

## SCENARIO

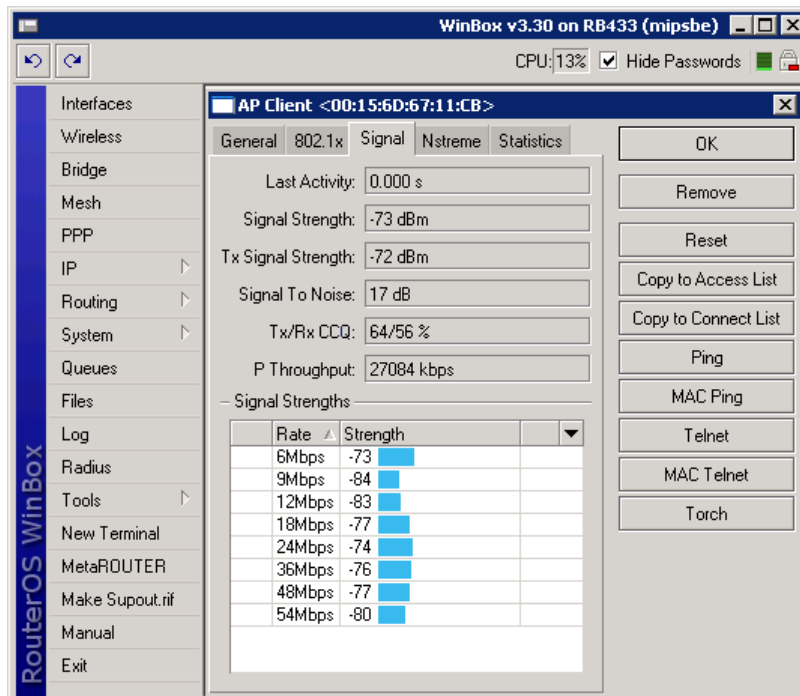
LearnMikroTik was contracted to design and deploy a wireless backhaul to deliver at least 20 mbps TCP throughput for a wireless ISP. Reliability and price point were the main concerns.

## SOLUTION

Using products from Titan Wireless ([www.titanwirelessonline.com](http://www.titanwirelessonline.com)), a Round Rock, Texas based wireless solution provider, LearnMikroTik used RadioMobile to plot the path between the two towers to be used for the link. The base end of the link would be on a 100 ft self supporting tower and the client end would be on the customer's 200 foot guyed tower. A primary design consideration was the wind loading and weight of the antennas to be used since the 100 ft tower was already heavily loaded.

LearnMikroTik chose RF Elements 27 db dish antenna for both ends of the link due to the small diameter (less than 20 inches), light weight (less than 3 pounds) and excellent performance characteristics. The Ubiquity XR5 radio card was chosen for it's high power output and proven frequency stability over time. MikroTik 433 main boards were chosen for their high performance, high reliability and low cost (coupled with the power and flexibility of RouterOS). Generic die cast weatherproof enclosures from Titan completed the design.

Both ends were installed and the dishes aligned resulting in a -72 dBm signal strength, well within the operating characteristics for the card and within 2 dB of the calculated link loss:



WinBox v3.30 on RB433 (mipsbe) CPU: 13% Hide Passwords

RouterOS WinBox

Interfaces  
Wireless  
Bridge  
Mesh  
PPP  
IP  
Routing  
System  
Queues  
Files  
Log  
Radius  
Tools  
New Terminal  
MetaROUTER  
Make Supout.tif  
Manual  
Exit

AP Client <00:15:6D:67:11:CB>

General 802.1x Signal Nstreme Statistics

Last Activity: 0.000 s

Signal Strength: -73 dBm

Tx Signal Strength: -72 dBm

Signal To Noise: 17 dB

Tx/Rx CCQ: 64/56 %

P Throughput: 27084 kbps

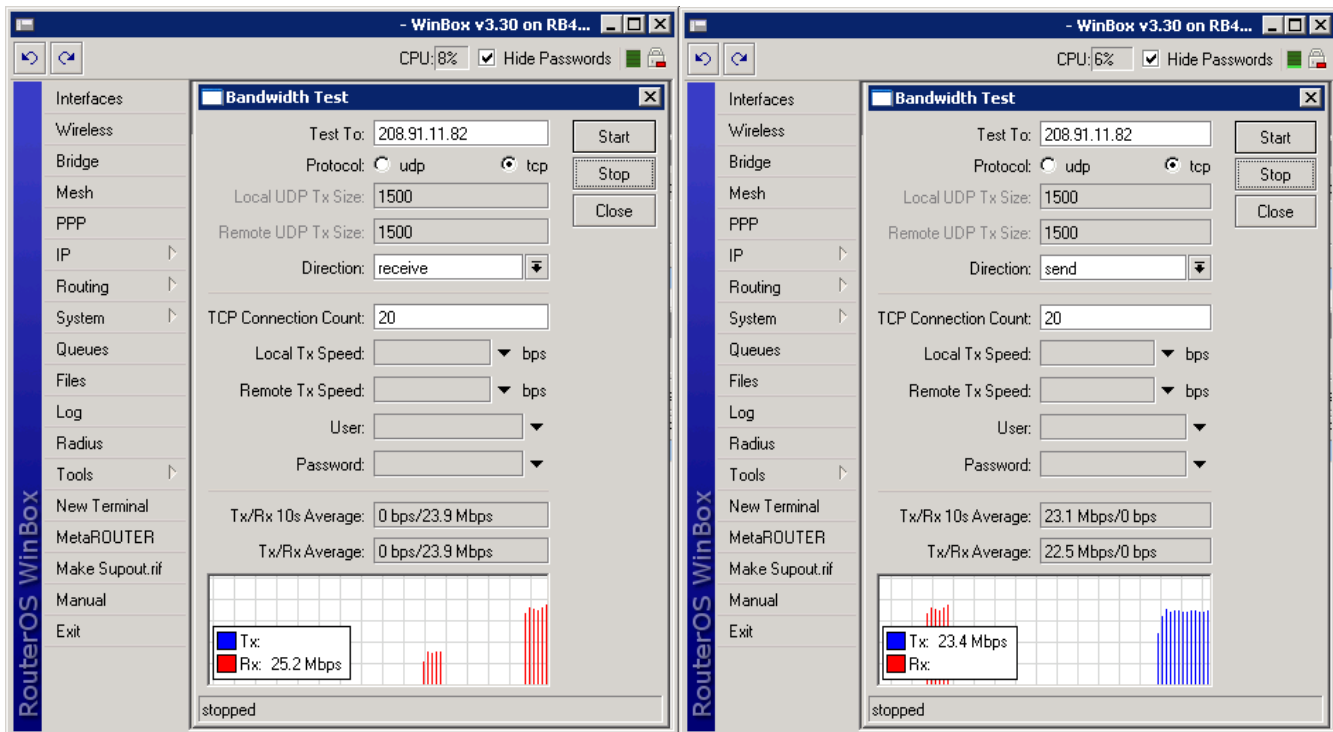
- Signal Strengths

Rate	Strength
6Mbps	-73
9Mbps	-84
12Mbps	-83
18Mbps	-77
24Mbps	-74
36Mbps	-76
48Mbps	-77
54Mbps	-80

OK  
Remove  
Reset  
Copy to Access List  
Copy to Connect List  
Ping  
MAC Ping  
Telnet  
MAC Telnet  
Torch

## 26 MILE WIRELESS BACKHAUL USING MIKROTIK cont...

Throughput tests were then conducted to determine performance of the link:



Based upon the performance, the link was accepted by the customer and is currently in production.

### SETTINGS

All standard wireless settings for 5GHz, 20 MHz channel, single NSTREME operation were used with the addition of NSTREME "Enable" and NSTREME "Best Fit" framer policy. Wireless "AP Bridge" and "Station wds" modes were used according to the MikroTik reference manual for transparent bridges.

### CONCLUSION

This design provided a relatively low cost (less than \$1,000 USD), high reliability solution for a 26 mile link. The combination of high performance RF Elements antennas, Ubiquity XR5 long range cards and MikroTik Router OS technology yielded the right solution, that respected customer requirements including low price point, reduced tower loading, short deployment time and high reliability.

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