

# **FCC/IC REPORT**

## **(BLE)**

**Applicant:** DEI Headquarters, Inc.

**Address of Applicant:** 1 Viper Way, Vista, CA 92081, USA

**Equipment Under Test (EUT)**

Product Name: BLE SIREN

Model No.: DS4WS

Trade Mark: Viper

**FCC ID:** EZSDS4WS

**Canada IC:** 1513A-DS4WS

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247  
RSS-Gen Issue 4, November 2014  
RSS-247 Issue 2, February 2017

**Date of sample receipt:** 10 Jul., 2018

**Date of Test:** 11 Jul., to 26 Jul., 2018

**Date of report issued:** 27 Jul., 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          | 27 Jul., 2018 | Original    |
|             |               |             |
|             |               |             |
|             |               |             |
|             |               |             |

Tested by:

*Zora Lee*

Date:

27 Jul., 2018

Test Engineer

Reviewed by:

*Wimer Zhang*

Date:

27 Jul., 2018

Project Engineer

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## 4 Test Summary

| Test Items                                                                     | Section           |                                             | Result |
|--------------------------------------------------------------------------------|-------------------|---------------------------------------------|--------|
|                                                                                | FCC               | IC                                          |        |
| Antenna Requirement                                                            | 15.203/15.247 (c) | /                                           | Pass   |
| AC Power Line Conducted Emission                                               | 15.207            | RSS-GEN Section 8.8                         | N/A    |
| Conducted Peak Output Power                                                    | 15.247 (b)(3)     | RSS-247 Section 5.4 (d)                     | Pass   |
| 6dB Emission Bandwidth<br>99% Occupied Bandwidth                               | 15.247 (a)(2)     | RSS-247 Section 5.2 (a)                     | Pass   |
| Power Spectral Density                                                         | 15.247 (e)        | RSS-247 Section 5.2 (b)                     | Pass   |
| Band Edge                                                                      | 15.247(d)         | RSS-GEN Section 8.10<br>RSS-247 Section 5.5 | Pass   |
| Conducted and Radiated Spurious<br>Emission                                    | 15.205/15.209     | RSS-GEN Section 6.13<br>RSS-247 Section 5.5 | Pass   |
| <i>Pass: The EUT complies with the essential requirements in the standard.</i> |                   |                                             |        |
| <i>N/A: The EUT not applicable of the test item.</i>                           |                   |                                             |        |

## 5 General Information

### 5.1 Client Information

|              |                                                                             |
|--------------|-----------------------------------------------------------------------------|
| Applicant:   | DEI Headquarters, Inc.                                                      |
| Address:     | 1 Viper Way, Vista, CA 92081, USA                                           |
| Manufacturer | DEI Headquarters, Inc.                                                      |
| Address:     | 1 Viper Way, Vista, CA 92081, USA                                           |
| Factory:     | Nutek Coropration                                                           |
| Address:     | 167, Lane 235, Bauchiau Rd, Xindian District, New Taeipi City 23145, Taiwan |

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

|                        |                  |
|------------------------|------------------|
| Product Name:          | BLE SIREN        |
| Model No.:             | DS4WS            |
| Operation Frequency:   | 2402-2480 MHz    |
| Channel numbers:       | 40               |
| Channel separation:    | 2 MHz            |
| Modulation technology: | GFSK             |
| Data speed :           | 1Mbps            |
| Antenna Type:          | Internal Antenna |
| Antenna gain:          | 3.3 dBi          |
| Power supply:          | DC 12V           |

#### Operation Frequency each of channel

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| 0       | 2402MHz   | 10      | 2422MHz   | 20      | 2442MHz   | 30      | 2462MHz   |
| 1       | 2404MHz   | 11      | 2424MHz   | 21      | 2444MHz   | 31      | 2464MHz   |
| 2       | 2406MHz   | 12      | 2426MHz   | 22      | 2446MHz   | 32      | 2466MHz   |
| 3       | 2408MHz   | 13      | 2428MHz   | 23      | 2448MHz   | 33      | 2468MHz   |
| 4       | 2410MHz   | 14      | 2430MHz   | 24      | 2450MHz   | 34      | 2470MHz   |
| 5       | 2412MHz   | 15      | 2432MHz   | 25      | 2452MHz   | 35      | 2472MHz   |
| 6       | 2414MHz   | 16      | 2434MHz   | 26      | 2454MHz   | 36      | 2474MHz   |
| 7       | 2416MHz   | 17      | 2436MHz   | 27      | 2456MHz   | 37      | 2476MHz   |
| 8       | 2418MHz   | 18      | 2438MHz   | 28      | 2458MHz   | 38      | 2478MHz   |
| 9       | 2420MHz   | 19      | 2440MHz   | 29      | 2460MHz   | 39      | 2480MHz   |

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. Channel No. 0, 19 & 39 were selected as Lowest, Middle and Highest channel.

## 5.3 Test environment and test mode

| Operating Environment:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Temperature:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24.0 °C                                                 |
| Humidity:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 54 % RH                                                 |
| Atmospheric Pressure:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1010 mbar                                               |
| Test mode:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                         |
| Transmitting mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Keep the EUT in continuous transmitting with modulation |
| <p>The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.</p> |                                                         |

## 5.4 Description of Support Units

The EUT has been tested as an independent unit.

## 5.5 Measurement Uncertainty

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

## 5.6 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>

## 5.7 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

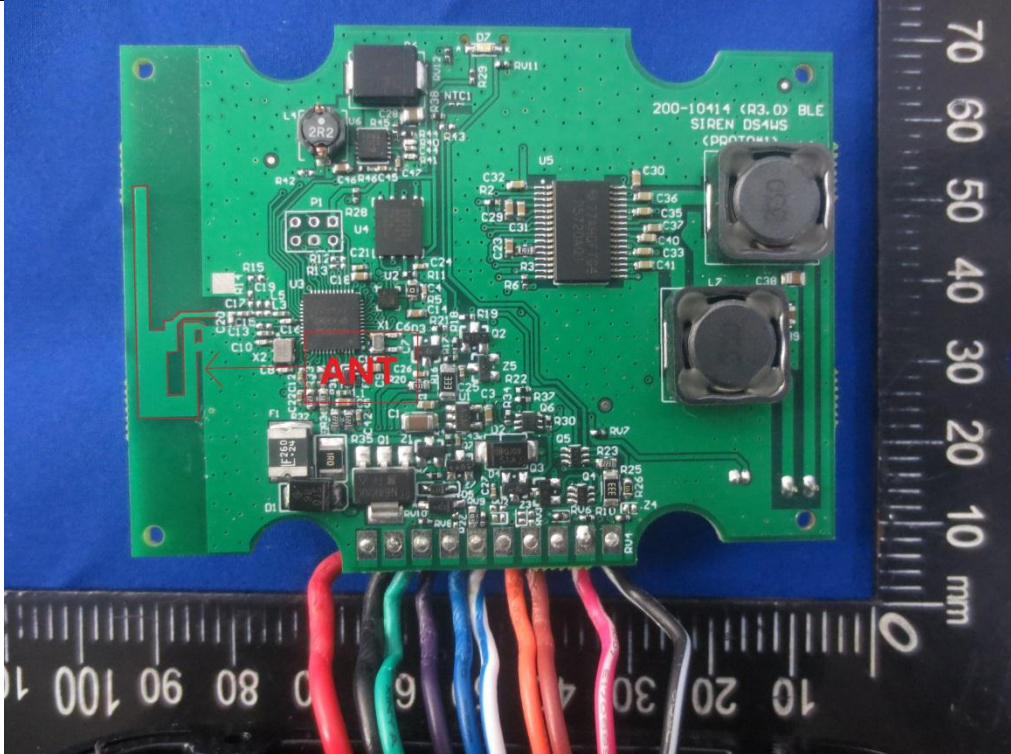
## 5.8 Test Instruments list

| 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               |
| Horn Antenna       | SCHWARZBECK     | BBHA 9170     | BBHA9170582 | 11-21-2017           | 11-20-2018               |
| 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               |
| Spectrum analyzer  | Rohde & Schwarz | FSP40         | 100363      | 11-21-2017           | 11-20-2018               |
| 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               |

