



PLUS Limited Module Tag

Model 2110

User Manual

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Regulatory and Legal Information

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Intended Use

This document examines the PLUS 2110 Modular Tag. This document is intended for PLUS Location Systems internal use only.

FCC Compliance

U.S. Operation: This device complies with Part 15 of the FCC Rules. Operation is subject to the following 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. (3) Operation on board an aircraft or a satellite is prohibited. (4) Devices operating under this section may not be employed for the operation of toys. (5) Except for operation onboard a ship or a terrestrial transportation vehicle, the use of a fixed outdoor infrastructure is prohibited. A fixed infrastructure includes antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole. This outdoor infrastructure prohibition applies to intentional ultra-wideband (UWB) emitters.

Operation in disregard of these conditions is a violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties. Disassembling or modifying the unit will void both FCC compliance and PLUS ® Location Systems warranty provisions.

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Safety Information

Read and follow all instructions before using the **Model 2110 Tag** when it has been incorporated into a host product. The following are typical safety instructions for a PLUS Tag that would apply to a host product using the 2110 Module.

- Do not use the Tag if it has been damaged.
- Do not install in environments that exceed temperature and humidity requirements.
- Do not leave the Tag on a heat source.
- Never open the case on the Tag: There are no user serviceable parts or replaceable parts inside the enclosure.

Revisions to this Document

Version	Comments	Release Date
Rev A	Initial release	05/29/2014
Rev B	Updates in response to FCC request for clarification	8/18/2014

Introduction

The Plus Model 2110 Limited Module is a modular design for integration into a host product consisting of, at a minimum, an enclosure and a 3 VDC battery. It has the following features:

- Runs from a 3 VDC power source (can operate down to 2 volts DC)
- Will transmit a UWB packet at a rate set at time of manufacture. Rate can be set to 1Hz, 6Hz, or 10Hz.
- Meets FCC Section 15.212, rules concerning single limited modular transmitters.
- Certified to comply with FCC Part 15.519

Overview

Background

Tag tracking is accomplished by analyzing time-differences-of-arrival (TDOAs) of tag transmissions. When a tag transmits a packet, PLUS ® Sensors that successfully receive the packet will send out information concerning the tag packet, including a precise timestamp. The difference in the timestamp between sensors gives the TDOA for that sensor pair/tag combination. At least three sensors must hear a tag in order to determine a valid position for that tag.

Model 2110 Limited Modular Tag

The 2110 Limited Modular Tag allows the implementation of a controlled and defined UWB transmitter onto a PWA, provided the specifications in the PLUS documentation with regards to PWB layout, board material, component sources and values, and assembly of the 2110 Tag circuitry are followed.

The 2110 Series Tag is a small transmit only device with an active transmit duty cycle of less than 0.0026%. The Tag consists of a plastic housing, 3V battery, and the 2110 Limited Module (FCC ID ZEH0414). The Module includes one integrated antenna.

The data packets transmitted by the Tag include a tag identification code, status information, and time of arrival data.

As mentioned in the introduction, the data packet rate can be set at the time of manufacture to 1Hz, 6Hz, or 10Hz. This is done by selection of the value of one part and is identified in a table in the schematic.

PLUS Documentation:

The controlling PLUS documentation for the 2110 Limited Module Tag is:

- 300-0214, PWB, 2110 TAG Module
- 200-0254 PWA, 2110 TAG Module

The PWB document controls the layout of the 2110 Tag printed circuit board, hence the antenna and transmitter, and it defines the printed circuit board parameters including board material and thickness.

The PWA document defines the connections of the 2110 Tag board circuitry and the AVL for all the components. The PWA also contains the block diagram for the 2110 Tag.

The controlling documentation is for the exclusive use of PLUS Location Systems USA, LLC, or it's designated Contract Manufacturer (CM) for the production of host products using the Module. As a Limited Module, the Module will not be provided to third parties for integration in host products.

