

SAMSUNG MONITOR MINILED  
ODYSSEY NEO G9

VISUAL PERFORMANCE & OPTICAL  
CONSTRUCTION ANALYSIS

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# AUTHORS OF THIS REPORT



**Marc Leconte: Innovation Leader,  
Optical System Architect at PISÉO**

Marc Leconte is in charge of optical system innovation projects for illumination and detection for all types of applications within PISÉO. He holds an Engineering degree in optics from the Institut d'Optique Graduate School (IOGS) and has more than 25 years of experience in the detection of defects by optical process in hollow glass components within the world leader in this field. In this context, Marc has notably designed detection systems combining lighting and imaging to reveal defects among the ambient noise caused by the environment.



**Matthieu Verstraete: Senior  
Analyst Electronics at PISÉO**

Matthieu Verstraete is in charge of R&D studies and expertise at PISÉO. He holds a degree in Electronics Engineering and has around 20 years of experience, mainly within the Philips group. Based for several years in the Netherlands, he participated in the 2000s in the advanced development of digital decoding systems and embedded electronics for the optical systems of the first DVD+RW recorders. He then joined the lighting division of the Philips group, where he was in charge of specifying and developing the driver portfolio for professional LED luminaires worldwide. Before joining PISÉO, Matthieu held the role of Global Platform Outdoor Architect for all optical and electronic solutions integrated into Philips' outdoor lighting fixtures worldwide. Thanks to his expertise in electronics and embedded software, he is an innovator for customer projects with strong electronic and software connotations and supports all projects requiring expertise in his field.



**Thibault Cabana: Product Owner &  
Display R&D Leader at DXOMARK**

Thibault Cabana is head of the display team at DXOMARK, leading the R&D of display laboratories and protocols. Since joining the company in 2020, he has contributed significantly to developing and implementing DXOMARK's first display testing protocol. Thibault now also leads consulting services with the major players in the smartphone industry. Previously, he worked in the automotive sector, designing interior optical systems for the French company Valeo. His work there focused on display image quality, display integration in the control panel, and display innovation-related works (for which he filed a patent). Thibault holds an Engineering degree in Optics from the Institut d'Optique Graduate School (IOGS) in France.

# EXECUTIVE SUMMARY

- After several years and many announcements, Mini-LED backlights are coming to the market. According to manufacturers' claims, they will allow LCD displays to offer a contrast similar to OLEDs, while providing high brightness. All this while offering reduced power consumption, a very thin form factor (thickness), and cost/price competitiveness with OLED.
- With its MiniLED Odyssey Neo G9, Samsung announces a brighter image for better contrast – all in 8K.
- To evaluate the benefits of this new type of backlight, DXOMARK and PISÉO – leaders in the assessment of consumer electronics quality and photonic system architecture, respectively – have teamed up to produce this report.
- To evaluate the display quality of the Samsung Monitor MiniLED Odyssey Neo G9, DXOMARK carried out visual performance measurements. This report presents the test results and the performance comparison.
- In order to understand the technology of the Samsung Monitor MiniLED Odyssey Neo G9 backlight, PISÉO analyzed the optical architecture of the unit. This report includes a description of the height of the optical films integrated between the MiniLED array and the LCD panel.
- Based on their own analyses, DXOMARK and PISÉO carried out a cross-analysis to show the links between the user experience and backlight optical construction.
- MiniLED displays, and the future microLED displays, are clearly a disruption for the display industry. This is both in terms of performance, as analyzed in this report, and also in terms of supply chain. All the major consumer electronics manufacturers such as Apple, Samsung, TCL and Skyworth, and display device manufacturers, are testing the market with new products and adapting their supply chains. They are also trying to find differentiation in terms of design and choices of the right display architecture, as well as choice of the right components and modules.



# WHAT'S IN THE REPORT

## Key features

- Measurement and analysis of brightness, brightness uniformity, contrast, EOTF, color, color uniformity, angular performance, halo in video, high and standard dynamic range (HDR and SDR) formats.
- Measurement and analysis of artifacts such as screen reflectance and flicker.
- Description of the MiniLED-based backlight unit technology.
- Details about LED emission characteristics.
- Main characteristics and roles of the different films in the optical stack.
- Backlight unit operation when displaying a simple scene.
- PISÉO's and DXOMARK's opinion on Samsung Monitor MiniLED Odyssey Neo G9 performance.

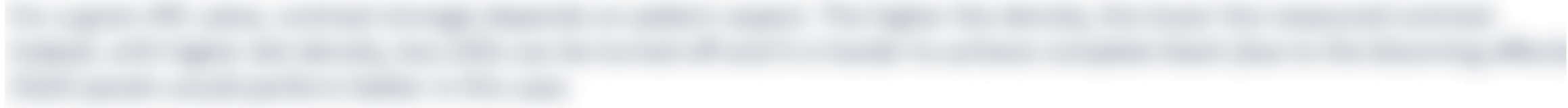


# COMPANIES CITED IN THIS REPORT

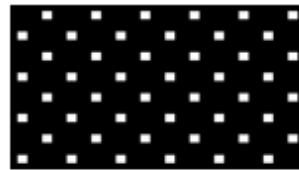
- 3M
- Hansol
- MNTech
- Nanosys
- Samsung
- Shinwha
- Zeonor

# VIDEO CONTENT – CONTRAST (3/3)

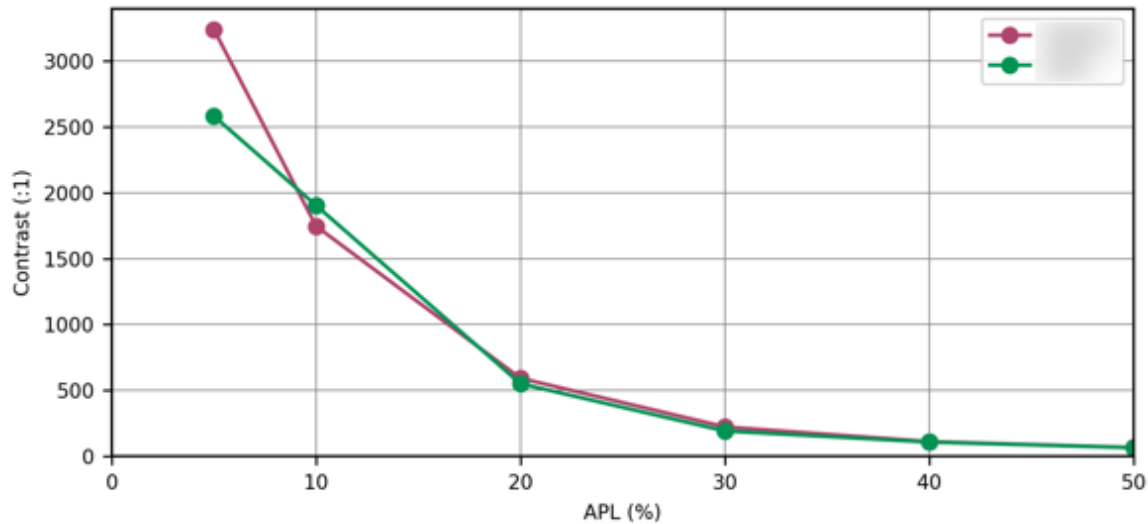
For HDR and SDR content and for both pattern sets, contrast is higher on lower APL.



Pattern set 1



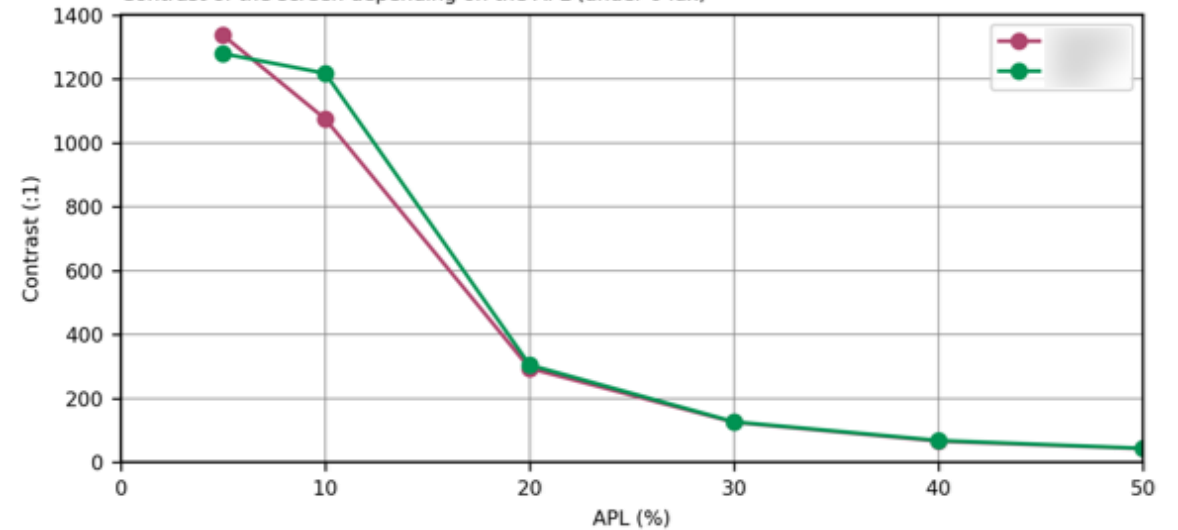
Contrast of the screen depending on the APL (under 0 lux)



Pattern set 2

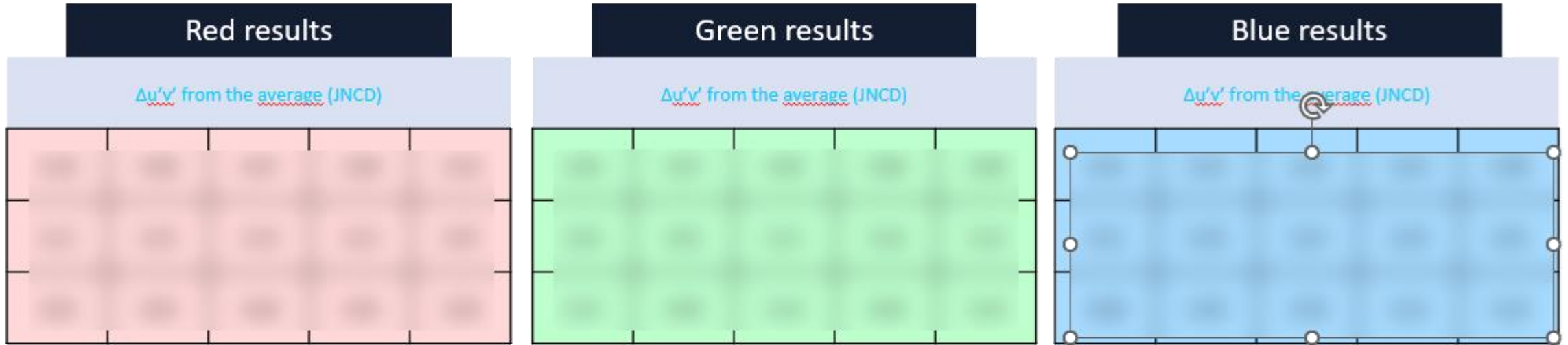


Contrast of the screen depending on the APL (under 0 lux)





# STILL CONTENT – BRIGHTNESS UNIFORMITY



## Conclusion:

[Redacted content]

# PISEO PHOTOMETRIC LAB

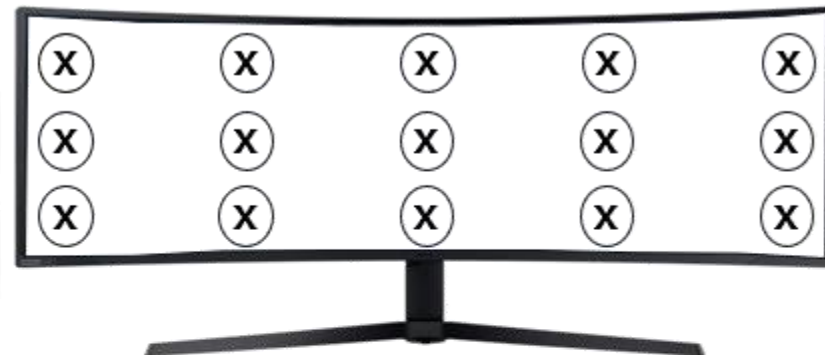
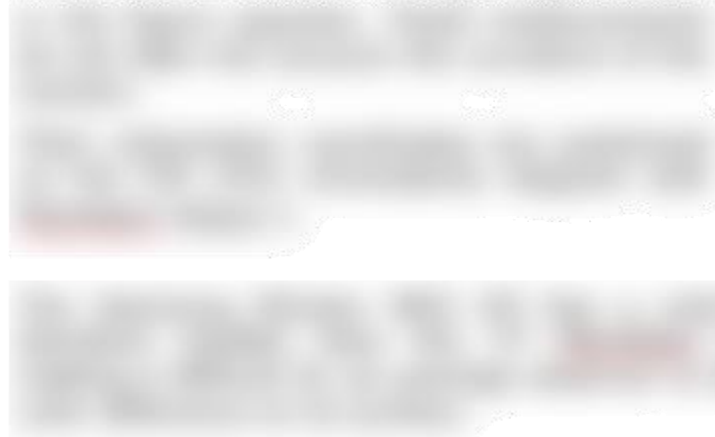
PISEÓ has performed photometric tests in its own laboratory equipped with state-of-the-art equipment.

- To record luminance images, the Westboro Photonics PF 501A 5Mpx videoluminance meter was used.
- To perform spectral, photometric, and radiometric flux measurements, Instrument Systems' CAS120 (VIS), CAS 140CT (VIS), and CAS 140D (300nm - 1100nm) spectroradiometers were used.

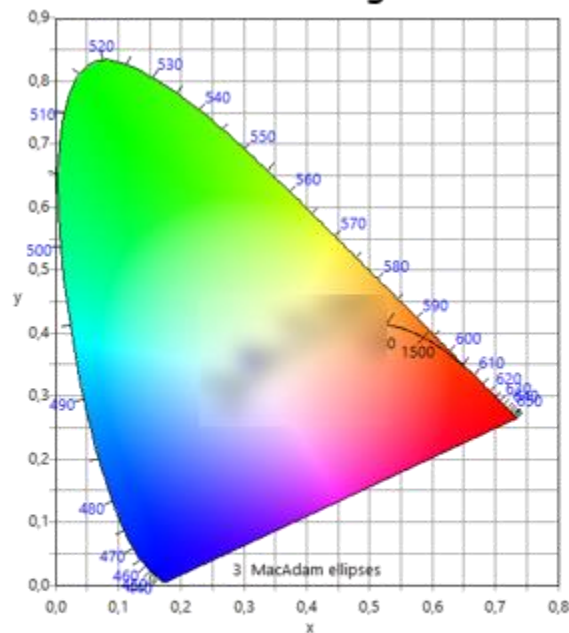


# MONITOR COLORIMETRIC DEVIATION

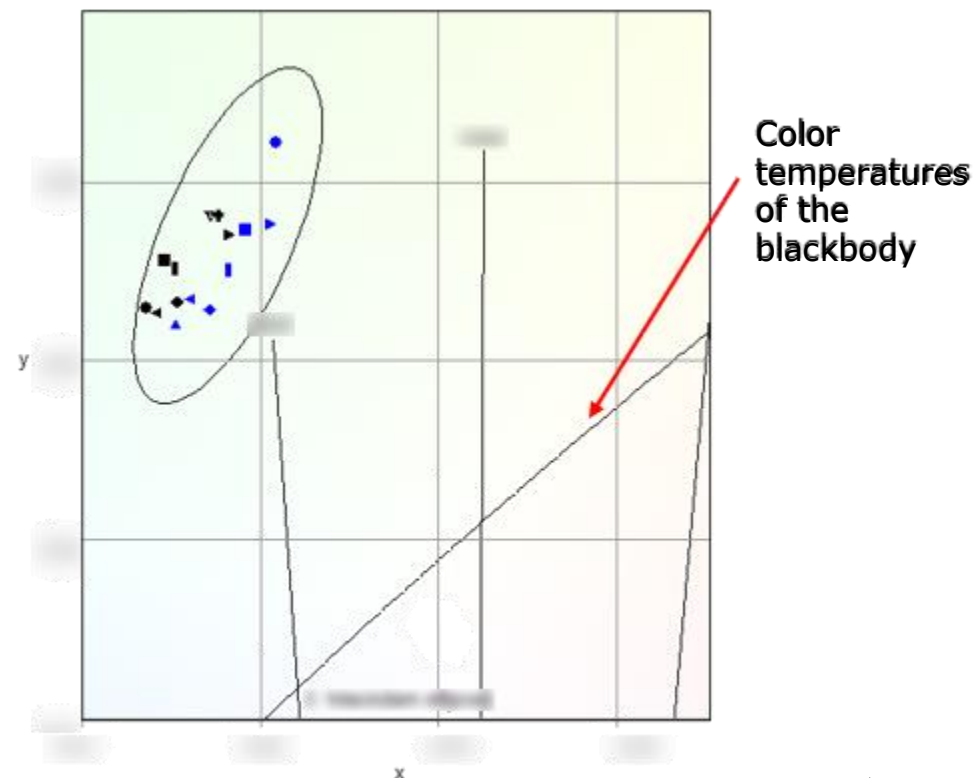
The spectrum of a uniform white pattern in full screen is measured in 15 points, as shown



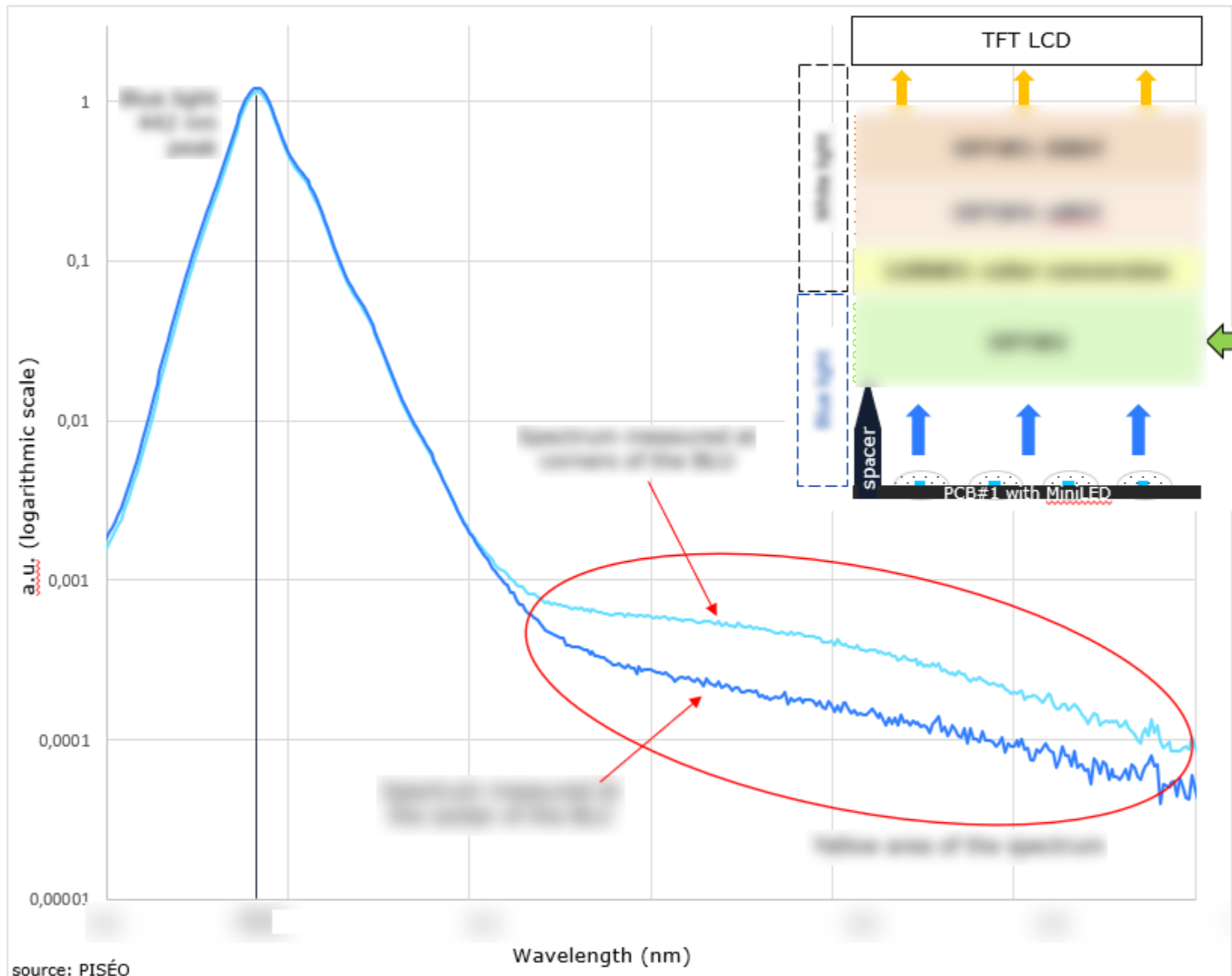
CIE 1931 diagram



source: PISÉO



# BLU – EMISSION SPECTRA (2/3)



source: PISÉO

# RELATED PRODUCTS

[Apple iPad Pro MiniLED 12.9"](#)  
Visual performance & optical construction analysis



[Samsung TV NEO QLED 65QN900A](#)  
Visual performance & optical construction analysis



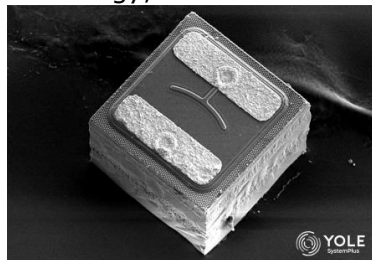
[TCL TV 85X925 Pro 85" MiniLED 8K](#)  
Visual performance & optical construction analysis



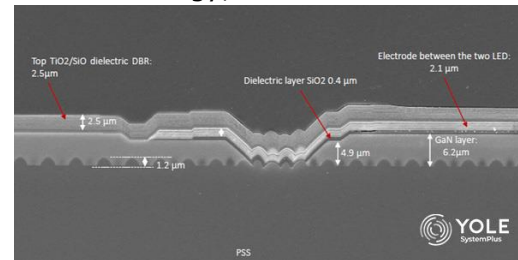
[MiniLED 2022: LCD Backlights and Direct View LED Displays](#)  
Market and Technology Trends



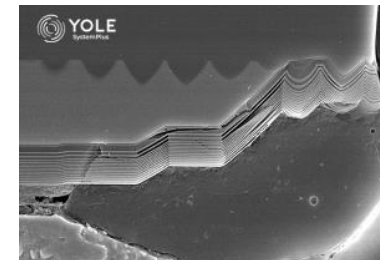
[MiniLED backlight in iPad Pro](#)  
Technology, Process and Cost



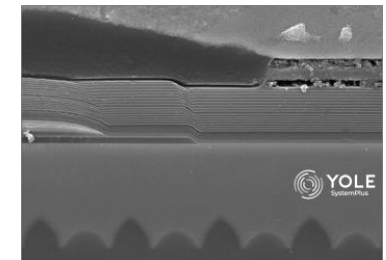
[MiniLED backlight unit in Odyssey Neo G9 49" Samsung Monitor](#)  
Technology, Process and Cost



[TCL MiniLED X9 TV 85"](#)  
Technology, Process and Cost



[MiniLED backlight unit in Samsung neo QLED TV](#)  
Technology, Process and Cost

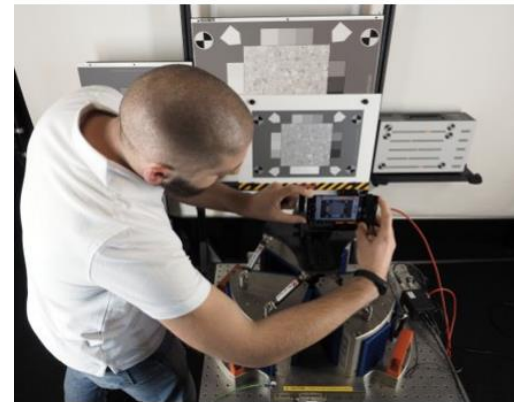
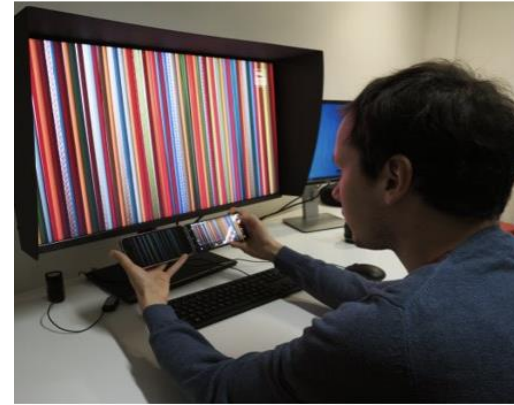


# ABOUT DXOMARK

**Independent French technology company and laboratories**

**International leader in quality assessment of camera, display, audio, and battery**

**Editor of [dxomark.com](https://www.dxomark.com), an online quality benchmark database**



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Huawei Mate 40 Pro+: 139	Oppo A74: 86	Asus ROG Phone 5: 79
Huawei Mate 40 Pro: 136	Wiko Power 100: 85	Asus Smartphone for Snapdragon insiders: 77
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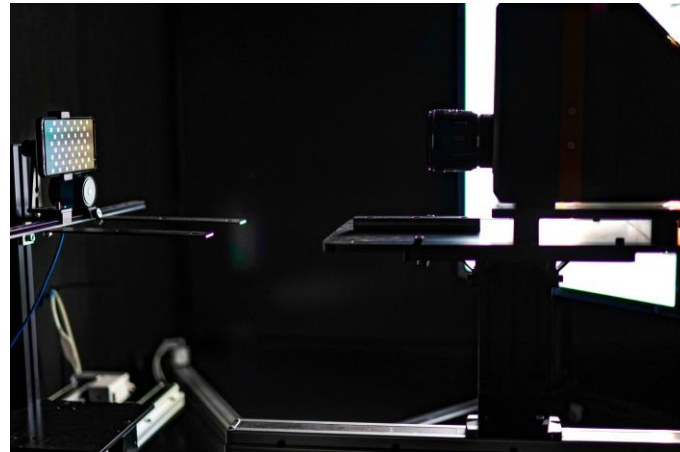
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- Samsung Galaxy Z Fold3 5G Audio review: An outstanding concert-recording device** 72 AUDIO

# DXOMARK DISPLAY TESTING LAB – MAIN SETUPS



## Video Analysis Kit

Use a representative set of SDR and HDR10 reference videos displayed on a professional monitor to perform video perceptual analysis.



## Display Bench

Photometric measurements under controlled lighting that simulates real-life ambient light conditions, using an easy automated workflow.



## Touch Bench

Measure touch interface performance (reaction time, smoothness, accuracy) in real-life scenarios, including browsing, zooming, and gaming.

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source: PISEO, Olivier Ramonteu



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COMPONENTS



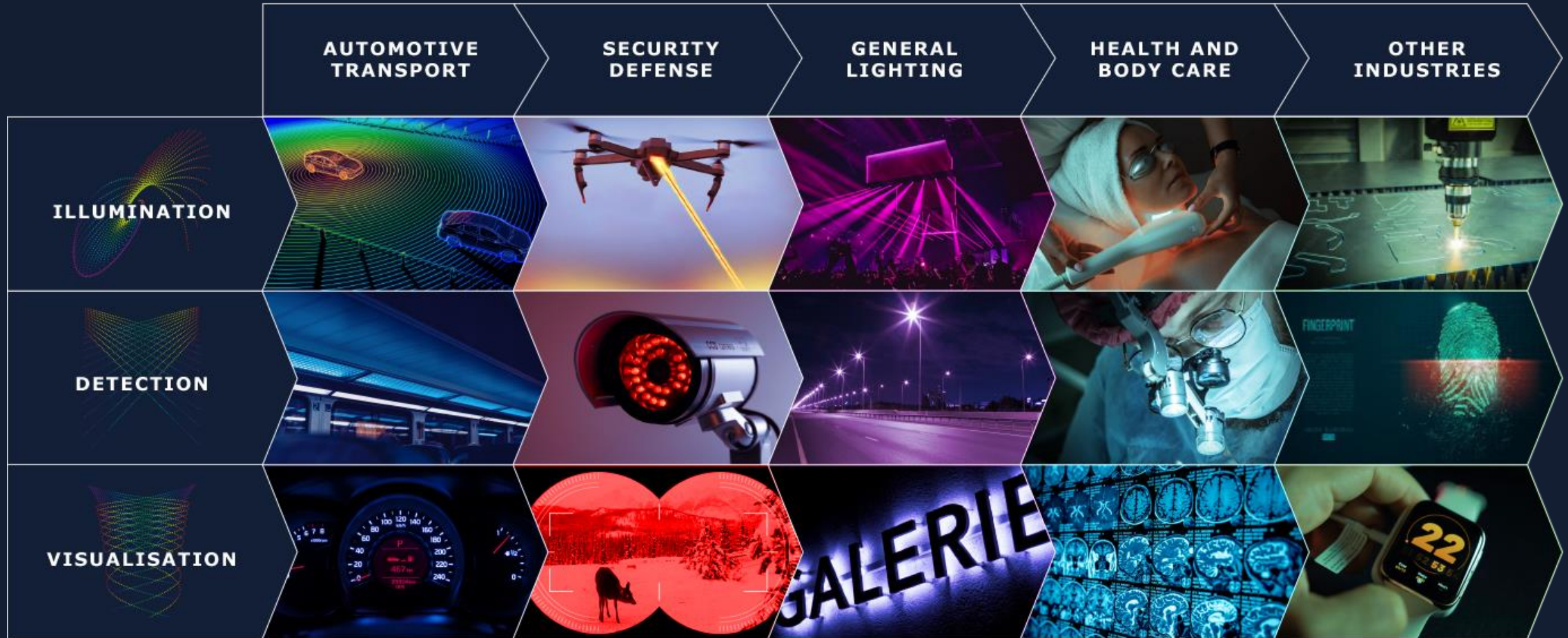
SYSTEMS



source : PISEO, Olivier Ramonteu

**HEALTHCARE, ENVIRONNEMENT, LIGHTING, AUTOMOTIVE,  
AERONAUTICS, RAILWAYS, DEFENSE, TELECOM, PROCESSES...**

# MARKETS AND PRODUCT TYPES



# PISÉO, THE FACTS

- **10 years old.**
- **Eight shareholders**, including Yole Développement, GIL-Syndicat du luminaire, Syndicat de l'éclairage, Serma Group, and Cluster Lumière.
- Electro-optical characterization **laboratory ISO 17025 accredited** by COFRAC (scope available on [www.cofrac.fr](http://www.cofrac.fr)).
- **150+ customers** (Start-ups, SMEs, large groups) in France and abroad.
- **17 employees** highly qualified from the industry.
- **5,000+** tests carried out.
- **300+** customer projects carried out.
- Based in **Lyon**, France.



## REPORTS, MONITORS & TRACKS

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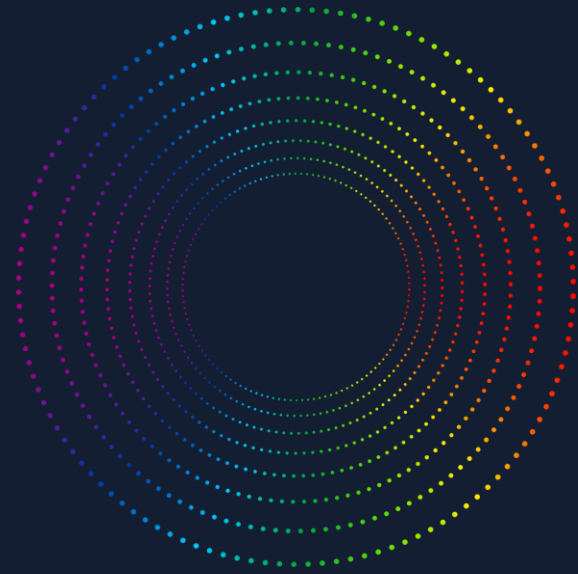
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