

Wireless access point

WEP-12ac

Quick manual

Firmware version 1.16.0

IP address: 192.168.1.10

Username: admin

Password: password

Contents

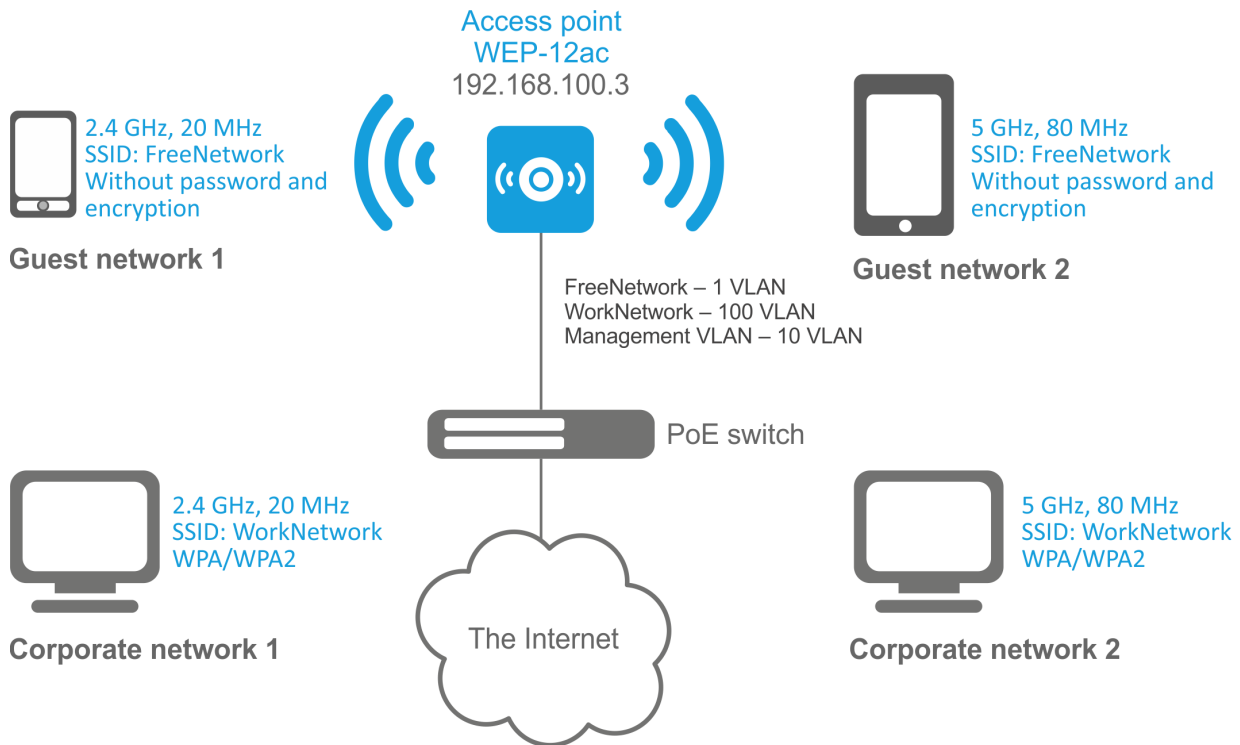
1	Annotation	3
2	Connecting to the web interface	4
3	Configuration of WEP-12ac network parameters	5
4	WEP-12ac firmware update.....	6
5	SNMP service configuration	7
6	Wireless interfaces configuration.....	8
7	Virtual access points configuration.....	10
8	Monitoring main parameters of wireless network.....	12
9	Cluster operation mode	14
9.1	Description	14
9.2	Installation.....	14
9.3	Cluster configuration	14
9.4	Monitoring	17
9.5	Firmware update	20
9.5.1	Firmware update via web interface	20
9.5.2	Firmware updating through DHCP Autoprovisioning	20

1 Annotation

This manual specifies the following:

- connection to WEP-12ac web interface;
- configuration of WEP-12ac network parameters;
- WEP-12ac firmware update;
- SNMP configuration;
- wireless interfaces configuration (operation mode, band);
- virtual access points configuration;
- monitoring of wireless network main parameters.

The manual gives an example of access point configuration without using a soft controller. The following scheme is given as an example.



Type of the network	VLAN used	SSID used	Encryption/ authorization by password
Inner corporate wireless network using 2.4 and 5 GHz bands. The network is isolated from other guest networks. To connect to the network, password authorization is required. The network is dedicated to secure data exchange among company staff.	100	WorkNetwork	WPA/WPA2
Guest wireless network using 2.4 and 5 GHz bands. The network does not require password authorization. It is dedicated to connect users with standard wireless gadgets to a public network for Internet access, for instance.	1 (without VLAN)	FreeNetwork	No encryption and authorization

To perform the configuration, you need to have a PC with access to the device via Ethernet and any web browser (Internet Explorer, Firefox, Google Chrome, Opera, etc.)

