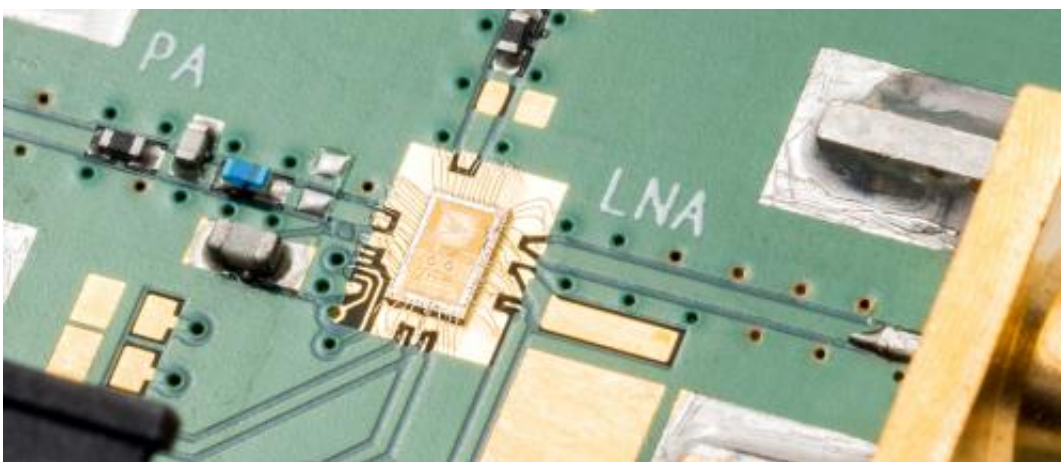


Breakthrough solution for TX-to-RX isolation in reconfigurable, multiband front-end modules for mobile phones

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Electrical-Balance Duplexer in $0.18\mu\text{m}$ SOI CMOS

At next week's Mobile World Congress in Barcelona, Spain (MWC2015), imec, Murata and Huawei will present a stand-alone multiband electrical-balance duplexer in $0.18\mu\text{m}$ SOI CMOS. This type of duplexer is a promising alternative to the fixed frequency surface-acoustic wave (SAW) filters implemented in mobile phones providing transmit-to-receive (TX-to-RX) isolation.

SAW duplexers are integrated into today's mobile phones to suppress TX-to-RX signal transfer and avoid unwanted frequency components in the RF signal. As SAW duplexers are functioning at a fixed frequency, more

and more SAW duplexers would be needed so that mobile phones can support the ever growing amount of bands adopted by operators. Due to their frequency flexibility, electrical-balance duplexers are paving the way to an integrated multiband solution for TX-to-RX isolation in front end modules in mobile phones.

The new 1.9-2.2GHz duplexer (1.75mm²) is implemented in 0.18μm RF silicon-on-insulator (SOI) CMOS technology enabling high quality integrated passive devices and high power duplexer operation (+27dBm TX output). It achieves excellent linearity (more than +70dBm IIP3 in both TX and RX), which is comparable to conventional passive SAW filters. This prevents the duplexer from generating nonlinear distortion in the presence of external jammer signals at specific sensitive frequencies and its own large TX signal.

The duplexer achieves low insertion losses, at less than 3.7dB TX and 3.9dB RX, and has isolation characteristics competitive with state of the art SAW duplexers. The duplexer uses a single ended topology to avoid common mode leakage issues that could cause the RX to compress for high power TX input signals. Marking an industry first achievement reported upon at the International Solid State Circuits Conference (ISSCC), Feb. 22-26, it is the first electrical balance duplexer reported to be linear enough to avoid RX de sensitization due to inter and cross modulation between the TX and typical 3GPP-defined jammers.

"We are pleased to have achieved these breakthrough results in close collaboration with our partners Murata and Huawei. Our solution paves the way to integrated reconfigurable multiband front-end modules for frequency division duplexing in next-generation mobile phones," stated Joris Van Driessche, program manager reconfigurable radios at imec . "Our industrial affiliation program on reconfigurable radios leverages on the multidisciplinary expertise of our global partner network and our own scientific expertise to develop disruptive solutions for today's ever

evolving mobile and high speed wireless communications market."

Provided by IMEC

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