

## MPE Calculation / RF Exposure

Product: UWB Radar Sensor Module

Applicant: Umain Inc.

Model: UWB THUNDER 80M

Address: 504, Fifth Floor, 59, Oncheon-ro, Yuseong-gu, Daejeon, Republic of Korea

FCC ID: 2AN8QUM80M

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC Rules and Regulations.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310 is listed in below table. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* (180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

## Result

### Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

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, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

**MPE Prediction** Prediction of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

**Classification** The antenna of this product is at least 20 cm away from the body of the user. So this product is classified as mobile device.

<b>Frequency (GHz)</b>	<b>Tune up EIRP</b>		<b>Evaluation Distance (cm)</b>	<b>Power Density (mW/cm<sup>2</sup>)</b>	<b>MPE Limit (mW/cm<sup>2</sup>)</b>
	<b>(dBm)</b>	<b>(mW)</b>			
8.019	-2.19	0.604	20	0.000 12	1

**Results:** Compliant

This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm<sup>2</sup> at 20 cm operation.