

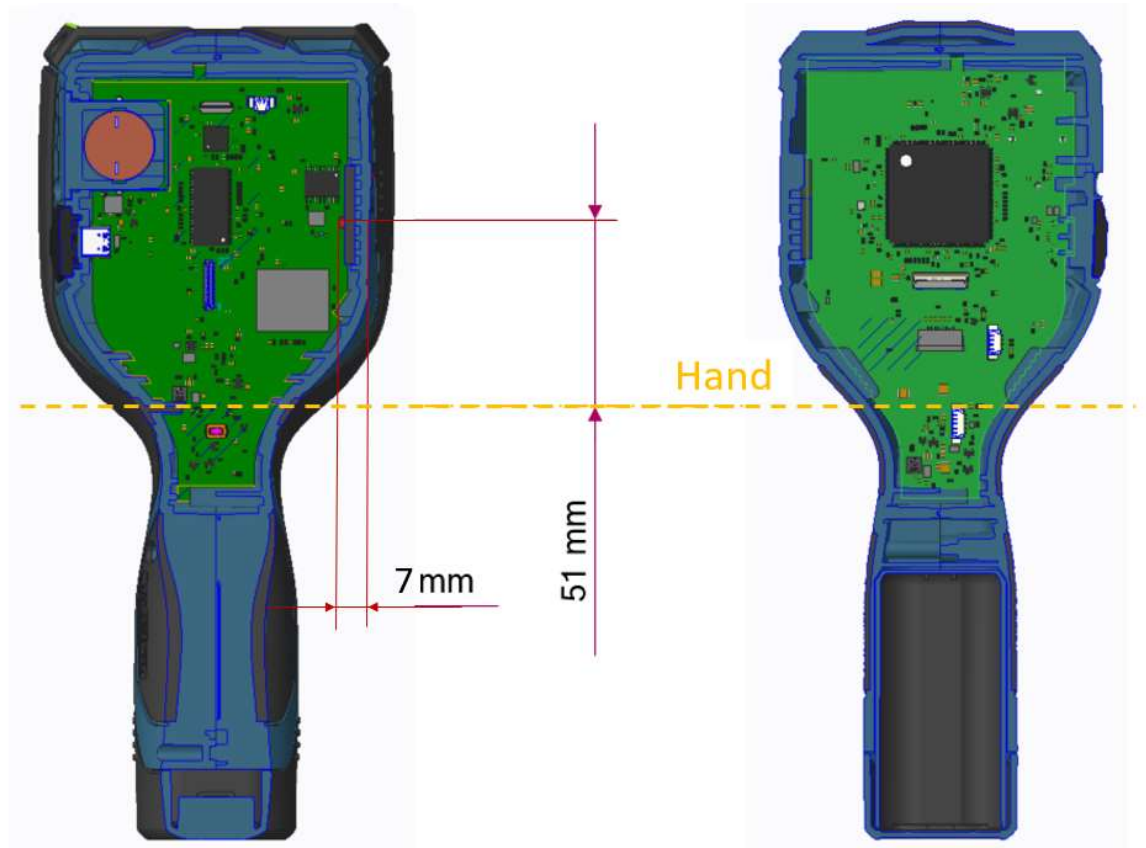
GTC600C RF EXPOSURE CALCULATION FOR NA (FCC AND ISED)

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1 RF Exposure assessment for GTC600C

1.1 Antenna Position



1.2 Product and Radio details

The dimensions of the product GTC600C, shown above, are: 233 mm x 95 mm x 63 mm (length X width X height). GTC600C has been assessed for compliance with RF Exposure requirements in the mobile condition (at more than 20 mm from a person). As seen in section 2.2 of this document, the maximum possible output power, based on the highest rated power including tune-up tolerance, is 31.62 mW (converted from 13.1 dBm measured power + 1.9 dBi Antenna Gain) in the 2.4 GHz band. The WLAN antenna is 51 mm from the closest part of the user's hand. To be conservative, we base our assessment on 50 mm distance from the transmitter.

1.3 RF Output Power

Maximum RF Output Power from WLAN module is 13.1 dBm EIRP, which is within FCC mobile exposure limits. This value is taken from Conducted RF output power measurement.

Conducted Measurement					
FCC §15.247 (b)(3) RSS-247 5.4 (d)					
Modulation	Channel	Frequency	Measured Conducted TX Power	Conducted Tx-Power Limit	Margin
		MHz	dBm	dBm	dB
802.11b, 1 Mbps	CH1	2412	9.8	30.0	-20.2
	CH6	2437	9.4	30.0	-20.6
	CH11	2462	9.5	30.0	-20.5
802.11n, HT20, MCS0	CH1	2412	13.1	30.0	-17.0
	CH6	2437	12.8	30.0	-17.2
	CH11	2462	12.9	30.0	-17.1

CSA Report reference number: 80166757-03 Rev_0_LH_FCC_15.247, Dated: 12.07.2023

1.4 **FCC Mobile Assessment**

WLAN module Power Density calculated: 0.0077 mW/cm², FCC Limit: 1 mW/cm²; Compliance: 0.77% of FCC limit.

Power Density calculation:

$$\text{Power Density} = (P * G) / (4 * \pi * D^2)$$

P = RF Output Power (in Watts)

G = Antenna Gain

D = Distance from Antenna (in meters)

Values used for calculation: P = 0.0204 W; G = 1.9 dBi; D= 0.2 m

Power Density = 0.077 Watts/m² or 0.0077 mW/cm²

1.5 **ISED Mobile Assessment**

For ISED Canada, the RF Exposure assessment exemption threshold is determined by the following formula from <https://ised-isde.canada.ca/> :

At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz

Applying this formula at 2.48 GHz, the limit is calculated as 2.73 Watts.

Maximum possible output power from the device GTC600C is 31.63 mW.

Therefore, this device does not require an RF Exposure test for mobile conditions.

The mobile RF Exposure limit for ISED in the 2.4 GHz band is the same as the FCC (although expressed in W/m² instead of mW/cm²); therefore, the device also meets the ISED Canada mobile RF exposure limits at 0.77% of the limit.

1.6 FCC Portable SAR test Exemption (<50 cm, Handheld)

Based on handheld use of the device. For the FCC, section 4.3 of KDB 447498:

$(\text{output power in mW} / \text{distance in mm}) \times (\sqrt{\text{frequency in GHz}}) \leq 7.5$

$(31.63 / 50) \times \sqrt{2.48} \leq 7.5$ (for extremity use at 50 mm, distance from Antenna to Hand, see the picture above)

0.6326×1.575

$0.996 \leq 7.5$ (for extremity use at 50 mm to the nearest transmitter antenna)

Therefore, SAR testing is not required.

1.7 ISED Portable SAR test exclusion

This assessment is based on handheld use of the device (which is 51 mm from the antenna).

Section 2.5.1 of RSS-102 issue 5 is used as reference below to check the limit for ISED Canada.

The total power of transmitter in the thermal camera is (based on the worst case of output power or EIRP): 13.1 dBm (conducted RF output power) + 1.9 dBi = 15 dBm EIRP = 31.63 mW.

The ISED SAR text exclusion at 50 mm distance from the hand: 309 mW.

Therefore, SAR testing is not required.

2 Reference

2.1 RSS-102 Exemption limit for Routine Evaluation – SAR Evaluation

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW