Radio Frequency Exposure Evaluation Report

FOR:
CalAmp

Model Name:
LMU-3030
LMU-3035

Product Description:
GPS tracking device with OBD support

FCC ID: APV-3030LVB
IC ID: 5843C-3030LVB

Per:

CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISEDC RSS-102 Issue 5

Report number: EMC_CALAM_081_19001_FCC_ISED_MPE_Rev1

DATE: 03/14/2019

***CETECOM* Inc.**
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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 &1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 5 under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).
In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
CalAmp	GPS tracking device with OBD support	LMU3030LVBL, LMU3035LVBL

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
03/14/2019	Compliance	Cindy Li (Lab Manager)	Cindy Li Digitally signed by Cindy Li DN: cn=Cindy Li, o=Cetecom Inc., ou=EMC, email=cindy.li@cetecom.com, c=US Date: 2019.03.14 16:03:58 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
03/14/2019	Compliance	Yuchan Lu (Test Engineer)	Yuchan Lu Digitally signed by: Yuchan Lu DN: CN = Yuchan Lu email = Yuchan.Lu@cetecom.com C = US O = CETECOM Inc. OU = EMC Date: 2019.03.14 14:56:33 -07'00'

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Street Address:	411 Dixon Landing Road
City/Zip Code	Milpitas, CA 95035
Country	USA
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Lab Manager:	Cindy Li
Responsible Project Leader:	Cathy Palacios

2.2 Identification of the Client / Manufacturer

Applicant's Name:	CalAmp
Street Address:	2177 Salk Ave, Suite 200
City/Zip Code	Carlsbad, CA 90228
Country	USA

Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Assessment

Marketing name:	LMU-3030
HW Version :	REV A1
SW Version :	7.5
Firmware Version Identification Number (FVIN):	7.5
Hardware Version Identification Number (HVIN):	REV A1
Product Marketing Name (PMN):	LMU-3030
Regulatory Band:	❖ **Cellular Module:** ▪ LTE BAND 4: 1717.5 ~ 1747.5 MHz ▪ LTE BAND 13: 779.5 ~ 784.5MHz ❖ **Bluetooth LE:** ▪ 2402 MHz (ch0) – 2480 MHz (ch39), 40 channels
Integrated Module Info:	❖ **Cellular Module:** ▪ Module name: Telit ▪ Model number: LE910SVL ▪ FCC/IC ID: RI7LE910SVL
Antenna Type:	❖ **Cellular:** ▪ Trace Antenna, max peak gain 2.8dBi ❖ **Bluetooth LE:** ▪ Ceramic Antenna, max peak gain 2.5dBi
Maximum Conducted Output Power:	❖ **Cellular:** From modular grant [Watts]: ▪ LTE Band 4: 0.194 ▪ LTE Band 13: 0.170 ❖ **Bluetooth LE:** From Measured [Watts]: 0.00077
Power Supply/ Rated Operating Voltage Range:	Low 9VDC, Nominal 12VDC, High 16VDC
Operating Temperature Range:	Low -30º C, High 75º C
Sample Revision:	☐Prototype Unit; ■Production Unit; ☐Pre-Production

4 RF Exposure Limits and FCC and IC Basic Rules

For the specific described radio apparatus the following basic limits and rules apply for both, FCC and IC where not indicated differently.

4.1 Power Density Limits acc. to FCC 1.1310(e) / RSS-102 i5, cl. 4:

FCC

Frequency Range (MHz)	Power density (mW/cm^2)	Averaging time (minutes)
300 – 1500	f (MHz) /1500	30
1500 – 100.000	1.0	30

IC

300 – 6000	0.02619 x f (MHz) $^{0.6834}$	6

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.109(c) / RSS-102, cl. 2.5 (rounded to 1 decimal point):

FCC
operating frequency < 1.5GHz: excluded if ERP < 1.5W / 31.8dBm (EIRP: 33.9);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9);

IC
300MHz < = operating frequency < 6 GHz: excluded if EIRP < 0.0131 x f (MHz) $^{0.6834}$ W

4.3 RF Exposure Estimation (MPE Estimation)

Having available the source based average output power and peak antenna gain or the ERP/EIRP of the specified device and for a known minimum distance of its radiating structures from the body of persons according to its use cases (at least 20cm) the power density at that distance can be estimated by the following formula for plane-wave equivalent conditions (far-field conditions), when ground reflection is neglected.

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

where: S = power density (mW/cm^2 or W/m^2)
P = power input to the antenna (mW or W)
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 (cm or m)

5 Evaluations

5.1 Analysis of RF Exposure for simultaneous transmission

- Evaluations are based on worst case power density limits for Canada.
- Calculations are made for 20cm.
- Evaluations are based on ERP/EIRP measured or calculated from known gain and conducted output power.
- Cellular can transmit simultaneously with BLE.

Radio	freq [MHz]	Max Conducted power [W]	Gain [dBi]	Gain [lin]	EIRP [W]	IC Limit [W/m2]	FCC Limit [W/m2]	Actual [W/m2]	How much of limit is used up
LTE 4	1717.5	0.194	2.8	1.91	0.371	4.255	10.000	0.737	17.33%
LTE 13	779.5	0.170	2.8	1.91	0.325	2.480	5.197	0.646	26.05%
BT-LE	2402	0.00060	2.5	1.78	0.001	5.351	10.000	0.003	0.05%

5.2 Conclusion:

- **The worst-case simultaneous transmission is LTE Band 13 simultaneous with BLE which is using 26.1 of a limit of 100%. The equipment is passing RF exposure requirements for 20cm distance.**

6 Revision History

Date	Report Name	Changes to report	Report prepared by
03/11/2019	EMC_CALAM_081_19001_FCC_ISED_MPE	Initial Release	Yuchan Lu
03/14/2019	EMC_CALAM_081_19001_FCC_ISED_MPE_Rev1	Updated the cellular module info and Evaluations	Yuchan Lu