SAR evaluation

MPE Calculation Method

$E\ (V/m) = (30*P*G)^{0.5}/d$

Power Density: $Pd\ (W/m2) = E^2/377$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$Pd = (30*P*G) / (377*d^2)$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Calculated WIFI Result and Limit(WORSE CASE IS AS BELOW)

Antenna Gain (Numeric)	Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)	Test Result
1.413 (1.5dBi)	651.6284 (28.14dBm)	0.18	1	Compiles

ERP=28.14+1.5-2.15=27.49dBm(561.048mW)

Calculated ZIGBEE 1 Result and Limit(WORSE CASE IS AS BELOW)

Antenna Gain (Numeric)	Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)	Test Result
1.413 (1.5dBi)	123.8797 (20.93dBm)	0.0348	1	Compiles

ERP=20.93+1.5-2.15=20.28dBm(106.66mW)

Calculated ZIGBEE 2 Result and Limit(WORSE CASE IS AS BELOW)

Antenna Gain (Numeric)	Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)	Test Result
1.462 (1.65dBi)	123.0269 (20.90dBm)	0.0358	1	Compiles

ERP=20.90+1.65-2.15=20.4dBm(109.65mW)

$\sum_{i=1}^{a} \frac{P_i}{P_{\mathrm{th},i}}$ =651.6284/3060 +123.8797/3060 +123.0269/3060 =0.2936

$\sum_{j=1}^{b} \frac{ERP_j}{ERP_{\mathrm{th},j}}$ =(561.048+106.66+109.65)/3060 =0.254

$\sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k}$ =（0.18+0.0348+0.0358）/1=0.2506

$$\sum_{i=1}^{a} \frac{P_i}{P_{\mathrm{th},i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{\mathrm{th},j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

0.2936+0.254+0.2506=0.7982<1