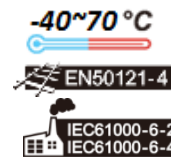


Industrial Grade 5G NR/LTE Router

WR315GR-2C-5GM2 / WR315GR-2C-LTE

Equipped with a dual-core 880MHz CPU, the WR315GR-2C Series industrial router uses the M.2 socket for 5G NR as well as 4G LTE, 3G/2G cellular modules. The five Ethernet ports are flexible and can be configured as either one Gigabit WAN and four Gigabit LAN ports or two Giga WAN and three Giga LAN ports, delivering both managed switch router features and WAN redundancy on cellular networks. The Firewall, IPSec, L2TP, GRE and OpenVPN protocols provide protection against cybersecurity threats. Additionally, the router is embedded with MQTTS and RESTful API, which makes it easy to integrate with public clouds such as AWS or Azure. With ThingsMaster OTA, remote firmware and configuration upgrades can be conveniently executed over the air.



ThingsMaster OTA
ThingsMaster
NetMaster



Features & Benefits

High-Speed 5G NR Cellular Network

- Dual Core High Speed Processor
- Extended M2 socket for 5G New Radio, SA+NSA, backward compatible support high speed 4G LTE
- 5G NR/4G/3G/2G full cellular network compatibility
- GNSS Support GPS/GLONASS/BDS/Galileo for location services*

High-Performance Routing Switch

- 5-port Gigabit Ethernet supports routing and bridging mode
- Close to wire-speed NAT routing performance
- Hardware NAT for CPU utilization saving

Dynamic Routing with Redundancy Protection

- RIPv1&v2, OSPFv1&v2 for intra-domain routing within an autonomous system
- Efficient unicast/multicast* static routing
- VRRP guarantees sustainable routing in a single point of failure

Rugged Design for Wayside Surveillance, ITS Application

- EN50121-4 railway trackside EMC compliant design for Industrial IoT, ITS applications
- Effective heat dissipation design for operating in -40~70°C environments
- CE Marking
- IEC61000-6-2/IEC61000-6-4 heavy industrial EMC compliance

Enhanced Cyber Security & Redundancy

- Firewall for inbound/outbound traffic
- OpenVPN (server/client), and IPSec support AES256 for secure remote connection
- L2TP with PPP, PAP, CHAP(LCP, IPCP)
- GRE tunnel*
- HTTPs/SSH secure login
- TACACS+ multi-user authentication for privileged user management
- Cellular to WAN redundancy, dual SIM backup

Industrial IoT LAN & Cloud Management

- Embedded Amazon AWS & Microsoft Azure cloud service
- Various configuration paths, including CGI WebGUI, CLI, SNMP and RMON*
- 1:1 NAT, port forwarding and NATP for local traffic protection
- Support SNMPv3 and entity-MIB (RFC4133), MIB II (RFC1213)
- NTP v3 time management
- WoMaster Software Utilities
 - NetMaster**: Network Management System with VLAN visualization* and ERPS* Ring
 - ViewMaster**: Configuration Management
 - ThingMaster**: Interactive monitoring dashboard to collect data from field devices
 - ThingMaster OTA**: Realtime map showing the status, signal strength, location of the remote devices, over-the-air batch device registration, configuration and firmware upgrade*, alerts on critical events to prevent downtime
- Support MQTTS/CoAP protocol, ready to use AWS/Azure and Private Cloud Agent for cloud management
- LLDP* for topology control, auto-topology drawing
- Diagnostic tool includes Ping, TFTP, SNMP Trap, E-mail Alert and System Log

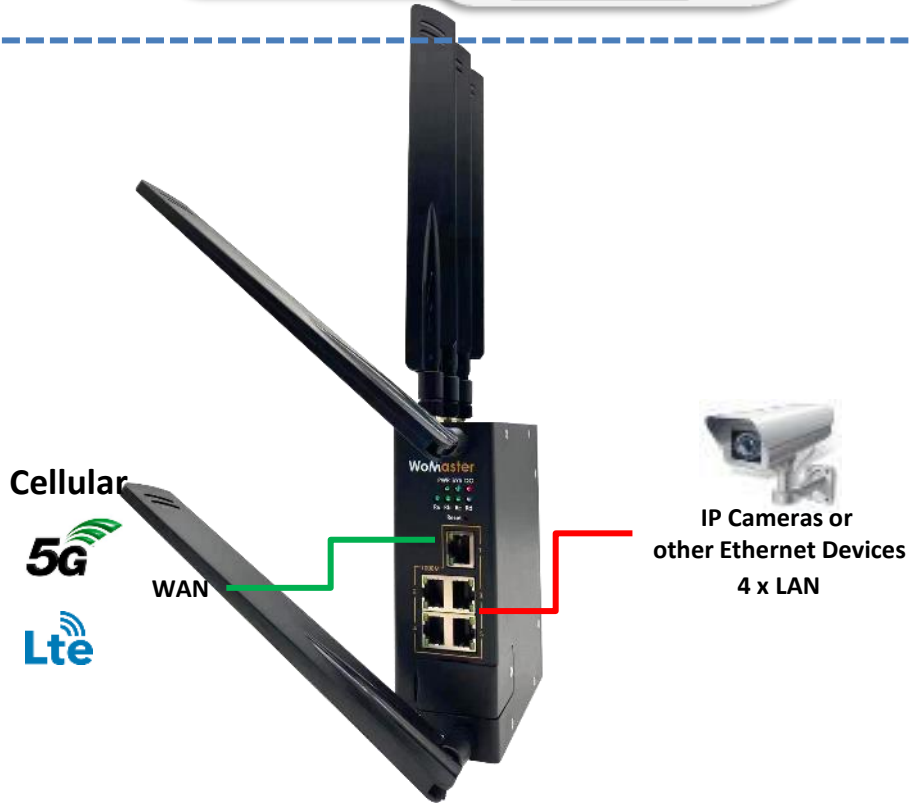


✓ Ready Total Solution for IoT

Cloud Service

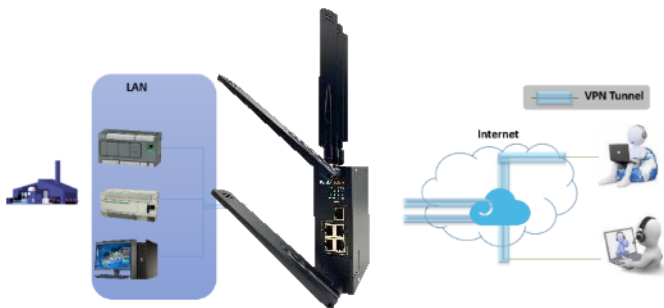


ThingsMaster ThingsMaster OTA



✓ Secured Remote Access by VPN

WR322 can act as a VPN server for data encryption and dynamic remote access. Multiple VPN protocols are supported such as OpenVPN, DMVPN, and L2TP. The channels between multiple networks, ex. private/public/hybrid networks are fully secured and with authentication features.



✓ Cyber Security Guard

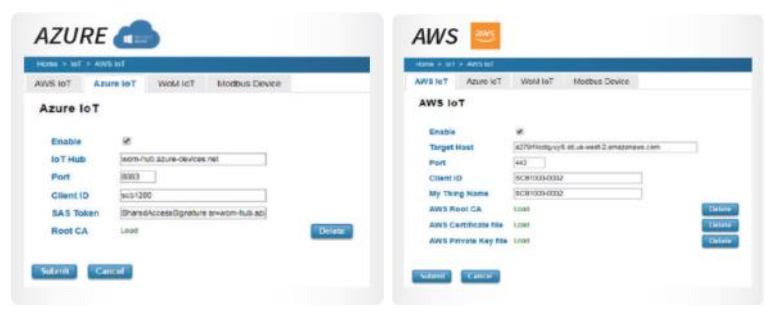
The stateful firewall can monitor the status of connection at all time. Multiple industrial fieldbus protocols, ex. Modbus TCP*, EtherNet/IP* are also supported for factory automation applications.



Secure IoT Modbus Tags

- Tag-based data acquisition with MQTT/CoAP support
- MQTT client acting as publisher and subscriber
- The latest TLS encryption and X.509 authentication
- Selectable serial port and data type. Sensor alive check and display sensor value.

