

802.11n, Dual Band 2T2R Wireless LAN USB Module

WN4516R
User Manual



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FCC WARNING STATEMENT**FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE 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 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.

CAUTION:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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 warning

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated in accordance with provided instructions and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

FCC RF Radiation Exposure Statement: 1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. 2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: PPQ-WN4516R " and "Contains transmitter module IC: 4491A - WN4516R"

Information for the OEMs and Integrators

The following statement must be included with all versions of this document supplied to an OEM or integrator, but should not be distributed to the end user.

- 1) This device is intended for OEM integrators only.
- 2) Please see the full Grant of Equipment document for other restrictions.

IC WARNING STATEMENT**Canada, Industry Canada (IC) Notices**

This Class B digital apparatus complies with Canadian ICES-003 and RSS-210. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Canada, avis d'Industry Canada (IC)

Cet appareil numérique de classe B est conforme aux normes canadiennes ICES-003 et RSS-210.

Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (les antennes se situent à moins de 20 cm du corps d'une personne).

PRODUCT FEATURES

- Operate at ISM frequency Band (2.4 / 5GHz)
- IEEE Standards Support, 802.11a , 802.11b, 802.11g and 802.11n
- Support USB 2.0 host interface
- Enterprise level security supporting: WPA, WPA2, WPS2.0, WAPI
- Two-stream IEEE 802.11n support for 20MHz and 40MHz bandwidth channels provides PHY layer rates up to 300Mbps
- Integrated LNA, PA and T/R switch
- Support Wi-Fi Direct
- RoHS compliance
- Low Halogen compliance

PRODUCT SPECIFICATIONS

MAIN CHIPSET

MAC/ Baseband/ RF: MediaTek MT7600U

FUNCTIONAL SPECIFICATIONS

Wi-Fi Function	
Standard	IEEE802.11a;IEEE802.11b; IEEE 802.11g; IEEE 802.11n
Bus Interface	USB2.0
Data Rate	<p><i>802.11a:</i> 54, 48, 36, 24, 18, 12, 9, 6 Mbps</p> <p><i>802.11b:</i> 11, 5.5, 2, 1 Mbps</p> <p><i>802.11g:</i> 54, 48, 36, 24, 18, 12, 9, 6 Mbps</p> <p><i>802.11n:</i> MCS 0 to 15 for HT20MHz MCS 0 to 15 for HT40MHz</p>
Media Access Control	CSMA/CA with ACK
Modulation Techniques	<p><i>802.11a:</i> 64QAM, 16QAM, QPSK, BPSK</p> <p><i>802.11b:</i> CCK, DQPSK, DBPSK</p> <p><i>802.11g:</i> 64QAM, 16QAM, QPSK, BPSK</p> <p><i>802.11n:</i> 64QAM, 16QAM, QPSK, BPSK</p>
Network Architecture	Ad-hoc mode (Peer-to-Peer) Infrastructure mode
Operation Channel	<p><i>2.4GHz</i> 11: (Ch. 1-11) – United States 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan</p> <p><i>5GHz</i> 21: USA 19: EU 8: Japan</p>
Frequency Range	<p><i>802.11bg</i> 2.400 ~ 2.4835 GHz</p> <p><i>802.11a</i> 5.15 ~ 5.85 GHz</p>
Transmit Output Power – 2x2 MAX: 16.5dBm (Tolerance: ±1.5dBm)	<p><i>802.11a:</i> 12 dBm@6Mbps 12 dBm@54Mbps</p> <p><i>802.11b:</i> 15 dBm@1Mbps 15 dBm@11Mbps</p> <p><i>802.11g:</i> 14 dBm@6Mbps</p>

14 dBm@54Mbps

802.11n:

2.4G

20MHz:

13 dBm@MCS0

13 dBm@MCS7

13 dBm@MCS15

40MHz:

13 dBm@MCS0

13 dBm@MCS7

13 dBm@MCS15

5G

20MHz:

11 dBm@MCS0

11 dBm@MCS7

11 dBm@MCS15

40MHz:

11 dBm@MCS0

11 dBm@MCS7

11 dBm@MCS15

Receiver Sensitivity

802.11a:

-86 dBm@6Mbps

-70 dBm@54Mbps

802.11b:

-88 dBm@1Mbps

-82 dBm@11Mbps

802.11g:

-86 dBm@6Mbps

-71 dBm@54Mbps

802.11n:

