



DVG-5402G/GF

Wireless AC1200 Wave 2 MU-MIMO Dual Band Gigabit Router with Fiber WAN Port, 3G/LTE Support, 2 FXS Ports, and USB Port

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CHAPTER 1. INTRODUCTION

Contents and Audience

This manual describes the router DVG-5402G/GF 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.
<i>Before You Begin</i>	A reference to a chapter or section of this manual.
<i>“Quick Installation Guide”</i>	A reference to a document.
Change	A name of a menu, menu item, control (field, checkbox, drop-down list, button, etc.).
192.168.8.254	Data that you should enter in the specified field.
 <u>Information</u>	An important note.

Document Structure

Chapter 1 describes the purpose and structure of the document.

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

Chapter 3 explains how to install the router DVG-5402G/GF and configure a PC in order to access its web-based interface.

Chapter 4 describes all pages of the web-based interface in detail.

Chapter 5 includes safety instructions and tips for networking.

Chapter 6 introduces abbreviations and acronyms most commonly used in User Manuals for D-Link customer premises equipment.

CHAPTER 2. OVERVIEW

General Information

The DVG-5402G/GF device is a wireless dual band gigabit VoIP router with 3G/LTE support, a fiber WAN port, two FXS ports, USB port, and built-in 4-port switch.

The device is equipped with two FXS ports which allow connection of analog phones for calls via Internet.

The router is equipped with a USB port for connecting a USB modem¹, 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.

In order to use the multifunction USB port effectively, the router supports simultaneous operation of several USB devices. For example, you can access multimedia content of the connected HDD storage and at the same time share a USB printer.²

Any Ethernet port of the device can be configured to connect to a private Ethernet line.

Using the DVG-5402G/GF 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 wireless connection rate up to 1167Mbps³).

The router supports multiple functions for the wireless interface: several security standards (WEP, WPA/WPA2/WPA3), MAC address filtering, WPS, WMM.

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.

Multi-user MIMO technology allows to distribute the router's resources to let multiple wireless clients use the Wi-Fi network efficiently, keeping high rates for HD media streaming, lag-free gaming, and fast transfer of large files.

Transmit Beamforming technology allows to flexibly change the antennas' radiation pattern and to redistribute the signal directly to wireless devices connected to the router.

Support of guest Wi-Fi network allows you to create a separate wireless network with individual security settings and maximum rate limitation. Devices connected to the guest network will be able to access the Internet, but will be isolated from the devices and resources of the router's LAN.

1 Not included in the delivery package. D-Link does not guarantee compatibility with all USB modems. For the list of supported USB modems, see the *Specifications* section, page 9.

2 When using a USB hub with external power supply.

3 Up to 300Mbps for 2.4GHz and up to 867Mbps for 5GHz.

The wireless router DVG-5402G/GF 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.

The SSH protocol support provides more secure remote configuration and management of the router due to encryption of all transmitted traffic, including passwords.

In addition, the router supports IPsec and allows to create secure VPN tunnels. Support of the IKEv2 protocol allows to provide simplified message exchange and use asymmetric authentication engine upon configuration of an IPsec tunnel.

The router also supports the SkyDNS web content filtering service, which provides more settings and opportunities for safer Internet experience for home users of all ages and for professional activities of corporate users.

Now the schedules are also implemented; they can be applied to the rules and settings of the firewall and used to reboot the router at the specified time or every specified time period, to automatically save the configuration of the router to a connected USB storage, to set rules for limitation of wireless client maximum bandwidth, and to enable/disable the wireless network and the Wi-Fi filter.

The new ad blocking function effectively blocks advertisements which appear during web surfing.

You can configure the settings of the wireless router DVG-5402G/GF via the user-friendly web-based interface (the interface is available in several languages).

The configuration wizard allows you to quickly switch DVG-5402G/GF to one of the following modes: router (for connection to a wired or wireless ISP), access point, repeater, or client, and then configure all needed setting for operation in the selected mode in several simple steps.

Also DVG-5402G/GF supports configuration and management via mobile application for Android and iPhone smartphones.

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

Specifications*

Hardware	
Processor	<ul style="list-style-type: none"> · RTL9607C (900MHz)
RAM	<ul style="list-style-type: none"> · 256MB, DDR3, built in processor
Flash	<ul style="list-style-type: none"> · 128MB, SPI NAND
Interfaces	<ul style="list-style-type: none"> · 1000BASE-X SFP WAN port · 4 10/100/1000BASE-T LAN ports · 2 RJ-11 FXS ports · USB 2.0 port
LEDs	<ul style="list-style-type: none"> · Power · SFP · Internet · LAN 1-4 · WLAN 2.4G/5G · WPS · USB · FXS 1-2
Buttons	<ul style="list-style-type: none"> · ON/OFF button to power on/power off · RESET button to restore factory default settings · WLAN button to enable/disable wireless network · WPS button to set up wireless connection
Antenna	<ul style="list-style-type: none"> · Four external non-detachable antennas (5dBi gain)
MIMO	<ul style="list-style-type: none"> · 2 x 2, MU-MIMO
Power connector	<ul style="list-style-type: none"> · Power input connector (DC)

Software	
WAN connection types	<ul style="list-style-type: none"> · Mobile Internet (via supported USB modem) · PPPoE · IPv6 PPPoE · PPPoE Dual Stack · Static IPv4 / Dynamic IPv4 · Static IPv6 / Dynamic IPv6 · PPPoE + Static IP (PPPoE Dual Access) · PPPoE + Dynamic IP (PPPoE Dual Access) · PPTP/L2TP + Static IP · PPTP/L2TP + Dynamic IP · L2TP Dual Stack · IPIP6 in DSLite mode · 6in4 · 6to4 · 6rd

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

Software	
Network functions	<ul style="list-style-type: none"> · DHCP server/relay · Advanced configuration of built-in DHCP server · Stateful/Stateless mode for IPv6 address assignment, IPv6 prefix delegation · Automatic obtainment of LAN IP address (for access point/repeater/client modes) · DNS relay · Dynamic DNS · Static IPv4/IPv6 routing · IGMP Proxy · RIP · Support of UPnP · Support of VLAN · WAN ping respond · Support of SIP ALG · Support of RTSP · WAN failover · LAN/WAN conversion · Autonegotiation of speed, duplex mode, and flow control / Manual speed and duplex mode setup for each Ethernet port · Built-in UDPXY application · XUPNPD plug-in · Equal load distribution while using several WAN connections (traffic balancing) · Port mirroring
Firewall functions	<ul style="list-style-type: none"> · Network Address Translation (NAT) · Stateful Packet Inspection (SPI) · IPv4/IPv6 filter · MAC filter · URL filter · Ad blocking function · DMZ · Virtual servers · Built-in SkyDNS web content filtering service
VPN	<ul style="list-style-type: none"> · IPsec/PPTP/L2TP/PPPoE pass-through · PPTP/L2TP servers · PPTP/L2TP tunnels · L2TP over IPsec client · GRE/EoGRE/EoIP/IPIP tunnels · IPsec tunnels <ul style="list-style-type: none"> Transport/Tunnel mode IKEv1/IKEv2 support DES encryption NAT Traversal Support of DPD (Keep-alive for VPN tunnels)
USB interface functions	<ul style="list-style-type: none"> · USB modem <ul style="list-style-type: none"> Auto connection to available type of supported network (4G/3G/2G) Auto configuration of connection upon plugging in USB modem Enabling/disabling PIN code check, changing PIN code⁴ Sending/receiving/reading/removing SMS messages⁴ Support of USSD requests⁴ · USB storage <ul style="list-style-type: none"> File browser Print server Access to storage via accounts Built-in Samba/FTP/DLNA server Built-in Transmission torrent client; uploading/downloading files from/to USB storage

⁴ For some models of USB modems.

Software	
Management and monitoring	<ul style="list-style-type: none"> · Local and remote access to settings through SSH/TELNET/WEB (HTTP/HTTPS) · Multilingual web-based interface for configuration and management · Support of D-Link Assistant application for Android and iPhone smartphones · 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 logging to remote host/connected USB storage · Automatic synchronization of system time with NTP server and manual time/date setup · Ping utility · Traceroute utility · TR-069 client · Schedules for rules and settings of firewall, automatic reboot and saving a configuration backup to a connected USB storage, limitation of wireless client maximum bandwidth, and enabling/disabling wireless network and Wi-Fi filter · Automatic upload of configuration file from ISP's server (Auto Provision) · Configuration of action for hardware buttons

Wireless Module Parameters	
Standards	<ul style="list-style-type: none"> · IEEE 802.11ac Wave 2 · IEEE 802.11a/b/g/n · IEEE 802.11w
Frequency range <i>The frequency range depends upon the radio frequency regulations applied in your country</i>	<ul style="list-style-type: none"> · 2400 ~ 2483.5MHz · 5150 ~ 5350MHz · 5650 ~ 5850MHz
Wireless connection security	<ul style="list-style-type: none"> · WEP · WPA/WPA2 (Personal/Enterprise) · WPA3 (Personal) · MAC filter · WPS (PBC/PIN)
Advanced functions	<ul style="list-style-type: none"> · Support of client mode · WMM (Wi-Fi QoS) · Information on connected Wi-Fi clients · Advanced settings · Guest Wi-Fi / support of MBSSID · Rate limitation for wireless network/separate MAC addresses · Periodic scan of channels, automatic switch to least loaded channel · Support of 2.4GHz/5GHz TX Beamforming · Autonegotiation of channel bandwidth in accordance with environment conditions (20/40 Coexistence) · Support of STBC · CoovaChilli authentication portal
Wireless connection rate	<ul style="list-style-type: none"> · 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 867Mbps (from MCS0 to MCS9)

Wireless Module Parameters	
<p>Transmitter output power</p> <p><i>The maximum value of the transmitter output power depends upon the radio frequency regulations applied in your country</i></p>	<ul style="list-style-type: none"> · 802.11a (typical at room temperature 25 °C) 15dBm at 6, 9, 12, 18, 24, 36, 48, 54Mbps · 802.11b (typical at room temperature 25 °C) 15dBm at 1, 2, 5.5, 11Mbps · 802.11g (typical at room temperature 25 °C) 15dBm at 6, 9, 12, 18, 24, 36, 48, 54Mbps · 802.11n (typical at room temperature 25 °C) 2.4GHz, HT20/HT40 15dBm at MCS0/8~7/15 5GHz, HT20/HT40 15dBm at MCS0/8~7/15 · 802.11ac (typical at room temperature 25 °C) VHT20/VHT40/VHT80 15dBm at MCS0~9
<p>Receiver sensitivity</p>	<ul style="list-style-type: none"> · 802.11a (typical at PER < 10% 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% at room temperature 25 °C) -82dBm at 1Mbps -80dBm at 2Mbps -78dBm at 5.5Mbps -76dBm at 11Mbps · 802.11g (typical at PER < 10% 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

Wireless Module Parameters																																																				
	<ul style="list-style-type: none"> · 802.11n (typical at PER = 10% at room temperature 25 °C) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">2.4GHz/5GHz, HT20</td> <td style="width: 50%;">2.4GHz/5GHz, HT40</td> </tr> <tr> <td>-82dBm at MCS0/8</td> <td>-79dBm at MCS0/8</td> </tr> <tr> <td>-79dBm at MCS1/9</td> <td>-76dBm at MCS1/9</td> </tr> <tr> <td>-77dBm at MCS2/10</td> <td>-74dBm at MCS2/10</td> </tr> <tr> <td>-74dBm at MCS3/11</td> <td>-71dBm at MCS3/11</td> </tr> <tr> <td>-70dBm at MCS4/12</td> <td>-67dBm at MCS4/12</td> </tr> <tr> <td>-66dBm at MCS5/13</td> <td>-63dBm at MCS5/13</td> </tr> <tr> <td>-65dBm at MCS6/14</td> <td>-62dBm at MCS6/14</td> </tr> <tr> <td>-64dBm at MCS7/15</td> <td>-61dBm at MCS7/15</td> </tr> </table> · 802.11ac (typical at PER = 10% at room temperature 25 °C) <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">VHT20</td> <td style="width: 33%;">VHT40</td> <td style="width: 33%;">VHT80</td> </tr> <tr> <td>-82dBm at MCS0</td> <td>-79dBm at MCS0</td> <td>-76dBm at MCS0</td> </tr> <tr> <td>-79dBm at MCS1</td> <td>-76dBm at MCS1</td> <td>-73dBm at MCS1</td> </tr> <tr> <td>-77dBm at MCS2</td> <td>-74dBm at MCS2</td> <td>-71dBm at MCS2</td> </tr> <tr> <td>-74dBm at MCS3</td> <td>-71dBm at MCS3</td> <td>-68dBm at MCS3</td> </tr> <tr> <td>-70dBm at MCS4</td> <td>-67dBm at MCS4</td> <td>-64dBm at MCS4</td> </tr> <tr> <td>-66dBm at MCS5</td> <td>-63dBm at MCS5</td> <td>-60dBm at MCS5</td> </tr> <tr> <td>-65dBm at MCS6</td> <td>-62dBm at MCS6</td> <td>-59dBm at MCS6</td> </tr> <tr> <td>-64dBm at MCS7</td> <td>-61dBm at MCS7</td> <td>-58dBm at MCS7</td> </tr> <tr> <td>-56dBm at MCS8</td> <td>-56dBm at MCS8</td> <td>-53dBm at MCS8</td> </tr> <tr> <td></td> <td>-54dBm at MCS9</td> <td>-51dBm at MCS9</td> </tr> </table> 	2.4GHz/5GHz, HT20	2.4GHz/5GHz, HT40	-82dBm at MCS0/8	-79dBm at MCS0/8	-79dBm at MCS1/9	-76dBm at MCS1/9	-77dBm at MCS2/10	-74dBm at MCS2/10	-74dBm at MCS3/11	-71dBm at MCS3/11	-70dBm at MCS4/12	-67dBm at MCS4/12	-66dBm at MCS5/13	-63dBm at MCS5/13	-65dBm at MCS6/14	-62dBm at MCS6/14	-64dBm at MCS7/15	-61dBm at MCS7/15	VHT20	VHT40	VHT80	-82dBm at MCS0	-79dBm at MCS0	-76dBm at MCS0	-79dBm at MCS1	-76dBm at MCS1	-73dBm at MCS1	-77dBm at MCS2	-74dBm at MCS2	-71dBm at MCS2	-74dBm at MCS3	-71dBm at MCS3	-68dBm at MCS3	-70dBm at MCS4	-67dBm at MCS4	-64dBm at MCS4	-66dBm at MCS5	-63dBm at MCS5	-60dBm at MCS5	-65dBm at MCS6	-62dBm at MCS6	-59dBm at MCS6	-64dBm at MCS7	-61dBm at MCS7	-58dBm at MCS7	-56dBm at MCS8	-56dBm at MCS8	-53dBm at MCS8		-54dBm at MCS9	-51dBm at MCS9
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-74dBm at MCS3	-71dBm at MCS3	-68dBm at MCS3																																																		
-70dBm at MCS4	-67dBm at MCS4	-64dBm at MCS4																																																		
-66dBm at MCS5	-63dBm at MCS5	-60dBm at MCS5																																																		
-65dBm at MCS6	-62dBm at MCS6	-59dBm at MCS6																																																		
-64dBm at MCS7	-61dBm at MCS7	-58dBm at MCS7																																																		
-56dBm at MCS8	-56dBm at MCS8	-53dBm at MCS8																																																		
	-54dBm at MCS9	-51dBm at MCS9																																																		
Modulation schemes	<ul style="list-style-type: none"> · 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 																																																			

Phone	
General SIP Features	<ul style="list-style-type: none"> · Support of several SIP profiles · Individual account per port · Invite with Challenge · Register by IP address or domain name of SIP server · Backup proxy support · Support of DHCP option 120 · RFC3986 SIP URI format support · Outbound proxy support · STUN client · NAT public IP address · NAT keep-alive · Session timer (re-invite/update) · Call types: voice/modem/fax · User programmable Dial Plan · Manual peer table (for P2P calls) · Handling numbers in E.164 format

Phone	
Call Features	<ul style="list-style-type: none"> · Direct IP-to-IP call without SIP proxy (P2P) · Call hold/retrieve · Call awaiting · Forwarding (unconditional, busy, no answer) · Do Not Disturb · Anonymous call blocking · Speed/abbreviated dialing · PIN code before dialing · Hotline · Vertical service codes · CLIR · Intercom (internal calls without SIP server) · Filtering SIP packets by IP address/domain name (white/black list) · Alarm clock · Logging calls · Sending text messages to VoIP gateways/IP phones
Voice Features	<ul style="list-style-type: none"> · Codecs: G.711 a/μ-law, G.729A, G.726, G.722, G.723.1 · DTMF detection and generation · In-band DTMF, out-of-band DTMF (RFC2833, SIP-INFO) · Comfort Noise Generation (CNG) · Voice Activity Detection (VAD) · Dynamic Jitter Buffer · Echo Cancellation (LEC/NLP) · Call progress tone generation (FXS) · DTMF/PULSE dial support · Caller ID detection and generation · T.30 FAX bypass to G.711, T.38 Real Time FAX Relay, V.152 · Adjustable Flash Time · Advanced call transfer, three-party calls · Volume control (speaker/microphone)

Physical Parameters	
Dimensions (L x W x H)	· 206 x 123 x 32 mm (8.1 x 4.8 x 1.3 in)
Weight	· 330 g (0.73 lb)

Operating Environment	
Power	· Output: 12V DC, 1.5A
Temperature	<ul style="list-style-type: none"> · Operating: from 0 to 40 °C · Storage: from -20 to 65 °C
Humidity	<ul style="list-style-type: none"> · Operating: from 10% to 90% (non-condensing) · Storage: from 5% to 95% (non-condensing)

Supported USB modems⁵

GSM

- Alcatel X500
- D-Link DWM-152C1
- D-Link DWM-156A6
- D-Link DWM-156A7
- D-Link DWM 156A8
- 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 E3131 (MTS 420S)
- Huawei E352 (Megafon)
- Huawei E3531
- Prolink PHS600
- Prolink PHS901
- ZTE MF112
- ZTE MF192
- ZTE MF626
- ZTE MF627
- ZTE MF652
- ZTE MF667
- ZTE MF668
- ZTE MF752

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

Supported USB modems	
LTE	<ul style="list-style-type: none">· Alcatel IK40V· D-Link DWM-222· Huawei E3131· Huawei E3272· Huawei E3351· Huawei E3372s· Huawei E3372h-153· Huawei E3372h-320· Huawei E367· Huawei E392· Megafon M100-1· Megafon M100-2· Megafon M100-3· Megafon M100-4· Megafon M150-1· Megafon M150-2· Megafon M150-3· Quanta 1K6E (Beeline 1K6E)· MTS 824F· MTS 827F· Yota LU-150· Yota WLTUBA-107· ZTE MF823· ZTE MF823D· ZTE MF827· ZTE MF833T· ZTE MF833V
Smartphones in USB tethering mode	<ul style="list-style-type: none">· Some models of Android smartphones

Product Appearance

Upper Panel



Figure 1. Upper panel view.

LED	Mode	Description
Power	<i>Solid green</i>	The router is powered on.
	<i>Blinking green</i>	The firmware is being updated.
	<i>No light</i>	The router is powered off.
SFP	<i>Solid green</i>	The cable is connected to the port.
	<i>Blinking green</i>	Data transfer through the SFP port.
	<i>No light</i>	The cable is not connected.

LED	Mode	Description
Internet	<i>Solid green</i>	The default WAN connection is on.
	<i>No light</i>	<ul style="list-style-type: none"> The default WAN connection is off, or there are no WAN connections created, or the device is configured as an access point or repeater.
LAN 1-4	<i>Solid green</i>	A device is connected to the port of the router (for the LAN port configured as the WAN port: the router is connected to an Ethernet line).
	<i>Blinking green</i>	Data transfer through the relevant LAN port.
	<i>No light</i>	The cable is not connected to the relevant port.
WLAN 2.4G WLAN 5G	<i>Solid green</i>	The router's WLAN of the relevant band is on.
	<i>Blinking green</i>	Data transfer through the Wi-Fi network of the relevant band.
	<i>No light</i>	The router's WLAN of the relevant band is off.
WPS	<i>Blinking green</i>	Attempting to add a wireless device via the WPS function.
	<i>No light</i>	The WPS function is not in use.
USB	<i>Solid green</i>	A USB device is connected to the router's USB port.
	<i>No light</i>	No USB device.
FXS 1-2	<i>Solid green</i>	The line is registered on the SIP server.
	<i>Slow blinking green</i>	Attempting to register on the SIP server.
	<i>Fast blinking green</i>	The receiver is off-hook, an incoming call, or talking.
	<i>No light</i>	The line is not registered on the SIP server, because registration is disabled or the corresponding connection is off.

In case the **Power**, **Internet**, **WPS**, **USB**, and **FXS 1-2** LEDs are blinking green at the same time, the device is in the emergency mode. Power the device off and on. If the device is loaded in the emergency mode again, restore the factory default settings via the hardware **RESET** button.

Side Panel



Figure 2. Side panel view.

Name	Description
RESET	A button to restore the factory defaults. To restore the factory defaults, press the button (with the device turned on), hold it for 10 seconds, and then release the button.
WLAN	A button to enable/disable wireless network. To disable the router's wireless network: with the device turned on, press the button and release. The WLAN 2.4G and WLAN 5G LEDs should turn off.

Name	Description
WPS	A button to set up a wireless connection (the WPS function). To use the WPS function: with the device turned on, press the button, hold it for 2 seconds, and release. The WPS LED should start blinking.

Back Panel



Figure 3. Back panel view.

Port	Description
SFP	An optical port to connect to a fiber optic line.
PHONE 1-2	Ports to connect analog phones.
LAN 1-4	4 Ethernet ports to connect computers or network devices.
USB	A port for connecting a USB device (modem, storage, printer).
POWER	Power connector.
ON/OFF	A button to turn the router on/off.

The device is also equipped with four external non-detachable Wi-Fi antennas.

Delivery Package

The following should be included:

- Router DVG-5402G/GF
- Power adapter DC 12V/1.5A
- Ethernet cable
- RJ-11 telephone 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.

Computer or Mobile Device

Configuration of the wireless dual band gigabit VoIP router with 3G/LTE support DVG-5402G/GF (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.

Also you can use D-Link Assistant application for Android or iPhone mobile devices (smartphones or tablets).

PC Web Browser

The following web browsers are recommended:

- Apple Safari 8 and later
- Google Chrome 48 and later
- Microsoft Internet Explorer 10 and later
- Microsoft Edge 20.10240 and later
- Mozilla Firefox 44 and later
- Opera 35 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.

SFP Transceiver

To connect to a fiber optic line, you need to use an SFP transceiver recommended by your ISP.

VoIP

On order to use VoIP over SIP, you need to connect an analog phone to an FXS port of the router. Then access the web-based interface of the router, and you will be able to configure all needed settings.

USB Modem

To connect to an LTE or 3G 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 Internet⁶.

Your USB modem should be equipped with an active SIM card 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 some models of USB modems, it is required to disable the PIN code check on the SIM 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. Connect an Ethernet cable between any of LAN ports located on the back panel of the router and the Ethernet port of your PC.
2. **To connect the device to a fiber optic line:** connect your SFP transceiver to the SFP port, then connect the fiber optic cable to the SFP transceiver.
3. **To connect via USB modem:** connect your USB modem to the USB port⁷ located on the back panel of the router.



In some cases you will need to reboot the router after connection of the USB modem.

4. **To connect the device to an Ethernet line:** please connect the router to the ISP's Ethernet line only after setting the WAN port (see the **WAN Remapping** section, page 227) and creating an Internet connection (see the **WAN** section, page 83).
5. Connect a phone cable between an FXS port of the router and the phone.
6. 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.
7. Turn on the router by pressing the **ON/OFF** button on its back panel.

Then make sure that your PC is configured to obtain an IP address automatically (as DHCP client).

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

Obtaining IP Address Automatically (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.)

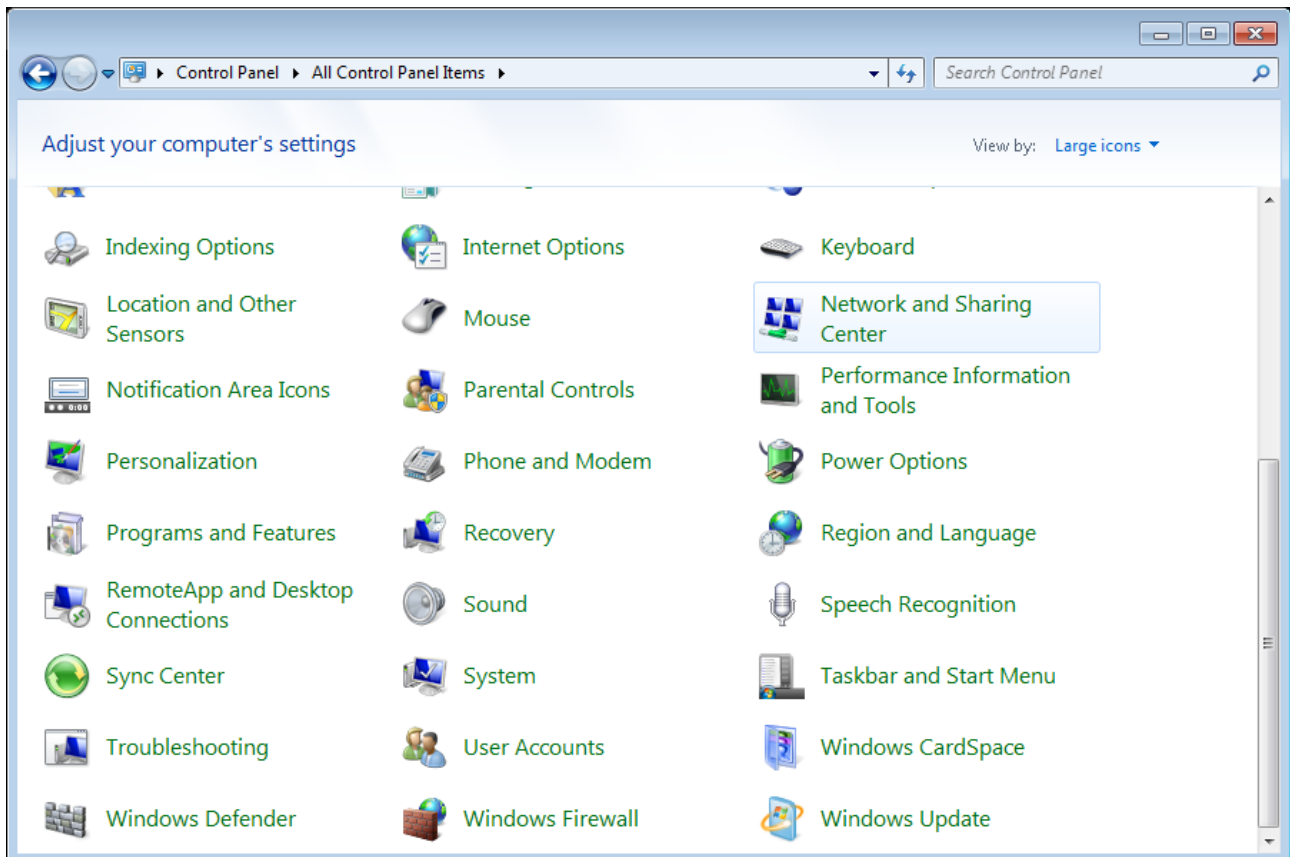


Figure 4. The **Control Panel** window.

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

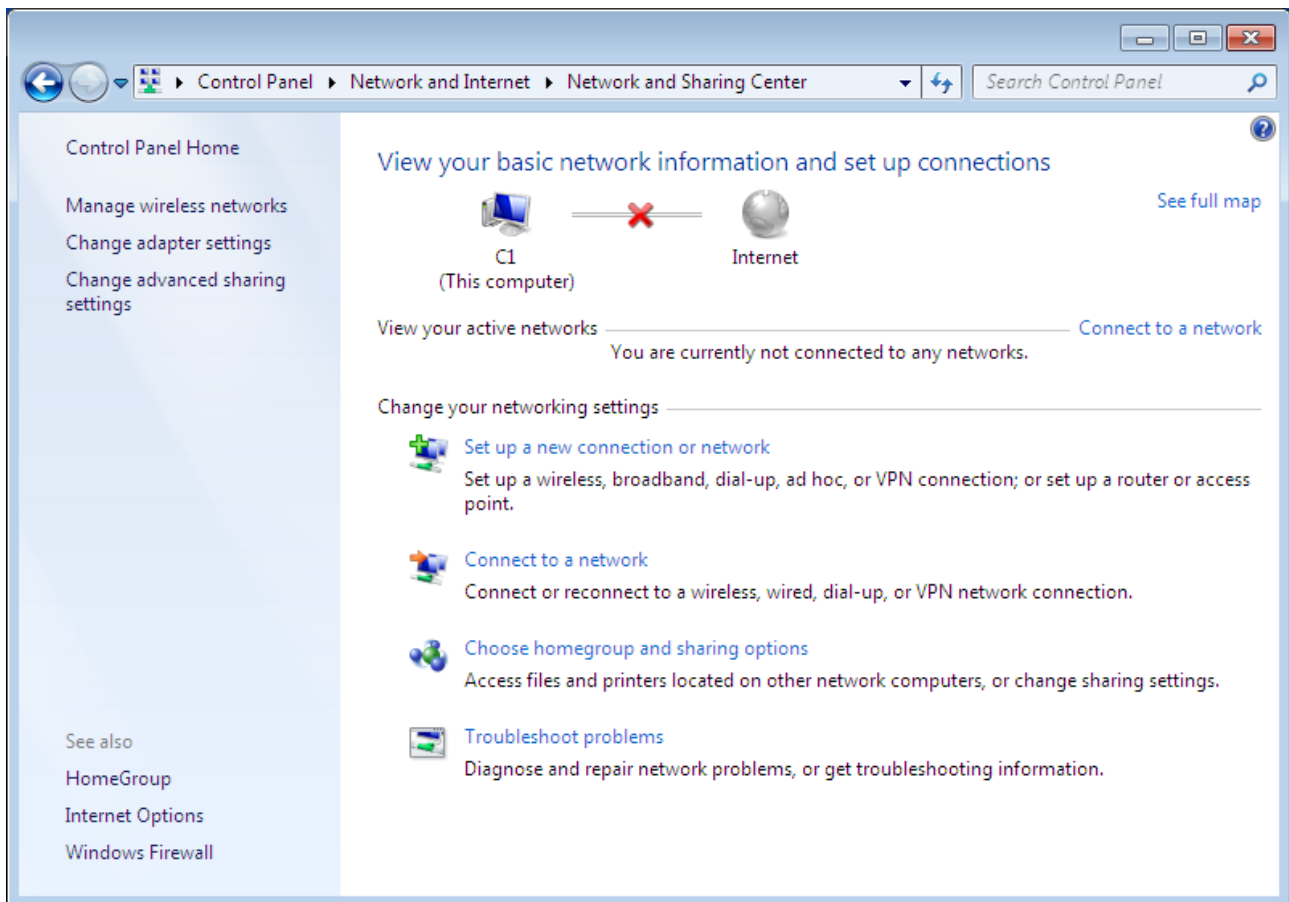


Figure 5. The **Network and Sharing Center** window.

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

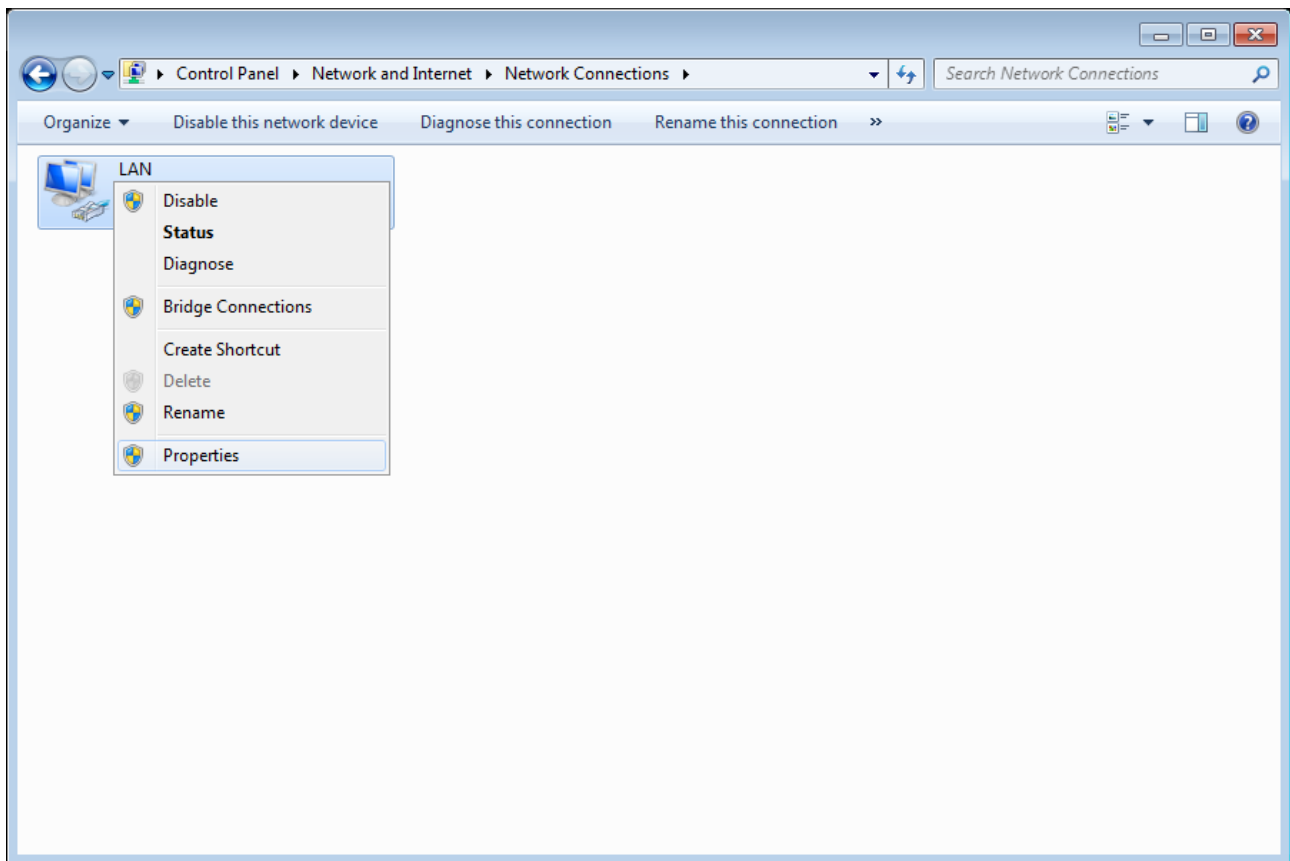


Figure 6. The **Network Connections** window.

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.

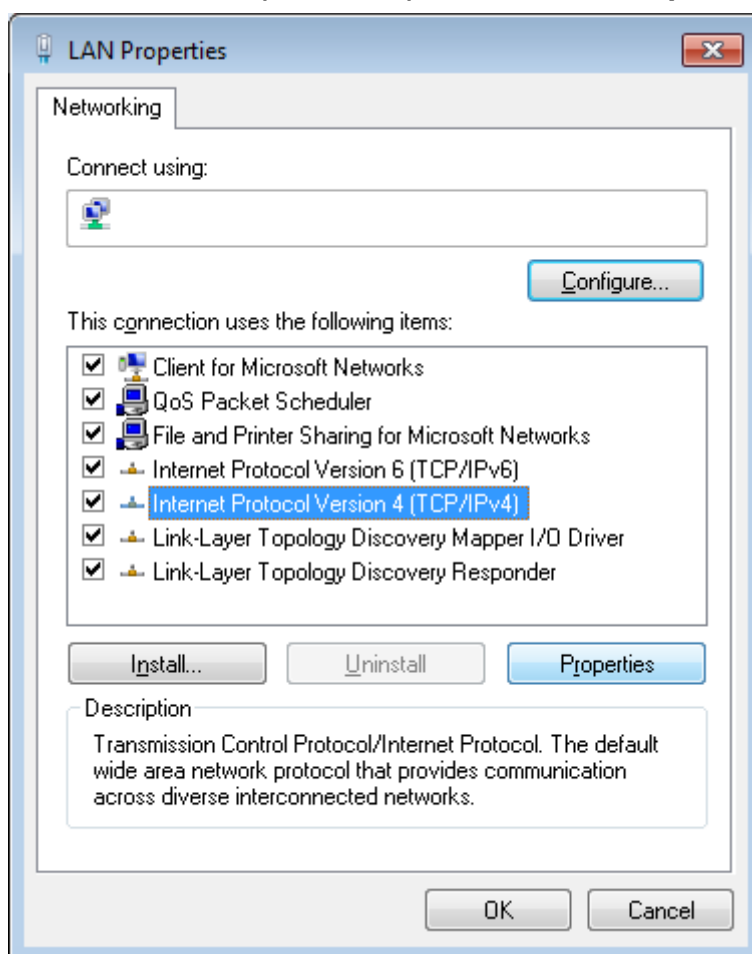


Figure 7. The **Local Area Connection Properties** window.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

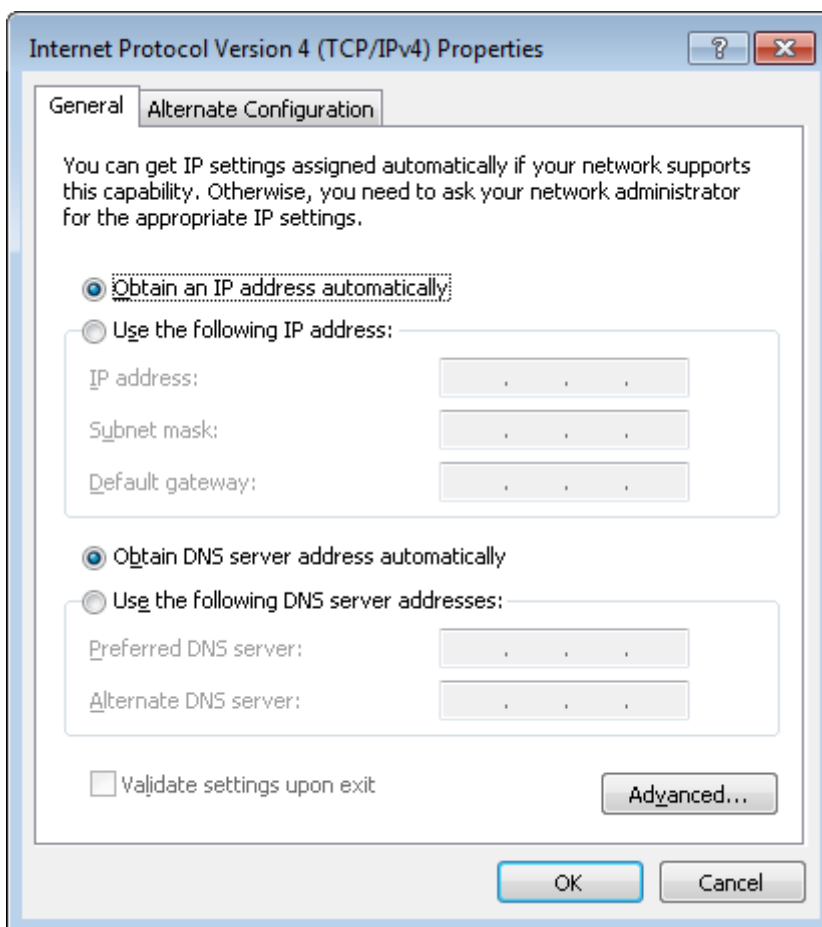


Figure 8. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

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

Obtaining IP Address Automatically (OS Windows 10)

1. Click the **Start** button and proceed to the **Settings** window.
2. Select the **Network & Internet** section.

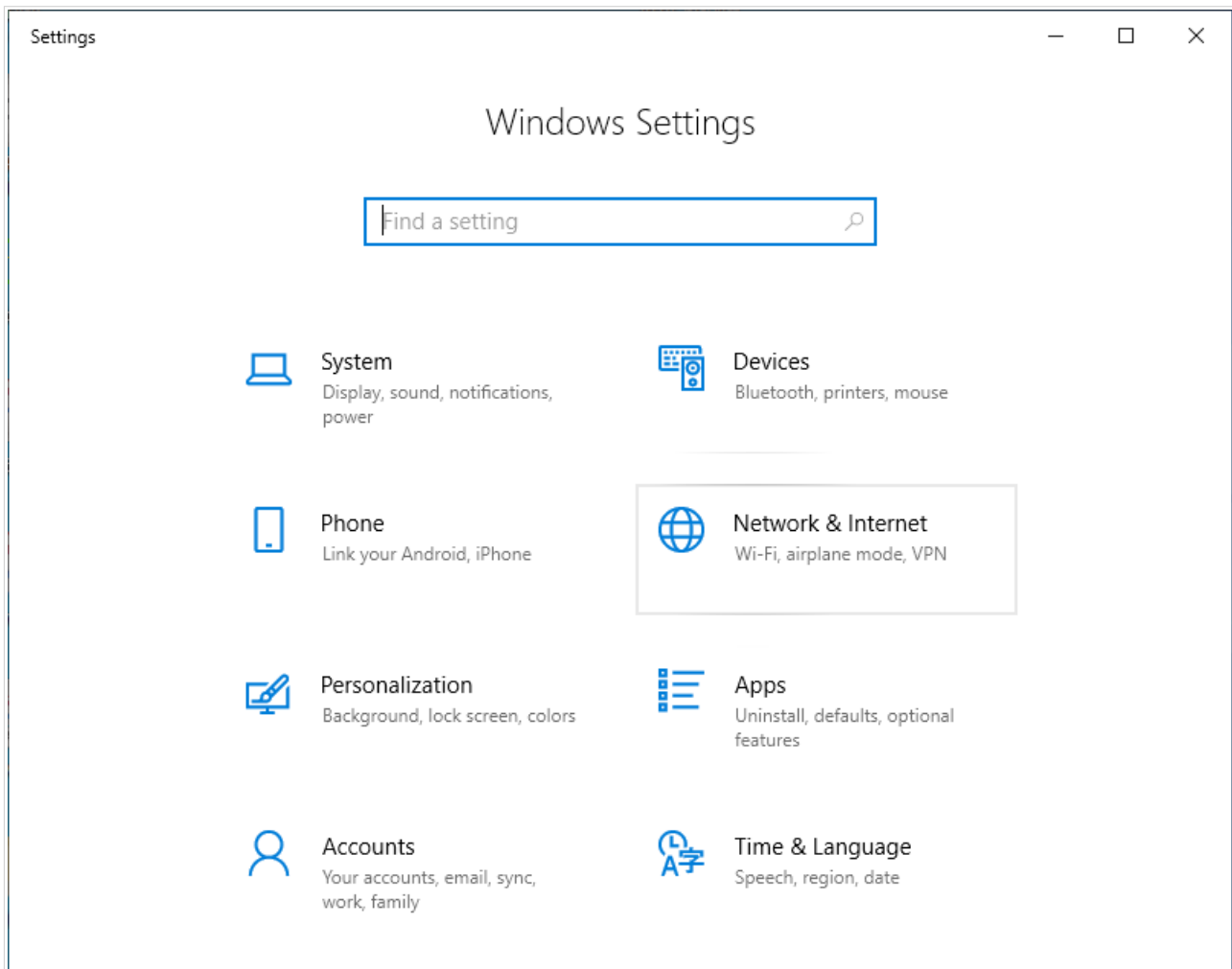


Figure 9. The **Windows Settings** window.

3. In the **Change your network settings** section, select the **Change adapter options** line.

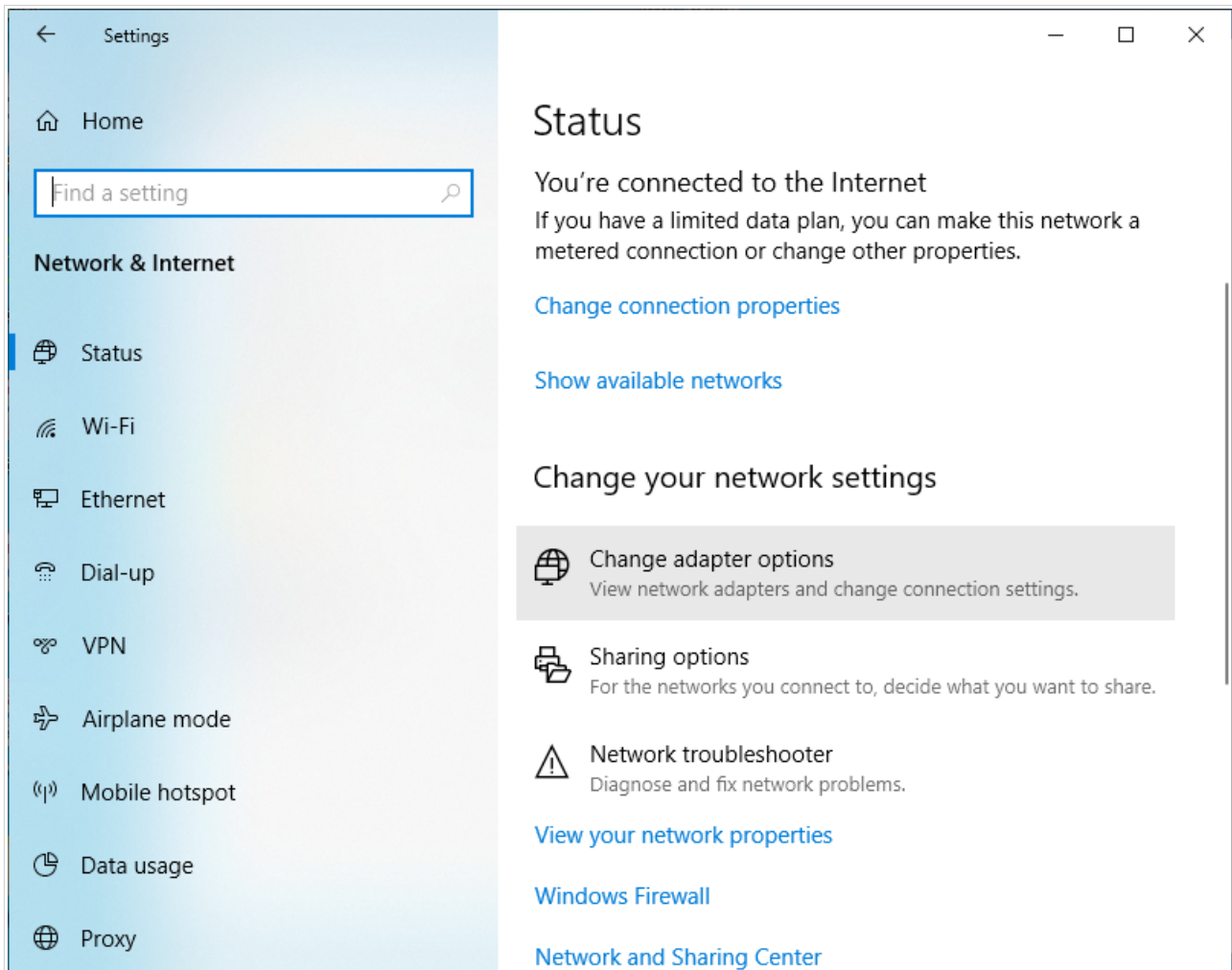


Figure 10. The **Network & Internet** window.

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

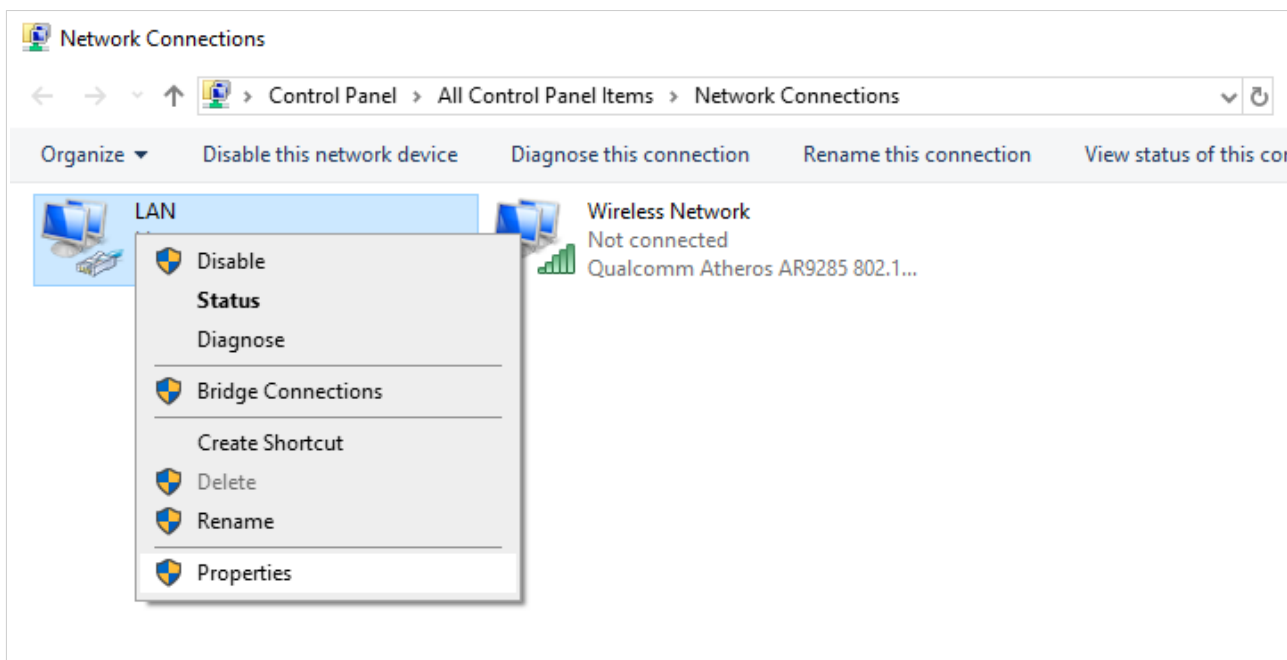


Figure 11. The **Network Connections** window.

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.

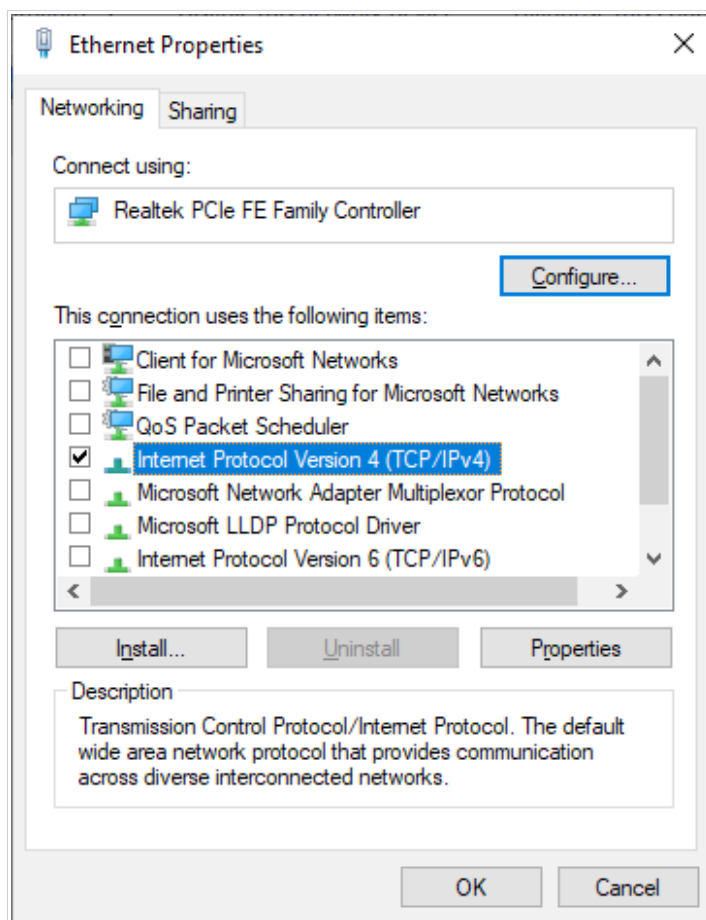


Figure 12. The local area connection properties window.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

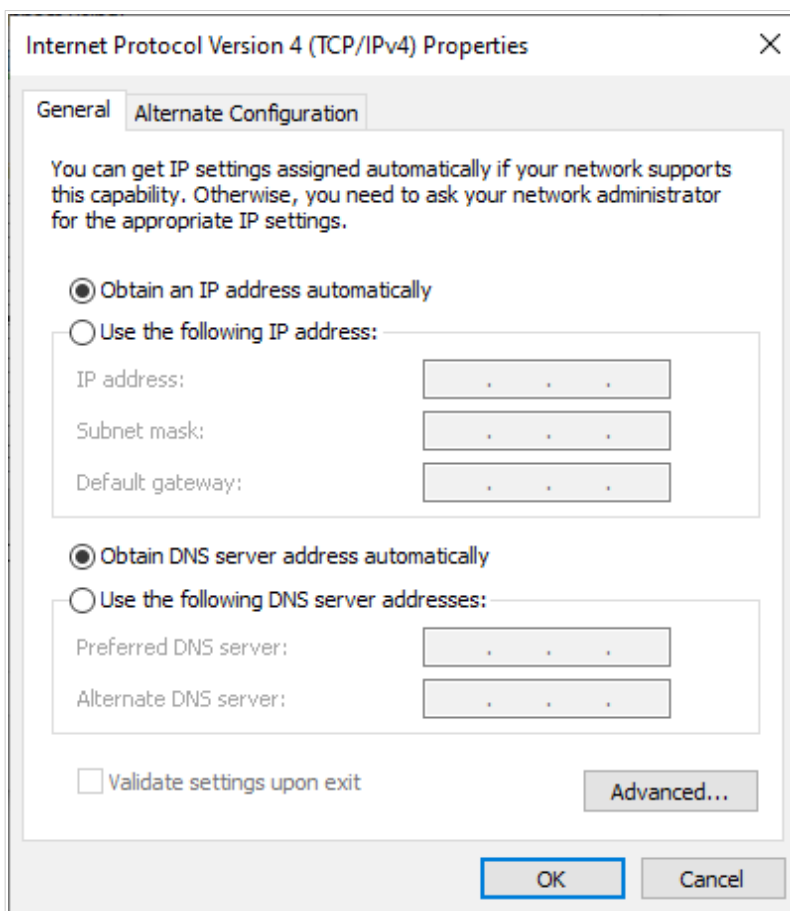


Figure 13. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

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

PC with Wi-Fi Adapter

1. **To connect the device to a fiber optic line:** connect your SFP transceiver to the SFP port, then connect the fiber optic cable to the SFP transceiver.
2. **To connect via USB modem:** connect your USB modem to the USB port⁸ located on the back panel of the router.

! In some cases you will need to reboot the router after connection of the USB modem.

3. **To connect the device to an Ethernet line:** please connect the router to the ISP's Ethernet line only after setting the WAN port (see the *WAN Remapping* section, page 227) and creating an Internet connection (see the *WAN* section, page 83).
4. Connect a phone cable between an FXS port of the router and the phone.
5. 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.
6. Turn on the router by pressing the **ON/OFF** button on its back panel.
7. Make sure that the Wi-Fi adapter of your PC is on. 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.

Then make sure that your Wi-Fi adapter is configured to obtain an IP address automatically (as DHCP client).

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

Obtaining IP Address Automatically and Connecting to Wireless Network (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.)

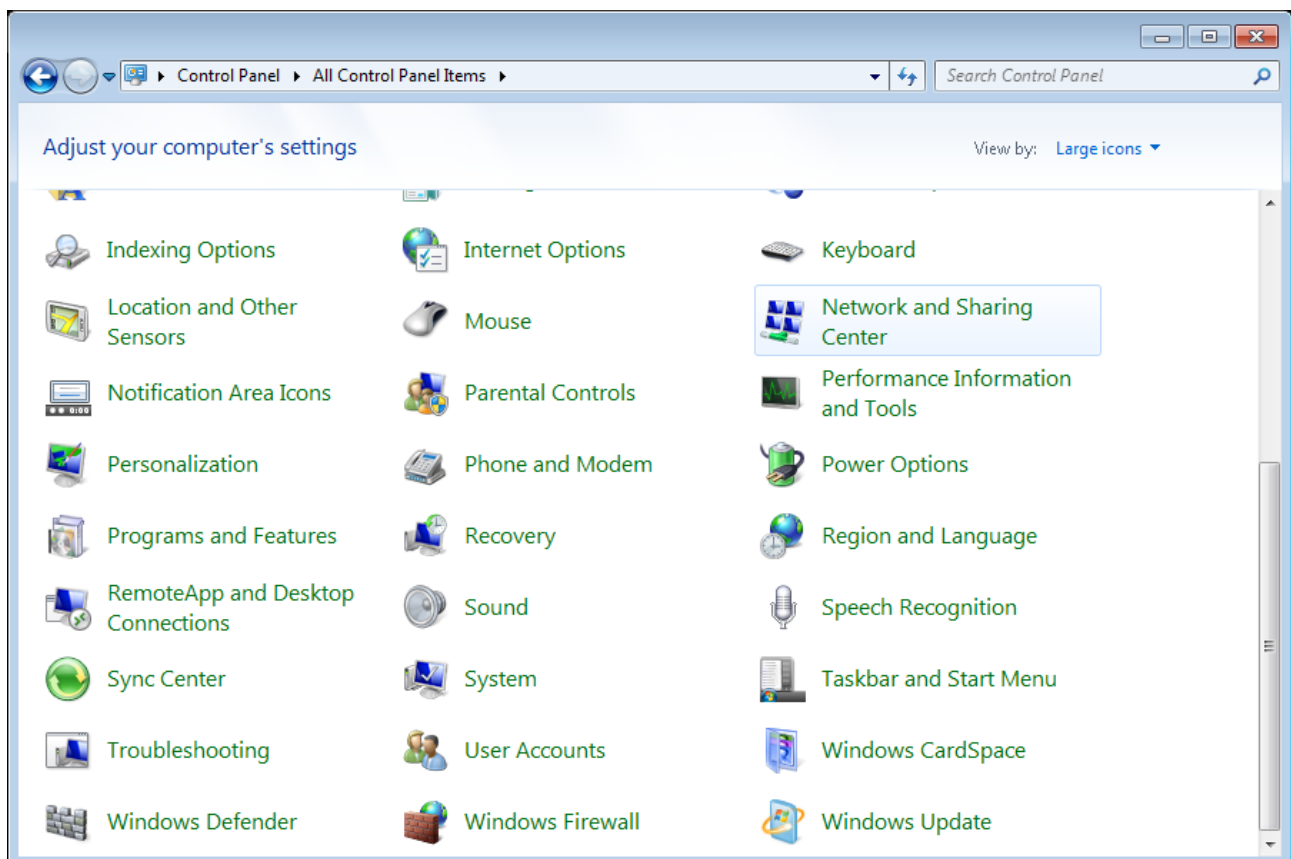


Figure 14. The **Control Panel** window.

3. In the menu located on the left part of the window, select the **Change adapter settings** line.
4. In the opened window, right-click the relevant **Wireless Network Connection** icon. Make sure that your Wi-Fi adapter is on, then select the **Properties** line in the menu displayed.
5. In the **Wireless Network Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

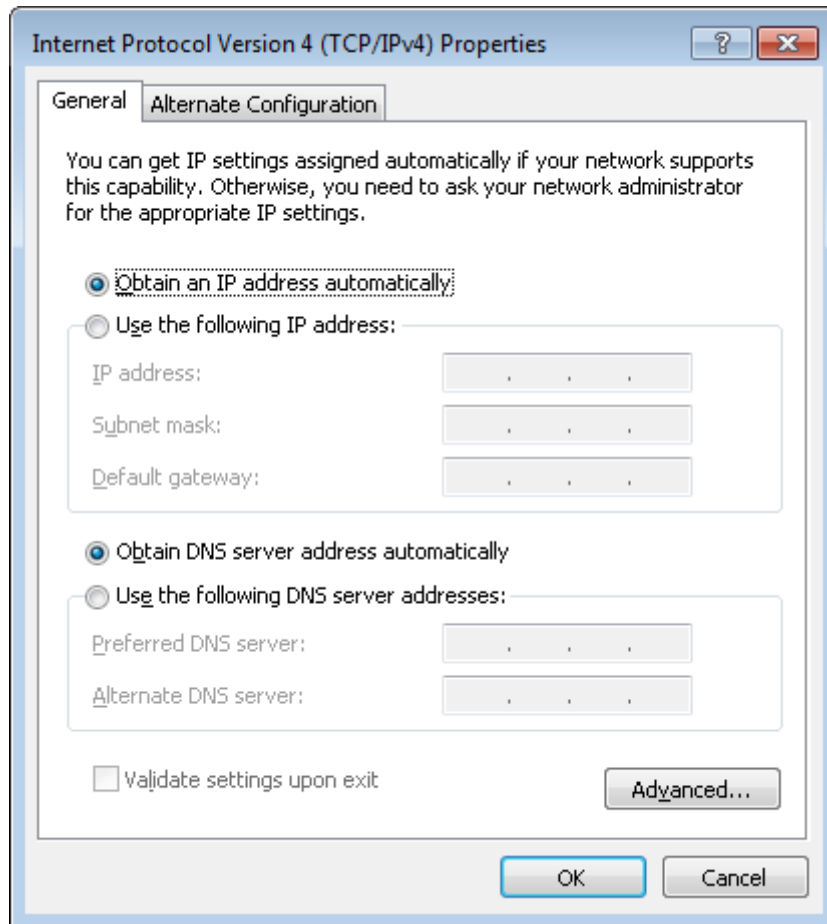


Figure 15. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

7. Click the **OK** button in the connection properties window.
8. 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.

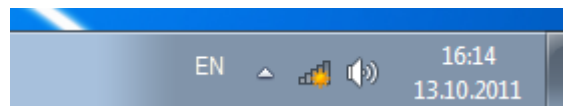


Figure 16. The notification area of the taskbar.

- In the opened **Wireless Network Connection** window, select the wireless network **DVG-5402G** (for operating in the 2.4GHz band) or **DVG-5402G-5G** (for operating in the 5GHz band) and click the **Connect** button.

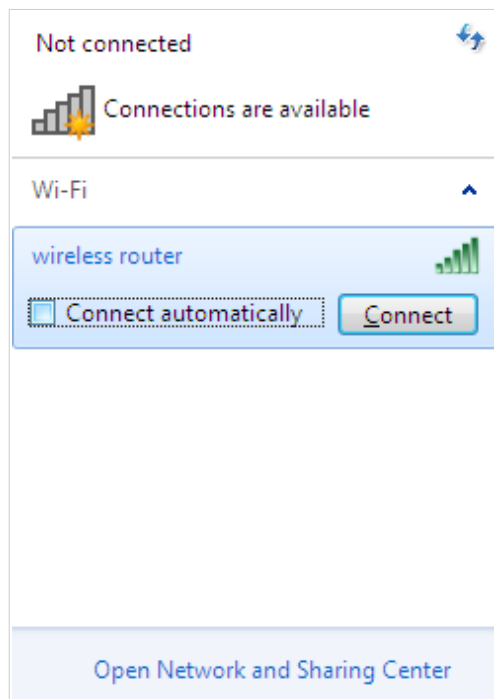


Figure 17. The list of available networks.

- 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.
- 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.

Obtaining IP Address Automatically and Connecting to Wireless Network (OS Windows 10)

1. Click the **Start** button and proceed to the **Settings** window.
2. Select the **Network & Internet** section.

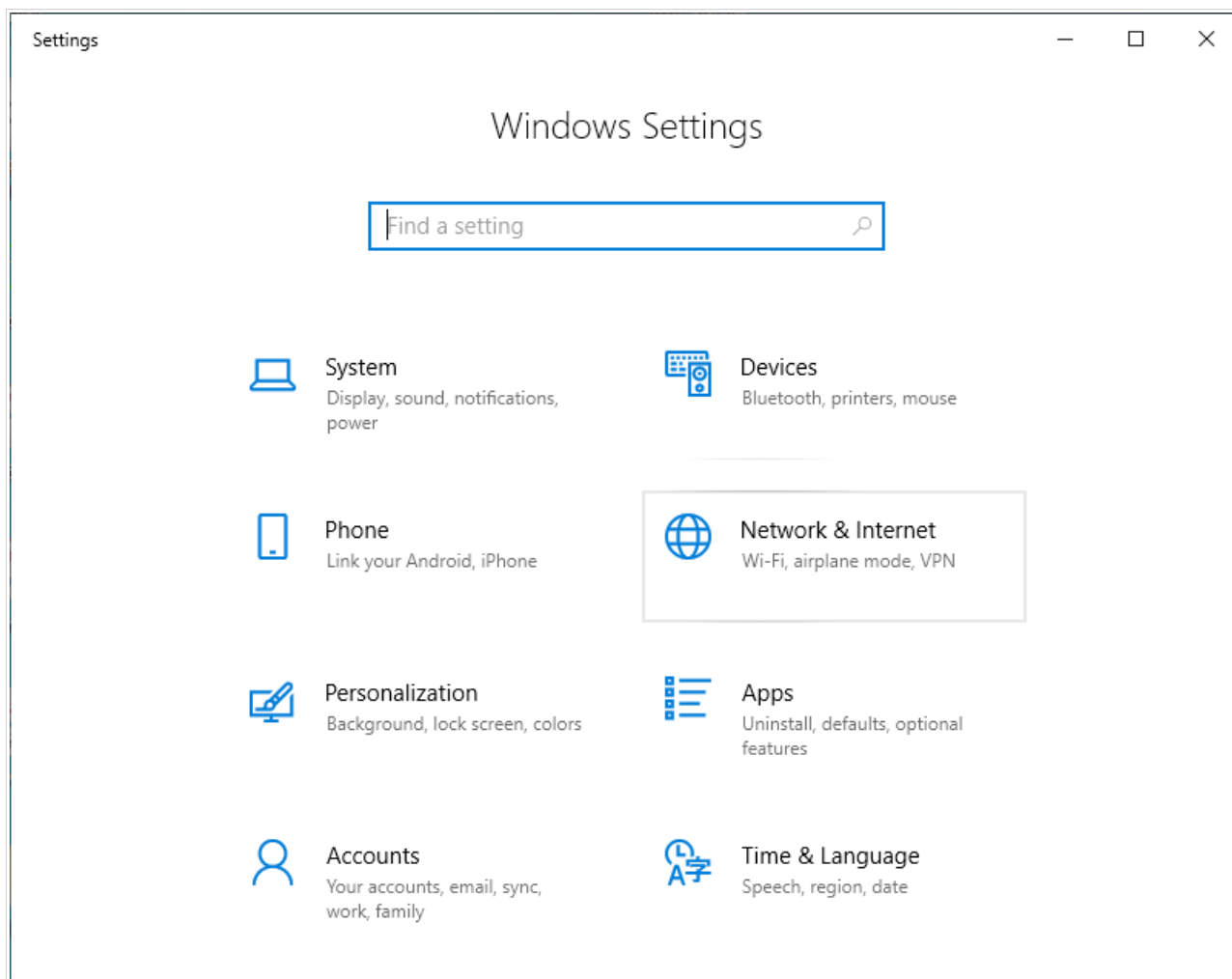


Figure 18. The **Windows Settings** window.

3. In the **Change your network settings** section, select the **Change adapter options** line.
4. In the opened window, right-click the relevant **Wireless Network Connection** icon. Make sure that your Wi-Fi adapter is on, then select the **Properties** line in the menu displayed.
5. In the **Wireless Network Connection Properties** window, on the **Networking** tab, select the **Internet Protocol Version 4 (TCP/IPv4)** line. Click the **Properties** button.

6. Make sure that the **Obtain an IP address automatically** and **Obtain DNS server address automatically** choices of the radio buttons are selected. Click the **OK** button.

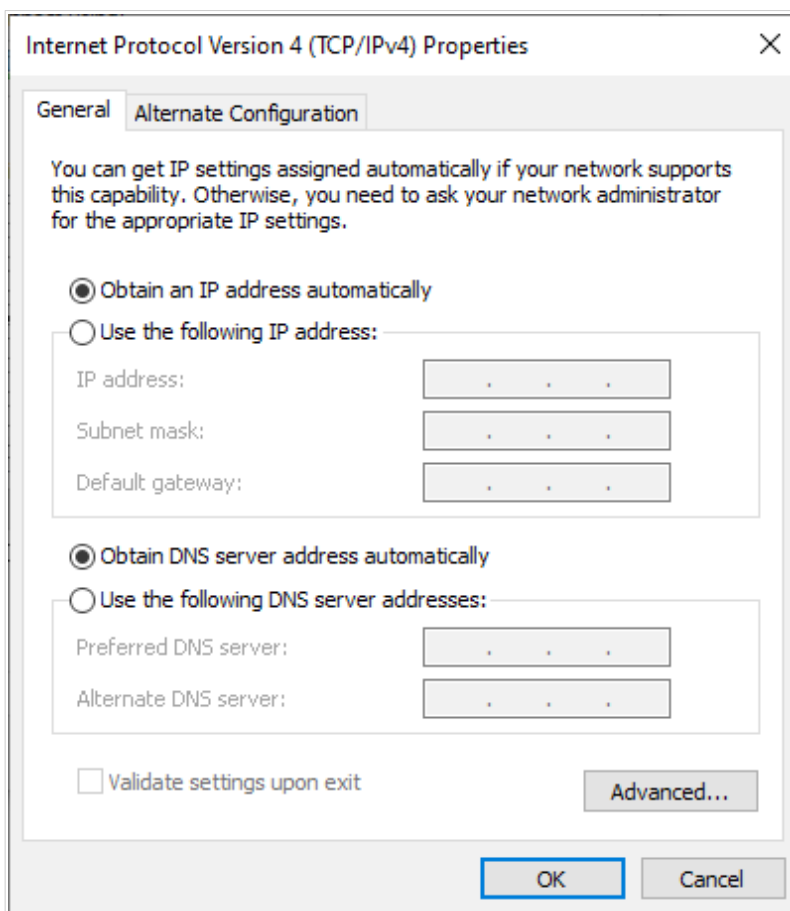


Figure 19. The **Internet Protocol Version 4 (TCP/IPv4) Properties** window.

7. Click the **Close** button in the connection properties window.
8. 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.

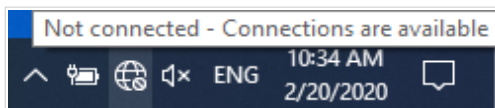


Figure 20. The notification area of the taskbar.

- In the opened **Wireless Network Connection** window, select the wireless network **DVG-5402G** (for operating in the 2.4GHz band) or **DVG-5402G-5G** (for operating in the 5GHz band) and click the **Connect** button.

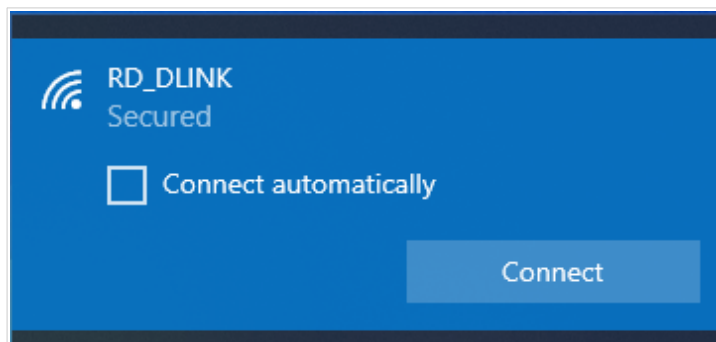


Figure 21. The list of available networks.

- 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 **Next** button.
- Allow or forbid your PC to be discoverable by other devices on this network (**Yes / No**).

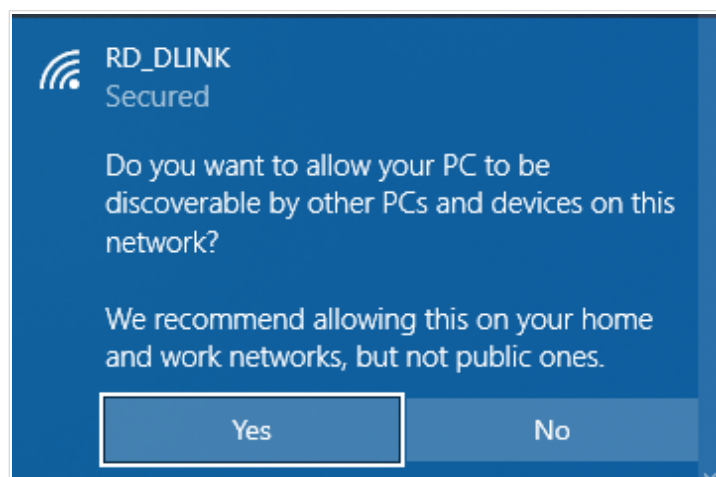


Figure 22. PC discovery settings.

- Wait for about 20-30 seconds. After the connection is established, the network icon will be displayed as a dot with curved lines indicating the signal level.

! 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.).

! Clients connected to the router with default settings do not have access 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 23). In the address bar of the web browser, enter the domain name of the router (by default, **dlinkrouter.local**) with a dot at the end and press the **Enter** key. Also you can enter the IP address of the device (by default, **192.168.8.254**).

