D-Link®

User Manual

DIR-816L

Wireless AC750 Dual Band Router & Access Point with 3G/CDMA/LTE Support and USB Port

March 2016

Contents

CHAPTER 1. INTRODUCTION

Contents and Audience

This manual describes the router DIR-816L and explains how to configure and operate it.

This manual is intended for users familiar with basic networking concepts, who create an in-home local area network, and system administrators, who install and configure networks in offices.

Conventions

Example	Description
text	The body text of the manual.
Before You Begin	A reference to a chapter or section of this manual.
"Quick Installation Guide"	A reference to a document.
Change	A name of a menu, menu item, control (field, checkbox, drop-down list, button, etc.).
`192.168.0.1`	Data that you should enter in the specified field.
! Information	An important note.

Document Structure

Chapter 1 describes the purpose and structure of the document.

Chapter 2 gives an overview of the device's hardware and software features, describes its appearance and the package contents.

Chapter 3 explains how to install the DIR-816L device and configure a PC in order to access its web-based interface.

Chapter 4 describes all pages of the web-based interface for the device in the router mode.

Chapter 5 describes all pages of the web-based interface for the device in the access point mode.

Chapter 6 includes safety instructions and tips for networking and connecting additional equipment.

Chapter 7 introduces abbreviations and acronyms used in this manual.

CHAPTER 2. OVERVIEW

General Information

The DIR-816L device is a wireless dual band router supporting the access point mode. It is an affordable solution for creating wireless networks at home or in an office.

The router is equipped with a USB port for connecting a USB modem[1], which can be used to establish connection to the Internet. In addition, to the USB port of the router you can connect a USB storage device, which will be used as a network drive, or a printer.

Using the DIR-816L device, you are able to quickly create a high-speed wireless network at home or in your office, which lets computers and mobile devices access the Internet virtually anywhere (within the operational range of your wireless network). Simultaneous activity of 2.4GHz band and 5GHz band allows performing a wide range of tasks. The router can operate as a base station for connecting wireless devices of the standards 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac (at the rate up to 733Mbps[2]).

The device supports multiple functions for the wireless interface: several security standards (WEP, WPA/WPA2), MAC address filtering, different operation modes (access point, router, client), WPS, WMM.

You are able to connect the wireless router DIR-816L switched to the router mode to a cable or DSL modem or to a private Ethernet line and use a high-speed Internet connection to successfully fulfill a wide range of professional tasks. The built-in 4-port switch enables you to connect Ethernet-enabled computers, game consoles, and other devices to your network.

In the router mode, the DIR-816L device includes a built-in firewall. The advanced security functions minimize threats of hacker attacks, prevent unwanted intrusions to your network, and block access to unwanted websites for users of your LAN.

In addition, the device is equipped with a button for switching the Wi-Fi network off/on. If needed, for example, when you leave home, you can easily switch the router's WLAN by pressing the button, and devices connected to the LAN ports of the router will stay online.

You can configure the settings of the wireless router DIR-816L via the user-friendly web-based interface (the interface is available in several languages).

Now you can simply update the firmware: the router itself finds approved firmware on D-Link update server and notifies when ready to install it.

1 Not included in the delivery package. D-Link does not guarantee compatibility with all USB modems. Please, refer to the ***Specifications**** section, page 8.

2 Up to 300Mbps for 2.4GHz and up to 433Mbps for 5GHz.

*Specifications**

Hardware	
Interfaces	· 10/100BASE-TX WAN port · 4 10/100BASE-TX LAN ports · USB 2.0 port
LEDs	· Power · Internet · WLAN / WPS · 4 LAN LEDs
Buttons	· ON/OFF button to power on/power off · RESET button to restore factory default settings · WPS button to set up secure wireless connection and enable/disable wireless network
Antenna	· Two external dual band antennas (5dBi gain for 2.4GHz and for 5GHz)
MIMO	· 2 x 2
Power connector	· Power input connector (DC)

Software	
Operation Modes	· Router mode · Access point mode
WAN connection types	· LTE · 3G · PPPoE · IPv6 PPPoE · PPPoE Dual Stack · Static IP / Dynamic IP · Static IPv6 / Dynamic IPv6 · PPPoE + Static IP / Dynamic IP · PPTP/L2TP + Static IP · PPTP/L2TP + Dynamic IP
Network functions	· Support of IEEE 802.1X for Internet connection · DHCP server/relay · DHCPv6 server (Stateful/Stateless), IPv6 prefix delegation · DNS relay · Support of DNSv6 AAAA records · Dynamic DNS · Static IP routing · Static IPv6 routing · IGMP Proxy · RIP · Support of UPnP IGD · Support of VLAN · Flow control · WAN ping respond · Support of SIP ALG · Support of RTSP · Channel reservation · Manual speed and duplex mode setup for each Ethernet port
Firewall functions	· Network Address Translation (NAT) · Stateful Packet Inspection (SPI) · IP filter · IPv6 filter · MAC filter · URL filter · DMZ · Prevention of ARP and DDoS attacks · Virtual servers · Built-in Yandex.DNS web content filtering service

* The device features are subject to change without notice. For the latest versions of the firmware and relevant documentation, visit www.dlink.ru.

Software	
VPN	· IPSec/PPTP/L2TP/PPPoE pass-through · IPSec tunnels
USB interface functions	· USB modem Auto connection to available type of supported network (4G/3G/2G)[3] Enabling/disabling PIN code check, changing PIN code[4] · USB storage File browser Print server Access to storage via accounts Built-in Samba server Built-in FTP server Built-in DLNA server Built-in Transmission torrent client; uploading/downloading files from/to USB storage
Management	· Local and remote access to settings through TELNET/WEB (HTTP/HTTPS) · Multilingual web-based interface for configuration and management · Notification on connection problems and auto redirect to settings · Firmware update via web-based interface · Automatic notification on new firmware version · Saving/restoring configuration to/from file · Support of remote logging · Automatic synchronization of system time with NTP server and manual time/date setup · Ping function · Traceroute utility · TR-069 client

Wireless Module Parameters	
Standards	· IEEE 802.11a/n/ac · IEEE 802.11b/g/n
Frequency range	· 2400 ~ 2483.5MHz · 5150 ~ 5350MHz
Wireless connection security	· WEP · WPA/WPA2 (Personal/Enterprise) · MAC filter · WPS (PBC/PIN)
Advanced functions	· WLAN splitting (up to 4 SSIDs) · “Client” function in the router mode (WISP repeater) · “Client” function in the access point mode (wireless network client, wireless network repeater) · WMM (Wi-Fi QoS) · Managing connected stations · Advanced settings
Wireless connection rate	· IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, and 54Mbps · IEEE 802.11b: 1, 2, 5.5, and 11Mbps · IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, and 54Mbps · IEEE 802.11n (2.4GHz/5GHz): from 6.5 to 300Mbps (from MCS0 to MCS15) · IEEE 802.11ac (5GHz): from 6.5 to 433Mbps (from MCS0 to MCS9)
Transmitter output power *The maximum value of the transmitter output power depends upon the radio frequency regulations applied in your country*	· 802.11a (typical at room temperature 25 °C) 16dBm (+/-2dB) at 6, 9, 12, 18, 24Mbps 15dBm (+/-2dB) at 36Mbps 14dBm (+/-2dB) at 48, 54Mbps · 802.11b (typical at room temperature 25 °C) 16dBm (+/-2dB) at 1, 2, 5.5, 11Mbps · 802.11g (typical at room temperature 25 °C) 16dBm (+/-2dB) at 6, 9, 12, 18, 24, 36Mbps 15dBm (+/-2dB) at 48Mbps 14dBm (+/-2dB) at 54Mbps

3 For LTE and GSM USB modems.
4 For GSM USB modems only.

Wireless Module Parameters	
	· 802.11n (typical at room temperature 25 °C) 2.4GHz, HT20 16dBm (+/-2dB) at MCS0/1/2/3/4, MCS8/9/10/11/12 15dBm (+/-2dB) at MCS5, MCS13 14dBm (+/-2dB) at MCS6/7, MCS14/15 2.4GHz, HT40 16dBm (+/-2dB) at MCS0/1/2/3/4, MCS8/9/10/11/12 15dBm (+/-2dB) at MCS5, MCS13 14dBm (+/-2dB) at MCS6/7, MCS14/15 5GHz, HT20 16dBm (+/-2dB) at MCS0/1/2/3/4 15dBm (+/-2dB) at MCS5 14dBm (+/-2dB) at MCS6/7 5GHz, HT40 16dBm (+/-2dB) at MCS0/1/2/3/4 15dBm (+/-2dB) MCS5 14dBm (+/-2dB) MCS6/7 · 802.11ac (typical at room temperature 25 °C) HT20 16dBm (+/-2dB) at MCS0/1/2/3/4 15dBm (+/-2dB) at MCS5 14dBm (+/-2dB) at MCS6/7 12dBm (+/-2dB) at MCS8 HT40 16dBm (+/-2dB) at MCS0/1/2/3/4 15dBm (+/-2dB) at MCS5 14dBm (+/-2dB) at MCS6/7 12dBm (+/-2dB) at MCS8 11dBm (+/-2dB) at MCS9 HT80 16dBm (+/-2dB) at MCS0/1/2/3/4 15dBm (+/-2dB) at MCS5 14dBm (+/-2dB) at MCS6/7 12dBm (+/-2dB) at MCS8 11dBm (+/-2dB) at MCS9
Receiver sensitivity	· 802.11a (typical at PER = 10% (1000-byte PDUs) at room temperature 25 °C) -82dBm at 6Mbps -81dBm at 9Mbps -79dBm at 12Mbps -77dBm at 18Mbps -74dBm at 24Mbps -70dBm at 36Mbps -66dBm at 48Mbps -65dBm at 54Mbps · 802.11b (typical at PER = 8% (1000-byte PDUs) at room temperature 25 °C) -79dBm at 11Mbps -82dBm at 5.5Mbps -84dBm at 2Mbps -84dBm at 1Mbps · 802.11g (typical at PER = 10% (1000-byte PDUs) at room temperature 25 °C) -82dBm at 6Mbps -81dBm at 9Mbps -79dBm at 12Mbps -77dBm at 18Mbps -74dBm at 24Mbps -70dBm at 36Mbps -66dBm at 48Mbps -65dBm at 54Mbps · 802.11n (typical at PER = 10% (1000-byte PDUs)) 2.4GHz/5GHz, HT20 -82dBm at MCS0 -79dBm at MCS1 -77dBm at MCS2 -74dBm at MCS3 -70dBm at MCS4 -66dBm at MCS5 -65dBm at MCS6 -64dBm at MCS7

Wireless Module Parameters	
	2.4GHz/5GHz, HT40 -79dBm at MCS0 -76dBm at MCS1 -74dBm at MCS2 -71dBm at MCS3 -67dBm at MCS4 -63dBm at MCS5 -62dBm at MCS6 -61dBm at MCS7 · 802.11ac (typical at PER = 10% (1000-byte PDUs)) HT20 -82dBm at MCS0 -79dBm at MCS1 -77dBm at MCS2 -74dBm at MCS3 -70dBm at MCS4 -66dBm at MCS5 -65dBm at MCS6 -64dBm at MCS7 -59dBm at MCS8 -57dBm at MCS9 HT40 -79dBm at MCS0 -76dBm at MCS1 -74dBm at MCS2 -71dBm at MCS3 -67dBm at MCS4 -63dBm at MCS5 -62dBm at MCS6 -61dBm at MCS7 -56dBm at MCS8 -54dBm at MCS9 HT80 -76dBm at MCS0 -73dBm at MCS1 -71dBm at MCS2 -68dBm at MCS3 -64dBm at MCS4 -60dBm at MCS5 -59dBm at MCS6 -58dBm at MCS7 -53dBm at MCS8 -51dBm at MCS9
Modulation schemes	· 802.11a: BPSK, QPSK, 16QAM, 64QAM with OFDM · 802.11b: DQPSK, DBPSK, DSSS, CCK · 802.11g: BPSK, QPSK, 16QAM, 64QAM with OFDM · 802.11n: BPSK, QPSK, 16QAM, 64QAM with OFDM · 802.11ac: BPSK, QPSK, 16QAM, 64QAM, up to 256QAM with OFDM

Physical Parameters	
Dimensions	· 151.6 x 112 x 30.5 mm (6 x 4.4 x 1.2 in)
Weight	· 204 g (0.5 lb)

Operating Environment	
Power	· Output: 12V DC, 1A
Temperature	· Operating: from 0 to 40 °C · Storage: from -20 to 65 °C
Humidity	· Operating: from 10% to 90% (non-condensing) · Storage: from 5% to 95% (non-condensing)

Supported USB modems[5]	
GSM	· Alcatel X500 · D-Link DWM-152C1 · D-Link DWM-156A6 · D-Link DWM-156A7 · D-Link DWM-156C1 · D-Link DWM-157B1 · D-Link DWM-157B1 (Velcom) · D-Link DWM-158D1 · D-Link DWR-710 · Huawei E150 · Huawei E1550 · Huawei E156G · Huawei E160G · Huawei E169G · Huawei E171 · Huawei E173 (Megafon) · Huawei E220 · Huawei E352 (Megafon) · Huawei E367 (3G mode) · Huawei E392 (3G mode) · ZTE MF112 · ZTE MF192 · ZTE MF626 · ZTE MF627 · ZTE MF652 · ZTE MF667 · ZTE MF668 · ZTE MF752
CDMA	· Airplus MCD-650 · Airplus MCD-800 · AnyDATA ADU-300A · AnyDATA ADU-500A · AnyDATA ADU-510A · Huawei EC306 · ZTE AC5710 · ZTE AC5730
LTE	· Huawei E3131 · Huawei E3272 · Huawei E3351 · Huawei E367 · Huawei E392 · Megafon M100-1 · Megafon M100-2 · Megafon M100-3 · Megafon M100-4 · Megafon M150-1 · MTS 824F · Quanta 1K6E (Beeline 1K6E) · Yota LU-150 · Yota WLTUBA-107 · ZTE MF823 · ZTE MF827
Smartphones in USB tethering mode	· Some models of Android smartphones

5 The manufacturer does not guarantee proper operation of the router with every modification of the firmware of USB modems.

Product Appearance

Top Panel

Figure 1. Top panel view.

LED	Mode	Description
Power	*Solid green*	The router is powered on.
	No light	The router is powered off.
Internet	*Solid green*	The Internet connection is on.
	Blinking green	The WAN interface is active (upstream or downstream traffic).
	No light	The cable is not connected.

LED	Mode	Description
WLAN WPS	*Solid green*	The 2.4GHz and/or 5GHz bands are on.
	Fast blinking green	The WLAN interface is active (upstream or downstream traffic).
	Slow blinking green	Attempting to add a wireless device via the WPS function.
	No light	The 2.4GHz and 5GHz bands are off.
LAN 1-4	*Solid green*	A device (computer) is connected to the relevant port, the connection is on.
	Blinking green	The LAN port is active (upstream or downstream traffic). When the router is being loaded, the LEDs are blinking one at a time. When the firmware is being upgraded, the LEDs are blinking two at a time.
	No light	The cable is not connected to the relevant port.

Side Panel

Figure 2. Side panel view.

Name	Description
WPS	A button to set up a secure wireless connection (the WPS function) and enable/disable the wireless network. To use the WPS function: with the device turned on, push the button, hold it for 2 seconds, and release. The **WLAN / WPS** LED should start blinking. To disable the router's wireless network: with the device turned on, press the button, hold for 7 seconds, and release. The **WLAN / WPS** LED should turn off.

Back and Bottom Panels

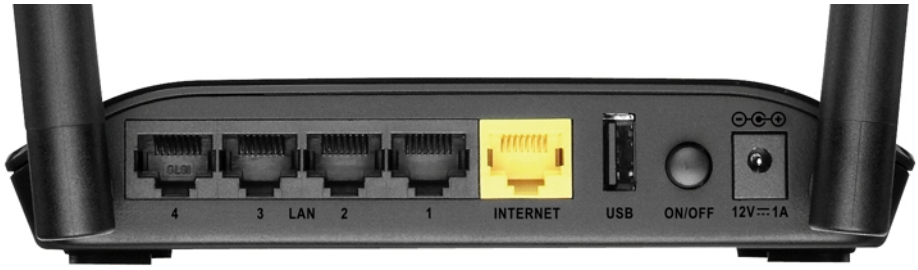


Figure 3. Back panel view.

Port	Description
LAN 1-4	4 Ethernet ports to connect computers or network devices.
INTERNET	A port to connect to a cable or DSL modem or to a private Ethernet line (it is recommended to use the cable included in the delivery package).
USB	A port for connecting a USB device (modem, storage, printer).
ON/OFF	A button to turn the router on/off.
12V=1A	Power connector.

The **RESET** button located on the bottom panel of the router is designed to restore the factory default settings. To restore the factory defaults, push the button (with the device turned on), hold it for 10 seconds, and then release the button.

The device is also equipped with two external Wi-Fi antennas.

Delivery Package

The following should be included:

- Router DIR-816L
- Power adapter DC 12V/1A
- Ethernet cable
- "***Quick Installation Guide***" (brochure).

The "***User Manual***" and "***Quick Installation Guide***" documents are available on D-Link website (see www.dlink.ru).

! Using a power supply with a different voltage rating than the one included will cause damage and void the warranty for this product.

CHAPTER 3. INSTALLATION AND CONNECTION

Before You Begin

Please, read this manual prior to installing the device. Make sure that you have all the necessary information and equipment.

Operating System

Configuration of the wireless dual band router DIR-816L supporting LTE, 3G GSM and CDMA with Gigabit Ethernet ports (hereinafter referred to as "the router") is performed via the built-in web-based interface. The web-based interface is available from any operating system that supports a web browser.

Web Browser

The following web browsers are recommended:

- Apple Safari 5 and later
- Google Chrome 5 and later
- Microsoft Internet Explorer 8 and later
- Mozilla Firefox 5 and later
- Opera 10 and later.

For successful operation, JavaScript should be enabled on the web browser. Make sure that JavaScript has not been disabled by other software (such as virus protection or web user security packages) running on your computer.

Wired or Wireless NIC (Ethernet or Wi-Fi Adapter)

Any computer that uses the router should be equipped with an Ethernet or Wi-Fi adapter (NIC). If your computer is not equipped with such a device, install an Ethernet or Wi-Fi adapter prior to using the router.

Wireless Connection

Wireless workstations from your network should be equipped with a wireless 802.11a, b, g, n, or ac NIC (Wi-Fi adapter). In addition, you should specify the values of SSID, channel number and security settings defined in the web-based interface of the router for all these wireless workstations.

USB Modem

To connect to an LTE, 3G GSM or CDMA network, you should use a USB modem. Connect it to the USB port of the router, then access the web-based interface of the router, and you will be able to configure a connection to the Internet[6].

Your USB modem should be equipped with an active identification card (SIM or R-UIM) of your operator.

! Some operators require subscribers to activate their USB modems prior to using them. Please, refer to connection guidelines provided by your operator when concluding the agreement or placed on its website.

For LTE and CDMA USB modems, it is required to disable the PIN code check on the identification card prior to connecting the USB modem to the router.

6 Contact your operator to get information on the service coverage and fees.

Connecting to PC

PC with Ethernet Adapter

1. Make sure that your PC is powered off.
2. Connect an Ethernet cable between any of LAN ports located on the back panel of the router and the Ethernet port of your PC.
3. To connect via an LTE, 3G GSM or CDMA network: connect your USB modem to the USB port[7] located on the back panel of the router.

! If you need to connect or change a USB modem to another one when the router is powered on, power off the router, connect the modem to the USB port, and power on the router.

4. Connect the power cord to the power connector port on the back panel of the router, then plug the power adapter into an electrical outlet or power strip.
5. Turn on the router by pressing the **ON/OFF** button on its back panel.
6. Turn on your PC and wait until your operating system is completely loaded.

Obtaining IP Address Automatically in OS Windows XP

1. Click the **Start** button and proceed to the **Control Panel > Network and Internet Connections > Network Connections** window.
2. In the **Network Connections** window, right-click the relevant **Local Area Connection** icon and select the **Properties** line in the menu displayed.

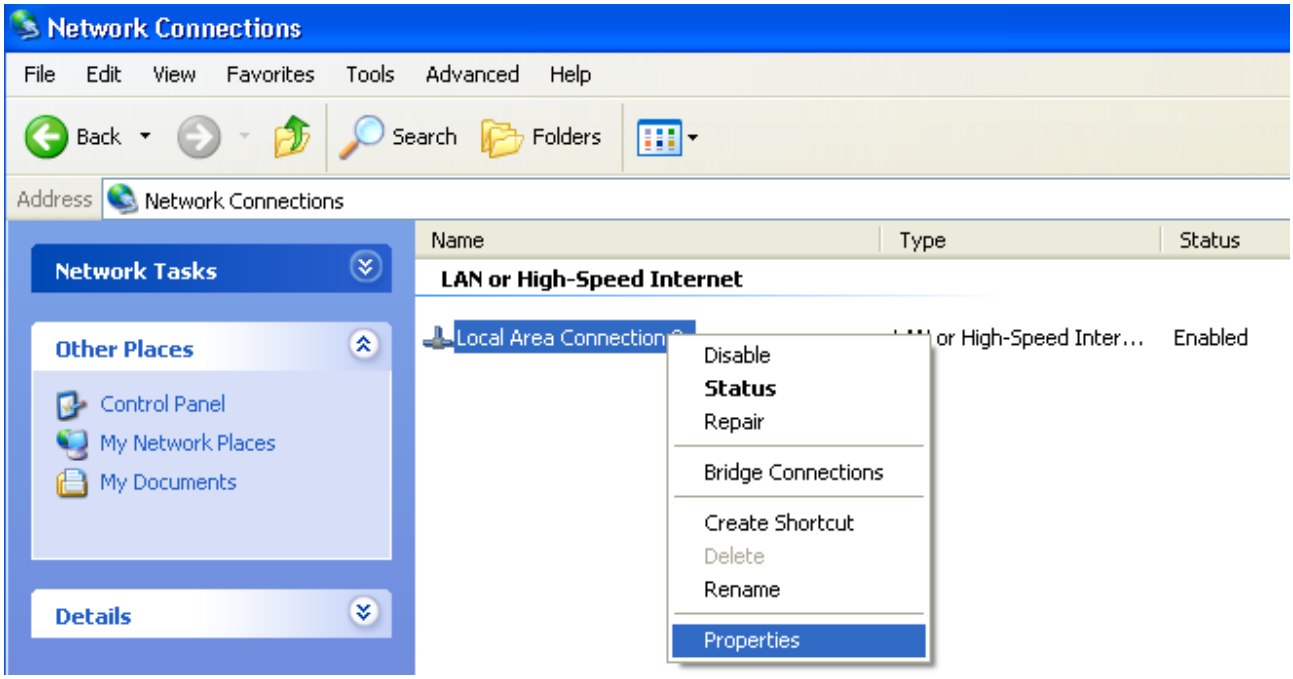


*Figure 4. The **Network Connections** window.*

7 It is recommended to use a USB extension cable to connect a USB modem to the router.

3. In the **Local Area Connection Properties** window, on the **General** tab, select the **Internet Protocol (TCP/IP)** line. Click the **Properties** button.

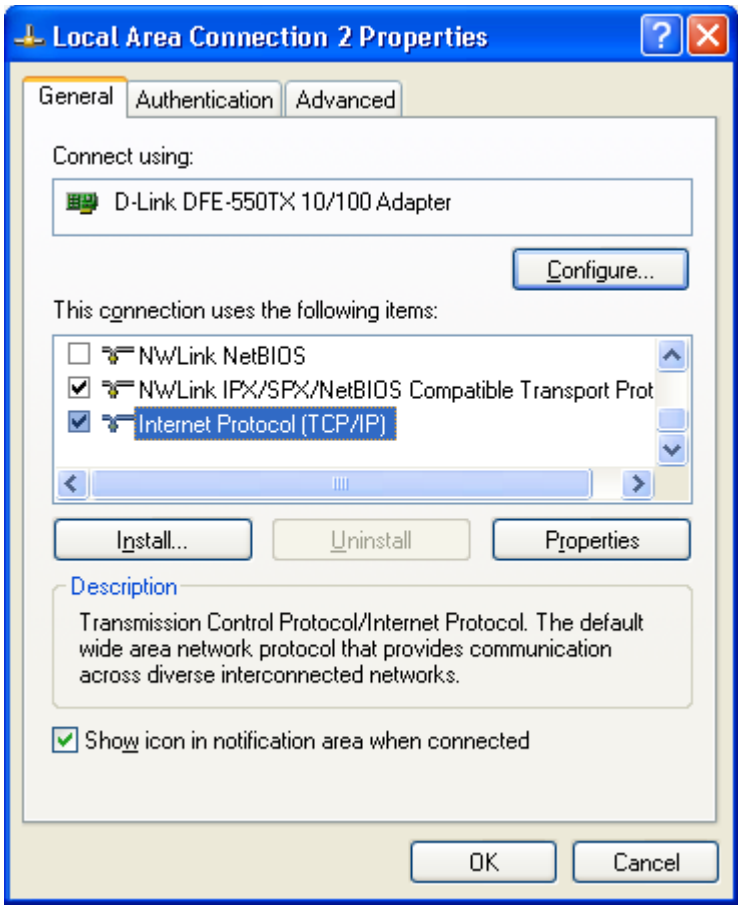


*Figure 5. The **Local Area Connection Properties** window.*

4. Select the **Obtain an IP address automatically** and **Obtain DNS server address automatically** radio buttons. Click the **OK** button.

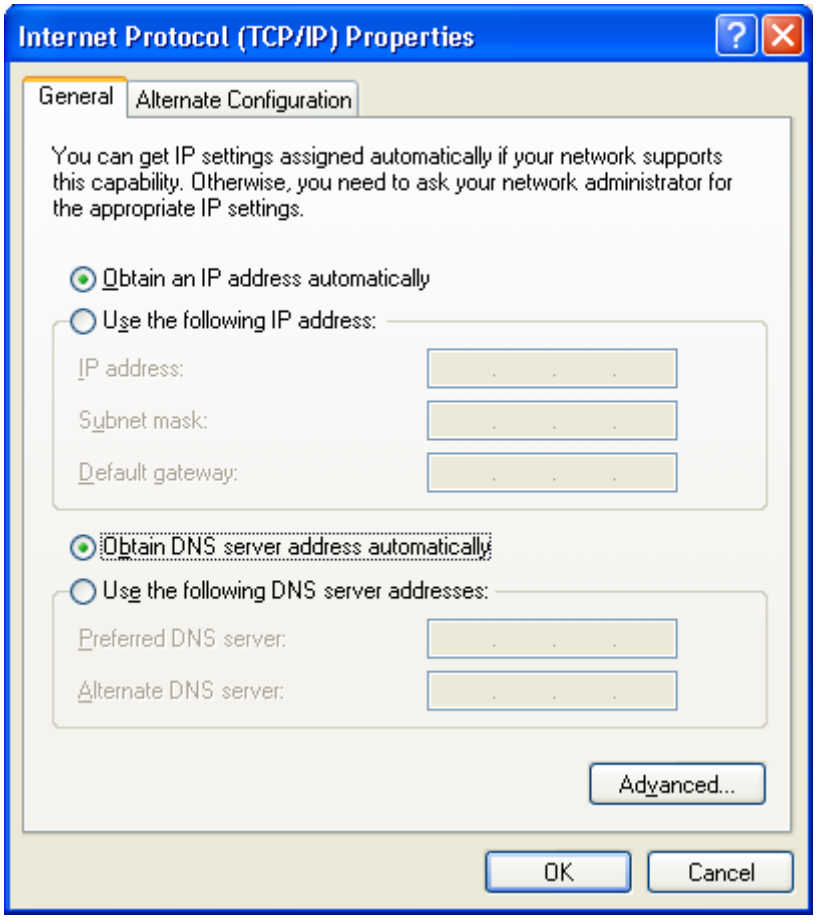


*Figure 6. The **Internet Protocol (TCP/IP) Properties** window.*

5. Click the **OK** button in the connection properties window.

Now your computer is configured to obtain an IP address automatically.

Obtaining IP Address Automatically in OS Windows 7

1. Click the **Start** button and proceed to the **Control Panel** window.
2. Select the **Network and Sharing Center** section. (If the Control Panel has the category view (the **Category** value is selected from the **View by** drop-down list in the top right corner of the window), choose the **View network status and tasks** line under the **Network and Internet** section.)

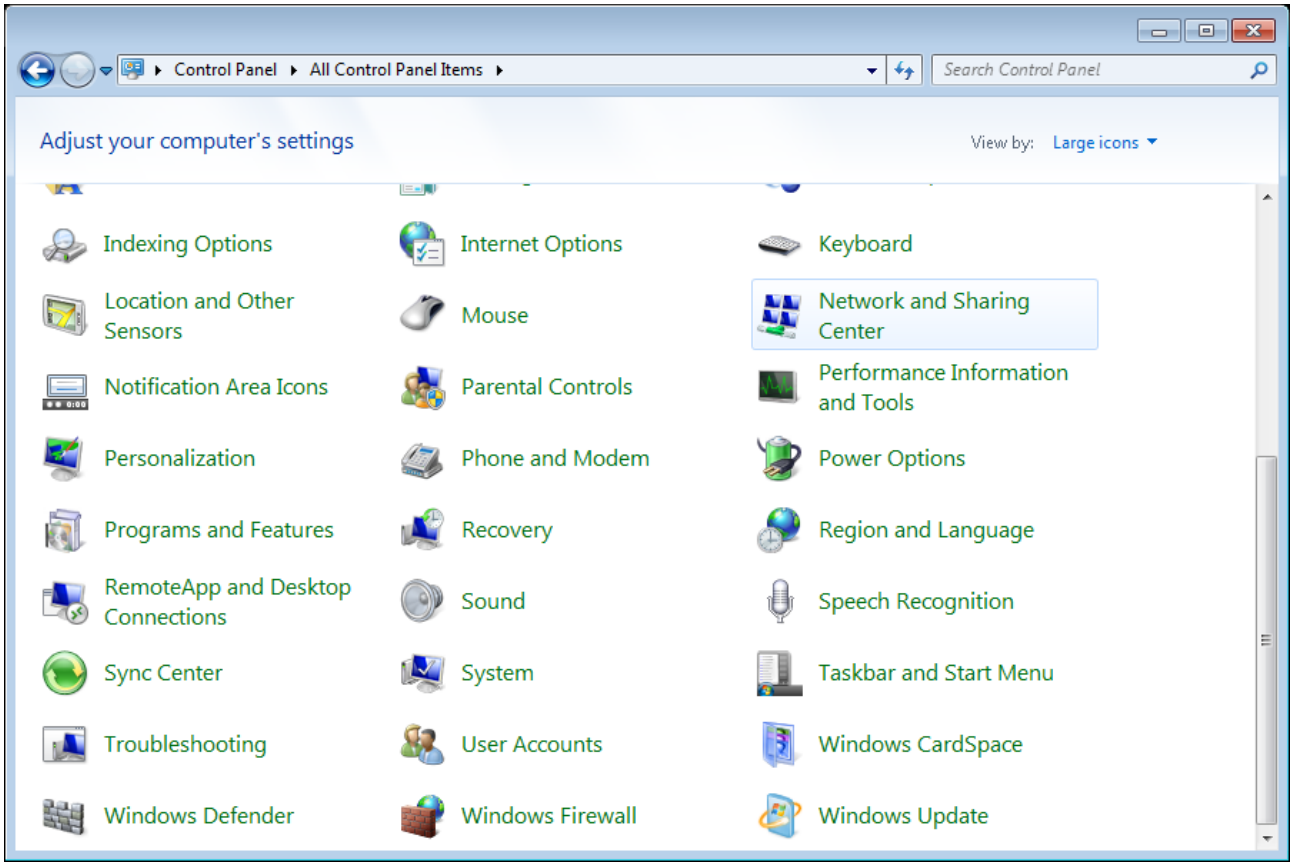


*Figure 7. The **Control Panel** window.*

3. In the menu located on the left part of the window, select the **Change adapter settings** line.

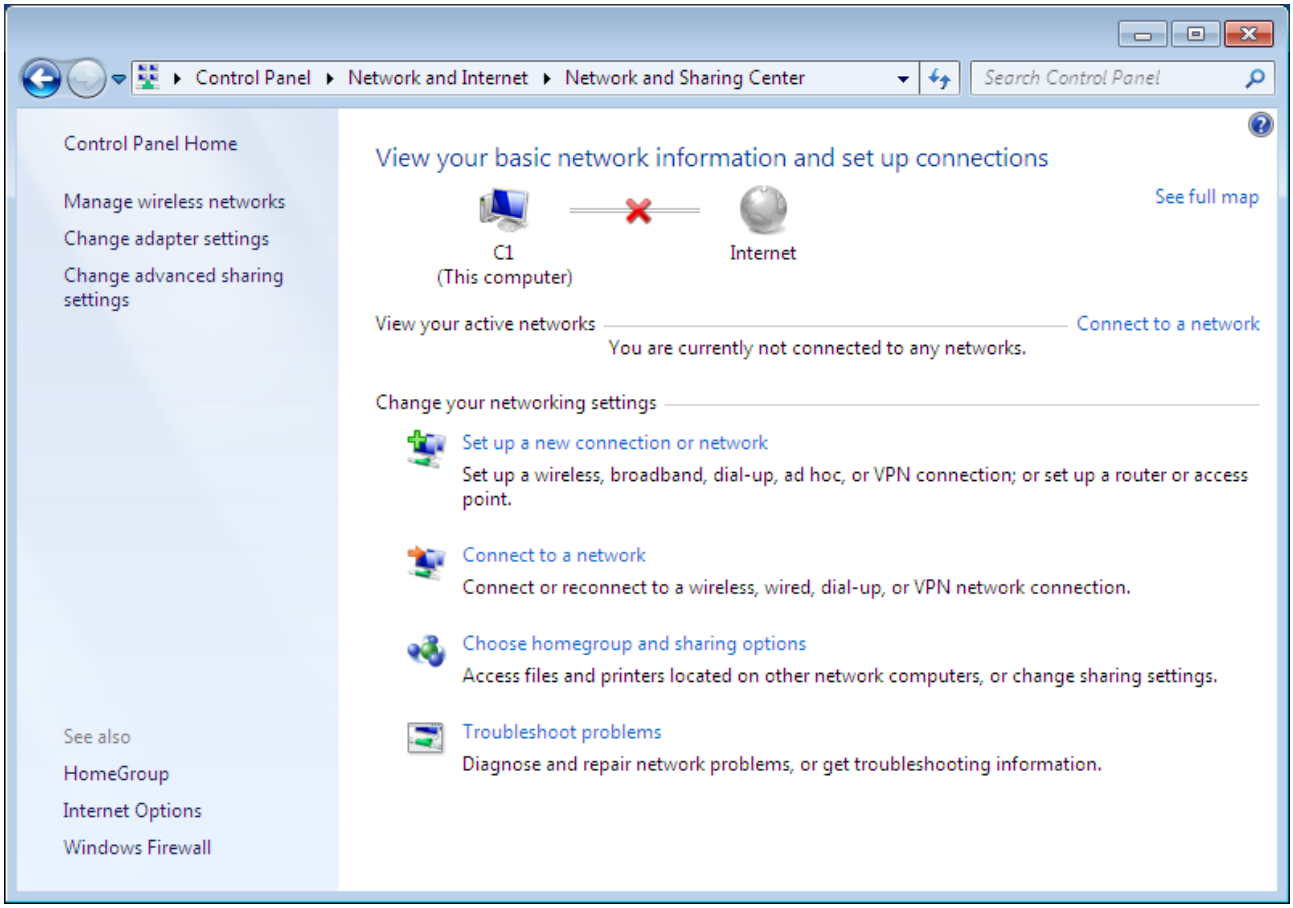


*Figure 8. The **Network and Sharing Center** window.*

4. In the opened window, right-click the relevant **Local Area Connection** icon and select the **Properties** line in the menu displayed.

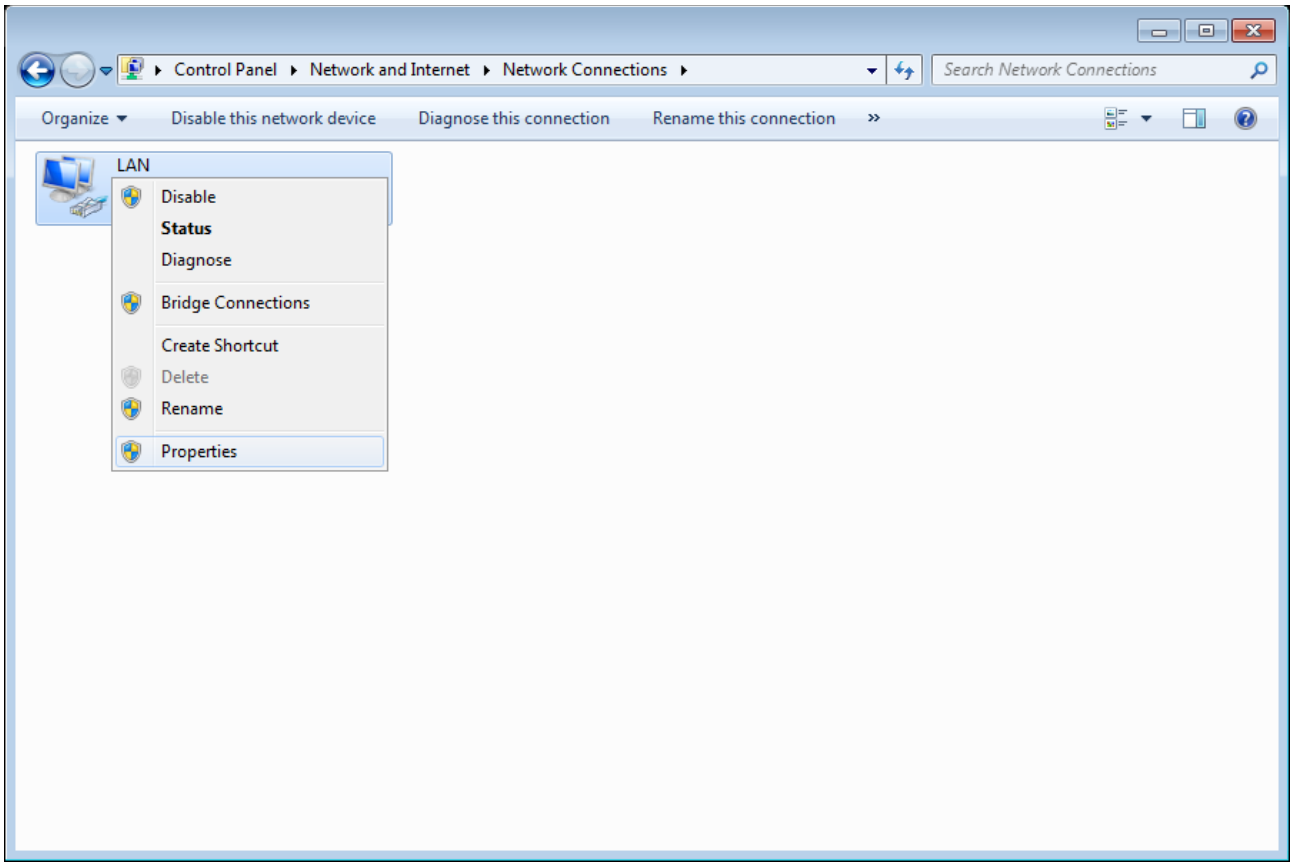


*Figure 9. The **Network Connections** window.*

5. In the **Local Area Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

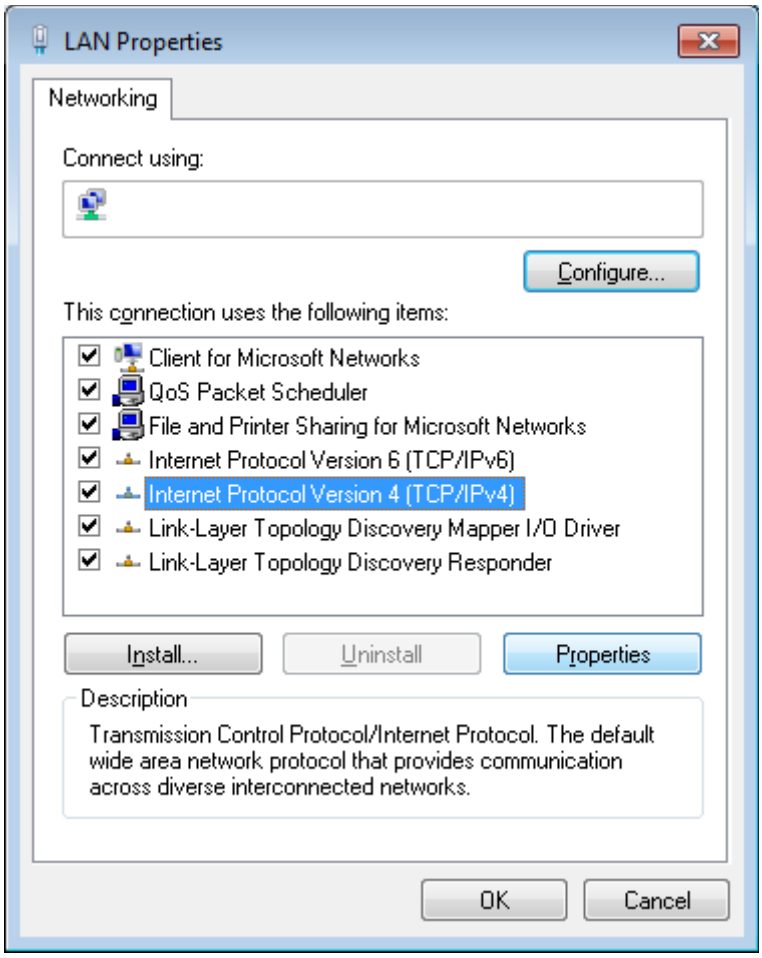


*Figure 10. The **Local Area Connection Properties** window.*

6. Select the **Obtain an IP address automatically** and **Obtain DNS server address automatically** radio buttons. Click the **OK** button.

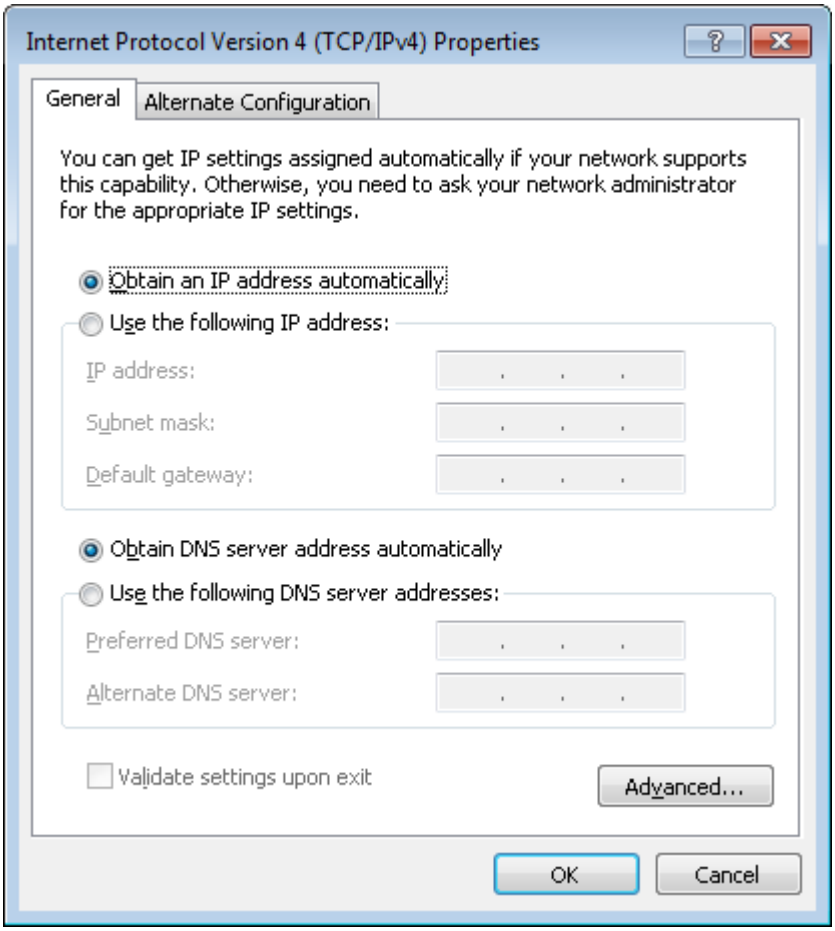


*Figure 11. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.*

7. Click the **OK** button in the connection properties window.

Now your computer is configured to obtain an IP address automatically.

PC with Wi-Fi Adapter

1. To connect via an LTE, 3G GSM or CDMA network: connect your USB modem to the USB port[8] located on the back panel of the router.

! If you need to connect or change a USB modem to another one when the router is powered on, power off the device, connect the modem to the USB port, and power on the router.

2. Connect the power cord to the power connector port on the back panel of the router, then plug the power adapter into an electrical outlet or power strip.
3. Turn on the router by pressing the **ON/OFF** button on its back panel.
4. Turn on your PC and wait until your operating system is completely loaded.
5. Turn on your Wi-Fi adapter. As a rule, modern notebooks with built-in wireless NICs are equipped with a button or switch that turns on/off the wireless adapter (refer to your PC documents). If your PC is equipped with a pluggable wireless NIC, install the software provided with your Wi-Fi adapter.

8 It is recommended to use a USB extension cable to connect a USB modem to the router.

Configuring Wi-Fi Adapter in OS Windows XP

1. Click the **Start** button and proceed to the **Control Panel > Network and Internet Connections > Network Connections** window.
2. Select the icon of the wireless network connection and make sure that your Wi-Fi adapter is on.

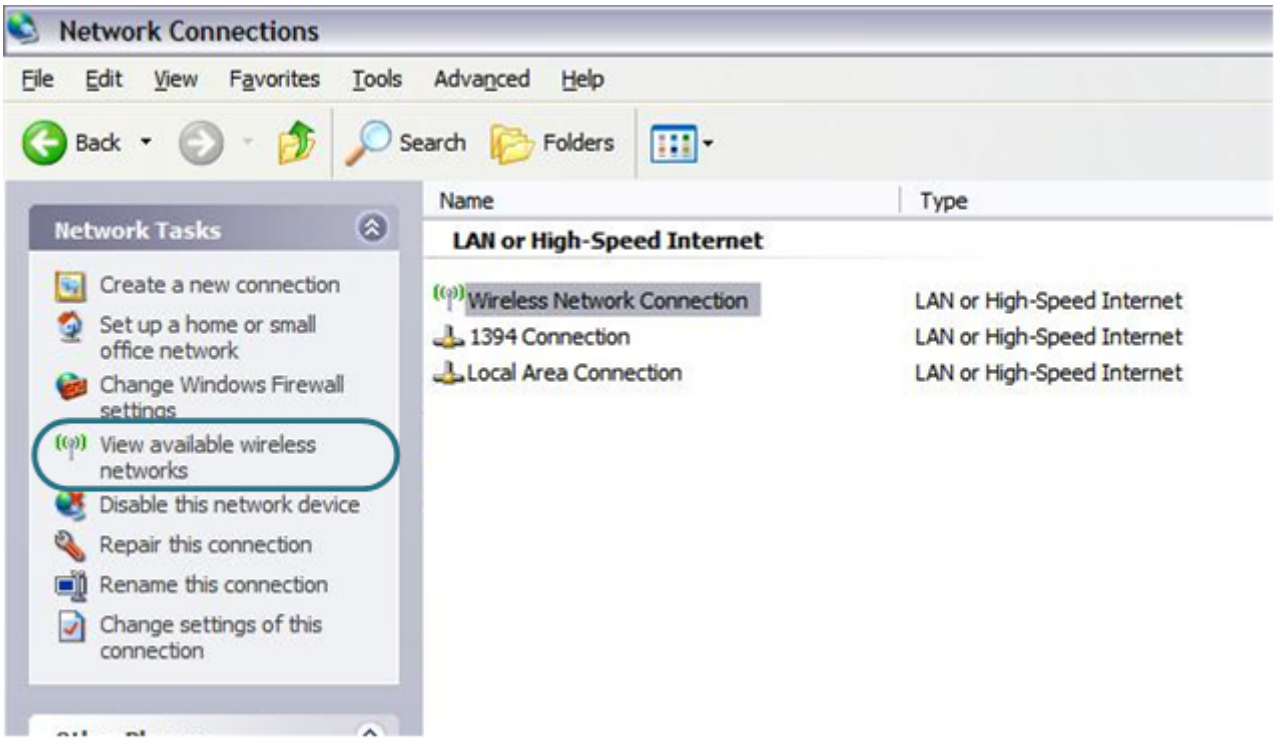


*Figure 12. The **Network Connections** window.*

3. Search for available wireless networks.
4. In the opened **Wireless Network Connection** window, select the wireless network **DIR-816LA1A** (for operating in the 2.4GHz band) or **DIR-816LA1A-5G** (for operating in the 5GHz band) and click the **Connect** button.
5. In the opened window, enter the network key (see WPS PIN on the barcode label on the bottom panel of the device) in the **Network key** and **Confirm network key** fields and click the **Connect** button.

After that the **Wireless Network Connection Status** window appears.

If you perform initial configuration of the router via Wi-Fi connection, note that immediately after changing the wireless default settings of the router you will need to reconfigure the wireless connection using the newly specified settings.

Configuring Wi-Fi Adapter in OS Windows 7

1. Click the **Start** button and proceed to the **Control Panel** window.
2. Select the **Network and Sharing Center** section. (If the Control Panel has the category view (the **Category** value is selected from the **View by** drop-down list in the top right corner of the window), choose the **View network status and tasks** line under the **Network and Internet** section.)

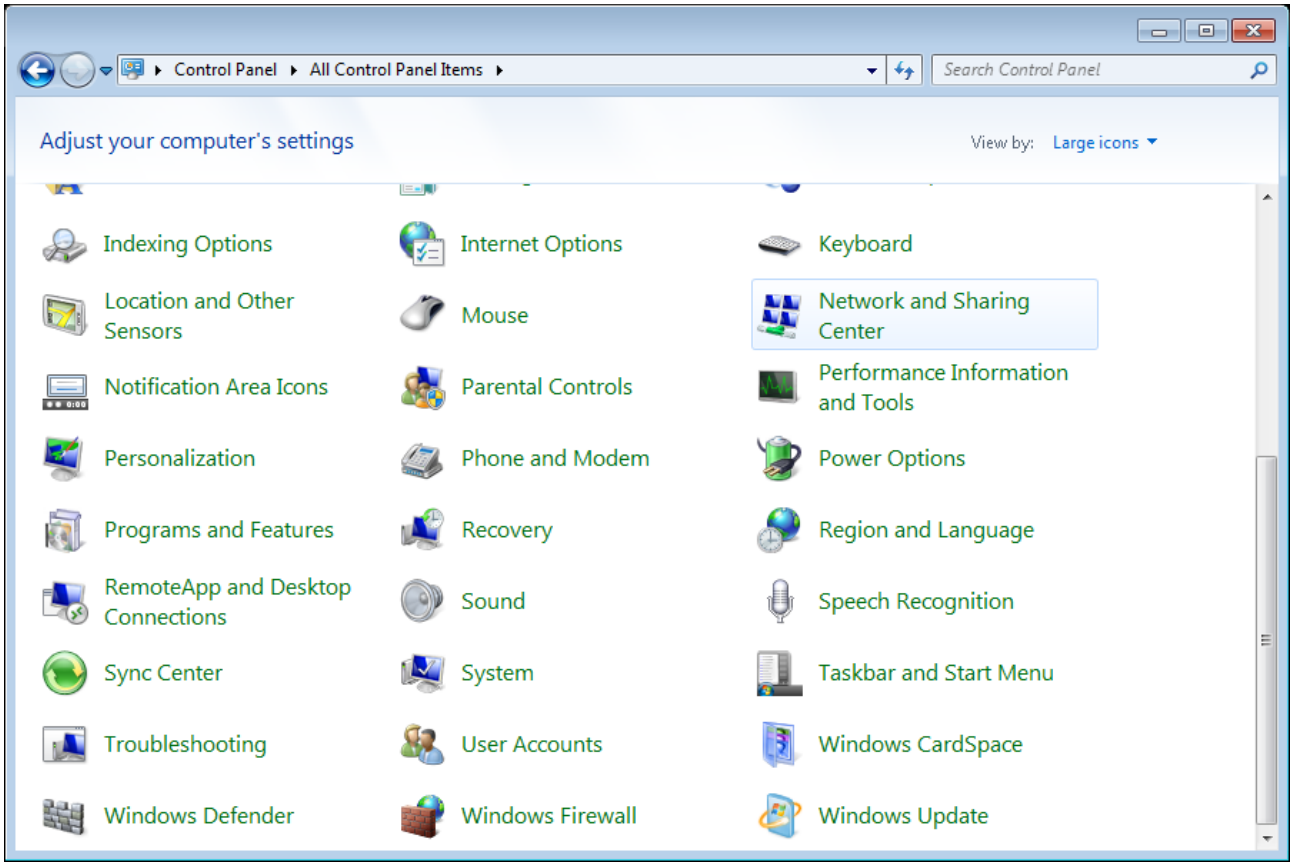


*Figure 13. The **Control Panel** window.*

3. In the menu located on the left part of the window, select the **Change adapter settings** line.
4. In the opened window, select the icon of the wireless network connection and make sure that your Wi-Fi adapter is on.
5. To open the list of available wireless networks, select the icon of the wireless network connection and click the **Connect To** button or left-click the network icon in the notification area located on the right side of the taskbar.

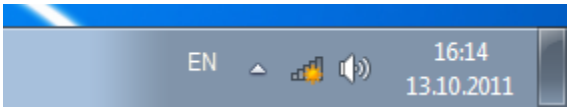


Figure 14. The notification area of the taskbar.

6. In the opened **Wireless Network Connection** window, select the wireless network **DIR-816LA1A** (for operating in the 2.4GHz band) or **DIR-816LA1A-5G** (for operating in the 5GHz band) and click the **Connect** button.

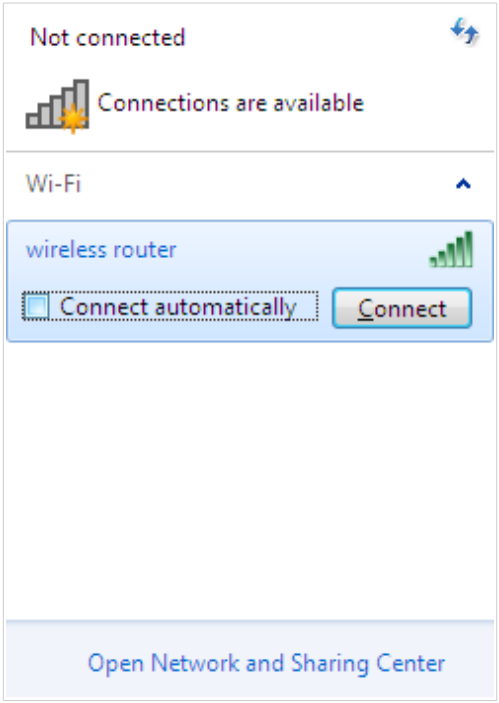


Figure 15. The list of available networks.

7. In the opened window, enter the network key (see WPS PIN on the barcode label on the bottom panel of the device) in the **Security key** field and click the **OK** button.
8. Wait for about 20-30 seconds. After the connection is established, the network icon will be displayed as the signal level scale.

If you perform initial configuration of the router via Wi-Fi connection, note that immediately after changing the wireless default settings of the router you will need to reconfigure the wireless connection using the newly specified settings.

Connecting to Web-based Interface

When you have configured your computer, you can access the web-based interface and configure needed parameters (create a WAN connection, change the parameters of the wireless network, specify the settings of the firewall, etc.).

For security reasons, DIR-816L with default settings cannot connect to the Internet. To get started, please set your own password used to access the web-based interface and, if needed, configure other settings recommended by your ISP.

Start a web browser (see the ***Before You Begin*** section, page 18). In the address bar of the web browser, enter the IP address of the router (by default, the following IP address is specified: **192.168.0.1**). Press the **Enter** key.

Figure 16. Connecting to the web-based interface of the DIR-816L device.

If the error "*The page cannot be displayed*" (or "*Unable to display the page*"/"*Could not connect to remote server*") occurs upon connecting to the web-based interface of the router, make sure that you have properly connected the router to your computer.

After the first access to the web-based interface you need to change the default administrator password. Enter the new password in the **Password** and **Confirmation** fields. You may set any password except **admin**. Use digits, Latin letters (uppercase and/or lowercase), and characters available on the keyboard. Then click the **Apply** button.

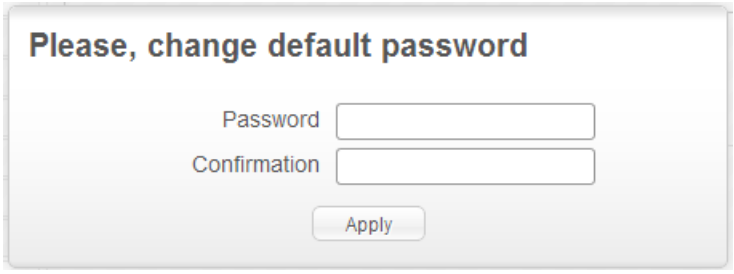


Figure 17. The page for changing the default administrator password.

Remember or write down the new password for the administrator account. In case of losing the new password, you can access the settings of the router only after restoring the factory default settings via the hardware **RESET** button. This procedure wipes out all settings that you have configured for your router.

When the web-based interface is accessed the next time and after, the login page opens. Enter the username (**admin**) in the **Login** field and the password you specified in the **Password** field, then click the **Enter** button.

Figure 18. The login page.

Web-based Interface Structure

General Information Page

After successful registration the **Home / Information** page opens. The selected operating mode defines the view of the page and the components of the web-based interface.

The web-based interface of the router is multilingual. If you need to select another language for the web-based interface, place the mouse pointer over the **English** caption in the top part of the page and select a language from the menu displayed.

Figure 19. Changing the language of the web-based interface.

Also you can find a specific page via search. To do this, enter the name of the page, wholly or partly, in the search bar in the top part of the web-based interface page, and then select a needed link in the search results.

Router Mode

The **Home / Information** page displays general information on the router and its software.

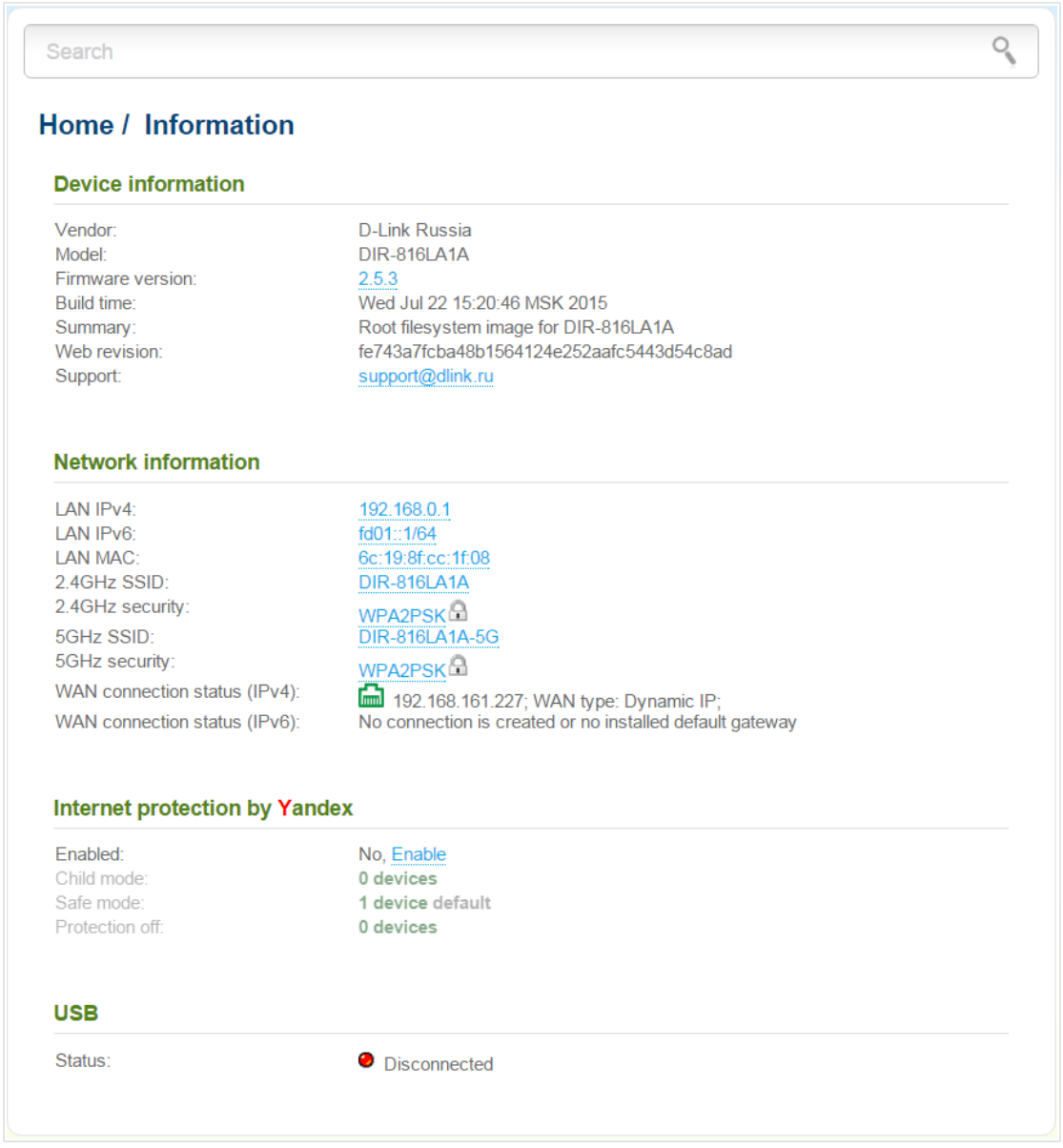


Figure 20. The general information page in the router mode.

From the page you can quickly get to some pages of the web-based interface.

To upgrade the firmware of the router, left-click the current firmware version (the right column of the **Firmware version** line) and follow the dialog box appeared.

To contact the technical support group (to send an e-mail), left-click the support e-mail address (the right column of the **Support** line). After clicking the line, the e-mail client window for sending a new letter to the specified address opens.

To edit the router's local interface parameters, left-click the IPv4, IPv6, or MAC address of the local interface (the right column of the lines **LAN IPv4**, **LAN IPv6**, or **LAN MAC** correspondingly). After clicking the line, the page for editing the LAN interface opens (for the detailed description of the page, see the ***LAN*** section, page 134).

To configure the router's WLAN parameters, left-click the SSID of the WLAN (the right column of the **2.4GHz SSID** or **5GHz SSID** line). After clicking the line, the **Wi-Fi / Basic settings** page for the relevant band opens (for the detailed description of the page, see the ***Basic Settings*** section, page 139).

To configure security settings of the WLAN, left-click the network authentication type (the right column of the **2.4GHz security** or **5GHz security** line). After clicking the line, the **Wi-Fi / Security settings** page for the relevant band opens (for the detailed description of the page, see the ***Security Settings*** section, page 145).

To proceed to the page for configuring the Yandex.DNS web content filtering service, left-click the name of the **Internet protection by Yandex** section. Also you can enable/disable the service or change the default mode directly from the general information page.

In the **USB** section, data on the USB device connected to the router is displayed.

Also use the menu in the left part of the page to configure the router.

The **Monitoring** section provides an interactive scheme which illustrates the router's settings and the LAN structure.

In the **Home** section you can run the needed Wizard.

To configure connection to the Internet, go to the **Click'n'Connect** page (for the detailed description of the Wizard, see the ***Click'n'Connect*** section, page 48).

To configure the router's wireless network, go to the **Wireless network settings wizard** page (for the detailed description of the Wizard, see the ***Wireless Network Settings Wizard*** section, page 77).

To configure access from the Internet to a web server located in your LAN, go to the **Virtual server settings wizard** page (for the detailed description of the Wizard, see the ***Virtual Server Settings Wizard*** section, page 85).

To configure the router to use an IPTV set-top box, go to the **IPTV settings wizard** page (for the detailed description of the Wizard, see the ***IPTV Settings Wizard*** section, page 87).

The pages of the **Status** section display data on the current state of the router (for the description of the pages, see the ***Status*** section, page 88).

The pages of the **Net** section are designed for configuring basic parameters of the LAN interface of the router and creating a connection to the Internet (for the description of the pages, see the ***Net*** section, page 94).

The pages of the **Wi-Fi** section are designed for specifying all needed settings of the router's wireless network (for the description of the pages, see the ***Wi-Fi*** section, page 139).

The pages of the **Advanced** section are designed for configuring additional parameters of the router (for the description of the pages, see the ***Advanced*** section, page 165).

The pages of the **Firewall** section are designed for configuring the firewall of the router (for the description of the pages, see the ***Firewall*** section, page 189).

The pages of the **3G/LTE modem** section are designed to operate the connected LTE, 3G GSM or CDMA USB modem (for the description of the pages, see the ***3G/LTE Modem*** section, page 198).

The pages of the **USB storage** section are designed to operate the connected USB storage (for the description of the pages, see the ***USB Storage*** section, page 202).

The pages of the **Transmission** section are designed for configuration of the built-in Transmission torrent client and management of downloading process (for the description of the pages, see the ***Transmission*** section, page 209).

The pages of the **Control** section are designed for creating restrictions on access to the Internet (for the description of the page, see the ***Control*** section, page 212).

The pages of the **Yandex.DNS** section are designed for configuring the Yandex.DNS web content filtering service (for the description of the pages, see the ***Yandex.DNS*** section, page 214).

The pages of the **System** section provide functions for managing the internal system of the router (for the description of the pages, see the ***System*** section, page 217).

Access Point Mode

The **Home / Information** page displays general information on the router and its software.

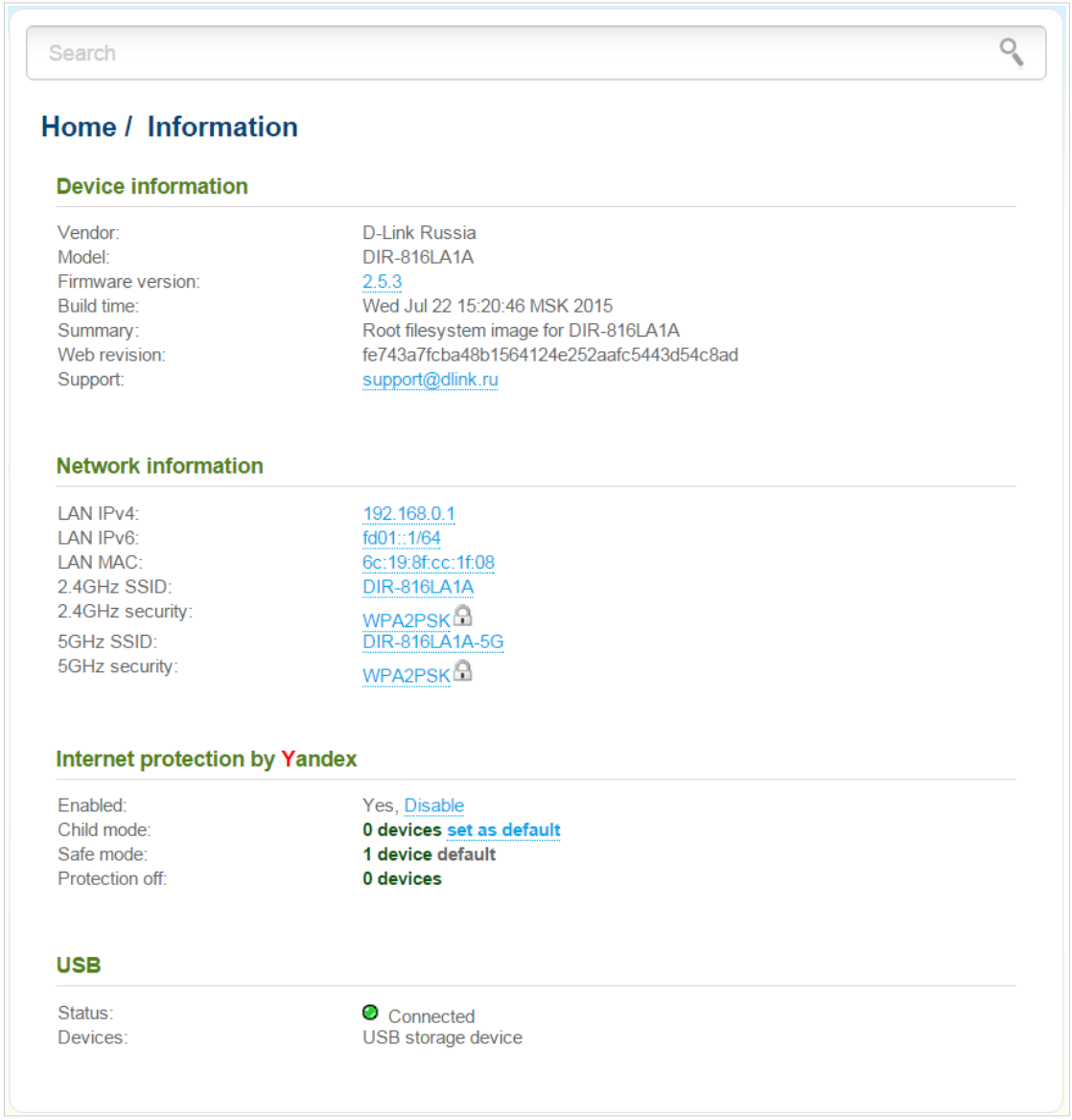


Figure 21. The general information page in the access point mode.

From the page you can quickly get to some pages of the web-based interface.

To upgrade the firmware of the router, left-click the current firmware version (the right column of the **Firmware version** line) and follow the dialog box appeared.

To contact the technical support group (to send an e-mail), left-click the support e-mail address (the right column of the **Support** line). After clicking the line, the e-mail client window for sending a new letter to the specified address opens.

To edit the router's local interface parameters, left-click the IPv4, IPv6, or MAC address of the local interface (the right column of the lines **LAN IPv4**, **LAN IPv6**, or **LAN MAC** correspondingly). After clicking the line, the page for editing the LAN interface opens (for the detailed description of the page, see the ***LAN*** section, page 246).

To configure the router's WLAN parameters, left-click the SSID of the WLAN (the right column of the **2.4GHz SSID** or **5GHz SSID** line). After clicking the line, the **Wi-Fi / Basic settings** page for the relevant band opens (for the detailed description of the page, see the ***Basic Settings*** section, page 250).

To configure security settings of the WLAN, left-click the network authentication type (the right column of the **2.4GHz security** or **5GHz security** line). After clicking the line, the **Wi-Fi / Security settings** page for the relevant band opens (for the detailed description of the page, see the ***Security Settings*** section, page 256).

In the **USB** section, data on the USB device connected to the router is displayed.

Also use the menu in the left part of the page to configure the router.

In the **Home** section you can run the Wi-Fi Wizard.

To configure the router's wireless network, go to the **Wireless network settings wizard** page (for the detailed description of the Wizard, see the ***Wireless Network Settings Wizard*** section, page 234).

The pages of the **Status** section display data on the current state of the router (for the description of the pages, see the ***Status*** section, page 242).

The page of the **Net** section is designed for configuring basic parameters of the LAN interface of the router (for the description of the page, see the ***Net*** section, page 246).

The pages of the **Wi-Fi** section are designed for specifying all needed settings of the router's wireless network (for the description of the pages, see the ***Wi-Fi*** section, page 250).

The pages of the **USB storage** section are designed to operate the connected USB storage (for the description of the pages, see the ***USB Storage*** section, page 276).

The pages of the **System** section provide functions for managing the internal system of the router (for the description of the pages, see the ***System*** section, page 283).

Notifications and System Drop-down Menu

The router's web-based interface displays the notifications in the top right part of the page.

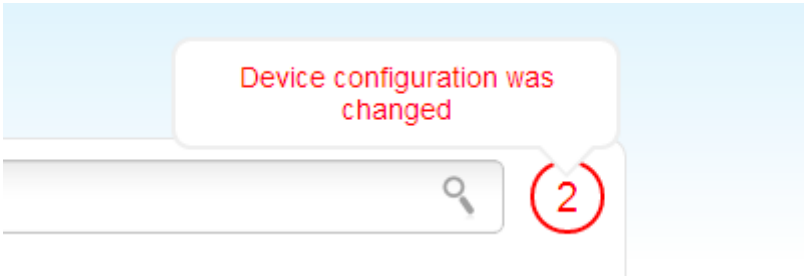


Figure 22. The web-based interface notifications.

Click the icon displaying the number of notifications to view the complete list and click the relevant link.

Note that you should regularly save the changes of the router's settings to the non-volatile memory.

You can save the router's settings via the menu displayed when the mouse pointer is over the **System** caption in the top left part of the page. Also the **System** menu allows you to reboot the device, create and load the configuration backup, restore the factory defaults, update the firmware, disable/enable the WLAN, and safely remove the USB storage connected to the router.

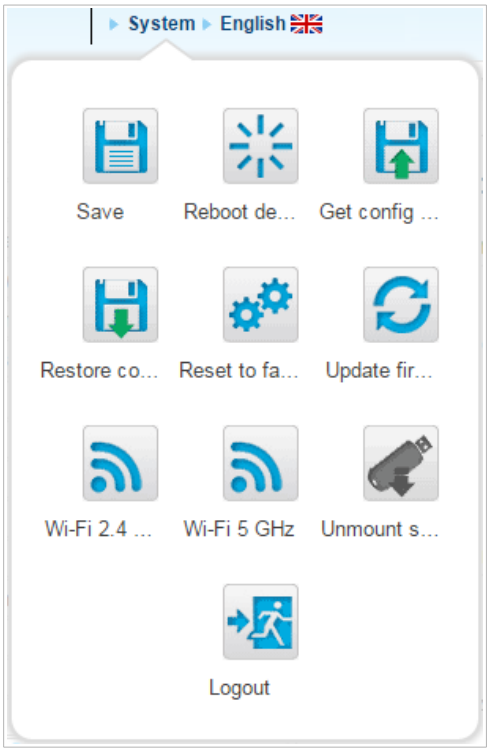


*Figure 23. The **System** menu in the top part of the page.*

Control	Description
 **Save**	Click the icon to save new settings to the non-volatile memory. Also you can save the device's parameters via the **Save** button on the **System / Configuration** page.
 **Reboot device**	Click the icon to reboot the device. All unsaved changes will be lost after the device's reboot.
 **Get config backup**	Click the icon to save the configuration (all settings of the router) to your PC. The configuration backup will be stored in the download location of your web browser. Also you can create the configuration backup via the **Backup** button on the **System / Configuration** page.
 **Restore config**	Click the icon to go to the **System / Configuration** page.
 **Reset to factory**	Click the icon to restore the factory default settings. Also you can restore the factory defaults via the **Factory** button on the **System / Configuration** page. Also you can restore the factory default settings via the hardware **RESET** button. The button is located on the bottom panel of the router. Push the button (with the router powered on) and hold for 10 seconds. Then release the button.
 **Update firmware**	Click the icon to update the firmware of the router. Also you can update the firmware on the **System / Firmware upgrade** page.
 **Wi-Fi 2.4 GHz**	Click the icon to disable or enable the device's WLAN in the 2.4GHz band. Also you can disable/enable the router's WLAN in the 2.4GHz band on the **Wi-Fi / Basic settings / 2.4 GHz** page.
 **Wi-Fi 5 GHz**	Click the icon to disable or enable the device's WLAN in the 5GHz band. Also you can disable/enable the router's WLAN in the 5GHz band on the **Wi-Fi / Basic settings / 5 GHz** page.

Control	Description
 **Unmount storage**	Click the icon to safely disconnect the USB storage. Also you can safely disconnect the USB storage on the **USB storage / Information** page.
 **Logout**	Click the icon to exit the web-based interface.

Device Operation Modes

Router Mode

In the router mode, the device is used to connect to the Internet. You can connect the device to a cable or DSL modem or to a private Ethernet line and create a WAN connection. In addition, you can configure connection to a Wireless Internet Service Provider.

Access Point Mode

In the access point mode, the device is used to create a wireless local area network or to connect to a wired router.

CHAPTER 4. CONFIGURING DEVICE (ROUTER MODE)

Monitoring

The page displays an interactive scheme which illustrates the router's settings and the LAN structure.

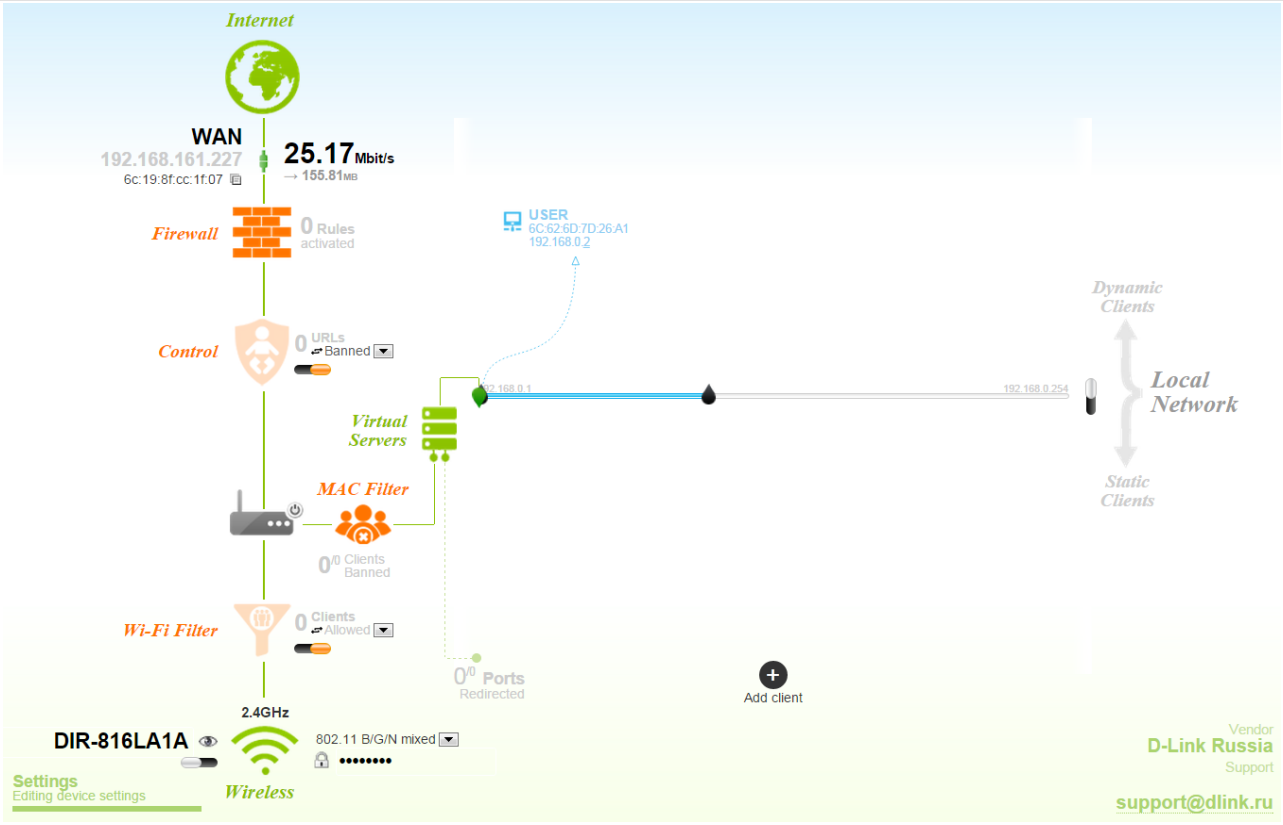
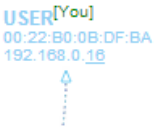


*Figure 24. The **Monitoring** page.*

Also you can modify the basic parameters of the router on the **Monitoring** page. To access the router's advanced settings, click the **Editing device settings** link in the bottom left corner of the page. For the detailed description of all the router's functions, see the relevant section of this manual.

The interactive scheme displays the following elements:

Control	Description
 **Internet**	The **Internet** element displays information on the active connection. Place the mouse pointer over the icon to switch to another connection, remove existing connections, or add new ones. If the Ethernet cable provided by your ISP is connected to the WAN port of the router, to the left, the name of the active connection, received or specified IP address, and the MAC address of this connection are displayed. You can change the MAC address in the editing mode or clone the MAC address of a connected device by placing the mouse pointer over the **Clone MAC address** icon ( ). To the right, the approximate data transfer rate and the total value of the received data are displayed.
 **Firewall**	The **Firewall** element displays the number of the IP filter active rules. Place the mouse pointer over the icon to view the list of the IP filter rules, remove existing rules, add new ones, or quickly switch the filtering mode for a rule.
 **Control**	The **Control** element displays the number of blocked/allowed web sites. Place the mouse pointer over the icon to view the list of web sites, remove existing entries, or add new ones. Use the **Enable/Disable URL-filter** switch ( ) to enable or disable the URL filter. Use the drop-down list to the right of the element to quickly change the operating mode: block access to web sites from the list or allow access to web sites from the list.
 **Device**	The **Device** element displays the layout of your device. Place the mouse pointer over the top right corner of this icon to display the system menu which helps you to reboot the device, save the configuration, restore the factory default settings, update the firmware, exit the web-based interface.
 **MAC Filter**	The **MAC Filter** element displays the total number of clients to which the filtering rules are applied and the number of blocked clients. Place the mouse pointer over the icon to view the list of filtered clients, remove existing clients, add new ones, or quickly switch the filtering mode for a client.

Control	Description
 **Virtual Servers**	The **Virtual Servers** element is designed for redirecting incoming traffic to a specific IP address in the LAN. It displays the total number of rules for redirecting traffic and the number of rules active in this specific LAN. Place the mouse pointer over the icon to view the list of all rules for redirecting traffic, remove existing rules, or add new ones.
 **DHCP**	The **DHCP** element is a scale where the range of the DHCP server addresses is placed. Dynamic clients receive IP addresses from this range. Use the **Enable/Disable DHCP Server** switch () to enable or disable DHCP server. If you want to change the range, enter a value from the keyboard in the editing mode or move the sliders. In the editing mode, you can specify the subnet mask.
 **Dynamic Clients**	The **Dynamic Clients** area displays all connected dynamic clients. An icon of a client displays the name of a device, its MAC address, and received IP address. The list of actions available for each client is displayed when the mouse pointer is over an icon. If you want to assign the current IP address to the MAC address of the client, drag and drop its icon to the static clients area.
 **Static Clients**	The **Static Clients** area displays all static clients. An icon of a client displays the name of a device, its MAC address, and received IP address. The list of actions available for each client is displayed when the mouse pointer is over an icon. If you want to break the binding between the MAC address of the client and its current IP address, drag and drop its icon to the dynamic clients area. Use the **Add client** button to add static clients.

Control	Description
 **Wireless**	The **Wireless** element displays information on Wi-Fi module operation in the 2.4GHz band. To switch to the editing mode of Wi-Fi module settings in the 5GHz band, click the icon 2.4GHz (**Band**). To the left, the name of the access point is displayed. You can change it in the editing mode. Use the **Hide Access Point** switch (/) to forbid or allow other users to see your wireless network. Use the **Enable/Disable Wireless** switch () to enable or disable your wireless network. To the right, the standards of devices which can connect to the access point are displayed. You can select other standards from the drop-down list. Use the **Enable/Disable password protection** switch (/) to modify security settings of your wireless network. If you want to view or change the password, switch to the editing mode of the relevant field.
 **Wireless (Client Mode)**	The **Wireless (Client Mode)** element displays operation of Wi-Fi module in the client mode. To the right of the graphical representation of another access point, its name and MAC address are displayed. Use the **Disable client mode** switch () to disable the client mode.
 **Wi-Fi Filter**	The **Wi-Fi Filter** element displays the number of MAC addresses specified in the MAC filter. The element is unavailable when the Wi-Fi module is in the client mode. Place the mouse pointer over the icon to view the list of MAC addresses, remove existing addresses, or add new ones. Use the **Enable/Disable Wi-Fi filter** switch () to enable or disable the Wi-Fi filter. Use the drop-down list to the right of the element to quickly change the mode of the filter (allow or forbid access to your wireless network).

In this section, you can contact the technical support group (to send an e-mail). To do this, left-click the support e-mail address in the bottom right corner of the page. After clicking the line, the e-mail client window for sending a new letter to the specified address opens.

Click'n'Connect

To configure connection to the Internet, click the **Click'n'Connect** link in the **Home** section.

Figure 25. Configuring connection to the Internet.

Connect the Ethernet cable provided by your ISP to the WAN port of the router. Verify the relevant LED (the **Internet** LED should be on).

Click the **Next** button to continue.

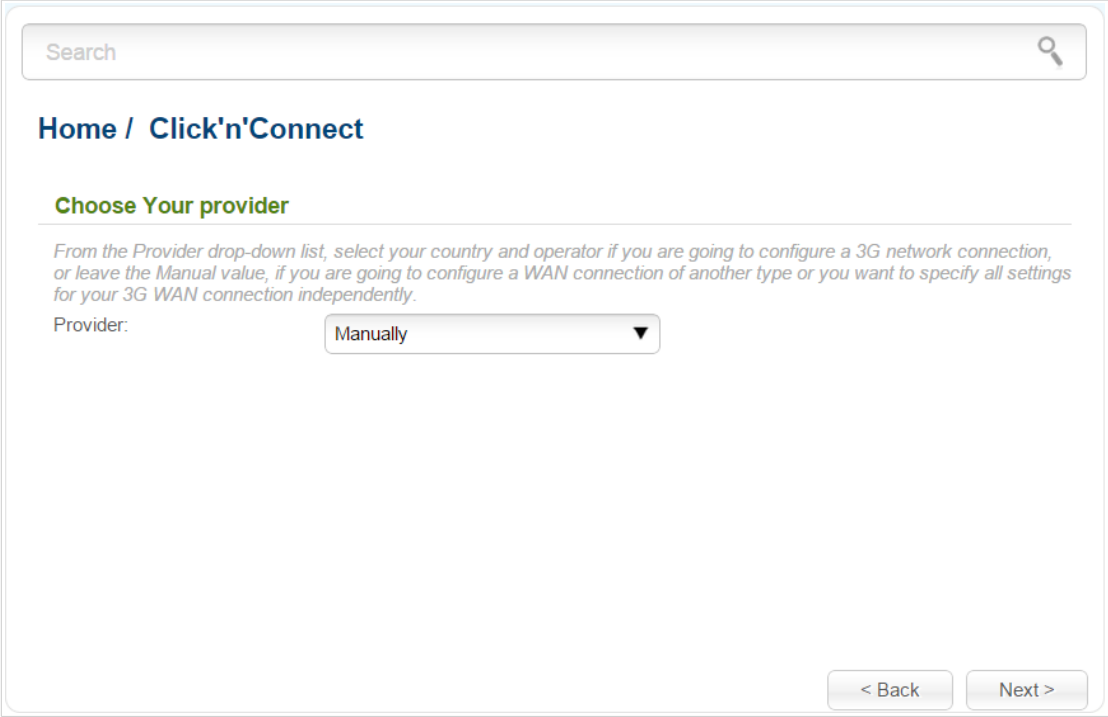


Figure 26. The page for selecting a 3G network operator.

On the opened page, from the **Provider** drop-down list, select your country and operator if you are going to configure a 3G network connection, or leave the **Manually** value, if you are going to configure a wired, LTE WAN connection or you want to specify all settings for your 3G WAN connection independently.

Click the **Next** button to continue.

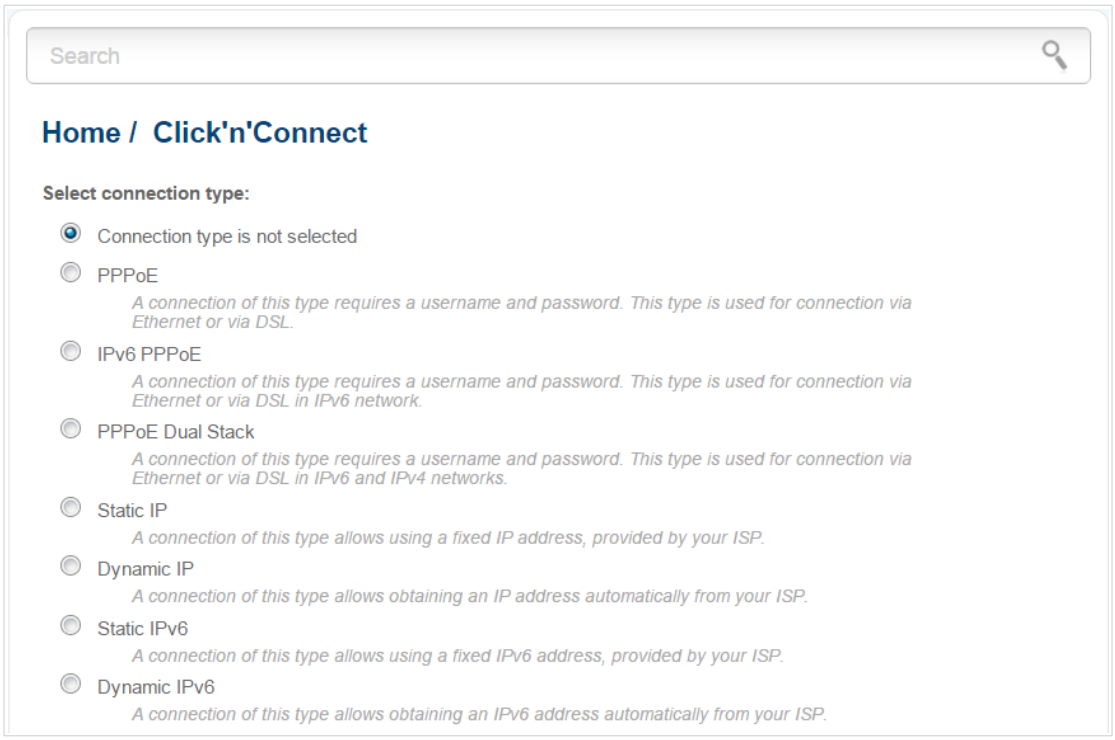


Figure 27. The page for selecting the connection type.

On the opened page, select the needed choice of the radio button and click the **Next** button.

Creating WAN Connection

PPPoE Connection

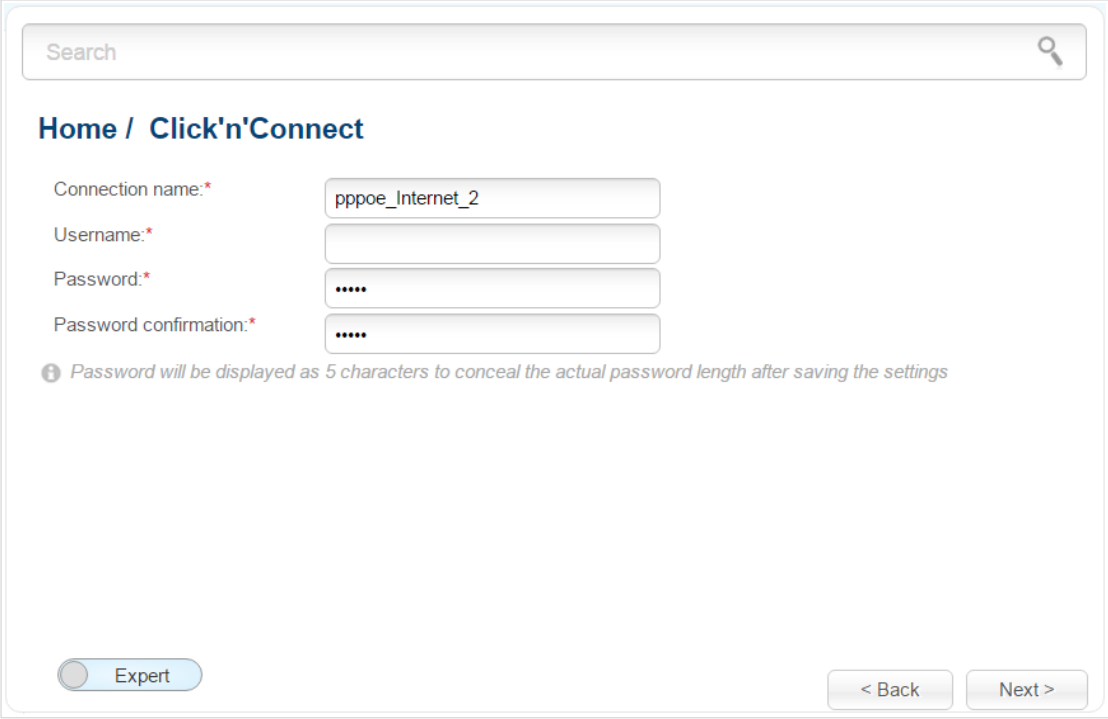


Figure 28. Configuring PPPoE WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your ISP.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPPoE WAN Connection*** section, page 95).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

IPv6 PPPoE or PPPoE Dual Stack Connection

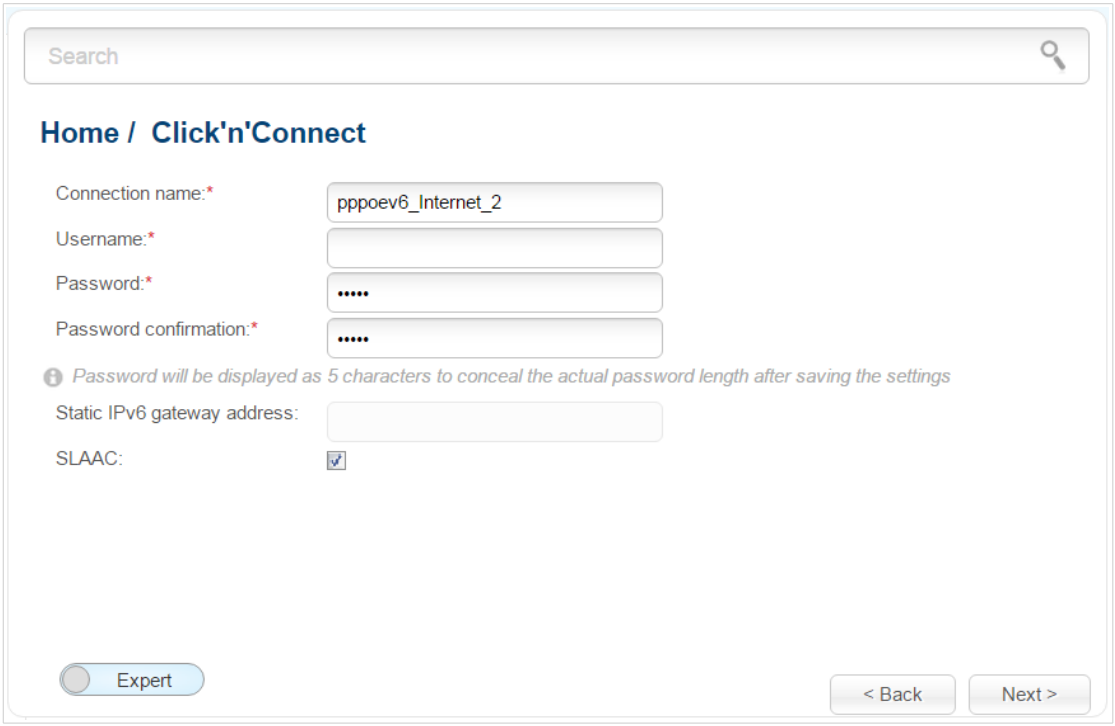


Figure 29. Configuring IPv6 PPPoE WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your ISP.

If you need to specify the gateway address manually, deselect the **SLAAC** checkbox and fill in the **Static IPv6 gateway address** field.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating IPv6 PPPoE or PPPoE Dual Stack WAN Connection*** section, page 99).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

Static IP Connection

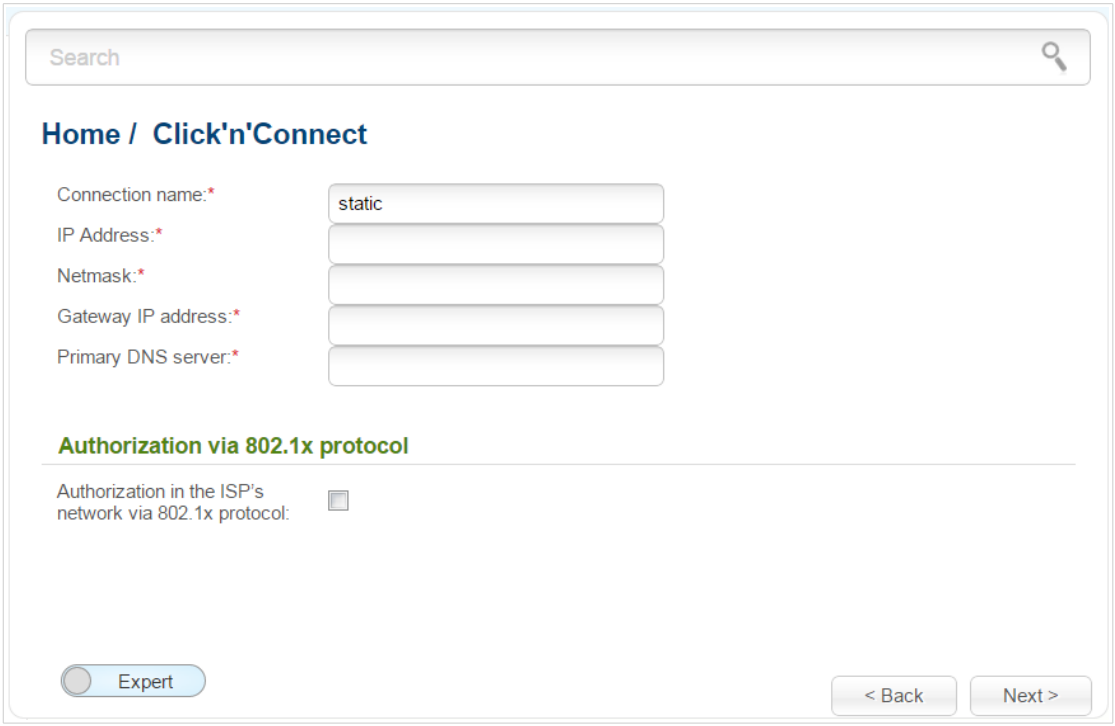


Figure 30. Configuring Static IP WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

Fill in the **IP Address** and **Netmask** fields.

In the **Gateway IP address** field, enter the IP address of the gateway used by this WAN connection.

In the **Primary DNS server** field, enter the address of the primary DNS server.

If your wired ISP uses authorization via the 802.1x protocol, in the **Authorization via 802.1x protocol** section, select the **Authorization in the ISP's network via 802.1x protocol** checkbox and fill in the fields of the section in accordance with data provided by your ISP.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating Static IP or Dynamic IP WAN Connection*** section, page 105).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

Dynamic IP Connection

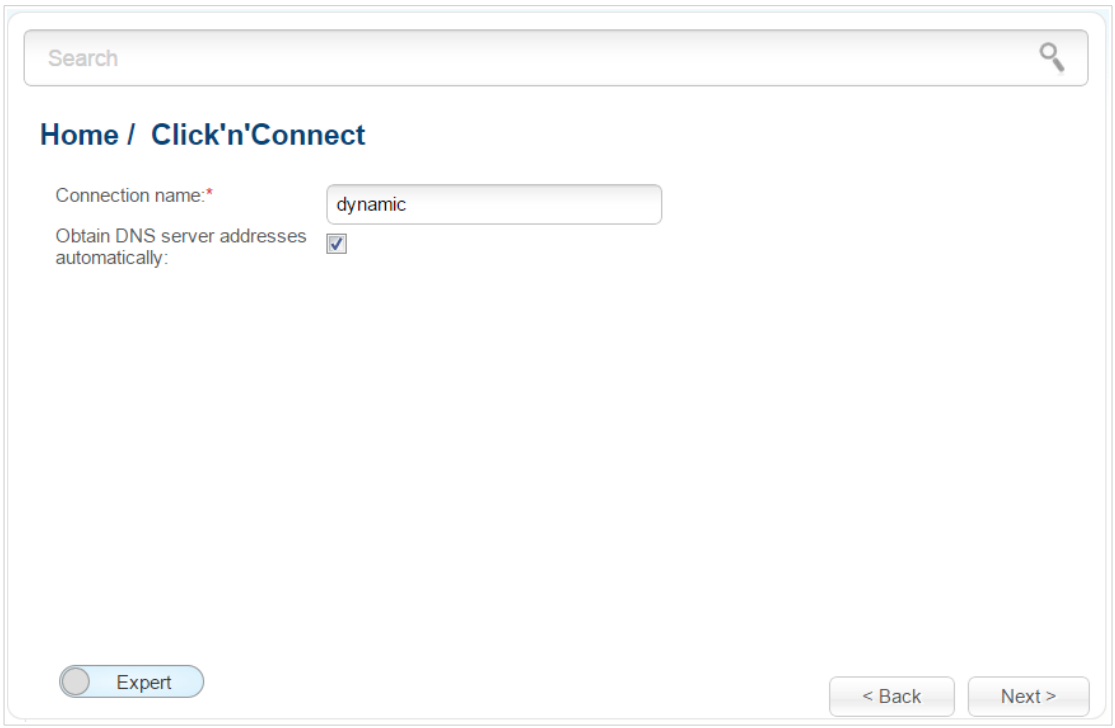


Figure 31. Configuring Dynamic IP WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

If your ISP has provided the addresses of the DNS servers, deselect the **Obtain DNS server addresses automatically** checkbox and fill in the **Primary DNS server** field.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating Static IP or Dynamic IP WAN Connection*** section, page 105).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

Static IPv6 Connection

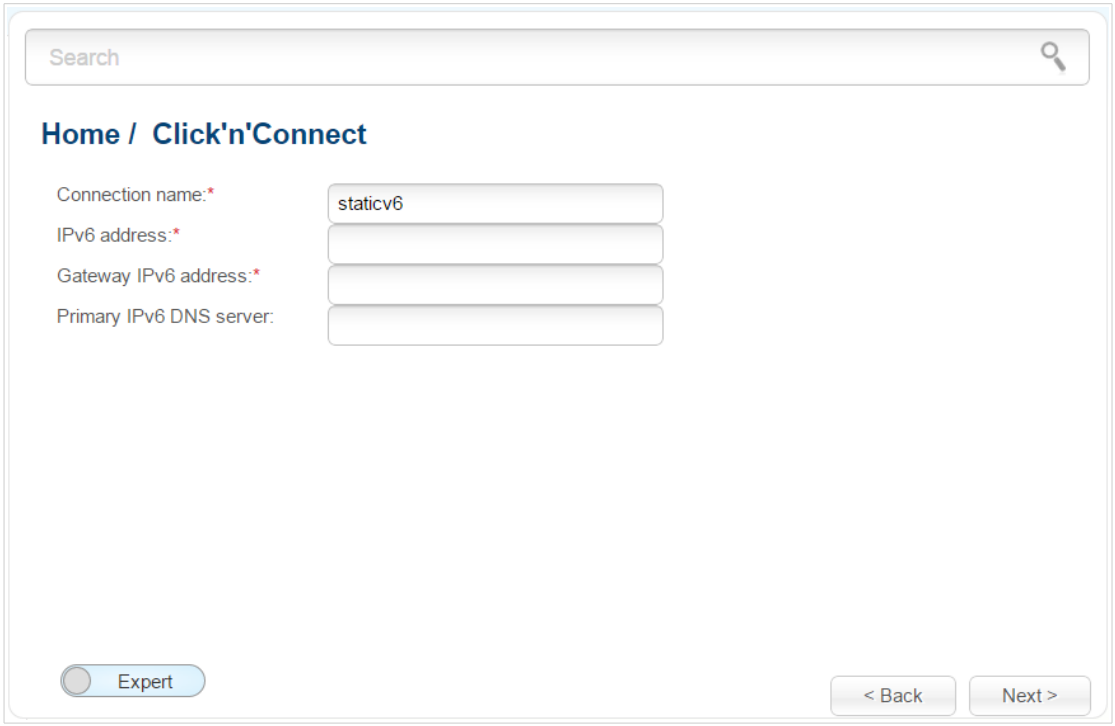


Figure 32. Configuring Static IPv6 WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

Fill in the **IPv6 address** and **Gateway IPv6 address** fields.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating Static IPv6 or Dynamic IPv6 WAN Connection*** section, page 110).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

Dynamic IPv6 Connection

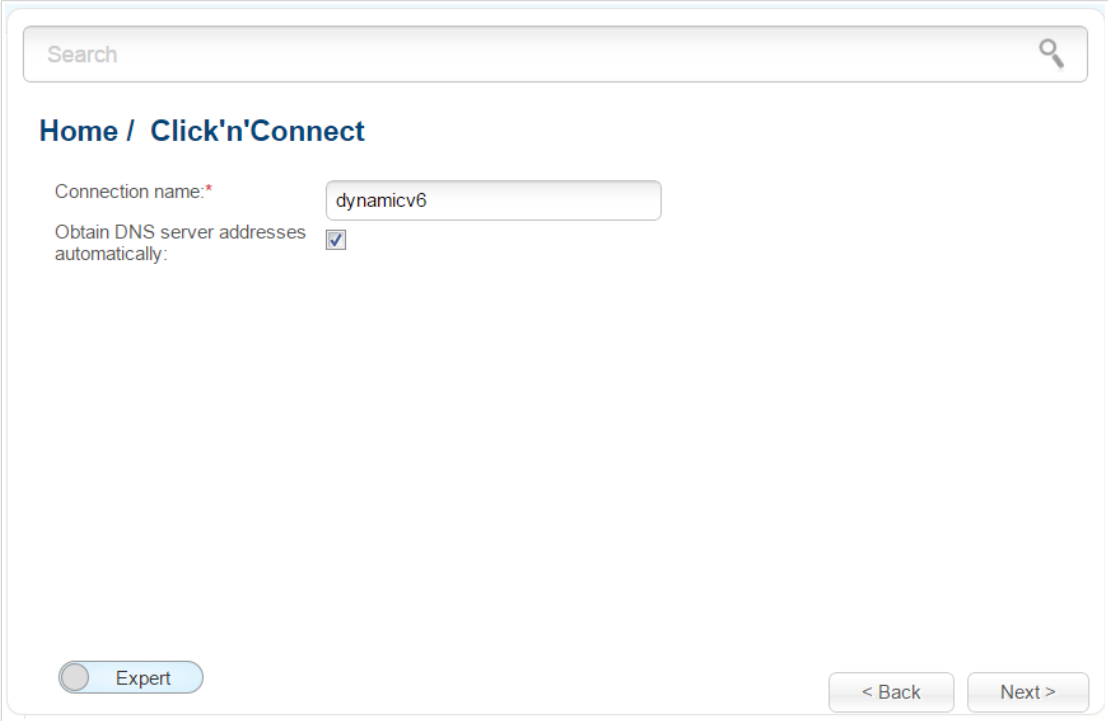


Figure 33. Configuring Dynamic IPv6 WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

If your ISP has provided the addresses of the DNS servers, deselect the **Obtain DNS server addresses automatically** checkbox and fill in the **Static primary DNS server** field.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating Static IPv6 or Dynamic IPv6 WAN Connection*** section, page 110).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

PPPoE + Static IP Connection

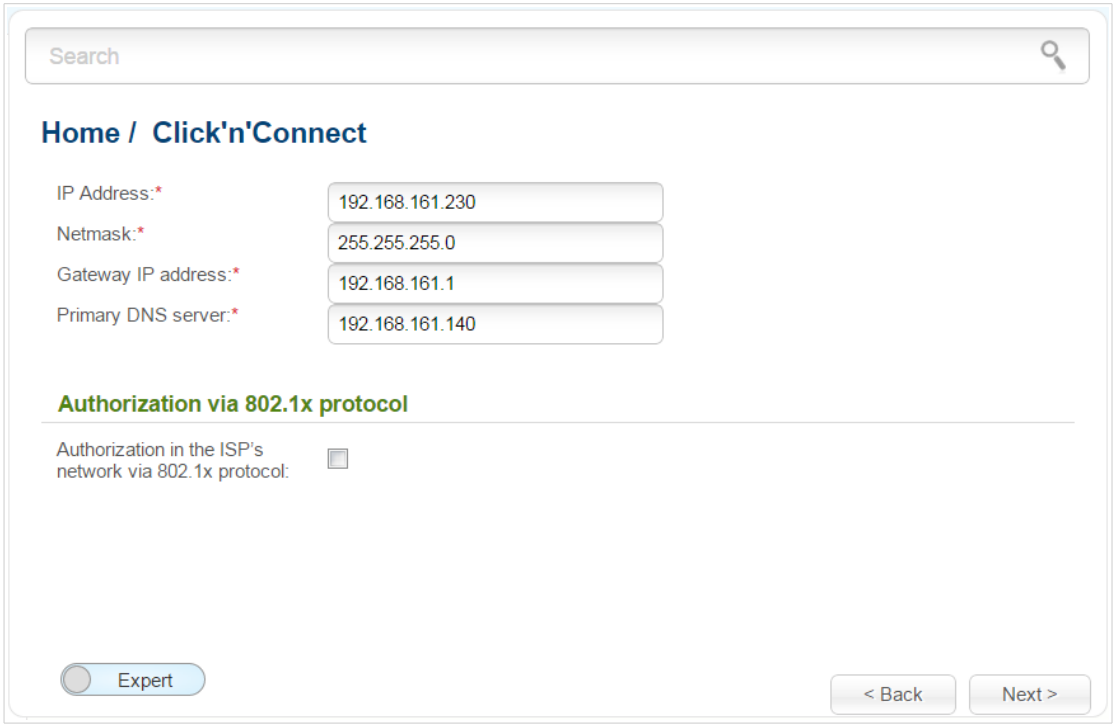


Figure 34. Configuring PPPoE + Static IP WAN connection.

Fill in the **IP Address** and **Netmask** fields.

In the **Gateway IP address** field, enter the IP address of the gateway used by this WAN connection.

In the **Primary DNS server** field, enter the address of the primary DNS server.

If your wired ISP uses authorization via the 802.1x protocol, in the **Authorization via 802.1x protocol** section, select the **Authorization in the ISP's network via 802.1x protocol** checkbox and fill in the fields of the section in accordance with data provided by your ISP.

As a rule, the specified settings are enough at this step to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPPoE + Static IP or PPPoE + Dynamic IP WAN Connection*** section, page 114).

Click the **Next** button to continue.

If needed, enter the IP addresses of the ISP's local resources.

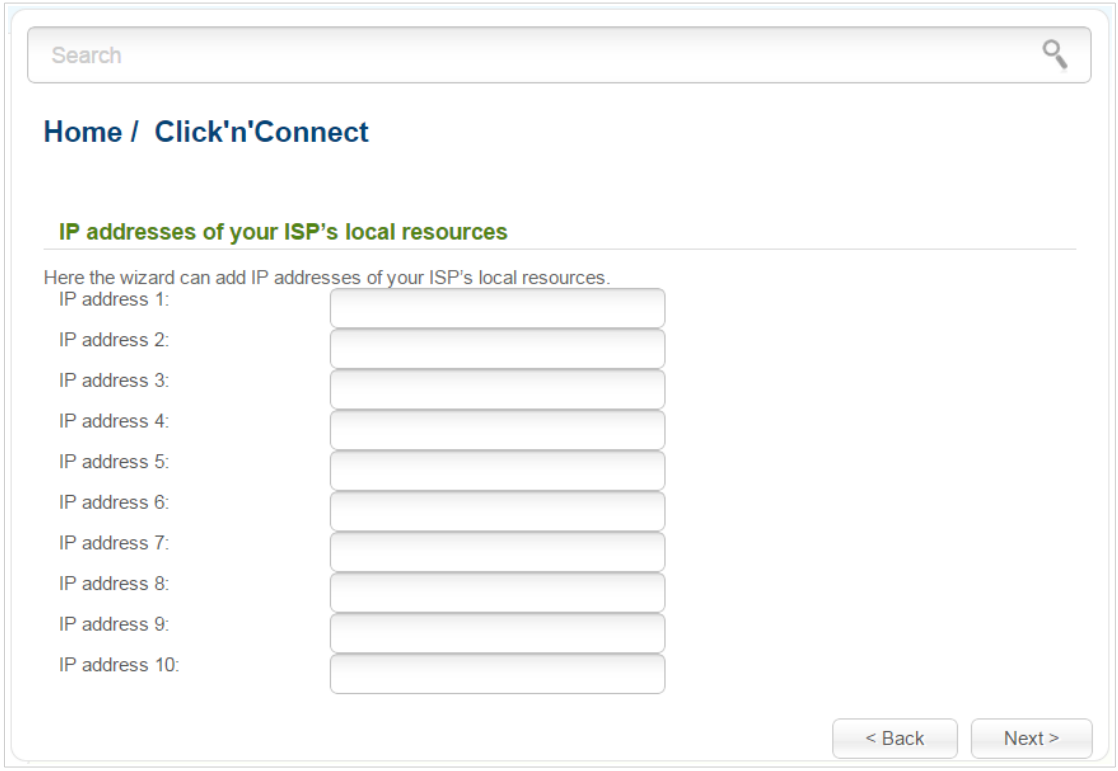


Figure 35. Configuring PPPoE + Static IP WAN connection.

Click the **Next** button to continue.

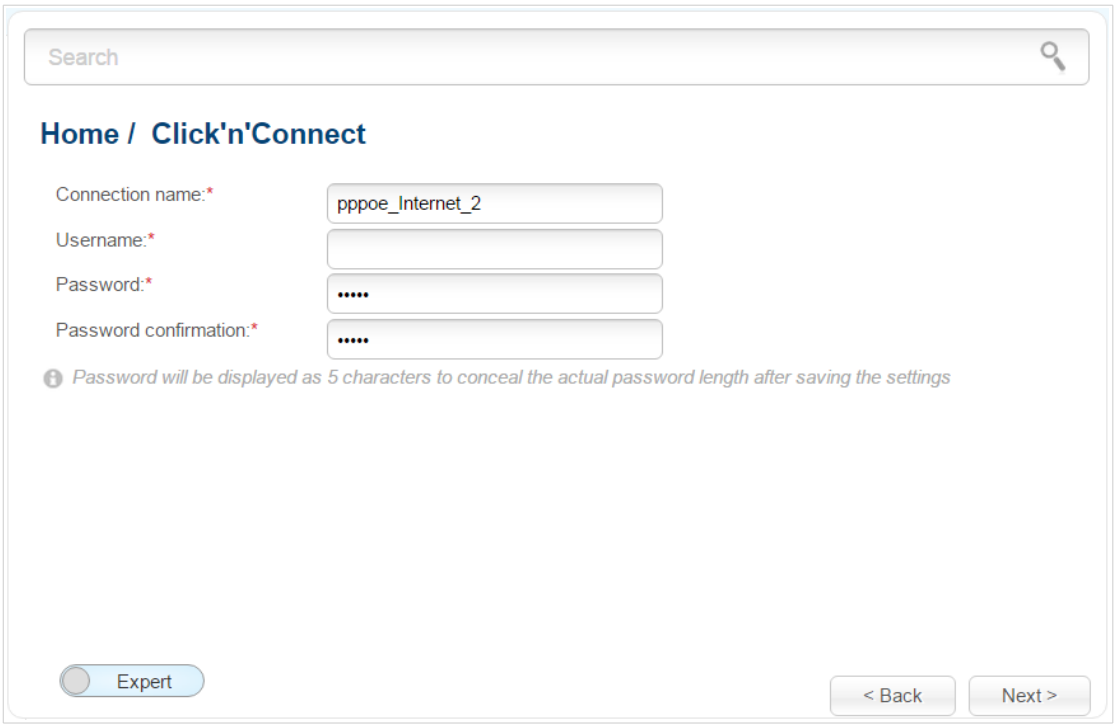


Figure 36. Configuring PPPoE + Static IP WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your ISP.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPPoE + Static IP or PPPoE + Dynamic IP WAN Connection*** section, page 114).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

PPPoE + Dynamic IP Connection

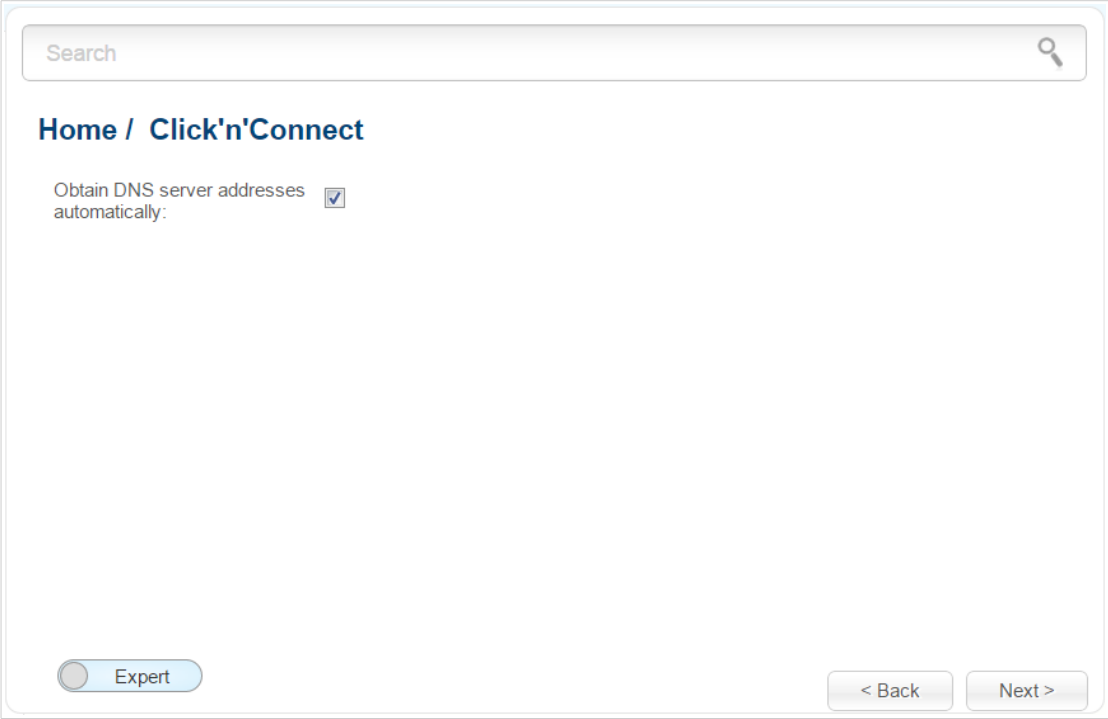


Figure 37. Configuring PPPoE + Dynamic IP WAN connection.

If your ISP has provided the addresses of the DNS servers, deselect the **Obtain DNS server addresses automatically** checkbox and fill in the **Primary DNS server** field.

As a rule, the specified settings are enough at this step to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPPoE + Static IP or PPPoE + Dynamic IP WAN Connection*** section, page 114).

Click the **Next** button to continue.

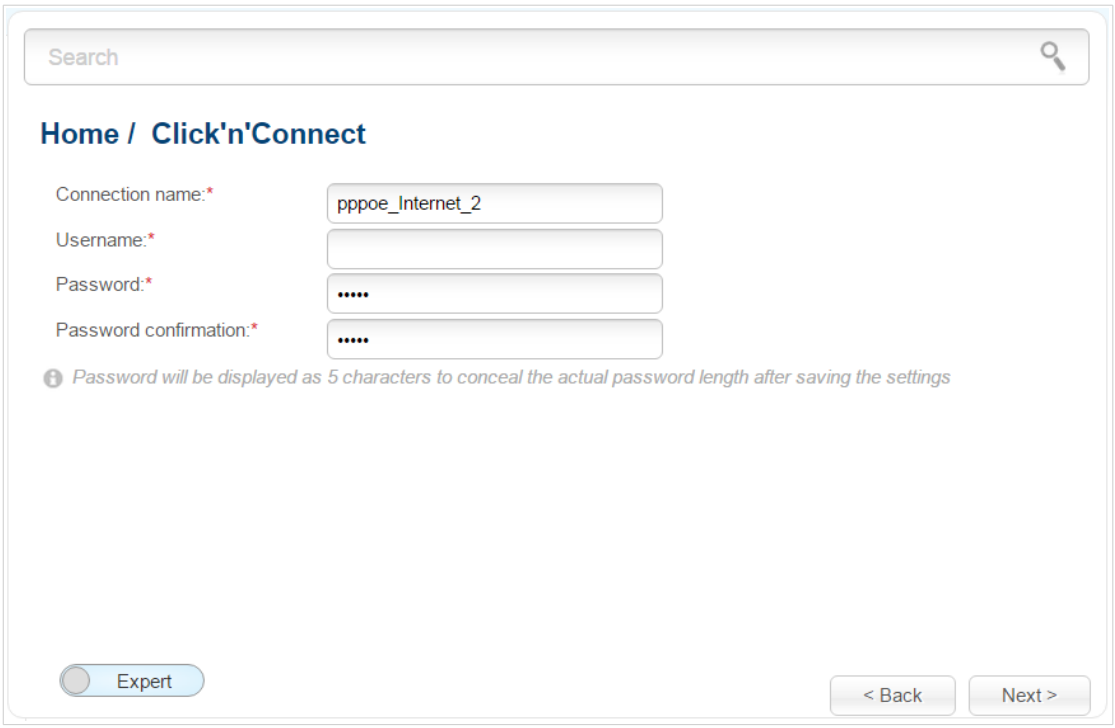


Figure 38. Configuring PPPoE + Dynamic IP WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your ISP.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPPoE + Static IP or PPPoE + Dynamic IP WAN Connection*** section, page 114).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

PPTP + Static IP or L2TP + Static IP Connection

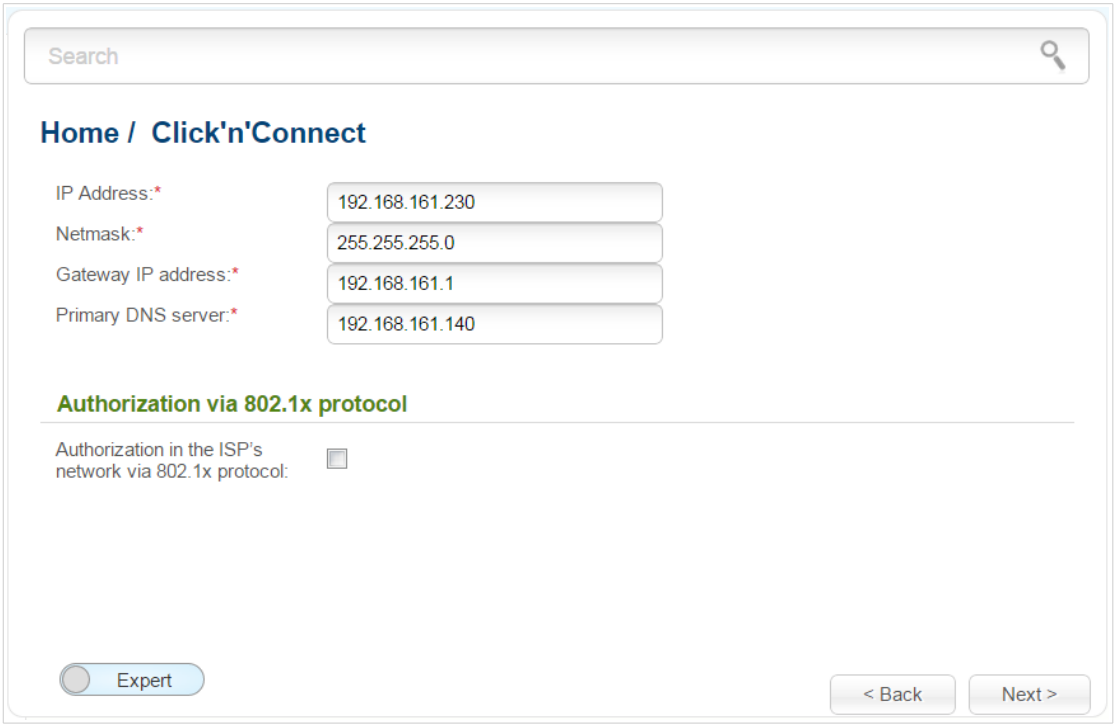


Figure 39. Configuring PPTP + Static IP WAN connection.

Fill in the **IP Address** and **Netmask** fields.

In the **Gateway IP address** field, enter the IP address of the gateway used by this WAN connection.

In the **Primary DNS server** field, enter the address of the primary DNS server.

If your wired ISP uses authorization via the 802.1x protocol, in the **Authorization via 802.1x protocol** section, select the **Authorization in the ISP's network via 802.1x protocol** checkbox and fill in the fields of the section in accordance with data provided by your ISP.

As a rule, the specified settings are enough to configure a non-protected connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPTP/L2TP + Static IP or PPTP/L2TP + Dynamic IP WAN Connection*** section, page 121).

Click the **Next** button to continue.

If needed, enter the IP addresses of the ISP's local resources.

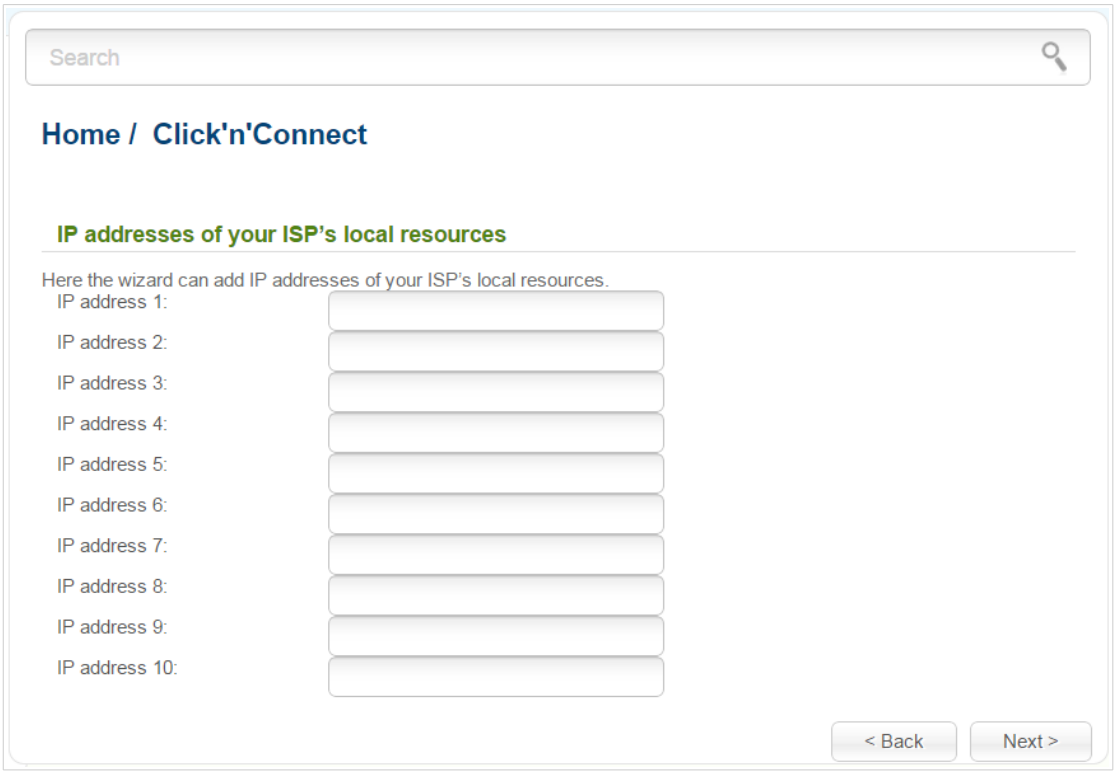


Figure 40. Configuring PPTP + Static IP WAN connection.

Click the **Next** button to continue.

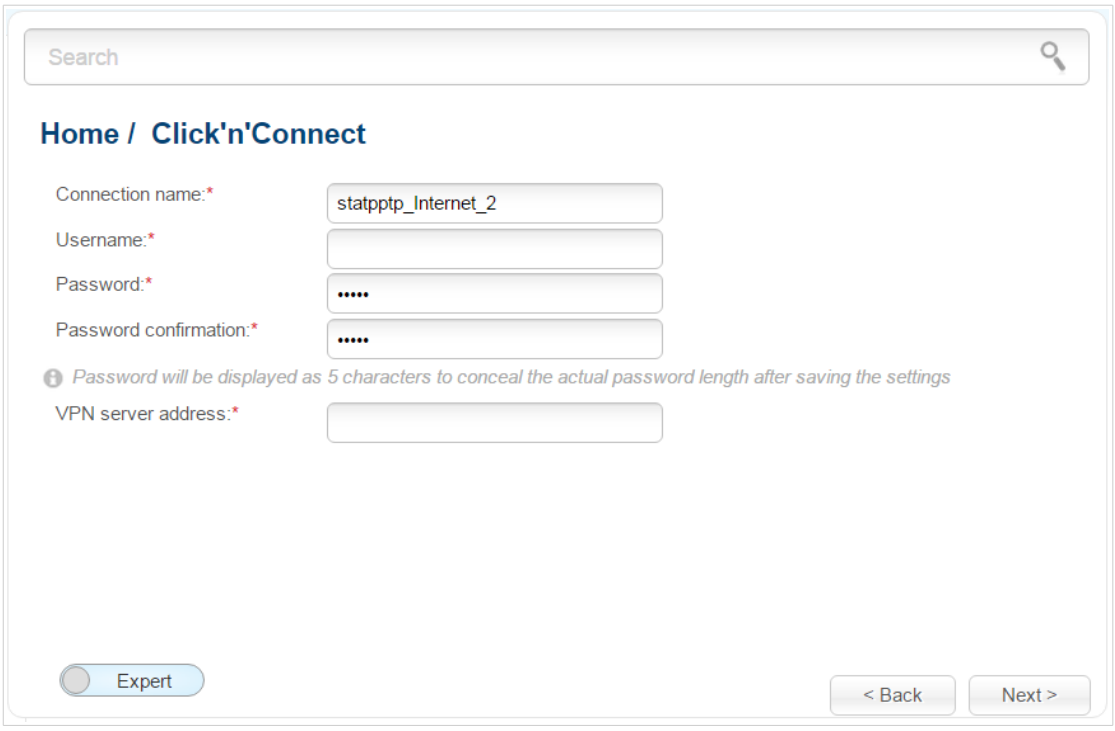


Figure 41. Configuring PPTP + Static IP WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your ISP.

In the **VPN server address** field, enter the IP or URL address of the PPTP or L2TP authentication server.

As a rule, the specified settings are enough to configure a protected connection (the VPN tunnel). If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPTP/L2TP + Static IP or PPTP/L2TP + Dynamic IP WAN Connection*** section, page 121).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

PPTP + Dynamic IP or L2TP + Dynamic IP Connection

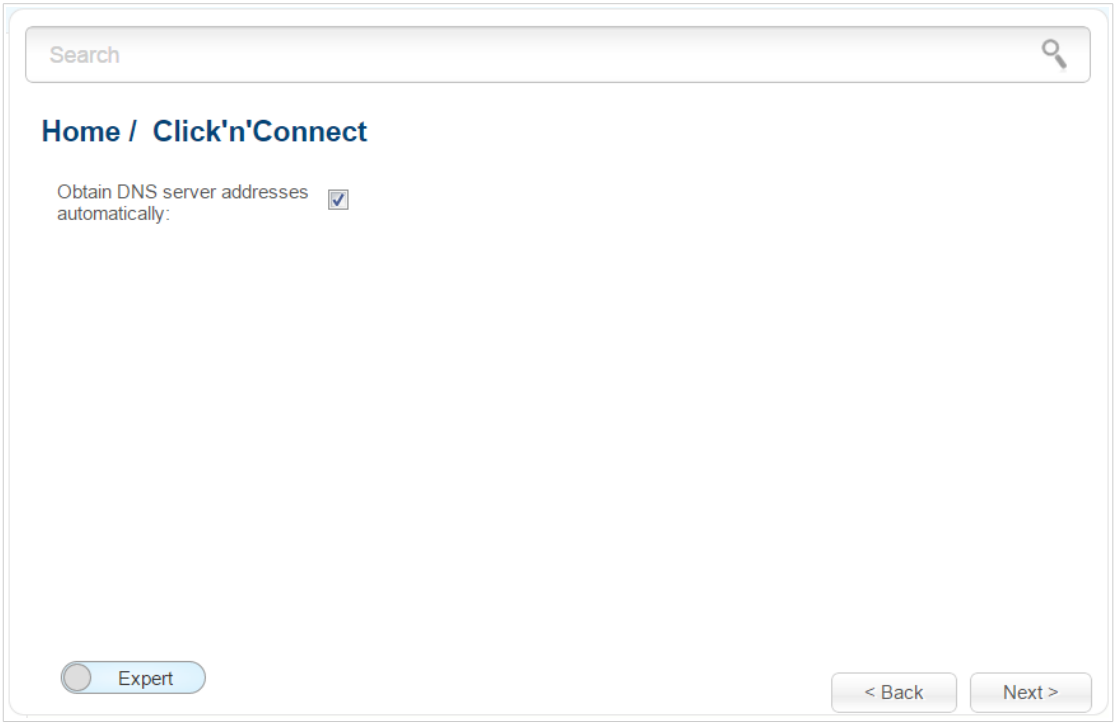


Figure 42. Configuring PPTP + Dynamic IP WAN connection.

If your ISP has provided the addresses of the DNS servers, deselect the **Obtain DNS server addresses automatically** checkbox and fill in the **Primary DNS server** field.

As a rule, the specified settings are enough to configure a non-protected connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPTP/L2TP + Static IP or PPTP/L2TP + Dynamic IP WAN Connection*** section, page 121).

Click the **Next** button to continue.

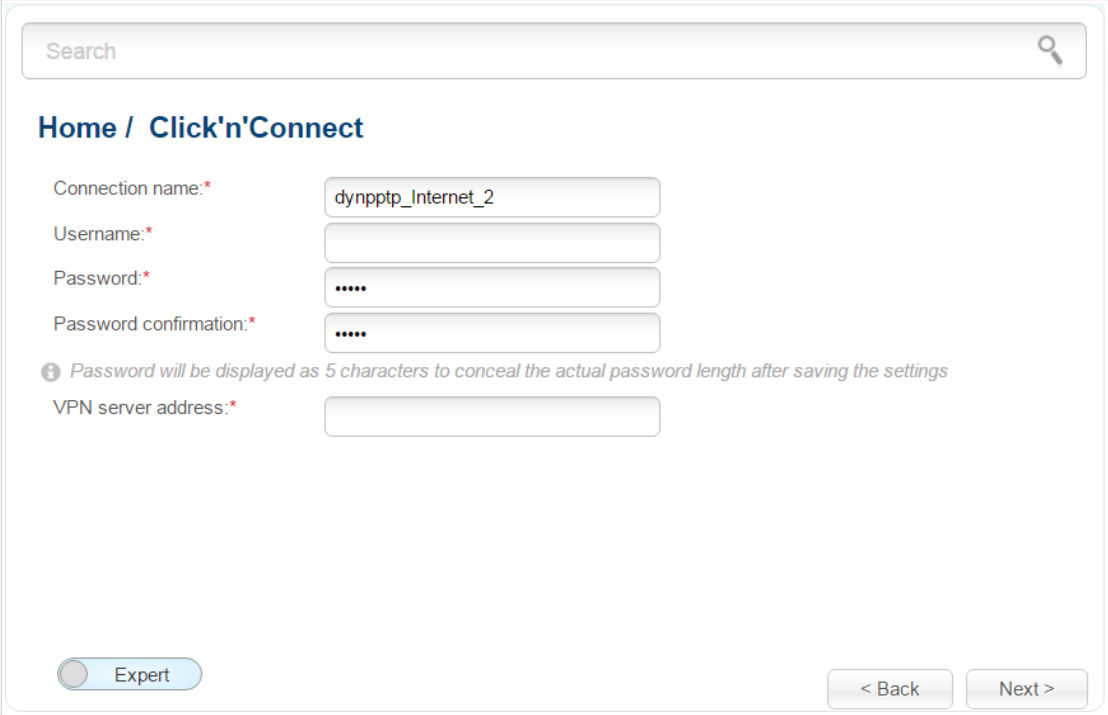


Figure 43. Configuring PPTP + Dynamic IP WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your ISP.

In the **VPN server address** field, enter the IP or URL address of the PPTP or L2TP authentication server.

As a rule, the specified settings are enough to configure a protected connection (the VPN tunnel). If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating PPTP/L2TP + Static IP or PPTP/L2TP + Dynamic IP WAN Connection*** section, page 121).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

3G Connection

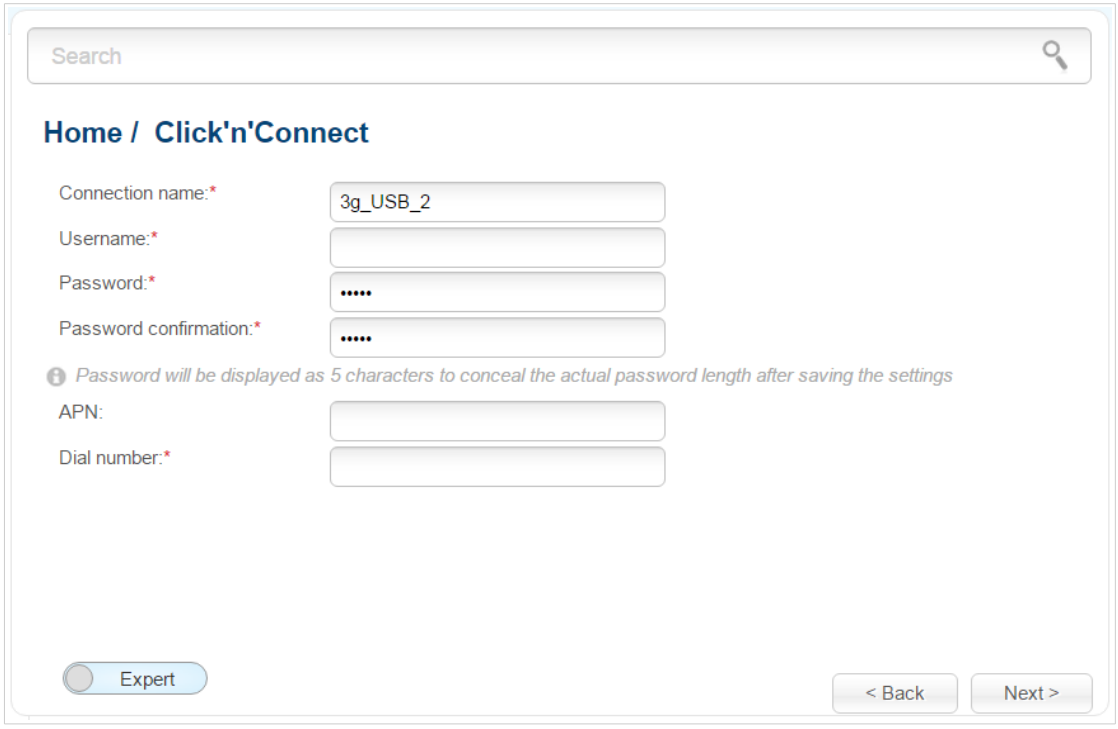


Figure 44. Configuring 3G WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

In the **Username** field, enter your login, and in the **Password** and **Password confirmation** fields – the password provided by your 3G operator.

In the **APN** field (for GSM USB modems only), enter the access point name, and in the **Dial number** field, enter the number dialed to connect to the authorization server of the operator.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating 3G WAN Connection*** section, page 128).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

LTE Connection

For the USB modem Megafon M100-1, please reboot the router after finishing the Wizard.

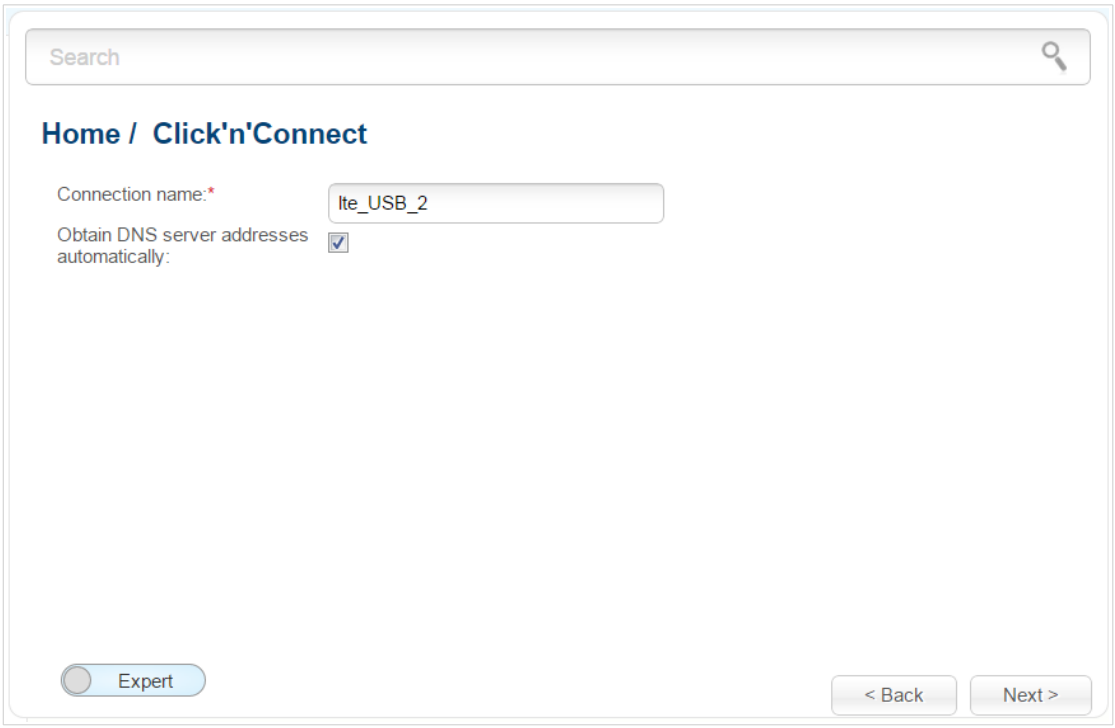


Figure 45. Configuring LTE WAN connection.

In the **Connection name** field, specify a name for the connection for easier identification.

If your ISP has provided the addresses of the DNS servers, deselect the **Obtain DNS server addresses automatically** checkbox and fill in the **Primary DNS server** field.

As a rule, the specified settings are enough to configure a connection of the selected type. If you need to specify additional settings, open the expert settings mode. To do this, use the switch in the bottom left corner of the page (for a detailed description of all the connection's parameters, see the ***Creating LTE WAN Connection*** section, page 131).

Click the **Next** button to continue.

After that the page displaying all specified settings opens. Click the **Apply** button to create the connection or the **Back** button to specify other settings.

After clicking the **Apply** button, the page for checking the Internet availability opens (see the ***Checking Internet Availability*** section, page 69).

Checking Internet Availability

On the page, you can check the WAN connection you have created.

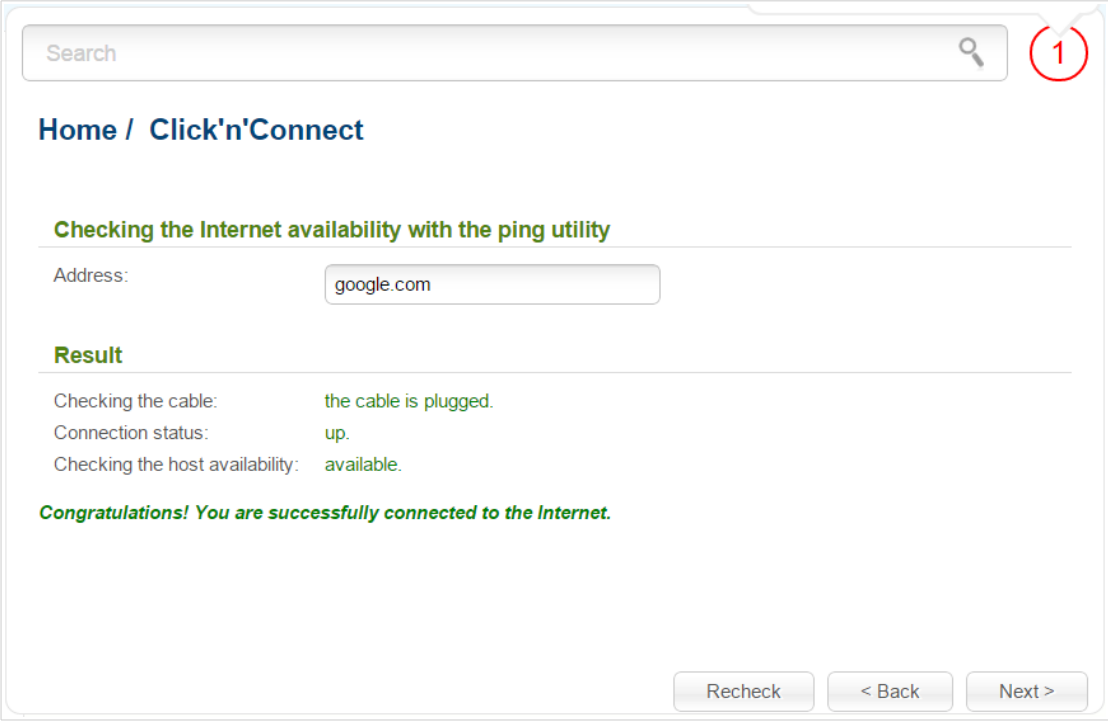


Figure 46. Checking the Internet availability.

In the **Result** section, the status of the WAN connection and possible causes of malfunctions are displayed. To recheck the status of the WAN connection, enter the IP address or name of a host in the **Address** field or leave the value specified by default (`google.com` for IPv4 connections, `ipv6.google.com` for IPv6 connections). Then click the **Recheck** button.

Click the **Back** button to specify other settings.

Click the **Next** button to continue.

After clicking the **Next** button, the page for configuring the Yandex.DNS service opens (see the ***Configuring Yandex.DNS Service*** section, page 70).

Configuring Yandex.DNS Service

On the page, you can enable the Yandex.DNS service and configure its operating mode.

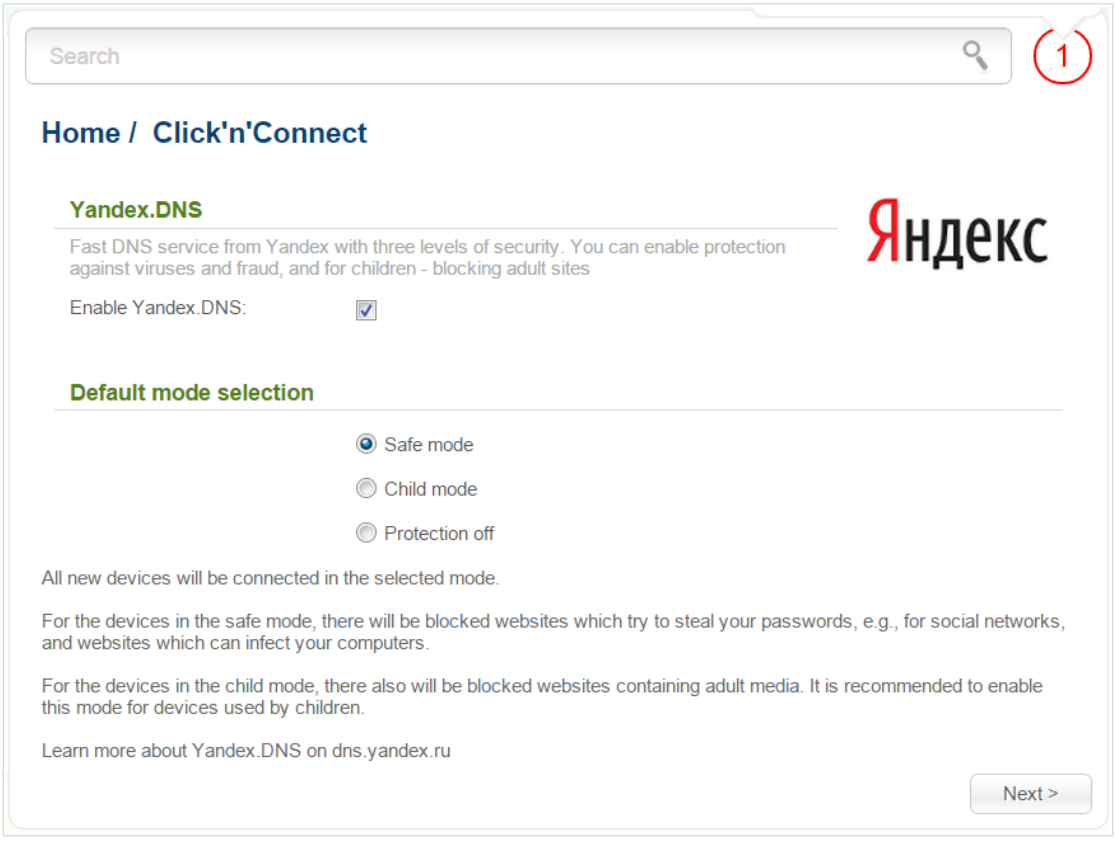


Figure 47. Configuring the Yandex.DNS service.

To enable the Yandex.DNS service, select the **Enable Yandex.DNS** checkbox. Then select the needed choice of the radio button to configure filtering for all devices of the router's network:

- **Safe mode**: when this value is selected, the service blocks access to malicious and fraudulent web sites;
- **Child mode**: when this value is selected, the service blocks access to malicious and fraudulent web sites and blocks access to adult content;
- **Protection off**: when this value is selected, the service provides the DNS server with no restrictions on access to unsafe web sites.

If you are not going to use the service, leave the **Enable Yandex.DNS** checkbox unselected.

Click the **Next** button to continue.

After clicking the **Next** button, the page for configuring wireless connection opens (see the ***Configuring Wireless Connection*** section, page 71).

Configuring Wireless Connection

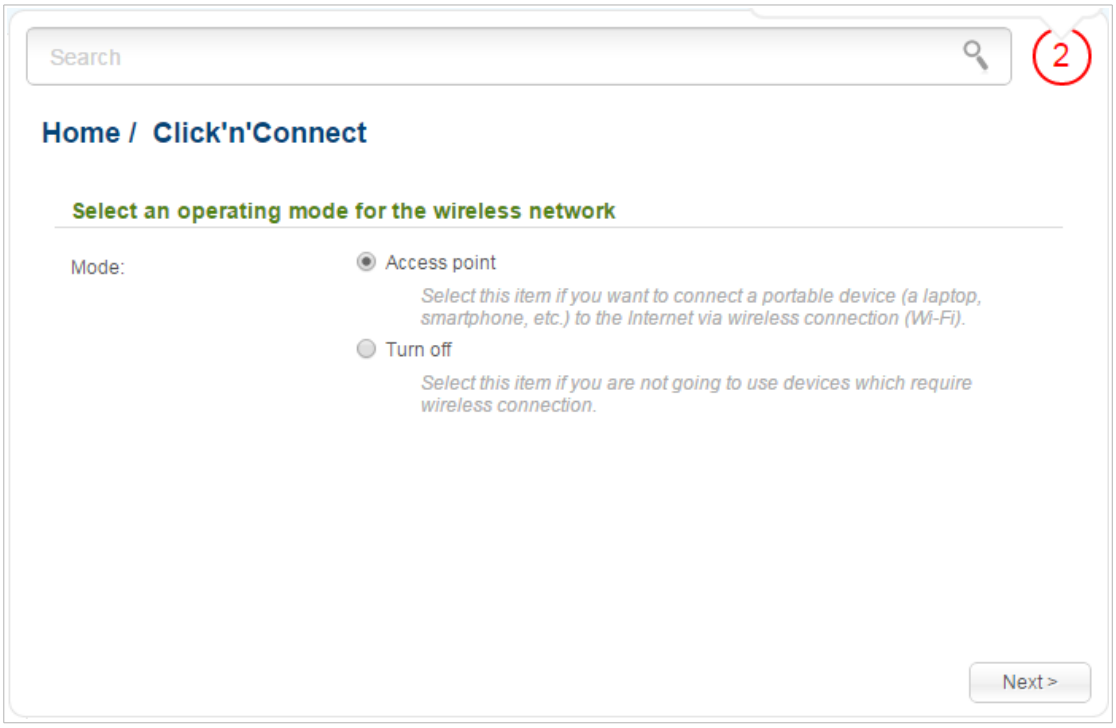


Figure 48. Selecting the operating mode for the wireless network.

If you are not going to use the wireless connection, select the **Turn off** choice of the **Mode** radio button. Click the **Next** button and then click the **Apply** button on the opened page. After clicking the button, the page for configuring the router to use an IPTV set-top box opens (see the ***Configuring IPTV*** section, page 76).

If you want to connect portable devices to the Internet via wireless connection, select the **Access point** choice of the **Mode** radio button. Click the **Next** button.

On the opened page, in the **SSID** field, specify a new name for the network in the 2.4GHz band (use digits and Latin characters).

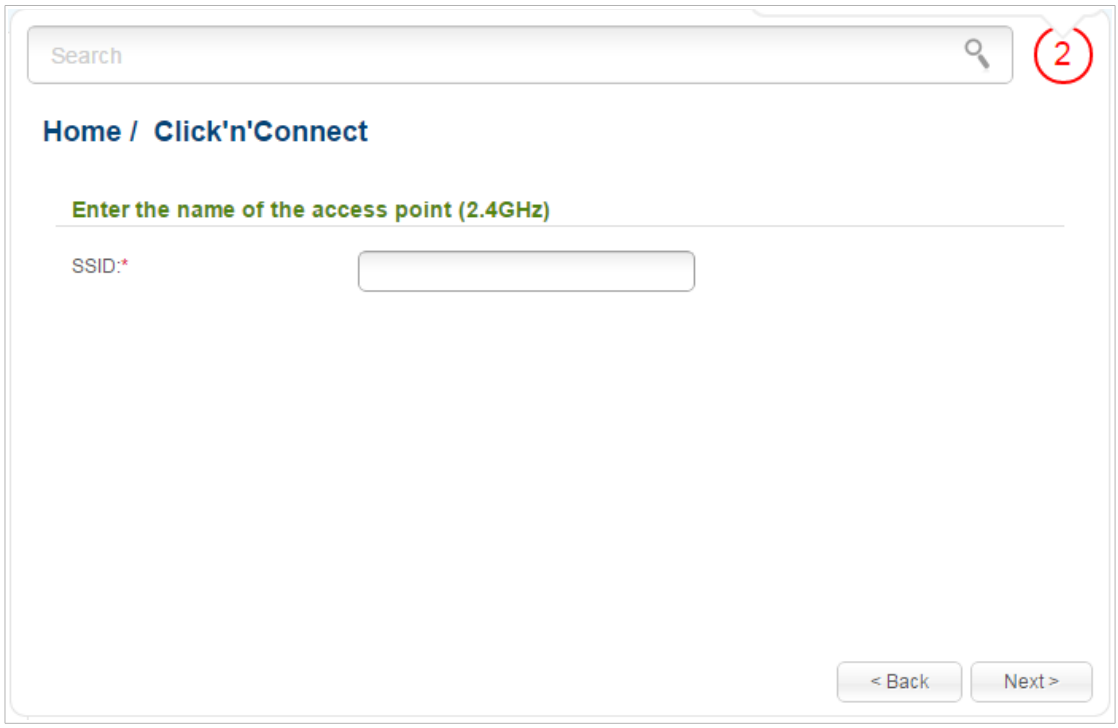


Figure 49. Changing the name of the wireless LAN in the 2.4GHz band.

Click the **Next** button to continue.

On the next page, you can modify security settings of the WLAN in the 2.4GHz band.

Select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN in the 2.4GHz band.

When the **Open** value is selected, the **Network key** field is unavailable. After applying this setting, the **Open** authentication type with no encryption is specified for the router's WLAN in the 2.4GHz band.

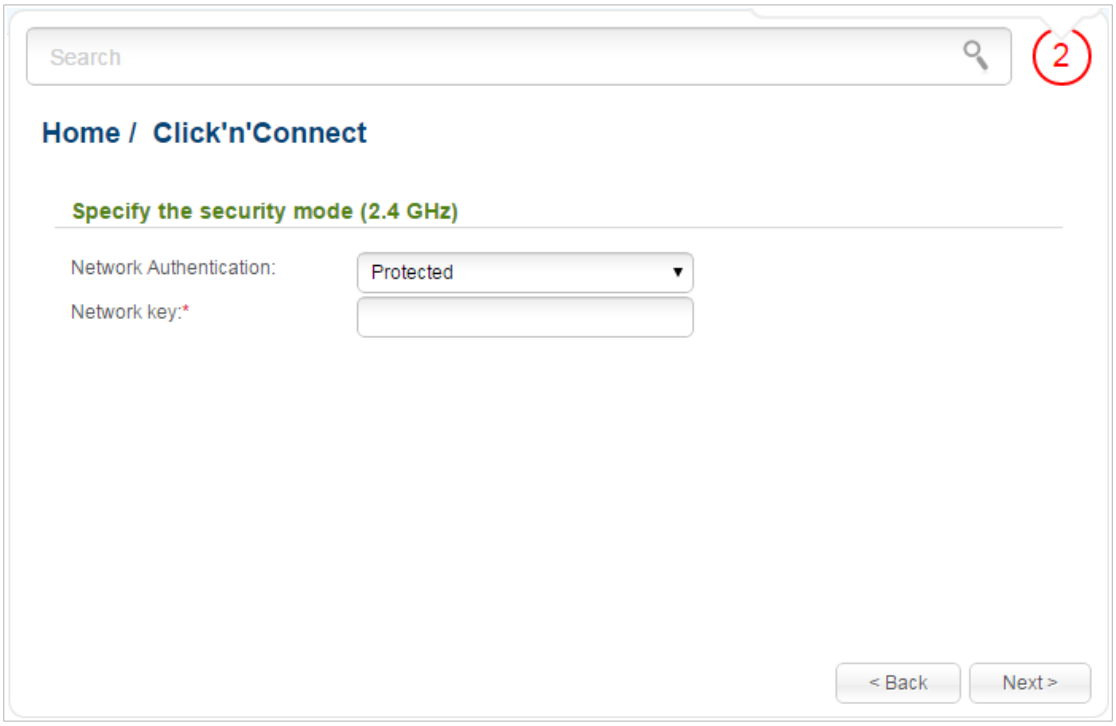


Figure 50. Selecting a security mode for the wireless network in the 2.4GHz band.

Click the **Next** button to continue.

On the opened page, in the **SSID** field, specify a new name for the network in the 5GHz band (use digits and Latin characters).

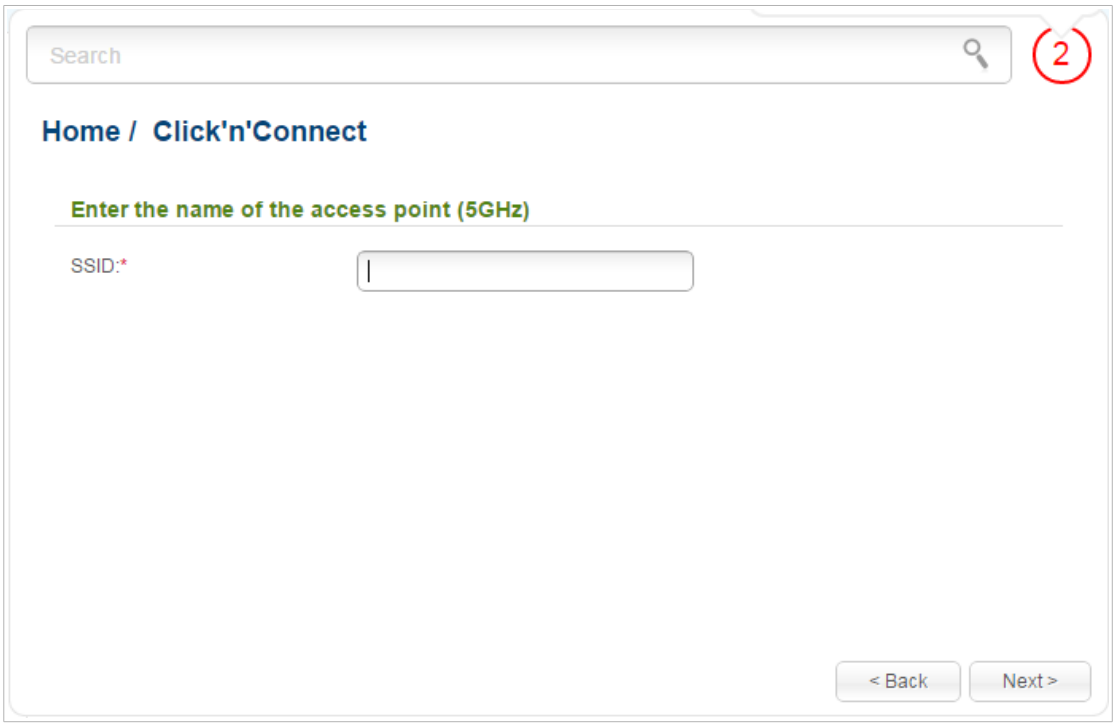


Figure 51. Changing the name of the wireless LAN in the 5GHz band.

Click the **Next** button to continue.

On the next page, you can modify security settings of the WLAN in the 5GHz band.

Select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN in the 5GHz band.

When the **Open** value is selected, the **Network key** field is unavailable. After applying this setting, the **Open** authentication type with no encryption is specified for the router's WLAN in the 5GHz band.

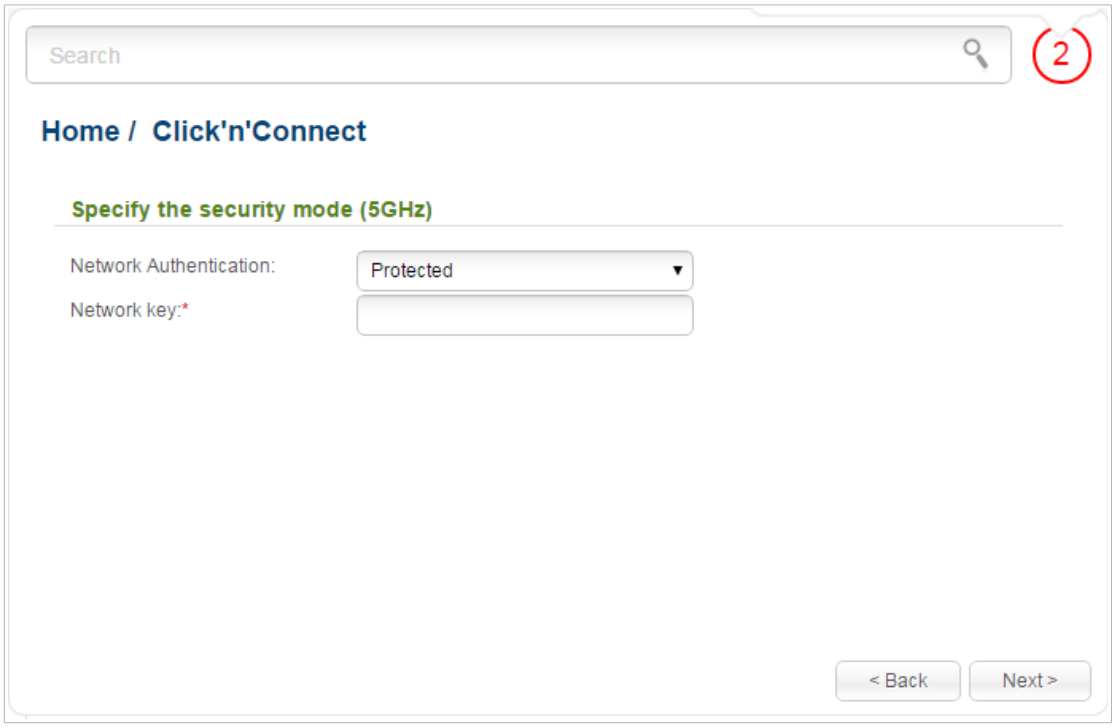


Figure 52. Selecting a security mode for the wireless network in the 5GHz band.

Click the **Next** button to continue.

On the next page, the specified settings are displayed. Make sure that they are correct and then click the **Apply** button. After clicking the button, the page for configuring the router to use an IPTV set-top box opens (see the ***Configuring IPTV*** section, page 76).

Configuring IPTV

On the page, you can configure the router to use an IPTV set-top box.

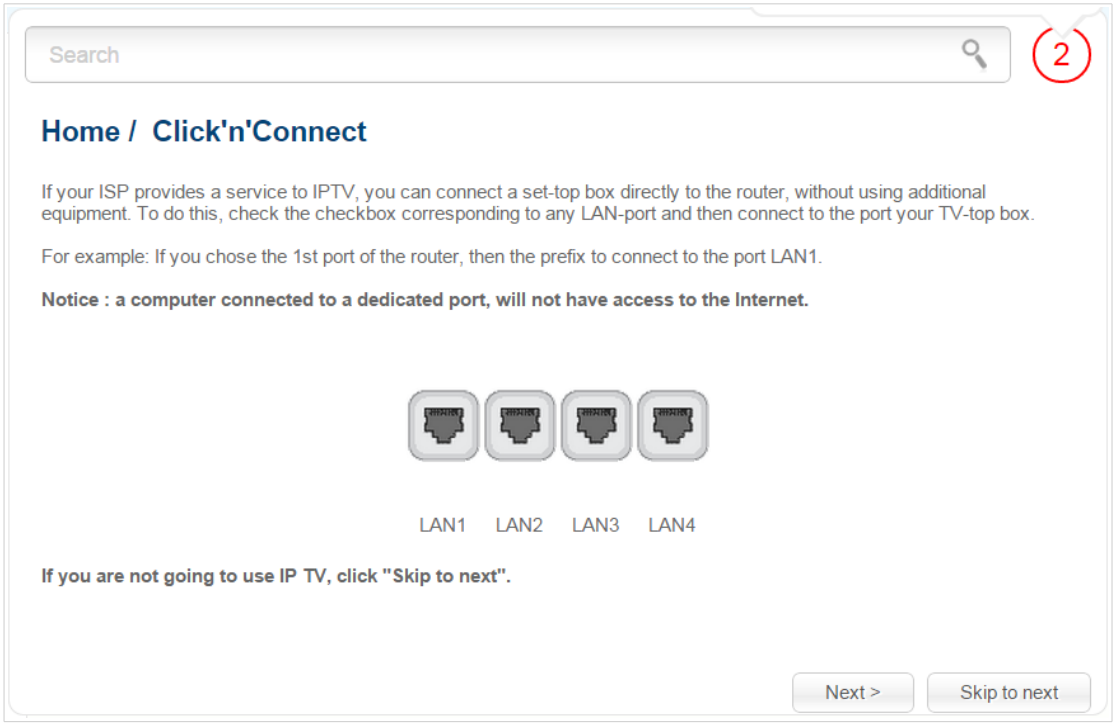


Figure 53. Selecting a LAN port to connect an IPTV set-top box.

On the opened page, select the LAN port of the router to which you will connect your IPTV set-top box.

If in the future you need to disconnect your IPTV set-top box from the specified LAN port and connect to it a computer, start the **IPTV settings wizard** (for the detailed description of the Wizard, see the ***IPTV Settings Wizard*** section, page 87).

If for accessing the Internet and IPTV services your ISP uses virtual local area networks with identifiers (VLAN ID), to configure access to the IPTV service, proceed to the **Advanced / VLAN** page, create a group of ports with the required value of the **VLAN ID** parameter, the **Bridge** type, and the port to which the set-top box will be connected (see the ***VLAN*** section, page 166, for a detailed description of the elements from the page).

Click the **Next** button to continue.

Click the **Skip to next** button in order not to apply the IPTV settings.

Click the **Apply** button to save the specified settings.

After clicking the **Apply** button, the **Home / Information** page opens.

Wireless Network Settings Wizard

To specify all needed settings for your wireless network, click the **Wireless network settings wizard** link in the **Home** section.

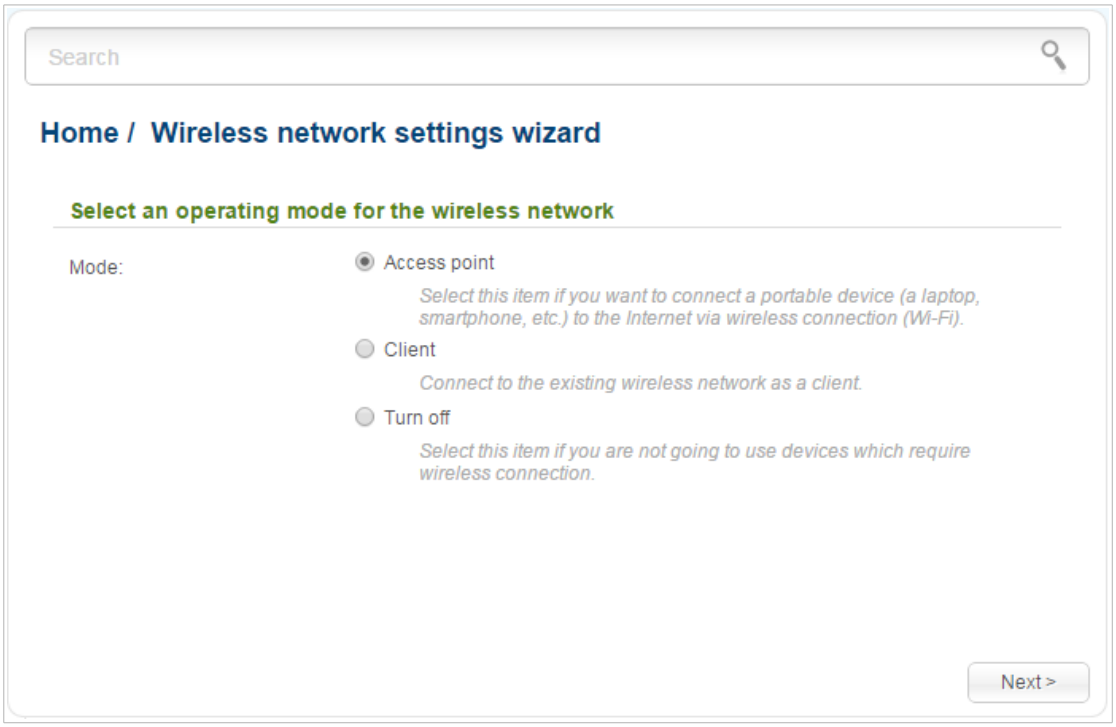


Figure 54. The page for selecting the operating mode for the wireless network.

If you are not going to use the wireless connection, select the **Turn off** choice of the **Mode** radio button. Click the **Next** button and then click the **Apply** button on the opened page.

If you want to connect portable devices to the Internet via wireless connection, select the **Access point** choice of the **Mode** radio button. Click the **Next** button.

If you want to configure the router as a client to connect to a wireless access point, select the **Client** choice of the **Mode** radio button. Click the **Next** button.

Access Point Mode

On the opened page, in the **SSID** field, specify a new name for the network in the 2.4GHz band (use digits and Latin characters).

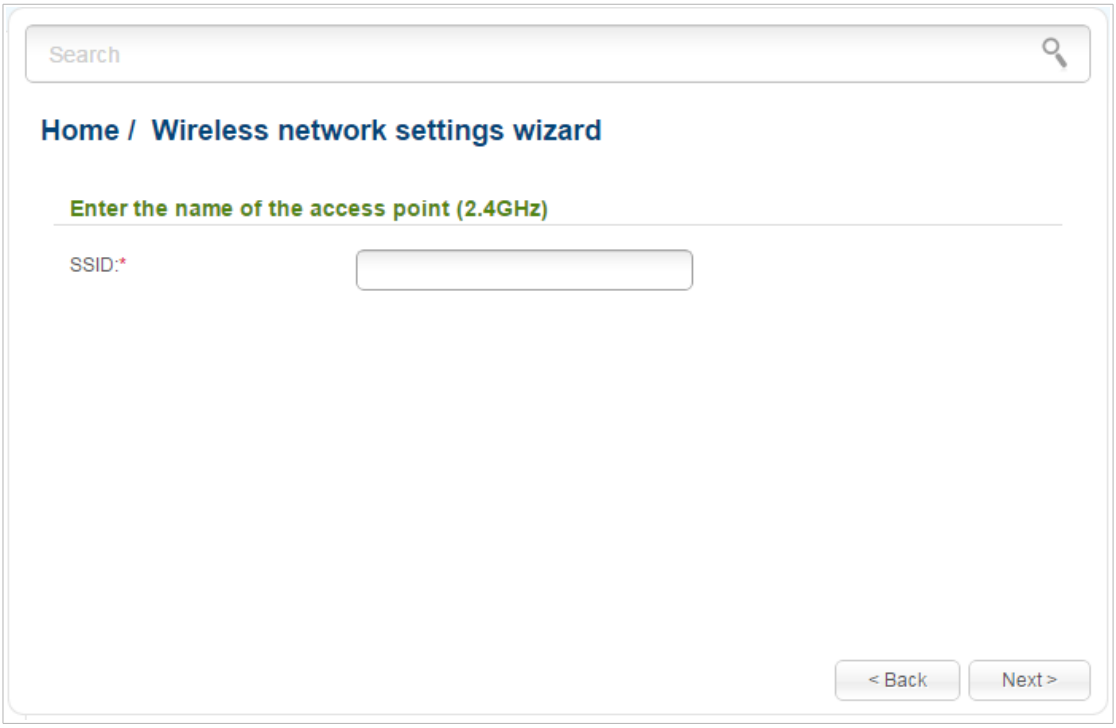


Figure 55. Page for changing the name of the wireless LAN in the 2.4GHz band.

Click the **Next** button to continue.

On the next page, you can modify security settings of the WLAN in the 2.4GHz band.

Select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN in the 2.4GHz band.

When the **Open** value is selected, the **Network key** field is unavailable. After applying this setting, the **Open** authentication type with no encryption is specified for the router's WLAN in the 2.4GHz band.

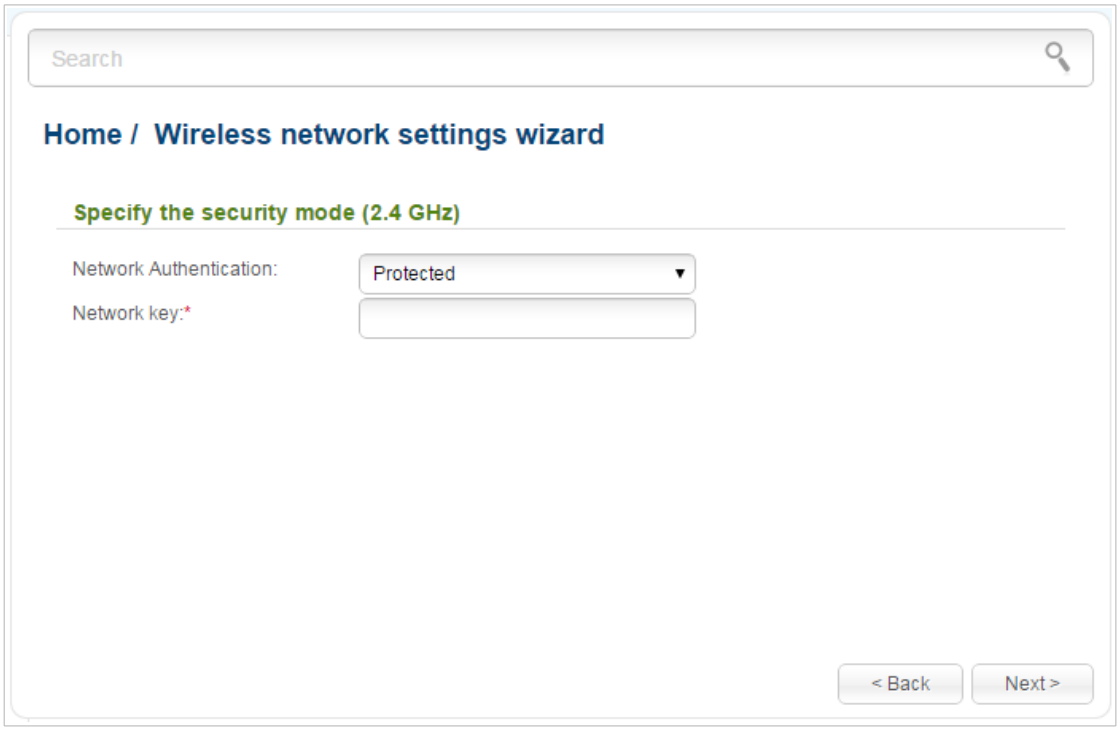


Figure 56. Page for selecting a security mode for the wireless network in the 2.4GHz band.

Click the **Next** button to continue.

On the opened page, in the **SSID** field, specify a new name for the network in the 5GHz band (use digits and Latin characters).

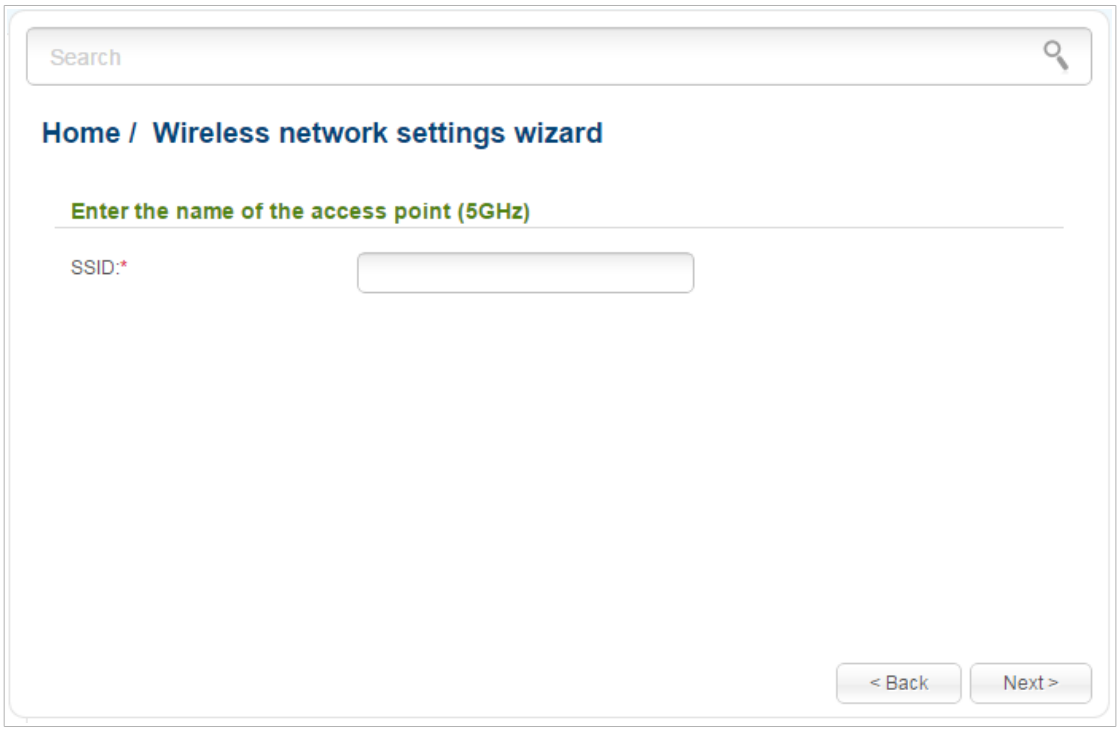


Figure 57. Page for changing the name of the wireless LAN in the 5GHz band.

Click the **Next** button to continue.

On the next page, you can modify security settings of the WLAN in the 5GHz band.

Select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN in the 5GHz band.

When the **Open** value is selected, the **Network key** field is unavailable. After applying this setting, the **Open** authentication type with no encryption is specified for the router's WLAN in the 5GHz band.

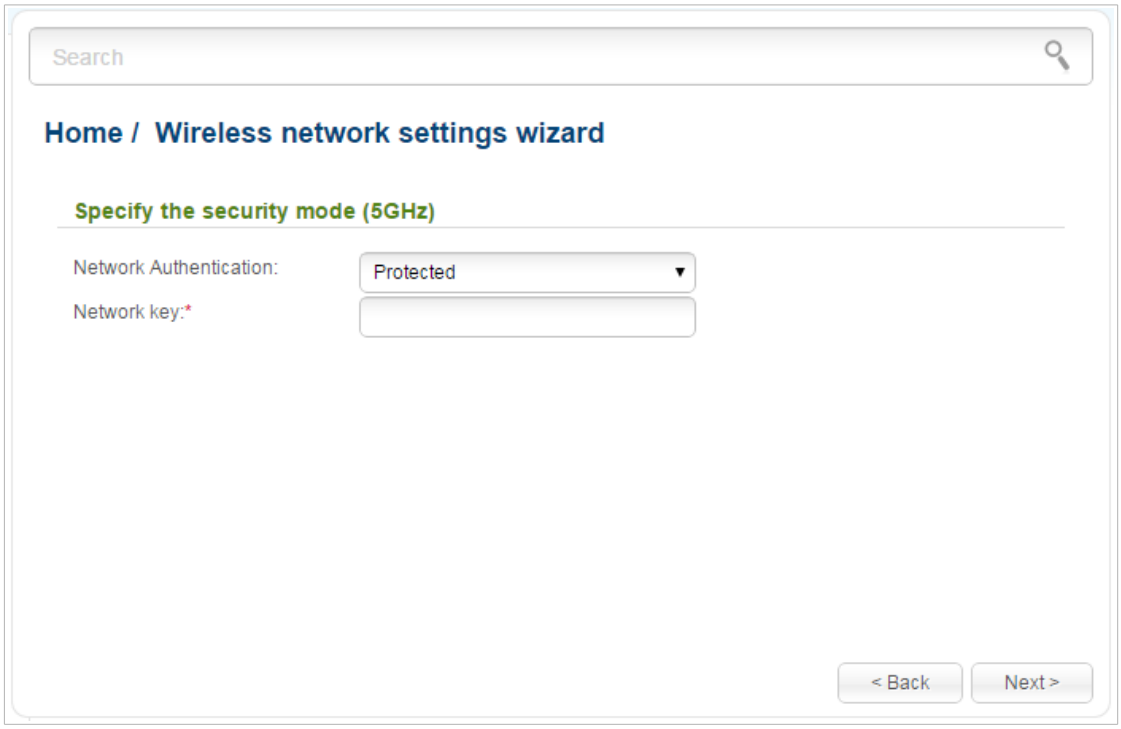


Figure 58. Page for selecting a security mode for the wireless network in the 5GHz band.

Click the **Next** button to continue.

On the next page, the specified settings are displayed. Make sure that they are correct and then click the **Apply** button.

Client Mode

On the opened page, select the band of the network to which you want to connect from the **Wireless network range** drop-down list and click the **Search** button.

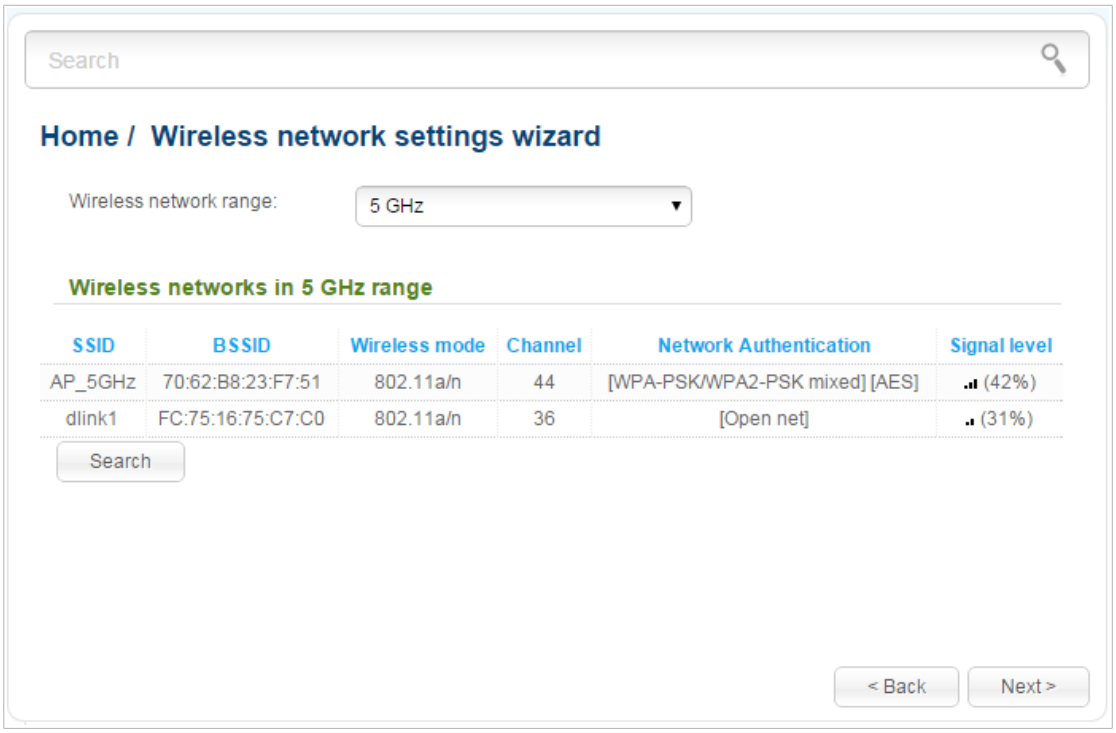


Figure 59. The page for selecting a network to connect.

Select the network to which you want to connect and click the **Next** button.

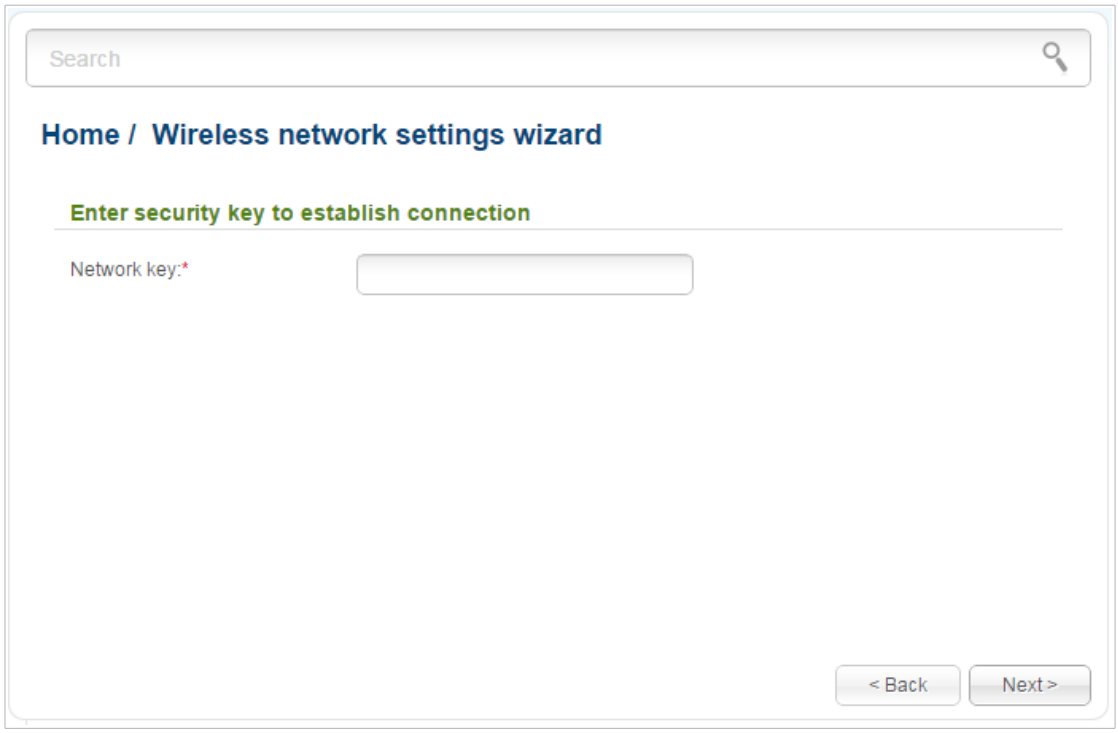


Figure 60. The page for entering the password for connection to the wireless network.

If you need a password to connect to the selected network, enter the password in the **Network key** field and click the **Next** button.

On the next page, you can specify an individual name (SSID) and security settings for the router or disable the router's wireless network broadcast.

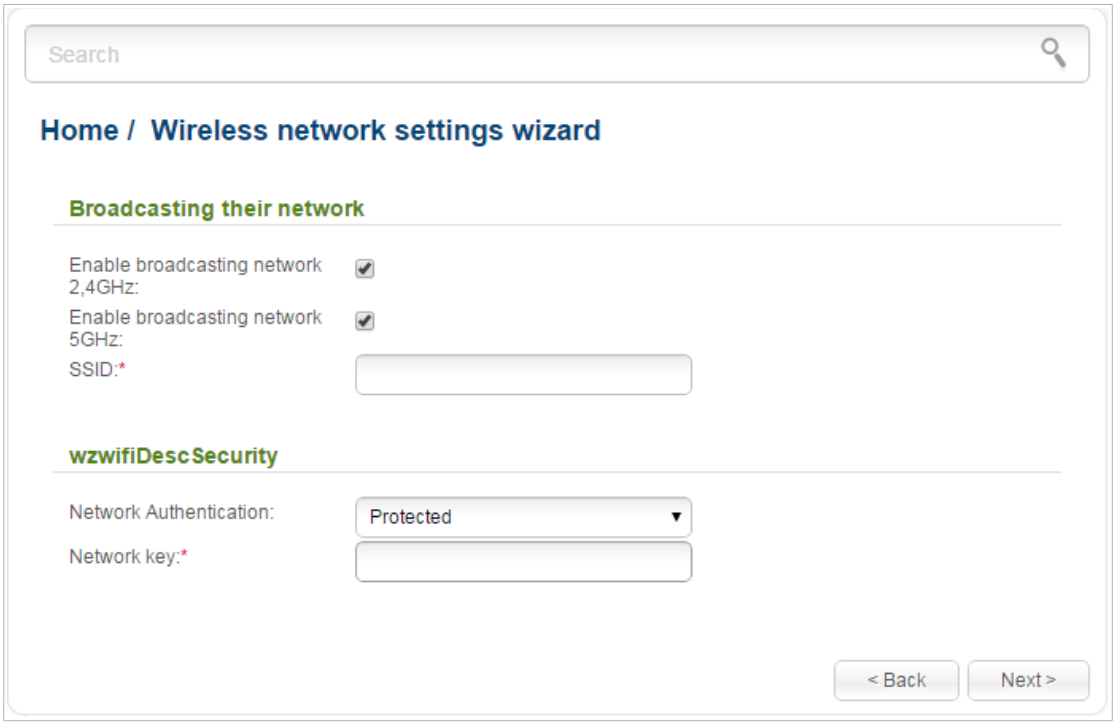


Figure 61. The page for changing the settings of the wireless local area network.

If you want to use the router's wireless network in the 2.4GHz or 5GHz band to connect devices, leave the corresponding checkbox (**Enable broadcasting network 2,4GHz** or **Enable broadcasting network 5GHz**) selected. Then, if needed, specify another name for the network in the **SSID** field (the name of the 5GHz band WLAN will contain the extra **_5GHz** identifier). Use digits and Latin characters.

It is strongly recommended to configure the secure wireless network of DIR-816L. To do this, select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN. Click the **Next** button.

On the next page, the parameters of the network to which you want to connect, the entered password, and the settings of the wireless network of the router are displayed. Make sure that the specified settings are correct and then click the **Apply** button. After that, the wireless channel of DIR-816L will switch to the channel of the wireless access point to which you have connected.

After configuring the device as a client, you need to create a WAN connection with relevant parameters for the **WiFiClient** interface.

After clicking the **Apply** button, the **Home / Information** page opens.

Virtual Server Settings Wizard

To create a virtual server for redirecting incoming Internet traffic to a specified IP address in the LAN, click the **Virtual server settings wizard** link in the **Home** section.

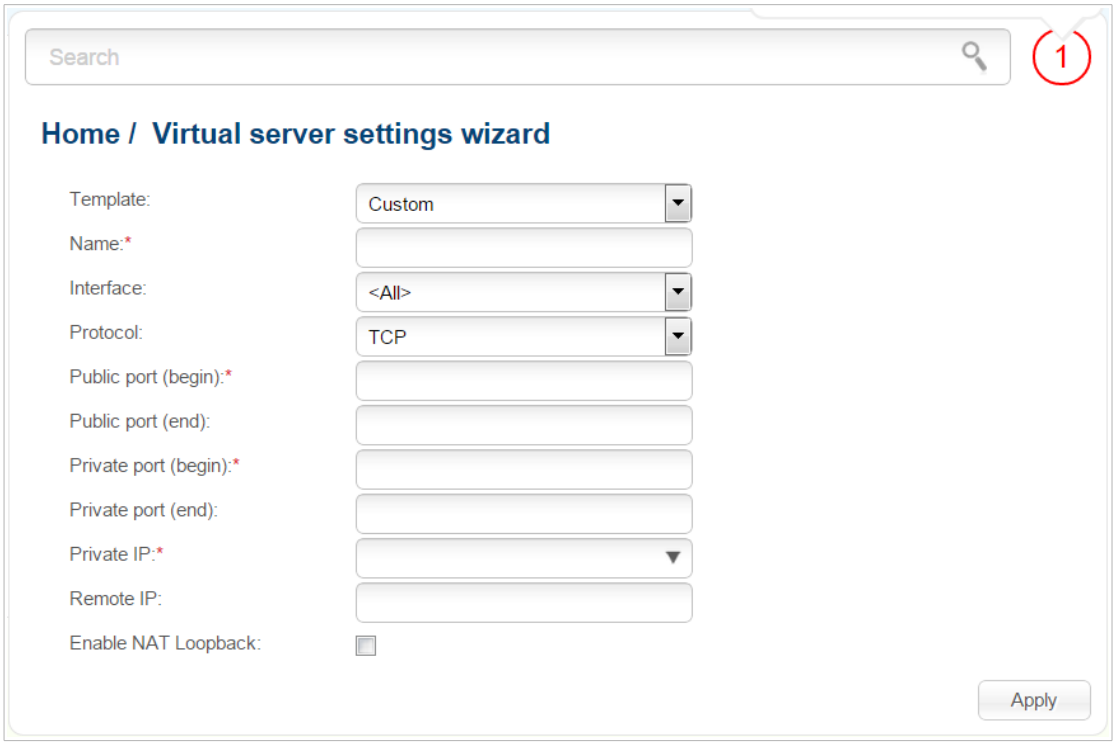


Figure 62. The page for adding a virtual server.

On the opened page, you can specify the following parameters:

Parameter	Description
Template	Select a virtual server template from the drop-down list, or select **Custom** to specify all parameters of the new virtual server manually.
Name	Enter a name for the virtual server for easier identification. You can specify any name.
Interface	Select a WAN connection to which this virtual server will be assigned.
Protocol	A protocol that will be used by the new virtual server. Select a value from the drop-down list.
Public port (begin)/ Public port (end)	A port of the router from which traffic is directed to the IP address specified in the **Private IP** field. Specify the start and the end value for the port range. If you need to specify one port, enter the needed value in the **Public port (begin)** field and leave the **Public port (end)** field blank.

Parameter	Description
Private port (begin)/ Private port (end)	A port of the IP address specified in the **Private IP** field to which traffic is directed from the **Public port**. Specify the start and the end value for the port range. If you need to specify one port, enter the needed value in the **Private port (begin)** field and leave the **Private port (end)** field blank.
Private IP	Enter the IP address of the server from the local area network. To choose a device connected to the router's LAN at the moment, select the relevant value from the drop-down list (the field will be filled in automatically).
Remote IP	Enter the IP address of the server from the external network.
Enable NAT Loopback	If the checkbox is selected, users of the router's LAN can access the server, which IP address is specified in the **Private IP** field, using the router's external IP address as the server's IP address. If a DDNS service is configured on the **Advanced / DDNS** page, the users can access the server via the router's domain name.

When needed settings are configured, click the **Apply** button.

After clicking the **Apply** button, a dialog box appears.

If you are going to create a new virtual server, click the **OK** button. After clicking the button, the **Firewall / Virtual servers** page opens (see the ***Virtual Servers*** section, page 192, for a detailed description of the elements from the page).

If you are not going to create a new virtual server, click the **Cancel** button. After clicking the button, the **Home / Information** page opens.

IPTV Settings Wizard

To configure the router to use an IPTV set-top box, click the **IPTV settings wizard** link in the **Home** section.

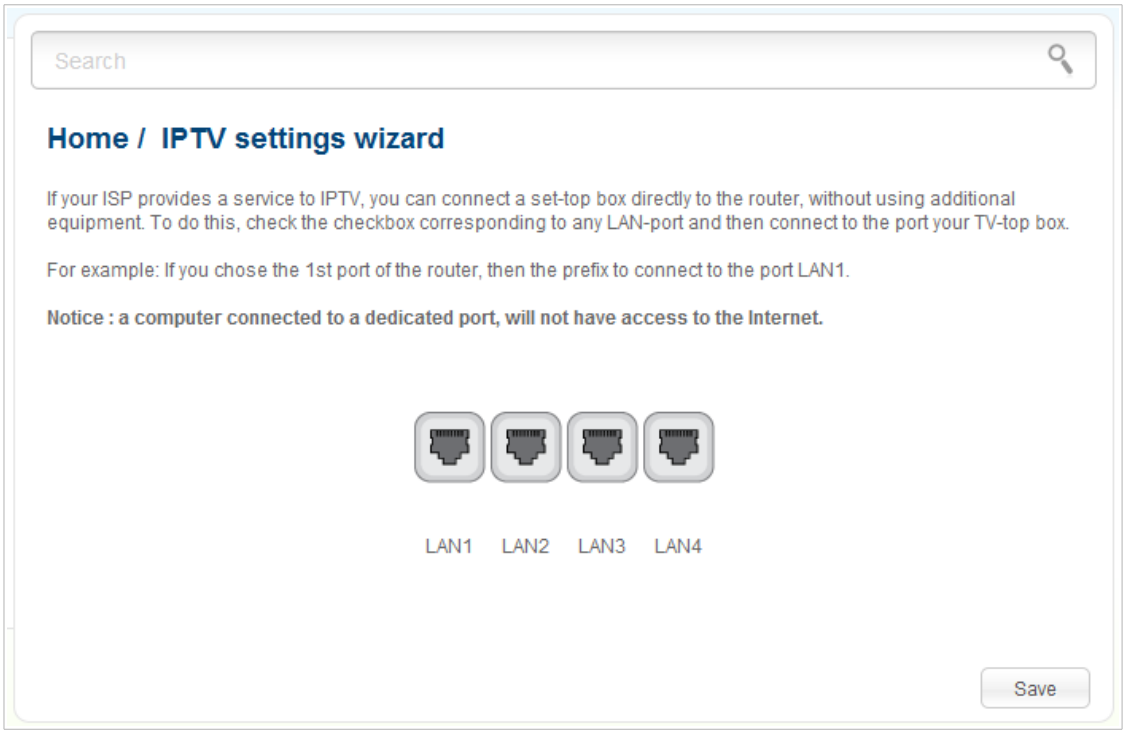


Figure 63. The page for selecting a LAN port to connect an IPTV set-top box.

On the opened page, select the LAN port of the router to which you will connect your IPTV set-top box and click the **Save** button. After clicking the button, the **Home / Information** page opens.

If in the future you need to disconnect your IPTV set-top box from the specified LAN port and connect to it a computer, on the current page deselect the LAN port and click the **Save** button.

If for accessing the Internet and IPTV services your ISP uses virtual local area networks with identifiers (VLAN ID), to configure access to the IPTV service, proceed to the **Advanced / VLAN** page, create a group of ports with the required value of the **VLAN ID** parameter, the **Bridge** type, and the port to which the set-top box will be connected (see the ***VLAN*** section, page 166, for a detailed description of the elements from the page).

Status

The pages of this section display data on the current state of the router:

- network statistics
- IP addresses leased by the DHCP server
- the routing table
- data on devices connected to the router's network and its web-based interface
- active sessions
- addresses of active multicast groups.

Network Statistics

On the **Status / Network statistics** page, you can view statistics for all connections existing in the system (WAN connections, LAN, WLAN). For each connection the following data are displayed: name and state (when the connection is on, its name is highlighted in green, when the connection is off, its name is highlighted in red), IP address and subnet mask, gateway (if the connection is established), MAC address, MTU value, and volume of data received and transmitted (with increase of the volume the units of measurement are changed automatically: byte, Kbyte, Mbyte, Gbyte).

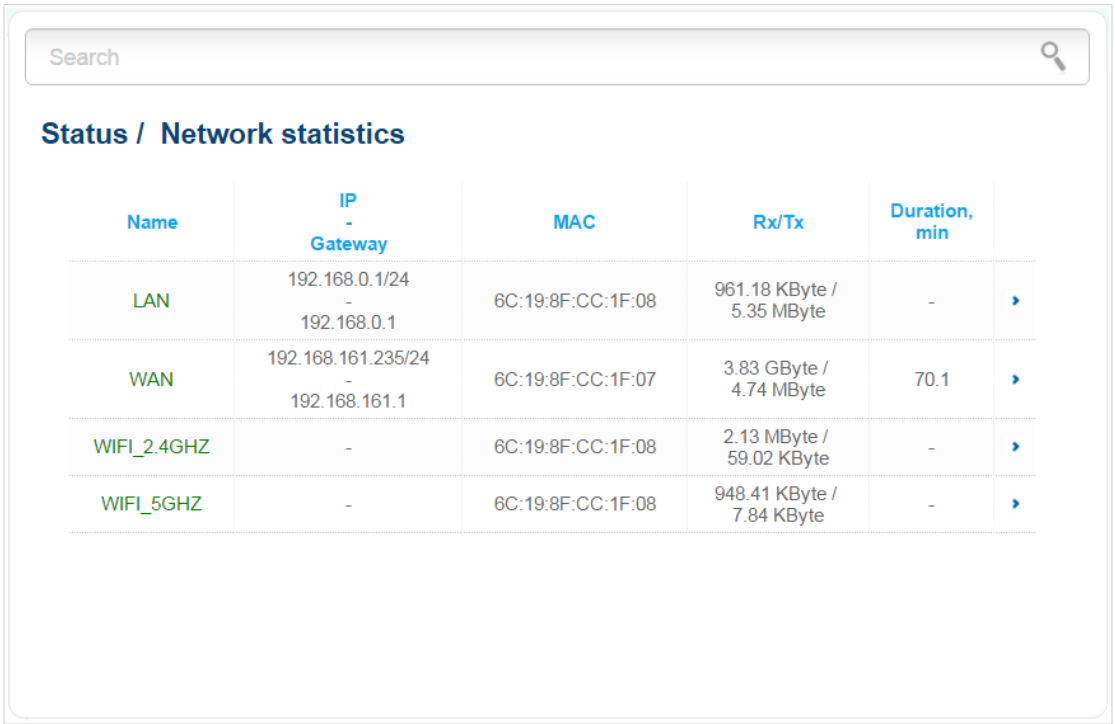


*Figure 64. The **Status / Network statistics** page.*

DHCP

The **Status / DHCP** page displays the information on computers that have been identified by hostnames and MAC addresses and have got IP addresses from the DHCP server of the device, as well as the IP address expiration periods (the lease time).

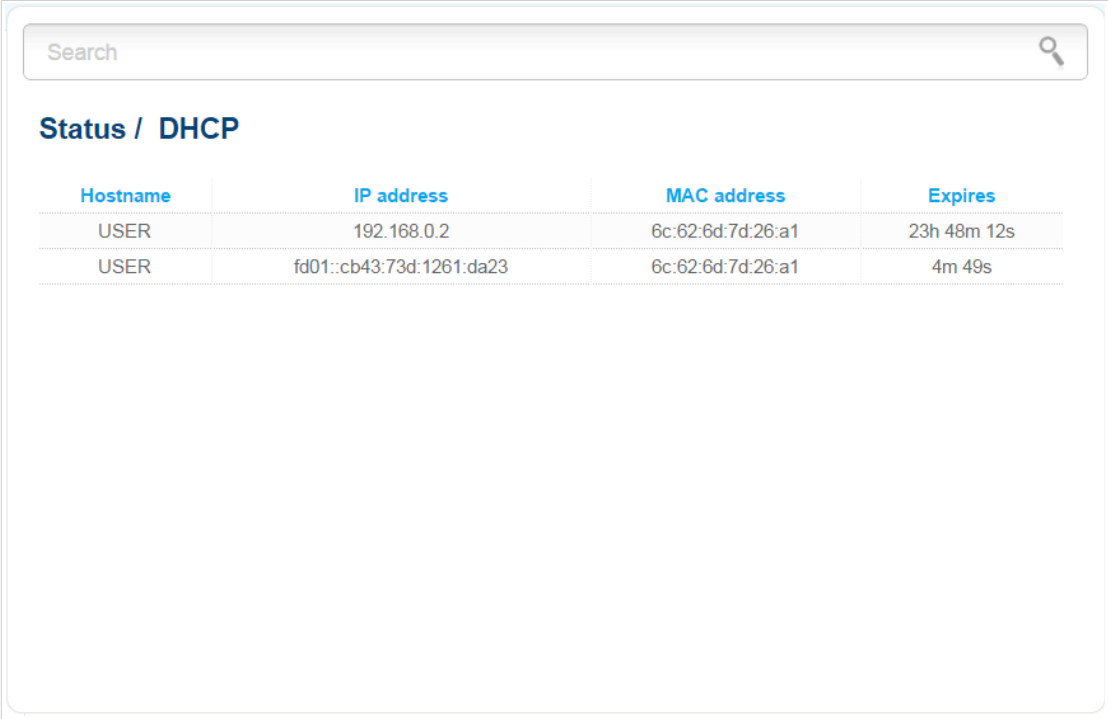


*Figure 65. The **Status / DHCP** page.*

Routing Table

The **Status / Routing table** page displays the information on routes. The table contains destination IP addresses, gateways, subnet masks, and other data.

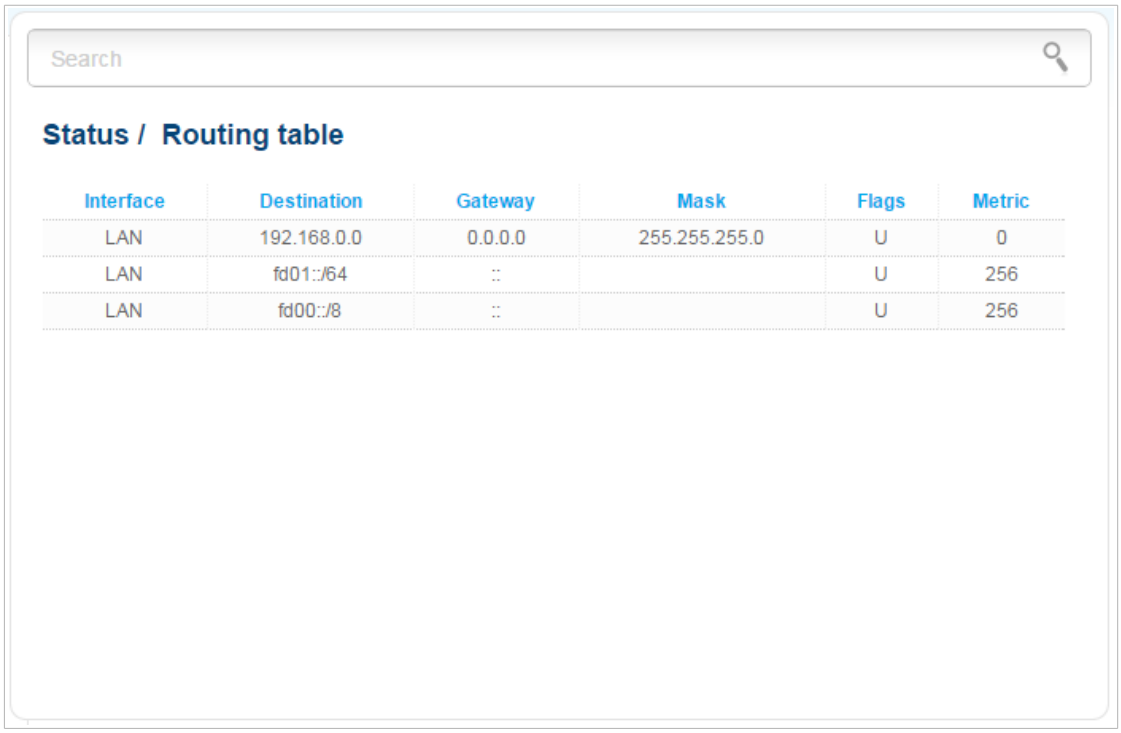


*Figure 66. The **Status / Routing table** page.*

Clients

On the **Status / Clients** page, you can view the list of devices connected to the router and devices accessing its web-based interface.

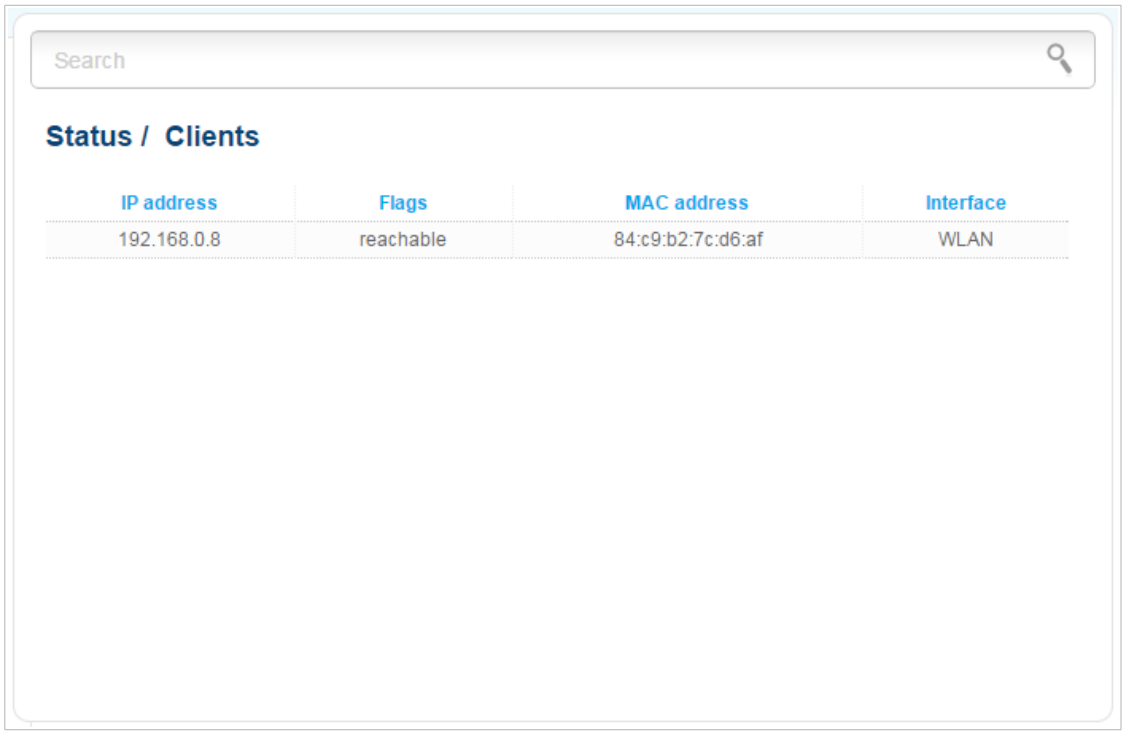


*Figure 67. The **Status / Clients** page.*

For each device the following data are displayed: the IP address, the MAC address, and the interface to which the device is connected.

Active Sessions

On the **Status / Active sessions** page, you can view information on current sessions in the router's network. For each session the following data are displayed: a protocol for network packet transmission, a source IP address and port, a destination IP address and port.

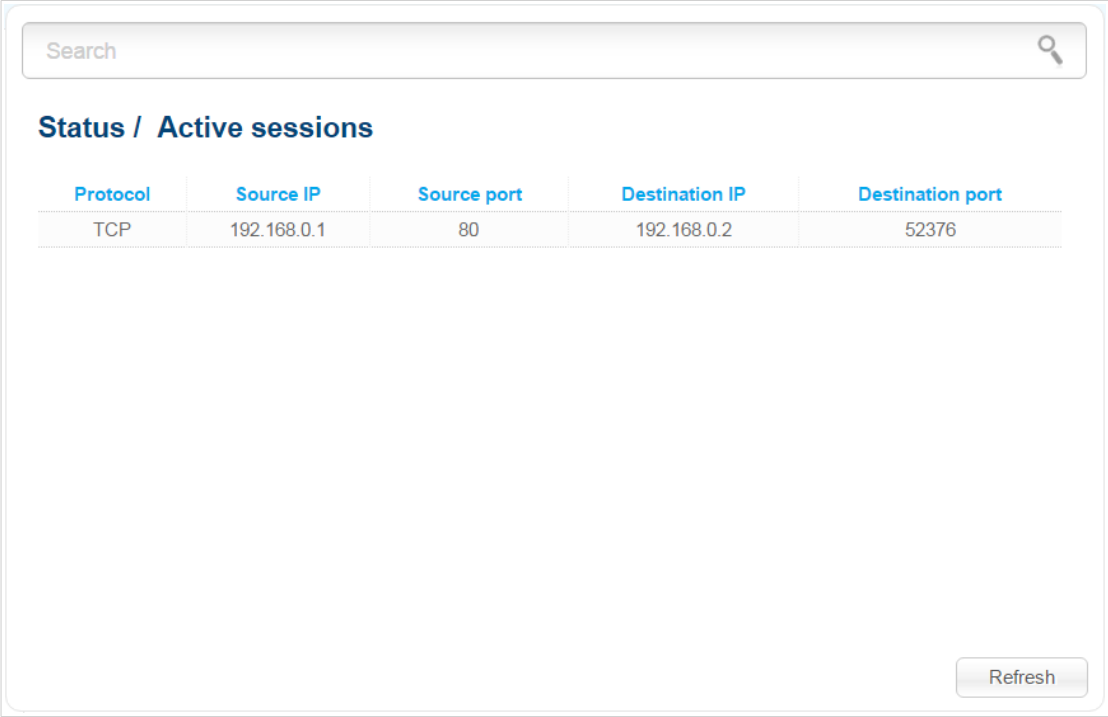


*Figure 68. The **Status / Active sessions** page.*

To view the latest data on current sessions in the router's network, click the **Refresh** button.

Multicast groups

The **Status / Multicast groups** page displays addresses of active multicast groups (including IPTV channels and groups for transferring service information) to which the device is subscribed, and the interface through which the device is subscribed.

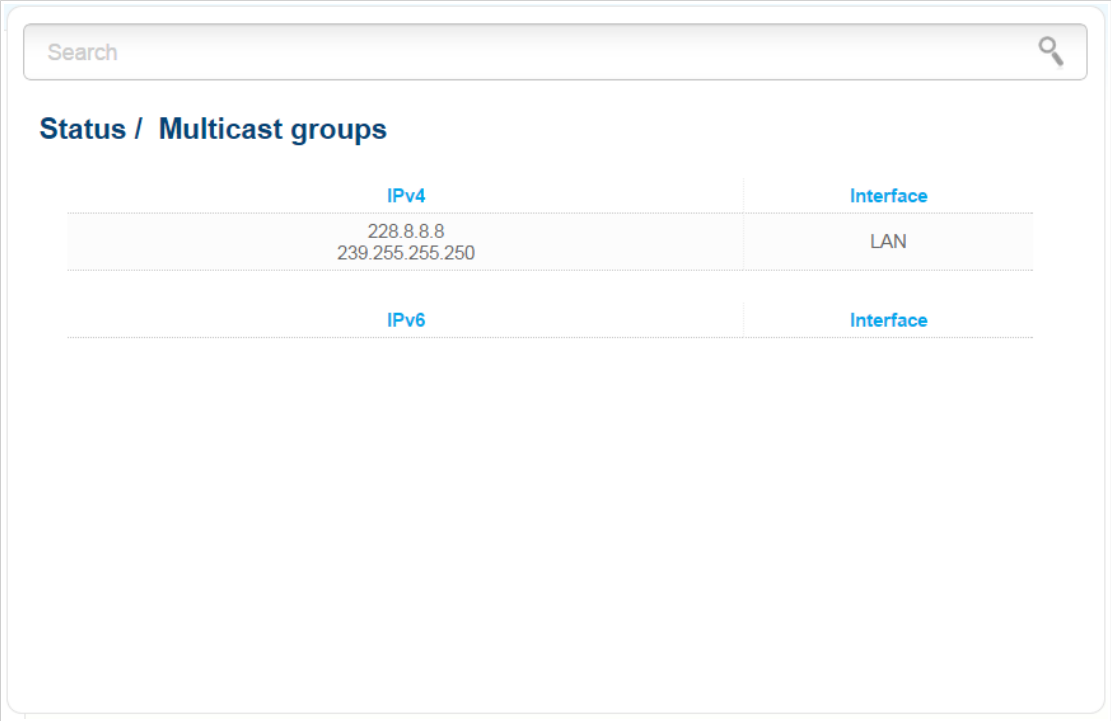


*Figure 69. The **Status / Multicast groups** page.*

Net

In this menu you can configure basic parameters of the router's local area network and configure connection to the Internet (a WAN connection).

WAN

On the **Net / WAN** page, you can create and edit connections used by the router.

By default, a **Dynamic IP** connection is configured in the system. It is assigned to the WAN port of the router. You can edit this connection or delete it.

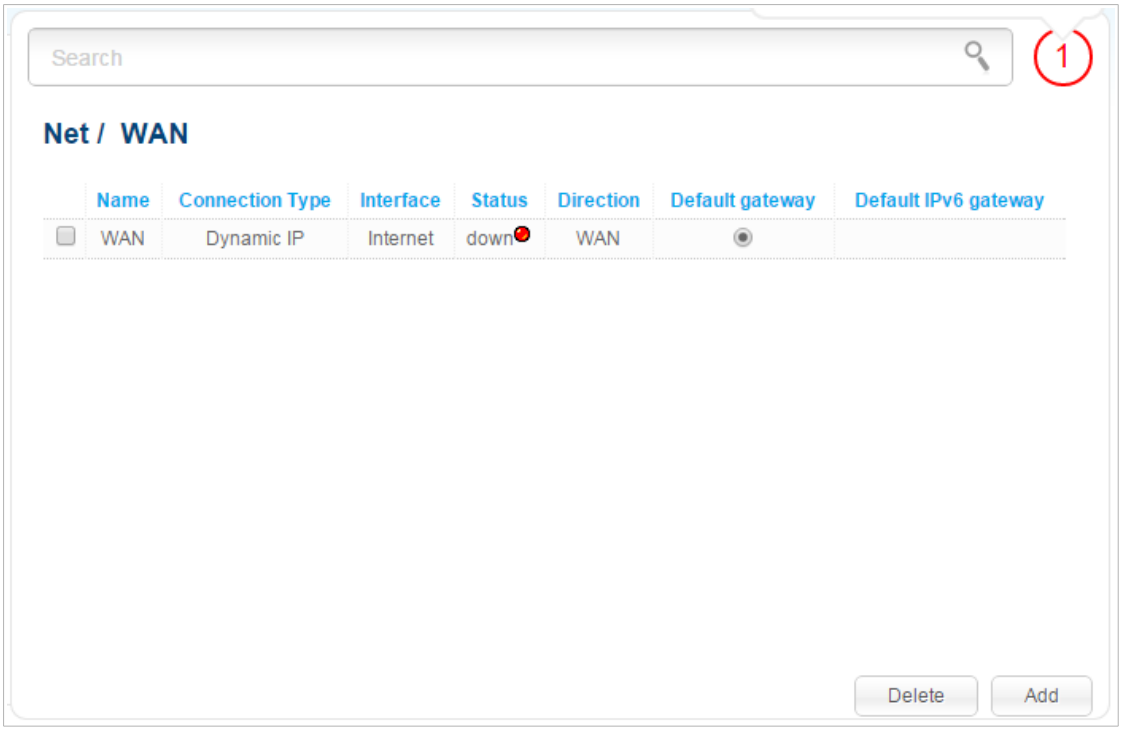


*Figure 70. The **Net / WAN** page.*

To create a new connection, click the **Add** button. On the page displayed, select the needed value from the **Connection Type** drop-down list and specify the relevant values.

To edit an existing connection, left-click the relevant line in the table. On the page displayed, change the parameters and click the **Apply** button.

To remove a connection, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove a connection on the editing page.

To use one of existing WAN connections as a default IPv4 gateway, select the choice of the **Default gateway** radio button located in the line corresponding to this connection.

To use one of existing WAN connections as a default IPv6 gateway, select the choice of the **Default IPv6 gateway** radio button located in the line corresponding to this connection.

Creating PPPoE WAN Connection

To create a connection of the PPPoE type, click the **Add** button on the **Net / WAN** page. On the opened page, select the **PPPoE** value from the **Connection Type** drop-down list and specify the needed values.

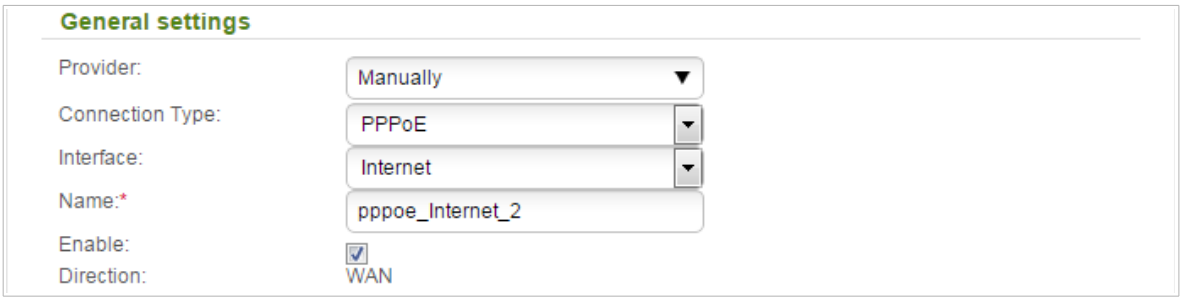


*Figure 71. The page for creating a new **PPPoE** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	A physical or virtual interface to which the new connection will be assigned.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

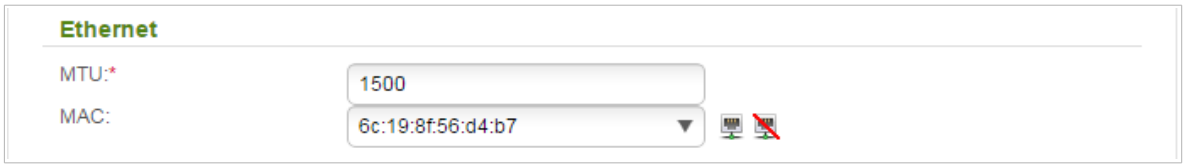


*Figure 72. The page for creating a new **PPPoE** connection. The **Ethernet** section.*

Parameter	Description
Ethernet	
MTU	The maximum size of units transmitted by the interface.
MAC	A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement. You can click the **Clone MAC address of your computer** icon ( ) to set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface. Also you can set the address of a device connected to the router's LAN at the moment. To do this, select the relevant value from the drop-down list (the field will be filled in automatically). You can click the **Restore default MAC address** icon ( ) to set the router's MAC address.

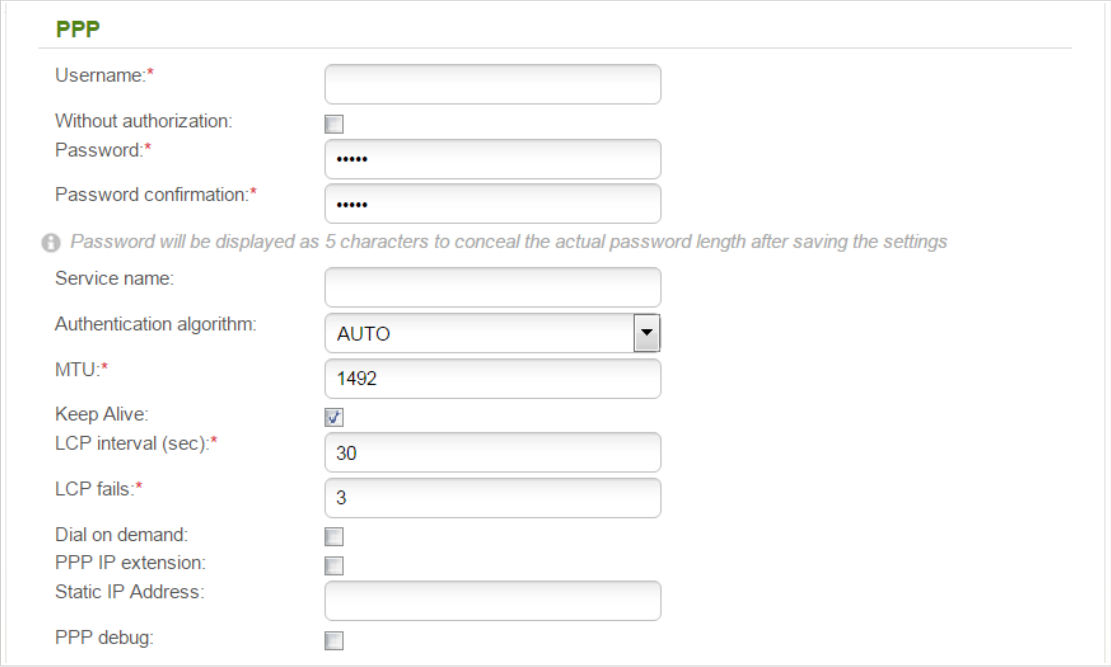


*Figure 73. The page for creating a new **PPPoE** connection. The **PPP** section.*

Parameter	Description
PPP	
Username	A username (login) to access the Internet.
Without authorization	Select the checkbox if you don't need to enter a username and password to access the Internet.
Password	A password to access the Internet.
Password confirmation	The confirmation of the entered password (to avoid mistypes).
Service name	The name of the PPPoE authentication server.
Authentication algorithm	Select a required authentication method from the drop-down list or leave the **AUTO** value.
MTU	The maximum size of units transmitted by the interface.
Keep Alive	Select the checkbox if you want the router to keep you connected to your ISP even when the connection has been inactive for a specified period of time. When the checkbox is selected, the **LCP interval** and **LCP fails** fields are available. Specify the required values.
Dial on demand	Select the checkbox if you want the router to establish connection to the Internet on demand. In the **Maximum idle time** field, specify a period of inactivity (in seconds) after which the connection should be terminated.

Parameter	Description
PPP IP extension	This option is used by some ISPs. Contact your ISP to clarify if this checkbox needs to be enabled.
Static IP Address	Fill in the field if you want to use a static IP address to access the Internet.
PPP debug	Select the checkbox if you want to log all data on PPP connection debugging.

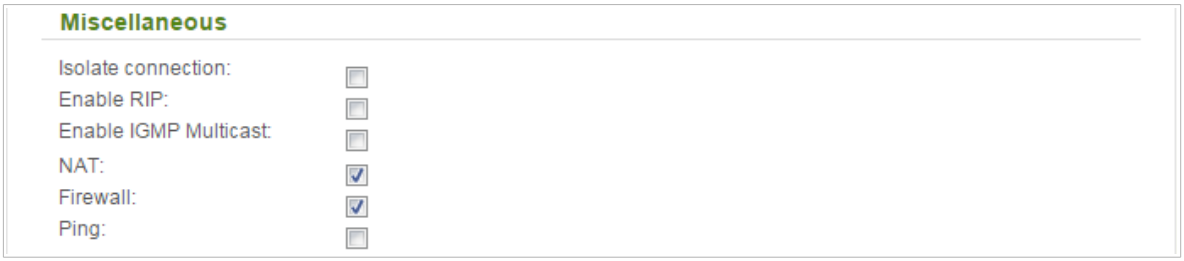


*Figure 74. The page for creating a new **PPPoE** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous	
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Enable IGMP Multicast	Select the checkbox to allow multicast traffic from the external network (e.g. video streaming) to be received.
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating IPv6 PPPoE or PPPoE Dual Stack WAN Connection

To create a connection of the IPv6 PPPoE or PPPoE Dual Stack type, click the **Add** button on the **Net / WAN** page. On the opened page, select the relevant value from the **Connection Type** drop-down list and specify the needed values.

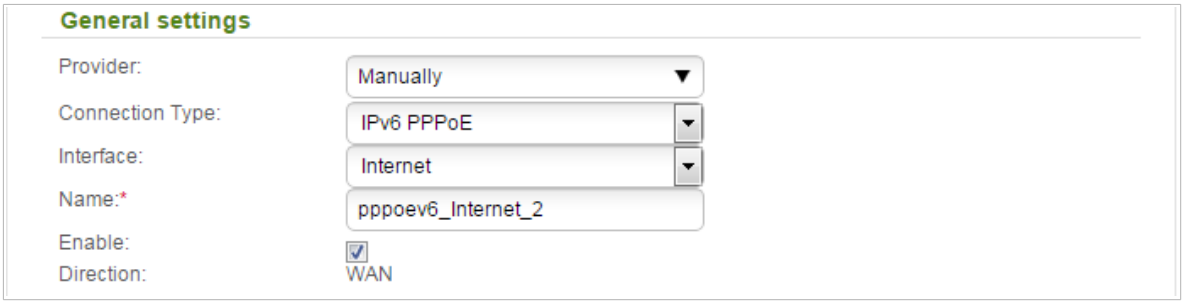


*Figure 75. The page for creating a new **IPv6 PPPoE** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	A physical or virtual interface to which the new connection will be assigned.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

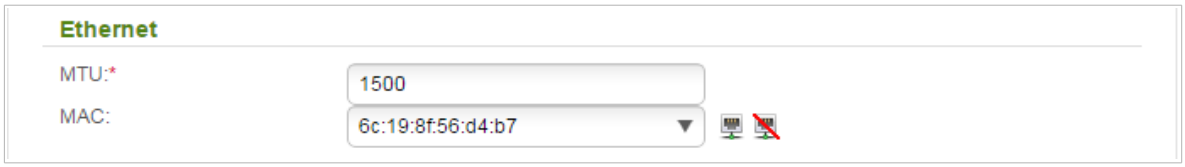


*Figure 76. The page for creating a new **IPv6 PPPoE** connection. The **Ethernet** section.*

Parameter	Description
Ethernet	
MTU	The maximum size of units transmitted by the interface.
MAC	A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement. You can click the **Clone MAC address of your computer** icon ( ) to set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface. Also you can set the address of a device connected to the router's LAN at the moment. To do this, select the relevant value from the drop-down list (the field will be filled in automatically). You can click the **Restore default MAC address** icon ( ) to set the router's MAC address.

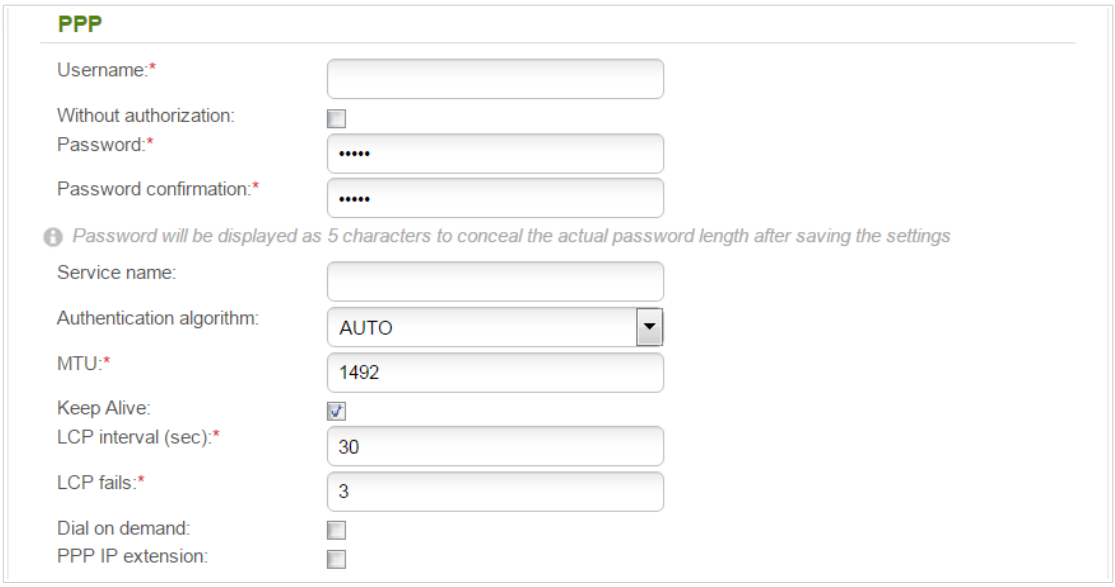


*Figure 77. The page for creating a new **IPv6 PPPoE** connection. The **PPP** section.*

Parameter	Description
PPP	
Username	A username (login) to access the Internet.
Without authorization	Select the checkbox if you don't need to enter a username and password to access the Internet.
Password	A password to access the Internet.
Password confirmation	The confirmation of the entered password (to avoid mistypes).
Service name	The name of the PPPoE authentication server.
Authentication algorithm	Select a required authentication method from the drop-down list or leave the **AUTO** value.
MTU	The maximum size of units transmitted by the interface.
Keep Alive	Select the checkbox if you want the router to keep you connected to your ISP even when the connection has been inactive for a specified period of time. When the checkbox is selected, the **LCP interval** and **LCP fails** fields are available. Specify the required values.
Dial on demand	Select the checkbox if you want the router to establish connection to the Internet on demand. In the **Maximum idle time** field, specify a period of inactivity (in seconds) after which the connection should be terminated.
PPP IP extension	This option is used by some ISPs. Contact your ISP to clarify if this checkbox needs to be enabled.

Parameter	Description
Static IP Address	*For the **PPPoE Dual Stack** type only.* Fill in the field if you want to use a static IP address to access the Internet.

*Figure 78. The page for creating a new **Pv6 PPPoE** connection. The **IPv6** section.*

Parameter	Description
IPv6	
Get IPv6	Select a method for IPv6 address assignment from the drop-down list or leave the **Automatically** value.

*Figure 79. The page for creating a new **Pv6 PPPoE** connection. The **IPv6 gateway** section.*

Parameter	Description
IPv6 gateway	
SLAAC	Select the checkbox to automatically assign the IPv6 gateway address with help of SLAAC (*Stateless Address Autoconfiguration*).
Static IPv6 gateway address	The static address of the IPv6 gateway. The field is available for editing, if the **SLAAC** checkbox is not selected.

*Figure 80. The page for creating a new **Pv6 PPPoE** connection. The **IPv6 DNS addresses** section.*

Parameter	Description
IPv6 DNS addresses	
Obtain DNS server addresses automatically	Select the checkbox to configure automatic assignment of IPv6 DNS server addresses. If the checkbox is selected, the **Static primary DNS server** and **Static secondary DNS server** fields are not available for editing.
Static primary DNS server/Static secondary DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.
PPP debug	Select the checkbox if you want to log all data on PPP connection debugging.

*Figure 81. The page for creating a new **Pv6 PPPoE** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous	
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Enable IGMP Multicast	*For the **PPPoE Dual Stack** type only.* Select the checkbox to allow multicast traffic from the external network (e.g. video streaming) to be received.
NAT	*For the **PPPoE Dual Stack** type only.* Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating Static IP or Dynamic IP WAN Connection

To create a connection of the Static IP or Dynamic IP type, click the **Add** button on the **Net / WAN** page. On the opened page, select the relevant value from the **Connection Type** drop-down list and specify the needed values.

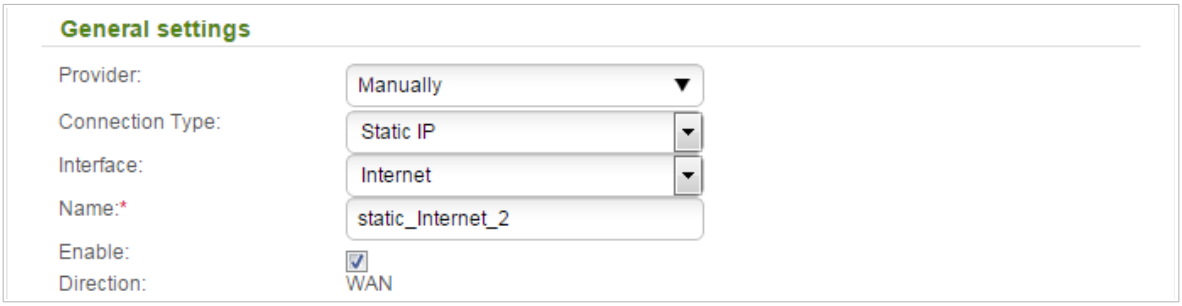


*Figure 82. The page for creating a new **Static IP** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	A physical or virtual interface to which the new connection will be assigned.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

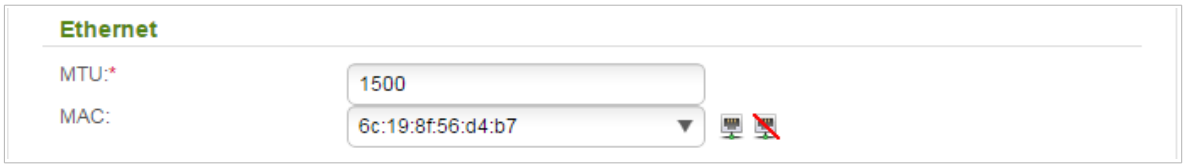


*Figure 83. The page for creating a new **Static IP** connection. The **Ethernet** section.*

Parameter	Description
Ethernet	
MTU	The maximum size of units transmitted by the interface.
MAC	A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement. You can click the **Clone MAC address of your computer** icon ( ) to set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface. Also you can set the address of a device connected to the router's LAN at the moment. To do this, select the relevant value from the drop-down list (the field will be filled in automatically). You can click the **Restore default MAC address** icon ( ) to set the router's MAC address.

*Figure 84. The page for creating a new **Static IP** connection. The **IP** section.*

Parameter	Description
IP	
*For **Static IP** type*	
IP Address	Enter an IP address for this WAN connection.
Netmask	Enter a subnet mask for this WAN connection.
Gateway IP address	Enter an IP address of the gateway used by this WAN connection.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
*For **Dynamic IP** type*	
Obtain DNS server addresses automatically	Select the checkbox to configure automatic assignment of DNS server addresses. If the checkbox is selected, the **Primary DNS server** and **Secondary DNS server** fields are not displayed.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
Vendor ID	The identifier of your ISP. *Optional*.
Hostname	A name of the router specified by your ISP. *Optional*.

*Figure 85. The page for creating a new **Static IP** connection. The **Authorization via 802.1x protocol** section.*

Parameter	Description
Authorization via 802.1x protocol	
Authorization in the ISP's network via 802.1x protocol	Select the checkbox to allow authorization in the ISP's network via the 802.1x protocol.
Authentication method	Select a needed authentication method from the drop-down list.
Username	Enter the username provided by your ISP.
Password	Enter the password provided by your ISP.

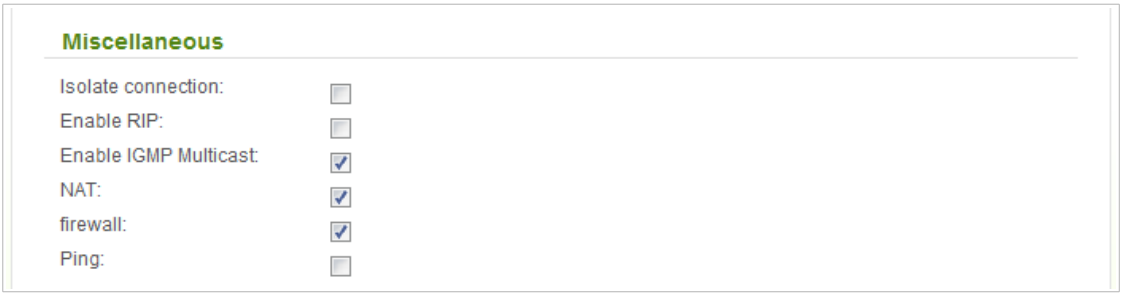


*Figure 86. The page for creating a new **Static IP** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous	
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Enable IGMP Multicast	Select the checkbox to allow multicast traffic from the external network (e.g. video streaming) to be received.
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating Static IPv6 or Dynamic IPv6 WAN Connection

To create a connection of the Static IPv6 or Dynamic IPv6 type, click the **Add** button on the **Net / WAN** page. On the opened page, select the relevant value from the **Connection Type** drop-down list and specify the needed values.

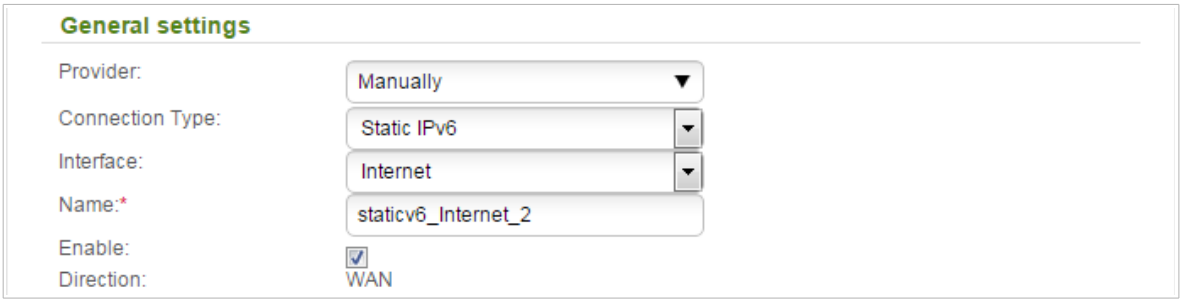


*Figure 87. The page for creating a new **Static IPv6** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	A physical or virtual interface to which the new connection will be assigned.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

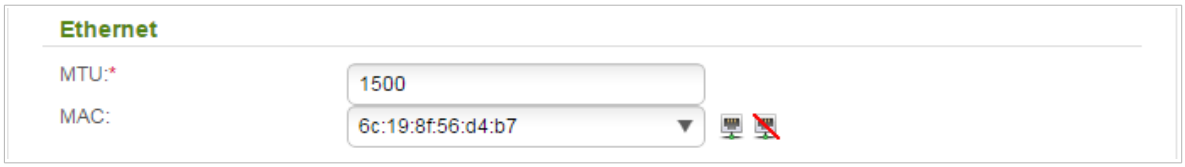


*Figure 88. The page for creating a new **Static IPv6** connection. The **Ethernet** section.*

Parameter	Description
Ethernet	
MTU	The maximum size of units transmitted by the interface.
MAC	A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement. You can click the **Clone MAC address of your computer** icon ( ) to set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface. Also you can set the address of a device connected to the router's LAN at the moment. To do this, select the relevant value from the drop-down list (the field will be filled in automatically). You can click the **Restore default MAC address** icon ( ) to set the router's MAC address.

*Figure 89. The page for creating a new **Static IPv6** connection. The **IP** section.*

Parameter	Description
IP	
*For **Static IPv6** type*	
IPv6 address	Enter an IPv6 address for this WAN connection.
Gateway IPv6 address	Enter an IPv6 address of the gateway used by this WAN connection.
Primary IPv6 DNS server/Secondary IPv6 DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.
*For **Dynamic IPv6** type*	
Get IPv6	Select a method for IPv6 address assignment from the drop-down list or leave the **Automatically** value.
Gateway by SLAAC	Select the checkbox to automatically assign the IPv6 gateway address with help of SLAAC (*Stateless Address Autoconfiguration*).
Static IPv6 gateway address	The static address of the IPv6 gateway. The field is available for editing, if the **Gateway by SLAAC** checkbox is not selected.
Obtain DNS server addresses automatically	Select the checkbox to configure automatic assignment of IPv6 DNS server addresses. If the checkbox is selected, the **Static primary DNS server** and **Static secondary DNS server** fields are not available for editing.
Static primary DNS server/Static secondary DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.

*Figure 90. The page for creating a new **Static IPv6** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous	
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating PPPoE + Static IP or PPPoE + Dynamic IP WAN Connection

To create a connection of the PPPoE + Static IP or PPPoE + Dynamic IP type, click the **Add** button on the **Net / WAN** page. On the opened page, select the relevant value from the **Connection Type** drop-down list and specify the needed values.

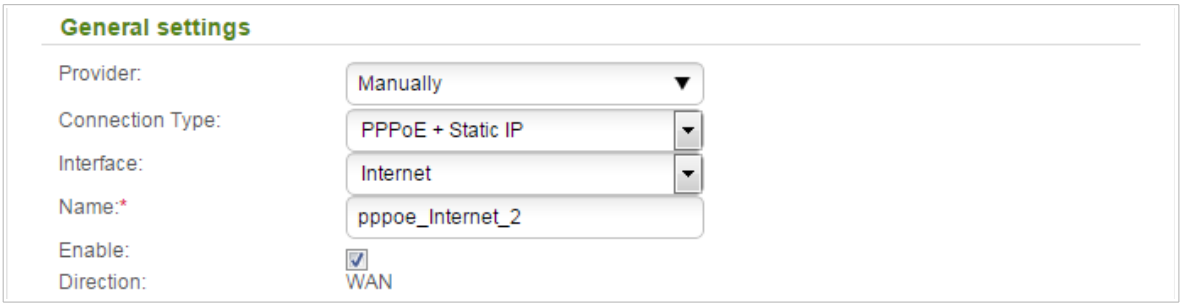


*Figure 91. The page for creating a new **PPPoE + Static IP** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	A physical or virtual interface to which the new connection will be assigned.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

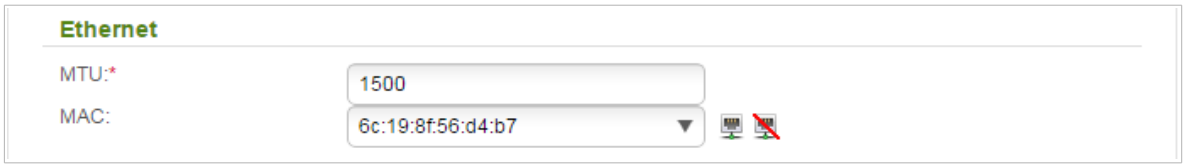


*Figure 92. The page for creating a new **PPPoE + Static IP** connection. The **Ethernet** section.*

Parameter	Description
Ethernet	
MTU	The maximum size of units transmitted by the interface.
MAC	A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement. You can click the **Clone MAC address of your computer** icon ( ) to set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface. Also you can set the address of a device connected to the router's LAN at the moment. To do this, select the relevant value from the drop-down list (the field will be filled in automatically). You can click the **Restore default MAC address** icon ( ) to set the router's MAC address.

*Figure 93. The page for creating a new **PPPoE + Static IP** connection. The **IP** section.*

Parameter	Description
IP	
*For **PPPoE + Static IP** type*	
IP Address	Enter an IP address for this WAN connection.
Netmask	Enter a subnet mask for this WAN connection.
Gateway IP address	Enter an IP address of the gateway used by this WAN connection.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
*For **PPPoE + Dynamic IP** type*	
Obtain DNS server addresses automatically	Select the checkbox to configure automatic assignment of DNS server addresses. If the checkbox is selected, the **Primary DNS server** and **Secondary DNS server** fields are not displayed.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
Vendor ID	The identifier of your ISP. *Optional*.
Hostname	A name of the router specified by your ISP. *Optional*.

*Figure 94. The page for creating a new **PPPoE + Static IP** connection. The **Authorization via 802.1x protocol** section.*

Parameter	Description
Authorization via 802.1x protocol	
Authorization in the ISP's network via 802.1x protocol	Select the checkbox to allow authorization in the ISP's network via the 802.1x protocol.
Authentication method	Select a needed authentication method from the drop-down list.
Username	Enter the username provided by your ISP.
Password	Enter the password provided by your ISP.

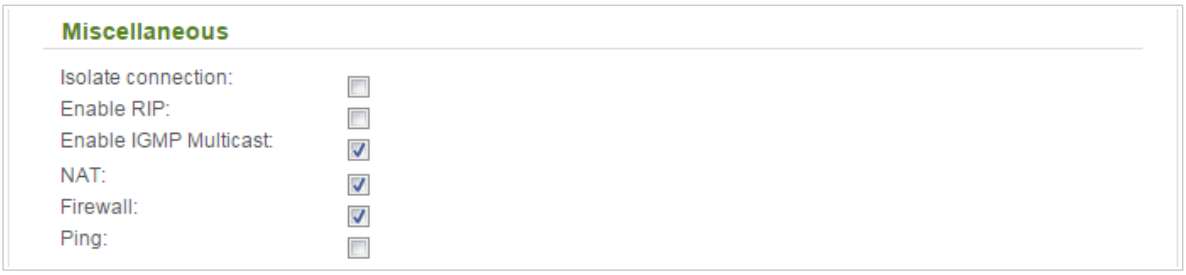


*Figure 95. The page for creating a new **PPPoE + Static IP** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous *(for **IP** section)*	
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Enable IGMP Multicast	Select the checkbox to allow multicast traffic from the external network (e.g. video streaming) to be received.
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

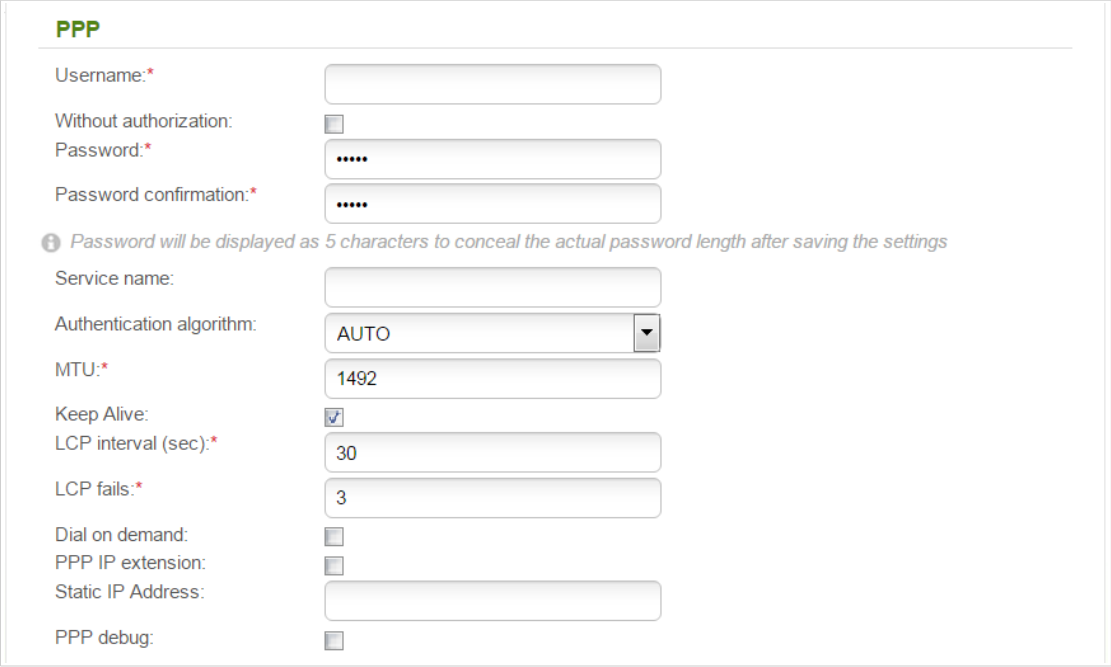


*Figure 96. The page for creating a new **PPPoE + Static IP** connection. The **PPP** section.*

Parameter	Description
PPP	
Username	A username (login) to access the Internet.
Without authorization	Select the checkbox if you don't need to enter a username and password to access the Internet.
Password	A password to access the Internet.
Password confirmation	The confirmation of the entered password (to avoid mistypes).
Service name	The name of the PPPoE authentication server.
Authentication algorithm	Select a required authentication method from the drop-down list or leave the **AUTO** value.
MTU	The maximum size of units transmitted by the interface.
Keep Alive	Select the checkbox if you want the router to keep you connected to your ISP even when the connection has been inactive for a specified period of time. When the checkbox is selected, the **LCP interval** and **LCP fails** fields are available. Specify the required values.
Dial on demand	Select the checkbox if you want the router to establish connection to the Internet on demand. In the **Maximum idle time** field, specify a period of inactivity (in seconds) after which the connection should be terminated.

Parameter	Description
PPP IP extension	This option is used by some ISPs. Contact your ISP to clarify if this checkbox needs to be enabled.
Static IP Address	Fill in the field if you want to use a static IP address to access the Internet.
PPP debug	Select the checkbox if you want to log all data on PPP connection debugging.

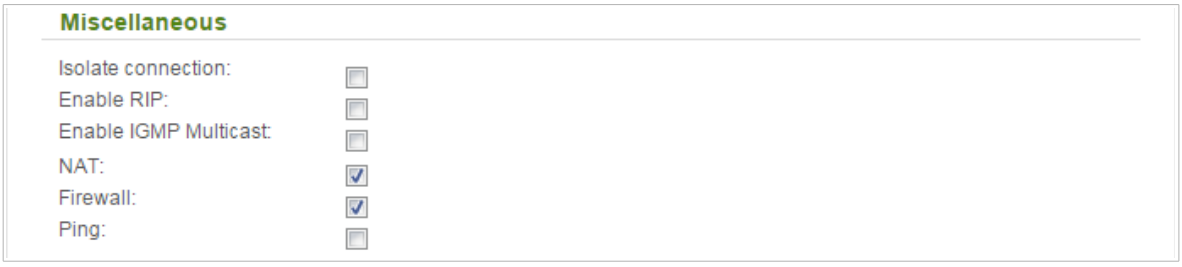


*Figure 97. The page for creating a new **PPPoE + Static IP** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous *(for **PPP** section)*	
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Enable IGMP Multicast	Select the checkbox to allow multicast traffic from the external network (e.g. video streaming) to be received.
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating PPTP/L2TP + Static IP or PPTP/L2TP + Dynamic IP WAN Connection

To create a connection of the PPTP + Static IP, L2TP + Static IP, PPTP + Dynamic IP, or L2TP + Dynamic IP type, click the **Add** button on the **Net / WAN** page. On the opened page, select the relevant value from the **Connection Type** drop-down list and specify the needed values.

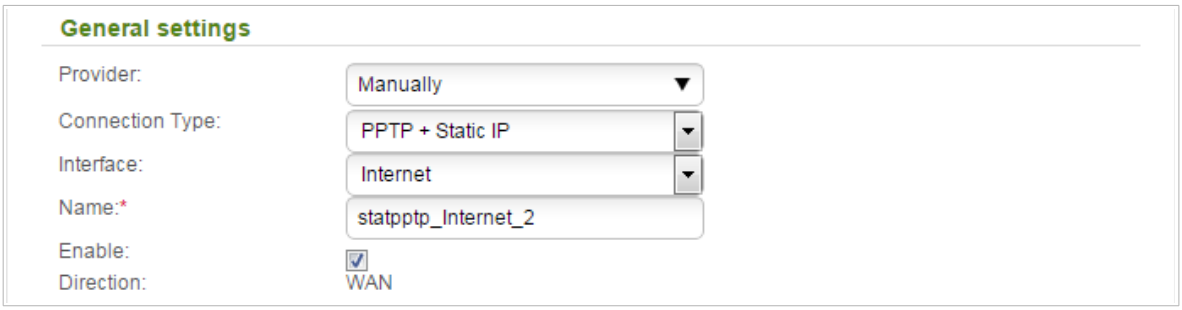


*Figure 98. The page for creating a new **PPTP + Static IP** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	A physical or virtual interface to which the new connection will be assigned.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

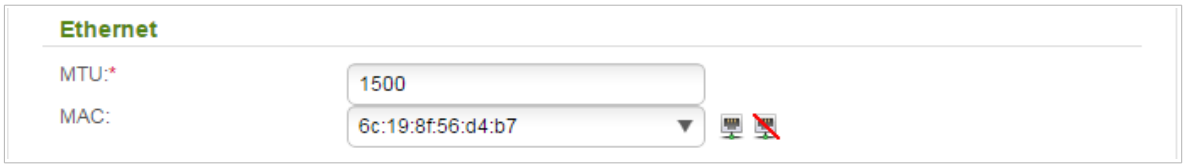


*Figure 99. The page for creating a new **PPTP + Static IP** connection. The **Ethernet** section.*

Parameter	Description
Ethernet	
MTU	The maximum size of units transmitted by the interface.
MAC	A MAC address assigned to the interface. This parameter is mandatory if your ISP uses MAC address binding. In the field, enter the MAC address registered by your ISP upon concluding the agreement. You can click the **Clone MAC address of your computer** icon ( ) to set the MAC address of the network interface card (of the computer that is being used to configure the router at the moment) as the MAC address of the WAN interface. Also you can set the address of a device connected to the router's LAN at the moment. To do this, select the relevant value from the drop-down list (the field will be filled in automatically). You can click the **Restore default MAC address** icon ( ) to set the router's MAC address.

*Figure 100. The page for creating a new **PPTP + Static IP** connection. The **IP** section.*

Parameter	Description
IP	
*For **PPTP + Static IP** and **L2TP + Static IP** types*	
IP Address	Enter an IP address for this WAN connection.
Netmask	Enter a subnet mask for this WAN connection.
Gateway IP address	Enter an IP address of the gateway used by this WAN connection.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
*For **PPTP + Dynamic IP** and **L2TP + Dynamic IP** types*	
Obtain DNS server addresses automatically	Select the checkbox to configure automatic assignment of DNS server addresses. If the checkbox is selected, the **Primary DNS server** and **Secondary DNS server** fields are not displayed.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
Vendor ID	The identifier of your ISP. *Optional*.
Hostname	A name of the router specified by your ISP. *Optional*.

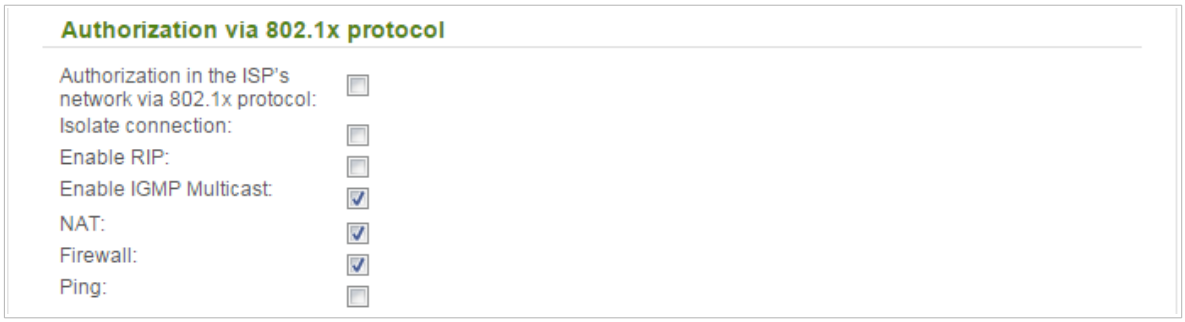


*Figure 101. The page for creating a new **PPTP + Static IP** connection. The **Authorization via 802.1x protocol** section.*

Parameter	Description
Authorization via 802.1x protocol	
Authorization in the ISP's network via 802.1x protocol	Select the checkbox to allow authorization in the ISP's network via the 802.1x protocol.
Authentication method	Select a needed authentication method from the drop-down list.
Username	Enter the username provided by your ISP.
Password	Enter the password provided by your ISP.
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
Enable IGMP Multicast	Select the checkbox to allow multicast traffic from the external network (e.g. video streaming) to be received.
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

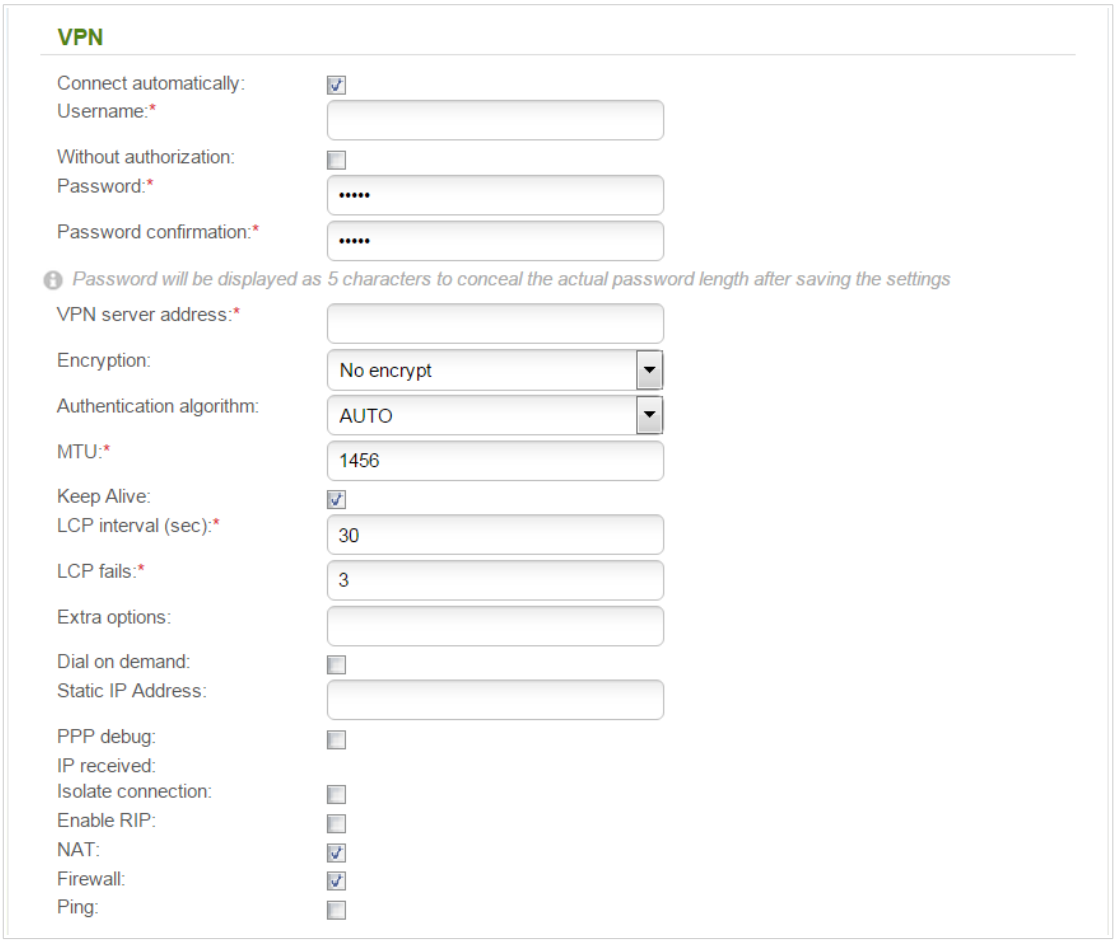


*Figure 102. The page for creating a new **PPTP + Static IP** connection. The **VPN** section.*

Parameter	Description
VPN	
Connect automatically	Select the checkbox to enable auto-start of the connection upon the boot-up of the router.
Username	A username (login) to access the Internet.
Without authorization	Select the checkbox if you don't need to enter a username and password to access the Internet.
Password	A password to access the Internet.
Password confirmation	The confirmation of the entered password (to avoid mistypes).
VPN server address	The IP or URL address of the PPTP or L2TP authentication server.

Parameter	Description
Encryption	Select a method of MPPE encryption. • **No encrypt**: MPPE encryption is not applied. • **MPPE 40/128 bit**: MPPE encryption with a 40-bit or 128-bit key is applied. • **MPPE 40 bit**: MPPE encryption with a 40-bit key is applied. • **MPPE 128 bit**: MPPE encryption with a 128-bit key is applied. MPPE encryption can be applied only if the **MS-CHAP, MS-CHAP-V2**, or **AUTO** value is selected from the **Authentication algorithm** drop-down list.
Authentication algorithm	Select a required authentication method from the drop-down list or leave the **AUTO** value.
MTU	The maximum size of units transmitted by the interface.
Keep Alive	Select the checkbox if you want the router to keep you connected to your ISP even when the connection has been inactive for a specified period of time. When the checkbox is selected, the **LCP interval** and **LCP fails** fields are available. Specify the required values.
Extra options	Advanced options of the pppd daemon which need to be specified for this connection. *Optional*.
Dial on demand	Select the checkbox if you want the router to establish connection to the Internet on demand. In the **Maximum idle time** field, specify a period of inactivity (in seconds) after which the connection should be terminated.
Static IP Address	Fill in the field if you want to use a static IP address to access the Internet.
PPP debug	Select the checkbox if you want to log all data on PPP connection debugging.
IP received	The IP address assigned by the ISP.
Isolate connection	When the checkbox is selected, the router uses an alternate routing table for this connection. Select the checkbox only when your ISP requires this.
Enable RIP	Select the checkbox to allow using RIP for this connection.
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.

Parameter	Description
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating 3G WAN Connection

If the PIN code check is enabled for the SIM card inserted into your USB modem, then prior to creating a 3G WAN connection, proceed to the **3G/LTE modem / PIN** menu and enter the PIN code on the page displayed (see the ***3G/LTE Modem*** section, page 198). Then proceed to the **Net / WAN** page, click the **Add** button, and select the **3G** value from the **Connection Type** drop-down list.

*Figure 103. The page for creating a new **3G** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	To automatically specify all settings required to connect to the Internet, select your country and operator from the drop-down list. To specify all settings independently, leave the **Manually** value.
Interface	Select the **USB** value.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

*Figure 104. The page for creating a new **3G** connection. The **USB modem** section.*

Parameter	Description
USB modem	
Mode	The value of the field specifies the type of the network to which the router connects. Leave the **auto** value to let the router connect automatically to an available type of network, or select a needed value from the drop-down list. *For GSM USB modems only*.

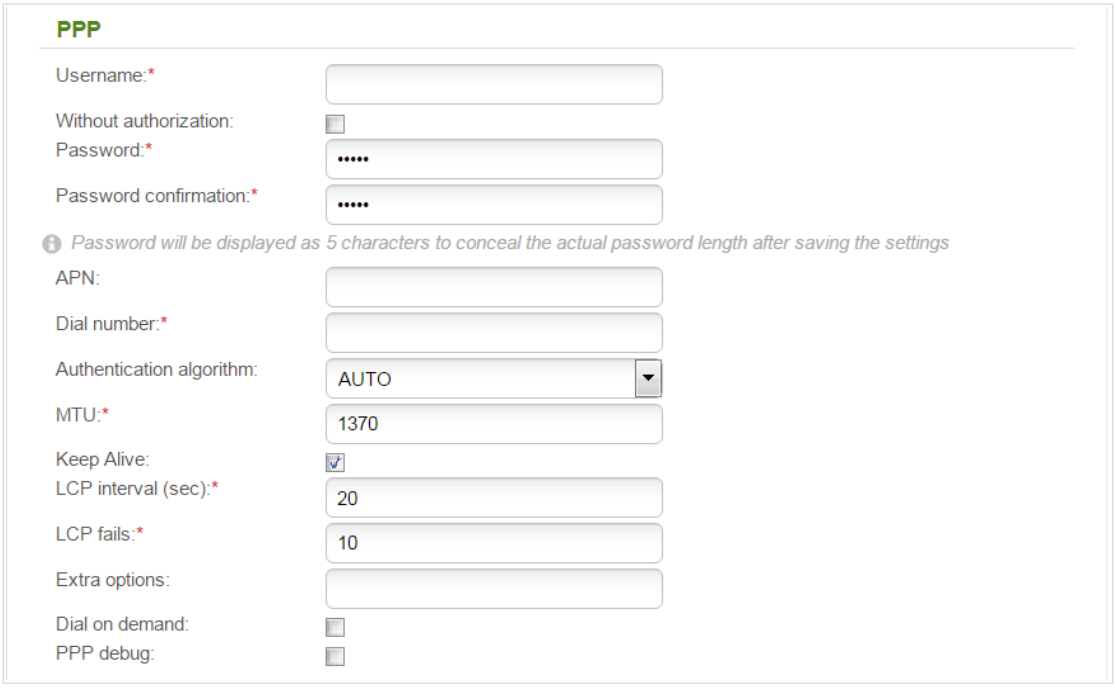


*Figure 105. The page for creating a new **3G** connection. The **PPP** section.*

Parameter	Description
PPP	
Username	A username (login) to connect to the network of the operator.
Without authorization	Select the checkbox if your operator does not require authorization.
Password	A password to connect to the network of the operator.
Password confirmation	The confirmation of the entered password (to avoid mistypes).
APN	An access point name. *For GSM USB modems only*.

Parameter	Description
Dial number	A number dialed to connect to the authorization server of the operator.
Authentication algorithm	Select a required authentication method from the drop-down list or leave the **AUTO** value.
MTU	The maximum size of units transmitted by the interface. *Optional*.
Keep Alive	Select the checkbox if you want the router to keep you connected to the network of your operator even when the connection has been inactive for a specified period of time. When the checkbox is selected, the **LCP interval** and **LCP fails** fields are available. Specify the required values.
Extra options	In the field, you can specify additional data for encryption or authentication. *Optional*.
Dial on demand	Select the checkbox if you want the router to establish connection to the Internet on demand. In the **Maximum idle time** field, specify a period of inactivity (in seconds) after which the connection should be terminated.
PPP debug	Select the checkbox if you want to log all data on PPP connection debugging.

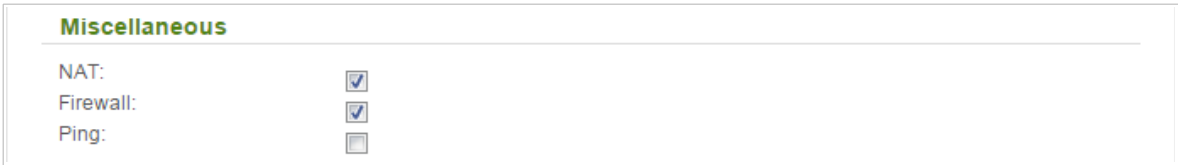


*Figure 106. The page for creating a new **3G** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous	
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

Creating LTE WAN Connection

! For the USB modem Megafon M100-1, please reboot the router after creating the WAN connection.

To create a connection of the LTE type, click the **Add** button on the **Net / WAN** page. On the opened page, select the relevant value from the **Connection Type** drop-down list and specify the needed values.

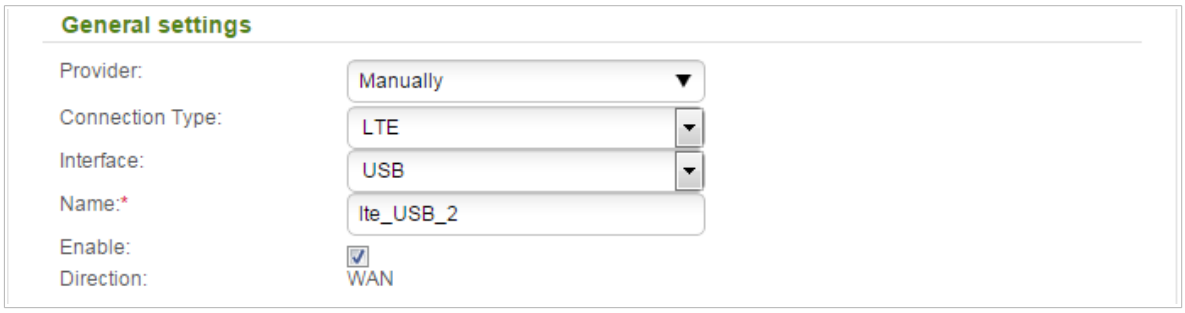


*Figure 107. The page for creating a new **LTE** connection. The **General settings** section.*

Parameter	Description
General settings	
Provider	Leave the **Manually** value.
Interface	Select the **USB** value.
Name	A name for connection for easier identification.
Enable	Select the checkbox to enable the connection.
Direction	The direction of this connection.

*Figure 108. The page for creating a new **LTE** connection. The **USB modem** section.*

Parameter	Description
USB modem	
Mode	The value of the field specifies the type of the network to which the router connects. Leave the **auto** value to let the router connect automatically to an available type of network, or select a needed value from the drop-down list.[9]
APN	An access point name.

*Figure 109. The page for creating a new **LTE** connection. The **IP** section.*

Parameter	Description
IP	
Obtain DNS server addresses automatically	Select the checkbox to configure automatic assignment of DNS server addresses. If the checkbox is selected, the **Primary DNS server** and **Secondary DNS server** fields are not displayed.
Primary DNS server/ Secondary DNS server	Enter addresses of the primary and secondary DNS servers in the relevant fields.
Vendor ID	The identifier of your ISP. *Optional*.
Hostname	A name of the router specified by your ISP. *Optional*.

9 Some LTE USB modems do not support network type selection and work in the **auto** mode regardless of the value selected from the drop-down list.

*Figure 110. The page for creating a new **LTE** connection. The **Miscellaneous** section.*

Parameter	Description
Miscellaneous	
NAT	Select the checkbox if you want one WAN IP address to be used for all computers of your LAN.
Firewall	Select the checkbox to enable protection against ARP and DDoS attacks.
Ping	Select the checkbox to allow the router to answer ping requests from the external network through this connection. For security reasons, it is recommended not to select this checkbox.

When all needed settings are configured, click the **Apply** button.

LAN

To configure the router's local interface, proceed to the **Net / LAN** page.

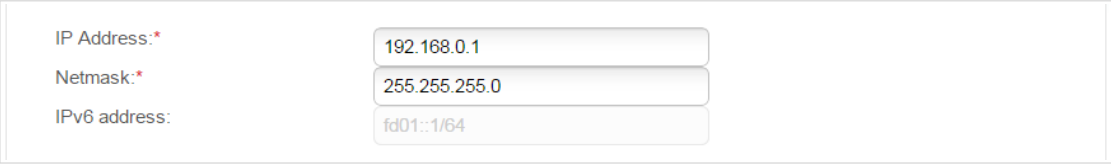


Figure 111. Basic settings of the local interface.

If needed, edit the basic settings of the local interface.

Parameter	Description
IP Address	The IP address of the router in the local subnet. By default, the following value is specified: `192.168.0.1`.
Netmask	The mask of the local subnet. By default, the following value is specified: `255.255.255.0`.
IPv6 address	The IPv6 address of the router in the local subnet. By default, the following value is specified: `fd01::1/64`. The field is available for editing, if the **DHCP PD** checkbox is not selected.

When needed settings are configured, click the **Apply** button.

In the **DHCP server** section, you can configure the built-in DHCP server of the router.

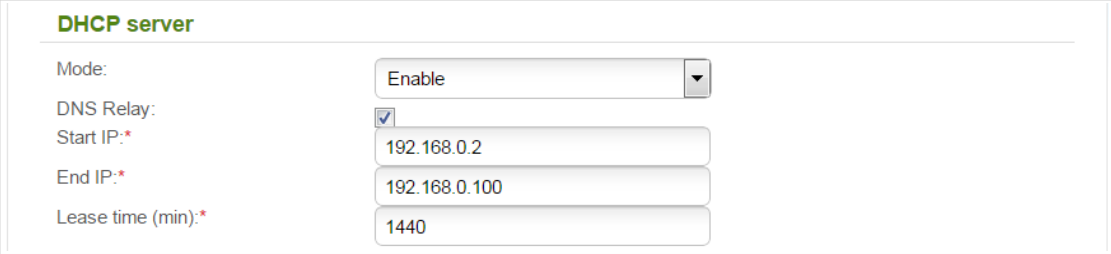


Figure 112. The section for configuring the DHCP server.

Parameter	Description
Mode	An operating mode of the router's DHCP server. **Enable**: the router assigns IP addresses to clients automatically in accordance with the specified parameters. When this value is selected, the **DNS Relay**, **Start IP**, **End IP**, and the **Lease time** fields are displayed on the page. **Disable**: the router's DHCP server is disabled, clients' IP addresses are assigned manually. **Relay**: an external DHCP server is used to assign IP addresses to clients. When this value is selected, the **External DHCP server IP** field is displayed on the page.

Parameter	Description
DNS Relay	Select the checkbox so that the devices connected to the router obtain the address of the router as the DNS server address. Deselect the checkbox so that the devices connected to the router obtain the address transmitted by the ISP as the DNS server address.
Start IP	The start IP address of the address pool used by the DHCP server to distribute IP addresses to clients.
End IP	The end IP address of the address pool used by the DHCP server to distribute IP addresses to clients.
Lease time	The lifetime of IP addresses leased by the DHCP server. At the end of this period the leased IP address is revoked and can be distributed to another device, unless the previous device has confirmed the need to keep the address.
External DHCP server IP	The IP address of the external DHCP server which assigns IP addresses to the router's clients.

When all needed settings are configured, click the **Apply** button.

In the **IPv6 address assignment** section, you can configure the built-in the DHCPv6 server of the router.

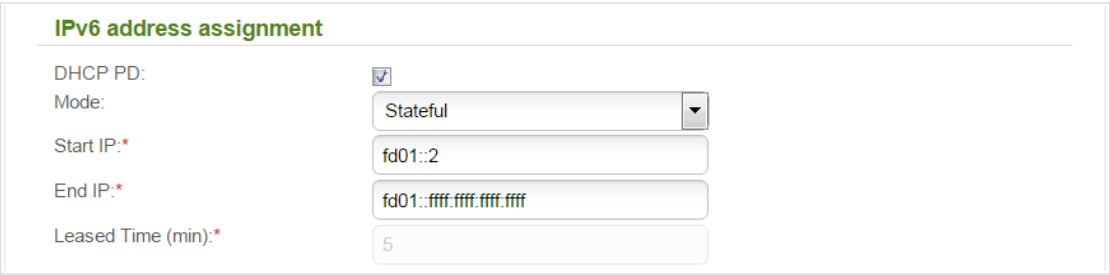


Figure 113. The section for configuring the DHCPv6 server.

Parameter	Description
DHCP PD	Select the checkbox to activate the Prefix Delegation function. When the checkbox is selected, the router requests a prefix to configure IPv6 addresses for clients of the LAN from a delegating router.
Mode	Select an operating mode of the DHCPv6 server from the drop-down list. **Stateless**: clients themselves configure IPv6 addresses using the prefix. **Stateful**: clients receive IPv6 addresses from the range specified in the **Start IP** and **End IP** fields. **Disable**: the router's DHCPv6 server is disabled, clients' IPv6 addresses are assigned manually.

Parameter	Description
Start IP	The start IPv6 address of the address pool used by the DHCPv6 server to distribute addresses to clients.
End IP	The end IPv6 address of the address pool used by the DHCPv6 server to distribute addresses to clients.
Leased Time	The lifetime of IPv6 addresses leased by the DHCPv6 server. The field is available for editing, if the **DHCP PD** checkbox is not selected.

When all needed settings are configured, click the **Apply** button.

In the **Static DHCP** section, you can specify MAC address and IP address pairs (set a fixed IPv4 address in the local area network for a device with a certain MAC address). The router assigns IP addresses in accordance with the specified pairs only when the DHCP server is enabled (in the **DHCP server** section, in the **Mode** drop-down list, the **Enable** value is selected).

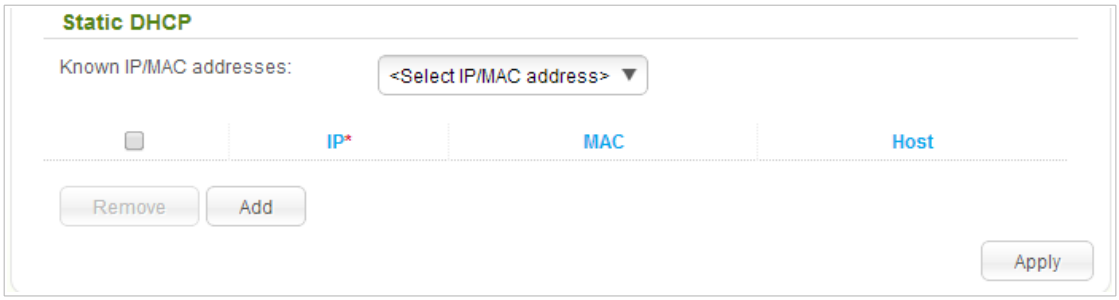


Figure 114. The section for creating MAC-IP pairs.

To create a MAC-IP pair, click the **Add** button. In the **IP** field, enter an IPv4 address which will be assigned to the device from the LAN, then in the **MAC** field, enter the MAC address of this device. In the **Host** field, specify a network name of the device for easier identification (*optional*).

Also you can create a MAC-IP pair for a device connected to the router's LAN at the moment. To do this, select the relevant value from the **Known IP/MAC addresses** drop-down list (the **IP** and **MAC** fields will be filled in automatically).

When all needed MAC-IP pairs are specified, click the **Apply** button.

Existing MAC-IP pairs are displayed in the table of the **Static DHCP** section. To remove a pair, select the checkbox in the relevant line in the table and click the **Remove** button. Then click the **Apply** button.

WAN Reservation

On the **Net / WAN reservation** page, you can enable the WAN backup function, which provides you with uninterrupted access to the Internet. When your main connection breaks down, the router activates the backup connection; and when the main channel is recovered, the router switches to it and disconnects the reserve one.

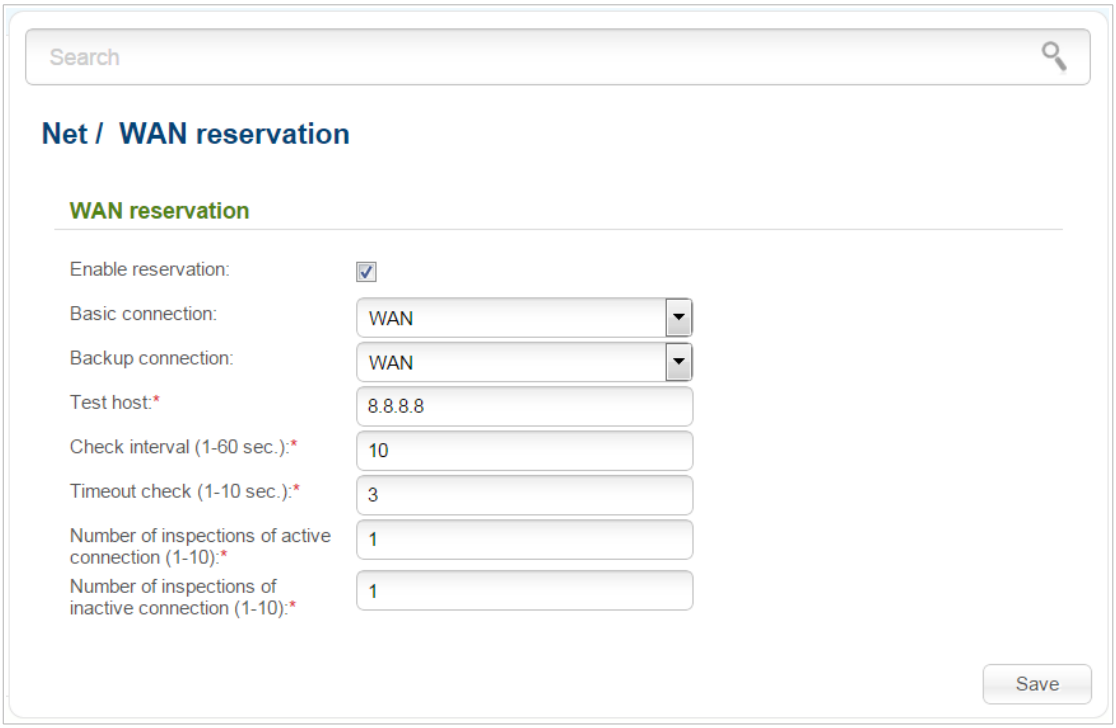


*Figure 115. The **Net / WAN reservation** page.*

To activate the backup function, on the **Net / WAN** page, create the main and the reserve WAN connections. After that proceed to the **Net / WAN reservation** page, select the **Enable reservation** checkbox, and specify the needed values in the fields displayed on the page.

Parameter	Description
Basic connection	From the drop-down list, select a WAN connection which will be used as the main one.
Backup connection	From the drop-down list, select a WAN connection which will be used as the reserve one.
Test host	An IP address that the router will check for availability via ICMP ping mechanism.
Check interval	A time period (in seconds) between attempts to check the status of the main connection. By default, the value **10** is specified.
Timeout check	A time period (in seconds) for an attempt to check the status of the main connection. At the end of this period the router's internal system makes a decision to enable/disable the reserve channel. By default, the value **3** is specified.

Parameter	Description
Number of inspections of active connection	A number of requests that will be sent in order to analyze the status of the main connection when the connection is active (the router uses the main connection as a default gateway).
Number of inspections of inactive connection	A number of requests that will be sent in order to analyze the status of the main connection when the connection is inactive (the router uses the reserve connection as a default gateway).

When all needed settings are configured, click the **Save** button.

Wi-Fi

In this menu you can specify all needed settings for your wireless network.

Basic Settings

On pages of the **Wi-Fi / Basic settings** section, you can enable your wireless local area network (WLAN) and configure its basic parameters. To configure the 2.4GHz band or 5GHz band, proceed to the relevant page.

2.4GHz Band

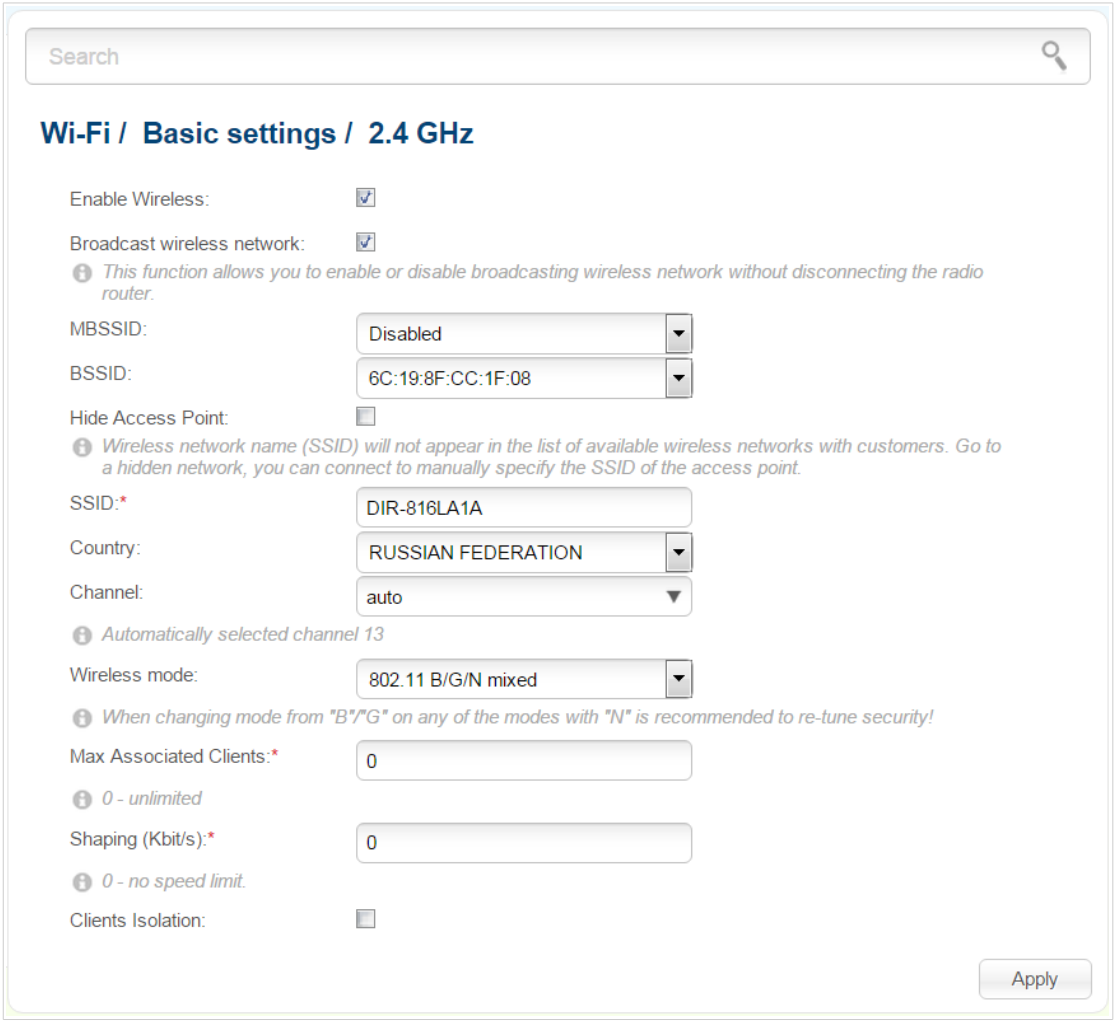


Figure 116. Basic settings of the wireless LAN in the 2.4GHz band.

Parameter	Description
Enable Wireless	The checkbox enables Wi-Fi connections in the 2.4GHz band. If you want to disable your WLAN in this band, deselect the checkbox.
Broadcast wireless network	If the checkbox is not selected, devices cannot connect to the router's WLAN in the 2.4GHz band (or to the selected part of the WLAN if the network is splitted into parts). Upon that the router can connect to another access point as a wireless client.
MBSSID	To split the network into several parts in the 2.4GHz band, select a relevant value (**2**, **3**, or **4**) from the drop-down list. By default, the wireless network is not splitted (the **Disabled** value is selected from the list). For every part of the WLAN you can specify a name (SSID), security settings, and rules for MAC filtering. To specify these values, select the needed part from the **BSSID** drop-down list and click the **Apply** button. Then proceed to the relevant page of the **Wi-Fi** menu section.
BSSID	The unique identifier for your Wi-Fi network (for the 2.4GHz and 5GHz band). You cannot change the value of this parameter, it is determined in the device's internal settings. If you have splitted your WLAN into parts, the drop-down list contains several values. Each identifier corresponds to a single part of the WLAN.
Hide Access Point	If the checkbox is selected, other users cannot see your Wi-Fi network. (It is recommended not to select this checkbox in order to simplify initial configuration of your WLAN.)
SSID	A name for the WLAN. By default, the value **DIR-816LA1A** is specified. If your network is splitted into parts, each part has the default name (**DIR-816LA1A.2**, **DIR-816LA1A.3**, and **DIR-816LA1A.4**). It is recommended to specify another name for the network upon initial configuration (use digits and Latin characters).
Country	The country you are in. Select a value from the drop-down list.
Channel	The wireless channel number. When the **auto** value is selected, the router itself chooses the channel with the least interference.
Wireless mode	Operating mode of the wireless network of the router. This parameter defines standards of the devices that will be able to use this band of your wireless network. Select a value from the drop-down list.

Parameter	Description
Max Associated Clients	The maximum number of devices connected to the wireless network of the router (or to the selected part of the WLAN if the network is splitted into parts). When the value **0** is specified, the device does not limit the number of connected clients.
Shaping	The maximum bandwidth (Kbit/s) of your WLAN (or the selected part of the WLAN if the network is splitted into parts). Specify the needed value or leave the value specified by default (**0**) not to limit bandwidth of your WLAN.
Clients Isolation	Select the checkbox to forbid wireless clients of your WLAN (or the selected part of the WLAN if the network is splitted into parts) to communicate to each other.

When you have configured the parameters, click the **Apply** button.

5GHz Band

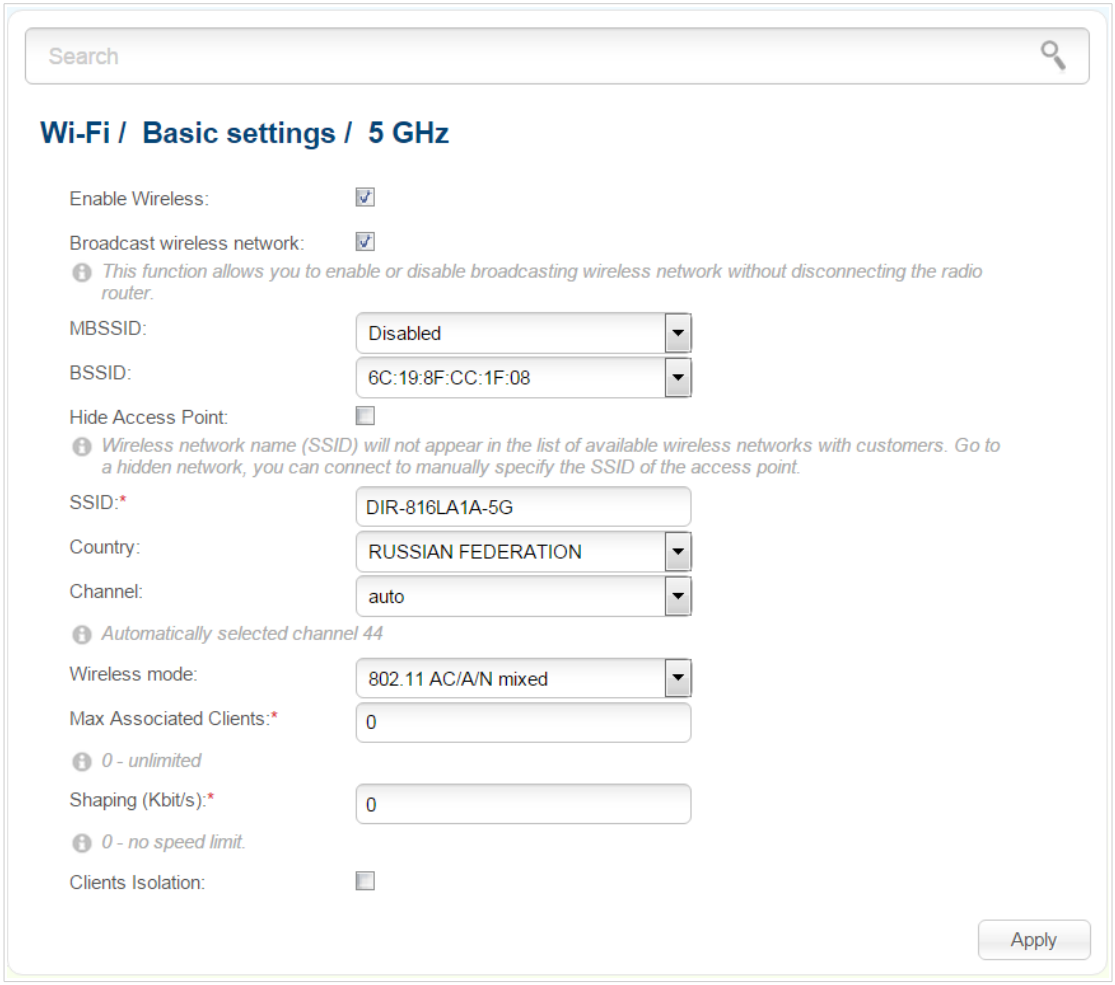


Figure 117. Basic settings of the wireless LAN in the 5GHz band.

Parameter	Description
Enable Wireless	The checkbox enables Wi-Fi connections in the 5GHz band. If you want to disable your WLAN in this band, deselect the checkbox.
Broadcast wireless network	If the checkbox is not selected, devices cannot connect to the router's WLAN in the 5GHz band (or to the selected part of the WLAN if the network is splitted into parts). Upon that the router can connect to another access point as a wireless client.

Parameter	Description
MBSSID	To split the network into several parts in the 5GHz band, select a relevant value (**2**, **3**, or **4**) from the drop-down list. By default, the wireless network is not splitted (the **Disabled** value is selected from the list). For every part of the WLAN you can specify a name (SSID), security settings, and rules for MAC filtering. To specify these values, select the needed part from the **BSSID** drop-down list and click the **Apply** button. Then proceed to the relevant page of the **Wi-Fi** menu section.
BSSID	The unique identifier for your Wi-Fi network (for the 2.4GHz and 5GHz band). You cannot change the value of this parameter, it is determined in the device's internal settings. If you have splitted your WLAN into parts, the drop-down list contains several values. Each identifier corresponds to a single part of the WLAN.
Hide Access Point	If the checkbox is selected, other users cannot see your Wi-Fi network. (It is recommended not to select this checkbox in order to simplify initial configuration of your WLAN.)
SSID	A name for the WLAN. By default, the value **DIR-816L-5G** is specified. If your network is splitted into parts, each part has the default name (**DIR-816LA1A-5G.2**, **DIR-816LA1A-5G.3**, and **DIR-816LA1A-5G.4**). It is recommended to specify another name for the network upon initial configuration (use digits and Latin characters).
Country	The country you are in. Select a value from the drop-down list.
Channel	The wireless channel number. When the **auto** value is selected, the router itself chooses the channel with the least interference.
Wireless mode	Operating mode of the wireless network of the router. This parameter defines standards of the devices that will be able to use this band of your wireless network. Select a value from the drop-down list.
Max Associated Clients	The maximum number of devices connected to the wireless network of the router (or to the selected part of the WLAN if the network is splitted into parts). When the value **0** is specified, the device does not limit the number of connected clients.

Parameter	Description
Shaping	The maximum bandwidth (Kbit/s) of your WLAN (or the selected part of the WLAN if the network is splitted into parts). Specify the needed value or leave the value specified by default (**0**) not to limit bandwidth of your WLAN.
Clients Isolation	Select the checkbox to forbid wireless clients of your WLAN (or the selected part of the WLAN if the network is splitted into parts) to communicate to each other.

When you have configured the parameters, click the **Apply** button.

Security Settings

On pages of the **Wi-Fi / Security settings** section, you can modify security settings of the WLAN. To configure the 2.4GHz band or 5GHz band, proceed to the relevant page.

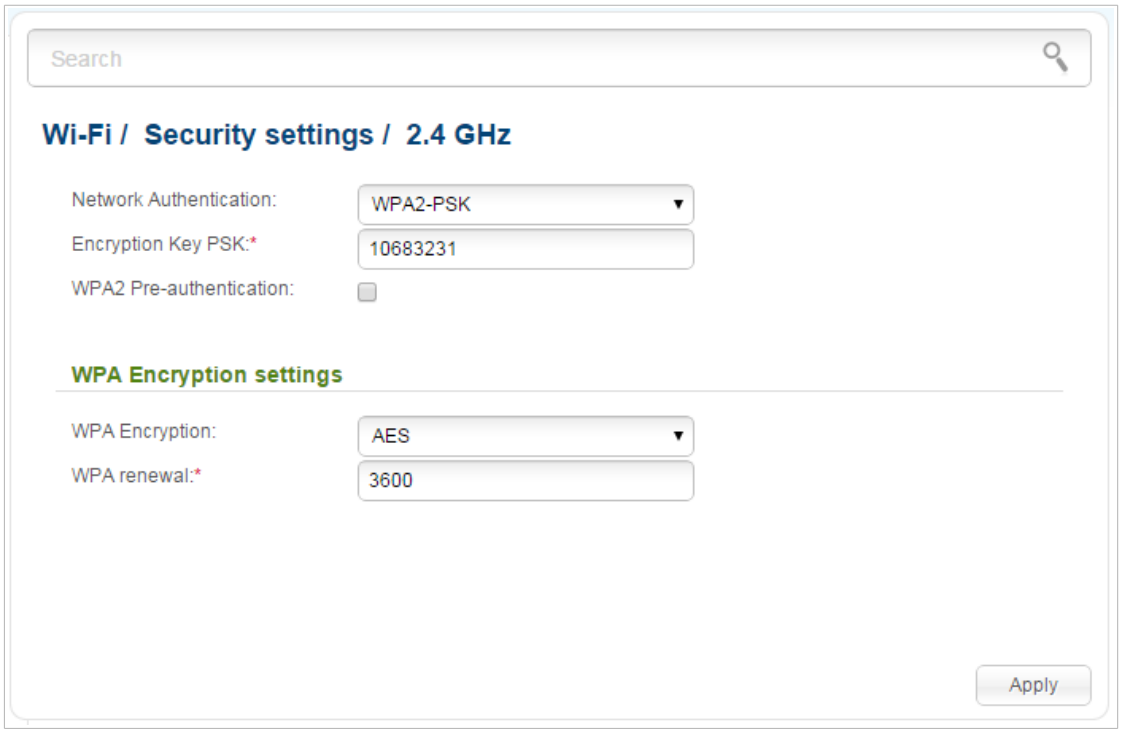


Figure 118. The default security settings.

By default, the **WPA2-PSK** network authentication type is specified for both bands of the WLAN. WPS PIN from the barcode label is used as the network key.

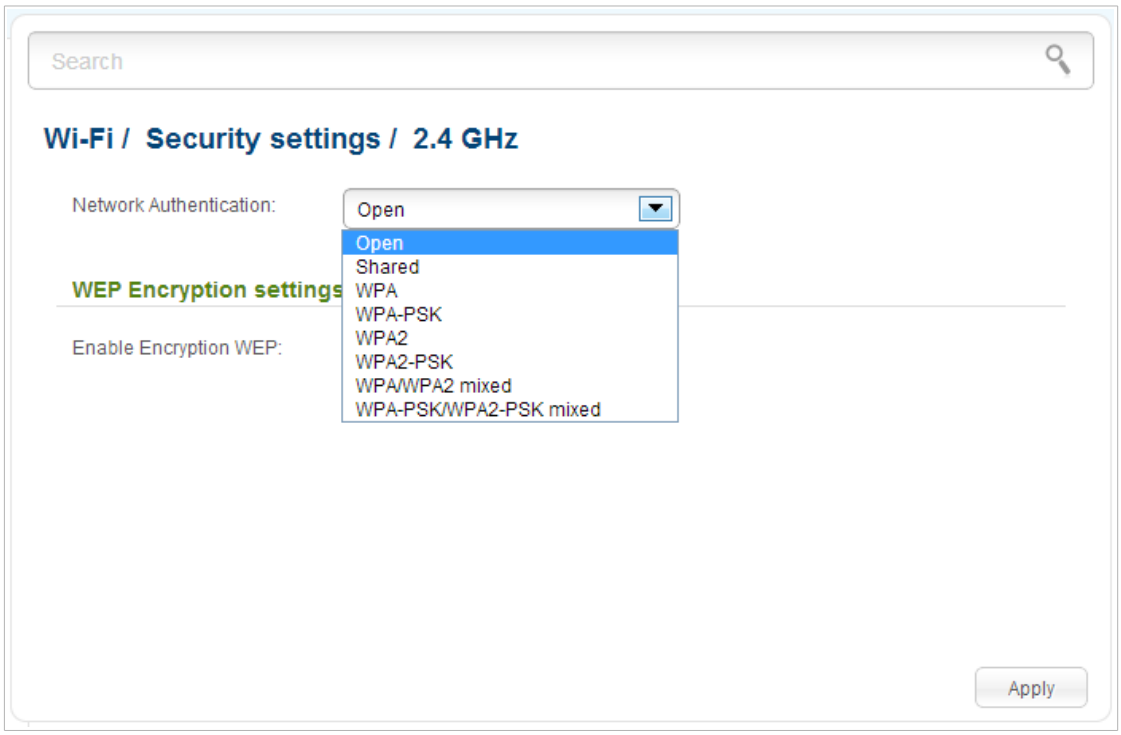


Figure 119. Network authentication types supported by the router.

The router supports the following authentication types:

Authentication type	Description
Open	Open authentication (with WEP encryption for wireless network modes not supporting 802.11n devices).
Shared	Shared key authentication with WEP encryption. This authentication type is not available when on the **Wi-Fi / Basic settings** page of the relevant band, in the **Wireless mode** drop-down list, a mode supporting 802.11n devices is selected.
WPA	WPA-based authentication using a RADIUS server.
WPA-PSK	WPA-based authentication using a PSK.
WPA2	WPA2-based authentication using a RADIUS server.
WPA2-PSK	WPA2-based authentication using a PSK.
WPA/WPA2 mixed	A mixed type of authentication. When this value is selected, devices using the **WPA** authentication type and devices using the **WPA2** authentication type can connect to the WLAN of the router.
WPA-PSK/WPA2-PSK mixed	A mixed type of authentication. When this value is selected, devices using the **WPA-PSK** authentication type and devices using the **WPA2-PSK** authentication type can connect to the WLAN of the router.

The **WPA**, **WPA2**, and **WPA/WPA2 mixed** authentication types require a RADIUS server.

When the **Open** or **Shared** value is selected, the **WEP Encryption settings** section is displayed (the section is unavailable for the wireless network operating modes which support the standard 802.11n):

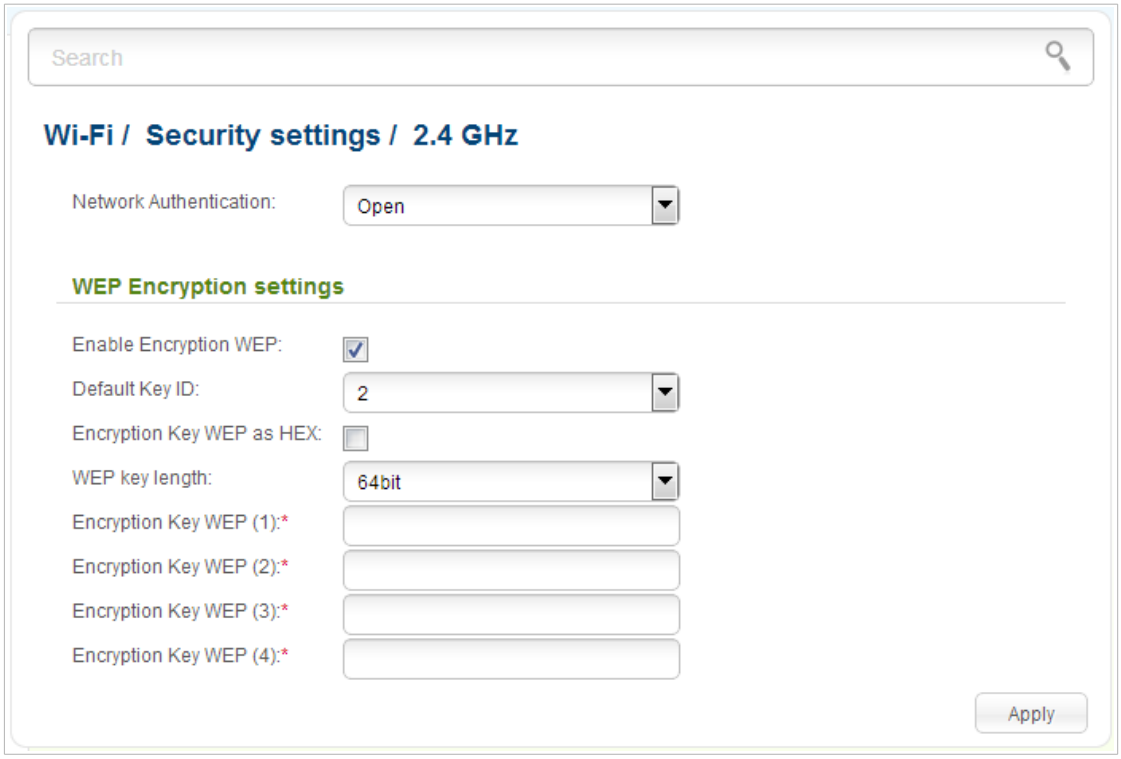


*Figure 120. The **Open** value is selected from the **Network Authentication** drop-down list.*

Parameter	Description
Enable Encryption WEP	The checkbox activating WEP encryption. When the checkbox is selected, the **Default Key ID** field, the **Encryption Key WEP as HEX** checkbox, the **WEP key length** drop-down list, and four **Encryption Key WEP** fields are displayed on the page. For the **Shared** authentication type the checkbox is always selected.
Default Key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption Key WEP as HEX	Select the checkbox to set a hexadecimal number as a key for encryption.
WEP key length	The length of WEP encryption key. Select the value **64bit** to specify keys containing 5 ASCII symbols or 10 HEX symbols. Select the value **128bit** to specify keys containing 13 ASCII symbols or 26 HEX symbols.
Encryption Key WEP (1-4)	Keys for WEP encryption. The router uses the key selected from the **Default Key ID** drop-down list. It is required to specify all the fields.

When the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** value is selected, the **WPA Encryption settings** section is displayed:

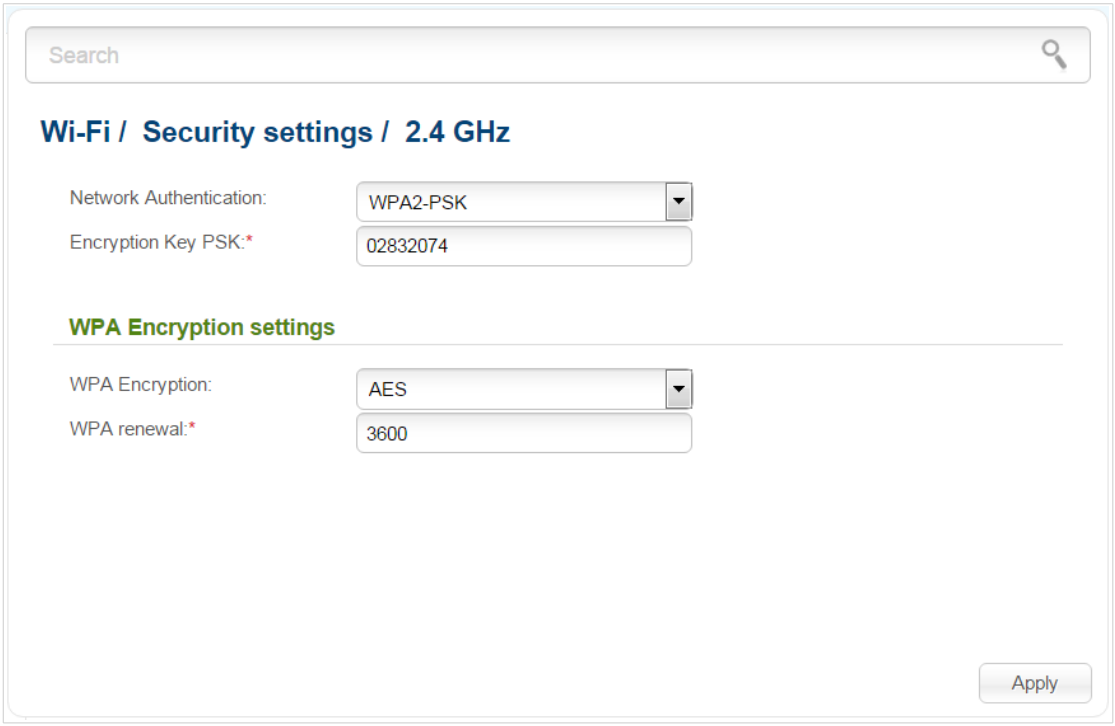


*Figure 121. The **WPA2-PSK** value is selected from the **Network Authentication** drop-down list.*

Parameter	Description
Encryption Key PSK	A key for WPA encryption. The key can contain digits and/or Latin characters.
WPA Encryption	An encryption method: **TKIP**, **AES**, or **TKIP+AES**.
WPA renewal	The time period (in seconds), at the end of which a new key for WPA encryption is generated. When the value **0** is specified for this field, the key is not renewed.

When the **WPA**, **WPA2**, or **WPA/WPA2 mixed** value is selected, the **RADIUS settings** and **WPA Encryption settings** sections are available:

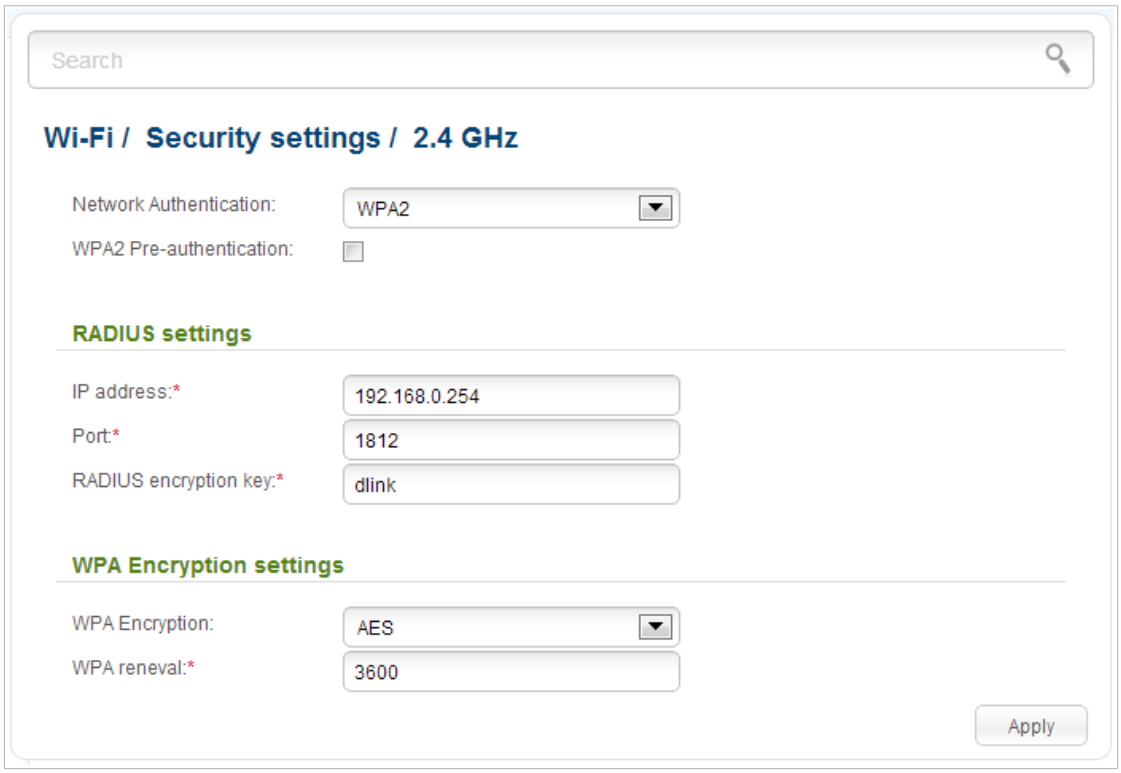


*Figure 122. The **WPA2** value is selected from the **Network Authentication** drop-down list.*

Parameter	Description
WPA2 Pre-authentication	The checkbox activating preliminary authentication (displayed only for the **WPA2** and **WPA/WPA2 mixed** authentication types).
IP address	The IP address of the RADIUS server.
Port	A port of the RADIUS server.
RADIUS encryption key	The password which the router uses for communication with the RADIUS server (the value of this parameter is specified in the RADIUS server settings).
WPA Encryption	An encryption method: **TKIP**, **AES**, or **TKIP+AES**.
WPA renewal	The time period (in seconds), at the end of which a new key for WPA encryption is generated. When the value `0` is specified for this field, the key is not renewed.

When you have configured the parameters, click the **Apply** button.

MAC Filter

On pages of the **Wi-Fi / MAC Filter** section, you can define a set of MAC addresses of devices which will be allowed to access the WLAN, or define MAC addresses of devices which will not be allowed to access the WLAN. Settings specified on this page are applied to both bands of the WLAN.

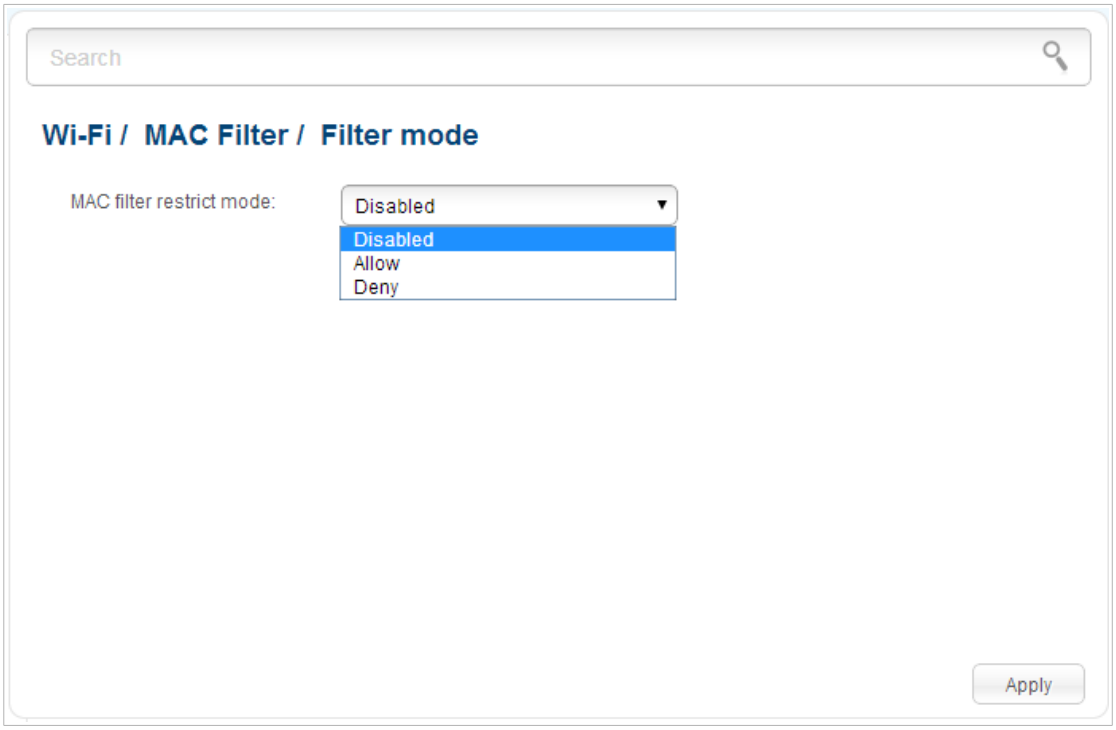


Figure 123. The page for configuring the MAC filter for the wireless network.

By default, MAC filtering is not active (the **Disabled** value is selected from the **MAC filter restrict mode** drop-down list on the **Wi-Fi / MAC Filter / Filter mode** page).

To open your wireless network for the devices which MAC addresses are specified on the **Wi-Fi / MAC Filter / MAC addresses** page and to close the wireless network for all other devices, select the **Allow** value from the **MAC filter restrict mode** drop-down list and click the **Apply** button.

To close your wireless network for the devices which MAC addresses are specified on the **Wi-Fi / MAC Filter / MAC addresses** page, select the **Deny** value from the **MAC filter restrict mode** drop-down list and click the **Apply** button.

To add a MAC address to which the selected filtering mode will be applied, proceed to the **Wi-Fi / MAC Filter / MAC addresses** page.

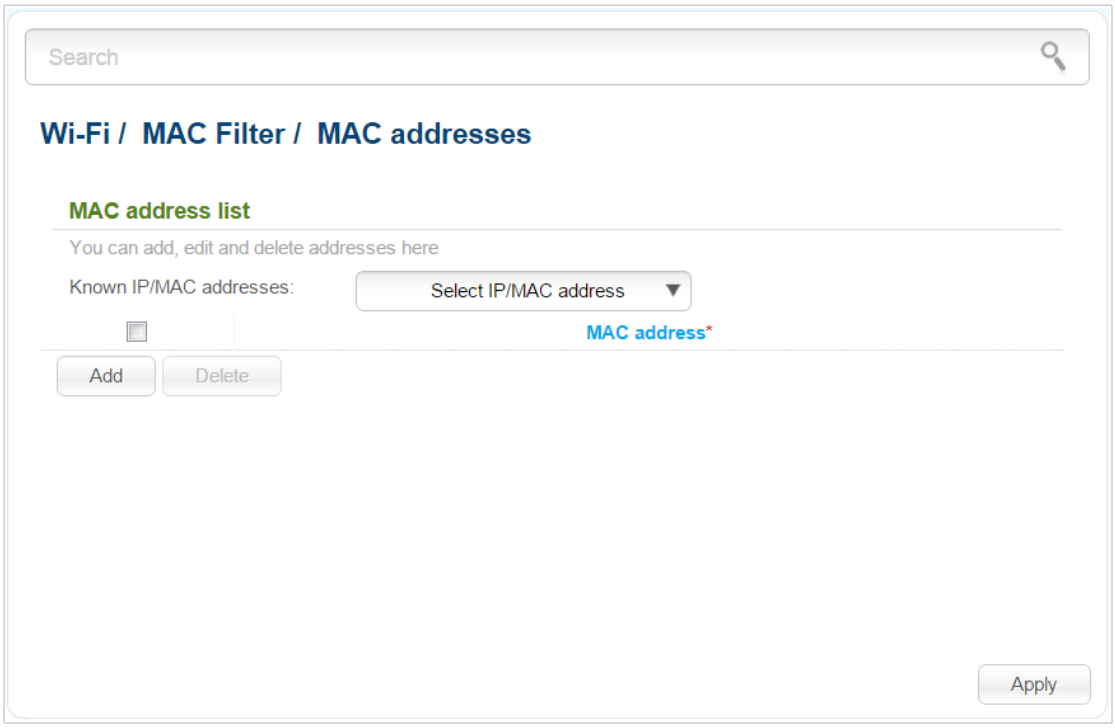


Figure 124. The page for adding a MAC address.

Click the **Add** button and enter an address in the field displayed. Also you can enter the MAC address of a device connected to the router's LAN at the moment. To do this, select the relevant device from the **Known IP/MAC addresses** drop-down list (the field will be filled in automatically). Then click the **Apply** button.

To remove a MAC address from the list of MAC addresses, select the checkbox located to the left of the relevant MAC address and click the **Delete** button. Then click the **Apply** button.

List of Wi-Fi Clients

On the **Wi-Fi / List of Wi-Fi clients** page, you can view the list of wireless clients connected to the router.

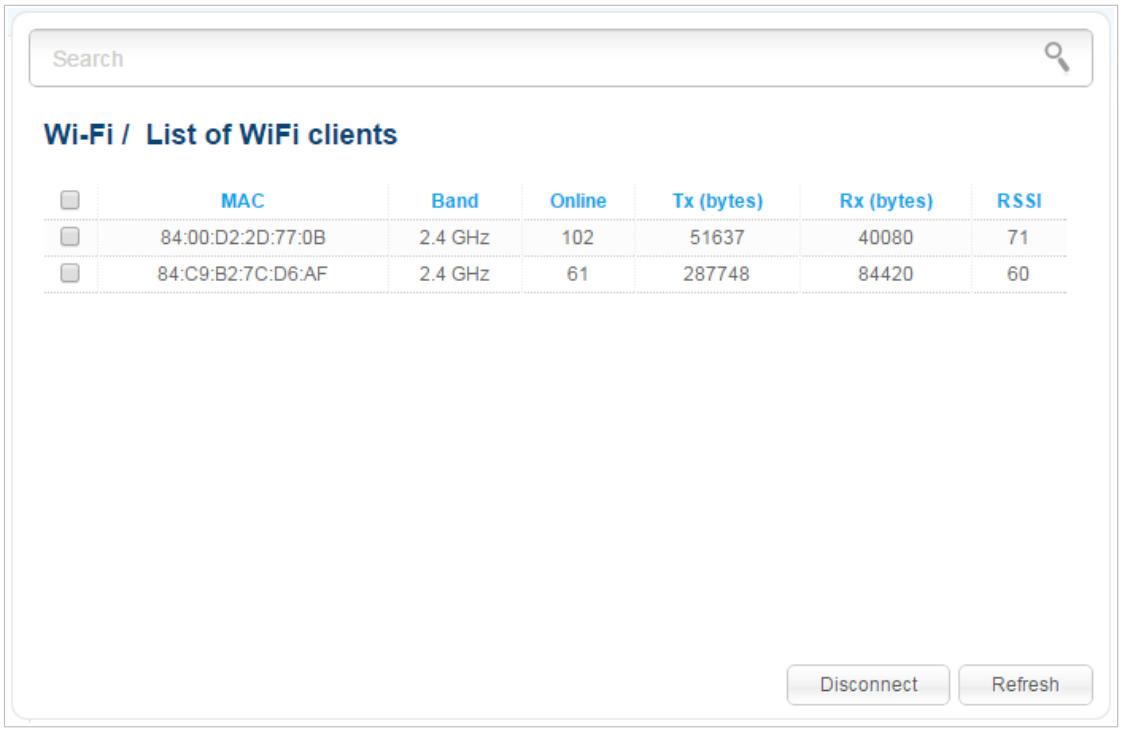


Figure 125. The list of the wireless clients.

If you want to disconnect a wireless device from your WLAN, select the checkbox in the line containing the relevant MAC address, and click the **Disconnect** button.

To view the latest data on the devices connected to the WLAN, click the **Refresh** button.

WPS

On pages of the **Wi-Fi / WPS** section, you can enable the function for secure configuration of the WLAN and select a method used to easily add wireless devices to the WLAN.

The WPS function helps to configure the protected wireless network automatically. Devices connecting to the wireless network via the WPS function must support the WPS function.

! If the router's WLAN is splitted into parts (the value **2**, **3**, or **4** is selected from the **MBSSID** drop-down list on the **Wi-Fi / Basic settings** page), the WPS function can be used only for the first part of the WLAN (the first value from the **BSSID** drop-down list).

! Before using the function you need to configure one of the following authentication types: **Open** with no encryption, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** with the **AES** encryption method (on the relevant band page of the **Wi-Fi / Security settings** section). When other security settings are specified for the band of the WLAN, controls of the **Wi-Fi / WPS** page of the relevant band are not available.

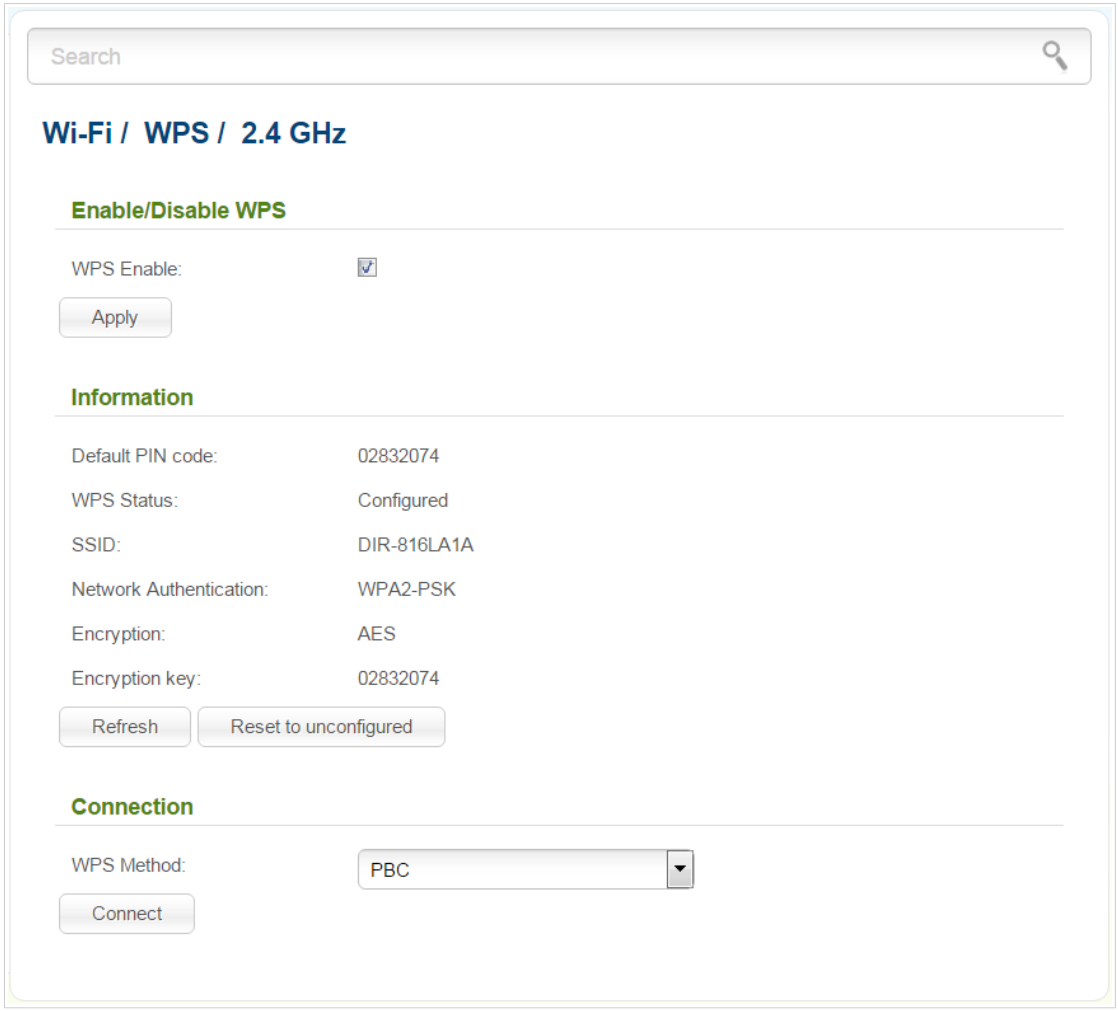


Figure 126. The page for configuring the WPS function.

To activate the WPS function, select the **WPS Enable** checkbox on the **Wi-Fi / WPS/ 2.4 GHz** or **Wi-Fi / WPS / 5 GHz** page and click the **Apply** button. When the checkbox is selected, the **Information** and **Connection** sections are available on the page.

Parameter	Description
Default PIN code	The PIN code of the router. This parameter is used when connecting the router to a registrar to set the parameters of the WPS function.
WPS Status	The state of the WPS function: • **Configured** (all needed settings are specified; these settings will be used upon establishing the wireless connection) • **Unconfigured** (after activating the WPS function, the SSID and the encryption key will be configured automatically, the network authentication type will be changed to WPA2-PSK).
SSID	The name of the router's WLAN (or the first part of the WLAN if the network is splitted into parts).
Network Authentication	The network authentication type specified for the WLAN (or first part of the WLAN).
Encryption	The encryption type specified for the WLAN (or first part of the WLAN).
Encryption key	The encryption key specified for the WLAN (or first part of the WLAN).
Refresh	Click the button to refresh the data on the page.
Reset to unconfigured	Click the button to reset the parameters of the WPS function.
WPS Method	A method of the WPS function. Select a value from the drop-down list. **PIN**: Connecting the device via the PIN code. **PBC**: Connecting the device via the push button (actual or virtual).
PIN Code	The PIN code of the WPS-enabled device that needs to be connected to the wireless network of the router. The field is displayed only when the **PIN** value is selected from the **WPS Method** drop-down list.
Connect	Click the button to connect the wireless device to the router's WLAN via the WPS function.

Using WPS Function via Web-based Interface

To add a wireless device via the PIN method of the WPS function, follow the next steps:

1. Select the **WPS Enable** checkbox.
2. Click the **Apply** button.
3. Select the **PIN** value from the **WPS Method** drop-down list.
4. Select the PIN method in the software of the wireless device that you want to connect to the router's WLAN.
5. Click the relevant button in the software of the wireless device that you want to connect to the WLAN.
6. Right after that, enter the PIN code specified on the cover of the wireless device or in its software in the **PIN Code** field.
7. Click the **Connect** button in the web-based interface of the router.

To add a wireless device via the PBC method of the WPS function, follow the next steps:

1. Select the **WPS Enable** checkbox.
2. Click the **Apply** button.
3. Select the **PBC** value from the **WPS Method** drop-down list.
4. Select the PBC method in the software of the wireless device that you want to connect to the router's WLAN.
5. Click the relevant button in the software or press the WPS button on the cover of the wireless device that you want to connect to the WLAN.
6. Click the **Connect** button in the web-based interface of the router.

Using WPS Function without Web-based Interface

You can add a wireless device to the router's WLAN without accessing the web-based interface of the router. To do this, you need to configure the following router's settings:

1. Specify corresponding security settings for the wireless network of the router.
2. Select the **WPS Enable** checkbox.
3. Click the **Apply** button.
4. Save the settings and close the web-based interface (click the icon  (**Save**) in the menu displayed when the mouse pointer is over the **System** caption in the top left part of the page, then click the icon  (**Logout**)).

Later you will be able to add wireless devices to the WLAN by pressing the **WPS** button of the router.

1. Select the PBC method in the software of the wireless device that you want to connect to the router's WLAN.
2. Click the relevant button in the software or press the WPS button on the cover of the wireless device that you want to connect to the WLAN.
3. Press the **WPS** button of the router, hold it for 2 seconds, and release. The **WLAN / WPS** LED will start blinking.

Additional Settings

On pages of the **Wi-Fi / Additional settings** section, you can define additional parameters for the WLAN of the router. To configure the 2.4GHz band or 5GHz band, proceed to the relevant page.

Changing parameters presented on this page may negatively affect your WLAN!

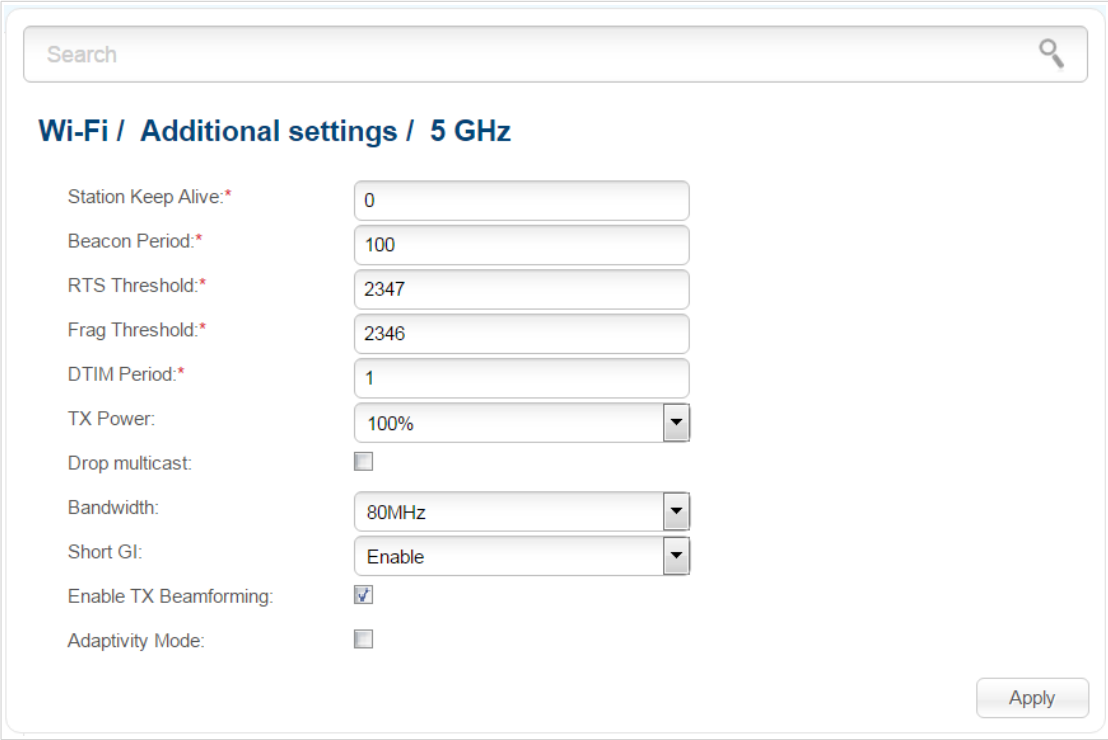


Figure 127. Additional settings of the WLAN.

The following fields are available on the page:

Parameter	Description
Station Keep Alive	The time interval (in seconds) between keep alive checks of wireless devices from your WLAN. When the value **0** is specified, the checking is disabled.
Beacon Period	The time interval (in milliseconds) between packets sent to synchronize the wireless network.
RTS Threshold	The minimum size (in bites) of a packet for which an RTS frame is transmitted.
Frag Threshold	The maximum size (in bites) of a non-fragmented packet. Larger packets are fragmented (divided).
DTIM Period	The time period (in seconds) between sending a DTIM (a message notifying on broadcast or multicast transmission) and data transmission.

Parameter	Description
TX Power	The transmit power (in percentage terms) of the router.
Drop multicast	Select the checkbox to disable multicasting for the router's WLAN. Deselect the checkbox to enable multicasting from WAN connections for which the **Enable IGMP Multicast** checkbox is selected.
Bandwidth	The channel bandwidth for 802.11n devices in 2.4GHz band (the **Wi-Fi / Additional settings / 2.4GHz** page). **20MHz**: 802.11n devices operate at 20MHz channels. **40MHz**: 802.11n devices operate at 40MHz channels. **20/40MHz -**: 802.11n devices operate at 20MHz and 40MHz channels (the channel is combined with the previous adjacent channel). **20/40MHz +**: 802.11n devices operate at 20MHz and 40MHz channels (the channel is combined with the next adjacent channel). The channel bandwidth for 802.11n devices in 5GHz band (the **Wi-Fi / Additional settings / 5GHz** page). **20MHz**: 802.11n devices operate at 20MHz channels. **40MHz**: 802.11n devices operate at 40MHz channels.
Short GI	Guard interval (in nanoseconds). This parameter defines the interval between symbols transmitted when the router is communicating to wireless devices. **Enable**: the router uses the 400 ns short guard interval. For the wireless network operating modes which support 802.11n standard only (see the value of the **Wireless mode** drop-down list on the **Wi-Fi / Basic settings** page). **Disable**: the router uses the 800 ns standard guard interval.
Enable TX Beamforming	Select the checkbox to let the router use the TX Beamforming technology. Such a settings allows the router to redistribute the signal strength on the basis of location of the wireless network clients.
Adaptivity Mode	Select the checkbox to prevent your wireless network from interfering with radars and other mobile or stationary radio systems. Such a setting can slow down the router's WLAN.

When you have configured the parameters, click the **Apply** button.

WMM

On the **Wi-Fi / WMM** page, you can enable the Wi-Fi Multimedia function.

The WMM function implements the QoS features for Wi-Fi networks. It helps to improve the quality of data transfer over Wi-Fi networks by prioritizing different types of traffic.

To enable the function, select the **WMM** checkbox and click the **Apply** button.

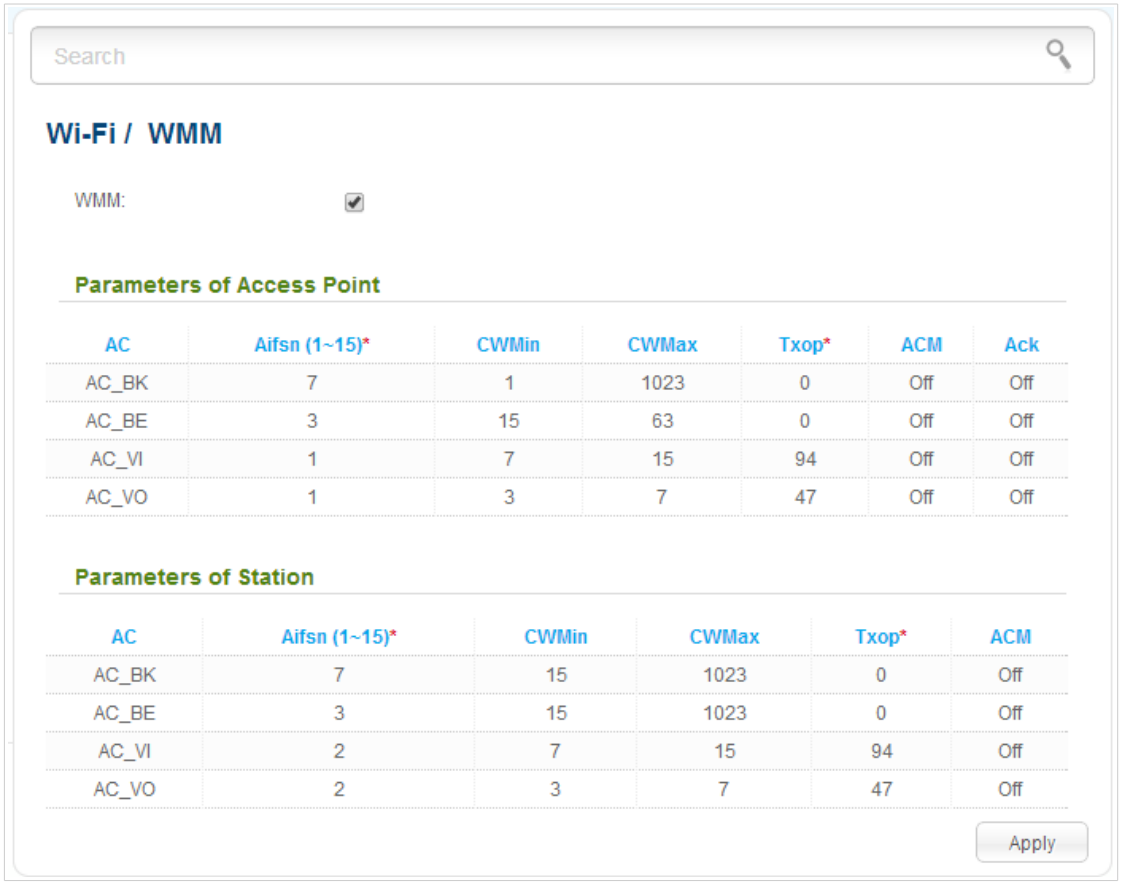


Figure 128. The page for configuring the WMM function.

All needed settings for the WMM function are specified in the device's system. It is recommended not to change the default values.

The WMM function allows assigning priorities for four Access Categories (AC):

- **AC_BK** (*Background*), low priority traffic (print jobs, file downloads, etc.).
- **AC_BE** (*Best Effort*), traffic from legacy devices or devices/applications that do not support QoS.
- **AC_VI** (*Video*).
- **AC_VO** (*Voice*).

Parameters of the Access Categories are defined for both the router itself (in the **Parameters of Access Point** section) and wireless devices connected to it (in the **Parameters of Station** section).

For every Access Category the following fields are available:

Parameter	Description
Aifsn	*Arbitrary Inter-Frame Space Number*. This parameter influences time delays for the relevant Access Category. The lower the value, the higher is the Access Category priority.
CWMin/CWMax	*Contention Window Minimum/Contention Window Maximum*. Both fields influence time delays for the relevant Access Category. The **CWMax** field value should not be lower, than the **CWMin** field value. The lower the difference between the **CWMax** field value and the **CWMin** field value, the higher is the Access Category priority.
Txop	*Transmission Opportunity*. The higher the value, the higher is the Access Category priority.
ACM	*Admission Control Mandatory*. If on, prevents from using the relevant Access Category.
Ack	*Acknowledgment*. Answering response requests while transmitting. Displayed only in the **Parameters of Access Point** section. If off, the router answers requests. If on, the router does not answer requests.

When you have configured the parameters, click the **Apply** button.

Client

On the **Wi-Fi / Client** page in the router mode, you can configure the device as a client to connect to a WISP access point.

The “client” function in the router mode allows using DIR-816L as a WISP repeater.

To use the router as a WISP repeater, you need to configure the same channel of the wireless connection for DIR-816L and the WISP access point. Other parameters of the wireless network of DIR-816L do not depend upon the settings of the WISP access point.

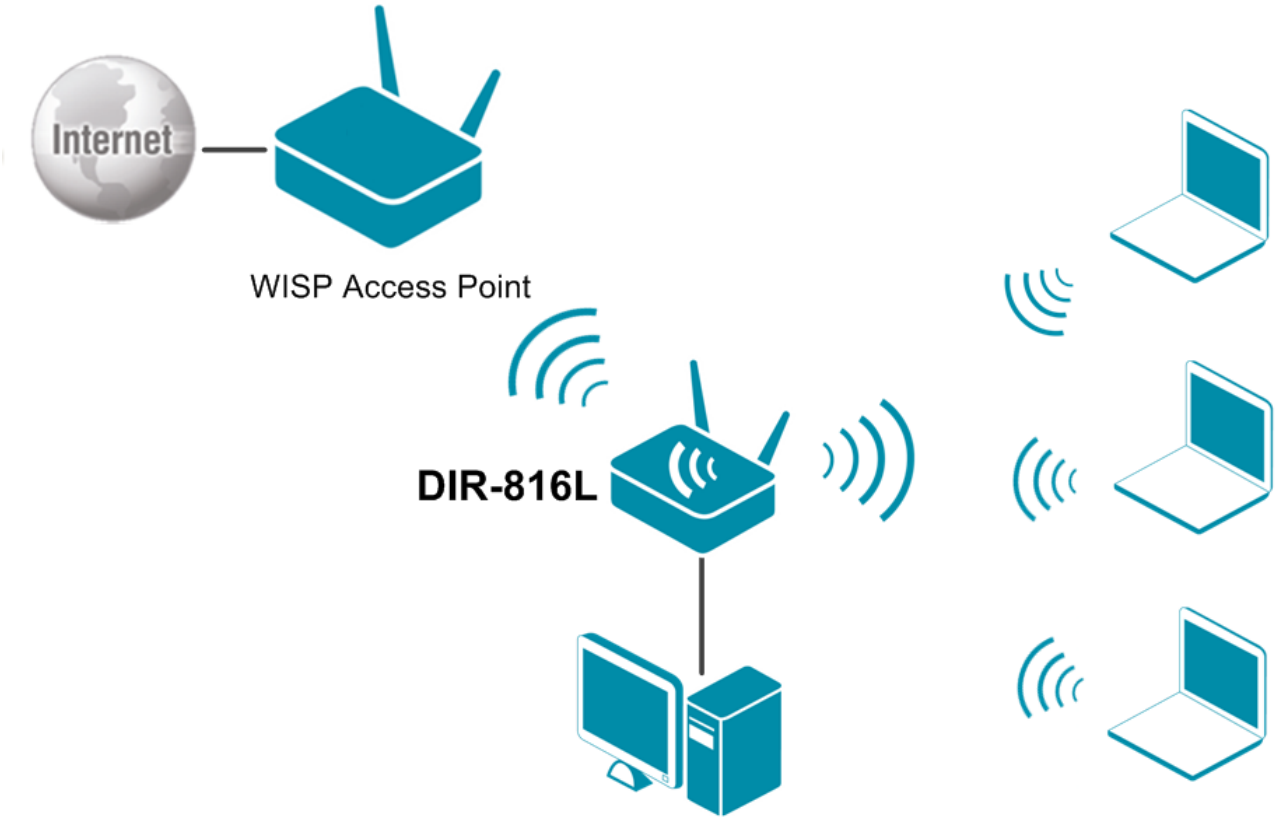


Figure 129. Connecting DIR-816L in the router mode as a client.

After configuring the device as a client, you need to create a WAN connection with relevant parameters for the **WiFiClient** interface.

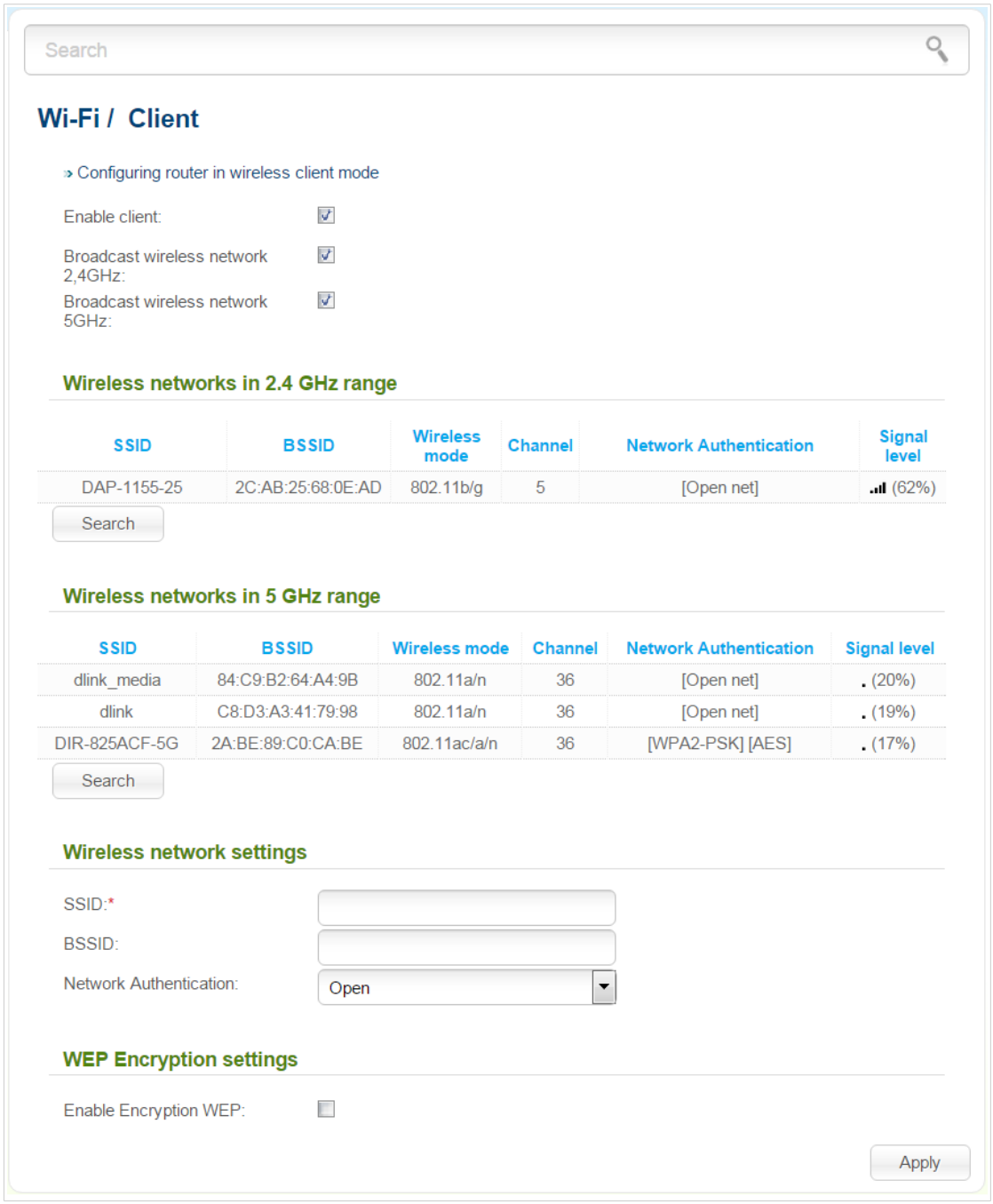


Figure 130. The page for configuring the client mode.

To configure the router as a client, select the **Enable client** checkbox. When the checkbox is selected, the following fields are displayed on the page:

Parameter	Description
Broadcast wireless network 2.4GHz / Broadcast wireless network 5GHz	If the checkbox is not selected, devices cannot connect to the relevant band of the router's WLAN. Upon that the router can connect to another access point as a wireless client.
Wireless network settings	

Parameter	Description
SSID	The name of the network to which the router connects.
BSSID	The unique identifier of the network to which the router connects.
Network Authentication	The authentication type of the network to which the router connects.