2.4G/5G

20MHz

-86 dBm@MCS0

-68 dBm@MCS7

-68 dBm@MCS15

40MHz

-83 dBm@MCS0

-65 dBm@MCS7

-65 dBm@MCS15

Security

WPA, WPA2, WPS, WEP 64b&128bit, IEEE 802.1X, IEEE 802.11i

Operating Voltage

3.3V ± 5% I/O supply voltage

OS Supported

Linux based

	<i>Average</i>	<i>Max</i>
Power Consumption	<i>TX Mode:</i> TBD mA	1.2A <i>Strongly recommend TV platform has to fulfill output current at least 1A</i>
	<i>RX Mode:</i> TBD mA	
	<i>Standby Mode:</i> TBD mA	
	<i>Radio Off:</i> TBD mA	

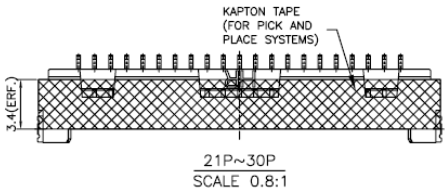
Antenna Type

Metal antenna

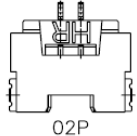
PIN ASSIGNMENT

Pin.	Pin Define	Status
1	+3.3V	YES
2	USB_D-	YES
3	USB_D+	YES
4	GND	YES
5	RESET#	YES
6	GND	YES

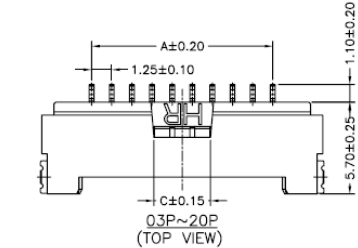
USB CONNECTOR SPEC



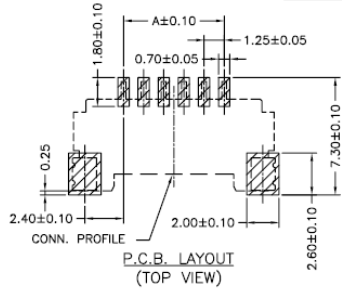
21P~30P
SCALE 0.8:1



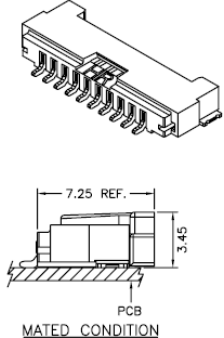
02P



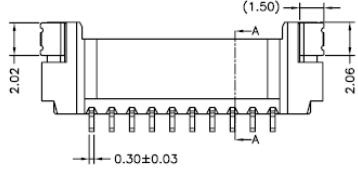
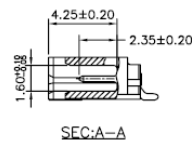
03P~20P
(TOP VIEW)



P.C.B. LAYOUT
(TOP VIEW)



