

GIObal United Technology Services Co., Ltd.

Report No.: GTS201911000113F01

# **TEST REPORT**

| Applicant:   | Shenzhen Bobotel Technology Dev. Co., Ltd.   |
|--|--|
| Address of Applicant:                                  | Block 130-131, Pinghuan Bld., Pinghuan Rd., Pingshan<br>District, Shenzhen, China  |
| Manufacturer:  | Shenzhen Bobotel Technology Dev. Co., Ltd.   |
| Address of<br>Manufacturer:<br>Equipment Under Test (E | Block 130-131, Pinghuan Bld., Pinghuan Rd., Pingshan<br>District, Shenzhen, China<br>E <b>UT)</b>  |
| Product Name:  | Smart Plug   |
| Model No.:<br>Trade Mark:                              | KW-US-101, KW-US-SA01, KW-US-SA06, KW-US-BS01,<br>KW-US-BS02, KW-US-BS21, KW-US-SWA1, KW-US-SWA5,<br>KW-US-JS01, KW-US-BB00-A, KW-US-BB01-A, XS-SSA01<br>Kaforto |
| FCC ID:  | 2ATPP-US101  |
| Applicable standards:                                  | FCC CFR Title 47 Part 15 Subpart C Section 15.247  |
| Date of sample receipt:                                | 2019-07-06   |
| Date of Test:  | 2019-07-07 to 2019-09-11   |
| Date of report issued:                                 | 2019-11-20   |
| Test Result :  | PASS *   |

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

uthorized Sig ture: 8019

**Robinson Lo** Laboratory Manager

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#### Version 2

| Version No. | Date       | Description |
|-------------|------------|-------------|
| 00          | 2019-11-20 | Original    |
|             |            |             |
|             |            |             |
|             |            |             |
|             |            |             |

Prepared By:

Date:

2019-11-20

Project Engineer

Check By:

Date: obinson Reviewer

2019-11-20



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## 4 Test Summary

| Test Item                        | Section                    | Result |
|----------------------------------|----------------------------|--------|
| Antenna requirement              | FCC part 15.203/15.247 (c) | Pass   |
| AC Power Line Conducted Emission | FCC part 15.207            | Pass   |
| Conducted Peak Output Power      | FCC part 15.247 (b)(3)     | Pass   |
| Channel Bandwidth & 99% OCB      | FCC part 15.247 (a)(2)     | Pass   |
| Power Spectral Density           | FCC part 15.247 (e)        | Pass   |
| Band Edge                        | FCC part 15.247(d)         | Pass   |
| Spurious Emission                | FCC part 15.205/15.209     | Pass   |

Remark: Test according to ANSI C63.10:2013 and RSS-Gen

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

#### **Measurement Uncertainty**

| Test Item                           | Frequency Range                      | Measurement Uncertainty           | Notes |
|-------------------------------------|--------------------------------------|-----------------------------------|-------|
| Radiated Emission                   | 30MHz-200MHz 3.8039dB                |                                   | (1)   |
| Radiated Emission                   | 200MHz-1GHz 3.9679dB                 |                                   | (1)   |
| Radiated Emission                   | 1GHz-18GHz 4.29dB                    |                                   | (1)   |
| Radiated Emission                   | n 18GHz-40GHz 3.30dB                 |                                   | (1)   |
| AC Power Line Conducted<br>Emission | 0.15MHz ~ 30MHz                      | 3.44dB                            | (1)   |
| Note (1): The measurement unce      | ertainty is for coverage factor of k | =2 and a level of confidence of 9 | 95%.  |



### 5 General Information

### 5.1 General Description of EUT

| •                      |   |
|------------------------|---|
| Product Name:          | Smart Plug  |
| Model No.:             | KW-US-101   |
| Serial No.:            | KW-US-SA01, KW-US-SA06, KW-US-BS01, KW-US-BS02, KW-US-<br>BS21, KW-US-SWA1, KW-US-SWA5, KW-US-JS01, KW-US-BB00-A,<br>KW-US-BB01-A, XS-SSA01 |
| Hardware Version:      | 1.0.1   |
| Software Version:      | V1.0  |
| Test sample(s) ID:     | GTS201911000113-1   |
| Sample(s) Status:      | Engineer sample   |
| Sample(s) Status:      | Engineer sample   |
| Channel numbers:       | 802.11b/802.11g /802.11n(HT20): 11  |
| Channel separation:    | 5MHz  |
| Modulation technology: | 802.11b: Direct Sequence Spread Spectrum (DSSS)   |
|                        | 802.11g/802.11n(H20): Orthogonal Frequency Division Multiplexing (OFDM)   |
| Antenna Type:          | PCB Antenna   |
| Antenna gain:          | 1.7dBi  |
| Power supply:          | Input: AC 100V-240V~50/60Hz, 10A(Max.)  |



| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1                                   | 2412MHz   | 4       | 2427MHz   | 7       | 2442MHz   | 10      | 2457MHz   |
| 2                                   | 2417MHz   | 5       | 2432MHz   | 8       | 2447MHz   | 11      | 2462MHz   |
| 3                                   | 2422MHz   | 6       | 2437MHz   | 9       | 2452MHz   |         |           |

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:

| Test channel    | Frequency (MHz)               |
|-----------------|-------------------------------|
|                 | 802.11b/802.11g/802.11n(HT20) |
| Lowest channel  | 2412MHz                       |
| Middle channel  | 2437MHz                       |
| Highest channel | 2462MHz                       |



#### 5.2 Test mode

| Transmitting mode | Keep the EUT in continuously transmitting mode |
|-------------------|--|
|-------------------|--|

Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

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:

| Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case. |               |       |         |  |  |
|--|---------------|-------|---------|--|--|
| Mode   | 802.11n(HT20) |       |         |  |  |
| Data rate  | 1Mbps         | 6Mbps | 6.5Mbps |  |  |

#### 5.3 Description of Support Units

None.

#### 5.4 Deviation from Standards

None.

#### 5.5 Abnormalities from Standard Conditions

#### None.

#### 5.6 Test Facility

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

#### • FCC — Registration No.: 381383

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

#### • IC — Registration No.: 9079A

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

#### • NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

#### 5.7 Test Location

All tests were performed at: Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

#### 5.8 Additional Instructions

| Test Software Version | SecureCRT.exe |                   |    |  |  |  |  |
|-----------------------|---------------|-------------------|----|--|--|--|--|
| Channel               | CH 01         | CH 01 CH 06 CH 11 |    |  |  |  |  |
| IEEE 802.11b DSSS     | 40            | 40                | 40 |  |  |  |  |
| IEEE 802.11g OFDM     | 60            | 60                | 60 |  |  |  |  |
| IEEE 802.11n (HT20)   | 65            | 65                | 65 |  |  |  |  |