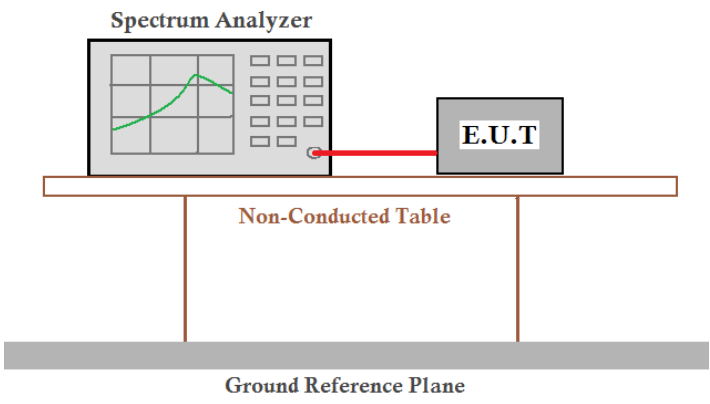
| Conducted Emission: |                 |            |             |                      |                          |
|---------------------|-----------------|------------|-------------|----------------------|--------------------------|
| Test Equipment      | Manufacturer    | Model No.  | Serial No.  | 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 | 07-21-2017           | 07-20-2018               |
|                     |                 |            |             | 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 Part 15 C Section 15.203 /247(c) |
| <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.</p> <p>15.247(c) (1)(i) requirement:<br/>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p> |                                      |
| <b>E.U.T Antenna:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |
| <p>The BLE antenna is an internal antenna which cannot replace by end-user, the best-case gain of the antenna is 3.3 dBi.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |

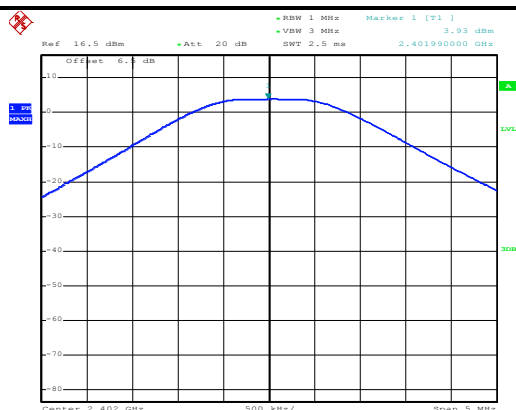
## 6.2 Conducted Output Power

|                   |                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C Section 15.247 (b)(3)<br>RSS-247 section 5.4(d)                                                                                                                                                                                                                                                                                                  |
| Test Method:      | ANSI C63.10:2013 and KDB558074                                                                                                                                                                                                                                                                                                                                 |
| Limit:            | 30dBm                                                                                                                                                                                                                                                                                                                                                          |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is positioned above a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details                                                                                                                                                                                                                                                                                                                               |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                               |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                         |

### Measurement Data:

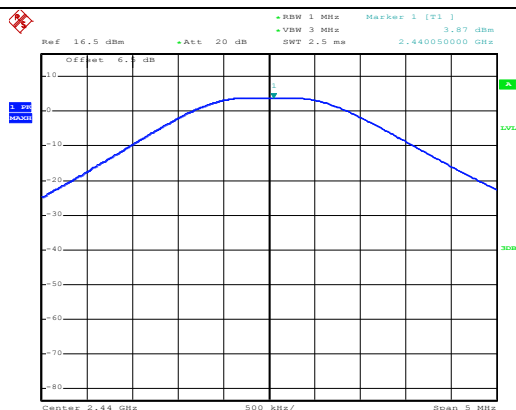
| Test CH | Maximum Conducted Output Power (dBm) | Limit(dBm) | Result |
|---------|--------------------------------------|------------|--------|
| Lowest  | 3.93                                 | 30.00      | Pass   |
| Middle  | 3.87                                 |            |        |
| Highest | 3.66                                 |            |        |

Test plot as follows:



