Radio Frequency Exposure Evaluation Report

FOR:
OpenTV Inc

Model Number:
HW1872

Product Description:
Indoor Location Gateway

FCC ID: 2AYG4-HW1872-1

Applied Rules and Standards:
CFR Part Part1 (1.1307 &1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06

Report #: EMC_LOOMA_014_23001_FCC_RF_Exposure_EX

DATE: 2023-07-21

A2LA Accredited

IC recognized #
3462B-1

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

Contents

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) 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 rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model #
OpenTV Inc	Indoor Location Gateway	HW1872

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2023-07-21	Compliance	Arndt Stoecker (Director of Regulatory Service)	Arndt Stoecker Digitally signed by: Arndt Stoecker DN: CN = Arndt Stoecker email = arndt.stoecker@cetecom.com C = US O = CETECOM Inc Date: 2023.07.24 18:11:49 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2023-07-21	Compliance	Cheng Song (EMC Engineer)	cheng.song@cetecom.com Digitally signed by: cheng.song@cetecom.com DN: CN = cheng.song@cetecom.com Date: 2023.07.21 12:29:36 -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
Director of Regulatory Services:	Arndt Stoecker
Responsible Project Leader:	Akanksha Baskaran

2.2. Identification of the Client / Manufacturer

Client's Name:	OpenTV Inc
Street Address:	5090 North 40th St., Suite 450
City/Zip Code	85018, Phoenix
Country	USA

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

3. Equipment under Assessment

Model No:	HW1872
HW Version :	04-Production
SW Version :	R4K_01.01.00.B01
FCC ID :	2AYG4-HW1872-1
PMN:	RecovR
Product Description:	Indoor Location Gateway
Radio Information:	**BTLE:** • Module: Silicon Labs RS9116-B00 • Bluetooth 5 LE • Operating frequency: 2402MHz – 2480MHz
Antenna Information as declared:	**BTLE:** • Peak Gain: 2.99 dBi **Cellular:** • Low band peak gain: 2.2 dBi • High band peak gain: 4.8dBi
Power Supply/ Rated Operating Voltage Range:	Vmin: 4.5 VDC/ Vnom: 5 VDC / Vmax: 5.5 VDC
Operating Temperature Range	Low -20ºC, High 70ºC
Other Radios included in the device:	**Cellular:** • Module: Nordic nRF9160-SICA • FCC ID: 2ANPO00NRF9160
Sample Revision	☐Prototype Unit; ☐Production Unit; ■Pre-Production

4. FCC Exemption Limits for Routine Evaluation

4.1. Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 1.1307(b)(3)(i)(B).

Single RF sources is exempt if the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold Pth (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a}\frac{P_i}{P_{\text{th},i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{\text{th},j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k} \le 1$$

5. RF Exposure Evaluation

5.1. Analysis of RF Exposure

Tech-Band	Freq-Low$_{[GHz]}$	Pwr$_{[dBm]}$	Power$_{[W]}$	Ant-G$_{[dBi]}$	ERP$_{[mW]}$	FCC 2.1091(c)(1) Pth$_{[mW]}$ = ERP$_{20cm}$
LTE 2	1.8550	23.00	0.200	4.80	367.282	3060.00
LTE 4	1.7150	23.00	0.200	4.80	367.282	3060.00
LTE 5	0.8290	23.00	0.200	2.20	201.837	1691.16
LTE 12	0.7040	23.00	0.200	2.20	201.837	1436.16
LTE 13	0.7795	23.00	0.200	2.20	201.837	1590.18
LTE 25	1.8550	23.00	0.200	4.80	367.282	3060.00
LTE 26	0.8190	23.00	0.200	2.20	201.837	1670.76
LTE 66	1.7150	23.00	0.200	4.80	367.282	3060.00
Tech-Band	**Freq-Low$_{[GHz]}$**	**Pwr$_{[dBm]}$**	**Power$_{[W]}$**	**Ant-G$_{[dBi]}$**	**ERP$_{[mW]}$**	**FCC 2.1091(c)(1) Pth$_{[mW]}$ = ERP$_{20cm}$**
BTLE	2.4020	4.71	0.003	2.99	3.589	3060.00

The worst simultaneous transmissions is LTE B12 and BTLE:
TER = 0.142
RF exposure exemption applicable

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2023-07-21	EMC_LOOMA_014_23001_FCC_RF_Exposure_EX	Initial	Cheng Song