



Microtest
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RF EXPOSURE Test Report

Report No.: MTi220420004-01E6

Date of issue: 2022-09-23

Applicant: Lathem Time Corporation

Product name: Time Clock

Model(s): PCEXPRESS

FCC ID: UP3-PCEXPRESS

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>



Instructions

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TEST RESULT CERTIFICATION	
Applicant's name	Lathem Time Corporation
Address	210 The Bluffs, Suite 107 SW Austell, GA 30168 United States
Manufacturer's Name ...	SHENZHEN HEROFUN BIO-TECH CO., LTD
Address	West 401, Building A2, TianRui Industrial Park, No. 35 FuYuan 1st Road, XinHe Community, FuHai Street, BaoAn District, Shenzhen, China
Product description	
Product name	Time Clock
Trademark	Lathem
Model Name	PCEXPRESS
Serial Model	N/A
Standards	N/A
Test procedure	KDB 447498 D01 v06
Date of Test	
Date (s) of performance of tests .:	2022-04-29 ~ 2022-09-22
Test Result	Pass
This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.	

Testing Engineer

:

Yanice Xie

(Yanice Xie)

Technical Manager

:

Leon Chen

(Leon Chen)

Authorized Signatory

:

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

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,

Power density limited: 1mW/ cm²

5GWiFi:

802.11a: 20 MHz

802.11n: 20 MHz, 40 MHz

802.11ac: 20 MHz, 40 MHz, 80MHz

Antenna Type: FPC Antenna;

BT/BLE, 2.4GWIFI antenna gain: 1.89dBi

5GWiFi antenna gain: 2.52dBi

R=20cm

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

BT/BLE, 2.4GWIFI antenna gain Numeric= $10^{(dBi/10)}=10^{(1.89/10)}=1.55$

5G WIFI antenna gain Numeric= $10^{(dBi/10)}=10^{(2.52/10)}=1.79$

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	4.62	5±1	6	3.981	1.89	1.55	0.0012	1
2441		5.92	6±1	7	5.012	1.89	1.55	0.0015	1
2480		8.15	8±1	9	6.310	1.89	1.55	0.0024	1
2402	π/4-DQPSK	4.41	5±1	6	3.981	1.89	1.55	0.0012	1
2441		6.64	6±1	7	5.012	1.89	1.55	0.0015	1
2480		5.74	6±1	7	5.012	1.89	1.55	0.0015	1
2402	8DPSK	3.39	4±1	5	3.162	1.89	1.55	0.0010	1
2441		5.26	6±1	7	5.012	1.89	1.55	0.0015	1
2480		6.02	6±1	7	5.012	1.89	1.55	0.0015	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/cm2)	(mW/cm2)
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	1.57	1±1	2	1.585	1.89	1.55	0.0005	1
2440		3.18	3±1	4	2.512	1.89	1.55	0.0008	1
2480		3.41	3±1	4	2.512	1.89	1.55	0.0008	1

2.4GWiFi:

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		
		Ant A	Ant A	Ant A	Ant A	Ant A	Ant A	
2412	802.11b	11.38	11±1	12	15.849	1.55	0.00489	1
2437		11.06	11±1	12	15.849	1.55	0.00489	1
2462		11.89	11±1	12	15.849	1.55	0.00489	1
2412	802.11g	12.07	12±1	13	19.953	1.55	0.00615	1
2437		11.84	12±1	13	19.953	1.55	0.00615	1
2462		12.65	12±1	13	19.953	1.55	0.00615	1
2412	802.11n H20	11.50	12±1	13	19.953	1.55	0.00615	1
2437		11.21	12±1	13	19.953	1.55	0.00615	1
2462		12.21	12±1	13	19.953	1.55	0.00615	1



5GWiFi: UNII-1

Frequency (MHz)	Modulation mode	conduct ed power	Tune- up powe r	Max		Anten na	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
		Ant A	Ant A	(dBm)	(mW)	Numer ic		
		Ant A	Ant A	Ant A	Ant A	Ant A	Ant A	
5180	11a	0.39	0±1	1	1.259	1.79	0.00045	1
5200	11a	0.35	0±1	1	1.259	1.79	0.00045	1
5240	11a	0.61	0±1	1	1.259	1.79	0.00045	1
5180	11ac (HT20)	0.05	0±1	1	1.259	1.79	0.00045	1
5200	11ac (HT20)	-0.19	0±1	1	1.259	1.79	0.00045	1
5240	11ac (HT20)	0.1	0±1	1	1.259	1.79	0.00045	1
5190	11ac (HT40)	-0.03	0±1	1	1.259	1.79	0.00045	1
5230	11ac (HT40)	0.02	0±1	1	1.259	1.79	0.00045	1
5210	11ac (HT80)	0.95	0±1	1	1.259	1.79	0.00045	1

UNII-3

Freque ncy (MHz)	Modulation mode	conduct ed power	Tune- up powe r	Max		Anten na	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
		Ant A	Ant A	(dBm)	(mW)	Numer ic		
		Ant A	Ant A	Ant A	Ant A	Ant A	Ant A	
5745	11a	-4.22	(-5)±1	-4	0.398	1.79	0.00014	1
5785	11a	-5.26	(-5)±1	-4	0.398	1.79	0.00014	1
5825	11a	-5.85	(-5)±1	-4	0.398	1.79	0.00014	1
5745	11ac (HT20)	-4.05	(-5)±1	-4	0.398	1.79	0.00014	1
5785	11ac (HT20)	-5.15	(-5)±1	-4	0.398	1.79	0.00014	1
5825	11ac (HT20)	-5.8	(-5)±1	-4	0.398	1.79	0.00014	1
5755	11ac (HT40)	-3.8	(-4)±1	-3	0.501	1.79	0.00018	1
5795	11ac (HT40)	-4.87	(-5)±1	-4	0.398	1.79	0.00014	1
5775	11ac (HT80)	-3.85	(-4)±1	-3	0.501	1.79	0.00018	1



Conclusion:

Simultaneous transmit:

BR&EDR +2.4G WIFI=0.0024+0.03882=0.04122

BR&EDR+5G WIFI UNII-1=0.0024+0.00045=0.00285

BR&EDR+5G WIFI UNII-3=0.0024+0.00018=0.00258

BLE+2.4G WIFI=0.0008+0.03882=0.03962

BLE+5G WIFI UNII-1=0.0008+0.00045=0.00125

BLE+5G WIFI UNII-3=0.0008+0.00018=0.00098

For the max result: $0.04122 \leq 1.0$ for 1g SAR, No SAR is required.

----END OF REPORT----