

**LTM1215 IOE Module
Datasheet**

V 1.1

June 2016

LTM1215 Datasheet V1.1

Revision	Date	Description
V1.0	2016/05/20	Initial release
V1.1	2016/06/14	Update the module's size

LTM1215 Datasheet V1.1

1.Introduction	- 5 -
1.1 General Description	- 5 -
1.2 Hardware Description	- 5 -
1.3 Wireless Specification	- 5 -
1.4 Performance Specification	- 6 -
1.5 Protocols	- 6 -
1.6 Typical application	- 6 -
1.7 Warranty	- 6 -
1.8 Certifications	- 6 -
2.System Block Diagram.....	- 7 -
2.1 Module System Block Diagram	- 7 -
2.2 Typical design	- 7 -
3.Features	- 8 -
3.1 IPv4/IPv6 Networking	- 8 -
3.2 Power Management	- 9 -
3.3 Application Program Interface	- 10 -
3.4 WiFi Link Feature	- 10 -
4.LTM1215 Pin-out.....	- 11 -
4.1 Pin-out Top view	- 11 -
4.2 LTM1215 Pin Assignment and Descriptions.....	- 11 -
5.Electrical Specifications.....	- 12 -
5.1 Absolute Maximum Ratings	- 12 -
5.2 Recommended Operating Conditions.....	- 13 -
6.RF Parameters.....	- 14 -
6.1 Transmitter Characteristics for 2.4GHz Operation	- 14 -

LTM1215 Datasheet V1.1

6.2 Receiver Characteristics for 2.4GHz Operation	- 14 -
7. Mechanical Dimensions	- 15 -
8. Manufacture information	- 15 -
8.1 Optical Inspection	- 15 -
8.2 Rework	- 15 -
8.3 Handling	- 16 -
8.4 Soldering Recommendations	- 16 -
9. Ordering Information	- 17 -

1.Introduction

1.1 General Description

Midea LTM1215 module with a built-in printed antenna is an intelligent Internet of Everything platform which can be powered by alljoyn with low power wireless connectivity. This complete networking platform enables customers to add full-featured Wi-Fi to a wide variety of products with minimal development effort and cost. It supports a network stack along with SSL security, enabling full-featured internet connectivity and reliable information exchange in a small, low-cost system.

The LTM1215 module contains a Midea WIFI IOT SIP LTP1218. The LTP1218 is a single chip system on a chip (SoC) 1x1 802.11 b/g/n device optimized for low-power embedded applications with single-stream capability for both Tx and Rx. It has an integrated network processor with a large set of TCP/IP with IPv4/IPv6-based services. The LTM1215 provides UART_based host interfaces for connecting to local system controllers.

1.2 Hardware Description

- Size: 18 x 13 x 3.8 mm
- Tolerance: $\pm 0.3\text{mm}$
- Operating voltage: 3.6 V ~ 5.5V
- Operating humidity: 20-70%
- Operating temperature range:
 - Industrial: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
 - Commercial: $-10^{\circ}\text{C} \sim +65^{\circ}\text{C}$
- Power consumption
 - Transmit: 250 mA @16dBm
 - Receive: 75 mA (typical)
 - Power saving mode(DITM=1): 1.09mA
 - Standby mode(Sleep): 130uA
- Connector: DIP or SMD-Pad connector - 4 Pads
- Host interface: UART
 - UART interface: Supports AT style command set.

1.3 Wireless Specification

- Standard supported: IEEE802.11b/g/n
- Frequency: 2.412 to 2.484GHz
- Channels: up to 13 channels

1.4 Performance Specification

- Host data rates
 - UART: 115200bps, 8, n, 1
- Link rates
 - Up to 150MHz

1.5 Protocols

- Internet protocols: IPv4/IPv6, TCP/UDP, ARP/NDP, DHCPv4, ICMPv6
- Security protocols: WPS, WPA, WPA2, WAPI, WEP, TKIP

1.6 Typical application

- Household appliances
- Gaming consoles
- Handheld terminals
- Embedded wireless products
- security monitoring device
- industrial remote control
- Home automation

1.7 Warranty

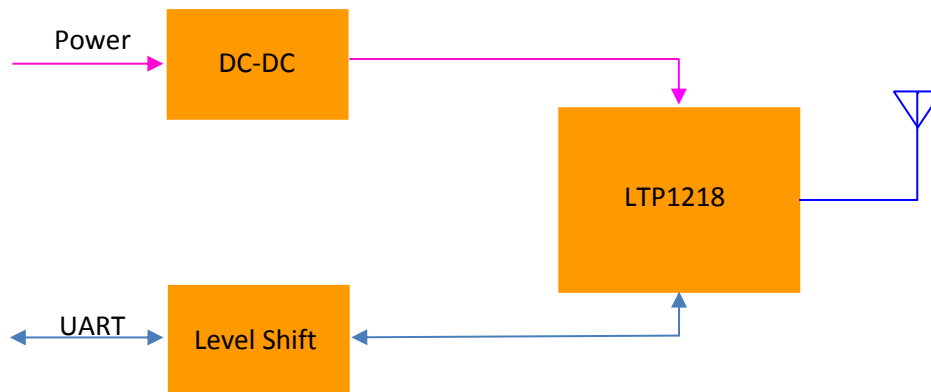
- One Year

1.8 Certifications

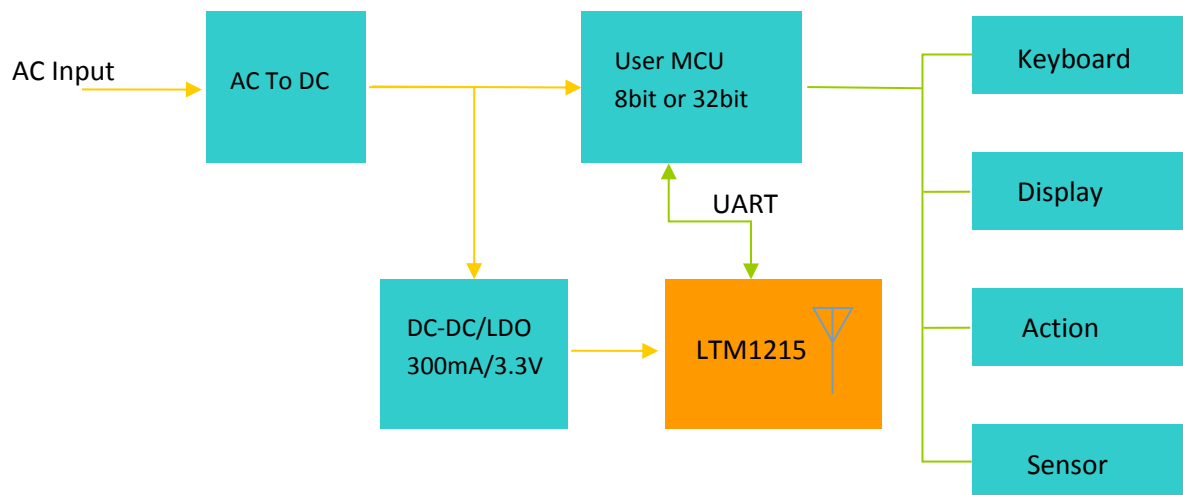
- CE
- FCC
- ROHS compliant

2. System Block Diagram

2.1 Module System Block Diagram



2.2 Typical design



3.Features

3.1 IPv4/IPv6 Networking

The QCA4004 includes a TCP/IP and UDP offload capability. This capability can reduce Flash requirements on a host MCU by up to 100 KBytes and also free up CPU cycles. The IP stack is a simultaneous IPv4/IPv6 stack with a BSD-like interface to simplify porting and integration with common embedded operating systems. The supported features of the QCA4004 (support for DHCP, multicast, and ARP) include:

- ARP
- Forwarding
- Fragmentation/reassembly (supported with limitation)
- IPv4/v6 header processing
- UDP/TCP socket support
- DHCP v4
- Neighbor discovery
- Broadcast/multicast
- Path MTU discovery
- Address auto-configuration
- Multicast
- TCP zero-copy feature

QCA4004 IPv4 Supported RFCs

IPv4 RFC Number
RFC 1122 (TCP Timeout/retransmission)
RFC1122:TCP Keep-alive
RFC1122:TCP Zero-Window-Probe
RFC1122:TCP Sliding window protocol

LTM1215 Datasheet V1.1

QCA4004 IPv6 Supported RFCs

IPv6 RFC Number
RFC-2464:Transmission of IPv6 packets over Ethernet networks
RFC-2460:Internet Protocol version 6
RFC2462, Duplicate Address Detection (DAD)
RFC-2463:ICMPv6
RFC3513:IP version 6 addressing architecture
RFC3484:Default Address Selection
RFC2461:Neighbour discovery for IPv6 host
RFC4862:Stateless Address Auto-configuration

3.2 Power Management

LTM1215 provides integrated power management and control functions for maximum battery life across all operational states.

