



3G and Wi-Fi Router
A 1475
Instruction manual
Version 1.1, Code No. 20 752 510

Distributor:

METREL d.d.
Ljubljanska cesta 77
1354 Horjul
Slovenia

web site: <http://www.metrel.si>
e-mail: metrel@metrel.si

Manufacturer:

HQ JSC Teltonika
Saltoniskiu st. 10c
LT-08105, Vilnius,
Lithuania

Tel: +370 5 212 74 72
Tel: +370 5 265 73 60
Fax: +370 5 276 13 80

web site: <http://www.teltonika.lt/>
e-mail: info@teltonika.lt



Mark on your equipment certifies that this equipment meets the requirements of the EU (European Union) concerning safety and interference causing equipment regulations

© 2016 METREL

No part of this publication may be reproduced or utilized in any form or by any means without permission in writing from METREL.

1	Introduction	4
2	Remote Communication over 3G / GPRS network	4
2.1	Router connection	4
2.2	Router Setup	6
2.3	Connection status	10
2.4	Connection check and further steps	11
3	Remote Communication over Wi-Fi network.....	11
3.1	Router connection	11
3.2	Router Setup	12
3.3	Connection status	19
3.4	Connection check and further steps	19
4	Technical Specifications	20
4.1	General specification	20
4.2	LAN and Wi-Fi.....	20
4.3	HSUPA/HSDPA/UMTS	21
4.4	GSM/GPRS/EDGE.....	21

1 Introduction

Metrel instruments (MI 2892 Power Master, MI 2885 Master Q4, etc.) can be remotely accessed through Ethernet communication port.

However on measurement locations where 3G/2G mobile or Wi-Fi communication is available, this router can be used to establish communication bridge to the instrument. 3G and Wi-Fi Router A 1475, is a high speed Wi-Fi and 3G gateway, for remote access to the measurement certified and tested by Metrel. In this manual MI 2892 Power Master is used as example, however other Metrel instruments with Ethernet port are used in similar way. Two configurations are supported and described:

- Instrument remote communication over 3G / GPRS network
- Instrument remote communication over Wi-Fi network

For other means of connections and configuration please check RUT 500 instruction manual, provided by OEM manufacturer Teltonika www.teltonika.lt.

Standard set include:

- 3G/2G RUT 500 Modem
- Ethernet patch cable
- Wi-Fi 5dBi Stub Antenna
- 3G/2G 3dBi antenna
- 12V power supply adapter

2 Remote Communication over 3G / GPRS network

2.1 Router connection

After you unpack box, follow the steps, documented below, in order to properly connect the router.

1. Remove back panel and insert SIM card which was given by your Internet Service Provider (ISP). Correct SIM card orientation is shown in the figure below.



Figure 1: SIM card insertion into router

2. Attach GSM and Wi-Fi antennas.
3. Connect devices, as shown on figure below
 - Use Ethernet cable to connect instrument and router

- Use Ethernet cable to connect Router with PC. PC will be used to set up router.
- Alternatively router can be set up over Wi-Fi network, by finding Teltonika access point on PC. In that case Ethernet connection with PC is not needed.

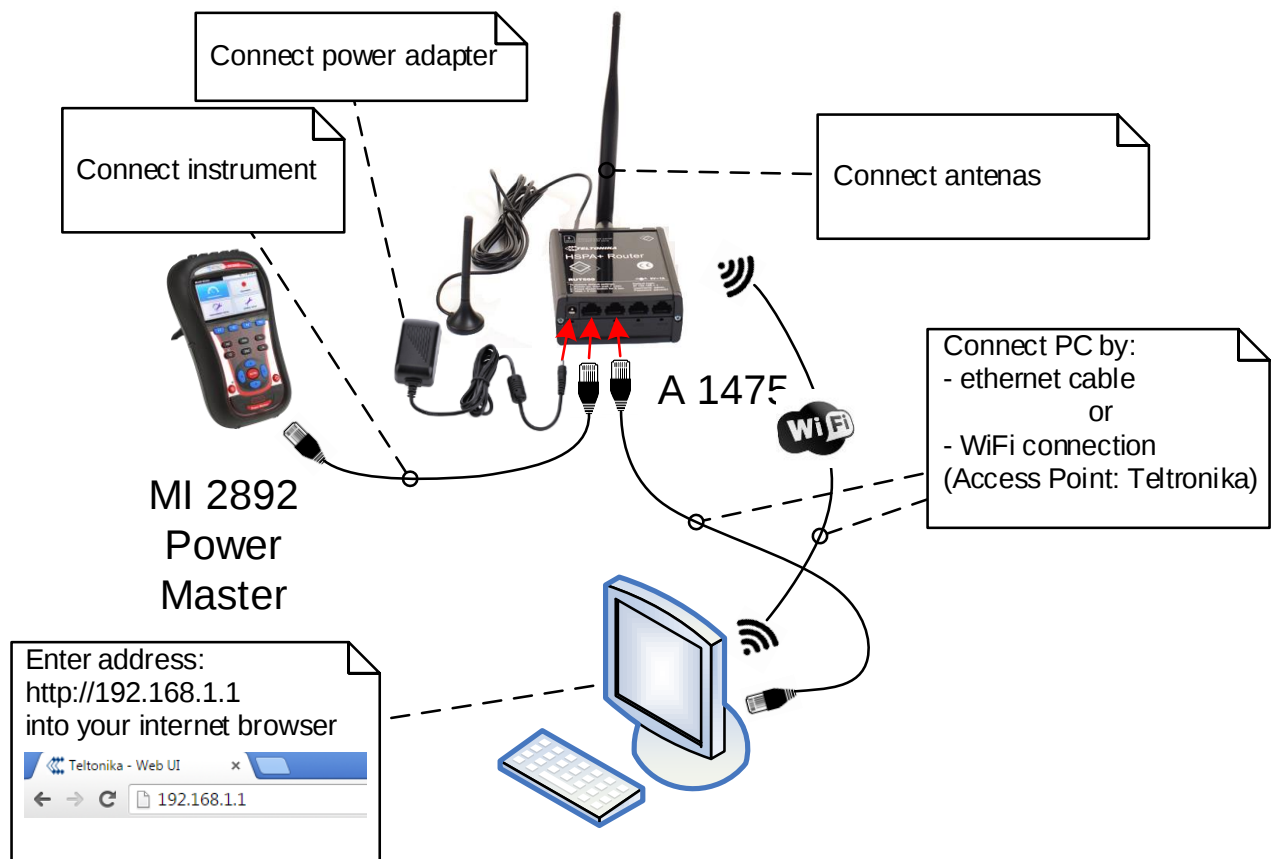


Figure 2: Router 3G connection

4. Power up router, instrument and PC.

On following figures description of router plates can be found.



Figure 3: Router front plate

1	Power socket
2,3,4	LAN Ethernet ports
5	WAN Ethernet ports
6	Power LED
7,8,9	LAN LEDs
10	WAN LED

Back Panel



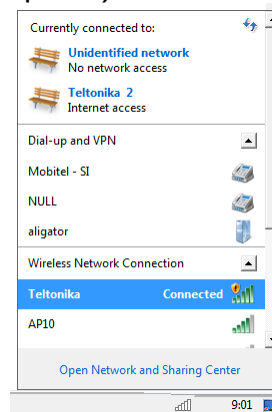
Figure 4: Router back plate

1	GSM main antenna connector
2	Wi-Fi antenna connector
3	GSM auxiliary antenna connector (unavailable on alternate model)
4	Reset button
5	GSM LED

2.2 Router Setup

Before first use, router should be setup in order to work with 3G network.

1. To connect to the router
 - Through Wi-Fi, look up for Access Point **Teltonika** on your computer, and connect to it (no password is required).



- through LAN (Ethernet) network, plug Ethernet cable into computer and LAN Ethernet port marked as "LAN1" on the router.
2. Connect instrument and modem with Ethernet cable. Use Ethernet port marked as "LAN2"
 3. Launch your browser and enter the router IP into the address field:



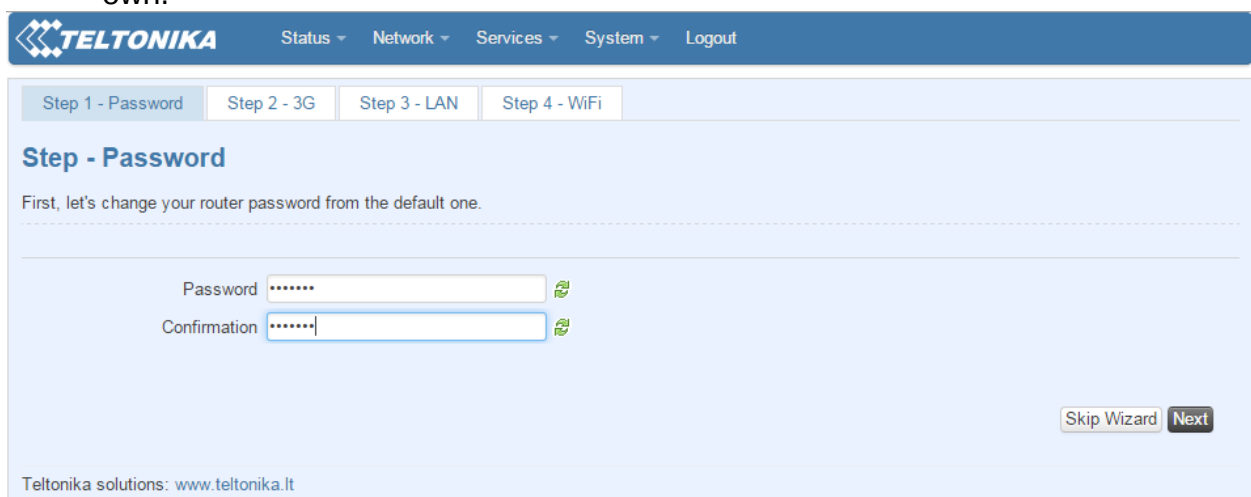
4. If connection was successful, a login screen will appear:



The screenshot shows the 'Authorization Required' page of the Teltonika router's web interface. At the top is the Teltonika logo. Below it, the title 'Authorization Required' is followed by the instruction 'Please enter your username and password.' There are two input fields: 'Username' with the value 'admin' and an empty 'Password' field. Below these fields are 'Login' and 'Reset' buttons. At the bottom, it says 'Teltonika solutions: www.teltonika.lt'.

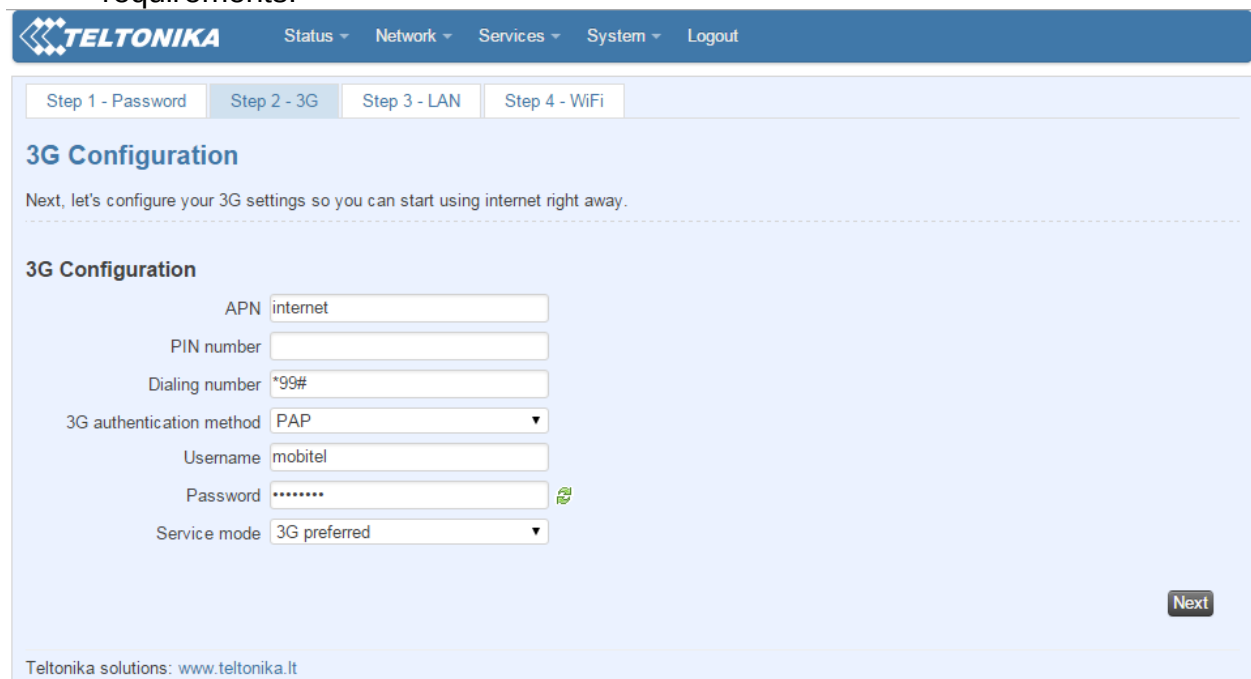
Enter the default password **admin01** into the Password field and then click on Login button.

