

FCC RF Exposure

Applicant : Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address : 8F, Wenzhou World Trade Center, Danan Road, Lucheng District,
Wenzhou, Zhejiang, China
Product Name : UWB Radio Frequency Module
Brand Mark :  久凌电子
JL TECHNOLOGY
Model : UWB-X5-AOA-T
Series model : UWB-U2-CA (PRO MAX)
FCC ID : 2BXGOUWB-X5-AOA-T
Report Number : BLA-EMC-202606-A54-02
Date of Receipt : Jun. 16, 2026
Date of Test : Jun. 16, 2026 to Jul. 13, 2026
Test Standard : 47 CFR Part 15, Part1.1307
47 CFR Part 15, Part2.1091
47 CFR Part 15, Part2.1093
KDB447498D04 General RF Exposure Guidance v01
Test Result : Pass

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Revise Record

Version No.	Date	Description
01	Sep. 02, 2026	Original

1 General information

1.1 General information

Applicant	Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address	8F, Wenzhou World Trade Center, Danan Road, Lucheng District, Wenzhou, Zhejiang, China
Manufacturer	Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address	8F, Wenzhou World Trade Center, Danan Road, Lucheng District, Wenzhou, Zhejiang, China
Factory	Jiuling (Wenzhou) Electronic Technology Co., Ltd
Address	8F, Wenzhou World Trade Center, Danan Road, Lucheng District, Wenzhou, Zhejiang, China

1.2 General description of EUT

Product Name	UWB Radio Frequency Module
Model No.	UWB-X5-AOA-T
Series model	UWB-U2-CA (PRO MAX)
Differences of Series model	Their electrical circuit design layout, components used and internal wiring are identical, only the model name are different. The sole minor mechanical difference is that the dimensions of the metal shielding can (shield cover) used on the PCB are slightly different between the two versions.
Operation Frequency	Channel 09: 7987.2MHz
Modulation Type	BPM-BPSK
Application Category	Hand held UWB systems
Number of Channels	1
Antenna Type	FPC antenna & Chip antenna
Antenna Gain	Chip Antenna: 5.3dBi (Provided by customer) FPC Antenna: 4.9dBi (Provided by customer)
Power supply	DC 3.3V
Hardware Version	N/A
Software Version	N/A

Note: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

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2 Maximum Permissible Exposure (MPE) Assessment

2.1 Introduction

According to 47 CFR §2.1091, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location while transmitting. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal desktop computer, are considered to be mobile devices if they meet the 20-centimeter separation requirement. The exposure limits to be used for MPE evaluation are specified in §1.1310. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population / uncontrolled exposure.

2.2 Determination of Exemption for Low Power Devices

For Single RF Sources, a single RF source is exempt if:

Option A: The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A). Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A).

Option B:

The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B. 2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).

Example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
	5	10	15	20	25	30	35	40	45	50	
	300	39	65	88	110	129	148	166	184	201	217
	450	22	44	67	89	112	135	158	180	203	226
	835	9	25	44	66	90	116	145	175	207	240
	1900	3	12	26	44	66	92	122	157	195	236
	2450	3	10	22	38	59	83	111	143	179	219
	3600	2	8	18	32	49	71	96	125	158	195
	5800	1	6	14	25	40	58	80	106	136	169

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B. 1})$$

d =the separation distance (cm)

Option C:

Using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1: Thresholds for single RF sources subject to routine environmental evaluation.
Frequency f in MHz, wavelength in m, distance R in m.

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R ²
1.34	–	30	35.6 m	–	1.6 m	3,450 R ² /f ²
30	–	300	1.6 m	–	159 mm	3.83 R ²
300	–	1,500	159 mm	–	31.8 mm	0.0128 R ² f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

For 6000MHz to 10000MHz

Frequencies above 300 kHz but at distances $R > \lambda/2\pi$, R is the antenna-person separation distance.
 λ =wavelength of transmitted signal.

Can calculate from the frequency of operation using $v = f \cdot \lambda$

v =speed of light= $3 \cdot 10^8$ m/s

f =frequency(Hz)

Primarily an MPE-based exclusion but also SAR-based where $\lambda/2\pi$ is < 20 cm.

For Multiple RF Sources, multiple RF sources are exempt if:

Option A:

The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in §1.1307(b)(3)(i)(A). Medical implant devices may only use this exemption and that in §1.1307(b)(3)(i)(A).

Option B:

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption per §1.1307(b)(3)(i)(B) for P_{th} , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption per §1.1307(b)(3)(i)(C) for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to §1.1307(b)(3)(i)(B) for fixed, mobile, or portable RF source i .

ERP_j = the ERP of fixed, mobile, or portable RF source j .

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$ according to the applicable formula of §1.1307(b)(3)(i)(C).

$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

Exposure Limit_k = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from §1.1310.

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2.3 RF Exposure Evaluation Result

For 6000MHz to 10000MHz

FPC Antenna:

Separation distance= 20cm

Antenna Gain: 4.9dBi

Evolution mode	Distance (cm)	$\lambda/2\pi$ (m)	$\lambda/2\pi$ (cm)	$R > \lambda/2\pi$
UWB	20	0.006	0.6	Yes

Frequency (MHz)	Peak Power Spectral Density (dBm/MHz)	EIRP (dBm)	ERP (dBm)	ERP (mW)	Thresholds ERP (mW)	Verdict
7987.2	-49.397	-22.01	-24.16	0.00384	768	Pass

Note 1: UWB Power Spectral Density (dBm/MHz) refers to report "BLA-EMC-202606-A54-01".

Note 2: UWB EIRP (dBm) = Power Spectral Density (dBm/MHz) + $10 \cdot \log(-10\text{dB Bandwidth})$, the -10dB Bandwidth is 548 MHz which refers to report "BLA-EMC-202606-A54-01".

Note 3: ERP (dBm) = EIRP (dBm) - 2.15.

Note 4: ERP (mW) = $10^{\text{ERP (dBm)} / 10}$.

it's deemed to fulfil the RF exposure requirement.

Chip Antenna:

Separation distance= 20cm

Antenna Gain: 5.3dBi

Evolution mode	Distance (cm)	$\lambda/2\pi$ (m)	$\lambda/2\pi$ (cm)	$R > \lambda/2\pi$
UWB	20	0.006	0.6	Yes

Frequency (MHz)	Peak Power Spectral Density (dBm/MHz)	EIRP (dBm)	ERP (dBm)	ERP (mW)	Thresholds ERP (mW)	Verdict
7987.2	-49.305	-21.92	-24.07	0.00392	768	Pass

Note 1: UWB Power Spectral Density (dBm/MHz) refers to report "BLA-EMC-202606-A54-01".

Note 2: UWB EIRP (dBm) = Power Spectral Density (dBm/MHz) + $10 \cdot \log(-10\text{dB Bandwidth})$, the -10dB Bandwidth is 548 MHz which refers to report "BLA-EMC-202606-A54-01".

Note 3: ERP (dBm) = EIRP (dBm) - 2.15.

Note 4: ERP (mW) = $10^{\text{ERP (dBm)} / 10}$.

it's deemed to fulfil the RF exposure requirement.

Remark:

The UWB FPC Antenna and FPC Antenna is not can Simultaneous Transmission.

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