



RF EXPOSURE Test Report

Report No.: MTi230921033-05E3
Date of issue: 2023-11-08
Applicant: Shenzhen hnlife lighting technology co., LTD
Product: IPSTUBE Nixie Tube
Model(s): HN-H401
FCC ID: 2A5J2-H401

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>



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Test Result Certification	
Applicant:	Shenzhen hnlife lighting technology co., LTD
Address:	6rd flr, 4th bld, E area of xinyongfeng factory, shilong RD, shuitian, shiyan, Bao'an, shenzhen, Guangdong
Manufacturer:	Shenzhen hnlife lighting technology co., LTD
Address:	6rd flr, 4th bld, E area of xinyongfeng factory, shilong RD, shuitian, shiyan, Bao'an, shenzhen, Guangdong
Product description	
Product name:	IPSTUBE Nixie Tube
Trademark:	IPSTUBE
Model name:	HN-H401
Series Model:	N/A
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2023-10-13 to 2023-11-08
Test result:	Pass

Test Engineer :

Letter Lan.

(Letter Lan)

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

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

BLE:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm²

Antenna Type: PCB Antenna

Antenna gain: 2 dBi

R=20cm

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

antenna gain Numeric= $10^{(dBi/10)}=10^{(2/10)}=1.58$

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-1M	2.29	2±1	3	1.995	2	1.58	0.0006	1
2440		2.15	2±1	3	1.995	2	1.58	0.0006	1
2480		1.65	1±1	2	1.585	2	1.58	0.0005	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	12.92	12±1	13	19.953	1.58	0.00629	1
2437		12.66	12±1	13	19.953	1.58	0.00629	1
2462		11.70	11±1	12	15.849	1.58	0.00500	1
2412	802.11g	11.79	11±1	12	15.849	1.58	0.00500	1
2437		11.47	11±1	12	15.849	1.58	0.00500	1
2462		10.76	10±1	11	12.589	1.58	0.00397	1
2412	802.11n H20	12.00	12±1	13	19.953	1.58	0.00629	1
2437		11.79	11±1	12	15.849	1.58	0.00500	1
2462		11.08	11±1	12	15.849	1.58	0.00500	1
2422	802.11n H40	11.02	11±1	12	15.849	1.58	0.00500	1
2437		10.65	10±1	11	12.589	1.58	0.00397	1
2452		10.59	10±1	11	12.589	1.58	0.00397	1



Conclusion:

The device can transmitter simultaneously.

For the max result: $0.00629+0.0006=0.00635\leq 1$, No SAR is required.

----END OF REPORT----