2 Connecting to the web interface

Connection of a PC to the device might be executed as follows:

- Connect network cable to PoE interface of WEP-12ac and to PoE injector (or switch). Then connect a PC to the PoE injector (or switch).
- You may connect WEP-12ac to power supply network through 220VAC – 12VAC adapter supplied with the device. And connect a PC through 1 Ethernet interface of WEP-12ac.

To connect to the web interface of the device, enter the following to the URL bar of your browser: **192.168.1.10**. If the connection has been performed successfully, the authorization page will be displayed. Use the following data for authorization:

- User Name: **admin**
- Password: **password**

If the authorization page is not displayed after entering the device IP in the browser, check the IP address on the PC and switch settings. If the configuration on the device has been changed (is not a default one), reset the device to factory settings. To perform this, press and hold the button «F» on the side panel of the device within 20 seconds. Wait for the indicator on the front panel to start blinking, and then release the button. The light of the indicator should be changed to red, it means that loading is in operation.

3 Configuration of WEP-12ac network parameters

For remote management of WEP-12ac, you should set network parameters of the device according to the settings of the network that you intend to use. In «**Manage**» menu, open «**Ethernet Settings**» tab and perform the following:

Modify Ethernet (Wired) settings

Hostname (Range : 1 - 63 characters)

Internal Interface Settings

MAC Address AB:F9:4B:B0:43:61

Management VLAN ID (Range: 1 - 4094, Default: 1)

Untagged VLAN Enabled Disabled

Untagged VLAN ID (Range: 1 - 4094, Default: 1)

Connection Type ▼

Static IP Address . . .

Subnet Mask . . .

Default Gateway . . .

DNS Nameservers Dynamic Manual

. . .

. . .

Click "Update" to save the new settings.

- **Management VLAN ID** – set the number of VLAN that you are going to use for access point management. 10 is used in the given example.
- **Connection Type** – select «Static IP» to set IP addresses for access points manually. Specify the IP address of WEP-12ac (in the example, it is 192.168.100.3) in «**Static IP Address**» field. Enter the address of the default gateway in «**Default Gateway**» field. 192.168.100.1. Changing the network mask is optional. If you want the access points to obtain IP addresses via DHCP, «Connection type» field should be set to «DHCP» value. If DHCP is selected, the network settings configuration is completed.

Click «**Update**». Since that, WEP-12ac is available in 10 VLAN via 192.168.100.3 address.

Before changing the settings, make sure that the managing computer has the access to the access point. If you make a mistake while changing the settings, you may undo them by resetting the access point to factory settings. To perform this, press and hold «F» button on the side panel of the device for 20 seconds until the indicator on the front panel is blinking.

4 WEP-12ac firmware update

For proper operation of WEP-12ac, it is recommended to update the firmware. You may consult the vendor on the relevance of the firmware version:

Phone number: **+7(383) 272-83-31**

+7(383) 274-47-87

e-mail: techsupp@eltex.nsk.ru

After obtaining the relevant firmware version, open the menu «**Maintenance**», «**Upgrade**» tab, and perform the following:

Manage firmware

Model: Eltex WEP-12AC

Firmware Version

Primary Image: (current firmware version)

Secondary Image: (backup image firmware version)

Switch

Upload Method: HTTP TFTP

New Firmware Image: Файл не выбран.

Upgrade

- Press «**Switch**» button if you want to switch to an Alternative firmware image set in «**Secondary Image**» field.
- **Upload Method** – check «**HTTP**» box.
- **New Firmware Image** – click «**Browse**» button and select relevant firmware version, click «**Open**».
- Click «**Upgrade**». The process may take several minutes (its current status will be shown on the page). The device will be automatically rebooted when the update is completed.

Do not switch off or reboot the device during the firmware update.

You may check the current firmware version in «**Basic Settings**» menu (Firmware Version).

5 SNMP service configuration

SNMP service configuration is performed in «**Services**» menu, «**SNMP**» section.

SNMP Configuration

SNMP Enabled Disabled

Read-only community name (for permitted SNMP get operations) (Range: 1 - 256 characters)

Port number the SNMP agent will listen to (Range: 1025 - 65535, Default: 161)

Allow SNMP set requests Enabled Disabled

Read-write community name (for permitted SNMP set operations) (Range: 1 - 256 characters)

Restrict the source of SNMP requests to only the designated hosts or subnets Enabled Disabled

Hostname, address, or subnet of Network Management System (xxxx.xxx.xxx.xxx/Hostname max: 255 Characters)

IPv6 hostname, address, or subnet of Network Management System (xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx/Hostname max: 255 Characters)

Trap Destinations

Enabled	Host Type	SNMP version	Community name (Range: 1 - 256 characters)	Hostname or IP or IPv6 Address (xxxx.xxx.xxx.xxx/xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx/Hostname max: 255 Characters)
<input checked="" type="checkbox"/>	IPv4	snmpV2	trap	192.168.26.136
<input type="checkbox"/>	IPv4	snmpV2		
<input type="checkbox"/>	IPv4	snmpV2		

Debug Settings

Debugging output tokens (Range: 0 - 256 characters, empty string for 'no debug', 'ALL', or 'traps.send' - any tokens without spaces)

Dump sent and received SNMP packets Enabled Disabled

Logs to

Logs to specified files (Range: 1 - 256 characters, Default: /var/log/snmpd.log)

Logs priority level (for Standart output, Standart error and File logs output)

Logs priority range From to (only for Syslog output)

Transport UDP UDP6 TCP TCP6

Click "Update" to save the new settings.

- **Restrict the source of SNMP requests to only the designated hosts or subnets** – check «**Enabled**» box.
- **Hostname, address, or subnet of Network Management System** – specify an IP-address of SNMP server, from which SNMP commands will be transmitted.
- **Community name for traps** – set «**public**» .
- **Enabled / Host Type / Host name or IP or IPv6 Address** – check one of the fields for specifying traps receiver address and enter an IP address of the device to which WEP-12ac will send traps.
- Click «**Update**».

6 Wireless interfaces configuration

WEP-12ac has 2 radio interfaces which are capable to operate simultaneously – Radio 1 and Radio 2. Each interface is capable to operate on its frequency band in different wireless network modes.

The example of configuration of a network with the following characteristics is given below:

Radio1:

- Frequency range: 2.4 GHz;
- Standards: 802.11b/g/n;
- Bandwidth: 40 MHz.

Radio2:

- Frequency range: 5 GHz;
- Standards: 802.11a/n/ac;
- Bandwidth: 80 MHz.

In «**Manage**» menu, open «**Wireless Settings**» tab and perform the following:

Modify wireless settings

Country: Russia

Transmit Power Control: On

TSPEC Violation Interval: 300 (Sec, Range: 0 - 900, 0 Disables)

Global isolation:

Radio Interface

MAC Address: AB:F9:4B:B0:43:60

Mode: IEEE 802.11b/g/n

Channel: Auto

Airtime Fairness: On Off

Radio Interface 2

MAC Address: AB:F9:4B:B0:43:70

Mode: IEEE 802.11a/n/ac

Channel: Auto

Airtime Fairness: On Off

AeroScout™ Engine Protocol Support: Disabled

Click "Update" to save the new settings.

Update

- **Country** – select settings according to the rules of selected country. Select «**RU – Russia**» in the list.
- **Transmit Power Control** – configuring *Transmit Power Limit* parameter restrictions. Select «**On**» in the list.

Configuring Radio 1:

- **Radio Interface** – check «**On**» box;
- **Mode** – select value «**IEEE 802.11b/g/n**».
- Click «**Update**».

Configuring Radio 2:

- **Radio Interface 2** – check «**On**» box;
- **Mode** – select value «**IEEE 802.11a/n/ac**».
- Click «**Update**».

In «**Manage**» menu, open «**Radio**» tab and perform the following:

Modify radio settings

Radio 1 ▾

Status On Off

Mode IEEE 802.11b/g/n ▾

Channel Auto ▾

Channel Update Period Off ▾

Limit Channels

Channel	1	2	3	4	5	6	7	8	9	All
Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Channel Bandwidth 40 MHz ▾

Primary Channel Lower ▾

Transmit Power Limit (dBm, Range: 10 - 16)

Advanced Settings +

TSPEC Settings +

Click "Update" to save the new settings.

Update

Configuring Radio 1:

- **Radio** – select value «1»;
- **Channel Bandwidth** – set value «80MHz»;
- Click «Update».

Configuring Radio 2:

- **Radio** – select value «2»;
- **Channel Bandwidth** – set value «80MHz»;
- Click «Update».

7 Virtual access points configuration

On each wireless interface, you may configure up to 16 virtual access points. Each access point may have individual name of wireless network (SSID) and type of authentication/authorization. According to the network scheme given in the figure 1, it is necessary to configure 2 virtual access points on Radio 1 and Radio 2.

Band Steer feature allows clients having opportunity of operation at 2.4 GHz and 5 GHz to set priority of connection to virtual access points operating at 5 GHz.

The followings are necessary for Band Steer feature operation:

- configure radio interfaces for operation at different frequency ranges;
- create virtual access points (VAP) on each frequency range with the same SSID;
- when using encryption, make sure the passwords of the VAPs are the same;
- activate Band Steer feature on the access points.

In «**Manage**» menu, open «**VAP**» tab and perform the following:

Configuring Radio 1:

- **Radio** – select value «**1**»;
- **Enabled** – check the boxes for VAP 0 and VAP1.
- **VLAN ID** – VLAN number:
 - set value «**100**» for VAP 0;
 - set value «**1**» for VAP 1;
- **SSID** – wireless network name:
 - set value «**Work Network**» for VAP 0;
 - set value «**Free Network**» for VAP 1;
- **Station Isolation** – forbid packet transmission among access point's clients. Check the box.
- **Band Steer** – set a priority of users connection to SSID configured at 5 GHz. Check the box.
- **VLAN Priority** – the 2nd priority level which will be assigned to packets transmitted through the given VAP from radio environment to wired network.
- **Security** – secure network mode:
 - set «**WPA Personal**» value for VAP 0 and set a password for this network connection in «**Key**» field;
 - set value «**None**» for VAP 1.
- Click «**Update**».

Configuration of Radio 2 is performed in the same way. Select «**2**» value in **Radio** and perform the configuration as for the Radio 1 (given above). The password for «**Work Network**» should be the same. Click «**Update**».

When using WPA Enterprise mode, the authorization is implemented through a RADIUS server. The request on user connection to SSID is sent to a RADIUS server. The table *Global RADIUS server settings* specifies the followings:

- RADIUS IP Address – an IP address of a RADIUS server;
- RADIUS Key – a password to access the RADIUS server.

Modify Virtual Access Point settings

Global RADIUS server settings

RADIUS Domain:

RADIUS IP Address Type: IPv4 IPv6

RADIUS IP Address:

RADIUS IP Address-1:

RADIUS IP Address-2:

RADIUS IP Address-3:

RADIUS Key:

RADIUS Key-1:

RADIUS Key-2:

RADIUS Key-3:

Enable RADIUS accounting

Radio

VAP	Enabled	VLAN ID	SSID	Broadcast SSID	VLAN trunk	Station Isolation	Band Steer	802.11k	DSCP Priority	VLAN Priority	Security	MAC Auth Type
0	<input checked="" type="checkbox"/>	100	Work Network	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	None	Disabled
1	<input checked="" type="checkbox"/>	1	Free Network	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	WPA Enterprise	Disabled

WPAVersions: WPA-TKIP WPA2-AES

Enable pre-authentication

Use global RADIUS server settings

RADIUS Domain:

RADIUS IP Address Type: IPv4 IPv6

RADIUS IP Address:

RADIUS IP Address-1:

RADIUS IP Address-2:

RADIUS IP Address-3:

RADIUS Key:

RADIUS Key-1:

RADIUS Key-2:

RADIUS Key-3:

Enable RADIUS accounting

Active Server:

Broadcast Key Refresh Rate: (Range:0-86400)

Session Key Refresh Rate: (Range:30-86400 ,0 Disables)

8 Monitoring main parameters of wireless network

You may view the list of connected users in «**Status**» menu, «**Client Association**» tab.

View list of currently associated client stations

Click "Refresh" button to refresh the page.

Total Number of Associated Clients 12

SSID	Station	IP Address	Hostname	Uptime	RSSI	SNR	Noise	Link Quality	Rate	Quality	Link Capacity	Status
Eltex-Local (wlan0vap1)	5c:e2:f4:52:35:f4	192.168.40.99	android-703f77361a424899	00:00:07	-75 dBm	14 dB	-89 dBm	44%	100%	59%	Yes	
Eltex-Local (wlan0vap1)	84:55:a5:56:18:2d	192.168.40.122	android-64b6ec2b4e700d5b	00:00:02	-78 dBm	11 dB	-89 dBm	31%	100%	54%	Yes	
Eltex-Local (wlan0vap1)	00:28:53:94:49:31	192.168.40.138	android-3025657d07a9a40c	00:01:18	-83 dBm	6 dB	-89 dBm	0%	100%	100% (not changed)	Yes	
Eltex-Local (wlan1vap1)	24:df:6a:69:d1:b4	192.168.40.179	android-f5188aa6e186679e	00:00:41	-73 dBm	19 dB	-92 dBm	70%	75%	68%	Yes	
Eltex-Local (wlan1vap1)	6c:72:e7:7d:38:39	192.168.40.83	iPhone6S-Den	00:00:50	-64 dBm	28 dB	-92 dBm	59%	100%	80%	Yes	
Eltex-Local (wlan1vap1)	dc:f0:90:8b:e3:20	192.168.40.73	android-c73ea2ec51920ecd	00:00:54	-69 dBm	23 dB	-92 dBm	61%	74%	75%	Yes	
Eltex-Local (wlan1vap1)	94:53:30:05:6c:d5	192.168.40.127	LAPTOP-UDGPM1A9	00:02:46	-61 dBm	31 dB	-92 dBm	87%	100%	79%	Yes	
Eltex-Local (wlan1vap1)	9c:4f:da:80:8c:44	192.168.40.112	iPhone-Leonid	00:03:09	-67 dBm	25 dB	-92 dBm	45%	100%	90%	Yes	
Eltex-Local (wlan1vap1)	0c:b3:19:19:2b:2b	192.168.40.159	android-6eafc287effa485c	00:00:23	-55 dBm	37 dB	-92 dBm	73%	100%	Not supported	Yes	
Eltex-Guest (wlan1vap2)	d0:17:c2:0d:c6:ea		android-e0cf7606a6c051f3	00:00:05	-68 dBm	24 dB	-92 dBm	89%	100%	75%	Yes	
BRAS-Guest (wlan1vap4)	78:02:f8:fa:8f:f4		Redmi4-Redmi	00:00:01	-60 dBm	32 dB	-92 dBm	80%	100%	Not supported	Yes	
BRAS-Guest (wlan1vap4)	64:76:ba:a5:8f:de	192.168.53.198	Air-tester	00:01:05	-59 dBm	33 dB	-92 dBm	81%	91%	72%	Yes	

The list of third-party access points in WEP-12ac area with data on wireless channel used and transmitted signal level is presented in «**Status**» menu, «**Rogue AP Detection**» tab.

View Rogue AP Detection

Click "Refresh" button to refresh the page.

AP Detection for Radio 1 Enabled Disabled
 AP Detection for Radio 2 Enabled Disabled

Click "Update" to save the new settings.

Detected Rogue AP List
 Click "Delete old" to delete old entries from Detected Rogue AP List

Action	MAC	Radio	Beacon Int.	Type	SSID	Privacy	WPA	Band	Channel	[BandWidth]	Channel Blocks	Signal	Beacons	Last Beacon	Rates
<input type="button" value="Grant"/>	a8:f9:4b:b5:fb:31	wlan0	100	AP	_Test24_31	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:43:67	wlan0	100	AP	_Test24_31	Off	Off	2.4	1	[20]	1 - 3		2	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:cf:a8:d9	wlan0	100	AP	ELTX-2.4GHz_WiFi_A8D8	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:42:40	wlan0	100	AP	SBER_test	Off	Off	2.4	1	[20]	1 - 3		2	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:2d:a0	wlan0	100	AP	Eltex VAP	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b6:45:66	wlan0	100	AP	EltexWiFi	Off	Off	2.4	11	[40]	1 - 7		2	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:31:80	wlan0	100	AP	2_4_vap0_fitotest	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	6,9,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b4:afd0	wlan0	100	AP	000111_test01	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b4:afd1	wlan0	100	AP	000111_test_enterprise	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b4:afd2	wlan0	100	AP	000111_scenarii	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:31:81	wlan0	100	AP	2_4_vap1_fitotest_ent	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	6,9,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b4:afd3	wlan0	100	AP	FBT-SSID	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:00:e2	wlan0	100	AP	ssid05	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:00:e3	wlan0	100	AP	ssid04	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:1f:fc:01	wlan0	100	AP	wpa_test	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:33:20	wlan0	100	AP	0000000000	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:33:21	wlan0	100	AP	0000000002	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:00:e0	wlan0	100	AP	ssid02	Off	Off	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:33:22	wlan0	100	AP	0000000001	On	On	2.4	1	[20]	1 - 3		1	Wed Jun 28 16:42:37 2017	1,2,5,5,6,9,11,12,18,24,36,48,54
<input type="button" value="Grant"/>	a8:f9:4b:b0:31:82	wlan0	100	AP	2_4_vap2_open	Off	Off	2.4	1	[20]	1 - 3		2	Wed Jun 28 16:42:37 2017	6,9,12,18,24,36,48,54

The list of events is given in «**Status**» menu, «**Events**» tab.

9 Cluster operation mode

9.1 Description

The cluster operation mode allows to manage devices in a cluster simultaneously, that sufficiently improves operation efficiency while deploying, configuring or exploiting a wireless network.

When operating in Cluster mode, it is sufficiently that you configure only one access point. The rest of the access points will copy the configuration of the device with set parameters. If the configuration of one access point in a cluster has been changed, the other access points will apply the same changes. The solution is valid while firmware update. Operation in Cluster mode allows to perform manageable consistent firmware update of devices in a cluster.

The cluster is a group of devices allocated in a single broadcast domain with synchronized configuration and firmware. Cluster mode is enabled by default. The defining parameter of the mode is the name of a cluster by which the identification of device attachment to this cluster is performed.

The default name of a cluster is «*default*». After loading, WEP-12ac defines if there are devices located on the network with the same name as in its configuration. If the devices with these parameters are not found, WEP-12ac becomes a master of the cluster. If the devices belonging to the cluster are found, WEP-12ac starts copying the configuration of a master. Thus, the first device with enabled Cluster mode occurred on the network becomes a master of its cluster. Other devices occurred on the network later and having the same cluster name start duplicating the master configuration. Several clusters with different names might be located in the same network simultaneously. One access point should be included to only one cluster.

WEP-12ac announces its affiliation to a cluster through a special protocol. The device sends broadcast UDP packets to LAN with data on affiliation to a particular cluster. Thus, all the access points included to a cluster exchange data among them, identify a master of the cluster and its configuration. The master carries out an inventory of the devices in the cluster and always controls the quantity of the access points in the cluster and their addresses.

9.2 Installation

It is sufficient that only one access point be configured when deploying a network. For providing data exchange among devices in a cluster, you should install a DHCP server for network addresses distribution. Network installation algorithm:

1. DHCP server installation.
2. Configuration and physical connection of an access point.
3. Physical connection of other access points in the cluster.

After installing the first access point, you do not need to configure the rest, it is sufficient to connect them physically to the network. The devices will obtain network addresses, define the master of the «*default*» cluster and will be automatically configured according to the master configuration.

9.3 Cluster configuration

The device may operate in a cluster only if WDS (Wireless Distribution System) and WGB (Work Group Bridge) features are disabled.

For operation in a cluster Management Ethernet interfaces of all access points should be located in one network.

Cluster operation mode is disabled by default.

In «**Cluster**» menu, open «**Access Points**» tab and perform the following:

Manage access points in the cluster

Clustering: ▼

Clustering Options...

Enter the location of this AP.
 Location:

Enter the name of the cluster for this AP to join.
 Cluster Name:

Clustering IP Version: IPv6 IPv4

Cluster-Priority: (Range: 0-255, Default: 0)

Click "Update" to save the new settings.

Single IP Management...

Cluster Management Address: (X.X.X.X)

Click "Update" to save the new settings.

To edit the settings in «**Clustering Options**» section, switch cluster mode to «**Off**» state. In «**Clustering Options**» menu, perform the following configuration:

- **Location** – specify physical location of the access point. The option is used to analyse and control the network in different monitoring tables. «*Eltex*» is used in the example;
- **Cluster Name** – set name cluster. The access point will be connected only to a cluster, which name is specified in «*Cluster Name*». «*default*» is used in the example;
- **Clustering IP Version** – select used IP version for management data exchange among access points in the cluster. «*IPv4*» is used in the example.
- **Cluster-Priority** – set the priority of the device in the cluster. «*Eltex*» is used in the example;

Click «**Update**» to save changes. In «**Single IP Management**» menu, perform the following configuration:

- **Cluster Management Address** – specify an address via which the device may access the master cluster. The master should be located in the same subnet with the cluster. «*192.168.10.10*» is used in the example.

Click «**Update**» to save changes. To enable cluster mode, select «**On**» in «**Clustering**» field.

Manage access points in the cluster

This access point is operating in stand-alone mode...

Softwlc mode only for Captive Portal Instance Configuration

Clustering:

Clustering Options...

Enter the location of this AP.

Location:

Enter the name of the cluster for this AP to join.

Cluster Name:

Clustering IP Version: IPv6 IPv4

Cluster-Priority: (Range: 0-255, Default: 0)

Click "Update" to save the new settings.

Single IP Management...

Cluster Management Address: (X.X.X.X)

Click "Update" to save the new settings.

To enable automatic channel selection according to the data on channels used by neighbouring access points and spectral analysis of environment on third-party access points noise, switch to «**Radio Resource Management**» tab and click «**Start**» in «**Channel Planner**» section. To enable automatic output power distribution of the access point according to influence of neighbouring access points which operate in the same cluster, switch to «**Radio Resource Management**» tab and click «**Start**» in «**Transmit Power Control**» section.

Automatically manage radio resource assignments

Channel Planner ...

automatically re-assigning channels

Current Channel Assignments

IP Address	Radio	Band	Channel	Status
192.168.15.129	A8:F9:4B:B7:ED:70	B/G/N	1	up
192.168.15.129	A8:F9:4B:B7:ED:60	A/N/AC	36	up

Advanced

Change channels if interference is reduced by at least (Range: -100...-30)

Refresh when access point is added to the cluster (Range: -100...-30)

Determine if there is better set of channel settings every (Range: 1800...86400 or 0)

Click "Update" to save the new settings.

Transmit Power Control ...

automatically re-assigning tx power

RSSI threshold 2.4 GHz (Range: -100...-30)

RSSI threshold 5 GHz (Range: -100...-30)

Interval (Range: 1800...86400 or 0)

Advanced

Minimal Tx Power (Range: 6...30)

Active Scan Mode

Debug Mode

Monitoring

TPC statistics is not available because tpc-planner is not up

In «**Advanced**» menu, perform the following configuration:

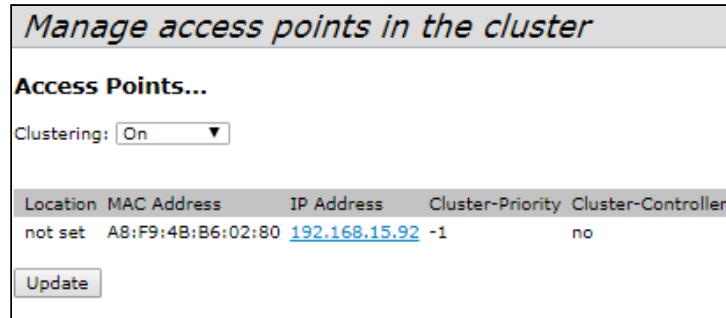
- **Change channels if interference is reduced by at least** – select a percentage that the interference must be reduced by for the access point to change channels. «75%» is used in the example.
- **Refresh when access point is added to the cluster** – enable re-counting of common spectral structure of environment and selection of optimal channel for the access point («**enable**» value) when new access point is being connected to the cluster.
- **Determine if there is better set of channel settings every** – set a time interval to schedule updates of environment spectral structure determination and selection of better channel for the access points. «1Day» is used in the example.

Click «**Update**» to save changes.

9.4 Monitoring

To view sessions parameters of clients connected to the access points of given cluster, switch to «**Sessions**» tab.

Clients are defined through MAC addresses and an access points which they are connected to. To view the statistics, select necessary value and click «**Go**» in «**Display**» section. The following parameters might be viewed:



- **AP Location** – access point's location. The value is obtained from location description on «**Basic Settings**» tab;
- **User MAC** – MAC address of client's wireless device;
- **Idle** – average time that the device has been in stand-by mode (when the device does not receive or transmit data).
- **Rate** – transmit data rate between an access point and a particular client, in Mbps;
- **Signal** – a level of signal received from an access point;
- **Rx Total** – total number of packets received by a client within current session;
- **Transmit Total** – total number of packets transmitted by a client within current session;
- **Error Rate** – total number of packets dropped by an access point within current session;

To view correspondence of access points in a cluster and wireless networks detected by these devices, switch to «**Wireless Neighborhood**» tab. There is a table, on «**Wireless Neighborhood**» tab, that shows which wireless networks are detected by each access point and what signal level each access point accept.

Neighbors [167]	Cluster	Neighbors [167]
KDKS_WIFI		
KDKS_WIFI		
1111222		
Wireless AP		
0000011111111111		
111222_wireless		
rtah		
reference		
reference		
Default		
reference		

According to this table, spectral analysis of the whole network might be carried out and there is an opportunity to estimate interference influence to each access point. It will help you to estimate better location of access points among coverage area and to define locations with exceeding level of noise. The top string of the table contains data on each radio interface of access points included in a particular cluster. The left column contains data on wireless networks which are defined by the devices in the cluster. A value of signal level of each access point is displayed in the top-right cell of the table.

The table is formed in the way that wireless networks organized by a cluster are displayed first, the third-party networks follow after them.

The table might be displayed in 3 modes:

- **In cluster** – when checked, the table consists data only on wireless networks organized by the cluster;
- **Not in cluster** – when checked, the table consists data only on third-party wireless networks;
- **Both** – when checked, the table consists data on all wireless networks.

To view current list of the access points in the cluster and their parameters, switch to «**Radio Resource Management**» tab. The table «**Current Channel Assignments**» consists the following parameters:

- **IP Address** – IP address of the access point in the cluster;
- **Radio** – MAC address of a radio interface of the access point in the cluster;
- **Band** – standards supported by the radio interface of the access point in the cluster at the moment;
- **Channel** – number of a channel on which the access point operate;
- **Status** – operation state of the access point's radio interface in the cluster;
- **Locked** – block channel change. When checked, the radio interface will always use the same channel even when another channel is selected as optimal for all the access points in the cluster.

Click «**Refresh**» to update the table «**Current Channel Assignments**».

Automatically manage radio resource assignments

Channel Planner ...

automatically re-assigning channels

Current Channel Assignments

IP Address	Radio	Band	Channel	Status
192.168.15.129	A8:F9:4B:B7:ED:70	B/G/N	1	up
192.168.15.129	A8:F9:4B:B7:ED:60	A/N/AC	36	up


Advanced


Change channels if interference is reduced by at least ▾

Refresh when access point is added to the cluster ▾

Determine if there is better set of channel settings every ▾

Click "Update" to save the new settings.

Clustered 

1 Access Points 

Transmit Power Control ...

automatically re-assigning tx power

RSSI threshold 2,4 GHz (Range: -100...-30)

RSSI threshold 5 GHz (Range: -100...-30)

Interval (Range: 1800...86400 or 0)

Advanced

Minimal Tx Power (Range: 6...30)

Active Scan Mode

Debug Mode

Monitoring

TPC statistics is not available because tpc-planner is not up

The table «**Proposed Channel Assignments**» contains data on available channel values, which the radio interface will switch to if optimal channel selection has been launched:

- **IP Address** – IP address of the access point in the cluster;
- **Radio** – MAC address of a radio interface of the access point in the cluster;
- **Proposed Channel** – a channel number to which the radio interface will switch when optimal channel selection is launched.

9.5 Firmware update

The operation in the cluster mode allows to perform automatic firmware update for all the access points in the cluster without using external systems or controllers. Firmware update might be performed:

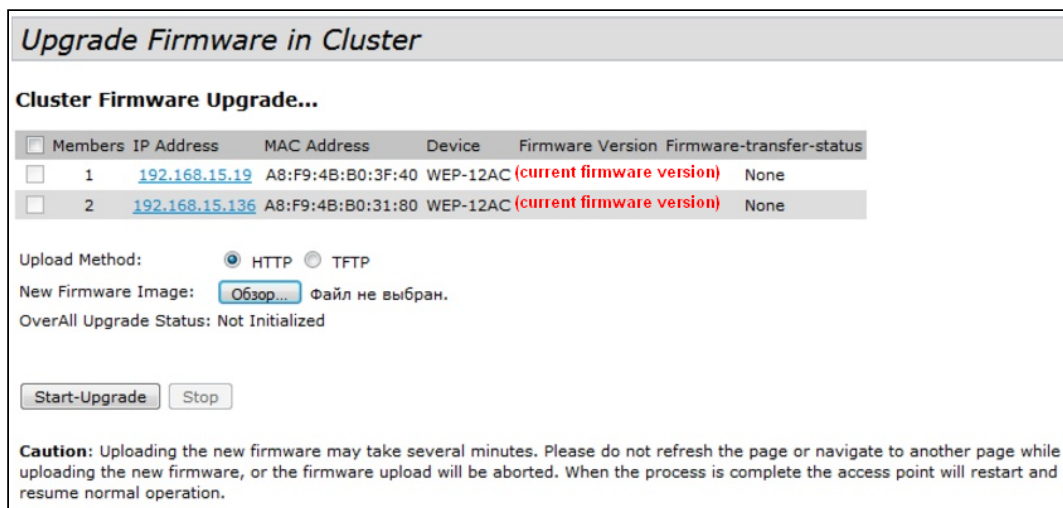
- through web interface;
- through DHCP Autoprovisioning (opt 66, opt 67).

9.5.1 Firmware update via web interface

To update firmware on devices in a cluster through web interface, open «**Cluster Firmware Upgrade**» tab of an access point.

When updating firmware of devices in a cluster, the firmware file will be loaded to each access point and set to «*Primary Image*». Reloading of the devices with new firmware version loading is performed automatically. The previous firmware version will be saved as «*Secondary Image*» (backup firmware version).

Perform the following in «**Cluster Firmware Upgrade**» tab:



Members	IP Address	MAC Address	Device	Firmware Version	Firmware-transfer-status
<input type="checkbox"/>	1	192.168.15.19	A8:F9:4B:B0:3F:40	WEP-12AC (current firmware version)	None
<input type="checkbox"/>	2	192.168.15.136	A8:F9:4B:B0:31:80	WEP-12AC (current firmware version)	None

Upload Method: HTTP TFTP

New Firmware Image: Файл не выбран.

OverAll Upgrade Status: Not Initialized

Caution: Uploading the new firmware may take several minutes. Please do not refresh the page or navigate to another page while uploading the new firmware, or the firmware upload will be aborted. When the process is complete the access point will restart and resume normal operation.

- **Upload Method** – select the firmware loading method for the devices. The loading through TFTP is used in the example;
- **New Filename Image** – enter a file name of firmware image which will be loaded to the device.

Click «**Start-Upgrade**» to start updating.

While firmware updating, do not switch off the devices and do not update or change the web page with progress bar.

9.5.2 Firmware updating through DHCP Autoprovisioning

To update firmware, you need a TFTP server and a DHCP server with particular configuration. The updating process is as follows:

1. An access point is loaded and obtains address via DHCP. The access point obtains 2 parameters from the server while DHCP session: tftp-server and file name, where tftp-server – an IP address of TFTP server, and filename is a name of the file with .manifest extension which contains data on the firmware.
2. A master of the cluster, according to received data, starts make attempts to download manifest-file from TFTP server. After downloading the file, the master compares firmware version specified in a file with its own. If firmware versions are different, the master downloads firmware file from the TFTP server (file name of the firmware is specified in manifest-file) and updates automatically.

3. The other devices in the cluster define that the master is not in operation. Then, new master is selected in the cluster. The device with bigger «uptime» value becomes a master. New master also repeat the second step: downloads manifest-file, compares firmware versions and updates.
4. The cycle is repeated until all the devices in the cluster are updated.

Update configuration algorithm:

a) Place "**wep12.manifest**" file on TFTP server, the file should contain the following string:

VERSION= "1.16.0.X" WEP-12ac-1.16.0.X.tar.gz,

where WEP-12ac-1.16.0.X.tar.gz – name of the archive containing firmware for WEP-12ac;

1.16.0.X – a firmware version included to the archive. The firmware version might be viewed in «version» file in firmware archive.

b) Place archive with firmware for WEP-12ac on TFTP server.

c) Correct DHCP server settings (dhcpd.conf) as follows:

```
option tftp-server-name "192.168.10.1";
```

```
option bootfile-name "wep12.manifest";
```

where 192.168.10.1 – TFTP server address;

wep12.manifest – manifest-file name.

TECHNICAL SUPPORT

For technical assistance in issues related to handling of ELTEXALATAU Ltd. equipment please address to Service Centre of the company:

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