

FCC ID : VMIPRO4KVDB

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
(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

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.

RF Exposure Information: The radiated output power of this device meets the limits of FCC/IC radio frequency exposure limits. This device should be operated with a minimum separation distance of 20cm (8 inches) between the equipment and a person's body.

11.2 Measurement Result

WIFI2.4G

Antenna gain: 2.57 dBi

Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
22.65	22 to 23	23	1.81	0.07173	1

433.92MHz

Antenna gain: -9.14 dBi

Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
-8.32	0	0	0.12	0.00002	1

Note:

$$EIRP = E_{Meas} + 20 \log(d_{Meas}) - 104.7$$

where

$EIRP$ is the equivalent isotropically radiated power, in dBm
 E_{Meas} is the field strength of the emission at the measurement distance, in dBμV/m
 d_{Meas} is the measurement distance, in m

$$EIRP = P_{Cond} - G_{EUT}$$

where

$EIRP$ is the equivalent isotropically radiated power, in dBm
 P_{Cond} is the measured power at feedpoint of the EUT antenna, in dBm
 G_{EUT} is the gain of the EUT radiating element (antenna), in dBi

WIFI and 433.92MHz support for simultaneous delivery
MAX RF EXPOSURE EVALUATION

WIFI2.4G (mW/cm ²)	433.92MHz (mW/cm ²)	Summation of Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
0.07173	0.00002	0.07175	1