



Radio Frequency Exposure Evaluation Report

FOR:

Smart Armor Protected, LLC

Model:

Smart Cube

Product Description:

Bluetooth Enabled Mechanical Locking System

FCC ID: 2ANAB-090

IC ID: 23092-090

Applied Rules and Standards:

CFR 47 Part 2 (2.1093),

FCC KDB 447498 D01 General RF Exposure Guidance v06

ISED RSS-102 Issue 5

Report number: SAR_SMART-001-17001_FCC_SAR-EX

DATE: 2018-03-09



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1. Assessment

The following device was evaluated against the limits for general population uncontrolled exposure specified in CFR 47 Part 2.1093 according to SAR evaluation exclusion requirements specified in FCC regulation as listed in KDB 447498, and ISEDC RSS-102 Issue 5.

The device meets the requirements for SAR exclusion as stipulated by the above given FCC/ISEDC rules.

Company	Description	Model #
Smart Armor Protected, LLC	Bluetooth enabled mechanical locking system	Smart Cube

Responsible for Testing Laboratory:

2018-03-09	Compliance	James Donnellan (Lab Manager)	
Date	Section	Name	Signature

Responsible for the Report:

2018-03-09	Compliance	Cindy Li (EMC Engineer)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section 3.

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2. Administrative Data

2.1. Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
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Director Radio Com. and EMC:	Peter Nevermann
Responsible Project Leader:	Cindy Li

2.2. Identification of the Client / Manufacturer

Applicant's Name:	Smart Armor Protected,LLC
Street Address:	19 Kris Court
City/Zip Code	Newark DE
Country	USA
Contact Person:	Eric Young
Phone No.	858-231-3184 / 858-405-5767
e-mail:	eyoung@artifexrde.com / luke@smartarmortech.com

3. Equipment under Assessment

Model No	Smart Cube
HW Version	03
SW Version	1.1.3
FCC-ID	2ANAB-090
IC ID	23092-090
HVIN	Smart Cube
Product Description	Bluetooth enabled mechanical locking system
Device Category	<input type="checkbox"/> Fixed Installation <input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Mixed Mobile and Portable
Frequency Range / number of channels	2400 MHz – 2483.5 MHz; 40 channels
Type(s) of Modulation	Bluetooth LE: GFSK
Modes of Operation / Declared Output power	Measured conducted power: 2.94dBm
Max. declared antenna gain	W3008C chip antenna, gain 2.2 dBi
Minimum distance of antenna or radiating parts to user	5mm
Power Supply/ Rated Operating Voltage Range	Battery. Vnom: 3.0 VDC / Vmax: 3.5 VDC
Operating Temperature Range	+5 °C to +35 °C
Other Radios included in the device	None
Co-located Transmitters / Antennas	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Sample Revision	<input type="checkbox"/> Prototype <input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-Production
Exposure Category	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> General Population/ Uncontrolled

4. FCC and ISEDC Exemption Limits for Routine Evaluation

4.1. FCC SAR test exclusions per KDB 447498

KDB 447498 D01 General RF Exposure Guidance v06 Section: 4.3.1.
Standalone SAR test exclusion considerations states

- 4) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR, 30 where}$$

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as *numeric thresholds*.

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz.

4.2. ISEDC SAR test exclusions per IC RSS-102 Issue 5

ISEDC RSS-102 Section: 2.5.1 Exemption Limits for Routine Evaluation — SAR Evaluation
SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1. Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power.

Table1 with limits for the frequencies off interest

Frequency (MHz)	d[mm]	Exemption Limits [mW]
2450	5	4

5. Stand-alone Transmission SAR Exclusion Evaluation

5.1. SAR Exclusion Calculation Table

Band	d [mm]	f [GHz]	Max Power + Tune Up [mW]	Source Based Duty Cycle	FCC / IC Limit @ 5 mm [mW]	SAR Exclusion applicable (Yes/No)
BTLE	5	2.48	3.27	1	9.5 / 4	Yes

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2018-03-09	SAR_SMART-001-17001_FCC_SAR-EX	Initial version	Cindy Li