



FCC ID:2BMPV-S90

RF EXPOSURE EVALUATION

Limits

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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

Friis transmission formula: $Pd = (P_{out} * G) / (4 * \pi * r^2)$

Where

Pd = power density in mW/cm², **Pout** = output power to antenna in mW;

G = gain of antenna in linear scale, **Pi** = 3.1416;

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

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



Test Result of RF Exposure Evaluation

2.4G WI-FI (ANT1)								
Mode	Frequency (MHz)	Output power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
802.11 b	2462	15.394	15±1	16	39.81	0.011932	1.0	PASS
802.11 g	2412	14.910	14±1	15	31.62	0.009478	1.0	PASS
802.11 n20	2462	14.956	14±1	15	31.62	0.009477	1.0	PASS
802.11 n40	2452	13.658	13±1	13	19.95	0.005980	1.0	PASS
Note: Antenna Gain = 1.78dBi								

5.8G WI-FI (ANT1)								
Mode	Frequency (MHz)	Output power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
802.11 a	5745	12.042	12±1	13	19.95	0.008885	1.0	PASS
802.11 n20	5745	11.356	11±1	12	15.85	0.007059	1.0	PASS
802.11 n40	5755	11.851	11±1	12	15.85	0.007059	1.0	PASS
802.11ac20	5745	11.612	11±1	12	15.85	0.007059	1.0	PASS
802.11ac40	5755	11.131	11±1	12	15.85	0.007059	1.0	PASS
802.11ac80	5775	10.540	10±1	11	12.59	0.005607	1.0	PASS
Note: Antenna Gain = 3.50dBi								



BT (ANT2)								
Mode	Frequency (MHz)	Output power (dBm)	Tune-up power (dBm)	Max tune-up power (dBm)	Max tune-up power (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
GFSK	2402	2.266	2±1	3	2.00	0.000798	1.0	PASS
π/4-DQPSK	2402	3.142	3±1	4	2.51	0.001002	1.0	PASS
8-DPSK	2402	3.539	3±1	4	2.51	0.001002	1.0	PASS
Note: Antenna Gain = 3.02dBi								

Remark:

The same antenna cannot transmit at the same time, but ANT₁ & ANT₂ can transmit at the same time,
So the worst simultaneous transmitting consideration:

The ratio = ANT₁ MPE_(MAX) / limit + ANT₂ MPE_(MAX) / limit = 0.011932 / 1.0 + 0.001002 / 1.0 = 0.012934 < 1.0.