

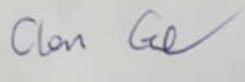
# RF TEST REPORT



**Report No.: FCC IC\_RF\_SL16040101-AER-001\_BLE\_Rev. 1.0**  
**Supersede Report No.: None**

|                                                     |   |                                                                                     |
|-----------------------------------------------------|---|-------------------------------------------------------------------------------------|
| Applicant                                           | : | Aerohive Networks, Inc.                                                             |
| Product Name                                        | : | Access Point                                                                        |
| Model No.                                           | : | AP245X                                                                              |
| Test Standard                                       | : | 47 CFR 15.247<br>RSS 247 Iss.1 : May 2015                                           |
| Test Method                                         | : | ANSI C63.10: 2013<br>RSS Gen Iss 4: Nov 2014<br>558074 D01 DTS Meas Guidance v03r04 |
| FCC ID                                              | : | WBV-AP245                                                                           |
| IC ID                                               | : | 7774A-AP245                                                                         |
| Dates of test                                       | : | 05/12/2016 – 05/23/2016                                                             |
| Issue Date                                          | : | 06/16/2016                                                                          |
| Test Result                                         | : | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail              |
| Equipment complied with the specification [X]       |   |                                                                                     |
| Equipment did not comply with the specification [ ] |   |                                                                                     |

This Test Report is Issued Under the Authority of:

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
| <b>Rachana Khanduri</b>                                                             | <b>Chen Ge</b>                                                                       |
| Test Engineer                                                                       | Engineer Reviewer                                                                    |

**Issued By:**  
**SIEMIC Laboratories**  
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## Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

| Country/Region | Accreditation Body     | Scope                             |
|----------------|------------------------|-----------------------------------|
| USA            | FCC, A2LA              | EMC, RF/Wireless, Telecom         |
| Canada         | IC, A2LA, NIST         | EMC, RF/Wireless, Telecom         |
| Taiwan         | BSMI, NCC, NIST        | EMC, RF, Telecom, Safety          |
| Hong Kong      | OFTA, NIST             | RF/Wireless, Telecom              |
| Australia      | NATA, NIST             | EMC, RF, Telecom, Safety          |
| Korea          | KCC/RRR, NIST          | EMI, EMS, RF, Telecom, Safety     |
| Japan          | VCCI, JATE, TELEC, RFT | EMI, RF/Wireless, Telecom         |
| Mexico         | NOM, COFETEL, Caniety  | Safety, EMC, RF/Wireless, Telecom |
| Europe         | A2LA, NIST             | EMC, RF, Telecom, Safety          |
| Israel         | MOC, NIST              | EMC, RF, Telecom, Safety          |

### Accreditations for Product Certifications

| Country   | Accreditation Body | Scope                 |
|-----------|--------------------|-----------------------|
| USA       | FCC TCB, NIST      | EMC, RF, Telecom      |
| Canada    | IC FCB, NIST       | EMC, RF, Telecom      |
| Singapore | iDA, NIST          | EMC, RF, Telecom      |
| EU        | NB                 | EMC & R&TTE Directive |
| Japan     | MIC (RCB 208)      | RF, Telecom           |
| Hong Kong | OFTA (US002)       | RF, Telecom           |

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## 1 Report Revision History

| Report No.                                | Report Version | Description                                              | Issue Date |
|-------------------------------------------|----------------|----------------------------------------------------------|------------|
| FCC IC_RF_SL16040101-AER-001_BLE          | None           | Original                                                 | 06/10/2016 |
| FCC IC_RF_SL16040101-AER-001_BLE_Rev. 1.0 | Rev. 1.0       | Updated Internal Photos and Test Instruments information | 06/16/2016 |
|                                           |                |                                                          |            |
|                                           |                |                                                          |            |
|                                           |                |                                                          |            |

## 2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Aerohive Networks, Inc.  
Product: Access Point  
Model: AP245X

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> page.

## 3 Customer information

|                      |   |                                                                   |
|----------------------|---|-------------------------------------------------------------------|
| Applicant Name       | : | Aerohive Networks, Inc.                                           |
| Applicant Address    | : | 1011 McCarthy Blvd, Milpitas, CA 95035, California, United States |
| Manufacturer Name    | : | Aerohive Networks, Inc.                                           |
| Manufacturer Address | : | 1011 McCarthy Blvd, Milpitas, CA 95035, California, United States |

## 4 Test site information

|                      |                                             |
|----------------------|---------------------------------------------|
| Lab performing tests | SIEMIC Laboratories                         |
| Lab Address          | 775 Montague Expressway, Milpitas, CA 95035 |
| FCC Test Site No.    | 881796                                      |
| IC Test Site No.     | 4842D-2                                     |
| VCCI Test Site No.   | A0133                                       |

## 5 Modification

| Index | Item | Description | Note |
|-------|------|-------------|------|
| -     | -    | -           | -    |
|       |      |             |      |
|       |      |             |      |
|       |      |             |      |
|       |      |             |      |
|       |      |             |      |

## 6 EUT Information

### 6.1 EUT Description

|                           |   |                    |
|---------------------------|---|--------------------|
| Product Name              | : | Access Point       |
| Model No.                 | : | AP245X             |
| Trade Name                | : | Aerohive           |
| Serial No.                | : | N/A                |
| Host Model No.            | : | N/A                |
| Input Power               | : | 100-240V, 50/60Hz  |
| Power Adapter Manu/Model  | : | Microsemi 9001GR   |
| Power Adapter SN          | : | C15336594000002605 |
| Product Hardware version  | : | 1                  |
| Product Software version  | : | HIVEOS 7.0r1       |
| Radio Hardware version    | : | 1                  |
| Radio Software version    | : | HIVEOS 7.0r1       |
| Date of EUT received      | : | 05/07/2016         |
| Equipment Class/ Category | : | DTS                |
| Port/Connectors           | : | PoE, Ethernet,USB  |

### 6.2 Spec for BT Radio

| Radio Type             | Bluetooth       |
|------------------------|-----------------|
| Operating Frequency    | 2402MHz-2480MHz |
| Modulation             | GFSK (LE)       |
| Channel Spacing        | 2MHz (LE)       |
| Antenna Type           | PIFA Antenna    |
| Antenna Gain           | 4.57 dBi (BTLE) |
| Antenna Connector Type | U.FL connector  |

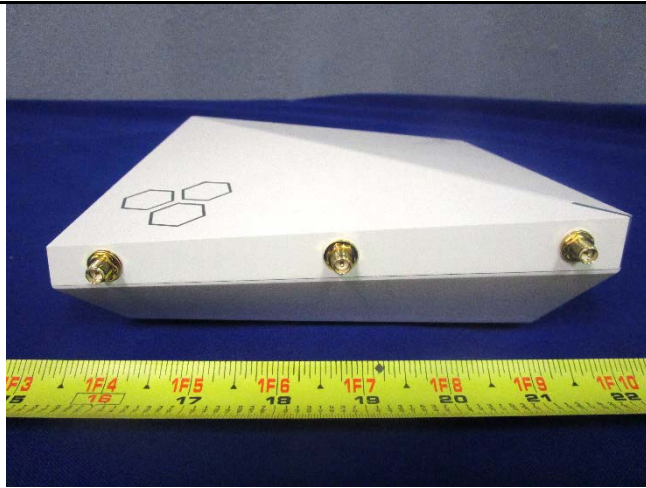
| Type                           | Channel No. | Frequency (MHz) | Power Setting |
|--------------------------------|-------------|-----------------|---------------|
| Bluetooth(BLE)<br>2402-2480MHz | 0           | 2402            | Default       |
|                                | 19          | 2440            | Default       |
|                                | 39          | 2480            | Default       |

### 6.3 EUT test modes/configuration Description

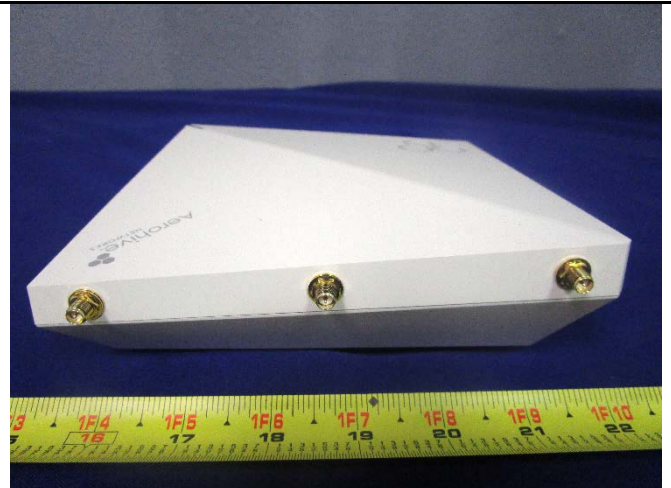
| Mode      | Note       |
|-----------|------------|
| Bluetooth | BLE (GFSK) |



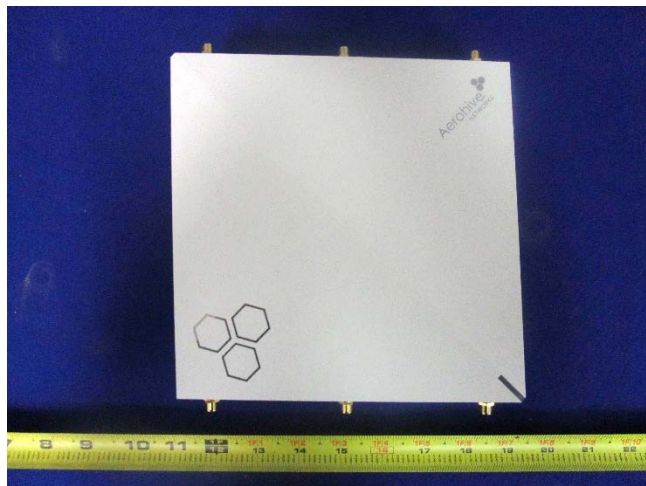
## 6.4 EUT Photos – External



EUT - Front View



EUT – Rear View



EUT - Top View



EUT – Bottom View



EUT – Left Side View



EUT – Right Side View



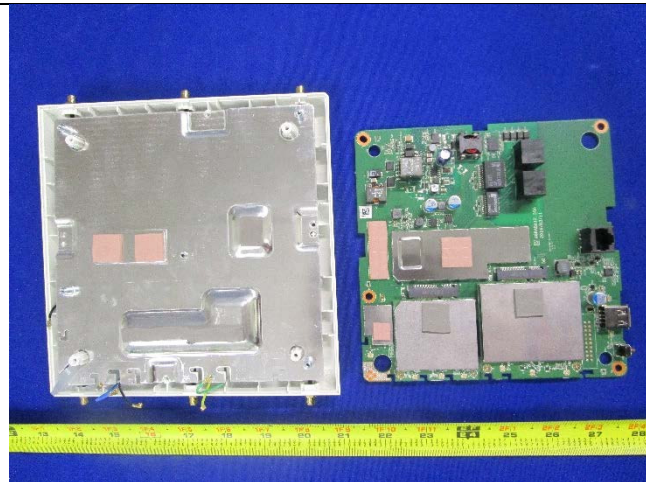
**Support Equipment Power Supply Top View**



