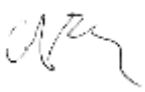


# RF TEST REPORT



Report No.: SL19061903-MED-074-NCC

|                                                                                                      |   |                                                                        |
|------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------|
| Applicant                                                                                            | : | Medtronic Inc.                                                         |
| Product Name                                                                                         | : | Percept PC (B35200)/ Sequentia LT (977005)/ Vanta (977006)             |
| Model No.                                                                                            | : | B35200, 977005, 977006                                                 |
| Test Standard                                                                                        | : | LP0002 :2018                                                           |
| Test Method                                                                                          | : | LP0002 :2018                                                           |
| Dates of test                                                                                        | : | 05/14/2018 to 05/18/2018                                               |
| Issue Date                                                                                           | : | 08/20/2019                                                             |
| Test Result                                                                                          | : | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Equipment complied with the specification [X]<br>Equipment did not comply with the specification [ ] |   |                                                                        |

|                                                                                                                                      |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| This Test Report is Issued Under the Authority of:                                                                                   |                                                                                      |
|                                                   |  |
| <b>Cipher</b>                                                                                                                        | <b>Chen Ge</b>                                                                       |
| 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 |                                                                                      |

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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 & 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 |
|-------------------------------|----------------|--------------------------|------------|
| SL18041705-MED-027-NCC        | None           | Original                 | 05/29/2018 |
| SL18041705-MED-027-NCC - Rev1 | Rev1           | Add 175KHz receive only  | 01/04/2019 |
| SL19061903-MED-074-NCC        | None           | Add model 977005, 977006 | 08/20/2019 |
| SL19061903-MED-074-NCC_Rev2   | Rev2           | Update Model Number      | 08/20/2019 |

## 2 Executive Summary

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

Company: Medtronic, Inc.  
Product: Percept PC (B35200)/ Sequentia LT (977005)/ Vanta (977006)  
Model: B35200, 977005, 977006

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         | : | Medtronic, Inc.                             |
| Applicant Address 1    | : | 710 Medtronic Parkway NE MN USA 55432       |
| Applicant Address 2    | : | 7000 Central Ave. NE, Minneapolis, MN 55432 |
| Manufacturer Name      | : | Medtronic, Inc.                             |
| Manufacturer Address 1 | : | 710 Medtronic Parkway NE MN USA 55432       |
| Manufacturer Address 2 | : | 7000 Central Ave. NE, Minneapolis, MN 55432 |

## 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                | : | Percept PC (B35200)/ Sequentia LT (977005)/ Vanta (977006)                                                                                                                                                                                                                                                 |
| Model No.                   | : | B35200, 977005, 977006                                                                                                                                                                                                                                                                                     |
| Trade Name                  | : | Medtronic                                                                                                                                                                                                                                                                                                  |
| Serial No.                  | : | NPI700112H                                                                                                                                                                                                                                                                                                 |
| Input Power                 | : | Battery Power 3.2V                                                                                                                                                                                                                                                                                         |
| Product Hardware version    | : | dct2                                                                                                                                                                                                                                                                                                       |
| Product Software version    | : | NRP1025-37052 dct2                                                                                                                                                                                                                                                                                         |
| Radio Hardware version      | : | dct2                                                                                                                                                                                                                                                                                                       |
| Radio Software version      | : | NRP1025-37052 dct2                                                                                                                                                                                                                                                                                         |
| Product Radio Test firmware | : | NRP1025-37052                                                                                                                                                                                                                                                                                              |
| Date of EUT received        | : | 04/28/2018                                                                                                                                                                                                                                                                                                 |
| Equipment Class/ Category   | : | MICS                                                                                                                                                                                                                                                                                                       |
| Working Frequencies         | : | 402-405MHz (RX 175KHz)                                                                                                                                                                                                                                                                                     |
| Note                        | : | The product is a Active implantable Medical Device. Manufacturer declare: Percept PC (B35200)/ Sequentia LT (977005)/ Vanta (977006) models have the same radio electrical hardware and software and share the same enclosure mechanical hardware for the radio. Differences are therapy model assignment. |

### 6.2 Radio Description

#### Specifications for Radio:

| Radio Type             | MICS                  |
|------------------------|-----------------------|
| Operating Frequency    | 402-405 MHz           |
| Modulation             | FSK                   |
| Channel Spacing        | 300 KHz               |
| Antenna Type           | Integral Loop Antenna |
| Antenna Gain           | -4dBi                 |
| N0. Of RF Channels     | 10                    |
| Antenna Connector Type | N/A                   |

### 6.3 EUT test modes/configuration Description

| Mode              | Note                                                                       |
|-------------------|----------------------------------------------------------------------------|
| RF test           | Set the EUT to transmit continuously in different test modes and channels. |
|                   |                                                                            |
|                   |                                                                            |
| <b>Note:</b> None |                                                                            |

| Test Item                                                        | Operating mode                | Tested antenna port | Test frequencies                                                                       |
|------------------------------------------------------------------|-------------------------------|---------------------|----------------------------------------------------------------------------------------|
| Antenna Requirement                                              | embedded antenna into implant | -                   | -                                                                                      |
| Effective Radiated Power of the Fundamental Emission             | Continuous Transmit           | -                   | 402.15 MHz (Low Channel 1),404.85 MHz (High Channel 10)                                |
| Radiated Measurements 30MHz to 1GHz                              | Continuous Transmit           | -                   | 402.15 MHz (Low Channel 1),404.85 MHz (High Channel 10)                                |
| Radiated Measurements above 1GHz                                 | Continuous Transmit           | -                   | 402.15 MHz (Low Channel 1),<br>403.35MHz (Mid Channel 5), 404.85 MHz (High Channel 10) |
| Frequency Stability                                              | Continuous Transmit           | -                   |                                                                                        |
| Occupied Bandwidth                                               | Continuous Transmit           | -                   |                                                                                        |
| Note: Only radiated measurements were performed during the test. |                               |                     |                                                                                        |

