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Q1 2024 Himax Technologies Inc Earnings Call

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PRESENTATION

Operator

Good day, and thank you for standing by. Welcome to the Himax Technologies, Inc. First Quarter 2024 Conference Call. (Operator Instructions). Please be advised that today's conference is being recorded. And at this time, I'd like to hand the conference over to your host, Mr. Mark Schwalenberg from MZ Group. Please go ahead.

Mark Schwalenberg ***MZ Group S.A. - Director***

Welcome everyone to the Himax First Quarter 2024 Earnings Call. Joining us from the Company are Mr. Jordan Wu, President and Chief Executive Officer; Ms. Jessica Pan, Chief Financial Officer; and Mr. Eric Li, Chief IR/PR Officer.

After the Company's prepared comments, we've allocated time for questions in a Q&A session. If you have not yet received a copy of today's results release, please e-mail himx@mzgroup.us, access the press release on financial portals or download a copy from Himax's website at www.himax.com.tw.

Before we begin the formal remarks, I'd like to remind everyone that some of the statements in this conference call, including statements regarding expected future financial results and industry growth, are forward-looking statements that involve a number of risks and uncertainties that could cause actual events or results to differ materially from those described in this conference call.

A list of the factors can be found in the Company's SEC filings, Form 20-F for the year ended December 31, 2023, in the section entitled Risk Factors as may be amended. Except for the Company's full year of 2023 financials, which were provided in the Company's 20-F and filed with the SEC on April 2, 2024, the financial information included in this conference call is unaudited and consolidated and prepared in accordance with IFRS accounting. Such financial information is generated internally and has not been subjected to the same review and scrutiny, including internal auditing procedures and external audits by an independent auditor, to which we subject our annual consolidated financial statements and may vary materially from the audited consolidated financial information for the same period. The Company undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. I would now like to turn the call over to Mr. Eric Li. Eric, the floor is yours.

Eric Li ***Himax Technologies, Inc. - Chief of IR/PR Officer & Spokesperson***

Thank you, Mark, and thank you, everyone, for joining us. My name is Eric Li, Chief IR/PR Officer at Himax. On today's call, I will first review Himax consolidated financial performance for the first quarter 2024, followed by our second quarter outlook. Jordan will then give an update on the status of our business, after which we will take questions. We will review our financials on an IFRS basis.

We are pleased to report that Q1 revenues, gross margin and profits all exceeded guidance issued on February 6, 2024, despite the seasonal downturn as well as ongoing macro headwinds. The better-than-expected financial results primarily stemmed from strong order momentum in our automotive and Tcon product lines, coupled with cost improvements and a favorable product mix.

First quarter revenues registered $207.6 million, a decrease of 8.8% sequentially, exceeding our guidance range of a 9% to 16% decline. Gross margin came in at 29.3%, outperforming our guidance of around 28.5%. Q1 profit per diluted ADS was 7.1 cents, surpassing the guidance range of 2.0 cents to 5.0 cents.

Revenue from large display drivers decreased 7.0% sequentially to $31.3 million due to seasonally soft macroeconomic conditions compounded by ongoing production and inventory control measures by our leading panel customers. Consequently, our sales of TV and

monitor ICs declined sequentially. However, notebook IC sales saw a nice double-digit increase quarter-over-quarter, as customers accelerated their purchases after several quarters of destocking. Sales of large panel driver ICs accounted for 15.1% of total revenues for the quarter, compared to 14.8% last quarter and 21.7% a year ago.

Small and medium-sized display driver segment revenue reached $144.3 million, a sequential decline of 11.5%. The better-than-guidance result was fueled by strong sales in DDIC for automotive and OLED tablets. Driven by rush orders for traditional DDIC, Q1 automotive driver sales, encompassing both traditional DDIC and TDDI, experienced a single-digit decline, outperforming the guidance of a mid-teens decline.

Meanwhile, automotive TDDI sales continued to defy the industry downturn and increased sequentially thanks to our robust pipeline of design-win projects. The automotive business, including traditional DDIC, TDDI, Tcon and OLED sales, remained the largest revenue contributor in first quarter representing around 46% of total sales. Q1 smartphone IC sales declined sequentially but exceeded guidance, fueled by rush orders from leading customers. Conversely, tablet driver sales declined as expected amidst the typical low season characterized by sluggish demand. The small and medium-sized driver IC segment accounted for 69.5% of total sales for the quarter compared to 71.6% in the previous quarter and 63.3% a year ago.

First quarter non-driver sales exceeded guidance, reaching $32 million, an increase of 3.4% from the previous quarter. The better-than-expected performance is attributable to a resurgence in orders for large-sized display Tcon products. In the realm of automotive Tcon, the adoption of our automotive local dimming Tcon continues to rapidly expand, as evidenced by increasing number of project awards from numerous Tier-1s for the new vehicle projects of their OEM customers around the world. This sets the stage for robust sales growth in the coming years. Non-driver products accounted for 15.4% of total revenues, as compared to 13.6% in previous quarter and 15% a year ago.

First quarter operating expenses were $50.7 million a decrease of 3.1% from the previous quarter and a decline of 0.6% from a year ago. Given the persistent macroeconomic headwinds, we continue to be diligent with strict budget and expense control measures.

First quarter operating income was $10 million or 4.8% of sales, compared to 7.2% of sales for the same period last year and 7.3% of sales last quarter. The decreases in operating margin were primarily driven by lower sales. The sequential decrease was also attributed to lower gross margin. However, Q2 gross margin is on track to rebound from Q1. First quarter after-tax profit was $12.5 million, or 7.1 cents per diluted ADS compared to $23.6 million or 13.5 cents per diluted ADS last quarter and $14.9 million or 8.5 cents per diluted ADS in the same period of last year.

Turning to the balance sheet, we had $277.4 million of cash, cash equivalents and other financial assets at the end of March 2024, compared to $223.8 million at the same time last year and $206.4 million a quarter ago. The increase in cash balance stemmed primarily from continuous destocking efforts across all major product lines.

In Q2, however, cash, cash equivalents, and other financial assets are set to decline primarily due to decreasing sales in the previous two quarters, resulting in lower Q1 receivables. In addition, accounts payable is expected to increase as a result of the rising Q1 wafer orders placed in preparation for higher shipment volumes starting in Q2. Other significant Q2 cash outflows include annual income tax payments as well as refunds to certain customers for deposits made during the industry-wide capacity supply shortage. As of the end of the first quarter, we had $39 million in long-term unsecured loans, of which $6 million was the current portion.

Our quarter-end inventories as of March 31, 2024, were $201.9 million, lower than $217.3 million last quarter, yet another illustration of our successful destocking efforts. Accounts receivable at the end of March 2024 was $212.3 million, down from $235.8 million last quarter and down from $252.2 million a year ago. DSO was 93 days at the quarter end, as compared to 91 days last quarter and 93 days a year ago. First quarter capital expenditures were $2.7 million, versus $15.1 million last quarter and $2.8 million a year ago. The first quarter CapEx was mainly for R&D-related equipment and in-house testers of our IC design business.

Prior to today's call, we announced an annual cash dividend of 29.0 cents per ADS, totaling $51 million and payable on July 12, 2024, with a payout ratio of 100% of the previous year's profit. The high payout ratio is supported by our positive business outlook, as we pursue

business objectives and strive for sustainable long-term growth and shareholder value while maintaining a healthy balance sheet.

As of March 31, 2024, Himax had $174.7 million ADS outstanding, unchanged from last quarter. On a fully diluted basis, the total number of ADS outstanding for the first quarter was $175 million.

Now turning to our second quarter 2024 guidance. We expect second quarter revenues to increase 8% to 13% sequentially. Gross margin is expected to be around 31.5% to 33.5%, a notable increase from 29.3% of the previous quarter, primarily because of higher sales from automotive and Tcon businesses, both of which enjoy better gross margin than corporate average. The final number may vary depending on product mix.

The second quarter profit attributable to shareholders is estimated to be in the range of 13.0 to 17.0 cents per fully diluted ADS.

I will now turn the call over to Jordan to discuss our Q2 outlook. Jordan, the floor is yours.

Jordan Wu ***Himax Technologies, Inc. - Co-Founder, President, CEO & Director***

Thank you, Eric. Amid ongoing macroeconomic uncertainty, customer behavior in the display market remains conservative with panel makers continuing to implement strict output control measures amidst the cautious end brand panel procurement environment.

Given the limited visibility, customers tend to maintain lean inventory levels and underestimate demand, thereby providing us with conservative forecasts, accompanied by last-minute order increases. This trend has persisted over the past 7 consecutive quarters, including Q1, with our actual sales consistently at the upper end of or exceeding our guidance range.

As we look ahead to the second half, even with lean inventory levels, we anticipate this conservative market sentiment will persist, causing customers to continue to prioritize agility in response to market dynamics.

With that being said, we believe Q1 will be the low point for this year and see sales starting to pick up in Q2, especially in the automotive sector. With several other upcoming demand catalysts on the horizon, including major sporting events and festival shopping seasons, business momentum is expected to continue to steadily improve throughout the second half.

Now let me elaborate a bit on the near-term outlook for automotive business, our largest source of revenue. While many semiconductor vendors and their customers, are still going through painstaking destocking processes, our inventory position for automotive sector has become healthy since the end of last year with our panel customers also maintaining low stock levels at present. This is best illustrated by the large quantities of rush orders we received from panel customers over the last two months, for which we also had to place rush orders to our foundry vendors.

Therefore, notwithstanding the recent headwinds faced by the global automotive industry, our outlook for the automotive display IC business remains positive for the second half of the year.

The automotive display market is experiencing a megatrend of expanding quantities, sizes and sophistication of displays within vehicles as fancy displays are increasingly becoming a major selling point for car makers. As the leader in the automotive display IC business, Himax is poised to benefit from this trend, which implies higher content value per vehicle for display semiconductor vendors such as us, leading to sustainable growth slated for the next few years. Our confidence stems from our dominant design-win pipelines in TDDI and local dimming Tcon, both relatively new and cutting-edge technologies for automotive displays with accelerating volume, a momentum which is expected to carry on over the next few years.

This will further solidify our position in the market where we are already the leader in the traditional DDIC. Moreover, more customers are adopting Himax's local dimming Tcon along with TDDI or LTDI, as an integral part of their development platform for crafting new automotive displays, reflecting strong customer loyalty for our technology and service.

Additionally, we are implementing cost optimization and supplier diversification strategies to enhance supply flexibility and

cost-effectiveness, as exemplified by our recent strategic partnership announced with Nexchip for the automotive market.

As Eric mentioned earlier, we just declared our annual cash dividend with a payout ratio of 100% of last year's profit. Our decision for the high dividend payout ratio this year underscores our unwavering commitment to shareholder value, even in the face of uncertain macroeconomic conditions. This not only recognizes the ongoing support of our shareholders, but also demonstrates our confidence in our financial stability.

With that, I will now begin with an update on the large panel driver IC business. In Q2 2024, we anticipate a mid-teens sequential increase in large display driver IC revenue, primarily bolstered by customer restocking following several quarters of muted demand, as well as increasing orders from customers preparing for the upcoming shopping festivals.

Q2 TV and monitor IC sales are expected to increase single digit and nice double digit, respectively, quarter-over-quarter. In contrast, notebook IC sales are poised for a decline following strong restocking in the previous quarter. In the notebook market, a burgeoning trend of AI PC is emerging, prompting demand for display upgrades to include touch-enabled features and/or adoption of OLED displays. Himax offers comprehensive offerings in both LCD and OLED technologies, encompassing DDIC, Tcon and touch-related products.

As we look ahead to 2025, the anticipated beginning of replacement cycles, we are well-positioned to capitalize on this opportunity with numerous in-cell TDDI projects for mainstream LCD notebooks, and DDIC and touch controller for OLED notebooks, some of which poised to enter mass production for leading brands in the second half of this year. We believe this will serve as an important growth catalyst for us in notebook and elevate our presence in the market.

Turning to the small and medium-sized display driver IC business, we anticipate second quarter revenue to increase single digit sequentially. Automotive IC revenue is expected to grow high teens sequentially, with sales for both DDIC and TDDI poised for sequential growth, despite recent reports of softening electric vehicle demand. Our leadership position in automotive TDDI remains solid, underscored by the rapidly expanding adoption as demonstrated by more than 450 secured design-win projects, and a continuous influx of new pipeline and design wins across the board.

It's also important to note that only approximately 30% of awarded projects are currently in mass production, as an indication of the potential lucrative growth opportunity we believe is yet to be realized.

Automotive TDDI sales are anticipated to represent more than 40% of automotive driver sales in Q2. In contrast, both smartphone and tablet sales are projected to decline quarter-over-quarter, as consumers prolong their replacement cycles in response to the challenging economic environment. To mitigate these sluggish conditions, we have taken steps to improve our cost structure by diversifying our supplier base, to position Himax for a resurgence in demand.

To elaborate further on our automotive IC business, where we have more than 40% market share. Himax offers the industry's most comprehensive LCD product lineup, which includes traditional DDIC and TDDI technologies, alongside cutting-edge LTDI and local dimming Tcon solutions. Moreover, we are actively expanding and bolstering our footprint in OLED with a comprehensive range of products covering DDIC, Tcon and on-cell touch controller while forming strategic alliances with top panel manufacturers in Korea and China. This proactive approach aligns us with the dynamic transformation of the industry towards increasing adoption of OLED displays for high end vehicles.

The inherent flexibility of OLED displays to cater to foldable or curved shapes, along with their outstanding visual performance and low power consumption, opens new horizons for automotive interior displays.

Notably, our meticulously engineered OLED on-cell touch controller sets a new standard as it boasts an industry-leading touch signal-to-noise ratio exceeding 45 dB and offers heightened sensitivity, accommodating challenging user conditions such as glove-wearing and wet-finger operations.

Our comprehensive solution in our automotive LCD and OLED displays address a broad spectrum of customer preferences and requirements, nurturing robust customer loyalty and fostering collaborations with global panel makers, Tier 1 suppliers and automotive manufacturers. We anticipate our automotive business will remain a significant catalyst for our growth moving forward.

Next for an update of our OLED business. As I just covered, we have made significant progress in providing solutions for automotive OLED displays, an area with exciting growth potential. We also are expanding into other OLED applications such as tablet, notebook and monitor, through collaborations with leading panel manufacturers in Korea and China, featuring a comprehensive offering, covering DDIC, Tcon and touch controllers. Additional products with new feature enhancements are slated to enter mass production in the second half of 2024.

Regarding smartphone OLED, the current slowdown in smartphone market demand has unfortunately necessitated adjustments to our initial timeline. Nonetheless, collaborations with customers in Korea and China persist, with ongoing verification and partnership projects.

I would like to now turn to our non-driver IC business update. First, for an update on our Tcon business. We anticipate a notable sequential increase of more than 40% in Tcon sales in Q2, propelled by escalating shipments for Tcon in large-sized displays and automotive. Himax has been devoted to developing panel driver ICs and timing controller for decades. We stand as the industry leader in both monitor and automotive Tcons, universally adopted by leading panel makers across the board.

In the monitor Tcon sector, Himax excels in the high-end market, especially in gaming, where intricate designs are required for high resolution, high refresh rate and low latency display performance, crucial for achieving immersive gaming and entertainment experiences. In the automotive Tcon domain, our leading position remains unchallenged, boasting well over 100 design-win projects, powered by our cutting-edge local dimming technology along with our industry-leading proprietary algorithm.

The incorporation of local dimming Tcon not only significantly enhances the display's contrast ratio but also offers improved power efficiency, particularly crucial for EV and larger-sized displays. Our industry-leading local dimming Tcon solutions support super high frame rates and a wide range of resolutions from FHD to up to 8K. We are encouraged by the rapidly expanding validation and widespread deployment of our solutions initially in customers' premium car models, which have been expanded into mainstream models worldwide.

In the second quarter, automotive Tcon sales are anticipated to grow more than 30% sequentially, representing more than 3% of total sales. From a longer-term perspective, the growing traction of our local dimming Tcon for automotive is on track to mirror the success of our automotive TDDI over the last couple of years.

Switching gears to the WiseEye Ultralow Power AI Sensing solution, a cutting edge endpoint AI integration featuring proprietary ultralow power AI processors, always-on CMOS image sensors and advanced CNN-based AI algorithms.

In the rapidly evolving AI landscape, WiseEye AI technology stands out for its expertise in on-device tinyML solutions and unique ultralow power consumption, measuring merely single-digit milliwatts. This opens the door for battery-powered endpoint devices to incorporate AI sensing for intuitive and intelligent user interaction, something that would otherwise be impossible without such extremely low power consumption AI.

For instance, in smart door locks, which are typically battery-powered devices, China's leading high-end door lock maker DESMAN, harnessing Himax's ultralow power WiseEye AI technology, created the world first smart door lock products that feature 24/7 sentry monitoring and real-time event recordings.

Our WiseEye total solution for DESMAN, boasts an exceptionally low power draw of just 2.2 milliwatts representing a novel and highly advantageous feature with minimal impact on battery life. The potent AI inherent in WiseEye allows the door lock camera to capture snapshots periodically on a 24/7 basis and when detecting human presence, immediately start recording while concurrently waking up the door lock's much higher power consuming main processor. The result is a comprehensive event recording for seamless threat

protection that better ensures security while mitigating potential breaches, all achieved with a battery-powered door lock.

By working with ecosystem partners and customers, we are expanding WiseEye AI applications aggressively, covering new areas, including, but not limited to smart home, smart agriculture, automotive, smart office, AMR (Automatic Meter Reading), healthcare and a wide range of other AIoT applications.

To broaden our market reach and help shorten customers' development cycles, we also offer seamlessly integrated, plug-and-play WiseEye Modules. These modules enable no-code/low-code AI development, while providing built-in context-aware AI algorithms, which are reprogrammable by the customer. Within a few months after its launch, WiseEye Modules have seen successful adoption in battery-powered parking systems across Asia, as well as applications in fleet management, occupancy sensing, pet tracking, people flow sensing, access control, among others.

Moreover, for companies with their own AI expertise, we provide hands-on open-source AI frameworks, tool chains, and robust AI models to streamline development efforts and reduce cost and lead time for AI development or AI product introduction.

This year at the ISC West, a leading U.S. trade show for the security industry, Himax unveiled WiseEye PalmVein technology, a ultralow power contactless biometric authentication solution. Powered by the advanced WiseEye2 AI processor, WiseEye PalmVein can swiftly authenticate an individual's identity in less than 100 milliseconds while consuming mere milliwatts of power. It boasts exceptional accuracy, enhancing security by minimizing the risk of duplication or spoofing through the distinct palm vein patterns unique to every individual. The solution targets battery-powered access control devices for a small group of authorized individuals. Having only launched recently, WiseEye PalmVein technology has already attracted interest for applications such as automotive, door lock, surveillance, laptop and more.

We are actively accelerating verification and partnership projects in these areas and are enthusiastic about the potential for WiseEye PalmVein authentication, that marks a significant breakthrough in the industry.

Next, for an update of our LCoS Microdisplay technology. At the upcoming Display Week 2024 in May in San Jose, California, Himax will unveil its groundbreaking ultra-luminous, new-generation Color Sequential Front-Lit LCoS Microdisplay, capable of achieving a brightness of up to 250,000 nits. This represents a notable 2.5-fold increase from its predecessor announced at the Display Week 2023, while maintaining low power consumption of just 300 milliwatts.

Additionally, thanks to its compact form factor of just 0.5 c.c. in volume, when including both illumination optics and the LCoS panel, stylish and everyday-ready AR glasses are becoming a reality. While volume commercialization of AR glasses targeting the general public may still take several years, we are proud that Himax's new-generation Color Sequential Front-Lit LCoS stands as the sole viable solution in the marketplace for authentic see-through AR glasses, delivering unparalleled brightness, power consumption, form factor, display quality and mass production readiness. Collaborations with leading tech companies worldwide are on the rise solidifying Himax's position, as the leader in the field.

For non-driver IC business, we expect revenue to increase double digit sequentially in the second quarter. That concludes my report for this quarter. Thank you for your interest in Himax. We appreciate you joining today's call and are now ready to take questions.

QUESTIONS AND ANSWERS

Operator

(Operator Instructions). Our first question comes from the line of Frank Wang with Athena Capital.

Frank Wang *Athena Capital - President*

The first question is on the auto sector. Texas Instruments, NXP, TSMC, UMC indicate some softness in the auto sector. What is your view? And why are these leading semiconductor companies seems to be more pessimistic on the auto sector, while you are expecting a decent quarter-over-quarter growth in the auto sector.

Jordan Wu ***Himax Technologies, Inc. - Co-Founder, President, CEO & Director***

Going through softness in auto semiconductor business, we are guiding for a pretty strong outlook. So I guess, Frank's question is why we are seeing this departure of directions. I think, indeed, we have seen in recent earnings calls from semiconductor companies, both foundries and IDMs across U.S., Europe and Japan where they are giving rather cautionary outlooks on the auto market demand.

But if you read carefully about their comments, you'll be able to see that they are not saying the auto industry's overall shipment is going to decline. What they are saying really is that their stocks are perhaps too high and they are going through de-stocking process. And that is the reason for their cautionary outlook.

And if you look at the industry forecast, most people are -- I mean, while we are not expecting a very strong auto shipment for this year, people are not forecasting any decline either typically at least something like 3% or 5% or some forecast or even perspective or higher growth outlook for the vehicle shipment volume this year. So the industry actually remains solid.

And I mentioned in my prepared remarks that our inventory for auto market actually is very, very lean and so are our customers' inventory positions. And I particularly mentioned in my prepared remarks that we actually had to take another rush orders recently. Actually I'm talking about very sizable quantities of rush orders for our panel customers. And the reason why they are giving rush orders clearly is because they have run out of stock and their existing stock cannot meet the customer demand. And with the rush orders, we also have to turn around and place our orders, rush orders, to our foundry partners because again, for the same reason, our inventory is very low, and our existing inventory simply cannot meet the demand of the customer.

So I think I also explained in my prepared remarks, there has been a total of 7 quarters in a row when we see our inventory consistently declining very nicely. And also, we announced end of last year that we believe our inventory level has become very healthy, and that certainly covers the auto industry.

And I think that is the major reason for departure, I suppose. And also, I think we continue to highlight the fact that auto industry is going through this megatrend to upgrade their panels in terms of quantity, feature sophistication, size, et cetera, for vehicle's panels. And that is very good news for panel makers targeting auto industry because for each vehicle, the panel content value is increasing and even more so for IC vendors because for each panel going to vehicles, the IC content value is increasing. So we are going through that megatrend right now and being the market leader, I think we really are taking a nice ride and enjoying this megatrend. So I hope that explains the short-term difference in our outlook as opposed to most semiconductor makers. Back to you, operator.

Frank Wang ***Athena Capital - President***

Can I just ask you to relay one more question, please. Himax is a leader in LCoS. Can you talk about the chance for see-through AR glasses to really happen?

Jordan Wu ***Himax Technologies, Inc. - Co-Founder, President, CEO & Director***

Okay. Yes, I suppose, Frank, asking about AR glasses and particularly our LCoS solution targets that market. And towards the end of my prepared remarks, we highlighted the major breakthrough in technology and our excitement about the breakthrough. And I suppose we're not hearing the details of Frank's question. I suppose many people may wonder, AR as a general of our products has not seen a great success so far. And LCoS is just a supporting technology for AR glasses industry. So what is our comment, is they're really a future. And the Company over the many years seems to have been committed to the development of LCoS technology for AR glasses.

So I guess many people may have questions about whether this strategy actually makes sense. And my response is, obviously, we believe there's a reasonable chance for AR glasses to become successful. And I will elaborate on the importance of microdisplay or LCoS Microdisplay for the success of AR glasses. And clearly, we are committed and frankly bringing money to develop this technology for many, many years because of the simple reason that we have a very strong commitment for its success, and we certainly believe that the chance of success is quite good. And I will also highlight the fact that simply because the technology is so difficult, when it is successful, it's going to be tremendous potential, tremendous business opportunity for Himax because very few people are involved simply because the technology is actually quite challenging.

Now let me elaborate the background a little bit. One of the major technical challenges for see-through AR glasses is the display system, which by definition, needs to be totally different than the displays we are so used to every day for, say, smartphone or watch or even those AR and MR goggles.

So basically, a see-through displays is comprised of 3 things: a microdisplay which generates image, a waveguide, which projects the image and the coupling lens, which channels the image generated by microdisplay to the waveguide, okay?

Now because of the see-through nature and the need to allow for outdoor use, the brightness to eyes for display for AR glasses needs to be significantly higher than those for the usual displays, which typically ranges between 250 to 300 nits around.

I'm talking about your usual notebook displays or cellphone on display or TV displays, right, typically between 250 to 350 nits.

In comparison, our customers are now demanding for the brightness to eyes for the AR glasses to be at least 1,000 nits, which is quite a number of times higher than our usual displays. Now the trouble is the optical efficiencies of both the waveguide and the coupling lens are quite low, especially the waveguide, which is typically as low as 1% or less. While for the coupling lens is around 50%, 60%. So what this means is that more than 99% of the brightness generated by the microdisplay is "wasted" after traveling through the optical system and before the image is projected onto the eyes. And this is the reason why we are now offering our new generation from the LCoS with super high brightness of 250,000 nits.

So on the ballpark basis, if the waveguide efficiency is 1% then our 250,000 nits LCoS can create about 1,500 nits brightness to eyes, which is going to meet the demand of our customers for AR glasses.

So while we will continue to work towards even higher brightness, we believe, for the first time ever in the industry, we are finally seeing a microdisplay, which offers a legitimate level of brightness for AR glasses targeting the general public. So to complete the story, in addition to the major breakthrough in brightness, our new Front-Lit LCoS also offers low power consumption of around 300 milliwatts as I mentioned in my prepared remarks and the form factor of just 0.5 c.c. in total volume.

All of these are very critical for the success of AR glasses. Last but not least, our LCoS solution is way beyond laboratory level and is actually now quite ready for volume production. I would just add one last point, which is the only competing technology for AR glasses for display is micro-LED, for which the industry has put in tremendous resources over the last few years to develop billions of dollars of resources. In our view, our proprietary front-lit LCoS provides much better power efficiency than micro-LED i.e., even the same of model power consumption, our solution actually produces much better brightness than LED, than micro-LED microdisplay. So as far as we can tell, what we have achieved so far in our Color Sequential Front-Lit LCoS solution is far better than the performance delivered by any micro-LED microdisplay.

While we are offering comfortable form factor with much better readiness for mass production. And this is a pretty lengthy response, but I hope that kind of addresses the issue for our long-term commitment to the development of LCoS for our AR glasses industry. Thank you.

Operator

This concludes the Q&A. We're going to hand it over to you, Jordan, for closing remarks.

Jordan Wu ***Himax Technologies, Inc. - Co-Founder, President, CEO & Director***

I apologize for the system issue. But as a final note, Eric Li, our Chief IR/PR Officer, will maintain investor marketing activities and continue to attend investor conferences. We'll announce the details as they come about. Thank you, and have a nice day.

Operator

This concludes today's conference. You may now disconnect.