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Q4 2021 Himax Technologies Inc Earnings Call

EVENT DATE/TIME: FEBRUARY 17, 2022 / 1:00PM GMT

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PRESENTATION

Operator

Hello, ladies and gentlemen. Welcome to the Himax Technologies Inc. Fourth Quarter and Full Year 2021 Earnings Conference Call. (Operator Instructions). As a reminder, this conference is being recorded. I would now like to turn the conference over to your host, Mr. Mark Schwalenberg from MZ Group.

Mark Schwalenberg *MZ Group North America - Director*

Thank you. Welcome, everyone, to Himax's Fourth Quarter and Full Year 2021 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 have allocated time for questions in the 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.

Unless otherwise specified, we will discuss our financials based on non-IFRS measures. You can find the related reconciliation to IFRS on our website. 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 results or events to differ materially from those described in this conference call.

These factors include, but are not limited to, the effect of the COVID-19 pandemic on the Company's business; general business and economic conditions and the state of the semiconductor industry; market acceptance and competitiveness of the driver and nondriver products developed by the Company; demand for end-use applications products; reliance on a small group of principal customers; the uncertainty of continued success in technological innovations; our ability to develop and protect our intellectual property; pricing pressures including declines in average selling prices; changes in customer order patterns; changes in estimated full year effective tax rate; shortage in supply of key components; changes in environmental laws and regulations; changes in export license regulated by Export Administration Regulations, (EAR); exchange rate fluctuations; regulatory approvals for further investments in our subsidiaries; our ability to collect accounts receivable and manage inventory and other risks described from time to time in the Company's SEC filings, including those risks identified in the section, entitled "Risk Factors" in its Form 20-F for the year ended December 31, 2020, filed with the SEC as may be amended.

Except for the company's full year of 2020 financials, which were provided in the company's 20-F and filed with the SEC on March 31, 2021, 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 will now turn the call over to Mr. Eric Li. Eric, the floor is yours.

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

Thank you, Mark. Thank you, everybody, for joining us. My name is Eric Li, and I am the Chief IR/PR Officer. Joining me are Jordan Wu, our CEO; and Jessica Pan, our CFO.

On today's call, I will first review the Himax consolidated financial performance of the fourth quarter and full year 2021, followed by the first quarter 2022 outlook. Jordan will then give an update on the status of our business, after which we will take questions.

Our fourth quarter revenues were at the upper end of the guidance range, while gross margin and EPS both exceeded the guidance issued on November 4, 2021. The fourth quarter revenues, gross margin and EPS all reached new records. Full year 2021 revenues surpassed \$1.5 billion, along with record gross margin and EPS. For the fourth quarter, we recorded net revenue of \$451.9 million, an increase of 7.4% sequentially and an increase of 63.9% compared to the same period last year.

Gross margin was 51.8%, an increase from the already high level of 51.7% in the third quarter and above our guidance of around 50%. Non-IFRS profit per diluted ADS was 84.9 cents, exceeding the estimates of 78.0 cents to 83.0 cents. IFRS profit per diluted ADS was 81.5 cents, higher than guidance range of 74.5 cents to 79.5 cents.

Revenue from large displays driver was \$125 million in Q4, up 6.3% sequentially and nearly double year-over-year. Monitor revenue came in better than expected, up more than 30% sequentially, ahead of our prior guidance of a more than 20% increase, due to accelerated orders for high-end monitor from certain end customers. Notebook sales continued strong growth momentum, delivering double-digit sequential growth as a result of strong shipment of high-end products toward leading notebook vendors.

As expected, the fourth quarter TV IC revenue was down single digits sequentially on the backdrop of sluggish global TV market. In some cases, where TV customers who borne shipment liability to us and suffered business headwinds, under mutual content, we redirected their allocated foundry capacity towards IT displays where demand stayed strong. It was through such efficient operating execution that we were able to achieve sales growth for the large display driver business despite the slow TV market and further reinforce the business relationship with strategic customers.

Large panel driver IC accounted for 27.7% of total revenues for the quarter compared to 27.9% in the third quarter of 2021 and 23.3% a year ago.

Small and medium-sized display driver saw resilient sales with revenue of \$276.6 million, up 9.6% sequentially and up more than 50% year-over-year. The automotive segment has repeatedly been the fastest growing sector among our small and medium-sized display driver segment with sales up more than 20% sequentially this quarter. It's worth highlighting that the e-paper business, another product in our small and medium-sized driver lineup and one of the decent margin, enjoyed more than 80% sequential growth in Q4. Small and medium-sized driver IC segment accounted for 61.2% of total sales of our quarter compared to 59.9% in the previous quarter and 64.5% a year ago.

In Q4, smartphone, tablet and automotive driver businesses contributed about the same sales with automotive significantly outgrowing the other two segments, a trend that we believe will continue over the next few years. The fourth quarter smartphone sales reached \$91.3 million, up double digits sequentially and up more than 30% compared to the same period last year due mainly to higher shipments to key customers despite the outbreak of COVID-19 variants, weighing down the worldwide smartphone market. The smartphone segment represented around 20% of our total sales in Q4. Our supply for smartphone was still limited by the total capacity accessible to us, where we could only support shipment to select end customers.

Amidst a slow tablet market, our tablet revenue reached \$85.8 million, a decline of single digit sequentially, but up around 30% year-over-year. The decline was caused by shrinking traditional DDIC shipments, while TDDI sales were slightly better than record level

in Q3 and represented the eighth consecutive quarter of growth since initial production from the first quarter of 2020. We maintained our leading market share position in the non-iOS tablet market with accelerated TDDI penetration among leading name brands.

Tablet revenue in the quarter accounted for 19% of total sales. Our fourth quarter revenue for automotive set another record, amounting to \$89.1 million, up more than 20% sequentially and up more than 130% year-over-year, thanks to our strong shipment in high-end DDIC product, rising TDDI shipment as well as market share gains across numerous automotive customers. As panel inside vehicle continue to grow in quantity, size and include more advanced features, we expect to see sustainable, robust growth in our automotive business.

Fourth quarter revenue from our non-driver business was \$50.3 million, slightly down sequentially and up around 50% year-over-year. We are pleased to report that our ultralow power AI image sensing total solution successfully entered into mass production in Q4 last year for a major tech name over a mainstream application. We reached this major milestone in just one year after we delivered the first samples, a remarkable achievement and an illustration of the robustness of our AI solution.

CMOS image sensor sales were up mid-teens, while Tcon business decreased by low teens sequentially as a result of slow demand in TV and the Chromebook. However, on a year-over-year basis, Tcon sales were up more than 70%, a reflection of our leading position across 4K/8K TV, gaming monitor and the low-power notebook. Non-driver products in Q4 accounted for 11.1% of total revenues, as compared to 12.2% in the third quarter of 2021 and 12.2% a year ago.

Non-IFRS gross margin for the fourth quarter sustained at high level of 51.8%, a continuation from 51.7% of last quarter and greatly increased from 31.2% of the same period last year. The higher gross margin was a reflection of better mix towards high-end products area and a more favorable IC pricing environment resulting from tight foundry capacity.

IFRS gross margin was also 51.8% for the quarter. Our non-IFRS operating expenses for the fourth quarter was \$48.5 million, up 9.1% from the previous quarter and up 11.5% from a year ago. The sequential increase was a result of a onetime cash bonus at the end of December to further reward employees for the remarkable financial results, while the year-over-year increase was caused mainly by increased salary.

IFRS operating expenses were \$56 million for the fourth quarter, down 18.2% from the preceding quarter, but up 27.9% from a year ago. The difference was mainly due to annual bonus compensation, which we award employees at the end of September each year. Reflecting the higher sales and better gross margin, the fourth quarter non-IFRS operating income was \$185.5 million or 41.1% of sales versus 41.2% of sales in the last quarter. Again, the Q4 operating income reached a historical high. Non-IFRS after tax profit was \$148.4 million or 84.9 cents per diluted ADS, a new record high and the increase from \$138.9 million or 79.5 cents per diluted ADS, last quarter.

Now let's have a quick review on the 2021 full year financial performance. Revenues totaled \$1,547.1 million in 2021, representing 74.4% growth over that of 2020. The ongoing efforts of the pandemic, coupled with the foundry capacity shortage, created a challenging operating environment, yet also provided favorable conditions for IC vendors, such as ourselves, with overall market demand far outpacing supply.

Among our 3 major product categories, small and medium-sized display drivers posted the highest growth of 86.8% in 2021, with sales totaling \$963.5 million. We saw extraordinary business momentum, particularly in tablet and automotive sales in 2021 as the leading non-iOS tablet brands, all adopted our tablet TDDI solutions, and automotive displays continued to evolve a rapid rate in the number, size and the sophistication.

Automotive sales enjoyed the highest growth among all product lines in 2021, up more than 110%, while sales for tablet IC, our top sales contributor in 2021, grew 77%. Smartphone and e-paper sales were up more than 85% and 23%, respectively, in 2021. Revenue for large panel display drivers totaled \$397.9 million in 2021, representing annual growth of 65.3%.

During the pandemic, the surge in IT demand boosted our notebook display IC sales significantly, up more than 370%, whereas monitor display sales increased more than 30%. TV sales were also up by more than 40% despite the dip in worldwide TV shipments during the second half of the year.

Non-driver products sales totaled \$185.7 million, an increase of 42% from last year. The increase was mainly from Tcon sales, more than double amidst growing needs for high frame rate and the high-resolution displays. CMOS image sensor business, severely capped by capacity constraints throughout the year, was up mid-single digit from the strong demand in notebook and web camera for work-from-home and online education. This annual sales increase was offset by WLO, wafer level optics, as the legacy product of a major customer gradually decreased.

Non-IFRS gross margin in 2021 was 48.5%, greatly increased from 24.9% in 2020. The increase was mainly a reflection of more favorable IC pricing and the product mix resulting from the tight foundry capacity as well as increasing contribution from high-margin product lines, especially in automotive, notebook drivers and Tcon. Non-IFRS operating expenses were \$171.5 million, up \$15.2 million or 9.7% due to higher salary expenses and a cash bonus, we awarded our employees at the end of December.

Despite the NT dollar appreciation against the U.S. dollar during 2021, the currency fluctuation to Himax were of limited impact as our accounting was U.S. dollar-denominated, the same as the bulk of our buying and the selling activities, thereby, creating a new natural hedge. The stronger NT dollar in 2021 did contribute to around \$4.6 million of operating expenses increase as we paid the salary of the Taiwan-based employees and much of the Taiwan local incurred expenses in NT dollars.

Yet, the non-IFRS operating expenses ratio of 2021 was reduced to 11.1% from 17.6% in 2020, indicating our consistent and prudent management of operating expenses. IFRS operating expenses were \$203.6 million, up \$40.7 million or 25% compared to last year. The increase came mainly from vested portion of the annual bonus compensation we award employees at the end of September each year.

Reflecting higher sales and better gross margin, non-IFRS operating income was \$578.3 million or 37.4% of sales, an increase of \$513.7 million from \$64.6 million in 2020. For the same reason, but partially offset by increase of annual bonus compensation, IFRS operating income was \$545 million, in contrast to \$57.9 million in 2020.

Our non-IFRS net profit for 2021 was \$463.6 million or 265.1 cents per diluted ADS, up \$411.2 million from \$52.3 million or 30.2 cents per diluted ADS in 2020. IFRS net profit for the year was \$436.9 million or 249.8 cents, up \$389.8 million from \$47.1 million or 27.2 cents per diluted ADS in 2020. The upswing in income was a result of better sales, higher gross margin along with well-managed operating expenses.

