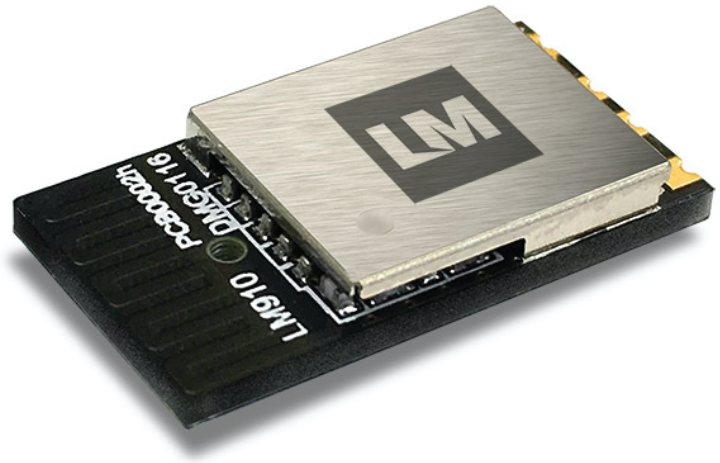
LM910 Bluetooth® v4.0 Dual Mode Module

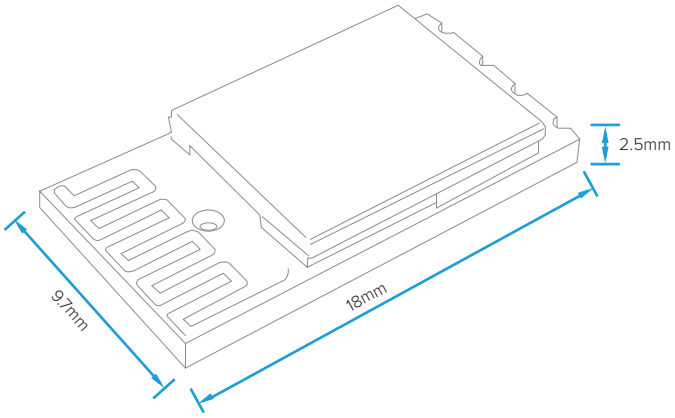
Host Controller Interface (HCI) via USB Interface

Product	LM910
Part No (Tray)	910-0630
Part No (Tape& Reel)	910-0631
Revised	16/DEC/2016

iBeacon OSX Linux Win XP Win Vista Win 7 Win 8 Win 10

Bluetooth®





Features

- Bluetooth® v4.0 wireless technology
- < 35mA Current Consumption (Continuous Tx mode)
- PCB Antenna
- 10 dBm (Bluetooth® v2.1 + EDR) and 9 dBm (Bluetooth® v4.0) Tx Output Power
- -85 dBm (Bluetooth® 2.1 +EDR) and -90 dBm (Bluetooth® v4.0) Rx Sensitivity
- USB 2.0 (Full Speed) for data and power source
- Host Controller Interface (HCI)
- Plug and Play (OSX, Linux and Windows XP to Windows 10 compatible)
- Voice and Data Application support (including VoIP over Bluetooth®)
- Stereo Audio supported
- 18mm x 9.7mm X 2.5mm
- SMT Side and Bottom Pads for easy production
- IC, FCC, CE / RED Directive and SIG Certified Solution
- RoHS, REACH and WEEE Compliant Solution

Overview

The LM910 Bluetooth® v4.0 module is a small, simple and highly compatible solution. A plug and play module, compatible with Linux, MAC OSX and Windows XP to Windows 10 platforms. Allowing your embedded system to wirelessly communicate with other nearby Bluetooth® and Bluetooth® v4.0 enabled devices (such as the iPhone and Android devices). Providing a low energy connection and high quality data stream.

The LM910 has many possible uses e.g. within an iBeacon and a data logger. Typically used in industries such as EPOS, M2M and automotive. And is ideal for developing voice and data applications.

The module has a Host Controller Interface (HCI) for a simple connection via USB to a host computer or MCU.

Designed with a PCB antenna for a cost effective solution providing a high antenna gain. It's SMT side and bottom pads allows for easy integrations into your embedded system. Simplifying the production and manufacturing phase.

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General Specification

Wireless

Bluetooth® Standard	v4.0 low energy technology and v2.0, v.2.1 wireless technology
Module Type	Host Controller Interface (HCI)
OS Compatibility	OSX (Apple's Bluetooth® Stack), Linux (BlueZ) and Windows XP – 10 (Widcomm)

Hardware

Chipset	Broadcom
Antenna	PCB Antenna
Interfaces	USB 2.0 (Full Speed)
Power Supply	5V DC (USB powered)
Crystal Oscillators	20 MHz

RF Characteristics

Tx Output Power	10 dBm (Bluetooth® v2.1 + EDR) and 9 dBm (Bluetooth® v4.0)
Rx Sensitivity	-85 dBm (Bluetooth® v2.1 + EDR) and -90 dBm (Bluetooth® v.4.0)
Current Consumption (Continuous Tx)	<35 mA (Typical)
Current Consumption (Continuous Rx)	27 mA (Typical)
Data Rate	Up to 3Mbps
Frequency	2.4 GHz to 2.485 GHz
Modulation Scheme	GFSK for 1 Mbps, π/4-DQPSK for 2 Mbps, 8-DPSK for 3 Mbps
Spread Spectrum	FHSS (Frequency Hopping Spread Spectrum)

Physical Characteristics

Operating Temperature	-20°C to +75°C
Dimensions (L x W x H)	18mm x 9.7mm x 2.5mm
Weight	0.81g
Certifications	IC, FCC, CE / RED Directive and SIG Certified Solution
Compliance	RoHS, REACH and WEEE

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HCI Architecture

Within the Host Controller Interface (HCI) Architecture, the LM910 runs the HCI Firmware, Link Manager Firmware and baseband controller.

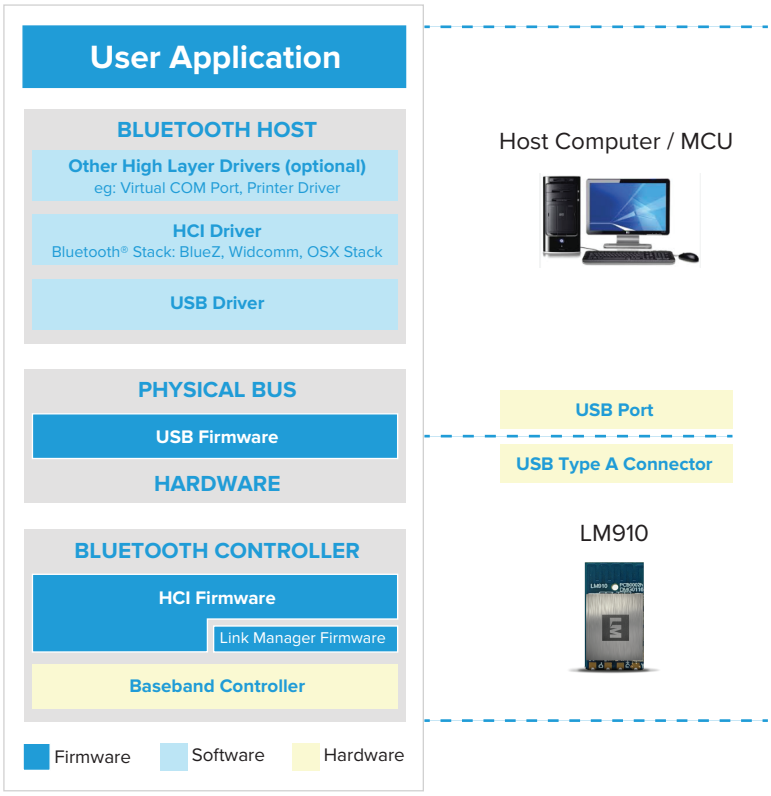
The host operating system runs the Bluetooth® v2.1 + EDR / v4.0 user application. It also runs the Bluetooth® Stack (HCI Driver), USB Driver and other necessary drivers.

The Bluetooth® Stack (HCI Driver) exchanges data and commands with the HCI firmware via the USB interface.

The LM910 is plug and play and compatible with the OSX, Linux and Windows XP – 10 platforms.

The Bluetooth® Stack is in-built into the operating system. With the Widcomm Bluetooth® Stack Software specifically designed for the Broadcom chipset within the LM910.

The table below shows the tested OS version numbers:



Host Operating System	Bluetooth® Stack *	LM Tested OS Version Number
MAC OSX	OSX Bluetooth® Stack	OSX 10.11 (El Capitan)
Linux	BlueZ	Ubuntu 15.10 (Kernel 4.2.0-16-generic) and Ubuntu 14.04.03 (Kernel 3.13.0-77-generic)
Windows	Widcomm	Win 10 (64-bit), Win 10 (32-Bit), Win 8/8.1 (64-bit), Win 8/8.1 (32-Bit), Win 7 (64-bit) and Win XP (32-bit)

*NOTE: Third-party Bluetooth® Stack Software can be used as an alternative to the in-built Bluetooth® Stack for more supported profiles.

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Radio Frequency Characteristics

Transmit Power Measurements

Crystal Trim

Specification	Measurement	Unit
Frequency Offset ±3 KHz	0	KHz

Output Power

Specification			Measurement						Unit
Class	Ppk	Pav	Packet Type	2402MHz (CH0)		2441MHz (CH39)		2480MHz (CH78)		
1	<23dBm	0dBm< Pave<20dBm	DH5	Pav 10.26	Ppk 10.5	Pav 10.6	Ppk 10.8	Pav 10.24	Ppk 10.47	dBm

Receive Measurements

Maximum Usable Level

Specification			Measurement			Unit
Class		Packet Type	2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)	
1	BER≤0.1% for receiving power is -20 dBm or greater.	DH1	0	0	0	%

Sensitivity

Specification			Measurement			Unit
Class		Packet Type	2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)	
1	BER≤0.1% for receiving power is -75 dBm or better.	DH1	0	0	0	%
		DH5	0	0	0	%

Minumum Sensitivity

Specification			Measurement			Unit
Class		Packet Type	2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)	
1	BER≤0.1%	DH1	-85	-85	-85	dBm

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EDR - Bit Error Rate (BER) Floor Performance

Specification			Measurement			Unit
Class			2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)	
1	BER≤0.0007% for receiving power is -60 dBm or better	2Mbits/sec	0	0	0	%
DH3		3Mbits/sec	0	0	0	%

Bluetooth® low energy - Limitation Sensitivity

Specification		Measurement			Unit
Low Energy		2402MHz (CH37)	2442MHz (CH18)	2480MHz (CH39)	
	PER≤30.8% for finding receiving the lowest power.	-90	-90	-90	dBm

Current Consumption Test

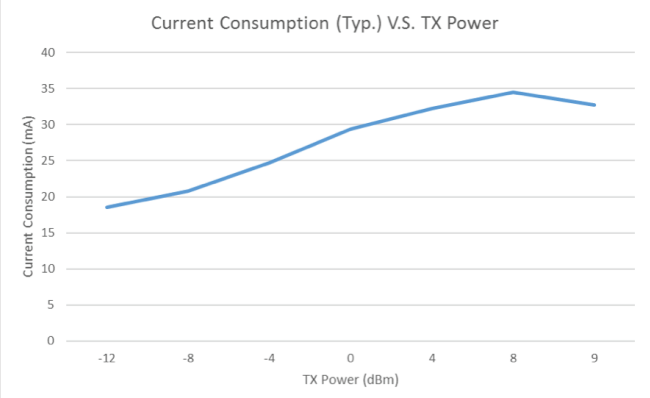
Test Condition

(BDR DM1 PRBS9 Channel 2442MHz)

Continuous TX: <35 mA (typ.) (See Figure)

Continuous RX: 27 mA (typ.)

