Docket #: S13-277

Full Duplex Wireless Radios

Engineers in Prof. Sachin Katti's laboratory have developed a full duplex wireless system designed to double throughput by simultaneously transmitting and receiving signal on a standard single inband antenna. The technology combines tools from RF circuit design, digital signal processing algorithms and communications to cancel self-interference from the antenna (110 dB over 80 Mhz wide band). This is achieved with no additional hardware beyond the RF cancellation circuit. This full duplex radio could help build faster, more efficient wireless networks with specific applications in APs and base stations.

Stage of Research
Prototype – the inventors built analog circuit boards and integrated them with a fully WiFi-PHY compatible software radio implementation and demonstrated robust performance in noisy indoor environments with close to expected doubling of throughput.

MIMO implementation – described in Stanford Docket S13-276

Applications

- **Wireless communications:**
  - point-to-point links
  - multi-channel single AP WiFi
  - programmable LTE phones and base stations
  - LTE access

Advantages

- **Increased spectrum** - full duplex operation on single antenna:
  - WiFi with gains near 2x from standard single antenna system

    - co-existence of full duplex WiFi AP with half duplex client provides 1.5x gains
- **Standard equipment:**
    - uses WiFi 802.11 ac PHYs
    - only additional hardware is RF cancellation circuit

Publications

- US Patent Application 20140348018
- Dinesh Bharadia, Emily Mcmilin and Sachin Katti, "Full Duplex Radios", *ACM SIGCOMM 2013*

Patents

- Published Application: 20140348018
- Issued: 10,284,356 (USA)

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