MikroTik RouterOS Wireless and LTE features overview

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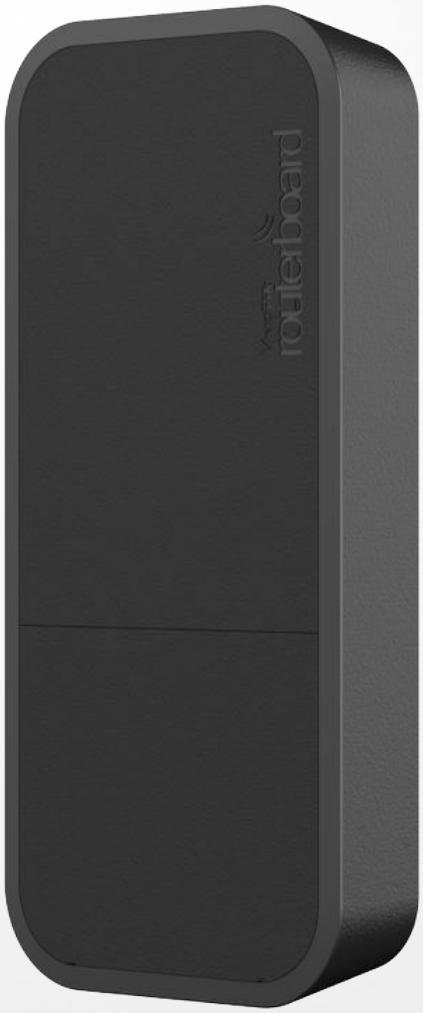
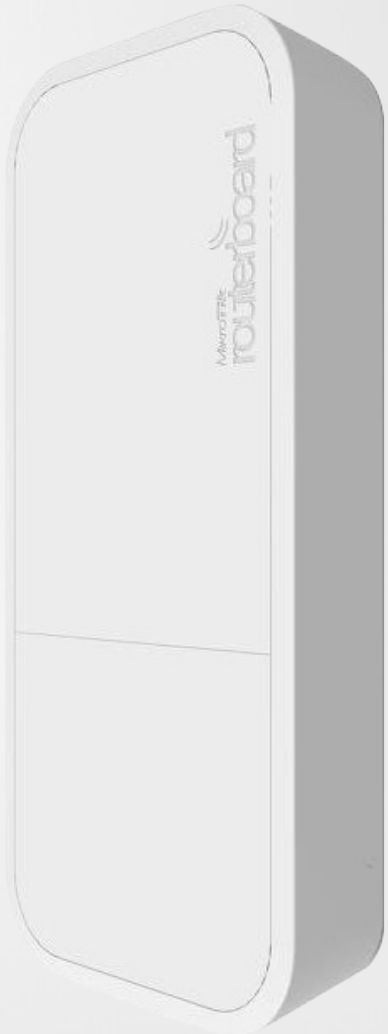
Overview

- RouterBOARD wAP
- Wireless quick guide
- New Wireless (wireless-rep) package
- LTE Interface and “wAP LTE kit”

wAP

Black and White edition





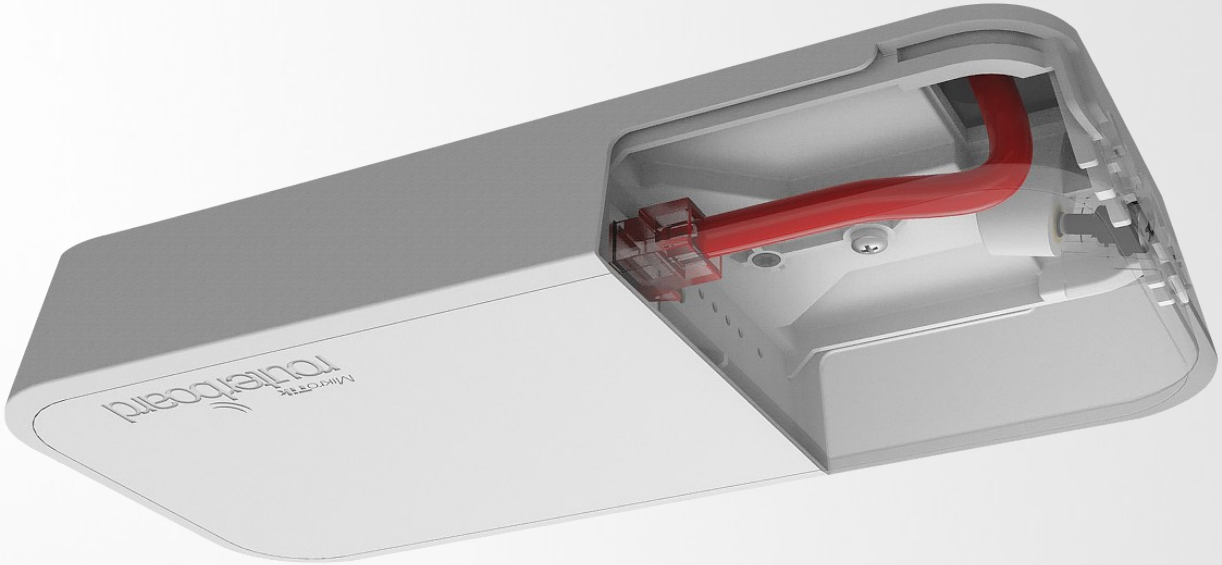
Features

- 2 chain Wireless radio
- Jack and PoE power option
- Wide power input range (11-57V)
- Supports 802.3af/at and Passive PoE
- Low Power Consumption
- High Operating Temperatures
- Suitable for indoor and outdoor
- Waterproof case design

Specification

- CPU 650 MHz
- RAM 64 MB
- Flash 16 MB
- Wireless 802.11b/g/n dual-chain
- Gain 2dBi antennas
- Ethernet 10/100Mbps
- Voltage 11-57V
- Consumption up to 4W
- Operating Temperatures -40C to +70C
- Dimensions 185 x 85 x 30 mm

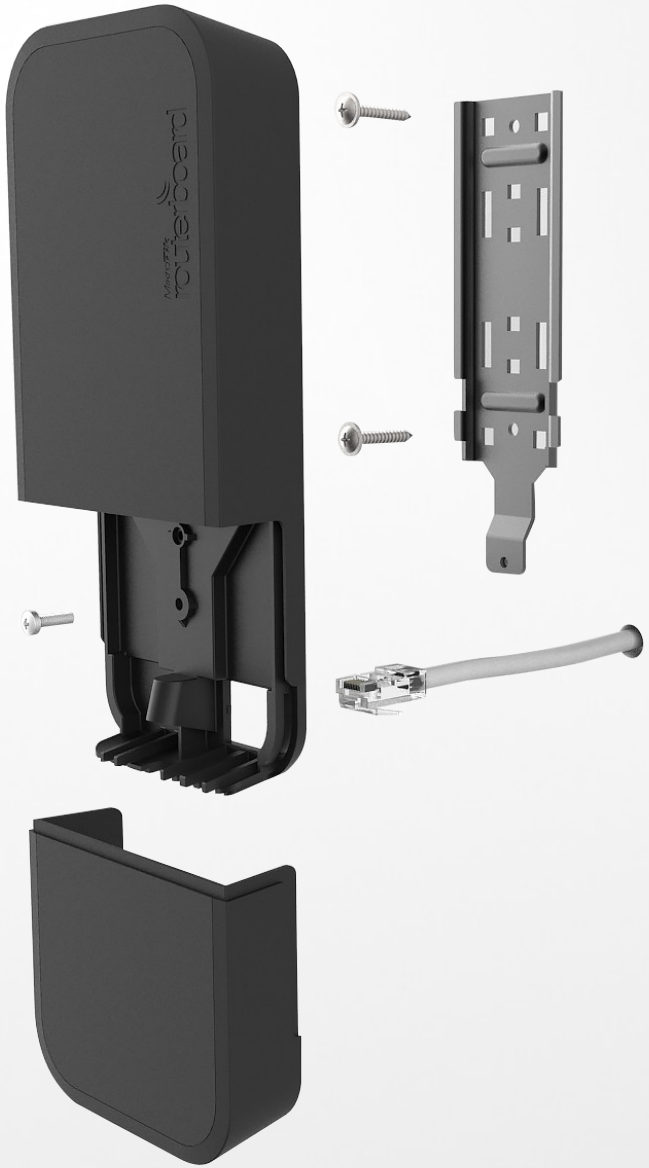
Usage Cases



Use it on the ceiling!

- The wAP comes bundled with all the necessary things to be mounted on ceiling
- Cable breakout provides ability to run cable through the ceiling

Usage Cases



Use it on the wall!

- Wall mounting is easy thanks to the provided drill template and screw anchor. Everything included

New wAP ac

- CPU 720 MHz
- RAM 64 MB
- Flash 16 MB
- Wireless 802.11b/g/n dual-chain
- Wireless 802.11a/n/ac triple-chain
- Gain 2dBi antennas
- Ethernet 10/100/1000Mbps
- Voltage 11-57V
- Consumption up to 12W
- Operating Temperatures -40C to +50C
- Dimensions 185 x 85 x 30 mm

Wireless quick guide

Frequency limitations

regulatory-domain – Limit available channels and maximum transmit power for each channel according to the country limitations

manual-txpower – Use frequency limitations by country, without limiting the maximum transmit power

superchannel – Allow all frequencies supported by the card

lock specific frequencies – Request factory installed lock package, to allow use of only specific wireless frequencies

Wireless usage

PTP (Creates a connection between 2 points)

- PTP devices use **directional** antennas to send signal to narrow beam

PTMP (Allows multiple clients to establish connection)

Sector

- Uses **semi-directional** antenna to cover a specific range with signal, also called sector antenna

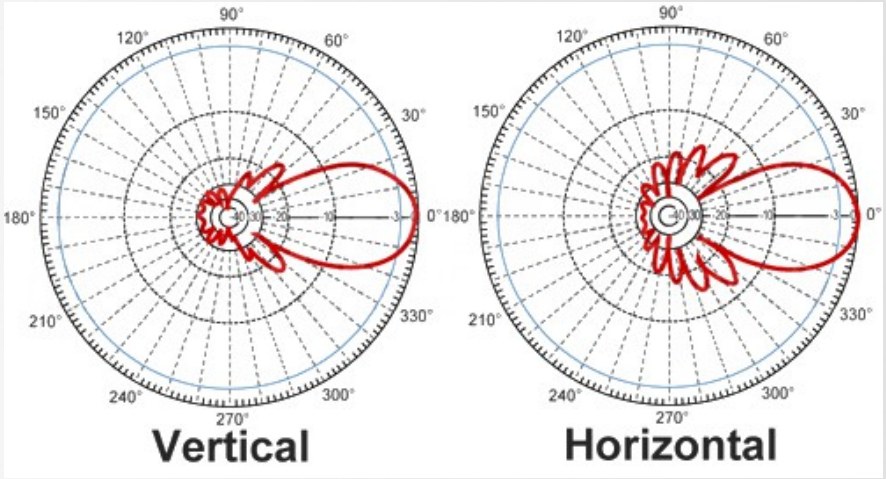
Regular (omni)

- Uses **omni-directional** antenna
- Allows clients to connect from all directions

Directional antenna

Used for PTP links

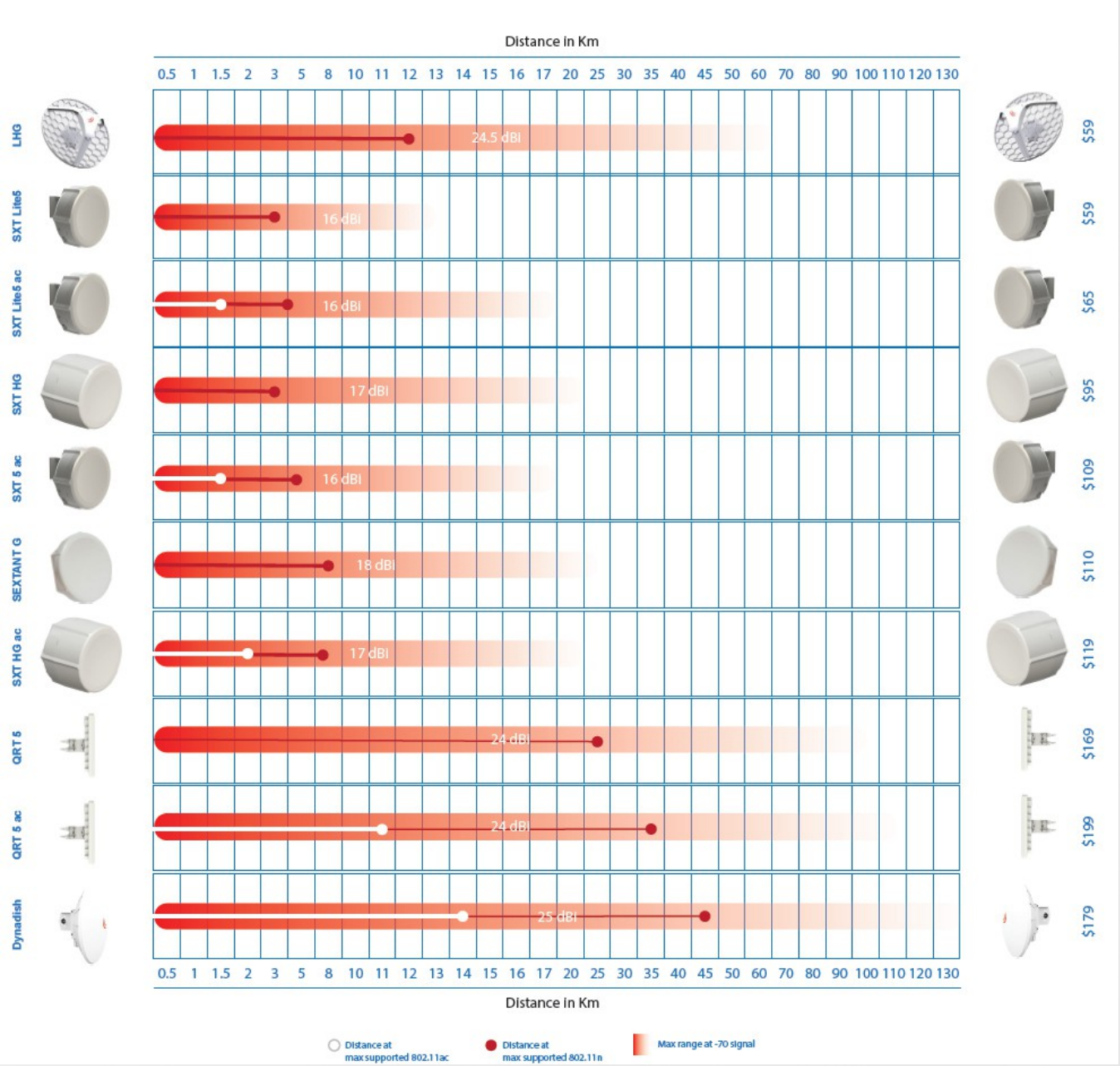
- Focused beam
- Increased antenna gain
- Extended distance
- Reduced interference



MikroTik PTP devices: DynaDish, LHG, SXT, QRT, Sextant

MikroTik PTP antenna: mANT – parabolic dish antenna
mANT can be used with: NetMetal, BaseBox, NetBox or any other RP-SMA connector compatible device

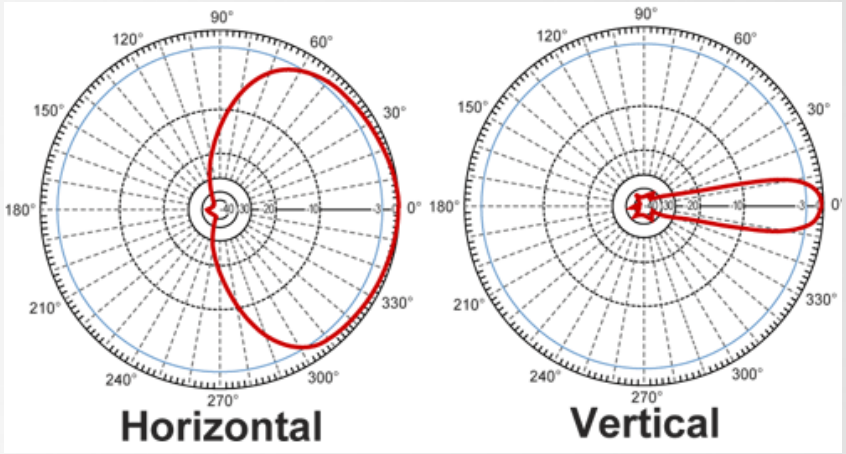
Choose by distance



Sector antenna

Used for PTMP links

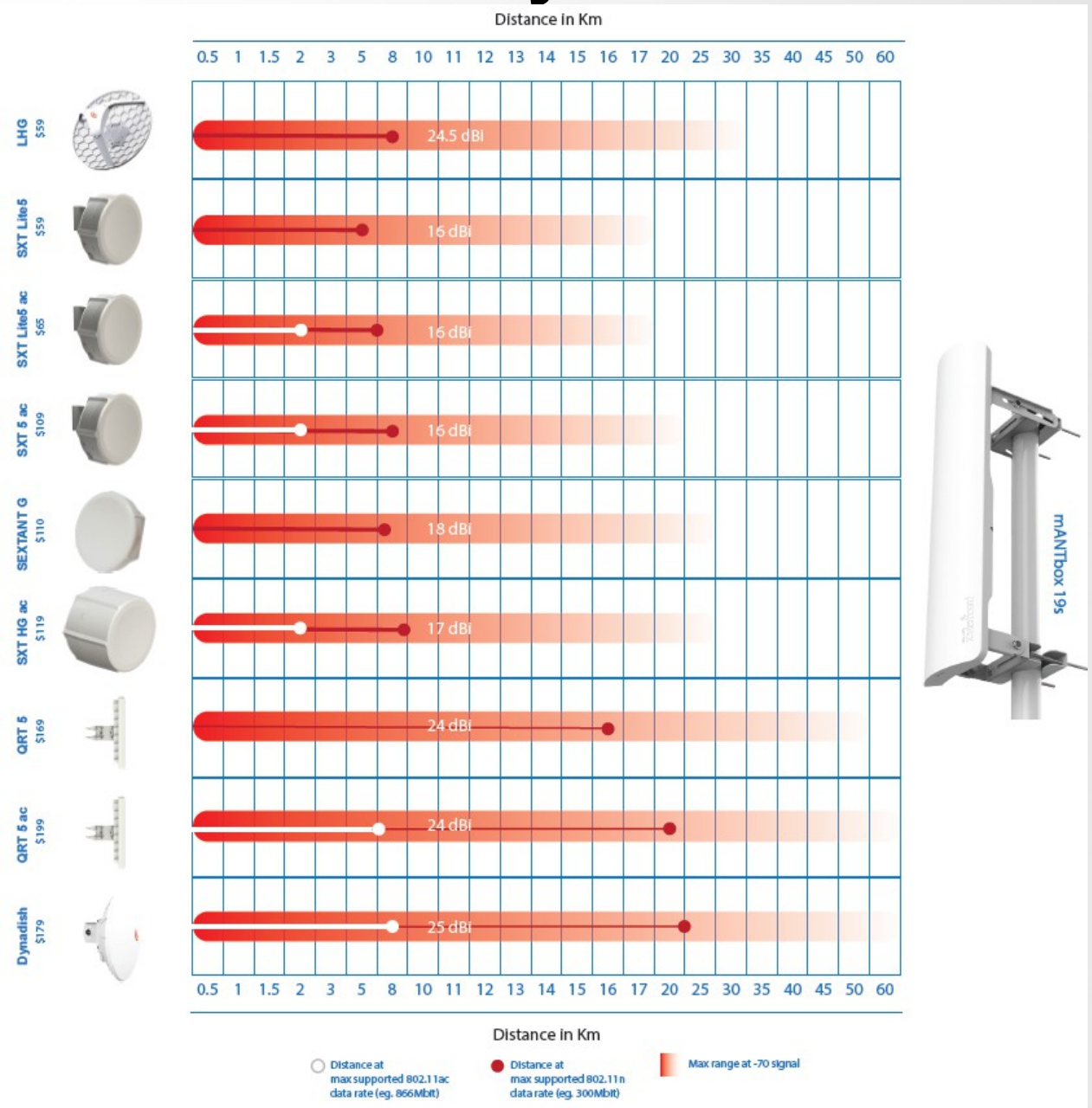
- Specific angle
- Covers large area
- Allows multiple clients
- Lower interference