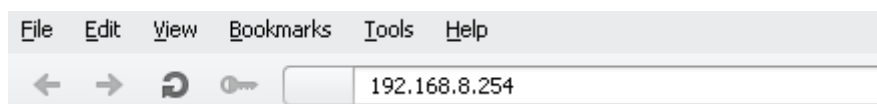


Figure 23. Connecting to the web-based interface of the DVG-5402G/GF device.

! 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.

If the device has not been configured previously or the default settings have been restored, after access to the web-based interface the Initial Configuration Wizard opens (see the **Initial Configuration Wizard** section, page 50).

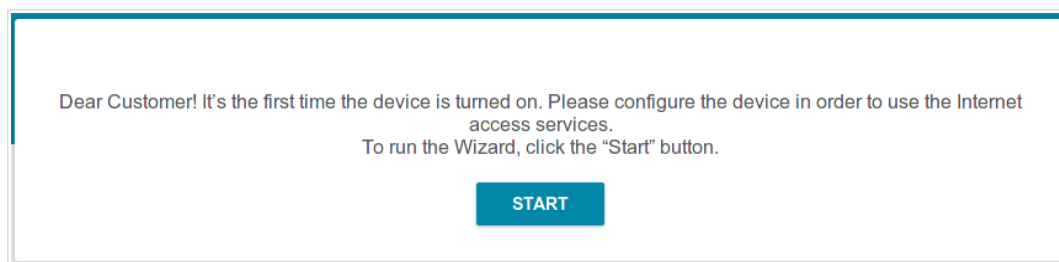
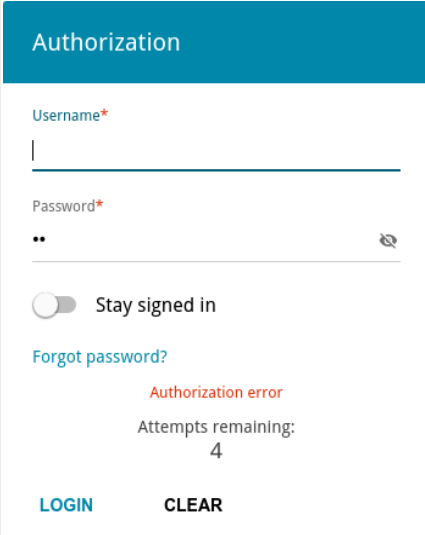


Figure 24. The page for running the Initial Configuration Wizard.

If you configured the device previously, after access to the web-based interface the login page opens. Enter the username (**admin**) in the **Username** field and the password you specified in the **Password** field, then click the **LOGIN** button.



Authorization

Username*

admin

Password*

••

Stay signed in

[Forgot password?](#)

Authorization error

Attempts remaining:
4

[LOGIN](#) [CLEAR](#)

Figure 25. The login page.

In order not to log out, move the **Stay signed in** switch to the right. After closing the web browser or rebooting the device, you need to enter the username and the password again.

If you enter a wrong password several times, the web-based interface will be blocked for a while. Please wait for one minute and reenter the password you specified.

Web-based Interface Structure

Summary Page

On the **Summary** page, detailed information on the device state is displayed.

The screenshot displays the 'Summary' page of the router's web interface. The page is organized into several sections:

- Device Information:** Model: DVG-5402G; Hardware version: S1; Firmware version: 4.0.5; Build time: Thu Sep 29 2022 12:21:00 PM MSK; UI version: 1.35.0.d2a6d9e-embedded; Vendor: D-Link Russia; Serial number: DVG5402GF1111; Support: support@dlink.ru; Summary: Root filesystem image for DVG_5402GF_RT9607C; Uptime: 5 days 16 h. 45 min.; Device mode: Router.
- WAN IPv4:** Connection type: Static IPv4; Status: Connected; MAC address: 74:DA:DA:00:54:10; IP address: 192.168.161.189.
- LAN:** LAN IPv4: 192.168.8.254; Wireless connections: -; Wired connections: 1.
- LAN Ports:** SFP: Off; LAN4: 1000M-Full; LAN3: Off; LAN1: Off.
- Wi-Fi 2.4 GHz:** Status: On; Broadcasting: On; Additional networks: 0; Network name (SSID): DVG-5402G-5410; Security: WPA2-PSK.
- Wi-Fi 5 GHz:** Status: On; Broadcasting: On; Additional networks: 0; Network name (SSID): DVG-5402G-5G-5410; Security: WPA2-PSK.
- USB Devices:** No connected devices.
- VoIP:** DHCP option 120 status: Enabled; Option value is not received.

Figure 26. The summary page.

The **Device Information** section displays the model and hardware version of the router, the firmware version, and other data.

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

To change the operation mode of the device, left-click the name of the mode in the **Device mode** line. In the opened window, click the **Initial Configuration Wizard** link (for the detailed description of the Wizard, see the *Initial Configuration Wizard* section, page 50).

The **Wi-Fi 2.4 GHz** and **Wi-Fi 5 GHz** sections display data on the state of the device's wireless network, its name and the authentication type, and availability of an additional wireless network in the relevant band.

In the **WAN** section, data on the type and status of the existing WAN connection are displayed.

In the **LAN** section, the IPv4 and IPv6 address of the router and the number of wired and wireless clients of the device are displayed.

The **LAN Ports** section displays the state of the device's LAN ports and data transfer mode of active ports.

The **USB Devices** section displays the device connected to the USB port of the router.

The **VoIP** section displays data on the status of the existing VoIP lines, phones, and DHCP option 120.

Home Page

The **Home** page displays links to the most frequently used pages with device's settings.

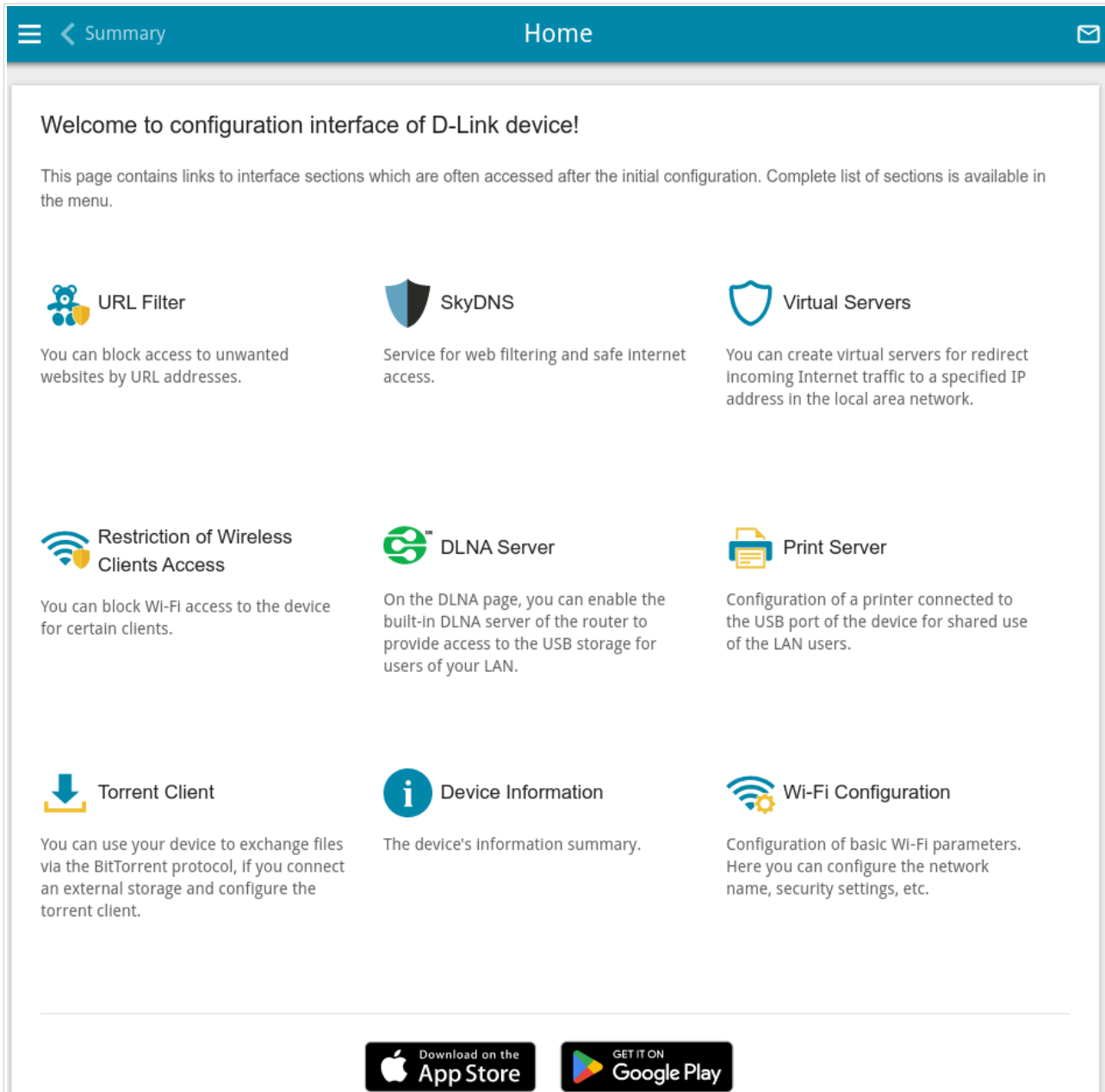


Figure 27. The **Home** page.

Other settings of the router are available in the menu in the left part of the page.

Menu Sections

To configure the router use the menu in the left part of the page.

In the **Initial Configuration** section you can run the Initial Configuration Wizard. The Wizard allows you to configure the router for operation in the needed mode and specify all parameters necessary for getting started (for the description of the Wizard, see the **Initial Configuration Wizard** section, page 50).

The pages of the **Statistics** section display data on the current state of the router (for the description of the pages, see the **Statistics** section, page 74).

The pages of the **Connections Setup** 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 **Connections Setup** section, page 83).

The pages of the **VPN** section are designed for configuring VPN connections based on IPsec/GRE/EoGRE/EoIP/IPIP protocols and creating a PPTP or L2TP server and accounts for access to it (for the description of the pages, see the **VPN** section, page 143).

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 167).

The **Print Server** section is designed for configuring the router as a print server (see the **Print Server** section, page 199).

The pages of the **USB Storage** section are designed for operating the connected USB storage (for the description of the pages, see the **USB Storage** section, page 200).

The pages of the **USB Modem** section are designed for operating the connected 3G or LTE USB modem (for the description of the pages, see the **USB Modem** section, page 216).

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 223).

The pages of the **VoIP** section are designed for specifying all settings needed for VoIP (for the description of the pages, see the **VoIP** section, page 254).

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 292).

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 313).

The pages of the **SkyDNS** section are designed for configuring the SkyDNS web content filtering service (for the description of the pages, see the **SkyDNS** section, page 342).

To exit the web-based interface, click the **Logout** line of the menu.

Notifications

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



Figure 28. The web-based interface notifications.

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

CHAPTER 4. CONFIGURING VIA WEB-BASED INTERFACE

Initial Configuration Wizard

To start the Initial Configuration Wizard, go to the **Initial Configuration** section. On the opened page, click the **OK** button and wait until the factory default settings are restored.

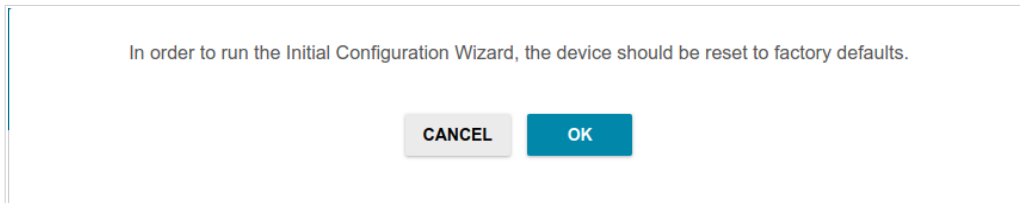


Figure 29. Restoring the default settings in the Wizard.

If you perform initial configuration of the router via Wi-Fi connection, please make sure that you are connected to the wireless network **DVG-5402G** (for operating in the 2.4GHz band) or **DVG-5402G-5G** (for operating in the 5GHz band) and click the **NEXT** button.

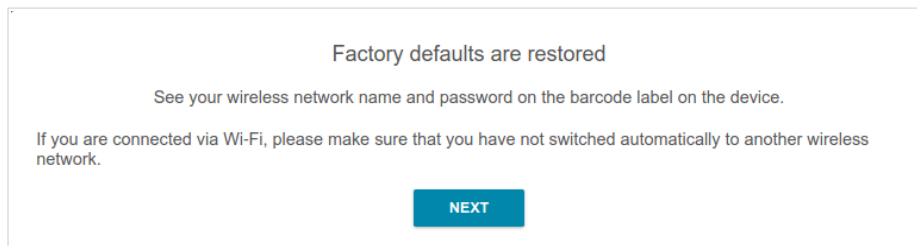


Figure 30. Checking connection to the wireless network.

Click the **START** button.

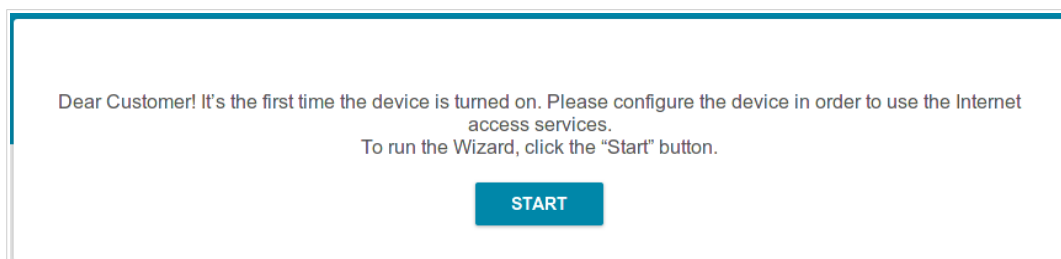


Figure 31. Starting the Wizard.

On the opened page, click **YES** in order to leave the current language of the web-based interface or click **NO** to select another language.

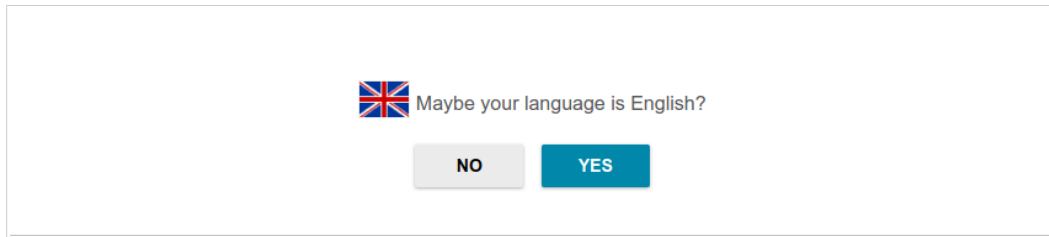


Figure 32. Selecting a language.

You can finish the wizard earlier and go to the menu of the web-based interface. To do this, click the **ADVANCED SETTINGS** button. On the opened page, change the default settings: specify the administrator password in the **User's interface password** and **Password confirmation** and the name of the wireless network in the 2.4GHz and 5GHz bands in the **Network name 2.4 GHz (SSID)** and **Network name 5 GHz (SSID)** fields correspondingly. Then click the **APPLY** button.

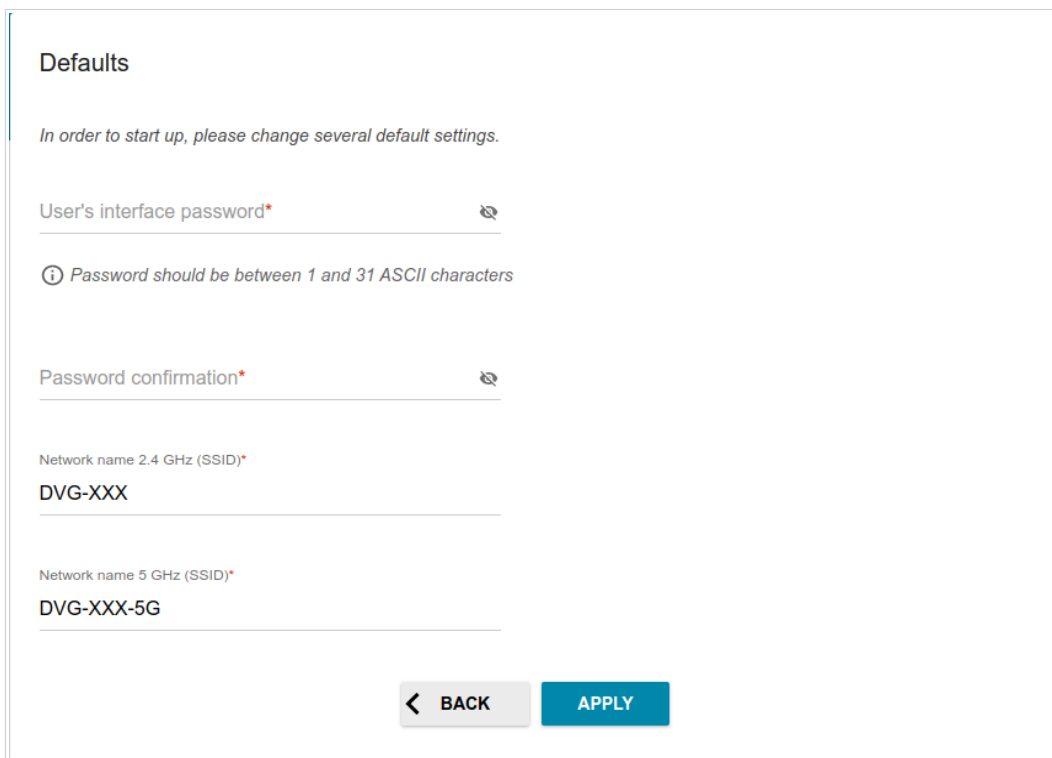


Figure 33. Changing the default settings.

To continue the configuration of the router via the Wizard, click the **CONTINUE** button.

Selecting Operation Mode

Select the needed operation mode and click the **NEXT** button.

Router

In order to connect your device to a fiber optic line, on the **Device mode** page, from the **Connection method** list, select the **Fiber (SFP)** value. Then from the **Work mode** list, select the **Router** value. In this mode you can configure a WAN connection, set your own settings for the wireless network in the 2.4GHz and 5GHz bands, configure LAN ports to connect an STB or VoIP phone, and set your own password for access to the web-based interface of the device.

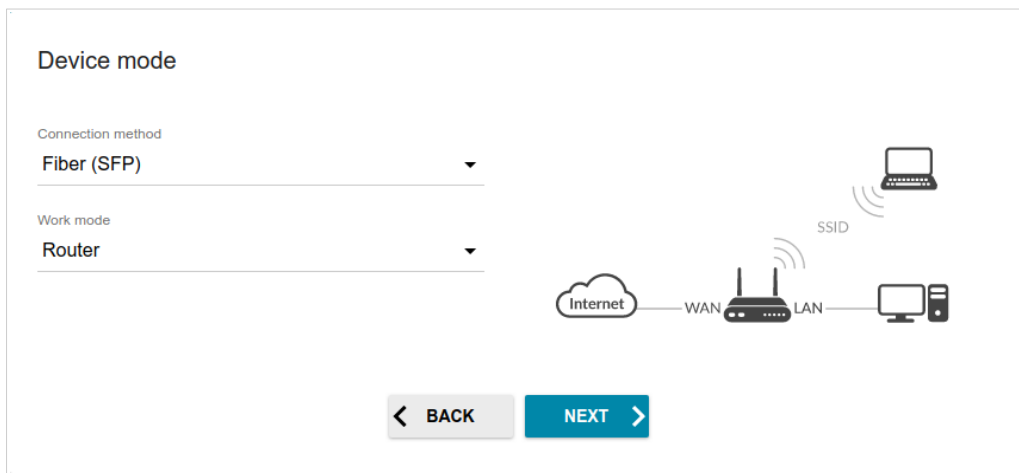


Figure 34. Selecting an operation mode. The **Router** mode.

In order to connect your device to the network of a 3G or LTE operator, on the **Device mode** page, from the **Connection method** list, select the **Mobile Internet** value. In this mode you can configure a 3G/LTE WAN connection, set your own settings for the wireless network in the 2.4GHz and 5GHz bands, and set your own password for access to the web-based interface of the device.



Figure 35. Selecting an operation mode. The **Mobile Internet** mode.

In order to connect your device to a wireless ISP (WISP), on the **Device mode** page, from the **Connection method** list, select the **Wi-Fi** value. Then from the **Work mode** list select the **WISP Repeater** value. In this mode you can connect your device to another access point, configure a WAN connection, set your own settings for the wireless network in the 2.4GHz and 5GHz bands, and set your own password for access to the web-based interface of the device.

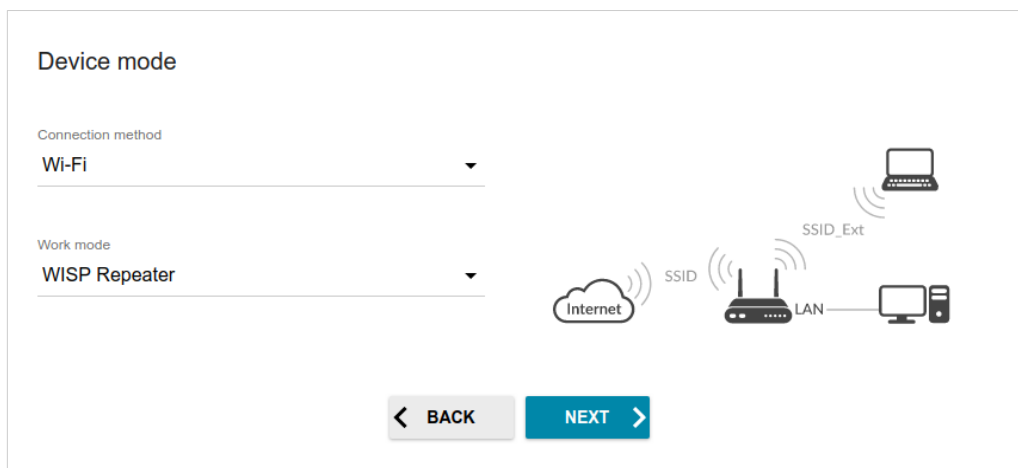


Figure 36. Selecting an operation mode. The **WISP Repeater** mode.

Access Point or Repeater

In order to connect your device to a wired router for adding a wireless network to the existing local network, on the **Device mode** page, from the **Connection method** list, select the **Fiber (SFP)** value. Then from the **Work mode** list select the **Access point** value. In this mode you can change the LAN IP address, set your own settings for the wireless network in the 2.4GHz and 5GHz bands, and set your own password for access to the web-based interface of the device.

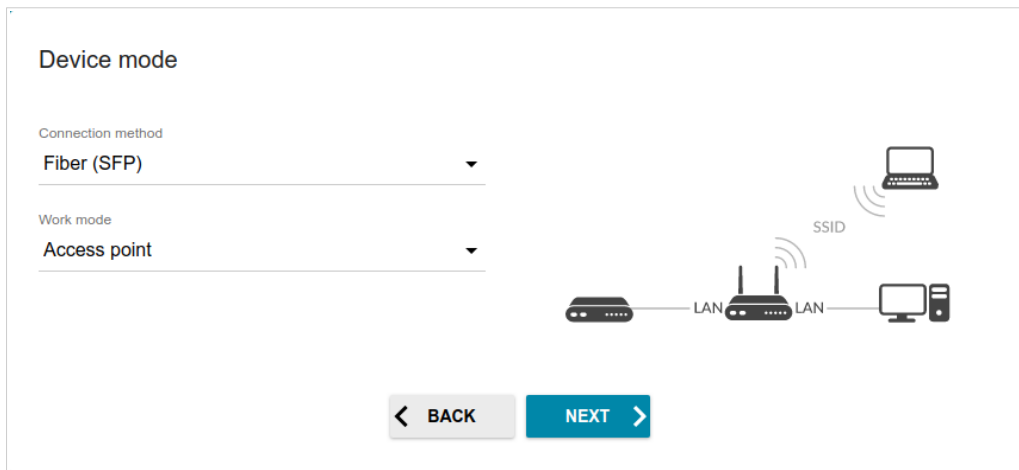


Figure 37. Selecting an operation mode. The **Access point** mode.

In order to connect your device to a wireless router for extending the range of the existing wireless network, on the **Device mode** page, from the **Connection method** list, select the **Wi-Fi** value. Then from the **Work mode** list select the **Repeater** value. In this mode you can change the LAN IP address, connect your device to another access point, set your own settings for the wireless network in the 2.4GHz and 5GHz bands, and set your own password for access to the web-based interface of the device.

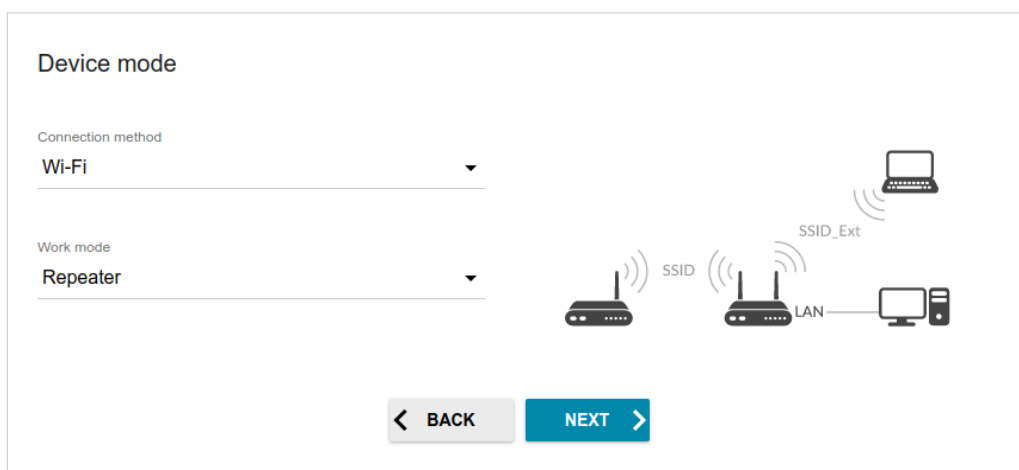


Figure 38. Selecting an operation mode. The **Repeater** mode.

In order to let wired PCs connected to your device access the network of a wireless router, on the **Device mode** page, from the **Connection method** list, select the **Wi-Fi** value. Then from the **Work mode** list select the **Client** value. In this mode you can change the LAN IP address, connect your device to another access point, and set your own password for access to the web-based interface of the device.

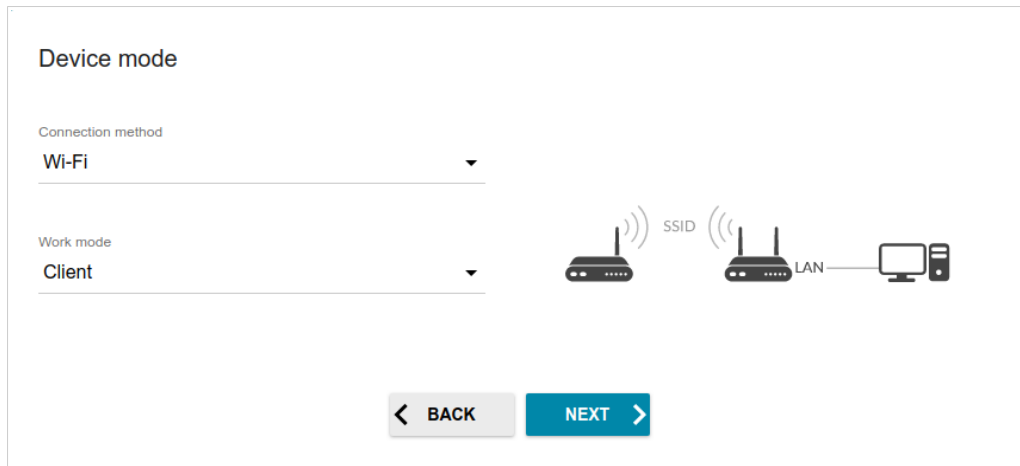
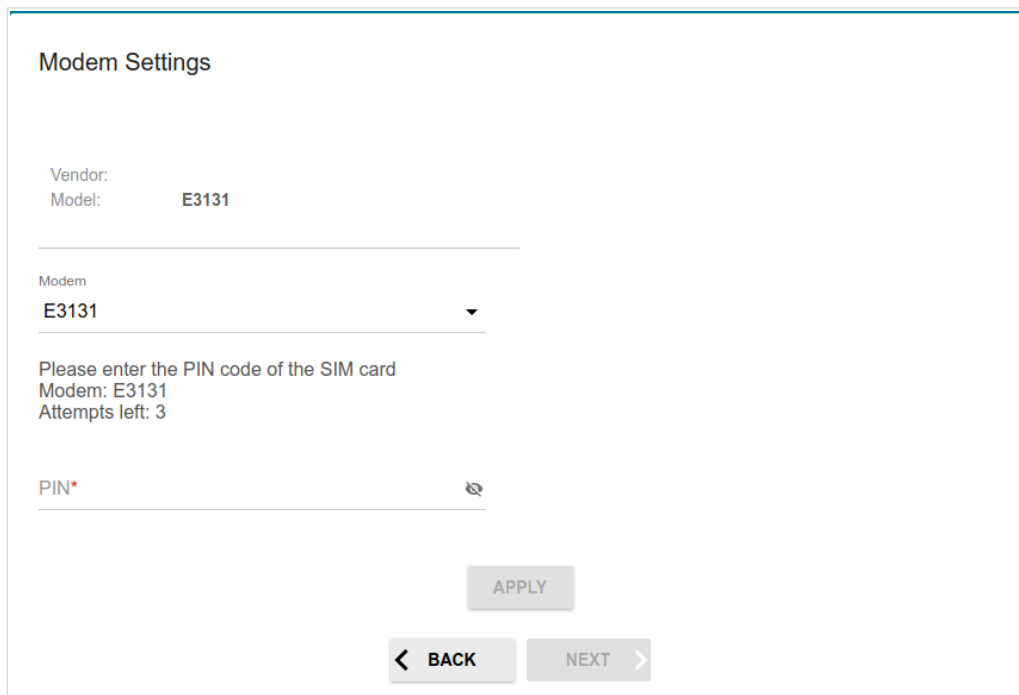


Figure 39. Selecting an operation mode. The **Client** mode.

Creating 3G/LTE WAN Connection

This configuration step is available for the **Mobile Internet** mode.

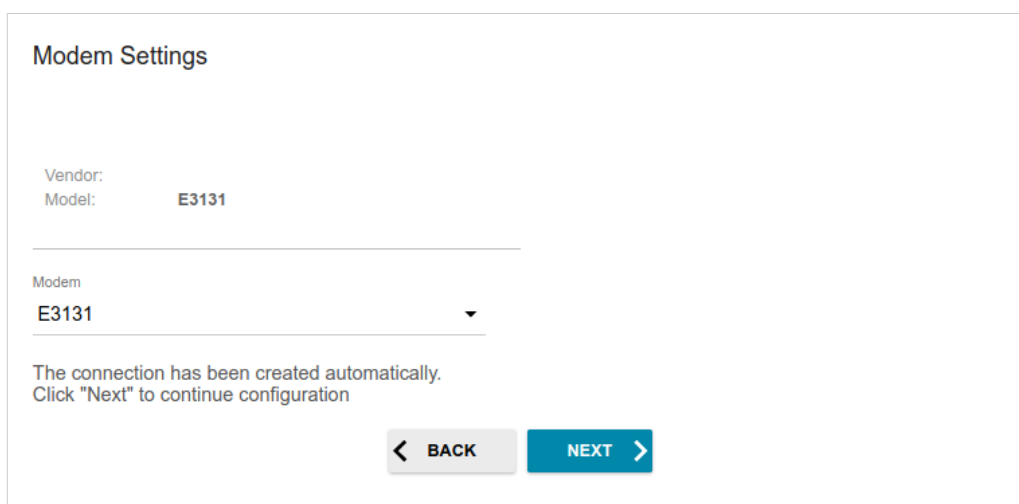
1. If the PIN code check is enabled for the SIM card inserted into your USB modem, enter the PIN code in the **PIN** field and click the **APPLY** button.



The screenshot shows the 'Modem Settings' page. At the top, it displays 'Vendor:' and 'Model: E3131'. Below this is a 'Modem' dropdown menu currently set to 'E3131'. A message reads: 'Please enter the PIN code of the SIM card', 'Modem: E3131', and 'Attempts left: 3'. There is a text input field labeled 'PIN*' with a small eye icon to its right. At the bottom, there are three buttons: 'APPLY', '< BACK', and 'NEXT >'.

Figure 40. The page for entering the PIN code.

2. Please wait while the router automatically creates a WAN connection for your mobile operator.



The screenshot shows the 'Modem Settings' page after the connection has been created. It displays the same 'Vendor:' and 'Model: E3131' information. The 'Modem' dropdown is still set to 'E3131'. A message reads: 'The connection has been created automatically. Click "Next" to continue configuration'. At the bottom, there are three buttons: '< BACK', 'NEXT >', and 'APPLY'.

Figure 41. The page for creating 3G/LTE connection.

3. Click the **NEXT** button.

If the router failed to create a WAN connection automatically, click the **CONFIGURE MANUALLY** button. On the **Modem Settings** page, configure all needed settings and click the **NEXT** button.

Changing LAN IPv4 Address

This configuration step is available for the **Access point**, **Repeater**, and **Client** modes.

1. Select the **Automatic obtainment of IPv4 address** to let DVG-5402G/GF automatically obtain the LAN IPv4 address.
2. In the **Hostname** field, you should specify a domain name of the router using which you can access the web-based interface after finishing the Wizard. Enter a new domain name of the router ending with **.local** or leave the value suggested by the router.

! In order to access the web-based interface using the domain name, in the address bar of the web browser, enter the name of the router with a dot at the end.

If you want to manually assign the LAN IPv4 address for DVG-5402G/GF, do not select the **Automatic obtainment of IPv4 address** checkbox and fill in the **IP address**, **Subnet mask**, **DNS IP address**, **Hostname** fields and, if needed, the **Gateway IP address** field. Make sure that the assigned address does not coincide with the LAN IPv4 address of the router to which your device connects.

LAN

Automatic obtainment of IPv4 address

! Automatic obtainment of IPv4 address sufficiently protects against use of the same addresses in one LAN. In order to avoid IPv4 address conflicts, static IPv4 addresses of LAN devices should not coincide with addresses from the address range assigned by an upper-level router (or a local DHCP server).

IP address*

192.168.8.254

Subnet mask*

255.255.255.0

Gateway IP address

DNS IP address*

8.8.8.8

Hostname*

dlinkap799b.local

i Specify a domain name ending with .local. In order to access the web-based interface using the domain name, enter this name with a dot and slash at the end in the address bar of the web browser (for example, dlinkap12ab.local./)

< BACK **NEXT >**

Figure 42. The page for changing the LAN IPv4 address.


3. Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

Wi-Fi Client

This configuration step is available for the **WISP Repeater**, **Repeater**, and **Client** modes.

1. On the **Wi-Fi Client** page, click the **WIRELESS NETWORKS** button and select the network to which you want to connect in the opened window. When you select a network, the **Network name (SSID)** and **BSSID** fields are filled in automatically.

If you cannot find the needed network in the list, click the **UPDATE LIST** icon ().

2. If a password is needed to connect to the selected network, fill in the relevant field. Click the **Show** icon () to display the entered password.

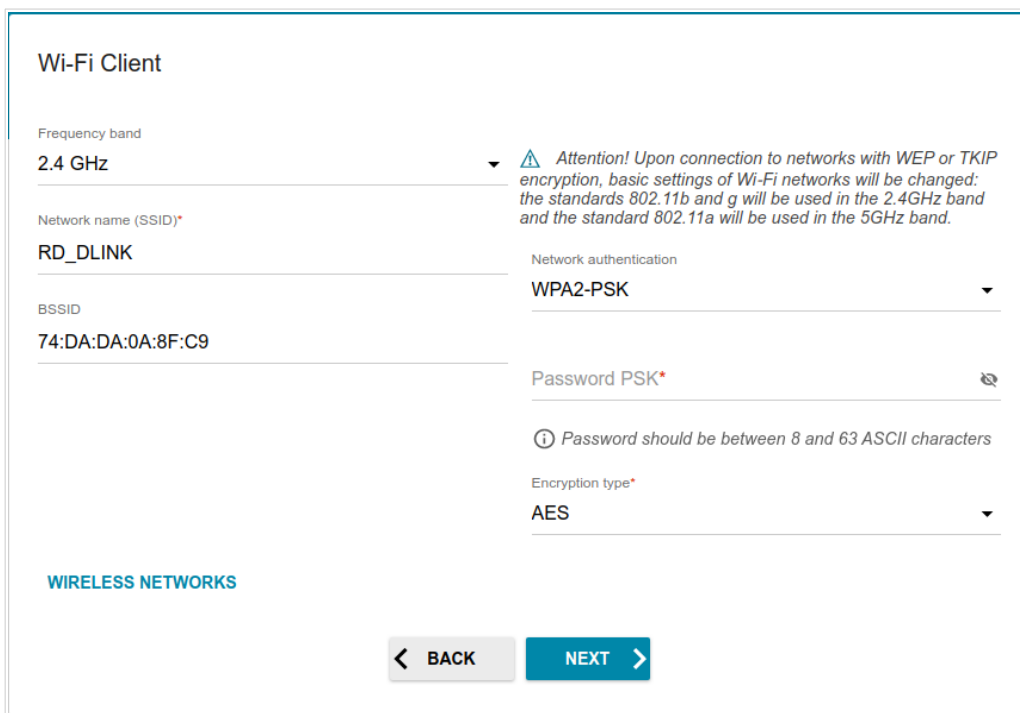


Figure 43. The page for configuring the Wi-Fi client.

If you connect to a hidden network, select the band where the hidden network operates from the **Frequency band** list and enter the network name in the **Network name (SSID)** field. Then select a needed value from the **Network authentication** list and then, if needed, enter the password in the relevant field.

When the **Open** or **WEP** authentication type is selected, the following settings are displayed on the page:

Parameter	Description
Enable encryption WEP	<i>For Open authentication type only.</i> The checkbox activating WEP encryption. When the checkbox is selected, the Default key ID drop-down list, the Encryption key WEP as HEX checkbox, and four Encryption key fields are displayed on the page.
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.
Encryption key (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. Click the Show icon (👁) to display the entered key.

When the **WPA-PSK**, **WPA2-PSK**, **WPA-PSK/WPA2-PSK mixed**, **WPA3-SAE**, and **WPA2-PSK/WPA3-SAE mixed** authentication type is selected, the following fields are displayed:

Parameter	Description
Password PSK	A password for WPA encryption. Click the Show icon (👁) to display the entered password.
Encryption type	An encryption method: TKIP , AES , or TKIP+AES . <i>TKIP and TKIP+AES encryption types are not available for WPA3-SAE and WPA2-PSK/WPA3-SAE mixed authentication types.</i>

3. Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

Configuring Wired WAN Connection

This configuration step is available for the **Router** and **WISP Repeater** modes.



You should configure your WAN connection in accordance with data provided by your Internet service provider (ISP). Make sure that you have obtained all necessary information prior to configuring your connection. Otherwise contact your ISP.

1. On the **Internet connection type** page, click the **SCAN** button (available for the **Router** mode only) to automatically specify the connection type used by your ISP or manually select the needed value from the **Connection type** list.
2. Specify the settings necessary for the connection of the selected type.
3. If a particular MAC address was registered by your ISP upon concluding the agreement, from the **MAC address assignment method** drop-down list (available for the **Router** mode only), select the **Manual** value and enter this address in the **MAC address** field. Choose the **Clone MAC address of your device** value to place the MAC address of your network interface card in the field, or leave the **Default MAC address** value to place the router's WAN interface MAC address in the field.
4. If the Internet access is provided via a VLAN channel, select the **Use VLAN** checkbox and fill in the **VLAN ID** field (available for the **Router** mode only).
5. Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

Static IPv4 Connection

Internet connection type

Connection type
Static IPv4

(i) A connection of this type allows you to use a fixed IP address provided by your ISP.

SCAN Network scan for connection type and parameters detection

IP address*

Subnet mask*

Gateway IP address*

DNS IP address*

MAC address assignment method
Default MAC address

MAC address
74:DA:DA:00:54:10

(i) In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet.

Use VLAN
(i) Select the checkbox if the Internet access is provided via a VLAN channel.

Use IGMP
(i) Internet Group Management Protocol is designed to manage multicast traffic in IP-based networks.

Ping

Enable automatic creation of Mobile Internet connection

< BACK **NEXT >**

Figure 44. The page for configuring Static IPv4 WAN connection.

Fill in the following fields: **IP address**, **Subnet mask**, **Gateway IP address**, and **DNS IP address**.

Static IPv6 Connection

Internet connection type

Connection type
Static IPv6

ⓘ A connection of this type allows you to use a fixed IP address provided by your ISP.

SCAN Network scan for connection type and parameters detection

IP address*

Prefix*

Gateway IP address*

DNS IP address*

MAC address assignment method
Default MAC address

MAC address
74:DA:DA:00:54:10

ⓘ In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet.

Use VLAN

ⓘ Select the checkbox if the Internet access is provided via a VLAN channel.

Ping

Enable automatic creation of Mobile Internet connection

< BACK **NEXT >**

Figure 45. The page for configuring Static IPv6 WAN connection.

Fill in the following fields: **IP address**, **Prefix**, **Gateway IP address**, and **DNS IP address**.

PPPoE, IPv6 PPPoE, PPPoE Dual Stack, PPPoE + Dynamic IP (PPPoE Dual Access) Connections

The screenshot shows a web-based configuration interface for an internet connection. The title is "Internet connection type". The "Connection type" dropdown menu is set to "PPPoE". Below this, there is an information icon and a note: "A connection of this type requires a user name and password." There is a "SCAN" button with the text "Network scan for connection type and parameters detection". A checkbox labeled "Without authorization" is present. The "Username*" field is empty. The "Password*" field contains a masked password with a "Show" icon (an eye with a slash) to its right. The "Service name" field is empty. The "MAC address assignment method" dropdown menu is set to "Default MAC address". The "MAC address" field contains "74:DA:DA:00:54:10" with a lock icon to its right. Below this, there is an information icon and a note: "In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet." There are three checkboxes: "Use VLAN" (unchecked), "Ping" (unchecked), and "Enable automatic creation of Mobile Internet connection" (checked). At the bottom, there are "BACK" and "NEXT" buttons.

Figure 46. The page for configuring PPPoE WAN connection.

In the **Username** field enter the login and in the **Password** field enter the password provided by your ISP. Click the **Show** icon (👁) to display the entered password. If authorization is not required, select the **Without authorization** checkbox.

PPPoE + Static IP (PPPoE Dual Access) Connection

The screenshot shows a configuration page titled "Internet connection type". At the top, there is a dropdown menu labeled "Connection type" with the selected option "PPPoE + Static IP (PPPoE Dual Access)". Below this, an information icon (i) is followed by the text: "A connection of this type requires a user name, password, and a fixed IP address provided by your ISP." There is a "SCAN" button with the text "Network scan for connection type and parameters detection" next to it. Below the scan button is a checkbox labeled "Without authorization". The form contains several input fields, each with a red asterisk indicating it is required: "Username*", "Password*" (with a "Show" icon to its right), "Service name", "IP address*", "Subnet mask*", "Gateway IP address*", and "DNS IP address*".

Figure 47. The page for configuring PPPoE + Static IP (PPPoE Dual Access) WAN connection.

In the **Username** field enter the login and in the **Password** field enter the password provided by your ISP. Click the **Show** icon (👁) to display the entered password. If authorization is not required, select the **Without authorization** checkbox.

Also fill in the following fields: **IP address**, **Subnet mask**, **Gateway IP address**, and **DNS IP address**.

PPTP + Dynamic IP or L2TP + Dynamic IP Connection

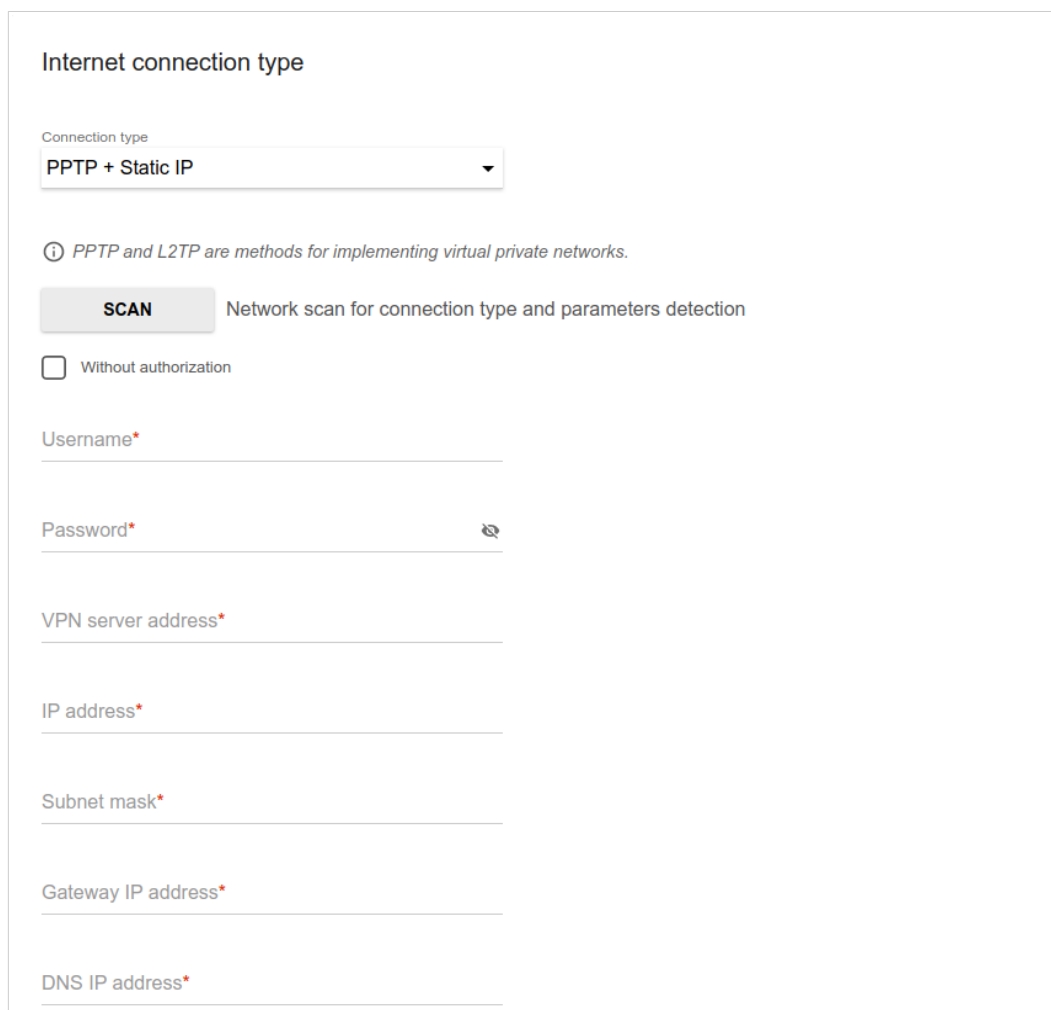
The screenshot shows a configuration page titled "Internet connection type". At the top, a dropdown menu is set to "PPTP + Dynamic IP". Below this is an information icon and a note: "PPTP and L2TP are methods for implementing virtual private networks." A "SCAN" button is present with the text "Network scan for connection type and parameters detection". There is a checkbox labeled "Without authorization" which is currently unchecked. The "Username*" field is empty. The "Password*" field contains a masked password with a "Show" icon (an eye with a slash) to its right. The "VPN server address*" field is empty. The "MAC address assignment method" dropdown is set to "Default MAC address". The "MAC address" field shows "74:DA:DA:00:54:10" with a lock icon to its right. Below the MAC address field is an information icon and a note: "In some ISP's networks, it is required to register a certain MAC address in order to get access to the Internet." There are three checkboxes: "Use VLAN" (unchecked), "Use IGMP" (checked), and "Ping" (unchecked). A note below "Use IGMP" states: "Internet Group Management Protocol is designed to manage multicast traffic in IP-based networks." At the bottom, there is a checkbox for "Enable automatic creation of Mobile Internet connection" which is checked. At the very bottom of the form are two buttons: "BACK" with a left arrow and "NEXT" with a right arrow.

Figure 48. The page for configuring PPTP + Dynamic IP WAN connection.

In the **Username** field enter the login and in the **Password** field enter the password provided by your ISP. Click the **Show** icon (👁) to display the entered password. If authorization is not required, select the **Without authorization** checkbox.

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

PPTP + Static IP or L2TP + Static IP Connection



The screenshot shows a configuration page titled "Internet connection type". At the top, there is a dropdown menu labeled "Connection type" with "PPTP + Static IP" selected. Below this is an information icon and the text: "PPTP and L2TP are methods for implementing virtual private networks." There is a "SCAN" button with the text "Network scan for connection type and parameters detection" next to it. Below the scan button is a checkbox labeled "Without authorization" which is currently unchecked. The page contains several text input fields, each with an asterisk indicating it is required: "Username*", "Password*" (with a show/hide icon), "VPN server address*", "IP address*", "Subnet mask*", "Gateway IP address*", and "DNS IP address*".

Figure 49. The page for configuring PPTP + Static IP WAN connection.

In the **Username** field enter the login and in the **Password** field enter the password provided by your ISP. Click the **Show** icon (👁) to display the entered password. If authorization is not required, select the **Without authorization** checkbox.

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

Also fill in the following fields: **IP address**, **Subnet mask**, **Gateway IP address**, and **DNS IP address**.

Configuring Wireless Network

This configuration step is available for the **Mobile Internet, Router, Access point, WISP Repeater**, and **Repeater** modes.

1. On the **Wireless Network 2.4 GHz** page, in the **Network name** field, specify your own name for the wireless network in the 2.4GHz band or leave the value suggested by the router.
2. In the **Password** field, specify your own password for access to the wireless network or leave the value suggested by the router (WPS PIN of the device, see the barcode label).
3. If the router is used as a Wi-Fi client, you can specify the same parameters of the wireless network as specified for the network to which you are connecting. To do this, click the **USE** button (available for the **WISP Repeater** and **Repeater** modes only).
4. You can restore the parameters of the wireless network specified before resetting to factory defaults. To do this, click the **RESTORE** button.

Wireless Network 2.4 GHz

Enable

Broadcast wireless network 2.4 GHz

Disabling broadcast does not influence the ability to connect to another Wi-Fi network as a client.

Network name*

my wi-fi

The number of characters should not exceed 32

Open network

Password*

.....

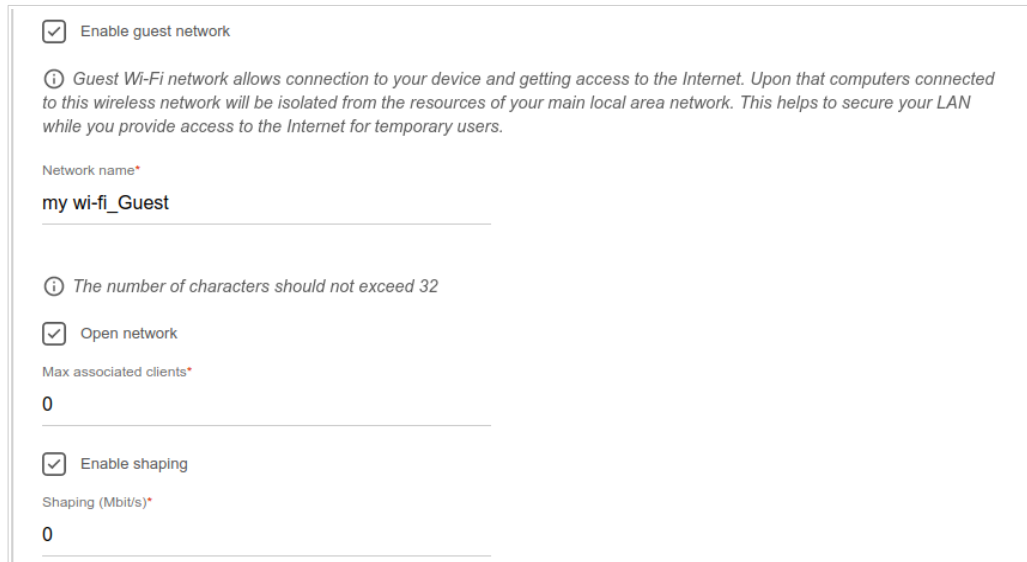
Password should be between 8 and 63 ASCII characters

USE Use the same parameters as on the root access point.

RESTORE You can restore network name and security that was set before applying factory settings.

Figure 50. The page for configuring the wireless network.

5. If you want to create an additional wireless network isolated from your LAN in the 2.4GHz band, select the **Enable guest network** checkbox (available for the **Mobile Internet**, **Router**, and **WISP Repeater** modes only).



Enable guest network

Guest Wi-Fi network allows connection to your device and getting access to the Internet. Upon that computers connected to this wireless network will be isolated from the resources of your main local area network. This helps to secure your LAN while you provide access to the Internet for temporary users.

Network name*

my wi-fi_Guest

The number of characters should not exceed 32

Open network

Max associated clients*

0

Enable shaping

Shaping (Mbit/s)*

0

Figure 51. The page for configuring the wireless network.

6. In the **Network name** field, specify your own name for the guest wireless network or leave the value suggested by the router.
7. If you want to create a password for access to the guest wireless network, deselect the **Open network** checkbox and fill in the **Password** field.
8. If you want to limit the bandwidth of the guest wireless network, select the **Enable shaping** checkbox and fill in the **Shaping** field.
9. Click the **NEXT** button to continue or click the **BACK** button to specify other settings.
10. On the **Wireless Network 5 GHz** page, specify needed settings for the wireless network in the 5GHz band and click the **NEXT** button.

Configuring LAN Ports for IPTV/VoIP

This configuration step is available for the **Router** mode.

1. On the **IPTV** page, select the **Is an STB connected to the device** checkbox.

IPTV

Is an STB connected to the device?

ⓘ If your ISP provides IPTV service, you can connect an STB directly to the router without additional equipment

Use VLAN ID

VLAN ID*

ⓘ Information about the VLAN ID can be found in the contract.

SFP LAN4 LAN3 LAN2 LAN1

Figure 52. The page for selecting a LAN port to connect an IPTV set-top box.

2. Select a free LAN port for connecting your set-top box.
3. If the IPTV service is provided via a VLAN channel, select the **Use VLAN ID** checkbox and fill in the **VLAN ID** field.
4. Click the **NEXT** button to continue or click the **BACK** button to specify other settings.

5. On the **VoIP** page, select the **Is an IP phone connected to the device** checkbox.

VoIP

Is an IP phone connected to the device?

ⓘ If your ISP provides VoIP service, you can connect an IP phone directly to the router without additional equipment

Use VLAN ID

VLAN ID*

ⓘ Information about the VLAN ID can be found in the contract.

SFP LAN4 LAN3 LAN2 LAN1

BACK NEXT

Figure 53. The page for selecting a LAN port to connect a VoIP phone.

6. Select a free LAN port for connecting your IP phone.
7. If the VoIP service is provided via a VLAN channel, select the **Use VLAN ID** checkbox and fill in the **VLAN ID** field.
8. Click the **NEXT** button to continue or click the **BACK** button to specify other settings.

Changing Web-based Interface Password

On this page, you should change the default administrator password. To do this, enter a new password in the **User's interface password** and **Password confirmation** fields. You may set any password except **admin**. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout.⁹

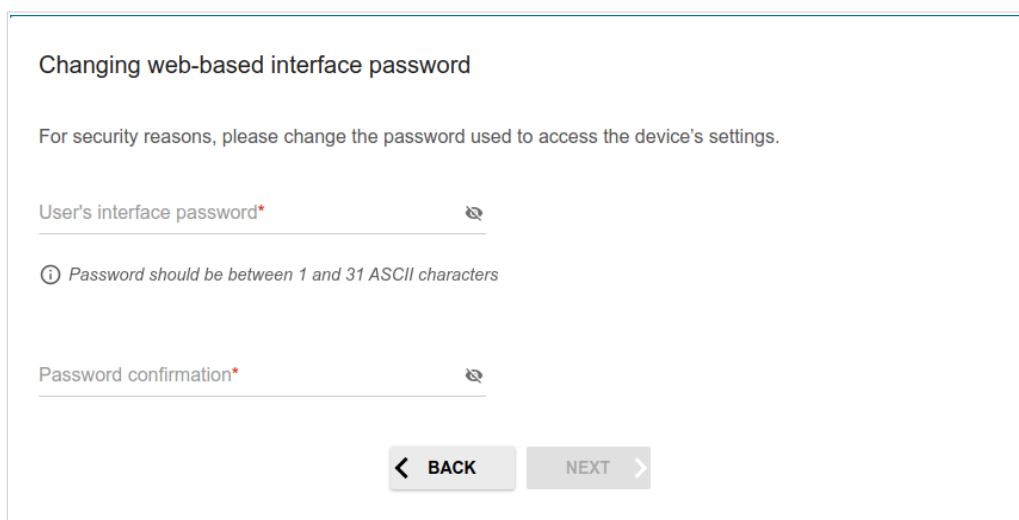


Figure 54. The page for changing the web-based interface password.



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.

Click the **NEXT** button to continue or click the **BACK** button to return to the previous page.

On the next page, check all specified settings.

Also you can save a text file with parameters set by the Wizard to your PC. To do this, click the **SAVE CONFIGURATION FILE** button and follow the dialog box appeared.

To finish the Wizard, click the **APPLY** button. The router will apply settings and reboot. Click the **BACK** button to specify other settings.

⁹ 0-9, A-Z, a-z, space, !"#%&'()*+,-./:;<=>?@[\\]^_`{|}~.

If the Wizard has configured a WAN connection, after clicking the **APPLY** button, the page for checking the Internet availability opens.

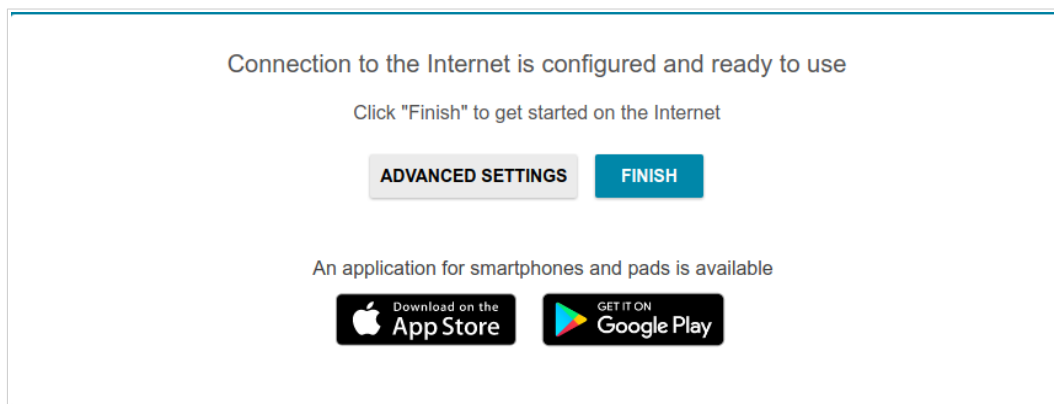


Figure 55. Checking the Internet availability.

If the router has been successfully connected to the Internet, click the **FINISH** button.

If problems appeared when connecting to the Internet, click the **CHECK AGAIN** button to recheck the state of the WAN connection.

If problems of connection have not been solved, contact the technical support of your ISP (as a rule, the technical support phone is provided with the agreement) or the D-Link technical support (the phone number will be displayed on the page after several attempts of checking the connection).

To specify other settings, click the **ADVANCED SETTINGS** button. After clicking the **ADVANCED SETTINGS** button, the **Home** page opens (see the *Home Page* section, page 47).

Statistics

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 rules and routing tables
- data on devices connected to the router's network and its web-based interface, and information on current sessions of these devices
- statistics for traffic passing through ports of the router
- addresses of active multicast groups
- statistics for IPsec tunnels of the router
- the list of clients connected to the PPTP or L2TP server of the router.

Network Statistics

On the **Statistics / 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, and volume of data received and transmitted (with increase of the volume the units of measurement are changed automatically: byte, Kbyte, Mbyte, Gbyte).

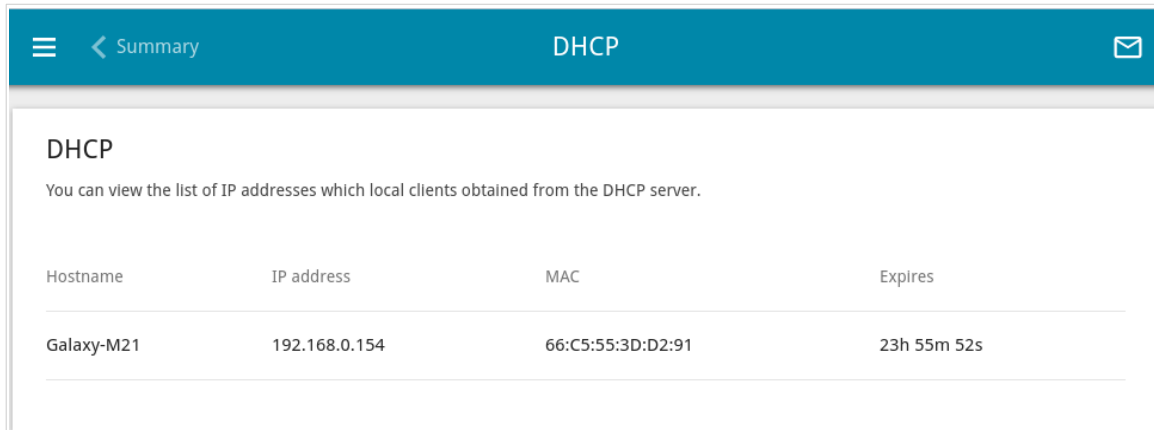
Name	IP - Gateway	Rx/Tx	Rx/Tx errors	Duration
LAN	IPv4: 192.168.8.254/24 --	775.27 Kbyte / 9.13 Mbyte	0 / 0	-
statip_81	IPv4: 192.168.161.189/24 - 192.168.161.1	34.51 Mbyte / 44.10 Mbyte	0 / 0	5 h., 35 min
DVG-XXX	-	168.81 Kbyte / -	0 / 0	-
DVG-XXX-5G	-	209.00 byte / -	0 / 0	-

Figure 56. The **Statistics / Network Statistics** page.

To view detailed data on a connection, click the line corresponding to this connection.

DHCP

The **Statistics / DHCP** page displays the information on devices that have been identified by hostnames and MAC addresses and have got IP addresses from the DHCP server of the router.



Hostname	IP address	MAC	Expires
Galaxy-M21	192.168.0.154	66:C5:55:3D:D2:91	23h 55m 52s

Figure 57. The **Statistics / DHCP** page.

Routing

The **Statistics / Routing** page displays the routing rules and routing tables.

The screenshot shows the 'Routing' configuration page. It features a teal header with a menu icon, a back arrow labeled 'Configuration', the title 'Routing', and an envelope icon. Below the header, there are two main sections: 'Rules' and 'Tables'.

Rules Table:

Table	Type	IP (Source/Destination)	Interfaces (Incoming/Outgoing)	Priority	ToS	FWmark (HEX)
group_1	IPv4	all / all	any / any	100	0	0x65
dhcp_1	IPv4	all / all	any / any	200	0	0x64
group_1	IPv4	all / all	LAN / any	300	0	0x0
main	IPv4	all / all	any / any	32766	0	0x0
group_1	IPv6	all / all	any / any	100	0	0x65
dhcp_1	IPv6	all / all	any / any	200	0	0x64
main	IPv6	all / all	any / any	32766	0	0x0

Tables Table:

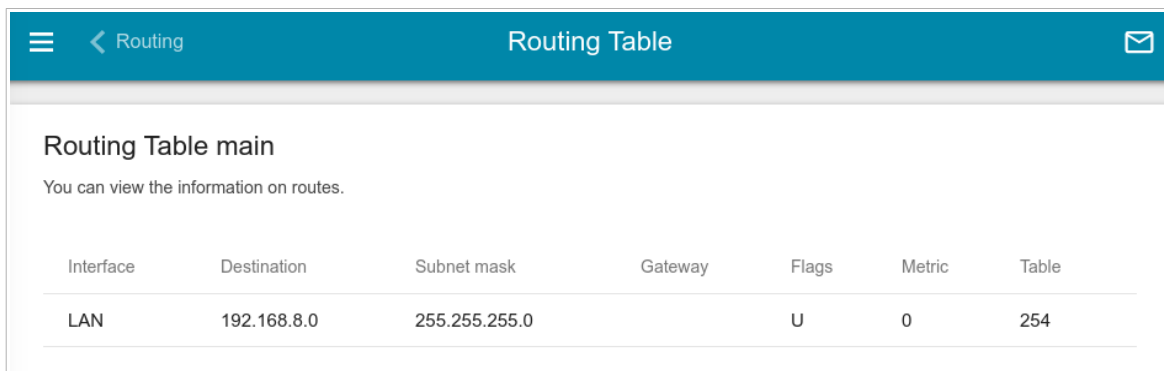
ID	Name	Description
254	main	Main routing table
1000	voip	Routing table for connections
256	dhcp_1	Routing table for connections
257	group_1	Routing table for groups

At the bottom of the page, there is an information icon and a note: "The group contains one or several WAN interfaces and LAN interface."

Figure 58. The **Statistics / Routing** page.

The **Rules** section displays routing rules, their corresponding routing tables, incoming and outgoing interfaces, priority levels, and other data.

The **Tables** section displays the list of routing tables stored in the device's memory. To view detailed information on routes, left-click the relevant line in the table.



The screenshot shows a web-based interface for configuring a router. The top navigation bar is teal and contains a menu icon, a back arrow labeled 'Routing', the page title 'Routing Table', and an envelope icon. Below the navigation bar, the main content area has a heading 'Routing Table main' and a sub-heading 'You can view the information on routes.' Below this is a table with the following data:

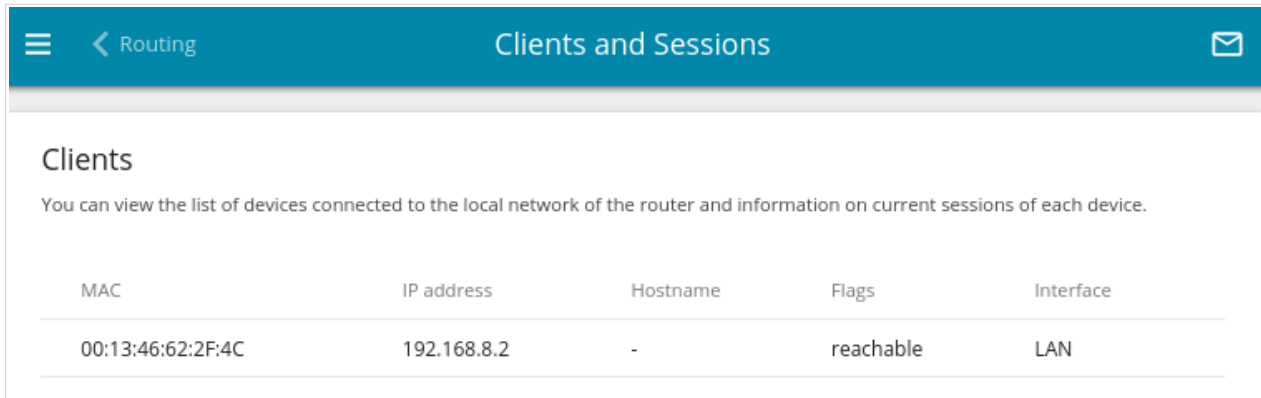
Interface	Destination	Subnet mask	Gateway	Flags	Metric	Table
LAN	192.168.8.0	255.255.255.0		U	0	254

Figure 59. The routing table page.

The opened page displays the information on routes in the selected routing table. The table contains destination IP addresses, gateways, subnet masks, and other data.

Clients and Sessions

On the **Statistics / Clients and Sessions** page, you can view the list of devices connected to the local network of the router and information on current sessions of each device.



The screenshot shows the 'Clients and Sessions' page. At the top, there is a navigation bar with a menu icon, a back arrow labeled 'Routing', the page title 'Clients and Sessions', and an envelope icon. Below the navigation bar, the section is titled 'Clients' with a subtitle: 'You can view the list of devices connected to the local network of the router and information on current sessions of each device.' Below this is a table with the following data:

MAC	IP address	Hostname	Flags	Interface
00:13:46:62:2F:4C	192.168.8.2	-	reachable	LAN

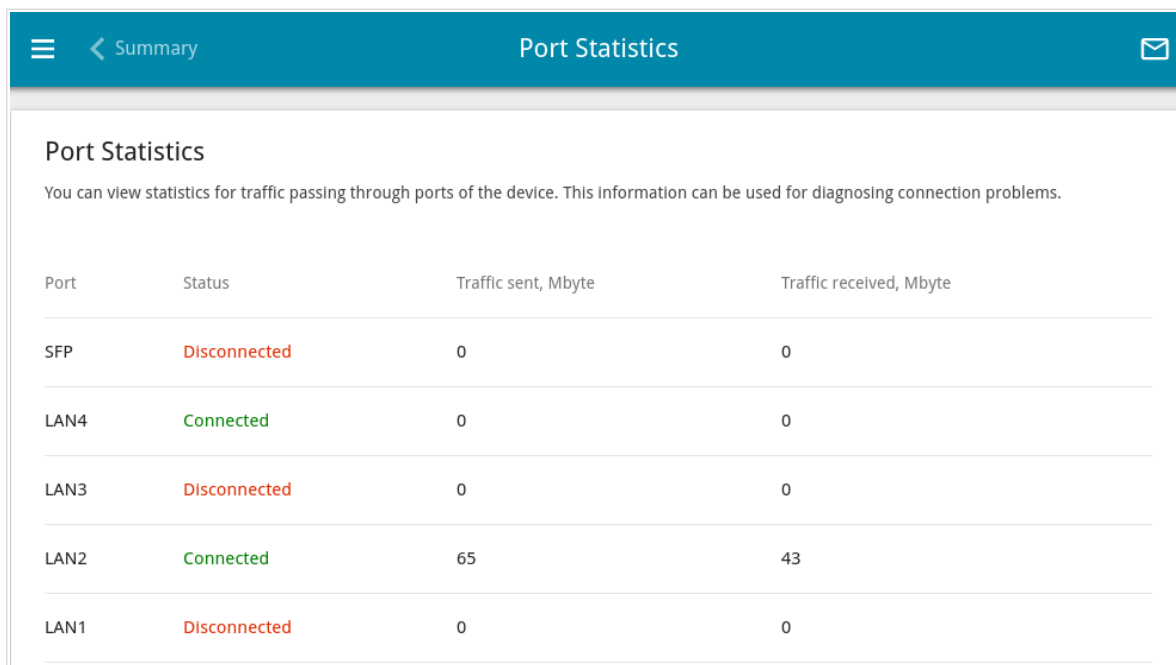
Figure 60. The **Statistics / Clients and Sessions** page.

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

To view the information on current sessions of a device, select this device in the table. On the opened page, the following data for each session of the selected device will be displayed: the protocol for network packet transmission, the source IP address and port, and the destination IP address and port.

Port Statistics

On the **Statistics / Port Statistics** page, you can view statistics for traffic passing through ports of the router. The information shown on the page can be used for diagnosing connection problems.



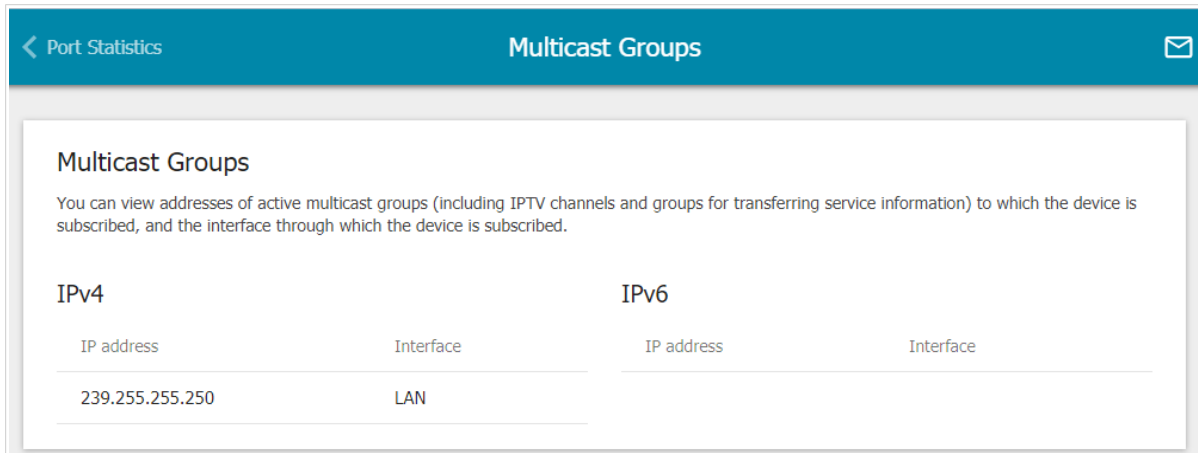
Port	Status	Traffic sent, Mbyte	Traffic received, Mbyte
SFP	Disconnected	0	0
LAN4	Connected	0	0
LAN3	Disconnected	0	0
LAN2	Connected	65	43
LAN1	Disconnected	0	0

Figure 61. The **Statistics / Port Statistics** page.

To view the full list of counters for a port, click the line corresponding to this port.

Multicast Groups

The **Statistics / 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.

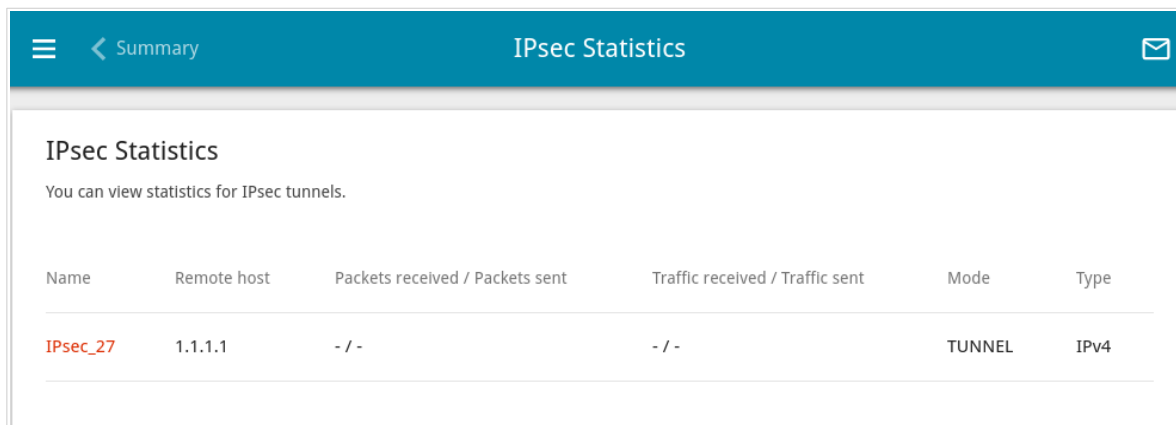


IPv4		IPv6	
IP address	Interface	IP address	Interface
239.255.255.250	LAN		

Figure 62. The **Statistics / Multicast Groups** page.

IPsec Statistics

On the **Statistics / IPsec Statistics** page, you can view statistics for IPsec tunnels of the router. For each tunnel 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), remote host address or domain name, connection type and mode, and number of packets and volume of data received and transmitted.



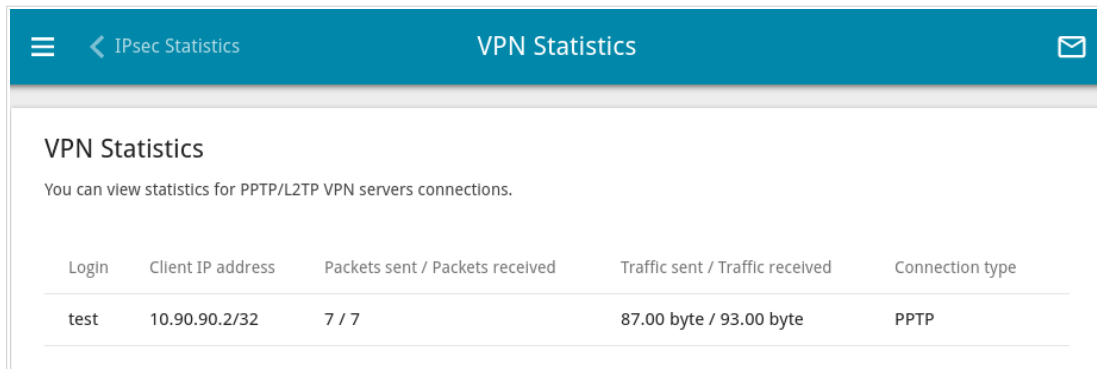
Name	Remote host	Packets received / Packets sent	Traffic received / Traffic sent	Mode	Type
IPsec_27	1.1.1.1	- / -	- / -	TUNNEL	IPv4

Figure 63. The **Statistics / IPsec Statistics** page.

To view detailed data on a tunnel, click the line corresponding to this tunnel.

VPN Statistics

On the **Statistics / VPN Statistics** page, you can view the list of clients connected to the PPTP or L2TP server of the router.



The screenshot shows a web interface for 'VPN Statistics'. The page has a teal header with a menu icon, a back arrow labeled 'IPsec Statistics', and the title 'VPN Statistics' with an envelope icon. Below the header, the page title 'VPN Statistics' is repeated, followed by a sub-header: 'You can view statistics for PPTP/L2TP VPN servers connections.' Below this is a table with the following data:

Login	Client IP address	Packets sent / Packets received	Traffic sent / Traffic received	Connection type
test	10.90.90.2/32	7 / 7	87.00 byte / 93.00 byte	PPTP

*Figure 64. The **Statistics / VPN Statistics** page.*

For each VPN client the following data are displayed: the unique IP address, username, connection type, and number of packets and volume of data received and transmitted.

To view detailed data on a connected VPN client, click the line corresponding to this client.

Connections Setup

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

By default, a **Dynamic IPv4** connection is configured in the system. It is assigned to the **SFP** port of the router.

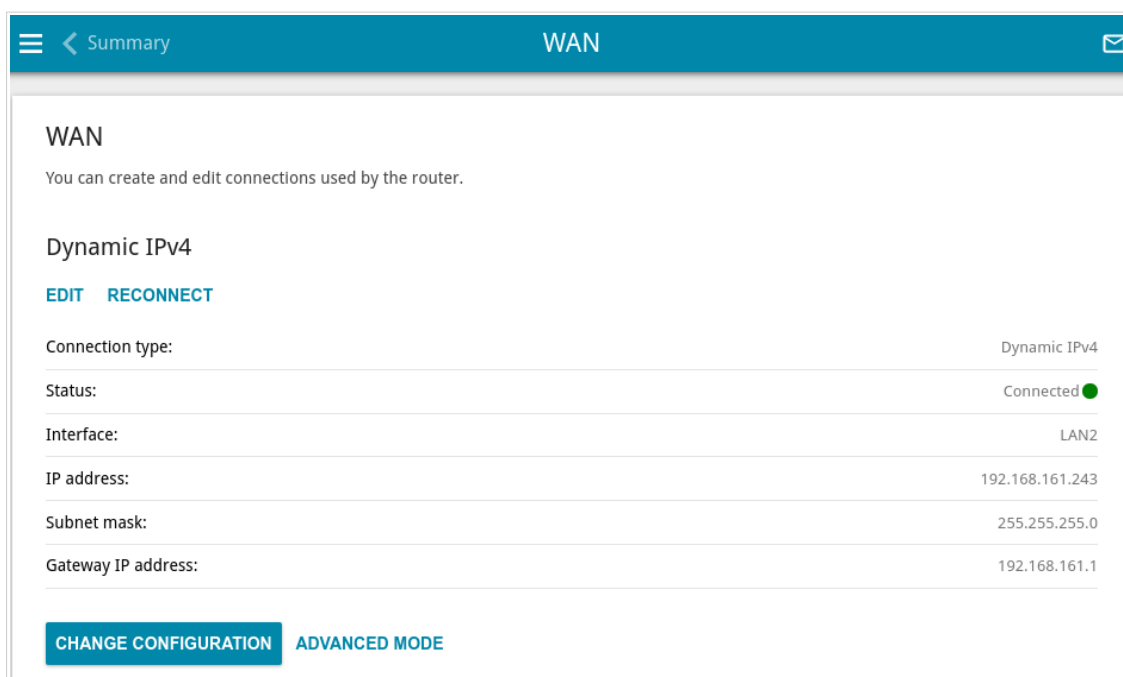


Figure 65. The **Connections Setup / WAN** page. The simplified mode.

To edit an existing connection, click the **EDIT** button. On the opened page, change the needed parameters and click the **APPLY** button.

To disconnect a connection and establish it again, click the **RECONNECT** button.

To remove an existing connection and create a new one, click the **CHANGE CONFIGURATION** button. Upon that the connection creation page opens.

To create several WAN connections, go to the advanced mode. To do this, click the **ADVANCED MODE** button.

! When connections of some types are created, the **Connections Setup / WAN** page is automatically displayed in the advanced mode.

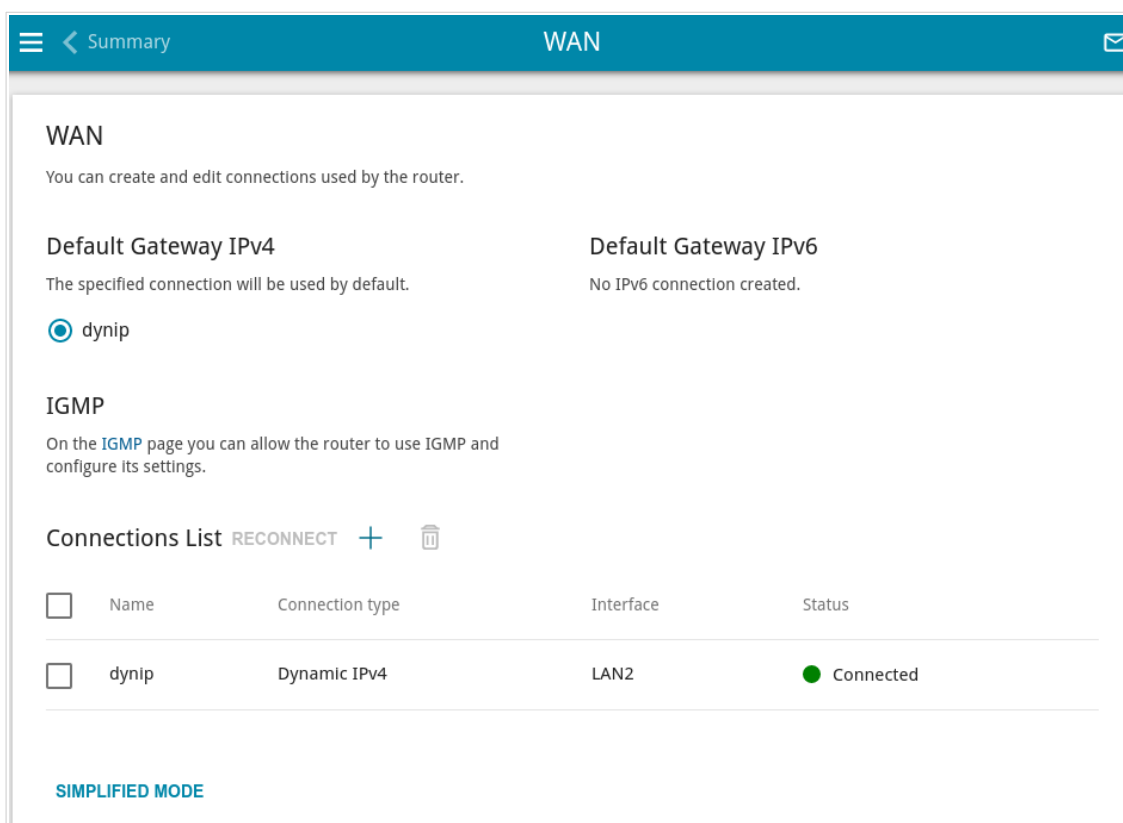


Figure 66. The **Connections Setup / WAN** page. The advanced mode.

To create a new connection, click the **ADD** button (**+**) in the **Connections List** section. Upon that the connection creation page opens.

To edit an existing connection, in the **Connections List** section, left-click the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To disconnect a connection and establish it again, select the checkbox located to the left of the relevant line in the table and click the **RECONNECT** button.

To remove a connection, in the **Connections List** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (**🗑**).

To allow multicast traffic (e.g. streaming video) for a connection, click the **IGMP** link (for the description of the page, see the **IGMP** section, page 246).

To use one of existing WAN connections as the default IPv4 or IPv6 connection, in the **Default Gateway** section, select the choice of the radio button which corresponds to this connection.

To return to the simplified mode, click the **SIMPLIFIED MODE** button (the button is unavailable if several WAN connections are created).

Creating Dynamic IPv4 or Static IPv4 WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

General Settings

Connection type
Static IPv4

Interface
LAN2

Connection name*
statiP_20

(i) The number of characters should not exceed 32

Enable connection

NAT

(i) The network address translation function. It is recommended not to disable unless your ISP requires it.

Ping

(i) WAN Ping Respond allows the device to respond to ping requests from the external network.

RIP

Figure 67. The page for creating a new **Static IPv4** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	A physical or virtual WAN interface to which the new connection will be assigned.
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NAT	If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	Move the switch to the right to allow using RIP for this connection.

Ethernet

MAC address*

EC:22:30:EC:4E:9C

Clone MAC address of your NIC
(00:13:46:62:2F:4C)

RESTORE DEFAULT MAC ADDRESS

MTU*

1500

Figure 68. The page for creating a new **Static IPv4** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>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.</p> <p>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, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

IPv4

IP address*

Subnet mask*

Gateway IP address*

Primary DNS*

Secondary DNS

ⓘ If the connection is created for the IPTV service only and no data on IP addressing is given by your ISP, then you can set the following values: IP address = 1.0.0.1, Netmask = 255.255.255.252, Gateway IP address = 1.0.0.2, Primary DNS server = 1.0.0.2

Figure 69. The page for creating a new **Static IPv4** connection. The **IPv4** section.

Parameter	Description
IPv4	
<i>For Static IPv4 type</i>	
IP address	Enter an IP address for this WAN connection.
Subnet mask	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 / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.
<i>For Dynamic IPv4 type</i>	
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of DNS server addresses. Upon that the Primary DNS and Secondary DNS fields are not available for editing.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.
Vendor ID	The identifier of your ISP. <i>Optional.</i>

Parameter	Description
Hostname	A name of the router specified by your ISP. <i>Optional.</i>

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

Creating Dynamic IPv6 or Static IPv6 WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

General Settings

Connection type
Static IPv6

Interface
LAN2

Connection name*
stativ6_86

The number of characters should not exceed 32

Enable connection

NATv6

The network address translation function. It is recommended not to disable unless your ISP requires it.

Ping

WAN Ping Respond allows the device to respond to ping requests from the external network.

Figure 70. The page for creating a new **Static IPv6** connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	A physical or virtual WAN interface to which the new connection will be assigned.
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NATv6	If the switch is moved to the right, the network address translation function for IPv6 is enabled. Do not disable the function unless your ISP requires this.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.

Ethernet

MAC address*
EC:22:30:EC:4E:9C

Clone MAC address of your NIC
(00:13:46:62:2F:4C)

RESTORE DEFAULT MAC ADDRESS

MTU*
1500

Figure 71. The page for creating a new **Static IPv6** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>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.</p> <p>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, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

IPv6

IPv6 address*

Prefix*

Gateway IPv6 address*

Primary IPv6 DNS server*

Secondary IPv6 DNS server

Figure 72. The page for creating a new **Static IPv6** connection. The **IPv6** section.

Parameter	Description
IPv6	
<i>For Static IPv6 type</i>	
IPv6 address	Enter an IPv6 address for this WAN connection.
Prefix	The length of the subnet prefix. The value 64 is used usually.
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.
<i>For Dynamic IPv6 type</i>	
Get IPv6	Select a method for IPv6 address assignment from the drop-down list or leave the Automatically value.

Parameter	Description
Enable prefix delegation	<p>From the drop-down list, select the mode of a prefix request from a delegating DHCPv6 server to configure a range of IPv6 addresses for the local network.</p> <ul style="list-style-type: none">• None: The mode without prefix request.• Auto: The mode with the ability to request a prefix. When this value is selected, the router requests a prefix from a DHCPv6 server. Upon that obtaining a prefix is not mandatory to establish the connection.• Force: The mode with forced prefix request. When this value is selected, the router requests a prefix from a DHCPv6 server. Upon that obtaining a prefix is mandatory to establish the connection.
Obtain DNS server addresses automatically	<p>Move the switch to the right to configure automatic assignment of IPv6 DNS server addresses. Upon that the Primary IPv6 DNS server and Secondary IPv6 DNS server fields are not available for editing.</p>
Primary IPv6 DNS server / Secondary IPv6 DNS server	<p>Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.</p>

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

Creating PPPoE WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of a web interface for creating a PPPoE connection. It includes the following fields and options:

- Connection type:** A dropdown menu with 'PPPoE' selected.
- Interface:** A dropdown menu with 'LAN2' selected.
- Connection name*:** A text input field containing 'pppoe_57'. Below it is an information icon with the text: 'The number of characters should not exceed 32'.
- Enable connection:** A toggle switch that is currently turned on (blue).
- NAT:** A toggle switch that is currently turned on (blue). Below it is an information icon with the text: 'The network address translation function. It is recommended not to disable unless your ISP requires it.'
- Ping:** A toggle switch that is currently turned off (grey).
- WAN Ping Respond:** A toggle switch that is currently turned off (grey). Below it is an information icon with the text: 'WAN Ping Respond allows the device to respond to ping requests from the external network.'
- RIP:** A toggle switch that is currently turned off (grey).

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

Parameter	Description
General Settings	
Interface	A physical or virtual WAN interface to which the new connection will be assigned.
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NAT	If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	Move the switch to the right to allow using RIP for this connection.

Ethernet

MAC address*
 EC:22:30:EC:4E:9C

Clone MAC address of your NIC
 (00:13:46:62:2F:4C)

RESTORE DEFAULT MAC ADDRESS

MTU*
 1500

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

Parameter	Description
Ethernet	
MAC address	<p>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.</p> <p>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, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

PPP

Without authorization

Username*

Password* 🔍

Service name

MTU*

1492

Encryption protocol

No encryption ▼

Authentication protocol

AUTO ▼

Keep Alive

LCP interval*

30

LCP fails*

3

Dial on demand

Maximum idle time (in seconds) 🔒

Static IP address

PPP debug

Figure 75. The page for creating a new **PPPoE** connection. The **PPP** section.

Parameter	Description
PPP	
Without authorization	Move the switch to the right if you don't need to enter a username and password to access the Internet.
Username	A username (login) to access the Internet.
Password	A password to access the Internet. Click the Show icon (🔍) to display the entered password.
Service name	The name of the PPPoE authentication server.
MTU	The maximum size of units transmitted by the interface.

Parameter	Description
Encryption protocol	<p>Select a method of MPPE encryption.</p> <ul style="list-style-type: none"> • No encryption: 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. <p>MPPE encryption can be applied only if the MS-CHAP, MS-CHAPv2, or AUTO value is selected from the Authentication protocol drop-down list.</p>
Authentication protocol	<p>Select a required authentication method from the drop-down list or leave the AUTO value.</p>
Keep Alive	<p>If the switch is moved to the right, the router sends echo requests in order to check the connection state. After several consecutive unanswered requests the router restarts the PPP connection. If needed, change the interval (in seconds) between requests and the number of unanswered requests in the LCP interval and LCP fails fields correspondingly or leave the default values.</p>
Dial on demand	<p>Move the switch to the right 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.</p>
Static IP address	<p>Fill in the field if you want to use a static IP address to access the Internet.</p>
PPP debug	<p>Move the switch to the right if you want to log all data on this PPP connection debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the Log section, page 329).</p>

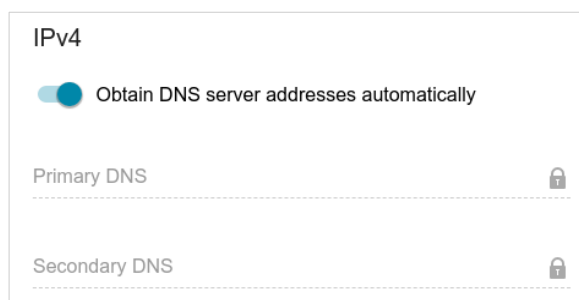


Figure 76. The page for creating a new **PPPoE** connection. The **IPv4** section.

Parameter	Description
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of DNS server addresses. Upon that the Primary DNS and Secondary DNS fields are not available for editing.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.

When all needed settings are configured, click the **APPLY** button. In the simplified mode, after clicking the button, the window for creating an additional connection opens.

If your ISP offers access to local services (e.g. audio and video resources), click the **CREATE CONNECTION** button. On the page displayed, specify the parameters for the connection of the **Dynamic IPv4** or **Static IPv4** type and click the **APPLY** button.

If you do not need to create an additional connection, click the **SKIP** button. In this case, the **Connections Setup / WAN** page opens.

Creating PPTP, L2TP, L2TP Dual Stack, or L2TP over IPsec WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of a web interface. At the top, 'Connection type' is a dropdown menu set to 'PPTP'. Below it, 'Connection name*' is a text input field containing 'pptp_81'. A small information icon and text note below the name field state: 'The number of characters should not exceed 32'. There are three toggle switches: 'Enable connection' (checked), 'NAT' (checked), and 'Ping' (unchecked). Below the 'NAT' toggle, another information icon and text note state: 'The network address translation function. It is recommended not to disable unless your ISP requires it.' Below the 'Ping' toggle, a final information icon and text note state: 'WAN Ping Respond allows the device to respond to ping requests from the external network.'

Figure 77. The page for creating a new **PPTP** connection. The **General Settings** section.

Parameter	Description
General Settings	
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NAT	If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.
NATv6	<i>For the L2TP Dual Stack type only.</i> If the switch is moved to the right, the network address translation function for IPv6 is enabled. Do not disable the function unless your ISP requires this.
Ping	<i>For the PPTP, L2TP, and L2TP Dual Stack types only.</i> If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.

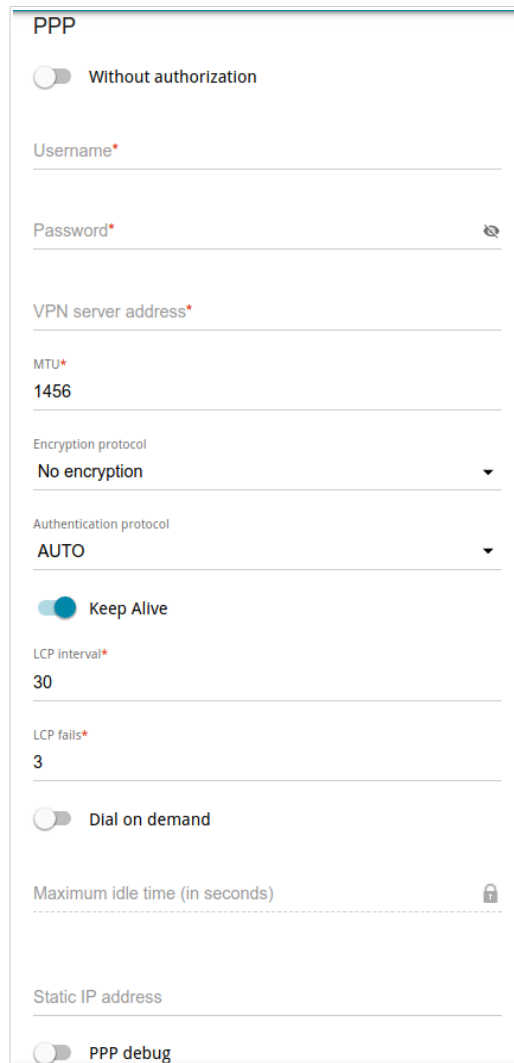


Figure 78. The page for creating a new PPTP connection. The PPP section.

Parameter	Description
PPP	
Without authorization	Move the switch to the right if you don't need to enter a username and password to access the Internet.
Username	A username (login) to access the Internet.
Password	A password to access the Internet. Click the Show icon (🔍) to display the entered password.
VPN server address	The IP or URL address of the PPTP or L2TP authentication server.
MTU	The maximum size of units transmitted by the interface.

Parameter	Description
<p>Encryption protocol</p>	<p>Select a method of MPPE encryption.</p> <ul style="list-style-type: none"> • No encryption: 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. <p>MPPE encryption can be applied only if the MS-CHAP, MS-CHAPv2, or AUTO value is selected from the Authentication protocol drop-down list.</p>
<p>Authentication protocol</p>	<p>Select a required authentication method from the drop-down list or leave the AUTO value.</p>
<p>Keep Alive</p>	<p>If the switch is moved to the right, the router sends echo requests in order to check the connection state. After several consecutive unanswered requests the router restarts the PPP connection. If needed, change the interval (in seconds) between requests and the number of unanswered requests in the LCP interval and LCP fails fields correspondingly or leave the default values.</p>
<p>Dial on demand</p>	<p><i>For the PPTP, L2TP, and L2TP over IPsec types only.</i></p> <p>Move the switch to the right 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.</p>
<p>Static IP address</p>	<p>Fill in the field if you want to use a static IP address to access the Internet.</p>
<p>PPP debug</p>	<p>Move the switch to the right if you want to log all data on this PPP connection debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the Log section, page 329).</p>

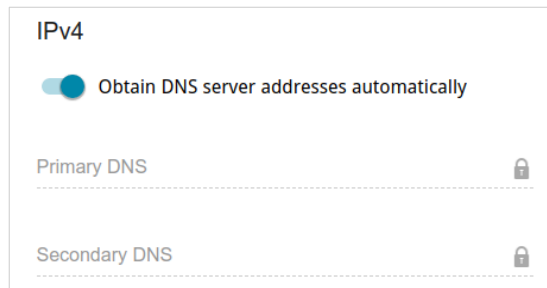


Figure 79. The page for creating a new **PPTP** connection. The **IPv4** section.

Parameter	Description
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of DNS server addresses. Upon that the Primary DNS and Secondary DNS fields are not available for editing.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.

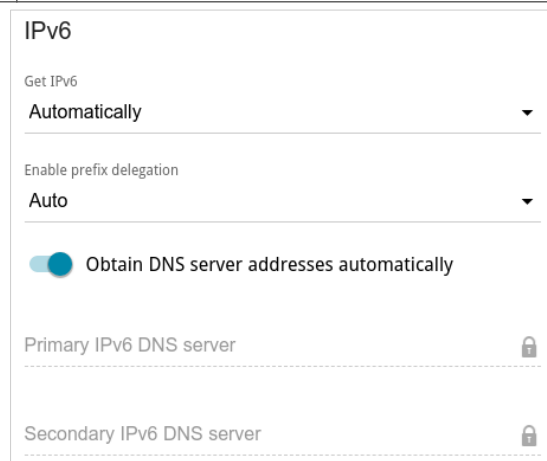


Figure 80. The page for creating a new **L2TP Dual Stack** connection. The **IPv6** section.

Parameter	Description
IPv6 (for the L2TP Dual Stack type)	
Get IPv6	Select a method for IPv6 address assignment from the drop-down list or leave the Automatically value.

Parameter	Description
<p>Enable prefix delegation</p>	<p>From the drop-down list, select the mode of a prefix request from a delegating DHCPv6 server to configure a range of IPv6 addresses for the local network.</p> <ul style="list-style-type: none"> • None: The mode without prefix request. • Auto: The mode with the ability to request a prefix. When this value is selected, the router requests a prefix from a DHCPv6 server. Upon that obtaining a prefix is not mandatory to establish the connection. • Force: The mode with forced prefix request. When this value is selected, the router requests a prefix from a DHCPv6 server. Upon that obtaining a prefix is mandatory to establish the connection.
<p>Obtain DNS server addresses automatically</p>	<p>Move the switch to the right to configure automatic assignment of IPv6 DNS server addresses. Upon that the Primary IPv6 DNS server and Secondary IPv6 DNS server fields are not available for editing.</p>
<p>Primary IPv6 DNS server / Secondary IPv6 DNS server</p>	<p>Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.</p>

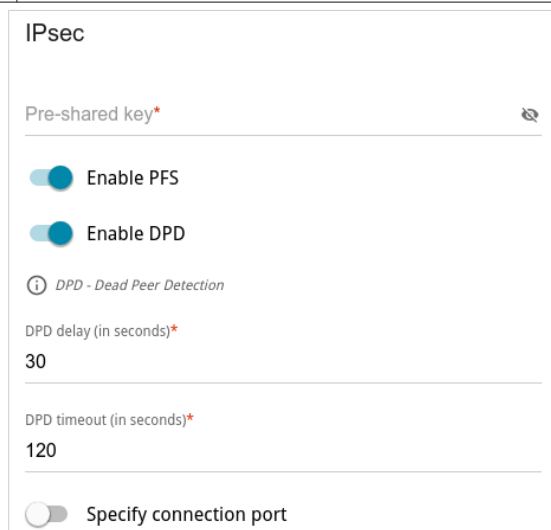


Figure 81. The page for creating a new **L2TP over IPsec** connection. The **IPsec** section.



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

Parameter	Description
IPsec (for the L2TP over IPsec type)	
Pre-shared key	A key for mutual authentication of the parties. Click the Show icon (🔍) to display the entered key.
Enable PFS	Move the switch to the right to enable the PFS option (<i>Perfect Forward Secrecy</i>). If the switch is moved to the right, a new encryption key exchange will be used upon establishing the IPsec tunnel. This option enhances the security level of data transfer, but increases the load on DVG-5402G/GF.
Enable DPD	Move the switch to the right to enable using DPD protocol for this tunnel. Such a setting allows to check the status of the 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 switch is moved to to the left, the DPD delay and DPD timeout fields are not available for editing.
DPD delay	A time period (in seconds) between DPD messages. By default, the value 30 is specified.
DPD timeout	A waiting period for the response to a DPD message (in seconds). If the host does not answer in the specified time, the router breaks down the tunnel connection, updates information on it, and tries to reestablish the connection. By default, the value 120 is specified.
Specify connection port	Move the switch to the right to change the port used for data exchange with the other party enter the needed value in the Port field displayed. By default, the value 1701 is specified.

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

After clicking the button, the window for additional configuration of the connection opens.

If you want to use this WAN connection to access the Internet, select the **to the Internet** choice of the radio button. Then select an existing connection which will be used to access the PPTP/L2TP server and click the **CONTINUE** button; or select the **create a new connection** choice of the radio button and click the **CREATE CONNECTION** button.

If you have already configured the connection to the Internet and you want to use this WAN connection only to connect to the virtual private network, select the **to the virtual private network** choice of the radio button and click the **CONTINUE** button.

After creating a connection of the **L2TP over IPsec** type, on the **VPN / IPsec** page, in the **Status** section, the current state of the IPsec tunnel is displayed.

Creating PPPoE IPv6 or PPPoE Dual Stack WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

General Settings

Connection type
 PPPoE IPv6 ▼

Interface
 LAN2 ▼

Connection name*
 pppoev6_7

(i) The number of characters should not exceed 32

Enable connection

NATv6

You can't use prefix delegation and NATv6 simultaneously

(i) The network address translation function. It is recommended not to disable unless your ISP requires it.

Ping

(i) WAN Ping Respond allows the device to respond to ping requests from the external network.

Figure 82. The page for creating a new PPPoE IPv6 connection. The **General Settings** section.

Parameter	Description
General Settings	
Interface	A physical or virtual WAN interface to which the new connection will be assigned.
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NAT	<i>For the PPPoE Dual Stack type only.</i> If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.

Parameter	Description
NATv6	If the switch is moved to the right, the network address translation function for IPv6 is enabled. Do not disable the function unless your ISP requires this.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
RIP	<i>For the PPPoE Dual Stack type only.</i> Move the switch to the right to allow using RIP for this connection.

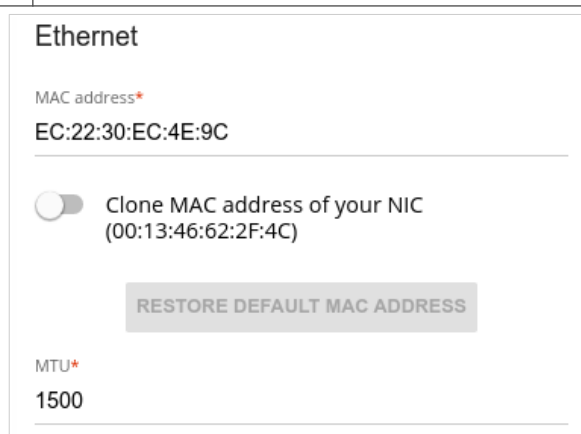


Figure 83. The page for creating a new **PPPoE IPv6** connection. The **Ethernet** section.

Parameter	Description
Ethernet	
MAC address	<p>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.</p> <p>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, move the Clone MAC address of your NIC switch to the right. When the switch is moved to the right, the field is unavailable for editing.</p> <p>To set the router's MAC address, click the RESTORE DEFAULT MAC ADDRESS button (the button is available when the switch is moved to the right).</p>
MTU	The maximum size of units transmitted by the interface.

PPP

Without authorization

Username*

Password* 🔍

Service name

MTU*

1492

Encryption protocol

No encryption ▼

Authentication protocol

AUTO ▼

Keep Alive

LCP interval*

30

LCP fails*

3

Static IP address

PPP debug

Figure 84. The page for creating a new **PPPoE IPv6** connection. The **PPP** section.

Parameter	Description
PPP	
Without authorization	Move the switch to the right if you don't need to enter a username and password to access the Internet.
Username	A username (login) to access the Internet.
Password	A password to access the Internet. Click the Show icon (🔍) to display the entered password.
Service name	The name of the PPPoE authentication server.
MTU	The maximum size of units transmitted by the interface.

Parameter	Description
Encryption protocol	<p>Select a method of MPPE encryption.</p> <ul style="list-style-type: none"> • No encryption: 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. <p>MPPE encryption can be applied only if the MS-CHAP, MS-CHAPv2, or AUTO value is selected from the Authentication protocol drop-down list.</p>
Authentication protocol	<p>Select a required authentication method from the drop-down list or leave the AUTO value.</p>
Keep Alive	<p>If the switch is moved to the right, the router sends echo requests in order to check the connection state. After several consecutive unanswered requests the router restarts the PPP connection. If needed, change the interval (in seconds) between requests and the number of unanswered requests in the LCP interval and LCP fails fields correspondingly or leave the default values.</p>
Static IP address	<p>Fill in the field if you want to use a static IP address to access the Internet.</p>
PPP debug	<p>Move the switch to the right if you want to log all data on this PPP connection debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the <i>Log</i> section, page 329).</p>

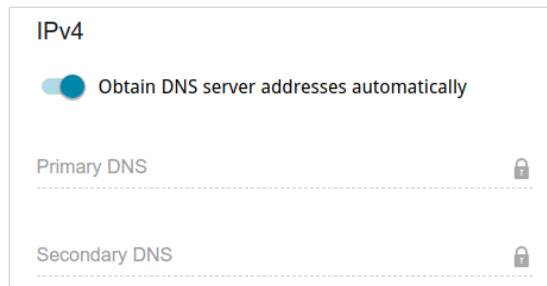


Figure 85. The page for creating a new PPPoE Dual Stack connection. The IPv4 section.

Parameter	Description
IPv4 (for the PPPoE Dual Stack type)	
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of DNS server addresses. Upon that the Primary DNS and Secondary DNS fields are not available for editing.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.

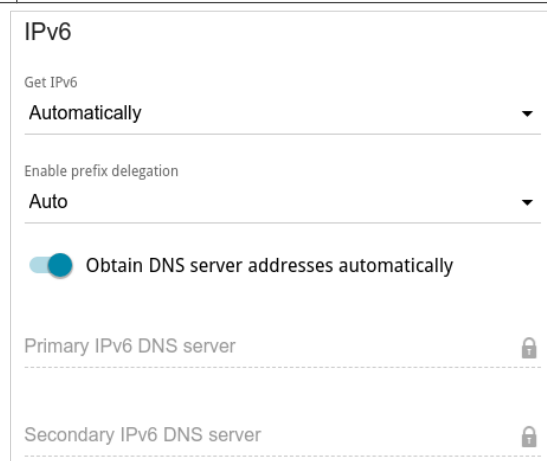


Figure 86. The page for creating a new PPPoE Pv6 connection. The IPv6 section.

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

Parameter	Description
Enable prefix delegation	<p>From the drop-down list, select the mode of a prefix request from a delegating DHCPv6 server to configure a range of IPv6 addresses for the local network.</p> <ul style="list-style-type: none">• None: The mode without prefix request.• Auto: The mode with the ability to request a prefix. When this value is selected, the router requests a prefix from a DHCPv6 server. Upon that obtaining a prefix is not mandatory to establish the connection.• Force: The mode with forced prefix request. When this value is selected, the router requests a prefix from a DHCPv6 server. Upon that obtaining a prefix is mandatory to establish the connection.
Obtain DNS server addresses automatically	<p>Move the switch to the right to configure automatic assignment of IPv6 DNS server addresses. Upon that the Primary IPv6 DNS server and Secondary IPv6 DNS server fields are not available for editing.</p>
Primary IPv6 DNS server / Secondary IPv6 DNS server	<p>Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.</p>

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

Creating Mobile Internet WAN Connection

If the PIN code check is enabled for the SIM card inserted into your USB modem, for correct operation of the mobile WAN connection click the **ENTER PIN** button in the notification in the top right corner of the page and enter the PIN code¹⁰ in the window displayed. Then on the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

General Settings

Connection type
Mobile Internet

Connection name*
mobileinet_38

The number of characters should not exceed 32

Enable connection

Use as interface

This option allows creating a network interface to connect clients to the modem through a transparent bridge. Attention! Only clients connected to the interfaces which are included into this transparent bridge will have access to the Internet. For further configuration, please go to the VLAN page

NAT

The network address translation function. It is recommended not to disable unless your ISP requires it.

Ping

WAN Ping Respond allows the device to respond to ping requests from the external network.

Figure 87. The page for creating a new **Mobile Internet** connection. The **General Settings** section.

Parameter	Description
General Settings	
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
Use as interface	Move the switch to the right in order to create a network interface for this connection, for example, to combine several interfaces into a transparent connection.

¹⁰ Some models of USB modems do not support disabling the PIN code check on the SIM card through the web-based interface of the router.

Parameter	Description
NAT	<p>If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.</p> <p>The switch is displayed when the IPv4 or Dual value is selected from the Type drop-down list in the Modem Settings section.</p>
NATv6	<p>If the switch is moved to the right, the network address translation function for IPv6 is enabled. Do not disable the function unless your ISP requires this.</p> <p>The switch is displayed when the IPv6 or Dual value is selected from the Type drop-down list in the Modem Settings section.</p>
Ping	<p>If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.</p>

Modem Settings

MODEM/SIM CARD SELECTION

Mode
Auto ▼

APN

Dial number
*99#

Without authorization

Authentication protocol
PAP 🔒

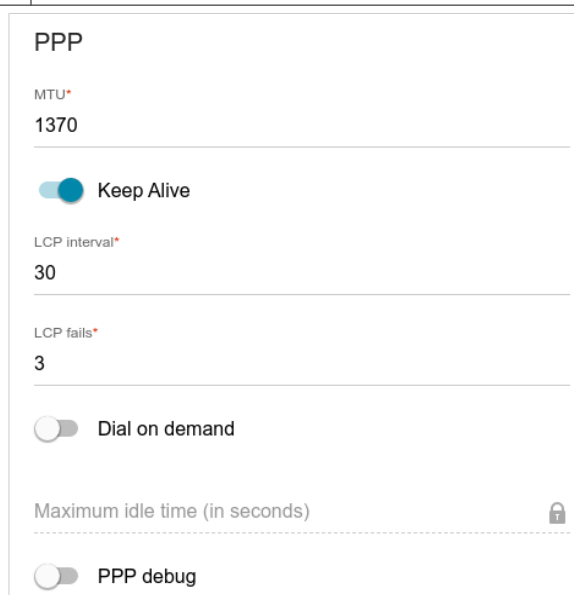
Username 🔒

Password 🔒

Type
IPv4 ▼

Figure 88. The page for creating a new **Mobile Internet** connection. The **Modem Settings** section.

Parameter	Description
Modem Settings	
MODEM/SIM CARD SELECTION	Click the button in order to assign the connection to one of connected USB modems. ¹¹
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.
APN	An access point name.
Dial number	A number dialed to connect to the authorization server of the operator.
Without authorization	Move the switch to the right if your operator does not require authorization.
Authentication protocol	Select a required authentication method from the drop-down list.
Username	A username (login) to connect to the network of the operator.
Password	A password to connect to the network of the operator. Click the Show icon (👁) to display the entered password.
Type	An IP version which will be used by this connection. Select the IPv4 , IPv6 , or Dual value from the drop-down list.



PPP


MTU*
1370

Keep Alive

LCP interval*
30

LCP fails*
3

Dial on demand

Maximum idle time (in seconds) 

PPP debug

Figure 89. The page for creating a new **Mobile Internet** connection. The **PPP** section.

¹¹ When several devices are connected to one USB port of the router, it is recommended to use a self-powered USB hub.

Parameter	Description
PPP	
MTU	The maximum size of units transmitted by the interface.
Keep Alive	If the switch is moved to the right, the router sends echo requests in order to check the connection state. After several consecutive unanswered requests the router restarts the PPP connection. If needed, change the interval (in seconds) between requests and the number of unanswered requests in the LCP interval and LCP fails fields correspondingly or leave the default values.
Dial on demand	Move the switch to the right 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	Move the switch to the right if you want to log all data on this PPP connection debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the <i>Log</i> section, page 329).

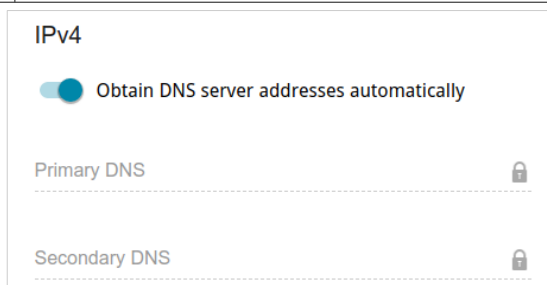



Figure 90. The page for creating a new **Mobile Internet** connection. The **IPv4** section.

Parameter	Description
IPv4 (for the <i>Dual</i> and <i>IPv4</i> types)	
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of DNS server addresses. Upon that the Primary DNS and Secondary DNS fields are not available for editing.
Primary DNS / Secondary DNS	Enter addresses of the primary and secondary DNS servers in the relevant fields.

Figure 91. The page for creating a new **Mobile Internet** connection. The **IPv6** section.

Parameter	Description
IPv6 (for the <i>Dual</i> and <i>IPv6</i> types)	
Obtain DNS server addresses automatically	Move the switch to the right to configure automatic assignment of IPv6 DNS server addresses. Upon that the Primary IPv6 DNS server and Secondary IPv6 DNS server fields are not available for editing.
Primary IPv6 DNS server / Secondary IPv6 DNS server	Enter addresses of the primary and secondary IPv6 DNS servers in the relevant fields.

Figure 92. The page for creating a new **Mobile Internet** connection. The **Health Check** section.

Parameter	Description
Health Check	
Enable	Move the switch to the right to check the connection health using the ICMP ping mechanism.
The maximum number of attempts	A number of requests to check the health of the connection. By default, the value 10 is specified. Several ping requests are sent to check the hosts. After several failed attempts the connection status is changed until a successful attempt is made.
Timeout	A time period (in seconds) allocated for a respond to one ping request. By default, the value 3 is specified.
Connection restart	Move the switch to the right to reestablish connection if the maximum number of ping requests fails.
Addresses	IP addresses from the external network that the router will check for availability via ICMP ping mechanism. By default, the router checks the IP address 8.8.8.8. Click the ADD button, and in the line displayed, enter an IP address or leave value suggested by the router. You can add several addresses. To remove an IP address from the list, click the Delete button () in the line of the address.
Modem IP address verification	Move the switch to the right to let the router request the actual IP address from the modem in case modem's IP address changes before expiration of the previous one.

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

Creating IPIP6 WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of a web interface. At the top, the title is 'General Settings'. Below it, there is a 'Connection type' dropdown menu currently set to 'IPIP6'. Underneath is a 'Connection name*' field containing the text 'ipipv6_67'. A small information icon (i) is next to the name field with the text 'The number of characters should not exceed 32'. Below the name field are three toggle switches: 'Enable connection' (which is turned on), 'NAT' (which is turned off), and 'Ping' (which is turned off). Each toggle switch has a corresponding information icon (i) with a note: 'The network address translation function. It is recommended not to disable unless your ISP requires it.' for NAT, and 'WAN Ping Respond allows the device to respond to ping requests from the external network.' for Ping.

Figure 93. The page for creating a new IPIP6 connection. The **General Settings** section.

Parameter	Description
General Settings	
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
NAT	If the switch is moved to the right, the network address translation function for IPv4 is enabled. Do not disable the function unless your ISP requires this.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.

Figure 94. The page for creating a new **IPIP6** connection. The **IP** section.

Parameter	Description
IP	
Obtain remote host address automatically	Move the switch to the right to configure automatic assignment of a remote host IPv6 address.
Type	Select an identification method for the remote host from the drop-down list: <ul style="list-style-type: none"> • Address: The remote host is identified by its IPv6 address. • FQDN: The remote host is identified by its domain name. The drop-down list is displayed if the Obtain remote host address automatically switch is moved to the left.
Remote host	Enter the remote host IPv6 address if the Address value is selected from the Type drop-down list. Enter the remote host domain name if the FQDN value is selected from the Type drop-down list. The field is available for editing, if the Obtain remote host address automatically switch is moved to the left.
Mode	An operation mode of the connection. From the drop-down list, select the DSLite value.
Set MTU automatically	Move the switch to the right to set the maximum size of units transmitted by the interface automatically. Move the switch to the left to specify this parameter manually. Upon that the MTU field is displayed.
MTU	The maximum size of units transmitted by the interface.

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

After clicking the button, the window for additional configuration of the connection opens.

If you want to use this WAN connection to access the Internet, select the **to the Internet** choice of the radio button. Then select an existing connection which will be used to access the VPN server or select the **create a new connection** choice of the radio button and click the **CONTINUE** button.

If you have already configured the connection to the Internet and you want to use this WAN connection only to connect to the virtual private network, select the **to the virtual private network** choice of the radio button. Then select an existing connection which will be used to access the VPN server or select the **create a new connection** choice of the radio button and click the **CONTINUE** button.

Creating 6in4 WAN Connection

! Before configuring the connection, please first register on a tunnel broker's web site.

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section of the web interface. It includes a 'Connection type' dropdown menu set to '6in4'. Below it is a 'Connection name*' field with the value '6in4_69' and a note: 'The number of characters should not exceed 32'. There are three toggle switches: 'Enable connection' (checked), 'Ping' (unchecked), and 'Set MTU automatically' (checked). On the right side, there are four text input fields: 'Remote host*', 'Client IPv6 address*', 'Server IPv6 address*', and 'Routed IPv6 network*'. Each of these fields has a corresponding informational icon and text: 'Enter the server and client IPv6 addresses received from the tunnel broker without specifying the prefix length (for example, 2001:0DB8::1)' for the Client and Server fields, and 'Enter the IPv6 subnet which will be routed through the connection of 6in4 type without specifying the prefix length (for example, 2001:0DB8::)' for the Routed IPv6 network field.

Figure 95. The page for creating a new **6in4** connection.

Parameter	Description
General Settings	
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
Remote host	Enter the IPv4 address of the server provided by the tunnel broker.
Client IPv6 address	Enter the IPv6 address of the router provided by the tunnel broker (without specifying the prefix length).
Server IPv6 address	Enter the IPv6 address of the server provided by the tunnel broker (without specifying the prefix length).
Routed IPv6 network	Enter the address of the routed IPv6 subnet (without specifying the prefix length) provided by the tunnel broker.

Parameter	Description
Set MTU automatically	Move the switch to the right to set the maximum size of units transmitted by the interface automatically. Move the switch to the left to specify this parameter manually. Upon that the MTU field is displayed.
MTU	The maximum size of units transmitted by the interface.

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

After clicking the button, the window for additional configuration of the connection opens.

To use this WAN connection to access the Internet, select the **to the Internet** choice of the radio button. Then select an existing connection which will be used to access the server or select the **create a new connection** choice of the radio button and click the **CONTINUE** button.

Creating 6to4 WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' configuration page for a 6to4 Relay Router. The IP address is 192.88.99.1. The 'Connection type' is set to '6to4'. The 'Set MTU automatically' toggle is turned on. The 'Connection name' is '6to4_91'. The 'Enable connection' toggle is turned on, and the 'Ping' toggle is turned off. A note states: 'WAN Ping Respond allows the device to respond to ping requests from the external network.'

Figure 96. The page for creating a new **6to4** connection.

Parameter	Description
General Settings	
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
6to4 Relay Router	The IPv4 address of the gateway which is used to transfer IPv6 packets.
Set MTU automatically	Move the switch to the right to set the maximum size of units transmitted by the interface automatically. Move the switch to the left to specify this parameter manually. Upon that the MTU field is displayed.
MTU	The maximum size of units transmitted by the interface.

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

After clicking the button, the window for additional configuration of the connection opens.

To use this WAN connection to access the Internet, select the **to the Internet** choice of the radio button. Then select an existing connection which will be used to access the server or select the **create a new connection** choice of the radio button and click the **CONTINUE** button.

Creating 6rd WAN Connection

On the connection creation page, in the **General Settings** section, select the relevant value from the **Connection type** drop-down list and specify the needed values.

The screenshot shows the 'General Settings' section for a new 6rd connection. The 'Connection type' is set to '6rd', which has locked the '6rd IPv6 prefix', '6rd IPv6 prefix length', and 'IPv4 mask length' fields. The 'Obtain 6rd settings automatically' toggle is turned on. The 'Connection name' is '6rd_56'. The 'Enable connection' toggle is turned on, and the 'Ping' toggle is turned off. The 'Hub and spoke' toggle is turned off, and the 'Set MTU automatically' toggle is turned on.

Figure 97. The page for creating a new **6rd** connection.

Parameter	Description
General Settings	
Connection name	A name for the connection for easier identification.
Enable connection	Move the switch to the right to enable the connection. Move the switch to the left to disable the connection.
Ping	If the switch is moved to the right, the router responds to ping requests from the external network through this connection. For security reasons, it is recommended to disable this function.
Obtain 6rd settings automatically	Move the switch to the right to let the router obtain 6rd domain settings automatically from the LAN DHCP server or from a delegating router. Upon that the 6rd Border Relay , 6rd IPv6 prefix , 6rd IPv6 prefix length , and IPv4 mask length fields are not available for editing.
6rd Border Relay	Enter the IPv4 address of the router provided by your ISP for the 6rd domain.
6rd IPv6 prefix	The IPv6 prefix for the 6rd domain provided by your ISP.

Parameter	Description
6rd IPv6 prefix length	The IPv6 prefix length for the 6rd domain (in bits) allocated by your ISP. By default, the value 32 is specified.
IPv4 mask length	The number of bits in the IPv4 address of the router in the 6rd domain.
Hub and spoke	Move the switch to the right to exchange traffic between clients through the main host of the network in the 6rd domain. Move the switch to the left to exchange traffic between clients without the main host of the network.
Set MTU automatically	Move the switch to the right to set the maximum size of units transmitted by the interface automatically. Move the switch to the left to specify this parameter manually. Upon that the MTU field is displayed.
MTU	The maximum size of units transmitted by the interface.

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

After clicking the button, the window for additional configuration of the connection opens.

To use this WAN connection to access the Internet, select the **to the Internet** choice of the radio button. Then select an existing connection which will be used to access the server or select the **create a new connection** choice of the radio button and click the **CONTINUE** button.

LAN

To configure the router's local interface, go to the **Connections Setup / LAN** page.

IPv4

Go to the **IPv4** tab to change the IPv4 address of the router, configure the built-in DHCP server, specify MAC address and IPv4 address pairs, or add own DNS records.

Local IP Address

IP address*

192.168.8.254

Mask*

255.255.255.0


Hostname

dlinkrouter.local

i Specify a domain name ending with .local. In order to access the web-based interface using the domain name, enter this name with a dot and slash at the end in the address bar of the web browser (for example, dlinkrouter.local/.)

Figure 98. Configuring the local interface. The IPv4 tab. The Local IP Address section.

Parameter	Description
Local IP Address	
Mode of local IP address assignment	<p>Available if the Access point, Repeater, or Client mode was selected in the <i>Initial Configuration Wizard</i>.</p> <p>Select the needed value from the drop-down list.</p> <ul style="list-style-type: none"> • Static: The IPv4 address, subnet mask, and the gateway IP address are assigned manually. • Dynamic: The router automatically obtains these parameters from the LAN DHCP server or from the router to which it connects. When this value is selected, the controls of the Dynamic IP Addresses section are not available. Also when this value is selected, the Obtain DNS server addresses automatically switch is displayed on the tab.

Parameter	Description
IP address	The IPv4 address of the router in the local subnet. By default, the following value is specified: 192.168.8.254 .
Mask	The mask of the local subnet. By default, the following value is specified: 255.255.255.0 .
Gateway IP address	<p><i>Available if the Access point, Repeater, or Client mode was selected in the Initial Configuration Wizard.</i></p> <p>The gateway IPv4 address which is used by the router to connect to the Internet (e.g., for synchronizing the system time with an NTP server). <i>Optional.</i></p>
Hostname	The name of the device assigned to its IPv4 address in the local subnet.
Obtain DNS server addresses automatically	<p><i>Available if the Access point, Repeater, or Client mode was selected in the Initial Configuration Wizard.</i></p> <p>Move the switch to the right to configure automatic assignment of DNS server IPv4 addresses. Upon that the DNS IP address field is not available for editing.</p>
DNS IP address	<p><i>Available if the Access point, Repeater, or Client mode was selected in the Initial Configuration Wizard.</i></p> <p>If needed, specify a DNS server IPv4 address for the selected mode of local IP address assignment.</p> <p>If you want to specify several DNS servers, click the ADD button, and in the line displayed, enter the IPv4 address.</p> <p>To remove the address, click the Delete button () in the line of the address.</p> <p>The DNS servers specified on this page will have higher priority than the servers specified on the Advanced / DNS page.</p>

Dynamic IP Addresses

Mode of IPv4 address assignment

DHCP ▼

Start IP*

192.168.8.100

End IP*

192.168.8.199

SELECT ADDRESS RANGE

Lease time (in minutes)*


1440

DNS relay

ⓘ Assigns the LAN IP address of the device as the DNS server for connected clients.

Figure 99. Configuring the local interface. The IPv4 tab. The **Dynamic IP Addresses** section.

Parameter	Description
Dynamic IP Addresses	
Mode of IPv4 address assignment	<p>An operating mode of the router's DHCP server.</p> <ul style="list-style-type: none"> Disable: The router's DHCP server is disabled, clients' IP addresses are assigned manually. DHCP: The router assigns IP addresses to clients automatically in accordance with the specified parameters. When this value is selected, the Start IP, End IP, Lease time fields, the SELECT ADDRESS RANGE button, and the DNS relay switch are displayed on the tab. Also when this value is selected, the DHCP Options, Static IP Addresses, and Hosts sections are displayed on the tab. Relay: An external DHCP server is used to assign IP addresses to clients. When this value is selected, the External DHCP server IP, Option 82 Circuit ID, Option 82 Remote ID, and Option 82 Subscriber ID fields are displayed on the tab. <i>Available if the Router, WISP Repeater, or Mobile Internet mode was selected in the Initial Configuration Wizard.</i>

Parameter	Description
Start IP	The start IP address of the address range used by the DHCP server to distribute IP addresses to clients.
End IP	The end IP address of the address range used by the DHCP server to distribute IP addresses to clients.
SELECT ADDRESS RANGE	Use the button to set one of the available IP address ranges. In the window displayed, select the needed range and click the SAVE button to automatically fill in the Start IP and End IP fields.
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.
DNS relay	Move the switch to the right so that the devices connected to the router obtain the address of the router as the DNS server address. Move the switch to the left so that the devices connected to the router obtain the address transmitted by the ISP or specified on the Advanced / DNS page as the DNS server address.
External DHCP server IP	The IPv4 address of the external DHCP server which assigns IPv4 addresses to the router's clients. To specify several IPv4 addresses, click the ADD button, and in the line displayed, enter an IPv4 address. To remove the IPv4 address, click the Delete button () in the line of the address.
Option 82 Circuit ID Option 82 Remote ID Option 82 Subscriber ID	The value of the relevant field of DHCP option 82. Do not fill in the fields unless your ISP or the administrator of the external DHCP server provided these values.

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

In the **DHCP Options** section, you can change default values for some options of DHCP protocol (IP address, subnet mask, DNS servers) or specify additional parameters which the built-in DHCP server should send to clients to configure the local network.

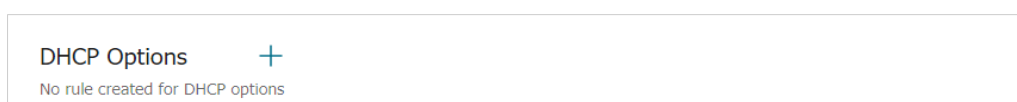


Figure 100. Configuring the local interface. The **IPv4** tab. The section for configuring DHCP options.

To do this, click the **ADD** button ().

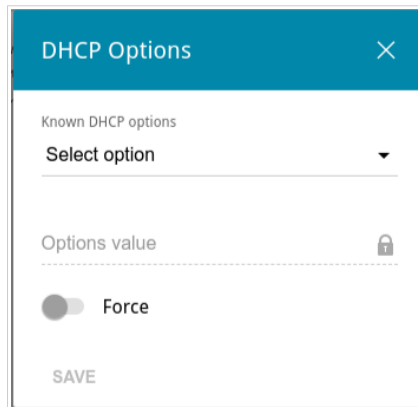



Figure 101. Configuring the local interface. The IPv4 tab. The window for configuring a DHCP option.

In the opened window, you can specify the following parameters:

Parameter	Description
Known DHCP options	From the drop-down list, select an option which you want to configure.
Options value	Specify the value for the selected option.
Force	Move the switch to the right to let the DHCP server send the selected option regardless of the client's request. Move the switch to the left to let the DHCP server send the selected option only when the client requests it.

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

To edit the parameters of an option, left-click the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove the value of an option, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

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

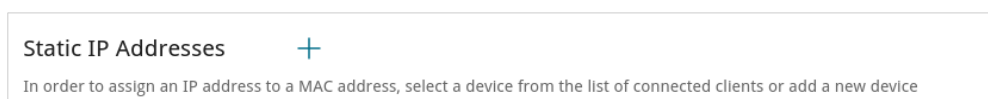





Figure 102. Configuring the local interface. The IPv4 tab. The section for creating MAC-IPv4 pairs.

To create a MAC-IPv4 pair, click the **ADD** button (). In the opened window, fill in the **MAC address** field. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant MAC address from the drop-down list (the field will be filled in automatically). Then in the **IP address** field, enter an IPv4 address which will be assigned to the device with the specified MAC address. In the **Hostname** field, specify a network name of the device for easier identification. To limit the time of the specified IPv4 address assignment, specify the required value in the **Lease time** field. Click the **SAVE** button.

To edit the settings for an existing MAC-IPv4 pair, left-click the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a MAC-IPv4 pair, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

If needed, you can add your own address resource records. To do this, click the **ADD** button () in the **Hosts** section (*available if in the **Dynamic IP Addresses** section the **DHCP** value is selected from the **Mode of IPv4 address assignment** drop-down list*).

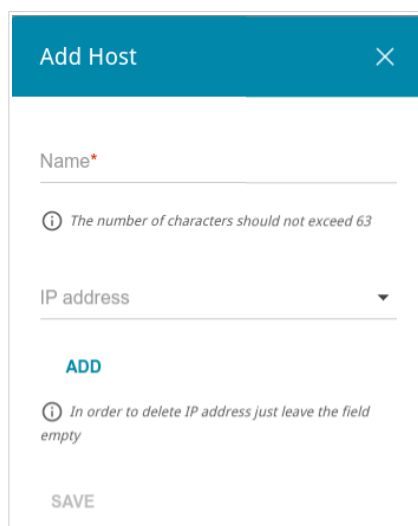



Figure 103. Configuring the local interface. The **IPv4** tab. The window for adding a DNS record.

In the **Name** field, specify the domain or domain name to which the specified IPv4 address will correspond. In the **IP address** field, specify a host from the internal or external network. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IPv4 address from the drop-down list (the field will be filled in automatically). To specify several IP addresses, click the **ADD** button. Click the **SAVE** button.

To edit an existing record, in the **Hosts** section, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.


To remove a record, in the **Hosts** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().


After completing the work with records, click the **APPLY** button.

IPv6

Go to the **IPv6** tab to change or add the IPv6 address of the router, configure IPv6 addresses assignment settings, specify MAC address and IPv6 address pairs, or add own DNS records.

Local IPv6 Address

For example: fd00::1/64 

 Enter IPv6 address, slash (/), and a decimal value equal to the size of the prefix in bits.

ADD

Hostname
dlinkrouter.local


 Specify a domain name ending with .local. In order to access the web-based interface using the domain name, enter this name with a dot and slash at the end in the address bar of the web browser (for example, dlinkrouter.local/.)


Figure 104. Configuring the local interface. The **IPv6** tab. The **Local IPv6 Address** section.

To add an IPv6 address of the router, click the **ADD** button. In the line displayed, enter an IPv6 address and then a slash followed by a decimal value of the prefix length. To change an IPv6 address of the router, edit the corresponding line.

To remove an IPv6 address, click the **DELETE** () button in the corresponding line of the table. Then click the **APPLY** button.

Also you can specify the following parameters:

Parameter	Description
Local IPv6 Address	
Gateway IPv6 address	<p><i>Available if the Access point, Repeater, or Client mode was selected in the Initial Configuration Wizard.</i></p> <p>The gateway IPv6 address which is used by the router to connect to the Internet (e.g., for synchronizing the system time with an NTP server). <i>Optional.</i></p>
Hostname	The name of the device assigned to its IPv6 address in the local subnet.

Parameter	Description
<p>DNS IP address</p>	<p>Available if the Access point, Repeater, or Client mode was selected in the <i>Initial Configuration Wizard</i>.</p> <p>If needed, specify a DNS server IPv6 address.</p> <p>If you want to specify several DNS servers, click the ADD button, and in the line displayed, enter the IPv6 address.</p> <p>To remove the address, click the Delete button () in the line of the address.</p> <p>The DNS servers specified on this page will have higher priority than the servers specified on the Advanced / DNS page.</p>

In the **Dynamic IP Addresses** section, you can configure IPv6 addresses assignment settings.

Dynamic IP Addresses


Mode of IPv6 address assignment
Stateful ▼

Start IP*
 ::2

End IP*
 ::64

SELECT ADDRESS RANGE

Lease time (in minutes)*
 1440

 Lease time will be chosen by ISP based on the delegated prefix life time.

The default route for LAN clients

DNS relay



 Assigns the LAN IP address of the device as the DNS server for connected clients.

Figure 105. Configuring the local interface. The **IPv6** tab. The **Dynamic IP Addresses** section.

Parameter	Description
Dynamic IP Addresses	
Mode of IPv6 address assignment	<p>Select the needed value from the drop-down list.</p> <ul style="list-style-type: none"> • Disable: Clients' IPv6 addresses are assigned manually. • Stateless: Clients themselves configure IPv6 addresses using the prefix. • Stateful: The built-in DHCPv6 server of the router allocates addresses from the range specified in the Start IP and End IP fields. Also when this value is selected, the Static IP Addresses and Hosts sections are displayed on the tab. • Relay: An external DHCP server is used to assign IPv6 addresses to clients. When this value is selected, the External DHCP server IP field is displayed on the tab. <i>Available if the Router, WISP Repeater, or Mobile Internet mode was selected in the Initial Configuration Wizard.</i>
Start IP / End IP	The start and the end values for the latest hexet (16 bit) of the range of IPv6 addresses which the DHCPv6 server distributes to clients.
SELECT ADDRESS RANGE	Use the button to set one of the available IP address ranges. In the window displayed, select the needed range and click the SAVE button to automatically fill in the Start IP and End IP fields.
Lease time	The lifetime of IPv6 addresses provided to clients.
The default route for LAN clients	Move the switch to the right to let the clients, that received IPv6 addresses or configured them using the prefix, use the router as the default IPv6 route.
DNS relay	<p>Move the switch to the right so that the devices connected to the router obtain the address of the router as the DNS server address.</p> <p>Move the switch to the left so that the devices connected to the router obtain the address transmitted by the ISP or specified on the Advanced / DNS page as the DNS server address.</p>
External DHCP server IP	<p>The IPv6 address of the external DHCP server which assigns IPv6 addresses to the router's clients.</p> <p>To specify several IPv6 addresses, click the ADD button, and in the line displayed, enter an IPv6 address.</p> <p>To remove the IPv6 address, click the Delete button () in the line of the address.</p>

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

In the **Static IP Addresses** section, you can specify MAC address and IPv6 address pairs (set a fixed IPv6 address in the local area network for a device with a certain MAC address). The router assigns IPv6 addresses in accordance with the specified pairs only when the **Stateful** value is selected from the **Mode of IPv6 address assignment** drop-down list in the **Dynamic IP Addresses** section.

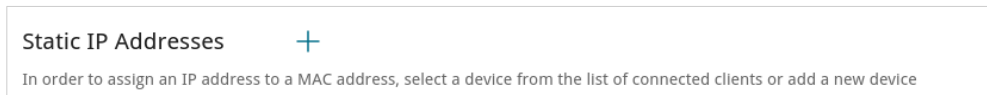





Figure 106. Configuring the local interface. The IPv6 tab. The section for creating MAC-IPv6 pairs.

To create a MAC-IPv6 pair, click the **ADD** button (). In the opened window, fill in the **MAC address** field. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant MAC address from the drop-down list (the field will be filled in automatically). Then in the **IP address** field, enter an IPv6 address which will be assigned to the device with the specified MAC address. In the **Hostname** field, specify a network name of the device for easier identification. To limit the time of the specified IPv6 address assignment, specify the required value in the **Lease time** field. Click the **SAVE** button.

To edit the settings for an existing MAC-IPv6 pair, left-click the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a MAC-IPv6 pair, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

If needed, you can add your own address resource records. To do this, click the **ADD** button () in the **Hosts** section (available if in the **Dynamic IP Addresses** section the **Stateful** value is selected from the **Mode of IPv6 address assignment** drop-down list).

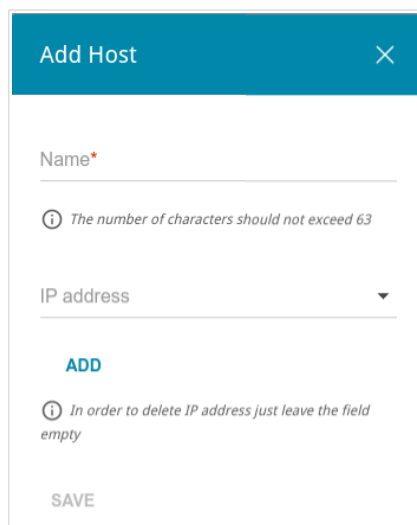



Figure 107. Configuring the local interface. The IPv6 tab. The window for adding a DNS record.

In the **Name** field, specify the domain or domain name to which the specified IPv6 address will correspond. In the **IP address** field, specify a host from the internal or external network. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IPv6 address from the drop-down list (the field will be filled in automatically). To specify several IP addresses, click the **ADD** button. Click the **SAVE** button.

To edit an existing record, in the **Hosts** section, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a record, in the **Hosts** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

After completing the work with records, click the **APPLY** button.

WAN Failover

On the **Connections Setup / WAN Failover** 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.

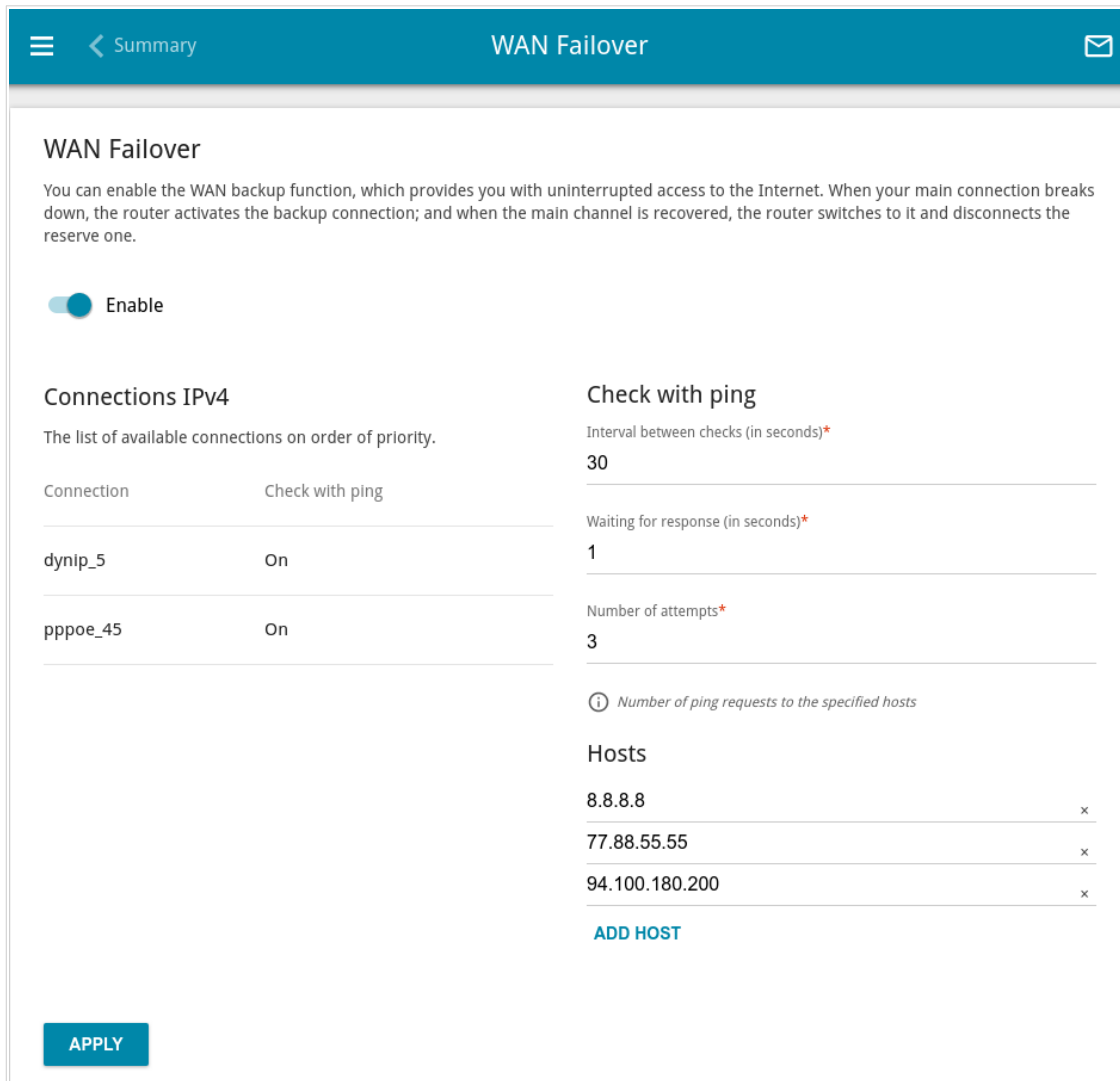


Figure 108. The **Connections Setup / WAN Failover** page.

To activate the backup function, create several WAN connections. After that go to the **Connections Setup / WAN Failover** page, move the **Enable** switch to the right.

In the **Connections IPv4** section, the existing IPv4 connections are displayed in order of their priority. The first connection on the list serves as the main connection, the others are backup connections.

To change the priority of a connection, left-click the relevant line in the table.

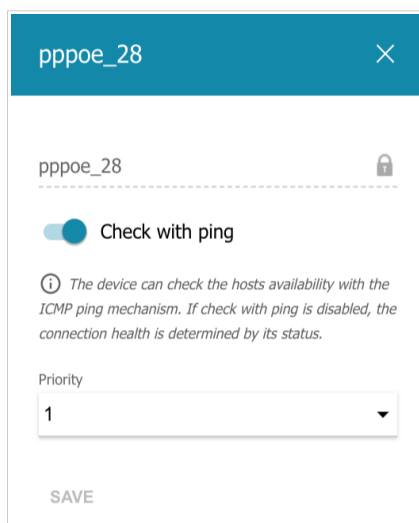


Figure 109. The window for changing the priority of a connection.

In the opened window, specify the needed parameters.

Parameter	Description
Check with ping	Move the switch to the right to let the router use ICMP ping mechanism for checking the connection. Move the switch to the left to let the router check only the status of the connection (may be useful for unstable connections).
Priority	The priority level of the connection. Level 1 is for the main connection, the others are backup connections. Select the required value from the drop-down list.

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

In the **Check with ping** section, specify settings of checking the connection using ICMP ping mechanism.

Parameter	Description
Check with ping	
Interval between checks	<p>A time period (in seconds) between regular checks of the hosts' availability. By default, the value 30 is specified. The value of this field should be higher than product of Waiting for response and Number of attempts fields values.</p> <p>After a successful check the router keeps using the main connection. If the check fails, the router repeats it. After two failed checks the next operational connection from the list will be used as the default connection.</p>
Waiting for response	<p>A time period (in seconds) allocated for a response to one ping request.</p>
Number of attempts	<p>A check is considered failed in case none of the sent ping requests receive a response.</p>
Hosts	<p>External IP addresses that the router will check for availability via ICMP ping mechanism.</p> <p>Click the ADD HOST button, and in the line displayed, enter an IP address or leave values suggested by the router.</p> <p>To remove an IP address from the list, click the Delete icon (✕) in the line of the address.</p>

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

Auto Configuration of 3G/LTE

On the **Connections Setup / Auto Configuration of 3G/LTE** page, you can enable the function for automatic creation of a mobile WAN connection upon plugging a USB modem into the router.

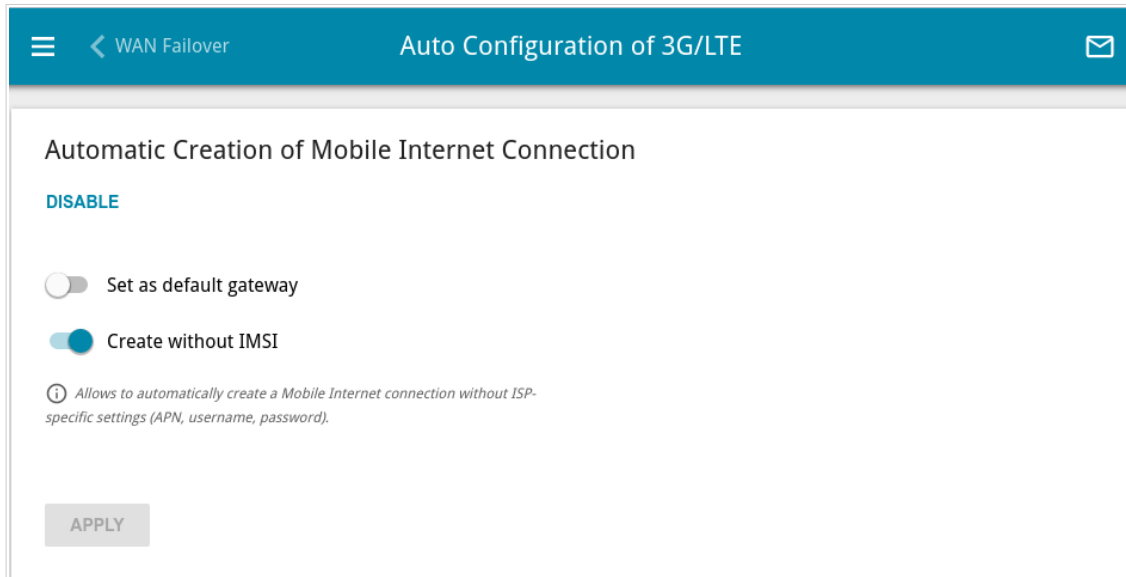


Figure 110. The **Connections Setup / Auto Configuration of 3G/LTE** page.

If you want to enable the function for automatic creation of a mobile WAN connection, click the **ENABLE** button. If needed, change the settings on this page.

Parameter	Description
Set as default gateway	<p>Move the switch to the right to allow the router to use an automatically created mobile WAN connection as the default connection.</p> <p>Move the switch to the left if you want the router to continue using the existing default connection when automatically creating a mobile WAN connection.</p>
Create without IMSI	<p>Move the switch to the right to enable automatic creation of a mobile WAN connection without the operator's settings. This setting will be useful if the code stored in the SIM card is unavailable.</p> <p>Move the switch to the left to disable automatic creation of a mobile WAN connection without the operator's settings.</p>

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

If the PIN code check for the SIM card inserted into your USB modem is disabled, then an active WAN connection with the operator's settings will be automatically created when plugging the USB modem into the router. The connection will be displayed on the **Connections Setup / WAN** page.

If you want to disable the function for automatic creation of a mobile WAN connection, click the **DISABLE** button.

Traffic Balancing

On the **Connections Setup / Traffic balancing** page, you can enable the traffic balancing function. This function enables equal load balancing on the router and increases maximum bandwidth of your Internet connection while using several WAN connections (for example, if access to the Internet is provided by several ISPs).

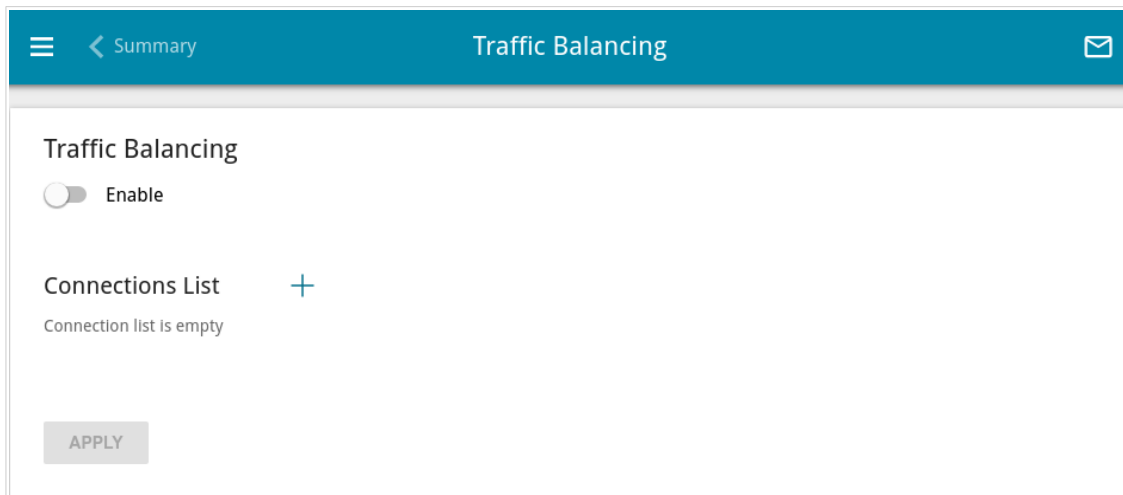


Figure 111. The **Connections Setup / Traffic Balancing** page.

To enable the traffic balancing function, move the **Enable** switch to the right. Then add connections to the page among which traffic will be balanced. To do this, click the **ADD** button (**+**) in the **Connections List** section.

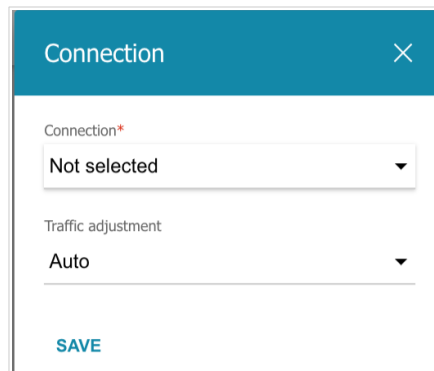



Figure 112. The window for adding a new connection to the page.

In the opened window, specify the needed parameters.

Parameter	Description
Connection	From the drop-down list, select a WAN connection to which traffic balancing will be applied.
Traffic adjustment	Select a value from the drop-down list. <ul style="list-style-type: none">• Auto: Traffic is equally divided among connections with the same setting.• Manual: Traffic is equally divided among connections in accordance with the value specified in the Weight field.
Weight	Specify the percentage of traffic which will pass through the connection.

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

To edit the setting for an added connection, in the **Connections List** section, select the relevant line in the table. In the opened window, change the value and click the **SAVE** button.

To remove a connection from the page, in the **Connections List** section, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button ().

After specifying the needed parameters, click the **APPLY** button. Upon that the **Status** field is displayed on the page.

To disable the traffic balancing function, move the **Enable** switch to the left and click the **APPLY** button.

VPN

In this menu you can configure VPN connections based on IPsec/GRE/EoGRE/EoIP/IPIP protocols and create a PPTP or L2TP server and accounts for access to it.

IPsec

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

IPsec is a protocol suite for securing IP communications.

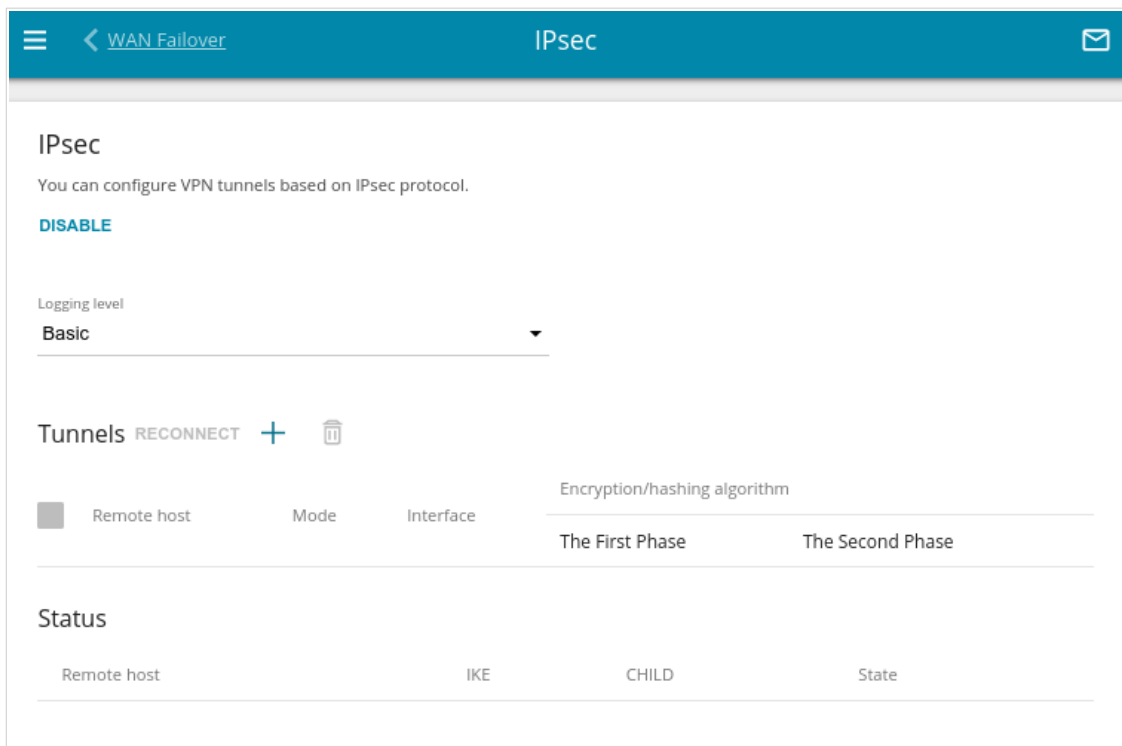


Figure 113. The **VPN / IPsec** page.

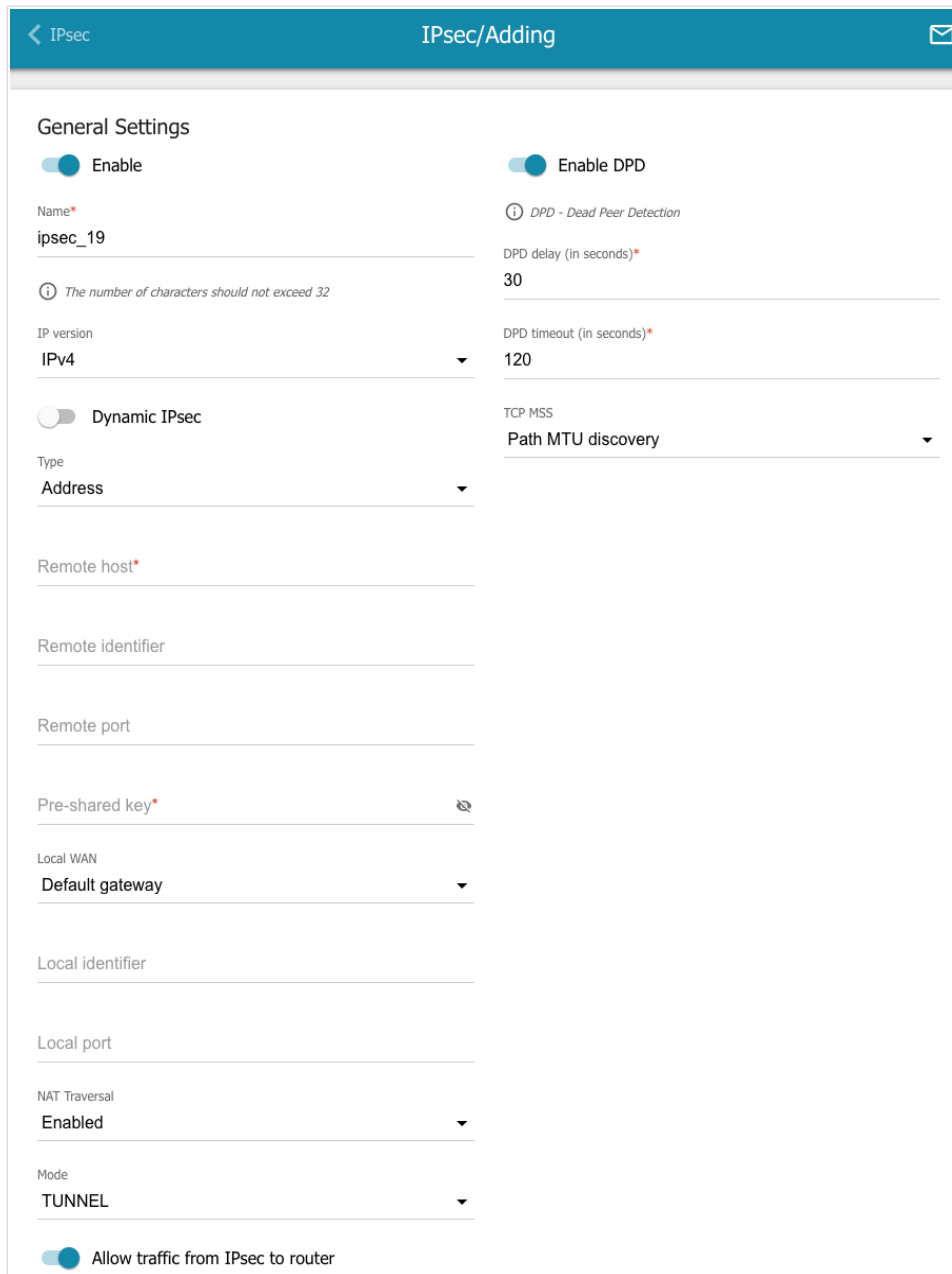
To allow IPsec tunnels, click the **ENABLE** button. Upon that the **Tunnels** and **Status** sections and the **Logging level** drop-down list are displayed on the page.

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

From the **Logging level** drop-down list, select a detail level of messages recorded to the system log or leave the value specified by default. The **Basic** value is recommended to establish an IPsec tunnel faster. To view the log, go to the **System / Log** page (see the **Log** section, page 329).

To create a new tunnel, click the **ADD** button () in the **Tunnels** section.

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



The screenshot shows the 'IPsec/Adding' configuration page. The 'General Settings' section includes the following fields and options:

- Enable:** A toggle switch that is turned on.
- Name*:** A text input field containing 'ipsec_19'. A tooltip below it states: 'The number of characters should not exceed 32'.
- IP version:** A dropdown menu set to 'IPv4'.
- Dynamic IPsec:** A toggle switch that is turned off.
- Type:** A dropdown menu set to 'Address'.
- Remote host*:** An empty text input field.
- Remote identifier:** An empty text input field.
- Remote port:** An empty text input field.
- Pre-shared key*:** An empty text input field with a copy icon to its right.
- Local WAN:** A dropdown menu set to 'Default gateway'.
- Local identifier:** An empty text input field.
- Local port:** An empty text input field.
- NAT Traversal:** A dropdown menu set to 'Enabled'.
- Mode:** A dropdown menu set to 'TUNNEL'.
- Enable DPD:** A toggle switch that is turned on. A tooltip below it states: 'DPD - Dead Peer Detection'.
- DPD delay (in seconds)*:** A text input field containing '30'.
- DPD timeout (in seconds)*:** A text input field containing '120'.
- TCP MSS:** A dropdown menu set to 'Path MTU discovery'.
- Allow traffic from IPsec to router:** A toggle switch that is turned on.

Figure 114. The page for adding an IPsec tunnel. The **General Settings** section.

You can specify the following parameters:

Parameter	Description
General Settings	
Enable	<p>Move the switch to the right to enable the tunnel.</p> <p>Move the switch to the left to disable the tunnel.</p>
Name	A name for the tunnel for easier identification. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout. ¹²
IP version	An IP version.
Dynamic IPsec	<p>Move the switch to the right to allow a remote host with any public IP address to connect to the router via IPsec protocol. Such a setting can be specified for one IPsec tunnel only. Connection requests via this tunnel can be sent by a remote host only.</p>
Type	<p>Select an identification method for the remote host (router) from the drop-down list:</p> <ul style="list-style-type: none"> • Address: The remote host is identified by its IP address. • FQDN: The remote host is identified by its domain name. <p>The drop-down list is displayed if the Dynamic IPsec switch is moved to the left.</p>
Remote host	<p>Enter the remote subnet VPN gateway IP address if the Address value is selected from the Type drop-down list.</p> <p>Enter the remote subnet VPN gateway domain name if the FQDN value is selected from the Type drop-down list.</p> <p>The field is available for editing if the Dynamic IPsec switch is moved to the left.</p>
Remote identifier	<p>A remote host identifier to establish connection over IPsec with particular hosts only. To establish connection, DVG-5402G/GF remote identifier value should correspond to the local identifier value specified in the settings of the remote host. Use an IP address of a host or subnet, the value %any (all IP addresses), a domain name, or certificate CN. By default, the value specified in the Remote host field is used.</p>

¹² 0-9, A-Z, a-z, space, !"#%&'()*+,-./:;<=>?@[^_`{|}~.

Parameter	Description
Remote port	A port of the remote host, that is used for IPsec packets exchange during the First Phase of the connection. If the field is left blank, port 500 is used. If the field is left blank and the network address translation (NAT) function is used for the connection, port 4500 is used.
Pre-shared key	A PSK key for mutual authentication of the parties. Click the Show icon (🔑) to display the entered key.
Local WAN	A WAN connection through which the tunnel will pass. Select a value from the drop-down list. <ul style="list-style-type: none">• Interface: When this value is selected, the Interface drop-down list is displayed. Select an existing WAN connection from the list.• Default gateway: When this value is selected, the router uses the default WAN connection.
Local identifier	A local identifier of the router to establish connection over IPsec with particular hosts only. To establish connection, DVG-5402G/GF local identifier value should correspond to the remote identifier value specified in the settings of the remote host. Use an IP address, domain name, or certificate CN. <i>Optional.</i>
Local port	A port of the router, that is used for IPsec packets exchange during the First Phase of the connection. If the field is left blank, port 500 is used. If the field is left blank and the network address translation (NAT) function is used for the connection, port 4500 is used.
NAT Traversal	The NAT Traversal function allows VPN traffic to pass through the NAT-enabled device. DVG-5402G/GF allows to forcibly encapsulate VPN traffic in UDP packets for passing through a remote device regardless of whether it supports address translation. If you need to enable forced encapsulation of VPN traffic, select the Enabled value. If you need to disable forced encapsulation of VPN traffic, select the Disabled value.

Parameter	Description
Mode	<p>An operation mode of the IPsec tunnel. Select a value from the drop-down list.</p> <ul style="list-style-type: none"> • TUNNEL: As a rule, it is used to create a secure connection to remote networks. In this mode, the source IP packet is fully encrypted and added to a new IP packet and data transfer is based on the header of the new IP packet. • TRANSPORT: As a rule, it is used to encrypt data stream within one network. In this mode, only the content of the source IP packet is encrypted, its header remains unchanged and data transfer is based on the source header.
Allow traffic from IPsec to router	<p>Move the switch to the left to deny access to your router from the remote subnet via IPsec. The switch is displayed when the TUNNEL value is selected from the Mode drop-down list.</p>
Enable DPD	<p>Move the switch to the right to enable using DPD protocol for this tunnel. Such a setting allows to check the status of the 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 switch is moved to to the left, the DPD delay and DPD timeout fields are not available for editing.</p>
DPD delay	<p>A time period (in seconds) between DPD messages. By default, the value 30 is specified.</p>
DPD timeout	<p>A waiting period for the response to a DPD message (in seconds). If the host does not answer in the specified time, the router breaks down the tunnel connection, updates information on it, and tries to reestablish the connection. By default, the value 120 is specified.</p>
TCP MSS	<p><i>Maximum Segment Size of a TCP packet.</i> This parameter influences the size of a TCP packet which will be sent from the remote host to the router.</p> <p>If the Manual value is selected, you can specify the value of this parameter for each subnet of the tunnel in the MTU field. The field is displayed in the window for adding a subnet in the Tunneled Networks section.</p> <p>If the Path MTU discovery value is selected, the parameter will be configured automatically for all created subnets.</p>

The First Phase	The Second Phase
First phase encryption algorithm DES	Second phase encryption algorithm DES
Encryption mode CBC	Encryption mode CBC
Hashing algorithm MD5	Hashing algorithm MD5
Size of hash 96	Size of hash 96
Hashing mode HMAC	Hashing mode HMAC
First phase DHgroup type MODP768	<input checked="" type="checkbox"/> Enable PFS
IKE-SA lifetime* 10800	Second phase DHgroup type MODP768
<input type="checkbox"/> Aggressive Mode	IPsec-SA lifetime* 3600
IKE version 1	

Figure 115. The page for adding an IPsec tunnel. **The First Phase / The Second Phase** sections.

Parameter	Description
The First Phase	
First phase encryption algorithm	Select an available encryption algorithm from the drop-down list.
Encryption mode	Select an encryption mode from the drop-down list.
Hashing algorithm	Select a hashing algorithm from the drop-down list.
Size of hash	The length of the hash in bits.
Hashing mode	Select a hashing mode from the drop-down list.
First phase DHgroup type	A Diffie-Hellman key group for the First Phase. 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 be greater than the value specified in the IPsec-SA lifetime field.

Parameter	Description
Aggressive Mode	Move the switch to the right to enable the aggressive mode for mutual authentication of the parties. Such a setting accelerates the connection establishment, but reduces its security.
IKE version	IKE (<i>Internet Key Exchange</i>) is a protocol of keys exchange between two hosts of VPN connections. Select a version of the protocol from the drop-down list.
The Second Phase	
Second phase encryption algorithm	Select an available encryption algorithm from the drop-down list.
Encryption mode	Select an encryption mode from the drop-down list.
Hashing algorithm	Select a hashing algorithm from the drop-down list.
Size of hash	The length of the hash in bits.
Hashing mode	Select a hashing mode from the drop-down list.
Enable PFS	Move the switch to the right to enable the PFS option (<i>Perfect Forward Secrecy</i>). If the switch is moved to the right, a new encryption key exchange will be used for the Second Phase. This option enhances the security level of data transfer, but increases the load on DVG-5402G/GF.
Second phase DHgroup type	A Diffie-Hellman key group for the Second Phase. Select a value from the drop-down list. The drop-down list is available if the Enable PFS switch is moved to the right.
IPsec-SA lifetime	The lifetime of the Second Phase keys in seconds. After the specified period it is required to renegotiate the keys. The value specified in this field should be greater than zero.


To specify IP addresses of local and remote subnets for this tunnel, click the **ADD** button () in the **Tunneled Networks** section.


Figure 116. The page for adding an IPsec tunnel. The window for adding a tunneled network.

In the opened window, you can specify the following parameters:

Parameter	Description
Local network	<p>A local subnet IP address and mask.</p> <p>To add one more subnet, click the ADD SUBNET button and enter the subnet address in the displayed line (available if 2 is selected from the IKE version list in the The First Phase section).</p> <p>To remove the subnet, click the Delete icon (×) in the line of the subnet address.</p>
Remote subnet	<p>A remote subnet IP address and mask.</p> <p>To add one more subnet, click the ADD SUBNET button and enter the subnet address in the displayed line (available if 2 is selected from the IKE version list in the The First Phase section).</p> <p>To remove the subnet, click the Delete icon (×) in the line of the subnet address.</p>
MTU	<p>The maximum size (in bytes) of a non-fragmented packet. The field is displayed when the Manual value is selected from the TCP MSS drop-down list in the General Settings section.</p>

Click the **SAVE** button.


To edit fields in the **Tunneled Networks** section, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a subnet, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Also you can remove a subnet in the editing window.

After configuring all needed settings for the IPsec tunnel, click the **APPLY** button.

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

To disconnect an existing tunnel and establish it again, select the checkbox located to the left of the relevant line in the table and click the **RECONNECT** 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 (). Also you can remove a tunnel on the editing page.

To disable VPN tunnels based on IPsec protocol, click the **DISABLE** button.

GRE

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

GRE (*Generic Routing Encapsulation*) is a protocol for tunneling network packets, which enables you to create unprotected VPN tunnels.

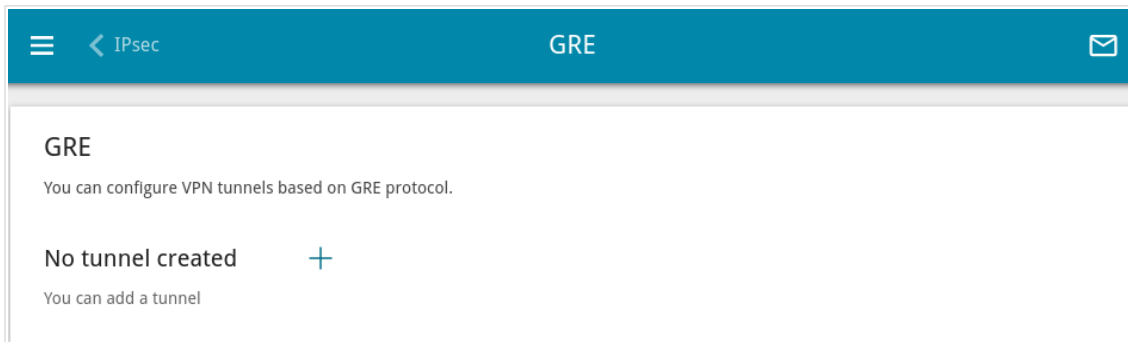


Figure 117. The **VPN / GRE** page.

To create a new tunnel, click the **ADD** button ().

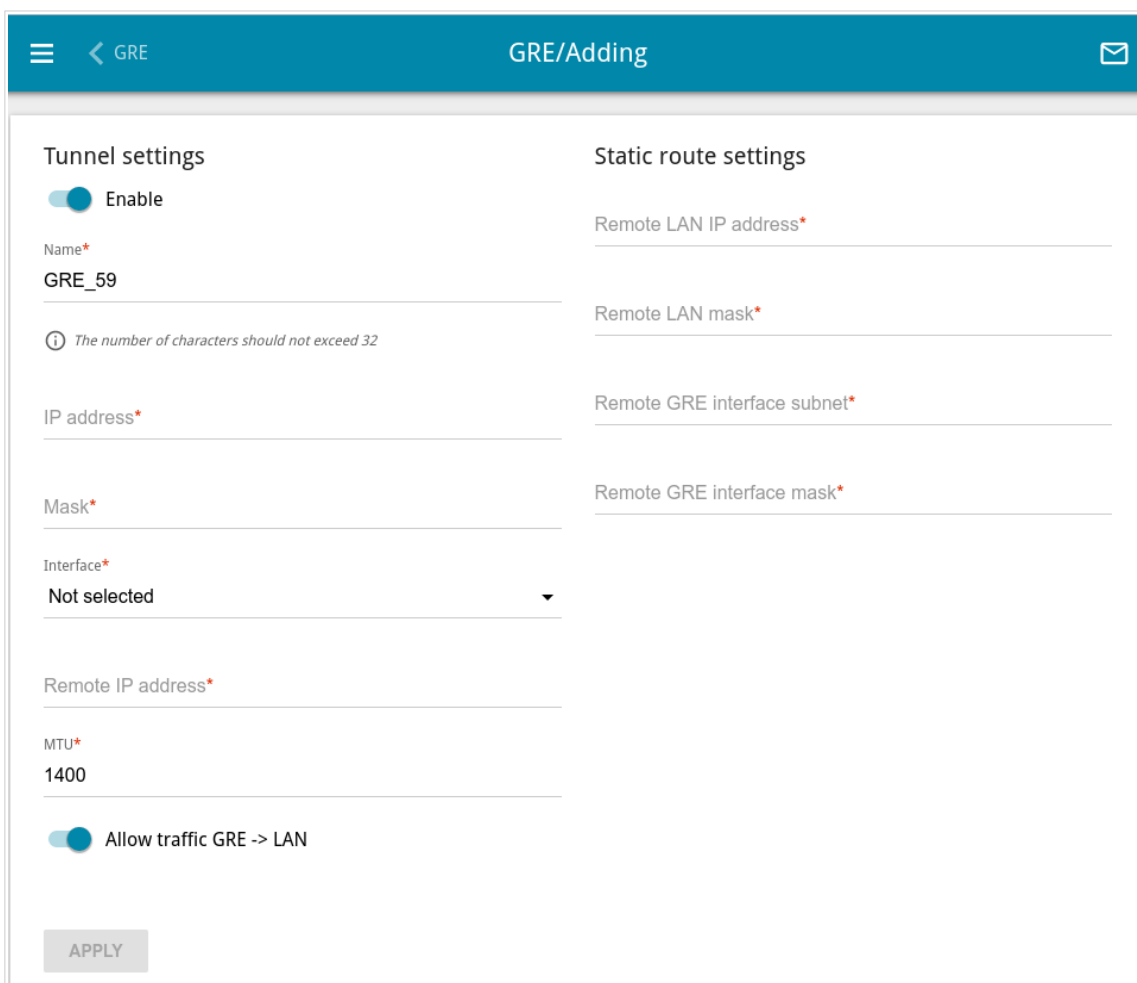



Figure 118. The page for adding a GRE tunnel.

You can specify the following parameters:

Parameter	Description
Tunnel settings	
Enable	Move the switch to the right to enable the GRE tunnel. Move the switch to the left to disable the GRE tunnel.
Name	A name of the tunnel for easier identification. You can specify any name.
IP address	The IP address of the GRE tunnel interface.
Mask	The mask of the subnet.
Interface	From the drop-down list, select a WAN connection through which the tunnel will pass. Select the Default gateway value to use the default WAN connection.
Remote IP address	Enter the IP address of the remote subnet VPN gateway.
MTU	The maximum size of units transmitted from the remote host to the router.
Allow traffic GRE → LAN	Move the switch to the right to allow GRE tunnel users access devices in the remote local subnet.
Static route settings	
Remote LAN IP address	The IP address of the remote local subnet.
Remote LAN mask	The mask of the remote local subnet.
Remote GRE interface subnet	The subnet of the remote GRE interface.
Remote GRE interface mask	The mask of the remote GRE interface.

After configuring all needed settings, click the **APPLY** button.

To edit the parameters of an existing tunnel, in the **Tunnels** 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 ().

IPIP

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

IPIP (*IP Encapsulation within IP*) is a protocol for IP-tunneling network packets, which enables you to create unprotected VPN tunnels, encapsulating IP packets within other IP packets.

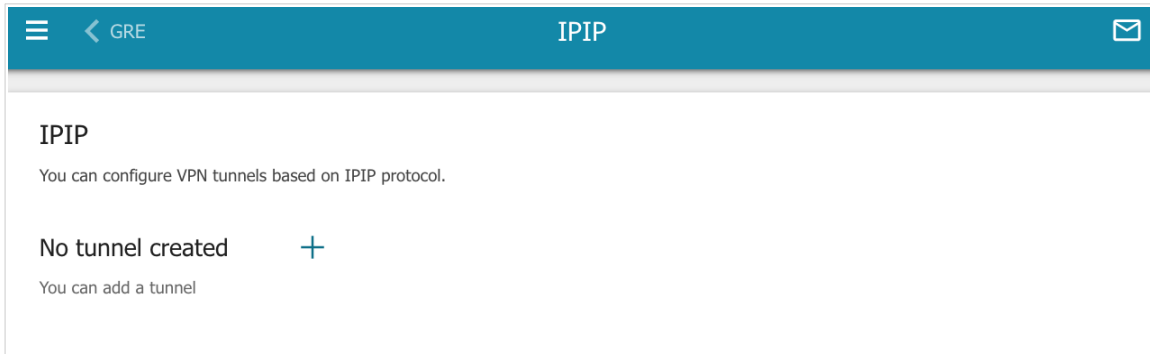


Figure 119. The **VPN / IPIP** page.

To create a new tunnel, click the **ADD** button (**+**).


Figure 120. The page for adding an IPIP tunnel.

You can specify the following parameters:

Parameter	Description
Tunnel settings	
Enable	Move the switch to the right to enable the IPIP tunnel. Move the switch to the left to disable the IPIP tunnel.
Name	A name of the tunnel for easier identification. You can specify any name.
IP address	The IP address of the IPIP tunnel interface.
Mask	The mask of the subnet.
Interface	From the drop-down list, select a WAN connection through which the tunnel will pass. Select the Default gateway value to use the default WAN connection.
Remote IP address	Enter the IP address of the remote subnet VPN gateway.
MTU	The maximum size of units transmitted from the remote host to the router.
Allow traffic IPIP → LAN	Move the switch to the right to allow IPIP tunnel users access devices in the remote local subnet.
Static route settings	
Remote LAN IP address	The IP address of the remote local subnet.
Remote LAN mask	The mask of the remote local subnet.
Remote IPIP interface subnet	The subnet of the remote IPIP interface.
Remote IPIP interface mask	The mask of the remote IPIP interface.

After configuring all needed settings, click the **APPLY** button.

To edit the parameters of an existing tunnel, in the **Tunnels** 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 ().

PPTP/L2TP Servers

On the **VPN / PPTP/L2TP Servers** page, you can enable the PPTP or L2TP VPN server. To configure the PPTP or L2TP server, go to the relevant tab.

PPTP and L2TP help to establish a secure connection creating a tunnel in the standard insecure network.

! Before creating the PPTP or L2TP server with authentication enabled, it is required to create user accounts (see the *VPN Users* section, page 161).

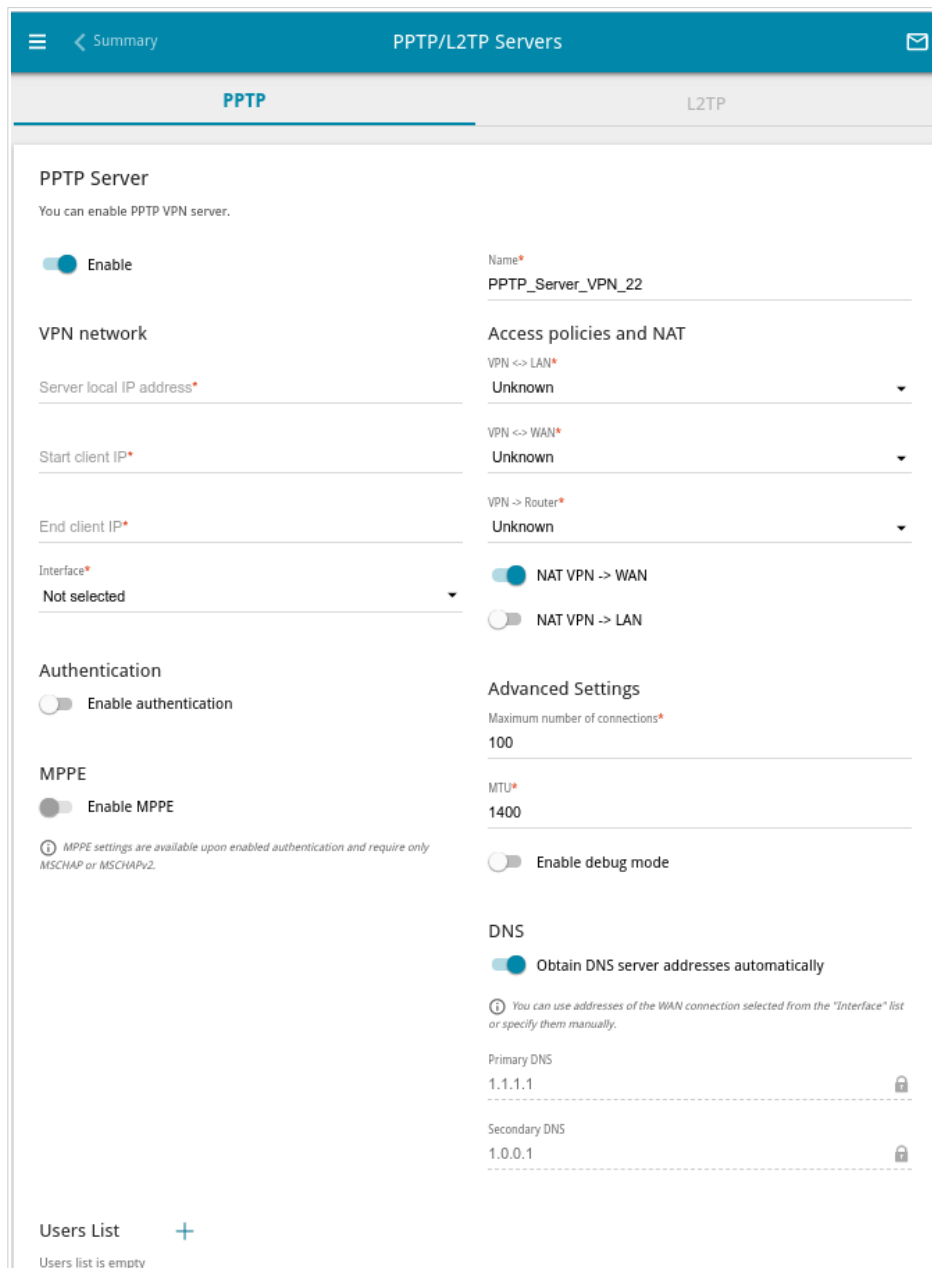


Figure 121. The **VPN / PPTP/L2TP Servers** page.

To enable the server, move the **Enable** switch to the right.

You can specify the following parameters:

Parameter	Description
Name	A name of the server for easier identification. You can specify any name.
VPN network	
Server local IP address	The IP address of the VPN server.
Start client IP	The start IP address of the address range for VPN server's clients.
End client IP	The end IP address of the address range for VPN server's clients.
Interface	Select a WAN connection through which this VPN server will be available. If the Default gateway value is selected, the router uses the default WAN connection.
Access policies and NAT	
VPN ↔ LAN	Select a value from the drop-down list. <ul style="list-style-type: none"> • Allow: VPN server's clients can access the router's local network; clients from the router's local network can access the VPN server's network. • Deny: VPN server's clients cannot access the router's local network; clients from the router's local network cannot access the VPN server's network.
VPN ↔ WAN	Select a value from the drop-down list. <ul style="list-style-type: none"> • Allow: VPN server's clients can access the external network; clients from the external network can access the VPN server's network. • Deny: VPN server's clients cannot access the external network; clients from the external network cannot access the VPN server's network.
VPN → Router	Select a value from the drop-down list. <ul style="list-style-type: none"> • Allow: VPN server's clients can access the router. • Deny: VPN server's clients cannot access the router.
NAT VPN → WAN	If the switch is moved to the right, the network address translation function between the VPN server's interface and the external network interface is enabled.

Parameter	Description
NAT VPN → LAN	If the switch is moved to the right, the network address translation function between the VPN server's interface and the local network interface is enabled.
Authentication	
Enable authentication	Move the switch to the right to enable authentication. Upon that the Multiple sessions , CHAP , MSCHAP , MSCHAPv2 , and PAP lists are displayed on the page.
Multiple sessions	<p>The mode of connection for the users listed in the Users List section. Select a value from the drop-down list.</p> <ul style="list-style-type: none"> • Allow: Several users with the same user account are allowed to connect. • Only new connections: If there are several users with the same user account, only new users are allowed to connect. • Only old connections: If there are several users with the same user account, new users are not allowed to connect.
<p style="text-align: center;">CHAP MSCHAP MSCHAPv2 PAP</p>	<p><i>Challenge Handshake Authentication Protocol.</i> <i>Microsoft Challenge Handshake Authentication Protocol.</i> <i>Password Authentication Protocol.</i></p> <p>Select the needed action from the drop-down list for the relevant protocol.</p> <ul style="list-style-type: none"> • Auto: Enable automatic client authentication over this protocol. • Refuse: Disable client authentication over this protocol. • Require: Require client authentication over this protocol.
MPPE	
Enable MPPE	<p>Move the switch to the right to enable MPPE encryption.</p> <p>MPPE encryption can be applied only if the Require value is selected from the MSCHAP or MSCHAPv2 drop-down list.</p>

Parameter	Description
MPPE40 MPPE128	<p>MPPE encryption with a 40-bit or 128-bit key is applied. Select the needed action from the drop-down list.</p> <ul style="list-style-type: none"> • Auto: Allow clients to connect to the VPN server automatically with MPPE encryption. • Refuse: Restrict clients from connecting to the VPN server with MPPE encryption. • Require: Allow clients to connect to the VPN server only with MPPE encryption.
Advanced Settings	
Maximum number of connections	<p><i>Available on the PPTP tab.</i></p> <p>The maximum number of devices allowed to connect to the PPTP server.</p>
Port	<p><i>Available on the L2TP tab.</i></p> <p>The port of L2TP server. By default, the value 1701 is specified.</p>
MTU	<p>The maximum size of units transmitted by the interface.</p>
Enable debug mode	<p>Move the switch to the right if you want to log all data on this VPN server debugging. Upon that the Debugging messages value should be selected from the Level drop-down list on the System / Log page (see the Log section, page 329).</p>
DNS	
Obtain DNS server addresses automatically	<p>Move the switch to the right to let VPN server's clients obtain DNS server addresses of the WAN connection which is selected from the Interface list. Upon that the Primary DNS and Secondary DNS fields are not available for editing.</p>
Primary DNS/ Secondary DNS	<p>Enter addresses of the primary and secondary DNS servers in the relevant fields.</p>

If you want to specify the list of accounts to provide access to this server, click the **ADD (+)** button in the **Users List** section.

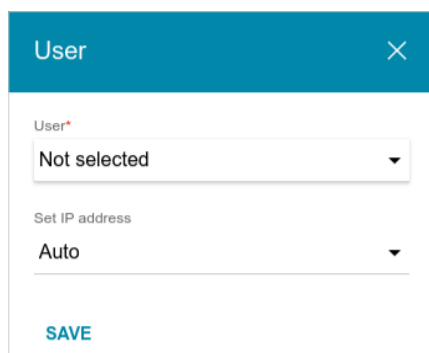



Figure 122. A window for adding a user.

In the opened window, you can specify the following parameters:

Parameter	Description
User	Select a user account to allow access.
Set IP address	The mode of IP address assignment. Select a value from the drop-down list. <ul style="list-style-type: none">• Auto: The IP address is assigned to the user automatically.• Single IP: The IP address is assigned to the user manually. When this value is selected, the IP address field is displayed.
IP address	Specify an IP address from the range specified in the Start client IP and End client IP fields.

Click the **SAVE** button.

To edit an existing user, in the **Users List** section, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a user, in the **Users List** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

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

To disable the server, move the **Enable** switch to the left and click the **APPLY** button.

VPN Users

On the **VPN / VPN Users** page, you can create user accounts to provide authorized access to a PPTP or L2TP server.

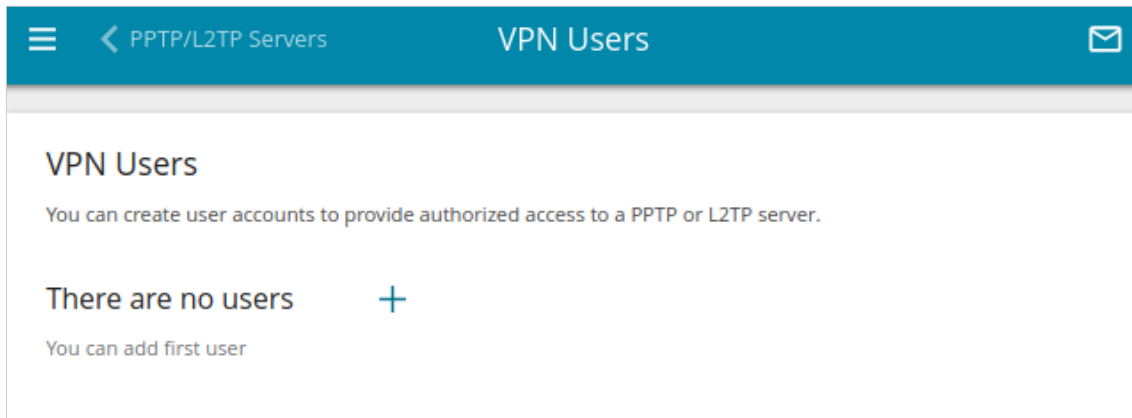


Figure 123. The **VPN / VPN Users** page.



To create a new user account, click the **ADD** button ().


Figure 124. The window for adding a user.

In the opened window, in the **Username** field, specify a username, and in the **Password** field – the password for the account. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout.¹³ Click the **Show** icon () to display the entered key.

Click the **SAVE** button.

To view passwords of all user accounts, move the **Show password** switch to the right.

To edit the parameters of an account, select the relevant line in the table. In the opened window, enter a new value in the relevant field, and then click the **SAVE** button.

To remove an account, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

¹³ 0-9, A-Z, a-z, !"#\$\$%&'()*+,-./:;<=>?@[\\]^_`{|}~.

EoGRE

On the **VPN / EoGRE** page, you can configure VPN tunnels based on EoGRE technology.

EoGRE (*Ethernet over GRE*) technology allows transferring traffic through VPN tunnels in heterogeneous networks, encapsulating Ethernet frames with the help of GRE protocol and transferring them over a network which uses a network protocol of another level.

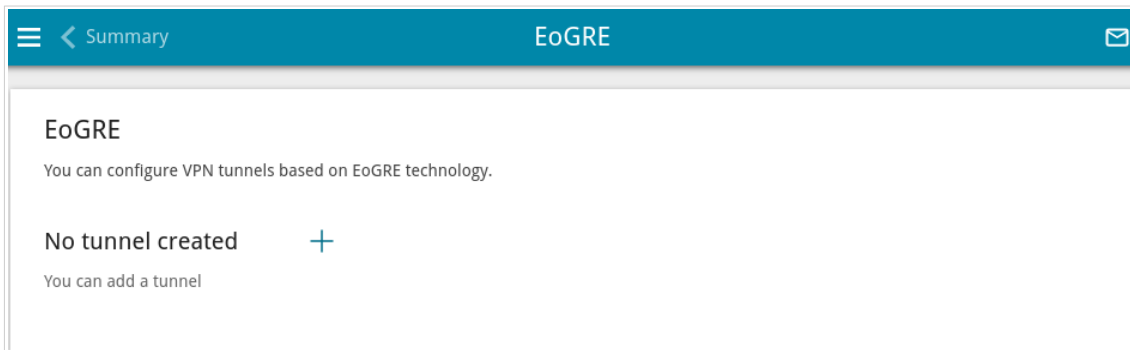


Figure 125. The **VPN / EoGRE** page.

To create a new tunnel, click the **ADD** button ().

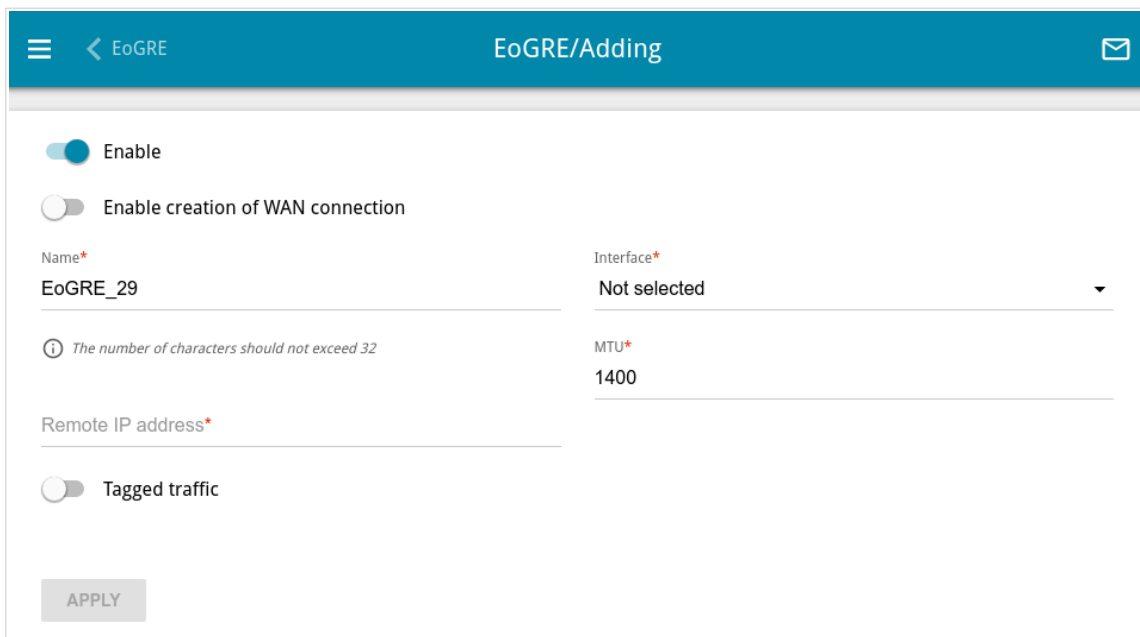



Figure 126. The page for adding an EoGRE tunnel.

You can specify the following parameters:

Parameter	Description
Enable	Move the switch to the right to enable the EoGRE tunnel. Move the switch to the left to disable the EoGRE tunnel.
Enable creation of WAN connection	Move the switch to the right to use the EoGRE tunnel as an interface for creating a WAN connection. For further configuration, you need to create a VLAN which will include the EoGRE interface (see the <i>VLAN</i> section, page 224), and then create a WAN connection which will be assigned to the interface of this VLAN (see the <i>WAN</i> section, page 83). Move the switch to the left if creating a WAN connection is not required.
Name	A name of the tunnel for easier identification. You can specify any name.
Remote IP address	Enter the IP address of the remote subnet VPN gateway.
Tagged traffic	Move the switch to the right to assign a tag (VLAN ID) to EoGRE traffic and specify the needed value in the VLAN ID field displayed.
Interface	From the drop-down list, select a WAN connection through which the tunnel will pass. Select the Default gateway value to use the default WAN connection.
MTU	The maximum size of units transmitted by the interface.

After configuring all needed settings, click the **APPLY** button.

To edit the parameters of an existing tunnel, in the **Tunnels** 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 ().

VPN tunnels using EoGRE technology will appear in the **EoGRE interfaces** section on the **Advanced / VLAN** page and will be automatically removed from this section after the tunnel is deleted from the current page.

EoIP

On the **VPN / EoIP** page, you can configure VPN tunnels based on EoIP technology.

EoIP (*Ethernet over IP*) technology allows creating an Ethernet tunnel between two routers via connections which can transmit IP packets (e.g., IPIP, PPTP connections).

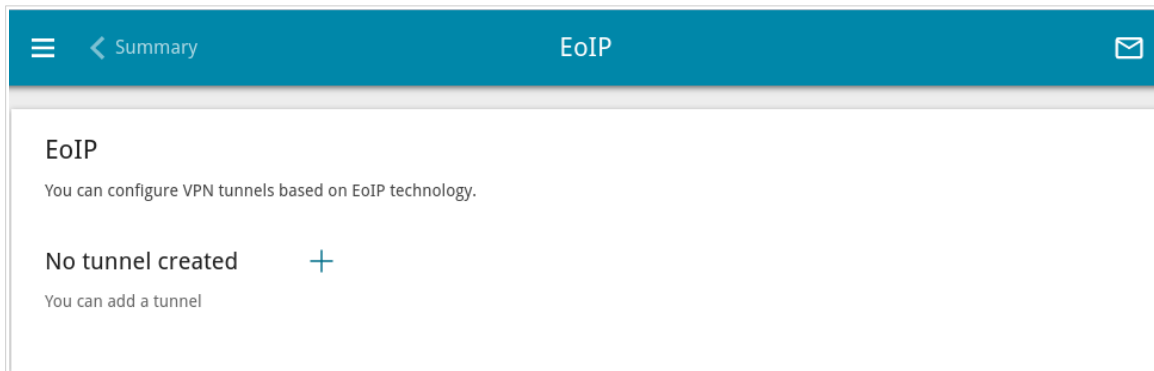


Figure 127. The **VPN / EoIP** page.

To create a new tunnel, click the **ADD** button (+).

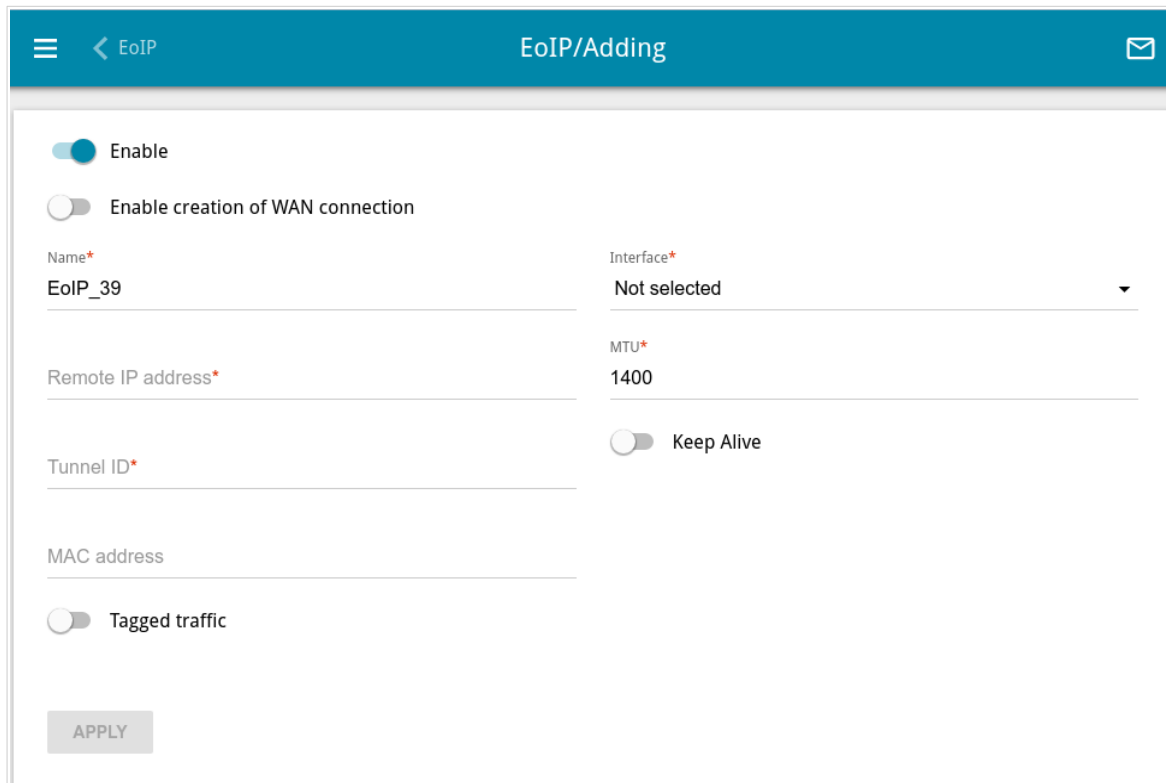


Figure 128. The page for adding an EoIP tunnel.


You can specify the following parameters:

Parameter	Description
Enable	<p>Move the switch to the right to enable the EoIP tunnel.</p> <p>Move the switch to the left to disable the EoIP tunnel.</p>
Enable creation of WAN connection	<p>Move the switch to the right to use the EoIP tunnel as an interface for creating a WAN connection. For further configuration, you need to create a VLAN which will include the EoIP interface (see the <i>VLAN</i> section, page 224), and then create a WAN connection which will be assigned to the interface of this VLAN (see the <i>WAN</i> section, page 83).</p> <p>Move the switch to the left if creating a WAN connection is not required.</p>
Name	A name of the tunnel for easier identification. You can specify any name.
Remote IP address	Enter the IP address of the remote subnet VPN gateway.
Tunnel ID	<p>Specify a unique identifier of the tunnel.</p> <p>The value for both parties which establish the tunnel should be the same.</p>
MAC address	<p>A MAC address assigned to the EoIP tunnel interface. <i>Optional.</i></p> <p>If the field is blank, the MAC address is assigned automatically.</p>
Tagged traffic	Move the switch to the right to assign a tag (VLAN ID) to EoIP traffic and specify the needed value in the Tag ID field displayed.
Interface	From the drop-down list, select a WAN connection through which the tunnel will pass. Select the Default gateway value to use the default WAN connection.
MTU	The maximum size of units transmitted by the interface.
Keep Alive	<p>Move the switch to the right to let the router detect the state of the tunnel on the other end. In the Interval and Attempts fields displayed, specify the required values.</p> <p>The router sends several check requests. If after several failed attempts the connection on the other end of the tunnel is inactive, the tunnel will be disabled. Upon that it will be enabled automatically when the other end tries to establish the connection.</p>

Parameter	Description
Interval	A time period (in seconds) allocated for one request to check the state of the tunnel on the other end. By default, the value 5 is specified.
Attempts	A number of failed attempts to check the state of the tunnel on the other end after which the tunnel is disabled. By default, the value 5 is specified.

After configuring all needed settings, click the **APPLY** button.

To edit the parameters of an existing tunnel, in the **Tunnels** 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 ().

VPN tunnels using EoIP technology will appear in the **EoIP interfaces** section on the **Advanced / VLAN** page and will be automatically removed from this section after the tunnel is deleted from the current page.

Wi-Fi

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

Basic Settings

In the **Wi-Fi / Basic Settings** section, you can change basic parameters for the wireless interface of the router and configure the basic and additional wireless networks. To configure the 2.4GHz band or 5GHz band, go to the relevant tab.

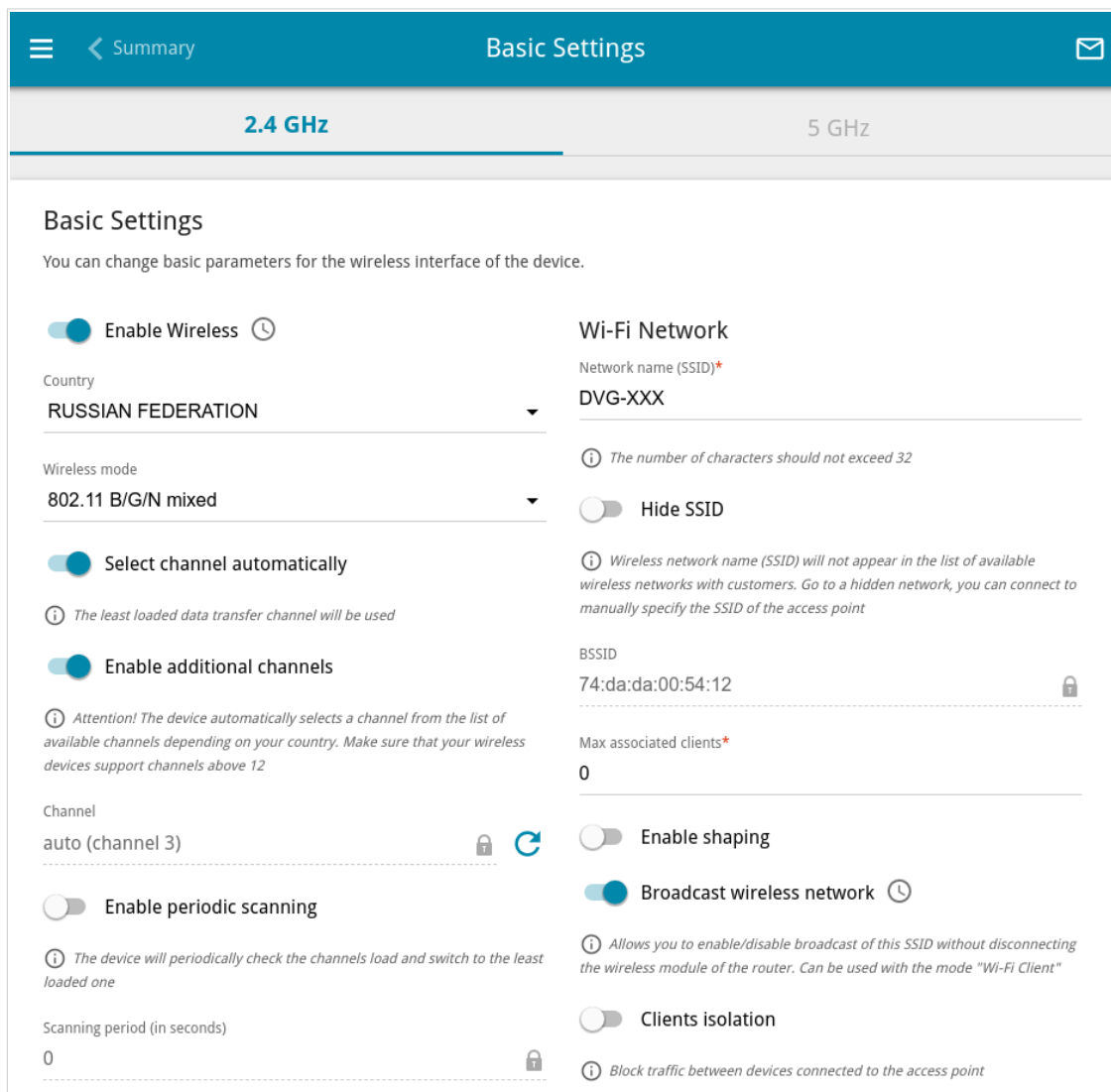



Figure 129. Basic settings of the wireless LAN in the 2.4GHz band.

In the **Basic Settings** section, the following parameters are available:

Parameter	Description
Enable Wireless	<p>To enable Wi-Fi connection, move the switch to the right.</p> <p>To disable Wi-Fi connection, move the switch to the left.</p> <p>To enable/disable Wi-Fi connection on a schedule, click the Set schedule icon (🕒). In the opened window, from the Rule drop-down list, select the Create rule value to create a new schedule (see the <i>Schedule</i> section, page 324) or select the Select an existing one value to use the existing one. Existing schedules are displayed in the Rule name drop-down list.</p> <p>To enable Wi-Fi connection at the time specified in the schedule and disable it at the other time, select the Enable wireless connection value from the Action drop-down list and click the SAVE button.</p> <p>To disable Wi-Fi connection at the time specified in the schedule and enable it at the other time, select the Disable wireless connection value from the Action drop-down list and click the SAVE button.</p> <p>To change or delete the schedule, click the Edit schedule icon (🕒). In the opened window, change the parameters and click the SAVE button or click the DELETE FROM SCHEDULE button.</p>
Country	The country you are in. Select a value from the drop-down list.
Wireless mode	Operating mode of the wireless network of the router. This parameter defines standards of the devices that will be able to use your wireless network. Select a value from the drop-down list.
Select channel automatically	Move the switch to the right to let the router itself choose the channel with the least interference.
Enable additional channels	If the switch is moved to the left, the device automatically selects one of available standard channels. To use additional channels (the 12th and 13th – in the 2.4 GHz band, the 100th and higher – in the 5 GHz band), move the switch to the right.

Parameter	Description
Channel	<p>The wireless channel number.</p> <p>To select a channel manually, left-click; in the opened window, select a channel and click the SAVE button. The action is available, when the Select channel automatically switch is moved to the left.</p> <p>To make the router select the currently least loaded channel, click the Refresh icon (). The icon is displayed, when the Select channel automatically switch is moved to the right.</p>
Enable periodic scanning	<p>Move the switch to the right to let the router search for a free channel in certain periods of time. When the switch is moved to the right, the Scanning period field is available for editing.</p>
Scanning period	<p>Specify a period of time (in seconds) after which the router rescans channels.</p>

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

To edit the settings of the basic wireless network, in the **Wi-Fi Network** section, change the needed parameters and click the **APPLY** button.

Also you can create an additional wireless network. To do this, click the **ADD WI-FI NETWORK** button. On the opened page, specify the relevant parameters.

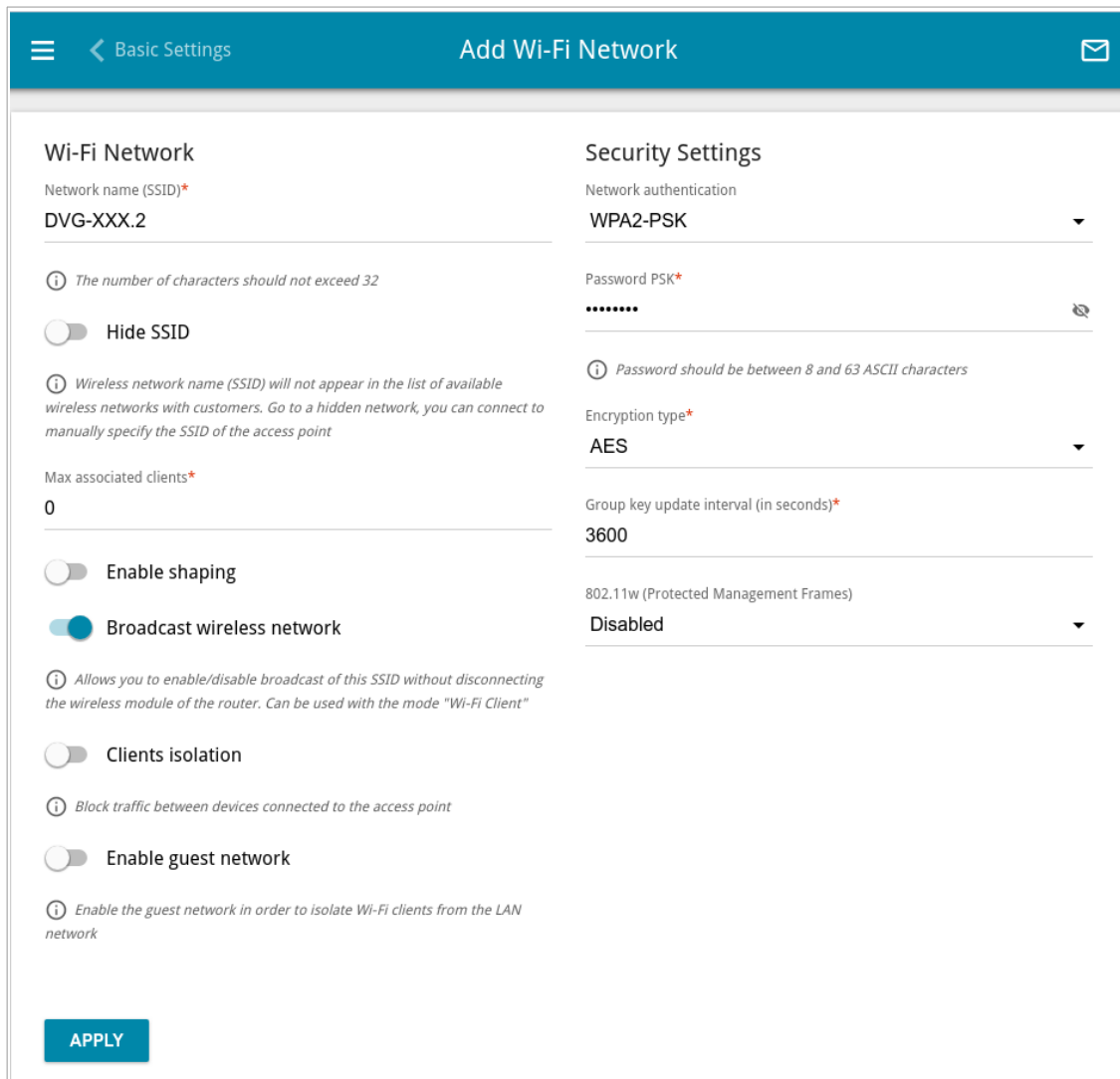


Figure 130. Creating a wireless network.

Parameter	Description
Wi-Fi Network	
Network name (SSID)	A name for the wireless network.
Hide SSID	If the switch is moved to the right, other users cannot see your Wi-Fi network. It is recommended not to hide the network in order to simplify initial configuration of the wireless network.

Parameter	Description
BSSID	The unique identifier for this wireless network. You cannot change the value of this parameter, it is determined in the device's internal settings. The field is displayed in the settings of the existing wireless network.
Max associated clients	The maximum number of devices connected to the wireless network. When the value 0 is specified, the device does not limit the number of connected clients.
Enable shaping	<p>Move the switch to the right to limit the maximum bandwidth of the wireless network. In the Shaping field displayed, specify the maximum value of speed (Mbps).</p> <p>Move the switch to the left not to limit the maximum bandwidth.</p>
Broadcast wireless network	<p>If the wireless network broadcasting is disabled, devices cannot connect to the wireless network. Upon that DVG-5402G/GF can connect to another access point as a wireless client.</p> <p>To enable/disable broadcasting on a schedule, click the Set schedule icon (🕒). In the opened window, from the Rule drop-down list, select the Create rule value to create a new schedule (see the <i>Schedule</i> section, page 324) or select the Select an existing one value to use the existing one. Existing schedules are displayed in the Rule name drop-down list.</p> <p>To enable broadcasting at the time specified in the schedule and disable it at the other time, select the Enable wireless network broadcasting value from the Action drop-down list and click the SAVE button. When the wireless connection is disabled, the device will not be able to enable broadcasting of this wireless network on schedule.</p> <p>To disable broadcasting at the time specified in the schedule and enable it at the other time, select the Disable wireless network broadcasting value from the Action drop-down list and click the SAVE button.</p> <p>To change or delete the schedule, click the Edit schedule icon (🕒). In the opened window, change the parameters and click the SAVE button or click the DELETE FROM SCHEDULE button.</p> <p>If you created an additional network, you can configure, change or delete a schedule for each network. To do this, click the icon in the line of the network.</p>

Parameter	Description
Clients isolation	Move the switch to the right to forbid wireless clients of this wireless network to communicate to each other.
Enable guest network	This function is available for the additional network. Move the switch to the right if you want the devices connected to the additional network to be isolated from the devices and resources of the router's LAN.

In the **Security Settings** section, you can change security settings of the wireless network.

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

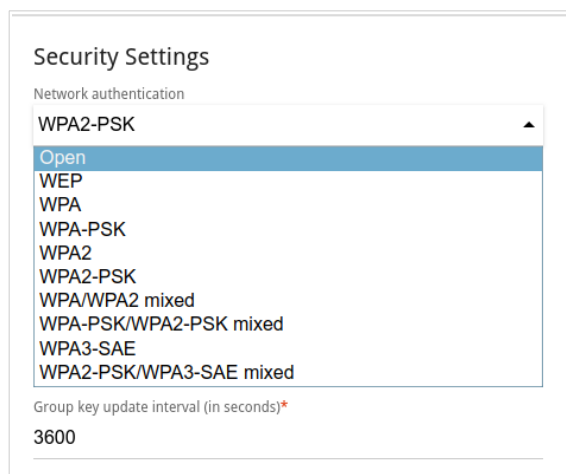



Figure 131. Network authentication types supported by the router.

The router supports the following authentication types:

Authentication type	Description
Open	Open authentication (with WEP encryption for wireless network modes not supporting 802.11n or 802.11ac devices).
WEP	Authentication with a shared key with WEP encryption. This authentication type is not available when a mode supporting 802.11n or 802.11ac devices is selected from the Wireless mode drop-down list on the Wi-Fi / Basic Settings page.
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.

Authentication type	Description
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 wireless network.
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 wireless network.
WPA3-SAE	WPA3-based authentication using a PSK and SAE method.
WPA2-PSK/WPA3-SAE mixed	A mixed type of authentication. When this value is selected, devices using the WPA2-PSK authentication type and devices using the WPA3-SAE authentication type can connect to the wireless network.

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

When the **Open** or **WEP** value is selected, the following settings are displayed on the page (unavailable for the wireless network operating modes which support the standard 802.11n or 802.11ac):

The screenshot shows the 'Security Settings' configuration page. At the top, 'Network authentication' is set to 'Open'. Below this, there is a toggle switch for 'Enable encryption WEP' which is turned on. The 'Default key ID' is set to '1'. A note indicates that the first key is recommended for compatibility. There is also a toggle for 'Encryption key WEP as HEX' which is turned off. At the bottom, there are four text input fields for 'Encryption key 1*' through 'Encryption key 4*', each with a 'Show' icon (an eye with a slash) to the right.

Figure 132. The **Open** value is selected from the **Network authentication** drop-down list.

Parameter	Description
Enable encryption WEP	For Open authentication type only. To activate WEP encryption, move the switch to the right. Upon that the Default key ID drop-down list, the Encryption key WEP as HEX switch, and four Encryption key fields are displayed on the page.
Default key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption key WEP as HEX	Move the switch to the right to set a hexadecimal number as a key for encryption.
Encryption key (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. Click the Show icon (👁) to display the entered key.

When the **WPA-PSK**, **WPA2-PSK**, **WPA-PSK/WPA2-PSK mixed**, **WPA3-SAE**, or **WPA2-PSK/WPA3-SAE mixed** value is selected, the following fields are displayed on the page:

Figure 133. The **WPA2-PSK** value is selected from the **Network authentication** drop-down list.

Parameter	Description
Password PSK	A password for WPA encryption. The password can contain digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout. ¹⁴ Click the Show icon (🔍) to display the entered password.
Encryption type	An encryption method: TKIP , AES , or TKIP+AES . <i>TKIP and TKIP+AES encryption types are not available for WPA3-SAE and WPA2-PSK/WPA3-SAE mixed authentication types.</i>
Group key update interval	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.

¹⁴ 0-9, A-Z, a-z, space, !"#\$%&'()*+,-./:;<=>?@[^_`{|}~.

Parameter	Description
<p>802.11w (Protected Management Frames)</p>	<p>For WPA2-PSK, WPA3-SAE, and WPA2-PSK/WPA3-SAE mixed authentication types only.</p> <p>Protected Management Frames help to improve packet privacy protection for wireless data transmission. Select a value for the wireless network from the drop-down list.</p> <ul style="list-style-type: none"> • Disabled: Protected Management Frames are not used. • Optional: Protected Management Frames are optional. • Required: Protected Management Frames are required. When this value is selected, devices not supporting the 802.11w standard cannot connect to the wireless network. <p>The default value cannot be changed for WPA3-SAE and WPA2-PSK/WPA3-SAE mixed authentication types.</p>

When the **WPA**, **WPA2**, or **WPA/WPA2 mixed** value is selected, the following settings are displayed on the page:

The screenshot shows the 'Security Settings' configuration page. At the top, 'Network authentication' is set to 'WPA2'. Below this, 'WPA2 Pre-authentication' is a toggle switch that is currently turned off. Other settings include 'IP address RADIUS server*' (192.168.0.254), 'RADIUS server port*' (1812), 'RADIUS encryption key*' (dlink), 'Encryption type*' (AES), and 'Group key update interval (in seconds)*' (3600). At the bottom, '802.11w (Protected Management Frames)' is set to 'Disabled'.


Figure 134. The **WPA2** value is selected from the **Network authentication** drop-down list.

Parameter	Description
<p>WPA2 Pre-authentication</p>	<p>Move the switch to the right to activate preliminary authentication (displayed only for the WPA2 and WPA/WPA2 mixed authentication types).</p>

Parameter	Description
IP address RADIUS server	The IP address of the RADIUS server.
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).
Encryption type	An encryption method: TKIP , AES , or TKIP+AES .
Group key update interval	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.
802.11w (Protected Management Frames)	<p><i>For WPA2 authentication type only.</i></p> <p>Protected Management Frames help to improve packet privacy protection for wireless data transmission. Select a value for the wireless network from the drop-down list.</p> <ul style="list-style-type: none"> • Disabled: Protected Management Frames are not used. • Optional: Protected Management Frames are optional. • Required: Protected Management Frames are required. When this value is selected, devices not supporting the 802.11w standard cannot connect to the wireless network.

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

To edit the basic or additional wireless network, left-click the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To remove the additional network, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Then click the **APPLY** button.

Client Management

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

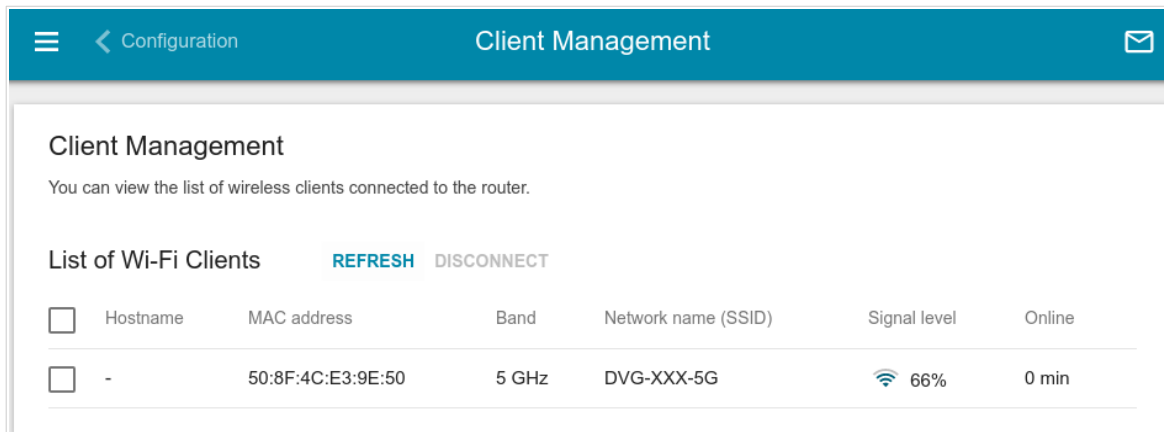


Figure 135. The page for managing the wireless clients.

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

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

To view the latest data on a connected device, left-click the line containing the MAC address of this device.

WPS

On the **Wi-Fi / WPS** page, you can enable the function for configuration of the WLAN and select a method for connection 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.

! The WPS function allows adding devices only to the basic wireless network of the router.

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. When other security settings are specified, controls of the **WPS** page on the tab of the relevant band are not available.

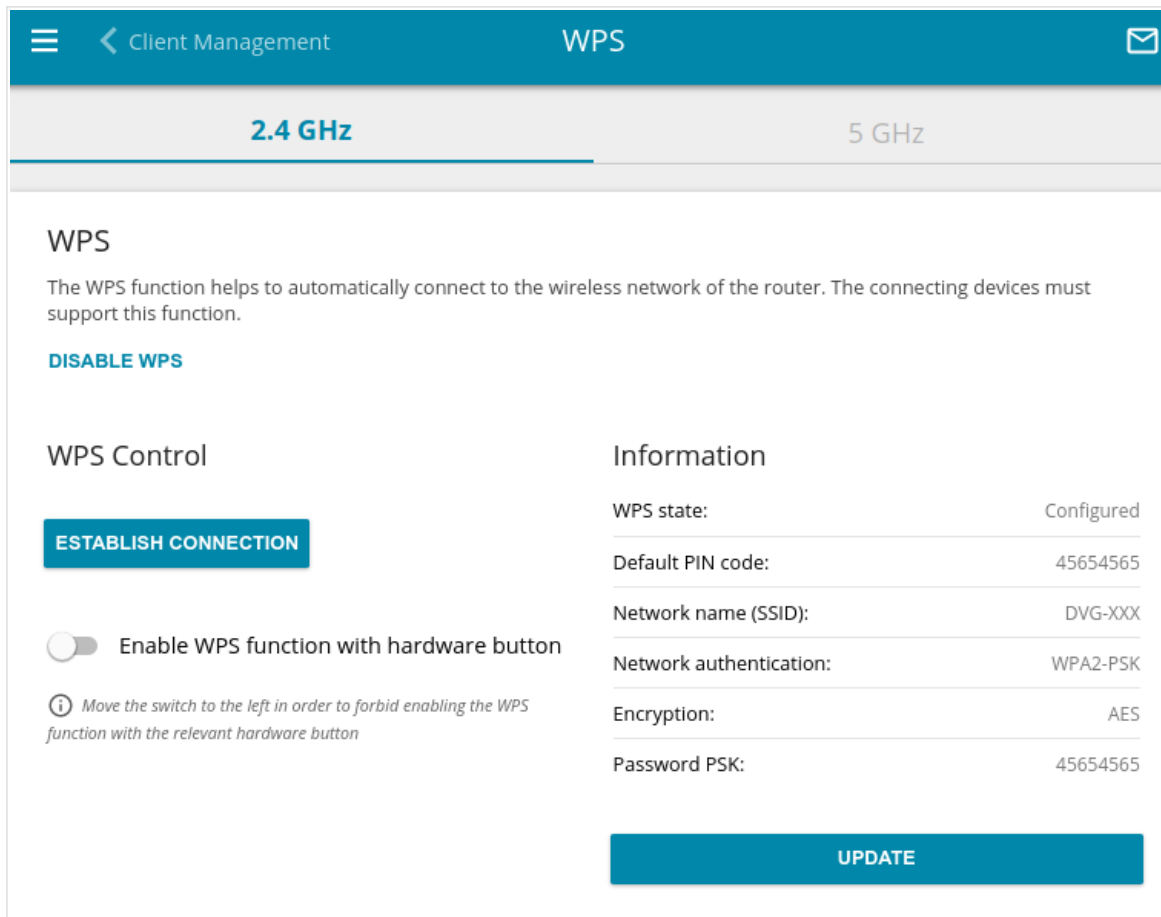


Figure 136. The page for configuring the WPS function.

You can activate the WPS function via the web-based interface or the hardware **WPS** button on the cover of the device.

To activate the WPS function via the hardware button, move the **Enable WPS function with hardware button** switch to the right on the tabs of both bands. Then, with the device turned on, press the **WPS** button, hold it for 2 seconds, and release. The **WPS** LED should start blinking. In addition, upon pressing the button, the wireless interfaces of the device are enabled if they were disabled before.

If you want to disable activating the WPS function via the hardware button, on the tabs of both bands, move the **Enable WPS function with hardware button** switch to the left and make sure that the WPS function is not activated via the web-based interface.

To activate the WPS function via the web-based interface, on the tab of the relevant band, click the **ENABLE WPS** button.

When the WPS function is enabled, the **Information** section is available on the page.

Parameter	Description
WPS state	The state of the WPS function: <ul style="list-style-type: none">• 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).
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.
Network name (SSID)	The name of the router's wireless network.
Network authentication	The network authentication type specified for the wireless network.
Encryption	The encryption type specified for the wireless network.
Password PSK	The encryption password specified for the wireless network.
UPDATE	Click the button to update the data on the page.

Using WPS Function via Web-based Interface

To connect to the basic wireless network via the PIN method of the WPS function, follow the next steps:

1. Click the **ENABLE WPS** button.
2. In the **WPS Control** section, click the **ESTABLISH CONNECTION** button.
3. In the opened window, 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 connect to the basic wireless network via the PBC method of the WPS function, follow the next steps:

1. Click the **ENABLE WPS** button.
2. In the **WPS Control** section, click the **ESTABLISH CONNECTION** button.
3. In the opened window, 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. Right after that, click the **CONNECT** button in the web-based interface of the router.

Using WPS Function without Web-based Interface

You can use the WPS function without accessing the web-based interface of the router. To do this, you need to configure the following router's settings:

1. Specify relevant security settings for the wireless network of the router.
2. Make sure that the **Enable WPS function with hardware button** switch is moved to the right on the tabs of both bands.
3. Click the **ENABLE WPS** button.
4. Close the web-based interface (click the **Logout** line of the menu).

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 **WPS** LED should start blinking.

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.

Select the needed action from the drop-down list in the **Work mode** section to configure the WMM function:

- **Auto**: the settings of the WMM function are configured automatically (the value is specified by default).
- **Manual**: the settings of the WMM function are configured manually. When this value is selected, the **Access Point** and **Station** sections are displayed on the page.

The screenshot shows the WMM configuration page. At the top, there are tabs for '2.4 GHz' and '5 GHz'. Below the tabs, the 'Wi-Fi Multimedia' section is visible. The 'Work mode' is set to 'Manual'. Below this, there are two tables: 'Access Point' and 'Station'. Each table has columns for AC, AIFSN, CWMin, CWMax, TXOP, ACM, and ACK, with rows for BE, BK, VI, and VO.

Access Point							Station					
AC	AIFSN	CWMin	CWMax	TXOP	ACM	ACK	AC	AIFSN	CWMin	CWMax	TXOP	ACM
BE	3	15	63	0	off	off	BE	3	15	1023	0	off
BK	7	31	1023	0	off	off	BK	7	15	1023	0	off
VI	2	7	15	94	off	off	VI	2	7	15	94	off
VO	2	3	7	47	off	off	VO	2	3	7	47	off

Figure 137. The page for configuring the WMM function.

! All needed settings for the WMM function are specified in the device's system. Changing parameters manually may negatively affect your WLAN!

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

- **BK** (*Background*), low priority traffic (print jobs, file downloads, etc.).
- **BE** (*Best Effort*), traffic from legacy devices or devices/applications that do not support QoS.
- **VI** (*Video*).
- **VO** (*Voice*).

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

To edit the parameters of an Access Category, left-click the relevant line. In the opened window, change the needed parameters.

Figure 138. The window for changing parameters of the WMM function.

Parameter	Description
AIFSN	<i>Arbitrary Inter-Frame Space Number.</i> This parameter influences time delays for the relevant Access Category. The lower the value, the higher is the Access Category priority.
CWMin / CWMax	<i>Contention Window Minimum/Contention Window Maximum.</i> 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.

Parameter	Description
TXOP	<i>Transmission Opportunity.</i> The higher the value, the higher is the Access Category priority.
ACM	<i>Admission Control Mandatory.</i> If the switch is moved to the right, the device cannot use the relevant Access Category.
ACK	<i>Acknowledgment.</i> Answering response requests while transmitting. Displayed only in the Access Point section. If the switch is moved to the left, the router answers requests. If the switch is moved to the right, the router does not answer requests.

Click the **SAVE** button.

Client

On the **Wi-Fi / Client** page, you can configure the router as a client to connect to a wireless access point or to a WISP. To configure the 2.4GHz band or 5GHz band, go to the relevant tab.

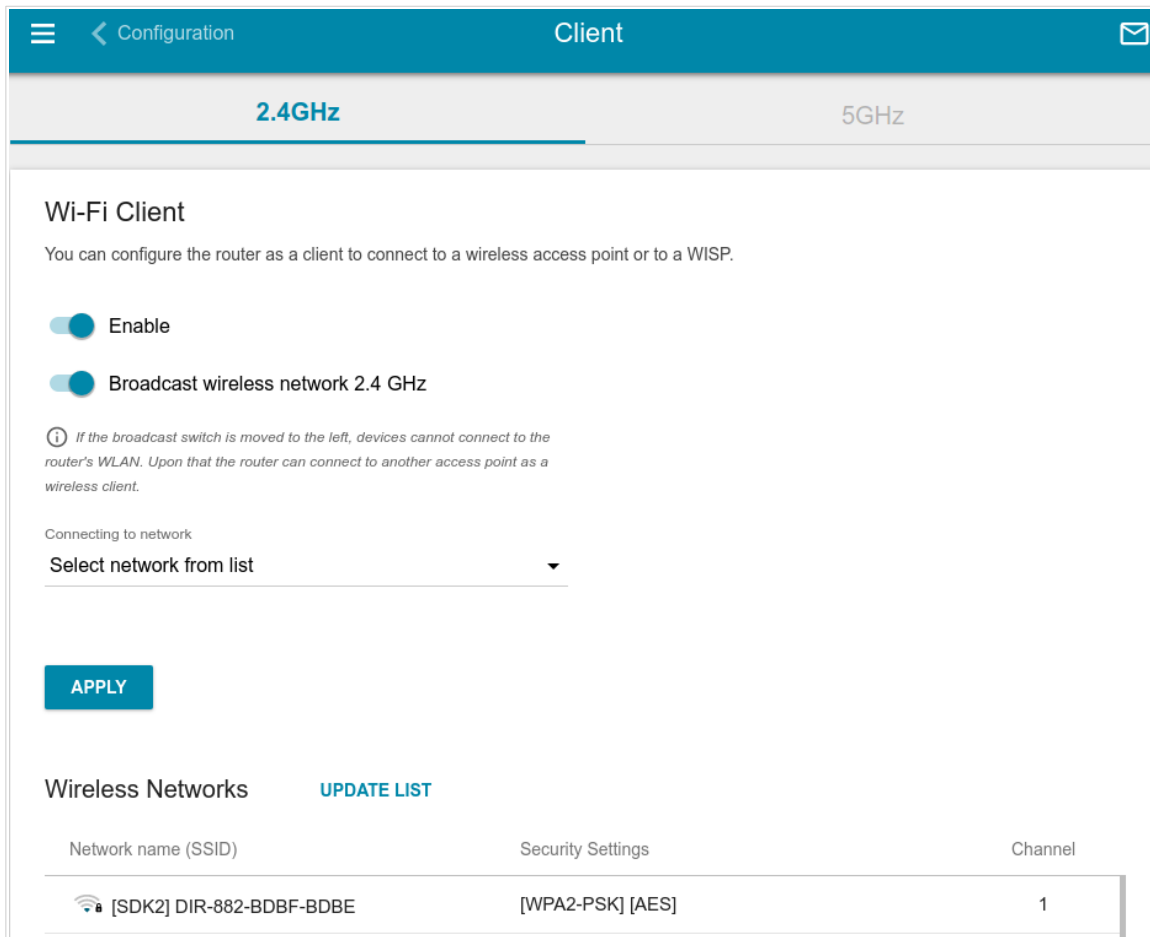


Figure 139. The page for configuring the client mode.

To configure the router as a client, move the **Enable** switch to the right. Upon that the following fields are displayed on the page:


Parameter	Description
Broadcast wireless network 2.4 GHz / Broadcast wireless network 5 GHz	If the switch is moved to the left, devices cannot connect to the router's WLAN. Upon that the router can connect to another access point as a wireless client.
Connecting to network	A method for connecting to another access point.

In the **Wireless Networks** section, the list of available wireless networks is displayed. To view the latest data on available wireless networks, click the **UPDATE LIST** button.

To connect to a wireless network from the list, select the needed network. Move the **Network options** switch to the right to view more detailed information on the network to which the router connects. If a password is required, enter it in the relevant field. Click the **CONNECT** button.

To connect to a hidden network, select the **Connect to hidden network** value from the **Connecting to network** drop-down list. Enter the name of the network in the **Network name (SSID)** field. If needed, fill in the **BSSID** field. Then select the needed type of authentication from the **Network authentication** drop-down list.

When the **Open** or **WEP** authentication type is selected, the following settings are displayed on the page:

Parameter	Description
Enable encryption WEP	<i>For Open authentication type only.</i> To activate WEP encryption, move the switch to the right. Upon that the Default key ID drop-down list, the Encryption key WEP as HEX switch, and four Encryption key fields are displayed on the page.
Default key ID	The number of the key (from first to fourth) which will be used for WEP encryption.
Encryption key WEP as HEX	Move the switch to the right to set a hexadecimal number as a key for encryption.
Encryption key (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. Click the Show icon () to display the entered key.

When the **WPA-PSK**, **WPA2-PSK**, **WPA-PSK/WPA2-PSK mixed**, **WPA3-SAE**, and **WPA2-PSK/WPA3-SAE mixed** authentication type is selected, the following fields are displayed:

Parameter	Description
Password PSK	A password for WPA encryption. Click the Show icon (🔍) to display the entered key.
Encryption type	An encryption method: TKIP , AES , or TKIP+AES . <i>TKIP and TKIP+AES encryption types are not available for WPA3-SAE and WPA2-PSK/WPA3-SAE mixed authentication types.</i>

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

When connecting to a wireless access point, the wireless channel of DVG-5402G/GF will switch to the channel of the access point to which you have connected.

In addition, the **Connection Information** section in which you can view the connection status and the network basic parameters is displayed.

If you want to connect to the WISP network, after configuring the device as a client, you need to create a WAN connection with relevant parameters for the **WiFiClient_2GHz** interface in the 2.4GHz band or for the **WiFiClient_5GHz** interface in the 5GHz band.

Client Shaping

On the **Wi-Fi / Client Shaping** page, you can limit the maximum bandwidth of upstream and downstream traffic for each wireless client of the router by its MAC address.

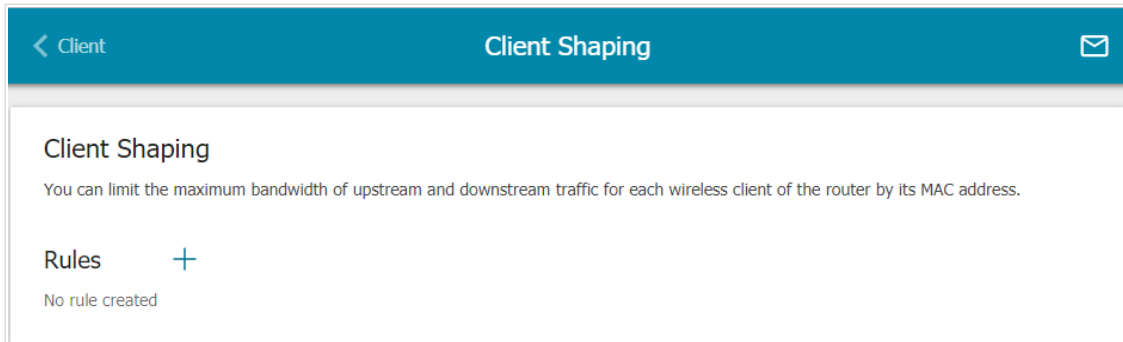


Figure 140. The **Wi-Fi / Client Shaping** page.

If you want to limit the maximum bandwidth of traffic for the router's wireless client, create a relevant rule. To do this, click the **ADD** button (**+**).

The 'Add Rule' window is shown with a teal header containing the title 'Add Rule' and a close button. The form includes several fields: 'Frequency band' set to '2.4 GHz', 'SSID' set to 'DVG-XXX', and a toggle switch for 'Enabled' which is turned on. There is a 'MAC address*' field with a dropdown arrow. Below this, the 'Upload' section has a toggle switch for 'Not limited' which is turned off, followed by a 'Maximum rate (Mbit/s)*' input field. The 'Download' section also has a toggle switch for 'Not limited' which is turned off, followed by another 'Maximum rate (Mbit/s)*' input field. A blue 'SAVE' button is located at the bottom of the window.


Figure 141. The window for setting up rate limit.


In the opened window, you can specify the following parameters:

Parameter	Description
Frequency band	From the drop-down list, select a band of the wireless network.
SSID	A wireless network to which the rule will be applied. Select the needed value from the drop-down list.
Enabled	If the switch is moved to the right, the rule is active. Move the switch to the left to disable the rule.
MAC address	In the field, enter the MAC address to which the rule will be applied. 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).
Upload	
Maximum rate	Specify the maximum value of the upstream traffic rate (Mbps) or move the Not limited switch to the right not to limit the maximum bandwidth of upstream traffic.
Download	
Maximum rate	Specify the maximum value of the downstream traffic rate (Mbps) or move the Not limited switch to the right not to limit the maximum bandwidth of downstream traffic.

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

To edit a rule, left-click the relevant rule. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a rule, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

To set a schedule for the bandwidth limitation rule, click the **Set schedule** icon () in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the bandwidth limitation rule at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the bandwidth limitation rule at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To change or delete the schedule for a rule, click the **Edit schedule** icon (🕒) in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

Additional

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

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

The screenshot shows the 'Additional' settings page for the 2.4 GHz band. The page is titled 'Wi-Fi Additional Settings' and includes a sub-header 'You can define additional parameters for the WLAN of the router.' The settings are organized into two columns. The left column includes: Bandwidth (Auto), Autonegotiation 20/40 (Coexistence) (disabled), TX power (100), Preamble (Auto), Drop multicast (disabled), Enable TX Beamforming (checked), and STBC (checked). The right column includes: B/G protection (Auto), Short GI (Enable), Beacon period (100), RTS threshold (2347), Frag threshold (2346), DTIM period (1), and Station Keep Alive (0). An 'APPLY' button is located at the bottom left of the settings area.

Figure 142. Additional settings of the WLAN.

The following fields are available on the page:

Parameter	Description
<p>Bandwidth</p>	<p>The channel bandwidth for 802.11n standard in the 2.4GHz band (the 2.4 GHz tab).</p> <ul style="list-style-type: none"> • 20 MHz: 802.11n clients operate at 20MHz channels. • 20/40 MHz: 802.11n clients operate at 20MHz or 40MHz channels. • Auto: The router automatically chooses the most suitable channel bandwidth for 802.11n clients. <p>The channel bandwidth for 802.11n and 802.11ac standards in 5GHz band (the 5 GHz tab).</p> <ul style="list-style-type: none"> • 20 MHz: 802.11n and 802.11ac clients operate at 20MHz channels. • 20/40 MHz: 802.11n and 802.11ac clients operate at 20MHz or 40MHz channels. • 20/40/80 MHz: 802.11ac clients operate at 20MHz, 40MHz, or 80MHz channels. • Auto: The router automatically chooses the most suitable channel bandwidth for 802.11n and 802.11ac clients.
<p>Autonegotiation 20/40 (Coexistence)</p>	<p><i>Available on the 2.4 GHz tab.</i></p> <p>Move the switch to the right to let the router automatically choose the most suitable channel bandwidth (20MHz or 40MHz) for the connected devices (this setting can substantially lower the data transfer rate of your wireless network). The switch is displayed when the 20/40 MHz or Auto value is selected from the Bandwidth drop-down list.</p>
<p>TX power</p>	<p>The transmit power (in percentage terms) of the router.</p>
<p>Preamble</p>	<p>This parameter defines the length of the CRC block sent by the router when communicating to wireless devices.</p> <p>Select the needed value from the drop-down list.</p> <ul style="list-style-type: none"> • Auto: The length of the block is defined automatically. • Long: The long block. • Short: The short block (this value is recommended for networks with high-volume traffic).

Parameter	Description
<p>Enable DFS</p>	<p><i>Available on the 5 GHz tab.</i></p> <p>Move the switch to the right to enable the DFS (<i>Dynamic Frequency Selection</i>) mechanism. Upon that the router uses the channels at which radars and other mobile or stationary radio systems can operate, but switches to other channels if these devices require this. In order to use the DFS mechanism, the automatic channel selection should be enabled (on the Wi-Fi / Basic Settings page).</p> <p>Move the switch to the left not to let the router use the channels at which radars and other mobile or stationary radio systems can operate.</p>
<p>Drop multicast</p>	<p>Move the switch to the right to disable multicasting for the router's WLAN. Move the switch to the left to enable multicasting from the WAN connection selected on the Advanced / IGMP page.</p>
<p>Enable TX Beamforming</p>	<p>TX Beamforming is the signal processing/directing technique which helps to support a high enough transfer rate in the areas with difficult conditions for the signal propagation.</p> <p>Move the switch to the right to improve the signal quality.</p>
<p>STBC</p>	<p>The STBC (<i>Space-time block coding</i>) technique allows increasing data transfer reliability even for portable devices equipped with poor antennas (smartphones, pads, etc.) due to using several data streams and processing several versions or received data.</p> <p>Move the switch to the right if you need to use the STBC technique.</p>
<p>B/G protection</p>	<p><i>Available on the 2.4 GHz tab.</i></p> <p>The 802.11b and 802.11g protection function is used to minimize collisions between devices of your wireless network.</p> <p>Select a value from the drop-down list.</p> <ul style="list-style-type: none"> • Auto: The protection function is enabled and disabled automatically depending on the state of the network (this value is recommended if your wireless local area network consists of both 802.11b and 802.11g devices). • Always On: The protection function is always enabled (this setting can substantially lower the efficiency of your wireless network). • Always Off: The protection function is always disabled.

Parameter	Description
Short GI	<p>Guard interval (in nanoseconds). This parameter defines the interval between symbols transmitted when the router is communicating to wireless devices.</p> <ul style="list-style-type: none">• Enable: The router uses the 400 ns short guard interval. Only for the wireless network operating modes which support 802.11n and 802.11ac standards (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.
Beacon period	<p>The time interval (in milliseconds) between packets sent to synchronize the wireless network.</p>
RTS threshold	<p>The minimum size (in bytes) of a packet for which an RTS frame is transmitted.</p>
Frag threshold	<p>The maximum size (in bytes) of a non-fragmented packet. Larger packets are fragmented (divided).</p>
DTIM period	<p>The number of beacon frames between sending DTIM messages (messages notifying on broadcast or multicast transmission).</p>
Station Keep Alive	<p>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.</p>

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

MAC Filter

On the **Wi-Fi / MAC Filter** page, 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.

! It is recommended to configure the Wi-Fi MAC filter through a wired connection to DVG-5402G/GF.

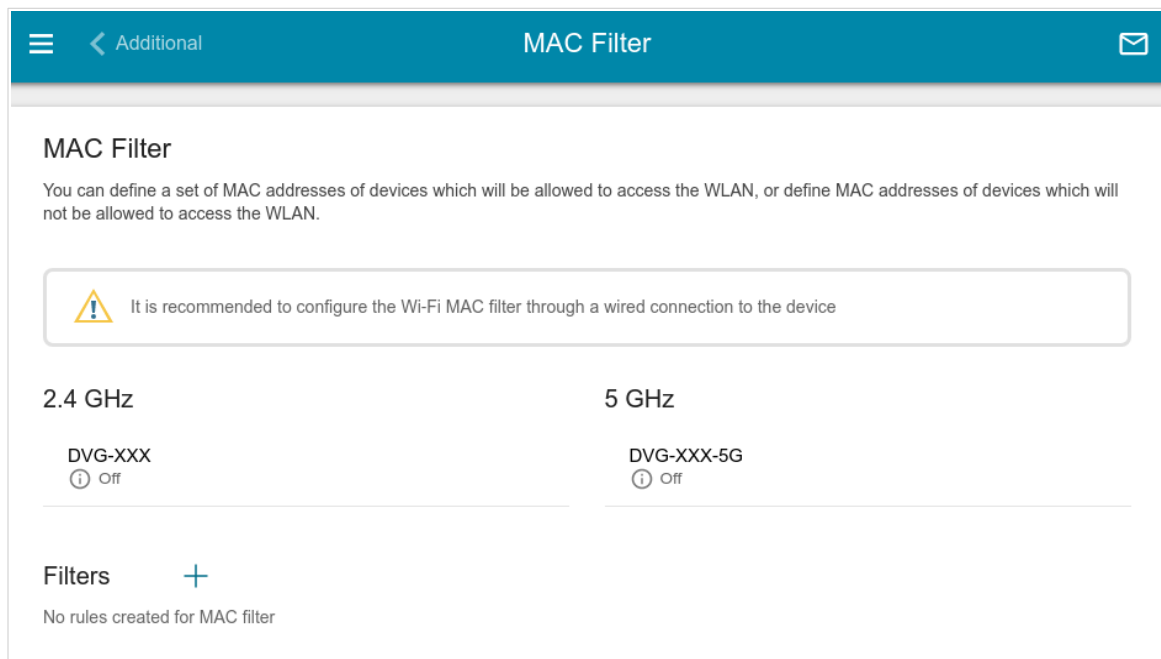


Figure 143. The page for configuring the MAC filter for the wireless network.

By default, the Wi-Fi MAC filter is disabled.

To configure the MAC filter, first you need to create rules (specify MAC addresses of devices for which the specified filtering modes will be applied). To do this, click the **ADD** button (+).

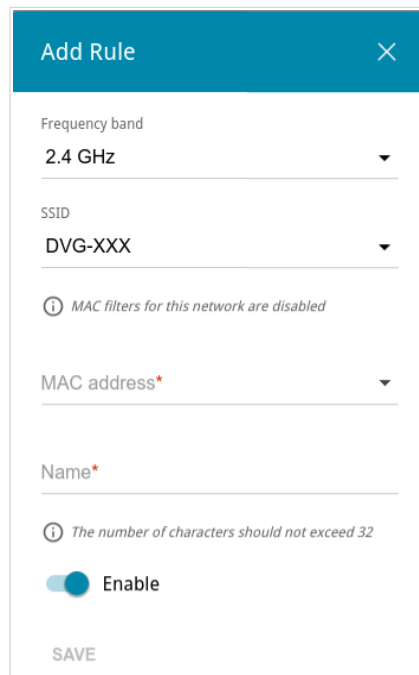


Figure 144. The window for adding a rule for the MAC filter.

You can specify the following parameters:

Parameter	Description
Frequency band	From the drop-down list, select a band of the wireless network.
SSID	A wireless network to which the rule will be applied. Select the needed value from the drop-down list.
MAC address	In the field, enter the MAC address to which the selected filtering mode will be applied.
Name	The name of the device for easier identification. You can specify any name.
Enable	If the switch is moved to the right, the rule is active. Move the switch to the left to disable the rule.

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

To edit the parameters of the existing rule, in the **Filters** section, left-click the needed rule. In the opened window, change the settings and click the **SAVE** button.

To remove the rule from the page, in the **Filters** section, select the checkbox located to the left of the relevant rule and click the **DELETE** button (🗑️).

After creating the rules you need to configure the filtering modes.

To open the basic or additional wireless network for the devices which MAC addresses are specified on this page and to close the wireless network for all other devices, in the section corresponding to the band (**2.4 GHz** or **5 GHz**), left-click the line of the wireless network. In the opened window, move the **Enable MAC filter** switch to the right. Upon that the **MAC filter restrict mode** drop-down list will be displayed. Select the **Allow** value from the drop-down list and click the **SAVE** button.

To close the wireless network for the devices which MAC addresses are specified on this page, select the **Deny** value from the **MAC filter restrict mode** drop-down list and click the **SAVE** button.

To set a schedule for the MAC filter rule, click the **Set schedule** icon (🕒) in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the MAC filter rule at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the MAC filter rule at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To change or delete the schedule for a rule, click the **Edit schedule** icon (🕒) in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

Print Server

On the **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 the printer to the USB port of the router, power on the printer, then power on the router.

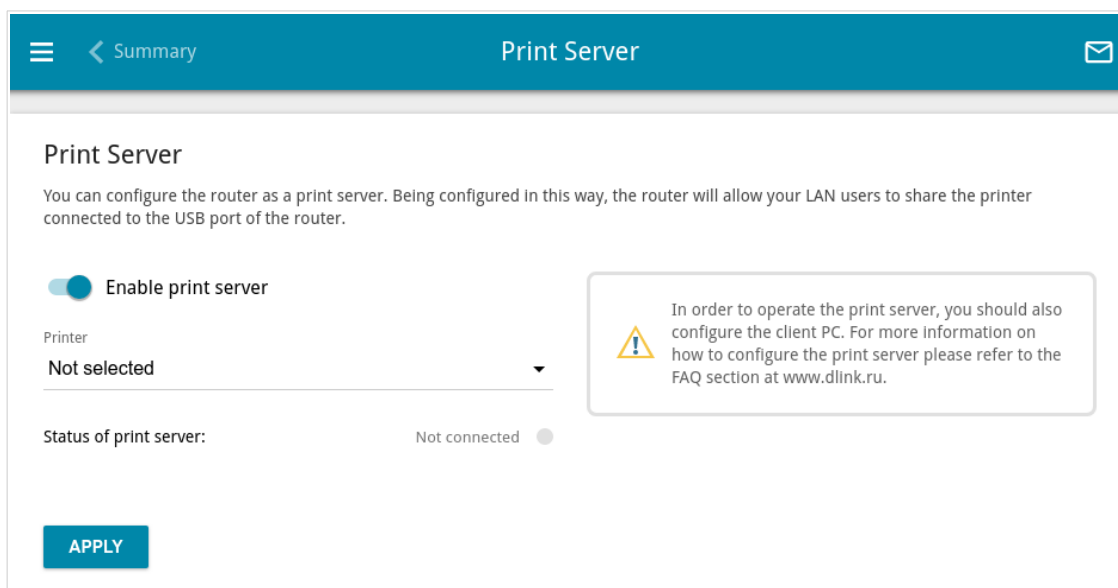


Figure 145. The Print Server page.

To configure the router as a print server, move the **Enable print server** switch to the right. Make sure that the printer connected to the router is selected from the **Printer** drop-down list. Click the **APPLY** button. The status of the connected device will be displayed in the **Status of print server** field.

If you don't want to use the router as a print server, move the **Enable print server** switch to the left and click the **APPLY** button.

USB Storage

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

- view data on the connected USB storage
- create accounts for users to allow access to the content of the USB storage
- enable the built-in Samba server of the router
- enable the built-in FTP server of the router
- view content of the connected USB storage
- enable the built-in DLNA server of the router
- configure the built-in Transmission torrent client and manage distributing and downloading processes
- enable the XUPNPD plug-in.

Information

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

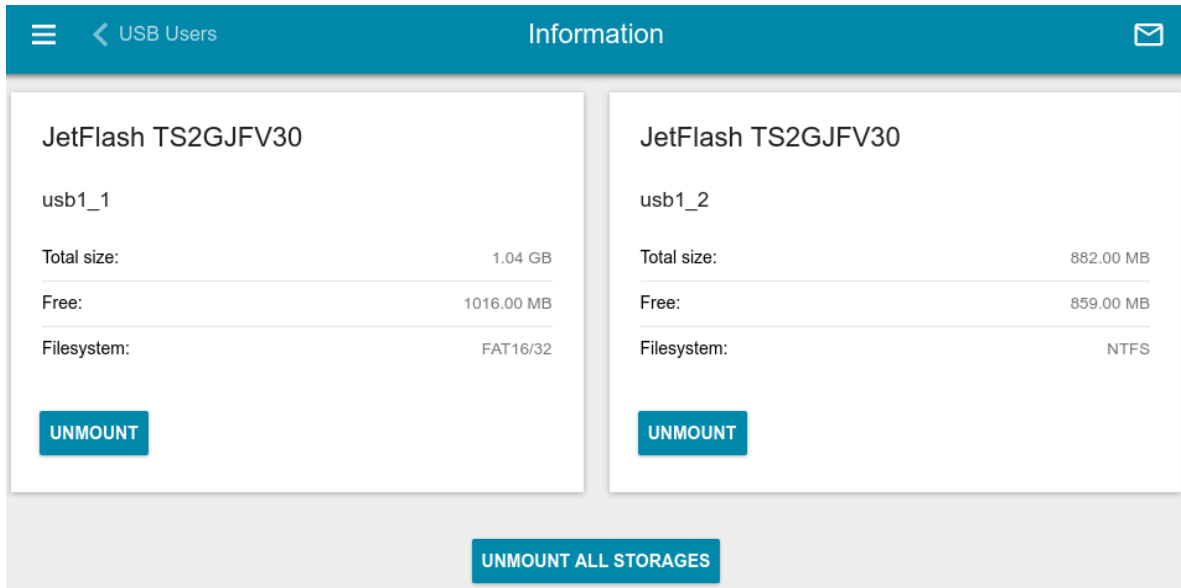


Figure 146. The **USB Storage / Information** page.

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, exFAT, NTFS, ext2/3/4).

If the USB storage is divided into volumes, a section for every volume (partition) of the USB storage is displayed on the page.

To safely disconnect the USB storage or a volume of the USB storage, click the **UNMOUNT** button in the relevant section and wait for several seconds.

To disconnect all volumes of the USB storage, click the **UNMOUNT ALL STORAGES** button.

USB Users

On the **USB Storage / USB Users** page, you can create user accounts to provide access to data on the USB storage connected to the router.

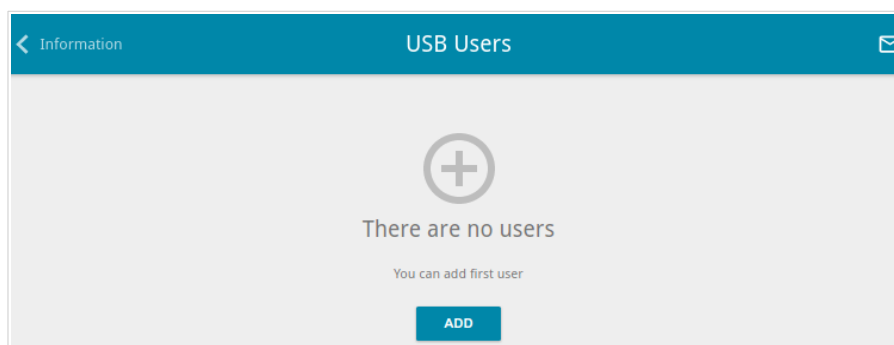



Figure 147. The **USB Storage / USB Users** page.

To create a new user account, click the **ADD** button ().

The screenshot shows a modal window titled 'Add User' with a close button (X) in the top right corner. It contains three input fields: 'Username*' with a red asterisk and a teal information icon below it with the text 'The number of characters should not exceed 32'; 'Password*' with a red asterisk and a teal eye icon to toggle visibility; and a 'Read only' toggle switch which is currently turned off. At the bottom of the window is a 'SAVE' button.

Figure 148. The window for adding a user.

In the opened window, in the **Username** field, specify a username, and in the **Password** field – the password for the account. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout.¹⁵

 Some reserved words (e.g., **root**, **admin**, **nobody**, etc.) cannot be usernames.


Move the **Read only** switch to the right not to let the user create, change, or delete files.

Click the **SAVE** button.

To view passwords of all user accounts, move the **Show password** switch to the right.

¹⁵ 0-9, A-Z, a-z, space, !"#%&'()*+,-./:;<=>?@[\\]^_`{|}~.

To edit the parameters of an account, select the relevant line in the table. In the opened window, enter a new value in the relevant field, and then click the **SAVE** button.

To remove an account, select the checkbox located to the left of the relevant line in the table and click the **DELETE** 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.

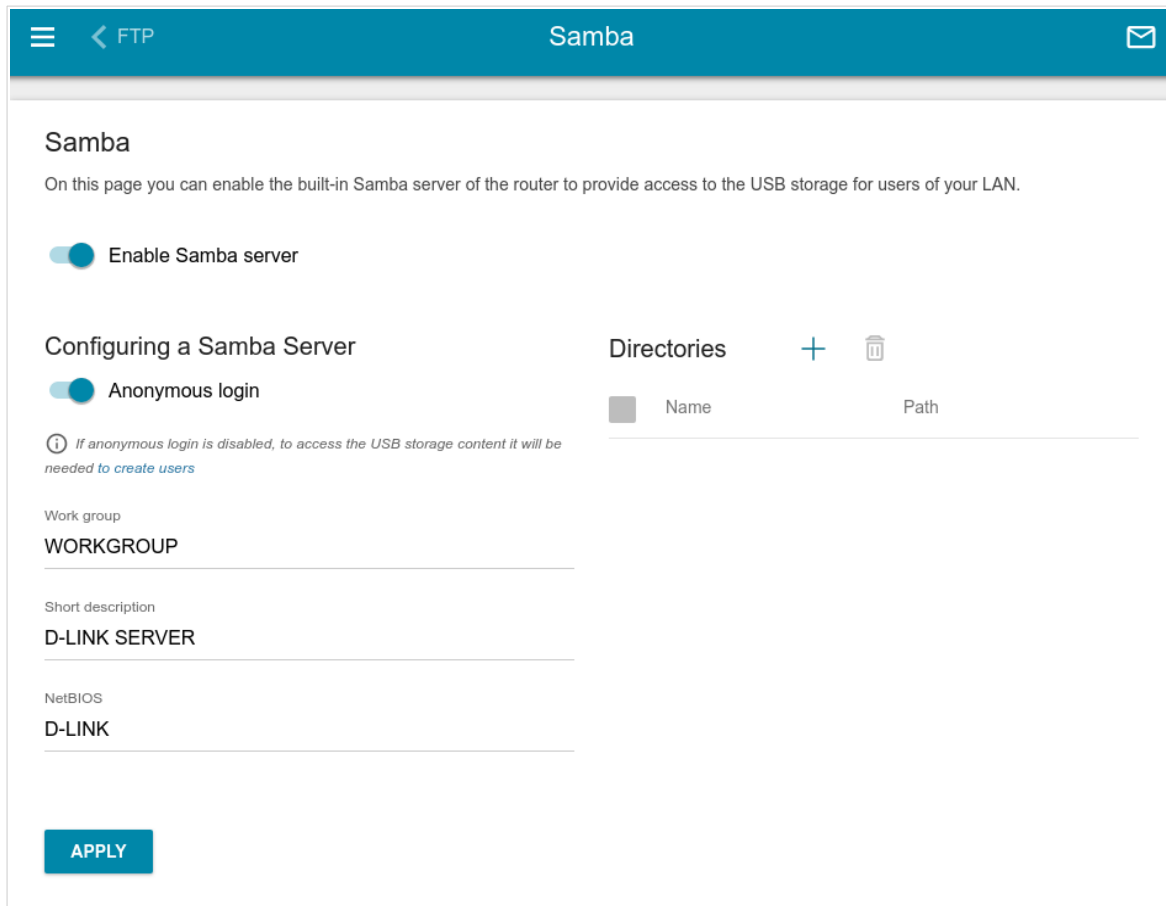


Figure 149. The **USB Storage / Samba** page.

To enable the Samba server, move the **Enable Samba server** switch to the right.

The **Anonymous login** switch (by default, the switch is moved to the right) allows 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, move the switch to the left. After applying the parameters on this page, go to the **USB Storage / USB Users** page and create needed accounts.

In the **Work group** 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 name of the USB storage which will be displayed for users of your LAN. Use digits and/or Latin characters.

To allow access only to a certain folder of the USB storage, click the **ADD** (+) button in the **Directories** section.

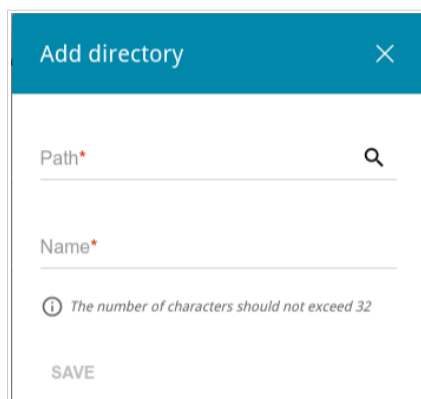


Figure 150. Specifying a folder.

In the opened window, locate a folder containing files. To do this, click the **Search** icon (🔍) in the **Path** field. Then go to the needed folder and click the **SELECT** button.

In the **Name** field, specify a name of the selected folder which will be displayed for users of your LAN. Use digits and/or Latin characters.

Click the **SAVE** button.

To remove a folder from the list in the **Directories** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (🗑️).

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

To disable the built-in Samba server of the router, move the **Enable Samba server** switch to the left 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.

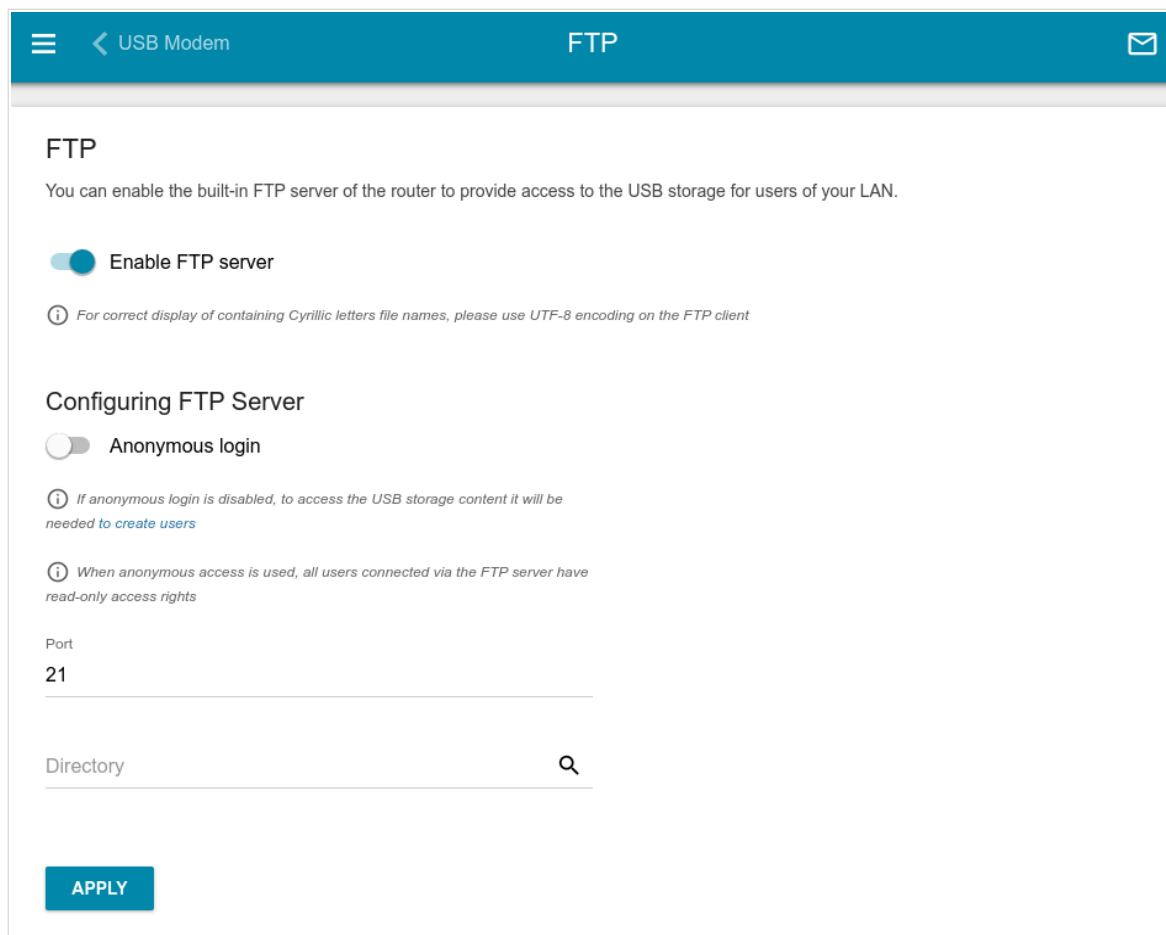



Figure 151. The **USB Storage / FTP** page.

To enable the FTP server, move the **Enable FTP server** switch to the right.

Move the **Anonymous login** switch to the right to allow 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, move the switch to the left. After applying the parameters on this page, go to the **USB Storage / USB Users** page and create needed accounts.

If needed, change the router's port used by the FTP server in the **Port** field (by default, the standard port **21** is specified).

To allow access only to a certain folder of the USB storage for users of your LAN, locate a folder containing files. To do this, click the **Search** icon () in the **Directory** field. Then go to the needed folder and click the **SELECT** button.

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

To allow access to all the content of the USB storage for users of your LAN again, remove the value specified in the **Directory** field and click the **APPLY** button.

To disable the built-in FTP server of the router, move the **Enable FTP server** switch to the left and click the **APPLY** 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.

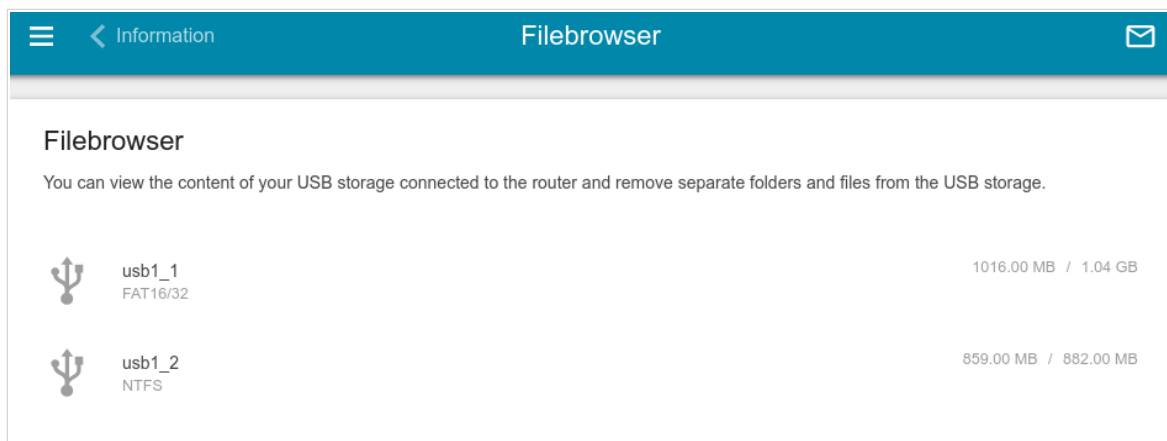




Figure 152. The **USB Storage / Filebrowser** page.

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

To go to a folder, click the line corresponding to this folder.

To refresh the folder contents, click the **Actions** icon () in the line corresponding to this folder and select the **Refresh** value.

To remove a folder or file, click the **Actions** icon () in the line corresponding to this folder or file and select the **Delete** value.

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.

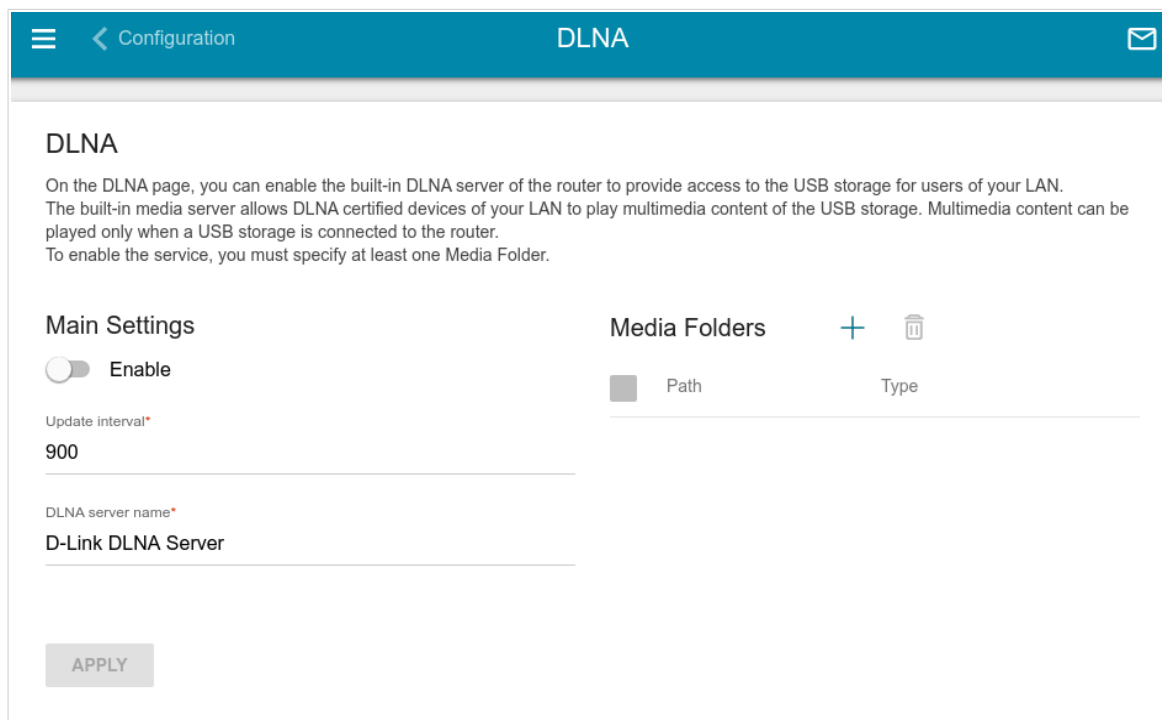


Figure 153. The **USB Storage / DLNA** page.

To enable the DLNA server, move the **Enable** switch to the right.

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**).

In the **DLNA server name** field, specify a name of the DLNA server which will be displayed for users of 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 **Media Folders** section.

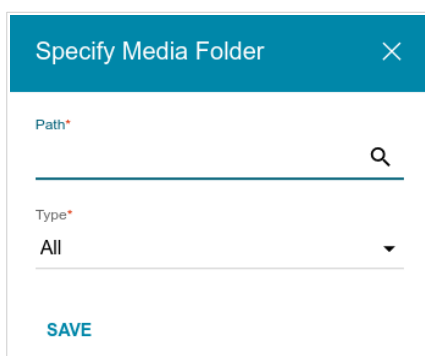



Figure 154. Specifying a media folder.

In the opened window, locate a folder containing files. To do this, click the **Search** icon () in the **Path** field. Then go to the needed folder and click the **SELECT** 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.

Click the **SAVE** button.

To remove a folder from the list in the **Media Folders** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** () button.

After specifying all needed settings on the **USB Storage / DLNA** page, click the **APPLY** button.

To disable the built-in DLNA server of the router, move the **Enable** switch to the left and click the **APPLY** button.

Torrent Client

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

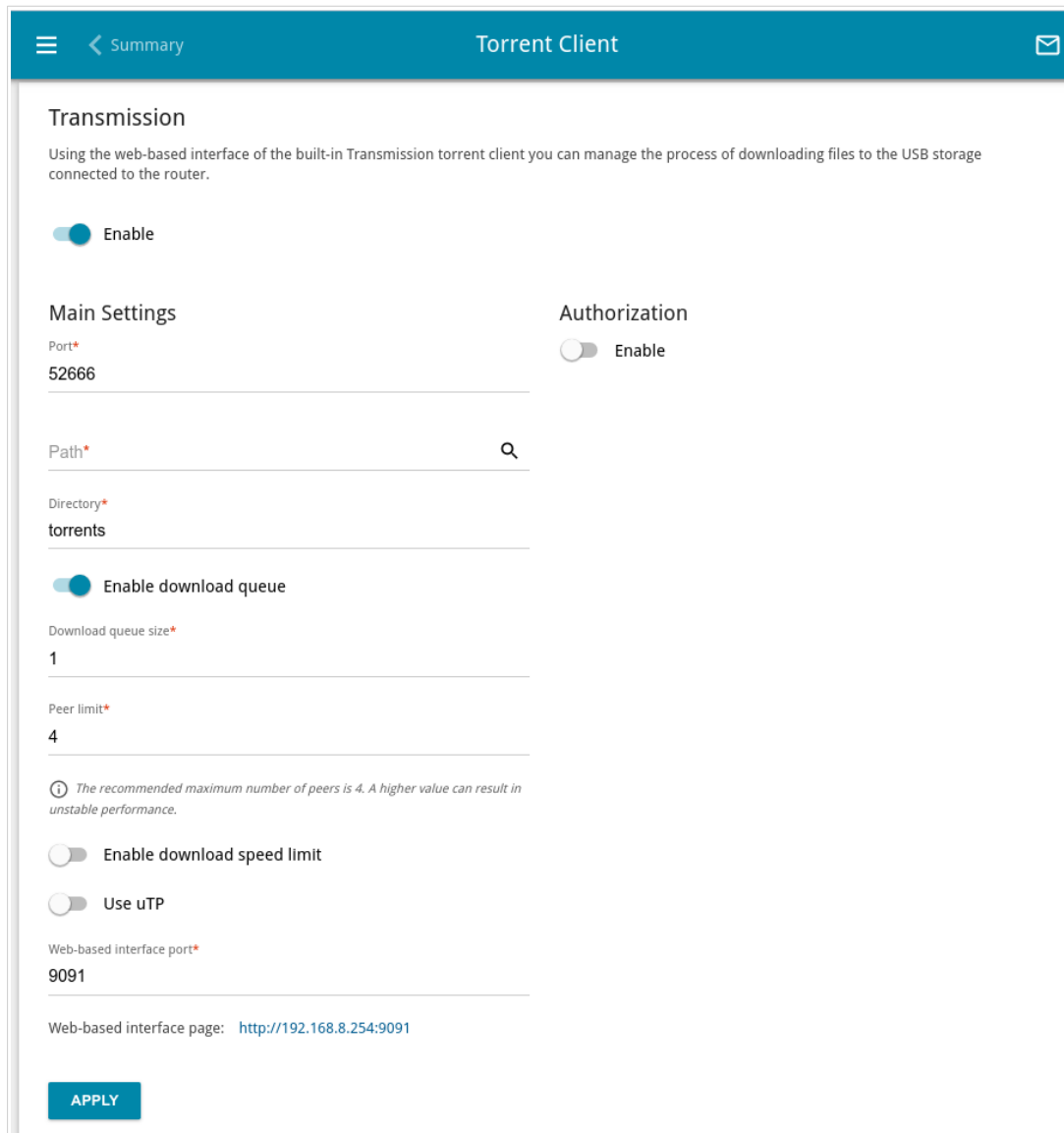



Figure 155. The **USB Storage / Torrent Client** page.

You can specify the following parameters:

Parameter	Description
Transmission	
Enable	Move the switch to the right to activate the Transmission client.
Main Settings	
Port	The router's port which will be used by the Transmission client.

Parameter	Description
Path	Locate data of the Transmission client. To do this, click the Search icon (), select the needed value, and click the SELECT button.
Directory	The folder on the USB storage where data of the Transmission client will be stored.
Enable download queue	<p>Move the switch to the right if you want to limit the number of simultaneous downloads. Upon that the Download queue size field will be displayed.</p> <p>Move the switch to the left not to limit the number of simultaneous downloads.</p>
Download queue size	The maximum number of simultaneous downloads. By default, the value 1 is specified.
Peer limit	The maximum number of the service users from which you can download files.
Enable download speed limit	<p>Move the switch to the right to limit the maximum file download speed. In the Download speed limit field displayed, specify the maximum value of speed (KBps).</p> <p>Move the switch to the left not to limit the maximum download speed.</p>
Use uTP	<p>Move the switch to the right to enable μTP (<i>Micro Transport Protocol, a transport protocol for file sharing</i>). Such a setting can increase the load on the router.</p> <p>Move the switch to the left to disable μTP.</p>
Web-based interface port	The port on which the web-based interface of the Transmission client is available.
Authorization	
Enable	Move the switch to the right if you want the Transmission client to request for username and password when accessing its web-based interface. Then fill in the Username and Password fields.
Username	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-based 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.

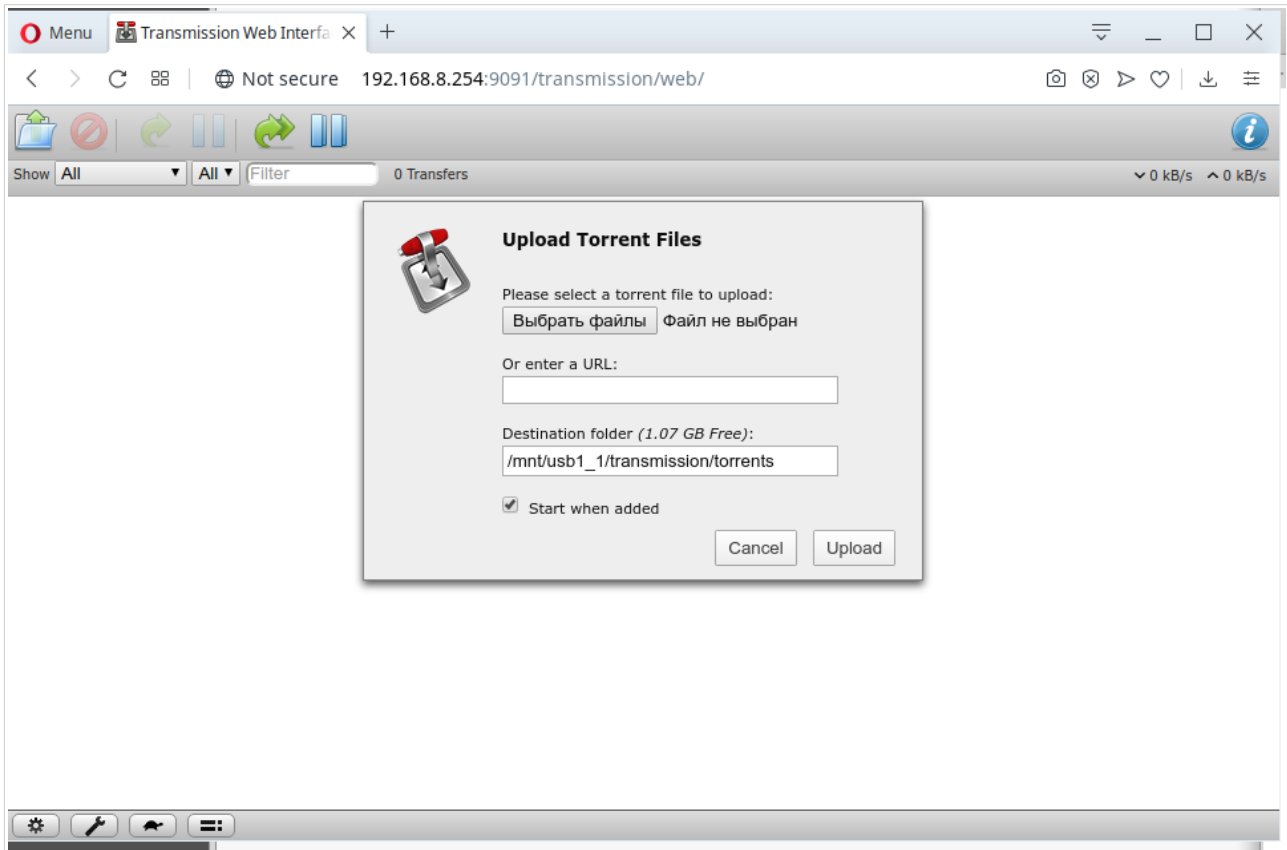









Figure 156. The web-based interface of the Transmission torrent client.

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.

The following buttons are available on the page:

Parameter	Description
 Open Torrent	Click the button to add a new torrent file (a metadata file according to which the Transmission client downloads files) to the download queue. In the dialog box appeared, select a file stored on your PC and click the Upload button.
 Remove Selected Torrents	Select the torrent file which you want to remove from the download queue and click the button.
 Start Selected Torrents	Select the torrent file corresponding to the download which should be restarted and click the button.

Parameter	Description
 Start All Torrents	Click the button to restart all downloads. If you limited the maximum number of simultaneous downloads, the Transmission client starts processing of the specified number of torrent files; after completing download of the first one, the client proceeds to the next file in the queue.
 Pause Selected Torrents	Select the torrent file corresponding to the download which should be stopped and click the button.
 Pause All Torrents	Click the button to stop all downloads.
 Toggle Inspector	Select a torrent file and click the button to view its data.

XUPNPD

On the **USB Storage / XUPNPD** page, you can enable the XUPNPD plug-in. It allows to broadcast media content received from the Internet sources or IPTV service to DLNA-certified devices of your LAN.

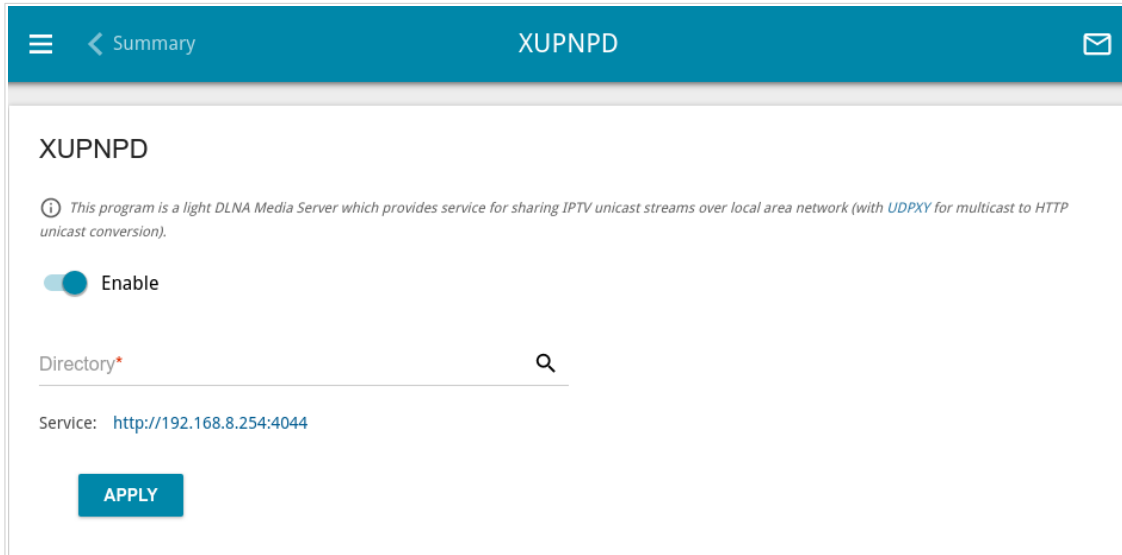



Figure 157. The **USB Storage / XUPNPD** page.

To use the XUPNPD plug-in, connect a USB storage to the router and move the **Enable** switch to the right.



To let IPTV services operate using the XUPNPD plug-in, enable the UDPXY application.

In the **Directory** field, locate a folder to which playlists added on the page of the XUPNPD plug-in will be saved. To do this, click the **Search** icon (), then go to the needed folder and click the **SELECT** button.

Click the **APPLY** button.

In the **Service** field, the address of the web-based interface of the XUPNPD plug-in is displayed. To access the page of the XUPNPD plug-in and configure all needed settings, click the link.

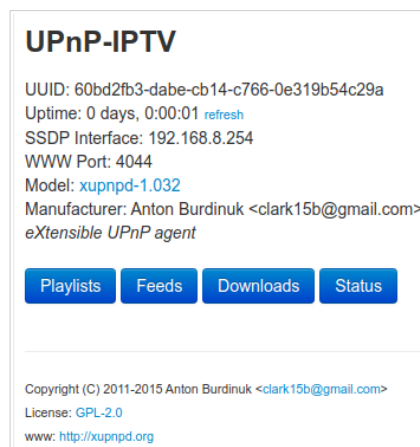


Figure 158. The XUPNPD plug-in page.

USB Modem

This menu is designed to operate USB modems.

! Some models of USB modems do not allow performing operations available in this menu section through the web-based interface of the router.

If the PIN code check for the SIM card inserted into the USB modem is not disabled, the relevant notification will be displayed in the top right corner of the page.

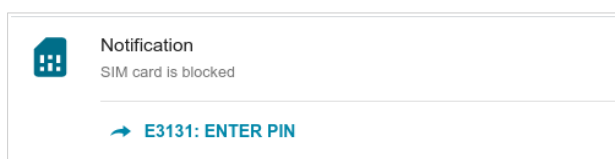


Figure 159. The notification on the PIN code check.

Click the **ENTER PIN** button and enter the PIN code in the **PIN input** window. Click the **Show** icon (🔍) to display the entered code. Then click the **APPLY** button.

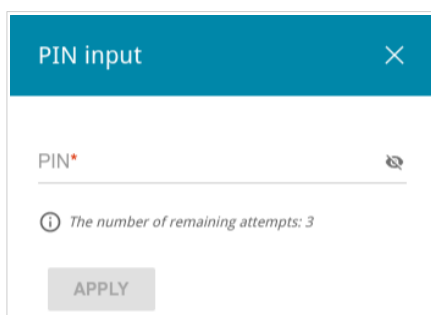


Figure 160. The window for entering the PIN code.

Some USB modems in the router mode and Android smartphones in the modem mode have an IP address from the subnet which coincides with the router's local subnet. In this case, the router's web-based interface can be unavailable. For correct operation, disconnect the device from the USB port and reboot the router. Then access the web-based interface, go to the **Connections Setup / LAN** page, and change the value of the **IP address** field on the **IPv4** tab (for example, specify the value **192.168.2.1**). Wait until the router is rebooted.

Basic Settings

On the **USB Modem / Modem name / Basic Settings** page, you can view data on the USB modem connected to the router, change the PIN code of the SIM card inserted into your USB modem, disable or enable the check of the PIN code.

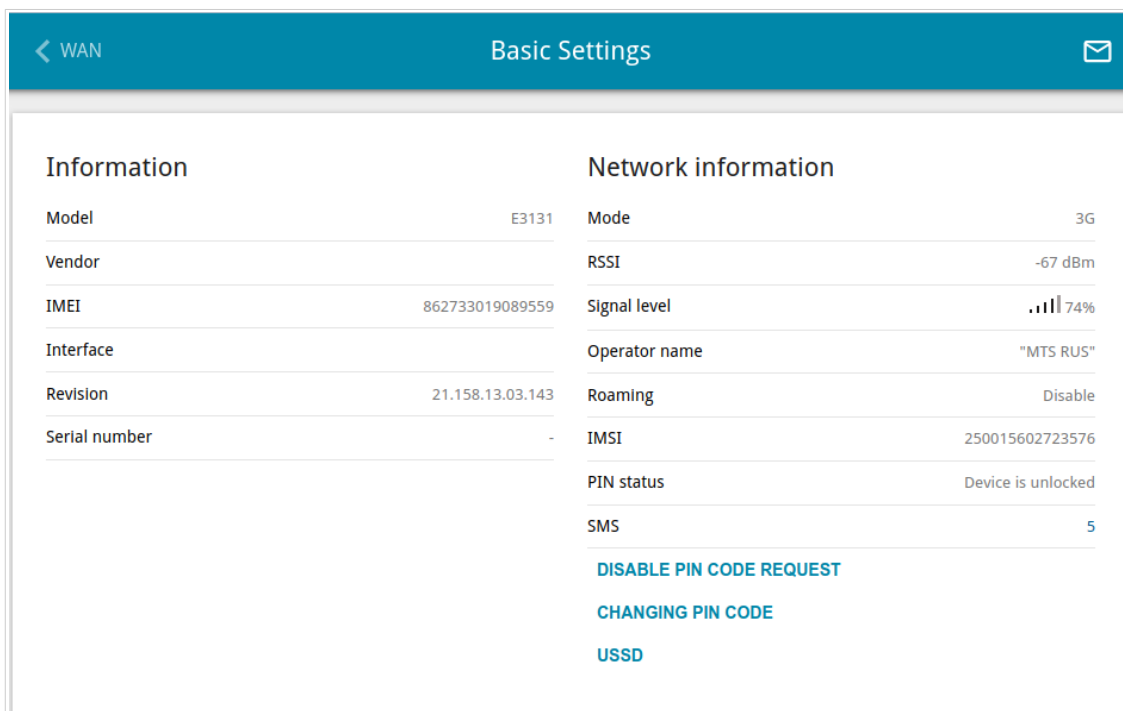


Figure 161. The **USB Modem / Modem name / Basic Settings** page.

If the PIN code check for the SIM card inserted into your USB modem is disabled, then an active WAN connection with default settings (for LTE modems) or the operator's settings (for GSM modems) will be automatically created when plugging the USB modem into the router. The connection will be displayed on the **Connections Setup / WAN** page.

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

Parameter	Description
Information	
Model	The alphanumeric code of the model of your USB modem.
Vendor	The manufacturer of your USB modem.
IMEI	The code stored in the memory of the USB modem.
Interface	The network interface name.
Revision	The revision of the firmware of your USB modem.
Serial number	The unique identifier assigned to the device by its manufacturer.

Parameter	Description
Network information	
Mode	A type of the network to which the USB modem is connected.
RSSI	The strength of the signal received by 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	The name of the mobile operator providing the service.
Roaming	Roaming mode status of the SIM card inserted into the USB modem.
IMSI	The code stored in the SIM card inserted into your USB modem.
PIN status	PIN code request status of the SIM card inserted into the USB modem.
SMS	The number of text messages stored in the memory of the SIM card inserted into the USB modem. Click the number of text messages in the line to go to USB Modem / Modem name / SMS page.

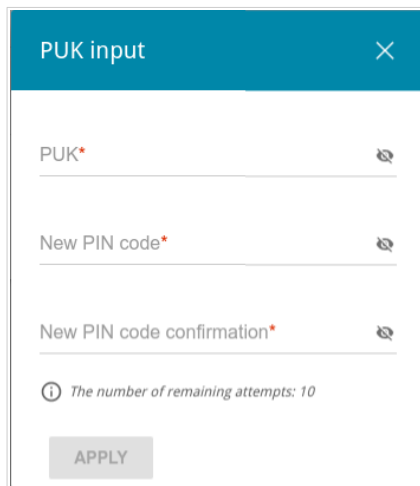
If the PIN code check for the SIM card inserted into your USB modem is not disabled, the **PIN INPUT** button is displayed on the page.

