802.11a/an/ac PTP Continuous Hops Jumping Platform Loop Backup System Outdoor WiFi MIMO Long Distance / Large Bandwidth Wireless Access Point

■ IOP-EGAP-XACX
(Flat plate cover)

■ IOP-EGAP-SAC1
(Single frequency single RF card)

■ IOP-EGAP-SAC2
(Single frequency double RF card)

With 5GHz 20dBi Panel Antenna
All-in-one Wireless ODU

This product uses 802.11a / an / ac 2X2 MIMO technology, through unique and exclusive wireless software settings, supports 5.8GHz single-frequency module (optional 2.4GHz and 5GHz dual-frequency dual-module, optional multi-interface application).

One 5.8GHz 802.11ac wireless module, adopts HT80MHz channel width transmission, up to 867Mbps data rate, point-to-point PTP Mesh transmission bandwidth traffic, up to 560Mbps or more.

Under the HT80MHz channel width transmission operation of the two wireless modules, the maximum data rate can reach 1.7Gbps, and the bandwidth traffic can reach more than 820Mbps (limited by CPU-Bus, the limit is 860Mbps), easily solving the bandwidth traffic of long-distance transmission Insufficient application problems, at the same time, it can improve the architecture of the wireless information highway system and provide architectural applications for sky and ground networks

This product has standard WiFi AP (Access Point) server and dedicated STA (Station) client operation mode and PTP Mesh point-to-point backbone transmission operation mode. There are three basic operation modes.

1. WiFi AP server operation mode :

It is a basic use function of WiFi AP's international standards and specifications to provide wireless Internet users with Internet access services and PtP (point-to-point) and PtMP (point-to-multipoint) basic wireless connection transmission applications.

2. STA (Station) client operation mode:

A. It belongs to the WiFi AP connection client dedicated to this product and cannot be connected to other company's AP devices.

B. STA client wireless, connected to a dedicated AP server wireless device, can execute "multi-point continuous hops platform transmission mechanism", providing the performance of "continuous hops platform low bandwidth loss" and "packet response low delay" , Carry out a wide range of multiple wireless transmission backbones to achieve the exclusive application of wireless network transmission system.

The continuous wireless relay hopping of STA connected AP can support 250 times of hopping. After providing 10 times of wireless relay hopping, the transmission bandwidth can still reach more than 300Mbps, and the wireless packet of wireless relay hoping 10 times Latency can be controlled within 30ms, suitable for a wide range of wireless signal coverage transmission system applications.

C. When set to STA client wireless operation mode, you can further set the Secondary AP mechanism, preset multiple sets of backup AP SSID connection mechanism on the operation page, through "automatically detect disconnection time", "RSSI signal to reduce the threshold Value ", try to connect according to the default AP SSID priority order, to achieve redundant repair connection mechanism.

3. PTP Mesh point-to-point backbone transmission operation mode:

It has three operating functions: PTP Mesh / PTP Mesh Hops / PTP Mesh Hops Ring;

A. PTP Mesh provides "private military-grade point-to-point anti-jamming security encryption transmission technology", which can provide point-to-point backbone transmission traffic bandwidth of up to 560Mbps, easily carrying the large bandwidth of more than 50pcs x 3 million pixel IP Cam digital cameras Wide flow transmission requirements.

B. PTP Mesh Hops has "multi-group point-to-point continuous relay hopping transmission mechanism", which provides the performance of "continuous relay hopping low bandwidth loss" and "packet response low latency", supplemented by "privatized military regulations of point-to-point anti-interference secure encrypted transmission technology" can more securely construct a large range of dedicated wireless transmission backbones to complete the exclusive private network transmission application of the anti-interference wireless network transmission system.

PTP Mesh Hops can continuously wireless relay hopping 250 times, after providing 12 times of wireless relay hopping, the transmission traffic bandwidth can still reach more than 300Mbps, and the wireless packet response delay (Latency) of wireless relay hopping 12 times, It can be controlled within 25ms, which is especially suitable for the application of wireless monitoring and

transmission system with large range and wide bandwidth.

C. PTP Mesh Hops Ring has "multiple sets of point-to-point continuous relay hopping loop backup repair transmission mechanism", through the update of the information of each hop node of PTP Mesh Hops and the packet transmission research of the Root ... etc. The multi-loop connection architecture supports Mesh-like network functions including:

- ✓ Support to find the best transmission path automatically.
- ✓ Support automatic detection and repair circuit backup connection function.
- ✓ Support automatic multi-outlet network distribution balance function.
- ✓ Support the function of automatically updating system node information.
- ✓ Support multiple repair and backup of multiple circuit breaks.
- ✓ Support the function of multiple export backup structure.
- ✓ Supports the backup mechanism across wireless and wired networks, which is very suitable for wired optical fiber network systems, and constitutes a wired and wireless interactive backup transmission system application.

➢ Product model category of this series:

Model	Interface specification of wireless module group	Module Quantity
IOP-EGAP-SAC1	802.11a/an/ac 5GHz Single Frequency 2x2 MIMO Output High Power 27dBm (500mW)	1
IOP-EGAP-DAC1*	802.11a/g/agn/agac 2.4 & 5GHz Dual Frequency 2x2 MIMO Output High Power 21dBm (125mW)	1
IOP-EGAP-SAC2	802.11a/an/ac 5GHz Single Frequency 2x2 MIMO Output High Power 27dBm (500mW)	2
IOP-EGAP-DAC2*	802.11a/g/agn/agac 2.4 & 5GHz Dual Frequency 2x2 MIMO Output High Power 21dBm (125mW)	2

* Supports optional 2.4GHz & 5.8GHz dual-band wireless RF card with 802.11a / g / agn / agac; the dual-band network card must be activated and checked through hidden web pages.

➢ This product has the following operating functions:

■ WiFi AP and STA (Station) operation mode

1. WiFi AP operation mode, providing basic wireless Internet service and large bandwidth PtP and PtMP transmission operation functions:

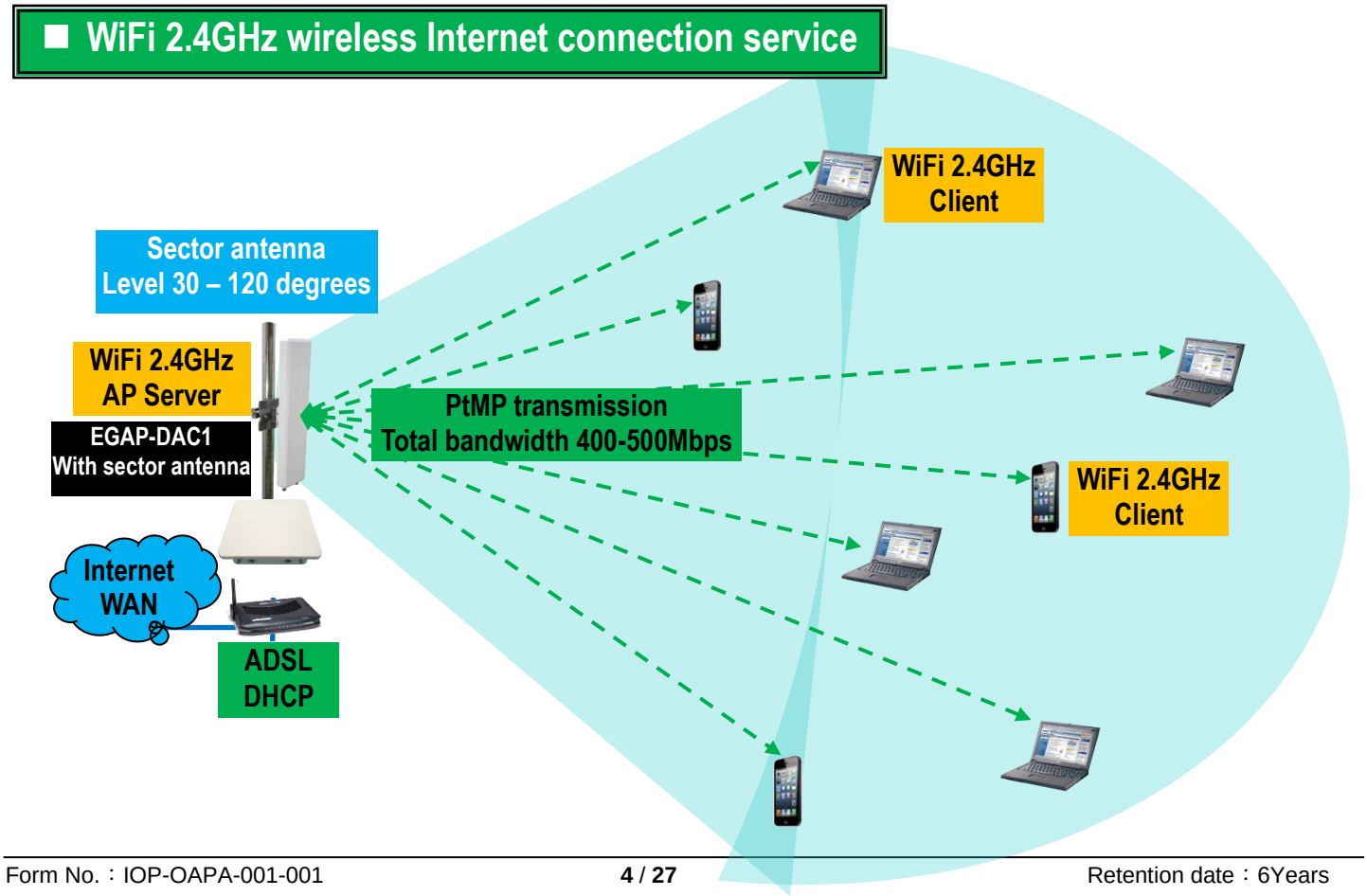
AP (Access Point) mode of operation, providing basic WiFi 5.8GHz (or optional 2.4GHz) Internet connection service and PtP and PtMP transmission services, 802.11ac 2x2 MIMO wireless transmission technology, which can be on HT80 the channel width setting, it provides a single wireless RF card module with a data rate of 867Mbps (Short GI) and a maximum transmission bandwidth of 500Mbps; the double wireless RF card module can provide a transmission rate of 1.7Gbps and a total of 800Mbps transmission traffic bandwidth with two network cards .

IOP-EGAP-SAC1 with standard 802.11ac 80MHz 5GHz wireless RF card, if you need to provide 2.4GHz wireless signal coverage Internet connection service, you must perform the following actions:

A. The single-band wireless RF card needs to be replaced with a 2.4 & 5.8GHz dual-band wireless RF card with 802.11a / g / agn / agac.

B. Through the hidden webpage of the wireless device, check to enable the dual-band operation function supporting 2.4GHz & 5.8GHz.

C. On the wireless device operation settings page, select the 2.4GHz channel item supported.



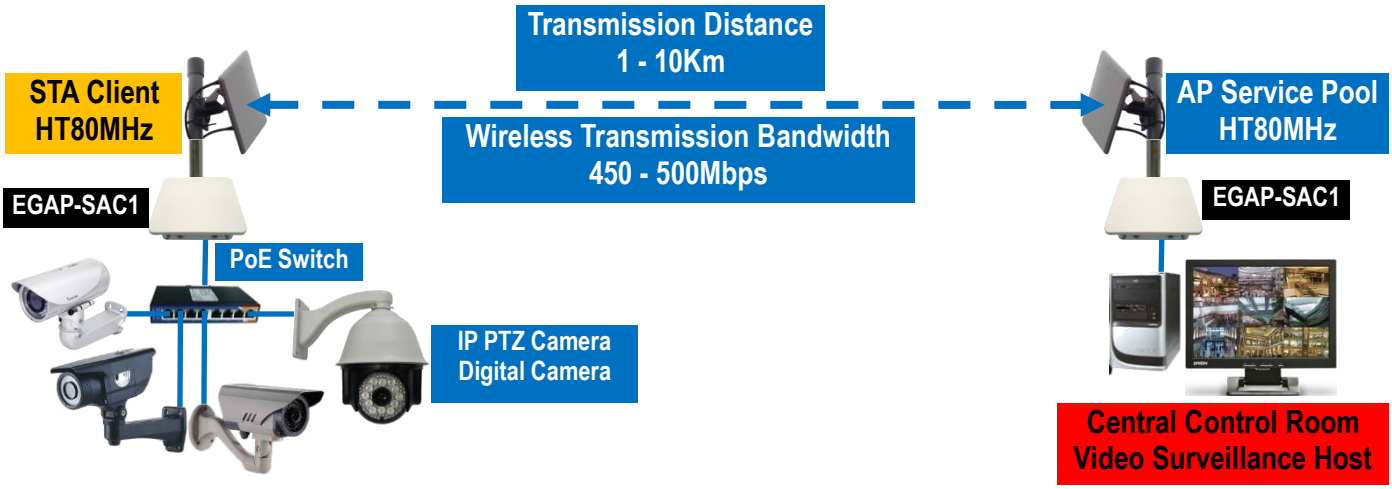
2. The STA (Station) operation mode provides wireless client connection to the AP:

STA (client) operation mode, acting as a PtP and PtMP client connection transmission application, through 802.11ac 2x2 MIMO wireless transmission technology, under the HT80 channel width setting, provides a single wireless RF module 867Mbps data rate and with 500Mbps bandwidth, it is suitable for the installation of monitoring image and data transmission backbone.

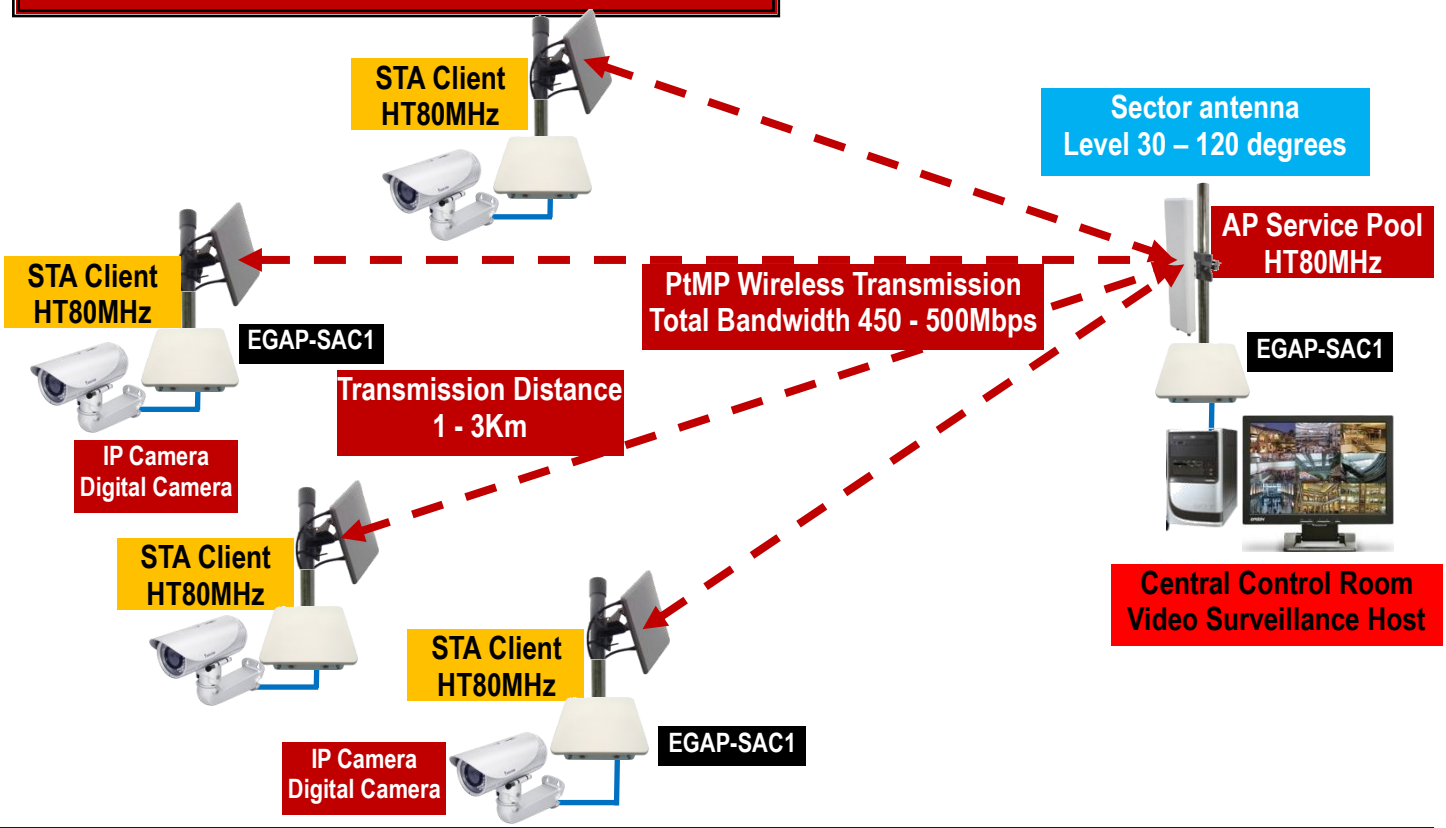
■ PtP Wireless Backbone Transmission

802.11ac channel width and transmission distance and transmission bandwidth description

1. HT20 can transmit distance 40Km, maximum bandwidth 70-90Mbps
2. HT40 can transmit a distance of 20Km, and the maximum bandwidth is 240-260Mbps
3. HT80 can transmit distance 10Km, the maximum bandwidth is 450-500Mbps



■ PtMP Wireless Backbone Transmission

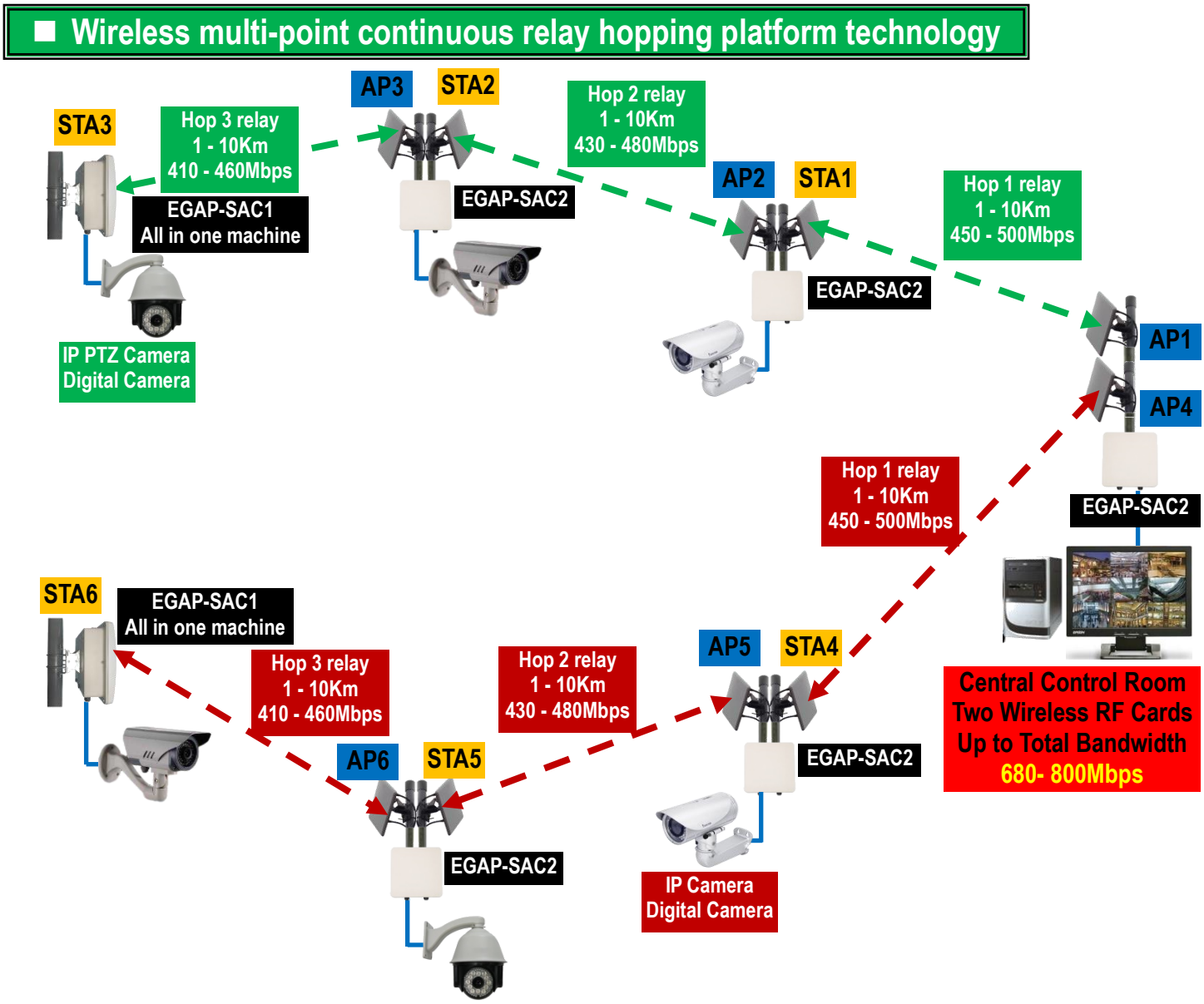


3. STA connected to AP's "Multipoint Continuous Relay Hopping Technology", with backbone loss low bandwidth and low delay transmission function: (Wireless Multiple Continuous Relay Platform Technology)

When STA (Station) and AP are continuously relayed and transmitted, the traffic will be reduced by about 10-20Mbps per repeater once, and the transmission bandwidth after the fifth hop will be reduced to 10-15Mbps once after every hop, after 10 hops It can still maintain more than 300Mbps bandwidth, and also has low latency characteristics of packet response within 30ms after 10 hops.

Dual wireless module products can construct two co-channel or dual-band continuous relay hopping wireless transmission backbones to provide transmission requirements in different directions. The two wireless backbones can aggregate about 800Mbps bandwidth for image data flow.

By setting up three sets of dual wireless module products, continuous relay hopping transmission in six directions can build 6 wireless transmission backbones, a total of 800Mbps * 3 = 2400Mbps wireless transmission backbone traffic bandwidth, very suitable for designing to become wireless highways and mesh networks covered by wireless large-scale signals.



■ PTP Mesh and PTP Mesh Hops and PTP Mesh Hops Ring operating modes

1. PTP Mesh Wireless Transmission Backbone Operation Function:

PTP Mesh "wires the network" of wireless network transmission, introduces Mesh concepts and technologies, and has the following characteristics:

A. Introduce "Mesh network group and Link ID technology": Let PTP MESH form an exclusive private wireless transmission system, completely isolated from ordinary WiFi AP wireless devices, free from communication interference and blocking wireless connection by WiFi connection operation Hacker intrusion.

B. Introduce "Mesh Network Root and Node Concept Technology": Provide Mesh-like "Automatic Update System Node Information Function" and "Automatic Multi-Exit Network Diversion and Balance Function".

C. Introduce "wireline network operation protocol rules": Let wireless network transmission be similar to wired network operation mode, except to avoid the wireless network transmission regulations and provide point-to-point wireless transmission bandwidth up to 560Mbps

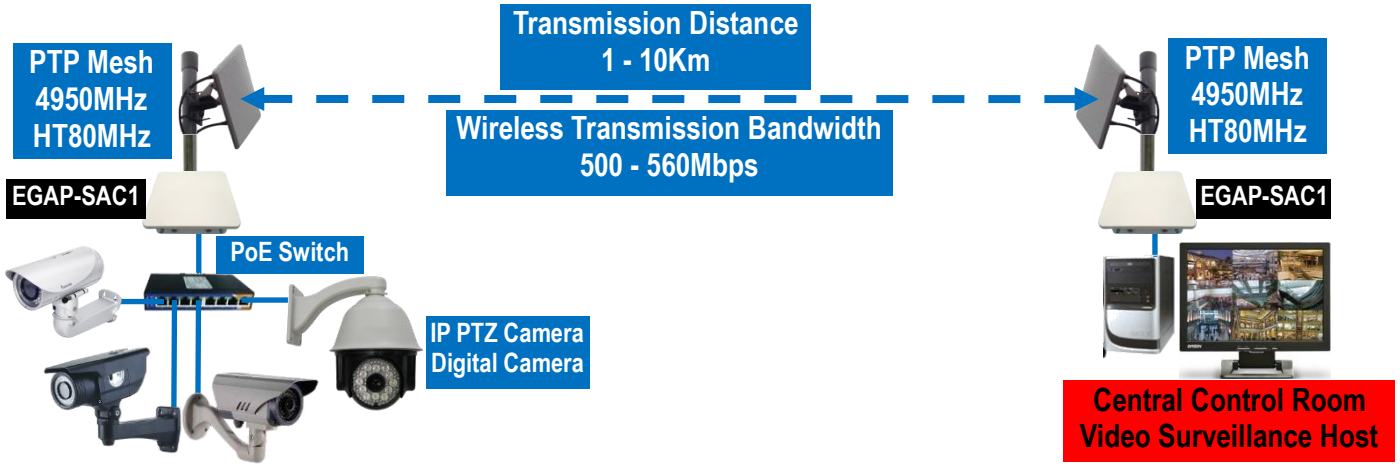
D. Introduce "Frequency Freedom Correspondence Setting" to provide a more free frequency setting method, increase the number of available channels, and avoid the channels / frequency used by the general WiFi standard to improve anti-interference and interference avoidance performance.

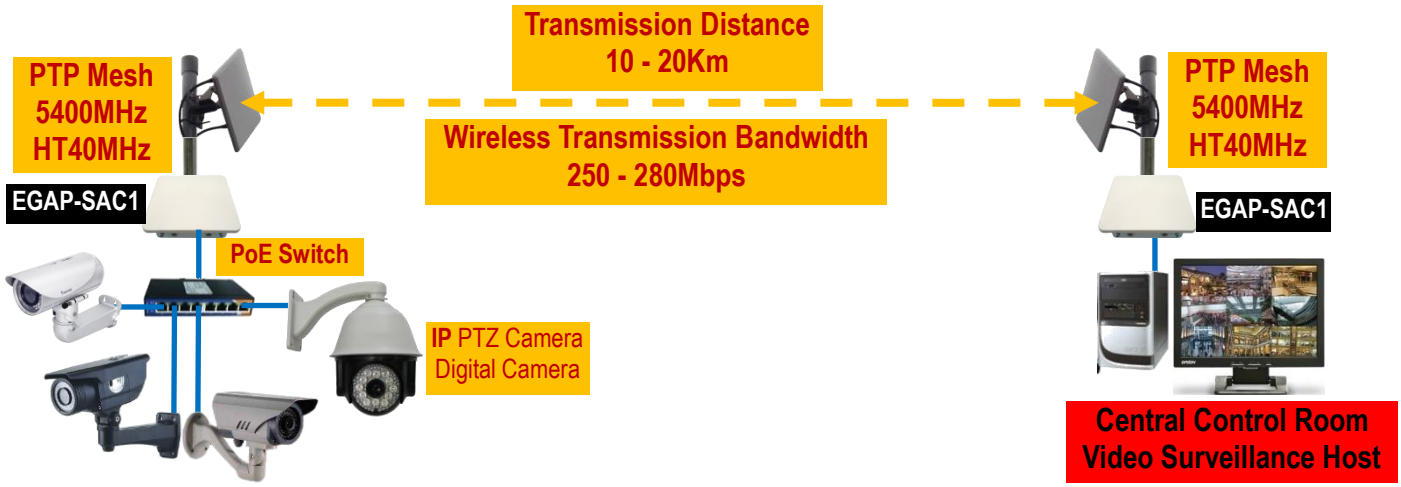
E. Exclusive private wireless transmission characteristics, supplemented by military-like encryption technology, can be invisible in many wireless system environments.

■ PTP Mesh Wireless Backbone Transmission

802.11ac channel width and transmission distance and transmission bandwidth description

1. HT20 can transmit distance 40Km, maximum bandwidth 80-110Mbps
2. HT40 can transmit distance 20Km, the maximum bandwidth is 250-280Mbps
3. HT80 can transmit a distance of 10Km, and the maximum bandwidth is 500-560Mbps





2. PTP Mesh Hops Multi-PtP Continuous Relay Platform Wireless Transmission Backbone Operation Function:

The point-to-point PTP Mesh connection system has been advanced to a multi-point continuous relay platform system. The operation structure of PTP Mesh Hops is utilized, and it has the following excellent features:

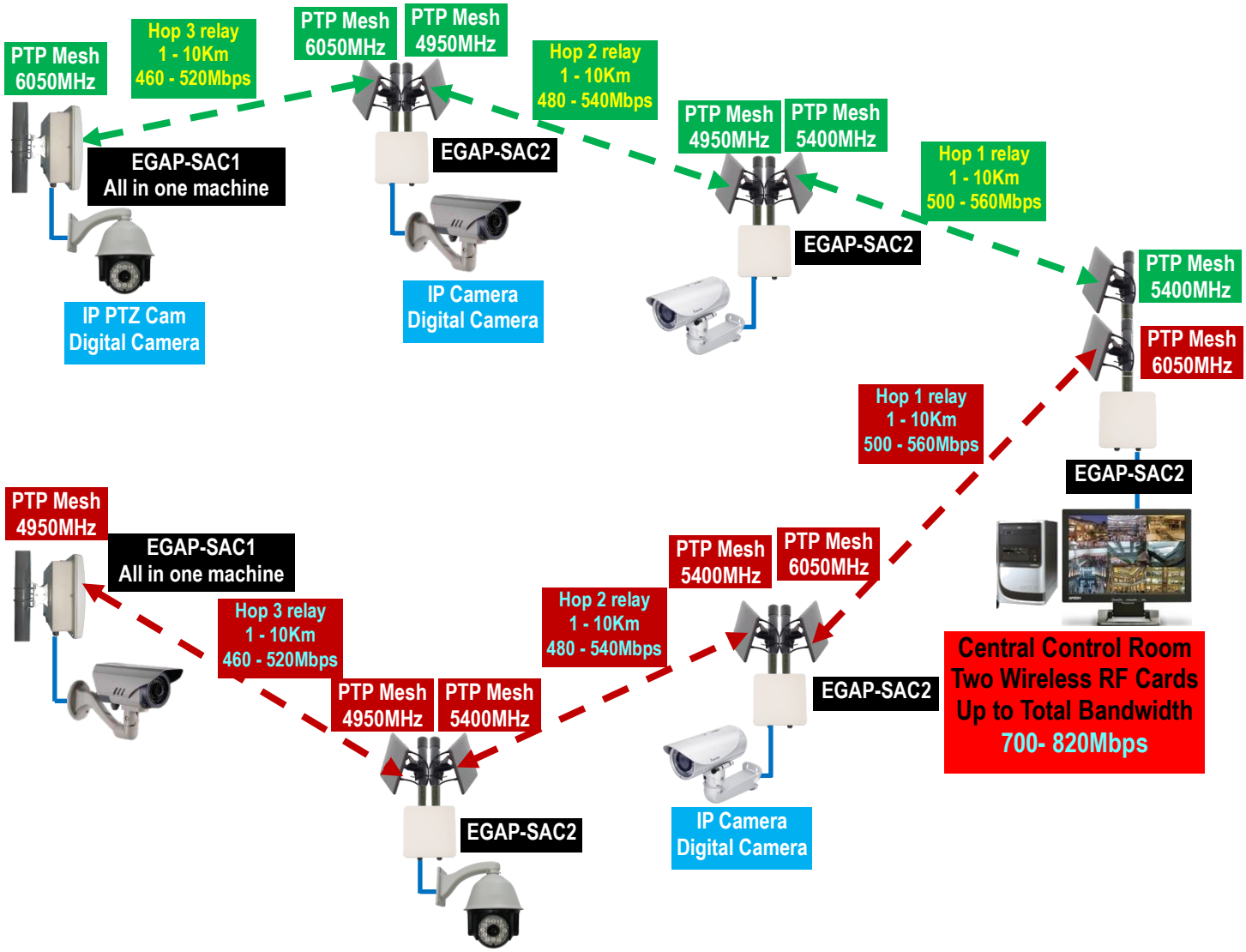
A. Each wireless connection of PTP Mesh Hops belongs to its own independent connection. Through the software packet switching technology and Hops jumping platform technology, the operation performance of multi-point continuous relay jumping platform transmission is achieved.

B. Continuing the existing proprietary private wireless transmission system features of PTP Mesh, while providing the operation function of multi-point continuous relay hopping transmission, compared to STA / AP relay hopping, PTP Mesh Hops can provide greater bandwidth Lower packet response delay and more stable bandwidth traffic transmission effect.

C. PTP Mesh Hops can make good use of "Frequency Freedom Correspondence Setting", avoid the limitation of general WiFi channels / frequency fixation, exert the best anti-interference and interference avoidance setting advantages, especially suitable for system installation in a wide range of environments.

D. IOP-EGAP-SACX and IOP-EL-NX are based on the same technical development concept. From the perspective of wireless technology and packet transmission and functional technology, many compatible integration and application architecture interoperability are carried out during development. When planning and designing the actual wireless transmission system and setting up the actual site, it provides more flexibility and higher-order application possibilities.

■ PTP Mesh Hops Multi-PtP Continuous Relay Platform Wireless Transmission Backbone Technology



3. PTP Mesh Hops Ring Multi-PtP Continuous Relay Hopping Platform "Operation Function of Ring Loop Backup Transmission Backbone":

PTP Mesh Hops multi-PtP continuous relay platform transmission system, at the end node of the platform or other suitable backup nodes, adding a wireless interface can form a loop backup transmission architecture, providing the following functional operating mechanism:

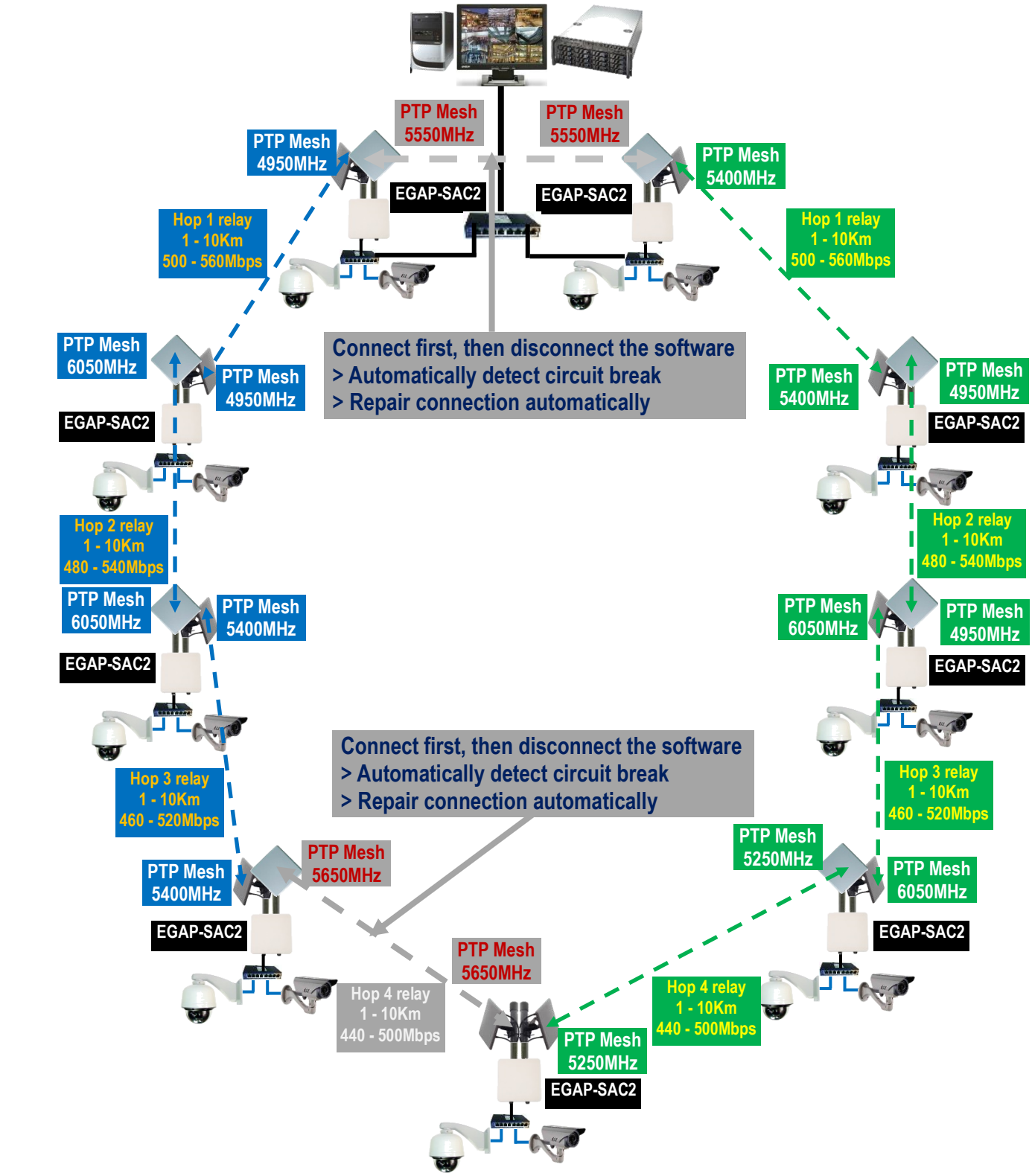
A. After the wireless transmission system generates a loop, the software automatically cuts off the loop node, automatically detects disconnection and repairs the connection

B. With multiple ring loop backup operation structure, with multiple exit backup mechanism, automatic detection of the best path transmission

C. With a loop backup mechanism across wired and wireless networks, it is particularly suitable for cross-backup applications in fiber optic networks

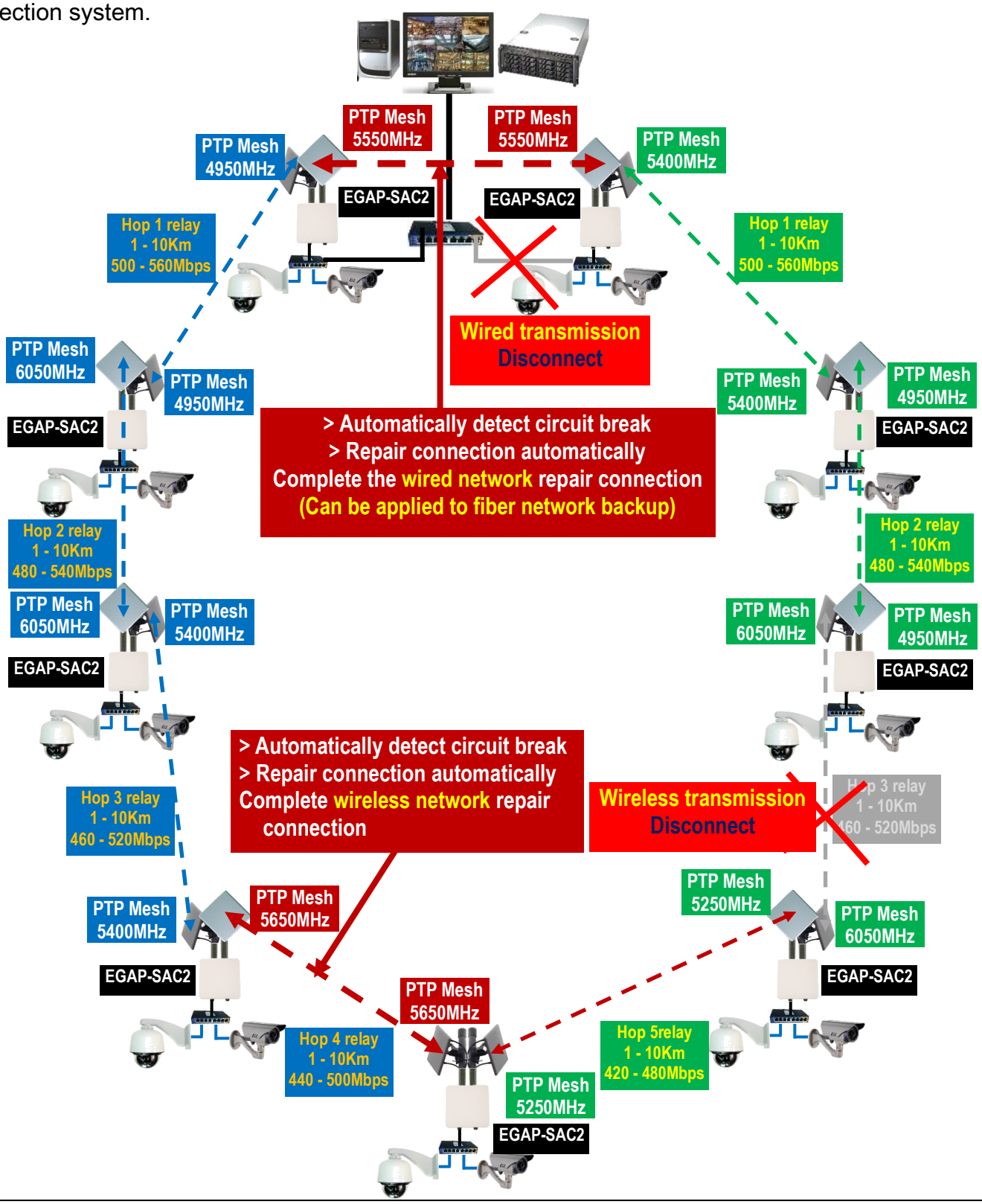
■ PTP Mesh Hops Ring Multi-PtP Continuous Relay Platform Wireless Transmission Backbone Back up Technology

2 Point-to-Point Loop Wireless Transmission Backbone
Provide 1000 ~ 1120Mbps Bandwidth Traffic
2 PTP Mesh Wireless Backup Connection Networks
1 PTP Mesh Wired Backup Connection Network



4. PTP Mesh Hops Ring Multi-point Continuous Relay Hopping Platform "Circular loop backup repair connection operation diagram":

When the PTP Mesh Hops Ring system is in operation, the loop backup node that is automatically cut off by the software is in the operating state of detecting the loop transmission system at any time; when any section of the transmission node is interrupted, the loop backup node will be cut off Automatically start the connection recovery operation to achieve the transmission recovery of the connection system.



■ IOP-EGAP-XACX: 802.11ac backward compatible with IOP-EL-N-X: 802.11an wireless product features

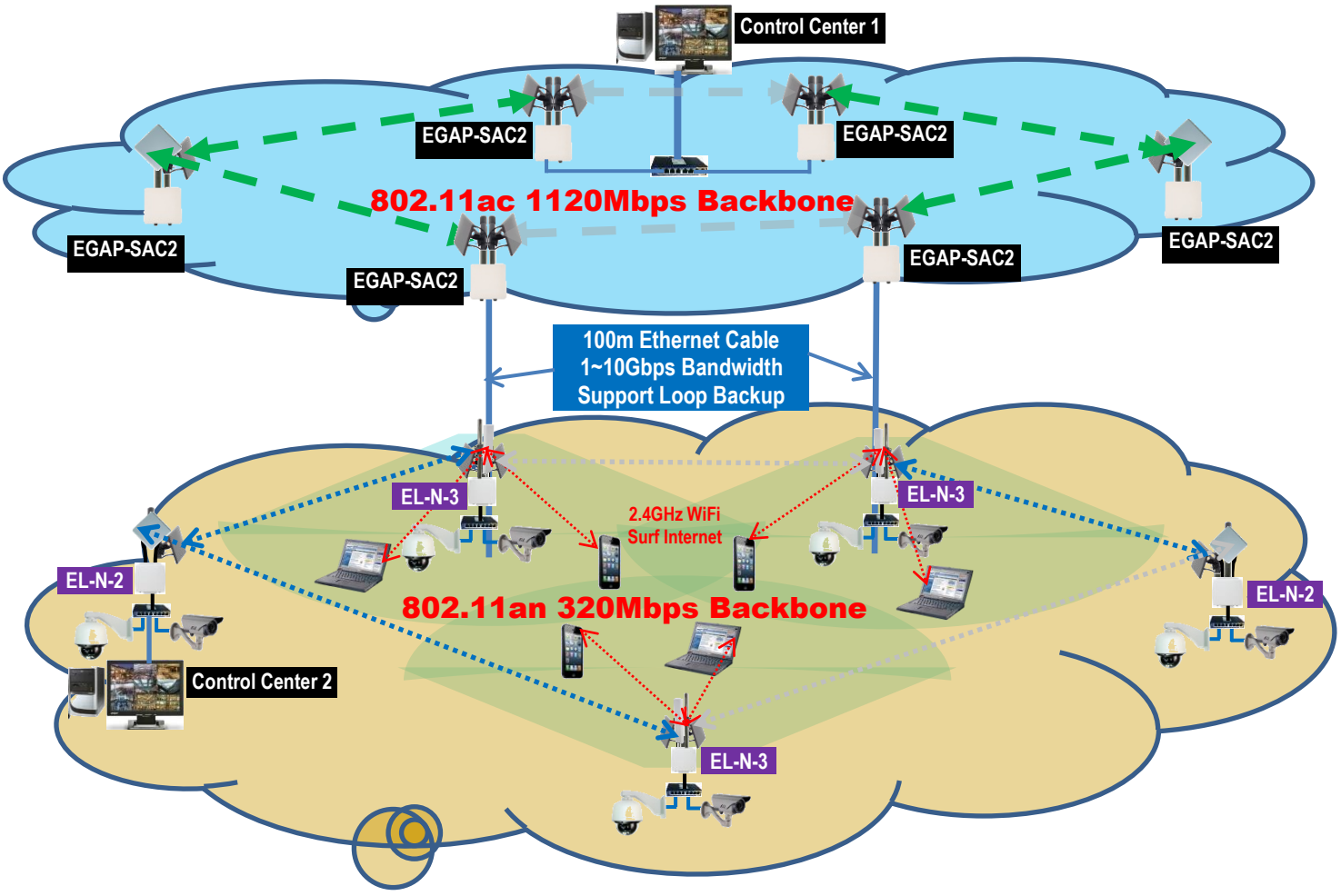
EGAP-XACX constructs upper-layer large-bandwidth backone skynet + EL-N-X constructs lower-layer transmission highway backbone ground network

EGAP and EL-N are integrated and developed with compatible technologies. The special functions of PTP Mesh, packet processing mode and relay transmission are all compatible with the system.

EGAP's 802.11ac is 80MHz spread spectrum transmission, providing up to 800Mbps * N times the bandwidth. It is suitable for the backbone network application of the upper layer, allowing the traffic of the lower layer network to be shunted back to the management center from multiple outlets.

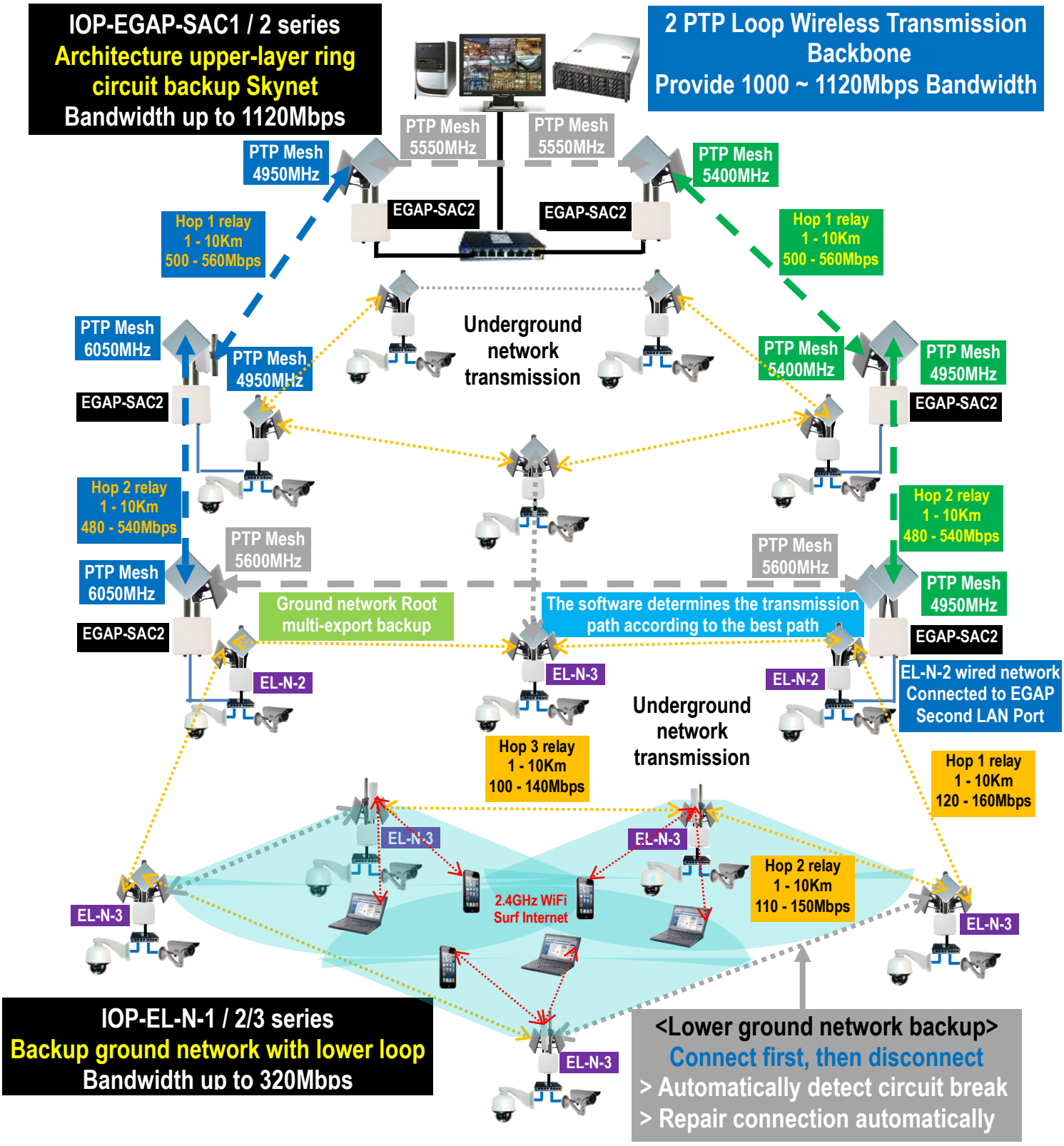
EL-N's 802.11an is a 40MHz spread spectrum transmission, with more than a dozen channels available, and can provide up to 160Mbps * N times the bandwidth, suitable for the application of the underlying network backbone and WiFi wireless Internet signal coverage.

Upper-layer Large-bandwidth Backbone Skynet



Lower-layer Wireless Transmission Highway Backbone Ground Network

■ EGAP-XACX + EL-N-X Double-layer Wireless Loop Network Backup Architecture Diagram



➢ Product Specifications

■ Hardware Specification

Main Element	
Main Processor	Freescale P1020E / CPU Speed 800MHz
Wireless Chipset	Standard collocation: Atheros QCA9892 for industrial grade network (QCA9882 belongs to commercial network) mini PCI, IEEE 802.11 a / an / ac, 2T2R MIMO, 867Mbps (Available with: Atheros QCA9890 mini PCI, IEEE 802.11 a / g / agn / agac, 2T2R MIMO, 867Mbps)
Switch Controller	Broadcom ExpressLane™ PEX8603
Memory RAM	1GB DDR3
Flash	256MB NAND Flash
Interface Specifications	
Wireless network card module	Atheros QCA9892 (or QCA9882) mPCIe IEEE 802.11ac (11a/11an/11ac) 5.8GHz Support 1x1 SISO, 2x2 MIMO Output Power / Receive Sensitivity: 1. 26dBm @MCS0 (58.5 ~ 65Mbps) / -96dBm 2. 23dBm @MCS7 (585 ~ 650Mbps) / -77dBm 3. 19dBm @MCS9 (702 ~ 780Mbps)(867Mbps Short GI) / -72dBm IEEE 802.11ac, 2x2 MIMO, Data Rate 867Mbps Max
Number of wireless network cards	Support Atheros QCA9892 (or QCA9882) mPCIe x 2 Modules
Antenna connector	IOP-EGAP-SAC1 : 2 x N-type (1 wireless card) IOP-EGAP-SAC2 : 4 x N-type (2 wireless cards)

Antenna matching	External Antenna Model: IOP-PANFO-5M2001213-5GHz 18-20dBi Dual-polarized MIMO Patch Antenna. All-in-one Antenna Model: IOP-EGAP-RF1-PANFO-5M2001213-5GHz 18-20dBi Dual Polarized MIMO Patch Antenna, Assembled in Aluminum Die-cast IP67 Waterproof Chassis (The all-in-one machine can be used with this wireless network board or other wireless network boards)
Wireless frequency	IEEE 802.11ac (11a / 11an / 11ac) 5.8GHz, providing 4.9GHz ~ 6.1GHz operating frequency
Wireless channel width	20MHz / 40MHz / 80MHz A variety of wireless radio frequency transmission channel width settings, according to the actual transmission bandwidth requirements, choose to match the wireless channel width, in order to increase the number of wireless channels used and reduce the probability of wireless frequency mutual interference. (If you are considering the risk of environmental interference or want to provide wireless Internet access, you can choose to match: Atheros QCA9890 mini PCI, IEEE 802.11 a / g / agn / agac, 2T2R MIMO, 867Mbps)
Modulation method	802.11a, 11an, 11ac are all OFDM (support BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
Wired network interface	Support Giga Ethernet Port x 2 ■ RJ-45 1 Port: Support 10/100 / 1000Mbps RJ-45 port, with 10BASE-T, 100BASE-TX and 1000BASE-T, half-duplex / duplex / half-duplex, Auto negotiation flow automatic detection control, phase Content: IEEE802.3 / 802.3i / 802.3u; and supports standard 802.3af / 3at client PoE PD power receiving mode. ■ RJ-45 1 Port: Support 10/100 / 1000Mbps RJ-45 port, with 10BASE-T, 100BASE-TX and 1000BASE-T, half-duplex / duplex / half-duplex, Auto negotiation flow automatic detection control, phase Content: IEEE802.3 / 802.3i / 802.3u etc.
Set up the connection interface	UART 1 (Pin header) / UART 2 (Pin header) GPIO (Pin header) RTC DS1339

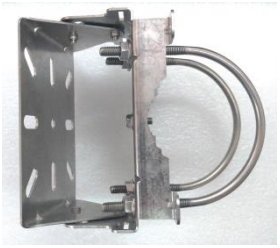
Ethernet lightning protection surge protection interface	Support PoE Port Ethernet anti-lightning surge protection up to 10KA @ 8 / 20μs. (The component passes IEC 61000-4-5 10KA @ 8 / 20μs total pulse discharge current 10 times)
Power supply and demand mode	
Power supply terminal	DC 12-48V wide voltage input (Pin mode)
	With IEEE 802.3af / 3at Clientndard standard PoE-PSE power supply, it provides 48Vdc / 0.6A / 30W maximum power.
Ethernet Receiver Mode	Support IEEE 802.3af / 3at Clientndard standard PoE PD receiver 48Vdc / 0.6A / 30W maximum power.
Device power consumption (Including PoE power supply)	IOP-EGAP-SAC1: Static operation 4W/H, general operation 8W/H or less, full speed transmission above 500Mbps 10W/H maximum, instant start maximum power consumption 16W/H IOP-EGAP-SAC2: Static operation 6W/H, general operation 10W/H or less, full speed transmission above 500Mbps 12W/H maximum, instant start maximum power consumption 20W/H
Physical size and weight	
Size	Flat top cover version: L268 X W268 X H80mm (H90 with vent valve) Convex plate cover version: L268 X W268 X H108mm (H118 with vent valve) Double lower cover lock version: L268 X W268 X H140mm (H150 with vent valve) After assembling the fixing frame, add 72mm in height All-in-one Machine top cover version: L266 X W266 X H110mm (H120 with vent valve)
Weight and packaging	Equipment weight 3.0Kg–3.2Kg All-in-one Machine weight: 2.4Kg–2.5Kg (depending on the number of open joints) Product packaging box (including PoE power supply and fixing frame accessories) 4.0Kg-4.5Kg Carton carton, 2 boxes of 9Kg

Use environment tolerance specification	
Operating temperature range	-40~70℃ operating temperature, can withstand the high temperature of sunshine to reach the ambient temperature of 45℃, and the internal temperature of sunshine is 75℃.
humidity	0% ~ 95% maximum (non-condensing)
Storage temperature	-40 ~ 85℃
Waterproof and Dustproof Grade	Outdoor IP68 rating
Chassis material and protection	Aluminum die-cast housing with anti-corrosion paint The thickness of the aluminum die-casting shell is up to 3.5mm to improve the resistance to external electromagnetic waves and improve the corrosion resistance of the seaside and special use environments The All in One Machine with patch antenna has two drain holes under the antenna back plate to help the antenna drain water (condensation) in normal environment. Please do not block the drain hole. (The internal components of the antenna are waterproof and rust-proof. After the antenna enters the water normally, as long as the accumulated water is drained from the lower drain hole, it can be used normally.)
Product related certification	
Electronic product certification	JRF Japan wireless certification National Communications Commission NCC certification (in progress) BSMI (Ongoing) IP68 Dustproof and Waterproof Certification (Ongoing) FCC (tentative)

VESA universal stainless steel fixing frame

VESA universal stainless steel wind pressure resistant fixing frame

Fixed frame model: IOP-UHMK-VESA75-1



1. Applicable to VESA international specifications and standards-75mm x 75mm indoor / outdoor various equipment fixed
2. Suitable for general engineering equipment standards-60mm x 60mm indoor / outdoor various equipment fixed
3. Support triangle fixed point fixing method
4. Support the tightening method of screw fixing point
5. Support +-40◦up and down antenna angle adjustment function
6. Support wall-mounted fixing method (can also support car-mounted fixing method)
7. Support column pole fixing method, support 0.5 ~ 2.5 inch rod diameter
8. Support street lamp pole fixing method (8-inch pole strap / strap width: 15mm / strap thickness: 2mm)
9. Support the fixation of telephone poles (12-inch pole strap / strap width: 15mm / strap thickness: 2mm)
10. Assembly size: L x W x H: 125 x 125 x 77mm / thickness: 1.2mm
11. Bearing wind pressure: It can bear the highest wind pressure of more than 17 grades (250Km / hr or more / Beaufort's 17 grades)
12. Support wall screw hole anti-slip fixing method
13. Accessories are made of stainless steel:

-U-shaped screw x 2
-M6 hexagon nut with washer x 4
-M5 X 8mm hexagon screws with washers x 9
-M5 X 12mm hexagon screws with washers x 1

■ Software Specification

Network switching bridge software function	
Network bridge operation function	1. Mesh network data transmission with OSI (Open System Interconnection Reference Model) Layer 2 data Link & Layer 3 Data IP Layer data link layer to achieve fast data transfer and automatic healing link, reducing the time delay of path selection And the bandwidth attenuation of the multi-hop relay to provide bandwidth traffic of more than 300Mbps after 12 hops. 2. PTP Mesh Hops closed private wireless backbone transmission system technology. 3. With PTP Mesh Hops Ring loop disconnection and disconnection backup repair transmission function. 4. Fast transparent forwarding operation of fast bridge across network segments. 5. Support internet group management protocol snooping (IGMP Snooping) (IGMP V2 & IGMP V3). 6. Support management VLAN (Management VLAN) and Data data VLAN 15 groups of QoS (WMM). 7. Equipped with low loss bandwidth and low latency response technology of PTP Mesh Hops for 250 consecutive wireless relay hops. 8. Support "Automatically find the best transmission path function". 9. Support "Automatically update system node information function". 10. Support "multiple fast automatic backup repair connection function". 11. Support "the function of multiple export backup structure". 12. Support "automatic multi-exit network distribution balancing function". (Support operation function and system integration compatible with 802.11an series EL-N-1 / EL-N-2 / EL-N-3)

Wireless device operation function	
System operation mode	With wireless bridging and transparent bridge capabilities (Bridge), providing standard WiFi services and PtP / PtMP and PTP Mesh / PTP Mesh Hops / PTP Mesh Hops Ring and other applications. The main system operation modes include: 1. AP (Access Point): Provide general wireless client connection or Internet connection service and PTP / PTMP and other application methods. 2. STA (Station client): For the AP mode of this product, a dedicated client connection is formed to form a backbone transmission structure with continuous relay jumping platform. (Does not have connection function with other APs) 3. The operation of PTP Mesh transmission (with Mesh backup mechanism), including: -- PTP Mesh transmission architecture -- PTP Mesh Hops relay hopping platform architecture -- PTP Mesh Hops Ring relay hopping loop architecture…Operation modes (Operation function, compatible with 802.11an series EL-N-1 / EL-N-2 / EL-N-3 series)
Wireless multiple modules and multiple export interfaces and support dual-band operation	1.Support the multi-module design of 2 wireless network cards, carry out dynamic multi-mode export interface distribution of wired and wireless networks, switch to AP or STA or PTP Mesh operation mode according to operational needs to cope with multi-link relay jumping platform and aggregated data stream transmission and service Internet access and other system requirements. 2.You can choose the multi-frequency and multi-exit interfaces and multiple operating modes with 2.4GHz & 5.8GHz dual-band wireless network card to set the operating mechanism independently.
Support wireless IGMP communication protocol	1. Equipped with IGMP Snooping (IGMP V2 & IGMP V3) communication protocol technology to solve the transmission problems caused by wireless broadcast packets. 2. Support multi-point / broadcast packet storm generation limitation function to solve the transmission demand problem of multiple monitoring and management units simultaneously capturing a large number of image broadcast packets, and improve the efficiency of IP multimedia streaming.

PTP Mesh Hops multiple relay hopping platform with low loss bandwidth function	1. PTP Mesh Hops' multiple relay jumping platform is applied to encounter obstacles such as buildings or hillside terrain or woods. It can continuously relay hop turntable transmission function multiple times to solve the problem of transmission blocking. 2. PTP Mesh Hops can be continuously relayed to the wireless hops 250 times, and the packet is transparently exchanged, distributed and forwarded. 3. PTP Mesh Hops relay hopping platform transmission bandwidth, through the exchange of packet technology, to achieve low loss bandwidth performance. 4. The transmission delay of PTP Mesh Hops relay hopping platform, through the exchange response technology, achieves the transmission effect of packet response with low delay and high efficiency.
PTP Mesh Hops Ring PtP Multi-loop continuous relay jumper disconnection backup repair function	1. PTP Mesh Hops Ring is serially connected through PTP Mesh Hope's continuous relay, and finally forms a circular loop back-up connection structure. After that, the software will automatically judge and disconnect one of the connected node groups to solve the loop system's Various problems of packet loop transmission. When any connection node group in the transmission system has a transmission interruption or operational failure, the connection node group previously disconnected by the software will automatically restore the connection to repair the system transmission. 2. PTP Mesh Hops Ring forms a multi-loop connection structure with a circular loop, supporting the following functions: -- Support to find the best transmission path automatically. -- Support automatic detection and repair backup connection function. -- Support automatic multi-outlet network distribution and balance function. -- Support automatic update of system node information. -- Support multiple repair and backup of multiple circuit breaks. -- Support the function of multiple export backup structure. 3. Support the backup mechanism across wireless and wired networks, so it is very suitable for coexisting with the fiber network to form a wireless backup system. 4. Specially designed the core software operation function beyond the IEEE 802.1d STP / IEEE 802.1w RSTP / IEEE 802.1s MSTP.

Support wireless parameter adjustment function	Support advanced wireless parameter adjustment settings to optimize wireless transmission signal quality and transmission stability and reduce packet drop rate ... etc., Including: 1. PTP Mesh Hops Ring loop architecture Cost path parameter progressive calculation setting. 2. Optimization of automatic frequency offset adjustment of the radio frequency during antenna adjustment. 3. The PTP Mesh mode has a special "Frequency Freedom Correspondence Setting" to support special channel settings. 4. The transmission power / data rate / maximum distance parameters and the specified backup repair connection path Cost and other adjustment settings to facilitate the stability of the transmission link.
Support wireless environment detection and scanning function	Support the wireless environment detection and scanning function to facilitate the evaluation of the wireless frequency used by the system; the software will perform AP scanning in the environment according to the use frequency and activation frequency of the wireless network card.
Support the secondary AP relay jumper disconnection and backup connection repair transmission function of the AP-STA backup setting	In the AP-STA operation mode, the STA side can pre-set multiple sets of backup connection APs in the Secondary AP in the advanced function, so that the STA can perform backup and repair connections to other AP mechanisms when the connection is disconnected. The following functions are included: 1. The SSID and channel (frequency) of other backup APs are preset, and a maximum of 3 sets of backup priority can be preset. 2. The switchover connection time for switching APs after detecting disconnection is preset, and the switching is completed in the shortest 3 seconds. 3. Preset to detect the lowest connection RSSI signal value dBm to start the switchover of the backup AP. 4. You can define the judgment time for successive scans to detect new APs to facilitate effective detection in a short time.

Transmission efficiency and relay hopping bandwidth	
Transfer from wireless interface to wired interface (TCP / RTP)	One wireless network card interface is transmitted to the wired network interface, the maximum transmission bandwidth is more than 560Mbps Two wireless network card interfaces are transmitted to the wired network interface, and the maximum transmission bandwidth is more than 820Mbps The wired network supports two 1Gbps RJ-45 network ports, which can provide a total bandwidth of 2Gbps. In addition, Port1 supports the transfer of Port2 and has the same relay hopping mechanism as PTP Mesh Hops.
PPS short packet transmission quantity	A wireless network card interface can transmit short packets> 40,000 or more, with a maximum bandwidth of 560Mbps Two wireless network card interfaces can send short packets> 60,000 or more, maximum bandwidth 820Mbps (The number of transmitted packets can be used as the basis for estimating the maximum number of device connections and allocated bandwidth traffic)
PTP Mesh Hops relay hopping platform -- Bandwidth	1. "Wireless transmission traffic bandwidth" of multi-point relay jumping platform: @ 80MHz transmission rate 867Mbps definition -- The transmission bandwidth of PTP Mesh Hops relay hopping platform, which will reduce the bandwidth of about 10-20Mbps once every hop The transmission bandwidth of the first hop can reach more than 500Mbps The transmission bandwidth of the second hop can reach more than 460Mbps The transmission bandwidth of the third hop can reach more than 440Mbps The transmission bandwidth of the fourth hop can reach more than 420Mbps The transmission bandwidth of the 5th hop can reach more than 400Mbps The transmission bandwidth of the 6th hop can reach more than 390Mbps The transmission bandwidth of the 7th hop can reach more than 380Mbps After 12 points of multi-point relay hopping, the transmission traffic bandwidth can still reach more than 300Mbps, which can provide a wireless large-bandwidth backbone transmission system in a large-scale factory area or form a high-speed mesh network transmission architecture system.

PTP Mesh Hops relay hopping platform -- Latency	2. "Wireless packet response delay (Latency)" for the number of multi-point relay hopping: -- PTP Mesh Hops adds 1ms delay per hop, and every third hop will increase 1-2ms delay The wireless packet response delay of the first hop is within 1ms The wireless packet response delay of the second hop is within 2ms The wireless packet response delay of the third hop is within 5ms The wireless packet response delay of the 4th hop is within 6ms The wireless packet response delay of the 5th hop is within 7ms The wireless packet response delay of the 6th hop is within 10ms The wireless packet response delay of the 7th hop is within 11ms > = 12-hop response delay <25ms, can provide high real-time video surveillance transmission and remote control system use.
Data security encryption and equipment security management	
Data security encryption	1. PTP Mesh network system has military-grade security features of exclusive private wireless transmission system. 2. PTP Mesh operation mode, with wireless security mechanism of system group ID (Main Group ID) and neighbor node connection ID (Link ID), similar to military-grade encryption method, replacing the previous low-level wireless network The standard encryption technology (WEP) wireless security mechanism supports 64bit / 128bit / 152bit data encryption. 3. With wireless security mechanism of service organization identification code (SSID). 4. With WPA / WPA2 PSK / CCMP AES key encryption.

Equipment safety management	1. Equipped with user interface and password input setting security function. 2. Firmware software update: dual backup design (Firmware Upgrade: Dual Backup Images). 3. The authentication encryption of the core software adopts random matrix encryption technology. 4. Customized products are equipped with modified parameters and preset frequencies and wireless operating parameters to achieve a separation from the use of general wireless equipment parameters. 5. Open the customer to switch the 2.4GHz & 5.8GHz frequency operation function of the wireless network card by hiding the webpage. 6. Open the client to change the login logo and account password of the device by hiding the webpage, which is convenient for the client to distinguish the display segmentation and security management mechanism of different crime scenes.
System management and system maintenance functions	
System management functions	1. Support HTTP (s) WEB GUI operation and management via web browser. 2. Support VLAN and VLAN Qos. 3. Support NTP Client for client network time correction. 4. Support dual configuration files / backup configuration files / restore factory settings. 5. Support Multiple Level Management.
System maintenance function	1. Software Support Hardware Watchdog. 2. Dedicated simple system network management software that supports L2-MAC layer system scanning and automatic detection display and automatic software update. 3. Provide OEM / ODM to customize, set, and manage the wireless device Logo and parameters. 4. Supports the operation of the utility network management software's scan detection and firmawre update mechanism. 5. Support for Firmware Upgrade / Downgrade. 6. Optional support for simple network management SNMP v2c / v3, standard / private MIBs (NRE optional).

Auxiliary tools for system construction	
Wireless connection signal scanning and connection status auxiliary tool	1. With the detection and scanning function of the wireless installation environment, to facilitate the wireless engineering technicians to determine the reference for channel selection and use. 2. Support dynamic wireless signal and transmission rate and flow display icons to facilitate wireless engineering technicians to judge the stability of wireless system operation. 3. Support on-site and long-distance wireless devices, mutually detect the connection signal value and transmission rate, and whether or not to display information encryption mechanism, so that wireless engineering technicians can judge the signal operation at both ends of the wireless system during future maintenance situation.
Antenna calibration and transmission bandwidth and packet loss rate test tool	1. After the antenna is set up, the wireless antenna calibration and adjustment mechanism is implemented through the built-in software to obtain the wireless RSSI signal strength information of the local end and the opposite remote end, so as to judge whether the antenna is aligned or not, and help the construction personnel to perform antenna adjustment. 2. Software testing mechanism that supports wireless link traffic transmission to confirm that the transmission bandwidth of the wireless system can exceed 500 Mbps or more, and at the same time display the packet loss rate to facilitate the determination of connection transmission stability. 3. Adopt "multiple two-way bandwidth test of real-time antenna adjustment" in the advanced function to carry out the actual verification and adjustment of wireless transmission traffic, so as to facilitate the operation evaluation of the operation bandwidth efficiency.

Wireless system transmission distance and bandwidth performance	
Wireless point-to-point transmission channel width and transmission distance and bandwidth traffic	1. Adopt HT80MHz channel width operation, the maximum transmission distance can reach 10km, the transmission rate can reach 867Mbps, the bandwidth flow rate is more than 550Mbps; the received signal must reach more than -50dBm 2. Using HT40MHz channel width operation, the maximum transmission distance can reach 20 kilometers, the transmission rate can reach 300Mbps, the bandwidth flow rate is more than 260Mbps; the received signal must reach more than -60dBm. 3. Use HT20MHz channel width operation, the transmission distance can reach more than 40 kilometers, the transmission rate can reach 144Mbps, the bandwidth flow rate is more than 100Mbps; the received signal must reach more than -70dBm. 4. Using HT20MHz channel width operation, the transmission distance can reach more than 50 kilometers, The received signal can reach more than -73dBm, the transmission rate can reach 117Mbps, and the bandwidth flow can be more than 80Mbps. The received signal can reach more than -76dBm, the transmission rate can reach 104Mbps, and the bandwidth flow can be more than 60Mbps. The received signal can reach more than -79dBm, the transmission rate can reach 54Mbps, and the bandwidth traffic can be more than 25Mbps. ** Special Note: When transmitting at full speed, the above-mentioned received signal will decrease by 6 ~ 10dBm.

➢ Packaging and accessories

- IOP-EGAP-SAC1 / IOP-EGAP-SAC2 802.11a / an / ac outdoor wireless bridge AP.
  or IOP-EGAP-DAC1 / IOP-EGAP-DAC2 802.11a / g / agn / agac outdoor wireless bridge AP.
- 802.3af / at standard 1Gbps 48V 0.6A PoE-PSE Ethernet power supply.
- AC 100V ~ 240V to DC 19V / 4.74A transformer, with US standard AC Code 1.5m power cord.
- IOP-UHMK-VESA75-1 VESA universal stainless steel wind pressure fixing frame assembly, with pole, lamp post, wall and other fixing functions.