## 6 Test Instruments list

| Rad  | iated Emission:                        |                                |                             |                  |                        |                            |
|------|--|--------------------------------|-----------------------------|------------------|------------------------|----------------------------|
| ltem | Test Equipment                         | Manufacturer                   | Model No.                   | Inventory<br>No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |
| 1    | 3m Semi- Anechoic<br>Chamber           | ZhongYu Electron               | 9.2(L)*6.2(W)* 6.4(H)       | GTS250           | July. 03 2015          | July. 02 2020              |
| 2    | Control Room                           | ZhongYu Electron               | 6.2(L)*2.5(W)* 2.4(H)       | GTS251           | N/A                    | N/A                        |
| 3    | EMI Test Receiver                      | Rohde & Schwarz                | ESU26                       | GTS203           | June. 26 2019          | June. 25 2020              |
| 4    | BiConiLog Antenna                      | SCHWARZBECK<br>MESS-ELEKTRONIK | VULB9163                    | GTS214           | June. 26 2019          | June. 25 2020              |
| 5    | Double -ridged<br>waveguide horn       | SCHWARZBECK<br>MESS-ELEKTRONIK | BBHA 9120 D                 | GTS208           | June. 26 2019          | June. 25 2020              |
| 6    | Horn Antenna                           | ETS-LINDGREN                   | 3160                        | GTS217           | June. 26 2019          | June. 25 2020              |
| 7    | EMI Test Software                      | AUDIX                          | E3                          | N/A              | N/A                    | N/A                        |
| 8    | Coaxial Cable                          | GTS                            | N/A                         | GTS213           | June. 26 2019          | June. 25 2020              |
| 9    | Coaxial Cable                          | GTS                            | N/A                         | GTS211           | June. 26 2019          | June. 25 2020              |
| 10   | Coaxial cable                          | GTS                            | N/A                         | GTS210           | June. 26 2019          | June. 25 2020              |
| 11   | Coaxial Cable                          | GTS                            | N/A                         | GTS212           | June. 26 2019          | June. 25 2020              |
| 12   | Amplifier(100kHz-3GHz)                 | HP                             | 8347A                       | GTS204           | June. 26 2019          | June. 25 2020              |
| 13   | Amplifier(2GHz-20GHz)                  | HP                             | 84722A                      | GTS206           | June. 26 2019          | June. 25 2020              |
| 14   | Amplifier (18-26GHz)                   | Rohde & Schwarz                | AFS33-18002<br>650-30-8P-44 | GTS218           | June. 26 2019          | June. 25 2020              |
| 15   | Band filter                            | Amindeon                       | 82346                       | GTS219           | June. 26 2019          | June. 25 2020              |
| 16   | Power Meter                            | Anritsu                        | ML2495A                     | GTS540           | June. 26 2019          | June. 25 2020              |
| 17   | Power Sensor                           | Anritsu                        | MA2411B                     | GTS541           | June. 26 2019          | June. 25 2020              |
| 18   | Wideband Radio<br>Communication Tester | Rohde & Schwarz                | CMW500                      | GTS575           | June. 26 2019          | June. 25 2020              |
| 19   | Splitter                               | Agilent                        | 11636B                      | GTS237           | June. 26 2019          | June. 25 2020              |
| 20   | Loop Antenna                           | ZHINAN                         | ZN30900A                    | GTS534           | June. 26 2019          | June. 25 2020              |
| 21   | Breitband<br>hornantenne               | SCHWARZBECK                    | BBHA 9170                   | GTS579           | Oct. 19 2019           | Oct. 18 2020               |
| 22   | Amplifier                              | TDK                            | PA-02-02                    | GTS574           | Oct. 19 2019           | Oct. 18 2020               |
| 23   | Amplifier                              | TDK                            | PA-02-03                    | GTS576           | Oct. 19 2019           | Oct. 18 2020               |
| 24   | PSA Series Spectrum<br>Analyzer        | Rohde & Schwarz                | FSP                         | GTS578           | June. 26 2019          | June. 25 2020              |



| Cone | ducted Emission          |                             |                      |                  |                        |                            |
|------|--------------------------|-----------------------------|----------------------|------------------|------------------------|----------------------------|
| ltem | Test Equipment           | Manufacturer                | Model No.            | Inventory<br>No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |
| 1    | Shielding Room           | ZhongYu Electron            | 7.3(L)x3.1(W)x2.9(H) | GTS252           | May.15 2019            | May.14 2022                |
| 2    | EMI Test Receiver        | R&S                         | ESCI 7               | GTS552           | June. 26 2019          | June. 25 2020              |
| 3    | Coaxial Switch           | ANRITSU CORP                | MP59B                | GTS225           | June. 26 2019          | June. 25 2020              |
| 4    | Artificial Mains Network | SCHWARZBECK<br>MESS         | NSLK8127             | GTS226           | June. 26 2019          | June. 25 2020              |
| 5    | Coaxial Cable            | GTS                         | N/A                  | GTS227           | N/A                    | N/A                        |
| 6    | EMI Test Software        | AUDIX                       | E3                   | N/A              | N/A                    | N/A                        |
| 7    | Thermo meter             | KTJ                         | TA328                | GTS233           | June. 26 2019          | June. 25 2020              |
| 8    | Absorbing clamp          | Elektronik-<br>Feinmechanik | MDS21                | GTS229           | June. 26 2019          | June. 25 2020              |
| 9    | ISN                      | SCHWARZBECK                 | NTFM 8158            | GTD565           | June. 26 2019          | June. 25 2020              |

| RF C | RF Conducted Test:                                   |              |                  |            |                        |                            |  |  |
|------|--|--------------|------------------|------------|------------------------|----------------------------|--|--|
| ltem | Test Equipment                                       | Manufacturer | Model No.        | Serial No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |  |  |
| 1    | MXA Signal Analyzer                                  | Agilent      | N9020A           | GTS566     | June. 26 2019          | June. 25 2020              |  |  |
| 2    | EMI Test Receiver                                    | R&S          | ESCI 7           | GTS552     | June. 26 2019          | June. 25 2020              |  |  |
| 3    | Spectrum Analyzer                                    | Agilent      | E4440A           | GTS533     | June. 26 2019          | June. 25 2020              |  |  |
| 4    | MXG vector Signal<br>Generator                       | Agilent      | N5182A           | GTS567     | June. 26 2019          | June. 25 2020              |  |  |
| 5    | ESG Analog Signal<br>Generator                       | Agilent      | E4428C           | GTS568     | June. 26 2019          | June. 25 2020              |  |  |
| 6    | USB RF Power Sensor                                  | DARE         | RPR3006W         | GTS569     | June. 26 2019          | June. 25 2020              |  |  |
| 7    | RF Switch Box  | Shongyi      | RFSW3003328      | GTS571     | June. 26 2019          | June. 25 2020              |  |  |
| 8    | Programmable Constant<br>Temp & Humi<br>Test Chamber | WEWON        | WHTH-150L-40-880 | GTS572     | June. 26 2019          | June. 25 2020              |  |  |

| Gene | General used equipment:            |              |           |               |                        |                            |  |  |
|------|------------------------------------|--------------|-----------|---------------|------------------------|----------------------------|--|--|
| Item | Test Equipment                     | Manufacturer | Model No. | Inventory No. | Cal.Date<br>(mm-dd-yy) | Cal.Due date<br>(mm-dd-yy) |  |  |
| 1    | Humidity/ Temperature<br>Indicator | KTJ          | TA328     | GTS243        | June. 26 2019          | June. 25 2020              |  |  |
| 2    | Barometer                          | ChangChun    | DYM3      | GTS255        | June. 26 2019          | June. 25 2020              |  |  |



## 7 Test results and Measurement Data

#### 7.1 Antenna requirement

| Standard requirement:   | FCC Part15 C Section 15.203 /247(c)  |  |  |  |  |  |  |
|---|--|--|--|--|--|--|--|
| 15.203 requirement:   | ·  |  |  |  |  |  |  |
| responsible party shall be u<br>antenna that uses a unique<br>so that a broken antenna ca | 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. |  |  |  |  |  |  |
| 15.247(c) (1)(i) requiremer   | nt:  |  |  |  |  |  |  |
| operations may employ tran  | 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point asmitting antennas with directional gain greater than 6dBi provided the t power of the intentional radiator is reduced by 1 dB for every 3 dB that the ana exceeds 6dBi.   |  |  |  |  |  |  |
| EUT Antenna:  |  |  |  |  |  |  |  |
| The antennas are PCB antenna, t   | he best case gain of the antennas are 1.7dBi, reference to the appendix II for   |  |  |  |  |  |  |



