

RF Exposure evaluation

According to 447498 D04 Interim General RF Exposure Guidance v01

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

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.

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

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

$$e_{irp} = p_t \times g_t = (E \cdot d)^2 / 30$$

where:

p_t = transmitter output power in watts,

g_t = 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

$$S_{opt} = (E \cdot d)^2 / 30 \times g_t$$

Left Part:

Ant gain = 1.85dBi, so Ant numeric gain= 1.53

Field strength = 93.14dBμV/m @3m@2480MHz (Worst Case)

$$\text{So } P_t = \{ [10^{(93.14/20)} / 10^6 \times 3]^2 / (30 \times 1.53) \} \times 1000 \text{ mW} = 0.404 \text{ mW} < 2.79 \text{ mW}$$

Right Part:

Ant gain = 1.85dBi, so Ant numeric gain= 1.53

Field strength = 93.14dBμV/m @3m@2441MHz (Worst Case)

$$\text{So } P_t = \{ [10^{(93.14/20)} / 10^6 \times 3]^2 / (30 \times 1.53) \} \times 1000 \text{ mW} = 0.404 \text{ mW} < 2.76 \text{ mW}$$

Then SAR evaluation is not required