Turning to the balance sheet, we had \$364.4 million of cash, cash equivalents and other financial assets as of December 31, 2021, compared to \$201.4 million at the same time last year and the \$250.8 million a quarter ago. The higher cash balance was mainly from \$182.2 million of operating cash inflow during the quarter and the payments received from customers for the purpose of securing their long-term chip supply, partially offset by payment we made in order to secure our long-term foundry capacity.

Restricted cash was \$154.1 million at the end of Q4 compared to \$156.8 million a quarter ago and \$104 million a year ago. The restricted cash was mainly used to guarantee the short-term secured borrowings for the same amount. We had \$52.5 million of long-term unsecured loans as of end of Q4, of which \$6 million was current portion.

Our year-end inventory were \$198.6 million, up from \$160.9 million last quarter and up from \$108.7 million a year ago. Amidst tight foundry capacity where demand still outpaces supply, we continue to pursue an aggressive inventory buildup strategy. The vast majority of our inventory position now is comprised of work-in-process goods, while finished goods are promptly shipped as soon as they are available. Accounts receivable at the end of December 2021 was \$410.2 million, slightly up from \$400.9 million last quarter and up from \$243.6 million a year ago due to higher sales.

DSO was 97 days at the quarter end as compared to 100 days both a year ago and from last quarter. Fourth quarter capital expenditures were \$2 million versus \$2.1 million last quarter and \$0.8 million a year ago. The fourth quarter CapEx was mainly for R&D-related equipment and in-house tester of our IC design business. Total capital expenditure for the year was were \$7.6 million, mainly for design tools, R&D-related equipment as well as in-house tester of our IC design business as compared to \$5.8 million in 2020.

As of December 31, 2021, Himax had 174.3 million ADS outstanding, unchanged from last quarter. On a fully diluted basis, total number of ADS outstanding for the fourth quarter was 174.8 million.

Now turning to our first quarter 2022 guidance. Coming off of the record revenue result from Q4 2021, we expect first quarter revenue to decline 5% to 9% sequentially, yet still better than off-season sales, we typically experienced during the Lunar New Year season with fewer working days.

The guided range implies a year-over-year increase of 33% to 39% in revenues. Non-IFRS gross margin is expected to be around 46% to 48% depending on the final product mix. Non-IFRS profit attributable to shareholders is expected to be in the range of 67.0 cents to 73.0 cents per fully diluted ADS, down 21% to 14% sequentially, but up 74% to 90% year-over-year. IFRS profit attributable to shareholders is estimated to be in the range of 63.5 cents to 69.5 cents per fully diluted ADS.

I would now like to turn the call over to Jordan. Jordan, the floor is yours.

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

Thank you, Eric. Our spectacular results in 2021 were achieved, thanks to macro level tailwinds, our efforts to secure solid capacity and the steadfast focus on optimizing product mix and solidifying strategic customer relationships. All of these factors contributed to the record sales and profit margins.

Now as we look ahead into 2022, against the backdrop of the industry-wide foundry capacity shortage, which is expected to extend well into 2022, the visibility into certain areas of consumer electronics is rather limited with global consumption potentially impacted by the ongoing COVID-19 pandemic, port congestion, worldwide inflationary pressure and worries over geographical conflict. However, we are upbeat about our year-ahead growth prospect, backed by a few product areas, notably the automotive and ultralow power AI image sensing businesses, which we feel confident will stay strong regardless of the macroeconomic concerns.

We anticipate these two product areas, both with good gross margin, will outgrow other product lines in 2022. Robust demand for our traditional automotive driver IC is backed by strong foundry capacity support while automotive TDDI is on track to experience exponential growth throughout 2022 and beyond.

We expect to reach 10 million units cumulative shipment in automotive TDDI in as soon as the second quarter of this year. In the first quarter of 2022, our automotive product sales, including traditional driver IC, TDDI, Tcon and OLED driver, are expected to represent more than 25% of our total sales. As the contribution of automotive revenue grows, it will better position our long-term product mix in terms of both profit margin and business visibility.

Meanwhile, we are highly encouraged by the early success we have seen with ultralow power AI image sensing business thus far after a leading customer adopted it for a mainstream application. We expect to see more design-wins awarded across a broad customer base and a high variety of applications leading to robust sales growth for this new high-margin product line.

Now let me quickly address the ongoing foundry capacity shortage. We expect the supply-demand imbalance to continue throughout 2022, especially on the mature nodes that we are primarily anchored to. Himax has been proactive in this regard, continuing to pursue new partnerships and agreements to increase our available capacity and achieve our 2022 business goals. In the meantime, we entered contractual agreements with the vast majority of panel makers and, in some instances, select leading end customers, where they prepay or make a deposit to secure their long-term chip supply which in turn also improves our business visibility.

While pricing has stabilized recently on both the foundry and customer sides, we guided for a modest sequential decline in gross margin for the first quarter due to a couple of factors. First, our cost of goods sold this quarter represents pricing from the previous quarter when foundries were still raising their prices. Second, in the fourth quarter we benefited from expedited orders from customers who paid the premium and we have since seen a decrease in such orders during the first quarter.

On a year-over-year basis, however, our first quarter margin will still be substantially higher. Looking ahead into 2022, backed by more

secured foundry capacity than last year and an advanced product portfolio, we are well positioned to continue to grow our top line and will continue to work towards maintaining a high gross margin, one of our major long-term business goals, wherein we anticipate further revenue and profit growth in 2022.

With that, now let us start with an update on the large panel driver IC business. Historically, the first quarter has seasonally been the slowest of the year due to the Lunar New Year holidays. In addition, we are seeing softness in certain market segments and intensified China local competition. Nevertheless, Himax is armed with a diversified and comprehensive product offering, covering TV, monitor and notebook, which provides us with the flexibility to take actions in tandem with our customers and suppliers to direct production towards the sectors with stronger demand.

For the first quarter, large display driver IC revenue is projected to be flat to slightly down sequentially, but this will represent an increase of around 70% year-over-year. Despite the low season, TV IC sales are expected to be around flat sequentially in the first quarter, anchored by high-end and large-sized TV IC shipments to key accounts.

Conversely, we expect both monitor and notebook IC sales to drop from last quarter due mainly to panel customers' inventory adjustments in response to the slowing sales momentum after consecutive strong quarterly increases.

Foreseeing the continuation of the prevailing foundry shortage and the demand for advanced displays to remain strong, we continue to move towards higher-end markets while providing advanced driver ICs and Tcons for a one-stop shopping experience, focusing on higher-end displays and premium models for the respective leading end customers in TV, monitor and notebook markets.

We are also supporting further future upgrades for customers' next-generation products, including high-speed interface, low power consumption, higher refresh rate, ultra-large-sized, high aspect ratio and curved-view design. All these will help boost our profit margins and represent a high barrier of entry that differentiates us from China local competition. We remain positive on our large display driver IC business for 2022.

Now let's turn to the small and medium-sized display driver IC business. In the first quarter, revenue is expected to slightly decline by mid-single digit sequentially but increase around 30% year-over-year. Sales for automotive drivers, again, are poised to post another quarter of strong growth, up over 30% sequentially while tablet sales are expected to be down mid-single-digit and smartphone IC business to decline double digit sequentially.

Now let's review these three major product segments within the small- and medium-sized display driver IC business. First, on automotive sector. Order backlog and secured multiyear foundry capacity provide good long-term visibility for Himax in the automotive driver IC [market] (corrected by company after the call), where we have a leading global market share of 40%. Backed by strong design win coverage with all major panel houses and numerous car makers, alongside an enlarged capacity, we expect the automotive sector to be our No.1 sales contributor starting 2022.

We are now targeting to double our automotive sales again in 2022, on top of the already strong 2021 sales, which went up more than 110% from the year before. For the first quarter, our automotive driver IC sales are expected to grow over 30% sequentially, an increase of more than 170% year-over-year. More specifically, we expect the Q1 automotive DDIC sales still much larger than those of TDDI and AMOLED, to grow over 20% sequentially, on its own accounting for more than 20% of our total sales.

Notwithstanding the decent growth, we are still suffering from a severe foundry capacity shortage for automotive DDIC, which is the area with the most severe shortage for us right now. The automotive TDDI, where we are much better prepared in terms of foundry capacity, is set to outgrow DDIC going forward. Currently, we are leading the market with hundreds of design win TDDI projects across the board with world leading panel makers, Tier 1s and automotive OEMs, with just a small portion of them already in mass production.

We announced earlier that our Gen 2 automotive TDDI, which we started ramping as recent as Q3 last year, achieved 1 million units during the first quarter of shipment alone. The Gen 2 automotive TDDI has become the mainstream product shortly after introduction to the market and already dominates our shipments right now. Our automotive TDDI shipment reached around 1.4 million units in the

fourth quarter last year, and we expect to ship considerably over 3 million units in Q1 this year.

Automotive TDDI brings us not only much higher content value on a per panel basis, but is also harder to compete in for late comers. Automotive TDDI, still a relatively new technology, has become a major growth engine for us with the accelerating momentum expected to carry over throughout 2022 and the years ahead.

Looking at the automotive display industry trends, the car market continues to embrace sophisticated display technologies and caters to interactive, stylish and curve designs with ever-improving display resolution and image quality. There is also a shift towards more and larger-sized displays per vehicle than ever before, all indicating much more driver IC demands.

Himax is the market leader in automotive display driver business, covering the entire spectrum of products and technologies, including the industry's most comprehensive traditional DDIC product offerings as well as leading solutions for new technology areas, such as TDDI, local dimming Tcon, LTDI and OLED.

For automotive TDDI, a technology that is essential for large-sized, stylish and curved automotive displays, we pioneered the mass production of the new technology back in 2019 and have shipped cumulatively millions of units since. We continue to dominate new project design wins with direct and indirect customers across the continents. For larger than 30 inches, slim and curved automotive displays, we again led the industry by introducing cutting-edge LTDI technology that strives for a seamless incorporation of sophisticated touch features with multi-chip design architecture.

We are encouraged by the progress made in recent quarters, having increased design win coverage across panel makers and engaged more Tier 1s and OEMs for them to incorporate our LTDI into their new vehicle models. Some of them are slated for mass production starting the first half of 2023. With the commencement of TDDI mass production and LTDI thereafter, we are confident that our overall market share in the automotive display driver market will continue to rise in the coming years.

Next, on smartphone and tablet businesses. We expect Q1's smartphone IC business to decline double digits sequentially, challenged by slowing sales in the global smartphone market, inventory held in stock by smartphone makers and last, but not least, longer production cycle of a new product, a factor which is specific to Himax, but only during this quarter.

In Q1, amidst the worldwide smartphone slowdown, we strategically initiated a product transition plan for key customers' next-generation new designs that support higher frame rate, ultra slim bezel and higher resolution features. The new generation product is designed with more masking layers and therefore requires longer production time, which, during the first quarter of production, will lead to less output.

The product's output is expected to be back to normal starting from the second quarter. Our tablet sales are expected to decline mid-single digit in Q1 due to worldwide tablet market adjustment from a high level. However, our TDDI sales, bucking the seasonality, are expected to be up low-single digit sequentially in the first quarter, benefited by the proactive adoption by all leading non-iOS tablet names of our TDDI solutions. We continue to see an acceleration in TDDI penetration for tablets following surging needs for larger size displays, higher frame rate and active stylus features.

As the dominating tablet driver IC supplier for literally all non-iOS tablet vendors, our TDDI solutions continue to gain traction and are adopted broadly in customers' next-generation tablet products. Among all, we are seeing fast expanding education tablets where our tablet TDDI with active stylus feature has been widely adopted by several leading Chinese players.

Turning to the e-paper driver business, another product in our small and medium-sized driver lineup. Our e-paper business, which currently only represents a small portion of total sales, is set to grow by more than 100% sequentially and more than 240% year-over-year in Q1, driven by the early ramp-up of projects with leading customers and backed by long-term supply agreements. We are collaborating with world-leading e-paper customers for certain ASIC projects on their next-generation products. This consolidates our market presence in the emerging e-reading and e-signage segments from 2022 and onward.

Next, for an update on AMOLED. Himax continues to gear up for the AMOLED driver IC development in partnership with major Chinese and Korean panel makers. In Q1, our flexible AMOLED driver and Tcon for automotive application successfully ramped up for customers' flagship EV model. The number of awarded projects for our automotive OLED Ics is growing with further EV vendors. In addition, our OLED for tablet is expected to commence mass production in the second quarter of this year with Chinese panel makers. As for smartphone, we continue to commit R&D resources to AMOLED driver IC through engagement with top-tier customers. In view of serious constraints on OLED display driver capacity in the next few years, we have also secured meaningful capacity for smartphone OLED drivers.

Now let me share some of the progress we made on the non-driver IC businesses. Let's start from the timing controller. We anticipate Q1 Tcon sales to decrease single digit sequentially as a result of weaker demand in TV and Chromebook notebook sectors. However, on a year-over-year basis, Tcon sales will be up around 50%. We are optimistic about the long-term growth prospect of the Tcon business, where we have successfully positioned ourselves for higher-end and higher value-added areas, including 4K/8K TV, gaming monitor and low-power notebook in view of the consumers' pursuance of various new types of entertainment for film, television and gaming.

Additionally, we extend our Tcon product reach into automotive and gaming TV markets. Our cutting-edge automotive local dimming Tcon has won numerous awards and penetrated into OEMs and Tier 1 car makers' new premium models, with some of them slated for mass production starting in the second quarter of 2022. In the gaming TV market, we are also leading the industry by introducing the world's first 288 Hertz 8K TV Tcon in collaboration with major TV panel makers. We believe the Tcon segment will be one of the driving forces for our non-driver business moving forward.

Now switching gears to the ultralow power AI image sensing total solution, which incorporates Himax ultralow power CMOS image sensor, our proprietary processor and CNN-based AI algorithm. As reported earlier, the sizable order for a top-tier name customer's mainstream application successfully entered mass production in Q4 last year, marking another impressive milestone for our new AI business within just one year since our initial release. We will give further details after the end customers' official announcement.

We have also made good progress on this mainstream application with other leading vendors, where the number of design-in projects is increasing as we speak. In addition to the success story I just mentioned, the second application we expect to see significant volume is in automatic meter reading, or AMR, where our AI total solution has been widely adopted by numerous customers across a wide geographical area in China. Our power-saving AI cameras deployed over the existing installed base of traditional water meters, enable the water meter to automatically collect consumption data with AI operating locally on the edge.

The device transmits only byte-sized metadata to the server for billing and in-time detection of abnormal consumption or leakage, eliminating the need for manual reading. The battery pack has a lifetime of over 5 years, greatly outperforming conventional AMR solutions, which usually are in a bulky form with large battery packs and, without local AI capability, have to transmit massive image data to the cloud to perform meter reading.

We are already seeing accelerated deployment of our AI solutions to a wide range of applications, including notebook, home appliances, utility meter, automotive, battery-powered surveillance camera, panoramic video conferencing and medical, among other things. Moreover, new design-in sockets are on the way as we look to leverage the collaboration with leading cloud service partners, such as Microsoft Azure and Google TensorFlow, on their edge-to-cloud platform to drive further adoption on applications, such as smart home, smart office, health care, agriculture, retail and factory automation.

Last but not least, we are seeing numerous design-in activities of our AI solutions for endoscope, an area we are extremely excited about that may represent an extraordinary game changer for the health examination industry. We will report more detail in due course. We are very encouraged by the traction this relatively new product line has generated in a short amount of time and expect to see increasing sales contribution through 2022 and beyond.

Lastly, given the recent surge of interest in the metaverse and immersive technologies, I'd like to give an update on our optical-related product lines, to which we have committed years of R&D efforts. Our LcoS, WLO and 3D Sensing, three separate optical-related technologies, may individually or combined play a key role in enabling metaverse devices. To help users transit and connect seamlessly

between AR/VR devices and real-life, the right display and 3D technologies are vital.

AR glasses, considered one of the ideal displays for metaverse applications, feature vision augmentation onto the real-world environment, where users see through the glasses with virtual objects and/or digital twins of real-life objects projected by AI engines onto the glasses. For this, Himax showcases Front-lit LCoS Microdisplay, one of the tiniest display modules that offers significantly a higher brightness, lighter weight and lower power consumption, all making the technology ideal for AR headsets.

To further enable AR glasses, we offer WLO waveguide that propagates light patterns from the LCoS display in a predefined path towards the eyes. Furthermore, for virtual objects reconstruction or digital twin information, Himax provides industry leading WLO and 3D decoding technologies, which are essential in enabling both structured light and ToF, or Time of Flight, 3D sensing. The 3D sensing technology, when combined with image sensors, can also enable 3D-based gesture recognition, eliminating the need for handheld controllers, enhancing perception of the environment, which making the ideal technology for contactless interface for AR/VR devices.

In all these technologies I just mentioned, we have a market-leading position with our technology already embedded in various products of quite a few of the biggest tech names in the business and have shipped hundreds of millions in volume with proven product development and manufacturing track records over the years.

While metaverse is still years away from mass volume deployment, Himax is at the forefront of these key technologies to enable the industry, and we are ready to bring the metaverse to life through partnerships with tech industry's leading players, who are aggressively investing in the space. We will not miss the next big thing and are ready to seize the opportunities ahead. We will report additional progress in this new arena as it continues to develop. For non-driver IC business, we expect revenue to decline high teens sequentially in the first 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). And our first question coming from the line of Tristan Gerra with Baird.