MATED CONDITION

SEC:A-A

P/N LEGEND

A1253 WRA-S-XP XXX

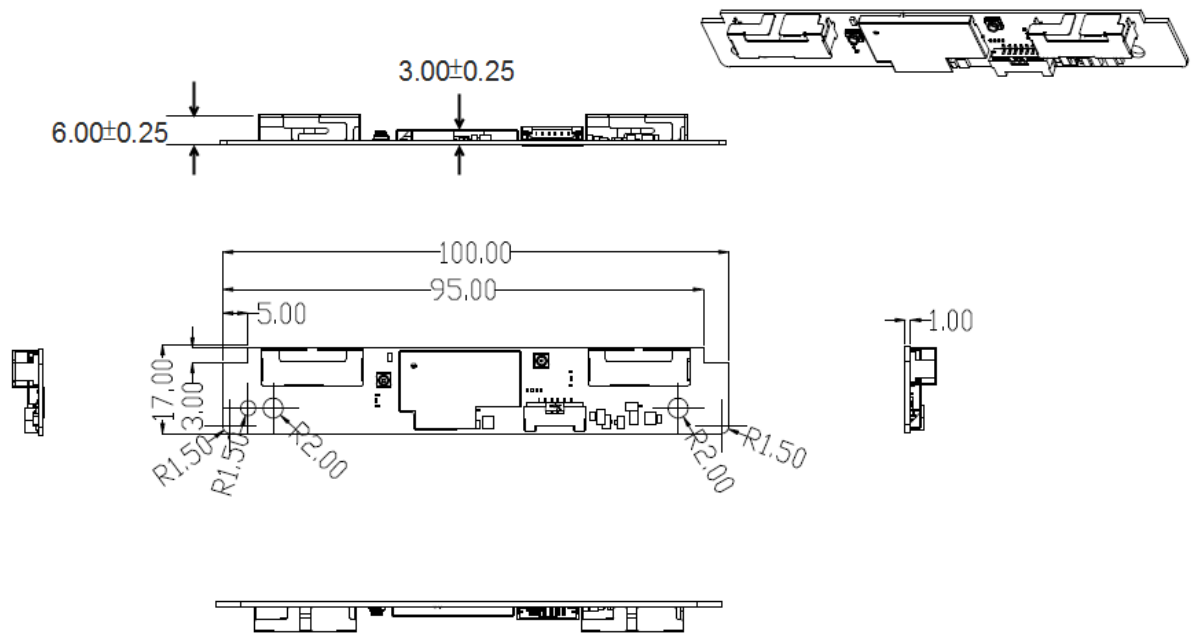
① Series No.
② Connector type: WR=Right angle A Type
③ Mounting type: S=SMT Type
④ No. of circuits
⑤ Option code:
Blank=Contacts/Matte Tin-plated
Solder Tabs/Matte Tin-plated
D01=Contacts/Gold-flash and Solder tabs/Gold-flash
D20=Contacts/Gold-flash and Solder tabs/Gold-flash With Mylar
C=Contacts/Matte Tin-plated Solder Tabs/Matte Tin-plated With Mylar

SPECIFICATIONS
Current Rating: 1A AC,DC
Voltage Rating: 150V AC,DC
Temperature Range: -25°C ~ +85°C
Contact Resistance: 20mΩ Max.
Insulation Resistance: 500MΩ Min.
Withstanding Voltage: 500V AC/minute
Pin Material: Brass
Solder Tabs: Brass
Material: Nylon 6T,UL94V-0
Color: Natural(Black)

Circuit No.	Dimensions		
	A	B	C
02P	1.25	7.45	3.50
03P	2.50	8.70	3.50
04P	3.75	9.95	3.50
05P	5.00	11.20	3.50
06P	6.25	12.45	3.50
07P	7.50	13.70	3.50
08P	8.75	14.95	3.50
09P	10.00	16.20	3.50
10P	11.25	17.45	3.50
11P	12.50	18.70	5.00
12P	13.75	19.95	5.00
13P	15.00	21.20	5.00
14P	16.25	22.45	5.00
15P	17.50	23.70	5.00
20P	23.75	29.95	5.00
25P	30.00	36.20	6.00
30P	36.25	42.45	6.00

UNIT	SCALE	SHEET	TITLE:				
mm	1:1	1 of 2	1.25mm PITCH				
DRAWN BY	APPROVED BY	90° WAFER-SMT TYPE,					
歐陽小強	謝瑞清	ULTRA LOW PROFILE,					
2007.12.26	2007.12.26	WITHOUT BOSS					
GENERAL TOLERANCE			DRAW NO.:				
			A1253WRA-S-XP				
			REV. B2				
B2	EN1012140291	2010.12.14	陳敏	X.X±0.25	ANGLE		
REV.	DESCRIPTION	DATE	NAME	X.XX±0.15	⊕		
				X.XXX±0.05			

