

# FCC ID: 2A08RNI-3431

## RF Exposure Evaluation

### Limits

According to KDB 447498 D01 General RF Exposure Guidance v06 and part 2.1091

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 <sup>2</sup> )	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 <sup>2</sup> )	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 <sup>2</sup> )	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:  $Pd = (Pout * G) / (4 * \pi * r^2)$

Where

**Pd** = power density in mW/cm<sup>2</sup>, **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/cm<sup>2</sup>. 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

	Modulation	Frequency (MHz)	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Wifi2.4g	802.11b	2412	17.54	56.7545	0.0219	1.0	PASS
		2437	17.08	51.0505	0.0197	1.0	PASS
		2462	17.96	62.5173	0.0241	1.0	PASS
	802.11g	2412	16.27	42.3643	0.0164	1.0	PASS
		2437	15.69	37.0681	0.0143	1.0	PASS
		2462	16.73	47.0977	0.0182	1.0	PASS
	802.11n20	2412	16.18	41.4954	0.0160	1.0	PASS
		2437	15.42	34.8337	0.0135	1.0	PASS
		2462	16.43	43.9542	0.0170	1.0	PASS
	802.11 n40	2422	15.84	38.3707	0.0148	1.0	PASS
		2437	15.19	33.0370	0.0128	1.0	PASS
		2452	15.38	34.5144	0.0133	1.0	PASS

	Modulation	Frequency (MHz)	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Wifi5.2g	802.11a20	5180	15.68	36.9828	0.0153	1.0	PASS
		5200	14.87	30.6902	0.0127	1.0	PASS
		5240	14.09	25.6448	0.0106	1.0	PASS
	802.11n20	5180	15.26	33.5738	0.0139	1.0	PASS
		5200	14.64	29.1072	0.0120	1.0	PASS
		5240	13.86	24.3220	0.0100	1.0	PASS
	802.11ac20	5180	15.05	31.9890	0.0132	1.0	PASS
		5200	14.58	28.7078	0.0119	1.0	PASS
		5240	13.77	23.8232	0.0098	1.0	PASS
	802.11n40	5190	12.45	17.5792	0.0073	1.0	PASS
		5240	12.19	16.5577	0.0068	1.0	PASS
	802.11ac40	5190	12.39	17.3380	0.0072	1.0	PASS
		5240	12.08	16.1436	0.0067	1.0	PASS
	802.11ac80	5210	11.65	14.6218	0.0060	1.0	PASS

	Modulation	Frequency (MHz)	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Wifi5.8g	802.11a20	5745	12.84	19.2309	0.0079	1.0	PASS
		5785	11.86	15.3462	0.0063	1.0	PASS
		5825	12.37	17.2584	0.0071	1.0	PASS
	802.11n20	5745	12.53	17.9061	0.0074	1.0	PASS
		5785	11.72	14.8594	0.0061	1.0	PASS
		5825	12.05	16.0325	0.0066	1.0	PASS
	802.11ac20	5745	12.41	17.4181	0.0072	1.0	PASS
		5785	11.69	14.7571	0.0061	1.0	PASS
		5825	12.12	16.2930	0.0067	1.0	PASS
	802.11n40	5755	11.69	14.7571	0.0061	1.0	PASS
		5795	11.22	13.2434	0.0055	1.0	PASS
	802.11ac40	5755	11.42	13.8676	0.0057	1.0	PASS
		5795	11.02	12.6474	0.0052	1.0	PASS
	802.11ac80	5755	10.51	11.2460	0.0046	1.0	PASS

- Remark: 1. WIFI Antenna gain is 2.88 dBi@2.4g, 3.17dBi@5g .  
2. Wifi2.4g, wifi5.2g and wifi5.8g cannot transmit at the same time.

So a SAR test is not required