

# 欧智通科技

*Fn-Link* 6221C-PUC

WiFi Dual-band 1X1 11ac + Bluetooth V4.2

Use's Manual

## **Revision History**

Date	Revision Content	Revised By	Version	Approved	
2017/09/22	-Preliminary	longer	1.0	William Tan	
2018/02/02	Updated pin function description	Longer	1.1	William Tan	



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## 1. Introduction

Fn-Link Technology would like to announce a low-cost and low-power consumption module which has all of the WiFi and Bluetooth functionalities. The highly integrated module makes the possibilities of web browsing, VoIP, Bluetooth headsets applications. With seamless roaming capabilities and advanced security, also could interact with different vendors' 802.11a/b/g/n/ac 1x1 Access Points in the wireless LAN.

The wireless module complies with IEEE 802.11 a/b/g/n/ac 1x1 MIMO standard and it can achieve up to a speed of 433Mbps to connect the wireless LAN. The integrated module provides PCI-e interface for WiFi, USB/ PCM interface for Bluetooth.

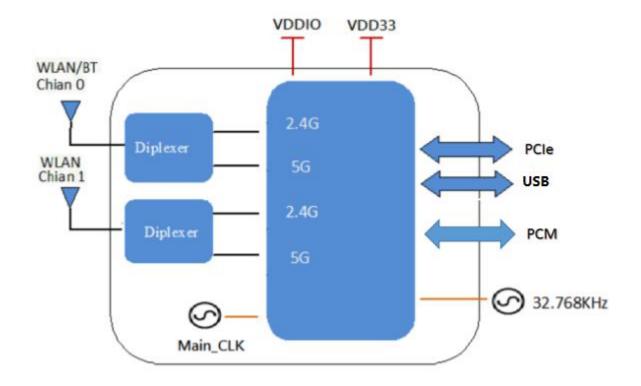
This compact module is a total solution for a combination of WiFi and Bluetooth V4.2 technologies. The module is specifically developed for all portable devices.



## 2. Features

- Highly integrated wireless local area network(WLAN) system-on-chip (SOC) for 5 GHZ 802.11ac, or 2.4G/5G 802.11n WLAN applications.
- Supports 20/40MHz at 2.4GHz and supports 20/40/80MHz at 5GHz
- Supports low power PCI-e interface for WLAN and USB/PCM interface for Bluetooth.
- Supports Bluetooth V4.2+HS, BLE and be backwards compatible with Bluetooth 1.2,
   2.X+ enhance data rate.
- Supports WLAN-Bluetooth coexistence and ISM-LTE coexistence.
- Supports Bluetooth for class1 and class2 power level transmissions without requiring an external PA.
- BT host digital interface:
  - USB1.1
  - PCM for audio data

A simplified block diagram of the module is depicted in the figure below.





# 3. General Specification

## 3.1 General Specification

Model Name	6221C-PUC
Product Description	Support WiFi/Bluetooth functionalities
Dimension	L x W x H: 16x 12x 1.8 (typical) mm (tolerance ±0.1mm)
WiFi Interface	Support PCI-e
BT Interface	USB/ PCM
Operating temperature	-20°C to70°C
Storage temperature	-40°C to 125°C

#### 3.1 Recommended Operating Rating

	Min.	Тур.	Max.	Unit
Operating Temperature	-30	25	85	deg.C
VCC33	3.15	3.3	3.45	V
VDDIO	3.15	3.3	3.45	V



# 4. WiFi RF Specification

## 4.1 2.4GHz RF Specification

Feature	Description		
WLAN Standard	IEEE 802.11a/b/g/n/ac WiFi compliant		
Frequency Range	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)		
Number of Channels	2.4GHz: Ch1 ~ Ch14		
	802.11b /11Mbps : 16 dBm ± 1.5 dB @ EVM ≤ -9dB		
Output Power	802.11g /54Mbps : 15 dBm ± 1.5 dB @ EVM ≤ -25dB		
	802.11n /MCS7 : 14 dBm ± 1.5 dB @ EVM ≤ -28dB		
CICO Dogojivo	- 1Mbps PER @ -92 dBm, typical		
SISO Receive Sensitivity (11b,20MHz)	- 2Mbps PER @ -90 dBm, typical		
@8% PER	- 5.5Mbps PER @ -87 dBm, typical		
@0701 LIX	- 11Mbps PER @ -85 dBm, typical		
	- 6Mbps PER @ -89 dBm, typical		
	- 9Mbps PER @ -88 dBm, typical		
SISO Receive	- 12Mbps PER @ -87 dBm, typical		
Sensitivity (11g,20MHz)	- 18Mbps PER @ -84 dBm, typical		
@10% PER	- 24Mbps PER @ -81 dBm, typical		
	- 36Mbps PER @ -78 dBm, typical		
	- 48Mbps PER @ -73 dBm, typical		
	- 54Mbps PER @ -71 dBm, typical		
	- 6Mbps PER @ -91 dBm, typical		
	- 9Mbps PER @ -90 dBm, typical		
NAINAO Danaire	- 12Mbps PER @ -89 dBm, typical		
MIMO Receive	- 18Mbps PER @ -87 dBm, typical		
Sensitivity (11g,20MHz) @10% PER	- 24Mbps PER @ -84 dBm, typical		
@10701 LIX	- 36Mbps PER @ -81 dBm, typical		
	- 48Mbps PER @ -76 dBm, typical		
	- 54Mbps PER @ -74 dBm, typical		
	- MCS=0 PER @ -89 dBm, typical		
SISO Receive	- MCS=1 PER @ -86 dBm, typical		
Sensitivity (11n,20MHz)	- MCS=2 PER @ -84 dBm, typical		
@10% PER	- MCS=3 PER @ -80 dBm, typical		
	- MCS=4 PER @ -77 dBm, typical		