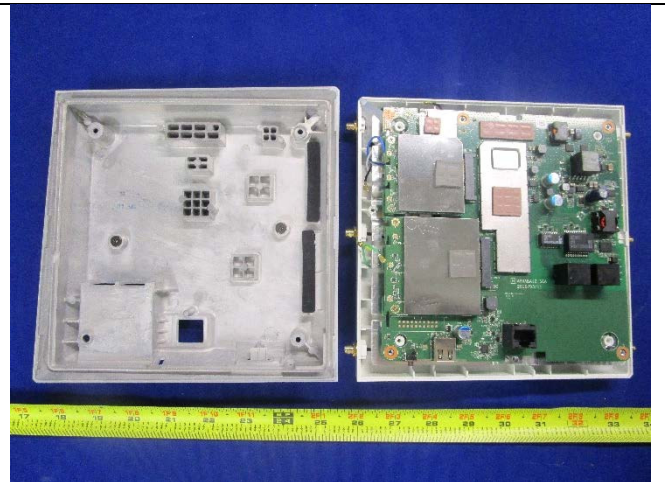
**Support Equipment Power Supply Bottom View**



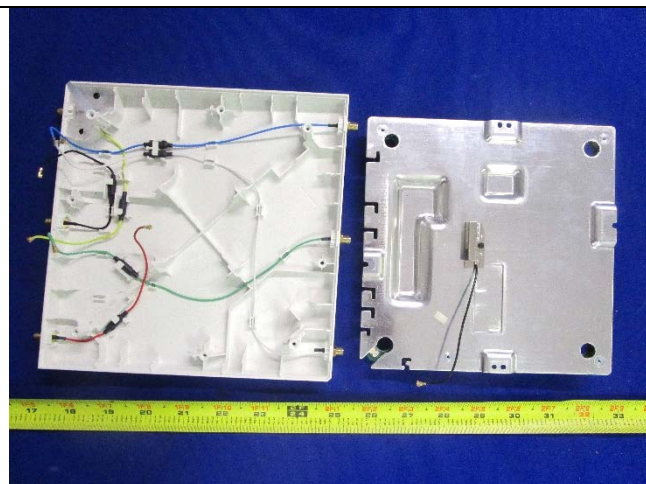
## 6.5 EUT Photos (Internal)