To disable the PIN code check, click the **DISABLE PIN CODE REQUEST** button (the button is displayed if the PIN code check is enabled). In the opened window, enter the current PIN code in the **PIN code** field and click the **DISABLE** button.

To enable the PIN code check, click the **ENABLE PIN CODE REQUEST** button (the button is displayed if the PIN code check is disabled). In the opened window, enter the PIN code used before disabling the check in the **PIN code** field and click the **ENABLE** button.

To change the PIN code, click the **CHANGING PIN CODE** button (the button is displayed if the PIN code check is enabled). In the opened window, 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 **SAVE** 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 PIN input window), the SIM card inserted into your USB modem is blocked.



The screenshot shows a modal window titled "PUK input" with a close button in the top right corner. It contains three input fields, each with a "Show" icon (an eye with a slash) to its right. The fields are labeled "PUK*", "New PIN code*", and "New PIN code confirmation*". Below the fields, there is a status message: "The number of remaining attempts: 10". At the bottom of the window is an "APPLY" button.

Figure 162. The **USB Modem / Modem name / Basic Settings** page. The window for PUK code input.

For further use of the card, click the **PUK INPUT** button, enter the PUK code in the relevant field, and then specify a new PIN code for your SIM card in the **New PIN code** and **New PIN code confirmation** fields. Click the **Show** icon (👁) to display the entered values. Click the **APPLY** button.

Click the **USSD** button to go to the **USB Modem / Modem name / USSD** page.

SMS

When a new text message is received, the relevant notification will be displayed in the top right corner of the page. Click the **CHECK** button. After clicking the button, the **USB Modem / Modem name / SMS** page opens.

On the **USB Modem / Modem name / SMS** page, you can create and send a text message and also view the history and status of sent and received messages stored in the memory of the SIM card.

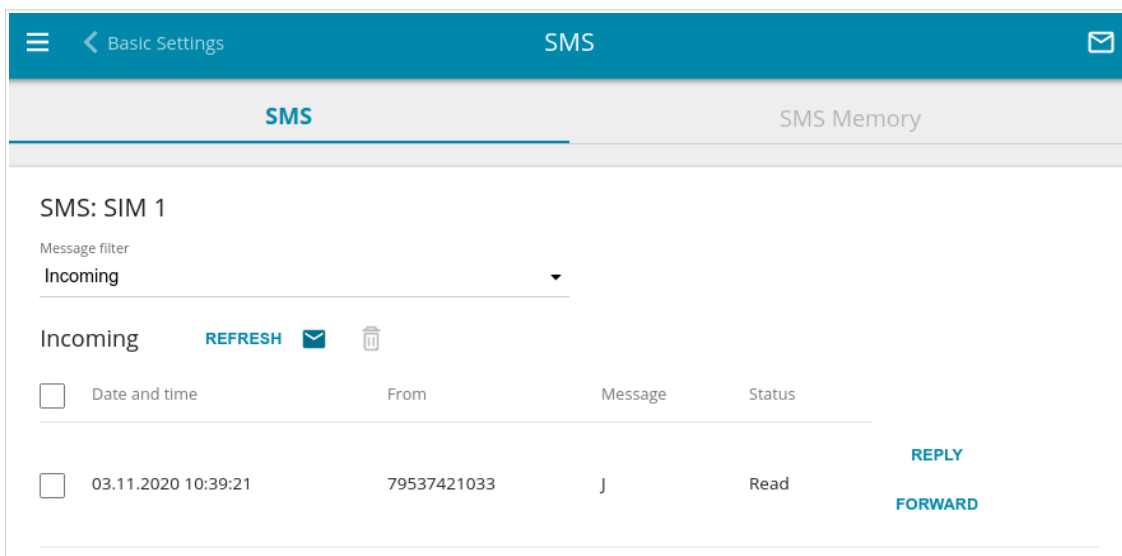


Figure 163. The **USB Modem / Modem name / SMS** page. The **SMS** tab.

To view all outgoing and incoming messages on the **SMS** tab, select the relevant value from the **Message filter** drop-down list.

To view the latest data on sent and received messages, click the **REFRESH** button.

To create and send a text message, click the **New message** button (✉).

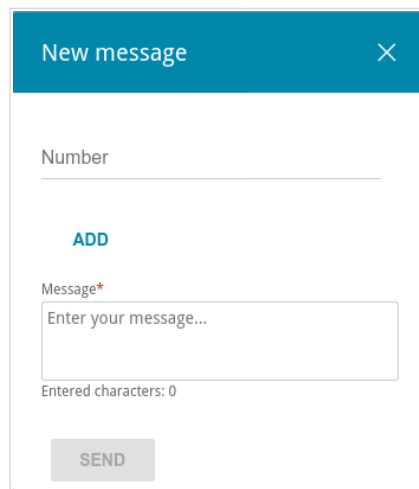


Figure 164. The window for creating a new text message.

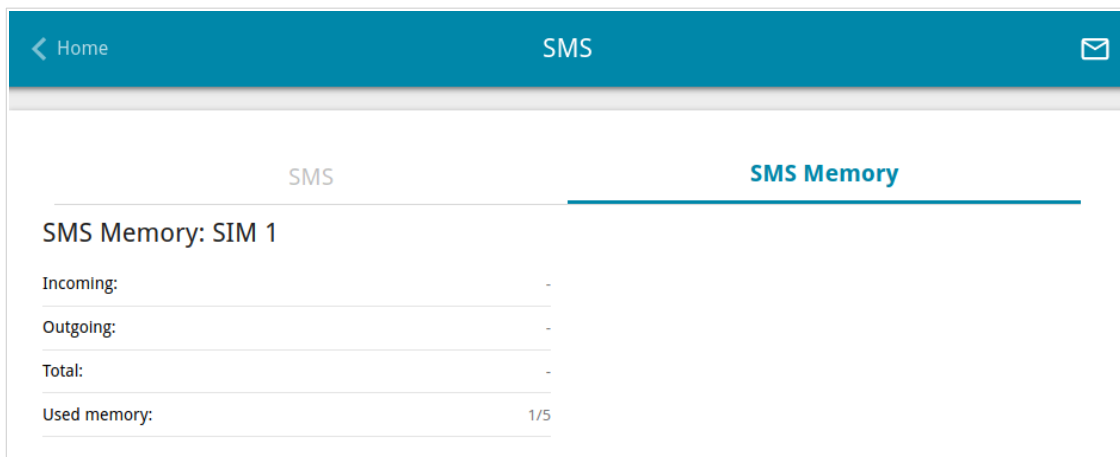
In the **Number** field, enter the recipient's phone number. If you need to send the text message to several recipients, click the **ADD** button, and in the line displayed, enter a phone number. Enter the text of the message in the **Message** field and click the **SEND** button.

To remove a message, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (🗑).

To reply to an incoming message, click the **REPLY** button in the line corresponding to the message.

To forward an incoming message, click the **FORWARD** button in the line corresponding to the message.

On the **SMS Memory** tab, you can view data on the number of messages and the state of the SIM card memory.



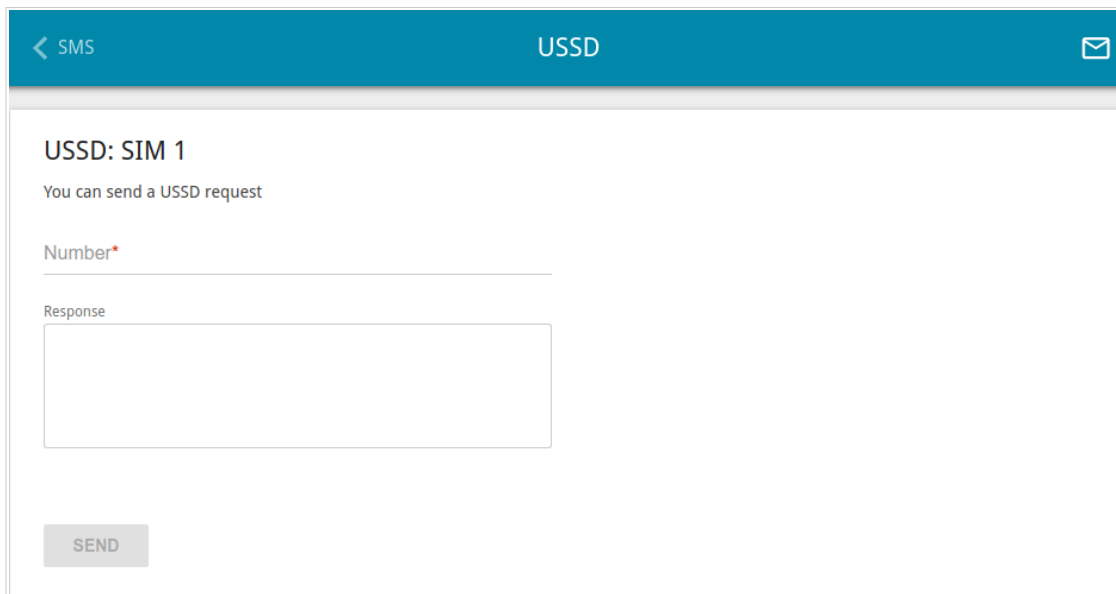
SMS Memory: SIM 1	
Incoming:	-
Outgoing:	-
Total:	-
Used memory:	1/5

Figure 165. The **USB Modem / Modem name / SMS** page. The **SMS Memory** tab.

USSD

On the **USB Modem / Modem name / USSD** page, you can send a USSD command.¹⁶

USSD (*Unstructured Supplementary Service Data*) is a technology which provides real-time message exchange between a subscriber and a mobile operator's special application. USSD commands are often used to check the SIM card balance, receive data on the rate plan or service packets, etc.



The screenshot shows a web interface for sending USSD commands. The header is teal with a back arrow, 'SMS', 'USSD', and an envelope icon. The main content area is white and contains the text 'USSD: SIM 1' and 'You can send a USSD request'. Below this are two input fields: 'Number*' and 'Response'. At the bottom left is a 'SEND' button.

Figure 166. The **USB Modem / Modem name / USSD** page.

In the **Number** field, enter a USSD command and click the **SEND** button. After a while, the results will be displayed in the **Response** field.

¹⁶ Contact your operator to get information on USSD commands and their functions.

Advanced

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

- create or edit VLANs
- allow the router to connect to a private Ethernet line
- add name servers
- configure a DDNS service
- configure autonegotiation or manually configure speed and duplex mode for each Ethernet port of the router
- configure notifications on the reason of the Internet connection failure
- define static routes
- configure TR-069 client
- enable the function of mirroring the router's ports
- enable the UPnP function
- enable the built-in UDPXY application for the router
- allow the router to use IGMP
- enable the RTSP, SIP ALG mechanisms, and PPPoE/PPTP/L2TP/IPsec pass through functions
- configure the CoovaChilli service.

VLAN

On the **Advanced / VLAN** page, you can edit existing and create new virtual networks (VLAN), e.g., for distinguishing traffic or specifying additional WAN interfaces.

By default, 2 VLANs are created in the router's system.

- **LAN**: For the LAN interface, it includes the LAN port and Wi-Fi networks. You cannot delete this VLAN.
- **SFP**: For the WAN interface; it includes the **SFP** port. You can edit or delete this VLAN.

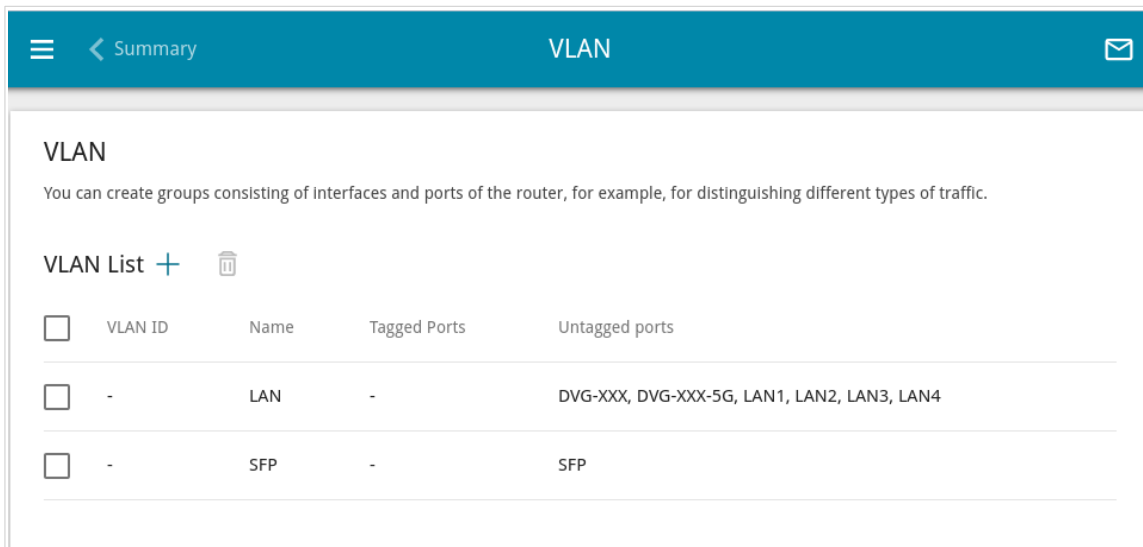


Figure 167. The **Advanced / VLAN** page.

In order to add an untagged LAN port or available Wi-Fi networks to an existing or new VLAN, first you need to exclude them from the **LAN** network on this page. To do this, select the **LAN** line. On the opened page, from the **Type** drop-down list of the element corresponding to the LAN port or Wi-Fi network, select the **Excluded** value and click the **APPLY** button.

To create a new VLAN, click the **ADD** button ().

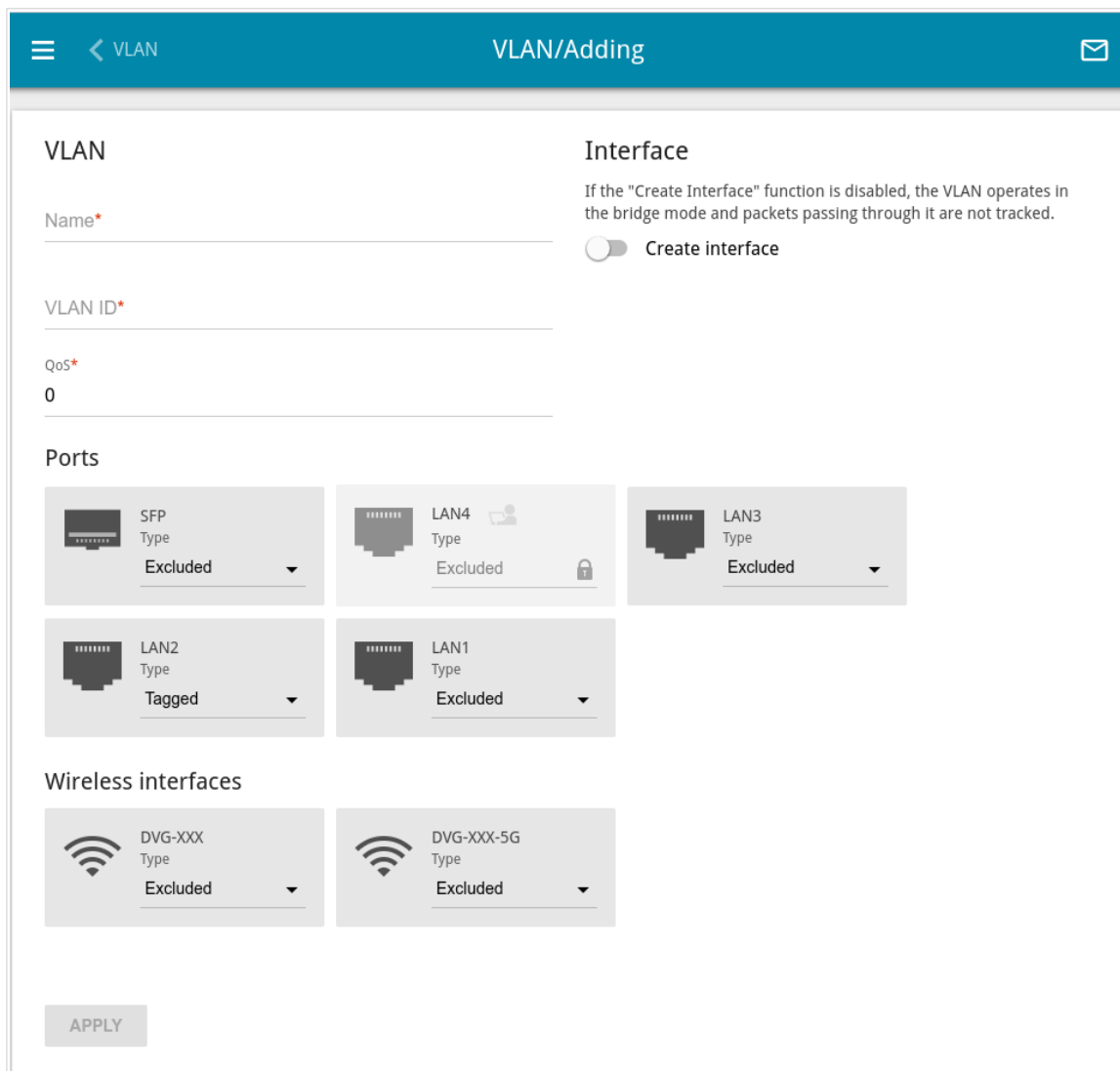


Figure 168. The page for adding a VLAN.


You can specify the following parameters:

Parameter	Description
Name	A name for the VLAN for easier identification.
VLAN ID	An identifier of the VLAN.
QoS	A priority tag for the transmitted traffic.
Create interface	<p>Move the switch to the right to create an interface that can be used for creating WAN connections.</p> <p>Move the switch to the left for the VLAN to work in the bridge mode. This mode is mostly used to connect IPTV set-top boxes.</p>

Parameter	Description
Ports	Select a type for each port included in the VLAN. <ul style="list-style-type: none">• Untagged: Untagged traffic will be transmitted through the specified port.• Tagged: Tagged traffic will be transmitted through the specified port. If at least one port of this type is included to the VLAN, it is required to fill in the VLAN ID and QoS fields. Leave the Excluded value for the ports not included in the VLAN.
Wireless interfaces	Select the Untagged value for each Wi-Fi interface included in the VLAN. Leave the Excluded value for the Wi-Fi interfaces not included in the VLAN.

Click the **APPLY** button.

To edit an existing VLAN, select the relevant line in the table. On the page displayed, change the parameters and click the **APPLY** button.

To remove an existing VLAN, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

WAN Remapping

On the **Advanced / WAN Remapping** page, you can configure the router to connect to a private Ethernet line.

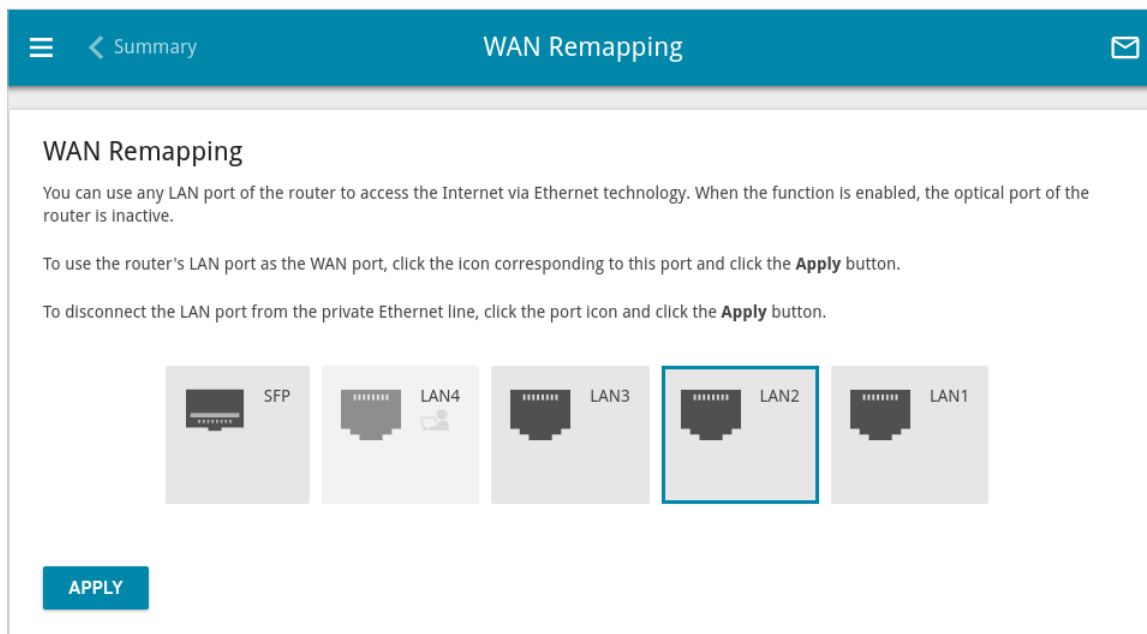


Figure 169. The **Advanced / WAN Remapping** page.

To use one of the router's LAN port as the WAN port, click the icon corresponding to this port and click the **APPLY** button. The port configured as the WAN port is highlighted in teal.

If in the future you need to disconnect the LAN port from the private Ethernet line, click the icon highlighted in teal and click the **APPLY** button.

DNS

On the **Advanced / DNS** page, you can add DNS servers to the system.

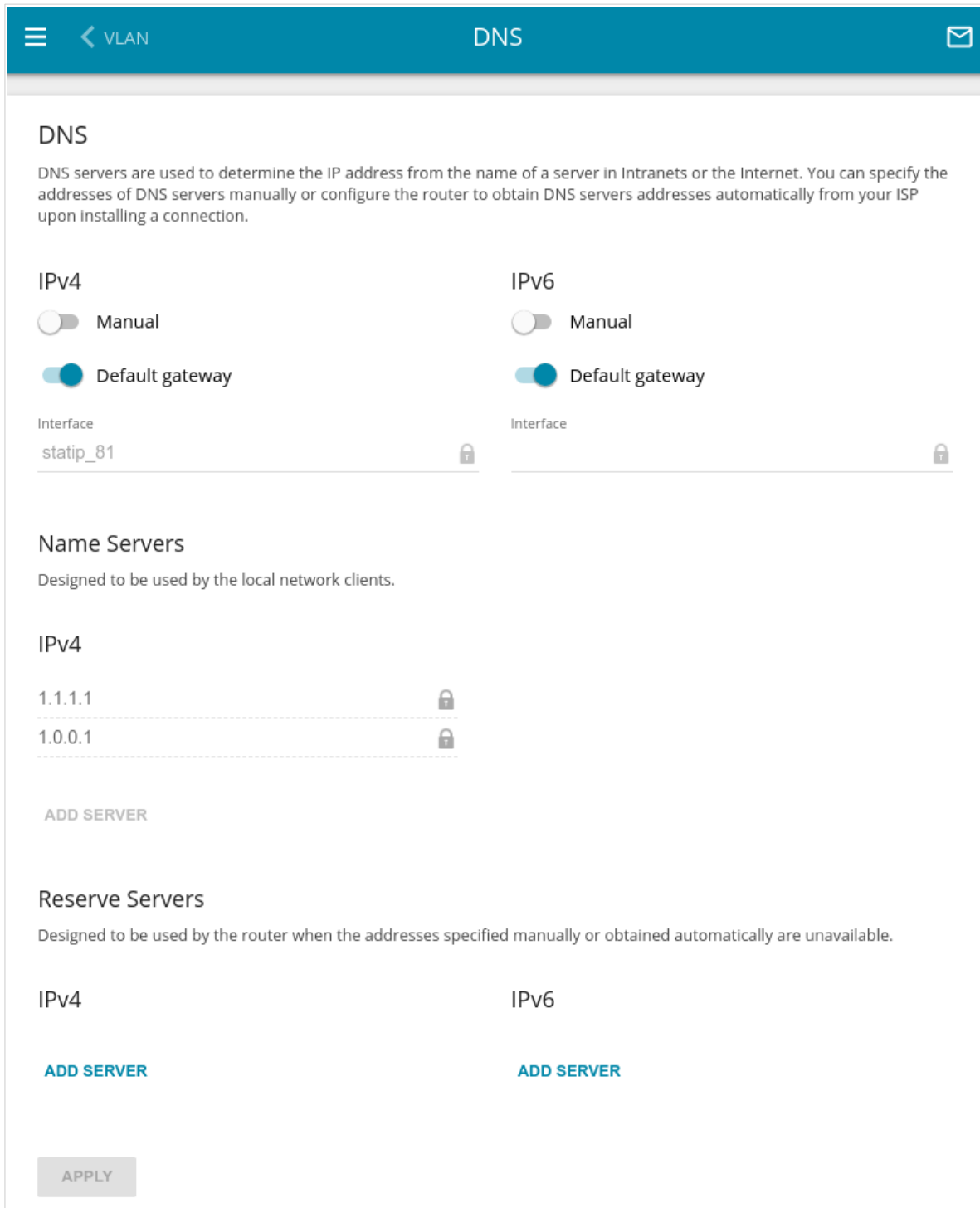


Figure 170. The **Advanced / DNS** page.

DNS servers are used to determine the IP address from the name of a server in Intranets or the Internet (as a rule, they are specified by an ISP or assigned by a network administrator).

You can specify the addresses of DNS servers manually on this page or configure the router to obtain DNS servers addresses automatically from your ISP upon installing a connection. Also here you can specify addresses of reserve DNS servers which the router can use if the addresses specified manually or obtained automatically are unavailable.




When you use the built-in DHCP server, the network parameters (including DNS servers) are distributed to clients automatically.

Specify needed settings for IPv4 in the **IPv4** section and for IPv6 in the **IPv6** section.

If you want to configure automatic obtainment of DNS servers addresses, move the **Manual** switch to the left. Then move the **Default gateway** switch to the left and from the **Interface** drop-down list select a WAN connection which will be used to obtain addresses of DNS servers automatically. If you want the router to use the default WAN connection to obtain addresses of DNS servers, move the **Default gateway** switch to the right.

To specify a DNS server manually, move the **Manual** switch to the right. In the **Name Servers** section of the relevant IP version, click the **ADD SERVER** button, and in the line displayed, enter an IP address of the DNS server.

To specify a reserve DNS server, in the **Reserve Servers** section of the relevant IP version, click the **ADD SERVER** button, and in the line displayed, enter an IP address of the DNS server.

To remove a DNS server from the page, click the **Delete** button () in the line of the address.

When all needed settings are configured, 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.

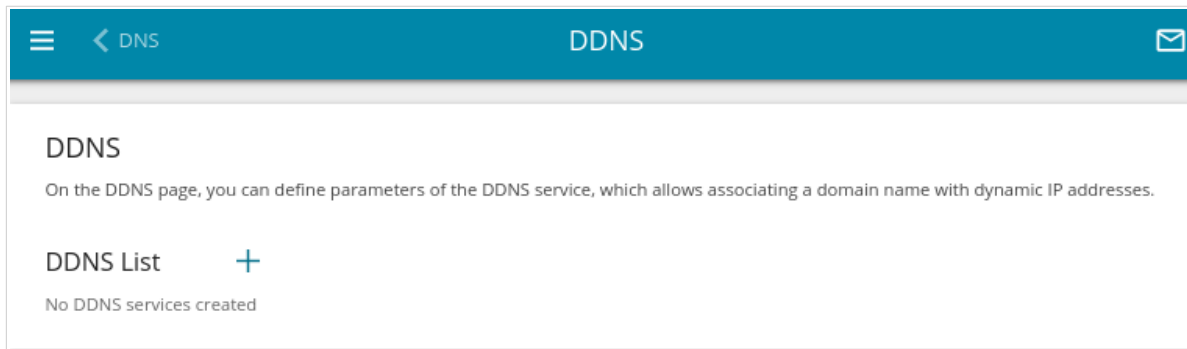


Figure 171. The **Advanced / DDNS** page.

To add a new DDNS service, click the **ADD** button (**+**).

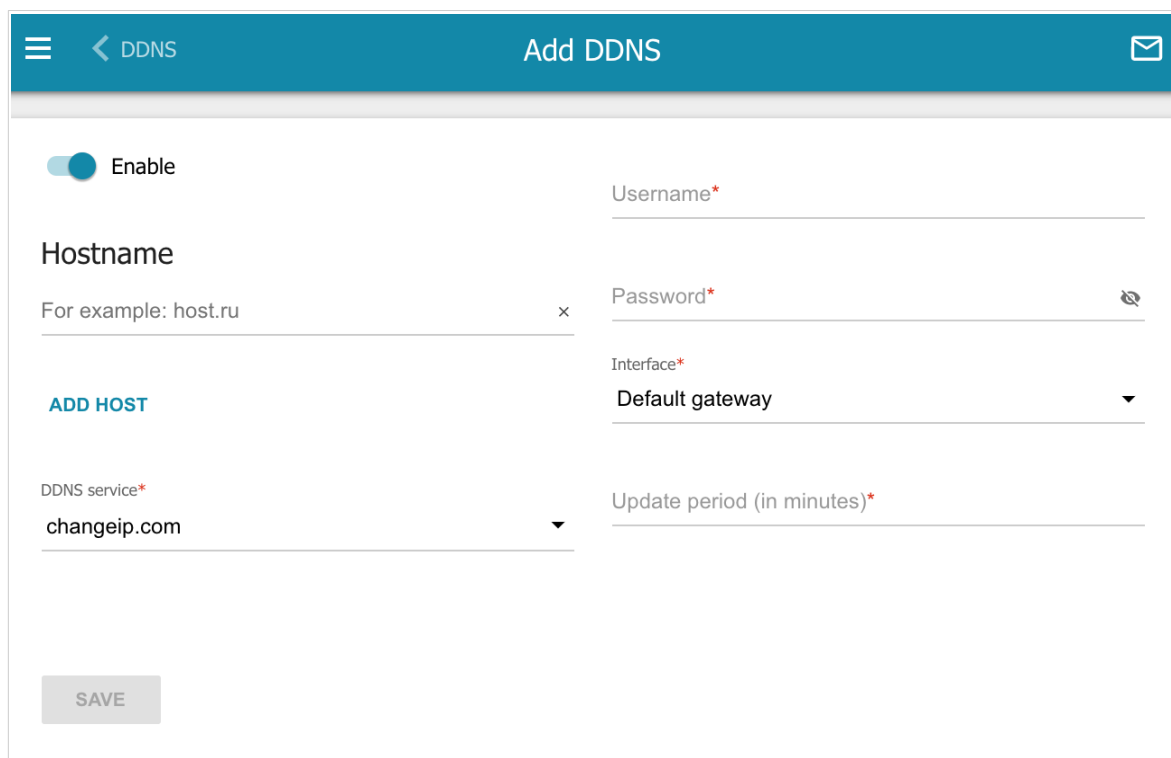


Figure 172. The page for adding a DDNS service.

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

Parameter	Description
Enable	Move the switch to the right to enable DDNS. Move the switch to the left to disable DDNS.
Hostname	Enter the full domain name registered at your DDNS provider. If you want to use another domain name of this DDNS provider, click the ADD HOST button, and in the line displayed, enter the needed value. To remove a domain name, click the Delete icon (✕) in the line of the name.
DDNS service	Select the DDNS provider from the drop-down list. If your provider is not in the list, select the Custom provider value and fill in the fields displayed on the page. Specify the DDNS provider name in the Name field, the domain name of the provider's server in the Server field, and the location of settings in the Path field.
Username	The username to authorize for your DDNS provider.
Password	The password to authorize for your DDNS provider. Click the Show icon (👁) to display the entered password.
Interface	From the drop-down list, select a WAN connection which will be used for DDNS, or leave the Default gateway value.
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 **SAVE** button.

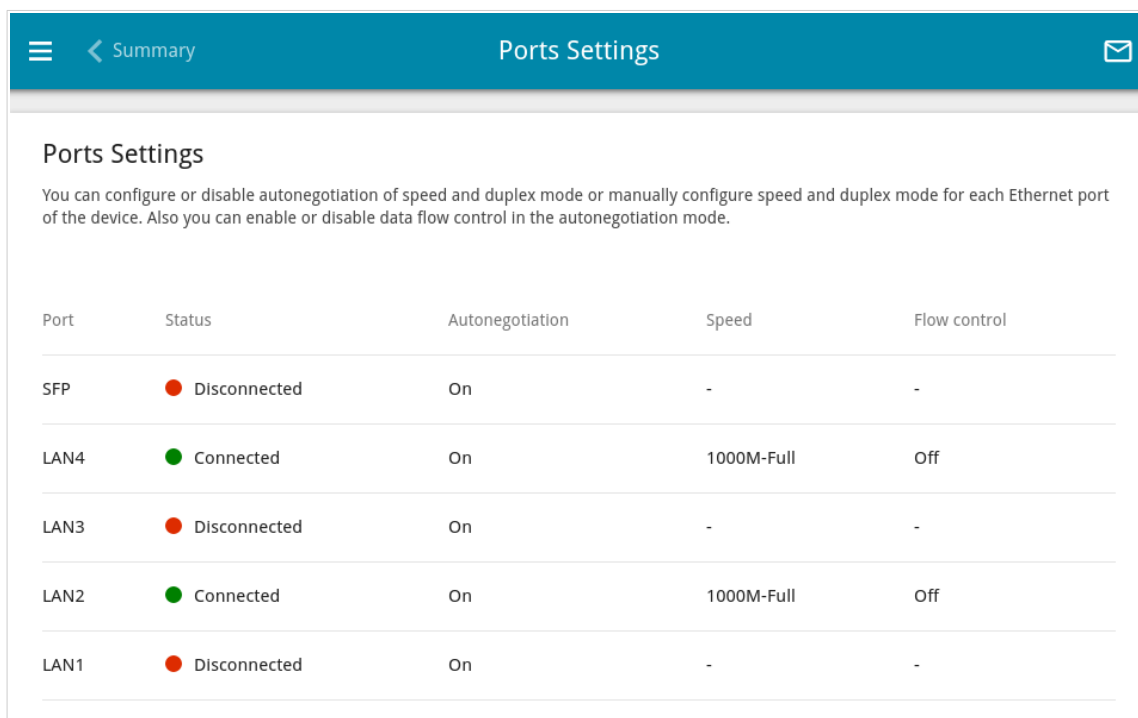
To edit parameters of the existing DDNS service, select the relevant line in the table. On the opened page, change the needed parameters and click the **SAVE** button.

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 (🗑).

Ports Settings

On the **Advanced / Ports Settings** page, you can configure or disable autonegotiation of speed and duplex mode or manually configure speed and duplex mode for each Ethernet port of the router.

Also you can enable or disable data flow control in the autonegotiation mode. This function is used for equal load balancing in ISPs' networks. Contact your ISP to clarify if this function needs to be enabled.



Port	Status	Autonegotiation	Speed	Flow control
SFP	Disconnected	On	-	-
LAN4	Connected	On	1000M-Full	Off
LAN3	Disconnected	On	-	-
LAN2	Connected	On	1000M-Full	Off
LAN1	Disconnected	On	-	-

Figure 173. The **Advanced / Ports Settings** page.

In order to configure autonegotiation or configure speed and duplex mode manually for an Ethernet port, select it in the table.



Autonegotiation should be enabled for both devices connected to each other.



When autonegotiation is disabled, speed and duplex mode settings for both devices connected to each other should be the same.

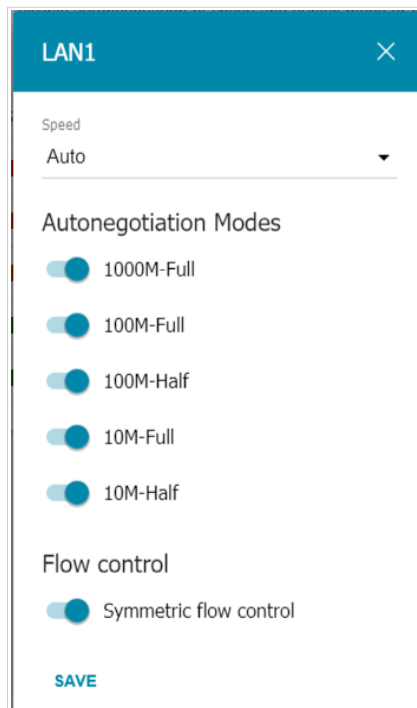


Figure 174. The window for changing the settings of the router's port.

In the opened window, specify the needed parameters:

Parameter	Description
<p>Speed</p>	<p>Select the Auto value to enable autonegotiation. When this value is selected, the Autonegotiation Modes and Flow control sections are displayed.</p> <p>Select the 10M-Half, 10M-Full, 100M-Half, or 100M-Full value to manually configure speed and duplex mode for the selected port.</p> <ul style="list-style-type: none"> • 10M-Half: Data transfer in just one direction at a time (data can be either sent or received) at the maximum possible rate of up to 10Mbps. • 10M-Full: Data transfer in two directions simultaneously (data can be sent and received at the same time) at the maximum possible rate of up to 10Mbps. • 100M-Half: Data transfer in just one direction at a time (data can be either sent or received) at the maximum possible rate of up to 100Mbps. • 100M-Full: Data transfer in two directions simultaneously (data can be sent and received at the same time) at the maximum possible rate of up to 100Mbps.

Parameter	Description
Autonegotiation Modes	
To enable the needed data transfer modes, move relevant switches to the right.	
Flow control	
Symmetric flow control	Move the switch to the right to enable the flow control function for the port. Move the switch to the left to disable the flow control function for the port.

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

If in the future you need to edit the parameters of the router's port, select the port in the table. In the opened window, change the needed parameters and click the **SAVE** 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.

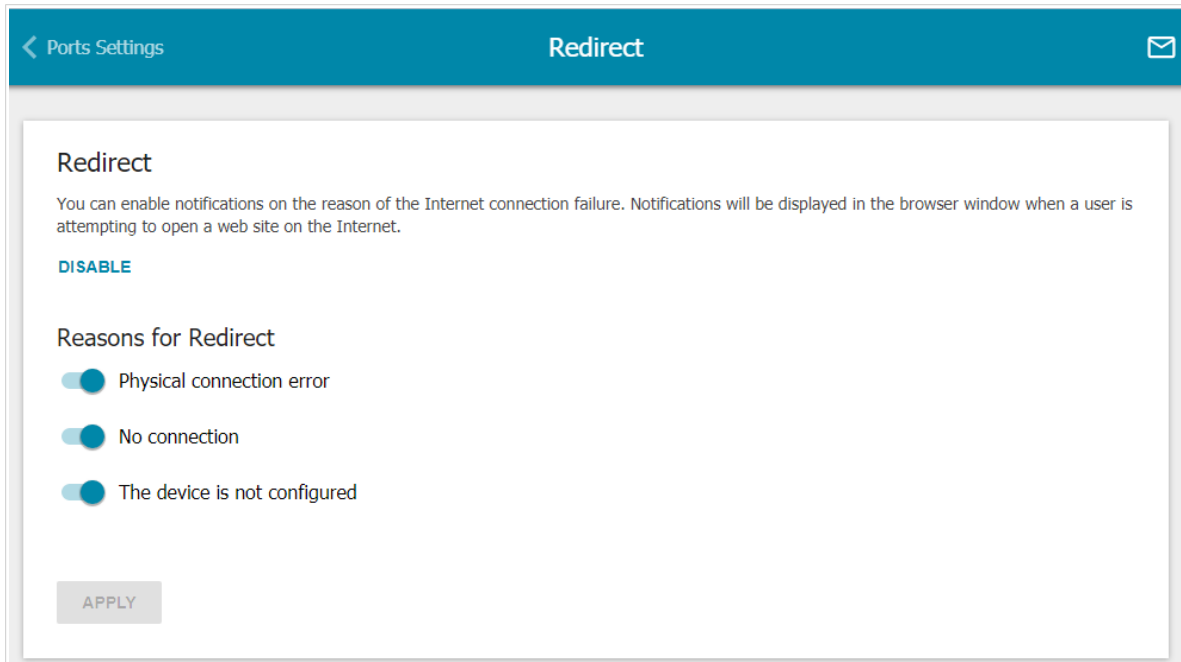


Figure 175. The **Advanced / Redirect** page.

To configure notifications, click the **ENABLE** button. Then, in the **Reasons for Redirect** section, move the needed switches to the right.

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).
No connection	Notifications in case of problems of the default WAN connection (authorization error, the IPS's server does not respond, etc.).
The device is not configured	Notifications in case when the device works with default settings.

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

To disable notifications, click the **DISABLE** button.

Routing

On the **Advanced / Routing** page, you can specify static (fixed) routes.

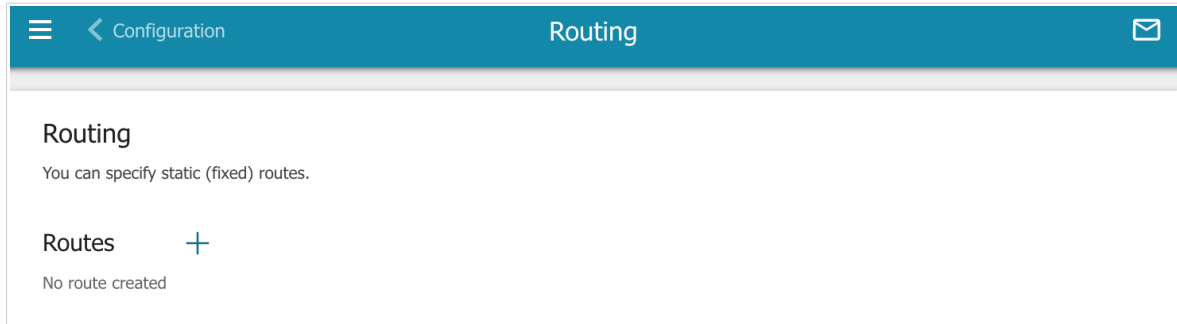


Figure 176. The **Advanced / Routing** page.

To specify a new route, click the **ADD** button (**+**).

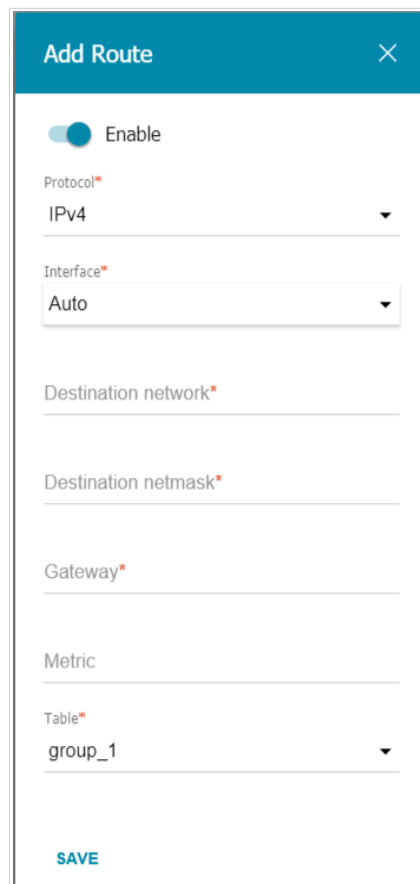
The 'Add Route' dialog window is shown. It has a teal header with the title 'Add Route' and a close button. The form contains the following fields: an 'Enable' toggle switch which is turned on; a 'Protocol*' dropdown menu set to 'IPv4'; an 'Interface*' dropdown menu set to 'Auto'; a 'Destination network*' text input field; a 'Destination netmask*' text input field; a 'Gateway*' text input field; a 'Metric' text input field; and a 'Table*' dropdown menu set to 'group_1'. At the bottom left, there is a blue 'SAVE' button.


Figure 177. The window for adding a new route.

In the opened window, you can specify the following parameters:

Parameter	Description
Enable	Move the switch to the right to enable the route. Move the switch to the left to disable the route.
Protocol	An IP version.
Interface	From the drop-down list, select an interface (connection) through which the device will communicate with the remote network. If you have selected the Auto value, the router itself sets the interface according to the data on the existing dynamic routes.
Destination network	A remote network which can be accessed with help of this route. You can specify an IPv4 or IPv6 address. The format of a host IPv6 address is 2001:db8:1234::1 , the format of a subnet IPv6 address is 2001:db8:1234::/64 .
Destination netmask	<i>For IPv4 protocol only.</i> The remote 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. <i>Optional.</i>
Table	From the drop-down list, select a routing table for the route. <ul style="list-style-type: none"> • group_1 table is used to route user traffic. • main table is used to route management traffic from internal system services of the router. • voip table is used to route VoIP traffic.

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

To edit an existing route, select a relevant line of the table. In the opened window, change the needed parameters and click the **SAVE** 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 ().

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 178. The page for configuring the TR-069 client.

You can specify the following parameters:

Parameter	Description
TR-069 Client	
Enable TR-069 client	Move the switch to the right to enable the TR-069 client.

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.
Inform Settings	
On	Move the switch to the right 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	
Get URL address via DHCP	If the switch is moved to the right, the router obtains the URL address of the ACS upon establishing the Dynamic IP type connection. If you need to specify the URL address manually, move the switch to the left and enter the needed value in the URL address field.
URL address	The URL address of the ACS provided by the ISP.
Username	The username to connect to the ACS.
Password	The password to connect to the ACS. Click the Show icon (👁) to display the entered password.
Connection Request Settings	
Username	The username used by the ACS to transfer a connection request to the router.
Password	The password used by the ACS. Click the Show icon (👁) to display the entered password.
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.

Port Mirroring

On the **Advanced / Port Mirroring** page, you can enable the function of mirroring the router's ports. This function allows to copy traffic from one or several ports to the destination port to monitor network issues with the help of traffic analysis software.

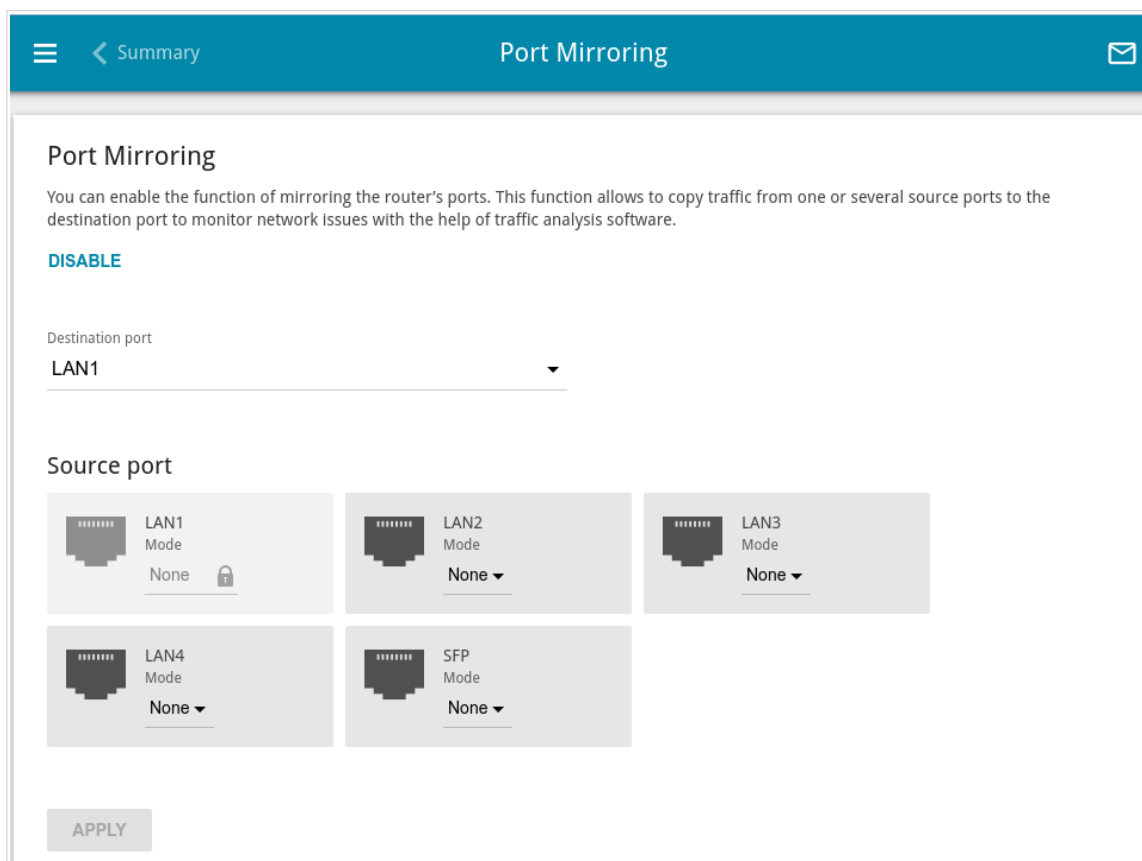


Figure 179. The **Advanced / Port Mirroring** page.

To enable the function, click the **ENABLE** button. Upon that the following settings are available on the page.

Parameter	Description
Destination port	The port of the router to which a copy of traffic from one or several ports will be sent. Select the relevant value from the drop-down list.

Parameter	Description
Source port	<p>Select the mode for each port traffic from which should be copied to the destination port:</p> <ul style="list-style-type: none">• Both: Copy incoming and outgoing traffic from the source port to the destination port.• TX: Copy outgoing traffic from the source port to the destination port.• RX: Copy incoming traffic from the source port to the destination port. <p>Leave the None value for ports from which it is not required to copy traffic.</p>

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

To disable the function of port mirroring, click the **DISABLE** button.

UPnP

On the **Advanced / UPnP** page, you can enable the UPnP function. The UPnP function allows to automatically create port forwarding rules for applications in the router's LAN requiring a connection from an external network.

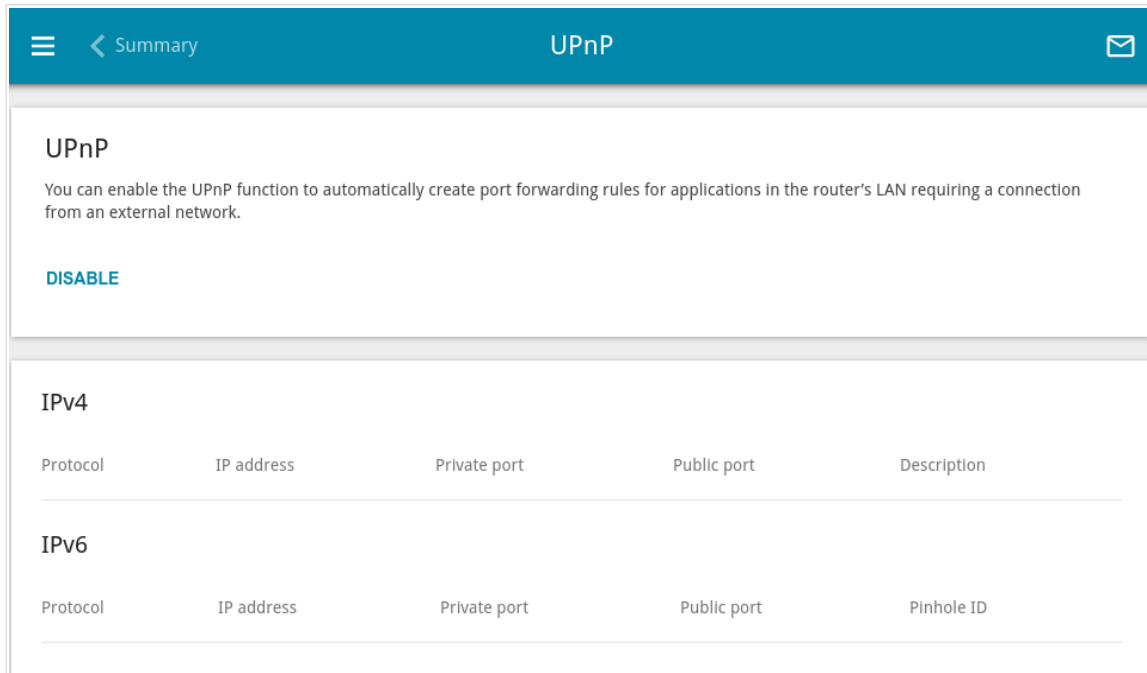


Figure 180. The **Advanced / UPnP** page.

By default, the UPnP function is enabled. You can also manually add port forwarding rules for network applications on the **Firewall / Virtual Servers** page.

! Port forwarding rules will be automatically created only in case the router's default WAN connection uses a public IP address.

When the function is enabled, the following parameters of the router are displayed on the page:

Parameter	Description
IPv4 / IPv6	
Protocol	A protocol for network packet transmission.
IP address	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.

Parameter	Description
Description	<i>For IPv4 only.</i> Information transmitted by a client's network application.
Pinhole ID	<i>For IPv6 only.</i> An identifier of the rule created by the client for an incoming connection to the router.

If you want to disable the UPnP function, click the **DISABLE** button.

UDPXY

On the **Advanced / UDPXY** page, you can allow the router to use the built-in UDPXY application. The UDPXY application transforms UDP traffic into HTTP traffic. This application allows devices which cannot receive UDP streams to access stream video.

Figure 181. The **Advanced / UDPXY** page.

To enable the application, move the **Enable** switch to the right.

Upon that the following fields are displayed on the page:

Parameter	Description
Port	The port of the router which the UDPXY application uses.
Maximum client number	Maximum number of devices from the router's LAN which will be served by the application.
Buffer size for incoming data	Size of intermediate buffer for received data. By default, the recommended value is specified.
Buffer size for data transferred to client	Size of intermediate buffer for transmitted data. By default, the recommended value is specified.
WAN interface	From the drop-down list, select a WAN connection which will be used for operation with streaming video.

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

To access the status page of the application, click the **Status** link.

udpxy status:

Server Process ID	Accepting clients on	Multicast address	Active clients
18286	192.168.8.254:4022	192.168.161.191	0

Available HTTP requests:

Request template	Function
<code>http://address:port/udp/mcast_addr:mport/</code>	Relay multicast traffic from mcast_addr:mport
<code>http://address:port/status/</code>	Display udpxy status
<code>http://address:port/restart/</code>	Restart udpxy

udpxy v. 1.0 (Build 23) standard - [Thu Sep 16 18:11:37 2021]
udpxy and udpcrec are Copyright (C) 2008-2018 Pavel V. Cherenkov and licensed under GNU GPLv3

Figure 182. The UDPXY application status page.

IGMP

On the **Advanced / IGMP** page, you can allow the router to use IGMP.

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.

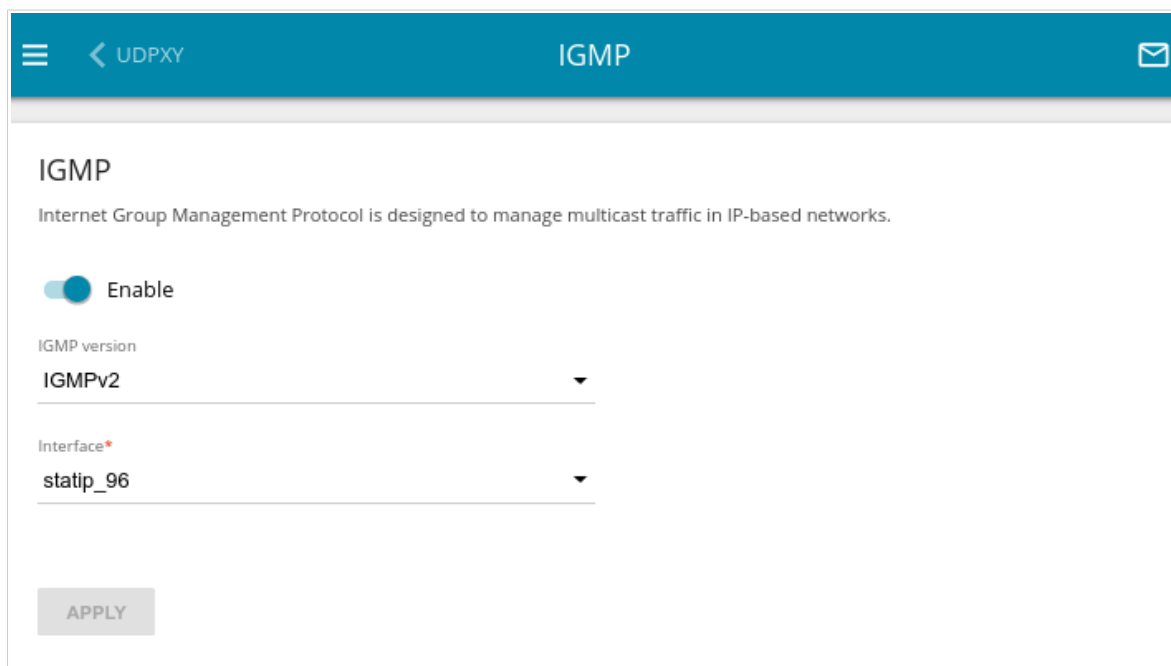


Figure 183. The **Advanced / IGMP** page.

The following elements are available on the page:

Parameter	Description
IGMP	
Enable	Move the switch to the right to enable IGMP.
IGMP version	Select a version of IGMP from the drop-down list.
Interface	From the drop-down list, select a connection of the Dynamic IPv4 or Static IPv4 type for which you need to allow multicast traffic (e.g. streaming video).

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

ALG/Passthrough

On the **Advanced / ALG/Passthrough** page, you can enable the RTSP, SIP ALG mechanisms, and PPPoE/PPTP/L2TP/IPsec pass through functions.

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 connections of the router.

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

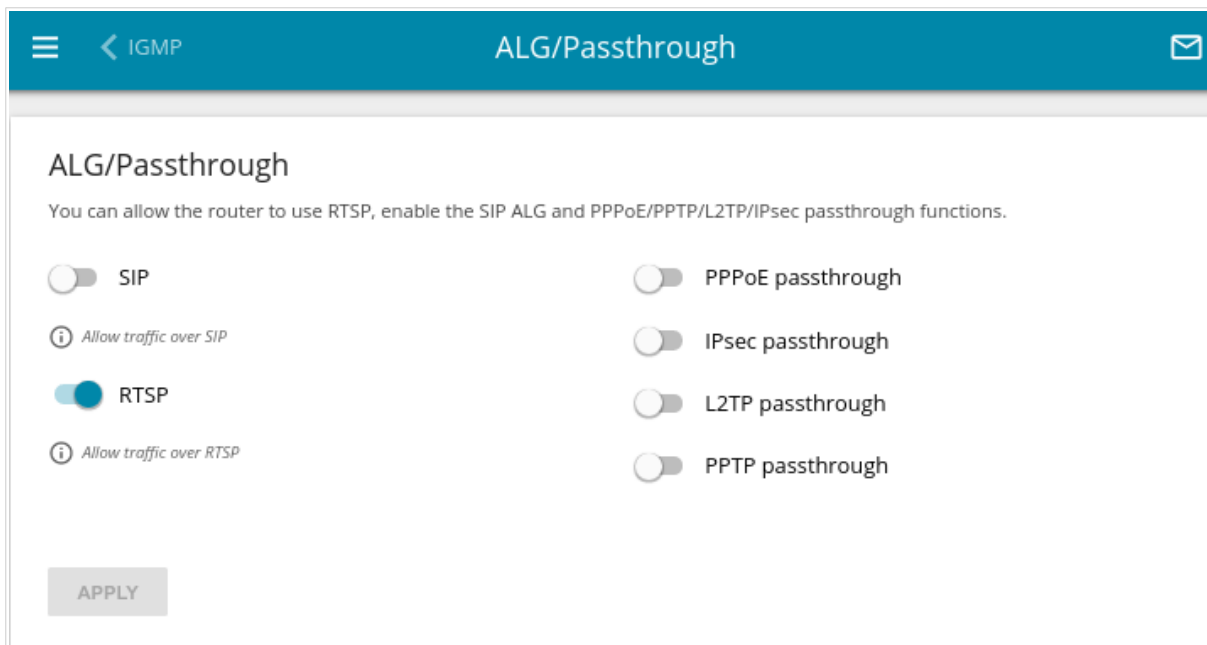


Figure 184. The **Advanced / ALG/Passthrough** page.

The following elements are available on the page:

Parameter	Description
SIP	Move the switch to the right to enable SIP. Such a setting allows using the SIP ALG function. This function allows VoIP traffic to pass through the NAT-enabled router. ¹⁷
RTSP	Move the switch to the right to enable RTSP. Such a setting allows managing media stream: fast forward streaming audio/video, pause and start it.
PPPoE pass through	Move the switch to the right to enable the PPPoE pass through function.
IPsec pass through	Move the switch to the right to enable the IPsec pass through function.
L2TP pass through	Move the switch to the right to enable the L2TP pass through function.
PPTP pass through	Move the switch to the right to enable the PPTP pass through function.

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

¹⁷ On the **Connections Setup / WAN** page, create a WAN connection, move the **SIP** switch to the right on the **Advanced / ALG/Passthrough** page, connect an Ethernet 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).

CoovaChilli

The CoovaChilli service provides authorized Internet access for clients in your corporate or public network. On the **Advanced / CoovaChilli** page, you can add an authorization server.

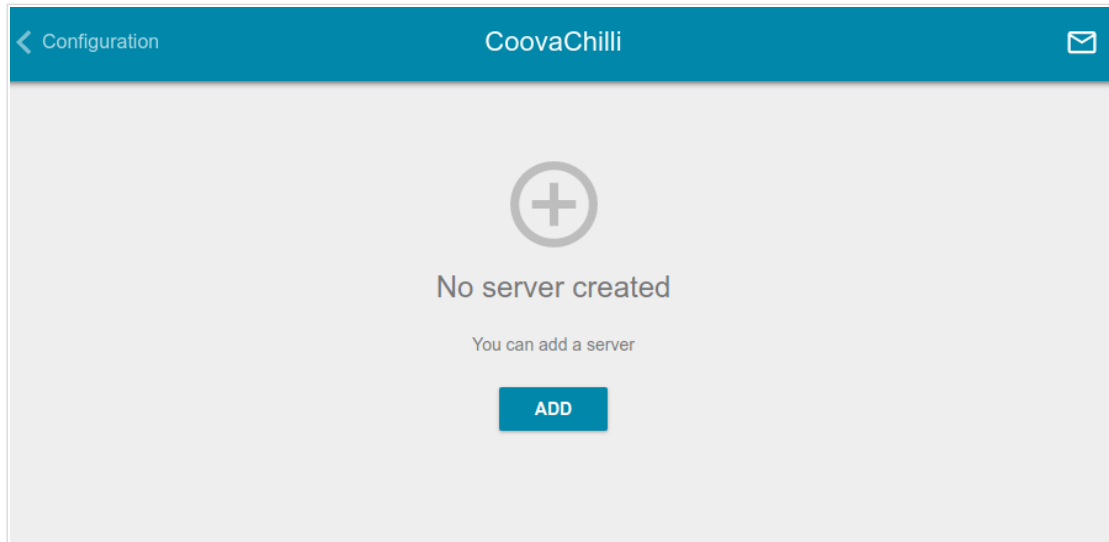



Figure 185. The **Advanced / CoovaChilli** page.

To add an authorization server, click the **ADD** button (). On the opened page, move the **Enable** switch to the right to enable the CoovaChilli service.

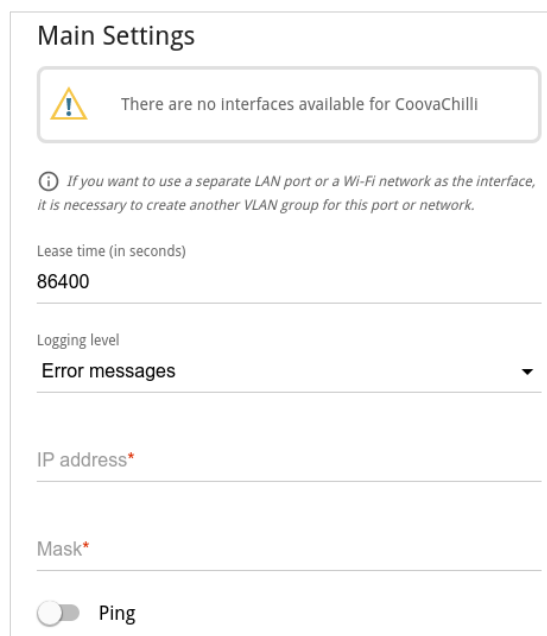
The image displays the 'Main Settings' section of the CoovaChilli configuration page. It starts with a warning icon and the message 'There are no interfaces available for CoovaChilli'. Below this is an information icon and a note: 'If you want to use a separate LAN port or a Wi-Fi network as the interface, it is necessary to create another VLAN group for this port or network.' The settings include: 'Lease time (in seconds)' set to '86400'; 'Logging level' set to 'Error messages' with a dropdown arrow; 'IP address*' and 'Mask*' fields, both currently empty; and a 'Ping' toggle switch that is currently turned off.

Figure 186. The page for adding an authorization server. The **Main Settings** section.

In the **Main Settings** section, you can specify the following parameters:

Parameter	Description
Interface	From the drop-down list, select an interface to be used for the authorization server. A VLAN which includes a separate LAN port or a Wi-Fi network (see the VLAN section, page 224) is used as an interface for the server.
Lease time	The interval (in seconds) between sending authorization requests to clients.
Logging level	Select a type of messages and alerts/notifications to be logged.
IP address	Specify an IP address of the router to be used for authorized client access.
Mask	Specify a subnet mask.
Ping	If the switch is moved to the right, the router responds to ping requests by the IP address specified on this page. For security reasons, it is recommended to disable this function.

RADIUS server

Primary RADIUS server address*

Secondary RADIUS server address

RADIUS encryption key* 🔒

RADIUS server port
1813

Authentication port
1812

NASID

Figure 187. The page for adding an authorization server. The **RADIUS server** section.

In the **RADIUS server** section, you can specify the following parameters:

Parameter	Description
Primary RADIUS server address / Secondary RADIUS server address	Enter addresses of the primary and secondary RADIUS servers in the relevant fields.

Parameter	Description
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). Click the Show icon (🔍) to display the entered password.
RADIUS server port	A port of the RADIUS server.
Authentication port	The number of a router port which will be used to connect to the RADIUS server. By default, the value 1812 is specified.
NASID	A network access server ID (the value of this parameter is specified in the RADIUS server settings).

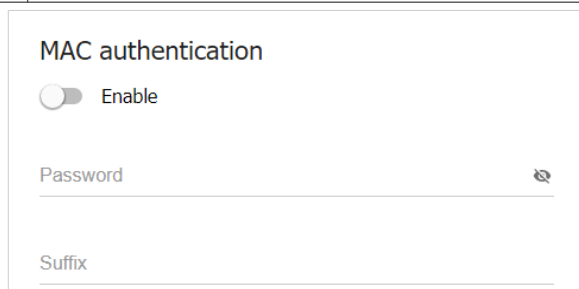


Figure 188. The page for adding an authorization server. The **MAC authentication** section.

In the **MAC authentication**¹⁸ section, you can specify the following parameters:

Parameter	Description
Enable	MAC authentication allows the RADIUS server to authorize clients by their MAC addresses. Move the switch to the right to enable MAC authentication. Move the switch to the left to disable MAC authentication.
Password	If required, specify the password to authenticate clients by their MAC addresses. Click the Show icon (🔍) to display the entered password.
Suffix	Specify a suffix for anonymous MAC authentication.

¹⁸ Will be available in future software versions.

UAM

Enable CHAP authentication

ⓘ If the switch is moved to the left, PAP authentication is used

Authorization port
3990

UAM encryption key* 🔍

ⓘ The key length cannot exceed 64 characters

UAM server*

ⓘ The address of the UAM server should start with a protocol. Example: http://dlink.ru

Access for unauthorized users

ⓘ The list of resources (separated by a comma) which unauthorized users are allowed to access

Figure 189. The page for adding an authorization server. The **UAM** section.


In the **UAM** section, you can specify the following parameters:

Parameter	Description
Enable CHAP authentication	Move the switch to the right to enable CHAP authentication. Move the switch to the left to enable PAP authentication (the value of this parameter is specified in the RADIUS server settings).
Authorization port	The number of a router port which will be used for UAM server authorization. By default, the value 3990 is specified.
UAM encryption key	Specify the UAM authentication encryption key. Click the Show icon (🔍) to display the entered key.
UAM server	Specify the URL of the UAM server which ensures client authorization. The address of the UAM server should start with a protocol. Example: http://dlink.ru
Access for unauthorized users	Specify the list of resources (separated by a comma) which unauthorized users are allowed to access. Please specify a site address and a port. Example: dlink.ru:80

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

After adding an authorization server, on the **Advanced / CoovaChilli** page, in the **Status** section, the current state of the server connection is displayed.

To edit the parameters of a server, left-click the relevant line 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 ().

VoIP

In this menu you can configure all parameters essential for VoIP via SIP and specify all needed settings for the phone connected to the router.

Home

On the **VoIP / Home** page you can enable VoIP and manage profiles.

Home

You can enable VoIP and manage profiles.

Enable VoIP

Interface type
WAN group

Local SIP port*
5060

Profile List

<input type="checkbox"/>	Name	DHCP option 120	Status
<input type="checkbox"/>	Voice profile	Enabled	Disabled

APPLY

Figure 190. The **VoIP / Home** page.

To enable VoIP, move the **Enable VoIP** switch to the right. You can specify the following parameters:

Parameter	Description
Interface type	<p>The type of network interface for VoIP. Select the needed value from the drop-down list.</p> <ul style="list-style-type: none">• Connection: The selected WAN connection serves as the interface for VoIP.• WAN group: The default WAN connection is used as the interface for VoIP.

Parameter	Description
Bound interface name	From the drop-down list, select a WAN connection for VoIP. The list is displayed if the Connection value is selected from the Interface type drop-down list.
Local SIP port	A port of the router for outbound SIP traffic. Unless another setting is given by your ISP, it is recommended to leave the default value (5060).

In the **Profile List** section, the list of existing profiles with their status is displayed.

To create a new profile, click the **ADD** button ().

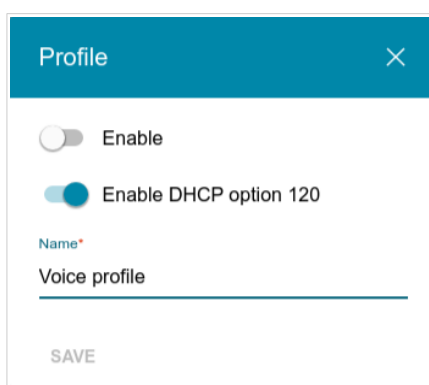



Figure 191. The window for adding a profile.

In the opened window, you can specify the following parameters:

Parameter	Description
Enable	Move the switch to the right to enable the profile. Move the switch to the left to disable the profile.
Enable DHCP option 120	Move the switch to the right to allow using DHCP option 120. Move the switch to the left if your provider does not require automatic obtainment of the SIP proxy server address.
Name	The name of the profile for easier identification. You can specify any name.

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

To edit an existing profile, in the **Profile List** section, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove an existing profile, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

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

Advanced Settings

On the **VoIP / Advanced Settings** page, you can specify additional settings for VoIP.

Advanced Settings

You can specify additional settings for VoIP.

Locale selection
RU

Replace # with %23

Support rport

SIP transport protocol
UDP

NAT Traversal
 Mode
Disabled

Record to USB
 Save log to a USB storage
 Logs are exported in CSV format

Marking DSCP
 RTP DSCP
0
 SIP DSCP
0


Port List

Name	Flash time, ms	Caller ID
phone 1	80 - 1000	FSK BELLCORE
phone 2	80 - 1000	FSK BELLCORE

APPLY

Figure 192. The **VoIP / Advanced Settings** page.

Parameter	Description
Locale selection	Select your country from the drop-down list. This setting defines the parameters of the phone signals traditional for the specific country.
Replace # with %23	RFC3261 doesn't support # (pound) for a phone number. If a phone number has the character, move the switch to the right to replace the character # with the special sequence %23.

Parameter	Description
Support rport	Move the switch to the right to enable the Symmetric Response Routing function in accordance with RFC3581. This function allows sending responses to a request to the port and IP address from which the request was received via the NAT-enabled router. The SIP proxy server must support the function.
SIP transport protocol	Transport protocol that will be used to transfer SIP packets. Select the needed value from the drop-down list.
Record to USB	
Save log to a USB storage	Move the switch to the right to save the call log to a USB storage connected to the router. Upon that the Path and File name fields are displayed on the page.
Path	Click the Search icon () located to the right of the field in order to locate the folder where call log files will be stored.
File name	A name for call log files.
NAT Traversal	
Mode	<p>The NAT Traversal function allows VoIP traffic to pass through the NAT-enabled router.</p> <p>Select the Disabled value to disable the function.</p> <p>Select the STUN value to enable the STUN client (<i>Session Traversal Utilities for NAT</i>). The STUN client sends requests to a STUN server. On the basis of the received replies, the client allows VoIP traffic to pass through the NAT-enabled router. When this value is selected, the Server address, Port, and Binding period fields are displayed.</p> <p>Select the NAT Public IP value to manually specify a public (“white”) IP address of an upper-level router which exchanges service messages with the SIP proxy server. When this value is selected, the Public address and Port fields are displayed.</p>
Server address	An IP or URL address of a STUN server to which a connection is established.
Public address	A public (“white”) IP address of an upper-level router which exchanges service messages with the SIP proxy server.