5. A wizard will start in order to setup router. Change default password with your own.



The screenshot shows the 'Step 1 - Password' screen of the Teltonika router's web interface. The top navigation bar includes the Teltonika logo and links for Status, Network, Services, System, and Logout. Below the navigation bar, there are four tabs: 'Step 1 - Password', 'Step 2 - 3G', 'Step 3 - LAN', and 'Step 4 - WiFi'. The title 'Step - Password' is followed by the instruction 'First, let's change your router password from the default one.' There are two input fields: 'Password' and 'Confirmation', both masked with dots. To the right of each field is a small green icon. At the bottom right, there are 'Skip Wizard' and 'Next' buttons. At the bottom left, it says 'Teltonika solutions: www.teltonika.lt'.

6. Set up mobile network parameters, according to the mobile provider requirements.



The screenshot shows the '3G Configuration' screen of the Teltonika router's web interface. The top navigation bar includes the Teltonika logo and links for Status, Network, Services, System, and Logout. Below the navigation bar, there are four tabs: 'Step 1 - Password', 'Step 2 - 3G', 'Step 3 - LAN', and 'Step 4 - WiFi'. The title '3G Configuration' is followed by the instruction 'Next, let's configure your 3G settings so you can start using internet right away.' There are several input fields and dropdown menus: 'APN' with the value 'internet', 'PIN number' (empty), 'Dialing number' with the value '*99#', '3G authentication method' with the value 'PAP', 'Username' with the value 'mobitel', 'Password' (masked with dots), and 'Service mode' with the value '3G preferred'. To the right of the 'Password' field is a small green icon. At the bottom right, there is a 'Next' button. At the bottom left, it says 'Teltonika solutions: www.teltonika.lt'.

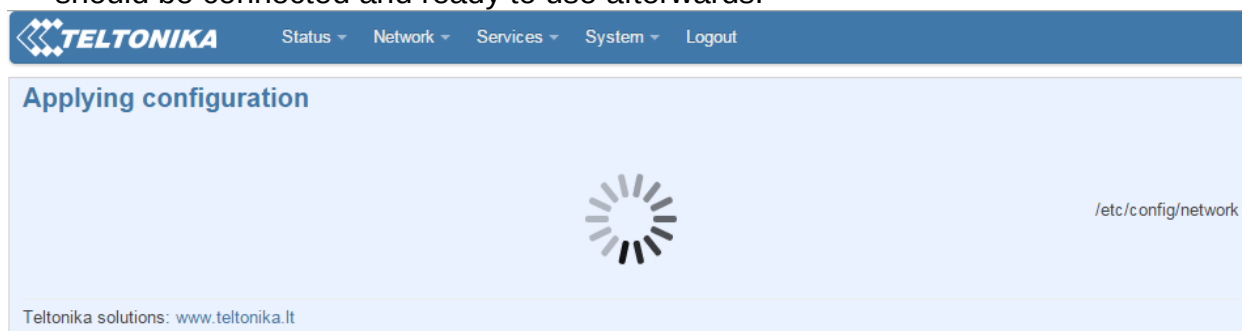
7. Change LAN setup if necessary, otherwise leave it as is.

The screenshot shows the 'Step 3 - LAN' configuration page of the Teltonika router. The top navigation bar includes the Teltonika logo and links for Status, Network, Services, System, and Logout. Below the navigation bar, there are four tabs: Step 1 - Password, Step 2 - 3G, Step 3 - LAN (selected), and Step 4 - WiFi. The main heading is 'Step - LAN'. Below it, a text box explains that the wizard will cover static IP address LAN and DHCP client configurations. The 'Common Configuration' section includes a 'Protocol' dropdown set to 'Static address', an 'IPv4 address' field with '192.168.1.1', an 'IPv4 netmask' dropdown set to '255.255.255.0', an empty 'IPv4 broadcast' field, and a 'Use custom DNS servers' field with a help icon. The 'DHCP Server' section has a 'Disable' checkbox, a 'Start' field with '100', a 'Limit' field with '150', and a 'Leasetime' field with '12h'. A note indicates the expiry time of leased addresses is at least 2 minutes. A 'Next' button is at the bottom right. The footer shows 'Teltonika solutions: www.teltonika.lt'.

8. Set up wireless network if you would like to use router as access point. Don't forget to protect it with password and encryption.

The screenshot shows the 'Step 4 - WiFi' configuration page of the Teltonika router. The top navigation bar is the same as in the previous screenshot. Below it, there are four tabs: Step 1 - Password, Step 2 - 3G, Step 3 - LAN, and Step 4 - WiFi (selected). The main heading is 'Step - Wireless'. Below it, a text box explains that changing parameters like SSID or encryption will drop the current connection. The 'Device Configuration' section has a 'Wireless network is enabled' dropdown set to 'Disable', with a note that it should not be disabled if the router is accessed wirelessly. Below this are 'Channel' (11 (2.462 GHz)), 'Mode' (802.11g), and 'Country Code' (00 - World) dropdowns. The 'Interface Configuration' section includes an 'ESSID' field with 'MetrelAPPP', a 'Hide ESSID' checkbox, an 'Encryption' dropdown set to 'WPA2-PSK', a 'Cipher' dropdown set to 'auto', and a 'Key' field with a masked password and a help icon. A 'Finish' button is at the bottom right. The footer shows 'Teltonika solutions: www.teltonika.lt'.

