

## FCC ID : 2ACWIWA43UF

### 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 20cm

$P_d$  the limit of MPE, 1mW/cm<sup>2</sup>. 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.

#### 11.2 Measurement Result

WIFI 5G antenna A:

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted 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> )
5180	11a	34.36	15.36	14dBm to 16dBm	16	4.48	0.03548	<1
5220	11a	37.58	15.75	14dBm to 16dBm	16	4.48	0.03548	<1
5240	11a	34.83	15.42	14dBm to 16dBm	16	4.48	0.03548	<1
5180	11n(VHT20)	32.14	15.07	14dBm to 16dBm	16	4.48	0.03548	<1
5220	11n(VHT20)	31.26	14.95	14dBm to 16dBm	16	4.48	0.03548	<1
5240	11n(VHT20)	30.62	14.86	14dBm to 16dBm	16	4.48	0.03548	<1
5180	11ac(VHT20)	32.51	15.12	14dBm to 16dBm	16	4.48	0.03548	<1
5220	11ac(VHT20)	31.48	14.98	14dBm to 16dBm	16	4.48	0.03548	<1
5240	11ac(VHT20)	32.21	15.08	14dBm to 16dBm	16	4.48	0.03548	<1

5190	11n(VHT40)	21.13	13.25	13dBm to 15dBm	15	4.48	0.03548	<1
5230	11n(VHT40)	23.17	13.65	13dBm to 15dBm	15	4.48	0.03548	<1
5190	11ac(VHT40)	24.27	13.85	13dBm to 15dBm	15	4.48	0.03548	<1
5230	11ac(VHT40)	27.42	14.38	13dBm to 15dBm	15	4.48	0.03548	<1
5210	11ac(VHT80)	23.33	13.68	13dBm to 15dBm	15	4.48	0.03548	<1

WIFI 5G antenna B:

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2 )	Power density Limits (mW/cm2 )
5180	11a		15.24	14dBm to 16dBm	16	4.48	0.03548	<1
5220	11a		15.34	14dBm to 16dBm	16	4.48	0.03548	<1
5240	11a		15.40	14dBm to 16dBm	16	4.48	0.03548	<1
5180	11n(VHT20)		15.22	14dBm to 16dBm	16	4.48	0.03548	<1
5220	11n(VHT20)		15.14	14dBm to 16dBm	16	4.48	0.03548	<1
5240	11n(VHT20)		14.99	14dBm to 16dBm	16	4.48	0.03548	<1
5180	11ac(VHT20)		15.05	14dBm to 16dBm	16	4.48	0.03548	<1
5220	11ac(VHT20)		14.85	14dBm to 16dBm	16	4.48	0.03548	<1
5240	11ac(VHT20)		15.18	14dBm to 16dBm	16	4.48	0.03548	<1
5190	11n(VHT40)		13.48	13dBm to 15dBm	15	4.48	0.03548	<1
5230	11n(VHT40)		13.57	13dBm to 15dBm	15	4.48	0.03548	<1
5190	11ac(VHT40)		14.35	13dBm to 15dBm	15	4.48	0.03548	<1
5230	11ac(VHT40)		13.29	13dBm to 15dBm	15	4.48	0.03548	<1
5210	11ac(VHT80)		13.42	13dBm to 15dBm	15	4.48	0.03548	<1

WIFI 5G antenna A+B:

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2 )	Power density Limits (mW/cm2 )
5180	11n(VHT20)	65.46	18.16	17dBm to 19dBm	19	9.52	0.15044	<1
5200	11n(VHT20)	63.97	18.06	17dBm to 19dBm	19	9.52	0.15044	<1
5240	11n(VHT20)	62.23	17.94	17dBm to 19dBm	19	9.52	0.15044	<1
5180	11ac(VHT20)	64.57	18.10	17dBm to 19dBm	19	9.52	0.15044	<1
5200	11ac(VHT20)	62.09	17.93	17dBm to 19dBm	19	9.52	0.15044	<1
5240	11ac(VHT20)	65.16	18.14	17dBm to 19dBm	19	9.52	0.15044	<1
5190	11n(VHT40)	43.45	16.38	16dBm to 18dBm	18	9.52	0.11950	<1
5230	11n(VHT40)	45.92	16.62	16dBm to 18dBm	18	9.52	0.11950	<1
5190	11ac(VHT40)	51.52	17.12	16dBm to 18dBm	18	9.52	0.11950	<1
5230	11ac(VHT40)	48.75	16.88	16dBm to 18dBm	18	9.52	0.11950	<1
5210	11ac(VHT80)	45.29	16.56	16dBm to 18dBm	18	9.52	0.11950	<1

WIFI 2.4G antenna A:

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2 )	Power density Limits (mW/cm2 )
2.412	11b	64.12	18.07	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11b	77.98	18.92	17dBm to 19dBm	19	4.48	0.07080	<1
2.462	11b	69.18	18.40	17dBm to 19dBm	19	4.48	0.07080	<1
2.412	11g	69.18	18.40	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11g	66.37	18.22	17dBm to 19dBm	19	4.48	0.07080	<1
2.462	11g	76.38	18.83	17dBm to 19dBm	19	4.48	0.07080	<1
2.412	11n HT20	62.52	17.96	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11n HT20	76.56	18.84	17dBm to 19dBm	19	4.48	0.07080	<1
2.462	11n HT20	71.12	18.52	17dBm to 19dBm	19	4.48	0.07080	<1
2.422	11n HT40	57.15	17.57	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11n HT40	70.96	18.51	17dBm to 19dBm	19	4.48	0.07080	<1
2.452	11n HT40	71.94	18.57	17dBm to 19dBm	19	4.48	0.07080	<1

WIFI antenna B:

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2 )
2.412	11b	64.57	18.10	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11b	78.70	18.96	17dBm to 19dBm	19	4.48	0.07080	<1
2.462	11b	70.47	18.48	17dBm to 19dBm	19	4.48	0.07080	<1
2.412	11g	70.47	18.48	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11g	65.31	18.15	17dBm to 19dBm	19	4.48	0.07080	<1
2.462	11g	74.47	18.72	17dBm to 19dBm	19	4.48	0.07080	<1
2.412	11n HT20	61.80	17.91	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11n HT20	75.34	18.77	17dBm to 19dBm	19	4.48	0.07080	<1
2.462	11n HT20	70.47	18.48	17dBm to 19dBm	19	4.48	0.07080	<1
2.422	11n HT40	56.23	17.50	17dBm to 19dBm	19	4.48	0.07080	<1
2.437	11n HT40	69.34	18.41	17dBm to 19dBm	19	4.48	0.07080	<1
2.452	11n HT40	71.12	18.52	17dBm to 19dBm	19	4.48	0.07080	<1

WIFI antenna A+B:

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Antenna Gain Numeric	Evaluation result (mW/cm2 )	Power density Limits (mW/cm2 )
2.412	11n HT20	124.45	20.95	20dBm to 22dBm	22	9.52	0.30017	<1
2.437	11n HT20	152.05	<b>21.82</b>	20dBm to 22dBm	22	9.52	0.30017	<1
2.462	11n HT20	141.58	21.51	20dBm to 22dBm	22	9.52	0.30017	<1
2.422	11n HT40	113.50	20.55	20dBm to 22dBm	22	9.52	0.30017	<1
2.437	11n HT40	140.28	21.47	20dBm to 22dBm	22	9.52	0.30017	<1
2.452	11n HT40	143.22	21.56	20dBm to 22dBm	22	9.52	0.30017	<1

WIFI 5G +WIFI 2.4G MAX RF EXPOSURE EVALUATION

Max WIFI 2.4G band Evaluation result (mW/cm2 )	Max WIFI 5G band Evaluation result (mW/cm2 )	Summation of Evaluation result (mW/cm2 )	Power density Limits (mW/cm2 )
0.30017	0.15044	0.45061	<1