

MEMS Microphone

Knowles, STMicroelectronics/OMRON, AAC Technologies/Infineon Technologies, InvenSense/Analog Devices

Market growth, challenged leader : patent battle can start

REPORT OUTLINE

- Technology and patent infringement risk analysis of MEMS Microphones S1157 (Knowles), MP45DT01 (STMicroelectronics), SR595 (AAC/Infineon) and ICS-43432 (InvenSense/Analog Devices)
- April 2015
- PDF & Excel file
- 170+ slides
- €5,990

KEY FEATURES OF THE REPORT

- Deep insight on technology data and manufacturing processes
- Comparative studies of product features (similarities & differences)
- Key patents related to the target product features per company
- Cross analysis of potential patent infringement risks
- Excel database with all patents analyzed in the report

OBJECTIVES OF THE REPORT

- Find the technical and manufacturing process similarities and differences of S1157, MP45DT01, SR595 and ICS-43432 MEMS Microphones.
- Identify key patents held by Knowles, STMicroelectronics, OMRON, AAC Technologies, Infineon Technologies, Analog Devices and InvenSense, and related to the target product features.
- Find the link between patented technological solutions and marketed products.
- Discover the potential infringing parties and help to find evidence of use.
- Understand potential risks of patent infringement and identify the patents which require a more in depth legal assessment.

RELATED REPORTS

- 9-Axis MEMS IMU Patent Infringement Risks Analysis 2014.
- MEMS Microphone: Market, Applications and Business Trends 2014.
- InvenSense ICS-43432 Digital MEMS Microphone.
- iPhone 5S MEMS Microphones Knowles & AAC Technologies.

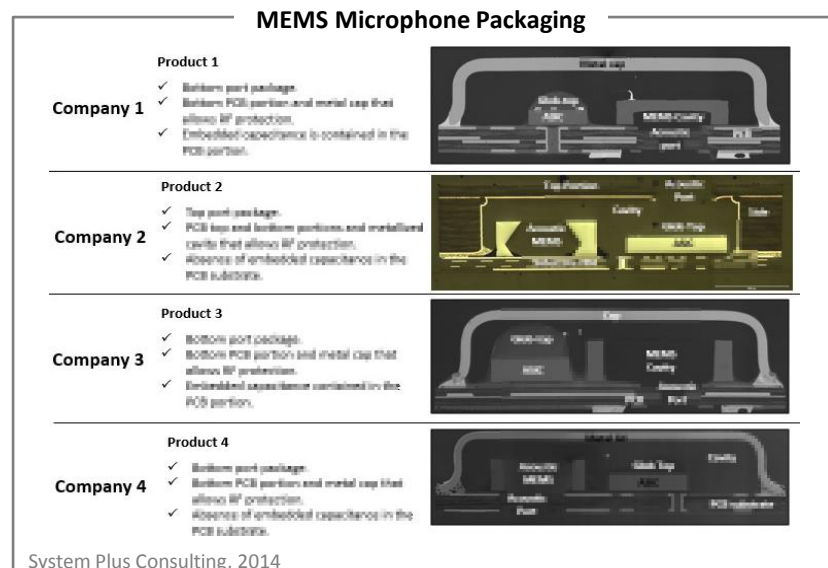
NOW IT'S TIME FOR PATENT BATTLE IN MEMS MICROPHONE BUSINESS

The **MEMS Microphone** will remain one of the fastest growing MEMS components due to existing and new opportunities. According to Yole Développement, the market will grow from \$785M in 2013 to \$1.65B by 2019. Shipments are expected to grow from 2.4B in 2013 to 6.6B units in 2019 which points to a market filled with opportunities for existing new players.

Knowles is the dominant player with 61% market shares in 2013 and 58% in 2014. A decrease is again expected in the next years with new challengers entering the market: **STMicroelectronics, OMRON, AAC Technologies, Infineon Technologies and InvenSense/(Analog Devices)**.

The global market share of these 6 players account for more than 80% of MEMS Microphone market in 2014. These players are all developing innovative technical and manufacturing solutions and, in parallel of course, the right patents to protect their inventions.

