



Maximum Permissible Exposure Evaluation

FCC ID: 2A233-AM02

1. Client Information

Applicant	:	Shenzhen Konk Technology Co., Ltd
Address	:	Room 215, Building 22, Maker Town, No. 4109, Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China
Manufacturer	:	Shenzhen Konk Technology Co., Ltd
Address	:	Room 215, Building 22, Maker Town, No. 4109, Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China

2. General Description of EUT

EUT Name	:	Retro Mini PC
Models No.	:	AYANEO Retro Mini PC AM02
Model Difference	:	----
Sample ID	:	HC-C-202311-0249-01-02-1#&HC-C-202311-0249-01-02-2#
Product Description	:	Operation Frequency: Bluetooth 5.2: 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11ax(HE20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz 802.11ax(HE40): 2422MHz~2452MHz U-NII-1: 5180MHz~5240MHz U-NII-3: 5745MHz~5825MHz
Power Rating	:	Adapter (Model: J652-1206000IX) Input: 100-240V~ 50/60Hz, 1.7A Output: 20.0V=5.0A, 100.0W
Software Version	:	----
Hardware Version	:	----
Connecting I/O Port(S)	:	Please refer to the User's Manual
Remark	:	the MPE report used the EUT-2(HC-C-202311-0249-01-02-2#).

MPE Calculations

1. Antenna Gain:

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)	
				Ant.1	Ant.2
Bluetooth	N/A	N/A	FPC	1.11	/
2.4G WIFI	N/A	N/A	FPC	1.11	0.42
U-NII-1	N/A	N/A	FPC	0.08	-0.26
U-NII-3	N/A	N/A	FPC	0.8	-0.18

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(BR+EDR) 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	1	2402	4.00	4±1	5	1.11	20	0.00081
		2441	4.26	4±1	5	1.11	20	0.00081
		2480	3.69	3±1	4	1.11	20	0.00064
π/4-DQPSK	1	2402	5.79	5±1	6	1.11	20	0.00102
		2441	6.09	6±1	7	1.11	20	0.00128
		2480	5.58	5±1	6	1.11	20	0.00102
8-DPSK	1	2402	5.98	5±1	6	1.11	20	0.00102
		2441	6.17	6±1	7	1.11	20	0.00128
		2480	5.59	5±1	6	1.11	20	0.00102

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.

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-1M	1	2402	5.21	5±1	6	1.11	20	0.00102
		2440	5.37	5±1	6	1.11	20	0.00102
		2480	4.85	4±1	5	1.11	20	0.00081
GFSK-2M	1	2402	5.17	5±1	6	1.11	20	0.00102
		2440	5.39	5±1	6	1.11	20	0.00102
		2480	4.84	4±1	5	1.11	20	0.00081

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.



2.4G WiFi Worst Maximum MPE Result Ant.1								
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	16.01	16±1	17	1.11	20	0.01287
		2437	16.10	16±1	17	1.11	20	0.01287
		2462	16.05	16±1	17	1.11	20	0.01287
802.11g	1	2412	15.81	15±1	16	1.11	20	0.01022
		2437	15.91	15±1	16	1.11	20	0.01022
		2462	15.93	15±1	16	1.11	20	0.01022
802.11n20	1	2412	14.80	14±1	15	1.11	20	0.00812
		2437	14.94	14±1	15	1.11	20	0.00812
		2462	14.85	14±1	15	1.11	20	0.00812
802.11n40	1	2422	15.41	15±1	16	1.11	20	0.01022
		2437	15.42	15±1	16	1.11	20	0.01022
		2452	15.37	15±1	16	1.11	20	0.01022
802.11ax20	1	2412	14.10	14±1	15	1.11	20	0.00812
		2437	14.08	14±1	15	1.11	20	0.00812
		2462	14.06	14±1	15	1.11	20	0.00812
802.11ax40	1	2422	14.26	14±1	15	1.11	20	0.00812
		2437	14.28	14±1	15	1.11	20	0.00812
		2452	14.37	14±1	15	1.11	20	0.00812

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.



