Troubleshooting

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This lesson describes basic troubleshooting actions to be taken in case a problem occurs to the wireless link.

List of possible problems:

- 1.No access to the local unit
- 2. Wireless link is not established
- 3. The wireless link is established, but there is no access to the remote device
- 4. The wireless link throughput is lower than expected
- 5. Common errors in configuration

1.No access to the local unit

Checking the network infrastructure

Make sure there is connectivity between the control center and the device installation point. If the access is missing only to the Infinet device, further verification must be performed at the installation site.

LED indication

Check the power supply to the device. The "POWER" indicator has three possible colors:

- Red light - the device is connected to the electricity mains,
- Yellow light - a wired connection with a speed of 10/100 Mbps
- Green light - a wired connection with a speed of 1000 Mbps.

Other indicators are used to perform coarse antenna alignment. The more indicators are on, the better wireless connection is established. The blinking indicator means an intermediate state.

If there is no power, it is necessary to check the power supply, connectors, the Ethernet cables integrity.

Received Signal Level Indicator
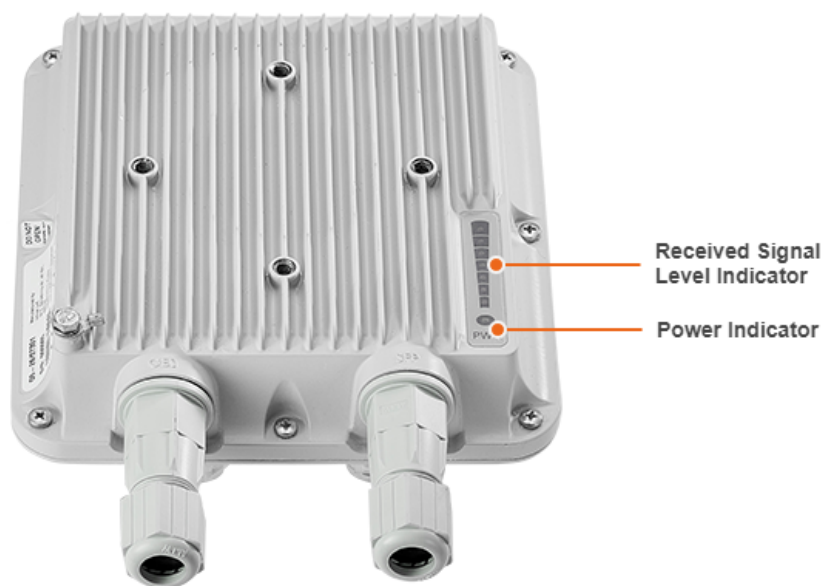
Power Indicator

Access to the unit recovery

If the power indicator is on and there is connection via the Ethernet interface, connect to the device directly as it is shown in the scheme below. Make sure that the IP address of the PC is in the same subnet as the IP address of the device. You can restore the IP address and reset the device to the factory settings using the ERConsole utility.

Ethernet

L3 traffic
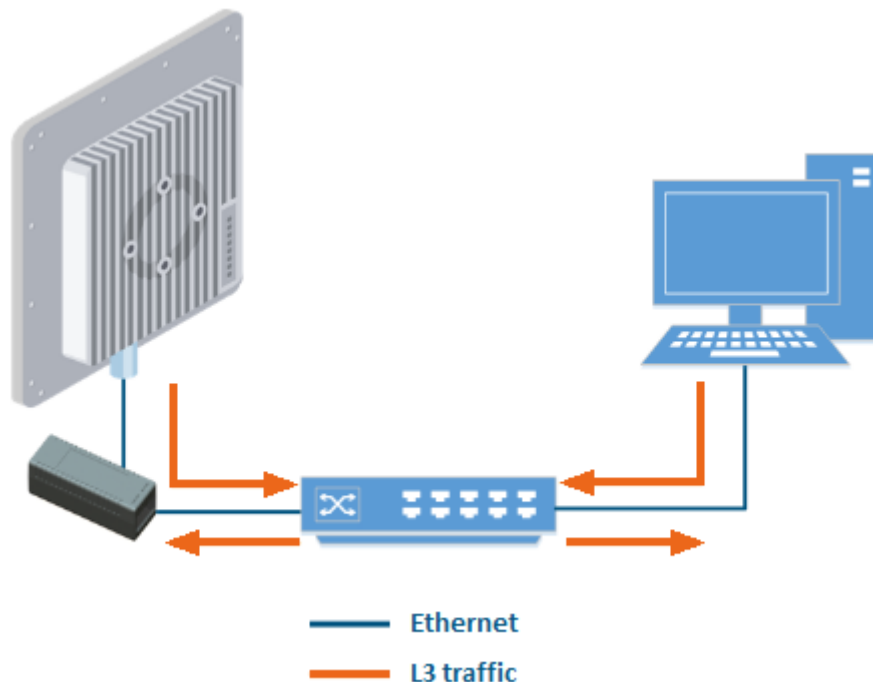
Before starting the access restoring procedure, it is recommended to install the following software:

- ERConsole: https://ftp.infinet.ru/pub/Utils/EmergenceRepairConsole/ERConsole.zip.
- Java Runtime Environment: http://www.java.com/en/download/.

Turn off any anti-virus or firewall running on your computer. If no device can be discovered by ERConsole, turn on the firewall, and add an UDP connection port 10009 as an exception .

Use a simple unmanaged switch as intermediary device between your PC and the **Infinet** unit. It is essential to reboot the InfiNet unit each time in order to activate the Emergency Repair Protocol on the unit, therefore the switch would prevent your PC Ethernet interface from flapping up and down. Using Cisco Catalyst switches for unit recovery is not recommended due to a known issue port mode negotiation delay.

IP address should be configured on the PC for the ERConsole utility work.

> ⚠ **NOTE**
>
> ERConsole and Infinet Wireless units exchange information only during the bootup process, therefore each time you need to read the units IP-address, to add a new IP-address or to restore to the default configuration, the Infinet Wireless unit should be rebooted.

Access recovery

Follow the steps below to recovery access to the device:

- Run the ERConsole application.
- Turn off the Infinet Wireless unit by removing ethernet cable from power supply unit and then turn it on in a few seconds.
- Wait for 30 seconds until the ERConsole receive information from the device. The Serial number, number of device reset cycles ("*Sequence*" field), IP-address, network mask and MAC-adress will be displayed on the screen.

If an IP-address is assigned to the device, configure an IP-address belonging to the same network on your laptop and connect to the unit.

IP-address assigning

To assign new IP address make the following steps:

- Click the «**+**» button in the ERConsole application and a new window will appear.
- Set the additional IP-address and network mask, then click "OK".
- Turn off and on the Infinet unit. Wait for about 30 seconds until the "Complete" sign will uppear.
- Add an IP-address from the same network subnet to your PC and access the unit. Note that ERConsole will not show newly assigned IP-address.
- Login to the unit using the new IP-address. Do not reboot the unit now because the IP-address added by ERConsole is temporar and will be removed by saving new configuration.

Factory settings restore

To restore the device to the factory default settings, follow the steps below.

> ⚠ **NOTE**
>
> If the management of the unit is lost due to unknown user name or password it can be restored using factory password. Put an serial number of device in the "User name" field and factory password in the "Password" field.

- Get the factory password by sending a request to the your distributor or to the Infinet technical support service if the device was purchased directly. In the request, specify the serial number and the "Sequence" parameter value (if the value is not zero).
- Obtain the IP-address of the unit using the ERConsole as described in the section above.
- Click on the «+» button in the ERConsole application and a new window will appear.
- Select "Reset configuration" option and enter the Factory Password obtained at the previous step in the "Factory password" field, then click «OK». The password must be entered the same format as it has been got it from the distributor or IW support (with the gaps)..
- Turn off and on the device and then wait for about 30 seconds until the "Complete" sign will uppear.
- The unit will start in special emergency mode with the IP-address 10.10.10.1 and mask 255.255.255.0.
- Login to the unit and use "Restore Factory Settings" button on the "Maintenance" page to switch off emergency mode.
- Set new login and password, then save the configuration and restart the unit.

Checking the wired interface state

If you were able to access the device by connecting directly, try to determine the possible reason for the unavailability through the network. Pay attention to the wired interface statistics.
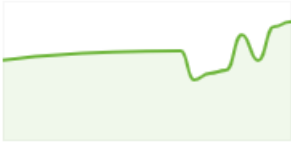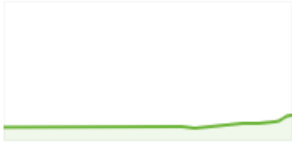
Title

In the "Wired interface" section, you can monitor the wired interface status and its traffic load for reception and transmission. The wired interface statistics is on the right side and can be reset by clicking the "Clear counters" button. Pay attention to the FCS errors number which indicate a violation of data integrity during transmission over the wired segment. Also, the problem can be caused by a queue (port) overflow or inappropriate frame size (runt and oversize).

> ⚠️ **NOTE**
>
> The FCS errors counter can increase due to the following reasons:
>
> - The device connection is performed using inappropriate cable. We strongly recommend to use FTP Cat5e cable with outside diameter not exceed 7 mm.
> - A shielded RJ-45 connector is used from the outdoor unit side. Make sure RJ-45 connectors are installed in the correct order. The shielded connector must be installed on the power supply side, the standard RJ-45 must be installed on the wireless device end.
> - The device is grounded incorrectly, make sure the device installation complies with the recommendations specified in the "Grounding and Lightning Protection" article.

Pay attention to the duplex mode on the network devices connected to the wireless bridge. The duplex mode can be changed in the "Switch" - "Network Ports" section. We recommend setting the autonegotiation mode provided by the Ethernet standard. The problem can occur while connecting two devices with different duplex settings. For example, if one device has the autonegotiation mode, and the other - fixed full duplex mode.

Network ports

Port	Status	Duplex	Description	
ge0	Enabled	auto		✏

QoS:

Edit network port ge0

Status: 🟢

Duplex:

auto ▲

VLAN based switching

auto

Enabled:

10BaseT-halfduplex

10BaseT-halfduplex-manual

VLAN ID	Description	10BaseT-fullduplex

10BaseT-fullduplex-manual

| 1 | default | 100BaseTX-halfduplex | ✏ ✕ |

100BaseTX-halfduplex-manual

Add VLAN

100BaseTX-fullduplex

100BaseTX-fullduplex-manual

1000BaseTX-fullduplex

1000BaseTX-fullduplex-manual

2. Wireless link is not established
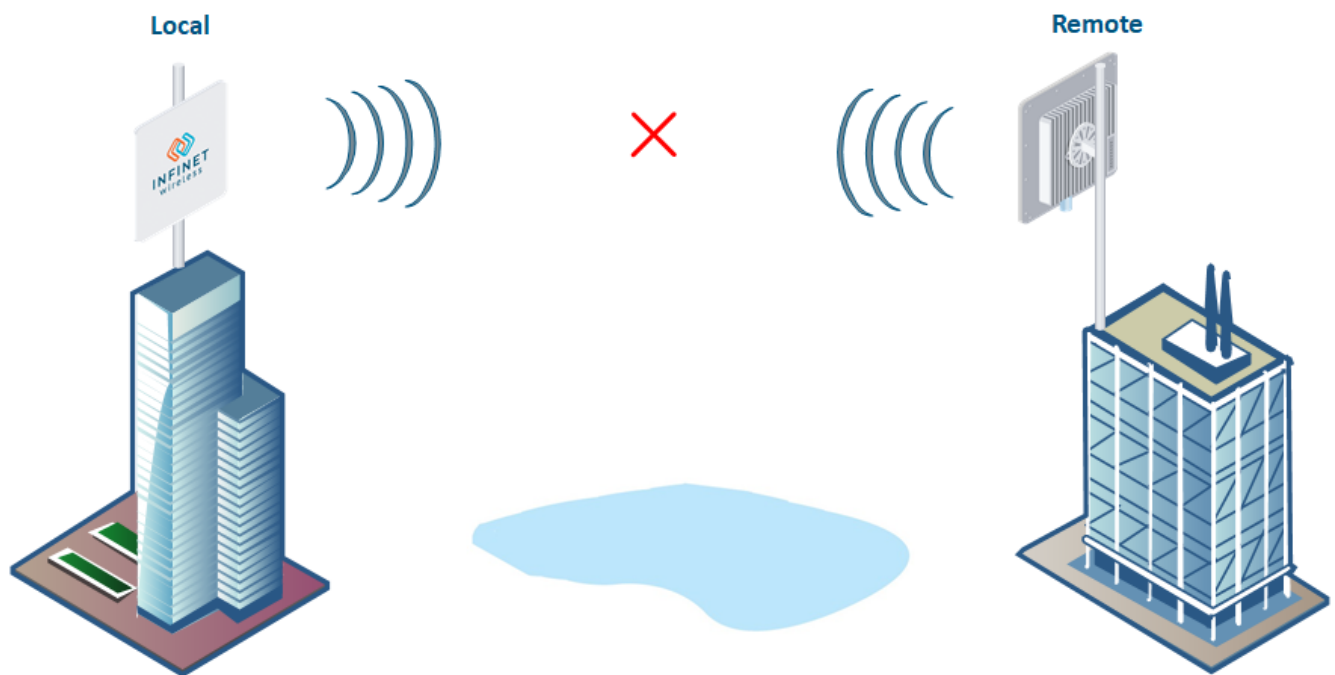
Pre-configuration in the lab

Before installing the devices on site, we recommend to configure the basic parameters in the lab and to make sure that the link is establishing. Step-by-step instructions for a wireless link configuration are given in the Link Pre-configuration in the lab article.

> ⚠️ **NOTE**
>
> During the configuration of the devices in a lab, take into account the following requirements:
>
> - Make sure that the devices are not directed at each other in order to prevent the damage of the radio modules. It is recommended to place the devices at a distance from each other, with the antennas directed to the floor.
> - The minimum transmit output power must be set on the devices.
> - In case of using two devices with "E" index, it is recommended to connect them directly using RF cables and RF attenuators with an attenuation of at least 40 dB for each polarization (the installation\deinstallation of the RF attenuators and of the RF cables should only be performed when the devices are switched off).
> - The failure or damage of the device's radio module in case of disregarding these requirements is not covered by warranty.

Checking the radio parameters

If the wireless link is not establishing in lab conditions, make sure that the radio parameters are set to the values determined during the planning stage. The correct configuration of the device can be obtained using the Configuration Generator tool found on the IW Academy website. To establish a wireless link, one device must be configured as Master, the second (or all subscribers of the base station in the point-to-multipoint topology) as Slave. The following parameters must be identical on both devices:

- Channel Width.
- Frequency.
- Frame length.
- Access key.

Checking the firmware version

In the "Maintenance" section, make sure that the same firmware version is installed on both devices. The latest software versions can be downloaded from the official FTP server.

Checking the installation requirements

Check if the suspension height, azimuth and elevation of the antenna match with the values obtained from InfiPLANNER. Make sure that the obstacles on the path profile are not higher than those specified during the planning phase.

Alignment Data

((•)) Site G

Latitude: 43.2538611131

Longitude: 42.4993906081

Antenna height: 15 m

Antenna tilt angle: 15.39°

Bearing: 336.10°

Magnetic bearing: 328.78°

Magnetic declination: 7.31°

Interference: -83 dBm

Temperature: 0 °C

((•)) Site H

Latitude: 43.3452483968

Longitude: 42.4436864915

Antenna height: 15 m

Antenna tilt angle: -15.47°

Bearing: 156.10°

Magnetic bearing: 148.76°

Magnetic declination: 7.34°

Interference: -82 dBm

Temperature: -27 °C

Interference detection

Using the built-in Spectrum Analyzer tool, scan the air on both sides of the link to make sure there is no interference that could corrupt the signal on the device's operating frequency and on the adjacent frequencies. To get accurate information about the frequency, hover the mouse cursor over it. The pop-up window below provides information about frequency, maximum signal level, average signal level. The indicators show the signal level in dBm. For operation at the highest modulations, the RSSI parameter value should be in the range of -60 ...- 40 dBm. To get the spectrum scanning results on the remote device, use the "Last snapshot" button.

Start frequency, MHz:	5470	Estimated scan time:	28 s
End frequency, MHz:	5725	Last scanning:	1/2/1988, 2:24:33 AM
Scan step, MHz:	1		
Channel width, MHz:	5		Start scanning
Scan duration:	Brief		Last snapshot

Polarization: Both Vertical Horizontal
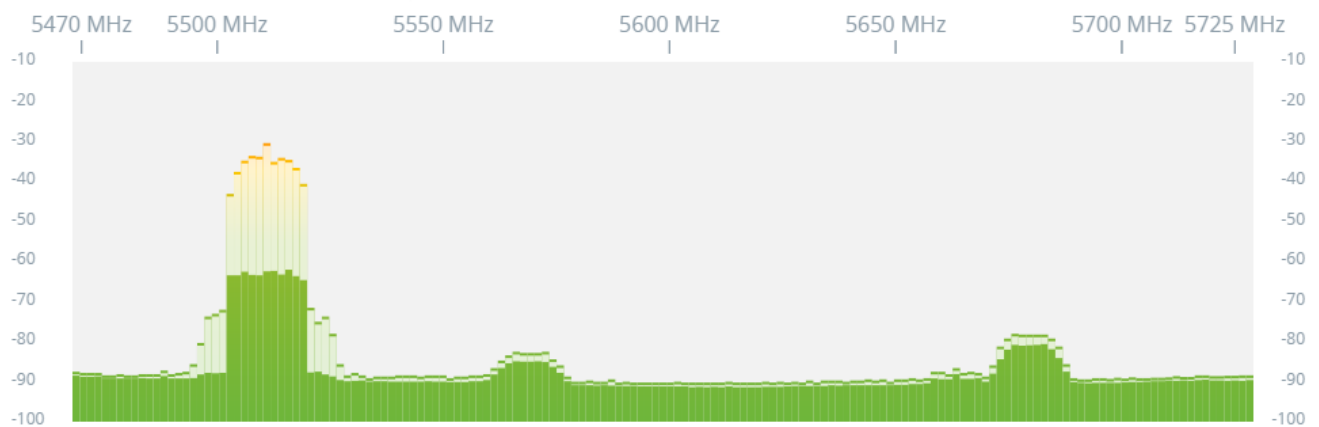
3. The wireless link is established, but there is no access to the remote device

Checking the switch settings on the local device

In the "Switch" section of the web interface, make sure the VLAN-based switching settings are configured in accordance with the network architecture. Make sure the connectivity between the "ge0" and "radio" interfaces is enabled.
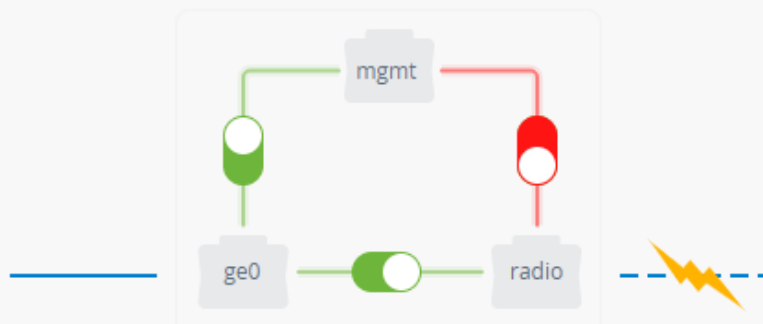
VLAN based switching

Enabled:

VLAN ID	Description	Priority	ge0	radio	mgmt		
1	default		off	off	off	✏	✕
100			tagged	tagged	tagged	✏	🗑
200-400			tagged	tagged	off	✏	🗑

Add VLAN

Connectivity matrix

Checking the switch settings on the remote device

Further diagnostics should be performed at the device installation site. Try to access the device directly using the ERConsole utility.

When accessing the web interface, in the "Switch" section, make sure the VLAN-based switching settings are configured in accordance with the network architecture. Make sure the connectivity between the "ge0", "radio" and "mgmt" interfaces is enabled in a connectivity matrix.

In the "Network" section, make sure the correct VLAN ID is assigned to the management IP address and the default gateway is configured in accordance with network architecture.

Network interface

IP address	Subnet mask	VLAN ID	DHCP		
192.168.98.17	/ 24	100	Disabled	✏	✕

+ Add IP address

Default gateway: 192.168.98.1

4. The wireless link throughput is lower than expected

The wireless link indicators

Go to the web interface of both devices, check the new firmware version availability. Update the firmware if available.

Check the EVM and RSSI parameters values in the dashboard section:

- If the value of the RSSI parameter remains high while the CINR value decreases, it may indicate high interference levels near one of the devices. Use the "Spectrum analyzer" utility built into the web interface to determine the interference level on the current channel and select a new frequency channel.
- The deterioration of both the RSSI and the CINR parameters can indicate a misalignment of the devices. Check the antennas alignment, the RF cables condition and the obstacles in the first Fresnel zone.

Proceed to the "Radio" section and check the following settings:

- The frame length value, if it is too small try to increase it;
- Power limit, increase the value, make sure Automatic Transmit Power Control is enabled, target RSSI value matches expected values.

Perform an antenna alignment using the built-in utility, especially in case the RSSI and EVM values are low.

MCS				EVM, dB			
Downlink ⊕	Downlink ⊕	Uplink ⊕	Uplink ⊕	Downlink ⊕	Downlink ⊕	Uplink ⊕	Uplink ⊕
stream 0 13	stream 1 10	stream 0 13	stream 1 13	stream 0	stream 1	stream 0	stream 1
256-QAM-7/8	64-QAM-5/6	256-QAM-7/8	256-QAM-7/8	-29,1	-28,5	-28,9	-30
Clear AMC statistics							

RSSI, dBm				ARQ		Frame loss	
Downlink ⊕	Downlink ⊕	Uplink ⊕	Uplink ⊕	Downlink ⊕	Uplink ⊕	Downlink ⊕	Uplink ⊕
stream 0	stream 1	stream 0	stream 1				
-55,1	-55	-55,3	-55,3	0,0e+0 (0,0%)	0,0e+0 (0,0%)	2,0e-6 (0,0%)	9,7e-6 (0,0%)
				Clear counters		310	1479

Availability statistics

To analyze the wireless link availability time, proceed to the corresponding statistics in the "Dashboard" - "Availability statistics" of web interface. The opened window displays the link operation statistics for each modulation.

Link Availability Statistics

Status	Current uptime	Total uptime	Availability	Disconnection	Last outage	Total outage
Connected	4d 11:55:04	5d 22:43:50	100%	6	00:00:07	00:04:16

MCS Availability Statistics, %

Modulation	TX, Stream 0	TX, Stream 1	RX, Stream 0	RX, Stream 1
QPSK-1/4	99,9	99,9	99,9	99,9
QPSK-1/3	99,9	99,9	99,9	99,9
QPSK-1/2	99,9	99,9	99,9	99,9
QPSK-5/8	99,9	99,9	99,9	99,9
QPSK-3/4	99,9	99,9	99,9	99,9
16-QAM-1/2	99,9	99,9	99,9	99,9
16-QAM-5/8	99,9	94,8	99,9	99,9
16-QAM-3/4	99,9	94,7	96,5	99,9

5. Common errors in configuration

Automatic transmit power control

Enable the automatic transmit power control (ATPC) in order to increase the operational life of the devices. Set the "Target RSSI" parameter to values from -40 to -60 dBm.

Automatic modulation and transmit power control

AMC strategy:	Normal ▾
Automatic transmit power control:	⬤
Target RSSI, dBm:	-55

Frame length

Make sure the selected frame size ensures the best performance for your wireless system. A short frame will transmit less payload than a long one, however it ensures a smaller delay.