Radio Frequency Exposure Evaluation Report

FOR:
Xirgo Technologies, Inc.

Model Number:
XT6384

Product Description:
Vehicle tracking solutions with optional OBD to support a wide range of vehicle protocols including passenger, light to heavy-duty trucks, and commercial equipment.

FCC ID: GKM-XT6384
IC ID: 10281A-XT6384

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_XIRGO-168-22001_FCC_ISED_MPE

DATE: 2022-08-25

***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 #
Xirgo Technologies, Inc.	Vehicle tracking solutions with optional OBD to support a wide range of vehicle protocols including passenger, light to heavy-duty trucks, and commercial equipment.	XT6384

Report reviewed by: TCB Evaluator

Date	Section	Name	Signature
2022-08-25	Compliance	Kevin Wang (EMC Lab Manager)	kevin.wang@cetecom.com Digitally signed by: kevin.wang@cetecom.com DN: CN = kevin.wang@cetecom.com Date: 2022.08.25 17:32:39 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2022-08-25	Compliance	Cheng Song (EMC Engineer)	cheng.song@cetecom.com Digitally signed by: cheng.song@cetecom.com DN: CN = cheng.song@cetecom.com Date: 2022.08.25 14:04:34 -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:	Kevin Wang
Responsible Project Leader:	Akanksha Baskaran

2.2 Identification of the Client / Manufacturer

Client's Name:	Xirgo Technologies, Inc.
Street Address:	1461 Lawrence Dr, Ste 1
City/Zip Code	Thousand Oaks, CA 91320
Country	USA

Identification of the Manufacturer

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

3 Equipment under Assessment

Model No:	XT6384
HW Version :	XT6384-001
SW Version :	XT6384-01
FCC ID :	GKM-XT6384
IC ID:	10281A-XT6384
Product Marketing Name (PMN):	XT6384
Product Description:	Vehicle tracking solutions with optional OBD to support a wide range of vehicle protocols including passenger, light to heavy-duty trucks, and commercial equipment.
Radio Information:	**Bluetooth Low Energy (BLE):** Module: Texas Instrument CC2564BRVMR Modulation: Bluetooth version 4.1, GFSK
Antenna Information:	Ceramic SMT Max gain: 1.5dBi
Maximum Conducted Output Power:	BLE: -1.69 dBm
Power Supply/ Rated Operating Voltage Range:	Vmin: 8.0 VDC/ Vnom: 12 VDC / Vmax: 24 VDC
Operating Temperature Range:	-30 ºC to 70 ºC
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 (W/m²)	Averaging time (minutes)
300 – 1500	f (MHz) / 150	30
1500 – 100000	10	30

IC

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

4.2 Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(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 dBm);
operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm (EIRP: 36.9 dBm);

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/cm² or W/m²)
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 US and Canada.
- Calculations are made for 20cm.
- Evaluations are based on ERP/EIRP measured or calculated from known gain and conducted output power.

Radio	**freq MHz**	MaxPower **W** conducted	MaxPower convert to **dBm**	Ant Gain dbi	Ant Gain lin	EIRP W calculated	Max Duty Cycle	IC W/m2	FCC W/m2	Actual W/m2	How much of IC limit is used up	How much of FCC limit is used up
BLE	2402	0.001	-1.690	1.5	1.41	0.001	100.00%	5.351	10.000	0.002	0.02%	0.01%

5.2 Conclusion:

The worst-case transmission is BLE, which is using 0.02% of IC limit and 0.01% of FCC limit. The equipment is passing RF exposure requirements for 20cm distance.

6 Revision History

Date	Report Name	Changes to report	Prepared by
2022-08-25	EMC_XIRGO-168-22001_FCC_ISED_MPE	Initial Release	Cheng Song

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