2.4G WiFi Worst Maximum MPE Result Ant.2								
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	16.55	16±1	17	0.42	20	0.01098
		2437	16.69	16±1	17	0.42	20	0.01098
		2462	16.64	16±1	17	0.42	20	0.01098
802.11g	1	2412	15.94	15±1	16	0.42	20	0.00872
		2437	16.35	16±1	17	0.42	20	0.01098
		2462	16.46	16±1	17	0.42	20	0.01098
802.11n20	1	2412	14.01	14±1	15	0.42	20	0.00693
		2437	15.18	15±1	16	0.42	20	0.00872
		2462	15.43	15±1	16	0.42	20	0.00872
802.11n40	1	2422	15.97	15±1	16	0.42	20	0.00872
		2437	16.02	16±1	17	0.42	20	0.01098
		2452	16.07	16±1	17	0.42	20	0.01098
802.11ax20	1	2412	14.12	14±1	15	0.42	20	0.00693
		2437	14.56	14±1	15	0.42	20	0.00693
		2462	14.88	14±1	15	0.42	20	0.00693
802.11ax40	1	2422	15.03	15±1	16	0.42	20	0.00872
		2437	15.12	15±1	16	0.42	20	0.00872
		2452	15.27	15±1	16	0.42	20	0.00872

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



5.2G WiFi Worst Maximum MPE Result Ant.1								
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]
802.11a	1	5180	16.80	16±1	17	0.08	20	0.01015
		5200	16.86	16±1	17	0.08	20	0.01015
		5240	14.99	14±1	15	0.08	20	0.00640
802.11n20	1	5180	12.77	12±1	13	0.08	20	0.00404
		5200	12.86	12±1	13	0.08	20	0.00404
		5240	13.01	13±1	14	0.08	20	0.00509
802.11n40	1	5190	10.70	10±1	11	0.08	20	0.00255
		5230	10.93	10±1	11	0.08	20	0.00255
802.11ac20	1	5180	10.21	10±1	11	0.08	20	0.00255
		5200	10.52	10±1	11	0.08	20	0.00255
		5240	10.59	10±1	11	0.08	20	0.00255
802.11ac40	1	5190	10.47	10±1	11	0.08	20	0.00255
		5230	10.78	10±1	11	0.08	20	0.00255
802.11ac80	1	5210	10.19	10±1	11	0.08	20	0.00255
802.11ax20	1	5180	11.13	11±1	12	0.08	20	0.00321
		5200	11.27	11±1	12	0.08	20	0.00321
		5240	11.54	11±1	12	0.08	20	0.00321
802.11ax40	1	5190	9.75	9±1	10	0.08	20	0.00202
		5230	9.78	9±1	10	0.08	20	0.00202
802.11ax80	1	5210	9.85	9±1	10	0.08	20	0.00202

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



5.2G WiFi Worst Maximum MPE Result Ant.2								
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]
802.11a	1	5180	17.01	17±1	18	-0.26	20	0.01182
		5200	17.34	17±1	18	-0.26	20	0.01182
		5240	15.36	15±1	16	-0.26	20	0.00746
802.11n20	1	5180	13.29	13±1	14	-0.26	20	0.00470
		5200	13.47	13±1	14	-0.26	20	0.00470
		5240	13.49	13±1	14	-0.26	20	0.00470
802.11n40	1	5190	12.34	12±1	13	-0.26	20	0.00373
		5230	12.61	12±1	13	-0.26	20	0.00373
802.11ac20	1	5180	12.24	12±1	13	-0.26	20	0.00373
		5200	12.14	12±1	13	-0.26	20	0.00373
		5240	12.23	12±1	13	-0.26	20	0.00373
802.11ac40	1	5190	12.39	12±1	13	-0.26	20	0.00373
		5230	12.56	12±1	13	-0.26	20	0.00373
802.11ac80	1	5210	10.76	10±1	11	-0.26	20	0.00235
802.11ax20	1	5180	11.67	11±1	12	-0.26	20	0.00296
		5200	11.73	11±1	12	-0.26	20	0.00296
		5240	11.92	11±1	12	-0.26	20	0.00296
802.11ax40	1	5190	9.97	9±1	10	-0.26	20	0.00187
		5230	10.21	10±1	11	-0.26	20	0.00235
802.11ax80	1	5210	10.16	10±1	11	-0.26	20	0.00235

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.