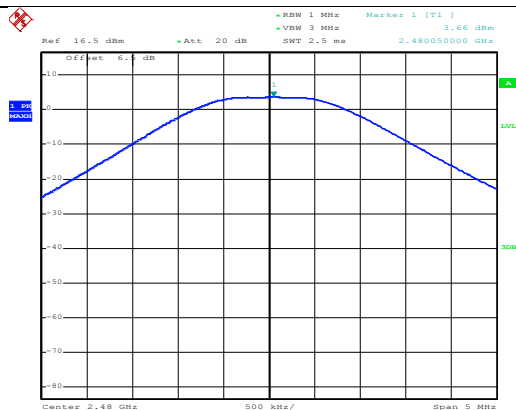
Date: 16.JUL.2018 15:10:40

Lowest channel



Date: 16.JUL.2018 15:12:02

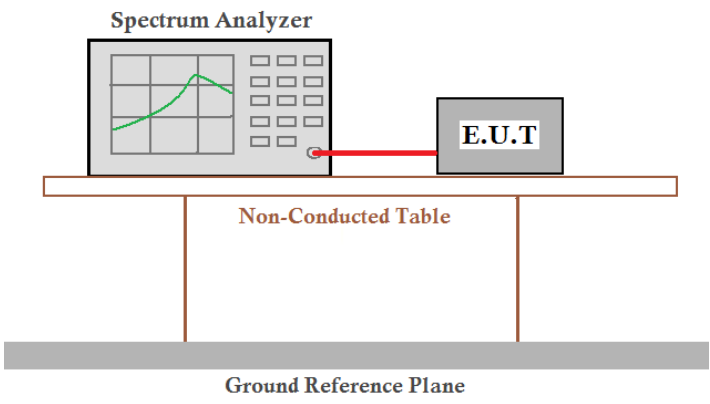
Middle channel



Date: 16.JUL.2018 15:12:22

Highest channel

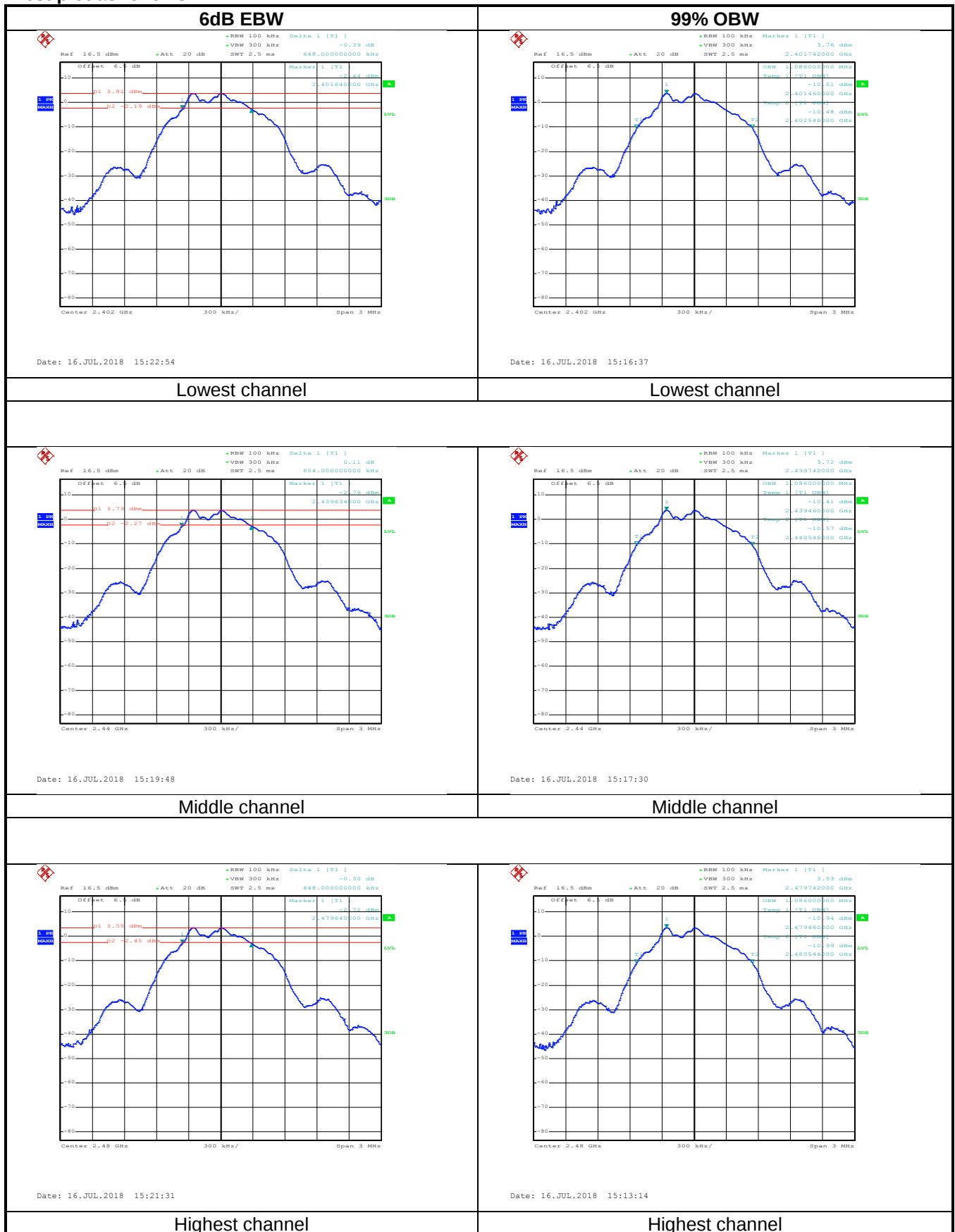
## 6.3 Occupy Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                                                   |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C Section 15.247 (a)(2)<br>RSS-247 section 5.2(a)                                                                                                                                                                                                                                                                                     |
| Test Method:      | ANSI C63.10:2013 and KDB558074                                                                                                                                                                                                                                                                                                                    |
| Limit:            | >500kHz                                                                                                                                                                                                                                                                                                                                           |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details                                                                                                                                                                                                                                                                                                                  |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                  |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                            |

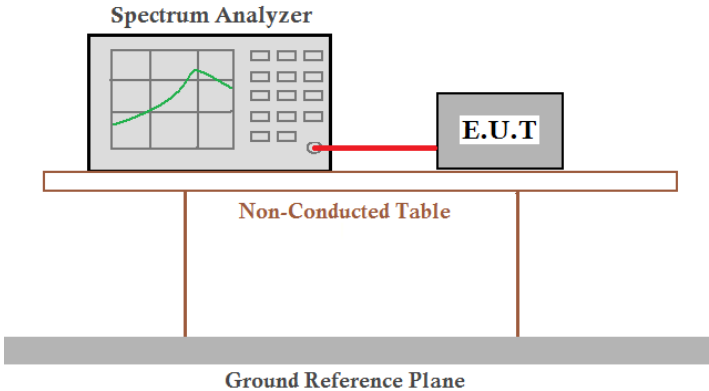
### Measurement Data:

| Test CH | 6dB Emission Bandwidth (MHz) | Limit(kHz) | Result |
|---------|------------------------------|------------|--------|
| Lowest  | 0.648                        | >500       | Pass   |
| Middle  | 0.654                        |            |        |
| Highest | 0.648                        |            |        |
| Test CH | 99% Occupy Bandwidth (MHz)   | Limit(kHz) | Result |
| Lowest  | 1.086                        | N/A        | N/A    |
| Middle  | 1.086                        |            |        |
| Highest | 1.086                        |            |        |

Test plot as follows:



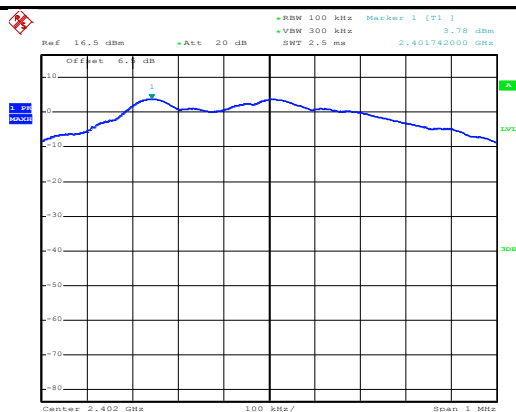
## 6.4 Power Spectral Density

|                   |                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C Section 15.247 (e)<br>RSS-247 section 5.2(b)                                                                                                                                                                                                                                                                                          |
| Test Method:      | ANSI C63.10:2013 and KDB558074                                                                                                                                                                                                                                                                                                                      |
| Limit:            | 8 dBm                                                                                                                                                                                                                                                                                                                                               |
| 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. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details                                                                                                                                                                                                                                                                                                                    |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                    |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                              |

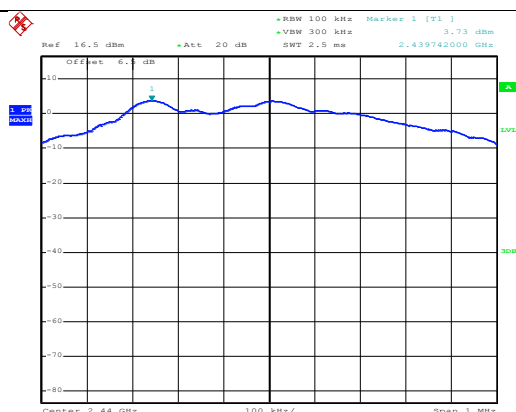
### Measurement Data:

| Test CH | Power Spectral Density (dBm/3KHz) | Limit(dBm/3KHz) | Result |
|---------|-----------------------------------|-----------------|--------|
| Lowest  | 3.78                              | 8.00            | Pass   |
| Middle  | 3.73                              |                 |        |
| Highest | 3.54                              |                 |        |

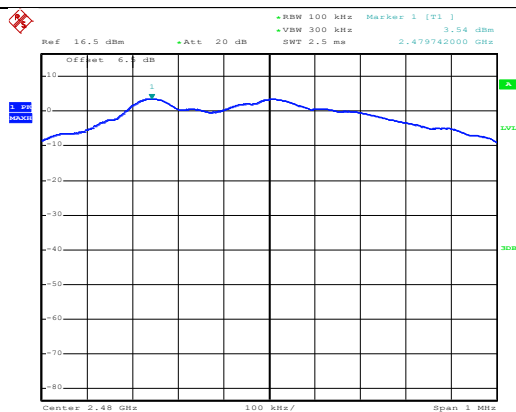
Test plots as follow:



