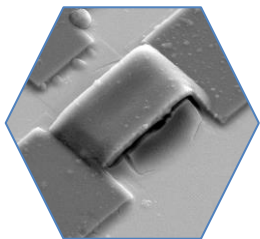
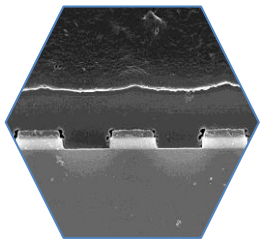


## SAW Filter Comparison 2020

*Deep dive analysis and cost review of key SAW filter technologies from Murata, Skyworks, Qorvo, Qualcomm, Wisol, Taiyo Yuden, Kyocera, Tai-SAW, SAWNICS and Shoulder.*



**Title:** SAW Filter Comparison 2020

**Pages:** 201

**Date:** June 2020

**Format:** PDF & Excel file

**Price:** EUR 6,490

**Reference:** SP20490

In 2018, the market for Radio Frequency (RF) Front-Ends and connectivity was worth \$15 billion, Yole Développement estimates. The leader in this market was Murata, with a quarter share, mainly with its discrete filters. In this segment, more than 60% of the filters are based on Surface Acoustic Wave (SAW) technology in 2020. There are three main process: SAW, Temperature-Compensated SAW (TC-SAW) and Thin-Film SAW (TF-SAW). For pure SAW, several Asian companies are involved, like Wisol and Kyocera. For TC-SAW, the market is split between four players. Two of them are Skyworks and Qorvo. The other two companies have now introduced TF-SAW technology into their portfolio, Murata in 2019 and Qualcomm in 2020.

This report provides insights and technology data for SAW filter technology for different suppliers. It includes a comparative study of thirteen components from Murata, Skyworks, Qorvo, Qualcomm, Wisol, Taiyo Yuden, Sawmics, Kyocera, Tai-SAW and Shoulder.

Physical data for several components has been compared in terms of process flow, cost and integration to provide a large panel of technical and economic choices from the market such as:

- Standard SAW technology from emerging Asian companies compared to leaders on the market
- Temperature-Compensated and High-Performance SAW filters using oxide layers, air cavity and protective layer
- Thin-Film SAW from Murata using ceramic/silicon wafer bonding to improve standard SAW technology

The report includes a description of each process flow for the thirteen SAW technologies on the market. It also contains a complete cost analysis of each process and tries to explain OEM choices.

### COMPLETE TEARDOWN WITH

- Comparative study with photos and cross-sections
- Filter overview: Schematics, materials, dimensions
- Manufacturing process flow
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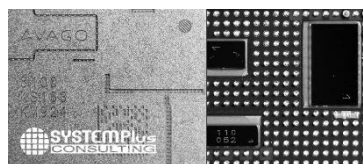
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### RF Front-End Module Comparison 2020 – Volume 2

*Technical and cost overview of Huawei's Mate and P series Radio Frequency Front-End Module technologies from 2015 to 2019.*

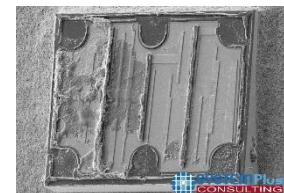
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### Broadcom AFEM-8100 System-in-Package in the Apple iPhone 11 Series

*Cost effective third generation of mid/high band Front-End Module with advanced and innovative packaging.*

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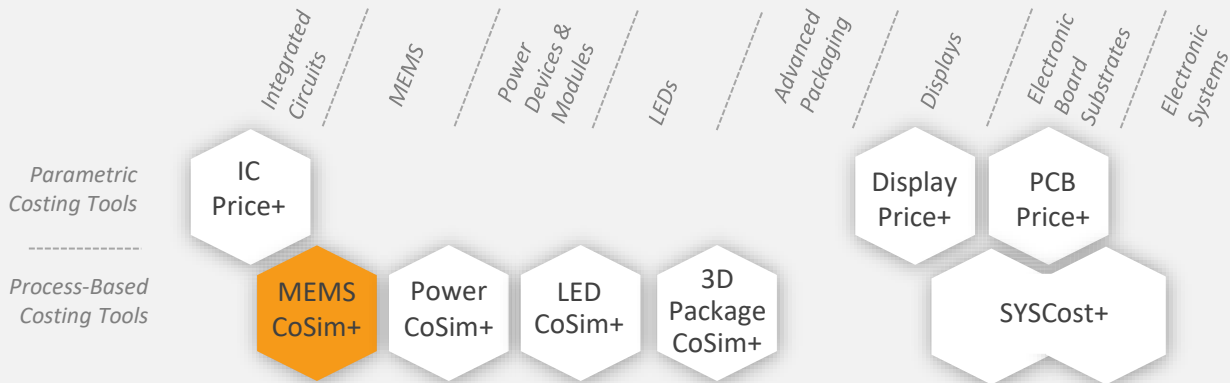


### Murata Incredible High Performance (IHP) SAW Filter

*The first thin-film SAW filter for 2.4 GHz Wi-Fi smartphone front-ends.*

October 2019 - EUR 3,990\*

## COSTING TOOLS



Our analysis is performed with our costing tool MEMS CoSim+.

System Plus Consulting offers powerful costing tools to evaluate any process or device, the production cost and selling price, from single chip to complex structures. All these tools are on sale under corporate license.

### MEMS CoSim+

Cost simulation tool to evaluate the cost of any MEMS process or device: From single chip to complex structures.

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### WHAT IS A REVERSE COSTING®?

Reverse Costing® is the process of disassembling a device (or a system) in order to identify its technology and calculate its manufacturing cost, using in-house models and tools.



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# TERMS AND CONDITIONS OF SALES

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## 1. INTRODUCTION

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Buyer must note that placing an order means an agreement without any restriction with these terms and conditions.

## 2. PRICES

Prices of the purchased services are those which are in force on the date the order is placed. Prices are in Euros and worked out without taxes. Consequently, the taxes and possible added costs agreed when the order is placed will be charged on these initial prices.

System Plus Consulting may change its prices whenever the company thinks it necessary. However, the company commits itself in invoicing at the prices in force on the date the order is placed.

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## 4. TERMS OF PAYMENT

System Plus Consulting delivered services are to be paid within 30 days end of month by bank transfer except in the case of a particular written agreement.

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The delivery schedule on the purchase order is given for information only and cannot be strictly guaranteed. Consequently any reasonable delay in the delivery of services will not allow the buyer to claim for damages or to cancel the order.

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## 8. FORCE MAJEURE

System Plus Consulting responsibility will not be involved in non execution or late delivery of one of its duties described in the current terms and conditions if these are the result of a force majeure case. Therefore, the force majeure includes all external event unpredictable and irresistible as defined by the article 1148 of the French Code Civil?

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As a rule, all information handed by customers to system Plus Consulting are considered as strictly confidential. A non-disclosure agreement can be signed on demand.

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The Buyer is responsible for the use and interpretations he makes of the reports delivered by System Plus Consulting. Consequently, System Plus Consulting responsibility can in no case be called into question for any direct or indirect damage, financial or otherwise, that may result from the use of the results of our analysis or results obtained using one of our costing tools.

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Any dispute that may arise about the interpretation or execution of the current terms and conditions shall be resolved applying the French law.

If the dispute cannot be settled out-of-court, the competent Court will be the Tribunal de Commerce de Nantes.