



L509 Series_EVB User Manual

LTE Module Series

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Some features of the product and its accessories described herein rely on the software installed, capacities and settings of local network, and therefore may not be activated or may be limited by local network operators or network service providers. Thus, the descriptions herein may not exactly match the product or its accessories which you purchase. Shanghai Mobiletek Communication Ltd reserves the right to change or modify any information or specifications contained in this manual without prior notice and without any liability.

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Version History

Date	Version	Modify records	Author
2022-04-05	V1.0	Initial	g.zhong
2025-05-09	V1.1	1. The document was retyped; 2. The EPI has been upgraded to V2.	rc.tian

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1. Introduction

The L509_EVB is designed to help the developers to debug and test the L509 Series module. The following figure shows the label of the main functions of the L509_EVB. This document will describe the various parts of its functions in later chapters.

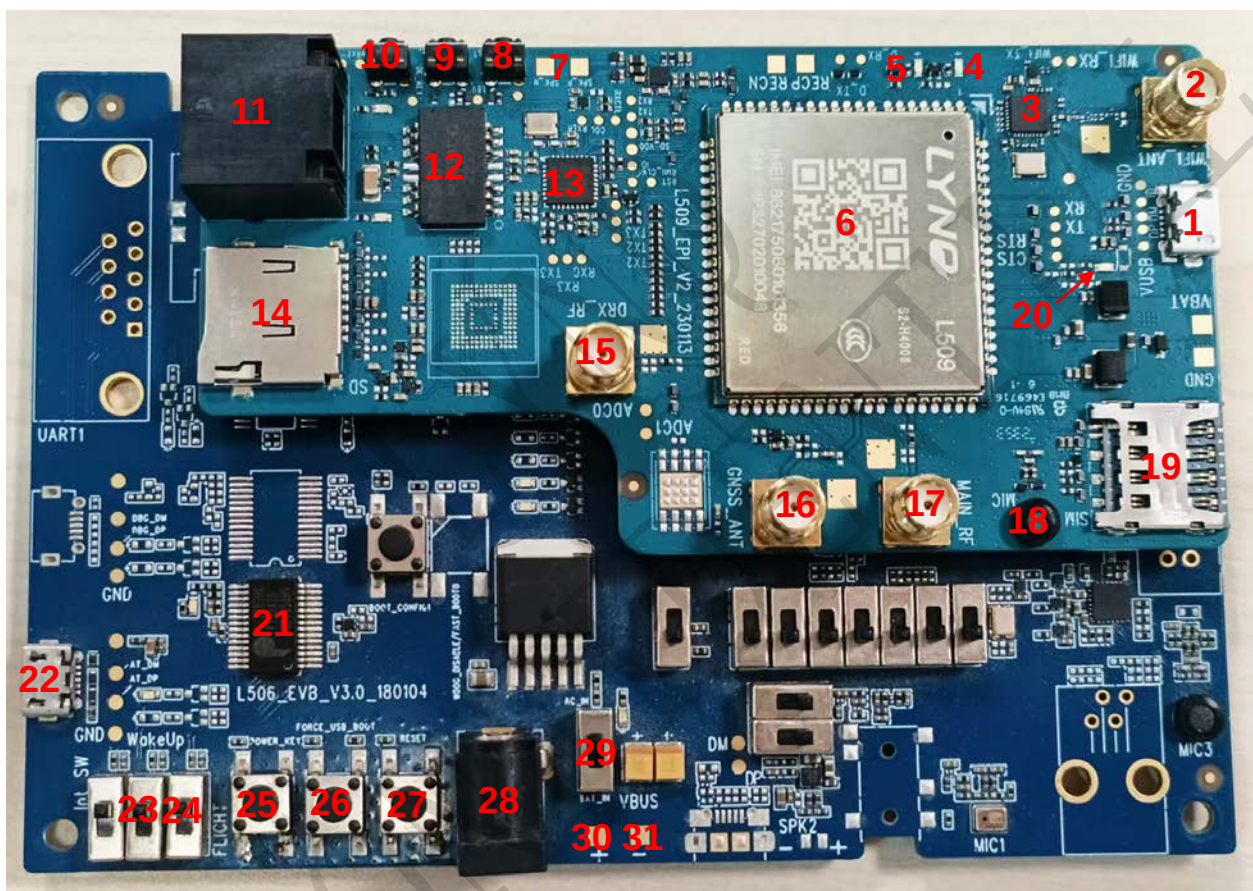


Figure 1-1 L509_EVB TOP View

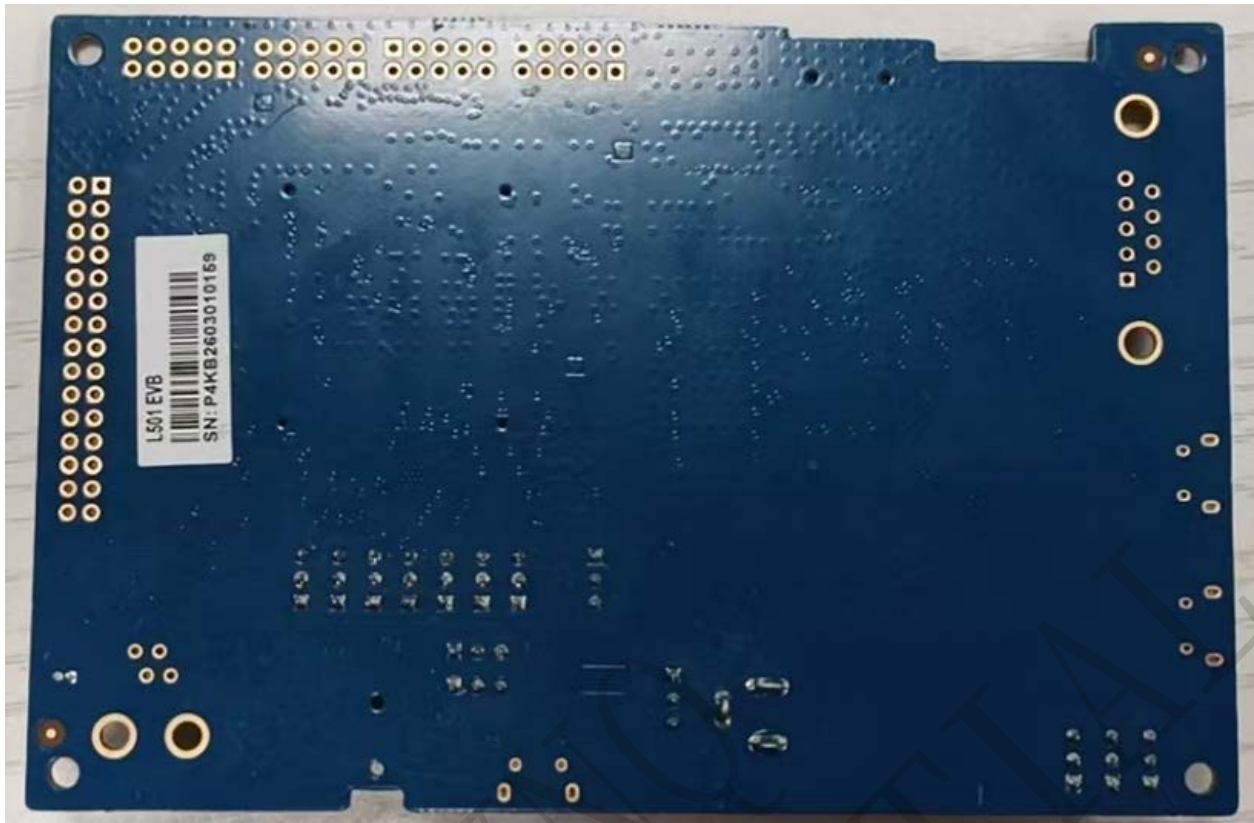


Figure 1-2 L509_EVB BOT View

Table 1-1 Label Description

1. 5pin Micro USB	2. WIFI Antenna	3. WIFI IC
4. NET_MODE LED	5. NET_STATUS LED	6. L509 Series Module
7. SPK Interface	8. RESET Key	9. Force_DL Key
10. Power Key	11. Ethernet RJ 45	12. Single port transformer
13. Ethernet PHY	14. SD Card	15. DRX Antenna
16. GNSS Antenna	17. MAIN Antenna	18. Cylindrical MIC
19. (U)SIM Card	20. STATUS LED	21. USB to UART IC
22. 5pin Micro USB (AT Command)	23. WAKEUP Switch	24. FLIGHTMODE Switch
25. Power Key	26. Force_DL Key	27. RESET Key
28. DC5V	29. Power Switch	30. DC3.8V
31. GND		

2. Function Introduction

2.1 Power Supply

The L509_EVB provides two kinds of power supply: DC5V adapter power supply and DC3.8V power supply. Customers can switch by controlling Power Switch. When the switch sets to the DC5V, it is powered by the DC5V adapter. When the switch sets to the DC3.8V, it is powered by the DC3.8V. As shown in the figure below.

