

January 13, 2020



Resonant Power Handling Innovation Lowers RF Filter Costs for High-Power 4G Devices

GOLETA, CA / ACCESSWIRE / January 13, 2020 / Resonant Inc.(NASDAQ:RESN), a leader in transforming the way radio frequency, or RF, front-ends are being designed and delivered for mobile handset and wireless devices, today announced its RF filter design innovation that allows the design of high-power RF filters using low-cost surface acoustic wave (SAW) processes resulting in devices capable of filtering at higher power (HiPower™).

This breakthrough will first impact the fast-growing market for 4G high power user equipment (HPUE) devices. The HiPower SAW innovation was enabled by Resonant's [high-precision Infinite Synthesized Networks®](#) (ISN®) RF filter design tool.

Currently, Tier 1 4G smartphones have between 50-90 RF filters to support multiple antennas and radio frequencies needed for worldwide operation. Lower-cost processes will significantly reduce the bill of materials (BOM) cost.

HPUE devices, which are classified as power class 2 and operate at +26 dBm, were first announced by mobile network operators Sprint and China Mobile. Sprint, in particular, has actively promoted[1] its HPUE strategy saying it allows the company to expand the coverage range of its 2.5 GHz cell sites by 24% and to offer 49% faster download speeds when compared to its 1.9GHz network.

Resonant Details Innovation in new Whitepaper

Resonant has documented the performance of the HiPower SAW innovation in a recently posted whitepaper titled: [Mobile Filter Innovation is Alive and Well in Extending the Reach of 4G](#). All filters that pass high RF power experience self-heating that limits the filter's maximum power. Through very precise simulation, Resonant is able to improve the power durability performance of filters made using the HiPower SAW designs.

This was shown by the results of a test described in the whitepaper which measured the power output of a standard SAW Band 3 transmit (Tx) filter and the Resonant HiPower SAW Band 3 filter as the input power was increased incrementally. The tests showed a linear progression for the SAW part until 32.5dBm of input power. The HiPower SAW part, however, continued its linear power performance up to an input power of 35dBm.

In the whitepaper, both of these power results were layered over simulations of the parts conducted by ISN, which predicted the power results very accurately.

"We know that power will be an issue in 5G devices, but our new whitepaper shows just how high power devices are emerging on 4G networks, making this new innovation essential for

carriers that are moving to services based on mid-band spectrum," said George Holmes, Resonant Chairman and CEO. "This innovation is good news for Resonant as the market for 4G filters is still growing across the world, and demand for 4G filters will be strong even in 5G phones."

About Resonant Inc.

Resonant (NASDAQ: RESN) is transforming the market for RF front-ends (RFFE) by disrupting the RFFE supply chain through the delivery of solutions that leverage our Infinite Synthesized Networks (ISN) software tools platform, capitalize on the breadth of our IP portfolio, and are delivered through our services offerings. Customers leverage Resonant's disruptive capabilities to design cutting edge filters and modules, while capitalizing on the added stability of a diverse supply chain through Resonant's fabless ecosystem-the first of its kind. Working with Resonant, customers enhance the connectivity of current mobile devices, while preparing for the demands of emerging 5G applications.

For more information, please visit www.resonant.com.

To learn more about Resonant, view the series of videos published on its website that explain Resonant's technologies and market positioning:

- [Resonant Corporate Video](#)
- [ISN and XBAR: Speeding the Transition to 5G](#)
- [Infinite Synthesized Networks. ISN Explained](#)
- [What is an RF Filter?](#)
- [RF Filter Innovation](#)
- [Transforming the Mobile Filter Supply Chain](#)

For more information, please visit www.resonant.com.

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About Resonant's ISN® Technology

Resonant can create designs for difficult bands, modules and other complex RF Front End requirements that we believe have the potential to be designed and manufactured for less cost and less time than traditional approaches. ISN is a suite of proprietary mathematical methods, software design tools and network synthesis techniques that enable us to explore a much larger set of possible design solutions that regularly incorporate our proprietary technology. We then quickly deliver design simulations to our customers, which they manufacture or have manufactured by one of our foundry partners. These improved solutions still use Surface Acoustic Wave (SAW) or Temperature Compensated Surface Acoustic Wave (TC-SAW) manufacturing methods and perform as well as those using higher

cost manufacturing methods such as Bulk Acoustic Wave (BAW). Resonant's method delivers excellent predictability, enabling achievement of the desired product performance in roughly half as many turns through the fab. In addition, because Resonant's models are fundamental, integration with its foundry and fab customers is seamless because its models speak the "fab language" of basic material properties and dimensions.

Resonant Safe Harbor / Forward-Looking Statements

This press release contains forward-looking statements, which include the following subjects, among others: the capabilities of our filter designs and software tools. Forward-looking statements are made as of the date of this document and are inherently subject to risks and uncertainties which could cause actual results to differ materially from those in the forward-looking statements, including, without limitation, the following: the satisfaction of the conditions to closing of the offering, including reaching an agreement with Murata on the terms of our commercial agreement for XBAR solutions and obtaining applicable governmental approval; risks associated with the cash requirements of our business; our limited operating history; our ability to complete designs that meet customer specifications; the ability of our customers (or their manufacturers) to fabricate our designs in commercial quantities; our customers' ability to sell products incorporating our designs to their OEM customers; changes in our expenditures and other uses of cash; the ability of our designs to significantly lower costs compared to other designs and solutions; the risk that the intense competition and rapid technological change in our industry renders our designs less useful or obsolete; our ability to find, recruit and retain the highly skilled personnel required for our design process in sufficient numbers to support our growth; our ability to manage growth; and general market, economic and business conditions. Additional factors that could cause actual results to differ materially from those anticipated by our forward-looking statements are under the captions "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our most recent Annual Report (Form 10-K) or Quarterly Report (Form 10-Q) filed with the Securities and Exchange Commission. Forward-looking statements are made as of the date of this release, and we expressly disclaim any obligation or undertaking to update forward-looking statements.

[1] <https://newsroom.sprint.com/sprint-unveils-breakthrough-technology-innovation-to-deliver-better-coverage-and-faster-data-speeds-in-more-places.htm>

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