5.8G WiFi Worst Maximum MPE Result Ant.1								
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]
802.11a	1	5745	20.27	20±1	21	0.8	20	0.03011
		5785	20.27	20±1	21	0.8	20	0.03011
		5825	20.17	20±1	21	0.8	20	0.03011
802.11n20	1	5745	19.63	19±1	20	0.8	20	0.02391
		5785	19.61	19±1	20	0.8	20	0.02391
		5825	19.73	19±1	20	0.8	20	0.02391
802.11n40	1	5755	17.75	17±1	18	0.8	20	0.01509
		5795	17.79	17±1	18	0.8	20	0.01509
802.11ac20	1	5745	17.19	17±1	18	0.8	20	0.01509
		5785	17.47	17±1	18	0.8	20	0.01509
		5825	17.24	17±1	18	0.8	20	0.01509
802.11ac40	1	5755	16.33	16±1	17	0.8	20	0.01198
		5795	16.36	16±1	17	0.8	20	0.01198
802.11ac80	1	5775	16.74	16±1	17	0.8	20	0.01198
802.11ax20	1	5745	16.38	16±1	17	0.8	20	0.01198
		5785	16.44	16±1	17	0.8	20	0.01198
		5825	16.38	16±1	17	0.8	20	0.01198
802.11ax40	1	5755	16.45	16±1	17	0.8	20	0.01198
		5795	16.49	16±1	17	0.8	20	0.01198
802.11ax80	1	5775	16.44	16±1	17	0.8	20	0.01198

Note:

 N_{TX}= Number of Transmit Antennas

RF Output power specifies that Maximum Conducted Peak Output Power.



5.8G WiFi Worst Maximum MPE Result Ant.2								
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]
802.11a	1	5745	20.18	20±1	21	-0.18	20	0.02402
		5785	19.99	19±1	20	-0.18	20	0.01908
		5825	20.09	20±1	21	-0.18	20	0.02402
802.11n20	1	5745	20.20	20±1	21	-0.18	20	0.02402
		5785	20.08	20±1	21	-0.18	20	0.02402
		5825	20.07	20±1	21	-0.18	20	0.02402
802.11n40	1	5755	18.31	18±1	19	-0.18	20	0.01516
		5795	18.10	18±1	19	-0.18	20	0.01516
802.11ac20	1	5745	17.90	17±1	18	-0.18	20	0.01204
		5785	17.64	17±1	18	-0.18	20	0.01204
		5825	17.48	17±1	18	-0.18	20	0.01204
802.11ac40	1	5755	17.00	17±1	18	-0.18	20	0.01204
		5795	16.88	16±1	17	-0.18	20	0.00956
802.11ac80	1	5775	16.93	16±1	17	-0.18	20	0.00956
802.11ax20	1	5745	16.67	16±1	17	-0.18	20	0.00956
		5785	16.41	16±1	17	-0.18	20	0.00956
		5825	16.38	16±1	17	-0.18	20	0.00956
802.11ax40	1	5755	16.84	16±1	17	-0.18	20	0.00956
		5795	16.68	16±1	17	-0.18	20	0.00956
802.11ax80	1	5775	16.58	16±1	17	-0.18	20	0.00956

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 (BT/2.4G WIFI/5G WIFI) Ant.1 and (2.4G WIFI/5G WIFI) Ant.2. The (BT/2.4G WIFI/5G WIFI) Ant.1 and (2.4G WIFI/5G WIFI) Ant.2 can transmit simultaneous. The (BT/2.4G WIFI/5G WIFI) Ant.1 and (2.4G WIFI/5G 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

(BT/2.4G WIFI/5G WIFI) Ant.1 + (2.4G WIFI/5G WIFI) Ant.2 *Maximum Simultaneous transmission MPE Ratios is*

$$0.03011+0.02402=0.05413 \leq 1.0$$

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-----