9. Press Finish button. Router will now apply new settings and restart. Router should be connected and ready to use afterwards.



2.3 Connection status

Modem connection status can be observed under Status → Network information menu.

The screenshot displays the Teltonika web interface with the following sections:

- Network information**
 - 3G**

State	connected
IMEI	351579051743076
Sim card state	OK
Signal strength	-97 dBm
Operator	SI MOBILTEL GSM
Connection type	3G (WCDMA)
Bytes recieved	328151
Bytes sent	193987

Shows the state of the Modem (3G / 2G) connection.
- WAN**

Interface	3G-ppp
Type	3g
IPv4 address	188.196.55.213
Netmask	255.255.255.255
Gateway	188.196.55.213
DNS 1	213.229.249.161
DNS 2	213.229.192.181
Connected	0h 36m 27s

3G/2G modem connection is used for internet access.
- LAN**

IPv4 address	192.168.1.1
Netmask	255.255.255.0
Connected	0h 36m 52s
- Wireless**

SSID	TeltonikaAP
Mode	Master
Channel	11 (2.46 GHz)
BSSID	00:1E:42:12:BC:FC
Encryption	None
Bit rate	0.0 MBit/s
Country	00

Shows the status of instrument connection. In this example instrument MI 2892 with serial number 14430002 is connected to the router.
- Associated Stations**

MAC-Address	Network	Signal	RX Rate	TX Rate
No information available				
- DHCP Leases**

Hostname	IPv4-Address	MAC-Address	Leasetime remaining
MI2892_14430002	192.168.1.178	1e:32:2f:dc:00:00	11h 28m 42s
razvoj2	192.168.1.248	00:e0:4c:3b:04:ce	11h 29m 20s
- Backup WAN Status**

WAN backup link is disabled

Teltonika solutions: www.teltonika.lt

2.4 Connection check and further steps

Assure that your PC is accessing to the internet only by A 1475 3G and Wi-Fi Router (disconnect other communication channels) and try to access www.google.com with your browser. If success, router is ready for use with the instrument.

If internet connection over A 1475 3G and Wi-Fi Router is not established:

- Verify hardware connections (SIM card, supply, patch cables, antennas,...)
- Reset Router and repeat setup procedure.
- Check if 3G or Wi-Fi signal is present.
- Contact Metrel for assistance.

Instrument should be now set up in the same manner as described in user manual under section: "Remote instrument connection (over Internet)". Please check this section in manual and follow described connection procedure.

3 Remote Communication over Wi-Fi network

3.1 Router connection

After you unpack the box, follow the steps, documented below, in order to properly connect the router.

1. Attach Wi-Fi antenna and optionally GSM antenna.
 2. Power up router, instrument and PC
 3. Connect devices, as shown on figure below
 - Use Ethernet cable to connect instrument and router
 - Use Ethernet cable to connect Router with PC. PC will be used to set up router.
- Alternatively router can be set up over Wi-Fi network, by finding Teltonika access point on PC. In that case Ethernet connection with PC is not needed.

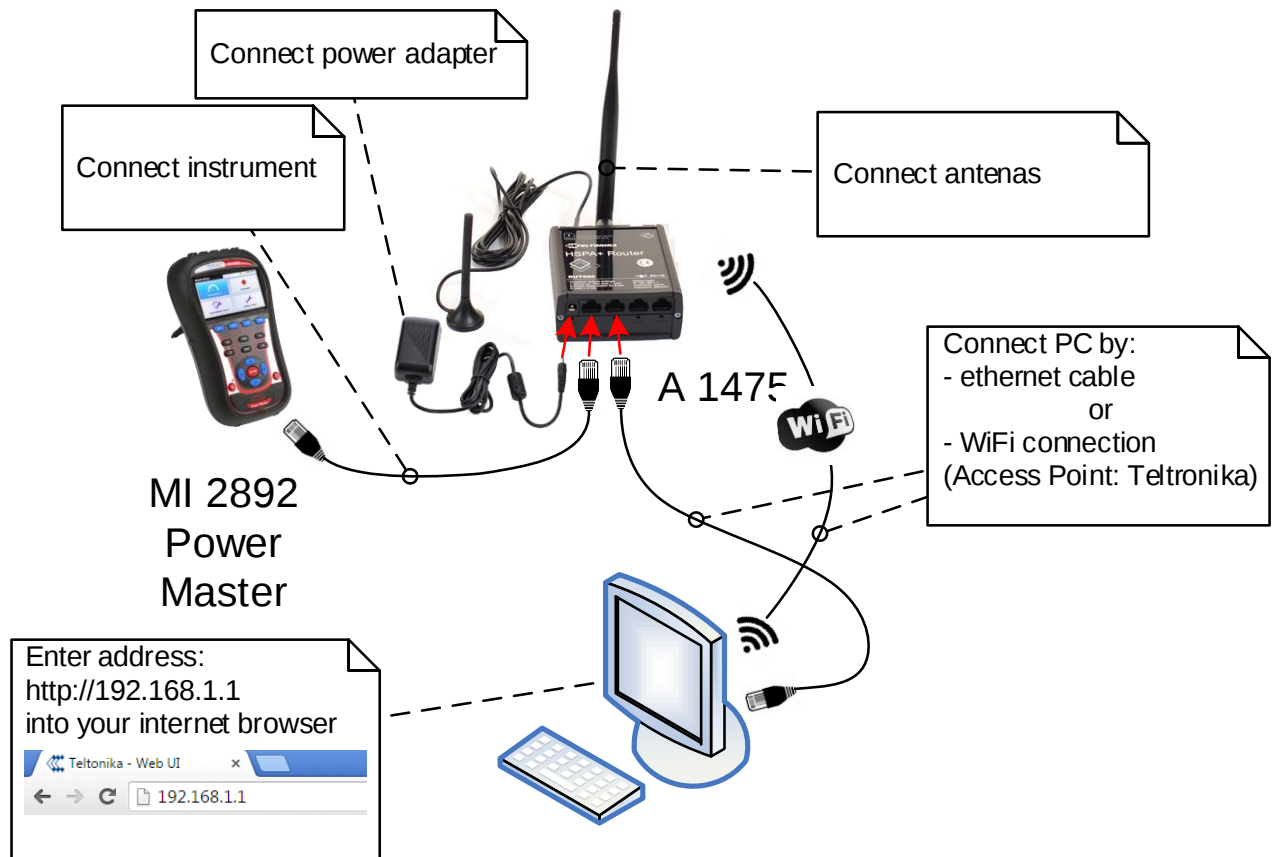
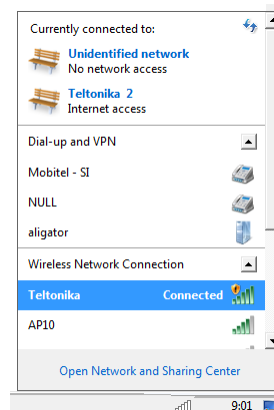


