MAXIMUM PERMISSIBLE EXPOSURE

1. Maximum Permissible Exposure

1.1. Applicable Standard

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 levels 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 0.20 m 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/ cm²)	Averaging Time |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
300-1500			F/300	6
1500-100,000			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/ cm²)	Averaging Time |E|², |H|² or S (minutes)
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
1500-100,000			1.0	30

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

1.2 MPE Calculation Method

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

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

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

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

1.3 Calculated Result and Limit

For WLAN function:

Antenna Type: Dipole antenna

Max Conducted Power for IEEE 802.11n MCS0 20MHz: 16.29 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Average Output Power (dBm)	Average Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
5	3.1623	16.2938	42.5970	0.026812	1	Complies

For 2G/3G Function (FCC ID: NMNMC8705):

Frequency range: 824 – 849 MHz

Antenna with 5 dBi gain

Frequency (MHz)	Max. Conducted output Power (dBm)	Max. EIRP power (dBm)	Max. EIRP power (mW)	Power Density (S) (mW/cm^2) including duty cycle of 0.5	Limit of Power Density (S) (mW/cm^2)	Test Result
824	32	37	5012	0.49	0.55	Complies

Frequency range: 1850 - 1910 MHz

Antenna with 3.3 dBi gain

Frequency (MHz)	Max. Conducted output Power (dBm)	Max. EIRP power (dBm)	Max. EIRP power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
1850	29.7	33	1995	0.39	0.55	Complies

CONCLUSION:

Both of the WLAN function and the 2G/3G function can transmit simultaneously, the formaula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + … etc < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst case situation is 0.026812 / 1 + 0.49 / 0.55 = 0.917, which is less than '1'. This is to confirm that the device complies with FCC 1.1310 MPE limit.