

## 5. RF EXPOSURE EVALUATION

### 5.1 Applicable Standard

According to §1.1307(b)(3)(i)

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$  = the separation distance (cm);

According to KDB 447498 D04 Interim General RF Exposure Guidance v01:

#### 2.2.2 Simultaneous Transmission with both SAR-based and MPE-Based Test Exemptions

This case is described in detail in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of Formula (1) is satisfied.

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

## 5.2 Measurement Result

| Operation Modes | Frequency (MHz) | Distance (mm) | P <sub>th</sub> |              | Maximum Conducted Power including Tune-up Tolerance (dBm) | Antenna Gain + Beamforming Gain (dBi) | ERP (dBm) | ERP (mW) | Exemption |
|-----------------|-----------------|---------------|-----------------|--------------|-----------------------------------------------------------|---------------------------------------|-----------|----------|-----------|
|                 |                 |               | (mW)            | (dBm)        |                                                           |                                       |           |          |           |
| WLAN 2.4G       | 2412-2462       | 200           | 3060            | <b>34.86</b> | 26                                                        | 8.0                                   | 31.85     | 1531.09  | Compliant |
| WLAN 5.2G       | 5150-5250       | 200           | 3060            | <b>34.86</b> | 21                                                        | 8.0                                   | 26.85     | 484.17   | Compliant |
| WLAN 5.8G       | 5725-5850       | 200           | 3060            | <b>34.86</b> | 22                                                        | 8.0                                   | 27.85     | 609.54   | Compliant |

WLAN 2.4G and 5G can transmit simultaneously:

$$\sum_{i=1}^a \left( \frac{P_i}{P_{th_i}} \right) + \sum_{j=1}^b \left( \frac{ERP_j}{ERP_{th_j}} \right) + \sum_{k=1}^c \left( \frac{Evaluated_k}{Exposure Limit_k} \right)$$

$$= \text{EPR}_{2.4G} / P_{th-2.4G} + \text{EPR}_{5G} / P_{th-5G}$$

$$= 1531.09 / 3060 + 609.54 / 3060$$

$$= 0.70$$

**Result:** The device compliant the Exemption at 20cm distances.

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