

FCC ID:WA5WS3800

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)

KDB447498 D01 General RF Exposure Guidance v06
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: 915MHz

Antenna Type: FPC Antenna

Antenna gain: 0.1dBi,

R=20cm

$mW=10^{(dBm/10)}$

Transmit power

Frequency (MHz)	EIRP power (dBuV/m)	EIRP power (dBm)	EIRP power (mW)
915	92.98	-2.28	0.5916

$EIRP=E-104.8+20\log(D)$

Maximum Permissible Exposure:

Channel Freq. (MHz)	modulation	EIRP power (dBm)	EIRP power (mW)	Tune-up power (dBm)	Max tune-up power (dBm)	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
915	FSK	-2.28	0.5916	-2±1	-1	0.000158	0.61

2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

WIFI 802.11n HT40:2422-2452MHz

Power density limited: 1mW/ cm²

Antenna Type: PCB antenna

Antenna gain: 1.5dBi;

R=20cm

$mW=10^{(dBm/10)}$

antenna gain Numeric= $10^{(dBi/10)}=10^{(1.5/10)}=1.41$

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm2)	Power density (mW/cm2)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	12	12±1	13	19.953	1.50	1.41	0.0056	1
2437		11.84	12±1	13	19.953	1.50	1.41	0.0056	1
2462		11.2	12±1	13	19.953	1.50	1.41	0.0056	1
2412	802.11g	12.05	11.5±1	12.5	17.783	1.50	1.41	0.0050	1
2437		12.41	11.5±1	12.5	17.783	1.50	1.41	0.0050	1
2462		10.85	11.5±1	12.5	17.783	1.50	1.41	0.0050	1
2412	802.11n H20	11.22	10.5±1	11.5	14.125	1.50	1.41	0.0040	1
2437		11.04	10.5±1	11.5	14.125	1.50	1.41	0.0040	1
2462		9.85	10.5±1	11.5	14.125	1.50	1.41	0.0040	1
2422	802.11n(H T40)	10.08	10±1	11	12.589	1.50	1.41	0.0035	1
2437		10.64	10±1	11	12.589	1.50	1.41	0.0035	1
2452		9.91	10±1	11	12.589	1.50	1.41	0.0035	1

Note: WIFI 2.4G and 915MHz cannot be transmitted at the same time.

Conclusion:

For the max result : $0.0056 \leq 0.61$ for 1g SAR, No SAR is required.



Signature:

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