Green Products

▶ Sustainable Products

Smartphones, public infrastructure, and related communication hardware facilities play a crucial role in enhancing public convenience and facilitating the exchange of information and knowledge, especially during emergencies. WIN helps customers develop new products across all communication sectors that drive communication advancements and benefit future societies. By integrating WIN's multi-functional chips, reducing the critical dimension of technology platforms, and improving process capabilities, we greatly reduce wafer manufacturing quantities and the dimensions of electronic products to protect the Earth's environment, promote energy conservation, carbon reduction, and foster mutual prosperity for both customers and WIN.

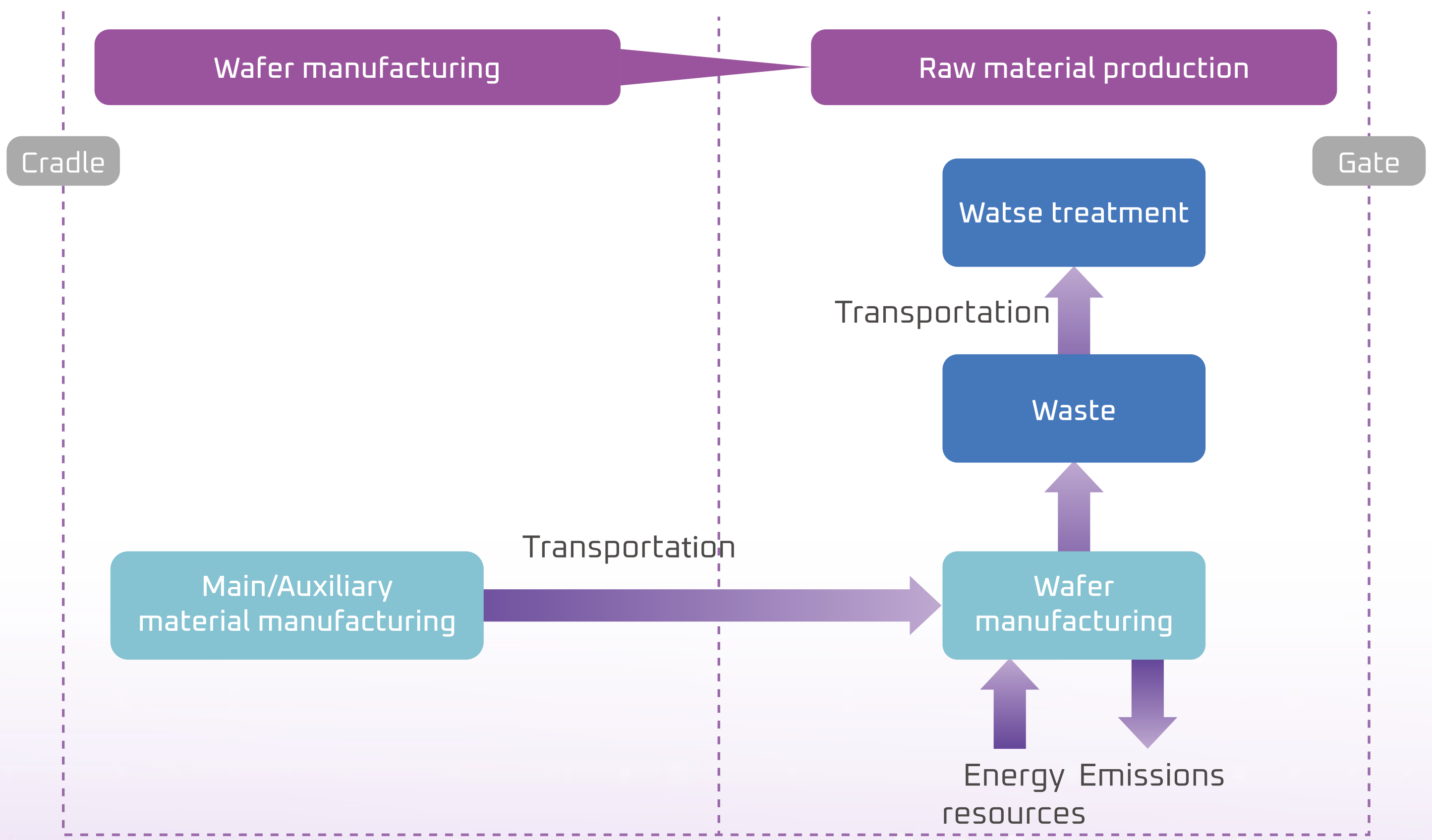
WIN has long been committed to the development of compound semiconductor technology. As the world's largest GaAs foundry, WIN continues to launch high-efficiency technology platforms to produce more energy-efficient and energy-saving semiconductor communication products and optical related components.

