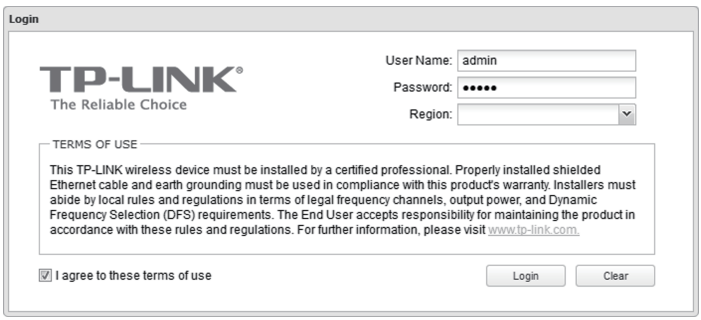
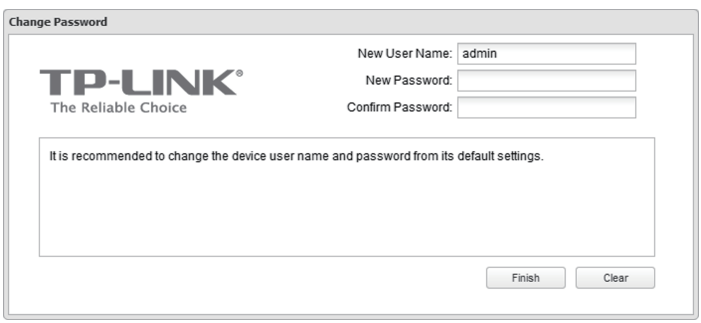
2. Open your web browser, type 'http://192.168.0.254' in the address field and press 'Enter'. It is recommended to use the latest version of Google Chrome, Safari or Firefox.

3. The 'Login' page will appear, set the parameters as below.

- Username: admin
- Password: admin
- Region: select according to your country/region
- Select 'I agree to these terms of use'
- Click 'Login'

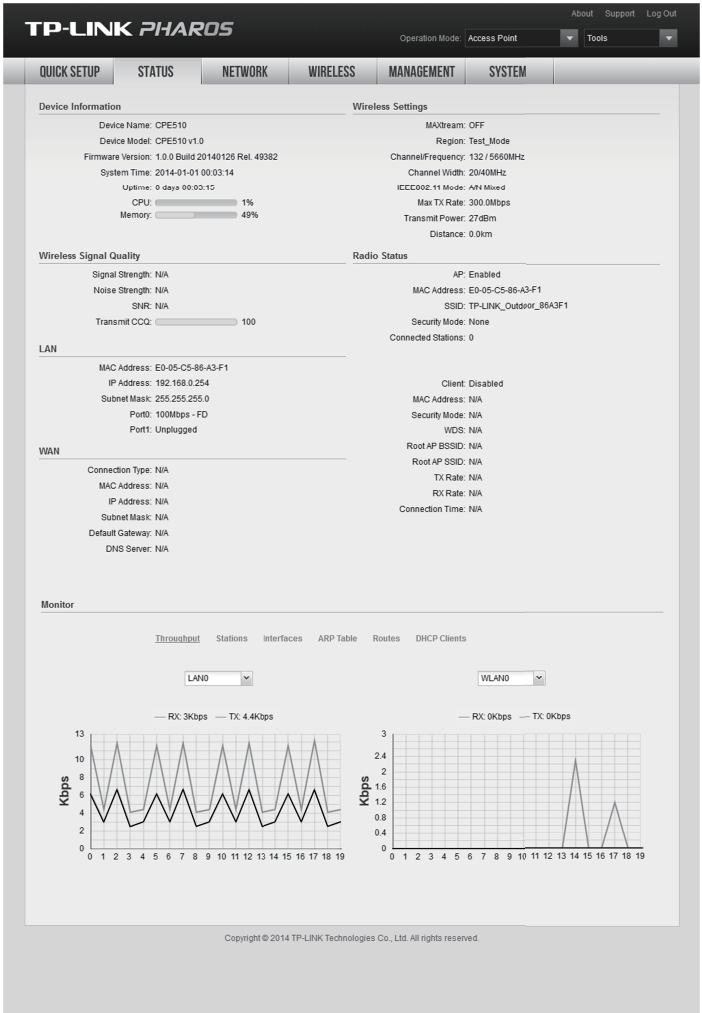


4. At the first login, change the 'Password' for safety.



For subsequent logins, you only need to enter the username and password that you have set to log in.

5. Then you will log in to the PharOS Web Interface and see the Status page, shown as the figure below.

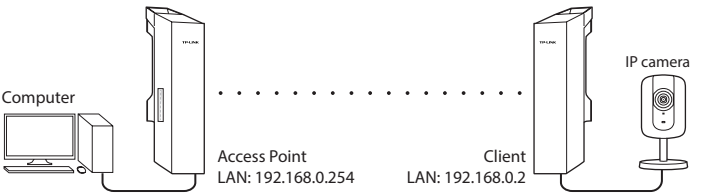


2. Configuration for Typical Application

This section introduces the configurations for the Point-to-Point application.

• Point-to-Point

Point-to-Point application is used to build a transparent bridge between two locations which are far from each other. The figure shown below is an example for this application.



Refer to the following steps to configure the CPEs.

Configure the Access Point

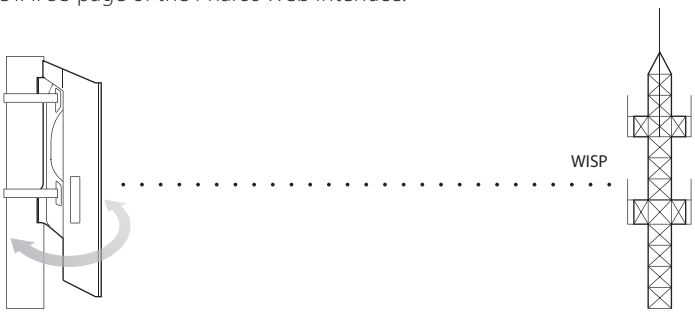
1. Log in to PharOS
2. Go to the Quick Setup page
3. Operation Mode
   - Select 'Access Point'
   - Click 'Next'
4. LAN Settings: Click 'Next'
5. Wireless AP Settings
   - SSID: customize the name for the network as you like
   - Security: select 'WPA-PSK/WPA2-PSK'
   - PSK Password: create the password for the network as you like
   - Distance Setting: enter the distance between the Access Point and the Client. It is recommended to round the number up to the nearest integer
   - Select the MAXtream option if the Access Point and the Client both are Pharos outdoor CPEs. (Refer to Q4 in FAQ for details about MAXtream)
   - Click 'Next'
6. Finsh: Click 'Finish'

Configure the Client

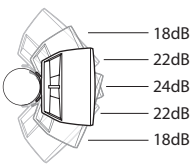
1. Log in to PharOS
2. Go to the Quick Setup page
3. Operation Mode
   - Select 'Client'
   - Click 'Next'
4. LAN Settings
   - IP Address: 192.168.0.2 (on the same subnet with the Access Point)
   - Click 'Next'
5. Wireless Client Settings
   - SSID of Remote AP: click 'Survey', select the SSID of the Access Point, and click 'Connect'
   - Security: select 'WPA-PSK/WPA2-PSK'
   - PSK Password: enter the password of the Access Point
   - Distance Setting: enter the same number with the Access Point
   - Click 'Next'
6. **Finsh:** Click 'Finish'

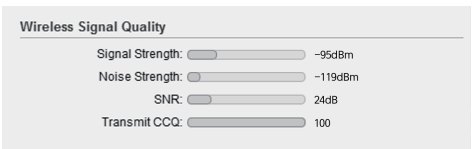
Antenna Alignment

In order to get the best performance, you can precisely align the direction of the CPE with the assistance of 'Wireless Signal Quality' on STATUS page of the Pharos Web Interface.



Adjust the direction of the CPE until the device reaches the highest SNR





Specifications

HARDWARE FEATURES				
Dimensions	CPE520/CPE220: 275.83*79*60.3mm CPE510/CPE210: 224.34*79*60.3mm			
Interface	LAN0: 10/100Mbps Ethernet Port(PoE IN) LAN1: 10/100Mbps Ethernet Port GND: Grounding Terminal for Lightning Protection RESET: Button to restore the device to Factory Default			
Power Supply	24V Passive PoE Adapter Included			
ESD Protection[1)]	15kV			
Lightning Protection[1)]	6kV			
Operating Temperature	-30℃ ~60℃ (-22℉ ~158℉)			
Operating Humidity	5% ~ 95 %			
Certification	CE, FCC, RoHS, IPX5			
WIRELESS FEATURES				
Models	CPE210	CPE220	CPE510	CPE520
Antenna Gain	9dBi	12dBi	13dBi	16dBi
Horizontal Beamwidth/ Elevation Beamwidth[2)]	65°/ 45°	45°/ 30°	45°/ 33°	50°/ 20°
Maximum Transmit Power[3)]	27dBm	30dBma	27dBm	30dBm
Operating Frequency	2.4-2.4835GHz	2.4-2.4835GHz	5.15-5.85GHz	5.15-5.85GHz
802.11 Standards	11b/g/n	11b/g/n	11a/n	11a/n

Note

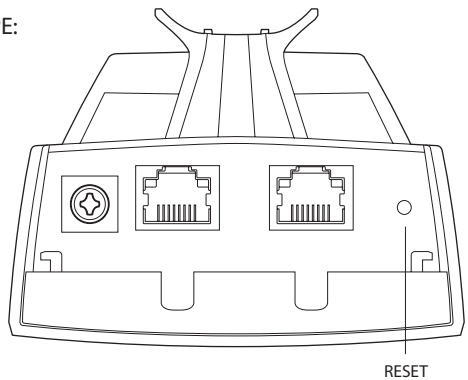
1) Estimation is based on copper grounding cable and shielded CAT5e cable with ESD drain wire.
2) Beamwidth values may vary throughout operating frequency.
3) Maximum transmit power and operating frequency may vary in different countries or regions.

Frequently Asked Questions (FAQ)

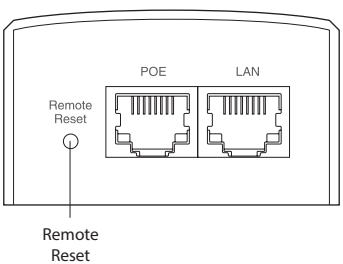
Q1. How to restore the CPE to its factory default settings?

With the CPE powered on, press and hold the 'RESET' button of the CPE or the 'Remote Reset' button of the Passive PoE Adapter for about 8 seconds until the Wireless Signal Strength LEDs flash.

Pharos CPE:

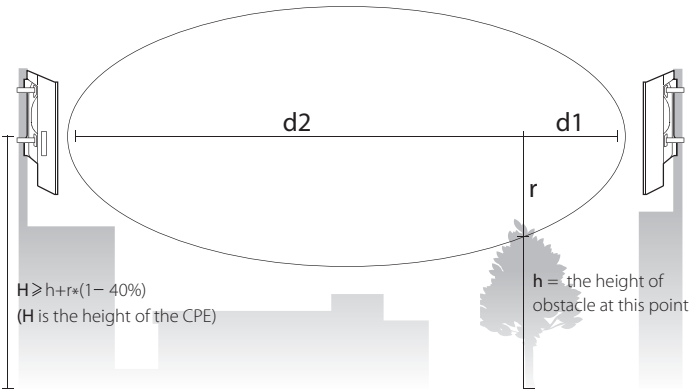


Passive PoE Adapter:



Q2. How to calculate the minimum mounting height of the devices?

In order to maximize the received signal strength of the devices, installers need to minimize the effect of the out-of-phase signals, which is caused by obstacles in the path between the transmitter and the receiver. Fresnel Zone is a usual method to calculate this path, as shown in the formula and the figure below.



$$r = \sqrt{\frac{d_1 \times d_2}{d_1 + d_2} \cdot \frac{c}{f}}$$

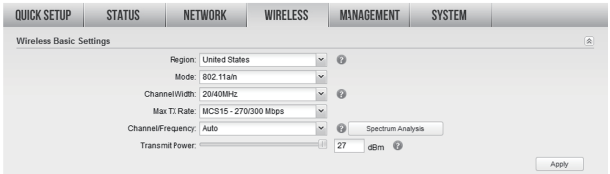
where,
r = Fresnel zone radius in meters
c = $3x10^8$ m/s, speed of light
f = operating frequency of the devices in Hz
d1 & d2 = the distances between the point and the devices in meters

For example, assume d1 is 2km, d2 is 8km, and f is 2.4GHz, then r would be 14.142m. Considering a toleration of 40%, allowable radius would be 8.485m. Assume h is 10m, then the result of the minimum mounting height based on this point would be 18.485m. Similarly, calculate the results based on all the points where there are obstacles, and the maximum value would be the final result.

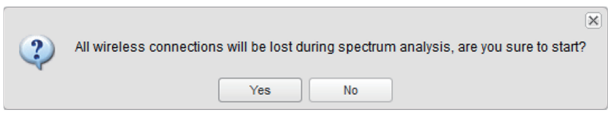
For more information, please refer to
http://en.wikipedia.org/wiki/Fresnel_zone

Q3. How can I use Spectrum Analysis to find the appropriate channel for the devices?

