

RF Exposure Requirement

1.Limits

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 (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	-	-	F/300	6
1500-100,000	-	-	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	-	-	F/1500	6
1500-100,000	-	-	1	30

F= Frequency in MHz

Formula

Transmission formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, $1 mW/cm^2$. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 23°C and 42% RH.

3. Test Result of RF Exposure Evaluation

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
1	2401	4.28	2.68
40	2440	2.33	1.71
80	2480	-3.42	0.45

4. MPE Calculation

The Max Conducted Peak Output Power is 2.68mW in lowest channel
The Antenna Gain is -0.83dBi.

For FCC:

According to the formula $P_d = (P_{out} * G) / (4 * \pi * r^2)$

$$((2.68 * (-0.83)) / (4 * 3.14 * 0.25)) = -0.708$$

Frequency Band(MHz)	Maximum RF Power(mW)	Power Density at R = 0.5cm(mW/cm^2)
2401-2480	2.68	-0.708

Note:

The power density P_d (4th column) at a distance of 0.5 cm calculated from the transmission formula is far below the limit of $1 mW/cm^2$.