

# User Manual

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## 1 Introduction

The Trimble Comm Board Tornado is an 802.11a/b/g/n/ac Wi-Fi and Bluetooth module that acts as an AP for use with a long-range wireless scanner. The core chipset is a Qualcomm QCA9378-7.

### 1.1 Structure of this document

The structure of this document is as follows:

- Section 2 describes the devices key features
- Section 3 describes the antenna requirements
- Section 4 describes the connector interface
- Section 5 details the board configuration to use
- Section 6 provides FCC compliance information

## 2 Key features

This section describes the key features of the Trimble Comm board Tornado device.

Key Features	
<b>Manufacturer</b>	Trimble Navigation Limited
<b>Chipset</b>	Qualcomm-Atheros QCA9378-7
<b>Host Interface</b>	USB 2.0
<b>Operating Voltage</b>	5 V
<b>Supported Radios</b>	2.4 GHz and 5 GHz WLAN, Bluetooth
<b>Features</b>	Supports Spatial Multiplexing, LDPC, MRC, and STBC, Transmit Beam Forming
<b>Dimensions</b>	95 mm x 45 mm x 4 mm

Table 1 - Device features

## 3 Antenna

This section describes the antenna requirements for both WLAN and Bluetooth for the Trimble Comm board Tornado device.

Antenna Requirements	
<b>Type</b>	Pulse W3334B0150
<b>Connector</b>	2 x u.FL Antenna connector
<b>Antenna Gain</b>	2.4 GHz – 4 dBi 5 GHz – 5.5 dBi
<b>Antenna Diversity</b>	2 x 2 : 2 for both 2.4 GHz and 5 GHz

Table 2 - Antenna requirements

## 4 Connector Interface

The connector interface for the Trimble Comm Board Tornado is a female 6 pin FFC connector (top contact). The host interface is USB 2.0. Figure 1 shows the connector pinout.

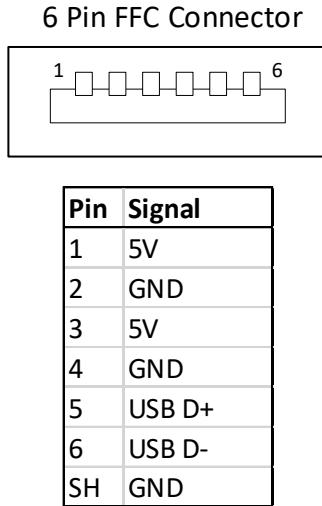


Figure 1 - 6 pin FFC Connector pinout

## 5 Board Configuration

The board configuration file is compliant with both FCC and ETSI regulatory domains. The board configuration is set to the US regulatory domain and this cannot be altered by the end user.

## 6 Compliance Information

### 6.1 FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

### 6.2 FCC Caution

(1) Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must not be collocated or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

(2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

(3) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

(4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### 6.3 RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.

### 6.4 User Information

**Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This radio transmitter Trimble Comm Board Tornado module has been approved by FCC to operate with the Pulse W3334B0150 antenna, with the maximum permissible gain of 4 dBi in the 2.4 GHz band, and 5.5 dBi in the 5 GHz bands. Use of an antenna having a gain greater than the maximum gain specified, are strictly prohibited for use with this device and will void the user's authority to operate the equipment.

The host product incorporating this radio module shall be labelled as follows to be in compliance with FCC regulations:

- “Contains FCC ID: YK5-73350047”
- “This device may not cause harmful interference and must accept any interference received, including interference that may cause undesired operation” - This statement can be in the user manual of the final product in case it is impracticable to place it on the label.

### 6.5 ETSI Adaptivity Declarations of Conformance

The Trimble Comm board Tornado is an LBE device with the following declarations:

- Operates as a Supervising Device that does not make use of note 1 or note 2 of Table 7 EN 301 893 clause 4.2.7.3.2.4.
  - The maximum Channel Occupancy Time (COT) is within 6 ms for Priority class 2.
  - The maximum Channel Occupancy Time (COT) is within 6 ms for Priority class 1.
- Operates as both an Initiating Device and a Responding Device.
- Implements all 4 Priority Classes: 1, 2, 3, and 4
- Conforms to Option 1 of Energy Detection Threshold as described in EN 301 893 clause 4.2.7.3.2.5.
  - Conforms only to IEEE 802.11 2016 clause 17, clause 18, and clause 21.
  - Complies with the Initiating Device Channel Access Mechanism requirements contained in EN 301 893 clause 4.2.7.3.2.6.
  - Complies with the Responding Device Channel Access Mechanism requirements contained in EN 301 893 clause 4.2.7.3.2.7