

Maximum Permissible Exposure Evaluation

FCC ID: 2AMM6-8822CSS3AH

1. Client Information

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

2. General Description of EUT

EUT Name	:	WiFi & BT combo module
Models No.	:	EWN-8822CSS3AH
Product Description	:	Operation Frequency: U-NII-1: 5180MHz~5240MHz U-NII-2A: 5260MHz~5320MHz U-NII-2C: 5500MHz~5700MHz U-NII-3: 5745MHz~5825MHz 802.11b/g/n: 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz Bluetooth 5.2(BER+EDR): 2402MHz~2480MHz Bluetooth 5.2(BLE): 2402MHz~2480MHz
Power Rating	:	DC 3.3V
Software Version	:	v1.0
Hardware Version	:	A1.6
Remark	:	The adapter and antenna gain provided by the applicant, 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		
		Antenna 0	Antenna 1	Antenna 2
Bluetooth	PCB	2	/	/
2.4G WiFi		/	2	2
U-NII-1		/	2	2
U-NII-2A		/	2	2
U-NII-2C		/	2	2
U-NII-3		/	2	2

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 ≤ 1.0 .

This means that:

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

4. Test Result:

Bluetooth MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
GFSK	1	2402	7.87	8±1	9	2	20	0.0025
		2441	7.142	7±1	8	2	20	0.0020
		2480	6.375	6±1	7	2	20	0.0016
π /4-DQPSK	1	2402	9.438	9±1	10	2	20	0.0032
		2441	8.63	9±1	10	2	20	0.0032
		2480	8.133	8±1	9	2	20	0.0025
8-DPSK	1	2402	10.173	10±1	11	2	20	0.0040
		2441	9.235	9±1	10	2	20	0.0032
		2480	8.877	9±1	10	2	20	0.0032

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.

BLE MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
GFSK (1Mbps)	1	2402	8.063	8±1	9	2	20	0.0025
		2440	7.295	7±1	8	2	20	0.0020
		2480	6.568	7±1	8	2	20	0.0020
GFSK (2Mbps)	1	2402	8.018	8±1	9	2	20	0.0025
		2440	7.425	7±1	8	2	20	0.0020
		2480	6.688	7±1	8	2	20	0.0020

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.

2.4G WiFi MPE Result								
Test Mode	Antenna	Channel	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
11B	Ant1	2412	17.71	18±1	19	2	20	0.0250
	Ant2	2412	17.03	17±1	18	2	20	0.0199
	Ant1	2437	17.04	17±1	18	2	20	0.0199
	Ant2	2437	17.61	18±1	19	2	20	0.0250
	Ant1	2462	17.59	18±1	19	2	20	0.0250
	Ant2	2462	17.11	17±1	18	2	20	0.0199
11G	Ant1	2412	17.57	18±1	19	2	20	0.0250
	Ant2	2412	17.93	18±1	19	2	20	0.0250
	Ant1	2437	17.28	17±1	18	2	20	0.0199
	Ant2	2437	17.80	18±1	19	2	20	0.0250
	Ant1	2462	17.33	17±1	18	2	20	0.0199
	Ant2	2462	17.11	17±1	18	2	20	0.0199
11N20	Ant1	2412	14.52	15±1	16	2	20	0.0126
	Ant2	2412	14.59	15±1	16	2	20	0.0126
	total	2412	17.57	/	/	/	/	/
	Ant1	2437	14.92	15±1	16	2	20	0.0126
	Ant2	2437	14.56	15±1	16	2	20	0.0126
	total	2437	17.75	/	/	/	/	/
	Ant1	2462	14.33	14±1	15	2	20	0.0100
	Ant2	2462	13.84	14±1	15	2	20	0.0100
	total	2462	17.10	/	/	/	/	/
11N40	Ant1	2422	14.45	14±1	15	2	20	0.0100
	Ant2	2422	14.51	15±1	16	2	20	0.0126
	total	2422	17.49	/	/	/	/	/
	Ant1	2437	14.41	14±1	15	2	20	0.0100
	Ant2	2437	14.98	15±1	16	2	20	0.0126
	total	2437	17.71	/	/	/	/	/
	Ant1	2452	14.05	14±1	15	2	20	0.0100
	Ant2	2452	14.21	14±1	15	2	20	0.0100
	total	2452	17.14	/	/	/	/	/

Note: RF Output power specifies that Maximum Conducted Peak Output Power.