MikroTik PTMP devices: SXT SA5, SXT SA5 ac, mANTBox 15s/19s

Mikrotik PTMP antenna: mANT 15s/19s – sector antenna
mANT can be used with: NetMetal, BaseBox, NetBox or any other RP-SMA connector compatible device

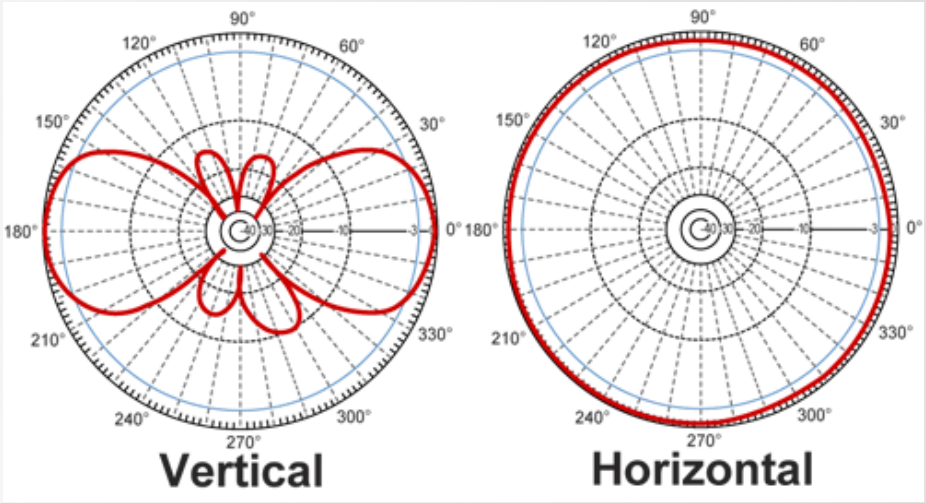
Choose by distance



Omni antenna

Used to cover 360 degrees

- Receives and transmits signals to all directions
- Do not need to be pointed
- Allows multiple clients



MikroTik industrial omni devices: RB Groove, RB Metal, OmniTIK

MikroTik home/office wireless devices are equipped with omni antennas

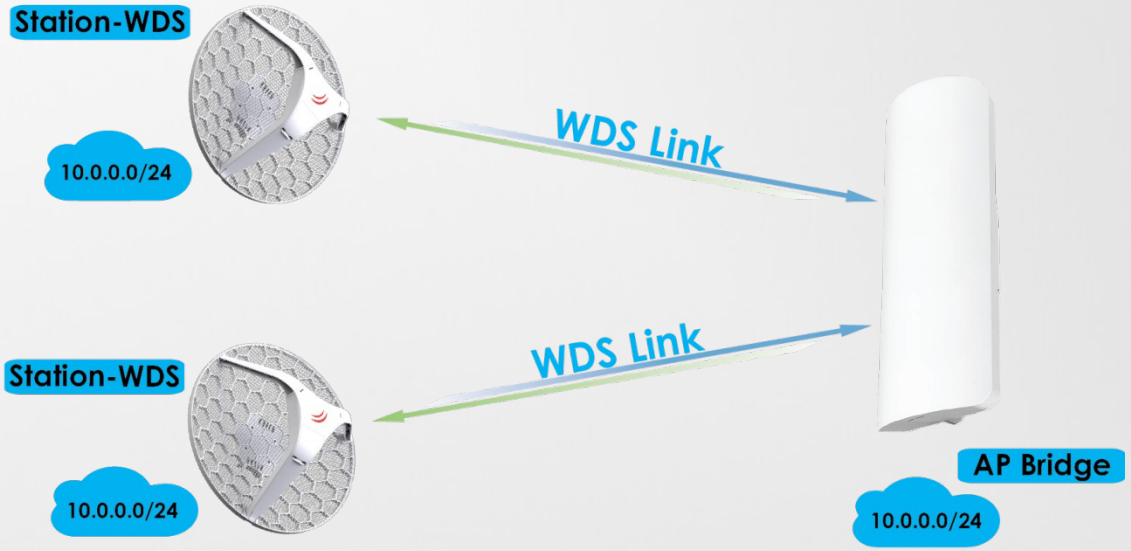
RouterBOARD: any wireless device with attached omni antenna

Wireless **station** modes

Station

Station-bridge

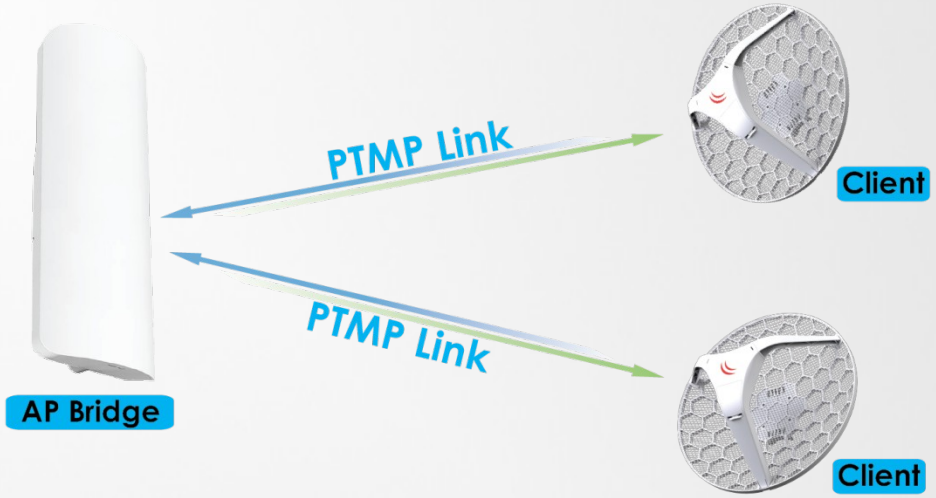
Station-WDS



Wireless **AP** modes

Bridge

AP-Bridge



WDS-Slave

Wireless modes

AP modes:

- AP-bridge (Requires at least level 4 license)
- bridge (Requires at least level 3 license)

Station modes:

- Requires at least level 3 license

Router as station

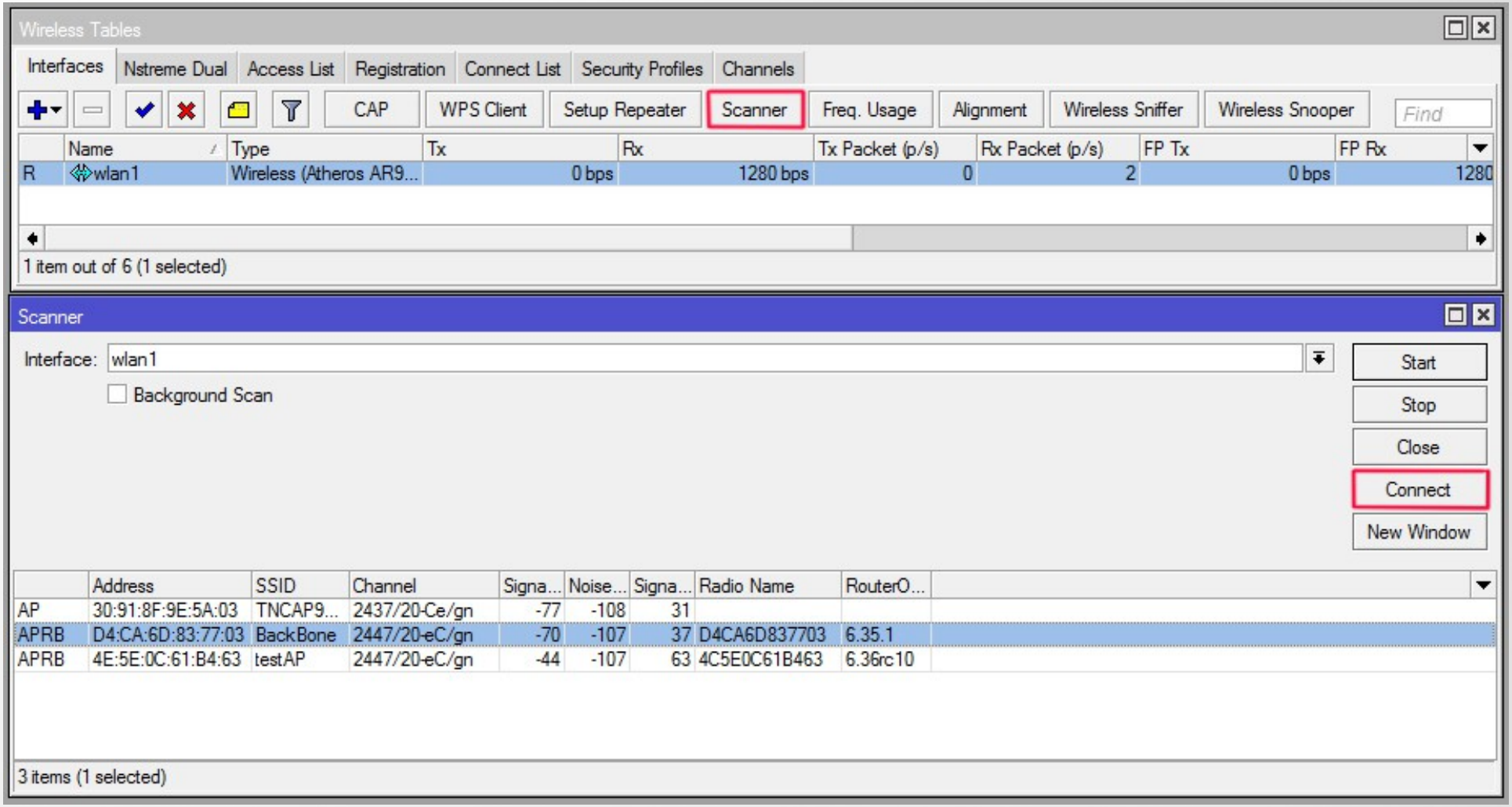
Configure wireless settings manually to connect to any access point.

- Configure security profiles (authentication-type, mode, key)
- Configure wireless settings (station mode,frequency, band, SSID)

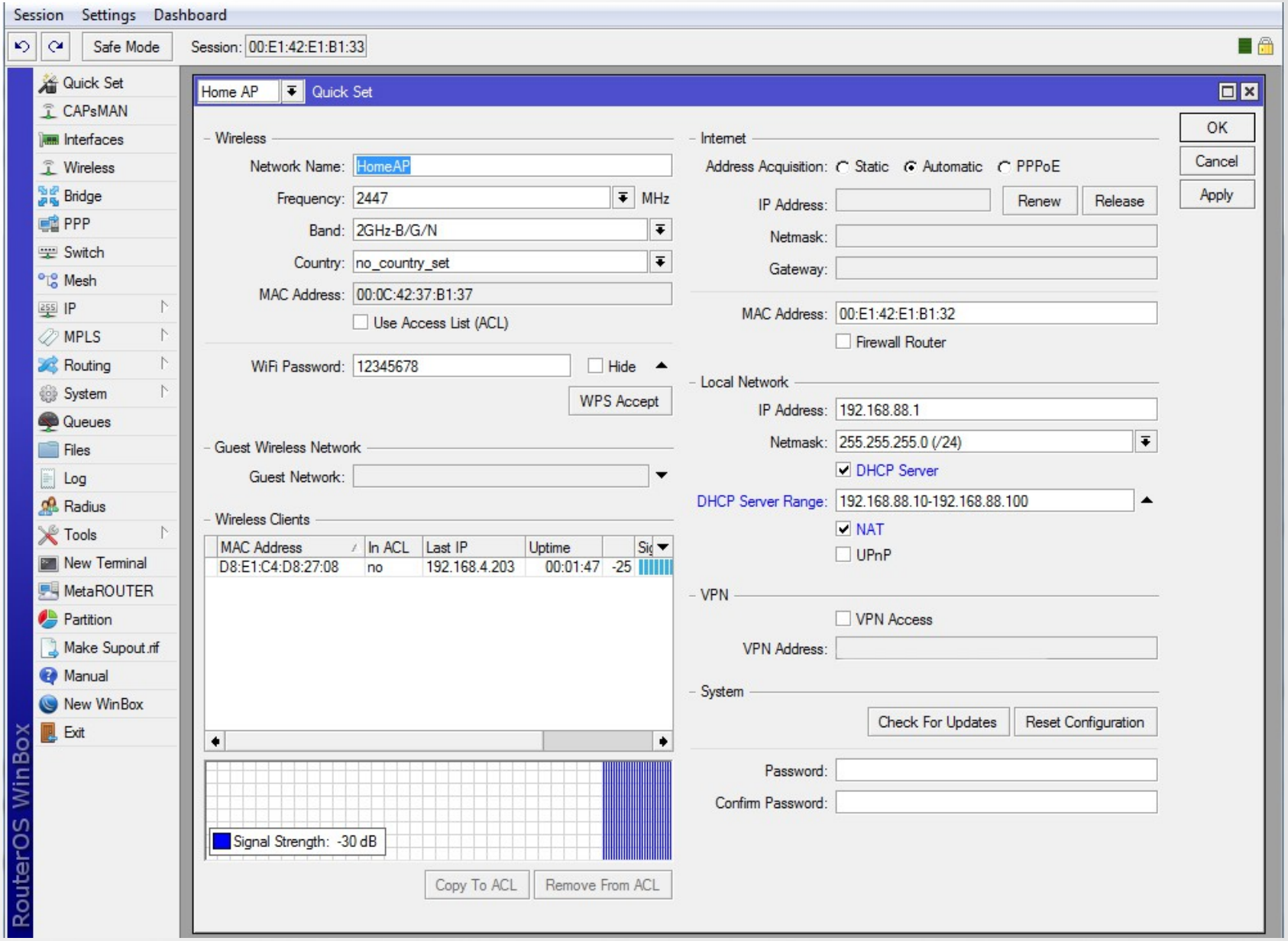
Or use **wireless scan** feature!

