

## 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	Electric Field	Magnetic Field	<b>Power Density</b>	Averaging Time				
Range(MHz)	Strength(V/m)	Strength(A/m)	(mW/cm <sup>2</sup> )	(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 \*  $\pi$ \*  $r^2$ )

 $r = \sqrt{((Pout * G) / 4 * \pi * Pd))}$ 

Where

Pd = Power density in mW/cm²

Pout = Output power to antenna in mW

G = Gain of antenna in linear scale

 $\pi$ = 3.1416

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

Pd is the limit of MPE, <u>1 mW/cm²</u>. 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.





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### **Test Result:**

The maximum antenna gain is 0 dBi or 1(Numeric) for GSM 850 band.

		Test result:	PASS	
	Power density at pr	<u>0.013987</u>	(mW/cm^2)	
IVIPE IIIIII IOI	uncontrolled exposure a	t prediction frequency:	1	(IIIVV/CITY2)
MDE limit for	uncontrolled evacure a		(mW/cm^2)	
		Prediction frequency:		(MHz)
		Prediction distance:		(cm)
	M	laximum antenna gain:	1.00	(numeric)
		Antenna gain(peak):	0.00	(dBi)
Maximu	m peak output power at a	70.31	(mW)	
Maximu	m peak output power at a	18.47	(dBm)	

The maximum antenna gain is 0 dBi or 1(Numeric) for GSM 1900 band.

Maximum peak output power at antenna input terminal:				14.66	(dBm)
Maximum peak ou	29.24	(mW)			
		Antenna gain(peak):			(dBi)
	Max	Maximum antenna gain:  Prediction distance:			(numeric)
					(cm)
	F	Prediction frequency:			(MHz)
MPE limit for uncontrol	1	(mW/cm^2)			
<u>Powe</u>	Power density at prediction frequency:			<u>0.005817</u>	(mW/cm^2)
		Test result:			