



BL-M35343XS1

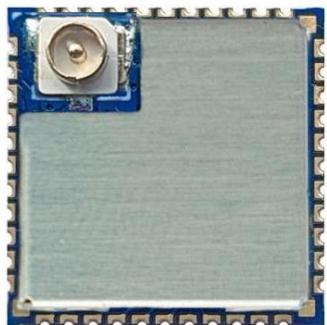
802.11ax 150Mbps WLAN +BLE

Combo SDIO Module Specification

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(Top View)



(Bottom View)

Module Name: BL-M35343XS1

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

Revision: V1.0

Customer Approval:

Company:

Title:

Signature:

Date:

Approval:

Title:

Signature:

Date:

Revision History

Revision	Summary	Release Date	Revised By
1.0	Official release	2025-04-08	Cxf

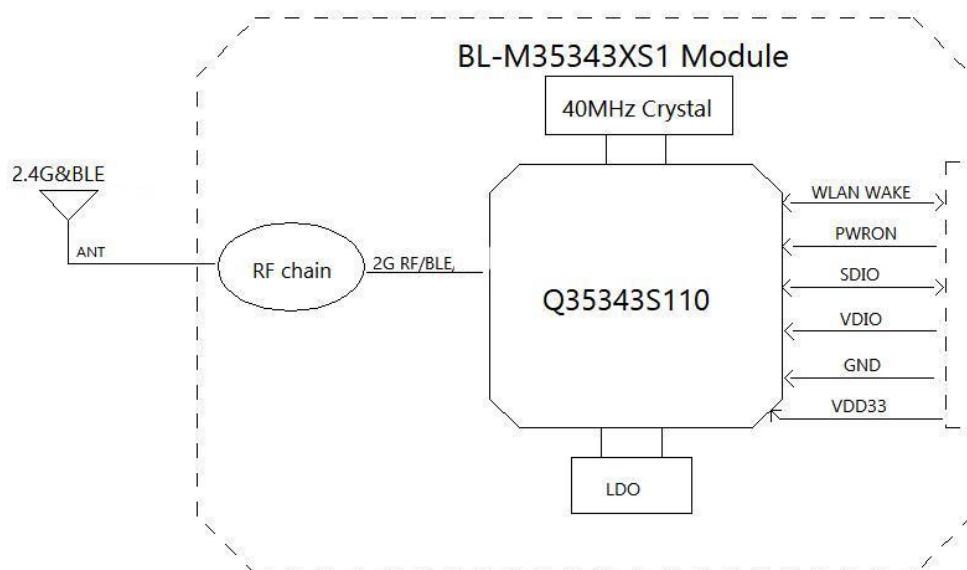
1. Introduction

BL-M35343XS1 is a highly integrated 2.4GHz WLAN+BLE+SLE Combo module base on Q35343S110 single chip, which compatible IEEE802.11b/g/n/ax standard, supports Bluetooth Low Energy 4.2/5.2 and NearLink SLE1.0. 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 SDIO2.0
- 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
- Compatible NearLink SLE1.0
- Industrial Grade operating temperature range
- Connect to external antenna through MHF1/IPEX connector
- Power Supply: 3.3V main power and 1.8V/3.3V I/O power

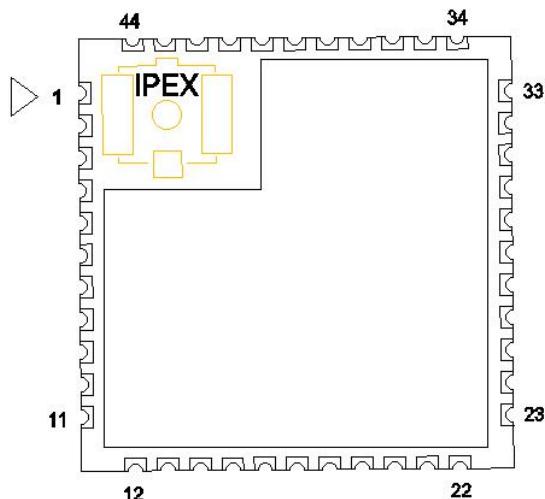
1.2 Block Diagram



1.3 General Specifications

Module Name	BL-M35343XS1
Chipset	Q35343S110
WLAN Standards	IEEE802.11b/g/n/ax
Host Interface	SDIO2.0 for WLAN/BLE
Antenna	Connect to external antenna through MHF1/IPEX connector
Dimension	12.0*12.0*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/BLE_ANT
2	RF	NC		NC(RF Pad for 2.4G WLAN/BLE_ANT)
3	GND	RF		RF Ground for WLAN/BLE_ANT

