



# RF Exposure Evaluation Report

FOR:  
**TELIT Corporation**

**Model Number: LE866SV1**

**Product Description: LTE Module**

**FCC ID: RI7LE866SV1**  
**IC ID: 5131A-LE866SV1**

**FCC CFR 47 Part 1.1310, 2.1091**  
**IC RSS-102, Issue 5**

**TEST REPORT #: EMC\_VERIZ-049-150022\_FCCICMPE\_v1.1**  
**DATE: 01-27-2016**



**FCC Recognized**  
**A2LA Accredited**  
**IC recognized # 3462E-1**

***CETECOM Inc.***

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## 1 Assessment

The radio equipment as further described in section 3 of this test report, meets the RF exposure limits and/or the conditions for exemption from routine evaluation as defined in the below listed rule parts and standards, when used under fixed / mobile conditions as defined in the same rule parts / standards, and when used with antennae providing gain values not higher then the maximum gain values determined within this report.

### Notes:

Use of the equipment (LTE Module) in host devices for portable use conditions will require new FCC and/or IC certification of the host device, as appropriate, based on SAR testing.

| Standard               | Version                    |
|------------------------|----------------------------|
| FCC CFR 47 Part 1.1310 | Current as of 10-13-2015   |
| FCC CFR 47 Part 2.1091 | Current as of 10-13-2015   |
| FCC KDB 447498         | v05r02                     |
| OET Bulletin 65        | Edition 97-01, August 1997 |
| IC RSS-102             | Issue 5                    |

### Responsible for Testing Laboratory:

| 02-04-2016 | Compliance | Franz Engert<br>(Compliance Manager) | <br>Digitally signed by Franz Engert<br>DN: cn=Franz Engert, c=US, o=CETECOM, ou=Compliance, email=franz.engert@cetecom.com |
|------------|------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date       | Section    | Name                                 | Signature                                                                                                                                                                                                        |

### Responsible for the Report:

| 02-04-2016 | Compliance | Anthony Planinac<br>(EMC Engineer) | <br>Digitally signed by Anthony Planinac<br>DN: cn=Anthony Planinac, c=US, o=CETECOM, ou=EMC SD, email=anthony.planinac@cetecom.com<br>Reason: release<br>Date: 2016.02.05 19:59:20 -08'00' |
|------------|------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date       | Section    | Name                               | Signature                                                                                                                                                                                                                                                                        |

The test results of this test report relate exclusively to the test item specified in Section 3.  
CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

## 2 Administrative Data

### 2.1 Identification of the Testing Laboratory Issuing the Test Report

|                  |                                                                    |
|------------------|--------------------------------------------------------------------|
| Company Name     | CETECOM Inc.                                                       |
| Department       | Compliance                                                         |
| Address          | 6370 Nancy Ridge Drive, Suite 101<br>San Diego, CA 92121<br>U.S.A. |
| Telephone        | +1 (858) 362 2400                                                  |
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| Test Lab Manager | Milton Ponce de Leon                                               |
| Project Manager  |                                                                    |
| Test Engineer    | Anthony Planinac                                                   |

### 2.2 Identification of the Client

|                   |                              |
|-------------------|------------------------------|
| Applicant's Name: | Telit Wireless Solutions Inc |
| Street Address:   | 3131 RDU Center Drive 135    |
| City/Zip Code     | Morrisville NC 27560         |
| Country           | USA                          |
| Contact Person:   | James Hayter                 |
| Phone No.         | 919-439-7977                 |
| Fax:              |                              |
| e-mail:           |                              |

### 2.3 Identification of the Manufacturer

|                        |                 |
|------------------------|-----------------|
| Manufacturer's Name:   | Same as client. |
| Manufacturers Address: |                 |
| City/Zip Code          |                 |
| Country                |                 |