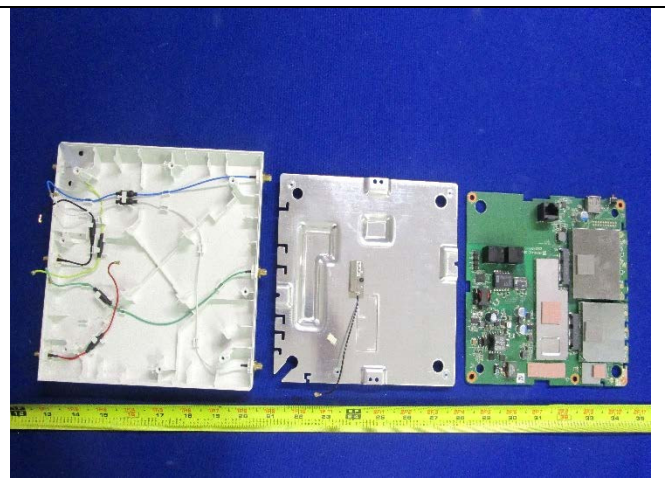
EUT: Cover Off View 1



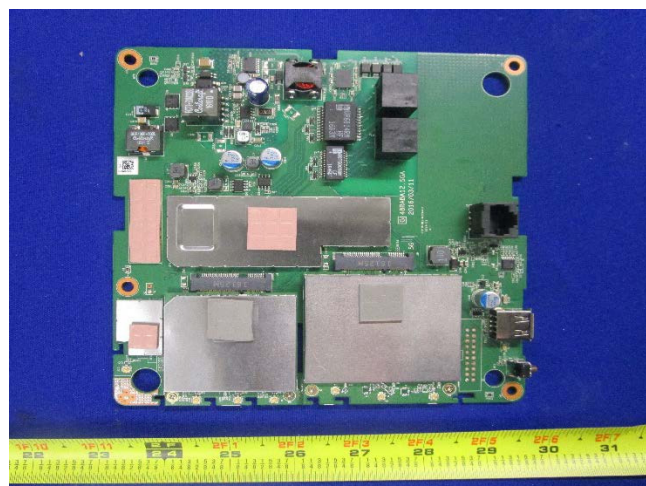
EUT: Cover Off View 2



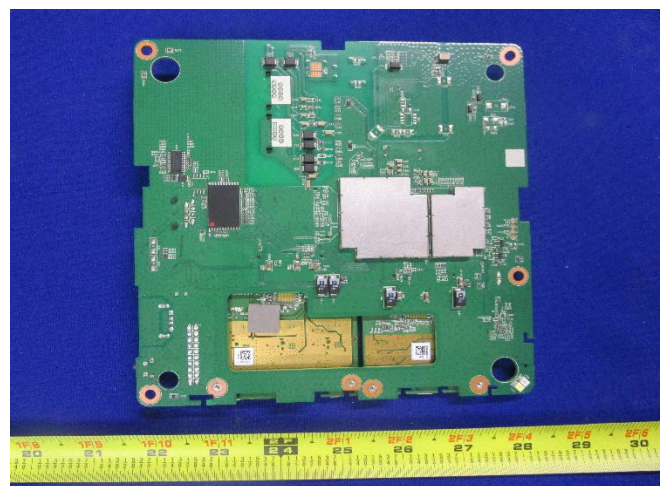
EUT: Cover Off View 3



EUT: Cover Off View 4

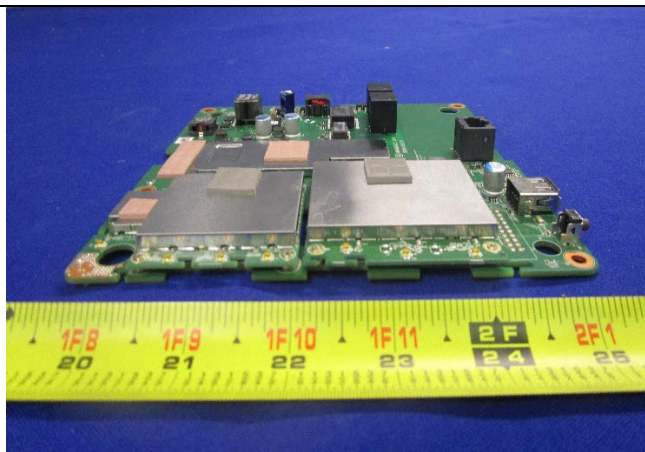


PCBA Top View

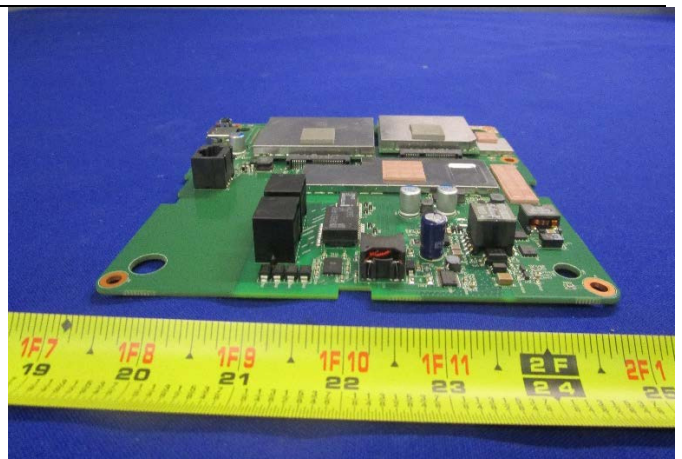


PCBA Bottom View

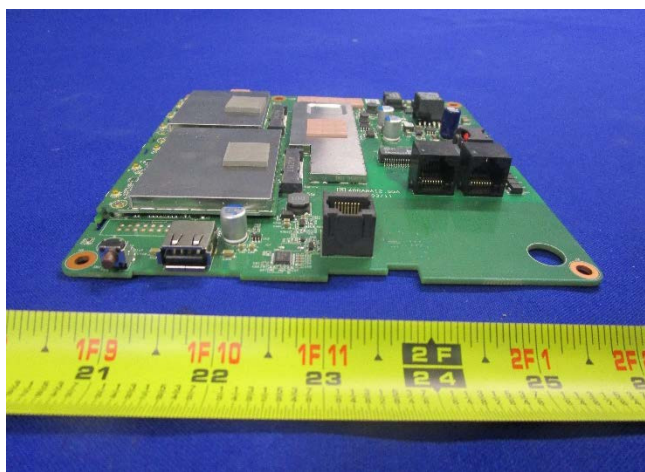




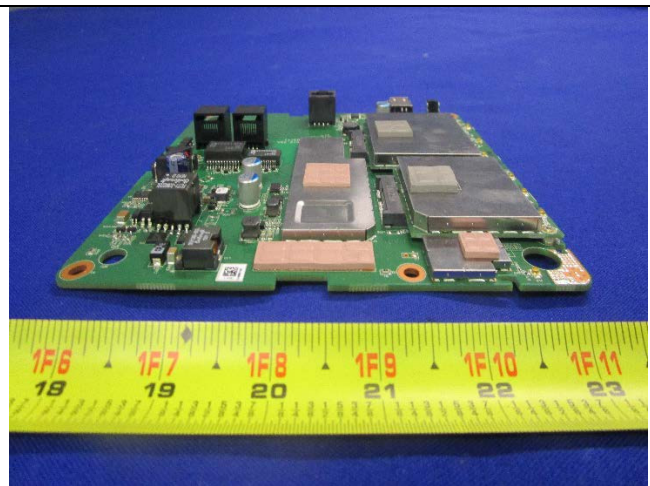
**PCBA Front View**



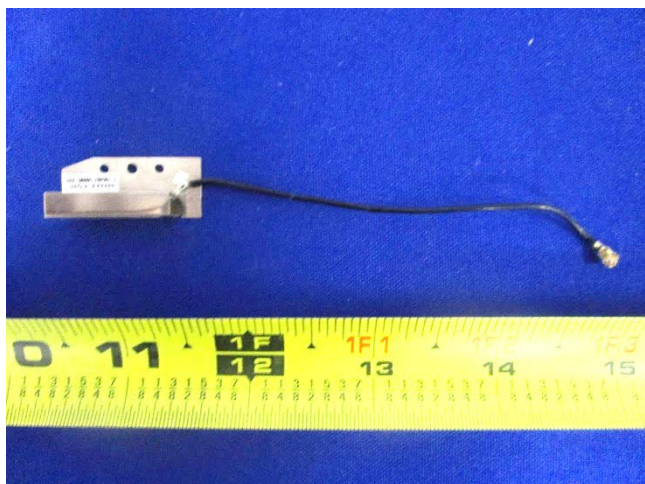
**PCBA Rear View**



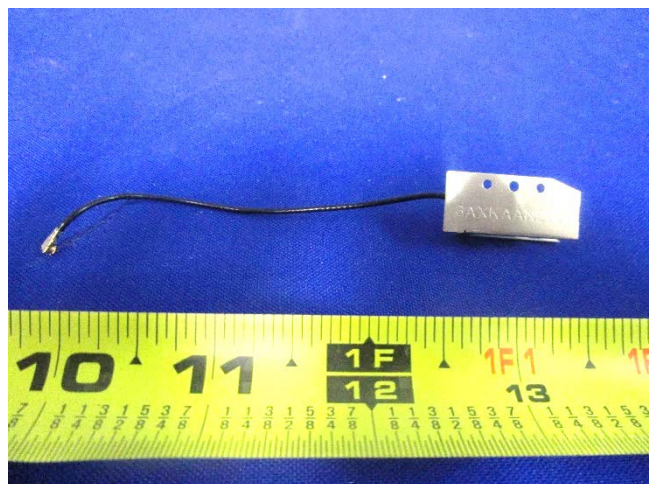
**PCBA Left-Side View**



**PCBA Right-Side View**



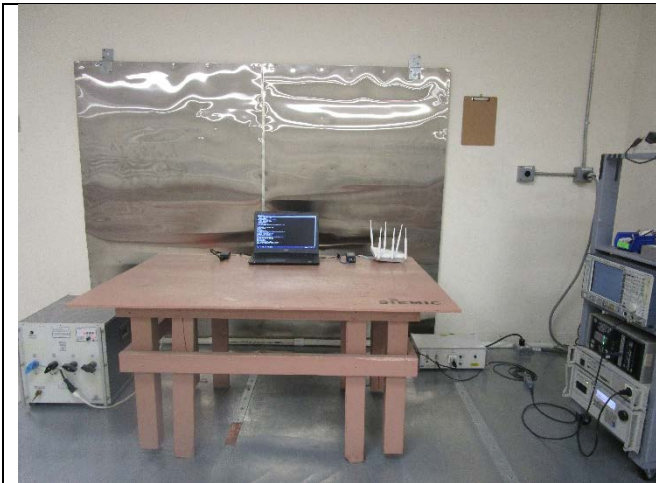
**Antenna Top View**



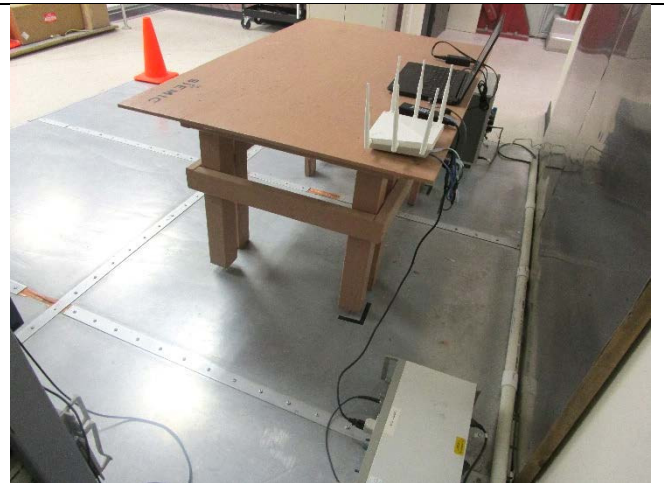
**Antenna Bottom View**



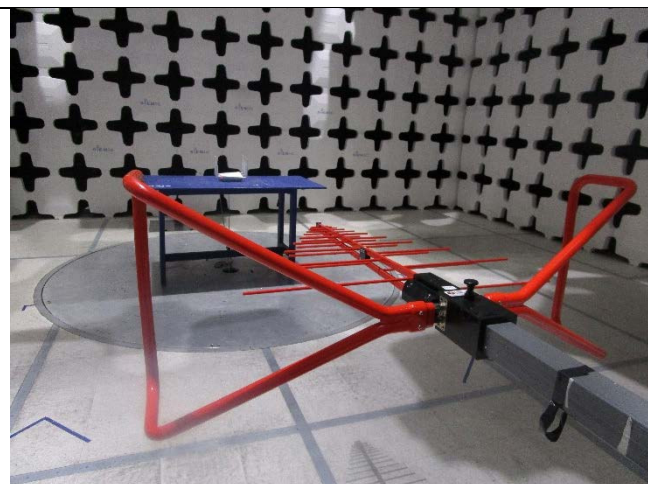
## 6.6 EUT Test Setup Photos



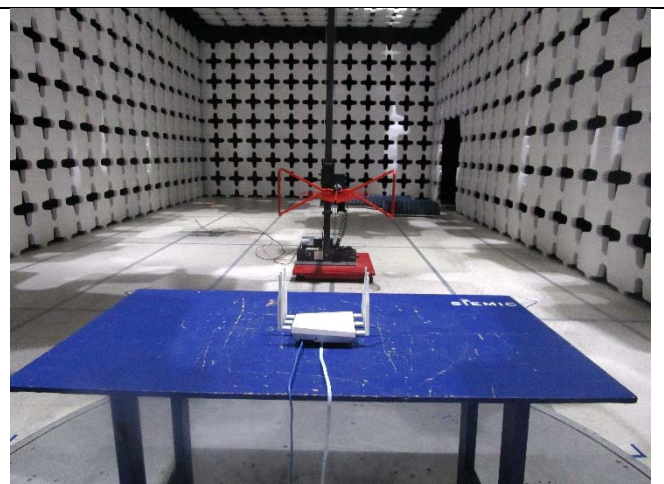
AC Line Conducted Emissions – Front View



AC Line Conducted Emissions – Rear View



Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

| Item | Supporting Equipment Description | Model         | Serial Number | Manufacturer | Note |
|------|----------------------------------|---------------|---------------|--------------|------|
| 1    | Laptop                           | Latitude 3550 | N/A           | Dell         | -    |
|      |                                  |               |               |              |      |
|      |                                  |               |               |              |      |

### 7.2 Cabling Description

| Name | Connection Start |          | Connection Stop |          | Length / shielding Info |            | Note |
|------|------------------|----------|-----------------|----------|-------------------------|------------|------|
|      | From             | I/O Port | To              | I/O Port | Length (m)              | Shielding  |      |
| RJ45 | EUT              | RJ45     | POE             | RJ45     | 2                       | Unshielded | -    |
| RJ45 | EUT              | RJ45     | Laptop          | USB      | 3                       | Unshielded | -    |

### 7.3 Test Software Description

| Test Item  | Software  | Description                                                |
|------------|-----------|------------------------------------------------------------|
| RF Testing | Tera Term | Set the EUT to transmit continuously in diferent test mode |
|            |           |                                                            |
|            |           |                                                            |



## 8 Test Summary

| Test Item                    | Test standard |              | Test Method/Procedure |                                     | Pass / Fail                              |
|------------------------------|---------------|--------------|-----------------------|-------------------------------------|------------------------------------------|
| Restricted Band of Operation | FCC           | 15.205       | FCC                   | ANSI C63.10:2013                    | <input checked="" type="checkbox"/> Pass |
|                              | IC            | RSS Gen 8.10 | IC                    | 558074 D01 DTS Meas Guidance v03r04 | <input type="checkbox"/> N/A             |
| AC Conducted Emissions       | FCC           | 15.207(a)    | FCC                   | ANSI C63.10:2013                    | <input checked="" type="checkbox"/> Pass |
|                              | IC            | RSS Gen 8.8  | IC                    | RSS Gen Issue 4: 2014               | <input type="checkbox"/> N/A             |

### DTS band Requirement

| Test Item                                 | Test standard                                                                                                                                                                                                                                                                                                                                                                                                   |                | Test Method/Procedure |                                                         | Pass / Fail                                                              |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|---------------------------------------------------------|--------------------------------------------------------------------------|
| 99% Occupied Bandwidth                    | -                                                                                                                                                                                                                                                                                                                                                                                                               | -              | -                     | -                                                       | <input checked="" type="checkbox"/> Pass                                 |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS Gen 6.6    | IC                    | RSS Gen Issue 4: 2014 -                                 | <input type="checkbox"/> N/A                                             |
| 6dB Bandwidth                             | FCC                                                                                                                                                                                                                                                                                                                                                                                                             | 15.247(a)(2)   | FCC                   | 558074 D01 DTS Meas Guidance v03r04                     | <input checked="" type="checkbox"/> Pass                                 |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS247 (5.2.1) | IC                    |                                                         | <input type="checkbox"/> N/A                                             |
| Band Edge and Radiated Spurious Emissions | FCC                                                                                                                                                                                                                                                                                                                                                                                                             | 15.247(d)      | FCC                   | ANSI C63.10:2013<br>558074 D01 DTS Meas Guidance v03r04 | <input checked="" type="checkbox"/> Pass                                 |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS247 (5.5)   | IC                    |                                                         | <input type="checkbox"/> N/A                                             |
| Output Power                              | FCC                                                                                                                                                                                                                                                                                                                                                                                                             | 15.247(b)      | FCC                   | 558074 D01 DTS Meas Guidance v03r04                     | <input checked="" type="checkbox"/> Pass                                 |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS247 (5.4.4) | IC                    |                                                         | <input type="checkbox"/> N/A                                             |
| Receiver Spurious Emissions               | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS Gen (4.8)  | IC                    | RSS Gen Issue 4: 2014                                   | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> N/A |
| Antenna Gain > 6 dBi                      | FCC                                                                                                                                                                                                                                                                                                                                                                                                             | 15.247(e)      | FCC                   | -                                                       | <input type="checkbox"/> Pass                                            |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | -              | IC                    | -                                                       | <input checked="" type="checkbox"/> N/A                                  |
| Power Spectral Density                    | FCC                                                                                                                                                                                                                                                                                                                                                                                                             | 15.247(e)      | FCC                   | 558074 D01 DTS Meas Guidance v03r04                     | <input checked="" type="checkbox"/> Pass                                 |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS247 (5.2.2) | IC                    |                                                         | <input type="checkbox"/> N/A                                             |
| RF Exposure requirement                   | FCC                                                                                                                                                                                                                                                                                                                                                                                                             | 15.247(i)      | FCC                   | -                                                       | <input type="checkbox"/> Pass                                            |
|                                           | IC                                                                                                                                                                                                                                                                                                                                                                                                              | RSS Gen(5.5)   | IC                    | RSS Gen Issue 4: 2014                                   | <input checked="" type="checkbox"/> N/A                                  |
| Remark                                    | <ol style="list-style-type: none"> <li>All measurement uncertainties do not take into consideration for all presented test results.</li> <li>The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.</li> <li>The device is operating at near 98% duty cycle.</li> </ol> |                |                       |                                                         |                                                                          |

