

Reconfigurable radio solutions enable low-cost, low-power spectrum sensing

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Caption: Imec's digital front-end for low-cost and low-power spectrum sensing.

Imec presents a digital front-end component for low-cost and low-power spectrum sensing, paving the way to power-efficient cognitive radios and networks. The new results support industry's search for increased flexibility and reliability for their next-generation wireless devices.

The accelerated deployment of broadband personal communication coupled with the continuously increasing demand for large data rates results in an increasing [spectrum](#) scarcity. A dynamic access to the available spectrum would increase the throughput efficiency significantly. In licensed bands scenarios, dynamic spectrum access would for example allow personal mobile terminals to seamlessly set-up and maintain a reliable wireless connection. In unlicensed bands (e.g. the crowded 2.4 GHz band), it would bring great added value to products for

which interruptions in the connectivity cannot be tolerated, for safety reasons in a control system (e.g. surveillance camera's), or for comfort reasons in real-time applications (wireless conferencing, hearing aids,...) as it would improve connectivity even in the presence of many competing and interfering networks.

However, current radio architectures are focused on the reception of a predefined channel, and cannot proceed to a frequency scan operation in a timely, cost- and energy-effective way. Imec's cognitive reconfigurable radio solutions hold the solution for such next-generation flexible radios, as they enable multi-mode communication and spectrum sensing.

Imec's new spectrum sensing component was designed as a versatile digital engine to meet a wide variety of use cases, at low cost and low power overhead. The chip, which hosts a dedicated ASIP (application-specific integrated processor), can perform both flexible synchronization and spectrum sensing for high-throughput WLAN (802.11a-n), cellular standards (including the recent 3GPP-LTE), and digital broadcasting standards.

The novel spectrum sensing component connects to imec's in-house designed analog reconfigurable radio chip (SCALDIO) and imec's programmable digital baseband platform conceived for [4G](#) seamless connectivity (COBRA). As such, imec's complete reconfigurable radio solutions enable multimode communication with efficient use of the spectrum.

Imec cooperates with K.U.Leuven and Vrije Universiteit Brussel in the project 'Essences', funded by the Flemish government agency for Innovation by Science and Technology, IWT, to conceive even lower power solutions for the future.

Provided by IMEC

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