Intel User Guide for Intel® Wireless UWB Link 3480M Module Revision 2.0

Disclaimer

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL® PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER, AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.
Intel products are not intended for use in medical, life saving, or life sustaining applications.
Intel may make changes to specifications and product descriptions at any time, without notice.
Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them.
The Intel products in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.
Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.
All dates specified are target dates, are provided for planning purposes only and are subject to change.
Intel® EM64T requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel EM64T. Processor will not operate (including 32-bit operation) without an Intel EM64T-enabled BIOS. Performance will vary depending on your hardware and software configurations. See www.intel.com/info/em64t for more information including details on which processors support Intel EM64T or consult with your system vendor for more information.
Napa, Santa Rosa, Montevina, Calpella, Paso Robles and other code names featured are used internally within Intel to identify products that are in development and not yet publicly announced for release. Customers, licensees and other third parties are not authorized by Intel to use code names in advertising, promotion or marketing of any product or services and any such use of Intel's internal code names is at the sole risk of the user.
Intel, Centrino, and the Intel logo are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

* Other names and brands may be claimed as the property of others.

Copyright © 2000-2008 Intel Corporation

Special Note: Intel UWB FCC Test Tool is a special test tool for engineering testing purpose. It works with Intel® Wireless UWB Link 3480M module only. This tool is developed for Intel internal use. It may be used by an ODM or OEM under certain agreement. It is not to be released to, or used by other parties any general public consumers.

FCC 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

This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.

Revision History

Revision	Date	Comments
1.0	February 29, 2008	Draft 1.0
1.5	March, 3, 2008	Formating Added
2.0	March 5, 2008	Hardware Installation

Contributors

Date	Comments
Jian Wu	Intel
Richard Phillips	Intel
Krishna Shetty	Intel
Priya Kesavan	Intel

Product Name: Intel® Wireless UWB Link 3480M

Operating Temperature 0° C to 85° C
Storage Temperature –55° C to 125° C
Operating Systems Windows* and Linux*
Compliant with WiMedia PHY and Media Access
Control (MAC) specifications
Supports Band Groups 1 and 3
Dual Transceiver Chain with Transmit Power
Control and Detect and Avoid (DAA) functions
Implements Certified Wireless USB protocol
based on USB-IF specification
Implements WiMedia Logical Link Control
Protocol (WLP) for IP communications
Supports all WiMedia PHY speeds including
480 Mb/s
Supports industry standard interfaces such as
PCI-Express and Hi-Speed USB
Additional interfaces like SPI, I2C, JTAG, and
GPIO ports for EEPROM/FLASH connections
and ancillary functions
Supports industry standard association models
and data encryption (AES-128 CCM) for
security
Driver support for Microsoft* Windows* and
Linux* operating systems

Contents

Intel® Wireless UWB Link 3480M

1.1 Introduction

This document describes the basic installation of the Intel® Wireless UWB Link 3480M module into the OEM Platform. Installation and use of the Intel® USB Connection Manager Software setup for evaluation and testing of the Intel® Wireless UWB Link 3480M module. Secondarily, this document also contains instructions for the installation and use of the Intel® FCC software test tool. Driver and software functions used in the USB Connection Manager and the FCC software tool are part of Intel® Wireless UWB Link 3480 drivers that provide Radio control, UWB bandwidth, PHY transmit and Receive management functions. The architecture was designed with the following goals:

1. Enable the OEM to Evaluate and Test the Intel® Wireless UWB Link 3480M module in the OEM Platform.

2. Enable connectivity of the Intel® Wireless UWB Link 3480M module to third party Native and DWA devices.

3. Providing a continuous transmit or receive signal functionality for base FCC tests.

4. Enable the OEM to perform Base Waveform characterization of the Intel® Wireless UWB Link 3480M Module within the OEM platform.

