



# AP322

# Datasheet

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



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## Secured and Rugged LTE Router for IIoT

### AP322

#### Industrial Secure Cellular Router

Innovative industrial secure LTE router AP322 Series is designed for IIoT applications by dual radio high-speed LTE routing and Wi-Fi networks. LTE Cat.4/6 technology provides up to 300Mbps data rate, while IEEE 802.11ac Wi-Fi delivers up to 866Mbps high throughput. Dual RS232/422/485 ports are able to connect to local serial devices over cellular and Ethernet network. Cyber redundancy includes wireless auto-offload, LTE/WAN backup, redundant SIM ensure the best connectivity. The embedded MQTT and RESTful API enables public cloud integration such as AWS or Azure. The private cloud platform ATMS can also be setup for instant and secured access to track location and monitor data over cloud.



#### High speed 4G LTE & Wi-Fi Network

- LTE Cat.4, 2x2 MIMO, 150M downlink and 50M uplink
- LTE Cat.6 with 2CA, 2T2R MIMO provides 300M downlink and 50M uplink
- 4G/3G/2G full cellular network compatibility
- Support GPS for location services
- IEEE 802.11ac compliant & backward compatible with 802.11a/b/g/n
- Selectable 5G/2.4G Wi-Fi for local coverage, up to 866Mbps bandwidth

#### Serial Communication & High Throughput Data Switching

- Dual serial ports with RS232/422/485 full functions for serial over LTE/Wi-Fi/Ethernet data switching
- 2-port Gigabit Ethernet supports routing and bridging mode
- Close to wire-speed NAT routing performance
- Hardware NAT for CPU utilization saving

#### Enhanced Cyber Security & Redundancy

- Support Firewall for inbound/outbound traffic
- OpenVPN (server/client), IPsec for secure remote connection
- Support L2TP with PPP, PAP, CHAP(LCP, IPCP)
- Support GRE tunnel
- HTTPs/SSH secure login
- Support TACACS+ multi-user authentication for privileged user management

#### Management Features

- Various configuration paths, including Web GUI, Telnet, LAN Utility (AIAS), and NMS (ANMS)
- Supports cellular to WAN redundancy, dual SIM backup
- Supports Cellular to WLAN auto offload
- Supports RSTP spanning tree protocol
- 1:1 NAT, port forwarding and NAPT for local traffic protection
- ARP response over 802.2 LLC SNAP
- Support SNMPv3 and entity-MIB (RFC4133), MIB II (RFC1213)
- NTP v3 time management

#### Cloud Management Service

- Support Amazon AWS & Microsoft Azure cloud service
- Support proprietary ATMS cloud service
- Interactive monitoring dashboard and map shows the status, signal strength, location etc.

#### Rugged Design for Wayside Surveillance, ITS Application

- EN50121-4 railway trackside EMC certificate design for Industrial IoT, ITS applications
- Effective heat dissipation design for operating in -40~75°C environments
- CE Marking
- IEC61000-6-2/IEC61000-6-4 heavy industrial EMC compliance



## Function interface

### System LED

- 1 x Power
- 1 x System Status
- 1 x DO
- 2 x Ethernet Port
- 1 or 2 x Serial Port ( By Model)
- 6 x Radio LED (Ra~Rf)

	AP322-LTE	AP322-WLAN+LTE
Ant 1	LTE-Main	Wi-Fi 1
Ant 2	LTE- Diversity/ GPS (by model)	Wi-Fi 2
Ant 3	-	LTE-Main
Ant 4	-	GPS (by model)
Ant 5	-	LTE-Diversity

### USB Extension Port

- USB for Configuration/  
Firmware update
- External Storage

\*Antenna: Wi-Fi in White; LTE in Black

### Gigabit Ethernet

- 2-port 10/100/1000M RJ45
- WAN + LAN configurable

### SIM Card

- AP322-WLAN+LTE
- 2x SIM or
- 2x SIM + 1x MicroSD

### DIN Clip

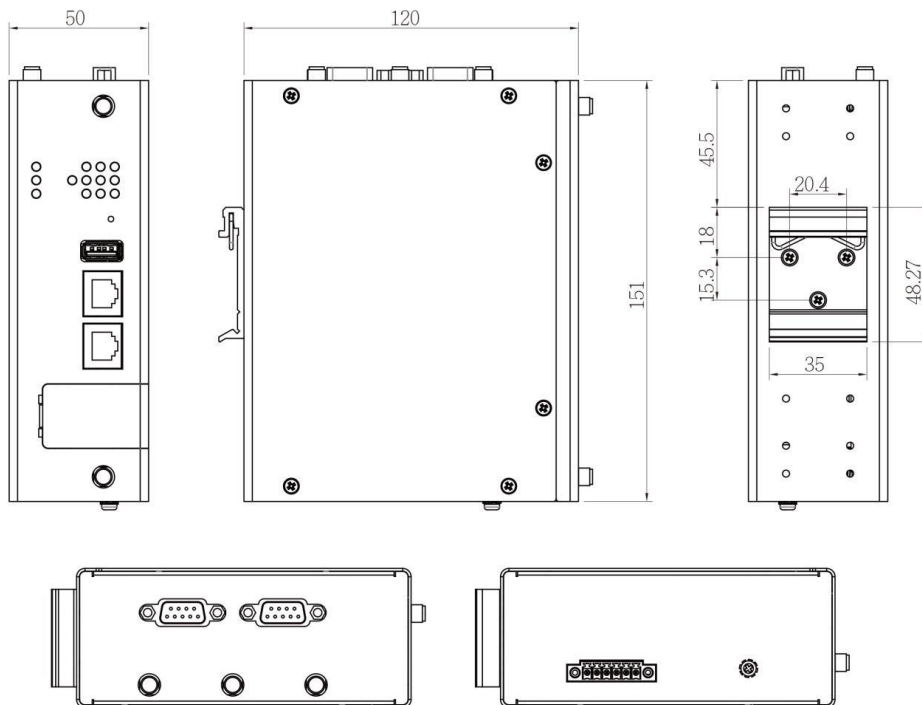
### Integrated Power Connector

- 1 x 6-pin terminal block
- 4 pin for redundant power
- 2 pin DO



## Installation dimensions

(mm)



Technology	
<b>Standard</b>	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
	IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP)
	IEEE 802.1Q for VLAN
Interface	
<b>Ethernet Port</b>	2 x 10/100/1000MBase-T RJ45, Auto Negotiation, Auto-MDI/MDIX
<b>System LED</b>	<p>1 x PWR: Green On            1x SYS: Ready: Green On, Firmware Updating: Green Blinking            1 x DO: Red On            2 x Ethernet Ports: Link: Green On, Activity: Green Blinking            3 x Serial Ports (Serial 1/2, by model): Activity: Green Blinking</p> <p><b>AP322-LTE:</b>            3 x Radio (Ra, Rb, Rc): Radio status            Ra: SIM detected: Green On, SIM not inserted: Off            Rb: 2/3G connection: Green On, Not 2/3G connection: Off            Rc: 4G connection: Green On, Not 4G connection: Off</p> <p><b>AP322-WLAN+LTE:</b>            6 x Radio (Ra, Rb, Rc, Rd, Re, Rf): Radio status            Ra: AP mode: Green On, Station mode connected: Green Blinking, Station mode/radio disable: Off            Rb/Rc: Reserved            Rd: SIM detected: Green On, SIM not inserted: Off            Re: 4G connection: Green On, 2/3G connection: Green Blinking, disconnected: Off            Rf: Base station connected: Green On for 2 sec period, Base station disconnected: Green Off for 2 sec period</p>
<b>USB</b>	1 x USB for Configuration/Firmware Update
<b>Reset</b>	System Reset(2~6 Seconds) / Default Settings Reset(over 7 Seconds)
<b>SMA Socket</b>	<p><b>AP322-LTE:</b> Up to 2 x RP-SMA Female            LTE 2T2R: ANT1 for LTE Main, ANT2 for LTE Aux OR LTE + GPS: ANT1 for LTE Main, ANT2 for GPS</p> <p><b>AP322-WLAN+LTE:</b> Up to 5 x RP-SMA Female            Wi-Fi 2T2R: ANT1 for Wi-Fi1, ANT2 for Wi-Fi2,            LTE 2T2R: ANT3 for LTE Main, ANT 5 for LTE Aux            GPS: ANT4</p>
<b>SIM Socket</b>	2 x Nano SIM with redundancy
<b>MicroSD</b>	(Only for <b>E Series</b> ) 1x for field diagnostic data logging
<b>Serial</b>	Up to 2 x RS232/422/485, DB9
<b>Power Input, Digital Output</b>	<p>6-Pin Removable Terminal Block            Connector 4 Pin for Redundant Power            2 Pin for DO (Relay Alarm)            DO: Dry Relay Output with 1A/24V DC</p>

<b>Cellular Properties (LTE Cat. 6)</b>	
<b>Standard</b>	UMTS/HSPA 3GPP Release 8 LTE 3GPP Release 12 (LTE Cat.6)
<b>Data Rate</b>	TD-SCDMA: DL Max 4.2Mbps, UL: Max 2.2Mbps HSPA: DL: Max. 42 Mbps, UL: Max. 5.76 Mbps WCDMA: DL: Max 384Kbps, UL: Max 384Kbps LTE-FDD: DL: Max. 300 Mbps, UL: Max. 50 Mbps, 2x2 DL MIMO LTE-TDD: DL: Max. 226 Mbps, UL: Max. 28 Mbps, 2x2 DL MIMO
<b>Band Information: LTE-E</b>	LTE-FDD: B1/B3/B5/B7/B8/B20/B28/B32 (2100/1800/850/2600/900/800/700/1500MHz) LTE-TDD: B38/B40/B41 (2600/2300/2500MHz) WCDMA: B1/B3/B5/B8 (2100/1800/850/900MHz)
<b>Band Information: LTE-U</b>	LTE-FDD: B2/B4/B5/B7/B12/B13/B17/B25/B26/B29/B30/B66 (1900/1700/700/2600/700/700/700/1900/850/700/2300/1700MHz) LTE-TDD: B41 (2500MHz) WCDMA: B2/B4/B5 (1900/1700/850MHz)
<b>Band Information: LTE-AP</b>	LTE-FDD: B1/B3/B5/B7/B8/B18/B19/B21/B26 (2100/1800/850/2600/900/850/850/1500/850MHz) LTE-TDD: B38/B39/B40/B41 (2600/1900/2300/2500MHz) WCDMA: B1/B5/B6/B8/B9/B19 (2100/850/UMTS only/900/1800/850MHz) TD-SCDMA: B39 (1900MHz)

<b>Cellular Properties (LTE Cat. 4)</b>	
<b>Standard</b>	GSM/GPRS/EDGE 3GPP Release 6 UMTS/HSPA 3GPP Release 8 LTE 3GPP Release 11
<b>Data Rate</b>	GPRS: DL: max. 85.6 kbps, UL: max. 85.6 kbps EDGE: DL: max. 236.8 kbps, UL: max. 236.8 kbps HSPA: DL: max. 42 Mbps, UL: max. 5.76 Mbps LTE-FDD Cat.4: DL: max. 150 Mbps, UL: max. 50 Mbps, 2x2 DL MIMO LTE-TDD Cat.4: DL: max. 130 Mbps, UL: max. 35 Mbps, 2x2 DL MIMO
<b>Band Information: LTE-E</b>	LTE: FDD B1/B3/B5/B7/B8/B20 (2100/1800/850/2600/900/800MHz) LTE: TDD B38/B40/B41 (2600/2300/2500MHz) WCDMA: FDD B1/B5/B8 (2100/850/900MHz) GSM: B3/B8 (1800/900MHz)
<b>Band Information: LTE-AU</b>	LTE: FDD B1/B2/B3/B4/B5/B7/B8/B28 (2100/1900/1800/1700/850/2600/900/700MHz) LTE: TDD B40 (2300MHz) WCDMA: FDD B1/B2/B5/B8 (2100/1900/850/900MHz) GSM: B2/B3/B5/B8 (1900/1800/850/900MHz)
<b>Band Information: LTE-U</b>	LTE: FDD B2/B4/B12 (1900/1700/700MHz) WCDMA: B2/B4/B5 (1900/1700/850MHz)
<b>Band Information: LTE-CN</b>	LTE FDD: B1/B3/B5/B8 (2100/1800/850/900MHz) LTE TDD: B38/B39/B40/B41 (2600/1900/2300/2500MHz) TD-SCDMA: B34/B39 (2000/1900MHz) WCDMA: B1/B8 (2100/900MHz) CDMA: BC0 GSM: 900/1800MHz

<b>GPS Properties</b>	
<b>GNSS</b>	GPS/GLONASS/BeiDou/Galileo
<b>Performance</b>	Cold start: 18s, Warm start: 2.2s, Hot start: 1.8s
<b>Sensitivity</b>	Cold start: -146dBm, Reacquisition: -157dBm, Tracking: -157dBm
<b>Accuracy</b>	<1.5M
<b>GNSS Frequency</b>	GPS/Galileo: 1575.42±1.023 MHz GLONASS: 1597.5~1605.8 MHz BeiDou: 1561.098±2.046 MHz
<b>Antenna (Optional Accessory-A-GPS-27-RSM-3M)</b>	Frequency range: 1561~1615MHz Polarization: RHCP or linear VSWR: <2 (Typ.) Passive antenna gain: >0dBi

<b>Wi-Fi Properties</b>	
<b>Standard</b>	IEEE 802.11ac/a/b/g/n, 2T2R MIMO 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
<b>Data Rate</b>	802.11ac: MCS0 ~ 9, max. 866Mbps 802.11b: 11Mbps / 802.11a/g: 54Mbps / 802.11n: MCS0 ~ 15, max. 300Mbps Check detail TX/RX information in User Manual
<b>Frequency</b>	ISM Band, 2.412GHz ~ 2.472GHz, 5.180MHz ~ 5.825MHz(Band 1,4)
<b>RSSI</b>	≤20db, compliant with CE request

Antenna	
LTE Default Antenna	<b>Frequency:</b> 704~960/1710~2690 MHz
	<b>Gain:</b> 2 dBi
	<b>Dimension:</b> 161xΦ13 mm
Wi-Fi Default Antenna	<b>Frequency:</b> 2400~2500/ 4900~5900 MHz
	<b>Gain:</b> 2.4GHz: 2.5 dBi, 5GHz: 3dBi
	<b>Direction:</b> Omni-directional
	<b>Dimension:</b> 196xΦ13 mm
Power Requirement	
<b>Input Voltage</b>	24V (12~48VDC)
<b>Reverse Polarity Protect</b>	Yes
<b>Input Current</b>	<b>AP322-LTE:</b> 0.23A@24V <b>AP322-WLAN+LTE:</b> 0.26A@24V
<b>Power Consumption</b>	<b>AP322-LTE:</b> Max 5.52W @24VDC full traffic, suggest to reserve 15% tolerance <b>AP322-WLAN+LTE:</b> Max 6.24W @24VDC full traffic, suggest to reserve 15% tolerance
Software	
<b>Network Protocols</b>	TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, HTTPS, SMTP, NTP, ARP, ICMP
<b>Management Interface</b>	CGI WebGUI, Command Line Interface (CLI), Telnet, SNMP
<b>User Management</b>	Radius client, TACACS+, local database
<b>Serial communication</b>	TCP Server/TCP Client/UDP mode, TCP Alive check, Force TX Delimiter/Timeout/interval/length, Long Distance Termination
<b>Time Management</b>	NTPv3, SNTP, Cellular Time
<b>IoT</b>	AWS Agent, Azure Agent, ATMS Agent
<b>Network Management</b>	IPv4, SNMP v1/v2c/v3/Trap, MIB II, Entity MIB, DHCP server/client, DHCP relay*, TFTP, ARP response over 802.2 LLC SNAP, Proxy ARP, DNS (client/proxy)
<b>Traffic Management</b>	Traffic Control, 1:1 NAT, Customized NAT, NAPT(SNAT/DNAT), Port Forwarding
<b>Routing</b>	RIPv2*, Static Route
<b>Security</b>	Firewall, DMZ, HTTPS, SSH, IEEE 802.1X/RADIUS
<b>Redundancy Protocol</b>	Rapid Spanning Tree Protocol (RSTP)
<b>VPN</b>	IPsec, OpenVPN (server/client), L2TP*, GRE
<b>Cellular Configuration</b>	Radio on/off, 2G, 3G and 4G modes configurable, SIM Security, Connection Status, Cellular to Eth-WAN Redundancy, GPS positioning (by model), Backup SIM Retry (1-10 times)
<b>WLAN Configuration</b>	WLAN Basic Settings: Radio on/off, AP/client mode, 2.4G 11n/5G 11ac Band and Frequency selection, SSID/Multi-SSID configuration, SSID broadcast, VLAN ID, WLAN to LAN Link fault pass-through, Cellular to WLAN Auto Offload and advanced WLAN settings, 802.1X
<b>Utility</b>	AIAS, ANMS, Ping, Traceroute
Mechanical	
<b>Installation</b>	DIN Rail
<b>Enclosure Material</b>	Steel Metal with Aluminum
<b>Dimension</b>	50 x 151 x 120 mm(W x H x D) / without DIN Rail Clip
<b>Ingress Protection</b>	IP30
<b>Weight</b>	AP322: ~660g without package
Environmental	
<b>Operating Temperature &amp; Humidity</b>	-40°C~75°C , 5%~95% Non- Condensing
<b>Storage Temperature</b>	-40°C~85°C
<b>MTBF</b>	>200,000 hours at 40° full cycle
<b>Warranty</b>	5 years

Approval	
Safety	EN 60950-1 Compliance EN 62368-1:2014/AC:2017 Compliance IEC 60255-27:2013 Compliance
EMC	EN61000-6-2/EN61000-6-4 Compliance
EMI	CISPR 22, FCC part 15B Class A Compliance
EMS	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
Radio	RED Compliance Safety: EN 62368-1 EN 50385/EN62311 MPE assessment EN 301 489-1/17/19/52, EN 55032/55024 EN 300 328/EN 301 893 EN 301 908-1 FCC Part 15B
Railway	EN50121-4
Environmental	EN 60870-2-2:1998 Compliance IEC 60068-2-21:2006 Compliance

## Ordering Information

Model Name	Description
AP322-LTE	Industrial Wireless IIoT Secure Routing Gateway,1GE WAN+1GE LAN,2×COM, 1×USB, 1×SD,1×SIM, LTE Cat.4,12~48VDC
AP322-LTE-D	Industrial Wireless IIoT Secure Routing Gateway,1GE WAN+1GE LAN,2×COM, 1×USB, 2×SIM, GPS,LTE Cat.4,12~48VDC
AP322-WLAN	Industrial Wireless IIoT Secure Routing Gateway,1GE WAN+1GE LAN,2×COM, 1×USB, 1×SD,Wi-Fi 2.4G 11n/5G 11ac,12~48VDC
AP322R-WLAN-LTE	Industrial Wireless IIoT Secure Routing Gateway,1GE WAN+1GE LAN,2×COM, 1×USB, 1×SD,LTE ,Wi-Fi 2.4G 11n/5G 11ac,12~48VDC
AP322A-WLAN-LTE	Industrial Wireless IIoT Secure Routing Gateway,1GE WAN+1GE LAN,2×COM,2×DI,1×DO, 1×USB, 1×SD,LTE ,Wi-Fi 2.4G 11n/5G 11ac,12~48VDC
AP322A-WLAN-LTE-M12	Industrial Wireless IIoT Secure Routing Gateway,1GE WAN+1GE LAN,2×COM,2×DI,1×DO,1×USB, 1×SD,LTE ,Wi-Fi 2.4G 11n/5G 11ac,12~48VDC
AP322A-EC	Industrial IoT edge calculation,1GE WAN+1GE LAN,2×COM, 1×USB, 1×SD,Wi-Fi 2.4G 11n/5G 11ac,12~48VDC
<b>Package List</b>	
1 x Product Unit	
1 x 6-pin Removable Terminal Connector	
1 x Quick Installation Guide	
1 x Attached Din Clip	
<b>Default Enclosed Antennas:</b>	
AP322-LTE: 2 x LTE Antennas, Black	
AP322-WLAN: 2 x Wi-Fi Antennas, White	
AP322-WLAN+LTE: 2 x LTE Antennas, Black + 2 x Wi-Fi Antennas, White	

Ordering Information	
A-LTE_WLAN_G-4_4-RSM-2M	Combo IP67 Antenna, LTE WW 4dBi, Wi-Fi 2.4/5GHz dual band Omni-directional 4/4dBi, GPS 1561- 1670MHz 28dBi, RP-SMA male, 2M
A-LTE_WLAN_G-3_2-RSM-2M	Combo IP67 Antenna, LTE WW 3dBi, Wi-Fi 2.4/5GHz dual band Omni-directional 2/2dBi, GPS 1575- 1610MHz 28dBi, RP-SMA male, 2M
A-LTE-3-NM	LTE Antenna, LTE WW 3dBi, N-type male
A-WLAN-6-NM	Wi-Fi Antenna, Wi-Fi 2.4/5GHz dual band Omni-directional 4/6dBi, N-type male
A-GPS-27-RSM-3M	GPS Antenna, GPS 1575MHz 27dBi, RP-SMA male, 3M
C-RF-R-RSF_RSM-1M	RF cable, RP-SMA female to RP-SMA male, 1M
C-RF-C2-NF_RSM-2M	RF cable, N-type female to RP-SMA male, CFD200, 2M