Figure 5: Router Wi-Fi connection

4. To power up router, instrument and PC.

3.2 Router Setup

1. To connect to the router
 - wirelessly, look up for Access Point **Teltonika** on your computer, and connect to it (no password is required).



- through LAN (Ethernet) network, plug Ethernet cable into computer and LAN Ethernet port marked as "LAN1" on the router
2. Connect instrument and modem with Ethernet cable. Use Ethernet port marked as "LAN2"

3. Launch your browser and enter the routers IP into the address field:



4. If connection was successful, a login screen will appear:

A screenshot of the Teltonika router's login page. The header is blue with the 'TELTONIKA' logo. Below it, the title 'Authorization Required' is displayed. The text 'Please enter your username and password.' is followed by two input fields: 'Username' with 'admin' entered and 'Password' which is empty. There are 'Login' and 'Reset' buttons. At the bottom, it says 'Teltonika solutions: www.teltonika.lt'.

Enter the default password **admin01** into the Password field and then click on Login button.

5. A wizard start in order to setup router. Change default password with your own. Wizard can be start anytime later in menu System → Configuration Wizard

A screenshot of the Teltonika Configuration Wizard, Step 1: Password. The header is blue with the 'TELTONIKA' logo and navigation links: Status, Network, Services, System, and Logout. Below the header, there are four tabs: Step 1 - Password (selected), Step 2 - 3G, Step 3 - LAN, and Step 4 - WiFi. The main content area has the title 'Step - Password' and the instruction 'First, let's change your router password from the default one.' There are two input fields: 'Password' and 'Confirmation', both with masked characters (dots) and a green eye icon to toggle visibility. At the bottom right, there are 'Skip Wizard' and 'Next' buttons. The footer says 'Teltonika solutions: www.teltonika.lt'.

6. Change 3G configuration if necessary, otherwise leave it as is and press Next button. These settings are not used for instrument Wi-Fi connection.

 Status Network Services System Logout

Step 1 - Password Step 2 - 3G Step 3 - LAN Step 4 - WiFi

3G Configuration

Next, let's configure your 3G settings so you can start using internet right away.

3G Configuration

APN

internet

PIN number

Dialing number

*99#

3G authentication method

PAP

Username

mobitel

Password

Service mode

3G preferred

Next

Teltonika solutions: www.teltonika.lt

7. Change LAN setup if necessary, otherwise leave it as is.

 Status Network Services System Logout

Step 1 - Password Step 2 - 3G Step 3 - LAN Step 4 - WiFi

Step - LAN

Here we will configure the basic settings of a typical LAN configuration. The wizard will cover 2 basic configurations: static IP address LAN and DHCP client.