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

| Item | Support Equipment Description | Model          | Serial Number | Manufacturer | Notes |
|------|-------------------------------|----------------|---------------|--------------|-------|
| 1    | LAPTOP                        | LATITUDE E6220 | N/A           | DELL         | N/A   |
| 2    | Medtronic TM91                | TM91           | NPE000046N    | Medtronic    | N/A   |

### 7.2 Cabling Description

| Item | Connection Start |          | Connection Stop |          | Length / shielding Info |           | Note |
|------|------------------|----------|-----------------|----------|-------------------------|-----------|------|
|      | From             | I/O Port | To              | I/O Port | Length (m)              | Shielding |      |
| N/A  | N/A              | N/A      | N/A             | N/A      | N/A                     | N/A       | N/A  |

### 7.3 Test Software Description

| Test Item  | Software      | Description                                            |
|------------|---------------|--------------------------------------------------------|
| RF Testing | NRP1025-37052 | Provided by manufacturer to set EUT in continuous mode |

## 8 Test Summary

| Test Item                                            | Test standard                                                                                                                                                                                                                                                                                                                                           |              | Test Method/Procedure |                       | Pass / Fail                                                              |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------|-----------------------|--------------------------------------------------------------------------|
| Effective Radiated Power of the Fundamental Emission | NCC                                                                                                                                                                                                                                                                                                                                                     | LP0002, 4.11 | NCC                   | LP0002: 2018 Appendix | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Radiated Spurious Emissions                          | NCC                                                                                                                                                                                                                                                                                                                                                     | LP0002, 4.11 | NCC                   | LP0002: 2018 Appendix | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Frequency Stability                                  | NCC                                                                                                                                                                                                                                                                                                                                                     | LP0002, 4.11 | NCC                   | LP0002: 2018 Appendix | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Occupied Bandwidth                                   | NCC                                                                                                                                                                                                                                                                                                                                                     | LP0002, 4.11 | NCC                   | LP0002: 2018 Appendix | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Remark                                               | <ol style="list-style-type: none"> <li>All measurement uncertainties are not taken into consideration for all presented test result.</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> </ol> |              |                       |                       |                                                                          |

## 9 Measurement Uncertainty

### 9.1 Conducted Emissions

The test is to measure the conducted emissions to the mains port of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the LISN
- Uncertainty of cables
- Uncertainty due to the mismatches
- Etc, see the below table for details

| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading                  | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.105                |
| Filter Insertion Loss             | 0.25       | Normal                   | 2        | 1                       | 0.125                |
| LISN Insertion Loss               | 0.40       | Normal                   | 2        | 1                       | 0.20                 |
| Receiver CW accuracy              | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response          | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| PRF Response                      | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| Mismatch LISN - Receiver          | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| LISN Impedance                    | 2.5        | Triangular               | 2.449    | 1                       | 1.0208248            |
| Combined Standard Uncertainty     |            |                          |          |                         | 1.928133             |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>3.856266</b>      |

The total derived measurement uncertainty is +/- 3.86 dB.

### 9.2 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading                  | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.105                |
| Filter Insertion Loss             | 0.25       | Normal                   | 2        | 1                       | 0.125                |
| Antenna Factor                    | 0.65       | Normal                   | 2        | 1                       | 0.325                |
| Receiver CW accuracy              | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response          | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| PRF Response                      | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| Mismatch Filter - Receiver        | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| NSA Calibration                   | 4.0        | U-Shape                  | 1.414    | 1                       | 2.8288543            |
| Combined Standard Uncertainty     |            |                          |          |                         | 3.0059131            |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>6.0118262</b>     |

The total derived measurement uncertainty is +/- 6.00 dB.

### 9.3 Radiated Emissions (1GHz to 60GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading                  | 0.12       | Rectangular              | 1.732    | 1                       | 0.0692840            |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.1050000            |
| Filter Insertion Loss             | 0.25       | Normal                   | 2        | 1                       | 0.1250000            |
| Antenna Factor                    | 0.65       | Normal                   | 2        | 1                       | 0.3250000            |
| Receiver CW accuracy              | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response          | 1.5        | Rectangular              | 1.732    | 1                       | 0.8660508            |
| PRF Response                      | 1.5        | Rectangular              | 1.732    | 1                       | 0.8660508            |
| Mismatch Filter - Receiver        | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| VSWR Calibration                  | 2.0        | U-Shape                  | 1.414    | 1                       | 1.4144272            |
| Combined Standard Uncertainty     |            |                          |          |                         | 4.2363               |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>8.4726</b>        |

The total derived measurement uncertainty is +/- 8.47 dB.

### 9.4 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

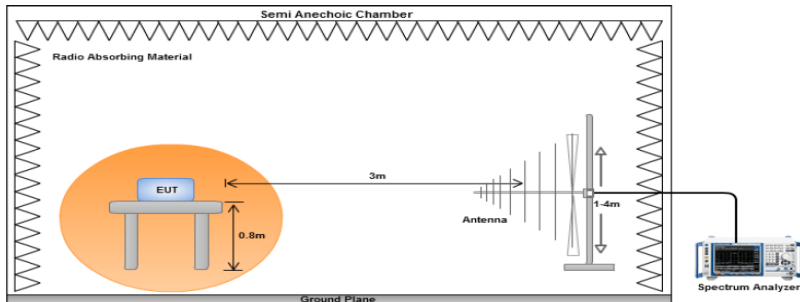
| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Reference Level                   | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.105                |
| Attenuator                        | 0.25       | Normal                   | 2        | 1                       | 0.125                |
| Mismatch                          | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| Combined Standard Uncertainty     |            |                          |          |                         | 0.476087             |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>0.952174</b>      |

The total derived measurement uncertainty is +/- 0.95 dB.