- Transmit: 250 mA @16dBm;
- Receive: 75 mA (typical)
- Power saving mode: 1.09 mA(DTIM=1)
- Standby mode(Sleep): 130uA

Sleep state minimizes power consumption while network services are not required, yet the system needs to remain available for use within a short time.

LTM1215 Datasheet V1.1

State		Typical Current Consumption for LTM1215 module
SLEEP		130uA
802.11g (2.4GHz)	DTIM1	1,090uA
	DTIM3	437uA
	DTIM5	335uA
	DTIM10	274uA

3.3 Application Program Interface

APIs provided by Qualcomm enable flexible host application customization. The firmware is written, owned, controlled, and maintained by Qualcomm , whereas the reference host software is supplied for system integrator to create application-specific host software, or even to use without modification.

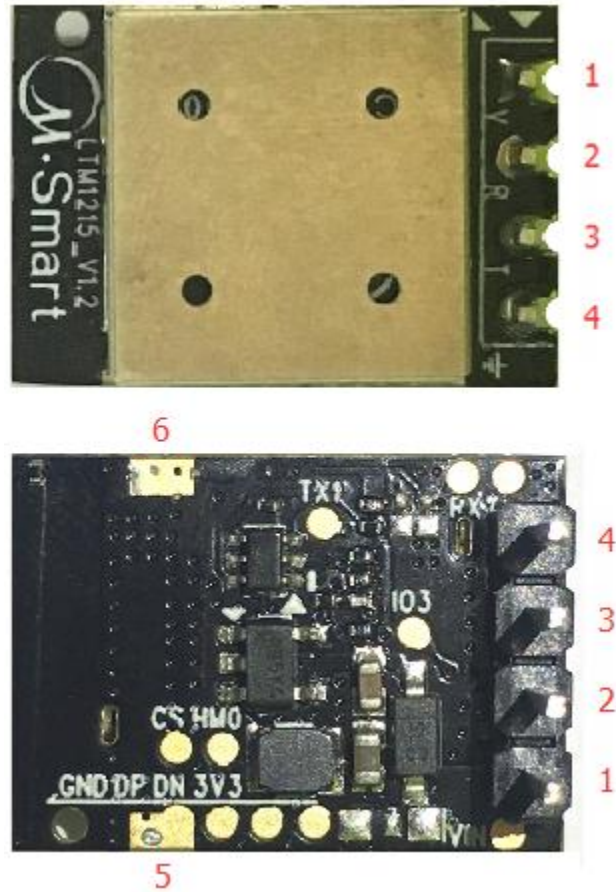
Note: If system integrator leverages the Qualcomm host software components, ultimately the system developer is responsible for the host software on their platforms, OSes, and interconnects.

3.4 WiFi Link Feature

- IEEE 802.11b/g/n, single stream 1x1
- Single-band 2.4 GHz
- Integrated PA, LNA, with support for external PA and external LNA
- Green Tx power saving mode
- Low power listen mode
- Two-layer PCB design
- Link rates up to 150 Mbps

4.LTM1215 Pin-out

4.1 Pin-out Top view



4.2 LTM1215 Pin Assignment and Descriptions

PIN	Signal Name	Description
1	VCC	Supply Input Pin
2	RXD	UART receive data
3	TXD	UART transmit data
4	VSS	Ground
5,6	VSS	Ground for SMT

5. Electrical Specifications

5.1 Absolute Maximum Ratings

Table 5-1 summarizes the absolute maximum ratings and Table 5-2 lists the recommended operating conditions for the LTM1215. Absolute maximum ratings are those values beyond which damage to the device can occur.

Functional operation under these conditions, or at any other condition beyond those indicated in the operational sections of this document, is not recommended.

NOTE Maximum rating for signals follows the supply domain of the signals.

Table 5-1 absolute maximum ratings

symbol	Description	Max rating	unit
VCC	VCC supply for whole module	−0.3 to 6.0	V
VIH MIN	Minimum Digital I/O Input Voltage for 5V I/O Supply	−0.3	V
VIH MAX	Maximum Digital I/O Input Voltage for 5 V I/O Supply	VCC +0.3	V
RFin	Maximum RF input (reference to 50-Ω input)	+10	dbm
Tstore	Storage Temperature	−45 to 135	°C
Tj	Junction Temperature	125	°C
ESD	Electrostatic Discharge Tolerance	HBM - 2000 CDM - 500	V

5.2 Recommended Operating Conditions

These conditions apply to all DC characteristics unless otherwise specified:

T_{amb} = 25 °C, V_{CC} = 5 V

Table 5-2 Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	unit
VCC	VDD supply for whole module	3.6	5	5.5	V
Tcase	Case temperature	0	-	85	°C
PsiJT	Thermal Parameter2	-	3	-	°C/W

6.RF Parameters

6.1 Transmitter Characteristics for 2.4GHz Operation

Table 6-1 summarizes the transmitter characteristics for the LTM1215.

Table 6-1 transmitter characteristics

Symbol	Rate/Mbps	IEEE Citation	Output power/dbm
802.11b	11	18.4.7.2	18 ± 3
802.11g	6	17.3.9.1	18 ± 3
	54	17.3.9.1	14 ± 3
802.11n	6.5	20.3.21.3	18 ± 3
	135	20.3.21.3	13 ± 3

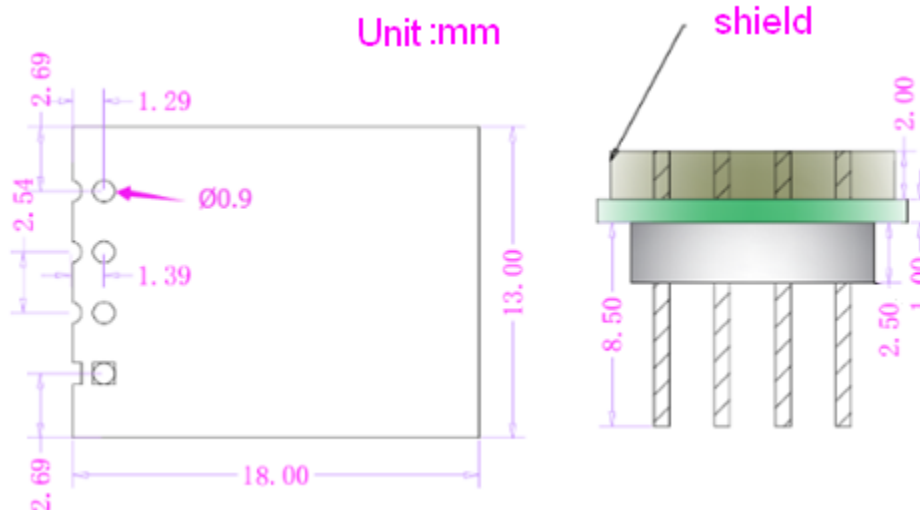
6.2 Receiver Characteristics for 2.4GHz Operation

Table 6-2 summarizes the receiver characteristics for the LTM1215. Notice that transmitter and especially receiver characteristics must be test under test guider.

Table 6-2 receiver characteristics

Symbol	Rate/Mbps	IEEE limited/dbm	Typical Sensitivity/dbm
802.11 b	11	-76	-88
802.11g	6	-82	-90
	54	-65	-74
802.11n	6.5	-82	-90
	135	-61	-68

7. Mechanical Dimensions



8. Manufacture information

8.1 Optical Inspection

After SMT, LTM1215 PCBA will be automatically sent to do AOI (Automatic Optic Inspection).

Midea uses TR7500 to check every PCBA.

TR7500 features:

- 3CCD camera with 5 detectors
- All pictures have the sense of 3D
- Resolution: 10 μ m

TR7500 can detect blemishes during SMT to guarantee quality at the first step before IOE and fully functional test.