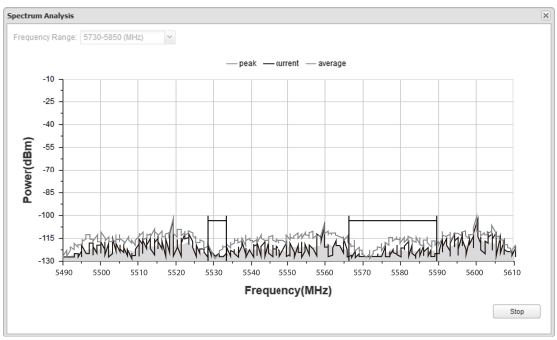
1. Log in to PharOS, on the 'WIRELESS' page, you can find the 'Spectrum Analysis' button as shown in the figure below. Click the button.



2. The following window will pop up. Click 'Yes' and you will then get into the Spectrum Analysis page.



3. Select the 'Frequency Range' and click the 'Start' button, the PharOS will begin to analyze the power of the frequency. Watch the curves for a period of time, and then click 'Stop'. Mark the relatively low and continuous part of the average curve, and note the corresponding frequency range.
Here we take the figure below as an example.



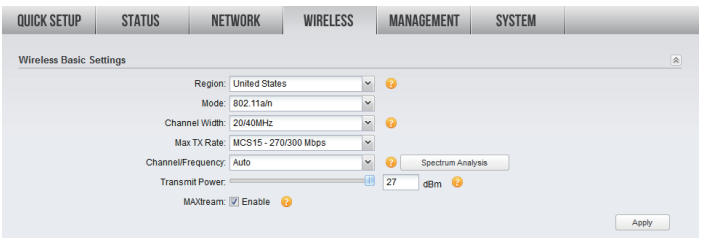
4. Close the Spectrum Analysis Window, and then you will get back to the Wireless page. For the Channel/Frequency option, it is recommended to select a value whose frequency is within the noted frequency range.
So, in this example, the recommended Channel/Frequency is 116/5580MHz.

Q4. What is Pharos MAXtream?

Pharos MAXtream is a proprietary protocol developed on the basis of Time Division Multiple Access (TDMA) by TP-LINK.

The MAXtream technology has the following advantages:
• Eliminates hidden node collisions & improves channel efficiency.
• Lower latency, higher throughput, larger network capacity & more stability.

To enable the MAXtream function among the AP and stations, you only need to select the MAXtream option on the 'WIRELESS' page of the PharOS Web Interface of the AP, shown as the figure below. Then the stations will automatically adjust their connections to the AP.



Pharos MAXtream is a non-standard Wi-Fi protocol that is only compatible with TP-LINK's Pharos series products. Please notice that you will not be able to connect other Wi-Fi devices to an AP with MAXtream enabled.

FCC STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

"To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

Limited to local law of the United States, selecting country code and channel function was disabled.

The permitted channel&power is controlled by wireless driver.The end-user have no permission and no way to change it. That is to say that The device can only work in legal channel&power.

CE Mark Warning

CE 1588 ⓘ

This is a class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Canadian Compliance Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) This device may not cause interference, and
(2)This device must accept any interference, including interference that may cause undesired operation of the device.
Cet appareil est conforme aux norms CNR exemptes de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes:
(1) cet appareil ne doit pas provoquer d'interférences et
(2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité de l'appareil.

Industry Canada Statement

Complies with the Canadian ICES-003 Class B specifications.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
This device complies with RSS 210 of Industry Canada. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.
Cet appareil numérique de la Classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Safety Information

- When product has power button, the power button is one of the way to shut off the product;

When there is no power button, the only way to completely shut off power is to disconnect the product or the power adapter from the power source.

- Don't disassemble the product, or make repairs yourself. You run the risk of electric shock and

voiding the limited warranty. If you need service, please contact us.

- Avoid water and wet locations.

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This product can be used in the following countries:

AT / BG / BY / CA / CZ / DE / DK / EE / ES / FI / FR / GB / GR / HU / IE / IT
LT / LV / MT / NL / NO / PL / PT / RO / RU / SE / SK / TR / UA

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Website: http://www.tp-link.com
Tel: +86 755 26504400
E-mail: support@tp-link.com
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