

## Platform technologies and core technologies

In order for Murata to continue to create new value, we need our technologies to evolve constantly. Murata, which has an integrated production structure encompassing materials to products, has developed technologies into platforms so that technologies forming the basis can be independently researched, developed, accumulated and applied in product development.

Murata has five platform technology domains, and each platform technology is comprised of several core technologies. Each core technology has been refined over a long period within Murata, and has become a source to differentiate us from competitors and create innovations.

### Platforms

<b>Materials technology</b>	 Materials design  Materials processing	<p>Materials technology is the technology to simulate and model material composition, crystal structures, and electrical properties, as well as to disperse and combine these materials while controlling ceramic particle sizes and crystal structures.</p>
<b>Front-end process technology</b>	 Laminating & stacking  Printing  Sintering  Nano & thin film fabrication  Surface finishing  Precision mechanical processing	<p>Front-end process technology includes, mainly, the technology to laminate and align crystal particles by forming them into dielectric sheets, technology to thinly and accurately form internal electrodes and wirings on ceramic sheets, and technology to form thin films on a submicron level using lithography and etching.</p>
<b>Product design technology</b>	 High frequency design  Device design  Embedded  High reliability design  Circuit design  Simulation	<p>Product design technology includes, mainly, the technology to design RF components and modules, to achieve high performance and small devices using software, etc., to achieve high reliability under harsh environmental conditions, and simulation to analyze electromagnetic fields, heat, and stress.</p>
<b>Back-end process technology</b>	 Packaging  Measurement  Automation  Industrial engineering	<p>Back-end process technology mainly includes the technology to achieve miniaturization and high reliability of devices through high-heat resistance connections and air-tight sealing, and technology to design equipment that transports extremely small products in different shapes at high speed and with low damage.</p>
<b>Analytical technology</b>	 Materials characterization  Failure analysis	<p>Analytical technology includes the technology to physically and electronically evaluate material compositions through non-destructive analysis, heat analysis, organic and inorganic analysis, and surface analysis, and technology to identify the cause of failures that occurred in materials and products through the abovementioned analytical methods.</p>

### TOPICS

## Opening of Minato MIRAI Innovation Center, largest R&D hub

Murata opened Minato MIRAI Innovation Center, a new R&D hub, in December 2020. At this center, Murata intends to bolster its design and planning capacities, as well as basic product research for new markets like energy, healthcare, and IoT, in addition to its core business in the communications and mobility markets. In particular, the company plans to increase its share of the healthcare and energy markets by strengthening collaborations with clients and industry participants using its geographical advantage. In its business related to the mobility market, Murata will increase its competitiveness by installing a large anechoic chamber for vehicles, accumulating further design expertise and gaining rapid and continuous feedback for its product design.

Minato MIRAI Innovation Center will reinforce collaboration with other R&D hubs such as the Yasu

and Yokohama Divisions. With a concept of a “place where new possibilities are born, from mixture of various things,” the center plays various roles including holding meetings for technical exchange with internal or external parties, business creation through collaboration with various customers from various industries, and organizing events. The center will provide innovative products and technologies that will help Murata lead the industry by promoting and enhancing collaboration with external parties through technology exchange events.