In a patent infringement action, the potential sales volume plays a major role for assessing the damage award. Thereby, this study is naturally focused on the last **MEMS Microphone components** supplied by these market leaders and challengers: **Knowles (S1157, iPhone 5S/6), ST/OMRON (MP45DT01), AAC/Infineon (SR595, iPhone 5S/6), InvenSense/ADI (ICS-43432)**.



This raises interesting questions: What are the similarities and the differences in term of technical and manufacturing choices at the devices level? What is the related patent situation? Knowmade (specialized in patent analysis) and System Plus Consulting (specialized in reverse engineering and reverse costing) are joining their unique added value in order to combined technology and manufacturing analysis with patent claims understanding to highlight the risks of patent infringement between **Knowles, STMicroelectronics, OMRON, AAC Technologies, Infineon Technologies, Analog Devices and InvenSense** in the field of **MEMS Microphone**. As the MEMS Microphone market is growing very fast, it is the right time now to understand what could happen between these companies and how to differentiate patents and claims compared to the other players.

This report provides an overview of technology data and manufacturing process of **S1157, MP45DT01, SR595 and ICS-43432** MEMS Microphone components.

A comparative study of the technology and manufacturing process of these **MEMS Microphone components** has been performed in order to highlight the technical similarities and differences of the product features.

Knowmade, April 2015

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AUTHORS



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Dr Nicolas Baron is CEO and co-founder of Knowmade. He is leading the Microelectronics and Nanotechnology scientific and patent analysis department. He holds a PhD in Physics from the University of Nice Sophia-Antipolis, plus a University Diploma in Intellectual Property Strategy and Innovation from the European Institute for Enterprise and Intellectual Property (IEEPI Strasbourg), France.



Romain Fraux is Project Manager for Reverse Costing analyses at System Plus Consulting. Since 2006, Romain is in charge of costing analyses of MEMS devices, Integrated Circuit and Advanced Packaging. He has significant experience in the modeling of the manufacturing costs of electronics components. Romain has a BEng from Heriot-Watt University of Edinburgh, Scotland and a master's degree in Microelectronics from the University of Nantes, France.

ABOUT KNOWMADE (<http://www.knowmade.fr>)

Headquartered in Sophia Antipolis, France, **Knowmade** is specialized in analysis of patents and scientific research findings. We provide Patent Search, IP landscape, Patent Analysis, Scientific Literature Landscape, State of the art, Technology Scouting, Technology Transfer and Technology Tracking. Our service offer consists of custom studies, analysis reports, on-demand tracking and strategy consulting. Knowmade combines information search services, scientific expertise, powerful analytics and visualization tools, and proprietary methodologies for analyzing patents and scientific information. With a solid focus on Microelectronics, Compound Semiconductors, LED, MEMS, Nanotechnology and Biotechnology, **Knowmade** supports research laboratories, industrial companies and investors in their business development.

ABOUT SYSTEM PLUS CONSULTING (<http://www.systemplus.fr>)

Headquartered in Nantes, France, **System Plus Consulting** is specialized in technology and cost analysis of electronic components and systems in the fields of Integrated Circuits, Power Devices and Modules, MEMS & Sensors, LED, Image Sensors, Packaging including wafer level, Electronic Boards and Systems. The company offers custom reverse costing analyses, standard reverse costing reports and costing tools. These analyses are used by Purchasing Departments to measure their suppliers' cost structure, R&D Departments to confirm technological choices depending on their impact on costs, and Benchmarking/Marketing Departments to monitor the products on the market.

ORDER FORM

MEMS Microphone

Technology and Patent Infringement Risk Analysis

Knowles - STMicroelectronics - OMRON - AAC Technologies

- Infineon Technologies - InvenSense - Analog Devices

April 2015

SHIP TO

Name (Mr/Ms/Dr/Pr):

Job Title:

Company:

Address:

City:

State:

Postcode/Zip:

Country:

VAT ID Number for EU members:

Tel:

Email:

Date:

PAYMENT METHODS

Check

To pay your invoice using a check, please mail your check to the following address:

KnowMade S.A.R.L.

2405 route des Dolines, BP 65

06902 Valbonne Sophia Antipolis

FRANCE

Bank Transfer

To pay your invoice using a bank money wire transfer please contact your bank to complete this process. Here is the information that you will need to submit the payment:

Payee: KnowMade S.A.R.L.

Bank: Banque populaire St Laurent du Var CAP 3000 - Quartier du lac- 06700 St Laurent du Var

IBAN: FR76 1560 7000 6360 6214 5695 126

BIC/SWIFT: CCBPFRPPNCE

Paypal

In order to pay your invoice via PAYPAL, you must first register at www.paypal.com. Then you can send money to the KnowMade S.A.R.L. by entering our E-mail address contact@knowmade.fr as the recipient and entering the invoice amount.

PRODUCT ORDER

☐

€ 5,990

☐

Bundle with Knowmade and/or System Plus
Consulting other related reports (contact us)

For price in dollars, please use the day's exchange rate.

For French customer, add 20% for VAT.

All reports are delivered electronically in pdf format

RETURN ORDER BY

E-mail: contact@knowmade.fr

Mail: KnowMade S.A.R.L. 2405 route des Dolines, CS 10065, 06902 Sophia Antipolis, FRANCE

CONTACT

E-mail: contact@knowmade.fr

I hereby accept KnowMade's Terms and Conditions of Sale
Signature:

TERMS AND CONDITIONS OF SALES

Definitions

“Acceptance”: Action by which the Buyer accepts the terms and conditions of sale in their entirety. It is done by signing the purchase order which mentions “I hereby accept Knowmade’s Terms and Conditions of Sale”.

“Buyer”: Any business user (i.e. any person acting in the course of its business activities, for its business needs) entering into the following general conditions to the exclusion of consumers acting in their personal interests.

“Contracting Parties” or “Parties”: The Seller on the one hand and the Buyer on the other hand.

“Intellectual Property Rights” (“IPR”) means any rights held by the Seller in its Products, including any patents, trademarks, registered models, designs, copyrights, inventions, commercial secrets and know-how, technical information, company or trading names and any other intellectual property rights or similar in any part of the world, notwithstanding the fact that they have been registered or not and including any pending registration of one of the above mentioned rights.

“License”: For the reports and databases, 2 different licenses are proposed. The buyer has to choose one license:

1. Single user license: a single individual at the company can use the report.
2. Corporate license: the report can be used by unlimited users within the company. Subsidiaries are not included.

“Products”: Reports are established in PowerPoint and delivered on a PDF format and the database may include Excel files.

“Seller”: Based in Sophia Antipolis (France headquarters), Knowmade is a technology intelligence company specialized in the research and analysis of scientific and technical information. We provide patent landscapes and scientific state of the art with high added value to businesses and research laboratories. Our intelligence digests play a key role to define your innovation and development strategy.

1. Scope

1.1 The Contracting Parties undertake to observe the following general conditions when agreed by the Buyer and the Seller. ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

1.2 This agreement becomes valid and enforceable between the Contracting Parties after clear and non-equivocal consent by any duly authorized person representing the Buyer. For these purposes, the Buyer accepts these conditions of sales when signing the purchase order which mentions “I hereby accept Knowmade’s Terms and Conditions of Sale”. This results in acceptance by the Buyer.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email or to the Buyer’s address. In the absence of any confirmation in writing, orders shall be deemed to have been accepted.

2. Mailing of the Products

2.1 Products are sent by email to the Buyer:

- within [1] month from the order for Products already released; or
- within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in progress.

2.2 Some weeks prior to the release date the Seller can propose a pre-release discount to the Buyer.

The Seller shall by no means be responsible for any delay in respect of article 2.2 above, and including in cases where a new event or access to new contradictory information would require for the analyst extra time to compute or compare the data in order to enable the Seller to deliver a high quality Products.

2.3 The mailing of the Product will occur only upon payment by the Buyer, in accordance with the conditions contained in article 3.

2.4 The mailing is operated through electronic means either by email via the sales department. If the Product’s electronic delivery format is defective, the Seller undertakes to replace it at no charge to the Buyer provided that it is informed of the defective formatting within 90 days from the date of the original download or receipt of the Product.

2.5 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity to the order. Any claim for apparent defects or for non-conformity shall be sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to produce sufficient evidence of such defects.

2.6 No return of Products shall be accepted without prior information to the Seller, even in case of delayed delivery. Any Product returned to the Seller without providing prior information to the Seller as required under article 2.5 shall remain at the Buyer’s risk.

3. Price, invoicing and payment

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effective price is deemed to be the one applicable at the time of the order.

3.2 Payments due by the Buyer shall be sent by cheque payable to Knowmade, PayPal or by electronic transfer to the following account:

Banque populaire St Laurent du Var CAP 3000 - Quartier du lac- 06700 St Laurent du Var

BIC or SWIFT code: CCBPFRPPNCE

IBAN: : FR76 1560 7000 6360 6214 5695 126

To ensure the payments, the Seller reserves the right to request down payments from the Buyer. In this case, the need of down payments will be mentioned on the order.

3.3 Payment is due by the Buyer to the Seller within 30 days from invoice date, except in the case of a particular written agreement. If the Buyer fails to pay within this time and fails to contact the Seller, the latter shall be entitled to invoice interest in arrears based on the annual rate Refi of the «BCE» + 7 points, in accordance with article L. 441-6 of the French Commercial Code. Our publications (report, database, tool...) are delivered only after reception of the payment.

3.4 In the event of termination of the contract, or of misconduct, during the contract, the Seller will have the right to invoice at the stage in progress, and to take legal action for damages.

4. Liabilities

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for choosing the Products and for the use and interpretations he makes of the documents it purchases, of the results he obtains, and of the advice and acts it deduces thereof.

4.2 The Seller shall only be liable for (i) direct and (ii) foreseeable pecuniary loss, caused by the Products or arising from a material breach of this agreement

4.3 In no event shall the Seller be liable for:

a) damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of profits, business interruption and loss of programs or information) arising out of the use of or inability to use the Seller's website or the Products, or any information provided on the website, or in the Products;

b) any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations thereof.

4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 All the Products that the Seller sells may, upon prior notice to the Buyer from time to time be modified by or substituted with similar Products meeting the needs of the Buyer. This modification shall not lead to the liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product initially ordered.

4.6 In the case where, after inspection, it is acknowledged that the Products contain defects, the Seller undertakes to replace the defective products as far as the supplies allow and without indemnities or compensation of any kind for labor costs, delays, loss caused or any other reason. The replacement is guaranteed for a maximum of two months starting from the delivery date. Any replacement is excluded for any event as set out in article 5 below.

4.7 The deadlines that the Seller is asked to state for the mailing of the Products are given for information only and are not guaranteed. If such deadlines are not met, it shall not lead to any damages or cancellation of the orders, except for non-acceptable delays exceeding [4] months from the stated deadline, without information from the Seller. In such case only, the Buyer shall be entitled to ask for a reimbursement of its first down payment to the exclusion of any further damages.

4.8 The Seller does not make any warranties, express or implied, including, without limitation, those of saleability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making the Products available, the Seller cannot guarantee that any Product will be free from infection.

5. Force majeure

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labor difficulties, equipment failure, late deliveries by suppliers or other difficulties which are beyond the control, and not the fault of the Seller.

6. Protection of the Seller's IPR

6.1 All the IPR attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions.

6.2 The Buyer agreed not to disclose, copy, reproduce, redistribute, resell or publish the Product, or any part of it to any other party other than employees of its company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use the Product for purposes such as:

- Information storage and retrieval systems;
- Recordings and re-transmittals over any network (including any local area network);
- use in any timesharing, service bureau, bulletin board or similar arrangement or public display;
- Posting any Product to any other online service (including bulletin boards or the Internet);
- Licensing, leasing, selling, offering for sale or assigning the Product.

6.3 The Buyer shall be solely responsible towards the Seller of all infringements of this obligation, whether this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial consequences in their entirety.

6.4 The Buyer shall define within its company point of contact for the needs of the contract. This person will be the recipient of each new report in PDF format. This person shall also be responsible for respect of the copyrights and will guaranty that the Products are not disseminated out of the company.

7. Termination

7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be borne by the Seller, following this decision.

7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.

8. Miscellaneous

All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

Any notices under these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party.

The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.

9. Governing law and jurisdiction

9.1 Any dispute arising out or linked to these Terms and Conditions or to any contract (orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Grasse, which shall have exclusive jurisdiction upon such issues.

9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.