When the **Open** or **Shared** authentication type is selected, the following fields are available:

Parameter	Description
Enable Encryption WEP	The checkbox activating WEP encryption. When the checkbox is selected, the **Default Key ID** field, the **Encryption Key WEP as HEX** checkbox, the **WEP key length** drop-down list, and four **Encryption Key WEP** fields are displayed on the page. For the **Shared** authentication type the checkbox is always selected.
Default Key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption Key WEP as HEX	Select the checkbox to set a hexadecimal number as a key for encryption.
WEP key length	The length of WEP encryption key. Select the value **64bit** to specify keys containing 5 ASCII symbols or 10 HEX symbols. Select the value **128bit** to specify keys containing 13 ASCII symbols or 26 HEX symbols.
Encryption Key WEP (1-4)	Keys for WEP encryption. The router uses the key selected from the **Default Key ID** drop-down list. It is required to specify all the fields.

When the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** authentication type is selected, the following fields are available:

Parameter	Description
Encryption Key PSK	A key for WPA encryption. The key can contain digits and/or Latin characters.
WPA Encryption	An encryption method: **TKIP**, **AES**, or **TKIP+AES**.

When you have configured the parameters, click the **Apply** button.

In addition, when the **Enable client** checkbox is selected, the list of available wireless networks is displayed on the page.

To view the latest data on the available 2.4GHz band wireless networks, click the **Search** button in the **Wireless networks in 2.4 GHz range** section.

To view the latest data on the available 5GHz band wireless networks, click the **Search** button in the **Wireless networks in 5 GHz range** section.

To connect to a wireless network from the list, select the needed network. Upon that the relevant values are automatically inserted in the **SSID**, **BSSID**, and **Network Authentication** fields.

For the **Open** authentication type with no encryption, click the **Apply** button.

For the **Open** authentication type with encryption and the **Shared** authentication type, select a needed value from the **Default Key ID** drop-down list. If needed, select the **Encryption Key WEP as HEX** checkbox to set a hexadecimal number as a key for encryption. Then select a needed value in the **WEP key length** drop-down list, fill in 4 **Encryption Key WEP** fields, and click the **Apply** button.

For the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** authentication types, fill in the **Encryption Key PSK** field and click the **Apply** button.

After clicking the **Apply** button, the wireless channel of DIR-816L will switch to the channel of the wireless access point to which you have connected.

If the router is connected to the selected network successfully, the green indicator appears to the right of the network's SSID in the table.

The step-by-step description of how to configure the router as a wireless client is available on D-Link website. To access it, click the **Configuring router in wireless client mode** link in the top part of the page.

Advanced

In this menu you can configure advanced settings of the router:

- create groups of ports for VLANs
- enable the UPnP IGD protocol
- manually configure speed and duplex mode for each Ethernet port
- configure notifications on the reason of the Internet connection failure
- configure a DDNS service
- define static routes
- create rules for remote access to the web-based interface
- allow the router to use IGMP, RTSP, enable the SIP ALG, PPPoE pass through, PPTP pass through, and L2TP pass through functions
- configure TR-069 client
- enable the flow control function
- configure VPN tunnels based on IPsec protocol.

VLAN

On the **Advanced / VLAN** page, you can create and edit groups of ports for virtual networks (VLANs).

By default, 2 groups are created in the router's system:

- **lan**: it includes ports 1-4. You cannot delete this group.
- **wan**: for the WAN interface; it includes the **INTERNET** port. You can edit or delete this group.

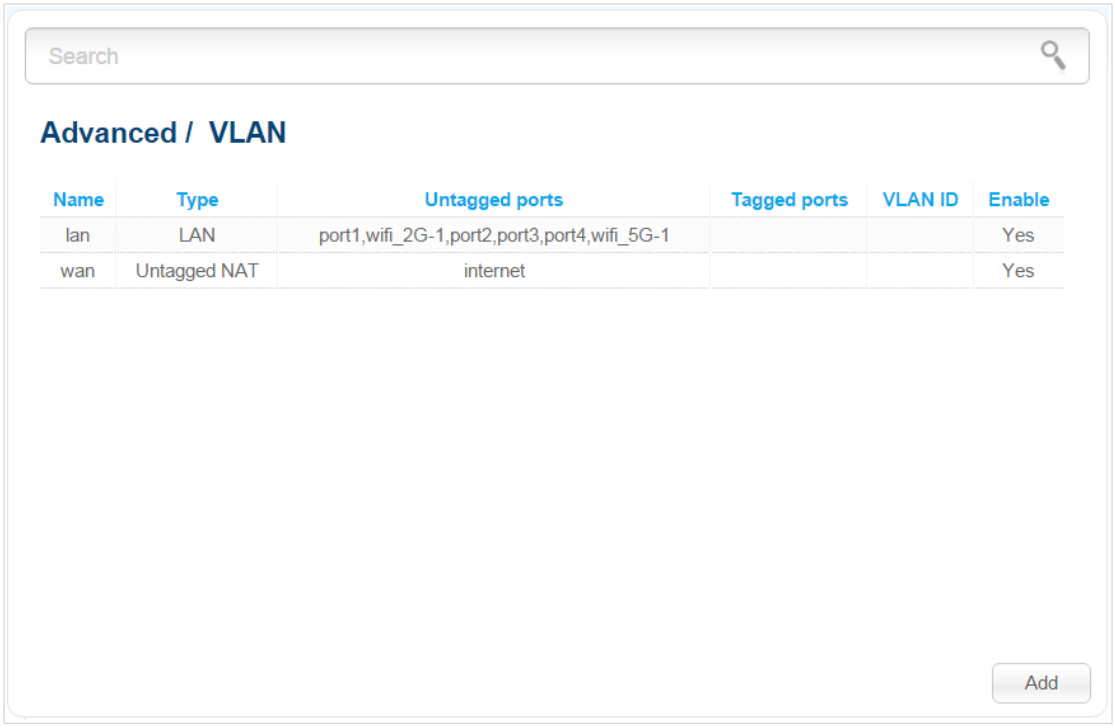


*Figure 131. The **Advanced / VLAN** page.*

If you want to create a group including LAN ports of the router, first delete relevant records from the **lan** group on this page. To do this, select the **lan** group, deselect the needed checkbox located to the left of the relevant port, and click the **Apply** button.

To create a new group for VLAN, click the **Add** button.

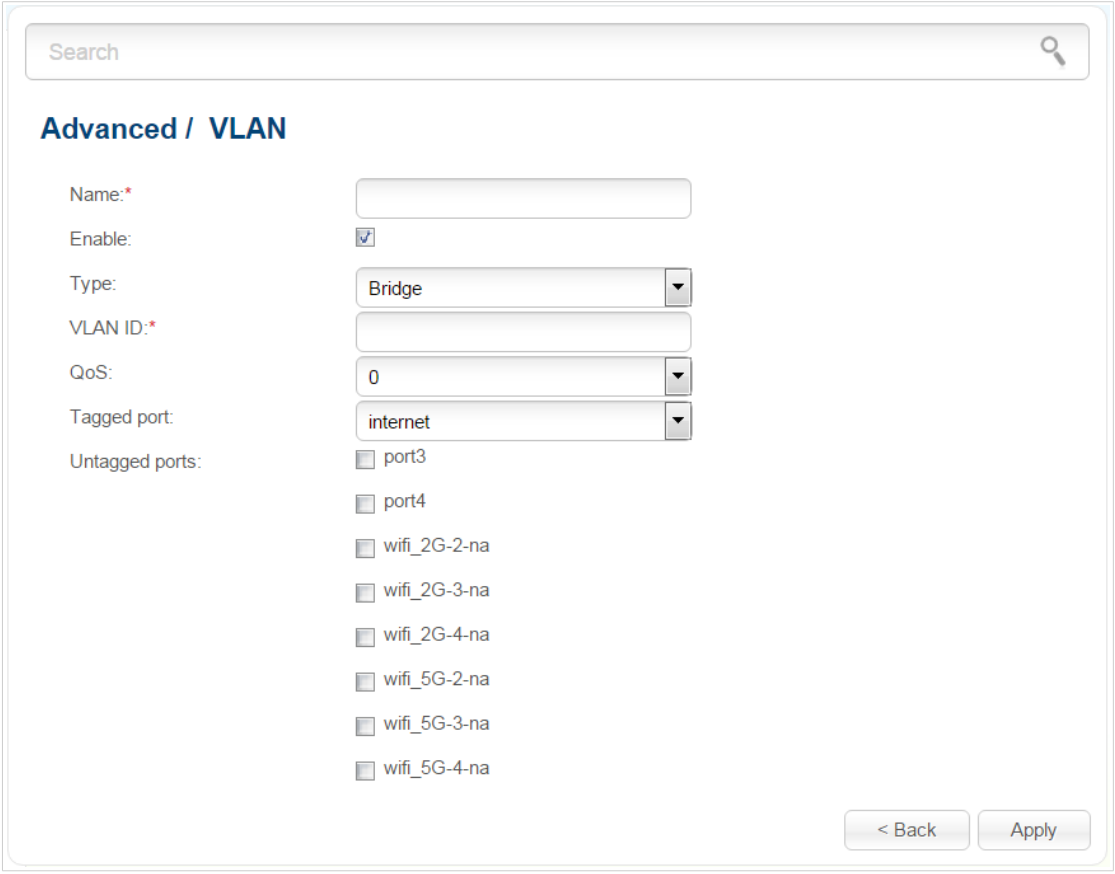


Figure 132. The page for adding a group of ports for VLAN.

You can specify the following parameters:

Parameter	Description
Name	A name for the port for easier identification.
Enable	Select the checkbox to allow using this group of ports.
Type	The type of the VLAN. **Untagged NAT**. The group of this type is an external connection with address translation. It is mostly used to transmit untagged traffic. When this value is selected, the **VLAN ID** field and the **QOS**, **Tagged port** drop-down lists are not displayed. **Tagged NAT**. The group of this type is an external connection with address translation. It is mostly used to connect to the Internet. Later the VLAN which identifier is specified in the **VLAN ID** field is used to create a WAN connection (on the **Net / WAN** page). When this value is selected, the **Untagged ports** section is not displayed. **Bridge**. The group of this type is a transparent connection between an internal port and an external connection. It is mostly used to connect IPTV set-top boxes.

Parameter	Description
VLAN ID	An identifier of the VLAN to which this group of ports will be assigned.
QoS	A priority tag for the type of traffic transmitted.
Tagged port	From the list, select an available value to assign it to this group.
Untagged ports	The section includes the ports (a physical port of the router, the wireless interface, or, if the wireless network is splitted into parts, a part of the wireless network) that can be added to the group. To add a port to the group, select the needed checkbox located to the left of the relevant port. To remove a port from the group, deselect the needed checkbox located to the left of the relevant port.

Click the **Apply** button.

To edit or remove an existing group, select the relevant group on the **Advanced / VLAN** page. On the page displayed, change the parameters and click the **Apply** button, or click the **Delete** button.

UPnP IGD

On the **Advanced / UPnP IGD** page, you can enable the UPnP IGD protocol. The router uses the UPnP IGD protocol for automatic configuration of its parameters for network applications requiring an incoming connection to the router.

*Figure 133. The **Advanced / UPnP IGD** page.*

If you want to manually specify all parameters needed for network applications, deselect the **Enabled** checkbox and click the **Apply** button.

If you want to enable the UPnP IGD protocol in the router, select the **Enabled** checkbox and click the **Apply** button.

When the protocol is enabled, the router's parameters configured automatically are displayed on the page:

Parameter	Description
Protocol	A protocol for network packet transmission.
IP	The IP address of a client from the local area network.
Private port	A port of a client's IP address to which traffic is directed from a public port of the router.
Public port	A public port of the router from which traffic is directed to a client's IP address.
Comments	Information transmitted by a client's network application.

Speed and Duplex

On the **Advanced / Speed and duplex** page, you can manually configure speed and duplex mode for each Ethernet port of the router.

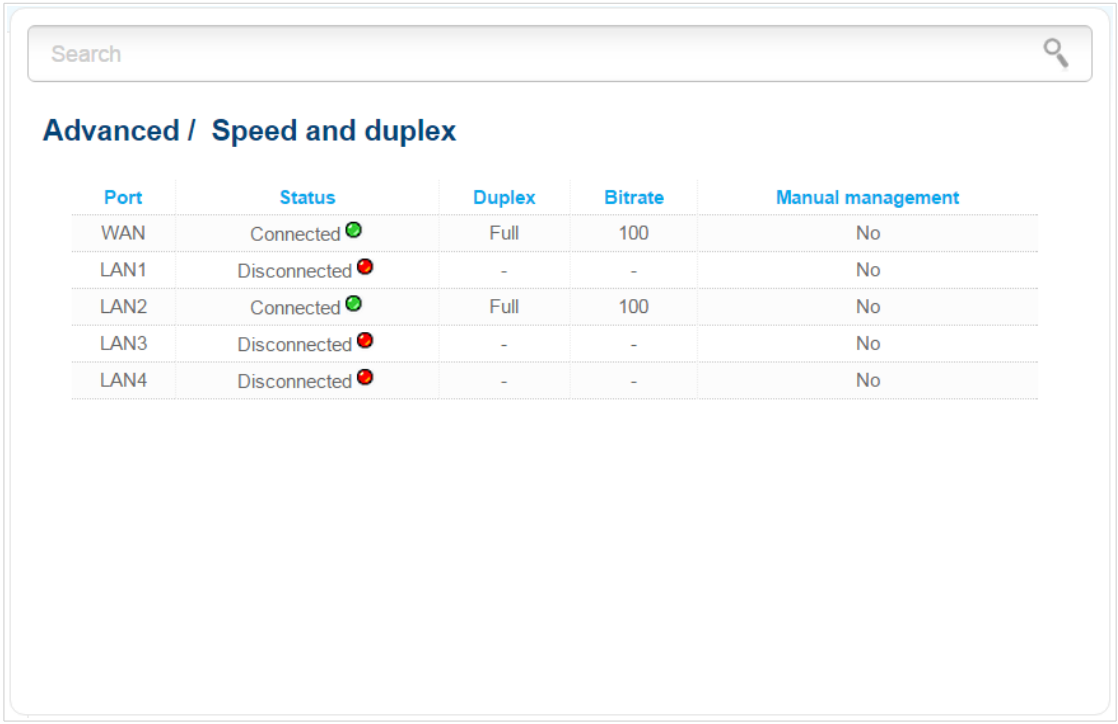


*Figure 134. The **Advanced / Speed and duplex** page.*

By default, autonegotiation of speed and duplex mode is configured for each Ethernet port of the router. If you need to specify speed and duplex mode for a port manually, select the relevant port in the table.

! Speed and duplex mode settings for both devices connected to each other should be the same.

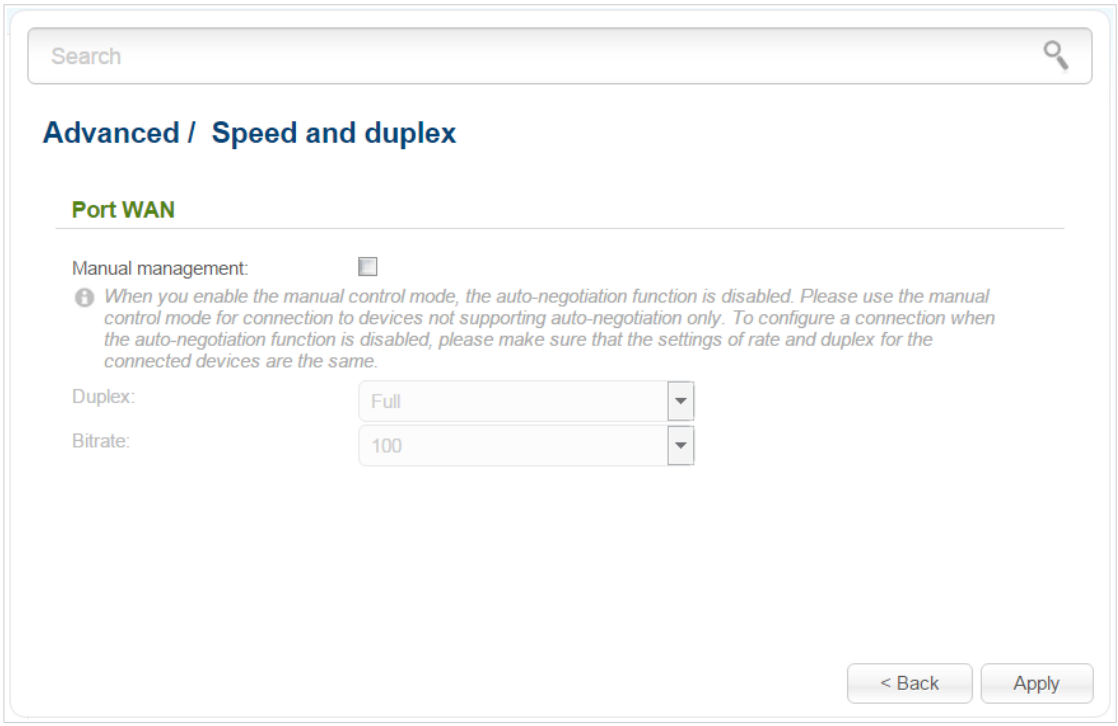


Figure 135. The page for changing the settings of the router's port.

On the opened page, select the **Manual management** checkbox and specify the needed parameters:

Parameter	Description
Duplex	Select data transfer mode from the drop-down list: **Full:** Data transfer in two directions simultaneously (data can be sent and received at the same time). **Half:** Data transfer in just one direction at a time (data can be either sent or received).
Bitrate	Data transfer rate (Mbps) for a port.

After specifying the needed parameters, click the **Apply** button.

If in the future you need to edit the parameters of the router's port, select the port in the table. On the opened page, change the needed parameters and click the **Apply** button.

To enable autonegotiation for the router's port again, select the port in the table and deselect the **Manual management** checkbox on the opened page. Then click the **Apply** button.

Redirect

On the **Advanced / Redirect** page, you can enable notifications on the reason of the Internet connection failure. Notifications will be displayed in the browser window when a user is attempting to open a web site on the Internet.

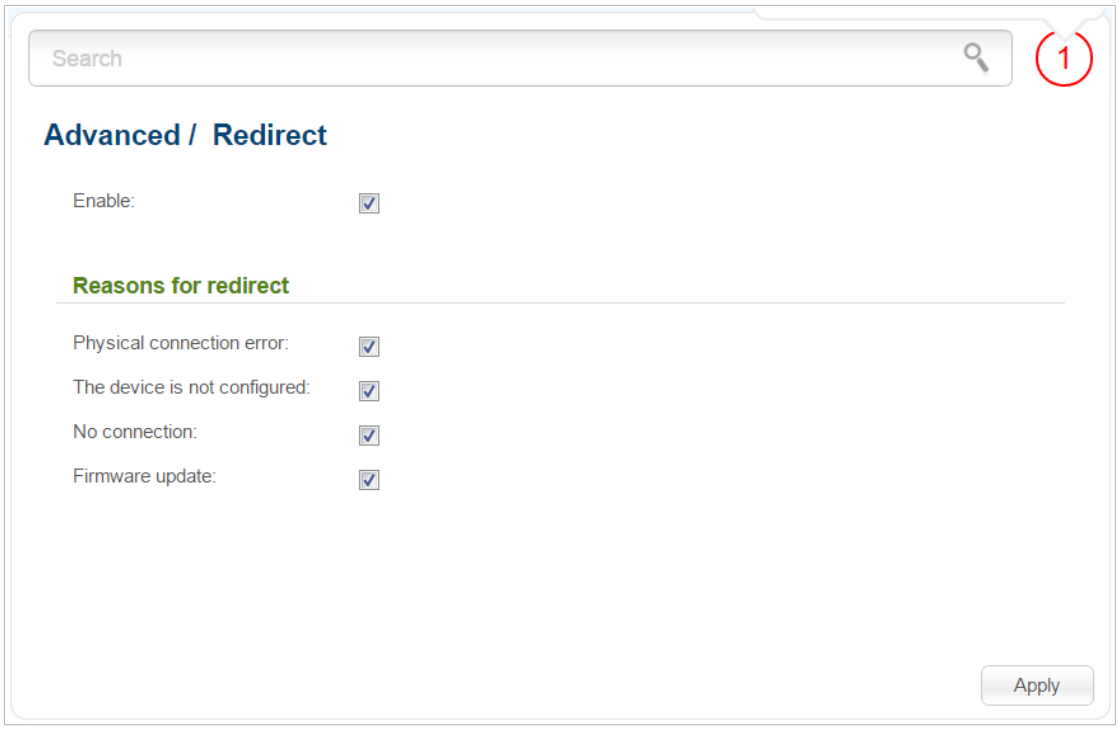


*Figure 136. The **Advanced / Redirect** page.*

To configure notifications, select the **Enable** checkbox. Then select needed checkboxes in the **Reasons for redirect** section.

Parameter	Description
Reasons for redirect	
Physical connection error	Notifications in case of physical connection problems (the ISP's cable is not connected, an additional device needed to access the Internet is not connected).
The device is not configured	Notifications in case when the device works with default settings.
No connection	Notifications in case of problems of the connection used as the default gateway (authorization error, the IPS's server does not respond, etc.).
Firmware update	Notifications in case of update of the device's firmware.

When you have configured the parameters, click the **Apply** button.

To disable notifications, deselect the **Enable** checkbox and click the **Apply** button.

DDNS

On the **Advanced / DDNS** page, you can define parameters of the DDNS service, which allows associating a domain name with dynamic IP addresses.

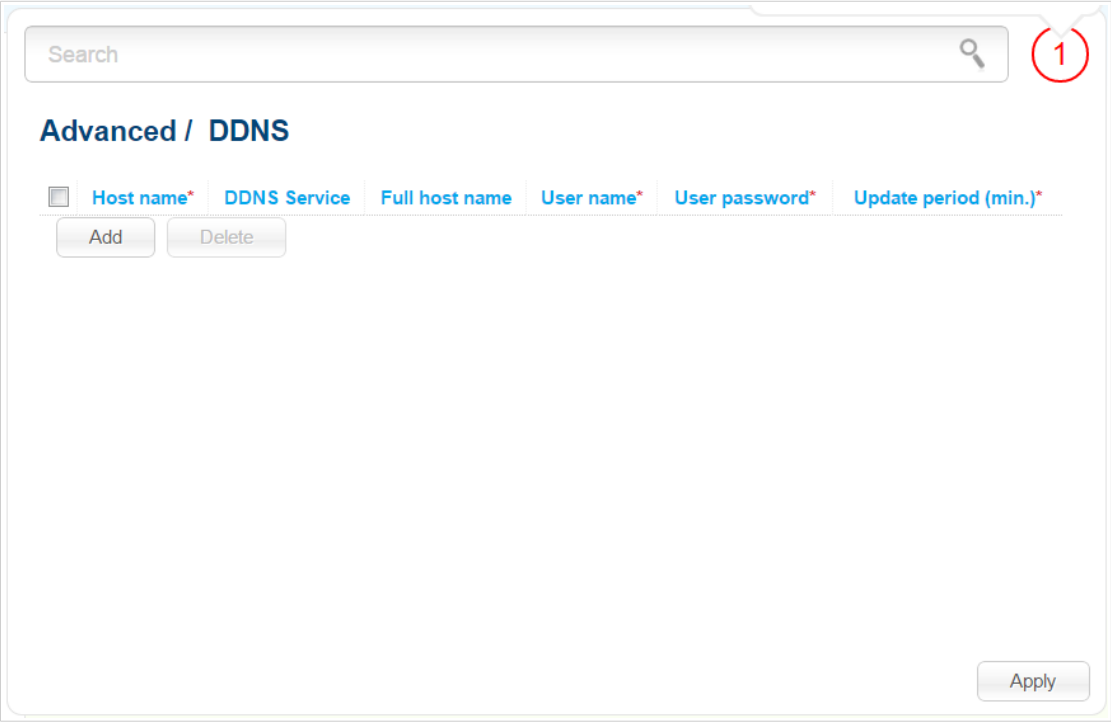


*Figure 137. The **Advanced / DDNS** page.*

To add a new DDNS service, click the **Add** button. In the line displayed, you can specify the following parameters:

Parameter	Description
Host name	The part of the domain name specified by a user while registering at a DDNS provider.
DDNS Service	Select a DDNS provider from the drop-down list.
Full host name	The domain name registered at your DDNS provider. The field will be filled in automatically.
User name	The username to authorize for your DDNS provider.
User password	The password to authorize for your DDNS provider.
Update period	An interval (in minutes) between sending data on the router's external IP address to the relevant DDNS service.

After specifying the needed parameters, click the **Apply** button.

To edit parameters of the existing DDNS service, select a needed field in the relevant line of the table, change its value, and click the **Apply** button.

To remove an existing DDNS service, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Then click the **Apply** button.

Routing

On the **Advanced / Routing** page, you can add static routes into the system.

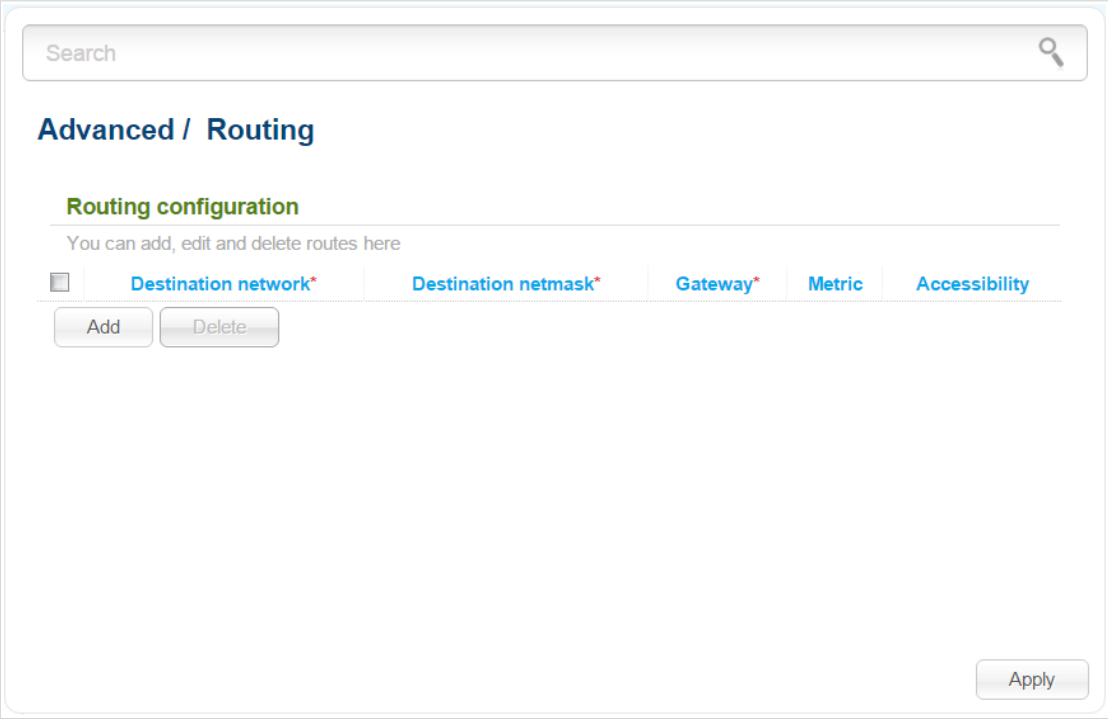


*Figure 138. The **Advanced / Routing** page.*

To create a new route, click the **Add** button. In the line displayed, you can specify the following parameters:

Parameter	Description
Destination network	A destination network to which this route is assigned.
Destination netmask	The destination network mask.
Gateway	An IP address through which the destination network can be accessed.
Metric	A metric for the route. The lower the value, the higher is the route priority. *Optional*.

After specifying the needed parameters, click the **Apply** button.

To edit an existing route, select a needed field in the relevant line of the table, change its value, and click the **Apply** button.

To remove an existing route, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Then click the **Apply** button.

IPv6 Routing

On the **Advanced / IPv6 routing** page, you can add static routes into the system.

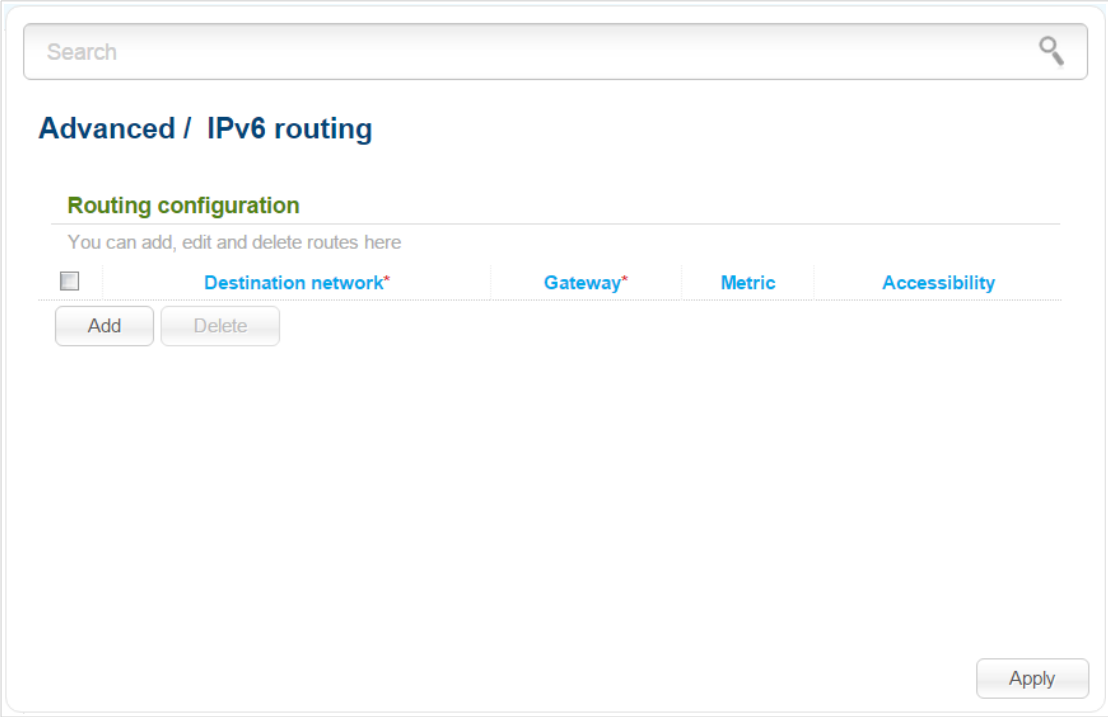


*Figure 139. The **Advanced / IPv6 routing** page.*

To create a new route, click the **Add** button. In the line displayed, you can specify the following parameters:

Parameter	Description
Destination network	A destination network to which this route is assigned. You can specify an IPv6 address (`2001:db8:1234::1`) or an IPv6 address with a prefix (`2001:db8:1234::/64`).
Gateway	An IPv6 address through which the destination network can be accessed.
Metric	A metric for the route. The lower the value, the higher is the route priority. *Optional*.

After specifying the needed parameters, click the **Apply** button.

To edit an existing route, select a needed field in the relevant line of the table, change its value, and click the **Apply** button.

To remove an existing route, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Then click the **Apply** button.

Remote Access to Device

On the **Advanced / Remote access to device** page, you can configure access to the web-based interface of the router. By default, the access from external networks to the router is closed. If you need to allow access to the router from the external network, create relevant rules.

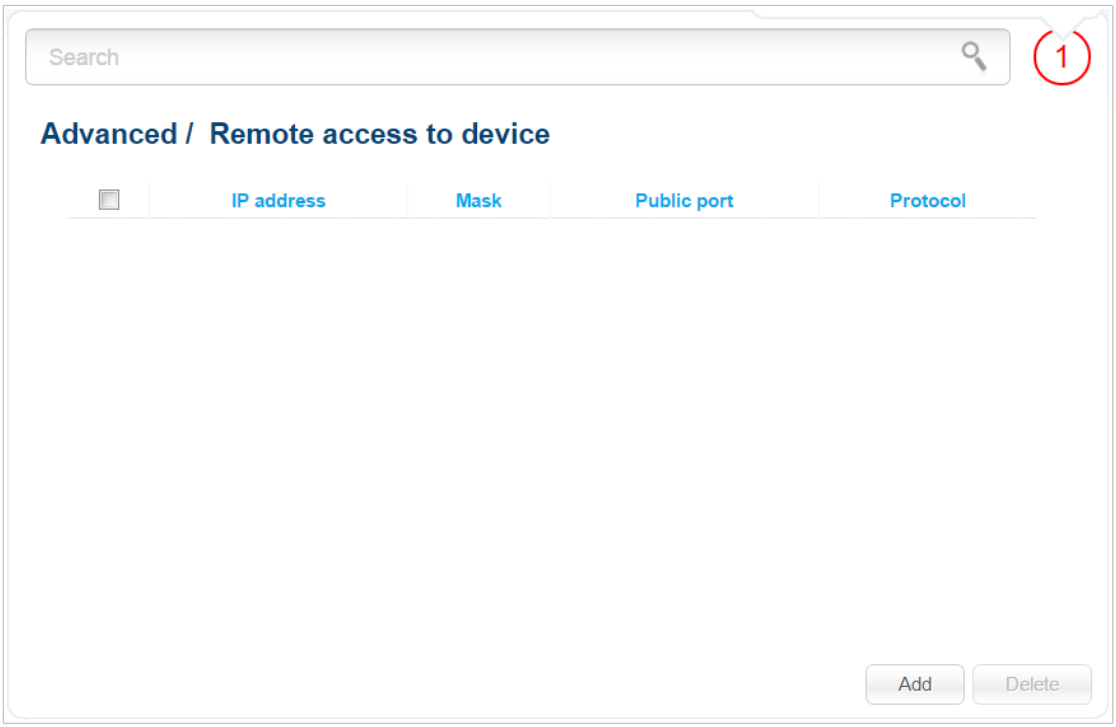


*Figure 140. The **Advanced / Remote access to device** page.*

To create a new rule, click the **Add** button.

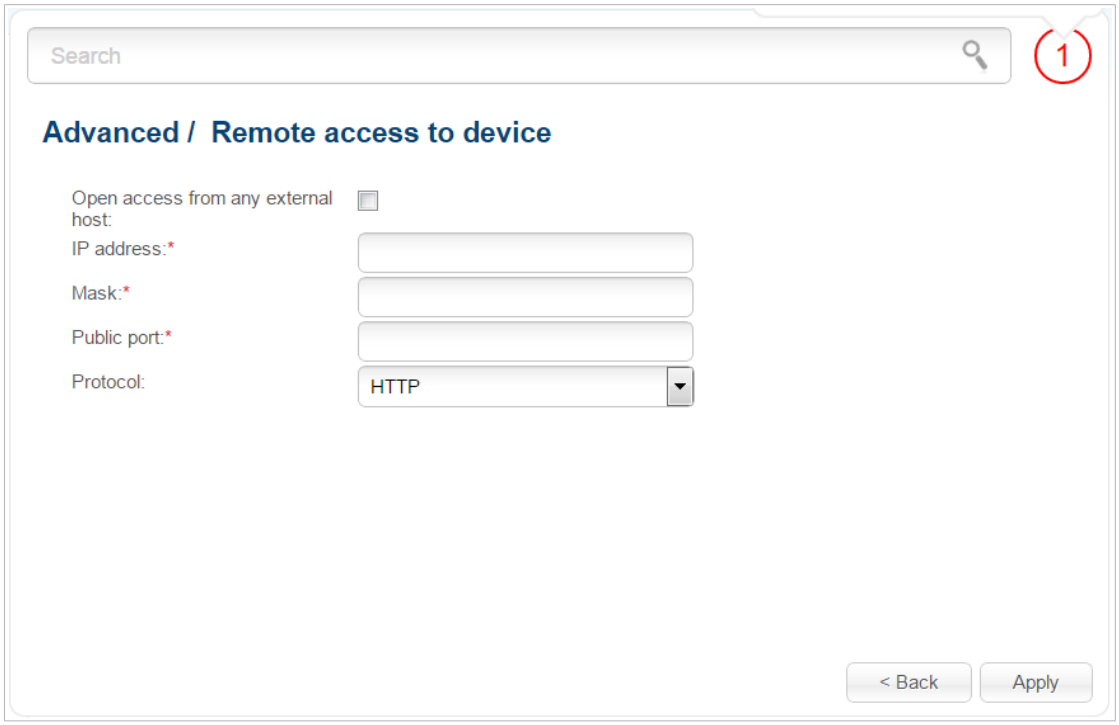


Figure 141. The page for adding a rule for remote management.

You can specify the following parameters:

Parameter	Description
Open access from any external host	Select the checkbox to allow access to the router for any host. When the checkbox is selected, the **IP version** drop-down list is displayed on the page, and the **IP address** and **Mask** fields are not available for editing.
IP version	An IP version to which the rule will be applied. Select the relevant value from the drop-down list.
IP address	A host or a subnet to which the rule is applied. You can specify an IPv4 or IPv6 address.
Mask	*For the IPv4-based network only.* The mask of the subnet.
Public port	*For the IPv4-based network only.* An external port of the router. You can specify only one port.
Protocol	The protocol available for remote management of the router.

After specifying the needed parameters, click the **Apply** button.

To edit a rule for remote access, click the link to the relevant rule. On the opened page, change the needed parameters and click the **Apply** button.

To remove a rule for remote access, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove a rule on the editing page.

Miscellaneous

On the **Advanced / Miscellaneous** page, you can enable IGMP, RTSP, the SIP ALG, the PPPoE pass through, PPTP pass through, and L2TP pass through functions for the router.

IGMP is used for managing multicast traffic (transferring data to a group of destinations). This protocol allows using network resources for some applications, e.g., for streaming video, more efficiently.

SIP is used for creating, modifying, and terminating communication sessions. This protocol allows telephone calls via the Internet.

RTSP is used for real-time streaming multimedia data delivery. This protocol allows some applications to receive streaming audio/video from the Internet.

The PPPoE pass through function allows PPPoE clients of computers from your LAN to connect to the Internet through PPPoE connections of the router.

The PPTP pass through and L2TP pass through functions allow VPN PPTP and L2TP traffic to pass through the router so that clients from your LAN can establish relevant connections with remote networks.

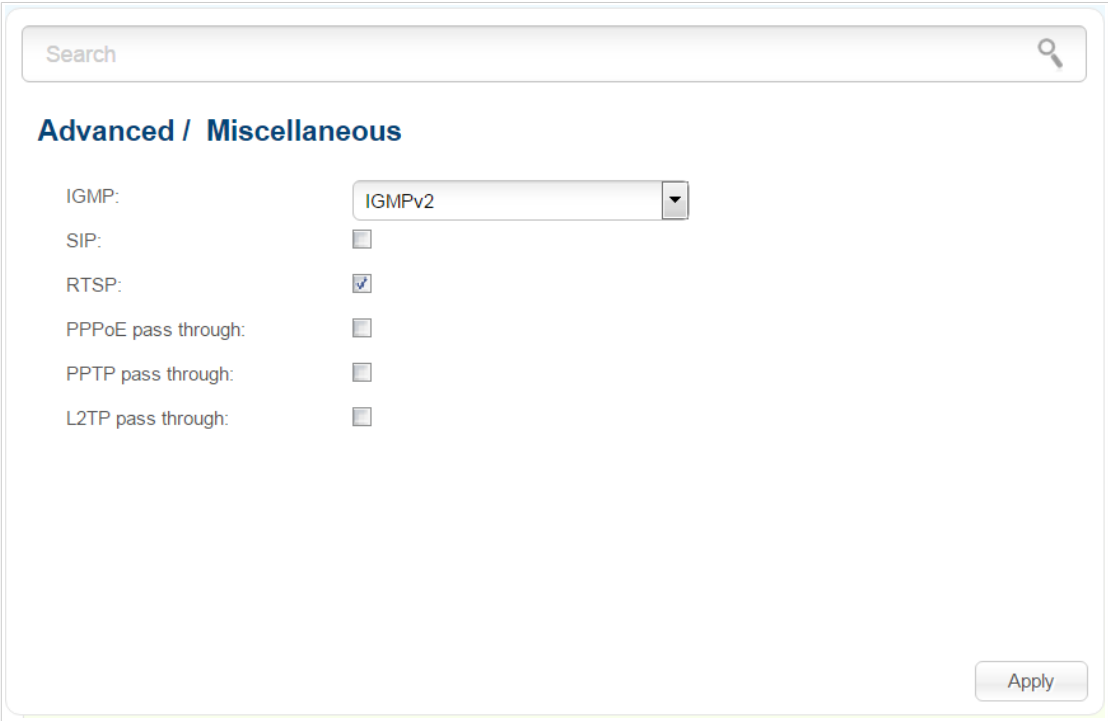


*Figure 142. The **Advanced / Miscellaneous** page.*

The following elements are available on the page:

Parameter	Description
IGMP	Select a version of IGMP from the drop-down list to enable IGMP. Such a setting allows using the IGMP Proxy function for all WAN connections for which the **Enable IGMP Multicast** checkbox is selected. To disable IGMP, select the **Off** value from the drop-down list.

Parameter	Description
SIP	Select the checkbox to enable SIP. Such a setting allows using the SIP ALG function. This function allows VoIP traffic to pass through the NAT-enabled router.[10]
RTSP	Select the checkbox to enable RTSP. Such a setting allows managing media stream: fast forward streaming audio/video, pause and start it.
PPPoE pass through	Select the checkbox to enable the PPPoE pass through function.
PPTP pass through	Select the checkbox to enable the PPTP pass through function.
L2TP pass through	Select the checkbox to enable the L2TP pass through function.

After specifying the needed parameters, click the **Apply** button.

10 On the **Net / WAN** page, create a WAN connection, on the **Advanced / Miscellaneous** page, select the **SIP** checkbox, connect the phone cable between a LAN port of the router and the IP phone. Specify SIP parameters on the IP phone and configure it to obtain an IP address automatically (as DHCP client).

TR-069 Client

On the **Advanced / TR-069 Client** page, you can configure the router for communication with a remote Auto Configuration Server (ACS).

The TR-069 client is used for remote monitoring and management of the device.

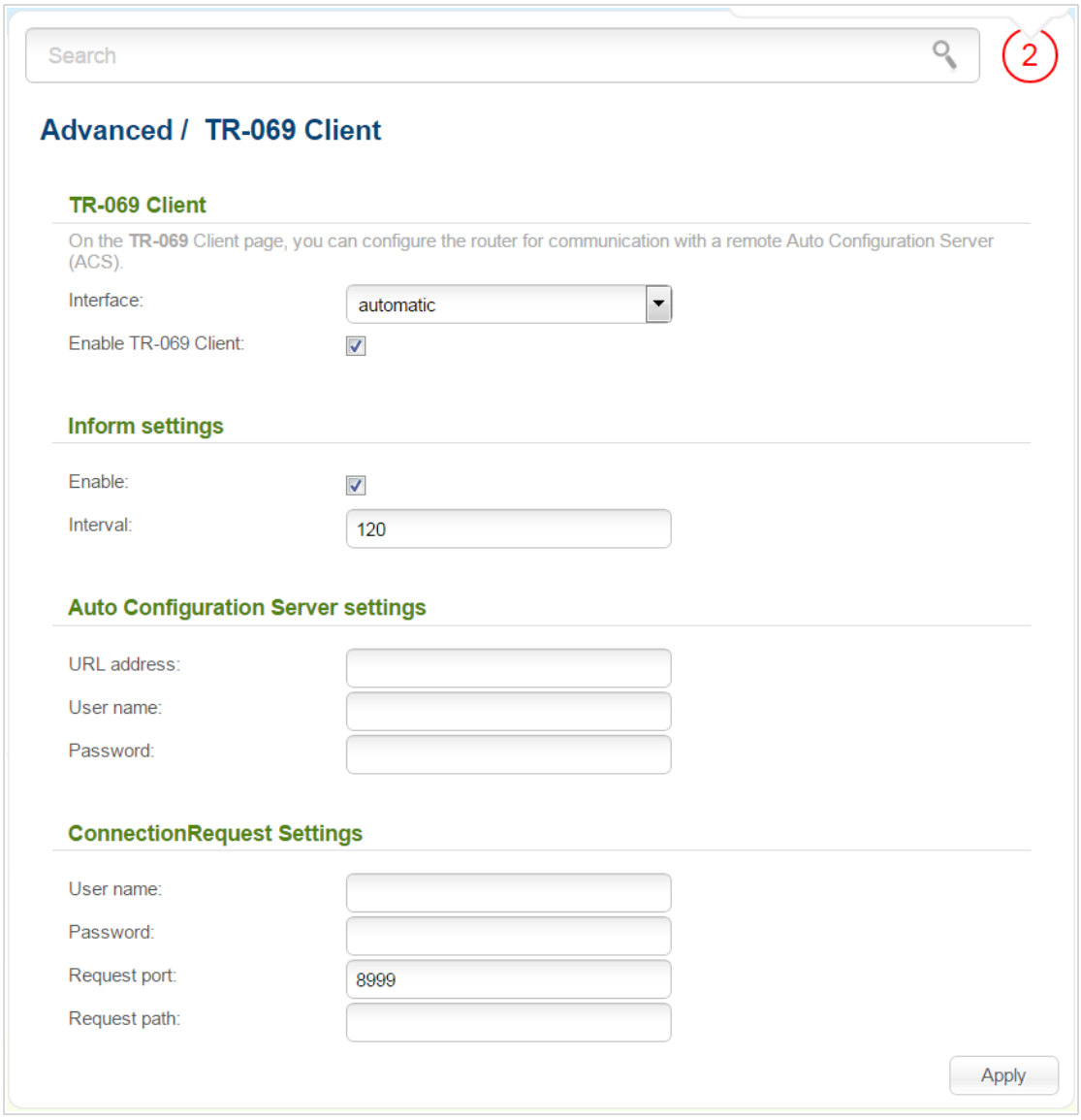


Figure 143. The page for configuring the TR-069 client.

You can specify the following parameters:

Parameter	Description
Interface	The interface which the router uses for communication with the ACS. Leave the **automatic** value to let the device select the interface basing on the routing table or select another value if required by your ISP.
Enable TR-069 Client	Select the checkbox to enable the TR-069 client.

Parameter	Description
Inform settings	
Enable	Select the checkbox so the router may send reports (data on the device and network statistics) to the ACS.
Interval	Specify the time period (in seconds) between sending reports.
Auto Configuration Server settings	
URL address	The URL address of the ACS provided by the ISP.
User name	The username to connect to the ACS. The username can contain digits, Latin letters (uppercase and/or lowercase), and characters available on the keyboard.
Password	The password to connect to the ACS. The password can contain digits, Latin letters (uppercase and/or lowercase), and characters available on the keyboard.
ConnectionRequest Settings	
User name	The username used by the ACS to transfer a connection request to the router. The username can contain digits, Latin letters (uppercase and/or lowercase), and characters available on the keyboard.
Password	The password used by the ACS. The password can contain digits, Latin letters (uppercase and/or lowercase), and characters available on the keyboard.
Request port	The port used by the ACS. By default, the port **8999** is specified.
Request path	The path used by the ACS.

When you have configured the parameters, click the **Apply** button.

Flow Control

On the **Advanced / Flow Control** page, you can enable and disable data flow control for the WAN port of the router.

This function is used for equal load balancing in ISPs' networks. Contact your ISP to clarify if this function needs to be enabled.

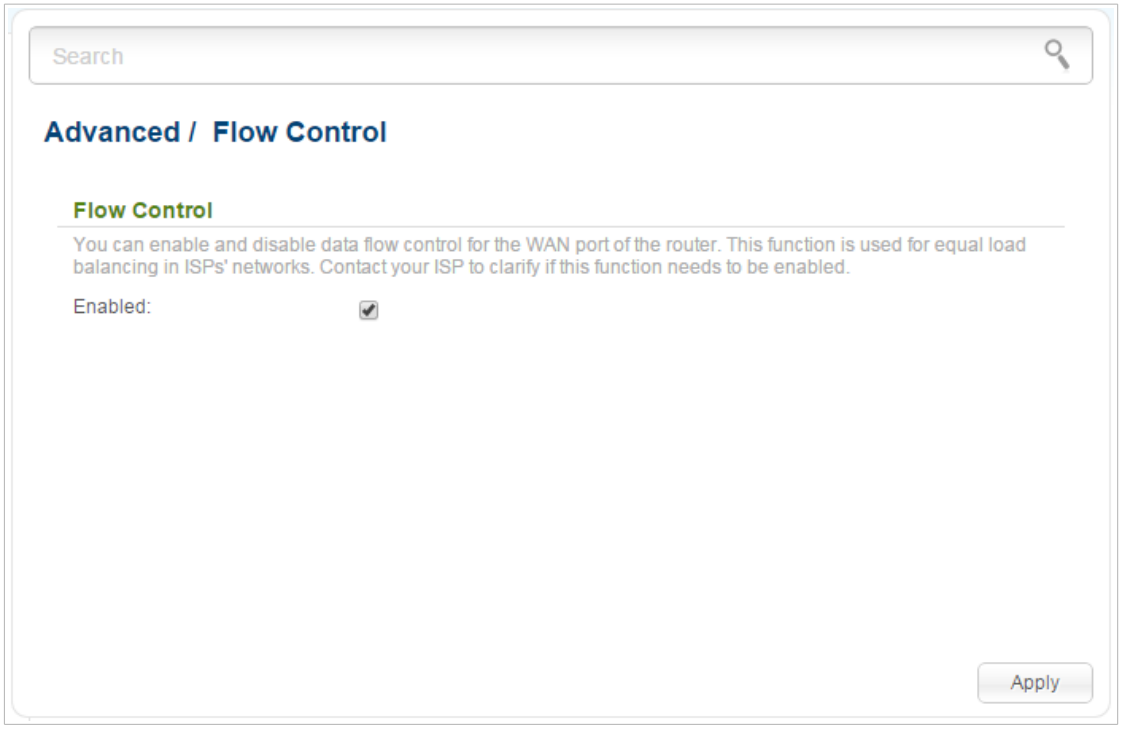


*Figure 144. The **Advanced / Flow Control** page.*

To enable the flow control function, select the **Enabled** checkbox and click the **Apply** button.

To disable the flow control function, deselect the **Enabled** checkbox and click the **Apply** button.

IPsec

On the **Advanced / IPsec** page, you can configure VPN tunnels based on IPsec protocol.

IPsec is a protocol suite for securing IP communications.

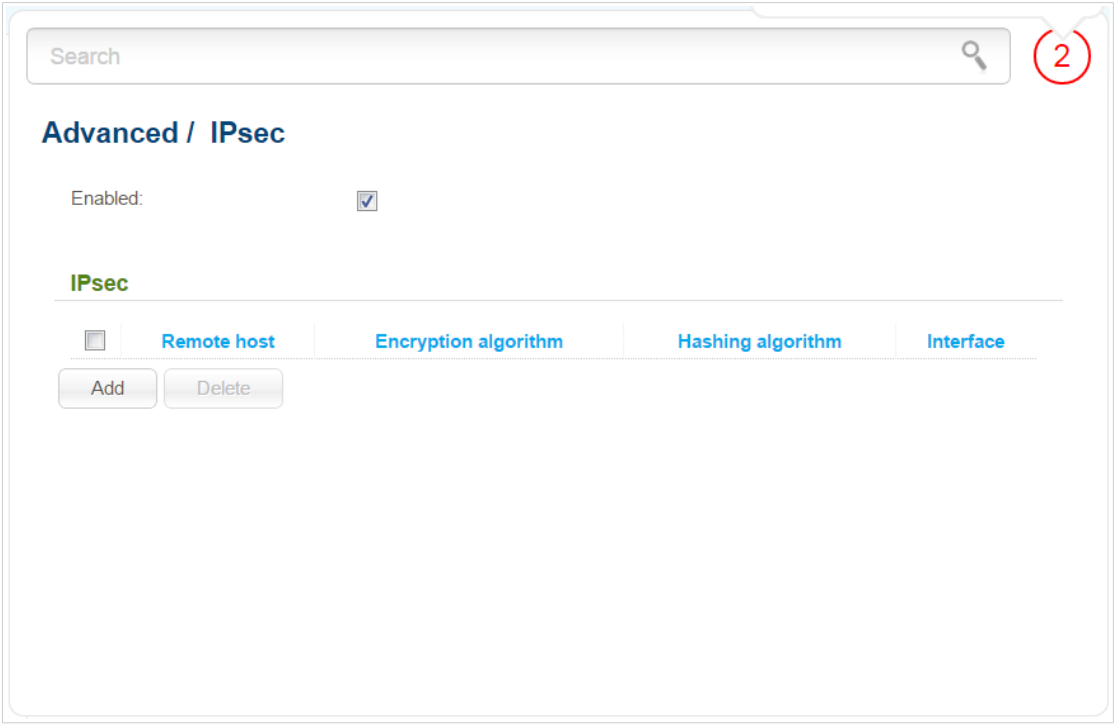


*Figure 145. The **Advanced / IPsec** page.*

To allow IPsec tunnels, select the **Enabled** checkbox. Then click the **Add** button to create a new tunnel.

Setting for both devices which establish the tunnel should be the same.

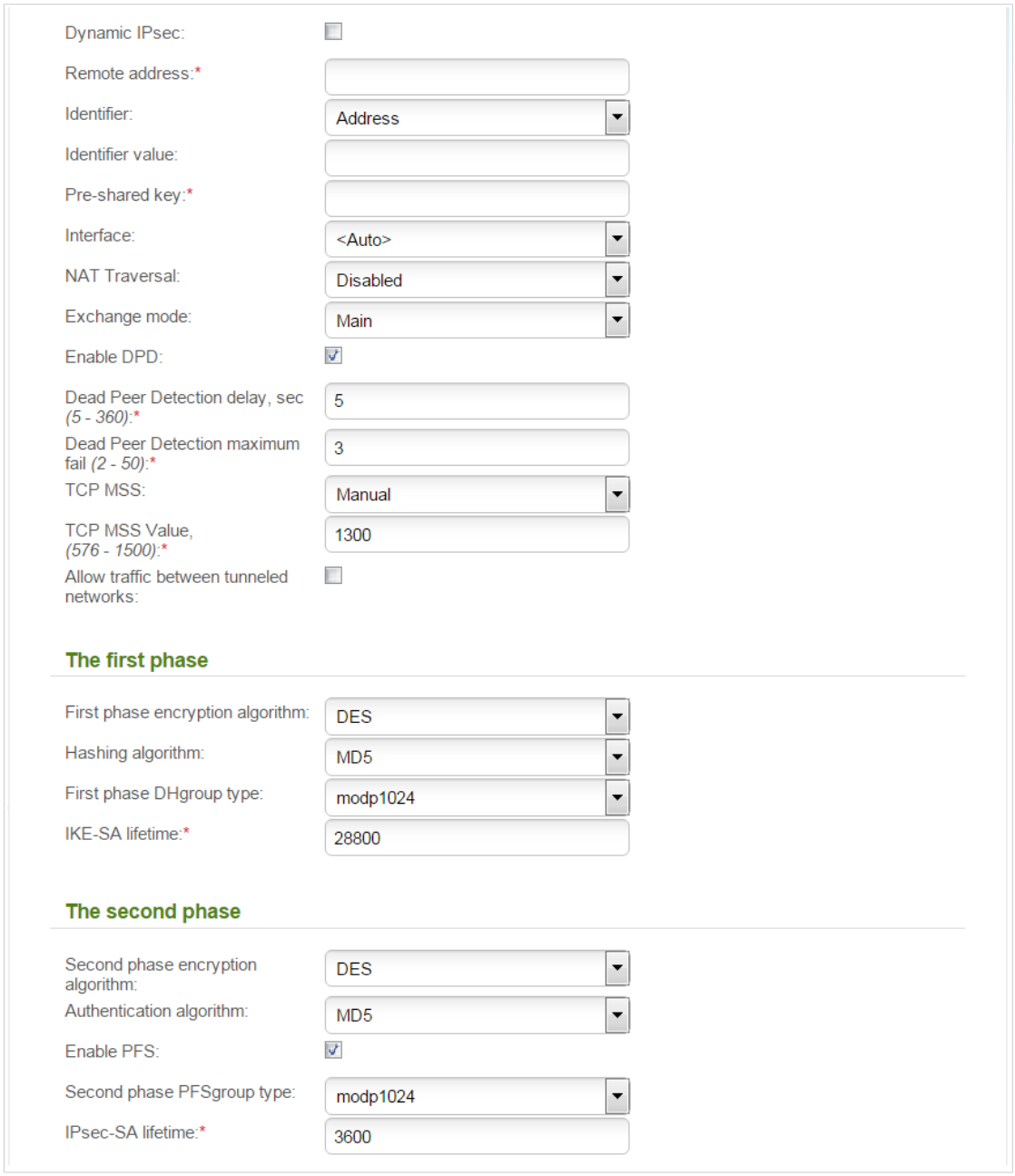


Figure 146. The page for adding an IPsec tunnel.

You can specify the following parameters:

Parameter	Description
Dynamic IPsec	Select the checkbox to allow a remote host with any public IP address to connect to the router via IPsec protocol. The checkbox can be selected for one tunnel only. Connection requests via the tunnel, for which this checkbox is selected, can be sent by a remote host only.
Remote address	A remote subnet VPN gateway IP address. The field is available, if the **Dynamic IPsec** checkbox is not selected.

Parameter	Description
Identifier	Select an identification method of a remote host from the drop-down list: **Address:** A remote host is identified by its IP address. **FQDN:** A remote host is identified by its domain name.
Identifier value	Specify the value of the identifier.
Pre-shared key	A key for mutual authentication of the parties.
Interface	Select a WAN connection through which the tunnel will pass. When the **<auto>** value is selected, the router uses the connection set as the default gateway.
NAT Traversal	The NAT Traversal function allows VPN traffic to pass through the NAT-enabled router. Select the **Disabled** value to disable the function**.** Select the **Enabled** value to enable the function if it is supported by a remote host. Select the **Force** value to make the function be always on even if it is not supported by a remote host.
Exchange mode	Select the mode of negotiation from the drop-down list: **Main:** The mode provides the most secure communication between the parties in the course of negotiation of the authentication procedures. **Base:** The draft negotiation mode with preliminary authentication of a host. **Aggressive:** The mode provides faster operation as it skips several stages of negotiation of the authentication procedures.
Enable DPD	Select the checkbox to enable using DPD protocol for this tunnel. Such a setting allows to check the status of a remote host: if encrypted packets exchange between the router and the remote host breaks down, the router starts sending DPD messages to the remote host. If the checkbox is not selected, the **Dead Peer Detection delay** and **Dead Peer Detection maximum fail** fields are not available for editing.
Dead Peer Detection delay	A time period (in seconds) between attempts to check the status of a remote host. By default, the value **5** is specified.

Parameter	Description
Dead Peer Detection maximum fail	A number of DPD messages that were sent to check the status of a remote host and left unanswered. By default, the value **3** is specified. If a remote host does not answer the specified number of messages, the router breaks down the tunnel connection, removes the encryption keys, and tries to activate the connection.
TCP MSS	*Maximum Segment Size of a TCP packet.* This parameter influences the size of a TCP packet which will be sent from a remote host to the router. If the **Manual** value is selected, you can specify the parameter in the **TCP MSS Value** field. If the **Path MTU Discovery** value is selected, the parameter will be configured automatically.
TCP MSS Value	The maximum size (in bites) of a non-fragmented packet. The field is available for editing when the **Manual** value is selected from the **TCP MSS** drop-down list.
Allow traffic between tunneled networks	Select the checkbox to allow data exchange between subnets with which IPsec tunnels have been created.
The first phase	
First phase encryption algorithm	Select encryption algorithm from the drop-down list.
Hashing algorithm	Select hashing algorithm from the drop-down list.
First phase DHgroup type	A Diffie-Hellman key group for Phase 1. Select a value from the drop-down list.
IKE-SA lifetime	The lifetime of IKE-SA keys in seconds. After the specified period it is required to renegotiate the keys. The value specified in this field should exceed the value specified in the **IPsec-SA lifetime** field. Specify **0** if you don't want to limit the lifetime of the keys.
The second phase	
Second phase encryption algorithm	Select encryption algorithm from the drop-down list.
Authentication algorithm	Select authentication algorithm from the drop-down list.

Parameter	Description
Enable PFS	Select the checkbox to enable the PFS option (*Perfect Forward Secrecy*). If the checkbox is selected, a new encryption key exchange will be used for Phase 2. This option increases the security level of data transfer.
Second phase PFSgroup type	A Diffie-Hellman key group for Phase 2. Select a value from the drop-down list. The field is available, if the **Enable PFS** checkbox is selected.
IPsec-SA lifetime	The lifetime of IPsec-SA keys in seconds. After the specified period it is required to renegotiate the keys. Specify `0` if you don't want to limit the lifetime of the keys.

If you need to specify IP addresses of local and remote subnets for creating a tunnel, click the **Add** button in the **Tunneled networks** section.

Figure 147. The page for adding an IPsec tunnel.

In the line displayed, you can specify the following parameters:

Parameter	Description
Local subnet	A local subnet IP address and mask.
Remote subnet	A remote subnet IP address and mask.

To edit fields in the **Tunneled networks** section, select a needed field in the relevant line of the table and change its value.

To remove IP addresses of subnets, select the checkbox located to the left of the relevant line in the table and click the **Delete** button.

Click the **Apply** button.

After clicking the **Apply** button, the page with the sections **IPsec** and **Status** opens.

To edit the parameters of an existing tunnel, in the **IPsec** section, select the relevant tunnel in the table. On the opened page, change the needed parameters and click the **Apply** button.

To remove an existing tunnel, select the checkbox located to the left of the relevant line in the table and click the **Delete** button.

In the **Status** section, the current state of an existing tunnel is displayed.

To disable VPN tunnels based on IPsec protocol, deselect the **Enabled** checkbox.

Firewall

In this menu you can configure the firewall of the router:

- add rules for IP filtering
- create virtual servers
- define a DMZ
- configure the MAC filter.

IP Filters

On the **Firewall / IP filters** page, you can create new rules for filtering IP packets and edit or remove existing rules.

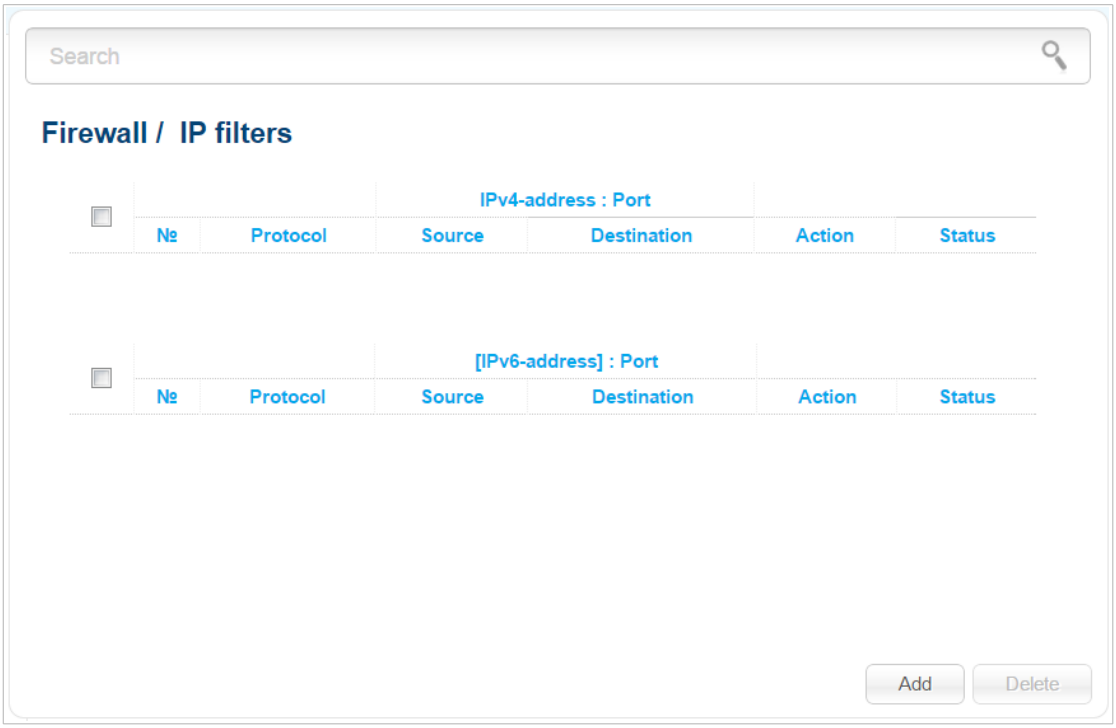


*Figure 148. The **Firewall / IP filters** page.*

To create a new rule, click the **Add** button.

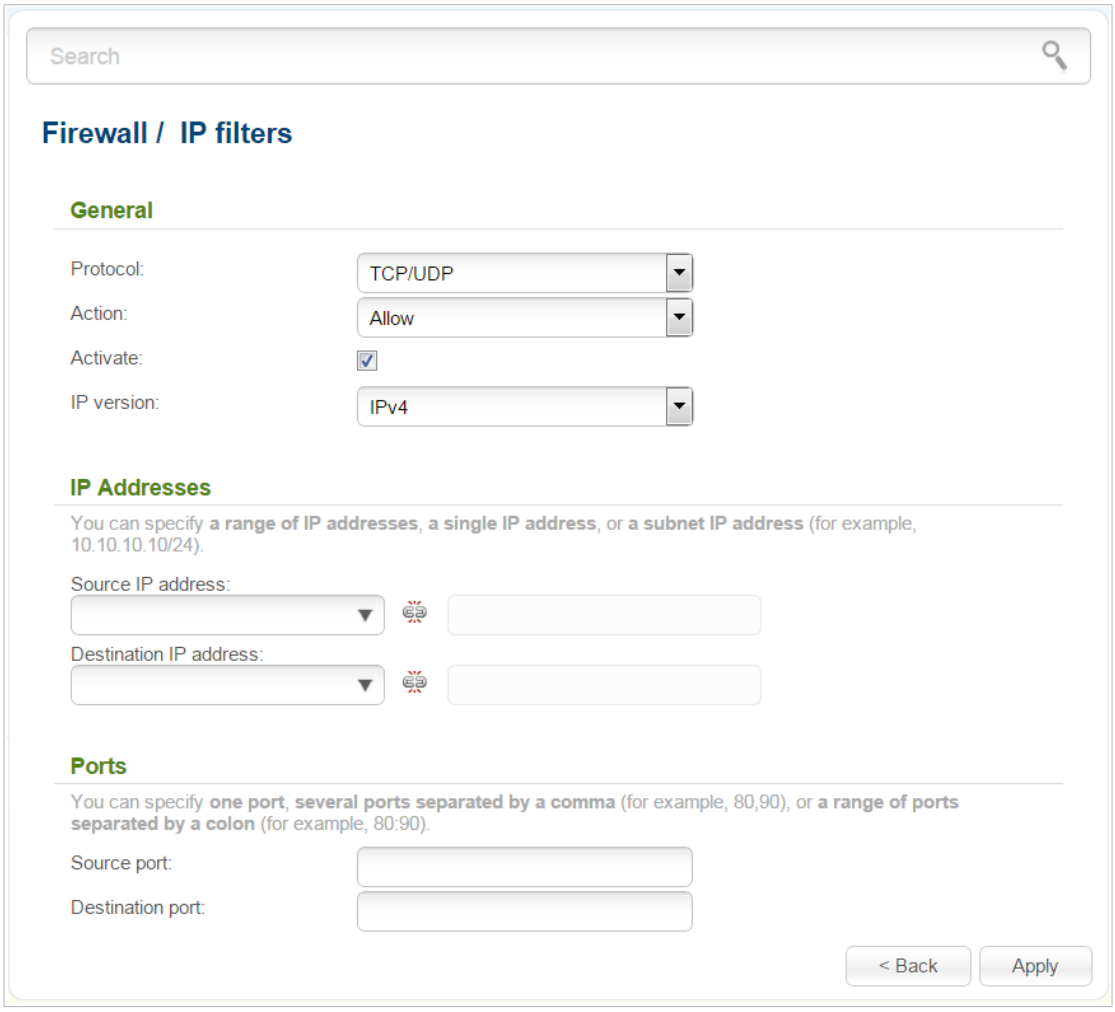


Figure 149. The page for adding a rule for IP filtering.

You can specify the following parameters:

Parameter	Description
General	
Protocol	A protocol for network packet transmission. Select a value from the drop-down list.
Action	Select an action for the rule. **Allow**: Allows packet transmission in accordance with the criteria specified by the rule. **Deny**: Denies packet transmission in accordance with the criteria specified by the rule.
Activate	If the checkbox is selected, the rule is enabled. Deselect the checkbox to disable the rule.
IP version	An IP version to which the rule will be applied. Select the relevant value from the drop-down list.
IP Addresses	

Parameter	Description
Source IP address	The source host/subnet IP address. To choose a device connected to the router's LAN at the moment, select the relevant IP address from the drop-down list (the field will be filled in automatically). If you want to specify a range of IP addresses, click the icon (**Range**) and enter the starting and ending addresses in the left and right fields correspondingly.
Destination IP address	The destination host/subnet IP address. To choose a device connected to the router's LAN at the moment, select the relevant IP address from the drop-down list (the field will be filled in automatically). If you want to specify a range of IP addresses, click the icon (**Range**) and enter the starting and ending addresses in the left and right fields correspondingly.
Ports	
Source port	A port of the source IP address. You can specify one port, several ports separated by a comma, or a range of ports separated by a colon.
Destination port	A port of the destination IP address. You can specify one port, several ports separated by a comma, or a range of ports separated by a colon.

Click the **Apply** button.

To edit a rule for IP filtering, click the link to the relevant rule. On the opened page, change the needed parameters and click the **Apply** button.

To remove a rule, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove a rule on the editing page.

Virtual Servers

On the **Firewall / Virtual servers** page, you can create virtual servers for redirecting incoming Internet traffic to a specified IP address in the local area network.

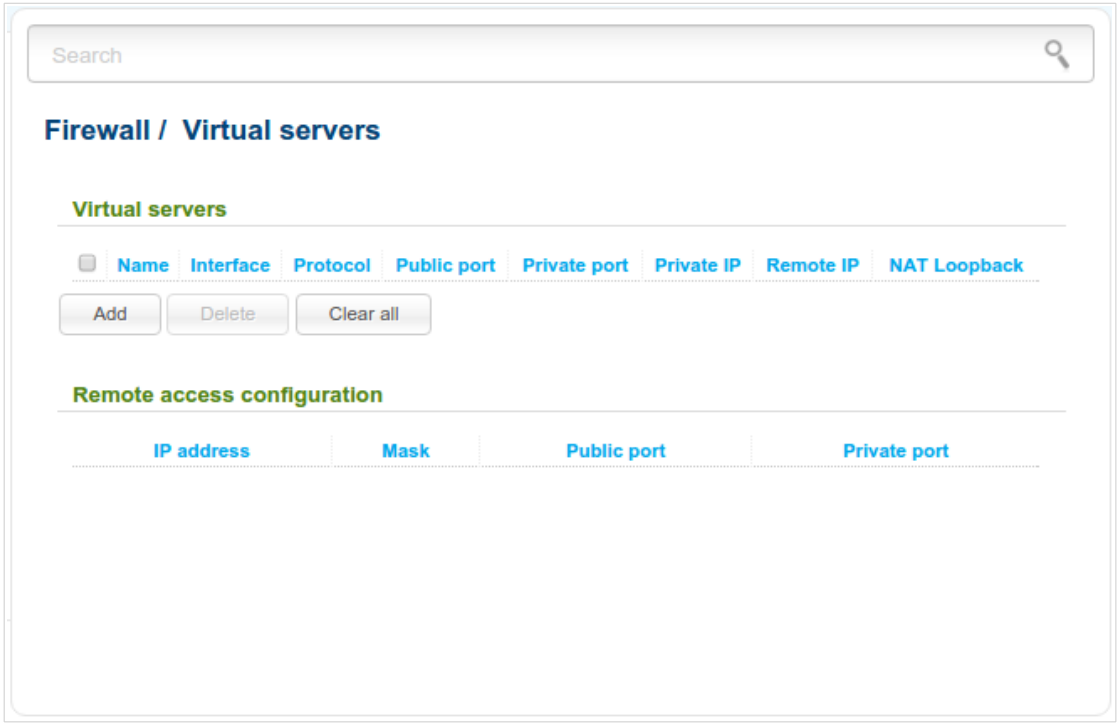


*Figure 150. The **Firewall / Virtual servers** page.*

To create a new virtual server, click the **Add** button.

Figure 151. The page for adding a virtual server.

You can specify the following parameters:

Parameter	Description
Template	Select a virtual server template from the drop-down list, or select **Custom** to specify all parameters of the new virtual server manually.
Name	A name for the virtual server for easier identification. You can specify any name.
Interface	A WAN connection to which this virtual server will be assigned.
Protocol	A protocol that will be used by the new virtual server. Select a value from the drop-down list.
Public port (begin)/ Public port (end)	A port of the router from which traffic is directed to the IP address specified in the **Private IP** field. Specify the start and the end value for the port range. If you need to specify one port, enter the needed value in the **Public port (begin)** field and leave the **Public port (end)** field blank.
Private port (begin)/ Private port (end)	A port of the IP address specified in the **Private IP** field to which traffic is directed from the **Public port**. Specify the start and the end value for the port range. If you need to specify one port, enter the needed value in the **Private port (begin)** field and leave the **Private port (end)** field blank.
Private IP	The IP address of the server from the local area network. To choose a device connected to the router's LAN at the moment, select the relevant value from the drop-down list (the field will be filled in automatically).
Remote IP	The IP address of the server from the external network.
Enable NAT Loopback	If the checkbox is selected, users of the router's LAN can access the server, which IP address is specified in the **Private IP** field, using the router's external IP address as the server's IP address. If a DDNS service is configured on the **Advanced / DDNS** page, the users can access the server via the router's domain name.

Click the **Apply** button.

To edit the parameters of an existing server, select the relevant server in the table. On the opened page, change the needed parameters and click the **Apply** button.

To remove a server, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove a server on the editing page.

To remove all servers from this page, click the **Clear all** button.

In the **Remote access configuration** section, rules created on the **Advanced / Remote access to device** page are displayed. If after creating virtual servers you need to edit rules for remote access, you can quickly get to the **Advanced / Remote access to device** page by clicking the link to the relevant rule.

DMZ

A DMZ is a host or network segment located “between” internal (local) and external (global) networks. In the router, the DMZ implements the capability to transfer a request coming to a port of the router from the external network to a specified host of the internal network.

On the **Firewall / DMZ** page you can specify the IP address of the DMZ host.

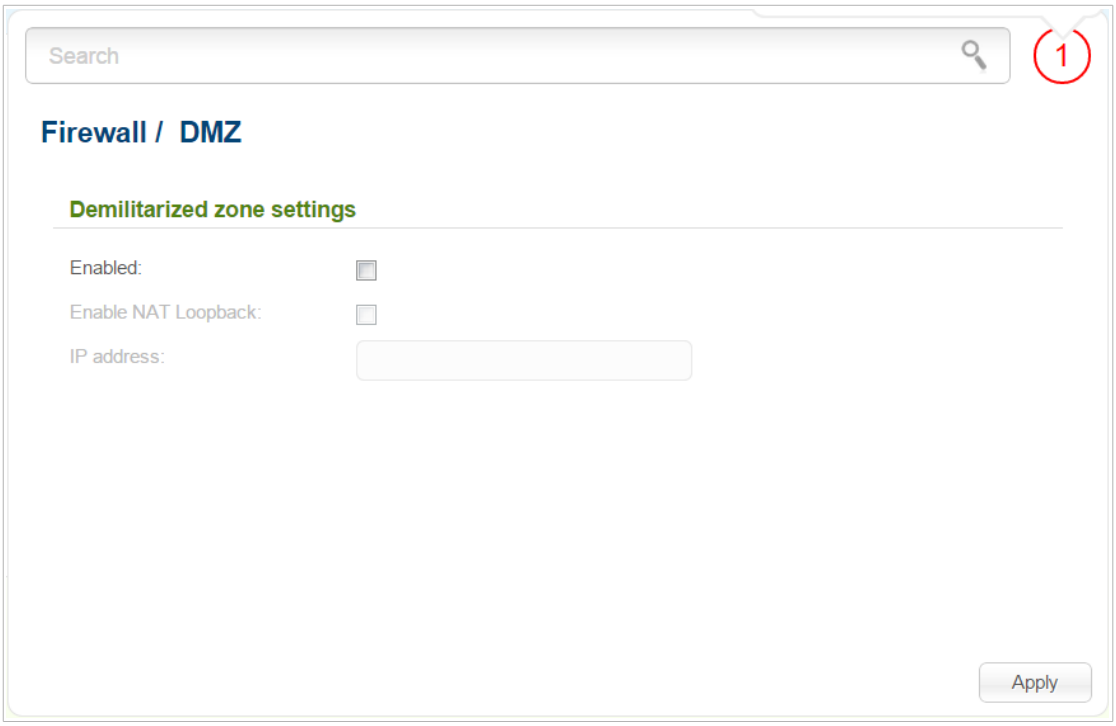


*Figure 152. The **Firewall / DMZ** page.*

To enable the DMZ, select the **Enabled** checkbox.

Enter the IP address of a host from your network in the **IP address** field. To choose a device connected to the router's LAN at the moment, select the relevant value from the drop-down list (the field will be filled in automatically).

If you want users of the router's LAN to access the host using the router's external IP address, select the **Enable NAT Loopback** checkbox. If a DDNS service is configured on the **Advanced / DDNS** page, also the users can access the host via the router's domain name.

Click the **Apply** button.

Note that when the DMZ is enabled, all traffic coming to a port of the WAN interface of the router is directed to the same port of the specified IP address. Also note that virtual servers have higher priority than the DMZ host. In other words, if there has been created a virtual server that directs traffic from external port 80 to a port of the device from the router's local network, then entering **`http://router_WAN_IP`** in the address bar, users of the external network are directed to the specified port and IP address configured for the virtual server, but not to port 80 of the device with the IP address specified on the **Firewall / DMZ** page.

To disable the DMZ, deselect the **Enabled** checkbox and click the **Apply** button.

MAC Filter

On the **Firewall / MAC filter** page, you can configure MAC-address-based filtering for computers of the router's LAN.

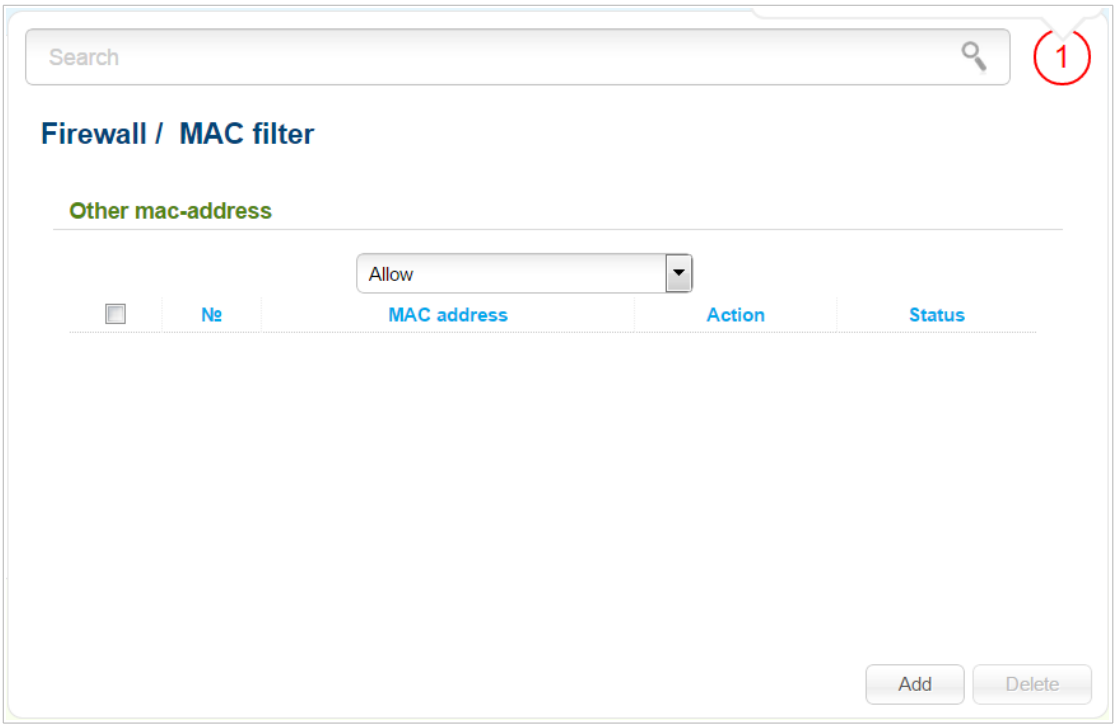


*Figure 153. The **Firewall / MAC filter** page.*

Select the needed action from the drop-down list to configure filtering for all devices of the router's network:

- **Allow**: Allows access to the router's network and to the Internet for devices (the value is specified by default);
- **Deny**: Blocks access to the router's network for devices.

If you need to specify a filtering mode for each device separately, create relevant rules. To do this, click the **Add** button.

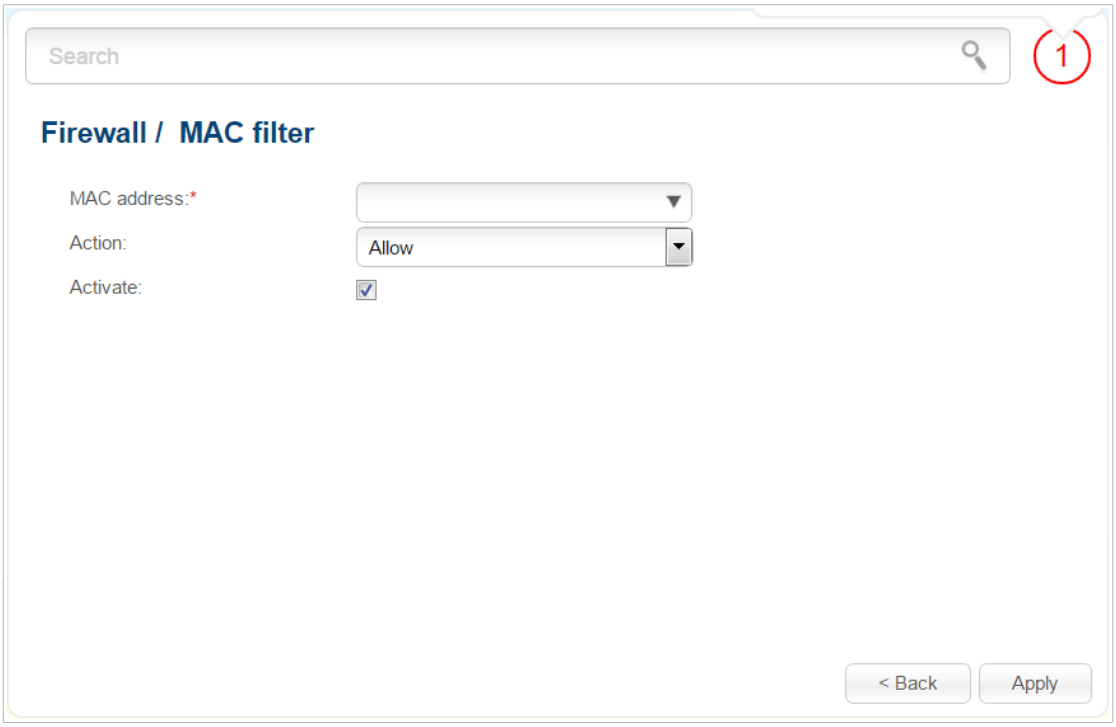


Figure 154. The page for adding a rule for the MAC filter.

You can specify the following parameters:

Parameter	Description
MAC address	The MAC address of a device from the router's LAN. You can enter the MAC address of a device connected to the router's LAN at the moment. To do this, select the relevant device from the drop-down list (the field will be filled in automatically).
Action	Select an action for the rule. **Deny**: Blocks access to the router's network for the device with the specified MAC address. **Allow**: Allows access to the router's network and to the Internet for the device with the specified MAC address when the rules on the **Firewall / IP filters** page block access for this device.
Activate	If the checkbox is selected, the rule is enabled. Deselect the checkbox to disable the rule.

After specifying the needed parameters, click the **Apply** button.

To edit a rule for filtering, click the link to the relevant rule. On the opened page, change the needed parameters and click the **Apply** button.

To remove a rule, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove a rule on the editing page.

3G/LTE Modem

This menu is designed to operate USB modems.

If the PIN code check for the SIM card inserted into your USB modem is not disabled, proceed to the **3G/LTE modem / PIN** section. On the opened page, enter the PIN code in the **PIN code** field and click the **Enter** button[11].

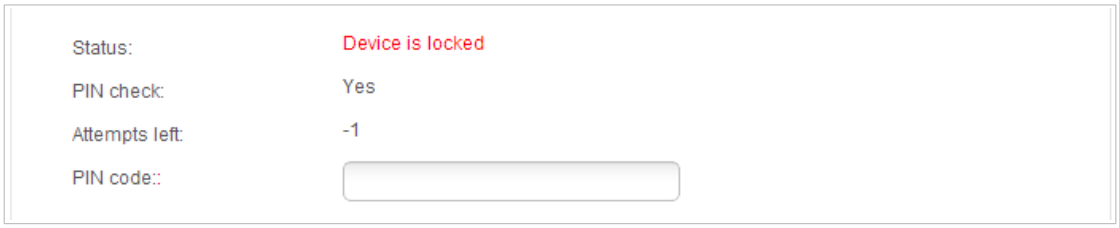


Figure 155. The page for checking the PIN code.

If the PIN code check for the SIM card inserted into your USB modem is disabled, an active WAN connection will be automatically created on the **Net / WAN** page when connecting a USB modem to the router[12].

Some USB modems[13] have an IP address from the subnet which coincides with the router's local subnet. In this case, the relevant notification will be displayed in the web-based interface. For proper operation of a USB modem, proceed to the **Net / LAN** page and change the value of the **IP Address** field (for example, specify the `192.168.2.1` value). Wait until the router is rebooted.

11 For GSM USB modems only. For LTE and CDMA USB modems, it is required to disable the PIN code check on the identification card prior to connecting the USB modem to the router.

12 For LTE and GSM USB modems only.

13 For Huawei E3272, ZTE MF823, ZTE MF827 USB modems only.

Information

On the **3G/LTE modem / Information** page, you can view data on the USB modem connected to the router.

*Figure 156. The **3G/LTE modem / Information** page.*

When a USB modem is connected to the router, the following data are displayed on the page:

Parameter	Description
Vendor	The manufacturer of your USB modem.
Model	The alphanumeric code of the model of your USB modem.
Revision	The revision of the firmware of your USB modem.
IMSI	The code stored in the SIM card inserted to your USB modem.
IMEI	The code stored in the memory of the USB modem.
Signal level	The signal level at the input of the modem's receiver. The zero signal level shows that you are out of the coverage area of the selected operator's network.
Operator name	When the needed network is available, the name of the operator is displayed in this field.
Mode	A type of the network to which the USB modem is connected.

PIN

On pages of the **3G/LTE modem / PIN** section, you can change the PIN code of the identification card inserted into your USB modem, disable or enable the check of the PIN code.

The operations presented in this section are not available for LTE and CDMA USB modems.