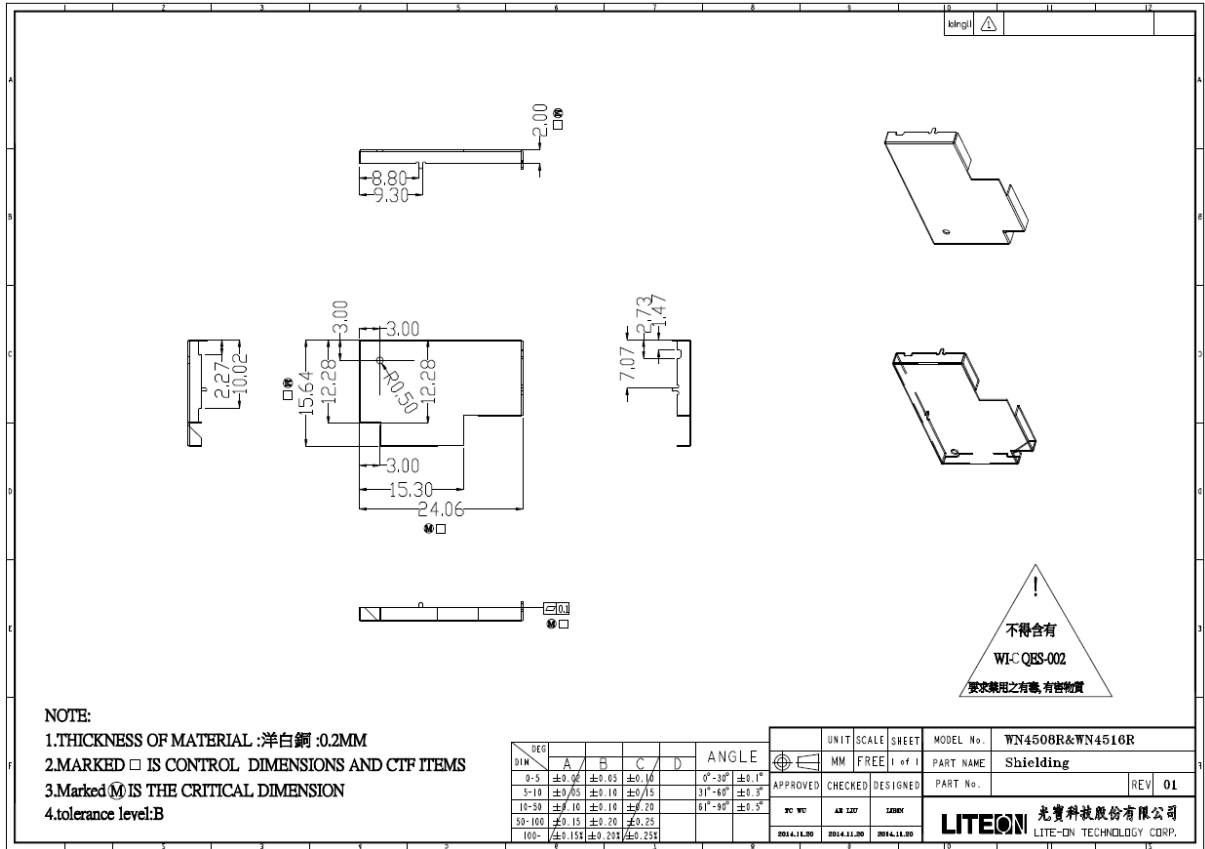
MECHANICAL



Tolerance: $\pm 0.10\text{mm}$
Unit: mm

SHIELDING CASE SPEC

Manufacture: Hun Pai(宏湃)



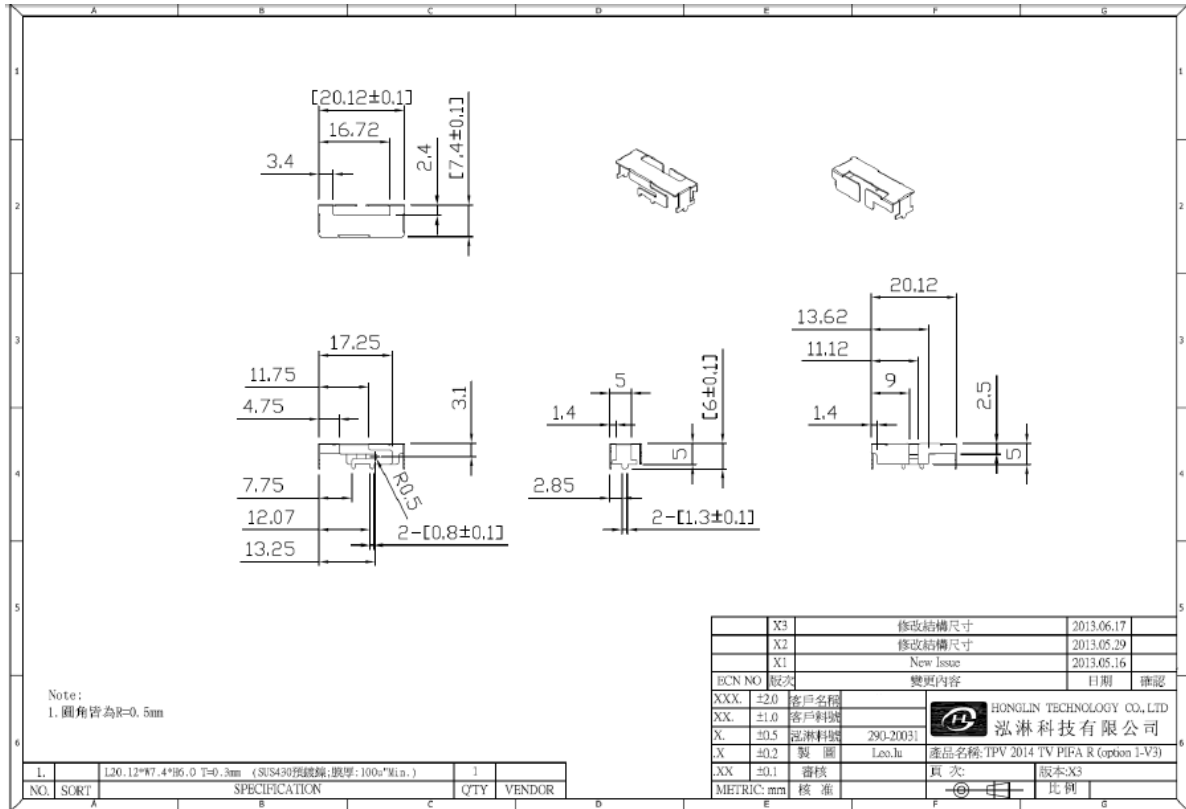
- NOTE:
- 1.THICKNESS OF MATERIAL :洋白銅 :0.2MM
 - 2.MARKED □ IS CONTROL DIMENSIONS AND CTF ITEMS
 - 3.Marked ⊗ IS THE CRITICAL DIMENSION
 - 4.tolerance level:B

