Industrial Wireless Solutions
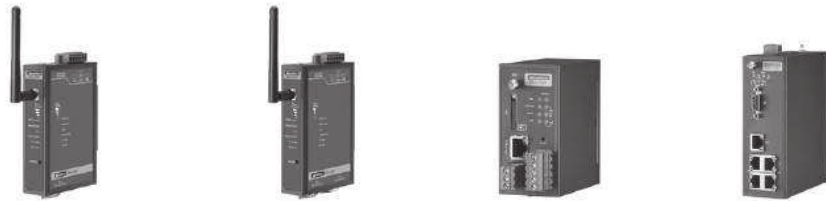
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To view all of Advantech's Industrial Ethernet Solutions, please visit www.advantech.com/products.

Industrial Wireless Product Selection Guide

Cellular IP Router/Gateway

Model Name		EKI-1321	EKI-1322	EKI-1331	EKI-1334
Descripton		1-Port RS-232/422/485 to GPRS IP Gateway	2-Port RS-232/422/485 to GPRS IP Gateway	1-Port RS-232/485 & Ethernet to GPRS/HSPA+ IP Gateway	4-Port HSPA+ IP Router
Cellular Interface	Standard	GSM/GPRS	GSM/GPRS	GS/GPRS/UMTS/HSPA+	GS/GPRS/UMTS/HSPA+
	Band Option	850/900/1800/1900 MHz	850/900/1800/1900 MHz	850/900/1800/1900/2100 MHz	850/900/1800/1900/2100 MHz
	Connector	SMA female	SMA female	SMA female	SMA female
SIM	No.	2	2	1	1
	Control	3V	3V	3V	3V
Ethernet WAN	No.	-	-	-	1
	Connector	-	-	-	RJ45
	Speed	-	-	-	10/100 Mbps
	Protection	-	-	-	1.5 KV built-in magnetic isolation protection
Ethernet LAN	No.	1	1	1	4
	Connector	RJ45	RJ45	RJ45	RJ45
	Speed	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps
	Protection	1.5 KV built-in magnetic isolation protection	1.5 KV built-in magnetic isolation protection	1.5 KV built-in magnetic isolation protection	1.5 KV built-in magnetic isolation protection
Serial Communication	Type	RS-232/422/485	RS-232/422/485	RS-232/485	RS-232
	Baud Rate	50 bps ~ 921.6 kbps, any baud rate setting	50 bps ~ 921.6 kbps, any baud rate setting	9600 bps ~ 232.4 kbps	9600 bps ~ 232.4 kbps
	No. of Ports	1	2	1	1
	Port Connector	DB9 Male	DB9 Male	Terminal Block	DB9 Male
	Protection	15 KV ESD for all signals	15 KV ESD for all signals	15 KV ESD for all signals	15 KV ESD for all signals
Software	Gateway/ Router	Gateway	Gateway	Gateway	Router
	Configuration	Windows utility, Telnet console, Web Browser	Windows utility, Telnet console, Web Browser	Telnet console, Web Browser	Telnet console, Web Browser
	Operation mode	VCOM, RVCOM, TCP Server/Client, UDP Server/Client, SMS Tunnel	VCOM, RVCOM, TCP Server/Client, UDP Server/Client, SMS Tunnel	TCP Server/Client, UDP Server/Client, Modbus RTU to Modbus TCP	TCP Server/Client, UDP Server/Client, Modbus RTU to Modbus TCP
Power	Power Input Range	12 - 48 V_{DC}	12 - 48 V_{DC}	12 - 24 V_{DC}	12 - 24 V_{DC}
	Redundant DC Power Input	V	V	-	-
Mechanism	DIN-Rail Mount	V	V	V	V
	Wall Mount	V	V	V	V
	IP Grade	IP30	IP30	IP30	IP30
Operating Temperature	-30 ~ 65°C (-22 ~ 149°F)	V	V	-	-
	-20 ~ 70°C (-5 ~ 160°F)	-	-	V	V
Certification	CE	V	V	V	V
	FCC	V	V	V	V
	GCF	-	-	V	-
	PCTRB	-	-	V	-
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Wireless Access Point/Client

Model Name	EKI-6310GN	EKI-6311GN	EKI-6331AN	EKI-6340-1	EKI-6340-2	EKI-6340-3	EKI-6351-A
Description	IEEE802.11 b/g/n WiFi AP/Client	IEEE 802.11 b/g/n Wi-Fi AP/Client	IEEE 802.11 a/n Wi-Fi AP/Client	IEEE 802.11 a/b/g/n Outdoor Single-Radio Wi-Fi AP	IEEE 802.11 a/b/g/n Outdoor Dual-Radio Wi-Fi AP	IEEE 802.11 a/b/g/n Outdoor Triple-Radio Wi-Fi AP	IEEE 802.11 a/b/g/n Wi-F AP/Client
Interface — IEEE Standard	802.11b/g/n	802.11b/g/n	802.11a/n	802.11 a/b/g/n	802.11 a/b/g/n	802.11 a/b/g/n	802.11 a/b/g/n
100Base-TX	v	v	v	v	v	v	v
1000Base-TX	-	-	-	v	v	v	v
Radio Number	1	1	1	1	2	3	1
RF — MIMO	1T1R	1T1R	2T2R	2T2R	2T2R	2T2R	2T2R
Transmit Output Power	*	*	*	*	*	*	*
Receive Sensitivity	*	*	*	*	*	*	*
Operating Mode — Multi-Hopping	-	-	-	v	v	v	v
AP/CPE	v	v	v	v	v	v	v
Power — PoE	802.3af	Passive 12 V	Passive 15 V	802.3at	802.3at	802.3at	802.3at
Power Input Votage	-	12 V$_{DC}$	15 V$_{DC}$	12 ~ 48 V$_{DC}$			
Redundant DC Power Input	-	-	-	v	v	v	v
Mechanism — DIN-rail Mount	v	-	-	-	-	-	v
Wall Mount	-	-	-	v	v	v	v
VESA Mount	-	-	-	v	v	v	-
Pole Mount	v	v	v	v	v	v	-
IP Grade	IP66	IP55	IP55	IP67	IP67	IP67	IP30
Operating Temperature — -20 ~ 70°C (-4 ~ 158°F)	v	v	v	-	-	-	-
-35 ~ 75°C (-31 ~ 167°F)	-	-	-	v	v	v	v
Certification — FCC	v	v	v	v	v	v	v
CE	v	v	v	v	v	v	v
EN50155	-	-	-	v	v	v	v
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*Note: Transmit Output Power & Receive Sensitivity are specified on data sheet.
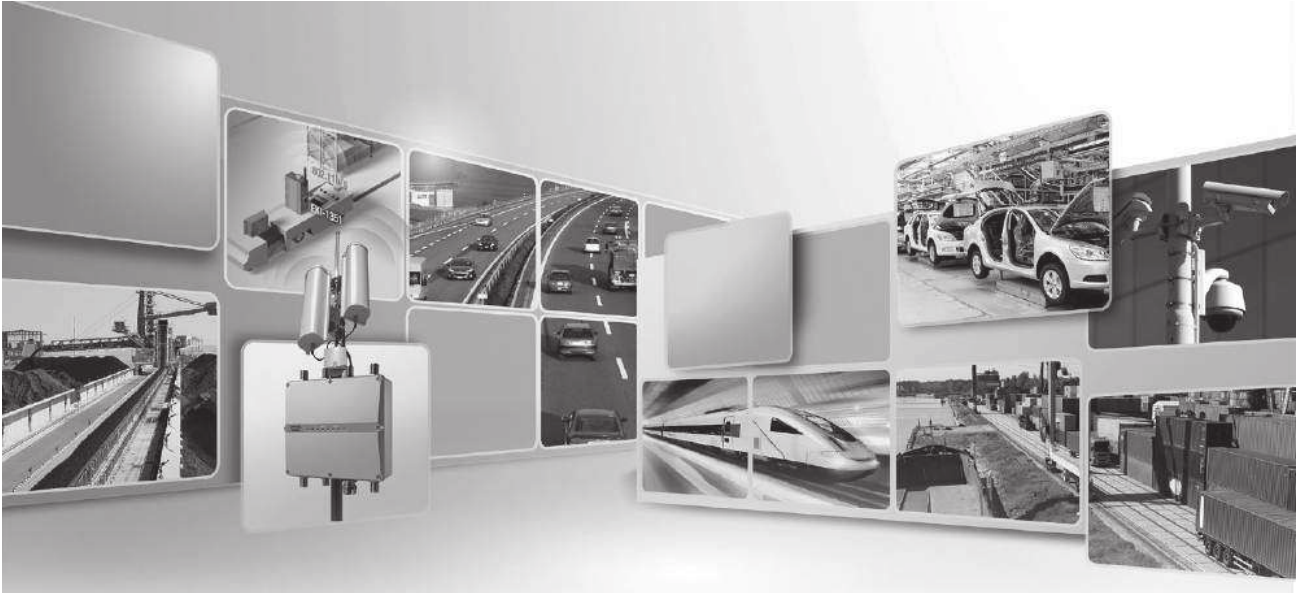
Introduction

## Introduction to Industrial IEEE 802.11 Wireless

In the past, Wireless deployment has been limited by security concerns, the cost of deployment, inadequate management solutions, lack of standards, and availability of innovative solutions. Rapid advances in wireless local area network (WLAN) technology in recent years, along with the widespread adoption of the technology in the industrial and enterprise space, have eliminated many of these roadblocks. WLAN is not a wholesale replacement for broadband, but it is a fast and cost-effective way to construct backhaul broadband transmissions. Wireless communication provides an easier way to connect devices, particularly those in dispersed locations or harsh environments. Today, a new wave of opportunity exists for industrial industries to improve margins through the use of wireless technology.
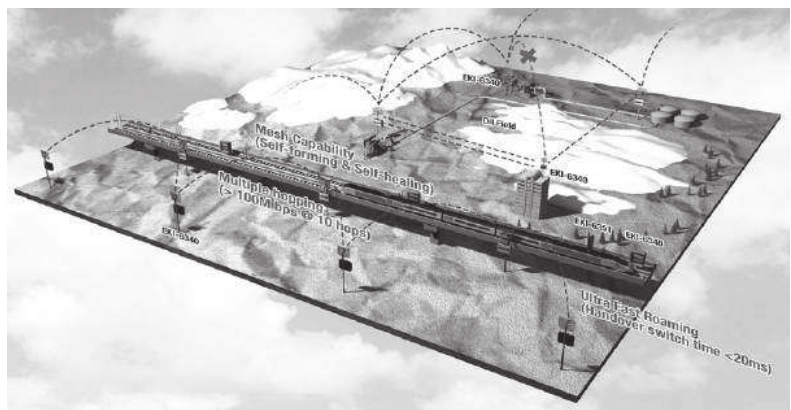
802.11 Standard Evolution

The IEEE 802.11 standard specifies a way to use radio frequency (RF) technology to send Ethernet packets over the air. Wireless LAN is based on the IEEE 802.11 standard and is referred to as Wi-Fi. The 802.11b standard, which operates in the 2.4 GHz frequency band at 11 Mbps, was the first commercially successful WLAN technology.

As wireless technology evolved, a higher transmission rate of 54 Mbps was achieved with 802.11g, which uses the 2.4 GHz band, and 802.11a, which uses the 5 GHz frequency band with same transmission rate of 54 Mbps. To extend the wireless communication distance and bandwidth, IEEE 802.11n has added more specifications in the MIMO standard and dual-band support. The transmission rate of 802.11n is up to 600Mbps. 802.11n offers a suite of advanced new features that increase effective data throughput, extended wireless coverage, and creates more reliable networks. Choosing the right WLAN technology is an important factor in determining the performance of your wireless network and overall return on investment.

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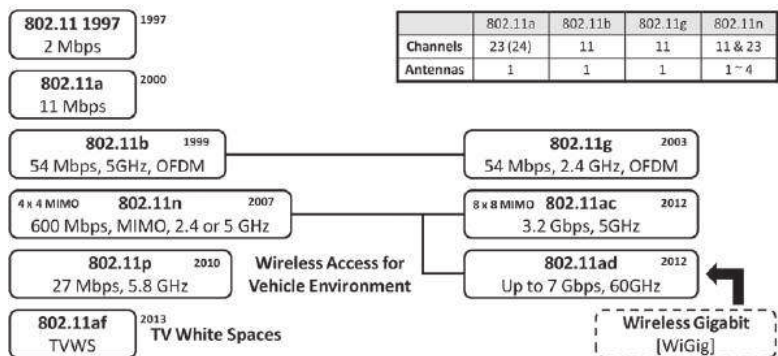
Wireless Architecture

AP-Client mode

The EKI-6300 series of products can perform as Access Points (AP) or Clients. When it's used as an AP, it's connected to a wired network via the Ethernet port and accepted connections from wireless clients and passes data upwards to a network wirelessly. In Client mode, it receives a wireless signal over last mile application, helping WISPs deliver wireless broadband Internet service to residents and business customers. In Client mode, it does not accept wireless associations from wireless clients.

WDS mode

A Wireless Distribution System (WDS) provides an easy way for APs to communicate wirelessly with each other. In this mode, it can support single or multiple WDS links and no wireless clients can be associated with it.

AP-Repeater mode

EKI-6300 series products can be used as a Clients to receive wireless signals over the last mile, helping WISPs deliver wireless broadband Internet service to new residential and business customers. And it can be used as an AP to accept wireless connections from client devices in this mode.


Cellular IP Gateway Technologies

RVCOM

iGateway series supports Advantech patented RVCOM function that allows user use the virtual com port as usual, even the device gets a private IP address.
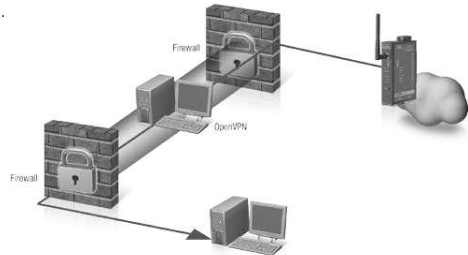

DDNS Support

DDNS support helps user to locate the exactly current IP address of device easily. Device will automatically update current IP address to DDNS server. When using DDNS with VCOM or RVCOM, users don't need to do the lookup manually after setup. The connection will handle VCOM or RVCOM automatically.
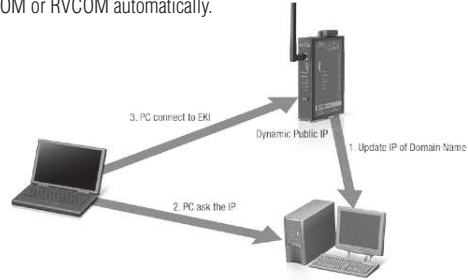
OpenVPN Support

iGateway series supports standard OpenVPN protocol that provide trustable data communication. Users can setup private OpenVPN server easily without an extra software license fee.

IPv6 and IPv4 Dual Stack Support

IPv6 is becoming more popular and the iGateway series supports IPv6 and IPv4 dual protocol stack that helps user to overcome the impact of Ethernet architecture transition smoothly and easily.
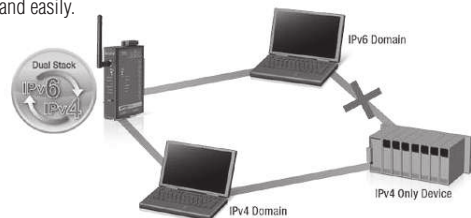
iGateway Application for Solar Power

Advantech's GPRS/3G Serial Device Servers are a perfect fit for wireless data transmission systems due to their great performance, reliability and ruggedness. The GPRS/3G Serial Device Servers collect data from solar panels & inverters, pyranometers, and relative sensors. This information is transmitted through cellular data network to the telecom control center. Service providers and users are able to easily access real-time information anywhere, anytime. The GPRS/3G Serial Device Servers provide dual SIM slots for telecom carrier redundancy and one SD slot for serial data buffering.

EKI-1321
EKI-1322

1-port RS-232/422/485 to GPRS IP Gateway

2-port RS-232/422/485 to GPRS IP Gateway

NEW

EKI-1321   EKI-1322

Features

- Universal quad-band GSM/GPRS 850/900/1800/1900 MHz
- Dual SIM for telecom redundancy
- Supports SDHC SD Card for Data Buffering
- Connects Ethernet and Serial Devices over VPN
- Various operation modes: COM port redirector, RVCOM, TCP, UDP, SMS tunnel, and pair connection
- Any baud rate setting for easy configuration
- Built-in 15 KV ESD protection for all serial signals
- 1.5 KV isolation protection (EKI-1321)
- 2 digital inputs (EKI-1321)
- Multiple configuration methods: Windows utility, Telnet, and Web console

Introduction

EKI-1321 and EKI-1322 cellular gateways can transparently bring RS-232/422/485 or Ethernet devices to a cellular network. They allow nearly any device with serial or Ethernet ports to connect and share a cellular network with easy and simple configuration. EKI-1321 and EKI-1322 GPRS IP Gateway's are compact, and can be DIN-rail or wall mounted and with both front panel and side panel LED displays for easy identification. They come with dual DC power input from 12 to 48 V$_{DC}$ and have 2 KV EFT/Surge protection to prevent damage from various type of power resources. The serial ports are also protected by 15 KV ESD line protection to keep your system safe from unexpected electrical discharges. Both models support dual SIM slots to support GPRS signal redundancy to switch to an available channel automatically while the existing one is disconnected, and SD card slot for data buffering to prevent loss of serial data while the communication is interrupted.

Specifications

LAN Interface
- **Ethernet** — 10/100 Mbps, auto MDI/MDIX
- **Connector** — RJ45
- **Protection** — 1.5 KV built-in magnetic isolation protection

Cellular Interface
- **Standards** — GSM/GPRS
- **Band Option** — Quad-band 850/900 and 1800/1900 MHz
- **GPRS Multi-Slot** — Class 10
- **GPRS Terminal Device** — Class B
- **GPRS Coding Schemes** — CS1 ~ CS4
- **Tx Power** — 1 W for GSM 1800/1900, 2 W for EGSM 850/900
- **No. of SIM** — 2
- **SIM Control** — 3 V

Serial Communications
- **Port Type** — RS-232/422/485, software selectable
- **No. of Ports** — EKI-1321: 1, 2 KV isolation protection
  EKI-1322: 2
- **Port Connector** — DB9 male
- **Data Bits** — 5, 6, 7, 8
- **Stop Bits** — 1, 1.5, 2
- **Parity** — None, Odd, Even, Space, Mark
- **Baud Rates** — 75 bps to 921.6 kbps, any baud rate setting
- **Serial Signals** — RS-232: TxD, RxD, CTS, RTS, DTR, DSR, DCD, RI, GND
  RS-422: TxD+, TxD-, RxD+, RxD-, GND
  RS-485: Data+, Data-, GND
- **Protection** — 15 KV ESD for all signals

Relay Output
- **Channel** — 1
- **Contact Rating** — 0.5 A @ 120 V$_{AC}$
  0.25 A @ 240 V$_{AC}$; 2 A @ 30 V$_{DC}$
- **Relay off Time(Typ.)** — 4 ms
- **Relay on Time(Typ.)** — 3 ms

Digital Input (EKI-1321)
- **Channel** — 2
- **Input Level** — Logic level 0: 1 V Maximum
  Logic level 1: 3 ~ 30 V

General
- **LED Indicators** — System: Power, Status
  GPRS: Quality, ready
  Serial: Tx, Rx
  Ethernet: Speed, Link/Active
- **Reboot Trigger** — Built-in WDT (watchdog timer)

Software
- **Driver Support** — 32-bit/64-bit Windows XP/Vista/7/8, Windows Server 2003/2008/2008 R2/2012, Windows CE 5.0, and Linux
- **Utility Software** — Advantech EKI Device Configuration Utility
- **Operating Modes** — Virtual COM, Reverse Virtual COM, TCP/UDP server mode, TCP/UDP client mode, Pair connection mode (Serial Tunnel), RFC2217, SMS Tunnel, IP Gateway w/ VPN
- **Configuration** — Windows utility, Telnet console, Web Browser
- **Protocols** — ARP, ICMP, IPv4, IPv6, TCP, UDP, BOOTP, DHCP Client, Auto IP, Telnet, DNS, SNMP, HTTP, HTTPS, SMTP, SNTP, SSL
- **Router/Firewall** — NAT, port forwarding

Mechanics
- **Dimensions (W x H x D)** — 27 x 120 x 85 mm (1.06" x 4.72" x 3.35")
- **Enclosure** — Metal with solid mounting hardware
- **Mounting** — DIN-rail, Wall
- **Weight** — 0.49 Kg

Power Requirements
- **Power Input** — 12 ~ 48 V$_{DC}$, redundant dual inputs
- **Power Connector** — Terminal block
- **Power Consumption** — EKI-1321: 8W, EKI-1322: 8.5W
- **Power EFT/Surge Prot.** — 2 KV

Environment
- **Operating Temperature** — -30 ~ 65°C (-22 ~ 149°F)
- **Storage Temperature** — -40 ~ 75°C (-40 ~ 167°F)
- **Operating Humidity** — 5 ~ 95% RH

Regulatory Approvals
- **EMC** — CE: EN55022/EN55024, Class A
  FCC: FCC part 15 subpart B, Class A
- **RF** — FCC Part22H/Part24E, EN301 489-1, EN301 489-7, EN301 511

Ordering Information
- **EKI-1321** — 1-port GPRS IP Gateway
- **EKI-1322** — 2-port GPRS IP Gateway
- **OPT1-DB9** — D-Sub 9 to Terminal Converter

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EKI-1334

Industrial Ethernet/Serial Router

NEW

Features

- Universal five-band UMTS/HSPA+ 850/900/1800/1900/2100 MHz
- Universal quad-band GSM/GPRS 850/900/1800/1900 MHz
- Connect Ethernet and Serial Devices over VPN
- Dual WAN (Ethernet WAN and Cellular WAN) for redundancy
- Built-in 15 KV ESD protection for all serial signals
- Multiple configuration methods: Serial console, Telnet, and Web console

Introduction

The EKI-1334 is a compact designed industrial cellular routers which can help users quickly access high-speed Internet and support secure and reliable data transmission. The products combine together with the functions of switch, serial device server, 3G Router, IP modem and Advanced VPN client and provide with high cost-effective solution for applications in industrial automation and control, fleet monitoring, video surveillance, advertising media, and outlets networking. They allow nearly any device with serial or Ethernet ports to connect and share a cellular network with easy and simple configuration through the browser without connection to the router by cable. EKI-1334 HSPA+ IP Router is compact, and can be DIN-rail or wall mounted for easy identification. They come with dual DC power input from 9 to 26 V_{DC} and have 2 KV EFT/Surge protection to prevent damage from various type of power resources. The serial/Ethernet ports are also protected by 15 KV ESD line protection to keep your system safe from unexpected electrical discharges and enable the capability to work under harsh conditions.

Specifications

LAN Interface

Ethernet	10/100 Mbps, auto MDI/MDIX
Connector	RJ45
Protection	1.5 KV built-in magnetic isolation protection
No. of Port	4

Cellular Interface

Standards	HSPA+/UMTS/GPRS/GSM
Band Option	Quad-band 850/900 and 1800/1900/2100 MHz
No. of SIM	1
SIM Control	3 V
SMA Connector	SMA Female with inner pin

Ethernet WAN Interface

Ethernet	10/100 Mbps, auto MDI/MDIX
Connector	RJ45
Protection	1.5 KV built-in magnetic isolation protection
No. of Port	1

Serial Communications

Port Type	RS-232/485
No. of Ports	1
Port Connector	5-pin Terminal block
Data Bits	5, 6, 7, 8
Stop Bits	1, 1.5, 2
Parity	None, Odd, Even, Space, Mark
Baud Rates	9600 bps to 232.4 kbps
Serial Signals	RS-232: TxD, RxD, CTS, RTS, DTR, DSR, DCD, RI, GND
	RS-485: Data+, Data-, GND
Protection	15 KV ESD for all signals

General

LED Indicators	System: Power, Status, Warn, Error
	Cellular: Three Levels of Cellular
	Signal Strength
	Ethernet: Speed, Link/Active
Reboot Trigger	Built-in WDT (watchdog timer)

Software

Operating Modes	TCP/UDP server mode, TCP/UDP client mode, IP Router w/ VPN
Configuration	Telnet console, Web Browser
Protocols	ARP, ICMP, PPP, IPv4, TCP, UDP, BOOTP, DHCP Client, DHCP Server, Auto IP, SNMP, SNTP, SMTP, Ping, Trace, DNS Relay, DDNS, Telnet, HTTP, HTTPS, SSH, VRRP, VPN (IPSec/SSL/PPTP/L2TP/GRE/VPN)
Network Security	SPI, DDoS protection, Stateless Packet Inspection, Filtering Multicast/Ping package, Access Control List (ACL), NAT, DMZ, Port mapping, NAT, PAT,

Mechanics

Dimensions (W x H x D)	113 x 45 x 133 mm (4.45" x 1.8" x 5.24")
Enclosure	Metal with solid mounting hardware
Mounting	DIN-rail, Wall
Weight	0.34 Kg

Power Requirements

Power Input	9 ~ 26 V_{DC}
Power Connector	Terminal block
Power Consumption	3.48W
Power EFT/Surge Prot.	2 KV

Environment

Operating Temperature	-20 ~ 70°C (-5 ~ 160°F)
Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)
Operating Humidity	5 ~ 95% RH

Regulatory Approvals

EMC	EN61000-4-2, level 2; EN61000-4-3, level 2
	EN61000-4-4, level 2; EN61000-4-5, level 2
	EN61000-4-6, level 2; EN61000-4-12, level 2
Shock	IEC60068-2-27
Free Fall	IEC60068-2-32
Vibration	IEC60068-2-6

Ordering Information

EKI-1334	Industrial HSPA+ IP Router

1 WebAccess+ Solutions
2 Motion Control
3 Power & Energy Automation
4 Automation Software
5 Intelligent Operator Panel
6 Automation Panels
7 Panel PCs
8 Industrial Wireless Solutions
9 Industrial Ethernet Solutions
10 Industrial Gateway Solutions
11 Serial communication cards
12 Embedded Automation PCs
13 DIN-Rail IPCs
14 CompactPCI Systems
15 IoT Wireless I/O Modules
16 IoT Ethernet I/O Modules
17 RS-485 I/O Modules
18 Data Acquisition Boards

EKI-6340 Series IEEE 802.11 a/b/g/n Outdoor Wi-Fi AP

Features

- High throughput multiple hopping (≥100 Mbps @10 hops)
- Ease of use installation utilities: antenna alignment, distance calculation and site survey tools
- Compliant with IEEE 802.11 a/b/g/n
- Up to 3 radios for Mesh back haul and Access Point
- MIMO 2 x 2, up to 300 Mbps data rate
- Dual 12 ~ 48 V redundant DC input power
- 802.3 at PoE input
- Gigabit Ethernet support
- WEP, WPA, WPA2-PSK/EAP (IEEE 802.1X/RADIUS, TKIP and AES)
- IP67 enclosure, wide operating temperature range
- EN50155 compliant

EKI-6340-1   EKI-6340-2   EKI-6340-3

Introduction

The EKI-6340 series are perfect wireless APs for outdoor deployment. With self-healing & self-forming capabilities, the wireless network is free from interruption even part of Mesh nodes failed. It's especially critical for infrastructures where wired solutions are hard to deploy. The low latency and high throughput multiple hopping features greatly enables the extension of network coverage. This high throughput network perfectly covers the growing number of data demands such as video security, surveillance and entertainment. Comprehensive security features prevent system from intrusion. IP67 sturdy waterproof enclosure with wide-temperature design enables excellent performances under all harsh outdoor environments.

Specifications

Standard Support

- **Wireless** IEEE 802.11a/b/g/n compliant
- **Ethernet** IEEE 802.11i, IEEE 802.3/802.3u/802.3ab,
  IEEE 802.3at PoE, 802.1d, 802.1w, 802.1q, 802.1p
- **Data Rates** IEEE 802.11b: 1, 2, 5.5, 11 Mbps
  IEEE 802.11a, g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
  IEEE 802.11n: @ 800ns (400ns) GI
  20 MHz BW
  1 Nss: 65 (72.2) Mbps maximal
  2 Nss: 130 (144.4) Mbps maximal
  40 MHz BW
  1 Nss: 135 (150) Mbps maximal
  2 Nss: 270 (300) Mbps maximal

Physical Specifications

- **Power** Dual redundant 12 ~ 48 V_{DC}
  IEEE 802.3at PoE
- **Power Consumption** Normal operation:
  EKI-6340-1   Max. 17 W
  EKI-6340-2   Max. 21W
  EKI-6340-3   Max. 25 W
  Cold start:
  EKI-6340-1   Max. 13W
  EKI-6340-2/3 Max. 25 W
- **Dimensions (W x H x D)** 225 x 242 x 65 (8.86" x 9.53" x 2.56")
- **Weight** 2.25 Kg
- **Enclosure** Metal, IP67 protection
- **Mounting** Pole, Wall, VESA

Environment

- **Operating Temperature** -35 ~ 75°C (-31 ~ 167°F)
- **Storage Temperature** -40 ~ 85°C (-40 ~ 185°F)
- **Ambient Relative Humidity** 5% ~ 100% (non-condensing)

Interface

- **Antenna** N-type female connector
  EKI-6340-1: 2 connectors
  EKI-6340-2: 4 connectors
  EKI-6340-3: 6 connectors
- **Power** M12 D-code connector
- **LAN** M25 cable gland

System Operation Mode

- Bridge/ Router

Other Features

- DHCP Client/Server, Statistic routing table, RIP v1&v2, WMM, Multi-SSID (up to 16x ESSID for each radio), traffic limitation, IEEE 802.11h DFS, Syslog, L2 management utility, HTTP (s), Telnet, SSH, CLI, SNMP, installation utilities.

Modulation Techniques

- **IEEE 802.11a/n** OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
- **IEEE 802.11b** DSSS (DBPSK, DQPSK, CCK)
- **IEEE 802.11g/n** OFDM (BPSK, QPSK, 16-QAM, 64-QAM)

Frequency Range

- **USA** 2.400 ~ 2.483 GHz, 5.725 ~ 5.825 GHz
- **Europe** 2.400 ~ 2.483 GHz, 5.15 ~ 5.35 GHz, 5.47 ~ 5.725 GHz
- **China** 2.400 ~ 2.483 GHz, 5.725 ~5.85 GHz

Note: radio is capable to be operated within FCC DFS2 band or ETSI/EC DFS band, or other countries which is regulating or is planning to regulate mid -5 GHz band. The usage of mid -5 GHz band is subject to the regulatory approval status.

Certificates

- **EMC** US FCC Part 15 Class B & C & E, Europe ETSI 301 489-1&17
- **Radio** ETSI 300 328, ETSI 301 893, FCC 15.247
- **Rail Traffic** EN50155, EN50121-1/-4
- **Safety** EN 60950

Ordering Information

- **EKI-6340-1A** 802.11 a/b/g/n Outdoor Single Radio AP
- **EKI-6340-2A** 802.11 a/b/g/n Outdoor Dual Radio AP
- **EKI-6340-3A** 802.11 a/b/g/n Outdoor Triple Radio AP
- **EKI-6340-1U** 802.11 a/b/g/n Outdoor Single Radio AP (EU)
- **EKI-6340-2U** 802.11 a/b/g/n Outdoor Dual Radio AP (EU)
- **EKI-6340-3U** 802.11 a/b/g/n Outdoor Triple Radio AP (EU)

EKI-6351-A

IEEE 802.11 a/b/g/n Wi-Fi AP/Client

1 WebAccess+ Solutions
2 Motion Control
3 Power & Energy Automation
4 Automation Software
5 Intelligent Operator Panel
6 Automation Panels
7 Panel PCs
8 Industrial Wireless Solutions
9 Industrial Ethernet Solutions
10 Industrial Gateway Solutions
11 Serial communication cards
12 Embedded Automation PCs
13 DIN-Rail IPCs
14 CompactPCI Systems
15 IoT Wireless I/O Modules
16 IoT Ethernet I/O Modules
17 RS-485 I/O Modules
18 Data Acquisition Boards

Features

Unique features of EKI-6351-A

- Highly secured self-healing & self-forming Mesh capability

Common features:

- Ease of use installation utilities: antenna alignment, distance calculation and site survey tools
- Compliant with IEEE 802.11a/b/g/n
- MIMO 2 x 2 11n, up to 300 Mbps data rate
- Dual 12 ~ 48 V redundant DC input power
- 802.3at PoE input
- Gigabit Ethernet support
- WEP, WPA, WPA2-PSK/EAP (IEEE 802.1X/RADIUS, TKIP and AES)
- Wide operating temperature range from -35 to 75°C
- EN50155 compliant

Introduction

The EKI-6351-A are perfect wireless AP/Clients for deployment in many locations. This high throughput network covers the increasing data demands of applications such as video security, surveillance and entertainment. Comprehensive security features prevent the system from intrusion whilst the wide operating temperature range enables excellent performances in harsh environments.

Specifications

Standard Support

- **Wireless**   IEEE 802.11a/b/g/n compliant
- **Ethernet**   IEEE 802.11i, IEEE 802.3/802.3u/802.3ab, IEEE 802.3at PoE, 802.1d, 802.1w, 802.1q, 802.1p
- **Data Rates**   802.11b: 1, 2, 5.5, 11 Mbps
                        802.11a, g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
                        Passive 15 V PoE, max. distance: 20 meters
                        IEEE 802.11n: @ 800ns (400ns) GI
                        20 MHz BW
                        1 Nss: maximal
                        2 Nss: 130 (144.4) Mbps maximal
                        40 MHz BW
                        1 Nss: 135 (150) Mbps maximal
                        2 Nss: 270 (300) Mbps maximal

Physical Specifications

- **Power**   Dual redundant 12 ~ 48 V_{DC}
                        IEEE 803.2at PoE
- **Power Consumption** Normal operation: Max. 17 W
                        Cold start: Max. 13W
- **Dimensions (W x H x D)** 37 x 140 x 95 mm (1.46" x 5.51" x 3.74")
- **Weight**   0.63 Kg
- **Enclosure**   Metal, IP30 protection
- **Mounting**   DIN-rail, Wall

Environment

- **Operating Temperature** -35 ~ 75°C (-31 ~ 167°F)
- **Storage Temperature**   -40 ~ 85°C (-40 ~ 185°F)
- **Ambient Relative**   5% ~ 100% (non-condensing)
  Humidity

Interface

- **Antenna**   2 x RSMA connector
- **Power**   Terminal block
- **LAN**   RJ45

System Operation Mode

- EKI-6351-A - Bridge/Router/Mesh

Other Features

- DHCP Client/Server*, Statistic routing table*, RIP v1&v2*, WMM, Multi-SSID (up to 16x ESSID for each radio), traffic limitation, IEEE 802.11h DFS, Syslog,L2 management utility, HTTP (s), Telnet, SSH, CLI, SNMP, installation utilities.

Modulation Techniques

- **IEEE 802.11a/n**   OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
- **IEEE 802.11b**   DSSS (DBPSK, DQPSK, CCK)
- **IEEE 802.11g/n**   OFDM (BPSK, QPSK, 16-QAM, 64-QAM)

Frequency Range

- **USA**   2.400 ~ 2.483 GHz, 5.15 ~ 5.25GHz, 5.725 ~ 5.825 GHz
- **Europe**   2.400 ~ 2.483 GHz, 5.15 ~ 5.35 GHz, 5.47 ~ 5.725 GHz
- **China**   2.400 ~ 2.483 GHz, 5.725 ~5.85 GHz

Note: radio is capable to be operated within FCC DFS2 band or ETSI/EC DFS band, or other countries which is regulating or is planning to regulate mid -5 GHz band. The usage of mid -5 GHz band is subject to the regulatory approval status.

Certificates

- **EMC**   US FCC Part 15 Class B & C & E, Europe ETSI 301 489-1&17
- **Radio**   ETSI 300 328, ETSI 301 893, FCC 15.247
- **Rail Traffic** EN50155, EN50121-1/-4
- **Safety**   EN 60950

Ordering Information

EKI-6331AN

IEEE 802.11 a/n Wi-Fi AP/Client

Features

- Compliant with IEEE 802.11 a/n
- IP55 waterproof certification
- MIMO 2 x 2 11n
- Embedded 16 dBi dual-polarity directional antenna with external R-SMA connector for optional antenna
- High output power 24 dBm
- Passive 15 V PoE
- Supports distances up to 10 km
- WEP/WPA/WPA2/ IEEE 802.1 x authentication support
- IGMP snooping protocol support

Introduction

The EKI-6331AN is a feature rich wireless AP/Client which provides a reliable 5GHz wireless connectivity for industrial environments. The PoE injector enhances flexibility in deployment of this AP/Client even where the DC power supply is hard to fulfill. As an 802.11n compliant device, EKI-6331AN provides 3 times higher data rates than legacy 802.11a devices. With MIMO 2 x 2 technology, EKI-6331AN provides both robust wireless connectivity as well as high throughput rate in wireless transmission. With the support of WMM and IGMP snooping protocols, EKI-6331AN effectively improves the reliability of wireless connectivity, especially in applications that need high reliability and high throughput data transmission. To secure wireless connections, EKI-6331AN implements the latest encryption technologies including WPA2/WPA/802.1x for powerful security authentication.

Specifications

Standard Support

Wireless	IEEE 802.11 a/n
Ethernet	IEEE 802.3u MDI / MDIX 10/100 Fast Ethernet
LAN	IEEE 802.11a wireless LAN interface
	IEEE 802.11n wireless LAN standard
	Passive 15 V PoE
Certification	US FCC Part 15
	ETSI 301 489-1&17,
	EN 60950 compliant and CE Mark
	EN 301 893 (5470-5725MHz DFS)
	EN 302 502 (5725-5850 MHz DFS)
Data Rates	IEEE 802.11a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps, auto-fallback
	IEEE 802.11n: 6 M, 6.5 M, 13 M, 13.5 M, 19.5 M, 26 M, 27 M, 39 M, 40.5 M, 53 M, 54 M, 58.5 M, 65 M, 78 M, 81 M, 104 M, 108 M, 117 M, 121.5 M, 130 M, 135 M, 150 Mbps, up to 300 Mbps

Physical Specifications

Power	15 V_{DC} @ 0.8A; AC Adapter 100 V ~ 240 V
Dimensions (W x H x D)	111 x 256 x 48 mm (4.37" x 10.08" x 1.89")
Mounting	Wall, Pole
Weight	0.5 Kg

Environment

Operating Temp.	-20 ~ 70°C (-4 ~ 158°F)
Storage Temperature	-30 ~ 80°C (-22 ~ 176°F)
Humidity	5% ~ 95% non-condensing

Interface Operation Modes

- Access Point (AP) / Client

Antenna

- Antenna Configuration 2 x 2 (2T2R)
- Default embedded 14~16 dBi (Dual-polarity)
- Reverse SMA Connectors (configured by software)

Other Features

Management	Telnet, FTP, SNMP, Web UI
Security	Open System , Shared Key, 802.1X only, WPA, WPA2, WPA-PSK (TKIP)
Wireless	Radio on/off, WMM/Regatta Mode, Output Power Control, Fragmentation Length, Beacon Interval, RTS/CTS threshold, DTIM Interval

Modulation Techniques

IEEE 802.11n	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
IEEE 802.11a	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)

Channel Support

FCC	5725-5850 MHz
CE	5470-5725 MHz, 5725-5850 MHz

Wireless Transmission Rates

IEEE 802.11a	6-24 Mbps: 24 dBm
	54 Mbps: 21 dBm
IEEE 802.11n	HT20 - MCS0: 23 dBm
	MCS15: 20 dBm
	HT40 - MCS0: 23 dBm
	MCS15: 19 dBm

- Note: bandedge exclusive (Controllable for different country regulations)

Receiver Sensitivity

IEEE 802.11a	54 Mbps: -76 dBm
IEEE 802.11n	HT20 - MCS15: -70 dBm
	HT40 - MCS15: -66 dBm

Ordering Information

EKI-6331AN	IEEE 802.11 a/n Wireless AP/Client
EKI-6331AN-EU	IEEE 802.11 a/n Wireless AP/Client (EU)

ADVANTECH | **Industrial Wireless Solutions**

EKI-6311GN

IEEE 802.11 b/g/n Wi-Fi AP/Client

Features

- Compliant with IEEE 802.11 b/g/n
- IP55 waterproof certification
- Embedded 8 dBi directional antenna with external N-type connector for optional antenna
- High output power 26 dBm
- MIMO 1 x 1 11n
- Passive 15 V PoE
- Supports distances up to 5 km
- WPA/WPA2-Enterprise encryption for a highly secure wireless network
- WEP/WPA/WPA2/ IEEE 802.1 x authentication support
- Spanning Tree and IGMP snooping protocol support

Introduction

The EKI-6311GN is a feature rich wireless AP/Client which provides a reliable wireless connectivity for industrial environments. The PoE injector enhances flexibility in deployment of this AP/Client even where the DC power supply is hard to fulfill. As an 802.11n compliant device, EKI-6311GN provides 3 times higher data rates than legacy 802.11g devices. With the support of STP, WMM and IGMP snooping protocols, EKI-6311GN effectively improves the reliability of wireless connectivity, especially in applications that need high reliability and high throughput data transmission. To secure wireless connections, EKI-6311GN implements the latest encryption technologies including WPA2/WPA/802.1x for powerful security authentication.

Specifications

Standard Support

Wireless	IEEE 802.11b/g/n
Ethernet	IEEE 802.3u MDI / MDIX 10/100 Fast Ethernet
LAN	IEEE 802.11b/g wireless LAN interface
	IEEE 802.11n wireless LAN standard
	Passive 15 V PoE, max. distance: 20 meters
Certification	US FCC Part 15 Class B & C & E
	Europe ETSI 300 328, ETSI 301 489-1&17,
	EN 60950 compliant and CE Mark
Data Rates	802.11b 11, 5.5, 2, 1 Mbps, auto-fallback,
	802.11g 54, 48, 36, 24, 18, 12, 9, 6 Mbps,
	auto-fallback
IEEE 802.11n:	6 M, 6.5 M, 13 M, 13.5 M, 19.5 M, 26 M, 27 M, 39 M,
	40.5 M, 53 M, 54 M, 58.5 M, 65 M, 78 M, 81 M,
	104 M, 108 M, 117 M, 121.5 M, 130 M, 135 M,
	150 Mbps

Physical Specifications

Power	DC 15 V / 0.8A; AC Adapter 100 V ~ 240 V
Dimensions (W x H x D)	60 x 165 x 34 mm (2.36" x 6.50" x 1.34")
Mounting	Wall, Pole
Weight	0.5 Kg

Environment

Operating Temperature	Non Heater : -20 ~ 70°C (-4 ~ 158°F)
Storage Temperature	-30 ~ 80°C (-22 ~ 176°F)
Humidity	10% ~ 95% non-condensing

Interface Operation Modes

- Access Point (AP) / Client

Antenna

- Antenna Configuration 1x1 (1 Tx, 1 Rx)
- Default embedded 8 dBi directional antenna (Vertical-Pol)
- Reserve N-type Connector (Plug) *Switchable by software
- Equipped N-to-RSMA adaptor and 5dBi dipole antenna for indoor AP applications.

Other Features

- Telnet, FTP, SNMP, Password Changes, Firmware updates, Configuration Files
- Radio on/off, WMM/Regatta Mode, Output Power Control, Fragmentation Length, Beacon Interval
- RTS/CTS threshold, DTIM Interval

Modulation Techniques

IEEE 802.11n	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
IEEE 802.11b	DSSS (DBPSK, DQPSK, CCK)
IEEE 802.11g	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)

Channel Support

IEEE 802.11b/g/gn	HT20
	FCC: CH1 ~ CH11; ETSI: CH1 ~ CH13
IEEE 802.11gn	HT40
	FCC: CH3 ~ CH9; ETSI: CH3 ~ CH11

Wireless Transmission Rates

Transmitted Power	802.11b: 26 dBm
	802.11g: 26 dBm @ 6 Mbps, 24 dBm @ 54 Mbps
	802.11gn HT20: 26 dBm @ MCS0, 22 dBm@ MCS7
	802.11gn HT40: 26 dBm @ MCS0, 21 dBm@ MCS7

Receiver Sensitivity

802.11b Sensitivity	-93 dBm @ 1 Mbps; -88 dBm @ 11 Mbps
802.11g Sensitivity	-89 dBm @ 6 Mbps; -73 dBm @ 54 Mbps
802.11n HT20	-88 dBm @ MCS0; -70 dBm @ MCS7
802.11n HT40	-84 dBm @ MCS0; -67 dBm @ MCS7

Ordering Information

EKI-6311GN	802.11 b/g/n Wireless AP/Client (US)
EKI-6311GN-EU	802.11 b/g/n Wireless AP/Client (EU)

1 WebAccess+ Solutions
2 Motion Control
3 Power & Energy Automation
4 Automation Software
5 Intelligent Operator Panel
6 Automation Panels
7 Panel PCs
8 Industrial Wireless Solutions
9 Industrial Ethernet Solutions
10 Industrial Gateway Solutions
11 Serial communication cards
12 Embedded Automation PCs
13 DIN-Rail IPCs
14 CompactPCI Systems
15 IoT Wireless I/O Modules
16 IoT Ethernet I/O Modules
17 RS-485 I/O Modules
18 Data Acquisition Boards

EKI-6310GN

IEEE 802.11 b/g/n Wi-Fi AP/Client

Features

- Compliant with IEEE802.11b/g/n
- IP66 waterproof certification
- High output power 27dBm
- Standard PoE (802.3af) support
- Supports distances up to 5Km
- Supports wireless data encryption with 64/128 bits WEP/WPA/WPA2/TKIP with IEEE 802.1X-Enterprise encryption for a highly secure wireless network
- WEP/WPA/WPA2/ IEEE 802.1 x authentication support
- Supports WPS by software

RoHS COMPLIANT 2011/65/EU CE FCC

Introduction

The EKI-6310GN is a feature rich wireless AP/Client which provides a reliable wireless connectivity for industrial environments. The standard PoE input enhances flexibility in deployment of this AP/Client even where the DC power supply is hard to fulfill. As an 802.11n compliant device, EKI-6310GN provides 3 times higher data rates than legacy 802.11g devices. EKI-6310GN, with an integrated Type N RF connector that can be directly plugged in to any antenna to create a robust outdoor AP/Client, effectively improves the reliability of wireless connectivity, especially in applications that need high reliability and high throughput data transmission. To secure wireless connections, EKI-6310GN implements the latest encryption technologies including WEP/WPA/WPA2/802.1x for powerful security authentication.

Specifications

Standard Support

- **Wireless**   IEEE802.11b/g/n
- **Ethernet**   IEEE802.3u MDI / MDIX 10/100 Fast Ethernet
- **LAN**   IEEE802.11b/g wireless LAN interface IEEE 802.11n wireless LAN standard Standard PoE 802.3af
- **Data Rates**   802.11b 11, 5.5, 2, 1 Mbps, auto-fallback, 802.11g 54, 48, 36, 24, 18, 12, 9, 6 Mbps, auto-fallback
- **802.11n**   6M, 6.5M, 13M, 13.5M, 19.5M, 26M, 27M, 39M, 40.5M, 53M, 54M, 58.5M, 65M, 78M, 81M, 104M, 108M, 117M, 121.5M, 130M, 135M, 150Mbps

Physical Specifications

- **Power**   Standard PoE 802.3af
- **Dimensions (W x H x D)** 61.7 x 206.2 x 47.7 mm (2.43" x 8.12" x 1.88")
- **Mounting**   DIN-rail, Wall, Pole
- **Weight**   0.5 Kg

Environment

- **Operating Temp.**   Non Heater: -30 ~ 70°C (-22 ~ 158°F)
- **Storage Temperature**   -30 ~ 80°C (-22 ~ 176°F)
- **Humidity**   10% ~ 95% non-condensing

Interface Operation Modes

- Access Point (AP)/Client

Antenna

- **Antenna Configuration**   1x1 (1 Tx, 1 Rx)
- Reserve N-type Connector (Plug)

*Equipped N-to-RSMA adaptor and 5dBi dipole antenna for indoor AP applications.

Other Features

- Telnet, FTP, SNMP, Password Changes, Firmware updates, Configuration Files
- Output Power Control, Bandwidth Control, Distance Adjustment, Site survey
- Open System , Shared Key, Radius 802.1X , WPA, WPA2, WPA-PSK (TKIP)

Modulation Techniques

- **802.11n**   OFDM(BPSK, QPSK, 16-QAM, 64-QAM)
- **802.11b**   DSSS (DBPSK, DQPSK, CCK)
- **802.11g**   OFDM (BPSK, QPSK, 16-QAM, 64-QAM)

Channel Support

- **802.11b/g/gn**   HT20
      FCC: CH1 ~ CH11; ETSI: CH1 ~ CH13
- **802.11gn**   HT40
      FCC: CH3 ~ CH9; ETSI: CH3 ~ CH11

Wireless Transmission Rates

- **Transmitted Power**   Max. 27 dBm

Receiver Sensitivity

- **802.11b Sensitivity**   -95dBm @ 11Mbps
- **802.11g Sensitivity**   -92dBm @ 54Mbps
- **802.11n Sensitivity**   -90dBm @ HT20

Ordering Information

- **EKI-6310GN**   802.11 b/g/n Wireless AP/Client (US)
- **EKI-6310GN-EU**   802.11 b/g/n Wireless AP/Client (EU)

Accessories

1 WebAccess+ Solutions
2 Motion Control
3 Power & Energy Automation
4 Automation Software
5 Intelligent Operator Panel
6 Automation Panels
7 Panel PCs
8 Industrial Wireless Solutions
9 Industrial Ethernet Solutions
10 Industrial Gateway Solutions
11 Serial communication cards
12 Embedded Automation PCs
13 DIN-Rail IPCs
14 CompactPCI Systems
15 IoT Wireless I/O Modules
16 IoT Ethernet I/O Modules
17 RS-485 I/O Modules
18 Data Acquisition Boards

Advantech P/N	ANT-1208-G2E	ANT-2209-G2E	ANT-2216-G2E	ANT-3215-G2E	ANT-1208-G5E	ANT-2218-G5E	ANT-3213-G5E
Frequency Range	2.4-2.5G	2.4-2.5G	2.4-2.5G	2.3-2.7G	4.9-5.35G	4.9-5.9G	4.9-5.9G
Antenna Type	Omni	Patch	Patch	Sector	Omni	Patch	Sector
Antenna Gain	8 dBi	9.5 dBi	16 dBi	15 dBi	8 dBi	18 dBi	13.5 dBi
Description	8 dBi 2.4G Omni Antennna	9.5 dBi 2.4G Patch Antenna	16 dBi 2.4G Patch Antenna	15 dBi 2.4G Sector Antenna	8dBi 5G Omni Antennna	18 dBi 5G Patch Antenna	13.5 dBi 5G Sector Antenna
Impedance	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm
Polarization	Linear, vertical	Linear, vertical	Linear, vertical	Linear, vertical	Linear, vertical	Linear, vertical	Linear, vertical
HPBW/Vertical	360/15	50/50	25/25	90/8	360/12	23/19	120/6
V.S.W.R.	2.0:1 (Max.)	1.5:1 (Max.)	1.5:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)
Power Handling	20 W (cw)	20 W (cw)	20 W (cw)	50 W (cw)	20 W (cw)	5 W (cw)	10 W (cw)
Connector	N-Jack	N-Jack	N-Jack	N-Jack	N-Jack	N-Jack	N-Jack
Operating Temp.	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80
IP Rating	IP55	N/A	IP57	IP55	IP55	IP55	IP55
Weight	0.34 kg	0.14 kg	1.5 kg	1 kg	0.28 kg	0.825 kg	0.55 kg

Advantech P/N	ANT-1205D-G25E	ANT-1210D-G25E	ANT-2215D-G25E	ANT-3215D-G25E	ANT-2216M-G2E	ANT-2216M-G5E	ANT-3214M-G2E	ANT-3215M-G5E
Frequency Range	2.4-5G; 5.1-5.9G	2.4-5G; 5.1-5.9G	2.4-5G; 5.1-5.9G	2.4-5G; 4.9-5.9G	2.3-2.7GHz	5.1-5.9G	2.4-2.5G	5.1-5.9G
Antenna Type	Omni	Omni	Patch	Sector	Patch	Patch	Sector	Sector
Antenna Gain	4/7 dBi	8/10 dBi	13.5/15.5 dBi	12/15 dBi	16 dBi	16 dBi	14 dBi	15 dBi
Description	4/7dBi Dual-Band Omni Antennna	8/10dBi Dual-Band Omni Antennna	13.5/15.5dBi Dual-Band Patch Antenna	12/15dBi Dual-Band Sector Antennna	16dBi 2.4G MIMO Patch Antennna	16dBi 5G MIMO Patch Antennna	14dBi 2.4G MIMO Sector Antennna	15dBi 5G MIMO Sector Antennna
Impedance	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm	50 Ohm
Polarization	Linear, vertical	Linear, vertical	Linear, vertical	Linear, vertical	Linear, vertical/ horizontal	Linear, vertical	Linear, vertical	Linear, vertical
HPBW/Vertical	360/30	360/13	30/30	70/18	25/25	19/21	90/13	90/8
V.S.W.R.	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)	2.0:1 (Max.)
Power Handling	2 W (cw)	5 W (cw)	10 W (cw)	10 W (cw)	6 W (cw)	6 W (cw)	10 W (cw)	6 W (cw)
Connector	N-Plug	N-Jack	N-Jack	N-Jack	N-Jack	N-Jack	N-Jack	N-Jack
Operating Temp.	-40 to +70	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80	-40 to +80
IP Rating	N/A	IP67	IP55	IP55	IP67	IP55	IP55	IP55
Weight	0.07 kg	0.394 kg	0.4 kg	0.462 kg	1.1 kg	0.8 kg	0.8 kg	1.4 kg

Advantech P/N	ANT-5115-AE	ANT-5130-AE	ANT-5210-AE	ANT-5230-AE	ANT-5260-AE	ANT-5290-AE
Description	1.5M N-Plug to SMA-Plug cable	3M N-Plug to SMA-Plug cable	1M N-Plug to N-Plug cable	3M N-Plug to N-Plug cable	6M N-Plug to N-Plug cable	9M N-Plug to N-Plug cable
Cable Type	ULA-168	ULA-168	ULA400	ULA400	ULA400	ULA400
VSWR	1.5 : 1 Max.@ DC ~ 3.0 GHz 2.0 : 1 Max.@ 3.0 ~ 6.0 GHz	1.5 : 1 Max.@ DC ~ 3.0 GHz 2.0 : 1 Max.@ 3.0 ~ 6.0 GHz	1.5 : 1 Max.@ DC ~ 6.0 GHz	1.5 : 1 Max.@ DC ~ 6.0 GHz	1.5 : 1 Max.@ DC ~ 6.0 GHz	1.5 : 1 Max.@ DC ~ 6.0 GHz
Insertion Loss	2.0 dB Max.@ DC ~ 3.0 GHz 2.5 dB Max.@ 3.0 ~ 6.0 GHz	3.5 dB Max.@ DC ~ 3.0 GHz 4 dB Max.@ 3.0 ~ 6.0 GHz	0.7 dB Max.@ DC ~ 3 GHz 1.0 dB Max.@ 3 ~ 6.0 GHz	1.1 dB Max.@ DC ~ 3 GHz 1.6 dB Max.@ 3 ~ 6.0 GHz	1.8 dB Max.@ DC ~ 3 GHz 2.7 dB Max.@ 3 ~ 6.0 GHz	3.0 dB (Max.) @ DC ~ 3 GHz 4.0 dB (Max.) @ 3 ~ 6 GHz
Connector Type	N-plug to RP SMA-plug	N-plug to RP SMA-plug	N-plug to N-plug	N-plug to N-plug	N-plug to N-plug	N-plug to N-plug
Cable Length	1.5M	3M	1M	3M	6M	9M

Advantech P/N	ANT-5501-AE	ANT-5502-AE	ANT-5601-AE
Description	1KV Aurge Arrestor N-Jack to N-Jack	1KV Aurge Arrestor N-Plug to N-Jack	Bulkhead adapter N-Jack to N-Jack
Surge Protection	1KV	1KV	N/A
VSWR	1.25: 1 Max @ DC ~ 4GHz 1.45: 1 Max @ 4 ~ 6GHz	1.3: 1 Max @ DC ~ 4GHz 1.5: 1 Max @ 4 ~ 6GHz	1.2: 1 Max @ DC ~ 3GHz 1.4: 1 Max @ 3 ~ 6GHz
Insertion Loss	0.8 dB	0.8 dB	N/A
Connector Type	N Jack to N Jack	N plug to N Jack	N-jack to N-jack