✓ **Built-in Microsoft Azure and Amazon AWS agent**



Home > IoT > Modbus Device

Modbus Logging

Modbus Logging Enable

Name // Tag Name

Serial

Slave ID

PLC Address

Function // Slave Address

Data Type

// Data Address, Register Address

Modbus RTU Slave Tag List

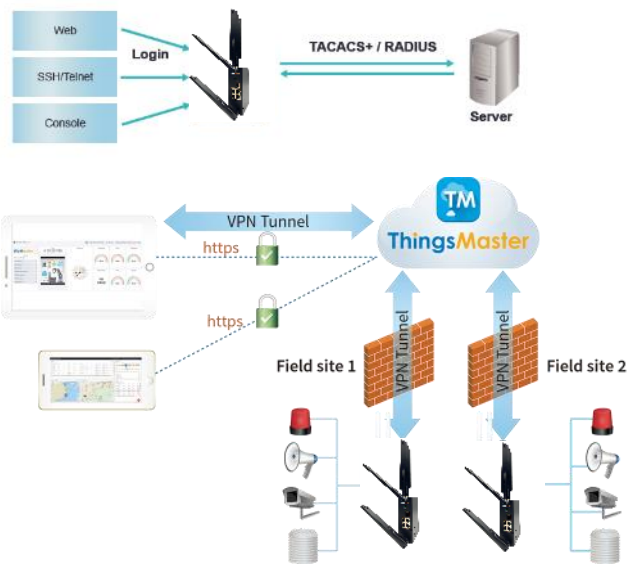
Select	Name	Serial	Slave ID	Address	Function Code	Data Type	Edit	Alive	Value
<input type="checkbox"/>	PM1	1	4	1	03	int16	<input type="button" value="Edit"/>	Yes	10
<input type="checkbox"/>	PM2_5	1	4	2	03	uint16	<input type="button" value="Edit"/>	Yes	13
<input type="checkbox"/>	PM10	1	4	3	03	uint16	<input type="button" value="Edit"/>	Yes	13
<input type="checkbox"/>	CO2	1	1	562	03	uint16	<input type="button" value="Edit"/>	Yes	1107
<input type="checkbox"/>	Temperature	1	1	564	03	int16	<input type="button" value="Edit"/>	Yes	255
<input type="checkbox"/>	Humidity	1	1	566	03	int16	<input type="button" value="Edit"/>	Yes	629
<input type="checkbox"/>	Temperature_f	1	1	1	03	float	<input type="button" value="Edit"/>	Yes	25.490820

(*The feature is only for the model with serial port.)

✓ **Multi-Level User Passwords**

Different centralized authentication servers are supported such as RADIUS and TACACS+. Using a central authentication server simplifies account administration, when you have more than one switches in the network.

Authentication Chain is also supported. An authentication chain is an ordered list of authentication methods to handle more advanced authentication scenarios. For example, you can create an authentication chain which first contacts a RADIUS server, and then looks in a local database if the RADIUS server does not respond.

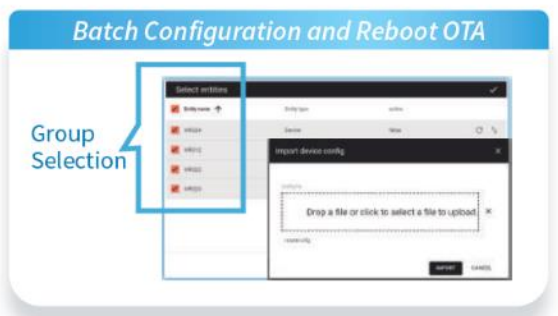
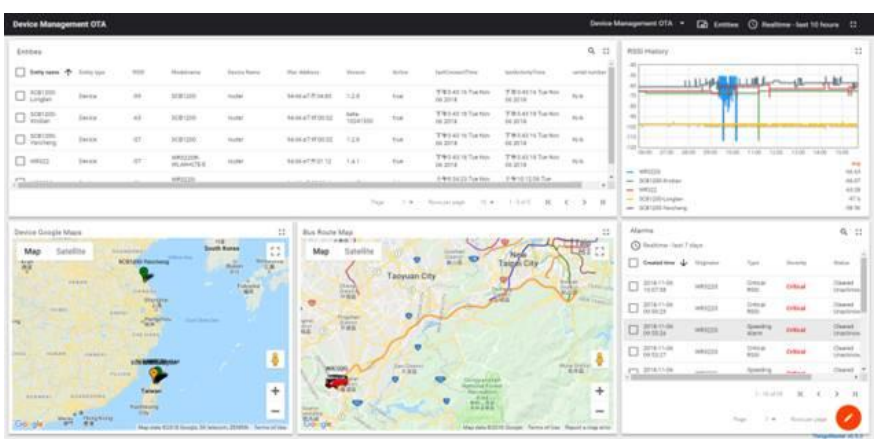


Secured Multi-sites Management

- N to N VPN
- Latest TLS encryption and X.509 authentication

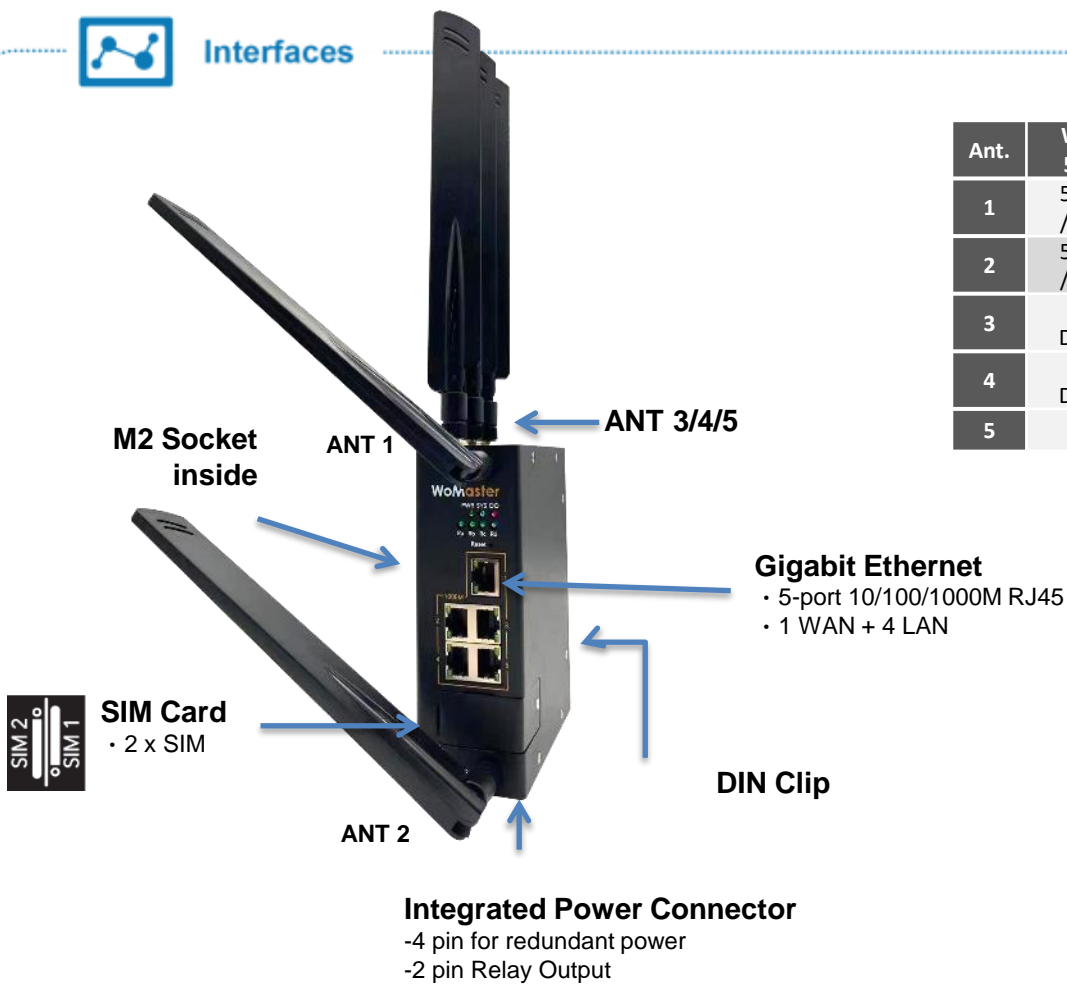
✓ **ThingsMaster OTA (device management over the air)**

The OTA agent embedded in WR322 upgrades device management over the air, anywhere you are and any time you want over your mobile devices. ThingsMaster OTA is a secured local OTA software that can be installed in a private or public server or even QNAP NAS (network attached storage). With OTA, all device information such as location, warning event can be shown in real time. The maintenance such as configuration reload, or device reboot can also be run by group.





Interfaces

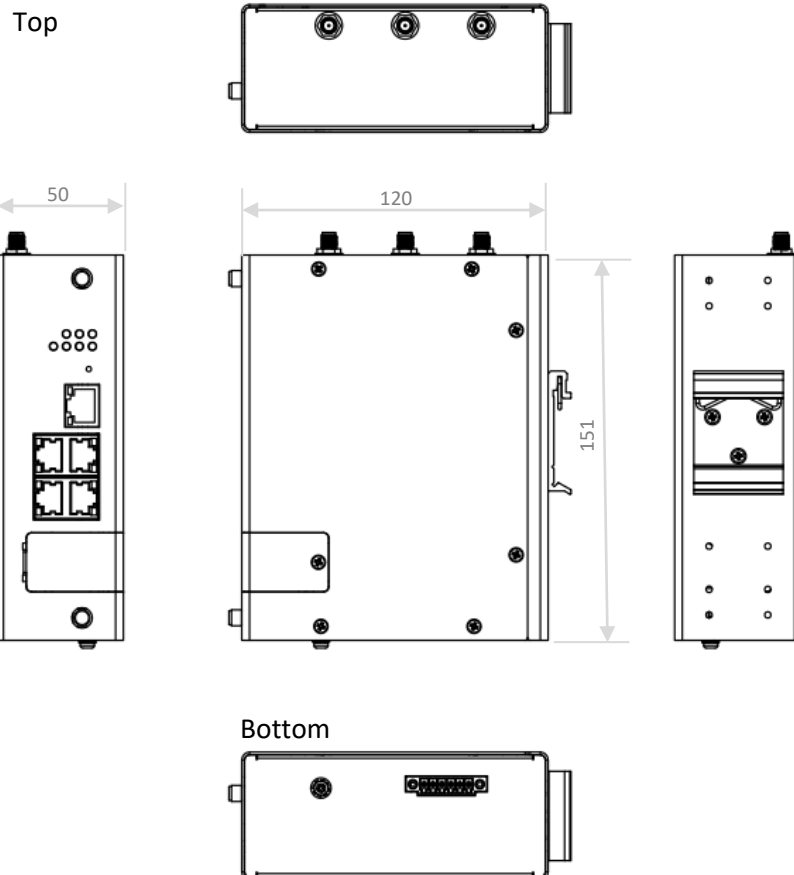


Ant.	WR315GR-5GM2(EU)	WR315GR-LTE
1	5GNR Main /4G/3G/2G	LTE Main
2	5GNR Main /4G/3G/2G	LTE Div.
3	5GNR/4G DL-MIMO 1	-
4	5GNR/4G DL-MIMO 2	-
5	GNSS*	By request



Dimensions

(mm)



Technology	
Standard	3GPP Release 11/12 Long Term Evolution (LTE), fallback 3GPP Release 7,8,9 for HSPA/UMTS
	IEEE 802.11ac wireless local area network (WLAN), Backward support 802.11n/g/a/b Wireless LAN
	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3ab 1000Base-T Gigabit Ethernet Copper
Interface	
Ethernet Port	5 x 10/100/1000MBase-T RJ45, Auto Negotiation, Auto-MDI/MDIX
System LED	1 x PWR: Green On 1 x SYS: Ready: Green On, Firmware Updating: Green Blinking 1 x DO(Relay): Red On 5 x Ethernet Ports: Link: Green On, Activity: Green Blinking 4 x Radio (Ra, Rb, Rc, Rd): Radio status Ra: SIM detected: Green On, SIM not inserted: Off Rb: 2G/3G/4G/5G Signal Strength: Signal Good: Green On, Medium: Green Blinking, Low: Off Rc: 2G/3G/4G/5G connection: Connected: Green On, Not Connected: Off Rd: Diagnostic LED of cellular module. Depends on module, check detail with our engineer.
Reset	System Reset(2~6 Seconds) / Default Settings Reset(over 7 Seconds)
SMA Socket	5 x SMA-Female -5GNR: ANT1 for 5GNR Main/4G/3G/2G, ANT2 for 5GNR/4G/3G/2G, ANT3 for 5GNR/4G DL-MIMO1, ANT4 for 5GNR/4G DL-MIMO2, ANT5 for GNSS -4G LTE: ANT1 for 4G Main, ANT2 for 4G Div.
SIM Socket	2 x Nano SIM with redundancy
Power Input, Digital Output	6-Pin Removable Terminal Block Connector 4 Pin for Redundant Power, 24VDC 2 Pin for DO (Relay Alarm) DO: Dry Relay Output with 1A/24V DC
M2 Expansion Socket	One M2 type expansion socket inside for our supported 5GNR/4G LTE Radio Module You can choose the 5GNR/4G LTE6 M2 Module by region, if you don't know which one, please inquire with our sales.
Power Requirement	
Input Voltage	24V(9~48VDC)
Reverse Polarity Protect	Yes
Input Current	0.7A@24V
Power Consumption	Max. 16.8W@24VDC full load and 5GNR peak current, suggest to reserve 15% tolerance
Antenna	
Cellular 5GNR Default Antenna	Frequency: 700~5000 MHz
	Gain: 4.12dBi @ 3500MHz 690~960MHz: 0.73~3.04dBi, 1700~1900MHz: 2.2~3.11dbi, 3300~3800MHz: 4.12~5.95dBi, 4000~5000MHz: 3.16~5.97dbi
	Direction: Omni
	Connector: SMA Male
	Dimension: 220x27mmΦ13mm
LTE Antenna for 4G Radio	Frequency: 690~960/1710~2700 MHz
	Peak Gain: 3.15dBi 690MHz: 1.36dBi, 960MHz: 1.37dBi, 1710MHz: 3.12dBi, 1800MHz: 1.29dBi 1900MHz: 2.63dBi, 2100MHz: 1.47dBi, 2170MHz: 1.14dBi, 2500MHz: 3.15dBi 2600MHz: 2.46dBi, 2700MHz: 1.89dBi
	Direction: Omni
	Connector: SMA Male
	Dimension: 158x17.6xΦ13 mm

Cellular Properties		Expansion 5G NR M2 Module	
5G NR-EU Frequency Bands		5G NR NSA/SA: 700M/3500MHz compliance (n28/n77/n78) LTE FDD: B1/B3/B7/B8/B20/B28 LTE TDD: B38/B40/B41/B42 (TBD) WCDMA: B1/B3/B8 GSM/GPRS/EDGE: 900/1800MHz GNSS: L1 GPS/GLONASS/BeiDou/Galileo/QZSS + L5 GPS/BeiDou-3 B2A/Galileo-E5a *For other frequency bands not listed, please inquire with our sales. *GNSS software by request	
5G NR-GL Frequency Bands		5G/4G/3G Multi-mode, 3GPP Rel.15, LTE Cat.16 5G NR NSA: n41/n77/n78/n79 5G NR SA: n1/n2/n3/n5/n7/n8/n12/n20/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 LTE FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD B34/B38/39/B40/B41/B42/B48 LTE LAA B46 WCDMA B1/B2/B3/B4/B5/B6/B8/B19 GNSS GP/GLONASS/BeiDou(Compass)/Galileo	
Cellular Properties		Expansion 4G LTE Cat.6 M2 Module	
Band Information: LTE6-E (LTE Cat. 6) (By MoQ Request)		LTE Cat.6, M.2 form factor LTE-FDD: B1/B3/B5/B7/B8/B20/B28/B32* LTE-TDD: B38/B40/B41 WCDMA: B1/B3/B5/B8	
Band Information: LTE6-A (LTE Cat. 6) (By MoQ Request)		LTE Cat.6, M.2 form factor LTE-FDD: B2/B4/B5/B7/B12/B13/B25/B26/B29*/B30/B66 LTE-TDD: B40/B41 WCDMA: B2/B4/B5	
		*For LTE Cat.4 or other frequency bands of LTE cat.6 not listed in above, please inquire with our sales. *LTE-FDD B29 and B32 support receiving only.	
Cellular Properties		(LTE Cat. 4)	
Band Information: LTE-EAU (By MoQ Request)		LTE Cat.4, M.2 form factor LTE: FDD B1/B3/B7/B8/B20/B28 LTE: TDD B38/B40/B41 WCDMA: FDD B1/B8, GSM: B3/B8	
Antenna			
Cellular 5G NR Default Antenna		Frequency: 700~5000 MHz	
		Gain: 4.12dBi @ 3500MHz 690~960MHz: 0.73~3.04dBi, 1700~1900MHz: 2.2~3.11dbi, 3300~3800MHz: 4.12~5.95dBi, 4000~5000MHz: 3.16~5.97dbi	
		Direction: Omni	
		Connector: SMA Male	
		Dimension: 220x27mmΦ13mm	
LTE Antenna for 4G Radio		Frequency: 690~960/1710~2700 MHz	
		Peak Gain: 3.15dBi 690MHz: 1.36dBi, 960MHz: 1.37dBi, 1710MHz: 3.12dBi, 1800MHz: 1.29dBi 1900MHz: 2.63dBi, 2100MHz: 1.47dBi, 2170MHz: 1.14dBi, 2500MHz: 3.15dBi 2600MHz: 2.46dBi, 2700MHz: 1.89dBi	
		Direction: Omni	
		Connector: SMA Male	
		Dimension: 158x17.6xΦ13 mm	

*5G NR / 4G LTE Module supports M.2 format, the module can be replaced according to customer regional requirements.

*If you already have the 5G/4G antenna, or you prefer to prepare by yourself, you can choose not to attach the default antenna.

Software	
Management	CGI WebGUI, Command Line Interface (CLI), IPv4/IPv6*, Telnet, SNMP v1/v2c/v3, SMS remote management, DDNS, DHCP server/client, DHCP Relay, Fixed IP, TFTP remote firmware/configuration update*, System Log, SMTP, ARP/Proxy ARP, DNS (client/proxy), Radius Authentication, dying gasp alarm, self diagnostic and alarm DO, Ethernet Port VLAN setting, PPPOE*
Traffic Management	Flow Control*, Traffic shaping, IP-SLA*
Filter	IEEE802.1Q VLAN, VLAN L3 interface**
Security	TLS v1.2, HTTPS/SSH, First login password management, MAC filtering for LAN/WAN port, Ethernet Port Enable/Disable, SYN FLOOD traffic blocking*, ICMP Check, LCP**
Advanced Security	TACACS+, Multi-user authentication
Time Management	NTP, SNTP, Cellular Time*
Redundancy Protocol	WAN/LTE Redundancy includes Eth-WAN Ping Tracking, 802.1d Spanning Tree Protocol (STP)**
WAN / Routing / NAT/ Firewall / VPN	WAN: 1x Fixed WAN, optional 2x Fixed WAN, Statistic for WAN interface Routing: Static Routing, RIPv2, OSPFv2, VRRPv2 NAT: 1-1 NAT, NAPT(SNAT/DNAT), Port Forwarding between LAN/WAN, DMZ Firewall: Stateful Inspection firewall(SIP), IP/Port Filter, MAC ACL, Port ACLs* VPN: IPSec, OpenVPN (Multipoint VPN), L2TP, DMVPN includes NHRP*, GRE*, PPTP*, mGRE*
Watchdog	Hardware watchdog for system status monitoring Software cellular watchdog/ ping watchdog for connection monitoring Periodic Reboot
IIoT Industrial Protocol	Modbus RTU, MQTTs, CoAP, RESTful API* *The IIoT related features are only for the model with serial port.
Private Cloud	ThingsMaster, ThingsMaster OTA
Public Cloud	AWS Agent, Azure Agent
Location	Google map, Baidu map
MIB	MIB-II, Entity MIB, WoMaster Private MIB for monitoring
Utility	ViewMaster, NetMaster, Ping, Traceroute
Cellular Configuration	Radio on/off, 2G/3G and 4G modes configurable, Dual SIM, SIM Security, Connection Status, Cellular to Eth-WAN Redundancy, GPS positioning (by model), Backup SIM Retry (1-10 times), MCC+MNC selectable*, display module info*
Mechanical	
Installation	DIN Rail
Enclosure Material	Steel Metal
Dimension	50 x 151 x 120 mm(W x H x D) / without DIN Rail Clip
Ingress Protection	IP30
Weight	~680g without package
Environmental	
Operating Temperature & Humidity	-40°C~70°C , 5%~95% Non- Condensing
Storage Temperature	-40°C~85°C
MTBF	>200,000 hours at 40° full cycle
Warranty	5 years
Approval	
CE	CE RED Compliance Safety: EN 62368-1:2014/AC:2017 EN 62311 MPE assessment EN 301 489-1/52, EN 55032/55024 EN 301 908-1*
FCC	FCC part 15B Class A Compliance, FCC Approved Radio Module
EMC	Railway Roadside EN 50121-1/4, EN61000-6-4 Compliance EN61000-4-2 ESD, EN61000-4-3 RS, EN61000-4-4 EFT, EN61000-4-5, EN61000-4-6 CS, EN61000-4-8 Magnetic Field EN61000-4-12/16/17/18/29 compliance for power application
Environmental	Shock/Vibration: EN 50155:2017/EN 61373:2010 Railway Shock/Vibration compliance Shock: IEC60068-2-27 Compliance Free fall: IEC60068-2-31 Compliance Vibration: IEC 60068-2-6 Compliance

Model	Description
WR315GR-M2-2C	Industrial Secure Router, Dual Core , 5GbE, 1 Relay, 2SIM, 1x Expansion M2 socket
WM-5GNR-M2-EU Kit	Expansion 5GNR M2 Module Kit, 5GNR-EU Module, Heat Sink and Pad, 4xAntennas
WM-5GNR-M2Q-GL Kit	Expansion 5GNR M2 Module Kit, 5GNR-GL Module, Heat Sink and Pad, 4xAntennas
WR315GR-2C-5GM2-EU (WR315GR-M2-2C+WM-5GNR-M2-EU Kit)	Industrial Secure Router, Dual Core , 5GbE, 1 Relay, 2SIM, M2 socket with 5GNR-EU module kit (*choose one by region)
WR315GR-2C-5GM2-GL (WR315GR-M2-2C+WM-5GNR-M2Q-GL Kit)	Industrial Secure Router, Dual Core , 5GbE, 1 Relay, 2SIM, M2 socket with 5GNR-GL module kit (*choose one by region)
WR315GR-2C-LTE6-(Region)	Industrial Secure Router, Dual Core , 5GbE, 1 Relay, 2SIM, LTE6-(Region)

5GNR/LTE Frequency/Bands:
*choose one by region: For other frequency bands not listed, please inquire with our sales.
List the available 4G LTE module/region in below

Package List

- 1 x Product Unit
- 1 x 6-pin Removable Terminal Connector
- 1 x Quick Installation Guide
- 1 x Attached Din Clip

Default Enclosed Antennas:
The model with 5GNR Kit: 4 x 5GNR Antennas, Black
The model with 4G LTE Kit: 2 x LTE Antennas, Black

Cellular Module	Frequency/Band Info
5GNR-EU	5G NR NSA/SA: 700M/3500MHz compliance (n1/n3/n7/n8/n20/n28/n41/n77/n78) LTE FDD: B1/B2/B3/B4/B5/B7/B8/B20/B28/B32 LTE TDD: B38/B40/B41/B42 WCDMA: B1/B3/B5/B6/B8 GSM/GPRS/EDGE: 900/1800/850/1900MHz GNSS L1+L5 GPS/GLONASS/BeiDou(Compass)/Galileo *For other frequency bands not listed, please inquire with our sales. *GNSS software by request
5GNR-GL (By Request)	5G NR NSA: n41/n77/n78/n79 5G NR SA: n1/n2/n3/n5/n7/n8/n12/n20/n28/n38/n40/n41/n48*/n66/n71/n77/n78/n79 LTE FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD B34/B38/39/B40/B41/B42/B48 LTE LAA B46 WCDMA B1/B2/B3/B4/B5/B6/B8/B19 GNSS GP/GLONASS/BeiDou(Compass)/Galileo
Band Information: LTE6-E (By Request)	LTE Cat.6, M.2 form factor LTE-FDD: B1/B3/B5/B7/B8/B20/B28/B32* LTE-TDD: B38/B40/B41 WCDMA: B1/B3/B5/B8
Band Information: LTE6-A (By Request)	LTE Cat.6, M.2 form factor LTE-FDD: B2/B4/B5/B7/B12/B13/B25/B26/B29*/B30/B66 LTE-TDD: B40/B41 WCDMA: B2/B4/B5
Band Information: LTE-EAU (By Request)	LTE Cat.4, M.2 form factor LTE: FDD B1/B3/B7/B8/B20/B28 LTE: TDD B38/B40/B41 WCDMA: FDD B1/B8, GSM: B3/B8