### 7.2 Conducted Emissions

| Test Requirement:     | FCC Part15 C Section 15.207   |  |          |          |  |  |  |  |
|-----------------------|---|--|----------|----------|--|--|--|--|
| Test Method:          | ANSI C63.10:2013  |  |          |          |  |  |  |  |
| Test Frequency Range: | 150KHz to 30MHz   |  |          |          |  |  |  |  |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, Sv   | weep time=auto                           |          |          |  |  |  |  |
| Limit:                |   | Limi                                     | t (dBuV) |          |  |  |  |  |
|                       | Frequency range (MHz)   | Frequency range (MHz) Quasi-peak Average |          |          |  |  |  |  |
|                       | 0.15-0.5  | 0.15-0.5 66 to 56* 56 to 46*             |          |          |  |  |  |  |
|                       | 0.5-5 56 46   |  |          |          |  |  |  |  |
|                       | 5-30  | 60                                       |          | 50       |  |  |  |  |
| Test setup:           | * Decreases with the logarithn  | n of the frequency.                      |          |          |  |  |  |  |
| Test procedure:       | <ul> <li>Reference Plane</li> <li>LISN 40cm 80cm LISN Filter AC power</li> <li>Equipment E.U.T Filter AC power</li> <li>Euri Equipment Under Test</li> <li>LISN Line Impedence Stabilization Network</li> <li>Test table/Insulation plane</li> </ul> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 500hm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and photographs). 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. |  |          |          |  |  |  |  |
|                       |   |  |          |          |  |  |  |  |
| Test Instruments:     | Refer to section 6.0 for details  |  |          |          |  |  |  |  |
| Test mode:            | Refer to section 5.2 for details  |  |          |          |  |  |  |  |
| Test environment:     | Temp.: 25 °C Hum  | nid.: 52%                                | Press.:  | 1012mbar |  |  |  |  |
| Test voltage:         | AC 120V, 60Hz   | 1  | 1        |          |  |  |  |  |
| Test results:         | Pass  |  |          |          |  |  |  |  |



#### Measurement data

| Terminal:                         | Line   | }  |  |  |   |  |  |                   |
|-----------------------------------|--|--|--|--|---|--|--|-------------------|
| Test Mode:                        | Nor  | mal workin   | g with TX  | B Mode   |   |  |  |                   |
| Remark:                           | Only   | y worse ca   | se is repo   | orted  |   |  |  |                   |
| 90.0 dBuV                         | Mar Mark   |  | ·<br>V   |  |   | MMMM   |  | P:<br>VG:<br>peak |
| -10                               | 0.   | 5<br>Reading   | ()<br>Correct  | MHz)<br>Measure-   | 5   |  |  | 30.000            |
| No. Mk.                           | Freq.  | Level  | Factor   | ment   | Limit   | Over   |  |                   |
|                                   | MHz  | dBuV   | dB   | dBuV   | dBuV  | dB   | Detector   | Comment           |
| 1                                 | 0.1580   |  |  |  | <b></b>   |  |  |                   |
|                                   |  | 35.68  | 9.77   | 45.45  | 65.56   |  | QP   |                   |
| 2                                 | 0.1580   | 22.88  | 9.77   | 32.65  | 55.56   | -22.91   | AVG  |                   |
| 3                                 | 0.1580<br>0.1940   | 22.88<br>37.05   | 9.77<br>9.78   | 32.65<br>46.83   | 55.56<br>63.86  | -22.91<br>-17.03   | AVG<br>QP  |                   |
| 3                                 | 0.1580<br>0.1940<br>0.1940   | 22.88<br>37.05<br>25.33  | 9.77<br>9.78<br>9.78   | 32.65<br>46.83<br>35.11  | 55.56<br>63.86<br>53.86   | -22.91<br>-17.03<br>-18.75   | AVG<br>QP<br>AVG                                 |                   |
| 3<br>4<br>5                       | 0.1580<br>0.1940<br>0.1940<br>0.2460   | 22.88<br>37.05<br>25.33<br>32.72                                     | 9.77<br>9.78<br>9.78<br>9.80                                 | 32.65<br>46.83<br>35.11<br>42.52                                     | 55.56<br>63.86<br>53.86<br>61.89  | -22.91<br>-17.03<br>-18.75<br>-19.37   | AVG<br>QP<br>AVG<br>QP                           |                   |
| 3<br>4<br>5<br>6                  | 0.1580<br>0.1940<br>0.1940<br>0.2460<br>0.2460                               | 22.88<br>37.05<br>25.33<br>32.72<br>21.78                            | 9.77<br>9.78<br>9.78<br>9.80<br>9.80                         | 32.65<br>46.83<br>35.11<br>42.52<br>31.58                            | 55.56<br>63.86<br>53.86<br>61.89<br>51.89                                     | -22.91<br>-17.03<br>-18.75<br>-19.37<br>-20.31                               | AVG<br>QP<br>AVG<br>QP<br>AVG                    |                   |
| 3<br>4<br>5<br>6<br>7             | 0.1580<br>0.1940<br>0.1940<br>0.2460<br>0.2460<br>0.2460                     | 22.88<br>37.05<br>25.33<br>32.72<br>21.78<br>25.96                   | 9.77<br>9.78<br>9.78<br>9.80<br>9.80<br>9.95                 | 32.65<br>46.83<br>35.11<br>42.52<br>31.58<br>35.91                   | 55.56<br>63.86<br>53.86<br>61.89<br>51.89<br>56.03                            | -22.91<br>-17.03<br>-18.75<br>-19.37<br>-20.31<br>-20.12                     | AVG<br>QP<br>AVG<br>QP<br>AVG<br>QP              |                   |
| 3<br>4<br>5<br>6<br>7<br>8 *      | 0.1580<br>0.1940<br>0.1940<br>0.2460<br>0.2460<br>0.4980<br>0.4980           | 22.88<br>37.05<br>25.33<br>32.72<br>21.78<br>25.96<br>22.21          | 9.77<br>9.78<br>9.78<br>9.80<br>9.80<br>9.80<br>9.95<br>9.95 | 32.65<br>46.83<br>35.11<br>42.52<br>31.58<br>35.91<br>32.16          | 55.56<br>63.86<br>53.86<br>61.89<br>51.89<br>56.03<br>46.03                   | -22.91<br>-17.03<br>-18.75<br>-19.37<br>-20.31<br>-20.12<br>-13.87           | AVG<br>QP<br>AVG<br>QP<br>AVG<br>QP<br>AVG       |                   |
| 3<br>4<br>5<br>6<br>7<br>8 *<br>9 | 0.1580<br>0.1940<br>0.1940<br>0.2460<br>0.2460<br>0.4980<br>0.4980<br>0.9220 | 22.88<br>37.05<br>25.33<br>32.72<br>21.78<br>25.96<br>22.21<br>23.68 | 9.77<br>9.78<br>9.78<br>9.80<br>9.80<br>9.95<br>9.95<br>9.29 | 32.65<br>46.83<br>35.11<br>42.52<br>31.58<br>35.91<br>32.16<br>32.97 | 55.56<br>63.86<br>53.86<br>61.89<br>51.89<br>56.03<br>46.03<br>56.00          | -22.91<br>-17.03<br>-18.75<br>-19.37<br>-20.31<br>-20.12<br>-13.87<br>-23.03 | AVG<br>QP<br>AVG<br>QP<br>AVG<br>QP<br>AVG<br>QP |                   |
| 3<br>4<br>5<br>6<br>7<br>8 *      | 0.1580<br>0.1940<br>0.1940<br>0.2460<br>0.2460<br>0.4980<br>0.4980           | 22.88<br>37.05<br>25.33<br>32.72<br>21.78<br>25.96<br>22.21          | 9.77<br>9.78<br>9.78<br>9.80<br>9.80<br>9.80<br>9.95<br>9.95 | 32.65<br>46.83<br>35.11<br>42.52<br>31.58<br>35.91<br>32.16          | 55.56<br>63.86<br>53.86<br>61.89<br>51.89<br>56.03<br>46.03<br>56.00<br>46.00 | -22.91<br>-17.03<br>-18.75<br>-19.37<br>-20.31<br>-20.12<br>-13.87           | AVG<br>QP<br>AVG<br>QP<br>AVG<br>QP<br>AVG       |                   |



