

# FCC ID : 2AVDC-XOC01B2433

## 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 <sup>2</sup> )	Average Time
<b>(A) Limits for Occupational/Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100000	--	--	5	6
<b>(B) Limits for General Population/Uncontrol Exposures</b>				
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/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

$\pi$  = 3.1416

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

Pd the limit of MPE,  $1\text{mW}/\text{cm}^2$ , If we know the maximum gain of the nd 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. the 433 MHz does not effect the overall RF Exposure and there was no need to evaluate for these bands.

## 11.2 Measurement Result

Wifi 2.4G--

Antenna gain: 2.75 dBi

modulation	Channel Freq. (MHz)	Max. Measured power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )
802.11b	2462	10.12	10 to 12	12	1.884	0.0059	1
802.11g	2462	7.81	7 to 9	9	1.884	0.0030	1
802.11n	2452	8.68	8 to 10	10	1.884	0.0037	1

433MHz

modulation	Channel Freq. (MHz)	Max. Measured power (dBuV/m)	Max. EIRP (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Evaluation result (mW/cm2 )	Power density Limits (mW/cm2 )
ASK	433.97	88.31	-6.92	-7 to -5	-5	0.000063	1

Note:  $EIRP[dBm] = E[dB \mu V/m] + 20 \log(d[meters]) - 104.77$

**Simultaneous Transmission:**

Mode	$\Sigma$ max ratios	Limit	Results
WIFI 2.4G+433MHz	0.005963	1.0	PASS