

WiFi Range Extender

The WiPhAIA (pronounced WiFire) product range uses patent pending technology to produce an integrated, low cost solution to WiFi range extension. The products use low loss optical fibre to deliver WiFi signals to remote locations, they are aimed at applications where standard twisted pair cannot reach a given location either for logistical, environmental or safety reasons. Some example scenarios :

- Flexible provisioning of WiFi within a building beyond normal 100m twisted pair length limit
- Delivering WiFi into tunnels or underground environments
- Delivering WiFi into and between Faraday Cage/Tempest environments
- Delivering WiFi securely between buildings avoiding earth loop issues of copper cabling

The system is made up of two parts, the *Sampler Box* and the *PhAIA (pronounced Fire) module*. Figure 1 shows a pre-production prototype of the *sampler box*. This unit takes a coaxial feed from any WiFi signal source which has a detachable antenna and converts the WiFi signals into bidirectional optical signals that are transmitted and received down standard multimode or single mode optical fibres. At the remote site, up to 1.5km away, the *PhAIA module*, shown in figure 2, takes the optical signals and converts them directly back into WiFi signals – the antennas are an integral part of the system as can be seen when the box lid is removed.



Figure 1 : Prototype *Sampler Box* for use in the WiPhAIA range extender system



Figure 2 : Prototype *PhAIA Module* for use at the remote end of a WiFi range extension system

The prototypes run off standard AC mains power and the typical WiFi range coverage is upto 8m at the remote site. This can be further extended with the use of low cost amplifiers in the remote unit.

Technology Status

Trials of **range extension** have now been run using live University based hotspots and dark fibre and excellent results have been achieved. Beginning in 2008, the University is seeking to transfer and license the technology to one or more product development partners.

Referenced Publications

- [1] M.J.Cryan *et al*, "A 2.4GHz Wireless-Over-Fibre Transceiver using Photonic Active Integrated Antennas (PhAIAs)", Microwave and Optical Technology Letters, February 2006.
- [2] "A low cost Wireless optical transceiver module", GB 0409855.4 May 2004, US Patent 20080031628
- [3] V.Sittakul, M.J. Cryan, "A Fully Bi-directional 2.4-GHz Wireless-over-fibre system using Photonic Active Integrated Antennas (PhAIAs)", IEEE Journal of Lightwave Technology , Nov 2007

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