

From
PT/ECS

Our Reference
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Leinfelden
28 April 2020

Report

Issue V02
Topic RF Exposure assessment for GTC400C
Description Co-location of TI WLAN module and MirX PTM10 Bosch BLE module assessing the exposure to the human body.

1 Module overview

1.1 Bluetooth® Low Energy (BLE) module

Manufacturer	Bosch
FCC ID	TXTPTM10 (Full Modular Approval)
IC ID	909H-PTM10
Operating frequency	2402 MHz to 2480 MHz
Output Power	up to 3.2 mW (5.05 dBm)
Antenna	PCB
Antenna gain	5 dBi

The module has been certified for mobile only conditions.

1.2 WLAN Module

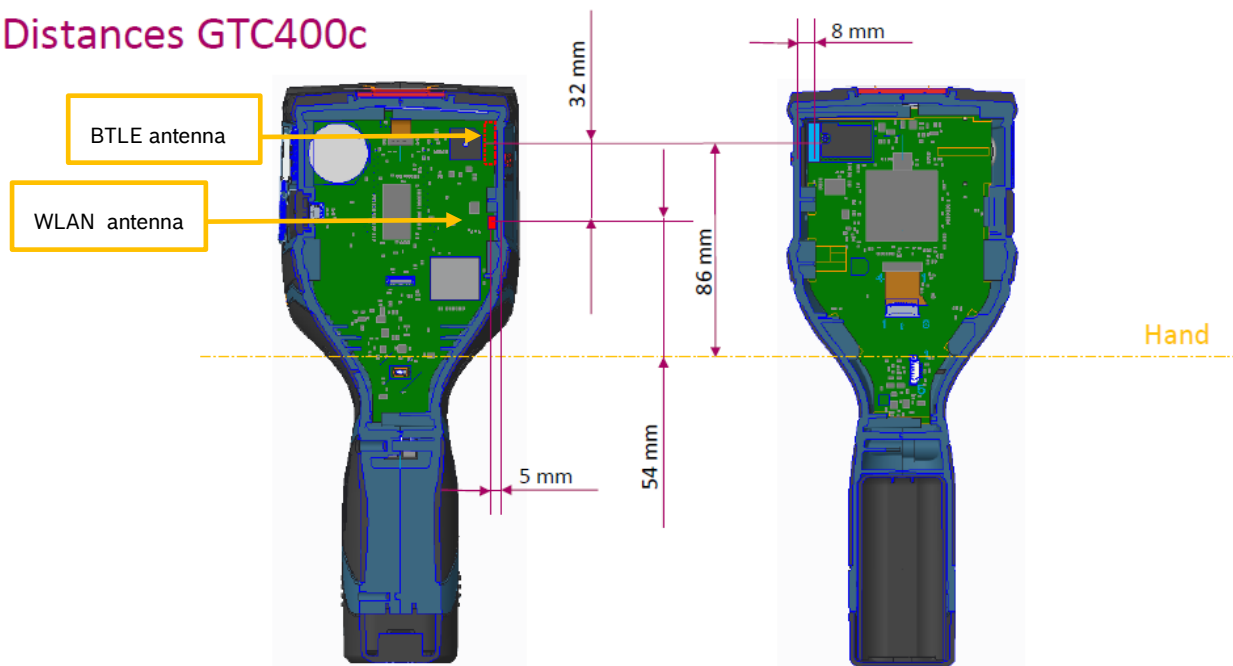
Manufacturer	Texas Instruments
FCC ID	Z64-CC3100MODR1 (2.4 GHz WLAN, Full Modular Approval)
IC ID	451I-CC3100MODR1
Operating frequency	2412 MHz to 2462 MHz
Output Power	up to 29.1 mW (14.64 dBm)
Antenna	Chip, Taiyo Yuden Multilayer RadiEdge (model: AH 316M245001-T)
Antenna gain	1.9 dBi

The module has been certified for mobile only conditions.

2 RF Exposure assessment for GTC400C

2.1 Physical situation – antenna locations

Distances GTC400c



The dimensions of the product GTC400C, shown above, are:
233mm x 95mm x 63 mm (length x width x height)

Each radio module has been assessed for compliance with RF Exposure requirements in the mobile condition (at more than 20 cm from a person), independently.

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 33.1 mW in the 2.4 GHz band.

The BLE antenna is 86 mm from the closest part of the user's hand and the WLAN antenna is 54 mm from the closest part of the user's hand. To be extra conservative, we base our assessment on 50 mm distance for both transmitters.

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2.2 Combined Output power

BLE Power	0.0040 Watts
WLAN Power	0.0291 Watts
Combined Power	0.0331 Watts

The combined power levels are well below the 1 Watt power limit in §15.247 and RSS-247. Therefore, the co-location output power requirements are satisfied.

2.3 FCC Mobile Assessment

Bluetooth module:	0.002 mW/cm ²	Limit: 1 mW/cm ²	Compliance: 0.2% of limit
WLAN module:	0.009 mW/cm ²	Limit: 1 mW/cm ²	Compliance: 0.9% of limit

Combined RF Exposure of Bluetooth and WLAN: 0.2% + 0.9% = 1.1% of the FCC limit

This shows clear compliance with the FCC mobile exposure limits with both transmitters active.

2.4 ISED Mobile Assessment

For ISED Canada, the RF Exposure assessment exemption threshold at 2.4 GHz is 2.68 Watts. Maximum possible combined output power from this device is 0.0331 Watts. 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 1 mW/cm² (10 W/m²). As shown in section 2.3 of this document, the device meets the ISED Canada mobile RF exposure limits at 1.1% of the limit.

2.5 FCC Portable SAR Exemption

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

$(\text{output power in mW} / \text{distance in mm}) \times (\sqrt{\text{frequency in GHz}}) \leq 7.5$
 $(33.1 / 50) \times \sqrt{2.48} \leq 7.5$ (for extremity use at 50 mm)
 0.662×1.575
 $1.043 \leq 7.5$ (for extremity use at 50 mm to the nearest transmitter antenna)

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2.6 *ISED Portable SAR test exclusion*

Based on hand held use of the device. For ISED Canada, section 2.5.1 of RSS-102 issue 5:

The total combined power of transmitters in the thermal camera (based on the worst case of output power or EIRP):

BLE: $(6 \text{ dBm} + 5 \text{ dBi}) = 11 \text{ dBm} = 12.59 \text{ mW}$, EIRP

WLAN: $(14.6 \text{ dBm} + 1.9 \text{ dBi}) = 16.5 \text{ dBm} = 44.7 \text{ mW}$, EIRP

Total combined EIRP: 57.3 mW

The ISED SAR text exclusion at 50 mm distance from the hand: 772.5 mW

Therefore, SAR testing is not required.

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