On the **3G/LTE modem / PIN / PIN code management** page, the current state of the identification card inserted into your USB modem is displayed in the **Status** field. If the PIN code is entered incorrectly or the PIN code is not entered when the PIN code check is enabled, the **Device is locked** value is displayed in the **Status** field. If the PIN code is entered correctly or the PIN check is disabled, the **Device is unlocked** value is displayed in the **Status** field.

If the PIN code check for the SIM card inserted into your USB modem is not disabled, the **Yes** value is displayed in the **PIN check** field. If the PIN check is disabled, the **No** value is displayed in the **PIN check** field.

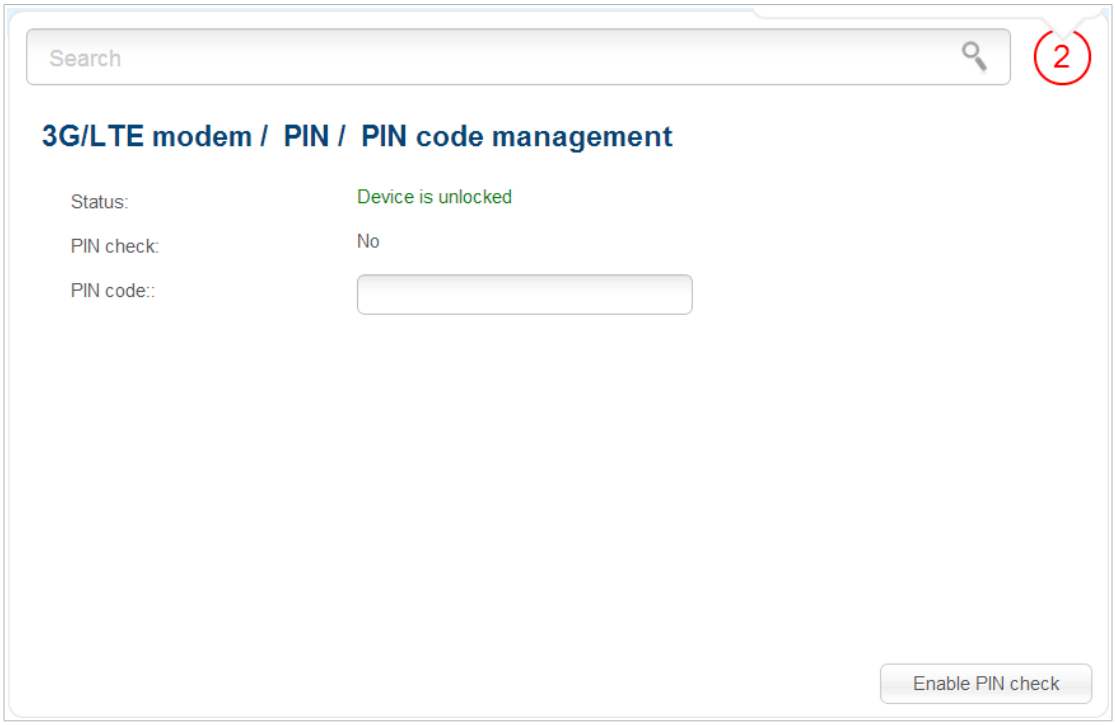


*Figure 157. The **3G/LTE modem / PIN / PIN code management** page.*

To disable the PIN code check, enter the current PIN code in the **PIN code** field and click the **Disable PIN check** button (the button is displayed if the PIN code check is enabled).

To enable the PIN code check, enter the PIN code, used before disabling the check, in the **PIN code** field and click the **Enable PIN check** button (the button is displayed if the PIN code check is disabled).

To change the PIN code, enable the PIN code check on the **3G/LTE modem / PIN / PIN code management** page and proceed to the **3G/LTE modem / PIN / Changing PIN code** page.

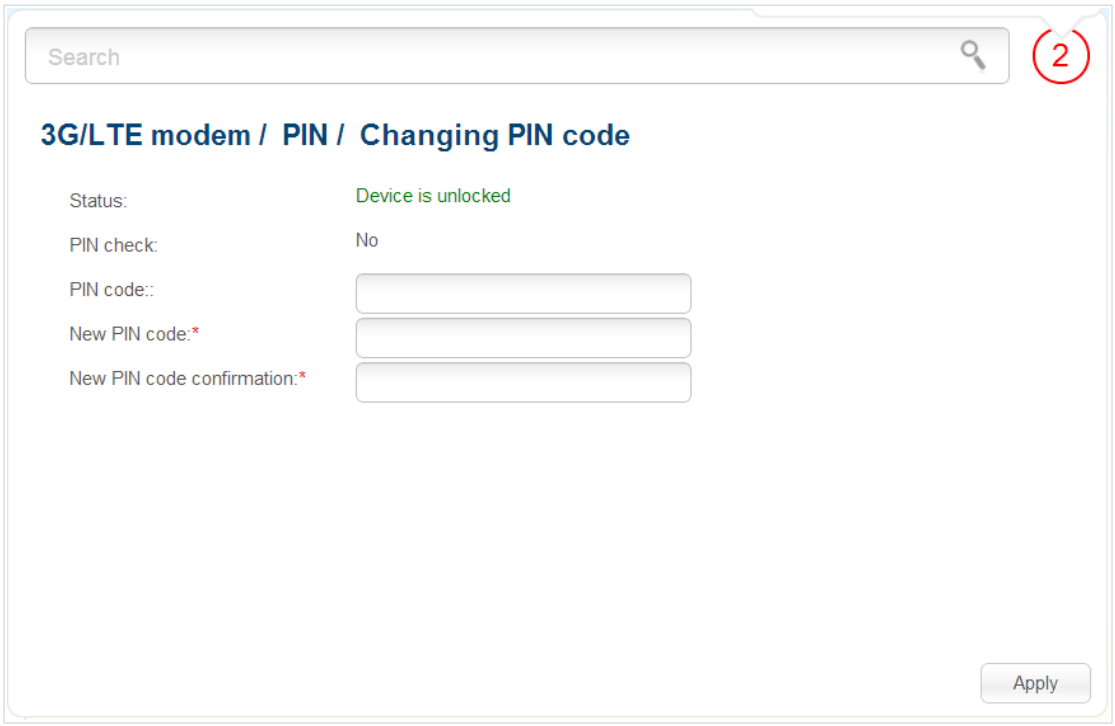


*Figure 158. The **3G/LTE modem / PIN / Changing PIN code** page.*

Enter the current code in the **PIN code** field, then enter a new code in the **New PIN code** and **New PIN code confirmation** fields and click the **Apply** button.

If upon one of the operations described above you have entered an incorrect value in the **PIN code** field three times (the number of remaining attempts is displayed in the **Attempts left** field), the identification card inserted into your USB modem is blocked.

For further use of the card, enter the PUK code in the relevant field, and then specify a new PIN code for your SIM card in the **New PIN code** field. Click the **Enter** button.

USB Storage

This menu is designed to operate USB storages. Here you can do the following:

- view data on the connected USB storage
- view content of the connected USB storage
- configure the router as a print server
- configure SMB-based access to the USB storage
- enable the built-in FTP server of the router
- enable the built-in DLNA server of the router.

Information

On the **USB storage / Information** page, you can view data on the USB storage connected to the router.

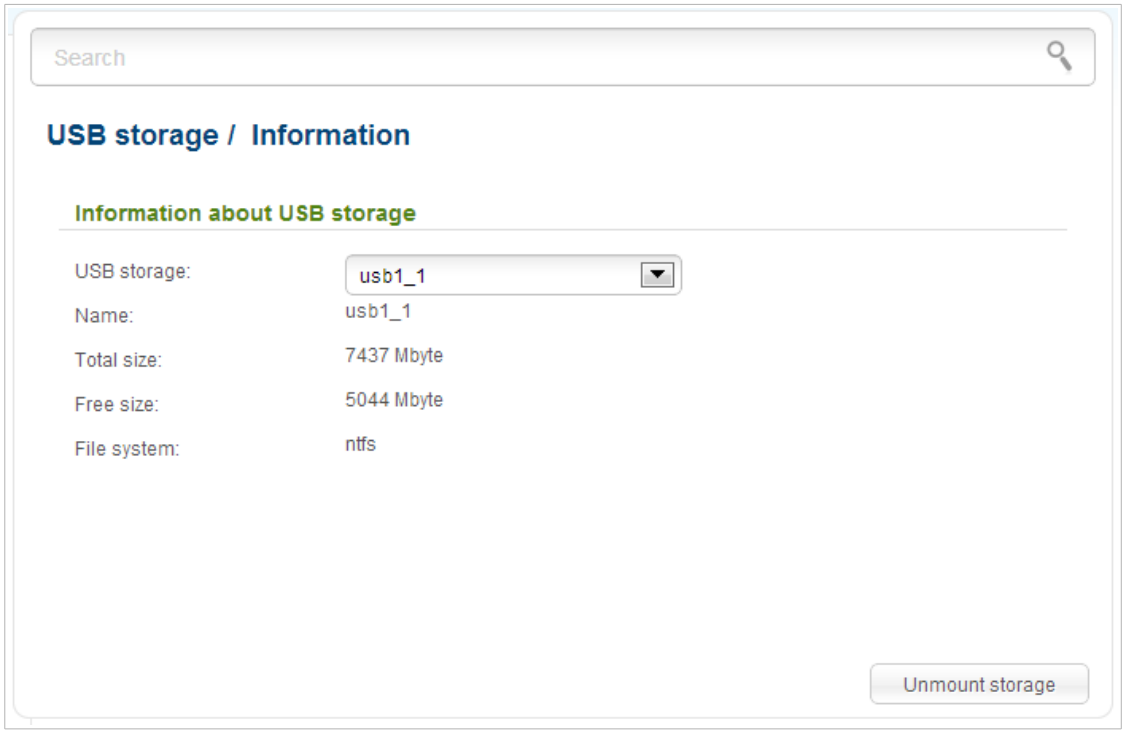


*Figure 159. The **USB storage / Information** page.*

The following data are presented on the page: the name, total and free space of the storage, and the type of its file system (supported file systems: FAT16/32, NTFS, and ext2/3).

If the USB storage is divided into volumes, several values are displayed in the **USB storage** drop-down list. Select the needed value to view data on the volume (partition) of the USB storage.

To safely disconnect the USB storage, click the **Unmount storage** button. When the **Disconnected** value is displayed on the page, remove the storage from the router.

To disconnect one volume of the storage, select the needed value from the **USB storage** drop-down list and click the **Unmount volume** button.

Filebrowser

On the **USB storage / Filebrowser** page, you can view the content of your USB storage connected to the router and remove separate folders and files from the USB storage.

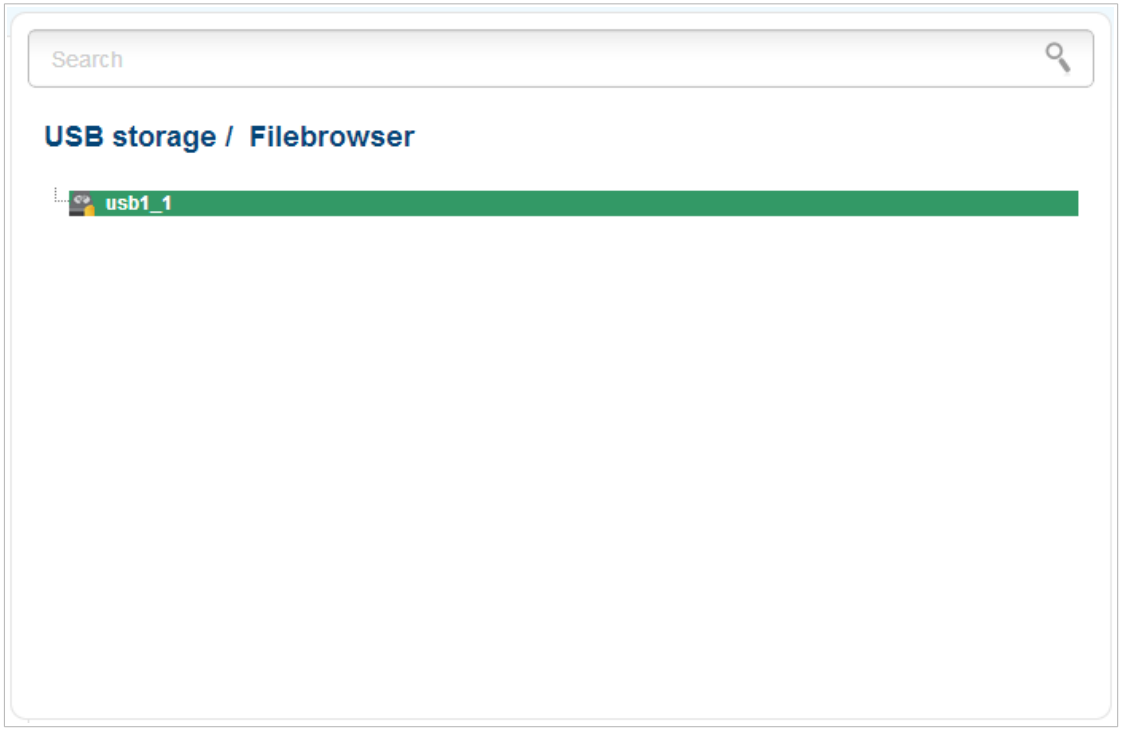


*Figure 160. The **USB storage / Filebrowser** page.*

To view the content of the USB storage, double-click the icon of the storage or storage partition. The list of folders and files will be displayed on the page.

To proceed to a folder, select it in the directory structure on the left part of the page and double-click the line corresponding to this folder.

To refresh the folder contents, right-click the line corresponding to this folder, and select the **Refresh** value in the menu displayed.

To remove a folder or file, right-click the line corresponding to this folder or file, and select the **Delete** value in the menu displayed.

Print Server

On the **USB storage / Print-server** page, you can configure the router as a print server. Being configured in this way, the router will allow your LAN users to share the printer connected to the USB port of the router.

To connect a printer to the router, power off both devices. Connect printer to the USB port of the router, power on the printer, then power on the router.

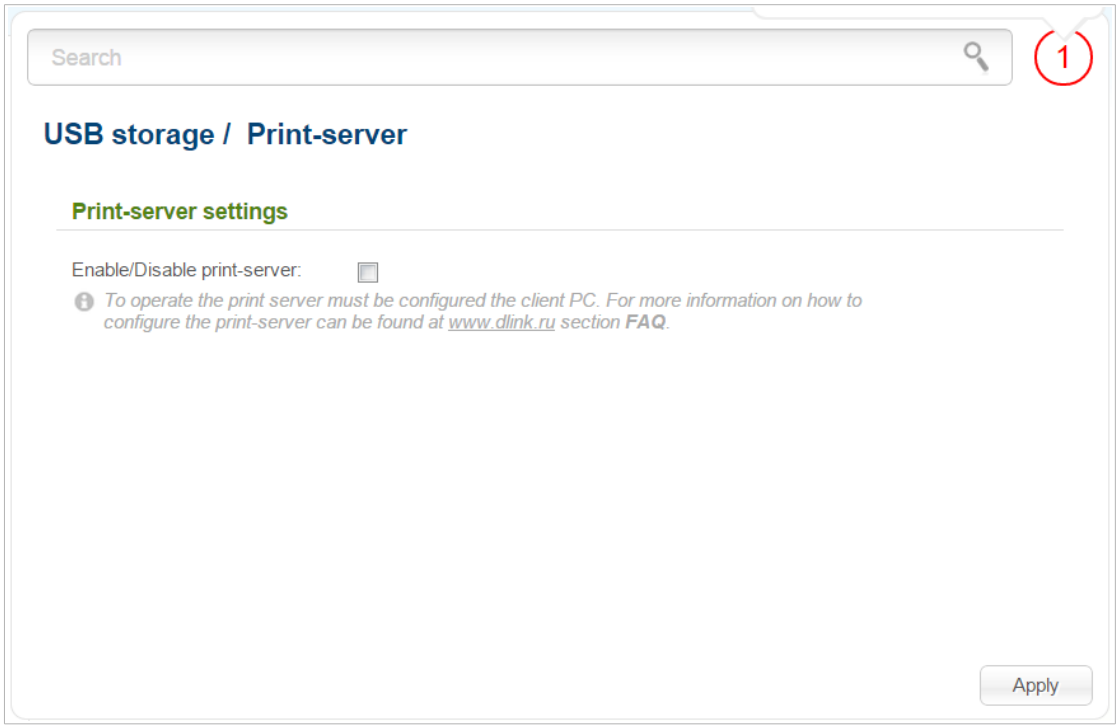


*Figure 161. The **USB storage / Print-server** page.*

To configure the router as a print server, select the **Enable/Disable print-server** checkbox and click the **Apply** button.

If you don't want to use the router as a print server, deselect the **Enable/Disable print-server** checkbox and click the **Apply** button.

Samba

On the **USB storage / Samba** page, you can enable the built-in Samba server of the router to provide access to the USB storage for users of your LAN.

*Figure 162. The **USB storage / Samba** page.*

You can enable the Samba server only when a USB storage is connected to the router (in this case, the **Connected** value is displayed in the **USB storage** field). To enable the Samba server, select the **Enable** checkbox.

The **Anonymous login** checkbox enables anonymous access to the content of the USB storage for users of your LAN. By default, the checkbox is selected.

If you want to provide authorized access to the content of the USB storage for users of your LAN, deselect the checkbox. After applying the parameters on this page, proceed to the **System / USB Users** page and create needed accounts.

In the **Workgroup** field, leave the value specified by default (`WORKGROUP`) or specify a new name of a workgroup which participants will have access to the content of the USB storage.

In the **Short description** field, you can specify an additional description for the USB storage. This value will be displayed in some operating systems. Use digits and/or Latin characters.

In the **NetBIOS** field, specify a new name of the USB storage for identification in your LAN. Use digits and/or Latin characters.

After specifying the needed parameters, click the **Apply** button.

To disable the built-in Samba server of the router, deselect the **Enable** checkbox and click the **Apply** button.

FTP

On the **USB storage / FTP** page, you can enable the built-in FTP server of the router to provide access to the USB storage for users of your LAN.

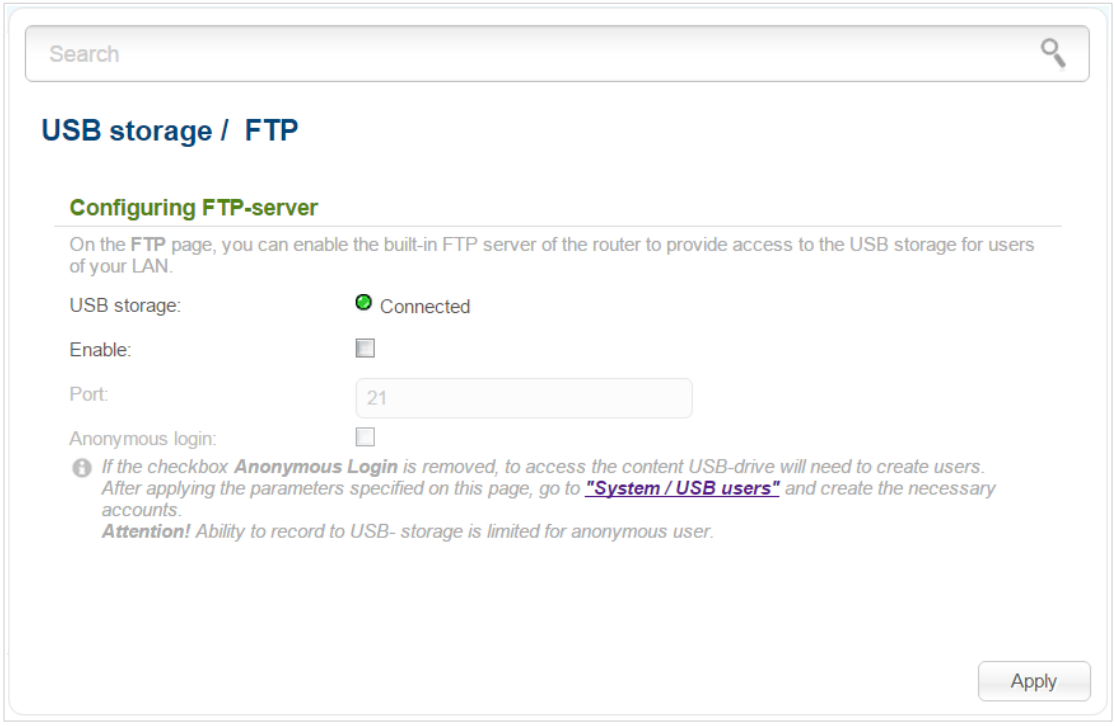


*Figure 163. The **USB storage / FTP** page.*

You can enable the FTP server only when a USB storage is connected to the router (in this case, the **Connected** value is displayed in the **USB storage** field).

Select the **Enable** checkbox; if needed, change the router's port used by the FTP server in the **Port** field (by default, the standard port `21` is specified).

Select the **Anonymous login** checkbox to enable anonymous access to the content of the USB storage for users of your LAN. If you want to provide authorized access to the content of the USB storage for users of your LAN, leave the checkbox unselected. After applying the parameters on this page, proceed to the **System / USB Users** page and create needed accounts.

After specifying the needed parameters, click the **Apply** button.

To disable the built-in FTP server of the router, deselect the **Enable** checkbox and click the **Apply** button.

DLNA

On the **USB storage / DLNA page**, you can enable the built-in DLNA server of the router to provide access to the USB storage for users of your LAN.

The built-in media server allows DLNA certified devices of your LAN to play multimedia content of the USB storage. Multimedia content can be played only when a USB storage is connected to the router.

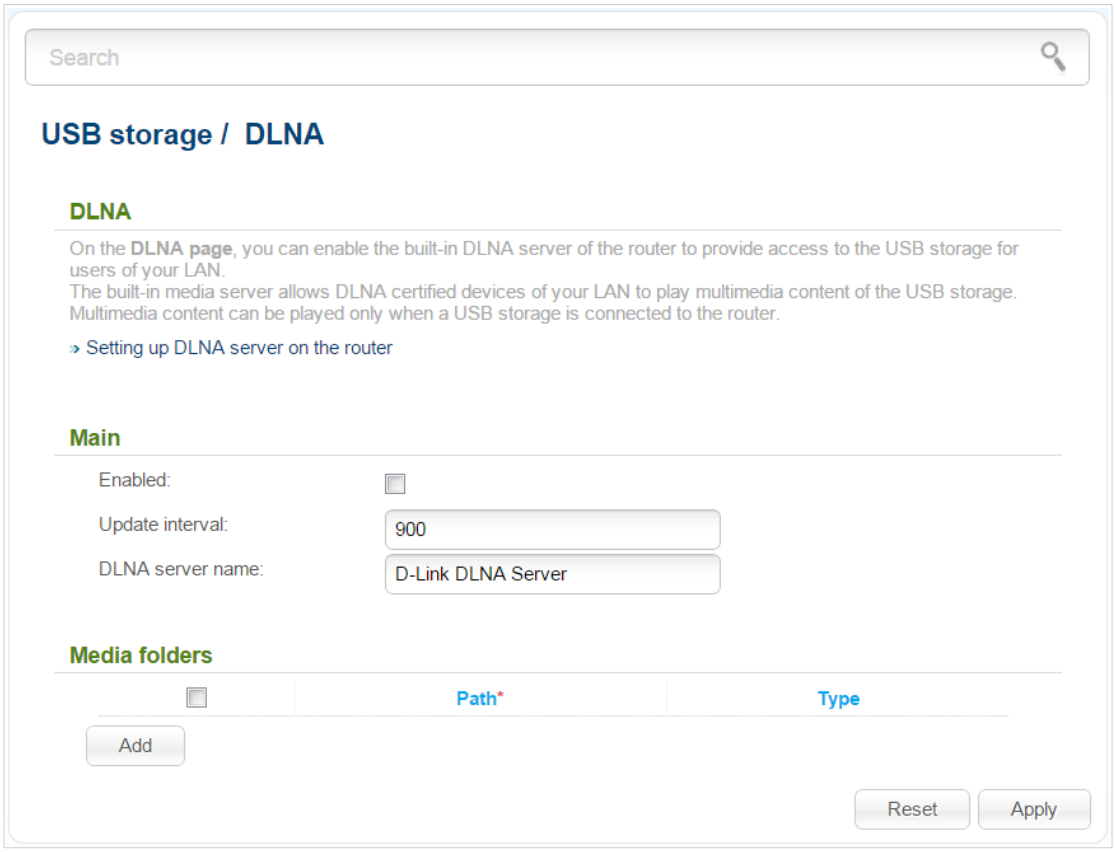


*Figure 164. The **USB storage / DLNA** page.*

To enable the DLNA server, select the **Enabled** checkbox.

In the **Update interval** field, specify the time period (in seconds), at the end of which the media server updates the file list of the USB storage, or leave the value specified by default (**900**). The minimal value you can specify is 60 seconds.

In the **DLNA server name** field, specify a new name of the DLNA server for easier identification in your LAN or leave the value specified by default (**D-Link DLNA Server**). Use digits and/or Latin characters.

To allow access to the content of the USB storage for users of your LAN, click the **Add** button. In the line displayed, locate a folder. To do this, click the button located to the right of the **Path** field (the button is available if the **Path** field is selected). In the opened window, double-click the icon of the storage or storage partition, select the needed folder in the directory structure, and click the **Open** button.

For each folder you can define the type of files which will be available for users of your LAN. To do this, select the needed type of files from the **Type** drop-down list. To share all files of a folder, select the **All** value from the **Type** drop-down list.

To undo the last changes, click the **Reset** button.

After specifying the needed parameters, click the **Apply** button.

To remove a folder from the list, select the checkbox in the line containing the relevant folder and click the **Apply** button.

To disable the built-in DLNA server of the router, deselect the **Enabled** checkbox and click the **Apply** button.

The step-by-step description of how to configure the DLNA server of the router is available on D-Link website. To access it, click the **Setting up DLNA server on the router** link in the top part of the page.

Transmission

In this menu you can configure the built-in Transmission torrent client and manage distributing and downloading processes.

Transmission Settings

On the **Transmission / Transmission settings** page, you can configure all needed settings for the built-in Transmission client.

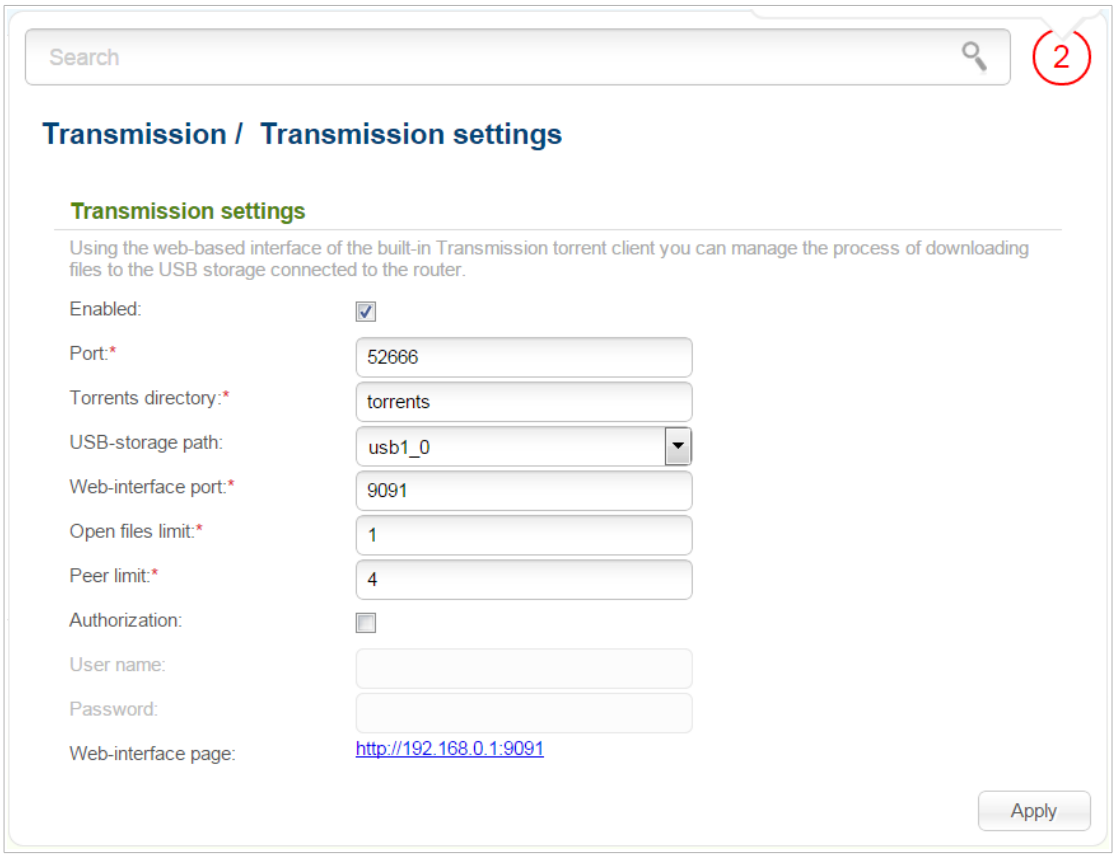


*Figure 165. The **Transmission / Transmission settings** page.*

You can specify the following parameters:

Parameter	Description
Enabled	Select the checkbox to activate the Transmission client.
Port	The router's port which will be used by the Transmission client.
Torrents directory	The folder on the USB storage where files of the Transmission client will be stored.
USB-storage path	The name of the USB storage in the file system of the router. If the USB storage is divided into volumes, several values are displayed in the drop-down list.

Parameter	Description
Web-interface port	The port on which the web-based interface of the Transmission client is available.
Open files limit	The maximum number of files which clients can download simultaneously.
Peer limit	The maximum number of the service users from which you can download files.
Authorization	Select the checkbox if you want the Transmission client to request for username and password when accessing its web-based interface. Then fill in the **User name** and **Password** fields.
User name	The username to access the web-based interface of the Transmission client.
Password	The password to access the web-based interface of the Transmission client.

After specifying the needed parameters, click the **Apply** button.

In the **Web-interface page** field, the address of the web-based interface of the Transmission client is displayed. To access the web-based interface of the Transmission client, click the link.

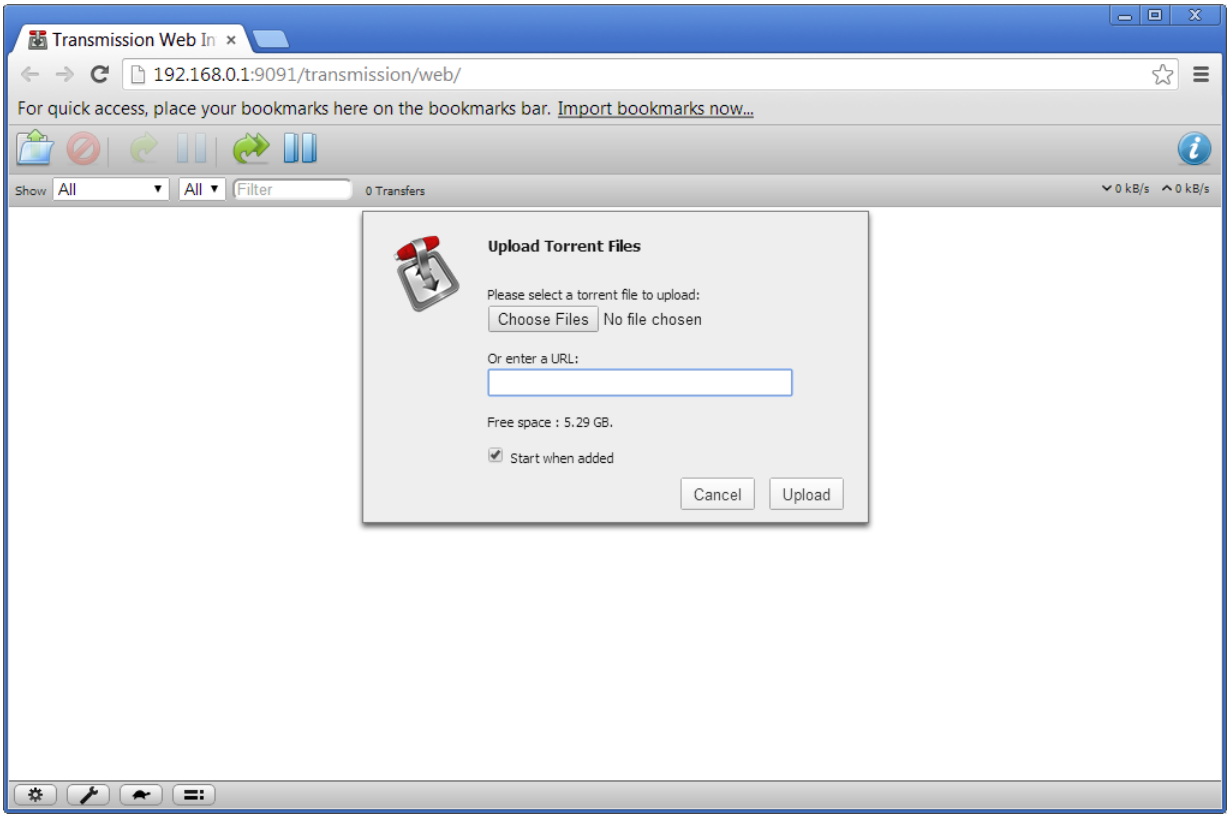


Figure 166. The web-based interface of the Transmission torrent client.

Using the web-based interface of the built-in Transmission torrent client you can manage the process of downloading files to the USB storage connected to the router.

To add a new torrent file, click the button  (**Open Torrent**) and select a file stored on your PC. Click the button **Upload** in the dialog box appeared.

To stop downloading of a file, select it in the list and click the button  (**Pause Selected Torrents**).

To resume downloading of a file, select it in the list and click the button  (**Start Selected Torrents**).

To view data on a file, select it in the list and click the button  (**Toggle Inspector**).

To remove a file presented on the page, select it in the list and click the button  (**Remove Selected Torrents**).

Control

This menu is designed to create restrictions on access to certain web sites.

URL Filter

On the pages of the **Control / URL filter** section, you can specify restrictions on access to certain web sites.

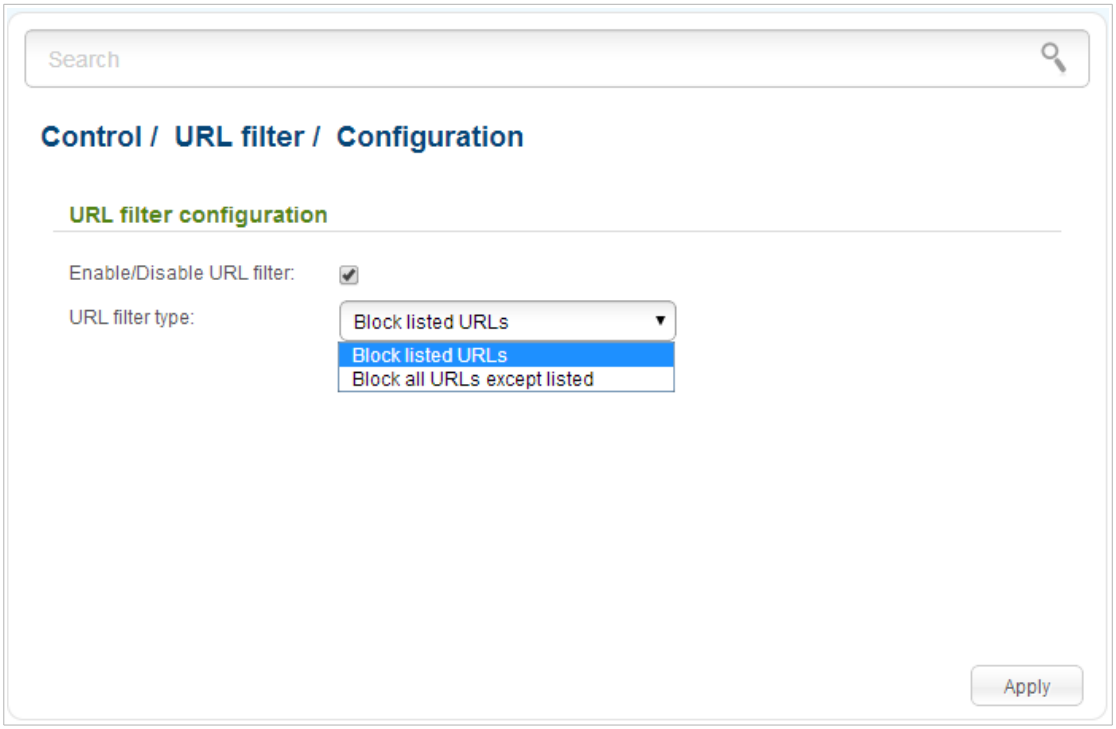


*Figure 167. The **Control / URL filter / Configuration** page.*

To enable the URL filter, select the **Enable/Disable URL filter** checkbox on the **Control / URL filter / Configuration** page, then select a needed mode from the **URL filter type** drop-down list:

- **Block listed URLs**: when this value is selected, the router blocks access to all addresses specified on the **Control / URL filter / Configuration** page;
- **Block all URLs except listed**: when this value is selected, the router allows access to addresses specified on the **Control / URL filter / Configuration** page and blocks access to all other web sites.

Click the **Apply** button.

To specify URL addresses to which the selected filtering will be applied, go to the **Control / URL filter / URL addresses** page.

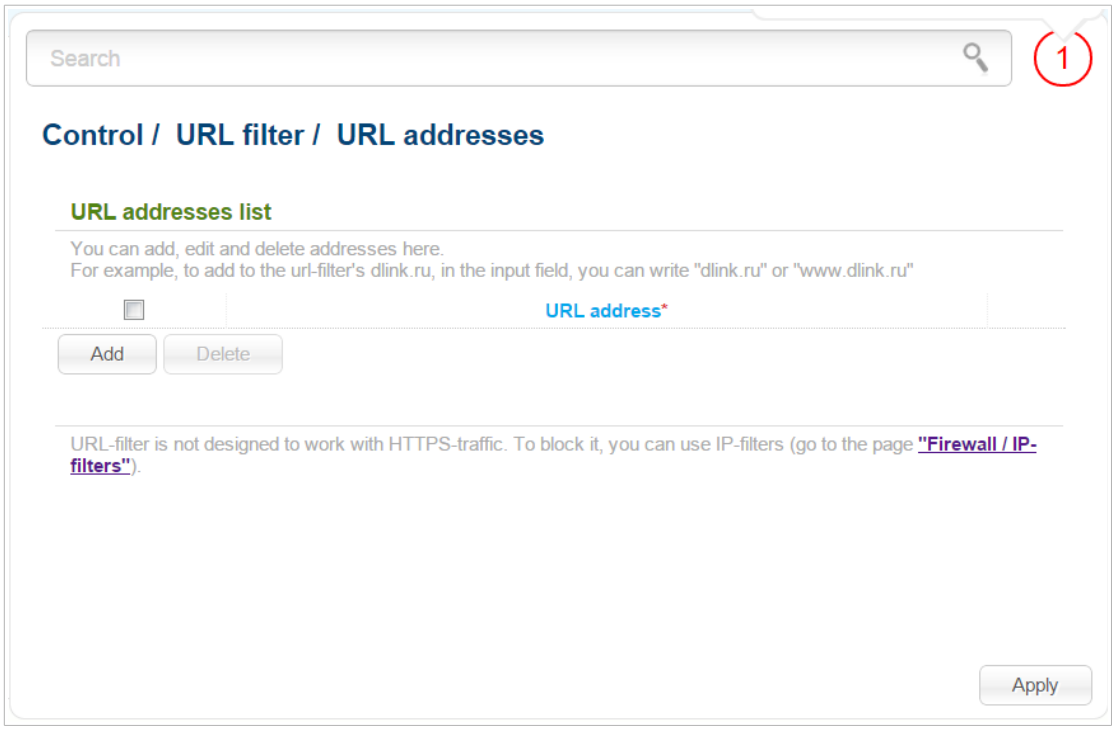


*Figure 168. The **Control / URL filter / URL addresses** page.*

Click the **Add** button and enter an address in the field displayed. Then click the **Apply** button.

To remove an address from the list of URL addresses, select the checkbox located to the left of the relevant URL address and click the **Delete** button. Then click the **Apply** button.

Yandex.DNS

This menu is designed to configure the Yandex.DNS service.

Yandex.DNS is a web content filtering service which provides the DNS server, protect a computer against malicious web sites, and block access to adult web sites. Click the **About yandex.DNS** link in the **Yandex.DNS** section to get detailed information on the service.

Internet Protection Settings

On the pages of the **Yandex.DNS / Internet protection settings** section, you can enable the Yandex.DNS service and configure its operating mode.

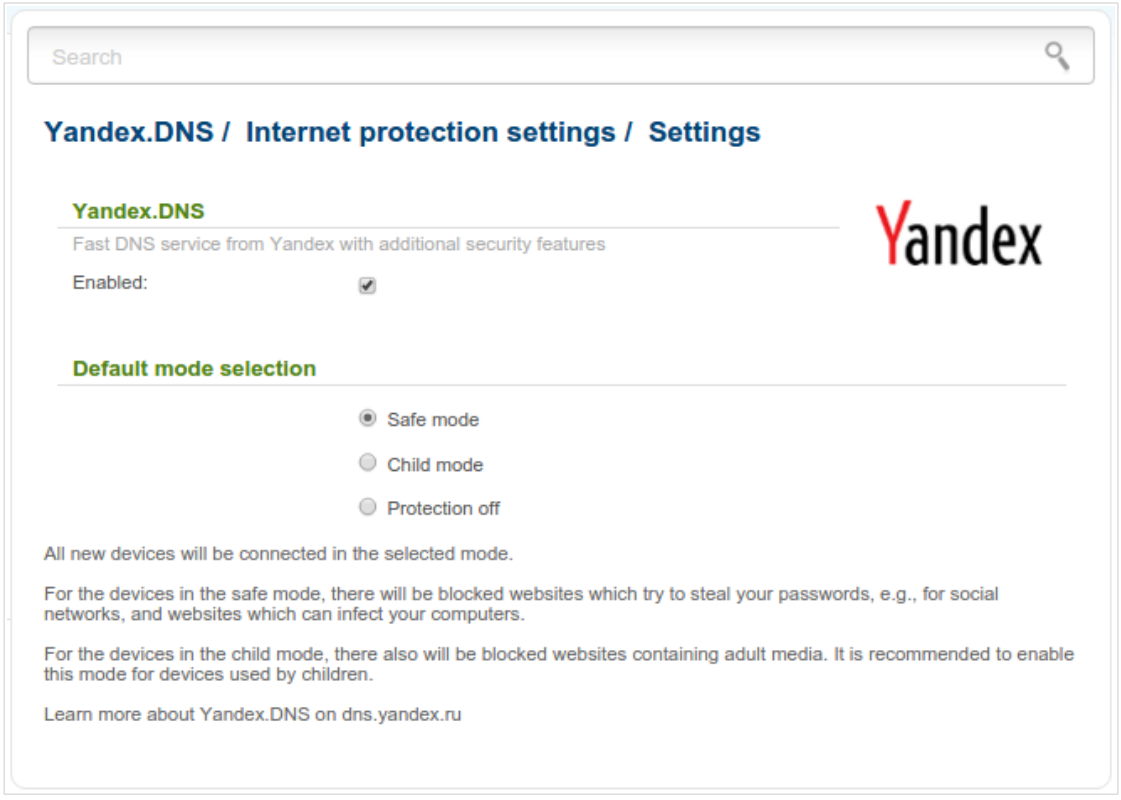


*Figure 169. The **Yandex.DNS / Internet protection settings / Settings** page.*

To enable the Yandex.DNS service, select the **Enabled** checkbox on the **Yandex.DNS / Internet protection settings / Settings** page.

When the checkbox is selected, the **Default mode selection** section is displayed on the page. Select the needed choice of the radio button to configure filtering for all devices of the router's network:

- **Safe mode**: when this value is selected, the service blocks access to malicious and fraudulent web sites;
- **Child mode**: when this value is selected, the service blocks access to malicious and fraudulent web sites and blocks access to adult content;
- **Protection off**: when this value is selected, the service provides the DNS server with no restrictions on access to unsafe web sites.

Also the selected filtering mode will be applied to all devices newly connected to the router's network.

If you need to specify a filtering mode for each device separately, create relevant rules. To do this, go to the **Yandex.DNS / Internet protection settings / Devices** page.

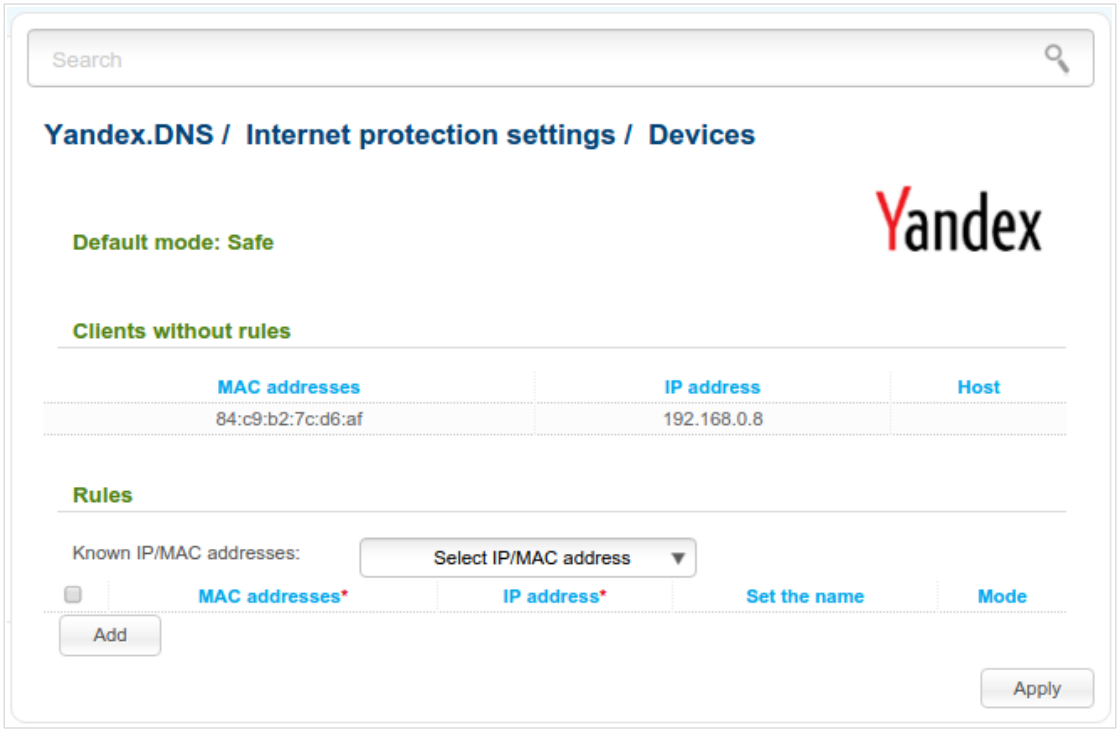


*Figure 170. The **Yandex.DNS / Internet protection settings / Devices** page.*

On the opened page, in the **Clients without rules** section, the devices which filtering mode is specified on the **Yandex.DNS / Internet protection settings / Settings** page are displayed. The name of the mode is displayed in the **Mode chosen by default** section.

To create[14] a new filtering rule for a device, click the **Add** button in the **Rules** section. In the line displayed, you can specify the following parameters:

Parameter	Description
MAC addresses	The MAC address of a device from the router's LAN. You can enter the MAC address of a device connected to the router's LAN at the moment. To do this, select the relevant device from the **Known IP/MAC addresses** drop-down list (the field will be filled in automatically).
IP address	The IP address of a device from the router's LAN. You can enter the IP address of a device connected to the router's LAN at the moment. To do this, select the relevant device from the **Known IP/MAC addresses** drop-down list (the field will be filled in automatically).
Set the name	Enter a name for the rule for easier identification. You can specify any name.
Mode	Select an operating mode of the Yandex.DNS service for this rule. **Child**: when this value is selected, the service blocks access to malicious and fraudulent web sites and blocks access to adult content. **Safe**: when this value is selected, the service blocks access to malicious and fraudulent web sites. **Protection off**: when this value is selected, the service provides the DNS server with no restrictions on access to unsafe web sites.

After specifying the needed parameters, click the **Apply** button.

To edit a rule for filtering, select a needed field in the relevant line of the table, change its value, and click the **Apply** button.

To remove a rule for filtering, select the checkbox located to the left of the relevant rule and click the **Apply** button.

To disable the Yandex.DNS service, deselect the **Enabled** checkbox on the **Yandex.DNS / Internet protection settings / Settings** page.

14 When a new rule for filtering is created, a MAC address and IP address pair is displayed on the **Net / LAN** page. The created pair will be deleted with the relevant rule.

System

In this menu you can do the following:

- change the password used to access the router's settings
- save the current settings to the non-volatile memory
- reboot the router
- create a backup of the router's configuration
- restore the router's configuration from a previously saved file
- restore the factory default settings
- view the system log
- update the firmware of the router
- configure automatic notification on new firmware version
- configure automatic synchronization of the system time or manually configure the date and time for the router
- check availability of a host on the Internet through the web-based interface of the router
- trace the route to a host
- allow or forbid access to the router via TELNET
- create accounts for users to allow access to the content of the USB storage
- switch the device to the other mode.

Administrator Password

On the **System / Administrator password** page, you can change the password for the administrator account used to access the web-based interface of the router and to access the device settings via TELNET.

! For security reasons, it is strongly recommended to change the administrator password upon initial configuration of the router.

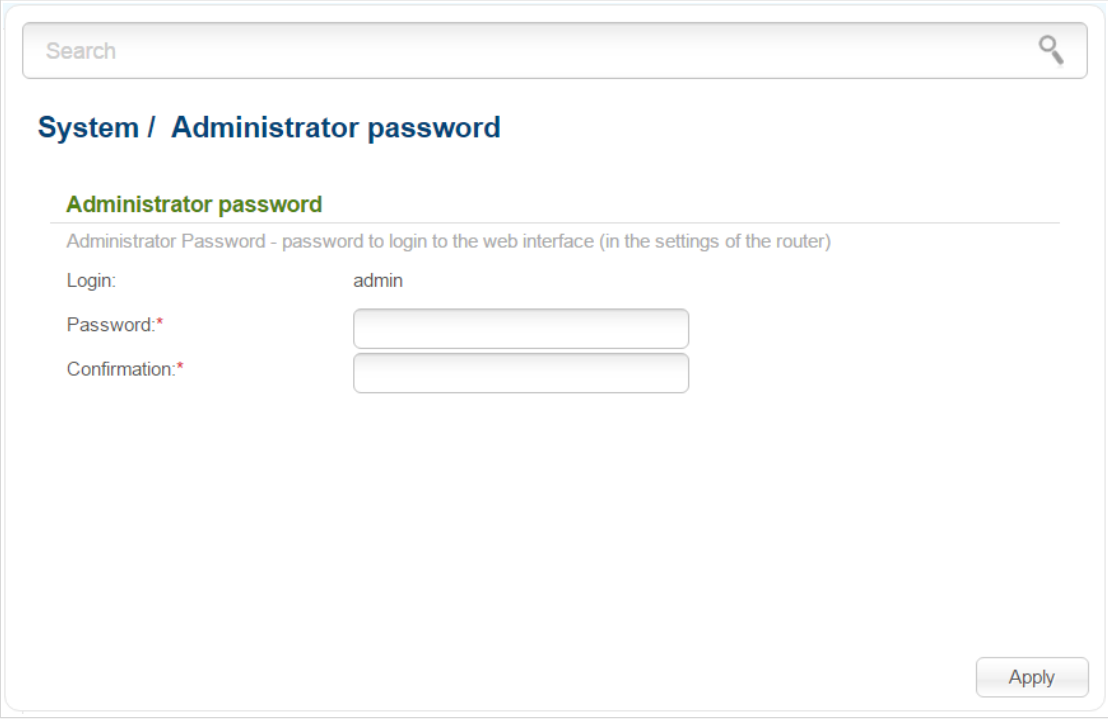


Figure 171. The page for modifying the administrator password.

Enter the new password in the **Password** and **Confirmation** fields and click the **Apply** button.

Configuration

On the **System / Configuration** page, you can reboot the device, save the changed settings to the non-volatile memory, restore the factory defaults, backup the current configuration, or restore the router's configuration from a previously created file.

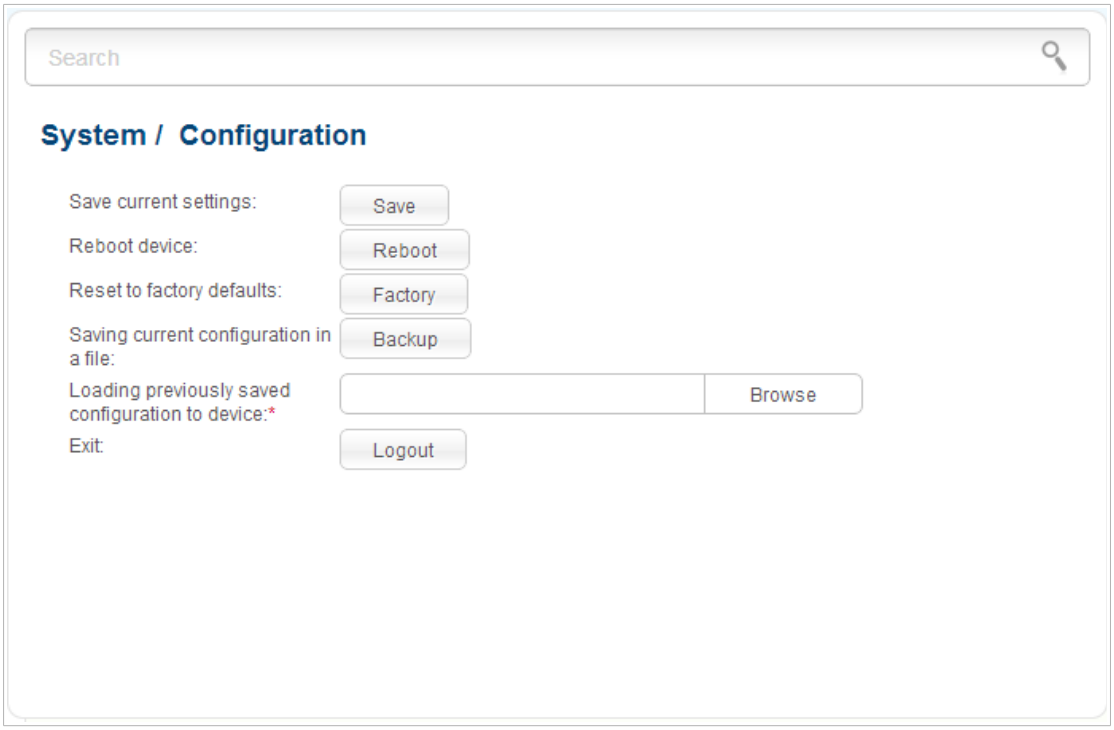


*Figure 172. The **System / Configuration** page.*

The following buttons are available on the page:

Control	Description
Save	Click the button to save settings to the non-volatile memory. Please, save settings every time you change the router's parameters. Otherwise the changes will be lost upon hardware reboot of the router.
Reboot	Click the button to reboot the device. All unsaved changes will be lost after the device's reboot.
Factory	Click the button to restore the factory default settings. Also you can restore the factory defaults via the hardware **RESET** button (see the ***Back and Bottom Panels*** section, page 16).
Backup	Click the button to save the configuration (all settings of the router) to your PC. The configuration backup will be stored in the download location of your web browser.

Control	Description
Browse	Click the button and follow the dialog box appeared to select a previously saved configuration file (all settings of the router) located on your PC and upload it.
Logout	Click the button to exit the web-based interface.

Actions of the **Save**, **Reboot**, **Factory**, **Backup**, and **Logout** buttons also can be performed via the top-page menu displayed when the mouse pointer is over the **System** caption.

System Log

On the **System / System log / Configuration** page, you can set the system log options and configure sending the system log to a remote host.

*Figure 173. The **System / System log / Configuration** page.*

To enable logging of the system events, select the **Logging** checkbox. Then specify the needed parameters.

Control	Description
Logging type	Select a type of logging from the drop-down list. • **Local**: the system log is stored in the router's memory (and displayed on the **System / System log / Log** page). When this value is selected, the **Server** and **Port** fields are not displayed. • **Remote**: the system log is sent to the remote host specified in the **Server** field. • **Local and remote**: the system log is stored in the router's memory (and displayed on the **System / System log / Log** page) and sent to the remote host specified in the **Server** field.
Logging level	Select a type of messages and alerts/notifications to be logged.
Server	The IP or URL address of the host from the local or global network, to which the system log will be sent.

Control	Description
Port	A port of the host specified in the **Server** field. By default, the value `514` is specified.

After specifying the needed parameters, click the **Apply** button.

To disable logging of the system events, deselect the **Logging** checkbox and click the **Apply** button.

On the **System / System log / Log** page, the events specified in the **Logging level** list are displayed.

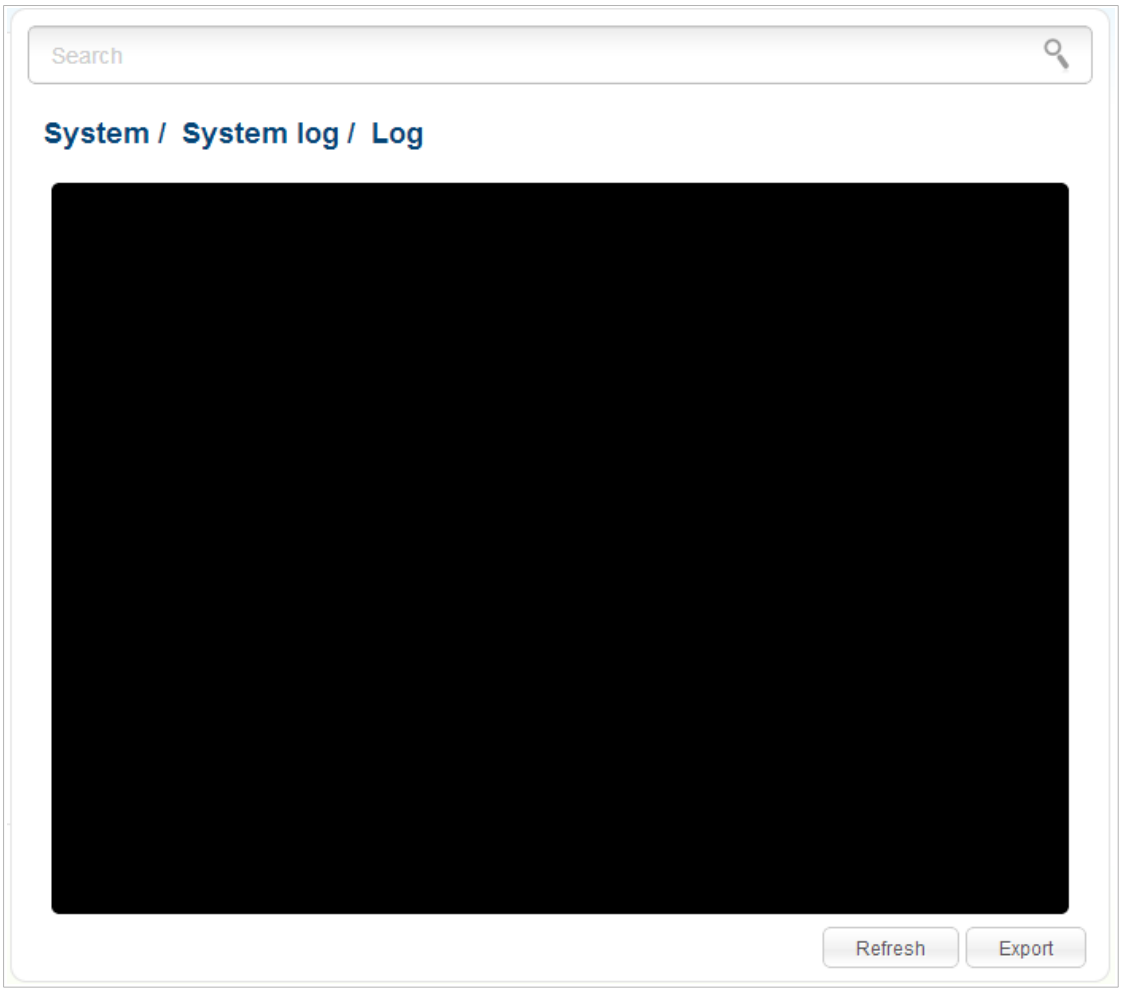


*Figure 174. The **System / System log / Log** page.*

To view the latest system events, click the **Refresh** button.

To save the system log to your PC, click the **Export** button and follow the dialog box appeared.

Firmware Upgrade

On the **System / Firmware upgrade** page, you can upgrade the firmware of the router and configure the automatic check for updates of the router's firmware.

! Upgrade the firmware only when the router is connected to your PC via a wired connection.

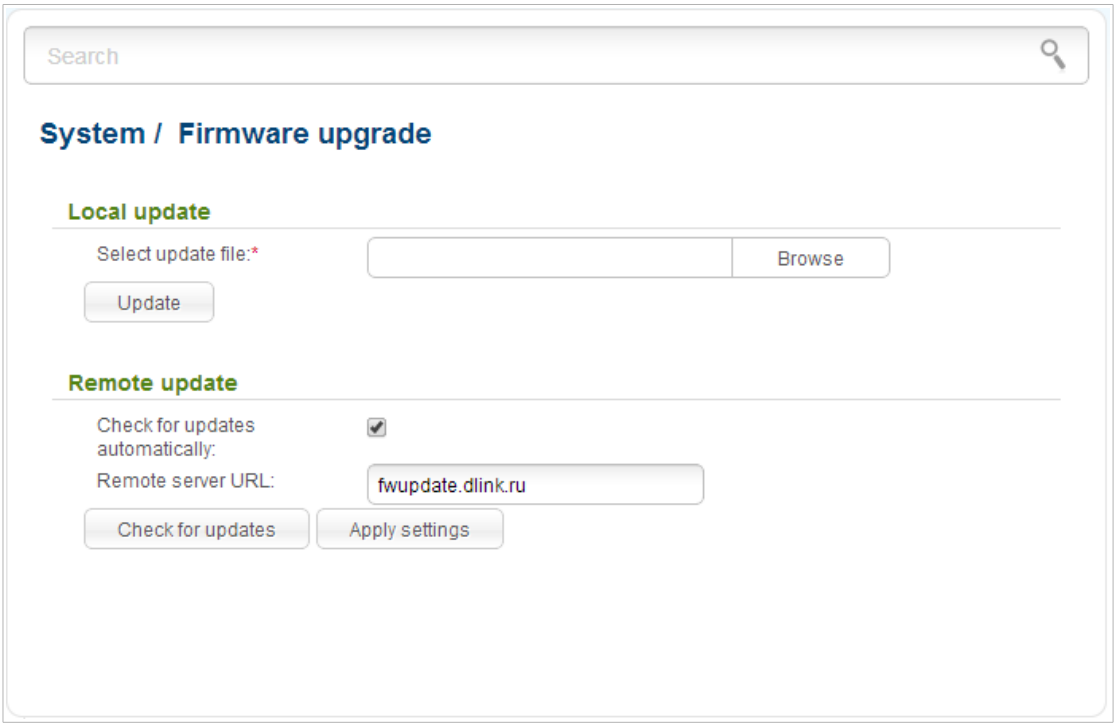


*Figure 175. The **System / Firmware upgrade** page.*

The current version of the router's firmware is displayed next the D-Link logo in the top left corner of the page.

By default, the automatic check for the router's firmware updates is enabled. If a firmware update is available, a notification will be displayed in the top right corner of the page.

To disable the automatic check for firmware updates, in the **Remote update** section, deselect the **Check for updates automatically** checkbox and click the **Apply settings** button.

To enable the automatic check for firmware updates, in the **Remote update** section, select the **Check for updates automatically** checkbox and click the **Apply settings** button. By default, in the **Remote server URL** field, the D-Link update server address (`fwupdate.dlink.ru`) is specified.

You can upgrade the firmware of the router locally (from the hard drive of your PC) or remotely (from the update server).

Local Update

> **!** Attention! Do not turn off the router before the firmware upgrade is completed. This may cause the device breakdown.

To update the firmware of the router locally, follow the next steps:

1. Download a new version of the firmware from www.dlink.ru.
2. Click the **Browse** button on the **System / Firmware upgrade** page to locate the new firmware file.
3. Click the **Update** button to upgrade the firmware of the router.
4. Wait until the router is rebooted (about one and a half or two minutes).
5. Log into the web-based interface using the login (`admin`) and the current password.

After the upgrade is completed, the new version of the firmware will be displayed in the top left corner of the page.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, place the mouse pointer over the **System** caption in the top left corner of the page and click the  (**Reset to factory**) icon. Wait until the router is rebooted.

Remote Update

> **!** Attention! Do not turn off the router before the firmware upgrade is completed. This may cause the device breakdown.

To update the firmware of the router remotely, follow the next steps:

1. On the **System / Firmware upgrade** page, in the **Remote update** section, click the **Check for updates** button to check if a newer firmware version exists.
2. Click the **OK** button in the window displayed to upgrade the firmware of the router. Also you can upgrade the firmware of the router by clicking the **Remote update** button (the button is displayed if a newer version of the firmware is available).
3. Wait until the router is rebooted (about one and a half or two minutes).
4. Log into the web-based interface using the login (`admin`) and the current password.

After the upgrade is completed, the new version of the firmware will be displayed in the top left corner of the page.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, place the mouse pointer over the **System** caption in the top left corner of the page and click the  (**Reset to factory**) icon. Wait until the router is rebooted.

System Time

On the **System / System time** page, you can manually set the time and date of the router or configure automatic synchronization of the system time with a time server on the Internet.

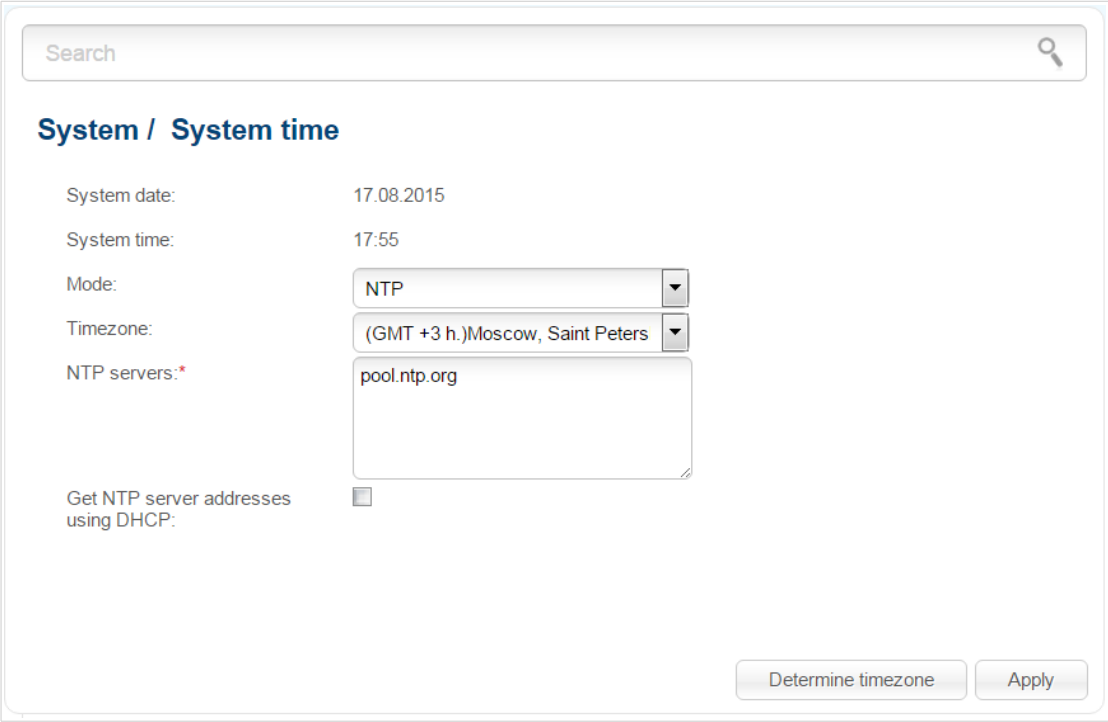


*Figure 176. The **System / System time** page.*

To set the system time manually, select the **Manual** value from the **Mode** drop-down list and set the time and date in the fields displayed. Then click the **Apply** button.

To enable automatic synchronization with a time server, follow the next steps:

1. Select the **NTP** value from the **Mode** drop-down list.
2. Select your time zone from the drop-down list. To set the time zone in accordance with the settings of your operating system, click the **Determine timezone** button in the bottom right corner of the page.
3. Specify the needed NTP server in the **NTP servers** field or leave the server specified by default.
4. Click the **Apply** button.

In some cases NTP servers addresses are provided by your ISP. In this case, you need to select the **Get NTP server addresses using DHCP** checkbox. Contact your ISP to clarify if this checkbox needs to be enabled. If the **Get NTP server addresses using DHCP** checkbox is selected, the **NTP servers** field is not available.

After clicking the **Apply** button, the date and time set for the router will be displayed in the **System date** and **System time** fields.

When the router is powered off or rebooted, the system time is reset to the default value. If you have set automatic synchronization for the system time, the internal clock of the device will be configured after connecting to the Internet. If you have set the system time manually, you need to set the time and date again (see above).

Ping

On the **System / Ping** page, you can check availability of a host from the local or global network via the Ping utility.

The Ping utility sends echo requests to a specified host and receives echo replies.

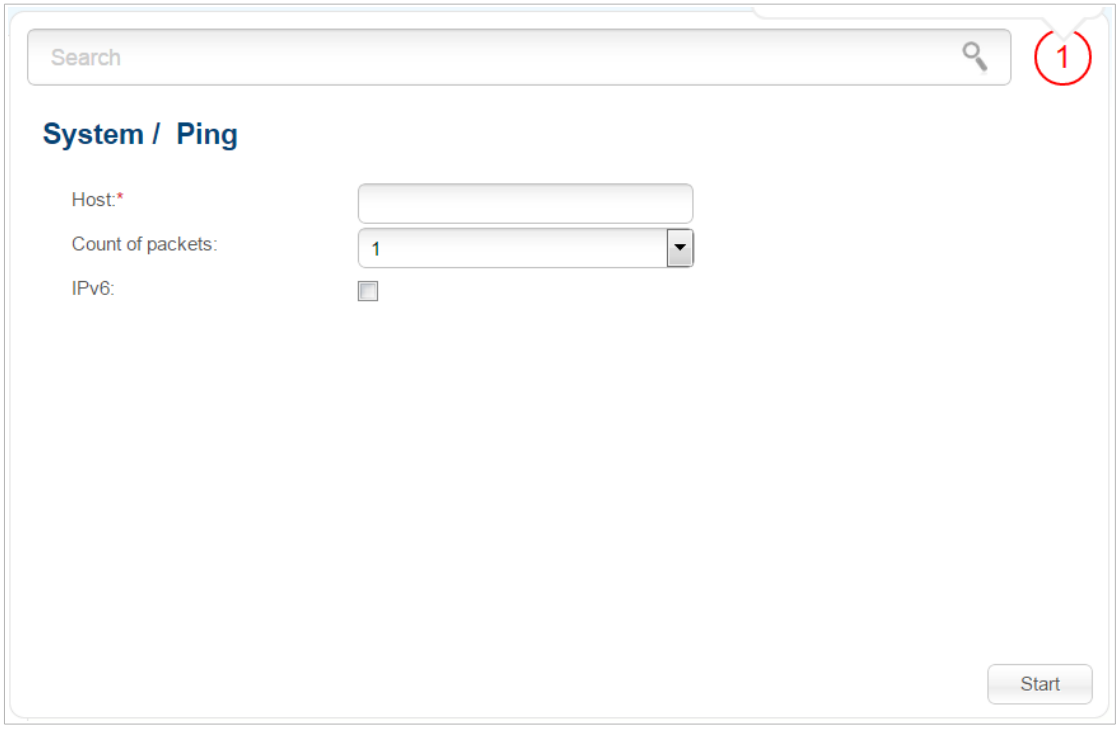


*Figure 177. The **System / Ping** page.*

To check availability of a host, enter the IP address or name of this host in the **Host** field, and select a number of requests that will be sent in order to check its availability from the **Count of packets** drop-down list. If availability check should be performed with IPv6, select the relevant checkbox. Click the **Start** button. After a while, the results will be displayed on the page.

Traceroute

On the **System / Traceroute** page, you can determine the route of data transfer to a host via the traceroute utility.

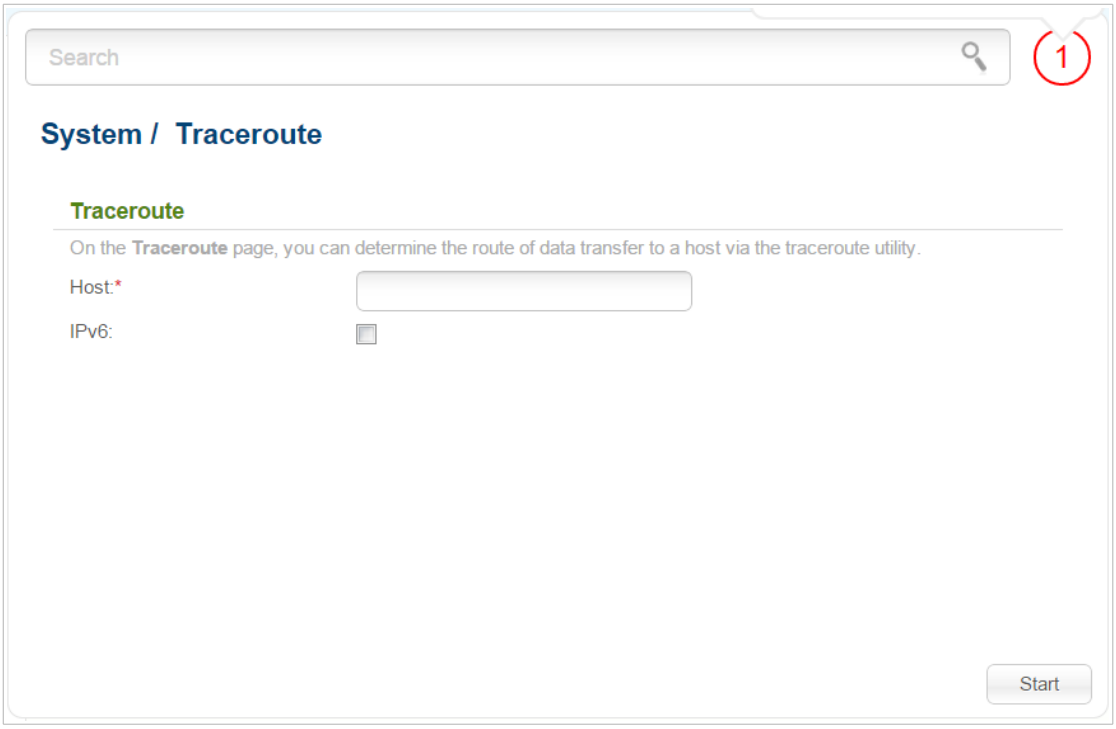


*Figure 178. The **System / Traceroute** page.*

To determine the route, enter the name or IP address of a host in the **Host** field. If the route should be determined using IPv6, select the relevant checkbox. Click the **Start** button. After a while, the results will be displayed on the page.

Telnet

On the **System / Telnet** page, you can enable or disable access to the device settings via TELNET from your LAN. By default, access is enabled.

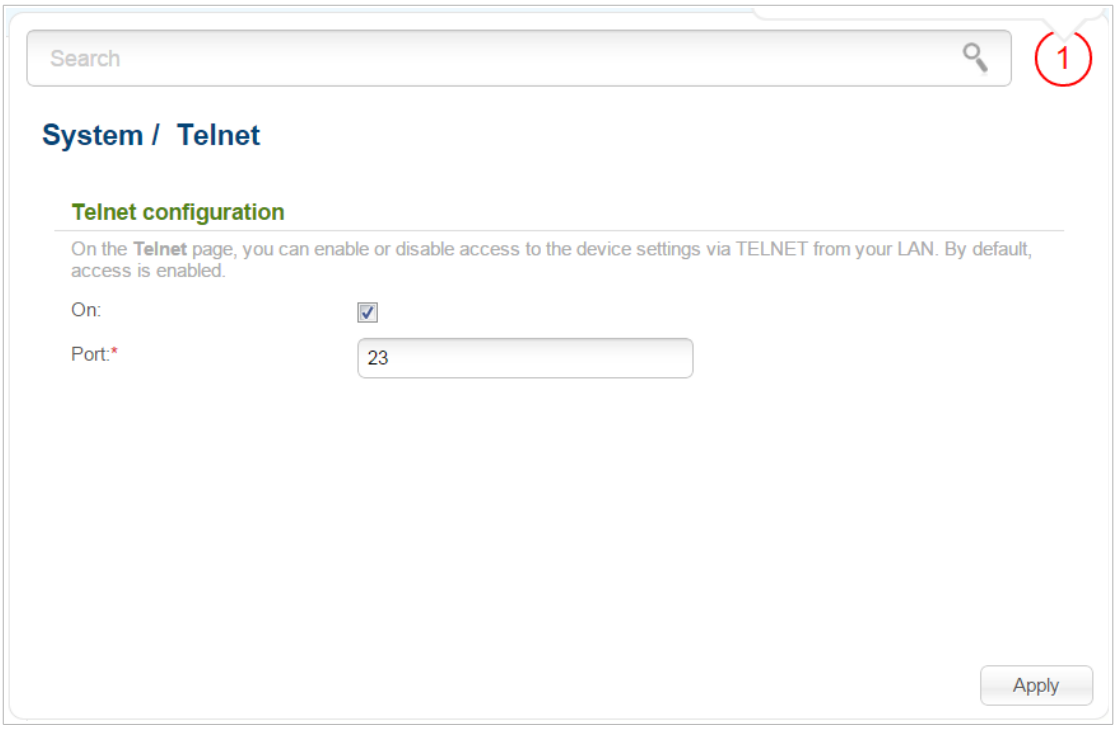


*Figure 179. The **System / Telnet** page.*

To disable access via TELNET, deselect the **On** checkbox and click the **Apply** button.

To enable access via TELNET again, select the **On** checkbox. In the **Port** field, enter the number of the router's port through which access will be allowed (by default, the port `23` is specified). Then click the **Apply** button.

USB Users

On the **System / USB users** page, you can create user accounts to provide access to data on the USB storage connected to the router.

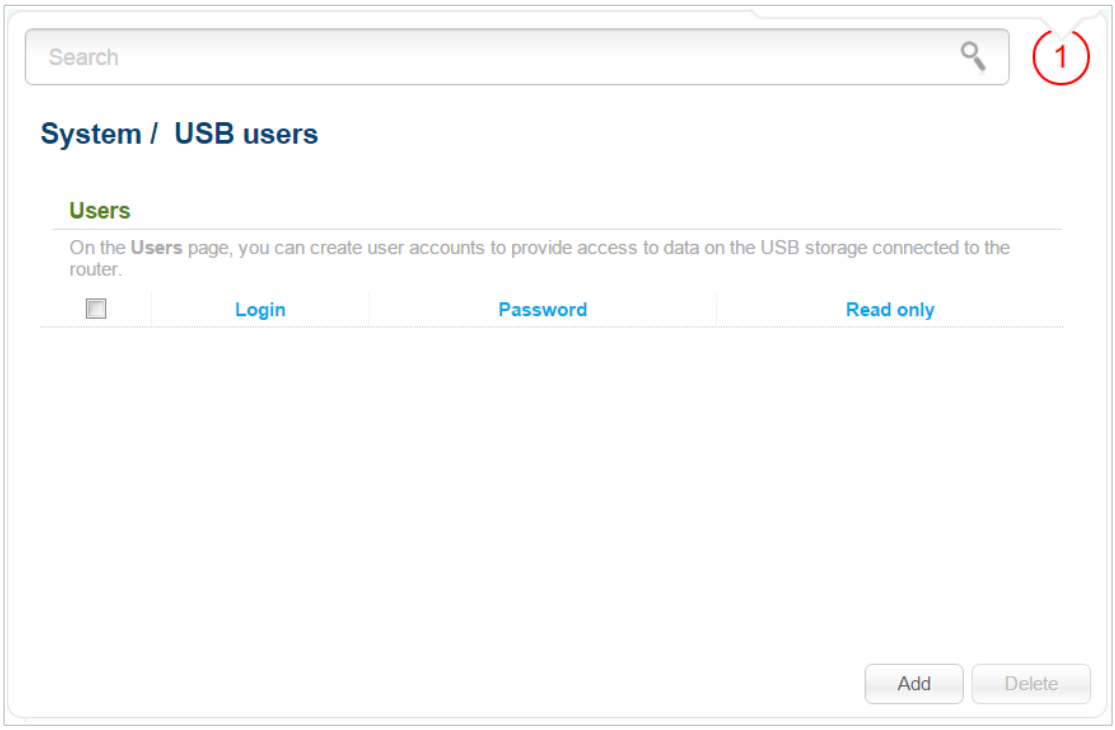


*Figure 180. The **System / USB users** page.*

To create a new user account, click the **Add** button.

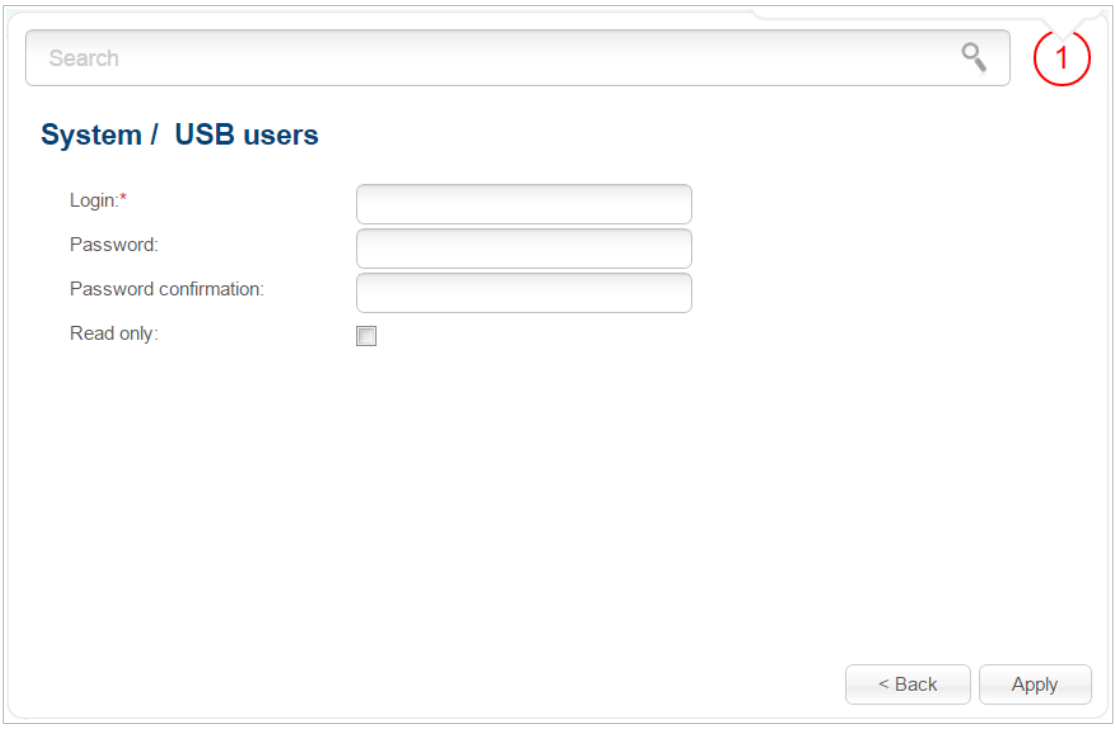


Figure 181. The page for adding a user.

On the opened page, in the **Login** field, specify a username, and in the **Password** and **Password confirmation** fields – the password for the account. You can use letters of the Latin alphabet (uppercase and/or lowercase) and digits.

! You cannot create accounts with the following usernames: **ftp**, **admin**, **support**, **user**, **nobody**.

To change the password of an account, select the relevant line in the table. On the opened page, enter a new value in the **Password** and **Password confirmation** fields, then click the **Apply** button.

To remove an account, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove an account on the editing page.

To remove all accounts from this page, click the **Clear all** button (the button is displayed if at least one account exists).

Device mode

On the **System / Device mode** page, you can change the operating mode of the device.

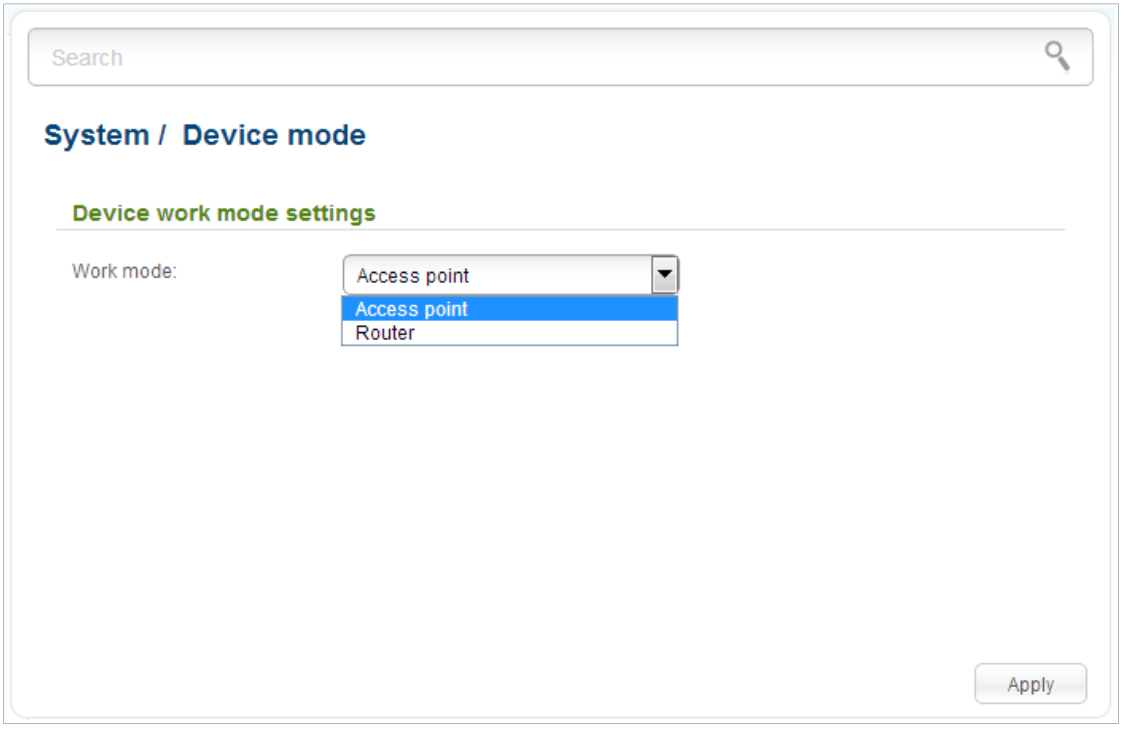


Figure 182. The page for changing the operating mode of the device.

To switch the device to the other mode, select the **Access point** value from the **Work mode** drop-down list and click the **Apply** button. In the opened dialog box, click the **OK** button to save new settings and immediately reboot the router.

CHAPTER 5. CONFIGURING DEVICE (ACCESS POINT MODE)

Wireless Network Settings Wizard

To specify all needed settings for your wireless network, click the **Wireless network settings wizard** link in the **Home** section.