Process technologies	Product Applications	Innovation/breakthroughs	Customer success
0.15 micron GaAs E/D pHEMT deep UV lithography for microwave applications	Base station and point-to-point communication	Develop deep UV lithography technology to increase production speed and optimize product uniformity.	Introduce products with superior linearity and noise performance.
28V 120 nm GaN HEMT for microwave applications	National defense and peer-to-peer communications	Optimize component gate processes and gain performance	Introduce products with superior power and efficiency
Highly resilient seventh-generation GaAs HBT for mobile communications applications	5G communication and Wi-Fi	Assist customers in completing new product verification	Introduce products with superior power and efficiency
MB surface sound wave filter process technology	5G communication and Wi-Fi	Develop high uniformity and highly reproducible processes to help customers quickly enter mass production	Launch high-yield and advanced products
Superjunction varactor diodes for communication applications	Satellite communications and base stations	Assist customers in completing new product verification	Introduce products with superior efficiency and stability
Various compound semiconductor technologies used in automotive lidar and industrial applications	Consumer electronics and smart driving	Assist customers in expanding the introduction of 3D sensing technology into more devices	Launch high-yield and advanced products
High-speed InP edge-emitting laser components used in netcom optical fiber transmission applications	Optical fiber communications	Develop high-speed, high-reliability laser light sources	Launch high-yield and advanced products
Customized InP optical integrated circuit components are used in DWDM optical fiber transmission	Optical fiber communications	Develop precise and highly reproducible semiconductor optical waveguide processes	Launch high-yield and advanced products