Lowest channel



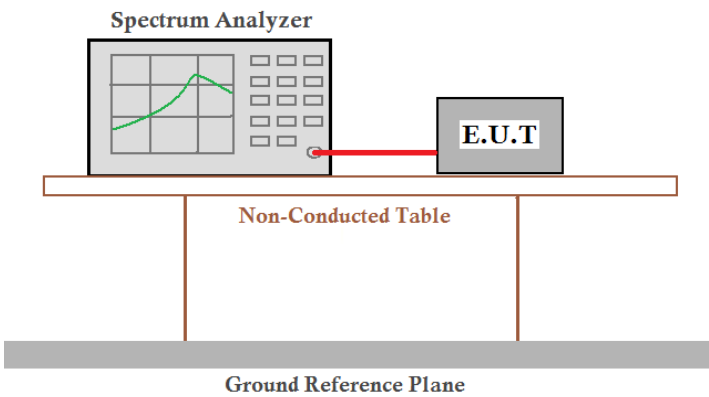
Middle channel



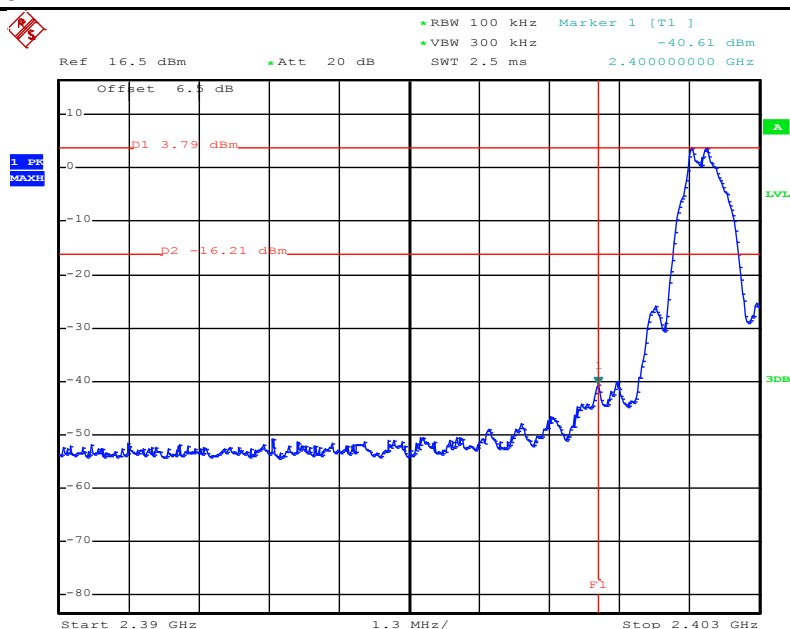
Highest channel

## 6.5 Band Edge

### 6.5.1 Conducted Emission Method

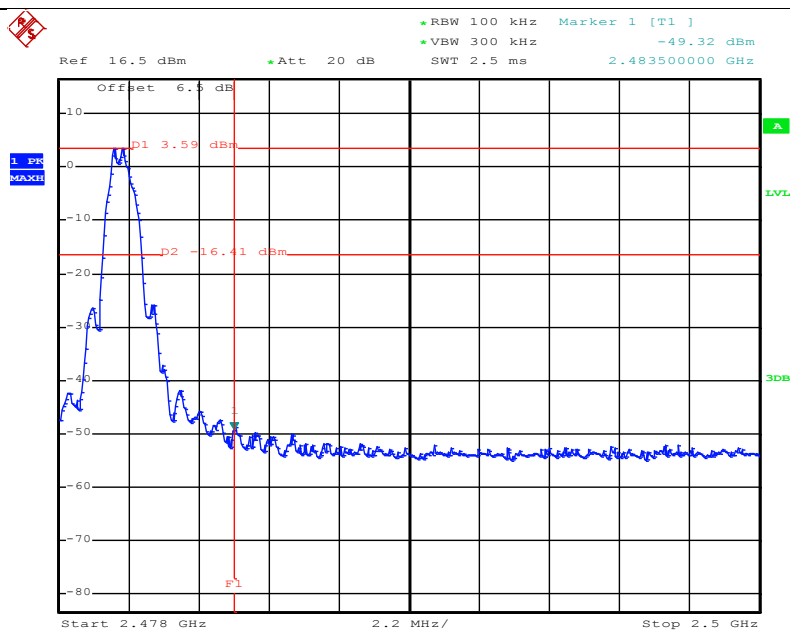
|                   |                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C Section 15.247 (d)<br>RSS-247 section 5.5                                                                                                                                                                                                                                                                                                                                 |
| Test Method:      | ANSI C63.10:2013 and KDB558074                                                                                                                                                                                                                                                                                                                                                          |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. |
| Test setup:       |  <p>The diagram illustrates the test setup for conducted emission measurement. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>                                   |
| Test Instruments: | Refer to section 5.8 for details                                                                                                                                                                                                                                                                                                                                                        |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                        |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                  |

Test plots as follow:



Date: 16.JUL.2018 15:30:28

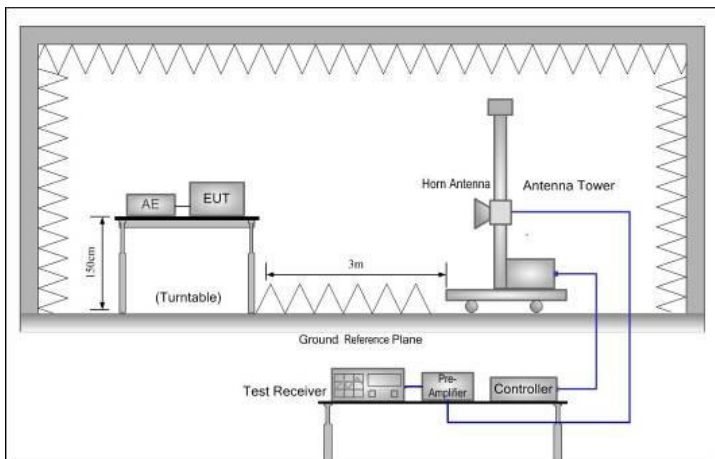
Lowest channel



Date: 16.JUL.2018 15:25:59

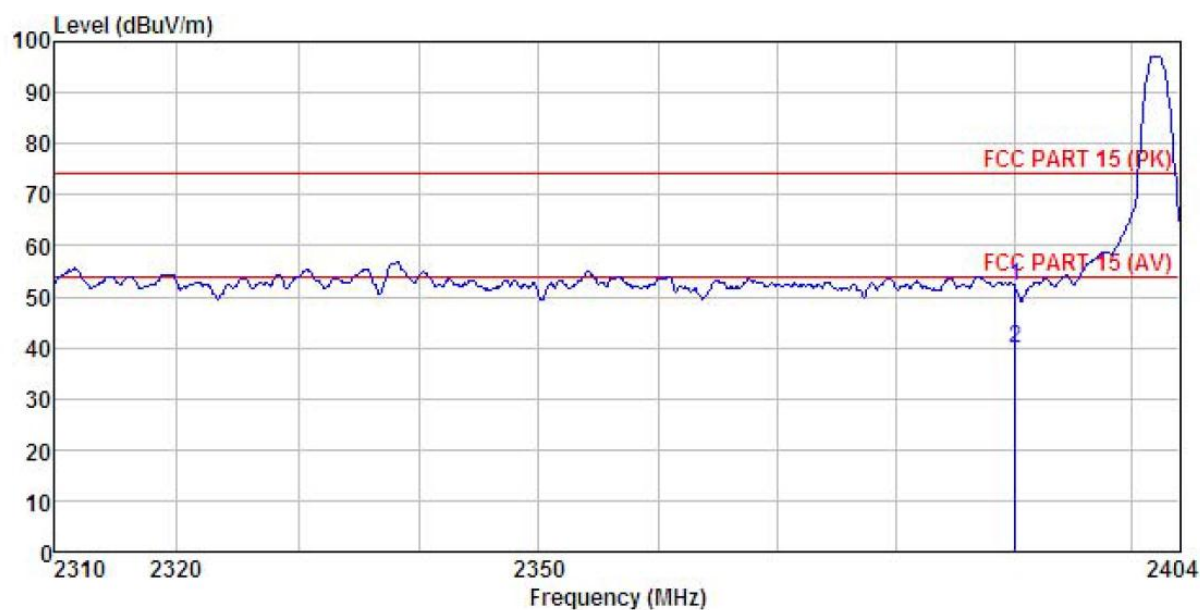
Highest channel

## 6.5.2 Radiated Emission Method

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                    |              |                             |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------|--------------|-----------------------------|
| Test Requirement:     | FCC Part 15 C Section 15.209 and 15.205<br>RSS-GEN section 8.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                    |              |                             |
| Test Method:          | ANSI C63.10: 2013 and KDB558074                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                    |              |                             |
| Test Frequency Range: | 2.3GHz to 2.5GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                    |              |                             |
| Test Distance:        | 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                    |              |                             |
| Receiver setup:       | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Detector    | RBW                | VBW          | Remark                      |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Peak<br>RMS | 1MHz<br>1MHz       | 3MHz<br>3MHz | Peak Value<br>Average Value |
| Limit:                | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             | Limit (dBuV/m @3m) |              | Remark                      |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             | 54.00<br>74.00     |              | Average Value<br>Peak 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 10 dB 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 10 dB 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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                    |              |                             |
| Test Instruments:     | Refer to section 5.8 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                    |              |                             |
| Test mode:            | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                    |              |                             |
| Test results:         | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                    |              |                             |

