AP315GR-2C Datasheet

Aiming to create better and safer working environments and life experiences through the products we deliver.

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Industrial High Performance Dual 5GNR/LTE Router

AP315GR-2C

Industrial Cellular Router/Gateway

The AP315GR-2C is equipped with a dual-core 880MHz processor, specifically designed to cater to 5GNR, 4G LTE, and 3G/2G cellular networks. Its flexible configuration options allow for either 1 WAN and 4 LAN Gigabit ports or 2 WAN and 3 LAN ports by different network requirements. The AP315GR-2C with dual concurrent LTE networks, featuring DSDA (Dual SIM Dual Active), ensures uninterrupted and redundant field connectivity for critical applications. To go beyond conventional capabilities, the AP315GR-2C provides GSMA's eUICC SIM compliance, offering unparalleled flexibility in managing SIM profiles. With the option for a solder chip SIM (MFF2) or integrated SIM (iSIM) available through customization requests, the router provides advanced solutions for diverse connectivity needs. The ATMS enables remote firmware and configuration updates over the air, enhancing convenience and efficiency.

High-Speed 5GNR Cellular Network

- Dual Core High Speed Processor
- Extended M2 socket for 5G New Radio, SA+NSA, backward compatible support high speed 4G LTE
- 5GNR/4G/3G/2G full cellular network compatibility
- Dual SIM standby for 5GNR Radio

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

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

- Effective heat dissipation design for operating in -40℃ ~70℃ environments
- CE Marking
- IEC61000-6-2/IEC61000-6-4 heavy industrial EMC compliance

Dual Radio and Dual Active

- Support Dual 4G LTE Cat.4 dual radio, optional to support 5GNR+4G LTE Cat.4 dual radio
- Dual Radio model supports Dual SIM Dual Active
- Optional to support Dual Active Dual Standby, up to 4x SIMs for dual radios

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

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 NAPT for local traffic protection
- Support SNMPv3 and entity-MIB (RFC4133), MIB II
- (RFC1213)
- NTP v3 time management
- AVCOMM Software Utilities
  -**ANMS:** Network Management System with VLAN visualization* and ERPS* Ring
  -**AIAS:** Configuration Management
  -ATMS: Interactive monitoring dashboard to collect data from field devices
  -**ATMS 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 Modbus RTU to cloud management*
- LLDP* for topology control, auto-topology drawing
- Diagnostic tool includes Ping, TFTP, SNMP Trap, E-mail Alert and System Log

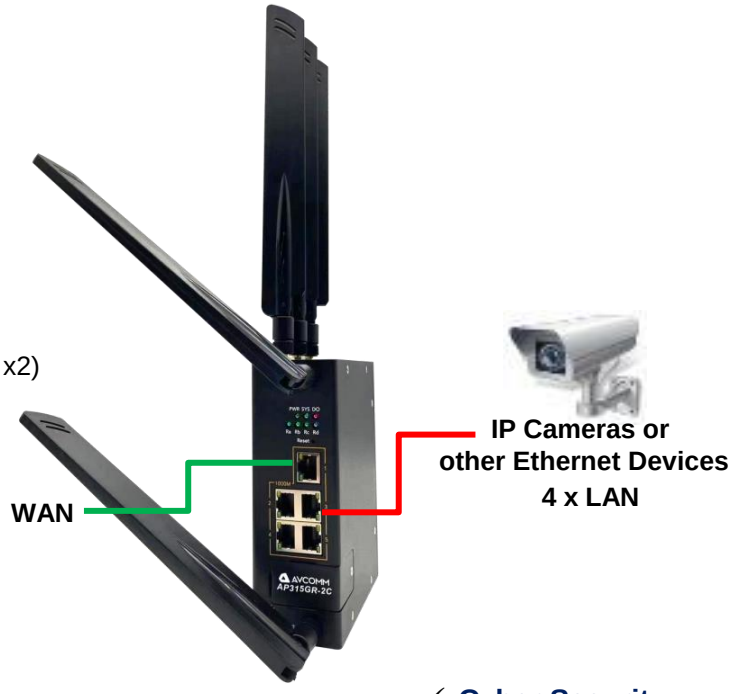
Product Features

✓ The Total Solution for IoT

Cloud Service

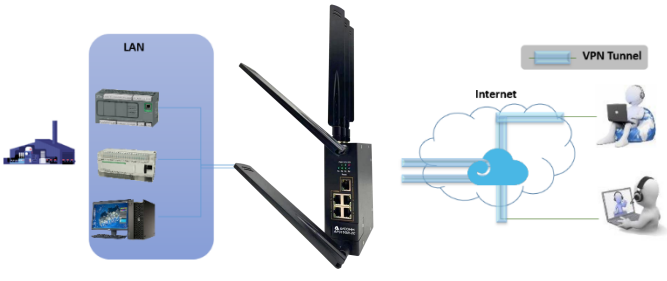
Cellular

(4G LTEx1/4G LTE x2)



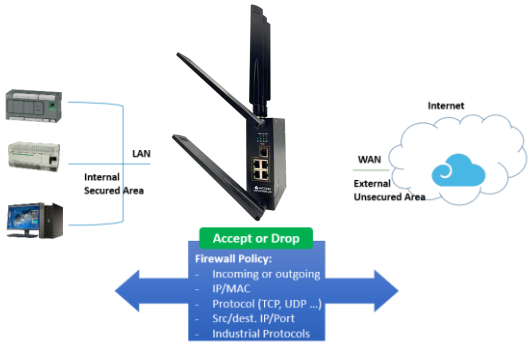
✓ Secure Remote Access VPN

AP315GR-2C 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.

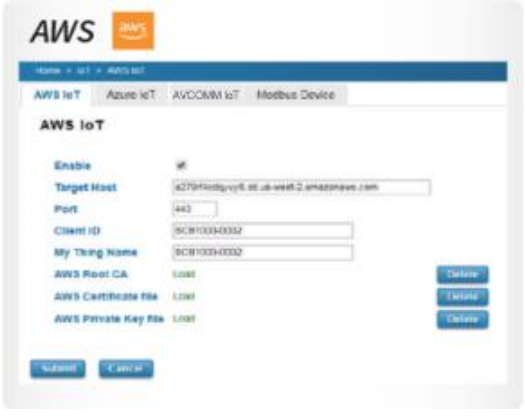


✓ Cyber Security

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.



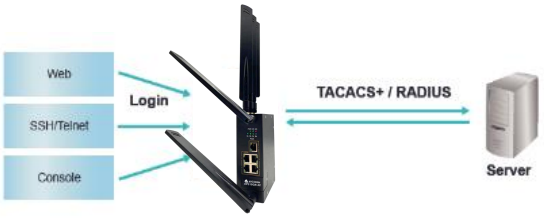
✓ Built-in Microsoft Azure and Amazon AWS Agents



✓ Multi-level User Passwords

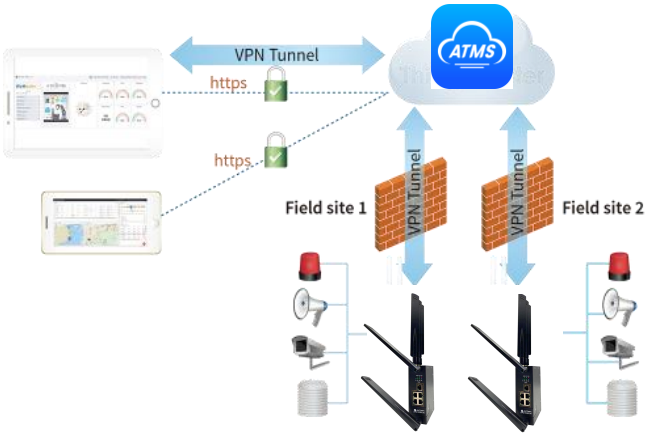
Different centralized authentication servers are supported such as RADIUS and TACACS+. Using a central authentication server simplifies account administration, when you have more than one switches in the network.

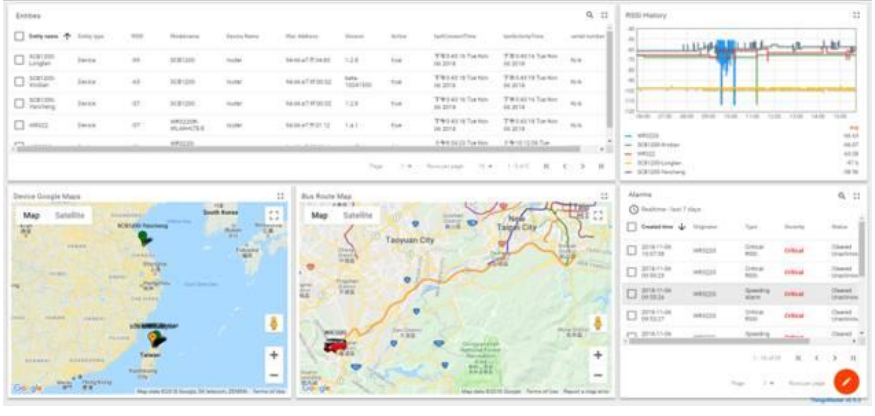
Authentication Chain is also supported. An authentication chain is an ordered list of authentication methods to handle more advanced authentication scenarios. For example, you can create an authentication chain which first contacts a RADIUS server, and then looks in a local database if the RADIUS server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

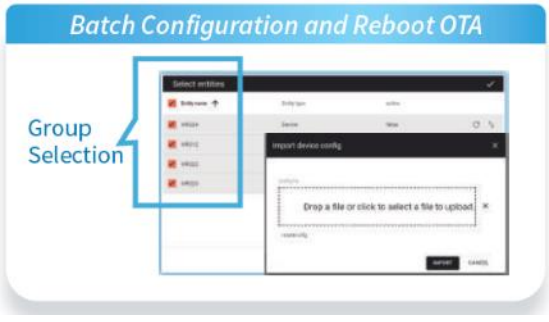


✓ ATMS OTA (device management over the air)

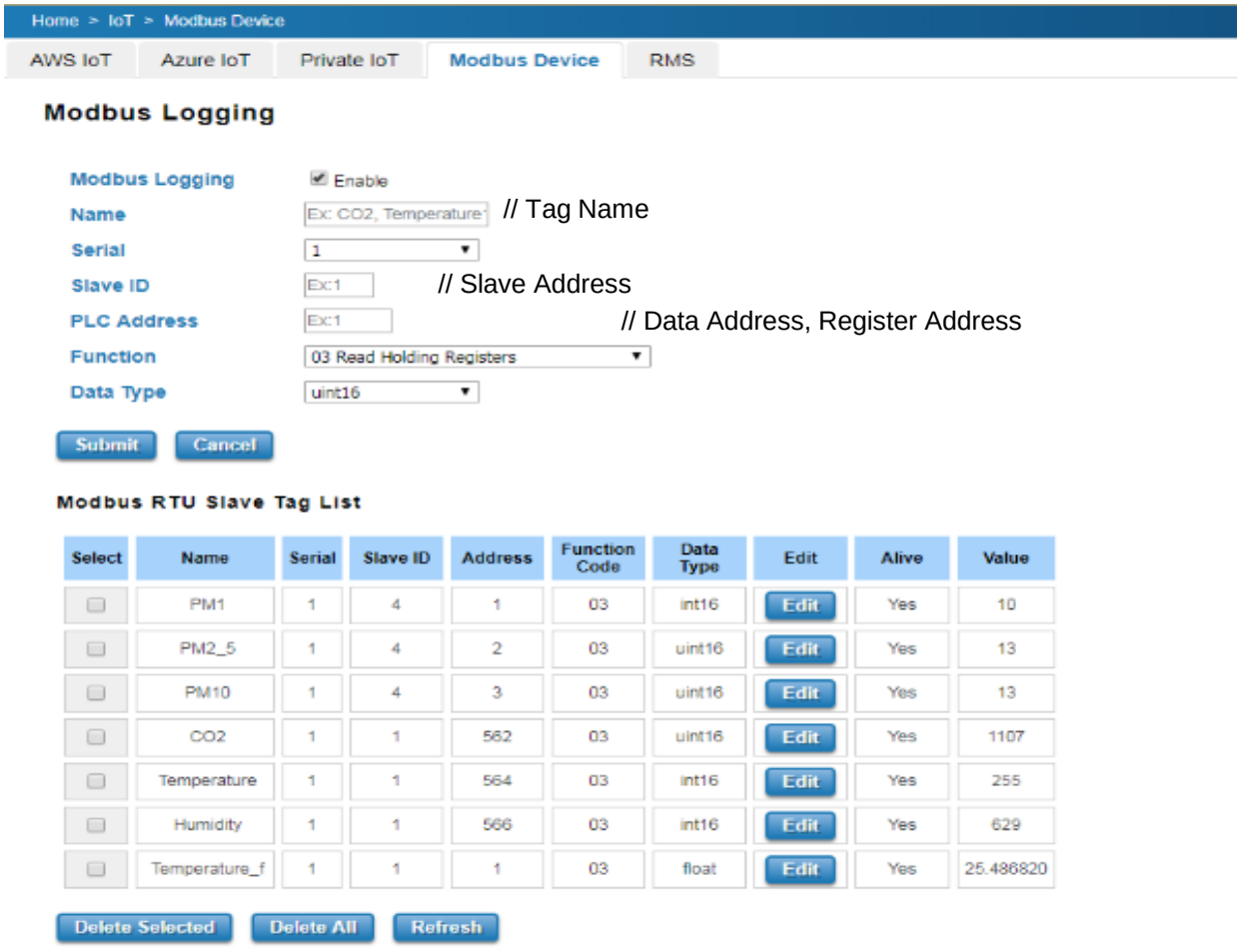
The OTA agent embedded in AP315GR-2C upgrades device management over the air, anywhere you are and any time you want over your mobile devices. ATMS OTA is a secured local OTA software that can be installed in a private or public server or even QNAP NAS (network attached storage). With OTA, all device 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.







Secure IoT Modbus Tags
Tag-based data acquisition with MQTTS/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.



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

Secured Multi-sites Management
N to N VPN
Latest TLS encryption and X.509 authentication

Ordering Information

Model	Description
AP315GR-2C-5GM2-EU	Industrial Secure Router, Dual Core, 5GbE, 1 Relay, 2SIM, M2 socket with 5GNR-EU module kit (*choose one by region)
AP315GR-2C-5GM2-GL	Industrial Secure Router, Dual Core, 5GbE, 1 Relay, 2SIM, M2 socket with 5GNR-GL module kit (*choose one by region)
AP315GR-2C-LTE6-(Region)	Industrial Secure Router, Dual Core, 5GbE, 1 Relay, 2SIM, LTE6-(Region)
AP315GR-2C-LTE-(Region)	Industrial Secure Router, Dual Core, 5GbE, 1 Relay, 2SIM, LTE-(Region)
AP315GR-2C-LTE2-(Region)	Industrial Secure Router, Dual Core, 5GbE, 1 Relay, 2SIM, Dual LTE-(Region)
	Optional 1/2 Serial Port by request
	Package List
	1 x Product Unit
	1 x 6-pin Removable Terminal Connector
	1 x Quick Installation Guide
	1 x Attached Din Clip
	Default Antenna by request (GPS antenna by optional order): AP315GR-2C-5GM2 : 4 x 5GNR Antennas, Black AP315GR-2C-LTE: 2 x LTE Antennas, Black AP315GR-2C-LTE2 : 4 x LTE Antennas, Black

Indoor Antenna

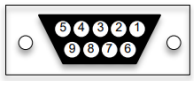
	Model	Type	Frequency (MHz)	Gain (dBi)	Connector	Dimension (mm)	Cable (M)	Operating Temp.
	A-LTE-2-SM (Default)	Omni	690~960/ 1710~2700	3	SMA Male	158x17.6Φ13	-	-10℃~ 70℃
	A-5GNR-5-SM (Default)	Omni	698~960/ 1710-2700/ 3200~3800/ 4400~5900	5	SMA Male	220x27 mmΦ13 mm	-	-10℃~70℃
	A-LTE-OMIN-MGN-9-SM-RG174-1M (optional)	Omni	700~950, 1710~2150Mhz	9	SMA Male	320 x Φ30	1	-40℃-60℃

Outdoor Antenna

	Model	Material	Type	Frequency (MHz)	Gain (dBi)	Connector	Dimension (mm)	Cable (M)	Operating Temp.
	**A-LTE-OMFG-BKT-9-SM-LMR100- 3M** (optional)	Fiberglass Bracket	Omni	720~960/ 1710~2696/ 3200-3600 MHz (5GNR)	3	SMA Male	Ø20*310 mm	3	-40℃~+85℃
	**A-LTE-OMFG-MGN-9-SM-RG58-3M** (optional)	Fiberglass Magnetic	Omni	720~960/ 1710~2696/ 3200-3600 MHz (5GNR)	9	SMA Male	Ø20*310 mm	3	-40℃~+85℃

GPS Antenna

	Model	Type	Frequency (MHz)	Gain (dBi)	Connector	Dimension (mm)	Cable (M)	Operating Temp.	Application
	A-GPS-27-RSM-3M (optional)	Omni	1575.42	27	RP SMA Male	36x36x13.9	3	-20℃~ 65℃	Indoor

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, Bridge mode and Router mode
System LED	1 x PWR: PWR1 is On/Both PWR1 and PWR2 are On: Green On, Only PWR2 is On: Green Blinking 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 6 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: Reserved. (Depends on module, check detail with our engineer.) Re: Cellular 2 SIM detected: Green On, SIM not inserted: Off Rf: Cellualr 2 2G/3G/4G Signal Strength: Signal Good: Green On, Medium: Green Blinking, Low: Off Rg: Cellular 2 Connection: Connected: Green On, Not Connected: Off (Short Blinking while searching)
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 -1x 4G LTE: 2x2 MIMO, ANT1 for 4G Main, ANT2 for 4G Div., -2x 4G LTE: 2x2 MIMO, Cellular 1: ANT1 for 4G/LTE Main, ANT2 for 4G/LTE Div., Cellular 2: ANT3 for 4G/LTE Main, ANT4 for GNSS/GPS, ANT5 for 4G/LTE Div.
SIM Socket	Nano SIM with Tray; 2 x Nano SIM redundancy for 5GNR and Dual 4G LTE, GSMA's eUICC SIM compliance; Note: Solder chip SIM(MFF2) or integrated SIM(iSIM) by customize request
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
Serial * By Request	Support RS232/422/485, DB9 connector Up to 2 Serial by request. DB9 Female 

Pin	RS232	RS485-4w/422	RS485-2w
1	DCD	TX-	Data-
2	TXD	RX+	-
3	RXD	TX+	Data+
4	DSR	-	-
5	GND	GND	GND
6	DTR	RX-	-
7	CTS	-	-
8	RTS	-	-
9	RI	-	-

Expansion Socket	M2 type socket inside for our supported 5GNR Radio Module mPCIe type socket inside for our supported 4G LTE Radio Module You can choose the 5GNR/4G LTE6/LTE4/LTE-M1 Module by region.
Dual 4G Radio	Support Dual LTE Dual Active mode (AP315GR-2C-LTE2) Dual SIM Dual Active: Choose SIM 1 of the Cellular 1 and SIM 1 of the Cellular 2 *Optional to support Dual Active Dual Standby mode, up to 4x SIMs, SIM 1 Active while SIM 2 standby in both Cellular 1 and Cellular 2, by customer request.
Power Requirement	
Input Voltage	24V(9~48VDC) with polarity, overcurrent, and overvoltage protection.
Reverse Polarity Protect	Yes
Input Current	0.7A@24V (Model with 5GNR Module) 0.41A@24V (Model with 2LTE module)
Power Consumption	Model with 5GNR Module: Max. 16.8W@24VDC full load and 5GNR peak current Model with 2LTE Module: Max. 9.8W@24VDC full load, suggest to reserve 15% tolerance

Cellular Properties	Expansion 5GNR M2 Module
5GNR-EU Frequency Bands	**5GNR 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
5GNR-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	**(LTE Cat. 4)**
Band Information: LTE-EUX (1x/2x LTE Cat.4 by request)	LTE Cat.4, mPCIe form factor LTE: FDD B1/B3/B7/B8/B20/B28A LTE: TDD B38/B40/B41 WCDMA: FDD B1/B8, GSM: B3/B8 **GNSS** GP/GLONASS/BeiDou(Compass)/Galileo (Only in LTEx2 model)
Band Information: LTE-AU	LTE: FDD B1/B2*/B3/B4/B5/B7/B8/B28 LTE: TDD B40 WCDMA: FDD B1/B2/B5/B8, GSM: B2/B3/B5/B8
Band Information: LTE-G (By MoQ Request)	LTE: FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28 LTE: TDD B38/B39/B40/B41 WCDMA: FDD B1/B2/B4/B5/B6/B8/B19, GSM: B2/B3/B5/B8
Cellular Properties	**Optional 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.
Default Antenna by request	
5GNR Antenna for 5G radio (A-5GNR-5-SM)	**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 (A-LTE-2-SM)	**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

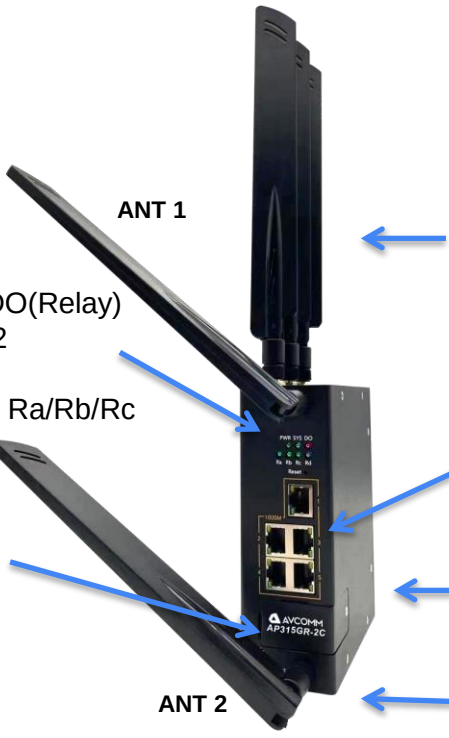
LTE Antenna for 4G Radio (A-LTE-2-SM)	**Connector:** SMA Male
	Dimension: 158x17.6xΦ13 mm
*5GNR / 4G LTE Module supports M.2/mPCIe format, the module can be replaced according to customer regional requirements. *The location/meaning of 5GNR/4G antenna may be different in different module/regions. Please check the user manual for detail.. *The 5G/4G antenna is not standard accessories, it is optional by request, please check with the sales.	
Optional GNSS/GPS Antenna for 4G Models (Optional Accessory-A-GPS-27-RSM-3M)	Frequency range: 1561~1615MHz Polarization: RHCP or linear VSWR: <2 (Typ.) Passive antenna gain: >0dBi
Software	
Management	CGI WebGUI, Command Line (CLI), IPv4/IPv6, Telnet/SSH, Console*, SNMP v1/v2c/v3, SMS remote management, DDNS, DHCP server/client, DHCP Relay, Fixed IP, Customized Default Configuration, TFTP firmware/configuration update*, Secure Firmware*, FTP/SFTP*, Event logging using System Log, Syslog over TLS*, SMTP, ARP/Proxy ARP, DNS (client/proxy), dying gasp alarm, self diagnostic and alarm DO, Ethernet Port VLAN setting, network diagnostic by iperf/netconf*
Traffic Management	Flow Control*, Traffic shaping, QoS/CoS based on 802.1p/DSCP/L2-4 classifiers* , egress queues supports priority queuing or Fair queuing*, IP-SLA*
Filter	IEEE802.1Q VLAN, 64VLANs*, 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, Authentication type includes Public key, EAP-TLS*, Pre-share key and IKE 1-2.Certificate and Encryption type includes X.509, SCEP*, PEM, DER, RSA, 3DES, AES 128/192/256, CBC, CTR*, CCM*, GCM*, SHA 256/384/512 HMAC
Advanced Security	User Authentication by Local RBAC, TACACS+, AAA/Radius, Mutli-user authentication, LDAP*
Time Management	NTP, SNTP, Cellular Time*
Redundancy Protocol	WAN/LTE Redundancy includes Eth-WAN Ping Tracking, Ethernet interface switching based on link loss, latency degradation/timeout or packet loss thresholds, 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, EBGP* NAT: 1-1 NAT, NAPT(SNAT/DNAT), Source NAT(Masquerading), Port Forwarding between LAN/WAN, DMZ Firewall: Stateful Inspection firewall(SIF), IP/Port Filter, MAC ACL, Port ACLs* VPN: IPSec, OpenVPN (Multipoint VPN), L2TP, DMVPN includes NHRP*, GRE Tunneling L3*,
Serial communication	Modbus RTU/TCP Server/TCP Client/UDP Unicast/Multicast mode, TCP Alive check, Force TX Delimiter/Timeout/interval/length, Long Distance Termination, BSAP*, DNP3* DLMS*
Watchdog	Hardware watchdog for system status monitoring, Periodic Reboot Software cellular watchdog/ ping watchdog for keep-Alive connection monitoring, the keep-alive parameters include IP/Port* of the Keep-alive server, Time interval, Maximum number of retries
IIoT Industrial Protocol*	Modbus RTU to MQTT/MQTTS/COAP docker without the need for external converter, Modbus RTU to Modbus TCP GW The IIoT related features are only for the model with serial port.
Private Cloud*	ATMS, ATMS OTA
Public Cloud*	AWS Agent, Azure Agent
Location	Google map, Baidu map
MIB	MIB-II, Entity MIB, AVCOMM Private MIB for monitoring
Utility	AIAS, ANMS, Ping, Traceroute
Cellular Configuration	Radio on/off, 2G/3G and 4G modes configurable, Dual SIM, Dual SIM Dual Active(LTEx2), 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 with anti-corrosion protection
Dimension	50 x 151 x 120 mm(W x H x D) / without DIN Rail Clip

Ingress Protection	IP30
Weight	~800g without package/antenna
Environmental	
Operating Temperature	-40°C~70°C
Humidity	5%~95% Non-Condensing
Storage Temperature	-40°C~85°C
MTBF	>200,000 hours at 40º full cycle
Warranty	5 years
Approval	
CE	CE RED Compliance, 2014/53/UE compatibility Safety EN 62368-1:2014/AC:2017, EN 301 489-1/52 RF EMC Radio Module: EN 62311 MPE assessment, EN 301 908-1*
EMC	Railway Roadside EN 50121-1/4, 2014/30/EU Compatibility
FCC	FCC part 15B Class A Compliance
Environmental	Shock/Vibration: EN 50155:2017/EN 61373:2010 Railway Shock/Vibration compliance Above 50% recyclable sources to complaint with ISO14021/UNE-EN15543

Function interface

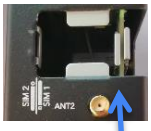
Ant.	AP315GR-2C-5GM2	AP315GR-2C-LTE
1	5GNR Main /4G/3G/2G	LTE Main
2	5GNR Main /4G/3G/2G	LTE Div.
3	5GNR/4G DL-MIMO 1	-
4	5GNR/4G DL-MIMO 2	-
5	-	-

System LED
- System: Power/System/DO(Relay)
- Ethernet Port 1/2
- Serial Port 1/2
- Radio 1: 3x LED Ra/Rb/Rc



Gigabit Ethernet
- 5-port 10/100/1000M RJ45
- 1 WAN + 4 LAN
- 2 WAN + 3 LAN

SIM Card
- 2 x nano SIM



Cellular 1

DIN Clip

Integrated Power Connector
- 4 pin for redundant power
- 2 pin Relay Output

Board/Cellular No.	SIM No.	AP315GR-2C-5GM2	AP315GR-2C-LTE
1 (Right)	1	Primary	Primary
	2	Standby	Standby

Installation dimensions

Unit: mm