1.2 References
TBD

1.3 Definitions, Acronyms, and Abbreviations

Term	Definition
WDM	Win32 Driver Model
WA	Wire Adapter
HWA	Host Wire Adapter
DWA	Device Wire Adapter
WUSB	Wireless USB
WHCI	Wireless (USB) Host Controller Interface
UWB	Ultra-Wideband
HMC	Half-Height Mini Card
DUT	Device Under Test

1.4 Customer Hardware Installation of the Intel® Wireless UWB Link 3480M Module

1. Install the Intel® Wireless UWB Link 3480M Module only in a system that is NRTL Listed to UL 60950-1.

2. Observe proper ESD control procedures to prevent damage to the module and the system.

3. The Intel® Wireless UWB Link 3480M Module is not designed to be "hot plugged" Prior to installation turn off system power and disconnect power cord from mains (AC power) socket outlet, some systems may require removal of a battery to disable all power to the system and PCIe connector.

4. Install the Intel® Wireless UWB Link 3480M module into the Device Under Test. Ensure that the Intel® Wireless UWB Link 3480M is installed .Plug the module into a PCIe mini connector compatible with (include specification # here)

5. Connect the antenna cable from the Antenna in the platform to the u-fl socket on the module and ensure the antenna is properly connected. (See example Figure 1.1 below)
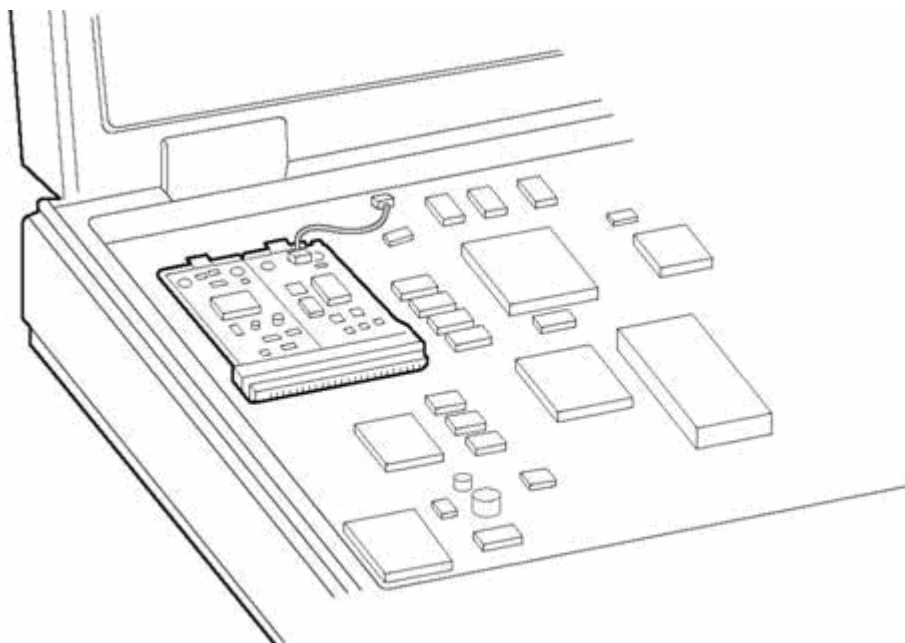

Figure 1-1: Example PCIe Half-Height Mini Card Installed in a Mobile Platform

6. If the UWB module will be transmitting at the same time as other wireless interfaces on the system an antenna separation distance of 20cm (8 inches) is required to meet FCC co-location restrictions, if this distance cannot be met additional testing may be required

5. Antenna usage: If the antenna selected is not an Omron model HKFF evaluation of the selected antenna's performance and type will be required. If antenna is not a planar inverted F, and/or if the gain of the antenna used is higher than 2 dBi in Band Group 1 and 0 dBi in Band Group 3 testing to verify compliance with regulatory limits will be required.

6. The Intel® Wireless UWB Link 3480M module is now installed and ready to use.

1.5 Wireless USB Connection Manager Software

The Intel® Wireless USB Connection Manager Software is the basic connectivity software tool for using the Intel® Wireless UWB Link 3480M Module. The Intel® Wireless USB Connection Manager software application is divided in four sections:
- Wireless USB Connections
- Radio Control
- Help
- About

Locate and Install the Intel® Wireless USB Connection Manager Software package that you received with The Intel® Wireless UWB Link 3480M module. Please check with your Intel UNO representative to ensure you are using the version of the software.

1.6 How to connect to a Wireless USB Device

1.6.1 Association

The association process enables your laptop to exchange secure identification information with the wireless USB device. Once in wireless mode, your laptop only communicates with the associated wireless USB device.