## Test channel: Lowest

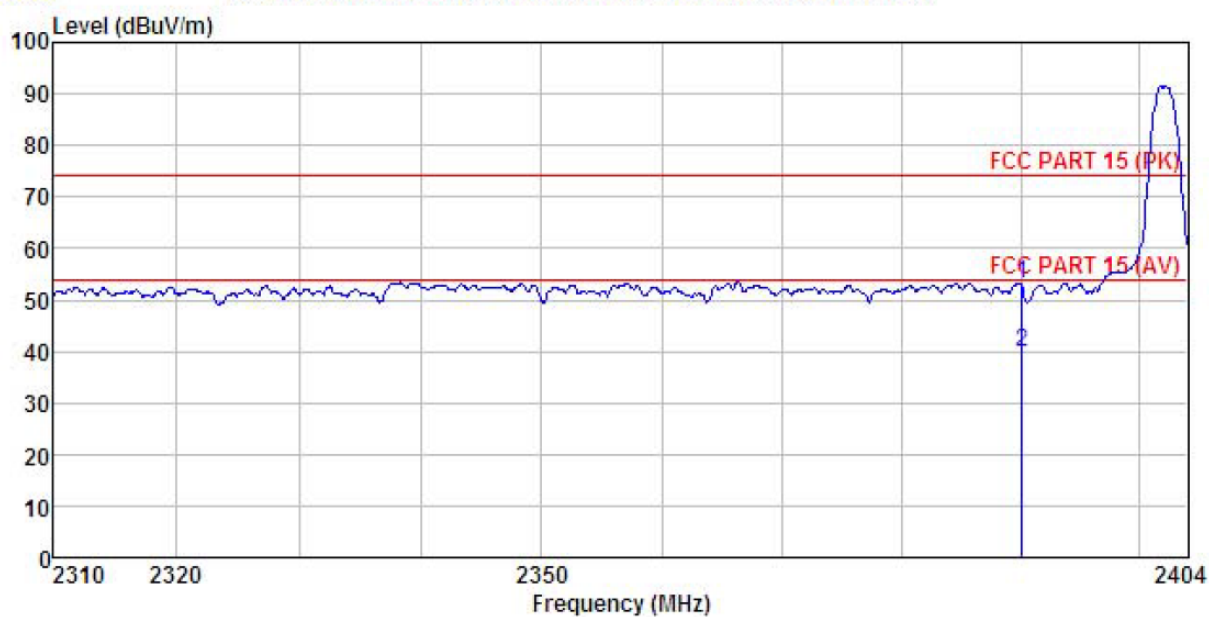
Horizontal:



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : BLE SIREN  
 Model : DS4WS  
 Test mode : BLE-L Mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

|   | Freq     | ReadAntenna | Cable | Preamp |       | Limit  | Over   |                |
|---|----------|-------------|-------|--------|-------|--------|--------|----------------|
|   | Level    | Factor      | Loss  | Factor | Level | Line   | Limit  | Remark         |
|   | MHz      | dBuV        | dB/m  | dB     | dB    | dBuV/m | dBuV/m | dB             |
| 1 | 2390.000 | 19.97       | 27.37 | 4.69   | 0.00  | 52.03  | 74.00  | -21.97 Peak    |
| 2 | 2390.000 | 7.88        | 27.37 | 4.69   | 0.00  | 39.94  | 54.00  | -14.06 Average |

Vertical:

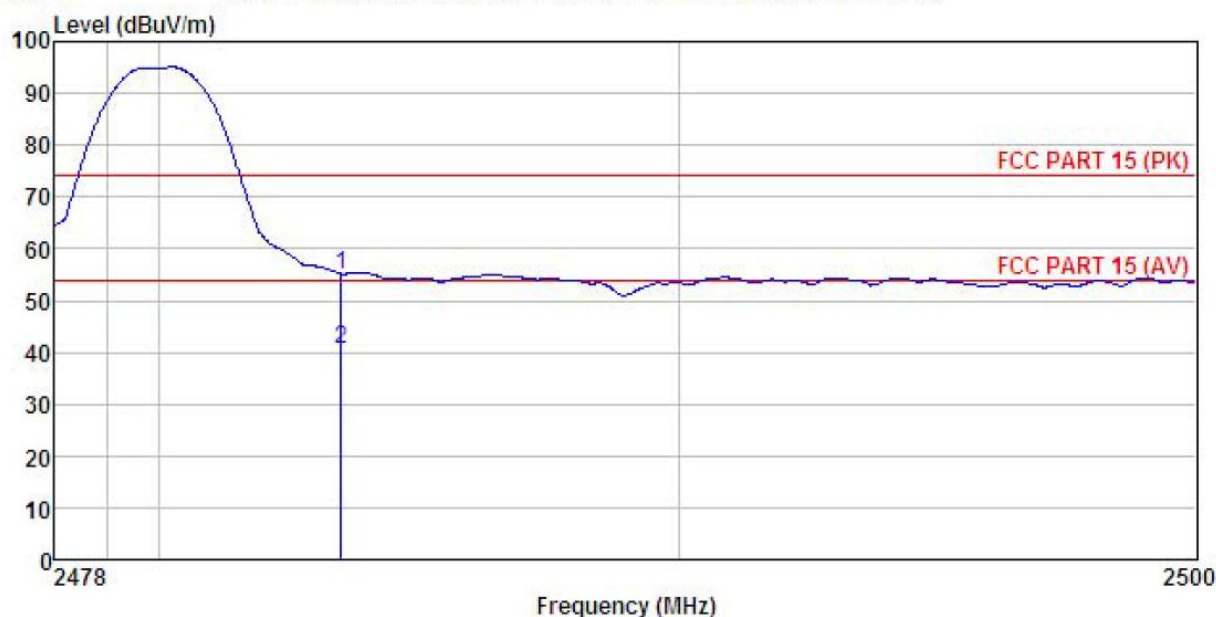


Site : 3m chamber  
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
EUT : BLE SIREN  
Model : DS4WS  
Test mode : BLE-L Mode  
Power Rating : AC 120V/60Hz  
Environment : Temp:25.5°C Humi:55%  
Test Engineer: Zora  
REMARK :

|   | Freq     | Read  | Antenna | Cable | Preamp | Limit  | Over   |                |
|---|----------|-------|---------|-------|--------|--------|--------|----------------|
|   |          | Level | Factor  | Loss  | Factor | Line   | Limit  | Remark         |
|   | MHz      | dBuV  | dB/m    | dB    | dB     | dBuV/m | dBuV/m | dB             |
| 1 | 2390.000 | 20.91 | 27.37   | 4.69  | 0.00   | 52.97  | 74.00  | -21.03 Peak    |
| 2 | 2390.000 | 7.90  | 27.37   | 4.69  | 0.00   | 39.96  | 54.00  | -14.04 Average |

