RF Exposure evaluation

According to 447498 D01 General RF Exposure Guidance v06

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:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

f(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

Worse case is as below:

For BLE:

[2441MHz: -1.299dBm(0.741 mW) output power]

(0.741 mW /5mm) ·[√2.441 (GHz)]= 0.232 <3.0 for 1-g SAR

For EDR:

[2441MHz: -1.274dBm(0.746 mW) output power]

(0.746 mW /5mm) ·[√2.441 (GHz)]= 0.233 <3.0 for 1-g SAR

For 2.4g:

eirp = pt x gt = (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((dBuV/m)/20)/106

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

So pt = (EXd)2/30 x gt

For Worst case Mode: 2455MHz

Field strength =90.82 dBuV/m @3m

Ant gain 1.5dBi; so Ant numeric gain=1.41

So pt= {[10(90.82/20)/106 x3]2/30x1.41} x 1000 mW =0.511 mW

So (0.511mW/5mm) x √2.455 GHz = 0.160 <3

For 917.0MHz-923.5MHz:

eirp = pt x gt = (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((dBuV/m)/20)/106

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

So pt = (EXd)2/30 x gt

For Worst case Mode: 917MHz

Field strength =86.18 dBuV/m @3m

Ant gain 1.5dBi; so Ant numeric gain=1.16

So pt= {[10(86.18/20)/106 x3]2/30x1.16} x 1000 mW =0.144 mW

So (0.144mW/5mm) x √0.917 GHz =0.028 <3

For EDR+BLE+2.4g+917.0MHz-923.5MHz:

0.233+0.232+ 0.16+0.028=0.653 <3

Then SAR evaluation is not required