

ATEL 900MHz Wi-Fi Halow Module —LM190

V1.4

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1 Introduction

LM190 is 900MHz Wi-Fi Halow IEEE 802.11ah Module, based on Morsemicro MM6108CQ chipset.

Key function as below

- 1) Based on Morsemicro chipset MM6108CQ,
- 2) Supports 802.1ah
- 3) Support USA market (frequency range 902MHz~928MHz
- 4) Support SDIO/SPI, GPIOs interfaces
- 5) MIMO 1*1

Product model definition:

Product	Band	DC Power	Chipset
LM190	902MHz~928MHz	3.3V and 5.0V	Morsemicro MM6108CQ

2 Spec overview

Item	Description
Network	
Wi-Fi Halow	Support
Frequency Range	902MHz~928MHz
Platform	Morsemicro MM6108CQ
Dimension	
Type	LGA
Dimension	Same with current GM02S module
Connector	LGA
Weight	<30g
Color	Blue
Hardware info	
CPU	Morsemicro MM6108CQ
Power supply	3.0V~3.6V, Type-3.3V
USB	Not Support
SDIO	Support
RF connector	PCB PAD
Memory	Integrate MM6108CQ chipset
DDR	NA
NOR flash	NA
NAND	NA
USIM	Not Support
Working Current	<750mA
Idle current	<15mA (TBD)

3 Silkscreen

3.1 PCB Silkscreen & Color

Item	Requirement
PCB	Blue
PCB version	Required
PCB ATTN	Required
Other	No

3.2 Label

Item	Requirement
Label color	White
Label Dimension	25*20*0.1mm (TBD)
Company	Required ,“ATEL”
TYPE	Required ,“LM190”
IMEI	Required ,
SN	Required ,
Certification	No
Made in China	Required ,
Other	No

4 Hardware requirement

4.1 Basic Wireless performance

Wi-Fi Halow	Support
WLAN Protocol	IEEE 802.11ah
Frequency Range	902MHz~928MHz
Platform	Morsemicro MM6108CQ
Bandwidth	1, 2,4,8MHz
Modulation	OFDM, BPSK, QPSK, 16QAM, 64QAM
Encryption Mode	AES, SHA-256, SHA-384, SHA-512, WPA3
Working mode	AP/STA

Throughput		
Max throughput	8MHz BW (MCS7)	32.5Mbps

4.2 Power supply

Voltage	Range
3.3V and 5.0V	3.3V range:3.0V ~ 3.6V
	5.0V range:4.2V~5.5V

Safety information:

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

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.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC Statement

Warning: Changes or modifications to this unit 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

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- 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

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

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.

FCC Radiation Exposure Statement

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

Does not comply with the use restrictions of the product:

Portable devices used close with human's body (within 20cm), Like Cell phone, Notebook etc.

Integration instructions for host product manufacturers according to KDB 996369 D03

OEM

Manual v01

2.2 List of applicable FCC rules

FCC Part 15 Subpart C 15.247 & 15.209

2.3 Specific operational use conditions

The module can be used for mobile applications with a maximum 1.27dBi antenna. The host manufacturer installing this module into their product must ensure that the final product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules,

User Manual_LM190_0917.pdf including the transmitter operation. The host manufacturer 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 shown in this manual.

2.4 Limited module procedures

Not applicable. The module is a Single module and complies with the requirement of FCC Part 15.212.

2.5 Trace antenna designs

Not applicable. The module has its own antenna, and doesn't need a host's printed board micro strip trace antenna etc.

2.6 RF exposure considerations

The module must be installed in the host equipment such that at least 20cm is maintained between the antenna and user's body; and if RF exposure statement or module layout is changed, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID or new application. The FCC ID of the module cannot be used on the final product. In these circumstances, the host manufacturer will be responsible for reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

2.7 Antennas

Antenna Specification are as follows:

Type: External Antenna

This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna; The module shall be only used with the external antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a "unique" antenna coupler.

As long as the conditions above are met, further transmitter test will not be required. However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc).

2.8 Label and compliance information

Frequency (MHz) :902~ 928 MHz,

Gain(dBi) :5.03 dBi

Host product manufacturers need to provide a physical or e-label stating "Contains FCC ID:

XYO-LM190" with their finished product.

2.9 Information on test modes and additional testing requirements

Host manufacturer must perform test of radiated & conducted emission and spurious emission, e.t.c according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15 Subpart C 15.247 & 15 209 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 circuitry), 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.

Federal Communication Commission Statement (FCC, US)

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 of the following measures:

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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.

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.