

RF Exposure Evaluation

1.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: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

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 id 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, and highest channel individually.

2.Test Result of RF Exposure Evaluation

802.11 a SISO

Channel	Output power to antenna (dBm)		Power Density at R=20cm (mW/cm ²)		Limit (mW/cm ²)	Result
	ANT 1	ANT 2	ANT 1	ANT 2		
5180MHz	16.845	16.923	0.017	0.017	1.0	PASS
5240MHz	16.808	16.98	0.017	0.018	1.0	PASS
5745MHz	15.023	15.346	0.011	0.012	1.0	PASS
5825MHz	14.131	16.199	0.009	0.015	1.0	PASS

802.11 n(HT20) MIMO

Channel	Output power to antenna (dBm)		Power Density at R=20cm (mW/cm ²)		Limit (mW/cm ²)	Result
	ANT 1	ANT 2	ANT 1	ANT 2		
5180MHz	14.575	15.055	0.010	0.011	1.0	PASS
5240MHz	14.696	15.112	0.010	0.011	1.0	PASS
5745MHz	13.329	13.882	0.008	0.009	1.0	PASS
5825MHz	12.471	14.672	0.006	0.010	1.0	PASS

Remark: antenna gain=2.5dBi

When the ANT 1 and ANT 2 transmit simultaneously (MIMO Mode), the formula of calculated the exposure is:
 $(MPE1 / Limit) + (MPE2 / Limit) + \dots \leq 1$ Therefore, the calculation of this situation is $(0.010 / 1) + (0.011 / 1) = 0.021$ (Worst case), which is less than the "1" limit.

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure.

3.FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, Human proximity to the antenna shall not be less than 20cm(8 inches) during normal operation. Proposed RF exposure safety information to include in User's Manual.