

FCC ID: 2ALAY-SHELLY1PM

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

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

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.14115926

R = distance between observation point and center of the radiator in cm(20cm)

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

WIFI:

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

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

Antenna Type: FPCB Antenna;

WIFI antenna gain: 1.00dBi;

R=20cm

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

antenna gain Numeric= $10^{(\text{dBi}/10)}=10^{(1/10)}=1.26$

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
		Ant A	Ant A	(dBm)	(mW)	Numeric		
2412	802.11b	11.56	11±1	12	15.848932	1.26	0.00397	1
2437		10.48	11±1	12	15.848932	1.26	0.00397	1
2462		10.75	11±1	12	15.848932	1.26	0.00397	1
2412	802.11g	12.02	11.5±1	12.5	17.782794	1.26	0.00446	1
2437		11.82	11.5±1	12.5	17.782794	1.26	0.00446	1
2462		10.59	11.5±1	12.5	17.782794	1.26	0.00446	1
2412	802.11n H20	11.76	11±1	12	15.848932	1.26	0.00397	1
2437		11.61	11±1	12	15.848932	1.26	0.00397	1
2462		10.41	11±1	12	15.848932	1.26	0.00397	1

Conclusion:

For the max result : $0.00446 \leq 1.0$ for for Max Power Density, compliance the RF Exposure.

Signature:

Alex

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NAME AND TITLE (Please print or type): Alex Li/Manager

COMPANY (Please print or type): Shenzhen NTEK Testing Technology Co., Ltd./ 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126P.R. China.