Specifications

Housing Material	Housing design varies to meet end user requirements. Housing material will vary and may include ABS, Polycarbonate, HDPE, Silicone, or Rubber.
Power Source	3V DC (can work down to 2V DC)
Ingress Protection	Dependent on User enclosure design
Compliance	FCC Part 15 15.519 (c) / 15.209 15.519 (d) 15.519 (b) 15.519 (c) 15.519 (e) EU Standard EN 302 500-1 v2.1.1 (2010-10) EN 302 500-2 v2.1.1 (2010-10) FCC ID ZEH0414 RoHS
Temperature	Typical Operating: -20°C to +55°C Typical Storage: -30°C to +60°C
Relative Humidity	Dependent on Host Product, typically up to 95% non-condensing
Model Number	2110

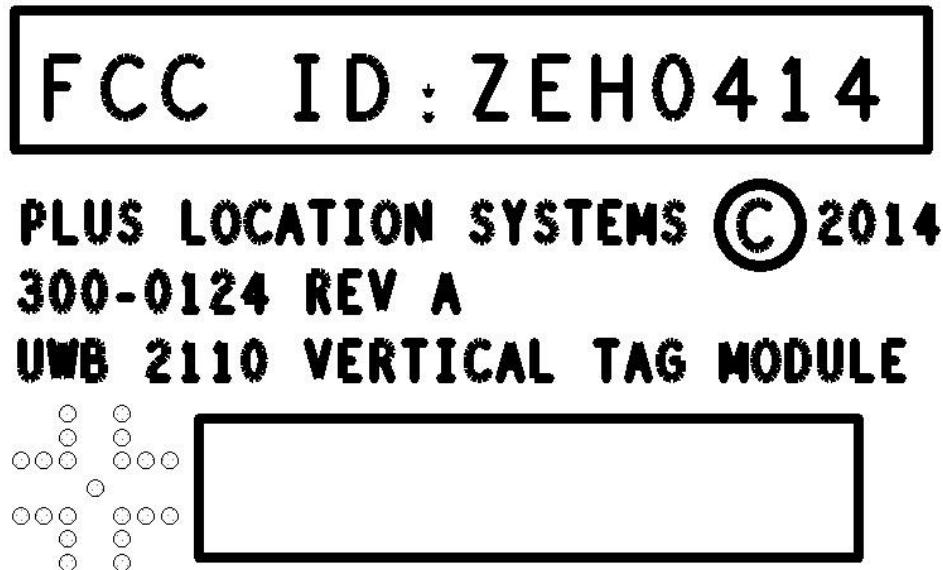
Mounting

Depending on end user requirements, mounting methods will vary.

Identification

Per FCC Section 15.212: The 2110 Tag FCC identification (ID) will be printed via the silkscreen on the bottom side of the board.

Figure 1-1 below shows the FCC ID as it appears on the bottom of the board right above the PLUS copyright and PWB identification:



FOR THE USER IMPLEMENTATION OF THE 2110 TAG:

Per FCC Section 15.212: The FCC identification (ID) information for the 2110 Modular Tag must be visible on the End product. The information must include product model number and the statement "CONTAINS FCC ID ZEH0414". Other information such as a unique serial number is encouraged but is not a requirement. PLUS document 320-0305 provides a template for required information and layout for the End Product ID label.

FCC Section 15.212 Compliance

The PLUS 2110 Tag complies with FCC Section 15.212 rules concerning Limited Single-Modular Transmitters. The requirements of 15.212 and KDB Publication 996369 D01 for Limited Single-Modular Transmitters and additional implementation details are addressed below.

Limitations for Third Parties

As a Limited Single-Modular Transmitter, the integration of the module and qualification of each host device product will be controlled by PLUS Location Systems USA, LLC (PLUS). PLUS will only sell or provide completed host products to third parties.

PLUS will not provide modules to third parties or enable third parties to integrate the modules. Note that a contract manufacturer building products according to PLUS' specifications is considered to be working under the direction of PLUS, not as an independent third party.

Software Control and Software Defined Radios

For clarification, this device is not a Software Defined Radio (SDR). Additionally, no software parameters are accessible or controllable to set power levels or other characteristics of the device that influence compliance.

Host Product Compliance

Any host product equipment functions not associated with the transmitter module (such as unintentional radiator elements) will be independently tested for compliance. Testing of the host product will be performed with the module installed and operational.

Module as a Printed Wiring Assembly (PWA)

The Limited Module is implemented as a physical Printed Wiring Assembly (PWA) with two electrical connections; a ground connection and 3V DC power.

Non-Accessible Module

The Limited Module integrated into the host device will not be accessible or replaceable by end users.

Integration Instructions

PLUS will maintain product assembly documentation for the Limited Module and host products for use by itself and its contract manufacturer. The Limited Module will not be made available to third parties for integration.

End Product ID Recommended Format

The PLUS drawing, 320-0305, that has the recommended format for the label that would include the 2110 FCC ID number, is presented below for information.