## 9 Measurement Uncertainty

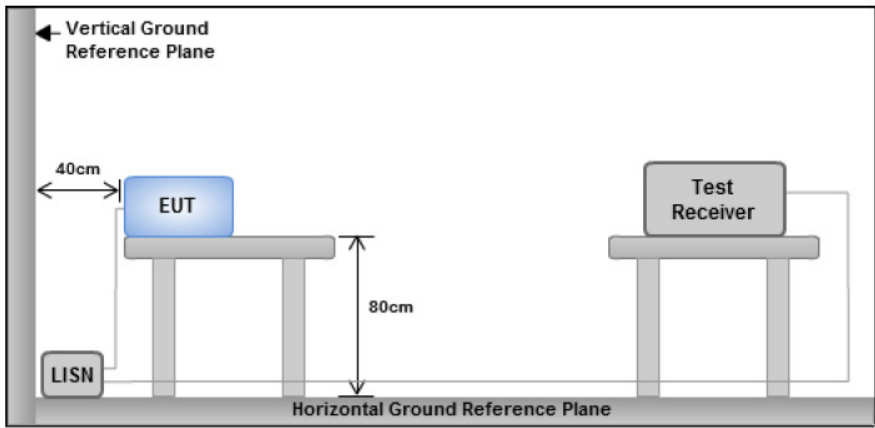
| Emissions                                 |                 |                                                                                                                                                 |               |
|-------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Test Item                                 | Frequency Range | Description                                                                                                                                     | Uncertainty   |
| AC Conducted Emissions                    | 150KHz – 30MHz  | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2                                 | ±3.5dB        |
| Band Edge and Radiated Spurious Emissions | 30MHz – 1GHz    | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +5.6dB/-4.5dB |
| Band Edge and Radiated Spurious Emissions | 1GHz – 40GHz    | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +4.3dB/-4.1dB |

## 10 Measurements, Examination and Derived Results

### 10.1 Conducted Emissions

#### Conducted Emission Limit

| Frequency ranges (MHz) | Limit (dBuV) |         |
|------------------------|--------------|---------|
|                        | QP           | Average |
| 0.15 ~ 0.5             | 66 – 56      | 56 – 46 |
| 0.5 ~ 5                | 56           | 46      |
| 5 ~ 30                 | 60           | 50      |

| Spec         | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Applicable                          |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 47CFR§15.207 | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges. | <input checked="" type="checkbox"/> |
| Test Setup   |  <p>Note: 1. Support units were connected to second LISN.<br/>2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |
| Procedure    | <ul style="list-style-type: none"> <li>- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.</li> <li>- The power supply for the EUT was fed through a 50<math>\Omega</math>/50<math>\mu</math>H EUT LISN, connected to filtered mains.</li> <li>- The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>- All other supporting equipment was powered separately from another main supply.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |
| Remark       | EUT tested with AC 120V 60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |
| Result       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                     |

Test Data    ☒ Yes                      ☐ N/A

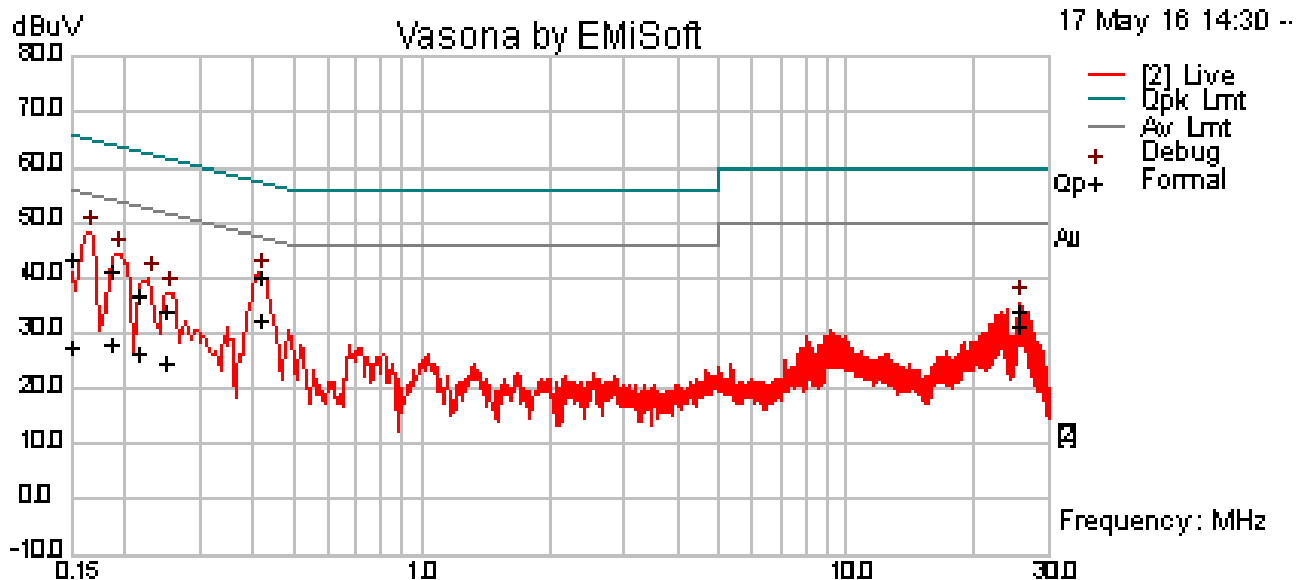
Test Plot    ☒ Yes (See below)                      ☐ N/A

Test was done by Rachana Khanduri at Conducted Emission Test Site.



## Conducted Emission Test Results

|                           |                     |      |         |                                                                               |
|---------------------------|---------------------|------|---------|-------------------------------------------------------------------------------|
| Test specification:       | Conducted Emissions |      |         |                                                                               |
| Environmental Conditions: | Temp(°C):           | 21   | Result: | <input checked="" type="checkbox"/> Pass<br><br><input type="checkbox"/> Fail |
|                           | Humidity (%):       | 42   |         |                                                                               |
|                           | Atmospheric(mbar):  | 1021 |         |                                                                               |
| Mains Power:              | 120Vac, 60Hz        |      |         |                                                                               |
| Tested by:                | Rachana Khanduri    |      |         |                                                                               |
| Test Date:                | 05/17/2016          |      |         |                                                                               |
| Remarks                   | AC Line @ Line      |      |         |                                                                               |



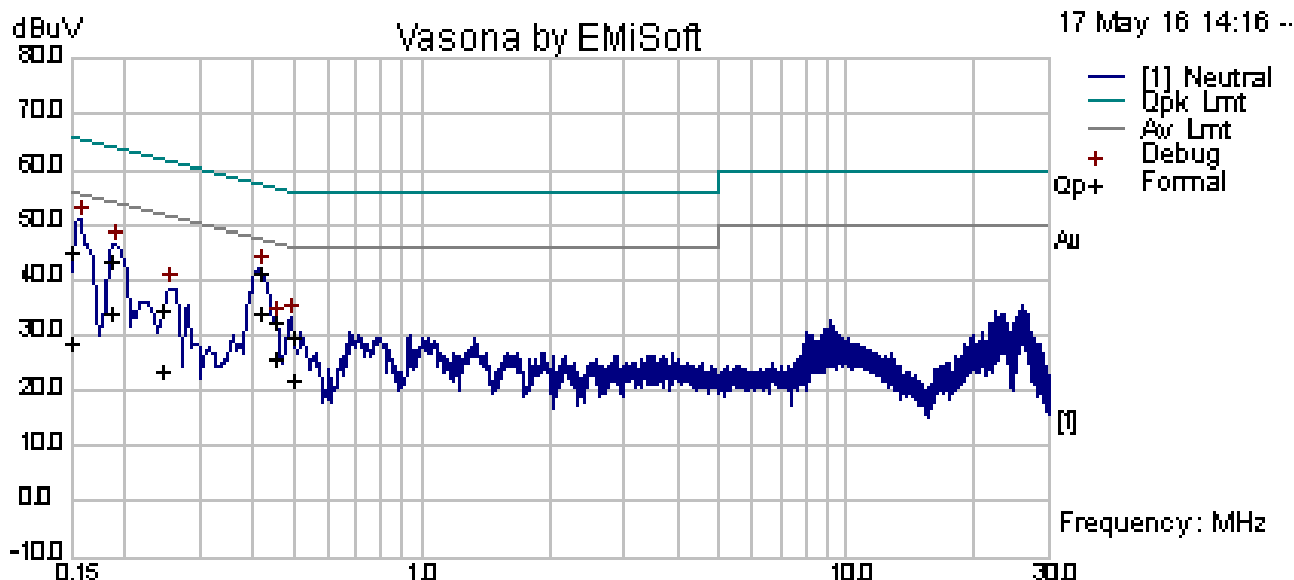
Line Plot at 120Vac, 60Hz

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line | Limit (dBuV) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|--------------|--------------|------------------|------|--------------|-------------|------------|
| 0.41            | 29.36      | 10.01           | 0.74         | 40.11        | Quasi Peak       | Live | 57.55        | -17.44      | Pass       |
| 0.15            | 31.48      | 10.00           | 1.80         | 43.28        | Quasi Peak       | Live | 66.00        | -22.72      | Pass       |
| 0.18            | 29.71      | 10.00           | 1.43         | 41.15        | Quasi Peak       | Live | 64.29        | -23.14      | Pass       |
| 0.21            | 25.52      | 10.00           | 1.23         | 36.75        | Quasi Peak       | Live | 63.02        | -26.27      | Pass       |
| 0.25            | 23.32      | 10.00           | 1.06         | 34.38        | Quasi Peak       | Live | 61.77        | -27.39      | Pass       |
| 25.49           | 23.16      | 10.08           | 0.78         | 34.01        | Quasi Peak       | Live | 60.00        | -25.99      | Pass       |
| 0.41            | 21.97      | 10.01           | 0.74         | 32.72        | Average          | Live | 47.55        | -14.83      | Pass       |
| 0.15            | 15.49      | 10.00           | 1.80         | 27.30        | Average          | Live | 56.00        | -28.70      | Pass       |
| 0.18            | 16.43      | 10.00           | 1.43         | 27.86        | Average          | Live | 54.29        | -26.43      | Pass       |
| 0.21            | 15.37      | 10.00           | 1.23         | 26.60        | Average          | Live | 53.02        | -26.42      | Pass       |
| 0.25            | 13.55      | 10.00           | 1.06         | 24.61        | Average          | Live | 51.77        | -27.16      | Pass       |
| 25.49           | 20.47      | 10.08           | 0.78         | 31.33        | Average          | Live | 50.00        | -18.67      | Pass       |

Note: The results above show only the worst case.

