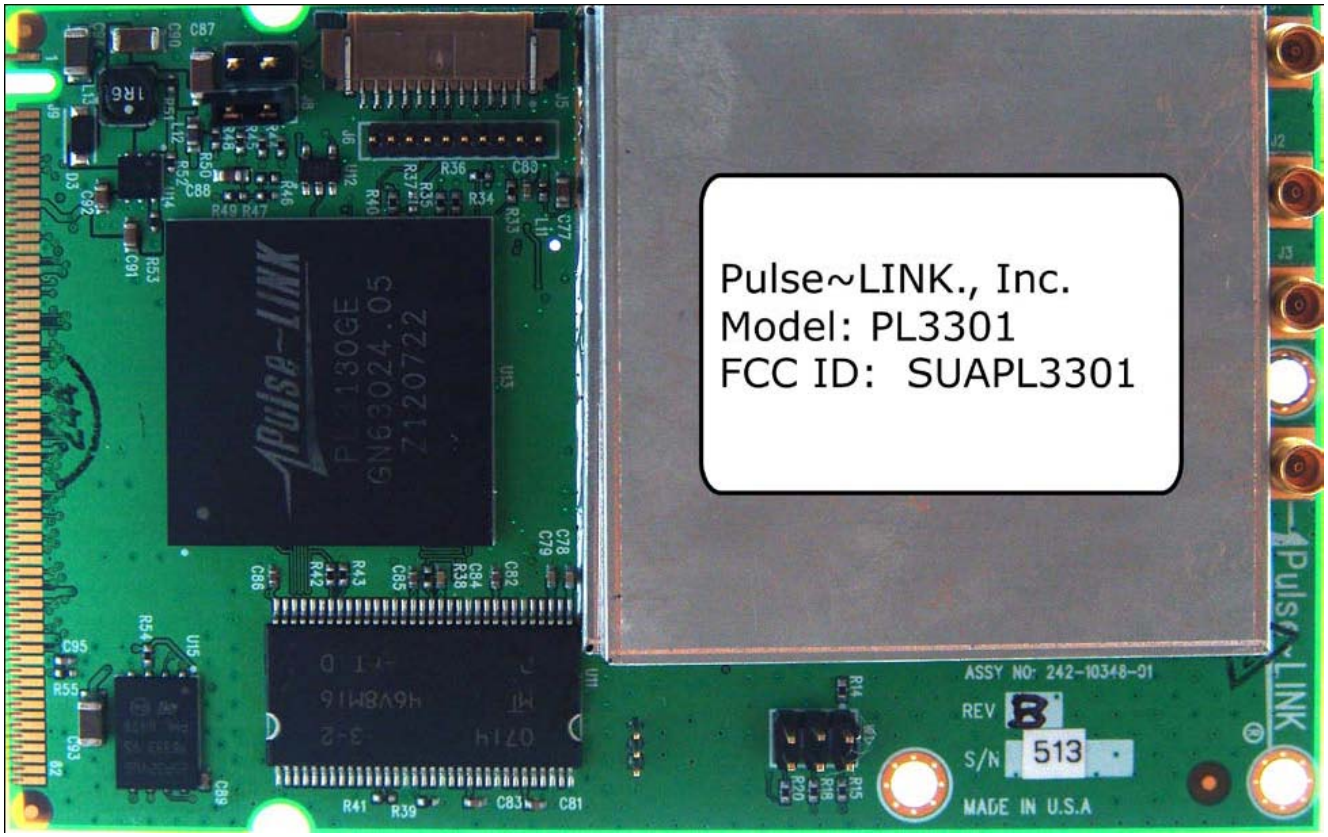
1969 Kellogg Ave.
Carlsbad, CA 92008
Phone 760-607-0844
Fax 760-607-0861
www.pulse-link.net

Ultra Wideband Solutions

USER GUIDE

PULSE~LINK UWB TRANSCEIVER MODULE
MODEL: PL3301, FCC ID: SUAPL3301



INTRODUCTION

This document describes the ultra-wideband (UWB) PL3301. This document includes instructions for configuring the radios.