Tristan Gerra Robert W. Baird & Co. Incorporated, Research Division - Senior Research Analyst

I'm trying to reconcile the commentary that you had on the call about panel inventory adjustments and also some weakness in smartphones with supply expected to remain tight. So if you could help us understand that you're improving your mix, but are you expecting those final inventory adjustment to basically adjust very quickly, in which case then is the reason why you expect your supply to remain tight? Or is any other factors that I should be considering to reconcile the two?

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

Thank you, Tristan. I understand your question is directed towards only smartphone. Am I correct?

Tristan Gerra Robert W. Baird & Co. Incorporated, Research Division - Senior Research Analyst

Well, even overall, because I figure that it is panel inventory adjustment. Eventually, it can have an impact on the overall demand, even though you mentioned that -- actually, I think the commentary that you had for panel inventory adjustment was if I heard well in the large panel driver IC business?

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

Right. Okay. Firstly, on smartphone, I mean, I think everybody understands the market is relatively slow globally. Having said that though, I think we are relatively immune from the slow market in the sense that we have relatively small exposure to the smartphone market with our sales currently only about 20% going to smartphone, ironically limited by capacity as we reported repeatedly in the past.

And I would admit, I don't have very good visibility on smartphone, when as you correctly mentioned, customers do have inventory pile up. However, again, we mentioned before, our pool of capacity for smartphone and tablet, it's the same pool. It's the same thing, right? So with the same limited amount of capacity available to us, we still have to make the choice of supporting tablet over smartphone because in tablet, we simply have a much higher market share with customers relying upon Himax a lot more than smartphone.

So on a combined basis in these two sectors, which is more than 40% of total sales combined, we are still running at a pretty serious shortage. Although, when we say the market visibility is limited, I think, if I speak to the customers across the board, whether it's smartphone, tablet or TV or monitor or notebook. I think other than the very exception of automotive, where we remain super positive, the shortage there is severe and we just are backing our foundry and the customers are backing us to ship more, right?

So if I put that aside, all other sectors I have to say, when I talk to customers across the board, while nobody has a very upbeat growth prospect year-over-year, no one is also predicting a major decline either. And that is a reflection of low visibility that we just reiterated. However, on this level of demand last year, we as well as the whole industry were running at a pretty severe shortage, and we are also seeing no major capacity increase, right, at least throughout the entire 2022, right?

So last year, there was a shortage. This year, it is highly, highly unlikely the demand is going to shrink in a meaningful way. So I think that is why as well as our peers are, and our foundry partners as well, in fact, are saying the shortage is likely to remain. If there should be a demand recovery, whether it's Q2 or the second half, I think shortage certainly will become more severe and vice versa, which, again, we have limited visibility. We just have to watch the market very closely. I don't know if that answers your question, Tristan?

Tristan Gerra *Robert W. Baird & Co. Incorporated, Research Division - Senior Research Analyst*

Yes. No, I certainly appreciate the color. And then for my follow-up, I'm looking at the gross margin implications. So it sounds that as wafer pricing continues to go up, you weren't able to offset that or fully offset that in Q1 and thus that brings basically a little bit of a sequential decline in gross margin. Given what you've mentioned about demand and supply, do you think that you have the ability to have pricing match further wafer price increases throughout the year, given the supply constraint that you've mentioned? Or do you think that the inventory adjustment will prevent you from having pricing that will mature higher cost beyond Q1?

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

I think, firstly, we are not seeing major or meaningful further price increase of foundry from this point over, at least not in this year, right? So our higher cost in this quarter is a reflection of the pricing which took place in Q4 compared to Q3, right? So this is how our business goes, right? We negotiate price. We agree a price with the foundry. We then place order and they start fabrication process for us, which typically will then take 3 months and you pass a little bit for back end. So that becomes the shipment. So Q4, wafer start becomes the Q1 shipments, right? So the new prices we agree with foundry during Q4 become our cost for Q1.

In Q3, foundry price was higher than that of Q3 -- sorry, sorry, let me repeat, Q4 foundry price was higher than that of Q3, meaning our Q1 shipping costs will be higher than that of Q4. I don't know if that is clear. And that explains why with this short-term decline in gross margin, a little bit of decline, because our customers are very basically telling us, hey, you have upped your prices a lot last year. And now the market is slowing down, and we really cannot accept for the price up.

So although our foundries are also telling us the same thing, right, they are saying, well, it looks like the market cannot accept further price hikes. So although the foundry is saying the same thing to us, however, the price hike that took place in Q4 already was built in into our Q1 costs, and that explains a little bit of squeeze in our gross margin. Now going forward, again, when I talked to all my foundry partners, no one is projecting further meaningful foundry price [increase] (added by company after the call) this year for the simple fact that you know if they raise the price further, the market may not be able to accept it given the overall market environment right now.

However, despite the slow market, our customers are not squeezing as hard for price down. Why? Because our customers, like us, and like our foundry partners, we are all still worried about the overall tightness of our foundry capacity. So we are kind of reaching a balance. How long the balance is going to last? I have no idea. As I said, if the second half, we see a rebound in demand, then it will be good news for us and vice versa, right? So I think it's too early to tell.

However, I think we are a lot more confident on our top line growth this year. Then gross margin, which is last year was 48.5%, is pretty high level. So whether we can further expand on the 48.5% of last year, I have no total confidence, but we also don't think we would depart too much from that if we have to go a little bit lower. So with higher top line growth and a little bit of uncertainty on gross margin, we still remain pretty good confidence on our bottom line as well. I think that's a big quick picture of a quick summary of the full picture of our 2022 outlook.

Operator

Your next question coming from the line of Jerry Su with Credit Suisse.

Jerry Su *Crédit Suisse AG, Research Division - Director*

Thanks for taking my question, Jordan. Just wanted to follow up on your comment on gross margin. As you mentioned that foundry is less likely to further increase the price in this year. And then I think you also mentioned that the automotive probably will be the largest contribution of your revenue. So with this dynamic, does that mean that your gross margin actually could at least hold at the current 46% to 48% level if the end demand does not change too much?

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

I think that's a fair assumption, yes. I mean, given all other things, pretty much staying or close to the current level. I think our mix is highly likely to improve, given the fact that we are very confident about our automotive sector outgrowing the others where automotive in general, enjoys better margin than the rest. So given all other factors being similar to the current level, then yes, I think there's a good chance we may actually sustain or improve our gross margin from this point onward.

Jerry Su *Crédit Suisse AG, Research Division - Director*

Okay. Got it. And just a quick follow-up on the Q1 guidance for the non-driver because I think you have guided on non-driver, but you only mentioned that timing control has declined in single digit. I'm just wondering what is causing the non-driver business to see a double-digit decline. Well, what's the missing point here?

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

I think Tcon, there's a short-term sequential decline, right? The Chromebook, TV being soft, et cetera, you know the story, right? So having said that, I think we are very confident about our Tcon growth for this year, year-over-year I think overall, because we mentioned we have positioned ourselves much better right now compared to a year ago when -- whether it's TV, notebook or monitor, we are focusing on higher-end products and having a stronger and more direct relationship with end customers, right? So we are fairly confident about Tcon growth.

Also in addition to that, our bundle sales approach, I think it's going to play a role here as well. Bundle sale means Tcon bundled together with driver IC, right, as a total solution. So we are saying Tcon sequential decline in this quarter will be a short-term phenomenon. For the whole year, we still remain confident. I think the you were saying the decline for non-driver overall the missing point. I think is in CMOS image sensor primarily. A little bit on WLO, where major customers, their legacy products is declining in volume, but that is playing much less impact on us now than before.

CIS, where we have a major market share in notebook and notebook short-term demand is not good. Although notebook, I think, if I may comment a little bit on CIS outlook for this year, the notebook market is undergoing a major upgrade, which you see mostly in the camera, from HD to full HD, right? So that is good news for us. So we are going to benefit, especially starting from second half of the year from this trend.

Having said that, I think webcam, which was a major contributor last year, because of the COVID situation. And when you can not upgrade your notebook, you buy a new webcam to support your video conferencing, right? So there was a major, major surge in demand last year. But with COVID, hopefully, leaving us, the webcam demand is likely to decline, right? So I think we are building in that assumption into our CIS forecast. And that results in a slower CIS. And also in Q1, we do see the trend of webcam having declined in projection.

Jerry Su *Crédit Suisse AG, Research Division - Director*

Okay. Got it. Thank you for the color. And then maybe just one last question. I think you spent some paragraph discussing the coverage of metaverse. Question is actually more related to the different display technology. I think in the previous couple of years after shipping the LCoS of some of the AR glasses. But I think more recently, we can see that some of the display technology has been shifting to OLED, (technical difficulty) and also potential (technical difficulty). I just wanted to know from your point of view, if you look at the LCoS versus the other 2 technologies, do you think that you have enough confidence or breakthrough that can bring LCoS back to become the mainstream in the next couple of years?

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

Thank you, Jerry, for the question. I think you correctly mentioned, we have been in AR glasses for many, many years, right? And we are certainly -- I mean, no doubt we are the pioneer in providing a key technology to enable AR glasses, which is microdisplay, right? So we are in the product, you know, of literally all of the most notable AR glasses products so far, although none of them have been a commercial success as we all appreciate. Now I think the lessons learned across the whole industry has included and most importantly, our end customers through all these years is that we have finally come to a good consensus as to what kind of products or technology required for the industry to put forward AR glasses, which is attractive enough for general public, right? So I'm not talking about fancy technology, see I'm just talking about common sense, right? .

Firstly, you need to have a (inaudible) design, fancy design, right, similar to your sunglasses with similar shape and weight even, right? And that is the first requirement, very important. Secondly, you need to have your display be in full color. And then display needs to provide over decent image quality and certainly affordable price. And lastly, but very importantly, a decent large enough size of field of view, FOV. So all these are the required barriers for a product, which hopefully will really attract the attention of general public.

And our products, together with our end customers, in the past, they missed many of such criteria, right? So throughout all these years, I think the industry has finally come to this conclusion that this is the target we are shooting for, so can we provide the technology. And I can tell you with a good degree of confidence that so far, as of today, we can't. But we feel we are getting very, very close. That's the key message we want to deliver.

So back to your question, how does our LCoS compare to other competing technologies for AR glasses? AR glasses, by definition is a see-through glasses, device, right? I.e., you need to have what we call microdisplays, displays which are tiny, and they have to sit on the side, near your ears, right, because they can't sit in the front because that will block your side of view, right? So they need to sit on the side. Since they are sitting on the side, they need some optical mechanism, including waveguide to lead the light, the image into your front, right? So those are the basic fundamental requirements. It doesn't matter what kind of display you use, you have to go through this requirement.

So again, to achieve these basic requirements and also the target specs, right, the target objectives of the general consumers, most importantly for microdisplay, you're talking about size, brightness, power consumption and cost. We now have a good consensus what kind of (inaudible) we need to make, to need to achieve size, brightness and power consumption and cost.

Firstly, on size, which is the most important because without the right size, you just cannot make the fancy glasses, and that you go back to the previous failures, right? So size is the utmost most important criteria. To achieve the right size, clearly, you're talking about for microdisplay, you can have two different types. One is what we call self-illuminating type. The other one is not. The importance of self-illuminating type is that because it's self-illuminating, meaning you don't need an external optical engine to enable the illumination, right? And once you have an external optical engine, the size, you failed the criteria already. So you are already out, right? So for self-illuminating technologies, you already narrowed down your candidate to 3 types, meaning AMOLED -- micro OLED, sorry micro OLED -- micro LED and our Front-Lit LCoS.

I emphasize Front-Lit is very important because other types of LCoS are not self-illuminating, including our other LCoS Front-Lit as a module, because we are putting our LED alongside the microdisplay. And so from the customer's point of view, our display module is very similar in size and weight compared to micro LED and micro OLED, other self-illuminating technologies, right? So only these 3 types are

self-illuminating, and only they can pass the first criteria, most importantly, the size.

Now the second problem is the brightness. The second biggest problem is brightness of the microdisplay. Why? Because I mentioned your microdisplays are sitting on the side. They need to pass the light through waveguide in the front. Waveguide, there are a couple of mainstream technologies in the whole we are offering, WLO is certainly one of them. But regardless of which type of technology you talk about for waveguide, the light efficiency is very poor, 5%, now people are very, very difficult to target right now, 5% light efficiency, meaning you are wasting most of your light, with vast majority of your light through the traveling in the optical mechanism.

But human being requires certain brightness to see the display, right? So how do you resolve the issue? You need to have your microdisplay being very, very bright, right? So this second criteria, again, is vital, right? So from this second criteria's point of view, in our view, micro OLED is already out because micro OLED right now, you need improve its brightness by several orders of magnitude. It just unachievable in any foreseeable future in our view, right, because it's simply too dark.

So now you are living with our LCoS microdisplay, which has enough brightness, and also micro LED. However, for micro LED, indeed, they can project with enough brightness, but micro LED can have only monochrome color in a display. So to make color display, right, I mentioned that's a fundamental requirement as well, they need RGB three panels combined. And with your RGB, you are failing your size test again. And also, you're failing your power consumption test, not to mention your cost test. So while there are talks about customers using micro LED from our insider's point of view, I think they have such hurdles and challenges that are just inconceivable to get around in any foreseeable future.

Now finally, back to our own Front-Lit LCoS Microdisplay. Admittedly, we introduced the technology years ago, but we kind of slowed down our development over the last couple of years. Why? Because the market was simply not there. However, we never stopped talking to our customers. Now with this renewed, a very vibrant interest of metaverse recently, we are seeing the very renewed interest in our LCoS again. So there are customers who are trying to utilize our existing Front-Lit LCoS product in their next-generation design, which admittedly is not ideal, right? They don't really effectively pass all the factors I just mentioned.

However, there are also customers who are taking a longer-term approach, and they are working with us starting from specs, discussions and joint developments for an idea Front-Lit LCoS Microdisplay that really fits the deal of all criteria that I just mentioned. And we are truly confident the technology is there. We just need a little bit of time and resources to make it happen. So I apologize for a slightly lengthy response, but this is a complicated issue. And I appreciate you asking the question and giving me the opportunity to explain it.

Jerry Su *Crédit Suisse AG, Research Division - Director*

Very detailed question and help us to understand a lot about the difference between the technologies. Thank you.

Operator

Next question coming from the line of Donnie Teng with Nomura Securities.

Donnie Teng *Nomura Securities Co. Ltd., Research Division - VP & Analyst of Greater China Semiconductor and Technology Research*

I just have two very short questions. First one is that it sounds like back in late last year, originally, I think we were relatively positive on the first quarter outlook. And then maybe after these 1 to 2 months, the market has been a little bit weaker than expected. So just curious about that. What kind of products in that has been weaker than what you have seen maybe for 1, 2 months ago, for example, it's like smartphone or tablet or any other application that you are seeing or weaker than expected demand in the past 1 to 2 months? And secondly is regarding to the gross margin, again. So I remember that automotive driver IC gross margin should be higher than corporate average. So I'm just curious that if looking at the fourth quarter gross margin and the first quarter gross margin, does automotive driver IC gross margin all higher than corporate average in these 2 quarters? Or it's also declining a little bit in the first quarter? Thank you.

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

Firstly, on the first quarter outlook, I think your impression about like slowing the market demand. I think we kind of get a similar feeling. I think it's primarily for smartphone. And again, automotive remained very strong. And TV, I think, overall, is slow, although we feel there

are talks about customers absorbing their inventory. And hopefully, starting from Q2 for the second half, there will be renewed demand coming from TV. And IT, the visibility is not great in a sense that end customers are revising up their forecast, rather they are staying on the sideline, but they are not revising down their forecast either, right? So I think your impression of slowing down forecast, maybe, primarily driven by smartphone.

Your second question about automotive, I think gross margin and related to automotive, I think, certainly, automotive is gross margin higher than our average. And I think more importantly, the visibility is much better as well. Visibility not in terms of just sales forecast, but also in terms of pricing, right? I cannot say I have very strong visibility for TV monitor, notebook or other things. But I can say with good confidence, the visibility of pricing. So I think that's an important factor.

And also, overall, I think in Q1, for example, large display driver, I think, based on our guidance is going to be about flat, while overall guidance is lower, right? And lastly, large display driver has lower gross margin compared to -- last year compared to small smartphone or tablet, certainly auto. So I think that also explains partially the lower gross margin on top of the explanation I gave to Tristan earlier.

Donnie Teng *Nomura Securities Co. Ltd., Research Division - VP & Analyst of Greater China Semiconductor and Technology Research*

Okay. Got it. So just to clarify. So in terms of the ranking of the gross margin, it's like auto is the highest, right, and followed by largely like small, medium driver IC, and lastly, large display driver IC prices. Is that correct?

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

Correct.

Operator

And I'm seeing no further for the questions at this time. I would now like to turn the call back over to Jordan Wu for any closing remarks.

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

As a final note, Eric Li, our Chief IR/PR Officer, will maintain investor meeting, our 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

Ladies and gentlemen, that does conclude our conference for today. Thank you for your participation. You may now disconnect.

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