

# Mikrotik Wireless PTP & PTMP Link Features

By

Mohammad Irfan

Dreams Network & Technology Pvt Ltd

Pakistan



# About Me

## **Name:**

**Mohammad Irfan**

## **Education:**

**BS Telecommunication  
(In Progress)**

## **Position:**

**Technical Sales Engineer**

## **Certifications:**

- MTCNA (MikroTik Certified Network Associate)
- UBWS (Ubiquiti Broadband Wireless Specialist)
- UBWA (Ubiquiti Enterprise Wireless Admin)
- CCNA (Cisco Certified Network Associate)

# About Company

- Started in 2003
- Top Wireless/Security & Network Equipment Distributor in Pakistan.
- We are Master Distributor for:
  - MIKROTIK, Yeastar, Fanvil, GrandStream, UBNT.....
- We Deals in:
- IT managed services
- Trainings
- Security Solutions
- Electrical & Instrumentation Solutions with SCADA

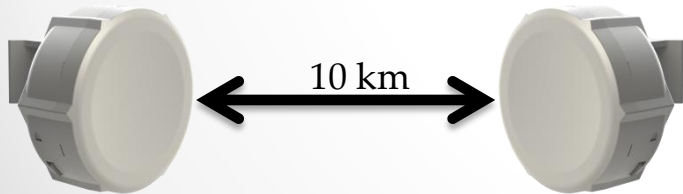
# Presentation Objective

- PTP & PTMP Connections
- Access List and Connect List
- Basic Features
- Q & A

# Types Of Connections

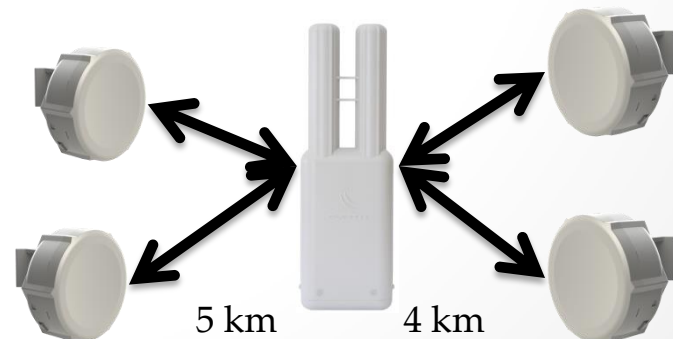
## PTP (Point to Point)

- You can establish long distance link.
- Better throughput.



## PTMP (Point to Multipoint)

- Mostly use in Wireless ISPs
- Cost effective than PTP



# Advantages & Disadvantages Of Wireless Links

## Advantages

- Easy to install
- Cost effective
- No cable to pull

## Disadvantages

- Country limitation
- Bandwidth limit

# Wireless Operation Modes in Mikrotik

- AP-bridge/Bridge <-> Station
- AP-bridge/Bridge <-> Station-wds/Stationbridge
- AP-bridge <-> WDS-slave
- AP-bridge/Bridge <-> Stationpseudobridge

# RouterOS License Requirement

- PTP link requires at least Level 3
  - Example: Bridge <-> Station
- PTMP link requires on AP at least Level 4 and on clients at least Level 3
  - Example: AP-bridge <-> Station
- For Non RouterOS AP:
  - Example: Non RouterOS AP <-> pseudobridge



# PTP & PTMP link Configuration

- PTP Link Requirements:
  - 1 x Wireless Equipment For Access Point Minimum RouterOS L3
  - 1 x Wireless Equipment For Station Minimum RouterOS L3
- PTMP Link Requirements:
  - 1 x Wireless Equipment For Access Point Minimum RouterOS L4
  - 1 - .... x Wireless Equipment For Station Minimum RouterOS L3

# PTP & PTMP link Configuration

- Access Point WDS Configuration Steps (PTP):

The screenshot displays the RouterOS WinBox interface for configuring WDS on an access point. The configuration is performed on the 'wlan1' interface. The steps are as follows:

1. Select the 'Wireless' tab in the left sidebar.
2. Select the 'Wireless' tab in the top menu.
3. Configure the 'General' tab: Mode: ap bridge, Band: 5GHz-A/N/AC, Channel Width: 20MHz, Frequency: 5765, SSID: MUM-PAKISTAN.
4. In the 'WDS' tab, check 'Default Authenticate'.
5. In the 'WDS' tab, configure 'Tx Chains' and 'Rx Chains' to 'chain0' and 'chain1'.
6. In the 'WDS' tab, set 'WDS Mode' to 'dynamic' and 'WDS Default Bridge' to 'bridge1'.
7. Click the 'Apply' button to save the configuration.

