

LIBERTY DEFENSE TECHNOLOGIES, INC. MPE REPORT

SCOPE OF WORK

MPE CALCULATION – HEXWAVE SECURITY BODY SCANNER

REPORT NUMBER

105270120BOX-007.1

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MPE REPORT

(FULL COMPLIANCE)

Report Number: 105270120BOX-007.1

Project Number: G105270120

Report Issue Date: 08/14/2023

Model(s) Tested: HW2000

Standards: FCC Part 1 Subpart I, April 2021

Procedures Implementing the National Environmental Policy Act of 1969
*§1.1307 Actions that may have a significant environmental effect, for which
Environmental Assessments (EAs) must be prepared.*

ISED RSS-102 Issue 5, March 19, 2015

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus
(All Frequency Bands)

Tested by:

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Client:

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187 Ballardvale St, Suite 110
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1 Introduction and Conclusion

This evaluation report covers for a mobile device subject to routine environmental evaluation for RF exposure. A mobile device is defined as a transmitting device designed to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

The evaluation indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining sections are the verbatim text from the actual evaluation during the investigation. These sections include the evaluation name, the specified Method, and Results. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product evaluated **complies** with the requirements of the standard(s) indicated. The results obtained in this report pertain only to the item(s) evaluated. Intertek does not make any claims of compliance for samples or variants which were not evaluated.

2 Evaluation Summary

Section	Test full name	Result
3	Client Information	-
4	Description of Equipment Under Evaluation and Variant Models	-
5	System Setup and Method	-
6	Power Density Calculation (FCC §1.1310; ISED RSS-102 Issue 5)	Compliant
7	Revision History	-

3 Client Information

This EUT was evaluated at the request of:

Client: Liberty Defense Technologies, Inc.
187 Ballardvale St, Suite 110
Wilmington, MA 01887
USA

Contact: Val Safran
Telephone: 888-617-7226
Email: vsafra@libertydefense.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Liberty Defense Technologies, Inc.
187 Ballardvale St, Suite 110
Wilmington, MA 01887
USA

Description of Equipment Under Test (provided by client)

The equipment under test is a HEXWAVE screens for concealed metallic and non-metallic weapons and other threats using millimeter wave, advanced 3D imaging, and Artificial Intelligence for enhanced security. The system can process people seamlessly in all types of venues both indoor and outdoor.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
100-264VAC	15A	50/60 Hz	1

Variant Models:

The following variant models have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 Power Density Calculation

5.1 Requirement(s)

FCC §1.1310 Radiofrequency radiation exposure limits

Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic field.

Table 1 – Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	842/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

F = frequency in MHz * = Plane-wave equivalent power density

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Table 2 below sets forth limits for the RF field strength.

Table 2 – RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency range (MHz)	Electric field strength (V/m rms)	Magnetic field strength (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/f ^{1.2}

Note: f is frequency in MHz. *Based on nerve stimulation (NS) **Based on specific absorption rate (SAR)

5.2 Method

An MPE evaluation was performed in order to show that the device was compliant with FCC §2.1091 and ISED RSS-102. The maximum power density was calculated for each transmitter at a separation distance of 20 cm. The calculation was performed using the maximum gain from the internal and external antennas declared by the manufacturer.

The maximum permissible exposure (MPE) is predicted by using the following equation:

$$S = PG/4\pi R^2$$

where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

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 (appropriate units, e.g., cm)

5.3 Calculation:

For P = 0.0000196336 ^{a)} mW, G = 4.0 dBi (2.5119), R = 20 cm,

$$S = [(0.0000196336) * (2.5119)] / (4 * \pi * 20^2) = \mathbf{0.000000098 \text{ mW/cm}^2} = \mathbf{0.000000098 \text{ W/m}^2}$$

a): Date was taken from Intertek test report number: 105270120BOX-007

5.4 Results:

The sample tested was found to Comply. The calculated maximum power density at 20 cm distance is less than the limits for general population / uncontrolled exposure.

6 ISED RSS-102 Issue 5 §2.5.2 Exemption

6.1 Requirement(s)

Exemption Limits: 10 W/m^2 ($6 \text{ GHz} \leq f < 15 \text{ GHz}$).

MPE calculation: **0.000000098 W/m²**

6.2 Results:

The sample tested was found to Comply. The calculated maximum power density at 20 cm distance is way less than the limits for general population / uncontrolled exposure.

7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	08/14/2023	105270120BOX-007.1	VFV	KPS <i>KPS</i>	Original Issue