

FCC ID: 2AJOF-ATOMA5MONITOR

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

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 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, and highest channel individually.

Test Result of RF Exposure Evaluation

IEEE 802.11a

WIFI 5GHz (Antenna-A)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Target power (dBm)	Target power (mW)	Antenna Gain (Numeric)	Power Density Limit (mW/cm ²)	Power Density At 20 cm (mW/cm ²)	Test Results
5180	20	15.649	16±1	50.12	1.78	1	0.0177	Pass
5200	20	15.446	16±1	50.12	1.78	1	0.0177	Pass
5240	20	15.714	16±1	50.12	1.78	1	0.0177	Pass
5745	20	15.023	15±1	39.81	1.78	1	0.0141	Pass
5785	20	14.912	15±1	39.81	1.78	1	0.0141	Pass
5825	20	14.131	15±1	39.81	1.78	1	0.0141	Pass

WIFI 5GHz (Antenna-B)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Target power (dBm)	Target power (mW)	Antenna Gain (Numeric)	Power Density Limit (mW/cm ²)	Power Density At 20 cm (mW/cm ²)	Test Results
5180	20	15.168	15±1	39.81	1.78	1	0.0141	Pass
5200	20	15.306	15±1	39.81	1.78	1	0.0141	Pass
5240	20	15.322	15±1	39.81	1.78	1	0.0141	Pass
5745	20	15.346	16±1	50.12	1.78	1	0.0177	Pass
5785	20	16.303	16±1	50.12	1.78	1	0.0177	Pass
5825	20	16.199	16±1	50.12	1.78	1	0.0177	Pass

IEEE 802.11n(HT20) mode

Antenna gain=2.5dBi, Directional gain=5.51dBi

WIFI 5GHz (Antenna-A)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Target power (dBm)	Target power (mW)	Antenna Gain (Numeric)	Power Density Limit (mW/cm ²)	Power Density At 20 cm (mW/cm ²)	Test Results
5180	20	16.166	16±1	50.12	1.78	1	0.0177	Pass
5200	20	15.78	16±1	50.12	1.78	1	0.0177	Pass
5240	20	15.976	16±1	50.12	1.78	1	0.0177	Pass
5745	20	13.329	13±1	25.12	1.78	1	0.0089	Pass
5785	20	12.818	13±1	25.12	1.78	1	0.0089	Pass
5825	20	12.471	13±1	25.12	1.78	1	0.0089	Pass

WIFI 5GHz (Antenna-B)

Test Frequency (MHz)	Minimum Separation Distance (cm)	Output Power (dBm)	Target power (dBm)	Target power (mW)	Antenna Gain (Numeric)	Power Density Limit (mW/cm ²)	Power Density At 20 cm (mW/cm ²)	Test Results
5180	20	13.131	13±1	25.12	1.78	1	0.0089	Pass
5200	20	13.353	13±1	25.12	1.78	1	0.0089	Pass
5240	20	13.414	13±1	25.12	1.78	1	0.0089	Pass
5745	20	13.882	14±1	31.62	1.78	1	0.0112	Pass
5785	20	14.073	14±1	31.62	1.78	1	0.0112	Pass
5825	20	14.672	14±1	31.62	1.78	1	0.0112	Pass

For the max simultaneous transmission MPE:

IEEE 802.11n(HT20) mode

U-NII Band I

Power Density (mW/cm ²) ANT A	Power Density (mW/cm ²) ANT B	Total	Power Density Limit (mW/cm ²)	Test Results
5GHz	5GHz	0.0266	1.000	Pass
0.0177	0.0089			

U-NII Band 4

Power Density (mW/cm ²) ANT A	Power Density (mW/cm ²) ANT B	Total	Power Density Limit (mW/cm ²)	Test Results
5GHz	5GHz	0.0201	1.000	Pass
0.0089	0.0112			

Note: 1. When the ANT 1 and ANT 2 transmit simultaneously (MIMO Mode), the formula of calculated the exposure is:

$$(MPE1 / Limit) + (MPE2 / Limit) + \dots \text{etc.} \leq 1$$

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