## 10 Measurements, examination and derived results

### 10.1 Effective Radiated Power of the Fundamental Emission

#### Requirement(s):

| Spec        | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Applicable                                                                                                                                                |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| LP0002:2018 | <p>Determine the ERP measurements by measuring the radiated field from the DUT at 3 meters and calculating the Effective Isotropic Radiated Power (EIRP). The equivalent radiated field strength at 3 meters for 25μW, 250 nW, and 100 nW EIRP is 18.2, 1.8, and 1.2 mV/meter, respectively, when measured on an open area test site; or 9.1, 0.9, and 0.6 mV/meter, respectively, when measured on a test site equivalent to free space such as a fully anechoic test chamber.</p> <p>Requirements:</p> <ul style="list-style-type: none"><li>• The ERP of the DUT transmitter that operates as part of a system that incorporates a monitoring system to select the frequency of operation using Listen before Transmit (LBT) and Adaptive Frequency Agility (AFA) shall not exceed 25 μW. This is applicable to devices operating in the MICS band and the MEDS band.</li><li>• For a DUT transmitter operating on any frequency in the band 403.5 MHz to 403.8 MHz and the operation frequency in this band has been selected by a monitoring system other than LBT and AFA, the ERP of the DUT transmitter shall not exceed 100nW.</li><li>• For a DUT transmitter operating on the MEDS band and the operation frequency in this band has been selected by a monitoring system other than LBT and AFA, the ERP of the DUT transmitter shall not exceed 250nW.</li></ul> | <div><input checked="" type="checkbox"/></div>                                                                                                            |
| Test Setup  | <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                           |
| Procedure   | <div><div><div>1.</div><div>The EUT was switched on and allowed to warm up to its normal operating condition.</div></div><div><div>2.</div><div>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:</div><div><div>a.</div><div>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</div></div><div><div>b.</div><div>The EUT was then rotated to the direction that gave the maximum emission.</div></div><div><div>c.</div><div>Finally, the antenna height was adjusted to the height that gave the maximum emission.</div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                           |
| Test Date   | 05/14/2018 to 05/18/2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <div><div>Environmental conditions</div><div><div>Temperature23°C</div><div>Relative Humidity48%</div><div>Atmospheric Pressure1026mbar</div></div></div> |
| Result      | <div><div><input checked="" type="checkbox"/> Pass</div><div><input type="checkbox"/> Fail</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                           |

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

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

**Test was done by Cipher at 10 meter chamber.**

#### Effective Radiated Power - 402.15 MHz

| Indicated       |            |        | Test Antenna |          | Substituted     |             |                |                 |                      |             |             |
|-----------------|------------|--------|--------------|----------|-----------------|-------------|----------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | Raw (dBuV) | Degree | Height (cm)  | Polarity | Frequency (MHz) | Level (dBm) | Ant Gain (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
| 402.15          | 80.66      | 36     | 157          | V        | 402.2           | -27.36      | 0              | 1               | -28.36               | -16         | -12.36      |
| 402.15          | 78.64      | 185    | 157          | H        | 402.2           | -30.53      | 0              | 1               | -31.53               | -16         | -15.53      |

#### Effective Radiated Power - 403.35 MHz

| Indicated       |            |        | Test Antenna |          | Substituted     |             |                |                 |                      |             |             |
|-----------------|------------|--------|--------------|----------|-----------------|-------------|----------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | Raw (dBuV) | Degree | Height (cm)  | Polarity | Frequency (MHz) | Level (dBm) | Ant Gain (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
| 403.35          | 79.06      | 36     | 157          | V        | 403.35          | -28.96      | 0              | 1               | -29.96               | -16         | -13.96      |
| 403.35          | 77.52      | 185    | 157          | H        | 403.35          | -32.13      | 0              | 1               | -33.13               | -16         | -17.13      |

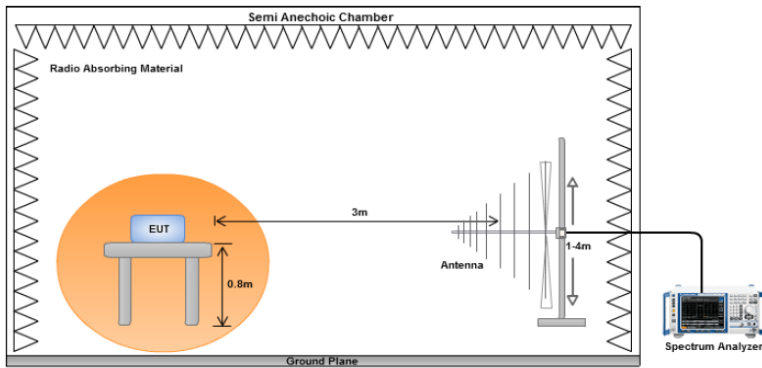
#### Effective Radiated Power - 404.85

| Indicated       |            |        | Test Antenna |          | Substituted     |             |                |                 |                      |             |             |
|-----------------|------------|--------|--------------|----------|-----------------|-------------|----------------|-----------------|----------------------|-------------|-------------|
| Frequency (MHz) | Raw (dBuV) | Degree | Height (cm)  | Polarity | Frequency (MHz) | Level (dBm) | Ant Gain (dBi) | Cable Loss (dB) | Absolute Level (dBm) | Limit (dBm) | Margin (dB) |
| 404.85          | 79.67      | 36     | 157          | V        | 404.9           | -28.35      | 0              | 1               | -29.35               | -16         | -13.35      |
| 404.85          | 78.02      | 185    | 157          | H        | 404.9           | -31.15      | 0              | 1               | -32.15               | -16         | -16.15      |

## 10.2 Radiated Measurements

### Radiated Measurements 30MHz to 1GHz

#### Requirement(s):

| Spec                  | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Applicable                                                                                                                                                                       |                       |         |     |          |     |         |     |           |     |                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------|-----|----------|-----|---------|-----|-----------|-----|------------------------------------------------|
| LP0002:2018           | <p>Transmitter unwanted emissions per FCC and Canadian regulations emissions more than 250 kHz outside of the MICS band (402–405 MHz) or 100 kHz outside of the MEDS band (401–402 MHz and 405–406 MHz) shall be attenuated to a level no greater than the following field strength limits.</p> <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 | 200 | Above 960 | 500 | <div><input checked="" type="checkbox"/></div> |
| 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>The EUT was switched on and allowed to warm up to its normal operating condition.</div></div><div><div>2.</div><div>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:<div><div>a.</div><div>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</div></div><div><div>b.</div><div>The EUT was then rotated to the direction that gave the maximum emission.</div></div><div><div>c.</div><div>Finally, the antenna height was adjusted to the height that gave the maximum emission.</div></div></div></div><div><div>3.</div><div>A Quasi-peak measurement was then made for that frequency point.</div></div><div><div>4.</div><div>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</div></div></div> |                                                                                                                                                                                  |                       |         |     |          |     |         |     |           |     |                                                |
| Test Date             | 05/14/2018 to 05/18/2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <div>Environmental conditions</div> <div><div>Temperature</div><div>23°C</div><div>Relative Humidity</div><div>48%</div><div>Atmospheric Pressure</div><div>1026mbar</div></div> |                       |         |     |          |     |         |     |           |     |                                                |
| Remark                | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                  |                       |         |     |          |     |         |     |           |     |                                                |
| Result                | <div><div><input checked="" type="checkbox"/> Pass</div><div><input type="checkbox"/> Fail</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                  |                       |         |     |          |     |         |     |           |     |                                                |

**Test Data** ☒ Yes (See below) ☐ N/A

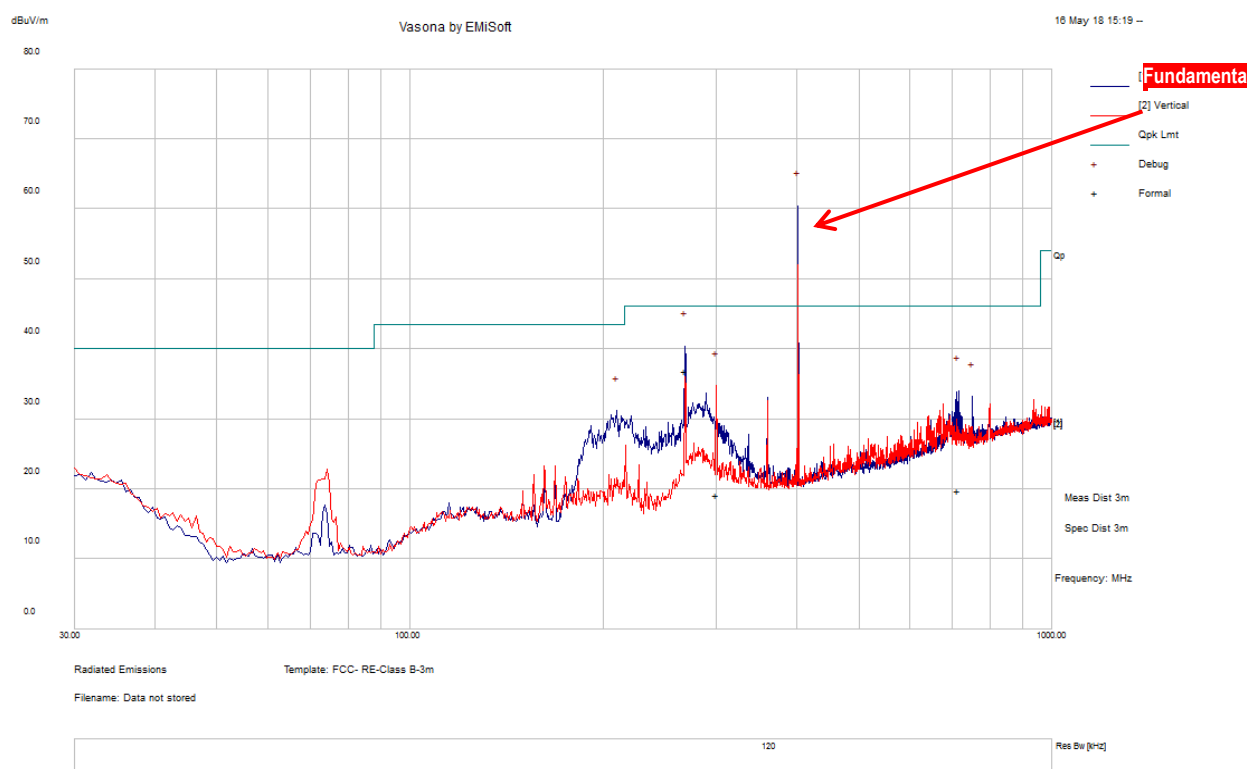
**Test Plot** ☒ Yes (See below) ☐ N/A

**Test was done by Cipher at 10 meter chamber.**

## Radiated Emission Test Results (Below 1GHz)

|                     |                          |         |                                                                           |
|---------------------|--------------------------|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Emissions       |         |                                                                           |
| Mains Power:        | 3.2 VDC                  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Cipher                   |         |                                                                           |
| Test Date:          | 05/14/2018 to 05/18/2018 |         |                                                                           |
| Remarks:            | 402.15 MHz               |         |                                                                           |

