

**SAR evaluation**  
**FCC ID: 2A8QF-B5306**

MPE Calculation Method

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

$$\text{Power Density: } P_d \text{ (W/m}^2\text{)} = E^2 / 377$$

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

$$P_d = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

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<br>(Numeric) | Peak Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|---------------------------|------------------------|-----------------------------------------|--------------------------------------------------|-------------|
| 2.29<br>(3.6dBi)          | 8.55<br>(9.32dBm)      | 0.0039                                  | 1                                                | Complies    |

Note:

Antenna Gain: 3.6dBi

Antenna Gain (Numeric): 2.29

$$\text{ERP} = 9.32 + 3.6 - 2.15 = 10.77 \text{ dBm} (12\text{mW} < 3060\text{mW})$$

**Calculated Bluetooth Result and Limit (WORSE CASE IS AS BELOW)**

$$\text{eirp} = p_t \times g_t = (E \cdot d)^2 / 30$$

where:

$p_t$  = transmitter output power in watts,

$g_t$  = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, ---  $10^{((\text{dBuV/m})/20)}/10^6$

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

$$\text{So } p_t = (E \cdot d)^2 / (30 \times g_t)$$

Ant gain = -0.58dBi so Ant numeric gain= 0.875

Field strength = 83.19dBμV/m @3m@2480MHz

So  $P_t = \{ [10^{(83.19/20)} / 10^6 \times 3]^2 / (30 \times 0.875) \} \times 1000 \text{ mW} = 0.071 \text{ mW}$

| Antenna Gain<br>(Numeric) | Peak Output<br>Power (mW) | Power Density<br>(S) (mW/cm <sup>2</sup> ) | Limit of Power<br>Density (S)<br>(mW/cm <sup>2</sup> ) | Test<br>Result |
|---------------------------|---------------------------|--------------------------------------------|--------------------------------------------------------|----------------|
| 0.875 (-0.58dBi)          | 0.071<br>(-11.49dBm)      | 0.00001                                    | 1                                                      | Compiles       |

Note:

Antenna Gain: -0.58dBi

Antenna Gain (Numeric): 0.875

ERP = -11.49 + 0.875 - 2.15 = -12.765 dBm (0.053 mW < 3060 mW)

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} = 8.55/3060 + 0.071/3060 = 0.0028$$

$$\sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} = (12 + 0.053) / 3060 = 0.0039$$

$$\sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} = (0.0039 + 0.00001) / 1 = 0.00391$$

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

$$0.0028 + 0.0039 + 0.00391 = 0.011 < 1$$