4	NC	/		NC
5	NC	/		NC
6	NC	/		NC
7	NC	/		NC
8	NC	/		NC
9	VDD33	P		DC 3.3V Power Supply
10	NC	/		NC
11	NC	/		NC
12	PWRON	I	VDIO	PMU power on enable active high input (Internal pull-high by 20K resistor and 220nF grounding capacitance)
13	WL/BLE_WAKE_HOST	I/O	VDIO	1.General Purpose I/O Pin GPIO10 2.WLAN/BLE wake up host output signal
14	SD_D2	I/O	VDIO	SDIO data 2
15	SD_D3	I/O	VDIO	SDIO data 3
16	SD_CMD	I/O	VDIO	SDIO command
17	SD_CLK	I	VDIO	SDIO clock
18	SD_D0	I/O	VDIO	SDIO data 0
19	SD_D1	I/O	VDIO	SDIO data 1
20	GND	P		Ground connections
21	NC	/		NC
22	VDIO	P		1.8V or 3.3V power supply for digital I/O
23	NC	/		NC
24	NC	/		NC
25	NC	/		NC
26	NC	/		NC
27	NC	/		NC
28	NC	/		NC
29	NC	/		NC
30	NC	/		NC
31	GND	P		Ground connections
32	NC	/		NC
33	GND	P		Ground connections
34	NC	/		NC
35	NC	/		NC
36	GND	P		Ground connections
37	UART0/LOG TX	I/O	VDIO	1.General Purpose I/O Pin GPIO3 2.UART0_TX for debug

38	UART0/LOG RX	I/O	VDIO	1. General Purpose I/O Pin GPIO11 2. UART0_RX for debug
39	NC	/		NC
40	HOST_WAKE_WL/BLE	I/O	VDIO	1.General Purpose I/O Pin GPIO000 2.. Host wake up WLAN/BLE Input signal
41	NC	/		NC
42	NC	/		NC
43	NC	/		NC
44	NC	/		NC
	IPEX	RF		Through IPEX for 2.4G WLAN/BLE/SLE_ANT

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	VDD33	3.1	3.3	3.5	V
	VDIO(3.3V)	3.1	3.3	3.5	V
	VDIO(1.8V)	1.7	1.8	1.9	V

3.2 Digital 3.3V GPIO DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	2.0	3.3	3.6	V
VIL	Input Low Voltage	-0.3	--	0.8	V
VOH	Output High Voltage	-0.2	--	--	V
VOL	Output Low Voltage	--	--	0.2	V

3.3 Digital 1.8V GPIO DC Specifications

Symbol	Parameter	Min	Typ	Max	Units
VIH	Input High Voltage	1.17	1.8	2.0	V

VIL	Input Low Voltage	-0.3	--	0.63	V
VOH	Output High Voltage	1.35	--	--	V
VOL	Output Low Voltage	--	--	0.45	V

