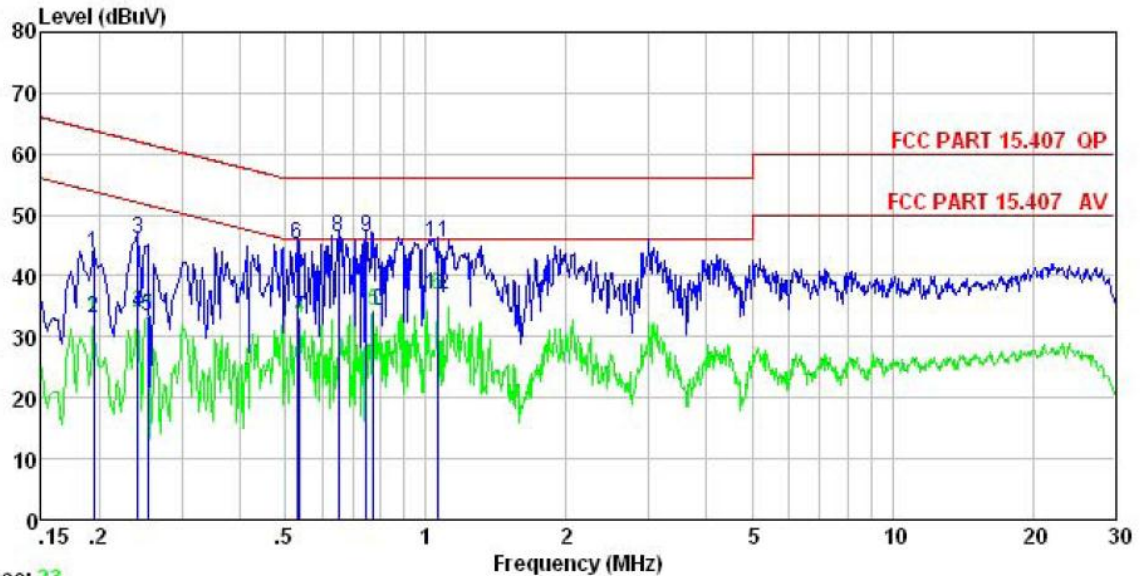
Site : CCIS Shielding Room  
 Condition : FCC PART 15.407 QP LISN LINE  
 EUT : Smartphone  
 Model : One  
 Test Mode : 5GWIFI mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa  
 Test Engineer: YT  
 Remark :

|    | Freq  | Read Level | LISN Factor | Cable Loss | Level | Limit | Over   |         |
|----|-------|------------|-------------|------------|-------|-------|--------|---------|
|    | MHz   | dBuV       | dB          | dB         | dBuV  | dBuV  | dB     | Remark  |
| 1  | 0.190 | 35.04      | 0.16        | 10.76      | 45.96 | 64.02 | -18.06 | QP      |
| 2  | 0.198 | 21.88      | 0.15        | 10.76      | 32.79 | 53.71 | -20.92 | Average |
| 3  | 0.253 | 21.76      | 0.14        | 10.75      | 32.65 | 51.64 | -18.99 | Average |
| 4  | 0.313 | 35.48      | 0.13        | 10.74      | 46.35 | 59.88 | -13.53 | QP      |
| 5  | 0.313 | 22.73      | 0.13        | 10.74      | 33.60 | 49.88 | -16.28 | Average |
| 6  | 0.474 | 35.54      | 0.12        | 10.75      | 46.41 | 56.45 | -10.04 | QP      |
| 7  | 0.486 | 23.78      | 0.12        | 10.76      | 34.66 | 46.23 | -11.57 | Average |
| 8  | 0.573 | 21.97      | 0.12        | 10.76      | 32.85 | 46.00 | -13.15 | Average |
| 9  | 0.598 | 36.20      | 0.13        | 10.77      | 47.10 | 56.00 | -8.90  | QP      |
| 10 | 0.690 | 34.66      | 0.13        | 10.77      | 45.56 | 56.00 | -10.44 | QP      |
| 11 | 0.690 | 21.73      | 0.13        | 10.77      | 32.63 | 46.00 | -13.37 | Average |
| 12 | 0.724 | 34.37      | 0.13        | 10.78      | 45.28 | 56.00 | -10.72 | QP      |

## Notes:

1. An initial pre-scan was performed on the live 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.

Test Phase: Neutral



Trace: 23

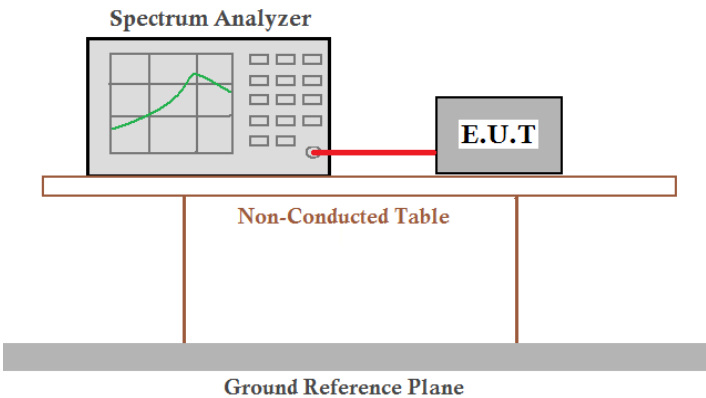
Site : CCIS Shielding Room  
 Condition : FCC PART 15.407 QP LISN NEUTRAL  
 EUT : Smartphone  
 Model : One  
 Test Mode : 5GWIFI mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa  
 Test Engineer: YT  
 Remark :

|    | Freq  | Read Level | LISN Factor | Cable Loss | Level | Limit Line | Over Limit | Remark  |
|----|-------|------------|-------------|------------|-------|------------|------------|---------|
|    | MHz   | dBuV       | dB          | dB         | dBuV  | dBuV       | dB         |         |
| 1  | 0.194 | 31.95      | 0.93        | 10.76      | 43.64 | 63.84      | -20.20     | QP      |
| 2  | 0.194 | 21.29      | 0.93        | 10.76      | 32.98 | 53.84      | -20.86     | Average |
| 3  | 0.242 | 34.35      | 0.94        | 10.75      | 46.04 | 62.04      | -16.00     | QP      |
| 4  | 0.242 | 22.15      | 0.94        | 10.75      | 33.84 | 52.04      | -18.20     | Average |
| 5  | 0.253 | 21.62      | 0.95        | 10.75      | 33.32 | 51.64      | -18.32     | Average |
| 6  | 0.529 | 33.38      | 0.97        | 10.76      | 45.11 | 56.00      | -10.89     | QP      |
| 7  | 0.538 | 21.27      | 0.97        | 10.76      | 33.00 | 46.00      | -13.00     | Average |
| 8  | 0.651 | 34.67      | 0.97        | 10.77      | 46.41 | 56.00      | -9.59      | QP      |
| 9  | 0.747 | 34.63      | 0.97        | 10.79      | 46.39 | 56.00      | -9.61      | QP      |
| 10 | 0.771 | 22.47      | 0.97        | 10.80      | 34.24 | 46.00      | -11.76     | Average |
| 11 | 1.060 | 33.60      | 0.97        | 10.88      | 45.45 | 56.00      | -10.55     | QP      |
| 12 | 1.060 | 24.93      | 0.97        | 10.88      | 36.78 | 46.00      | -9.22      | Average |

