

RF EXPOSURE EVALUATION

According to FCC 1.1310: 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 Exposure				
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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Measurement Result

SRD

Operation Frequency: GFSK: 905 MHz~926.5MHz

Antenna Type: Inverted-F antenna

Antenna gain: Antenna: -1.07 dBi

R=20cm

OCW=120KHz-jeweller

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
905.00	GFSK	7.575	7±1	8	6.310	-1.07	0.78	0.0010	0.60
915.85	GFSK	6.41	6.5±1	7.5	5.623	-1.07	0.78	0.0009	0.61
926.5	GFSK	5.413	6±1	7	5.012	-1.07	0.78	0.0008	0.62

OCW=140KHz-wings

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
905.00	GFSK	6.874	6.5±1	7.5	5.623	-1.07	0.78	0.0009	0.60
915.85	GFSK	6.762	6.5±1	7.5	5.623	-1.07	0.78	0.0009	0.61
926.5	GFSK	5.831	6±1	7	5.012	-1.07	0.78	0.0008	0.62

2.4G WIFI:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

WIFI 802.11n HT40:2422-2452MHz

Power density limited: $1\text{mW}/\text{cm}^2$

Antenna Type: Inverted-F antenna

Antenna gain: 1.58dBi;

R=20cm

$\text{mW}=10^{(\text{dBm}/10)}$

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(2.1/10)}=1.62$

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2412	802.11b	12.32	12±1	13	19.953	1.58	1.44	0.0057	1
2437		12.91	12±1	13	19.953	1.58	1.44	0.0057	1
2462		12.67	12±1	13	19.953	1.58	1.44	0.0057	1
2412	802.11g	15.19	15±1	16	39.811	1.58	1.44	0.0114	1
2437		15.45	15±1	16	39.811	1.58	1.44	0.0114	1
2462		15.17	15±1	16	39.811	1.58	1.44	0.0114	1
2412	802.11n H20	15.14	15±1	16	39.811	1.58	1.44	0.0114	1
2437		15.18	15±1	16	39.811	1.58	1.44	0.0114	1
2462		15.06	15±1	16	39.811	1.58	1.44	0.0114	1

Conclusion:

For the max result : $0.0010 \leq 0.60$ for Max Power Density, compliance RF exposure..

$0.0114 \leq 1$ for Max Power Density, compliance RF exposure..

Note: This product does not support simultaneous delivery.



Signature:

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