EVALUATION OF LOW-COST IP RADIOS FOR USE WITH COMREX BRIC-LINK

The Comrex engineering department doesn't usually take people's claims seriously until they put them to the test. In this spirit, we've been hearing quite a lot about the proliferation of new, low cost radios that can reportedly span quite some distance and provide good IP bandwidth. This concept is especially intriguing as we introduce our new BRIC-Link product, which has the potential to turn these radios into high quality, full-duplex, low delay audio links at a reasonable cost.

So we invested in a pair of these radios to see what we could find. Our criteria were:

- Low cost (less than $500 per end)
- 5.8 GHz operation (we heard this band is reasonably uncluttered)
- Unlicensed operation
- Easy to set up and operate

What we chose was the Tranzeo TR-5A-24F. This is a Wi-Fi access point that transmits at 20mW, but has an integral 24dB gain directional antenna. The system can easily be configured as a point-to-point link, and can even be daisy-chained to create a multiple-hop link. The total cost of the radios was $287 each from an online retailer.

TRANZEO
WIRELESS TECHNOLOGIES INC.

TR-5a Series

All-in-One Advanced AP/PtP/CPE Model

Tranzeo is pleased to announce our TR-5a Series 5.3/5.4/5.8 GHz* products. These are integrated fully functioning radios. That means these units can be configured as an ***Access Point***, a ***Point to Point*** bridge, or a ***Client Adapter (CPE)***.

Overall Features:
Dual Ethernet Ports
This allows you to daisy-chain radios at your installation sites (depending on power requirements). Perfect for back to back point to point scenarios. Also great for installing peripheral Power over Ethernet devices like weather monitoring or security cameras.

More Robust Routing Features
Tunneling Protocol Support
Includes support for tunneling protocols such as VPN, PPTP, RSA, etc.

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Using the provided instructions, we were able to configure the radios in a point-to-point fashion quickly and test them across the approximately 600 foot length of the Comrex headquarters property. The radios have a simple 5 LED signal strength meter used for pointing, but at this distance aiming was not a factor.

We used ACCESS portable codecs for convenience due to their battery capability, but in Linear mode these are functionally identical to BRIC-Link. After about a 2 minute procedure, we were transferring perfect 1.6 Mb/s linear stereo audio between the radios in full duplex.

In search of a more challenging link not too far from home, we decided to set up one end on a hilltop in Lunenburg, MA which has a pretty clear western view. From the hilltop we chose three locations that were line-of-sight--we guessed our choices were about 1500 ft, 1 mile, and 2.5 miles (turns out our distance estimations weren't too far off).

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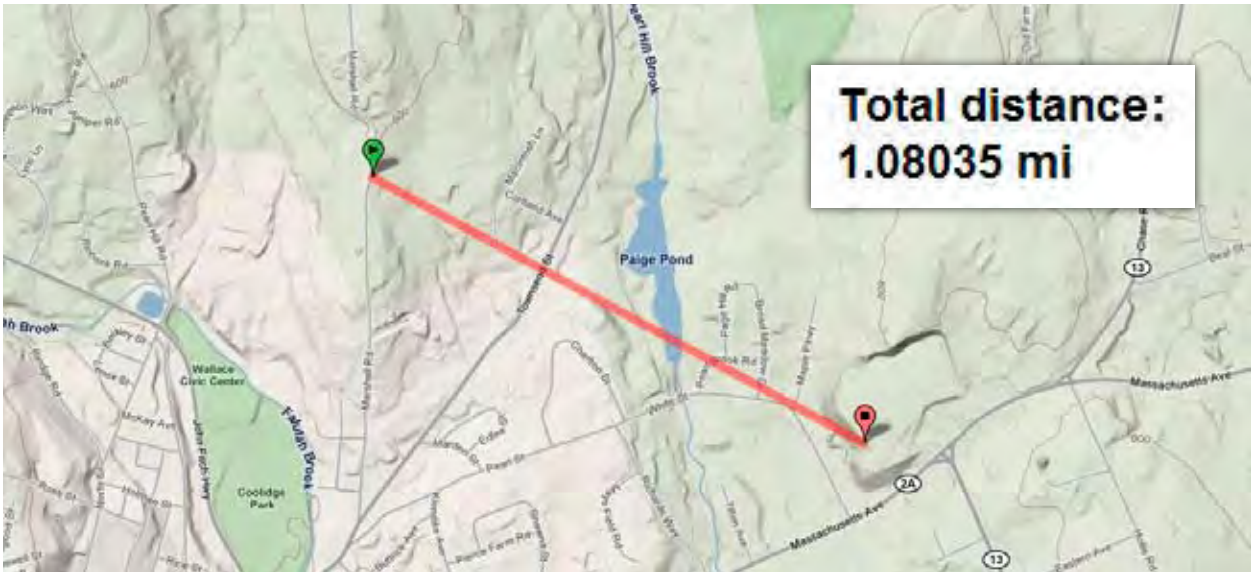
Our first stop, the nearest point (1500 ft), was very similar to the first test--full signal strength on the meter and crystal clear, low delay audio. The jitter buffers on our codec stats showed around 30mS buffering on each end, which is quite low. We could carry on conversations over the link easily.

The second stop was a mile out, path shown below:



No problems here, either. Four out of five bars on the signal meter, perfect audio transfer within about a minute after arriving.

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Off in the distance, we could see our final destination. On the far side of the sizable city of Fitchburg, some rolling hills were about the farthest shot possible from our base (with the exception of Mount Wachusett at a distance of 10 miles, but unfortunately the summit road was not yet accessible in early April). We found our way, found a spot and set up.

No problem. Although the signal meter now showed only 2 bars, audio was perfect and glitch free (again, using Linear PCM) for the duration of our test. Here's the shot:

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The statistics page of the ACCESS portable again showed perfect transmission with no packet loss and low jitter:

So in summary, it appears that these radios are a very easy and inexpensive way of creating an IP codec-friendly link across some pretty hefty distances if they happen to be line of sight. Coupled with the BRIC-Link codec, they create a powerful tool for point-to-point audio links within at least a 3 mile area. Versions of the radios are available with higher gain antennas to span even greater distances.

Next: We're waiting for that access road to open, and we'll take a shot from the top of Wachusett. Stay tuned!

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