

Information Meeting 2015



<http://www.murata.com/en-global/about/ir/library>

Core market (wireless communication market)

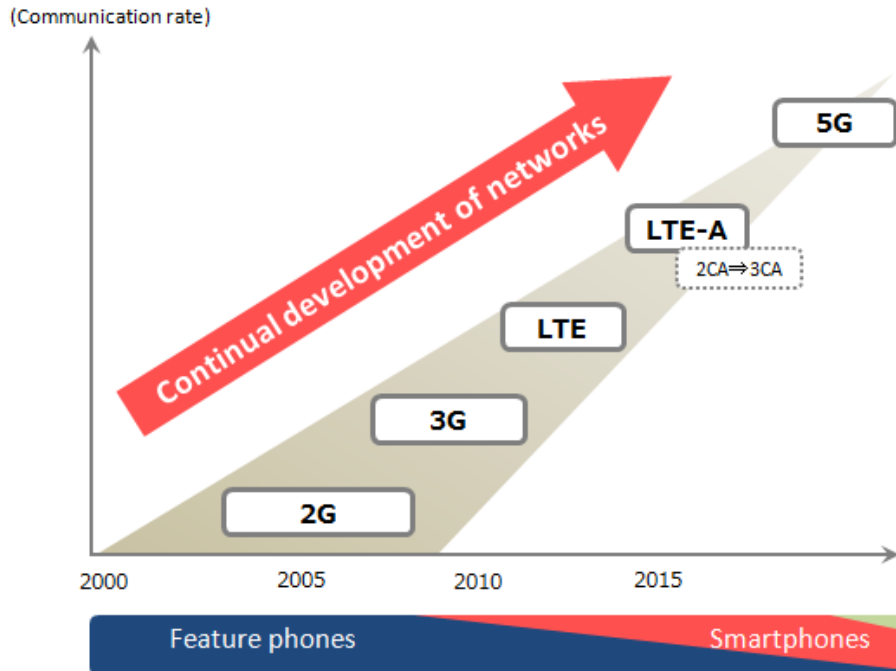
- An increasing use of digitalized information will continually accelerate world demand for electronic equipment.
- Wireless communication devices will be more functionally sophisticated and integrate more functions, increasing demand for electronic components.
- To increase its market shares for higher sales, Murata will introduce high-value-added new products and establish an on-demand supply structure.

Priority markets

- Murata will focus on launching and expanding business operations by promoting its unique strengths in not only the already successful automotive applications, but also in future growth markets such as health/medical care and energy.
- In the longer term, Murata will work on providing the value of combined sensing and communication technologies to meet the needs of IoT (Internet of Things) society.

Advanced communication technology delivering sophisticated and multiple functions

Progress in communication technology and changing electronic devices

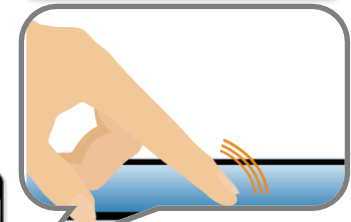


Electronic devices with sophisticated and multiple functions

Introduction of sensing technology



Integration of haptic devices



Improvement of camera functions

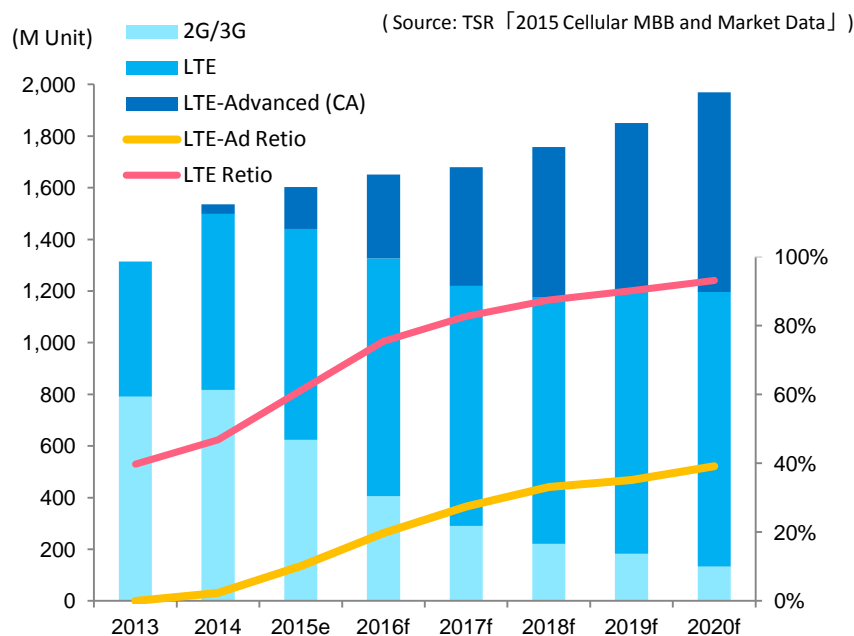


Demand for electronic components increases as electronic devices are more functionally sophisticated and integrate more functions!

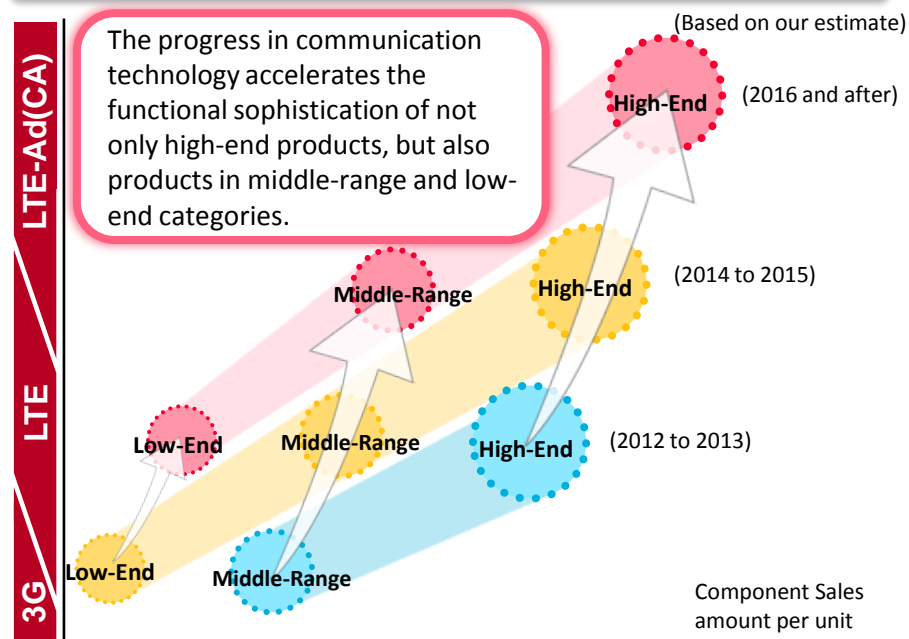
Profitable growth can be achieved by establishing a solid structure that enables us to develop and supply high-value-added components for electronic devices in response to progress in communication technology and an increasing use of sophisticated and multiple functions.

Growth of the smartphone market

Spread of high-speed communication devices



Changes in functionality in different categories



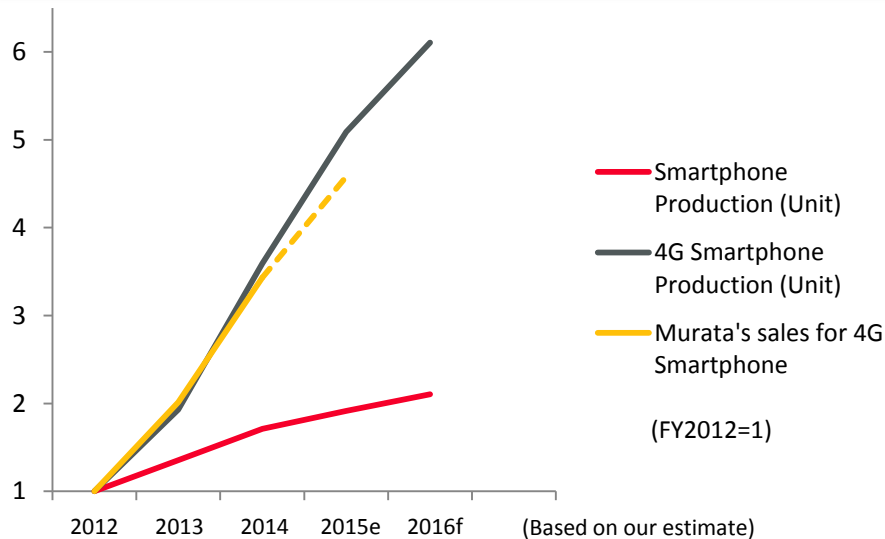
	Low-End	Middle-Range	High-End
MLCC	200 to 400	300 to 500	500 to 800
(Ultra-Compact MLCC)	100 to 200	200 to 400	300 to 600
SAW Device	9 to 12	12 to 20	20 to 40
(Duplexer)	0 to 4	4 to 7	7 to 13
(Multiplexer)	—	—	0 to 2
RF Inductor	20	40 to 50	100
Module	△	○	◎

- High-End**
Multi-carrier
LTE-Advances (CA)
- Middle-Range**
Multi-carrier
LTE
- Low-End**
Single-carrier
LTE

(Based on our estimate)

Increasing use of high-value-added components in high-end devices

Murata's Sales trend for 4G Smartphone Production



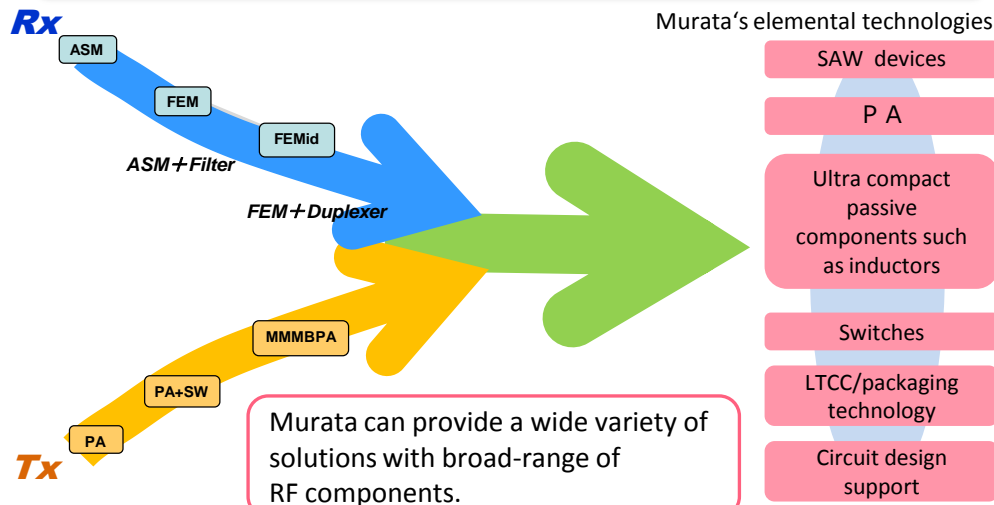
Functional sophistication of terminals increases the number of components per terminal.

⇒ Higher demand for more compact and more highly functional components

⇒ Allowing Murata to capitalize on its strengths in supplying high-value-added products

◎ Greater competitive advantage in Cutting edge MLCCs and SAW devices

Front-end integration road map



Communication modules deliver increasingly high performance for faster communication and higher efficiency. Murata has technologies necessary to create communication modules!



- Reducing manufacturing costs by increasing in-house production ratio
- Shortening research and development cycles
- Using in-house compact components to miniaturize modules

Chinese smartphones, and penetration of emerging markets

Trends in Chinese smartphones

Increase in the number of components per terminal, introduction of high-value-added products (2016 and after)

- Ultracompact MLCCs
- Increased use of modules

High-End

Increased need for highly functional and highly efficient products

Full-fledged introduction of CA (starting 2017)

Progress in the spread of multiband technology (starting 2015)

- Increase in the number of SAW devices per terminal

Middle-Range

Spread of smartphones to emerging economies

Accelerated entry of Chinese smartphone manufacturers in emerging markets

Unit sales in ASEAN market
2014F : 94 m
↓
2017F (forecast) : 186 m

Unit sales in Indian market
2014F : 75 m
↓
2017F (forecast) : 228 m

Note: Local production will also be started.

- Despite the expected slowdown in the growth of smartphone unit products in China, continued progress in functional sophistication will increase demand for components.
- In emerging markets like India and ASEAN countries, feature phones will be increasingly replaced by smartphones.

➡ Murata will meet the demand not only in China, but also in emerging economies by taking advantage of its shielded rooms in Shanghai, Beijing, Shenzhen, and Taipei to provide total design support including ensuring EMC.

Wearable Market

Spread of wearable devices

HealthCare/Fitness



Navigation



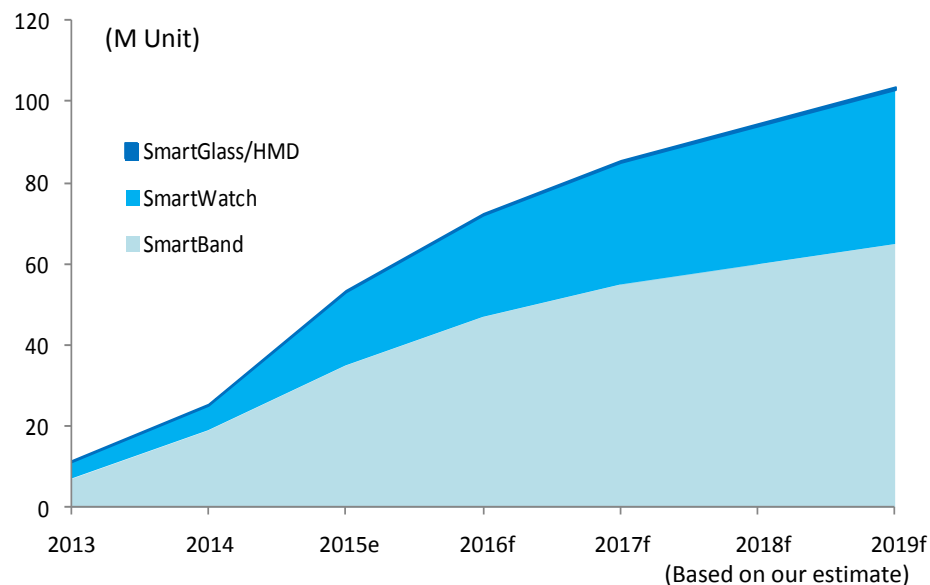
Product Management



Entertainment



Growth of wearable devices



Quality and technical requirements in wearables

- More compact and thinner
- Low power consumption
- Sensor/wireless communication technology



Allowing Murata to capitalize on its strengths in a greater scope of applications!

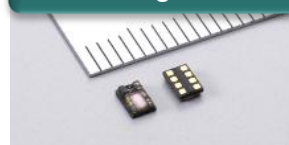
World smallest 0201 series (MLCC, Chip Inductor, Ferrite Beads)



The World's Smallest and the Lowest Power Bluetooth® SMART Module



Proximity and Ambient Light Sensor



Barometric Pressure Sensor



Film Temperature Sensors



Expansion into New Applications

Automotive

- Environmental responsibility
- Safe driving and accident prevention
- Infotainment

Murata will contribute to resolving social problems of mobility by offering the shared value of high reliability and making customers feel safer while making full use of its strengths in areas such as sensing, communication, miniaturization, and EMC.

