

Maximum Permissible Exposure Evaluation

FCC ID: 2BEQ8-H001

1. Client Information

Applicant	:	Baldr Group LTD
Address	:	71-75 Shelton Street, Covent Garden, WC2H 9JQ, London, United Kingdom
Manufacturer	:	Baldr Group LTD
Address	:	71-75 Shelton Street, Covent Garden, WC2H 9JQ, London, United Kingdom

2. General Description of EUT

EUT Name	:	Smart Thermostat and Controller	
Models No.	:	H001	
Model Different	:	----	
Product Description	:	Operation Frequency:	2.4G Wi-Fi: 2412MHz~2462MHz Bluetooth 5.0(BLE): 2402MHz~2480MHz
		Antenna Gain:	3.26dBi PCB Antenna 1 3.26dBi PCB Antenna 2
Power Rating	:	For Adapter (Model: CP0154-0502000C6) Input: 100-240V~ 50/60Hz 0.5A Max Output: 5.0V=2A, 10W	
Software Version	:	1704816908	
Hardware Version	:	H001A4499-D	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark:			
(1) The antenna gain and adapter provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.			
(2) The above antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.			

MPE Calculations for WIFI

1. EUT Operation Condition:

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

2. 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

3. 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:

worst reported.

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]
BLE (1Mbps)	1	2402	2.811	3±1	4	3.26	20	0.0011
		2440	3.181	3±1	4	3.26	20	0.0011
		2480	3.004	3±1	4	3.26	20	0.0011
Note: N _{TX} = Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

2.4G Wi-Fi MPE Result For Ant1 Module ESP32-S3-WROOM-1-N16R8								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (m) [R]	Power Density (W/ m ²) [S]
802.11b	1	2412	15.03	15±1	16	3.26	0.2	0.0168
		2437	15.26	15±1	16	3.26	0.2	0.0168
		2462	15.55	15±1	16	3.26	0.2	0.0168
802.11g	1	2412	15	15±1	16	3.26	0.2	0.0168
		2437	15.22	15±1	16	3.26	0.2	0.0168
		2462	15.43	15±1	16	3.26	0.2	0.0168
802.11 n20	1	2412	15.19	15±1	16	3.26	0.2	0.0168
		2437	15.34	15±1	16	3.26	0.2	0.0168
		2462	15.61	16±1	17	3.26	0.2	0.0211
802.11 n40	1	2422	15.38	15±1	16	3.26	0.2	0.0168
		2437	15.4	15±1	16	3.26	0.2	0.0168
		2452	15.64	16±1	17	3.26	0.2	0.0211
Note: N _{TX} = Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

2.4G Wi-Fi MPE Result For Ant2 Module ESP32C6MINI1

Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (m) [R]	Power Density (W/ m ²) [S]
802.11b	1	2412	-7.26	-7±1	-6	3.26	0.2	0.0001
		2437	-7.32	-7±1	-6	3.26	0.2	0.0001
		2462	-7.36	-7±1	-6	3.26	0.2	0.0001
802.11g	1	2412	-8.34	-8±1	-7	3.26	0.2	0.0001
		2437	-8.39	-8±1	-7	3.26	0.2	0.0001
		2462	-8.04	-8±1	-7	3.26	0.2	0.0001
802.11 n20	1	2412	-9.4	-9±1	-8	3.26	0.2	0.0001
		2437	-9.5	-9±1	-8	3.26	0.2	0.0001
		2462	-9.16	-9±1	-8	3.26	0.2	0.0001
802.11 n40	1	2422	-10.12	-10±1	-9	3.26	0.2	0.0001
		2437	-9.95	-9±1	-8	3.26	0.2	0.0001
		2452	-9.8	-9±1	-8	3.26	0.2	0.0001

Note:

N_{TX}= Number of Transmit Antennas

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

6. Summary simultaneous transmission results

support simultaneous transmit the

2.4GWiFi Ant1 MPE (Ratio)	2.4GWiFi Ant2 MPE (Ratio)	simultaneous MPE (Ratio)	MPE Limits (Ratio)
0.0067	0.0001	0.0068	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-----