Figure



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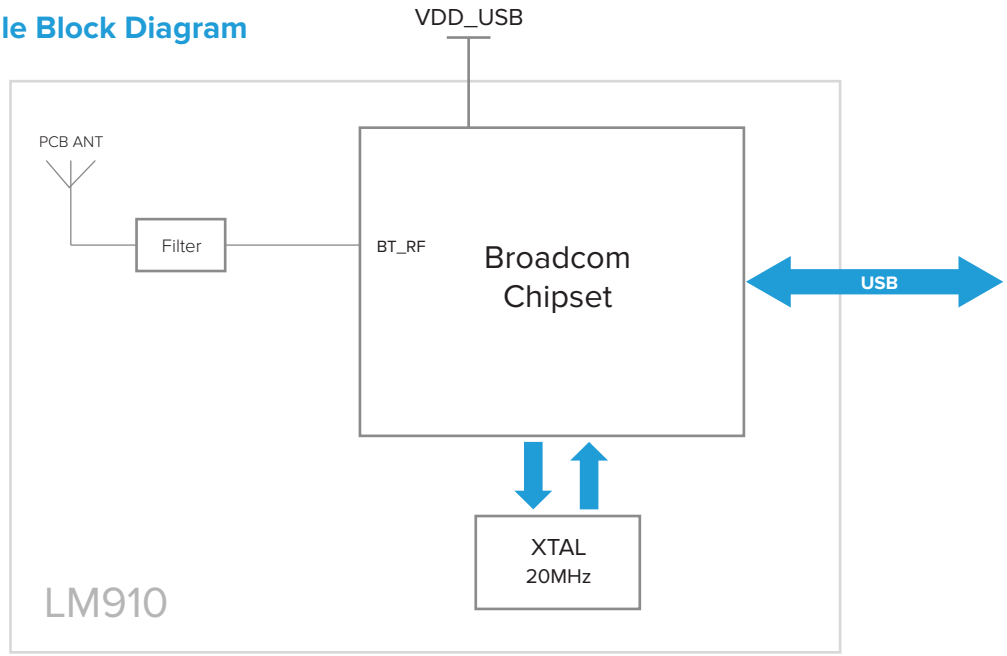
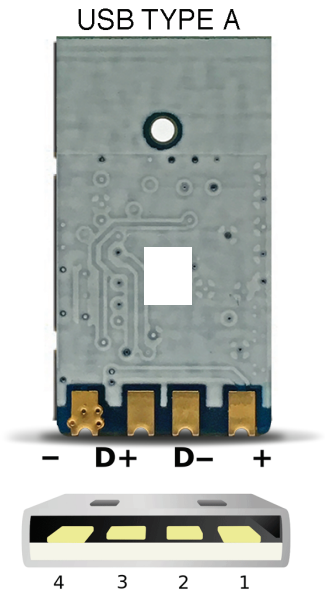
Module Block Diagram





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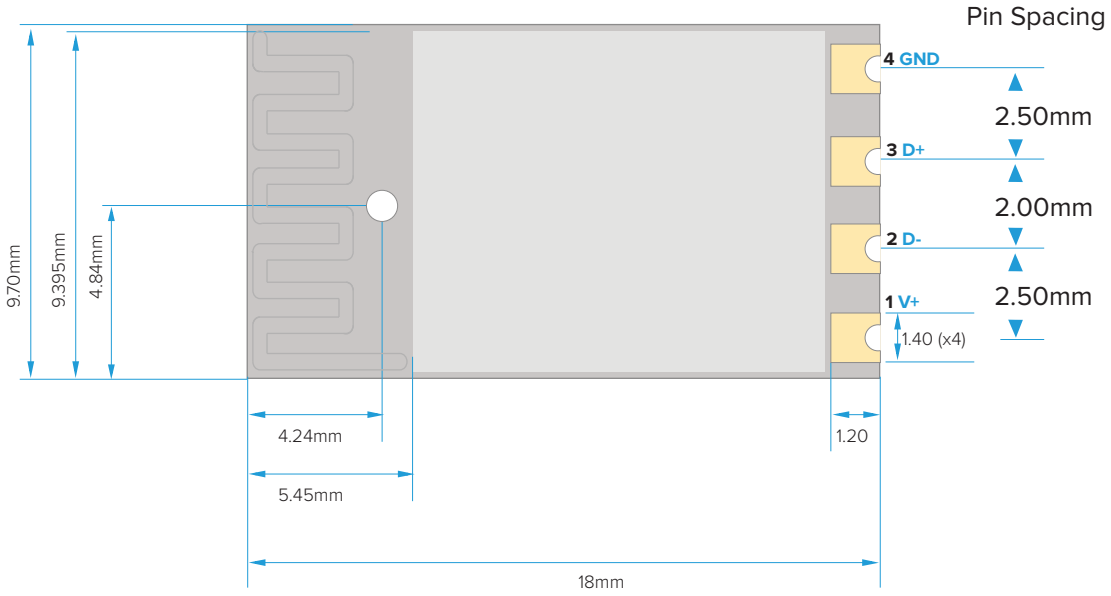
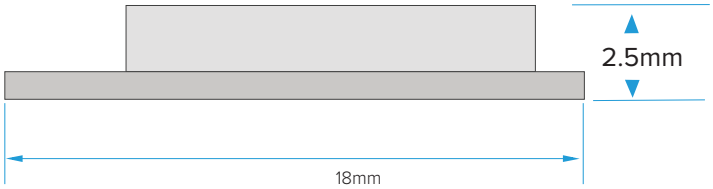
Physical Dimensions

Top View

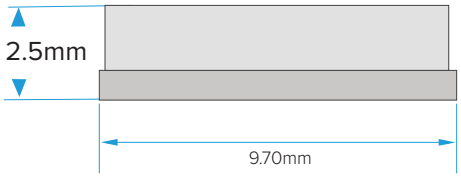


Pin	Description
4	GND
3	D+
2	D-
1	V+

Front View



Side View



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Host Controller Interface (HCI) via USB Interface

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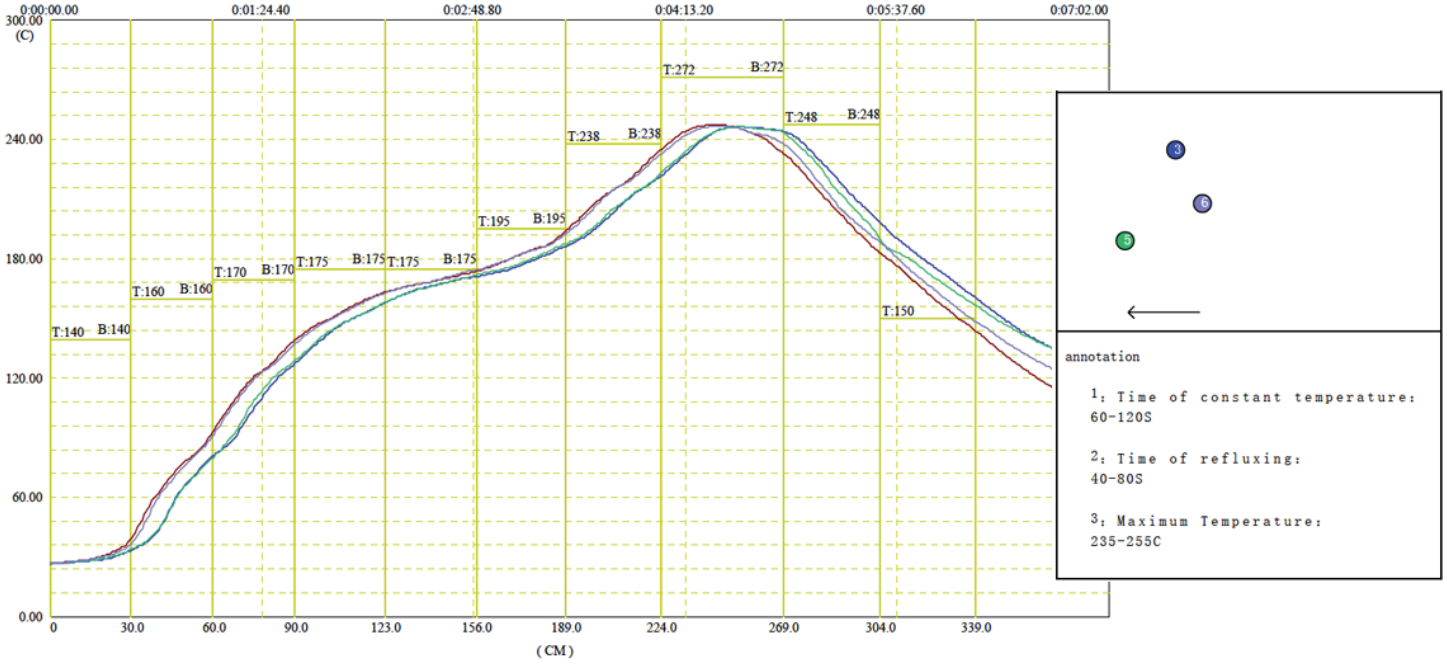
Soldering Reflow Chart



	Preheat zone slope		Immersion time 150 to 180℃		Refluxing time 220℃		Maximum Temperature		cooling zone slope	
	2.00	0.00%	71.00	-72.50%	72.50	62.50%	247.7	51.33%	-1.18	-82.00%
	2.10	10.00%	73.00	-67.50%	73.00	65.00%	246.9	46.00%	-1.30	-70.00%
	2.10	10.00%	71.00	-72.50%	69.50	47.50%	246.9	46.00%	-1.47	-53.04%
	1.90	-6.67%	70.50	-73.75%	74.50	72.50%	247.1	47.33%	-1.43	-57.50%

