USER GUIDE

iRZ GSM/3G/CDMA/LTE Routers:

RU41w, RL41w, RC41w

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1. Introduction

1.1. Document Description

This document provides explanatory information on technical specifications of iRZ routers of R4 series (RU41w, RL41w, RC41w), as well as information on express setting of the routers.

Document Version (updates)		Issue Date	
1.0		17/04/2015	
1.1 (Figures updated)		19/08/2015	
2.0 (List of models)		25/03/2019	
Prepared by:	T. Yakovleva	**Checked by:**	O. Kolmak

1.2. Terms and Abbreviations

Router – iRZ router.

3G – General name for a set of standards describing the operation in UMTS and GSM networks like GPRS, EDGE, HSPA.

Server – This term may be used to describe:

- the server part of a software package used by a computer system,
- the role of a component or an object in the structural and functional design of a technical solution deployed with the use of the router,
- a computer providing particular services (network services, data processing and storing services, etc.)

Technical Solution – An idea or a document describing a set of technical measures and/or procedures aimed at solving a particular problem; this is implemented through involving functionalities of components of such a technical solution which are interrelated and interacting in a particular way.

Public IP address – An Internet IP address assigned by an Internet service provider to the customer for use on the provider's or the client's equipment for direct connection with the customer's equipment through the Internet.

Static Public IP Address – A public IP address which can not be changed under any circumstances (change in client's equipment type, etc.) or in any event (reconnection to the provider's network, etc.); static IP address can only be changed through submission of a relevant application to the Internet service provider.

Authentication – The procedure of a user/client/host authenticity verification by comparing details provided by them at connection with the details correlating with the username/login in the database.

Router Web Interface – An administration tool built in the router to control and configure its functions and to monitor the state of these functions.

Remote Device (Remote Host) – A device physically removed from the location or facility/host which is under discussion in a particular context.

2. Information on Device

2.1. Purpose

The router is a multipurpose radio communication user device operating in mobile networks. The router is capable of data transmitting, receiving and protecting and supporting computer network.

2.2. Communication Standards

Table 2.1 Communication Standards*

Model	GPRS/EDGE	HSDPA/HSUPA	HSPA+	UMTS	1xEV-DO	LTE
RU41w	Yes	Yes	–	Yes	–	–
RL41w	Yes	–	Yes	Yes	–	Yes
RC41w	–	–	–	–	Yes	–

* Specifications of the models may be changed by the Manufacturer without preliminary notice.

2.3. Hardware Specifications

Table 2.2 Basic Specifications*

Type	Characteristic
Processor	ARM v5TE
Dynamic RAM	128 MB
Flash memory	128 MB
Ethernet connector	10/100/1000 Mbit
Terminal block	RS232 (TX, RX, GND); RS485; 3 x GPIO
USB connector	USB 2.0
Wi-Fi	2.4 GHz 802.11 b/g/n

* Specifications of the models may be changed by the Manufacturer without preliminary notice.

2.4. Physical Specifications

Table 2.3 Physical Specifications

Type	Characteristic
Overall dimensions (without connectors)	Max. 162×110×37 mm (L × W × H)
Overall dimensions (including connectors)	Max. 162 × 119 × 37 mm (L × W × H)
Weight	Max. 350 g
Operating temperature range	-30°C to +70°C
Storage temperature range	–40°C to +85°C
Permissible humidity	The router remains operable at relative humidity of max. 80% @ 25°C

2.5. Storage and Operating Conditions

The router shall be stored in a dry place, protected against water. The risk of static voltage (lightning, household static electricity) shall be eliminated.

Rating of ingress protection is IP20 per GOST 14254-96.

Permissible vibration:

The router maintains its strength characteristics under mechanical loads corresponding to 15th grade of sinusoidal vibration severity per GOST 30631-99: as a part of equipment operated in motion, installed on tractors, tracked vehicles and water transport (speed boats, hydrofoil vessels, etc.) and on process equipment or land transport, in case vibration frequency exceeds 80 Hz.

The router is not provided with any vibration isolation.

2.6. Electrical Specifications

Power supply characteristics:

- Supply voltage of 8 to 32 VDC
- Max. current consumption:
    - At supply voltage of +12 V: 1000 mA
    - At supply voltage of +24 V: 500 mA

2.7. Safety Precautions

Limitations to the router use in proximity of other electronic devices:

- Switch off the router in hospitals or in proximity of medical equipment (for example, cardiac pacemakers, hearing aid devices) as it may interfere with medical equipment.
- Switch off the router in aircraft and take measures to prevent its accidental switching on.
- Switch off the router in proximity of fueling stations, chemical facilities, areas of blasting operations. The router may interfere with equipment; at short distances it may also interfere with TV and radio sets.

Protect the router against dust and moisture.

Observe the permissible levels of power supply and vibration at the place of router installation.

2.8. Router Functional Diagram

Basic functional assemblies of the router (see Figure 2.1):

- Power connector
- Voltage converter
- Communication module(s)
- SMA connectors for external antenna
- CPU
- Microcontroller (µC)
- USB-A
- RS232, RS485 and GPIO interface units
- Ethernet interfaces (LAN)
- Ethernet interface (WAN) or SFP module
- SIM card 1 holder
- SIM card 2 holder
- LED indication block
- Buttons

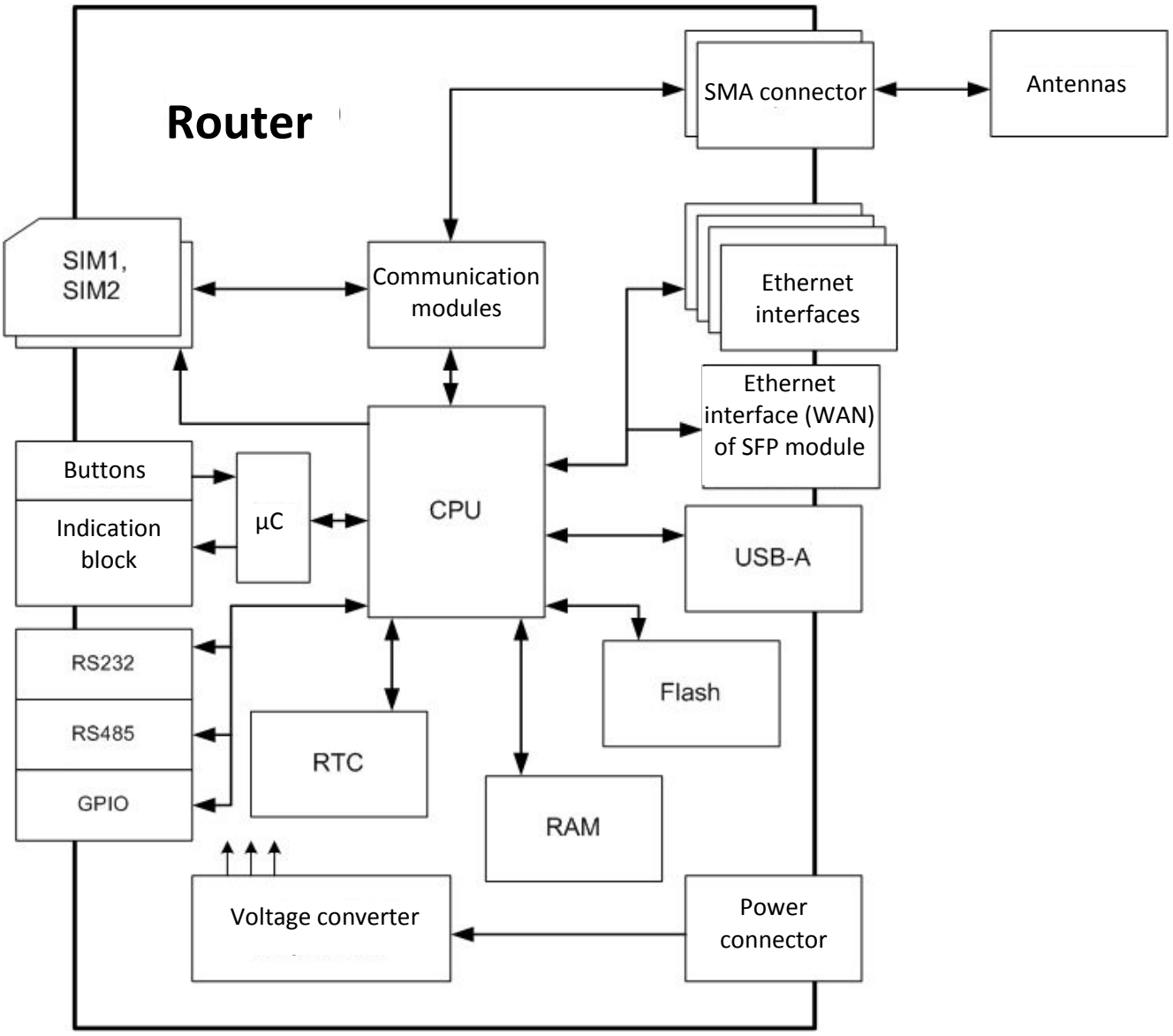

Figure 2.1 R4 Router Functional Diagram

3. Appearance and Interfaces

3.1. Appearance

3.1.1. Connectors and External Elements

The router is of industrial design with a rugged and lightweight plastic case.

Figure 3.1 Rear View

Legend for Figure 3.1:

1. Antenna connector 1
2. Interfaces terminal block
3. LAN connectors 1 to 4
4. Wide area network connector
5. Power connector
6. Reset button
7. Antenna connector 2

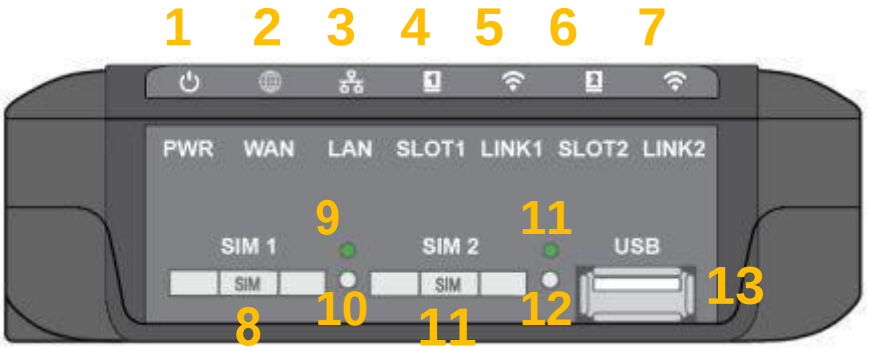

Figure 3.2 Side View

Legend for Figure 3.2:

1. Power indicator
2. Wide area network operation indicator
3. LAN operation indicator
4. Module 1 operation indicator
5. Module 1 signal level indicator
6. Module 2 operation indicator
7. Module 2 signal level indicator
8. SIM card 1 slot
9. SIM card 1 operation indicator
10. SIM card 1 eject button
11. SIM card 2 slot
12. SIM card 2 operation indicator
13. SIM card 2 eject button
14. USB connector

Figure 3.3 Front View

Legend for Figure 3.3:

1. Customizable button

3.1.2. Router Indication

Router indicators are located at the top of the side panel (see Figure 3.2). For explanation of signals and indicator colors, see Table 3.1.

Table 3.1 Router Indication

Status		Explanation
PWR (Power indicator) – shows the router state		
○	Off	No power
●	Blinks green	Booting in progress
●	Lights green	Normal operation
●	Blinks red	Embedded software update
WAN (wide-area network operation indicator) – shows the WAN wired connection state.		
○	Off	No connection set up.
●	Lights red	Connection is set up, but not established
●	Lights green	Connection is set up and established
LAN (local area network operation indicator) – shows the state of the router internal switchgear.		
○	Off	No link on all ports
●	Lights green	Link on at least one port
●	Blinks green	Data transmission via any port
Module 1 operation indicator – shows the state of the first wireless module.		
○	Off	No connection established.
●	Lights red	2G connection established
●	Lights green	3G/CDMA connection established
●	Blinks green	LTE connection established
Module 1 signal level indicator – shows the signal level of the first wireless module.		
○	Off	Module is off
●	Lights red	Low signal level
●	Lights yellow	Medium signal level
●	Lights green	High signal level
Module 2 operation indicator – shows the state of the second wireless module.		
○	Off	No connection established.
●	Lights red	2G connection established
●	Lights green	3G/CDMA connection established
●	Blinks green	LTE connection established
Module 2 signal level indicator – shows the signal level of the second wireless module.		
○	Off	Module is off
●	Lights red	Low signal level
●	Lights yellow	Medium signal level
●	Lights green	High signal level
SIM card 1 operation indicator		
●	On	SIM card 1 used
SIM card 2 operation indicator		
●	On	SIM card 2 used

3.2. Connectors and Interfaces

3.2.1. Power Connector

Microfit4 type power connector is designed to connect the router to power supply source.

Requirements to power source: 8 to 30 VDC, min. current of 1 A at 12 V.

Power source requirements for PoE operation: voltage of 24 to 30 V, min. current of 2 A at 24 V.

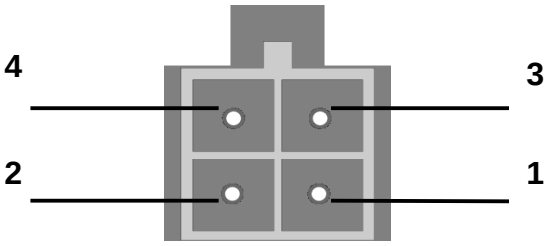

Figure 3.4 Power Connector

Table 3.2 Power Connector Pin Assignment

Contact	Signal	Purpose
1	No	Not used
2	No	Not used
3	GND	Supply voltage negative
4	+U	Supply voltage positive

3.2.2. Terminal Block

The terminal block accommodates serial interfaces and input/output lines.

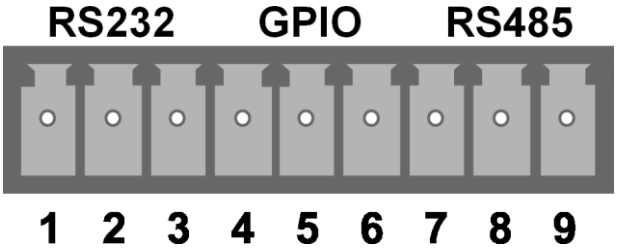

Figure 3.5 Interface Connector

Table 3.3 Interface Connector Pin Assignment

Pin	Purpose
1	RS232 GND
2	RS232 Tx
3	RS232 Rx
4	GPIO 1
5	GPIO 2
6	GPIO 3
7	RS485 Shield
8	RS485 B
9	RS485 A

3.2.3. Local Area Network Connectors

Local area network connectors are designed to connect LAN Ethernet devices supporting data rate of 10/100/1000 Mbit/s. Each connector is provided with port link and activity indicators. In the PoE (Power over Ethernet) supporting modules, port 4 may provide power for an external IEEE 802.3af device. Left indicator (yellow): Link/Activity; right (green): 1 Gbit speed.

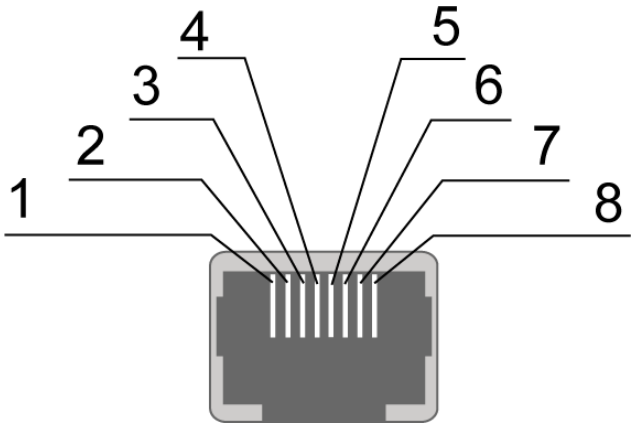

Figure 3.6 Ethernet Connector

Table 3.4 Ethernet Connector Pin Assignment

Contact	Signal	Direction	Purpose
1	TX D1+	Router → PC	Transmission positive
2	TX D1-	Router → PC	Transmission negative
3	RX D2+	PC → Router	Reception positive
4	BI D3 +	PC ↔ Router	Reception/transmission positive
5	BI D3 -	PC ↔ Router	Reception/transmission negative
6	RX D2-	PC → Router	Reception negative
7	BI D4+	PC ↔ Router	Reception/transmission positive
8	BI D4-	PC ↔ Router	Reception/transmission negative

3.2.4. Wide Area Network Connector

WAN connector is to be used to connect the router to the superior equipment providing for WAN wired access. The connector is provided with port link and activity indicators. Left indicator (green): Link/Activity; right (yellow): 1 Gbit speed.

3.2.5. USB Interface

USB interface is provided with a standard USB-A female connector and operates under USB 2.0 standard specification. For description of connector pins, see Table 3.5.

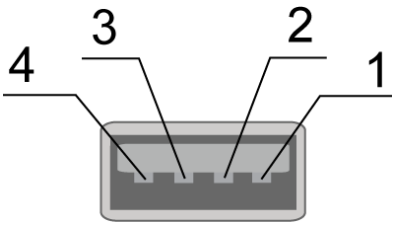

Figure 3.7 Universal Connector

Table 3.5 Universal Connector Pin Assignment

Contact	Signal	Purpose
1	VBUS	+5 V For feeding peripherals
2	D-	Differential data signal
3	D+	Differential data signal
4	GND	Chassis circuit For feeding peripherals

3.2.6. Antenna Connectors

Antenna connectors are designed to connect antennas to embedded wireless modules.
The connector type and purpose depend on the router model.

Table 3.6 Antenna Connector Assignment

Model	Antenna 1	Antenna 2
RU41w	GSM main	Wi-Fi main
RL41w	LTE main	Wi-Fi main
RC41w	CDMA main	Wi-Fi main

3.2.7. Reset Button

The reset button is designed to restore the router;s factory settings in case it can not be accessed.

4. Preparation for Operation

4.1. Connection

1. Connect antennas to antenna connectors.
2. Insert SIM cards in the slots.
3. Connect LAN cable to the LAN1-LAN4 ports.
4. Connect WAN cable to the WAN port.
5. Connect power cable to the POWER connector.
6. Make sure the local network IP address 192.168.1.1 is available and the computer is configured to receive IP address dynamically (DHCP) or has an address from the range of 192.168.1.0/24
7. Type the address **http://192.168.1.1** in the address bar.
8. Enter login and password **root/root.**

4.2. Local Area Network Configuration

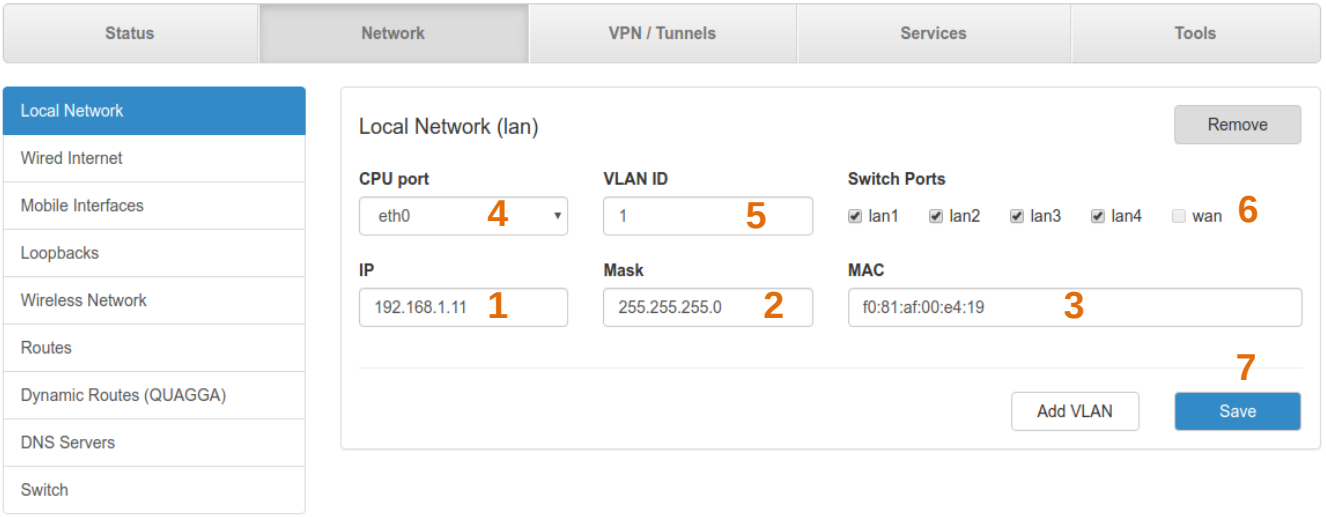

Figure 4.1 Local Area Network Configuration

1. Router IP address
2. Network mask
3. MAC address
4. CPU Port (two Ethernet 1Gbit ports, ETH0 and ETH1, are available in R4 routers. By default, ETH0 is four LAN ports, and ETH1 is one WAN port. However, this setting allows the user to allocate the ports between physical connectors)
5. VLAN ID (Specify VLAN number. Initially, the number is set automatically by the device, but may be changed by the user)
6. Switch Ports (Select the physical ports to be added to VLAN)
7. Settings save button

For details, see "USER GUIDE. iRZ Routers Control and Monitoring Tools".

4.3. Wide Area Network Configuration

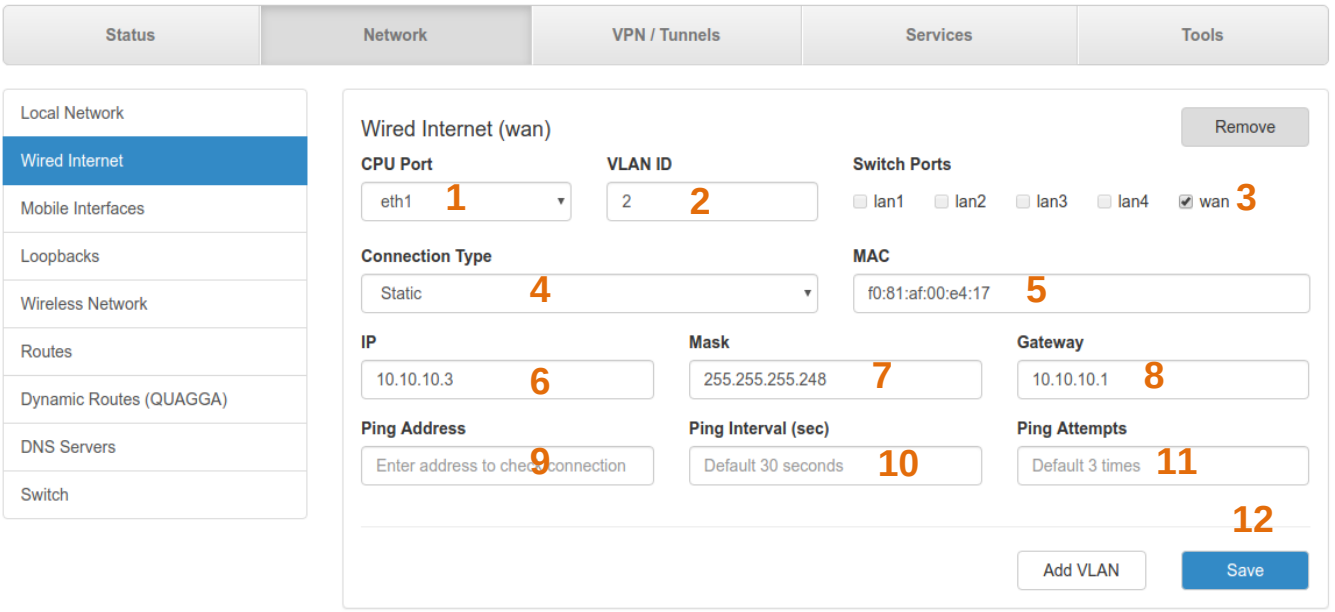

Figure 4.2 Wide Area Network Configuration

1. CPU Port (two Ethernet ports, ETH0 and ETH1, are available in R4 routers. By default, ETH0 is four LAN ports, and ETH1 is one WAN port. However, this setting allows the user to allocate the ports between physical connectors)
2. VLAN ID (Specify VLAN number. Initially, the number is set automatically by the device, but may be changed by the user)
3. Select the physical ports to be added to VLAN
4. The mode of obtaining an IP address via WAN port: Disabled – disable WAN port; DHCP – connection with settings received from DHCP server; Static – connection with manual settings; PPPoE – connection with authorization on a PPPoE server

Additional settings (depending on the selected connection type, **Connection Type** field):

5. Router's MAC address for VLAN created
6. Router's IP address for VLAN created
7. Router's network mask for VLAN created
8. Router's gateway for VLAN created
9. Remote host IP address to test the connection
10. Connection test interval in seconds (30 seconds by default).
11. Number of failed connection attempts after which the router will try to connect via mobile network (3 by default)
12. Settings save button

For details, see "USER GUIDE. iRZ Routers Control and Monitoring Tools".