5G Wi-Fi(U-NII-1) MPE Result								
Test Mode	Antenna	Channel	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
11A	Ant1	5180	17.46	17±1	18	2	20	0.0199
	Ant2	5180	17.31	17±1	18	2	20	0.0199
	Ant1	5220	17.49	17±1	18	2	20	0.0199
	Ant2	5220	17.81	18±1	19	2	20	0.0250
	Ant1	5240	17.32	17±1	18	2	20	0.0199
	Ant2	5240	17.59	18±1	19	2	20	0.0250
11N20	Ant1	5180	14.15	14±1	15	2	20	0.0100
	Ant2	5180	13.92	14±1	15	2	20	0.0100
	total	5180	17.05	/	/	/	/	/
	Ant1	5220	14.48	14±1	15	2	20	0.0100
	Ant2	5220	14.01	14±1	15	2	20	0.0100
	total	5220	17.26	/	/	/	/	/
	Ant1	5240	13.98	14±1	15	2	20	0.0100
	Ant2	5240	14.37	14±1	15	2	20	0.0100
11N40	total	5240	17.19	/	/	/	/	/
	Ant1	5190	14.31	14±1	15	2	20	0.0100
	Ant2	5190	13.97	14±1	15	2	20	0.0100
	total	5190	17.15	/	/	/	/	/
	Ant1	5230	14.64	15±1	16	2	20	0.0126
	Ant2	5230	14.74	15±1	16	2	20	0.0126
11AC20	total	5230	17.70	/	/	/	/	/
	Ant1	5180	14.77	15±1	16	2	20	0.0126
	Ant2	5180	14.36	14±1	15	2	20	0.0100
	total	5180	17.58	/	/	/	/	/
	Ant1	5220	14.36	14±1	15	2	20	0.0100
	Ant2	5220	14.87	15±1	16	2	20	0.0126
	total	5220	17.63	/	/	/	/	/
	Ant1	5240	14.17	14±1	15	2	20	0.0100
11AC40	Ant2	5240	14.58	15±1	16	2	20	0.0126
	total	5240	17.39	/	/	/	/	/
	Ant1	5190	14.96	15±1	16	2	20	0.0126
	Ant2	5190	13.84	14±1	15	2	20	0.0100
	total	5190	17.45	/	/	/	/	/
	Ant1	5230	14.31	14±1	15	2	20	0.0100
11AC80	Ant2	5230	14.53	15±1	16	2	20	0.0126
	total	5230	17.43	/	/	/	/	/
	Ant1	5210	14.86	15±1	16	2	20	0.0126
	Ant2	5210	14.33	14±1	15	2	20	0.0100
	total	5210	17.61	/	/	/	/	/
	total	5220	19.65	/	/	/	/	/
	Ant1	5240	16.98	17±1	18	2	20	0.0199
Ant2	5240	16.21	16±1	17	2	20	0.0158	
total	5240	19.62	/	/	/	/	/	

Note: RF Output power specifies that Maximum Conducted Peak Output Power.

