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# **Resonant Announces Performance Data of First XBAR™ Filter; Device Demonstrates the Potential for Wide Bandwidth, Low Insertion Loss, Small Size at High Frequency for 5G Mobile Devices**

BARCELONA, Spain, Feb. 25, 2019 (GLOBE NEWSWIRE) -- Resonant Inc. (NASDAQ: RESN), a leader in transforming the way radio frequency, or RF, front-ends are being designed and delivered for wireless devices, announced the performance characteristics of the first 5G RF filters that use its XBAR™ resonator technology.

The new filter, created using Resonant's Infinite Synthesized Networks® (ISN®) design technology, will be on display at the company's Mobile World Congress (February 25-28, 2019) demonstration suite. Mobile World Congress is the largest worldwide conference for the wireless telecommunication industry. At the show, the industry convenes to share innovation, explore trends and hear from today's leaders and influencers.

"ISN allows Resonant to develop new RF filters quickly because of the accuracy of the proprietary acoustic and electromagnetic models. In the very first wafers of XBAR filters the measured resonator performance is consistent with our simulations. Through consistent measured to model performance we are confident that we can consistently design new and more complex filters quickly," said George B. Holmes, CEO of Resonant. "The market timing of our successful validation of this XBAR filter is aligned well with the timing of device manufacturers bringing true 5G devices to market in 2020."

Thanks to ISN, the design and fabrication of the new filter took only a few months since the company first announced its breakthrough XBAR resonator structures in October 2018. More, and increasingly complex, filters will be required for 5G, putting further demand on design capacity to meet growing mobile RF front-end requirements. Companies that partner with Resonant will be able to leverage the power of the ISN platform to improve design efficiency and dramatically reduce the number of fab turns, allowing incumbent suppliers to maintain or increase their market share and new market entrants to compete in this dynamic and rapidly growing market.

In early tests, the prototype XBAR filters have demonstrated greater than 500 MHz of bandwidth in the 5 GHz frequency range. Many high data rate, 5G data services will operate in this frequency range, which is difficult to support using current RF filter technology. The early XBAR devices measured approximately 1 dB of passband insertion loss (from the center of the passband), minimizing the transmit signal loss, and hence prolonging battery life. The filter size measures 1.8 mm x 1.8 mm, a form factor optimal for mobile devices.

The XBAR resonators are new bulk acoustic wave (BAW) structures developed by Resonant using ISN. Company engineers have previously used ISN to design surface acoustic wave (SAW) and temperature-compensated SAW (TC-SAW) filters. By using ISN to design and simulate the performance of BAW resonators, Resonant was able to create a technology that has the performance needed for high-performance 5G devices, yet uses existing manufacturing processes for fast production and low unit costs.

With XBAR, Resonant can develop new “greenfield” filter designs for both high frequency and large bandwidth that do not currently have competing acoustic filter options.

Resonant plans to make its first XBAR filter, supporting band n79, available for licensing through its Filter IP Standard Library. The company is currently qualifying foundry partners in order to provide a turnkey solution for customers. The company expects to have foundries qualified and producing parts as early as the third quarter of 2019.

To arrange a briefing and demonstration of Resonant’s innovative XBAR technology, contact Steve Kubes at [skubes@resonant.com](mailto:skubes@resonant.com).

### **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 Network (ISN) software tools platform, capitalize on the breadth of our IP portfolio, and are delivered through our services offerings. In a market that is critically constrained by limited designers, tools and capacity, Resonant addresses these critical problems by providing customers with ever increasing design efficiency, reduced time to market and lower unit costs. 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.

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

- [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](http://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 manufactured for half the cost and developed in half the time of 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.

## **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 ISN tools and technology. 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: 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.

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Source: Resonant Inc.