socionext™
for better quality of experience

QUALITY ASSURANCE

Socionext Inc.

Nomura Shin-Yokohama Bldg., 2-10-23 Shin-Yokohama,
Kohoku-ku, Yokohama, Kanagawa, 222-0033, Japan
Tel. +81-45-568-1015

http://socionext.com/en/

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Leading Quality for Customer Success

Providing Optimum Quality to Customers through Comprehensive Management Systems.

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1. Quality policy

The products of Socionext are utilized in various fields and are playing very important roles in our customers' products. We build quality products that meet the varying QCD (Quality, Cost, and Delivery) needs of our customers. Additionally, through comprehensive management systems for the planning and design stages, we as a fabless company choose perfect partner companies (contract manufacturers) in Japan and overseas according to the characteristics, functionality, and quality of products to be manufactured. Moreover, by leveraging our high-quality and reliable technology that has been developed in the global market and through strong cooperation with our partner companies (contract manufacturers), we provide optimum quality to our customers in a timely manner.

2. Organization of QA

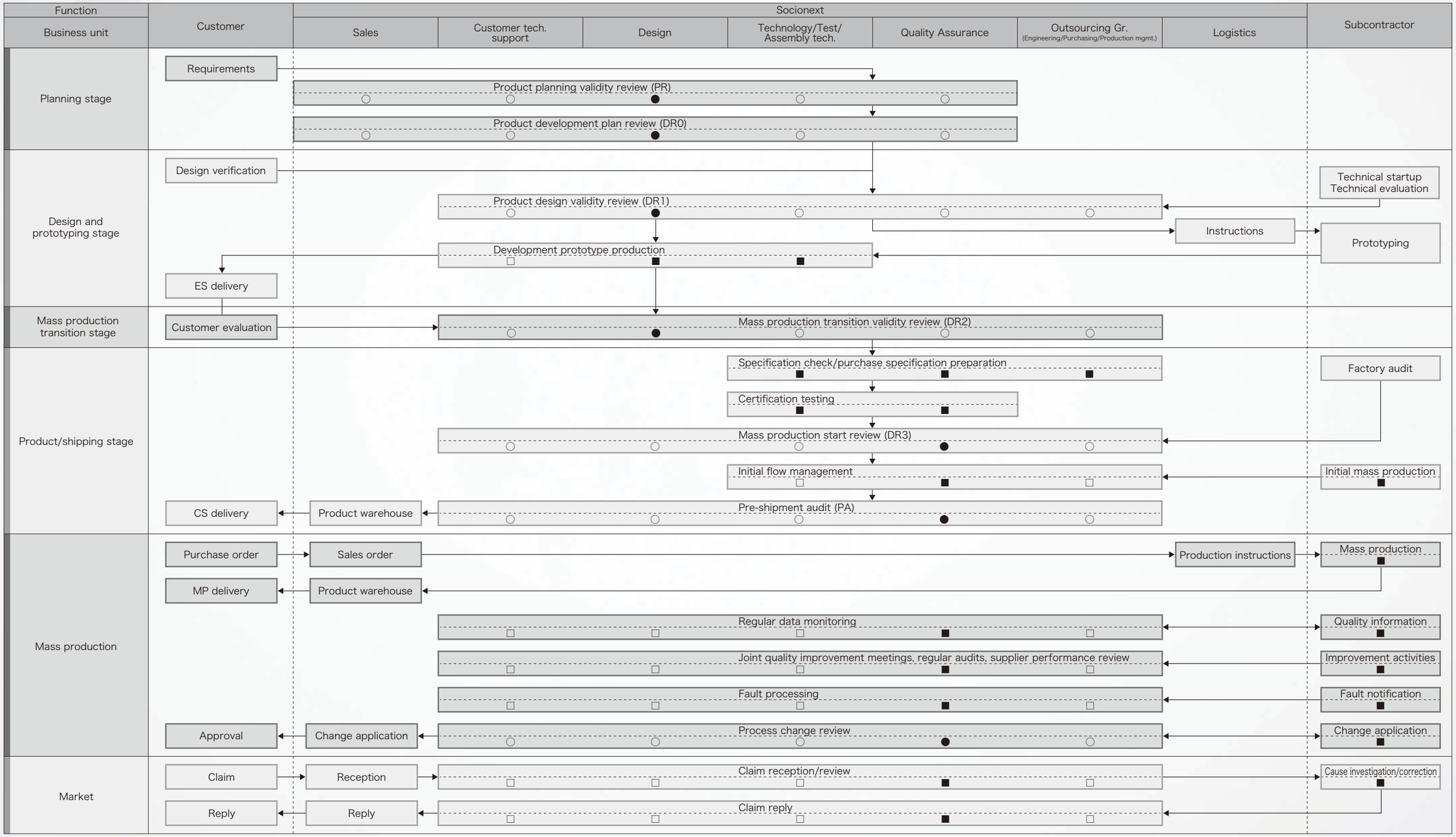
Socionext has organized itself to maintain and manage quality systems, promote design quality, develop reliability technology, support customer quality, offer feedback from Failure analysis, collaborate with subcontractors, and promote management.

Quality- Assurance Division

- Reliability Management Department
  (Customer support, Quality/ Environment management system, Design quality)
- Reliability Assurance Department
  (Customer complaints, Failure analysis, Reliability Engineering)
- Product Quality Department
  (Product design review, Subcontractor management)

3. Quality Assurance System

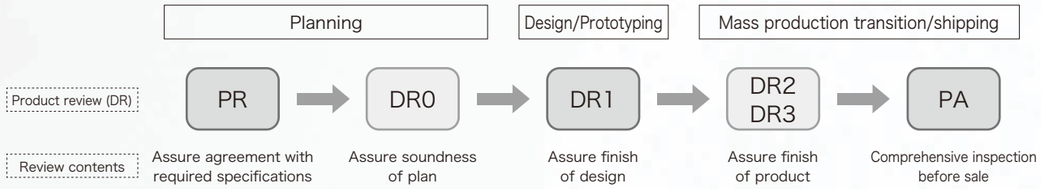
To provide customers with products that match their needs in a timely and continuous fashion, we have established and implemented a system which goes from product planning through design, prototyping, certification, and mass production all the way to the market.



PR : Planning Review DR : Design Review PA : Product Assurance
ES : Engineering Sample CS : Commercial Sample MP : Mass Production
● : Responsible department ○ : Related department ■ : Implementation department □ : Support department → : Route

4. Honing from the source (DR)

Each step at the development process, such as market, research, product planning and development planning is completed with design review before starting mass production. In our quality assurance program, design review consists of six steps: product planning validity review (PR), product development plan review (DR0), product design validity review (DR1), mass production transition validity review (DR2), mass production start review (DR3), and pre-shipment audit (PA). We place particular emphasis on the product planning validity review (PR) and product development plan review (DR0). By identifying problems at an earlier stage, we are able to resolve issues to hone quality from the source. Also, we optimize our review contents to ensure that nothing is left out.



Name	Role	Description
PR	Product planning validity review	We consider the target quality and target reliability to be used for the new product and confirm product development with the agreement of all related offices.
DR0	Product development plan review	We clarify the resources and work required to develop the new product and establish a plan that accounts for everything.
DR1	Product design validity review	Completing the planned design work, we check that the basic design matches the customer's requirements.
DR2	Mass production transition validity review	We confirm the necessary specifications for mass production prototyping, based on results obtained from prototype evaluation.
DR3	Mass production start review	We use the mass production prototype to evaluate the characteristics of the product and confirm the necessary specifications and facilities for mass production.
PA	Pre-shipment review	We conduct feedback based on initial flow management results and in-process fault information.

PR : Planning Review　DR : Design Review　PA : Product Assurance

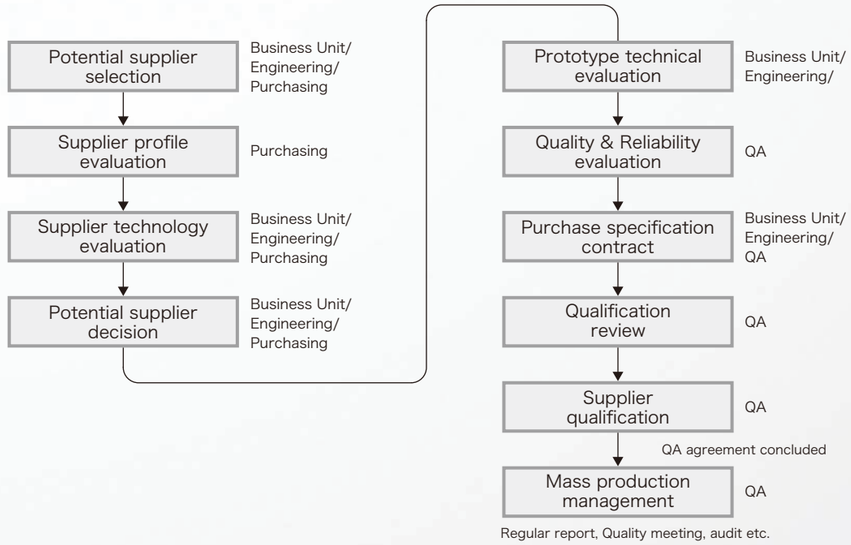
5. Subcontractor management

To assure optimal quality for fabless manufacturers, we build close relationships of cooperation with domestic and overseas foundries and partner companies that have the optimal technology. Through this, we achieve quality management equivalent to in-house fabs.

<Control ITEMS>
- Quality Performance result
- Inspection results
- Reliability data
- Production Performance result

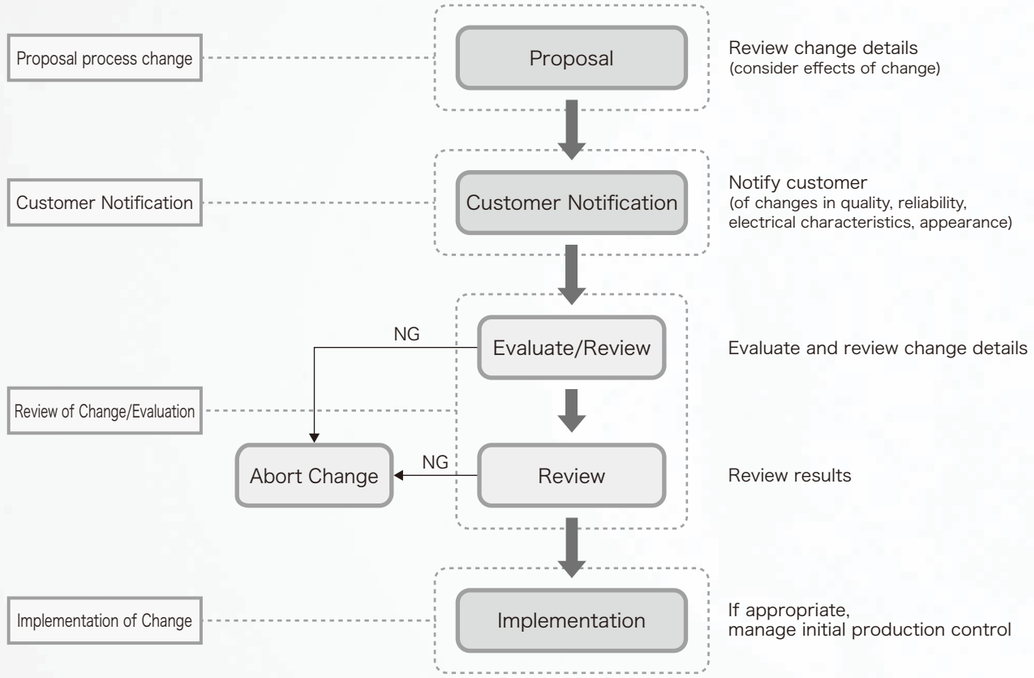
<Quality Control and Improvement ITEMS>
- QA system review by Audit
- Quality Meeting
- Supplier Performance Review
- Continual Improvement
- Corrective and Preventive Action
- Yield Improvement

Information shared data monitoring, speedy response (Investigation, Failure analysis), from data acquisition to prompt feedback in the communication. Subcontractor production faults and process changes managed through change management.



6. Change management

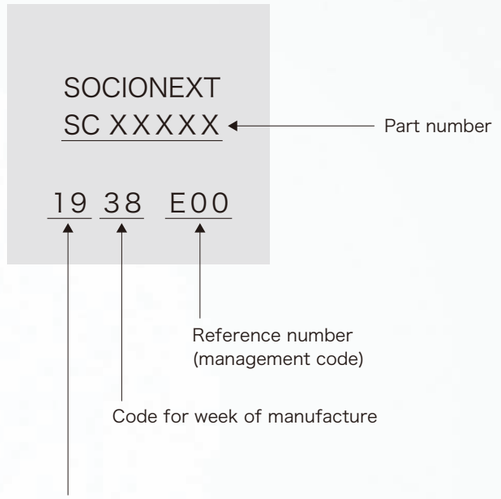
When changing design and processes, the QA and related business units, which draft the changes, review the details. They perform reliability evaluation of critical characteristics, and compare it to the current product and strictly check that there is no discrepancy in quality or reliability. The system is such that major changes have to be finally approved by the QA business units. The customer is notified of changes in quality, reliability, electrical characteristics, and appearance before changes are made.



7. Traceability

We employ fabrication management system so that manufacturing history can be traced if a quality problem arises in the market or a process. Products are marked upon shipping to make visible what they are and what their manufacturing history is.

■Marking example



<Main traceable details>
- Manufacturing history
- PCM measurement results
- Primary test results
- Wafer appearance inspection results
- Inspection results
- Final test results
- Shipping inspection results

Etc.

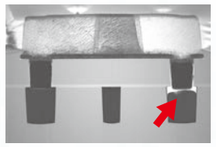
8. Failure Analysis

We thoroughly analyze products with defects found by customers. We identify the cause, address the problem, and prevent recurrence of the defect. We also conduct fault analysis and improvement for products with defects found in evaluation during development or in process faults at subcontractors.

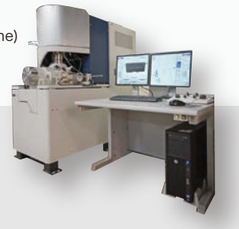
Development	● Operating defect ● Defect in evaluation
Mass production	● Defect in initial stages ● Fault at subcontractor
Customer	● Defect in process ● Defect in market

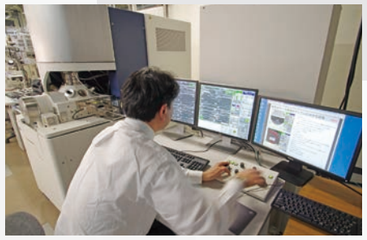
→ Use Failure Analysis to identify cause, prevent recurrence, and improve quality

■ Analysis photos

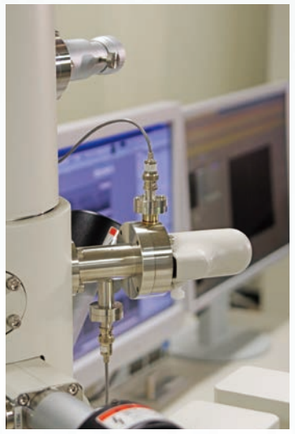


■ FIB
(Focused Ion Beam machine)





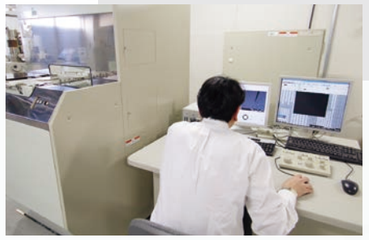
■ SEM
(Scanning Electron Microscope)



■ Fault analysis equipment (excerpt)

Purpose	Equipment
Failure point identification	ELITE (Enhanced Lock-In Thermal Emission)
	EMS (Emission Microscope)
	OBIRCH (Optical Beam Induced Resistance Change)
	OBIC (Optical Beam Induced Current)
	TDR (Time Domain Reflectometry)
	EBAC (Electron Beam Absorbed Current)
	Manual prober
Grinding/ etching	Plasma dry etcher
	Grinding machine
	Draft (acid, HF, organic)
	Precision grinding system (CMP)
Observation	SEM (Scanning Electron Microscope) + element analysis machine
	FIB (Focused Ion Beam machine)
	X-ray observation equipment (3D-CT)
	SAT (Scanning Acoustic Tomography)
	Optical microscope (Stereoscopic, Gold sensible, IR)
Others	LSI Tester + Thermo Stream
	Semiconductor parameter analyzer
	Laser opener
	Plastic mold opener

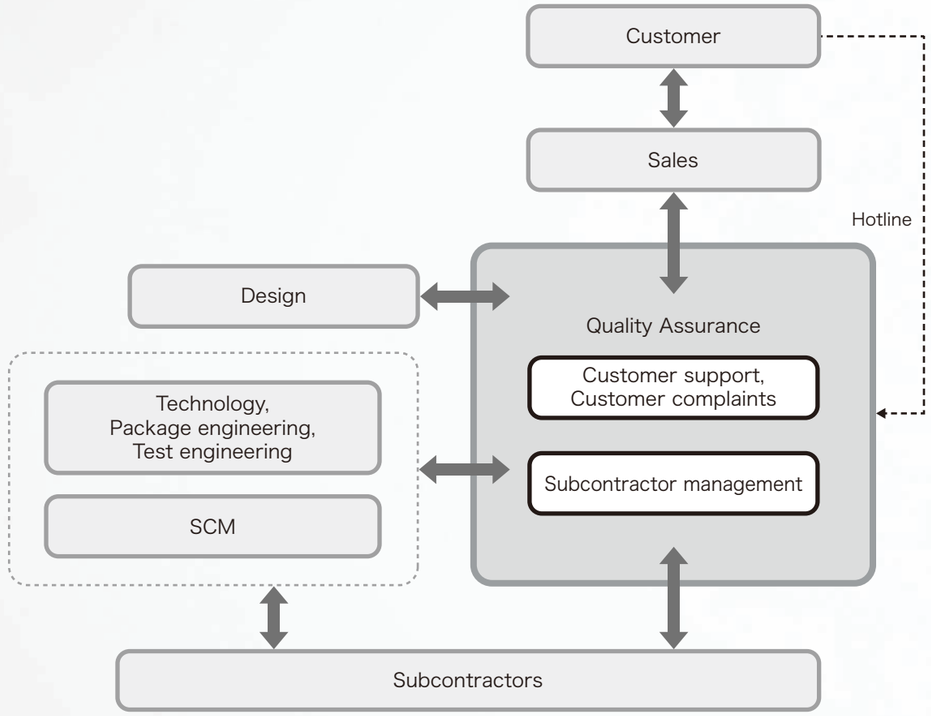
■ EBAC
(Electron Beam Absorbed Current)

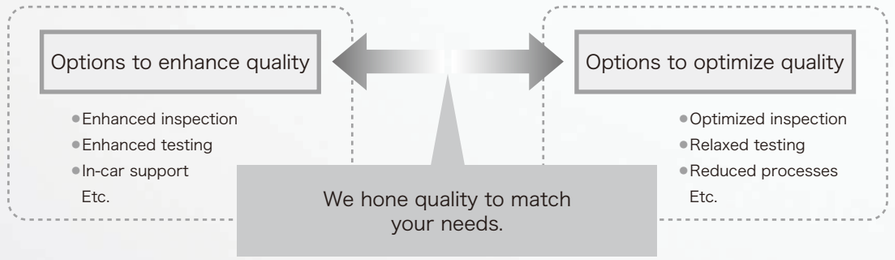


■ SAT
(Scanning Acoustic Tomography)

9. Customer Quality Support (Customer support, Customer complaints)

Socionext provides detailed support in order to supply our customers stably with products in which they can feel satisfied. Specifically, we thoroughly analyze products with defects found by the customer, identify the cause, take counter-measures to prevent recurrence of the defect, and report on the status and counter-measures. We always put great effort into our analysis data for products with defects found by the customer, as it directly guides our quality improvement.





10. Software Quality Assurance

Socionext meets the expectations of customers by co-creating software that accommodates their various QCD (quality/cost/delivery) needs. We conduct Software Assessments to guarantee consistency between the requirements we agreed upon with customers and the software we release. Software Assessment is a system that provides software that customers can have confidence in by having a third party certify the quality of the software.

■ Software Development

Review Name	Purpose of the Review	Details of the Review
Planning Review	Defines the software to be developed.	①Confirm the requirements we have agreed on ②Confirm that the software specifications meet the software requirements ③Confirm that the development plan meets the software requirements
Shipping Review	Certify the quality of the final software products to be delivered	④Confirm that the final software products to be delivered meet the requirements

The quality of the software products can be achieved by defining and developing appropriate quality characteristics, while taking your intended use into consideration. We follow the international standard ISO/IEC 9126 as a guideline for specifying the quality characteristics, to develop software products with quality characteristics that meet your expectations.

■ Software Quality Characteristics (ISO/IEC 9126)

Quality Characteristics	Quality Sub-characteristics
Functionality	Suitability, Accuracy, Interoperability, Security, Functionality Compliance
Reliability	Maturity, Fault Tolerance, Recoverability, Reliability Compliance
Usability	Understandability, Learnability, Operability, Attractiveness, Usability Compliance
Efficiency	Time Behavior, Resource Behavior, Efficiency Compliance
Maintainability	Analyzability, Changeability, Stability, Testability, Maintainability Compliance
Portability	Adaptability, Installability, Co-existence, Replaceability, Portability Compliance

11. Environmental activities

The Socionext aims to represent a business that contributes to a rich and sustainable low-carbon society in harmony with local communities. Our environmental efforts start from the environmental awareness of each one of our staff as we work with customers and communities to resolve environmental issues. In developing and supplying environmentally friendly devices and solutions that save energy and space, we contribute to reducing the environmental load of our customers' products.

■ Environment Policy

Socionext contributes to the protection of a rich global environment with customer through the design, development, and sale of SoC with superior environmental performance through advanced technology and the solutions business or services centered on these SoC. Socionext makes efforts to reduce the environmental impact and environmental pollution based on the following action policy through the entire life cycle from development to procurement, production, sale, use, and disposal.

(1) Active contribution to reducing the environmental impact, such as reducing CO_2 emissions and waste matter, by actively promoting the development of products that consider the environment, electric power conservation, light-weight products, and the suitable management of items containing chemical substances.

(2) Compliance with each country's and each region's environment laws and regulations, and agreements with customers.

(3) Aiming for improved awareness of the environment for all Socionext personnel, and promotion of environmental contributions to regional communities.

(4) Continuous improvement of environmental management system to effectively implement these environmental activities.

■ Environmentally friendly products

Socionext is pursuing the design and development of products that are environmentally friendly while strictly complying with legal regulations. By developing low-power consumption products and providing products that correspond to the legal and regulatory environment of various countries, we are delivering peace of mind to our customers.

The products of Socionext and the packing and packaging materials comply with the EU REACH regulations *1), EU RoHS directive *2), China RoHS directive *3) and other laws and regulations (excluding exceptions for applying usage prohibition measures).

*1 : The regulations in the EU with the purpose of registering, evaluating, authorizing and restricting chemicals (Registration, Evaluation, Authorization and Restriction of Chemicals)

*2 : The directive that prohibits the use of specific hazardous substances in electronic and electrical equipment sold in the EU (Restriction of Hazardous Substances)

*3 : The directive that prohibits the use of specific hazardous substances in electronic and electrical equipment sold in the People's Republic of China (Regulatory ordinance preventing pollution from the production of electronic and information products)

12. ISO certification

We acquired ISO9001 certification and use the production lines of partner businesses with IATF16949 certification, an automotive industry sector standard, while readying our system for global expansion. In addition, we acquired ISO14001 certification, an international standard for environmental management systems (EMS), and continuously implement initiatives for reducing environmental burdens.