

SAMPLE

5G

RF Acoustic Wave Filters

Patent Landscape Analysis

March 2026

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• **Main Technological Segments**

- Overview
- Time evolution
- Eight main technological segments:
 - RF filter circuit and architecture (multiplexers, etc.)
 - Thin-film Bulk Acoustic Resonator (FBAR)
 - Bulk Acoustic Wave - Solidly Mounted Resonator (BAW-SMR)
 - Temperature-Compensated Acoustic Wave
 - Thin-film Surface Acoustic Wave (TFSAW)
 - Laterally Excited Bulk Acoustic Wave (XBAR)
 - Composite substrate
 - Piezoelectric Layer

For each main technological segment: Patent portfolio overview, main patent assignees, and recent innovations and notable patents

IP PROFILE OF KEY PLAYERS **138**

- IP Leaders: **Murata, Skyworks, Qualcomm, Qorvo, Taiyo Yuden**
- Main IP Players: **Kyocera, Broadcom, Samsung Electro-Mechanics, Samsung Electronics, Wisol, Soitec**
- China Ecosystem:
 - Most established IP players in China: **Huawei, ROFS Microsystem, MEMSonic**
 - Other Chinese players: **Newsonic, Sanan IC, NSI Corp, Sapland Microelectronics, StarShine, Radrock**

For each player: Patent portfolio detailed analysis with summary of recent innovations and notable patents

ANNEX **180**

- Methodology for patent search, selection and analysis
- Terminology

KNOWMADE PRESENTATION **185**

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ONE-HOUR PRESENTATION

The author of the report is available to address any questions you may have.

A **one-hour online presentation** of the report is included with your purchase. This session offers the opportunity for a direct interaction with the author, including a presentation of the results and a dedicated Q&A session.

Feel free to contact the author to schedule a meeting.



Contact us



KNOWMADE is a technology intelligence and IP strategy consulting company specializing in the analysis of patents and scientific publications. We assist innovative companies, investors, and research organizations in understanding the competitive landscape, anticipating technological trends, identifying opportunities and risks, improving their R&D, and shaping effective IP strategies. Our highly qualified analysts transform patent information and scientific literature into actionable insights to support decision-making in R&D, innovation, investment, and intellectual property.

MAIN PATENT ASSIGNEES MENTIONED IN THIS REPORT

INDUSTRIALS

Murata, Skyworks, MEMSonic, Newsonic, RadRock (Ruishi Chuangxin), Huawei, CETC, StarShine Semiconductor, Sanan IC, Taiyo Yuden, Qorvo, Qualcomm, Chemsemi, Maxscend, Tiantong Ruihong Technology (Enicom), AIFO, Huntersun, Vanchip, Kyocera, Sappland Microelectronics, Shoulder Electronics, NSI Corp, Shanghai Xinou Integrated Microelectronics, GrandeurRF, Soitec, Wisol, BOE, Beijing Xinxin Semiconductor, Shanghai Institute of Microsystem and Information Technology (SIMIT), Lansus, Anhui Anuki Technologies, EPiCMEMS, Bosch, Samsung Electronics, Beijing Aerospace Micro-Electronics Technology, Beijing Metamaterial Info Tech, Honor Device, Nitto Denko, Soundcore Electronics, Hangzhou Shuxin Electronic Technology, Pinnacle Microwave, AAC Technologies, Samsung Electro-Mechanics, Chenchenchen Technology, ROFS Microsystem, Sunto Microelectronics, Shanghai Novel Si Integration Technology, Shanghai University, Wuhan University, Xintou Microelectronics, Suzhou Zhenxin Microelectronics, Texas Instruments, Xiamen University, Zhongxun Sifang, Fujian Sunwise Semiconductor Technology, Microgate Technology, North Latitude 38th Degree Integrated Circuit Manufacturing, Sinovision, Xiamen Sky Semiconductor, Yunji Xinguang Zhuhai Microelectronics, Zhejiang Huayuan Micro Electronic Technology, Oppo Mobile, Ruisi Microsystems, Zhongwei Longtu Electronic Technology, etc.

RESEARCH ORGANISATIONS

USTC, Tianjin University, South China University of Technology, Nanjing University, UESTC, Tsinghua University, Zhejiang University, Shanghai Jiao Tong University, Sun Yat-sen University, Xidian University, Nantong University, Southeast University, CASIA, Hangzhou Dianzi University, etc.

SCOPE OF THE REPORT

- This report provides a detailed picture of the patent landscape for **RF acoustic wave filters** (SAW, BAW, TC-SAW, TFSAW, FBAR, XBAR, etc.). This report is an update of the previous report published in 2024 and has identified 3,380+ recent published patent families.
- This report covers **patents published worldwide** up to **December 2025**. We have selected and analyzed more than **34,800+ patents and patent applications** grouped in more than **15,400+ patent families** relevant to the scope of this report.
- The patent search strategy has been implemented by using advanced search equations in the patent database and by a cautious patent selection, that has been performed by the analyst, in order to get the most out of the corpus.



 Your needs are out of scope of the report?

 You want a deeper analysis on technologies or companies?

