



Radio Frequency Exposure Evaluation Report

FOR:

Xirgo Technologies LLC

Model:

XT1040S6

Product Description:

Wireless Door Sensor

FCC ID: GKM-XT1040S6

IC: 10281A-XT1040S6

Per:

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

Report number: EMC_XIRGO_193_23001_FCC_ISED_RF_Exposure

DATE: 2023-09-29



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 LLC	Wireless Door Sensor	XT1040S6

Report reviewed by: TCB Evaluator

Arndt Stoecker			
(Director of Regulatory Services)			
2023-09-29	Compliance		
Date	Section	Name	Signature

Responsible for the Report:

Cheng Song			
(EMC Engineer)			
2023-09-29	Compliance		
Date	Section	Name	Signature

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:	Xirgo Technologies, LLC.
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

Product Description:	Wireless Door Sensor
Model Name :	XT1040S6
HW Version :	XT1040S6-001
SW Version :	XT1040S6-01
FCC ID :	GKM-XT1040S6
IC :	10281A-XT1040S6
Frequency Range / number of channels:	Nominal band: 2400 MHz – 2483.5 MHz; Center to center: 2402 MHz (ch 0) – 2480 MHz (ch 39), 40 channels
Radio Information:	Bluetooth Low Energy (BLE): • Module: Silicon Labs EFR32BG22 • Modulation: Bluetooth 5.3, GFSK
Antenna Information as declared:	Trace Antenna, Max Gain 3dBi
Max. Peak Output Power:	7.34dBm Conducted Power
Other Radios included in the device	NA
Power Supply/ Rated Operating Voltage Range	2 L91 Replaceable Lithium AA: 2.7V to 3.6VDC
Operating Temperature Range	Low : -40 °C to °C High +60 °C
Sample Revision	☐ Production ☒ Pre-Production
EUT Dimensions	55 mm x 145mm x 25.4mm
EUT Diameter	☒ < 60 cm ☐ Other _____

4 RF Exposure Limits and FCC and IC Basic Rules

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 P_{th} (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). P_{th} is given by:

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

Where

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

and

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

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.

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

4.2 ISED Exemption Limits for Routine Evaluation – RF Exposure Evaluation per IC RSS-102 Issue 5 section 2.5.2

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

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- 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 $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

5 Evaluations

5.1 Analysis of RF Exposure

FCC:

Radio	Tech-Band	Freq-Low _[GHz]	Pwr _[dBm]	Power _[W]	Ant-G _[dBi]	EIRP _[W]	ERP _[mW]	FCC 2.1091(c)(1) Pth _[mW] = ERP _{20cm}
BT	LE	2.4020	7.34	0.005	3.00	0.011	6.592	3060.00

RF exposure exemption applicable

IC:

Radio	Tech-Band	Freq-Low [MHz]	Pwr _[dBm]	Power _[W]	Ant-G [dBi]	EIRP _[W]	Exemption limit for Routine Evaluation
BT	LE	2402.0	7.34	0.005	3	0.011	2.68

RF exposure exemption applicable

6 Revision History

Date	Report Name	Changes to report	Prepared by
2023-09-27	EMC_XIRGO_193_23001_FCC_ISED_RF_Exposure	Initial Release	Cheng Song

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