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RF Exposure Evaluation

FCC ID	2A9DGSOLCOUNT1
Applicant	SOL Inc.
Applicant Address	2F, BK Tower, 28, Beobwon-ro 11-gil, Songpa-gu, Seoul, Republic of Korea
Equipment under test	SOL COUNT
Model name	SOL COUNT 1
Frequency Range	802.11 b/g/n(HT20) : 2 412 MHz ~ 2 472 MHz
Modulation technique	DSSS/CCK : 802.11 b, OFDM : 802.11 g, 802.11 n(HT20)
Number of channels	13
Antenna type	Chip Antenna
Antenna gain	3.5 dBi(Peak Gain)
Power source	DC 3.7 V(Battery)

1. Limit

According to FCC part 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 (min)
(A) Limits for Occupational/Contolled 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

2. Friis Formula

Friis transmission formula : $P_d = (P_{out}*G) / (4*pi*r2)$

Where,

P_d = power density in mW/cm^2

P_{out} = 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

P_d the limit of MPE, 1 mW/cm^2. 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 where the MPE limit is reached.

3. Result

Test Mode	Channel	Channel Frequency (MHz)	Maximum Average Output Power (mW)	Antenna Gain (dBi)	Power Density at 20 cm (mw/cm^2)	Limit (mW/cm^2)
802.11 b (1 Mbps)	01	2 412	18.16	3.5	0.008 093	1
	07	2 442	16.29		0.007 259	
	13	2 472	17.74		0.007 906	
802.11 g (6 Mbps)	01	2 412	5.63		0.002 509	
	07	2 442	5.55		0.002 473	
	13	2 472	5.04		0.002 246	
802.11 n(HT20) (MCS0)	01	2 412	5.68		0.002 531	
	07	2 442	5.74		0.002 558	
	13	2 472	5.18		0.002 308	

* Antenna gain(numeric) : 2.24, $Gain_{(num)} = 10^{(Gain(dBi)/10)}$, $2.24 = 10^{(3.5/10)}$