	- MCS=5	PER @ -72 dBm, typical	
	- MCS=6	PER @ -71 dBm, typical	
	- MCS=7	PER @ -69 dBm, typical	
	- MCS=0	PER @ -90 dBm, typical	
	- MCS=1	PER @ -89 dBm, typical	
	- MCS=2	PER @ -87 dBm, typical	
MIMO Deseive	- MCS=3	PER @ -84 dBm, typical	
MIMO Receive	- MCS=4	PER @ -80 dBm, typical	
Sensitivity (11n,20MHz) @10% PER	- MCS=5	PER @ -75 dBm, typical	
@10/01 LIX	- MCS=6	PER @ -73 dBm, typical	
	- MCS=7	PER @ -72 dBm, typical	
	- MCS=8	PER @ -87 dBm, typical	
	- MCS=15	PER @ -68 dBm, typical	
Maximum Input Level	802.11b : -10	dBm	
Maximum input Level	802.11g/n : -20	O dBm	
Antenna Reference	Small antennas with 0~2 dBi peak gain		

## 4 .2 5GHz RF Specification

Conditions: VBAT=3.6V; VDDIO=3.3V; Temp:25°C

Feature	Description		
WLAN Standard	IEEE 802.11a/n 2x2, WiFi compliant		
Frequency Range	4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)		
Number of Channels	5.0GHz: Please see the table <sup>1</sup>		
	802.11a /54Mbps : 13 dBm ± 1.5 dB @ EVM ≤ -25dB		
Output Power	802.11n /MCS7 : 12 dBm ± 1.5 dB @ EVM ≤ -28dB		
	802.11ac /MCS9 : 11 dBm ± 1.5 dB @ EVM ≤ -32dB		
	- 6Mbps PER @ -88 dBm, typical		
	- 9Mbps PER @ -87 dBm, typical		
	- 12Mbps PER @ -86 dBm, typical		
SISO Receive Sensitivity	- 18Mbps PER @ -83 dBm, typical		
(11a,20MHz) @10% PER	- 24Mbps PER @ -80 dBm, typical		
	- 36Mbps PER @ -77 dBm, typical		
	- 48Mbps PER @ -72 dBm, typical		
	- 54Mbps PER @ -70 dBm, typical		
MIMO Receive Sensitivity	- 6Mbps PER @ -90 dBm, typical		
(11a,20MHz) @10% PER	- 9Mbps PER @ -89 dBm, typical		



	- 12Mbps	PER @ -88 dBm, typical
	- 18Mbps	PER @ -86 dBm, typical
	- 24Mbps	PER @ -83 dBm, typical
	- 36Mbps	PER @ -80 dBm, typical
	- 48Mbps	PER @ -75 dBm, typical
	- 54Mbps	PER @ -71 dBm, typical
	- MCS=0	PER @ -88 dBm, typical
	- MCS=1	PER @ -85 dBm, typical
	- MCS=2	PER @ -83 dBm, typical
SISO Receive Sensitivity	- MCS=3	PER @ -80 dBm, typical
(11n,20MHz) @10% PER	- MCS=4	PER @ -76 dBm, typical
	- MCS=5	PER @ -71 dBm, typical
	- MCS=6	PER @ -70 dBm, typical
	- MCS=7	PER @ -68 dBm, typical
	- MCS=0	PER @ -89 dBm, typical
	- MCS=1	PER @ -88 dBm, typical
	- MCS=2	PER @ -86 dBm, typical
	- MCS=3	PER @ -83 dBm, typical
MIMO Receive Sensitivity	- MCS=4	PER @ -79 dBm, typical
(11n,20MHz) @10% PER	- MCS=5	PER @ -74 dBm, typical
	- MCS=6	PER @ -73 dBm, typical
	- MCS=7	PER @ -71 dBm, typical
	- MCS=8	PER @ -88 dBm, typical
	- MCS=15	PER @ -68 dBm, typical
	- MCS=0	PER @ -85 dBm, typical
	- MCS=1	PER @ -82 dBm, typical
	- MCS=2	PER @ -80 dBm, typical
SISO Receive Sensitivity	- MCS=3	PER @ -77 dBm, typical
(11n,40MHz) @10% PER	- MCS=4	PER @ -73 dBm, typical
	- MCS=5	PER @ -69 dBm, typical
	- MCS=6	PER @ -67 dBm, typical
	- MCS=7	PER @ -66 dBm, typical
	- MCS=0	PER @ -87 dBm, typical
MIMO Receive Sensitivity	- MCS=1	PER @ -85 dBm, typical
(11n,40MHz) @10% PER	- MCS=2	PER @ -83 dBm, typical
	- MCS=3	PER @ -80 dBm, typical
IL	1	- · · · · · · · · · · · · · · · · · · ·