## Conducted Emission Test Results

|                           |                     |      |         |                                                                               |
|---------------------------|---------------------|------|---------|-------------------------------------------------------------------------------|
| Test specification:       | Conducted Emissions |      |         |                                                                               |
| Environmental Conditions: | Temp(°C):           | 21   | Result: | <input checked="" type="checkbox"/> Pass<br><br><input type="checkbox"/> Fail |
|                           | Humidity (%):       | 42   |         |                                                                               |
|                           | Atmospheric(mbar):  | 1021 |         |                                                                               |
| Mains Power:              | 120Vac, 60Hz        |      |         |                                                                               |
| Tested by:                | Rachana Khanduri    |      |         |                                                                               |
| Test Date:                | 05/17/016           |      |         |                                                                               |
| Remarks                   | AC Line @ Neutral   |      |         |                                                                               |



Neutral Plot at 120Vac, 60Hz

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line    | Limit (dBuV) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|--------------|--------------|------------------|---------|--------------|-------------|------------|
| 0.15            | 33.20      | 10.00           | 1.80         | 45.00        | Quasi Peak       | Neutral | 66.00        | -21.00      | Pass       |
| 0.42            | 30.83      | 10.01           | 0.74         | 41.58        | Quasi Peak       | Neutral | 57.54        | -15.96      | Pass       |
| 0.19            | 32.20      | 10.00           | 1.42         | 43.62        | Quasi Peak       | Neutral | 64.21        | -20.59      | Pass       |
| 0.50            | 18.82      | 10.01           | 0.68         | 29.51        | Quasi Peak       | Neutral | 56.04        | -26.53      | Pass       |
| 0.25            | 23.35      | 10.00           | 1.08         | 34.43        | Quasi Peak       | Neutral | 61.91        | -27.47      | Pass       |
| 0.45            | 22.03      | 10.01           | 0.71         | 32.75        | Quasi Peak       | Neutral | 56.85        | -24.10      | Pass       |
| 0.15            | 16.60      | 10.00           | 1.80         | 28.41        | Average          | Neutral | 56.00        | -27.59      | Pass       |
| 0.42            | 23.29      | 10.01           | 0.74         | 34.03        | Average          | Neutral | 47.54        | -13.51      | Pass       |
| 0.19            | 22.59      | 10.00           | 1.42         | 34.01        | Average          | Neutral | 54.21        | -20.21      | Pass       |
| 0.50            | 11.38      | 10.01           | 0.68         | 22.07        | Average          | Neutral | 46.04        | -23.97      | Pass       |
| 0.25            | 12.49      | 10.00           | 1.08         | 23.57        | Average          | Neutral | 51.91        | -28.33      | Pass       |
| 0.45            | 15.2       | 10.01           | 0.71         | 25.92        | Average          | Neutral | 46.85        | -20.93      | Pass       |

Note: The results above show only the worst case.

## 10.2 Output Power (Bluetooth LE)

### Requirement(s):

| Spec                       | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Requirement                                                           | Applicable                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|
| § 15.247<br>RSS247 (5.4.2) | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FHSS in 2400-2483.5MHz with $\geq 75$ channels: $\leq 1$ Watt         | <input type="checkbox"/>                                                   |
|                            | b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FHSS in 5725-5850MHz: $\leq 1$ Watt                                   | <input type="checkbox"/>                                                   |
|                            | c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | For all other FHSS in the 2400-2483.5MHz band: $\leq 0.125$ Watt.     | <input type="checkbox"/>                                                   |
|                            | d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FHSS in 902-928MHz with $\geq 50$ channels: $\leq 1$ Watt             | <input type="checkbox"/>                                                   |
|                            | e)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FHSS in 902-928MHz with $\geq 25$ & $< 50$ channels: $\leq 0.25$ Watt | <input type="checkbox"/>                                                   |
|                            | f)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: $\leq 1$ Watt       | <input checked="" type="checkbox"/>                                        |
| Test Setup                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                       |                                                                            |
| Test Procedure             | <p>558074 D01 DTS Meas Guidance v03r04, 9.2.3.1</p> <p>Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.</p> <ul style="list-style-type: none"> <li>- Connect EUT's RF output power to power meter</li> <li>- Set EUT to be continuous transmission mode</li> <li>- Measurement the average output power using power meter and record the result</li> <li>- Repeat above steps for different test channel and other modulation type.</li> </ul> |                                                                       |                                                                            |
| Test Date                  | 05/13/2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Environmental condition                                               | Temperature 23°C<br>Relative Humidity 44%<br>Atmospheric Pressure 1021mbar |
| Remark                     | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                       |                                                                            |
| Result                     | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                       |                                                                            |

Test Data    ☒ Yes                      ☐ N/A

Test Plot    ☐ Yes (See below)              ☒ N/A

Test was done by **Rachana Khanduri** at **RF Test Site**.

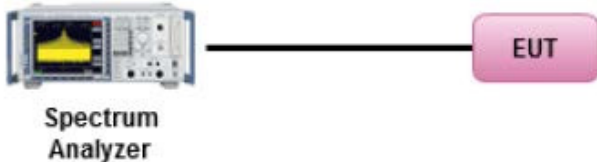


### Output Power measurement result (Bluetooth)

| Type         | Test mode    | Freq (MHz) | CH   | Conducted Power (dBm) | Limit (dBm) | Result |
|--------------|--------------|------------|------|-----------------------|-------------|--------|
| Output power | Bluetooth LE | 2402       | Low  | 4.72                  | 30          | Pass   |
|              |              | 2440       | Mid  | 5.21                  | 30          | Pass   |
|              |              | 2480       | High | 5.06                  | 30          | Pass   |

### 10.3 Band Edge (Bluetooth LE)

#### Requirement(s):

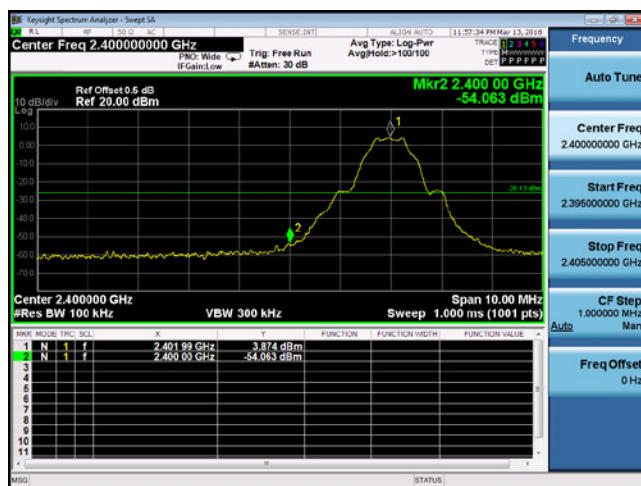
| Spec                    | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Applicable                                                                 |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| § 15.247<br>RSS247(5.5) | d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209 (a) is not required<br><br><input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down | <input checked="" type="checkbox"/>                                        |
| Test Setup              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                            |
| Test Procedure          | <p>558074 D01 DTS Meas Guidance v03r04</p> <p><u>Band Edge measurement procedure</u></p> <ol style="list-style-type: none"> <li>1. Set the EUT to maximum power setting and enable the EUT transmit continuously.</li> <li>2. Band edge emissions must be at least 30 dB down from the highest emission level within the authorized band as a measured. The attenuation shall be be 30 dB instead of 20 dB when Peak conducted output power procedure is used.</li> <li>3. Change modulation and channel bandwidth then repeat step 1 to 2.</li> <li>4. Measured and record the results in the test report.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                            |
| Test Date               | 05/13/2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Environmental condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Temperature 22°C<br>Relative Humidity 46%<br>Atmospheric Pressure 1020mbar |
| Remark                  | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                            |
| Result                  | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                            |

Test Data    ☐ Yes      ☒ N/A

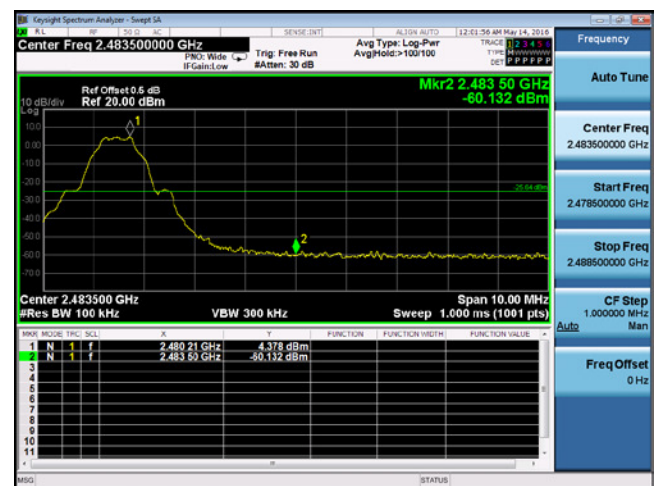
Test Plot    ☒ Yes (See below)      ☐ N/A

Test was done by **Rachana Khanduri** at **RF Test Site**.

### Band Edge Test Plots (Bluetooth LE)



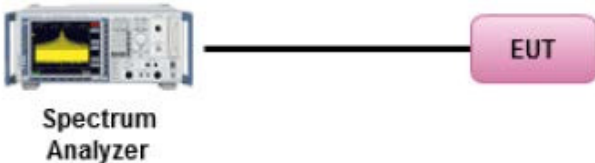
Band Edge-LE Low



Band Edge-LE High

## 10.4 6dB Bandwidth (Bluetooth LE)

### Requirement(s):

| Spec                       | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Requirement             | Applicable                                                                 |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------|
| § 15.247<br>RSS247 (5.2.1) | a)(2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 6dB BW ≥ 500KHz;        | <input checked="" type="checkbox"/>                                        |
| Test Setup                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |                                                                            |
| Test Procedure             | <p>558074 D01 DTS Meas Guidance v03r04, 8.1 DTS bandwidth</p> <p><u>6dB Emission bandwidth measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set RBW = 100 kHz.</li> <li>- Set the video bandwidth (VBW) ≥ 3 x RBW.</li> <li>- Detector = Peak.</li> <li>- Trace mode = max hold.</li> <li>- Sweep = auto couple.</li> <li>- Allow the trace to stabilize.</li> <li>- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.</li> </ul> |                         |                                                                            |
| Test Date                  | 05/13/2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Environmental condition | Temperature 23°C<br>Relative Humidity 42%<br>Atmospheric Pressure 1021mbar |
| Remark                     | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                         |                                                                            |
| Result                     | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                                                                            |

Test Data    ☒ Yes      ☐ N/A

Test Plot    ☒ Yes      ☐ N/A

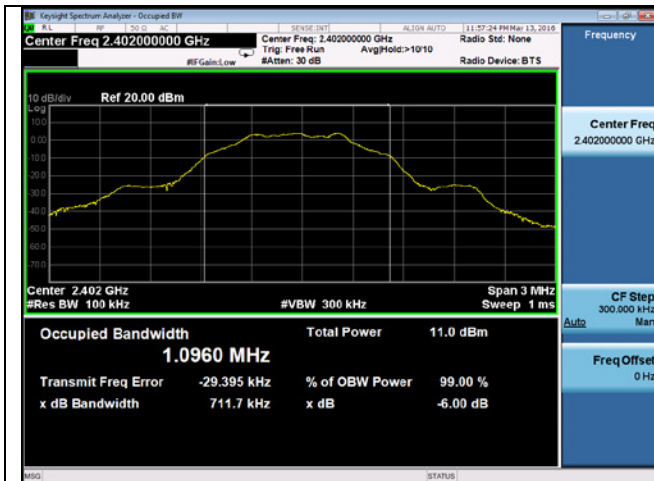
Test was done by **Rachana Khanduri** at **RF Test Site**.



