



Microtest
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RF EXPOSURE Test Report

Report No.: MTi231101006-02E4
Date of issue: 2023-12-28
Applicant: Changsha Hotone Audio Co.,LTD
Product: Multi-Effects Processor
Model(s): MP-380(Ampere II Stage)
FCC ID: 2AHJSMP-380

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>



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Test Result Certification	
Applicant:	Changsha Hotone Audio Co.,LTD
Address:	Room 201, East Block, Hunan University Science Park, No.186, Guyuan Rd. Yue Lu District, Changsha, China.
Manufacturer:	Changsha Hotone Audio Co.,LTD
Address:	Room 201, East Block, Hunan University Science Park, No.186, Guyuan Rd. Yue Lu District, Changsha, China.
Factory:	Changsha Hotone Audio Co.,LTD
Address:	Room 201, East Block, Hunan University Science Park, No.186, Guyuan Rd. Yue Lu District, Changsha, China.
Product description	
Product name:	Multi-Effects Processor
Trademark:	Hotone
Model name:	MP-380(Ampere II Stage)
Serial Model:	N/A
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2023-12-01 to 2023-12-28
Test result:	Pass

Test Engineer	:	<i>Yanice Xie</i>
		(Yanice.Xie)
Reviewed By	:	<i>Leon Chen</i>
		(Leon Chen)
Approved By	:	<i>Tom Xue</i>
		(Tom Xue)

RF EXPOSURE EVALUATION

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)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

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

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

R = distance between observation point and center of the radiator in cm (20cm)

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.

Measurement Result

BT/BLE:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm²

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

802.11n HT40: 2422-2452MHz,

Power density limited: 1mW/ cm²

Antenna Type: Copper tube antenna;

Antenna gain: 2.41dBi

R=20cm

$mW=10^{(dBm/10)}$

Antenna gain Numeric= $10^{(dBi/10)}=10^{(2.41/10)}=1.74$

BR+EDR :

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm ²)	(mW/c m ²)
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	4.28	4±1	5	3.162	2.41	1.74	0.0011	1
2441		3.63	4±1	5	3.162	2.41	1.74	0.0011	1
2480		4.43	4±1	5	3.162	2.41	1.74	0.0011	1
2402	π/4-DQPSK	6.56	6±1	7	5.012	2.41	1.74	0.0017	1
2441		5.81	6±1	7	5.012	2.41	1.74	0.0017	1
2480		6.6	6±1	7	5.012	2.41	1.74	0.0017	1
2402	8DPSK	7.03	7±1	8	6.310	2.41	1.74	0.0022	1
2441		6.29	7±1	8	6.310	2.41	1.74	0.0022	1
2480		7.03	7±1	8	6.310	2.41	1.74	0.0022	1

BLE :

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	(dBi)	Numeric		
2402	BLE	4.09	4±1	5	3.162	2.41	1.74	0.0011	1
2440		3.97	4±1	5	3.162	2.41	1.74	0.0011	1
2480		4.11	4±1	5	3.162	2.41	1.74	0.0011	1



2.4G WiFi:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
2412	802.11b	17.16	17±1	18	63.096	1.74	0.02186	1
2437		16.13	17±1	18	63.096	1.74	0.02186	1
2462		16.36	17±1	18	63.096	1.74	0.02186	1
2412	802.11g	17.33	17±1	18	63.096	1.74	0.02186	1
2437		16.53	17±1	18	63.096	1.74	0.02186	1
2462		16.73	17±1	18	63.096	1.74	0.02186	1
2412	802.11n H20	17.51	17±1	18	63.096	1.74	0.02186	1
2437		16.74	17±1	18	63.096	1.74	0.02186	1
2462		16.86	17±1	18	63.096	1.74	0.02186	1
2422	802.11n H40	17.56	17±1	18	63.096	1.74	0.02186	1
2437		16.80	17±1	18	63.096	1.74	0.02186	1
2452		16.49	17±1	18	63.096	1.74	0.02186	1

Conclusion:

Simultaneous transmit:

BR&EDR+2.4G WIFI =0.0022+0.02186=0.02406

BLE+2.4G WIFI =0.0011+0.02186=0.02296

For the max result: $0.02406 \leq 1.0$ SAR test exclusion threshold, No SAR is required.

----END OF REPORT----