## Test channel: Highest

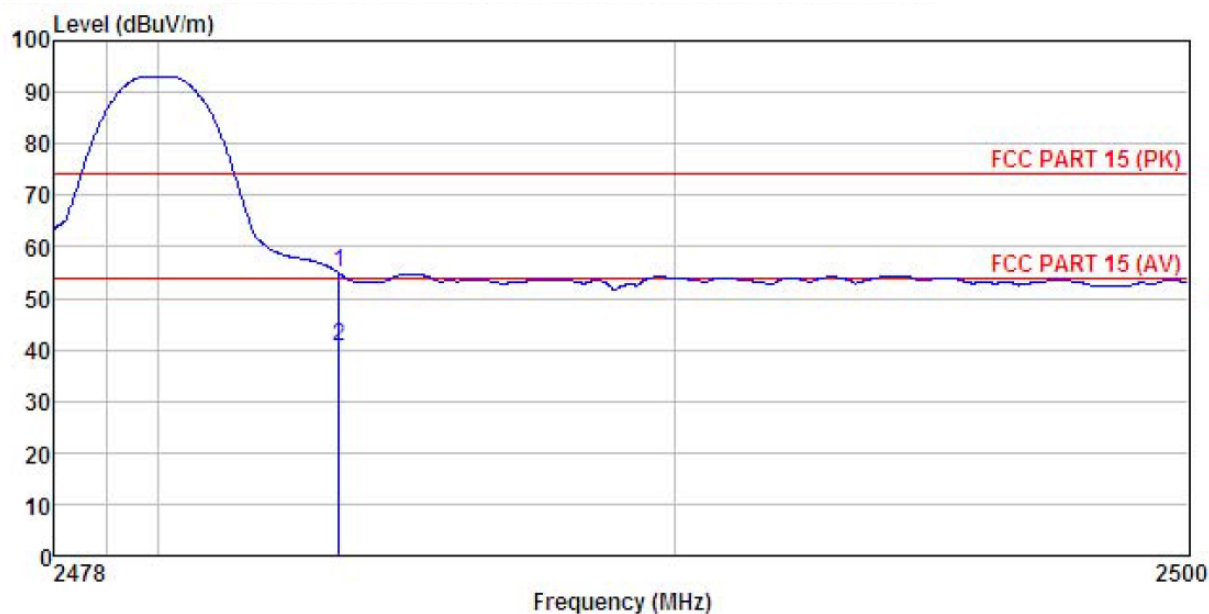
Horizontal:



Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL  
 EUT : BLE SIREN  
 Model : DS4WS  
 Test mode : BLE-H Mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

|   | Freq     | Read<br>Level | Antenna<br>Factor | Cable<br>Loss | Preamp<br>Factor | Level  | Limit  | Over<br>Limit | Remark  |
|---|----------|---------------|-------------------|---------------|------------------|--------|--------|---------------|---------|
|   | MHz      | dBuV          | dB/m              | dB            | dB               | dBuV/m | dBuV/m | dB            |         |
| 1 | 2483.500 | 22.74         | 27.57             | 4.81          | 0.00             | 55.12  | 74.00  | -18.88        | Peak    |
| 2 | 2483.500 | 8.23          | 27.57             | 4.81          | 0.00             | 40.61  | 54.00  | -13.39        | Average |

Vertical:

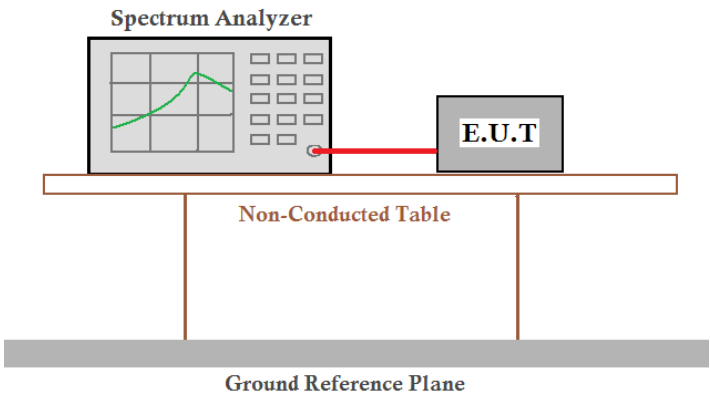


Site : 3m chamber  
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL  
 EUT : BLE SIREN  
 Model : DS4WS  
 Test mode : BLE-H Mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

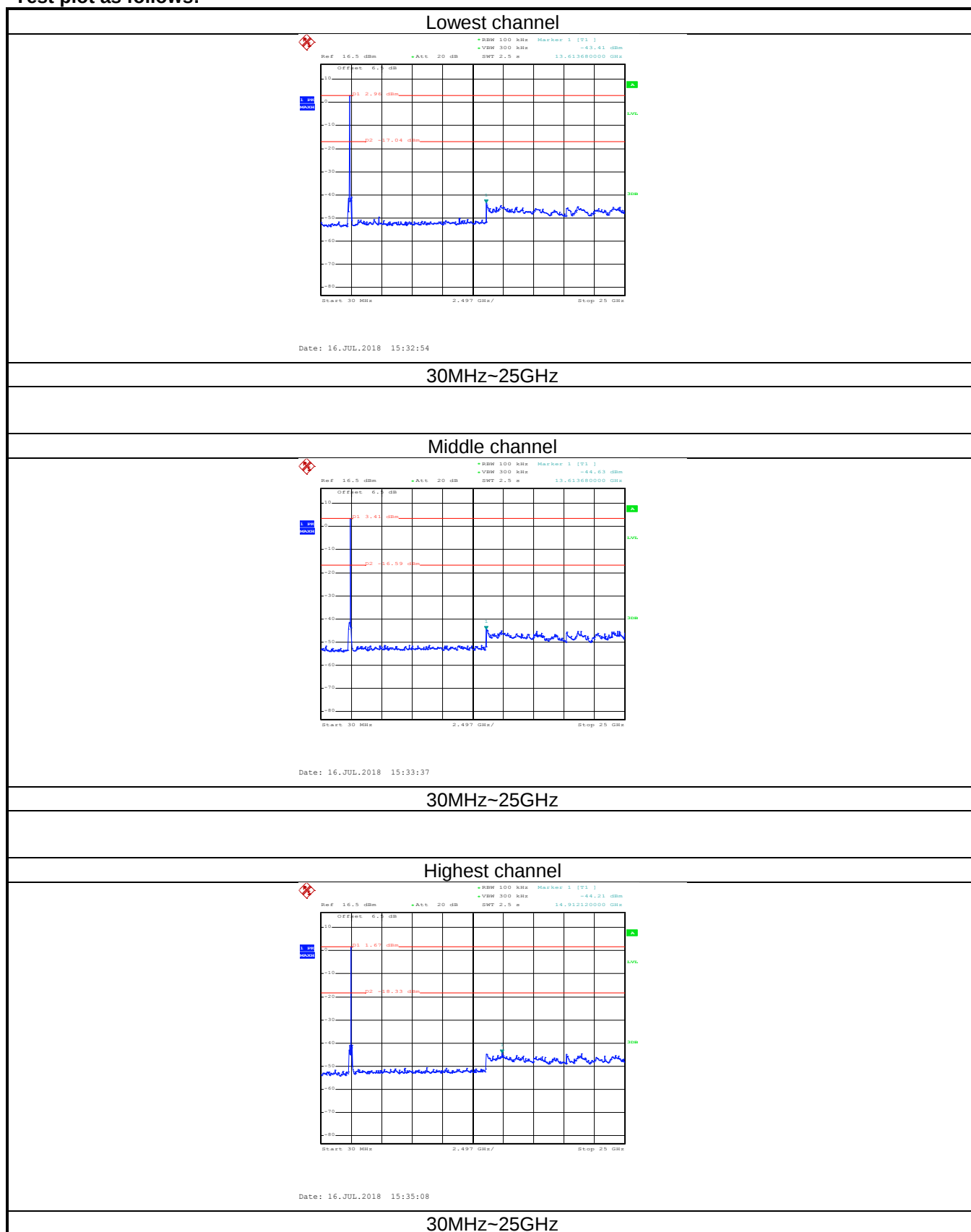
|   | Freq     | Read  | Antenna | Cable | Preamp | Level  | Limit  | Over   |         |
|---|----------|-------|---------|-------|--------|--------|--------|--------|---------|
|   |          | Level | Factor  | Loss  | Factor | Level  | Line   | Limit  | Remark  |
|   | MHz      | dBuV  | dB/m    | dB    | dB     | dBuV/m | dBuV/m | dB     |         |
| 1 | 2483.500 | 22.48 | 27.57   | 4.81  | 0.00   | 54.86  | 74.00  | -19.14 | Peak    |
| 2 | 2483.500 | 8.26  | 27.57   | 4.81  | 0.00   | 40.64  | 54.00  | -13.36 | Average |