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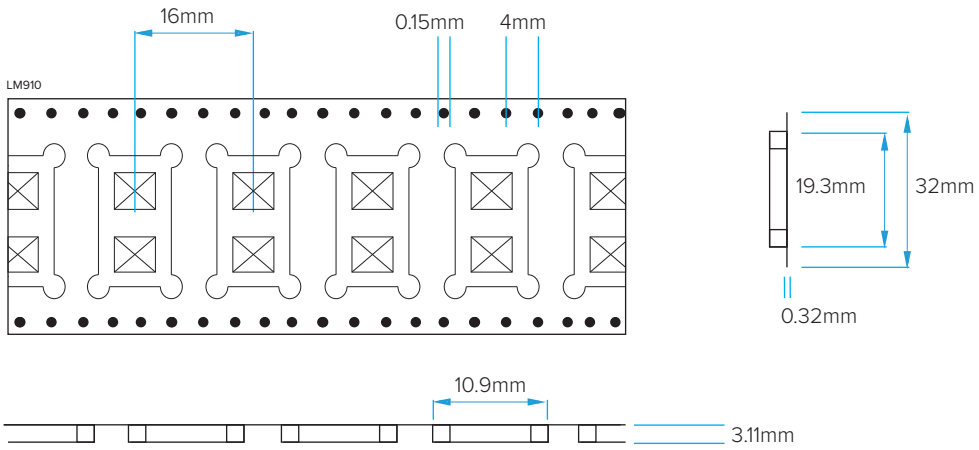
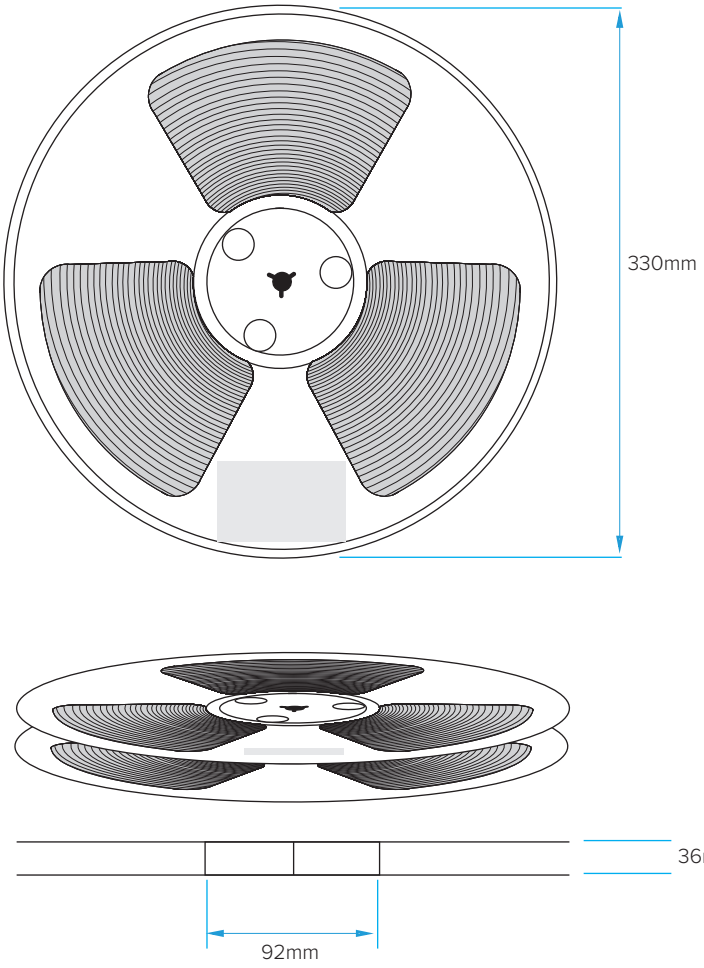
Tape and Reel Packaging

