MIMO-OFDM for high throughput WLAN: experimental results

**Alexei Gorokhov, Paul Mattheijssen, Manel Collados,
Bertrand Vandewiele, Gunnar Wetzker**

Philips Research

- ✦ PHY options for high throughput wireless LANs

- ✦ Right time and place for MIMO?

- ✦ Performance enhancement via antenna selection

- ✦ Experimental set-up and channel measurements

- ✦ MIMO architectures for high data rates

- ✦ Experimental results

PHILIPS

High data rates: challenges & solutions

Requirements

❑ *Higher data rates (> 100Mbps)*

❑ *Increased throughput*

❑ *Extended range*

❑ *Better coverage*

❑ *Higher network capacity*

Possible solutions

➢ *Increase bandwidth per link*

➢ *Higher order modulation*

➢ *More powerful CODEC*

➢ *TX / RX diversity*

➢ *MIMO*

PHILIPS

High data rates: challenges & solutions

Requirements

☺ Higher data rates (> 100Mbps)

❑ *Increased throughput*

❑ *Extended range*

❑ *Better coverage*

☹ Higher network capacity

☹ Currently ⇒ 12 channels
    2 x rate ⇒   6 channels

Possible solutions

➢ Increase bandwidth per link

➢ Higher order modulation

➢ More powerful CODEC

➢ TX / RX diversity

➢ MIMO

PHILIPS

High data rates: challenges & solutions

Requirements

- ☺ **Higher data rates (> 100Mbps)**

- ❑ *Increased throughput*

- ☹ **Extended range**

- ☹ **Better coverage**

- ❑ *Higher network capacity*

- ☹ *Over 64-QAM: severe requirements to analogue & mixed signal circuits*

Possible solutions

- ➤ *Increase bandwidth per link*

- ➤ *Higher order modulation*

- ➤ *More powerful CODEC*

- ➤ *TX / RX diversity*

- ➤ *MIMO*

PHILIPS

High data rates: challenges & solutions

Requirements

❑ *Higher data rates (> 100Mbps)*

☺ Increased throughput

☺ Extended range

☺ Better coverage

❑ *Higher network capacity*

☹ Higher complexity: power & area

Possible solutions

➢ Increase bandwidth per link

➢ Higher order modulation

➢ More powerful CODEC

➢ TX / RX diversity

➢ MIMO

▪ Iterative demodulation with "anti-Gray" maps
▪ Turbo coded CODEC

PHILIPS

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.