### f=30MHz – 1000MHz plot and 3 meter distance measurement

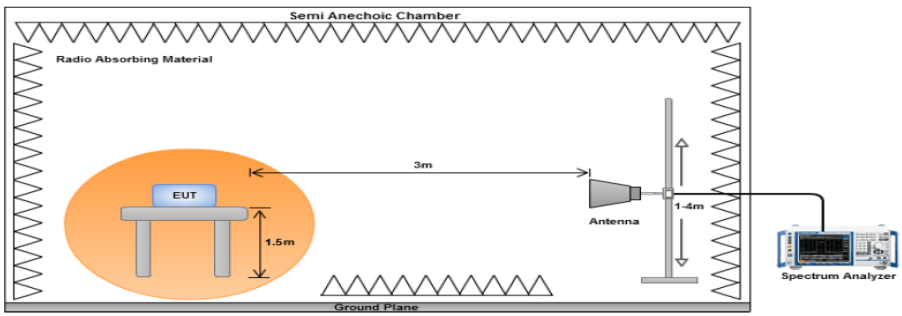


### f=30MHz – 1000MHz and 3 meter distance measurement

| 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 |
|---------------|------------|------------|--------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 268.23        | 47.21      | 13.08      | -23.44 | 36.85        | Quasi Max        | H   | 114    | 296     | 46           | -9.15     | Pass       |
| 299.69        | 28.76      | 13.24      | -22.82 | 19.18        | Quasi Max        | V   | 161    | 225     | 46           | -26.82    | Pass       |
| 714.28        | 19.83      | 15.2       | -15.26 | 19.76        | Quasi Max        | H   | 204    | 50      | 46           | -26.24    | Pass       |

## **Radiated Spurious Emissions above 1GHz**

### **Requirement(s):**

| Spec        | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Applicable                          |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| LP0002:2018 | <p>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.</p> <p><input type="checkbox"/> 20 dB down    <input checked="" type="checkbox"/> 30 dB down</p>                                                                                                                                                                                                                                                                                                                                                                                                                      | <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      | The EUT was scanned up to 6 GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case which is vertical.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                     |
| 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 *Cipher* at *3m chamber*.**

## Radiated Emission-3 meter distance Measurements Test Results (Above 1GHz)

### Above 1GHz – 402.15 MHz

| 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 |
|---------------|----------|------------|--------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 3780.64       | 38.85    | 11.37      | 1.40   | 51.62        | Peak Max         | V   | 124    | 52      | 74           | -22.38    | Pass       |
| 2653.54       | 40.61    | 9.30       | -4.89  | 45.01        | Peak Max         | V   | 115    | 291     | 74           | -28.99    | Pass       |
| 1635.43       | 43.40    | 7.21       | -11.82 | 38.79        | Peak Max         | V   | 120    | 81      | 74           | -35.21    | Pass       |
| 3780.64       | 25.93    | 11.37      | 1.40   | 38.70        | Average Max      | V   | 124    | 52      | 54           | -15.30    | Pass       |
| 2653.54       | 27.52    | 9.30       | -4.89  | 31.92        | Average Max      | V   | 115    | 291     | 54           | -22.08    | Pass       |
| 1635.43       | 30.34    | 7.21       | -11.82 | 25.73        | Average Max      | V   | 120    | 81      | 54           | -28.27    | Pass       |

### Above 1GHz –403.35 MHz

| 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 1873.38       | 43.08    | 7.70       | -9.01 | 41.77        | Peak Max         | V   | 148    | 264     | 74           | -32.23    | Pass       |
| 4873.57       | 38.92    | 13.2       | 3.76  | 55.88        | Peak Max         | V   | 138    | 87      | 74           | -18.12    | Pass       |
| 3797.79       | 39.58    | 11.41      | 1.55  | 52.54        | Peak Max         | V   | 183    | 15      | 74           | -21.46    | Pass       |
| 1873.38       | 29.88    | 7.70       | -9.01 | 28.57        | Average Max      | V   | 148    | 264     | 54           | -25.43    | Pass       |
| 4873.57       | 25.04    | 13.2       | 3.76  | 42.01        | Average Max      | V   | 138    | 87      | 54           | -11.99    | Pass       |
| 3797.79       | 25.82    | 11.41      | 1.55  | 38.78        | Average Max      | V   | 183    | 15      | 54           | -15.22    | Pass       |

### Above 1GHz – 404.85 MHz

| 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 4715.91       | 40.12    | 13.03      | 2.86  | 56.01        | Peak Max         | V   | 101    | 202     | 74           | -17.99    | Pass       |
| 1877.62       | 44.18    | 7.70       | -8.89 | 42.99        | Peak Max         | V   | 194    | 145     | 74           | -31.01    | Pass       |
| 2495.18       | 41.57    | 8.91       | -6.20 | 44.28        | Peak Max         | V   | 186    | 213     | 74           | -29.72    | Pass       |
| 4715.91       | 24.95    | 13.03      | 2.86  | 40.84        | Average Max      | V   | 101    | 202     | 54           | -13.16    | Pass       |
| 1877.62       | 30.10    | 7.70       | -8.89 | 28.91        | Average Max      | V   | 194    | 145     | 54           | -25.09    | Pass       |
| 2495.18       | 28.25    | 8.91       | -6.20 | 30.96        | Average Max      | V   | 186    | 213     | 54           | -23.04    | Pass       |

