User manual

User's Guide

Revision 1.0

2 September 2014

Contents

FCC Caution

The device is professional installed for fixed point-to-point operation only.

1. 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:
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.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 170 cm between the radiator & your body.

IC warning

The device is professional installed for fixed point-to-point operation only.

This device complies with Industry Canada licence-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.

This equipment complies with Industry Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 170 cm between the radiator & your body

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Le dispositif comprend ça antenne doit être installé pour fournir une distance de séparation d'au moins 170 cm de distance du corps de l'utilisateur

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

About this Guide

Prerequisite Skills and Knowledge

To use this document effectively, you should have a working knowledge of Local Area Networking (LAN) concepts and wireless Internet access infrastructures.

Conventions Used in this Document

The following typographic conventions and symbols are used throughout this document:

Additional information that may be helpful but which is not required.

Important information that should be observed.

bold Menu commands, buttons, input fields, links, and configuration keys are displayed in bold

italic References to sections inside the document are displayed in italic.

`code` File names, directory names, form names, system-generated output, and user typed entries are displayed in constant-width type

Abbreviation List

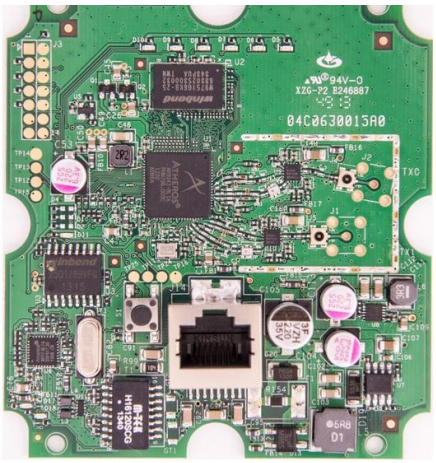
Abbreviation	Description
ACL	Access Control List
AES	Advanced Encryption Standard
AMSDU	Aggregated Mac Service Data Unit
AP	Access Point
CRC	Cyclic Redundancy Check
DHCP	Dynamic Host Control Protocol
EAP	Extensible Authentication Protocol
GHz	Gigahertz
GMT	Greenwich Mean Time.
GUI	Graphical User Interface

Abbreviation	Description
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
ISP	Internet Service Provider
IP	Internet Protocol
LAN	Local Area Network
LED	Light-Emitting Diode
MAC	Media Access Control
Mbps	Megabits per second
MHz	Megahertz
MIMO	Multiple Input, Multiple Output
MSCHAPv2	Microsoft version of the Challenge-handshake authentication protocol, CHAP.
NAT	Network address translation – translation of IP addresses (and ports)
PC	Personal Computer
PDA	Personal Digital Assistant
PTP	Point To Point
PTMP	Point To Multi Point
PSK	Pre-Shared Key
QoS	Quality of Service
PEAP	Protected Extensible Authentication Protocol
RSSI	Received Signal Strength Indication – received signal strength in mV, measured on BNC outdoor unit connector
RX	Receive
SISO	Simple Input, Simple Output
SNMP	Simple Network Management Protocol
SMTP	Simple Mail Transfer Protocol
SSID	Service Set Identifier
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
TTLS	Tunneled Transport Layer Security (EAP-TTLS) protocol
TX	Transmission
UDP	User Datagram Protocol
UAM	Universal Access Method
VLAN	Virtual Local Area Network
VoIP	Voice over Internet Protocol
WDS	Wireless Distribution System
WEP	Wired Equivalent Privacy
WISPr	Wireless Internet Service Provider roaming
WLAN	Wireless Local Area Network
WPA	Wi-Fi Protected Access
WPA2	Wi-Fi Protected Access 2

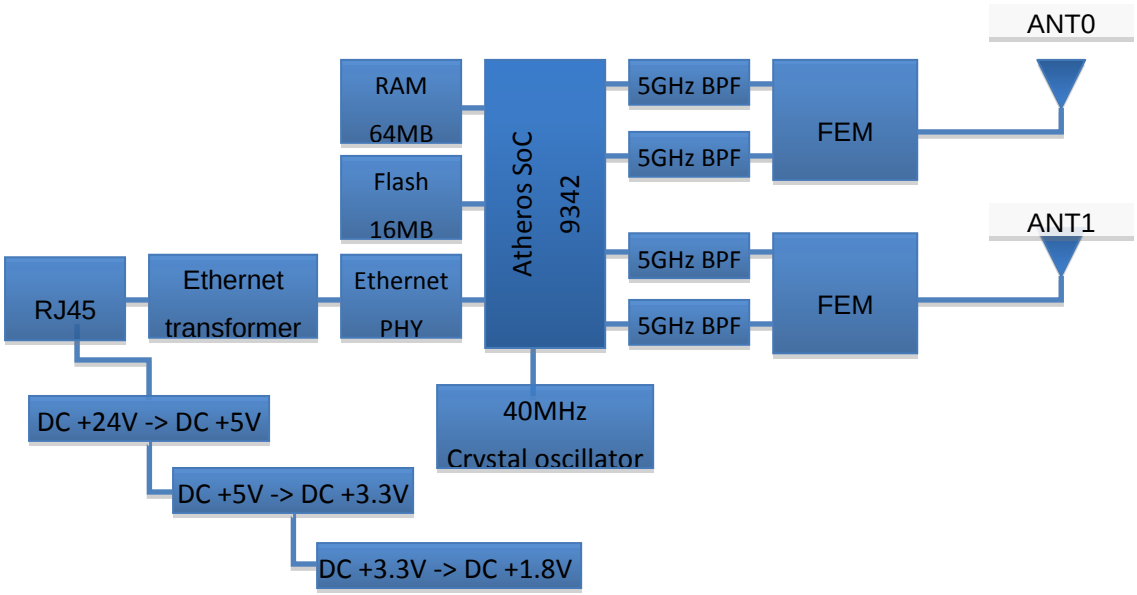
FWBD-2401 specification

The FWBD-2401 is a versatile, very efficient, and stable 5 GHz hardware platform. Platform is equipped with high output power 802.11n MIMO radio.

The robust hardware is coupled with an advanced and feature-rich operating system optimized for high performance communications which allows compatibility with older 802.11a standard while adding support for the latest in wireless communications.



Block diagram



Note 1: ANT0 and ANT1 frequency range is 5725-5850MHz.

Note 2: FEM stands for Front End Module. It includes RF PA, RF Switch and RF LNA.

Note 3: AR9342 contains contains internal Voltage Regulator making +1.2V from 3.3V.

Hardware information

Feature	Description	Notes
CPU	AR9342	
RAM	64MB	
Flash memory	16MB	
Watchdog timer	Built into CPU	
Reset push button	Connected to GPIO	
LED's	6 LED's connected to GPIO	Power, LAN, 4x received signal strength
Ethernet	One 10/100 Ethernet port	
Power options	Power-Over-Ethernet	PoE polarity independent via Eth pins 4/5 and7/8.
Power supply range	4V	
Serial port (UART)	Development port J3	3.3V TTL level, not end user accessible
Operating temperature range	From -40C to +65C	
Humidity	0 ~ 90 % (non-condensing)	
Power consumption	up to 4.6W	

Wireless information

Parameter	Description
WLAN standard	IEEE 802.11 a/n, iPoll proprietary
Radio mode	MIMO 2x2
Radio frequency band	5745 MHz - 5825 MHz
Receive sensitivity	Varying between -94 and -74 dBm depending on modulation
Channel size	20MHz, 40MHz
Modulation schemes	802.11 a/n: OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Data rates	802.11 n: 300, 270, 240, 180, 120, 90, 60, 30 Mbps 802.11 a: 54, 48, 36, 24, 18, 12, 9, 6 Mbps

Software

Features	
Advanced wireless functionality	Auto-channel, auto-modulation
Operating mode	Fixed point-to-point operation only
Wireless security	WPA/WPA2 Personal, WPA/WPA2 Enterprise
Wireless QoS	WMM
WAN protocols	Static IP, DHCP client, PPPoE client
Network	NAT
Services	DHCP server, SNMP server, Wireless and Ethernet statistics
Management	HTTP GUI, SSH CLI, SNMP read, WNMS, troubleshooting file, reset via reset tool
Tools	Site survey, Antenna alignment

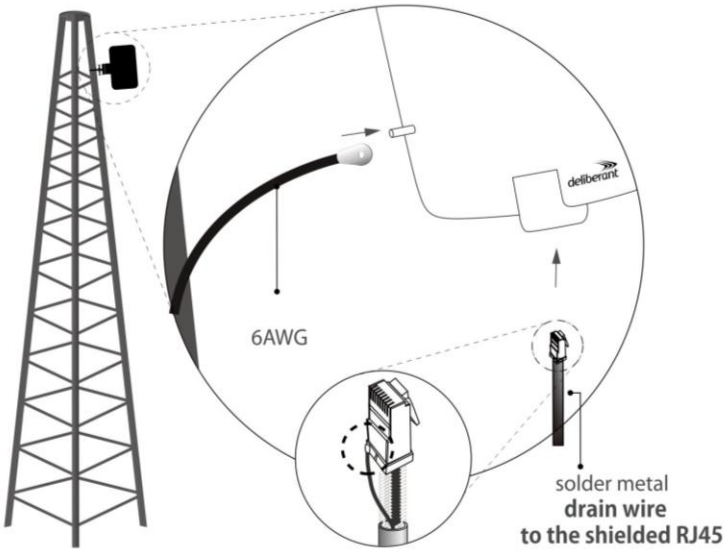
Power consumption

State	Current	Voltage	Power consumption
Idle	103 mA	24 V	2.47 W
Max load	192 mA	24 V	4.61 W

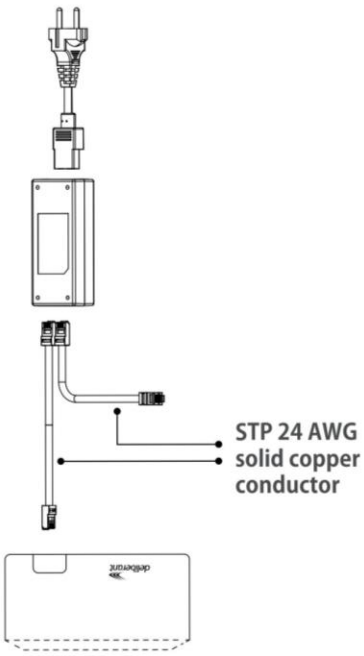
Installation

Default login settings:
IP address: DHCP client (fallback IP 192.168.2.66)
Login / Pass: admin / admin01

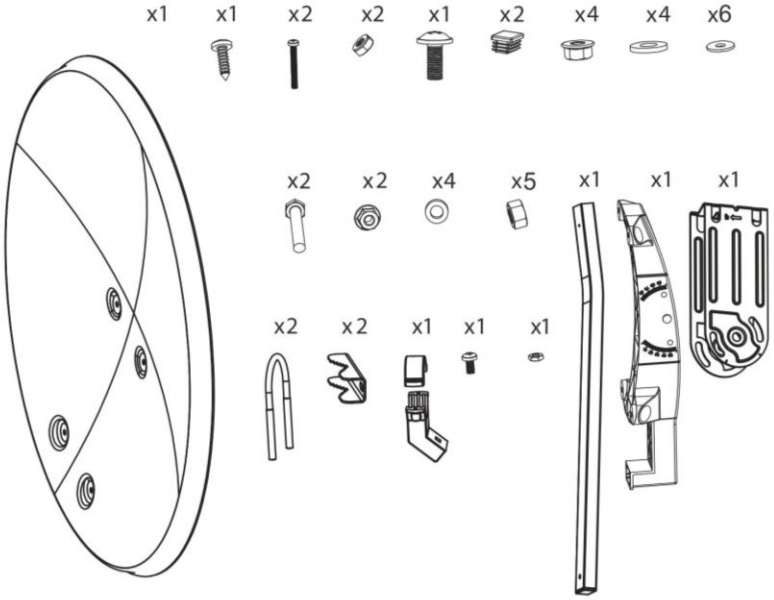
Grounding



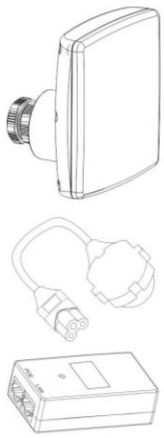
PoE connection



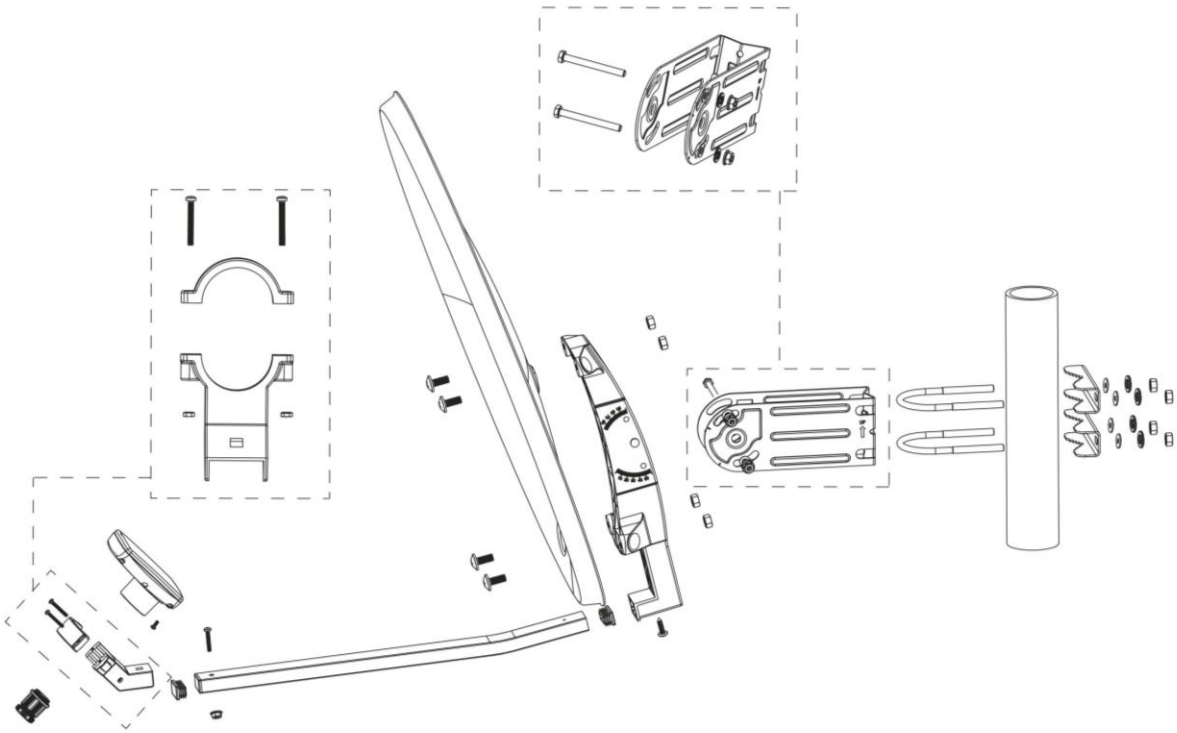
Dish package contents



ECHO 5 package contents



Installation



Initial Device Setup

The default product address is `192.168.2.66`.

To access the Web management interface, configure your PC with a static IP address on the 192.168.2.0 subnet with mask 255.255.255.0. Connect the device in to the same physical network as your PC. Open the Web browser and type the default IP address of the device `https://192.168.2.66/` and the login page will be loaded. Enter default administrator login settings:

Figure 1 – Login Page

Initial Station Setup

Step 1. Connect an Ethernet cable between your computer and the JetPalm 5M device.

Step 2. Make sure your computer is set to the same subnet as the APC, i.e. 192.168.2.150

Step 3. Start your Web browser.

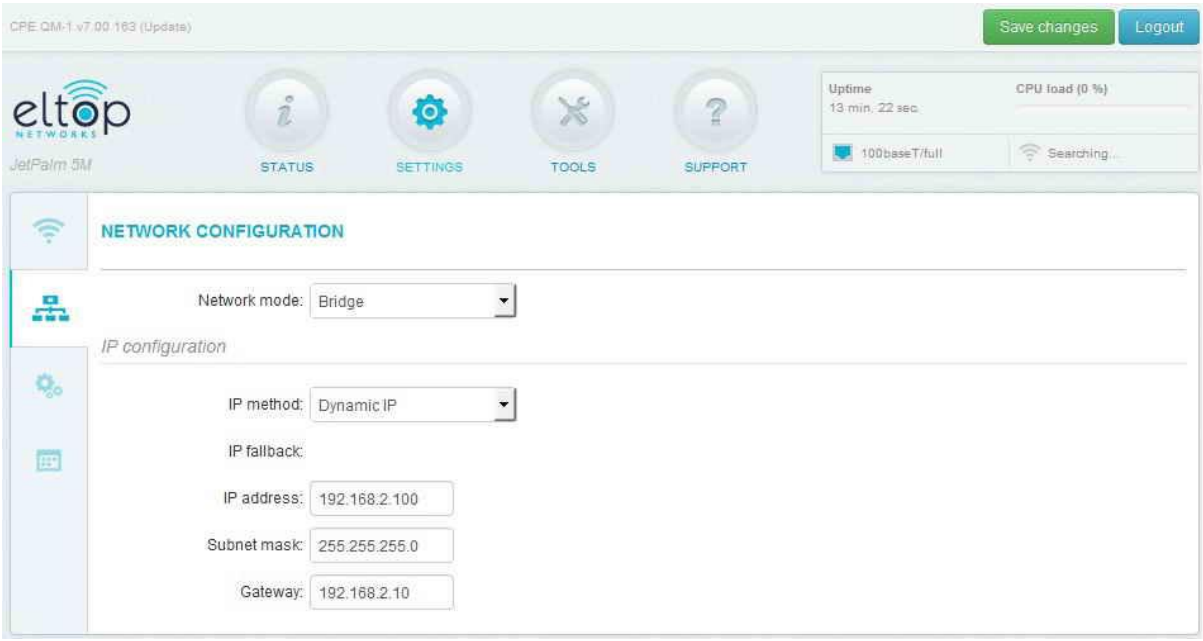
Step 4. Each APC devices uses following default settings:

- WAN IP: **192.168.2.66**
- Subnet mask: **255.255.255.0**
- Username: **admin**
- Password: **plz contact manufacturer for detailed info.**

The initial login screen looks as follow:

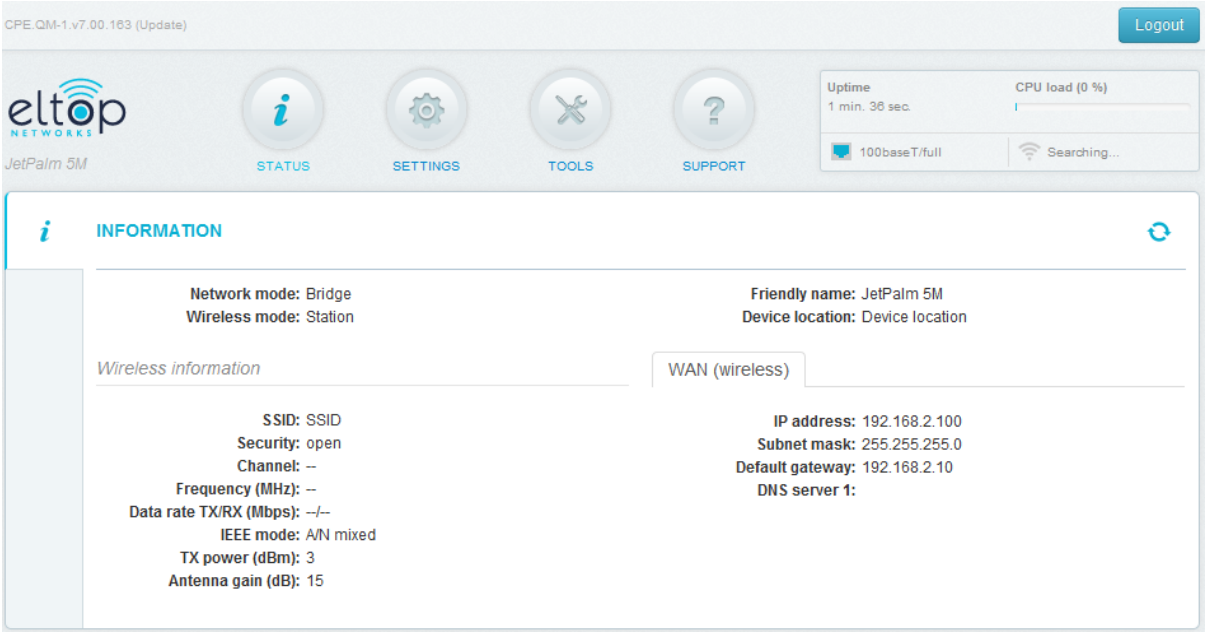
Step 5. Enter the default password, and then press the Login button to enter the APC web management page.

Step 6. Navigate to the **Network Configuration** tab and choose the bridge network mode with, Dynamic IP enabled (be sure that AP to which the device will be associated has a DHCP server running, specify the DHCP fallback settings in case the DHCP server will be unreachable and click **Save Changes** button:



Step 8. Navigate to the **Wireless Configuration** tab, choose Station WDS wireless mode, click **Scan** button near the SSID entry field to choose the SSID of the AP where the station will be associated to. Specify the Security parameters for the AP, check IEEE mode and click **Save Changes**:

Step 9. Verify connection. Navigate to the **Information** page. The **Information** page will display wireless information of the link with AP. The connection status must be displayed as Connected and progress bars indicating the quality of the connection must be displayed:



General Device Operation

Web Management Structure

The main web management menu is displayed after successfully login into the system. From this menu all essential configuration pages are accessed.

By default the **Information** menu is activated where the main device information is displayed.

The APC web management menu has the following structure:

Status

Information – displays general information and of the device.

Settings

Wireless configuration – specify Operating mode (Station, Station WDS), security and advanced radio settings.

Network configuration – to configure network mode, IP settings, management and data VLANs, DHCP.

Services configuration: SNMP service settings allowing remote device monitoring.

System configuration: specify device settings (friendly name, device location, contact information), choose system functions (backup, restore configuration, reboot, reset to factory defaults), work with users accounts (create, delete, edit).

Tools

Site Survey – information about other wireless networks in the local area.

Antenna alignment – measure received signal quality of the wireless link to align antenna in the best direction.

Support

Troubleshooting – may be downloaded troubleshooting file.

Saving Configuration Changes

There are three general buttons located on the right top corner of the WEB GUI allowing managing device configuration:

Save Changes – if pressed new configuration settings are applied instantly and written to the permanent memory.