

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, **P_{out}** = 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

wifi 5G mode: ANT1&ANT2 MIMO

Channel	Output power to antenna (dBm)		Output power to antenna (mW)		Power Density at R=20cm (mW/cm ²)		Limit (mW/cm ²)	Result
	Antenna1	Antenna2	Antenna1	Antenna2	Antenna1	Antenna2		
802.11a	10.986	11.252	12.5487	13.3414	0.00086	0.00092	1.0	PASS
802.11n HT20	11.065	10.647	12.7791	11.6065	0.00088	0.00080	1.0	PASS
802.11n HT40	11.101	10.449	12.8855	11.0892	0.00088	0.00076	1.0	PASS
802.11ac HT20	11.054	10.765	12.7468	11.9261	0.00088	0.00082	1.0	PASS
802.11ac HT40	10.62	10.486	11.5345	11.1841	0.00079	0.00077	1.0	PASS
802.11ac HT80	10.361	10.287	10.8668	10.6832	0.00075	0.00073	1.0	PASS

Remark: antenna gain=-4.62dBi

For Simultaneous transmitting, 1): The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = $0.00088/1 + 0.00082/1 = 0.0017 < 1$ Since the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in the device is ≤ 1.0 , the EUT is considered to satisfy MPE compliance for simultaneous transmission operations.