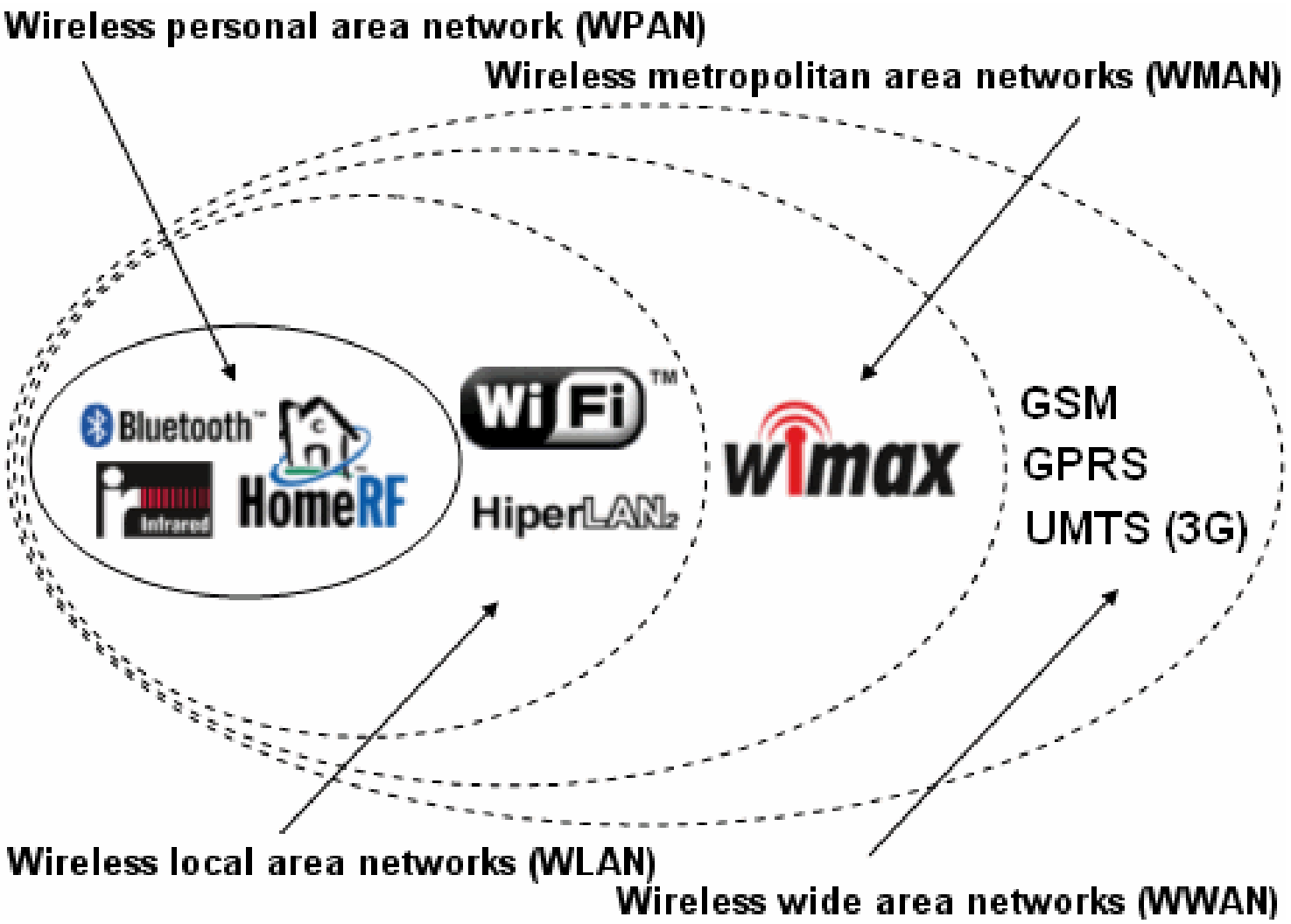
# Industrial Wireless Training Kit

# Global Wireless Standards



# IoT Focused Segments

**Intelligent**

Server group
Operation, induction, comparison, analysis

Information Sharing

**Interconnected**

2G, 3G, 4G

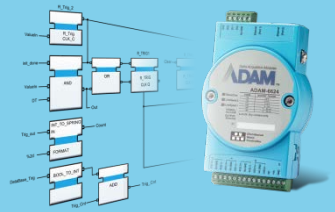
Wi-Fi

Infrastructure & Gateway

**Instrumented**

Remote I/O

Distributed Controller



WSN

Sensors, Pressure, Velocity, Temperature, Image

# Industrial Wireless LAN Product Offering

Dual band

Single band

## Multiple Function Mesh AP/CPE

EKI-6351

EKI-6340-1

EKI-6340-2

EKI-6340-3

## Entry Level AP/CPE

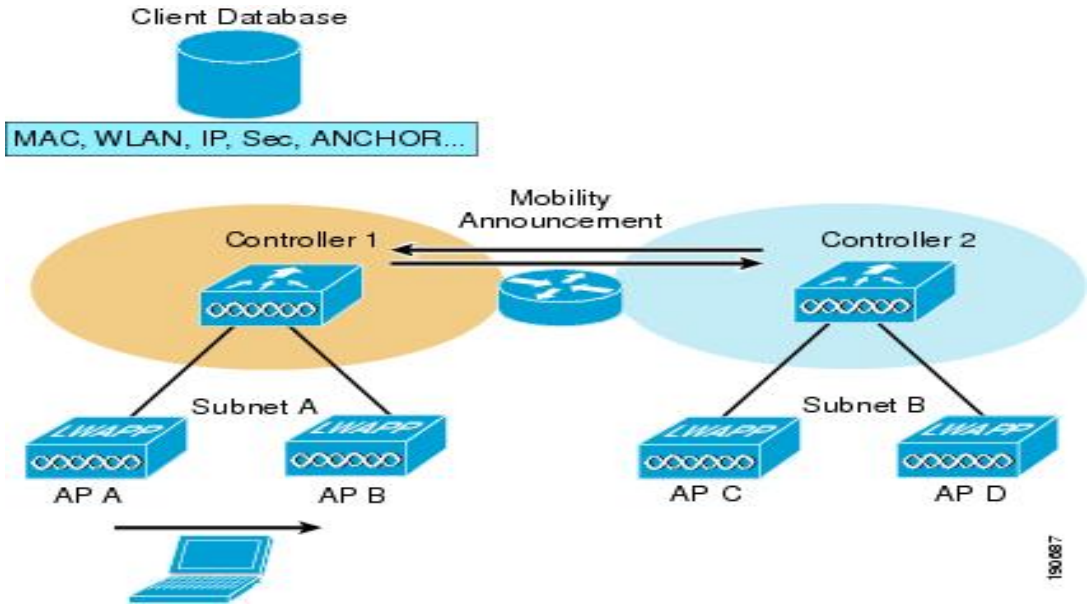
EKI-6311GN

EKI-6331AN

Single radio | Dual radio | Triple radio

# Entry-Level AP/CPE
# EKI-6311GN & EKI-6331AN

# Types of WLAN Architecture



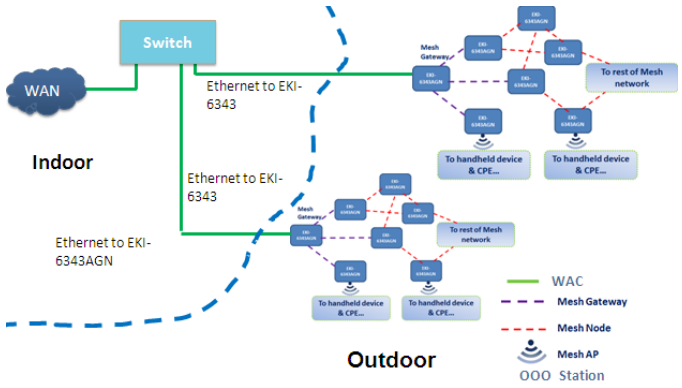

- Infrastructure mode follows Wi-Fi protocol
- Major for simple WLAN App.

**Wi-Fi AP/CPE**

**EKI-6311GN & 6331AN**

**WMN Solution**

- Wireless Mesh Network mode follows Wi-Fi & proprietary protocols
- Target industrial & outdoor users



# 802.11n MIMO Technology


*Figure 1. Single Input Single Output (SISO) radio channel access mode*

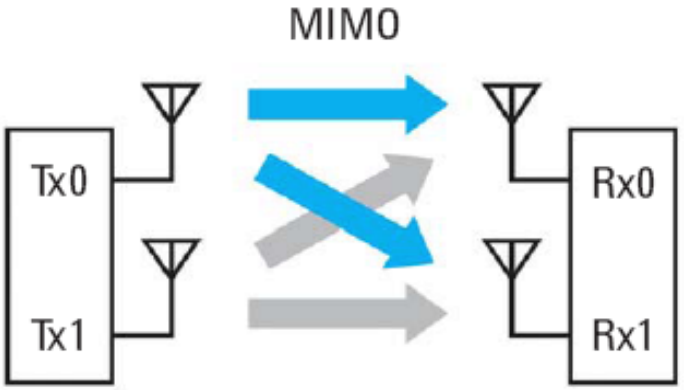



*Figure 4. MIMO with two transmitters and two receivers with independent data content*

**MIMO (Multiple Input Multiple Output ) Benefit**

- **More transmission paths in Tx.**
  - **Hundreds of Mb/s in transmission.**
- **More receiving paths in Rx.**
  - **Greater reliability in received quality.**
  - **Slighter RF interference impact**

# Advantech Wi-Fi AP/CPE Offering

802.11b/g/n,
w/MIMO 1X1
EKI-6311GN

802.11a/n,
w/ MIMO 2X2
EKI-6331AN

| Rugged Design |
| --- |
| • IP-55 rating housing<br>• Embedded directional antenna<br>• Operation temp: -20°C ~ 70°C |

| Rugged Design |
| --- |
| • IP-55 rating housing<br>• Embedded directional antenna<br>• Operation temp: -20°C ~ 70°C |

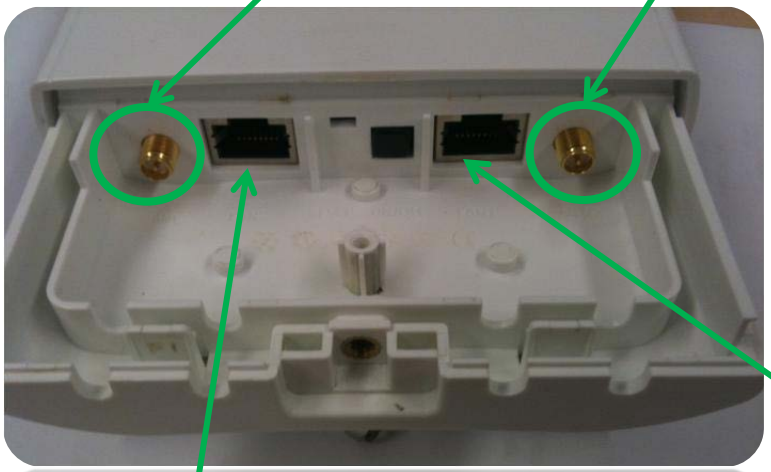
# EKI-6331AN Product Introduction

- Supports IEEE802.11a/n wireless standards
  - **High throughput rate: 3 times higher than 11a**
  - **Up to 80Mbps TCP/IP throughput rate**
  - Prevent RF interference from 2.4Ghz
- Built-in MIMO 2x2 to enhance the wireless communication quality
- **Supports up to 10Km with distances with embedded 16dBi directional antenna**
- IP-55 protection grade
- Wide operating temperature range: -20~70°C
- External R-SMA connector for an optional antenna

- WEP/WPA/WPA2 Enterprise/ IEEE 802.1 x authentication security support

# EKI-6331AN Product Introduction

External R-SMA connectors
for optional antennas



Passive 15V PoE Input

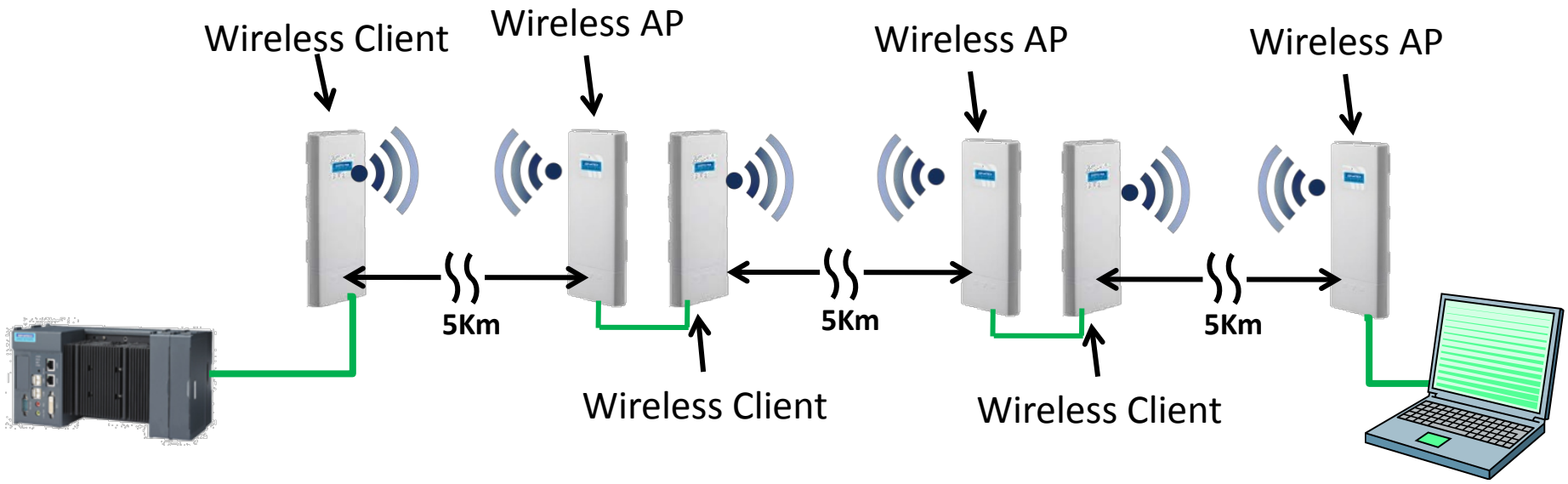
Passive 15V PoE output support
- Connects to EKI-6311GN or IP Camera

# EKI-6311GN Product Introduction

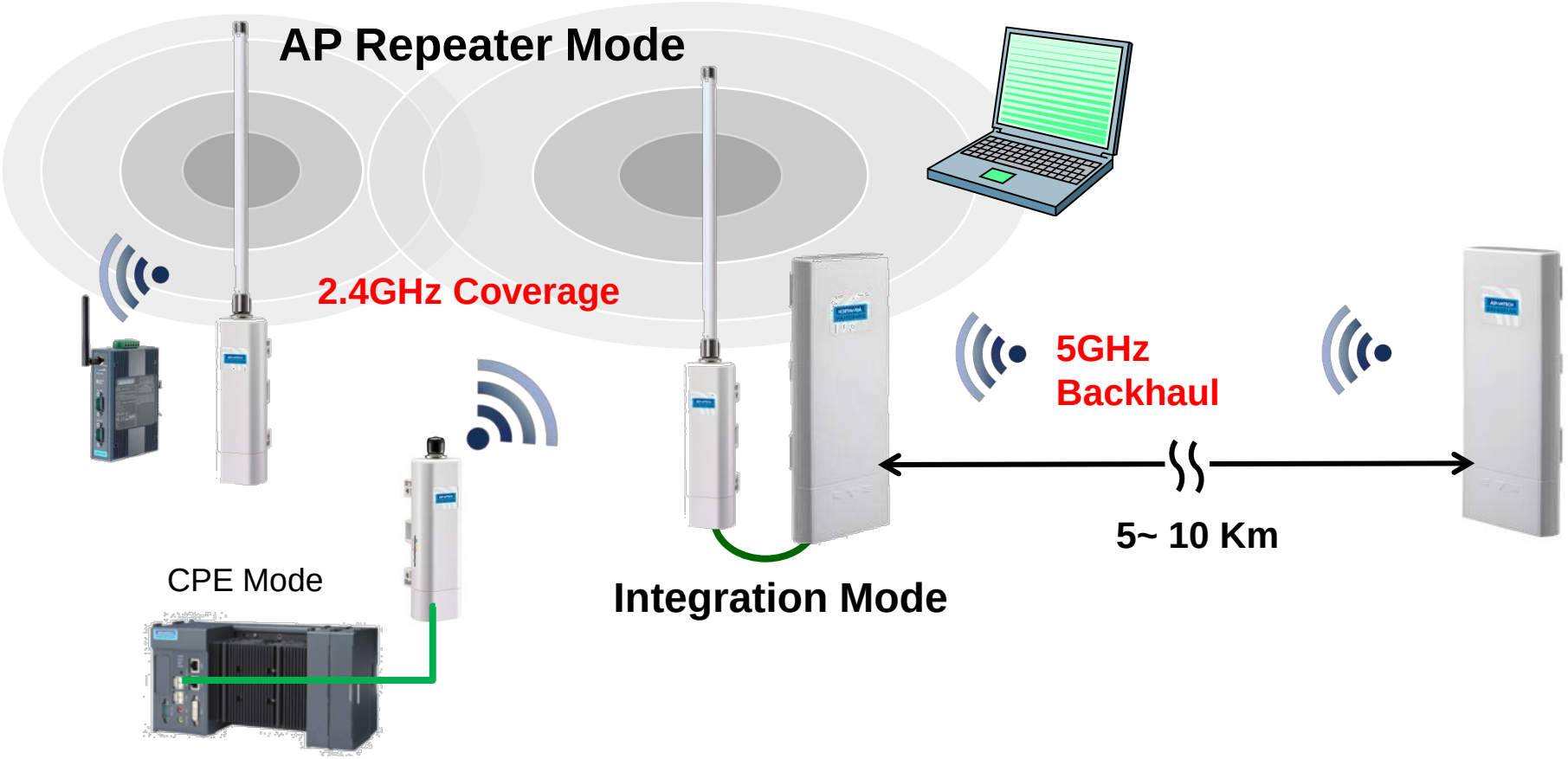
- External N-Type connector for an optional antenna
- Supports IEEE802.11 b/g/n wireless standards
  - **Higher throughput rate 3 times higher than 11g**
  - **Up to 80Mbps TCP/IP throughput rate**
- **Supports up to 10Km with distances with embedded 8 dBi directional antenna**
- **Attached with 5 dBi Omni antenna**
- IP-55 protection grade
- Wide operating temperature: -20~70°C
- WEP/WPA/WPA2 Enterprise / IEEE 802.1 x authentication security support

# Daisy Chain- Extending Coverage Range

**Features: Flexible operating mode in Multi-mode in AP, Client, WDS, Repeater**



# Integration Mode- Backhaul + Coverage




- EKI-6311GN, EKI-6331AN could also seamlessly work together to provide excellent 11n performance for middle-range backhaul + coverage solution.

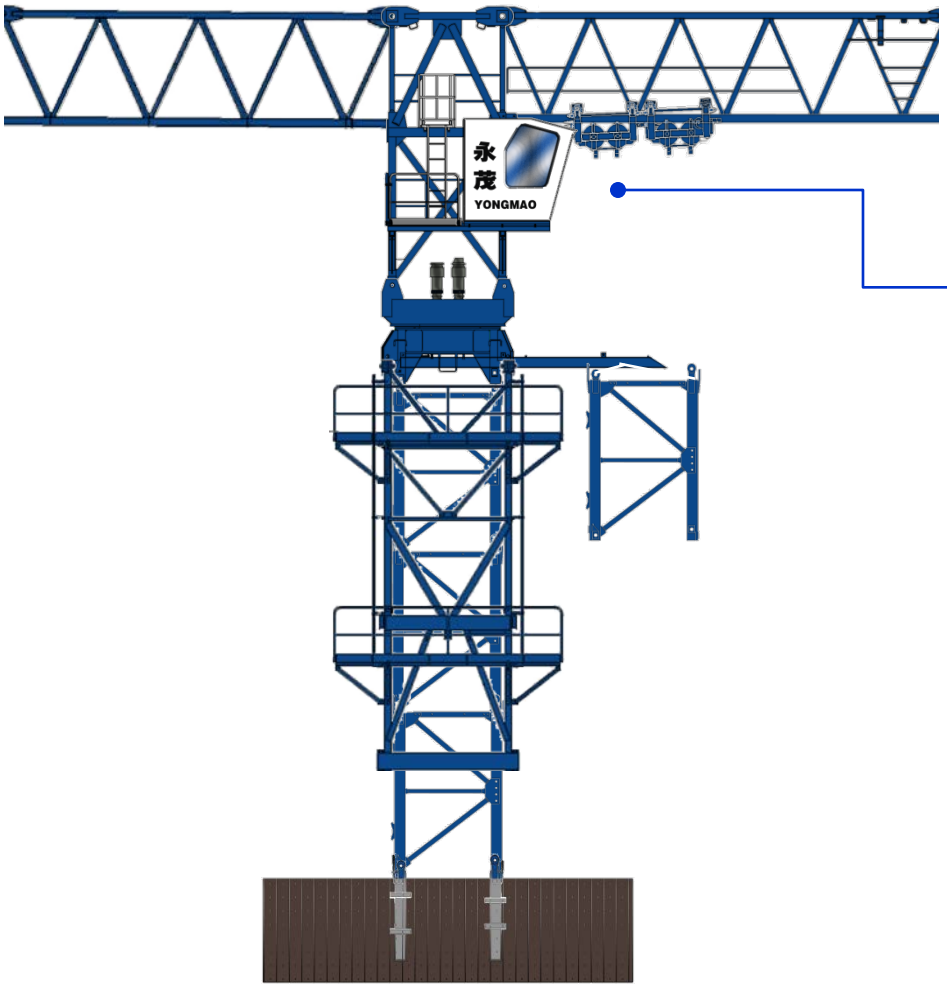
# Application(1): Man-less Factory Monitoring


- ✓ Ease of installation
- ✓ High Throughput

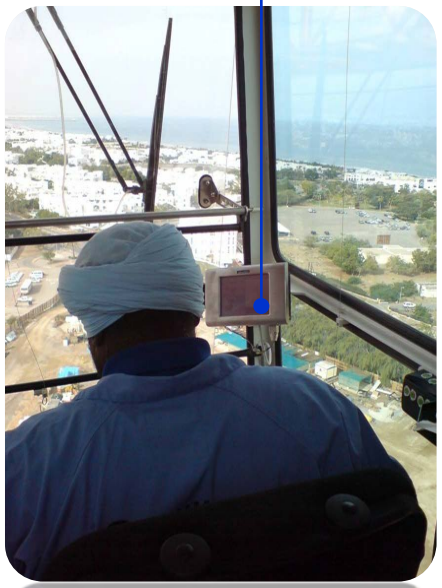
- Factory Area monitor
- Wireless Data transmission

# Application(2): Coal Mining in China

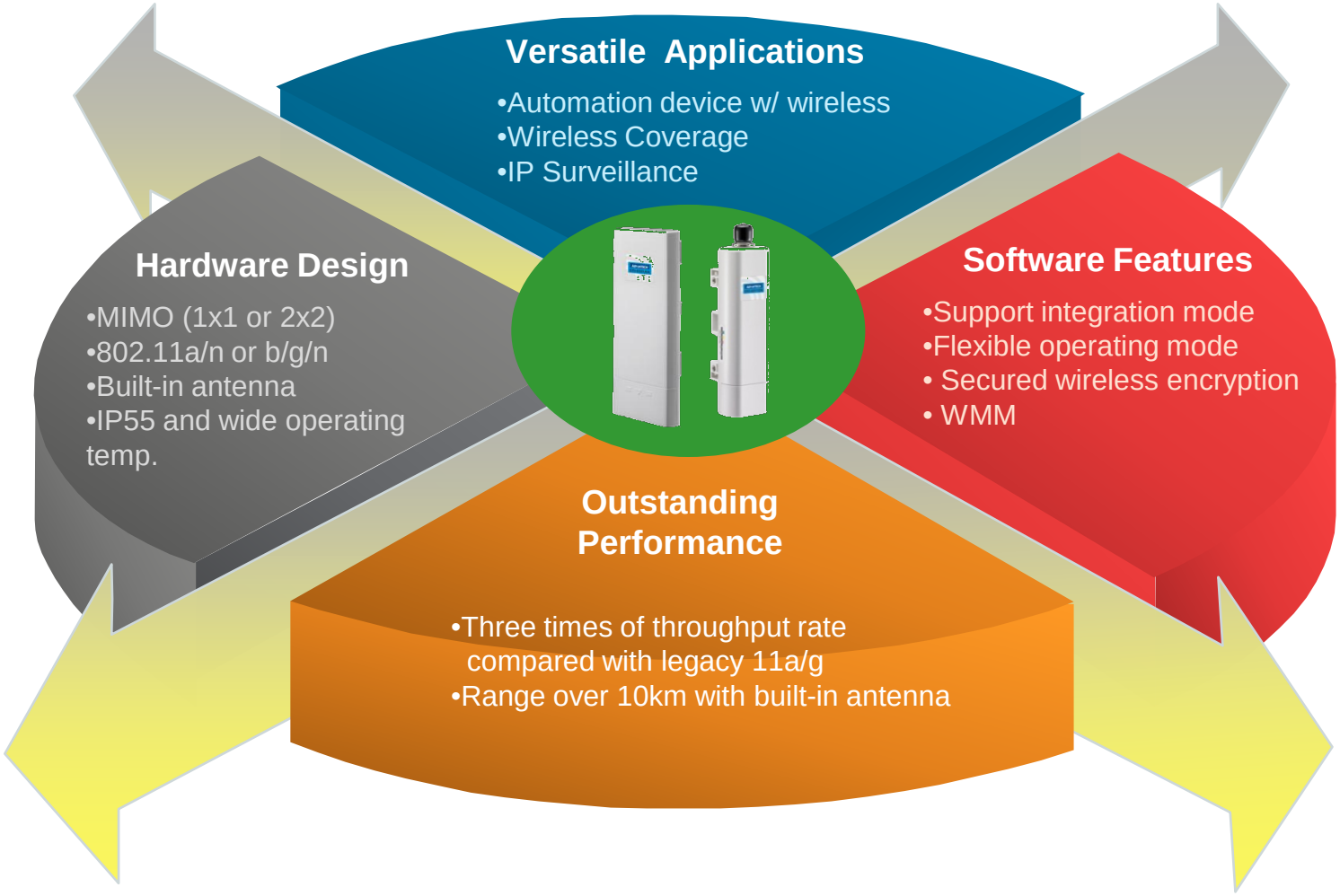
# Application(3): P-2-P for Crane Anti-Collision




**EKI-6331AN**
802.11n Wireless AP

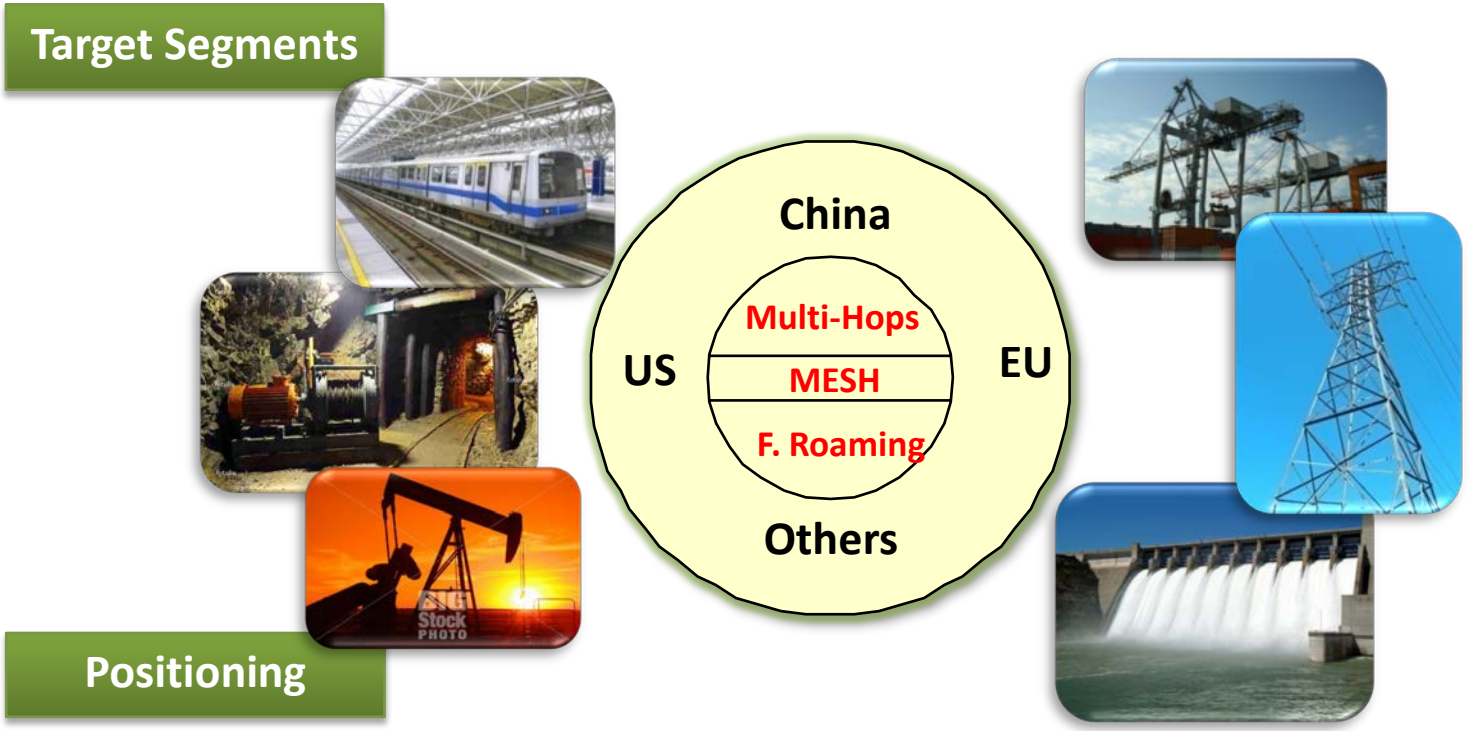


# EKI-6331AN/ 6311GN Key Selling Points



# EKI-6340
# Industrial Wireless Mesh AP

# TA Segments & Product positioning




EKI-6340 & EKI-6351 are the Industrial Wireless MESH System
providing quick and reliable deployment and seamless wireless data communication to free customer from concerns on communication loss

# Offered Values by EKI-6340 Series

| | Features | Performance |
|---|---|---|
| Functional Perspective | IEEE 802.11n+MIMO | 300Mbps data rate |
| | Network Auto-healing | Self-healing |
| | Multi-hopping | Throughput ≥100 Mbps @ 10 hops |
| | Fast roaming | Handover switching time ≤20ms |
| | Security | WPA, WPA2-PSK/ EAP, 802.11i |
| Usage Perspective | Graphical “Ping” Utility | Graphical on-line tool |
| | RSSI Calculator | Graphical antenna gain calculation tool |
| | Fresnel Zone Calculator | Graphical antenna & device installation guiding tool |
| | Antenna Alignment Tool | |

# Target Markets for Wireless Mesh AP


- Automated Guided Vehicles

- Docks

- Open coal mines

# EKI-6340 Series

## Outdoor Wireless Mesh AP

EKI-6340-1

EKI-6340-2

EKI-6340-3








**EKI-6341**
**EKI-6342**
**EKI-6343**

- -Mesh (Self-forming & Self-healing)
- - Multi-hopping w/high throughput
- - Ultra fast roaming
- - MIMO 2x2
- -35~75℃
- - 12~48$V_{DC}$ / PoE Supply
- - High security
- -IP67 protection

# EKI-6351

## Wireless Mesh AP/ Station

EKI-6351

## EKI-6351

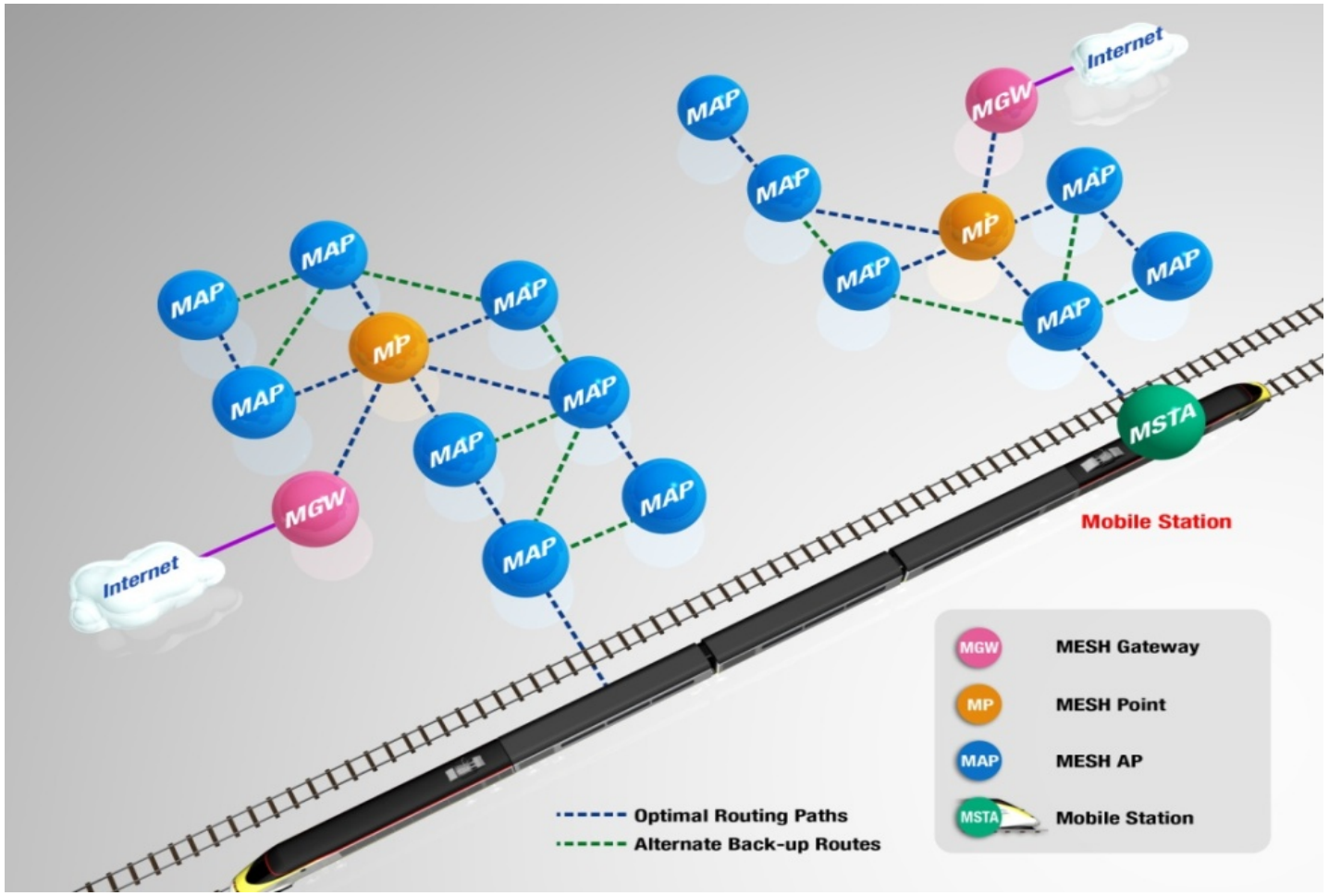
- Mesh (Self-forming & Self-healing)
- Ultra fast roaming
- IP30 protection
- -35℃~ 75℃
- Support 12-48$V_{DC}$
- Support 802.3at PoE
- Dual-band (2.4GHz/5GHz)
- MIMO 2x2

# Position of Each Model in System

| EKI-6340-1 | EKI-6340-2 | EKI-6340-3 | EKI-6351 |
|---|---|---|---|
|  |  |  |  |
| **Fast roaming AP**<br><br>-road side with fiber cables installed | **Multi-Hopping App.**<br><br>-Extend wireless signal coverage along river, railroad, highway or inside tunnel | **Mesh Points or Multi-Hopping App.**<br>-Community, campus, park or factory side<br>-As backhaul for road side without fiber cables installed | **Mesh Station**<br><br>-Indoor client station |

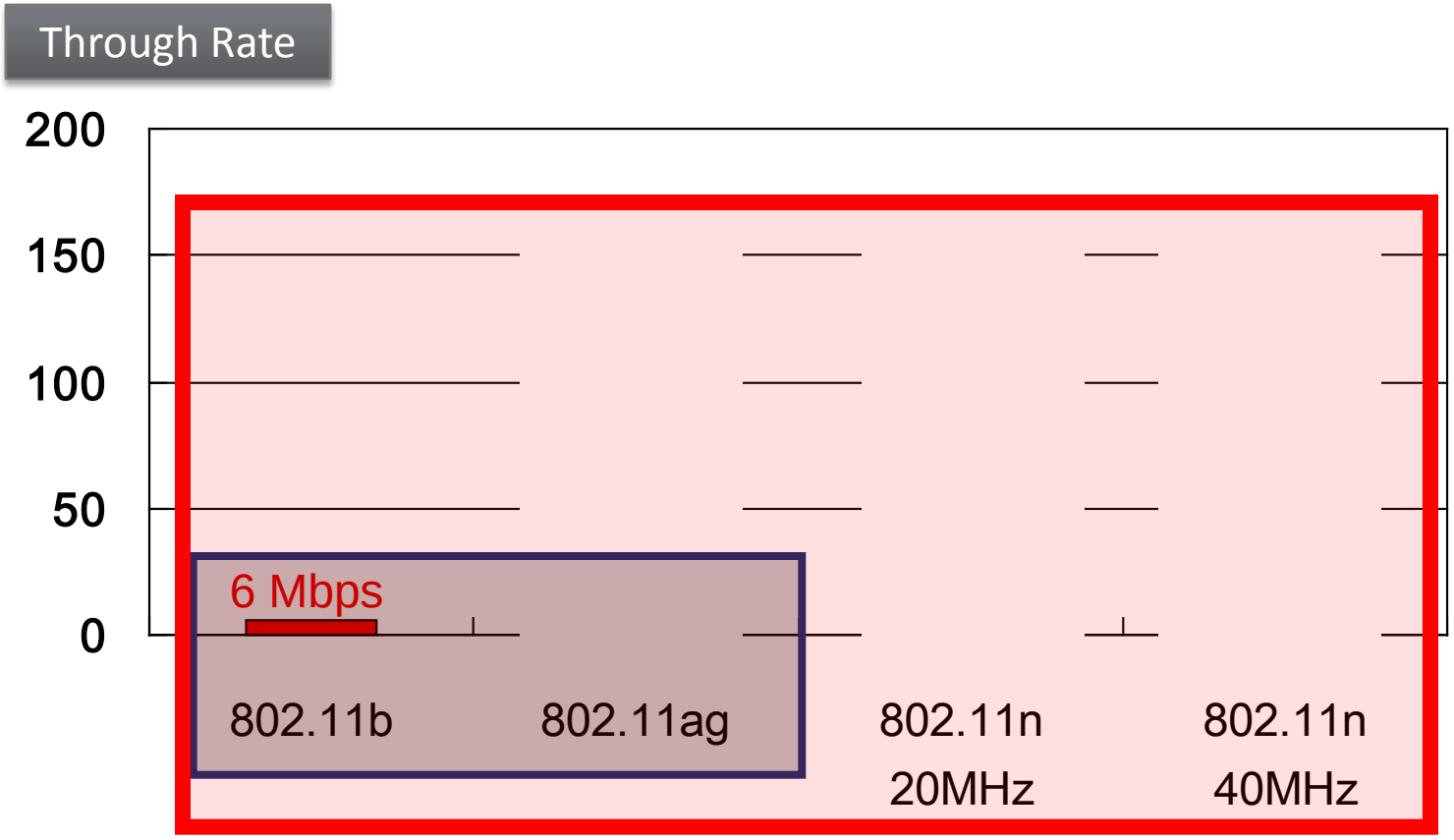
# Wireless MESH Network Structure

## Reliable Network & Ultra Fast Roaming



# IEEE 802.11n

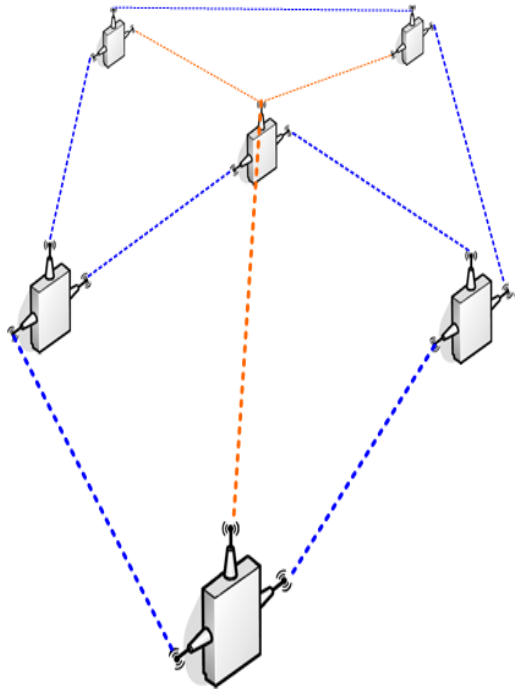
## Significant Throughput Improvement




- 802.11n performances are based on 2 Spatial Steams
- 802.11n 2X2 throughput is around 170 Mbps (Data rate: 300M bps)
- 802.11 a/g is around 27 Mbps (Data rate: 54M bps)

# Self-Forming & Healing Algorithm

- The self-healing and route choosing algorithms is following the calculation of number of hops and radio signal quality.
- Each wireless connection in a wireless mesh network will have a "*path score*" to represent the signal quality between nodes.
- A *path score* calculation includes RSSI , noise level and bandwidth flow information.
- A number of hops from source to destination will be minor consideration in routing algorithm.



# Fast-roaming Algorithm

- Fast roaming is the unique feature of Mesh Station (EKI-6351, not regular Wi-Fi clients )
- Mesh APs are set to periodically & proactively broadcast info. to nearby Mesh Stations.
- The Mesh Stations those who are under the coverage of Mesh APs can periodically generate a list of "*path score*" .
- Once a new "*path score*" is generated and it's better than the "*path score*" of current link, the Mesh Station will handover to another Mesh AP right away without going the procedure of authentication & association.
- The reason that Mesh Station doesn't need to process the authentication & association at the occasion of each handover because those two steps were done already as the Mesh Station joined this Mesh System by processing the registration.

# Reference against Competitors

| | Brand | Advantech | Motorola | Motorola | Cisco | Moxa |
|---|---|---|---|---|---|---|
| | Model | EKI-6340-3 | AP 7161 | AP 5181 | Aaironet 1552E | AWK-4131 |
| | Photo |  |  |  |  |  |
| **Wireless** | **Wi-Fi** | **802.11 a/b/g/n** | **802.11 a/b/g/n** | **802.11 a/b/g** | **802.11 a/b/g/n** | **802.11 a/b/g/n** |
| | **Freq.** | **2.4/ 5 Ghz** | **2.4/ 5 Ghz** | **2.4/ 5 Ghz** | **2.4/ 5 Ghz** | **2.4/ 5 Ghz** |
| | **MIMO** | **2X2** | **3x3** | **SISO** | **2x3** | **2x2** |
| | **Radio #** | **3** | **2** | **2** | **2** | **1** |
| Ethernet | Port # | 1 | 1 | 1 | 1 | 1 |
| | Speed | 10/100/1000 | ? | 10/100 | 10/100/1000 | 10/100/1000 |
| | Fiber | n/a | | | Fiber SFP | 1000 baseSFP |
| **Operation** | **MESH** | **Y** | **Y** | **Y** | **Y** | **n/a** |
| | **Fast roaming** | **< 20 ms** | **?** | **?** | **?** | **Controller-based** |
| | **Muti-hopping** | **Y** | **?** | **?** | **?** | **?** |
| | **AP/CPE** | **Y** | **Y** | **Y** | **Y** | **Y** |
| Power | PoE | 802.3at | 802.3at | 802.3af | 802.3af | 802.3af |
| | Input voltage | 12~48 Vdc | 36~57Vdc | 48dc | 12 Vdc | 12~48 Vdc |
| | Redudant DC power input | Y | ? | ? | ? | Y |
| Reliability | IP rating | 67 | 67 | 56 | 67 | 68 |
| Temperature | Operation | -35~75 | -40~70 | -30~55 | -40 to 55°C | -40 to 75°C |
| Warranty | | 5 yrs | 1 yr | 1 yr | 90 days | 5 yrs |

# Target Application & Industries

| App. Industry | Selling Points |
|---|---|
| Oil field  video monitoring | Multi-hopping and high throughput rate |
| Driving school exam. system | High throughput rate, fast roaming |
| Off-shore video monitoring | Mesh( self-forming & self-healing) |
| Harbor container management | Mesh & high throughput rate |
| Electric power tower video monitoring | Multi-hopping and high throughput rat |
| Factory site video monitoring | Multi-hopping and high throughput rate |

# Oil Field Application

**Fully meet application requirements:**

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**Multi-hopping**

- Throughput≥150 Mbps @ 2 hops
- Throughput ≥100 Mbps @ 10 hops

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**Mesh Network**

- Self-healing

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**Anti-harsh environment**

- IP67 (EKI-6340)
- IP30 (EKI-6351)
- Working temp.: -35~75℃

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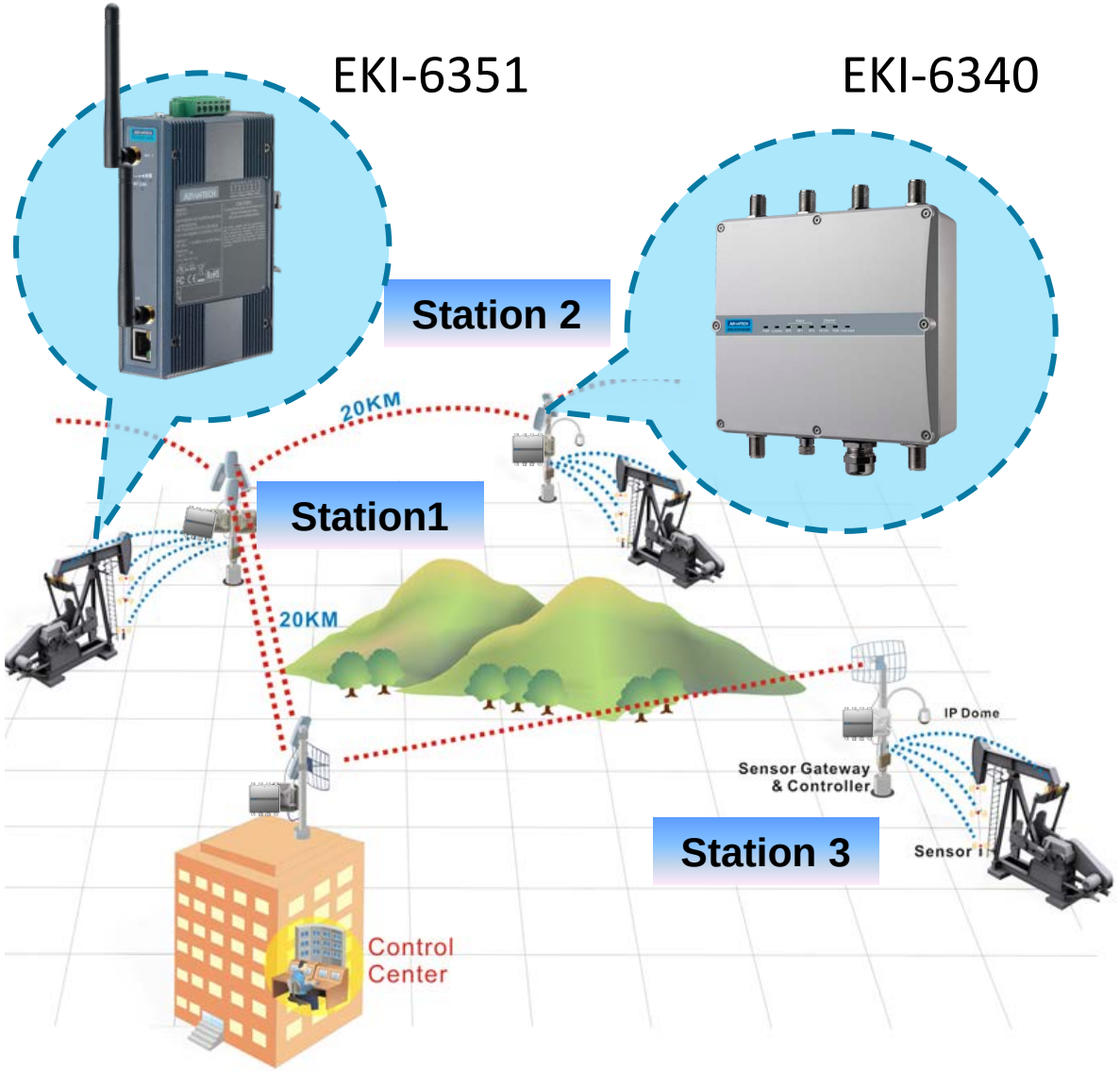

# Open Cut Coal Mine

**Fully met application requirements:**

---

**Multi-hopping**

- Throughput ≥150 Mbps @ 2 hops
- Throughput ≥100 Mbps @ 10 hops

---

**Mesh Network**

- Self-healing

---

**Works in harsh environments**

- IP67 (EKI-6340)
- IP30 (EKI-6351)
- Working temp.: -35~75℃

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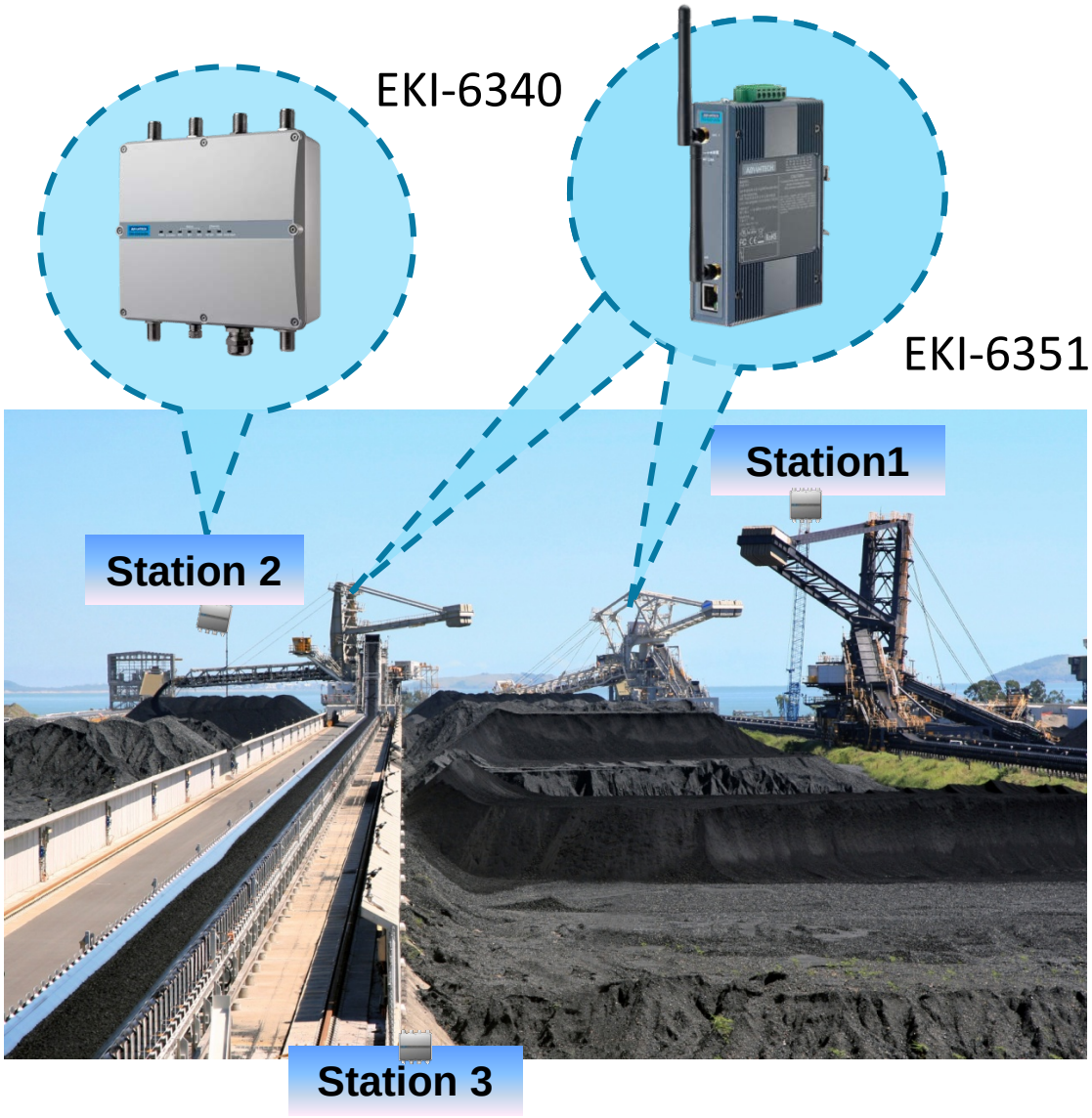


# Transportation Application

**Fully meet application requirements:**

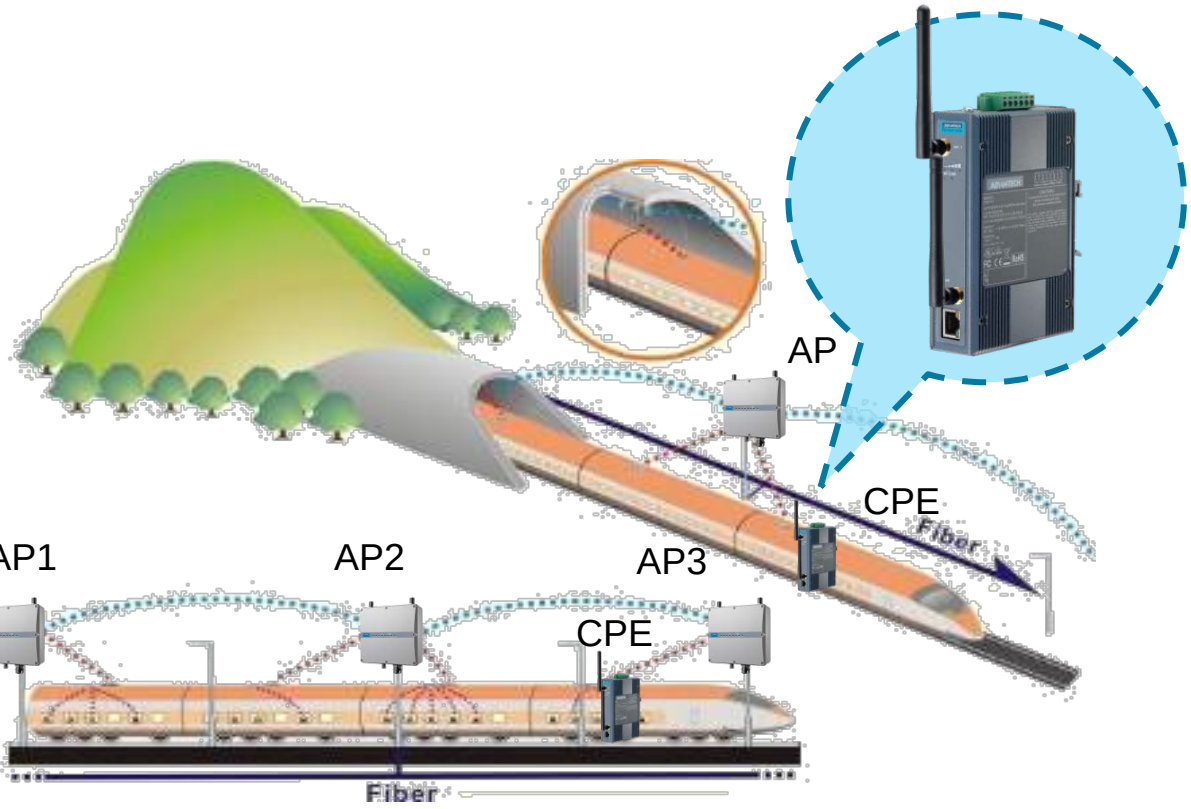
**Fast roaming:** ≤20ms

**High throughput:** ≥ 100Mbps

**Anti-harsh environment**

- IP67 (EKI-6340)
- IP30 (EKI-6351)
- Working temp.: -35~75℃

EKI-6351

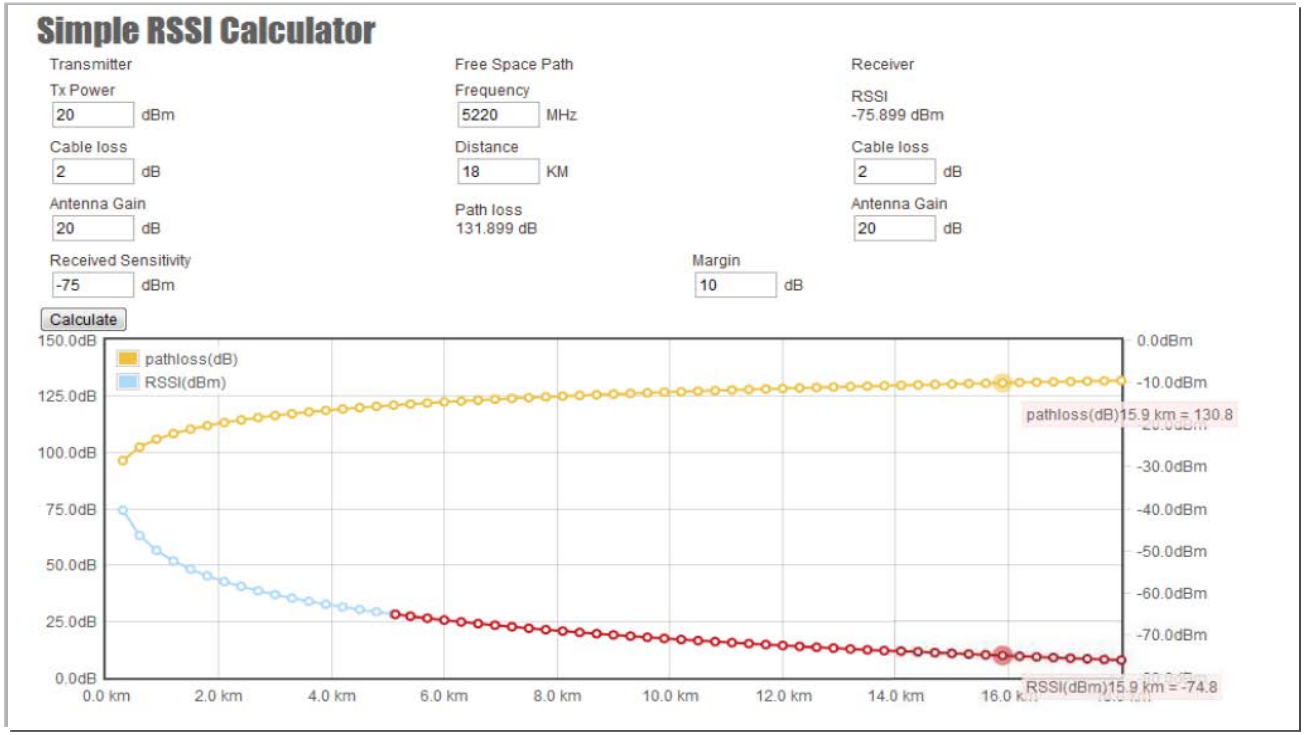



EKI-6340

# Valuable Tools for Installation & Antenna / Accessory Kits

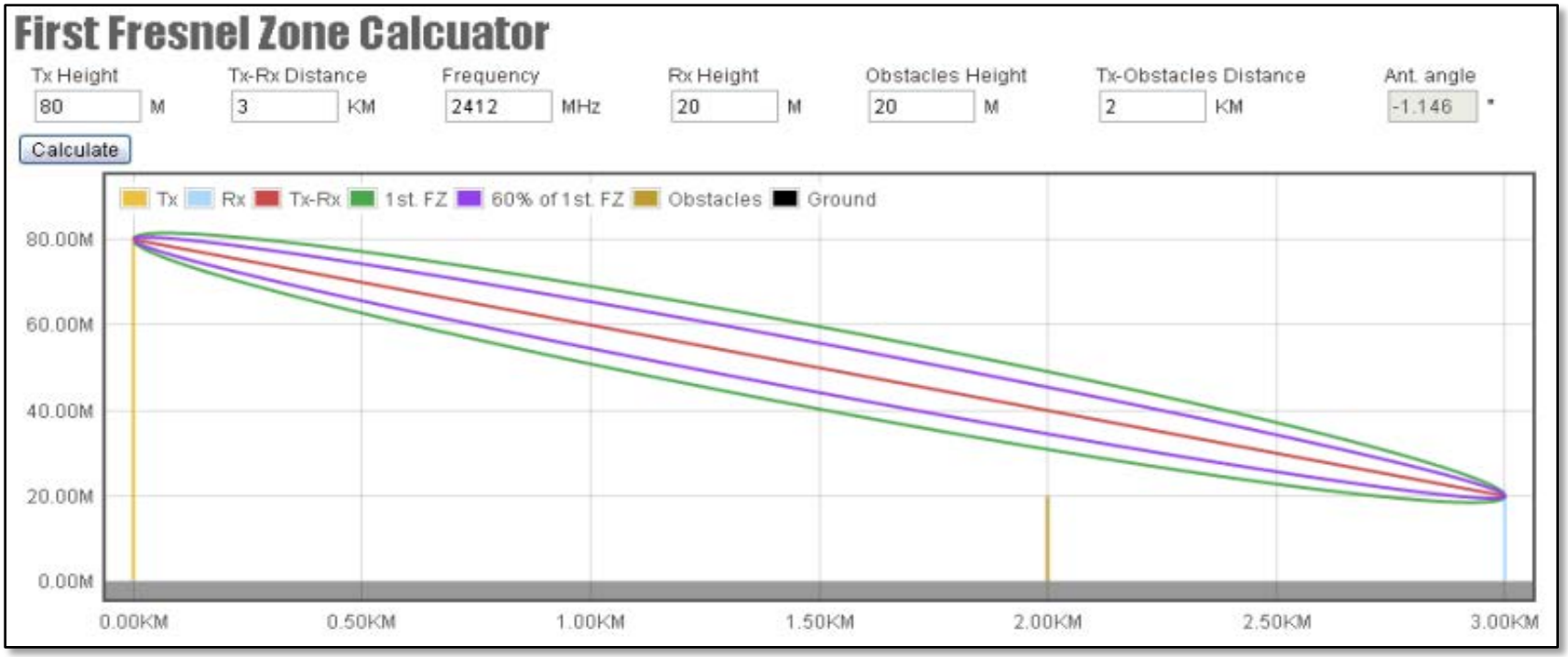
# RSSI Calculator

RSSI(Received Signal Strength Indication)



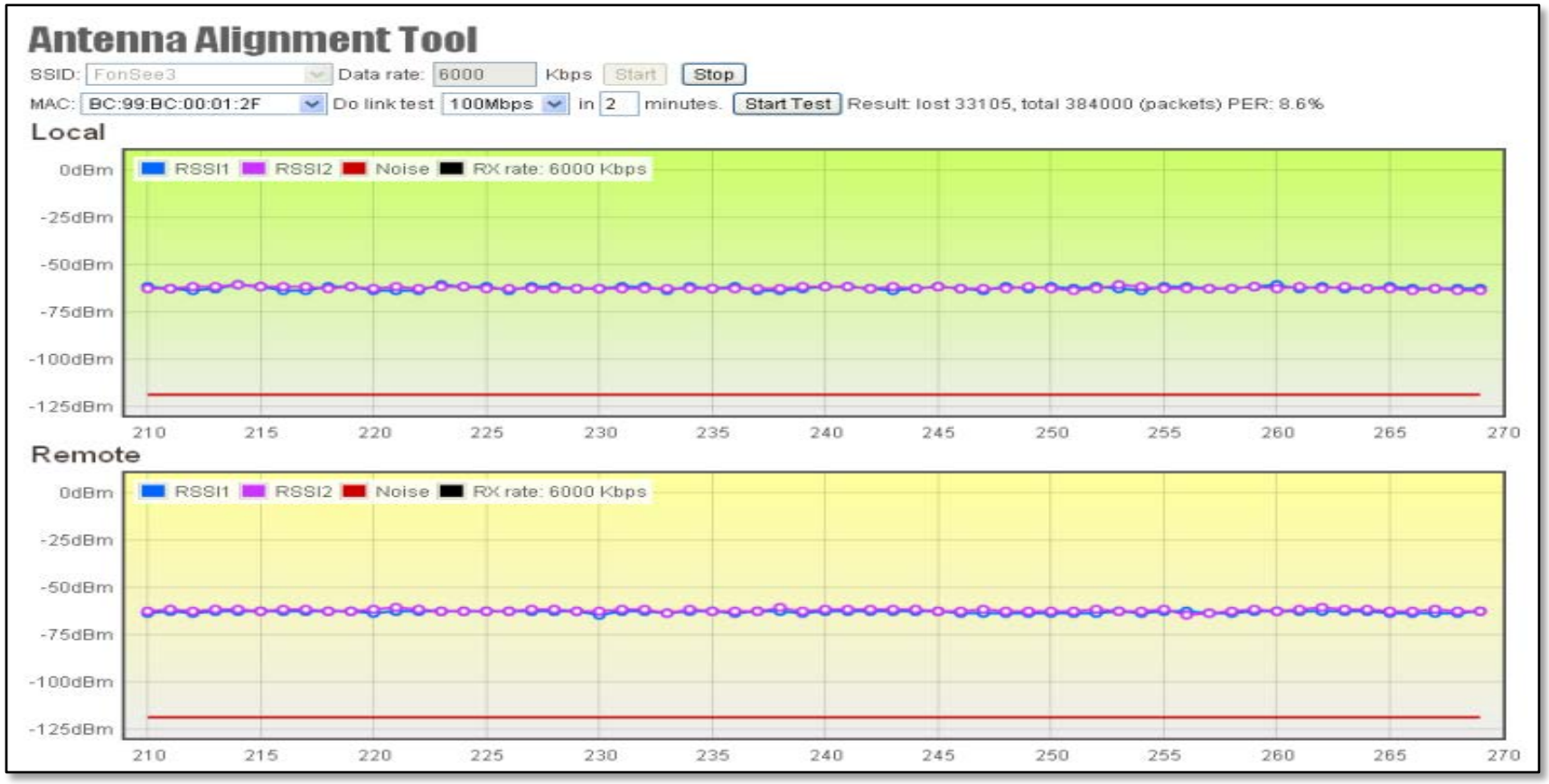

1. Simple RSSI Calculator estimate likely RSSI & path loss
2. Help evaluate selected cable loss & antenna gain by inputting device Tx power and frequency on transmitting and receiving side.
3. Graphically display changes of path loss and RSSI.

# Fresnel Zone Calculator




1. The Calculator can estimate the likely obstruction from existing object between two devices
2. The calculator of ***antenna angle*** calculation can help align the vertical angle of the directional antenna.

# Antenna Alignment Tool




1. The tool aligns and checks the antenna directions.
2. Graphically present RSSI changes in figure help adjust the directional antenna's horizontal and vertical angle to get the best RSSI level.

# Antenna, Normal function







| 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 | 2.4-2.5G | 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 |
| 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 |
| Conntector Q'ty | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 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 | IP45 | 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 |

# Antenna, Dual Function (Freq., or Antenna)

| Advantech P/N | ANT-2216M-G2E | ANT-3214M-G2E | ANT-2216M-G5E | ANT-3215M-G5E | ANT-1205D-G25E | ANT-1210D-G25E | ANT-2215D-G25E | ANT-3215D-G25E |
|---|---|---|---|---|---|---|---|---|
| Frequency Range | 2.4-2.5G | 2.4-2.5G | 5.1-5.9G | 5.1-5.9G | 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 |
| Antenna Type | Patch | Sector | Patch | Sector | Omni | Omni | Patch | Sector |
| Antenna Gain | 16 dBi | 14 dBi | 16 dBi | 15 dBi | 4/7 dBi | 8/10 dBi | 13.5/15.5 dBi | 12/15 dBi |
| Impedance | 50 Ohm | 50 Ohm | 50 Ohm | 50 Ohm | 50 Ohm | 50 Ohm | 50 Ohm | 50 Ohm |
| Polarization | Linear, vertical/horizontal | Linear, vertical | Linear, vertical | Linear, vertical | Linear, vertical | Linear, vertical | Linear, vertical | Linear, vertical |
| HPBW/Vertical | 25/25 | 90/13 | 19/21 | 90/8 | 360/30 | 360/13 | 30/30 | 70/18 |
| 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 | 6 W (cw) | 10 W (cw) | 6 W (cw) | 6 W (cw) | 2 W (cw) | 5 W (cw) | 10 W (cw) | 10 W (cw) |
| Connector | N-Jack | N-Jack | N-Jack | N-Jack | N-Plug | N-Jack | N-Jack | N-Jack |
| Conntector Q'ty | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Operating temp. | -40 to +80 | -40 to +80 | -40 to +80 | -40 to +80 | -40 to +70 | -40 to +80 | -40 to +80 | -40 to +80 |
| IP rating | IP67 | IP55 | IP55 | IP55 | IP55 | IP67 | IP55 | IP55 |
| Weight | 1.1 kg | 0.8 kg | 0.8 kg | 1.4 kg | 0.07 kg | 0.394 kg | 0.4 kg | 0.462 kg |

# Antenna Cable, Surge Protector






| Advantech P/N | ANT-5115 | ANT-5130 | ANT-5210 | ANT-5230 | ANT-5260 | ANT-5290 |
|---|---|---|---|---|---|---|
| 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<br>2.0 : 1 Max.@ 3.0~6.0 GHz | 1.5 : 1 Max.@ DC~3.0 GHz<br>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<br>2.5 dB Max.@ 3.0~6.0 GHz | 3.5 dB Max.@ DC~3.0 GHz<br>4 dB Max.@ 3.0~6.0 GHz | 0.7 dB Max.@ DC~3 GHz<br>1.0 dB Max.@ 3~6.0 GHz | 1.1 dB Max.@ DC~3 GHz<br>1.6 dB Max.@ 3~6.0 GHz | 1.8 dB Max.@ DC~3 GHz<br>2.7 dB Max.@ 3~6.0 GHz | 3.0 dB (Max.) @ DC - 3 GHz<br>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 | ANT-5502 | ANT-5601 |
|---|---|---|---|
| Description | 1KV Surge Arrestor N-Jack to N-Jack | 1KV Surge 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<br>1.45:1 Max @4~6GHz | 1.3:1 Max @DC~4GHz<br>1.5:1 Max @4~6GHz | 1.2:1 Max @DC~3GHz<br>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 |

# Cellular Gateway

# GPRS IP Gateway

## Compact

- Compact and Slim with solid mounting

## Advanced

- Supports versatile gateway features

## Efficient

- Supports various communication interfaces

## Simplicity

- Easy to use software features

## Accurate

- High redundancy with dual SIM and SD slots for data buffering

## Reliability

- Robust HW design

# EKI-132x Hardware Overview

10/100/1000
Ethernet

5 Band GPRS

Operating Temp
-30 to 65° C

Serial Ports
RS-232/422/485

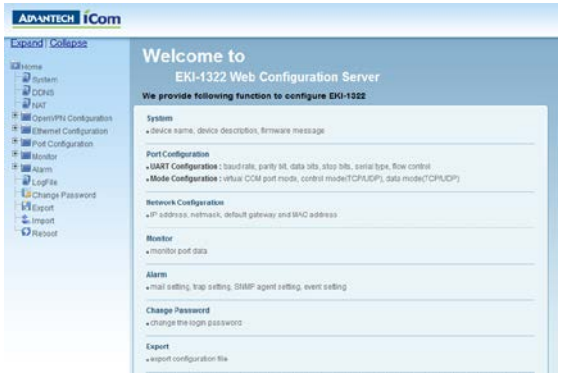

Dual Power Inputs (12 to 48 VDC)
Reverse Power Polarity Protection
Fault Relay for external PLC/Controller

Dual SIM
SD Slot

Serial ESD Protection: 15KV
2KV EFT/Surge protection for Power
2KV isolation (EKI-1321)

EKI-1321 : 1-port
EKI-1322 : 2-port

# Simplicity: Reduced Software Complexity


- Advantech Device Server Utility
- Easy Configuration thru Web
- 3~5 Steps to startup…

# iGateway Application

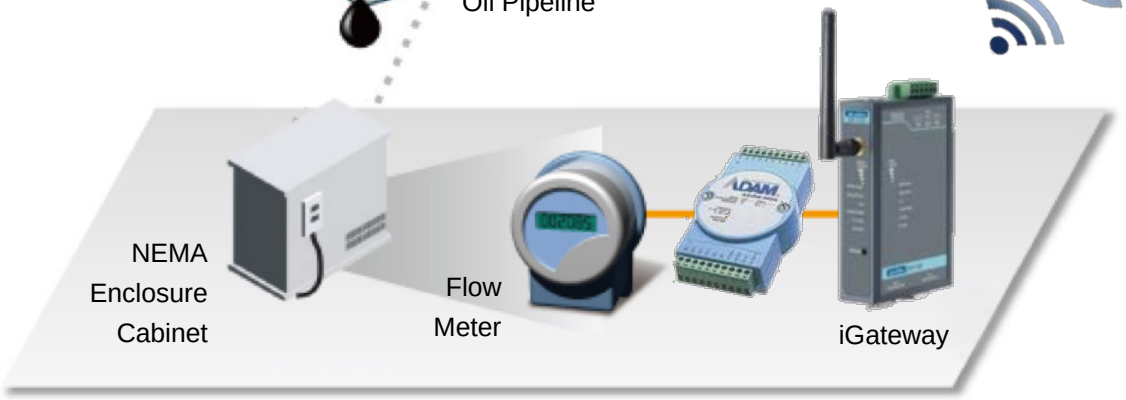



- Internet
- Frame Ready
- VPN

Wireless
Telco Network

Oil Pipeline

Pipeline Control Room



NEMA
Enclosure
Cabinet

Flow
Meter

iGateway

# THANK YOU

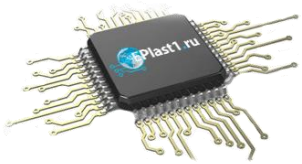
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

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