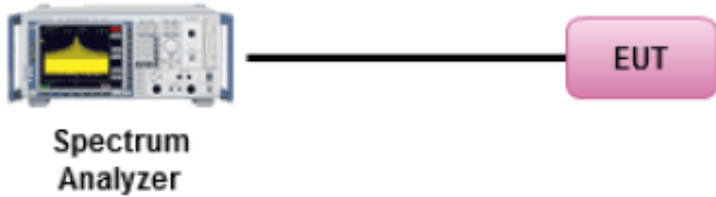


## 10.7 Frequency Stability

### Requirement(s):

| Spec                             | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Requirement                                                                                                                                                                                                                                                                                                                                                                                       | Applicable                                                                                 |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 47 CFR 2.1055, 47 CFR            | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The frequency stability of the transmitter shall be maintained within $\pm 0.0001$ percent ( $\pm 1$ ppm) of the center frequency over a temperature variation of $-30^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of $20^{\circ}\text{C}$ . | <input checked="" type="checkbox"/>                                                        |
| 47 CFR 2.1055, 47 CFR 24.135(a), | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The frequency stability of the transmitter shall be maintained within $\pm 0.0001$ percent ( $\pm 1$ ppm) of the center frequency over a temperature variation of $-30^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of $20^{\circ}\text{C}$ . | <input checked="" type="checkbox"/>                                                        |
| 47 CFR 2.1055, 47 CFR 27.54      | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.                                                                                                                                                                                                                                                               | <input checked="" type="checkbox"/>                                                        |
| Test Setup                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |
| Test Procedure                   | <p>The carrier frequency of the transmitter is measured at room temperature (<math>20^{\circ}\text{C}</math> to provide a reference).</p> <ol style="list-style-type: none"> <li>1. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.</li> <li>2. Frequency measurements are made at <math>10^{\circ}\text{C}</math> intervals ranging from <math>-30^{\circ}\text{C}</math> to <math>+50^{\circ}\text{C}</math>. A period of at least one half hour is provided to allow stabilization of the equipment at each temperature level.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |
| Test Date                        | 04/30/2015<br>10/26/2015 – 11/02/2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Environmental condition                                                                                                                                                                                                                                                                                                                                                                           | Temperature $23^{\circ}\text{C}$<br>Relative Humidity 48%<br>Atmospheric Pressure 1008mbar |
| Remark                           | NONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |
| Result                           | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Test Data for LTE Band 4:

| Voltage (%) | Power (VDC) | Temp. (°) | Frequency (KHz) | Frequency Error (Hz) | Deviation (ppm) |
|-------------|-------------|-----------|-----------------|----------------------|-----------------|
| 100%        | 48          | 20 (ref)  | 2132000.006     | 0                    | 0.000           |
| 100%        |             | 0         | 2132000.008     | 2                    | 0.001           |
| 100%        |             | 10        | 2132000.025     | 19                   | 0.009           |
| 100%        |             | 30        | 2132000.024     | 18                   | 0.008           |
| 100%        |             | 40        | 2132000.018     | 12                   | 0.006           |
| 115%        | 55.2        | 20        | 2132000.019     | 13                   | 0.006           |
| 85%         | 40.8        | 20        | 2132000.024     | 18                   | 0.008           |

Test Data for LTE Band 2:

| Voltage (%) | Power (VDC) | Temp. (°) | Frequency (KHz) | Frequency Error (Hz) | Deviation (ppm) |
|-------------|-------------|-----------|-----------------|----------------------|-----------------|
| 100%        | 48          | 20 (ref)  | 1960000.016     | 0                    | 0.000           |
| 100%        |             | 0         | 1960000.022     | 6                    | 0.003           |
| 100%        |             | 10        | 1960000.023     | 7                    | 0.004           |
| 100%        |             | 30        | 1960000.018     | 2                    | 0.001           |
| 100%        |             | 40        | 1960000.026     | 10                   | 0.005           |
| 115%        | 55.2        | 20        | 1960000.026     | 10                   | 0.005           |
| 85%         | 40.8        | 20        | 1960000.025     | 9                    | 0.005           |

## Annex A. TEST INSTRUMENT

| Instrument                         | Model      | Serial #   | Cal Date   | Cal Cycle | Cal Due    | In use                              |
|------------------------------------|------------|------------|------------|-----------|------------|-------------------------------------|
| <b>Radiated Emissions</b>          |            |            |            |           |            |                                     |
| EMI Test Receiver                  | ESIB 40    | 100179     | 06/03/2015 | 1 Year    | 06/03/2016 | <input checked="" type="checkbox"/> |
| Bi-Log antenna (30MHz~2GHz)        | JB1        | A030702    | 08/15/2015 | 1 Year    | 08/15/2016 | <input checked="" type="checkbox"/> |
| Horn Antenna (1-18GHz)             | 3115       | 10SL0059   | 08/25/2015 | 1 Year    | 08/25/2016 | <input checked="" type="checkbox"/> |
| Horn Antenna (18-40 GHz)           | AH-840     | 101013     | 08/28/2015 | 1 Year    | 08/28/2016 | <input checked="" type="checkbox"/> |
| Pre-Amplifier                      | LPA-6-30   | 11140711   | 02/19/2015 | 1 Year    | 02/19/2016 | <input checked="" type="checkbox"/> |
| Microwave Preamplifier (18-40 GHz) | PA-840     | 181251     | 02/19/2015 | 1 Year    | 02/19/2016 | <input checked="" type="checkbox"/> |
| 3 Meters SAC                       | 3M         | N/A        | 08/08/2015 | 1 Year    | 08/08/2016 | <input checked="" type="checkbox"/> |
| 10 Meters SAC                      | 10M        | N/A        | 09/05/2015 | 1 Year    | 09/05/2016 | <input checked="" type="checkbox"/> |
| <b>RF Conducted Measurement</b>    |            |            |            |           |            |                                     |
| Spectrum Analyzer                  | N9010A     | MY51440112 | 08/20/2015 | 1 Year    | 08/20/2016 | <input checked="" type="checkbox"/> |
| EMI Test Receiver                  | ESIB 40    | 100179     | 06/03/2015 | 1 Year    | 06/03/2016 | <input checked="" type="checkbox"/> |
| Agilent Signal Generator           | MXG N5182A | MY47071065 | 04/06/2015 | 1 Year    | 04/06/2016 | <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                         |                                                                                     | A1, A2, A3, A4, B1, B2, B3, B4, 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) |  | Phase I, Phase II                                                                       |
| Vietnam MIC<br>CAB Accreditation        |  | Please see the document for the detailed scope                                          |
| HongKong OFCA                           |  | (Phase II) OFCA Foreign Certification Body for Radio and Telecom                        |
|                                         |  | (Phase I) 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<br/><b>EMS</b>: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS<br/>KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS</p> <p><b>Radio</b>: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68</p> <p><b>Telecom</b>: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4</p> |
| Taiwan NCC CAB Recognition                         |    | LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Taiwan BSMI CAB Recognition                        |  | CNS 13438                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Japan VCCI                                         |  | <p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Australia CAB Recognition                          |  | <p><b>EMC</b>: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p> <p><b>Radiocommunications</b>: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771</p> <p><b>Telecommunications</b>: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1</p>                                                                                                            |
| Australia NATA Recognition                         |  | AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |