

**Information Meeting 2008
Murata Manufacturing Co., Ltd.**



Production of Electronic Equipment



(Sales figures in million)

		FY2006	FY2007		FY2008	
				Growth		Growth
Mobile phones	Component demand	990	1,169	+18%	1,217	+4%
PCs	Component demand	247	275	+12%	288	+5%

Final demand for electronic equipment continues steady growth

Future Market Environment



Quantity Demand for electronic equipment is expected to continue to grow

Mobile phones

- **Production of 3G terminals will increase by 30% every year until 2010**
 - Number of components per 3G phone
 - Capacitor: approx. 300 (approx. 1.5times higher per unit than in GSM handsets)
 - SAW filter: 9-10 (approx. 3 times higher per unit than in GSM handsets)
 - Increase in the ratio of products with additional functions such as W-LAN, GPS, Digital terrestrial television
- **New economies will gradually shift from initial spread to replacement phase, accelerating functional sophistication**

Future Market Environment



Flat-screen televisions

- Production continues to maintain double-digit growth
- Functional sophistication (e.g. increase in image quality) arouses replacement demand and demand for additional units
- Increase in screen size increases number of capacitors per unit
32-inch TV: approx. 700~800 40-inch or larger: more than 1,000

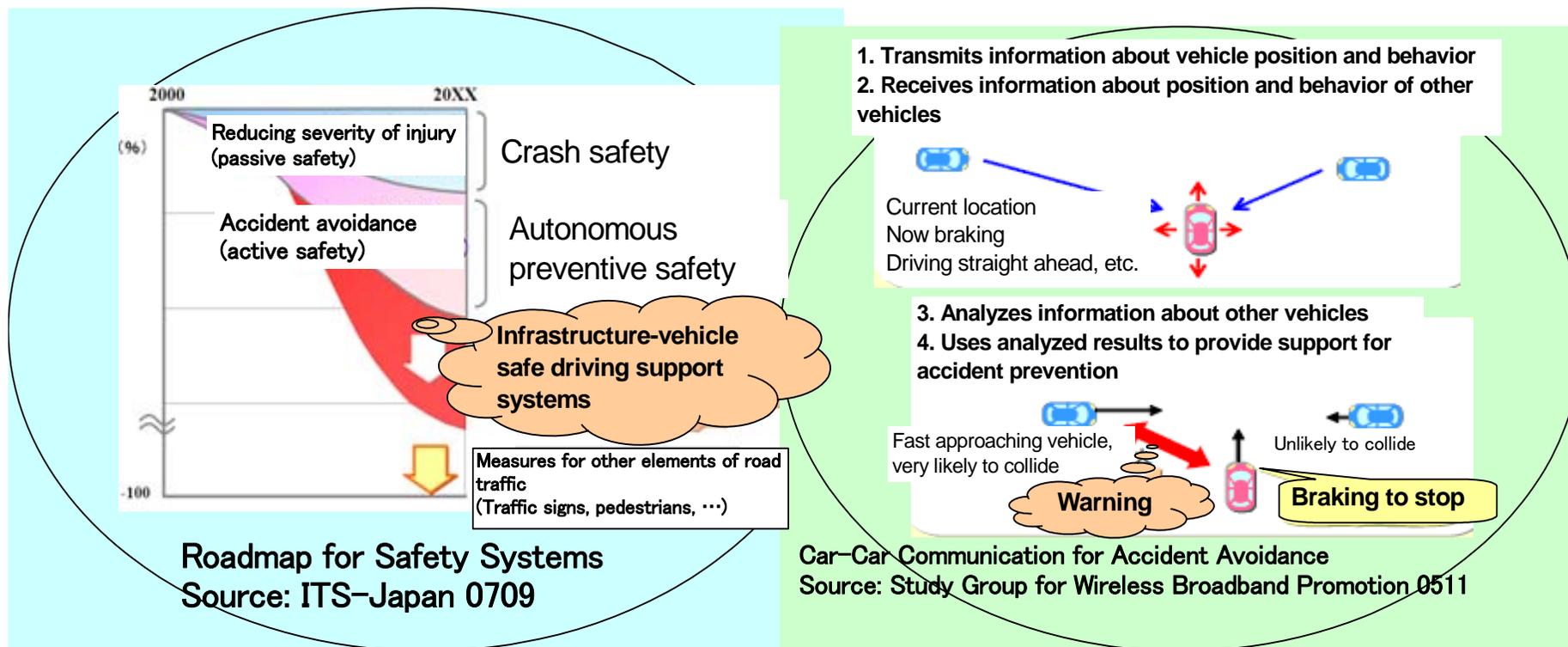
PCs

- Notebook PCs will enjoy steady production and continue annual double-digit growth until 2010
- Further improvement in performance and enhancement in wireless communication will increase number of components in PCs
- Low-cost notebook PCs will further increase PC production, helping increase component demand