5G Wi-Fi(U-NII-2A) MPE Result								
Test Mode	Antenna	Channel	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
11A	Ant1	5260	17.17	17±1	18	2	20	0.0199
	Ant2	5260	17.27	17±1	18	2	20	0.0199
	Ant1	5300	17.12	17±1	18	2	20	0.0199
	Ant2	5300	17.19	17±1	18	2	20	0.0199
	Ant1	5320	17.14	17±1	18	2	20	0.0199
	Ant2	5320	17.35	17±1	18	2	20	0.0199
11N20	Ant1	5260	13.82	14±1	15	2	20	0.0100
	Ant2	5260	14.40	14±1	15	2	20	0.0100
	total	5260	17.13	/	/	/	/	/
	Ant1	5300	13.83	14±1	15	2	20	0.0100
	Ant2	5300	14.23	14±1	15	2	20	0.0100
	total	5300	17.04	/	/	/	/	/
11N40	Ant1	5320	13.95	14±1	15	2	20	0.0100
	Ant2	5320	14.05	14±1	15	2	20	0.0100
	total	5320	17.01	/	/	/	/	/
	Ant1	5270	14.20	14±1	15	2	20	0.0100
	Ant2	5270	14.33	14±1	15	2	20	0.0100
	total	5270	17.28	/	/	/	/	/
11AC20	Ant1	5310	14.18	14±1	15	2	20	0.0100
	Ant2	5310	14.85	15±1	16	2	20	0.0126
	total	5310	17.54	/	/	/	/	/
	Ant1	5260	14.39	14±1	15	2	20	0.0100
	Ant2	5260	14.97	15±1	16	2	20	0.0126
	total	5260	17.70	/	/	/	/	/
11AC40	Ant1	5300	14.76	15±1	16	2	20	0.0126
	Ant2	5300	15.33	15±1	16	2	20	0.0126
	total	5300	18.06	/	/	/	/	/
	Ant1	5320	14.54	15±1	16	2	20	0.0126
	Ant2	5320	14.93	15±1	16	2	20	0.0126
	total	5320	17.75	/	/	/	/	/
11AC80	Ant1	5270	14.15	14±1	15	2	20	0.0100
	Ant2	5270	14.14	14±1	15	2	20	0.0100
	total	5270	17.16	/	/	/	/	/
	Ant1	5310	14.66	15±1	16	2	20	0.0126
	Ant2	5310	15.13	15±1	16	2	20	0.0126
	total	5310	17.91	/	/	/	/	/
11AC20	Ant1	5290	14.09	14±1	15	2	20	0.0100
	Ant2	5290	14.04	14±1	15	2	20	0.0100
	total	5290	17.08	/	/	/	/	/

Note: RF Output power specifies that Maximum Conducted Peak Output Power.

5G Wi-Fi(U-NII-2C) MPE Result								
Mode	Antenna	Channel	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
11A	Ant1	5500	17.21	17±1	18	2	20	0.0199
	Ant2	5500	17.31	17±1	18	2	20	0.0199
	Ant1	5580	17.70	18±1	19	2	20	0.0250
	Ant2	5580	18.08	18±1	19	2	20	0.0250
	Ant1	5700	17.27	17±1	18	2	20	0.0199
	Ant2	5700	17.00	17±1	18	2	20	0.0199
11N20	Ant1	5500	14.57	15±1	16	2	20	0.0126
	Ant2	5500	14.74	15±1	16	2	20	0.0126
	total	5500	17.67	/	/	/	/	/
	Ant1	5580	15.04	15±1	16	2	20	0.0126
	Ant2	5580	14.83	15±1	16	2	20	0.0126
	total	5580	17.95	/	/	/	/	/
	Ant1	5700	14.55	15±1	16	2	20	0.0126
	Ant2	5700	14.82	15±1	16	2	20	0.0126
total	5700	17.70	/	/	/	/	/	
11N40	Ant1	5510	14.54	15±1	16	2	20	0.0126
	Ant2	5510	14.96	15±1	16	2	20	0.0126
	total	5510	17.77	/	/	/	/	/
	Ant1	5550	15.18	15±1	16	2	20	0.0126
	Ant2	5550	14.61	15±1	16	2	20	0.0126
	total	5550	17.91	/	/	/	/	/
	Ant1	5670	14.66	15±1	16	2	20	0.0126
	Ant2	5670	14.76	15±1	16	2	20	0.0126
total	5670	17.72	/	/	/	/	/	
11AC20	Ant1	5500	14.13	14±1	15	2	20	0.0100
	Ant2	5500	14.43	14±1	15	2	20	0.0100
	total	5500	17.29	/	/	/	/	/
	Ant1	5580	15.14	15±1	16	2	20	0.0126
	Ant2	5580	14.38	14±1	15	2	20	0.0100
	total	5580	17.79	/	/	/	/	/
	Ant1	5700	14.40	14±1	15	2	20	0.0100
	Ant2	5700	13.70	14±1	15	2	20	0.0100
	total	5700	17.07	/	/	/	/	/
11AC40	Ant1	5510	14.65	15±1	16	2	20	0.0126
	Ant2	5510	15.19	15±1	16	2	20	0.0126
	total	5510	17.94	/	/	/	/	/
	Ant1	5550	15.20	15±1	16	2	20	0.0126
	Ant2	5550	14.53	15±1	16	2	20	0.0126
	total	5550	17.89	/	/	/	/	/
	Ant1	5670	14.10	14±1	15	2	20	0.0100
	Ant2	5670	14.82	15±1	16	2	20	0.0126
total	5670	17.49	/	/	/	/	/	
11AC80	Ant1	5530	14.60	15±1	16	2	20	0.0126
	Ant2	5530	14.79	15±1	16	2	20	0.0126
	total	5530	17.71	/	/	/	/	/

	Ant1	5610	14.35	14±1	15	2	20	0.0100
	Ant2	5610	14.54	15±1	16	2	20	0.0126
	total	5610	17.46	/	/	/	/	/

Note: RF Output power specifies that Maximum Conducted Peak Output Power.

5G Wi-Fi(U-NII-3) MPE Result								
Test Mode	Antenna	Channel	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
11A	Ant1	5745	17.57	18±1	19	2	20	0.0250
	Ant2	5745	17.48	17±1	18	2	20	0.0199
	Ant1	5785	17.75	18±1	19	2	20	0.0250
	Ant2	5785	17.19	17±1	18	2	20	0.0199
	Ant1	5825	17.40	17±1	18	2	20	0.0199
	Ant2	5825	17.54	18±1	19	2	20	0.0250
11N20	Ant1	5745	15.08	15±1	16	2	20	0.0126
	Ant2	5745	14.36	14±1	15	2	20	0.0100
	total	5745	17.75	/	/	/	/	/
	Ant1	5785	14.58	15±1	16	2	20	0.0126
	Ant2	5785	14.25	14±1	15	2	20	0.0100
	total	5785	17.43	/	/	/	/	/
	Ant1	5825	14.68	15±1	16	2	20	0.0126
	Ant2	5825	14.21	14±1	15	2	20	0.0100
11N40	total	5825	17.46	/	/	/	/	/
	Ant1	5755	15.01	15±1	16	2	20	0.0126
	Ant2	5755	14.33	14±1	15	2	20	0.0100
	total	5755	17.69	/	/	/	/	/
	Ant1	5795	15.14	15±1	16	2	20	0.0126
	Ant2	5795	14.30	14±1	15	2	20	0.0100
11AC20	total	5795	17.75	/	/	/	/	/
	Ant1	5745	15.13	15±1	16	2	20	0.0126
	Ant2	5745	14.72	15±1	16	2	20	0.0126
	total	5745	17.94	/	/	/	/	/
	Ant1	5785	14.88	15±1	16	2	20	0.0126
	Ant2	5785	14.07	14±1	15	2	20	0.0100
	total	5785	17.50	/	/	/	/	/
	Ant1	5825	14.94	15±1	16	2	20	0.0126
11AC40	Ant2	5825	14.87	15±1	16	2	20	0.0126
	total	5825	17.92	/	/	/	/	/
	Ant1	5755	14.44	14±1	15	2	20	0.0100
	Ant2	5755	14.53	15±1	16	2	20	0.0126
	total	5755	17.50	/	/	/	/	/
	Ant1	5795	14.74	15±1	16	2	20	0.0126
11AC80	Ant2	5795	14.35	14±1	15	2	20	0.0100
	total	5795	17.56	/	/	/	/	/
	Ant1	5775	14.56	15±1	16	2	20	0.0126
11AC80	Ant2	5775	14.26	14±1	15	2	20	0.0100
	total	5775	17.42	/	/	/	/	/

Note: RF Output power specifies that Maximum Conducted Peak Output Power.

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 ²)
300-1,500	F/1500
1,500-100,000	1.0

For:2402~2480MHz&2412~2462MHz&5180~5825MHz
MPE limit S: 1mW/ cm²

6. Summary simultaneous transmission results

WiFi and Bluetooth support simultaneous transmit the

5GWIFI ANT1 MPE (Ratio)	5GWIFI ANT2 MPE (Ratio)	Bluetooth MPE (Ratio)	simultaneous MPE (Ratio)	MPE Limits (Ratio)
0.0250	0.0250	0.0040	0.054	1.0000

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 REPORT-----