

# FASTER WIRELESS ISN'T ALWAYS BETTER WIRELESS

There- I said it! Let the trouncing commence, as I fully realize the title of this blog borders on sacrilege for those of us that do wireless for a living.

## **Different Frequencies, Speeds for Different Applications**

We of the Wi-Fi mindset have the numbers 2.4 and 5 etched upon our psyche. We know that these numbers are followed by GHz in our version of reality, and that depending on what we do with spatial streams, output power values, and antenna designs, we'll achieve fairly standard (to us) rate-over-range permutations that more or less make up the various possibilities for connectivity that we provide to our clients. Not exactly news, right? **Let's take a quick look at some other frequencies, applications, and data rates that you might not be aware of, before I get to the point of this blog:**

- Frequency: 76 Hz. Application: ELF Military Comms. Data Rate: a fraction of a bit per second
- Frequency: 60 kHz. Application: Atomic Clock. Data Rate: 1 bit per second
- Frequency: 4235kHz. Application: WeatherFax. Data Rate: 45 bits per second

- Frequency: 144 MHz. Application: “Short-range” Amateur Radio. Data Rate: 1200 bits per second
- **Frequency: 900 MHz. Application: WLAN P-P Bridging. Data Rate: 50 Mbps+**

You know the rest of the story- as we go up in frequency to the familiar 2.4 and 5 GHz ranges, we can achieve higher data rates with generally shorter distances in play. We also know that power output and antenna configs contribute to cell range capabilities, and that modulation types ultimately decide what we can do with a given channel width at a specific frequency. This is wireless 101, yes?

And us wireless types get jazzed over HIGHER speeds, not lower- this I know. **But I’m here to tell you that it’s worth stepping outside of our normal for a bit and spending some time on the last bullet in the list above- 900 MHz- and what it can do for us.**

## **What’s So Exciting About 900 MHz?**

To most of us doing normal, day to day Wi-Fi, the answer is “nothing”. The lowly 900 MHz space is meaningless to the modern WLAN. But... some of us also have to do point-to-point bridging on occasion. Even here, 900 MHz is generally considered a dated technology as we put in our fast licensed and unlicensed bridges that deliver hundreds of Mbps or even Gig speeds on really neat hardware that needs line of sight to work.

Wha? What was that last part?

*“... on really neat hardware that needs line of sight to work.”*

So what happens if you can't get line of site? If you didn't know better, you might just say “I cannot do this link, for I don't have line of sight! Everyone knows ya gotta have line of site! I can't do this!” But not all bridge links NEED blistering throughput and “carrier-grade” expensive hardware. There is some handy gear out there available for 900 MHz bridge links that can overcome many LOS challenges you're likely to hit, and still provide a few dozen Mbps of throughput. Depending on your creativity and skills, you can also use of couple links in parallel to double your fun. 900 MHz will go through trees, small buildings, and can feel like magic compared to the more strict LOS-dependent characteristics of the higher frequencies.

Ubiquiti gear is among the more popular in this space, and this is the sort of use case that gets people excited. They don't need gobs of throughput, but do need to get through obstacles.

Read a few of these testimonials (there is almost a cult following of sorts to some Ubiquiti hardware) and you can get the sense why 900 MHz is popular in agricultural settings, where there is distance to cover, trees and terrain changes are a fact of life, and where moderate throughput is better than no throughput when you want to link things up.

I recently learned of a farm-specific hardware line from Ayrstone that includes infrastructure and in-vehicle components in what amounts to a really fascinating product set (yes, it based on Ubiquiti, but with proprietary firmware.) Ubiquiti isn't the only player in 900 MHz kit, but they seem to be the most visible.

### **Your 900 MHz Mileage May Vary (and so might your noise floor)**

Out in the boonies, 900 MHz has a fighting chance as a bridge solution given the lack of people who might have competing devices. Get near a population center, and things get more worrisome for 900 MHz hardware. There are lots of cordless telephones that use 900 MHz, and in the Amateur Radio world, 900 MHz is also known as the licensed 33cm band. Here you'll find a mix of activities from voice to data and FM to sideband, and hams usually get to use a lot more power than unlicensed network equipment. There may be pagers and other unlicensed 900 MHz gadgets afoot as well.

If you need non-LOS bridging and don't have contention for the spectrum from nearby devices, 900 MHz might be the slower-speed solution that works when the stuff that you'd rather use wont.

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