This User Guide is intended for professional installers, OEM, ODM and system integrators, hereafter called “Users”. This manual describes the installation of UWB Model: PL3301, FCC ID: SUAPL3301 manufactured by Pulse~LINK, Inc. inside the Set-Top-Boxes (STBs), HDTVs, DVRs, DVD players, Media Center PCs, and other multimedia equipment, henceforth called “Final Product” to enable wireless high data rate networks.

PL3301 UWB MiniPCI Module FCC ID: SUAPL3301 consists of the PL3110 Low Noise Amplifier, PL3120 RF Transceiver, and PL3130 integrated Baseband + Mac chips. These chips form a UWB chipset for high-speed wireless connectivity.

The PL3110 Low Noise Amplifier receives low level signals and amplifies them to be captured by the RF Transceiver.

The PL3120 RF Transceiver uses a very high speed Analog to Digital converter to digitize the analog waveform, while the TX path modulates the digital information from the Baseband.

The PL3130 integrated Baseband + MAC (Media Access Control) IC (Integrated Circuit) comprises a Media Access Controller (MAC) and a Baseband Physical Layer (BB PHY) encoder/decoder.

Pulse~LINK’s PL3301 supports 1.35Gbps signaling rate, PHY data rates ranging from 21 Mbps to 1012 Mbps and operates in the frequency range of 3.1 -4.8GHz Ultra wide band spectrum. The PL3301 enables an IEEE 802.15.3b compliant Piconet to be easily setup for transport of streaming video, audio and asynchronous data. High data carrying capacity also enables interactive "Trick Play" capabilities (pause, fast-forward, fast-rewind) and menu-based navigation throughout the home.

PL3301 INSTALATION

The PL3301 uses a standard Mini-PCI form factor and interface. This combination allows easy integration into a host platform. The PL3301 card is built awith the CWave PL3100 chipset. The PL3301 card can be integrated into Set-Top-Boxes (STBs), HDTVs, DVRs, DVD players, Media Center PCs, and other multimedia equipment to enable wireless multimedia network within a room. Typical applications include Wireless HDMI, 1394 (firewire), and wireless Ethernet.

The PL3301 card can be plugged into the Mini PCI slot on the motherboard in a product such as a STB. The PL3301 card is hardware proven and ready for volume production.