| Teri | minal:  | Neu    | ıtral          |               |                  |       |                  |           |                      |
|------|---------|--------|----------------|---------------|------------------|-------|------------------|-----------|----------------------|
| Tes  | t Mode: | Nor    | mal workin     | g with TX     | B Mode           |       |                  |           |                      |
| Ren  | nark:   | Onl    | y worse ca     | se is repo    | orted            |       |                  |           |                      |
| 90.0 |         |        |                |               |                  |       | Wwwww<br>Wwwww   |           | P:<br>VG:<br>MMMpeal |
| -10  |         | 0.     | 5<br>Reading   | (I<br>Correct | MHz)<br>Measure- | 5     |                  |           | 30.000               |
| _    | No. Mk. | Freq.  | Level          | Factor        | ment             | Limit | Over             |           |                      |
| -    |         | MHz    | dBuV           | dB            | dBuV             | dBuV  | dB               | Detector  | Comment              |
| -    |         | 0.1539 | 38.79          | 9.60          | 48.39            |       | -17.39           | QP        |                      |
|      |         | 0.1539 | 23.67          | 9.60          | 33.27            | 55.78 |                  | AVG       |                      |
|      |         | 0.1900 | 36.91          | 9.58          | 46.49            | 64.03 |                  | QP        |                      |
|      |         | 0.1900 | 21.73          | 9.58          | 31.31            |       | -22.72           | AVG       |                      |
|      |         | 0.2185 | 34.25          | 9.61          | 43.86            | 62.87 |                  | QP        |                      |
|      |         | 0.2185 | 19.28          | 9.61          | 28.89            |       | -23.98           | AVG       |                      |
|      | 7       | 0.5380 | 24.04          | 9.78          | 33.82            |       | -22.18<br>-21.54 |           |                      |
| -    |         | 0.5380 | 14.68<br>23.80 | 9.78<br>9.69  | 24.46<br>33.49   |       | -21.54           | AVG<br>QP |                      |
|      |         | 0.8660 | 15.40          | 9.69          | 25.09            |       | -22.51           | AVG       |                      |
| -    | 10      | 1.2059 | 23.07          | 9.69          | 32.69            |       | -20.91           | QP        |                      |
|      |         | 1.2009 | 23.07          | 0.02          | 52.08            | 46.00 | -20.01           |           |                      |

Notes:

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



### 7.3 Conducted Peak Output Power

| Test Requirement : | FCC Part15 C Section 15.247 (b)(3)                                    |  |  |  |
|--------------------|---|--|--|--|
| Test Method :      | KDB558074 D01 DTS Meas Guidance V05or02                               |  |  |  |
| Limit:             | 30dBm   |  |  |  |
| Test setup:        | Power Meter<br>E.U.T<br>Non-Conducted Table<br>Ground Reference Plane |  |  |  |
| Test Instruments:  | Refer to section 6.0 for details                                      |  |  |  |
| Test mode:         | Refer to section 5.2 for details                                      |  |  |  |
| Test results:      | Pass  |  |  |  |

#### Measurement Data

| Test CH  |         | Peak Output Power (dl | Bm)           | Limit(dBm) | Result |
|----------|---------|-----------------------|---------------|------------|--------|
| Test CIT | 802.11b | 802.11g               | 802.11n(HT20) |            | Result |
| Lowest   | 9.66    | 9.12                  | 8.72          |            |        |
| Middle   | 10.04   | 9.44                  | 8.88          | 30.00      | Pass   |
| Highest  | 10.12   | 9.51                  | 8.24          |            |        |



### 7.4 Channel Bandwidth & 99% Occupy Bandwidth

| Test Requirement : | FCC Part15 C Section 15.247 (a)(2)  |  |  |  |  |
|--------------------|---|--|--|--|--|
| Test Method :      | KDB558074 D01 DTS Meas Guidance V05or02                                     |  |  |  |  |
| Limit:             | >500KHz   |  |  |  |  |
| Test setup:        | Spectrum Analyzer<br>E.U.T<br>Non-Conducted Table<br>Ground Reference Plane |  |  |  |  |
| Test Instruments:  | Refer to section 6.0 for details  |  |  |  |  |
| Test mode:         | Refer to section 5.2 for details  |  |  |  |  |
| Test results:      | Pass  |  |  |  |  |



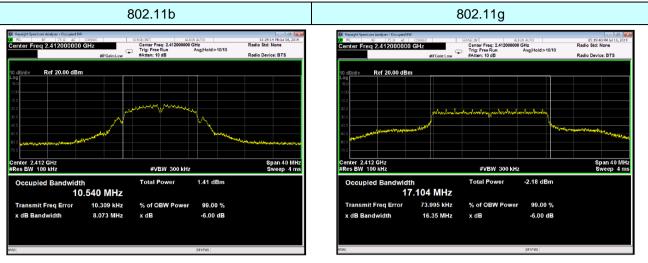
#### **Measurement Data**

| Test CH |         | Limit(KHz) | Result        |      |        |
|---------|---------|------------|---------------|------|--------|
|         | 802.11b | 802.11g    | 802.11n(HT20) |      | Result |
| Lowest  | 8.073   | 16.35      | 17.59         |      |        |
| Middle  | 8.048   | 16.36      | 17.60         | >500 | Pass   |
| Highest | 8.524   | 16.37      | 17.60         |      |        |

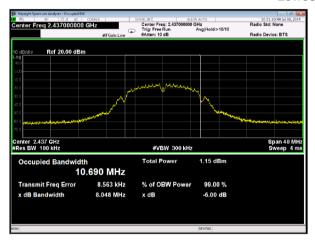
| Test CH | 99      | % Occupy Bandwidth | (MHz)         | Result |  |
|---------|---------|--------------------|---------------|--------|--|
|         | 802.11b | 802.11g            | 802.11n(HT20) | Result |  |
| Lowest  | 10.540  | 17.104             | 18.632        |        |  |
| Middle  | 10.690  | 17.233             | 18.512        | Pass   |  |
| Highest | 10.803  | 17.455             | 18.728        |        |  |

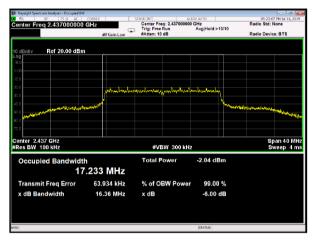


#### Test plot as follows:

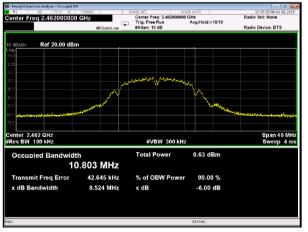


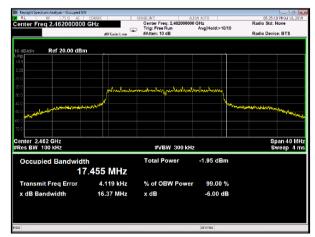


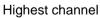






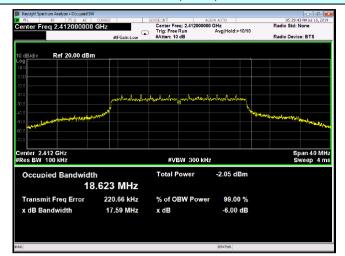




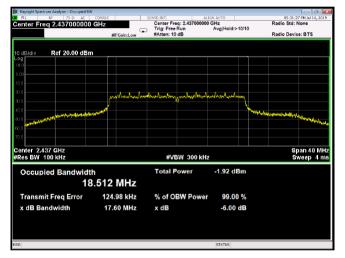




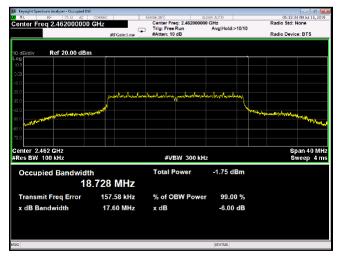
#### 802.11n(HT20)



#### Lowest channel



#### Middle channel



Highest channel



### 7.5 Power Spectral Density

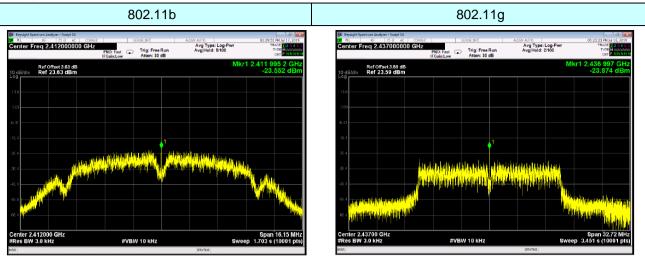
| Test Requirement: | FCC Part15 C Section 15.247 (e)   |
|-------------------|---|
| Test Method:      | KDB558074 D01 DTS Meas Guidance V05or02                                     |
| Limit:            | 8dBm/3kHz   |
| Test setup:       | Spectrum Analyzer<br>E.U.T<br>Non-Conducted Table<br>Ground Reference Plane |
| Test Instruments: | Refer to section 6.0 for details  |
| Test mode:        | Refer to section 5.2 for details  |
| Test results:     | Pass  |

#### **Measurement Data**

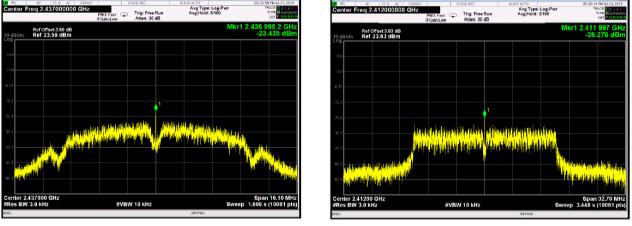
| Test CH  | Pow     | er Spectral Density (dE | 3m/3kHz)      | Limit      | Result |
|----------|---------|-------------------------|---------------|------------|--------|
| Test Off | 802.11b | 802.11g                 | 802.11n(HT20) | (dBm/3kHz) | Result |
| Lowest   | -23.552 | -26.278                 | -24.498       |            |        |
| Middle   | -23.439 | -23.874                 | -25.649       | 8.00       | Pass   |
| Highest  | -22.230 | -25.704                 | -25.704       |            |        |



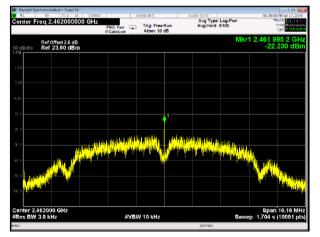
#### Test plot as follows:

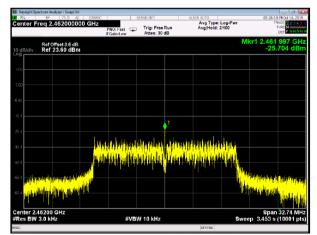


#### Lowest channel



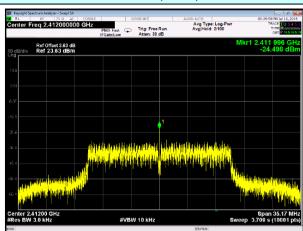






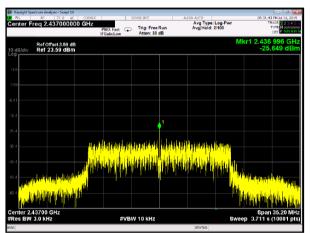
Highest channel



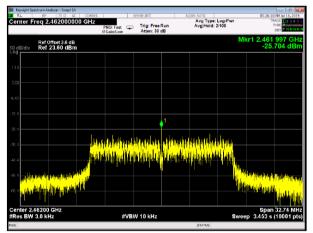


802.11n(HT20)

Lowest channel



Middle channel



Highest channel

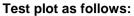


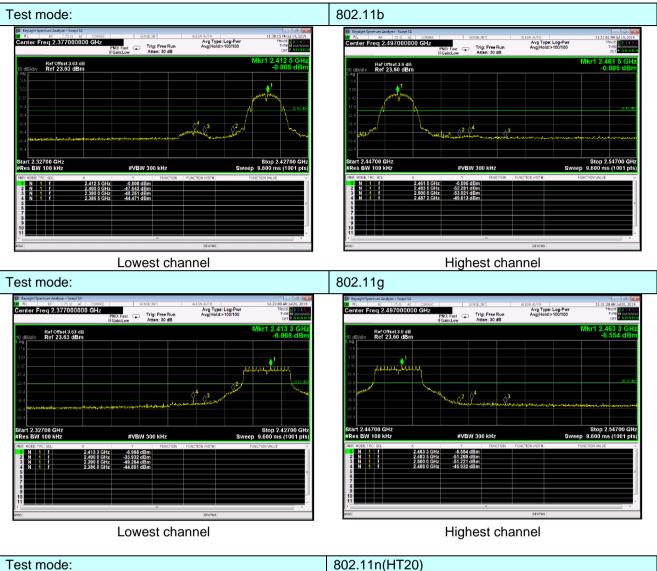
### 7.6 Band edges

### 7.6.1 Conducted Emission Method

| Test Requirement: | FCC Part15 C Section 15.247 (d)   |  |  |  |  |  |  |  |
|-------------------|---|--|--|--|--|--|--|--|
| Test Method:      | KDB558074 D01 DTS Meas Guidance V05or02   |  |  |  |  |  |  |  |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |  |  |  |  |  |  |  |
| Test setup:       | Spectrum Analyzer<br>E.U.T<br>Non-Conducted Table<br>Ground Reference Plane   |  |  |  |  |  |  |  |
| Test Instruments: | Refer to section 6.0 for details  |  |  |  |  |  |  |  |
| Test mode:        | Refer to section 5.2 for details  |  |  |  |  |  |  |  |
| Test results:     | Pass  |  |  |  |  |  |  |  |









Lowest channel

Highest channel



#### 7.6.2 Radiated Emission Method

| Test Requirement:     | FCC Part15 C S   | Section 15.209  | and 15.20   |   |   |
|-----------------------|--|---|---|---|---|
| Test Method:          | ANSI C63.10: 2   | 013   |   |   |   |
| Test Frequency Range: | All of the restric   | t bands were  | tested, only  | the worst ba  | and's (2310MHz to   |
|                       | 2500MHz) data  |   | -   |   |   |
| Test site:            | Measurement D  | istance: 3m   |   |   |   |
| Receiver setup:       | Frequency  | Detector  | RBW   | VBW   | Value   |
| -                     |  | Peak  | 1MHz  | 3MHz  | Peak  |
|                       | Above 1GHz   | Average   | 1MHz  | 3MHz  | Average   |
| Limit:                | Freque   |   | Limit (dBuV   | /m @3m)   | Value   |
|                       |  |   | 54.0  | ,   | Average   |
|                       | Above 1  | GHZ -   | 74.0  | 0   | Peak  |
|                       | Tum Table* ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~   | <3  | m ><br>Test Antenna<br>< 1m 4m >  |   |   |
| Test Procedure:       | -  |   |   | reamplifier+'   | .5 meters above   |
|                       | <ul> <li>the ground a determine the ground a determine the</li> <li>2. The EUT was antenna, whi tower.</li> <li>3. The antenna ground to de horizontal an measurement</li> <li>4. For each sus and then the and the rota a the maximum</li> <li>5. The test-recess Specified Ba</li> <li>6. If the emission the limit spect of the EUT we have 10dB m peak or avera sheet.</li> <li>7. The radiation And found th</li> </ul> | t a 3 meter ca<br>e position of the<br>s set 3 meters<br>ch was mount<br>height is varie<br>termine the m<br>d vertical pola<br>t.<br>pected emission<br>antenna was<br>table was turn<br>n reading.<br>siver system would be<br>report<br>argin would be<br>age method as<br>measurement | mber. The tall<br>ne highest rac<br>away from the<br>ed on the top<br>ed from one maximum value<br>inizations of the<br>ion, the EUT<br>tuned to heig<br>ed from 0 de<br>vas set to Pea<br>Aaximum Hol<br>EUT in peak<br>ting could be<br>ted. Otherwis<br>e re-tested o<br>s specified ar<br>hts are perform | ble was rota<br>diation.<br>The interferen<br>of a variable<br>neter to four<br>e of the field<br>the antenna a<br>was arrange<br>this from 1 m<br>grees to 360<br>ak Detect Fu<br>d Mode.<br>mode was 1<br>stopped and<br>the emissi<br>ne by one us<br>nd then repo<br>med in X, Y,<br>it is worse ca | ted 360 degrees to<br>ace-receiving<br>e-height antenna<br>meters above the<br>strength. Both<br>are set to make the<br>ed to its worst case<br>neter to 4 meters<br>0 degrees to find<br>anction and |
| Test Instruments:     | Refer to section   |   |   |   |   |
| Test mode:            | Refer to section   |   |   |   |   |
| Test results:         | Pass   |   |   |   |   |



#### Measurement data:

#### ■ 9kHz~30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

#### Below 1GHz

| nt. Po                       | ol.                          |  |                             | Hor   | izor         | ntal                          |                                  |   |  |  |                                  |             |              |          |                      |         |
|------------------------------|------------------------------|--|-----------------------------|---|--------------|-------------------------------|----------------------------------|---|--|--|----------------------------------|-------------|--------------|----------|----------------------|---------|
| est M                        | ode:                         |  |                             | TXI   | ВM           | lode                          | 241                              | 2MHz  |  |  |                                  |             |              |          |                      |         |
| emar                         | k:                           |  |                             | Only  | y wo         | orse                          | cas                              | e is repo   | orted                                      |  |                                  |             |              |          |                      |         |
| D.O dE                       | 3uV/m                        |  | _                           |   |              |                               |                                  |   |  |  |                                  |             |              |          |                      |         |
|                              | www                          |  | 2                           |   |              | 3                             | Lynn                             |   |  | *  | u v                              | 55<br>***** | 6            | Mar      | adiation<br>gin -6 ( |         |
|                              |                              |  |                             |   |              |                               |                                  |   |  |  |                                  |             |              |          |                      |         |
| 30.000                       | 40                           | 50   | 60                          | 70  | 80           |                               |                                  | (MHz  | :]   | 300                                      | ) 40                             | 0           | 500          | 600      | 700                  | 1000.00 |
| 30.000                       | 40<br>Mk.                    | 50<br>Freq.                                | Re                          | 70<br>eadin                                   | ng           | Corre                         |                                  | (MHz<br>Measure-<br>ment                              |  | 300<br>Over                              | ) 40                             | Ant         | enna         | Ta       | able                 | 1000.00 |
| 30.000                       |                              |  | Re                          | adin  | ng           |                               | tor                              | Measure-  | -  |  | ) 40<br>Detector                 | Ant<br>He   |              | Ta<br>De |                      | 1000.00 |
| 30.000                       | Mk.                          | Freq.                                      | Re                          | adin<br>evel                                  | ng           | Fac                           | tor<br>n                         | Measure-<br>ment                                      | Limit                                      | Over                                     |                                  | Ant<br>He   | enna<br>ight | Ta<br>De | able<br>gree         |         |
| 30.000<br>No.                | Mk.                          | Freq.<br>MHz                               | Re<br>L                     | edin<br>evel<br>BuV                           | ng<br>)      | Fac<br>dB/n                   | tor<br>n<br>15                   | Measure-<br>ment<br>dBuV/m                            | Limit<br>dBuV/m                            | Over<br>dB                               | Detector                         | Ant<br>He   | enna<br>ight | Ta<br>De | able<br>gree         |         |
| 30.000<br>No.                | Mk.<br>4 <sup>-</sup><br>62  | Freq.<br>MHz<br>7.3255                     | Re<br>L<br>5                | eadin<br>evel<br>iBuV<br>0.69                 | ng<br>)      | Fac<br>dB/n                   | tor<br>n<br>45<br>25             | Measure-<br>ment<br>dBuV/m<br>28.24                   | Limit<br>dBuV/m<br>40.00                   | Over<br>dB<br>-11.76                     | Detector<br>peak                 | Ant<br>He   | enna<br>ight | Ta<br>De | able<br>gree         |         |
| 30.000<br>No.<br>1<br>2<br>3 | Mk.<br>4<br>62<br>99         | Freq.<br>MHz<br>7.3255<br>2.2128           | Re<br>L<br>5<br>4           | eadin<br>evel<br>∄BuV<br>0.69<br>9.03         | ng<br>)<br>} | Fac<br>dB/n<br>-22.4<br>-24.2 | tor<br>n<br>45<br>25<br>08       | Measure-<br>ment<br>dBuV/m<br>28.24<br>24.78          | Limit<br>dBuV/m<br>40.00<br>40.00          | Over<br>dB<br>-11.76<br>-15.22           | Detector<br>peak<br>peak<br>peak | Ant<br>He   | enna<br>ight | Ta<br>De | able<br>gree         |         |
| 30.000<br>No.<br>1<br>2<br>3 | Mk.<br>4<br>6:<br>9:<br>* 26 | Freq.<br>MHz<br>7.3255<br>2.2128<br>5.4270 | Re<br>L<br>5<br>4<br>4<br>5 | eadin<br>evel<br>JBuV<br>0.69<br>9.03<br>0.78 | ng<br>)<br>3 | Fac<br>dB/n<br>-22.4<br>-24.2 | tor<br>n<br>45<br>25<br>08<br>64 | Measure-<br>ment<br>dBuV/m<br>28.24<br>24.78<br>18.70 | Limit<br>dBuV/m<br>40.00<br>40.00<br>43.50 | Over<br>dB<br>-11.76<br>-15.22<br>-24.80 | Detector<br>peak<br>peak         | Ant<br>He   | enna<br>ight | Ta<br>De | able<br>gree         |         |

Emission Level= Read Level+ Correct Factor





#### Emission Level= Read Level+ Correct Factor

#### Above 1GHz

| Ant.       | Pol.  | ŀ        | Horizontal        |                   |                  |        |        |          |  |
|------------|-------|----------|-------------------|-------------------|------------------|--------|--------|----------|--|
| Test Mode: |       |          | TX B Mode 2412MHz |                   |                  |        |        |          |  |
| N          | o. Mk | . Freq.  | Reading<br>Level  | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |  |
|            |       | MHz      | dBuV              | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1          |       | 4823.574 | 46.58             | 14.55             | 61.13            | 74.00  | -12.87 | peak     |  |
| 2          | *     | 4823.604 | 29.49             | 14.55             | 44.04            | 54.00  | -9.96  | AVG      |  |

| Ant. P | ol.   | · .      | Vertical          |                   |                  |        |        |          |  |
|--------|-------|----------|-------------------|-------------------|------------------|--------|--------|----------|--|
| Test N | lode: | -        | TX B Mode 2412MHz |                   |                  |        |        |          |  |
| No.    | Mk    | Freq.    | Reading<br>Level  | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |  |
|        |       | MHz      | dBuV              | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1      |       | 4824.924 | 48.32             | 14.55             | 62.87            | 74.00  | -11.13 | peak     |  |
| 2      | *     | 4824.924 | 34.06             | 14.55             | 48.61            | 54.00  | -5.39  | AVG      |  |

| Ant. Pol. |         | Horizontal       |                   |                  |        |        |          |  |
|-----------|---------|------------------|-------------------|------------------|--------|--------|----------|--|
| Test Mode | :       | TX B Mode 24     | TX B Mode 2437MHz |                  |        |        |          |  |
| No. Mk    | . Freq. | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |  |
|           | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1         | 4873.56 | 2 44.05          | 14.86             | 58.91            | 74.00  | -15.09 | peak     |  |
| 2 *       | 4873.56 | 2 29.23          | 14.86             | 44.09            | 54.00  | -9.91  | AVG      |  |

| Ant. P | ol.   |          | Vertical         |                   |                  |        |        |          |
|--------|-------|----------|------------------|-------------------|------------------|--------|--------|----------|
| Test M | lode: | •        | TX B Mode 243    | 37MHz             |                  |        |        |          |
| No.    | Mk.   | Freq.    | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|        |       | MHz      | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1      |       | 4874.990 | ) 48.85          | 14.86             | 63.71            | 74.00  | -10.29 | peak     |
| 2      | *     | 4875.218 | 34.45            | 14.87             | 49.32            | 54.00  | -4.68  | AVG      |

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| Ant. Po | Ι.  | H       | Horizontal       |                   |                  |        |        |          |
|---------|-----|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mo | de: | -       | TX B Mode 246    | 2MHz              |                  |        |        |          |
| No.     | Mk. | Freq.   | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|         |     | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1       | 4   | 925.128 | 43.87            | 15.19             | 59.06            | 74.00  | -14.94 | peak     |
| 2 '     | * 4 | 925.182 | 29.59            | 15.19             | 44.78            | 54.00  | -9.22  | AVG      |

| Ant. Pol.  |          | Vertical         |                   |                  |        |        |          |
|------------|----------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mode: |          | TX B Mode 246    | 62MHz             |                  |        |        |          |
| No. Mk     | . Freq.  | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|            | MHz      | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1 *        | 4924.234 | 4 29.60          | 15.17             | 44.77            | 54.00  | -9.23  | AVG      |
| 2          | 4924.558 | 3 48.48          | 15.17             | 63.65            | 74.00  | -10.35 | peak     |

| Ant. Po | I.   |         | Horizontal       |                   |                  |        |        |          |
|---------|------|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mo | ode: |         | TX G Mode 247    | 12MHz             |                  |        |        |          |
| No.     | Mk.  | Freq.   | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|         |      | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1       |      | 4823.22 | 0 45.05          | 14.55             | 59.60            | 74.00  | -14.40 | peak     |
| 2       | *    | 4825.05 | 6 30.32          | 14.56             | 44.88            | 54.00  | -9.12  | AVG      |

| Ant.       | Pol.   | `        | Vertical          |                   |                  |        |        |          |  |
|------------|--------|----------|-------------------|-------------------|------------------|--------|--------|----------|--|
| Test Mode: |        |          | TX G Mode 2412MHz |                   |                  |        |        |          |  |
| No         | o. Mk. | Freq.    | Reading<br>Level  | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |  |
|            |        | MHz      | dBuV              | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1          | *      | 4822.500 | 29.49             | 14.55             | 44.04            | 54.00  | -9.96  | AVG      |  |
| 2          |        | 4825.008 | 3 44.01           | 14.55             | 58.56            | 74.00  | -15.44 | peak     |  |
|            |        |          |                   |                   |                  |        |        |          |  |



| A          | nt. P | ol.     | Horizontal       |                   |                  |        |        |          |
|------------|-------|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mode: |       |         | TX G Mode 24     | 37MHz             |                  |        |        |          |
| No.        | Mk.   | Freq.   | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|            |       | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1          | *     | 4874.70 | 8 29.25          | 14.86             | 44.11            | 54.00  | -9.89  | AVG      |
| 2          |       | 4874.72 | 6 43.60          | 14.86             | 58.46            | 74.00  | -15.54 | peak     |

|          |          | Vertical          |                   |                  |        |        |          |  |
|----------|----------|-------------------|-------------------|------------------|--------|--------|----------|--|
| Test Mod | e:       | TX G Mode 2437MHz |                   |                  |        |        |          |  |
| No. N    | lk. Freq | Reading<br>Level  | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |  |
|          | MHz      | dBuV              | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1        | 4875.23  | 36 42.89          | 14.87             | 57.76            | 74.00  | -16.24 | peak     |  |
| 2 *      | 4875.23  | 36 29.26          | 14.87             | 44.13            | 54.00  | -9.87  | AVG      |  |

| Ant. F     | Pol.  | F        | lorizontal        |                   |                  |        |        |          |  |
|------------|-------|----------|-------------------|-------------------|------------------|--------|--------|----------|--|
| Test Mode: |       | Т        | TX G Mode 2462MHz |                   |                  |        |        |          |  |
| No         | b. Mk | . Freq.  | Reading<br>Level  | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |  |
|            |       | MHz      | dBuV              | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1          |       | 4924.798 | 43.46             | 15.18             | 58.64            | 74.00  | -15.36 | peak     |  |
| 2          | *     | 4925.182 | 29.57             | 15.19             | 44.76            | 54.00  | -9.24  | AVG      |  |

| A | Ant. Pol.  |     |          | Vertical         |                   |                  |        |        |          |
|---|------------|-----|----------|------------------|-------------------|------------------|--------|--------|----------|
| Т | Test Mode: |     |          | TX G Mode 246    | 62MHz             |                  |        |        |          |
|   | No.        | Mk. | Freq.    | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|   |            |     | MHz      | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| - | 1          | *   | 4923.292 | 2 29.54          | 15.17             | 44.71            | 54.00  | -9.29  | AVG      |
|   | 2          |     | 4924.630 | 0 43.93          | 15.17             | 59.10            | 74.00  | -14.90 | peak     |
|   |            |     |          |                  |                   |                  |        |        |          |



| Ant. P     | ol.   |         | Horizontal       |                   |                  |        |        |          |
|------------|-------|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mode: |       |         | TX N(HT20) M     | ode 2412MF        | lz               |        |        |          |
| No.        | . Mk. | Freq.   | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|            |       | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1          |       | 4824.63 | 0 45.80          | 14.55             | 60.35            | 74.00  | -13.65 | peak     |
| 2          | *     | 4824.71 | 4 30.27          | 14.55             | 44.82            | 54.00  | -9.18  | AVG      |

| Ant. P                             | Pol.  |         | Vertical         |                   |                  |        |        |          |
|------------------------------------|-------|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mode: TX N(HT20) Mode 2412MHz |       |         | łz               |                   |                  |        |        |          |
| No                                 | . Mk. | Freq.   | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|                                    |       | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1                                  | *     | 4822.65 | 6 29.47          | 14.55             | 44.02            | 54.00  | -9.98  | AVG      |
| 2                                  |       | 4822.71 | 0 43.73          | 14.55             | 58.28            | 74.00  | -15.72 | peak     |

| A                                  | nt. P | ol. |         | Horizontal       |                   |                  |        |        |          |
|------------------------------------|-------|-----|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mode: TX N(HT20) Mode 2437MHz |       |     |         |                  |                   |                  |        |        |          |
| _                                  | No.   | Mk  | . Freq. | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|                                    |       |     | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
|                                    | 1     |     | 4872.54 | 8 43.17          | 14.85             | 58.02            | 74.00  | -15.98 | peak     |
|                                    | 2     | *   | 4875.26 | 0 29.25          | 14.87             | 44.12            | 54.00  | -9.88  | AVG      |

| Ant. | Pol.  | V        | 'ertical                |                   |                  |        |        |          |
|------|-------|----------|-------------------------|-------------------|------------------|--------|--------|----------|
| Test | Mode: | Т        | TX N(HT20) Mode 2437MHz |                   |                  |        |        |          |
| N    | o. Mk | Freq.    | Reading<br>Level        | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|      |       | MHz      | dBuV                    | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1    |       | 4874.108 | 43.70                   | 14.86             | 58.56            | 74.00  | -15.44 | peak     |
| 2    | *     | 4875.080 | 29.27                   | 14.87             | 44.14            | 54.00  | -9.86  | AVG      |



| Ant. Pol. Horizonta |          |                  |                         |                  |        |        |          |  |
|---------------------|----------|------------------|-------------------------|------------------|--------|--------|----------|--|
| Test Mod            | e:       | TX N(HT20) M     | TX N(HT20) Mode 2462MHz |                  |        |        |          |  |
| No. N               | lk. Freq | Reading<br>Level | Correct<br>Factor       | Measure-<br>ment | Limit  | Over   |          |  |
|                     | MHz      | dBuV             | dB/m                    | dBuV/m           | dBuV/m | dB     | Detector |  |
| 1                   | 4924.77  | 4 43.80          | 15.18                   | 58.98            | 74.00  | -15.02 | peak     |  |
| 2 *                 | 4925.18  | 38 29.55         | 15.19                   | 44.74            | 54.00  | -9.26  | AVG      |  |

| Ant.       | Pol.   |         | Vertical         |                   |                  |        |        |          |
|------------|--------|---------|------------------|-------------------|------------------|--------|--------|----------|
| Test Mode: |        |         | TX N(HT20) M     | ode 2462MF        | łz               |        |        |          |
| N          | o. Mk. | Freq.   | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |
|            |        | MHz     | dBuV             | dB/m              | dBuV/m           | dBuV/m | dB     | Detector |
| 1          |        | 4922.72 | 8 43.26          | 15.17             | 58.43            | 74.00  | -15.57 | peak     |
| 2          | *      | 4925.34 | 4 29.57          | 15.19             | 44.76            | 54.00  | -9.24  | AVG      |

#### Remark:

1.No report for the emission which more than 10 dB below the prescribed limit.

