APPENDIX D – Maximum Permissible Exposure

RF Exposure Limit

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the Environmental 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)	Averaging Time (Minutes)
(A) Limits for occupational / Contral Exposure				
30 - 300	61.4	0.163	1	6
300 - 1500	…	…	F/300	6
1500 - 100000	…	…	5	6
(B) Limits for General Population / Uncontrolled Exposure				
30 - 300	27.5	0.073	0.2	30
300 - 1500	…	…	F/1500	30
1500 - 100000	…	…	1	30

F = Frequency (MHz)

Fries formula

Fries transmission formula : Pd = (Pout * G) / (4 * π* r²)

r = √((Pout * G) / 4 * π* Pd))

Where

Pd = Power density in mW/cm²

Pout = Output power to antenna in mW

G = Gain of antenna in linear scale

π= 3.1416

r = Distance between observation point center of the radiator in cm

Pd 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 Maximum distance r where the MPE limit is reached and Power density at prediction frequency.

Test Result :

The maximum antenna gain is **2.9 dBi**.

Maximum conducted output power at antenna input terminal:	9.60	(dBm)
Maximum conducted output power at antenna input terminal:	9.12	(mW)
Antenna gain(typical):	2.90	(dBi)
Maximum antenna gain:	1.95	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2440	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)

Maximum allowable antenna gain:	26.40	(dBi)
Maximum Distance:	1.19	(cm)

Power density at prediction frequency :   ***0.004***   ***(mW/cm^2)***

Test result: PASS

Note(s)

The nominal TX output power level declared by manufacturer is 6 dBm to 9.6 dBm.

The MPE was calculated with maximum nominal TX output power 9.6 dBm.