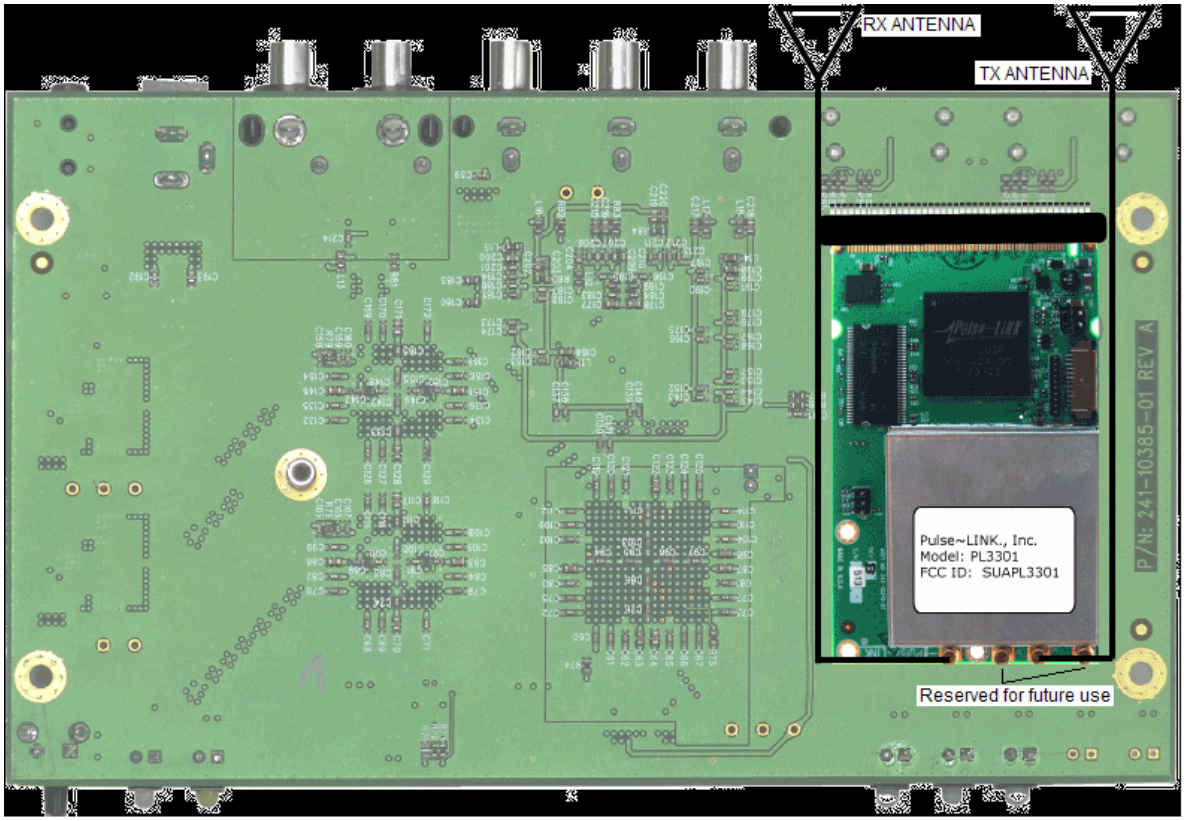


Figure 1: PL3301 plugged into the Mini PCI slot with Omron antennas integrated into the final product containing the PL3301

Figures 1 illustrates an example of PL3301 card integrated into an STB (set top box) enclosure with the Omron antennas external to the enclosure.

SOFTWARE

PL3100 chipset drivers must be integrated into the product containing the PL3301. Drivers are provided for Linux and Windows operating systems.

Table below shows data rates and code lengths used in PL3301.

DATA RATE	CODE and CODE LENGHT
21 Mb/s	A, 64 bit
42 Mb/s	B, 16 bits
84 Mb/s	B, 16 bits
169 Mb/s	C, 4 bits
338 Mb/s	C, 4 bits
671 Mb/s	None, 1 bit
1.012 Gb/s	None, 1 bit

For detailed description of GUI interface refer to Test Set Up procedure.

ANTENNAS

PL3301 has been certified with two Omron Electronics Components end-fed dipole type UWB antennas. One antenna is dedicated to receiving only and the other to transmitting only. The transmit and receive antennas are typically the same. The user may install any type of receive antenna.

The PL3301 mini-PCI UWB transceiver module's FCC certification is valid only with OMRON WXA-S1FL transmit antenna. The PL3301 is NOT FCC approved if any other antenna is attached to transmitter antenna port of this product. If use of a different transmit antenna is desired, arrangements can be made with Pulse~LINK to assist in obtaining a new FCC certification to cover the attachment of an alternative antenna.

The antenna specifications are listed below.

Manufacturer	Omron Electronic Components
Vendor Model Nr.	WXA-S1FL
Antenna Type	Dipole
Frequency (GHz)	3.1 - 4.9
Gain (dBi)	0
VSWR	3.0 max
Flatness for each bandwidth	3 dB max. (reference value)
Omni directivity	2 dB max. (reference value)

Antenna picture showing antenna cables permanently attached to the antennas with MMCX connectors are shown in Figure 3 below.