# PTP & PTMP link Configuration

- Station WDS Configuration Steps (PTP) :

The screenshot displays the RouterOS WinBox interface for configuring Station WDS on interface wlan2. The configuration is divided into several steps, indicated by red circles with numbers 1 through 6:

- 1**: The **Bridge** option is selected in the left-hand menu.
- 2**: The **wlan2** interface is selected in the **Wireless Tables** window.
- 3**: In the **Interface <wlan2>** configuration window, the **Mode** is set to **station wds**.
- 4**: The **Default Authenticate** checkbox is checked at the bottom of the configuration window.
- 5**: In the **Wireless** tab of the configuration window, both **Tx Chains** and **Rx Chains** are set to **chain0** and **chain1**.
- 6**: The **Apply** button is clicked to save the configuration.

The interface also shows various other settings such as Band (5GHz-A/N/AC), Channel Width (20MHz), Frequency (auto), SSID (MUM-PAKISTAN), and Security Profile (default).

# PTP & PTMP link Configuration

- Result UDP (PTP) :

The screenshot shows the RouterOS WinBox interface. The top status bar indicates the user is 'admin@E4:8D:8C:D6:B1:D3 (CPE)' on 'WinBox v6.35.2 on SXT Lite5 ac (mipsbe)'. The CPU usage is shown as 41%.

The main window displays the 'Wireless Tables' configuration. A table lists the wireless interface 'wlan2' with a MAC address of '4C5E0C...4C5E0C:D4:96:C8'. A 'Bandwidth Test (Running)' dialog box is open, showing the test configuration:

- Test To: 192.168.20.101
- Protocol: udp
- Local UDP Tx Size: 1500
- Remote UDP Tx Size: 1500
- Direction: both
- TCP Connection Count: 20
- User: admin
- Password: [redacted]
- Lost Packets: 966
- Tx/Rx Current: 75.8 Mbps/74.0 Mbps
- Tx/Rx 10s Average: 73.2 Mbps/72.3 Mbps
- Tx/Rx Total Average: 67.1 Mbps/64.5 Mbps

A graph at the bottom shows the current Tx and Rx rates, with Tx at 75.8 Mbps and Rx at 72.9 Mbps.

Red annotations highlight key steps: '1' points to the 'Tools' menu, '2' points to the 'Test To' field, and '3' points to the 'Start' button. A red box at the top right contains the text 'Always Check CPU Percentages As well' and 'CPU:41%'.

# PTP & PTMP link Configuration

- Result TCP (PTP) :

admin@E4:8D:8C:D6:B1:D3 (CPE) - WinBox v6.35.2 on SXT Lite5 ac (mipsbe)

Session Settings Dashboard

Safe Mode Session: E4:8D:8C:D6:B1:D3

Always Check CPU Percentages As well CPU: 100%

Wireless Tables

Interfaces Nstream Dual Access List Registration Connect List Security Profiles Channels

2- Test TCP

Radio Name	MAC Address	Interface	Uptime	AP	W...	Last Activit...	Tx/Rx Signal ...	Tx Rate	Rx Rate
4C5E0CD...	4C:5E:0C:D4:96:C8	wlan2	00:02:30	yes	yes	0.000	-43/-46	173.3Mbp...	173.3Mbp...

Bandwidth Test (Running)

2 Test To: 192.168.20.101 3

Protocol:  udp  tcp

Local UDP Tx Size: 1500

Remote UDP Tx Size: 1500

Direction: both

TCP Connection Count: 20

Local Tx Speed:  bps

Remote Tx Speed:  bps

Random Data

User: admin

Password:

Lost Packets: 0

Tx/Rx Current: 79.9 Mbps/54.2 Mbps

Tx/Rx 10s Average: 80.9 Mbps/52.8 Mbps

Tx/Rx Total Average: 79.3 Mbps/51.0 Mbps

Tx: 82.1 Mbps

Rx: 55.3 Mbps

Click on Tools and Select BANDWIDTH TEST

RouterOS WinBox



# PTP & PTMP link Configuration

- Access Point WDS Configuration Steps (PTMP):

The screenshot displays the RouterOS WinBox interface for configuring WDS on the wlan1 interface. The configuration is divided into several panels, with key settings highlighted by red boxes and numbered 1 through 7:

- 1**: The **Wireless** menu item in the left sidebar.
- 2**: The **WDS** tab selected in the configuration menu.
- 3**: The **General** tab of the wlan1 interface configuration, showing Mode: ap bridge, Band: 5GHz-A/N/AC, Channel Width: 20MHz, Frequency: 5765, SSID: MUM-PAKISTAN, and Security Profile: default.
- 4**: The **Default Forward** checkbox checked under the Default AP Tx Rate section.
- 5**: The **WDS** tab of the wlan1 interface configuration, showing Tx Chains and Rx Chains both checked for chain0 and chain1.
- 6**: The **WDS Mode** dropdown menu set to **dynamic** and the **WDS Default Bridge** dropdown menu set to **bridge1**.
- 7**: The **Apply** button in the bottom right corner.

# PTP & PTMP link Configuration

- StationWDS - 1 Configuration Steps (PTMP):

The screenshot displays the RouterOS WinBox interface for configuring Station WDS. The left sidebar (1) shows the 'Wireless' menu selected. The 'Wireless Tables' window (2) lists the wireless interfaces, with 'wlan2' selected. The 'Interface <wlan2>' configuration window (3) shows the 'Wireless' tab with 'Mode' set to 'station wds'. At the bottom of this window, 'Default Authenticate' and 'Default Forward' are checked (4). The 'Interface <wlan1>' configuration window (5) shows the 'Wireless' tab with 'Tx Chains' and 'Rx Chains' set to 'chain0' and 'chain1'. Finally, the 'Apply' button in the 'Interface <wlan1>' window is highlighted (6).

# PTP & PTMP link Configuration

- Station WDS - 2 Configuration Steps (PTMP):

The screenshot displays the RouterOS WinBox interface for configuring Station WDS. The interface is divided into several panes and sections, with red boxes and numbers highlighting key configuration steps:

- 1:** The **Wireless** menu item in the left sidebar is highlighted.
- 2:** The **wlan2** interface is selected in the **Wireless Tables** pane.
- 3:** The **WDS** tab in the **Interface <wlan2>** configuration window is active. The **Mode** is set to **station wds**.
- 4:** The **Default Authenticate** checkbox is checked in the **Advanced Status** section.
- 5:** The **WDS** tab in the **Interface <wlan1>** configuration window is active. The **Tx Chains** and **Rx Chains** are both set to **chain0** and **chain1**.
- 6:** The **Apply** button is highlighted in the **Interface <wlan1>** configuration window.

The **Wireless Tables** pane shows the following configuration for the selected interfaces:

Name	Type	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)	FP Tj
wlan1	Wireless (Atheros AR9...	0 bps	0 bps	0	0	0
wlan2	Wireless (Atheros AR9...	5.6 kbps	0 bps	9	0	0



# PTP & PTMP link Configuration

- Result UDP (PTMP) Both Stations:

The image shows two side-by-side screenshots of the WinBox configuration interface for two stations, labeled 'Station 1 - Test UDP' and 'Station 2 - Test UDP'. Both screenshots show the 'Bandwidth Test (Running)' window with various settings and results.

**Station 1 - Test UDP:**

- CPU: 24%
- Test To: 192.168.20.101
- Protocol: udp
- Local UDP Tx Size: 1500
- Remote UDP Tx Size: 1500
- Direction: both
- TCP Connection Count: 20
- Local Tx Speed: [empty] bps
- Remote Tx Speed: [empty] bps
- User: admin
- Password: [empty]
- Lost Packets: 153
- Tx/Rx Current: 42.5 Mbps/21.5 Mbps
- Tx/Rx 10s Average: 44.8 Mbps/17.8 Mbps
- Tx/Rx Total Average: 43.3 Mbps/17.9 Mbps

**Station 2 - Test UDP:**

- CPU: 18%
- Test To: 192.168.20.101
- Protocol: udp
- Local UDP Tx Size: 1500
- Remote UDP Tx Size: 1500
- Direction: both
- TCP Connection Count: 20
- Local Tx Speed: [empty] bps
- Remote Tx Speed: [empty] bps
- User: admin
- Password: [empty]
- Lost Packets: 343
- Tx/Rx Current: 49.0 Mbps/18.8 Mbps
- Tx/Rx 10s Average: 49.7 Mbps/19.0 Mbps
- Tx/Rx Total Average: 42.1 Mbps/19.8 Mbps

**Annotations:**

- A red box labeled '1' points to the 'Tools' menu item in the left sidebar.
- A red box labeled '2' points to the 'Test To' field in the bandwidth test window.
- A red box labeled '3' points to the 'Protocol' dropdown menu.
- A red box labeled '4' points to the 'Direction' dropdown menu.
- A red box labeled '5' points to the 'User' field.
- A red box labeled '6' points to the 'Password' field.
- A red box labeled '7' points to the 'Tx/Rx Current' field.
- A red box labeled '8' points to the 'Tx/Rx 10s Average' field.
- A red box labeled '9' points to the 'Tx/Rx Total Average' field.
- A red box labeled '10' points to the 'Lost Packets' field.
- A red box labeled '11' points to the 'Tx/Rx Current' field in the graph.
- A red box labeled '12' points to the 'Tx/Rx 10s Average' field in the graph.
- A red box labeled '13' points to the 'Tx/Rx Total Average' field in the graph.

**Text Overlay:** 'Always Check CPU Percentage As Well' is written in red across the top of the screenshots.

**Text Overlay:** 'Click on Tools and Select BANDWIDTH TEST' is written in red in the bottom left corner.

# PTP & PTMP link Configuration

- Result TCP (PTMP) Both Stations:

**Always Check CPU Percentage As Well**

**Station 1 - Test TCP**

**Station 2 - Test TCP**

**1** Click on Tools and Select BANDWIDTH TEST

**2** Test To: 192.168.20.101

Protocol: tcp

Local UDP Tx Size: 1500

Remote UDP Tx Size: 1500

Direction: both

TCP Connection Count: 20

Local Tx Speed: bps

Remote Tx Speed: bps

Random Data:

User: admin

Password:

Lost Packets: 0

Tx/Rx Current: 28.4 Mbps/20.1 Mbps

Tx/Rx 10s Average: 28.3 Mbps/22.4 Mbps

Tx/Rx Total Average: 21.4 Mbps/20.4 Mbps

Tx: 20.1 Mbps

Tx/Rx Current: 30.1 Mbps/21.5 Mbps

Tx/Rx 10s Average: 28.9 Mbps/17.4 Mbps

Tx/Rx Total Average: 23.2 Mbps/15.2 Mbps

Tx: 21.5 Mbps

# Access List & Connect List

## Access List

- Access list is used by access point to restrict allowed connections from other devices, and to control connection parameters.
- Access List is use in Access Point

## Connect List

- Connect List is used to assign priority and security settings to connections with remote access points and to restrict allowed connections.
- Connect List is use in Station

# Access List

- How to Enable Access List on Mikrotik Wireless Access Point

The screenshot displays the Mikrotik WinBox interface for configuring an Access List on a wireless interface. The interface is divided into several panes:

- Left Pane:** A sidebar menu with the "Wireless" option highlighted (1).
- Top Pane:** A table listing wireless interfaces. The "wlan1" interface is selected (2).
- Right Pane:** The "Access List" configuration window for the selected interface. It shows the MAC address "E4:8D:8C:D6:B1:D4" (5) and the "Authentication" checkbox checked (6).
- Bottom Pane:** The "Wireless Tables" configuration window for the "wlan1" interface. The "Default Authentication" checkbox is checked (3).

Red boxes and numbers (1-6) are overlaid on the screenshot to highlight the specific steps and elements mentioned in the list above.

# Access List

- Result:
  - Now Check on Wireless Registration Table, You will Find your Station Device

The screenshot displays the RouterOS WinBox interface. The 'Wireless Tables' window is open, showing a table with the following data:

Radio Name	MAC Address	Interface	Uptime	AP	WDS	Last Activit	Tx/Rx Signal	Tx Rate	Rx Rate
E48D8CD6B1D4	E4:8D:8C:D6:B1:D4	wlan1	00:04:20	no	yes	0.000	-40/-38	173.3Mbps...	6Mbps

Red boxes highlight the 'Wireless' menu item (1) and the 'Registration' tab (2). An 'AP Access Rule' dialog box is also open, showing the configuration for the selected MAC address:

- MAC Address: E4:8D:8C:D6:B1:D4
- Interface: all
- Signal Strength Range: -120..120
- AP Tx Limit: [empty]
- Client Tx Limit: [empty]
- Authentication:
- Forwarding:
- VLAN Mode: no tag
- VLAN ID: 1
- Private Key: none
- Private Pre Shared Key: [empty]
- Management Protection Key: [empty]
- Time: enabled



# Connect List

- How to Enable Connect List on MikroTik Wireless Station

The screenshot displays the MikroTik WinBox interface for configuring a wireless station. The interface is divided into several sections:

- Sidebar:** Contains navigation options such as Quick Set, CAPsMAN, Interfaces, Wireless, Bridge, PPP, Switch, Mesh, IP, MPLS, Routing, System, Queues, Files, Log, Radius, Tools, New Terminal, MetaROUTER, Partition, Make Supout.tif, Manual, New WinBox, and Ext.
- Main Window:** Features tabs for 'Wireless Tables', 'Access List', 'Registration', 'Connect List', 'Security Profiles', and 'Channels'. The 'Wireless Tables' tab is active, showing a table with columns for Name, Type, Tx, Rx, Tx Packet (p/s), Rx Packet (p/s), and FP Tx. The 'wlan2' interface is selected and highlighted with a red circle 2.
- Interface <wlan2> Dialog:** Shows configuration options for the selected interface. The 'Mode' is set to 'station wds'. The 'SSID' field is highlighted with a red circle 3.
- Connect List Tab:** The 'Connect List' tab is selected, showing a table with columns for #, Interface, MAC Address, Connect, Area Prefix, Signal Str..., and Security... The '+' button is highlighted with a red circle 5.
- Station Connect Rule <E4:8D:8C:D6:B1:D4> Dialog:** Shows the configuration for a new rule. The 'Interface' is set to 'wlan1', 'MAC Address' is 'E4:8D:8C:D6:B1:D4', and the 'Connect' checkbox is checked. The 'Copy' button is highlighted with a red circle 7.
- Station Connect Rule <4C:5E:0C:D4:96:C8> Dialog:** Shows the configuration for an existing rule. The 'Interface' is set to 'wlan7', 'MAC Address' is '4C:5E:0C:D4:96:C8', and the 'Connect' checkbox is checked. The 'OK' button is highlighted with a red circle 10.

# Connect List

- Result:

- Now Check on Wireless Registration Table, You will Find your Access Point Device. So which Access Point is Showing there switch off that one. Your Station Will Connect from Other AP.

The image displays two screenshots of the Mikrotik WinBox interface, showing the 'Wireless Tables' window with the 'Registration' tab selected. The first screenshot (labeled '1') shows a table with one entry for radio E48D8CD6B1D4. The second screenshot (labeled '2') shows a table with one entry for radio 4C5E0CD496C8. The 'Registration' tab is highlighted in red in both screenshots.

Radio Name	MAC Address	Interface	Uptime	AP	W...	Last Activ...	Tx/Rx Signal ...	Tx Rate	Rx Rate
E48D8CD6B1D4	E4:8D:8C:D6:B1:D4	wlan2	00:05:20	yes	yes	0.000	-47/-49	173.3Mbps...	173.3Mbps...

Radio Name	MAC Address	Interface	Uptime	AP	W...	Last Activ...	Tx/Rx Signal ...	Tx Rate	Rx Rate
4C5E0CD496C8	4C:5E:0C:D4:96:C8	wlan2	00:00:02	yes	yes	0.000	-60	6Mbps	144.4Mbps...

# Basic Features

- Scan
- Frequency Usage
- Snooper



# Basic Feature

- Scan
  - Scan command allows to see available AP in the frequency range defined in the scan-list.

The screenshot shows the Mikrotik WinBox interface. The main window is titled 'Interface <wan1>' and is in the 'Wireless' tab. The configuration for the 'wan1' interface is as follows:

- Mode: station
- Band: 2GHz-B/G
- Channel Width: 20MHz
- Frequency: 2412 MHz
- SSID: MikroTik
- Scan List: default
- Wireless Protocol: any
- Security Profile: default
- WPS Mode: push button
- Bridge Mode: enabled
- VLAN Mode: no tag
- VLAN ID: 1
- Default AP Tx Rate: [ ] bps
- Default Client Tx Rate: [ ] bps
- Default Authenticate
- Default Forward

Overlaid on the interface configuration is a 'Scanner (Running)' window. It shows the interface 'wan1' selected and a list of 17 detected wireless networks. The scanner window includes 'Start', 'Stop', 'Close', 'Connect', and 'New Window' buttons.

	Address	SSID	Channel	Signa...	Noise...	Signa...	Radio Name	RouterO...
ARB	4C:5E:0C:0B:36:3D	Mikro Tik...	2412/2...	-24	-115	91	4C5E0C0B363D	6.30.4
A	A0:F3:C1:81:F2:D6	Mamiott...	2412/2...	-88	-115	27		
A	E8:94:F6:29:48:9A	Mamiott...	2412/2...	-86	-115	29		
A	9C:AD:97:2B:A6:FE	HP-Print-f...	2412/2...	-79	-115	36		
ARB	E4:8D:8C:B3:06:19	Mikro Tik...	2422/2...	-42	-115	73	E48D8C830619	6.30.4
APRB	E4:8D:8C:53:78:87	Mamiott...	2422/2...	-72	-115	43	E48D8C537887	6.33.5
A	64:70:02:F9:34:B4	Mamiott...	2427/2...	-88	-115	27		
A	64:70:02:6C:37:E0	Mamiott...	2437/2...	-79	-114	35		
A	90:F6:52:2A:0A:26	Mamiott...	2442/2...	-91	-114	23		
A	54:E6:FC:9A:41:80	Mamiott...	2452/2...	-71	-114	43		
AP	50:68:0A:E6:3A:85	Khattak ...	2462/2...	-82	-114	32		
A	A0:F3:C1:D4:0D:A6	Mamiott...	2462/2...	-89	-114	25		
A	E8:DE:27:25:3A:A6	Mamiott...	2447/2...	-93	-114	21		
A	64:70:02:6C:49:A8	Board Ro...	2412/2...	-90	-115	25		
	00:18:F8:4A:E3:74	Mamiott...	2442/2...	-91	-114	23		

# Basic Feature

- Frequency Usage
  - This tool shows you that usage of frequency.

The screenshot displays the Mikrotik WinBox interface. The main window is titled 'Interface <wlan1>' and shows the configuration for the wireless interface. The 'General' tab is active, showing settings such as Mode: station, Band: 2GHz-B/G, Channel Width: 20MHz, Frequency: 2412 MHz, SSID: MikroTik, and Security Profile: default. The 'Freq. Usage (Running)' tool window is open, showing a table of frequency usage for the selected interface 'wlan1'.

Frequency (MHz)	Usage	Noise F...
2412	15.2	-114
2417	9.8	-114
2422	12.2	-115
2427	15.6	-115
2432	14.9	-115
2437	21.5	-115
2442	13.0	-114
2447	9.8	-114
2452	7.6	-114
2457	3.7	-114
2462	18.9	-115

# Basic Feature

- Snooper
  - This tool monitors surrounding frequency usage, and displays which devices occupy each frequency. It's available both in console, and also in Winbox.

The screenshot shows the Mikrotik WinBox interface with the Wireless Snooper tool running. The tool is configured for interface wlan1 and displays a table of detected wireless networks. The table has the following columns: Channel, Address, SSID, Signal, Of Freq. (%), Of Traf. (%), Bandwidth, Networks, and Stations. The data is as follows:

Channel	Address	SSID	Signal	Of Freq. (%)	Of Traf. (%)	Bandwidth	Networks	Stations
2427/2...				30.2		251.4 kbps	1	5
2452/2...				18.0		249.7 kbps	1	5
2452/2...	54:E6:FC:9A:41:80	Mamott_B...		5.7	31.6	222.2 kbps		3
2452/2...	54:E6:FC:9A:41:80	Mamott_B...	-70	5.7	31.6	222.2 kbps		
2412/2...				21.1		195.6 kbps	6	17
2437/2...	64:70:02:6C:37:E0	Mamott_G...		1.3		101.9 kbps		4
2437/2...				5.7	22.7	123.3 kbps	1	5
2437/2...	64:70:02:6C:37:E0	Mamott_G...	-71	1.1	19.8	101.3 kbps		
2417/2...				11.0		83.2 kbps	1	2
2457/2...				12.1		81.5 kbps	0	1
2412/2...	A0:F3:C1:81:F2:D6	Mamott_G...		2.4	11.6	79.5 kbps		2
2412/2...	A0:F3:C1:81:F2:D6	Mamott_G...	-87	2.4	11.6	79.5 kbps		
2412/2...	E8:94:F6:29:48:9A	Mamott_P...		1.3	6.3	66.1 kbps		7
2412/2...	E8:94:F6:29:48:9A	Mamott_P...	-87	1.3	6.3	66.1 kbps		
2462/2...				9.3		59.0 kbps	2	12

**Q&A**