

Information Meeting 2020



Facts & Figures



Our Business

We are worldwide leaders in the design, manufacture and supply of electronic components and solutions.

We are Innovators in Electronics.

Our Strengths

- Advanced materials technology and expertise
- Broad product portfolio
- Extensive global manufacturing and sales network

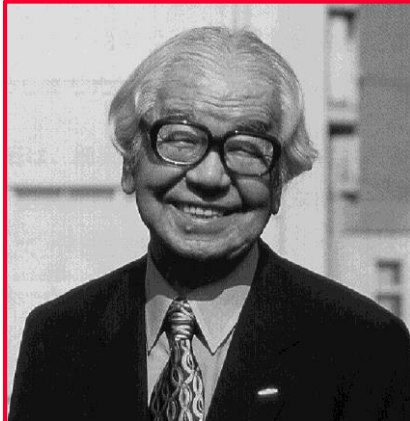
Our Figures

- Established in 1944
- Net sales 1,534,045 million JPY*
- Number of subsidiaries 90* (28 in Japan, 62 overseas)
- Employees 74,109*

**as of March 31, 2020*

**Murata Manufacturing Co., Ltd. is not included in the number of subsidiaries*

Murata Philosophy



Founder Akira Murata

社 是

技術を練磨し
科学的管理を实践し
独自の製品を供給して
文化の発展に貢献し
信用の蓄積につとめ
会社の発展と
協力者の共栄をばかり
これをよろこび
感謝する人びとと
ともに運営する

We contribute to the
advancement of society
by

Enhancing technologies and skills
Applying scientific approach
Creating innovative products and
solutions

Being trustworthy and,
together with all our stakeholders,
thankful for the increase in prosperity.

Murata's Value Creation Process

We continue to value Murata Philosophy, even in a changing business environment. Employees around the world sharing Murata Philosophy will create innovation and new value by trusting and cooperating with each other to demonstrate collective strength.

External environment

- Digitization of all types of objects
- The rise of IoT, AI and big data utilization
- Higher functioning and faster communication equipment
- Electric vehicles, ADAS (Advanced Driver Assistance System), and automated driving
- Enhancement of information security

Global social issues

- Climate change
- Resource depletion
- Human rights issues, etc.

Global social issues representing SDGs



Core Competences

MATERIALS TECHNOLOGY



We create new value by using our knowhow of ceramic, electrode and organic materials.

PRODUCTION TECHNOLOGY



Our production expertise has accumulated through in-house design and building of equipment and facilities to take full advantage of our materials technology.

LAYERING TECHNOLOGY



We are continuously refining layering processes to meet market demand for ever-thinner and smaller components.

RADIO FREQUENCY TECHNOLOGY



Murata's high-frequency filters and modules are part of many of today's and tomorrow's communication innovations. They contribute not only to data transfer but also to wireless charging.

Murata Technologies

Materials technology						
	Materials design	Materials processing				
Front-end process technology						
	Laminating & stacking	Printing	Sintering	Nano & thin film fabrication	Surface finishing	Precision mechanical processing
Product design technology						
	High frequency design	Device design	Embedded	High reliability design	Circuit design	Simulation
Back-end process technology						
	Packaging	Measurement	Automation	Industrial engineering		
Analytical technology						
	Materials characterization	Failure analysis				

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Highlights of our history

company



Murata established in 1944 in Kyoto by Akira Murata.

1940s

社是
技術を継承し
科学的管理を实践し
製品の品質を供給して
文化の発展に貢献し
信譽の基盤にのせて
会社の発展と
これよりこの
発展する人々と
ともに進歩する

Murata Philosophy Created.

Research Laboratory established.

1950s



Yokaichi plant established.

Murata listed on stock exchange.

1960s



Singapore and U.S. plants established.

1970s



Enlarging operations in Japan and expanding globally.

1980s



Established Wuxi plant in China.

1990s



New HQ in Nagaokakyo.

Birth of MURATA BOY and MURATA GIRL.

2000s



Birth of Murata Cheerleaders.

Sales of 1 trillion yen achieved.

2010s

Temperature compensating capacitors



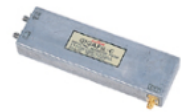
Ceramic filters



POSISTOR® for color TVs



GIGAFIL® for car phone systems



Chip multilayer ceramic capacitors (MLCCs)



SAW filters



Connectivity modules



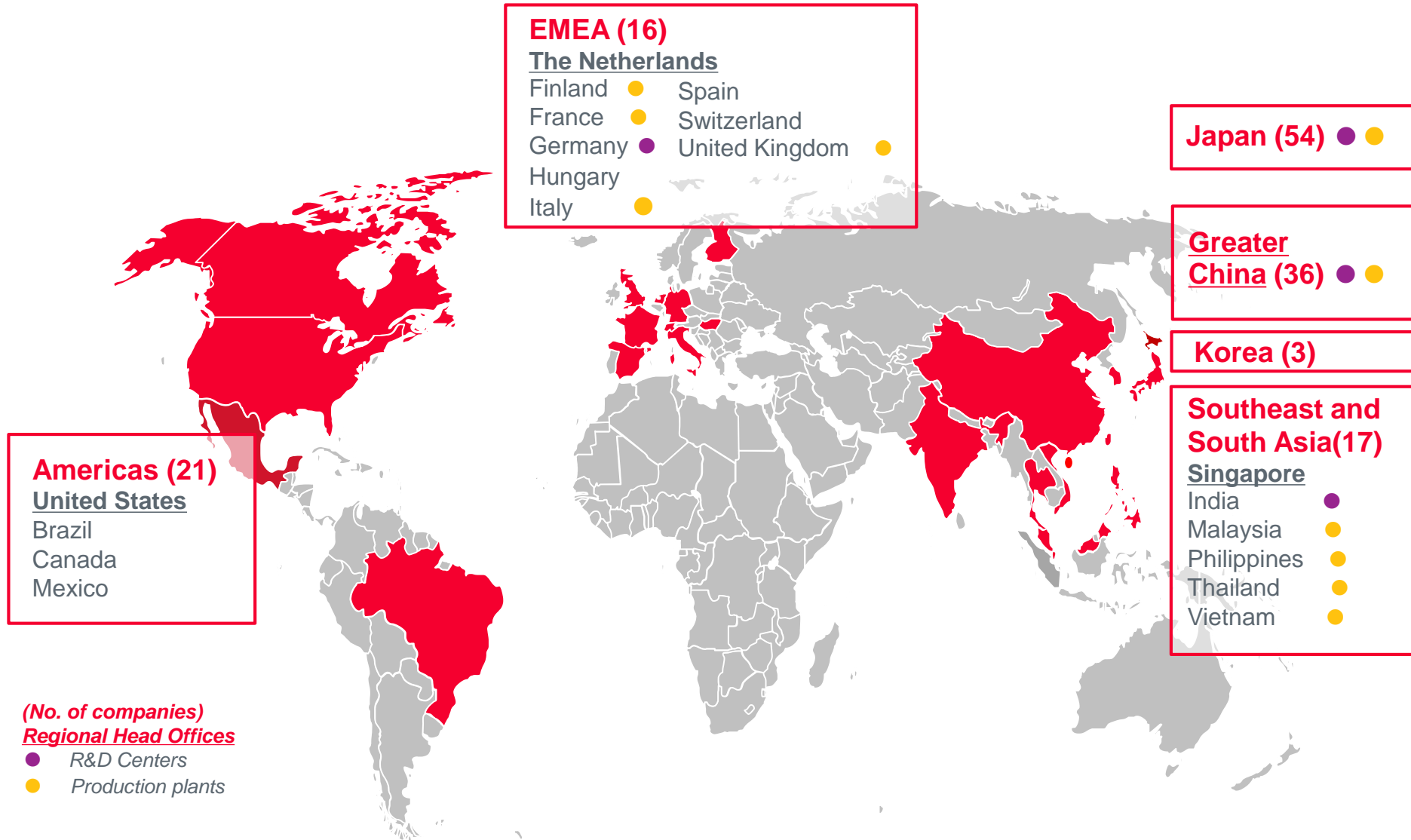
Combined gyroscopes/accelerometers

Power amplifier modules



innovations

Murata locations



Markets & Applications

Innovative electronics solutions

- from core electronics for smart phones, computers, audiovisual, and home appliances,
- to applications in automotive, energy, healthcare.

Increasing safety, quality of life and efficiency

COMMUNICATIONS



- Smart phones
- Smart watch
- Base station

COMPUTERS



- Laptop PCs
- Tablet PCs
- Printers

TV & VISUAL / HOME



- Flat-screen TVs
- Digital Still Cameras
- Refrigerators
- Air-conditioners

AUTOMOTIVE



- Safety systems
- Electric cars
- Infotainment

HEALTHCARE



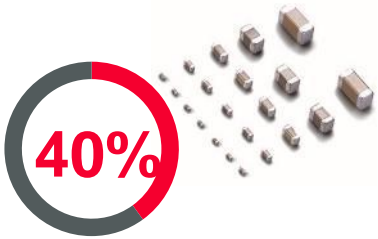
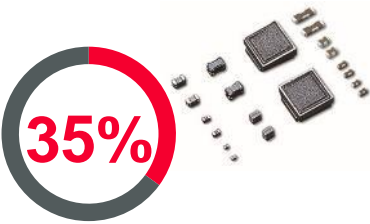
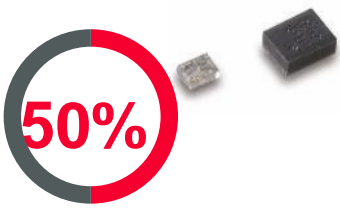
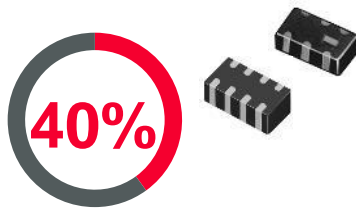

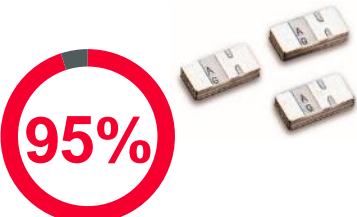

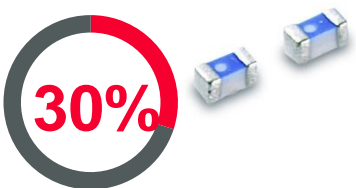
- Medical devices
- Biological Sensing

ENERGY









- HEMS
- BEMS

Global Market Shares*













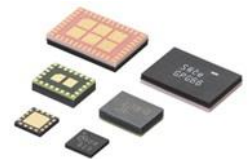



			
Chip multilayer ceramic capacitors	EMI suppression filters (EMIFIL®)	Surface acoustic wave filters	Multilayer LC filters (filters, couplers, baluns, etc.)
			
Micro Batteries "Silver Oxide Batteries"	Shock sensors	Ceramic resonators	High frequency inductors

*Global market shares based on Murata's presumption. Share changes according to market or application.

Typical Number of Components in Applications

Product category	Typical number of components in					
	Smart Phone 	Laptop 	Tablet 	Automotive 	TV 	Smart watch 
Chip multilayer ceramic capacitors	1000	800	600	3000-8000	600	200
EMI suppression filters (EMIFIL®)	100	60	90	200	50	30
Surface acoustic wave filters	4-70		4-70			
Connectivity modules	1	1	1	1	1	1
Shock sensors		1-3		4		
Ceramic resonators				15-20		
Chip inductors	300	30	200	300	30	30
Multilayer devices (Filter, Coupler, Balun, etc.)	2-14		2-7	2-8		2-3

Product Line-Up

			
Capacitor	Inductors	Noise Suppression Products / EMI Suppression Filters / ESD Protection Devices	SAW Filters
			
Thermistors (Temperature Sensors)	Sensors	Timing Devices (MEMS Resonator / Crystal Unit / Ceramic Resonator / Oscillator)	Quartz Devices
			
Connectors	Power Products	Batteries	RFID Products
			
Front End Module	Connectivity Modules	Balun	Coupler

Focus areas



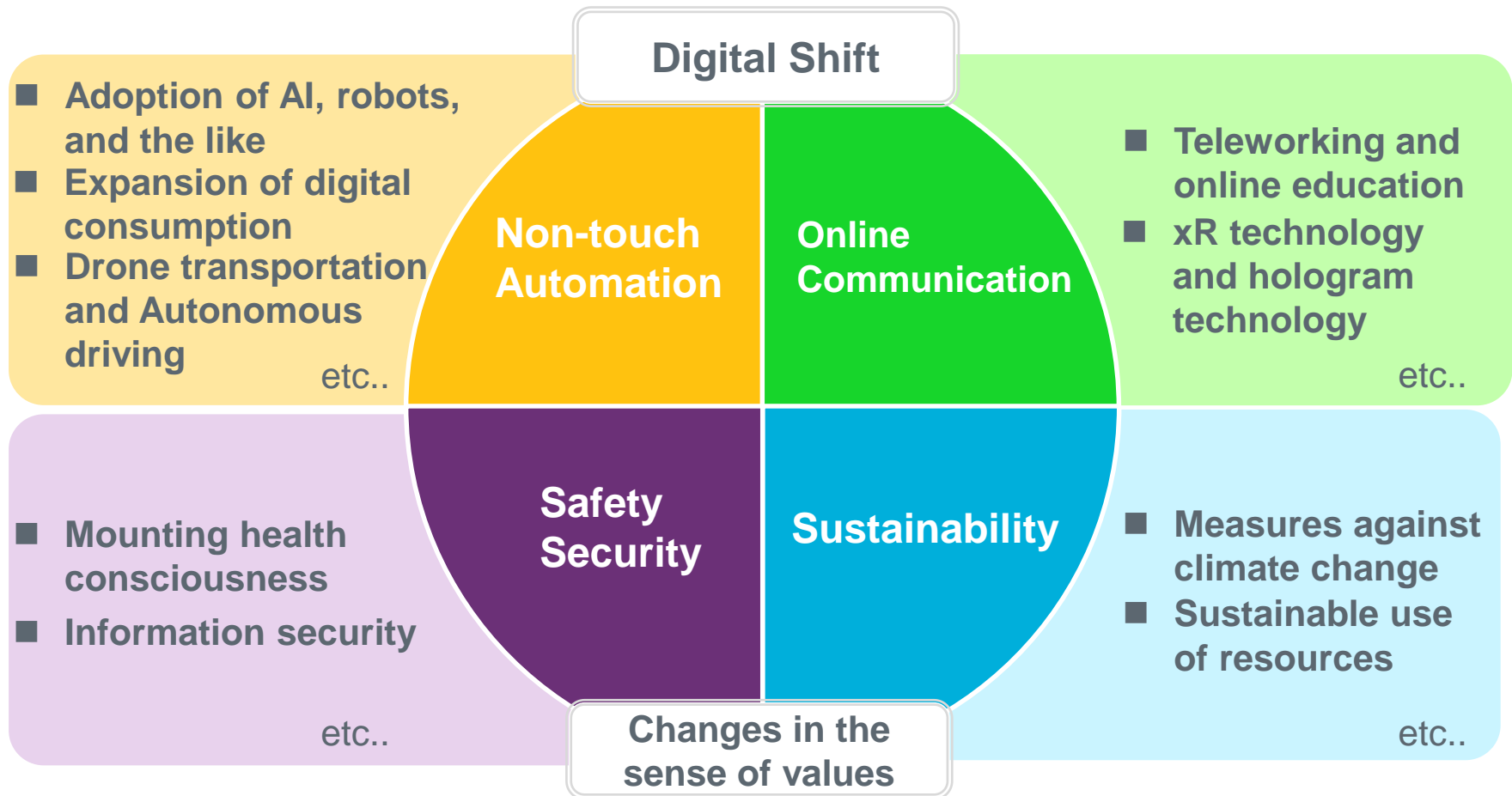
Market Environment

	Politics	Economy	Society	Technology
Opportunities / Risk	<p><u>COVID-19</u> Restrictions on economic activities. Implementation of government stimulus measures.</p> <p><u>ESG</u> Strengthening of environmental regulations</p> <p><u>Trade friction</u> Tensions between the US and China Rise of protectionism</p>	<p>Change in earnings environment by fluctuations in exchange rates</p> <p>Recovery period of the economy (Earlier than expected or Delayed)</p>	<p>Realization of a sustainable society (SDGs)</p> <p>Progress of digital transformation</p> <p>Change in lifestyles</p>	<p>Digital technology innovation (5G/AI)</p> <p>Automobiles become more electrification and autonomous driving</p>
			<p>Restrictions on activities by a new lockdown</p>	<p>Delay in technological innovation by geopolitical risk</p>

- 5G and automotive technological innovation remain unchanged. COVID-19 has changed society significantly.
- Business management from a long-term perspective through a big-picture approach to an evolving society.

Market Environment

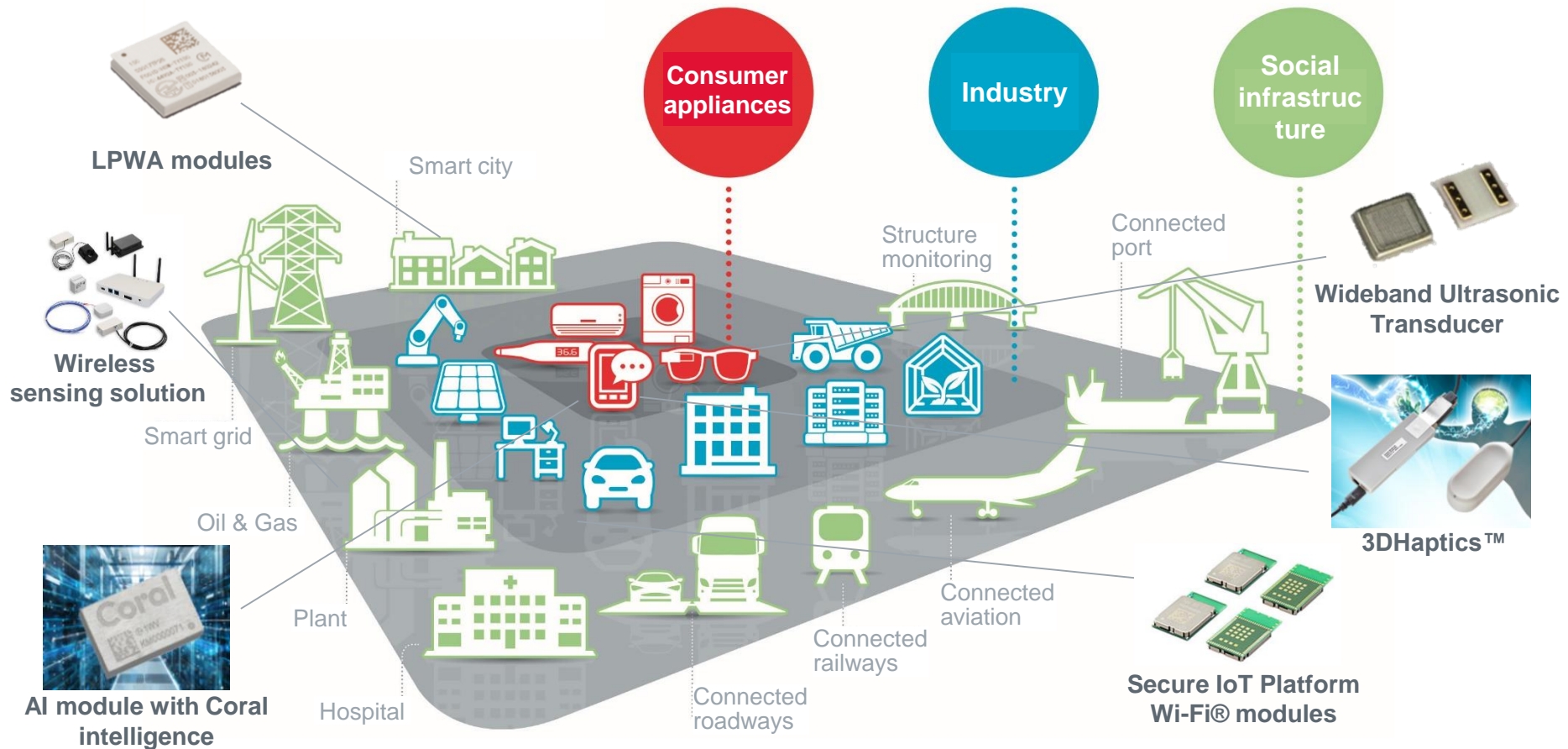
Social Change caused by COVID-19



- Demand for electronic equipment grows as COVID-19 accelerates a digital shift.
- Innovation brought by social change is a business opportunity.

Communication Market (1/4)

Expanding boundaries of electronics

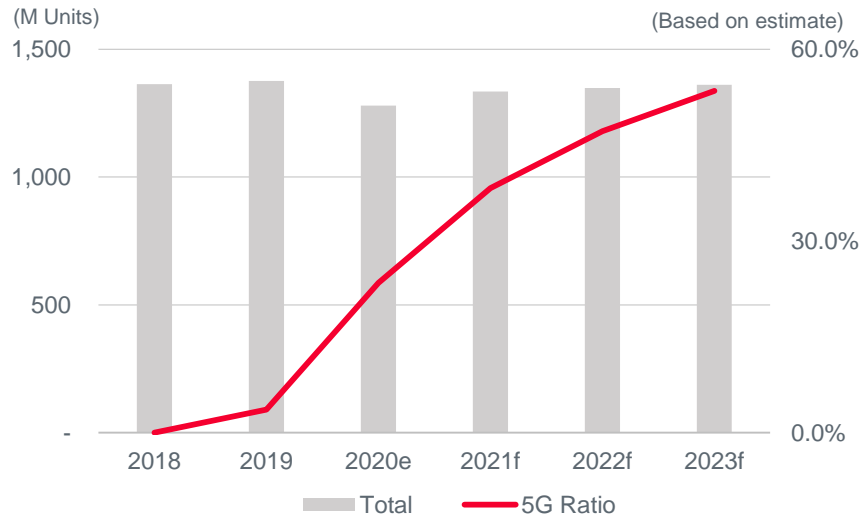


- Diverse needs created by 5G technology.
- Provide value to the expanding electronics market as an “Innovator”.

Communication Market (2/4) Market Forecast

Smartphone quantity forecast

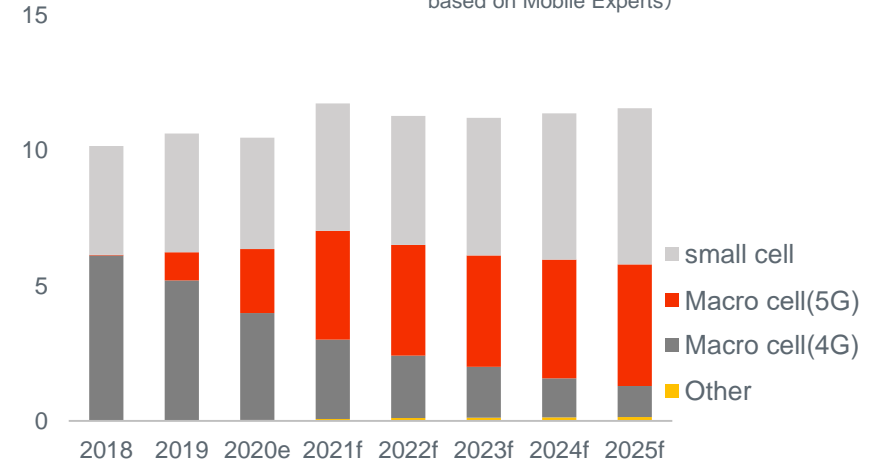
The ratio of 5G smartphones will rise, whereas growth in the total number of smartphones will slow down.



Base station quantity forecast

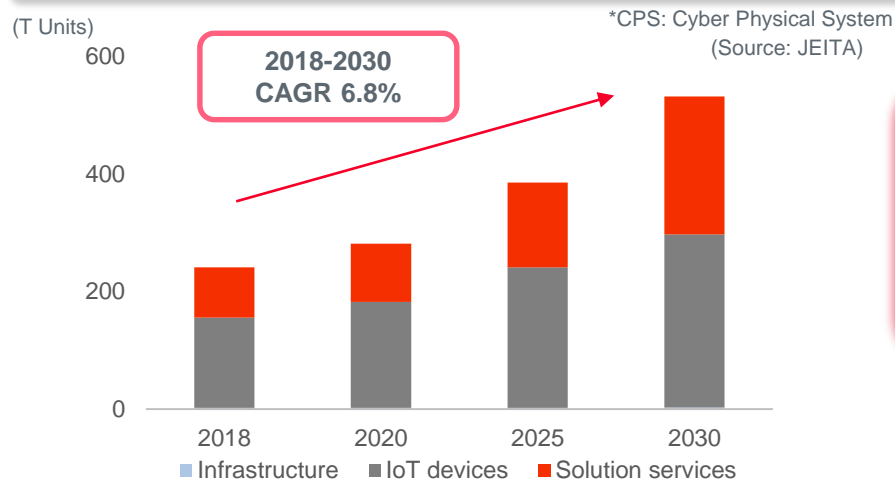
5G-compatible base stations keep increasing.

(M Units) (Source: Estimated by the Company based on Mobile Experts)



*In macrocells, the number of RRUs is totaled.

Global demand forecast by category in the CPS/IoT market



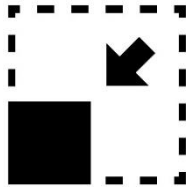
Global demand in the CPS/IoT market will grow year after year.
5G-compatible IoT devices and solution services will drive the demand.

Communication Market (3/4)

Technological Trends (for mobile devices)

Technological issues with 5G-compatible mobile devices

Downsizing of
devices



Demands for high-density mounting
Demands for smaller components



Increase in energy
consumption



Increase in energy consumption because of higher frequency and higher functionality



Thermal
problems



Increase in heat generation because of higher amounts of information processed



Requirements of components and modules

Small size

Low loss
characteristics

Low electricity
consumption

Guarantee
against high
temperatures

- Technological issues need to be solved on the level of components for the wide spread of 5G-compatible mobile devices.
- Beat the competition with responsiveness to customers, technological clout, and product appeal.

Communication Market (4/4)

Technological Trends (IoT Business)

Technologies necessary for IoT business

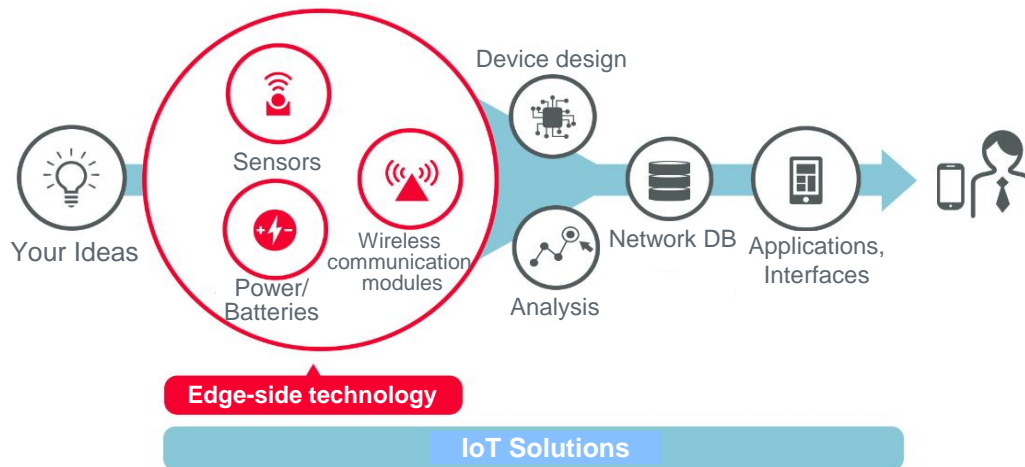
“Collect and connect data”

Sensing
technology

Wireless
communication
technology

Detect information accurately

Transmit information to the cloud



Murata's Strengths

Lineups of high performing and high-quality products

Knowledge of wireless communication technology

Total solutions by fusing components and module, software

Create a business that can be made possible only by Murata, based on knowhow of technology development of electronic components.

Automotive Market (1/4)

Future vision of automobiles

- High penetration of eco-friendly vehicles including EV and HV.
- Emergence of fully autonomous vehicles with a variety of sensors monitoring the situation seamlessly and AI making decisions.
- Emergence of diverse content and services through an automotive shift to IoT.

Infotainment



MLCC



EMI suppression
filters



V2X modules



Wi-Fi® modules



Common Mode
Choke Coil

etc..

Powertrain



MLCC



Film capacitors



Power inductors

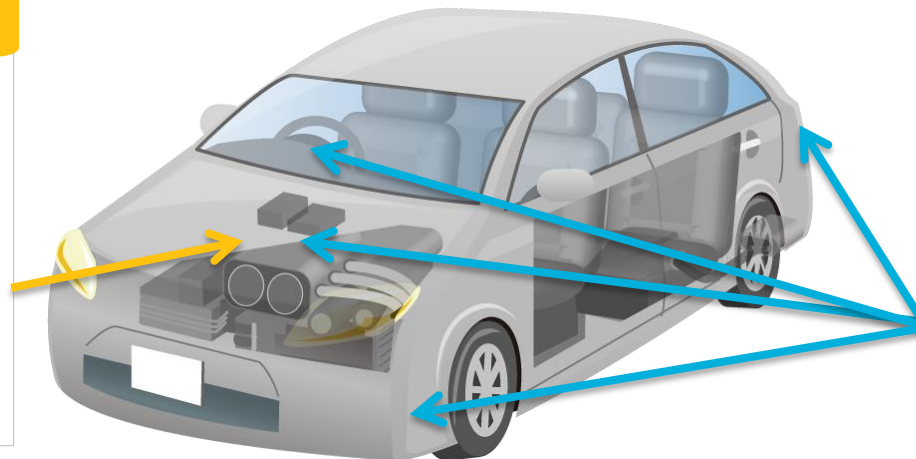


Thermistors



Ceramic Resonators

etc..



ADAS · Safety



MLCC



Silicon capacitors



MEMS sensors



Ultrasonic sensors



Timing devices

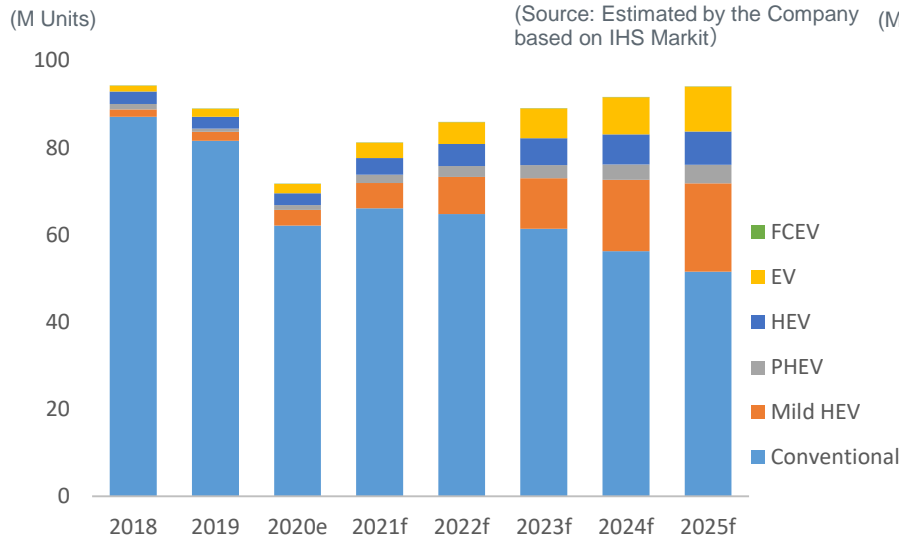
etc..

- Demand for electronic components will increase as automobiles become more electrification and autonomous driving.
- New demand is expected for communication modules, sensors, and other components.

Automotive Market (2/4) Market Forecast

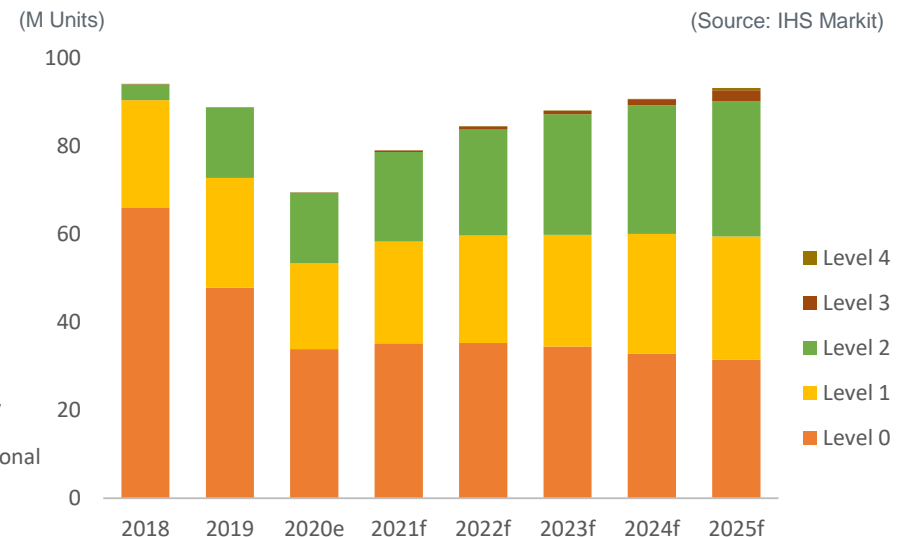
Expected quantity by powertrain

Electrification will be accelerated by stricter environmental regulations in countries around the world.



Expected quantity by autonomous driving level

Autonomous driving will become popular toward the realization of safe and comfortable transportation.



Understanding market and technology trends

Vehicle disassembly: Component demand, design concept
Driving evaluation: Required technology and level



- Feedback to R&D
- Improved demand forecast accuracy
- Enhanced proposal ability for customers

(By our research) (pcs)	Conventional vehicles Autonomous driving Lv0	HEV Lv2	EV Lv3
Capacitors	3,000	Min. 6,000	Min.10,000
Inductors	300	Min. 600	Min. 600

Automotive Market (3/4) Technological Trend

Technologies required of automotive components

Quality and reliability that
can withstand tough environments!

High
temperature
guaranteed

High heat
dissipation

High
humidity
guaranteed

<<Environment specific to vehicles>>
High temperature and
high humidity
Use of higher-power
electronic circuits

High
voltage
compatible

Measures
against risk
of short
circuit

Long-term
reliability

Murata's Strengths

Technological capability to create
highly reliable and high
performing products

Broad range of product lineups

Supply capacity to mass-produce
products with uniform quality

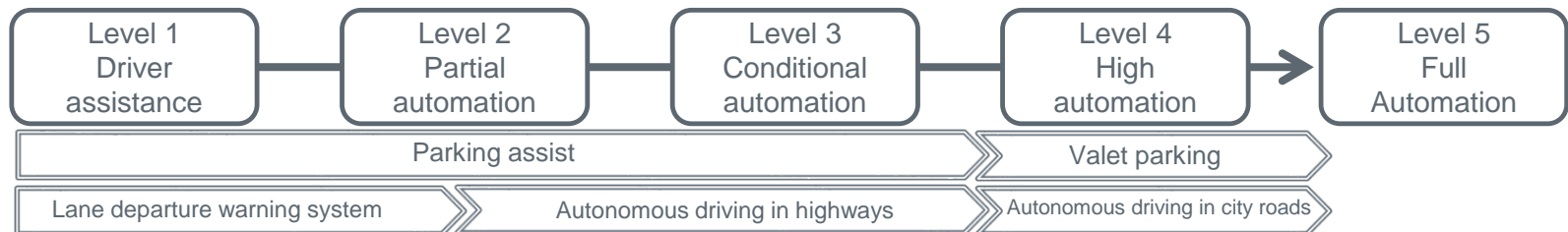


- Demonstrate competitive superiority in fields that demand high quality and reliability.
- Make advance development and anticipatory investment, step by step, with an eye on future growth markets.

Automotive Market (4/4)

Advance of Autonomous Driving Technology and Sensor Technology

Autonomous driving system



Necessary positioning error tolerance

~1m (within 10 seconds)	~0.3m (within 15 seconds)	~0.2m (within a few minutes)	< 0.2m (constantly)
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- Accelerometer/
Gyroscope sensor



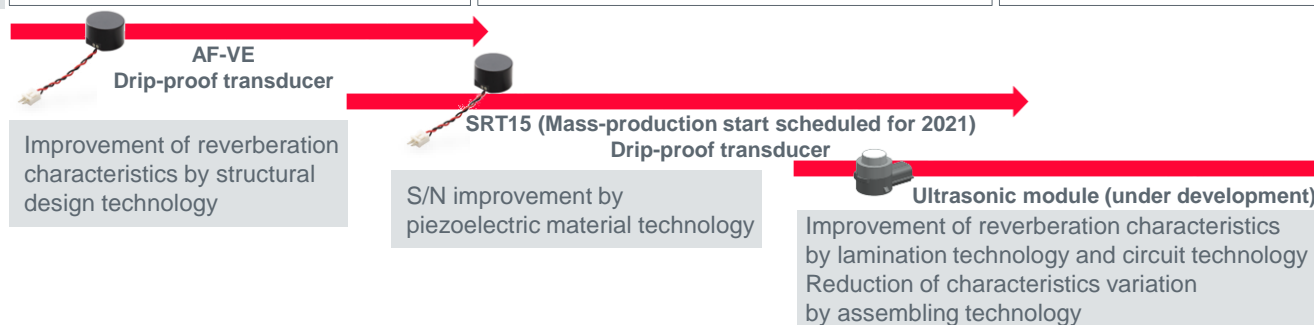
Core technologies

Noise reduction, improved anti-vibration characteristics and improved temperature characteristics realized with Murata's unique 3D-MEMS design/processing technology and gyro driving/sensing principle.

Required distance performance

20cm~4m	15cm~5.5m	10cm~7m
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- Ultrasonic sensor



The more advanced autonomous driving technology becomes, the higher sensor technology are required.

Product Strategy Three Portfolios

Solutions business
including software services.

Application-specific business
Customization is needed in products, such as modules, filters, sensors, MetroCirc and batteries.

Components business
Centering on standard products, such as capacitors, inductors, and electromagnetic interference (EMI) suppression filters.

Keys to Business Success

- Building of a business model that complies with cooperation with customers
- Creation of definite value and establishment of a monetization model

- Technology that differentiates Murata from competitors
- Realization of demands from customers to become the market leader
- Mass-customization by standardization of processes and materials

- Evolution of core technology
- Continuous technological innovation
- Supply capacity that realizes high cost competitiveness

Product Strategy - Capacitors

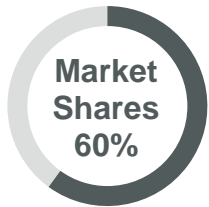
Communication Market



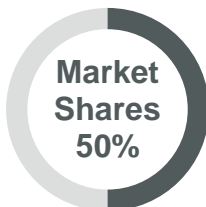
Automotive Market



0402M size



0603M size



0402M size / 1.0 μ F



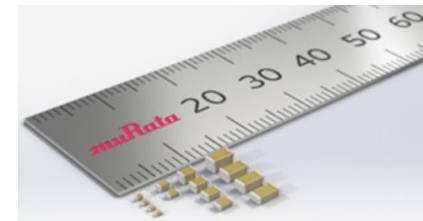
Realized large-capacitance products about 2.1 times higher than Murata's conventional ones of the same size

Small size and high capacitance

High reliability

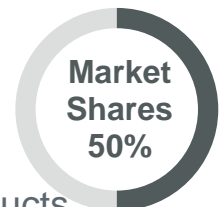
Technological capability
Supply power
Quality

High capacitance products for automotive use



Industry's highest level of capacitance for automotive use
3216M size / 47 μ F
3225M size / 100 μ F

Automotive Market



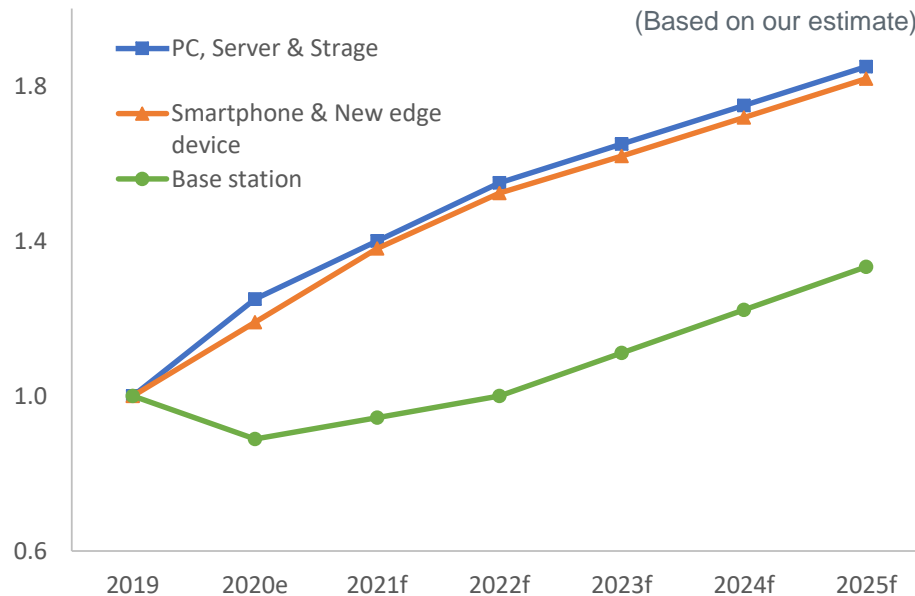
Further grow in the communication market and automotive market by leveraging competitive superiority.

Product Strategy - Capacitors

Communication Market

Expected number of Consumer MLCCs demanded

Demanded quantities will increase year after year as 5G becomes popular.



Usage quantity of MLCC for smartphones

Usage quantity will grow by 10 to 20% by making products compatible with 5G.

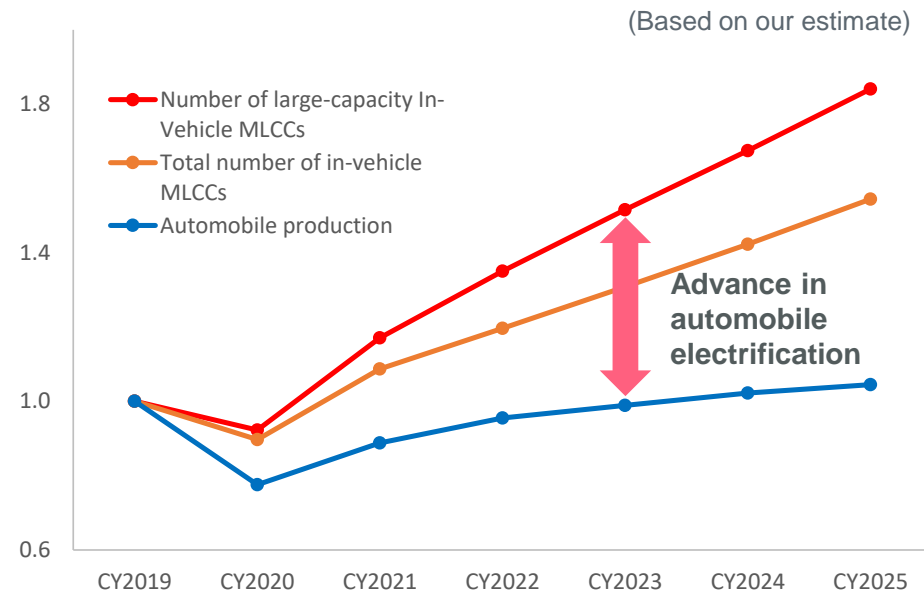
(pcs)

(By our research)	Low-end	Middle-range	High-end
Smartphone	400 ~500	700 ~800	900 ~1100

Automotive Market

In-vehicle MLCC market forecast (quantity basis)

Trend of automotive electrification remains unchanged.
Large-capacity components are increasing especially rapidly.



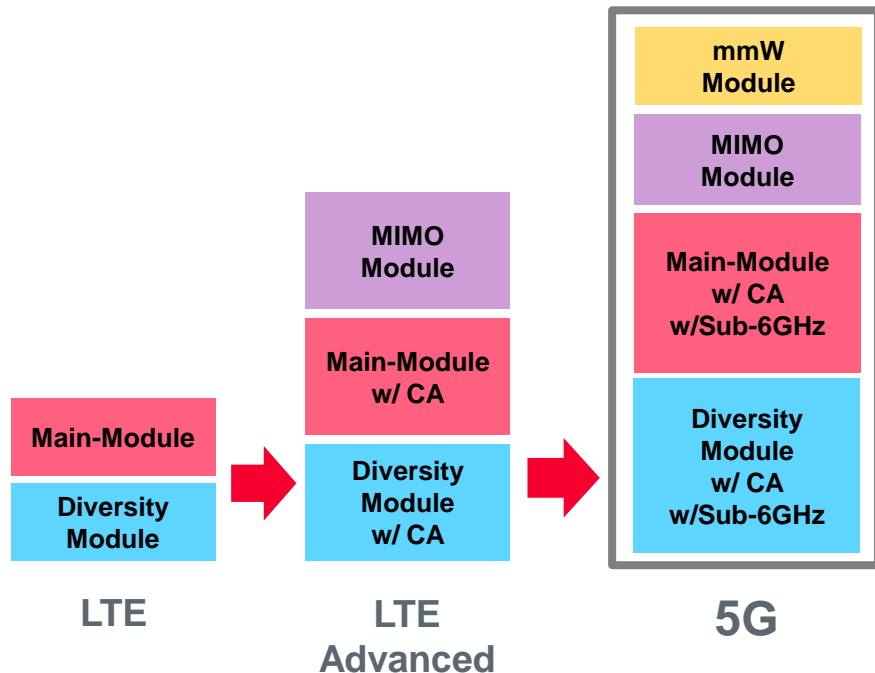
Number of in-vehicle MLCCs used

(pcs)

(By our research)	GAS	HV	PHEV	BEV
Powertrain	300~500	1,000~1,600	1,500~2,000	2,000~2,500
ADAS	2,000~3,000			
Safety	300~1,000			
Infotainment	500~2,500			
Other	500~2,500			

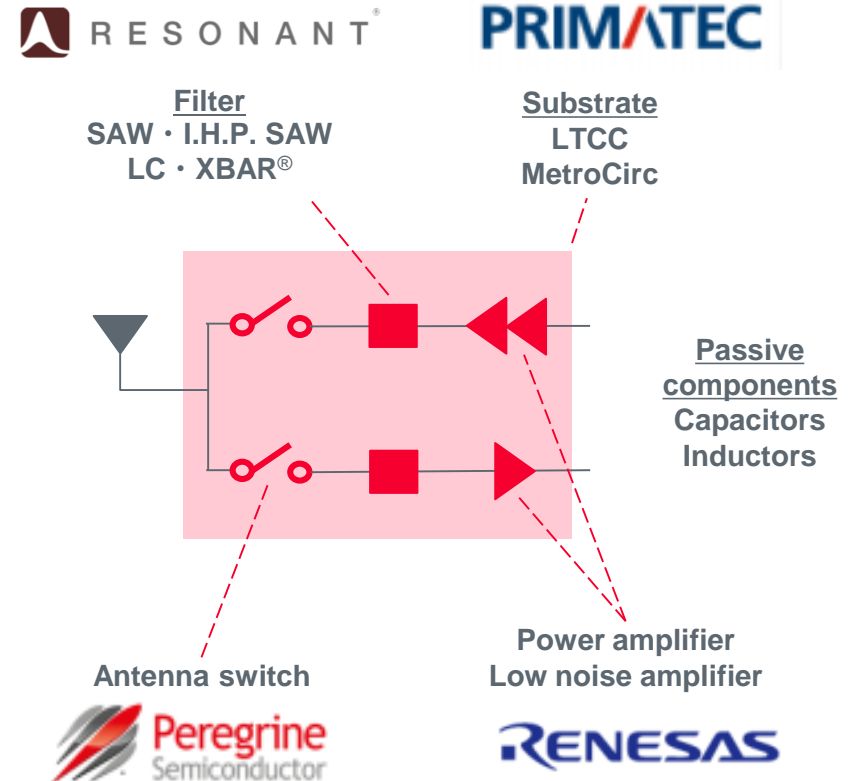
Product Strategy - RF modules

Technological trends for modules



Modulization will advance in mid-class terminals as well along with the addition of 5G-compatible modules

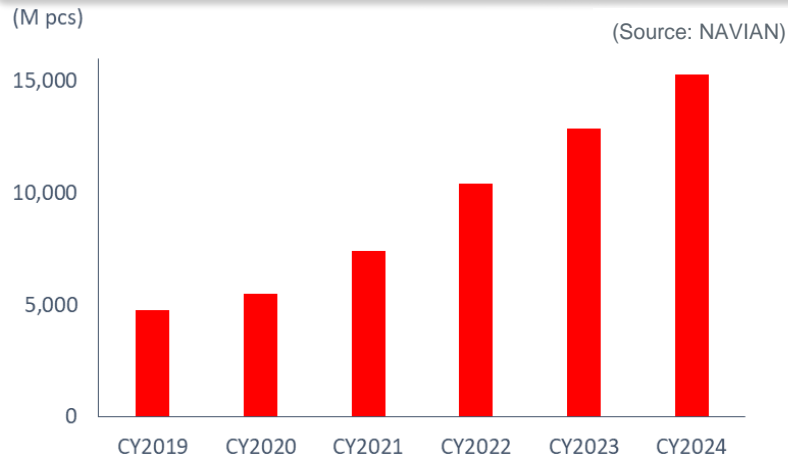
Key parts of modules



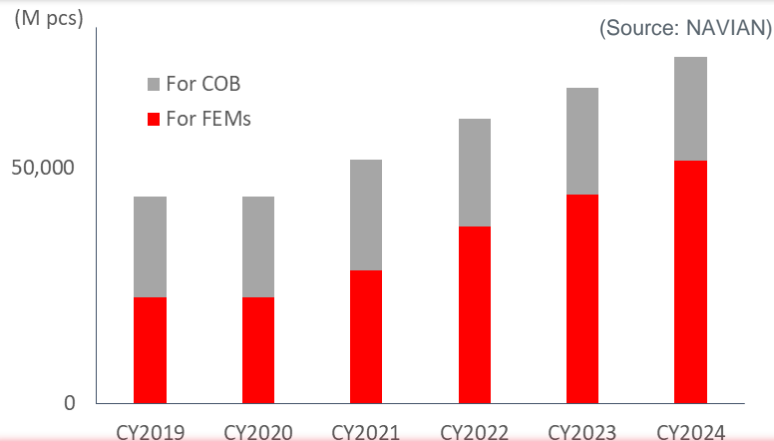
- Increase in 5G smartphones will accelerate modulization.
- Component lineups, which were strengthened by M&A, will be optimized for modules.

Product Strategy - Filters

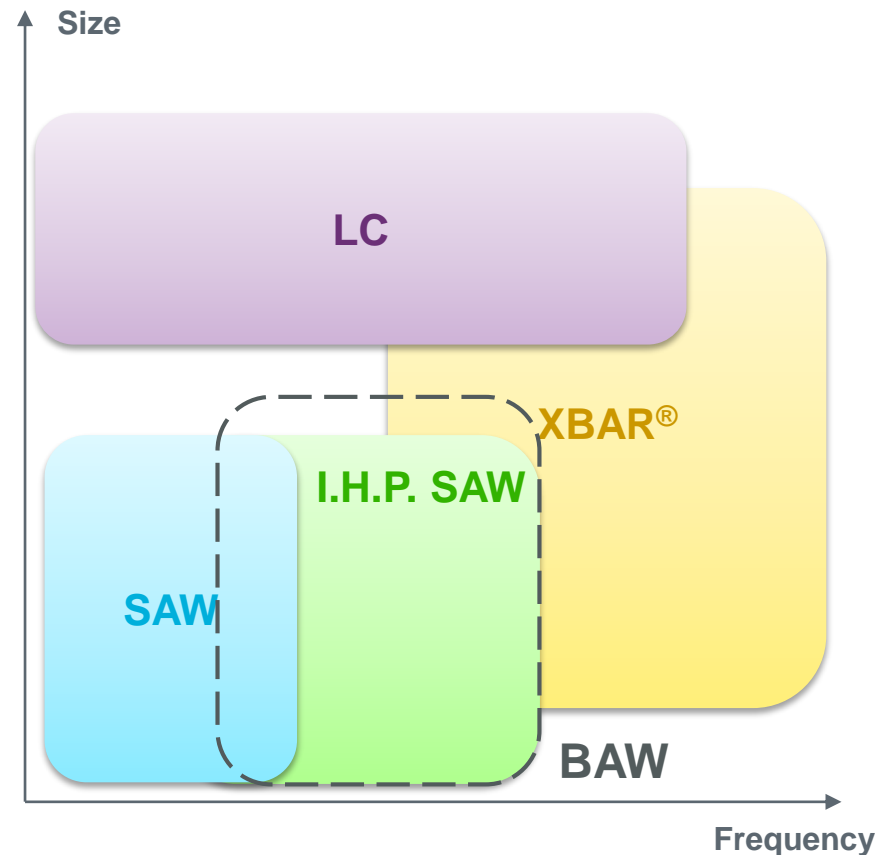
Market forecast of front-end modules



Market forecast of filters



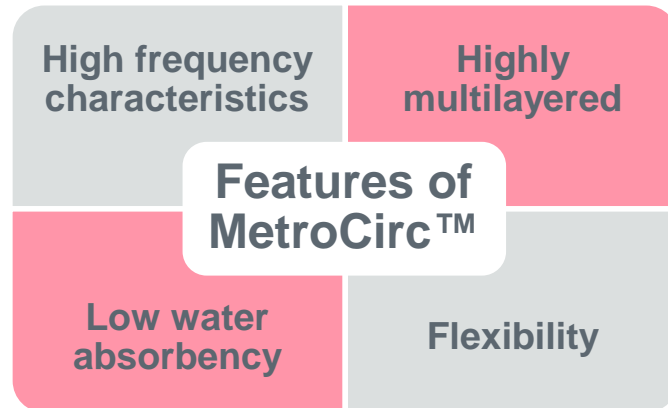
High Frequency and Size Trends



- 5G will expand demand for modules and filters.
- Line-ups and characteristics (high frequency/broadband/steepness/low attenuation/small size, etc.) will become important.

Product Strategy - MetroCirc™

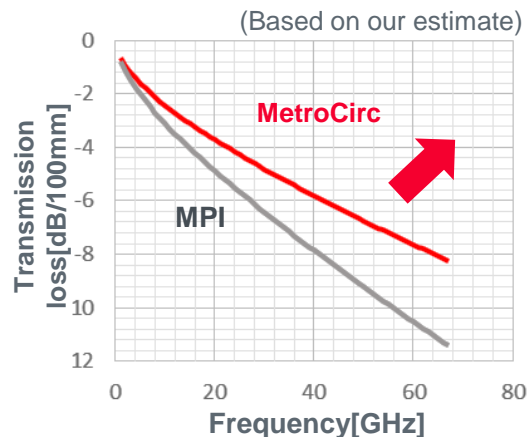
Features of MetroCirc™



MetroCirc™ sales expansion strategy



High frequency characteristics of MetroCirc™



Superior characteristics in the millimeter wave band differentiates MetroCirc™ from competing products.

Market expansion

- Develop new customers based on existing applications
- Develop new applications with 5G as a keyword

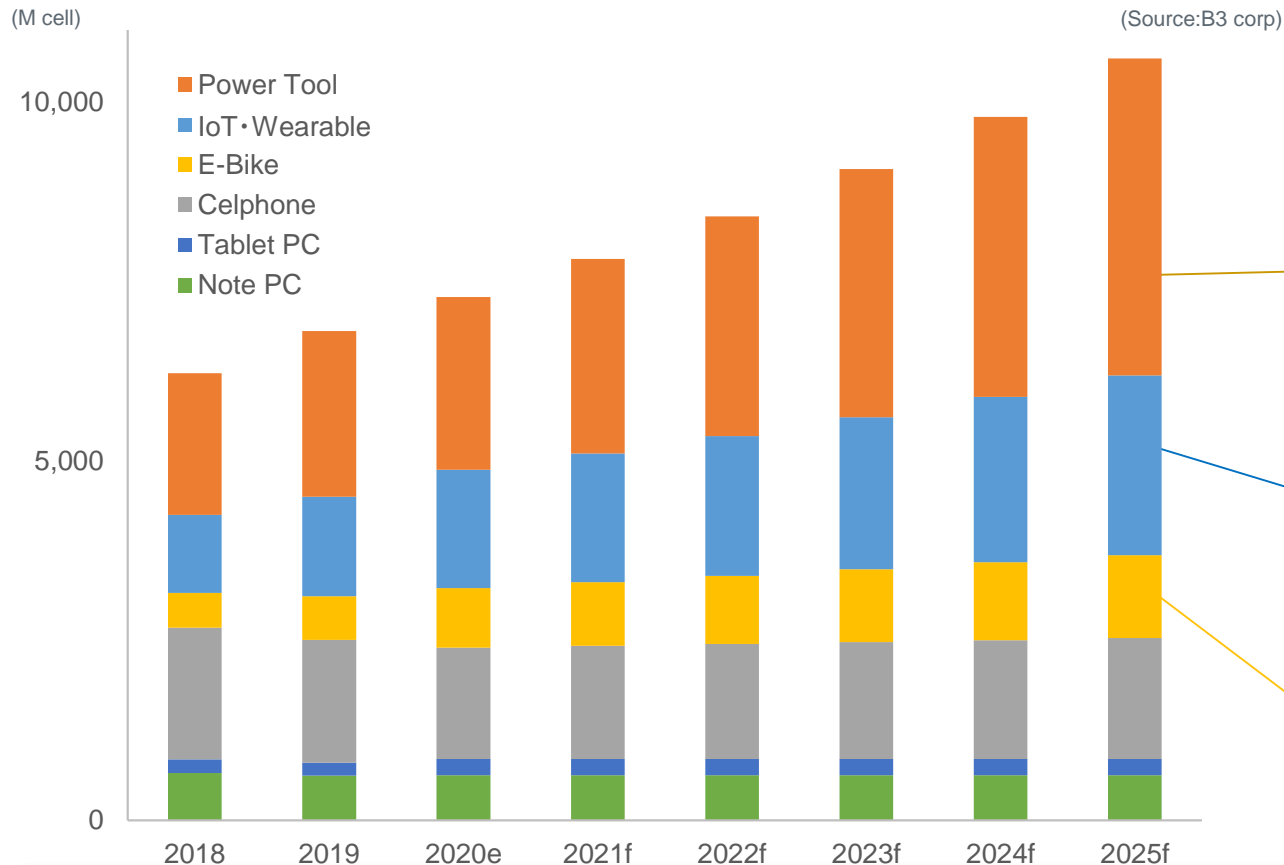
Strengthen collaboration with other businesses

Develop modules using MetroCirc™ as the substrate

- Utilize high frequency characteristics and flexibility in millimeter-wave modules and transmission lines.
- Capable of making proposals that can reduce the number of modules and that can enhance design freedom.

Product Strategy - Battery

Market Forecast for Consumer Lithium Ion Batteries



- The battery market will keep growing as power sources are replaced, and the use of 5G and IoT become popular.
- Diminish business for smartphones and apply selection and concentration to power tools and small batteries that are expected to grow.

Product Strategy - Battery

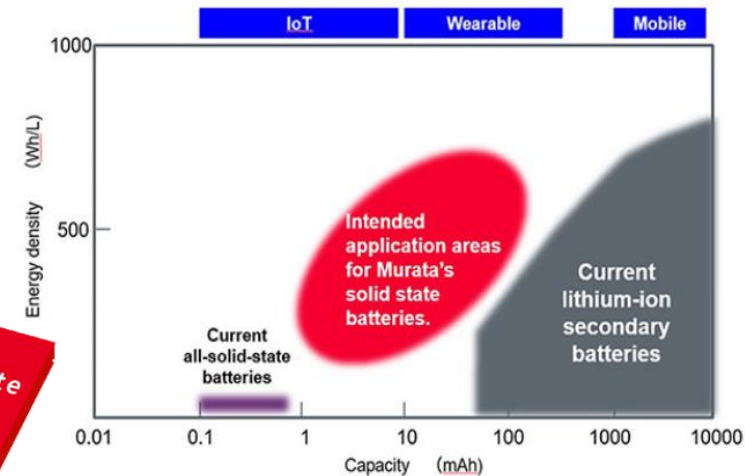
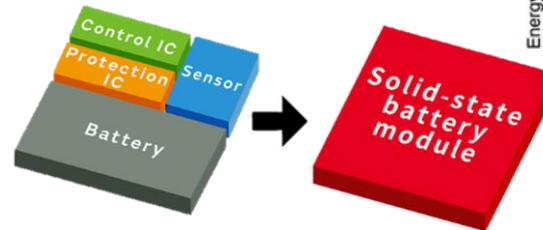
Competitive Superiority for Sales Growth

Power tools

- High output technology with product quality
- Shock-absorbing packaging technology

Small batteries

- All-solid-state batteries with high capacitance
- Small packaging technology

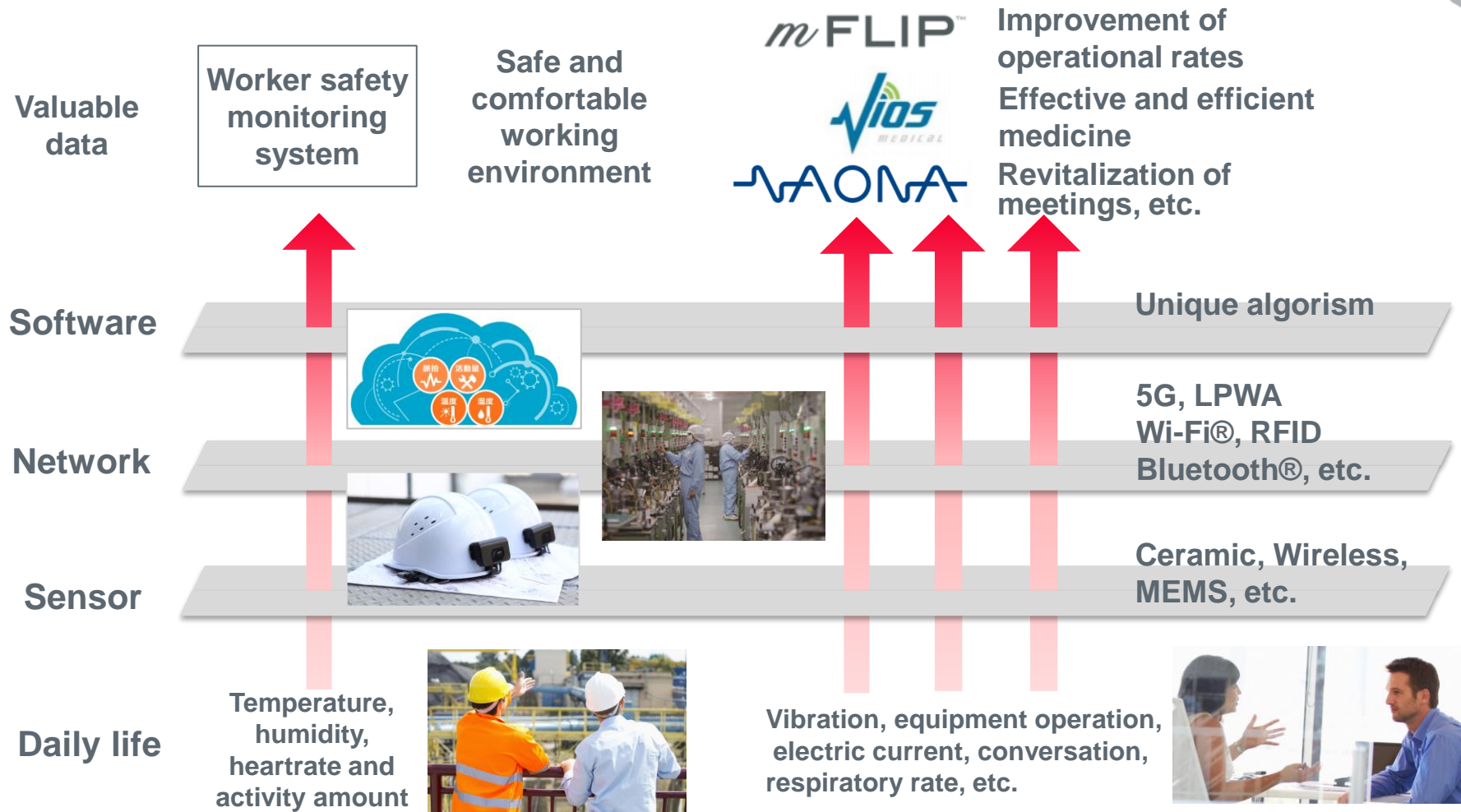


Reform of Cost Structure

- Enhancement of indirect productivity through optimization of logistics and production, and systemization of supply chains
- Portfolio management and companywide reallocation of resources
 - Consolidation of production bases
 - Diminish business of batteries for smartphones with low profitability
 - Make continuous efforts to optimize production and overhaul fixed costs

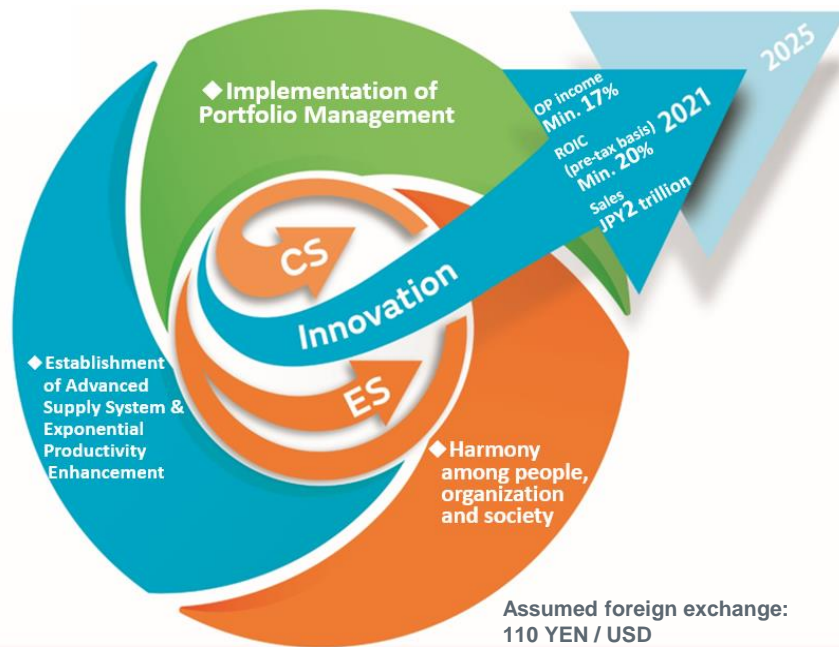
- Reform is underway in order to turn profitable in FY2021.
- Utilize and establish competitive superiority in growth markets.

Product Strategy – IoT solution



Create valuable data from everyday life through unique sensors, networks and software.

Progress in Midterm Direction 2021



	FY2019	FY2021
Sales target (JPY)	1,534 billion	2 trillion
Operating income ratio	16.5%	Min.17%
ROIC(pre-tax basis)	16.1%	Min.20%

Implementation of Portfolio Management

Adoption of a business evaluation model

Establishment of Advanced Supply System & Exponential Productivity Enhancement

Efficiency improvement in manufacturing capability (monozukuri) by methods such as active utilization of IoT.

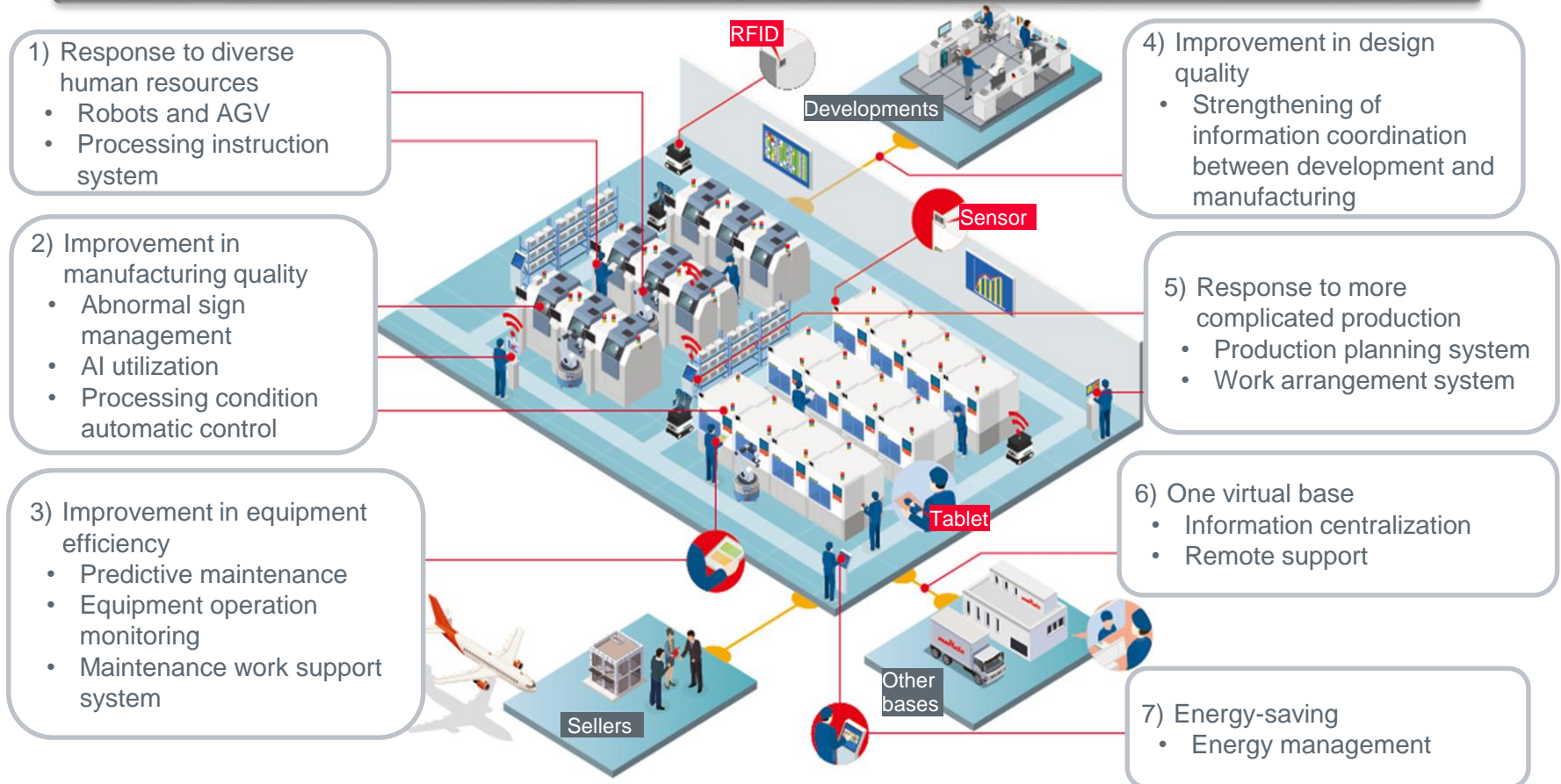
Harmony among people, organization and society

- Setting target values for key issues(materiality)
- Implementation of global surveys of employees

- Economic slowdown is a risk to achieving sales target on time.
- Make continuous efforts to enhance the operating income ratio and ROIC.
- Three company-wide issues for maintaining healthy growth have been addressed without fail.

Mid-term Direction 2021 Strengthening Monozukuri capabilities

Efforts for Smart Factories



Aim at improving direct labor productivity and equipment productivity through “Connectivity and Automation”!

Mid-term Direction 2021 Key issues (Materialities)

Resolution of social issues through business (opportunities)



Key issues

- Highly efficient components that contribute to strengthening climate change measures
- Miniaturized components that promote resource circulation

target

- To explore business opportunities based on social issues.
- To quantify the non-financial value of light, compact and high efficient products.

Initiatives for social issues in business processes (risks)

Identify key issues (Materialities) and reflect them in business management.

Environmental



Key issues

- Strengthening climate change measures
- Resource circulation
- Prevention of pollution and management of chemical substances

target

- To reduce greenhouse gas emissions
- To improve waste emissions

Social



Key issues

- Safe and secure workplace and health and productivity management
- Respect for human rights and diversity
- Coexistence with local communities

target

- Not to cause serious industrial accidents
- To operate human rights and labor management systems

Governance



Key issues

- Fair business transactions
- Information security
- Business continuity management (BCM)

target

- To spread the concept of information security
- To achieve a situation where the PDCA cycles for risk management

ESG Initiatives

Environment

Response to TCFD



- Announced support on February 7, 2020
- Disclose information in “Murata value report 2020”

Adoption of renewable energy



- Installed one of Japan’s largest parking-lot-based mega solar systems
- Plan to reduce 1,698 tons of CO2 per annum

Promotion of utilization of storage battery systems



- Hybrid power conditioner with built-in storage batteries
- One unit is capable of handling “Selling of surplus electricity from solar power generation,” “Saving of purchased electricity using storage batteries,” and “Electricity supply in an emergency.”

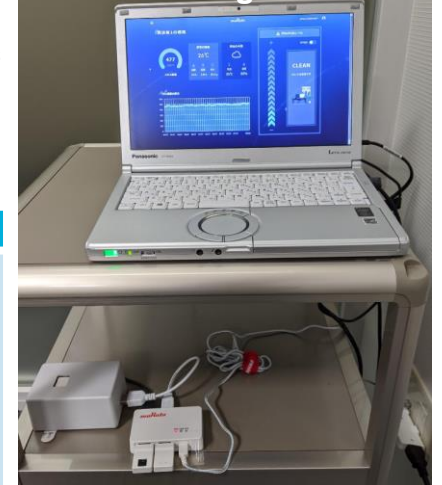
Response to COVID-19

Murata has put in place the following initiatives in order to safeguard the health and safety of employees as its top priority. Furthermore, Murata is running operations responsibly and continuously to avoid delays in supplies of components used for equipment that a great number of people need in society at the moment, such as ventilators and other medical equipment, PC-related devices necessary for teleworking, and essential appliances for comfortable home life.

■ Examples of Efforts

Hard measures	Soft measures
<ul style="list-style-type: none"> • Encouragement of teleworking • Change in office layout to avoid the 3Cs (Closed spaces, Crowded places, and Close contact) • Behavior tracing in the company cafeteria • Make comfortable meeting rooms with the Murata product “Co2 measuring instrument.” 	<ul style="list-style-type: none"> • Published a knowhow booklet that facilitates teleworking in healthy manners • Support new employees • Published a booklet that collects practical tips for communication, labor management, etc., to be made under emergency conditions (For managers)

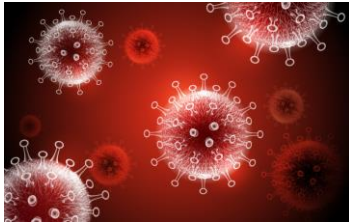
Co2 measuring instrument



Financial Strategy

Risks

COVID-19 and US-China friction



Growth Opportunities

Communication market and Automotive market



Strong financial foundation

- Secure credit lines from financial institutions
- Diversify funding methods by issuing bonds
- Cash reserves on an appropriate level
 - Operate with a cash reserves turnover of 2.5 to 3.5 months as the guideline

Business operation with risk taken

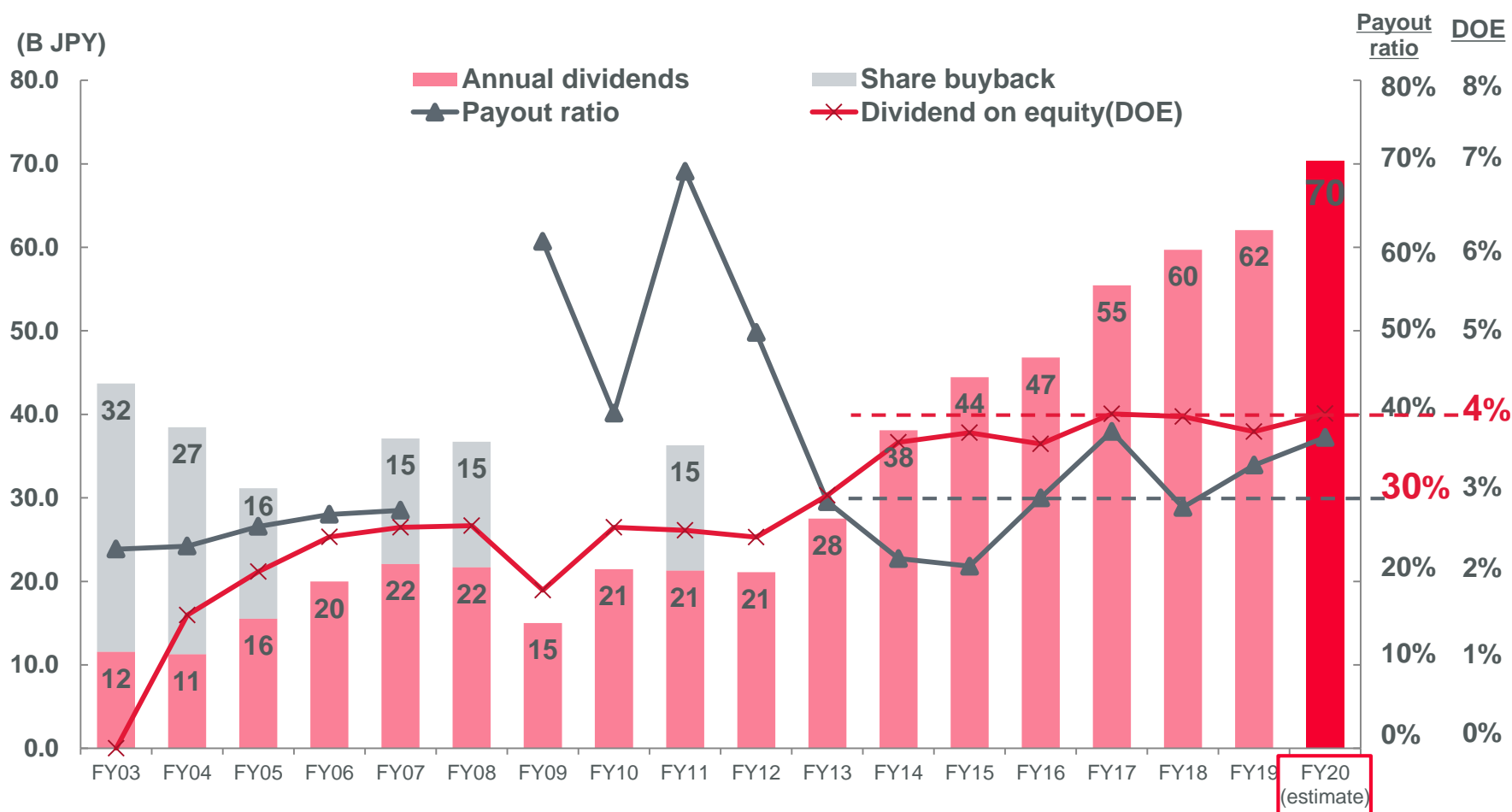
- Allocate resources from the perspectives of ROIC and growth
 - Priority investment in the communication and automotive markets
 - Diminution of business of batteries for smartphones and low-end modules
- Investment decision that reflects capital costs, and business evaluation
 - Collection period and investment profit ratio

Growth and profit distribution

- Midterm Direction 2021
 - Net sales of JPY 2 trillion, operating income ratio of 17% or more and ROIC of 20% or more (before tax)
- Stable increase in dividends
 - DOE of 4% or more with a medium-term payout ratio of about 30% as the guideline
- Share buyback at appropriate time

Return to Shareholders

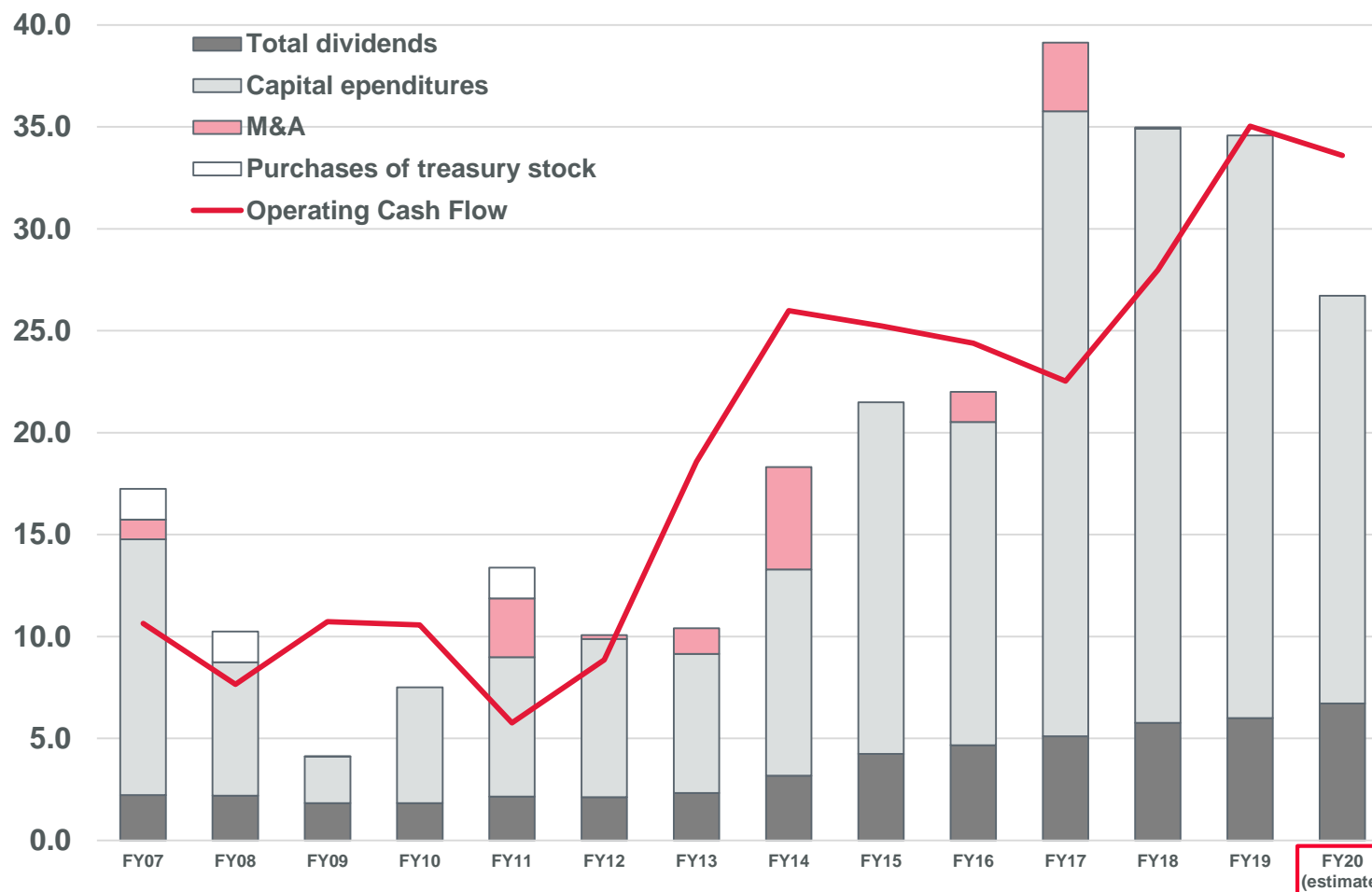
- **Dividend** In order to further implement our basic policy of striving for a stable increase in dividends, we have adopted DOE (Dividend on equity ratio) as our shareholder return indicator. From FY2020, we aim to achieve DOE of 4% or higher over the medium term with reference to dividend payout ratio of approximately 30%.
- **Share buyback** As a means of returning profits to shareholders, we have been buybacking shares in a timely manner to improve capital efficiency.



Cash Flows

- In FY2019, we issued corporate bonds to raise funds and invested in capital expenditures in anticipation of higher demand for electronic components in the automotive and communication market.
- In FY2020, we will decrease capital expenditures; operating cash inflow is expected to start exceeding cash outflow from capital expenditures and dividends.

(B JPY)



ESG index and Evaluations from External Organizations

Status of adoption in ESG index



2020 CONSTITUENT MSCI JAPAN
EMPOWERING WOMEN INDEX (WIN)

2020 CONSTITUENT MSCI JAPAN
ESG SELECT LEADERS INDEX



FTSE4Good



FTSE Blossom
Japan



Sense in
sustainability

Evaluations from/activities with external organizations



This report 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 report.

Thank you