## Notes:

1. An initial pre-scan was performed on the live 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.

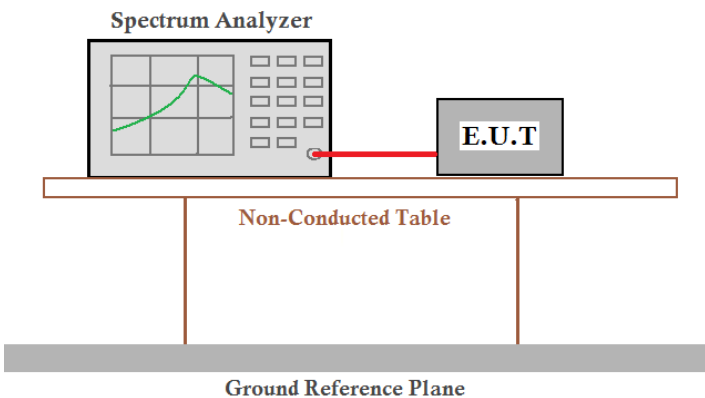
## 6.3 Conducted Output Power

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407 (a) (1) (iv)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test Method:      | ANSI C63.10: 2013, KDB789033                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Limit:            | Band 1: 24dBm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer, showing a frequency spectrum on its screen, is connected to an E.U.T (Equipment Under Test) by a red cable. Both the Spectrum Analyzer and the E.U.T are positioned on a 'Non-Conducted Table'. This table is supported by two vertical legs and rests on a 'Ground Reference Plane', which is represented by a thick grey horizontal bar at the bottom of the setup.</p> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Measurement Data:

| Band 1    |         |                              |             |        |
|-----------|---------|------------------------------|-------------|--------|
| Mode      | Test CH | Conducted Output power (dBm) | Limit (dBm) | Result |
| 802.11a   | Lowest  | 6.74                         | 24.00       | Pass   |
|           | Middle  | 6.23                         |             |        |
|           | Highest | 6.54                         |             |        |
| 802.11n20 | Lowest  | 6.67                         | 24.00       | Pass   |
|           | Middle  | 6.24                         |             |        |
|           | Highest | 6.58                         |             |        |
| 802.11n40 | Lowest  | 5.78                         | 24.00       | Pass   |
|           | Highest | 5.95                         |             |        |

## 6.4 Occupy Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407 (a) (5) and Section 15.407 (e)                                                                                                                                                                                                                                                                                                                                     |
| Test Method:      | ANSI C63.10:2013 and KDB 789033                                                                                                                                                                                                                                                                                                                                                                |
| Limit:            | Band 1: N/A (26dB Emission Bandwidth and 99% Occupy Bandwidth)                                                                                                                                                                                                                                                                                                                                 |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                               |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                               |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                         |

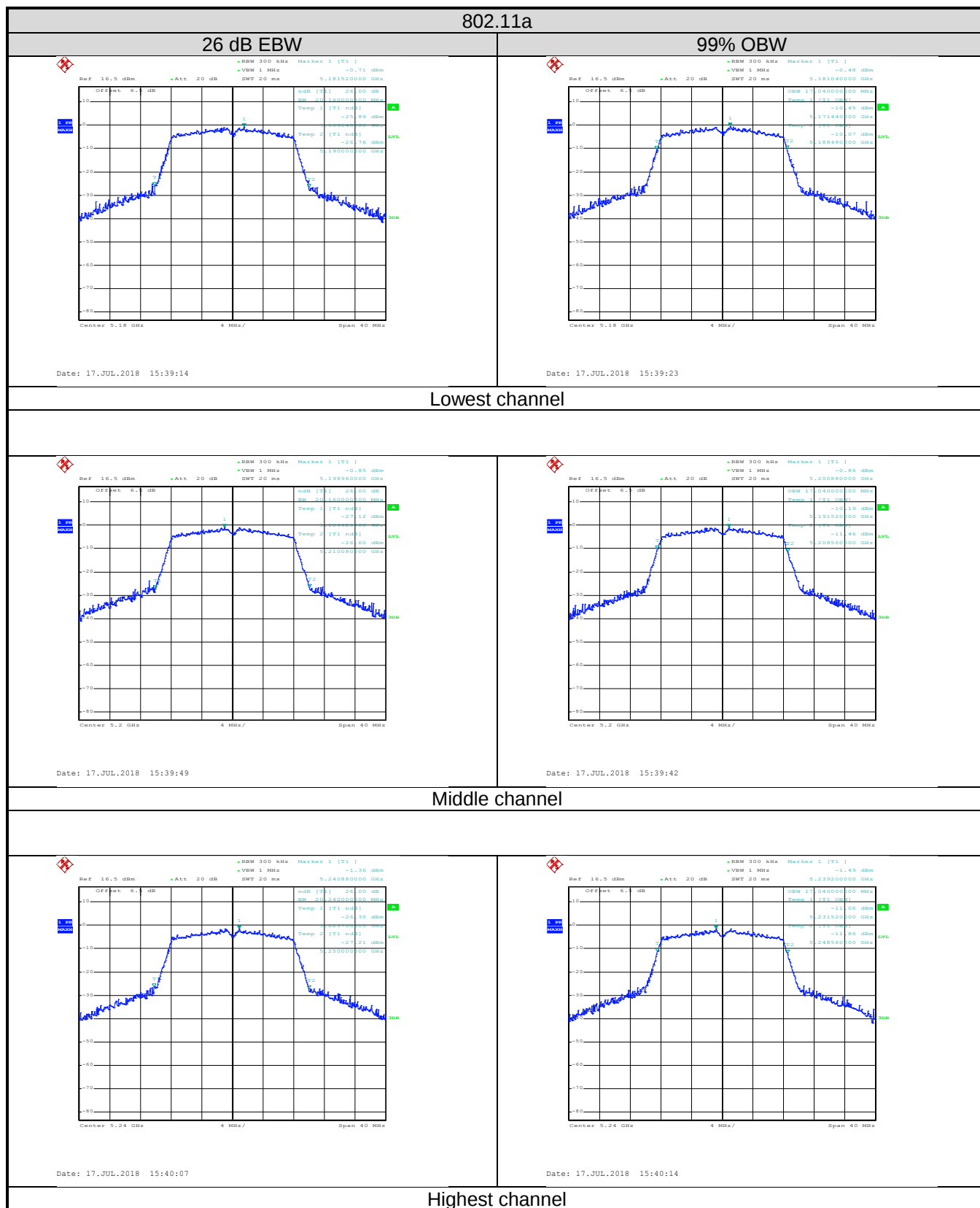
### Measurement Data:

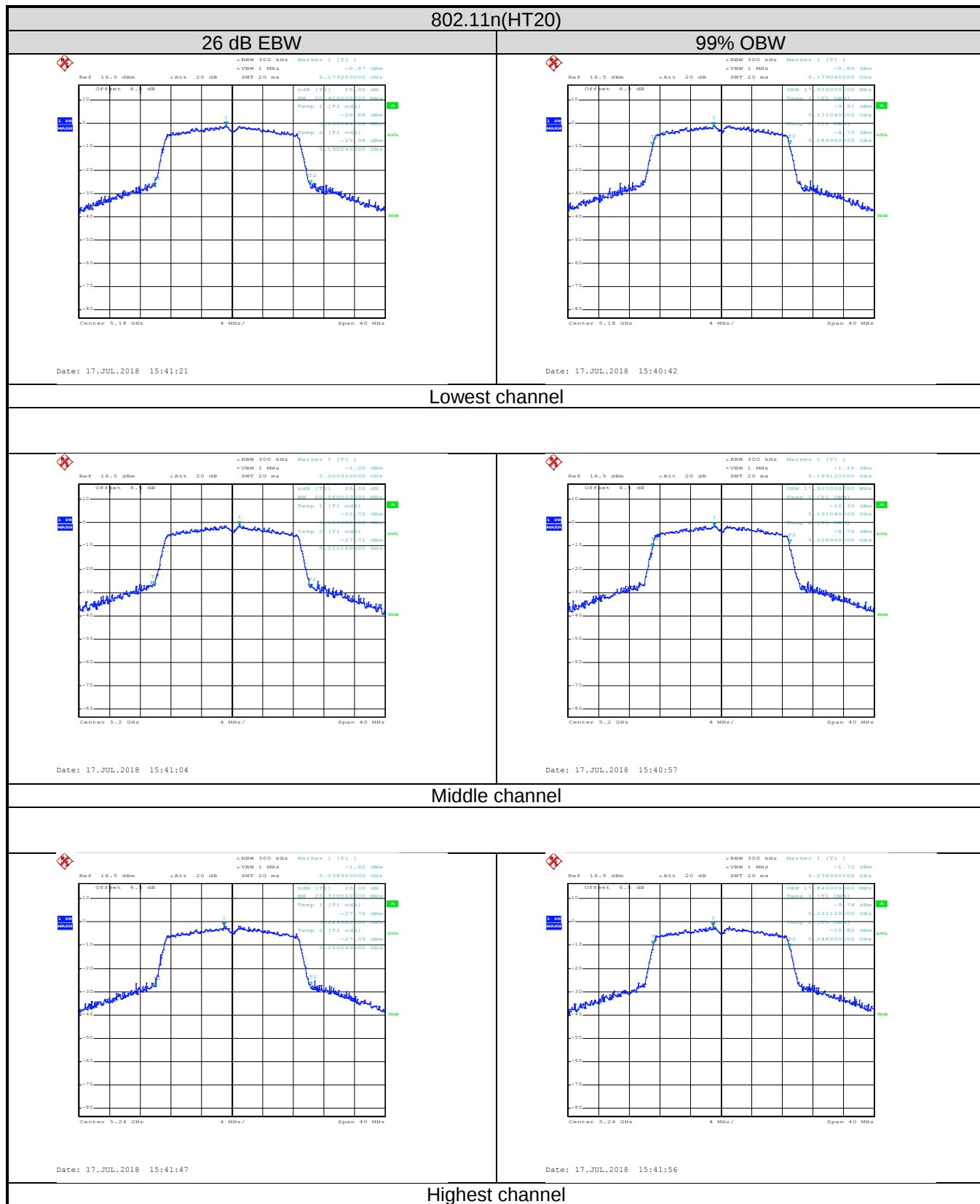
#### Band 1:

