

# RF TEST REPORT



Report No.: FCC\_IC\_RF\_SL17032201-SEV-019\_Co-Location  
Supersede Report No.: NONE

|                                                     |   |                                                                                                                |
|-----------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------|
| Applicant                                           | : | Trek Bicycle Corporation                                                                                       |
| Host Product Name                                   | : | Bcycle                                                                                                         |
| Module Model No.                                    | : | MFRFID1, BC127, 1EIQN2NN                                                                                       |
| Test Standard                                       | : | FCC 15.225, 15.209, 15.247, Part 27<br>RSS-210 Issue 9: 2016, RSS247 Issue 2, RSS 130 Issue 1, RSS 139 Issue 3 |
| Test Method                                         | : | FCC 15.225, 15.209, 15.247, Part 27<br>ANSI C63.10 2013<br>RSS Gen Issue 4 2014                                |
| FCC ID                                              | : | RFID: 2AHXDMFRFID1, BT: 2AHXDBC127-X, LTE: 2AHXD1EIQN2NN                                                       |
| IC ID                                               | : | RFID: 21334-MFRFID1, BT: 21334-BC127, LTE: 21334-1EIQN2NN                                                      |
| Dates of test                                       | : | 12/08/2017-12/27/2017                                                                                          |
| Issue Date                                          | : | 12/27/2017                                                                                                     |
| 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:                                                                                   |                                                                                       |
|                                                   |  |
| Vijay Chaudhary                                                                                                                      | Chen Ge                                                                               |
| RF Test Engineer                                                                                                                     | Engineer Reviewer                                                                     |
| This test report may be reproduced in full only<br>Test result presented in this test report is applicable to the tested sample only |                                                                                       |

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  | EMC, RF/Wireless, Telecom, Safety |
| 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 & RED 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_SL17032201-SEV-019 | None           | Original    | 12/27/2017 |
|                              |                |             |            |
|                              |                |             |            |
|                              |                |             |            |
|                              |                |             |            |

## 2 Executive Summary

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

Company: Trek Bicycle Corporation  
Host Product: Bcycle  
Module  
Model: MFRFID1, BC127, 1EIQN2NN

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       | : | Trek Bicycle Corporation             |
| Applicant Address    | : | 801 W Madison st, Waterloo, WI-53594 |
| Manufacturer Name    | : | Plexus                               |
| Manufacturer Address | : | 2444 Schultz Drive, Neenah, WI-54956 |

## 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

|                          |   |                            |
|--------------------------|---|----------------------------|
| Host Product Name        | : | Bcycle                     |
| Module Model No.         | : | MFRFID, BC127, 1EIQN2NN    |
| Trade Name               | : | BCycle                     |
| Serial No.               | : | T00FN                      |
| Input Power              | : | 3.5 Watts                  |
| Product Hardware version | : | 10                         |
| Product Software version | : | 1.30.0                     |
| Radio Hardware version   | : | 10                         |
| Radio Software version   | : | 1.30.0                     |
| Test SW Version          | : | 1.30.0                     |
| Date of EUT received     | : | 11/15/2017                 |
| Working Frequencies      | : | 125 kHz, 13.56MHz, BT, LTE |

### 6.2 Radio Description

#### Specifications for Radio:

| Radio Type             | RFID                             |
|------------------------|----------------------------------|
| Operating Frequency    | 125KHz, 13.56MHz                 |
| Modulation             | ASK (125KHz), ASK (13.56MHz)     |
| Channel Spacing        | None                             |
| Antenna Type           | Patch Antenna                    |
| Antenna Gain(dB)       | 125KHz: -28.73, 13.56MHz: -42.32 |
| Antenna Connector Type | SMC Connector                    |

#### Specs for Bluetooth

| Radio Type             | Bluetooth (EDR) |
|------------------------|-----------------|
| Operating Frequency    | 2402MHz-2480MHz |
| Modulation             | FHSS            |
| Channel Spacing        | 1MHz            |
| Antenna Type           | Patch Antenna   |
| Antenna Gain           | 0 dBi           |
| Antenna Connector Type | SMC connector   |

| Item                       | LTE                                                  | LTE                                              |
|----------------------------|------------------------------------------------------|--------------------------------------------------|
| Operating Band /Radio Type | LTE Band 4                                           | LTE Band 13                                      |
| Bandwidth                  | 5MHz, 10MHz, 15MHz, 20MHz                            | 5MHz, 10MHz, 15MHz, 20MHz                        |
| Modulation                 | QPSK/16QAM/64QAM                                     | QPSK/16QAM/64QAM                                 |
| Antenna Type               | Patch Antenna                                        | Patch Antenna                                    |
| Antenna Gain               | 3.5 dBi                                              | 1 dBi                                            |
| Frequency TX(MHz)          | TX: 1710 MHz to 1755 MHz<br>RX: 2110 MHz to 2155 MHz | TX: 777 MHz to 787 MHz<br>RX: 746 MHz to 756 MHz |

### 6.3 EUT test modes/configuration Description

| Mode              | Note                                                       |
|-------------------|------------------------------------------------------------|
| RF test           | EUT is set to continuously transmit at 13.56MHz and 125kHz |
|                   |                                                            |
|                   |                                                            |
| <b>Note:</b> None |                                                            |

| Test Item                   | Operating mode      | Tested antenna port |
|-----------------------------|---------------------|---------------------|
| Antenna Requirement         | N/A                 | -                   |
| Conducted Emissions Voltage | N/A                 | -                   |
| Radiated Spurious Emission  | Continuous Transmit | -                   |
| Frequency Stability         | N/A                 | -                   |
| Occupied Bandwidth          | N/A                 | -                   |
| <b>Note:</b> -              |                     |                     |