	- MCS=4 PER @ -76 dBm, typical
	- MCS=5 PER @ -72 dBm, typical
	- MCS=6 PER @ -70 dBm, typical
	- MCS=7 PER @ -69 dBm, typical
	- MCS=8 PER @ -85 dBm, typical
	- MCS=15 PER @ -66 dBm, typical
	- MCS=0, NSS1 PER @ -86 dBm, typical
	- MCS=1, NSS1 PER @ -84 dBm, typical
	- MCS=2, NSS1 PER @ -82 dBm, typical
0100 D	- MCS=3, NSS1 PER @ -79 dBm, typical
SISO Receive Sensitivity	- MCS=4, NSS1 PER @ -75 dBm, typical
(11ac,20MHz) @10% PER	- MCS=5, NSS1 PER @ -70 dBm, typical
	- MCS=6, NSS1 PER @ -69 dBm, typical
	- MCS=7, NSS1 PER @ -68 dBm, typical
	- MCS=8, NSS1 PER @ -64 dBm, typical
	- MCS=0, NSS1 PER @ -88 dBm, typical
	- MCS=1, NSS1 PER @ -87 dBm, typical
	- MCS=2, NSS1 PER @ -85 dBm, typical
	- MCS=3, NSS1 PER @ -82 dBm, typical
MIMO Deceive Consitivity	- MCS=4, NSS1 PER @ -78 dBm, typical
MIMO Receive Sensitivity (11ac,20MHz) @10% PER	- MCS=5, NSS1 PER @ -73 dBm, typical
(11ac,20101112) @10 /0 FER	- MCS=6, NSS1 PER @ -72 dBm, typical
	- MCS=7, NSS1 PER @ -71 dBm, typical
	- MCS=8, NSS1 PER @ -67 dBm, typical
	- MCS=0, NSS2 PER @ -87 dBm, typical
	- MCS=8, NSS2 PER @ -63 dBm, typical
	- MCS=0, NSS1 PER @ -84 dBm, typical
	- MCS=1, NSS1 PER @ -81 dBm, typical
	- MCS=2, NSS1 PER @ -79 dBm, typical
	- MCS=3, NSS1 PER @ -76 dBm, typical
SISO Receive Sensitivity	- MCS=4, NSS1 PER @ -73 dBm, typical
(11ac,40MHz) @10% PER	- MCS=5, NSS1 PER @ -68 dBm, typical
	- MCS=6, NSS1 PER @ -67 dBm, typical
	- MCS=7, NSS1 PER @ -66 dBm, typical
	- MCS=8, NSS1 PER @ -61 dBm, typical