Wireless scan

The fastest way to connect to AP

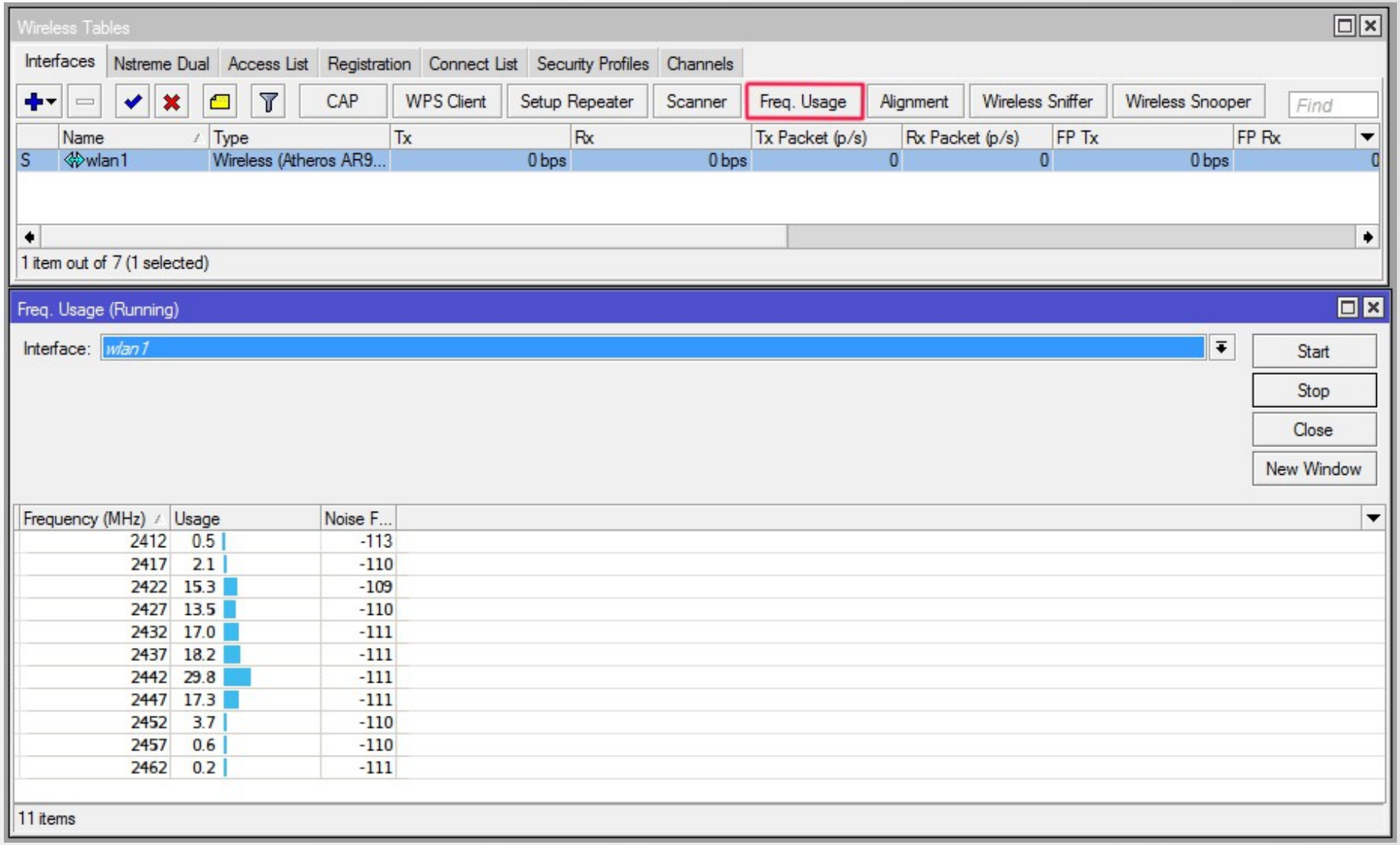


Create AP using Quickset



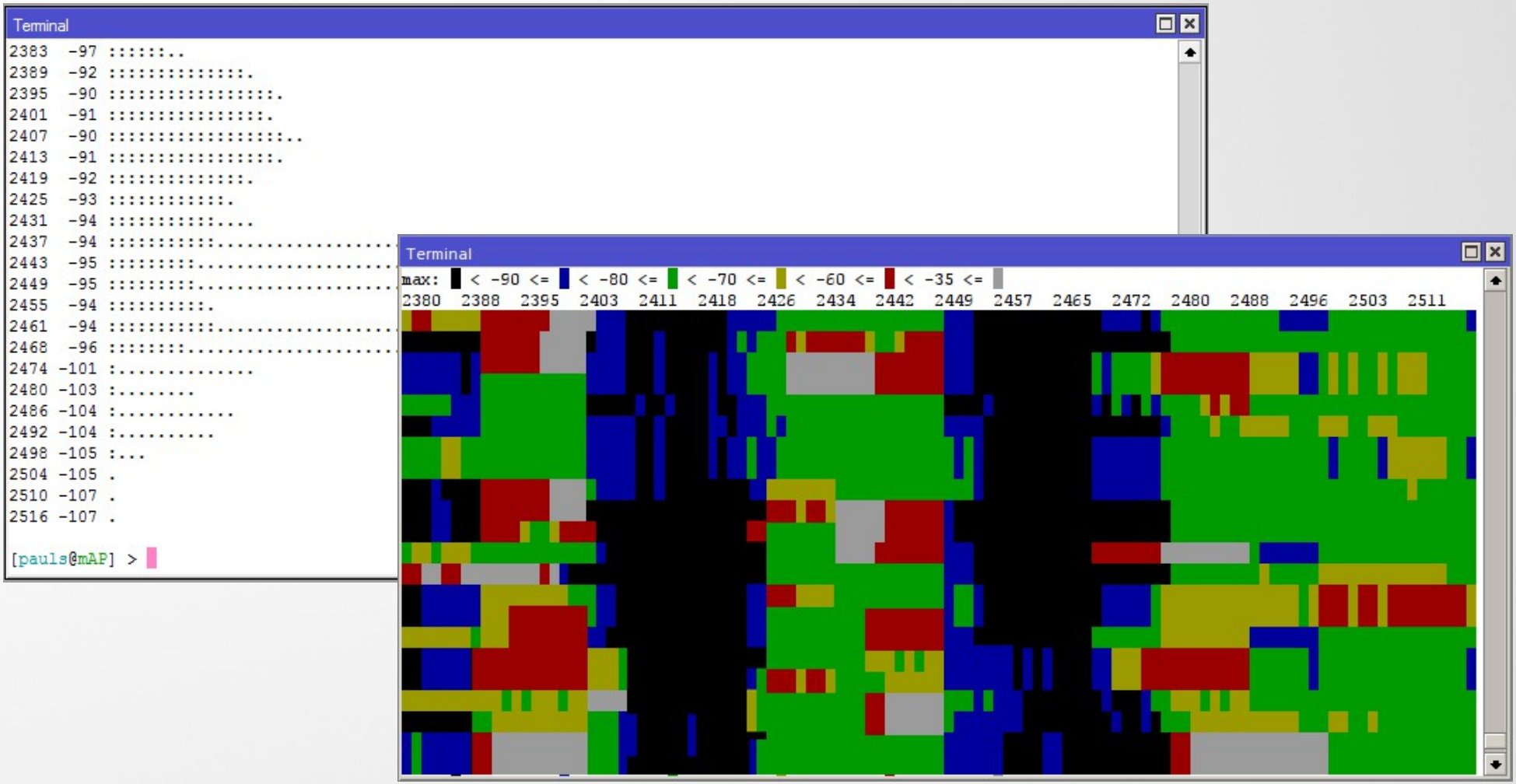
Frequency scan

Use scan tool, to find the best frequency



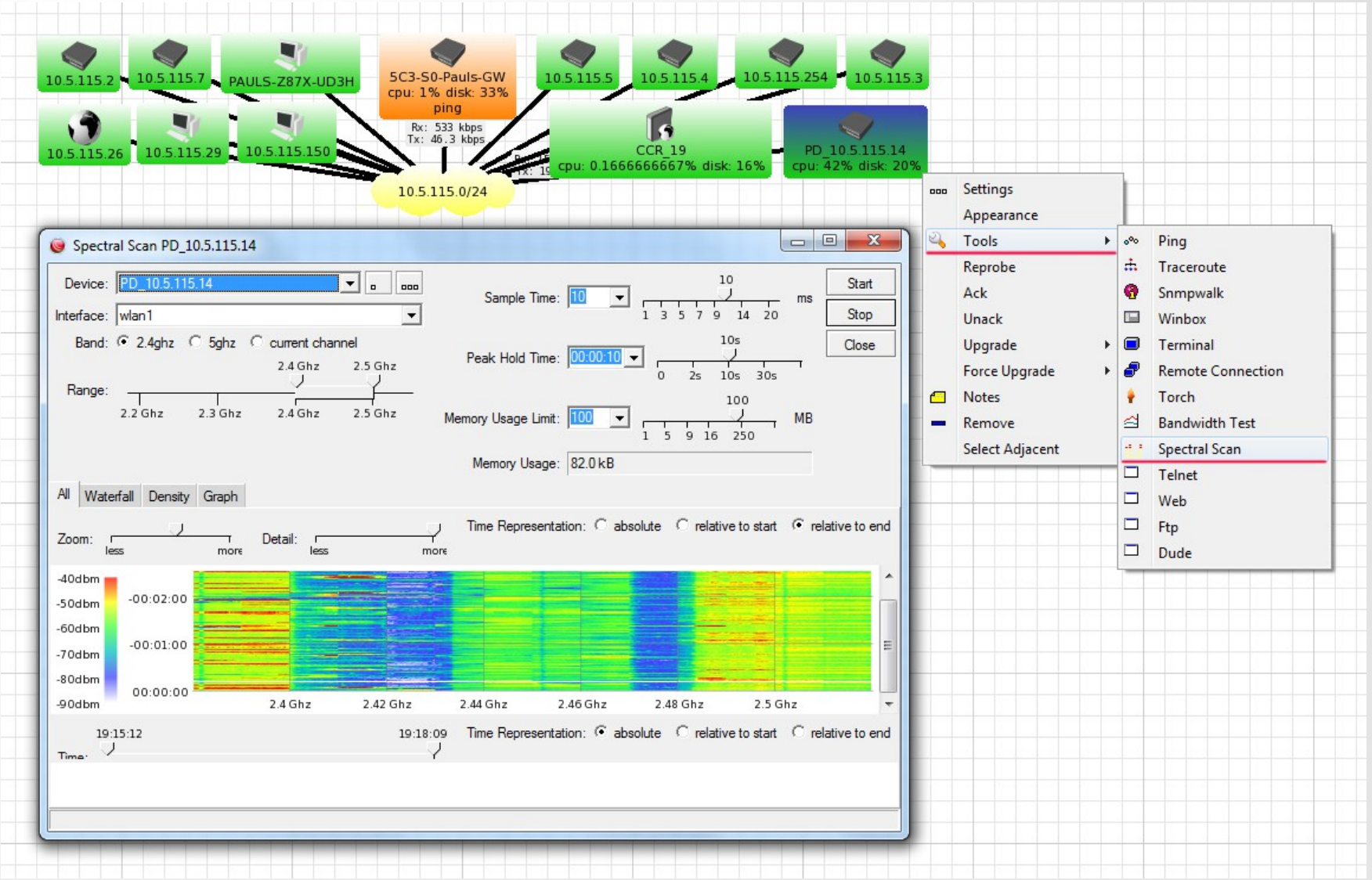
CLI wireless spectral scan

Use terminal to check used frequencies



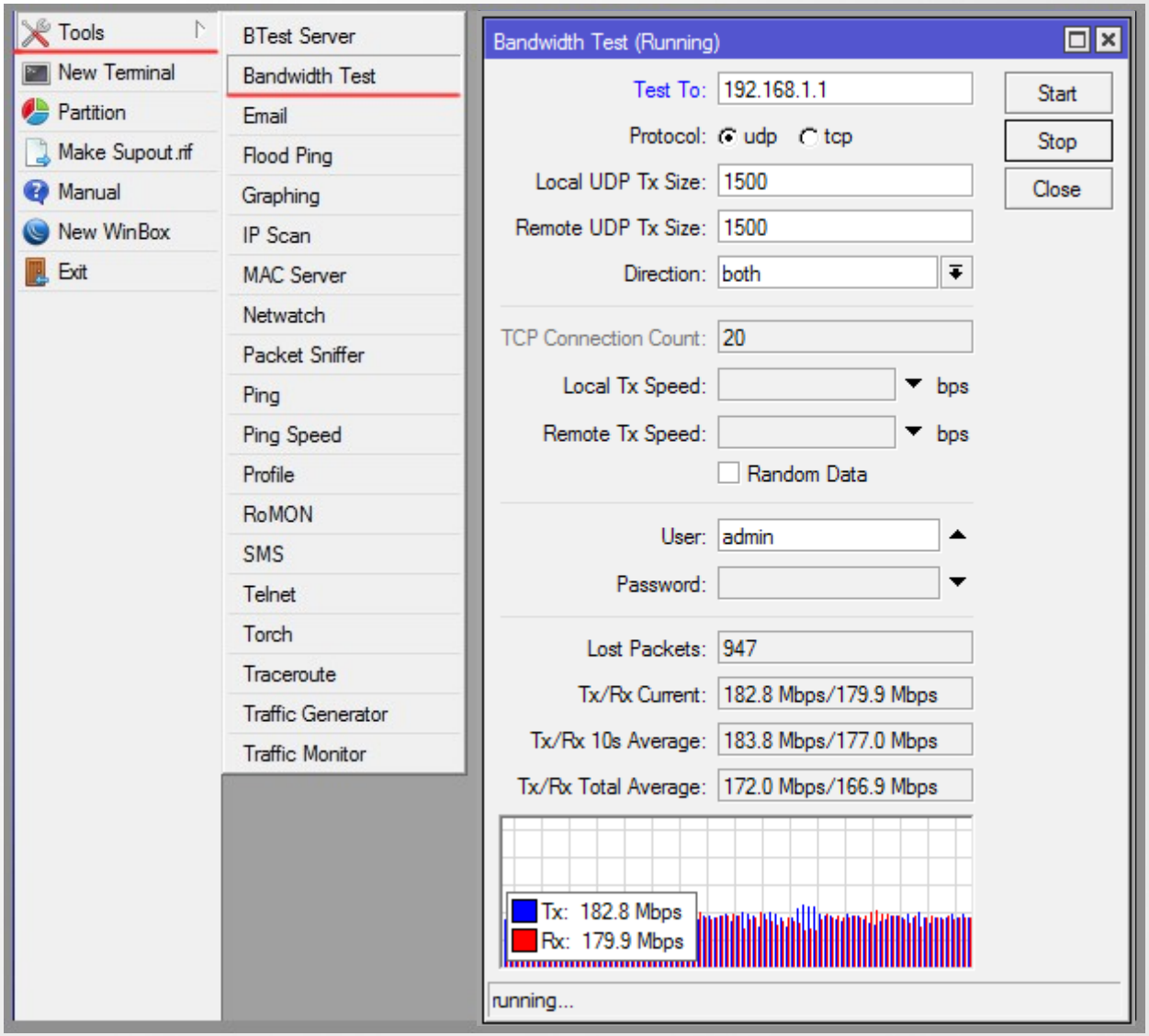
Dude

Wireless Spectral Scan from Dude



Test throughput

Measure throughput between wireless devices



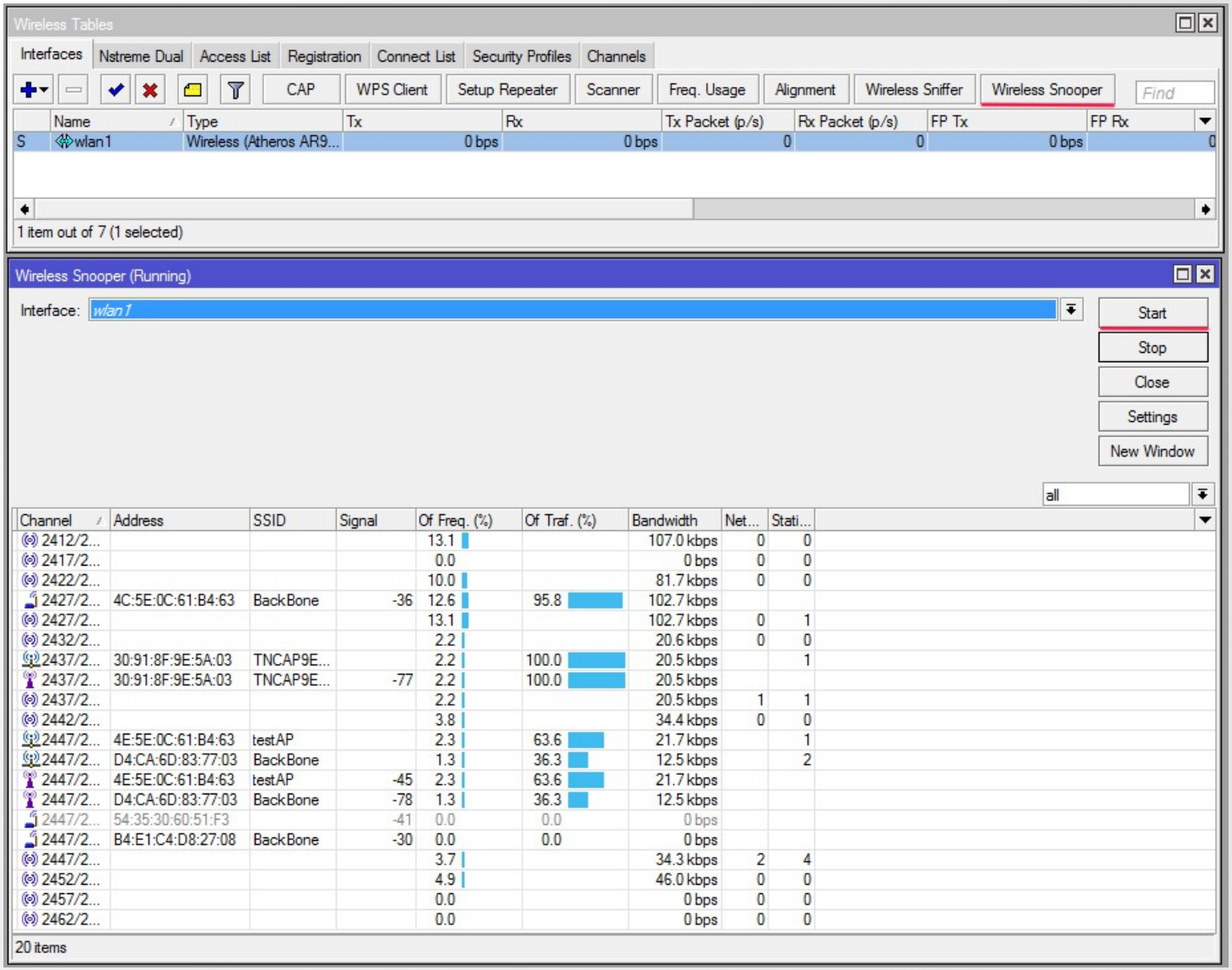
Results

Compare throughput in different frequencies

Frequency	Rx Mbps	Tx Mbps	Rx CCQ	Tx CCQ
2407	46.8	46	42	37
2417	74.7	70.3	66	76
2427	88.8	90.2	84	88
2437	98.1	97.3	89	86
2447	77.4	70.7	75	77
2457	63.3	65.4	62	65
2467	85.8	86.8	87	84
2477	95.8	93.3	62	92
2487	66	59.1	57	55

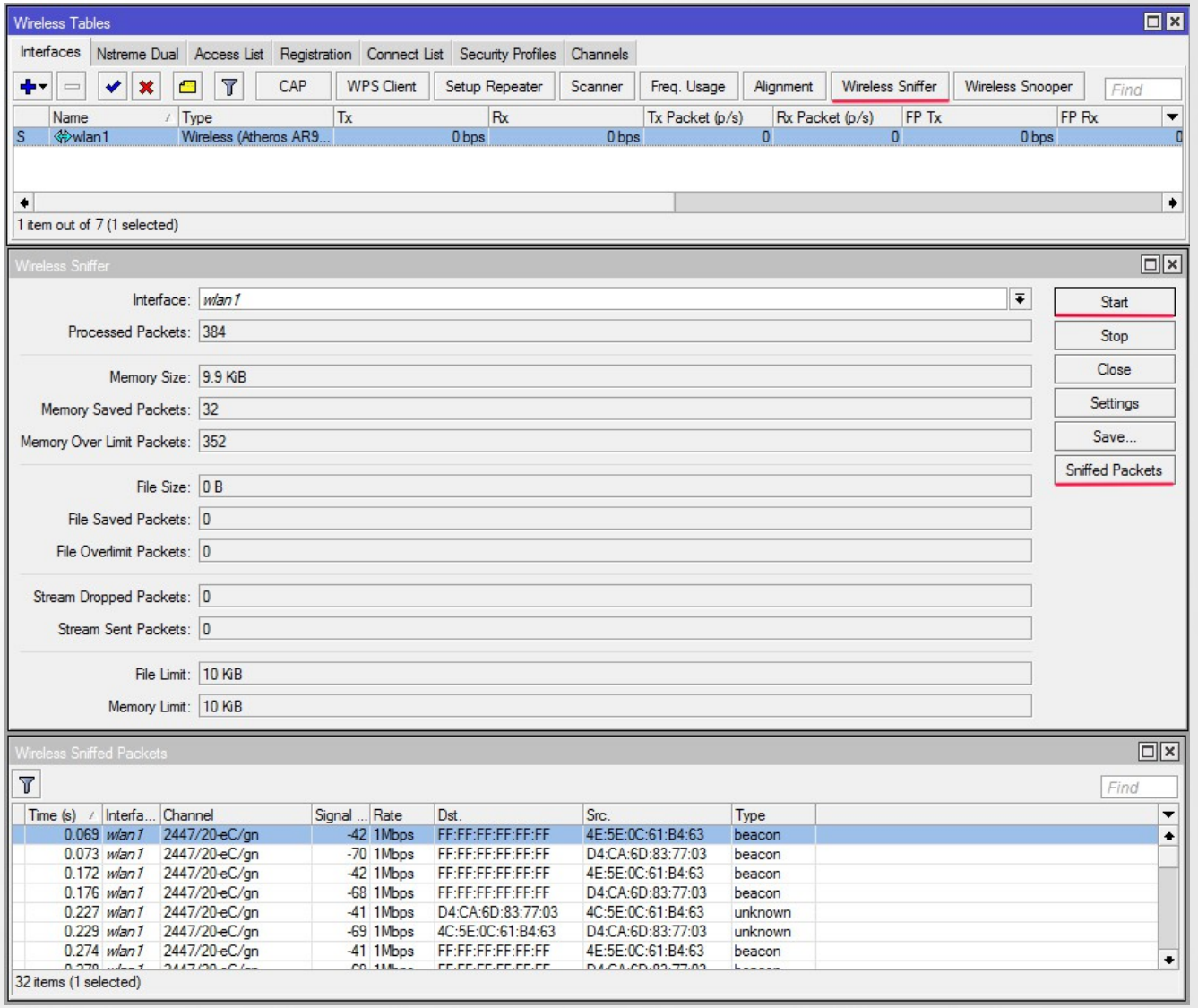
Wireless Snooper

Monitor wireless devices



Wireless Sniffer

Capture frames & packets



New Wireless (wireless-rep) package

New Wireless package

- Repeater setup
- Background scan
- Virtual Wireless Interfaces
- WPS client
- New Wireless Scan features
- Scan-list Step support
- Station Roaming support
- G/N band support
- CAPsMAN additional settings enabled
- CAPsMAN Rates support

Repeater Setup

- Allow to receive signal from the AP and repeat the signal using the same physical interface locally for connecting other clients
- Allows to extend wireless service for the wireless clients
- Steps that this setup command does:
  - Configure wireless interface to connect to the AP
  - Create a Virtual AP interface
  - Create Bridge interface
  - Adds both (main and virtual) interfaces to bridge ports

Background Scan

- Supported for 802.11 protocol only
- Working conditions
  - Wireless interface should be enabled
  - For AP mode – when operating on fixed channel
  - For Station mode – when connected to AP
- Supported also on Virtual interfaces
  - Scan is only performed in channel where master interface is running

Virtual Wireless Interfaces

- Supported for 802.11 protocol only
- Virtual AP and Client interface can be added on the same physical interface
- Multiple Virtual Wireless interfaces can be added
- Background scan is supported on Virtual Wireless Interfaces and is only performed in channel where master interface is running

WPS Client Support

- Allows wireless client to get Pre-Shared Key configuration of the AP that has WPS Server enabled
- Gets information from any WPS Server running or can be specified to get only with specific SSID or MAC address
- Received configuration is shown on the screen and can be also saved to a new wireless security profile

Wireless Scan features

- Scan to file
  - Allows to save the scan results in a CSV format file
  - Supported with background scan
- Scan Round setting
  - Allows to do full scan of the scan-list and then stop scanning
  - Useful for remote scans on the clients
  - Supported with background scan as well

Scan-list Step feature

- Scan-list Step feature allows to make compact scan-list entries
- To make scan-list from 5500-5700 with 20mhz step now you need just one entry:
  - Scan-list=5500-5700:20
  - In system it will create scan-list with such frequencies: 5500,5520,5540,5560,5580,5600,5620,5640,5660,5680,5700

Station Roaming support

- Supported for 802.11 protocol only
- While connected to AP station does periodic background scans to look for a better AP
- When a better AP is found station roams to the new AP
- Time intervals between scans becomes shorter when signal becomes worse
- Time intervals between scans becomes longer when signal becomes better

G/N Band Setting

- Regular Wireless Interface and CAPsMAN supports '2ghz-g/n' band setting
  - basic-rates – 6-54Mbps
  - supported – 6-54Mbps
  - ht-basic-mcs – None
  - ht-supported-mcs – 0-23

CAPsMAN Settings

- CAPsMAN now supports the following settings:
  - distance – default value is 'indoors'
  - hw-retries
  - hw-protection-mode
  - frame-lifetime
  - disconnect-timeout

CAPsMAN Rates support

- CAPsMAN supports Rates configuration tab:
  - Basic – B and A/G basic-rates
  - supported – B and A/G supported data-rates
  - ht-basic-mcs – N basic-rates
  - ht-supported-mcs – N supported data-rates
  - vht-basic-mcs – AC basic rates
  - vht-supported-mcs – AC supported data-rates

DFS mode setting changes in v6.37

- In RouterOS v6.37 DFS configuration is redesigned making the DFS mode setting unnecessary
- By default now the DFS mode setting is set to radar-detect
  - If you select a frequency that is a DFS frequency range then before beginning of transmission on that channel it will do a DFS radar detect
  - If you select a frequency that is not in a DFS frequency range then it will begin the transmission on that channel

Wireless packages in v6.37

- In RouterOS v6.37 there is only one wireless package - “wireless”
- “wireless” is the same wireless-rep package in older versions
- Upgrading from older RouterOS versions that had bundle package will automatically upgrade to new bundle package with new wireless package
- If you have multiple individual wireless packages installed, please leave only one wireless package installed before doing upgrade to v6.37

LTE interface

- RouterOS supports PPP emulation and Ethernet emulation driver:
  - PPP emulation has speed limit of approx 25Mbps
  - Ethernet emulation doesn't have such limitation
- Shows supported 2G/3G/4G interfaces that uses ethernet emulation driver under '/interface lte' section

LTE configuration
WEB or Direct

- LTE modem configuration might have two options:
  - WEB interface on the modem IP address where APN,PIN,modem specific configuration and status is located
  - Direct configuration in the RouterOS lte interface menu

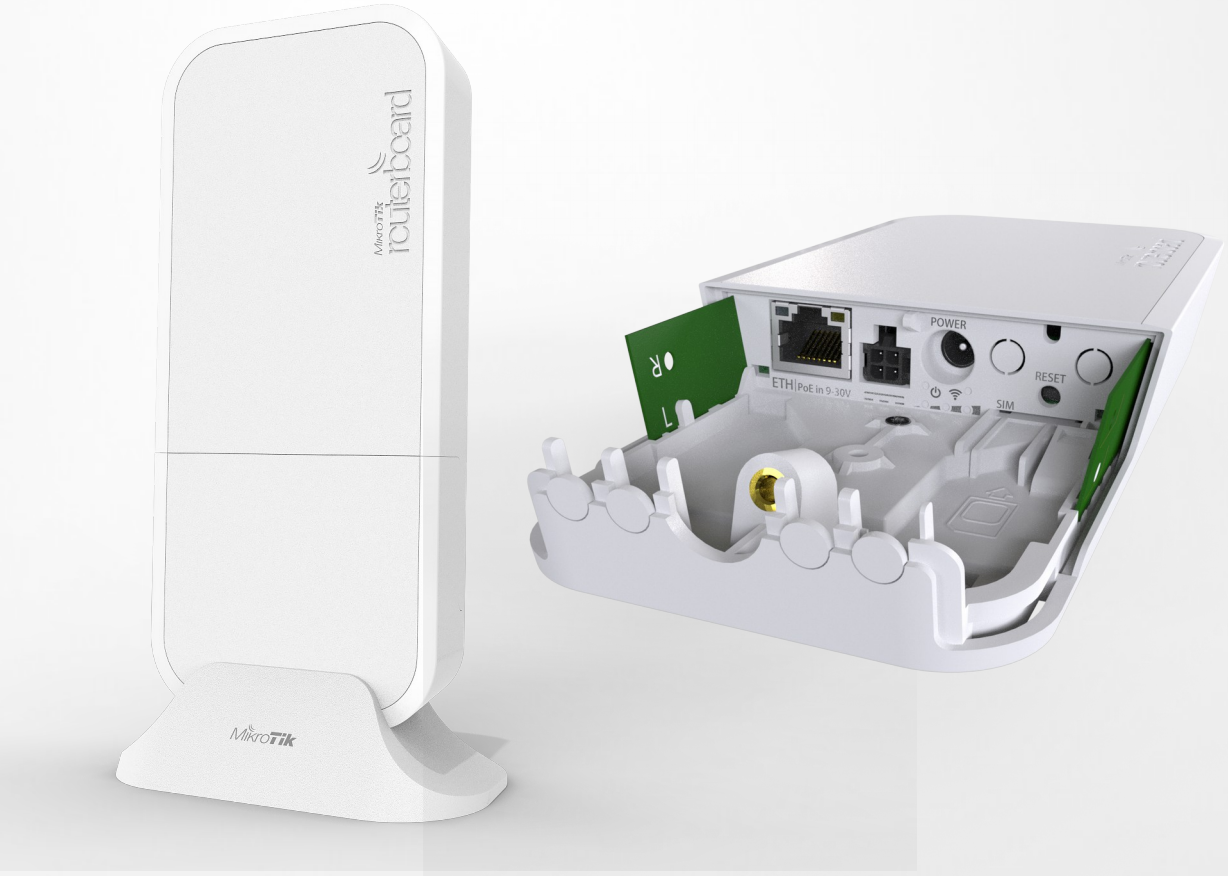
LTE interface IP address

- LTE interface IP address, default-gateway is added depending on the LTE modem:
  - On most of the LTE modems IP address, default-gateway is configured by adding DHCP-Client on LTE interface
  - On few LTE modems like SXT LTE the IP address, default-gateway is configured directly on the LTE interface without DHCP-Client
- SXT LTE also support IPv6 on the LTE interface

SMS on LTE interface

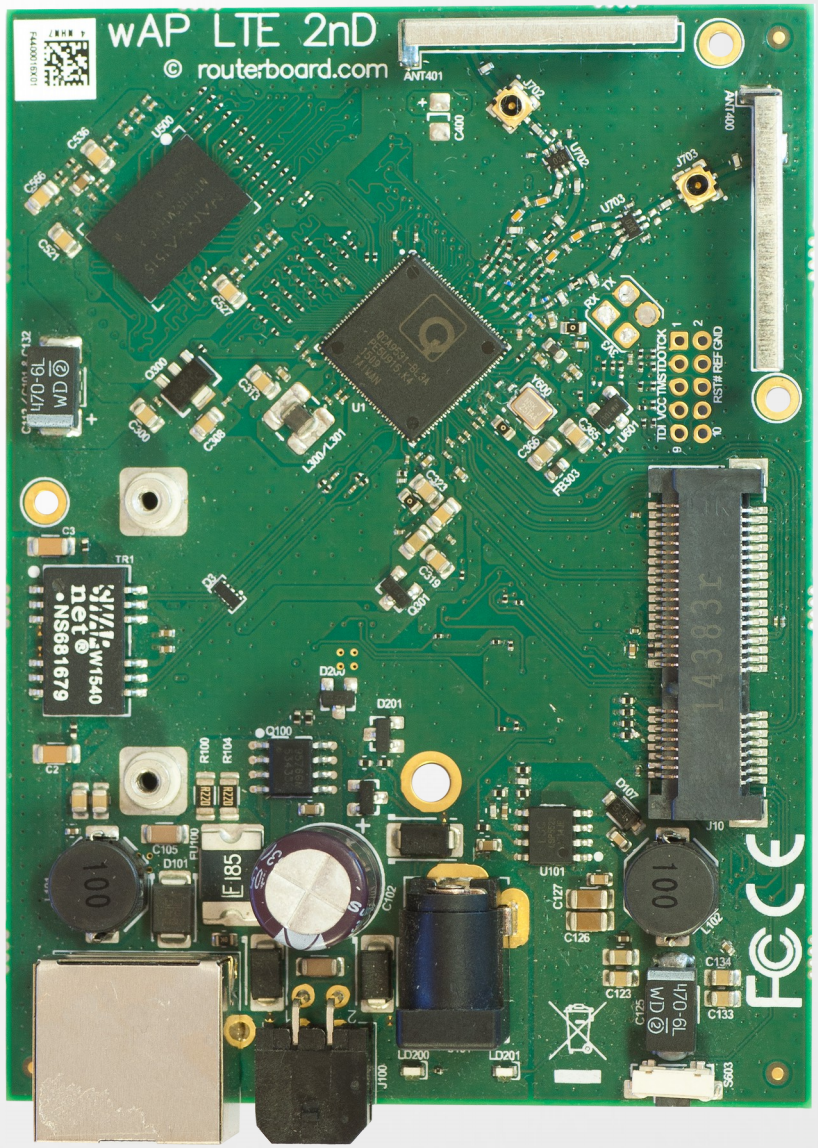
- Starting from RouterOS v6.37 you can Send and Receive SMS on LTE modems
- Allows to send custom status messages and execute scripts by receiving SMS messages
- Some limitations/requirements applies:
  - Sending and Receiving SMS will only work when the LTE interface is Running (Connected)
  - SMS tool supports only “GSM 7” encoding for SMS messages

wAP LTE kit



- wAPR-2nD board with case
- mini-PCIe LTE modem card
- Two LTE antennas built-in the case for LTE modem

wAPR-2nD board picture



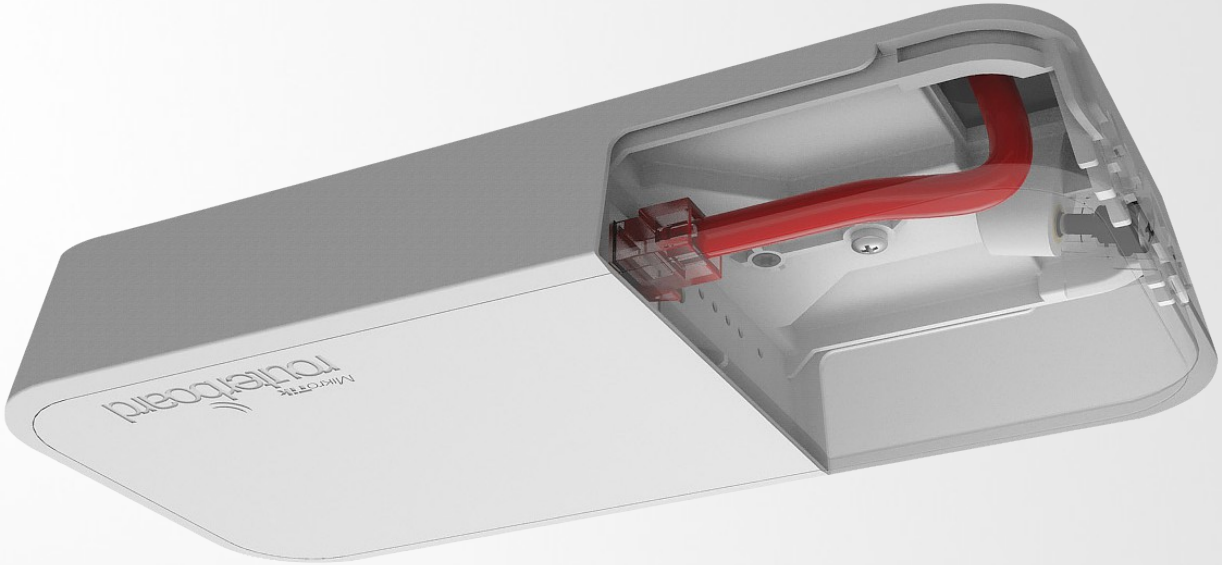
Features

- 2 chain Wireless radio
- Mini-PCIe slot for wireless radio or LTE modem
- SIM slot for LTE modem
- Integrated antennas for LTE interface
- Jack, PoE, 4-pin Automotive power option
- Supports Passive PoE
- Low Power Consumption
- High Operating Temperatures
- Suitable for indoor, outdoor and mobile operation
- Waterproof case design

Specification

- CPU 650 MHz
- RAM 64 MB
- Flash 16 MB
- Wireless 802.11b/g/n dual-chain
- One Mini-PCIe slot for wireless or LTE modem
- Gain 2dBi antennas for 802.11b/g/n
- Gain 2-4.5dbi antennas LTE modem
- Ethernet 10/100Mbps
- Voltage 11-30V
- Consumption up to 7W
- Operating Temperatures -40C to +60C
- Dimensions 185 x 85 x 30 mm

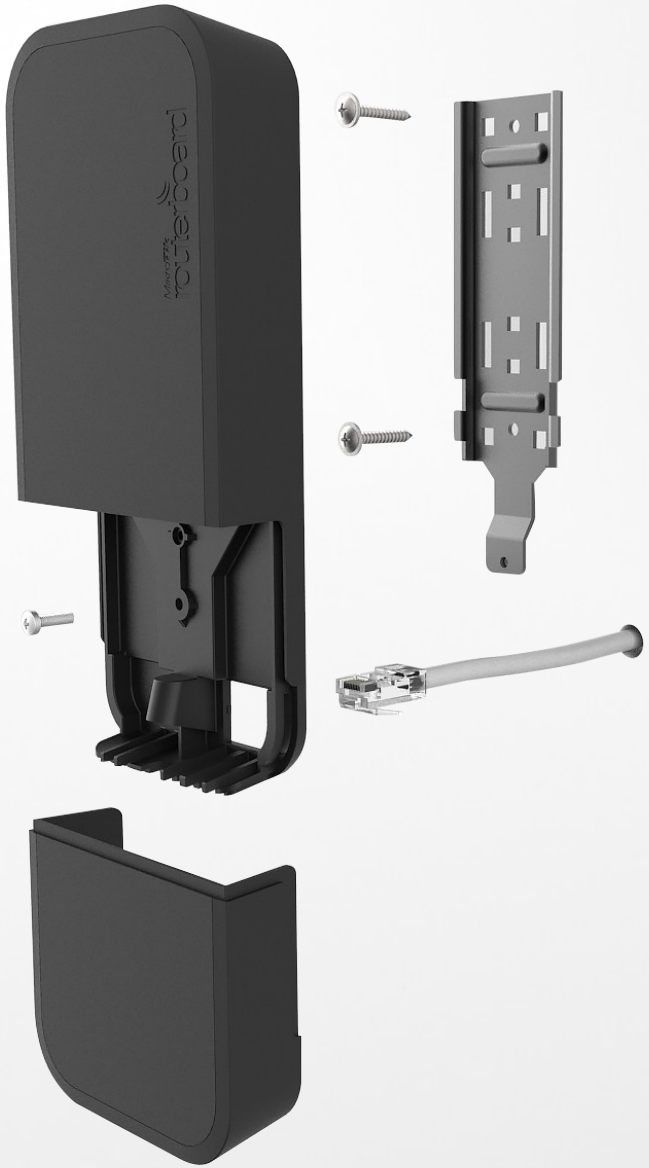
Usage Cases - Mobile



Use it on the ceiling inside a car, bus or train

- The wAP comes bundled with all the necessary things to be mounted on ceiling
- Cable breakout provides ability to run cable through the ceiling

Usage Cases - Wall



Use it on the wall!

- Wall mounting is easy thanks to the provided drill template and screw anchor. Everything included

Usage Cases – Table

Use it on the table!

- Use special plastic stand to place it on the table at home or office

Supported LTE modules

- RouterOS supported Mini-PCIe LTE modules can be found in this Wiki page:

http://wiki.mikrotik.com/wiki/Supported_Hardware

- MikroTik will provide bundle “WAP LTE kit” with a Mini-PCIe LTE module and antenna inside
  - LTE module will be different depending on the Region as LTE supported bands are not the same everywhere

Suggestions?
Feature requests?

Information on “WAP LTE kit” please talk to MikroTik staff at the registration table

Thank you!