REQ	A	B	C	D	ANGLE
0-5	±0.08	±0.05	±0.10		0°-30° ±0.1°
5-10	±0.05	±0.10	±0.15		31°-60° ±0.3°
10-50	±0.10	±0.10	±0.20		61°-90° ±0.5°
50-100	±0.15	±0.20	±0.25		
100-	±0.15	±0.20	±0.25		

UNIT	SCALE	SHEET	MODEL No.	WN4508R&WN4516R
MM	FREE	1 of 1	PART NAME	Shielding
APPROVED	CHECKED	DESIGNED	PART No.	REV 01
PC WC	AK LZF	LEBY	光寶科技股份有限公司 LITE-ON TECHNOLOGY CORP.	
2014.11.20	2014.11.20	2014.11.20		

ANTENNA SPEC

Manufacture: Hong Lin



1 Specification

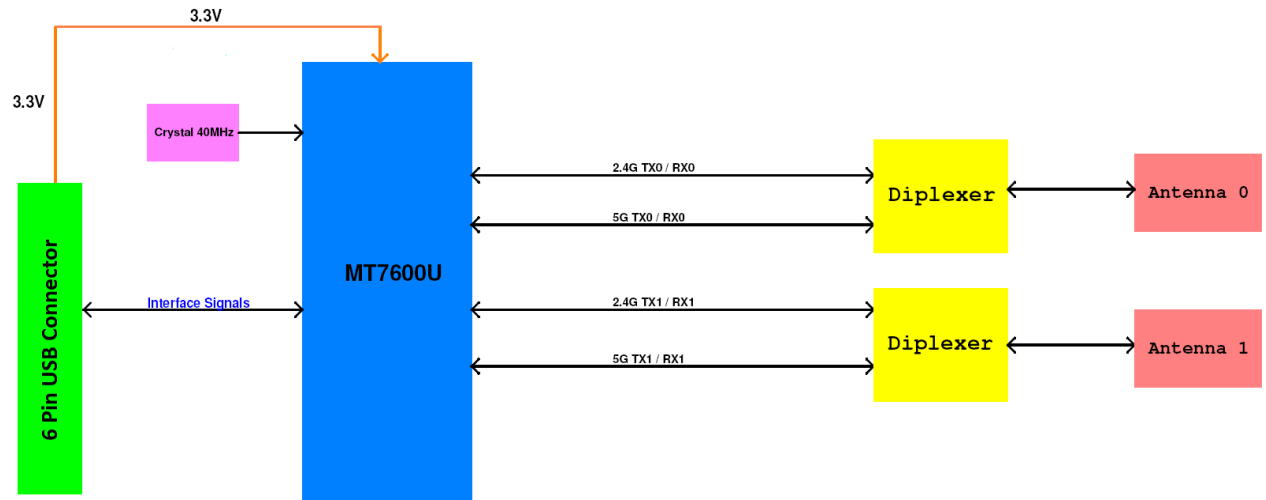
1.1 Electrical Properties

- 1.1.1 Frequency Range----- 2.4GHz~2.5GHz
4.9GHz~5.85GHz
- 1.1.2 Impedance----- 50Ω
- 1.1.3 VSWR----- 1.92:1
- 1.1.4 Return Loss----- -10dB
- 1.1.5 Peak Gain----- 2.2 dBi(2G)
4.6 dBi(5G)
- 1.1.6 Admitted Power----- 1W
- 1.1.7 Antenna type----- PIFA type

1.2 Physical Properties

- 1.2.1 Antenna Body-----SUS430 Plated Ni
- 1.2.2 Operating Temp----- -10°C~+60°C
- 1.2.3 Storage Temp----- -10°C~+70°C

BLOCK DIAGRAM



MODULE PHOTO



EEPROM INFORMATION

Reg Domain	World Wide 2.4G/5G Read from registry; Control by driver
	Offset 0x38 for 5G: 0xFF Offset 0x39 for 2.4G: 0xFF
Vendor ID	0x0471
Product ID	0x2126

ENVIRONMENTAL**Operating**

Operating Temperature: 0 to 70 °C (32 to 158 °F)

Relative Humidity: 5-90% (non-condensing)

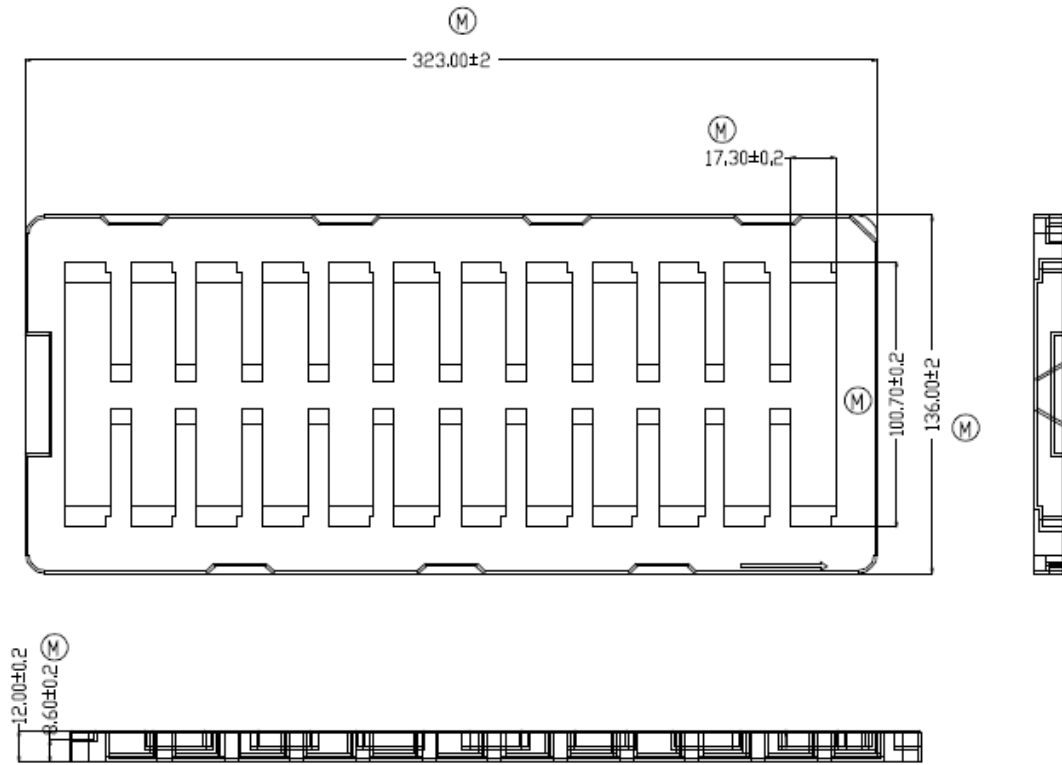
Storage

Temperature: -20 to 70 °C (-4 to 158 °F)

Relative Humidity: 5-95% (non-condensing)