 Contact us for a custom report



| Example | Selected patents | | |
|--|------------------|---------|----------|
| | Relevant | Related | Excluded |
| Patents related to SAW, BAW, FBAR, SMR, XBAR, LBAW, TCSAW, TCBAW, TFSAW for mobile applications | X | | |
| Patents related to multiplexers, diplexers, duplexers using acoustic wave filters | X | | |
| Patents related to materials and substrate for acoustic wave filter applications | X | | |
| Patents related to RF front-end module claiming the use of acoustic wave filters | | X | |
| Patents related to acoustic wave filters for other applications (defense, automotive, medical, etc.) | | | X |
| Patents related to non acoustic RF filter (LC, microstrip, etc.) | | | X |
| Patents related to SAW, BAW, etc. for sensor applications | | | X |

KEY FEATURES OF THE REPORT

- The report provides comprehensive patent data and strategic insights on **RF acoustic wave filters** (SAW, TC-SAW, TFSAW, BAW, FBAR, SMR, XBAR, etc.), covering the full technology stack from **piezoelectric materials and acoustic resonators to RF filter architectures and RF front-end modules** integrating these technologies.
- It delivers in-depth patent analyses of **key technologies and major industry players**, including:
 - **Main IP dynamics and technology trends**, highlighting recent innovation activity across SAW, BAW and emerging high-frequency acoustic platforms.
 - **Identification of IP leaders, most active players and recent newcomers**, revealing how the competitive landscape is evolving.
 - **Assessment of the IP position of key companies**, including the relative strength, maturity and geographical coverage of their patent portfolios.
 - **Time evolution of patent filings by company, country and technology segment**, identifying growth areas and emerging technology directions.
 - **Analysis of the current legal status of patents** (granted, pending, expired, etc.) to evaluate portfolio maturity and enforceability.
 - **Technology and application focus of leading companies**, including their positioning across acoustic platforms, materials and RF front-end integration.
 - **Joint developments, IP collaborations and patent transfers** between major organizations, highlighting partnerships and technology flows within the ecosystem.
 - **Selection of notable patents and recent technological developments**, illustrating the most significant innovations shaping next-generation RF acoustic filters.



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WHY STUDY THE PATENT LANDSCAPE

Understanding the **competitive landscape** and **technology developments** from a **patent perspective**

- **Key IP players** (key patents, IP strategy, technology roadmap)
- **Newcomers** (technologies and markets of interest)
- **Technology trends & Emerging technologies**
- **Benchmark patent portfolios** (competitors' strength & weakness)
- **Key patents** (blocking, valuable)
- **Key technical solutions**
- **Risks** (patent infringement, new entrants, etc.)
- **Opportunities** (partnership, technology acquisition, licensing, etc.)



Perfectly complement market research

Give another point of view of the competitors, technologies and markets

Links between patents and

- Key market players
- Supply chain
- Technology Readiness Levels (TRL)
- Market product
- Emerging technologies/applications
- Forecast

READING GUIDE

SAMPLE

Report sections



Your concern



Information you get



PATENT LANDSCAPE OVERVIEW

- **Ranking of players** (enforceability, current activity, geo/tech coverage, prior-art contribution, etc.)
- **Patent filings dynamics per player**
- **IP collaborations** (co-filings, IPR transfers)
- **Patent litigation/oppositions**

SEGMENTS ANALYSIS

- **Patent filings dynamics per segment**
- **IP leaders per segment** (enforceability, current activity, blocking potential)
- **Notable patents per segment**
- **Recent patenting activity per segment**

IP PROFILE OF KEY PLAYERS

- **Patent portfolio summary** (portfolio size, IP activity evolution, patents legal status, geo/tech coverage, strengths/weaknesses, etc.)
- **Key patents**
- **Recent patenting activity**

| | TECHNOLOGY <i>For R&D teams, engineers, scientists</i> | IP <i>For IP teams, patent attorneys</i> | MARKET <i>For executives, business developers</i> | PLAYER <i>Zoom in a competitor / partner</i> |
|---|--|---|--|--|
| Innovators | Main patent owners IP risks/opportunities | Ecosystem (competitors, newcomers, partners, clients) Main trends IP vs Market | IP position vs Market position Player relationships (collaborations/ dependencies) | |
| Technology trends Technology mapping | Blocking players IP risks/opportunities in each segment (FTO, litigation, licensing) | Benchmarking Markets of interest Future developments | IP position and level of investment in each segment Key IP developments | |
| Current R&D activities Technology roadmap | Blocking patents Geo/Tech coverage Link between patents and products | Future products Potential partners Potential targets | R&D investment level Key inventions Current IP activities Strengths / Weaknesses | |

REPORT HIGHLIGHTS

Report Package

- **180+ slide PDF report**
- **Methodology**, executive summary and full patent landscape analysis
- **Extensive Excel database** with all patent families analyzed in this study
- **One-hour online presentation** with the report's author (results + Q&A)

Patent Landscape Overview

- Global IP trends and publication time-evolution
- Geographic distribution of patent filings
- Major patent assignees and ecosystem timeline
- Newcomers driving recent innovation
- IP leadership evolution (2023 vs 2026)
- Geographic coverage of top players' patent portfolio
- High-impact patent assignees and notable IP portfolios
- IP ecosystems including co-owned patent and collaboration
- U.S. litigations and legal status insights

Excel Patent Database

- Complete dataset of **15,400+ patent families**
- Focus set of **3,380+ families added since June 2023**
- Segmentation fields and direct hyperlinks to the updated online database

Technology Segmentation & Innovation Layers

The report provides a detailed segmentation of patents across all major technical approaches, including:

- **Devices: SAW, BAW, AWF Modules, Temperature compensated, FBAR, XBAR, TFSAW, SMR**
- **Composite substrate materials: Quartz, Sapphire, SiC- Diamond**
- **Piezoelectric layer materials: LN Focus, LT Focus, LT&LN**

Each segment is analyzed through a consistent framework: patent portfolio overview, main patent assignees, and recent innovations and notable patents.

IP Evolution & Players IP Profiles

A structured and comparable IP profile analysis covers **20 influential AWF patent assignees**, reflecting the structure of the global ecosystem:

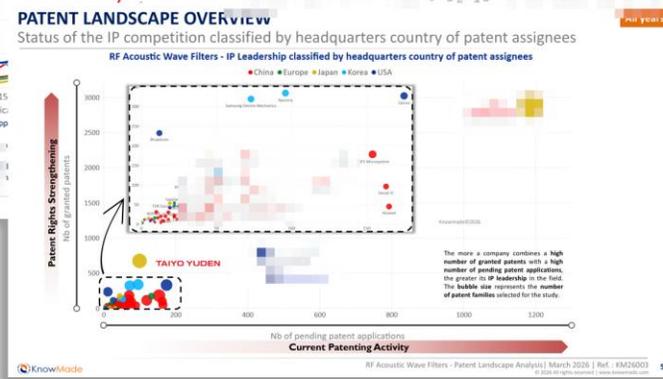
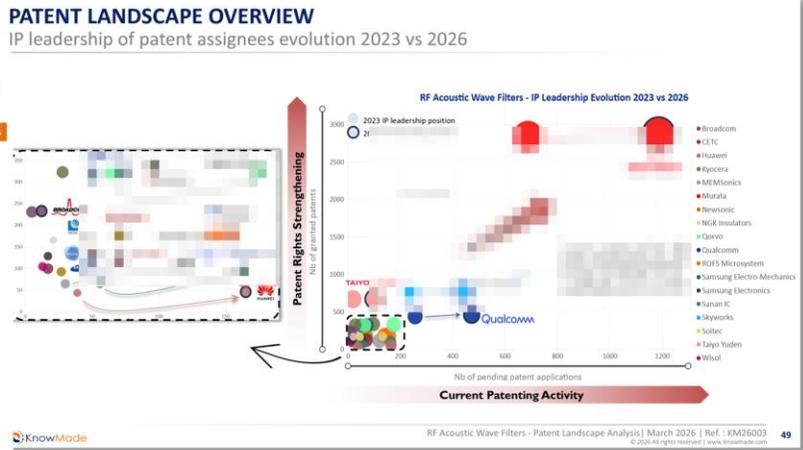
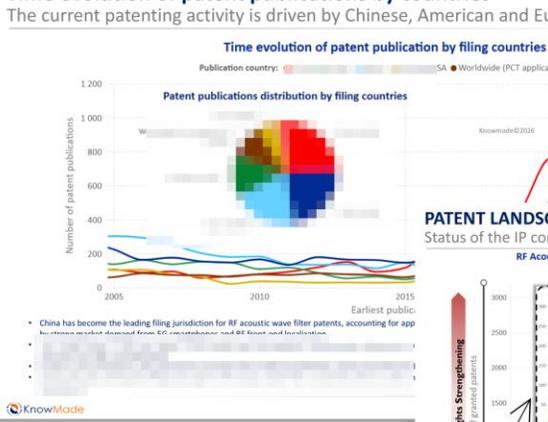
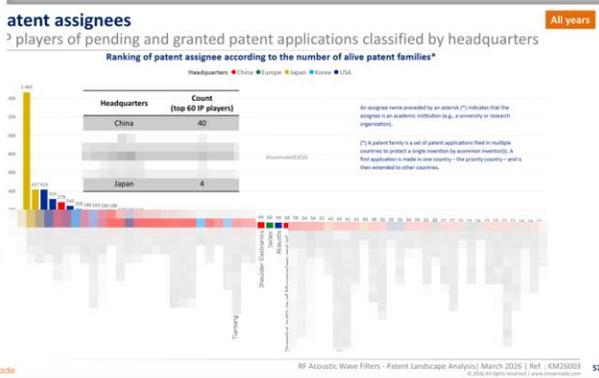
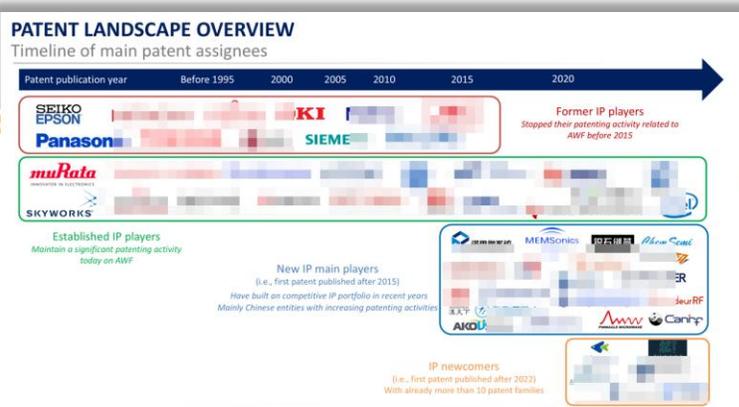
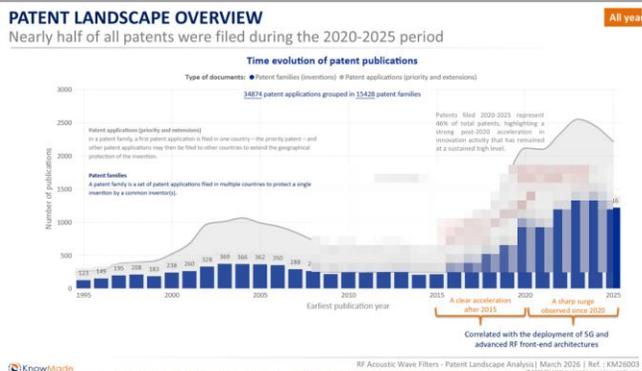
- IP leaders: **Murata, Skyworks, Qualcomm, Qorvo, Taiyo Yuden**
- Main IP players: **Kyocera, Broadcom, Samsung Electro-Mechanics, Samsung Electronics, Wisol, Soitec**
- China Ecosystem:
 - Most established IP players in China: **Huawei, ROFS Microsystem, MEMSonic**
 - Other Chinese players: **Newsonic, Sanan IC, NSI Corp, Sapland Microelectronics, StarShine, Radrock**

Each profile includes IP dynamics, geographical footprint, technical segmentation and recent patent activities, offering a clear and consistent view of how different categories of players shape the global RF acoustic wave filters innovation landscape.

PATENT LANDSCAPE OVERVIEW

General trends, main patent assignees and new entrants

SAMPLE



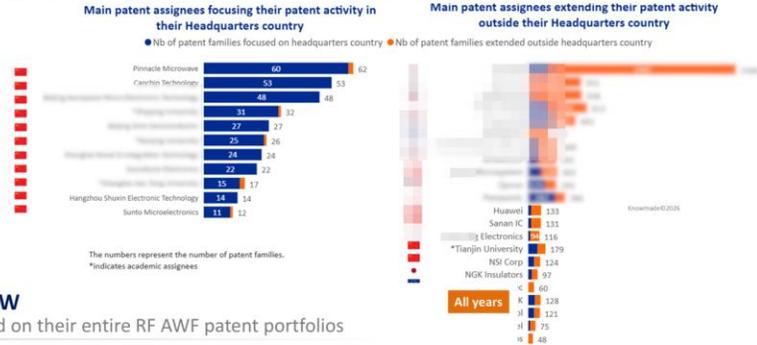
PATENT LANDSCAPE OVERVIEW

IP leaders, IP strategies, IP collaborations, licensing agreement, litigations

SAMPLE

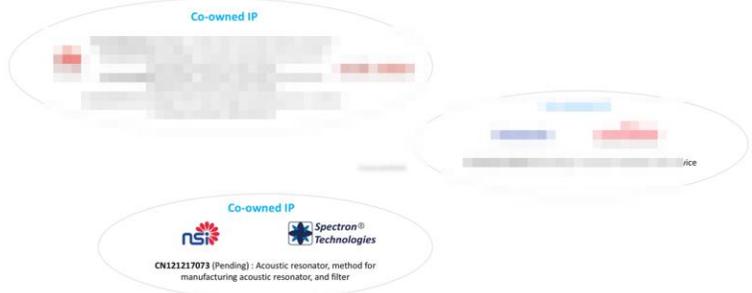
PATENT LANDSCAPE OVERVIEW

Domestic vs. Global IP strategies of main patent assignees



PATENT LANDSCAPE OVERVIEW

Main actors mutualizing R&D strength through recent IP collaborations



PATENT LANDSCAPE OVERVIEW

High-impact patent assignees based on their entire RF AWF patent portfolios

| Assignees | Nb of patent families | Nb Citing families (external citations) | Nb Citing families (external citations) per families | Nb Citing Assignees (external citations) | Technological impact factor | Grant factor | Geofactor | Strength index | Strength index per families |
|-------------|-----------------------|---|--|--|-----------------------------|--------------|-----------|----------------|-----------------------------|
| Murata | 612 | 2931 | 4.79 | 282 | 4.79 | 1.10 | 4 | 5270 | 8.61 |
| Taiyo Yuden | 558 | 1866 | 3.34 | 296 | 3.34 | 0.87 | 6 | 4855 | 8.67 |
| Otsu | 492 | 1959 | 3.98 | 204 | 3.98 | 1.50 | 5 | 4798 | 9.75 |
| | 291 | 2108 | 7.24 | 273 | 7.24 | 0.80 | 3 | 2772 | 9.53 |
| | 291 | 1424 | 4.86 | 225 | 4.86 | 1.12 | 4 | 2711 | 9.25 |
| | 551 | 1578 | 2.86 | 142 | 2.86 | 0.81 | 3 | 2536 | 4.60 |
| | 309 | 740 | 2.39 | 141 | 2.39 | 1.03 | 4 | 1831 | 5.93 |
| | 385 | 1665 | 4.32 | 229 | 4.32 | 0.94 | 4 | 1745 | 4.53 |
| | 260 | 1262 | 4.85 | 159 | 4.85 | 0.94 | 5 | 1287 | 4.95 |
| | 303 | 509 | 1.68 | 102 | 1.68 | 0.99 | 2 | 1245 | 4.11 |
| | 147 | 1140 | 7.76 | 142 | 7.76 | 0.16 | 5 | 1204 | 8.20 |
| | 189 | 1162 | 6.15 | 190 | 6.15 | 0.92 | 2 | 1178 | 6.18 |
| | 418 | 1063 | 2.54 | 183 | 2.54 | 0.91 | 4 | 1111 | 2.66 |
| | 116 | 553 | 4.77 | 126 | 4.77 | 1.11 | 5 | 1092 | 9.42 |
| | 217 | 691 | 3.18 | 107 | 3.18 | 0.27 | 5 | 888 | 4.09 |
| | 379 | 459 | 1.21 | 105 | 1.21 | 0.51 | 2 | 841 | 2.22 |
| | 128 | 604 | 4.72 | 97 | 4.72 | 0.41 | 4 | 817 | 6.42 |
| | 124 | 294 | 2.37 | 80 | 2.37 | 0.91 | 1 | 766 | 6.18 |
| | 60 | 113 | 1.88 | 46 | 1.88 | 0.87 | 2 | 762 | 12.70 |
| | 97 | 305 | 3.14 | 72 | 3.14 | 1.24 | 6 | 732 | 7.55 |
| | 133 | 145 | 1.09 | 57 | 1.09 | 0.34 | 4 | 702 | 5.28 |
| | 33 | 681 | 20.64 | 104 | 20.64 | 0.17 | 3 | 691 | 20.94 |
| | 201 | 96 | 0.48 | 44 | 0.48 | 0.98 | 2 | 611 | 3.04 |
| | 240 | 302 | 1.26 | 37 | 1.26 | 0.50 | 1 | 608 | 2.53 |
| Sanan IC | 131 | 52 | 0.40 | 107 | 0.40 | 0.71 | 3 | 538 | 4.11 |
| Alcorada | 65 | 244 | 3.75 | 66 | 3.75 | 1.66 | 1 | 530 | 8.15 |
| Intel | 75 | 331 | 4.41 | 97 | 4.41 | 0.61 | 4 | 517 | 6.89 |
| Wint | 171 | 84 | 0.69 | 40 | 0.69 | 0.94 | 1 | 501 | 2.93 |

PATENT LANDSCAPE OVERVIEW

Geographical coverage of granted patents and pending patent applications



PATENT LITIGATION

Main litigation filed or closed

→ Complaint for patent infringement filed or closed

DENSO vs **SKYWORKS**

Acoustic R... 943 2326, Sky5 144102, Sky5 04418, Sky5

piezoelectric material, and fabrication method of piezoelectric thin film and piezoelectric material, and resonator, actuator element, and physical sensor using piezoelectric thin film

vention includes an aluminum nitride thin film that contains scandium. A content ratio of scandium in the aluminum nitride thin film is 0.5 total amount of the number of scandium atoms and the number of aluminum atoms is 100 atom %. According to this arrangement, the in improve a piezoelectric response while keeping characteristics of elastic wave propagation speed, Q value, and frequency-temperature coefficient that the aluminum nitride thin film has.

tride thin film provided on a substrate and containing scandium, 5 atom % to 45 atom % on an assumption that a total amount of atoms of aluminum in the aluminum nitride thin film is 100 atom

duching at least one layer of an intermediate layer, and side thin film containing scandium at a content ratio different

Embodiment: The FBAR filter 10 includes a substrate 11, and a piezoelectric laminate structure 12 that is formed on the substrate 11. This figure is a cross sectional view schematically illustrating the FBAR filter 10.

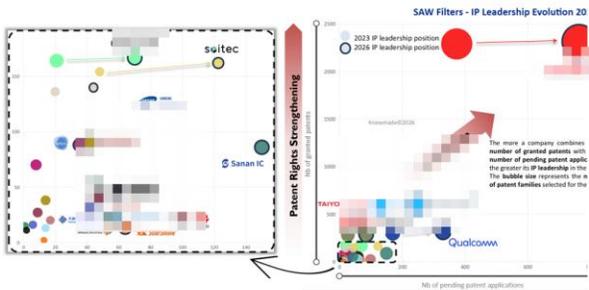
FOCUS ON TECHNICAL SEGMENTS

IP dynamics, main patent assignees, IP leaders, and notable patents by segment

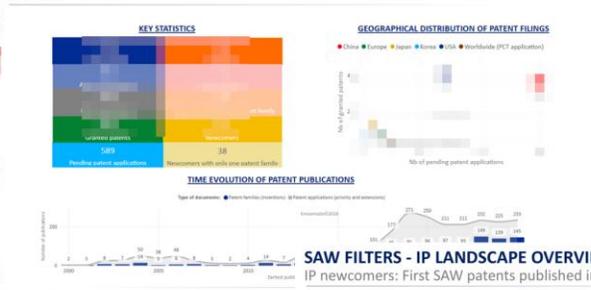
SAMPLE

SAW FILTERS - IP LANDSCAPE OVERVIEW

IP leadership of patent assignees evolution 2023 vs 2026



Main Technological Segments - Temperature-Compensated Overview



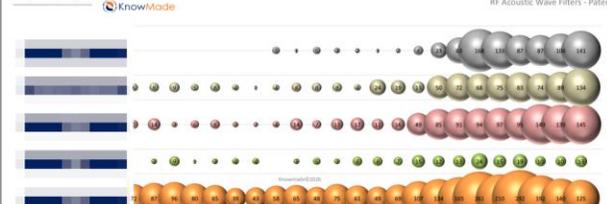
SAW FILTERS - IP LANDSCAPE OVERVIEW

IP newcomers: First SAW patents published in 2022 or later

* The IP newcomers listed here own more than 10 patent families.

| Company | Creation date | Total patent families | Granted patents | Pending applications |
|---------------------------------------|---------------|-----------------------|-----------------|----------------------|
| 2027 | 94 | 46 | 59 | |
| 2020 | 48 | 25 | 23 | |
| 2020 | 39 | 27 | 15 | |
| 2025 | 27 | 18 | 14 | |
| 2028 | 22 | 12 | 7 | |
| 2020 | 12 | 3 | 9 | |
| Suntco Microelectronics | 2028 | 10 | 9 | 0 |
| Zhongwei Longtu Electronic Technology | 2026 | 19 | 4 | 4 |

Main Tech Time evol



Main Technological Segments - AWF modules

Main IP players according to the number of alive patent families by countries

| Publication country | China | | Europe | | Japan | | Korea | | USA | | Worldwide (PCT application) | | Total |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------------------------|---------|-------|
| | Granted | Pending | Granted | Pending | |
| Minerva | 20 | 12 | 5 | 7 | 202 | 54 | 22 | 1 | 281 | 9 | 13 | 1879 | 181 |
| | 25 | 4 | 28 | 7 | 46 | 8 | 17 | 4 | 158 | 6 | 3 | 274 | 92 |
| | 16 | 11 | 17 | 6 | 14 | 12 | 2 | 46 | 5 | 3 | 335 | 30 | |
| | 25 | 3 | 1 | 1 | 47 | 1 | 2 | 32 | 1 | 2 | 107 | 7 | |
| | 30 | 18 | 1 | 1 | | | | | | | 1 | 1 | 50 |
| | 4 | 2 | 1 | 4 | 5 | 1 | 13 | 11 | 19 | 6 | 5 | 41 | 29 |
| | 1 | 4 | 1 | 4 | 24 | 10 | 2 | 32 | 5 | 1 | 38 | 14 | |
| | 1 | 4 | 1 | 4 | | | | | | | 1 | 1 | 82 |
| | 7 | 8 | 1 | 1 | 1 | 2 | 24 | 1 | 25 | 2 | 25 | 2 | |
| | 1 | 4 | 1 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 25 | 1 | |
| | 6 | 1 | 2 | 2 | 4 | 14 | 2 | 24 | 4 | 1 | 24 | 4 | |
| | 4 | 2 | 1 | 1 | 11 | 2 | 7 | 22 | 2 | 1 | 22 | 2 | |
| | 3 | 1 | 1 | 1 | 13 | 4 | 5 | 1 | 25 | 7 | 25 | 7 | |
| | 20 | 6 | | | | | | | | | 1 | 1 | 28 |
| | 19 | 4 | | | | | | | | | 1 | 1 | 19 |
| | 18 | 11 | | | | | | | | | 1 | 1 | 18 |
| | 3 | | | | 4 | | | | | | 1 | 1 | 15 |
| | 15 | 4 | | | | | | | | | 1 | 1 | 15 |
| | 1 | 1 | | | | | | | | | 1 | 1 | 10 |
| | 4 | 2 | 1 | 4 | 1 | 1 | 3 | 1 | 10 | 9 | 1 | 10 | |
| | 2 | 1 | 3 | 1 | 5 | 1 | 1 | 6 | 1 | 1 | 10 | 1 | |
| | 7 | 7 | | | | | | | 1 | 1 | 8 | 8 | |
| | 8 | 3 | | | | | | | | | 7 | 7 | |
| | 7 | 3 | | | | | | | | | 7 | 7 | |
| | 5 | 4 | | | | | | | | | 2 | 6 | |
| | 6 | 3 | | | | | | | | | 6 | 6 | |

RF Acoustic Wave Filters - Patent Landscape Analysis | March 2026 | Ref.: KM26003

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Innovation is structured into two broad categories (SAW & BAW) and across eight major technical domains:

- RF filter circuits & multiplexers
- FBAR
- BAW-SMR
- Temperature-compensated acoustic wave
- TFSAW
- XBAR
- Composite substrates
- Piezoelectric thin films

In this report, each segment includes patent portfolio analysis, main patent assignees, recent innovations, and selected notable patents.



The categories to which each patent belongs are available in the Excel file provided with the report

IP PROFILE OF PLAYERS

IP portfolio summary, IP strategy, notable patents and recent patenting activity

SAMPLE

This report provides a structured and data-driven IP profile analysis of **20 influential AWF patent assignees**, selected according to their IP leadership and recent activity from 2023 to 2026. To reflect the structure of the ecosystem, companies are grouped into IP leaders, main global IP players, most established IP players in China and other notable Chinese players.

- A detailed, in-depth analysis is conducted for five IP leaders:

Murata, Skyworks, Qualcomm, Qorvo, Taiyo Yuden



- Portfolio overviews and summary for seven main global IP players:

Kyocera, Broadcom, Samsung Electro-Mechanics, Samsung Electronics, Wisol, Soitec



- A detailed, in-depth analysis for three most established IP players in China:

Huawei, ROFS Microsystem, MEMSonicS



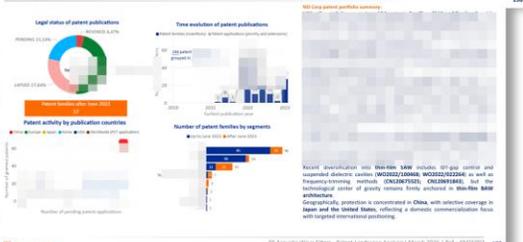
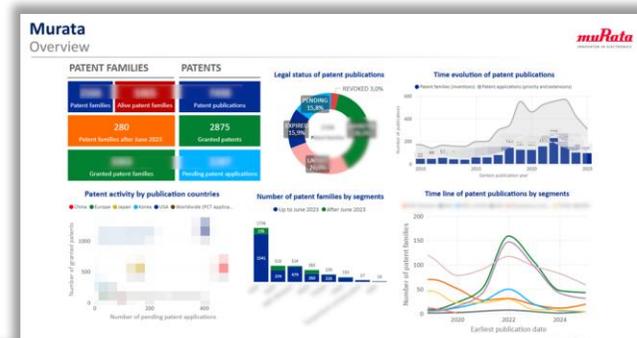
- Portfolio overviews and summary for six other notable Chinese players:

Newsonic, Sanan IC, NSI Corp, Sapland Microelectronics, StarShine, Radrock



IP Profile

- Patent portfolio evolution
- IP dynamics
- Granted patents vs pending applications balance
- Geographical coverage
- Technical segmentation
- Main innovation directions
- Recent patent activities

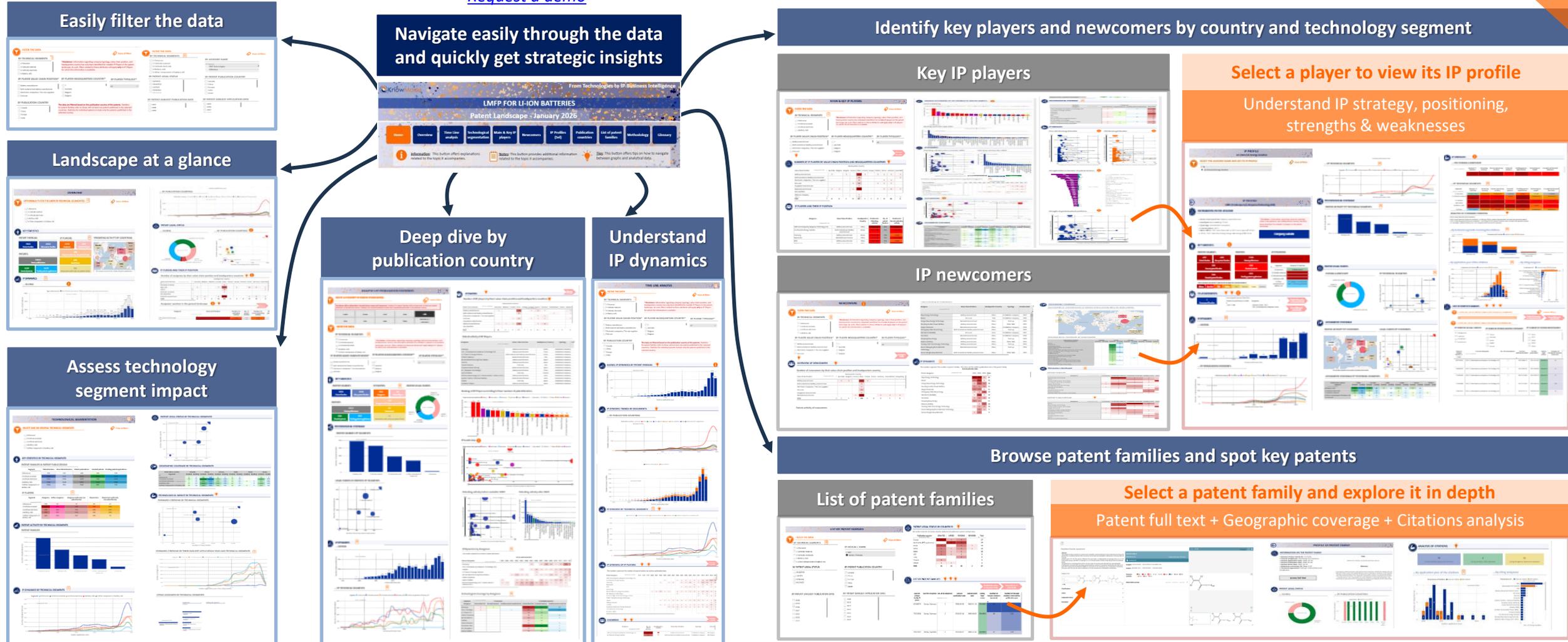


Interactive dashboard (optional)

SAMPLE

An optional **interactive dashboard** can be provided with this report, transforming the analysis into a true decision-support tool that puts you in control. It enables you to explore the patent landscape dynamically by applicant, technology, geography, publication period, or legal status, and to drill down instantly into key insights, from high-level trends to individual players and patents. Tailored to the specific needs of R&D, IP, strategy, and business development teams, the dashboard delivers immediate visual answers to critical questions, enabling faster and more informed strategic decision-making across your organization.

[Request a demo](#)



ORDER FORM

RF Acoustic Wave Filters

Patent Landscape Analysis – March 2026

Ref.:KM26003

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:

PRODUCT ORDER

REPORT + DATABASE ⁽¹⁾: **4,990 EUR**

REPORT + DATABASE ⁽¹⁾ + DASHBOARD ⁽²⁾: **7,990 EUR**



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

For French customer, add 20% for VAT.

The report (PDF), database (Excel), and access to the interactive online dashboard will be delivered electronically upon receipt of payment.

⁽¹⁾Report & Database are provided under a **multi-user license and can be shared internally** among employees of the purchasing organization. Subsidiaries and joint ventures are excluded from this license. Please be aware that the report is watermarked on each page, with the name of the recipient and the organization (the name mentioned in the PO).

⁽²⁾Access to the interactive dashboard is granted for **one year (12 months) to an unlimited number of authorized users** within the purchasing organization. Access codes must not be shared with any third party. The dashboard must not be used to produce analyses or reports that are resold, sublicensed, or otherwise made available to any external user or entity outside the purchasing organization.

I hereby accept Knowmade's Terms and Conditions of Sale

Signature:

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, Le Drakkar,
06560 Valbonne Sophia Antipolis
FRANCE

Money 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 Méditerranée, CAP 3000 Quartier du lac, 06700 St Laurent du Var, France
IBAN: FR76 1460 7003 6360 6214 5695 139
BIC/SWIFT: CCBPFRPPMAR

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.

RETURN ORDER BY

E-mail: contact@knowmade.fr

Mail: KnowMade S.A.R.L., 2405 route des Dolines, Le Drakkar,
06560 Valbonne Sophia Antipolis, FRANCE

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. One 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 and joint ventures 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 Méditerranée, CAP 3000 Quartier du lac, 06700 St Laurent du Var, France

BIC or SWIFT code: CCBPFRPPMAR

IBAN: : FR76 1460 7003 6360 6214 5695 139

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.

KNOWMADE

Patent and Technology Intelligence

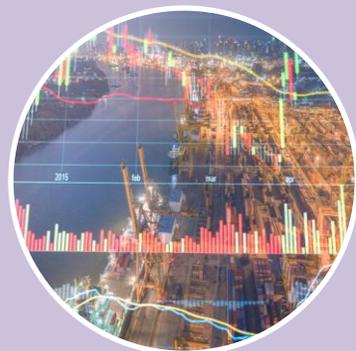
KNOWMADE PURPOSE

Turning **patent** and **scientific data** into **actionable insights** to support **decision-making in R&D, innovation, investment, and intellectual property.**

Competitive landscape | Technology trends | Opportunities / Risks | R&D and IP strategy



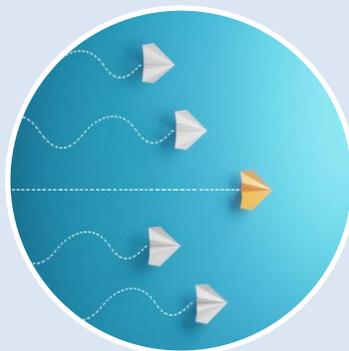
WHAT INFORMATION CAN YOU GET ?



MARKET

*For executives,
business developers*

- Identify competitors
- Compare IP with market position
- Evaluate the level of investment
- Future products & target markets



TECHNOLOGY

*For R&D teams,
engineers, scientists*

- R&D activities
- Technological roadmap
- Position on the supply chain



INTELLECTUAL PROPERTY

*For IP teams,
patent attorneys*

- Risks and opportunities (FTO, litigations, licensing)
- Key patents
- Link between patents and products

KNOWMADE OFFER

CUSTOM SERVICES

(Tailor-made analysis)

To meet your needs and budget/lead time constraints

- Specific and dedicated report.
- Prior-art search, literature review, patent landscape, freedom-to-operate, patent valuation, IP due diligence, technology scouting, monitoring service, etc.

Format

- Analysis report
- Patent data base
- Interactive dashboard
- Access to the analyst

REPORTS

(multi-client product)

To understand the competitive landscape and explore the emerging ecosystems and new technologies

- Stand alone report
- Patent landscape.
- Overview on IP dynamics, trends and players.
- Competitor, technology and strategy analysis.
- Benchmark of patent portfolios.
- Key IP players & key patents.

Format

- Analysis report
- Patent data base
- Interactive dashboard

MONITORS

(multi-client product)

To track the latest R&D developments and IP activities, and to be sensitive to weak signals

- Annual subscription
- Patent monitoring service.
- Quarterly updated patent data and technology trends.
- Current R&D and IP activities.
- Early detect weak signals, opportunities and risks.
- Open discussion with analyst.

Format

- Updated interactive dashboard
- Updated patent data base
- Access to the analyst for result presentations, Q&A sessions, and additional researches

INSIGHTS

(free article & webinar)

To get unique information about industry and technology

- Analyst point of view about industry news (product release, M&A, start-up, fund-raising, etc.) from a patent perspective.

Format

- Knowmade website

MAIN FIELDS OF EXPERTISE

SEMICONDUCTORS

- Materials & Substrates
- Power electronics
- RF & Wireless datacom
- MEMS, Sensing & Imaging
- Photonics, Lighting & Display
- Memory
- Packaging

ENERGY

- Batteries
- Fuel-cells
- Solar PV
- Power management

HEALTHCARE

- Therapeutic tools
- Diagnostics and Theragnostics
- Medical devices and imaging
- Drug discovery and delivery

AGRI-FOOD

- Food processing & formulation
- Vegan food
- Next-gen packaging
- Agriculture 4.0







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