- MCS=0, NSS1 PER @ -86 dBm, typical - MCS=1, NSS1 PER @ -82 dBm, typical - MCS=3, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -76 dBm, typical - MCS=4, NSS1 PER @ -76 dBm, typical - MCS=5, NSS1 PER @ -76 dBm, typical - MCS=6, NSS1 PER @ -71 dBm, typical - MCS=6, NSS1 PER @ -70 dBm, typical - MCS=6, NSS1 PER @ -70 dBm, typical - MCS=7, NSS1 PER @ -69 dBm, typical - MCS=8, NSS1 PER @ -69 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=0, NSS2 PER @ -84 dBm, typical - MCS=0, NSS2 PER @ -84 dBm, typical - MCS=0, NSS2 PER @ -80 dBm, typical - MCS=0, NSS1 PER @ -81 dBm, typical - MCS=1, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -60 dBm, typical - MCS=3, NSS1 PER @ -60 dBm, typical - MCS=3, NSS1 PER @ -60 dBm, typical - MCS=6, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=0, NSS2 PER @ -60 dBm, typical			
MIMO Receive Sensitivity (11ac,40MHz) @10% PER		- MCS=0, NSS1 PER @ -86 dBm, typical	
MIMO Receive Sensitivity (11ac,40MHz) @10% PER		- MCS=1, NSS1 PER @ -84 dBm, typical	
MIMO Receive Sensitivity (11ac,40MHz) @10% PER		- MCS=2, NSS1 PER @ -82 dBm, typical	
MIMO Receive Sensitivity (11ac,40MHz) @10% PER  - MCS=5, NSS1 PER @ -70 dBm, typical - MCS=8, NSS1 PER @ -69 dBm, typical - MCS=9, NSS1 PER @ -63 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -70 dBm, typical - MCS=9, NSS1 PER @ -63 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=0, NSS1 PER @ -78 dBm, typical - MCS=1, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=5, NSS1 PER @ -60 dBm, typical - MCS=6, NSS1 PER @ -64 dBm, typical - MCS=7, NSS1 PER @ -64 dBm, typical - MCS=7, NSS1 PER @ -65 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=0, NSS1 PER @ -69 dBm, typical - MCS=1, NSS1 PER @ -79 dBm, typical - MCS=2, NSS1 PER @ -72 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -72 dBm, typical - MCS=5, NSS1 PER @ -60 dBm, typical - MCS=6, NSS1 PER @ -60 dBm, typical - MCS=8, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical		- MCS=3, NSS1 PER @ -79 dBm, typical	
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- MCS=8, NSS1 PER @ -64 dBm, typical - MCS=9, NSS1 PER @ -63 dBm, typical - MCS=0, NSS2 PER @ -84 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=0, NSS1 PER @ -60 dBm, typical - MCS=0, NSS1 PER @ -81 dBm, typical - MCS=1, NSS1 PER @ -78 dBm, typical - MCS=2, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -64 dBm, typical - MCS=7, NSS1 PER @ -62 dBm, typical - MCS=8, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=1, NSS1 PER @ -56 dBm, typical - MCS=1, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -81 dBm, typical - MCS=2, NSS1 PER @ -72 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=3, NSS1 PER @ -69 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=5, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -69 dBm, typical - MCS=7, NSS1 PER @ -69 dBm, typical - MCS=7, NSS1 PER @ -60 dBm, typical - MCS=8, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical	(11ac,40MHz) @10% PER	- MCS=6, NSS1 PER @ -70 dBm, typical	
- MCS=9, NSS1 PER @ -63 dBm, typical - MCS=0, NSS2 PER @ -84 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=0, NSS1 PER @ -60 dBm, typical - MCS=1, NSS1 PER @ -78 dBm, typical - MCS=2, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -69 dBm, typical - MCS=4, NSS1 PER @ -66 dBm, typical - MCS=6, NSS1 PER @ -66 dBm, typical - MCS=6, NSS1 PER @ -64 dBm, typical - MCS=7, NSS1 PER @ -62 dBm, typical - MCS=8, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -82 dBm, typical - MCS=9, NSS1 PER @ -82 dBm, typical - MCS=0, NSS1 PER @ -81 dBm, typical - MCS=1, NSS1 PER @ -79 dBm, typical - MCS=2, NSS1 PER @ -72 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -66 dBm, typical - MCS=5, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -60 dBm, typical - MCS=7, NSS1 PER @ -65 dBm, typical - MCS=8, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical		- MCS=7, NSS1 PER @ -69 dBm, typical	
- MCS=0, NSS2 PER @ -84 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=0, NSS1 PER @ -81 dBm, typical - MCS=1, NSS1 PER @ -76 dBm, typical - MCS=2, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=3, NSS1 PER @ -69 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=5, NSS1 PER @ -66 dBm, typical - MCS=6, NSS1 PER @ -66 dBm, typical - MCS=7, NSS1 PER @ -62 dBm, typical - MCS=8, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -82 dBm, typical - MCS=0, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -81 dBm, typical - MCS=2, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -75 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -66 dBm, typical - MCS=5, NSS1 PER @ -67 dBm, typical - MCS=5, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -60 dBm, typical - MCS=7, NSS1 PER @ -65 dBm, typical - MCS=8, NSS1 PER @ -65 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical		- MCS=8, NSS1 PER @ -64 dBm, typical	
- MCS=9, NSS2 PER @ -60 dBm, typical - MCS=0, NSS1 PER @ -81 dBm, typical - MCS=1, NSS1 PER @ -78 dBm, typical - MCS=2, NSS1 PER @ -76 dBm, typical - MCS=3, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=5, NSS1 PER @ -66 dBm, typical - MCS=6, NSS1 PER @ -66 dBm, typical - MCS=7, NSS1 PER @ -62 dBm, typical - MCS=8, NSS1 PER @ -62 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -75 dBm, typical - MCS=4, NSS1 PER @ -75 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=5, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -69 dBm, typical - MCS=7, NSS1 PER @ -60 dBm, typical - MCS=8, NSS1 PER @ -61 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical		- MCS=9, NSS1 PER @ -63 dBm, typical	
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- MCS=2, NSS1		- MCS=0, NSS1 PER @ -81 dBm, typical	
SISO Receive Sensitivity (11ac,80MHz) @10% PER  - MCS=3, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -66 dBm, typical - MCS=6, NSS1 PER @ -66 dBm, typical - MCS=7, NSS1 PER @ -62 dBm, typical - MCS=8, NSS1 PER @ -62 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=9, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -81 dBm, typical - MCS=2, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -75 dBm, typical - MCS=4, NSS1 PER @ -75 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -67 dBm, typical - MCS=7, NSS1 PER @ -67 dBm, typical - MCS=7, NSS1 PER @ -65 dBm, typical - MCS=8, NSS1 PER @ -61 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical		- MCS=1, NSS1 PER @ -78 dBm, typical	
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- MCS=6, NSS1 PER @ -64 dBm, typical - MCS=7, NSS1 PER @ -62 dBm, typical - MCS=8, NSS1 PER @ -58 dBm, typical - MCS=9, NSS1 PER @ -56 dBm, typical - MCS=0, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -81 dBm, typical - MCS=2, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -75 dBm, typical - MCS=4, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical (11ac,80MHz) @10% PER - MCS=6, NSS1 PER @ -67 dBm, typical - MCS=7, NSS1 PER @ -65 dBm, typical - MCS=8, NSS1 PER @ -61 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical	SISO Receive Sensitivity	- MCS=4, NSS1 PER @ -69 dBm, typical	
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- MCS=0, NSS1 PER @ -82 dBm, typical - MCS=1, NSS1 PER @ -81 dBm, typical - MCS=2, NSS1 PER @ -79 dBm, typical - MCS=3, NSS1 PER @ -75 dBm, typical - MCS=4, NSS1 PER @ -72 dBm, typical - MCS=4, NSS1 PER @ -69 dBm, typical - MCS=5, NSS1 PER @ -69 dBm, typical - MCS=6, NSS1 PER @ -67 dBm, typical - MCS=7, NSS1 PER @ -65 dBm, typical - MCS=7, NSS1 PER @ -61 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=9, NSS1 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -56 dBm, typical - MCS=9, NSS2 PER @ -56 dBm, typical		- MCS=8, NSS1 PER @ -58 dBm, typical	
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(11ac,80MHz) @10% PER		- MCS=4, NSS1 PER @ -72 dBm, typical	
- MCS=7, NSS1 PER @ -65 dBm, typical - MCS=8, NSS1 PER @ -61 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=0, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -56 dBm, typical Maximum Input Level 802.11a/n: -30 dBm	MIMO Receive Sensitivity	- MCS=5, NSS1 PER @ -69 dBm, typical	
- MCS=8, NSS1 PER @ -61 dBm, typical - MCS=9, NSS1 PER @ -60 dBm, typical - MCS=0, NSS2 PER @ -80 dBm, typical - MCS=9, NSS2 PER @ -56 dBm, typical  Maximum Input Level 802.11a/n: -30 dBm	(11ac,80MHz) @10% PER	- MCS=6, NSS1 PER @ -67 dBm, typical	
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Maximum Input Level 802.11a/n : -30 dBm		- MCS=0, NSS2 PER @ -80 dBm, typical	
		- MCS=9, NSS2 PER @ -56 dBm, typical	
Antenna Reference Small antennas with 0~2 dBi peak gain	Maximum Input Level	802.11a/n : -30 dBm	
· · · · · · · · · · · · · · · · · · ·	Antenna Reference	Small antennas with 0~2 dBi peak gain	



#### <sup>1</sup>5GHz(20MHz) Channel table

Band range	Operating Channel Numbers	Channel center frequencies (MHz)
	36	5180
5180MHz~5240MHz	40	5200
	44	5220
	48	5240
	52	5260
5260MHz~5320MHz	56	5280
(not support)	60	5300
(,	64	5320
	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
5550MHz~5700MHz	120	5600
(not support)	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
	149	5745
	153	5765
5745MHz~5825MHz	157	5785
	161	5805
	165	5825

# 5. Bluetooth Specification

### 5.1 Bluetooth Specification

Feature	Description	
General Specification		
Bluetooth Standard	Bluetooth V4.2 of 1, 2 and 3 Mbps.	
Host Interface	USB	
Antenna Reference	Small antennas with 0~2 dBi peak gain	
Frequency Band	2402 MHz ~ 2480 MHz	
Number of Channels	79 channels	
Modulation	FHSS, GFSK, DPSK, DQPSK	



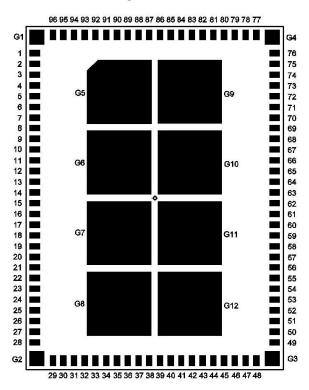


RF Specification								
	Min.	Typical.	Max.					
Output Power (Class 1.5)		4 dBm						
Output Power (Class 2)		2 dBm						
Sensitivity @ BER=0.1% for GFSK (1Mbps)		-92 dBm						
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)		-92 dBm						
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)		-85 dBm						
	GFSK (1Mbps):-20dBm							
Maximum Input Level	π/4-DQPSK (2Mbps) :-20dBm							
	8DPSK (3Mbps)	8DPSK (3Mbps) :-20dBm						

# 6. Pin Assignments

### 6.1 Pin Outline

#### < TOP VIEW >





### 6.2 Pin Definition

NO	Name	Туре	Description	Voltage
1	NC	_	No connect	
2	NC	_	No connect	
3	NC	_	No connect	
4	3_3V	Р	Main power voltage source input 3.3V	3.3V
5	3_3V	Р	Main power voltage source input 3.3V	3.3V
6	GND	_	Ground connections	0V
7	NC	_	No connect	
8	NC	_	No connect	
9	NC	_	No connect	
10	NC	_	No connect	
11	LTE_SYNC	I	LTE coexist signal	3.3V
12	LTE_PRI	0	LTE coexistence signal	3.3V
13	LTE_ACTIVE	I/O	LTE coexistence signal	3.3V
14	NC	_	No connect	
15	NC	_	No connect	
16	NC	_	No connect	
17	GND	_	Ground connections	0V
18	NC	_	No connect	
19	NC	_	No connect	
20	GND	_	Ground connections	0V
21	NC	_	No connect	
22	NC	_	No connect	
23	GND	_	Ground connections	0V
24	HOST_WAKE_BT	PD	Host wake up BT	3.3V
25	NC	_	No connect	
26	GND	_	Ground connections	
27	SUSCLK	PD	External sleep clock input(32.768kHz),internal weak pull down.	3.3V
28	WL_EN	_	WLAN enable pin, High: enable,Low:disable	3.3V
29	PCIe_WAKE	OD	PCI-e wake up host	3.3V
30	CLKREQ	OD	PCI-e reference clock request signal	3.3V
31	PERST	PD	PCI-e reset module	3.3V
32	GND	_	Ground connections	0V
33	REFCLKN0	I	PCI-E CLK Difference -	



34	REFCLKP0	I	PCI-E CLK Difference +			
35	GND	_	Ground connections	0V		
36	PETN0	0	PCI-E Data Out Difference -			
37	PETP0	0	PCI-E Data Out Difference +			
38	GND	_	Ground connections	0V		
39	PERN0	I	PCI-E Data IN Difference -			
40	PERP0	I	PCI-E Data IN Difference +			
41	GND	_	Ground connections	0V		
42	NC	_	No connect			
43	NC	_	No connect			
44	NC	_	No connect			
45	NC	_	No connect			
46	NC	_	No connect			
47	NC	_	No connect			
48	NC	_	No connect			
49	NC	_	No connect			
50	NC	_	No connect			
51	NC	_	No connect			
52	NC	_	No connect			
53	BT_WAKE_HOST	0	Bluetooth wake up host	3.3V		
54	NC	_	No connect			
55	NC	_	No connect			
56	NC	_	No connect			
57	NC	_	No connect			
58	PCM_SYNC	I/O	PCM sync signal	3.3V		
59	PCM_IN	I	PCM data input	3.3V		
60	PCM_OUT	0	PCM Data output	3.3V		
61	PCM_CLK	I/O	PCM clock	3.3V		
62	GND	_	Ground connections	0V		
63	BT_EN	PD	Bluetooth enable signal, internal pull up 100KΩ resistor and pull down 0.1uF capacitor,active high.			
64	LED#2	0	BT link LED, active low.			
65	LED#1	0	WLAN link LED,active low.			
66	NC	_	No connect			
67	HOST_WAKE_BT	PD	Host wake up BT, active high			
68	GND	_	Ground connections			
				I		

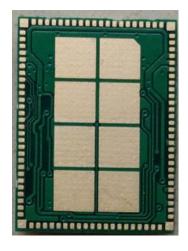


69	USB_D-	I/O	USB difference line for BT				
70	USB_D+	I/O	USB difference line for BT				
71	GND	_	Ground connections	0V			
72	3.3V	Р	Main power voltage source input 3.3V				
73	3.3V	Р	Main power voltage source input 3.3V				
74~ 96	GND		Ground connections				
G1- G12	GND		Ground connections				

## 7. Dimensions

### 7.1 True Module

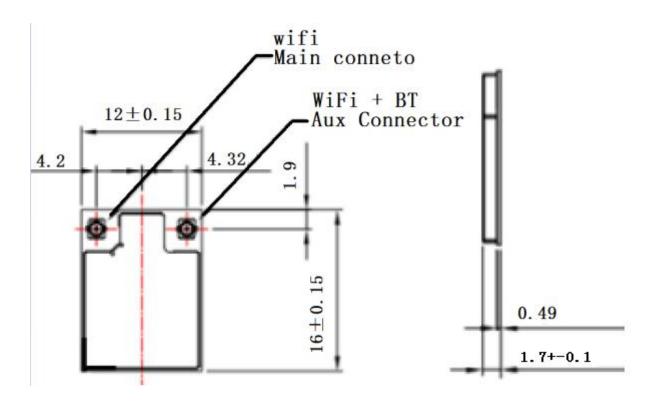




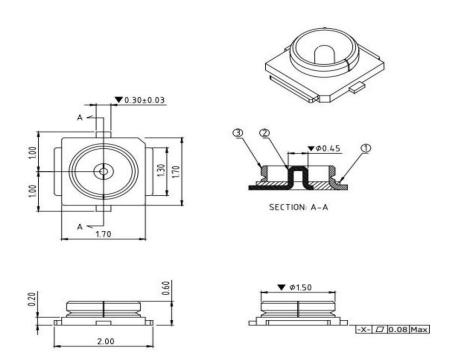


## 7.2 Physical Outline

(Unit: mm)



## 7.3 Connector Specification

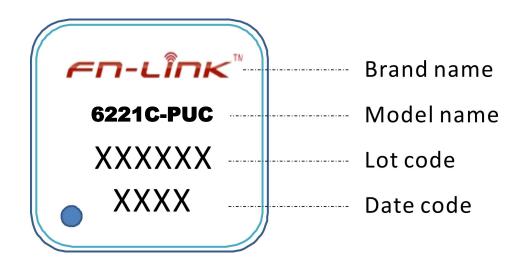






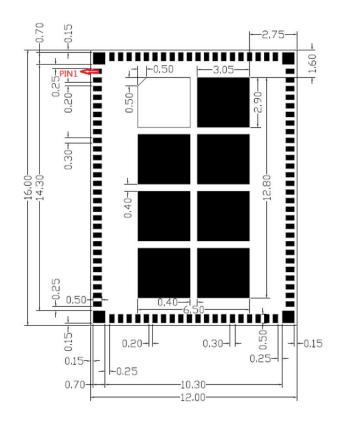
### 7.4 Marking Description

#### < TOP VIEW >



### 7.5 Module Physical Dimensions

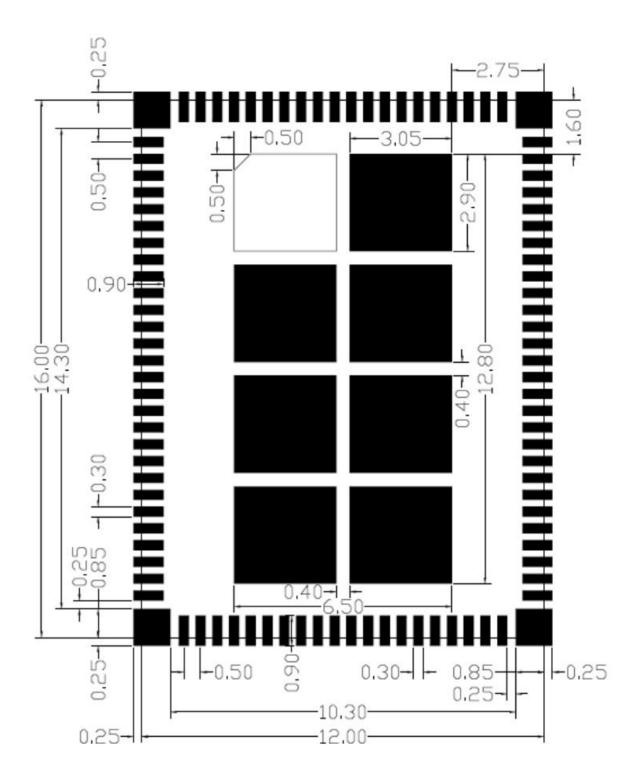
(Unit: mm) < TOP VIEW >





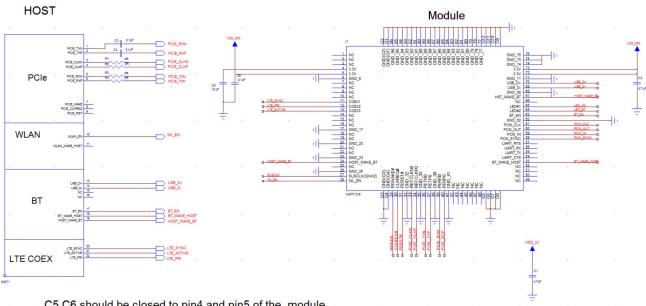
### 7.6 Layout Recommendation

(Unit: mm)





# 8. Reference Design



C5 C6 should be closed to pin4 and pin5 of the module

C1 should be cosed to pin43 of the module

PCle layout should be followed to end impedence 50 Ohm and difference impedence 100 Ohm.

