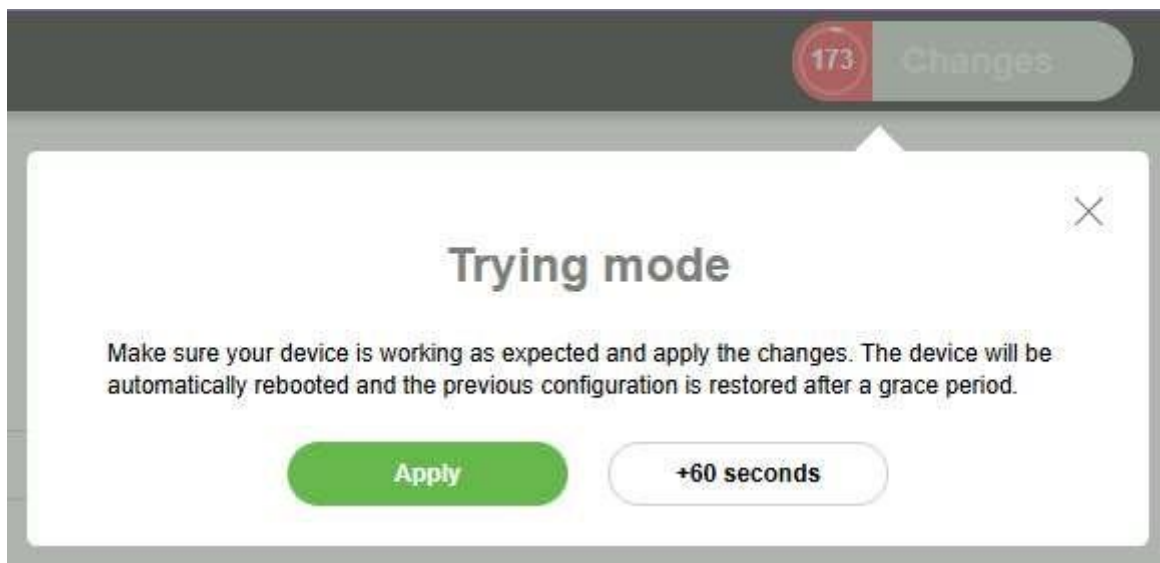To apply the configuration safely, use the "Try" button. In this case, the previous configuration will be restored after 180 seconds automatically if changes will not be confirmed or test period extended by the administrator.
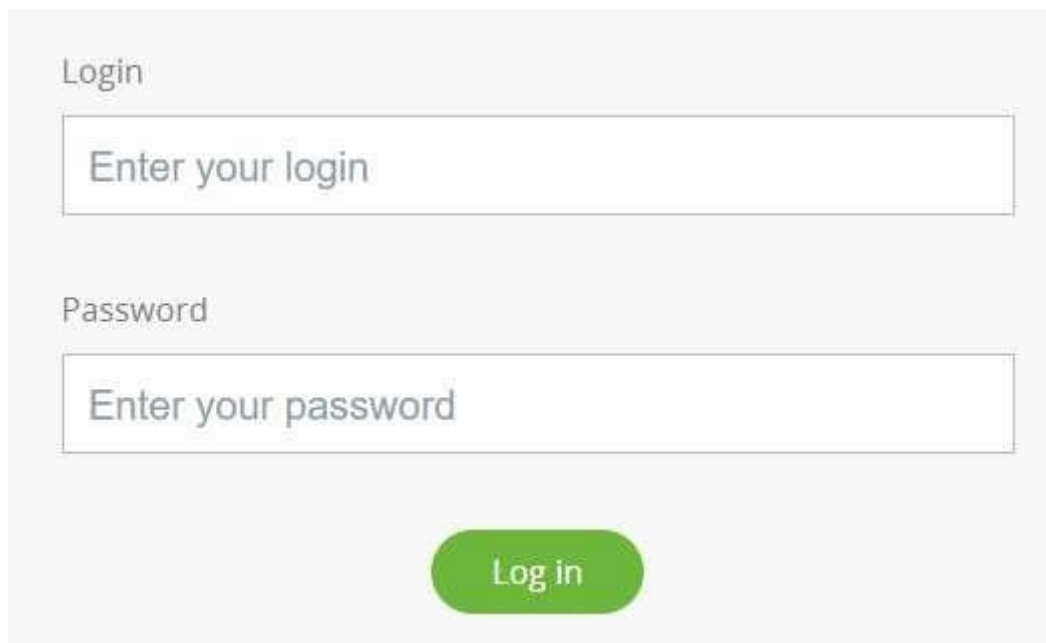
Web GUI access

Web User Graphical Interface (**Web GUI**) – is the basic way to configure and operate a wireless unit.

Operation system starts automatically when you power on the unit, Web GUI is enabled by default. In order to access the unit via Web browser, type an IP address in the address bar.

> (!) NOTE
>
> By default any username and any password can be used to login Web GUI.
>
> It's strongly recommended to set permanent username and password after the first log in. In order to do this go to the "General settings" section.

Login

Enter your login

Password

Enter your password

Log in

Dashboard

This section is intended to provide the main information about the wireless unit operation.

The Dashboard displays a read-only summary of the current link status information, local and remote device signal strength, capacity , current values of the basic configuration settings and Ethernet network status.

Device status
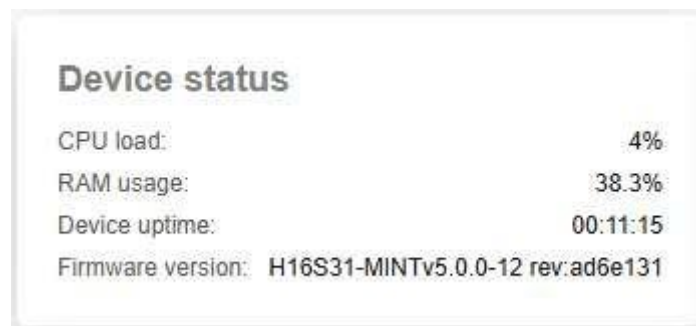
Parameter	Description
CPU load	Displays the load percentage of the CPU.
RAM usage	Displays the usage percentage of the random-access memory.
Device uptime	The device operating time since the last reboot.
Firmware version	The firmware version uploaded to the device.

Wired interface

In the "Wired interface status" tab, the wired interface status can be monitored, as well as media type, duplex mode and physical interface MAC-address.

Current interface load is displayed at the charts for both directions.

The wired interface statistic is available on the right side.
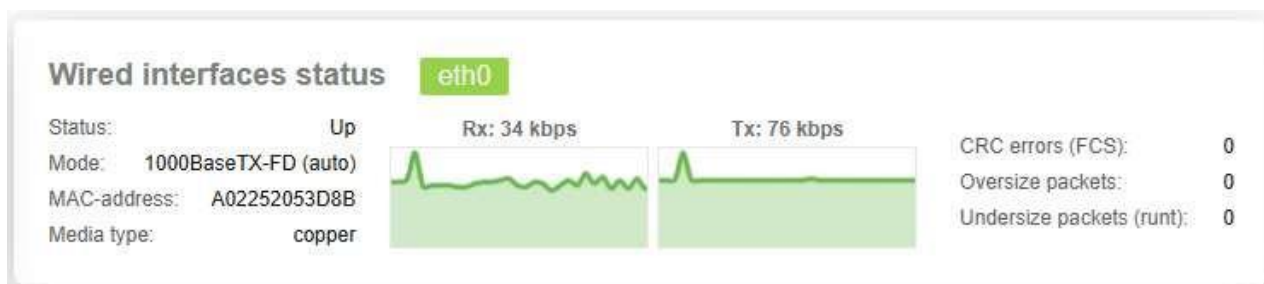
Parameter	Description
CRC errors (FCS)	Packets dropped due to checksum mismatch. The possible reasons for the error counter increasement are described in the "Troubleshooting" article.
Oversize packets	Packets larger than 9600 bytes.
Undresize packets (runt)	Packets less than 64 bytes in size.

Wireless link status

The left part of the section contains basic information about link status.
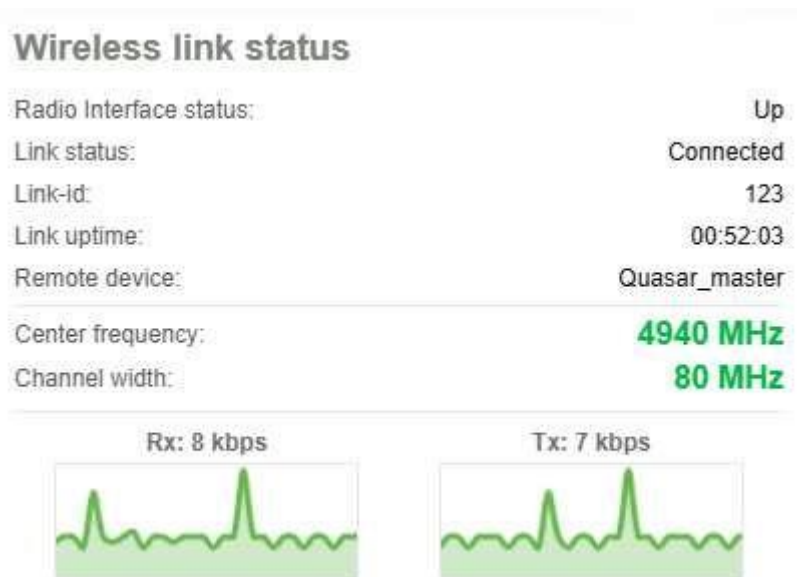
Parameter	Description
Radio interface status	Administrative interface status set in the "Switch" section.
Link status	Wireless connection state.
Link ID	Wireless link can be established only with devices which have the same link ID.
Link uptime	The link operating time since the last outage.
Remote device	Device name set at the remote side.
Center frequency	The downlink and uplink center frequency value set in the "Radio" section manually or by the automatic frequency selection mechanism.
Channel width	The channel width value set in the "Radio" settings.

The right part contains real-time parameters values for local and remote device.

	Tx local device	Tx remote device
Tx power, dBm	0 (ATPC)	0 (manual)
MCS	BPSK 1/2 (0 auto)	1024-QAM-5/6 (11 auto)
Throughput, Mbps	0	0
Frames	496789	487335

	Rx local device		Rx remote device	
RSSI, dBm	-52	-50	-51	-55
EVM, dB	-39	-34	-26	-24

TX parameters:

- **Tx power, dBm** - transmit output power level for local and remote device. Automatic or manual if "Automatic transmit power control" is turned off.

- **MCS** - selected modulation coding scheme. Automatic or manual if "Automatic modulation control" is turned off.

- **Throughput, Mbps** – maximal available throughput at transmitter of local and remote device for selected MCS.

- **Frames** - frames amount transmitted since the last reboot.

RX parameters display values for both polarization:

- **RSSI, dBm** - the received signal level. Available values:

  - **-90...-80 dBm** - close to the receiver sensitivity level, only the lowest modulations are available.

  - **-80...-60 dBm** - average input range.

  - **-60...-40 dBm** - the recommended range for achieving best performance.

  - **>-40 dBm** - input signal level is too high.

- **EVM, dBm** – Error vector magnitude is an indicator of the measured input signal quality, telling how far are the received constellation symbols compared to the ideal symbols of the constellation. The parameter value must be as high as possible in absolute value. The recommended level should be less than -21 dB.

Link statistic

The link statistics window can be displayed by clicking "Statistics" button.

The "Link Availability" section displays the following information:

- The overall wireless link availability since the last device reboot, the number of wireless outages when the connection was unavailable.

- Availability statistics for each modulation, for downlink and uplink streams.

Link Availability   MCS Usage   ✕

Status	Current uptime	Total uptime	Availability	Disconnections	Last outage	Total outage
Connected	3d 22:58:35	3d 22:58:51	99.99528%	1	00:00:13	00:00:15

MCS		Rx	Tx
MCS 0	BPSK 1/2	99.99528%	99.99521%
MCS 1	QPSK 1/2	0.00000%	0.00000%
MCS 2	QPSK 3/4	0.00000%	0.00000%
MCS 3	16-QAM-1/2	0.00000%	0.00000%
MCS 4	16-QAM-3/4	0.00000%	0.00000%
MCS 5	64-QAM-2/3	0.00000%	0.00000%
MCS 6	64-QAM-3/4	0.00000%	0.00000%
MCS 7	64-QAM-5/6	0.00000%	0.00000%
MCS 8	256-QAM-3/4	0.00000%	0.00000%
MCS 9	256-QAM-5/6	0.00000%	0.00000%
MCS 10	1024-QAM-3/4	0.00000%	0.00000%
MCS 11	1024-QAM-5/6	0.00000%	0.00000%
MCS 12	4096-QAM-3/4	0.00000%	0.00000%
MCS 13	4096-QAM-5/6	0.00000%	0.00000%

The "MCS Usage" section displays amount of packets being transmitted on each modulation (bitrate) for downlink and uplink streams since the last reboot.

Link Availability   MCS Usage   ✕

MCS		Bitrate, kbps	Rx (packets)		Tx (packets)	
MCS 0	BPSK 1/2	17205	2006188	100.0%	1459549	100.0%
MCS 1	QPSK 1/2	34411	0	0.0%	0	0.0%
MCS 2	QPSK 3/4	51617	0	0.0%	0	0.0%
MCS 3	16-QAM-1/2	68823	0	0.0%	0	0.0%
MCS 4	16-QAM-3/4	103235	0	0.0%	0	0.0%
MCS 5	64-QAM-2/3	137647	0	0.0%	0	0.0%
MCS 6	64-QAM-3/4	154852	0	0.0%	0	0.0%
MCS 7	64-QAM-5/6	172058	0	0.0%	0	0.0%
MCS 8	256-QAM-3/4	206470	0	0.0%	0	0.0%
MCS 9	256-QAM-5/6	229411	0	0.0%	0	0.0%
MCS 10	1024-QAM-3/4	258088	0	0.0%	0	0.0%
MCS 11	1024-QAM-5/6	286764	0	0.0%	0	0.0%
MCS 12	4096-QAM-3/4	309705	0	0.0%	0	0.0%
MCS 13	4096-QAM-5/6	344117	0	0.0%	0	0.0%

Wired link status PRF

This section contains information about Pseudo Radio Interface status.

The top part describes prf-interface name, id and role, and the physical parent interface MAC-address. The bottom part describes parameters of joined interfaces (listed on the right side) and link uptime.

General settings

The "General" section allows to configure basic system parameters, described in the table below.

Device

These parameters are used for identification and link authorization.

Parameter	Description
Device Name	The arbitrary wireless unit name which will be used by network administrators for unit identification. It will be shown in Web GUI side panel.

SNTP

Starts the SNTP time synchronization service. For proper operation, specify the SNTP server time zone and the IP address first. By default, the SNTP service is disabled.

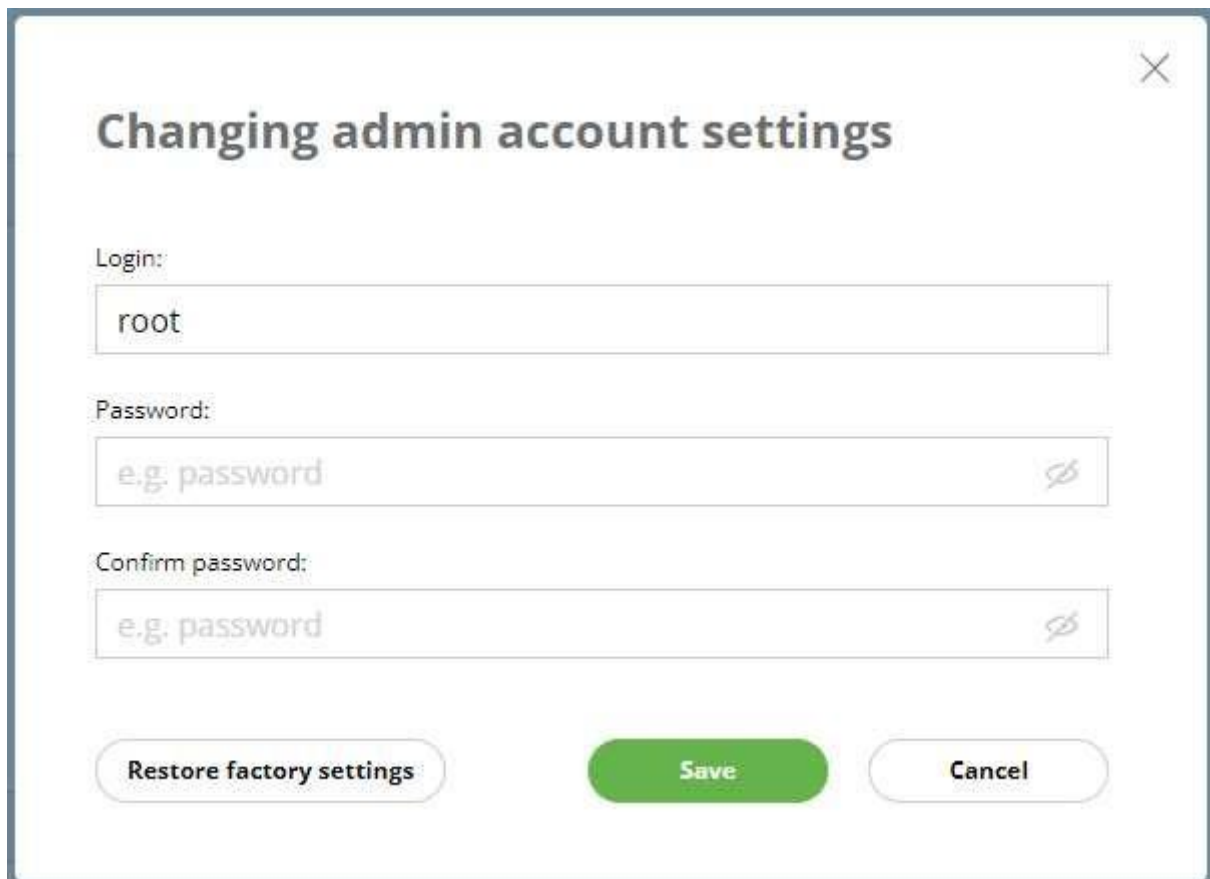| Parameter	Description
SNTP Server Address	The SNTP server IP address, the SNTP service will synchronize the time on the device with. The device must have network access to the SNTP server.
Time Zone	The time zone at the place of device installation. For example: GMT + 5.

Syslog

Allows to transmit syslog data to the server using the "syslog" protocol. Specify the syslog server address where data should be transmitted.

Security settings

The "Security settings" section allows to configure device access and security settings.

Administrator access

Here you may change system administrator account login and password, to change the identification data, click the "Change admin password" button. We strongly recommend you to set a login and password after the first login to the device.

Radius AAA

Here you may configure a device access control using a remote RADIUS server.

Parameter	Description
Address	Set the RADIUS server IP address.
Port	Set the RADIUS server port.
Password	Set the server password.

Command line interface

Allows to enable / disable remote device control by the command line using Telnet and SSH protocols.

SSH (Secure Shell) protocol provides secure remote control to network devices. Its functionality is similar to the Telnet protocol, but, unlike Telnet, SSH encodes all protocol messages, including transmitted passwords. By default, only access via Telnet is enabled.

Network access whitelist

This section is used to create a list of subnets from which access to the device will be allowed.

Network access whitelist

IP address	Subnet mask		
10.10.30.0	/	32	✏ 🗑
10.10.40.0	/	32	✏ 🗑

+ Add subnet

Radio Settings

Link Settings

Parameter	Description
Link ID	Wireless link identificator used to avoid connecting a unit to a wrong peer if there are several co-located units using the same center frequency. Specify different ID values for different links. Both ends of the same link must have the same ID.
Center frequency	Set the radio interface frequency (in MHz). Must be the same at both ends of the link.
Channel Width	Set the bandwidth of the radio interface in MHz. Must be the same at both ends of the link.

Link Settings

Link-id:

123

Center frequency, MHz:

4940

Channel width, MHz:

80

Power Settings

EIRP value is displayed in the right part of the section and represents the total system power calculated as: Tx Power + Antenna gain + Cable loss (should be specified in the fields below).

64

Parameter	Description
Power limit	Set the output power of the radio interface in dBm. Available values 0...27 dBm.
Cable loss	In case of external antenna usage, energy fading on cables should be set in accordance to the cable datasheet, in dB.
Antenna gain	In case of external antenna usage, it's gain should be set manually in dBi.
Automatic transmission power control (ATPC)	ATPC allows to control transmitter output power automatically based on target RSSI value. If actual RSSI level is lower then unit increases transmitter output power of the remote unit and vice versa. ATPC could not set value that may exceed the "Power limit" value. We highly recommend to always keep it turned on.
Target RSSI	RSSI value in dBm will be used by ATPC of remote device as target. Optimal values -60...-40 dBm.

Power Settings   EIRP: 30 dBm

Power limit, dBm:

4

Cable loss, dB:

0

Antenna gain, dBi:

26

Automatic transmission power control (ATPC):

Target RSSI, dBm:

-66

Modulation Settings

Parameter	Description
Automatic modulation control (AMC)	Modulation control algorithm selects the most appropriate modulation-coding scheme at each direction in order to maximize the link performance. By default, it is turned on (it is strongly recommended to remains "on").
Modulation limit	Set the maximum operating modulation scheme of the radio interface. Acts as a top limit for the modulation if the Autobitrate mechanism is turned on.

Automatic modulation control (AMC):

Modulation limit:

QAM1024 5/6

Frequency Grid

The frequency grid allows to limit the scan range in case the center frequency is automatically selected. Also Instant DFS will use these restrictions when monitoring the noise situation. Narrow grid of available frequencies speeds up scanning and link establishing process. Manual center frequency selection will also be limited to the values indicated in the grid. The frequency adjustment step is 1 MHz.

Frequency Grid ⓘ

Channel Bandwidth, MHz	Hardware Frequency Range, MHz	User Frequency Grid, MHz		
20	4900-6100	4900-5920/10	✏️	🗑️
40	4900-6100	4900-5920/10	✏️	🗑️
80	4900-6100	4900-5920/10	✏️	🗑️
160	4900-6100	4900-6100/10	✏️	🗑️

+ Add

Switch settings

Network interface

In the "Network Settings" section, there are displayed all physical and logical network interfaces that are already configured. The physical interfaces (eth0 and rf0) are set by default and they cannot be removed. For these two interfaces, you are allowed to change the parameters only.

Following layer 2 and 3 logical interfaces can be created with certain parameters by clicking "Add interface" button:

- **"VLAN"** can be assigned to a physical interface or to a virtual interface sviX. It is used for the creation of the logical network topology regardless of the physical topology of this network. VLAN allows creating groups of interfaces which have a common set of requirements. It contributes to reducing the multicast traffic in the network, as every VLAN is a separate multicast domain. VLAN usage increases the network security and manageability;

- **"SVI"**, Switch Virtual Interface is an L3 interface that can be assigned to a switching group for getting access to the unit management via this switching group. This interface becomes part of this switching group and can participate in the exchange of information with other group members so that any packets received by the group (according to its rules), or addressed to the sviX directly, or copies of multicast/broadcast packets, will be received by the unit through the "*sviX*". This interface allows getting the remote access to the unit management. It is also used for the Management VLAN configuration;

- **"PRF"** – Pseudo Radio Interface can be attached to the Ethernet interface in order to allow it to work as a radio interface using the MINT protocol, so that the node can find its neighbors and establish the links with them through this interface. The interface encapsulates MINT-frames into the Ethernet-frames and allows connecting the units of the MINT network using wired interfaces. Also, this interface can be joined with other MINT-interfaces;

- **"*LAG*"** can be assign to two physical interfaces in order to use them as one logical interface for total throughput increasing and system reliability improving. The total throughput of the logical channel represents the sum of the capabilities of associated physical interfaces. In case of failure of any physical channel included in the logical channel, the system will continue to operate, using the rest operable physical channels. Interface allows creating high speed links (between the unit and the network switch, for example) by means of aggregation of the two available Ethernet-interfaces of the unit;

Active interfaces are marked with black color, disabled interfaces are displayed with pale overlay, each network interface can be enabled/disabled with check box below it's name. To apply changes to a specific interface, click the tick sign or cross sign to roll back changes.

Following parameters can be configured for each interface:

Ethernet (ethX)

- **X** - interface number is set by default and can not be changed.
- **IP address** - IP-address and network mask can be set manually or be obtained automatically via DHCP. The IP address(es) of the "*ethX*" interface is accessible via Ethernet LAN segment only (it won't be accessible via the "*rfX*" interface from other neighbor unit).
- **Description** - set the arbitrary interface description (up to 72 characters).
- **Mode** - set the interface mode (for example: 1000Base-TX-fullduplex):
  - The default value is "*Auto*" (recommended)
  - Optical SFP modules may not work properly in auto-negotiation mode with some devices. In case of troubles with data transmission via the SFP port, it is recommended to set a fixed speed and duplex mode (for example, 1000BaseTX-fullduplex-manual).
  - Make sure the same duplex mode is set on both devices.

Radio interface (rfX)