RF EXPOSURE
Test Report

Report No.:	MTi230306002-01E3
Date of issue:	2023-03-28
Applicant:	Dier Digital Audio (Longnan) Co., Ltd
Product:	Wireless Charger with Speaker Clock
Model(s):	BT512
FCC ID:	2A5N7-BT512

Shenzhen Microtest Co., Ltd.

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Test Result Certification	
Applicant:	**Dier Digital Audio (Longnan) Co., Ltd**
Address:	Information Industry Technology City, Longnan , Longnan Economic Development Zone, Longnan, Ganzhou, Jiangxi Province, China
Manufacturer:	**Dier Digital Audio (Longnan) Co., Ltd**
Address:	Information Industry Technology City, Longnan , Longnan Economic Development Zone, Longnan, Ganzhou, Jiangxi Province, China
Factory:	**Dier Digital Audio (Longnan) Co., Ltd**
Address:	Information Industry Technology City, Longnan , Longnan Economic Development Zone, Longnan, Ganzhou, Jiangxi Province, China
Product description	
Product name:	Wireless Charger with Speaker Clock
Trademark:	N/A
Model name:	BT512
Serial Model:	N/A
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2023-03-14 ~ 2023-03-28
Test result:	Pass

Test Engineer : Yanice Xie

(Yanice Xie)

Reviewed By: Leon chen

(Leon Chen)

Approved By: Tom Xue

(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: $Pd= (Pout*G)\ (4*pi*R^2)$

Where

Pd= Power density in mW/cm^2

Pout=output power to antenna in mW

G= Numeric gain of the antenna relative to isotropic antenna

Pi=3.1415926

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

Pd the limit of MPE, $1mW/cm^2$. 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:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm^2

Antenna Type: PCB Antenna;

Antenna gain: -0.58dBi

R=20cm

mW=10^(dBm/10)

antenna gain Numeric=10^(dBi/10)= 10^(-0.58/10)=0.87

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/cm^2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	5.6	6±1	7	5.012	-0.58	0.87	0.0009	1
2441		5.66	6±1	7	5.012	-0.58	0.87	0.0009	1
2480		6.9	6±1	7	5.012	-0.58	0.87	0.0009	1
2402	π/4-DQPSK	6.33	6±1	7	5.012	-0.58	0.87	0.0009	1
2441		6.34	6±1	7	5.012	-0.58	0.87	0.0009	1
2480		7.57	7±1	8	6.310	-0.58	0.87	0.0011	1

Conclusion:

the simultaneous transmitting antenna pairs as below:

$$\sum_{i=1}^{a}\frac{P_i}{P_{\mathrm{th},i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\mathrm{th},j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

For the max result:

∑ of MPE ratio= WPT+Bluetooth=0.1032+0.0011=0.1043<1, No SAR is required.

(WPT MPE from MTi230306002-01E4.)

----END OF REPORT----