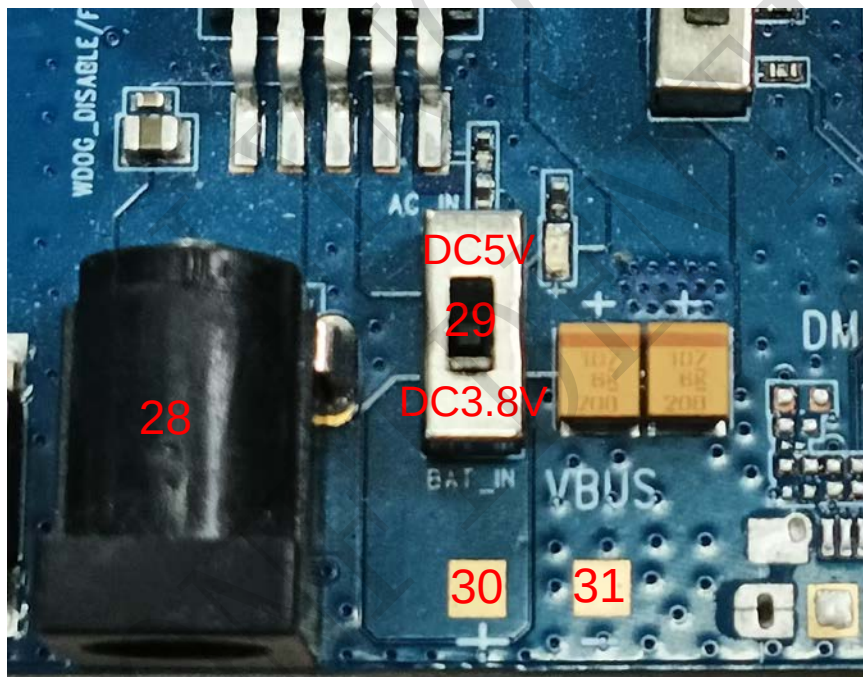


Figure 2.1-1 L509_EVB DC Power Interface and Power Switch

2.2 Power Key

The module can be turn on by pressing the power key for 1s.

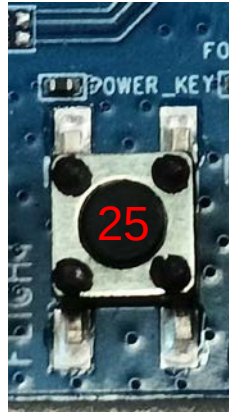


Figure 2.2-1 Power Key

2.3 Force download key

Pressing the forced download key can enter the forced download mode of the module. Before the system is powered on, pressing the force download key and the power key at the same time to enable the L509 Series module to enter the force download mode.

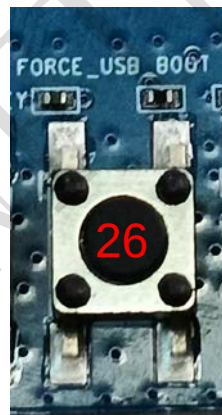


Figure 2.3-1 Force download key

2.4 RESET Key

Pressing the RESET Key can restart the module.



Figure 2.4-1 RESET Key

2.5 WAKEUP Switch

The WAKEUP switch can enable the module to enter sleep mode or Wake Up mode. The WAKEUP switch is shown in Figure 2.5-1.

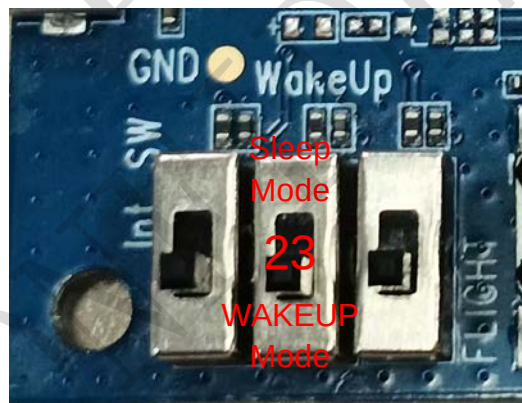


Figure 2.5-1 WAKEUP Switch

2.6 FLIGHTMODE Switch

The FLIGHTMODE switch can make the module enter the flight mode or exit the flight mode. The FLIGHTMODE switch is shown in Figure 2.6-1.