### 3 Equipment under Test (EUT)

#### 3.1 Specification of the Equipment under Test

|                                                                                 |                                                                                                                                |
|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Marketing Name:</b>                                                          | Telit Inc.                                                                                                                     |
| <b>Model Number:</b>                                                            | LE866SV1                                                                                                                       |
| <b>FCC-ID :</b>                                                                 | RI7LE866SV1                                                                                                                    |
| <b>IC-ID:</b>                                                                   | IC: 5131A-LE866SV1, HVIN: LE866-SV1, PMN: LE866-SV1                                                                            |
| <b>Product Description:</b>                                                     | LTE Chipset                                                                                                                    |
| <b>Operating Frequency Ranges (MHz) / Channels:</b>                             | LTE Band 13 (700MHz): 777 MHz – 787 MHz<br>LTE Band 4 (1700 MHz): 1710 -1755 MHz                                               |
| <b>Rated Max power:</b>                                                         | LTE Band 13=24dBm. LTE Band4=24dBm                                                                                             |
| <b>Type(s) of Modulation:</b>                                                   | QPSK and 16 QAM                                                                                                                |
| <b>Antenna info (antenna presented for testing with the development board):</b> | LTE Band 4 (1700): Antenna gain = 2.14 dBi<br>LTE Band 13 (700MHz): Antenna gain = 2.14 dBi                                    |
| <b>Rated Operating Voltage Range:</b>                                           | Vmin: 3.6V/ <b>Vnom: 3.9V</b> / Vmax: 4.2V                                                                                     |
| <b>Rated Operating Temperature Range:</b>                                       | -10°C ~ +55°C                                                                                                                  |
| <b>Test Sample Status:</b>                                                      | Prototype                                                                                                                      |
| <b>Device Category</b>                                                          | <input type="checkbox"/> Fixed Installation<br><input checked="" type="checkbox"/> Mobile<br><input type="checkbox"/> Portable |
| <b>Exposure Category</b>                                                        | <input type="checkbox"/> Occupational/ Controlled<br><input checked="" type="checkbox"/> General Population/ Uncontrolled      |

**3.2 Identification of the Equipment Under Test (EUT)**

| EUT # | Serial Number | Sample             | HW/SW Version |
|-------|---------------|--------------------|---------------|
| 1     | 163490000001  | Radiated/Conducted | 0.0/23.00.001 |

**3.3 Identification of Accessory Equipment**

| AE # | Type                 | Model   | HW Version | SW Version |                 |
|------|----------------------|---------|------------|------------|-----------------|
| 2    | External LTE Antenna | T-AT305 | NA         | NA         | 700MHz – 2.4GHz |

**3.4 Miscellaneous Information**

## 4 RF Exposure Evaluation Requirements

### 4.1 FCC:

Calculations can be made to predict RF field strength and power density levels around typical RF sources using the general equations (3) and (4) on page 19 of the following FCC document: “OET Bulletin 65, Edition 97-01 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”.

The table below is excerpted from Table 1B of CFR 47 1.1310 titled Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure:

| Frequency Range (MHz) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|-----------------------|-------------------------------------|--------------------------|
| 300 – 1500            | $f \text{ (MHz)} / 1500$            | 30                       |
| 1500 – 100.000        | 1.0                                 | 30                       |

Using the equation from page 19 of OET Bulletin 65, Edition 97-01:

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

### Additionally, according to § 2.1091:

The limit for <1.5 GHz mobile operations where no routine evaluation is required is: 1.5W ERP

The limit for >1.5 GHz mobile operations where no routine evaluation is required is: 3W ERP

### 4.2 IC:

#### RSS-102 Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p of the device is equal to or less than  $0.0131 \times f(\text{MHz})^{0.6834} \text{ W}$ .

#### RSS-102 4: RF Field strength limits for devices used by the General Public (Uncontrolled Environment):

Power density

$$300\text{MHz}- 6000 \text{ MHz} = 0.02619 \times f(\text{MHz})^{0.6834} \text{ W/m}^2$$

### Maximum Antenna Gain Analysis

#### Band XIII Frequency Band (777 -787 MHz)

| Mode | Maximum<br>conducted output<br>power (dBm) | Maximum<br>conducted output<br>power (W) | Duty<br>cycle |
|------|--------------------------------------------|------------------------------------------|---------------|
| LTE  | 24                                         | 0.25                                     | 100%          |