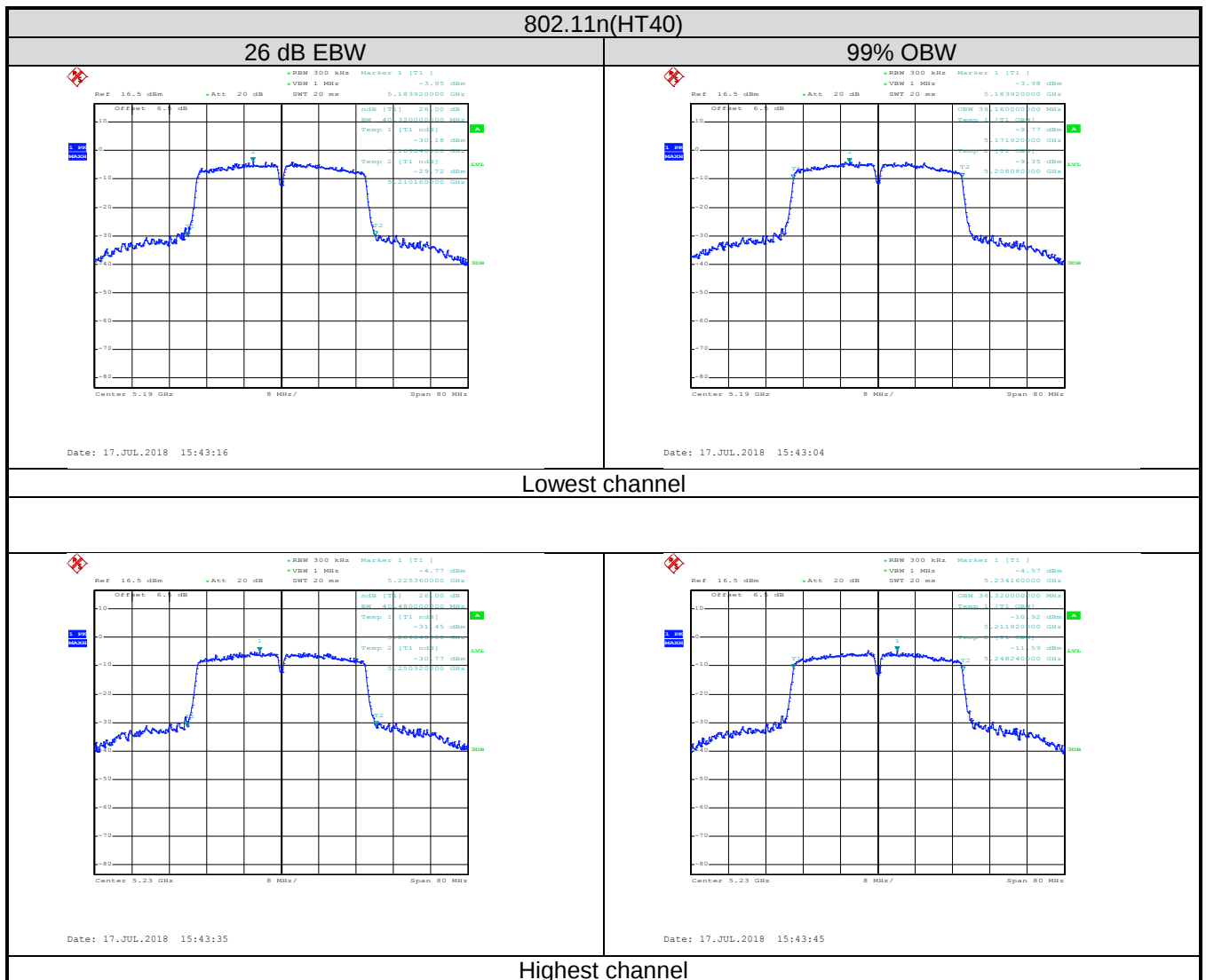
| Test Channel | 26dB Emission Bandwidth (MHz) |                |                | Limit | Result |
|--------------|-------------------------------|----------------|----------------|-------|--------|
|              | 802.11a                       | 802.11n (HT20) | 802.11n (HT40) |       |        |
| Lowest       | 20.16                         | 20.40          | 40.32          | N/A   | PASS   |
| Middle       | 20.16                         | 20.56          | ---            |       |        |
| Highest      | 20.24                         | 20.32          | 40.48          |       |        |
| Test Channel | 99% Occupy Bandwidth (MHz)    |                |                | Limit | Result |
|              | 802.11a                       | 802.11n (HT20) | 802.11n (HT40) |       |        |
| Lowest       | 17.04                         | 17.92          | 36.16          | N/A   | PASS   |
| Middle       | 17.04                         | 17.92          | ---            |       |        |
| Highest      | 17.04                         | 17.84          | 16.32          |       |        |

Test plot as follows:

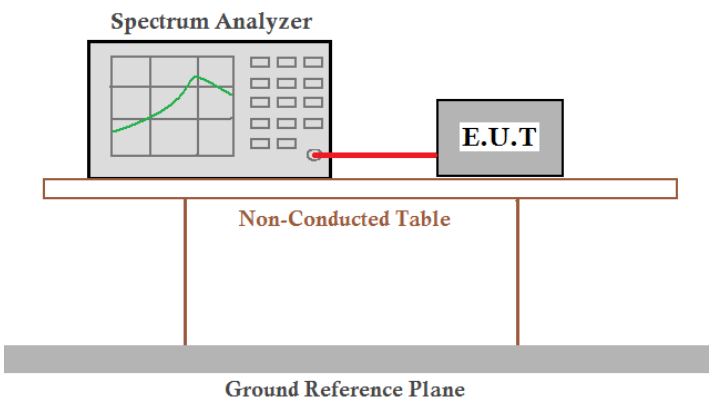
Band 1:







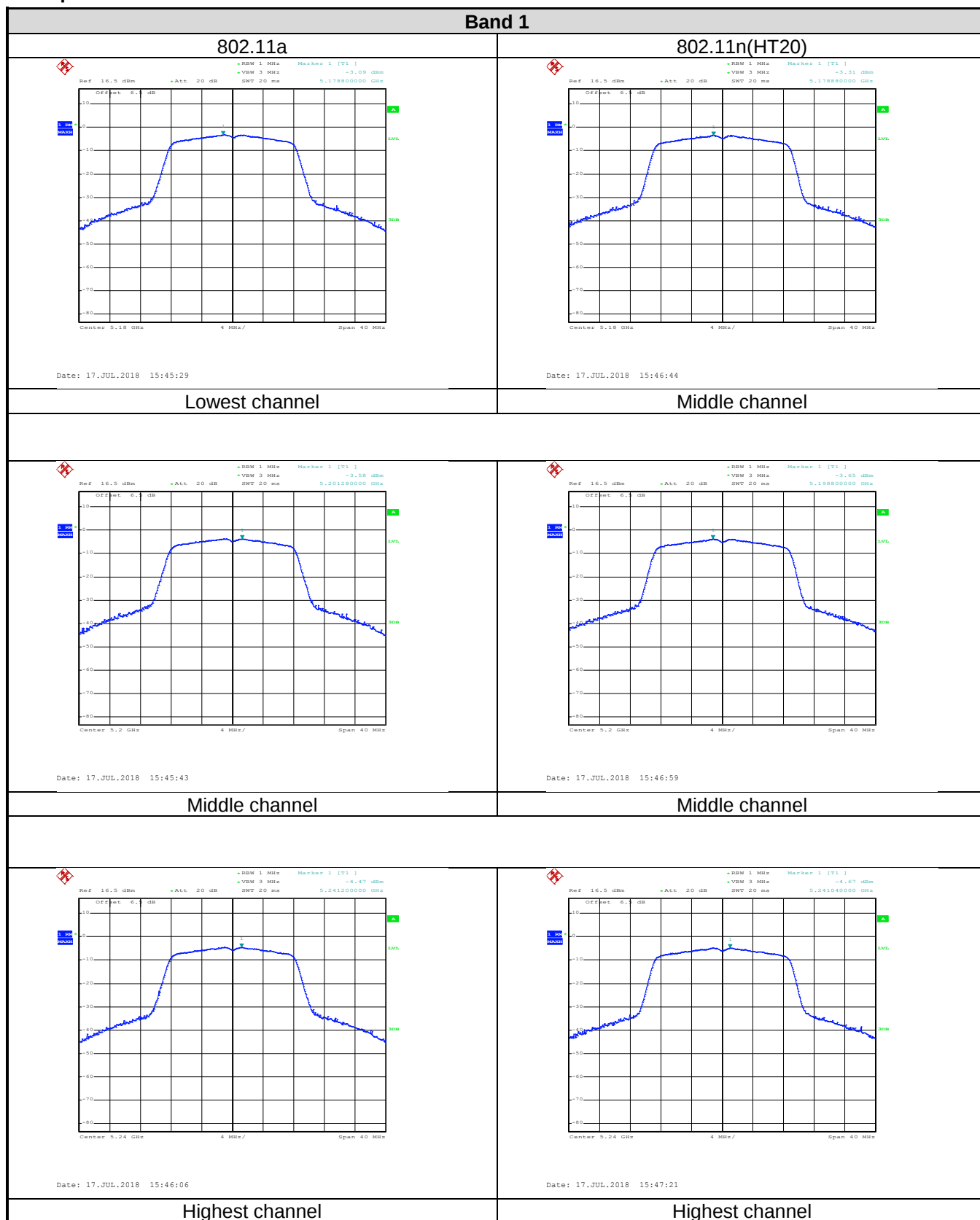
## 6.5 Power Spectral Density

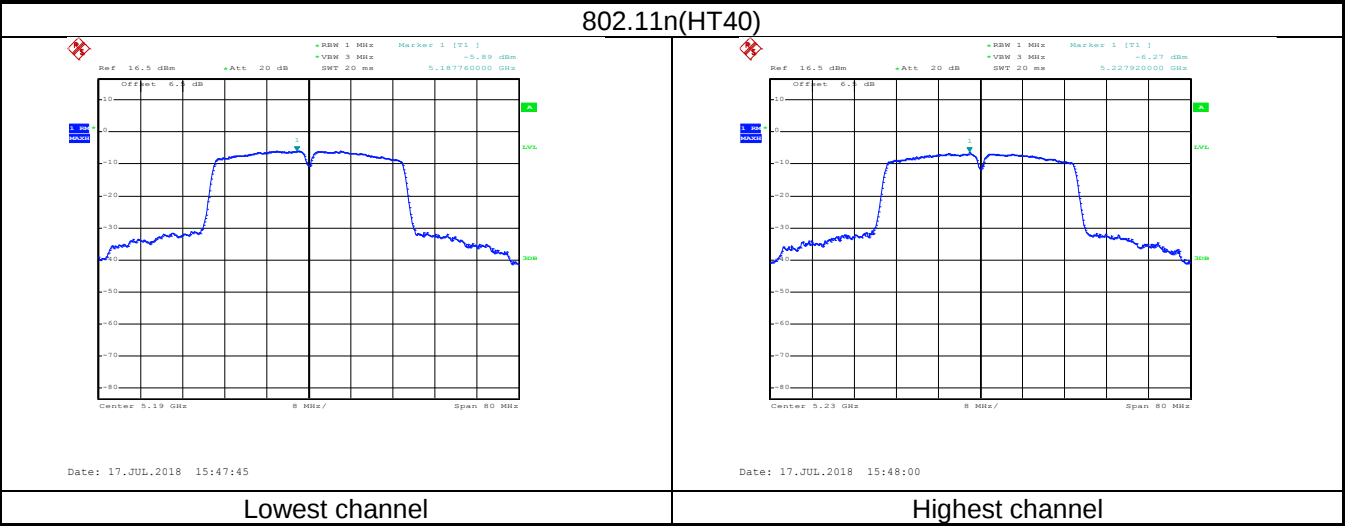
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407 (a) (1) (iv)                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test Method:      | ANSI C63.10:2013, KDB 789033                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Limit:            | Band 1: 11 dBm/MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve, is connected to an E.U.T (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T are resting on a white rectangular table labeled 'Non-Conducted Table'. Below this table is a thick grey horizontal bar labeled 'Ground Reference Plane'.</p> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

**Measurement Data:**

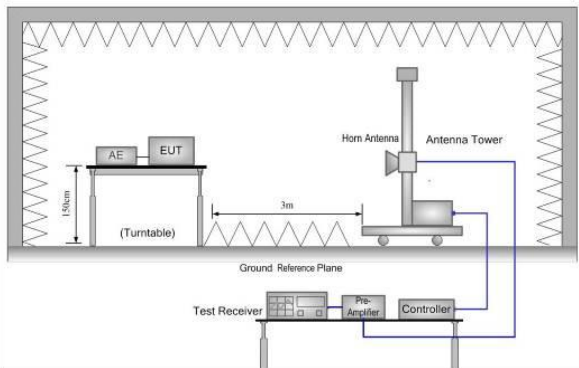
| Band 1        |         |           |             |        |
|---------------|---------|-----------|-------------|--------|
| Mode          | Test CH | PSD (dBm) | Limit (dBm) | Result |
| 802.11a       | Lowest  | -3.09     | 11.00       | Pass   |
|               | Middle  | -3.58     |             |        |
|               | Highest | -4.47     |             |        |
| 802.11n(HT20) | Lowest  | -3.31     | 11.00       | Pass   |
|               | Middle  | -3.65     |             |        |
|               | Highest | -4.67     |             |        |
| 802.11n(HT40) | Lowest  | -5.89     | 11.00       | Pass   |
|               | Highest | -6.27     |             |        |

Test plot as follows:





## 6.6 Band Edge

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                    |                  |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------|------------------|
| Test Requirement:                                                                   | FCC Part 15 E Section 15.407 (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                    |                  |
| Test Method:                                                                        | ANSI C63.10:2013 , KDB 789033                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                    |                  |
| Receiver setup:                                                                     | Detector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RBW    | VBW                | Remark           |
|                                                                                     | Quasi-peak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 120kHz | 300kHz             | Quasi-peak Value |
|                                                                                     | RMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1MHz   | 3MHz               | Average Value    |
| Limit:                                                                              | Band                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        | Limit (dBuV/m @3m) | Remark           |
|                                                                                     | Band 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        | 68.20              | Peak Value       |
|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        | 54.00              | Average Value    |
|                                                                                     | Remark:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |                    |                  |
| 1. Band 1 limit:<br>E[dBuV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |                    |                  |
| Test Procedure:                                                                     | <div>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</div> <div>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.</div> <div>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.</div> <div>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 rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div> |        |                    |                  |
| Test setup:                                                                         | <div><div><div><div><div>AE</div><div>EUT</div></div><div>(Turntable)</div></div><div>0.8m</div><div>3m</div><div>Horn Antenna</div><div>Antenna Tower</div><div>Ground Reference Plane</div><div>Test Receiver</div><div>Pre-Amplifier</div><div>Controller</div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |                    |                  |
| Test Instruments:                                                                   | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                    |                  |
| Test mode:                                                                          | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                    |                  |
| Test results:                                                                       | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |                    |                  |

**Measurement Data (worst case):**

**Band 1:**

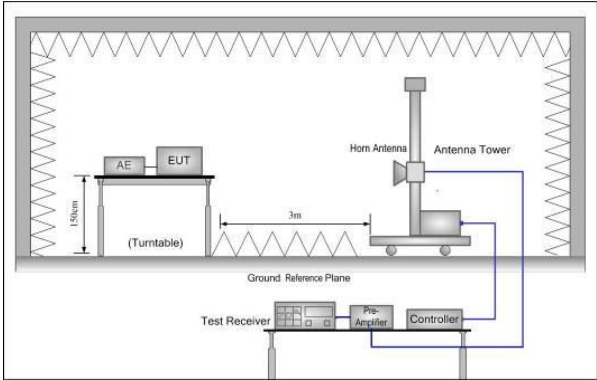
| Band 1 – 802.11a                                                                                                                                                                                                      |                     |                     |                 |                          |                |                     |                 |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                          |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5150.00                                                                                                                                                                                                               | 41.60               | 36.23               | 7.05            | 41.93                    | 42.95          | 68.20               | -25.25          | Horizontal   |
| 5150.00                                                                                                                                                                                                               | 40.23               | 36.23               | 7.05            | 41.93                    | 41.58          | 68.20               | -26.62          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5150.00                                                                                                                                                                                                               | 32.23               | 36.23               | 7.05            | 41.93                    | 33.58          | 54.00               | -20.42          | Horizontal   |
| 5150.00                                                                                                                                                                                                               | 31.77               | 36.23               | 7.05            | 41.93                    | 33.12          | 54.00               | -20.88          | Vertical     |
| Test channel: Highest channel                                                                                                                                                                                         |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5350.00                                                                                                                                                                                                               | 40.21               | 35.37               | 7.11            | 41.89                    | 40.80          | 68.20               | -27.40          | Horizontal   |
| 5350.00                                                                                                                                                                                                               | 39.64               | 35.37               | 7.11            | 41.89                    | 40.23          | 68.20               | -27.97          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5350.00                                                                                                                                                                                                               | 30.36               | 35.37               | 7.11            | 41.89                    | 30.95          | 54.00               | -23.05          | Horizontal   |
| 5350.00                                                                                                                                                                                                               | 31.40               | 35.37               | 7.11            | 41.89                    | 31.99          | 54.00               | -22.01          | Vertical     |
| <b>Remark:</b><br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                     |                     |                 |                          |                |                     |                 |              |

| Band 1 – 802.11n(HT20)                                                                                                                                                                                                |                     |                     |                 |                          |                |                     |                 |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                          |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak                                                                                                                                                                                                        |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5150.00                                                                                                                                                                                                               | 41.52               | 36.23               | 7.05            | 41.93                    | 42.87          | 68.20               | -25.33          | Horizontal   |
| 5150.00                                                                                                                                                                                                               | 40.36               | 36.23               | 7.05            | 41.93                    | 41.71          | 68.20               | -26.49          | Vertical     |
| Detector: Average                                                                                                                                                                                                     |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5150.00                                                                                                                                                                                                               | 31.34               | 36.23               | 7.05            | 41.93                    | 32.69          | 54.00               | -21.31          | Horizontal   |
| 5150.00                                                                                                                                                                                                               | 32.02               | 36.23               | 7.05            | 41.93                    | 33.37          | 54.00               | -20.63          | Vertical     |
| Test channel: Highest channel                                                                                                                                                                                         |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5350.00                                                                                                                                                                                                               | 41.30               | 35.37               | 7.11            | 41.89                    | 41.89          | 68.20               | -26.31          | Horizontal   |
| 5350.00                                                                                                                                                                                                               | 39.79               | 35.37               | 7.11            | 41.89                    | 40.38          | 68.20               | -27.82          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5350.00                                                                                                                                                                                                               | 30.23               | 35.37               | 7.11            | 41.89                    | 30.82          | 54.00               | -23.18          | Horizontal   |
| 5350.00                                                                                                                                                                                                               | 31.46               | 35.37               | 7.11            | 41.89                    | 32.05          | 54.00               | -21.95          | Vertical     |
| <b>Remark:</b><br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                     |                     |                 |                          |                |                     |                 |              |

| Band 1 – 802.11n(HT40)                                                                                                                                                                                                              |                     |                     |                 |                          |                |                     |                 |              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                                        |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                                |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5150.00                                                                                                                                                                                                                             | 41.34               | 36.23               | 7.05            | 41.93                    | 42.69          | 68.20               | -25.51          | Horizontal   |
| 5150.00                                                                                                                                                                                                                             | 39.25               | 36.23               | 7.05            | 41.93                    | 40.60          | 68.20               | -27.60          | Vertical     |
| Detector: Average Value                                                                                                                                                                                                             |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5150.00                                                                                                                                                                                                                             | 31.34               | 36.23               | 7.05            | 41.93                    | 32.69          | 54.00               | -21.31          | Horizontal   |
| 5150.00                                                                                                                                                                                                                             | 30.20               | 36.23               | 7.05            | 41.93                    | 31.55          | 54.00               | -22.45          | Vertical     |
| Test channel: Highest channel                                                                                                                                                                                                       |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                                |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5350.00                                                                                                                                                                                                                             | 41.34               | 35.37               | 7.11            | 41.89                    | 41.93          | 68.20               | -26.27          | Horizontal   |
| 5350.00                                                                                                                                                                                                                             | 41.78               | 35.37               | 7.11            | 41.89                    | 42.37          | 68.20               | -25.83          | Vertical     |
| Detector: Average Value                                                                                                                                                                                                             |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5350.00                                                                                                                                                                                                                             | 30.24               | 35.37               | 7.11            | 41.89                    | 30.83          | 54.00               | -23.17          | Horizontal   |
| 5350.00                                                                                                                                                                                                                             | 31.59               | 35.37               | 7.11            | 41.89                    | 32.18          | 54.00               | -21.82          | Vertical     |
| <b>Remark:</b><br>1. <i>Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.</i><br>2. <i>The emission levels of other frequencies are very lower than the limit and not show in test report.</i> |                     |                     |                 |                          |                |                     |                 |              |

## 6.7 Spurious Emission

### 6.7.1 Restricted Band

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                    |      |               |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|------|---------------|
| Test Requirement:     | FCC Part15 E Section 15.407(b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |                    |      |               |
| Test Method:          | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                    |      |               |
| Test Frequency Range: | 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                    |      |               |
| Test site:            | Measurement Distance: 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |                    |      |               |
| Receiver setup:       | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Detector | RBW                | VBW  | Remark        |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Peak     | 1MHz               | 3MHz | Peak Value    |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RMS      | 1MHz               | 3MHz | Average Value |
| Limit:                | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          | Limit (dBuV/m @3m) |      | Remark        |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          | 74.00              |      | Peak Value    |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          | 54.00              |      | Average Value |
| Test Procedure:       | <div>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.</div> <div>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.</div> <div>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.</div> <div>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.</div> <div>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</div> <div>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.</div> |          |                    |      |               |
| Test setup:           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |                    |      |               |
| Test Instruments:     | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                    |      |               |
| Test mode:            | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                    |      |               |
| Test results:         | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |                    |      |               |

**Measurement Data (worst case):**

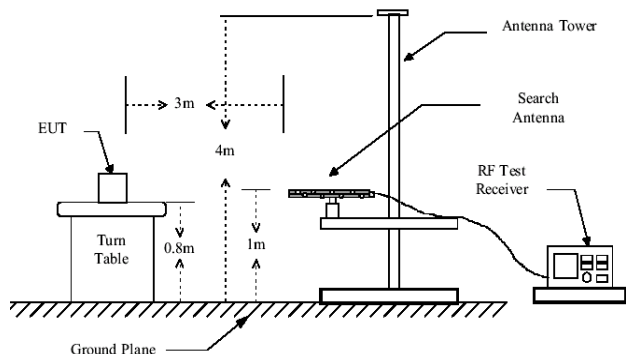
**Band 1:**

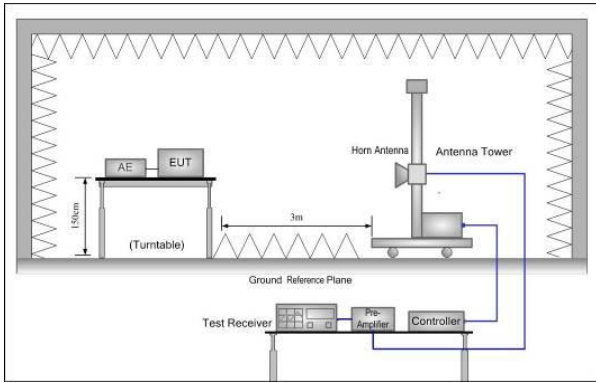
| Band 1 – 802.11a                                                                                                                                                                                                                    |                     |                     |                 |                          |                |                     |                 |              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                                        |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                                |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4500.00                                                                                                                                                                                                                             | 42.26               | 34.50               | 6.80            | 42.05                    | 41.51          | 74.00               | -32.49          | Horizontal   |
| 4500.00                                                                                                                                                                                                                             | 41.74               | 34.50               | 6.80            | 42.05                    | 40.99          | 74.00               | -33.01          | Vertical     |
| Detector: Average Value                                                                                                                                                                                                             |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4500.00                                                                                                                                                                                                                             | 31.36               | 34.50               | 6.80            | 42.05                    | 30.61          | 54.00               | -23.39          | Horizontal   |
| 4500.00                                                                                                                                                                                                                             | 30.58               | 34.50               | 6.80            | 42.05                    | 29.83          | 54.00               | -24.17          | Vertical     |
| Test channel: Highest channel                                                                                                                                                                                                       |                     |                     |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                                |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5460.00                                                                                                                                                                                                                             | 42.26               | 34.90               | 7.18            | 41.85                    | 42.49          | 74.00               | -31.51          | Horizontal   |
| 5460.00                                                                                                                                                                                                                             | 41.79               | 34.90               | 7.18            | 41.85                    | 42.02          | 74.00               | -31.98          | Vertical     |
| Detector: Average Value                                                                                                                                                                                                             |                     |                     |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                                     | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5460.00                                                                                                                                                                                                                             | 30.32               | 34.90               | 7.18            | 41.85                    | 30.55          | 54.00               | -23.45          | Horizontal   |
| 5460.00                                                                                                                                                                                                                             | 31.49               | 34.90               | 7.18            | 41.85                    | 31.72          | 54.00               | -22.28          | Vertical     |
| <b>Remark:</b><br>1. <i>Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.</i><br>2. <i>The emission levels of other frequencies are very lower than the limit and not show in test report.</i> |                     |                     |                 |                          |                |                     |                 |              |

| Band 1 – 802.11n(HT20)                                                                                                                                                                                                |                     |                     |                 |                    |                |                     |                 |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                          |                     |                     |                 |                    |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4500.00                                                                                                                                                                                                               | 41.58               | 34.50               | 6.80            | 42.05              | 40.83          | 74.00               | -33.17          | Horizontal   |
| 4500.00                                                                                                                                                                                                               | 41.76               | 34.50               | 6.80            | 42.05              | 41.01          | 74.00               | -32.99          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4500.00                                                                                                                                                                                                               | 32.03               | 34.50               | 6.80            | 42.05              | 31.28          | 54.00               | -22.72          | Horizontal   |
| 4500.00                                                                                                                                                                                                               | 31.49               | 34.50               | 6.80            | 42.05              | 30.74          | 54.00               | -23.26          | Vertical     |
| Test channel: Highest channel                                                                                                                                                                                         |                     |                     |                 |                    |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5460.00                                                                                                                                                                                                               | 42.02               | 34.90               | 7.18            | 41.85              | 42.25          | 74.00               | -31.75          | Horizontal   |
| 5460.00                                                                                                                                                                                                               | 41.77               | 34.90               | 7.18            | 41.85              | 42.00          | 74.00               | -32.00          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5460.00                                                                                                                                                                                                               | 31.62               | 34.90               | 7.18            | 41.85              | 31.85          | 54.00               | -22.15          | Horizontal   |
| 5460.00                                                                                                                                                                                                               | 30.49               | 34.90               | 7.18            | 41.85              | 30.72          | 54.00               | -23.28          | Vertical     |
| <b>Remark:</b><br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                     |                     |                 |                    |                |                     |                 |              |

| Band 1 – 802.11n(HT40)                                                                                                                                                                                                |                     |                     |                 |                    |                |                     |                 |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                          |                     |                     |                 |                    |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4500.00                                                                                                                                                                                                               | 42.20               | 34.50               | 6.80            | 42.05              | 41.45          | 74.00               | -32.55          | Horizontal   |
| 4500.00                                                                                                                                                                                                               | 41.77               | 34.50               | 6.80            | 42.05              | 41.02          | 74.00               | -32.98          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4500.00                                                                                                                                                                                                               | 31.30               | 34.50               | 6.80            | 42.05              | 30.55          | 54.00               | -23.45          | Horizontal   |
| 4500.00                                                                                                                                                                                                               | 30.56               | 34.50               | 6.80            | 42.05              | 29.81          | 54.00               | -24.19          | Vertical     |
| Test channel: Highest channel                                                                                                                                                                                         |                     |                     |                 |                    |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5460.00                                                                                                                                                                                                               | 41.58               | 34.90               | 7.18            | 41.85              | 41.81          | 74.00               | -32.19          | Horizontal   |
| 5460.00                                                                                                                                                                                                               | 41.89               | 34.90               | 7.18            | 41.85              | 42.12          | 74.00               | -31.88          | Vertical     |
| Detector: Average Value                                                                                                                                                                                               |                     |                     |                 |                    |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV/m) | Antenna Factor (dB) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 5460.00                                                                                                                                                                                                               | 31.32               | 34.90               | 7.18            | 41.85              | 31.55          | 54.00               | -22.45          | Horizontal   |
| 5460.00                                                                                                                                                                                                               | 31.46               | 34.90               | 7.18            | 41.85              | 31.69          | 54.00               | -22.31          | Vertical     |
| <b>Remark:</b><br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                     |                     |                 |                    |                |                     |                 |              |

## 6.7.2 Unwanted Emissions out of the Restricted Bands

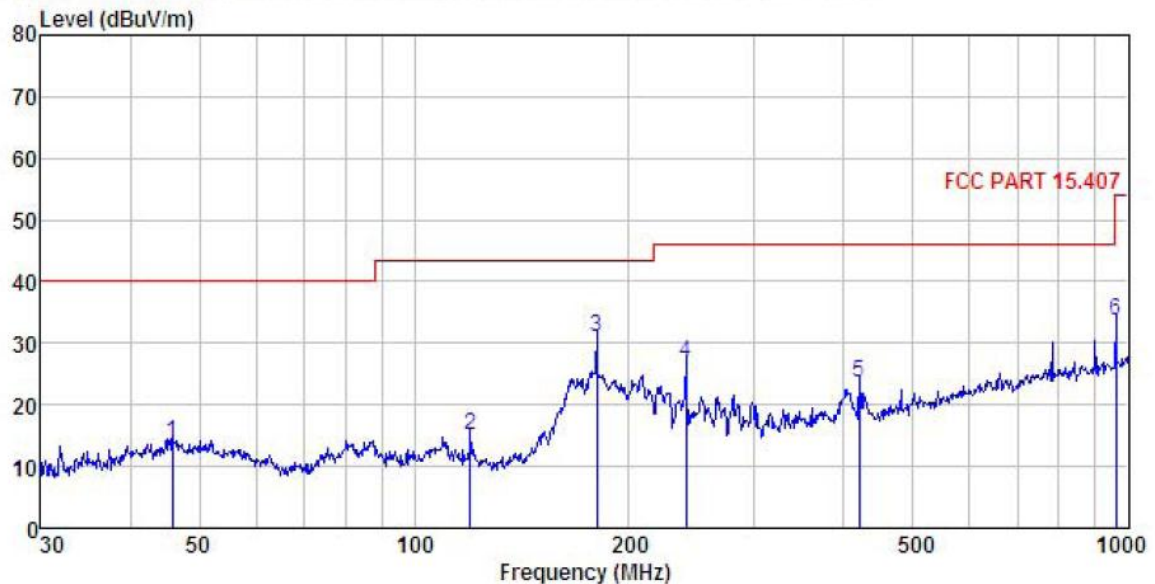
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                    |        |                  |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|--------|------------------|
| Test Requirement:     | FCC Part15 C Section 15.209 and 15.205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |                    |        |                  |
| Test Method:          | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                    |        |                  |
| Test Frequency Range: | 30MHz to 40GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |                    |        |                  |
| Test site:            | Measurement Distance: 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                    |        |                  |
| Receiver setup:       | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Detector   | RBW                | VBW    | Remark           |
|                       | 30MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Quasi-peak | 100kHz             | 300kHz | Quasi-peak Value |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Peak       | 1MHz               | 3MHz   | Peak Value       |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RMS        | 1MHz               | 3MHz   | Average Value    |
| Limit:                | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            | Limit (dBuV/m @3m) |        | Remark           |
|                       | 30MHz-88MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | 40.0               |        | Quasi-peak Value |
|                       | 88MHz-216MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            | 43.5               |        | Quasi-peak Value |
|                       | 216MHz-960MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            | 46.0               |        | Quasi-peak Value |
|                       | 960MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | 54.0               |        | Quasi-peak Value |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            | 68.20              |        | Peak Value       |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            | 54.00              |        | Average Value    |
|                       | Remark:<br>Above 1GHz limit:<br>$E[dBuV/m] = EIRP[dBm] + 95.2 = 68.2 \text{ dBuV/m}$ , for $EIPR[dBm] = -27dBm$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                    |        |                  |
| Test Procedure:       | <ol style="list-style-type: none"><li>1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) 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 setup:           | <div>Below 1GHz</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                    |        |                  |