4.4. Wireless Network Configuration

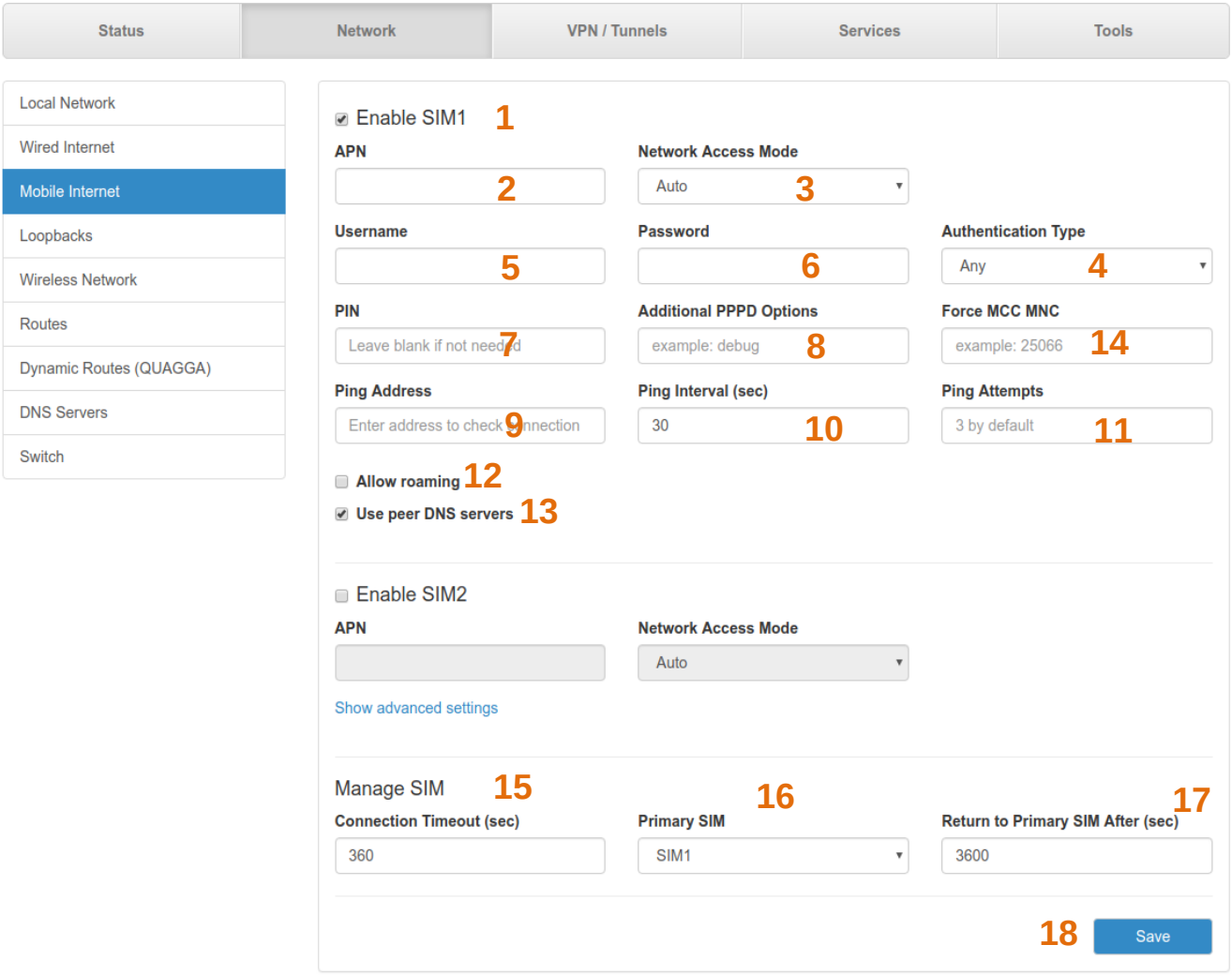

Figure 4.3 Wireless Network Configuration

1. Enable SIM1.
2. Mobile network name (APN).
3. Select the mode of operation with mobile networks: Auto – automatic detection of available network; 2G Only – operation in 2G network only; 3G Only – operation in 3G network only.
4. Select SIM card identification protocol in the provider's network: Any – any mode (by default), EAP, PAP, CHAP
5. Username for access to the provider's mobile network.
6. Password for access to the provider's mobile network.
7. SIM card PIN (if any).
8. Specify additional PPPD options when using mobile communication module.
9. Remote host IP address to test the connection

10. Packet sending interval in seconds to test the connection (30 seconds by default).
11. Number of failed connection attempts after which the router will try to connect via mobile network (3 by default)
12. Enable/disable SIM card in roaming.
13. Enable/disable external DNS servers of the provider.
14. Set MCC MNC (Mobile Country Code (MCC) in combination with Mobile Network Code (MNC) is a unique identifier of the mobile operator).
15. Time allowed for the SIM card to connect to the mobile operator. When this time has elapsed, the router reboots the mobile module and redialing starts again; measured in seconds.
16. Indicates which SIM card is of higher priority (for single-module routers only).
17. Specify the period of time after which the router will attempt to go back to the main SIM card.
18. Settings save button

The second SIM card is configured similarly to the first one. For details, see "USER GUIDE. iRZ Routers Control and Monitoring Tools".

4.5. Wi-Fi Setup

To set up Wi-Fi parameters, open the Wireless Network entry in the Network tab.

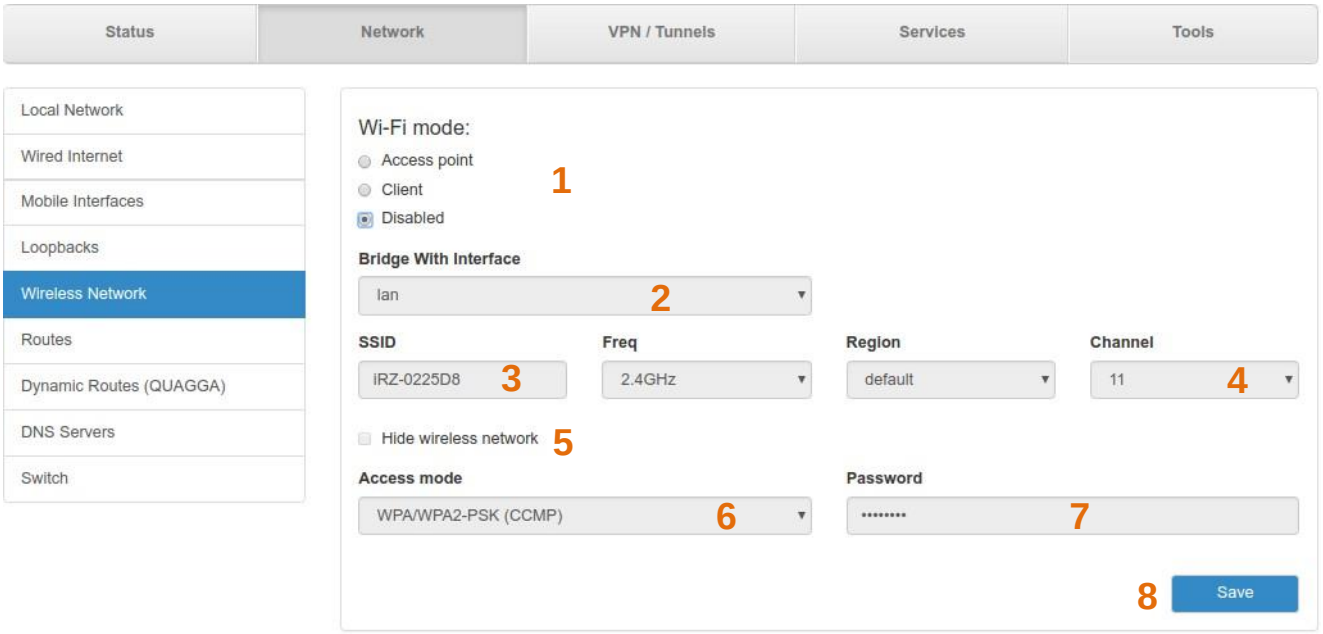

Figure 4.4 Wi-Fi Setup

1. Wi-Fi mode — select Wi-Fi module mode of operation: Access point — router acts as an access point and waits for clients to connect to its network; Client — router connects to external Wi-Fi network automatically and interface automatically becomes one of the WAN ports; Disabled — Wi-Fi module is off.
2. Bridge with Interface. Create a bridge with local interface or create a new interface.
3. Name of Wi-Fi network the clients will connect to.
4. Number of channel the Wi-Fi network will use.
5. Switch on/off hidden mode, i.e. without SSID broadcast.
6. Type of access password encryption for the created Wi-Fi network: Open – no access password; WPA; WPA2-PSK.
7. Access password for the created Wi-Fi network.
8. Settings save button

For details, see "USER GUIDE. iRZ Routers Control and Monitoring Tools".

5. Contacts and Support

To obtain new versions of firmware, documents and respective software, contact us using the details below:

Company website:	www.radiofid.ru
Contact phone in St.	+7 (812) 318 18 19
Petersburg: e-mail:	support@radiofid.ru

Our specialists are always ready to answer all your questions and assist in installing, configuring or troubleshooting of your equipment.

In case of any problem, contact the technical support service and specify the router software version. It is also recommended to attach any problematic service startup logs, configuration screenshots and any other relevant information to your letter. The more information you provide to the technical support specialist, the less time it will take to handle the situation.

Note: It is strongly recommended to update the router software to the current version prior to contacting the technical support service.

Warning! Failure to observe the operation conditions (improper use of the router) will make the warranty null and void.