

RF Exposure evaluation

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

For 2.4G mode

Frequency(MHz)	Field Strength (dBuv/m)	erp(mW)	limit (mW)	min. distance (cm)
2401.00	87.50	0.10	35.13	1.9

According to ANSI C63.10

Where:

EIRP (dBm)=E(dBuv/m)-95.2

ERP = EIRP-2.15dB

E =Field Strength (dBuv/m)

So ERP=87.5-95.2-2.15=-9.85dBm

For Bluetooth mode

Band	Frequency (MHz)	Output power (dBm)	Ant gain(dBi)	EIRP (dBm)	ERP (dBm)	ERP(mw)	Distance (cm)	P _{th} (mW)
BT	2402	11.39	2.1	13.49	11.34	13.61	1.9	35.1
BLE	2402	7.37	2.1	9.47	7.32	5.395	1.9	35.1

ERP = EIRP -2.15 dB

Remark:

BT and 2.4G Simultaneous Transmission:

$$\sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k}$$

BT + 2.4G=(13.61/35.1)+ (0.10/35.13)= 0.39+0.0028=0.3928<1

The max power density is less than MPE exempt limit, so it is compliance.