

## RF Exposure Evaluation

**Limit**

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 1.1310 & 2.1091

Table 1-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

Note: f = frequency in MHz

**Evaluation Method**

Transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>,  $P_{out}$  = output power to antenna in mW,  $G$  = gain of antenna in linear scale;  $P_i = 3.1416$ ,  $R$  = distance between observation point and center of the radiator in cm

**Conducted Power Results**

**WIFI**

Mode	Channel	Frequency (MHz)	Conducted Peak Output Power (dBm)
802.11b	1	2412	12.58
	6	2437	14.63
	11	2462	13.60
802.11b	1	2412	12.08
	6	2437	14.23
	11	2462	13.19
802.11n(HT20)	1	2412	11.98
	6	2437	14.05
	11	2462	13.07

**Manufacturing tolerance**

**WIFI**

<b>802.11b</b>			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	13.5	13.5	13.5
Tolerance ±(dB)	1.5	1.5	1.5
<b>802.11g</b>			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	13.5	13.5	13.5
Tolerance ±(dB)	1.5	1.5	1.5
<b>802.11n20</b>			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	13	13	13
Tolerance ±(dB)	1.5	1.5	1.5

**Evaluation Results**

**WIFI**

Band/Mode	Antenna Distance (cm)	EIRP		Gain of antenna in linear scale	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
		dBm	mW				
802.11b	20	18	63.10	1.78	0.022	1.0	Pass
802.11g	20	18	63.10	1.78	0.022	1.0	Pass
802.11n20	20	17.5	56.23	1.78	0.020	1.0	Pass

*Remark:*

1. Output power including tune up tolerance;
2. The maximum antenna gain is 3.0dBi
3. The exposure safety distance is 20cm.
4.  $EIRP = \text{Conducted Peak Output Power} + \text{Antenna Gain} + \text{Tolerance}$

**Conclusion**

The measurement results comply with the FCC Limit per 47 CFR 1.1310 & 2.1091 for the uncontrolled RF Exposure and MPE compliance per KDB 447498 v06.