3.4 Current Consumption

Conditions : VDD33=3.3V, VDIO=3.3V; Ta:25°C			
Use Case	VDD33 Current		
	Typ(I _{RMS})	Max(I _{Peak})	Units
WLAN/BLE/SLE Unassociated (Embedded Linux Driver)	31	43	mA
2.4G WLAN TCP throughput TX 76Mbps ((Linux, WLAN only)	158	244	mA
2.4G WLAN TCP throughput RX 93Mbps ((Linux, WLAN only)	74	242	mA
2.4G 11b 1Mbps TX@20dBm (TX RF test)	321	345	mA
2.4G 11b 1Mbps (RX RF test)	97	120	mA
2.4G 11b 11Mbps TX@20dBm (TX RF test)	325	360	mA
2.4G 11g 6Mbps TX@18dBm (TX RF test)	305	351	mA
2.4G 11g 6Mbps (RX RF test)	98	126	mA
2.4G 11g 54Mbps TX@17dBm (TX RF test)	287	368	mA
2.4G 11n HT20_MCS0 TX@18dBm (TX RF test)	313	355	mA
2.4G 11n HT40_MCS0 TX@18dBm (TX RF test)	312	354	mA
2.4G 11n HT40_MCS7 TX@16dBm (TX RF test)	233	321	mA
2.4G 11ax HE_SU 20M_MCS0 TX@17dBm (TX RF test)	309	425	mA
2.4G 11ax HE_SU 20M_MCS9 TX@15dBm (TX RF test)	253	360	mA
BT BLE_1M TX@20dBm (RF-Test)	335	409	mA
BT BLE_1M RX (RF-Test)	93	114	mA
BT BLE_2M TX@20dBm (RF-Test)	341	415	mA
BT BLE_2M RX (RF-Test)	94	113	mA
SLE 1M GFSK TX@20dBm (RF-Test)	218	419	mA
SLE 2M GFSK TX@20dBm (RF-Test)	155	391	mA
SLE 2M GFSK RX (RF-Test)	74	103	mA
SLE 1M QPSK: TX@14dBm (RF-Test)	141	299	mA
SLE 2M QPSK: TX@14dBm (RF-Test)	115	305	mA
SLE 2M QPSK RX (RF-Test)	73	105	mA

4. WLAN & Bluetooth & NearLink RF Specifications

4.1 2.4G WLAN RF Specifications

Conditions : VDD33=3.3V, VDIO=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~Ch11(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,OFDMA 26~242RU): 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	21	±1.5	≤ -10
802.11g@6Mbps	16	±1.5	≤ -10
802.11g@54Mbps	16	±1.5	≤ -25
802.11n@HT20_MCS0	16	±1.5	≤ -10
802.11n@HT20_MCS7	16	±1.5	≤ -28
802.11n@HT40_MCS0	15	±1.5	≤ -10
802.11n@HT40_MCS7	15	±1.5	≤ -28
802.11ax@HE_SU 20M_MCS0	16	±1.5	≤ -15
802.11ax@HE_SU 20M_MCS9	16	±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	-90	-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	-89	-10	< 10%
802.11ax@HE_SU 20M_MCS9	-68	-10	< 10%

4.2 Bluetooth RF Specification

Conditions: VDD33=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	-1	2	5
LE_125/500K	1	4	7
Items	Min	Typ	Max
LE_1M Modulation Characteristics			
Δf1avg	225KHz	252.01KHz	275KHz
Δf2avg	185KHz	220.25KHz	275KHz
Δf2max	185KHz	224.66KHz	/
Δf2avg/Δf1avg	0.8	0.87	/

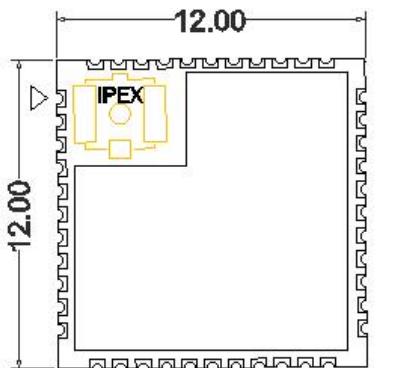
Items	Min	Typ	Max	
LE_2M Modulation Characteristics				
Δf1avg	450KHz	500.29KHz	550KHz	
Δf2avg	370KHz	427.80KHz	550KHz	
Δf2max	370KHz	442.08KHz	/	
Δf2avg/Δf1avg	0.8	0.85	/	
Bluetooth Receiver Specifications				
Items	Sensitivity		Maximum Input Level	
RX Rate	Input Level (Typ. dBm)	PER	Input Level (Typ. 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%