PACKING DRAWING

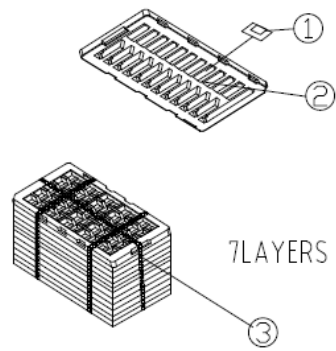
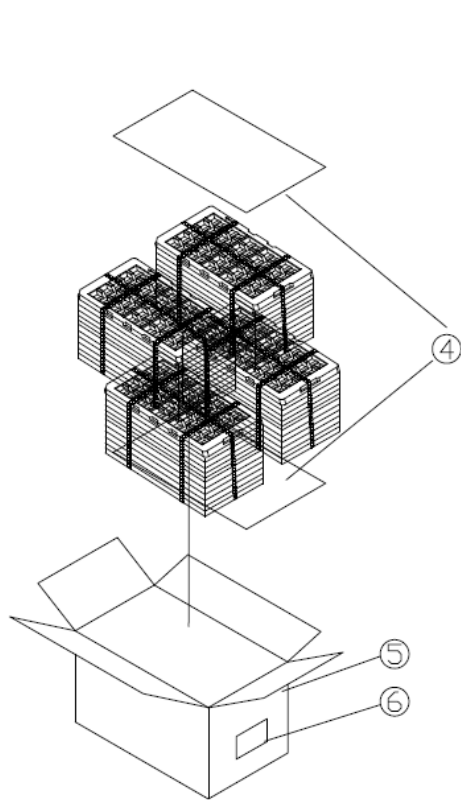
Tray



Note:

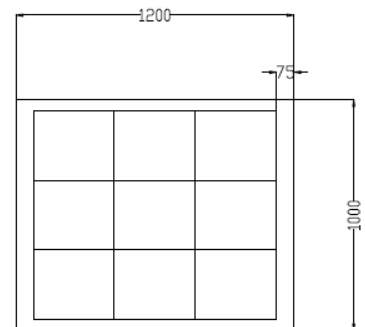
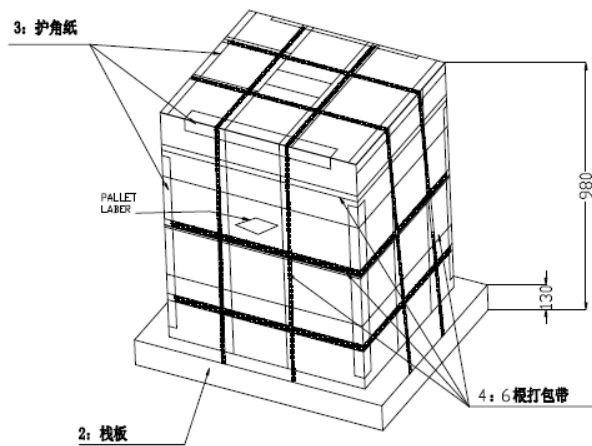
1. 材質：黑色 PS 1.2mm
2. 未注拔模角度為3度
3. 產品放進去不可以左右移動
4. 靜電阻值 $1 \times 10^4 \sim 1 \times 10^9 \Omega$
5. 錶面摩擦電壓100V以下
6. Marked (M) IS THE CRITICAL DIMENSION





1 carton=7Layer*4=(6*12+1*0)*4=288pcs

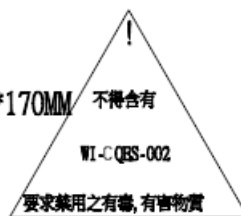
ITEM	P/N	DESCRIPTION	QTY
1	xxxxxxx	product	1
2	523000486ZD/CD	Clamshell	7/72
3	521000004ZD	Straps	1.73m/72
4	5160000928XD	Carton sheet	2/288
5	5030000231XD	Carton	1/288
6	MM108xxx	Carton Label	1/288



TOP VIEW 1:1

Note:

1. 5LAYERS/HIGH=980MM
2. CARTON OUT DIMENSIONS: 350*300*170MM 不得含有
3. 288 SETS /CARTON
4. 9 CARTON/LAYER
5. 12960 SETS/PALLET
6. SHIP BY AIR



1	PART NAME	PART NUMBER	DIM	QTY
2	PALLET	514000035QD	1200*1000*130MM	1/12960
3	PAPER	5040000063D	850*50*50*5MM	8/12960
4	STRAPS	521000004ZD	W=9MM	??/12960