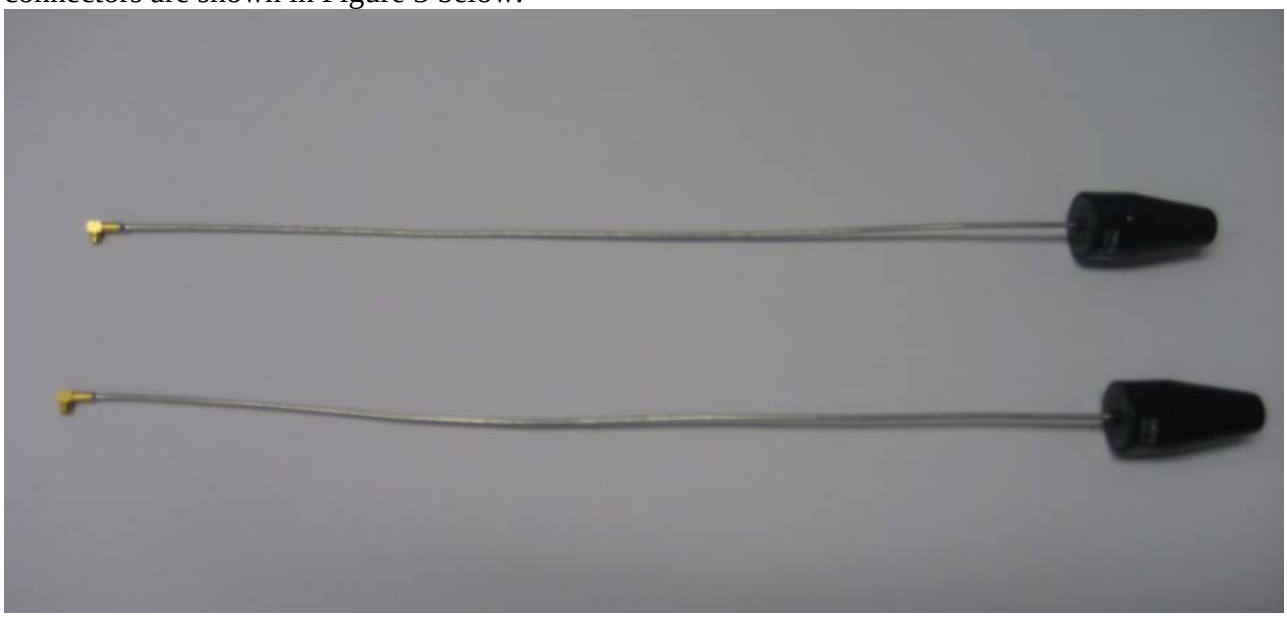


Figure 3: PL3301 with internal antennas.

Antenna radiation patterns are depicted in Figure 4 below. The following frequencies are shown 3.1 GHz, 4.0GHz and 4.9GHz.