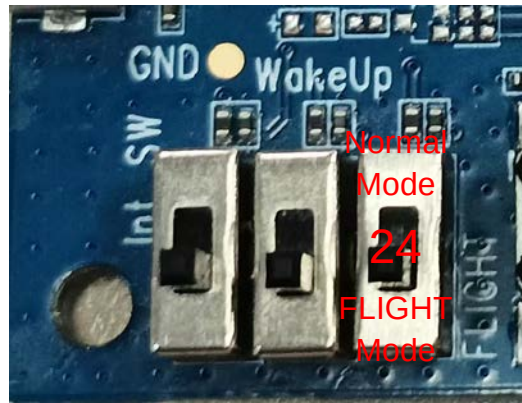


Figure 2.6-1 FLIGHTMODE Switch

2.7 Analog Audio Interface

The L509_EVB provides one MIC and one SPK. If you need to test the MIC and SPK functions, you need to solder the SPK device on the EVB.

2.8 Application Interface

2.8.1 USB to UART Interface

The L509_EVB provides one serial port through serial USB to UART IC which converts the COMS 1.8V level of the L509 to a standard USB2.0 signal. Users can connect PC or other terminal equipment through USB cable for UART communication and the default baud rate for the first boot is 115200bps. DBG_UART requires separate soldering wires and the baud rate is 115200bps.

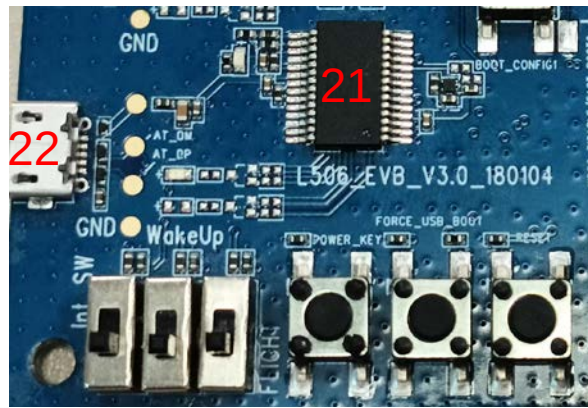


Figure 2.8.1-1 USB to UART Interface

2.8.2 USB Interface

The L509_EVB provides a standard Micro USB interface. The USB is mainly used for data transmission, firmware update, module program testing and send AT command.



Figure 2.8.2-1 USB Interface

2.8.3 (U)SIM Card

The L509_EVB provides one (U)SIM interfaces which can automatically identify 1.8V and 3V (U)SIM card.



Figure 2.8.3-1 (U)SIM Card

2.8.4 SD Card

The L509_EVB provides one SD interface.