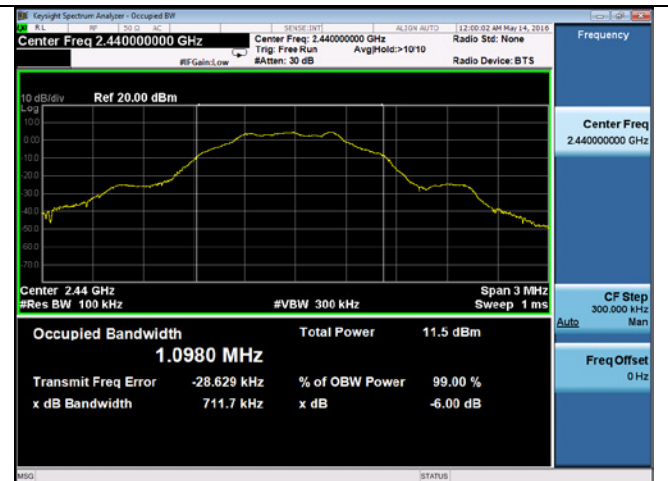
**6dB Bandwidth measurement result for 2.4GHz**

| Type   | Test mode | Freq (MHz) | CH   | Result (MHz) | Limit (MHz) | Result |
|--------|-----------|------------|------|--------------|-------------|--------|
| 6dB BW | BT-LE     | 2402       | Low  | 0.711        | $\geq 0.5$  | Pass   |
|        |           | 2440       | Mid  | 0.711        | $\geq 0.5$  | Pass   |
|        |           | 2480       | High | 0.713        | $\geq 0.5$  | Pass   |

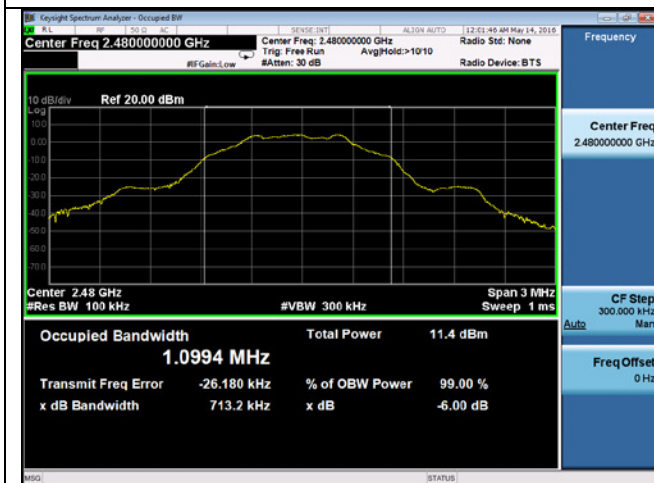
## Test Plots



6dB BW –Bluetooth LE 2402MHz



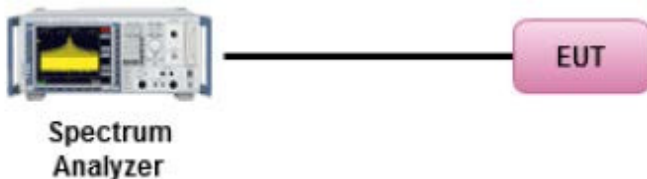
6dB BW –Bluetooth LE 2440MHz



6dB BW –Bluetooth LE 2480MHz

## 10.5 99% Occupied Bandwidth (Bluetooth LE)

### Requirement(s):

| Spec          | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Applicable                                                                                            |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| RSS Gen 4.6.1 | The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual. The trace data points are recovered and directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth | <input checked="" type="checkbox"/>                                                                   |
| Test Setup    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                       |
| Procedure     | 1. EUT was set for low , mid, high channel with modulated mode and highest RF output power.<br>2. The spectrum analyzer was connected to the antenna terminal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                       |
| Test Date     | 05/13/2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Environmental condition<br>Temperature 23oC<br>Relative Humidity 47%<br>Atmospheric Pressure 1019mbar |
| Remark        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                       |
| Result        | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                       |

**Test Data**    ☒ Yes (See below)      ☐ N/A

**Test Plot**    ☒ Yes (See below)      ☐ N/A

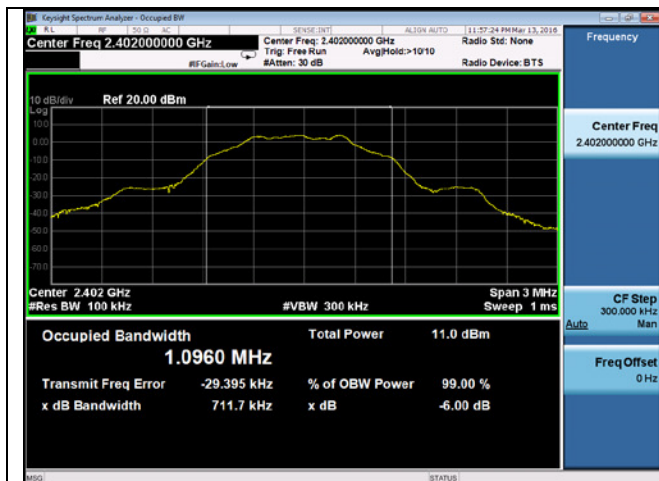
**Test was done by** *Rachana Khanduri* **at** *RF Test Site*.

### 99% Bandwidth measurement result for Bluetooth LE

| Type    | Test mode | Freq (MHz) | CH   | Result (MHz) |
|---------|-----------|------------|------|--------------|
| 99% OBW | BT-LE     | 2402       | Low  | 1.0960       |
|         |           | 2440       | Mid  | 1.0980       |
|         |           | 2480       | High | 1.0994       |



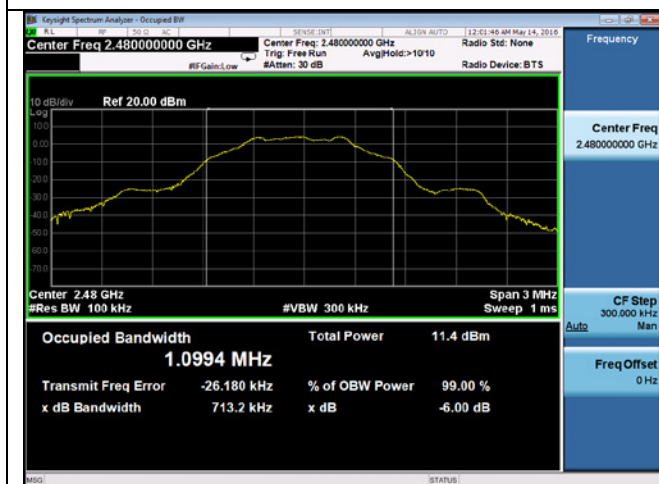
## 99%dB Bandwidth Test Plot (Bluetooth LE)



99% BW –Bluetooth LE 2402MHz



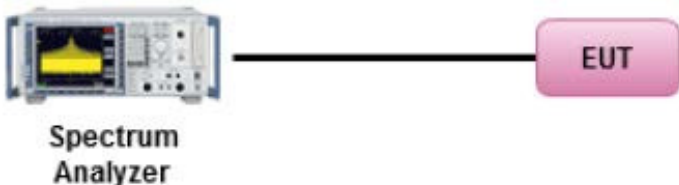
99% BW –Bluetooth LE 2440MHz



99% BW –Bluetooth LE 2480MHz

## 10.6 Peak Spectral Density (Bluetooth LE)

### Requirement(s):

| Spec           | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Requirement                                                           | Applicable                                                                 |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|
| § 15.247(e)    | e)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DSSS: $\leq 8\text{dBm}/3\text{KHz}$                                  | <input checked="" type="checkbox"/>                                        |
| RSS247 (5.2.2) | f)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | DSSS in hybrid sys with FH turned off: $\leq 8\text{dBm}/3\text{KHz}$ | <input type="checkbox"/>                                                   |
| Test Setup     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       |                                                                            |
| Test Procedure | <p>558074 D01 DTS Meas Guidance v03r04, 10.2 Method PKPSD (peak PSD)</p> <p><u>Peak spectral density measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set analyzer center frequency to DTS channel center frequency.</li> <li>- Set the span to 1.5 times the DTS bandwidth.</li> <li>- Set the RBW to: <math>3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}</math>.</li> <li>- Set the VBW <math>\geq 3 \times \text{RBW}</math>.</li> <li>- Detector = Peak</li> <li>- Sweep time = auto couple.</li> <li>- Trace mode = Trace Max Hold over 100 traces</li> <li>- Allow trace to fully stabilize.</li> <li>- Use the peak marker function to determine the maximum amplitude level within the RBW.</li> <li>- If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.</li> </ul> |                                                                       |                                                                            |
| Test Date      | 05/13/2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Environmental condition                                               | Temperature 22°C<br>Relative Humidity 46%<br>Atmospheric Pressure 1020mbar |
| Remark         | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       |                                                                            |
| Result         | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                       |                                                                            |

Test Data    ☒ Yes                      ☐ N/A

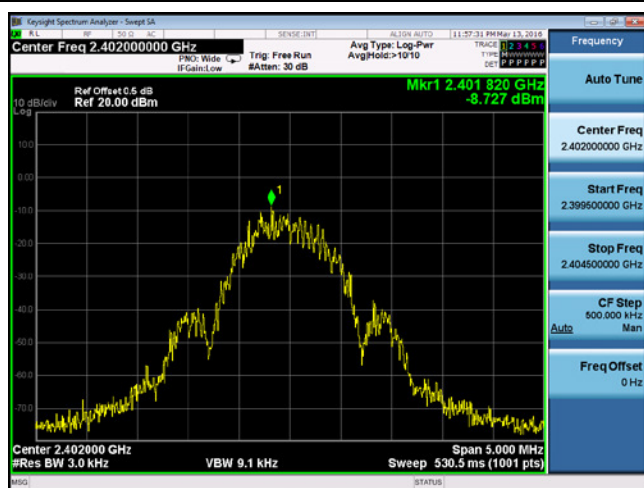
Test Plot    ☒ Yes (See below)      ☐ N/A

Test was done by **Rachana Khanduri** at **RF Test Site**.

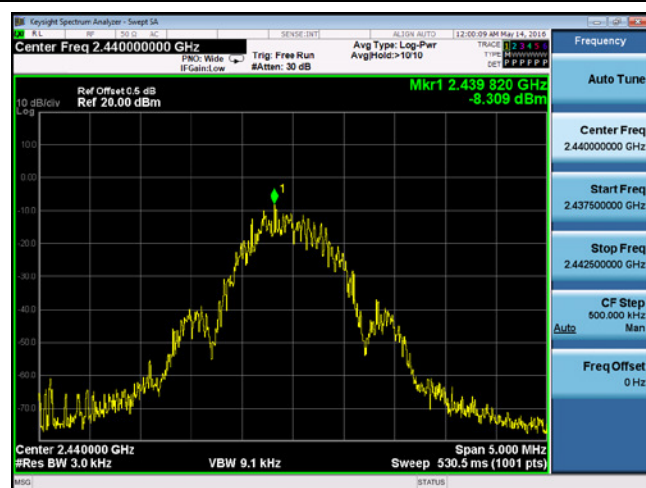
### PSD measurement result (Bluetooth LE)

| Type | Test mode    | Freq (MHz) | CH   | Conducted PSD (dBm/3KHz) | Limit (dBm/3KHz) | Result |
|------|--------------|------------|------|--------------------------|------------------|--------|
| PSD  | Bluetooth LE | 2402       | Low  | -8.727                   | ≤8               | Pass   |
|      |              | 2440       | Mid  | -8.309                   | ≤8               | Pass   |
|      |              | 2480       | High | -8.576                   | ≤8               | Pass   |

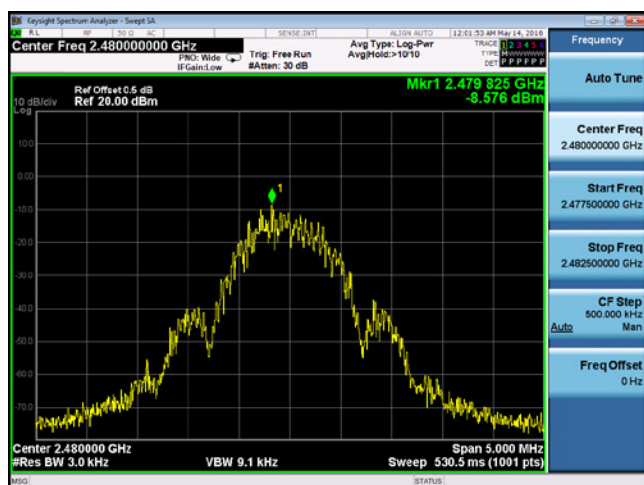
## Test Plots (Bluetooth LE)



PSD -Bluetooth LE Low



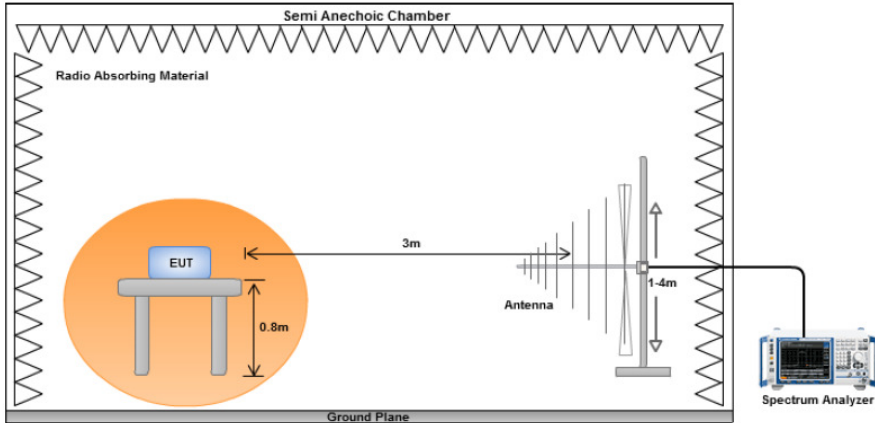
PSD -Bluetooth LE Mid



PSD -Bluetooth LE High

## 10.7 Transmitter Radiated Spurious Emissions Below 1GHz

### Requirement(s):

| Spec                            | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Requirement                                                                                                                                                                                                                                                                                                                                   | Applicable                          |                       |                       |         |     |          |     |         |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------|-----------------------|---------|-----|----------|-----|---------|
| 47CFR§15.247(d),<br>RSS247(5.5) | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges | <input checked="" type="checkbox"/> |                       |                       |         |     |          |     |         |
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <table><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr><tr><td>30 – 88</td><td>100</td></tr><tr><td>88 – 216</td><td>150</td></tr><tr><td>216 960</td><td>200</td></tr><tr><td>Above 960</td><td>500</td></tr></table>                                                                                                   |                                     | Frequency range (MHz) | Field Strength (uV/m) | 30 – 88 | 100 | 88 – 216 | 150 | 216 960 |
| Frequency range (MHz)           | Field Strength (uV/m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| 30 – 88                         | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| 88 – 216                        | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| 216 960                         | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| Above 960                       | 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| Test Setup                      | <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| Procedure                       | <div><div><div>1.</div><div>2.</div><div>3.</div><div>4.</div></div><div><p>The EUT was switched on and allowed to warm up to its normal operating condition.</p><p>The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:</p><div><div>a.</div><div>b.</div><div>c.</div></div><p>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</p><p>The EUT was then rotated to the direction that gave the maximum emission.</p><p>Finally, the antenna height was adjusted to the height that gave the maximum emission.</p><p>A Quasi-peak measurement was then made for that frequency point.</p><p>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</p></div></div> |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| Remark                          | The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |
| Result                          | <div><input checked="" type="checkbox"/> Pass</div> <div><input type="checkbox"/> Fail</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                               |                                     |                       |                       |         |     |          |     |         |

**Test Data** ☒ Yes (See below) ☐ N/A

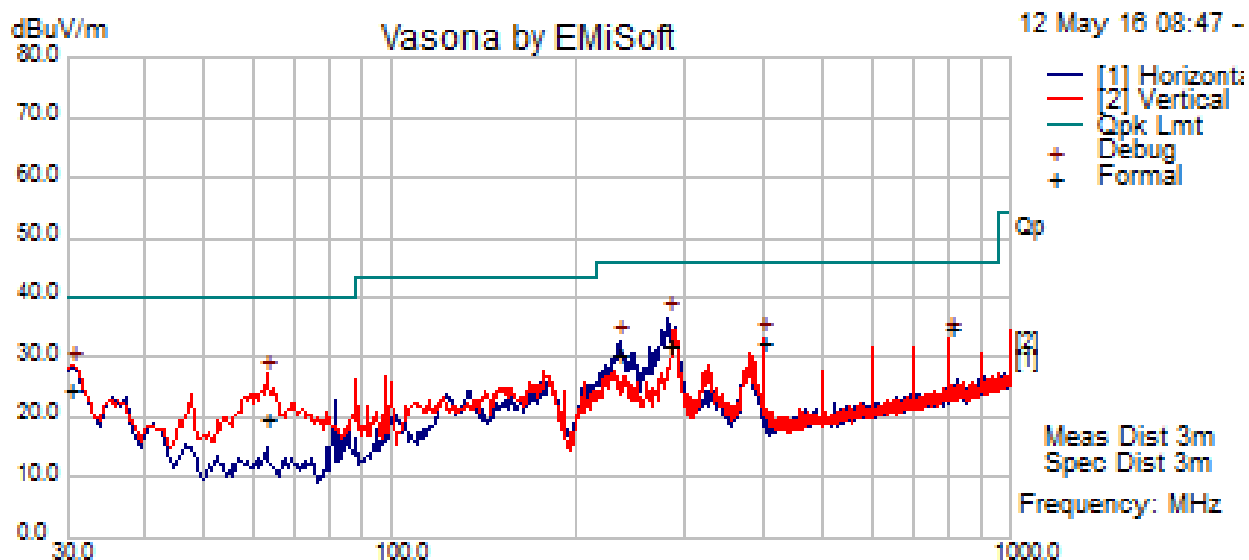
**Test Plot** ☒ Yes (See below) ☐ N/A

**Test was done by** *Rachana Khanduri* **at** *10m Chamber*.



## Radiated Emission Test Results

|                           |                      |            |        |  |
|---------------------------|----------------------|------------|--------|--|
| Test specification        |                      | Below 1GHz |        |  |
| Environmental Conditions: | Temp (°C):           | 25.7       | Result |  |
|                           | Humidity (%)         | 29         |        |  |
|                           | Atmospheric (mPa):   |            |        |  |
| Mains Power:              | 110VAC, 60Hz         |            |        |  |
| Tested by:                | Rachana Khanduri     |            |        |  |
| Test Date:                | 05/12/2016           |            |        |  |
| Remarks:                  | Bluetooth LE 2440MHz |            |        |  |



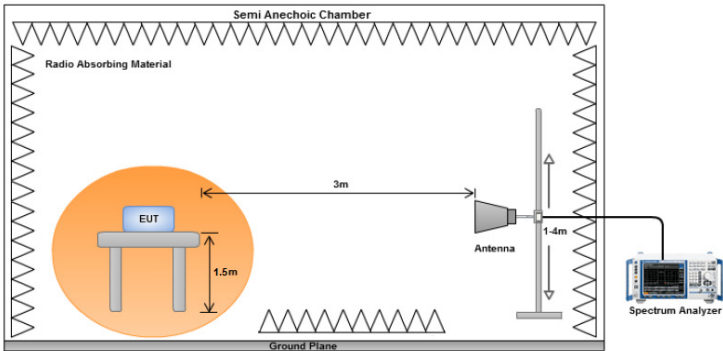
## Quasi Max Measurement

| Frequency MHz | Raw dBuV | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---------------|----------|------------|--------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 280.14        | 55.69    | 2.57       | -26.17 | 32.09        | Quasi Max        | H   | 120    | 255     | 46.02        | -13.93    | Pass       |
| 30.35         | 39.84    | 0.82       | -15.95 | 24.71        | Quasi Max        | V   | 126    | 309     | 40.00        | -15.29    | Pass       |
| 799.99        | 47.60    | 4.51       | -17.41 | 34.71        | Quasi Max        | V   | 116    | 186     | 46.02        | -11.31    | Pass       |
| 400.00        | 53.24    | 3.10       | -23.86 | 32.49        | Quasi Max        | H   | 100    | 123     | 46.02        | -13.53    | Pass       |
| 63.21         | 49.53    | 1.21       | -31.07 | 19.67        | Quasi Max        | V   | 102    | 164     | 40.00        | -20.33    | Pass       |
| 233.82        | 56.00    | 2.28       | -27.82 | 30.46        | Quasi Max        | H   | 144    | 235     | 46.02        | -15.56    | Pass       |

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

## 10.8 Transmitter Radiated Spurious Emissions > 1GHz & Restricted band

### Requirement(s):

| Spec                            | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Applicable                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 47CFR§15.247(d),<br>RSS247(5.5) | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required<br><br><input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down | <input checked="" type="checkbox"/> |
|                                 | b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | or restricted band, emission must also comply with the radiated emission limits specified in 15.209                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <input checked="" type="checkbox"/> |
| Test Setup                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |
| Procedure                       | <ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>An average measurement was then made for that frequency point.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |
| Remark                          | Both horizontal and vertical polarities were investigated. The results show only the worst case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |
| Result                          | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |

Test Data    ☒ Yes (See below)    ☐ N/A

Test Plot    ☐ Yes (See below)    ☒ N/A

Test was done by **Rachana Khanduri** at **3m Chamber**.