To associate your laptop with your wireless USB device:
1. Install Intel(R) Wireless UWB Link 1480 Software on your laptop.
2. Connect the wireless USB device to your laptop by using a USB mini cable.
3. Perform the cable association.
4. Run the "cbafupdate" utility if required.
5. Disconnect the mini cable.
6. The DWA should be listed in the WUSB Connections as below.

Note: The cable association is performed the first time you use the wireless USB device or if your laptop does not recognize the wireless USB device after you have disassociated it from your laptop.

1.6.2 Connection
To connect your laptop to a wireless USB device:
1. Install Intel(R) Wireless UWB Link 1480 Software on your laptop.
2. Connect the Client wireless USB device to your laptop by using a USB mini cable.
3. Perform the cable association.
   Note: The cable association is performed the first time you use the wireless USB device or if your laptop does not recognize the wireless USB device after you have disassociated it from your laptop.
4. Once the cable association is completed, the Wireless USB Connection Manager displays a device entry in the Wireless USB Connections tab.
5. Disconnect the USB cable from your laptop to the wireless USB device.
6. Now the wireless USB device should connect automatically to your laptop. Some wireless USB devices support manual connection option. Please refer to the documentation from the wireless USB device vendor describing how to connect.

1.6.3 Disconnection
To disconnect an existing wireless connection:
1. In the Wireless USB Connection Manager, go to the Wireless USB Connections tab and select the device you would like to disconnect.
2. Click the Disconnect button at the bottom of the screen or right-click on the device and choose the Disconnect Device option.
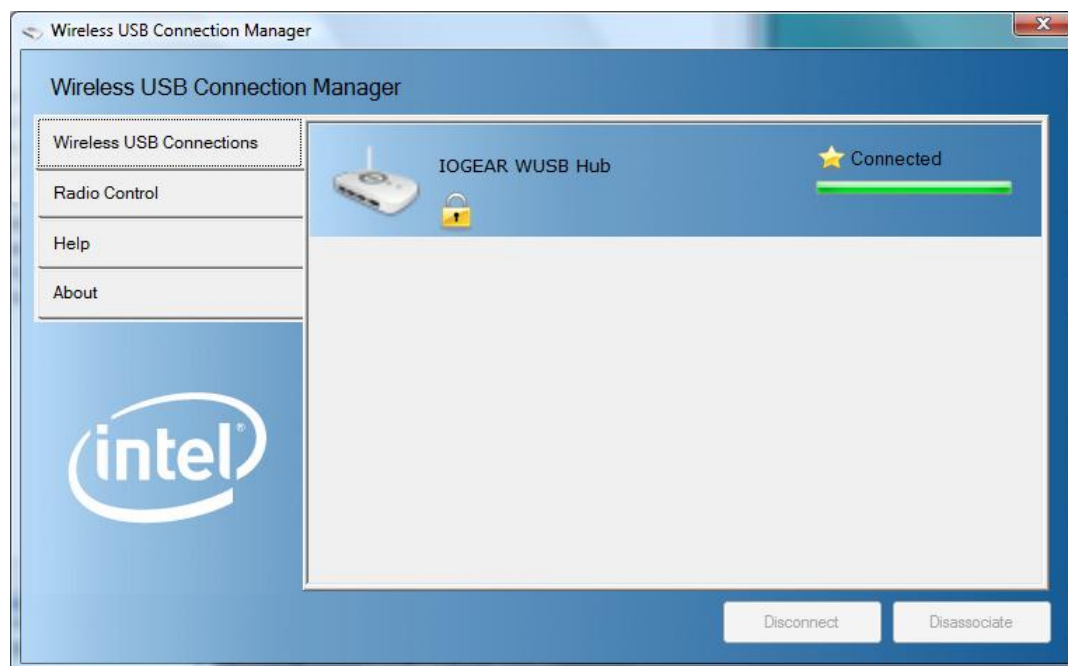
Figure 1-2 Intel® Wireless USB Connection Manager Software GUI

1.7 Disassociation

The disassociation process removes the secure identification information about your laptop and your wireless USB device so your laptop no longer recognizes the wireless USB device.

To disassociate your laptop from your wireless USB device:
1. In the Wireless USB Connection Manager, go to the Wireless USB Connections tab and select the device you would like to disassociate.
2. Click the Disassociate button at the bottom of the screen or right-click on the device and choose the Disassociate Device option.