## 6.6 Spurious Emission

### 6.6.1 Conducted Emission Method

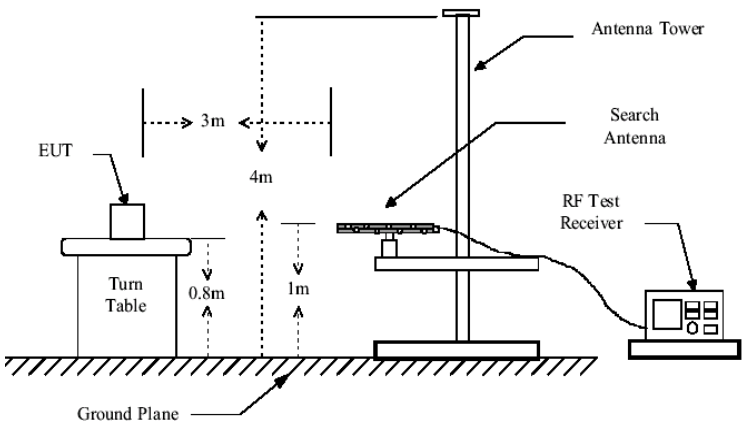
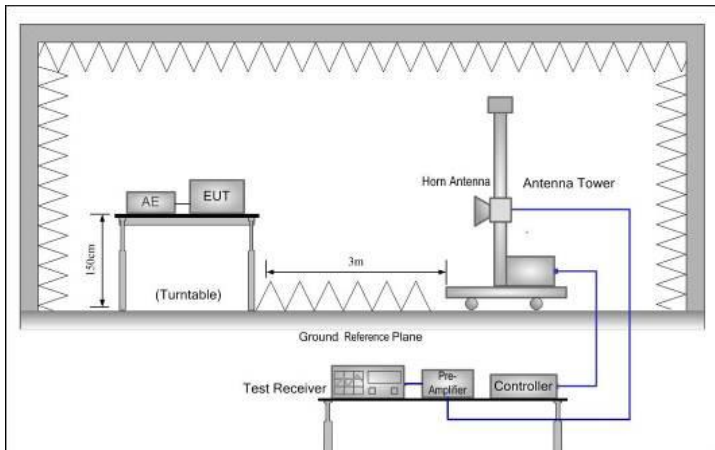
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part 15 C Section 15.247 (d)<br>RSS-247 section 5.5                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test Method:      | ANSI C63.10:2013 and KDB558074                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.                                                                                            |
| Test setup:       |  <p>The diagram illustrates the test setup for conducted emission testing. A Spectrum Analyzer, shown with a green trace on its screen, is connected to an Equipment Under Test (E.U.T.) 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 thick, grey Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test mode:        | Refer to section 5.3 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test results:     | Passed                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Test plot as follows:



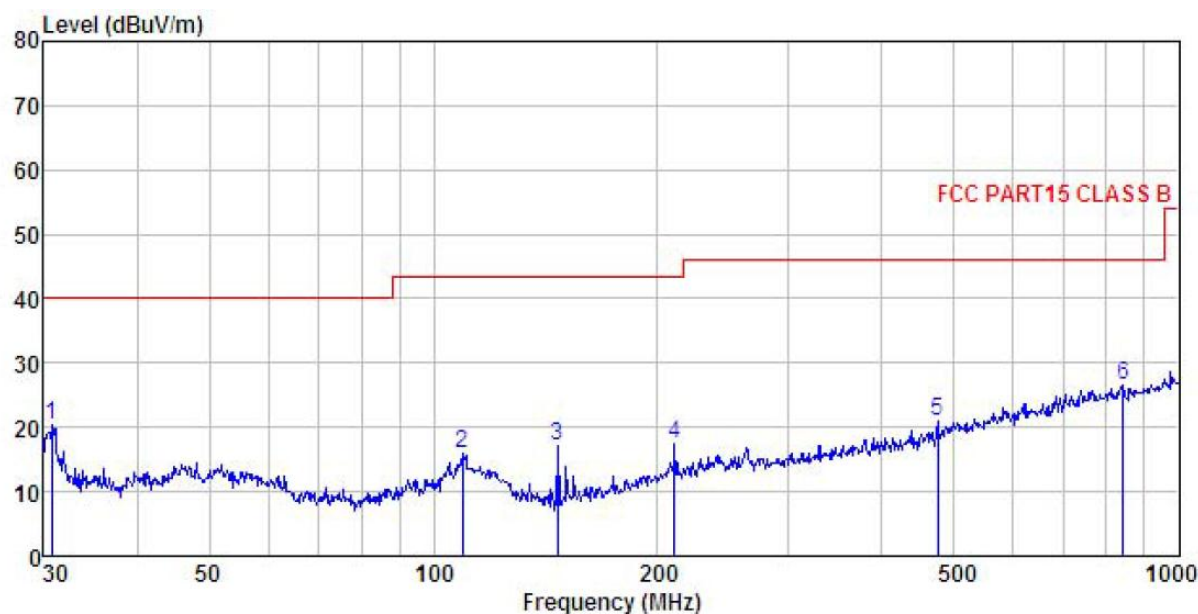
## 6.6.2 Radiated Emission Method

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                    |        |                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|--------|------------------|
| Test Requirement:     | FCC Part 15 C Section 15.209 and 15.205<br>RSS-Gen section 6.13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                    |        |                  |
| Test Method:          | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                    |        |                  |
| Test Frequency Range: | 9kHz to 25GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                    |        |                  |
| Test Distance:        | 3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |                    |        |                  |
| Receiver setup:       | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Detector   | RBW                | VBW    | Remark           |
|                       | 30MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Quasi-peak | 120KHz             | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            | 54.0               |        | Average Value    |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | 74.0               |        | Peak Value       |
| Test Procedure:       | <div>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.</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 10 dB 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 10 dB 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> |            |                    |        |                  |

|                          |                                                                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Test setup:</p>       | <p>Below 1GHz</p>  <p>Above 1GHz</p>                                               |
| <p>Test Instruments:</p> | <p>Refer to section 5.8 for details</p>                                                                                                                                                                                                                 |
| <p>Test mode:</p>        | <p>Refer to section 5.3 for details</p>                                                                                                                                                                                                                 |
| <p>Test results:</p>     | <p>Passed</p>                                                                                                                                                                                                                                           |
| <p>Remark:</p>           | <ol style="list-style-type: none"> <li>1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case.</li> <li>2. 9 kHz to 30MHz is too low, so only shows the data of above 30MHz in this report.</li> </ol> |

