HIKVISION

DS-3WF03C

User Manual

User Manual

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About this Manual

This Manual is applicable to DS-3WF03C (Product Series).

The Manual includes instructions for using and managing the product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please find the latest version in the company website (http://overseas.hikvision.com/en/).

Please use this user manual under the guidance of professionals.

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FCC Information

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC compliance: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Conditions

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.

EU Conformity Statement

This product and - if applicable - the supplied accessories too are marked with "CE" and comply therefore with the applicable harmonized European standards listed under the EMC Directive 2014/30/EU, the LVD Directive 2014/35/EU, the RoHS Directive 2011/65/EU.

2012/19/EU (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information see: www.recyclethis.info

2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: www.recyclethis.info

Industry Canada ICES-003 Compliance

This device meets the CAN ICES-3 (A)/NMB-3(A) standards requirements.

Applicable Models

This manual is applicable to switches below: DS-3WF03C (product series).

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
![NOTE]	Provides additional information to emphasize or supplement important points of the main text.
![WARNING]	Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
![DANGER]	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

![WARNING]

● During the installation and utilization of the device, please strictly conform to electrical safety rules in different nations and regions.

● You shall acknowledge that the use of the device with Internet access might be under network security risks, please strengthen protection for your personal information and data security. If you find the device might be under network security risks, please contact with us.

Catalog

Chapter 1 Introduction

1.1 Overview

DS-3WF03C wireless bridge can be applied in industries, such as wireless video surveillance, railway, transportation, power and other industries, wireless video/data transmission, wireless coverage, carrier wireless backbone network construction, Wi-Fi wireless coverage, rural information construction, and wireless network coverage. The long-distance transmission of the device can guarantee multi-channel HD video transmission.

1.2 Packing List

The packing list is shown as below. If any accessories are damaged or lost, keep the package intact and contact your dealer for replacement.

Table 1-1 Packing List of DS-3WF03C

Name	Item	Quantity
Device	DS-3WF03C	1
PoE Adapter	24 V, 0. 5 A	1
Power Cord	Power Cord	1
Hoop	Hoop for mounting device	2
Quick Start Guide	Instruction manual	1

1.3 Appearance

1.3.1 Front Panel

Front panel of DS-3WF03C is shown as below.

Front Panel of DS-3WF03C

Figure 1-1 DS-3WF03C Front Panel

Indicator

Indicators are used to monitor the status of the DS-3WF03C. See the following table for the description of the indicators.

Figure 1-2 Indicators

Table 1-2 Indicator Description

Indicator	Description
⏻	Power indicator. If the green light is steady on, it indicates that the power is on.
LAN	Network connection light. The light indicates there is one IPC or other network device connects to the LAN port of PoE adapter. Blinking means sending data.
WLAN	Wireless indicator light. The light indicates that the wireless is enabled. Blinking means sending data.
◢	Signal strength indicator light. Red light on, indicating that the signal is weak or no signal. Yellow and red lights on, indicating signal level is medium. Green, yellow and red lights on, indicating the wireless signal level is strong

Physical Interface

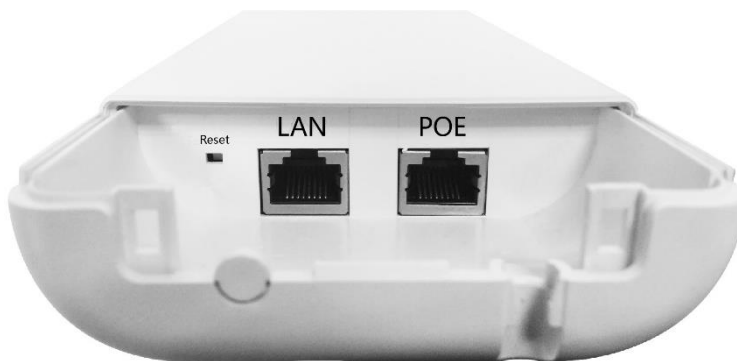The hardware interfaces of the DS-3WF03C are as follows.

Figure 1-3 Physical Interface

Table 1-3 Physical Interface

Physical Interface	Description
Reset	Restore default factory settings
LAN	Access to the camera, information distribution screen and other equipment
POE	PoE port connection with PoE power supply

Chapter 2 Installation

Step 1 Select the unobstructed high point around the device to ensure that the devices are aligned and there is no obstruction in the middle. Fix the device as shown in the figure below. Attach the back of the device to the pole, use the hoop to pass through the hoop hole on the back of the device, tighten the hoop, and fix the device on the pole.
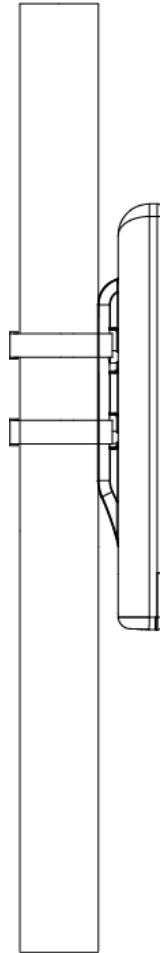

Figure 2-1 Install host

Step 2 Connect the PoE interface of the device to the PoE interface of the PoE power supply through the network cable. The LAN interface of the device and the LAN interface of the PoE power supply can be connected to the front-end network devices such as IPC through the network cable, as shown in the following figure.
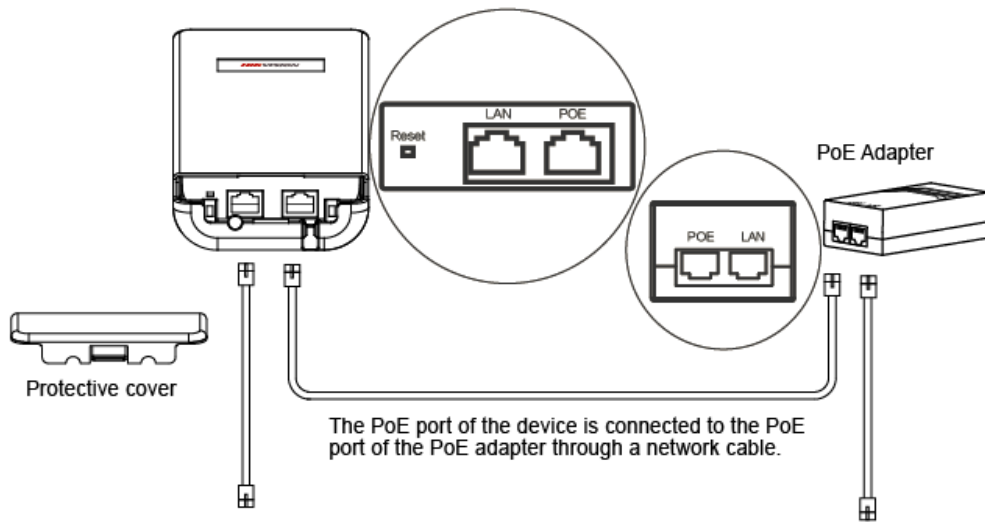
Figure 2-2 Power on the device

Step 3 The schematic diagram of the installation of the device is as follows.
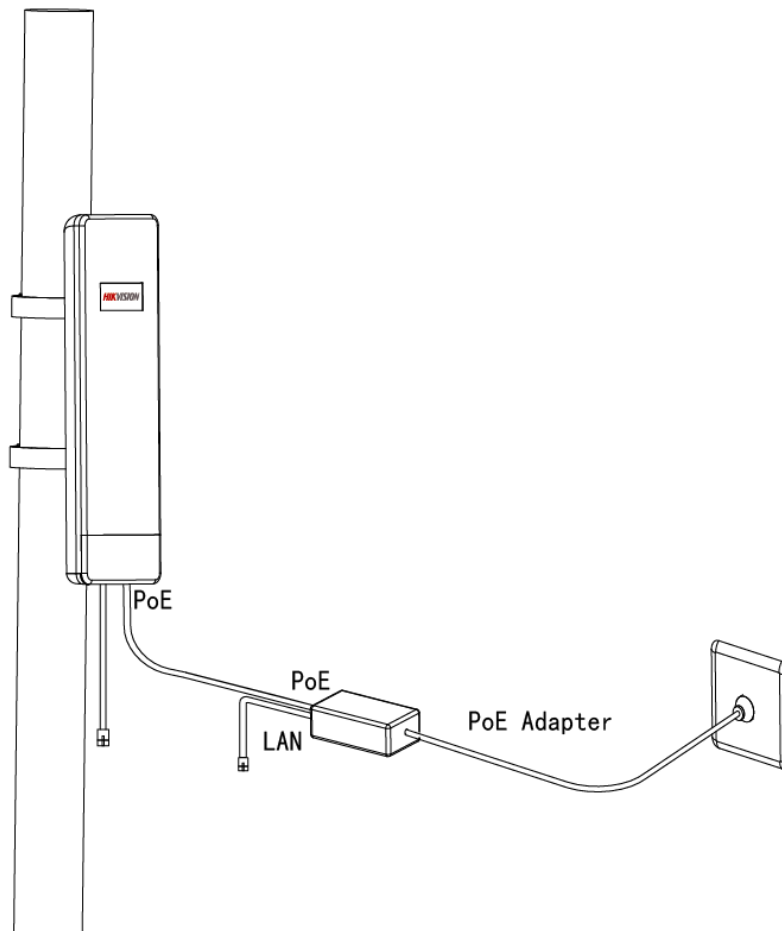

Figure 2-3 Finish installation

Chapter 3   Quick Configuration

This chapter describes how to configure the device quickly.

3.1   Log in

To log in the device, user needs to configure the TCP/IP of your computer first as the following steps:

Step 1 Use a network cable to connect the computer to the LAN interface of the device or PoE power supply to prepare the device. First, you need to configure the computer IP address and the device's default IP address to be on the same network segment. Take the Windows 7 system as an example. Click the network logo in the lower right corner of the desktop and click Open Network & Internet settings-Network and Sharing Center. As shown below.
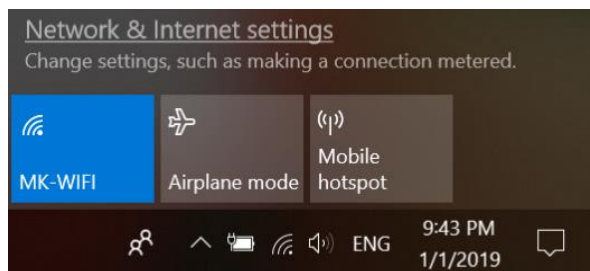

Figure 3-1 Network & Internet settings

Step 2 Click "Local Area Connection" on the right and click "Properties". As shown below.
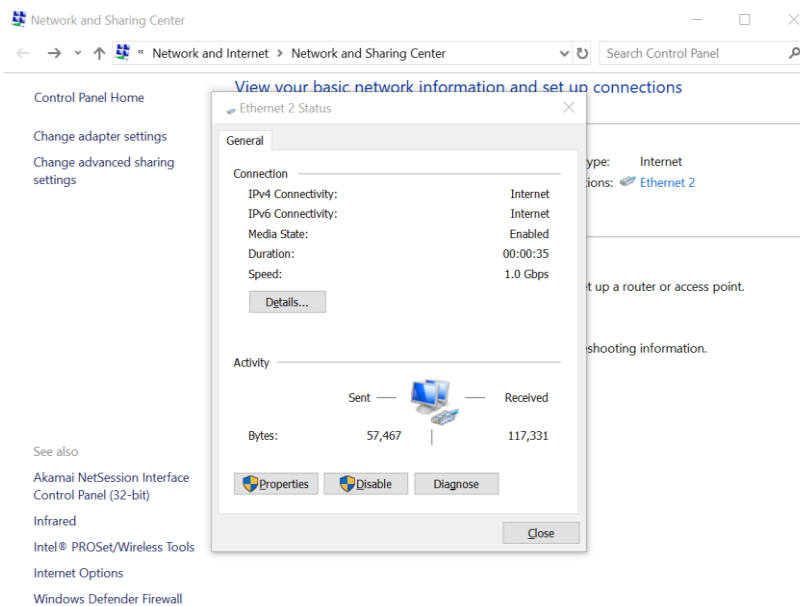

Figure 3-2 Local Area Connection

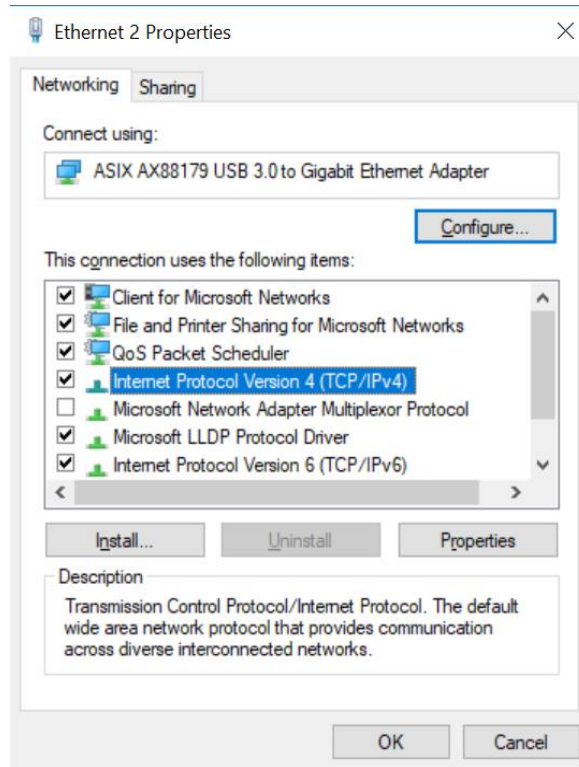Step 3 Double-click Internet Protocol Version 4 (TCP/IPv4). As shown below.

Figure 3-3 Internet Protocol Version 4 (TCP/IPv4)

Step 4 Configure the IP address of the computer to be the unused 192.168.1.X address in the LAN. X is any integer other than 36 in 2 to 253. The subnet mask is 255.255.255.0. Click "OK" as shown below.
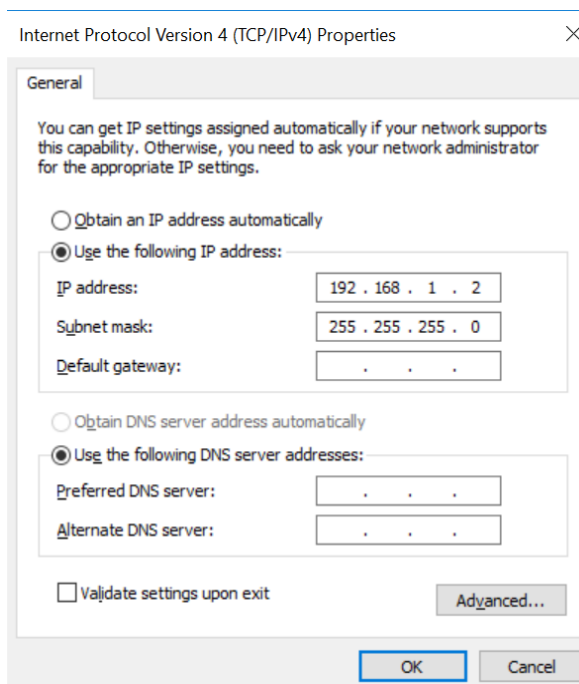

Figure 3-4 Configure the IP

Make sure that the IP address of the computer is inconsistent with the default IP address of the device. On the same network segment, use a browser to log in to the device, open a browser, and enter the default IP address of the device in the address bar: 192.168.1.36.

![NOTE icon] **NOTE**

● When you log in to the device for the first time, click Enter, enter the device activate page. The user name is admin, and the user password is set by the user. You also need to select your password, country, language and time zone, as shown in Figure 3-5. Check "I agree to these terms of use" and click "Activate". Take the AP device as an example.
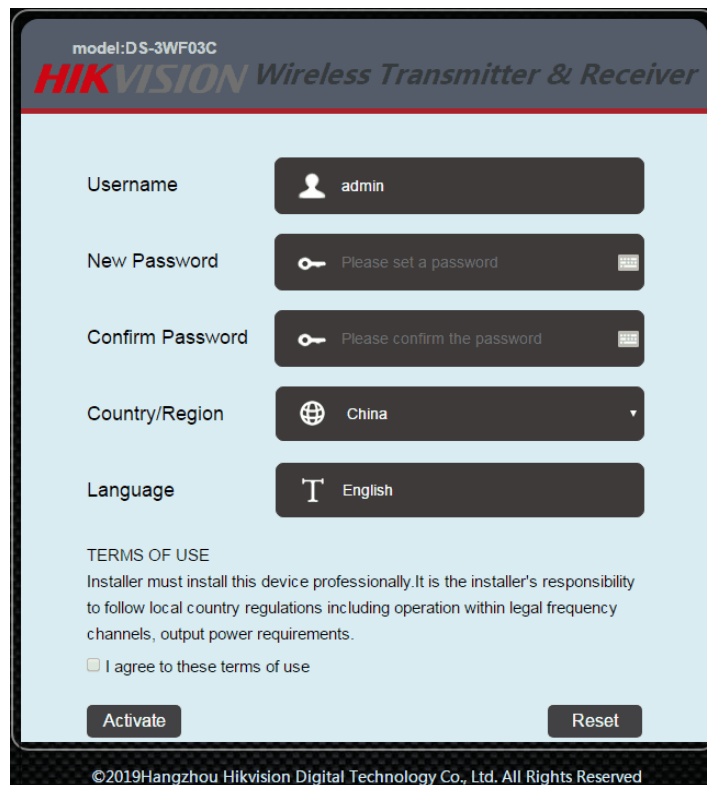

Figure 3-5 login

3.2 Wizard

The users will see how to configure the device quickly in this chapter.

Step 1 Go to the device page and click the "Wizard" bar at the top of the page to enter the "Network" page to set the IP address of the device. In the address field of the LAN IP, fill in 192.168.1.X, X is any integer from 2 to 253, and the address is not used. The subnet mask can be used by default. Click "Next" when finished.
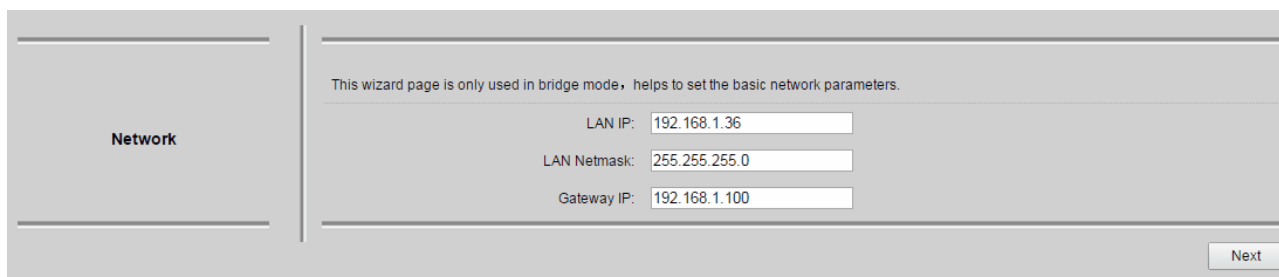
Figure 3-6 Wizard – Network

Step 2 Go to the "Wireless" page. The device can modify the wireless parameters such as network name, frequency, and key through this page. The default wireless mode of the device is the Station. The default network name of the device is Wireless. When pairing with the Access Point device, please note that the key and the SSID on the Station side must be the same as the Access Point. Other configurations are recommended to keep the default values. Click "Next".

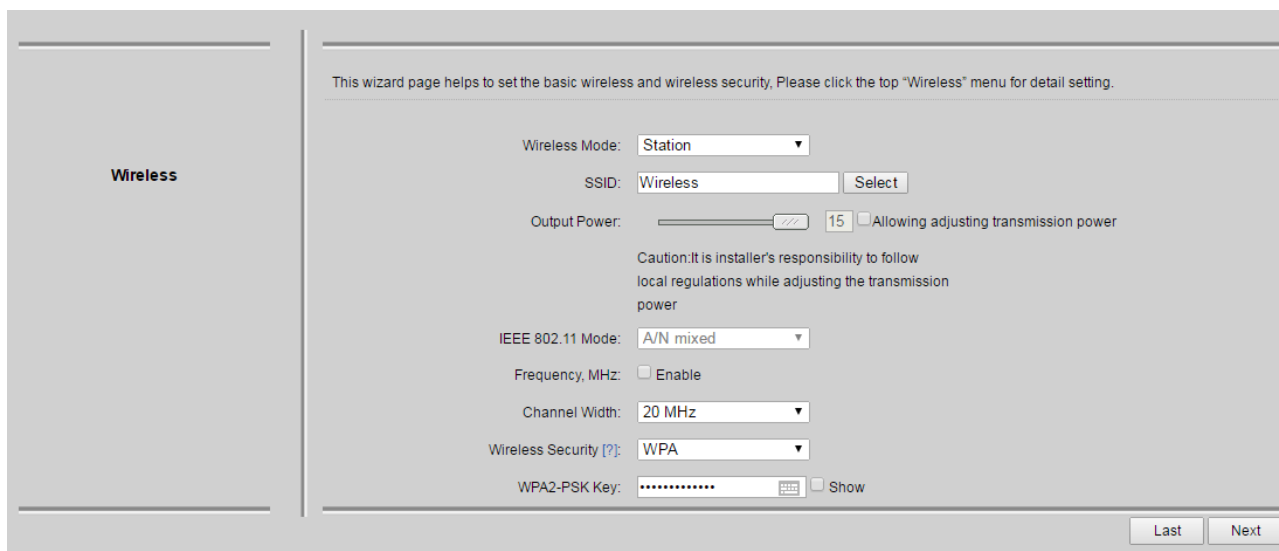

Figure 3-7 Wizard – Wireless

Step 3 Go to the Setup "Wizard – Finish" page and click "Change" to save the configuration.
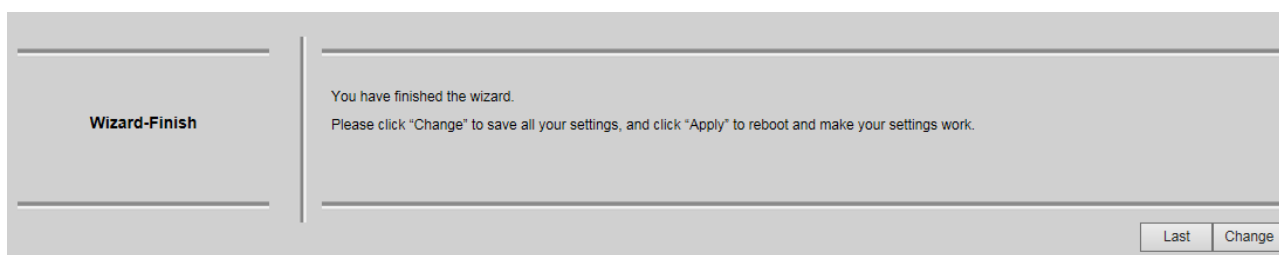

Figure 3-8 Wizard – Finish

For the Access Point device configuration, please refer to the station device configuration.

Chapter 4　Status

Status shows the current configuration and real-time monitoring of the device. This page is divided into 2 parts: Status and Monitor.

4.1 Status

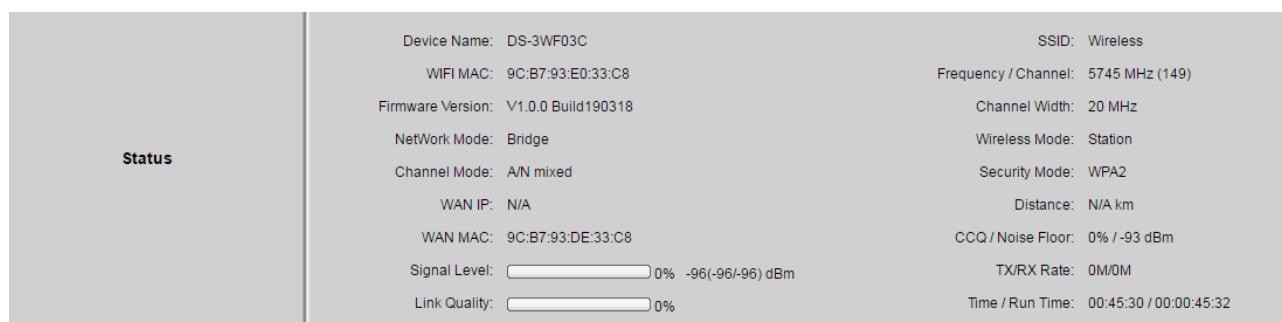The status page is shown in the following Figures：
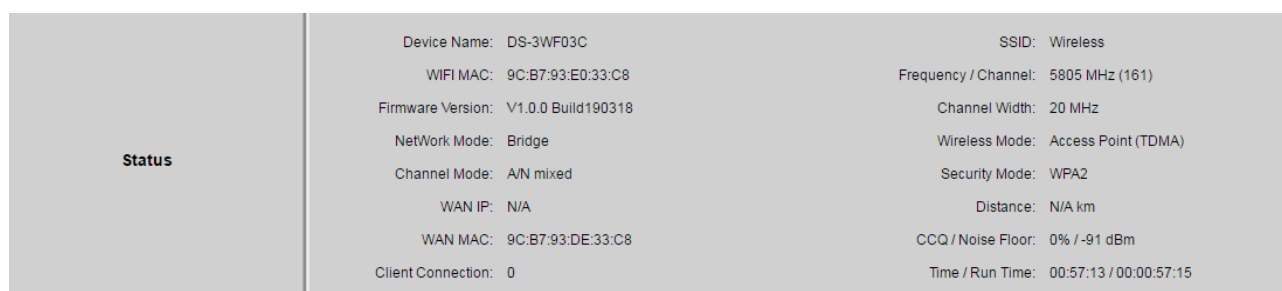

Figure 4-1 Status-Station

Figure 4-2 Status-AP

All the configurations in Status page is shown in Table 4-1.

Table 4-1 Configurations shown in Status

Items	Description	Items	Description
Device Name	Name of the device	SSID	Name of the wireless network
WIFI MAC	MAC of the wireless port	Frequency/Channel	Wireless channel chosen
Firmware Version	Software version number	Channel Width	20 MHz/40 MHz
Network Mode	Network mode: Router or Bridge	Wireless Mode	Access Point, Station, WDS Access Point, WDS Station
Channel Mode	Wireless	Security Mode	Wireless encryption method

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	communication protocol		
WAN IP	WAN IP address	Distance	The distance between two associated devices
WAN MAC	MAC of the WAN port	CCQ/Noise Floor	CCQ: Client link quality, the general recommended value of 90% or more, when the CCQ shows less than 90%, the user may consider to take the appropriate method to improve the link quality (Such as changing the environment, channel, etc.) Noise Floor: Noise Floor value, in order to achieve the best equipment, it is generally recommended at least less than -95dBm noise in the use of the environment.
Signal Level(Only the station page is displayed)	It indicates the signal strength of the device, recommended signal strength of 60% or more (or -30 dBm ~ -60 dBm), when the signal strength is less than 25%, the display bar turns red	TX/RX Rate(Only the station page is displayed)	The date rate of current device during sending and receiving data
Link Quality(Only the station page is displayed)	Quality of the connection link, the recommended value is more than 60%, when the display is less than 25%, the display turns red	Time/Run Time	Time: The real-time. Run Time: Equipment running time.
Connection(Only the AP page is displayed)	The number of station devices that the device is connected to		

4.2 Monitor

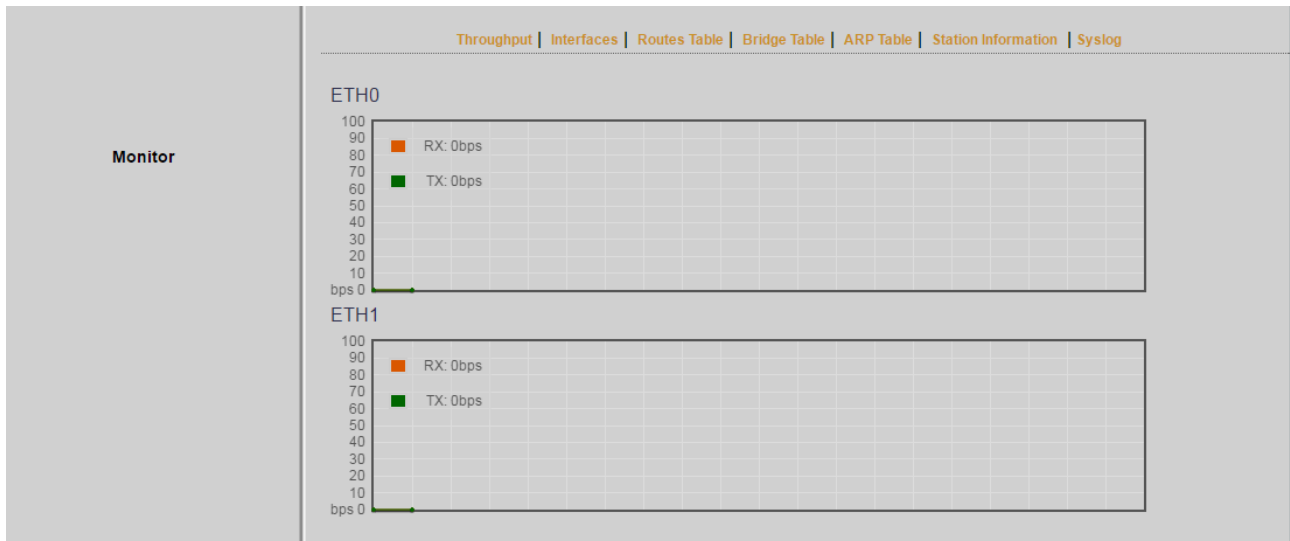The Monitor page is shown below:

Figure 4-3 Monitor

Throughput: The figure here monitors the real-time throughput of the ETH0 port (the LAN port of the PoE power supply) and the ETH1 port (the LAN port of the device).

Interfaces: Device interface MAC address, MTU, IP, RX Bytes, RX Errors, TX Bytes, and TX Errors.

Routes Table: It is stored in a router that lists the routes to particular network destinations, and in some cases, metrics (distances) associated with those routes. The route table contains information about the topology of the network immediately around it.

Bridge Table: It lists all the devices that communicate through the DS-3WF03C device.

ARP Table: It lists the IP address and MAC address of the devices that communicate through the LAN port of the DS-3WF03C device.

AP/Station Information: Showing the status information of the associated devices. For example, if the DS-3WF03C device is an AP, and the associated device is a Station, and this Station Information shows the related information of the Station device. If the DS-3WF03C is a Station, and AP Information shows the associated AP device's information.

Syslog: Display the log information of DS-3WF03C.

Chapter 5 TDMA

Currently, most of the outdoor bridge products are developed based on 802.11 protocols, however, it has the limitations of short-distance, hidden node problems, and poor point-to-multi-point performance.

VTrans technology utilizes a series of advanced technologies such as TDMA, 20 M/40 MHz bandwidth support, intelligent rate control, Auto ACK Time-out Adjust, having the advantage of long transmission range, high date rate and robust transmission.

TDMA technology solves the problems of hidden-node problem in the 802.11 network infra-structure. 20 M/40 MHz bandwidth can be flexibly configured by the uses in different working scenario to achieve the best link quality. Intelligent rate control algorithm can be adapted to quick channel quality variations, while stabilize the wireless throughput, thus suitable for long-distance transmission. ACK Time-out Auto Adjust can automatically detect the distances of the devices, and adjust the wireless parameters to achieve the best link quality.

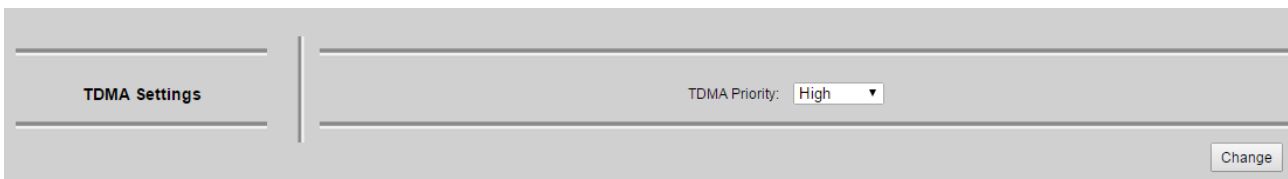The TDMA setting is shown in the following figure:

Figure 5-1 TDMA Settings

To use the TDMA, the user needs to enable TDMA mode in the AP device, and set a priority level in the station device. When several stations are connected to one AP, different stations demand different throughput. If the station demands higher throughput, its priority level can be set to High, otherwise set to Low. When the stations demand the same throughput, their priority level can be set to the same level.

NOTE

● When using TDMA mode, the TDMA button need to be enabled at both AP and station devices in the web-based configuration menu. The devices from other vendors cannot be connected to DS-3WF03C in the TDMA mode.

Chapter 6　Wireless

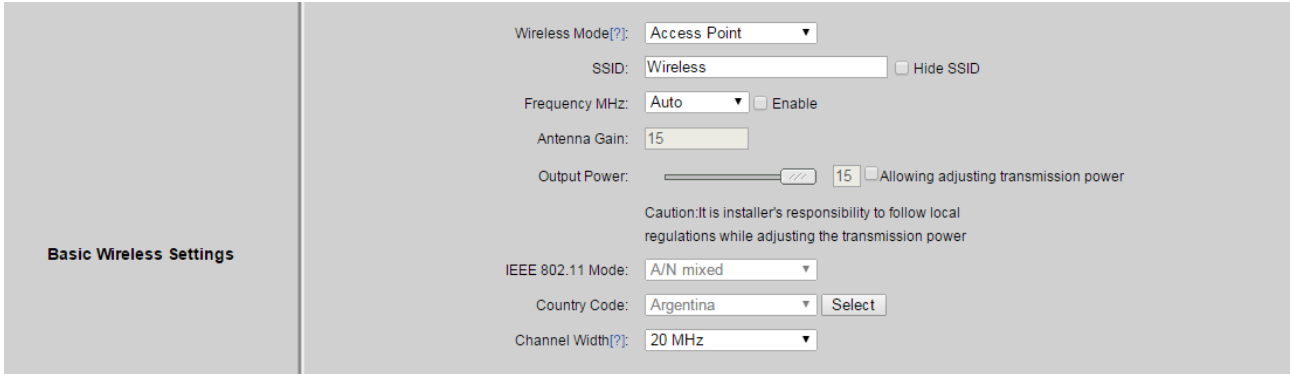Wireless is shown in the following figure:
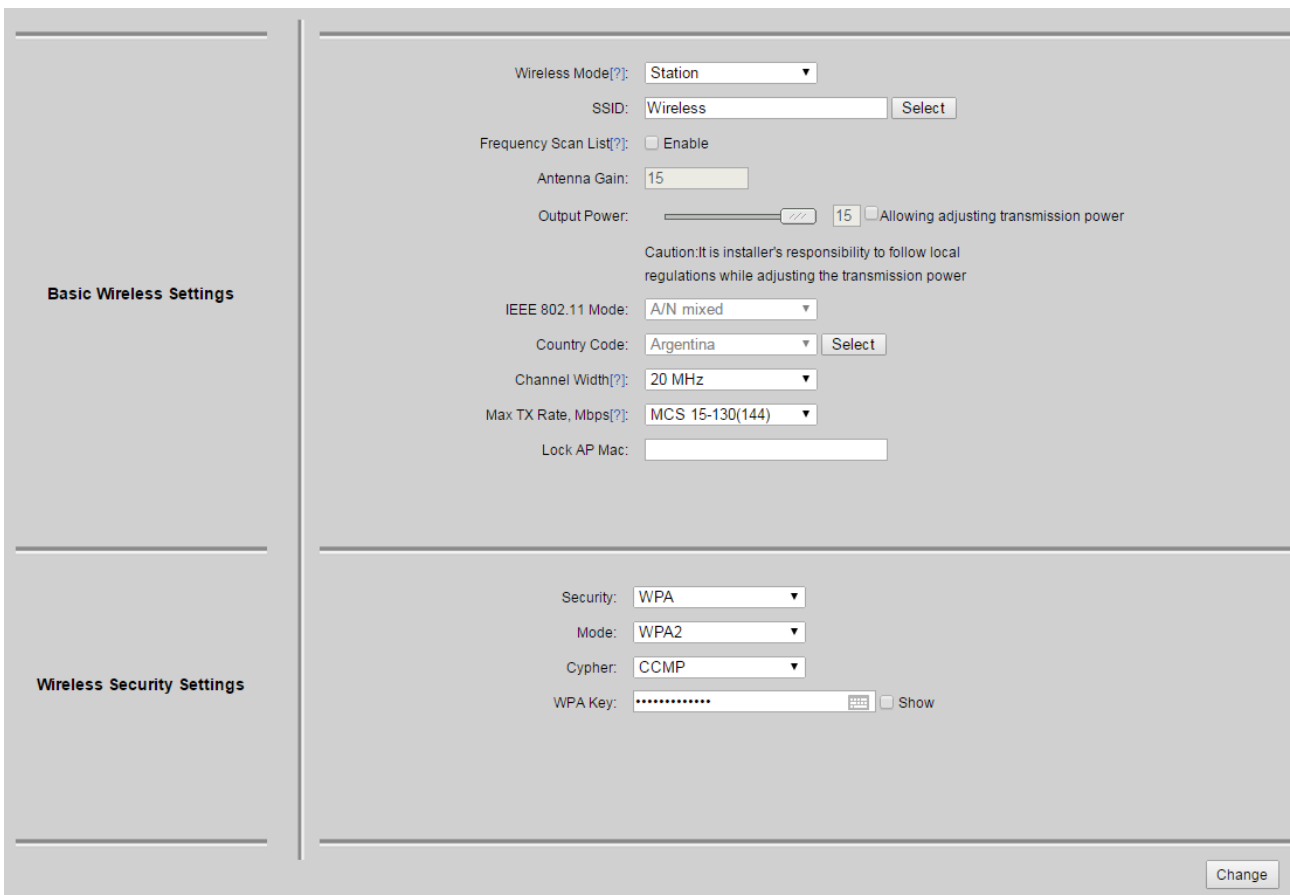

Figure 6-1 Wireless-AP

Figure 6-2 Wireless-Station

Wireless Mode: There are totally 4 wireless modes, including: Station, Access Point, WDS Station, and WDS Access Point.

Access Point: Access point.

Station: A client device that can be connected to an AP.

WDS Station: Use WDS feature to link multiple APs in a network, all associated stations from any AP can communicate with each other like in ad-hoc mode. WDS station means this device is a station in WDS mode.

WDS Access Point: Use WDS feature to link multiple APs in a network, all associated stations from any AP can communicate with each other like in ad-hoc mode. WDS AP means this device is an AP in WDS mode.

SSID: Name of a wireless.

Shown in Figure 6-3, the user can click the Select button (only the station page is displayed) to list all the SSIDs that can be associated, and then choose the one need to be associated.

Access Point Information

	MAC Address	SSID	Frequency	Signal Level
○	74:7D:24:87:73:B5	@PHICOMM_B2_5G	5220	-84
○	9C:B7:93:E6:72:A5	CC_Office_003_5G	5180	-62
○	A2:B7:93:E6:72:A5	CC_Guest_003_5G	5180	-62

Figure 6-3 Access Point Information

Frequency MHz: This only appears when the device is configured to Access Point mode or WDS Access Point mode. The device can only work on one channel at the same time.

Frequency scan list: This only appears when the device is configured to Station mode or WDS Station mode. If it's not enabled, the station will scan all the channels which both the device and the country code allowed and then choose the same channel as the associated AP. If it's enabled, click select, another window will pop up and let the user to choose the working channels, and the channels should include the associated AP's channel, which can fasten the association process between the AP and the Station.

Output Power: Output power of the device.

Country Code: Different countries allows different channels, users can select the country code when the device is activated to only allow the device works at the channels permitted in the particular country.

Channel Width: Channel width selection, and DS-3WF03C device supports 20MHz/40MHz bandwidth.

Max TX Rate: Max transmission rate, and it can be used to limit the max transmission rate of a device.

Lock AP Mac: In Station, WDS Station modes, users can use this to limit the APs associated to.

Security: User can set the security based on needs to guarantee the wireless security.

WPA: Encryption method supported by 802.11 Protocol.

Chapter 7 Network

7.1 Bridge mode

In Bridge mode, there is no WAN port. The LAN port of the PoE adaptor, and the LAN port of the device can all be the LAN port, and the user can choose one of them to use as LAN port.
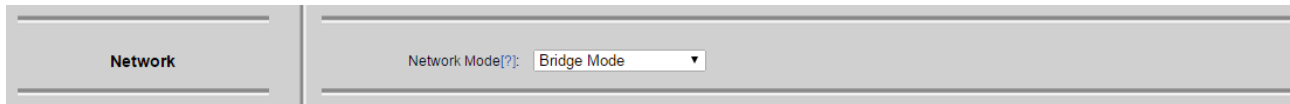

Figure 7-1 Bridge mode

7.2 Management

The IP address of the device can be modified, and the management of the device can be performed by setting the specified management interface.
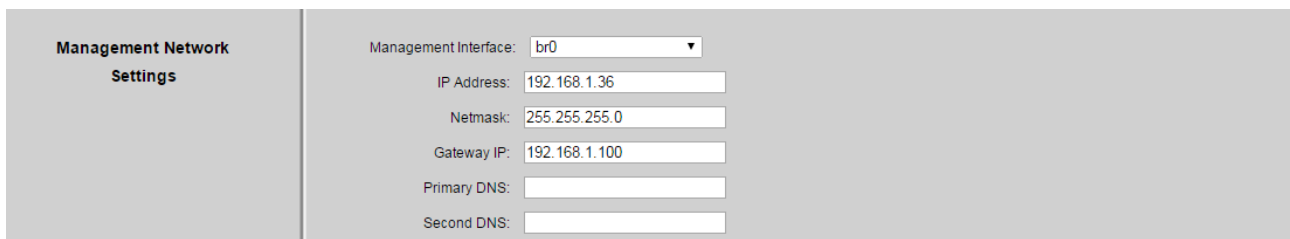

Figure 7-2 Management Network Settings

7.3 Firewall

When the user wants to shield some devices from DS-3WF03C, a firewall can be used to implement this function. The firewall is as shown below:
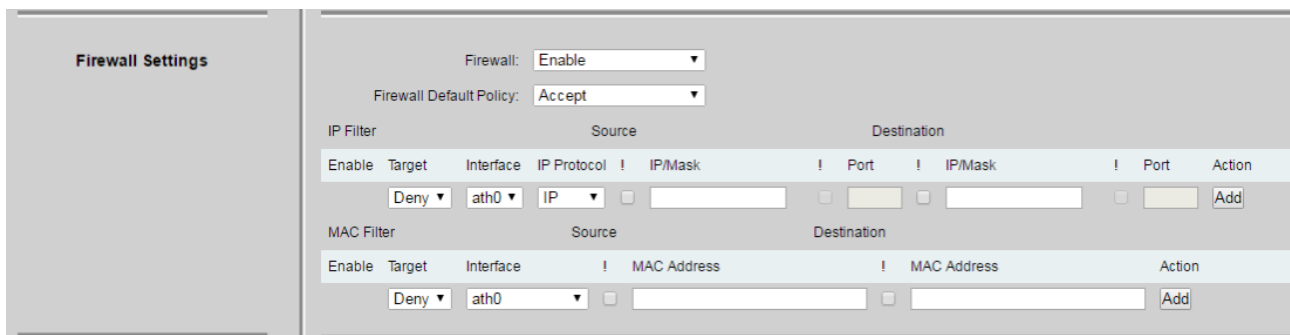

Figure 7-3 Firewall Settings

1. Filter the device whose LAN port IP address is 192.168.1.100.

The firewall is enabled, the default rule of the firewall is Accept, the destination of the IP address filtering is Deny, the interface eth0, the IP type IP, the source IP/mask 192.168.1.100/32, and other values are null.

2. Filter the device whose MAC address is 00:00:00:00:00:01.

The firewall is enabled. The default rule of the firewall is Accept. The MAC filtering mode is Deny, the interface is eth0, the source MAC00 is 00:00:00:00:01, and the other values are empty.

7.4   IP Aliases Settings

This function can add multiple IP addresses of the same network segment or different network segments to a network interface. The IP aliases of different interfaces cannot be the same.

Figure 7-4 IP Aliases Settings

7.5   Static Routes

This feature can be set to static routing.

Figure 7-5 Static Routes Settings

7.6   Traffic Shaping

Traffic shaping is used to control the traffic of ingress/egress based on each network port. As show below, the ingress of ath0 is limited to 10240Kbps, and the egress is limited to 20480Kbps. That means the receiving rate of the wireless link is limited within 10Mbps, the sending rate is limited to less than 20Mbps. But usually, the input limited effect is not obviously, that's because we could not control how quickly the traffic arrives. However, when a port sends out egress traffic, it can control how quickly the traffic exits.

Burst defines the how many bytes allowed for downloading/uploading during a quick time. That leads to momentary throughput can greater than the limit value.

Figure 7-6 Traffic Shaping

- Ingress   traffic entering ath0, control the input rate

- Egress   traffic exiting ath0, control the output rate

The relationship of rate and burst for ingress:

- Set burst to 0, the rate of ingress is unlimited

- Set burst to about 1/10 of rate limit, the rate curve is stable

- Set burst larger than rate limit, the rate curve will hold a high value for a while then down to stable

Below is the table that reflects the relationship between ingress rate limit and burst.

Table 7-1 Ingress rate limit and burst

Ingress		Throughput when reach stable	
Rate Limit(kbps)	Burst(Kbytes)	(Mbps)	Description
10000	0	29.587	Unlimited
10000	10	4.286	Stable
10000	100	8.037	Oblique up to stable
10000	1000	8.825	From 9.5 down to stable
10000	10000	8.6	From 28.5 down to stable
10000	40000	8.6	Hold on 10 seconds at 29.6, then suddenly down to stable

The relationship of rate and burst for egress:

- Set burst less than 1/10 of rate limit, the rate curve is stable totally

- Set burst larger than rate limit, the rate curve will hold a while at a higher value then down to stable

Below is the table that reflects the relationship between egress rate limit and burst.

Table 7-2 Egress rate limit and burst

Egress		Throughput when reach stable	
Rate Limit(kbps)	Burst(Kbytes)	(Mbps)	Description
20000	0	18.853	Stable
20000	20	19.021	Stable
20000	200	19.205	Stable
20000	2000	19.437	From 23.5 down to stable
20000	20000	19.2	Hold on 20 seconds at 24.5, then suddenly down to stable
20000	80000	19.2	Hold on several minutes at 24.5, then suddenly down to stable

7.7   VLAN Settings

The VLAN function allows user to create multiple virtual local area network. As show below, we add a VLAN on port ath0. The VLAN ID is 10. The range of VLAN ID is 2~4094. Each VLAN ID represents a different VLAN.

Figure 7-7 VLAN Settings1

Bridge function is needed to use together with VLAN. As show below, we add VLAN 10 on port eth0 and ath0, they are eth0.10 and ath0.10, and put them into the same bridge. The packets from eth0.10 or ath0.10 will be added a VLAN label which ID is 10. That requires: the opposite wireless connection side must support VLAN 10, the device which connects with eth0 is also need to support VLAN 10.

Figure 7-8 VLAN Settings2

7.8   Bridge Network

This feature allows the ports of the device to bridge. Bridge, refers to the process of forwarding network packets according to the address of the link layer of the OSI network model, working in the second layer of OSI.

Figure 7-9 Bridge Network

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Chapter 8   Advanced

The Advanced pages are shown below.

Figure 8-1 Advanced-STA

Figure 8-2 Advanced-AP

Auto ACK-Timeout Adjust: It is suggested to enable this function, so that the distance between 2 DS-3WF03C devices can be detected and all the related parameters can be optimized to achieve the best link quality.

Distance: The distance can be set manually if the Auto ACK-Timeout Adjust is disabled, otherwise, the distance parameter is not allowed to be set. It is suggested the distance is set automatically by enabling Auto ACK-Timeout Adjust parameter.

Aggregation: It enables several data frames of 802.11 to be aggregated and transmitted out, thus improve the throughput. In default, it's enabled.

Multicast Data: When it's enabled, DS-3WF03C devices allow multicast function.

Device discover: This feature should be used with the device discover tool.   The tool window will display the MAC address of the device, IP address, and product name and so on.

🛈 **NOTE**

● When the equipment is found by wireless way, please keep multicast support enabled.

Client Isolation: Enable this feature can make connection with an access point, the WDS access points equipment cannot communicate with each other, even though the client IP duplicate nor of communication have any impact (only the access point page is displayed).

Max Station Limit: By setting it to limit the number of clients and WDS clients that are connected to an access point, a WDS access point (only the access point page is displayed).

LED configure: This is to configure the signal strength value needed to light on. There are 3 LEDs on DS-3WF03C devices (LED3 value > LED2 value > LED1 value). The default values are -86 dBm, -71 dBm and -56 dBm. When LED1 value < signal strength < LED2 value, LED1 is lighted on; When LED2 value < signal strength < LED3 value, both the LED1 and LED2 are lighted on; When signal strength > LED3 value, all three LEDs are lighted on.

Chapter 9   System

System page is shown in Figure 9-1, and it is divided into the following 4 parts: Configuration Management, Firmware Configuration, Device Setting, and Accounts Information.

Figure 9-1 System

Backup configuration: When clicking Download button, the current configuration can be backed up to a file.

Backup Syslog: When clicking Download button, the current syslog can be backed up to a file.

Upload configuration: When clicking browse, user can choose the backup configuration file and then click upload, so that the configuration stored in the backup file can be applied.

Firmware update: Click browse button and choose the file, and then click update button, the firmware can be updated to the latest version.

Firmware reboot: Click the Reboot button to reboot the device.

Restore Factory Settings: Click the Reset button to restore to the factory default settings.

Device name: It can be set to any name needed.

Login Timeout: Login Timeout setting.

Interface Language: Language setting.

Sync with Time: Click the Sync button, the device will automatically calibrate the time, synchronized with the system standard clock, and displayed on the Status page.

Accounts: The user can modify the name and password of user and Read-Only Account.

Chapter 10   Tools

The Tools page is shown in Figure 10-1.

Figure 10-1 Tools

Ping IP: User can input the destination IP address of another device, and click Ping button. If that destination device is successfully connected to the DS-3WF03C device, the result shows Alive, otherwise shows Not Alive.

Time to Reboot: Timing restart equipment.

NTP: If this NTP server is set, and the DS-3WF03C device can access to this NTP server. DS-3WF03C device automatically calibrate the time and date information with the NTP server and show the time information in the Status page.

Ping Watchdog: The ping watchdog sets the DS-3WF03C device to continuously ping a user-defined IP address (for example, it can be the IP address of the AP the Client is connecting to). If it is unable to ping under the user defined constraints, the DS-3WF03C device will automatically reboot. It is highly recommended that users enable this feature at the side of "Station" and disable this feature at the side of "Access Point".

Ping Interval: Specify time interval (in seconds) between the ping requests are sent by the Ping Watchdog.

Ping IP Address: Specify an IP address of the target which will be monitored by Ping Watchdog. If this feature is enabled at the side of "Station", Ping IP Address should be the IP address of the AP the Client is connecting to.

Startup Delay: specify initial time delay (in seconds) until first ping request is sent by the Ping Watchdog.

Ping Failure: Specify the number of ping replies. If the specified number of ping replies is not received continuously, the Ping Watchdog will reboot the device.

NOTE

● If users want to modify the parameters of Ping Watchdog, please disable it first and then apply. When the web page shows that Ping Watchdog is really disabled, users can now re-enable it with modified parameters.

Syslog: When Syslog is enabled, and the System Log server's IP is also set here, the log information will be output to the Syslog server automatically.

SNMP: When SNMP is enabled, use can check the working condition and information of the DS-3WF03C device.

Spectral Scanning: Spectral scanning function can view around the 20MHz bandwidth frequency of the use situation; this can help you configure the device to avoid busy frequency. If you run the spectral scanning, you cannot do any configuration operations on the device page. If you want to configure the device again, you only need to click the exit button in the spectral scanning web page to exit.

Antenna Calibration 5G: Outdoor remote adjustment of the antenna angle used, every few seconds to refresh the current 5G associated signal strength histogram, the user can judge the current two devices according to the two antenna is at the best angle.
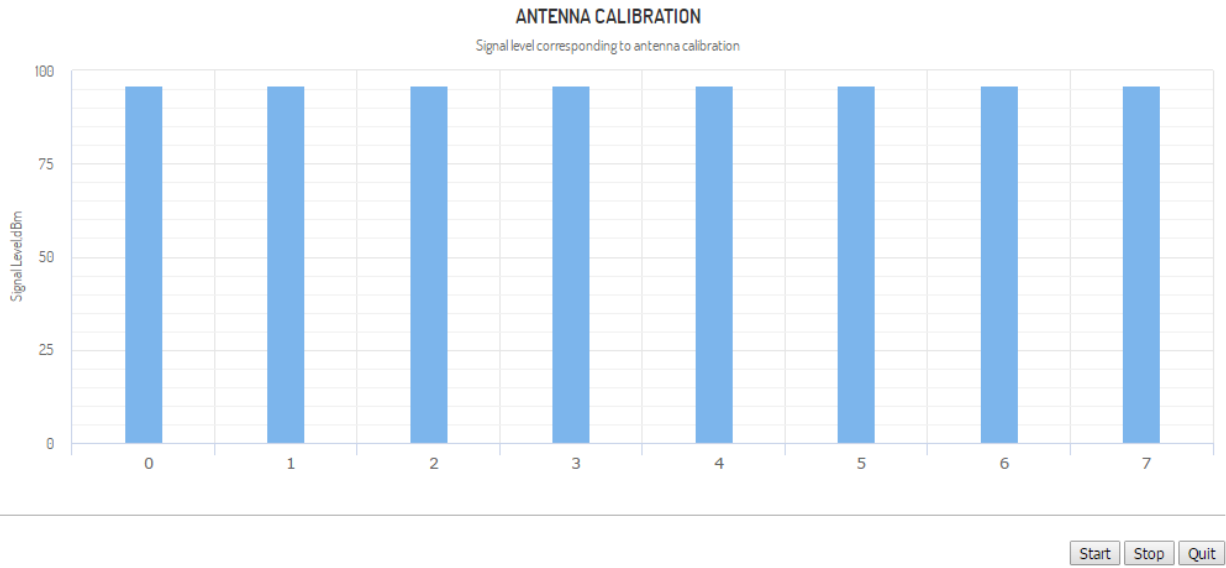
Figure 10-2 Antenna Calibration 5G

📋 **NOTE**

● When the bar graph shows the signal strength is higher than 60, said the signal strength is poor, it is recommended that users adjust the equipment to ensure that the two devices antenna angle is the best.

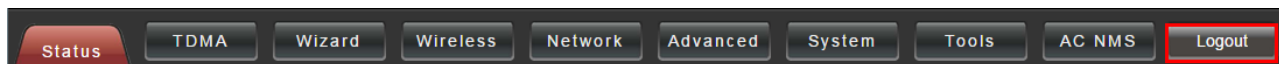# Chapter 11   Logout

When you click logout button, the web will quit and return to the login web.

Figure 11-1 Logout

See Far, Go Further