

RF EXPOSURE EVALUATION

KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

EUT Specification

FCC ID	2AYZD-14-BW
EUT	WIRELESS BBQ THERMOMETER
Frequency band (Operating)	☒ BT: 2.402GHz ~ 2.480GHz ☐ WLAN: 2.412GHz ~ 2.462GHz ☐ RLAN: 5.180GHz ~ 5.240GHz ☐ RLAN: 5.260GHz ~ 5.320GHz ☐ RLAN: 5.500GHz ~ 5.700GHz ☐ RLAN: 5.745GHz ~ 5.825GHz ☐ Others:
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others ____
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm2) ☒ General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Antenna gain (Max)	BT: 4.07 dBi
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Limits for Maximum Permissible Exposure(MPE)

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm ²)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = Power density in mW/cm²

P_{out} =output power to antenna in Mw

G= gain of antenna in linear scale

π =3.1416

R= distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Max Measurement Result

Operating Mode	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm ²)
	(dBm)	(dBm)	(dBm)	(dBi)	(mW/ cm ²)	
BLE	0.31	0.31 ±1	1.31	4.07	0.0007	1

Contain FCC ID: 2ANDL-WBR3

Calculated Data: WIFI

Maximum peak output power at antenna input terminal (dBm):	24.33
Maximum peak output power at antenna input terminal (mW):	271.02
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	2.5
Maximum Antenna Gain (numeric):	1.78
The worst case is power density at predication frequency at 20 cm (mW/cm ²):	0.0960
MPE limit for general population exposure at prediction frequency (mW/cm ²):	1.0

0.0960(mW/cm²) < 1 (mW/cm²)

Result: Compliant

Calculated Data: BLE

Maximum peak output power at antenna input terminal (dBm):	6.25
Maximum peak output power at antenna input terminal (mW):	4.22
tune-up conducted power(dBm):	9.0
tune-up conducted power(mW):	7.94
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	2.5
Maximum Antenna Gain (numeric):	1.78
The worst case is power density at predication frequency at 20 cm (mW/cm ²):	0.0028
MPE limit for general population exposure at prediction frequency (mW/cm ²):	1.0

Note: The tune-up conducted power (9 dBm) was declared by the manufacturer.0.0028 (mW/cm²) < 1 (mW/cm²)

Result: Compliant

The Maximum simultaneous transmission for BLE+WiFi 2.4G:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$=S_{BLE}/S_{limit-2.4}+ S_{WIFI}/S_{limit-2.4}$$

$$=0.0007/1+0.0960/1$$

$$=0.0967$$

$$< 1.0$$