Tape Dimensions



Reel Dimensions



Notes

- Carton Dimensions (L x W x H): 360mm x 290mm x 370mm

Quantities

- 1500 modules per Tape
- 4 Boxes per Carton
- 6000 modules per Carton

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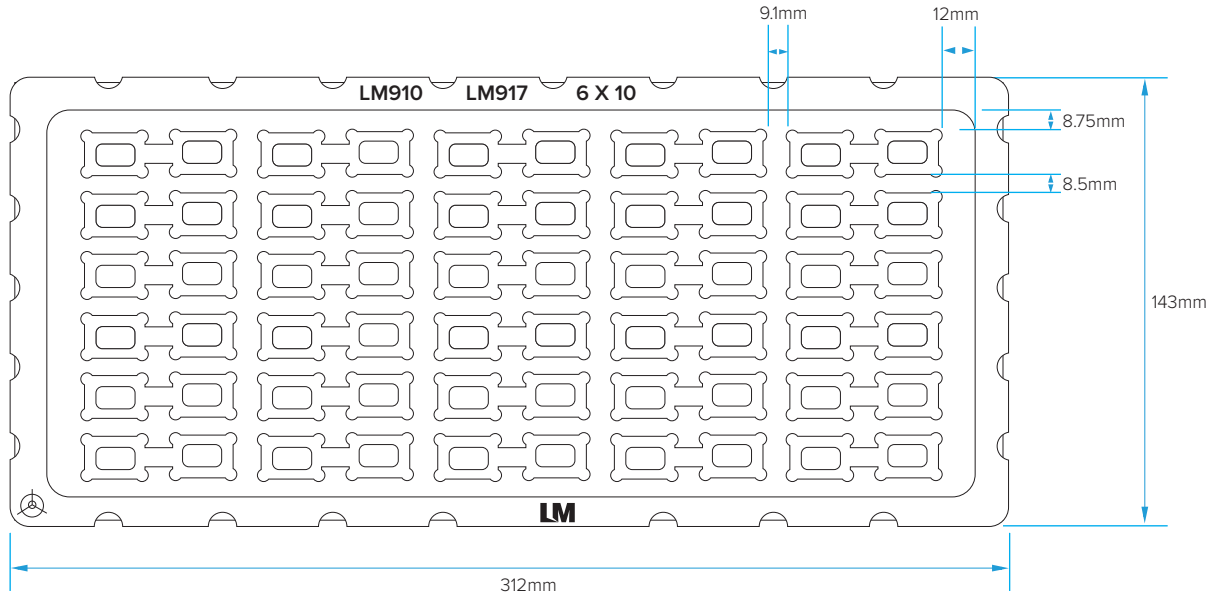
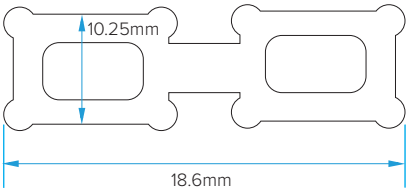
Tray Packaging

Tray Dimensions





Notes

- Anti-Static PS Tray, Black .
- Electrical Resistance: 1 MΩ< R< 100MΩ .
- Thickness: T= 0.8 mm
- Carton Dimensions (L x W x H):
  360mm x 325mm x 160mm

Quantities

- 60 modules per Tray
- 600 modules per Box
- 4 Boxes per Carton
- 2400 modules per Carton

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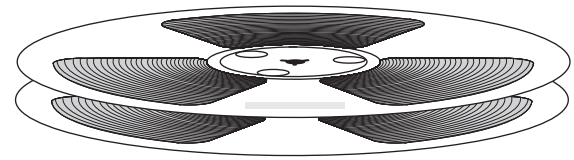
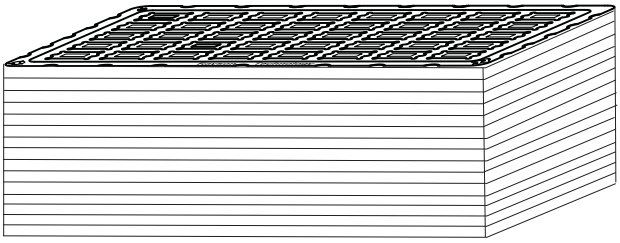
Packaging for Tape & Reel / Tray

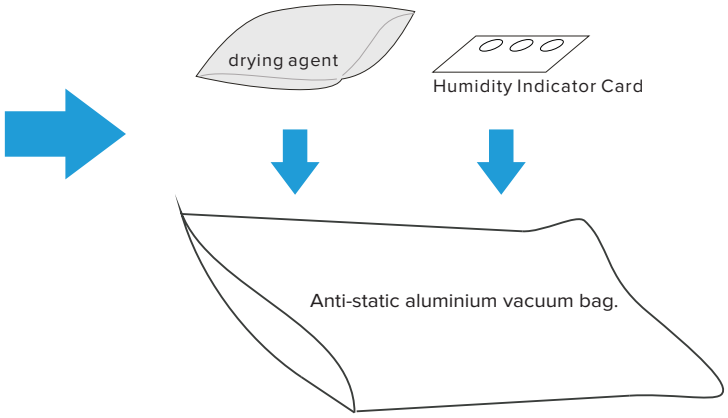
The trays/reels are stacked and inserted into an anti-static vacuum bag and the Anti-Static Label, Model Name Label and Moisture Sensitive Labels stuck on.



