

# The Dawn of The InP Market in Consumer Applications

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## Abstract

Reaching US\$5.6B in 2027, the InP device market is expanding from traditional Datacom and Telecom applications towards consumer applications. The remarkable high-volume potential in consumer applications could have a significant impact on the InP industry. The InP 2022 report provides an overview of market triggers for InP EELs and the development of the InP wafer and epiwafer industries, along with market forecast of different impacted segments.

## INTRODUCTION

Thanks to its direct bandgap and emission in the short-wavelength InfraRed (SWIR) range 1000-1700 nm, InP-based photonic devices are witnessing an explosion of interest in various applications. Over the last decades, Datacom and Telecom applications are considered one of the market drivers for InP thanks to the low optical losses that InP EELs can provide at the SWIR range. However, new technologies are emerging in consumer and automotive applications which could impact the industry landscape of InP. For instance, consumer applications such as smartphones or smartwatches with high volume potential represent a huge opportunity for the InP market.

To benefit from emerging market opportunities, players from different regions of the world and from different technology areas (material and equipment suppliers, photonics device manufacturer, system integrators) are

entering or investing significantly. In this paper, Yole Intelligence provides their analysis and insights on the InP ecosystem including their understanding of the current market share dynamics and future evolution of business opportunities.

## DATACOM AND TELECOM APPLICATIONS

The migration to higher data rates, lower power consumption within data centers and the deployment of 5G base stations will drive the development and growth of optical transceiver technology in the coming years. As an indispensable building block for high-speed and long-range optical transceivers, InP laser diodes remain the best choice for Telecom & Datacom photonic applications. This growth is driven by high volume adoption of high-data-rate modules, above 400G, by big cloud services and national telecom operators requiring increased fiber-optic network capacity. With that in mind, the InP market, long dominated by Datacom and Telecom applications, is expected to grow from \$2.5B in 2021 to around \$5.6B in 2027 (see figure 1). Yole’s InP 2022 [1] report addresses the main drivers for the growth in the Telecom and Datacom applications.

## NEXT STOP: CONSUMER APPLICATIONS

There has been long speculation for the penetration of InP in consumer applications. The year 2022 marks the beginning of this adoption. For smartphones, OLED displays are

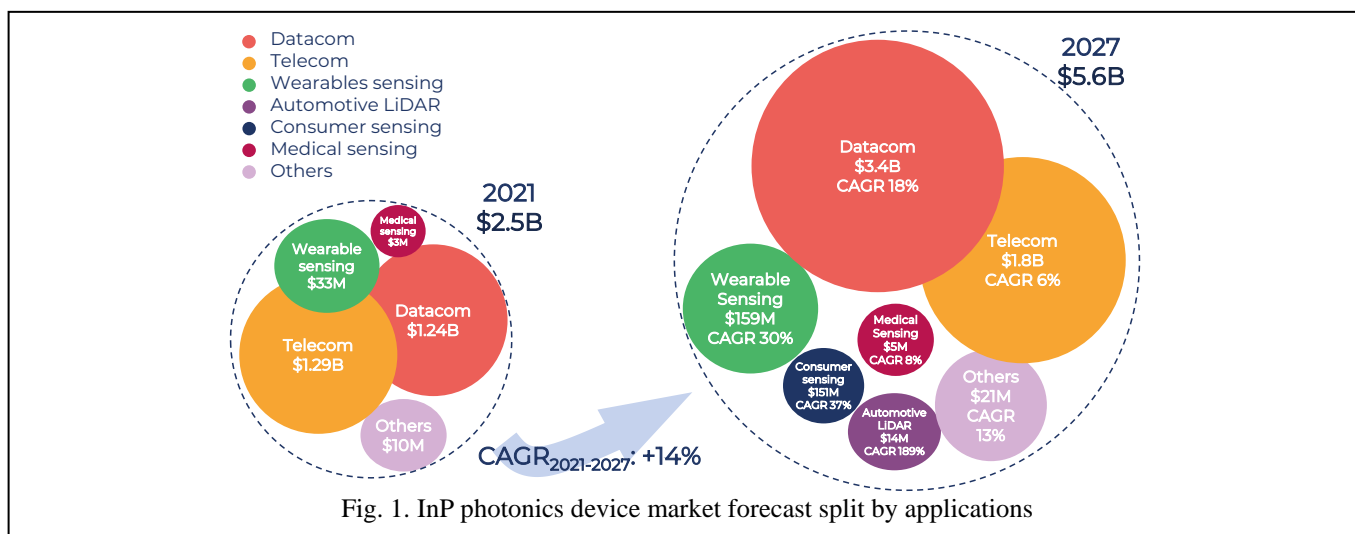


Fig. 1. InP photonics device market forecast split by applications

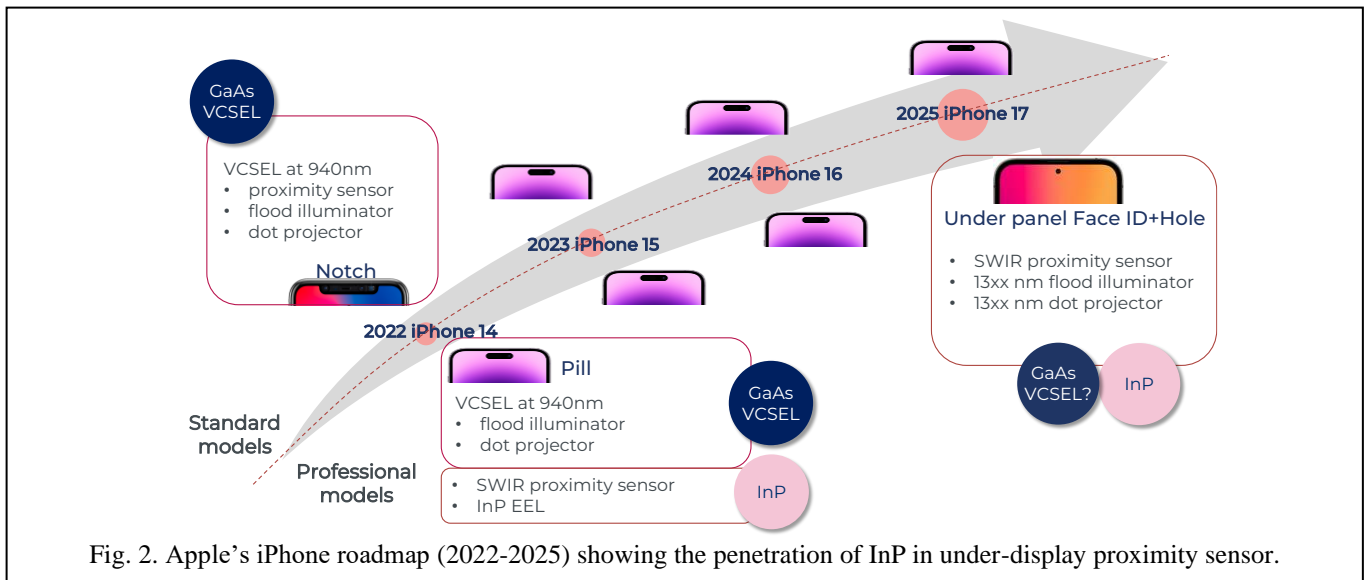


Fig. 2. Apple's iPhone roadmap (2022-2025) showing the penetration of InP in under-display proximity sensor.

transparent at wavelengths in the range from around 1380 to 1450nm. OEMs interested in removing the camera notch on mobile phone screens and integrating the 3D-sensing modules under OLED displays are considering moving to InP Edge Emitting Lasers (EELs), replacing the current GaAs Vertical Cavity Surface Emitting Lasers (VCSELs). However, such a move is not straightforward from cost and supply perspectives. We have spotted the first penetration of InP into wearable earbuds in 2021. Apple was the first OEM to deploy InP-based proximity sensor into its AirPods 3 family to help differentiate between skin and other surfaces. This adoption has been extended to iPhone's 14 pro family (see Figure 2). The leading smartphone player has had changed the aesthetics of its top range smartphones, the iPhone 14 Pro family, reducing the size of the notch at the top of the screen to feature a pill shape. To achieve this new front camera arrangement some other sensors, such as the proximity sensor, must be placed under the display. The InP-based under-display proximity sensor in the iPhone 14 pro family has been confirmed by Energy-dispersive X-ray (EDX) analysis at Yole System Plus [2]. This begs the questions: Could InP penetration continue towards 3D sensing modules such as dot projectors and flood illuminators? As GaAs photonics players are developing GaAs for SWIR applications, could GaAs technology come back again with a different solution for long-wavelength lasers?

The impact of an innovative company like Apple adding a differentiator functionality to its product significantly affects companies in its supply chain, and vice versa. Traditional GaAs suppliers for Apple's proximity sensors could switch from GaAs to InP platforms since both materials could share similar front-end processing tools. We certainly expect to see new players entering the InP business as the consumer market represents high volume potential. Added to that, Apple's move could trigger the penetration of InP in other consumer applications such as smartwatches and automotive Light Detection and Ranging (LiDAR) within silicon photonics

platforms. Yole's InP 2022 report [1] provides an overview on supply chain movements and the InP capacity expansion roadmaps of leading players. With the InP penetration in consumer applications, Yole analysts are following the supply-demand of InP as it could be critical considering the volume demand of consumer technologies. We are spotting investments in capacity expansion as well as the transition to bigger InP wafer diameters so that the supply can meet the demand if InP penetrates heavily in consumer and automotive applications.

## CONCLUSIONS

The adoption of InP in smartphones in 2022 could be the introductory step for further adoption within different consumer applications. The rapid evolution of smart connected devices would trigger more investments, new entrants and mergers and acquisition in this very dynamic industry.

## REFERENCES

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## ACRONYMS

SWIR: Short-Wavelength InfraRed  
OLED: organic light-emitting diode  
EELs: Edge Emitting Lasers  
VCSELs: Vertical Cavity Surface Emitting Lasers  
EDX: Energy-Dispersive X-ray  
CAGR: Compound Annual Growth Rate