## 6.4 EUT Photos – External



Top View



Bottom View



Front Side



Rear Side

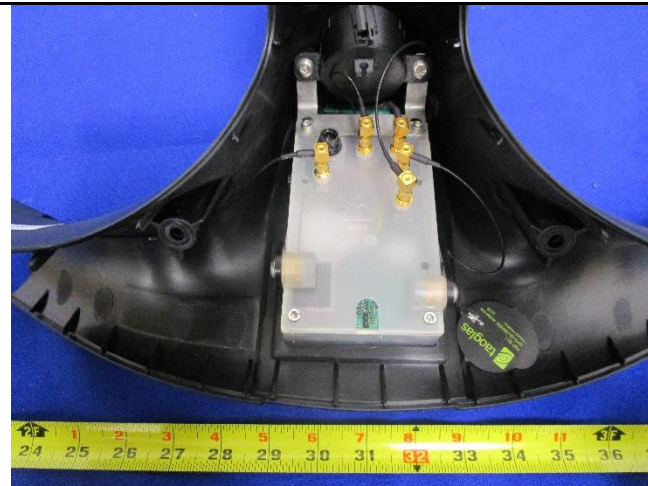


Left Side

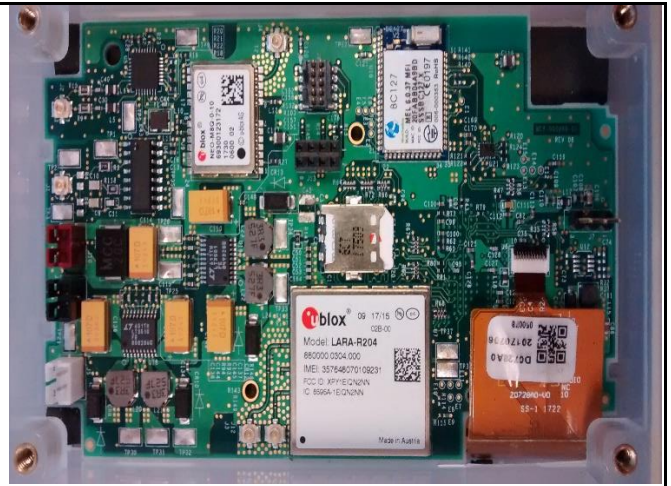


Right Side

## 6.5 EUT Photos – Internal



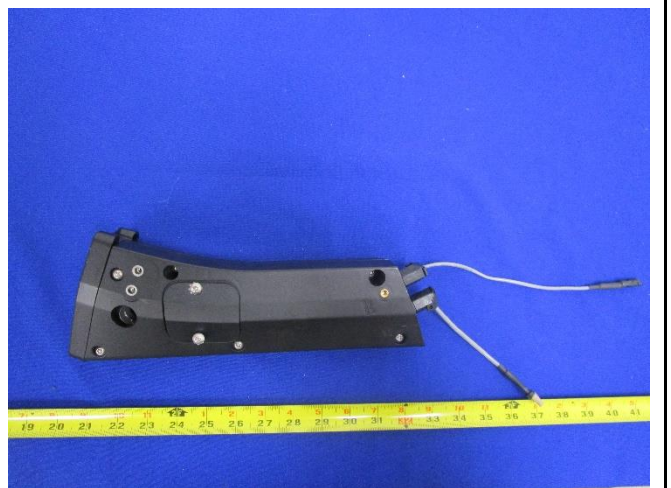
PCB View with Cover



Cover off PCB View

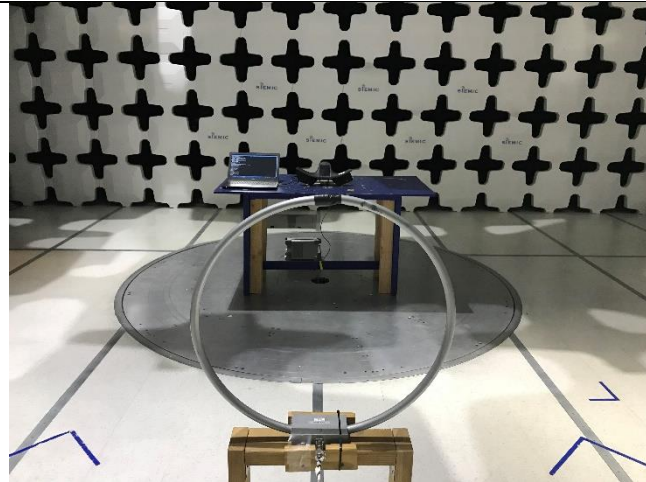


Battery Top View



Battery Side View

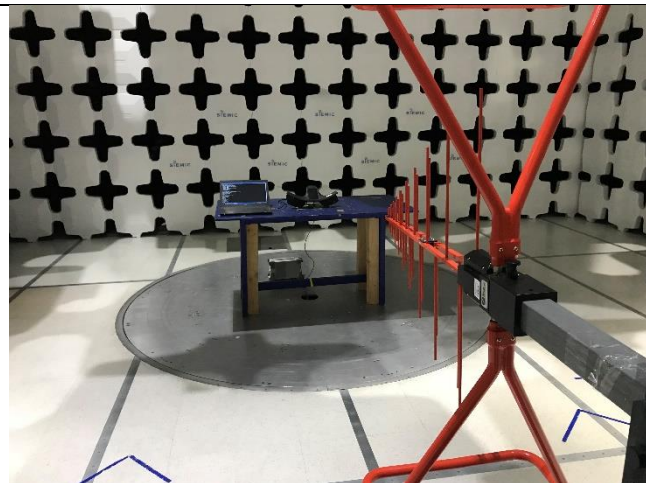
## 6.6 EUT Test Setup Photos



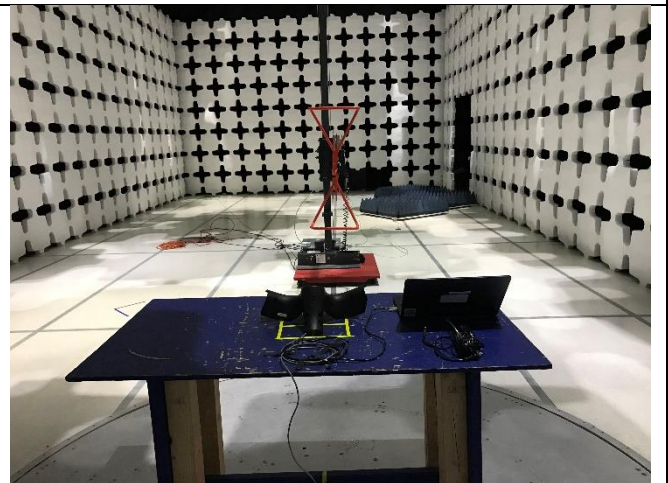
Radiated Emissions (<30MHz) – Front View



Radiated Emissions (<30MHz) – Rear View



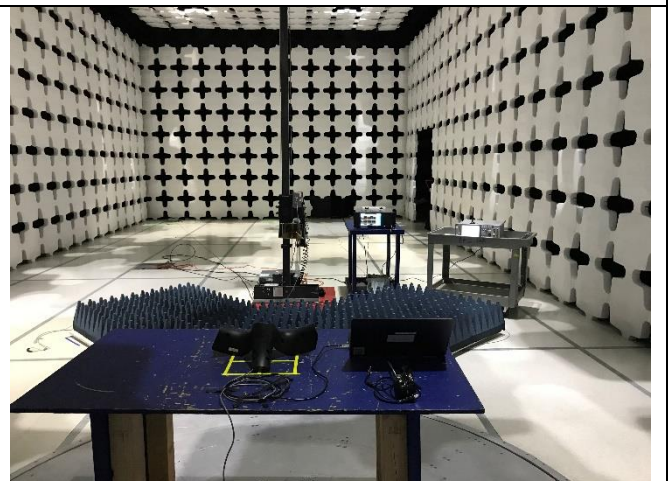
Radiated Emissions (<1GHz) – Front View



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

| Index | Supporting Equipment Description | Model | Serial No | Manu | Note |
|-------|----------------------------------|-------|-----------|------|------|
| -     | -                                | -     | -         | -    | -    |

### 7.2 Cabling Description

| Name | Connection Start |           | Connection Stop |          | Length / shielding Info |           | Note |
|------|------------------|-----------|-----------------|----------|-------------------------|-----------|------|
|      | From             | I/O Port  | To              | I/O Port | Length (m)              | Shielding |      |
| 1    | EUT              | Connector | Computer        | USB      | 5                       | -         | -    |

### 7.3 Test Software Description

| Test Item  | Software  | Description                                                           |
|------------|-----------|-----------------------------------------------------------------------|
| RF Testing | Tera Term | Set the EUT to transmit continuously in 125KHz and 13.56MHz test mode |
| -          | -         | -                                                                     |

## 8 Test Summary

| Test Item                      | Test standard                                                          |                 | Test Method/Procedure                                      | Pass / Fail                             |
|--------------------------------|------------------------------------------------------------------------|-----------------|------------------------------------------------------------|-----------------------------------------|
| Antenna Requirement            | FCC                                                                    | 15.203          | ANSI C63.10 – 2013<br>558074 D01 DTS Meas. Guidance v03r02 | <input type="checkbox"/> Pass           |
|                                | IC                                                                     | -               |                                                            | <input checked="" type="checkbox"/> N/A |
| AC Conducted Emissions Voltage | FCC                                                                    | 15.225(a)       | ANSI C63.10 2013<br>RSS Gen. 8.8                           | <input type="checkbox"/> Pass           |
|                                | IC                                                                     | RSS Gen (7.2.2) |                                                            | <input checked="" type="checkbox"/> N/A |
| Remark                         | 1. Device is battery operated. Conducted Emission test is not required |                 |                                                            |                                         |

