

FCC ID: OKU-CAW07015

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)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

11.1 Friis transmission formula: $P_d = \frac{P_{out} * G}{4 * \pi * R^2}$

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 = 3.1416

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.

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

11.2 Measurement Result

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,
802.11n HT40: 2422-2452MHz,

Power density limited: $1\text{mW}/\text{cm}^2$

Antenna Type: FPCB antenna;

WIFI antenna gain: 1dBi

R=20cm

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

WIFI ANT

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
2412	802.11b	39.66	15.983	16±1	17	1.26	0.009942	1
2437	802.11b	40.11	16.033	16±1	17	1.26	0.010054	1
2462	802.11b	37.96	15.793	16±1	17	1.26	0.009515	1
2412	802.11g	18.27	12.618	13±1	14	1.26	0.004580	1
2437	802.11g	20.69	13.158	13±1	14	1.26	0.005186	1
2462	802.11g	27.03	14.318	14±1	15	1.26	0.006776	1
2412	802.11n-HT20	26.35	14.207	14±1	15	1.26	0.006605	1
2437	802.11n-HT20	25.45	14.057	14±1	15	1.26	0.006380	1
2462	802.11n-HT20	28.82	14.597	14±1	15	1.26	0.007224	1
2422	802.11n-HT40	17.54	12.44	13±1	14	1.26	0.004397	1
2437	802.11n-HT40	18.54	12.68	13±1	14	1.26	0.004647	1
2452	802.11n-HT40	20.42	13.10	13±1	14	1.26	0.005119	1

Operation Frequency: BT:2402MHz~2480MHz

Power density limited: $1\text{mW}/\text{cm}^2$

Antenna Type: PCB Antenna

Antenna gain: 1.0dBi,

R=20cm

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

BT ANT

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
2.402	GFSK	0.88	-0.54	0±1	1	1.26	0.000221	1
2.441	GFSK	0.92	-0.36	0±1	1	1.26	0.000231	1
2.480	GFSK	0.96	-0.17	0±1	1	1.26	0.000241	1
2.402	$\pi/4$ -DQPSK	1.25	0.98	1±1	2	1.26	0.000313	1
2.441	$\pi/4$ -DQPSK	1.25	0.98	1±1	2	1.26	0.000313	1
2.480	$\pi/4$ -DQPSK	1.32	1.22	1±1	2	1.26	0.000331	1
2.402	8DPSK	1.32	1.21	1±1	2	1.26	0.000331	1
2.441	8DPSK	1.32	1.21	1±1	2	1.26	0.000331	1
2.480	8DPSK	1.40	1.47	1±1	2	1.26	0.000351	1

CONCLUSION:

Both of Bluetooth and WLAN 2.4GHz can transmit simultaneously, the formula of calculated the MPE is:

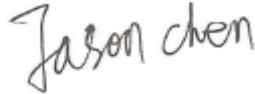
$CPD1 / LPD1 + CPD2 / LPD2 \dots \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is $0.010054/1 + 0.000351/1 = 0.010405$, which is less than "1".

This confirmed that the device comply with MPE limit, No SAR is required.



Signature:

Date: 2016-09-05

NAME AND TITLE (Please print or type): Jason Chen/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.