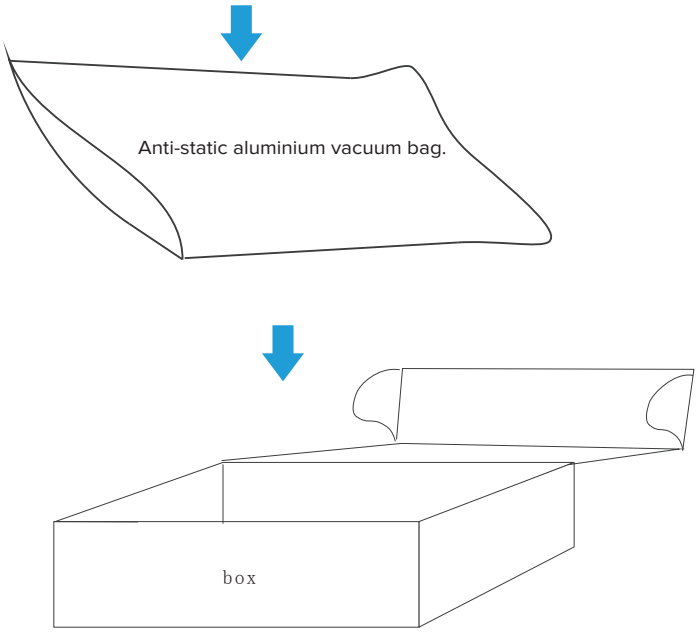
Reels are place within a vacuum bag.

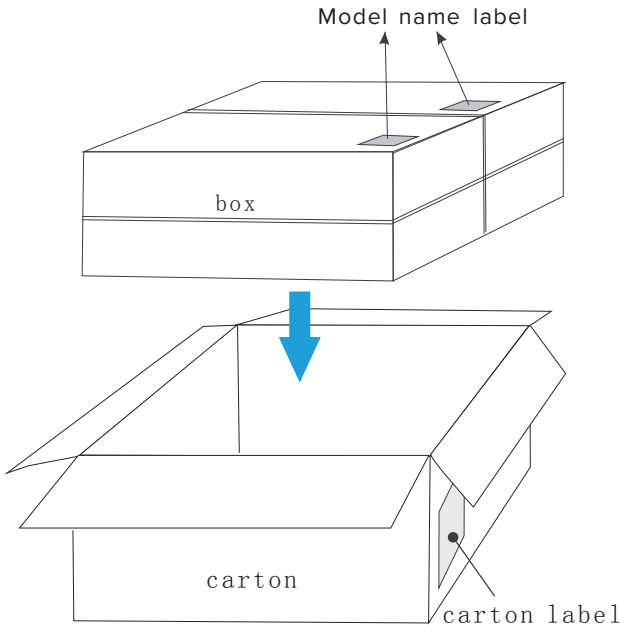


Trays are stacked up with an empty tray on the top.



The vacuum bag is placed inside the box and a Model Name Label stuck on the front-side of each box.





Each carton contains 4 boxes.

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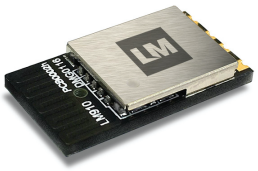
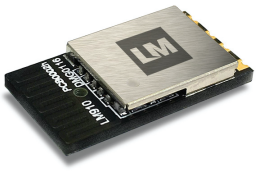
LM910 Packaging Options



910-0630

LM910 Module
1 x LM910 SMT Plug & Play PCB Antenna Module
Tray



910-0631

LM910 Module
1 x LM910 SMT Plug & Play PCB Antenna Module
Tape & Reel

- Product User Guides, Manuals and Configuration Software is available to download via our website - http://www.lm-technologies.com/downloads