## Radiated Emission Test Results

### BLE – 2402MHz

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | AF (dB) | Level (dBuV/m) | Measurement Type | Pol (V/H) | Hgt (cm) | Azt (Deg) | Limit (dBuV/m) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|---------|----------------|------------------|-----------|----------|-----------|----------------|-------------|------------|
| 4801.29         | 52.96      | 7.04            | -17.3   | 42.69          | Peak Max         | V         | 153      | 125       | 74             | -31.31      | Pass       |
| 7205.49         | 52.25      | 7.36            | -11.59  | 48.02          | Peak Max         | V         | 191      | 345       | 74             | -25.98      | Pass       |
| 9607.94         | 51.36      | 7.89            | -10.41  | 48.84          | Peak Max         | V         | 219      | 76        | 74             | -25.17      | Pass       |
| 4801.29         | 41.00      | 7.04            | -17.3   | 30.74          | Average Max      | V         | 153      | 125       | 54             | -23.27      | Pass       |
| 7205.49         | 39.96      | 7.36            | -11.59  | 35.74          | Average Max      | V         | 191      | 345       | 54             | -18.26      | Pass       |
| 9607.94         | 39.49      | 7.89            | -10.41  | 36.97          | Average Max      | V         | 219      | 76        | 54             | -17.03      | Pass       |

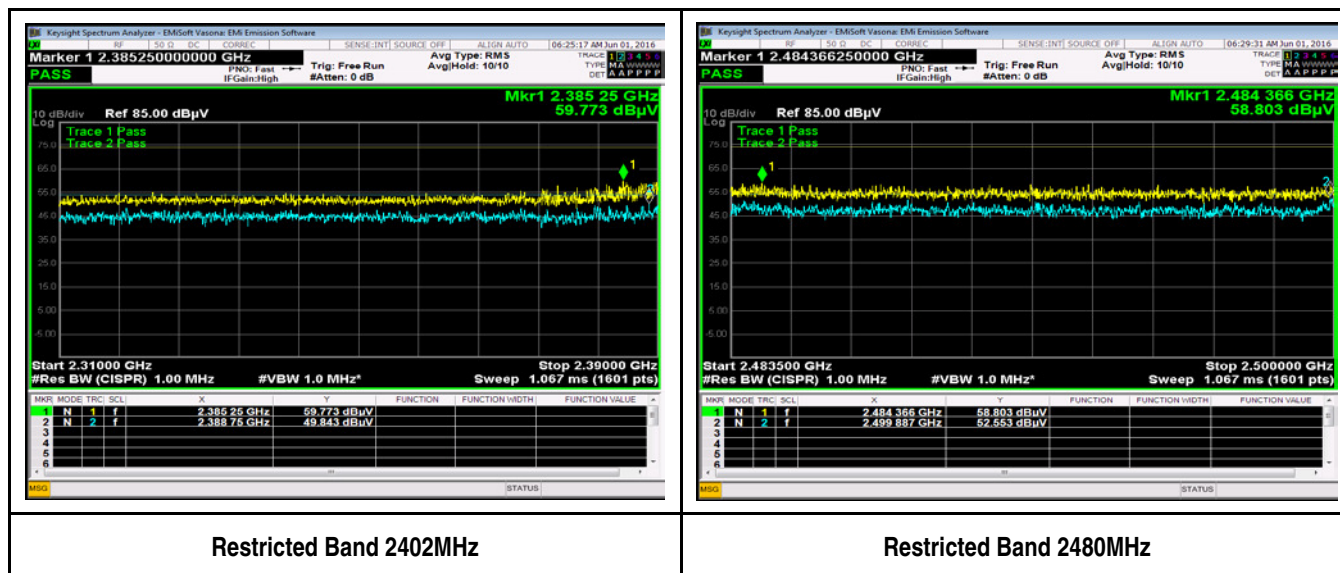
### BLE – 2440MHz

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | AF (dB) | Level (dBuV/m) | Measurement Type | Pol (V/H) | Hgt (cm) | Azt (Deg) | Limit (dBuV/m) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|---------|----------------|------------------|-----------|----------|-----------|----------------|-------------|------------|
| 7207.04         | 52.01      | 7.36            | -11.58  | 47.79          | Peak Max         | H         | 211      | 211       | 74             | -26.21      | Pass       |
| 9606.58         | 51.35      | 7.89            | -10.42  | 48.82          | Peak Max         | H         | 213      | 131       | 74             | -25.18      | Pass       |
| 1753.34         | 60.10      | 4.76            | -28.64  | 36.22          | Peak Max         | H         | 199      | 74        | 74             | -37.78      | Pass       |
| 7207.04         | 39.97      | 7.36            | -11.58  | 35.75          | Average Max      | H         | 211      | 211       | 54             | -18.25      | Pass       |
| 9606.58         | 39.27      | 7.89            | -10.42  | 36.73          | Average Max      | H         | 213      | 131       | 54             | -17.27      | Pass       |
| 1753.34         | 45.75      | 4.76            | -28.64  | 21.88          | Average Max      | H         | 199      | 74        | 54             | -32.12      | Pass       |

### BLE – 2480MHz

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | AF (dB) | Level (dBuV/m) | Measurement Type | Pol (V/H) | Hgt (cm) | Azt (Deg) | Limit (dBuV/m) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|---------|----------------|------------------|-----------|----------|-----------|----------------|-------------|------------|
| 4798.97         | 52.35      | 7.04            | -17.31  | 42.08          | Peak Max         | V         | 203      | 209       | 74             | -31.92      | Pass       |
| 7204.70         | 51.19      | 7.36            | -11.59  | 46.97          | Peak Max         | V         | 187      | 240       | 74             | -27.03      | Pass       |
| 9607.80         | 51.05      | 7.89            | -10.41  | 48.52          | Peak Max         | V         | 169      | 249       | 74             | -25.48      | Pass       |
| 4798.97         | 40.45      | 7.04            | -17.31  | 30.17          | Average Max      | V         | 203      | 209       | 54             | -23.83      | Pass       |
| 7204.70         | 39.53      | 7.36            | -11.59  | 35.31          | Average Max      | H         | 165      | 131       | 54             | -18.69      | Pass       |
| 9607.80         | 38.97      | 7.89            | -10.41  | 36.44          | Average Max      | H         | 152      | 218       | 54             | -17.56      | Pass       |

## Restricted Band Test plot



## Annex A. TEST INSTRUMENT

| Instrument                      | Model    | Manufacturer    | Serial #   | Cal Date   | Cal Cycle | Cal Due    | In use                              |
|---------------------------------|----------|-----------------|------------|------------|-----------|------------|-------------------------------------|
| <b>Conducted Emissions</b>      |          |                 |            |            |           |            |                                     |
| R & S Receiver                  | ESIB 40  | Rohde & Schwarz | 100179     | 06/08/2016 | 1 Year    | 06/08/2017 | <input checked="" type="checkbox"/> |
| CHASE LISN (9k-30MHz)           | MN2050B  | Chase           | 1018       | 08/07/2015 | 1 Year    | 08/07/2016 | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>       |          |                 |            |            |           |            |                                     |
| R & S Receiver                  | ESIB 40  | Rohde & Schwarz | 100179     | 06/08/2016 | 1 Year    | 06/08/2017 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer               | N9010A   | Keysight        | 10SL0219   | 08/20/2015 | 1 Year    | 08/20/2016 | <input checked="" type="checkbox"/> |
| Pre-Amplifier (1-26.5GHz)       | 8449B    | Hewlett Packard | 3008A00715 | 03/30/2016 | 1 Year    | 03/30/2017 | <input checked="" type="checkbox"/> |
| Preamplifier (100KHz-7GHz)      | LPA-6-30 | RF Bay, Inc.    | 11140711   | 02/10/2016 | 1 Year    | 02/10/2017 | <input checked="" type="checkbox"/> |
| ETS-Lingren Loop Antenna        | 6512     | ETS-Lingren     | 00049120   | 05/12/2015 | 1 Year    | 05/12/2016 | <input type="checkbox"/>            |
| Bi-Log antenna (30MHz~2GHz)     | JB1      | Sunol Sciences  | A030702    | 08/15/2015 | 1 Year    | 08/15/2016 | <input checked="" type="checkbox"/> |
| Horn Antenna (1-26.5GHz)        | 3115     | EMCO            | 10SL0059   | 08/25/2015 | 1 Year    | 08/25/2016 | <input checked="" type="checkbox"/> |
| 3 Meters SAC                    | 3M       | ETS-Lingren     | N/A        | 06/09/2016 | 1 Year    | 06/09/2017 | <input checked="" type="checkbox"/> |
| 10 Meters SAC                   | 10M      | ETS-Lingren     | N/A        | 09/05/2015 | 1 Year    | 09/05/2016 | <input checked="" type="checkbox"/> |
| <b>RF Conducted Measurement</b> |          |                 |            |            |           |            |                                     |
| Spectrum Analyzer               | N9010A   | Keysight        | 10SL0219   | 08/20/2015 | 1 Year    | 08/20/2016 | <input checked="" type="checkbox"/> |
| USB RF Power Sensor             | 7002-006 | ETS-Lingren     | 10SL0190   | 09/03/2015 | 1 Year    | 09/03/2016 | <input checked="" type="checkbox"/> |

## Test Software Version

| Test Item         | Vendor  | Software       | Version |
|-------------------|---------|----------------|---------|
| Radiated Emission | EMISoft | EMISoft Vasona | V5.0    |



## Annex B. SIEMIC Accreditation

| Accreditations                          | Document                                                                            | Scope / Remark                                                                                                                                                            |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO 17025 (A2LA)                        |    | Please see the documents for the detailed scope                                                                                                                           |
| ISO Guide 65 (A2LA)                     |    | Please see the documents for the detailed scope                                                                                                                           |
| TCB Designation                         |                                                                                     | <a href="#">A1</a> , <a href="#">A2</a> , <a href="#">A3</a> , <a href="#">A4</a> , <a href="#">B1</a> , <a href="#">B2</a> , <a href="#">B3</a> , <a href="#">B4</a> , C |
| FCC DoC Accreditation                   |    | FCC Declaration of Conformity Accreditation                                                                                                                               |
| FCC Site Registration                   |    | 3 meter site                                                                                                                                                              |
| FCC Site Registration                   |    | 10 meter site                                                                                                                                                             |
| IC Site Registration                    |    | 3 meter site                                                                                                                                                              |
| IC Site Registration                    |    | 10 meter site                                                                                                                                                             |
| EU NB                                   |    | <b>Radio &amp; Telecommunications Terminal Equipment:</b><br>EN45001 – EN ISO/IEC 17025                                                                                   |
|                                         |  | <b>Electromagnetic Compatibility:</b><br>EN45001 – EN ISO/IEC 17025                                                                                                       |
| Singapore iDA<br>CB(Certification Body) |  | <a href="#">Phase I</a> , <a href="#">Phase II</a>                                                                                                                        |
| Vietnam MIC<br>CAB Accreditation        |  | Please see the document for the detailed scope                                                                                                                            |
| Hong Kong OFCA                          |  | <b>(Phase II)</b> OFCA Foreign Certification Body for Radio and Telecom                                                                                                   |
|                                         |  | <b>(Phase I)</b> Conformity Assessment Body for Radio and Telecom                                                                                                         |
| Industry Canada CAB                     |  | <b>Radio:</b> Scope A – All Radio Standard Specification in Category I                                                                                                    |
|                                         |  | <b>Telecom:</b> CS-03 Part I, II, V, VI, VII, VIII                                                                                                                        |

|                                                    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Japan Recognized Certification<br>Body Designation |    | <b>Radio:</b> A1. Terminal equipment for purpose of calling<br><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Korea CAB Accreditation                            |    | <b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI<br>KN22: Test Method for EMI<br><b>EMS:</b> KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS<br>KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS<br><b>Radio:</b> RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68<br><b>Telecom:</b> President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4 |
| Taiwan NCC CAB Recognition                         |    | LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Taiwan BSMI CAB Recognition                        |  | CNS 13438                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Japan VCCI                                         |  | R-3083: Radiation 3 meter site<br>C-3421: Main Ports Conducted Interference Measurement<br>T-1597: Telecommunication Ports Conducted Interference Measurement                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Australia CAB Recognition                          |  | <b>EMC:</b> AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4<br><b>Radio communications:</b> AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771<br><b>Telecommunications:</b> AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1                                                                                                        |
| Australia NATA Recognition                         |  | AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |