



Outdoor WiFi MIMO wireless large bandwidth network system + Street lamp type DC UPS without interrupting the operation power supply system

**Apply to City Park, Science and Technology Industrial Park, School campuses, Elevated road,
Highways ... wireless surveillance project system**

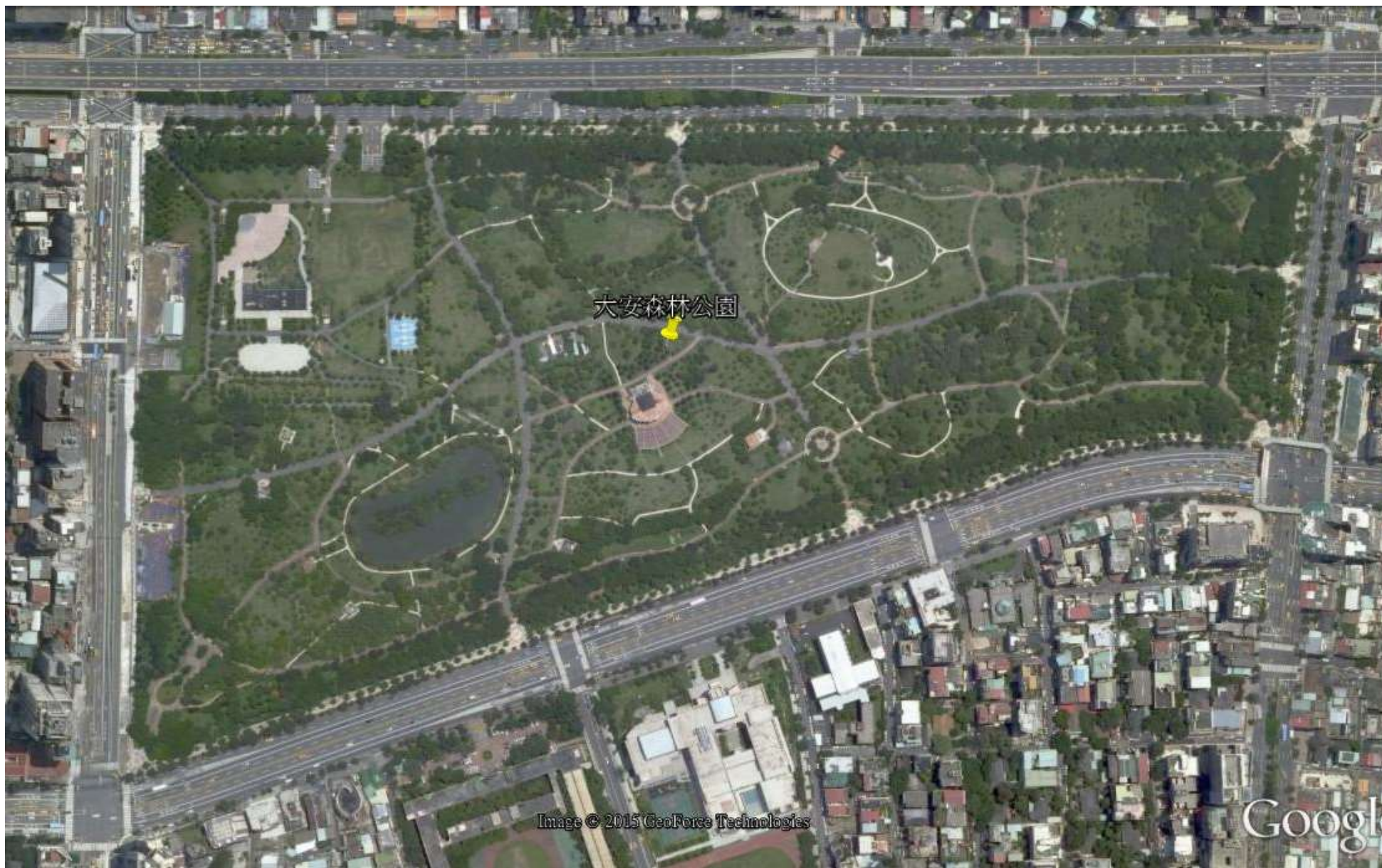
City of green parks, science parks, industrial parks, school campuses, elevated roads, highway ...etc., belong to public construction and operation of public places. Once the erection of additional surveillance cameras, infrared lights, video hosting, wireless transmission equipment, detection and control equipment ... and so on, shall be involves whether to excavation and laying of power lines or erecting dangling power lines to power supply the 24-hour operation of equipment system.

Because already exist power grid or power supply systems had completed for many years, to be added or modified power line system, there are many restrictions for the actual implementation, but also will cause a large construction project cost increases and subsequent maintenance of the system very difficult, even ordinary people commuting and daily operation.

Therefore, the existing street lamp of power supply source to power on at night as good use. Specially designed support high temperature and long cycle life DC UPS uninterrupted power supply system, it could solve difficult deployments power cable and demand a steady supply of 24 hours, the "Street lamp DC UPS without interrupting the operation power supply system" is bound to be the best power supply solution.



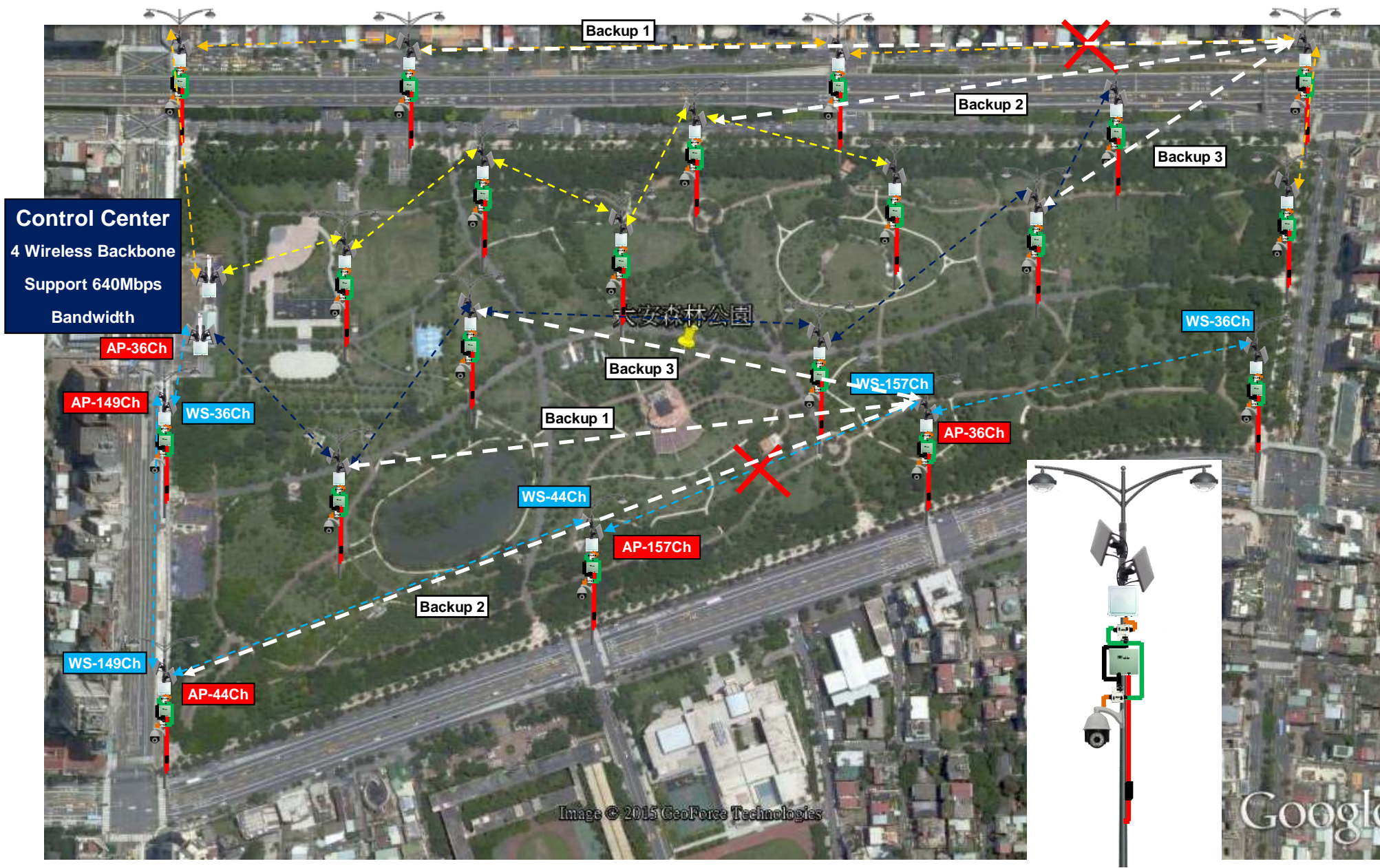
1、Google map of City Park (Da-An forest park, Taipei City)



2、Outdoor WiFi MIMO wireless "Multiple hops platform backbone transmission network" system design



3、Outdoor WiFi MIMO wireless "Multiple hops backbone transmission network" enable "3 backup AP link" design



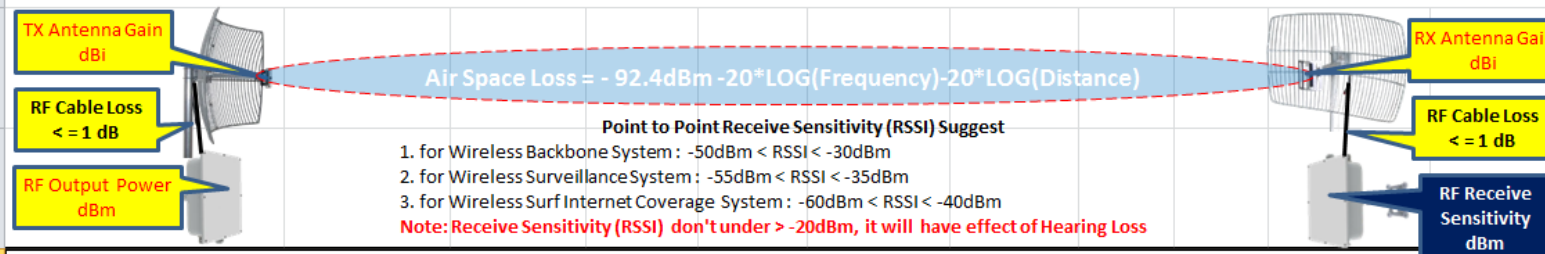
4、Outdoor WiFi MIMO Wireless transmission network system of "wireless transmission of rain attenuation" and "point to point wireless transmission signal" assessment

Wireless rain attenuation evaluations: 3Km distance, point-to-point wireless signal online affects about 200 mm of rainfall signals the rain attenuation within 3dBm

WiFi 2.4 ~ 2.485GHz & 5.25 ~ 5.85GHz 電波大雨衰減(Rain Attenuation)估算 單位: dB

PtP	2.4GHz ~ 2.485GHz Frequency									5GHz ~ 5.85GHz Frequency										
	Rainfall Rate	100mm/hr			200mm/hr			300mm/hr			100mm/hr			200mm/hr			300			
Km	EPD/Km	2.4	2.45	2.485	2.4	2.45	2.485	2.4	2.45	2.485	5.25	5.5	5.85	5.25	5.5	5.85	5.25	5.5	5.85	
1	0.64	0.06	0.07	0.07	0.15	0.16	0.16	0.24	0.26	0.27	0.41	0.46	0.53	0.96	1.07	1.23	1.57			
2	1.25	0.12	0.13	0.13	0.29	0.3	0.31	0.48	0.5	0.52	0.8	0.89	1.03	1.86	2.07	2.39	3.05			
3	1.81	0.18	0.19	0.19	0.42	0.44	0.46	0.69	0.73	0.75	1.17	1.3	1.5	2.71	3.02	3.48	4.44			
4	2.36	0.23	0.24	0.25	0.54	0.57	0.59	0.9	0.95	0.98	1.52	1.69	1.95	3.52	3.92	4.52	5.77			
5	2.88	0.28	0.3	0.31	0.66	0.7	0.72	1.1	1.15	1.19	1.85	2.06	2.38	4.29	4.78	5.5	7.02			

Wireless signal evaluation: 3Km distance, point-to-point wireless signals about online -56dBm (as the level of telecommunications), wireless transmission throughput up to 150Mbps.



無線鏈路訊號值(dBm)計算 (Wireless PtP Signal Sensitivity Calculation)

傳輸鏈路訊號計算 (Signal Selectivity Calculation)	RF Output Power dBm (Maximum)	RF Cable Loss Db (1m=0.6dB)	TX Antenna Gain dBi	Space Loss = 92.4	Frequency Loss GHz	Distance Loss Km	Rain Loss = 2 dB	Tree Loss 1m=5dB	RX Antenna Gain dBi	RF Cable Loss Db (1m=0.6dB)
參數定義 (Parameter definition)	無線最大輸出功率	RF線損耗	天線增益	空間衰減	頻率衰減	距離衰減	雨衰	樹衰	天線增益	RF線損耗
請填入數據 (Please fill in your data)	23	1	20	92.4	5.45	3	0	0	20	1
計算結果 (Calculation results)	-55.67									

5、 The power supply of the Park's lighting at night, specially designed lamp power supply uninterrupted operation power supply system

<< Special Note >>

City Park, science and technology industrial parks, school campuses, elevated roads, highway ...etc., the public construction and trading places. When you excavation of buried power lines or erecting dangling power lines etc., to the 24-hour operation of equipment system for power supply, there is actual implementation of a number of restrictions will also cause a large construction cost increases and subsequent maintenance of many difficulties.

Therefore, the existing street lamp power supply source of electricity at night to good use, through specially designed resistance to high temperature and long cycle life DC UPS uninterrupted power supply system and will definitely be the best power supply solutions.

1. Device power consumption:

- 1-1. Outdoor wireless AP APM-102RH: Define as 10W/H .
- 1-2. Outdoor 1Port DC PoE Injector: Define as 2W/H
- 1-3. Outdoor 100m IR network Speed Dome : @day 14W/H, @night 30W/H , Define average as 24W/H.

2. Design of street lamp power, with a temporary 4-hour blackout, without interrupting the operation of wireless surveillance system features (Total defined design could power consumption for system around 16 hours)

- 2-1. Outdoor Wireless AP APM-102RH Calculation: $10W/H * 16 H = 160W$
- 2-2. Outdoor 1Port DC PoE Injector Calculation: $2W/H * 16 H = 32W$
- 2-3. Outdoor 100m IR network Speed Dome Calculation: $24W/H * 16H = 384W$

Total: $160W + 32W + 384W = 576W/H$, $576W/H / 12.8V = 45Ah$

Suggest to use street lamp type DC UPS: IOP-USSP-1247-10B, 594 WH (46.4 Ah @ 12.8V)

3. Street lamp DC UPS systems description:

- 3-1. At day, wireless surveillance system using street lamp DC UPS's battery power, at night street lamp power on and charging the battery and charging controller continuous to power supply wireless surveillance system.
- 3-2. When the night lamp power due to temporary interruption of mains supply, can continue without interrupting the operation of wireless surveillance system for more than 4 hours.
- 3-3. Outdoor DC UPS power system support -stability voltage and anti-outburst shock (power surge, lightning surge).
- 3-4. In accordance with the actual outdoor temperature environmental test results, Streetlight power system charge and discharge after 1700 used (the equivalent of more than 5 years), still can keep 95% battery capacity.

Outdoor WiFi MIMO Panel Antenna
5GHz 20dBi 5Km-150Mbps

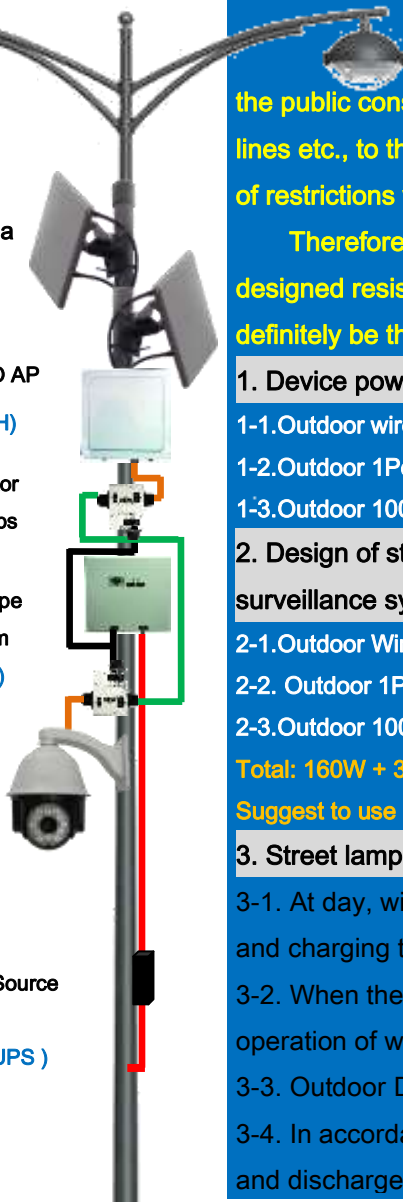
Outdoor WiFi MIMO AP
(IOP-APM-102RH)

Outdoor DC to DC PoE Injector
48VDC POE Bandwidth 1Gbps
(IOP-DPOE-PSP4872-1)

On Line Street Lamp Type
DC UPS Power System
(IOP-USSP-1247-10B)

Outdoor 100m IR
Network Speed Dome Camera
(Use Passive PoE-48VDC 72W)

100~240VAC Street Lamp Power Source
Output 18-28VDC Power
(At night power on to charge DC UPS)



<<<< Left Project Case: <<<<

1. Device power consumption:

- 1-1. Outdoor wireless AP APM-101RH: Define as 8W/H .
- 1-2. Outdoor 1Port DC PoE Injector: Define as 2W/H
- 1-3. Outdoor 20m IR network camera: : @day 4W/H, @night 8W/H ,Define average as 6W/H.

2. Design of street lamp power, with a temporary 4-hour blackout, without interrupting the operation of wireless surveillance system features (Total defined design could power consumption for system around 16 hours)

- 2-1. Outdoor Wireless AP APM-101RH Calculation: $8W/H * 16 H = 128W$
- 2-2. Outdoor 1Port DC PoE Injector Calculation: $2W/H * 16 H = 32W$
- 2-3. Outdoor 20m IR network camera Calculation: $6W/H * 16H = 96W$

Total: $128W + 32W + 96W = 256W/H$, $256W/H / 12.8V = 20Ah$

Suggest to use street lamp type DC UPS: IOP-USSP-1224-09B, 297 WH(23.2 Ah @ 12.8V)

>>>> Right Project Case: >>>>

1. Device power consumption:

- 1-1. Outdoor wireless AP APM-101RH: Define as 8W/H .
- 1-2. Outdoor 1Port DC PoE Injector: Define as 2W/H
- 1-3. Outdoor 50m IR network camera: @day 5W/H, @night 15W/H ,Define average as 10W/H.
- 1-4. Outdoor 4Port DC PoE Switch: Define as 4W/H
- 1-5. Outdoor 20m IR network camera: @day 4W/H, @night 8W/H ,Define average as 6W/H.

2. Design of street lamp power, with a temporary 4-hour blackout, without interrupting the operation of wireless surveillance system features (Total defined design could power consumption for system around 16 hours)

- 2-1. Outdoor Wireless AP APM-101RH Calculation: $8W/H * 16 H = 128W$
- 2-2. Outdoor 1Port DC PoE Injector Calculation: $2W/H * 16 H = 32W$
- 2-3. Outdoor 50m IR network camera Calculation: $10W/H * 16H = 160W$
- 2-4. Outdoor 4Port DC PoE Switch Calculation: $4W/H * 16 H = 64W$
- 2-5. Outdoor 20m IR network camera * 2 Calculation: $6W/H * 16H * 2 = 192W$.

Total: $128W + 32W + 160W + 64W + 192W = 580W/H$, $580W/H / 12.8V = 45Ah$

Suggest to use street lamp type DC UPS: IOP-USSP-1247-10B, 594 WH(46.4 Ah @ 12.8V)

Outdoor WiFi MIMO Panel Antenna
5GHz 20dBi 5Km-150Mbps

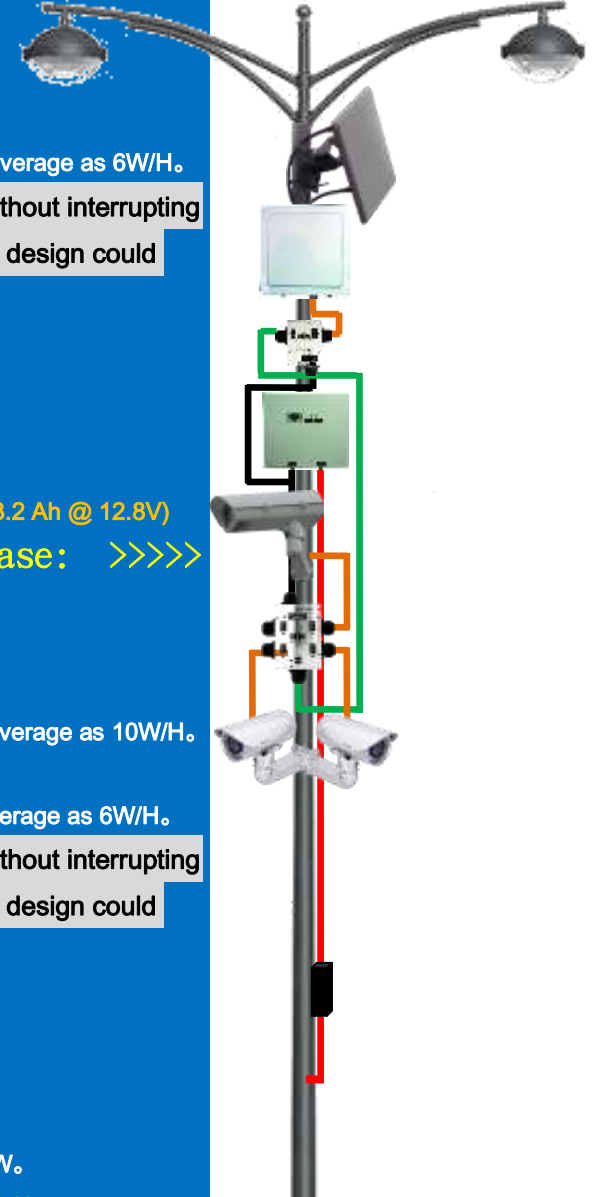
Outdoor WiFi MIMO AP
(IOP-APM-101RH)

Outdoor DC to DC PoE Injector
48VDC POE Bandwidth 1Gbps
(IOP-DPOE-PSP4872-1)

On Line Street Lamp Type
DC UPS Power System
(IOP-USSP-1224-10B)

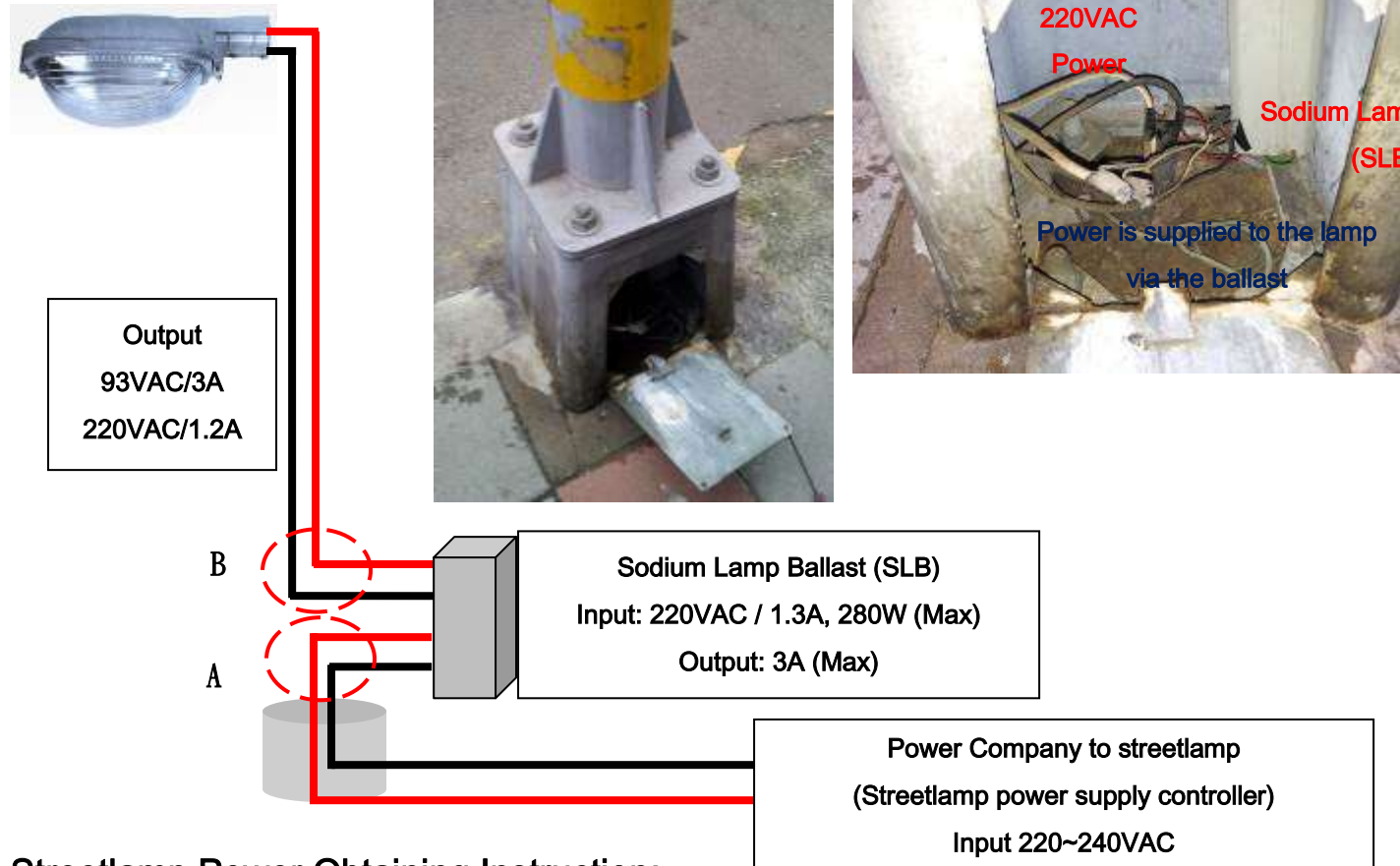
Outdoor 20m IR
Network Camera
(Use 12VDC Power)

100~240VAC Street Lamp Power Source
Output 18-28VDC Power
(At night power on to charge DC UPS)



6. Streetlamp Model DC UPS Installation Instruction

6-1. Streetlamp Power

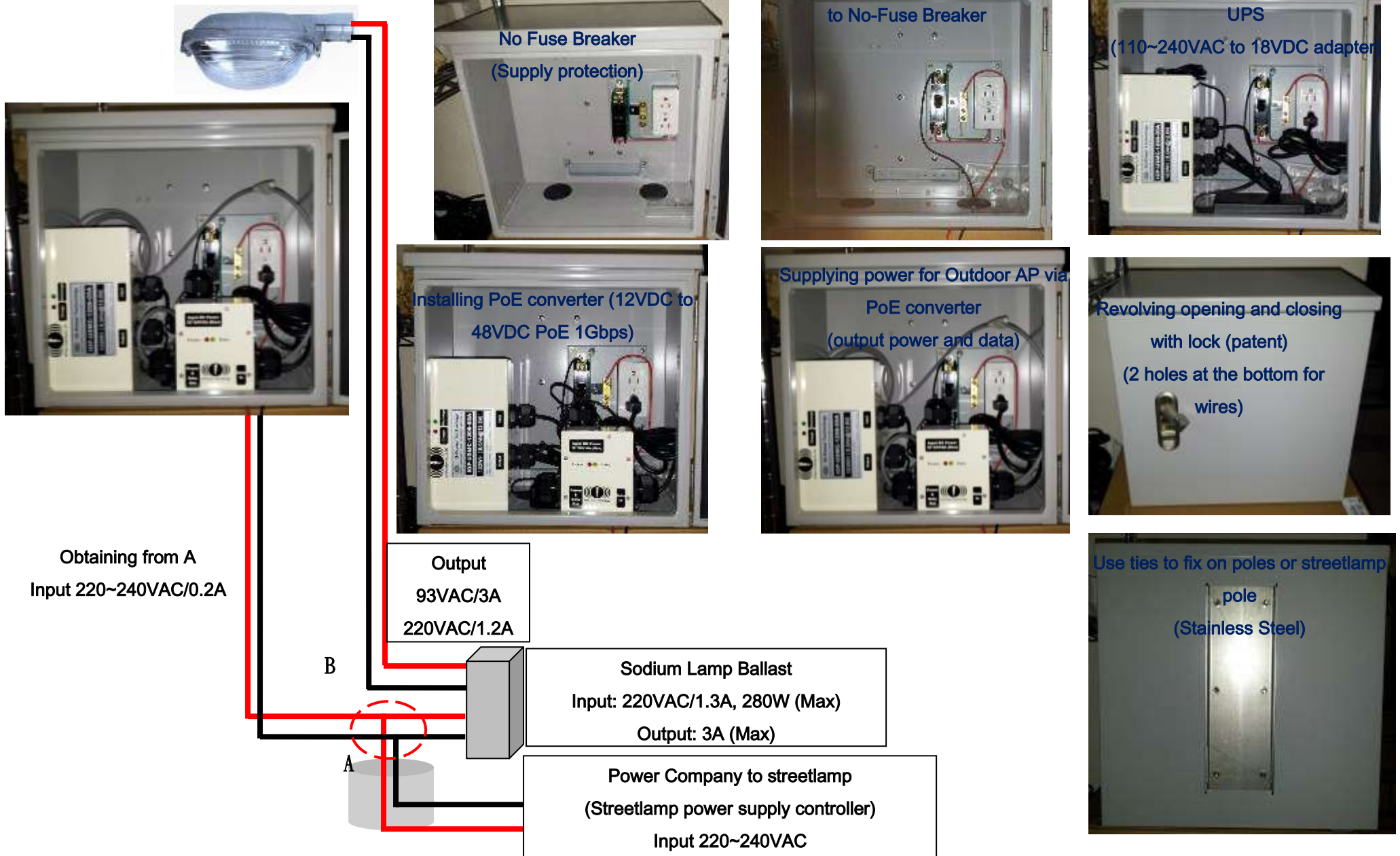


Streetlamp Power Obtaining Instruction:

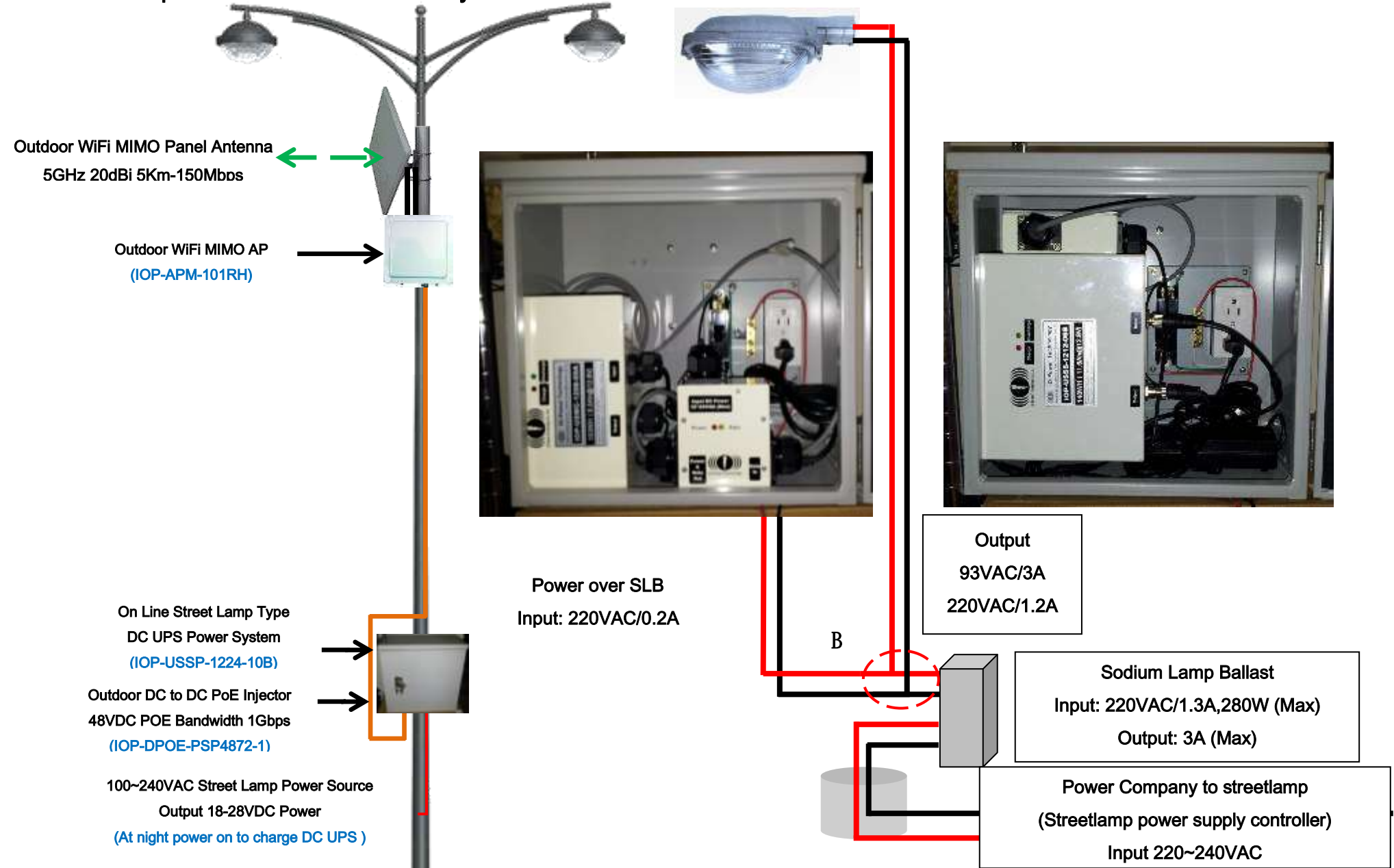
Obtaining from A (before SLB and after electric meter): Use 「No-Fuse Breaker」 or 「socket」 or 「cabling connecting」. The disadvantage is to receive the surges when power is on. And the advantage is no need to go through SLB and is able to protect SBL from surges.

Obtaining from B (after SLB): Need to consider if the power supply from 「SLB」 is enough. Use 「No-Fuse Breaker」 or 「socket」 or 「cabling connecting」. The disadvantage is unable to protect SLB and need to think about the power supply. The advantage is that the power via SLB is much more stable.

6-2. Distribution Box Installation



6-3. Streetlamp Model DC UPS Power System Installation



7、Project Cases Pictures

