

Information Meeting 2020 Q&A

Presenter: Norio Nakajima President

Yoshito Takemura Executive Vice President (Board Member)

Masahiro Ishitani Executive Vice President (Board Member)

[Strategy · Mid-term Direction2021]

Q: Your company boasts excellent assets and knowledge that have been fostered over 76 years of history since its founding. President Nakajima, what points do you think you will have to change down the road?

A: What I want to accomplish in the future is to create a solutions business as our third portfolio. I want the company to challenge to embark on a business that sort of lays software close to user interfaces, in particular by preparing infrastructure such as a sensor networks, while capturing a large change to our business model. I do not think that this business will play a central role in our portfolios soon, but when I envisage the additional business growth of Murata after 2030, I find it necessary to enter such a field.

Q: With what kind of business are you planning to fill a difference of 500 billion yen from sales of 2 trillion yen that is the medium-term target?

A: What we target more than sales is an operating income ratio of 17% and an ROIC of 20%. I think that the difference from our sales target can be filled by our components business and application-specific business. Regarding components, we expect MLCC and EMI, in particular, to grow. In the field of components, we continue to challenge the limits of technology, and I believe that we have been able to gain a comfortable lead in expanding business concerning cutting-edge products. In our application-specific business, we expect growth in RF modules, SAW filters, and sensors for autonomous driving. I believe that these two portfolios will enable us to achieve business growth in the 2 trillion yen level in the future.

Q: When you divide your business into components, application-specific, and solutions businesses, how do you plan to allocate capital to each in the coming five years? Additionally, how do you intend to manage capital allocation in new business areas?

A: I will discuss capital allocation to the solutions business specifically from now. We have been able to firmly expand the module business simply because our financial base is sound, so based on that financial base, we intend to develop a solutions business. Basically, we will not change our policy of maintaining a strong financial base. Accordingly, we plan to deepen specific discussions on how much we will invest in the solutions business. In this regard, we are pursuing portfolio management in Midterm Direction 2021 and are going to manage,

develop, and follow each business within this framework.

Q: If you have a ballpark idea of the allocation percentage for components and modules, please share it with us.

A: We have not disclosed any figures regarding this. However, in terms of investment and return, we aim at an ROIC of 20% as a whole, so we will consider investments and other means so as to achieve this goal.

[Capacitors (MLCC)]

Q: The graph on page 26 shows that the number of capacitors will grow in smartphones and automobiles on a similar scale up to 2025 with 2019 as the start. If you express this in terms of the load of production capacity, what will growth be like? Also, what percentage of production capacity do you assume automobiles will account for in 2025?

A: As for the production load, although it depends on how the size of products will trend, we expect that growth in terms of production load will be slightly lower than that of the quantity because we are also actively promoting the use of small products. In addition, since the size of products for automobiles is large, we expect products for automobiles to account for about 30% to 40% of our production capacity in 2025.

Q: Considering the large size and high added value of products for automobiles, I think the proportion of products for automobiles will increase slightly in 2025. If that is the case, can you accommodate future demand growth by reinforcing production capacity by 5% to 10% per year? Do you have any plans to invest more to meet demand?

A: There are various sizes of products for automobiles from low capacity to large capacity. We expect large capacity to grow, but we do not think that this percentage will exceed 50% in the near future. Although we also have large production capacity, we strive to reinforce production capacity by 5% to 10% annually. In this context, we will allocate resources to growing markets and fields that we want to grow. We have maintained a high level of investment, so we believe that if we continue an annual 5% to 10% capacity expansion for the time being, we will be able to maintain our position.

Q: Could you please share with us the progress in the activity to promote the downsizing of capacitors for automobiles? What kind of measures are you considering in order to increase the supply quantity when a tight supply and demand balance is projected in the future?

A: Many newly designed products for automobiles are more compact. We think that they will be shifted gradually to mass production. However, downsizing will be slow in progress due

to the nature of automobiles, so we plan to prepare a support system and take time to respond to this trend.

Q: Could you share with us measures for further improving the competitiveness of MLCC? Will you be able to raise it a step higher by something like the adoption of additional technology?

A: Our current policy will remain unchanged, but our basic course of actions is to continuously create products that are compact and thin with large capacity and reliability by utilizing various technologies. In terms of technological innovation and improvement in management technology in the direction of high reliability, there remains room for improvement, so we will proceed with efforts on a continuous basis. Moreover, we intend to roll out products that are superior in terms of ESG and SDGs, such as more eco-friendly products, by taking in new technological elements.

Q: Will a moment come in the immediate future when a potential discontinuous change is caused to MLCC?

A: It depends on the concept of discontinuity, but we will continue business activities in the belief that something will be created somewhere from the accumulated expertise that has catalyzed a series of small and large innovations, even though such a thing seems discontinuous from outside.

[Modules]

Q: Could you share with us where you did a good job and where you could have done a better job in the 5G field compared to last year? Also, in what fields will you be able to leverage Murata's competitiveness in the runup to next year?

A: As for the Sub6GHz, we were able to make progress as expected to some extent for customers in the U.S. and China, but we could not achieve expected growth for customers in South Korea. At the same time, we regarded 2020 as the first year of millimeter-wave 5G, but regrettably, this fiscal year's new smartphones are only for the U.S. market, so the attach rate is lower than initially expected. We expect the 5G attach rate to rise considerably toward the next fiscal year, and we will reinforce production capacity in order to increase sales accordingly.

Q: In accordance with the earnings forecast for the second half of the current fiscal year, I find that RF modules remain strong although sales to the largest company in China fell. Based on that trend, do you have any ideas for the next fiscal year, such as aiming at a

double-digit sales increase? If so, could you please share your ideas?

A: We expect demand itself for RF modules to have double-digit growth, so we intend to outperform the trend.

Q: Which do you think will have greater business opportunities in the medium to long term for Murata, the millimeter-wave potential, or the Sub6GHz potential?

A: In the case of millimeter waves, if you want to cover 360 degrees of radio waves received by a smartphone, you will need three millimeter-wave modules per smartphone. On the other hand, we can cope with the situation by using the flexibility of MetroCirc™, so we are making a proposition that can reduce the number of mounted modules to two. In the case of Sub6GHz, the number of RF modules to be mounted will be one to two. Therefore, it is difficult to judge which has higher potential. At the same time, we are proceeding with development, thereby demonstrating our competitive advantage in filters in the field of Sub6GHz. If we can clarify its superiority, we will find Sub6GHz a better position for us.

Q: I recognize that new smartphones in North America have adopted Murata's modules. Could you share with us what is behind the achievement of having your modules were adopted? Also, I heard that the attach rate was low this year, so am I right to expect that there is great room for growth next year in contrast?

A: If you ask if next year's growth potential is large, you are right. Since the performance of our power amplifiers and switches is almost on par with those of our competitors, it is difficult for us to differentiate ourselves in this area. As for the reason that we were able to increase our market share this year, our analysis is that our filters' ability to respond to needs is better than those of competitors in terms of the design technology of modules and filters that determine product characteristics.

[Filters]

Q: Currently, your company is planning to expand and reinforce its filter lineup by extending the frequency range of I.H.P. SAW and bringing XBAR® to market around 2022. Could you share with us the challenges that you face implementing this plan?

A: Please see page 28 of the material. LC filters are capable of meeting the specifications that can be realized in Sub6GHz 5G. In the second half of FY2022, there will be the need to respond to new frequency bands that are due from now, such as band 78 and diplexers in bands 77 and 79. To prepare for such a situation, we have been working to respond to the range that even BAW filters or I.H.P SAW cannot cope with by improving the performance of I.H.P SAW and developing XBAR®. We have mass-produced I.H.P.SAW, but we have no

experience in mass production of XBAR® as of now. Although we are able to draw out desired characteristics, we have not yet reached the level of being able to fully verify variation and yield in mass-production. Therefore, we still have the issue of improving our level from now.

Q: Should it be not possible to mass-produce XBAR®, what kind of filters will be used for 5G terminals in the future?

A: I figure that we will cope with that by accepting the loss and combining LC filters and I.H.P. SAW, or LC filters and BAW filters. With a larger loss, we will also have to take remedies, such as raising the output of the power amplifier.

Q: The higher the frequency band including millimeter waves is, the more difficult it will be to design, and we think that the difficulty level of designing filters will also increase. Am I right to say if the technical difficulty level is raised, it will relatively strengthen the supremacy of your company, which will work to your advantage?

A: Yes, you are. When the technical difficulty level is higher, we will be at an advantage.

[Batteries]

Q: Could you please share with us the current state of the battery business and your efforts to turn the business profitable toward the next fiscal term?

A: Partly due to the market environment that sees demand for batteries for automobiles growing, our market share is fortunately increasing more than expected in the fields of power tools and cleaners, which we target, and supply too is tight. To secure profits, we will strive to reduce fixed costs. However, the timing of becoming profitable may be delayed or advanced slightly, depending on capital investment. We will not change the target and will continue our efforts to achieve profitability by the end of FY2021.

Q: What is behind the possibility that the timing to achieve profitability may be slightly moved up or pushed back?

A: We think that if we prioritize achieving profitability while maintaining sales levels, it will be possible. However, there is a growing need for cylindrical batteries, batteries for wearables, and batteries that can provide high power for power tools. We think if we try to fully meet demands from the market, the timing of becoming profitable may be moved up or pushed back, depending on how much we will invest to meet such needs.

Q: What is the situation of developing all-solid-state batteries? Could you please share with us areas that you plan to expand into in the future? Additionally, what are the factors that enabled you to win a hard race recently in areas such as earphones, where small size is an advantage?

A: All-solid-state batteries that we are working on employ active materials that are not significantly different from those for current lithium ion secondary batteries. Their advantages are safety, such as being nonflammable and causing little heat, and the capability to achieve high energy density in a smaller size. Considering these advantages, IoT applications are the easiest to tackle, and we are preparing to start mass production by the end of this fiscal year. As the next step, we are considering development for wearable devices. However, in order to expand applications to wearable devices, it is necessary to increase capacity a little more. Therefore, for the moment, we are applying the technology of small batteries that are small versions of lithium ion secondary batteries, which we have originally established in the wearable market. These products have been adopted for items including earphones. We are exploring the possibility of applying all-solid-state batteries to these items as well in the future.

Q: What is behind the fact that Murata's compact lithium ion secondary batteries have been adopted for earphones and other wearable devices?

A: The product requires a technology to pack with thin metal, but regarding this technology, a German competitor that was initially ahead of us owns basic patents. We were able to develop a way of circumventing that patent, and we have accumulated mass-production technology through products for wearable devices since last year. These led our products to being adopted.

[MetroCirc™]

Q: Regarding millimeter waves, are there any technological moves for the next term? I think that there are technologies, such as polyimide and Teflon, that compete with MetroCirc™. From what perspective do users select components in terms of costs, performance, ease of use, ease of design, and others? Could you please share these points with us, including compatibility with the performance of substrates where parts are mounted and connectors?

A: Please see page 29 of the material. For millimeter-wave modules, we expected the attach rate to become about 50% at the beginning of FY2020. In reality, however, the attach rate is lower than expected, as shown in smartphones brought into market this fall. What is behind the current trend is that only part of the USA has sufficient infrastructure. Technically, we understand that new technologies have been used in issues such as a reduction of loss in antennas, transmission lines, or in module substrates. In this regard, page 29 of the material

shows a graph that indicates the difference in loss between MetroCirc™ and MPI. Whether or not this characteristic difference is tolerable depends on the guidelines for specifications of major clients. Whether or not MetroCirc™ is required depends on the level of specifications that major clients use as the criterion. For example, target specifications can be reached by using MetroCirc™ only in antennas, or specifications are those that can be realized when MetroCirc™ is also applied to module substrates, as expected. At the moment, the areas that always need MetroCirc™ are antennas and transmission lines. Whether or not it is used in millimeter-wave modules varies among our major clients.

Q: Regarding how to read the graph on page 29 of the material, am I right to understand that MPI has lower loss?

A: No, that is not the case. This is by output, so the graph indicates that MetroCirc™ has lower loss. The difference somewhere between 28GHz and 39GHz is the characteristic difference in current millimeter waves.

Q: I heard that millimeter modules would use MetroCirc™ in their substrates. When is that application scheduled to take place? Am I right to have the sense that MetroCirc™ itself is used as an active device to roll out solutions?

A: I think that we will be able to roll out modules with MetroCirc™ as substrates, little by little, from 2021. Built-in devices will be inductors, small capacitors, and 50ohm transmission lines.

[Others]

Q: I think that new business opportunities are emerging in the fields of power inductors and sensors. Could you share with us what products other than capacitors are expected to grow in the field of passive components in the future?

A: Capacitors will remain the core, but other components that are expected to grow in the future are EMI products, such as inductors and electromagnetic interference (EMI) suppression filters. The effects of the acquisition of TOKO have finally begun to show up in manufacturing as well, and our market share of power inductors for automotive applications is also growing. We intend to make it a future focal area. There are a number of products that we can expect to grow other than EMI products. In the sensor business, for example, extremely sophisticated inertial sensors are becoming necessary for autonomous vehicle operation. The MEMS inertial force sensor technology that we obtained through the acquisition of VTI Technologies in Finland will become an essential part of the autonomous driving technology that will advance to levels 3 and 4 in the future.

This Q&A contains forward-looking statements concerning Murata Manufacturing Co., Ltd. and its group companies' projections, plans, policies, strategies, schedules, and decisions. These forward-looking statements are not historical facts; rather, they represent the assumptions of the Murata Group (the "Group") based on information currently available and certain assumptions we deem as reasonable. Actual results may differ materially from expectations due to various risks and uncertainties. Readers are therefore requested not to rely on these forward-looking statements as the sole basis for evaluating the Group. The Company has no obligation to revise any of the forward-looking statements as a result of new information, future events or otherwise.

Risks and uncertainties that may affect actual results include, but are not limited to, the following: (1) economic conditions of the Company's business environment, and trends, supply-demand balance, and price fluctuations in the markets for electronic devices and components; (2) price fluctuations and insufficient supply of raw materials; (3) exchange rate fluctuations; (4) the Group's ability to provide a stable supply of new products that are compatible with the rapid technical innovation of the electronic components market and to continue to design and develop products and services that satisfy customers; (5) changes in the market value of the Group's financial assets; (6) drastic legal, political, and social changes in the Group's business environment; and (7) other uncertainties and contingencies.

The Company undertakes no obligation to publicly update any forward-looking statements included in this Q&A.