RF Exposure Compliance Requirement

1. Standard requirement

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $|E|^2$,$|H|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
00-1500	--	--	F/300	6
1500-100000	--	--	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $|E|^2$,$|H|^2$or S (inutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	F/1500	30
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

2. MPE Calculation Method

$E\ (V/m)=(30*P*G)^{0.5}/d$ Power Density: $Pd(W/m^2)=E^2/377$

E=Electric Field (V/m)

P=Peak 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

$Pd= (30*P*G)/(377*d^2)$

From the peak 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.

3. Calculated Result and Limit

WIFI mode

Antenna gain: 3.75dBi

(1)802.11b:

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
2412	2.371	15.06	32.063	0.01513	1	Complies
2442	2.371	15.63	36.559	0.01725	1	Complies
2462	2.371	16.11	40.832	0.01926	1	Complies

(2) 802.11g:

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
2412	2.371	13.71	23.496	0.01108	1	Complies
2442	2.371	14.37	27.353	0.01290	1	Complies
2462	2.371	14.78	30.061	0.01418	1	Complies

(3) 802.11n20 :

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
2412	2.371	13.81	24.044	0.01134	1	Complies
2442	2.371	14.69	29.444	0.01389	1	Complies
2462	2.371	14.45	27.861	0.01314	1	Complies

BT mode

Antenna: 2.12dBi

(4) GSFK:

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
2402	1.629	-9.87	0.103	0.00003	1	Complies
2441	1.629	-9.27	0.118	0.00004	1	Complies
2480	1.629	-8.44	0.143	0.00005	1	Complies

(5) π/4 QPSK:

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
2402	1.629	-10.02	0.100	0.00003	1	Complies
2441	1.629	-9.37	0.116	0.00004	1	Complies
2480	1.629	-8.48	0.142	0.00005	1	Complies

(6) 8-DPSK:

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
2402	1.629	-9.92	0.102	0.00003	1	Complies
2441	1.629	-9.3	0.117	0.00004	1	Complies
2480	1.629	-8.45	0.143	0.00005	1	Complies

As the form of data, calculate the simultaneously transmission of BT and WIFI.

The result:
$$\frac{0.00005}{1} + \frac{0.01926}{1} = 0.01931 < 1$$

Note: The formula of calculate the simultaneously transmission is

$$\frac{BT \ maximum \ data}{limit \ of \ the \ data} + \frac{WIFI \ maximum \ data}{limit \ of \ the \ data} < 1$$