

RF Exposure evaluation

FCCID: 2AIG6ACE210

According to 447498 D01 General RF Exposure Guidance v05

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

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

where:

pt = transmitter output power in watts,

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

E = electric field strength in V/m, --- $10((\text{dBuV/m})/20)/106$

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

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

RF Exposure evaluation

Copied from the FCC test report: clause 3.10 Maximum Peak Output Power

Test Result:

GFSK(1Mbps)

Test channel	Frequency	Reading level(dBm)	Conducted Output Power (dBm)	Limit
	MHz			dBm
CH 00	2402	2.224	5.024	30
CH 39	2441	2.320	5.120	30
CH 78	2480	2.263	5.063	30

Note: 1 watt=30dBm.

The channel separation > bandwidth.

Cable lose=2.8dB

$\pi/4$ -DQPSK(2Mbps)

Test channel	Frequency	Reading level(dBm)	Conducted Output Power (dBm)	Limit
	MHz			dBm

CH 00	2402	0.787	3.587	20.96
CH 39	2441	0.832	3.632	20.96
CH 78	2480	0.621	3.421	20.96

Note: 0.125 watt=20.96dBm.

The channel separation > 2/3 bandwidth.

Cable lose=2.8dB

8-DPSK (3Mbps

Test channel	Frequency	Reading level(dBm)	Conducted Output Power (dBm)	Limit
	MHz			dBm
CH 00	2402	0.569	3.369	20.96
CH 39	2441	0.554	3.354	20.96
CH 78	2480	0.302	3.102	20.96

Note: 0.125 watt=20.96dBm.

The channel separation > 2/3 bandwidth.

Cable lose=2.8dB

Then we choose GFSK(1Mbps) mode as the worst case of Maximum Peak Output Power:

GFSK(1Mbps)

Test channel	Frequency	Conducted Output Power (dBm)	Antenna gain/ dBi	EIRP/ dBm	EIRP / mW
	MHz				
CH 00	2402	5.024	1.0	6.024	4.003
CH 39	2441	5.120	1.0	6.120	4.093
CH 78	2480	5.063	1.0	6.063	4.039

Note: Cable lose=2.8dB.

EIRP/ dBm= Conducted Max Output Power/ dBm+ Antenna gain /dBi.

Since the distance from the internal BT-antenna to the outer is more than 10mm, we choose the min. test separation distance = 5mm

General RF Exposure:

(4.003 mW)/5.0mm)x $\sqrt{2.402 \text{ GHz}}$ = 1.241

(4.093 mW)/5.0mm)x $\sqrt{2.441 \text{ GHz}}$ = 1.279

(4.039 mW)/5.0mm)x $\sqrt{2.480 \text{ GHz}}$ = 1.272

SAR requirement: S=3.0

General RF Exposure<3

Then SAR evaluation is not required