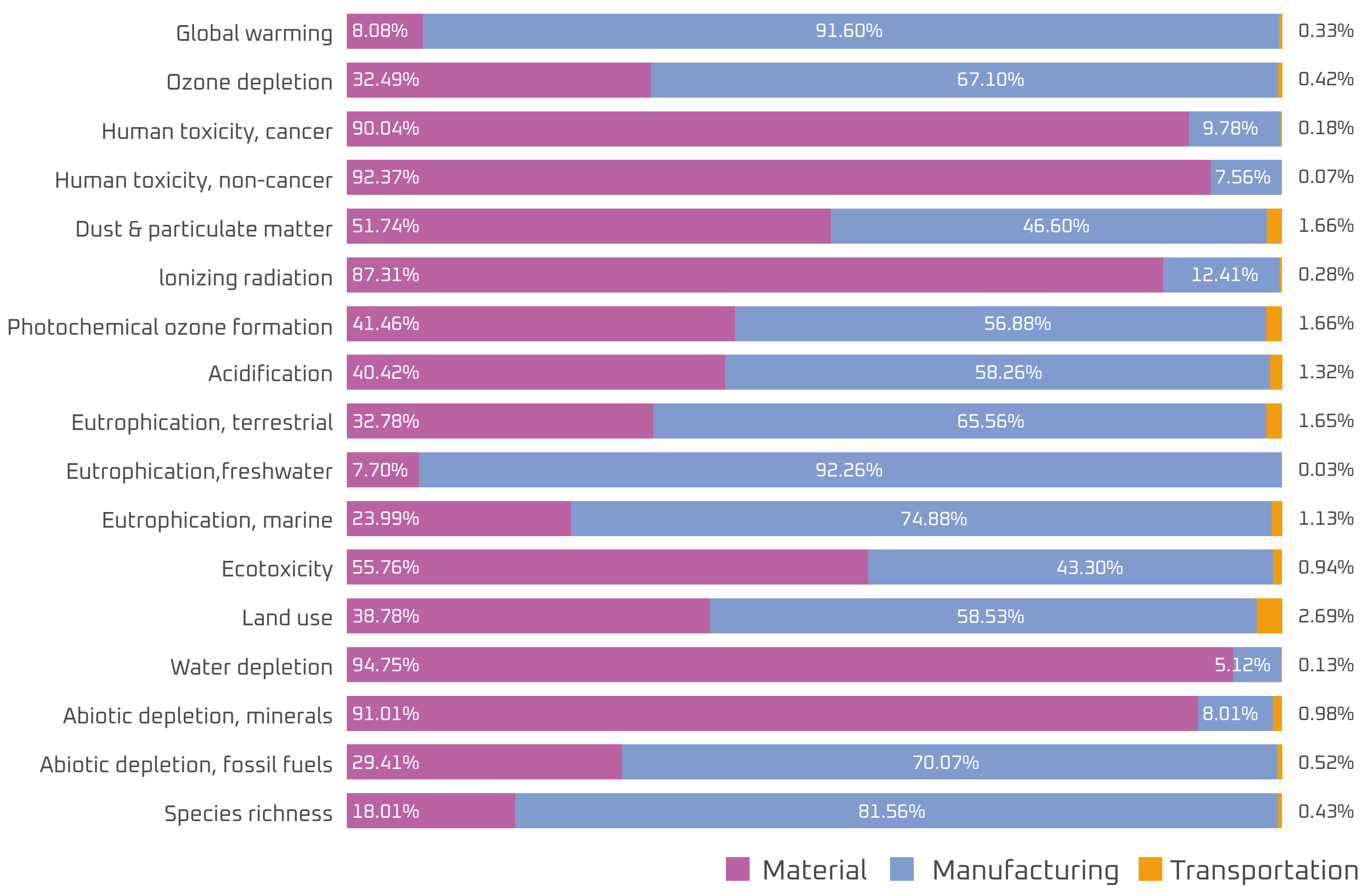
▶Life Cycle Assessment, Carbon Footprint, Water Footprint

As environmental issues are increasingly prioritized, the demands for corporate sustainable development and environmental impact information disclosure have also increased. WIN follows ISO 14040, ISO 14067, and ISO 14046 standards, utilizing life cycle assessment tools to assess the input and output data at various stages from raw material production to wafer manufacturing (cradle to gate). This assessment includes comparing potential environmental impacts at each stage. In addition to evaluating the 16 environmental impacts of the European Union Environmental Footprint (EF), we also assess the product's life cycle impact on biodiversity, in response to the global focus on biodiversity in recent years. Concurrently, we calculate the product's "carbon footprint" and "water footprint" to understand potential environmental impacts and use this information to develop strategies and measures for environmental management improvement.

Life Cycle Assessment System Boundaries



Result of Life Cycle Assessment



In 2023, WIN completed the product life cycle assessment of Fab A and Fab B (accounting for approximately 53.4% of total production), and obtained third-party verification in the second half of 2023. Based on the life cycle assessment results of Fab A and Fab B in 2022, it was found that "electricity usage" constituted a significant proportion of a number of environmental indicators, so WIN Fab A and Fab B converted coal-fired power generation to other energy sources with lower carbon emissions (Taipower) in 2023. In addition, the ISO 50001 energy management system was introduced in Fab A to improve energy efficiency. We will continue to promote energy-saving measures and evaluate the purchase of renewable energy certificates as strategies for continuous improvement.

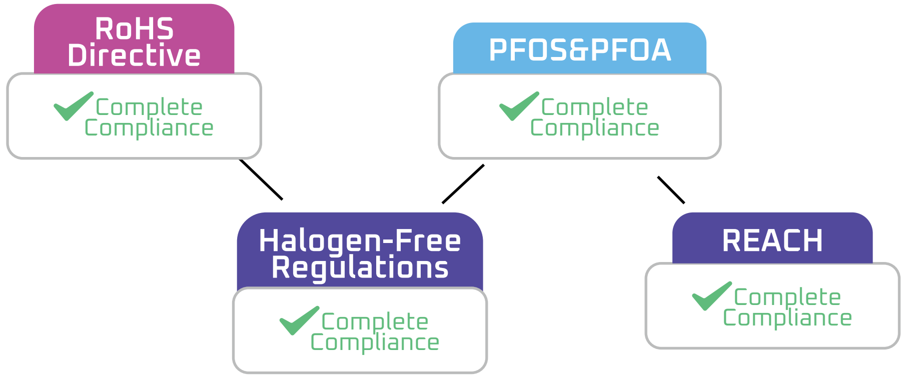
WIN plans to complete the product life cycle assessment of Fab C in 2024, and expects to obtain third-party verification in the second half of 2024, in order to obtain life cycle assessment information for the Company's 6-inch compound semiconductor equivalent wafers.

Product Accountability

To meet international green procurement trends and customer demand, WIN fulfills product responsibilities, establishes comprehensive management systems, and discloses information on the official website for reference by customers. We provide customers and consumers with products that conform to international green environmental protection regulations.

Product Safety and Hazardous Substance Management

To comply with the expectations of customers and stakeholders, WIN has established hazardous substance-free management procedures, actively checked the ingredients of raw materials, and required all raw materials have to meet EU implemented the Restriction of Hazardous Substances Directive (RoHS) and the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). WIN also require our products to meet the EU's regulations and other related hazardous substance-free regulations.



Product Hazardous Substance Management

I.Checklist of Hazardous Substances

To protect the environment and people's safety and health, WIN prohibits or restricts the purpose of use and quantity of hazardous substances in its products and raw materials, based on international directives and customer requirements. Additionally, it has formulated a hazardous substance checklist for compliance by its suppliers and employees. WIN's checklist is composed of two major categories:

- List of banned or restricted substances in products
- List of reportable substances in products

II.New Material/New Supplier Verification

WIN specifies in purchase contracts and order forms that new material suppliers must comply with WIN's supplier management procedures, and that the provided materials may not contain hazardous substances as defined by WIN. Furthermore, suppliers must regularly provide product testing reports and undertake annual supplier assessments as requested by WIN. Regarding new materials, the Technology R&D Department must abide by WIN's hazardous substance-free management procedures when determining product specifications and selecting materials to ensure that new materials are hazardous substance-free.

III.Supplier Evaluation

WIN requests all of its suppliers to provide a declaration of not using hazardous substances or third-party testing reports as part of the basis of evaluations which helps to ensure that the raw materials which WIN uses are free of hazardous substances.

IV.Third-party Testing of Hazardous Substances in Products

To satisfy customers and other stakeholders' demands for HSF products, WIN products are subject to third-party testing at least once every year to ensure that all of its products are in line with international green environmental standards. Inspection items include product HSF inspections based on REACH, RoHS, PFOS & PFOA, and halogen-free regulations to ensure that all product meet international green environmental protection regulations. In2023, all WIN products have been verified as 100% conforming to related HSF regulations, and have not caused any harm to people's physical health or environmental contamination as well.

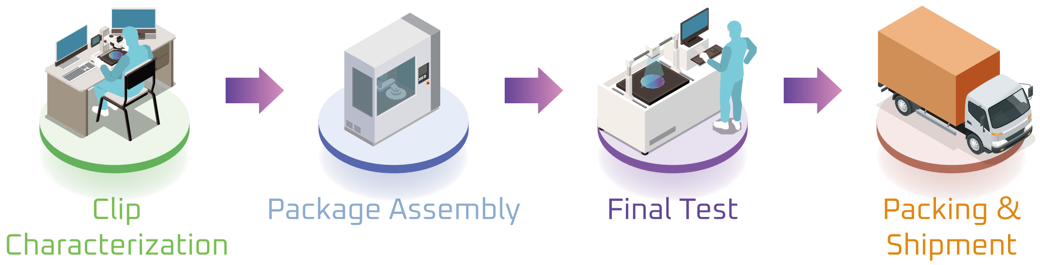
Information Disclosure Regarding Hazardous Substance Free by WIN

A Hazardous Substance Free (HSF) section was set up in the E-Service section on WIN's official website, providing the following information pertaining to hazardous substance free and conflicting minerals for customer access:

- ▶ Hazardous Substance Free Statement
- ▶ Declaration of Metal Conflict-Free
- ▶ Conflict Minerals Reporting Template
- ▶ Third-Party Product Testing Report

Customer Service

WIN's Services

Design Support Services	WIN is committed to shorten the turnaround time for our customers by developing accurate device models and variety of PDK's in cooperation with EDA vendors to provide complete design service, enhanced user-friendly design platform, and accurate circuit simulation. In addition, WIN streamlines the process flow for more efficient layout sign-off and mask tape-out service.
Foundry Services	Since 2007, WIN Semiconductors Corp. is the largest 6-inch (150 mm) GaAs pure play foundry in the world. WIN has three advanced fabs with a broad range of technology providing the best quality of HBT, pHEMT, BiHEMT, GaN foundry services for MMIC application. Since 2006, WIN has operated a 4 shift 24/7 non-stop foundry service. In addition to advanced semiconductor fabrication technology, WIN also provides layout support and automated DC/RF on-wafer testing. WIN is committed to fast turnaround time, cost-effective turn-key solutions and total quality control for our valuable customers.
Testing Services	In-house wafer testing service is available from WIN for both HBT and HEMT products. The service provides standard WAT database for all customers, and offers PCM database for SPC analysis in parallel. The real time yield report generated by CIM system automatically judges if processed wafer has met shipping criteria. WIN also provides probe card making service and offers on-wafer DC/RF screening depending on specific request. The proprietary design of our probe card offers the best quality to meet customers' requirements.
High Frequency Packaging and Final Test	From foundry to assembly and final test to shorten product manufactured cycle time & supply chain management.  Clip Characterization Package Assembly Final Test Packing & Shipment

Protect Customer Privacy

Customer satisfaction is one of WIN's core values. As a foundry service provider, WIN remains committed to protecting customer privacy and confidential information. Formulate a "Confidential Information Management Policy" and an "Information Security Policy" to detail the definition of confidential information and related operating specifications to provide the highest level of protection for customer confidential information including customer contracts, orders, technology and other data.

OEM service providers must qualify through rigorous and laborious customer verification procedures to obtain purchase orders from customers. As technology advances, companies' important confidential information may be stolen by malicious individuals, and leaks of confidential information may cause the loss of purchase orders and business reputation, and affect the Company's operations and development. WIN has always placed great emphasis on protecting customer privacy and we have therefore won the continuous trust of customers and provide services to more customers.

We pay close attention to customer demands for information security and restrict access to customer data and files through permissions. We have passed all information security audits implemented by customers each year. We have maintained relationships of trust with customers but we seek to do more. We shall continue to strengthen information security and exceed customer expectations.

- Obtain ISO/IEC 27001:2013 Information Security Certification.
- Personnel management: The Company continues to strengthen employees' awareness of information security. In addition to announcing them on WIN's internal website for employees, we also specify requirements in employees' commitment statements.
- System security: To protect the confidentiality and integrity of customer information, we continue to strengthen system and data security including the establishment of a comprehensive anti-virus system and file encryption systems and mechanisms. We also implement rigorous access control and management for customer data and files.
- Audit prevention: WIN continues to implement weakness scans on the website and servers each year based on the Company's internal audit procedures to strengthen data security for customers and prevent theft by malicious external entities. We also rectify weaknesses based on the assessment report to complete consistent protection from inside to outside.

We continue to monitor our use of customer personal data and throughout year 2023, we did not use collected personal data for any secondary purposes other than the specific purposes for which the personal data was first collected. Please see the chapter about Information Security Management for information security management measures.

There has been no case of leaks of customer privacy in WIN. The Company shall continue to strengthen information protection software and hardware facilities, protect customer privacy, and ensure zero leakage of customer information.