8.2 Rework

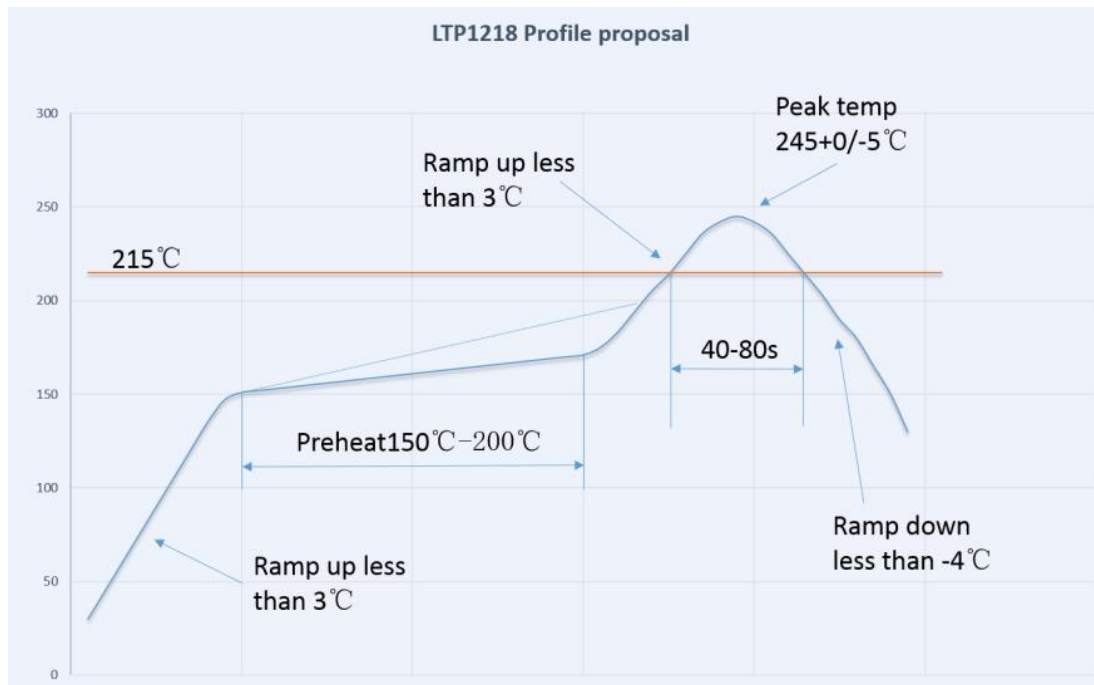
The module can be unsoldered from the host board if the Moisture Sensitivity Level (MSL) requirements are met as described in this datasheet. Never attempt a rework on the module itself, e.g. replacing individual components. Such actions will terminate warranty coverage.

8.3 Handling

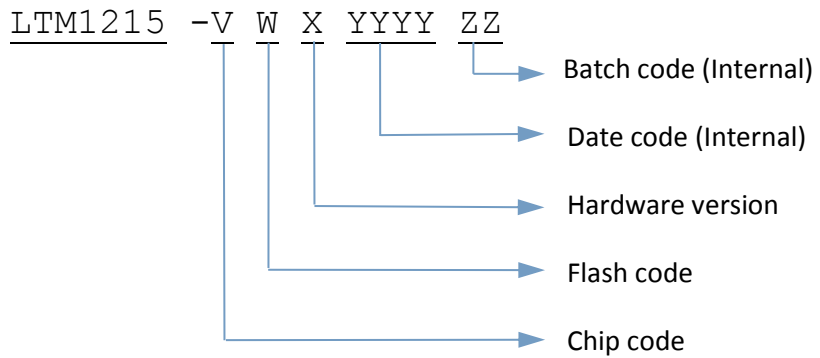
The LTM1215 modules contain a highly sensitive electronic circuitry. Handling without proper ESD protection may destroy or damage the module permanently.

8.4 Soldering Recommendations

The LTM1215 modules can be SMT on the board following the temperature curve graph :



9. Ordering Information



Chip code

Code	Description
A	A version(packing difference)
B	A version
C	B version(packing difference)
D	B version

Flash code

Code	Description
1	4M bits of FM
2	8M bits of FM

Hardware version

Code	Description
1	V1.01
2	V1.02
3	V1.03
...	...

Federal Communication Commission Interference 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.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, 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.

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

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 & your body.

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.

As long as 2 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 reevaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: 2AIRV0001". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

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.