



# 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:

2020-10-14	Compliance	Cindy Li (EMC Lab Manager)
Date	Section	Name

### Responsible for the Report:

2020-10-14	Compliance	Kris Lazarov (EMC Engineer)
Date	Section	Name

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**

<b>Company Name:</b>	CETECOM Inc.
<b>Department:</b>	Compliance
<b>Street Address:</b>	411 Dixon Landing Road
<b>City/Zip Code</b>	Milpitas, CA 95035
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<b>Compliance Manager:</b>	Cindy Li
<b>Responsible Project Leader:</b>	Akanksha Baskaran

### **2.2. Identification of the Client**

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

### **2.3. Identification of the Manufacturer**

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

### **3. Equipment under Assessment**

<b>Model No</b>	UR-HM1140-1, UR-HM1140-2, UR-HM1140-3 – See Note 1
<b>HW Version</b>	Version 1.1, s/n: MOD-1004
<b>SW Version</b>	0.7.5-RC6
<b>Frequency Range:</b>	Nominal band: 76 GHz – 81 GHz
<b>Modulation Characteristics:</b>	PMCW
<b>Modes of Operation:</b>	Single Mode – Continuous transmit
<b>Antenna Information:</b>	2*96=192 Virtual Receivers
<b>Co-located Transmitters/ Antennas?</b>	None
<b>Power Supply/ Rated Operating Voltage Range</b>	Vmin: 10V/ Vnom: 12V / Vmax: 16V
<b>Operating Temperature Range</b>	From: -10 C to +85 C, > 0.8 m/s air flow
<b>Sample Revision</b>	<input type="checkbox"/> Prototype <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production
<b>Device Category</b>	<input type="checkbox"/> Fixed Installation <input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable
<b>Exposure Category</b>	<input type="checkbox"/> Occupational/ Controlled <input checked="" type="checkbox"/> 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/cm <sup>2</sup> )	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, ISED 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/m <sup>2</sup> )	Reference Period (minutes)
15000-150000	61.4	0.163	10	616000/ f <sup>1.2</sup>

##### **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/cm<sup>2</sup> or W/m<sup>2</sup>)

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/cm <sup>2</sup> in 0.1s	ISED Limit mW/cm <sup>2</sup> in 51s	FCC Limit mW/cm <sup>2</sup>	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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