Industrial Wireless Training Kit
Global Wireless Standards

- Wireless personal area network (WPAN)
- Wireless metropolitan area networks (WMAN)
- Wireless local area networks (WLAN)
- Wireless wide area networks (WWAN)

- Bluetooth
- HomeRF
- Wi-Fi
- HiperLAN
- WiMAX
- GSM
- GPRS
- UMTS (3G)
IoT Focused Segments

Intelligent
- Server group
  - Operation
  - Induction
  - Comparison
  - Analysis

Interconnected
- 2G, 3G, 4G
- Wi-Fi

Instrumented
- Remote I/O
- Distributed Controller
- WSN

Infrastructure & Gateway

Sensors, Pressure, Velocity, Temperature, Image

Enabling an Intelligent Planet
Industrial Wireless LAN Product Offering

Multiple Function Mesh AP/CPE

Dual band
- EKI-6351
- EKI-6340-1
- EKI-6340-2
- EKI-6340-3

Single band
- EKI-6311GN
- EKI-6331AN

Single radio
- EKI-6351
- EKI-6340-1
- EKI-6311GN

Dual radio
- EKI-6340-2
- EKI-6331AN

Triple radio
- EKI-6340-3
Entry-Level AP/CPE
EKI-6311GN & EKI-6331AN
Types of WLAN Architecture

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

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

Wi-Fi AP/CPE

EKI-6311GN & 6331AN

Enabling an Intelligent Planet

ADVANTECH
**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

---

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

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

---

*Enabling an Intelligent Planet*
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
- Embedded directional antenna
- Operation temp: -20°C ~ 70°C

Enabling an Intelligent Planet
EKI-6331AN Product Introduction

- Supports IEEE 802.11a/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

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

- External R-SMA connector for an optional antenna

Enabling an Intelligent Planet
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

- 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
- WEP/WPA/WPA2 Enterprise / IEEE 802.1 x authentication security support
- External N-Type connector for an optional antenna
- IP-55 protection grade
- Wide operating temperature: -20~70°C
Daisy Chain- Extending Coverage Range

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

**Hardware Design**
- MIMO (1x1 or 2x2)
- 802.11a/n or b/g/n
- Built-in antenna
- IP55 and wide operating temp.

**Software Features**
- Support integration mode
- Flexible operating mode
- Secured wireless encryption
- WMM

**Versatile Applications**
- Automation device w/ wireless
- Wireless Coverage
- IP Surveillance

**Outstanding Performance**
- Three times of throughput rate compared with legacy 11a/g
- Range over 10km with built-in antenna

Enabling an Intelligent Planet
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

<table>
<thead>
<tr>
<th>Functional Perspective</th>
<th>Features</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IEEE 802.11n+MIMO</td>
<td>300Mbps data rate</td>
</tr>
<tr>
<td></td>
<td>Network Auto-healing</td>
<td>Self-healing</td>
</tr>
<tr>
<td></td>
<td>Multi-hopping</td>
<td>Throughput ≥100 Mbps @ 10 hops</td>
</tr>
<tr>
<td></td>
<td>Fast roaming</td>
<td>Handover switching time ≤20ms</td>
</tr>
<tr>
<td></td>
<td>Security</td>
<td>WPA, WPA2-PSK/ EAP, 802.11i</td>
</tr>
</tbody>
</table>

| 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

- Mesh (Self-forming & Self-healing)
- Multi-hopping with high throughput
- Ultra fast roaming
- MIMO 2x2
- 35~75°C
- 12~48VDC / PoE Supply
- High security
- IP67 protection

EKI-6341
EKI-6342
EKI-6343

Enabling an Intelligent Planet
EKI-6351

Wireless Mesh AP/Station

EKI-6351

- Mesh (Self-forming & Self-healing)
- Ultra fast roaming
- IP30 protection
- -35°C ~ 75°C
- Support 12-48VDC
- Support 802.3at PoE
- Dual-band (2.4GHz/5GHz)
- MIMO 2x2
# Position of Each Model in System

<table>
<thead>
<tr>
<th>EKI-6340-1</th>
<th>EKI-6340-2</th>
<th>EKI-6340-3</th>
<th>EKI-6351</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Fast roaming AP" /></td>
<td><img src="image" alt="Multi-Hopping App." /></td>
<td><img src="image" alt="Mesh Points or Multi-Hopping App." /></td>
<td><img src="image" alt="Mesh Station" /></td>
</tr>
<tr>
<td><strong>Fast roaming AP</strong></td>
<td><strong>Multi-Hopping App.</strong></td>
<td><strong>Mesh Points or Multi-Hopping App.</strong></td>
<td><strong>Mesh Station</strong></td>
</tr>
<tr>
<td>- Road side with fiber cables installed</td>
<td>- Extend wireless signal coverage along river, railroad, highway or inside tunnel</td>
<td>- Community, campus, park or factory side - As backhaul for road side without fiber cables installed</td>
<td>- Indoor client station</td>
</tr>
</tbody>
</table>

*Enabling an Intelligent Planet*
Wireless MESH Network Structure

Reliable Network & Ultra Fast Roaming

Diagram of a Wireless MESH Network Structure with labels for MAP, MGW, MEG, MP, and MSTA. The diagram shows optimal routing paths and alternate back-up routes.
IEEE 802.11n

Significant Throughput Improvement

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

<table>
<thead>
<tr>
<th>Brand</th>
<th>Advantech EKI-6340-3</th>
<th>Motorola AP 7161</th>
<th>Motorola AP 5181</th>
<th>Cisco Aironet 1552E</th>
<th>Moxa AWK-4131</th>
</tr>
</thead>
</table>

### Wireless

<table>
<thead>
<tr>
<th></th>
<th>Wi-Fi</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>802.11 a/b/g/n</td>
<td>802.11 a/b/g/n</td>
<td>802.11 a/b/g</td>
<td>802.11 a/b/g/n</td>
<td>802.11 a/b/g/n</td>
</tr>
<tr>
<td>Freq.</td>
<td>2.4/ 5 Ghz</td>
<td>2.4/ 5 Ghz</td>
<td>2.4/ 5 Ghz</td>
<td>2.4/ 5 Ghz</td>
<td>2.4/ 5 Ghz</td>
</tr>
<tr>
<td>MIMO</td>
<td>2X2</td>
<td>3x3</td>
<td>SISO</td>
<td>2x3</td>
<td>2x2</td>
</tr>
<tr>
<td>Radio #</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Port #</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Speed</td>
<td>10/100/1000</td>
<td>?</td>
<td>10/100</td>
<td>10/100/1000</td>
</tr>
<tr>
<td></td>
<td>Fiber</td>
<td>n/a</td>
<td>1000 baseSFP</td>
<td>n/a</td>
<td>1000 baseSFP</td>
</tr>
</tbody>
</table>

### Operation

<table>
<thead>
<tr>
<th></th>
<th>MESH</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>n/a</td>
</tr>
<tr>
<td>Fast roaming</td>
<td>&lt; 20 ms</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>Controller-based</td>
</tr>
<tr>
<td>Muti-hopping</td>
<td>Y</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>AP/CPE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Power

<table>
<thead>
<tr>
<th></th>
<th>PoE</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>802.3at</td>
<td>802.3at</td>
<td>802.3af</td>
<td>802.3af</td>
<td>802.3af</td>
</tr>
<tr>
<td>Input voltage</td>
<td>12~48 Vdc</td>
<td>36~57Vdc</td>
<td>48dc</td>
<td>12 Vdc</td>
<td>12~48 Vdc</td>
</tr>
<tr>
<td>Redundant DC power input</td>
<td>Y</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Reliability

<table>
<thead>
<tr>
<th></th>
<th>IP rating</th>
<th>67</th>
<th>67</th>
<th>56</th>
<th>67</th>
</tr>
</thead>
</table>

### Temperature

<table>
<thead>
<tr>
<th></th>
<th>Operation</th>
<th>-35~75</th>
<th>-40~70</th>
<th>-30~55</th>
<th>-40 to 55°C</th>
</tr>
</thead>
</table>

### Warranty

<table>
<thead>
<tr>
<th></th>
<th>5 yrs</th>
<th>1 yr</th>
<th>1 yr</th>
<th>90 days</th>
<th>5 yrs</th>
</tr>
</thead>
</table>

---

**Enabling an Intelligent Planet**
# Target Application & Industries

<table>
<thead>
<tr>
<th>App. Industry</th>
<th>Selling Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil field video monitoring</td>
<td>Multi-hopping and high throughput rate</td>
</tr>
<tr>
<td>Driving school exam. system</td>
<td>High throughput rate, fast roaming</td>
</tr>
<tr>
<td>Off-shore video monitoring</td>
<td>Mesh (self-forming &amp; self-healing)</td>
</tr>
<tr>
<td>Harbor container management</td>
<td>Mesh &amp; high throughput rate</td>
</tr>
<tr>
<td>Electric power tower video monitoring</td>
<td>Multi-hopping and high throughput rate</td>
</tr>
<tr>
<td>Factory site video monitoring</td>
<td>Multi-hopping and high throughput rate</td>
</tr>
</tbody>
</table>
Fully meet application requirements:

---

**Multi-hopping**
- Throughput $\geq 150$ Mbps @ 2 hops
- Throughput $\geq 100$ Mbps @ 10 hops

---

**Mesh Network**
- Self-healing

---

**Anti-harsh environment**
- IP 67 (EKI-6340)
- IP 30 (EKI-6351)
- Working temp.: -35°C~75°C

---

**Oil Field Application**

[Diagram showing EKI-6340 and EKI-6351 in an oil field application setup]
Fully met application requirements:

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

Mesh Network
- Self-healing

Works in harsh environments
- IP 67 (EKI-6340)
- IP 30 (EKI-6351)
- Working temp.: -35~75°C
Transportation Application

Fully meet application requirements:

Fast roaming: \( \leq 20\text{ms} \)

High throughput: \( \geq 100\text{Mbps} \)

Anti-harsh environment
- IP 67 (EKI-6340)
- IP 30 (EKI-6351)
- Working temp.: -35\text{~}75\,\text{°C}
Valuable Tools for Installation & Antenna / Accessory Kits
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.
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.
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.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>2.4-2.5G</td>
<td>2.4-2.5G</td>
<td>2.4-2.5G</td>
<td>2.4-2.5G</td>
<td>4.9-5.35G</td>
<td>4.9-5.9G</td>
<td>4.9-5.9G</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>Omni</td>
<td>Patch</td>
<td>Patch</td>
<td>Sector</td>
<td>Omni</td>
<td>Patch</td>
<td>Sector</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td>8 dBi</td>
<td>9.5 dBi</td>
<td>16 dBi</td>
<td>15 dBi</td>
<td>8 dBi</td>
<td>18 dBi</td>
<td>13.5 dBi</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
</tr>
<tr>
<td>HPBW/Vertical</td>
<td>360/15</td>
<td>50/50</td>
<td>25/25</td>
<td>90/8</td>
<td>360/12</td>
<td>23/19</td>
<td>120/6</td>
</tr>
<tr>
<td>V.S.W.R.</td>
<td>2.0:1 (Max.)</td>
<td>1.5:1 (Max.)</td>
<td>1.5:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
</tr>
<tr>
<td>Power Handling</td>
<td>20 W (cw)</td>
<td>20 W (cw)</td>
<td>20 W (cw)</td>
<td>50 W (cw)</td>
<td>20 W (cw)</td>
<td>5 W (cw)</td>
<td>10 W (cw)</td>
</tr>
<tr>
<td>Connector Q'ty</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Operating temp.</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
</tr>
<tr>
<td>IP rating</td>
<td>IP55</td>
<td>IP45</td>
<td>IP57</td>
<td>IP55</td>
<td>IP55</td>
<td>IP55</td>
<td>IP55</td>
</tr>
<tr>
<td>Weight</td>
<td>0.34 kg</td>
<td>0.14 kg</td>
<td>1.5 kg</td>
<td>1 kg</td>
<td>0.28 kg</td>
<td>0.825 kg</td>
<td>0.55 kg</td>
</tr>
</tbody>
</table>
Antenna, Dual Function (Freq., or Antenna)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>2.4-2.5G</td>
<td>2.4-2.5G</td>
<td>5.1-5.9G</td>
<td>5.1-5.9G</td>
<td>2.4-5G; 5.1-5.9G</td>
<td>2.4-5G; 5.1-5.9G</td>
<td>2.4-5G; 5.1-5.9G</td>
<td>2.4-5G; 4.9-5.9G</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>Patch</td>
<td>Sector</td>
<td>Patch</td>
<td>Sector</td>
<td>Omni</td>
<td>Omni</td>
<td>Patch</td>
<td>Sector</td>
</tr>
<tr>
<td>Antenna Gain</td>
<td>16 dBi</td>
<td>14 dBi</td>
<td>16 dBi</td>
<td>15 dBi</td>
<td>4/7 dBi</td>
<td>8/10 dBi</td>
<td>13.5/15.5 dBi</td>
<td>12/15 dBi</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
<td>50 Ohm</td>
</tr>
<tr>
<td>Polarization</td>
<td>Linear, vertical/horizontal</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
<td>Linear, vertical</td>
</tr>
<tr>
<td>HPBW/Vertical</td>
<td>25/25</td>
<td>90/13</td>
<td>19/21</td>
<td>90/8</td>
<td>360/30</td>
<td>360/13</td>
<td>30/30</td>
<td>70/18</td>
</tr>
<tr>
<td>V.S.W.R.</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
<td>2.0:1 (Max.)</td>
</tr>
<tr>
<td>Power Handling</td>
<td>6 W (cw)</td>
<td>10 W (cw)</td>
<td>6 W (cw)</td>
<td>6 W (cw)</td>
<td>2 W (cw)</td>
<td>5 W (cw)</td>
<td>10 W (cw)</td>
<td>10 W (cw)</td>
</tr>
<tr>
<td>Connector Qty</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Operating temp.</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +70</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
<td>-40 to +80</td>
</tr>
<tr>
<td>IP rating</td>
<td>IP67</td>
<td>IP55</td>
<td>IP55</td>
<td>IP55</td>
<td>IP55</td>
<td>IP67</td>
<td>IP55</td>
<td>IP55</td>
</tr>
<tr>
<td>Weight</td>
<td>1.1 kg</td>
<td>0.8 kg</td>
<td>0.8 kg</td>
<td>1.4 kg</td>
<td>0.07 kg</td>
<td>0.394 kg</td>
<td>0.4 kg</td>
<td>0.462 kg</td>
</tr>
</tbody>
</table>
## Antenna Cable, Surge Protector

<table>
<thead>
<tr>
<th>Advantech P/N</th>
<th>ANT-5115</th>
<th>ANT-5130</th>
<th>ANT-5210</th>
<th>ANT-5230</th>
<th>ANT-5260</th>
<th>ANT-5290</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>1.5M N-Plug to SMA-Plug cable</td>
<td>3M N-Plug to SMA-Plug cable</td>
<td>1M N-Plug to N-Plug cable</td>
<td>3M N-Plug to N-Plug cable</td>
<td>6M N-Plug to N-Plug cable</td>
<td>9M N-Plug to N-Plug cable</td>
</tr>
<tr>
<td>Cable Type</td>
<td>ULA-168</td>
<td>ULA-168</td>
<td>ULA400</td>
<td>ULA400</td>
<td>ULA400</td>
<td>ULA400</td>
</tr>
<tr>
<td>VSWR</td>
<td>1.5 : 1 Max.@ DC~3.0 GHz</td>
<td>2.0 : 1 Max.@ DC~3.0 GHz</td>
<td>1.5 : 1 Max.@ DC~6.0 GHz</td>
<td>1.5 : 1 Max.@ DC~6.0 GHz</td>
<td>1.5 : 1 Max.@ DC~6.0 GHz</td>
<td>1.5 : 1 Max.@ DC~6.0 GHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>2.0 dB Max.@ DC~3.0 GHz</td>
<td>3.5 dB Max.@ DC~3.0 GHz</td>
<td>0.7 dB Max.@ DC~3 GHz</td>
<td>1.0 dB Max.@ 3~6.0 GHz</td>
<td>1.1 dB Max.@ DC~3 GHz</td>
<td>1.6 dB Max.@ 3~6.0 GHz</td>
</tr>
<tr>
<td>Connector Type</td>
<td>N-plug to RP SMA-plug</td>
<td>N-plug to RP SMA-plug</td>
<td>N-plug to N-plug</td>
<td>N-plug to N-plug</td>
<td>N-plug to N-plug</td>
<td>N-plug to N-plug</td>
</tr>
<tr>
<td>Cable Length</td>
<td>1.5M</td>
<td>3M</td>
<td>1M</td>
<td>3M</td>
<td>6M</td>
<td>9M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advantech P/N</th>
<th>ANT-5501</th>
<th>ANT-5502</th>
<th>ANT-5601</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>1KV Surge Arrester N-Jack to N-Jack</td>
<td>1KV Surge Arrester N-Plug to N-Jack</td>
<td>Bulkhead adapter N-Jack to N-Jack</td>
</tr>
<tr>
<td>Surge Protection</td>
<td>1KV</td>
<td>1KV</td>
<td>N/A</td>
</tr>
<tr>
<td>VSWR</td>
<td>1.25:1 Max @ DC~4GHz</td>
<td>1.3:1 Max @ DC~4GHz</td>
<td>1.2:1 Max @ DC~3GHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>0.8 dB</td>
<td>0.8 dB</td>
<td>N/A</td>
</tr>
<tr>
<td>Connector Type</td>
<td>N-Jack to N-Jack</td>
<td>N-plug to N-Jack</td>
<td>N-Jack to N-Jack</td>
</tr>
</tbody>
</table>
Cellular 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

Enabling an Intelligent Planet

Advantech
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

Pipeline Control Room

NEMA Enclosure Cabinet
Flow Meter
iGateway
Oil Pipeline
THANK YOU