## **Radiated Spurious Emissions below 30MHz**

### **Requirement(s):**

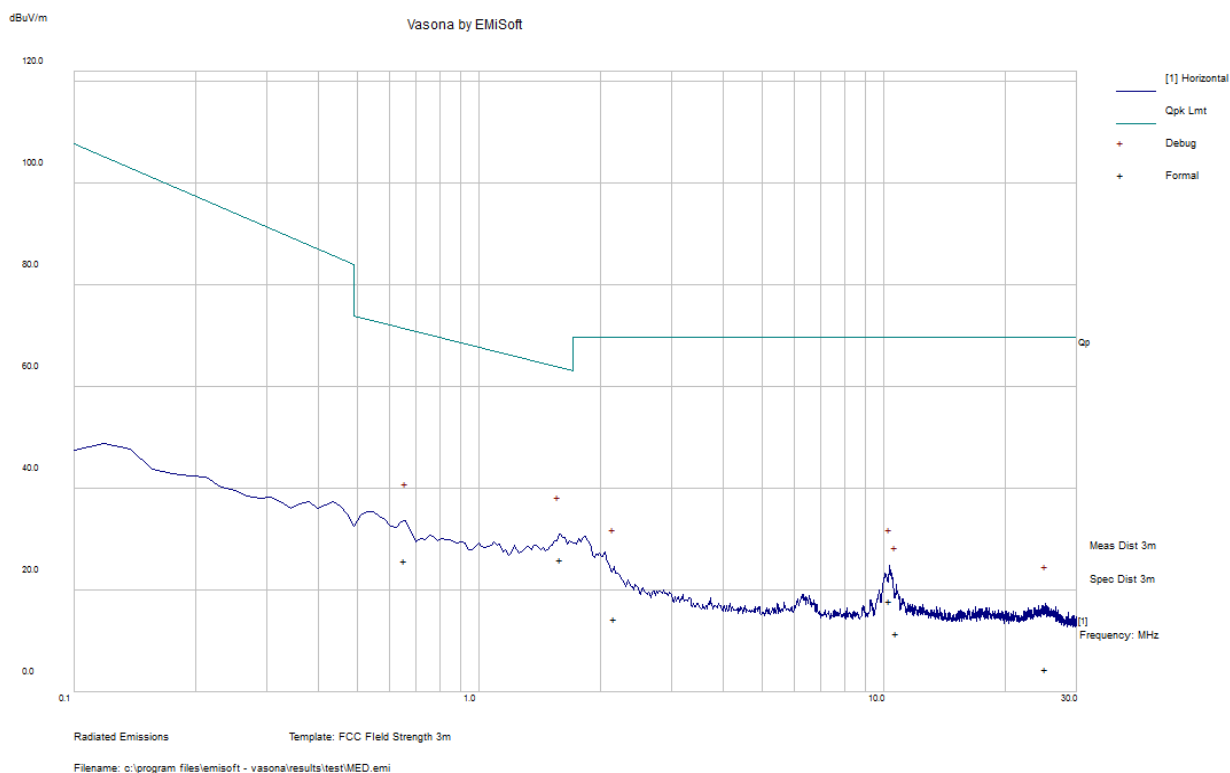
|                       | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Applicable            |                       |                               |             |             |     |             |              |    |            |    |    |              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-------------------------------|-------------|-------------|-----|-------------|--------------|----|------------|----|----|--------------|
| FCC 15.209            | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <div>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</div> <table><thead><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th><th>Measurement distance (meters)</th></tr></thead><tbody><tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr><tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr><tr><td>1.705-30.0</td><td>30</td><td>30</td></tr></tbody></table> | Frequency range (MHz) | Field Strength (uV/m) | Measurement distance (meters) | 0.009-0.490 | 2400/F(kHz) | 300 | 0.490-1.705 | 24000/F(kHz) | 30 | 1.705-30.0 | 30 | 30 | <div>☒</div> |
| Frequency range (MHz) | Field Strength (uV/m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Measurement distance (meters)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |
| 0.009-0.490           | 2400/F(kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |
| 0.490-1.705           | 24000/F(kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |
| 1.705-30.0            | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |
| Procedure             | <div>1. The EUT was switched on and allowed to warm up to its normal operating condition.</div> <div>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:<div><div>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</div><div>b. The EUT was then rotated to the direction that gave the maximum emission.</div><div>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</div></div></div> <div>3. A Quasi-peak measurement was then made for that frequency point.</div> <div>4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |
| Remark                | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |
| Result                | <div>☒ Pass</div> <div>☐ Fail</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       |                       |                               |             |             |     |             |              |    |            |    |    |              |

**Test Data**    ☒ Yes                      ☐ N/A

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

**Test was done by Cipher at 10m chamber.**

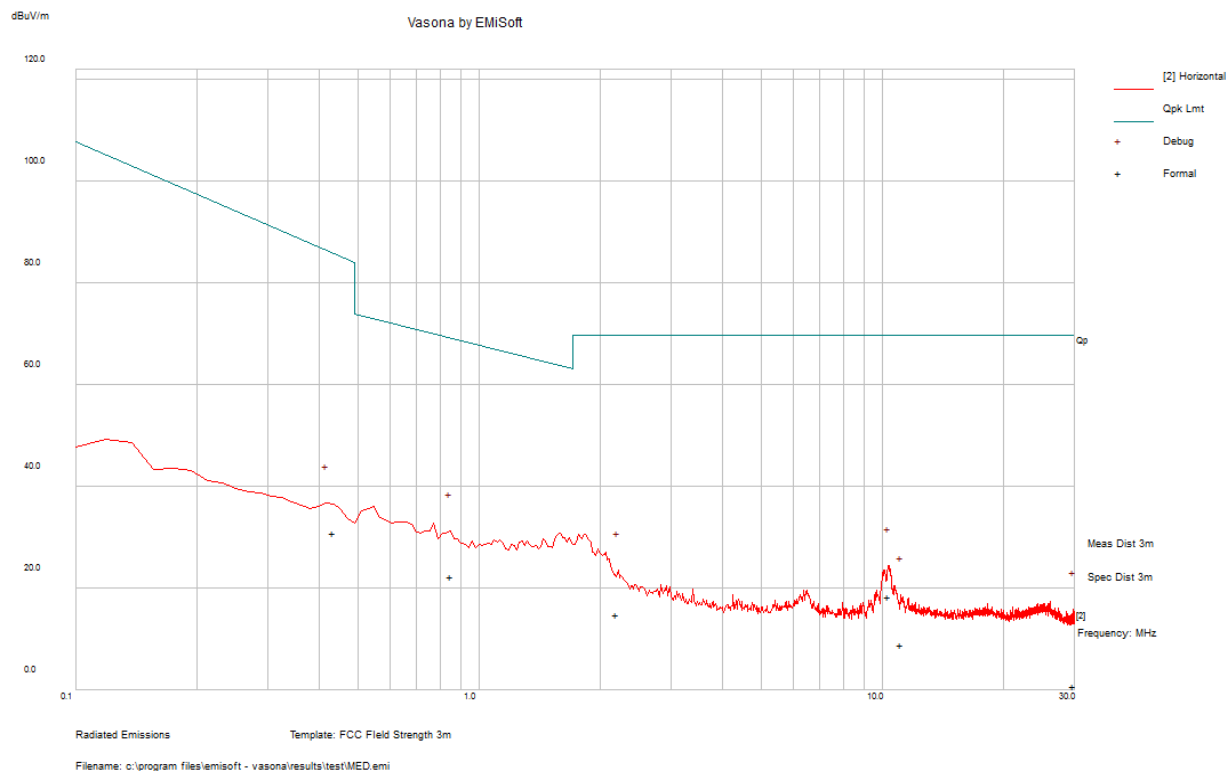
|                     |                                                      |  |         |                                                                           |
|---------------------|------------------------------------------------------|--|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Spurious Emissions                          |  |         |                                                                           |
| Mains Power:        | 3VDC                                                 |  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Cipher                                               |  |         |                                                                           |
| Test Date:          | 05/14/2018 to 05/18/2018                             |  |         |                                                                           |
| Remarks:            | f= 100kHz – 30MHz plot, and loop antenna at 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 |
|---------------|----------|------------|-------|--------------|------------------|------------|--------|---------|--------------|-----------|------------|
| 1.59          | 16.24    | 0.48       | 9.24  | 25.96        | Quasi Max        | 0          | 100    | 204     | 63.56        | -37.6     | Pass       |
| 0.66          | 9.24     | 0.4        | 16.2  | 25.85        | Quasi Max        | 0          | 100    | 36      | 71.26        | -45.41    | Pass       |
| 10.35         | 15.78    | 0.66       | 1.55  | 17.99        | Quasi Max        | 0          | 100    | 348     | 69.54        | -51.55    | Pass       |
| 2.17          | 6.85     | 0.51       | 6.93  | 14.29        | Quasi Max        | 0          | 100    | 2       | 69.54        | -55.25    | Pass       |
| 10.75         | 9.35     | 0.66       | 1.57  | 11.58        | Quasi Max        | 0          | 100    | 179     | 69.54        | -57.97    | Pass       |
| 25.12         | 1.94     | 0.91       | 1.73  | 4.57         | Quasi Max        | 0          | 100    | 338     | 69.54        | -64.97    | Pass       |

