



Maximum Permissible Exposure Evaluation

FCC ID: 2BG5W-MINIPC

1. Client Information

Applicant	:	Shenzhen Zhiben Electronics Co., Ltd
Address	:	No. 4093 Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, Langshange 311, Nanshan Yungu Innovation Industrial Park, China
Manufacturer	:	Shenzhen Zhiben Electronics Co., Ltd
Address	:	No. 4093 Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, Langshange 311, Nanshan Yungu Innovation Industrial Park, China

2. General Description of EUT

EUT Name	:	MINI PC
Models No.	:	MN, MN***** (* refer to 0-9, A-Z, a-z, -, + or empty)
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is the difference between the types of numbers is used to distinguish different sales customers, others include the electrical structure and key parts of the product are exactly the same, the appearance, the color is different, does not affect the safety and electromagnetic compatibility performance of the product.
Sample ID	:	RW-C-202404-0249-5-1#&RW-C-202404-0249-5-2#
Product Description	:	Operation Frequency: Bluetooth(BR+EDR) V5.2: 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11ax(HE20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz 802.11ax(HE40): 2422MHz~2452MHz
Power Rating	:	Adapter(JHD-AD120B-190632BA-A) Input: AC 100-240V~50/60Hz 1.5A Output: DC 19.0V/6.32A 120.08W
Software Version	:	Windows 11
Hardware Version	:	FP7
Connecting I/O Port(S)	:	Please refer to the User's Manual
Remark	:	the MPE report used the EUT-2(RW-C-202404-0249-5-2#).

MPE Calculations

1. Antenna Gain:

Antenna	Brand	Model Name	Type	Gain(dBi)	
				ANT.1	ANT.2
Bluetooth	N/A	N/A	FPC	0.26	/
2.4G WIFI	N/A	N/A	FPC	0.26	0.26

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. Standalone MPE Evaluation:

(Bluetooth&2.4G WIFI) Ant.1 Worst Maximum MPE Result							
Mode	N _{TX}	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	2.85	2±1	3	0.26	20	0.00042
π/4-DQPSK	1	5.309	5±1	6	0.26	20	0.00084
8-DPSK	1	5.842	5±1	6	0.26	20	0.00084
802.11b	1	19.1	19±1	20	0.26	20	0.02112
802.11g	1	18.13	18±1	19	0.26	20	0.01677
802.11n (HT20)	1	17.77	17±1	18	0.26	20	0.01332
802.11n (HT40)	1	16.53	16±1	17	0.26	20	0.01058
802.11ax (HE20)	1	16.56	16±1	17	0.26	20	0.01058
802.11ax (HE40)	1	17.07	17±1	18	0.26	20	0.01332

Note:
 N_{TX}= Number of Transmit Antennas
 RF Output power specifies that Maximum Conducted Peak Output Power.

2.4G WIFI Ant.2 Worst Maximum MPE Result							
Mode	N _{TX}	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	2	19.7	19±1	20	0.26	20	0.02112
802.11g	2	19.18	19±1	20	0.26	20	0.02112
802.11n (HT20)	2	18.58	18±1	19	0.26	20	0.01677
802.11n (HT40)	2	17.43	17±1	18	0.26	20	0.01332
802.11ax (HE20)	2	17.52	17±1	18	0.26	20	0.01332
802.11ax (HE40)	2	18.18	18±1	19	0.26	20	0.01677

Note:
 N_{TX}= Number of Transmit Antennas
 RF Output power specifies that Maximum Conducted Peak Output Power.



Remark:

1. Output power including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.
4. 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

7. Summary simultaneous transmission information

The sample supports two antennas for (Bluetooth+2.4G WIFI) Ant.1 and 2.4G WIFI Ant.2.

The (Bluetooth+2.4G WIFI) Ant.1 and 2.4G WIFI Ant.2 can transmit simultaneous.

The (Bluetooth+2.4G WIFI) Ant.1 and 2.4G WIFI Ant.2 with two different Antenna.

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

\sum of MPE ratios ≤ 1.0

8. Summary simultaneous transmission results

(Bluetooth+2.4G WIFI) Ant.1 and 2.4G WIFI Ant.2 Maximum Simultaneous transmission MPE Ratios is $0.02112+0.02112=0.04224 \leq 1.0$

9. Conclusion:

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-----