#### *IC Analysis*

|                |                                                                                                                                                |                    |                    |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| S              | MPE limit for uncontrolled exposure (777MHz)                                                                                                   | 0.247              | mW/cm <sup>2</sup> |
| G <sub>1</sub> | max Antenna gain to comply with MPE limit (for 20cm distance)                                                                                  | 6.9                | dBi                |
| G <sub>2</sub> | Antenna gain to exclude routine RF Exposure Analysis According to RSS-102 §2.5.2 (threshold 31dBm eirp)                                        | 7.0                | dBi                |
| G <sub>3</sub> | Antenna gain to comply with EIRP limits according to RSS-130 §4.4 (5W eirp for portable or indoor fixed, 50W eirp for mobile or outdoor fixed) | <b>12.9 / 22.9</b> | dBi                |

#### *FCC Analysis*

|                |                                                                                                                                  |                    |                    |
|----------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| S              | MPE limit for uncontrolled exposure (777MHz)                                                                                     | 0.518              | mW/cm <sup>2</sup> |
| G <sub>1</sub> | max Antenna gain to comply with MPE limit (for 20cm distance)                                                                    | 10.2               | dBi                |
| G <sub>2</sub> | Antenna gain to exclude routine RF Exposure Analysis According to §2.1091 (threshold 1.5W erp)                                   | 9.9                | dBi                |
| G <sub>3</sub> | Antenna gain to comply with ERP limits according to §27.50 b) 9)/10) (3W erp for portable, 30W eirp for mobile or outdoor fixed) | <b>12.9 / 22.9</b> | dBi                |

**Note: The maximum ERP/EIRP limits of the relevant licensed rule parts must be respected under all circumstances.**

### Maximum Antenna Gain Analysis

#### Band IV Frequency Band (1710 - 1755 MHz)

| Mode | Maximum conducted output power (dBm) | Maximum conducted output power (W) | Duty cycle |
|------|--------------------------------------|------------------------------------|------------|
| LTE  | 24                                   | 0.25                               | 100%       |

#### *IC Analysis*

|                |                                                                                                            |             |                    |
|----------------|------------------------------------------------------------------------------------------------------------|-------------|--------------------|
| S              | MPE limit for uncontrolled exposure                                                                        | 0.424       | mW/cm <sup>2</sup> |
| G <sub>1</sub> | max Antenna gain to comply with MPE limit (for 20cm distance)                                              | 9.3         | dBi                |
| G <sub>2</sub> | Antenna gain to exclude routine RF Exposure Analysis According to RSS-102 §2.5.2 (threshold 33.3 dBm eirp) | 9.3         | dBi                |
| G <sub>3</sub> | Antenna gain to comply with EIRP limits according to RSS-139 §6.5 (1W eirp)                                | <b>6.00</b> | dBi                |

#### *FCC Analysis*

|                |                                                                                              |             |                    |
|----------------|----------------------------------------------------------------------------------------------|-------------|--------------------|
| S              | MPE limit for uncontrolled exposure:                                                         | 1.0         | mW/cm <sup>2</sup> |
| G <sub>1</sub> | max Antenna gain to comply with MPE limit (for 20cm distance)                                | 13.0        | dBi                |
| G <sub>2</sub> | Antenna gain to exclude routine RF Exposure Analysis According to §2.1091 (threshold 3W erp) | 12.9        | dBi                |
| G <sub>3</sub> | Antenna gain to comply with ERP limits according to §27.50 d) 4) (1W eirp)                   | <b>6.00</b> | dBi                |

**Note: The maximum ERP/EIRP limits of the relevant licensed rule parts must be respected under all circumstances.**

**5 Revision History**

| Date       | Report Number                     | Changes to Report        | Report prepared by |
|------------|-----------------------------------|--------------------------|--------------------|
| 12-15-2015 | EMC_VERIZ-049-15002_FCCICMPE_v1.0 | First release            | MPDL               |
| 01-27-2016 | EMC_VERIZ-049-15002_FCCICMPE_v1.1 | Update IC-ID information | MPDL               |
| 02-04-2016 | EMC_VERIZ-049-15002_FCCICMPE_v1.2 | various corrections      | AMP                |