1.8 Intel® FCC Software Test Tool Installation

The Intel® FCC software test tool is an Internal Intel development tool that may be used provide test signals used in the basic module testing The software tool is only for use with the Intel® Wireless UWB Link 3480M Module.

1.8.1 FCC Test Tool Software Installation

1. Remove any previous FCC test application tool by uninstalling the drivers from Windows Device Manager.
2. Install Intel FCC Software application on test Platform: Unzip all files in this package into its own folder, eg: c:\FCC_Test_FV_PCIe
3. Create a shortcut of UwbFCCTestTool.exe on your Desktop by:
    - right click it->Send To->Desktop
4. Shut down the test platform or test PC.
5. Install the Intel® Wireless UWB Link 3480M module into the Device Under Test. Ensure that the Intel® Wireless UWB Link 3480M is installed in the test platform and the antenna is properly connected. (See example Figure 1.1)
7. Start the test platform or test PC.

8. When Windows pops up "Found new hardware Wizard":
- select the "No, not this time", then "Next"
- select "install from a list or specific location", then "Next"
- use the "Browse" button to select the folder you put the test tool files in, then "next"
9. Check the test drivers are installed properly using the Windows Device Manager.
"Intel® Wireless UWB Link 3480M FCC Test PCIe Driver v1.5" should display at the bottom of the display
10. Run the uwbFCCTestTool software application and at the select station window GUI in the box Select "Station A" Do not press Load Firmware button.
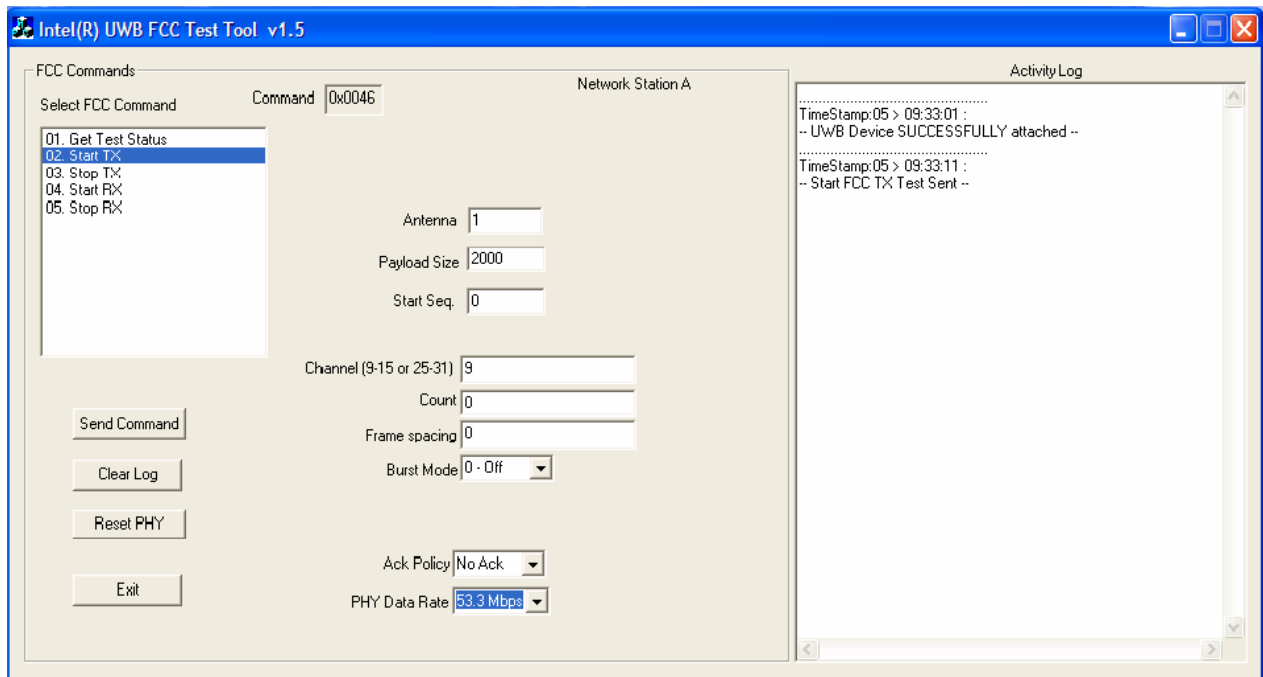11. The Intel® uwbFCCTestTool Software GUI will now appear. (See Figure 1-3 Below)

