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

$$E \ (V/m) \ = \ \frac{\sqrt{30 * P * G}}{d} \qquad\qquad \text{Power Density: } Pd \ (W/m^2) \ = \ \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd \ = \ \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Measurement Result

BT：
Operation Frequency: 2402MHz-2480MHz;
Antenna Type: PCB Antenna
Antenna gain: : 3.38dBi
R=20cm

Maximum Single sources

Band	Max Conducted (dBm)	Antenna Gain (dBi)	Separation distance (cm)	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)	Verdict
BLE	2.97	3.38	20	0.000858	1	PASS
EDR	3.26	3.38	20	0.000918	1	PASS

The conclusion should be 0.000918＜1 for Max Power Density, Compliance the RF Exposure requirement.

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E^2, H^2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^{n} \frac{S_i}{MPE_i} \leq 1$$

Maximum Multiple sources

Band	Max Conducted	Antenna	Separation distance (mm)	Evaluation result	Power density Limits	Evaluation result	Power density Limits	Verdict
	(dBm)	Gain (dBi)		/	/	/	/	
BT+WPT	3.26	3.38	20	0.000918	1	0.48251309	1	PASS
	/	/	20	0.785	1.63			

Signature: **Date:**   2023-06-17

Alex

NAME AND TITLE (Please print or type): Alex/Manager

COMPANY (Please print or type): Shenzhen NTEK Testing Technology Co., Ltd./ 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen P.R. China.