|                   |                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------|
|                   | <p>Above 1GHz</p>  |
| Test Instruments: | Refer to section 5.9 for details                                                                     |
| Test mode:        | Refer to section 5.3 for details                                                                     |
| Test results:     | Passed                                                                                               |

## Measurement Data (worst case):

Below 1GHz

Test Polarization: Horizontal



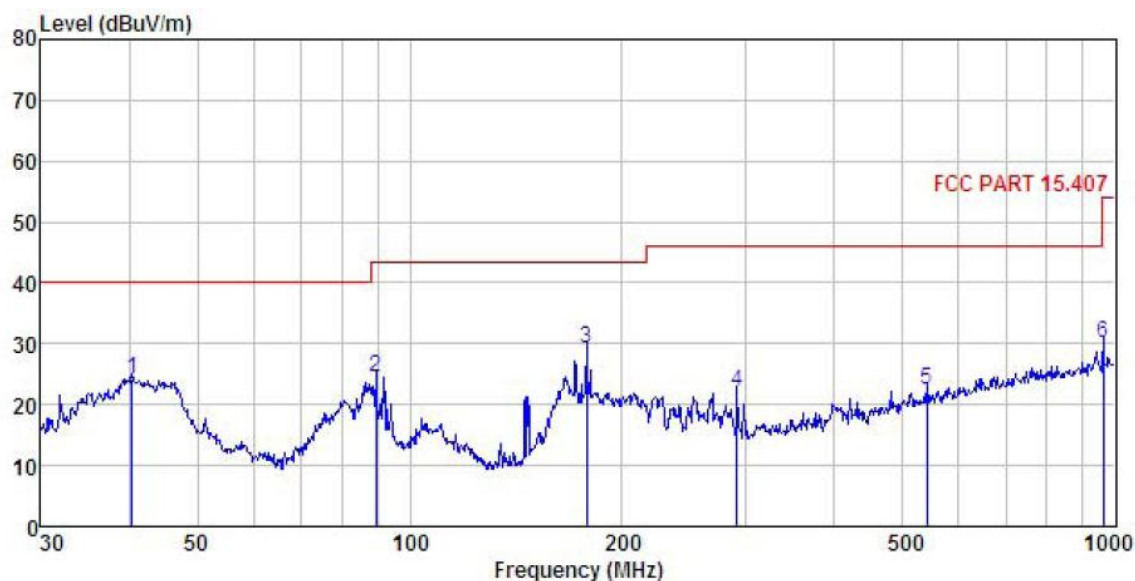
Site : 3m chamber  
 Condition : FCC PART 15.407 3m VULB9163(30M2G) HORIZONTAL  
 EUT : Smartphone  
 Model : One  
 Test mode : 5GWIFI mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: YT  
 REMARK :

|   | Freq    | Read  | Antenna | Cable | Preamp | Level  | Limit  | Over   |        |
|---|---------|-------|---------|-------|--------|--------|--------|--------|--------|
|   | MHz     | Level | Factor  | Loss  | Factor | Level  | Line   | Limit  | Remark |
|   | MHz     | dBuV  | dB/m    | dB    | dB     | dBuV/m | dBuV/m | dB     |        |
| 1 | 45.855  | 28.78 | 13.77   | 1.29  | 29.85  | 13.99  | 40.00  | -26.01 | QP     |
| 2 | 119.856 | 32.04 | 10.23   | 2.17  | 29.39  | 15.05  | 43.50  | -28.45 | QP     |
| 3 | 180.017 | 47.52 | 9.80    | 2.73  | 28.97  | 31.08  | 43.50  | -12.42 | QP     |
| 4 | 239.987 | 39.71 | 12.97   | 2.82  | 28.59  | 26.91  | 46.00  | -19.09 | QP     |
| 5 | 420.580 | 33.44 | 15.76   | 3.13  | 28.82  | 23.51  | 46.00  | -22.49 | QP     |
| 6 | 962.162 | 34.42 | 22.50   | 4.27  | 27.65  | 33.54  | 54.00  | -20.46 | QP     |

## Remark:

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

## Test Polarization: Vertical



Site : 3m chamber  
 Condition : FCC PART 15.407 3m VULB9163(30M2G) VERTICAL  
 EUT : Smartphone  
 Model : One  
 Test mode : 5GWIFI mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: YT  
 REMARK :

|   | Freq    | Read  | Antenna | Cable | Preamp | Level  | Limit  | Over   |        |
|---|---------|-------|---------|-------|--------|--------|--------|--------|--------|
|   | MHz     | Level | Factor  | Loss  | Factor | Level  | Line   | Limit  | Remark |
|   | MHz     | dBuV  | dB/m    | dB    | dB     | dBuV/m | dBuV/m | dB     |        |
| 1 | 40.417  | 39.86 | 12.88   | 1.22  | 29.90  | 24.06  | 40.00  | -15.94 | QP     |
| 2 | 89.590  | 41.99 | 9.93    | 2.04  | 29.57  | 24.39  | 43.50  | -19.11 | QP     |
| 3 | 178.133 | 45.63 | 9.73    | 2.71  | 28.99  | 29.08  | 43.50  | -14.42 | QP     |
| 4 | 291.036 | 34.16 | 13.55   | 2.92  | 28.47  | 22.16  | 46.00  | -23.84 | QP     |
| 5 | 541.373 | 29.64 | 17.92   | 3.84  | 29.07  | 22.33  | 46.00  | -23.67 | QP     |
| 6 | 962.162 | 31.00 | 22.50   | 4.27  | 27.65  | 30.12  | 54.00  | -23.88 | QP     |

## Remark:

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

Above 1GHz:

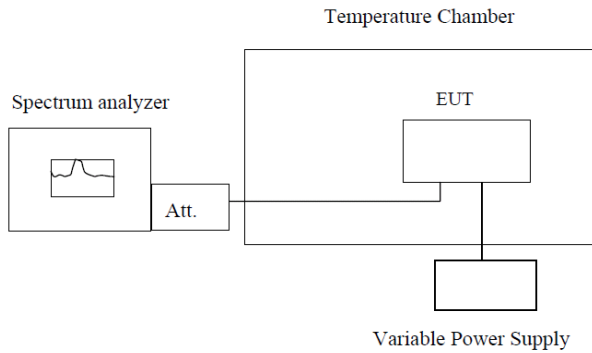
Band 1:

