

Maximum Permissible Exposure Evaluation

FCC ID: 2BKKX-K20SMA

1. Client Information

Applicant	:	shenzhenshijinxinfeikejiyouxiangongsi
Address	:	2112D, Shatoujiao Construction Building, No. 112 Shashen Road, Tianxin Community, Shatoujiao Street, Yantian District, Shenzhen, Guangdong Province, China
Manufacturer	:	shenzhenshijinxinfeikejiyouxiangongsi
Address	:	2112D, Shatoujiao Construction Building, No. 112 Shashen Road, Tianxin Community, Shatoujiao Street, Yantian District, Shenzhen, Guangdong Province, China

2. General Description of EUT

EUT Name	:	Ultrasonic Humidifier
Models No.	:	ALK-KH-K20SMA
Model Difference	:	----
Sample ID	:	HC-C-202408-0183-01-02#
Product Description	:	Operation Frequency: Bluetooth 5.0(BLE): 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz
Power Rating	:	Input: AC 100-220V~ 50/60Hz
Software Version	:	----
Hardware Version	:	----
Connecting I/O Port(S)	:	Please refer to the User's Manual

MPE Calculations

1. Antenna Gain:

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)
Bluetooth LE	N/A	N/A	PCB	2.54

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)
2.4G Wi-Fi	N/A	N/A	PCB	2.54

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

4. 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:

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

5. Test Result:

Bluetooth LE Worst Maximum 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	0.067	0±1	1	2.54	20	0.0004
		2440	0.541	1±1	2	2.54	20	0.0006
		2480	1.338	1±1	2	2.54	20	0.0006
Note: N _{TX} = Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

2.4G Wi-Fi Worst Maximum 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]
802.11b	1	2412	14.39	14±1	15	2.54	20	0.0113
		2437	14.84	15±1	16	2.54	20	0.0142
		2462	14.82	15±1	16	2.54	20	0.0142
802.11g	1	2412	14.2	14±1	15	2.54	20	0.0113
		2437	14.51	15±1	16	2.54	20	0.0142
		2462	14.67	15±1	16	2.54	20	0.0142
802.11n (HT20)	1	2412	14.29	14±1	15	2.54	20	0.0113
		2437	14.54	15±1	16	2.54	20	0.0142
		2462	14.64	15±1	16	2.54	20	0.0142
Note: N _{TX} = Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

Remark:

- Output power including turn-up tolerance;
- Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
- MPE evaluate distance is 20cm from user manual provide by manufacturer.
- Only the worst power was evaluated for each wireless function

6. 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 Bluetooth LE: 2402~2480MHz & 2.4G WIFI: 2412~2462MHz

MPE limit S: 1mW/ cm²

The worst MPE is calculated as **0.0142mW/cm² < limit 1mW/cm²**. 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.

For a more detailed features description, please refer to the RF Test Report.

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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