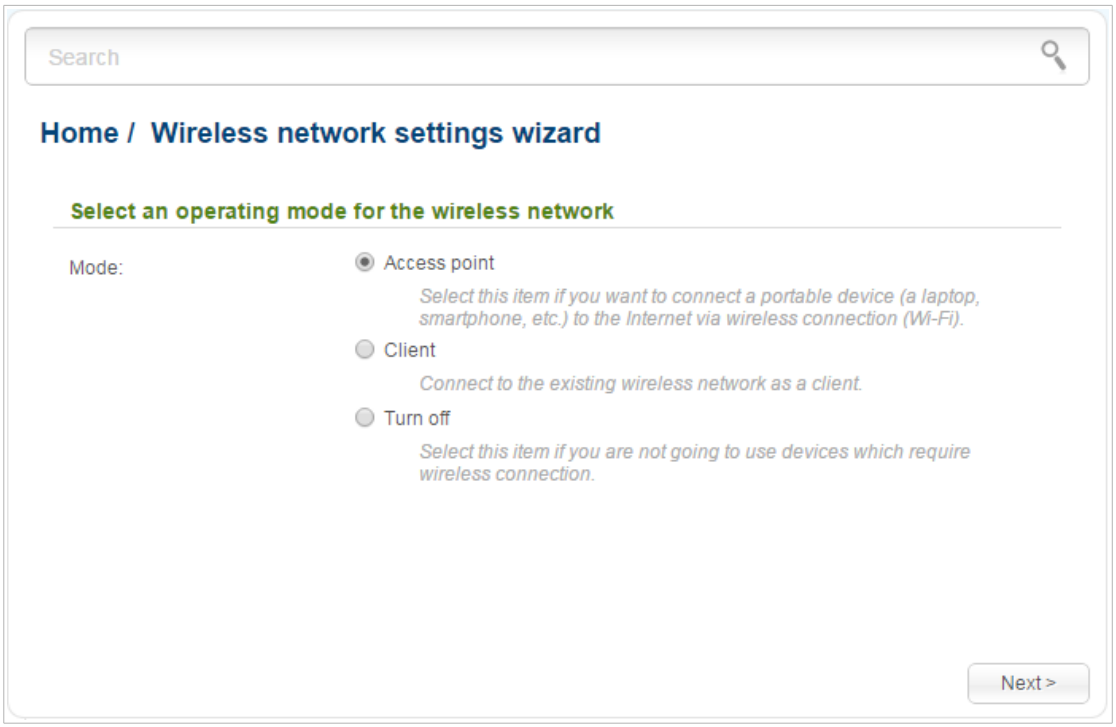


Figure 183. The page for selecting the operating mode for the wireless network.

If you are not going to use the wireless connection, select the **Turn off** choice of the **Mode** radio button. Click the **Next** button and then click the **Apply** button on the opened page.

If you want to connect portable devices to the Internet via wireless connection, select the **Access point** choice of the **Mode** radio button. Click the **Next** button.

If you want to configure the router as a client to connect to a wireless access point, select the **Client** choice of the **Mode** radio button. Click the **Next** button.

Access Point Mode

On the opened page, in the **SSID** field, specify a new name for the network in the 2.4GHz band (use digits and Latin characters).

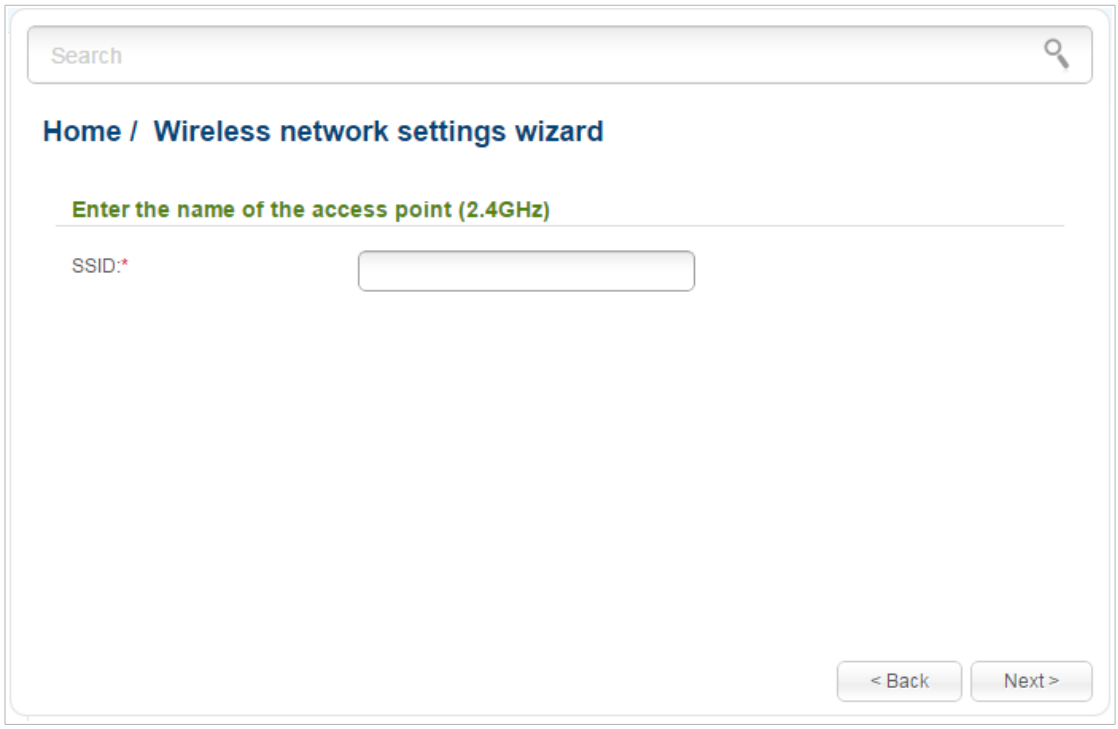


Figure 184. Page for changing the name of the wireless LAN in the 2.4GHz band.

Click the **Next** button to continue.

On the next page, you can modify security settings of the WLAN in the 2.4GHz band.

Select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN in the 2.4GHz band.

When the **Open** value is selected, the **Network key** field is unavailable. After applying this setting, the **Open** authentication type with no encryption is specified for the router's WLAN in the 2.4GHz band.

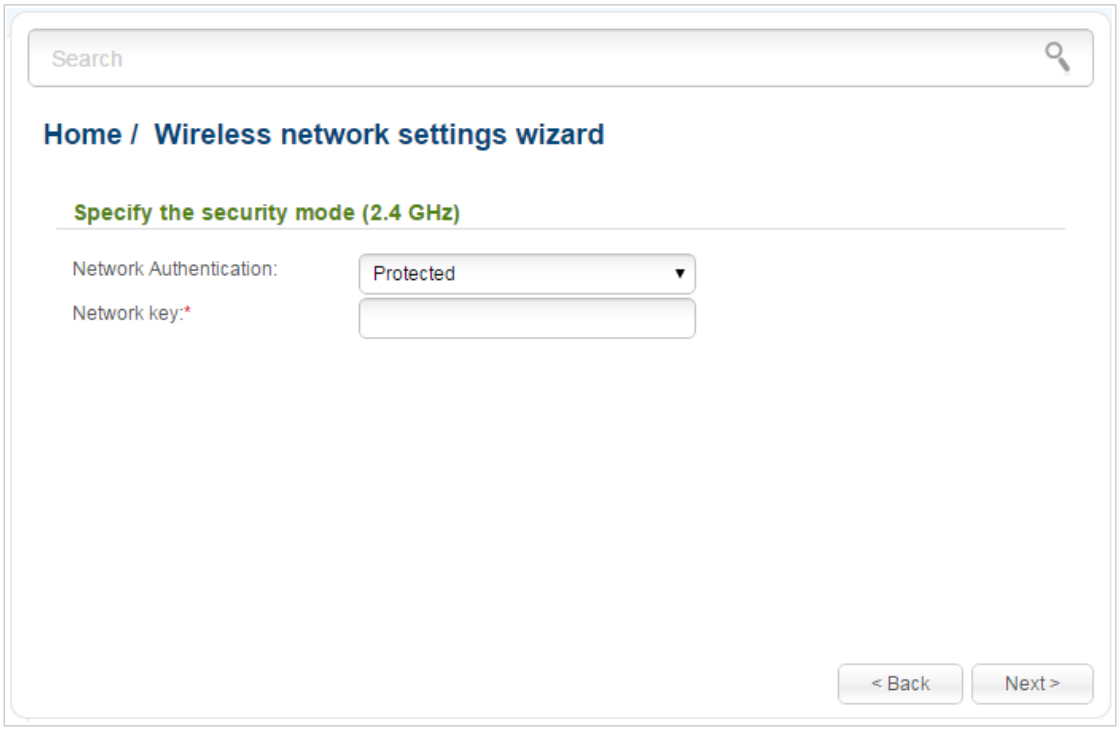


Figure 185. Page for selecting a security mode for the wireless network in the 2.4GHz band.

Click the **Next** button to continue.

On the opened page, in the **SSID** field, specify a new name for the network in the 5GHz band (use digits and Latin characters).

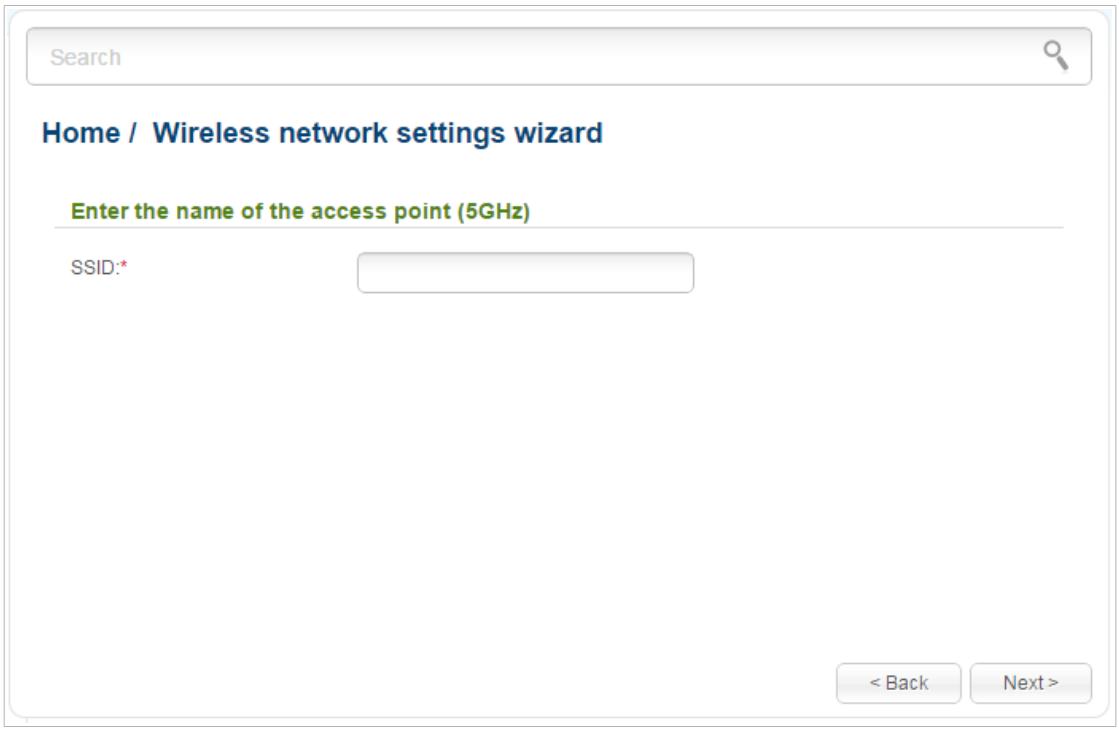


Figure 186. Page for changing the name of the wireless LAN in the 5GHz band.

Click the **Next** button to continue.

On the next page, you can modify security settings of the WLAN in the 5GHz band.

Select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN in the 5GHz band.

When the **Open** value is selected, the **Network key** field is unavailable. After applying this setting, the **Open** authentication type with no encryption is specified for the router's WLAN in the 5GHz band.

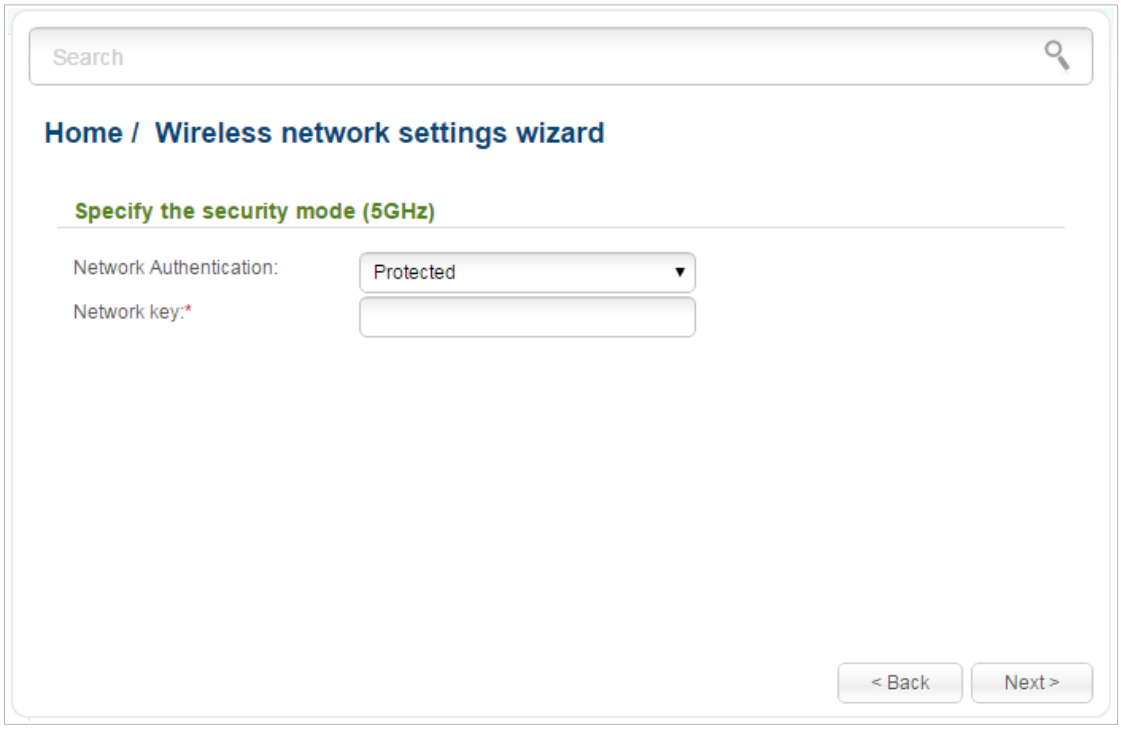


Figure 187. Page for selecting a security mode for the wireless network in the 5GHz band.

Click the **Next** button to continue.

On the next page, the specified settings are displayed. Make sure that they are correct and then click the **Apply** button.

Client Mode

On the opened page, select the band of the network to which you want to connect from the **Wireless network range** drop-down list and click the **Search** button.

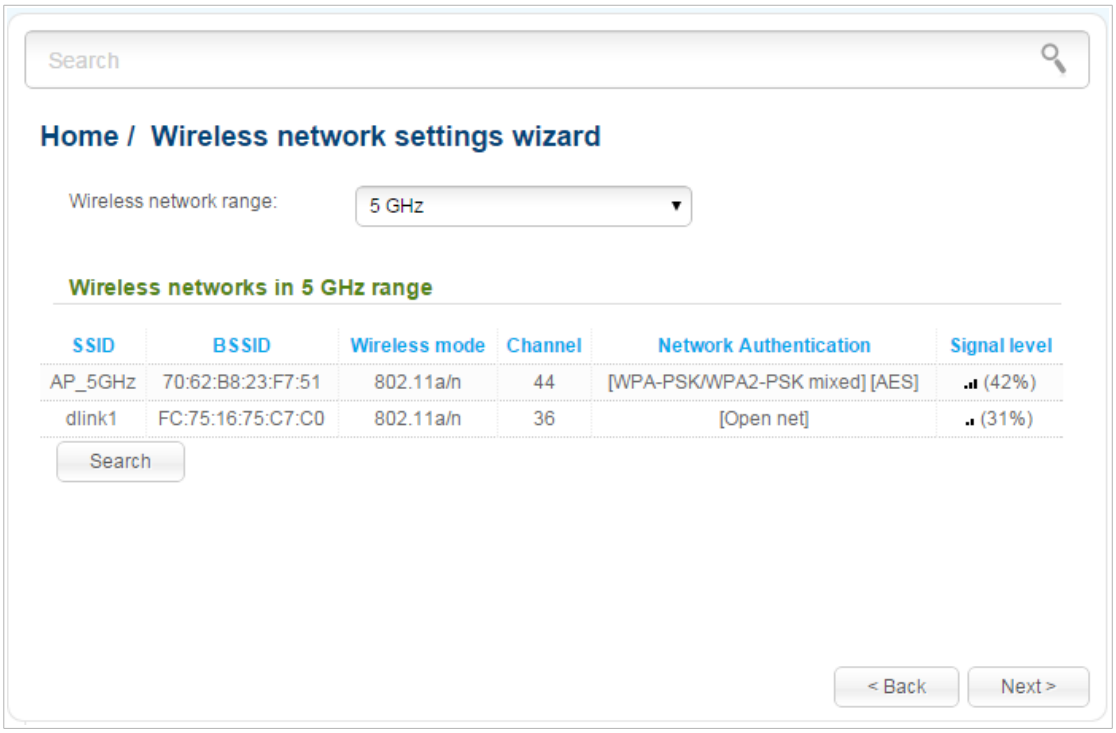


Figure 188. The page for selecting a network to connect.

Select the network to which you want to connect and click the **Next** button.

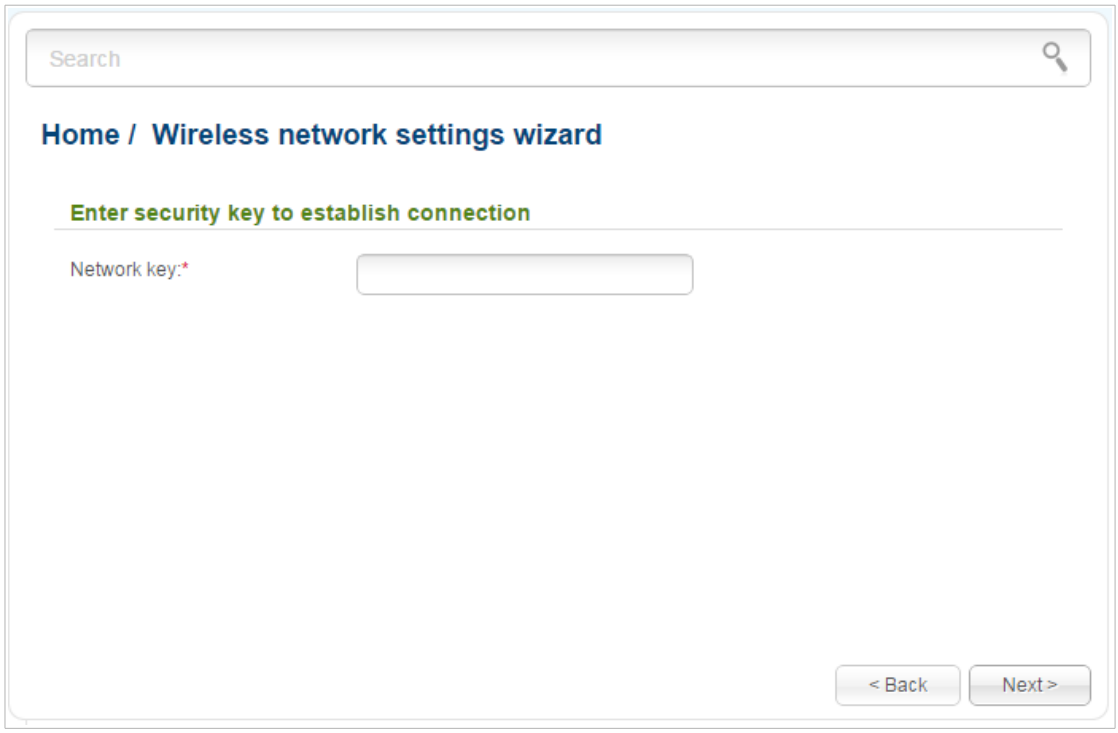


Figure 189. The page for entering the password for connection to the wireless network.

If you need a password to connect to the selected network, enter the password in the **Network key** field and click the **Next** button.

On the next page, you can specify an individual name (SSID) and security settings for the router or disable the router's wireless network broadcast.

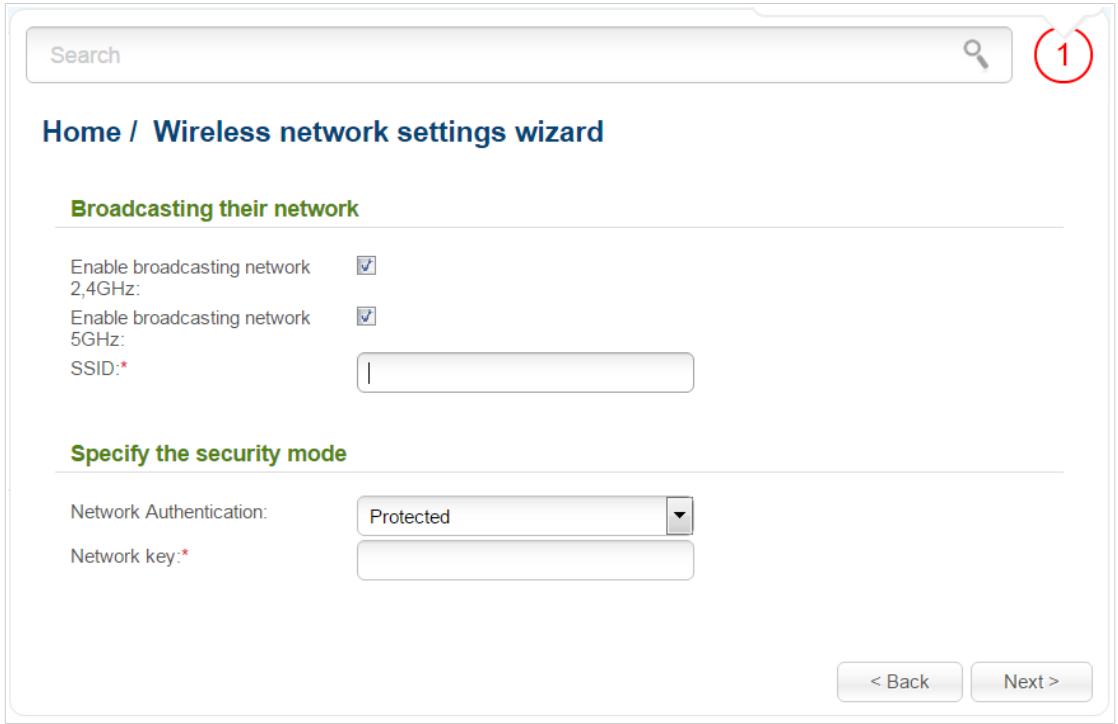


Figure 190. The page for changing the settings of the wireless local area network.

If you want to use the router's wireless network in the 2.4GHz or 5GHz band to connect devices, leave the corresponding checkbox (**Enable broadcasting network 2,4GHz** or **Enable broadcasting network 5GHz**) selected. Then, if needed, specify another name for the network in the **SSID** field (the name of the 5GHz band WLAN will contain the extra **_5GHz** identifier). Use digits and Latin characters.

It is strongly recommended to configure the secure wireless network of DIR-816L. To do this, select the **Protected** value from the **Network Authentication** drop-down list and enter a key (a password that will be used to access your wireless network) in the **Network key** field. Use digits and Latin characters. After applying this setting, the **WPA-PSK/WPA2-PSK mixed** authentication type is specified for the router's WLAN. Click the **Next** button.

On the next page, the parameters of the network to which you want to connect, the entered password, and the settings of the wireless network of the router are displayed. Make sure that the specified settings are correct and then click the **Apply** button. After that, the wireless channel of DIR-816L will switch to the channel of the wireless access point to which you have connected.

After clicking the **Apply** button, the **Home / Information** page opens.

Status

The pages of this section display data on the current state of the router:

- network statistics
- IP addresses leased by the DHCP server
- data on devices connected to the router's network and its web-based interface
- addresses of active multicast groups.

Network Statistics

On the **Status / Network statistics** page, you can view statistics for all connections existing in the system (LAN, WLAN). For each connection the following data are displayed: name and state (when the connection is on, its name is highlighted in green, when the connection is off, its name is highlighted in red), IP address and subnet mask, gateway (if the connection is established), MAC address, MTU value, and volume of data received and transmitted (with increase of the volume the units of measurement are changed automatically: byte, Kbyte, Mbyte, Gbyte).

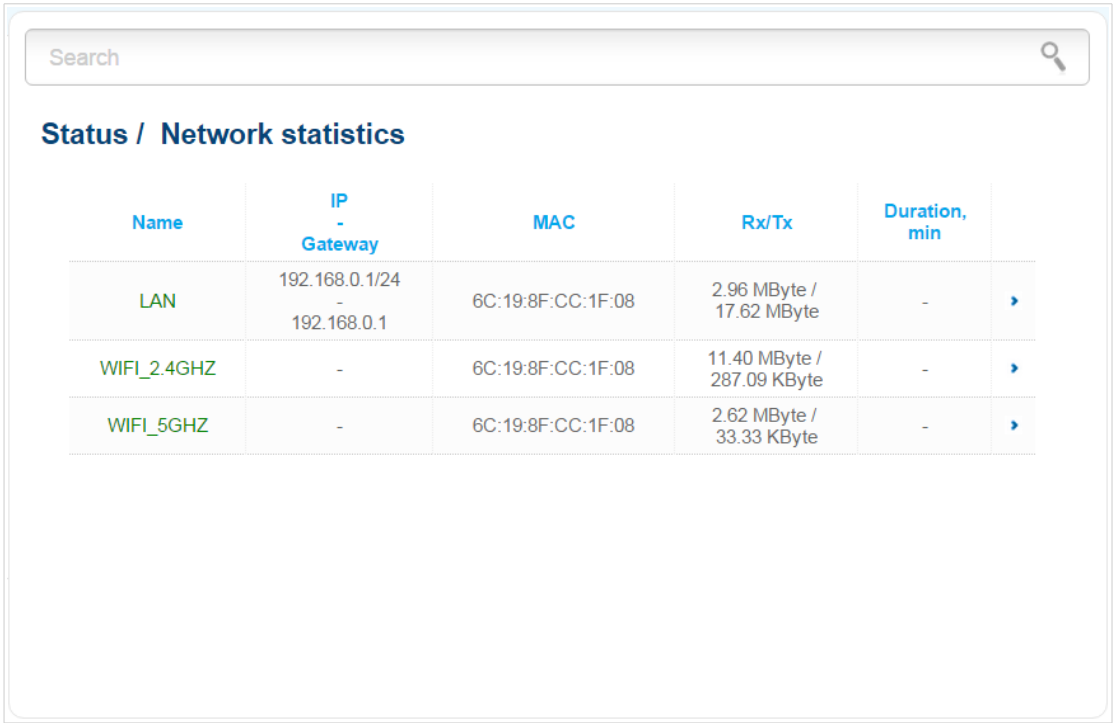


*Figure 191. The **Status / Network statistics** page.*

DHCP

The **Status / DHCP** page displays the information on computers that have been identified by hostnames and MAC addresses and have got IP addresses from the DHCP server of the device, as well as the IP address expiration periods (the lease time).

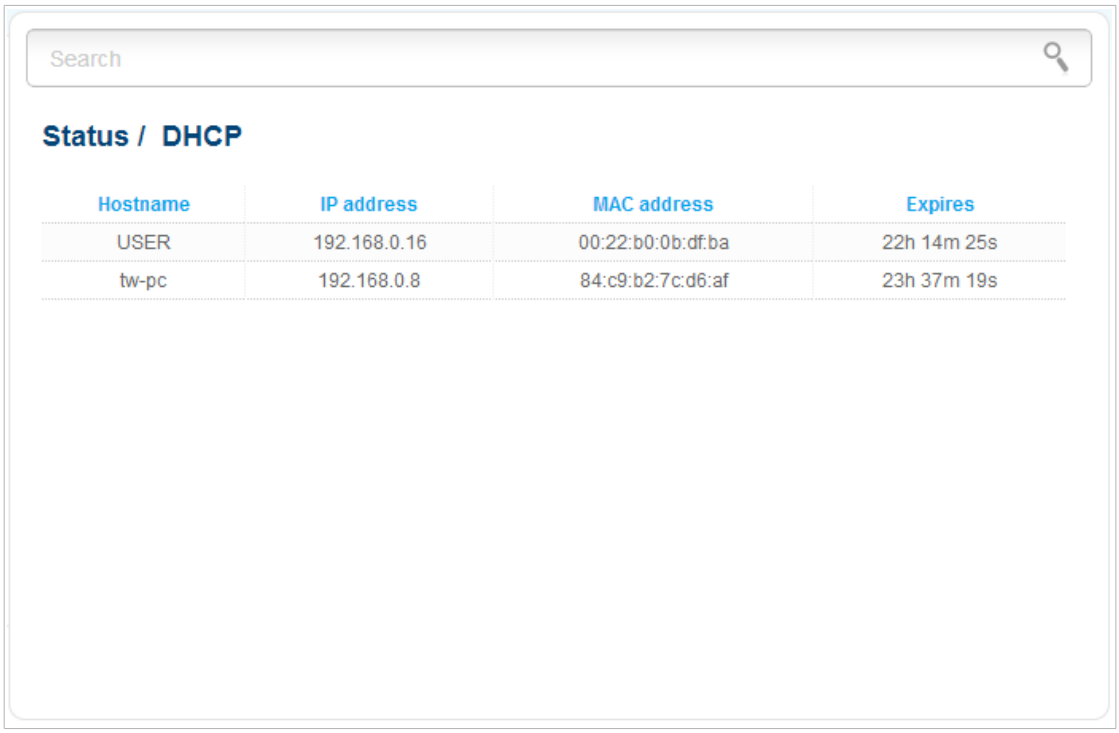


*Figure 192. The **Status / DHCP** page.*

Clients

On the **Status / Clients** page, you can view the list of devices connected to the router and devices accessing its web-based interface.

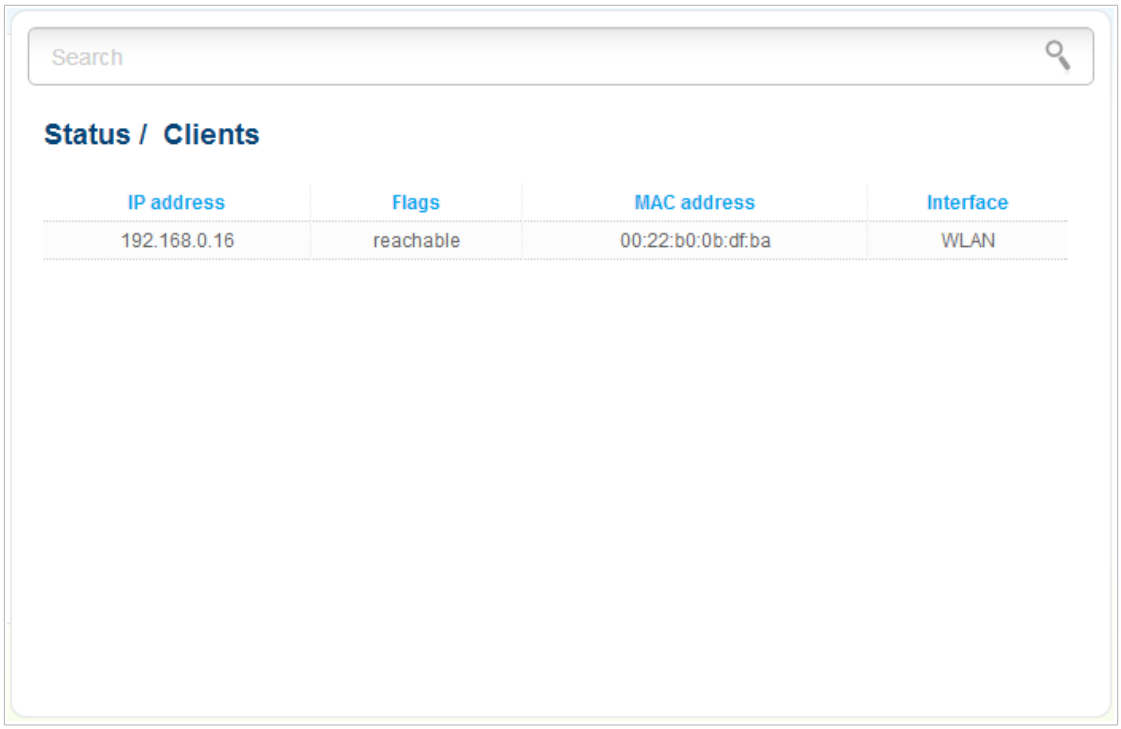


*Figure 193. The **Status / Clients** page.*

For each device the following data are displayed: the IP address, the MAC address, and the interface to which the device is connected.

Multicast groups

The **Status / Multicast groups** page displays addresses of active multicast groups (including IPTV channels and groups for transferring service information) to which the device is subscribed, and the interface through which the device is subscribed.

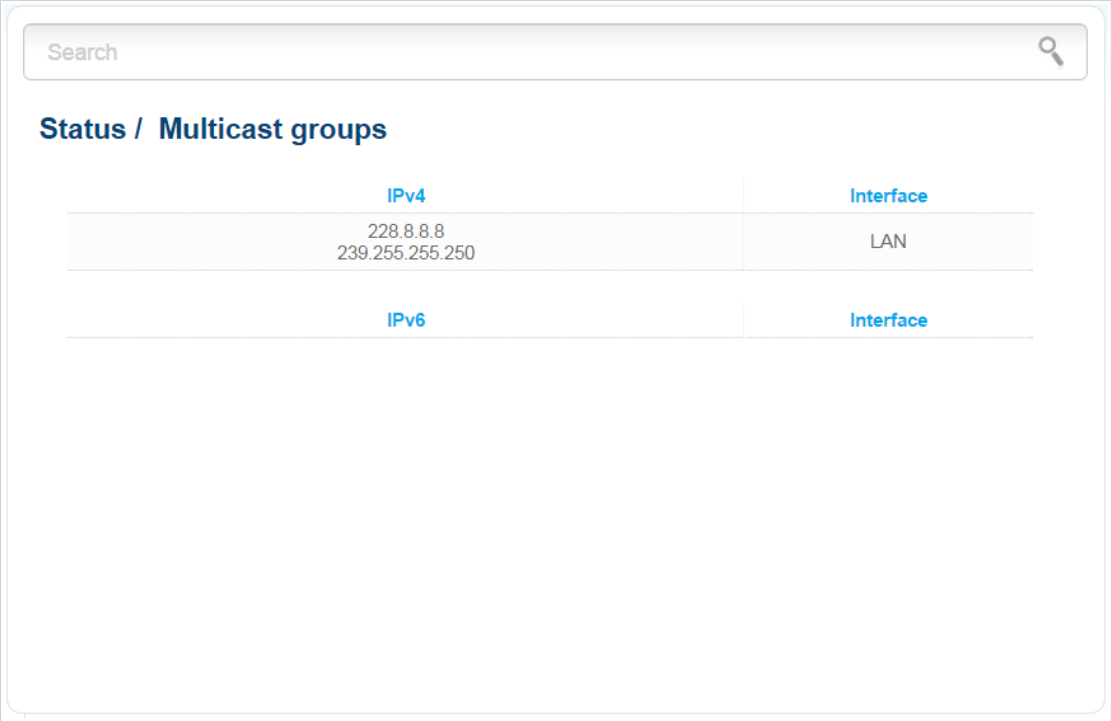


*Figure 194. The **Status / Multicast groups** page.*

Net

In this menu you can configure basic parameters of the router's local area network.

LAN

To configure the router's local interface, proceed to the **Net / LAN** page.

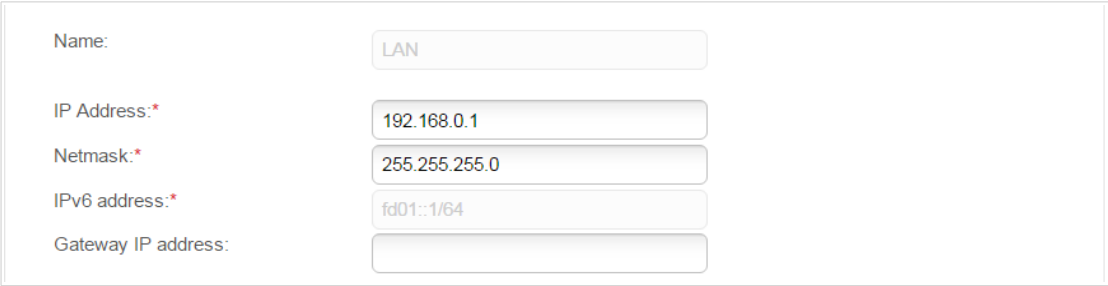


Figure 195. Basic settings of the local interface.

If needed, edit the basic settings of the local interface.

Parameter	Description
IP Address	The IP address of the router in the local subnet. By default, the following value is specified: `192.168.0.1`.
Netmask	The mask of the local subnet. By default, the following value is specified: `255.255.255.0`.
IPv6 address	The IPv6 address of the router in the local subnet. By default, the following value is specified: `fd01::1/64`. The field is available for editing, if the **DHCP PD** checkbox is not selected.
Gateway IP address	The gateway IP address which is used by the access point to connect to the Internet (e.g., for synchronizing the system time with an NTP server). *Optional.*

When needed settings are configured, click the **Apply** button.

In the **DHCP server** section, you can configure the built-in DHCP server of the router.

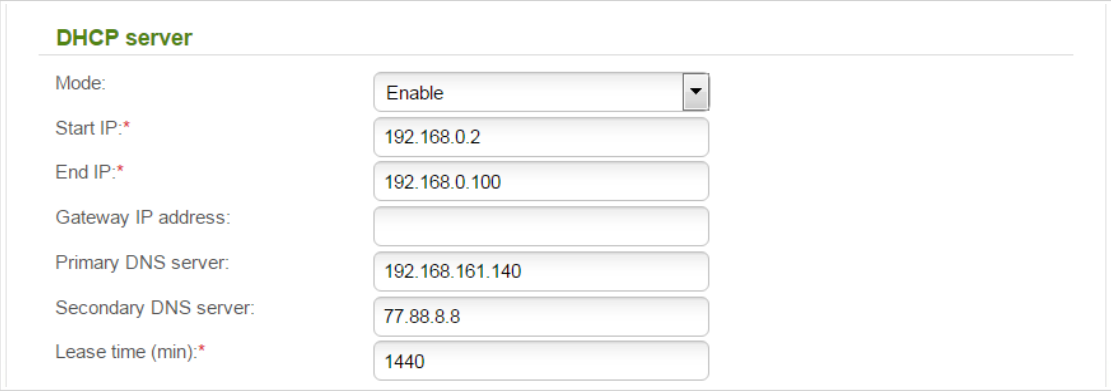


Figure 196. The section for configuring the DHCP server.

Parameter	Description
Mode	An operating mode of the router's DHCP server. **Enable**: the router assigns IP addresses to clients automatically in accordance with the specified parameters. When this value is selected, the **Start IP**, **End IP**, **Gateway IP address**, **Primary DNS server**, **Secondary DNS server**, and the **Lease time** fields are displayed on the page. **Disable**: the router's DHCP server is disabled, clients' IP addresses are assigned manually.
Start IP	The start IP address of the address pool used by the DHCP server to distribute IP addresses to clients.
End IP	The end IP address of the address pool used by the DHCP server to distribute IP addresses to clients.
Gateway IP address	The gateway IP address for clients of the router. When this field is left blank, clients use the IP address of the router as the gateway address.
Primary DNS server/ Secondary DNS server	The IP addresses of the primary and secondary DNS servers for clients of the router. When these fields are left blank, clients use the IP address of the router as the addresses of the DNS servers.
Lease time	The lifetime of IP addresses leased by the DHCP server. At the end of this period the leased IP address is revoked and can be distributed to another device, unless the previous device has confirmed the need to keep the address.

When all needed settings are configured, click the **Apply** button.

In the **IPv6 address assignment** section, you can configure the built-in the DHCPv6 server of the router.

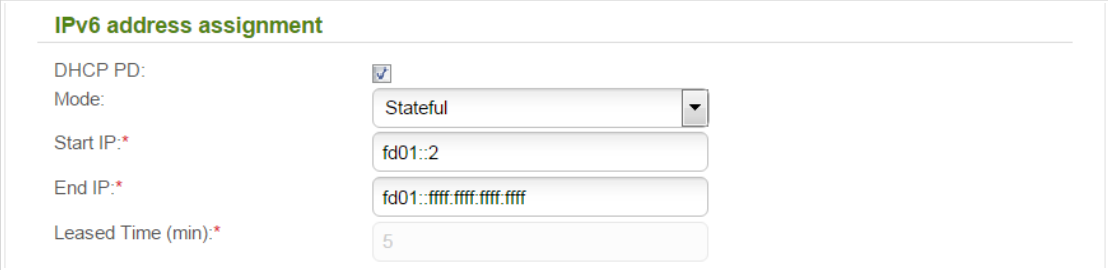


Figure 197. The section for configuring the DHCPv6 server.

Parameter	Description
DHCP PD	Select the checkbox to activate the Prefix Delegation function. When the checkbox is selected, the router requests a prefix to configure IPv6 addresses for clients of the LAN from a delegating router.
Mode	Select an operating mode of the DHCPv6 server from the drop-down list. **Stateless**: clients themselves configure IPv6 addresses using the prefix. **Stateful**: clients receive IPv6 addresses from the range specified in the **Start IP** and **End IP** fields. **Disable**: the router's DHCPv6 server is disabled, clients' IPv6 addresses are assigned manually.
Start IP	The start IPv6 address of the address pool used by the DHCPv6 server to distribute addresses to clients.
End IP	The end IPv6 address of the address pool used by the DHCPv6 server to distribute addresses to clients.
Leased Time	The lifetime of IPv6 addresses leased by the DHCPv6 server. The field is available for editing, if the **DHCP PD** checkbox is not selected.

When all needed settings are configured, click the **Apply** button.

In the **Static DHCP** section, you can specify MAC address and IP address pairs (set a fixed IPv4 address in the local area network for a device with a certain MAC address). The router assigns IP addresses in accordance with the specified pairs only when the DHCP server is enabled (in the **DHCP server** section, in the **Mode** drop-down list, the **Enable** value is selected).

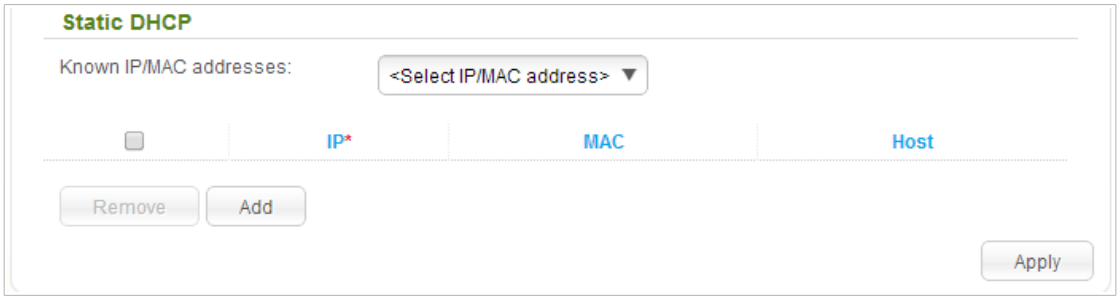


Figure 198. The section for creating MAC-IP pairs.

To create a MAC-IP pair, click the **Add** button. In the **IP** field, enter an IPv4 address which will be assigned to the device from the LAN, then in the **MAC** field, enter the MAC address of this device. In the **Host** field, specify a network name of the device for easier identification (*optional*).

Also you can create a MAC-IP pair for a device connected to the router's LAN at the moment. To do this, select the relevant value from the **Known IP/MAC addresses** drop-down list (the fields of the section will be filled in automatically).

When all needed MAC-IP pairs are specified, click the **Apply** button.

Existing MAC-IP pairs are displayed in the table of the **Static DHCP** section. To remove a pair, select the checkbox in the relevant line in the table and click the **Remove** button. Then click the **Apply** button.

Wi-Fi

In this menu you can specify all needed settings for your wireless network.

Basic Settings

On pages of the **Wi-Fi / Basic settings** section, you can enable your wireless local area network (WLAN) and configure its basic parameters. To configure the 2.4GHz band or 5GHz band, proceed to the relevant page.

2.4GHz Band

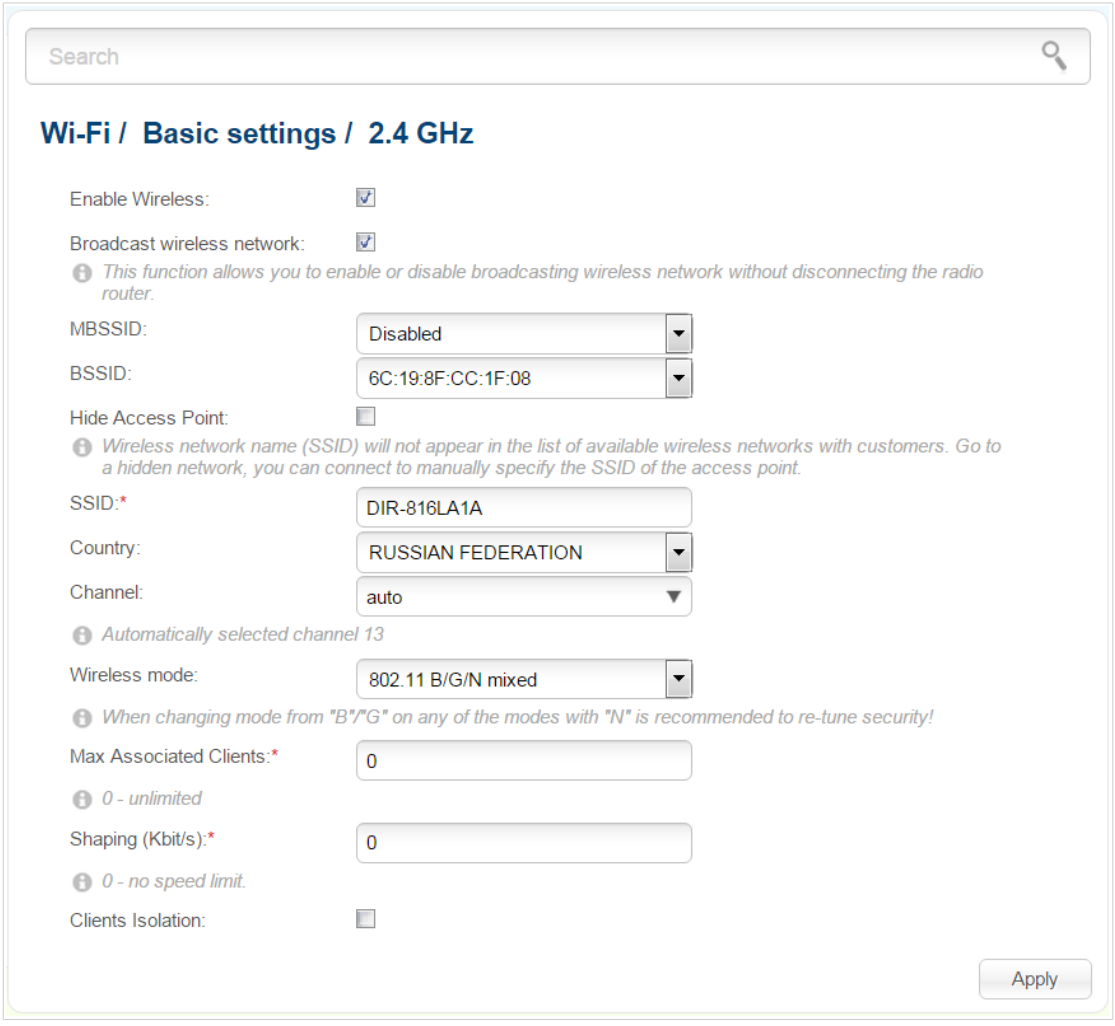


Figure 199. Basic settings of the wireless LAN in the 2.4GHz band.

Parameter	Description
Enable Wireless	The checkbox enables Wi-Fi connections in the 2.4GHz band. If you want to disable your WLAN in this band, deselect the checkbox.
Broadcast wireless network	If the checkbox is not selected, devices cannot connect to the router's WLAN in the 2.4GHz band (or to the selected part of the WLAN if the network is splitted into parts). Upon that the router can connect to another access point as a wireless client.
MBSSID	To split the network into several parts in the 2.4GHz band, select a relevant value (**2**, **3**, or **4**) from the drop-down list. By default, the wireless network is not splitted (the **Disabled** value is selected from the list). For every part of the WLAN you can specify a name (SSID), security settings, and rules for MAC filtering. To specify these values, select the needed part from the **BSSID** drop-down list and click the **Apply** button. Then proceed to the relevant page of the **Wi-Fi** menu section.
BSSID	The unique identifier for your Wi-Fi network (for the 2.4GHz and 5GHz band). You cannot change the value of this parameter, it is determined in the device's internal settings. If you have splitted your WLAN into parts, the drop-down list contains several values. Each identifier corresponds to a single part of the WLAN.
Hide Access Point	If the checkbox is selected, other users cannot see your Wi-Fi network. (It is recommended not to select this checkbox in order to simplify initial configuration of your WLAN.)
SSID	A name for the WLAN. By default, the value **DIR-816LA1A** is specified. If your network is splitted into parts, each part has the default name (**DIR-816LA1A.2**, **DIR-816LA1A.3**, and **DIR-816LA1A.4**). It is recommended to specify another name for the network upon initial configuration (use digits and Latin characters).
Country	The country you are in. Select a value from the drop-down list.
Channel	The wireless channel number. When the **auto** value is selected, the router itself chooses the channel with the least interference.
Wireless mode	Operating mode of the wireless network of the router. This parameter defines standards of the devices that will be able to use this band of your wireless network. Select a value from the drop-down list.

Parameter	Description
Max Associated Clients	The maximum number of devices connected to the wireless network of the router (or to the selected part of the WLAN if the network is splitted into parts). When the value **0** is specified, the device does not limit the number of connected clients.
Shaping	The maximum bandwidth (Kbit/s) of your WLAN (or the selected part of the WLAN if the network is splitted into parts). Specify the needed value or leave the value specified by default (**0**) not to limit bandwidth of your WLAN.
Clients Isolation	Select the checkbox to forbid wireless clients of your WLAN (or the selected part of the WLAN if the network is splitted into parts) to communicate to each other.

When you have configured the parameters, click the **Apply** button.

5GHz Band

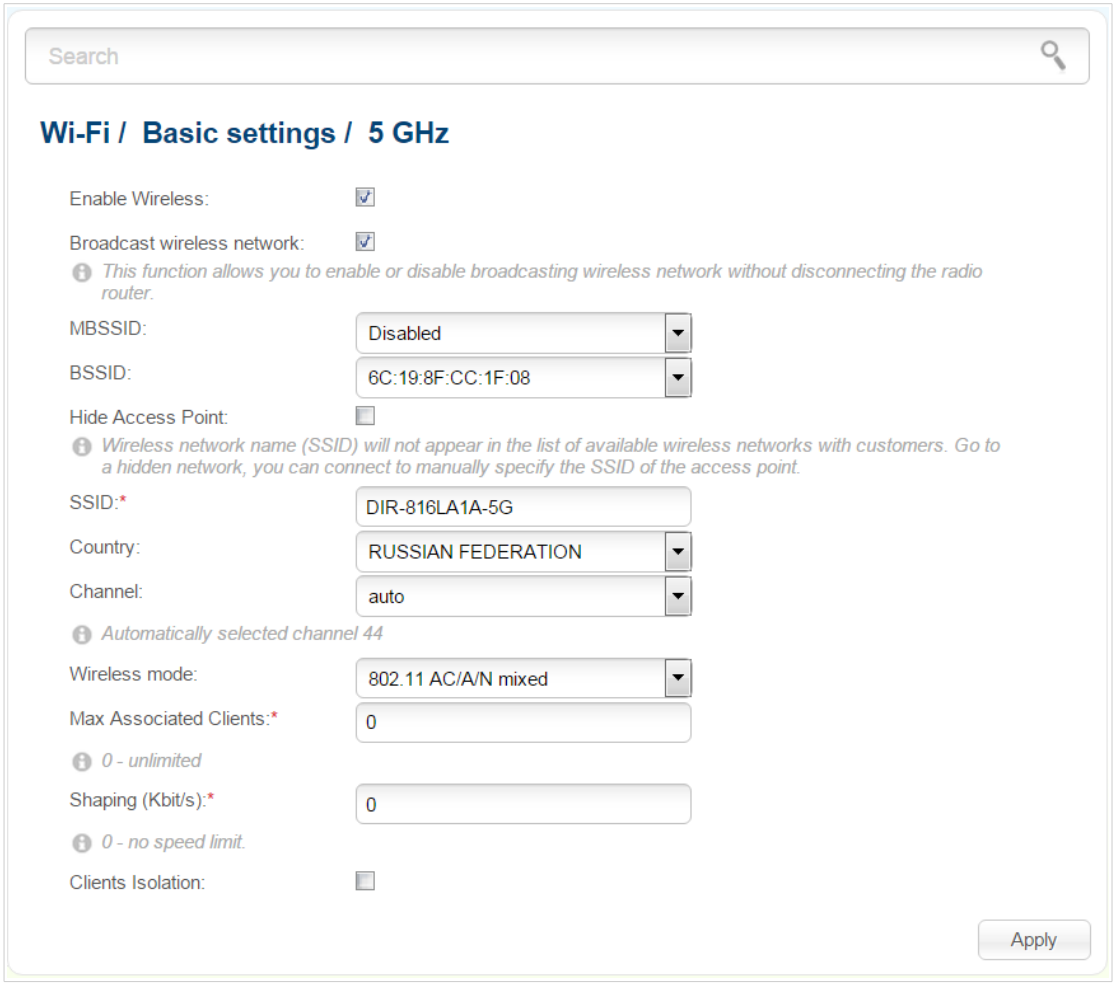


Figure 200. Basic settings of the wireless LAN in the 5GHz band.

Parameter	Description
Enable Wireless	The checkbox enables Wi-Fi connections in the 5GHz band. If you want to disable your WLAN in this band, deselect the checkbox.
Broadcast wireless network	If the checkbox is not selected, devices cannot connect to the router's WLAN in the 5GHz band (or to the selected part of the WLAN if the network is splitted into parts). Upon that the router can connect to another access point as a wireless client.

Parameter	Description
MBSSID	To split the network into several parts in the 5GHz band, select a relevant value (**2**, **3**, or **4**) from the drop-down list. By default, the wireless network is not splitted (the **Disabled** value is selected from the list). For every part of the WLAN you can specify a name (SSID), security settings, and rules for MAC filtering. To specify these values, select the needed part from the **BSSID** drop-down list and click the **Apply** button. Then proceed to the relevant page of the **Wi-Fi** menu section.
BSSID	The unique identifier for your Wi-Fi network (for the 2.4GHz and 5GHz band). You cannot change the value of this parameter, it is determined in the device's internal settings. If you have splitted your WLAN into parts, the drop-down list contains several values. Each identifier corresponds to a single part of the WLAN.
Hide Access Point	If the checkbox is selected, other users cannot see your Wi-Fi network. (It is recommended not to select this checkbox in order to simplify initial configuration of your WLAN.)
SSID	A name for the WLAN. By default, the value **DIR-816L-5G** is specified. If your network is splitted into parts, each part has the default name (**DIR-816LA1A-5G.2**, **DIR-816LA1A-5G.3**, and **DIR-816LA1A-5G.4**). It is recommended to specify another name for the network upon initial configuration (use digits and Latin characters).
Country	The country you are in. Select a value from the drop-down list.
Channel	The wireless channel number. When the **auto** value is selected, the router itself chooses the channel with the least interference.
Wireless mode	Operating mode of the wireless network of the router. This parameter defines standards of the devices that will be able to use this band of your wireless network. Select a value from the drop-down list.
Max Associated Clients	The maximum number of devices connected to the wireless network of the router (or to the selected part of the WLAN if the network is splitted into parts). When the value **0** is specified, the device does not limit the number of connected clients.

Parameter	Description
Shaping	The maximum bandwidth (Kbit/s) of your WLAN (or the selected part of the WLAN if the network is splitted into parts). Specify the needed value or leave the value specified by default (**0**) not to limit bandwidth of your WLAN.
Clients Isolation	Select the checkbox to forbid wireless clients of your WLAN (or the selected part of the WLAN if the network is splitted into parts) to communicate to each other.

When you have configured the parameters, click the **Apply** button.

Security Settings

On pages of the **Wi-Fi / Security settings** section, you can modify security settings of the WLAN. To configure the 2.4GHz band or 5GHz band, proceed to the relevant page.

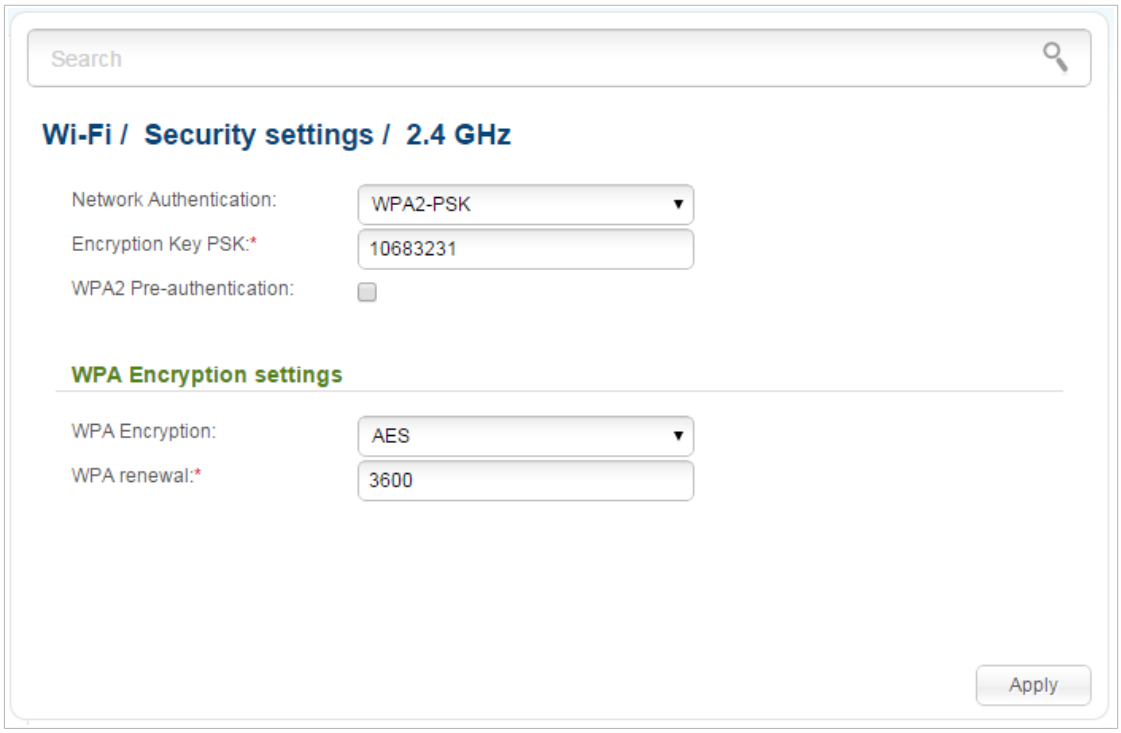


Figure 201. The default security settings.

By default, the **WPA2-PSK** network authentication type is specified for both bands of the WLAN. WPS PIN from the barcode label is used as the network key.

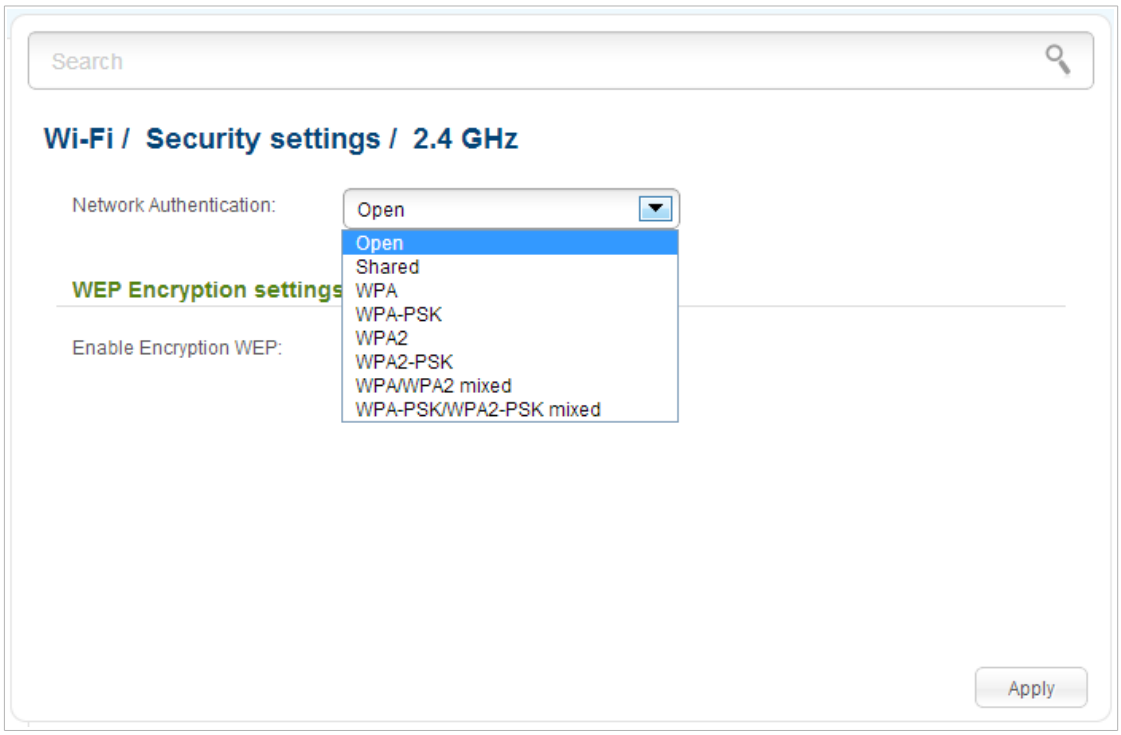


Figure 202. Network authentication types supported by the router.

The router supports the following authentication types:

Authentication type	Description
Open	Open authentication (with WEP encryption for wireless network modes not supporting 802.11n devices).
Shared	Shared key authentication with WEP encryption. This authentication type is not available when on the **Wi-Fi / Basic settings** page of the relevant band, in the **Wireless mode** drop-down list, a mode supporting 802.11n devices is selected.
WPA	WPA-based authentication using a RADIUS server.
WPA-PSK	WPA-based authentication using a PSK.
WPA2	WPA2-based authentication using a RADIUS server.
WPA2-PSK	WPA2-based authentication using a PSK.
WPA/WPA2 mixed	A mixed type of authentication. When this value is selected, devices using the **WPA** authentication type and devices using the **WPA2** authentication type can connect to the WLAN of the router.
WPA-PSK/WPA2-PSK mixed	A mixed type of authentication. When this value is selected, devices using the **WPA-PSK** authentication type and devices using the **WPA2-PSK** authentication type can connect to the WLAN of the router.

The **WPA**, **WPA2**, and **WPA/WPA2 mixed** authentication types require a RADIUS server.

When the **Open** or **Shared** value is selected, the **WEP Encryption settings** section is displayed (the section is unavailable for the wireless network operating modes which support the standard 802.11n):

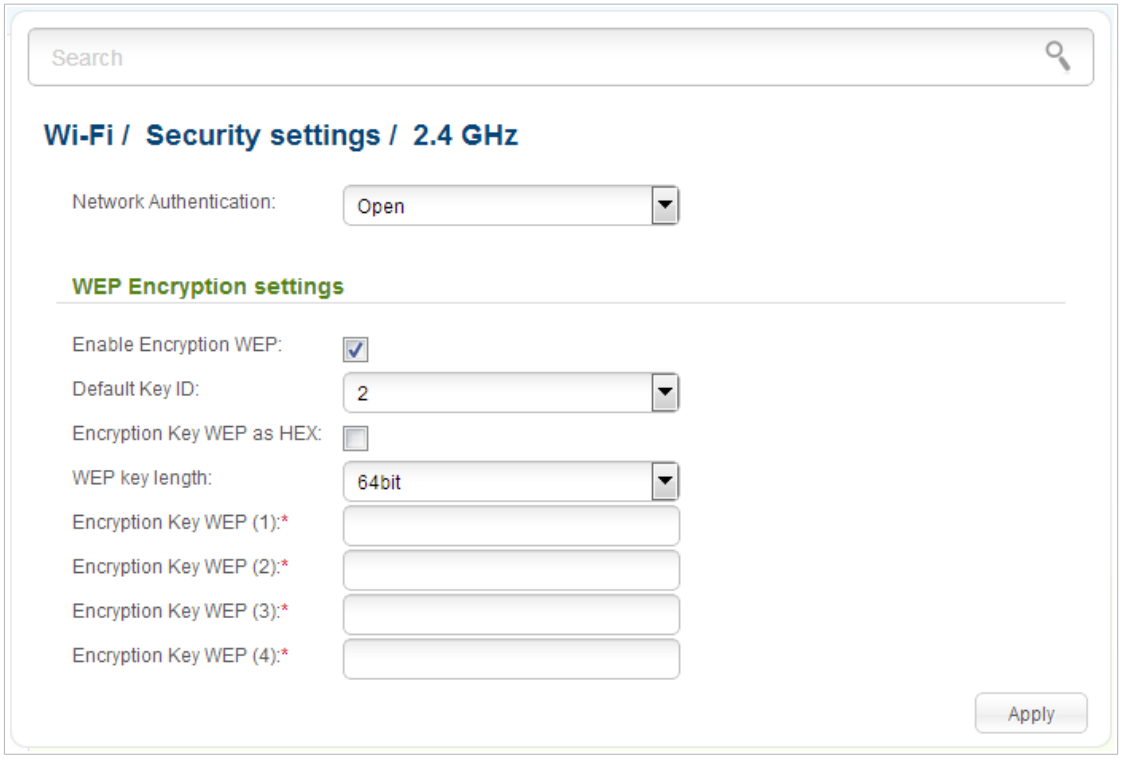


*Figure 203. The **Open** value is selected from the **Network Authentication** drop-down list.*

Parameter	Description
Enable Encryption WEP	The checkbox activating WEP encryption. When the checkbox is selected, the **Default Key ID** field, the **Encryption Key WEP as HEX** checkbox, the **WEP key length** drop-down list, and four **Encryption Key WEP** fields are displayed on the page. For the **Shared** authentication type the checkbox is always selected.
Default Key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption Key WEP as HEX	Select the checkbox to set a hexadecimal number as a key for encryption.
WEP key length	The length of WEP encryption key. Select the value **64bit** to specify keys containing 5 ASCII symbols or 10 HEX symbols. Select the value **128bit** to specify keys containing 13 ASCII symbols or 26 HEX symbols.
Encryption Key WEP (1-4)	Keys for WEP encryption. The router uses the key selected from the **Default Key ID** drop-down list. It is required to specify all the fields.

When the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** value is selected, the **WPA Encryption settings** section is displayed:

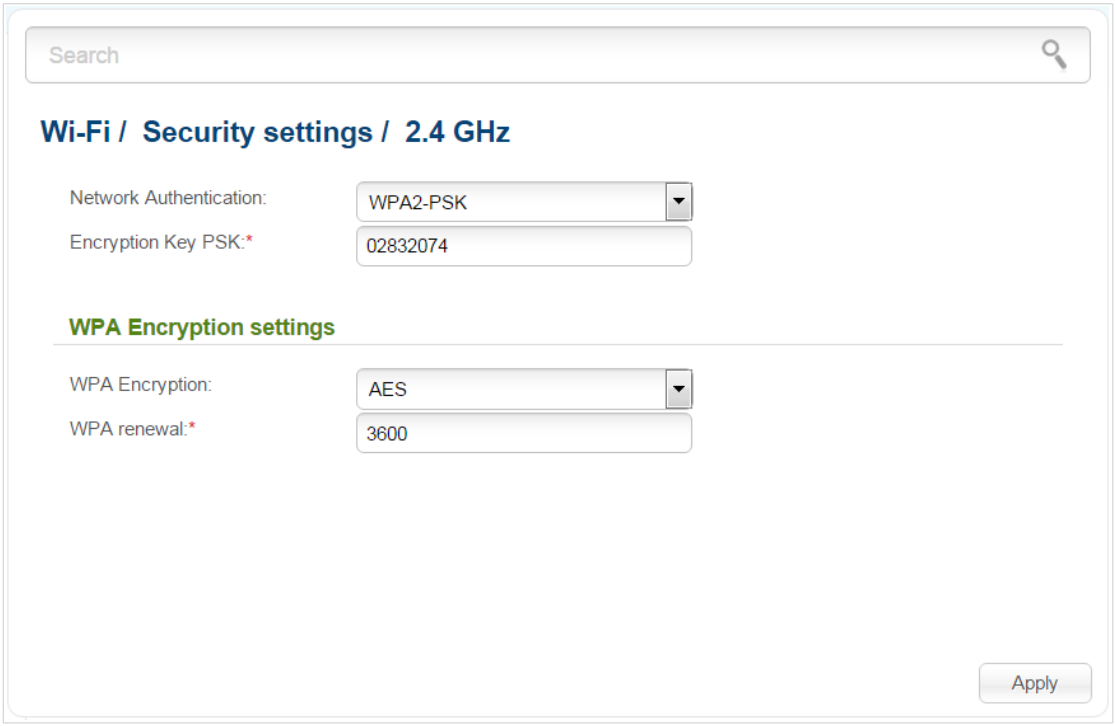


*Figure 204. The **WPA2-PSK** value is selected from the **Network Authentication** drop-down list.*

Parameter	Description
Encryption Key PSK	A key for WPA encryption. The key can contain digits and/or Latin characters.
WPA Encryption	An encryption method: **TKIP**, **AES**, or **TKIP+AES**.
WPA renewal	The time period (in seconds), at the end of which a new key for WPA encryption is generated. When the value **0** is specified for this field, the key is not renewed.

When the **WPA**, **WPA2**, or **WPA/WPA2 mixed** value is selected, the **RADIUS settings** and **WPA Encryption settings** sections are available:

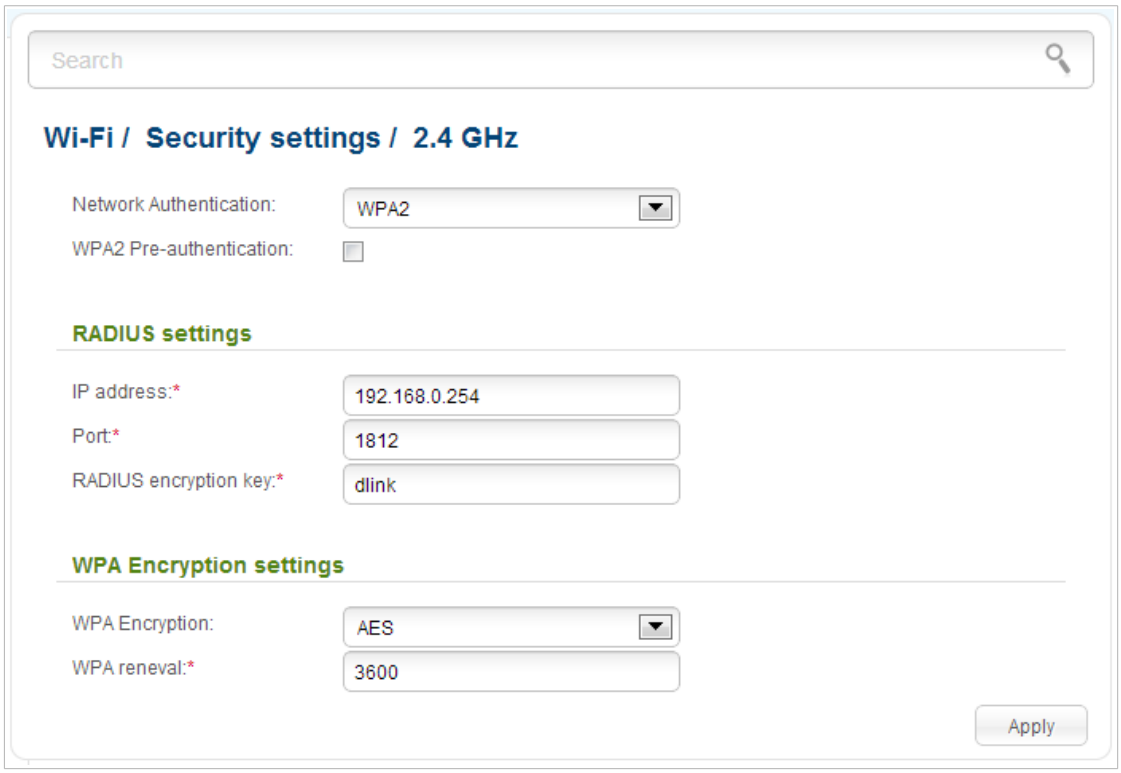


*Figure 205. The **WPA2** value is selected from the **Network Authentication** drop-down list.*

Parameter	Description
WPA2 Pre-authentication	The checkbox activating preliminary authentication (displayed only for the **WPA2** and **WPA/WPA2 mixed** authentication types).
IP address	The IP address of the RADIUS server.
Port	A port of the RADIUS server.
RADIUS encryption key	The password which the router uses for communication with the RADIUS server (the value of this parameter is specified in the RADIUS server settings).
WPA Encryption	An encryption method: **TKIP**, **AES**, or **TKIP+AES**.
WPA renewal	The time period (in seconds), at the end of which a new key for WPA encryption is generated. When the value `0` is specified for this field, the key is not renewed.

When you have configured the parameters, click the **Apply** button.

MAC Filter

On pages of the **Wi-Fi / MAC Filter** section, you can define a set of MAC addresses of devices which will be allowed to access the WLAN, or define MAC addresses of devices which will not be allowed to access the WLAN. Settings specified on this page are applied to both bands of the WLAN.

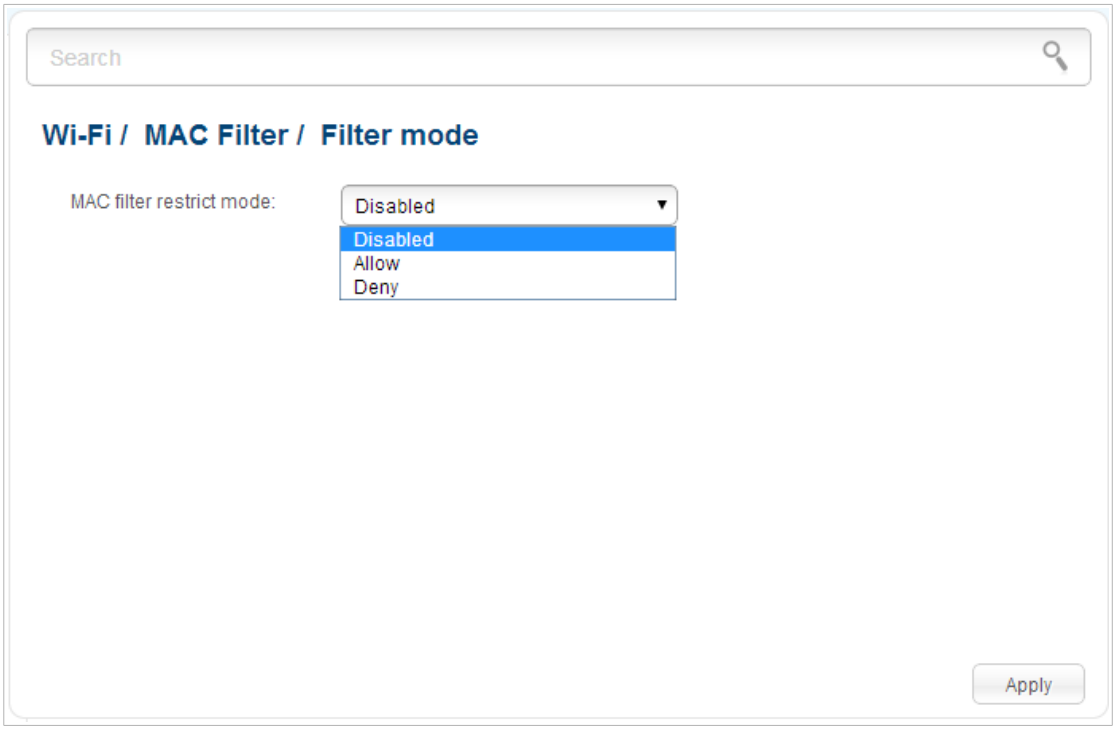


Figure 206. The page for configuring the MAC filter for the wireless network.

By default, MAC filtering is not active (the **Disabled** value is selected from the **MAC filter restrict mode** drop-down list on the **Wi-Fi / MAC Filter / Filter mode** page).

To open your wireless network for the devices which MAC addresses are specified on the **Wi-Fi / MAC Filter / MAC addresses** page and to close the wireless network for all other devices, select the **Allow** value from the **MAC filter restrict mode** drop-down list and click the **Apply** button.

To close your wireless network for the devices which MAC addresses are specified on the **Wi-Fi / MAC Filter / MAC addresses** page, select the **Deny** value from the **MAC filter restrict mode** drop-down list and click the **Apply** button.

To add a MAC address to which the selected filtering mode will be applied, proceed to the **Wi-Fi / MAC Filter / MAC addresses** page.

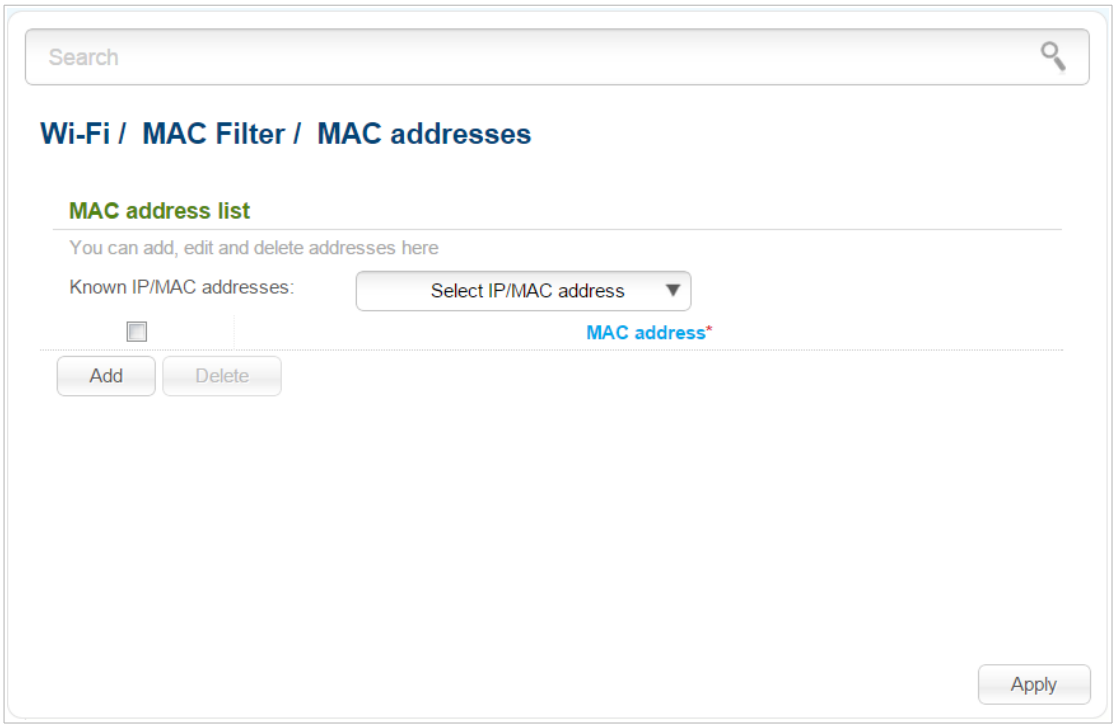


Figure 207. The page for adding a MAC address.

Click the **Add** button and enter an address in the field displayed. Also you can enter the MAC address of a device connected to the router's LAN at the moment. To do this, select the relevant device from the **Known IP/MAC addresses** drop-down list (the field will be filled in automatically). Then click the **Apply** button.

To remove a MAC address from the list of MAC addresses, select the checkbox located to the left of the relevant MAC address and click the **Delete** button. Then click the **Apply** button.

List of Wi-Fi Clients

On the **Wi-Fi / List of Wi-Fi clients** page, you can view the list of wireless clients connected to the router.

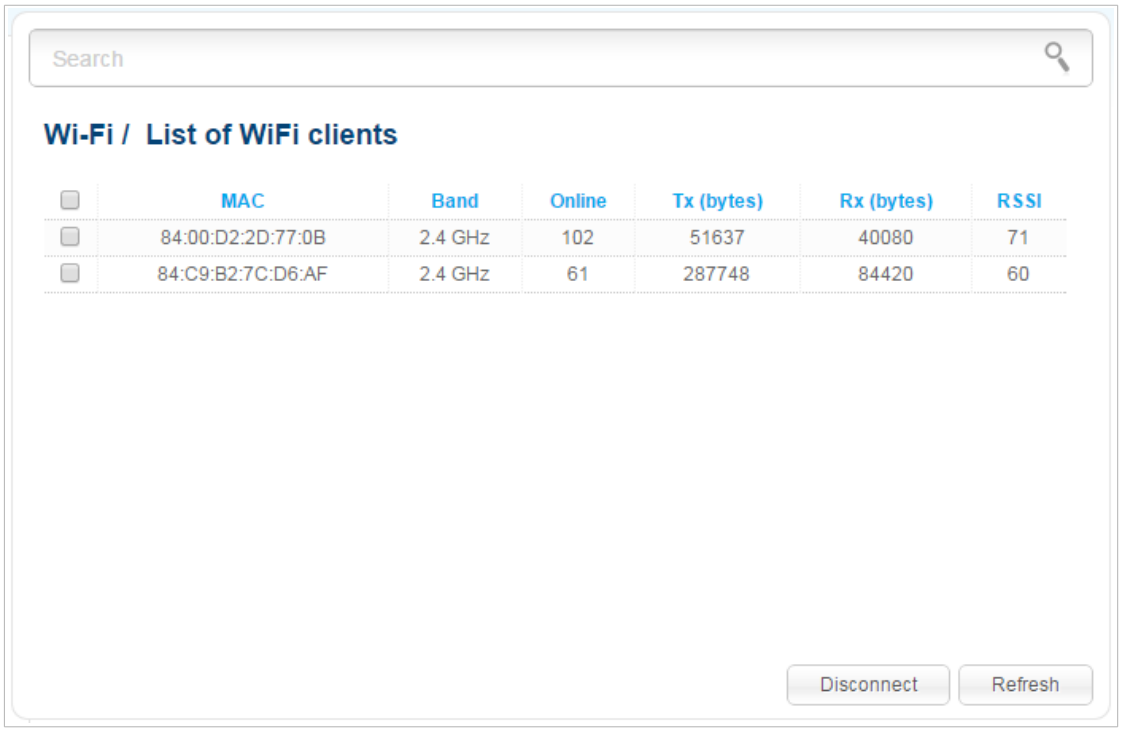


Figure 208. The list of the wireless clients.

If you want to disconnect a wireless device from your WLAN, select the checkbox in the line containing the relevant MAC address, and click the **Disconnect** button.

To view the latest data on the devices connected to the WLAN, click the **Refresh** button.

WPS

On pages of the **Wi-Fi / WPS** section, you can enable the function for secure configuration of the WLAN and select a method used to easily add wireless devices to the WLAN.

The WPS function helps to configure the protected wireless network automatically. Devices connecting to the wireless network via the WPS function must support the WPS function.

! If the router's WLAN is splitted into parts (the value **2**, **3**, or **4** is selected from the **MBSSID** drop-down list on the **Wi-Fi / Basic settings** page), the WPS function can be used only for the first part of the WLAN (the first value from the **BSSID** drop-down list).

! Before using the function you need to configure one of the following authentication types: **Open** with no encryption, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** with the **AES** encryption method (on the relevant band page of the **Wi-Fi / Security settings** section). When other security settings are specified for the band of the WLAN, controls of the **Wi-Fi / WPS** page of the relevant band are not available.

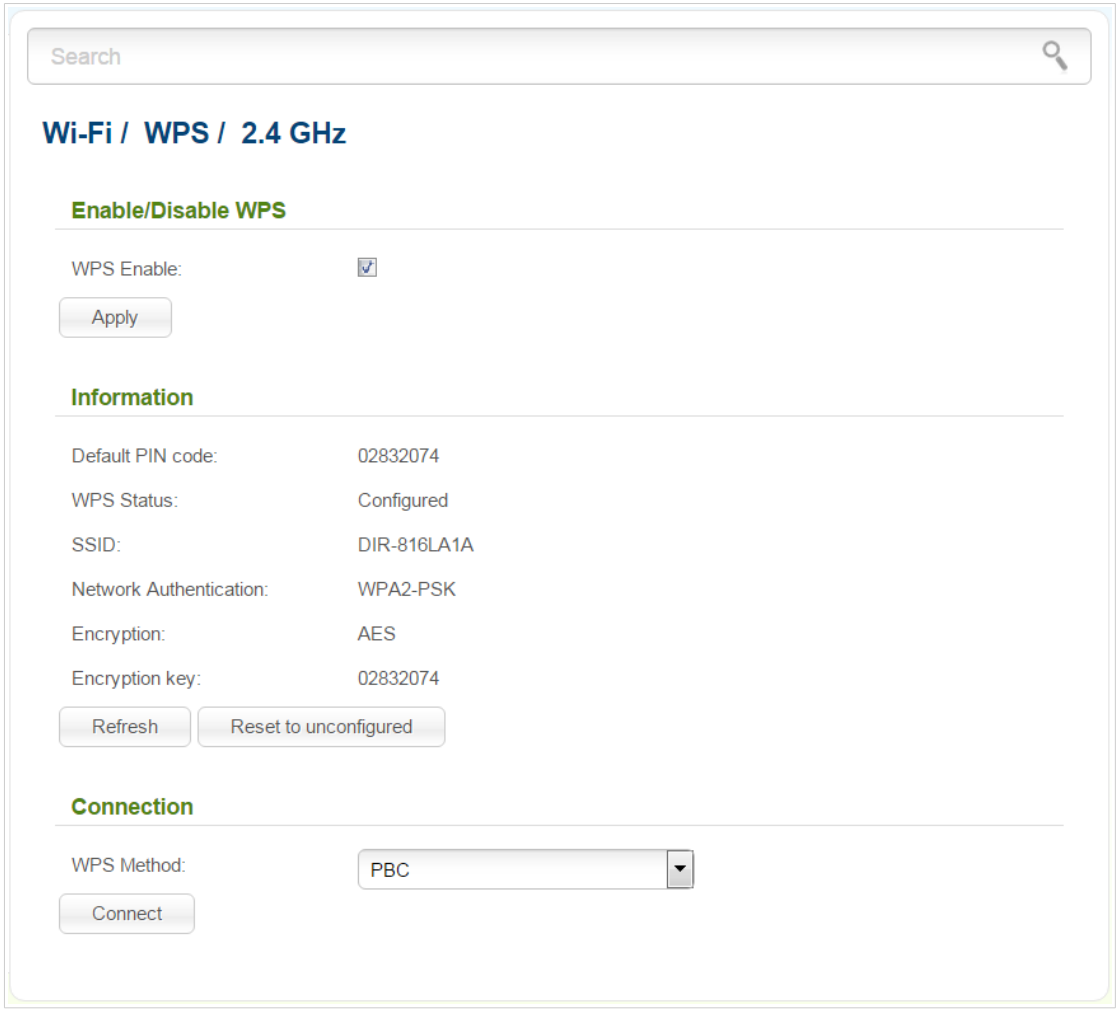


Figure 209. The page for configuring the WPS function.

To activate the WPS function, select the **WPS Enable** checkbox on the **Wi-Fi / WPS/ 2.4 GHz** or **Wi-Fi / WPS / 5 GHz** page and click the **Apply** button. When the checkbox is selected, the **Information** and **Connection** sections are available on the page.

Parameter	Description
Default PIN code	The PIN code of the router. This parameter is used when connecting the router to a registrar to set the parameters of the WPS function.
WPS Status	The state of the WPS function: • **Configured** (all needed settings are specified; these settings will be used upon establishing the wireless connection) • **Unconfigured** (after activating the WPS function, the SSID and the encryption key will be configured automatically, the network authentication type will be changed to WPA2-PSK).
SSID	The name of the router's WLAN (or the first part of the WLAN if the network is splitted into parts).
Network Authentication	The network authentication type specified for the WLAN (or first part of the WLAN).
Encryption	The encryption type specified for the WLAN (or first part of the WLAN).
Encryption key	The encryption key specified for the WLAN (or first part of the WLAN).
Refresh	Click the button to refresh the data on the page.
Reset to unconfigured	Click the button to reset the parameters of the WPS function.
WPS Method	A method of the WPS function. Select a value from the drop-down list. **PIN**: Connecting the device via the PIN code. **PBC**: Connecting the device via the push button (actual or virtual).
PIN Code	The PIN code of the WPS-enabled device that needs to be connected to the wireless network of the router. The field is displayed only when the **PIN** value is selected from the **WPS Method** drop-down list.
Connect	Click the button to connect the wireless device to the router's WLAN via the WPS function.

Using WPS Function via Web-based Interface

To add a wireless device via the PIN method of the WPS function, follow the next steps:

1. Select the **WPS Enable** checkbox.
2. Click the **Apply** button.
3. Select the **PIN** value from the **WPS Method** drop-down list.
4. Select the PIN method in the software of the wireless device that you want to connect to the router's WLAN.
5. Click the relevant button in the software of the wireless device that you want to connect to the WLAN.
6. Right after that, enter the PIN code specified on the cover of the wireless device or in its software in the **PIN Code** field.
7. Click the **Connect** button in the web-based interface of the router.

To add a wireless device via the PBC method of the WPS function, follow the next steps:

1. Select the **WPS Enable** checkbox.
2. Click the **Apply** button.
3. Select the **PBC** value from the **WPS Method** drop-down list.
4. Select the PBC method in the software of the wireless device that you want to connect to the router's WLAN.
5. Click the relevant button in the software or press the WPS button on the cover of the wireless device that you want to connect to the WLAN.
6. Click the **Connect** button in the web-based interface of the router.

Using WPS Function without Web-based Interface

You can add a wireless device to the router's WLAN without accessing the web-based interface of the router. To do this, you need to configure the following router's settings:

1. Specify corresponding security settings for the wireless network of the router.
2. Select the **WPS Enable** checkbox.
3. Click the **Apply** button.
4. Save the settings and close the web-based interface (click the icon  (**Save**) in the menu displayed when the mouse pointer is over the **System** caption in the top left part of the page, then click the icon  (**Logout**)).

Later you will be able to add wireless devices to the WLAN by pressing the **WPS** button of the router.

1. Select the PBC method in the software of the wireless device that you want to connect to the router's WLAN.
2. Click the relevant button in the software or press the WPS button on the cover of the wireless device that you want to connect to the WLAN.
3. Press the **WPS** button of the router, hold it for 2 seconds, and release. The **WLAN / WPS** LED will start blinking.

Additional Settings

On pages of the **Wi-Fi / Additional settings** section, you can define additional parameters for the WLAN of the router. To configure the 2.4GHz band or 5GHz band, proceed to the relevant page.

Changing parameters presented on this page may negatively affect your WLAN!

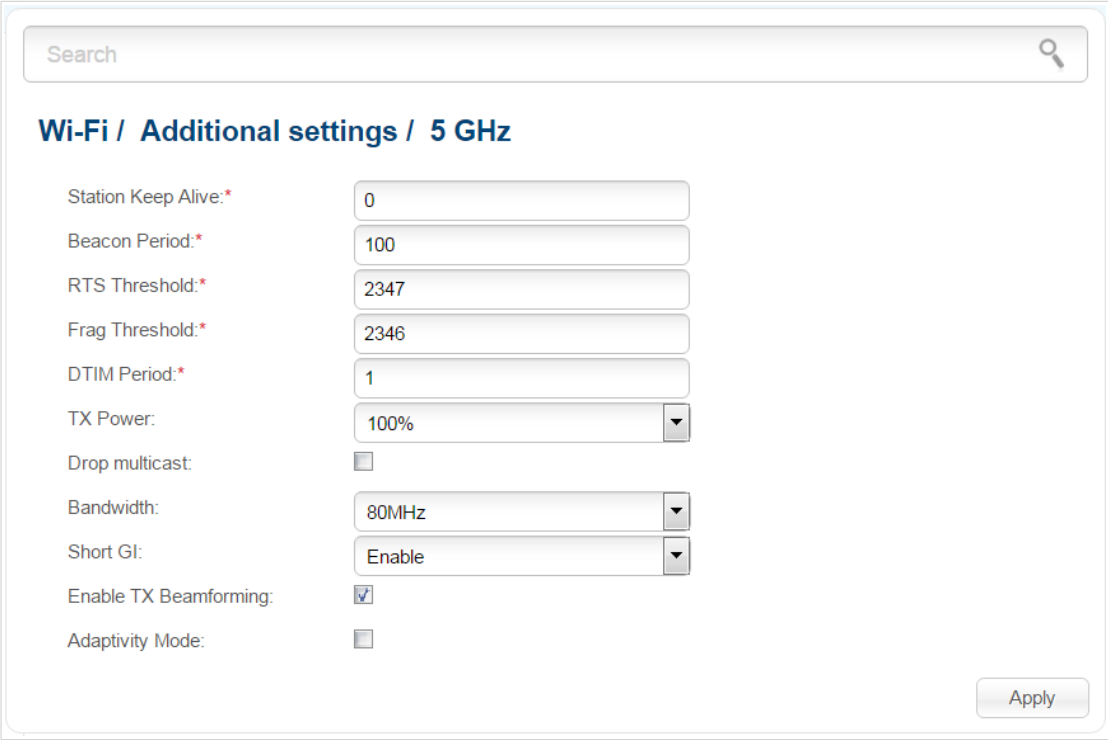


Figure 210. Additional settings of the WLAN.

The following fields are available on the page:

Parameter	Description
Station Keep Alive	The time interval (in seconds) between keep alive checks of wireless devices from your WLAN. When the value **0** is specified, the checking is disabled.
Beacon Period	The time interval (in milliseconds) between packets sent to synchronize the wireless network.
RTS Threshold	The minimum size (in bites) of a packet for which an RTS frame is transmitted.
Frag Threshold	The maximum size (in bites) of a non-fragmented packet. Larger packets are fragmented (divided).
DTIM Period	The time period (in seconds) between sending a DTIM (a message notifying on broadcast or multicast transmission) and data transmission.

Parameter	Description
TX Power	The transmit power (in percentage terms) of the router.
Drop multicast	Select the checkbox to disable multicasting for the router's WLAN. Deselect the checkbox to enable multicasting from WAN connections for which the **Enable IGMP Multicast** checkbox is selected.
Bandwidth	The channel bandwidth for 802.11n devices in 2.4GHz band (the **Wi-Fi / Additional settings / 2.4GHz** page). **20MHz**: 802.11n devices operate at 20MHz channels. **40MHz**: 802.11n devices operate at 40MHz channels. **20/40MHz -**: 802.11n devices operate at 20MHz and 40MHz channels (the channel is combined with the previous adjacent channel). **20/40MHz +**: 802.11n devices operate at 20MHz and 40MHz channels (the channel is combined with the next adjacent channel). The channel bandwidth for 802.11n devices in 5GHz band (the **Wi-Fi / Additional settings / 5GHz** page). **20MHz**: 802.11n devices operate at 20MHz channels. **40MHz**: 802.11n devices operate at 40MHz channels.
Short GI	Guard interval (in nanoseconds). This parameter defines the interval between symbols transmitted when the router is communicating to wireless devices. **Enable**: the router uses the 400 ns short guard interval. For the wireless network operating modes which support 802.11n standard only (see the value of the **Wireless mode** drop-down list on the **Wi-Fi / Basic settings** page). **Disable**: the router uses the 800 ns standard guard interval.
Enable TX Beamforming	Select the checkbox to let the router use the TX Beamforming technology. Such a settings allows the router to redistribute the signal strength on the basis of location of the wireless network clients.
Adaptivity Mode	Select the checkbox to prevent your wireless network from interfering with radars and other mobile or stationary radio systems. Such a setting can slow down the router's WLAN.

When you have configured the parameters, click the **Apply** button.

WMM

On the **Wi-Fi / WMM** page, you can enable the Wi-Fi Multimedia function.

The WMM function implements the QoS features for Wi-Fi networks. It helps to improve the quality of data transfer over Wi-Fi networks by prioritizing different types of traffic.

To enable the function, select the **WMM** checkbox and click the **Apply** button.

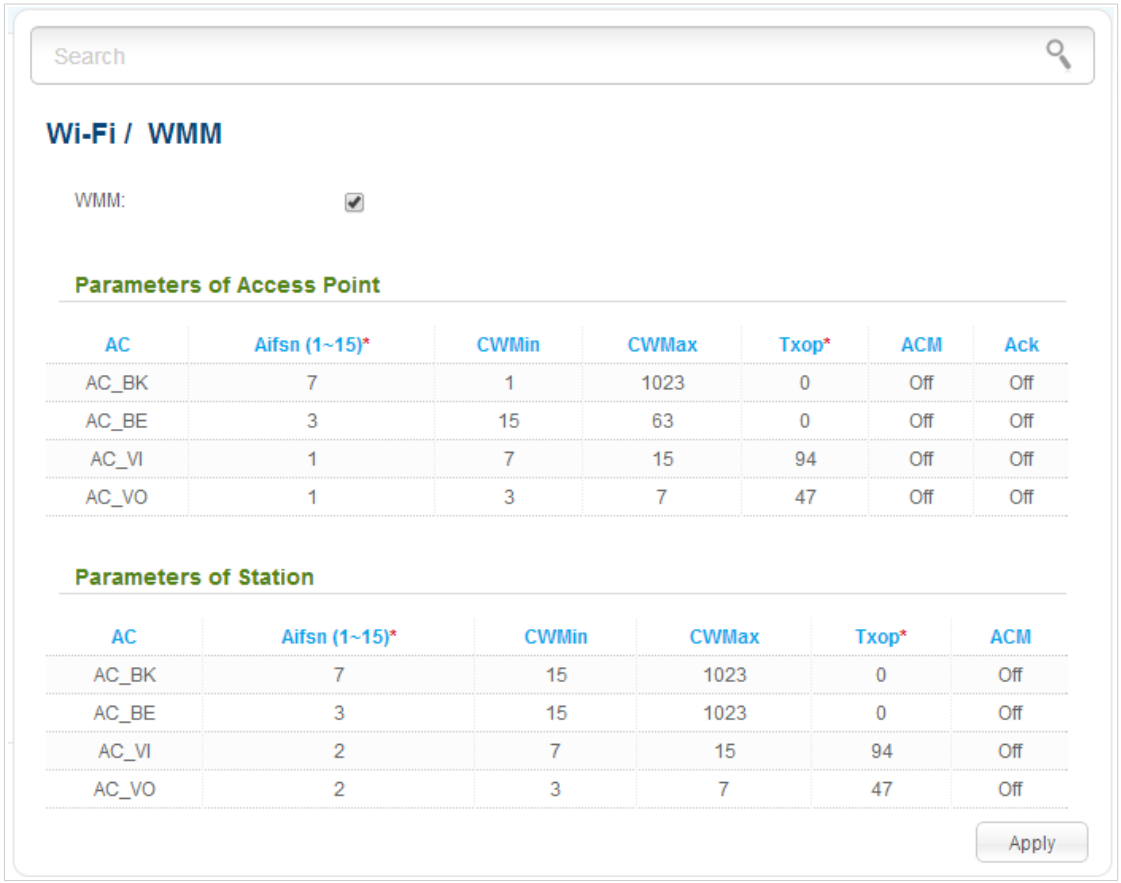


Figure 211. The page for configuring the WMM function.

All needed settings for the WMM function are specified in the device's system. It is recommended not to change the default values.

The WMM function allows assigning priorities for four Access Categories (AC):

- **AC_BK** (*Background*), low priority traffic (print jobs, file downloads, etc.).
- **AC_BE** (*Best Effort*), traffic from legacy devices or devices/applications that do not support QoS.
- **AC_VI** (*Video*).
- **AC_VO** (*Voice*).

Parameters of the Access Categories are defined for both the router itself (in the **Parameters of Access Point** section) and wireless devices connected to it (in the **Parameters of Station** section).

For every Access Category the following fields are available:

Parameter	Description
Aifsn	*Arbitrary Inter-Frame Space Number*. This parameter influences time delays for the relevant Access Category. The lower the value, the higher is the Access Category priority.
CWMin/CWMax	*Contention Window Minimum/Contention Window Maximum*. Both fields influence time delays for the relevant Access Category. The **CWMax** field value should not be lower, than the **CWMin** field value. The lower the difference between the **CWMax** field value and the **CWMin** field value, the higher is the Access Category priority.
Txop	*Transmission Opportunity*. The higher the value, the higher is the Access Category priority.
ACM	*Admission Control Mandatory*. If on, prevents from using the relevant Access Category.
Ack	*Acknowledgment*. Answering response requests while transmitting. Displayed only in the **Parameters of Access Point** section. If off, the router answers requests. If on, the router does not answer requests.

When you have configured the parameters, click the **Apply** button.

Client

On the **Wi-Fi / Client** page in the access point mode, you can configure the device as a client to connect to a wireless access point.

The “client” function in the access point mode allows using DIR-816L as a wireless client and a wireless repeater.

To use the router as a wireless repeater, you need to configure the same parameters of the wireless connection (the name of the wireless network, encryption parameters, and the channel) for DIR-816L and the remote access point.

To use the router as a wireless client, you need to configure the same channel of the wireless connection for DIR-816L and the remote access point. Other parameters of the wireless network of DIR-816L do not depend upon the settings of the remote access point.

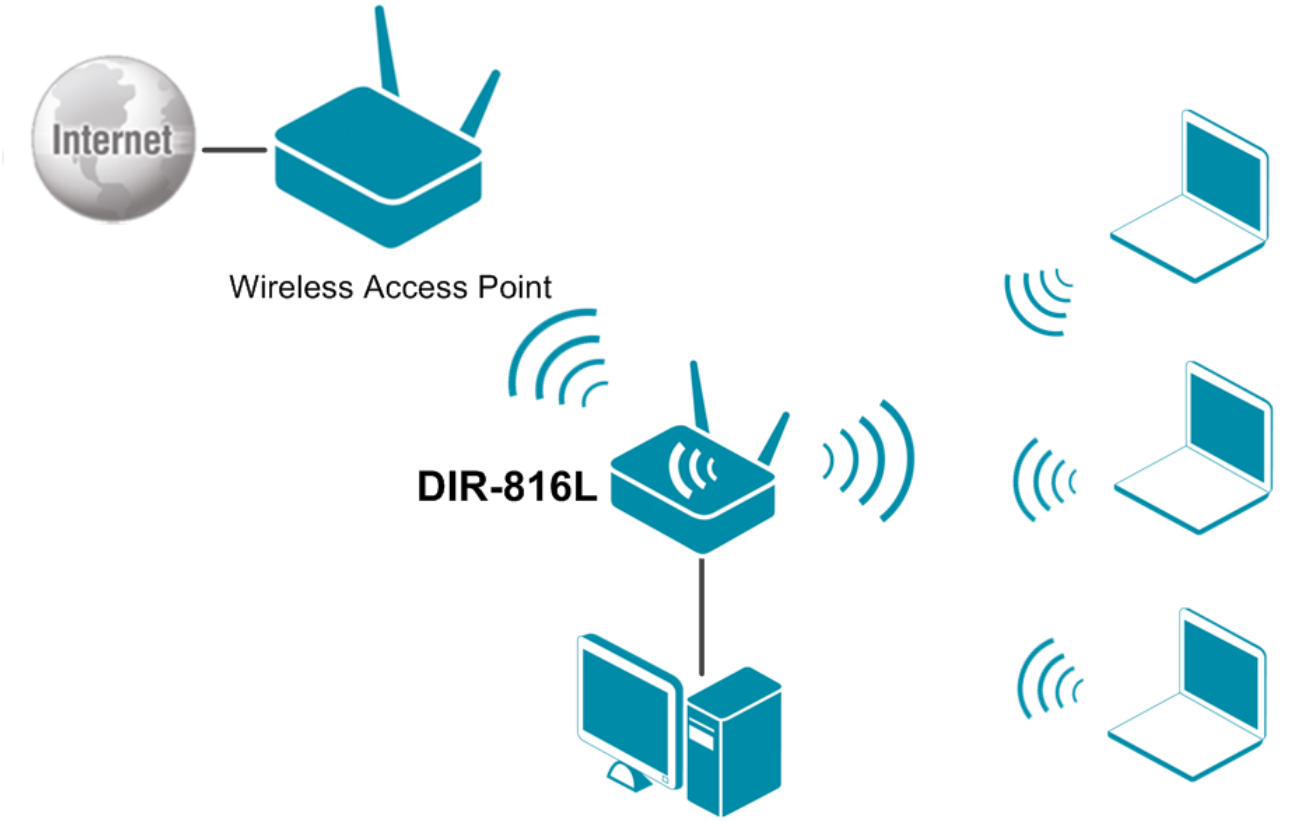


Figure 212. Connecting DIR-816L in the access point mode as a client.

To allow the devices from the LAN of DIR-816L to obtain the IP addresses from the DHCP server of the remote access point or network, it is necessary to disable the built-in DHCP server of the device. To do this, proceed to the **Net / LAN** page; then in the **DHCP server** section, in the **Mode** drop-down list, select the **Disable** value and click the **Apply** button.

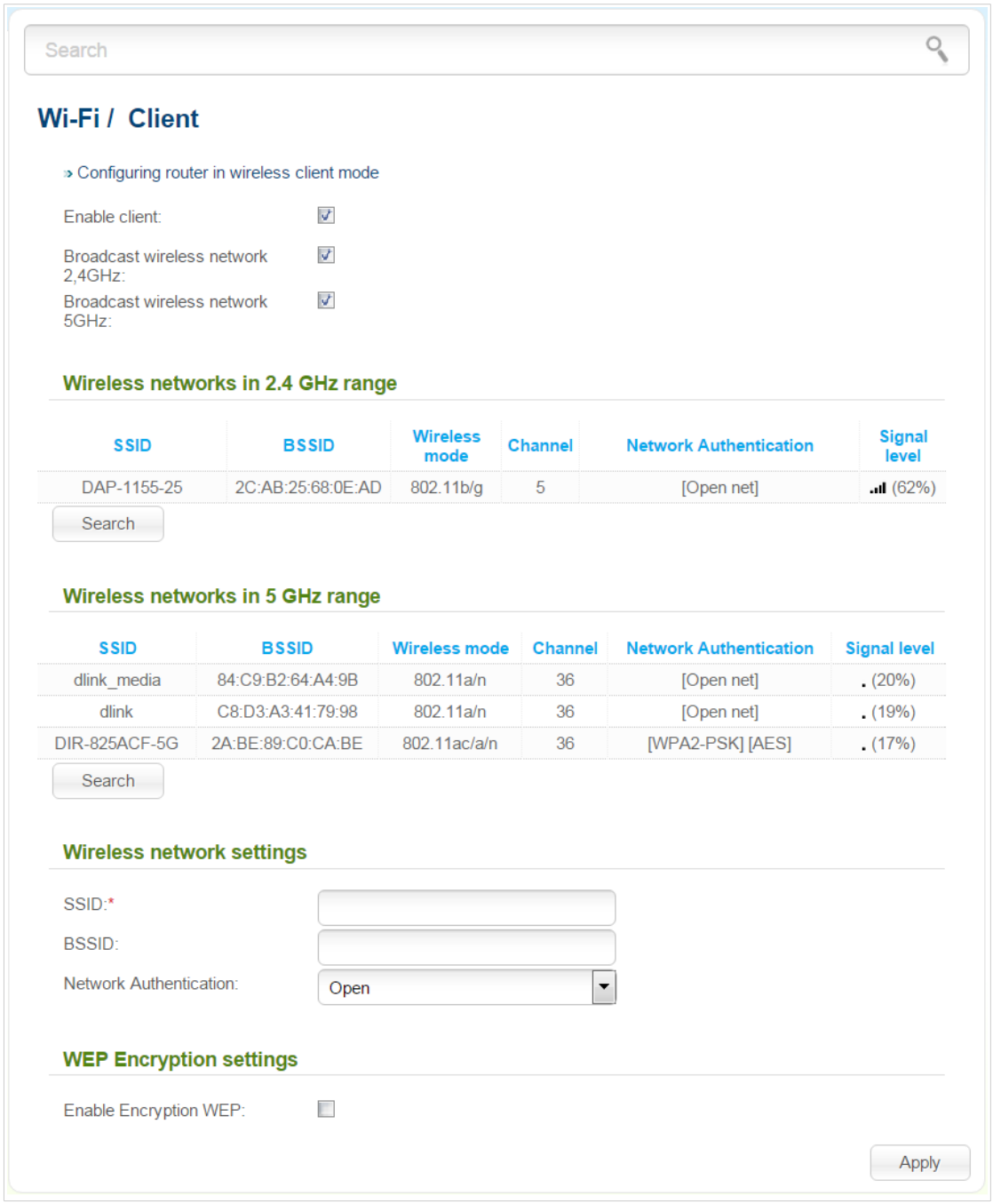


Figure 213. The page for configuring the client mode.

To configure the router as a client, select the **Enable client** checkbox. When the checkbox is selected, the following fields are displayed on the page:

Parameter	Description
SSID	The name of the network to which the router connects.
BSSID	The unique identifier of the network to which the router connects.
Network Authentication	The authentication type of the network to which the router connects.

When the **Open** or **Shared** authentication type is selected, the following fields are available:

Parameter	Description
Enable Encryption WEP	The checkbox activating WEP encryption. When the checkbox is selected, the **Default Key ID** field, the **Encryption Key WEP as HEX** checkbox, the **WEP key length** drop-down list, and four **Encryption Key WEP** fields are displayed on the page. For the **Shared** authentication type the checkbox is always selected.
Default Key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption Key WEP as HEX	Select the checkbox to set a hexadecimal number as a key for encryption.
WEP key length	The length of WEP encryption key. Select the value **64bit** to specify keys containing 5 ASCII symbols or 10 HEX symbols. Select the value **128bit** to specify keys containing 13 ASCII symbols or 26 HEX symbols.
Encryption Key WEP (1-4)	Keys for WEP encryption. The router uses the key selected from the **Default Key ID** drop-down list. It is required to specify all the fields.

When the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** authentication type is selected, the following fields are available:

Parameter	Description
Encryption Key PSK	A key for WPA encryption. The key can contain digits and/or Latin characters.
WPA Encryption	An encryption method: **TKIP**, **AES**, or **TKIP+AES**.

When you have configured the parameters, click the **Apply** button.

In addition, when the **Enable client** checkbox is selected, the list of available wireless networks is displayed on the page.

To view the latest data on the available 2.4GHz band wireless networks, click the **Search** button in the **Wireless networks in 2.4 GHz range** section.

To view the latest data on the available 5GHz band wireless networks, click the **Search** button in the **Wireless networks in 5 GHz range** section.

To connect to a wireless network from the list, select the needed network. Upon that the relevant values are automatically inserted in the **SSID**, **BSSID**, and **Network Authentication** fields.

For the **Open** authentication type with no encryption, click the **Apply** button.

For the **Open** authentication type with encryption and the **Shared** authentication type, select a needed value from the **Default Key ID** drop-down list. If needed, select the **Encryption Key WEP as HEX** checkbox to set a hexadecimal number as a key for encryption. Then select a needed value in the **WEP key length** drop-down list, fill in 4 **Encryption Key WEP** fields, and click the **Apply** button.

For the **WPA-PSK**, **WPA2-PSK**, or **WPA-PSK/WPA2-PSK mixed** authentication types, fill in the **Encryption Key PSK** field and click the **Apply** button.

If the router is connected to the selected network successfully, the green indicator appears to the right of the network's SSID in the table.

Proceed to the **Wi-Fi / Basic Settings** page of the relevant band and make sure that the wireless channel of DIR-816L has switched to the channel of the wireless access point to which you have connected.

The step-by-step description of how to configure the router as a wireless client is available on D-Link website. To access it, click the **Configuring router in wireless client mode** link in the top part of the page.

USB Storage

This menu is designed to operate USB storages. Here you can do the following:

- view data on the connected USB storage
- view content of the connected USB storage
- configure the router as a print server
- configure SMB-based access to the USB storage
- enable the built-in FTP server of the router
- enable the built-in DLNA server of the router.

Information

On the **USB storage / Information** page, you can view data on the USB storage connected to the router.

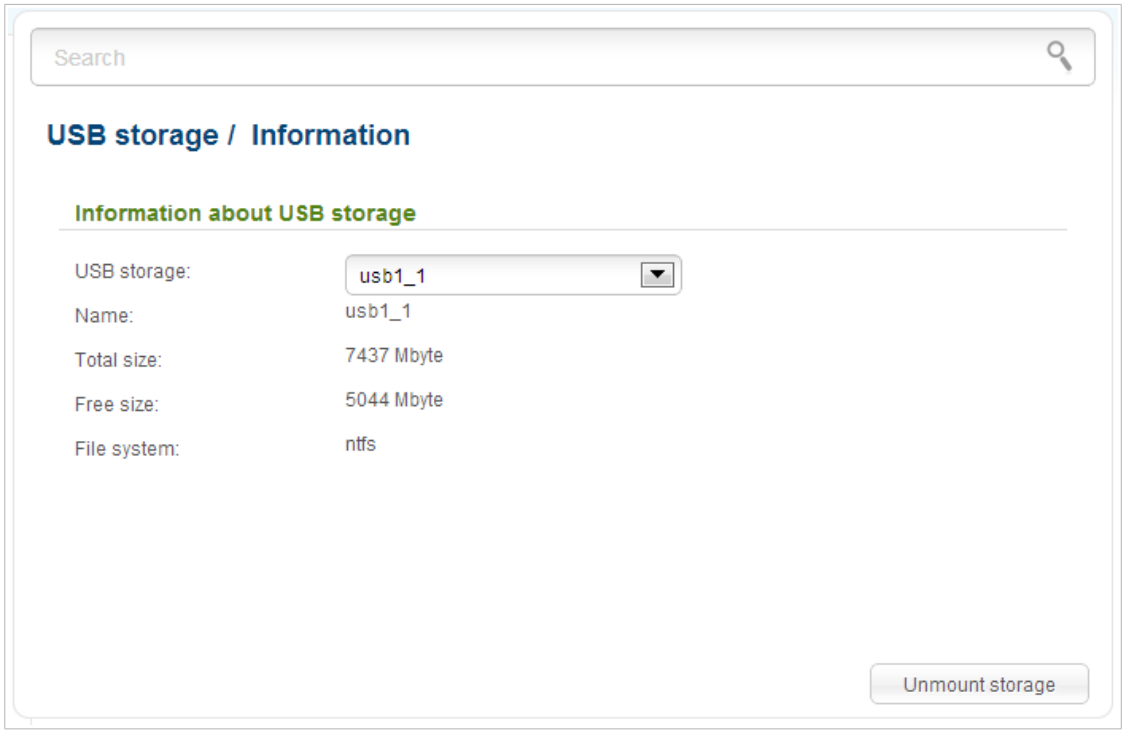


*Figure 214. The **USB storage / Information** page.*

The following data are presented on the page: the name, total and free space of the storage, and the type of its file system (supported file systems: FAT16/32, NTFS, and ext2/3).

If the USB storage is divided into volumes, several values are displayed in the **USB storage** drop-down list. Select the needed value to view data on the volume (partition) of the USB storage.

To safely disconnect the USB storage, click the **Unmount storage** button. When the **Disconnected** value is displayed on the page, remove the storage from the router.

To disconnect one volume of the storage, select the needed value from the **USB storage** drop-down list and click the **Unmount volume** button.

Filebrowser

On the **USB storage / Filebrowser** page, you can view the content of your USB storage connected to the router and remove separate folders and files from the USB storage.

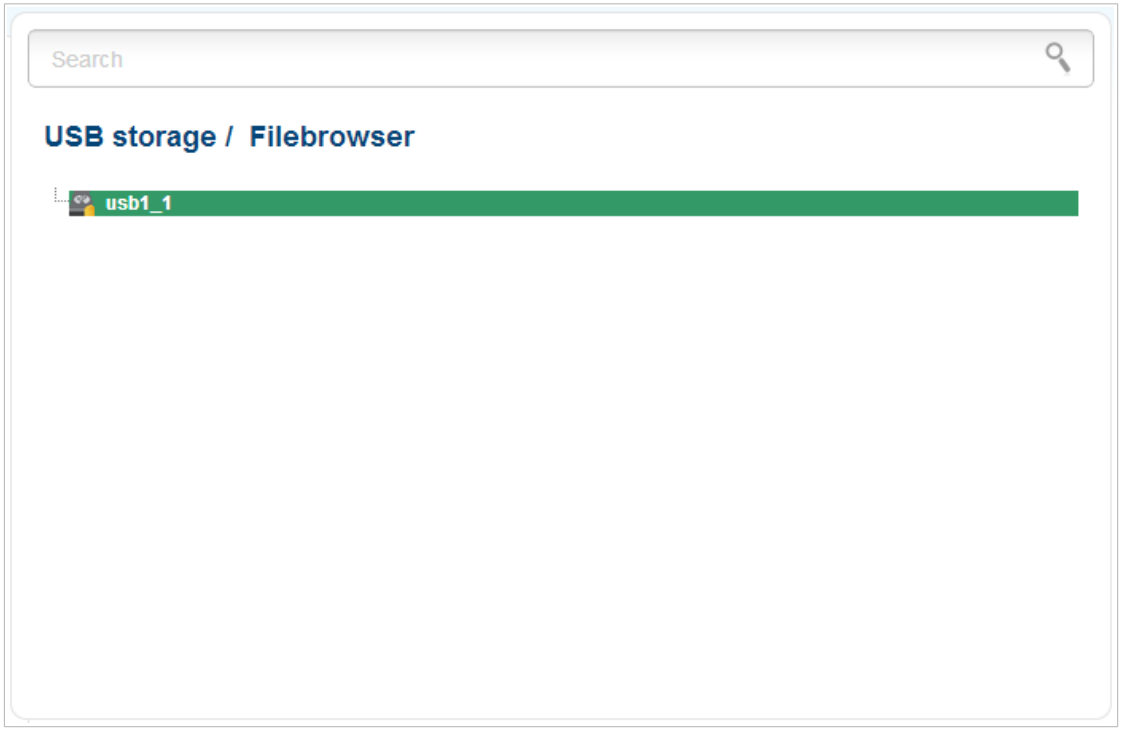


*Figure 215. The **USB storage / Filebrowser** page.*

To view the content of the USB storage, double-click the icon of the storage or storage partition. The list of folders and files will be displayed on the page.

To proceed to a folder, select it in the directory structure on the left part of the page and double-click the line corresponding to this folder.

To refresh the folder contents, right-click the line corresponding to this folder, and select the **Refresh** value in the menu displayed.

To remove a folder or file, right-click the line corresponding to this folder or file, and select the **Delete** value in the menu displayed.

Print Server

On the **USB storage / Print-server** page, you can configure the router as a print server. Being configured in this way, the router will allow your LAN users to share the printer connected to the USB port of the router.

To connect a printer to the router, power off both devices. Connect printer to the USB port of the router, power on the printer, then power on the router.

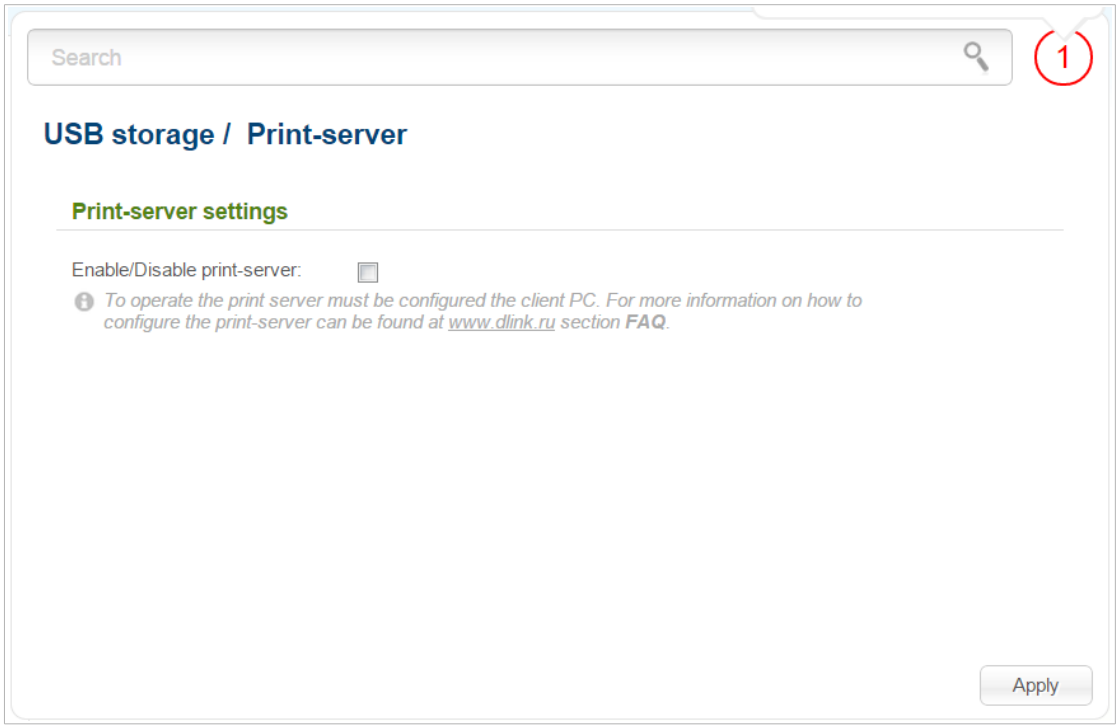


*Figure 216. The **USB storage / Print-server** page.*

To configure the router as a print server, select the **Enable/Disable print-server** checkbox and click the **Apply** button.

If you don't want to use the router as a print server, deselect the **Enable/Disable print-server** checkbox and click the **Apply** button.

Samba

On the **USB storage / Samba** page, you can enable the built-in Samba server of the router to provide access to the USB storage for users of your LAN.

*Figure 217. The **USB storage / Samba** page.*

You can enable the Samba server only when a USB storage is connected to the router (in this case, the **Connected** value is displayed in the **USB storage** field). To enable the Samba server, select the **Enable** checkbox.

The **Anonymous login** checkbox enables anonymous access to the content of the USB storage for users of your LAN. By default, the checkbox is selected.

If you want to provide authorized access to the content of the USB storage for users of your LAN, deselect the checkbox. After applying the parameters on this page, proceed to the **System / USB Users** page and create needed accounts.

In the **Workgroup** field, leave the value specified by default (`WORKGROUP`) or specify a new name of a workgroup which participants will have access to the content of the USB storage.

In the **Short description** field, you can specify an additional description for the USB storage. This value will be displayed in some operating systems. Use digits and/or Latin characters.

In the **NetBIOS** field, specify a new name of the USB storage for identification in your LAN. Use digits and/or Latin characters.

After specifying the needed parameters, click the **Apply** button.

To disable the built-in Samba server of the router, deselect the **Enable** checkbox and click the **Apply** button.

FTP

On the **USB storage / FTP** page, you can enable the built-in FTP server of the router to provide access to the USB storage for users of your LAN.

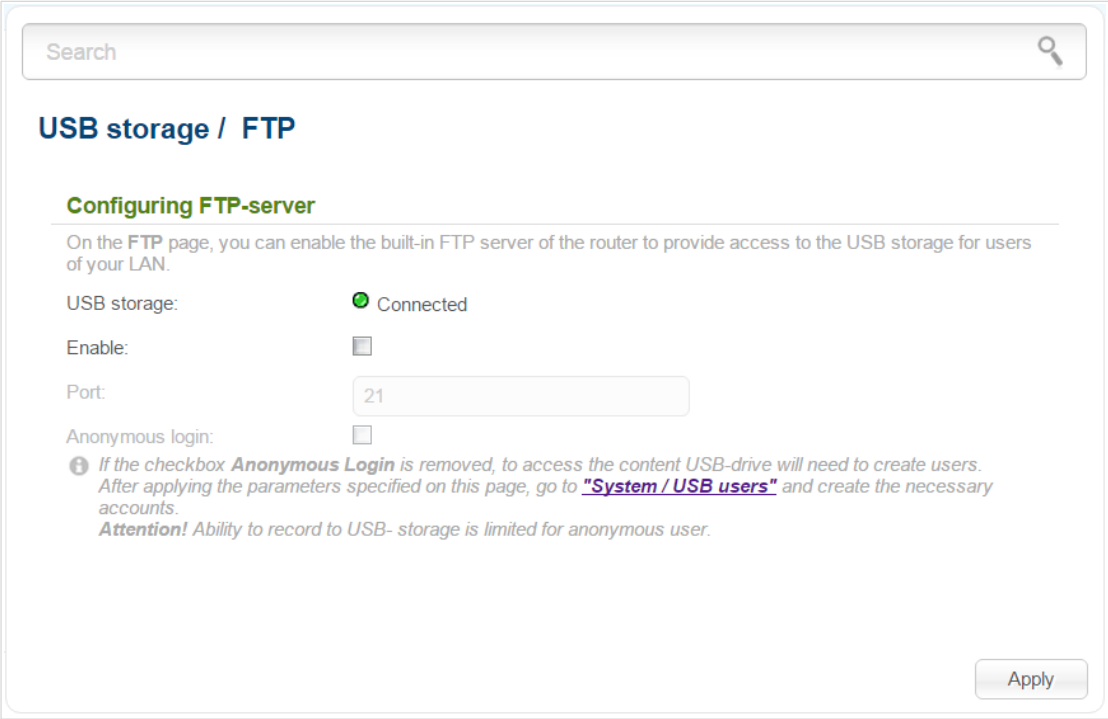


*Figure 218. The **USB storage / FTP** page.*

You can enable the FTP server only when a USB storage is connected to the router (in this case, the **Connected** value is displayed in the **USB storage** field).

Select the **Enable** checkbox; if needed, change the router's port used by the FTP server in the **Port** field (by default, the standard port `21` is specified).

Select the **Anonymous login** checkbox to enable anonymous access to the content of the USB storage for users of your LAN. If you want to provide authorized access to the content of the USB storage for users of your LAN, leave the checkbox unselected. After applying the parameters on this page, proceed to the **System / USB Users** page and create needed accounts.

After specifying the needed parameters, click the **Apply** button.

To disable the built-in FTP server of the router, deselect the **Enable** checkbox and click the **Apply** button.

DLNA

On the **USB storage / DLNA page**, you can enable the built-in DLNA server of the router to provide access to the USB storage for users of your LAN.

The built-in media server allows DLNA certified devices of your LAN to play multimedia content of the USB storage. Multimedia content can be played only when a USB storage is connected to the router.

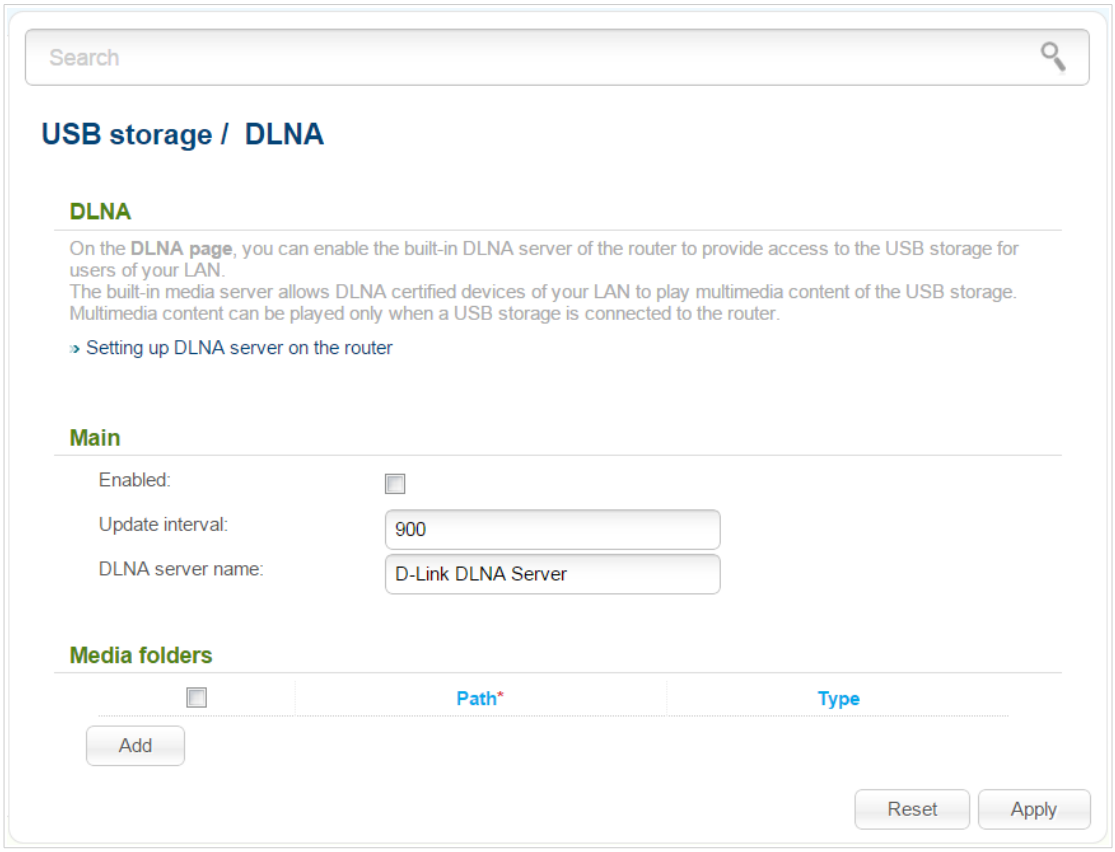


*Figure 219. The **USB storage / DLNA** page.*

To enable the DLNA server, select the **Enabled** checkbox.

In the **Update interval** field, specify the time period (in seconds), at the end of which the media server updates the file list of the USB storage, or leave the value specified by default (**900**). The minimal value you can specify is 60 seconds.

In the **DLNA server name** field, specify a new name of the DLNA server for easier identification in your LAN or leave the value specified by default (**D-Link DLNA Server**). Use digits and/or Latin characters.

To allow access to the content of the USB storage for users of your LAN, click the **Add** button. In the line displayed, locate a folder. To do this, click the button located to the right of the **Path** field (the button is available if the **Path** field is selected). In the opened window, double-click the icon of the storage or storage partition, select the needed folder in the directory structure, and click the **Open** button.

For each folder you can define the type of files which will be available for users of your LAN. To do this, select the needed type of files from the **Type** drop-down list. To share all files of a folder, select the **All** value from the **Type** drop-down list.

To undo the last changes, click the **Reset** button.

After specifying the needed parameters, click the **Apply** button.

To remove a folder from the list, select the checkbox in the line containing the relevant folder and click the **Apply** button.

To disable the built-in DLNA server of the router, deselect the **Enabled** checkbox and click the **Apply** button.

The step-by-step description of how to configure the DLNA server of the router is available on D-Link website. To access it, click the **Setting up DLNA server on the router** link in the top part of the page.

System

In this menu you can do the following:

- change the password used to access the router's settings
- save the current settings to the non-volatile memory
- create a backup of the router's configuration
- restore the router's configuration from a previously saved file
- restore the factory default settings
- view the system log
- update the firmware of the router
- configure automatic notification on new firmware version
- configure automatic synchronization of the system time or manually configure the date and time for the router
- check availability of a host on the Internet through the web-based interface of the router
- trace the route to a host
- allow or forbid access to the router via TELNET
- create accounts for users to allow access to the content of the USB storage
- switch the device to the other mode.

Administrator Password

On the **System / Administrator password** page, you can change the password for the administrator account used to access the web-based interface of the router and to access the device settings via TELNET.

! For security reasons, it is strongly recommended to change the administrator password upon initial configuration of the router.

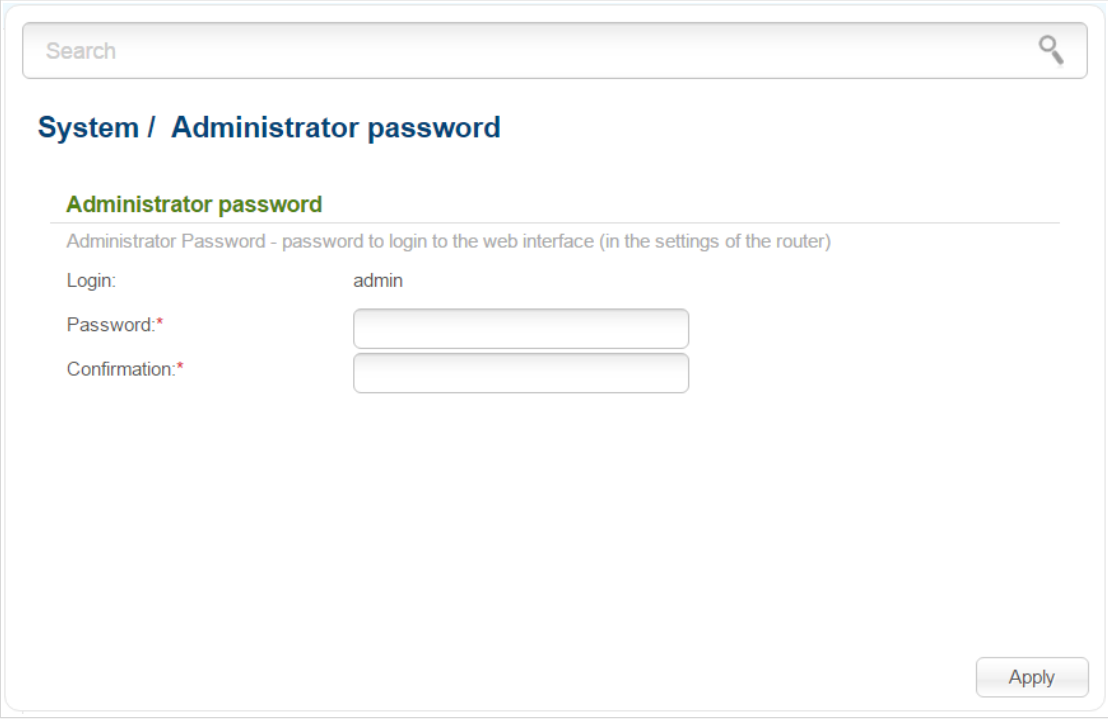


Figure 220. The page for modifying the administrator password.

Enter the new password in the **Password** and **Confirmation** fields and click the **Apply** button.

Configuration

On the **System / Configuration** page, you can reboot the device, save the changed settings to the non-volatile memory, restore the factory defaults, backup the current configuration, or restore the router's configuration from a previously created file.

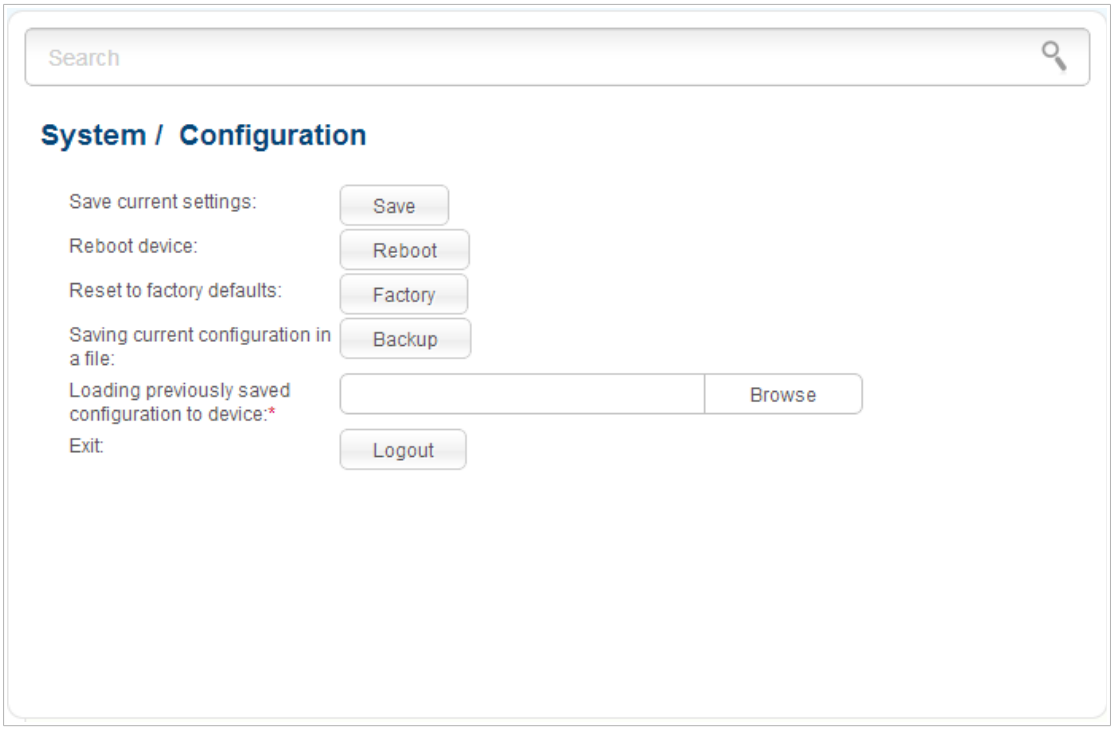


*Figure 221. The **System / Configuration** page.*

The following buttons are available on the page:

Control	Description
Save	Click the button to save settings to the non-volatile memory. Please, save settings every time you change the router's parameters. Otherwise the changes will be lost upon hardware reboot of the router.
Reboot	Click the button to reboot the device. All unsaved changes will be lost after the device's reboot.
Factory	Click the button to restore the factory default settings. Also you can restore the factory defaults via the hardware **RESET** button (see the ***Back and Bottom Panels*** section, page 16).
Backup	Click the button to save the configuration (all settings of the router) to your PC. The configuration backup will be stored in the download location of your web browser.

Control	Description
Browse	Click the button and follow the dialog box appeared to select a previously saved configuration file (all settings of the router) located on your PC and upload it.
Logout	Click the button to exit the web-based interface.

Actions of the **Save**, **Reboot**, **Factory**, **Backup**, and **Logout** buttons also can be performed via the top-page menu displayed when the mouse pointer is over the **System** caption.

System Log

On the **System / System log / Configuration** page, you can set the system log options and configure sending the system log to a remote host.

*Figure 222. The **System / System log / Configuration** page.*

To enable logging of the system events, select the **Logging** checkbox. Then specify the needed parameters.

Control	Description
Logging type	Select a type of logging from the drop-down list. • **Local**: the system log is stored in the router's memory (and displayed on the **System / System log / Log** page). When this value is selected, the **Server** and **Port** fields are not displayed. • **Remote**: the system log is sent to the remote host specified in the **Server** field. • **Local and remote**: the system log is stored in the router's memory (and displayed on the **System / System log / Log** page) and sent to the remote host specified in the **Server** field.
Logging level	Select a type of messages and alerts/notifications to be logged.
Server	The IP or URL address of the host from the local or global network, to which the system log will be sent.

Control	Description
Port	A port of the host specified in the **Server** field. By default, the value `514` is specified.

After specifying the needed parameters, click the **Apply** button.

To disable logging of the system events, deselect the **Logging** checkbox and click the **Apply** button.

On the **System / System log / Log** page, the events specified in the **Logging level** list are displayed.

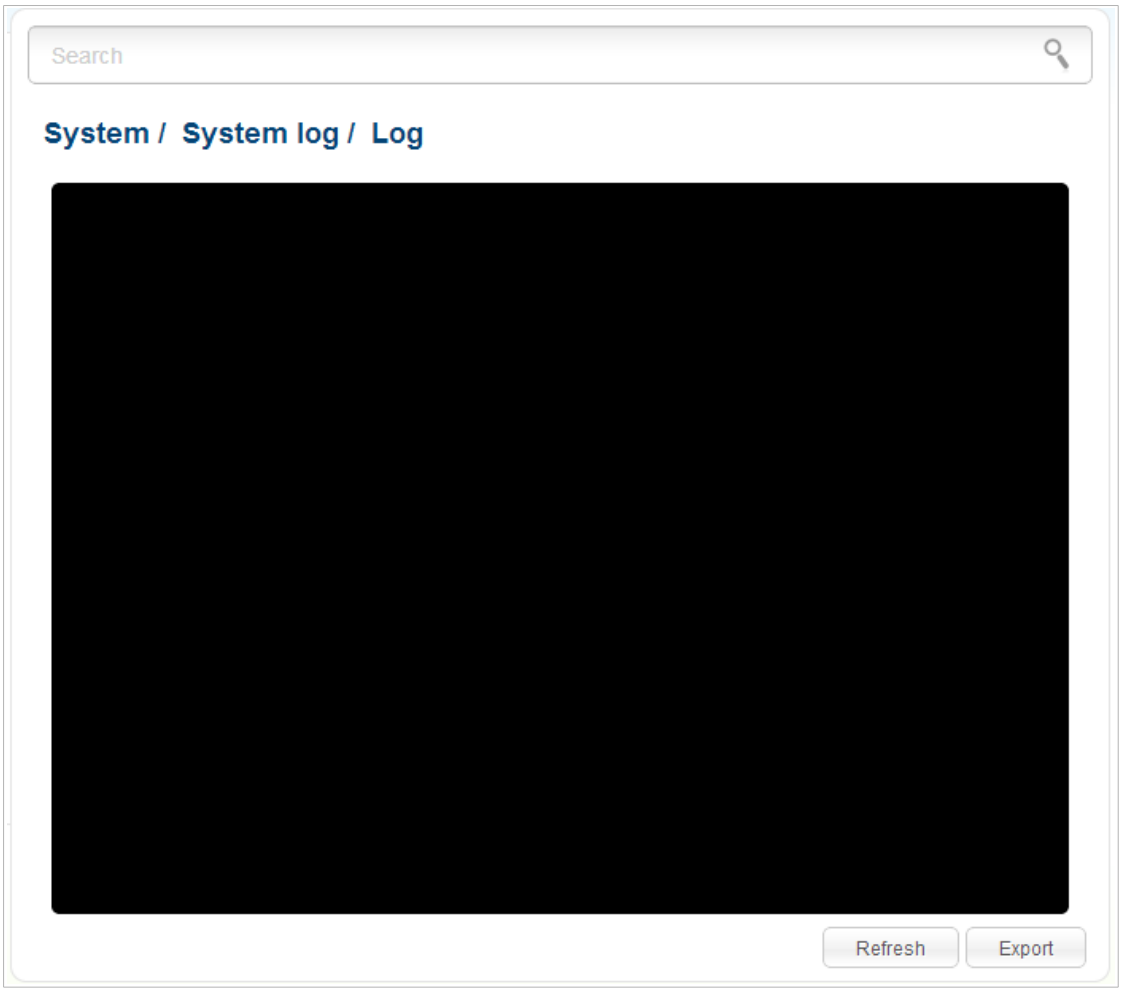


*Figure 223. The **System / System log / Log** page.*

To view the latest system events, click the **Refresh** button.

To save the system log to your PC, click the **Export** button and follow the dialog box appeared.

Firmware Upgrade

On the **System / Firmware upgrade** page, you can upgrade the firmware of the router and configure the automatic check for updates of the router's firmware.

! Upgrade the firmware only when the router is connected to your PC via a wired connection.

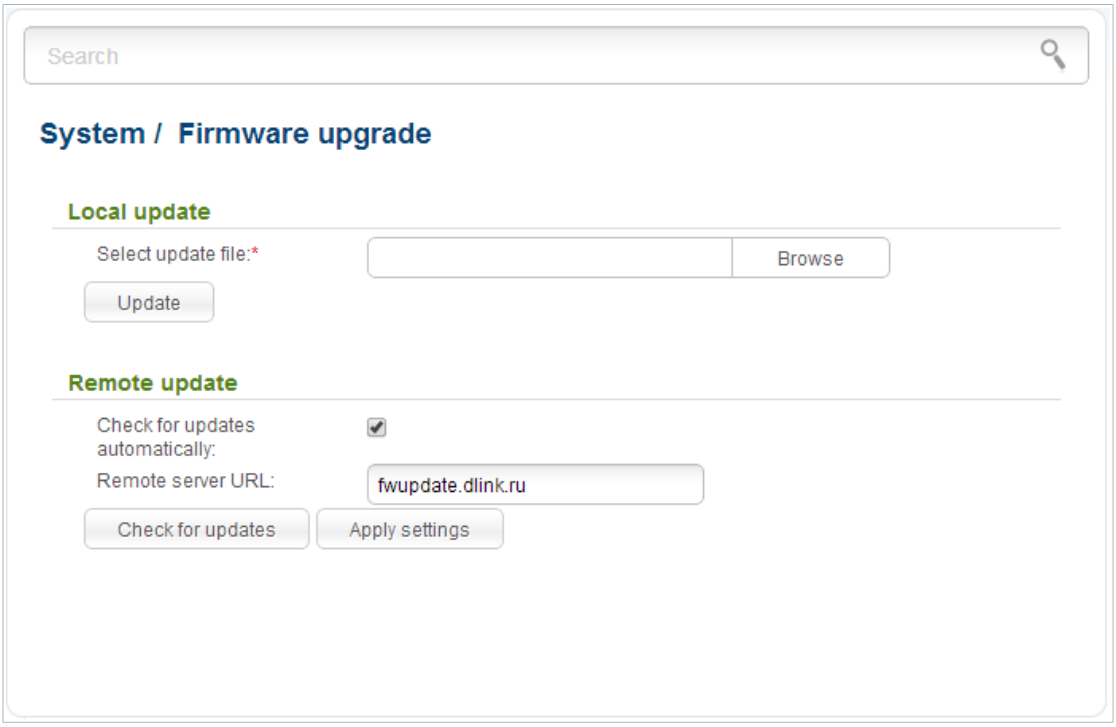


*Figure 224. The **System / Firmware upgrade** page.*

The current version of the router's firmware is displayed next the D-Link logo in the top left corner of the page.

By default, the automatic check for the router's firmware updates is enabled. If a firmware update is available, a notification will be displayed in the top right corner of the page.

To disable the automatic check for firmware updates, in the **Remote update** section, deselect the **Check for updates automatically** checkbox and click the **Apply settings** button.

To enable the automatic check for firmware updates, in the **Remote update** section, select the **Check for updates automatically** checkbox and click the **Apply settings** button. By default, in the **Remote server URL** field, the D-Link update server address (`fwupdate.dlink.ru`) is specified.

You can upgrade the firmware of the router locally (from the hard drive of your PC) or remotely (from the update server).

Local Update

> **!** Attention! Do not turn off the router before the firmware upgrade is completed. This may cause the device breakdown.

To update the firmware of the router locally, follow the next steps:

1. Download a new version of the firmware from www.dlink.ru.
2. Click the **Browse** button on the **System / Firmware upgrade** page to locate the new firmware file.
3. Click the **Update** button to upgrade the firmware of the router.
4. Wait until the router is rebooted (about one and a half or two minutes).
5. Log into the web-based interface using the login (`admin`) and the current password.

After the upgrade is completed, the new version of the firmware will be displayed in the top left corner of the page.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, place the mouse pointer over the **System** caption in the top left corner of the page and click the  (**Reset to factory**) icon. Wait until the router is rebooted.

Remote Update

> **!** Attention! Do not turn off the router before the firmware upgrade is completed. This may cause the device breakdown.

To update the firmware of the router remotely, follow the next steps:

1. On the **System / Firmware upgrade** page, in the **Remote update** section, click the **Check for updates** button to check if a newer firmware version exists.
2. Click the **OK** button in the window displayed to upgrade the firmware of the router. Also you can upgrade the firmware of the router by clicking the **Remote update** button (the button is displayed if a newer version of the firmware is available).
3. Wait until the router is rebooted (about one and a half or two minutes).
4. Log into the web-based interface using the login (`admin`) and the current password.

After the upgrade is completed, the new version of the firmware will be displayed in the top left corner of the page.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, place the mouse pointer over the **System** caption in the top left corner of the page and click the  (**Reset to factory**) icon. Wait until the router is rebooted.

System Time

On the **System / System time** page, you can manually set the time and date of the router or configure automatic synchronization of the system time with a time server on the Internet.

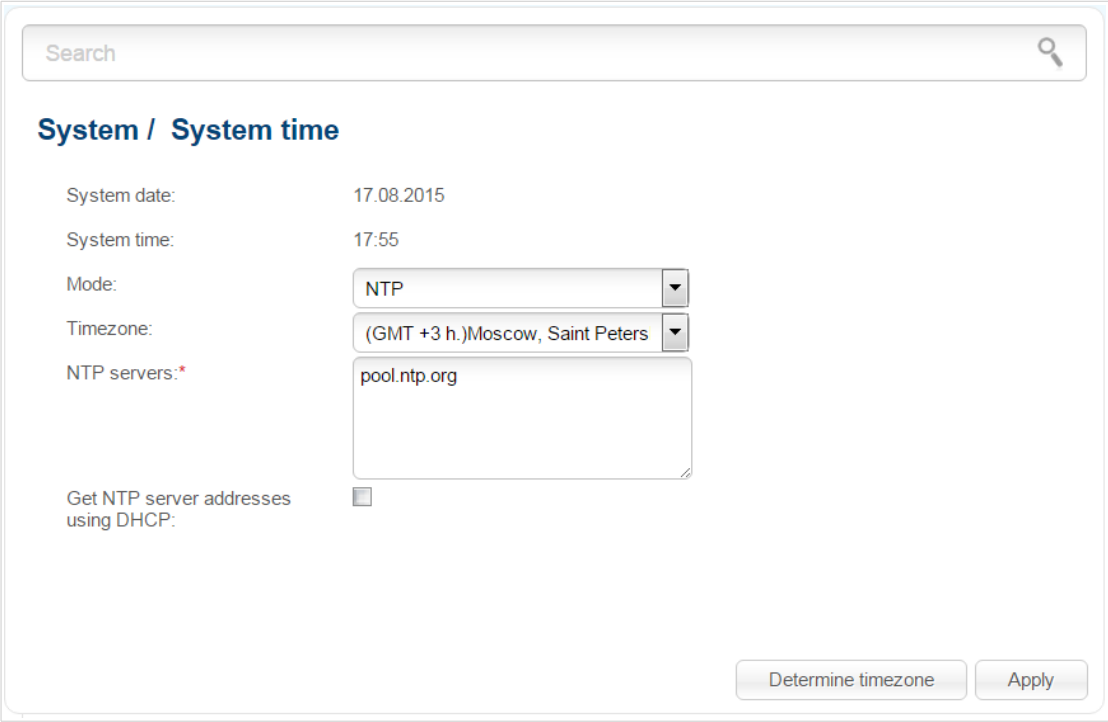


*Figure 225. The **System / System time** page.*

To set the system time manually, select the **Manual** value from the **Mode** drop-down list and set the time and date in the fields displayed. Then click the **Apply** button.

To enable automatic synchronization with a time server, follow the next steps:

1. Select the **NTP** value from the **Mode** drop-down list.
2. Select your time zone from the drop-down list. To set the time zone in accordance with the settings of your operating system, click the **Determine timezone** button in the bottom right corner of the page.
3. Specify the needed NTP server in the **NTP servers** field or leave the server specified by default.
4. Click the **Apply** button.

In some cases NTP servers addresses are provided by your ISP. In this case, you need to select the **Get NTP server addresses using DHCP** checkbox. Contact your ISP to clarify if this checkbox needs to be enabled. If the **Get NTP server addresses using DHCP** checkbox is selected, the **NTP servers** field is not available.

After clicking the **Apply** button, the date and time set for the router will be displayed in the **System date** and **System time** fields.

When the router is powered off or rebooted, the system time is reset to the default value. If you have set automatic synchronization for the system time, the internal clock of the device will be configured after connecting to the Internet. If you have set the system time manually, you need to set the time and date again (see above).

Ping

On the **System / Ping** page, you can check availability of a host from the local or global network via the Ping utility.

The Ping utility sends echo requests to a specified host and receives echo replies.

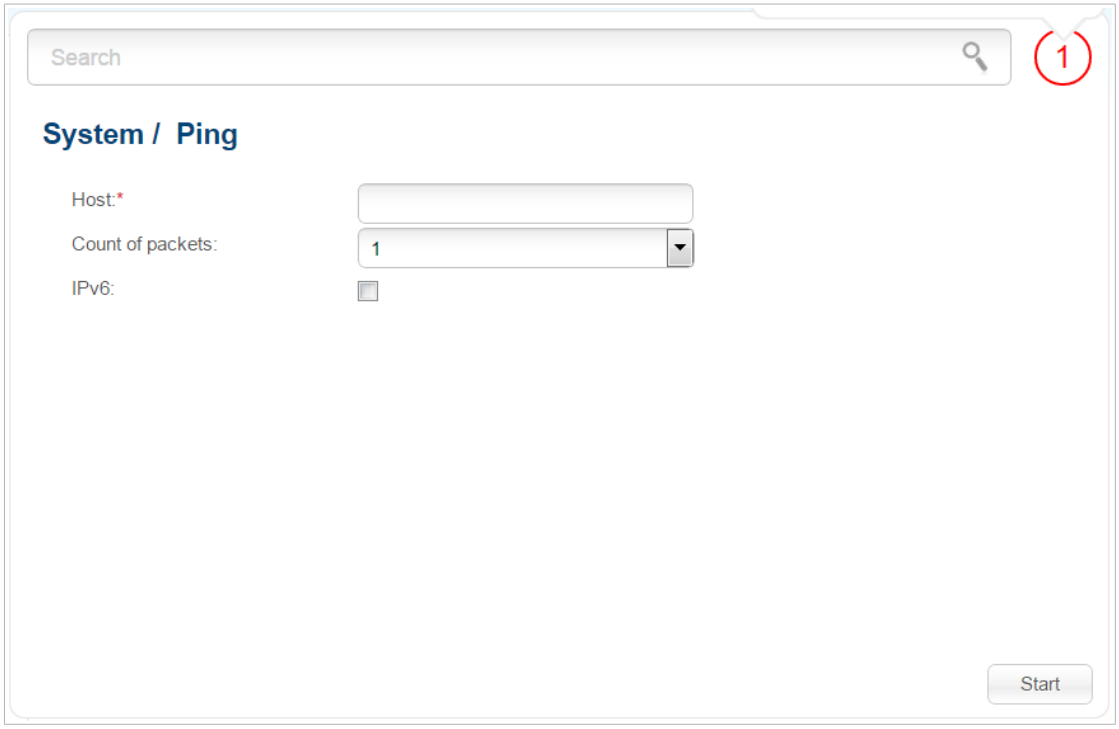


*Figure 226. The **System / Ping** page.*

To check availability of a host, enter the IP address or name of this host in the **Host** field, and select a number of requests that will be sent in order to check its availability from the **Count of packets** drop-down list. If availability check should be performed with IPv6, select the relevant checkbox. Click the **Start** button. After a while, the results will be displayed on the page.

Traceroute

On the **System / Traceroute** page, you can determine the route of data transfer to a host via the traceroute utility.

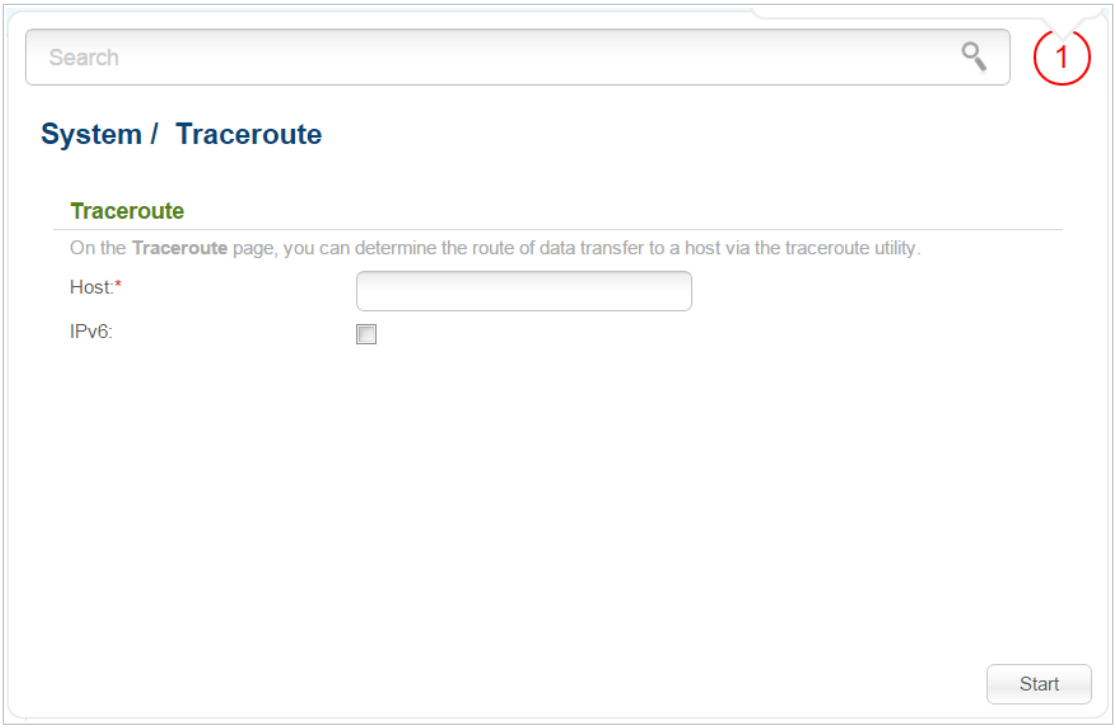


*Figure 227. The **System / Traceroute** page.*

To determine the route, enter the name or IP address of a host in the **Host** field. If the route should be determined using IPv6, select the relevant checkbox. Click the **Start** button. After a while, the results will be displayed on the page.

Telnet

On the **System / Telnet** page, you can enable or disable access to the device settings via TELNET from your LAN. By default, access is enabled.

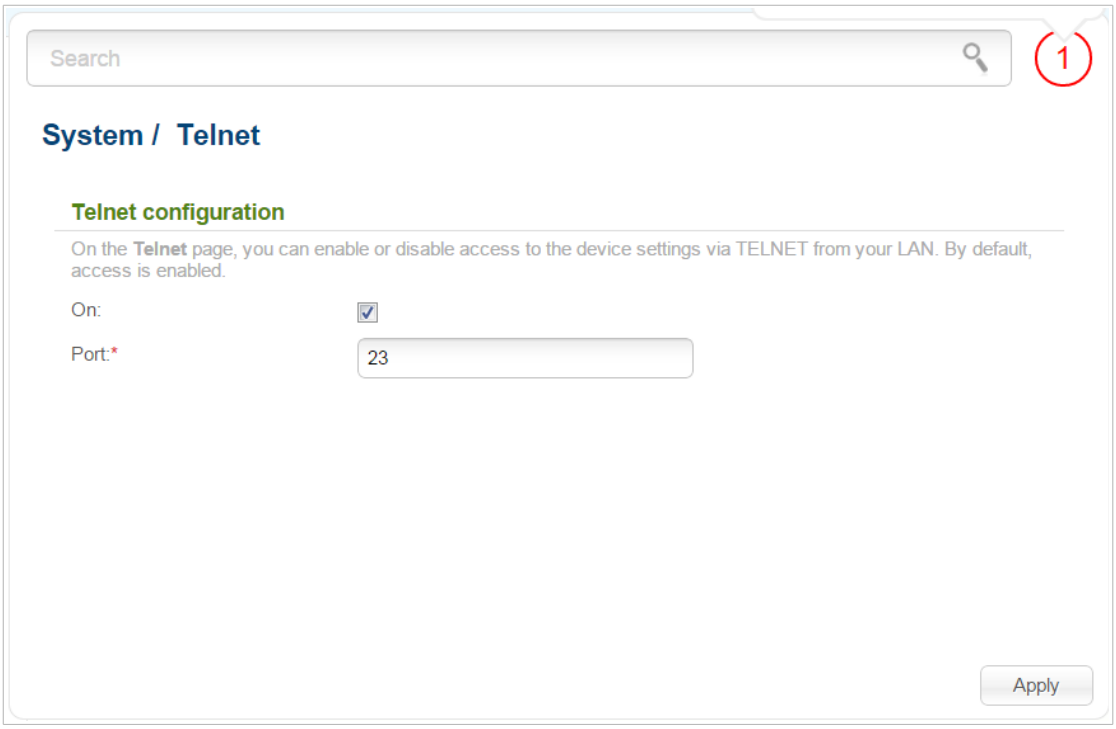


*Figure 228. The **System / Telnet** page.*

To disable access via TELNET, deselect the **On** checkbox and click the **Apply** button.

To enable access via TELNET again, select the **On** checkbox. In the **Port** field, enter the number of the router's port through which access will be allowed (by default, the port `23` is specified). Then click the **Apply** button.

USB Users

On the **System / USB users** page, you can create user accounts to provide access to data on the USB storage connected to the router.

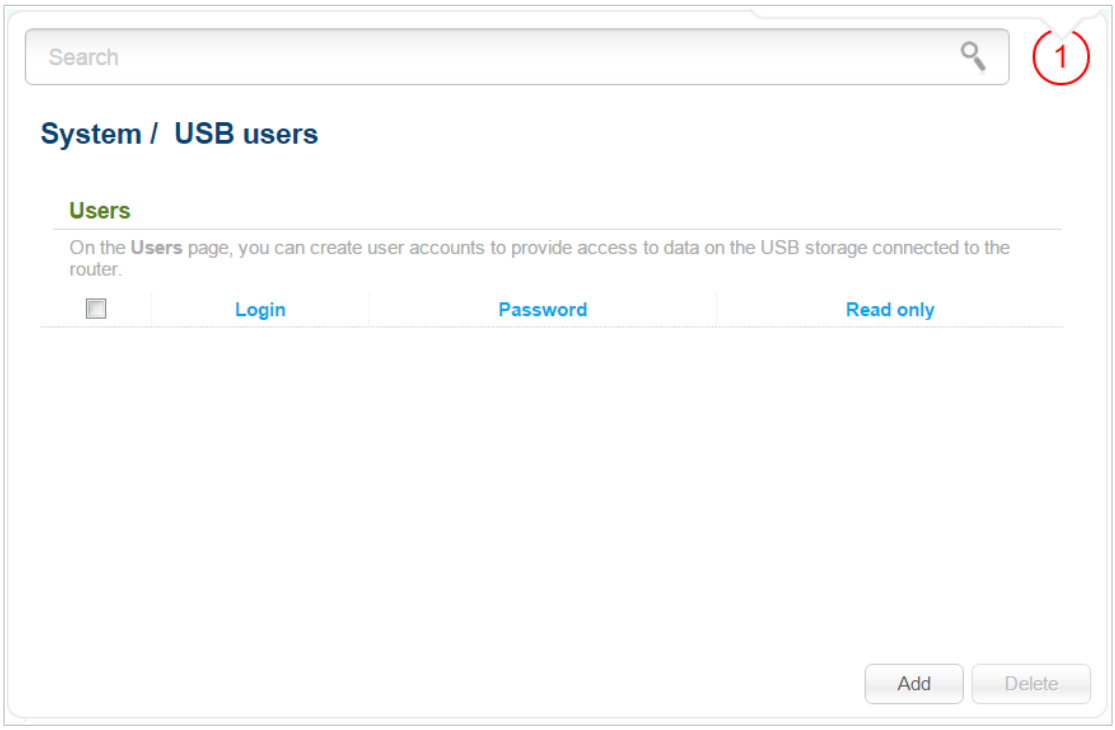


*Figure 229. The **System / USB users** page.*

To create a new user account, click the **Add** button.

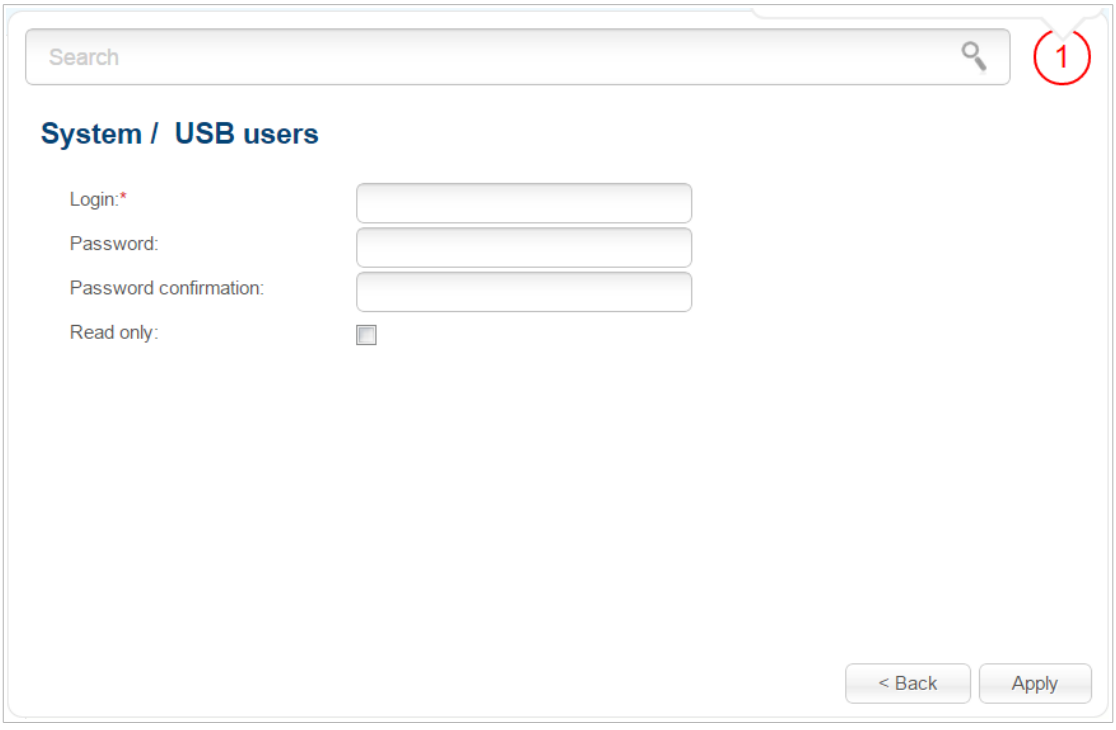


Figure 230. The page for adding a user.

On the opened page, in the **Login** field, specify a username, and in the **Password** and **Password confirmation** fields – the password for the account. You can use letters of the Latin alphabet (uppercase and/or lowercase) and digits.

! You cannot create accounts with the following usernames: **ftp**, **admin**, **support**, **user**, **nobody**.

To change the password of an account, select the relevant line in the table. On the opened page, enter a new value in the **Password** and **Password confirmation** fields, then click the **Apply** button.

To remove an account, select the checkbox located to the left of the relevant line in the table and click the **Delete** button. Also you can remove an account on the editing page.

To remove all accounts from this page, click the **Clear all** button (the button is displayed if at least one account exists).

Device mode

On the **System / Device mode** page, you can change the operating mode of the device.

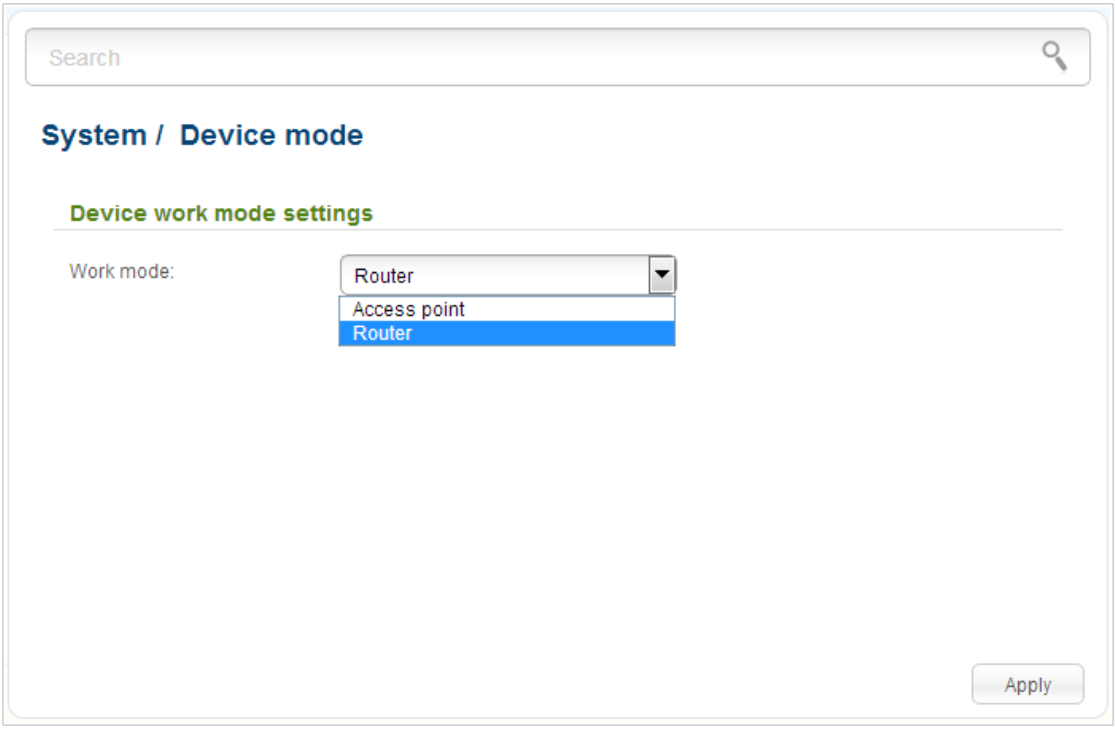


Figure 231. The page for changing the operating mode of the device.

To switch the device to the other mode, select the **Router** value from the **Work mode** drop-down list and click the **Apply** button. In the opened dialog box, click the **OK** button to save new settings and immediately reboot the router.

CHAPTER 6. OPERATION GUIDELINES

Safety Instructions

Place your router on a flat horizontal surface. Make sure that the router is provided with sufficient ventilation.

To prevent overheating, do not obstruct the ventilation openings of the router.

Plug the router into a surge protector to reduce the risk of damage from power surges and lightning strikes.

Operate the router only from an electrical outlet with the correct power source as indicated on the adapter.

Do not open the cover of the router. Otherwise any warranty will be invalidated.

Unplug the equipment before dusting and cleaning. Use a damp cloth to clean the equipment. Do not use liquid/aerosol cleaners or magnetic/static cleaning devices.

Wireless Installation Considerations

The DIR-816L device lets you access your network using a wireless connection from virtually anywhere within the operating range of your wireless network. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF noise in your home or office. To maximize your wireless range, follow the guidelines below.

1. Keep the number of walls and ceilings between the DIR-816L device and other network devices to a minimum – each wall or ceiling can reduce your wireless network range by 3-90 feet (1-30 meters).
2. Be aware of the direct line between network devices. Place your devices so that the signal travels straight through a wall or ceiling (instead of at an angle) for better reception.
3. Building materials make a difference. A solid metal door or aluminum studs may have a negative effect on your wireless range. Try to position your router, access points, and computers so that the signal passes through drywalls or open doorways. Materials and objects such as glass, steel, metal, walls with insulation, water (fish tanks), mirrors, file cabinets, brick, and concrete will degrade your wireless signal.
4. Keep your router away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.
5. If you are using 2.4 GHz cordless phones or X-10 equipment (wireless devices such as ceiling fans, lights, and home security systems), your wireless connection may degrade dramatically or drop completely. Make sure your 2.4 GHz phone base is as far away from your wireless devices as possible. Note, that the base transmits a signal even if the phone in not in use.

Connecting to Cable or DSL Modem

If you need to connect the router to a cable or DSL modem, do the following.

1. Place the router in an open location in the supposed center of your wireless network. Do not plug the power adapter into the router.
2. Turn off your PC.
3. Unplug the Ethernet cable (that connects your PC to your modem) from your computer and place it into the **INTERNET** port of your router.
4. Plug another Ethernet cable into one of the four LAN ports on the router. Plug the other end into the Ethernet port of your PC.
5. Turn on your modem. Wait until the modem is booted (about 30 seconds).
6. Plug the power adapter to the router and connect to an electrical outlet or power strip. Wait until the router is booted (about 30 seconds).
7. Turn on your PC.
8. Verify the LEDs of the router. The following LEDs should be solid or blinking green: **Power**, **LAN** (of the relevant Ethernet port), **Internet**, and **WLAN / WPS** (if the wireless network is on and in use). If not, make sure that your computer, modem, and router are powered on and the relevant cables are connected correctly.

CHAPTER 7. ABBREVIATIONS AND ACRONYMS

3G	Third Generation
AC	Access Category
AES	Advanced Encryption Standard
ARP	Address Resolution Protocol
BSSID	Basic Service Set Identifier
CDMA	Code Division Multiple Access
CRC	Cyclic Redundancy Check
DDNS	Dynamic Domain Name System
DDoS	Distributed Denial of Service
DHCP	Dynamic Host Configuration Protocol
DMZ	DeMilitarized Zone
DNS	Domain Name System
DTIM	Delivery Traffic Indication Message
GMT	Greenwich Mean Time
GSM	Global System for Mobile Communications
IGD	Internet Gateway Device
IGMP	Internet Group Management Protocol
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
ISP	Internet Service Provider
L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
LCP	Link Control Protocol
LTE	Long Term Evolution
MAC	Media Access Control

MTU	Maximum Transmission Unit
NAT	Network Address Translation
NTP	Network Time Protocol
OFDM	Orthogonal Frequency Division Multiplexing
PBC	Push Button Configuration
PIN	Personal Identification Number
PPPoE	Point-to-point protocol over Ethernet
PPTP	Point-to-point tunneling protocol
PSK	Pre-shared key
PUK	PIN Unlock Key
QoS	Quality of Service
R-UIM	Removable User Identity Module
RADIUS	Remote Authentication in Dial-In User Service
RIP	Routing Information Protocol
RTS	Request To Send
RTSP	Real Time Streaming Protocol
SIP	Session Initiation Protocol
SIM	Subscriber Identification Module
SMB	Server Message Block
SSID	Service Set Identifier
TKIP	Temporal Key Integrity Protocol
UDP	User Datagram Protocol
UPnP	Universal Plug and Play
URL	Uniform Resource Locator
USB	Universal Serial Bus
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
WAN	Wide Area Network

WEP	Wired Equivalent Privacy
Wi-Fi	Wireless Fidelity
WISP	Wireless Internet Service Provider
WLAN	Wireless Local Area Network
WMM	Wi-Fi Multimedia
WPA	Wi-Fi Protected Access
WPS	Wi-Fi Protected Setup