| Test Item                  | Test standard                                                                                                                                                                                                                                                                                                                                                                              |   | Test Method/Procedure |             | Pass / Fail                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------|-------------|------------------------------------------|
| Radiated Spurious Emission | FCC                                                                                                                                                                                                                                                                                                                                                                                        | - | FCC                   | RSS Gen 7.1 | <input checked="" type="checkbox"/> Pass |
|                            | IC                                                                                                                                                                                                                                                                                                                                                                                         |   | IC                    |             | <input type="checkbox"/> N/A             |
| Frequency Stability        | FCC                                                                                                                                                                                                                                                                                                                                                                                        | - | FCC                   | -           | <input type="checkbox"/> Pass            |
|                            | IC                                                                                                                                                                                                                                                                                                                                                                                         | - | IC                    | -           | <input checked="" type="checkbox"/> N/A  |
| Occupied Bandwidth         | FCC                                                                                                                                                                                                                                                                                                                                                                                        | - | FCC                   | -           | <input type="checkbox"/> Pass            |
|                            | IC                                                                                                                                                                                                                                                                                                                                                                                         | - | IC                    | -           | <input checked="" type="checkbox"/> N/A  |
| Remark                     | 2. All measurement uncertainties are not taken into consideration for all presented test result.<br>3. 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.<br>4. Only Radiated Spurious Emission for colocation has been tested for this report |   |                       |             |                                          |

