

## FCC RF Exposure

**FCC ID:** P53-EMW3080

**Applicant:** Shanghai MXCHIP Information Technology Co., Ltd

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Embedded WiFi module

Refer Standard: FCC Part 2.1091: Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

**FCC MPE Limited:**

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
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

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

2.4G WLAN Antenna Gain information

Antenna Gain: 0dBi

Note 1: According to KDB 662911, all transmit signals are completely uncorrelated with each other. Directional gain =  $G_{ANT}$

**Worst-Case mode Conducted Output Power Results for 2.4G WIFI**

Test mode	Channel	Frequency (MHz)	RF Power(dBm)
802.11b	1	2412	17.01
	6	2437	17.36
	11	2462	17.30
802.11g	1	2412	16.28
	6	2437	16.27
	11	2462	16.32
802.11n20	1	2412	16.25
	6	2437	16.60
	11	2462	16.34
802.11n40	3	2422	16.46
	6	2437	16.66
	9	2452	16.75

**Manufacturing tolerance**

Test mode	Channel	Frequency (MHz)	Max. RF Power(dBm)	Tolerance $\pm$ (dB)
802.11b	1	2412	17.01	$17 \pm 1$
	6	2437	17.36	$17 \pm 1$
	11	2462	17.30	$17 \pm 1$
802.11g	1	2412	16.28	$16 \pm 1$
	6	2437	16.27	$16 \pm 1$
	11	2462	16.32	$16 \pm 1$
802.11n20	1	2412	16.25	$16 \pm 1$
	6	2437	16.60	$16 \pm 1$
	11	2462	16.34	$16 \pm 1$
802.11n40	3	2422	16.46	$16 \pm 1$
	6	2437	16.66	$16 \pm 1$
	9	2452	16.75	$16 \pm 1$

**Calculation results (for 2.4G WIFI): pass**

Mode	Frequency (MHz)	Maximum tune up power(dBm)	RF distance(cm)	Result (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b	2412	18	20	0.013	1.0
	2437	18	20	0.013	
	2462	18	20	0.013	
802.11g	2412	17	20	0.010	
	2437	17	20	0.010	
	2462	17	20	0.010	
802.11n20	2412	17	20	0.010	
	2437	17	20	0.010	
	2462	17	20	0.010	
802.11n40	2422	17	20	0.010	
	2437	17	20	0.010	
	2452	17	20	0.010	

**Simultaneous Transmission Calculation (Worst-case mode)**

Antenna	Mode/Channel	Frequency (MHz)	Calculation results(mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Ratio
WLAN	802.11b/low	2412	0.013	1.0	0.013
WLAN=0.013<1.0, pass					