Healthcare

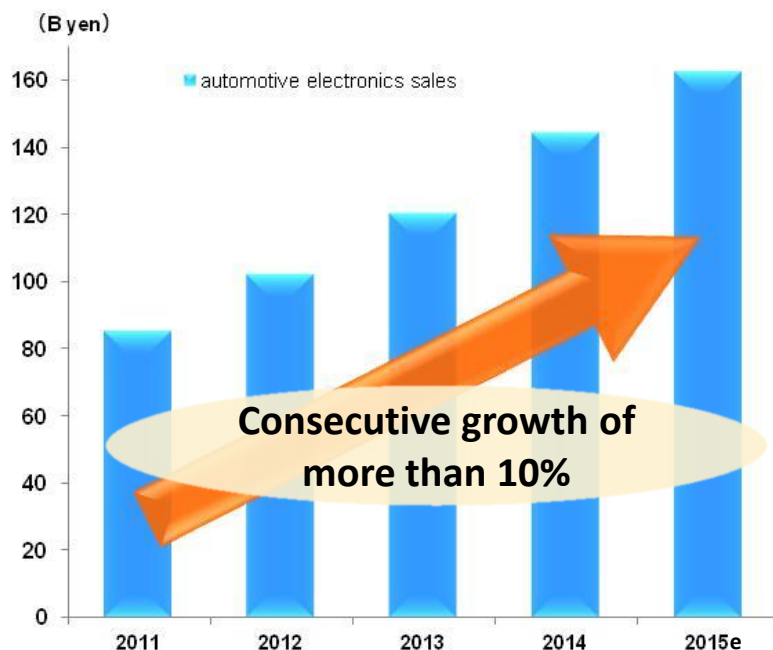
With the high quality of its components and successful records of delivery, Murata provides customers in the healthcare industry with a feeling of safety and security. To meet the current trends toward low invasiveness and networking of healthcare equipment, we will take advantage of our miniaturization, communication, and sensing technologies to contribute to sophisticating health care and improving people's quality of life.

Energy

By taking advantage of its technologies for compact, low-profile, and efficient components and the expertise developed by working on power modules, Murata will provide total information-management solutions by integrating energy-saving solutions in power conversion and transmission with sensors and communication modules to contribute to efficient use of energy and shaping an energy-saving society.

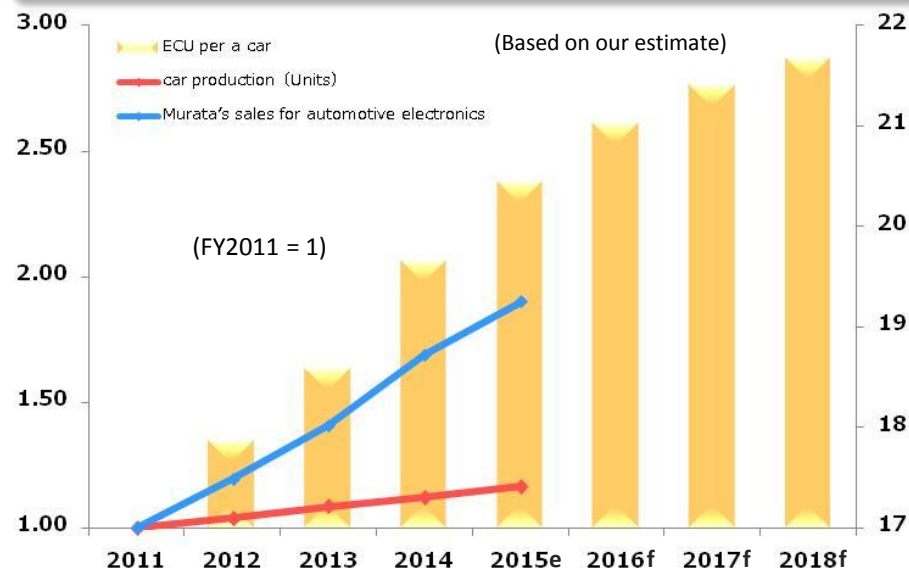
Murata's performance in Automotive market

Trend in Murata's automotive electronics sales



- Due to the progress in the electrification of vehicles, sales of solutions for car electronics achieved consecutive year-on-year growth of more than 10%, nearly doubling the figure in five years.
- Higher fuel efficiency, lower emissions, and increased safety and convenience will continue to increase the number of ECUs (electronic control units) per vehicle, allowing Murata to anticipate a further increase in demand for its components.

The pace of expansion car production/ Murata's sales for automotive electronics



Power train

- Gasoline engine
- Diesel engine
- xEV
- Idling stop
- Transmission

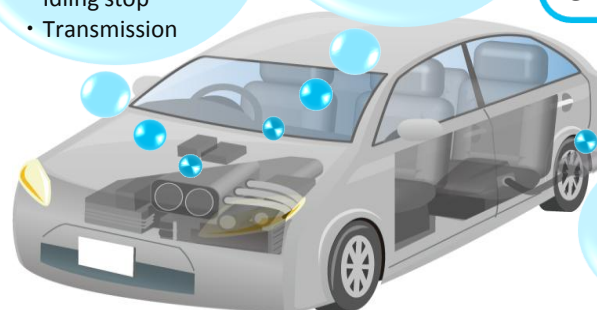
Information/communication

- Navigation
- Rear seat monitor

Mechanical control systems in vehicles are being replaced by electronics

Body control/Safety

- Electronic Stability Control
- Antilock Brake System
- Tire Pressure Monitoring System
- Parking Assist System



Environmental responsibility

Environmental policies of different nations

Area	Policy	~2015	2015 ~ 2020	2020~
EU	CO2 emission control		130g/km (2015)	95g/km (2021)
US	Zero-Emission Vehicle regulations	Infiltration of ZEV regulations (Expanding from California)	Tightening of ZEV regulations (2018)	
	CO2 emission control	About 163g/km (2012)	About 132g/km (2017)	About 113g/km (2020)
China	CO2 emission control		About 167g/km (2015)	About 116g/km

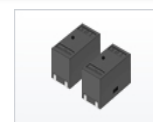
Products Lineup for ECUs

Reliable MLCCs



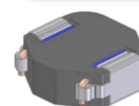
- Correspond circuit operation in high temperature (over 150 °C) such as engine room
- Capacitor has fail safe function to prevent short-circuit defect by stress-strain

EMI Suppression Filters



- Components for removing the noise that is generated from electronic devices, these filters are useful for improvement in electromagnetic wave noise of ECUs.

power inductors (synergy with the integration of Toko)



- Components used for noise suppression and current rectification in ECU power circuits
- They deliver impressive reductions in insulation resistance at 155°C.

- Starting in 2015, more stringent regulations on **fuel consumption (CO₂)** and **emissions (NO_x/PM)** will be introduced worldwide.
- Meeting the new regulations will require more intelligent engine management, hence an accelerated use of electronic systems.
- More ECUs will be used onboard, especially in the engine compartment dominated by punishing temperatures. This will require even **further miniaturization, greater heat resistance, and higher large-current capability.**



Demand for components used in ECUs — reliable MLCCs, power inductors, and EMI Suppression Filters — will increase in proportion to market growth.

In-vehicle sensors for ensuring safety

Murata sensors take an active part in ensuring vehicle safety

Driving safety/accident prevention

- **Shock sensors**

TPMS Wake Up



- **Combo Sensor**

Accelerometer & Gyroscope
ESC (Electronic Stability Control)



- **Ultrasonic sensors**

Autonomous Parking



- **Accelerometer**

Electronic suspension
Electronic parking brake
Hill-start assist



Comfort

- **Ultrasonic sensors**

Parking assist
by distance sensing



- **Gyroscope**

Navigation



- **Rotary position sensors**

Control switches
Door mirror angle detection
Detection of the angle of the car navigation panel



Other

- **Rotary sensors**
(under development)

Detection of motor rotation

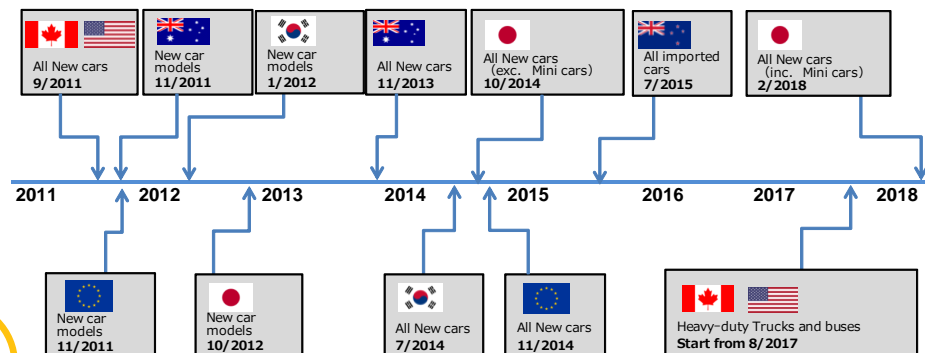


- **Thermistors**

Overcurrent protection
for ECUs and motor
driving circuits



Nations' timelines for legislating ESC



- By 2020, all vehicles sold in advanced countries will be legally required to be equipped with ESC.
- ESC will also be a legal obligation in emerging economies from 2020 and beyond.

- Increasing use of driving assistance systems raises demand for sensors.
- Increasing opportunities for Murata's MEMS sensors for ESC (Electronic Stability Control) and ultrasonic sensors that help support automatic parking.
- High precision sensors for monitoring the vehicle's state of operation are indispensable in making intelligent traffic and Advanced Driving Assistant Systems a reality.

Connected Car (C2X/V2X)

Exchanging information with pedestrians to alert the driver

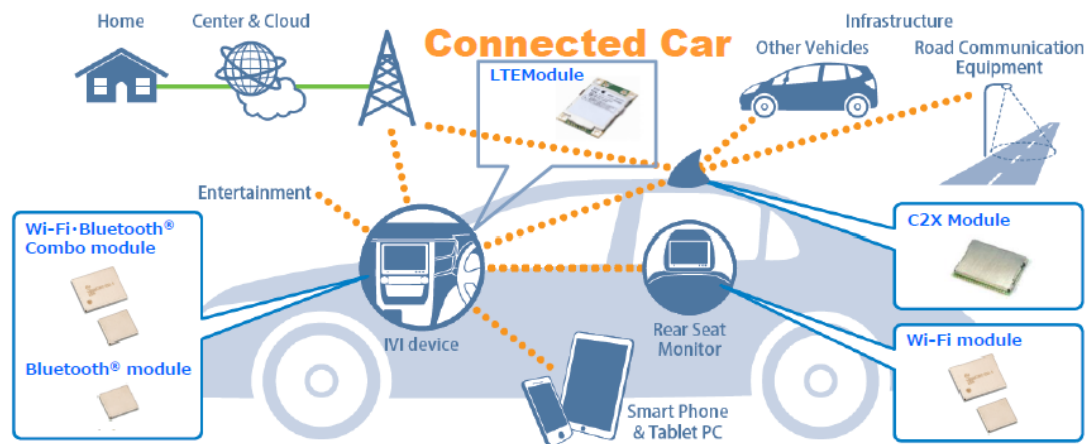
C2P / V2P

Exchanging information with traffic lights and other elements of infrastructure to ensure safety at places with poor visibility

C2I / V2I

Vehicles mutually exchange information on their locations and speeds to avoid collision

C2C / V2V



- Shaping a world where vehicles ensure wireless in-vehicle and C2X communications.
- In-vehicle communications are generating increasing demand for Wi-Fi modules for infotainment.
- External communications (car-to-car, car-to-infrastructure, and car-to-pedestrian) will support safe driving and help make autonomous driving a reality.

Murata aimed for further growth of communication modules with development of new markets!

- To meet the current trends toward low invasiveness and networking of healthcare equipment, Murata will take advantage of its miniaturization, communication, and sensing technologies.
- With the high quality of its components and successful records of delivery, Murata provides customers in the healthcare industry with a feeling of safety and security.

**Contributing to
sophisticating
health care and
improving people's
quality of life**

*Invasiveness: the risk of damage to the body.

Keywords in future medical equipment:

- **Compact size/light weight**
- **Intelligence**
- **Greater convenience for the patient**

Compact
Lightweight
Easy to use

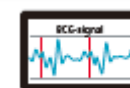
**Offering
new value**

Large
Heavy
Difficult to use

**Murata
technologies**

- **Miniaturization**
- **Communication**
- **Sensing**
- **High quality**

Wireless bed sensor



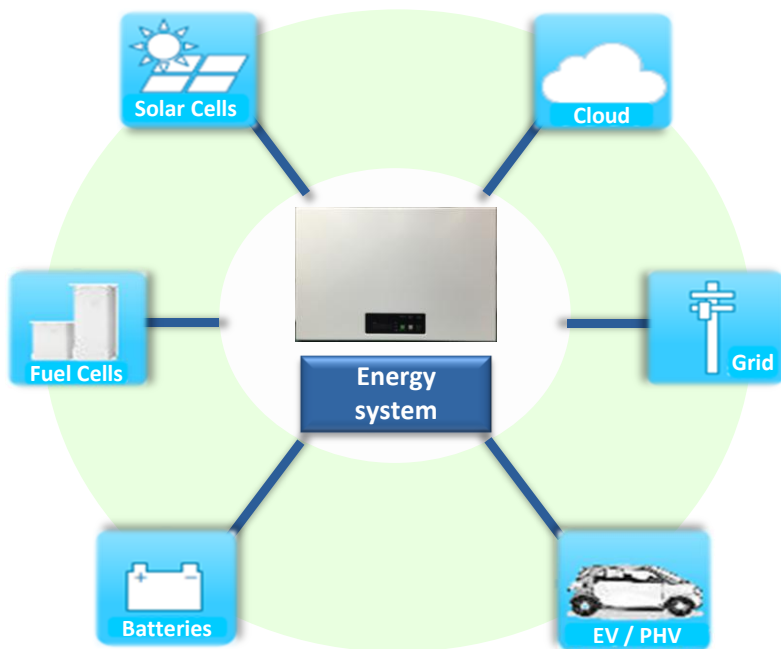
**MEMS sensor for BCG
(ballistocardiography)**

MLCCs for implant medical equipment

- Miniaturizing implant medical equipment to achieve lower invasiveness.
- So reliable as to accommodate implant medical equipment.



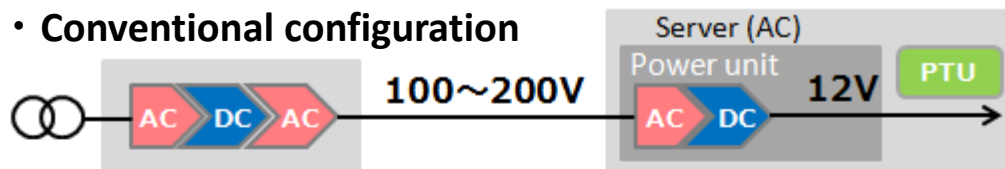
Energy management system



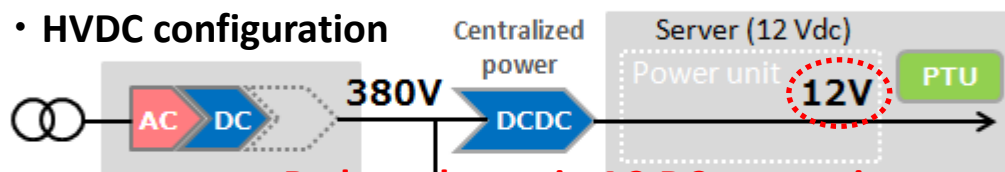
- A single unit can seamlessly produce, store, and make intelligent use of energy.
- High affinity to various energy sources (solar cells, fuel cells)

HVDC for data centers

• Conventional configuration



• HVDC configuration



Reduces losses in AC-DC conversion

What's more...

Three-phase AC input-compatible PFC converter



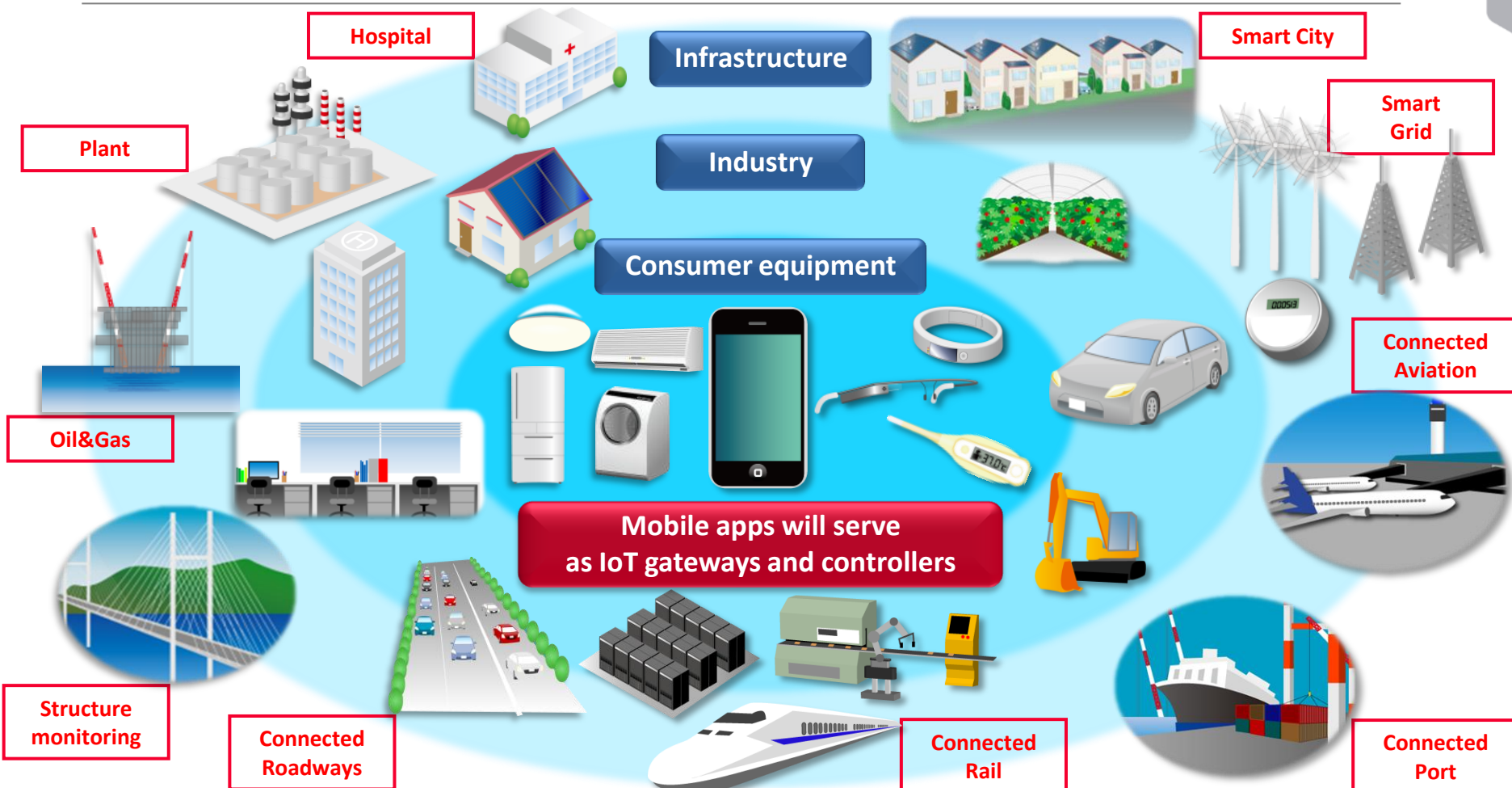
DC-DC converter for HVDC



Allows for diverse power configurations

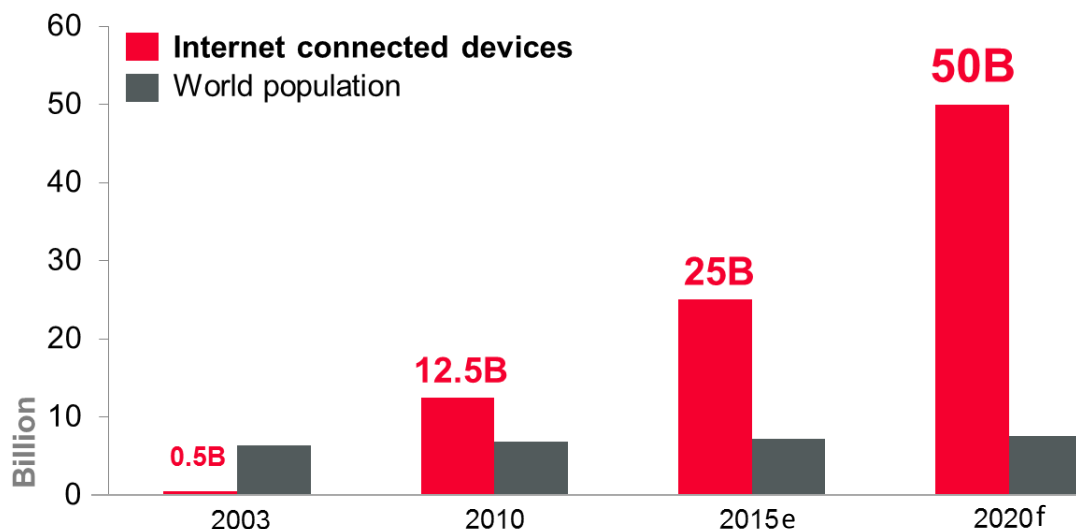
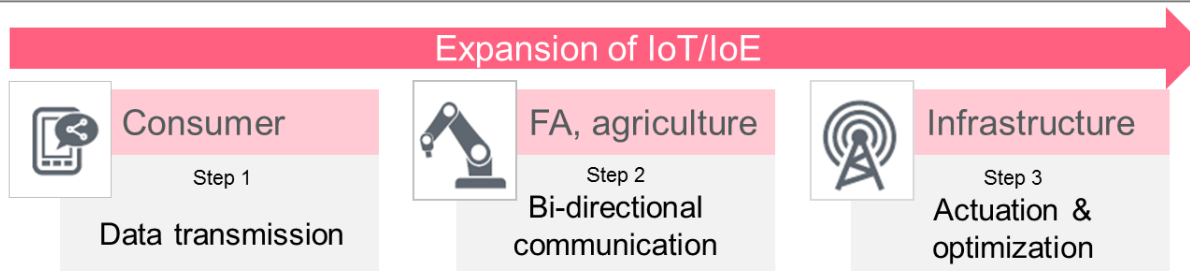
- Lower power conversion losses
- AC is converted into HVDC (300-400 Vdc), 12 Vdc, and -48 Vdc within data center servers
- To be rolled out in plant equipment for AC-HVDC conversion going forward

The Connected World



All things are digitalized and mutually connected via the Internet:
From “a closed world” to “a connected world”

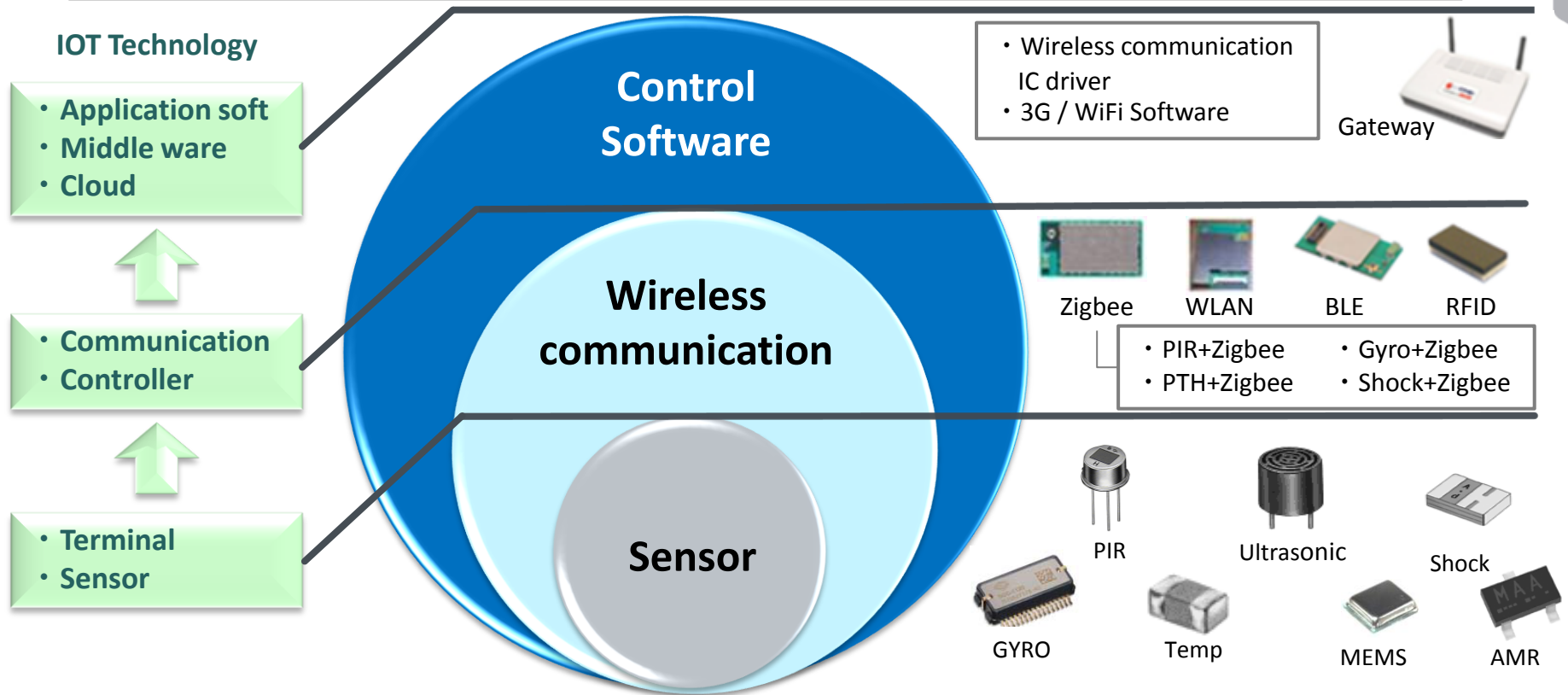
An Increasing Number of Connected Devices



Despite its 50 billion unit sales, the IoT market is difficult to grasp as something that generates demand in bulk. The value of IoT has yet to be clarified.

The market allows Murata to capitalize on its strengths in such technologies as communication and sensing. We will create synergy with our components and thus offer the value of fully meeting customer needs in order to expand our business while partnering with possible third parties.

Advantages of Murata in IoT Market



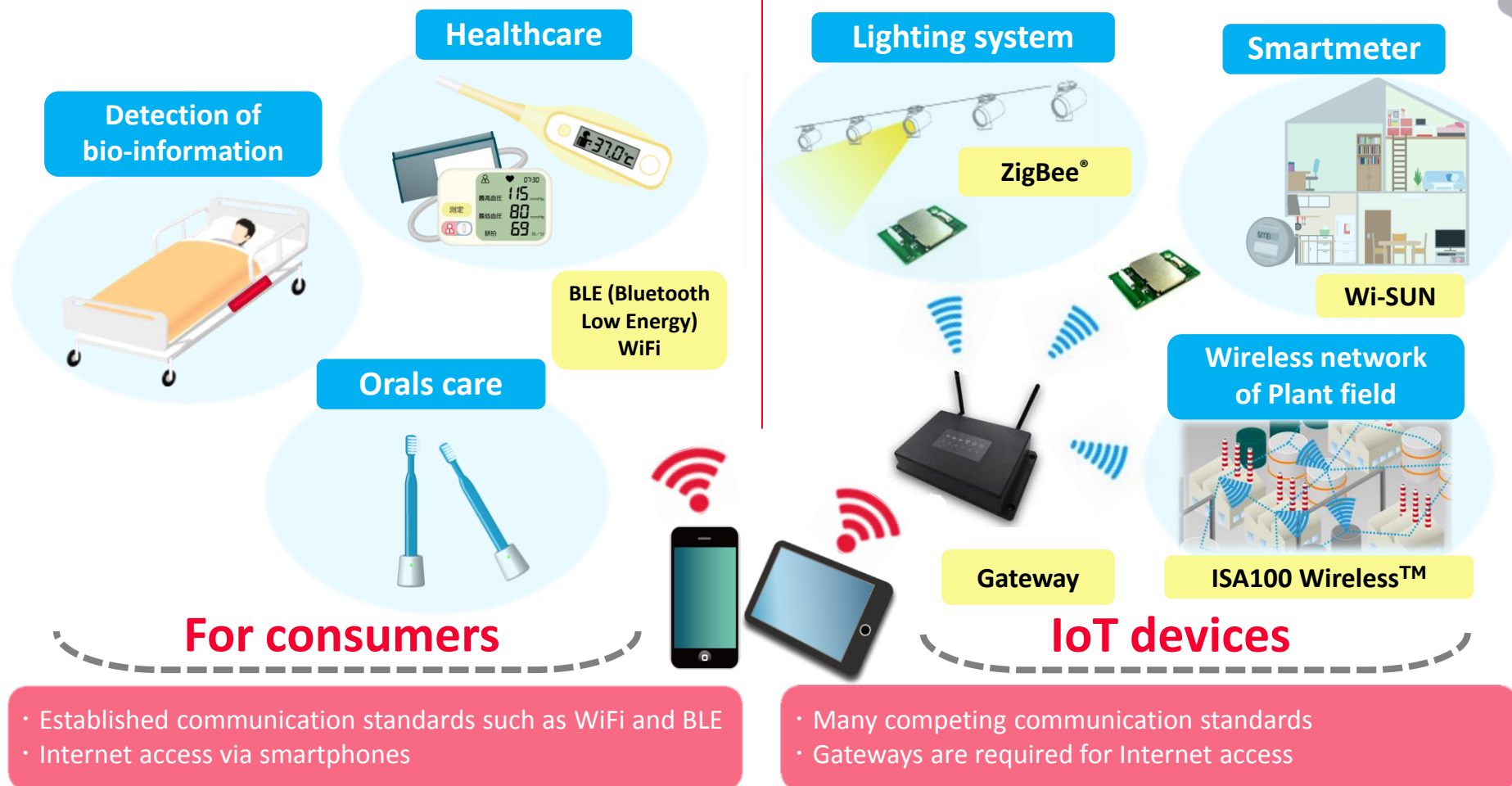
Wireless communication: Ensuring a connection with a target without crosstalk in a network comprised of multiple devices.

Sensors: Murata is a comprehensive component manufacturer with strong components.

Software: Software technology developed in the markets for mobile phones and Wi-Fi.

Murata will provide total solutions combining sensors, wireless technology and software to help build infrastructure for the "Internet of Things"

Examples of projects in the IoT market

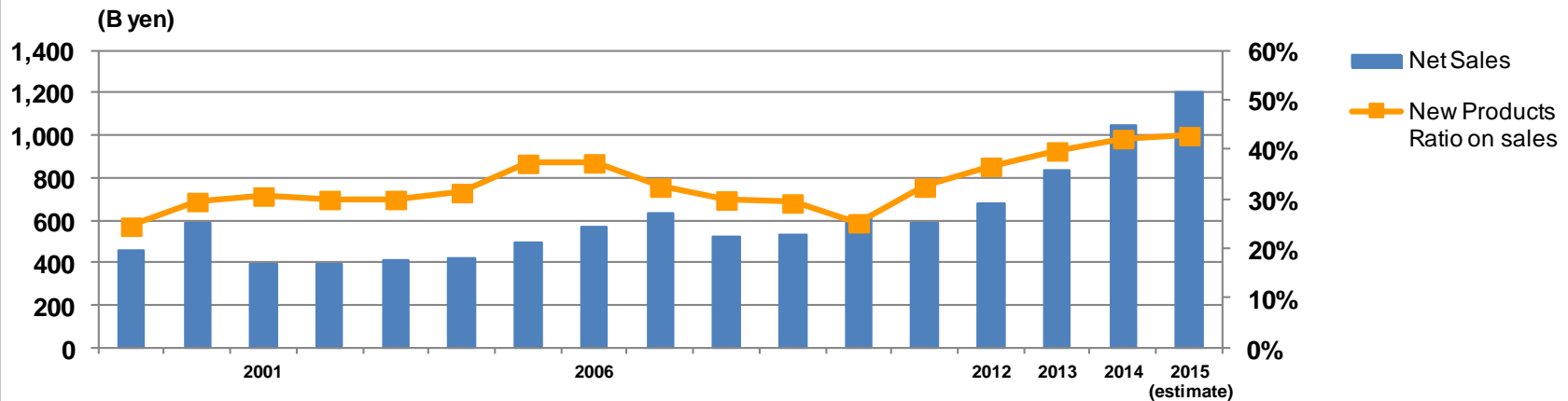


Offering new value by combining sensors with communication modules

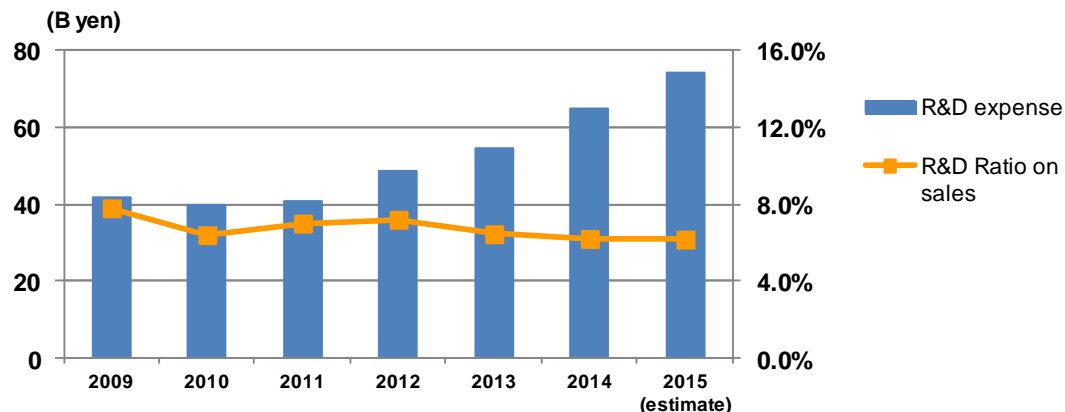
Collection of information --> summarizing information --> Information-based control

Net Sales and New Products Ratio on sales/ R&D expense and R&D ratio on sales

Net Sales and New Products Ratio on sales



R&D expense and R&D Ratio on sales



Fiscal year 2014

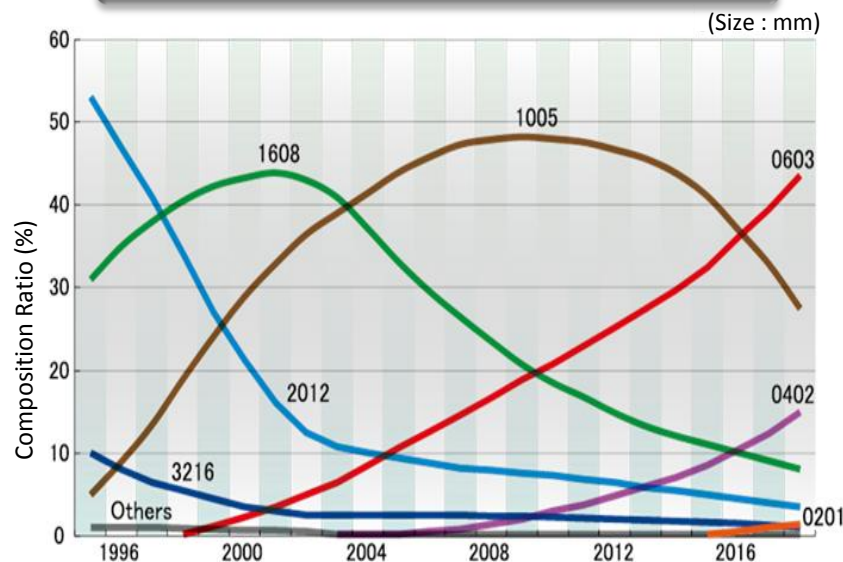
- R&D expense : 65 billion yen
- R&D Ratio on sales : 6.2 %

Fiscal year 2015 (Forecast)

- R&D expense : 74 billion yen
- R&D Ratio on sales : 6.2 %

“Technology Breakthrough ” as Top Runner in MLCCs

MLCC Size Trend

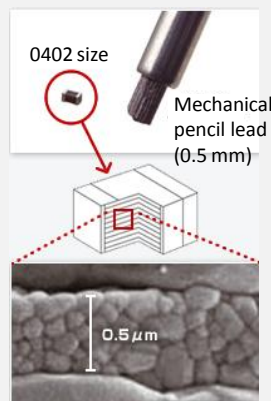


- Ultra-compact MLCC market (in which Murata has large share) will expand. 0603 size will be used as mainstream from 2016.
- The usage of 0402 (0.4×0.2mm) size will expand.
- We started mass production of the world's smallest 0201 size (0.25×0.125mm).

Strengths of Murata capacitors

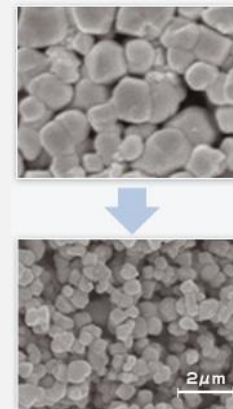
Thinner

Thin layer technology



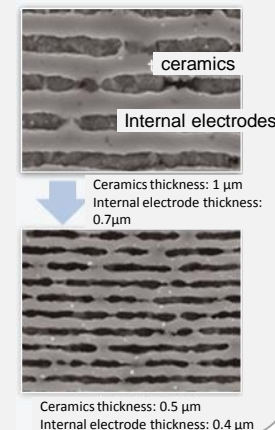
More compact

Fine particle technology



More accurate

High-accuracy multilayer technology



- Comprehensive control of all phases including design, selection of materials, purchasing, and production
- Establishment and further development of technologies for accurate control of the shape and size of ceramic powder particles and for dense and uniform distribution

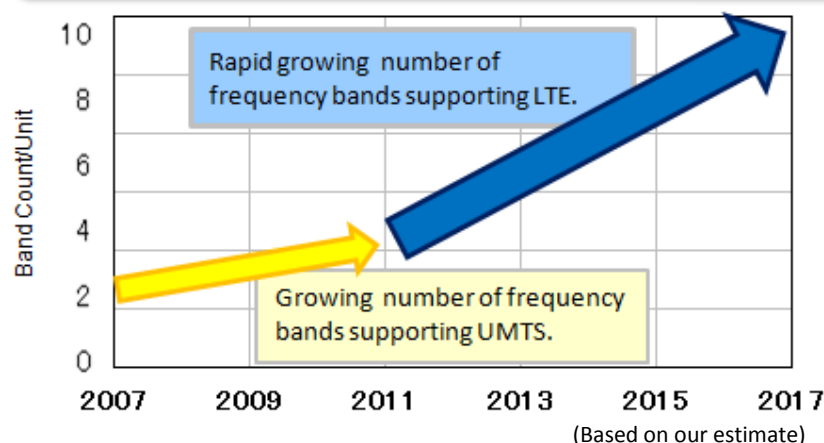
We are pursuing trend toward ultra-compact and high-capacitance MLCCs as the top runner of the market, and continue to lead the electronics industry.

Strength of Murata's SAW Devices

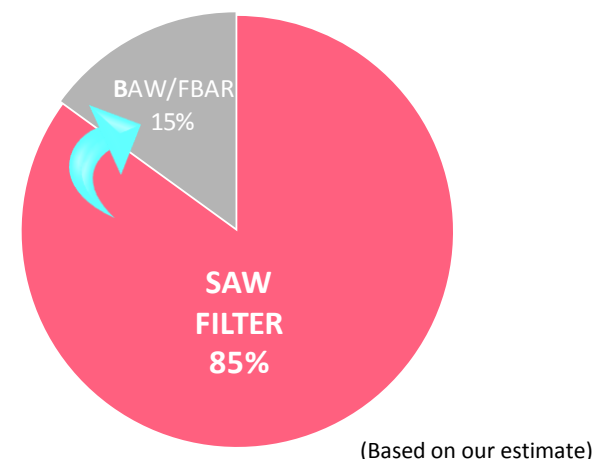
	B17	B13	B20	B5	B18	B8	B11	B21	B3	B9	B39	B25	B2	B4	B34	B1	B40	B41	B38	B7
	740 MHz	750 MHz	800 MHz	850 MHz	860 MHz	900 MHz	1500 MHz	1500 MHz	1800 MHz	1800 MHz	1900 MHz	1900 MHz	1900 MHz	2000 MHz	2000 MHz	2100 MHz	2400 MHz	2500 MHz	2500 MHz	2500 MHz
FY2014	○	○	○	○	○	○	○	○	△	○	○	×	△	○	○	○	△	△	○	△
									↓			↓	↓					↓		↓
FY2015	○	○	○	○	○	○	○	○	○	○	○	Preparing	○	○	○	○	△	○	○	○

○: Advantage for SAW △: SAW competes with BAW/FBAR ×: Advantage for BAW/FBAR

Estimated growth in average band count per mobile device



Shares of SAW and BAW/FBAR in demand for filters



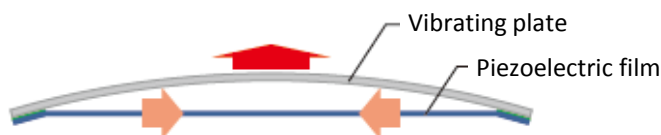
Low-TCF and improvements in the characteristics of existing SAW devices have been leading to an increasing replacement of BAW/FBAR devices by SAW products where both technologies compete. Preparations for mass-production of types for further frequencies are now under way. First, we aim to employ our new technology in in-house modules.

*Low-TCF (Low Temperature Compensated Frequency : a technology that suppresses frequency variations due to temperatures)

New Products

Piezoelectric film actuators

- Highly responsive vibrating devices ideal for haptic feedback
- Low profile and low power consumption
- Can be used for large-area applications such as flat keyboards



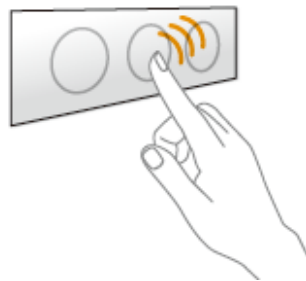
The vibrating plate comes above the film as the film shrinks.



The vibrating plate comes beneath the film as the film stretches.

Applications

- Haptic feedback in flat keyboards
- Touch feel in capacitive touch switches



Micro-positioning sensors

- Easy-to-use encoder and push-switch module ideal for wearable devices
- Ultracompact design for use in wearable devices
- Click-like feeling for reliable operation

Applications

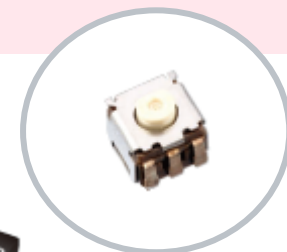
- Control switches in wearables



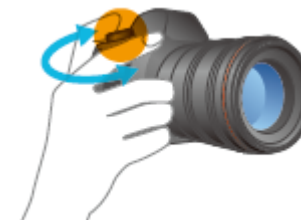
Smart glasses



Smart watch



- Control switches and feedback sensors



M&A

- Acquisition of C&D Technologies Power Electronics Division (now Murata Power Solutions)
- **Power Supplies**



- Acquisition of NEC **MR sensor** Business



- Acquisition of Tokyo Denpa Co., Ltd **Crystal Devices**



- Toko, Inc. became a consolidated subsidiary of Murata.
- **Coils**



- Acquisition of Peregrine Semiconductor
- **RF solutions incl. RF switches**

2007

2012

2013

2014



- Acquisition of VTI Technologies (now Murata Electronics Oy)
- **MEMS Sensors**



- Acquisition of Renesas **High Power Amplifier** Business



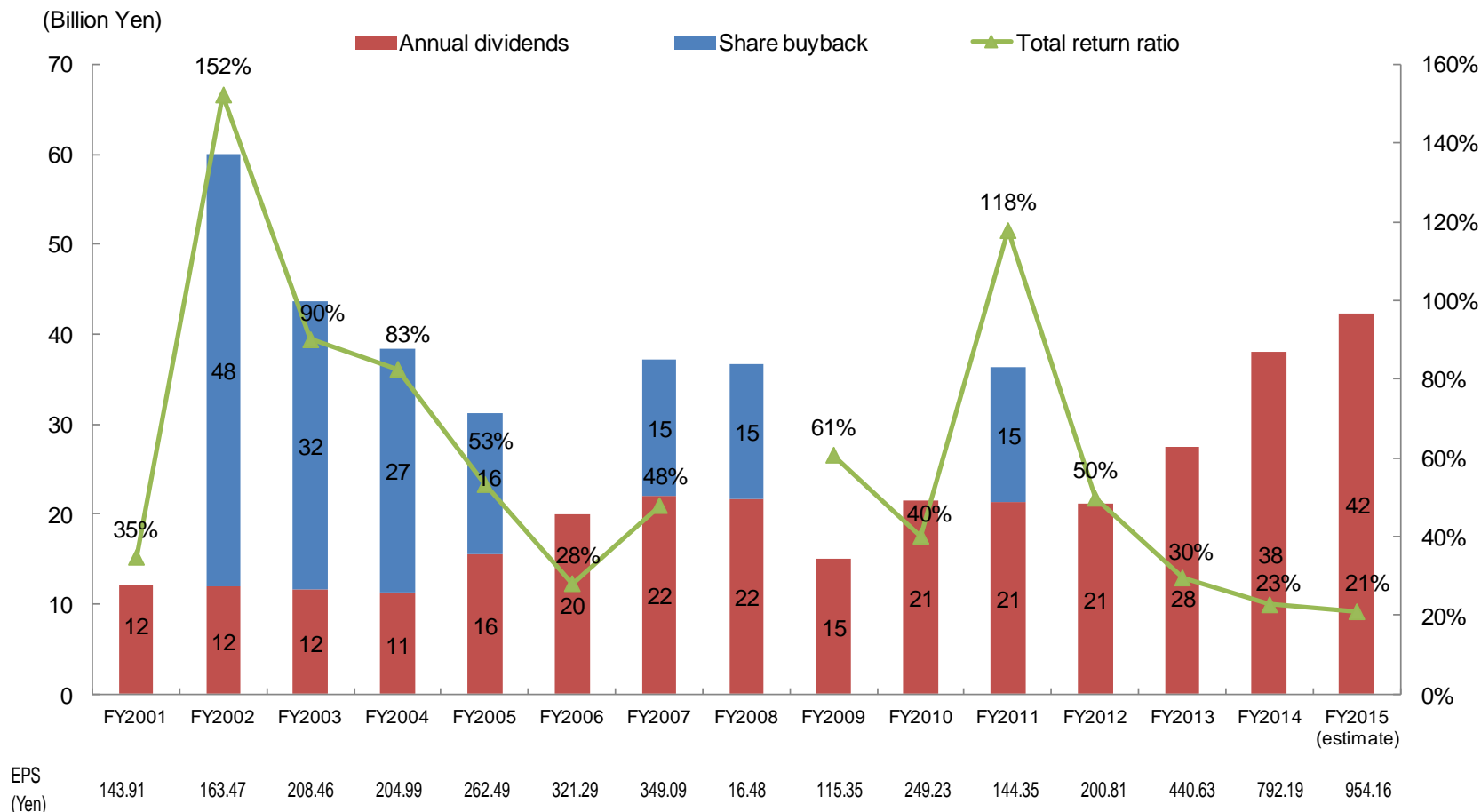
- Acquisition of RF Monolithics
- **Wireless Connectivity Solutions**



- Capital & Business Alliance with Ubiquitous Corporation
- **Software**

Proceed M&A for capturing new technologies and new market demand for Murata step by step.

Return to Shareholders



Our basic policy of profit distribution to shareholders is to prioritize the sharing of gains through payment of dividends, and to steadily raise them by increasing profit per share.

Corporate governance

Board of Directors

The nine directors of the board include two outside members.

The outside director position was introduced in June 2001.

Since June 2002, two outside directors have been on the board

for even more stringent monitoring of the management.

The system of vice presidents was introduced in June 2000.

The decision-making process on management policies and execution of important operations is thus separated from the function of daily operations to strengthen vice presidents' function of performing operations.

Murata was a pioneer among Japanese companies in increasing the transparency of management by introducing the perspective of outsiders.

Auditing

The Board of Statutory Auditors consists of five members including three from the outside.

The outside auditor system was introduced in 1971 to strengthen the audit operations even further.

Internal Control Committee

The Internal Control Committee was established in April 2004 as an advisory body for the President.

In 2007, Murata started an initiative to achieve compliance with the Japanese SOX Law.

The initiative included establishing the internal control of financial reporting and continual improvements.

Mid-term business targets

	Target for 2018F*	Reference Forecast for 2015F
Net sales	Sustained growth of 5 to 10% per annum	1,200 billion yen
Operating income ratio	More than 20%	22.7%
Share of new products in net sales	More than 40%	More than 40%

* Exchange rate assumed at \$1=115 yen

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