4.3 NearLink RF Specification

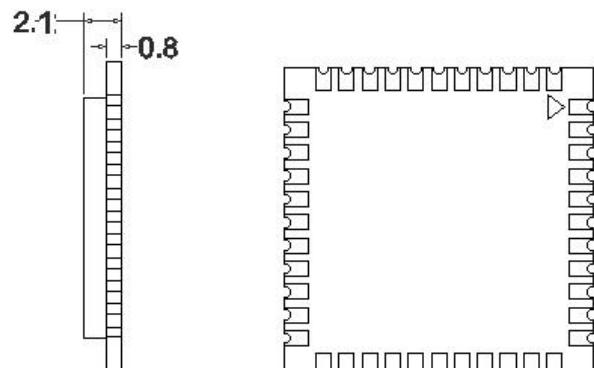
NA

5. Mechanical Specifications

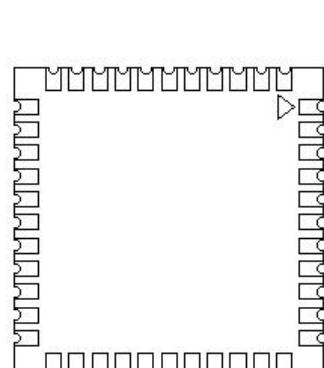
5.1 Module Outline Drawing



(Top View)



(Side View)



(Bottom View)

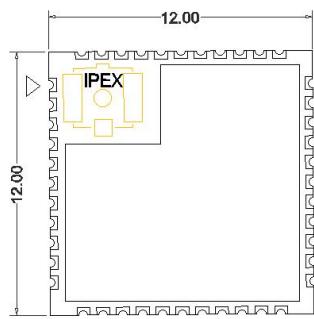
Module dimension: 12.0*12.0*2.1mm (L*W*H; Tolerance: $\pm 0.3\text{mm}_L/W$, $\pm 0.2\text{mm}_H$)

IPEX / MHF-1 connector dimension: 2.6*3.0*1.25mm (L*W*H; $\varnothing 2.0\text{mm}$)

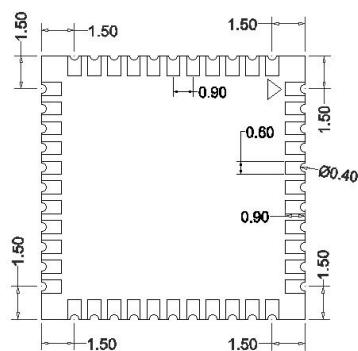


Module Bow and Twist: $\leq 0.1\text{mm}$

5.2 Mechanical Dimensions



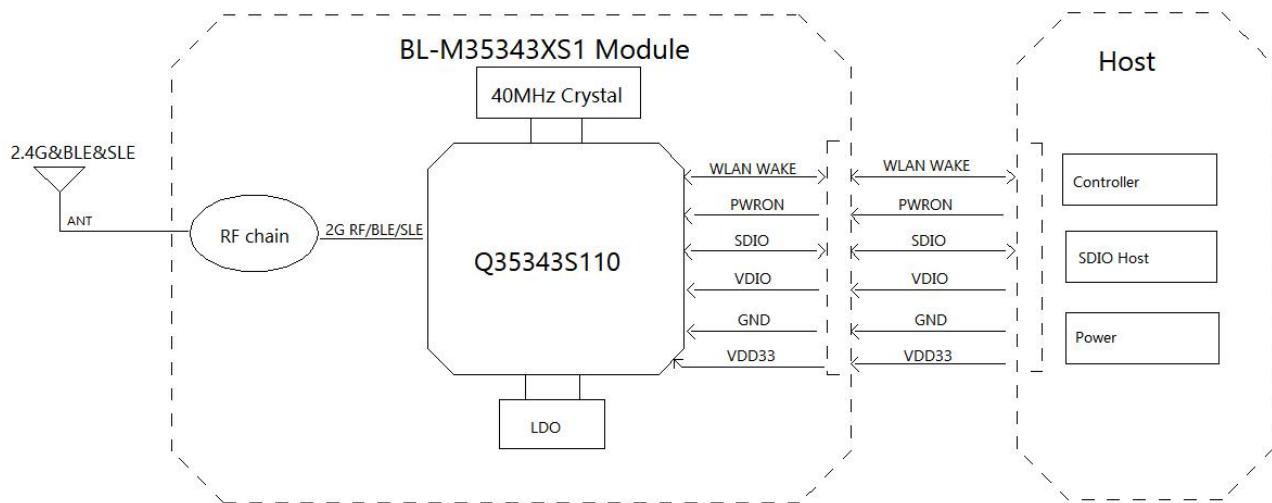
(Top View)



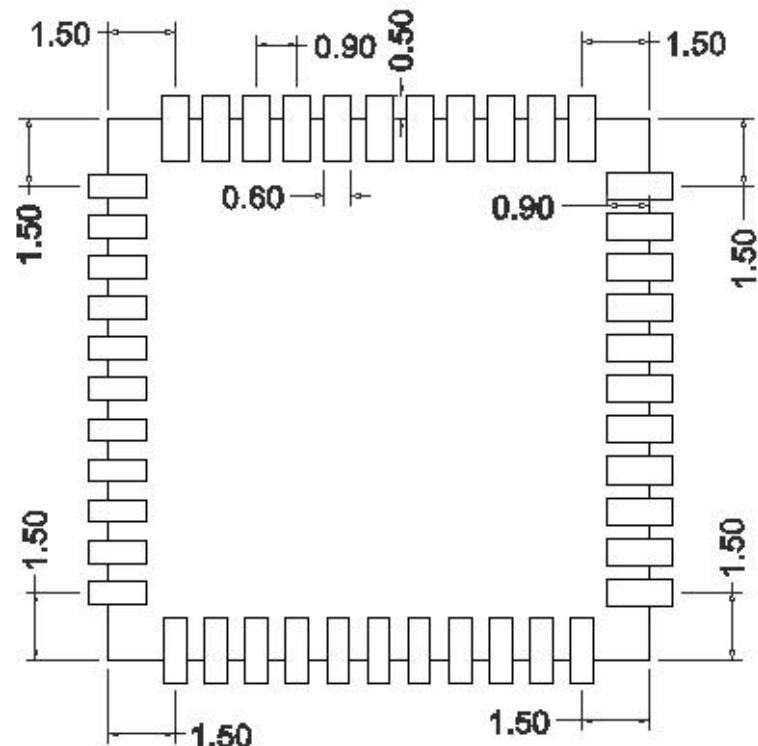
(Bottom View)

6. Application Information

6.1 Typical Application Circuit

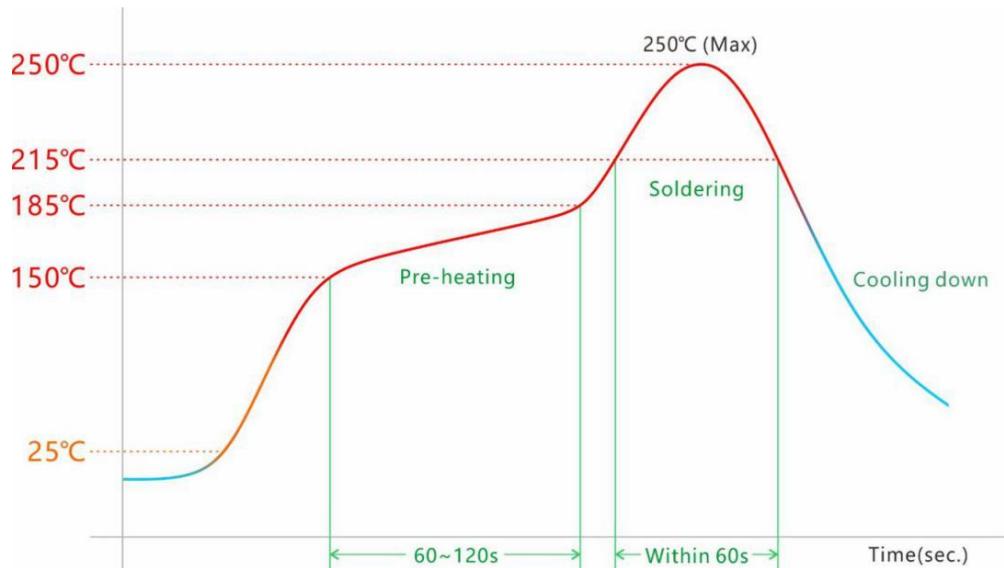


6.2 Recommend PCB Layout Footprint



(Design Units: mm)