Common Configuration

Protocol

Static address

IPv4 address

192.168.1.1

IPv4 netmask

255.255.255.0

IPv4 broadcast

Use custom DNS servers

DHCP Server

Disable

☐

Start

100

Limit

150

Leasetime

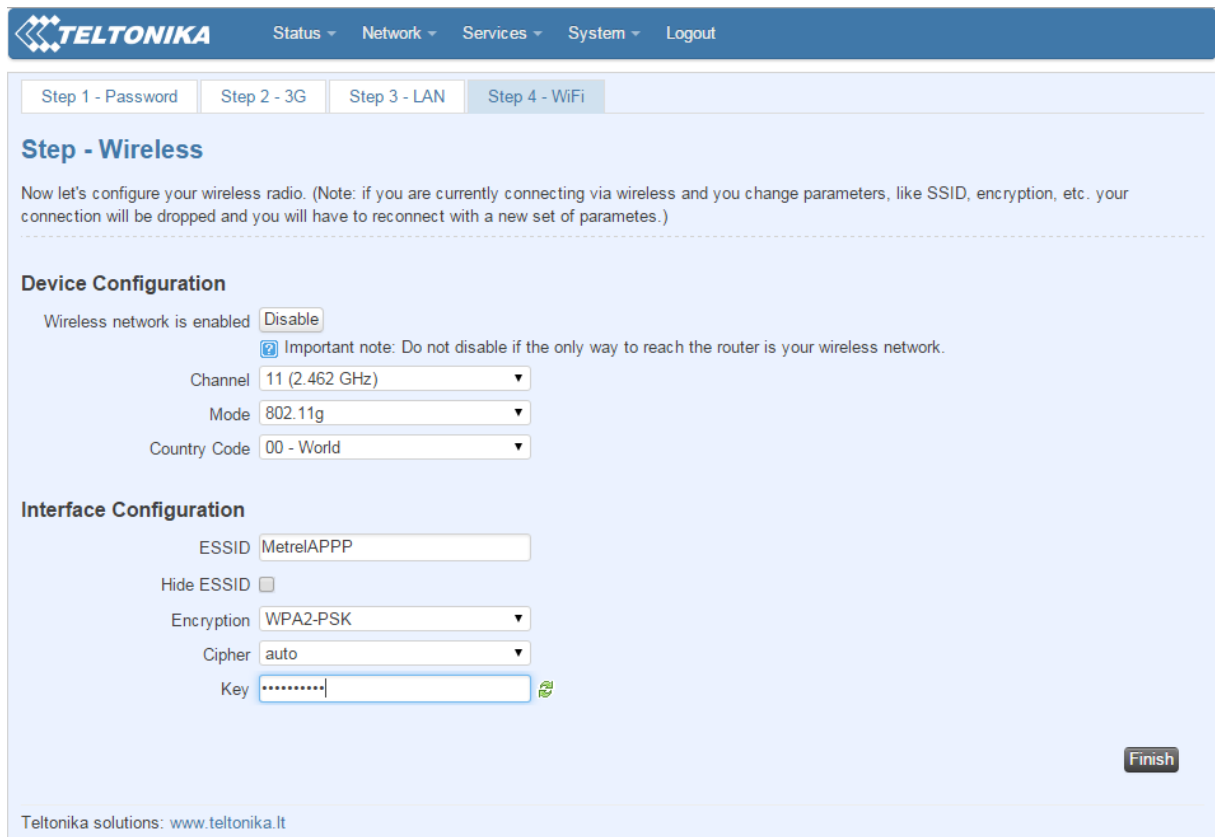
12h

 Expiry time of leased addresses, minimum is 2 Minutes (2m).

Next

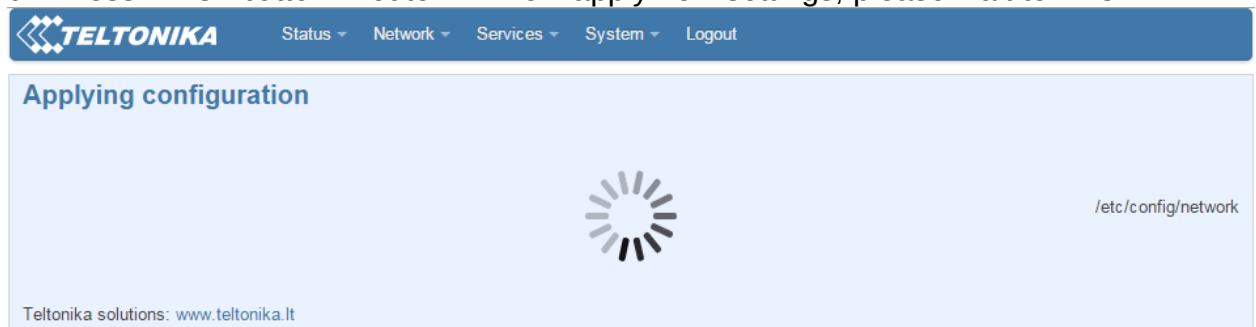
Teltonika solutions: www.teltonika.lt

8. Change Wi-Fi host configuration if necessary, otherwise leave it as is. These settings are not used for instrument Wi-Fi connection.



The screenshot shows the Teltonika router configuration interface, specifically the 'Step 4 - WiFi' tab. The top navigation bar includes 'Status', 'Network', 'Services', 'System', and 'Logout'. Below the navigation bar, there are four tabs: 'Step 1 - Password', 'Step 2 - 3G', 'Step 3 - LAN', and 'Step 4 - WiFi'. The main heading is 'Step - Wireless'. A note states: 'Now let's configure your wireless radio. (Note: if you are currently connecting via wireless and you change parameters, like SSID, encryption, etc. your connection will be dropped and you will have to reconnect with a new set of parameters.)'. The 'Device Configuration' section includes a 'Wireless network is enabled' toggle set to 'Disable', with a note: 'Important note: Do not disable if the only way to reach the router is your wireless network.' Below this are dropdown menus for 'Channel' (11 (2.462 GHz)), 'Mode' (802.11g), and 'Country Code' (00 - World). The 'Interface Configuration' section includes an 'ESSID' field (MetrelAPPP), a 'Hide ESSID' checkbox, an 'Encryption' dropdown (WPA2-PSK), a 'Cipher' dropdown (auto), and a 'Key' field (masked with dots). A 'Finish' button is located at the bottom right. The footer text is 'Teltonika solutions: www.teltonika.lt'.

9. Press Finish button. Router will now apply new settings, please wait to finish.



10. In Network → WAN menu and select **Wifi** option. Press Save Button, and wait that router reconfigure operation mode.

WAN

On this page you can configure your WAN settings. Your WAN configuration determines how the router will be connecting to the internet.

Operation Mode

Interface ☐ Wired
☒ Wifi
☐ 3G

Common configuration

General Setup Advanced Settings

Protocol

Hostname to send when requesting DHCP

IP-Aliases

This section contains no values yet

Add

Save

Teltonika solutions: www.teltonika.lt

11. Select Network → Wireless menu. Router will show available Access points in the area. Select one to which you want connect, and press Join Network button.

guestsMetrel
 60% Channel: 1 | Mode: Master | BSSID: 2E:A4:3C:7D:C6:31 | Encryption: WPA2 PSK (TKIP) Join Network

AP11
 65% Channel: 1 | Mode: Master | BSSID: 2A:A4:3C:7D:C9:18 | Encryption: WPA2 PSK (TKIP) Join Network

AP11
 40% Channel: 11 | Mode: Master | BSSID: 2A:A4:3C:0D:1C:A5 | Encryption: WPA2 PSK (TKIP) Join Network

hidden
 28% Channel: 1 | Mode: Master | BSSID: 36:A4:3C:0D:36:CF | Encryption: WPA2 PSK (CCMP) Join Network

78f672
 42% Channel: 1 | Mode: Master | BSSID: 70:54:D2:DE:06:7E | Encryption: mixed WPA/WPA2 PSK (TKIP) Join Network

AP12
 31% Channel: 2 | Mode: Master | BSSID: 00:12:5F:0A:4E:B0 | Encryption: WPA2 PSK (TKIP) Join Network

AP11
 40% Channel: 11 | Mode: Master | BSSID: 4A:D9:E7:21:B3:AB | Encryption: WPA2 PSK (TKIP) Join Network

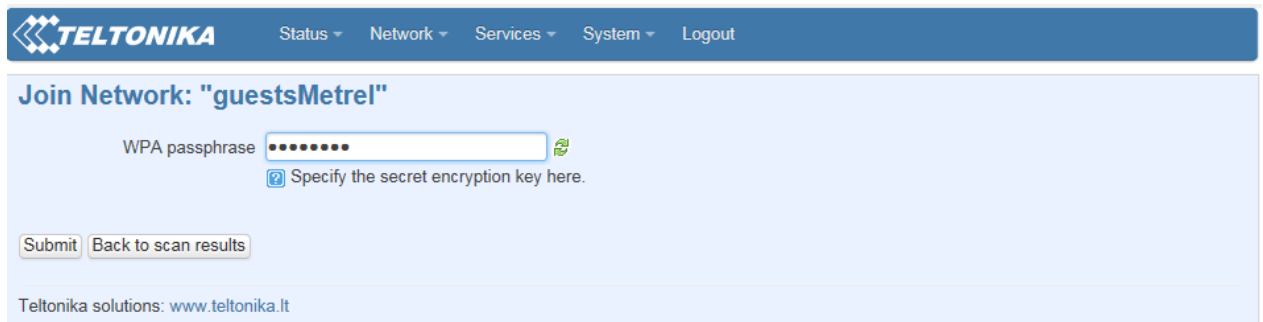
AP10
 40% Channel: 11 | Mode: Master | BSSID: 52:D9:E7:21:B3:AB | Encryption: mixed WPA/WPA2 802.1X (TKIP) Join Network

AP10
 60% Channel: 1 | Mode: Master | BSSID: 32:A4:3C:7D:C6:31 | Encryption: mixed WPA/WPA2 802.1X (TKIP) Join Network

AP10
 68% Channel: 1 | Mode: Master | BSSID: 32:A4:3C:7D:C9:18 | Encryption: mixed WPA/WPA2 802.1X (TKIP) Join Network

guestsMetrel
 65% Channel: 1 | Mode: Master | BSSID: 2E:A4:3C:7D:C9:18 | Encryption: WPA2 PSK (TKIP) Join Network

12. If necessary provide network password in provided text field. Press Submit button afterwards.



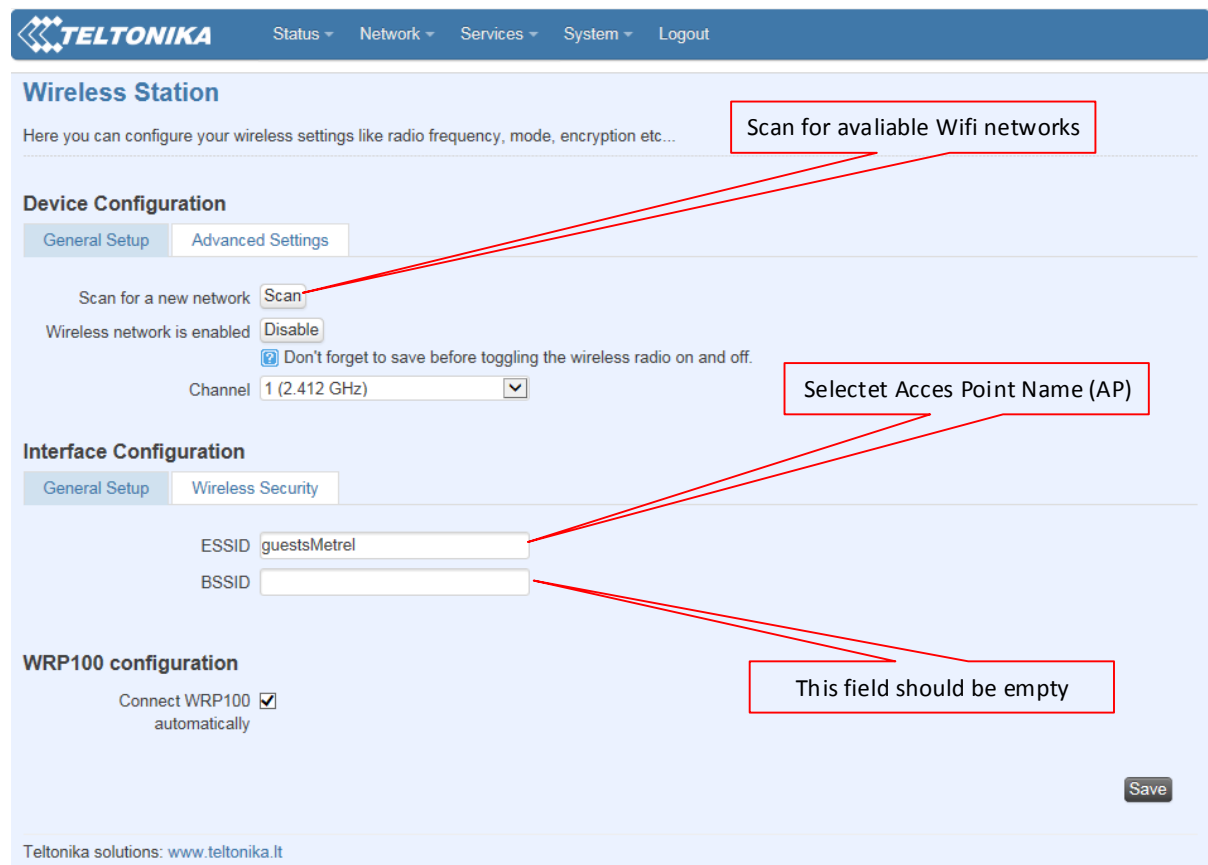
Join Network: "guestsMetrel"

WPA passphrase 

☐ Specify the secret encryption key here.

Teltonika solutions: www.teltonika.lt

13. Before new settings are applied, please double check that all settings are correct as shown on figures below. If everything is correct, press Save button.