## Below 1GHz:

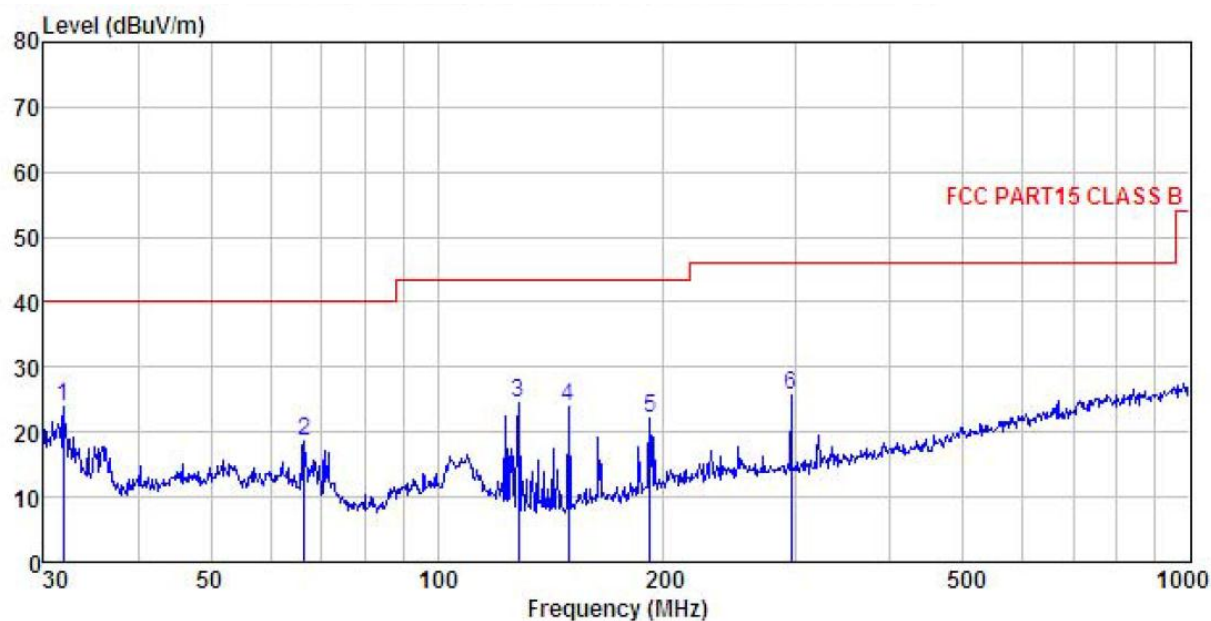
Horizontal:



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL  
 EUT : BLE SIREN  
 Model : DS4WS  
 Test mode : BLE Mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

|   | Freq    | ReadAntenna | Cable | Preamp |       | Limit  | Over   |           |
|---|---------|-------------|-------|--------|-------|--------|--------|-----------|
|   | Level   | Factor      | Loss  | Factor | Level | Line   | Limit  | Remark    |
|   | MHz     | dBuV        | dB/m  | dB     | dB    | dBuV/m | dBuV/m | dB        |
| 1 | 30.745  | 38.81       | 10.78 | 0.78   | 29.98 | 20.39  | 40.00  | -19.61 QP |
| 2 | 109.412 | 31.08       | 12.27 | 2.04   | 29.46 | 15.93  | 43.50  | -27.57 QP |
| 3 | 146.888 | 35.56       | 8.45  | 2.47   | 29.24 | 17.24  | 43.50  | -26.26 QP |
| 4 | 210.786 | 31.41       | 11.92 | 2.86   | 28.76 | 17.43  | 43.50  | -26.07 QP |
| 5 | 475.499 | 29.53       | 16.83 | 3.41   | 28.91 | 20.86  | 46.00  | -25.14 QP |
| 6 | 842.130 | 29.03       | 21.25 | 4.22   | 28.03 | 26.47  | 46.00  | -19.53 QP |

Vertical:



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL  
 EUT : BLE SIREN  
 Model : DS4WS  
 Test mode : BLE Mode  
 Power Rating : AC 120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: Zora  
 REMARK :

|      | ReadAntenna | Cable  | Preamp |        | Limit  | Over   |       |
|------|-------------|--------|--------|--------|--------|--------|-------|
| Freq | Level       | Factor | Loss   | Factor | Level  | Line   | Limit |
| MHz  | dBuV        | dB/m   | dB     | dB     | dBuV/m | dBuV/m | dB    |
| 1    | 31.843      | 42.10  | 11.03  | 0.85   | 29.97  | 24.01  | 40.00 |
| 2    | 66.499      | 36.72  | 10.20  | 1.41   | 29.75  | 18.58  | 40.00 |
| 3    | 128.113     | 42.70  | 8.97   | 2.26   | 29.34  | 24.59  | 43.50 |
| 4    | 149.486     | 42.11  | 8.58   | 2.51   | 29.22  | 23.98  | 43.50 |
| 5    | 191.745     | 36.84  | 11.25  | 2.81   | 28.89  | 22.01  | 43.50 |
| 6    | 295.147     | 37.62  | 13.57  | 2.93   | 28.46  | 25.66  | 46.00 |

## Above 1GHz:

| Test channel: Lowest channel |                   |                       |                 |                    |                |                     |                 |              |
|------------------------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| Detector: Peak Value         |                   |                       |                 |                    |                |                     |                 |              |
| Frequency (MHz)              | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4804.00                      | 46.73             | 30.85                 | 6.80            | 41.81              | 42.57          | 74.00               | -31.43          | Vertical     |
| 4804.00                      | 46.90             | 30.85                 | 6.80            | 41.81              | 42.74          | 74.00               | -31.26          | Horizontal   |
| Detector: Average Value      |                   |                       |                 |                    |                |                     |                 |              |
| Frequency (MHz)              | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4804.00                      | 38.68             | 30.85                 | 6.80            | 41.81              | 34.52          | 54.00               | -19.48          | Vertical     |
| 4804.00                      | 38.75             | 30.85                 | 6.80            | 41.81              | 34.59          | 54.00               | -19.41          | Horizontal   |

| Test channel: Lowest channel |                   |                       |                 |                    |                |                     |                 |              |
|------------------------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| Detector: Peak Value         |                   |                       |                 |                    |                |                     |                 |              |
| Frequency (MHz)              | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4880.00                      | 47.59             | 31.20                 | 6.86            | 41.84              | 43.81          | 74.00               | -30.19          | Vertical     |
| 4880.00                      | 46.38             | 31.20                 | 6.86            | 41.84              | 42.60          | 74.00               | -31.40          | Horizontal   |
| Detector: Average Value      |                   |                       |                 |                    |                |                     |                 |              |
| Frequency (MHz)              | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4880.00                      | 39.12             | 31.20                 | 6.86            | 41.84              | 35.34          | 54.00               | -18.66          | Vertical     |
| 4880.00                      | 38.45             | 31.20                 | 6.86            | 41.84              | 34.67          | 54.00               | -19.33          | Horizontal   |

| Test channel: Lowest channel |                   |                       |                 |                    |                |                     |                 |              |
|------------------------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| Detector: Peak Value         |                   |                       |                 |                    |                |                     |                 |              |
| Frequency (MHz)              | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4960.00                      | 47.85             | 31.63                 | 6.91            | 41.87              | 44.52          | 74.00               | -29.48          | Vertical     |
| 4960.00                      | 47.63             | 31.63                 | 6.91            | 41.87              | 44.30          | 74.00               | -29.70          | Horizontal   |
| Detector: Average Value      |                   |                       |                 |                    |                |                     |                 |              |
| Frequency (MHz)              | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 4960.00                      | 39.42             | 31.63                 | 6.91            | 41.87              | 36.09          | 54.00               | -17.91          | Vertical     |
| 4960.00                      | 39.25             | 31.63                 | 6.91            | 41.87              | 35.92          | 54.00               | -18.08          | Horizontal   |

## Remark:

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

The emission levels of other frequencies are very lower than the limit and not show in test report.