

RF Exposure evaluation

Product Name : Wireless Silent Mouse
FCC ID : 2AK8Q-TKMS008
Test Standard : KDB447498D04 General RF Exposure Guidance v01

According to 447498 D04 Interim General RF Exposure Guidance v01

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Ant gain = 1.8 dBi

MAX output power : 0.19dBm@2402MHz BLE

ERP=0.19+1.8-2.15=-0.16dBm

WORSE CASE:

$10^{0.019}=1.045\text{mW} < 2.715 \text{ mW}$

MAX output power : 0.186dBm@2402MHz BT

ERP=0.186+1.8-2.15=-0.164dBm

WORSE CASE:

$10^{0.0186}=1.044\text{mW} < 2.715 \text{ Mw}$

$\text{eirp} = \text{pt} \times \text{gt} = (\text{EXd})^2/30$

where:

pt = transmitter output power in watts,

gt = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, --- $10^{((\text{dBuV/m})/20)}/10^6$

d = measurement distance in meters (m)---3m

$\text{Sopt} = (\text{EXd})^2/30 \times \text{gt}$

Ant gain = 1.8 dBi (1.514) [-0.05dBd(0.99)]

Field strength = 96.95 dB μ V/m @3m @2403MHz

So $\text{Pt} = \{ [10^{(96.95/20)}/10^6 \times 3]^2 / (30 \times 1.514) \} \times 1000 \text{ mW}$

=1.08mW<22mW

So ERP=1.08x0.99=1.0692<22mW

Then SAR evaluation is not required