

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/cm²)	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: $P_d = \frac{P_{out} \cdot G}{4 \cdot \pi \cdot R^2}$

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 20cm

P_d the limit of MPE, 1mW/cm². 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.

11.2 Measurement Result

WIFI 5G:

modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
11a	50.12	15.31	15dBm to 17dBm	17	50.12	2	0.0199	<1
11n(VHT20)	50.12	15.25	15dBm to 17dBm	17	50.12	2	0.0199	<1
11ac(VHT20)	39.81	14.09	14dBm to 16dBm	16	39.81	2	0.0158	<1
11n(VHT40)	31.62	13.35	13dBm to 15dBm	15	31.62	2	0.0126	<1
11ac(VHT40)	31.62	13.50	13dBm to 15dBm	15	31.62	2	0.0126	<1
11ac(VHT80)	25.12	12.37	12dBm to 14dBm	14	25.12	2	0.0100	<1

WIFI 2.4G:

modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
11b	63.10	17.16	16dBm to 18dBm	18	63.10	2	0.0251	<1
11g	50.12	15.67	15dBm to 17dBm	17	50.12	2	0.0199	<1
11n HT20	31.62	14.24	13dBm to 15dBm	15	31.62	2	0.0126	<1
11n HT40	25.12	13.25	12dBm to 14dBm	14	25.12	2	0.0100	<1

BT DSS

modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
GFSK	5.01	5.59	5dBm to 7dBm	7	5.01	2	0.0020	<1
pi/4-DQPSK	6.31	6.2	6dBm to 8dBm	8	6.31	2	0.0025	<1
8DPSK	6.31	6.61	6dBm to 8dBm	8	6.31	2	0.0025	<1

BT DTS

Channel Freq. (MHz)	modulation	conducted power (mW)	conducted power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Antenna Gain Numeric	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
2402	GFSK	3.16	3.75	3dBm to 5dBm	5	3.16	2	0.0013	<1
2440	GFSK	3.16	3.40	3dBm to 5dBm	5	3.16	2	0.0013	<1
2480	GFSK	2.51	2.14	2dBm to 4dBm	4	2.51	2	0.0010	<1

WIFI 5G +WIFI 2.4G+BT MAX RF EXPOSURE EVALUATION

Max WIFI 2.4G band Evaluation result (mW/cm2)	Max WIFI 5G band Evaluation result (mW/cm2)	Max BT Evaluation result (mW/cm2)	Summation of Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
0.0199	0.0251	0.0025	0.0475	<1