Wireless Station

Here you can configure your wireless settings like radio frequency, mode, encryption etc...

Device Configuration

Scan for a new network

Wireless network is enabled

☐ Don't forget to save before toggling the wireless radio on and off.

Channel

Interface Configuration

WRP100 configuration

Connect WRP100 ☒ automatically

Teltonika solutions: www.teltonika.lt

 Status ▾ Network ▾ Services ▾ System ▾ Logout

Wireless Station

Here you can configure your wireless settings like radio frequency, mode, encryption etc...

Device Configuration

General Setup Advanced Settings

Scan for a new network Scan

Wireless network is enabled Disable

☒ Don't forget to save before toggling the wireless radio on and off.

Channel 1 (2.412 GHz) ▾

Interface Configuration

General Setup Wireless Security

Encryption WPA2-PSK ▾

Cipher auto ▾

Key myPassword 

WRP100 configuration

Connect WRP100 ☒ automatically

Save

Password for APN access

3.3 Connection status

Modem connection status can be observed under Status → Network information menu.

Network information

3G

State	disconnected
IMEI	351579051730552
Sim card state	OK
Signal strength	-97 dBm
Operator	SI MOBILTEL GSM
Connection type	3G (WCDMA)
Bytes recieved	N/A
Bytes sent	N/A

WAN

Interface	Wifi
Type	DHCP
IPv4 address	192.168.93.163
Netmask	255.255.255.0
Gateway	192.168.93.1
Expires	7h 0m 25s
Connected	0h 59m 34s

LAN

IPv4 address	192.168.1.1
Netmask	255.255.255.0
Connected	0h 60m 14s

Wireless

Signal quality	57%
SSID	guestsMetrel
Mode	Client
Channel	1 (2.41 GHz)
BSSID	2E:A4:3C:7D:C6:31
Encryption	WPA2 PSK (NONE)
Bit rate	26.0 Mbit/s
Country	00

Associated Stations

MAC-Address	Network	Signal	RX Rate	TX Rate
2E:A4:3C:7D:C6:31	Client "guestsMetrel"	-70 dBm	52.0 Mbit/s, MCS 5, 20MHz	26.0 Mbit/s, MCS 3, 20MHz

DHCP Leases

Hostname	IPv4-Address	MAC-Address	Leasetime remaining
MI2892_14430002	192.168.1.178	1e:32:2f:dc:00:00	11h 59m 12s

Wifi connection is used for internet access.

Shows the state of the Wifi connection.

Shows the status of instrument connection. In this example instrument MI 2892 with serial number 14430002 is connected to the router.

3.4 Connection check and further steps

Assure that your PC is accessing to the internet only by A 1475 3G and Wi-Fi Router (disconnect other communication channels) and try to access www.google.com with your browser. If success, router is now ready for use with the instrument.

If internet connection over A 1475 3G and Wi-Fi Router is not established:

- Verify hardware connections (SIM card, supply, patch cables, antennas,...)
- Reset Router and repeat setup procedure.
- Check if 3G or Wi-Fi signal is present.

- Contact Metrel for assistance.

Instrument should be now set up in the same manner as described in user manual under section: "Remote instrument connection (over Internet)". Please check this section in manual and follow described connection procedure.

4 Technical Specifications

In this section basic router specification is given. For complete technical specification please check RUT 500 user manual, provided by Teltonika.

4.1 General specification

Dimensions	100 mm L x 85 mm W x 36 mm H
Weight	220 g
Ethernet Cable length	1 m
Power Supply	7 - 30V / 1 A
Power consumption	max. 700 mA @ 12 V
Output connector	Antenna connector 2 x SMA for 3G, 1 x RP-SMA for Wi-Fi
Antenna	Stub antenna, angled, 54 mm, SMA male, 900/1800 MHz
Data transfer	3G, Wi-Fi, Ethernet
Status indicators	4 x Ethernet LEDs, 1 x Power LED, 1 x 3G LED.
Operating temperature	0 °C ÷ 50 °C
Storage temperature	-20 °C ÷ 70 °C

4.2 LAN and Wi-Fi

- Wireless AP, Router, 4-Port Switch and Firewall in one device
- High performance 320 MHz CPU with 256 Mbits SDRAM
- IEEE 802.11b/g/n, IEEE 802.3, IEEE 802.3u standards
- 64/128-bit WEP, WPA, WPA2, WPA&WPA2 encryption methods
- 3xLAN 10/100Mbps Ethernet ports
- 1xWAN 10/100Mbps Ethernet port
- Supports Auto MDI/MDIX
- Remote/local Web management
- 1x 5dBi wireless antenna
- SSID stealth mode and access control based over MAC address
- System log to record the status of the Router
- Auto negotiation/manual mode for IEEE 802.11b/g/n
- Dynamic DNS
- LAN access control over Internet connection
- Virtual server
- Auto wireless channel selection
- OpenVPN
- Backup WAN
- IPSec
- SMS and Ping reboot
- Din rail mounting (optional)
- Power over Ethernet (WAN and LAN)

4.3 HSUPA/HSDPA/UMTS

- Power Class 3 (0.25 W, 24 dBm) for UMTS
- UMTS mode: 384 Kbps DL/384 Kbps UL
- HSUPA mode: 5.76 Mbps (Cat 6) uplink speed
- 3dBi antenna
- Downlink speed up to 21 Mbps or 7.2 Mbps

4.4 GSM/GPRS/EDGE

- 850/900/1800/1900 MHz
- Power Class 4 (2 W, 33 dBm) for GSM/GPRS 850/900 MHz bands
- Power Class 1 (1 W, 30 dBm) for GSM/GPRS 1800/1900 MHz bands
- Power Class E2 (0.5 W, 27 dBm) for EDGE 850/900 MHz bands
- Power Class E2 (0.4 W, 26 dBm) for EDGE 1800/1900 MHz bands
- GSM: 14.4 Kbps DL/14.4 Kbps UL
- Module specific GPRS DL/UL speeds (up to 107 kbps (class 33))
- Module specific EDGE DL/UL speeds (up to 296 kbps (class 33))