BLUETOOTH MODULE DATASHEET
FOR CH16HL

Version：V1.5
Date：2022-02-23

Release History

Version	Modification	Written	Approval	Date	Department
V1.0	Initial Version	WAN	DAVID	2020/10/10	R&D Dept
V1.1	Revised Version	WAN	DAVID	2020/11/10	R&D Dept
V1.2	Updated, Add Layout	WAN	DAVID	2020/12/28	R&D Dept
V1.3	Update Manual Format	SAM	DAVID	2021/07/31	R&D Dept
V1.4	Add IO Funcion	SAM	DAVID	2021/12/24	R&D Dept
V1.5	Update Manual Format	W.Y	DAVID	2022/02/23	R&D Dept

1.Product Introduuction

1.1 Product Overvieeww

CH16HL is a Bluetooth BLE control mmodule developed and designed by Chuan Thinkss based on Bluetooth Low Energy (Bluetooth Low Energy) techhnnology for IOT, using FR8016 Bluetooth BLE IC. WWith high cost performance and high reliability, it prroovides the best solution and service in IOT era.

For IOT applications, CH16HL module with a series of hardware design reference materials and APP, firmware, can quickly help developers and manufacturers to achieve the development of Bluetooth smart products and rapid finished mass production.

For customization and in-depth design, we will also provide API interface, development tools SDK, Some more details on the company's website https://www.chuanthink.com
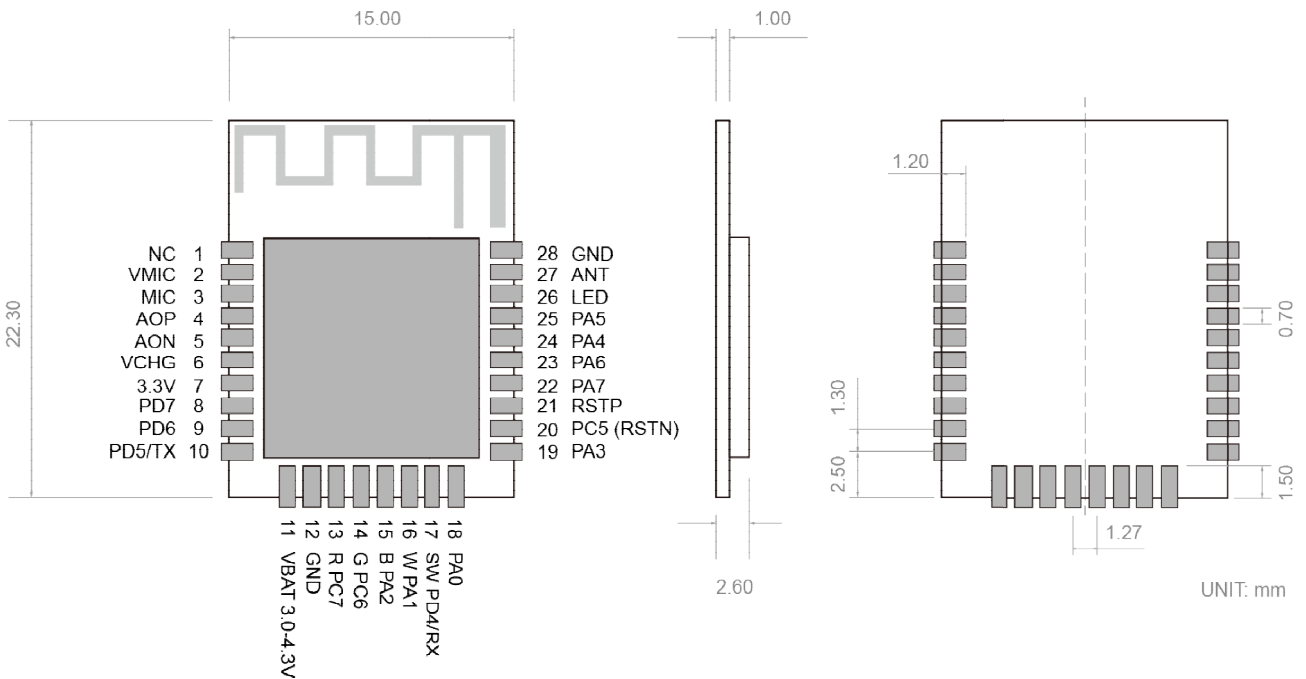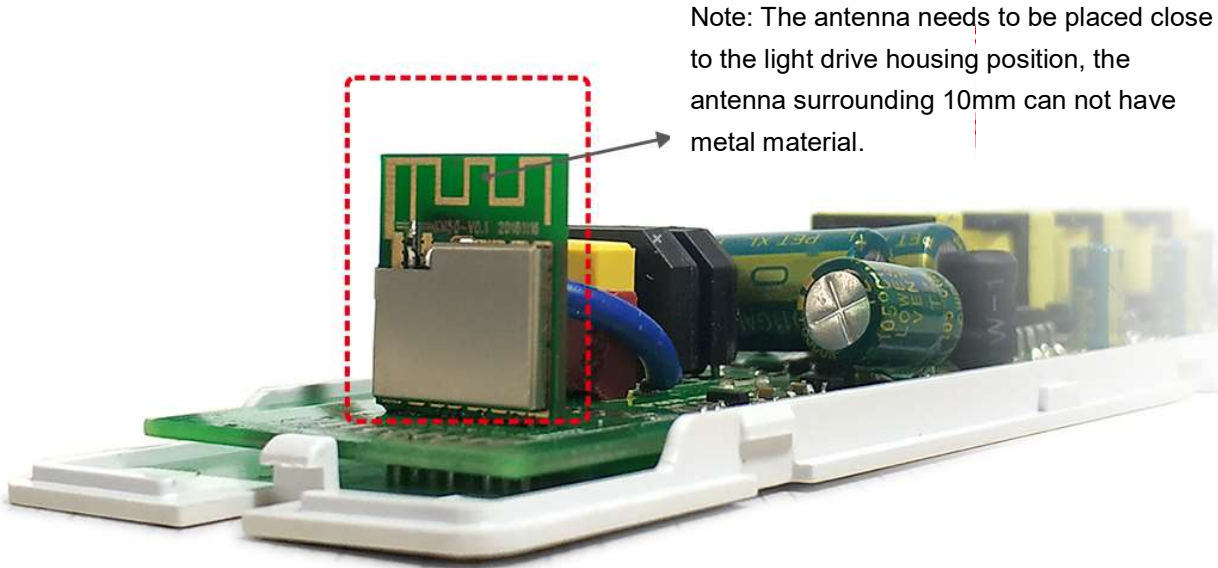
1.2 Product Pictures