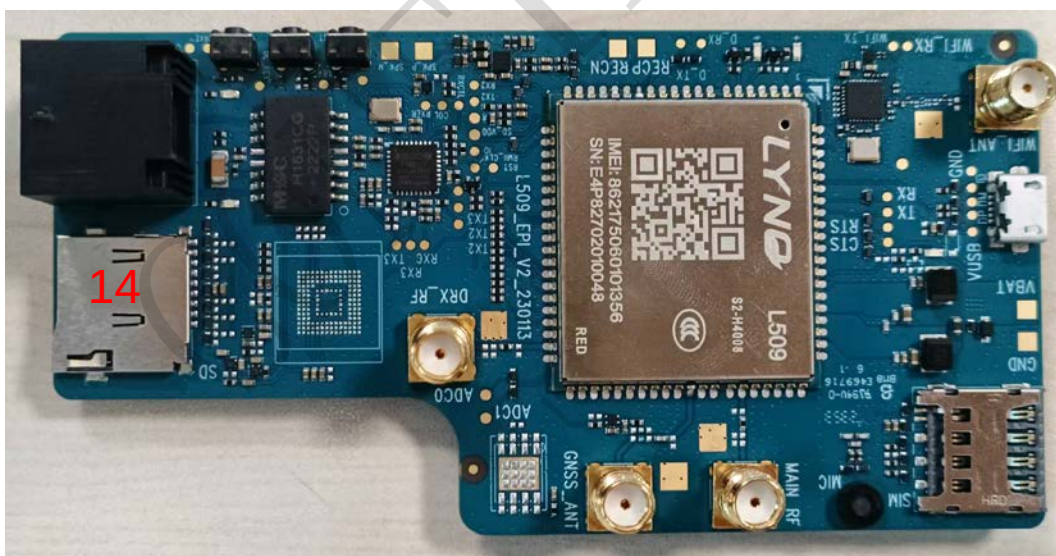


Figure 2.8.4-1 SD Card

2.8.5 NETLIGHT

NETLIGHT status light below the EVB board as shown in the figure.

Table 2.8.5-1 NETLIGHT Status

Pin Name	Pin working status	Module Status
NET_MODE	High Level	Registered network status
	How Level	Else
NET_STATUS	OFF	Power off
	64ms ON/800ms OFF	Shut down network
	64ms ON/3000ms OFF	Registered network

2.9 Antenna Interface

The L509_EVB provides four antenna interfaces. They are the WIFI antenna, diversity antenna, GNSS antenna and main antenna.

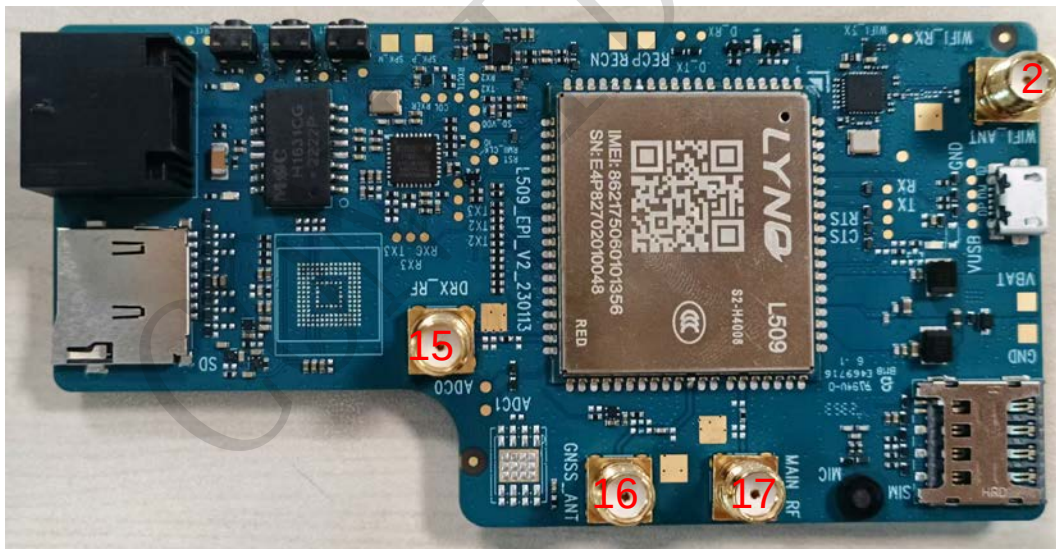


Figure 2.9-1 Antenna interface

3. EVB and Accessories

The EVB and its accessories are showed as follow figure which tell user how to connect them.

