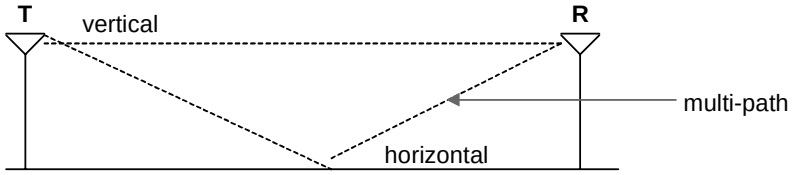
The Choice of Polarization — Indoor Picocell Antennas

Linear Polarization

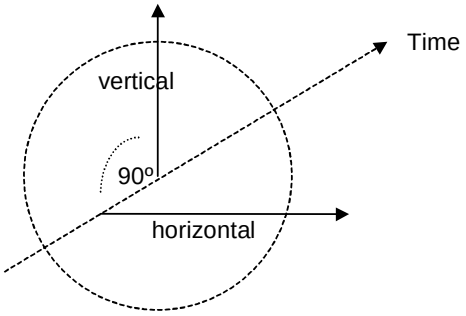
Unlike many outdoor environments, where direct line-of-sight between a transmitter and receiver allows reasonably unobstructed reception, indoor environments contain objects between the transmit and receive antennas. A linearly transmitted signal (either vertical or horizontal) can reflect off of walls and furniture, no longer traveling in a straight line. This 'multi-path' effect causes signal degradation and even cancellation where there are many reflective surfaces inside a building.



Reflective surface - angle of arrival

Circular Polarization

Circular polarization can significantly reduce multi-path effects in indoor environments. A circularly polarized signal is comprised of two orthogonal (right-angle) linear signals separated 90 degrees in electrical phase. (The vertical and horizontally polarized signals are spatially 90 degrees apart, with a 90 degree time delay built into the antenna design.)



Because different linear polarizations reflect and penetrate surfaces differently depending on the angle of arrival and material type, the most effective way to reach inside buildings is to use a circularly polarized antenna. The circularly polarized wave, as shown above, contains all the senses of linear polarization, (where vertical and horizontally polarized signals have maximum reflectivity off of a given surface at different angles), and will not cancel each other out. This allows for more continuous coverage in indoor environments than a purely linear polarized signal, and significantly increases the probability of maintaining the link.

A combination of linear vertical polarization and circular polarization is also acceptable in designing indoor wireless networks, depending upon the materials making up the reflective surfaces. At 7 dBi and 7 dBic gain, our micropicocell antennas provide continuous and efficient coverage for any indoor system.

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