Figure 0.1 CH16HL Module (No IPEX Holders)

1.3 Application illustrations

Note: The antenna needs to be placed close to the light drive housing position, the antenna surrounding 10mm can not have metal material.

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1.4 Intelligent Control System Introduction

With the integrated CH6HL module, developers can implement the Bluetooth control function in the following figure, using Bluetooth or cloud-based system to installed APP software, Smart devices can be controlled by mobile APP/common switch/voice etc. We will create the perfect human-machine interaction mechanism and device to device interconnection to bring the best user experience.

Need to install the APP before Bluetooth pairing, Wireless connection between smart devices and cell phone Bluetooth or Bluetooth router through APP.

1.5 Modules & Applications

Module Features

- Support 2.4GHz Bluetooth Low Energy BLE (Bluetooth Low Energy) 5.0
- Bluetooth specification V5.0 LE E,, support 1M, 500K and 125K data rates
- Supports up to 14 Bluetooth device connections , support master-slave role operation
- ARM CortexM3 32-bit processor and 12-48Mhz main frequency
- Built-in 150KB ROM, and up to 48KB SRAM
- Built-in 4Mbits memory for user program and data storage
- Interfaces: General GPIO, UART, SPI, I2C, PWM output, I2S, LED driver
- Built-in charge management unit
- Standalone watchdog circuit
- Support 240*240 pixel LCD color screen
- Support MIC microphone input, AUDIO speaker output
- Support AT remote upgrade and cloud OTA upgrade
- Support BLUETOOTH SIG MESH self-organizing network function
- Support PCB on-board antenna (external antenna can be supported if needed)

Applications

- Bluetooth Voice Remote Control
- Smart Toys
- Smart Lighting Fixtures
- Smart Sports and Fitness Equipment
- Smart Toothbrushes, Smart Weighing Scale and Smart Personal Care Devices
- Smart Home Appliances, Smart Home Devices
- Smart Medical Devices: Health Thermometer, Heart Rate, Blood Pressure, Blood Sugar, etc...

1.6 Product Specifications

Table 1-6-1 Product Specifications：

Protocols and Interface Standard	
Bluetooth Standard	Bluetooth V5.0 LE standard
Data Interface	UART/HSPI/I2C/I2S/IR Remote Control（Not for Lighting Control）
	GPIO,UART,SPI,I2C,PWM,I2S,LED
I/O Port	17 General I/O ports, all can be set as interrupts
CPU	
Main frequency processing speed	12-48 Mhz

| Memory Capacity	
SRAM	150KB ROM, up to 48KB RAM
FLASH	8M Flash ROM
Bluetooth BLE Features	
Transmit Power	Up to 10dBm Transmit Power
Encryption Type	AES/CCM
Bluetooth RF Parameters (Typical)	
Operating Frequency	2400-2483.5 mhz
Transmit Power	≤ 20 dbM
Operating Current (Typical)	
Power Input VCC	3.3V
Operating Current	8 mA
Operating Conditions	
Operating Temperature	-40ºC to +85ºC
Storage Temperature	-55ºC to +125ºC
Operating Humidity	5% to 95%（No Condensation）
Physical Parameters	
Antenna Type	PCB built-in Antenna, can choose whether IPEX holder is required (connect to external antenna)
Product Size	15.00*20.00*2.60(H) mm
Wireless Transmission Distance	
Wireless Transmission Distance	Indoor：20m，Outdoor：30m　(depending on the environment)

1.7 Interface Definition
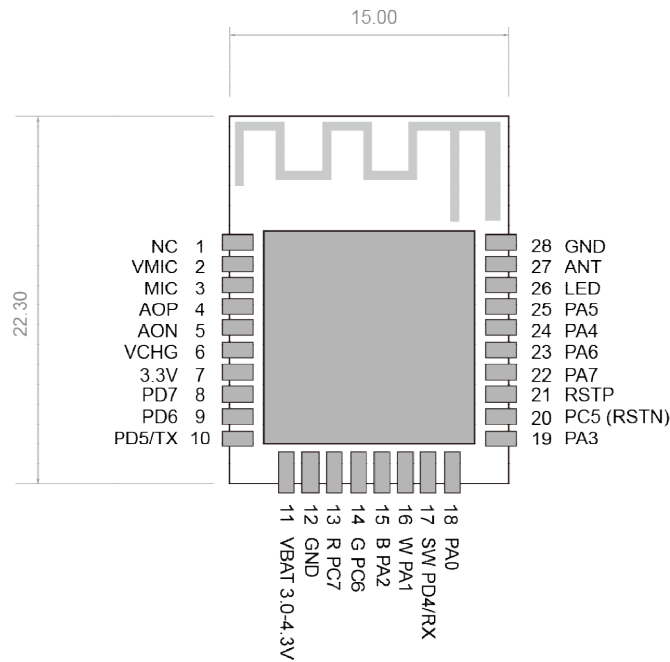
Figure 1-7-1 Pin Identification

Table 1-7-1 CH16HL BLE Module Pin Function Definition

No.	Pi Define	Pin Type	Function Descritption
1	NC	NC	Not applicable
2	VMIC	AO	Microphone bias out
3	MIC	AI	Microphone input
4	AOP	AO	Speaker output positive
5	AON	AO	Speaker output negative
6	VCHG	PWR	Charger supply input
7	3.3V	AO	Analog linear regulator output
8	PD7	DIO	SDA1/I2SDIN/PWM1/SSPDIN/UTXD0/UTXD1/ANT CTL1/PDMDAT/PWM0/ADC3
9	PD6	DIO	SCL1/I2SDOUT/PWM0/SSPDOUT/URXD0/URXD1/ CLKOUT/PDMCLK/PWM1/ADC2
10	PD5/TX	DIO	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/ANT CTL0/PDMDAT/PWM4/ADC1
11	VBAT	PWR	Battery positive supply input
12	GND	GND	Ground
13	R PC7	DIO	SDA1/I2SDIN/PWM5/SSPDIN/UTXD0/UTXD1/SWD IO/PDMDAT/PWM4

14	G PC6	DIO	SCL1/I2SDOUT/PWM4/SSPDOUT/URXD0/URXD1/SWTCK/PDMCLK/PWM5
15	B PA2	DIO	SCL1/I2SDOUT/PWM2/SSPDOUT/URXD0/URXD1/ANTCTL0/PDMCLK/PWM3
16	W PA1	DIO	SDA0/I2SFRM/PWM1/SSPCSN/UTXD0/UTXD1/ANTCTL0/PDMDAT/PWM0
17	SW PD4/RX	DIO	SCL0/I2SCLK/PWM4/SSPCLK/URXD0/URXD1/ANTCTL0/PDMCLK/PWM5/ADC0
18	PA0	DIO	SCL0/I2SCLK/PWM0/SSPCLK/URXD0/URXD1/CLKOUT/PDMCLK/PWM1
19	PA3	DIO	SDA1/I2SDIN/PWM3/SSPDIN/UTXD0/UTXD1/ANTCTL1/PDMDAT/PWM2
20	PC5	DIO	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/SWV/PDMDAT/PWM4
21	RSTP	AI	Global reset (high active)
22	PA7	DIO	SDA1/I2SDIN/PWM1/SSPDIN/UTXD0/UTXD1/ANTTL0/PDMDAT/PWM0
23	PA6	DIO	SCL1/I2SDOUT/PWM0/SSPDOUT/URXD0/URXD1/CLKOUT/PDMCLK/PW1M1
24	PA4	DIO	SCL0/I2SCLK/PWM4/SSPCLK/URXD0/URXD1/CLKOUT/PDMCLK/PWM5
25	PA5	DIO	SDA0/I2SFRM/PWM5/SSPCSN/UTXD0/UTXD1/ANTCTL1/PDMDAT/PWM4
26	LED	DO	LED2 control
27	ANT	AIO	RF input
28	GND	GND	Ground

Table 1-7-1 CH16HL BLE Module Pin Function Definition

Mark	Description
I	Digital Input
O	Digital Output
AI	Analog Input
AO	Analog Output
IO	Bidirectional(digital)
OD	Open Drain
PWR	Power
GND	Ground

2. Electrical Characteristics

Table 2-2 DC Electric Gas Parameters Table

Type	Name	Min	Max	Unit
Input Logic LOW	VIL	-0.3	0.3*VDDIO	V
Input Logic HIGH	VIH	0.7*VDDIO	VDDIO+0.3	V
Output Logic LOW	VOL	-	0.1*VDDIO	V
Output Logic HIGH	VOH	0.8*VDDIO	-	V

Table 2-3 Power Consumption Parameters

Operating Mode	Average	Max	Unit
TX Peak Current (0dB)	N/A	8	mA
RX Peak Current	N/A	9.7	mA
Deep Sleep Current(48K RAM Keep)	6.1	N/A	µA
Shutdown Current	2.7	N/A	µA

Table 2-4 Environmental Parameters

Operating Mode	Min	Max	Unit
Operating Temperature	-45	+85	ºC
Storage Temperature	-55	+125	ºC
Operating Humidity (non-condensing)	5%	95%	-
Storage Humidity (non-condensing)	5%	95%	-

3. RF Parameter

3.1 General Wireless Characteristics Parameters

Table 3-1 General Wireless Characteristics

Name	Conditions	Min	Typical	Max
Frequency Range(MHz)	-	2402	-	2480

3.2 Bluetooth receive (Rx) characteristics parameters

Table 3-2 Bluetooth receive characteristics parameters table

Name	Conditions	Min	Typical	Max
Sensitivity (dBm)	PER ≤30.8%	-95	-	-
Maximum Input Level (dBm)	PER ≤30.8%		1	-
C/I	C/I co-channel (dB)	21	-	-
	C/I +1MHz (dB)	15	-	-
	C/I -1MHz (dB)	15	-	-
	C/I +2MHz (dB)	-15	-	-
	C/I -2MHz (dB)	-17	-	-
	C/I +3MHz (dB)	-9	-	-
	C/I -3MHz (dB)	-27	-	-
	C/I Image+1MHz (dB)	-15	-	-
	C/I Image-1MHz (dB)	-15	-	-
Blocker Power (dBm)	70~2000MHz, Wanted signal level =-67dBm	-30	-	-
	2003~2399MHz, Wanted signal level =-67dBm	-35	-	-
	2484~2997MHz, Wanted signal level =-67dBm	-35	-	-
	3000MHz~6000MHz, Wanted signal level =-67dBm	-30	-	-
Max PER Report Integrity	Wanted signal: -30dBm	-	50%	-
Max Inter modulation level (dBm)	Wanted signal (f0): -64dBm Worst inter modulation level @2f1-f2=f0, |f1-f2|=n MHz, n=3, 4, 5… -	-50	-	-

3.3 Bluetooth Transmit (Tx) Characteristics Parameters

Table 3-3 Bluetooth Transmission Characteristics Parameters Table

Name	Conditions	Min	Typical	Nax
Maximum Output Power (dBm)	N/A	-30	0	10
Adjacent Channel Power Ratio (dBm)	+2MHz	-	-	-41
	-2MHz	-	-	-41
	≥+3MHz	-	-	-42
	≤-3MHz	-	-	-42
Modulation Characteristics	Δf1 avg (kHz)	-	240	-
	Δf2max (kHz)	185	-	-
	Δf2 max Pass Rate (%)	-	100	-
	Δf2 avg /Δf1 avg	-	0.9	-
Carrier Frequency Offset and Drift	Average Fn (kHz)	-	12.5	-
	Drift Rate (kHz/50μs)	-	10	-
	Avg Drift (kHz/50μs)	-	10	-
	Max Drift (kHz/50μs)	-	10	-
Output power of second harmonic(dBm)	N/A	-	-50	-
Output power of third harmonic(dBm)	N/A	-	-50	-

4. Operating Environment

4.1 Electrostatic Discharge Parameters

Table 4-1 Electrostatic Discharge Parameters Table

Name	Symbol	Reference	Level	Max	Unit
Electrostatic Discharge Voltage (manikin)	VESD (HBM)	Degree：16℃~35℃ Follow ANSI/ESDA/JEDEC JS-001-2014	2	2000	V

4.2 Recommended Operating Conditions

4-2 Table of Recommended Operating Conditions

Symbol	Parameters	Min	MId	Max	Unit
TA	Ambient operating temperature	-40	25	105	℃
TS	Storage temperature	-40	25	125	℃

5. Reflow Soldering Conditions

(1) Heating Method: conventional convection or IR convection

(2) Allowable reflow times: 2 times, based on the following tilt-up temperature conditions

(3) Peak Temperature：< 250°C
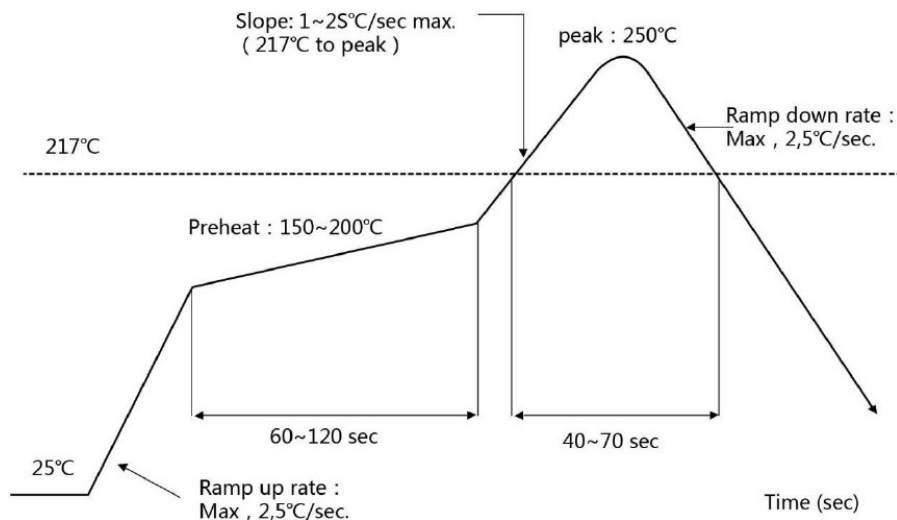
Table 5-1 Reflow Soldering Conditions Chart

6. Application Circuits

Table 6-1 Application Circuit Diagram
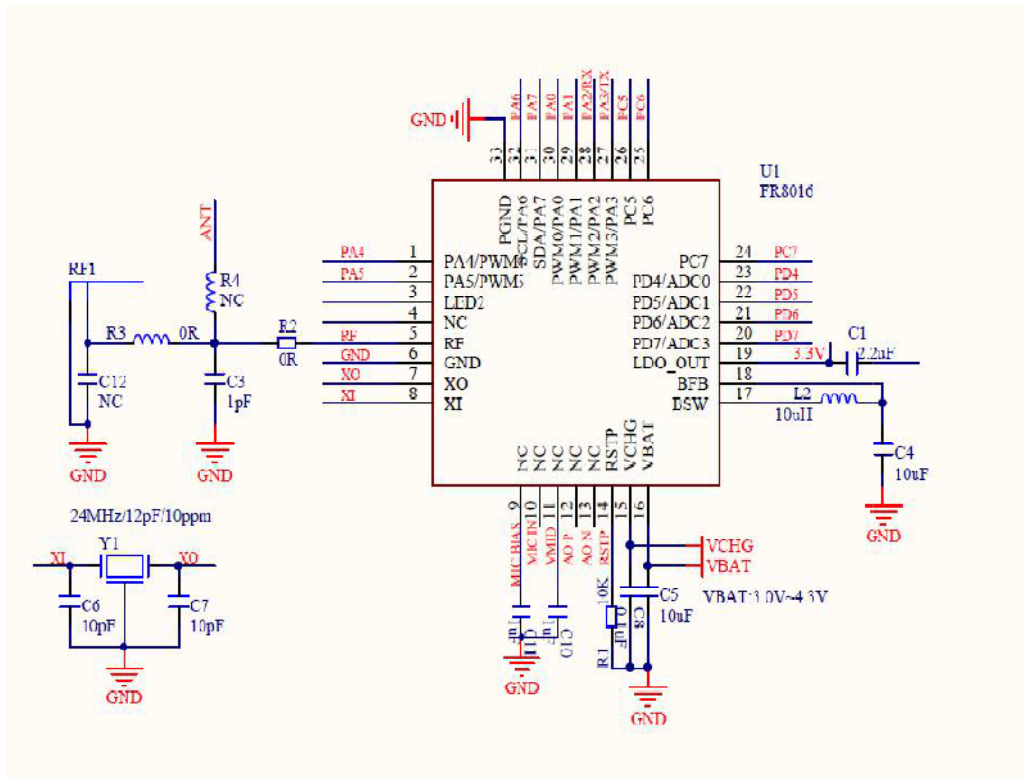
7. AT Command

8.1 AT Command Configuration

● The AT+ command is that in command mode the user through UART and module command transmission instruction set , and the format of the AT+ command will be explained later.

● After power-up successfully, the module can be set up via UART.

● The module UART port parameters are: Baud rate 9600, no Parity, 8 data bits, 1 stop bit

8.2 AT Command Overview

The AT+ command can be entered directly through CRT or a serial debugger. The AT+ command uses an ASCII-based command line, and the format of the command is as follows：

1. Format Description

    < >: Mandatory Part

    [ ]: Optional Parts

2. Command Message

    AT+[op][para-1,para-2,para-3,para-4…] <CR> <LF>

    AT+：　Command Message Prefix；

    [op]：　Command Operation Symbol, Parameter Setting or Inquiry

" =" ： Parameter Setting

" ?" ： Inquiry

[para-n]： Input for Parameter Setting, not required if Inquiry.

<CR>： End, Enter, ASCII Code 0X0D；

<LF>： End， Line Breaks, ASCII Code 0X0A；

[SPACE]：Blank Spaces，Spaces， ASCII Code 0X20

8.3 Response Message

<CR><LF>+<RSP>[op][para-1,para-2,para-3,para-4…]<CR><LF>

+： Response Message Prefix；

RSP： Response Strings, including：

" OK" ： Success

" ERR" ： Fail

[para-n] ： Error Code when Returns Parameters or Errors

<CR>:ASCII Code 0x0d；

<LF>: ASCIICode 0x0a；

[SPACE]：Blank Spaces，Spaces， ASCII Code 0X20

7. Packaging Method

Packing method A: Adopt Anti-Static Blister Tray Box, 100 PCS in one Box, and the tray box size as below.
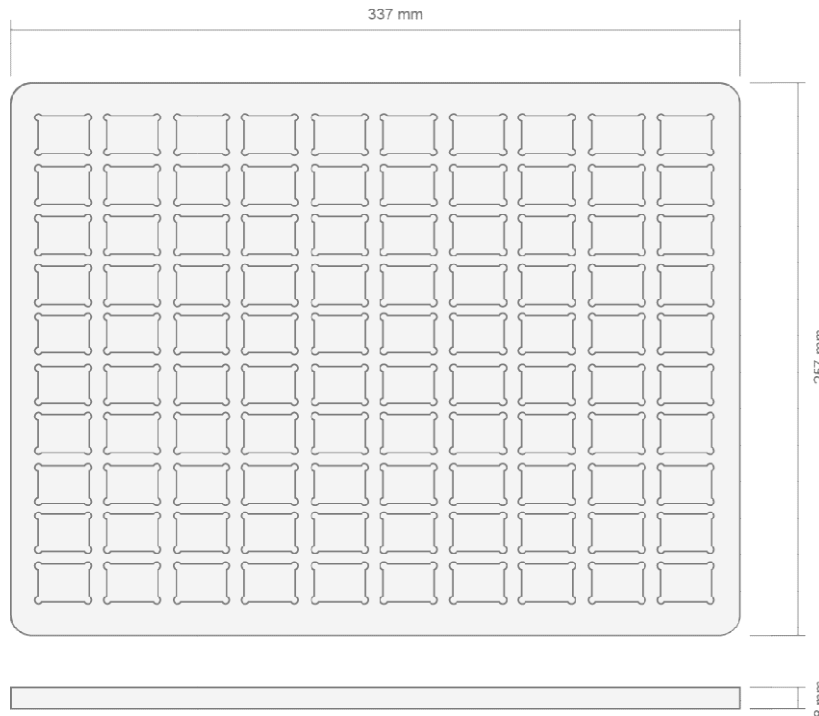
Figure 7-1 Blister tray box size

Packing method B: 2000 PCS per roll by Braided Tape, the size of the Tape is as below.
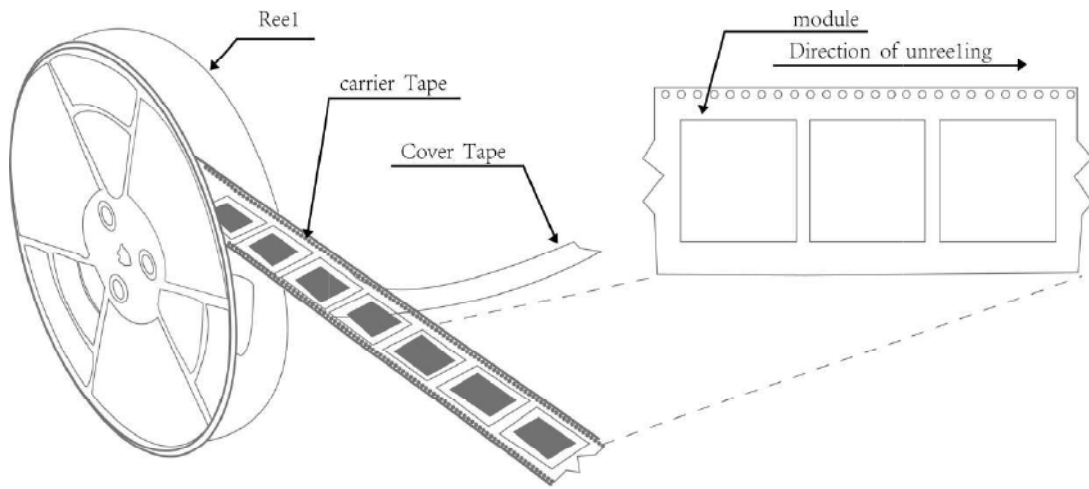
Figure 7-2 Braided Tape Picture
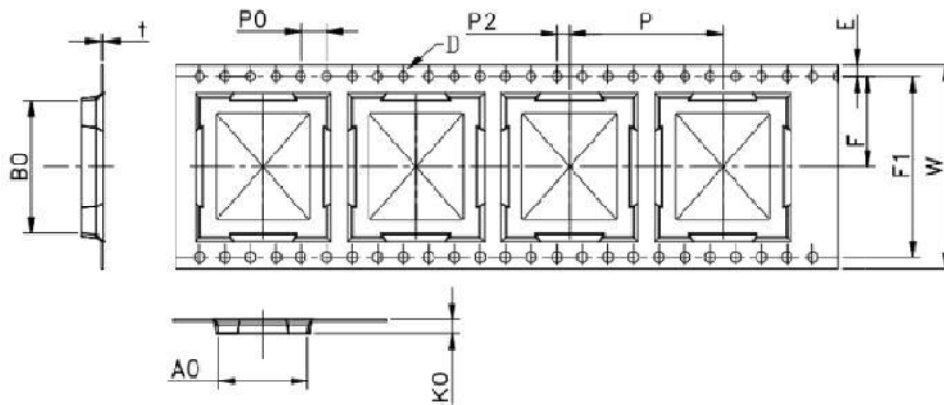
8. Order Information

As CH16HL module is divided into two types, shielded and unshielded, and there are two types of packaging: Reel-to-reel and braided tape, please read the details in the following table carefully before placing an order.

If the module is shipped with a special program to be burned, please specify
If the module is shipped with special MAC code requirements, please specify

Table 3-1 Order Information

Model	Shield	Pre-burn Program	MAC Code	MOQ
CH16HL-1	Yes	No	No	1K
CH16HL-2	No	No	No	1K

9. Certification and Safety Regulations

Certification	Description
FCC	PASS
CE	PASS
RoHS	PASS
BQB	PASS
SRRC	PASS
Huawei Hilink Certification	Already have the finished product made by CH16HL has been certified
HuaweiHarmonyOS Connect Certification	
Tuya Certification	CH16HL has been adopted as the official module and has been certified

10. Notes

The CH16HL module is mounted with a double row of pins. In order to obtain the best RF performance for the end product, the following principles must be observed：

1. Power supply part: Use independent LDO to power this module, it is recommended to use LDO with small ripple coefficient, and the module needs to be reliably grounded. Please note that the positive and negative poles of the power supply are the correct connection, if the reverse connection may cause permanent damage to the module.

2. Layout: The module is recommended to be placed at the open edge of the base plate as much as possible, and the antenna should face outward.

3.Routing: the power supply to the module on the bottom board is as thick as possible (0.5A current), the PCB board below the antenna in the module on the bottom board (double-sided and multi-layer board)

needs to be clear, not copper, that is, all layout layers below the antenna cannot have grounding or signal trace.

4. It is better not to have metal devices near the line, otherwise the communication distance of the module will be reduced to different degrees in different environments.

11. Static Electricity and other Considerations

Modules may be damaged by static discharge and it is recommended that all modules should be handled under several precautions

1. Anti-static measures must be followed and modules must not be held in bare hands.

2. The module must be placed in a placement area that prevents static electricity.

3. Anti-static circuits at high voltage inputs or high frequency inputs should be considered in the product design.

4. Static electricity can result in subtle performance degradation to the failure of the entire device.

Modules can be more vulnerable to damage as very small changes in parameters can cause the device to fail to meet the value limits required for its certification.

Humidity Sensitivity:

The module is a Class 3 humidity sensitive device according to standard IPC/JEDEC J-STD-020, please observe all requirements related to the use of such components. In addition, the customer must be aware of the following conditions.

a) Calculated shelf life of sealed bags: 12 months at < 40ºC and < 90% relative humidity (RH).

b) Environmental conditions during production: 30 ºC / 60% RH according to IPC/JEDEC J-STD-033A, paragraph 5

c) If conditions permit, the maximum time between opening the sealed bag and the reflow process must be 168 hours.

d) Compliance with "IPC/JEDEC J-STD-033A, paragraph 5.2" is observed.

e) If condition b) or c) is not complied with, baking is required.

f) If the humidity indicator inside the bag indicates 10% or more, baking is required.

FCC WARNING

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

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

Radiation Exposure Statement:

This equipment complies with FCC 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.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

"Contains Transmitter Module CH16HL"

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C(15.247).it specifically establish the 6dB Bandwidth,, Peak Output Power, Radiated Spurious Emission, Power Spectral Density, Restricted Band of Operation and Band Edge (Out of Band Emissions)   Measurement

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT has one PCB antenna, Yes, the module contains a permanently attached antenna, The antenna gain is 0dBi.

2.4 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer isresponsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.
Explanation: The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);

b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);

c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;

d) Appropriate parts by manufacturer and specifications;

e) Test procedures for design verification; and

f) Production test procedures for ensuring compliance.

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation: Yes, The module with trace antenna designs, and This manual has been shown the layout of trace design,, antenna, connectors, and isolation requirements.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module 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." This module is designed to comply with the FCC statement,
FCC ID is: 2AXDL-CH16HL

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type")).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has one PCB antenna, Yes, the module contains a permanently attached antenna, The antenna gain is 0dBi.

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This

includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2AXDL-CH16HL

2.9 Information on test modes and additional testing requirements₅

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: Chuan Thinks Technology Limited Company can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.