6.3 Reflow Soldering Standard Conditions



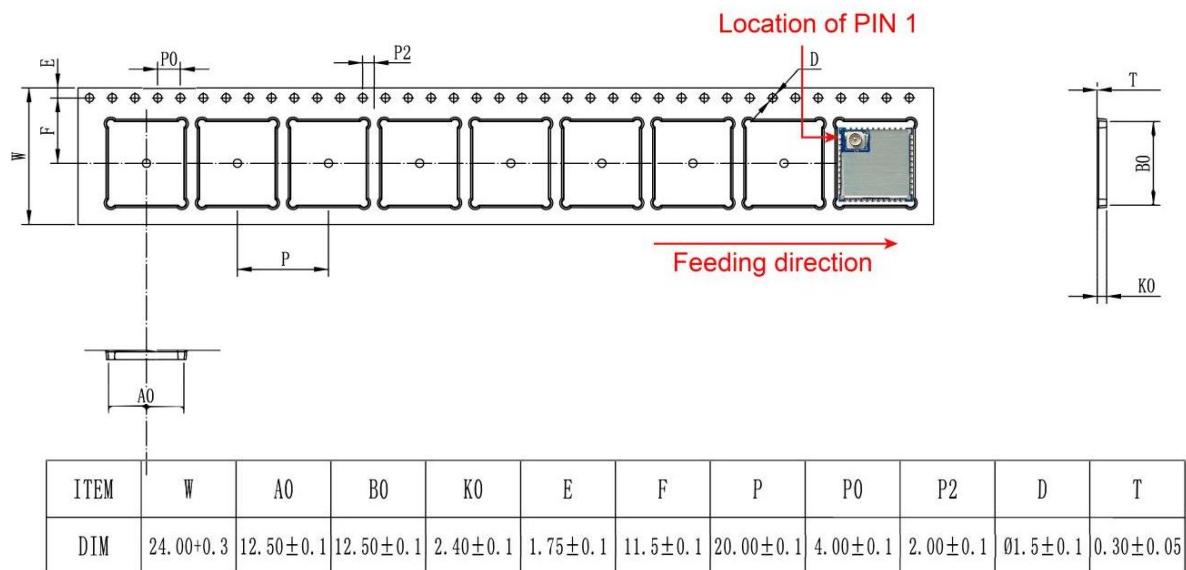
Please use the reflow within 2 times.
Set up the highest temperature within 250°C.

7. Key Components Of Module

No.	Parts	Specification	Manufacturer	Note
1	Chipset	Q35343S110	TriductorTechnology(Suzhou),Inc.	
2	PCB	BL-M35343XS1	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. 1,000 modules per roll and 5,000 modules per box.
2. Outer box size: 37.5*36*29cm.
3. 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).
4. Put 1 package of dry agent (20g) and humidity card in each anti-static vacuum bag.
5. 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

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 important announcement

Important Note:

Radiation Exposure Statement

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 and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

This device is intended only for OEM integrators under the following conditions:

1. The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2. The transmitter module may not be co-located with any other transmitter or antenna,
3. For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change. (if modular only test Channel 1-11)

As long as the three conditions above are met, further transmitter testing will not be required. 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.

End Product Labeling

The final end product must be labeled in a visible area with the following"

Contains **FCC ID: 2AL6KBL-M35343XS1** "

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.

**Integration instructions for host product manufacturers according to KDB 996369 D03
OEM Manual v01r01**

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

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.

2.7 Antennas

This radio transmitter **FCC ID: 2AL6KBL-M35343XS1** has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna No.	Model No. of antenna:	Type of antenna:	Gain of the antenna (Max.)		Frequency range:
			Antenna 1	Antenna 2	
Bluetooth	/	External Antenna	2.52	N/A	2402-2480MHz
2.4G Wi-Fi	/	External Antenna	2.52	N/A	2412-2462MHz

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following " Contains **FCC ID:AL6KBL-M35343XS1**".

2.9 Information on test modes and additional testing requirements

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

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.

2.11 Note EMI Considerations

Host manufacturer is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

2.12 How to make changes

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system. According to the KDB 996369 D02 Q&A Q12, that a host manufacturer only needs to do an evaluation (i.e., no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite. The host manufacturer must fix any failure.