Future Market Environment

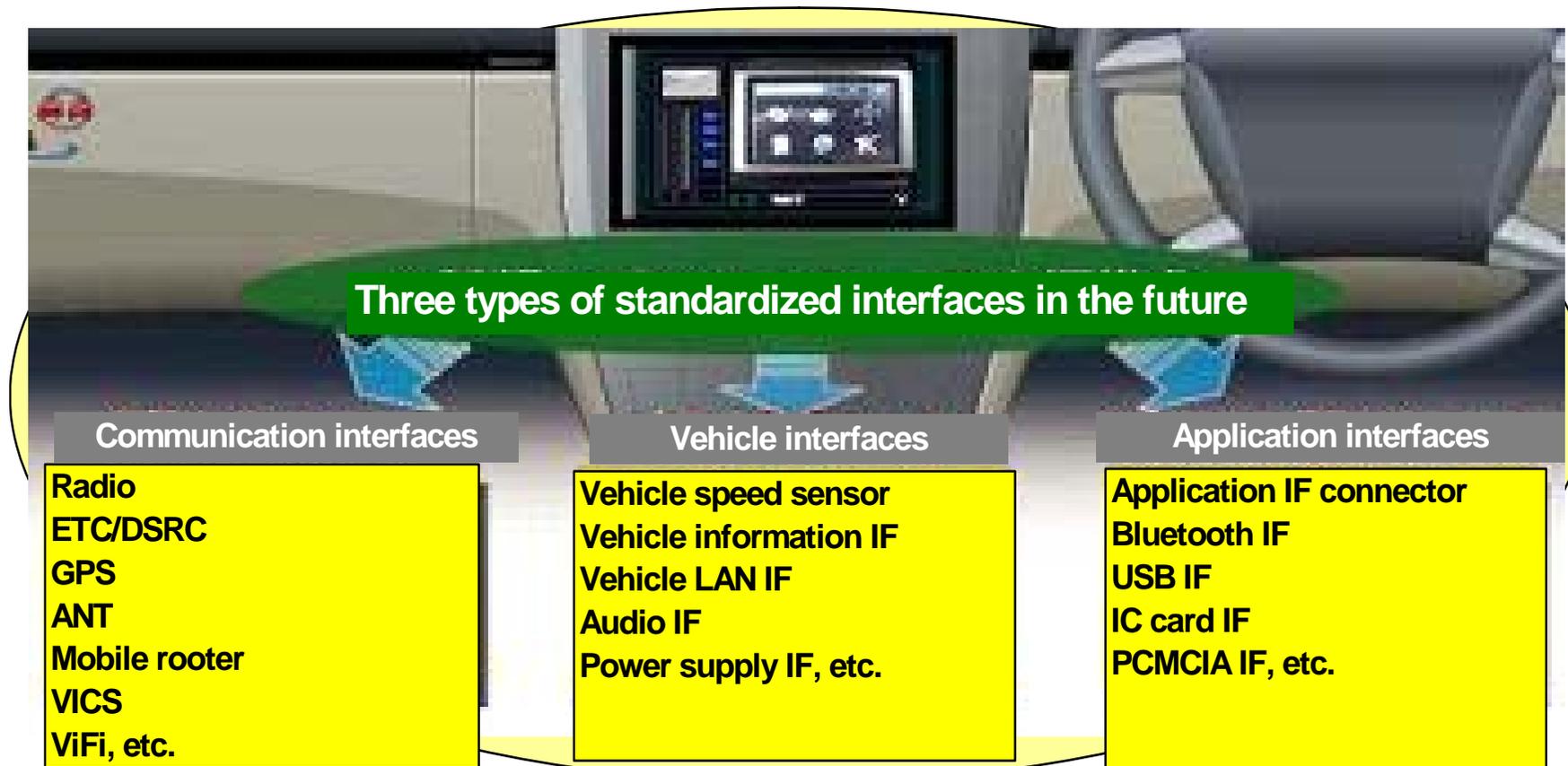
Automobiles

- Rapid “electronification” for improved safety and comfort will increase demand for Murata components
- Growing independence from fossil fuels will create huge demand in battery- and inverter-related segments



Future Market Environment

Automobiles



Source: Internet ITS Consortium

Large-capacitance capacitors

■ Demand will continue to grow

- Production of key assembled products (mobile phones, PCs, and flat-screen TVs) will continue to grow. Functional sophistication will also continue.

- Mobile phones: 3G terminal share will increase.

 - 3.9G/4G products will appear.

- Computer MPUs will have many cores and functionality will improve.

■ Murata is introducing thinner-layer products

- Large-capacitance capacitors with $0.5 \mu\text{m}$ thin-layer dielectrics will soon be commercialized.

 - 2012 size $100 \mu\text{F}$ capacitors**

 - 1005 size $10 \mu\text{F}$ capacitors**

Capacitors: Trends and Product Strategy



Ultra-small capacitors (0.6 x 0.3mm, 0.4 x 0.2mm)

- Introduction started with power amplifier modules. Recently, they spread to the main body of mobile phones and portable media players and games
- Demand continues to grow steadily in FY2008

Application-specific capacitors

- High shares combine with dual-core/quad-core technology to increase demand

High-end large-capacitance/small/application-specific capacitors

- ◆ Account for 60% of net Murata capacitor sales
- ◆ Increasing production and functionality of assembled products translates into continued growth

Noise Suppression Components: Trends and Product Strategy



Increase in noise levels due to digitalization and higher functionality of equipment increases demand

- Chip ferrite beads (BLM) efficiently suppress noise
- Chip coils (LCHIP) can adapt voltage transformation to the driving voltage of the ICs on which they are mounted
- Chip three-terminal capacitors (NFM) offer favorable characteristics for noise suppression in power supply lines of digital AV equipment
- Chip common-mode choke coils (DCC) effectively suppress noise generated in high-speed interfaces such as USB 2.0 and HDMI
- With their outstanding current superposition inductance characteristics, multilayer-type power inductors make smaller and thinner DC-DC converters possible

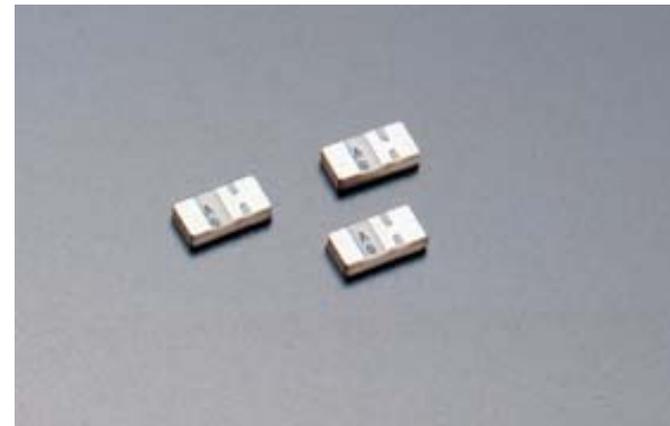
SAW Filters: Trends and Product Strategy

- Taking advantage of the recent increase in demand, Murata has launched new products and has made aggressive investments to increase supply capability, raising market share.
→ *Currently Murata is the leading manufacturer with a 40% share*
- In addition to the growing mobile phone production, multiband technology is increasing the number of components used per unit
GSM terminal: 2-3 → 3G. terminal: 9-10
- **Boundary acoustic wave filters**
 - New structure that eliminates cavity structure has resulted in significant downsizing (1/3 smaller in area than conventional products) and cost reductions.
 - More resistant to high temperatures and pressures

Sensor-related Products: Trends and Product Strategy

Shock sensors

- Number of components used per unit has increased as they are used in HDDs to detect not only shocks, but also rotations
- Used in most 2.5-inch and smaller HDDs, and also in an increasing portion of 3.5-inch HDDs due to an increase in storage capacity and recording density
- Also used for vehicle airbag systems and as TPMS tire movement sensors



Shock sensors

Sensor-related Products: Trends and Product Strategy



Ultrasonic Sensors

- Fitted in vehicle bumpers and passenger compartments, these sensors detect obstacles and burglars
- Number of ultrasonic sensors per vehicle is increasing because more vehicles use them and because they now detect not only distance to obstacle, but also direction in which obstacle is located

MEMS microfabrication technology

- Murata develops a range of ultra-small sensors such as MEMS gyros for car navigation.



MEMS gyro

Module Products: Trends and Product Strategy



Short-range wireless communication modules

- Rapid increase in wireless LAN modules
Net sales for FY2008 will increase more than 200% from previous year.
→ *Up 40% for SR wireless communication modules*
- Murata will develop and commercialize modules for next-generation technologies (WiMAX, UWB) to gain a major share
- Will use Sychip's software technology



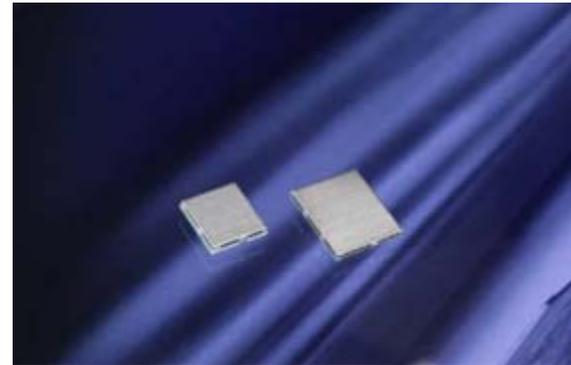
Wireless LAN module

Module Products: Trends and Product Strategy



DTTV tuners

- There is demand for tuner modules for 1-seg DTTVs
- Components for full-seg TVs are required to improve image quality.



DTTV tuners

Acquisition of the Power Electronics Division (PED) of U.S.-based C&D Technologies

- PED boasts a broad lineup of standard power supplies and a strong presence in overseas markets
- PED will introduce Murata's outstanding energy-saving technology
- Murata will start full-fledged business in Western markets for industrial power suppliers for servers, routers, and base stations

Hybrid converters

- High-power DC-DC converters for automobiles (HEV/EV)

Long-term Goal



Long-term goal of reaching 1 trillion yen net sales in FY 2015

■ Business to be enhanced based on existing businesses

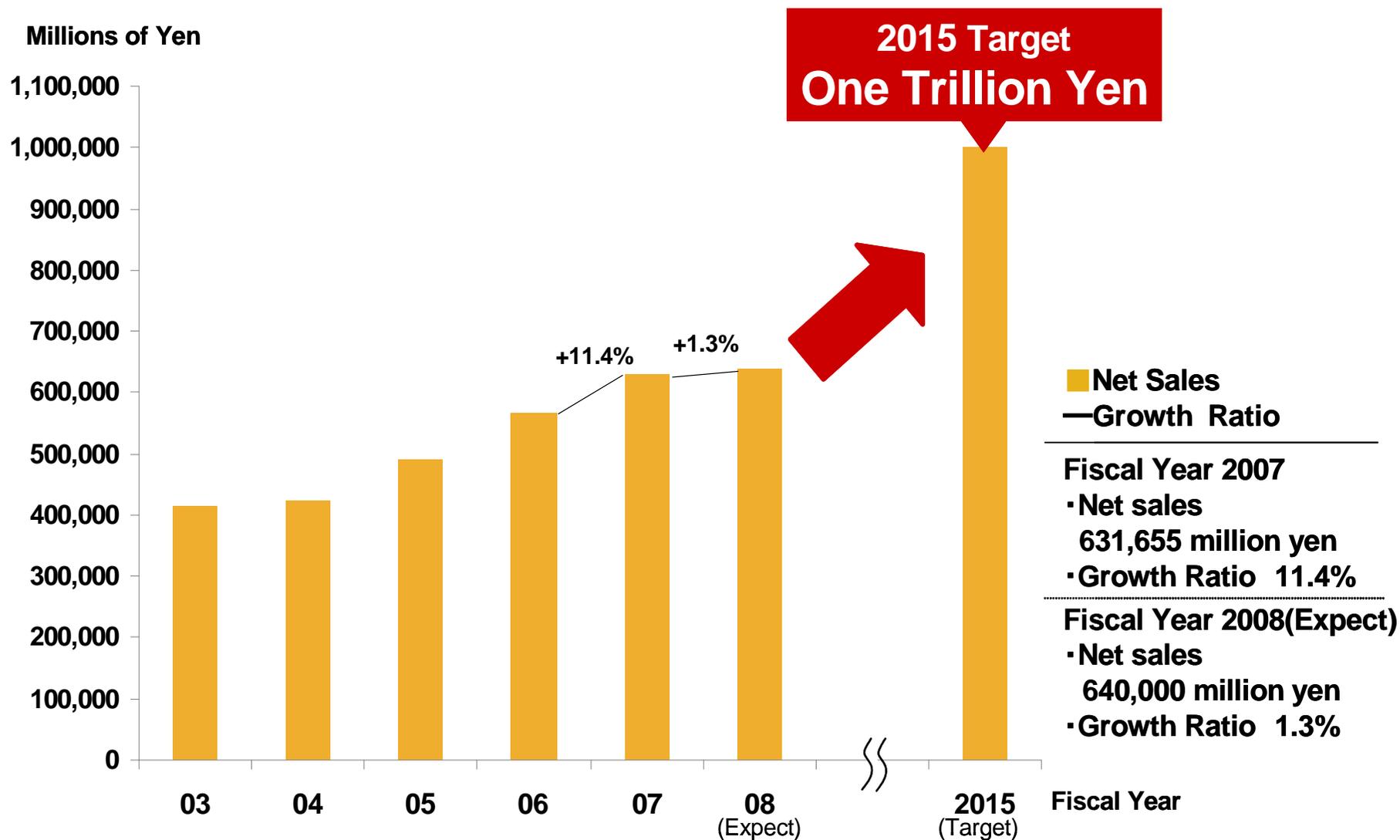
New products for migrating business domains both in terms of technology and market

→ Expanding our business areas

■ Development of new businesses

With a focus on electronic components for energy, power electronics, bio- and environmental markets

Long-term Goal

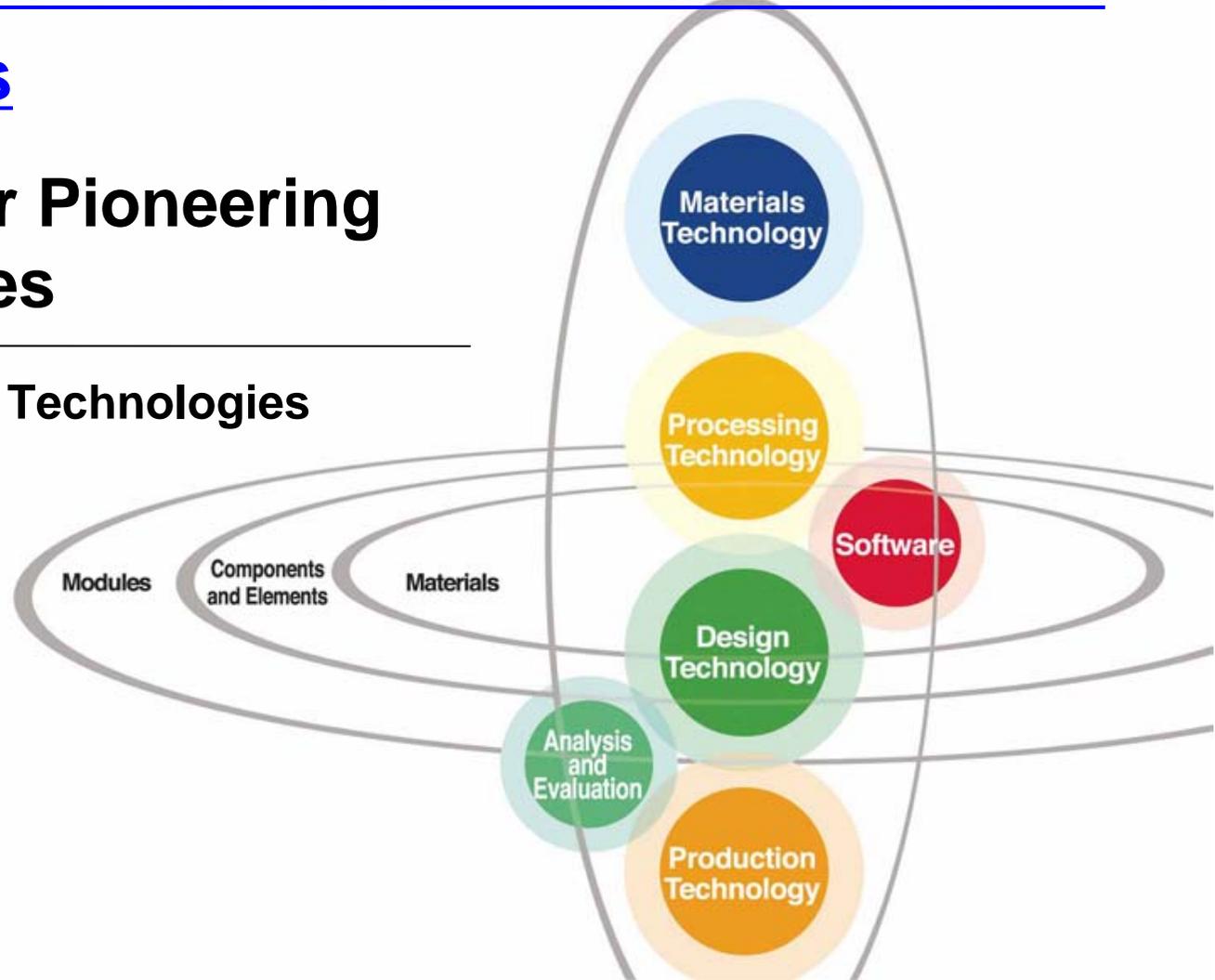


Long-term Goal

Vertical integration and horizontal dissemination of technologies

R&D System for Pioneering New Possibilities

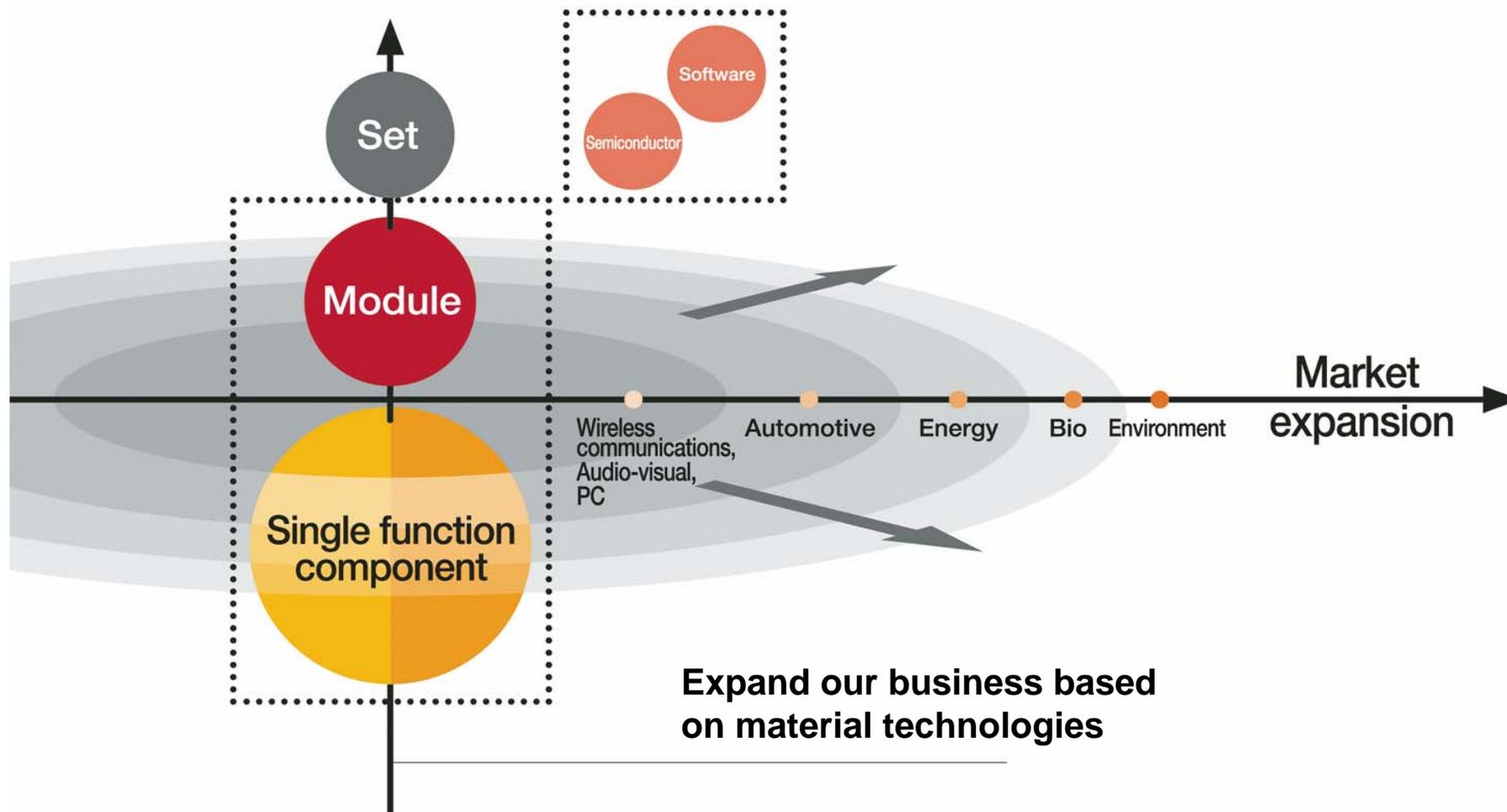
Vertical Integration of Technologies



Long-term Goal

Expansion of the business domain

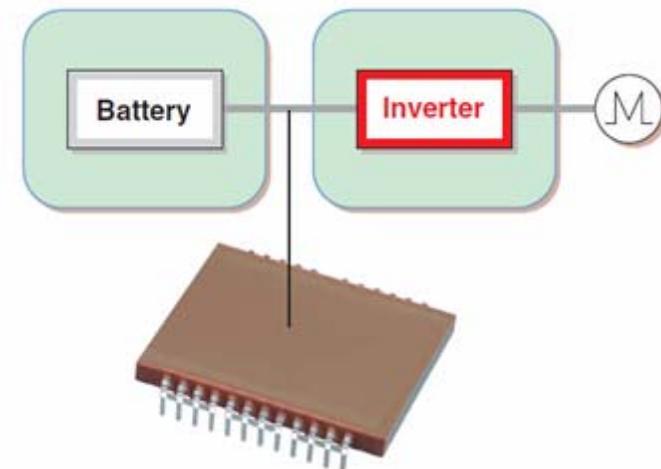
Multiple and advanced function



Future Business Development

Capacitors

- Murata will work on the reduction of dielectric layer thickness seeking to increase capacitance to a few hundreds to 1,000 μ F levels
- Activities in power electronics
 - Commercialization of **super-large monolithic ceramic capacitors** (40 × 32mm) for surge suppression at a new high-voltage and high-power range above 200V
 - Development of electrical double-layer capacitors (**EDLC**).
Planning to commercialize products for power assistance in battery equipment such as camera flashlights



Super-large monolithic ceramic capacitor

Piezoelectric devices

- **Broadening applications by utilizing excellent electrical characteristics and mechanical functions**
 - **Actuators**
Diesel fuel injection systems, camera modules

 - **Piezoelectric speakers**
Thin speakers for mobile equipment

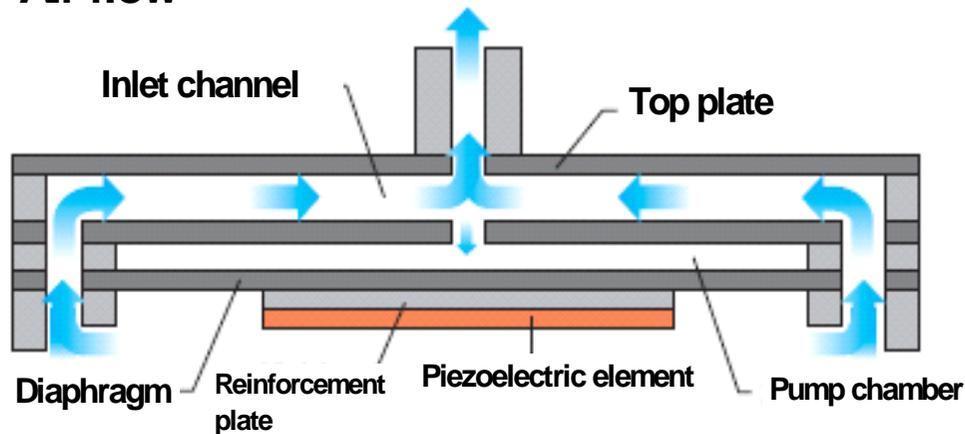
 - **Haptic function**
Future mobile equipment will transmit vibrations to the finger tip as it presses a button.

Piezoelectric devices

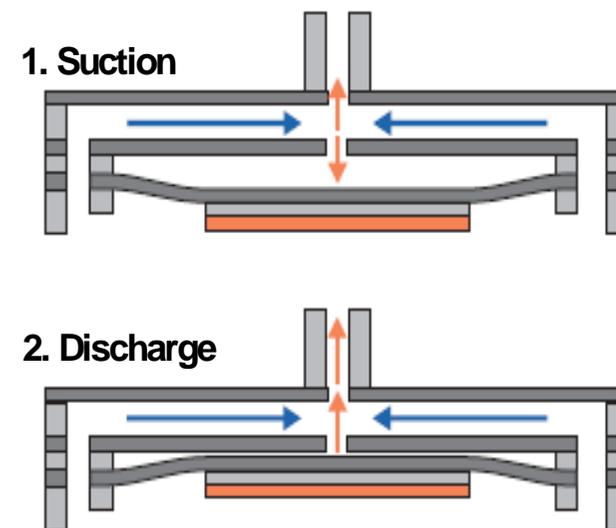
- Piezoelectric micro-blowers

Very thin (1.6 mm) and silent. Consume half the power required by traditional fan air-cooling systems.

Air flow



Operating principle



Future Business Development



Sensing devices

- **In addition to the traditional status detection available in gyros and shock sensors, the technology can be used for substance detection**
 - It will be possible to detect pollutants and biomolecules such as proteins.
 - In addition to electronics, the technology will be further developed for use in new fields, including environmental protection, medicine, and biotechnology.

Future Business Development



Wireless communication technology

- Advancement to new technologies (WiMAX, UWB, LTE (Long Term Evolution))

To achieve the fixed-line transmission rate

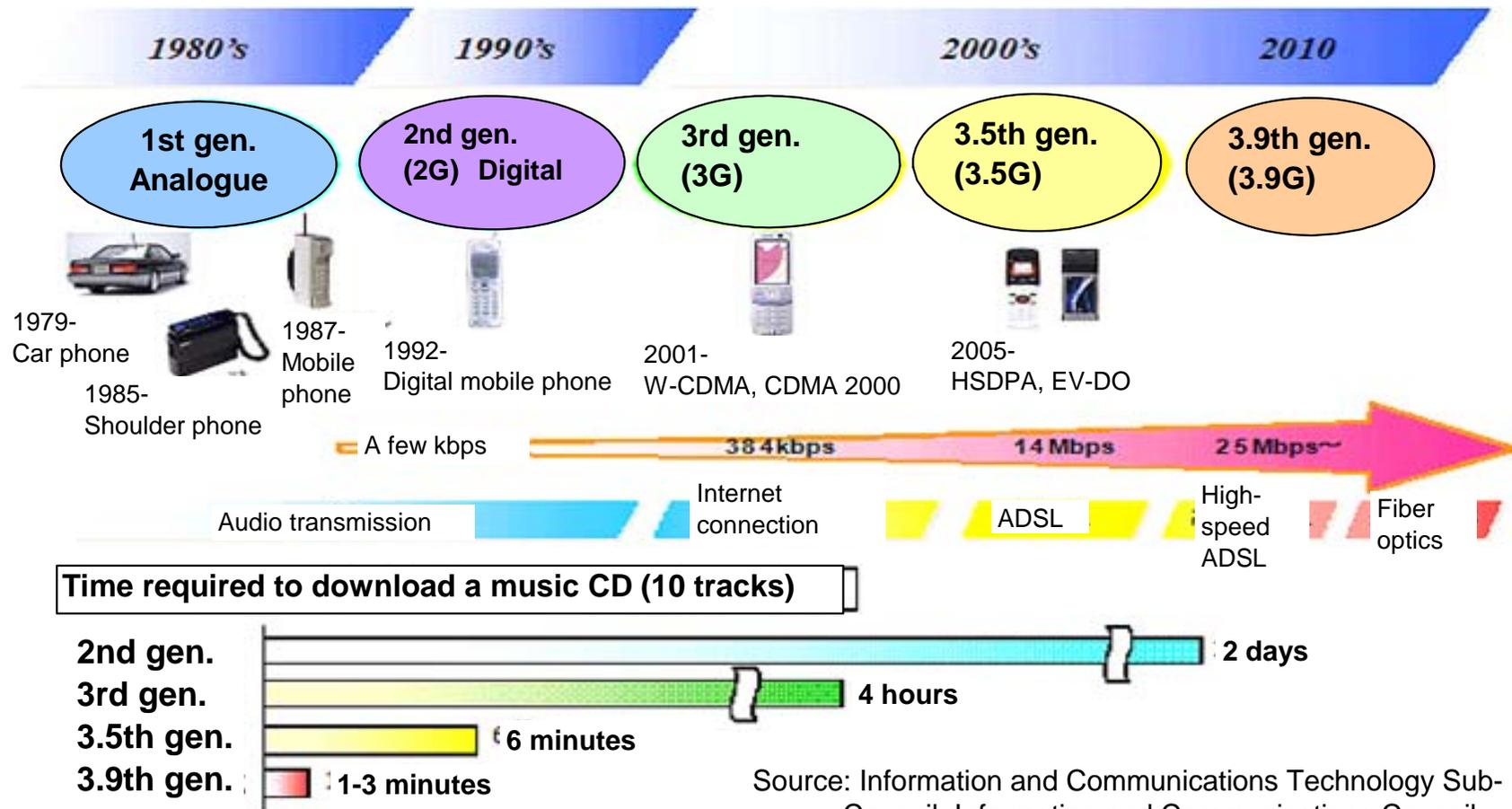
- The MIMO (multiple input multiple output) technology used in LTE will allow a single terminal to have more than two transmission/reception circuits, increasing the number of RF devices (antennas, SAW filters) used per unit depending on the number of circuits and bands employed

Production of LTE terminals is expected to increase to between 300 and 400 million units by 2015

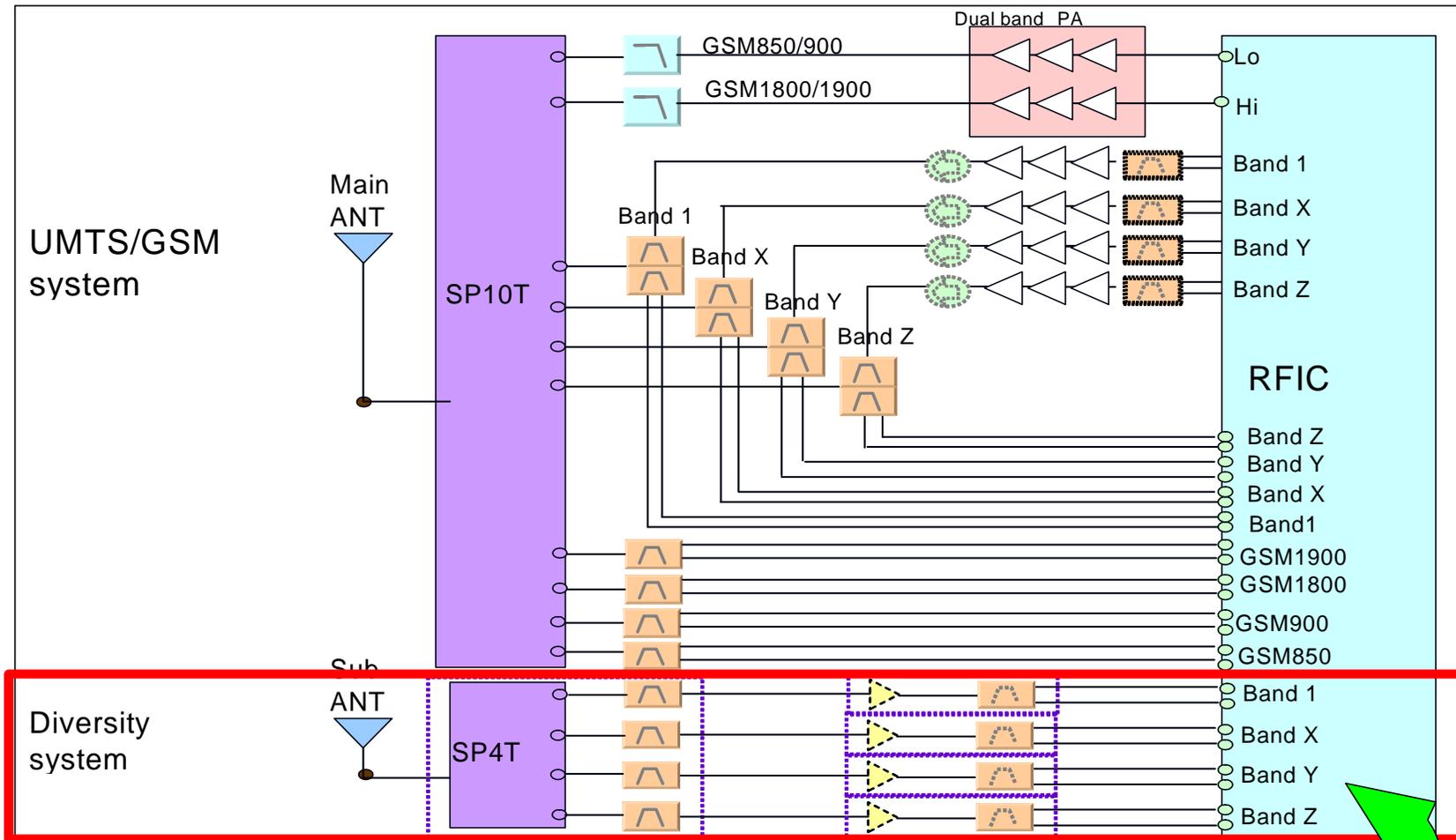
Progress in technology could bring new waves of growth in component demand.

Future Business Development

Generations of wireless communication



Future Business Development



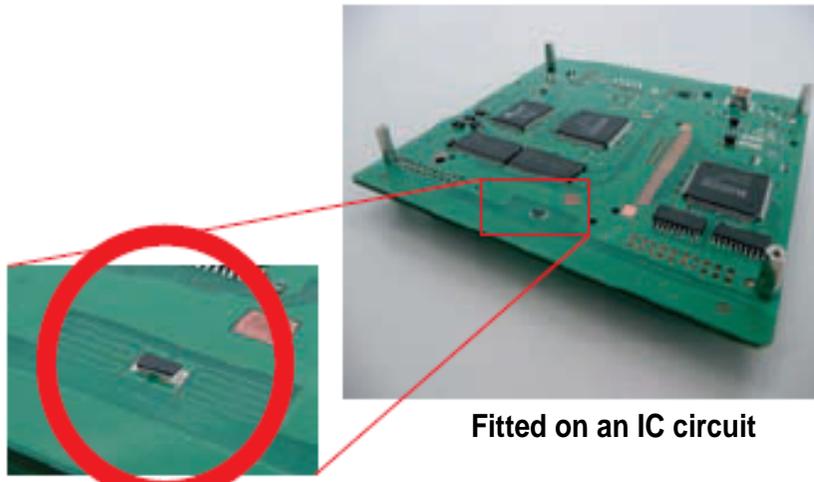
	①3G (4xGSM+3xUMTS)	②3.5G/3.9G(LTE) (4xGSM+3xUMTS+MIMO/Div.)	③3.5G/3.9G(LTE) (4xGSM+4UMTS+MIMO/Div.)
SAW Filter	16	19	24
Isolator	3	3	4
Antenna	1	2	2

Future Business Development

Magic Strap®

- Commercialized as an RFID (radio frequency identification) automatic non-contact tag
- Incorporating a matching circuit, Magic Strap® can be used in hot environments
- Already introduced for process history control. Increase in queries about packaging/shipment and space access control applications

The RFID tag can be mounted using reflow solder and thus can easily be formed on a PCB



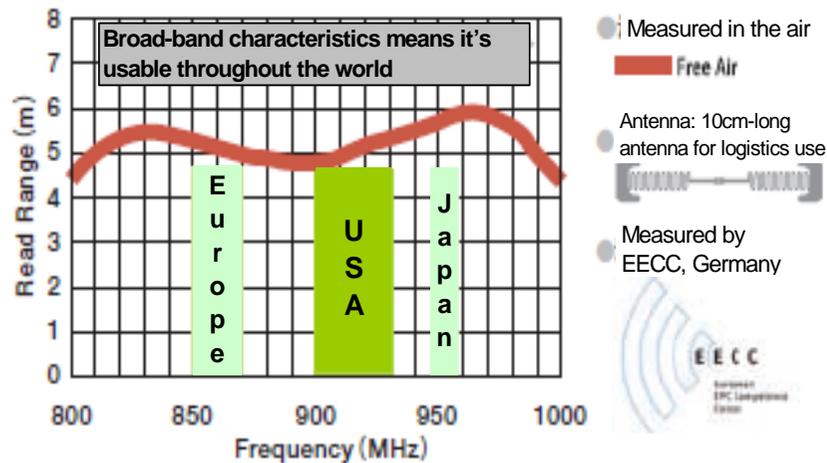
Mountable on tag-shy materials and offers stable operation



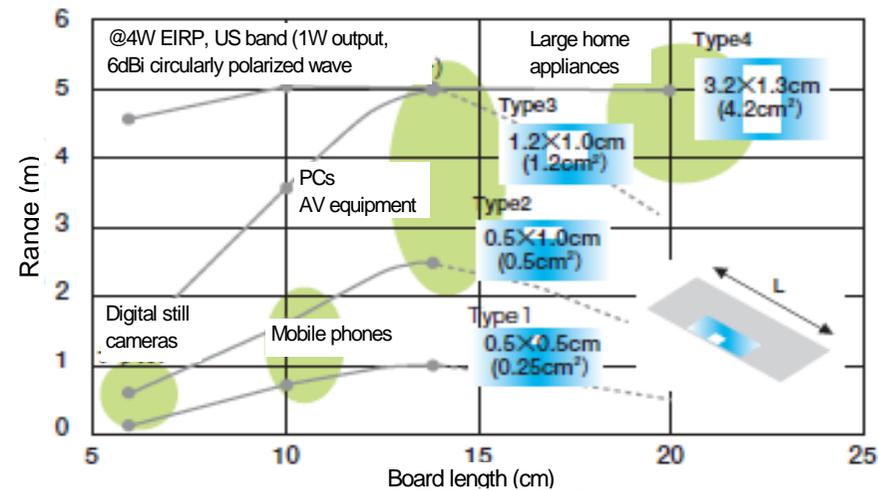
Future Business Development

Magic Strap®

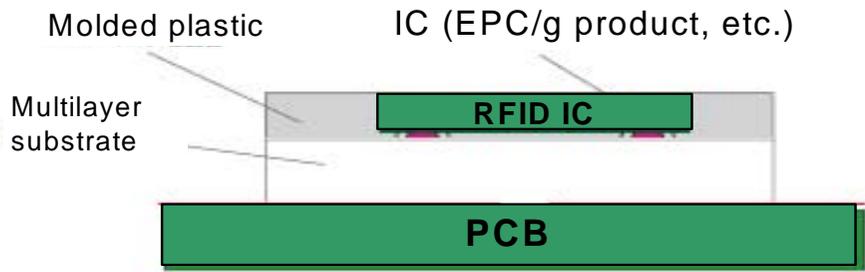
A single tag design can be used throughout the world



The range can easily be varied by changing antennas



Ordinary adhesives can be used for mounting



Future Business Development

Batteries (energy, power electronics)

- Lithium ion secondary battery is in the R&D phase
- Murata will accumulate basic battery technology and expertise to develop its energy- and power electronics businesses



Financial Strategy



Dividends per share

(Yen)

	Interim	Year-end	Annual
FY2006 Actual	40	50	90
FY2007 Actual	50	50	100
FY2008 Plan	50	50	100

Share buy-back

FY2002-2005: ¥122.9 billion, 22.33 million shares

FY2007: ¥15 billion, 2.56 million shares

FY2008: ¥15 billion, 5.50 million shares (Plan)

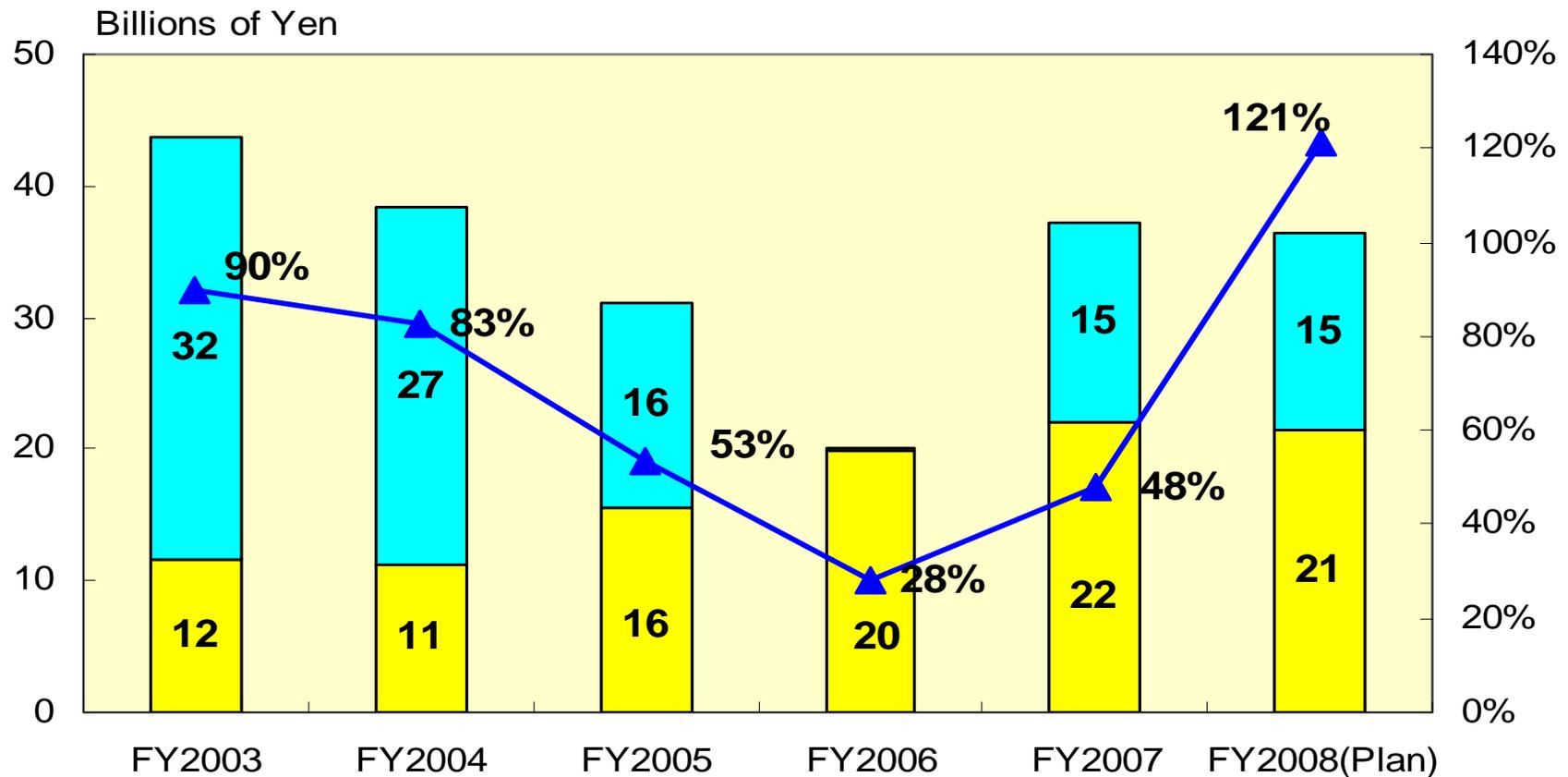
* Basically most of the shares brought back are canceled.

Financial Strategy



Total Return Ratio

■ Annual Dividends ■ Share buyback ▲ Total Return Ratio



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