2.Emission Level= Read Level+ Correct Factor



### 7.7 Spurious Emission

#### 7.7.1 Conducted Emission Method

| Test Requirement: | FCC Part15 C Section 15.247 (d)   |  |  |  |
|-------------------|---|--|--|--|
| Test Method:      | KDB558074 D01 DTS Meas Guidance V05or02   |  |  |  |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |  |  |  |
| Test setup:       | Spectrum Analyzer<br>E.U.T<br>Non-Conducted Table<br>Ground Reference Plane   |  |  |  |
| Test Instruments: | Refer to section 6.0 for details  |  |  |  |
| Test mode:        | Refer to section 5.2 for details  |  |  |  |
| Test results:     | Pass  |  |  |  |

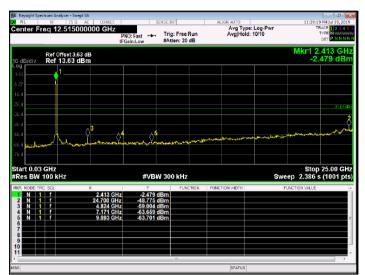


#### Test plot as follows:

#### Report No.: GTS201911000113F01

802.11b(Only worse case is reported)

Lowest channel



Middle channel

30MHz~25GHz

| Keysight Spectrum An         |                                 |                            |   |           |                        |           |                    | - 6  |
|------------------------------|---------------------------------|----------------------------|---|-----------|------------------------|-----------|--------------------|--|
| RL RF<br>enter Freq 12       | 75 Ω AC CORRE<br>2.515000000 GH |                            | SENSE:INT<br>Trig: Free I<br>#Atten: 20 | Run       | Avg Type:<br>Avg Hold: |           | TE                 | 2 PMJul 19, 2019<br>RACE 1 2 3 4 5<br>TYPE M<br>DET PINNIN |
| ) dB/div Ref                 | ffset 3.59 dB<br>13.59 dBm      |                            |   |           |                        |           |                    | .438 GH<br>145 dBn   |
| *9                           | 1                               |                            |   |           |                        |           |                    |  |
| 5.4                          |                                 |                            |   |           |                        |           |                    |  |
| 34 <u></u><br>34 <u></u>     |                                 |                            |   |           |                        |           |                    | -30.70 d   |
| 5.4<br>5.4                   | A 4                             | 0                          | > <mark>5</mark>                        | aaaluada  | and grant from         | معلمالوسي |                    | - In   |
| 5.4                          | What we are and the second      | hadrad to rhout a harry    | بالإفواق الكميار ليراميهما              |           |                        |           |                    |  |
| art 0.03 GHz<br>tes BW 100 k | Hz                              | #VE                        | W 300 kHz                               |           |                        | Swe       | Stop<br>ep 2.386 s | 25.00 GH<br>(1001 pt                                       |
| R NODE TRC SCL               | ×<br>2.438                      |                            |   | TION FUNC | TION WIDTH             | F         | UNCTION VALUE      |  |
| N 1 f<br>N 1 f<br>N 1 f      | 23.776<br>4.874<br>7.171        | GHz -63.649<br>GHz -64.093 | dBm<br>dBm                              |           |                        |           |                    |  |
| N 1 f                        | 9.918                           | 3Hz -63.347                | dBm                                     |           |                        |           |                    |  |
|                              |                                 |                            |   |           |                        |           |                    |  |
|                              |                                 |                            |   |           |                        |           |                    | ,  |
|                              |                                 |                            |   |           | STATUS                 |           |                    |  |

30MHz~25GHz

Highest channel



|               |       |              | RF                | 75 Ω                 |                                   |                   |  |                              | NT                   |           | AL      | IGN AUTO  |          |                 |                    | 11:5          | 4:47 PMJu              |              |
|---------------|-------|--------------|-------------------|----------------------|-----------------------------------|-------------------|--|------------------------------|----------------------|-----------|---------|---|----------|-----------------|--------------------|---------------|------------------------|--------------|
| :en           | ter   | Fre          | q 12.             | 51500                | 0000 GH                           | PN                | O:Fast ↔<br>ain:Low                          | . Trig<br>#At                | g: Free I<br>ten: 20 | Run<br>dB |         | Avg 1<br>Avg H  |          | Log-Pwr<br>0/10 |                    |               | TRACE<br>TYPE N<br>DET | WANNA        |
| 0 dE          | 3/di\ |              |                   | set 3.6 d<br>3.60 dB |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               | 2.463                  |              |
| .0g<br>3.60   |       |              | 1                 |                      |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               |                        |              |
|               |       |              | _ <u>`</u>        |                      |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               |                        |              |
|               |       |              | _                 |                      |                                   |                   |  |                              |                      |           | _       |   | _        |                 |                    |               |                        |              |
|               |       |              |                   |                      |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               |                        |              |
|               |       |              |                   |                      |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               |                        |              |
|               |       |              | 1                 |                      | _                                 |                   |  | 5                            |                      |           |         |   |          |                 |                    |               |                        | ωV           |
|               |       |              | ΤΛ,               | J.,                  | ý.                                | Ŷ.                | 1  | Q.                           | Laboration           | , and     | دارىدىر | به ال المانية العمادة العمادة العمادة المانية العمادة العمادة العمادة العمادة العمادة العمادة العمادة العمادة ا | فسطائحهم | يەرىپو بەلەتى   | 4-18 <sup>-4</sup> |               | -                      |              |
| 66.4          | -     | ALC: NO      | <i>.</i>          |                      |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               |                        |              |
|               |       |              |                   |                      |                                   |                   |  |                              |                      |           |         |   |          |                 |                    |               |                        |              |
| tar           |       | 03 G<br>N 10 | Hz<br>00 kH       | z                    |                                   |                   | #VE  | 3W 30                        | 0 kHz                |           |         |   |          |                 | Swee               | St<br>p 2.38  | op 25.0<br>6 s (10     | 10 G<br>01 p |
| irar<br>Iraci | S B   | N 10         | 00 kH<br>SCL      | z                    | X                                 |                   | Y  | 1                            | 0 kHz                | TION      | FUNCT   | TION WIDTH  | н        | ÷               |                    | Sto<br>p 2.38 | 6 s (10                | 10 G<br>01 p |
| irar<br>Iraci | S B   | N 10         | 00 kH<br>SCL      | 2                    | 2,463                             |                   | Y<br>-1.691                                  | IdBm                         |                      | TION      | FUNCT   | TION WIDTH  | н        |                 |                    | p 2.38        | 6 s (10                | 10 G<br>01 p |
| irar<br>Iraci | S B   | N 10         | 00 kH<br>SCL      | z                    | 2.463                             | GHz               | Y<br>-1.691<br>-49.949                       | dBm                          |                      | TION      | FUNCT   | TION WIDTH  | н        |                 |                    | p 2.38        | 6 s (10                | 10 G<br>01 p |
| irar<br>Iraci | S B   | N 10         | 00 kH<br>SCL<br>f | z                    | 2.463<br>24.576<br>4.874<br>7.221 | GHZ<br>GHZ<br>GHZ | Y<br>-1.691<br>-49.949<br>-64.524<br>-63.762 | IdBm<br>9dBm<br>IdBm<br>2dBm |                      | TION      | FUNCT   | TION WIDTH  | н        |                 |                    | p 2.38        | 6 s (10                | 10 G<br>01 p |
| Re:           | S B   | N 10         | 00 kH<br>SCL<br>f | z                    | 2.463<br>24.576<br>4.874          | GHZ<br>GHZ<br>GHZ | Y<br>-1.691<br>-49.949<br>-64.524            | IdBm<br>9dBm<br>IdBm<br>2dBm |                      | TION      | FUNCT   | FION WIDTH  |          |                 |                    | p 2.38        | 6 s (10                | 0 G          |

30MHz~25GHz



## 8 Test Setup Photo

Reference to the **appendix I** for details.

## 9 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----