

2020

# Alltraq UWB LRT Modular Radio Manual

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Device Name: UWB Radio

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## Regulatory and Compliance Information

### FCC Compliance

**FCC Certification number:**

2AAXVLRTNTMOD1

**Manufacturer:**

ABG Tag and Traq, Inc.  
510 E. Memorial Road, Suite B-1  
Oklahoma City, OK 73114  
USA

This device complies with Part 15 rules of FCC Rules and Industry Canada licenses-exempt RSS Standard(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device just accepts any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of a UWB transmitter device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However, there is no guarantee that interference will not occur.

### **NO UNAUTHORIZED MODIFICATIONS 47 CFR §15.21**

**CAUTION:** This equipment may not be modified, altered, or changed in any way without permission from ABG Tag and Traq, Inc. Unauthorized modification may void the equipment authorization from the FCC and will void the Alltraq warranty.

## Department of Communications—Canada

**Certification number:** 11400A-LRTNTMOD1

**PMN:** UWB Radio

### Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte les exigences du Règlement sur le matériel brouilleur du Canada.

This device complies with Class B Limits of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device just accepts any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radio électrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ABG Tag and Traq UWB Module is certified to the requirements of RSS-220 for Ultra-Wideband transmitters pertaining to Radiated Emissions and Peak Emissions.

# Module Operation and Use

## Overview

The primary use of the module is to provide active RFID location capabilities to a battery powered device. The module is intended to be soldered on to a device's circuit board. The modules will not be sold without the accompanying circuit board with controller circuit. The modules are capable of ranging to each other to within 1 foot of accuracy.

The UWB module is a self-regulated device that accepts a 2.8V to 3.6V range. It uses 15mA to 200mA of current to power the module during idle and active times. The module can also be put to sleep requiring less than 5uA of current.

The module requires an external controller to set its configuration and to put it in the different operating modes and to select channels. The primary means of communication with the module is by SPI bus. It also uses interrupt lines to indicate to the external controller when an event has occurred. A pin is also provided to wake the module from sleep mode.

The module uses the DecaWave DW1000 UWB radio. The module is certified to use channel 1 at 3.5GHz center frequency and channel 4 at 4GHz center frequency as defined in the DW1000 UWB radio's datasheet. The Channels with frequencies outside of 3.5GHz and 4GHz center frequencies shall not be used by this module. All communication requirement and register settings are defined in the DW1000 datasheet. Frequency is fixed by manufacturer at 3.5GHz and 4GHz with 500MHz and greater bandwidths. The module's pins are defined in the module's schematic. The RF output of channel 1 is from 3.1 GHz to 3.91 GHz. The RF output of channel 4 is from 3.48 GHz to 4.46 GHz.

The module has an embedded antenna. The antenna cannot be changed with any other antenna.

## Transmitter with External Frequency Selection Controls

These modules are programmed in production only for the 3.5GHz and 4.0 GHz center frequencies. The module can only be programmed using procedures and an external device which is not available to the end user of this equipment. There are no external frequency selection controls on the assembled product.

## Requirements for the Host Device

The host device and all the separately certified modules it contains jointly meet the RF exposure compliance requirements of RSS-102, if applicable.

The host device shall be properly labeled to identify the modules within the host device.

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device; otherwise, the host device will be labeled to display the Industry Canada certification number 11400A-LRTNTMOD1, for the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows: ABG Tag and Traq, Inc. shall provide with each unit of the module either a label such as described above, or an explanation and instructions to the user as to the host device labeling requirements.

The FCC certification label of a module shall be clearly visible at all times when installed in the host device; otherwise, the host device will be labeled to display the FCC identification number for the module, preceded by the words, "Contains FCC ID: 2AAXVLRTNTMOD1. ABG Tag and Traq, Inc. will provide such a label and/or an explanation and instructions to the user as to the host device labeling requirements.

ABG Tag and Traq, Inc. does not sell this module. ABG Tag and Traq, Inc. integrates this module into their own devices and are responsible for labeling of the module, final assemblies and for the compliance of the final assembly.



## Requirements for hand-held UWB System.

This module is primarily hand-held and may operate indoors or outdoors; its operation is limited under the provisions of section **15.519**. The UWB transmitter operates as part of a system in which it sends short duration UWB packets to one or more receivers. The transmitter's cycle of operation is as follows:

- 1) the transmitter's microcontroller begins in a non-transmitting sleep state
- 2) the transmitter transitions to an active state, in which it sends a short UWB packet of fixed duration of 715 microseconds
- 3) the transmitter microcontroller ceases the transmission and returns to a sleep state.

An oscilloscope screen capture of the 715 microsecond packet is shown in the figure below.



Figure 1. Ultra-wideband Packet

Per the 15.519(a)(1) requirement, the UWB transmitter is allowed to operate up to 10 seconds after which it must cease its transmission if it has not received an acknowledgement from the associated receiver. As demonstrated, the UWB transmitter will automatically cease its transmission after only 715 microseconds, meeting the requirement in much less than the allowed 10 seconds.

The use of outdoor mounted antennas, e.g., antennas mounted on the outside of a building or on a telephone pole, or any other outdoors infrastructure is prohibited.

## **Warranty Information**

The Customer shall carry out a thorough inspection of the associated hardware within 14 days of receipt of delivery and provide immediate contact with ABG Tag and Traq, Inc. of any omissions or defective items.

ABG Tag and Traq, Inc. warrants that the equipment delivered shall accord with the Quoted materials and/or specifications but offers no other warranty.