|                     |                                                       |  |         |                                                                           |
|---------------------|-------------------------------------------------------|--|---------|---------------------------------------------------------------------------|
| Test specification: | Radiated Spurious Emissions                           |  |         |                                                                           |
| Mains Power:        | 3VDC                                                  |  | Result: | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Tested by:          | Cipher                                                |  |         |                                                                           |
| Test Date:          | 05/14/2018 to 05/18/2018                              |  |         |                                                                           |
| Remarks:            | f= 100kHz – 30MHz plot, and loop antenna at 90 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 |
|---------------|----------|------------|-------|--------------|------------------|------------|--------|---------|--------------|-----------|------------|
| 0.85          | 7.93     | 0.43       | 14.02 | 22.38        | Quasi Max        | 90         | 100    | 321     | 68.99        | -46.61    | Pass       |
| 10.36         | 16.17    | 0.66       | 1.55  | 18.38        | Quasi Max        | 90         | 100    | 17      | 69.54        | -51.16    | Pass       |
| 2.20          | 7.52     | 0.51       | 6.83  | 14.87        | Quasi Max        | 90         | 100    | 275     | 69.54        | -54.68    | Pass       |
| 0.44          | 10.96    | 0.37       | 19.63 | 30.96        | Quasi Max        | 90         | 100    | 24      | 85.58        | -54.62    | Pass       |
| 11.12         | 6.73     | 0.66       | 1.58  | 8.97         | Quasi Max        | 90         | 100    | 357     | 69.54        | -60.57    | Pass       |
| 29.80         | -0.43    | 0.99       | 0.14  | 0.69         | Quasi Max        | 90         | 100    | 40      | 69.54        | -68.85    | Pass       |

### 10.3 Frequency Stability/Error

#### Requirement(s):

| Spec        | Requirement                                                                                                                                                                                                                                      |                          | Applicable                                                                                         |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------|
| LP0002:2018 | The frequency error for DUT transmitters operating in the 401 MHz to 406 MHz band shall not exceed ±100 ppm under normal, extreme, or any intermediate set of conditions.                                                                        |                          | <input checked="" type="checkbox"/>                                                                |
| Test Setup  | <div><div><div>EUT</div><div>Environmental Chamber</div></div><div>Fast Power Meter</div></div> <div><div>1. The EUT was set up inside an environmental chamber.</div><div>2. The EUT was placed in the centre of the environmental.</div></div> |                          |                                                                                                    |
| Procedure   | Frequency Stability was measured according to 47 CFR §2.1055. Measurement was taken with spectrum analyzer. The spectrum analyzer bandwidth and span was set to read in hertz. A voltmeter was used to monitor when varying the voltage.         |                          |                                                                                                    |
| Test Date   | 05/14/2018 to 05/18/2018                                                                                                                                                                                                                         | Environmental conditions | <div>Temperature23°C</div> <div>Relative Humidity48%</div> <div>Atmospheric Pressure1026mbar</div> |
| Remark      | None                                                                                                                                                                                                                                             |                          |                                                                                                    |
| 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 Cipher at RF test site.**

## Test Result for Frequency Stability

### Channel 1: 402.15 MHz

| Test Conditions | Measured Frequency Condition MHz | Frequency Error PPM | Limit PPM |
|-----------------|----------------------------------|---------------------|-----------|
| T (+25°C)       | 402.149521                       | -1.19               | +/-100    |
| T max (55°C)    | 402.149521                       | -1.19               | +/-100    |
| T min (-10°C)   | 402.150364                       | 0.90                | +/-100    |

