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PRESENTATION

Operator

Good day, ladies and gentlemen, and welcome to the Amkor Technology Fourth Quarter and Full Year 2021 Earnings Conference Call. My name is Alex, and I will be your conference facilitator today.

(Operator Instructions)

As a reminder, this conference is being recorded. I would now like to turn the call over to Jennifer Jue, Head of Investor Relations. Ms. Jue, please go ahead.

Jennifer Jue - *Amkor Technology, Inc. - Senior Director of IR and Finance*

Thank you, operator. Good afternoon, everyone, and thank you for joining us for Amkor's Fourth Quarter and Full Year 2021 Earnings Conference Call. Joining me today are Giel Rutten, our Chief Executive Officer; and Megan Faust, our Chief Financial Officer. Our earnings press release was filed with the SEC this afternoon and is available on the Investor Relations page of our website, along with the presentation slides that accompany today's call.

During this presentation, we will use non-GAAP financial measures, and you can find the reconciliation to the U.S. GAAP equivalent on our website. We will make forward-looking statements about our expectations for Amkor's future performance based on the environment as we currently see it. Of course, actual results could differ. Please refer to our press release and other SEC filings for information on risk factors, uncertainties and exceptions that could cause actual results to differ materially from these expectations. Please note that the financial results discussed today are preliminary, and final data will be included in our Form 10-K.

And now I would like to turn the call over to Giel.

Giel Rutten - *Amkor Technology, Inc. - President, CEO & Director*

Thanks, Jennifer. Good afternoon, everyone, and thank you for joining the call today. Amkor delivered outstanding results in the fourth quarter, achieving a record revenue and profitability. Revenue of \$1.72 billion and EPS of \$0.88 are all-time records and were above the high-end of guidance. Continued momentum drove excellent performance in all end markets.

2021 was an exceptional year for Amkor. We achieved our highest ever revenue of over \$6.1 billion, adding nearly \$1.1 billion to our previous record in 2020. We set new records in all end markets, with each growing robust double digits versus last year. High factory utilization and disciplined cost control resulted in excellent profitability, generating an all-time high EPS of \$2.62, up more than 85% from last year.

Our solid position in key growth markets, together with our proven execution, positions Amkor well to deliver strong financial performance in 2022 and beyond. Demonstrating confidence in our business outlook, we increased our quarterly dividend by 25% in November. Throughout the year, we successfully navigated the challenges brought on by the ongoing pandemic and the Amkor team demonstrated resilience and focus to achieve major milestones. We deepened the cooperation with lead customers and foundry partners to introduce innovative advanced packaging technology.

Revenue for advanced products represents over 70% of our business. Significant growth was driven by new product introductions, primarily in advanced SiP, wafer-level and flip chip technology supporting 5G communication, high-performance computing, automotive and IoT applications. Our mainstream business also showed a solid year-on-year increase through continued recovery in the automotive and industrial markets.

Now let me review the current dynamics in our end markets. Our communications business grew 22% for the full year, driven by strength in the smartphone market, particularly the transition to 5G smartphones. For the latest smartphone models in both the Android and the iOS ecosystems, we introduced a broad range of new technologies, most notably technology-enabling RF and sensor integration utilizing our advanced SiP platform and next-generation 5G processors utilizing our ultra-thin package-on-package solution. With Amkor's leadership position across 5G smartphones, we expect this market to remain an important growth driver, and we plan to continue investing in technology and manufacturing scale to support our customers.

Strong recovery in the automotive and industrial market drove 28% growth for the year. Continued supply constraints, especially in wafer and substrate supply, dampened even further growth. The strong performance of our automotive business is supported by a solid recovery in our mainstream automotive portfolio, notably, growth in high-power silicon carbide devices for the expanding EV markets. We also experienced strength in advanced products with significant ramps of new ADAS and infotainment processors relying on large body size flip chip technology in our advanced packaging factories in Korea. Although we foresee some short and midterm constraints in the automotive supply chain, we believe the long-term growth drivers in this market remain in place with the expected continued expansion of semiconductor content per car.

Our consumer business increased 12% for the year, supported by diversification of our product and customer portfolio in IoT wearables and strength in the traditional consumer products. In the consumer wearable market, we utilize our advanced SiP assembly and test platform that offers a turnkey solution to integrate over 80% of the electronic components into a single system. We expect this market to further expand, and our overall product and customer pipeline for advanced SiP solutions for consumer products remains strong.

Revenue in the computing market continued a robust growth trajectory with full year growth of 28%. We experienced solid performance in all computing applications and a further strengthening of our product pipeline. Like the automotive market, some further upside was tempered by constraints in material supply, especially high-end substrate materials. Going forward, we believe the computing market is an important driver for growth. Increasing data traffic across networks and data centers is accelerating the need for high-performance computing, utilizing the latest silicon nodes and enabled by advanced packaging technology. With our proven technology portfolio and established partnerships with lead customers and foundries, we believe Amkor is well positioned to capitalize on opportunities in this growing market, and we plan to continue our investments in technologies and manufacturing scale for computing applications.

Finally, our test business grew 17% compared to 2020. We are broadening the scope of our test services in areas like 5G communications, computing and system-level testing to enhance turnkey support to our customers. Our global manufacturing organization remains focused on operational excellence to serve our customers while maintaining industry-leading quality standards and high factory utilization.

Working through supply chain constraints for material and components required extraordinary flexibility to meet customer demand by optimizing factory planning and managing new product introductions. We expect these supply constraints to continue throughout 2022 until new capacity for substrates and critical silicon nodes comes online. In November, we announced our plans to expand our global factory footprint by building a state-of-the-art factory in Bac Ninh, Vietnam. The first phase of this factory will focus on advanced SiP technology. This is a strategic long-term investment in geographical diversification and factory capacity expansion. Utilization across our advanced packaging locations is high, and we expect the strong market demand for these technologies to continue.

Our Vietnam factory project is on schedule to start pilot production in the second half of 2023. This will provide key capacity to support future growth. In the U.S., we continue to monitor our investment policies to incentivize domestic semiconductor manufacturing.

Our CapEx for 2021 was \$780 million. We made significant investments in advanced technologies like wafer-level packaging, flip chip technology, advanced SiP and test, as well as in facility expansion. For 2022, we expect to increase CapEx to around \$950 million in order to capture new opportunities for a strong demand for our advanced package technologies. Our 2022 CapEx guidance of \$950 million includes around \$100 million for the construction of our new Vietnam factory.

Now let me turn to our first quarter 2022 revenue outlook. We are expecting another solid quarter with revenue of \$1.55 billion at the midpoint of our guidance. This represents a year-on-year increase of 17%. The full year 2022 is shaping up as another growth year for Amkor. Our key growth drivers remain in place. 5G deployments, high-performance computing, IoT wearables and automotive electronics are all expected to drive strong demand for our services. With Amkor's differentiated technology portfolio, global manufacturing scale and broad customer base, we believe we can outperform the semiconductor market in 2022.

Megan will now provide more detailed financial information.

Megan Faust - Amkor Technology, Inc. - Executive VP & CFO

Thank you, Giel, and good afternoon, everyone. Amkor delivered record financial results in Q4. Revenue, gross margin, net income and EPS all exceeded the high end of our guidance. Fourth quarter revenue of \$1.72 billion was up 3% sequentially. The Year-over-year fourth quarter revenue increased 26%, a result of significant double-digit growth in all end markets, including new all-time records for revenue in computing, automotive and industrial and consumer.

Communications revenue was flat from Q3 and came in stronger than expected due to less impact from material supply shortages. Utilization rates were high across our global factory footprint. We continued to work with our customers to provide assurance for future supply by means of advanced payments and long-term agreements. This allows us to secure capacity and material availability for future volume ramps.

During the quarter, we continued to see constraints for wafers, substrates and components, as well as extended lead times for certain equipment. In order to secure specific materials for our customers, we are exploring long-term arrangements, including investments with key suppliers to support capacity expansion. We expect continued tightness throughout 2022 until new capacity comes online.

In addition to supply constraints, we are also experiencing cost increases, both in fixed and variable costs. In order to preserve our profitability in this rising inflation environment, we are taking action to ensure our prices reflect these increasing costs. With high levels of utilization, gross margin expanded 170 basis points sequentially to 21% and our gross profit of \$362 million is an all-time record. This demonstrates the leverage in our financial model.

Operating expenses for the quarter came in better than expected at \$110 million. Fourth quarter operating income was an all-time record of \$252 million, and operating income margin expanded 200 basis points sequentially to 14.6%. Net income for the quarter was \$217 million, resulting in an all-time record EPS of \$0.88. We generated record EBITDA of \$398 million in Q4, and EBITDA margin was 23.1%. We ended the quarter with over \$1 billion of cash and short-term investments and total liquidity of \$1.6 billion. At December 31, total debt was approximately \$1.1 billion, and our debt-to-EBITDA ratio is 0.9x. Our solid financial position maintains our ability to fund expansion, entertain future growth opportunities and make strategic investments.

2021 was a year of many records and accomplishments for Amkor. Revenue for 2021 topped \$6.1 billion, an increase of nearly \$1.1 billion or 22% over 2020. Strong execution and technology leadership drove double-digit growth and set new records in all of our end markets. Gross margin for the full year 2021 was 20%, driving robust profitability and expanding over 200 basis points from 2020. We generated record gross profit of over \$1.2 billion, an increase of over 35% from 2020. We controlled operating expenses, reducing them as a percent of revenue, from 8.8% in 2020 to 7.5% in 2021 in a period of significant growth.

Strong operating results and disciplined spending resulted in operating income margin of 12.4%, an increase of 330 basis points over 2020. We reduced interest expense by \$12.5 million or 20% compared to 2020 by continuing to optimize the amount, cost and term of our debt. As a result of these actions, we generated record EPS of \$2.62, an increase of over 85% from 2020.

We invested \$780 million of CapEx or 12.7% capital intensity, primarily in our advanced products portfolio. This investment will strengthen our leadership position in the growth catalysts for 2022 and beyond: 5G; IoT; automotive; and high-performance computing.

We announced the expansion of our geographical footprint to add advanced SiP capacity in Vietnam. We generated \$344 million in free cash flow in 2021, an increase of over 50% from 2020. Customer advance payments had a favorable impact on free cash flow in 2021. We increased our quarterly cash dividend by 25% on strong financial results and confidence in the sustainability of our cash flow generation.

Moving on to our first quarter outlook. We expect revenue to be \$1.55 billion, plus or minus \$50 million, which reflects both seasonality and continued supply chain constraints. Gross margin is expected to be in the range of 17.5% to 20%. Operating expenses are expected to be around \$115 million. We expect our full year effective tax rate to be around 15%. Q1 net income is expected to be between \$115 million and \$165 million, resulting in EPS between \$0.45 and \$0.65. Given the continued strong demand in the market, we are increasing our forecast for capital expenditures in 2022 to around \$950 million. This includes spending related to our new facility in Vietnam, which is anticipated to be completed in 2023.

With that, we will now open the call up for your questions. Operator?

QUESTIONS AND ANSWERS

Operator

(Operator Instructions)

Our first question comes from the line of Randy Abrams with Crédit Suisse.

Randy Abrams - *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department*

Congratulations on the good result. I wanted to ask the first question on the first quarter. The seasonal is about in line with normal, about a 10% decline. But factoring you're mentioning a pretty strong growth outlook and some of the customers and peers have been a bit above seasonal. So if you could put in context just the factors on the seasonality? And in that, I think you discussed that there are some constraints on demand. But if you could lay out what you're seeing and perhaps by end market, how you're seeing the trend fourth quarter to first quarter?

Giel Rutten - *Amkor Technology, Inc. - President, CEO & Director*

Randy, this is Giel. Good to have you on the call. Yes, let me try to answer your question and go through the individual segments. Let me first start with making a comment to the product categories. I mean, where we see the quarter-on-quarter correction is mostly in our advanced SiP domain, both on the communications side as well as on the consumer side.

For the segments in the computing segment as well as in the Automotive segment, they're either slightly up or flat quarter-on-quarter versus Q4. So mostly, it's in SiP and mostly in the communications segment, which is slightly better-than-normal seasonality on the communication. And on the consumer side, we see some fluctuations with changeovers from one product generation to another, and that impacts our consumer segment. And on top of that, we made some reservation for our memory business because we see some supply constraints towards the tail end of this quarter with respect to vehicle supply. And there, we made a slight correction to include that in our quarterly outlook.

Randy Abrams - *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department*

Okay. Yes, that's helpful. And I guess, with the wafer supply, it's dealing with some of the issues on the contamination. The follow-up for the SiP business, where in the remarks you discussed diversified portfolio and good pipeline. If you could give a snapshot, if you still do the revenue run rate where it was last year and the broad expectation for this year with the transition, how you're seeing the SiP business for the coming year?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Well, there is strength across the board. I think we're introducing a broad range of new products on SiP share on the computing -- on the communication domain. And we expect that to be strong and significantly growing in this year. On the consumer domain, we see some products phasing out with one customer with some new customers face again with other customers. And there is some ramp up and ramp down. How that materialize exactly in comparison to last year, maybe Megan can give a little bit more detail there for Randy.

Megan Faust - Amkor Technology, Inc. - Executive VP & CFO

Randy, yes, just to close out '21, Randy, our SiP business grew over 20%. So we're -- our advanced SiP is \$2.3 billion is where we ended up for '21. And as Giel mentioned, we expect continued strong growth in the advanced SiP technology. As a reminder, we see that proliferating into all of the end markets, including automotive.

Randy Abrams - Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department

Okay. Great. And actually, where it translates to margin where you're coming off kind of a new recent high, for -- as you go into this year, I think there's a few drivers. But I'm curious, pricing, if now factoring in some of the constraints and rising material costs, what's happening on the pricing side. And in that -- then how you net it out, like for -- if the SiP business is still growing, how you see the margin trend? If kind of we reach similar levels and high utilization, or is it in tech, we could go in either direction with whether you're doing on pricing versus some of the material costs?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Okay. Let me start with the pricing part and then Megan can probably give a little bit more comments on the gross margin development for this year. Now on the pricing side, already for last year 2021, we work closely with our customers to include in our pricing, the increased material costs, specifically on substrate materials where we see increased cost during the last year already, and we expect that to continue. We have a close cooperation with our customers to include that in our pricing.

With respect to other inflation-related cost increases, be it energy, labor costs, et cetera, I think we do the same approach with our customer base currently we work closely with customers to basically increase prices where needed to include the inflation that we're currently experiencing across the board. So material increase is already ongoing for, let's say, the full of last year, and we expect it to continue the other inflation-related cost increases, I think we work on the same way closely with our customers to include that in our pricing.

Now with respect to our gross margin development, Megan, can you comment to that?

Megan Faust - Amkor Technology, Inc. - Executive VP & CFO

Sure. So Randy, as you know, generally, we see a 40% to 50% gross profit incremental flow-through. And as you mentioned, that can have headwinds or tailwinds, depending on product mix, which you had specifically mentioned SiP, utilization, currency exchange rates, et cetera. So with respect to our expectations for '22, as far as this being in 2021, that is a good representation of our material content.

And just to step-back, '21 had robust profitability a result of ongoing disciplined CapEx and focus on controlling our manufacturing costs for optimal absorption. We achieved the highest gross margin percent in over a decade. Operating income margin also reached the highest in over a decade. That being said, we've worked hard to establish a manufacturing cost structure that will provide leverage in growth cycles. So our expectation is that we will have improved profitability given the leverage that we've demonstrated in our financial model.

Randy Abrams - *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department*

Okay. And one just other margin question. Depreciation for the full year, if you have just factored in now the CapEx coming up a bit, how depreciation trends year-on-year?

Megan Faust - *Amkor Technology, Inc. - Executive VP & CFO*

Yes. 11%, Randy, is the increase in depreciation in '21.

Randy Abrams - *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department*

Okay. Great. And then a question on the long-term agreements. It sounds like there's some on both sides. If you could discuss how much you're seeing on the supply side? And does that lock in -- I guess, it's inflationary costs. How much does it lock in the pricing that could actually be a risk if the environment changes -- and where you're doing -- thinking about the co-investment? Is that more on substrate where we've been tight. And then I'm curious on the customer side, how much you've enacted long-term agreements or any kind of prepayment for the business with customers.

Giel Rutten - *Amkor Technology, Inc. - President, CEO & Director*

Well, let me comment on the structure first, and Megan can give the details on the total numbers. Now from a structural perspective, when we enhanced our agreements with customers, 90% of our top 25 customers, we have long-term agreements in place. They're either co-investment agreements or a take-or-pay agreement or other longer-term arrangements that would guarantee them supply. So guaranteed supply is the goal, is the goal for our customers.

And guaranteed delivery is, for us, the goal with our suppliers. I think mostly on the supply of substrate materials we put long-term agreements in place with critical suppliers, mostly on high-end substrates. And we executed that in the latter part of last year. and we will continue to do that this year. There are some -- I think that's to a lesser extent, co-investment agreements going on to help some of the smaller substrate companies to ramp up and to accelerate the ramp-up of new capacity.

On the total numbers, Megan, can you comment to that?

Megan Faust - *Amkor Technology, Inc. - Executive VP & CFO*

Yes. So Randy, we don't give specific levels of dollar capacity in there. I think what's important to know is that all -- nearly all of our top customers have engaged in some form of long-term arrangement, which does mitigate our investment in those programs.

On the supplier side, I think he did address, we are doing that specifically for the high-end substrates, which is where we're seeing the most significant constraints. The magnitude of that as well, we aren't disclosing but it is ensuring that we can secure that supply for the -- for our customers.

Randy Abrams - *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department*

Okay. And I'll just ask one final question, just following up for that. The -- for those where you mentioned the 90% of top 25 where there's agreements -- is that -- it looks like there's a take or pay or some that you actually guarantee and secure how much they take. Is it more than a quantity-driven or how much is also pricing? Like are these contracts also locking in some sort of pricing, or is it more to secure the volume and your market share? So I'm curious how you structure it. And then the other follow-up, because of the ongoing high-end substrate, how are you seeing the development on fan-out? And is that pulling in, or how do you see timing and magnitude of and out as a potential mediation of substrate?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Then let me start answering the last question on the fan-out acceleration. On fan-out, we have a broad engagement with critical customers. We expect that -- and I think I also reported that we talked in our last call on the fan-out timeline, we expect that to ramp in 2024.

So to volume with some initial production in 2023. So I don't see any short-term alternative for the high-end substrates part being introduced certainly because I expect fan-out to be actually coming together with the 3-nanometer silicon nodes -- and therefore, I think it will ramp in 2023 and after that.

With respect to securing volume, substrate prices currently are fluctuating quite significantly. Of course, we don't, let's say, fix the prices in our contracts. I think we relate that to market prices and market price developments. The longer-term contracts are mostly related to volume, and prices are very much related to market pricing.

Operator

(Operator Instructions)

Our next question comes from the line of Tom Diffely with D.A. Davidson.

Thomas Robert Diffely - D.A. Davidson & Co., Research Division - MD & Senior Research Analyst

So first, just as a follow-up, when you look at the material surcharges, are those at cost, whether you basically pass on the cost or is that with your normal margins attached to it?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Well, that's -- we don't want to go in too much detail here, but the intent is to work with our customers to cover the increased cost. Of course, when there is, let's say, specific fees on handling fees or others, I think that will be included in the increased material prices.

Thomas Robert Diffely - D.A. Davidson & Co., Research Division - MD & Senior Research Analyst

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Okay. That's helpful. And then in regards to your new facility in Vietnam, what were the main reasons or the driving force behind that location? And on a related question, is there anything in the new Chip Act that you think might increase your want to increase capacity here in the U.S. over the next few years?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Okay. Well, let's first start with the Vietnam factory. The Vietnam factory is, for us, a very strategic element to our manufacturing footprint. We see there a strong ecosystem developing in Vietnam, where our customer base is actually evaluating their supply chain strategies to include, let's say, lower risk geographies in their supply chain. That doesn't mean that companies completely move away from manufacturing in China, but they're actively looking for lower risk alternatives. In our view, Vietnam is one of them, also because there is a strong semiconductor ecosystem already present and our customers -- several of our customers are familiar with the location. There's a strong labor force. There are the strong incentive scheme from government. And we believe with the facility of our other manufacturing locations in Asia, this is the right location also from a cost structure perspective to have a long-term facility supporting our advanced technologies in Vietnam.

With respect to the U.S. chip act and potential investment in the U.S., I mean, we are monitoring this. Of course, our headquarters in the U.S., we are well positioned to participate in the U.S. supply chain. We are critically evaluating potential locations. Important, however, is to make it an economic viable manufacturing location. So we are evaluating the detailed support structure that is being developed by federal as well as state governments in the U.S.

Thomas Robert Diffely - *D.A. Davidson & Co., Research Division - MD & Senior Research Analyst*

Great. Okay. That's very helpful. And then just as a follow-up on that, is there a rule of thumb for the payback period for capital spending on equipment? Is it a 2-year payback period or might have kind of trying to figure out what the return is on these investments?

Giel Rutten - *Amkor Technology, Inc. - President, CEO & Director*

I'll leave that to Megan.

Megan Faust - *Amkor Technology, Inc. - Executive VP & CFO*

Tom, from a rule of thumb, I would say 2 years is a good rule of thumb. I would say generally, it's going to depend on a key customer. It's going to depend on if we have second customers lined up coming in with that. We may require faster. It's going to depend if the equipment is fungible, et cetera. But all those factors, I think, your 2 years is a good rule of thumb.

Thomas Robert Diffely - *D.A. Davidson & Co., Research Division - MD & Senior Research Analyst*

Okay. Great. And then final question. When you look at the automotive market and the growth you see there going forward, is most of that driven by the EV market with silicon carbide or is it the basically electrification of cars in general that's driving that?

Giel Rutten - *Amkor Technology, Inc. - President, CEO & Director*

I would say, the majority of the growth is driven by the electrification of cars in general. Of course, on the -- in the EV market, there are specific elements like high-power battery management, et cetera, that drive increased semiconductor content. If we talk about alternative materials like silicon carbide that can handle power management for the new generation of battery management in electrical cars, that's very specific for the EV market. But if we talk about driver assistance features, sensors, radar sensors, infotainment, all of that is generic, whether these are electrical cars or combustion engine cars.

Operator

Our next question is a follow-up from Randy Abrams with Crédit Suisse.

Randy Abrams - *Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department*

I have a follow-up just on the CapEx. If you could give a split like in that -- you mentioned the \$100 million for Vietnam. If you could give the split, and just directionally, if we take last year as a base, how the mix on the CapEx or priorities are changing year-on-year?

Giel Rutten - *Amkor Technology, Inc. - President, CEO & Director*

Megan, can you take that?

Megan Faust - Amkor Technology, Inc. - Executive VP & CFO

Sure. So Randy, I would say from looking at prior year, the mix would be pretty similar on the equipment and capability expansion where we would have the primary portion of that for advanced technologies. And then where we're seeing some increased CapEx is in our infrastructure in common. And as we mentioned, there's \$100 million earmarked for our facility in Vietnam.

Randy Abrams - Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department

And on wire bonding, for a while, there was like legacy capacity that you had. Some available capacity, is that still the case or you now fairly tight and need to invest in the mainstream wire bonding?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Yes. Let me comment to that, Randy. I mean, our wire bond factories in Japan as well as in the Philippines as well in Malaysia, were actually looking at a fairly high utilization when we exited last year in our fourth quarter. Still not fully utilized, I think we have some incremental capacity in our Japan facilities. We plan to invest in specific expansion in some of our facilities to accommodate some increased volumes for our customers.

But keep in mind, our wire bond business is clearly focused at some specific markets that are complementary to our advanced packaging markets, like in automotive where we hold a strong position in automotive. And of course, if these customers are basically expanding and want us to expand, we will do that, and that goes across the board with respect to automotive microcontrollers, which are actually growing quite significantly. So where needed, we will invest in wire bonding capacity also.

Randy Abrams - Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department

And related on the IBM outsourcing, there's been mixed feedback whether there is an outsourcing trend or they're actually stepping up investment in-house. And a few IDMs have discussed more investment both advance, but it sounds like they do want to do some OSAT investments as well. So I'm curious, the trend you're seeing for outsourcing. And there's probably a near-term dynamic-type environment versus a mid- to long-term strategic direction for that.

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Yes, I agree with that, Randy. I mean, the outsourcing trend from IDMs and the increase to more outsourcing is already ongoing for a long time, where there is a trend of increased outsourcing. Of course, it depends a little bit which markets in exact you're talking about, whether it's in computing or in memory or in automotive. I mean, currently, we see that the preference for investments by IDMs are if they are investing, it's more towards the front-end expansion instead of back-end expansion, unless it's very specialized technologies.

So there is an increased outsourcing ongoing, and we definitely see that. It's not only on the mainstream side. But it's definitely also on the advanced products sides where generally IDMs hold a strong, let's say, scale in the mainstream manufacturing side, but have limited scale in advanced products and tend to outsource more of their advanced product, let's say, volumes towards the old sets.

Randy Abrams - Crédit Suisse AG, Research Division - MD and Head of Taiwan Research in the Equity Research Department

Great. And the last question I have on the -- just on demand environment, it sounds like above seasonal, so positive on, I think you mentioned compute, auto. For market segments are two parts to it, but one, if there's any area you're seeing a bit of softness or a slowdown? And from an inventory picture, how you're viewing where levels are versus normal and also versus where customers seem to want to take it? Like if you see kind of a potential buildup through this year.?

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Yes. From where we -- from our perspective on the supply chain, we see inventories to be still very lean. And we are monitoring actively the inventories at the distributor level, at our customer level, also in specific markets. They're here and there, you have some inventory buildup with respect to kitting, but in my view, that's very short term and that will resolve itself. But in general, inventory levels, what we are seeing are low or definitely below our customer targets still. With respect to market development, we see 2022 another strong year. I mean, market forecast is in the high single digits. We believe we can outperform that. So we are very optimistic with respect to the outlook.

On the communications side, we believe that 5G continues to drive growth. I mean, the number of 5G phones will increase from let's say, around 400 million or 450 million this year to about 600 million next year, and that will drive significant growth. Automotive markets, the number of cars as well as the semiconductor content will continue to increase. And on the computing side, we're very optimistic with further growth, both on the networking side as well as data centers. But even on the turn on the PC side, for the OSAT domain, there's a good upside there to establish further growth.

IoT is a little bit a market, which is still in the early stage on the wearable electronics side. But overall, with our strength in the IP platform, where we do integrate the majority of the functionality in one asset. I think also there, we are optimistic. So overall, across market segments, inventories are still fairly moderate, and market demand we expect to be strong in this year, Randy.

Operator

Thank you. At this time, I'm showing no further questions. I would like to turn the call back over to Giel for closing remarks.

Giel Rutten - Amkor Technology, Inc. - President, CEO & Director

Okay. Thank you. Well, before closing the call, I would like to recap our key messages.

Amkor delivered outstanding financial results in 2021. We achieved record annual revenue of \$6.14 billion and a record annual EPS of \$2.62. We are expecting the first quarter '22 to be another solid quarter with revenue of \$1.55 billion, a robust year-on-year growth of 17%.

Supply chain constraints for substrates and components are expected to continue throughout 2022 until new capacity for substrates and critical silicon nodes come online. 2022 is expected to be another growth year for Amkor. And with our solid position in key growth markets, we expect to outgrow the semiconductor markets. And last but not least, I would like to thank the global Amkor team for delivering another great year. The team demonstrated the resilience and focus to overcome many challenges and made 2021 a milestone year.

Thanks for joining the call today.

Operator

Ladies and gentlemen, this concludes today's conference call. You may now disconnect.

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