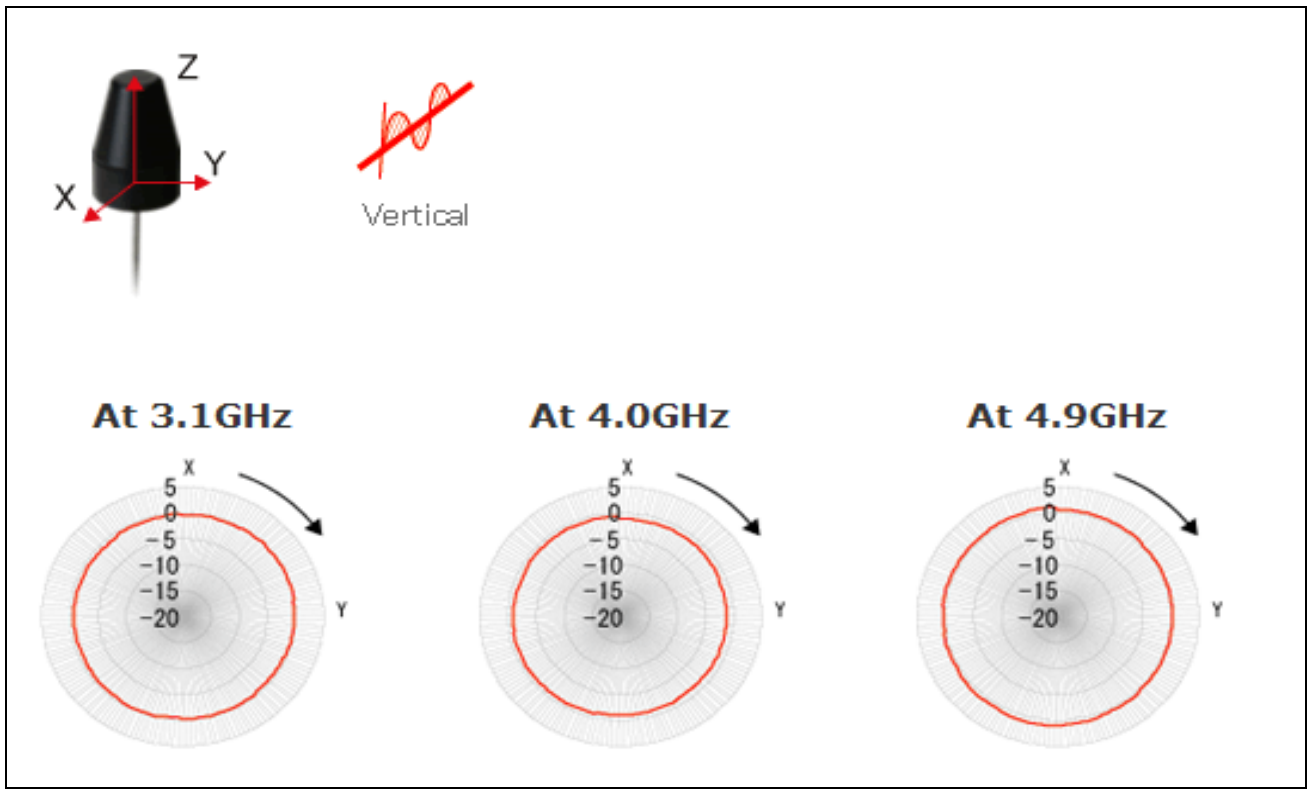


Figure 4: Antenna radiation patterns are shown below.

FCC COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment radiates radio frequency energy and therefore has the potential, though unlikely, to cause harmful interference to other electronic devices. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Reorient or relocate the antennas of either the device being interfered with or this equipment.
- Increase the separation between the device being interfered with and this equipment.
- Connect the equipment into an outlet on a circuit different from that to which the device being interfered with is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The software provided will not allow the device to operate differently or with emissions that are higher than what was approved in the FCC certification process. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment legally under the FCC rules.

DECLARATION OF CONFORMITY

This device complies with Part 15 of the FCC Rules, including waiver FCC 05-58. 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.

Changes or modifications not expressly approved by Pulse~LINK, Inc. may void the user's authority to operate the equipment.

OPERATIONAL LIMITATIONS

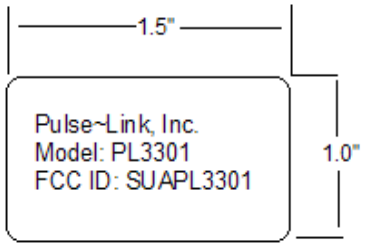
The use of antennas mounted on outdoors structures e.g. antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is strictly prohibited under FCC 47 CFR Section 15.519 9 (a) (2). Antennas may be mounted only on the hand held UWB device

PL3301 may be integrated in Final Product for use either indoors or outdoors according to FCC 47 CFR Section 15.519 (a) (3).

Since PL3301 satisfies all FCC requirements for hand held systems it may be integrated into the hand held Final Product.

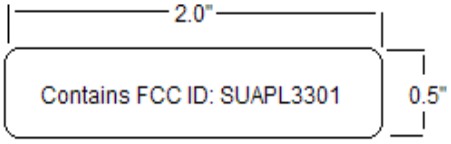
FCC LABELS

FCC Label on PL3301
The graphics of the FCC label that appears on PL3301 is shown below.



The photographs of the product and the label are shown in Figure 1 and Figure 2.

Exterior FCC ID Label on Final Product.
Picture below shows a sample of the required FCC ID Label that must be displayed on a Final Product. It is the responsibilities of Users to produced and display this label on the product. This requirement stems from FCC Second Report and Order FCC 07-56 Section A – "Single Unit Modular Transmitters" requirement paragraph 6; that states "The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization."



TESTING REFERENCES

Testing procedures are beyond the scope of this user manual. The following sources should be referenced for testing procedures:

- Code of Federal Regulations
  CFR 47, Part 15 Subpart F – Ultra Wideband Operation
  FCC 05-58 Waiver
- IEEE 802.15.3b-2005 Standard

IEEE Standard for Information Technology – 802.15.3b-2005 Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for High Rate Wireless Personal Area Networks (WPANs).

- ANSI Standards
  - ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation
  - ANSI C63.4-2001, American National Standard for Methods of Measurement of Radio-Noise Emissions form Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz