muRata
INNOVATOR IN ELECTRONICS

Information Meeting 2014

Dec 2,2014

Murata Manufacturing Co., Ltd.

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Murata and the Market Environment

Core Business (wireless communication market)

- Development of the connected world
  →Devices connected to the Internet:
  10 billion pcs in 2013→50 billion pcs in 2020
  →Increasing data traffic requires new wireless communication systems featuring higher speed and efficiency.

- Murata will expand its sales by accommodating an increasing use of devices connected to wireless communication networks as well as growing demand for electronic components due to the progress in wireless communication technology.

New Businesses

- Focus on establishing and expanding new business in future growth markets such as automotive, healthcare, environment and energy.

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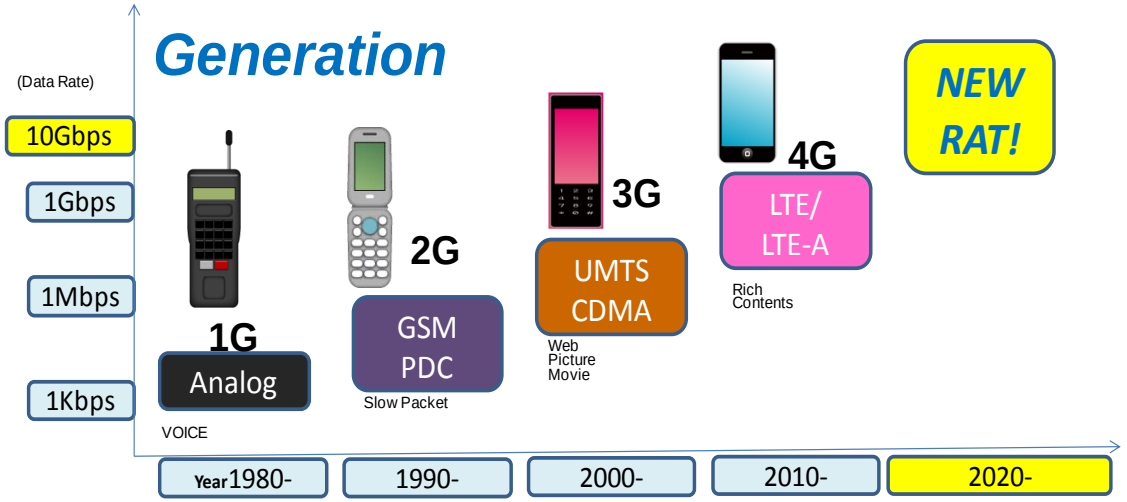
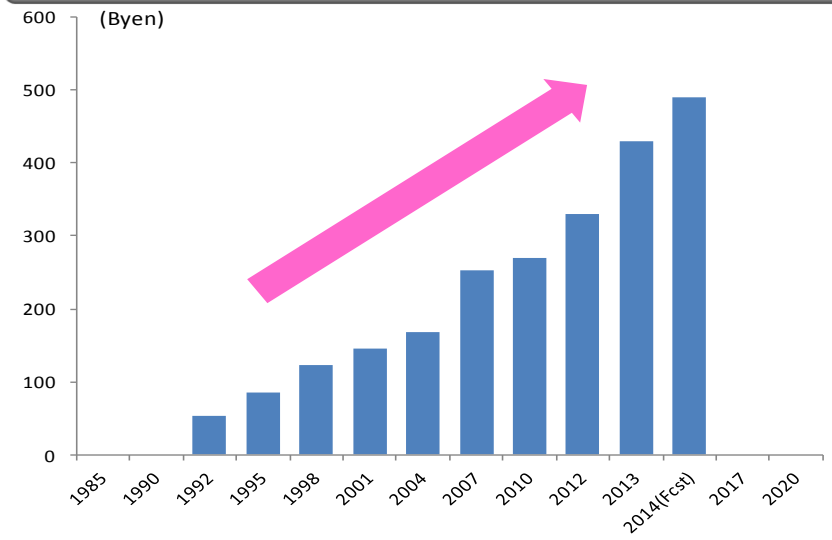
Generations of Communication Technology and Growth of Murata Business

Generations of communication technology since the 1980s



RAT has made progress with an increase in communication speed.

Murata net sales from the communication market



Murata has increased sales by addressing the growing demand for electronic components generated by the evolution of wireless communication technology.

※RAT(Radio Access Technology)

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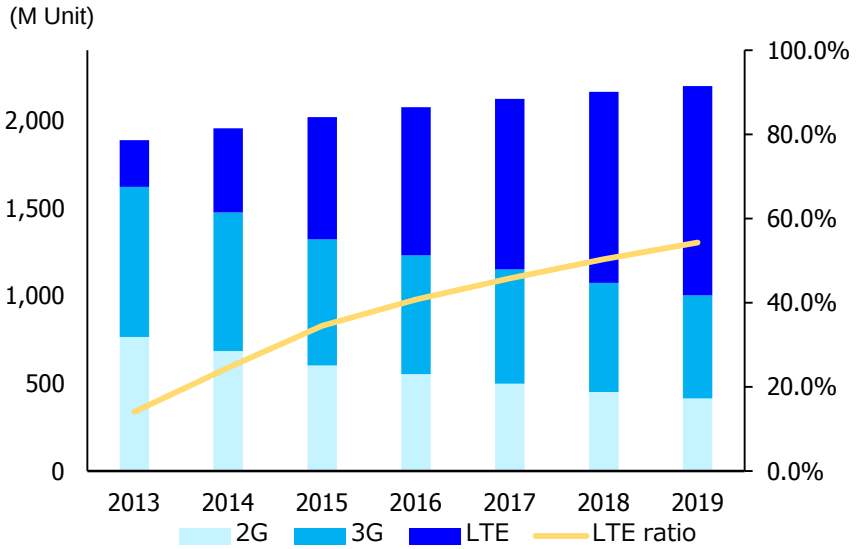
Growth of the LTE Market

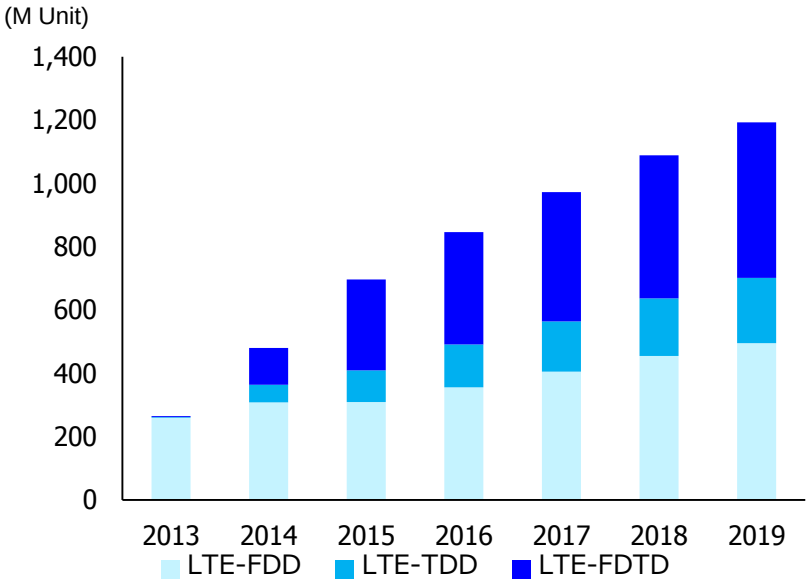
Even faster communication methods

LTE ratio will rise to 50% in 2017!



Growing shares of globally usable phones

（Source：TSR「1st half 2014 Mobile Phone Platform Market & Development」）



	2G Feature Phone	Low-End Smartphone	Middle-Rage Smartphone	High-End Smartphone
MLCC	100 to 200	200 to 400	300 to 500	400 to 800
(Ultra-Compact MLCC)	—	100 to 200	200 to 400	300 to 600
SAW Device	2 to 3	4 to 6	6 to 10	15～20 and more
RF Inductor	10	20	30	60～80
Module	—	△	○	◎

(Based on our estimate)

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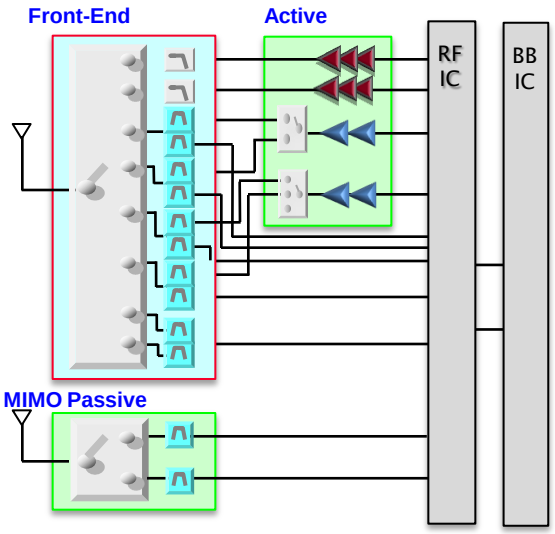
Communication Circuits Getting Increasingly Complex

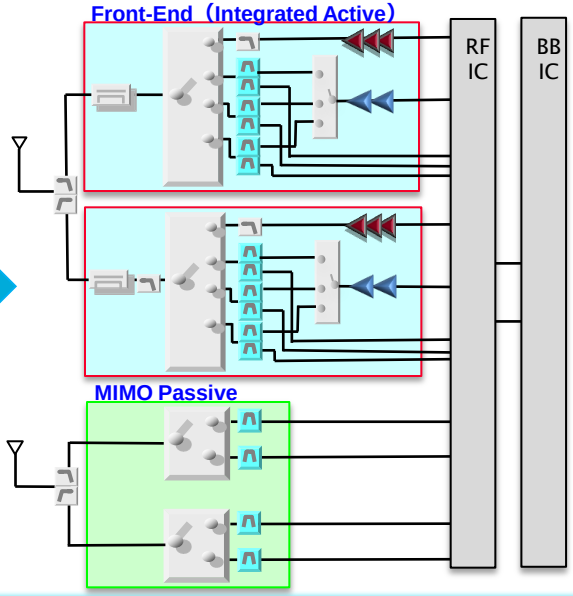
muRata INNOVATOR IN ELECTRONICS

Non－carrier aggregation

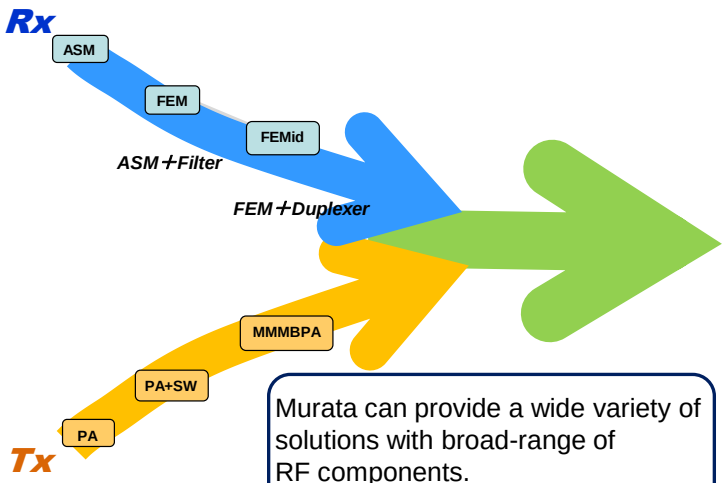


More Complicated

carrier aggregation



Front-end integration road map



Murata can provide a wide variety of solutions with broad-range of RF components.

Murata's elemental technologies

- SAW devices
- P A
- Ultra compact passive components such as inductors
- Switches
- LTCC/packaging technology
- Circuit design support

Multibanding has led to a rapid increase in the number of bands used per mobile device.
Increasingly complex circuits are more difficult to design.

⇩

・Components are required to provide better characteristics.
・Progress in modularization to meet the demand for size reduction and noise suppression

* Carrier aggregation
A method of achieving faster wireless communication.
By dividing communication data for the carriers, it simultaneously uses two or more carriers in different frequency bands as a single communication line, ensuring faster and more stable communication.

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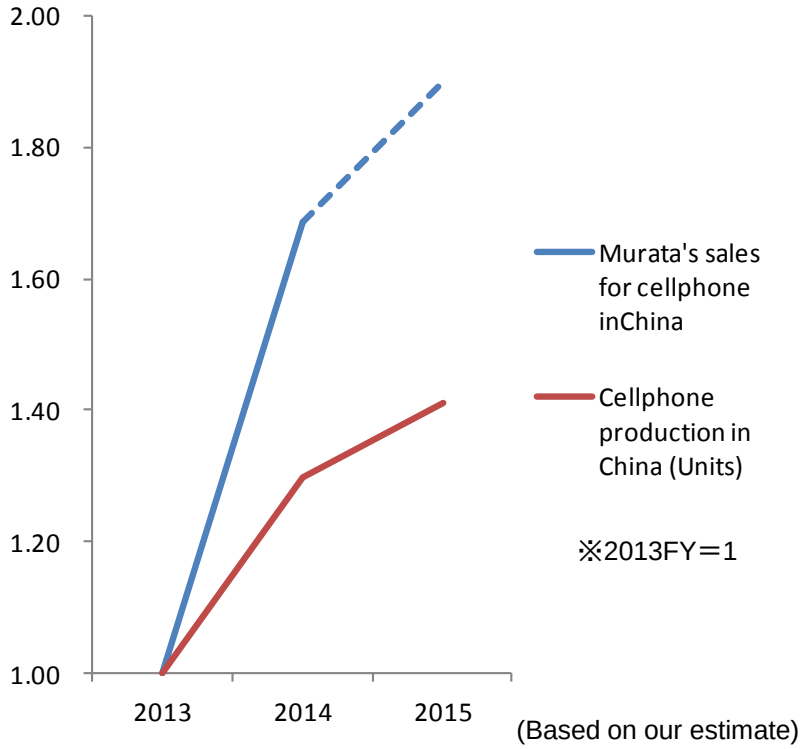
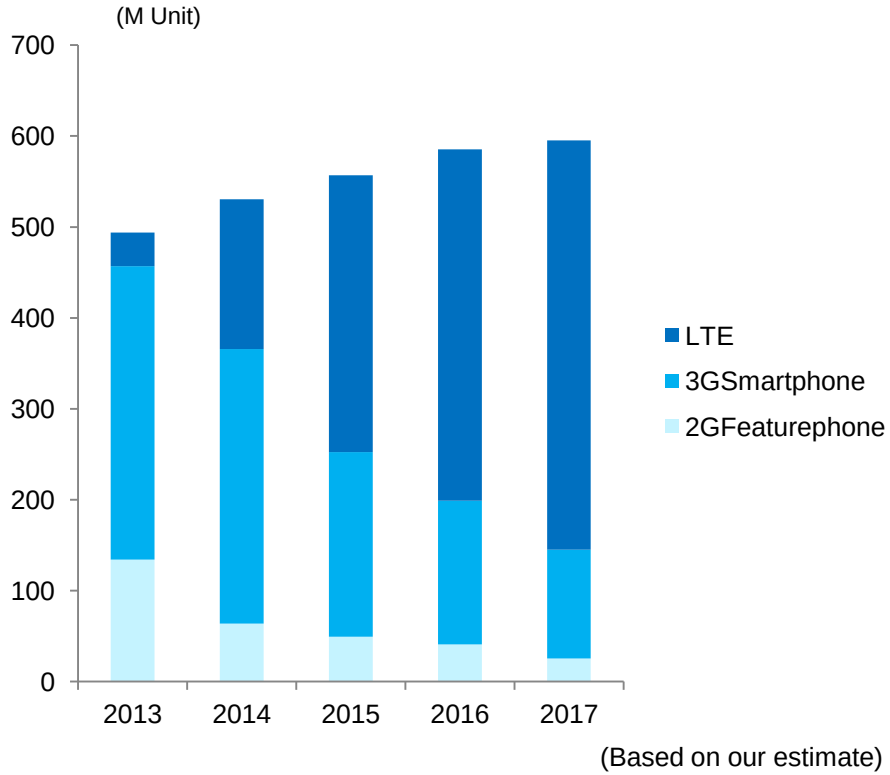
Development of the Chinese Smartphone Market

Murata's sales trend for mobile phones in China



(Based on our estimate)

Growth of LTE handsets in China smartphone market



(Based on our estimate)

China is also seeing a rapid shift toward LTE.
The increasing use of multiband and multiantenna technologies has been pushing up Murata sales in China.
⇒In addition to its sales network fully covering the entire region, Murata has shielded rooms in Shanghai, Beijing, Shenzhen, and Taipei to enhance total design support including ensuring EMC.

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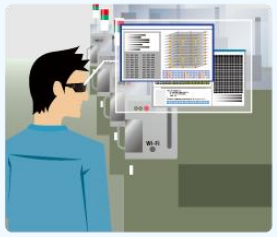
Wearable Market

Spread of wearable devices

<HealthCare/Fitness>

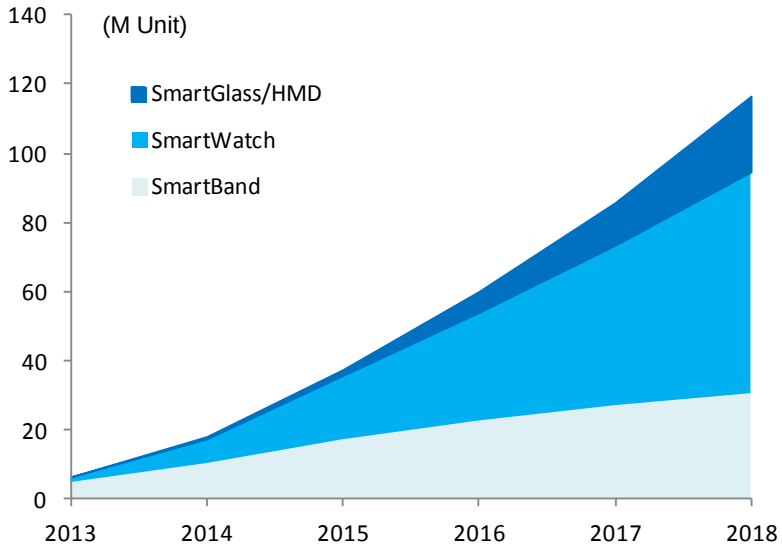
<Navigation>

<Product Management>



<Entertainment>

Growth of wearable devices



(Based on our estimate)

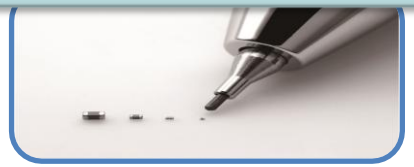
＜Quality and technical requirements in wearables＞

・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

Sensor Technology (Temp・Optical・Pressure)

Small Package of Crystal resonator

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Expansion into New Applications

AUTOMOTIVE

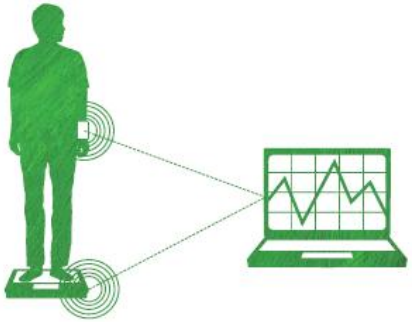
- **Safety & Accident Prevention**
  Sensor technology and Communication technology supporting driving, turning and stopping.
- **Infotainment**
  Communication modules to connect car and information equipment to increase comfort and safety thanks to new services (e.g. traffic jam).
- **Electrification**
  Progress of electrification of cars increases the use of ECUs which increases demand for highly reliable electronic components.

HEALTHCARE&MEDICAL

- **Solutions for Medical and Healthcare Applications**

  Low energy communication modules to connect healthcare devices and PCs / smart phones to support sports activities.

  Sensor technology supporting digitalization and portability of medical applications.



ENERGY & ENVIRONMENT

- **Home / Building Energy Management Systems (HEMS/BEMS)**

  Wireless communication modules for air and lightning control systems, combined with sensor technology to save energy.

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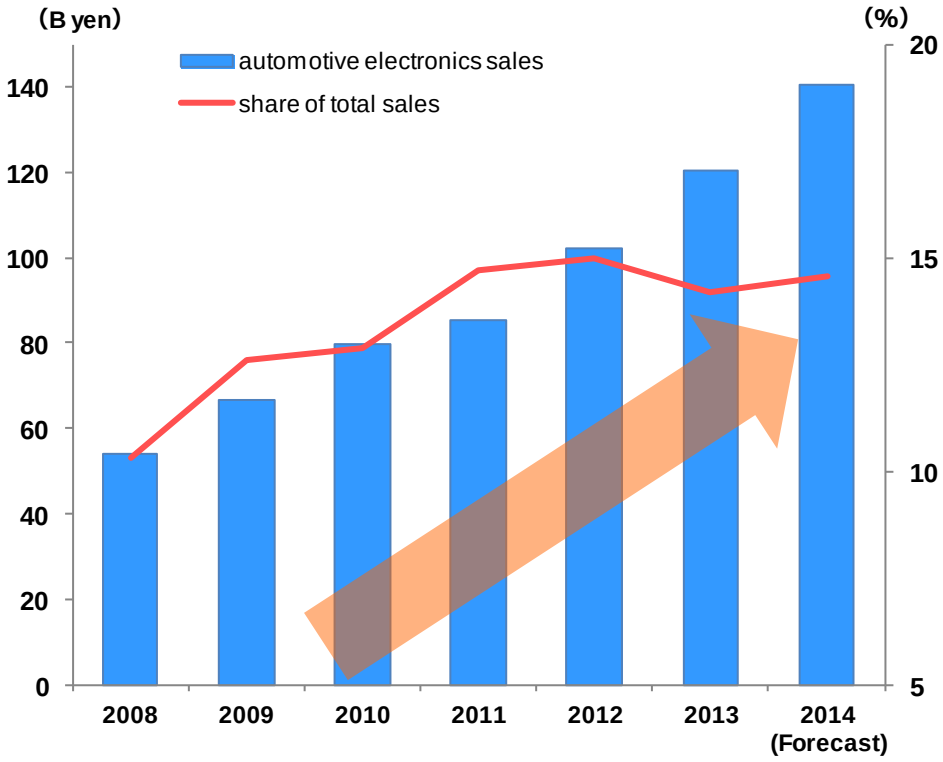
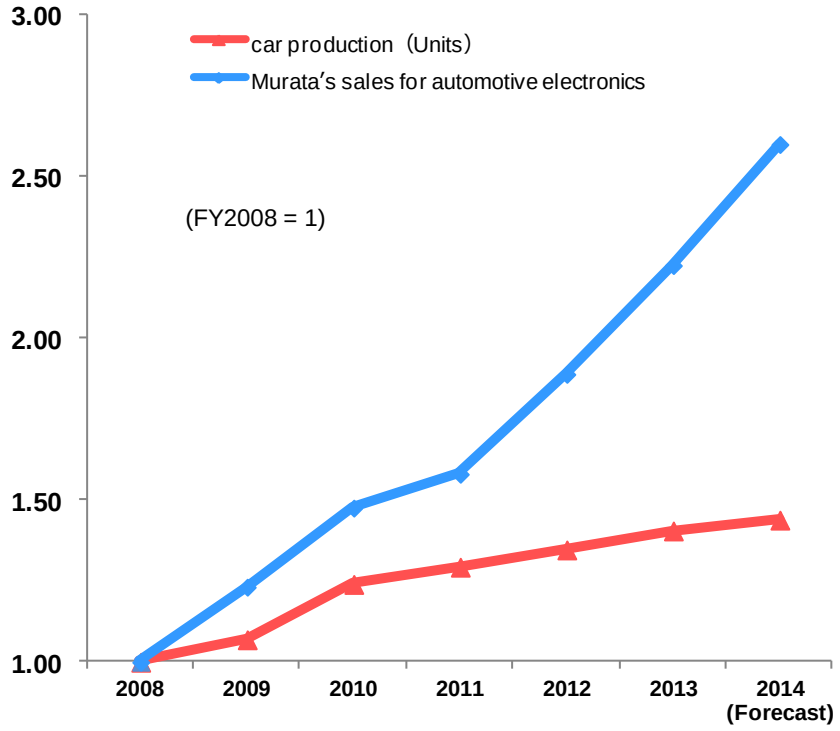
Murata's performance in Automotive market

Trend in Murata's automotive electronics sales



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



Murata's sales for automotive electronics are growing double digit or more every year. It account for 15% of Murata's entire sales in 2014 from 10% in 2008.

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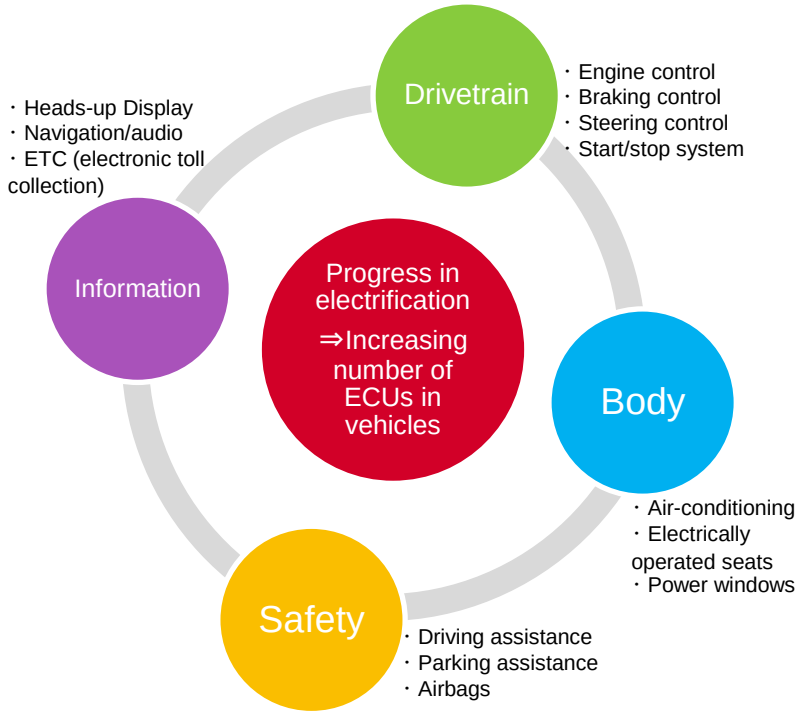
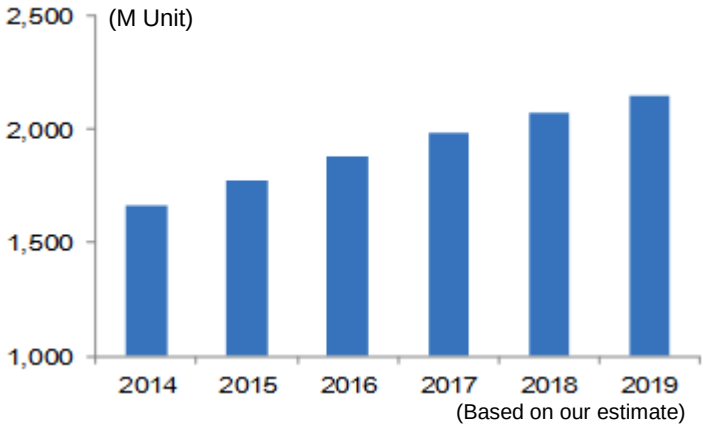
Increasing use of ECUs (further electrification)



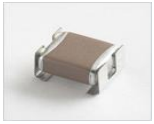
Growth of ECUs



(Based on our estimate)

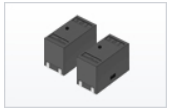
Products Lineup for ECUs

Reliable MLCCs

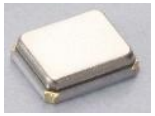
・Correspond circuit operation in high temperature (over 150 ℃) such as engine room
・Capacitor has fail safe function to prevent short-circuit defect by stress-strain

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.

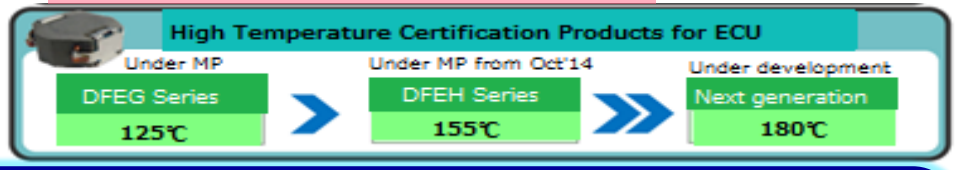
Timing Devices




・As electronic outfitting of automobiles progresses, communication between ECUs is needed and timing devices that deliver a highly accurate, high quality clock signal are called for.

New Product Lineup

TOKO



・The ECU market will expand with progress in electrification.
・Demand for components used in ECUs — reliable MLCCs, timing devices, and EMI Suppression Filters — will increase in proportion to market growth.
・Murata will also emphasize the sales promotion of power inductors by creating synergy with the integration of Toko.

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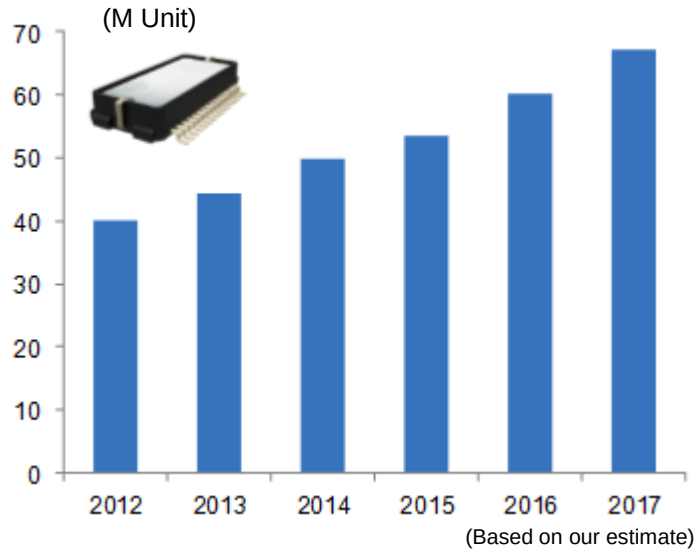
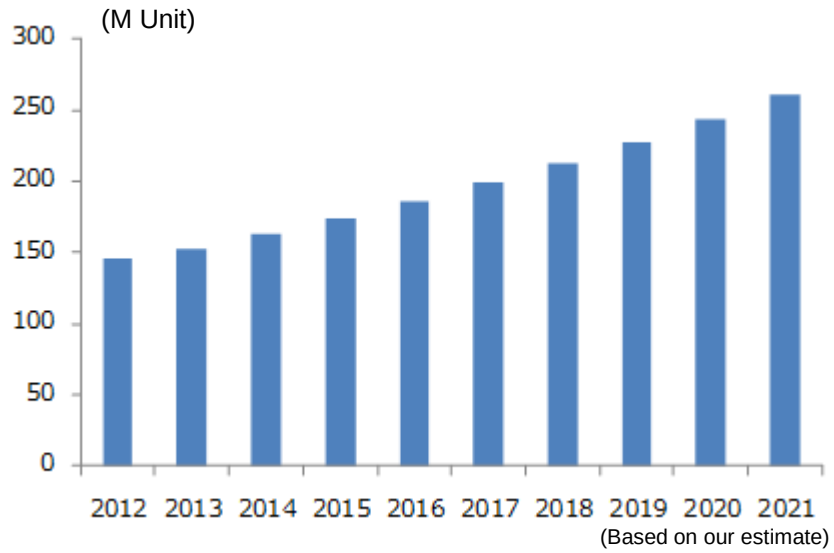
Sensor for Safety

Demand forecast of Acceleration Sensors for ESC



Demand forecast of Ultra sonic sensors for parking assistance system



- Increasing use of assistance systems for safe driving raises the demand of sensors.
- Increasing opportunities for Murata's MEMS sensors for ESC (Electronic Stability Control) and ultrasonic sensors for parking assist and automatic parking.

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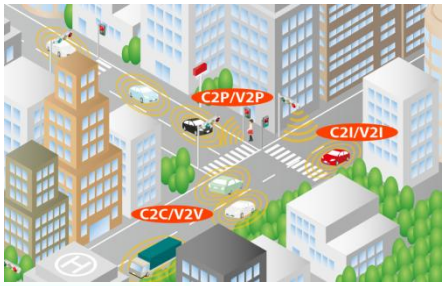
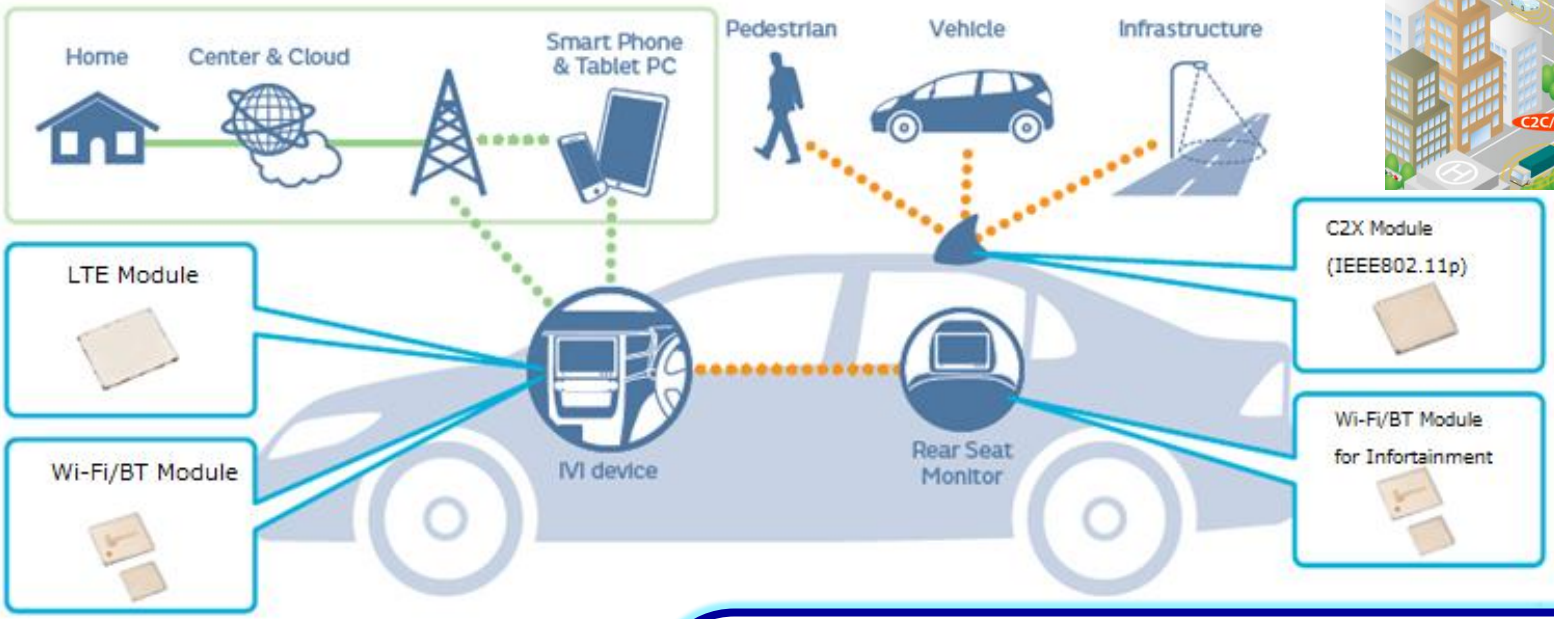
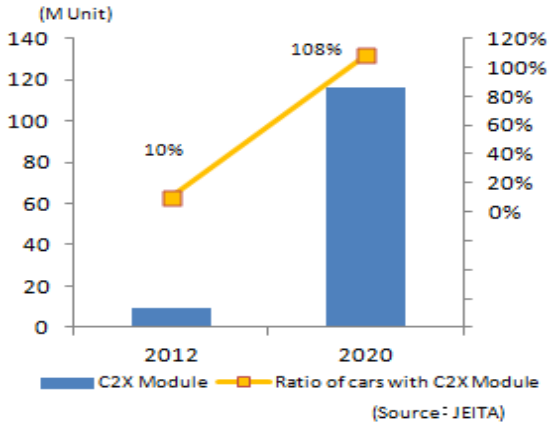
Connected Car (C2X/V2X)





W/W demand forecast of C2X modules and share of Vehicles with the modules



- 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-pedestorian) will support safe driving and help make autonomous driving a reality.

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

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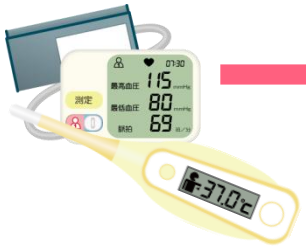
Medical/Healthcare Market

Body temperature, blood pressure, pulse rate, etc.

Film temperature Sensor
(temperature sensing function)

Optical Sensor
(pulse sensing function)

MEMS Pressure Sensor
(air pressure sensing function)



Internet

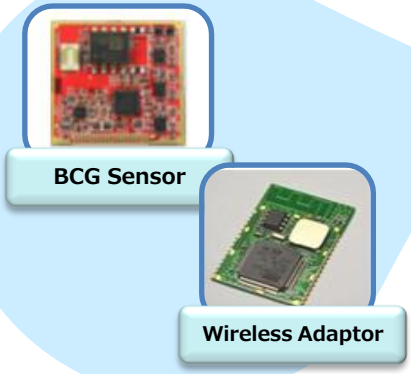
- Various sensing technologies register biometric measurements.
- The core communication technology is used for control via the Internet.
  ⇨ Providing support for telemedicine and home care

RFID solutions help medical treatment

Dosing error prevention, medicine control, test progress control

<Other uses>
Control of medical equipment, checks during exams, access control, location information control

MEMS sensors for BCG (ballistocardiography)



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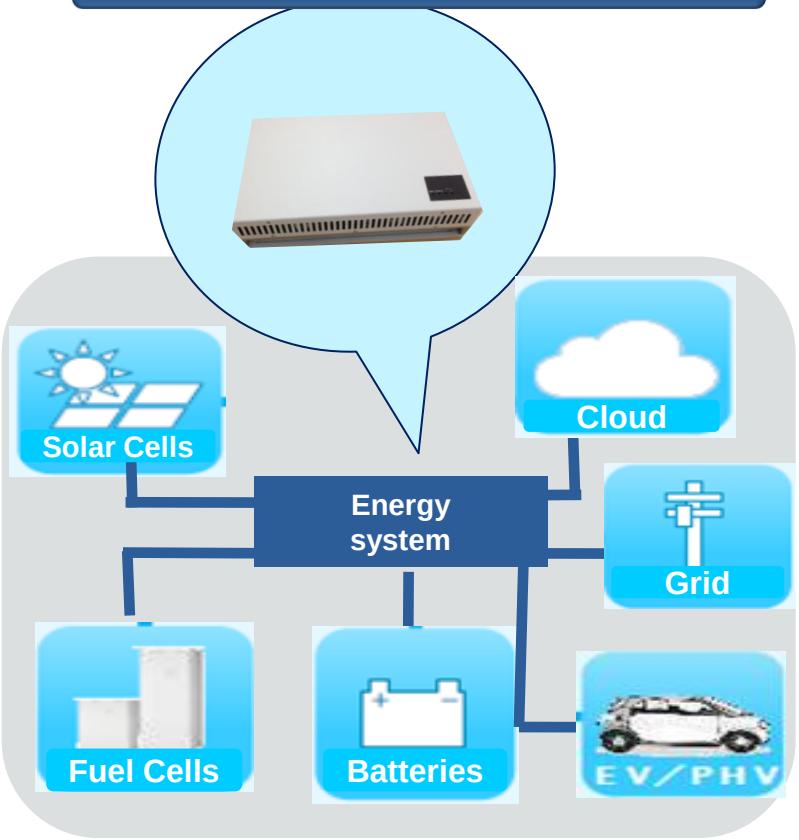
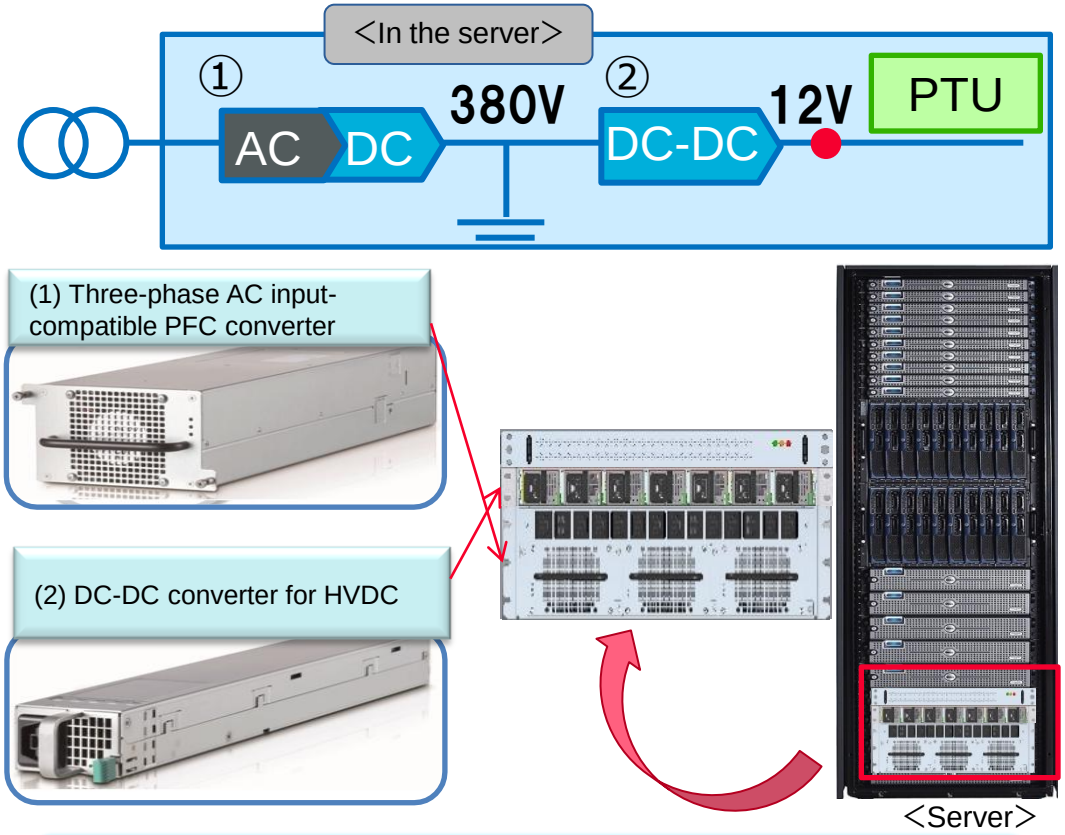
Environment & Energy

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



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

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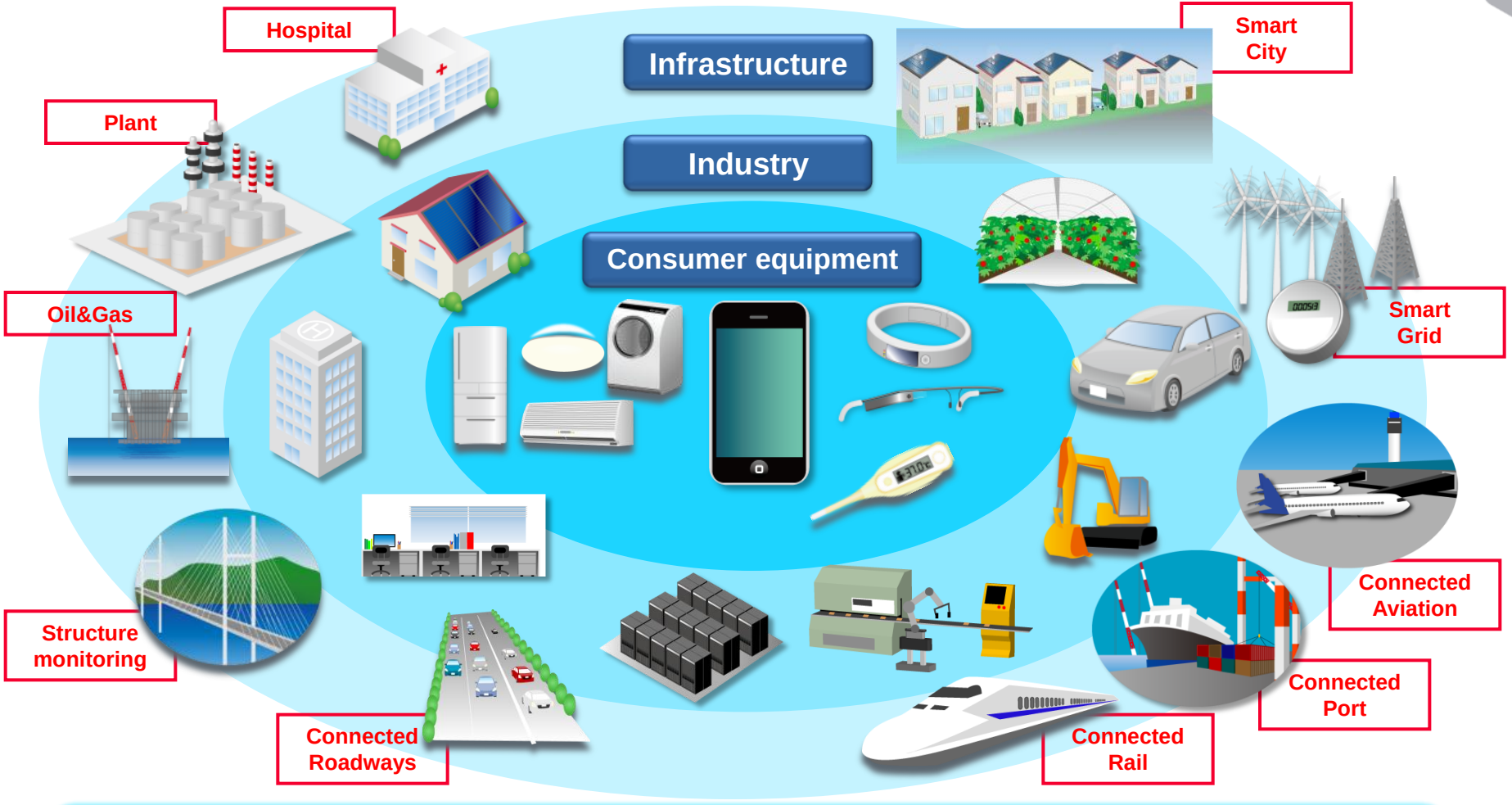
The Connected World



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

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An Increasing Number of Connected Devices and a Rapid Increase in Data Traffic

IoT/M2M

Need for new communication technologies

＊ Carrier aggregation

＊Advanced MIMO (use of multiple antennas)

＊ Wireless mesh network, etc.

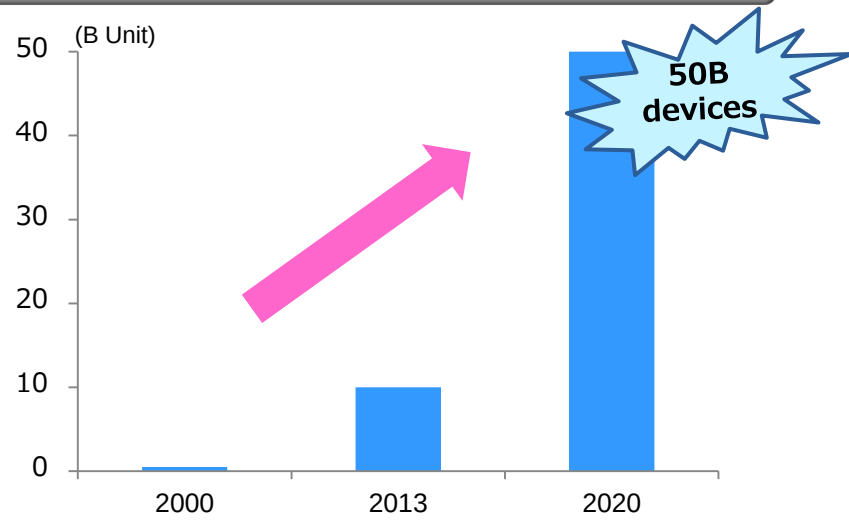
Increasing number of connected devices requires more data traffic.

Notes on technical terms

* MIMO (Multi-Input, Multi-Output)
  A wireless communication technology in which multiple antennas are used at both the transmitter and the receiver to ensure higher speed, quality and reliability.

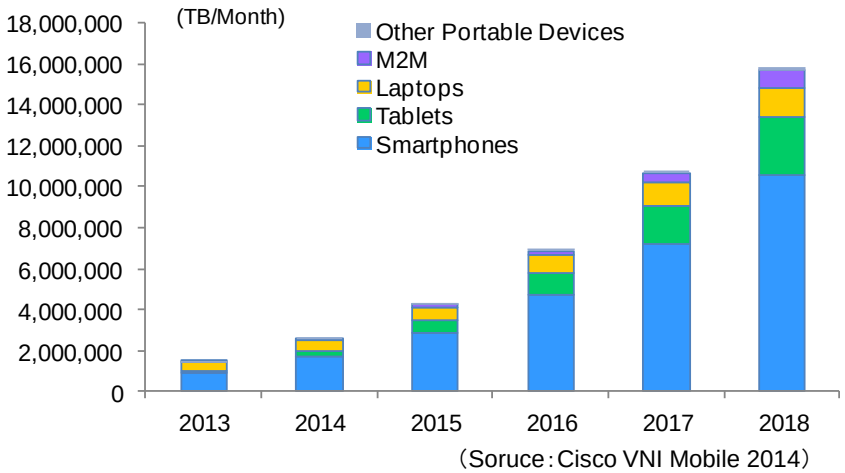
* Wireless mesh network
  A communication network made up of radio terminals mutually communicating in a mesh topology. A mesh network features high fault tolerance. If one terminal can no longer operate, the rest of the terminals can still communicate with each other because they adapt the network by using the normally functioning nodes only. This feature makes it possible to build an even broader and more flexible network.

Number of devices connected to the Internet



(Soruce：Cisco White Paper 「Embracing the Internet of Everything To Capture Japan's Share of $14.4 Trillion」, 2013)

Trend of the world's mobile data traffic



(Soruce：Cisco VNI Mobile 2014)

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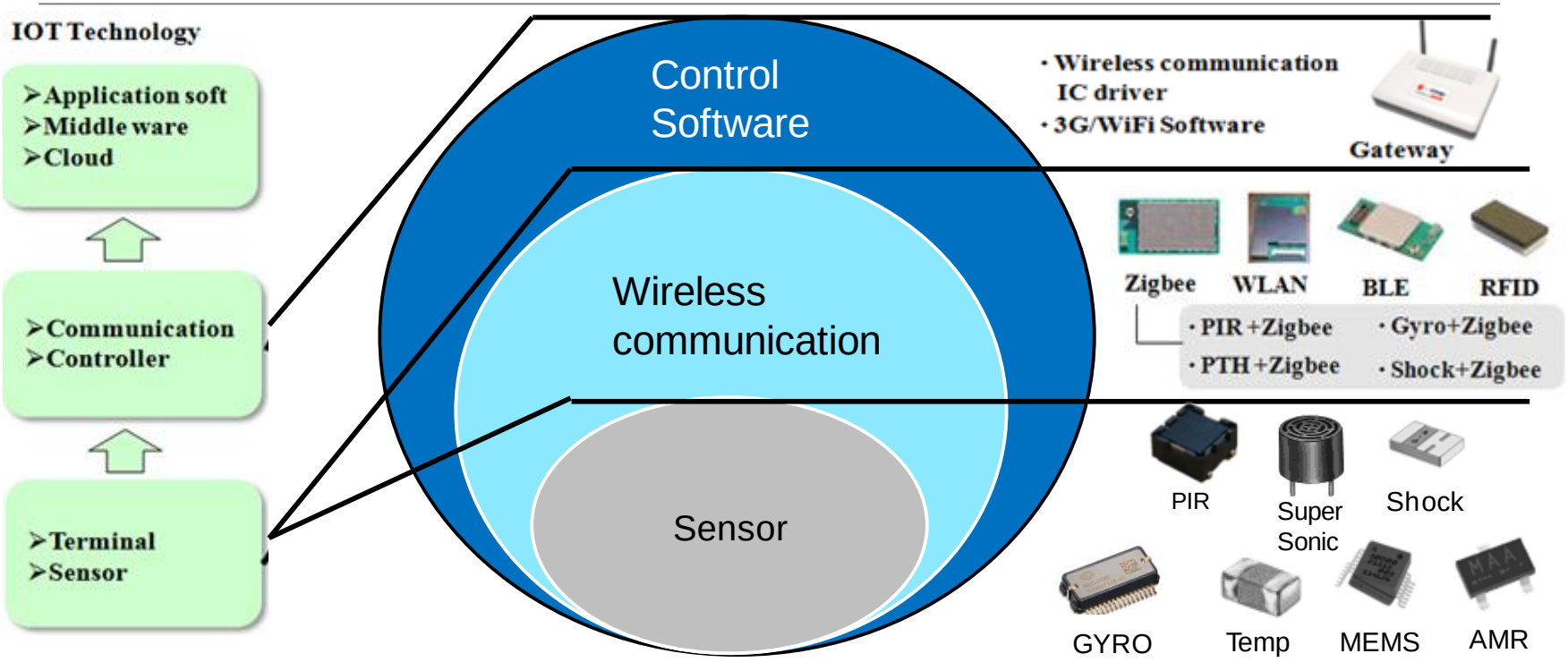
Advantages of Murata in IoT Market



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"

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Business Model in the IoT Market

Hospital

OFFICE

Museum・Gallery

ZigBee

PIR Sensor

Wi-Fi

Wi-Fi Router

Gateway
SHGC200

Smart device

Lumen Sensor

Murata has developed a lighting control system combining software with communication modules, offering the customer a choice of different lighting modes designed for several time divisions of day.
Reduced costs for introduction (such as cabling) and high flexibility have allowed it to be implemented by many customers.

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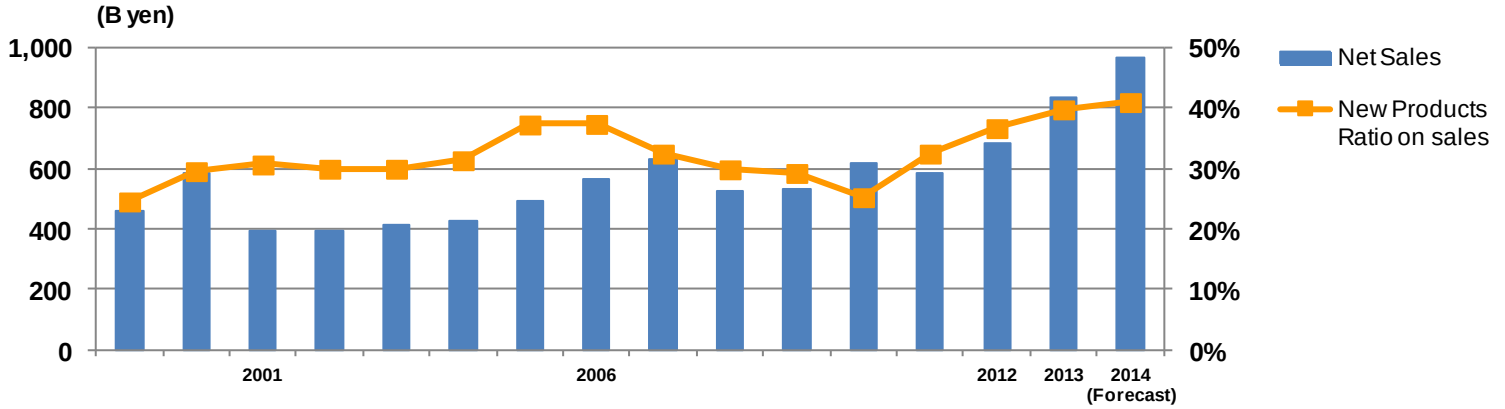
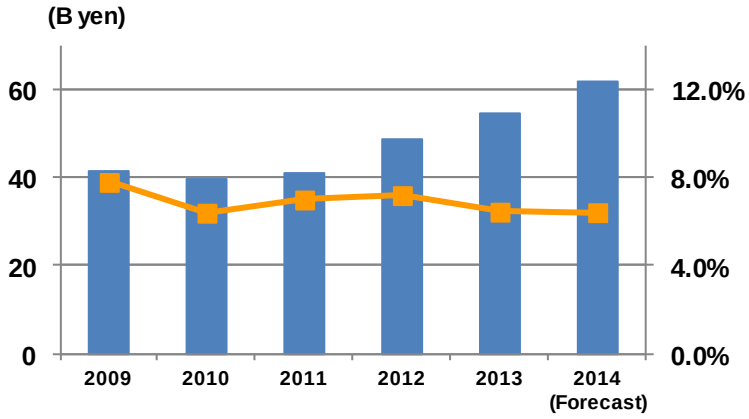
Net Sales and New Products Ratio on sales/ R&D expense and R&D ratio on sales

Net Sales and New Products Ratio on sales



R&D expense and R&D Ratio on sales



Fiscal year 2013
- R&D expense
  54,649 million yen
- R&D Ratio on sales 6.4%

Fiscal year 2014 (Forecast)
- R&D expense
  62,000 million yen
- R&D Ratio on sales 6.4%

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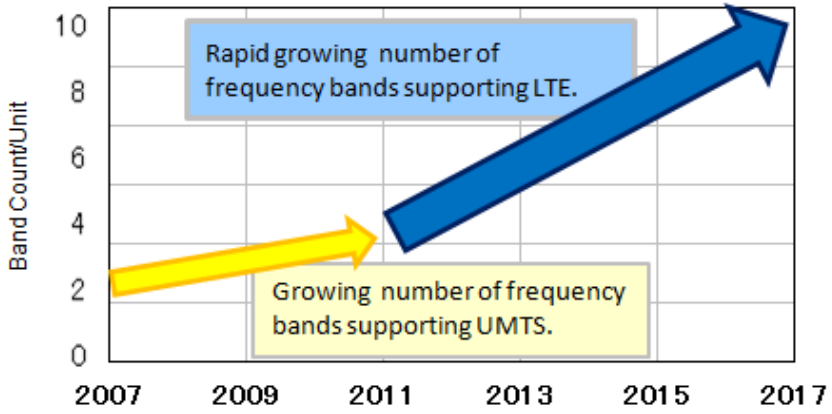
Strength of Murata's SAW Devices

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
○	○	○	○	○	○	○	○	△	○	○	×	△	○	○	○	△	△	○	△

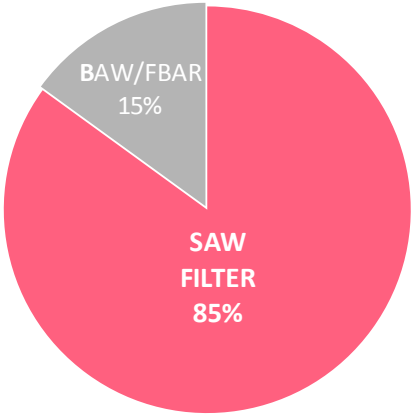
○: Advantage for SAW △: SAW competes with BAW／FBAR ×: Advantage for BAW／FBAR

Estimated growth in average band count per mobile device



(Based on our estimate)

Shares of SAW and BAW/FBARin demand for filters



(Based on our estimate)

Low-TCF and improvements in the characteristics of existing SAW devices, have been leading to an increased replacement of BAW/FBAR devices by SAW products in Chinese TD-LTE and other applications.

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

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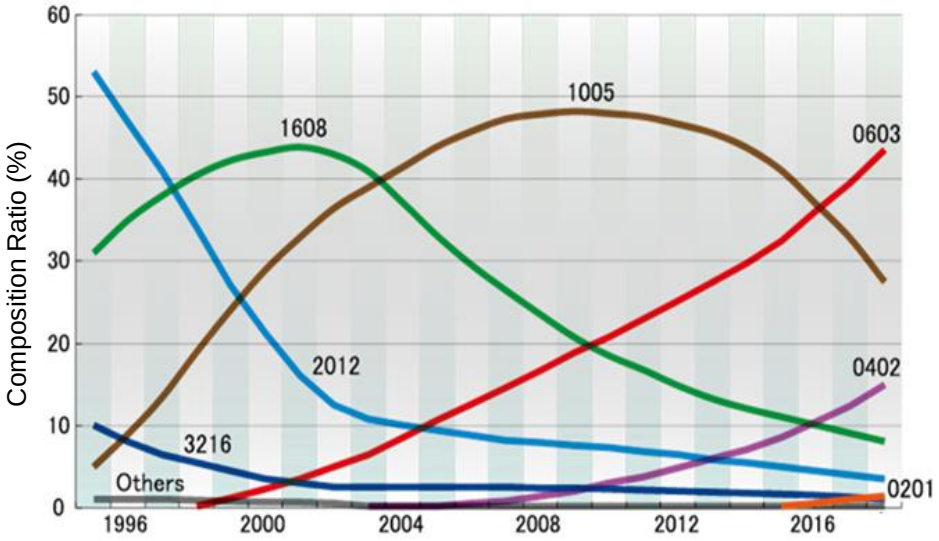
“Technology Breakthrough ” as Top Runner in MLCCs

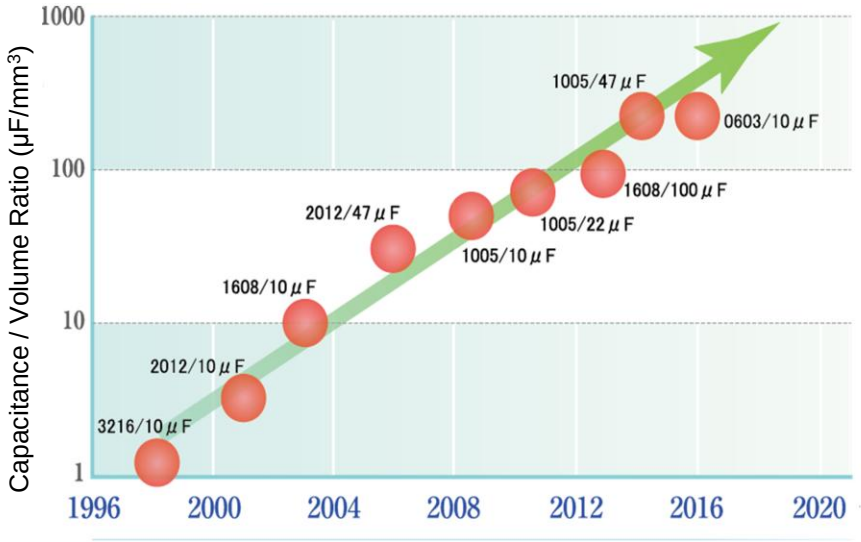
MLCC Size Trend

【Size : mm】



- 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) from April 2014.

Trend toward Compact & High-Capacitance MLCCs



- MLCC’s density of electrostatic capacity increases year by year.
- Trend of MLCC’s miniaturization and hi-capacitance will continue.
- Increase added value by shifting high-technology product in product mix.

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.

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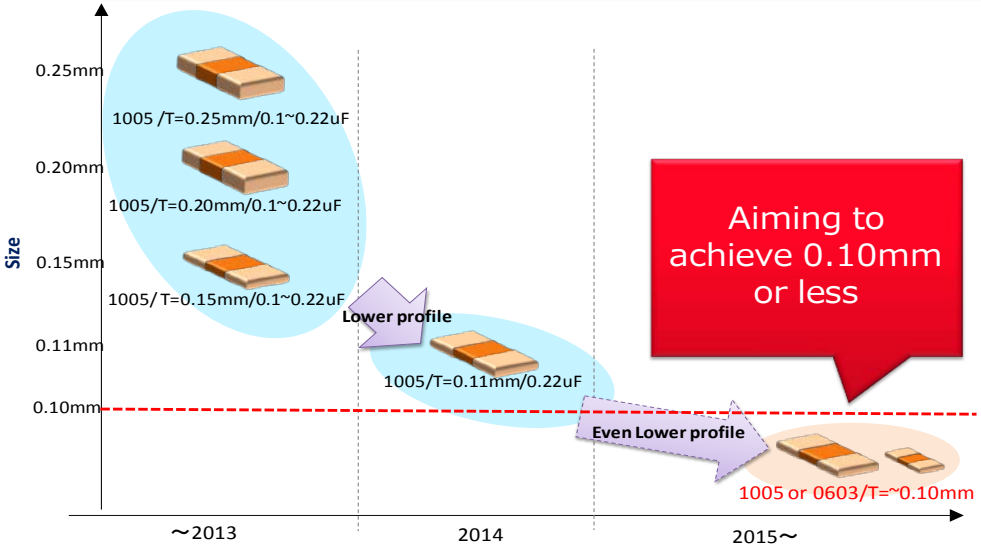
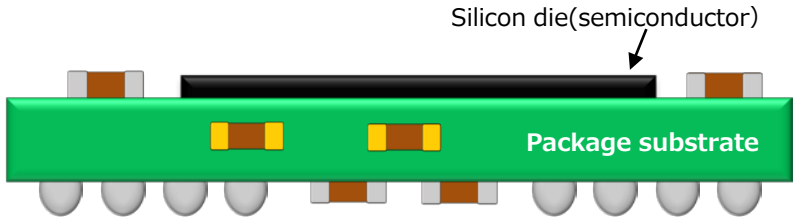
New Products & New Business

Taking On the Challenges of Embedded Capacitor Technology





- Helps downsize equipment and improve IC characteristics.
- Finds uses in smartphones, ICs, and wearables.
- Accelerates collaboration with IC manufacturers.

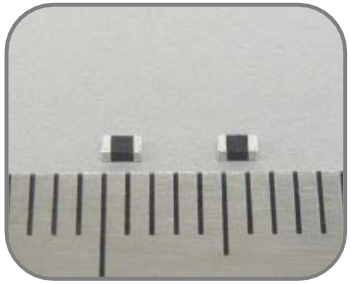
AMR sensors capable of 3D sensing

Murata's AMR element and circuit design technologies allow for non-directional 360-deg. magnetic sensing.

<Uses>
・Magnetic tampering detection in security devices and game machines
・Mobile phone proximity sensing in hearing aids

Ultra-compact low-profile metal alloy power inductors

muRata × TOKO



- Combining Murata and Toko technologies to create synergy
- Helping reduce the size and thickness of power supply circuits and extend battery life

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Capturing Demand in Emerging Countries

Increase in Production Ratio outside Japan

- The materials production plant was established in China (Foshan) in June, 2014.
- Continuing to shift production to China (Wuxi, Shenzhen), Thailand and Malaysia.
- Increase in production ratio outside Japan (FY2010: 15% ⇒ FY2014 (est.): 30%)

Expansion of Sales Facilities in Emerging Countries

- Building sales networks and support system in China included inland area.
- Focusing on exploiting demand in emerging countries with Chinese customer.
- Established sales companies in India(3 brunch) and Vietnam(1 brunch).

Seizing growing demand in emerging countries where upper/middle-class population is exploding.

Amplification of Design Supports

- Established a shielded room in Beijing, Shenzhen,Taipei, to promote EMC solutions in Greater China.
- Reinforcing support systems in addition to the Murata EMC Support Center in Shanghai.

EMC Support Center in Shanghai

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M&A

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

Murata Power Solutions

- 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 swiches***

(ongoing)

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.

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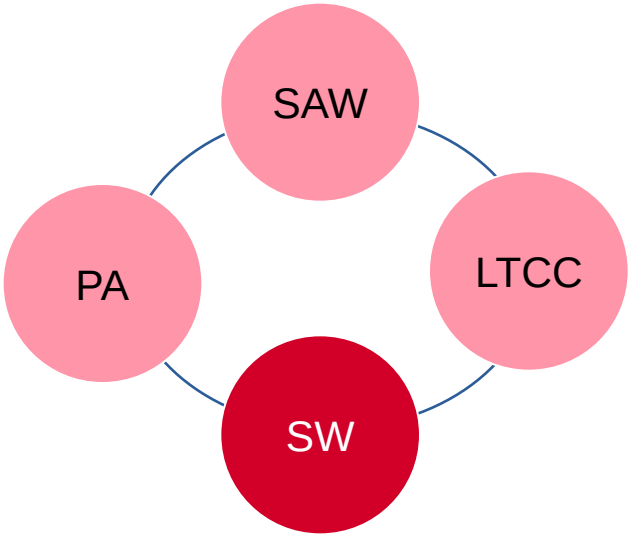
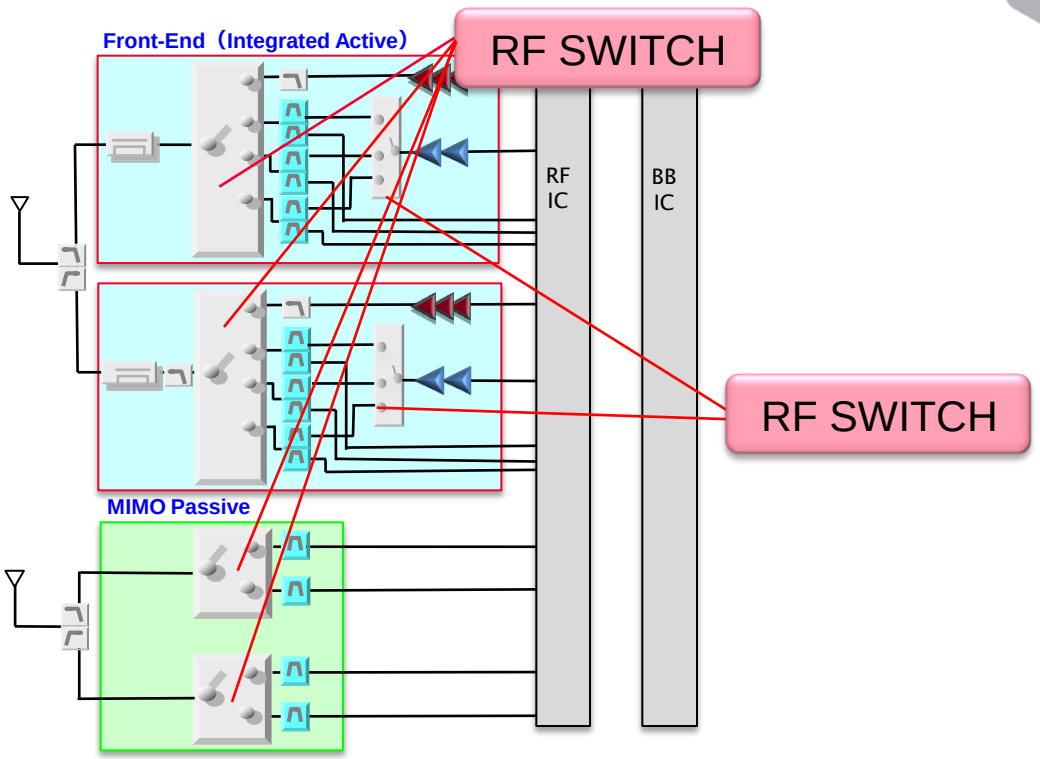
Objective of Acquisition of Peregrine

Peregrine Semiconductor





- A leading company providing semiconductor RF components, such as RF switches used in the RF front end, which are becoming increasingly complex
- Peregrine has RF CMOS technologies (RF-switches, RF-power amplifiers, and digital tuning devices).
- By integrating Peregrine as a competitive group member, Murata enhances its portfolio of key devices for use in the RF front end.
- Increasingly complex communication circuits require a greater number of RF switches.
- Peregrine allows Murata to establish a consistent RF component development system comprising of (1) semiconductor process development, (2) semiconductor design, (3) circuit design, and (4) module design.

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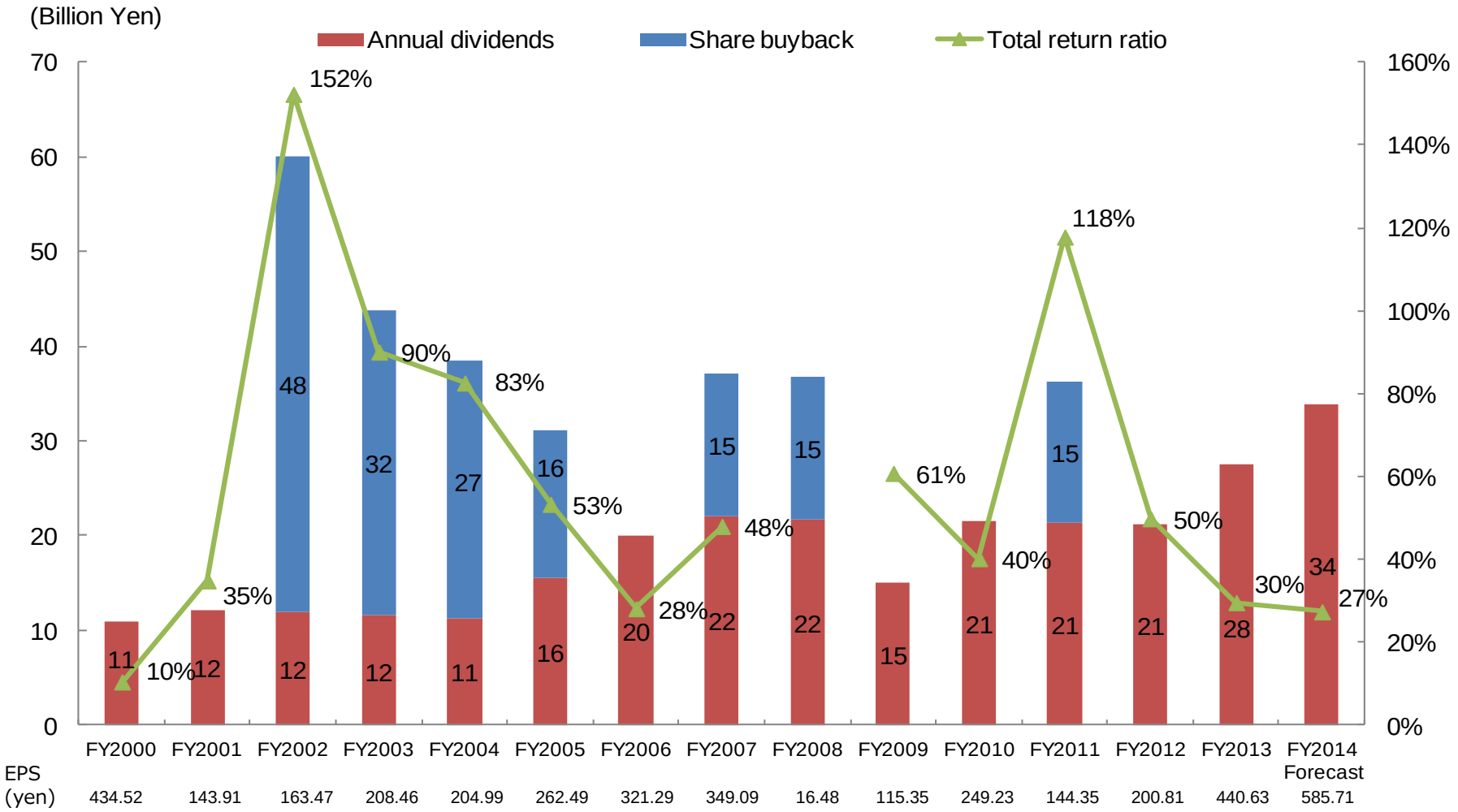
Return to Shareholders



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.

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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.

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Thank you

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