Radio Frequency Exposure Evaluation Report

For:

Uhnder

Model Name:

UR-HM1140-1, UR-HM1140-2, UR-HM1140-3

Product Description:

4D Digital Imaging Radar Sensor

FCC ID: 2AXF3-URHM1140
IC ID: 26449-URHM1140

Applied Rules and Standards:
CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091)
ISEDC RSS-102 Issue 5

Report number: EMC_UHNDE_003_20001_MPE

DATE: 2020-09-21

A2LA Accredited

IC recognized # 3462B-1

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1. Assessment

This RF Exposure evaluation report provides information about 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 ISEDC standard RSS-102, under given 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/ISEDC rule parts based on available specifications.

Company Name	Product Description	Model #
Uhnder	4D Digital Imaging Radar Sensor	UR-HM1140-1, UR-HM1140-2, UR-HM1140-3

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2020-10-14	Compliance	Cindy Li (EMC Lab Manager)	Cindy Li Digitally signed by cindy.li@cetecom.com DN: CN=cindy.li@cetecom.com Reason: I have reviewed this document Location: Date: 2020-10-14 16:15:58

Responsible for the Report:

Date	Section	Name	Signature
2020-10-14	Compliance	Kris Lazarov (EMC Engineer)	Kris Lazarov Digitally signed by Kris Lazarov Date: 2020.10.14 15:53:13 -07'00'

The test results of this test report relate exclusively to the test item specified in Section3.
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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 / Fax	+1 (408) 586 6200 / +1 (408) 586 6299
Compliance Manager:	Cindy Li
Responsible Project Leader:	Akanksha Baskaran

2.2. Identification of the Client

Client's Name:	Uhnder
Street Address:	3409 Executive Center Drive Suite 205
City/Zip Code	Austin TX
Country	US

2.3. Identification of the Manufacturer

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

3. Equipment under Assessment

Model No	UR-HM1140-1, UR-HM1140-2, UR-HM1140-3 – See Note 1
HW Version	Version 1.1, s/n: MOD-1004
SW Version	0.7.5-RC6
Frequency Range:	Nominal band: 76 GHz – 81 GHz
Modulation Characteristics:	PMCW
Modes of Operation:	Single Mode – Continuous transmit
Antenna Information:	2*96=192 Virtual Receivers
Co-located Transmitters/ Antennas?	None
Power Supply/ Rated Operating Voltage Range	Vmin: 10V/ Vnom: 12V / Vmax: 16V
Operating Temperature Range	From: -10 C to +85 C, > 0.8 m/s air flow
Sample Revision	☐Prototype ☐Production ■Pre-Production
Device Category	☐Fixed Installation ■Mobile ☐Portable
Exposure Category	☐ Occupational/ Controlled ■ General Population/ Uncontrolled

Note 1: The modules UR-HM1140-1, UR-HM1140-2, UR-HM1140-3 are identical electrically, and mechanically, and operate with the same firmware. The only difference between devices is the length of the attached cable.

4. RF Exposure Limits

4.1. Power Density Limits acc. to FCC 1.1310(e)

Frequency Range (MHz)	Power density (mW/cm²)	Averaging time (minutes)
1500 – 100000	1.0	30

4.2. Routine Environmental Evaluation Categorical Exclusion Limits acc. to FCC 2.1091(c)

Operating frequency > 1.5GHz: excluded if ERP < 3.0W / 34.8dBm

Per KDB 447498 D01 FCC allows calculative estimation of RF exposure for mobile applications when routine environmental evaluation categorical exclusion applies and also for fixed applications.

4.3. Exposure Limits RSS-102

For the purpose of this standard, ISEDC has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m2)	Reference Period (minutes)
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$

4.4. 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 for Compliance with MPE (Power Density) limits

Power Density Calculation							
Band of Operation GHz	**EIRP** dBm	**Maximum Duty Cycle** %	**Distance** cm	**Power Density** mW/cm² in 0.1s	**ISED Limit** mW/cm² in 51s	**FCC Limit** mW/cm²	**Verdict**
76 - 81	19	20	20	0.003	1.000	1.000	Pass

Conclusion:

- The equipment fulfills the MPE limits for the minimum 20cm distance between the antenna and the human body

6. Revision History

Date	Report Name	Changes to report	Report prepared by
2020-09-21	EMC_UHNDE_003_20001_MPE	Initial Version	Kris Lazarov

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