

March 4, 2024

FCC ID: V9X-STD504

To whom it may concern,

We, UL Japan, Inc, hereby declare that 2.4 GHz DSSS low power radio transceiver, model: STD-504 (FCC ID: V9X-STD504) of Circuit Design, Inc. is exempt from RF exposure SAR evaluation because 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 according to the Code of Federal Regulation title 47 section 1.1307(b)(3)(i)(B). This method is used at separation distances d (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive) for single RF sources. 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

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

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

When the minimum separation distance is shorter than 0.5 cm, 0.5 cm is applied.

The SAR evaluation exemption threshold is calculated as below.

P_{th} (mW)	3060
f (GHz)	2.4765
$ERP_{20 \text{ cm}}$ (mW)	3060
d (cm)	20.0

Conducted Power (dBm)	7.85
(mW)	6.10
Antenna Gain (dBi)	3.50
EIRP (dBm)	11.35
ERP (dBm)	9.21
(mW)	8.34

The Maximum time-averaged power or ERP whichever greater is 8.4 mW.
(Rounded up to two decimals place)

*The highest antenna gain was applied.

Thank you for your attention to this matter.



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Manager