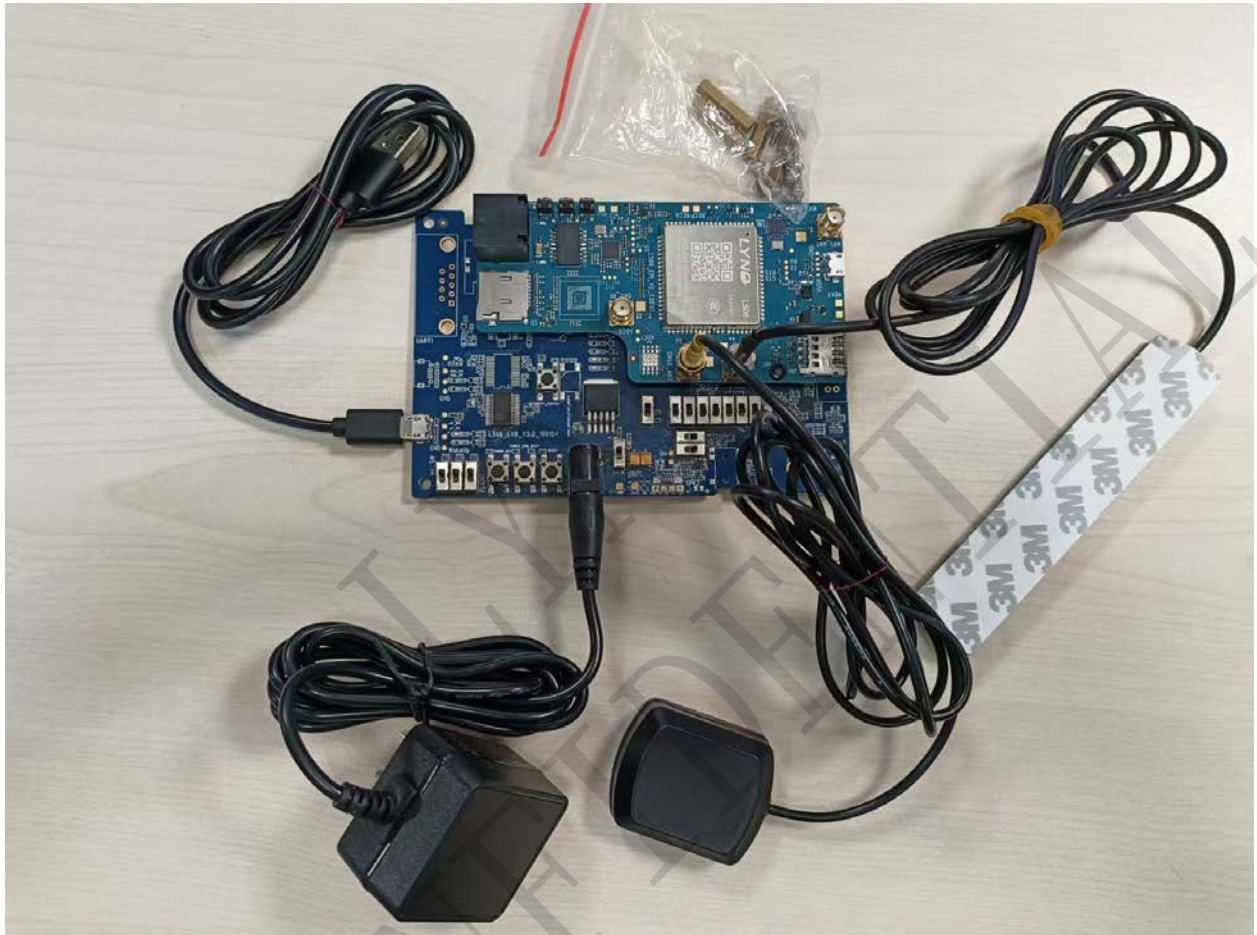


Figure 3-1 EVB and Accessories

4. USB to UART Driver

You need to install the driver of Micro-USB, when use Micro-USB for data communication. Please get the driver from our FAE of Mobiletek Company or download them from internet.

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5. Safety Information

For the reasonable usage of the module, please comply with all these safety notices of this page. The product manufacturers should send followed safety information to user, operator or product's spec.



The devices using the module may disturb some electronic equipment. Put the module away from the phone, TV, radio and automation equipment to avoid the module and the equipment to interfere with each other.



Shut down the mobile device or change to flying mode before boarding. The Using of wireless appliances in an aircraft is forbidden to avoid the interference, or else cause to unsafe flying, even violate the law.



In hospital or health care center, switch off the mobile devices. RF interference may damage the medical devices, like hearing-aid, cochlear implant and heart pacemaker etc.



Mobile devices can't guarantee to connect in all conditions, like no fee or with an invalid SIM card. When you need emergent help, please remember using emergency calls and make sure your device power on in an area with well signal.



Put the module away from inflammable gases. Switch off the mobile device when close to gas station, oil depot, chemical plant etc.



The module is not water proof. Please don't use the module in the area with high humidity like bathroom, which will decelerate the physical performance, insulation resistance and mechanical strength.



Non-professionals can't teardown the module which will damage it. Refer to the specification or communicate the related staffs to repair and maintain it.



Please switch on the module before cleaning. The staffs should be equipped with anti-ESD clothing and gloves.

The users and product manufacturers should abide by the national law of wireless modules and devices. If not, Mobiletek will not respond the related damages.

