

FCC ID: 2AE4O-KSK201

MPE calculation

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
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300-1500	--	--	F/1500	6
1500-100000	--	--	1	30

11.1 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 = Numeric gain of the antenna relative to isotropic antenna

π =3.1416

R = distance between observation point and center of the radiator in cm(20cm)

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

mW=10^(dBm/10)

11.2 Measurement Result

Operation Frequency: 2412- 2462MHz

Antenna 1 Gain =1dBi, Antenna 2 Gain =1dBi ,MIMO mode: Directional gain
= 10log(antenna 1 + antenna 2) dbi =4.01dbi

	Frequency	Antenna port	Maximum Conducted Output Power(PK)	Maximum Conducted Output Power(PK)	Total Conducted Output Power(PK)	Total Conducted Output Power(PK)	LIMIT
	(MHz)		(dBm)	(mW)	(mW)	(dBm)	dBm
802.11b	2412	Ant.1	14.58	28.71	N/A	N/A	30
		Ant.2	15.21	33.19			
	2437	Ant.1	14.75	29.85	N/A	N/A	30
		Ant.2	14.45	27.86			
	2462	Ant.1	14.68	29.38	N/A	N/A	30
		Ant.2	14.49	25.41			
802.11g	2412	Ant.1	14.53	28.38	N/A	N/A	30
		Ant.2	14.48	28.05			
	2437	Ant.1	13.69	23.39	N/A	N/A	30
		Ant.2	13.37	21.73			
	2462	Ant.1	13.35	21.63	N/A	N/A	30
		Ant.2	13.05	20.18			
802.11n20	2412	Ant.1	11.35	13.65	27.71	14.43	30
		Ant.2	11.48	14.06			
	2437	Ant.1	11.39	13.77	27.64	14.42	30
		Ant.2	11.42	13.87			
	2462	Ant.1	11.65	14.62	28.27	14.51	30
		Ant.2	11.35	13.65			
802.11n40	2422	Ant.1	10.76	11.91	23.37	13.69	30
		Ant.2	10.59	11.46			
	2437	Ant.1	10.62	11.53	22.70	13.56	30
		Ant.2	10.48	11.17			
	2452	Ant.1	10.71	11.78	23.13	13.64	30
		Ant.2	10.55	11.35			

max possible output power (PK,conducted): 15 ± 1 dbm

Pout=16dBm=39.81mW

Antenna 1 Gain =1dBi, Antenna 2 Gain =1dBi ,MIMO mode: Directional gain = 10log(antenna 1 + antenna 2) dbi =4.01dBi, numeric gain result =2.52=G R=20cm

$P_d = (P_{out} * G) / (4 * \pi * R^2) = 0.019968$ (mW/cm²)

Conclusion:

For the max result : 0.019968 (≤ 3.0 for 1g SAR, No SAR is required.