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

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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:

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

Responsible for the Report:

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

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 San Diego, CA 92121 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

Marketing Name:	Telit Inc.
Model Number:	LE866SV1
FCC-ID :	RI7LE866SV1
IC-ID:	IC: 5131A-LE866SV1, HVIN: LE866-SV1, PMN: LE866-SV1
Product Description:	LTE Chipset
Operating Frequency Ranges (MHz) / Channels:	LTE Band 13 (700MHz): 777 MHz – 787 MHz LTE Band 4 (1700 MHz): 1710 -1755 MHz
Rated Max power:	LTE Band 13=24dBm. LTE Band4=24dBm
Type(s) of Modulation:	QPSK and 16 QAM
Antenna info (antenna presented for testing with the development board):	LTE Band 4 (1700): Antenna gain = 2.14 dBi LTE Band 13 (700MHz): Antenna gain = 2.14 dBi
Rated Operating Voltage Range:	Vmin: 3.6V/ **Vnom: 3.9V** / Vmax: 4.2V
Rated Operating Temperature Range:	–10°C ~ +55°C
Test Sample Status:	Prototype
Device Category	☐ Fixed Installation ☒ Mobile ☐ Portable
Exposure Category	☐ Occupational/ Controlled ☒ 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^2)	Averaging time (minutes)
300 – 1500	f (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^2)
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 x $f(MHz)^{0.6834}$ W.

RSS-102 4: RF Field strength limits for devices used by the General Public (Uncontrolled Environment):
Power density
300MHz- 6000 MHz = 0.02619 x $f(MHz)^{0.6834}$ W/m^2

Maximum Antenna Gain Analysis

Band XIII Frequency Band (777 -787 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 (777MHz)	0.247	mW/cm^2
G_1	max Antenna gain to comply with MPE limit (for 20cm distance)	6.9	dBi
G_2	Antenna gain to exclude routine RF Exposure Analysis According to RSS-102 §2.5.2 (threshold 31dBm eirp)	7.0	dBi
G_3	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)	**12.9 / 22.9**	dBi

FCC Analysis

S	MPE limit for uncontrolled exposure (777MHz)	0.518	mW/cm^2
G_1	max Antenna gain to comply with MPE limit (for 20cm distance)	10.2	dBi
G_2	Antenna gain to exclude routine RF Exposure Analysis According to §2.1091 (threshold 1.5W erp)	9.9	dBi
G_3	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)	**12.9 / 22.9**	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^2
G_1	max Antenna gain to comply with MPE limit (for 20cm distance)	9.3	dBi
G_2	Antenna gain to exclude routine RF Exposure Analysis According to RSS-102 §2.5.2 (threshold 33.3 dBm eirp)	9.3	dBi
G_3	Antenna gain to comply with EIRP limits according to RSS-139 §6.5 (1W eirp)	**6.00**	dBi

FCC Analysis

S	MPE limit for uncontrolled exposure:	1.0	mW/cm^2
G_1	max Antenna gain to comply with MPE limit (for 20cm distance)	13.0	dBi
G_2	Antenna gain to exclude routine RF Exposure Analysis According to §2.1091 (threshold 3W erp)	12.9	dBi
G_3	Antenna gain to comply with ERP limits according to §27.50 d) 4) (1W eirp)	**6.00**	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