6. Warning Information

15.19 Labeling requirements.

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.

15.21 Changes or modification warning.

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

15.105 Information to the user.

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

RF warning for Mobile device:

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.

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

KDB 996369 D03 OEM Manual v01 rule sections:

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) or being used in a portable condition will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not application

2.5 Trace antenna designs

Not application

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 installed such that 20 cm can be maintained between the antenna and users.

Antenna Type(External)	GPRS/EGPRS 850: 2.3 dBi GPRS/EGPRS 1900:2.3 dBi WCDMA/HSDPA/HSUPA Band 2: 2.3 dBi WCDMAHSDPAHSUPA Band 4: 2.3 dBi WCDMA/HSDPA/HSUPA Band 5: 2.3 dBi FDD LTE Band 2: 2.3 dBi FDD LTE Band 4: 2.3 dBi FDD LTE Band 5: 2.3 dBi FDD LTE Band 7: 2.3 dBi FDD LTE Band 66: 2.3 dBi
Antenna connector	SMA

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2AK9DL509”. 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

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all conditions above are met, further transmitter test 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 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

Industry Canada statement

This K019-CW43-DW complies with ISED's licence-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

5G WIFI statement

The device is restricted to indoor use when operated in 5150MHz~5350MHz to reduce the potential for interference

Radiation Exposure Statement:

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with greater than 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

IC statement

The final end product must be labeled in a visible area with the following "Contains IC: 24342-L509"

The Host Marketing Name (HMN) must be indicated at any location on the exterior of the host

product or product packaging or product literature, which shall be available with the host product or online.

This radio transmitter [IC: 24342-L509] has been approved by Innovation, Science and Economic Development Canada 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.

Frequency range	Manufacturer	Peak gain	Impedance	Antenna type
GPRS/EGPRS 850	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
GPRS/EGPRS 1900	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
WCDMA/HSDPA/HSUPA Band 2	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
WCDMA/HSDPA/HSUPA Band 4:	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
WCDMA/HSDPA/HSUPA Band 5	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
FDD LTE Band 2	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
FDD LTE Band 4	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
FDD LTE Band 5	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
FDD LTE Band 7	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna
FDD LTE Band 66	Shanghai Jesoncom Communication Engineering Co., Ltd	2.3 dBi	50ohm	External Antenna

1.The OEM integrator must be aware not to provide information to the end user regarding how to install or remove this RF module in the user manual of the end product. The user manual which is provided by OEM integrators for end users must include the following information in a prominent location.

L'intégrateur OEM doit être conscient de ne pas fournir d'informations à l'utilisateur final sur la manière d'installer ou de retirer ce module RF dans le manuel d'utilisation du produit final. Le manuel d'utilisation fourni par les intégrateurs OEM pour les utilisateurs finaux doit inclure les informations suivantes dans un emplacement visible.

2.To comply with IC RF exposure compliance requirements, the antenna used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with IC multi-transmitter product procedures. Pour se conformer aux exigences de conformité de l'exposition RF IC, l'antenne utilisée pour cet émetteur ne doit pas être co-localisée ou fonctionner en conjonction avec une autre antenne ou un autre émetteur, sauf conformément aux procédures du produit multi-émetteur IC.

3.The final system integrator must ensure there is no instruction provided in the user manual or customer documentation indicating how to install or remove the transmitter module except such device has implemented two-ways authentication between module and the host system.

L'intégrateur système final doit s'assurer qu'aucune instruction n'est fournie dans le manuel de l'utilisateur ou dans la documentation du client indiquant comment installer ou retirer le module transmetteur, sauf qu'un tel dispositif a mis en place une authentification bidirectionnelle entre le module et le système hôte.

4. The host device shall be properly labelled to identify the module within the host device. The end product must be labeled in a visible area with the following: "Contains IC:24342-L09 "

Any similar wording that expresses the same meaning may be used.

Le périphérique hôte doit être correctement étiqueté pour identifier le module dans le périphérique hôte. Le produit final doit être étiqueté dans une zone visible avec: "Contains IC: 24342-L509 " Toute formulation similaire exprimant la même signification peut être utilisée. The IC Statement below should also be included on the label. When not possible, the IC Statement should be included in the User Manual of the host device. "This device complies with Industry Canada license-exempt RSS standard(s). 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."