## 9 Measurement Uncertainty

| Test Item                                                        | Description                                                                                                                                     | Uncertainty        |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| AC Conducted Emissions Voltage                                   | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2                                 | $\pm 3.5\text{dB}$ |
| Limit in the band of 13.553 – 13.567 MHz                         | 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      |
| Limit in the band of 13.410 – 13.553 MHz and 13.567 – 13.710 MHz |                                                                                                                                                 | +5.6dB/-4.5dB      |
| Limit in the band of 13.110 – 13.410 MHz and 13.710 – 14.010 MHz |                                                                                                                                                 | +5.6dB/-4.5dB      |
| Limit outside the band of 13.110 – 14.010 MHz                    |                                                                                                                                                 | +5.6dB/-4.5dB      |
| Radiated Spurious Emissions                                      |                                                                                                                                                 | +5.6dB/-4.5dB      |

## 10 Measurements, examination and derived results

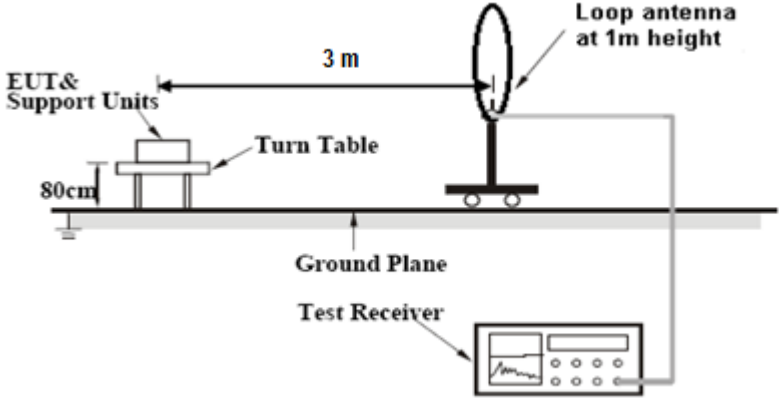
### 10.1 Antenna Requirement

| Spec    | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Applicable                          |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| §15.203 | <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.</p> <p>Antenna requirement must meet at least one of the following:</p> <p>a) Antenna must be permanently attached to the device.<br/> b) The antenna must use a unique type of connector to attach to the device.<br/> c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.</p> | <input checked="" type="checkbox"/> |
| Remark  | All Radio use special SMC connector for antenna connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                     |
| Result  | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |

## 10.2 Radiated Measurements

### 10.2.1 Radiated Measurements below 30MHz

#### Requirement(s):

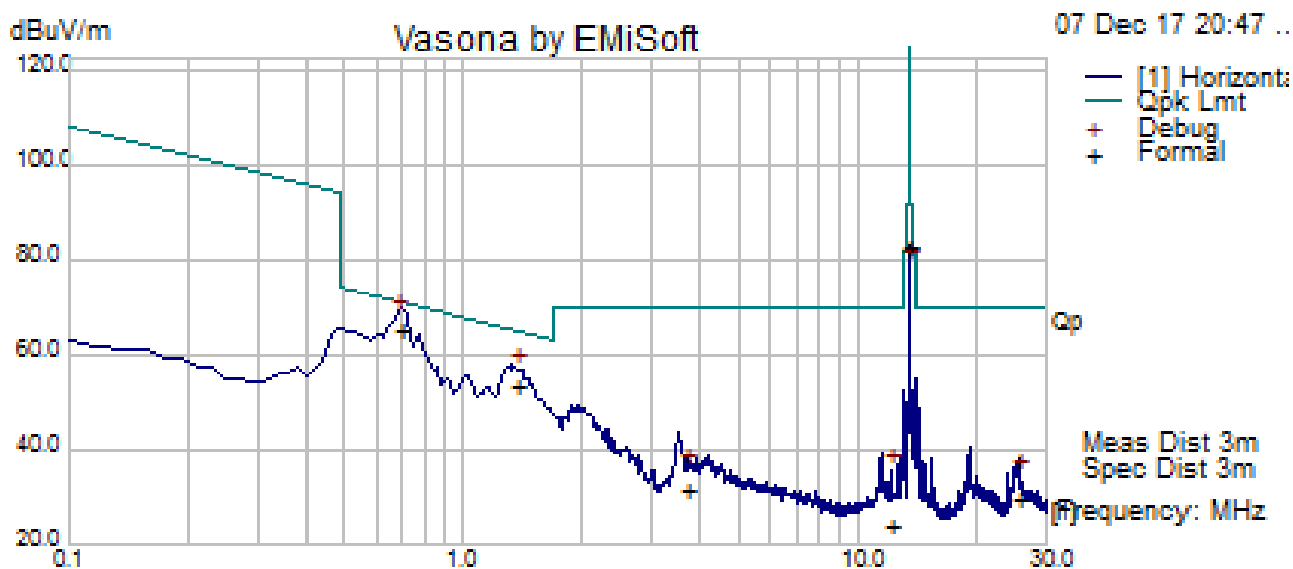
| Spec                            | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Applicable                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 47 CFR §15.225<br>RSS-210 (B.6) | <p>Operation within the band 13.110–14.010 MHz</p> <p>(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.</p> <p>(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.</p> <p>(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.</p> <p>(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.</p> | <input checked="" type="checkbox"/>                                                       |
| Test Setup                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                           |
| Procedure                       | <p>For &lt; 30MHz, Radiated emissions were measured according to ANSI C63.10. The EUT was set to transmit at the highest output power.</p> <p>The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz.</p> <p>The limit is converted from microvolt/meter to decibel microvolt/meter.</p>                                                                                                                                                                                                                                                           |                                                                                           |
| Test Date                       | 12/08/2017-12/12/2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Environmental conditions                                                                  |
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Temperature 22°C</p> <p>Relative Humidity 40%</p> <p>Atmospheric Pressure 1026mbar</p> |
| 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 Vijay Chaudhary at 10-meter chamber.**

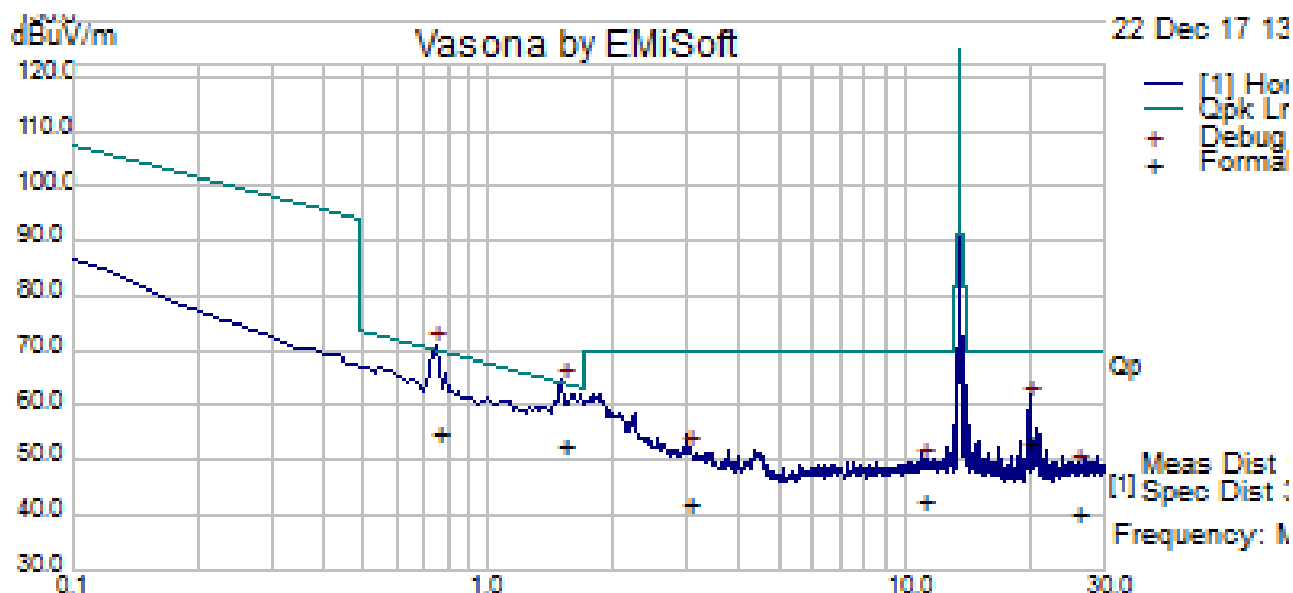
|                     |                                                                            |  |         |                                                                           |
|---------------------|----------------------------------------------------------------------------|--|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Spurious Emissions                                                |  |         |                                                                           |
| Mains Power:        | 10V DC                                                                     |  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Vijay Chaudhary                                                            |  |         |                                                                           |
| Test Date:          | 12/07/2017                                                                 |  |         |                                                                           |
| Remarks:            | Co-Location $f=100\text{kHz}-30\text{MHz}$ plot, and loop antenna 0 Degree |  |         |                                                                           |



#### Quasi Max Measurement

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol (0/90) | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---------------|----------|------------|-------|--------------|------------------|------------|--------|---------|--------------|-----------|------------|
| 0.69          | 38.86    | 10.19      | 15.71 | 64.77        | Quasi Max        | 0          | 99     | 5       | 70.73        | -5.96     | Pass       |
| 1.35          | 32.52    | 10.23      | 10.48 | 53.23        | Quasi Max        | 0          | 99     | 356     | 65           | -11.76    | Pass       |
| 13.56         | 70.25    | 10.62      | 1.67  | 82.54        | Quasi Max        | 0          | 99     | 176     | 124.92       | -42.38    | Pass       |
| 3.66          | 17.66    | 10.31      | 3.34  | 31.31        | Quasi Max        | 0          | 99     | 322     | 69.54        | -38.23    | Pass       |
| 12.06         | 11.63    | 10.57      | 1.6   | 23.8         | Quasi Max        | 0          | 99     | 262     | 69.54        | -45.75    | Pass       |
| 25.44         | 16.68    | 10.82      | 1.62  | 29.12        | Quasi Max        | 0          | 99     | 70      | 69.54        | -40.42    | Pass       |

|                     |                                                                                  |  |         |                                                                           |
|---------------------|----------------------------------------------------------------------------------|--|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Spurious Emissions                                                      |  |         |                                                                           |
| Mains Power:        | 10V DC                                                                           |  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Vijay Chaudhary                                                                  |  |         |                                                                           |
| Test Date:          | 12/22/2017                                                                       |  |         |                                                                           |
| Remarks:            | Co-Location $f = 100\text{kHz} - 30\text{MHz}$ plot, and loop antenna 90 Degrees |  |         |                                                                           |

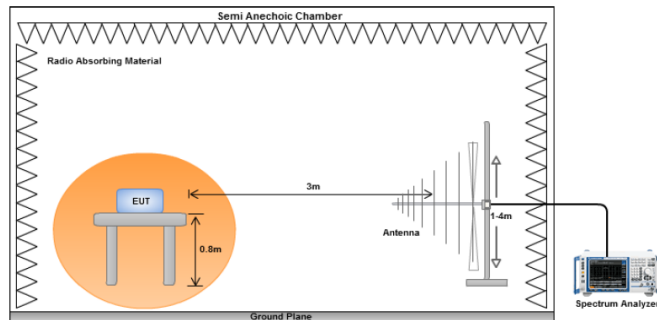


#### Quasi Max Measurement

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol (0/90) | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---------------|----------|------------|-------|--------------|------------------|------------|--------|---------|--------------|-----------|------------|
| 0.75          | 9.04     | 0.25       | 45.46 | 54.74        | Quasi Max        | 90         | 99     | 8       | 69.99        | -15.25    | Pass       |
| 1.50          | 12.03    | 0.28       | 40.1  | 52.41        | Quasi Max        | 90         | 99     | 84      | 64.03        | -11.63    | Pass       |
| 19.89         | 20.68    | 0.82       | 31.4  | 52.91        | Quasi Max        | 90         | 99     | 173     | 69.54        | -16.64    | Pass       |
| 3.03          | 6.66     | 0.34       | 34.98 | 41.98        | Quasi Max        | 90         | 99     | 34      | 69.54        | -27.56    | Pass       |
| 11.07         | 9.54     | 0.62       | 32.06 | 42.23        | Quasi Max        | 90         | 99     | 75      | 69.54        | -27.32    | Pass       |
| 26.07         | 7.43     | 0.86       | 31.87 | 40.17        | Quasi Max        | 90         | 99     | 112     | 69.54        | -29.37    | Pass       |

## 10.2.2 Radiated Measurements 30MHz to 1GHz

### Requirement(s):

| Spec                            | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Applicable                                                                                                                                                                                                           |                       |         |                   |          |                      |          |     |           |     |                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------|-------------------|----------|----------------------|----------|-----|-----------|-----|-------------------------------------|
| 47 CFR §15.225<br>RSS-210 (B.6) | <div>Operation within the band 13.110–14.010 MHz:<br/>(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.<br/>(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.<br/>(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.<br/>(d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.</div> <table><thead><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr></thead><tbody><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></tbody></table> | Frequency range (MHz)                                                                                                                                                                                                | Field Strength (uV/m) | 30 – 88 | 100               | 88 – 216 | 150                  | 216 960  | 200 | Above 960 | 500 | <input checked="" type="checkbox"/> |
| Frequency range (MHz)           | Field Strength (uV/m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| 30 – 88                         | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| 88 – 216                        | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| 216 960                         | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Above 960                       | 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Test Setup                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Procedure                       | <div>1. The EUT was switched on and allowed to warm up to its normal operating condition.<br/>2. 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:<br/>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.<br/>b. The EUT was then rotated to the direction that gave the maximum emission.<br/>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.<br/>3. A Quasi-peak measurement was then made for that frequency point.<br/>4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</div>                                                                  |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Test Date                       | 12/0/8/2017-12/12/2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <div>Environmental conditions</div> <table><tbody><tr><td>Temperature</td><td>20.1°C</td></tr><tr><td>Relative Humidity</td><td>36%</td></tr><tr><td>Atmospheric Pressure</td><td>1026mbar</td></tr></tbody></table> | Temperature           | 20.1°C  | Relative Humidity | 36%      | Atmospheric Pressure | 1026mbar |     |           |     |                                     |
| Temperature                     | 20.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Relative Humidity               | 36%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Atmospheric Pressure            | 1026mbar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Remark                          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |
| Result                          | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                      |                       |         |                   |          |                      |          |     |           |     |                                     |

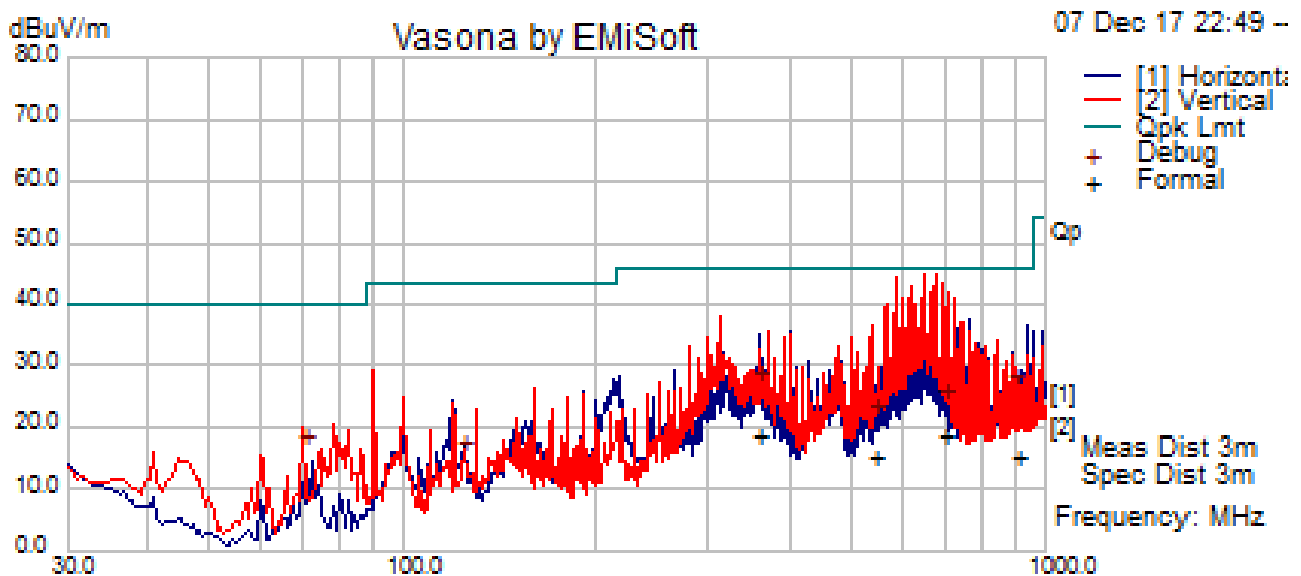
**Test Data**    ☒ Yes (See below)      ☐ N/A

