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RF Exposure Analysis – SAR Test Exemption – GCT-3042
FCC ID: TXTGCT3042

The GCT-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: TXTGCT3042

Transmitter frequency range = 2402 MHz to 2480 MHz

Maximum Conducted Power = 3.0 dBm (including tune-up tolerance) (**2.0 mW**)

Declared Maximum antenna gain: -0.6 dBi

EIRP = 3.0 dBm + (-0.6) dBi = 2.4 dBm

ERP = EIRP-2.15 dBm = 0.25 dBm (1.06 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 W – (**GCT-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 λ/2π

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2402 MHz operation - λ/2π = 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:

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

Where

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

and

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

d = the separation distance (cm);

For 2402 MHz operation:

For SAR test exemption (iii):

§1.1307(b)(3)(B) :

$ERP_{20\ cm}$ = 3060 mW

x = $-\log_{10}$ (60/(3060 √2.412))
= $-\log_{10}$ (0.0127) = 1.899

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

= 2.79 mW (4.4 dBm)

(Pth = device transmitter power ERP or conducted time averaged, whichever is greater)

FCC ID: TXTGCT3042 maximum conducted time averaged power is 3 dBm (2.0 mW)

Conclusion:

The maximum conducted time averaged power is below the applicable 2.79 mW threshold for operation at 2402 MHz and, therefore, RF Exposure Evaluation is not required for FCC ID: TXTGCT3042, as it is exempt from evaluation in accordance with §1.1307(b)(3).

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