

04/15/2024

RF Exposure Analysis – SAR Test Exemption – GCA-3042

FCC ID: TXTGCA3042

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The GCA-3042 is a Bluetooth LE transceiver that operates in the 2402 - 2480 MHz frequency band.

The following FCC Rule Parts are applicable:

Part 2.1093 – Radiofrequency radiation exposure evaluation: portable devices (i)

Part 1.1307(b)(3)(i)(C) - MPE test exemption (ii)

Part 1.1307(b)(3)(i)(B) - SAR test exemption (iii)

For FCC ID: TXTGCA3042

Transmitter frequency range = 2402 MHz to 2480 MHz

Maximum Conducted Power = 3.0 dBm (including tune-up tolerance)

Antenna gain: 2.4 dBi

EIRP = 3.0 dBm + 2.4 dBi = 5.4 dBm

ERP = EIRP - 2.15 dBm = 3.25 dBm (**2.11 mW**)

Minimum separation distance (d) = 5 mm (0.005 m)

Evaluation

From Part 2.1093(c)(1). RF exemption applies if the maximum transmitted power is less than the maximum of the following three criteria:

- i) No more than 1 mw Blanket exemption. $P_{TH} = 0.001 \text{ W}$ – (**GCA-3042 is not compliant**)
- ii) determination of exemption under the MPE-based §1.1307(b)(3)(i)(C), if i) not met
- iii) determination of exemption under the SAR-based §1.1307(b)(3)(i)(B) if both i) and ii) are not met;

Determination of threshold power (P_{TH}) under the MPE-based §1.1307(b)(3)(i)(C) :

This is only applicable at a separation distance greater than $\lambda/2\pi$

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2402 MHz operation - $\lambda/2\pi = 0.02$ m

Separation distance equals 0.005 m therefore this clause is not applicable.

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Determination of threshold power (P_{th}) under §1.1307(b)(3)(i)(B) as the transmitter power threshold for SAR test exemption:

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

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);

For 2402 MHz operation:

For SAR test exemption (iii):

§1.1307(b)(3)(B) :

$$ERP_{20 \text{ cm}} = 3060 \text{ mW}$$

$$\begin{aligned} x &= -\log_{10} (60/(3060 \sqrt{2.412})) \\ &= -\log_{10} (0.0127) = 1.899 \end{aligned}$$

$$\begin{aligned} \text{Threshold Power } P_{th} &= ERP_{20 \text{ cm}} (d/20 \text{ cm})^x \\ &= 3060 (0.5/20)^{1.899} \end{aligned}$$

$$= 2.79 \text{ mW (4.4 dBm)}$$

(P_{th} = device transmitter power ERP or conducted time averaged, whichever is greater)

FCC ID: TXTGCA3042 maximum ERP is 3.25 dBm (2.11 mW)



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Conclusion:

The maximum ERP is below the applicable 2.79 mW threshold for operation at 2402 MHz and, therefore, RF Exposure Evaluation is not required for FCC ID: TXTGCA3042, as it is exempt from evaluation in accordance with §1.1307(b)(3).

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