Figure 1-3: Intel® FCC Test Tool GUI with Typical Settings

1.8.2 FCC Software Test tool Application Content List

The following files are included in this release package:
1. FV_FCC_PCIeUWBmini.sys
2. UWBCtrl.sys
3. FV_A2_FCC_PICeMini.inf
4. uwbctrl.dll
5. UwbFCCTestTool.exe
6. This release note

1.8.3 Test System Conditions

1. Intel® based Laptop with available PCIe HMC Slot or
2. Intel® Pentium 4 or later desktop PC W/PCIe HMC slot
3. Microsoft* Windows XP with SP2
4. HMC with Intel® Wireless UWB Link 3480M (Lynx Creek)

1.8.4   Key features supported in this release

1. Continuous TX: Send packages continuously for spectrum mask measurement
2. Continuous Rx: Receive packages continuously for spectrum mask measurement
3. BG1 and BG3: support TX/Rx on both BG1 and BG3
4. Burst mode with user selectable long preamble or short preamble
5. User selectable PHY transmission rate
6. User selectable payload size (from 1 to 4095 bytes)

1.8.5   Known Issues and Workaround

A module under test may hang after many repeatedly TX/RX commands.
Workaround for this:
1. Start Windows Device Manager,
2. Right click on the "Intel® Wireless UWB Link 3480M FCC   Test PCIe Driver"
3. Select "Disable"
4. Right click it again, select "Enable"
5. Exit the test application
6. Restart the test application

1.8.6   Usage Note

1. Typical use for FCC Compliance testing of Intel® Wireless UWB Link 3480M Module in OEM/ODM customer platform.
2. FCC software tool may also be used to connect the DUT (HMC card) RF output to a spectrum analyzer (such as Agilent E4407B) via a coaxial cable.
3. Run the continuous TX (set package count to 0), and monitor the spectrum mask for FCC compliance or package error counts.
4. Run the TX power level selection to see the power level changes.

1.8.7   FCC Test Tool Typical Settings

1. The "uwbFCCTestTool" software application has several user selectable variables in the test tool GUI. (See Figure 1-4)
2. Typical option settings for use in FCC Compliance testing of an Intel® Wireless UWB Link 3480M Module in OEM/ODM customer platform:

> **Antenna: = 1**
> **Payload Size = 2000**
> **Start Seq = 0**
> **Channel= (9-15 or 25-31) Typ = 13**
> **Count = 0**
> **Frame Spacing = 0**
> **Burst Mode = 0=Off**
> **Ack Policy = NoAck**
> **PHY Data Rate = 53.3Mbps**