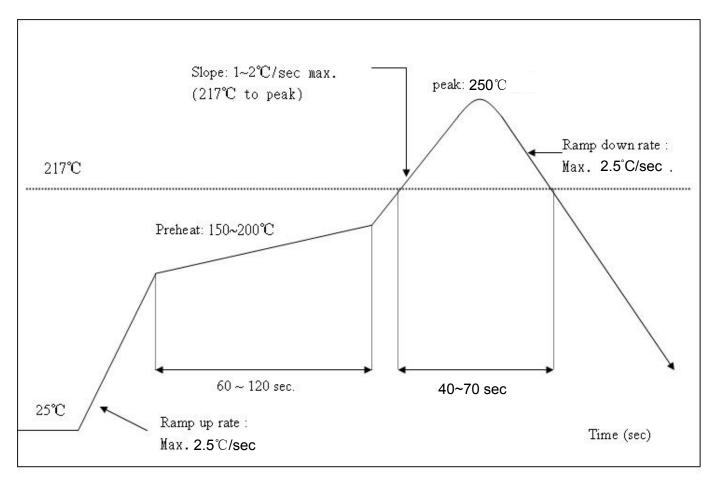




## 9. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C Number of Times : ≤2 times



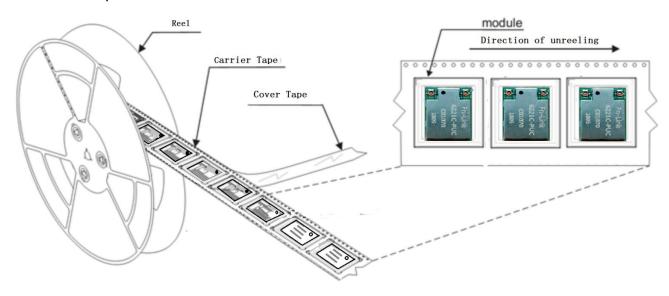




# 10. Package Information

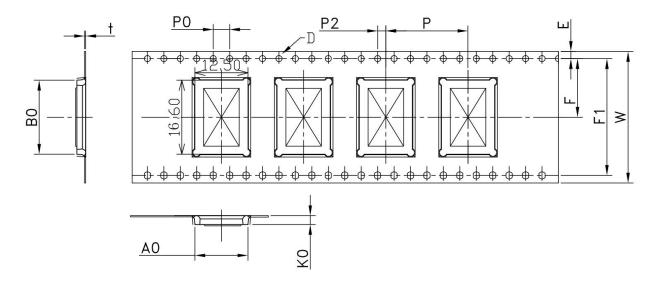
#### 10.1 Reel

A roll of 2000pcs



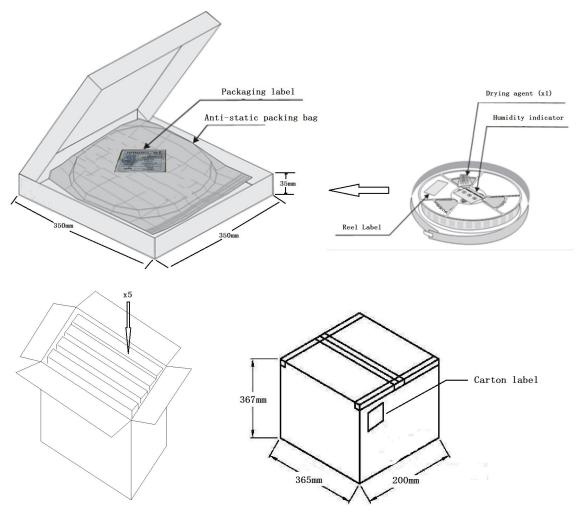
### 10.2 Carrier Tape Detail

,	ITEM	W	A0	В0	D	Е	F	F1	KO	P0	P2	P	T
	DIM	32	12.50	16.60	1.5	1.75	14. 20	28.4	2. 15	4.0	2.0	20.0	0.30
	TOLE	+0.3 -0.3	±0.18	±0.18	+0. 1 -0. 0	$\pm 0.1$	$\pm 0.15$	±0.10	$\pm 0.10$	$\pm 0.1$	$\pm 0.15$	$\pm 0.1$	$\pm 0.05$





#### 10.3 Packaging Detail



10.4 Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH).
- b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5.
- c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- b) "IPC/JEDEC J-STD-033A paragraph 5.2" is respected
- d) Baking is required if conditions b) or c) are not respected
- e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more

#### **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. (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: 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 generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. 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 try to correct the interference by one or more of the following measures:

- ---Reorient or relocate the receiving antenna.
- ---Increase the separation between the equipment and receiver.
- ---Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ---Consult the dealer or an experienced radio/TV technician for help.

**WARNING:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### LABEL OF THE END PRODUCT:

The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2AATL-6221C-PUC". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

#### **RF Exposure**

This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person's body) when installed in certain specific OEM configurations.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Due to missing shielding the module is strictly limited to integration by the Grantee himself or his dedicated OEM integrator under control of the Grantee. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

#### **IMPORTANT NOTE:**

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

#### **EU Regulatory Conformance**

Hereby, we(FN-LINK TECHNOLOGY LIMITED) declared that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU