



# Maximum Permissible Exposure Evaluation

**FCC ID: 2AMM6-8822CSE3AA**

## 1. Client Information

<b>Applicant</b>	:	Earda Technologies Co., Ltd
<b>Address</b>	:	Block A, LianFeng Creative Industry Park, 2 JiSheng Road., HuangGe Town, NanSha District, Guangzhou, PRC.
<b>Manufacturer</b>	:	Earda Technologies Co., Ltd
<b>Address</b>	:	Block A, LianFeng Creative Industry Park, 2 JiSheng Road., HuangGe Town, NanSha District, Guangzhou, PRC.

## 2. General Description of EUT

<b>EUT Name</b>	:	WiFi & BT combo module		
<b>Models No.</b>	:	EWN-8822CSE3AA		
<b>Model Different</b>	:	----		
<b>Brand Name</b>	:	EARDATEK		
<b>Sample ID</b>	:	HC-C-202308-0079-01-03-1#& HC-C-202308-0079-01-03-2#		
<b>Product Description</b>	:	<table border="0"> <tr> <td>Operation Frequency:</td> <td>                     U-NII-1: 5180MHz~5240MHz                      U-NII-2A: 5260MHz~5320MHz                      U-NII-2C: 5500MHz~5720MHz                      U-NII-3: 5745MHz~5825MHz                      802.11b/g/n(HT20): 2412MHz~2462MHz                      802.11n(HT40): 2422MHz-2452MHz                      Bluetooth 5.0(BR+EDR): 2402MHz~2480MHz                      Bluetooth 5.0(BLE): 2402MHz~2480MHz                 </td> </tr> </table>	Operation Frequency:	U-NII-1: 5180MHz~5240MHz U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5720MHz U-NII-3: 5745MHz~5825MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz-2452MHz Bluetooth 5.0(BR+EDR): 2402MHz~2480MHz Bluetooth 5.0(BLE): 2402MHz~2480MHz
Operation Frequency:	U-NII-1: 5180MHz~5240MHz U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5720MHz U-NII-3: 5745MHz~5825MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz-2452MHz Bluetooth 5.0(BR+EDR): 2402MHz~2480MHz Bluetooth 5.0(BLE): 2402MHz~2480MHz			
<b>Power Rating</b>	:	Input: DC 3.3V		
<b>Software Version</b>	:	v5.15.0.1-36		
<b>Hardware Version</b>	:	A1.0		
<b>Remark</b>	:	The antenna gain provided by the manufacturer, the verified for the RF conduction test provided by TOBY test lab.		



## Method of Measurement for FCC

### 1. Max. Antenna Gain:

Band	Antenna Type	Antenna Gain(dBi)	
		Antenna 1	Antenna 2
Bluetooth	PCB	5	/
2.4G Wi-Fi	PCB	5	5
U-NII-1		6	6
U-NII-2A		6	6
U-NII-2C		6	6
U-NII-3		6	6

### 2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### 3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

Where

**S:** power density

**P:** power input to the antenna

**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

### Simultaneous transmission MPE Considerations

According to KDB447498: All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1. Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is  $\leq 1.0$ .

This means that:

$$\sum \text{ of MPE ratios } \leq 1.0$$





**4. Test Result:**

Worst MPE Result							
Test Mode	Antenna	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Max. ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm <sup>2</sup> ) [S]
Bluetooth	/	9.11	9±1	10	5	20	0.0063
2.4G b	Ant1	20.6	21±1	22	5	20	0.0997
	Ant2	20.06	20±1	21	5	20	0.0792
2.4G g	Ant1	20.09	20±1	21	5	20	0.0792
	Ant2	18.81	19±1	20	5	20	0.0629
2.4G n20	Ant1	17.25	17±1	18	5	20	0.0397
	Ant2	16.51	17±1	18	5	20	0.0397
2.4G n40	Ant1	17.5	18±1	19	5	20	0.0500
	Ant2	16.56	17±1	18	5	20	0.0397
5G a	Ant1	21.19	21±1	22	6	20	0.1255
	Ant2	21.76	22±1	23	6	20	0.1580
5G n20	Ant1	21.09	21±1	22	6	20	0.1255
	Ant2	20.67	21±1	22	6	20	0.1255
5G n40	Ant1	21.05	21±1	22	6	20	0.1255
	Ant2	20.32	20±1	21	6	20	0.0997
5G ac20	Ant1	20.14	20±1	21	6	20	0.0997
	Ant2	20.56	21±1	22	6	20	0.1255
5G ac40	Ant1	20.85	21±1	22	6	20	0.1255
	Ant2	21.36	21±1	22	6	20	0.1255
5G ac80	Ant1	21.53	22±1	23	6	20	0.1580
	Ant2	22.37	22±1	23	6	20	0.1580

Note: The antenna gain used max. antenna gain





**5. Conclusion:**

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

**Limits for General Population/ Uncontrolled Exposure**

Frequency Range (MHz)	Power density (mW/ cm <sup>2</sup> )
300-1,500	F/1500
1,500-100,000	1.0

For: 2402~2480MHz&2412~2462MHz&5180~5825MHz

MPE limit S: 1mW/ cm<sup>2</sup>

The MPE is calculated as *0.1580mW / cm<sup>2</sup> < limit 1mW / cm<sup>2</sup>*.

**6. Summary simultaneous transmission information**

Modulation Type	Work Frequency Band	Transmit Antenna		MIMO
		Antenna 1	Antenna 2	
Bluetooth	2.4GHz	Yes	/	/
Bluetooth LE	2.4GHz	Yes	/	/
IEEE 802.11a	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	No
IEEE 802.11b	2.4GHz	Yes	Yes	No
IEEE 802.11g	2.4GHz	Yes	Yes	No
IEEE 802.11n HT20	2.4GHz	Yes	Yes	Yes
IEEE 802.11n HT40	2.4GHz	Yes	Yes	Yes
IEEE 802.11n HT20	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11n HT40	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11ac VHT20	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11ac VHT40	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes
IEEE 802.11ac VHT80	U-NII-1/ U-NII-2A U-NII-2C/ U-NII-3	Yes	Yes	Yes

**7. Summary simultaneous transmission results**

Bluetooth Ant.+ 2.4G/5G WIFI Ant.1 + 2.4G/5G WIFI Ant.2 support Synchronization transmit the

*$\sum MPE \text{ ratios} = 0.0063 + 0.1580 + 0.1580 = 0.3223 < 1$*

So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b). The RF Exposure Information page from the manual is included here for reference.

-----END OF THE REPORT-----

