FOR IMMEDIATE RELEASE:
Apple, the best positioned to bring high volume consumer microLEDs to market

Extracted from: MicroLED Displays 2018 report, Yole Développement, July 2018
Online webcast: MicroLED Displays: Hype and Reality, Hopes and Challenges on October 11, 2018 at 5 PM CEST - 8 AM PDT – Powered by Yole Développement - REGISTRATION

LYON, France – October 9, 2018: “MicroLED displays could potentially match or exceed OLED performance in all critical attributes,” comments Dr. Eric Virey, Senior Technology & Market Analyst at Yole Développement (Yole). It includes brightness, contrast, color gamut, refresh rate, viewing angle, ruggedness and durability, resolution and pixel density, lifetime, power consumption etc.
Yole and its partner Knowmade, both part of Yole Group of Companies release two microLEDs reports to reveal the status of the technology and give a deep understanding of the industry, the companies involved and the related supply chain. MicroLED Displays 2018 and MicroLED Displays: Intellectual Property Landscape are now available. A detailed description is available on i-micronews.com, Displays section.
This year again, Yole Group of Companies pursued its investigation to understand the technical issues and business challenges and confirms today its market positioning with a new online event: MicroLED Displays: Hype and Reality, Hopes and Challenges – Webcast on October 11, 2018 at 5 PM CEST - 8 AM PDT – Powered by Yole Développement. Make sure to get a clear vision of this emerging industry and REGISTER today.

Sony’s demonstration of a full HD 55” microLED TV at CES 2012, more than six years ago, was the first exposure for microLED displays and generated a lot of excitement. Since Apple acquired Luxvue in 2014, many leading companies such as Facebook, Google, Samsung, LG or Intel have entered the game via sizable internal developments, acquisitions, like those of
mLED and eLux, or investments in startups such as glō or Aledia. Analyzing Apple’s microLED patent activity shows that the company essentially halted its filing around 2015. This is a surprising finding in the light of the fact that the consumer electronics giant has maintained a large project team and consistently spent hundreds of millions of dollars annually on microLED development. A closer analysis however brought up the name of a possible strawman entity used by Apple to continue filing patents and shows that the company is still advancing key aspects of microLED technologies.

“Despite a later start compared to pioneers such as Sony or Sharp, Apple’s portfolio is one of the most complete, comprehensively covering all critical technologies pertinent to microLEDs,” explains Dr Virey from Yole. “The company is the most advanced and still one of the best positioned to bring high volume microLED products to the market. However, it also faces unique challenges”, he adds.

Apple can’t afford to tarnish its brand and introduce a product featuring such a highly differentiating technology that would be anything but flawless. Moreover, it requires high volumes, which makes setting up the supply chain more challenging than for any other company.

In addition, it has no prior experience in display manufacturing and due to its need for secrecy, has to develop pretty much everything internally, duplicating technologies and infrastructures that others have the option to outsource…

The smartphones sector is a good example to illustrate the leadership of Apple. Indeed smartwatch volumes could reach 100 million units by 2027 and Apple remains the single largest smartwatch maker, explains Yole’s analysts in microLED reports. Yole’s scenario assumes that Apple would start using microLEDs in 2021 in a new flagship model, and, as is common with the brand, will propagate the technology in a staggered fashion over the next three years as legacy products are discontinued… **MicroLED Displays report** invites you to discover the MicroLED world with a section dedicated to the patent landscape. With this focus, Yole Group of Companies offers you a unique opportunity to get a clear view of the competitive landscape, understand the current challenges and identify business opportunities.

MicroLED webcast will average on both Yole’s reports, MicroLED Displays and MicroLED Displays: Intellectual Property Landscape report in order to provide a global overview and status of the microLED industry

Powered by Yole, this event taking place on October 11, will provide an update on the status of the microLED industry. Dr. Eric Virey will detail the activity of the major players as well as remaining technology and supply chain bottlenecks. In addition, cost aspects will also be discussed as well as an assessment of when products can realistically be expected to hit the market. Yole Group of Companies is pleased
to welcome during this webcast, on October 11. To register, click Here. Stay tuned!
ABOUT THE REPORTS:

MICROLED DISPLAYS 2018
Technology advances enable a credible cost reduction path toward high volume applications - Produced Yole Développement (Yole).

Companies cited in the report:
Aixtron (DE), Aledia (FR), Allos Semiconductor (DE), AMEC (CN), Apple (US), AUO (TW), BOE (CN), CEA-LETI (FR), CIOMP (CN), Columbia University (US), Coolege (CA), Cree (US), CSOT (CN), eLux (US), eMagin (US), Epistar (TW), Epson (JP), Facebook (US), Foxconn (TW), Fraunhofer Institute (DE), Glö (SE), GlobalFoundries (US), Goertek (CN), Google (US), Hiphoton (TW), HKUST (HK), HTC (TW), Igis (CA), InfiniLED (UK), Intel (US), ITRI (TW), Jay Bird Display (HK), Kansas State University (US), KIMM (KR), Kookmin U. (KR) … Full list

MICROLED DISPLAYS: INTELLECTUAL PROPERTY LANDSCAPE
What are their major thrust areas and portfolio strength? – Produced by KnowMade & Yole Développement

Companies cited in the report:
3M, Aledia, Apple/Luxvue, Atom Nanoelectronics, Au Optronics, Bai Hangkong, Beijing University Of Technology, BOE Technology, CEA, Changchun Institute, CIOMP, CNRS, Columbia University, Coolege Lightning, Corning, Cree, CSOT, Delta Electronics, Emagin, ETRI, Facebook-Oculus, Focus Lightings Technology, Fraunhofer, Fudan University, Fuzhou University, Glo, Goertek, Google/X Development, Guangdong Poly Optoelectronic, Hahotech, HC Semitek, Eplight, Hiphoton, JD Display, Huawei, III-N Technology, Innolux, Intel, ITRI, Itswell, Jasper Display, Jiangsu Xinguanglian Semiconductor, Junwan Microelectronic Technology, KAIST, Kansas State University, KIMM,... Full list

ABOUT THE AUTHORS

- **Dr. Eric Virey** serves as a Senior Market and Technology Analyst at Yole Développement (Yole). Eric is a daily contributor to the development of LED, OLED, and Displays activities, with a large collection of market and technology reports as well as multiple custom consulting projects. Thanks to its deep technical knowledge and industrial expertise, Eric has spoken in more than 30 industry conferences worldwide over the last 5 years. He has been interviewed and quoted by leading media over the world. Previously Eric has held various R&D, engineering, manufacturing and business development positions with Fortune 500 Company Saint-Gobain in France and the United States. Dr. Eric Virey holds a Ph-D in Optoelectronics from the National Polytechnic Institute of Grenoble.

- As a technology and market analyst for the display industry, **Dr. Zine Bouhamri** is a member of the Photonics, Sensing and Display division at Yole Développement. Zine manages the day-to-day production of technology and market reports, as well as custom consulting projects. He is also deeply involved in business development activities for the Displays unit at Yole. Previously, Zine was in charge of numerous R&D programs at Aledia. In his time there he developed strong technical expertise as well as a detailed understanding of the display industry. Zine is the author and co-author of several papers and patents.

- **Dr. Nicolas Baron** is CEO and cofounder of Knowmade. He manages the development and strategic orientations of the company and personally leads the semiconductor department. Nicolas has more than 10 years-experience in semiconductor related patent & technology analysis. Previously Nicolas was research assistant at the French research laboratory CRHEA-CNRS where he worked on the development of a new generation of GaN-on-Silicon transistor for power and RF applications. Dr. Nicolas Baron holds a Ph-D in Physics from the University of Nice Sophia-Antipolis, and a Master of Intellectual Property Strategies and Innovation from the European Institute for Enterprise and Intellectual Property (IEEPI), Strasbourg, France.
ABOUT KNOWMADE

Knowmade is a Technology Intelligence and IP Strategy consulting company specialized in analysis of patents and scientific information. The company supports R&D organizations, industrial companies and investors in their business development by helping them to understand their IP environment and follow technology trends. KnowMade is involved in Compound Semiconductors, Power Electronics, RF & Microwave Technologies, LED/OLED Lighting & Display, Photonics, Memories, MEMS & Sensors, Manufacturing & Advanced packaging, Batteries & Energy management, Biotechnology, Pharmaceuticals, Medical Devices, Medical Imaging, Agri-Food & Environment.

Knowmade’s experts provide prior art search, patent landscape analysis, scientific literature analysis, patent valuation, IP due diligence and freedom-to-operate analysis. In parallel the company proposes litigation/licensing support, technology scouting and IP/technology watch service. Knowmade’s analysts combine their technical and patent expertise by using powerful analytics tools and proprietary methodologies to deliver relevant patent analyses and scientific reviews.


ABOUT YOLE DEVELOPPEMENT

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 80 collaborators worldwide covering MEMS & Sensors - Imaging - Medical Technologies - Compound Semiconductors - RF Electronics - Solid State Lighting - Displays - Photonics - Power Electronics - Batteries & Energy Management - Advanced Packaging - Semiconductor Manufacturing - Software & Computing and more...

The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and KnowMade, support industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business. For more information, visit www.yole.fr and follow Yole on LinkedIn and Twitter.

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Yole Développement, System Plus Consulting, Knowmade, PISEO and Blumorpho are part of Yole Group of Companies.

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