3. Highlight "Start Transmit" In Select FCC Command Box
4. Click "Send Command" Button to begin transmission.
5. Additional commands can be start/stopped in same manner.
6. Activity Log shows success/Failure of executed command.
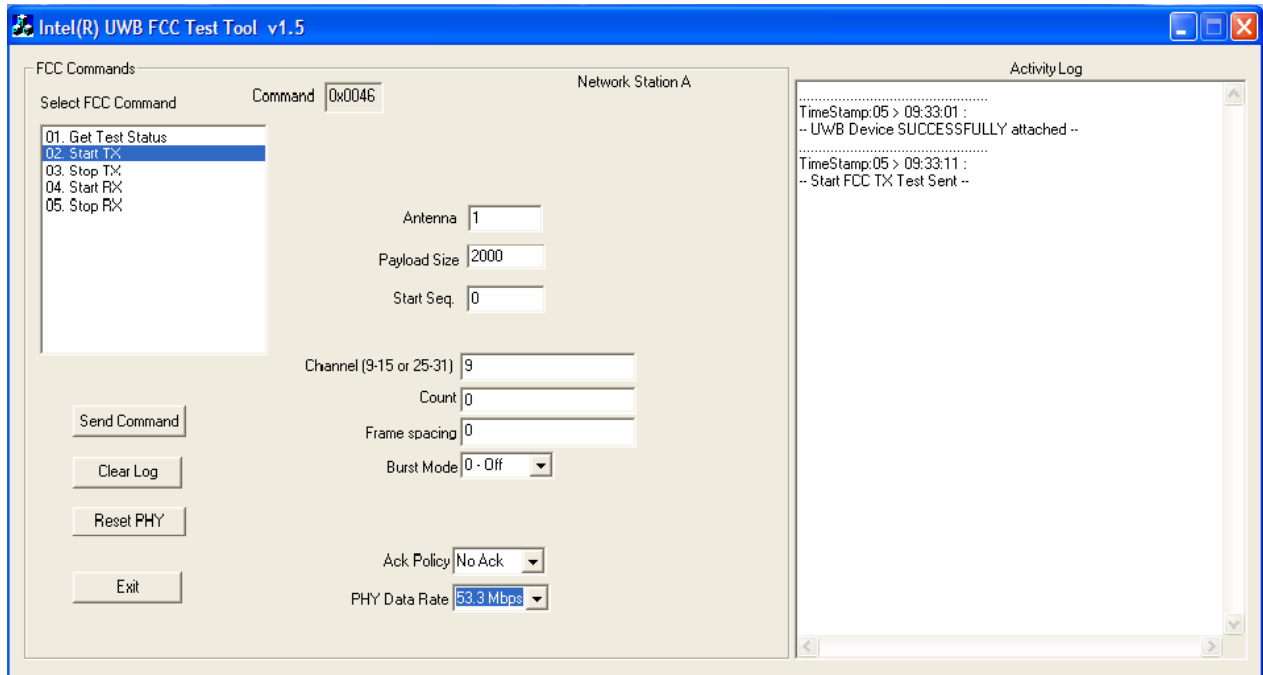7. Repeat steps as required for each band tested.

Intel Confidential

Figure 1-4: Intel® FCC Test Tool GUI with Typical Settings

Figure 1-5: Intel® Wireless UWB Link 3480M HMC Module without Insulator shield
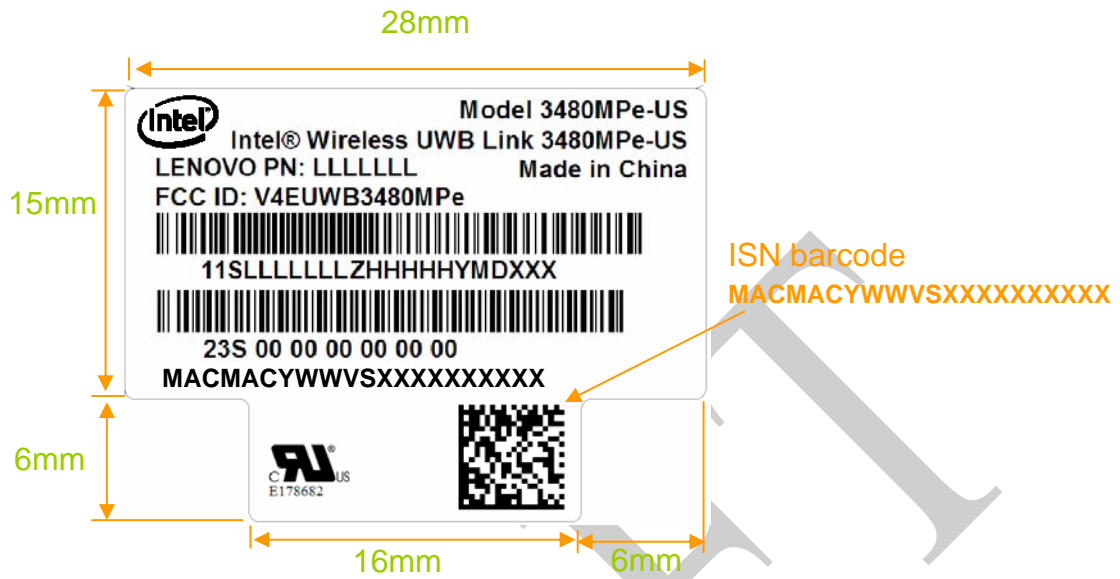
Insulator label

28mm

15mm

6mm

16mm   6mm

ISN barcode
MACMACYWWVSXXXXXXXXXX

Figure 1-4: Example FCC Label

Intel Confidential