### Channel 5: 403.35 MHz

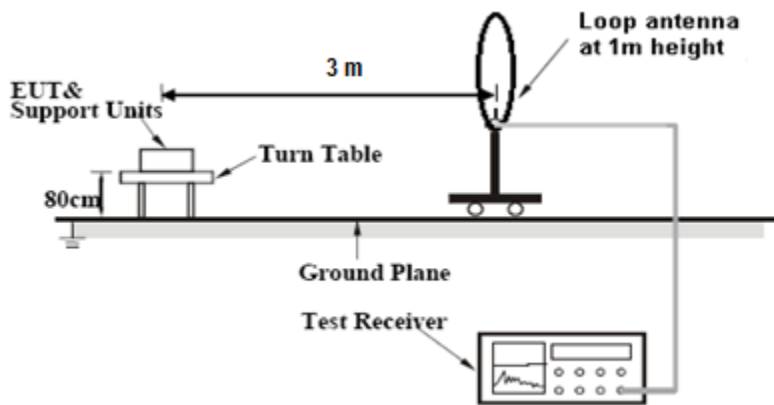
| Test Conditions | Measured Frequency Condition MHz | Frequency Error PPM | Limit PPM |
|-----------------|----------------------------------|---------------------|-----------|
| T (+25°C)       | 403.346170                       | -9.50               | +/-100    |
| T max (55°C)    | 403.350833                       | 2.06                | +/-100    |
| T min (-10°C)   | 403.350120                       | 0.30                | +/-100    |

### Channel 10: 404.85 MHz

| Test Conditions | Measured Frequency Condition MHz | Frequency Error PPM | Limit PPM |
|-----------------|----------------------------------|---------------------|-----------|
| T (+25°C)       | 404.849117                       | -2.18               | +/-100    |
| T max (55°C)    | 404.849117                       | -2.18               | +/-100    |
| T min (-10°C)   | 404.850021                       | 0.05                | +/-100    |

## 10.4 Occupied bandwidth

### Requirement(s):

| Spec        | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Applicable                                                                                                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LP0002:2018 | <p>The transmitted signal bandwidth to be reported is to be its 99% emission bandwidth. 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. See RSS-GEN 4.6.1 for detailed method of measurement.</p> <p>• The maximum permitted emission bandwidth shall be 300 kHz in MICS band</p> | <div><input checked="" type="checkbox"/></div>                                                                                                                                                           |
| Test Setup  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                          |
| Procedure   | <div><div>1.</div><div>The EUT was switched on and allowed to warm up to its normal operating condition.</div></div> <div><div>2.</div><div>To measure conducted, a SMA cable was used to replace the EUT antenna. To measure radiated, an external antenna was used to detect EUT transmission signal.</div></div> <div><div>3.</div><div>Measurement of the 99% Occupied Bandwidth of EUT transmission signal and make record.</div></div>                                                                                                                                                                                                                                                |                                                                                                                                                                                                          |
| Test Date   | 05/14/2018 to 05/18/2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <div>Environmental conditions</div> <div><div>Temperature</div><div>23°C</div></div> <div><div>Relative Humidity</div><div>48%</div></div> <div><div>Atmospheric Pressure</div><div>1025mbar</div></div> |
| Remark      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                          |
| Result      | <div><div><input checked="" type="checkbox"/> Pass</div><div><input type="checkbox"/> Fail</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                          |

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

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

**Test was done by Cipher at 10 meter chamber.**

## Test results:

### 402 MHz



| Frequency (MHz) | Occupied Bandwidth (KHz) |
|-----------------|--------------------------|
| 402.15          | 58.15                    |

### 403 MHz



| Frequency (MHz) | Occupied Bandwidth (KHz) |
|-----------------|--------------------------|
| 403.35          | 58.26                    |

## 405 MHz



| Frequency (MHz) | Occupied Bandwidth (KHz) |
|-----------------|--------------------------|
| 404.85          | 58.21                    |

## Annex A. TEST INSTRUMENT

| Instrument                      | Model    | Serial #   | Cal Date   | Cal Cycle | Cal Due    | In use                              |
|---------------------------------|----------|------------|------------|-----------|------------|-------------------------------------|
| <b>Radiated Emissions</b>       |          |            |            |           |            |                                     |
| R & S Receiver                  | ESIB 40  | 100179     | 06/08/2017 | 1 Year    | 06/08/2018 | <input checked="" type="checkbox"/> |
| Pre-Amplifier (1-26.5GHz)       | 8449B    | 3008A00715 | 03/30/2018 | 1 Year    | 03/30/2019 | <input checked="" type="checkbox"/> |
| Preamplifier (100KHz-7GHz)      | LPA-6-30 | 11140711   | 02/10/2018 | 1 Year    | 02/10/2019 | <input checked="" type="checkbox"/> |
| ETS-Lingren Loop Antenna        | 6512     | 49120      | 07/14/2017 | 1 Year    | 07/14/2018 | <input checked="" type="checkbox"/> |
| Bi-Log antenna (30MHz~2GHz)     | JB1      | A030702    | 07/08/2017 | 1 Year    | 07/08/2018 | <input checked="" type="checkbox"/> |
| Horn Antenna (18-40 GHz)        | AH-840   | 101013     | 07/15/2017 | 1 Year    | 07/15/2018 | <input checked="" type="checkbox"/> |
| Loop Antenna                    | 6512     | 49120      | 08/20/2017 | 1 Year    | 08/20/2018 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer               | N9010A   | 10SL0219   | 08/02/2017 | 1 Year    | 08/02/2018 | <input checked="" type="checkbox"/> |
| Agilent Signal Generator        | N5182A   | MY47071065 | 04/12/2018 | 1 Year    | 04/12/2018 | <input checked="" type="checkbox"/> |
| Test Equity Environment Chamber | 1007H    | 61201      | 07/21/2018 | 1 Year    | 07/21/2018 | <input checked="" type="checkbox"/> |

## 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 |    | <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 Measurements</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>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</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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |