

RF EXPOSURE EVALUATION METHOD**SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm**

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

| MHz | 5 | 10 | 15 | 20 | 25 | mm |
|------|----|----|-----|-----|-----|---|
| 150 | 39 | 77 | 116 | 155 | 194 | SAR Test Exclusion Threshold (mW) |
| 300 | 27 | 55 | 82 | 110 | 137 | |
| 450 | 22 | 45 | 67 | 89 | 112 | |
| 835 | 16 | 33 | 49 | 66 | 82 | |
| 900 | 16 | 32 | 47 | 63 | 79 | |
| 1500 | 12 | 24 | 37 | 49 | 61 | |
| 1900 | 11 | 22 | 33 | 44 | 54 | |
| 2450 | 10 | 19 | 29 | 38 | 48 | |
| 3600 | 8 | 16 | 24 | 32 | 40 | |
| 5200 | 7 | 13 | 20 | 26 | 33 | |
| 5400 | 6 | 13 | 19 | 26 | 32 | |
| 5800 | 6 | 12 | 19 | 25 | 31 | |

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where $f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Maximum measured transmitter power.

BT The Worst Case

| frequency | Maximum Peak Conducted Output Power | Tune up tolerance | Max Antenna Gain |
|-----------|---|-------------------|------------------|
| GHz | dBm | dBm | dBi |
| 2.402 | 4.712 | 5.5±1 | 0 |
| 2.441 | 5.857 | 5.5±1 | 0 |
| 2.480 | 6.444 | 5.5±1 | 0 |

Remark: The best case gain of the antenna is 0 dBi.

0 dBi logarithmic terms convert to numeric result is nearly 1

(2.402GHz) -6.5 dbm=4.4668mw

(2.441GHz) -6.5 dbm=4.4668mw

(2.480GHz) -6.5 dbm=4.4668mw

BT:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 4.4668/5 \cdot \sqrt{2.402} = 1.3646 \leq 3.0$

$[(\text{mid. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 4.4668/5 \cdot \sqrt{2.441} = 1.3958 \leq 3.0$

$[(\text{min. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 4.4668/5 \cdot \sqrt{2.480} = 1.4069 \leq 3.0$

Threshold at which no SAR required is $1.4069 \leq 3.0$ for 1-g SAR, Separation distance is 5mm.

Conclusion: No SAR is required.

BT 4.0

| frequency | Maximum Peak Conducted Output Power | Tune up tolerance | Max Antenna Gain |
|-----------|---|-------------------|------------------|
| GHz | dBm | dBm | dBi |
| 2.402 | -1.740 | -2±1 | 0 |
| 2.441 | -2.063 | -2±1 | 0 |
| 2.480 | -1.599 | -2±1 | 0 |

Remark: The best case gain of the antenna is 0 dBi.

0 dBi logarithmic terms convert to numeric result is nearly 1

(2.402GHz) -1 dbm=0.7943mw

(2.441GHz) -1dbm=0.7943mw

(2.480GHz) -1 dbm=0.7943mw

BT4.0:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 0.7943/5 \cdot \sqrt{2.402} = 0.2462 \leq 3.0$

$[(\text{mid. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 0.7943/5 \cdot \sqrt{2.441} = 0.2482 \leq 3.0$

$[(\text{min. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = 0.7943/5 \cdot \sqrt{2.480} = 0.2502 \leq 3.0$

Threshold at which no SAR required is $0.2502 \leq 3.0$ for 1-g SAR, Separation distance is 5mm.

Conclusion: No SAR is required.