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

**Test was done by Vijay Chaudhary at 10-meter chamber.**

|                     |                     |  |         |                                                                           |
|---------------------|---------------------|--|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Emissions  |  |         |                                                                           |
| Mains Power:        | 10V DC              |  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Vijay Chaudhary     |  |         |                                                                           |
| Test Date:          | 12/07/2017          |  |         |                                                                           |
| Remarks:            | Co-Location Testing |  |         |                                                                           |

*f*=30MHz – 1000MHz plot and 3-meter distance

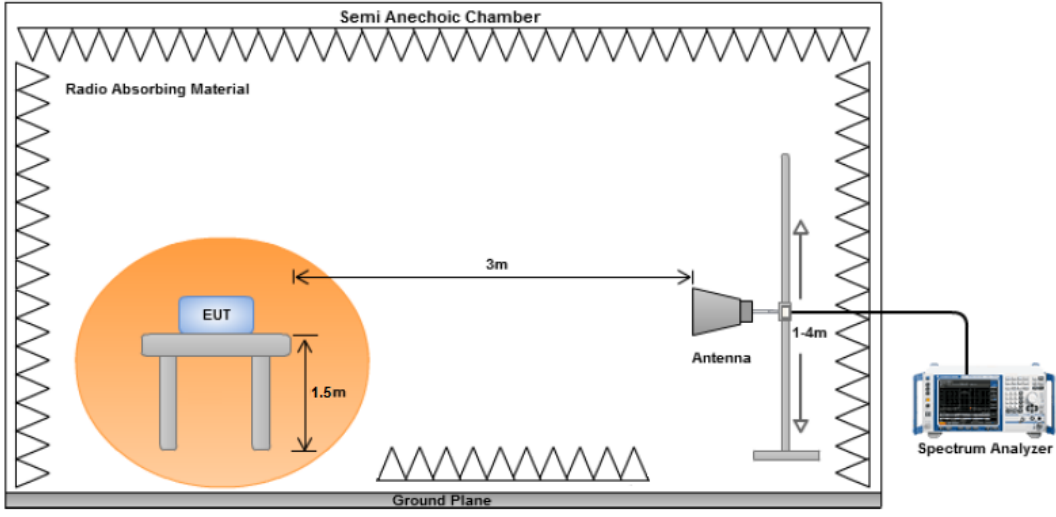


*f*=30MHz – 1000MHz Measurements

| Frequency MHz | Raw dBuV/m | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---------------|------------|------------|--------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 357.67        | 29.75      | 13.87      | -21.91 | 21.71        | Quasi Max        | H   | 102    | 205     | 46           | -24.29    | Pass       |
| 900.26        | 33.31      | 16.68      | -13.6  | 36.39        | Quasi Max        | V   | 336    | 112     | 46           | -9.61     | Pass       |
| 699.48        | 44.12      | 15.66      | -16.05 | 43.73        | Quasi Max        | H   | 187    | 142     | 46           | -2.27     | Pass       |
| 70.00         | 19.38      | 11.7       | -28.22 | 2.86         | Quasi Max        | H   | 266    | 4       | 40           | -37.14    | Pass       |
| 540.62        | 37.77      | 14.86      | -18.64 | 33.99        | Quasi Max        | V   | 121    | 255     | 46           | -12.01    | Pass       |
| 123.37        | 18.90      | 12.27      | -22.8  | 8.37         | Quasi Max        | V   | 130    | 93      | 43.5         | -35.13    | Pass       |

### 10.2.3 Radiated Spurious Emissions between 1GHz-25GHz

#### Requirement(s):

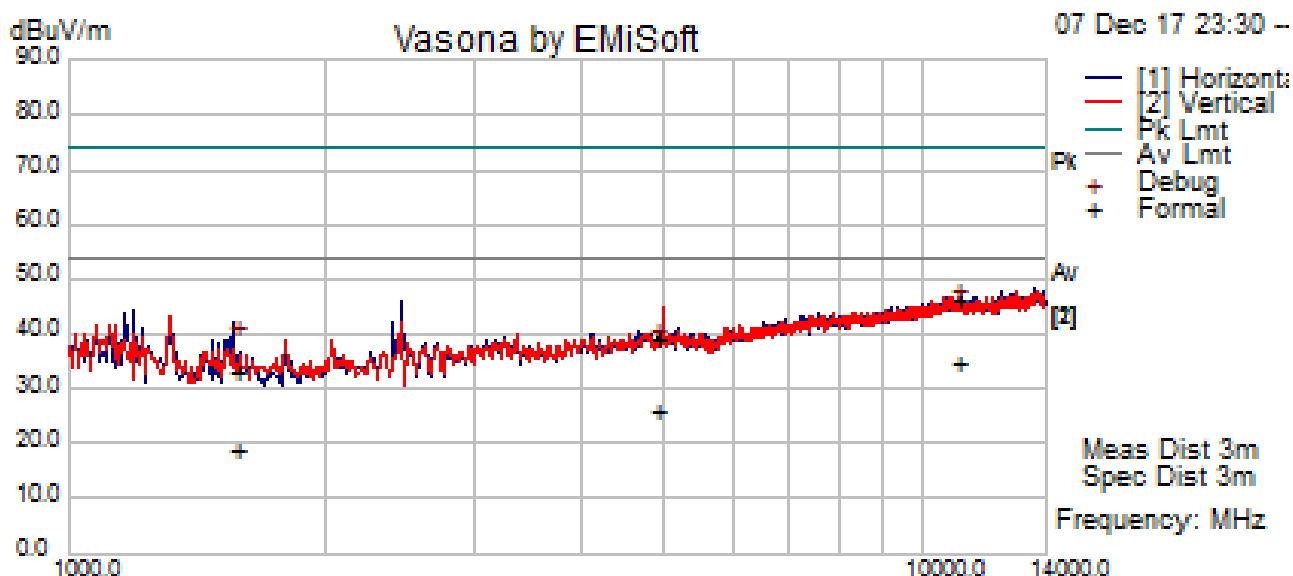
| Spec                             | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Applicable                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 47CFR§15.247(d),<br>RSS210(A8.5) | 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 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                           | The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |
| Result                           | <input checked="" type="checkbox"/> Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |

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

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

Test was done by Vijay Chaudhary at 10-meter chamber.

|                     |                     |  |         |                                                                           |
|---------------------|---------------------|--|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Emissions  |  |         |                                                                           |
| Mains Power:        | 10V DC              |  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Vijay Chaudhary     |  |         |                                                                           |
| Test Date:          | 12/07/2017          |  |         |                                                                           |
| Remarks:            | Co-Location Testing |  |         |                                                                           |



| Frequency MHz | Raw dBuV/m | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---------------|------------|------------|--------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 10982.53      | 41.32      | 6.13       | -1.22  | 46.23        | Peak Max         | V   | 276    | 163     | 74           | -27.77    | Pass       |
| 1569.76       | 53.66      | 2.41       | -22.88 | 33.19        | Peak Max         | V   | 170    | 251     | 74           | -40.81    | Pass       |
| 4879.00       | 47.25      | 4.18       | -12.19 | 39.23        | Peak Max         | V   | 134    | 268     | 74           | -34.77    | Pass       |
| 10982.53      | 29.60      | 6.13       | -1.22  | 34.51        | Average Max      | V   | 276    | 163     | 54           | -19.50    | Pass       |
| 1569.76       | 39.36      | 2.41       | -22.88 | 18.9         | Average Max      | V   | 170    | 251     | 54           | -35.11    | Pass       |
| 4879.00       | 33.98      | 4.18       | -12.19 | 25.96        | Average Max      | V   | 134    | 268     | 54           | -28.04    | Pass       |

## Annex A. TEST INSTRUMENT

| Instrument                      | Model  | Serial # | Cal Date   | Cal Cycle | Cal Due    | In use                              |
|---------------------------------|--------|----------|------------|-----------|------------|-------------------------------------|
| <b>Radiated Emissions</b>       |        |          |            |           |            |                                     |
| Spectrum Analyzer               | N9030B | 10SL0289 | 09/06/2017 | 1 Year    | 09/06/2018 | <input checked="" type="checkbox"/> |
| ETS-Lingren Loop Antenna        | 6512   | 00049120 | 07/14/2016 | 1 Year    | 07/14/2019 | <input checked="" type="checkbox"/> |
| Bi-Log antenna (30MHz~2GHz)     | JB1    | A030702  | 01/13/2017 | 1 Year    | 01/13/2018 | <input checked="" type="checkbox"/> |
| Horn Antenna (1-26.5GHz)        | 3115   | 10SL0059 | 11/09/017  | 1 Year    | 11/09/2018 | <input checked="" type="checkbox"/> |
| <b>RF Conducted Measurement</b> |        |          |            |           |            |                                     |
| Spectrum Analyzer               | N9030B | 10SL0289 | 09/06/2017 | 1 Year    | 09/06/2018 | <input checked="" type="checkbox"/> |

## Annex A. 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 Equipment: EN45011:</b><br>EN ISO/IEC 17065                                                                                                                      |
|                                         |  | <b>Electromagnetic Compatibility:</b><br>EN45011 – EN ISO/IEC 17065                                                                                                       |
| 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 |    | <p><b>Radio:</b> A1. Terminal equipment for purpose of calling</p> <p><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Korea CAB Accreditation                            |    | <p><b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI<br/>KN22: Test Method for EMI</p> <p><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</p> <p><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</p> <p><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</p> |
| Taiwan NCC CAB Recognition                         |   | LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Taiwan BSMI CAB Recognition                        |  | CNS 13438                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Japan VCCI                                         |  | <p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Australia CAB Recognition                          |  | <p><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</p> <p><b>Radiocommunications:</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</p> <p><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</p>                                                                                                              |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |