

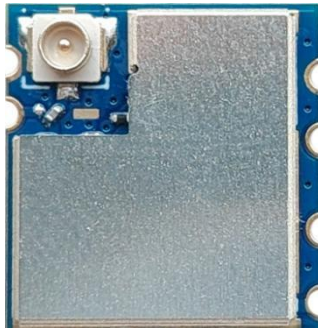


BL-M35343XU1

**802.11ax 150Mbps WLAN+BLE
Combo USB Module Specification**

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(Top View)



(Bottom View)

Module Name: BL-M35343XU1

Module Type: 802.11b/g/n/ax 150Mbps WLAN+BLE Combo USB Module

Revision: V0.1

Customer Approval:

Company:

Title:

Signature:

Date:

Approval:

Title:

Signature:

Date:

Revision History

Revision	Summary	Release Date	Revised By
0.1	Official release	2025-03-06	WMG

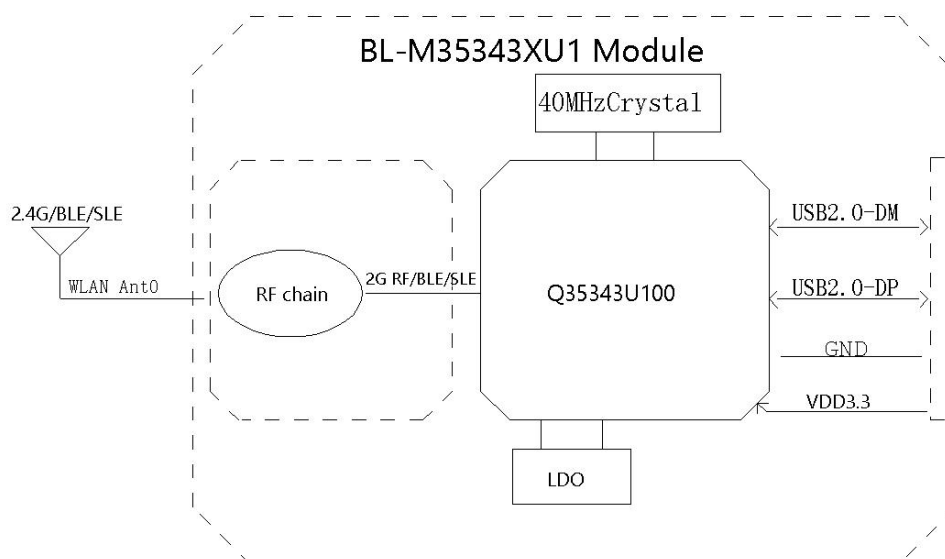
1. Introduction

BL-M35343XU1 is a highly integrated 2.4GHz WLAN+BLE Combo module base on Q35343U100 single chip, which compatible IEEE802.11b/g/n/ax standard, supports Bluetooth Low Energy 4.2/5.2 . This module offering feature-rich wireless connectivity at high standards, delivering reliable, cost-effective and longer communication distance, suitable for AIoT terminals such as consumer IP camera, dashcam, UAV, sweeping robot and OTT boxes.

1.1 Features

- Operating Frequencies: 2.4~2.4835GHz
- Host Interface is USB2.0
- Compatible IEEE802.11 b/g/n/ax, Maximum PHY rate up to 150Mbps
- Support 802.11ax MCS0 up to MCS9 (20MHz band width only)
- Compatible Bluetooth Low Energy 4.0/4.1/4.2/5.0/5.1/5.2
- Industrial Grade operating temperature range
- Connect to external antenna through IPEX connector
- Single 3.3V±0.2V Power Supply

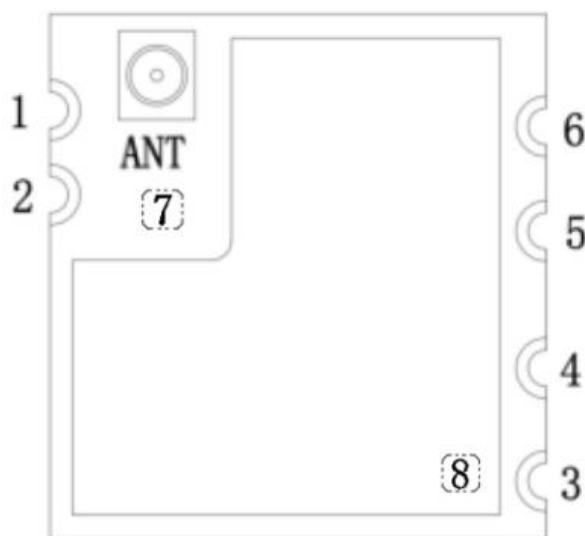
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M35343XU1
Chipset	Q35343U100
WLAN Standards	IEEE802.11b/g/n/ax
Host Interface	USB2.0
Antenna	Connect to external antenna through IPEX connector
Dimension	13.0*12.3*2.1mm (L*W*H)
Power Supply	3.3V±0.2V @600 mA (Max)
Operation Temperature	-40°C to +85°C
Operation Humidity	10% to 95% RH (Non-Condensing)

2. Pin Assignments



(Top view)

2.1 Pin Definition

No	Pin Name	Type	I/O Level	Description
1	GND	RF		RF Ground for WLAN_ANT
2	RF	NC		NC (Reserved RF Pad for 2.4G WLAN_ANT/BLE)
3	VDD3.3	P		DC 3.3V Power Supply
4	USB2.0_DM	A I/O		USB2.0 device Transmitter/Receiver Differential Pair

5	USB2.0_DP	A I/O		USB2.0 device Transmitter/Receiver Differential Pair
6	GND	P		Power Ground
7	GND	P		Auxiliary RF Ground connection PAD for ANT (It can be left floating, but grounding is strongly recommended to enhance ground connectivity and avoid RF interference)
8	GND	/		Auxiliary Ground connection PAD for power and USB (It can be left floating, but grounding is strongly recommended to reduce the power loop area and avoid interference with RF)
	ANT	RF		IPEX for 2.4G WLAN_ANT/BLE)

P: Power, I: Input, O: Output, I/O: In/Output, RF: Analog RF Port

3. Electrical and Thermal Specifications

3.1 Recommended Operating Conditions

Parameters		Min	Typ	Max	Units
Ambient Operating Temperature		-40	25	85	°C
External Antenna VSWR			1.7	2.0	/
Supply Voltage	VDD3.3	3.1	3.3	3.5	V

3.2 Current Consumption

Conditions : VDD3.3=3.3V, Ta:25°C			
Use Case	VDD3.3 Current		
	Typ(I _{RMS})	Max(I _{Peak})	Units
WLAN/BLE Unassociated (Android Driver)	59	72	mA
2.4G WLAN TCP throughput TX 74Mbps ((Android, WLAN only)	115	164	mA
2.4G WLAN TCP throughput RX 55Mbps ((Android, WLAN only)	115	216	mA
2.4G 11b@1Mbps TX@20dBm (TX RF test)	365	396	mA
2.4G 11b@1Mbps (RX RF test)	110	130	mA
2.4G 11b@11Mbps TX@20dBm (TX RF test)	358	416	mA
2.4G 11g@6Mbps TX@18dBm (TX RF test)	343	476	mA
2.4G 11g@6Mbps (RX RF test)	110	130	mA
2.4G 11g@54Mbps TX@17dBm (TX RF test)	226	388	mA
2.4G 11n@HT20_MCS0 TX@18dBm (TX RF test)	317	428	mA
2.4G 11n@HT40_MCS0 TX@18dBm (TX RF test)	315	427	mA

2.4G 11n@HT40_MCS7 TX@16dBm (TX RF test)	251	364	mA
2.4G 11ax@HE_SU 20M_MCS0 TX@17dBm (TX RF test)	310	420	mA
2.4G 11ax@HE_SU 20M_MCS9 TX@15dBm (TX RF test)	250	356	mA
BT BLE_1M TX@ 20dBm (RF-Test)	350	436	mA
BT BLE_1M RX (RF-Test)	73	100	mA
BT BLE_2M TX@ 20dBm (RF-Test)	299	460	mA
BT BLE_2M RX (RF-Test)	74	100	mA

4. WLAN & Bluetooth & NearLink RF Specifications

4.1 2.4G WLAN RF Specifications

Conditions : VDD3.3=3.3V; Ta:25°C			
Features		Description	
WLAN Standard		IEEE 802.11b/g/n/ax	
Frequency Range		2.4~2.4835GHz (2.4GHz ISM Band)	
Channels		Ch1~Ch13 (For 20MHz Channels)	
Modulation		802.11b (DSSS): DBPSK, DQPSK, CCK; 802.11g (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11n (OFDM): BPSK, QPSK, QAM16, QAM64; 802.11ax (OFDMA): BPSK, BPSK_DCM, QPSK, QPSK_DCM, QAM16, QAM16_DCM, QAM64, QAM256	
Data Rate		802.11b: 1, 2, 5.5, 11Mbps; 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n (HT20): MCS0~MCS7_6.5~72.2Mbps; 802.11n (HT40): MCS0~MCS7_13.5~150Mbps; 802.11ax (HE_MU, 26~106RU): MCS0~MCS9_0.4~50Mbps; 802.11ax (HE_SU, non-OFDMA 20MHz): MCS0~MCS9_3.6~114.7Mbps;	
Frequency Tolerance		≤ ±20ppm	
2.4G Transmitter Specifications （TX power tolerance calibrated, customers can define the target TX power within recommended range by modifying configuration file of the driver software）			
TX Rate	Recommended Target TX Power (dBm)	TX Power Tolerance (dBm)	EVM (dB)
802.11b@1~11Mbps	20	±1.5	≤-10
802.11g@6Mbps	18	±1.5	≤-10
802.11g@54Mbps	17	±1.5	≤-25
802.11n@HT20_MCS0	18	±1.5	≤-10
802.11n@HT20_MCS7	16	±1.5	≤-28

802.11n@HT40_MCS0	18	± 1.5	≤ -10
802.11n@HT40_MCS7	16	± 1.5	≤ -28
802.11ax@HE_SU 20M_MCS0	17	± 1.5	≤ -15
802.11ax@HE_SU 20M_MCS9	15	± 1.5	≤ -32
2.4G Receiver Specifications			
RX Rate	Min Input Level (Typ. dBm)	Max Input Level (Typ. dBm)	PER
802.11b@1Mbps	-95	-10	< 8%
802.11b@11Mbps	-88	-10	< 8%
802.11g@6Mbps	-92	-10	< 10%
802.11g@54Mbps	-74	-10	< 10%
802.11n@HT20_MCS0	-91	-10	< 10%
802.11n@HT20_MCS7	-72	-10	< 10%
802.11n@HT40_MCS0	-89	-10	< 10%
802.11n@HT40_MCS7	-70	-10	< 10%
802.11ax@HE_SU 20M_MCS0	-90	-10	< 10%
802.11ax@HE_SU 20M_MCS9	-68	-10	< 10%

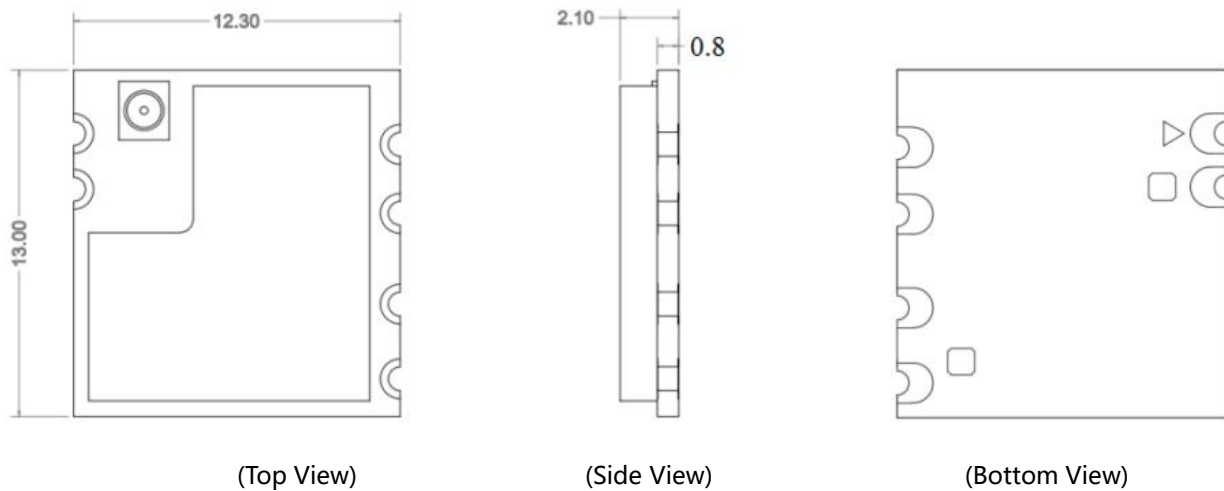
4.2 Bluetooth RF Specification

Conditions: VDD3.3=3.3V; Ta:25°C			
Features	Description		
Bluetooth Specification	Bluetooth Low Energy 4.0/4.1/4.2/5.0/5.1/5.2		
Frequency Range	2.4~2.4835GHz (2.4GHz ISM Band)		
Channels	Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels);		
Power Classes	Bluetooth Low Energy: Class1.0;		
Data Rate & Modulation	LE_1Mbps: GFSK (Uncoded); LE_2Mbps: GFSK (Uncoded); LE_125Kbps: GFSK (Coded_S=8); LE_500Kbps: GFSK (Coded_S=2);		
Bluetooth Transmitter Specifications			
Items	Min (dBm)	Typ (dBm)	Max (dBm)
TX Power			
LE_1M/2M	18	20	22
LE_125/500K	18	20	22

Items	Min	Typ	Max	
LE_1M Modulation Characteristics				
Δf1avg	225KHz	250.5KHz	275KHz	
Δf2avg	185KHz	224.1KHz	275KHz	
Δf2max	185KHz	232.8KHz	/	
Δf2avg/Δf1avg	0.8	0.89	/	
Items	Min	Typ	Max	
LE_2M Modulation Characteristics				
Δf1avg	450KHz	500.5KHz	550KHz	
Δf2avg	370KHz	436.5KHz	550KHz	
Δf2max	370KHz	451.6KHz	/	
Δf2avg/Δf1avg	0.8	0.87	/	
Bluetooth Receiver Specifications				
Items	Sensitivity		Maximum Input Level	
	Input Level (Typ. dBm)	PER	Input Level (Typ. dBm)	PER
LE_1M	-90	≤ 5%	-10	≤ 5%
LE_2M	-89	≤ 5%	-10	≤ 5%
LE_500K	-94	≤ 5%	-10	≤ 5%
LE_125K	-96	≤ 5%	-10	≤ 5%

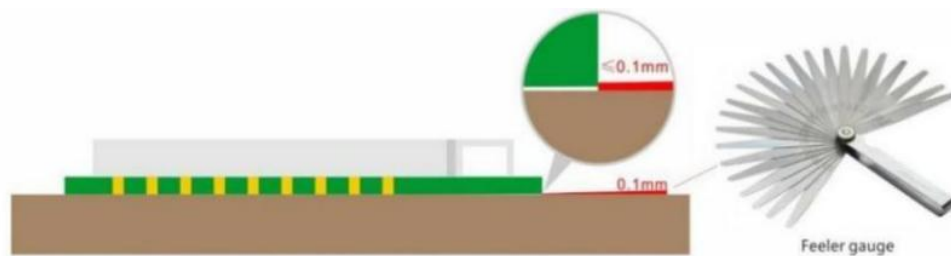
5. Mechanical Specifications

5.1 Module Outline Drawing



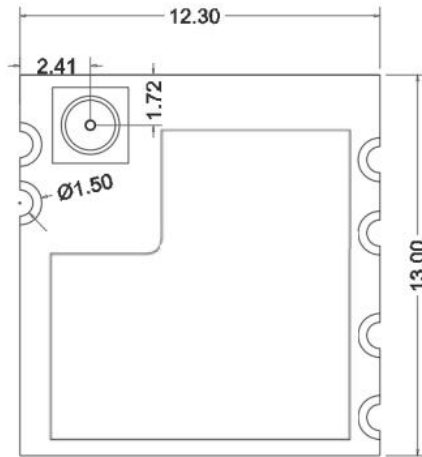
Module dimension: 13.0*12.3*2.10m (L*W*H; Tolerance: $\pm 0.3\text{mm}_L/W$, $\pm 0.2\text{mm}_H$)

IPEX / MHF-1 connector dimension: 3.0*2.6*1.2mm (L*W*H, $\varnothing 2.0\text{mm}$)

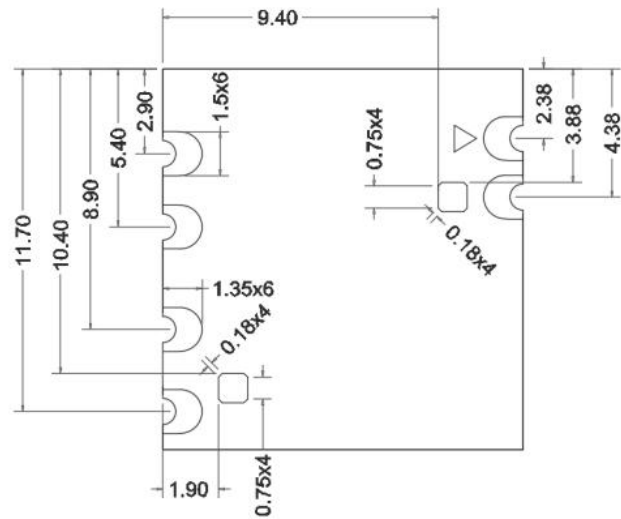


Module Bow and Twist: $\leq 0.1\text{mm}$

5.2 Mechanical Dimensions



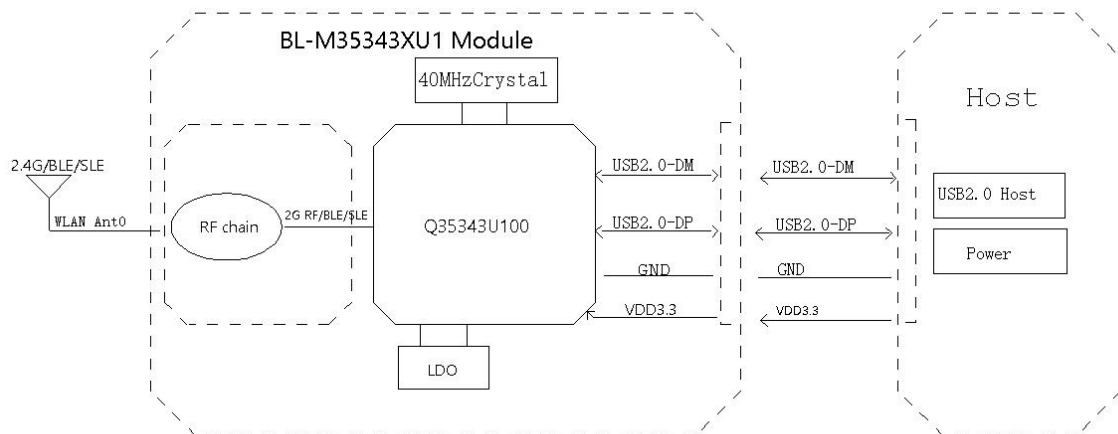
(Top View)



(Bottom View)

6. Application Information

6.1 Typical Application Circuit



6.2 HW Application Note

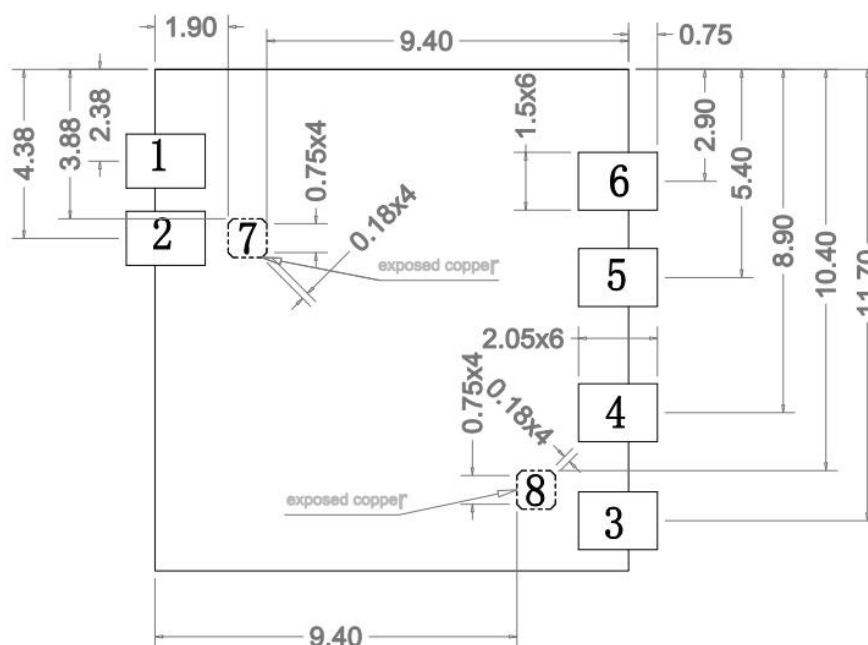
6.2.1 VDD3.3 Power requirement:

- DC 3.1~3.5V & Ripple Voltage <100mV power supply input, Maximum RMS current≥500mA and Maximum Peak current≥600mA.
- For achieve fast transient response, a current mode buck converter recommended.
- On customer's motherboard, use 10uF and 100nF MLCC capacitors close to the module's VDD3.3 Pin for power input decoupling. Each GND Pin has three close vias to ensure connectivity and thermal conductivity.

6.2.2 USB interface Design Guidelines:

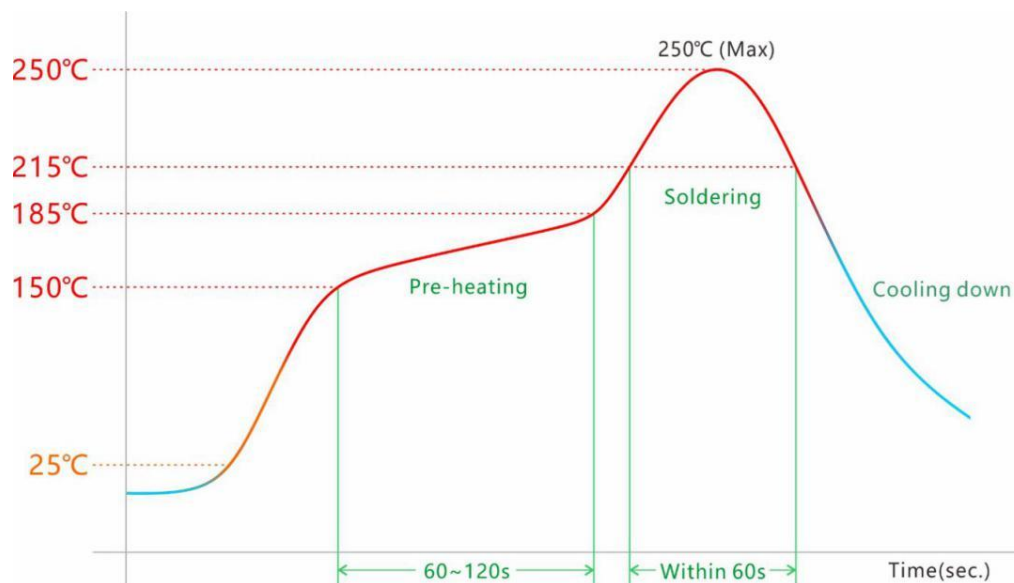
- A、 The module provides a USB device interface which is compatible with USB2.0 specification, High-Speed mode supports data transmission rate up to 480Mbps.
- B、 On customer's motherboard, PCB traces of the USB high-speed signal pair should be maintain $90\ \Omega$ differential impedance, structure of "Differential Coated Coplanar Waveguide With Ground" with the advantages of impedance control and GND surrounding isolation interference may be an ideal choice. To avoid interference, USB signal pair must be far away from power, RF and other signals, GND copper can be used to surround and isolate them.
- C、 PCB traces of the USB high-speed signal pair as short as possible, as far away from other signal as possible, minimize the length mismatch of signal pair, avoid layer change and maintain a complete reference layer to reduces signal reflections and impedance changes.
- D、 If It is necessary to change layers for USB signal pair routing, use GND vias close to signal pair's vias as the shortest return path.

6.3 Recommend PCB Layout Footprint



(Design Units: mm)

6.4 Reflow Soldering Standard Conditions



Please use the reflow within 2 times.

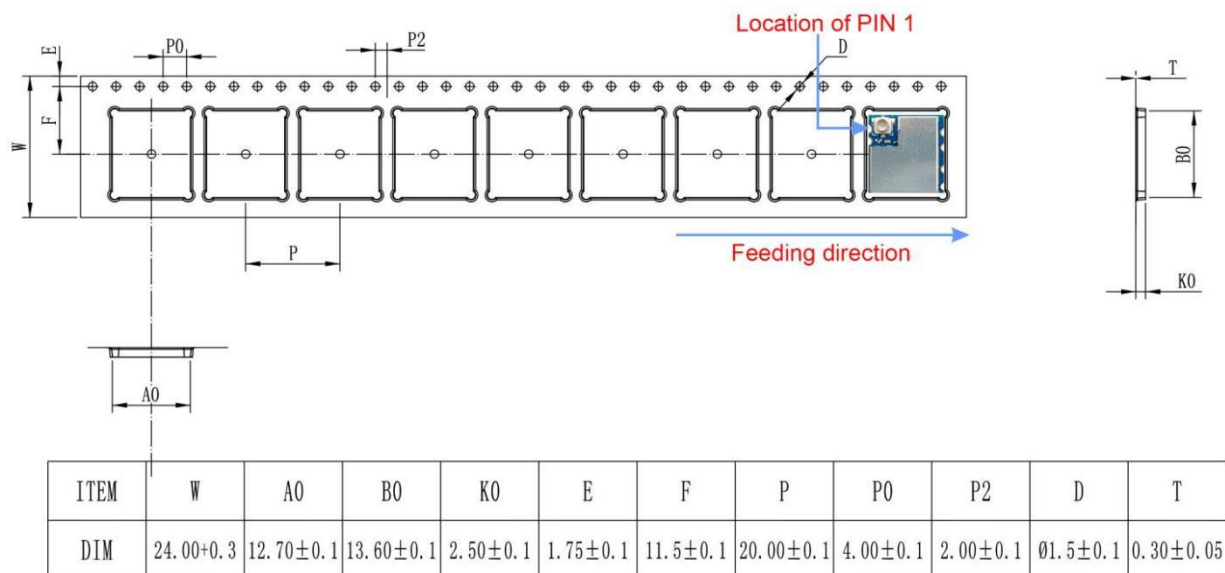
Set up the highest temperature within 250°C.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	Q35343U100	TriductorTechnology(Suzhou),Inc.	
2	PCB	BL-M35343XU1	SHEN ZHEN QILI ELECTRON CO.,LTD	
			Quzhou Sunlord Electronics Co.,Ltd	
			ShenZhen Tie Fa Technology Limited	
3	Crystal	40MHz-3225	Chengde oscillator Electronic Technology CO.,LTD	
			LUCKI CM ELECTRONICS CO.,LTD	
			JinHua East Crystal Electronic CO.,LTD	

8. Package and Storage Information

8.1 Package Dimensions



Package specification:

- 1,000 modules per roll and 5,000 modules per box.
- Outer box size: 37.5*36*29cm.
- The diameter of the blue environment-friendly rubber plate is 13 inches, with a total thickness of 28mm (with a width of 24mm carrying belt).
- Put 1 package of dry agent (20g) and humidity card in each anti-static vacuum bag.
- Each carton is packed with 5 boxes.

8.2 Storage Conditions

Absolute Maximum Ratings:

Storage temperature: -40°C to +85°C,
Storage humidity: 10% to 95 (Non-Condensing)

Recommended Storage Conditions:

Storage temperature: 5°C to +40°C,
Storage humidity: 20% to 90% RH

Please use this Module within 12month after vacuum-packaged.
The Module shall be stored without opening the packing.
After the packing opened, the Module shall be used within 72hours.
When the color of the humidity indicator in the packing changed,
the Module shall be baked before soldering.
Baking condition: 60°C, 24hours, 1time.

ESD Sensitivity:

ESD Protection: 4KV(HBM, Maximum rating)
The Module is a static-sensitive electronic device.
Do not operate or store near strong electrostatic fields.
Take proper ESD precautions!



ESD CAUTION

This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OE M Manual v01 guidance, the following must be strictly followed when using this certified module:

KDB 996369 D03 OE M Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15.247.

2.3 Summarize the specific operational use conditions

The module is typically use in industrial, household and general office / ITE and audio & video, EV charging system end-products. The product must not be co-located or operating in conjunction with any other antenna or transmitters.

2.4 Limited module procedures

not applicable

2.5 Trace antenna designs

Not applicable.

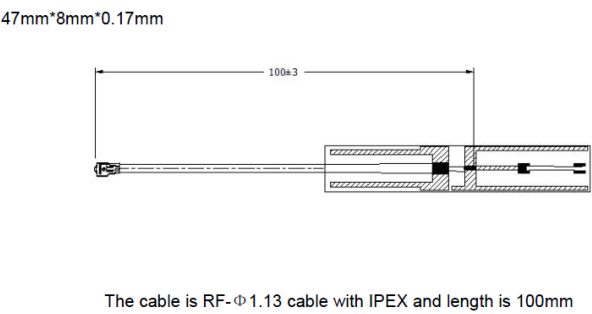
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2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.7 Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module. The antenna must be



	Freq. (MHz)	Gain (dBi)	Efficiency (%)
PCB_ANT	2400	0.68	65%
	2450	0.79	68%
	2500	0.87	67%
	5150	0.68	52%
	5470	1.89	55%
	5850	2.48	53%

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: “Contains FCC ID: **2AL6K-M35343XU1**”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.

IMPORTANT NOTE: In the event that these conditions can not 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 can not 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.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined 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.

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

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. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.