Weird & Wireless: What is the difference between a human eye and an antenna?

Welcome again to the wonderful but sometimes weird world of wireless comms, written by Joel Young, CTO of Digi International

As we grow up, until perhaps we enter our second physics class, we are never really taught that what we call visible light and other wireless things in the electromagnetic spectrum are really the same stuff.

Of course I very well realise that because the readers of this blog are naturally more intelligent than those non-blog readers, you all are well equipped with this knowledge.

Nonetheless, I think it is rather fun to consider that our eyes are perhaps the most advance antenna system ever created.

With this concept in mind, I want to add a disclaimer to those dictionary purists that will say an antenna must be made of metal and tuned to radio and microwave bands of the electromagnetic spectrum. I intend a broader definition.

With that in mind, think of it this way - the antenna system that is our eye has the ability to receive signals from about 430 to 750 THz (terahertz - 10 12) - a full range of 320 THz. Not only it is tuned to frequencies across this broad range of spectrum, it is also extremely directional.

It is so directional that it can determine distance from the source as well as relative position of a source among other sources.

Finally, the antenna system that is our eye also has an automatic gain adjustment to minimise the effects of saturation.

Contrast this with our best parabolic dish antennas that can really only accurately receive signals over the span of a few hundred megahertz.

The other amazing thing about the human eye as an antenna system is that it has the ability, through things called rods, to simultaneously look at the magnitude of a signal across a broad range with a rough location (think of this as our perception of overall brightness - or a black and white image) while at the same time being able to decode the signal into all of the different frequency components using things called cones (think of this as colour).

Remember that colour has not basis in reality; it is only a construct of our respective brains.

Now, assuming that you accept the above, many of you will no doubt say that we humans have developed a near equivalent antenna system known as a digital camera, or more specifically, a digital video camera.

Unfortunately, I think cameras are poor approximations in that they operate in still picture mode - frames, instead of continuously and can't do the precise tuning. Others of you are probably saying to yourself that the eye is really more of a full blown receiver than just an antenna system. This I think is a fair position and it really depends on where you draw the boundary between the eye and the optic nerve - however, for the purpose of this blog, it is really splitting hairs.

So anyway, the next time that you think of an eye - I suggest you imagine it with a million little antennas sticking out from within.

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Prior to joining Digi, Joel was VP of Sales & Marketing at Transcrypt International where he was responsible for sales, marketing, and product development for all information security products. During his tenure at Transcrypt, he also served as VP of Product Development and VP of Engineering where he was responsible for engineering, research and product development for wireless communications products, cellular telephony, wireline telephony and land mobile radio, data security and specialized digital radio products.

He also served as District Manager for AT&T Business Communications Services where he was responsible for the creation and implementation of voice processing and network database strategies, including deploying new voice processing platforms into the AT&T switched network for private network and other outbound calling services.