

AIXTRON SE

Analyst Earnings Conference Call

FY and Q4/2023 Results

February 29th, 2024

Edited Transcript

Executive Board

Dr. Felix Grawert, CEO & President

Dr. Christian Danninger, CFO

The spoken word applies

Operator & Forward-Looking Statements

Operator

Good afternoon, ladies and gentlemen. And welcome to AIXTRON's Conference Call regarding Full Year 2023 Results. At this time, all participants have been placed on a listen-only mode. The floor will be open for your questions following the presentation. Let me now turn the floor over to Carsten Werle.

Carsten Werle, AIXTRON Investor Relations

Thank you very much, Beatrice. Good afternoon from us and welcome to AIXTRON's Full Year 2023 Results Call. I'd like to particularly welcome our CEO, **Dr. Felix Grawert**, and our CFO, **Dr. Christian Danninger**, who will guide you through today's presentation and then take your questions.

This call - as a housekeeping remark - is being recorded by AIXTRON and is considered copyright material. As such, it cannot be recorded or re-broadcast without permission. Your participation in this call implies your consent to this recording. Please take note of the disclaimer that you find on page 2 of the presentation document as it applies throughout the conference call. This call is not being immediately presented by webcast or any other medium. However, we intend to place the transcript on our website at some point shortly after the call.

And with these introductory remarks, I would like to hand over now to our CEO for his opening remarks. Felix, the floor is yours.

Slide 2 – FY/2023 Highlights

Dr. Felix Grawert, AIXTRON CEO & President

Thank you, Carsten. Let me also welcome you all to our Full Year 2023 Results presentation. I will start with an overview of the highlights of the year and then hand over to Christian for more details on our financial figures. Finally, I will give you an update on the development of our business and our guidance.

Let me start by giving you an overview of the **highlights and key business developments on the year** on slide 2. The most important messages of the day from my viewpoint are:

- In 2023, we have successfully continued our growth trajectory.
- We have delivered on our 2023 guidance and achieved a very strong fourth quarter result.
- We have successfully launched the G10 series for all materials systems that we are addressing.
- We expect further growth for 2024 and strong further growth for 2025.

The 2023 revenues have grown 36% year-over-year versus the already strong fiscal year 2022 and have reached EUR 630 million. This results in a strong gross margin of 44% and - at the bottom line - EBIT margin at 25%. As indicated with our Q3 call in October, we have generated an outstanding Q4 2023 result.

AIXTRON plays a decisive role in driving the dynamics in the market with the launch of the **G10 product family**. In just one year, we have renewed AIXTRON's entire

product portfolio, starting with the introduction of our G10- SiC, continued with the G10-AsP in April 2023 and concluded with the G10-GaN in September 2023. All members of the G10 family take the strong performance of the already very successful predecessor products to the next level.

With its dual wafer size capability, the G10-SiC supports the transition of SiC power electronics to 200 mm wafers. The G10-SiC market entry was met with great response from our customers such that this product makes already about 30% of the full year revenue of 2023. This has also demonstrated the capability of the AIXTRON organization to scale new products into highest volume very fast.

Over the course of 2023, we were able to further improve the already strong performance and productivity of the system, so that the **G10-SiC** now sets standards in terms of performance, stability, productivity and unit costs.

The **G10-GaN**, on the other hand, has triggered a new era of high-volume production in the field of GaN power semiconductors. Not only does this system offer further improvements in performance, but above all it addresses the need of modern mass production: increased productivity, reduced space consumption, longer maintenance intervals with reduced maintenance efforts, and a further significant reduction in production costs per wafer.

Finally, **the G10-AsP** sets new standard in terms of stability and performance in the gallium arsenide material system. It is the first system to enable robust, large-scale production of Micro LED and laser components. In doing so, we have remained true

to our original market - optoelectronics. This system has set standards, particularly in the areas of particle reduction, automation and wafer size. Multiple customers with innovative applications have already chosen this system.

In addition to the sales achieved, **the awards received from Coherent, TI, TSMC and onsemi are proof cases of AIXTRON's focus on customer orientation.** We have grown from being a specialist into a reliable high-volume provider in the modern semiconductor industry. In recent years, we steadily increased the company's level of maturity in all areas, from quality to production to service. At the same time, we have optimized our internal structures and processes to achieve scalability for further growth.

I am very pleased that the area of **SiC and GaN Power Electronics** has been the strongest demand driver in 2023, representing about 80% of our equipment order intake for the year. This strong development is a result of further capacity expansion activities of our customers, but also great strides we've made in improving the uniformity of our **G10-SiC multiwafer system.**

Also in Q4, the biggest demand drivers were our systems for **SiC and GaN Power Electronics.** In addition, demand for tools for **Optoelectronics and LED, including Micro LED,** have rebounded in the fourth quarter after a weak first nine months.

Demand for our equipment has remained very strong, resulting in an **order intake** of EUR 641 million, up 9% year-on-year, driven by the strength of the growth of the

end markets our customers are serving. As a result of this, we can report a **strong order backlog** of EUR 354 million, up 1% year-on-year.

Concluding this short highlight section, I would like to express a strong gratitude to the entire AIXTRON team that has made all these achievements possible in 2023. With this, I will now hand over to our CFO, Christian Danninger, who will take you through the Full Year 2023 financials. Christian?

Slides 4-6 – FY/2023 Income Statement, Balance Sheet, Cash Flow Statement

Dr. Christian Danninger, AIXTRON CFO

Thanks, Felix, and hello to everyone.

Let me start with the financial highlights of our **income statement on slide 4**.

As Felix mentioned, **revenues** in 2023 were up 36% to EUR 630 million, with 74% of equipment revenues coming from power, 12% from Optoelectronics, 11% from LED, and a 2% contribution from our R&D tools.

Gross profit was strongly increased by 43% year-over-year to EUR 279 million. EBIT at EUR 157 million, a 50% increase. The **net profit** at EUR 145 million was up 45% year-on-year. **Q4/2023 revenues** at EUR 214 million even beat the very strong level of EUR 183 million in the same quarter of last year.

As Felix mentioned, **orders** in the quarter and the year continued to be strong, and our **backlog** was slightly up, fueled by the mentioned strength in demand. In 2023, we've made **great progress on profitability improvements** with a 2-percentage-

point increase in our Gross Margin versus 2022, up to 44%, and an EBIT margin at 25%.

At the same time, we have decided to increase our invest into R&D in the year 2023 to a total of EUR 88 million, driving OpEx to EUR 122 million. In 2024, you will see another increase of R&D expenses by around a mid-single-digit million euro number, before in 2025 it is expected to go back again to the level we have seen in 2023 or even below. The 2024 increase is driven by the efforts to complete the G10 series and to start work on the next product generation in parallel. We expect SG&A on the other side to remain flat from 2023.

In 2023, we again utilized tax loss carry forwards, and capitalized some additional deferred tax assets in the amount of EUR 7 million due to expected future profits. This is reflected in an effective tax rate of 8%. A housekeeping for modeling assumptions, we still recommend to apply a tax rate of around 15% in FY/2024.

Now to our balance sheet on **slide 5**

We ended the year 2023 with a **total cash** balance, including our financial assets of EUR 182 million, which was below the EUR 325 million last year. There are a number of factors driving this decrease:

- First, we have again seen an increase in receivables due to a disproportionately strong sales contribution in the last quarter, especially in the last month. These receivables will be collected in the first months of the year.
- Then, we have seen the increased CapEx for the construction of the **Innovation Center**.

- **Advance payments received from customers** were flat year-over-year at EUR 141 million, down payments represented about 40% of order backlog.
- **Inventory** levels at the end of 2023 went up to EUR 394 million, compared to EUR 224 million at the end of 2022. This is the result of our strategy to load the supply chain early enough to secure on-time delivery of our products despite tight supply chains. This was very effective in the year 2021 to 2023, and has secured us numerous orders, even in very competitive situations. Now that we see that global supply chains are relaxing, we are adjusting our strategy and reduce buffer stock. Based on this, we target a reduction of inventory levels throughout 2024.

As a consequence of all of these factors, **Free cash flow** in 2023 was negative at EUR 110 million negative compared to EUR 8 million plus in 2022. And with that, let me hand you back over to Felix. Felix?

Slide 7 – Guidance for Q1/2024 and FY/2024

Dr. Felix Grawert, AIXTRON CEO & President

Thank you, Christian.

Now, let me give you an **outlook to what we expect in 2024**.

First of all, we continue to work on our **new series G10 product generation**. We have successfully launched this product, and we received strong customer pull for these products. In silicon carbide power, the G10-SiC makes already the vast majority of our revenues in this material system. In gallium nitride, most of our existing

customers have switched repeat orders to the G10-GaN. And in gallium arsenide, customers are testing and qualifying the G10-AsP.

We can already today, few quarters after the launch, conclude that the G10 series is very successful and fully meets - even exceeds - our expectations. Furthermore, our customers bring many ideas for further improvement or enhancement of these products to us, such that the **development work on the G10 series continues in 2024.**

At the same time, we are **starting the work on the next generation of products** in parallel. This allows us to secure our strong market position in the near term, and also lay the foundation for further growth in the mid and in the long term.

To have enough space for all of this, we have decided on the construction of the **AIXTRON Innovation Center** in our headquarter location in Herzogenrath. Construction work on this cleanroom facility has started in Q4/2023, and by now a large part of the outer shell of the cleanroom has been completed. The project is fully on track with respect to timeline and budget.

Due to the efforts going along with the construction of the Innovation Center, and also the technical equipment needed for its operation, we expect CapEx in 2024 to surge to around EUR 100-120 million. In the following years, we expect CapEx to return to the normal level of EUR 30 million to EUR 40 million that you have seen in the recent past.

Now, let's turn to the **most recent developments in our end markets.**

Demand in GaN is stable on a very high level. We see that existing customers continue their expansion plans and additional new customers are entering the market. In many power electronics applications, GaN is substituting silicon as the material of choice, and the growth is now carried from a very broad range of applications across many voltage classes from roughly 100 volts to 650 volts, with some customers even working on higher voltage classes such as 1,200 volts.

In contrast, the **recent developments in the EV market** have led to a **moderate slowdown in SiC capacity expansion.** Customers continue to pursue their ramp and capacity build out plans, but many have somewhat reduced the pace and speed of the buildout. This leads to a moderate reduction in the number of silicon carbide units that we expect to ship in 2024 compared to the previous year. At the same time, we continue to **gain market share** in SiC with new customer wins in the last quarter again.

In 2024, we expect the markets for **lasers and Micro LEDs** to continue at a decent pace, both making reasonable contributions to our revenues: In Micro LEDs some customers plan small to medium-sized pilot lines, while high volume production and real volume ramp still seem a bit further out. We all have read in **announcements from one of the Micro LED players** this morning. This announcement does not affect our plan for revenues for 2024 and 2025.

Finally, in 2024, we expect **red LEDs to kick back into the game** and make a pretty sizeable contribution to our revenues. We expect this to have an impact on the gross margin in 2024 in a range between 1 and 2 percentage points due to the lower cost margin profile of this application.

So, overall we expect that our strategy of serving various co-related end markets with our systems will be successful again in 2024.

Based on this, let me now present our **full year guidance for 2024 on slide 7**.

As a starting point we have asked ourselves how we can **modify our guidance practice** to even better guide the capital markets through our business year. Many thanks for the input from some of you who have nudged us through review our previous practice.

So, what have we done? We have reviewed the guidance practice of other semiconductor equipment players and based on that we have decided to provide you with a **revenue indication for the following quarter** from today onwards. Why are we doing this? Our business follows some quarterly seasonal patterns that can be big in timing effects between quarter depending on whether shipments are reflected in one quarter or the next. We, therefore, want to make it clearer and more predictable to you that our annual guidance will hold up even if the next quarter for quarter may show some volatility.

On the other hand, we have decided to **drop the guidance regarding Order Intake**: no other company in our comparison of guidance practice is providing guidance regarding Order Intake. And we have seen that the timing effect related to receiving large orders and the arbitrary quarter end dates have led to surprises and sometimes even confusion.

As you are used to, we are continuing to guide the new fiscal year revenues, typically in a range of 10% to 14% versus the guidance midpoint like we did in the last six years. Gross Margin and EBIT Margin will be in a 3%pt range. This stays unchanged compared to the previous years. Also, to be clear, as we continue to grow, our bandwidth of guidance in absolute terms will grow. This year, we are at about 13% bandwidth related to the midpoint, fully in line with the ranges of the last six years.

With this, we expect revenues to come in at a range of EUR 630 to 720 million. At the high end, this would be 14% growth compared to 2023. We expect 2024 **Gross Margin of 43% to 45%** so somewhere around last year's level and an **EBIT Margin between 24% and 26%**. We expect the development to be driven by ongoing strong demand for Power Electronics, and an additional volume from the remainder of our businesses.

On **Q1/2024**, in line with the usual seasonal pattern, sales in the first quarter of the year with a bit slower than the annual quarterly average. In Q1 2024, we therefore expect **revenues between EUR 100 million and EUR 120 million**. This is significantly above the previous year's level and we're expecting a good start to the year.

For completeness, we have kept our US dollar, euro budget exchange rate at which we recorded US dollar denominated order and backlog at \$1.15 USD per euro. This has just a minor effect on the orders and backlog and only less than one-third of those are recorded in US dollar.

Finally, we would like to give you an **indication towards 2025**: In 2025, we expect a continuation of our growth trajectory with a further significant growth in revenues. We expect in 2025 the **next wave of SiC power shipments** and **GaN volume expansion** to kick in. For now, we expect a **stable demand in Optoelectronics** for 2025. This may, of course, change in case the **Micro LED** volume production gets started, which would add further momentum on top of what we have just discussed.

With these exciting growth prospects, I'll pass it back to Carsten.

Carsten Werle, AIXTRON Investor Relations

Thank you very much, Felix. Thank you very much, Christian.

Beatrice, I would like to hand it then over to you to start the Q&A.

[Operator Instructions]

Olivia Honychurch, Jefferies

Thanks a lot for taking the question. First one is on Micro LED. You did mention, Felix, in your statement, the announcement we had from ams OSRAM last night. You said there will be no impact on 2024 and 2025. I'm just wondering if you could explain why that is? ams OSRAM hosted a call this morning where they said that they still have about EUR 150 million worth of obligations for their Micro LED production fabs. I'm sure not all of that relates to AIXTRON's tools, but does that mean that you still had to ship to them and that therefore, you were enforcing those obligations? Or is it that the majority of your tools had been shipped as of the end of last year?

Felix Grawert, AIXTRON CEO & President

Thank you very much for the question, Olivia. So, please allow us to secure customer confidentiality in this case. This is always how we behave with our customers. So, I cannot comment on the exact details. On a higher level what we have stated, we have planned for the years 2024 and 2025 a moderate amount of Micro LED revenue as I have stated with a decent number of tools going out, getting shipped. However, we have baked the expectation in the 2024 guidance and the indication towards 2025 that there is no real volume ramp yet, only individual tools from individual customers, building out the pilot line, doing R&D purposes, trying out different things. This continues in 2024/2025, it's a decent amount, some high double-digit EUR amount of revenue, but it's not a volume

ramp. Volume ramp can be deemed EUR 100+ million, EUR 200+ million, which would come on top by the moment Micro LED really kicks in.

Olivia Honychurch, Jefferies

Okay, that makes sense. Thank you, Felix. Maybe just a follow-up on your 2024 guidance. The midpoint of your revenue range implies 7% growth in sales. Can you just talk about the drivers behind that? I know you mentioned in your comments that SiC may be down this year, but how may we expect GaN to perform alongside that? And I suppose what could drive you to the higher end of your guidance range? Would it be the Power Electronics or maybe more to come in the Opto or the LED business?

Felix Grawert, AIXTRON CEO & President

Let me shed some light on what we see and what we are expecting here. So, with our order pipeline, we are shooting clearly for the upper end of the guidance range, that's very clear. We have baked in a bit of a slowdown in the SiC market. I think we all read the news about EV ramp and EV roll out. We have been a bit cautious here because we don't know how much of the pipeline will materialize. So, there is a pipeline in place to get to the upper half of the guidance. I think at this point nobody exactly knows how exactly it will unfold. I mentioned also we continue to have the customer wins in SiC, so that's adding to it, which is also why we make a pretty strong statement on 2025. This is backed by a kind of Excel

spreadsheet. We have seen towards the end of 2023 that the situation around export licenses has been getting kind of back to normal. Nevertheless, we don't know whether this will continue on an ongoing basis or whether there may be any problems coming back. So, the lower end of the guidance considers that there may be some disturbing effects from the market and from export licenses, while a normal "scenario" point more towards the upper end of the guidance range.

Olivia Honychurch, Jefferies

That's really helpful color. Thank you. And maybe just one final one for me if I may. For 2025, you talked about strong growth. Can we assume that the level of growth in 2025 will be greater than what you're expecting for this year?

Felix Grawert, AIXTRON CEO & President

Definitely, yes. So, let's not go into semantics about strong. But I mean, I'm thinking clearly about the teens of percent or even more for the year 2025.

Olivia Honychurch, Jefferies

Thanks a lot.

Felix Grawert, AIXTRON CEO & President

Thank you.

Gustav Froberg, Berenberg

Thank very much for taking my questions. Just two from my side. Could you maybe give us a little bit more color on new customer wins in SiC, whether or not they are large or small, the ones you are winning? And then as a follow up, maybe to that two and a half questions, it sounds like you are also seeing some competition, maybe at one of your existing SiC customers. Could you maybe update us on how you see dual and triple sourcing playing out on the SiC side and whether or not you think this will occur at other customers? And then on gallium nitride, could you give us a split for 2024 as to how you think this will play out in terms of new and existing customers?

Felix Grawert, AIXTRON CEO & President

So, related to new customer wins, in the past quarter, in the Q4, we have been able in fact to win again a handful of new customers, quite a decent number of customers. Among those, both smaller customers, but also very large customers. I think I can put that here. I don't want to give more details. It's been a very successful quarter for us in terms of wins. Now, in terms of dual and triple sourcing, I think the SiC market in the end would be so big and our customers are planning such big ramp. That the dual vendor strategy we make in many places, every customer has their individual philosophy about how to set up their supply chain assets, but dual supply chain in many cases can be replaced. We on the other hand are not afraid of that scenario. Our tool is offering, because we use the

multiwafer system a very, very high productivity. And therefore, our assumption is that in case even of the dual sourcing, we would provide the majority of the tools in the dual wafer scenario, yeah. So, we are not concerned for that one. And with respect to the gallium nitride, I need your help. What exactly the question was again.

Gustav Froberg, Berenberg

Yeah. Just you talked about seeing sort of stable plus a little bit of growth for this year and then maybe into next year as well. Could you break this down into new customers and maybe new entrants into the market and existing customers ramping up and expanding their capacity?

Felix Grawert, AIXTRON CEO & President

Yeah. Thank you. Okay. Now I get it. Yeah. So, we see both. We see that existing customers continue their volume ramp plans, yeah. Some faster, some slower, there's really a vast mix I would say, yeah. At the same time, I mentioned that and we see that gallium nitride is more and more getting broader in terms of application addressed, yeah. From the power drill, from the electric bicycle, battery driven applications, solar plants, whatever you have it, yeah low voltage, all the way to high voltage and in some cases even higher voltage. And based on this, a very wide spread of application. We see again new entrants coming into this market, yeah. And companies, some of them who is very large as a company now

starting and taking on gallium nitride as well, yeah, we have seen in the Q4, even companies entering the gallium nitride, large companies entering newly into gallium nitride and at the shots, right, with big order, yeah. Very big order, yeah. So, the gallium nitride trend we can see is really having a momentum, a strong momentum and a continuing momentum.

Gustav Froberg, Berenberg

Great stuff. Thank you very much.

Felix Grawert, AIXTRON CEO & President

Thank you. Operator Thank you.

Michael Kuhn, Deutsche Bank

Yes, good afternoon. A few from me as well. Maybe a question that could be easier. Firstly, on your sales guidance, as usual in three elements, and one element is sales from new orders, which is EUR 190 million to EUR 280 million. If I remember correctly, in the last call, you spoke about lead times currently of 9 to 12 months. Would that indicate that you expect strong order intake early in the year, or is there another interpretation?

Felix Grawert, AIXTRON CEO & President

This is a very difficult question. You may apply more logic than we have when we made the guidance. It's difficult to answer that on a very serious note. We are trying to give a little bit of detail here, but you need to keep in mind that new orders are really only one factor influencing the full year revenues, there are other factors as well. It is just too early in the year to tell you that in detail and we will update you for the planning over the course of the year as soon as we have a better view.

Michael Kuhn, Deutsche Bank

Okay. Understood. But let's say your statements on lead times are still the same or given that you spoke about export licenses coming in quicker, again, we might think about 6 to 9 months again, which was I think the case like two, three years ago?

Felix Grawert, AIXTRON CEO & President

And we are not there yet. We are clearly targeting it within a year's timeframe to go to a shorter time again. We currently have the product situation that we have a very high level of inventory. You've seen it in our numbers. But on the other hand, some suppliers are still in a bottleneck situation. So, it really depends tool type by tool type. So, it's too difficult to put it as a general statement.

Michael Kuhn, Deutsche Bank

All right. Understood. And if you just spoke about inventories, I think temporarily you guided for lower inventories at the end of the year. Now, they went up. Is that kind of a strategic inventory buildup, which would again point towards the expectation of short-term orders being placed? Or are there other reasons involved as well?

Felix Grawert, AIXTRON CEO & President

I think you know we had the strategy to really build a large amount of inventory because to escape the supply chain crisis, which is now clearly over. And with that, we are now changing the strategy towards and we see the supply chains relaxing. We see shipment times from our suppliers coming back to a normal, not with all suppliers, but with most of them. And throughout the year 2024, we clearly expect that trend to continue and then all suppliers to get to normal. And with that, it's very clear we were now focused on reducing those inventories more back to levels that you have seen in the past. But as I mentioned, it depends really part by part supplier by supplier. So, I think by the, by the mid of the year, we will be able to give you a much more detailed view on that one. Just as the trend has reversed, we now resolve our strategy. We now together with our suppliers work what this new strategy means and we start step by step to implement that.

Michael Kuhn, Deutsche Bank

Understood. Thank you. One more on cash. Do you expect a positive free cash flow this year?

Dr. Christian Danninger, AIXTRON CFO

I mean, there are several elements flowing in, but I will not be able to give you a definitive number. But of course, the direction is absolutely clear. We are expecting to drive the inventories down and the end results will be positive and then on the other side we will have the CapEx for the Innovation Center. But the overall target should be clearly a positive free cash flow. The number we will see.

Michael Kuhn, Deutsche Bank

Perfect. And very last question, housekeeping, because I did not get that point exactly during the call. On R&D expense, what's the statement there for 2024 and 2025 on phasing of those cost items?

Dr. Christian Danninger, AIXTRON CFO

It's good that we clarify this. This is very important. What we indicated is that we will see some additional R&D expenses in 2024 in the range of a mid-single digit million euro amount compared to 2023. And the reason for that is that we are having a parallel situation now where we are completing finalizing the G10 systems and in parallel starting to work on the next generation platforms. But we are

expecting this then to go down in the next year, in 2025 to a level of 2023 or even below.

Michael Kuhn, Deutsche Bank

Okay. So, it's indeed down in absolute terms. Not just in...

Dr. Christian Danninger, AIXTRON CFO

In absolute terms. All in absolute terms.

Michael Kuhn, Deutsche Bank

Perfect. Many thanks.

Martin Marandon-Carlhian, Oddo BHF

Hi. Thanks for taking my question. My first question is on Micro LED. Could you maybe comment more broadly about what is your latest view on the Micro LED industry? And if you perceive this Micro LED project cancellation as related to one specific customer, or is Micro LED adoption somewhat delayed from what you previously thought? And I have a quick follow-up.

Felix Grawert, AIXTRON CEO & President

Thank you for the question. The first part of your question I understood was a broader view on the Micro LED. We see that Micro LED is not ready yet for volume ramp, predominantly due to challenges of the industry with the mass transfer, so

the Micro LED gets manufactured on a wafer with a semiconductor processing technology, with our equipment for the epi and other equipment to structure the wafer to make the Micro LED so that on the wafer you have millions and millions of Micro LED. This is all working now. This is mature. However then, we all know that Micro LED needs to get transferred from the wafer onto a new carrier substrate. And this transfer step, which has nothing to do with the initial semiconductor processing elements is still providing difficulties to the industry. And that is why, when we provided the guidance, we have said we are expecting for 2024 and the indication towards 2025 that it will be a number of sales of tools for R&D purposes. We are discussing with some customers who want to build up a pilot line of a number of tools to test out pilot line operations and start with these data to check the reliability. But we are expecting for the next two years due to this effect, not yet a volume ramp. Now, at the same time, we really see that the entire industry, all the display makers, are focusing on getting the Micro LED up and running. So, we have seen new players entering the space, big display makers. We have seen the structures of partnerships and collaborations, and I would say getting tighter, with some of the large players making moves such as taking equity investments into the epi providers or into the chip providers, and where you can see the investments that is going into this is getting large. And from that, you can derive that there is a decent amount of seriousness behind this in order to bring this in the end to a success. And I think an indicator for that the industry continues and is

really focusing on getting at some point. I think we don't want to give any indication for timing. Therefore, we only have baked in R&D and pilot line revenues in our guidance, and I don't want to dare forecast because the step is so far away from us that we simply don't belong to their respective owners. We have seen that at the Mobile World Congress, Lenovo showed a transparent Micro LED for I think a notebook, other did some stuff on the CES that was an automotive dashboard. We have seen Samsung reveal transparent screens at the CES in Las Vegas. So, if you see those names behind it, it's really the big display guys, and I think they are not there to demonstrate that they have a great R&D team, but it's kind of to create appetite potentially also to talk to some customers, once this is mature. So, we see that the industry I would see is getting a different stage. Maybe we are from the Gartner hype cycle out of the first boom “there's a new thing, and it comes tomorrow”. Rather, well, it takes a little bit more time and it takes bigger effort, maybe takes more capital involved, but we really see that some of the big guys are behind it. And you can be assured that AIXTRON is in the value chain for all of these efforts. So, sorry, it was a short question, long answer.

Martin Marandon-Carlhian, Oddo BHF

Thank you very much. It's very helpful. Maybe a quick follow-up on that. I think the field of today and what was released yesterday, the press release, is maybe that Micro LED doesn't work for smaller displays. And is it something which could

happen in your view, which is credible at Micro LED level until the smartwatch or smartphone market?

Felix Grawert, AIXTRON CEO & President

So, we have no specific insight into this customer. Also, I've no specific insight what the reasons and so on were. I have a market view, and I have my own opinion on this one, which I'm happy to share with you. And my personal and own opinion is or our company opinion is that we believe that for the smartwatch, the micro LCD is expected to be very suitable. Why? The number of pixels is relatively small number. For example, if you compare it with a mobile phone. The smartwatch is a device which is being carried all around, and all day situation, so to say. So, the benefits of the Micro LEDs, the very high brightness, the very low energy consumption probably has one of its sweetest spot in this application. While the display, the cost of a display for the smartwatch also in relation to the overall BOM of the device is relatively low. So, the entry point initially typically for a consumer product, right, at the beginning is expensive. And then, everybody works on over the years of getting the cost down and in the end it's cheap and high volume, right. So, to say the sweet spot about high cost, but high performance is really given in this application. That is a general our opinion about this application.

Martin Marandon-Carlhian, Oddo BHF

Thank you. It's very helpful. And maybe last one, if I may, on GaN. We see some GaN players like Navitas talking about price parity of GaN for smartphone chargers,

but also others like Infineon talking about GaN being integrated into automotive starting 2025. So, now taking about using GaN in AI for servers as well. So, I was just wondering what's in your view the most important drivers for GaN this year. And how do you see GaN adoption play out in the next couple of years with all of these applications?

Felix Grawert, AIXTRON CEO & President

I think the true answer is all of the above, which I mentioned about the broadening, which also gives us the confidence for the continued momentum. I would put it like this to shine a little more light on it. I think in the early phase when the gallium nitride was started in the phase 1a and 1b, gallium nitride was only used as a discrete device, meaning one transistor that can switch either very fast or very powerful. Very fast that property was used in the smartphone charger, or notebook charger to make it small and lightweight. We all remember how it went from the big heavy brick that you had to carry around to like the little lightweight thing that we all have now these days. That is the property of the fast switch. The other one for the discrete device is in the data center and the server. Very high power, hundreds and hundreds of servers, big energy being consumed, and gallium nitride makes the energy consumption less, meaning it's greener and cleaner. So, that was I think the phase 1b. Now, what you have indicated is gallium nitride has its second fundamental property. And the second fundamental property is that what you cannot do with silicon and high power, you can make out of

gallium nitride integrated power devices, you can make GaN ICs. And such a gallium nitride integrated circuit can help you to combine a lot of functionality in a very small space, but not only for logic, for the compute function, but really for power and for switching. And I think the industry is just now getting on the train what can you all do with these GaN ICs. And yes, that's definitely one of the server growth drivers, while the other driver, I would call it, the better transistor, the better power switch also get their market share gains. This is all happening in parallel.

Martin Marandon-Carlhian, Oddo BHF

Thank you very much.

Andrew Gardiner, Citi

Good afternoon, gentlemen. Thanks for taking the question. First of all, appreciate the modifications you guys have made to the approach to guidance. I think that does help. One thing in particular I was interested in talking to you about was the fact that you've given us a forward year guidance. Yes, maybe a bit vague, but you're at least giving us something on 2025, which I think is very helpful. When you're giving us that, would you say it's more based on your view of the end markets and how things are going to transpire, or do you feel like you're getting more feedback from your customers in terms of what their plans are, what tool

requirements are, the type of capacity that they're going to add? And therefore, yes, you can clearly see a bit of a, let's say, digestion phase in silicon carbide this year. But they're giving you feedback that suggests, yes, there is indeed going to be – there's another phase coming next year. It's not just you trying to call the cycle. You're basing it on the customer feedback. Thank you.

Felix Grawert, AIXTRON CEO & President

Andrew, you're spot-on. In silicon carbide, it's thoughtful. So, let's go market by market, right. While some of our market, it's a general statement based on end market view, for example, gallium nitride, what we just discussed. We see this broadening ongoing as just discussed. And we take it because there're so many players more on an end market view. And in silicon carbide, as you have hinted and suggested in your question, it is literally concrete discussions with customers about certain ramp plans when certain fab construction projects are getting concluded. Remember, silicon carbide, the one topic is the ramp, the other topic is that many customers are going through new fab construction projects and their timeline to finish the fab. And we have very concrete discussions with quite a decent number of customers, “Hey, my fab finishes this and then and then, I would need this number of tools” and the number is not just one or two, right. So, especially for silicon carbide, the concrete pipeline, we've concrete customers and concrete numbers behind my statement. And as said, just for the completeness across our markets for the lasers and Micro LED market, we just have no growth baked in in

our assumption. It's just stable and flat. So, there's no additional momentum baked in. And yet, then at some point the Micro LED really comes, that goes on top of all these statements that's not in yet.

Andrew Gardiner, Citi

That's clear. Thank you. And perhaps a quick one for you, Christian, on the gross margin outlook for 2024. I understand the point you're making about if LED was to grow within the mix, then naturally that would be a pressure on the gross margin. But you guys had also explained that we're only in the initial phase of the G10 migration. Previously, you've said it's a higher gross margin tool. So, in terms of those moving pieces, why are we not seeing some of the more positive impact of the G10 broadly? And then, I suppose if I think into next year, if power is growing more strongly next year, then why wouldn't gross margins expand in 2025?

Dr. Christian Danninger, AIXTRON CFO

Thanks, Andrew, for bringing this up again. This is really important to get this fully understood. In this year, we are seeing this additional wave of traditional LED shipments coming. And as I mentioned, this will impact our overall gross margin around 1 to 2 percentage points, somewhere in this area. And we see this for this year. And next year then with an improved end market mix, improved product mix, we should see this effect go away. And very specifically on the G10 margin profile and competitiveness of the systems, we do not see a margin erosion. How exactly

it will play out in 2025 depends of course then on the mix between the transition old system to new system generation to the G10s. But as we are so competitive, we see the trend completely there. And SiC, completely a strong or going into the G10-SiC, in the GaN and AsP, we will see how fast it goes.

Andrew Gardiner, Citi

Okay. Thank you, Christian.

Lee Simpson, Morgan Stanley

Great. Thanks so much. And thanks for squeezing me in here. Maybe if I could, I mean I think it's quite clear your rationale for not giving an order book guide, but I think maybe in the past it's always been the assumption that order book would deliver ahead of the sales in the out-year. So, would it be fair, given that we have a looming 2025, that the order book should at least be higher than the sales you've guided for 2024 as we go through 2024? But as I hear things, perhaps things will be lumpy, certainly with regards to silicon carbide as a market driver.

Felix Grawert, AIXTRON CEO & President

Well, I think it could very well happen.

Lee Simpson, Morgan Stanley

Okay. Maybe as a quick follow-up to that, I think you mentioned that gallium nitride for power would stretch up to 1,200 volts, considerable voltage limitations

being breached there. Where do you think the applications would be that would adopt the 1,200 volt use of gallium nitride? Thank you.

Felix Grawert, AIXTRON CEO & President

With 1,200 volts, you can address two very large-scale applications. The one application is you can use it in the onboard charger. And you can not only use it in the onboard charger, but even for the high-voltage architectures, like in 800 volt battery systems. 800 volt battery systems typically find, for example, Audi, Porsche have that in the high-end platform, when you want to charge 500 kilometers within 20 minutes, you need superhigh power, to go through. And then, typically you use the higher voltage for the battery, so you can use it for that one. And the other application, 1,200 volt is you can employ it in the main inverter as a potential substitute for silicon carbide as an alternative.

Lee Simpson, Morgan Stanley

Sure. Perfect. And maybe just a quick one. I thought it was interesting that you talked about the supply chain dynamics for Micro LEDs and where you thought some large display players would come in, particularly with their raft of IP and process IP they have in Micro LEDs. But it's always been and you've sort of alluded to this and I think in the margin, it's always been an issue, mass transfer, moving from a sort of optics platform to CMOS silicon. What do we think here? I mean,

maybe again personal view, what do we think here could be that which cuts the Gordian knot? Are we going to see magnetics take hold or is there another technology that helps us bridge the mass transfer problem? Thank you.

Felix Grawert, AIXTRON CEO & President

Well, I think the person who has that answer has a gold nugget in his hand. I think there is many really smart people in the world, CTOs of companies, senior scientists getting their head around it. I have to admit I cannot unfortunately give you the answer. I can only tell you that that, in fact, there is a gigantic breadth of technologies in place or under scientific evaluation right now, be it a laser-based transfer to cut them out, be it based on fluidics and printing, be it on something, putting stuff in a liquid adhering with magnetics. I think you were alluding to that one. Others still working with stamp. Then, there are other technologies trying to do that with a men's device like a little gripper trying like an excavator on the construction side to grip the Micro LED and put it somewhere else in another place, but with a men's device, a couple of 10,000 or 100,000 in one step. Honestly, I think nobody at this point really knows. I think that's really the road blocking point that's holding the whole industry off. I can only describe to you the problem. If I would have the answer in my sleeves, I could also be much more concrete about the timing for this market, I believe.

Lee Simpson, Morgan Stanley

Great. That's a very good answer. Thank you very much.

Didier Scemama, Bank of America

Yes, good afternoon. Thanks for taking my question. Sorry for a very stupid question, but, obviously ams said on their call this morning, they are – they want to get rid of the – or at least resell the equipment they bought from you and from other suppliers. So, my...

Felix Grawert, AIXTRON CEO & President

Didier, are you still there?

Didier Scemama, Bank of America

After I said ams, I got cut off. Anyways, I just wanted – I mean, they said on their call this morning they want to sell the equipment they brought from you and some other suppliers. So, is that – could you buy back the equipment from them, or would you have to compete in a sort of a grey market with them, from either other Micro LED chip makers, or and that's my two big question really, can this equipment be repurposed into something else than Micro LEDs like GaN and SiC or not? Thank you.

Felix Grawert, AIXTRON CEO & President

So, I cannot comment about the types of equipment they have from us. Again, this is a customer confidentiality. I think we need to sort all this out. This not the new statement to me. I think it needs some time to really, really get that out. Please understand that we cannot take a position here.

Didier Scemama, Bank of America

Okay. Okay. No problem. And on the R&D, I was just a bit surprised by the mid-single digit increase year-over-year. Your R&D sort of is much more, let's say, volatile on a quarterly basis. So, why is it so volatile? I mean, I would have thought R&D is more of a fixed cost. Well, have you got a lot of consultants or variable costs in R&D that we should be aware of?

Dr. Christian Danninger, AIXTRON CFO

I mean, overall, you're right. We are very much making sure that we keep fixed cost at a certain level. And then the peak loads that we have to drive these improvements, these final improvements on the G10 series as Felix explained, we are working with external resources, so flexible resources allowing us then also to drive this down without any problems. That's the strategy that we follow as these efforts should go down, for the parallel use of resource finalizing the current platform and then focusing on the next ones.

Didier Scemama, Bank of America

Okay. And do you care about commenting on whether Micro LED system just in general, can that be repurposed into power electronics or opto?

Felix Grawert, AIXTRON CEO & President

It depends on each type of equipment. We can't make a general statement here.

Didier Scemama, Bank of America

All right. Thanks very much.

Jürgen Wagner, Stifel

Yes, good afternoon. Thank you for letting me on. I have a question on your market share in power. How is that at the moment or has been shaping out last year in GaN and silicon carbide? And also the slowdown you have been mentioning, where do you see that? Thank you. I mean, in silicon carbide, right. Thank you.

Felix Grawert, AIXTRON CEO & President

So, the market share, our market share in gallium nitride remains very high, in the high-90s. Our market share in silicon carbide, we see somewhere between 50% and 60%, putting us in a clear number one position in silicon carbide. Regarding the slowdown in silicon carbide, there's an overall pattern, which we observe across multiple players, just as a market pattern overall, not a specific player.

Jürgen Wagner, Stifel

Okay. And your underlying assumption is that it will quickly come back or in 2025?

Felix Grawert, AIXTRON CEO & President

Yes. In 2025, as we have indicated.

Jürgen Wagner, Stifel

Okay. Thank you.

Gianmarco Bonacina, Equita

Yes. Good afternoon. Couple of questions from me. The first one is on the sales outlook. You are ending 2023 with the same backlog you had at the end of 2022. So, about EUR 350 million. What makes you confident that you can actually achieve growth and not achieve the same revenue level you had in 2023? The second question is on silicon carbide. If I heard you correctly, you said that you had some new customer win. Nonetheless, silicon carbide will not grow in 2023. So, is this because your big customer will reduce, the level of orders in 2023 and the new one will make smaller orders, or if you can maybe elaborate a little bit more? Thank you.

Felix Grawert, AIXTRON CEO & President

So, first of all, on the growth, I indicated towards the beginning of the call that based on our pipeline, we are shooting for the upper end of our guidance range. Nevertheless, the lower end takes some precautions on potential negative effect. That's our assumption for the growth guidance that we have provided for this year. And when you ask for the backlog and compare the backlog end of 2022, with the backlog end of 2023, you have to take into account that at the end of 2022, a number of shipments in the double-digit million range didn't go out. Which is why also in 2022, we came pretty low with respect to the revenues, while in 2023 everything that we wanted to ship, we could ship out. So, the effect that the backlog was stable in two years, one after another was, so to say, mostly dominated by a one-time effect at the end of 2022. I think this is what you have to take into account. So, and then when you put that in line, then everything makes sense again as an overall pattern. So, with that, let me come to your second question in silicon carbide. Well, we all know that in general, for AIXTRON, for our markets, the orders are lumpy and they come in chunks. I mean, the customers order when they order and typically fabs are getting built out in stages or in waves. And those waves are just falling how they fall. I think this is a general statement upfront. It's not like a continuous pattern with one customer ordering every quarter one tool and the other customer ordering two tools. It's rather he has an order for 10, he has an order for 5, he has an order for 20, whatever. So, first of all,

the orders fall as they fall. In this pattern, our customers are sharing their forecast with us, because, they, of course, want us to prepare ourselves and to prepare our supply chain such that we are then able to deliver. Based on this pattern, we have simply seen that 2024 is going to be a bit slower. However, the pipeline is building up strongly for 2025, which is the basis for the statements we've made in this quarter.

Gianmarco Bonacina, Equita

Thank you.

Madeleine Jenkins, UBS

Hi. Thanks for taking my question. I just wanted to get a sense of the order behavior at the smaller silicon carbide customers. I guess kind of major device players, I was just wondering if it tends to be kind of smaller units and they're ramping slowly, or whether they're placing some bigger orders and aggressively trying to get into the market. Thank you.

Felix Grawert, AIXTRON CEO & President

Well, I think it depends first of all, what is a smaller customer, right and many – behind many customers, we see very large group or many of our new customers, we see very large groups, very powerful groups who are now entering silicon carbide. But when we say smaller customers, in some of the cases, we mean a very

large, a very powerful company who is now entering silicon carbide and starting maybe with a small number of tools, but clearly having very ambitious roadmaps behind it. So, in some cases, these are customers starting with a small number, doing their R&D, doing their customer qualification, however, having quite some substantial ramp plans behind it. I think with small customers, we do not mean a larger well equipped start-up or something like that which may order, I don't know, two or three tools per year, but we rather talk about some of the big semiconductor companies who really say silicon carbide is such a big game, we want to be part of the party.

Madeleine Jenkins, UBS

Okay, that makes sense. And then just my final question. I don't know if I missed this, but could you please provide your current lead times if you can, and also whether you see any risk of pushouts of orders in your backlog and how this kind of might impact your revenue guidance? Thank you.

Felix Grawert, AIXTRON CEO & President

So, our current lead time is around 9 months to 12 months and pushouts, we have seen in one single case, but not across the board. So, no unusual pattern.

Madeleine Jenkins, UBS

Okay. Thank you.

Olivia Honychurch, Jefferies

Thanks a lot for taking another question, just one for me, on Silicon Carbide. You said in your answer to an earlier question that you've won a number of new customers, some small, some large. I'm wondering if I can ask as to whether that large customer we can think of as being one of the top five or the top tier players in SiC? Or is it one of the second tier or newer entrants into the market?

Felix Grawert, AIXTRON CEO & President

Olivia, I have expected the question comes in every of our calls. So, I gather you're getting a smile on my face. That's absolutely fine. We have decided in this case not to shine light on this topic, because also there's quite some competitive dynamics behind it. Please hold on and allow us to not answer this question directly.

Olivia Honychurch, Jefferies

All right. I thought I'd ask. Thank you.

Carsten Werle, AIXTRON

Thank you, Beatrice. Thank you very much for taking part in our call.

I got a few emails at the beginning that some have had difficulties to access the call in time, so our sincere apologies for this.

As I have said at the very beginning of the call, we will put the transcript on our web page in the next couple of days so that you also have all the information there. We are looking forward to speaking and meeting many of you in the next couple of days and weeks and wish you a good day.