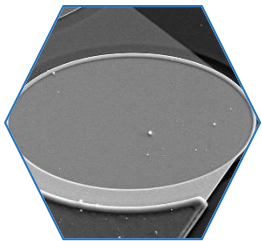
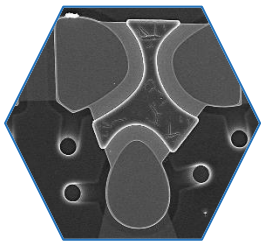
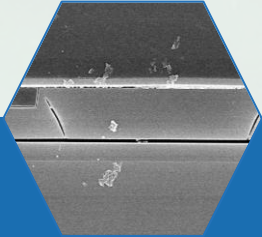


## Akoustis XBAW Technology for Connectivity

*Deep insight into Scandium doped Aluminum Nitride FBAR-BAW filter from Akoustis for WiFi 6 connectivity.*



**Title:** Akoustis XBAW Technology for Connectivity

**Pages:** 154

**Date:** July 2021

**Format:** PDF & Excel file

**Price:** EUR 3,990

**Reference:** SPR21620

Back in 2017, Akoustis had the idea to make a filter device based on a single crystal piezoelectric with the best performance on the market. Three years later, the company made its first XBAW filter using its own fabrication site, with custom packaging and started to ramp up production. With several patents, the company has built a large portfolio of Bulk Acoustic Wave (BAW) filters that address markets like defense, infrastructure and network routers.

This year, Akoustis entered the industrial/consumer market, in Amazon's eero Pro 6, which features WiFi 6 connectivity technology. The device relies on two different BAW filters from Akoustis covering two different frequency bands, UNII2c/3 (AKF-1252) and UNII1/2a (AKF-1256). Today, Akoustis can also provide a large portfolio in the 5.15–7.13 GHz frequency band for Wifi. The report will look at the AKF-1256 and two other components from the company portfolio, the A10155, which offers 665 MHz of bandwidth at 5.5 GHz, and the A10165, with 1.2 GHz of bandwidth at 6.5 GHz.

The components use innovative Scandium-doped Aluminum Nitride (ScAlN) growth technology and fusion bonding technology to transfer the piezoelectric structure. These newly developed devices implement complex ladder structures with a

resonator density higher than its major competitors. To seal the internal structure, the packaging uses a plastic lid on a printed circuit board substrate.

The report contains a deep analysis of the filter dies, with a complete cost analysis of the components. It also integrates a comparison between the manufacturing and cost of Akoustis A10165 versus AKF-1256/A10155. Finally, the Akoustis Solution is compared with the latest generation of Skyworks' and Broadcom's Film Bulk Acoustic Resonator (FBAR)-BAW, and Qorvo's solidly mounted resonator (SMR) BAW filter from the QM77040 integrated in several 5G phones.

### COMPLETE TEARDOWN WITH

- Detailed photos
- Precise measurements
- Materials analysis
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis
- Technology and cost comparison with Broadcom, Skyworks and Qorvo's BAW filter technology

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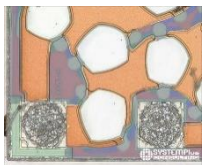


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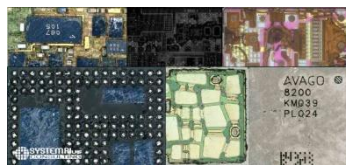
## RELATED ANALYSES



### Skyworks' 2nd Gen. FBAR-BAW in MB/HB Diversity SKY53X17

Second generation BAW filter in Mid-High Band diversity module from Skyworks integrated into Apple iPhone 12 and iPad Pro fifth generation.

June 2021 - EUR 3,990\*



### Broadcom AFEM-8200 PAMiD in the Apple iPhone 12 Series

Deep dive analysis of the fourth generation of mid/high band front-end module for 4G and 5G from Broadcom.

February 2021 - EUR 3,990\*

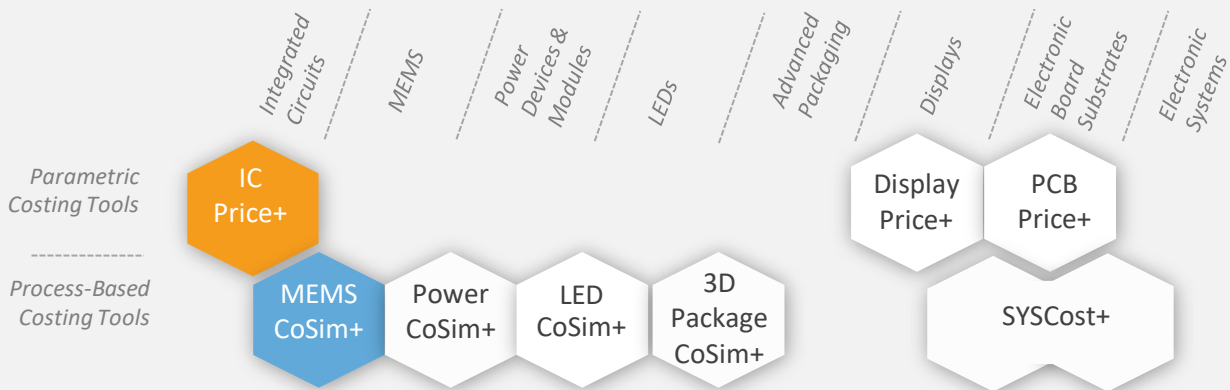


### 5G's Impact on RF Front-End for Telecom Infrastructure 2021

The RF component market for telecom infrastructure will peak at \$4.2B in 2023 thanks to active implementation of 5G.

March 2021 - EUR 6,490\*

## COSTING TOOLS



Our analysis is performed with our costing tools MEMS CoSim+ and IC Price+.

System Plus Consulting offers powerful costing tools to evaluate the production cost and selling price from single chip to complex structures.

### MEMS CoSim+

Cost simulation tool to evaluate the cost of any MEMS process or device.

### IC Price+

The tool performs the necessary cost simulation of any Integrated Circuit: ASICs, microcontrollers, DSP, memories, smartpower...

## ABOUT SYSTEM PLUS CONSULTING

## 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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System Plus Consulting is specialized in the cost analysis of electronics from semiconductor devices to electronic systems.

A complete range of services and costing tools to provide in-depth production cost studies and to estimate the objective selling price of a product is available.

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# TERMS AND CONDITIONS OF SALES

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## 1. INTRODUCTION

The present terms and conditions apply to the offers, sales and deliveries of services managed by System Plus Consulting except in the case of a particular written agreement.

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.

## 3. REBATES and DISCOUNTS

The quoted prices already include the rebates and discounts that System Plus Consulting could have granted according to the number of orders placed by the Buyer, or other specific conditions. No discount is granted in case of early payment.

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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.

If the payment does not reach System Plus Consulting on the deadline, the Buyer has to pay System Plus Consulting a penalty for late payment the amount of which is three times the legal interest rate. The legal interest rate is the current one on the delivery date. This penalty is worked out on the unpaid invoice amount, starting from the invoice deadline. This penalty is sent without previous notice.

When payment terms are over 30 days end of month, the Buyer has to pay a deposit which amount is 10% of the total invoice amount when placing his order.

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System Plus Consulting remains sole owner of the delivered services until total payment of the invoice.

## 6. DELIVERIES

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.

## 7. ENTRUSTED GOODS SHIPMENT

The transport costs and risks are fully born by the Buyer. Should the customer wish to ensure the goods against lost or damage on the base of their real value, he must imperatively point it out to System Plus Consulting when the shipment takes place. Without any specific requirement, insurance terms for the return of goods will be the carrier current ones (reimbursement based on good weight instead of the real value).

## 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?

## 9. CONFIDENTIALITY

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.

## 10. RESPONSABILITY LIMITATION

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.