

4. 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 (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

4.1. Friis Formula

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

Where

P_d = power density in mW/cm²

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/cm². 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.

4.2. EUT Operation condition

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

4.3. Test Result of RF Exposure Evaluation

Product : WLAN PCMCIA CARD
 Test Item : RF Exposure Evaluation Data
 Test Site : No.1 OATS
 Test Mode : Normal Operation

4.3.1 Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.6dBi or 1.45in linear scale.

4.3.2 Output Power Into Antenna & RF Exposure Evaluation Distance

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum Allowable Distance ® From Skin(cm)
1 (1Mbps)	2412	11.83	0.99
1 (11Mbps)	2412	10.81	0.88
6 (1Mbps)	2436	12.82	1.10
6 (11Mbps)	2436	12.16	1.02
11 (1Mbps)	2461	12.90	1.11
11 (11Mbps)	2461	12.87	1.11

The distance r (4th column) calculated from the Friis transmission formula is far shorter than 2.5 cm separation requirement. So, RF exposure limit warning or SAR test are not required.