Parameter	Description
Port	<p>If the STUN value is selected from the Mode drop-down list, a port of a STUN server to which a connection is established is displayed. By default, the port 3478 is specified.</p> <p>If the NAT Public IP value is selected from the Mode drop-down list, a port of an upper-level router which exchanges service messages with the SIP proxy server is displayed. By default, the port 5060 is specified.</p>
Binding period	The time interval between service messages (in seconds). Specify a needed value.
Marking DSCP	
RTP DSCP / SIP DSCP	<p><i>Differentiated Services Codepoint.</i></p> <p>Specify the required tags for DSCP traffic marking to change voice traffic priority. The function should be supported by your ISP.</p>

In the **Port List** section, you can change parameters of the FXS ports of the router. To do this, select the corresponding line in the table.

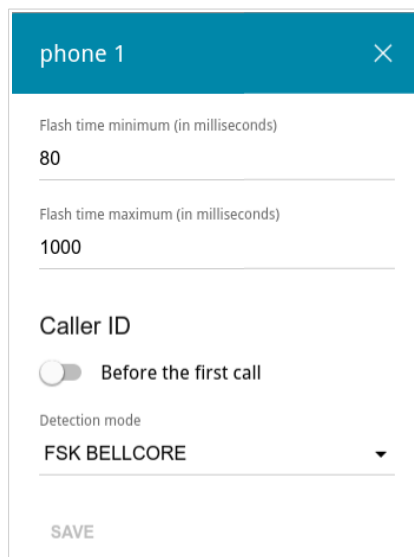


Figure 193. The window to change FXS port parameters.

In the opened window, you can specify the following parameters:

Parameter	Description
Flash time minimum / Flash time maximum	The maximum and minimum value for flash time (the user hangs up the receiver and lifts it again) in milliseconds which the router will regard as pressing the FLASH key.

Parameter	Description
Caller ID	
Before the first call	Move the switch to the right to deliver a phone number to the phones connected to the FXS ports of the router before the first phone ring when receiving an incoming call.
Detection mode	From the drop-down list, select an operation mode of the automatic caller identification function for the phones connected to the FXS ports of the router. To disable the automatic caller identification function for the phones connected to the FXS ports of the router, select the Do not use value from the drop-down list.

Click the **SAVE** button.

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

Rings

On the **VoIP / Rings** page, you can configure ring signal parameters.

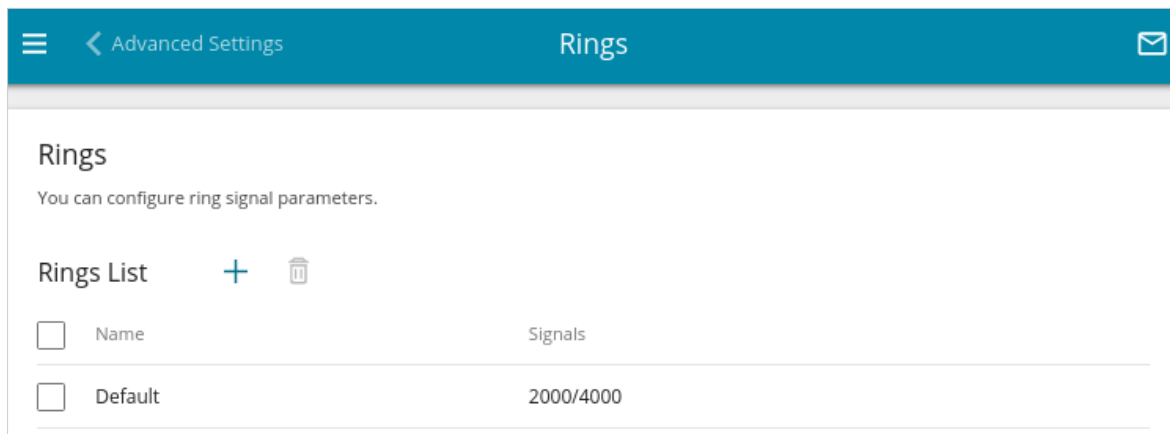


Figure 194. The **VoIP / Rings** page.

To add a new ring, in the **Rings List** section, click the **ADD** button (+).

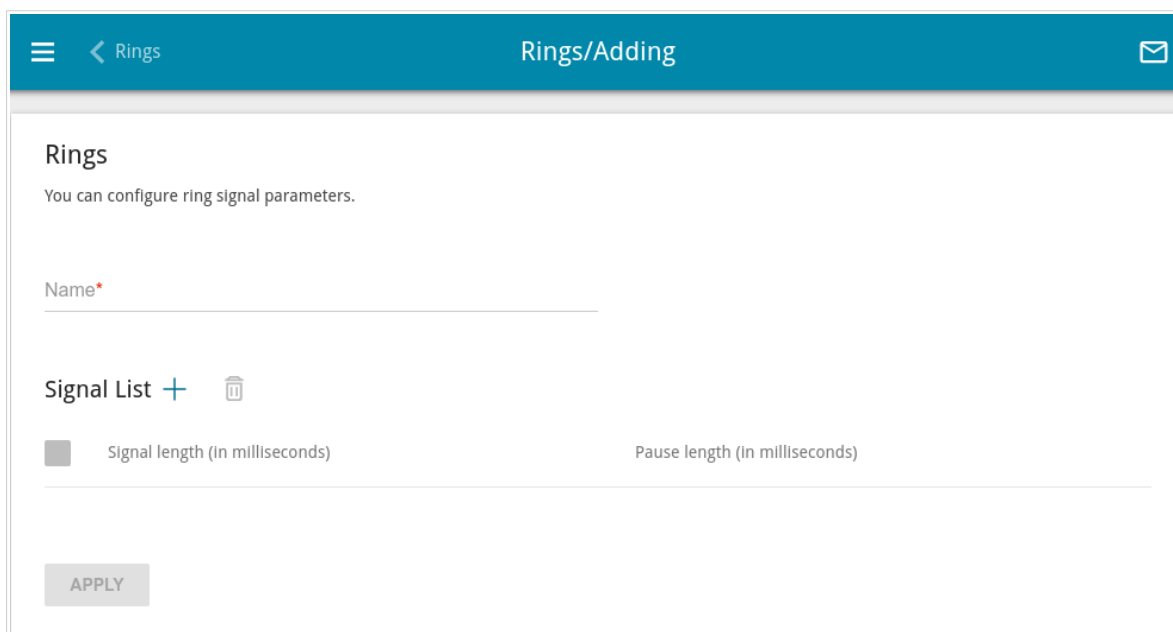
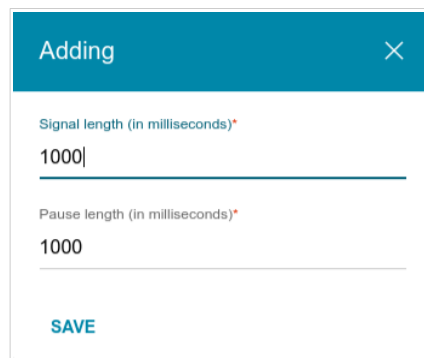


Figure 195. The page for adding a ring.

On the opened page, specify a ring name in the **Name** field for easier identification.

To specify the signal parameters for a ring, in the **Signal List** section click the **ADD** button (+).



Adding

Signal length (in milliseconds)*
1000

Pause length (in milliseconds)*
1000

SAVE

Figure 196. The window for specifying signal parameters.


In the opened window, fill in the **Signal length** and **Pause length** fields. For each ring, you can specify several variants of signal and pause length in milliseconds which will be used cyclically in the order of their appearance on the page.

Click the **SAVE** button.

To edit the parameters of a signal, in the **Signal List** section, select the corresponding line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

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

To edit the parameters of a ring, in the **Rings List** section, select the corresponding line in the table. On the displayed page, change the needed parameters and click the **APPLY** button.

To remove an existing ring, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

Security

On the **VoIP / Security** page, you can configure filtering rules for incoming calls of the phones connected to the FXS ports of the router.

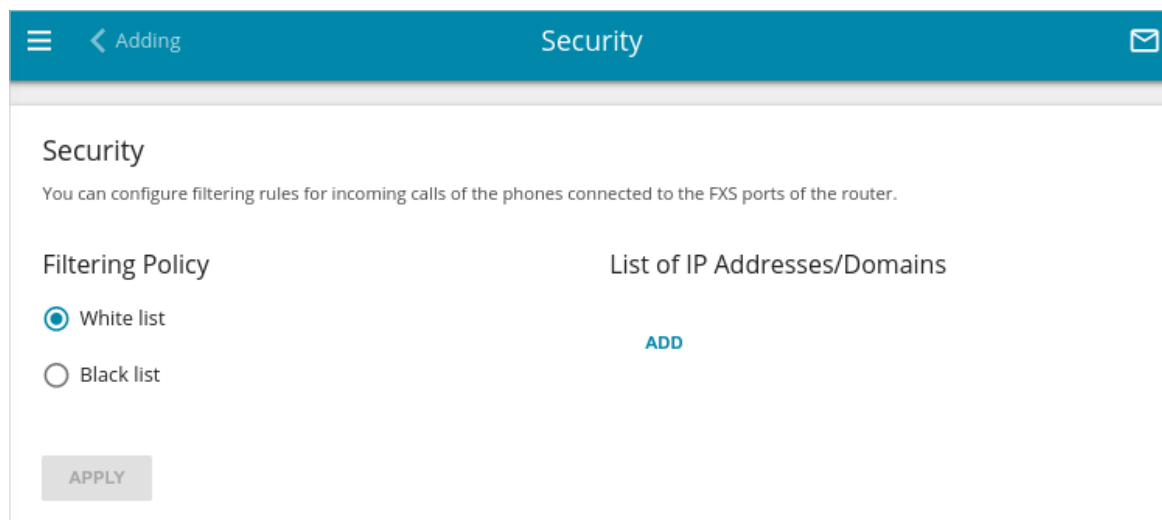


Figure 197. The **VoIP / Security** page.

In the **Filtering Policy** section, select the needed choice of the radio button.

- **White list:** The router accepts incoming calls only from IP addresses or domains specified in the **List of IP Addresses/Domains** section.
- **Black list:** The router accepts incoming calls from any IP addresses or domains except for those specified in the **List of IP Addresses/Domains** section.

To add an IP address or domain name, click the **ADD** button in the **List of IP Addresses/Domains** section. In the line displayed, specify the needed value.

To remove an IP address or domain name from the list, click the **Delete** icon (✕) in the relevant line.

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

Alarm Clock

On the **VoIP / Alarm Clock** page, you can configure the phones connected to the FXS ports of the router as alarm clocks.

Alarm Clock

You can configure the phones connected to the FXS ports of the router as alarm clocks.

Time 13:14

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.

Line 1

Enable alarm clock

Hours: 0

Minutes: 0

Ring time (in seconds): 30

Line 2

Enable alarm clock

Hours: 0

Minutes: 0

Ring time (in seconds): 30

APPLY

Figure 198. The **VoIP / Alarm Clock** page.

In the **Line 1** and/or **Line 2** section, move the **Enable alarm clock** switch to the right. Then specify the time at which the phone should ring in the **Hour** and **Minutes** fields. In the **Ring time** field, specify the signal duration. Then click the **APPLY** button.



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.

Profile Settings

In this menu section, you can do the following for your profile (**Voice profile** is created by default):

- configure basic and advanced profile settings for VoIP over SIP
- configure calls on events
- specify settings of data receipt/transfer for the fax machine
- configure audio parameters, volume and voice codecs
- configure speed dial parameters and dialplan settings
- specify call log parameters.

Basic Settings

On the **VoIP / Profile Name / Basic Settings** page, you can configure basic profile settings for VoIP over SIP.

Figure 199. The **VoIP / Profile Name / Basic Settings** page.

Parameter	Description
SIP Proxy	
Address	An IP or URL address of the SIP proxy server.
Port	A port of the SIP proxy server. Unless another setting is given by your ISP, it is recommended to leave the default value (5060).

Parameter	Description
SIP Outbound Proxy	
Address	An IP or URL address of the SIP outbound proxy server.
Port	A port of the SIP outbound proxy server. Unless another setting is given by your ISP, it is recommended to leave the default value (5060).
Backup SIP Proxy	
Address	An IP or URL address of the backup SIP proxy server. The router uses the backup SIP proxy server in case of no response from the main SIP proxy server.
Port	A port of the backup SIP proxy server. Unless another setting is given by your ISP, it is recommended to leave the default value (5060).
Unregister when switching	<p>If the switch is moved to the right, upon switching between the main SIP proxy server and the backup SIP proxy server and backwards, the router unregisters on the current registration server by sending special SIP packets in order to complete the registration session before it expires.</p> <p>If the switch is moved to the left, upon switching between the main SIP proxy server and the backup SIP proxy server and backwards, the router stays registered until the registration session expires.</p>
Allow call without registration	Move the switch to the right to allow calls without registration on the main SIP proxy server.
Backup route	An IP or URL address to which calls will be forwarded if the main or backup SIP proxy servers are unavailable.
Backup route port	A port of the backup route. Unless another setting is given by your ISP, it is recommended to leave the default value (5060).
Backup SIP Outbound Proxy	
Address	An IP or URL address of the backup SIP outbound proxy server. The router uses the backup SIP outbound proxy server in case of no response from the main SIP outbound proxy server.
Port	A port of the backup SIP outbound proxy server. Unless another setting is given by your ISP, it is recommended to leave the default value (5060).

Parameter	Description
SIP Domain	
Use domain to register	Move the switch to the right if your ISP requires to specify a domain name upon registration on the SIP proxy server. Then fill in the SIP domain name field.
SIP domain name	When this field is filled in, the router registers on the SIP proxy server using the specified domain name. When the field is blank, the router uses the IP address assigned to it.
Misc	
Local RTP port (minimum / maximum)	A range of ports for voice traffic receipt/transfer via RTP. Unless another setting is given by your ISP, it is recommended to leave the default value (9000 and 9100).
DNS Interface	Select the interface which will be used for domain name resolution in VoIP. Leave the Follow VoIP value if changing the interface for domain name resolution is not required.

Also on this page, you can specify incoming/outgoing call settings for the SIP lines.


List of SIP Lines + 				
<input type="checkbox"/>	SIP ID / Number	Username	Ports	Status
<input type="checkbox"/>	Line 1	-		Disabled

Figure 200. The **VoIP / Profile Name / Basic Settings**. The **List of SIP Lines** section.

To change parameters of a SIP line, select the relevant line in the table.

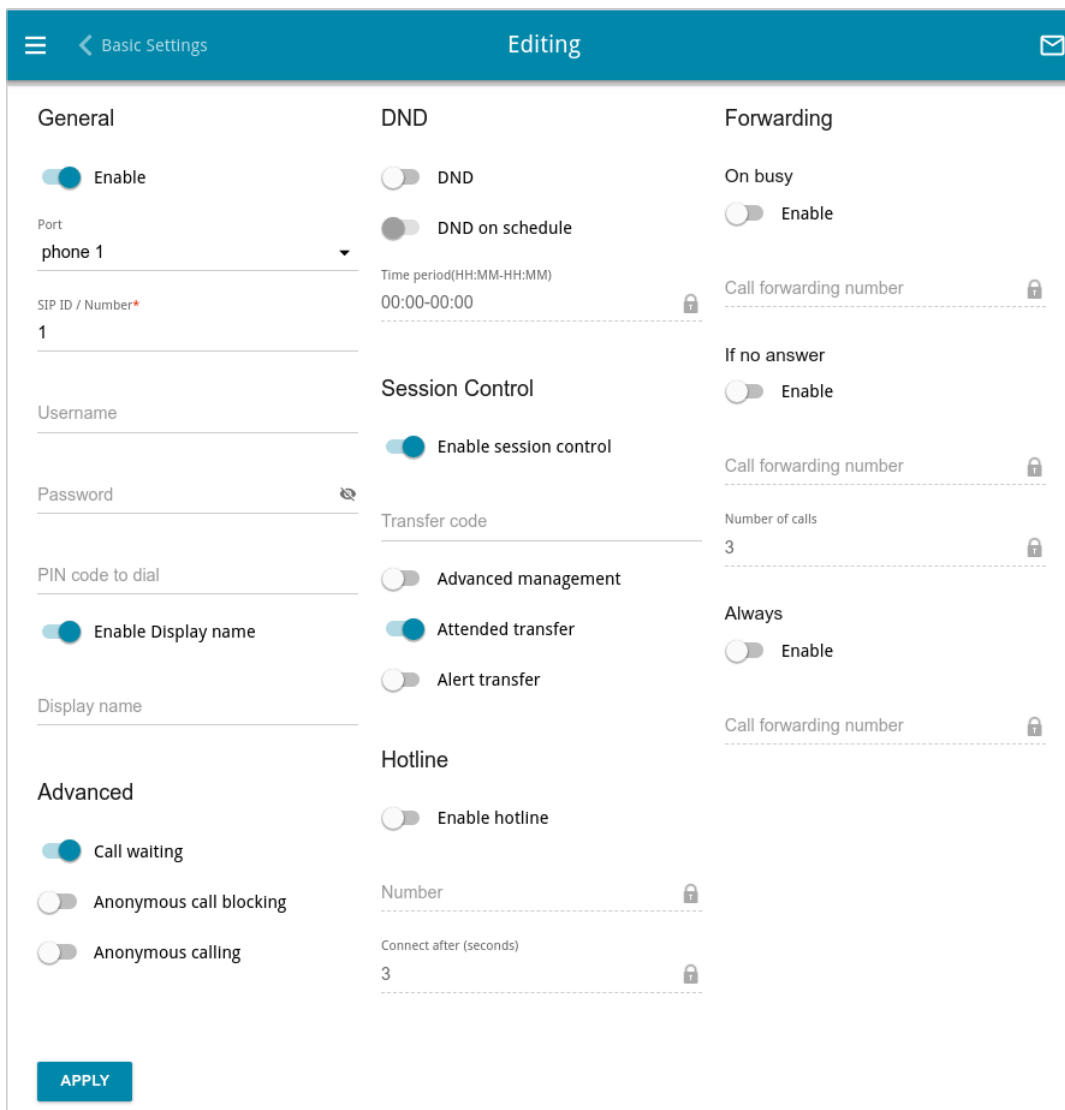


Figure 201. The page for editing SIP line settings.

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


Parameter	Description
General	
Enable	Move the switch to the right to enable the SIP line.
Port	Choose the FXS port to associate it with the line. If no port is selected, the line will be inactive.
SIP ID / Number	A number for this line. The called party sees the specified value as the caller number.
Username	A username for this line which is used to authorize on SIP proxy server. For most SIP proxy servers the username coincides with the phone number.

Parameter	Description
Password	A user password for this line.
PIN code to dial	Fill in the field to allow the user of the phone to make calls only after dialing the PIN code.
Enable Display name	Move the switch to the right to enable transfer of the caller's name for outgoing calls.
Display name	The name of the caller which will be displayed to the called party.
Advanced	
Call waiting	Move the switch to the right to accept incoming calls when the line is busy. To switch between calls, press the FLASH key on the phone.
Anonymous call blocking	Move the switch to the right to reject calls when the calling party conceals its number.
Anonymous calling	Move the switch to the right to conceal your number from the called party.
DND	
DND	<i>Do Not Disturb</i> . Move the switch to the right to reject all incoming calls (the busy tone will be heard).
DND on schedule	Move the switch to the right to reject all incoming calls at a certain time of day. If the switch is moved to the right, the Time period field is available. Specify the needed period as HH:MM-HH:MM , where HH:MM is time in 24-hour format.
Session Control	
Enable session control	Move the switch to the right to enable session control. Upon that you will be able to manage voice sessions during a call with the help of the FLASH key on your phone. (The function should be supported by your ISP).
Transfer code	Feature code for transferring a call to another phone.

Parameter	Description
Advanced management	<p>Move the switch to the right to use combination of the FLASH key and keys of the phone in order to organize three-party calls, manage sessions and calls.</p> <p>By default, each action is assigned to a certain key of the phone set. To change this value, in the line corresponding to the action, select the needed value from the drop-down list.</p> <p><u>Use of FLASH key</u></p> <ul style="list-style-type: none"> • The function is enabled. The phone connected to this line has an incoming call in the standby mode and an outgoing call in the talk mode. It's needed to press the FLASH key, hear the dial tone, and then press the key corresponding to your action. • The function is not enabled. The phone connected to this line has an incoming call in the standby mode and an outgoing call in the talk mode. It's needed: <ul style="list-style-type: none"> ◦ to press the FLASH key in order to put the second call on hold and continue the first call, ◦ to hang up the receiver in order to end both calls and connect the first and second speakers to each other.
Attended transfer	Move the switch to the right if you want to transfer calls when a called party's receiver is lifted.
Alert transfer	Move the switch to the right if you want to transfer calls when a dial tone is heard.
Hotline	
Enable hotline	Move the switch to the right to make the phone connected to this line dial the number specified in the Number field after the receiver is lifted.
Number	A number dialed by the phone connected to this line after the receiver is lifted. Also you can specify a number in the format phone_number@IP_address for direct IP calls bypassing the SIP proxy server. The field is available for editing if the Enable hotline switch is moved to the right.
Connect after	A time period (in seconds) between lifting up the receiver and dialing the hotline number. The field is available for editing if the Enable hotline switch is moved to the right.

Parameter	Description
Forwarding	
Enable	<p>In the corresponding sections, move the Enable switch to the right to enable forwarding always, on busy, or if there is no answer. When the switch is moved to the right, the Call forwarding number and Number of calls fields are available for editing.</p> <p>Move the corresponding switch to the left if forwarding is not required.</p>
Call forwarding number	A number to which the router redirects calls.
Number of calls	The number of calls before the router forwards a call to the number specified in the Call forwarding number field. The field is available for editing if the Enable switch in the If no answer section is moved to the right.

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

To add a new line, in the **List of SIP Lines** section, click the **ADD** button (). On the opened page, specify the needed parameters and click the **APPLY** button.

Call on Event

On the **VoIP / Profile Name / Call on Event** page, you can configure calls on different events.

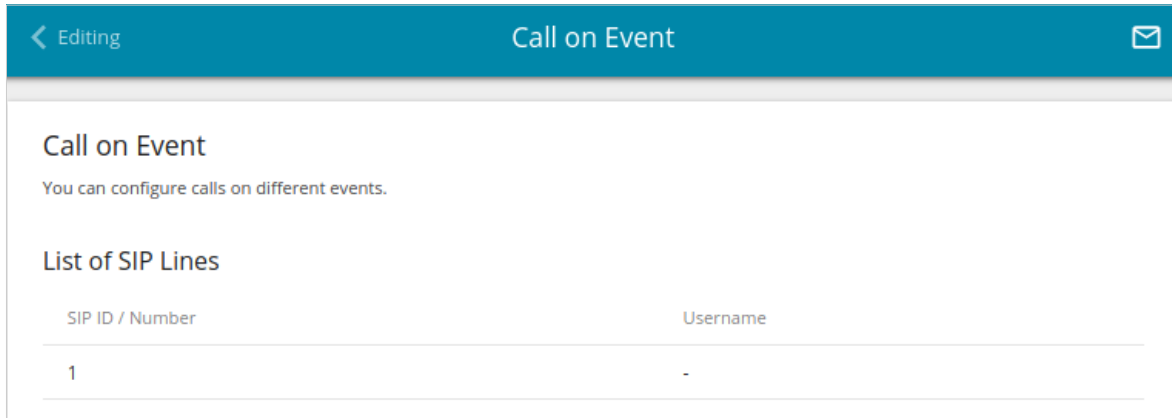


Figure 202. The **VoIP / Profile Name / Call on Event** page.

To change parameters of a SIP line, select the relevant line in the table.

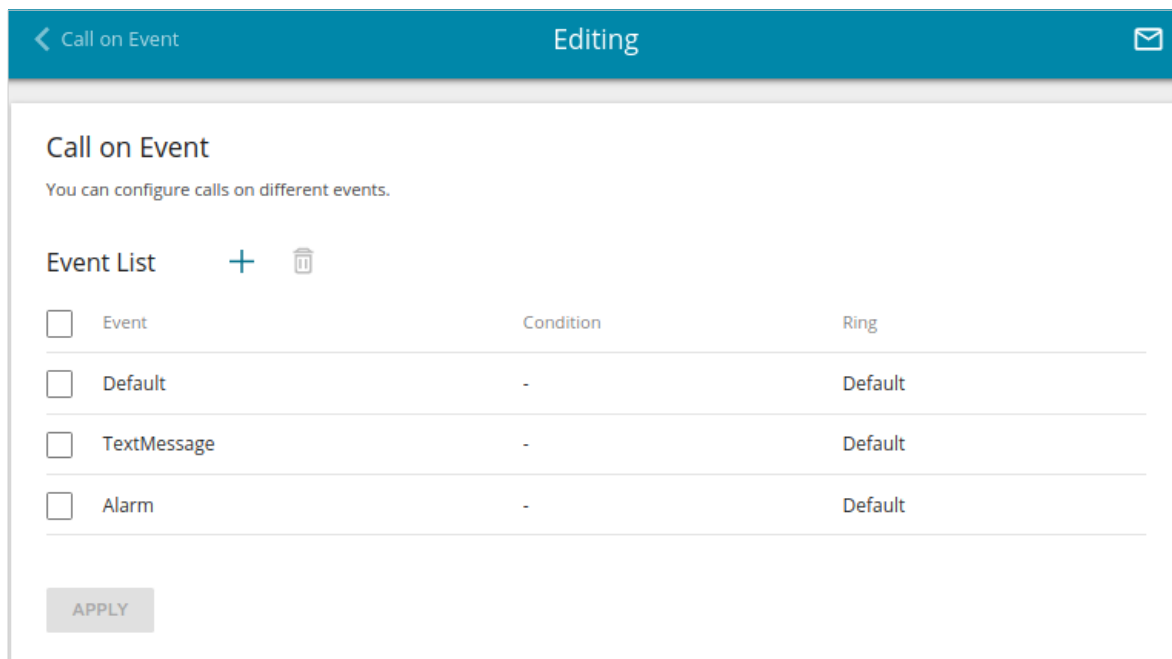


Figure 203. The page for call editing.

In the **Event List** section, the list of existing events and their parameters are displayed.

To create a new event, click the **ADD** button (**+**).


Figure 204. The window for adding an event.

In the opened window, you can specify the following parameters:

Parameter	Description
Event	Select the needed value from the drop-down list. <ul style="list-style-type: none"> • AlertInfo: Allows to change the phone ring type according to special ISP's data specified in the Template field. • CallerID: Allows to change the phone ring type according to special ISP's data specified in the Phone field.
Phone	The phone number of the calling party. Contact your ISP to clarify the number format. The field is displayed if the CallerID value is selected in the Event drop-down list.
Template	The value of CallerID information field transmitted by your ISP in SIP packets. Contact your ISP to clarify the template format. The field is displayed if the AlertInfo value is selected in the Event drop-down list.
Ring	Select a ring for the event from the drop-down list.

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

To edit the parameters of an existing event, in the **Event List** section, select the corresponding line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove an existing event, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (). Only events created by the user can be deleted.

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

Additional Settings

On the **VoIP / Profile Name / Additional Settings** page you can configure additional profile settings for VoIP over SIP.

Additional Settings

You can specify additional settings for VoIP via SIP.

Common Settings	Telephone Event Relay	Jitter Buffer
<input checked="" type="checkbox"/> Support PRACK	DTMF relay setting InBand	Delay (in milliseconds) 40
Registration	Content-Type for DTMF application/dtmf-relay	Maximal delay (in milliseconds) 100
Registration expire timeout (in seconds)* 1800	Flash relay setting Follow DTMF	Factor 7 (recommended)
Registration retry interval (in seconds)* 600	Content-Type for Flash Follow DTMF	Timeout Settings
Session expires (in seconds)* 1800	RTP Redundancy	Waiting for first digit (in seconds) 30
Session refresher Auto	Codec None	Dial delay time (in seconds) 5
Session update method UPDATE	Payload type 121	BusyTone timeout (in seconds) 30
NAT		HowerTone timeout (in seconds) 60
<input checked="" type="checkbox"/> NAT keep alive		RTCP
NAT support interval (in seconds)* 60		<input type="checkbox"/> Send RTCP
		Sending interval (in seconds)* 1

APPLY

Figure 205. The VoIP / Profile Name / Additional Settings page.

Parameter	Description
Common Settings	
Support PRACK	Move the switch to the right to enable the PRACK method (<i>Provisional Response ACKnowledgement</i>). The PRACK method provides reliable transmission of packets with provisional responses to an initiating request upon setting a session in accordance with RFC3262.
Registration	
Registration expire timeout	A time period (in seconds) after which the router changes the registration status in case of no response from the SIP proxy server.
Registration retry interval	A time period (in seconds) after which the registration will be repeated.
Session expires	A time period (in seconds) between attempts to check the status of the voice session.
Session refresher	From the drop-down list, select the preferred choice of checking the Internet connection state during the voice session. <ul style="list-style-type: none"> • Local: The router sends special SIP packets for checking the Internet connection state. • Remote: The SIP proxy server sends special SIP packets for checking the Internet connection state. • Auto: The SIP proxy server defines which party checks the Internet connection state.
Session update method	The voice session update method. Contact your ISP to clarify which value needs to be selected.
NAT	
NAT keep alive	Move the switch to the right to allow the router to support the state of automatically forwarded ports by periodic exchange of service messages. If the switch is moved to the right, the NAT support interval field is available for editing.
NAT support interval	The time interval (in seconds) between service messages. Specify the needed value.

Parameter	Description
Telephone Event Relay	
DTMF relay setting	<p>From the drop-down list, select a mode for DTMF signal transmission.</p> <ul style="list-style-type: none"> • InBand: Transmission with voice data. • RFC2833: Transmission in accordance with RFC2833. • SIPInfo: Transmission in the relevant SIP messages.
Content-Type for DTMF	Select DTMF data type from the drop-down list.
Flash relay setting	<p>The mode for signal transmission upon pressing the FLASH key.</p> <ul style="list-style-type: none"> • Follow DTMF: Transmission in the mode selected for DTMF signal transmission. • InBand: Transmission with voice data. • RFC2833: Transmission in accordance with RFC2833. • SIPInfo: Transmission in the relevant SIP messages.
Content-Type for Flash	In the drop-down list, select the data type to be transferred upon pressing the FLASH key.
Payload type for RFC 2833	<p>Select RFC2833 data type.</p> <p>The field is displayed if the RFC2833 value is selected in the DTMF relay setting drop-down list.</p>
RTP Redundancy	
Codec	<p>The RTP Redundancy function allows restoring a part of lost RTP packets while transmitting audio data.</p> <p>From the drop-down list, select a codec to which the function should be applied.</p> <p>To disable the function, select the None value from the drop-down list.</p>
Payload type	Payload data type.

Parameter	Description
Jitter Buffer	
Delay / Maximal delay	<p>The Jitter Buffer parameter improves the quality of voice transmission: received voice packets are specially delayed, which allows their reproducing in the order they were sent from the transmitting side.</p> <p>Specify the minimal and maximal packets waiting period (in milliseconds) in the relevant fields.</p>
Factor	<p>This parameter enhances efficiency of jitter buffer operation. When the minimal value is selected, the delay value will tend to be lower. Select the relevant value from the drop-down list.</p>
Timeout Settings	
Waiting for first digit	<p>The delay time before the first digit is dialed (in seconds). Specify the required value.</p>
Dial delay time	<p>The delay time before the next digit is dialed (from 3 to 9 seconds). When this time expires, the router regards that the dialing is completed and makes the call.</p>
BusyTone timeout	<p>Busy tone duration (in seconds).</p>
HowlerTone timeout	<p>Howler tone duration (in seconds).</p>
RTCP	
Send RTCP	<p><i>Real-Time Transport Control Protocol.</i></p> <p>Move the switch to the right to allow sending RTCP packets. RTCP packets exchange allows receiving statistics on RTP packets delivery.</p>
Sending interval	<p>Specify the time period (in seconds) between sending packets.</p>

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

Fax Settings

On the **VoIP / Profile Name / Fax Settings** page, you can specify settings of data receipt/transfer for the fax machines connected to the FXS ports of the router.

Figure 206. The **VoIP / Profile Name / Fax Settings** page.

Parameter	Description
T.38	
Enable T.38 support	Move the switch to the right to allow support of the T.38 protocol. If the switch is moved to the right, the Fax/Modem determination drop-down list and the Enable custom parameters switch are displayed on the page.
Fax/Modem determination	From the drop-down list, select a mode of fax/modem signal detection.

Parameter	Description
Enable custom parameters	Move the switch to the right to specify additional parameters for T.38 protocol. Upon that the Custom Parameters T.38 section is displayed on the page.
Custom Parameters T.38	
Maximal buffer	The maximum buffer size (in bytes) for data received by the router.
Rate management (TCF)	From the drop-down list, select a method for facsimile data transfer rate management: Local or Network .
Maximal rate	From the drop-down list, select the maximum rate for facsimile data receipt/transfer (in bauds).
Error correction mode	Move the switch to the right to enable the error correction mode. When the switch is moved to the right, the ECC signal and ECC data fields are available for editing.
Enable spoofing	Move the switch to the right to let the router simulate facsimile data receipt/transfer in case of delays.
Duplicate number	Specify the number of packet duplications.
Fax/Modem Passthrough	
Enable fax/modem	From the drop-down list, select the Auto value to enable the Fax Passthrough and Modem Passthrough mechanisms. To disable the mechanisms, select the Disable value.
Codec type	From the drop-down list, select a codec for data transfer.
Payload type	Payload data type.

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

Audio Settings

On the **VoIP / Profile Name / Audio Settings** page, you can configure audio parameters, volume and voice codecs.

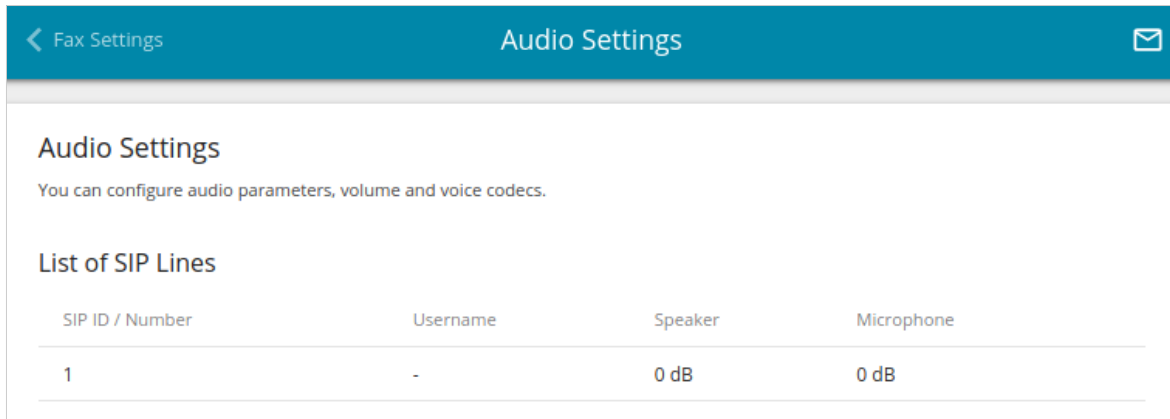


Figure 207. The **VoIP / Profile Name / Audio Settings** page.

To change the parameters for a SIP line, select the relevant line in the table.

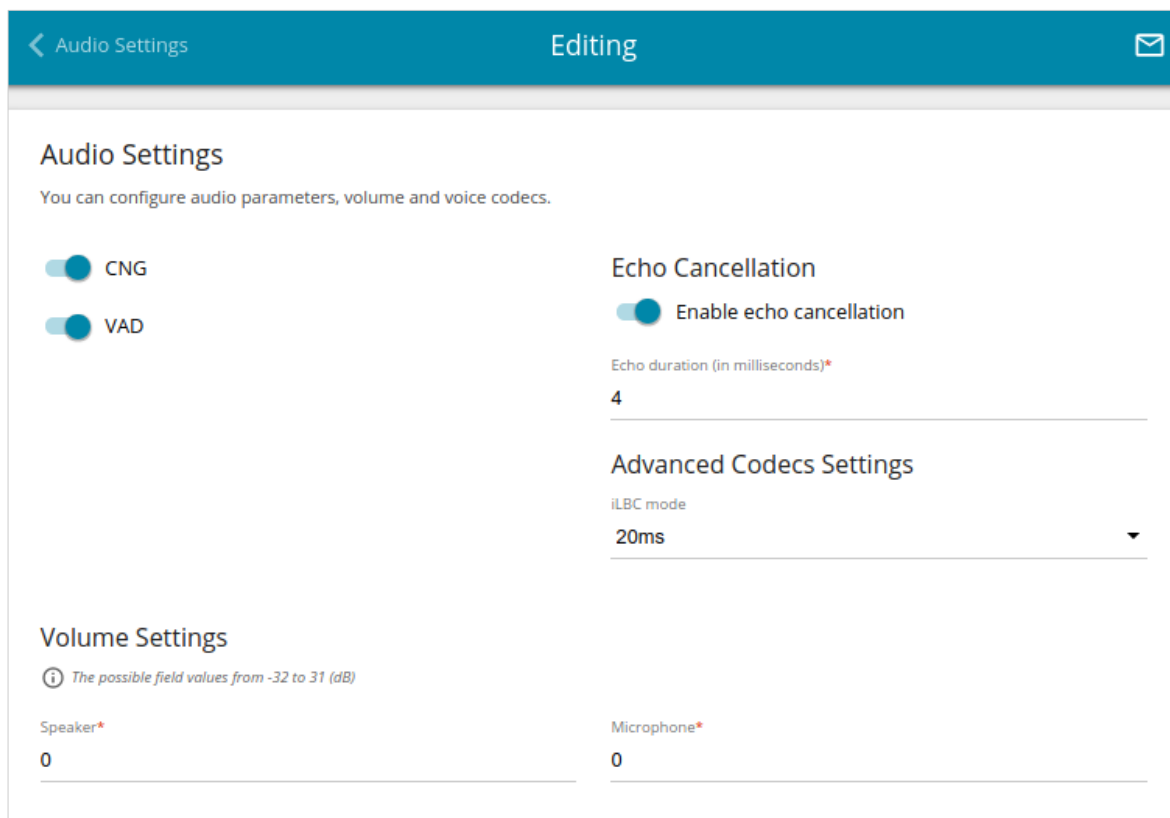


Figure 208. The page for audio settings for a SIP line.

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

Parameter	Description
Audio Settings	
CNG	<i>Comfort Noise Generation.</i> Move the switch to the right to enable the function.
VAD	<i>Voice Activity Detection.</i> Move the switch to the right to enable the function.
Echo Cancellation	
Enable echo cancellation	Move the switch to the right to enable the echo cancellation function.
Echo duration	Specify the maximum echo duration (in milliseconds).
Advanced Codecs Settings	
iLBC mode	<i>Internet Low Bitrate Codec.</i> The value of the field specifies the operation mode of the codec. Select the needed value from the drop-down list. <ul style="list-style-type: none"> • 20ms: The speech signal transfer rate is 15.20Kbps for 20ms frames. • 30ms: The speech signal transfer rate is 13.33Kbps for 30ms frames.
Volume Settings	
Speaker	Specify the earphone volume for the phone connected to this SIP line.
Microphone	Specify the microphone sensitivity for the phone connected to this SIP line.

In the **Codecs Settings** section, you can configure work of voice codecs in use.

Codecs Settings			
Codec	State	Priority	Period of packetization
G.711MuLaw	On	1	20
G.711ALaw	On	2	20
G.726-16	On	3	20
G.726-24	Off	4	20
G.726-32	On	5	20
G.726-40	Off	6	20
G.729	On	7	20
G.723.1	On	8	30
G.722	On	9	20
GSM-FR	Off	10	20
iLBC	Off	11	20

Figure 209. The **VoIP / Profile Name / Audio Settings** page. The **Codecs Settings** section.

To change parameters of a codec, left-click the relevant line in the table.

Figure 210. The window for changing the codec parameters.

In the opened window, you can specify the following parameters:

Parameter	Description
Enable codec	To enable the codec, move the switch to the right. To disable the codec, move the switch to the left.
Priority	Priority of the codec upon setting a voice session. Select the needed value from the drop-down list.
Period of packetization	Quantity of milliseconds transmitted in one packet. Select the needed value from the drop-down list.

Click the **SAVE** button.

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

Call Routing

On the **VoIP / Profile Name / Call Routing** page, you can configure speed dial parameters and dialplan settings.

Key	Number
1	
2	
3	
4	
5	
6	
7	
8	
9	
0	
*	
#	

Dialplan Settings

Use dialplan

Dialplan
X.T|X.<#:>

Figure 211. The **VoIP / Profile Name / Call Routing** page.

In the **Speed Dial** section, you can assign phone numbers to the number keys of the phone set connected to the port associated with your profile. To do this, left-click the line corresponding to the key of the phone set. In the opened window, enter the needed number in the **Number** field and click the **SAVE** button. Also you can specify a number in the format **phone_number@IP_address** or **phone_number@host_name** for direct IP calls bypassing the SIP proxy server.

To change or delete the number assigned to a number key, left-click the line corresponding to the key of the phone set. In the opened window, edit or remove the value of the **Number** field and click the **SAVE** button.

To dial a number specified in the **Speed Dial** section, long press the relevant number key.

In the **Dialplan Settings** section, you can configure the dial plan for VoIP. To do this, move the **Use dialplan** switch to the right and in the **Dialplan** field displayed, specify the needed rule. You can specify several rules separated by the character | (vertical bar). You can use digits (0-9), the characters * (asterisk) and # (pound), and the following characters:

Parameter	Description
[]	Digits and/or the characters * and # within square brackets specify a range of values for a certain position in the number.
X	Any digit, the character * or #.
.	Any number of repetitions (including none) of the previous digit or character.
<>	Angle brackets containing digits separated by : (colon) allow to substitute the digit after the colon for the digit before the colon.
N	Any digit from 0 to 9.
,	A dial tone after the previous position.

In the **Numbering Plan** section, you can configure abbreviated dial, local calls, calls by IP, and combinations of keys on the phone to change some parameters of VoIP directly from the connected phones.

Numbering Plan + 				
<input type="checkbox"/>	Prefix	User dial length	Action	Additional parameter
<input type="checkbox"/>	*72#	1-40	Enable Call Waiting	-
<input type="checkbox"/>	#72#	1-40	Disable Call Waiting	-
<input type="checkbox"/>	*74#	1-40	Enable Do Not Disturb	-
<input type="checkbox"/>	#74#	1-40	Disable Do Not Disturb	-
<input type="checkbox"/>	*78*	1-40	Enable Unconditional Forwarding	-
<input type="checkbox"/>	#78#	1-40	Disable Unconditional Forwarding	-
<input type="checkbox"/>	*76*	1-40	Enable Call Forwarding on Busy	-
<input type="checkbox"/>	#76#	1-40	Disable Call Forwarding on Busy	-
<input type="checkbox"/>	*75*	1-40	Enable Call Forwarding No Answer	-
<input type="checkbox"/>	#75#	1-40	Disable Call Forwarding No Answer	-
<input type="checkbox"/>	*79*	1-40	Enable Hot Line	-
<input type="checkbox"/>	#79#	1-40	Disable Hot Line	-

The part of the prefix that will not be sent at the end of dialing is highlighted in red

Figure 212. The **VoIP / Profile Name / Call Routing** page. The **Numbering Plan** section.

You can configure the following actions:

Parameter	Description
Set Dial	Sets the number for abbreviated dial. In the Additional parameter field, specify the actual number.
Enable Call Waiting	Enables the call waiting function.
Disable Call Waiting	Disables the call waiting function.
Enable Do Not Disturb	Enables rejection of all incoming calls (the busy tone will be heard).
Disable Do Not Disturb	Disables rejection of incoming calls.
Enable Unconditional Forwarding	Enables forwarding for all calls.
Disable Unconditional Forwarding	Disables forwarding for all calls.

Parameter	Description
Enable Call Forwarding On Busy	Enables call forwarding when this line is busy.
Disable Call Forwarding On Busy	Disables call forwarding when this line is busy.
Enable Call Forwarding No Answer	Enables call forwarding when this line gives no reply.
Disable Call Forwarding No Answer	Disables call forwarding when this line gives no reply.
Enable Hot Line	Enables the hotline.
Disable Hot Line	Disables the hotline.
Local Call	Makes a call to the neighboring line. In the Additional parameter field, specify the number of the SFX port for calling.
Call by IP	Makes an outgoing call. In the Additional parameter field, specify a part of the IP address for calling, for example, 192.168.100 . The remaining part of the IP address is dialed on the connected phone. Use the star (*) key to dial the dot (.) character.
Redial	Enables number redial.

To use the call forwarding function on the connected phone, dial the corresponding prefix, wait to hear the signal for number dialing in the receiver, and dial the number for forwarding on the phone. You can also configure call forwarding in the **List of SIP Lines** section on the **Profile Name / Basic Settings** page.

To change parameters of a numbering plan, select the relevant line in the table.

Figure 213. The window to configure the numbering plan.

In the opened window, you can specify the following parameters:

Parameter	Description
Prefix	A combination of keys on the phone connected to the router to activate an action.
Action	An action or operation performed by the DVG-5402G/GF after the prefix is dialed. Select the required action from the drop-down list.
Remove digits from position	The first symbol to be removed from the dialed prefix.
Delete digits	The number of symbols to be removed from the dialed prefix.
Min. dial length	The minimum length of a number dialed after the prefix.
Max. dial length	The maximum length of a number dialed after the prefix.

Parameter	Description
Additional parameter	If needed, specify an additional parameter for the selected action, for example, INVITE to send a service code to the SIP server, or the number or IP address for dialing.

Click the **SAVE** button.

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

Call Logging

On the **VoIP / Profile Name / Call Logging** page, you can configure the call log parameters and view information on all calls for your profile.

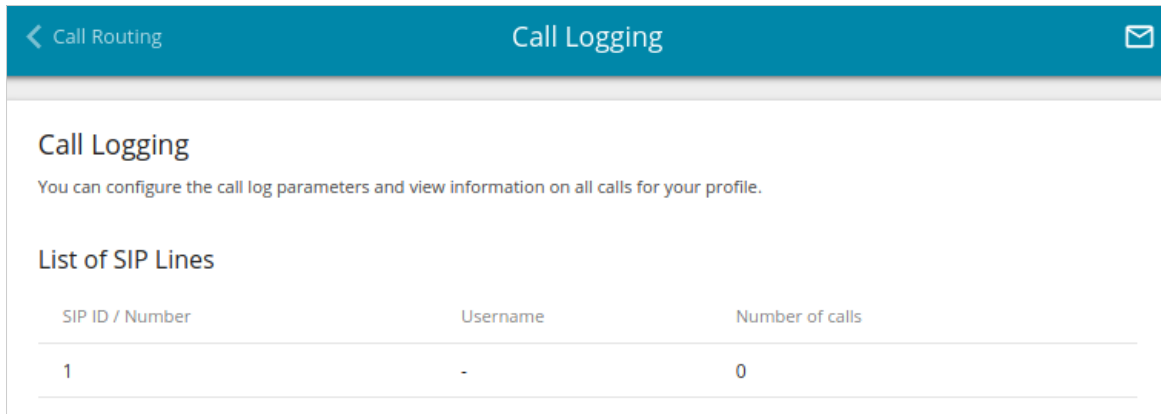


Figure 214. The **VoIP / Profile Name / Call Logging** page.

To change the parameters and view the call history for a SIP line, select the relevant line in the table.

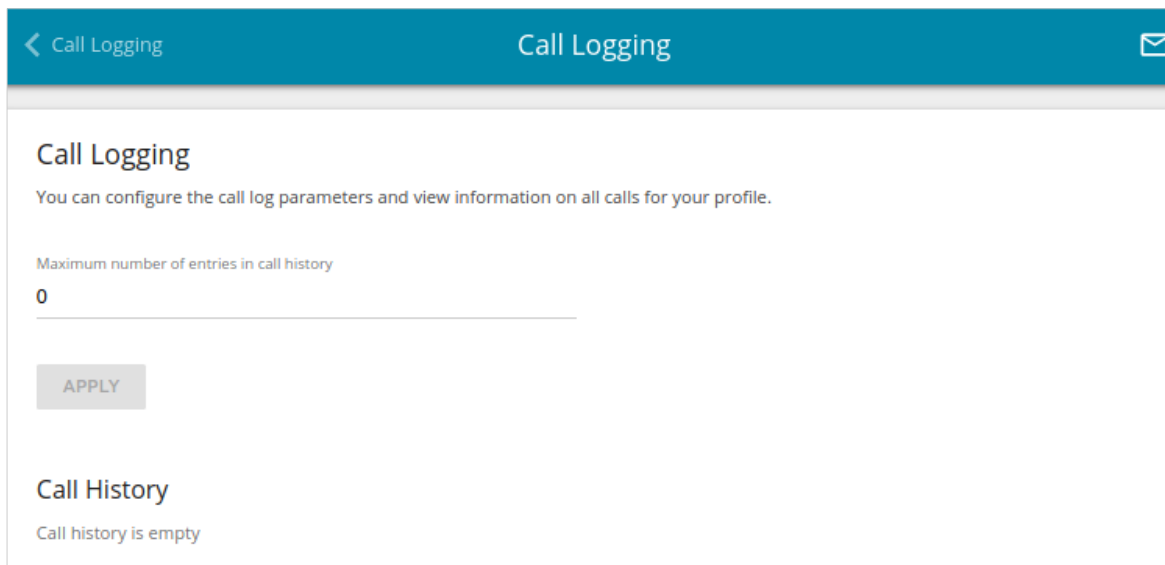




Figure 215. The **VoIP / Profile Name / Call Logging** page. The SIP line data.

On the opened page, you can specify the maximum number of call log entries. To do this, fill in the **Maximum number of entries in call history** field and click the **APPLY** button.



Upon every reboot of the router or its firmware update call log entries from the device's memory will be deleted. You can enable saving the call log to a USB storage connected to the router on the **VoIP / Advanced Settings** page.

In the **Call History** section, the detailed information on all calls is displayed: date and time, call duration, and a caller or called party number.

To sort the log records, in the **Call History** section, left-click the name of a column and click the ascending () or descending () **Sort** icon displayed.

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
- specify restrictions on access to certain web sites
- enable the function of blocking advertisements
- create rules for remote access to the web-based interface.

IP Filter

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

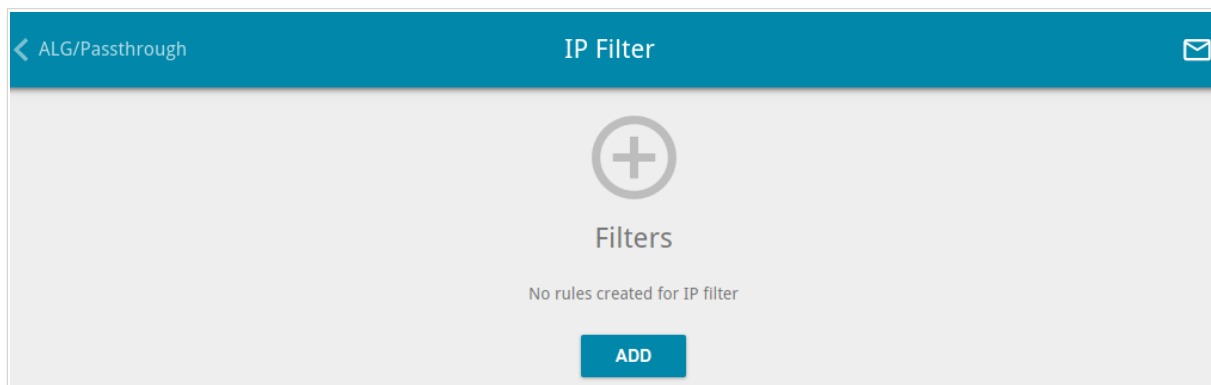


Figure 216. The **Firewall / IP Filter** page.

To create a new rule, click the **ADD** button (**+**).

Figure 217. The page for adding a rule for IP filtering.

You can specify the following parameters:

Parameter	Description
General Settings	
Enable rule	Move the switch to the right to enable the rule. Move the switch to the left to disable the rule.
Name	A name for the rule for easier identification. You can specify any name.

Parameter	Description
Action	<p>Select an action for the rule.</p> <ul style="list-style-type: none"> • 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.
Protocol	<p>A protocol for network packet transmission. Select a value from the drop-down list.</p>
IP version	<p>An IP version to which the rule will be applied. Select the relevant value from the drop-down list.</p>
Direction	<p>The direction of network packet transmission to which the rule will be applied. Select the source of the packet direction from the Source drop-down list.</p> <ul style="list-style-type: none"> • WAN: The rule will be applied to the packets transmitted from the external network. • LAN: The rule will be applied to the packets transmitted from the local network. • GRE: The rule will be applied to the packets transmitted from the GRE tunnel (<i>available if a GRE tunnel has been created on the device</i>). • IPIP: The rule will be applied to the packets transmitted from the IPIP tunnel (<i>available if an IPIP tunnel has been created on the device</i>). • IPsec: The rule will be applied to the packets transmitted from the IPsec tunnel (<i>available if an IPsec tunnel has been created on the device</i>). • PPTP Server: The rule will be applied to the packets transmitted from the PPTP server (<i>available if a PPTP server has been created on the device</i>). • L2TP Server: The rule will be applied to the packets transmitted from the L2TP server (<i>available if an L2TP server has been created on the device</i>).

Parameter	Description
	<p>Select the destination of the packet direction from the Destination drop-down list.</p> <ul style="list-style-type: none"> • Router: The rule will be applied to the packets transmitted to DVG-5402G/GF. • WAN: The rule will be applied to the packets transmitted to the external network. • LAN: The rule will be applied to the packets transmitted to the local network. • GRE: The rule will be applied to the packets transmitted to the GRE tunnel (<i>available if a GRE tunnel has been created on the device</i>). • IPIP: The rule will be applied to the packets transmitted to the IPIP tunnel (<i>available if an IPIP tunnel has been created on the device</i>). • IPsec: The rule will be applied to the packets transmitted to the IPsec tunnel (<i>available if an IPsec tunnel has been created on the device</i>). • PPTP Server: The rule will be applied to the packets transmitted to the PPTP server (<i>available if a PPTP server has been created on the device</i>). • L2TP Server: The rule will be applied to the packets transmitted to the L2TP server (<i>available if an L2TP server has been created on the device</i>). <p>From the Source interface and Destination interface drop-down lists, select source and destination interfaces for which the rule will be applied. Leave the Auto values to apply the rule to all created WAN interfaces.</p>
Source IP address	
Set as	Select the needed value from the drop-down list.
Start IPv4 address / Start IPv6 address	<p>The source host start IPv4 or IPv6 address.</p> <p>If it is necessary to specify a single address, leave the End IPv4 address / End IPv6 address field blank.</p> <p>You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IPv4 or IPv6 address from the drop-down list (the field will be filled in automatically).</p>

Parameter	Description
End IPv4 address / End IPv6 address	The source host end IPv4 or IPv6 address.
Subnet IPv4 address / Subnet IPv6 address	The source subnet IPv4 or IPv6 address. The field is displayed when the Subnet value is selected from the Set as drop-down list.
Destination IP address	
Set as	Select the needed value from the drop-down list.
Start IPv4 address / Start IPv6 address	The destination host start IPv4 or IPv6 address. If it is necessary to specify a single address, leave the End IPv4 address / End IPv6 address field blank. You can choose a device connected to the router's LAN at the moment. To do this, select the relevant IPv4 or IPv6 address from the drop-down list (the field will be filled in automatically).
End IPv4 address / End IPv6 address	The destination host end IPv4 or IPv6 address.
Subnet IPv4 address / Subnet IPv6 address	The destination subnet IPv4 or IPv6 address. The field is displayed when the Subnet value is selected from the Set as drop-down list.
Ports	
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.
Set source port manually	Move the switch to the right to specify a port of the source IP address manually. Upon that the Source port field is displayed.
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.


Click the **APPLY** button.


To set a schedule for the IP filter rule, click the **Set schedule** icon (🕒) in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the IP filter rule at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the IP filter rule at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To edit a rule, select the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To change or delete the schedule for a rule, click the **Edit schedule** icon () in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

To remove a rule, select the checkbox located to the left of the relevant line of 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.

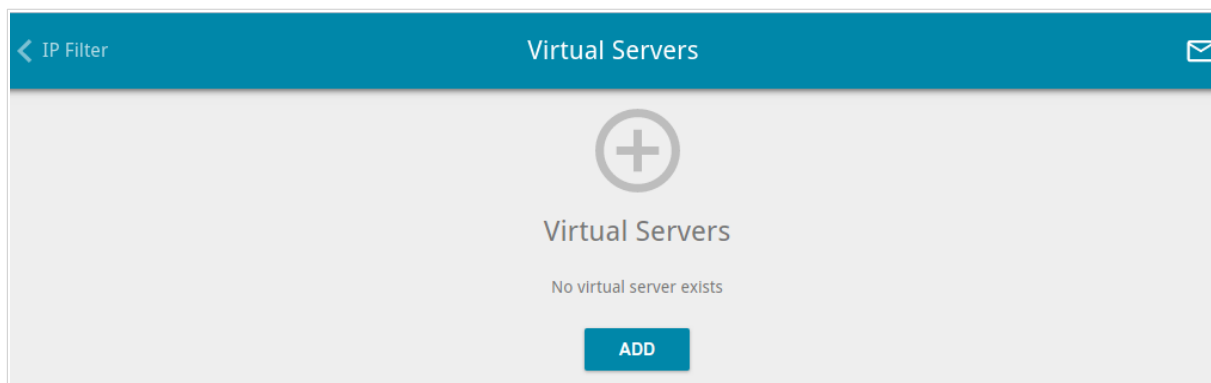


Figure 218. The **Firewall / Virtual Servers** page.


To create a new virtual server, click the **ADD** button ().

Figure 219. The page for adding a virtual server.

You can specify the following parameters:

Parameter	Description
General Settings	
Enable	Move the switch to the right to enable the server. Move the switch to the left to disable the server.
Name	A name for the virtual server for easier identification. You can specify any name.
Template	Select a virtual server template from the drop-down list, or select Custom to specify all parameters of the new virtual server manually.

Parameter	Description
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.
NAT Loopback	Move the switch to the right in order to let the users of the router's LAN access the local server using the external IP address of the router or its DDNS name (if a DDNS service is configured). Users from the external network access the router using the same address (or DDNS name).
Public Network Settings	
Remote IP address	The IP address of the host/subnet of the client that will connect to the virtual server. To add one more IP address, click the ADD REMOTE IP button and enter the address in the displayed line. To remove the IP address, click the Delete icon (✕) in the line of the address.
Public port	A port of the router from which traffic is directed to the IP address specified in the Private IP field in the Private Network Settings section. You can specify one port or several ports separated by a comma.
Private Network Settings	
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).
Private port	A port of the IP address specified in the Private IP field to which traffic is directed from the Public port . You can specify one port or several ports separated by a comma.


Click the **APPLY** button.


To set a schedule for a virtual server, click the **Set schedule** icon (🕒) in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the virtual server at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the virtual server at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

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

To change or delete the schedule for a server, click the **Edit schedule** icon () in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

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

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.

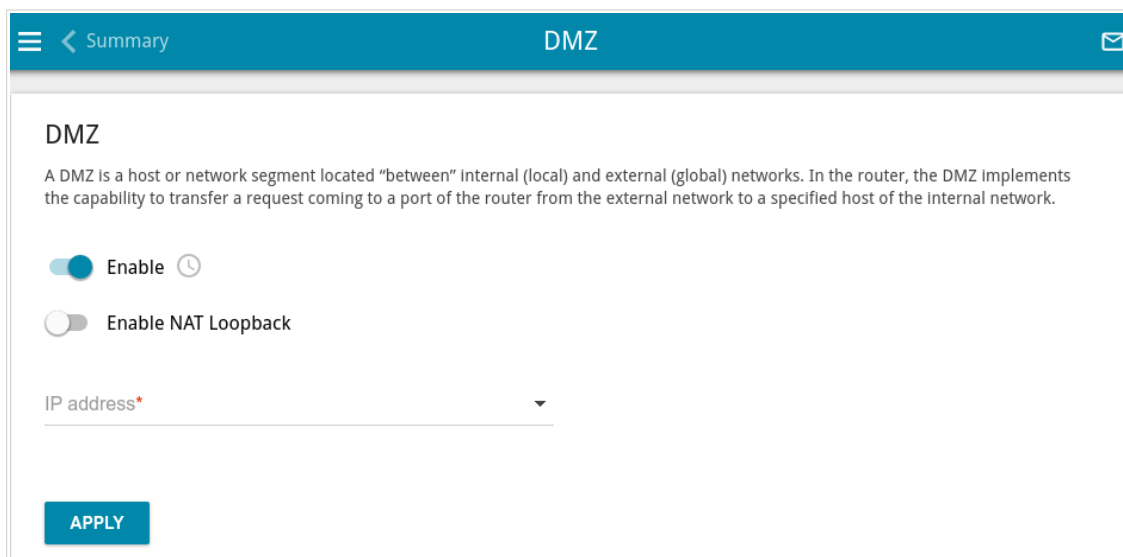


Figure 220. The **Firewall / DMZ** page.

To enable the DMZ, move the **Enable** switch to the right.

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).

Move the **Enable NAT Loopback** switch to the right in order to let the users of the router's LAN access the DMZ host using the external IP address of the router or its DDNS name (if a DDNS service is configured). Users from the external network access the router using the same address (or DDNS 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 set a schedule for the DMZ, click the **Set schedule** icon (🕒). In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the DMZ for the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the DMZ for the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To change or delete the schedule for the DMZ, click the **Edit schedule** icon (🕒). In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

To disable the DMZ, move the **Enable** switch to the left 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.

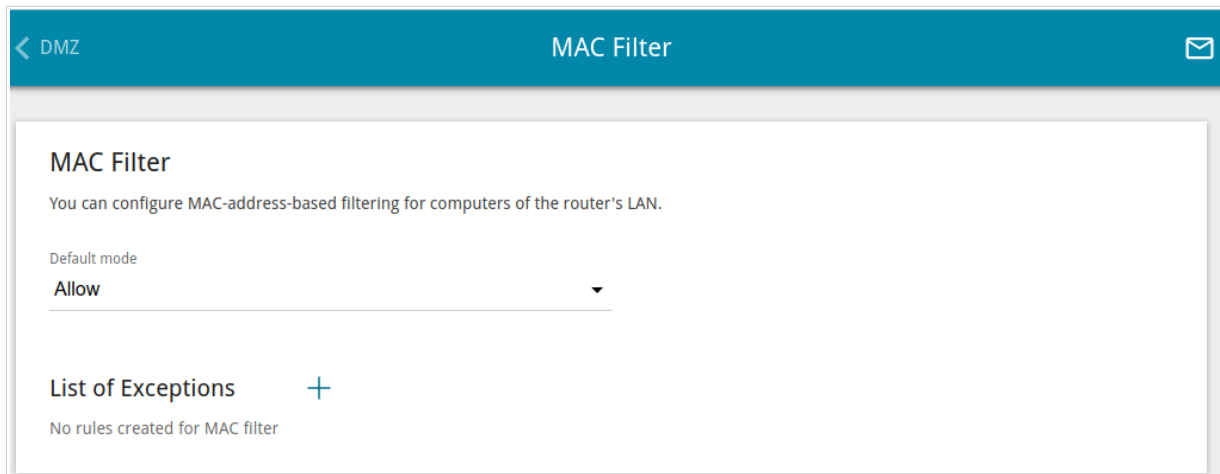


Figure 221. The **Firewall / MAC Filter** page.

Select the needed action from the drop-down list in the **Default mode** section 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.

! You can use the **Deny** mode only if an active rule which allows access to the device's network is created on the page.

To create a rule (specify a MAC address of a device for which the specified filtering mode will be applied), click the **ADD** button (**+**).

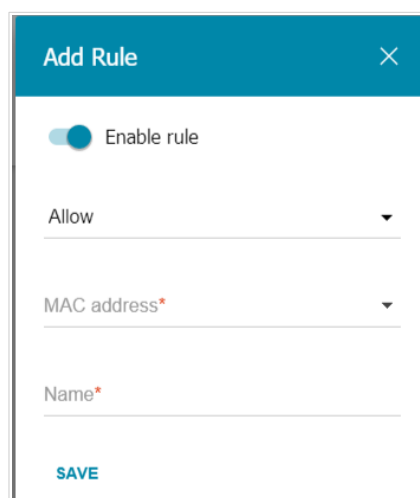


Figure 222. The window for adding a rule for the MAC filter.

In the opened window, you can specify the following parameters:

Parameter	Description
Enable rule	Move the switch to the right to enable the rule. Move the switch to the left to disable the rule.
Action	Select an action for the rule. <ul style="list-style-type: none"> • Deny: Blocks access to the Internet for the device with the specified MAC address even if the default mode allows access for all devices. • Allow: Allows access to the router's network and to the Internet for the device with the specified MAC address even if the default mode denies access for all devices.
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).
Name	The name of the device for easier identification. You can specify any name.

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

To set a schedule for the MAC filter rule, click the **Set schedule** icon (🕒) in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the MAC filter rule at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the MAC filter rule at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To edit a rule, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To change or delete the schedule for a rule, click the **Edit schedule** icon (🕒) in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

To remove a rule, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button (🗑️). Also you can remove a rule in the editing window.

URL Filter

On the **Firewall / URL Filter** page, you can specify restrictions on access to certain web sites and define devices to which the specified restrictions will be applied.

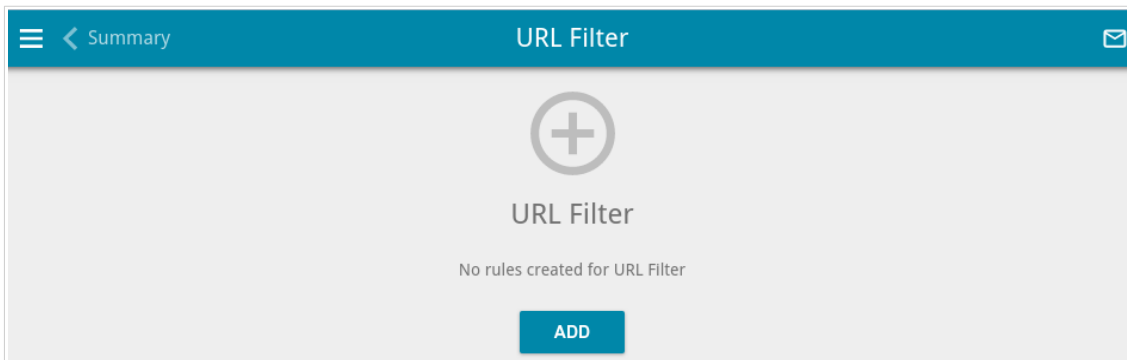


Figure 223. The **Firewall / URL Filter** page.

To create a new rule, click the **ADD** button (**+**).

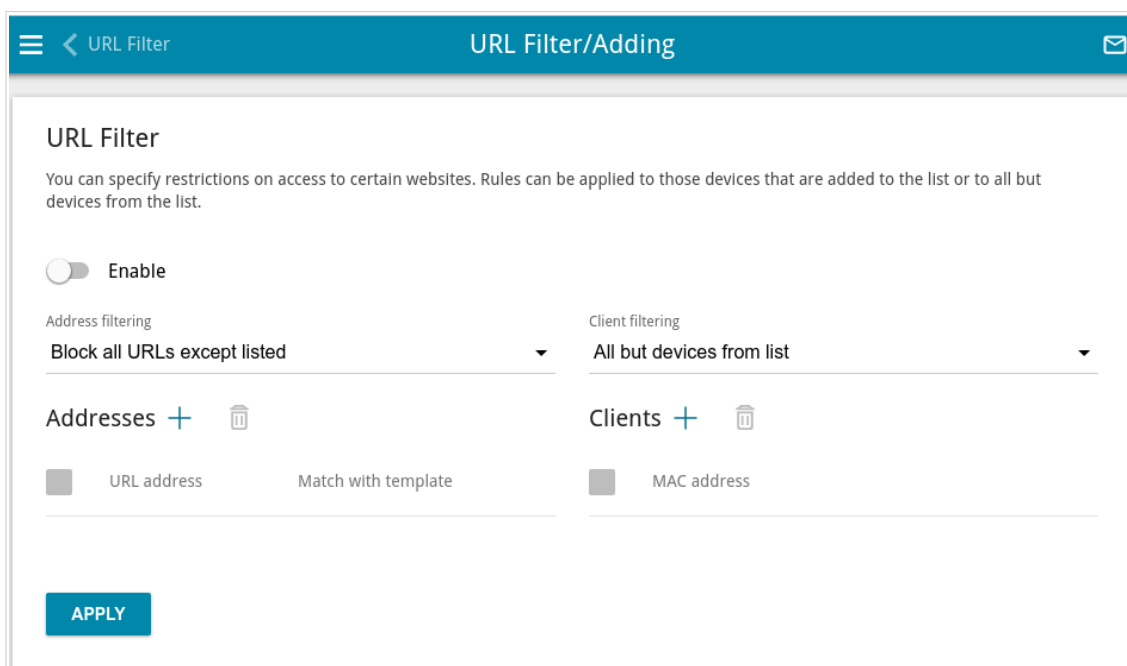



Figure 224. The page for adding a rule for URL filter.


On the opened page, move the **Enable** switch to the right to enable the rule, then select a mode from the **Address filtering** drop-down list.

- **Block listed URLs:** When this value is selected, the router blocks access to all web sites specified in the **Addresses** section;
- **Block all URLs except listed:** When this value is selected, the router allows access to web sites specified in the **Addresses** section and blocks access to all other web sites.

To specify URL addresses to which the selected filtering mode will be applied, in the **Addresses** section, click the **ADD** button (). In the opened window, you can specify the following parameters:


Parameter	Description
URL address	A URL address, a part of URL address, or a keyword.
Match with template	Select a value from the drop-down list. <ul style="list-style-type: none">• Full: The request address should exactly match the value specified in the field above.• Begin: The request address should begin with the value specified in the field above.• End: The request address should end with the value specified in the field above.• Partly: The request address should contain the value specified in the field above in any part of it.


Click the **SAVE** button.

To remove a URL address from the list, select the checkbox located to the left of the relevant address in the table and click the **DELETE** button (). Also you can remove an address in the editing window.

To define devices to which the specified restrictions will be applied, select a needed value from the **Client filtering** drop-down list.

- **Devices from list**: When this value is selected, the router applies restrictions only to the devices specified in the **Clients** section;
- **All but devices from list**: When this value is selected, the router does not apply restrictions to the devices specified in the **Clients** section, but applies restrictions to other devices.

To add a client to the list, in the **Clients** section, click the **ADD** button (). In the opened window, in the **MAC address** field, enter the MAC address of the device from the 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) and click the **SAVE** button.

To remove a client from the list, select the checkbox located to the left of the relevant rule of the table and click the **DELETE** button (). Also you can remove a client in the editing window.

After completing configuration of the URL filter, click the **APPLY** button.

To set a schedule for the URL filter rule, click the **Set schedule** icon (🕒) in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the URL filter rule at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the URL filter rule at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To edit a rule, select the relevant line in the table. On the opened page, change the needed parameters and click the **APPLY** button.

To change or delete the schedule for a rule, click the **Edit schedule** icon (🕒) in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

To remove a rule, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button (🗑️).

AdBlock

On the **Firewall / AdBlock** page, you can enable the function of blocking advertisements which appear during web surfing.

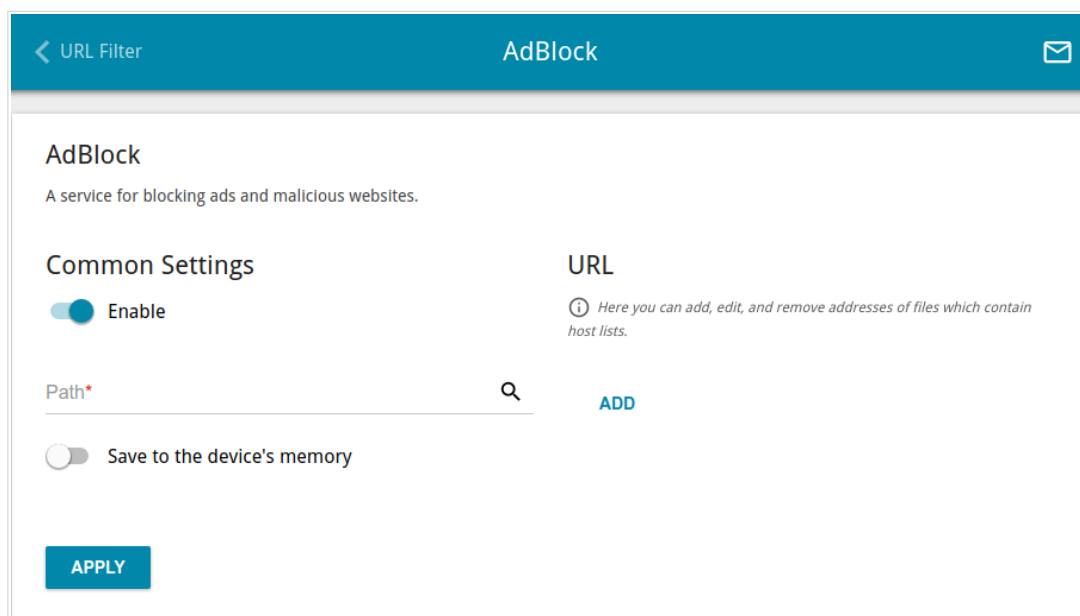



Figure 225. The **Firewall / AdBlock** page.

