

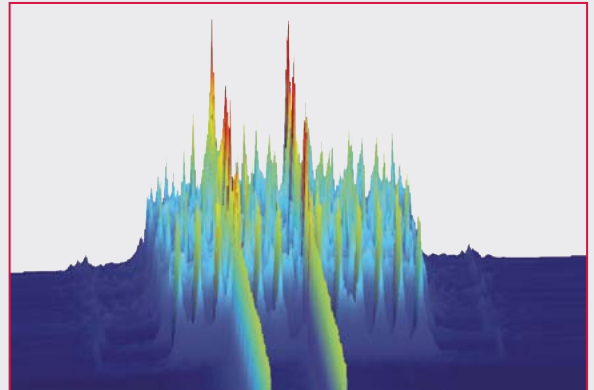
# Improving wireless communications using cognitive radio

# Cognitive radio technologies can improve the reliability, throughput and capacity of wireless communications systems through the application of advanced digital signal processing algorithms.

IRL (Industrial Research Limited) has significant research and development capability and a substantial intellectual property portfolio in cognitive radio technologies.

## Stand-out benefits

- ▶ Improved coverage and throughput for multi-carrier systems
- ▶ Compliance with industry standards, including IEEE 802.11a/g and IEEE 802.16-2004
- ▶ Robust in narrowband interference for unlicensed spectrum operation
- ▶ Best-in-class detection and mitigation of wideband interference for all shared spectrum applications
- ▶ Key technologies patent protected in New Zealand and United States
- ▶ Multidisciplinary team.



*Cordless telephone interfering with WiFi in 2.4GHz ISM unlicensed spectrum.*

IRL has been developing next generation wireless communications technologies for 20 years and has been improving the performance of multi-carrier modulations since 1998. Many of these technologies have been transferred to leading New Zealand companies, including Marine Air Systems, Deltec, Navman, ECONZ and Tait.

## Key expertise

- ▶ All aspects of OFDM baseband signal processing
- ▶ MIMO algorithms for multi- and single-carrier modulations
- ▶ Digital signal processing algorithm design, development and implementation
- ▶ Development capability for a variety of platforms, including MATLAB, C/C++, FPGA/VHDL and DSP
- ▶ Development, implementation and verification of MAC protocols
- ▶ Strong links to university researchers in New Zealand and overseas, see [www.nzwrn.org.nz](http://www.nzwrn.org.nz), [www.acorn.net.au](http://www.acorn.net.au)

## Patent portfolio

- ▶ Communication system using OFDM (NZ 506558, US 10373427)
- ▶ Maximum likelihood synchronisation for a communications system using a pilot symbol (NZ 509688, US 10470825)
- ▶ Method and apparatus for improving the performance of pilot symbol assisted receivers in the presence of narrowband interference (NZ 524929, US 10550633)
- ▶ Narrowband interference suppression for OFDM systems (NZ 526669, US 10561702)
- ▶ Detection of wideband interference (NZ 551179, PCT).

For all enquiries please contact the Industry Engagement team on 0508 CALL IRL (0508 225 5475). If calling from overseas phone +64 4 931 3000 or visit the *Contact Us* page on our website.

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