| Band 1 – 802.11a                                                                                                                                                                                               |                   |                       |                 |                          |                |                     |                 |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                   |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                           |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10360.00                                                                                                                                                                                                       | 48.52             | 40.10                 | 9.82            | 41.97                    | 56.47          | 68.20               | -11.73          | Vertical     |
| 10360.00                                                                                                                                                                                                       | 47.61             | 40.10                 | 9.82            | 41.97                    | 55.56          | 68.20               | -12.64          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                        |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10360.00                                                                                                                                                                                                       | 39.62             | 40.10                 | 9.82            | 41.97                    | 47.57          | 54.00               | -6.43           | Vertical     |
| 10360.00                                                                                                                                                                                                       | 40.10             | 40.10                 | 9.82            | 41.97                    | 48.05          | 54.00               | -5.95           | Horizontal   |
| Test channel: Middle channel                                                                                                                                                                                   |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                           |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10400.00                                                                                                                                                                                                       | 49.45             | 40.00                 | 9.85            | 41.95                    | 57.35          | 68.20               | -10.85          | Vertical     |
| 10400.00                                                                                                                                                                                                       | 48.62             | 40.00                 | 9.85            | 41.95                    | 56.52          | 68.20               | -11.68          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                        |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10400.00                                                                                                                                                                                                       | 40.25             | 40.00                 | 9.85            | 41.95                    | 48.15          | 54.00               | -5.85           | Vertical     |
| 10400.00                                                                                                                                                                                                       | 39.16             | 40.00                 | 9.85            | 41.95                    | 47.06          | 54.00               | -6.94           | Horizontal   |
| Test channel: Highest channel                                                                                                                                                                                  |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                           |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10480.00                                                                                                                                                                                                       | 49.62             | 39.70                 | 9.96            | 41.88                    | 57.40          | 68.20               | -10.80          | Vertical     |
| 10480.00                                                                                                                                                                                                       | 50.87             | 39.70                 | 9.96            | 41.88                    | 58.65          | 68.20               | -9.55           | Horizontal   |
| Detector: Average Value                                                                                                                                                                                        |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10480.00                                                                                                                                                                                                       | 40.02             | 39.70                 | 9.96            | 41.88                    | 47.80          | 54.00               | -6.20           | Vertical     |
| 10480.00                                                                                                                                                                                                       | 39.69             | 39.70                 | 9.96            | 41.88                    | 47.47          | 54.00               | -6.53           | Horizontal   |
| Remark:<br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                   |                       |                 |                          |                |                     |                 |              |

| Band 1 – 802.11n(HT20)                                                                                                                                                                                                |                   |                       |                 |                          |                |                     |                 |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                          |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10360.00                                                                                                                                                                                                              | 49.25             | 40.10                 | 9.82            | 41.97                    | 57.20          | 68.20               | -11.00          | Vertical     |
| 10360.00                                                                                                                                                                                                              | 48.77             | 40.10                 | 9.82            | 41.97                    | 56.72          | 68.20               | -11.48          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                               |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10360.00                                                                                                                                                                                                              | 39.26             | 40.10                 | 9.82            | 41.97                    | 47.21          | 54.00               | -6.79           | Vertical     |
| 10360.00                                                                                                                                                                                                              | 38.57             | 40.10                 | 9.82            | 41.97                    | 46.52          | 54.00               | -7.48           | Horizontal   |
| Test channel: Middle channel                                                                                                                                                                                          |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10400.00                                                                                                                                                                                                              | 49.62             | 40.00                 | 9.85            | 41.95                    | 57.52          | 68.20               | -10.68          | Vertical     |
| 10400.00                                                                                                                                                                                                              | 48.11             | 40.00                 | 9.85            | 41.95                    | 56.01          | 68.20               | -12.19          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                               |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10400.00                                                                                                                                                                                                              | 39.25             | 40.00                 | 9.85            | 41.95                    | 47.15          | 54.00               | -6.85           | Vertical     |
| 10400.00                                                                                                                                                                                                              | 41.42             | 40.00                 | 9.85            | 41.95                    | 49.32          | 54.00               | -4.68           | Horizontal   |
| Test channel: Highest channel                                                                                                                                                                                         |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10480.00                                                                                                                                                                                                              | 48.63             | 39.70                 | 9.96            | 41.88                    | 56.41          | 68.20               | -11.79          | Vertical     |
| 10480.00                                                                                                                                                                                                              | 49.27             | 39.70                 | 9.96            | 41.88                    | 57.05          | 68.20               | -11.15          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                               |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10480.00                                                                                                                                                                                                              | 39.62             | 39.70                 | 9.96            | 41.88                    | 47.40          | 54.00               | -6.60           | Vertical     |
| 10480.00                                                                                                                                                                                                              | 38.12             | 39.70                 | 9.96            | 41.88                    | 45.90          | 54.00               | -8.10           | Horizontal   |
| <b>Remark:</b><br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                   |                       |                 |                          |                |                     |                 |              |

| Band 1 – 802.11n(HT40)                                                                                                                                                                                                |                   |                       |                 |                          |                |                     |                 |              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-----------------|--------------|
| Test channel: Lowest channel                                                                                                                                                                                          |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10380.00                                                                                                                                                                                                              | 49.32             | 40.00                 | 9.85            | 41.95                    | 57.22          | 68.20               | -10.98          | Vertical     |
| 10380.00                                                                                                                                                                                                              | 48.51             | 40.00                 | 9.85            | 41.95                    | 56.41          | 68.20               | -11.79          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                               |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10380.00                                                                                                                                                                                                              | 38.23             | 40.00                 | 9.85            | 41.95                    | 46.13          | 54.00               | -7.87           | Vertical     |
| 10380.00                                                                                                                                                                                                              | 39.77             | 40.00                 | 9.85            | 41.95                    | 47.67          | 54.00               | -6.33           | Horizontal   |
| Test channel: Highest channel                                                                                                                                                                                         |                   |                       |                 |                          |                |                     |                 |              |
| Detector: Peak Value                                                                                                                                                                                                  |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10460.00                                                                                                                                                                                                              | 49.20             | 39.80                 | 9.92            | 41.90                    | 57.02          | 68.20               | -11.18          | Vertical     |
| 10460.00                                                                                                                                                                                                              | 48.17             | 39.80                 | 9.92            | 41.90                    | 55.99          | 68.20               | -12.21          | Horizontal   |
| Detector: Average Value                                                                                                                                                                                               |                   |                       |                 |                          |                |                     |                 |              |
| Frequency (MHz)                                                                                                                                                                                                       | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
| 10460.00                                                                                                                                                                                                              | 38.64             | 39.80                 | 9.92            | 41.90                    | 46.46          | 54.00               | -7.54           | Vertical     |
| 10460.00                                                                                                                                                                                                              | 41.43             | 39.80                 | 9.92            | 41.90                    | 49.25          | 54.00               | -4.75           | Horizontal   |
| <b>Remark:</b><br>1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.<br>2. The emission levels of other frequencies are very lower than the limit and not show in test report. |                   |                       |                 |                          |                |                     |                 |              |

## 6.8 Frequency stability

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407 (g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Limit:            | Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Test setup:       |  <p>Note : Measurement setup for testing on Antenna connector</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test procedure:   | <ol style="list-style-type: none"> <li>1. The EUT is installed in an environment test chamber with external power source.</li> <li>2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.</li> <li>3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.</li> <li>4. When temperature is stabled, measure the frequency stability.</li> <li>5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.</li> </ol> |
| Test Instruments: | Refer to section 5.9 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## Measurement Data (the worst channel):

## Band 1:

## Voltage vs. Frequency Stability (Lowest channel=5180MHz)

| Test conditions |             | Frequency(MHz) | Max. Deviation (ppm) |
|-----------------|-------------|----------------|----------------------|
| Temp(℃)         | Voltage(ac) |                |                      |
| 20              | 102V        | 5179.997643    | 0.45                 |
|                 | 120V        | 5179.974779    | 4.87                 |
|                 | 138V        | 5179.963951    | 6.96                 |

## Temperature vs. Frequency Stability (Lowest channel=5180MHz)

| Test conditions |         | Frequency(MHz) | Max. Deviation (ppm) |
|-----------------|---------|----------------|----------------------|
| Voltage(ac)     | Temp(℃) |                |                      |
| 120V            | -20     | 5179.987033    | 2.50                 |
|                 | -10     | 5179.995377    | 0.89                 |
|                 | 0       | 5179.968421    | 6.10                 |
|                 | 10      | 5179.987556    | 2.40                 |
|                 | 20      | 5179.996681    | 0.64                 |
|                 | 30      | 5179.974290    | 4.96                 |
|                 | 40      | 5179.963775    | 6.99                 |
|                 | 50      | 5179.974929    | 4.84                 |