To enable the advertisements blocking function, in the **Common Settings** section, move the **Enable** switch to the right.


In the **Path** field, locate a folder to which a file for blocking advertisements will be saved. To do this, click the **Search** icon (), go to the needed folder, and click the **SELECT** button.

Then in the **URL** section, click the **ADD** button and in the line displayed, enter a URL address of a file containing the list of advertising web sites which should be blocked.

Click the **APPLY** button and wait while the file is being loaded to the memory of the USB storage. Also you can save the file with the list of advertising web sites to the device's memory. To do this, move the **Save to the device's memory** switch to the right, and then click the **APPLY** button.



Files saved to the device's memory are updated upon every reboot of the router or its or firmware update. In case the file is not available at that moment, the list of web sites to be blocked will not be received.

If you don't want to use a file for blocking advertisements any longer, click the **Delete** icon () in the line of the URL address of the relevant file. Then click the **APPLY** button.

To disable the advertisements blocking function, move the **Enable** switch to the left and click the **APPLY** button.

Remote Access

On the **Firewall / Remote Access** 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.

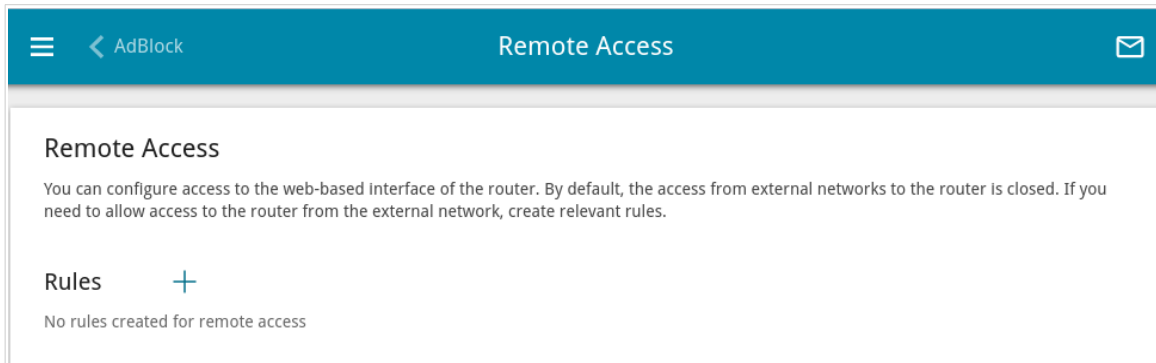


Figure 226. The **Firewall / Remote Access** page.

To create a new rule, click the **ADD** button (**+**).

The screenshot shows the 'Add Rule' configuration window. It has a teal header with the title 'Add Rule' and a close 'X' button. The form contains several fields and options: an 'Enable' toggle switch which is turned on; a 'Name*' text input field with a note below it: 'The number of characters should not exceed 32'; an 'Interface' dropdown menu set to 'Automatic'; an 'IP version' dropdown menu set to 'IPv4'; an 'Open access from any external host' toggle switch which is turned off; an 'IP address*' text input field; a 'Mask*' text input field; a 'Public port*' text input field set to '80'; and a 'Protocol' dropdown menu set to 'HTTP'. At the bottom of the form is a 'SAVE' button.

Figure 227. The window for adding a rule for remote management.

In the opened window, you can specify the following parameters:

Parameter	Description
Enable	Move the switch to the right to enable the rule. Move the switch to the left to disable the rule.
Name	A name for the rule for easier identification. You can specify any name.
Interface	From the drop-down list, select an interface (WAN connection) through which remote access to the router will operate. Leave the Automatic value to allow remote access to operate through all created WAN connections.
IP version	An IP version to which the rule will be applied. Select the relevant value from the drop-down list.
Open access from any external host	Move the switch to the right to allow access to the router for any host. Upon that the IP address and Mask fields are not displayed.
IP address	A host or a subnet to which the rule is applied. You can specify an IPv4 or IPv6 address.
Mask	<i>For the IPv4-based network only.</i> The mask of the subnet.
Public port	<i>For the IPv4-based network only.</i> 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 **SAVE** button.


To set a schedule for the remote access rule, click the **Set schedule** icon (🕒) in the line corresponding to this rule. In the opened window, from the **Rule** drop-down list, select the **Create rule** value to create a new schedule (see the *Schedule* section, page 324) or select the **Select an existing one** value to use the existing one. Existing schedules are displayed in the **Rule name** drop-down list.

To enable the rule for remote access at the time specified in the schedule and disable it at the other time, select the **Enable rule** value from the **Action** drop-down list and click the **SAVE** button.

To disable the rule for remote access at the time specified in the schedule and enable it at the other time, select the **Disable rule** value from the **Action** drop-down list and click the **SAVE** button.

To edit a rule for remote access, left-click the relevant rule. In the opened window, change the needed parameters and click the **SAVE** button.

To change or delete the schedule for a rule, click the **Edit schedule** icon () in the line corresponding to this rule. In the opened window, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** 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 ().

System

In this menu you can do the following:

- change the password used to access the router's settings
- restore the factory default settings
- create a backup of the router's configuration
- restore the router's configuration from a previously saved file
- save the current settings to the non-volatile memory
- reboot the router
- change the web-based interface language
- edit or add commands for the hardware buttons
- update the firmware of the router
- configure automatic notification on new firmware version
- configure rules to enable/disable Wi-Fi connection and the Wi-Fi filter, automatic reboot of the device and saving a configuration backup to the connected USB storage on a schedule, set rules for limitation of wireless client maximum bandwidth, and set a schedule for different rules and settings of the firewall
- view the system log; configure sending the system log to a remote host and/or a USB storage connected to the router
- check availability of a host on the Internet through the web-based interface of the router
- trace the route to a host
- enable or disable access to the device settings via TELNET and/or SSH
- configure automatic synchronization of the system time or manually configure the date and time for the router
- enable the Auto Provision function.

Configuration

On the **System / Configuration** 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, restore the factory defaults, backup the current configuration or configure automatic saving of the configuration backup to the connected USB storage on a schedule, restore the router's configuration from a previously created file, save the changed settings to the non-volatile memory, reboot the device, or change the web-based interface language.

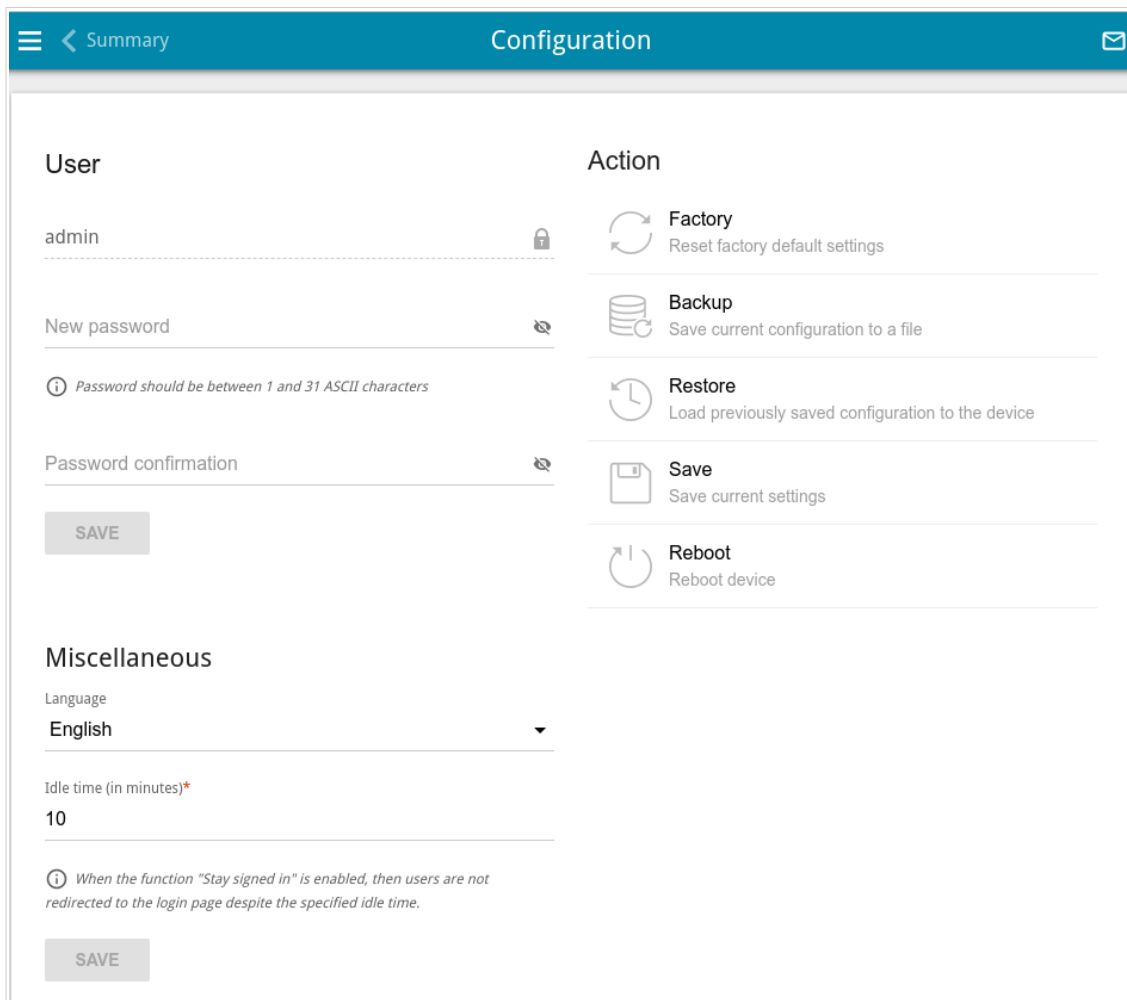


Figure 228. The **System / Configuration** page.

In order to change the password for the administrator account, in the **User** section, enter a new password in the **New password** and **Password confirmation** fields. Use digits, Latin letters (uppercase and/or lowercase), and other characters available in the US keyboard layout.¹⁹ Click the **Show** icon (👁) to display the entered values. Then click the **SAVE** button.


¹⁹ 0-9, A-Z, a-z, space, !"#%&'()*+,-./:;<=>?@[\\]^_`{|}~.

! 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.

To change the web-based interface language, in the **Miscellaneous** section, select the needed value from the **Language** drop-down list.

To change a period of inactivity after which the router completes the session of the interface, in the **Miscellaneous** section, in the **Idle time** field, specify the needed value (in minutes). By default, the value **5** is specified. Then click the **SAVE** button.

In the **Action** section, the following buttons are available:

Control	Description
Factory	Click the button to restore the factory default settings. Also you can restore the factory defaults via the hardware RESET button (see the <i>Side Panel</i> section, page 19).
Backup	Click the button to save the configuration (all settings of the router) to your PC or a USB storage connected to the router. See the <i>Creating Configuration Backup</i> section, page 316 for details on backup creation.
Restore	<p>Click the button to select and upload a previously saved configuration file (all settings of the router) located on your PC or a USB storage connected to the router.</p> <p>To upload a configuration file from your PC, select the Local storage value from the File location drop-down list. Click the CHOOSE FILE button and follow the dialog box appeared.</p> <p>To upload a configuration file from a USB storage connected to the router, select the USB Storage value from the File location drop-down list. Then locate the needed configuration file. To do this, click the Search icon () in the Path field. Then choose the needed file and click the SELECT button.</p> <p>To upload the configuration file, click the APPLY button.</p>
Save	<p>Click the button to save settings to the non-volatile memory.</p> <p>The router saves changed settings automatically. If changed settings have not been saved automatically, a notification is displayed in the top right part of the page.</p>

Control	Description
Reboot	Click the button to reboot the device. All unsaved changes will be lost after the device's reboot.

Creating Configuration Backup

To create a configuration backup, click the **Backup** button in the **Action** section.

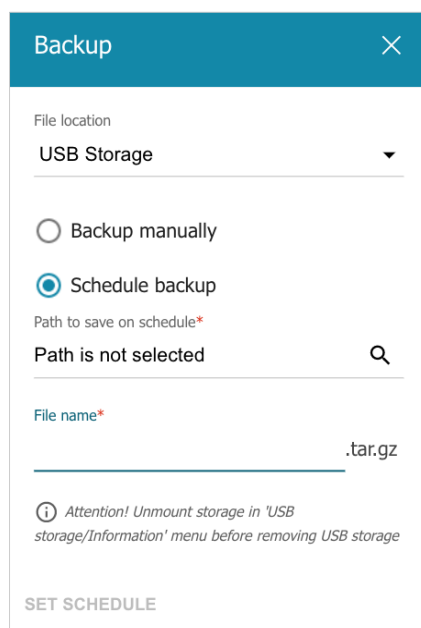



Figure 229. The window for creating a configuration backup.

To save the configuration backup to your PC, select the **Local storage** value from the **File location** drop-down list and click the **SAVE** button. The configuration backup will be stored in the download location of your web browser.

To save the configuration backup to a USB storage connected to the router, select the **USB Storage** value from the **File location** drop-down list. Then select the **Backup manually** choice of the radio button and click the **SAVE** button. In the opened window, in the **File name** field, specify a name for the configuration file. Then go to the needed folder and click the **SELECT** button to save the file.

To configure automatic creation of a configuration backup on a schedule, select the **Schedule backup** choice of the radio button and locate a folder to save the files (available if the **USB Storage** value was selected in the **File location** drop-down list). To do this, click the **Search** icon () in the **Path to save on schedule** field. Then go to the needed folder and click the **SELECT** button.

In the **File name** field, specify a name for the configuration file. Then click the **SET SCHEDULE** button.

In the opened window, specify a schedule name and the interval and time for its execution (see the **Schedule** section, page 324 for detailed description of the fields).

Click the **SAVE** button.

To change or delete the schedule, click the **Edit schedule** icon (🕒). In the opened window, click the **CHANGE SCHEDULE** button, change the parameters and click the **SAVE** button or click the **DELETE FROM SCHEDULE** button.

Buttons Configuration

On the **System / Buttons Configuration** page, you can edit or add commands for the **RESET**, **WLAN**, and **WPS** hardware buttons.

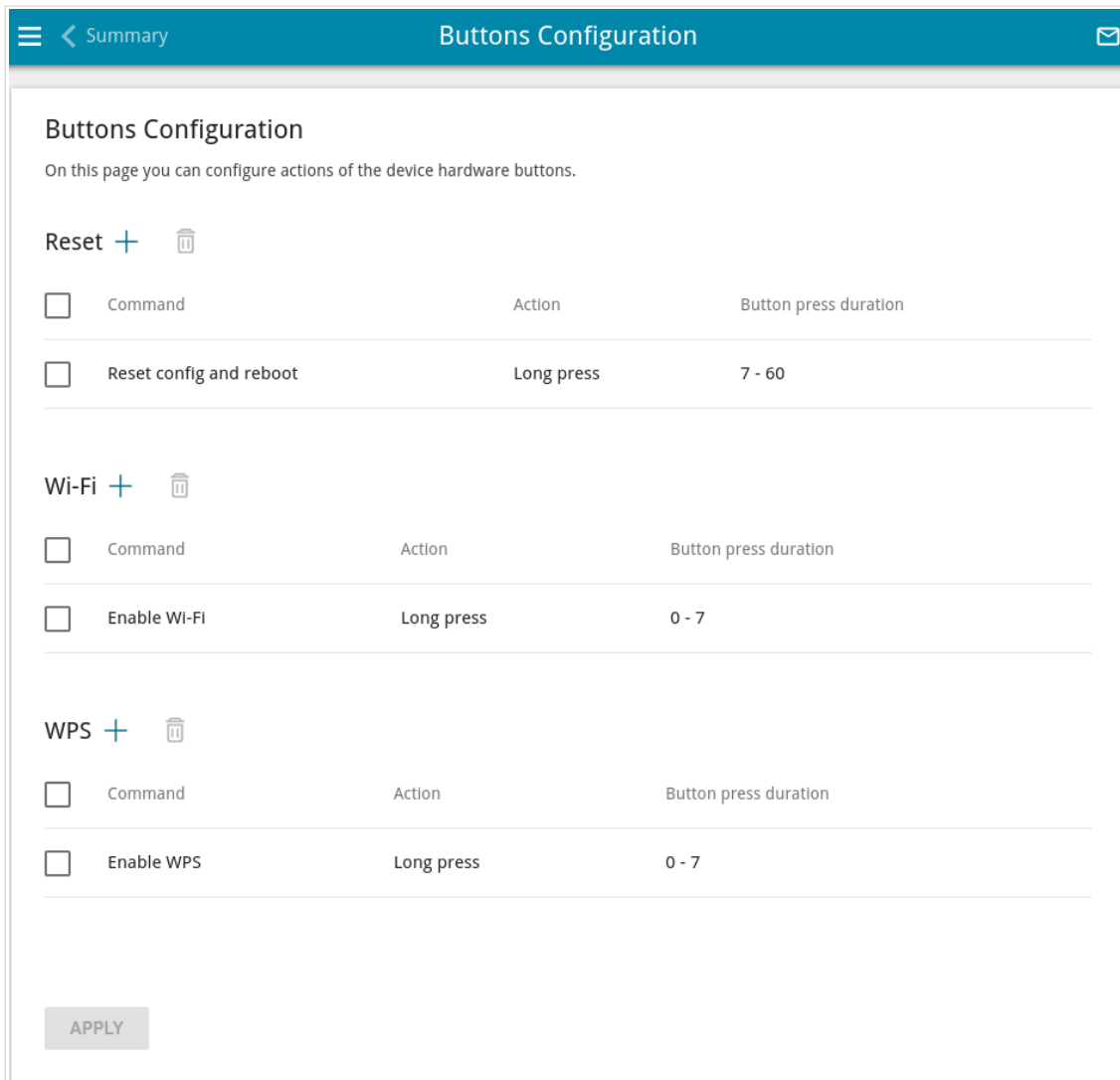


Figure 230. The **System / Buttons Configuration** page.

The page displays commands assigned to the buttons by default (for the description of the buttons actions with the commands assigned by default, see the **Product Appearance** section, page 17). You can edit or delete them.

To add a command for a button, click the **ADD** button (**+**) in the relevant section.

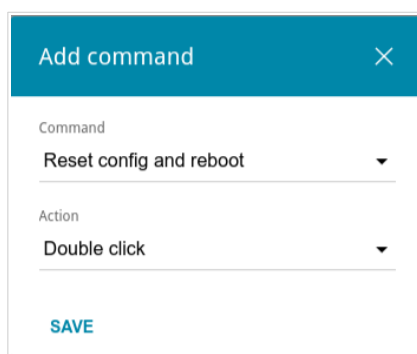


Figure 231. The window for adding a command.

In the opened window, specify the following parameters:

Control	Description
Reset / Wi-Fi / WPS	
Command	From the drop-down list, select a command.
Action	From the drop-down list, select an action for the command. <ul style="list-style-type: none"> • Single click: One short press of the button lasting less than one second. • Double click: Two short presses of the button. • Long press: Pressing of the button for several seconds. When this value is selected, the Button press duration section is displayed.
Button press duration	Specify a period of time (in seconds) within which you should hold the button to perform the specified action. You can specify values from 2 to 60 .

Click the **SAVE** button.

To edit the parameters for a command, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a command, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button (🗑).

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

Firmware Update

On the **System / Firmware Update** page, you can update the firmware of the router and configure the automatic check for updates of the router's firmware.

! Update the firmware only when the router is connected to your PC via a wired connection.

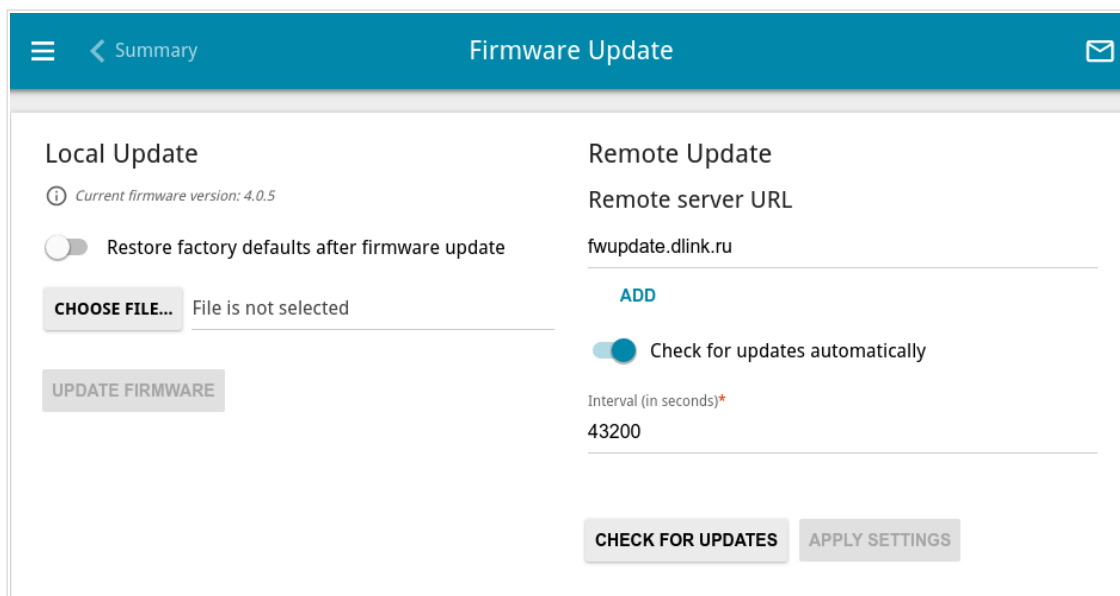


Figure 232. The **System / Firmware Update** page.


The current version of the router's firmware is displayed in the **Current firmware version** field.

By default, the automatic check for the router's firmware updates is enabled. If the **Access point, Repeater** or **Client** mode was selected in the Initial Configuration Wizard and the **Static** value is selected from the **Mode of local IP address assignment** list on the **Connections Setup / LAN** page, the **Gateway IP address** field should also be filled in on order to realize automatic check.

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, move the **Check for updates automatically** switch to the left and click the **APPLY SETTINGS** button.

To enable the automatic check for firmware updates, in the **Remote Update** section, move the **Check for updates automatically** switch to the right. In the **Interval** field, specify the time period (in seconds) between checks or leave the value specified by default (**43200**).

By default, in the **Remote server URL** field, the D-Link update server address (**fwupdate.dlink.ru**) is specified. To add one more address, click the **ADD** button and enter the address in the displayed line. To remove the address, click the **Delete** button () in the line of the address.

Click the **APPLY SETTINGS** button.

You can update 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 update 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 **CHOOSE FILE** button in the **Local Update** section on the **System / Firmware Update** page to locate the new firmware file.
3. If you want to restore the factory default settings immediately after updating the firmware, move the **Restore factory defaults after firmware update** switch to the right.
4. Click the **UPDATE FIRMWARE** button.
5. Wait until the router is rebooted (about one and a half or two minutes).
6. Log into the web-based interface using the login (**admin**) and the current password.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, click the **Factory** button on the **System / Configuration** page. Wait until the router is rebooted.

Remote Update



Attention! Do not turn off the router before the firmware update 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 Update** page, in the **Remote Update** section, click the **CHECK FOR UPDATES** button to check if a newer firmware version exists.
2. Click the **UPDATE FIRMWARE** 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.

If after updating the firmware the router doesn't work correctly, please restore the factory default settings. To do this, click the **Factory** button on the **System / Configuration** page. Wait until the router is rebooted.

Schedule

On the **System / Schedule** page, you can enable/disable Wi-Fi connection and the Wi-Fi filter, configure automatic reboot of the device on a schedule, set rules for limitation of wireless client maximum bandwidth, and set a schedule for different rules and settings of the firewall.

! Before creating a schedule you need to configure automatic synchronization of the system time with a time server on the Internet(see the **System Time** section, page 337).

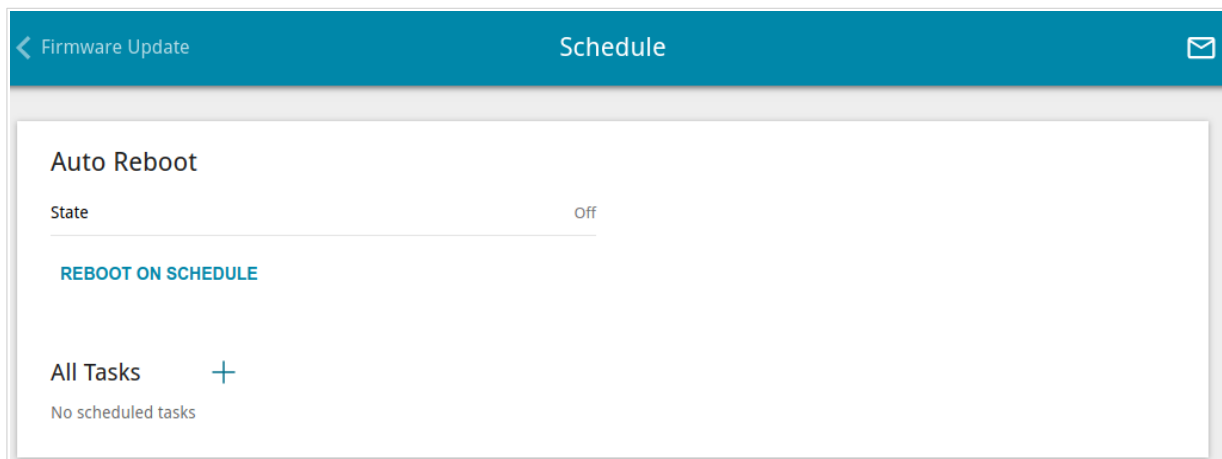


Figure 233. The **System / Schedule** page.

To configure automatic reboot of the device on a schedule, click the **REBOOT ON SCHEDULE** button in the **Auto Reboot** section.

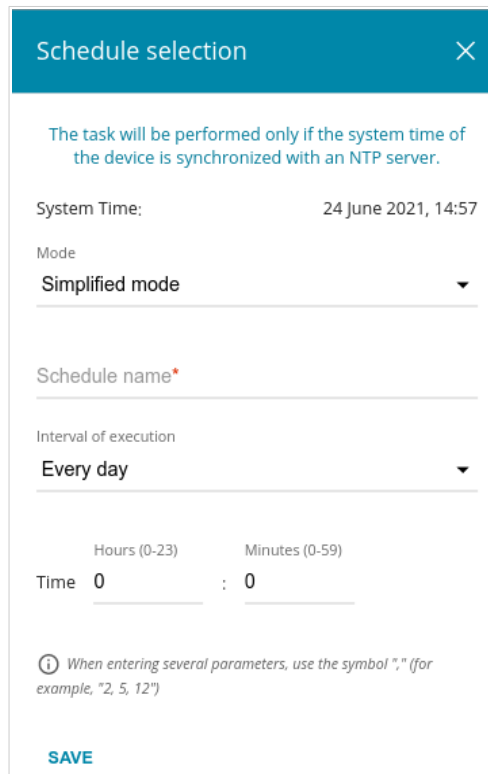


Figure 234. The window for configuring automatic reboot on a schedule.

In the opened window, in the **System Time** field, the system time of the device is displayed. You can select the **Simplified mode** value from the **Mode** drop-down list and specify the following parameters:

Parameter	Description
Simplified mode	
Schedule name	Specify a schedule name for easier identification. You can specify any name.
Interval of execution	Specify the time period for the device's reboot. <ul style="list-style-type: none"> • Every day: When this value is selected, the Time field is displayed in the section. • Every week: When this value is selected, the names of days of the week and the Time field are displayed in the section. • Every month: When this value is selected, the Day of month and Time fields are displayed in the section.
Time	Specify the time for the device's reboot.
Days of week	Select a day or days of the week when the device will be automatically rebooted. To do this, select the checkbox located to the left of the relevant value.
Day of month	Specify a day of the month. You can specify one value or several values separated by a comma.

In the advanced mode, you can specify more parameters for the schedule using a cron expression. To do this, select the **Advanced mode** value from the **Mode** drop-down list and specify the needed values in the fields displayed. You can specify one value or several values separated by a comma. You can use the character * (asterisk) to specify the entire range of possible values. Upon that the **Schedule** field will be filled in automatically. In the **Schedule name** field, specify a schedule name for easier identification (you can specify any name).

Click the **SAVE** button.

To edit the automatic reboot schedule, click the **EDIT** button in the **Auto Reboot** section. In the opened window, change the needed parameters and click the **SAVE** button.

To disable automatic reboot of the device on a schedule, click the **EDIT** button in the **Auto Reboot** section. In the opened window, click the **DISABLE** button.

To set a schedule for a task which will be applied to a rule or setting of the firewall, for limitation of wireless client maximum bandwidth or will enable/disable Wi-Fi connection or Wi-Fi filter, click the **ADD** button (**+**) in the **All Tasks** section.

Figure 235. The window for adding a schedule for a task.

In the opened window, in the **System Time** field, the system time of the device is displayed. You can select the simplified mode of the schedule. To do this, select the **Simplified mode** value from the **Mode** drop-down list and specify the following parameters:

Parameter	Description
Perform task on schedule	Move the switch to the right to enable the task. Move the switch to the left to disable the task.


Parameter	Description
Simplified mode	
Schedule name	Specify a schedule name for easier identification. You can specify any name.
Interval of execution	Specify the time period for performing a task. <ul style="list-style-type: none"> • Every minute. • Every hour: When this value is selected, the Time field is displayed in the section. • Every day: When this value is selected, the Time field is displayed in the section. • Every week: When this value is selected, the names of days of the week and the Time field are displayed in the section. • Every month: When this value is selected, the Day of month and Time fields are displayed in the section.
Duration	Specify the interval during which the task will be performing.
Time	Specify the time when the task should start running.
Days of week	Select a day or days of the week when the task will be performing. To do this, select the checkbox located to the left of the relevant value.
Day of month	Specify a day of the month. You can specify one value or several values separated by a comma.

In the advanced mode, you can specify more parameters for the schedule using a cron expression. To do this, select the **Advanced mode** value from the **Mode** drop-down list and specify the needed values in the fields displayed. You can specify one value or several values separated by a comma. You can use the character * (asterisk) to specify the entire range of possible values. Upon that the **Schedule** field will be filled in automatically. In the **Schedule name** field, specify a schedule name for easier identification (you can specify any name).

You can also use the calendar mode to configure the schedule. To do this, select the **Calendar mode** value from the **Mode** drop-down list. In the **Schedule name** field, specify a schedule name for easier identification (you can specify any name). In the table, select cells corresponding to needed hours and days of the week. To deselect a cell, left-click it once again. To deselect all cells and select others, click the **RESET** button and select new cells.

Click the **SAVE** button.

To edit a schedule, in the **All Tasks** section, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a schedule, in the **All Tasks** section, select the checkbox located to the left of the relevant line in the table and click the **DELETE** button ().

To assign a created schedule to a task which will be applied to a rule or setting of the firewall, for limitation of wireless client maximum bandwidth or will enable/disable Wi-Fi connection or Wi-Fi filter, go to the relevant page of the web-based interface of the device.

Log

On the **System / Log** page, you can set the system log options and configure sending the system log to a remote host and/or a USB storage connected to the router.

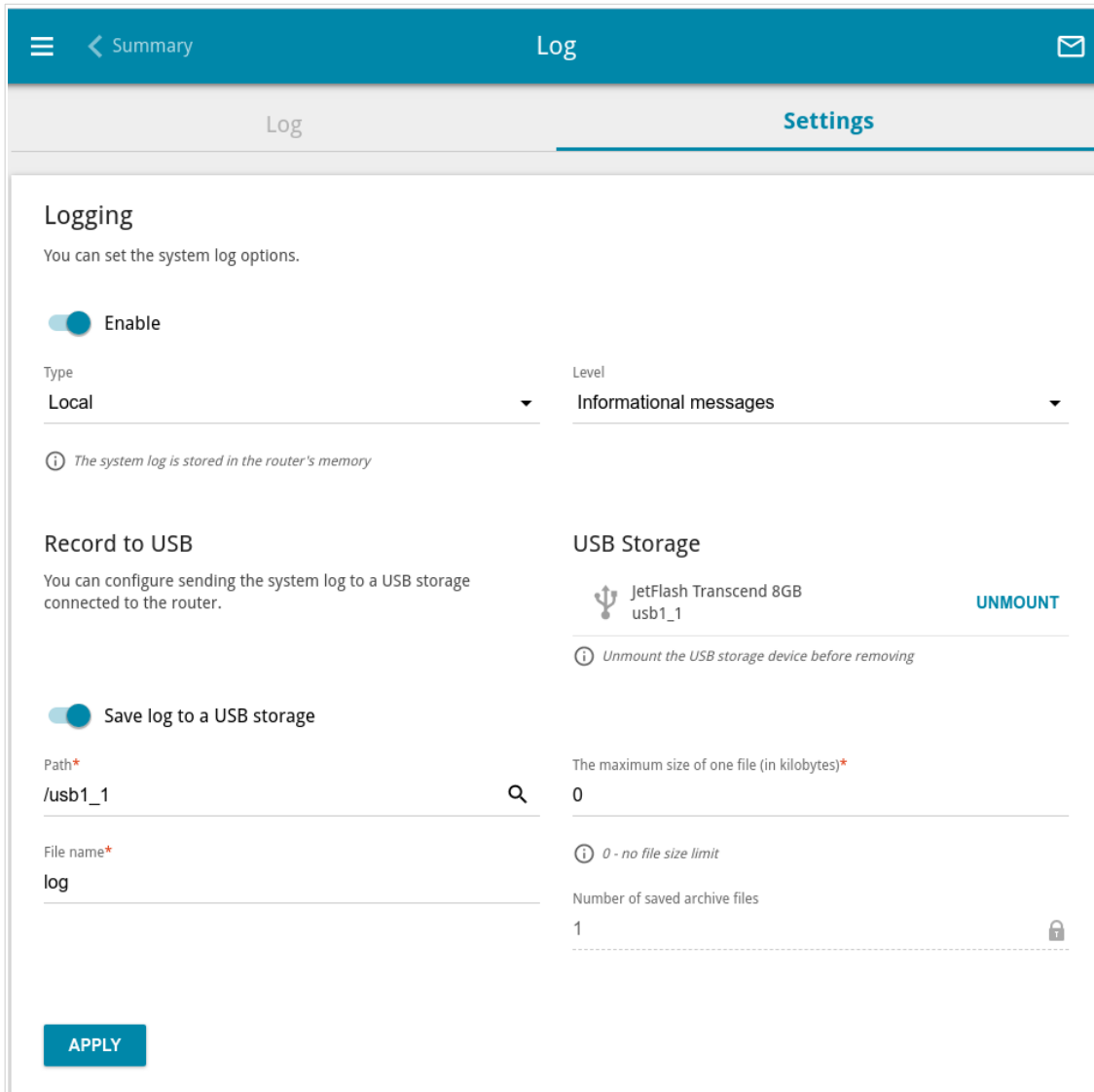



Figure 236. The **System / Log** page. The **Settings** tab.

To enable logging of the system events, go to the **Settings** tab and move the **Enable** switch to the right. Then specify the needed parameters.

Parameter	Description
Logging	
Type	<p>Select a type of logging from the drop-down list.</p> <ul style="list-style-type: none"> • Local: The system log is stored in the router's memory. 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. • Remote and local: The system log is stored in the router's memory and sent to the remote host specified in the Server field.
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.
Port	A port of the host specified in the Server field. By default, the value 514 is specified.
Record to USB	
USB Storage	<p>If a USB storage is connected to the router, its name is displayed in the field.</p> <p>To safely disconnect the USB storage, click the UNMOUNT button.</p>
Save log to a USB storage	Move the switch to the right so that the device could send the system log to the USB storage connected to it. Upon that the Path , File name , The maximum size of one file , and Number of saved archive files fields are displayed.
Path	Click the Search icon () located to the right of the field in order to locate the folder where system log files will be stored.
File name	A name for system log files.
The maximum size of one file	The maximum size (in kilobytes) of one system log file.
Number of saved archive files	The maximum number of files allowed to be recorded on the USB storage. When this number is exceeded, the file containing the oldest data will be overwritten. The field is available for editing if the value specified in the The maximum size of one file field is greater than zero.

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

To disable logging of the system events, move the **Enable** switch to the left and click the **APPLY** button.

To view the system log, go to the **Log** tab.

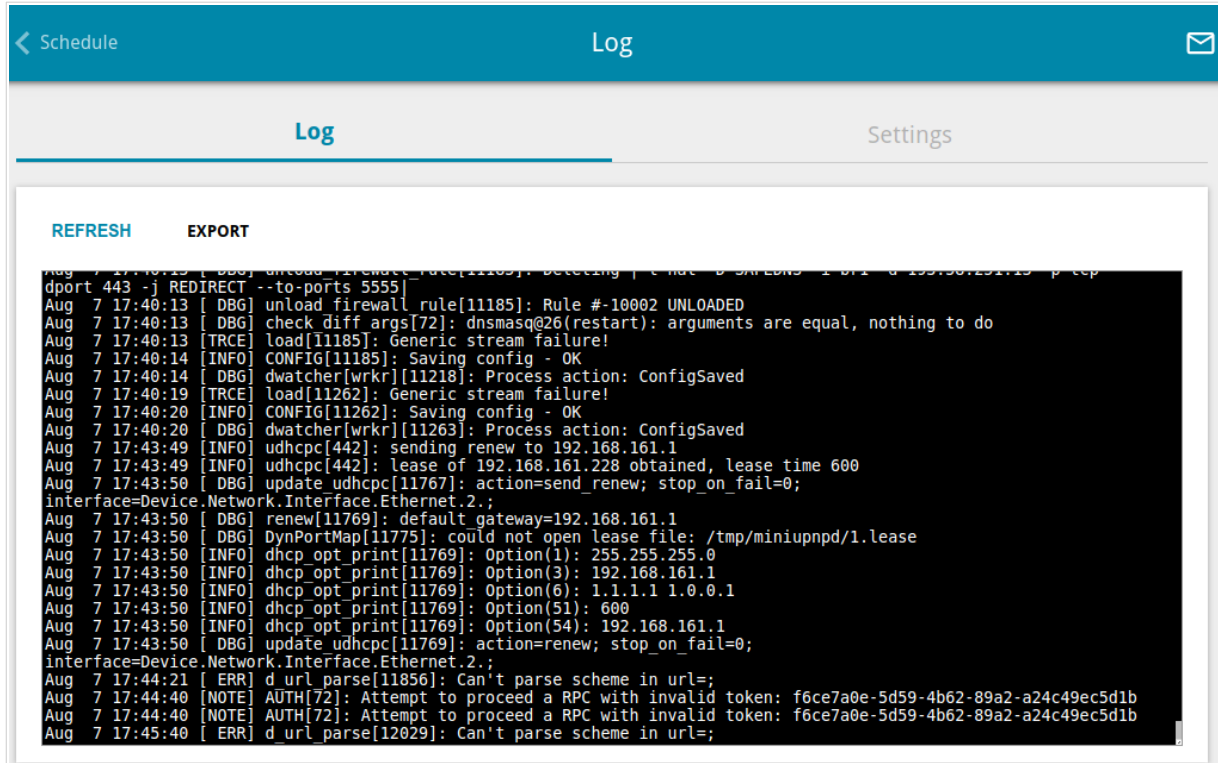


Figure 237. The System / Log page. The Log tab.

To view the latest system events, click the **REFRESH** button.

To save the system log to your PC, click the **EXPORT** button. The file will be stored in the download location of your web browser.

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.

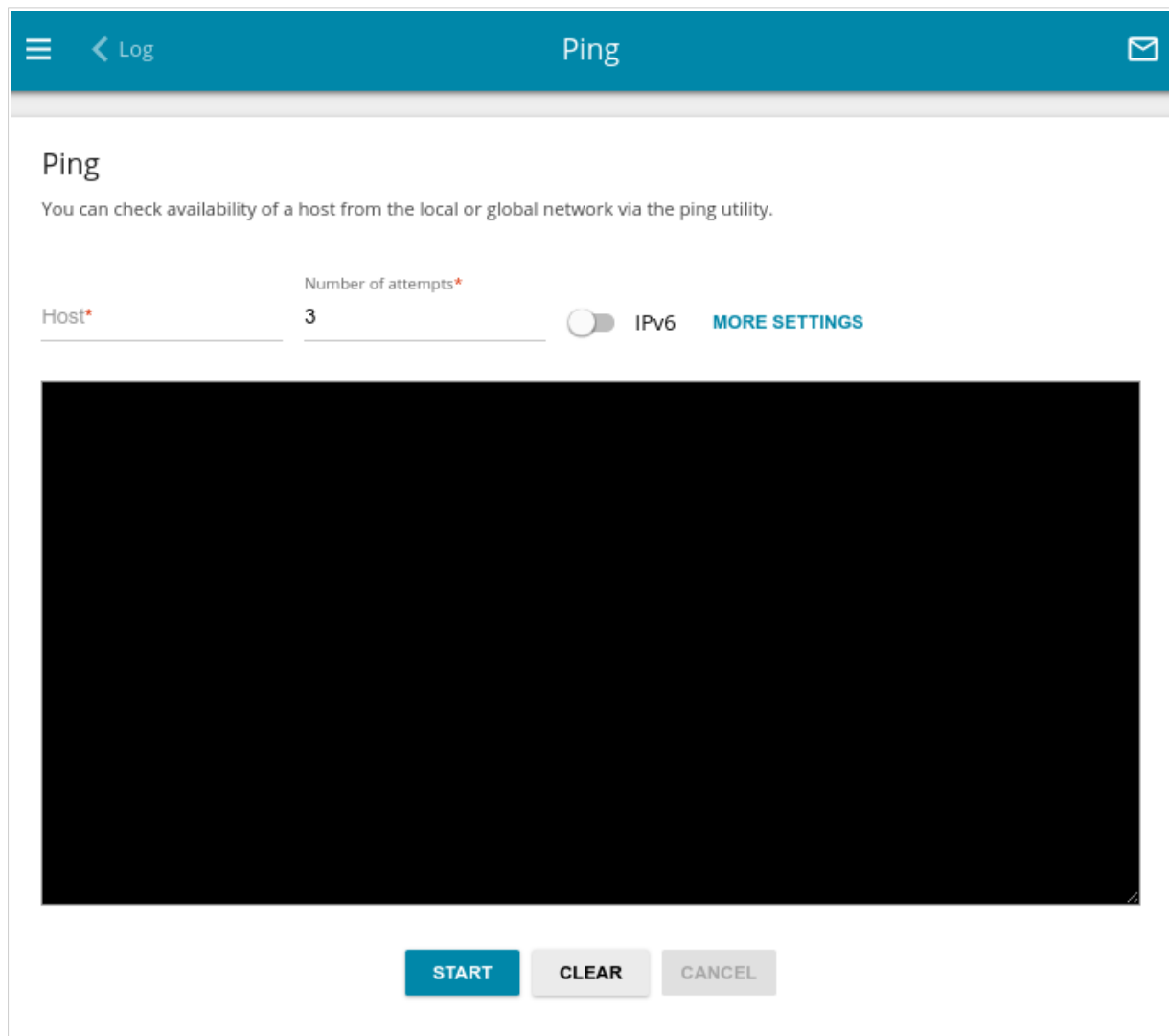
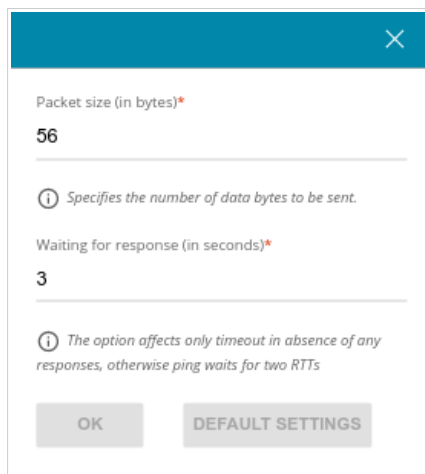


Figure 238. The **System / Ping** page.

To check availability of a host, enter the IP address or name of this host in the **Host** field and specify a number of requests that will be sent in order to check its availability in the **Number of attempts** field. If availability check should be performed with IPv6, move the **IPv6** switch to the right.

To specify additional settings, click the **MORE SETTINGS** button.



The screenshot shows a modal window titled 'Additional settings' with a close button (X) in the top right corner. It contains two input fields: 'Packet size (in bytes)*' with the value '56' and 'Waiting for response (in seconds)*' with the value '3'. Below the first field is a help icon (i) and the text 'Specifies the number of data bytes to be sent.' Below the second field is a help icon (i) and the text 'The option affects only timeout in absence of any responses, otherwise ping waits for two RTTs'. At the bottom are two buttons: 'OK' and 'DEFAULT SETTINGS'.

Figure 239. The **System / Ping** page. The additional settings window.

In the opened window, in the **Packet size** field, specify the volume of data sent in a request. In the **Waiting for response** field, specify the response waiting period in seconds. To restore the default field values, click the **DEFAULT SETTINGS** button.

After specifying the additional parameters, click the **OK** button.

To run the check, click the **START** button. After a while, the results will be displayed on the page.

If you need to interrupt the check, click the **CANCEL** button (the button is available from the moment the check starts).

To remove the check result from the page, click the **CLEAR** button.

Traceroute

On the **System / Traceroute** page, you can trace the route of data transfer to a host via the traceroute utility.

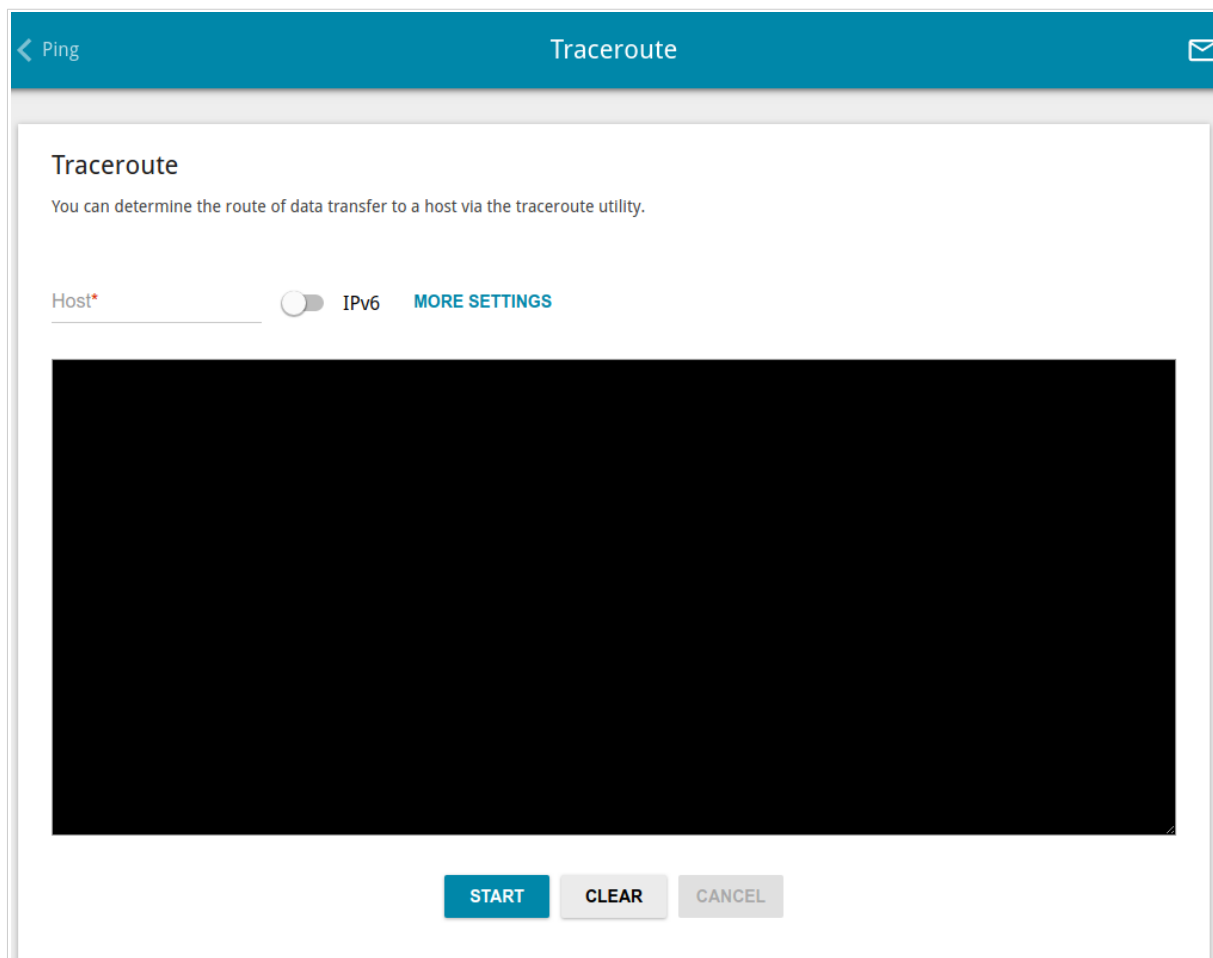


Figure 240. The **System / Traceroute** page.

To trace the route, enter the name or IP address of a host in the **Host** field. If the route should be traced using IPv6, move the **IPv6** switch to the right.

To specify additional settings, click the **MORE SETTINGS** button.

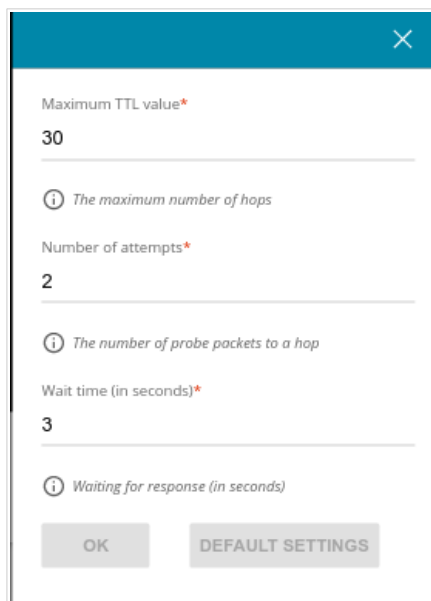


Figure 241. The **System / Traceroute** page. The additional settings window.

In the opened window, you can specify the following parameters:

Parameter	Description
Maximum TTL value	Specify the TTL (<i>Time to live</i>) parameter value. The default value is 30 .
Number of attempts	The number of attempts to hit an intermediate host.
Wait time	A period of waiting for an intermediate host response.

To restore the default field values, click the **DEFAULT SETTINGS** button.

After specifying the additional parameters, click the **OK** button.

To run the check, click the **START** button. After a while, the results will be displayed on the page.

If you need to interrupt the check, click the **CANCEL** button (the button is available from the moment the check starts).

To remove the check result from the page, click the **CLEAR** button.

Telnet/SSH

On the **System / Telnet/SSH** page, you can enable or disable access to the device settings via TELNET and/or SSH from your LAN. By default, access is disabled.

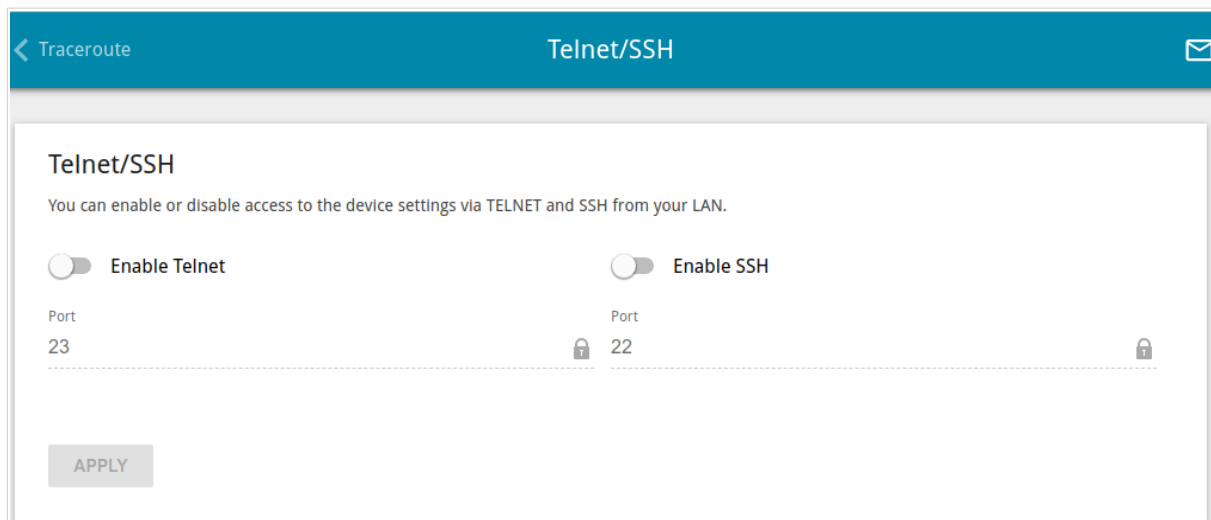


Figure 242. The **System / Telnet/SSH** page.

To enable access via TELNET and/or SSH, move the **Enable Telnet** switch and/or **Enable SSH** switch to the right. 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 for Telnet and the port **22** is specified for SSH). Then click the **APPLY** button.

To disable access via TELNET and/or SSH again, move the **Enable Telnet** switch and/or **Enable SSH** switch to the left and click the **APPLY** button.

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.

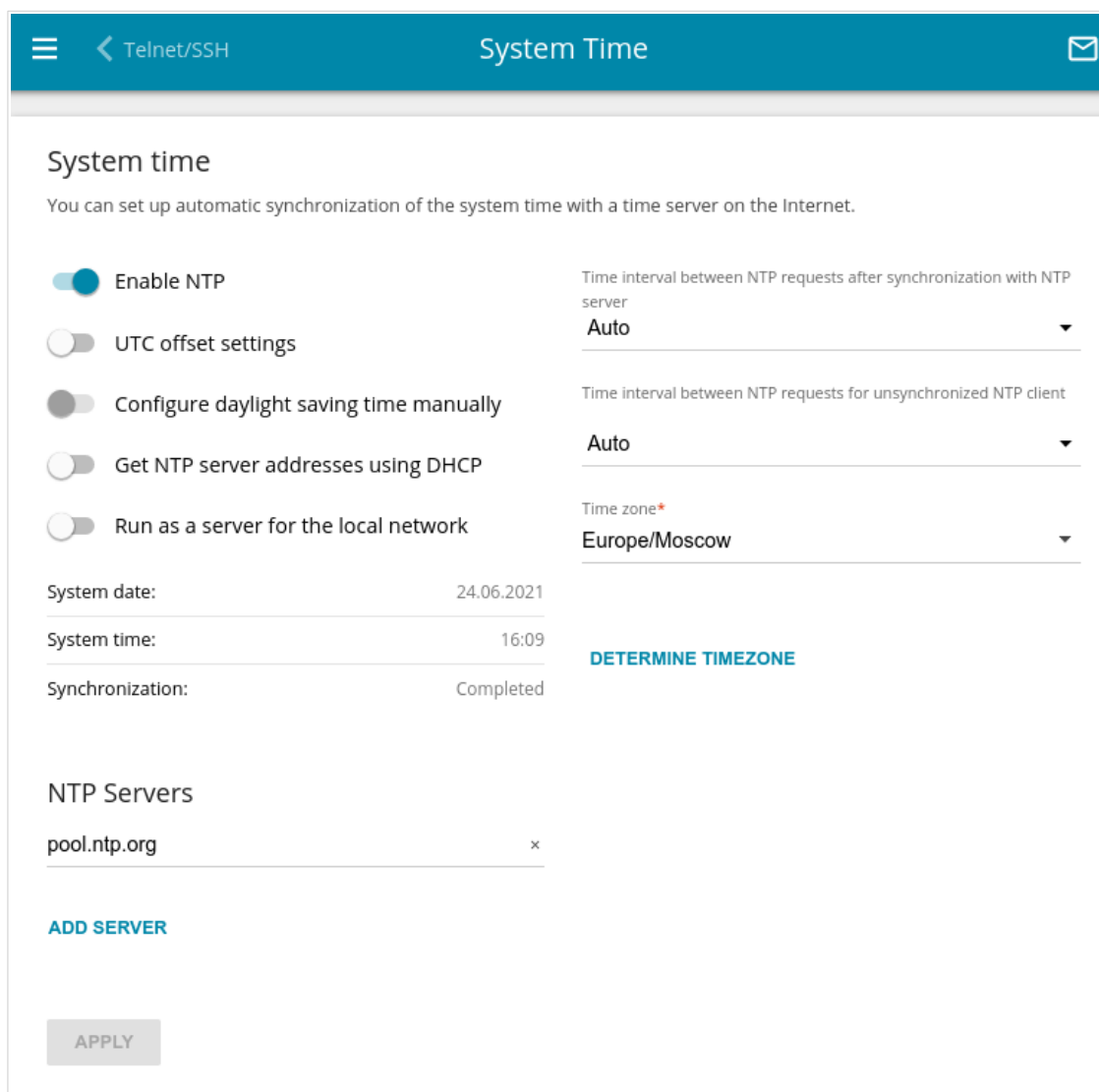


Figure 243. The **System / System Time** page.

To set the system time manually, follow the next steps:

1. Move the **Enable NTP** switch to the left.
2. In the **Time Settings** section, specify needed values. To specify the time set up your PC or portable device, click the **SET LOCAL TIME** button.
3. Click the **APPLY** button. The **System date** and **System time** fields will be filled in automatically.

To enable automatic synchronization with a time server, follow the next steps:

1. Move the **Enable NTP** switch to the right.
2. Specify the needed NTP server or leave the value specified by default in the **NTP Servers** section. If you need to specify several servers, click the **ADD SERVER** button.
3. Select your time zone from the **Time zone** drop-down list. To set the time zone in accordance with the settings of your operating system or portable device, click the **DETERMINE TIMEZONE** button.
4. Click the **APPLY** button. The **System date** and **System time** fields will be filled in automatically. In case of successful synchronization with the NTP server, the **Completed** value will be displayed in the **Synchronization** field.


If the router failed to get data from the server, the **Failed** value will be displayed in the **Synchronization** field. Upon that the creation date and time of the router's current firmware version is specified.

Additional settings are also available on the page:

Parameter	Description
UTC offset settings	Move the switch to the right to set the UTC (<i>Coordinated Universal Time</i>) offset for the router clock manually. In the UTC offset field displayed, specify the required offset time (in minutes).
Configure daylight saving time manually	Move the switch to the right to configure settings for daylight saving time for the router clock manually. In the Daylight Saving Time section displayed, specify the required offset time for daylight saving time (in minutes), and specify the needed values in the Beginning of daylight saving time and End of daylight saving time sections.
Get NTP server addresses using DHCP	Move the switch to the right if NTP servers addresses are provided by your ISP. Contact your ISP to clarify if this setting needs to be enabled. If the switch is moved to the right, the NTP Servers section is not displayed.
Run as a server for the local network	Move the switch to the right to allow connected devices to use the IP address of the router in the local subnet as a time server.
Time interval between NTP requests after synchronization with NTP server	From the drop-down list, select a time period (in seconds) after which a request to update the system time will be sent to the NTP server or leave the Auto value.

Parameter	Description
Time interval between NTP requests for unsynchronized NTP client	<p>A time period (in seconds) after which a request to synchronize the system time will be sent to the NTP server.</p> <p>Select the needed value from the drop-down list.</p> <ul style="list-style-type: none">• Auto: The time period is defined automatically.• Manual: The time period is defined in accordance with the value specified in the Interval value field.
Interval value	<p>Specify the time period (in seconds). The minimum acceptable value is 3.</p>

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

 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).

Auto Provision

On the **System / Auto Provision** page, you can enable the Auto Provision function.

The Auto Provision function allows your ISP to manage the device's settings remotely: DVG-5402G/GF connects to the ISP's server, compares the current configuration file with the configuration file stored on this server, and updates its settings if the files are different.

Figure 244. The page for configuring the Auto Provision function.

You can specify the following parameters:

Parameter	Description
Enable Auto Provision	Move the switch to the right to enable the Auto Provision function. Move the switch to the left to disable the Auto Provision function.
Use BOOTP option	If the switch is moved to the right, the parameters of your ISP's server (the address, the location of the configuration file, and the protocol) are automatically specified using DHCP options 66 and 67. Upon that a connection of the Dynamic IPv4 type should be configured on the Connections Setup / WAN page. If the switch is moved to the left, the parameters of your ISP's server should be specified manually.

Parameter	Description
Autoconfiguration server address	The IP or URL address of your ISP's server where the configuration file is stored.
File name	The location of the configuration file on the ISP's server.
File check period	A time period (in seconds) between attempts to compare the current configuration file with the configuration file on the ISP's server.
Protocol type	A protocol for communication with the ISP's server where the configuration file is stored.

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

If you need to check manually if the current configuration file corresponds to the configuration file on the ISP's server, click the **CHECK STATUS** button. The check result will be displayed in the **Status** field. If the files are different, the device's settings will be updated.

SkyDNS

This menu is designed to configure the SkyDNS service.

SkyDNS is a web content filtering service which provides protection against malicious web sites for devices connected to the router's network, and also allows to configure filtering, block access to adult web sites, and use search engines safely. In order to use the service, first register an account on the SkyDNS service web site.

Settings

On the **SkyDNS / Settings** page, you can enable the SkyDNS service and specify settings for its operation.

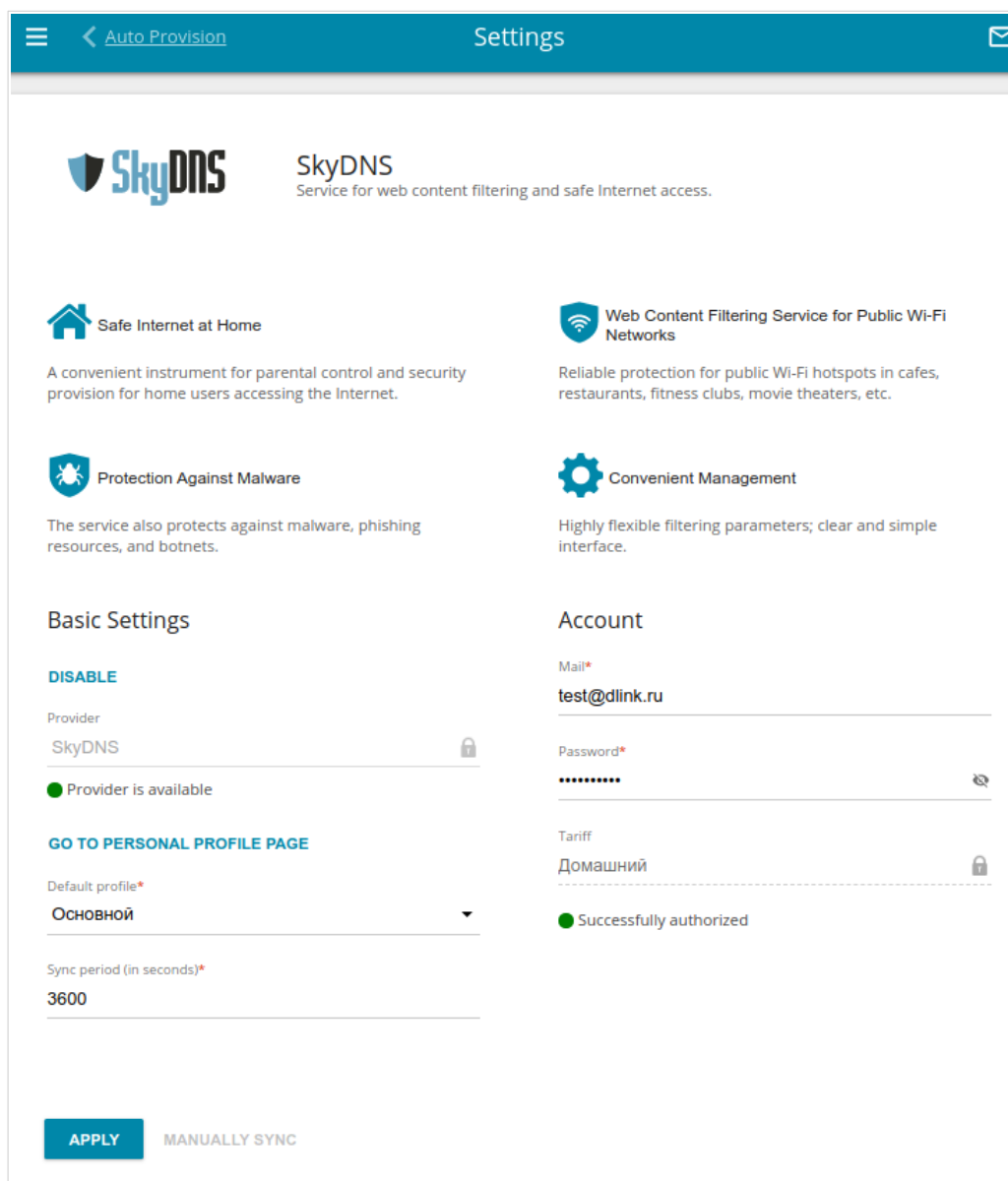


Figure 245. The **SkyDNS / Settings** page.

To enable the SkyDNS service, click the **ENABLE** button. Then in the **Mail** and **Password** fields, enter the account data (the e-mail address and the password correspondingly) specified upon registration on the SkyDNS service web site. Click the **APPLY** button. The account data (authorization status, the tariff used), the **Default profile** drop-down list, and the **Sync period** field will be displayed on the page. If needed, from the **Default profile** list, select another filtering profile which will be used for all devices of your LAN and click the **APPLY** button again.

The default filtering profile will be applied to all devices newly connected to the router's network.

To change the parameters of your account on the SkyDNS service web site, click the **GO TO PERSONAL PROFILE PAGE** button.

By default, the account parameters are automatically synchronized with the SkyDNS service web site once an hour (3600 seconds). To change the automatic synchronization period, specify another value in the **Sync period** field and click the **APPLY** button. To start synchronization manually, click the **MANUALLY SYNC** button.

To use another account, specify its data in the **Mail** and **Password** fields and click the **APPLY** button.

To disable the SkyDNS service, click the **DISABLE** button.

Devices and Rules

On the **SkyDNS / Devices and Rules** page, you can assign a specific filtering profile to a device connected to the router's network.

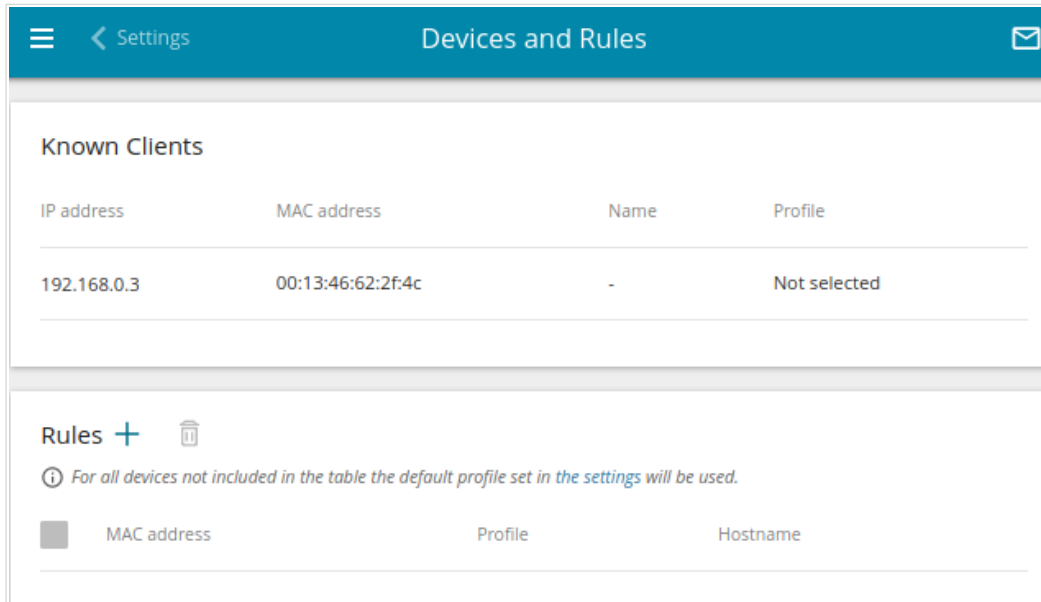


Figure 246. The **SkyDNS / Devices and Rules** page.

In the **Known Clients** section, the devices connected to the local network of the router at the moment and their relevant filtering profile are displayed.

To assign a specific filtering profile for a device, click the **ADD** button (**+**) in the **Rules** section or left-click the name of the filtering profile in the line of the device for which a profile should be assigned in the **Known Clients** section.


Figure 247. The **SkyDNS / Devices and Rules** page. The window for adding a rule.

In the opened window, specify the following parameters:

Parameter	Description
MAC address	The MAC address of a device from the router's LAN to which the specified filtering profile will be applied. 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).
Profile	Select the filtering profile which will be used for the device with the specified MAC address from the drop-down list.
Hostname	Enter a name for the rule for easier identification. <i>Optional.</i>

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

To edit a rule, select the relevant line in the table. In the opened window, change the needed parameters and click the **SAVE** button.

To remove a rule, select the checkbox located to the left of the relevant line of the table and click the **DELETE** button ().

CHAPTER 5. OPERATION GUIDELINES

Safety Rules and Conditions

Please carefully read this section before installation and connection of the device. Make sure that the power adapter and cables are not damaged. The device should be used only as intended in accordance with the documents.

The device is intended for use in dry, clean, dust-free, and well ventilated areas with normal humidity away from strong heat sources. Do not use the device outdoors or in the areas with high humidity. Do not place foreign objects on the device. Do not obstruct the ventilation openings of the device. The environmental temperature near the device and the temperature inside the device's cover should be within the range from 0 °C to +40 °C.

Only use the power adapter supplied with the device. Do not plug in the adapter, if its case or cable are damaged. Plug the adapter only into working electrical outlets with parameters indicated on the adapter.

Do not open the cover of the device! Unplug the device before dusting and cleaning. Use a damp cloth to clean the device. Do not use liquid/aerosol cleaners or magnetic/static cleaning devices. Prevent moisture getting into the device or the power adapter.

The service life of the device is 2 years.

Wireless Installation Considerations

The DVG-5402G/GF 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 DVG-5402G/GF 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 is not in use.

CHAPTER 6. ABBREVIATIONS AND ACRONYMS

3G	Third Generation
AC	Access Category
AES	Advanced Encryption Standard
AP	Access Point
ARP	Address Resolution Protocol
BPSK	Binary Phase-shift Keying
BSSID	Basic Service Set Identifier
CCK	Complementary Code Keying
CHAP	Challenge Handshake Authentication Protocol
DBSK	Differential Binary Phase-shift Keying
DDNS	Dynamic Domain Name System
DDoS	Distributed Denial of Service
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DMZ	DeMilitarized Zone
DNS	Domain Name System
DPD	Dead Peer Detection
DQPSK	Differential Quadrature Phase-shift Keying
DSL	Digital Subscriber Line
DSSS	Direct-sequence Spread Spectrum
DTIM	Delivery Traffic Indication Message
EoGRE	Ethernet over Generic Routing Encapsulation
GMT	Greenwich Mean Time
GRE	Generic Routing Encapsulation
GSM	Global System for Mobile Communications
HTTP	Hypertext Transfer Protocol

HTTPS	Hypertext Transfer Protocol Secure
ICMP	Internet Control Message Protocol
ID	Identifier
IGD	Internet Gateway Device
IGMP	Internet Group Management Protocol
IKE	Internet Key Exchange
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IPTV	Internet Protocol Television
IPsec	Internet Protocol Security
ISP	Internet Service Provider
L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
LCP	Link Control Protocol
LED	Light-emitting diode
LTE	Long Term Evolution
MAC	Media Access Control
MBSSID	Multiple Basic Service Set Identifier
MIB	Management Information Base
MIMO	Multiple Input Multiple Output
MPPE	Microsoft Point-to-Point Encryption
MS-CHAP	Microsoft Challenge Handshake Authentication Protocol
MTU	Maximum Transmission Unit
NAT	Network Address Translation
NIC	Network Interface Controller
NTP	Network Time Protocol

OFDM	Orthogonal Frequency Division Multiplexing
PAP	Password Authentication Protocol
PBC	Push Button Configuration
PFS	Perfect Forward Secrecy
PIN	Personal Identification Number
PoE	Power over Ethernet
PPP	Point-to-Point Protocol
pppd	Point-to-Point Protocol Daemon
PPPoE	Point-to-point protocol over Ethernet
PPTP	Point-to-point tunneling protocol
PSK	Pre-shared key
PUK	PIN Unlock Key
QAM	Quadrature Amplitude Modulation
QoS	Quality of Service
QPSK	Quadrature Phase-shift Keying
RADIUS	Remote Authentication in Dial-In User Service
RIP	Routing Information Protocol
RIPng	Next Generation Routing Information Protocol
RTS	Request To Send
RTSP	Real Time Streaming Protocol
SA	Security Association
SAE	Simultaneous Authentication of Equals
SIM	Subscriber Identification Module
SIP	Session Initiation Protocol
SMB	Server Message Block
SNMP	Simple Network Management Protocol
SSH	Secure Shell

SSID	Service Set Identifier
STBC	Space-time block coding
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
UAM	Universal Access Method
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
VRID	Virtual Router Identifier
VRRP	Virtual Router Redundancy Protocol
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