Customer Satisfaction

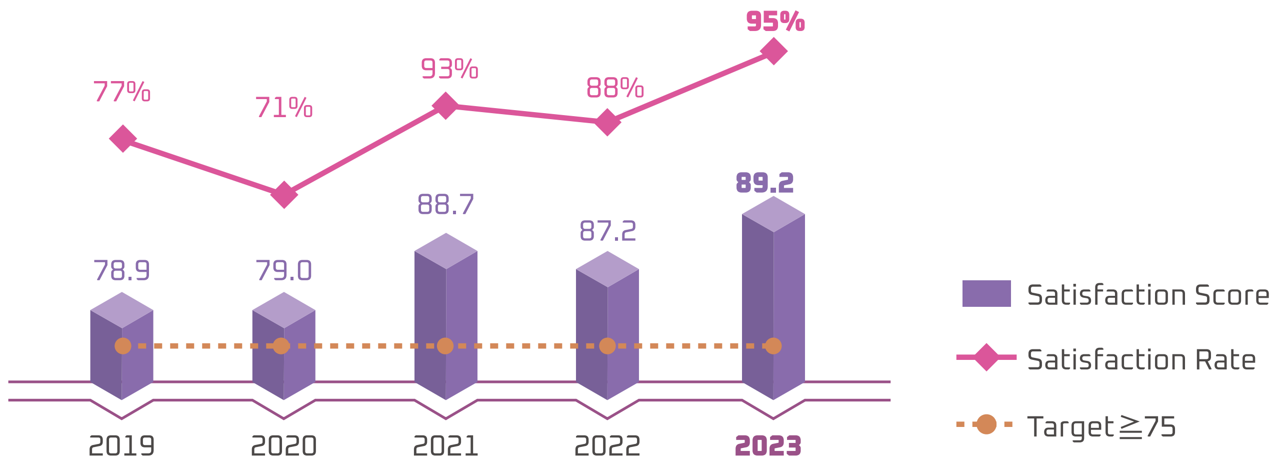
WIN is committed to the development and innovation of manufacturing technology. We pursue quality with a spirit of excellence and provide customers with high-quality products to satisfy our customers. There were no product recalls due to harm to human health and safety in 2023.

WIN has always focused on the importance of customer satisfaction. Customer feedback is the driving force for our efforts toward continuous improvements. We also adopt directions and measures derived from customer satisfaction surveys into standard operating procedures (customer satisfaction survey management procedures). We continuously research and develop our own technologies according to customer and market demands. Monthly or quarterly interviews with customers either in person or through video conferencing are conducted to adjust our internal practices, in order to improve work processes and enhance yield rates. In addition, customer satisfaction questionnaires are distributed at the beginning of every year for a comprehensive inspection of improvement goals to ensure that our performance is in line with customer needs.

A satisfaction survey was conducted in 2023, targeting the top 20 major clients of the previous year. The Sales Department distributed questionnaires, which were then collected and analyzed by the Quality Assurance Department.

WIN was evaluated by clients in five major areas: Services, Technology, Quality, Delivery, and Design Service. The evaluation utilized a 1–5-point scale, with 1 being unacceptable and 5 being highly satisfactory. For items with a score of "2" or "1," the Quality Assurance Department will take responsibility to confirm cases of customer dissatisfaction and their causes so that improvement or proper measures can be taken to rectify any problems going forward. In 2023, WIN saw marginal increases in ratings across five key dimensions. Notably in On Time Delivery, discrepancies between actual orders and sales forecasts required the reallocation of production capacity to optimize customer order fulfillment, leading to customer dissatisfaction with delivery times. Moving forward, WIN will request accurate sales forecasts from clients to mitigate any potential impact. To boost ratings in Technology of Performance/ Competitiveness, WIN will continue to introduce newly developed technologies to clients, affording ample opportunity for WIN's quality to shine through, and strive to heighten client contentment with ongoing process improvement initiatives.

Customer Satisfaction Survey Statistics



Note: WIN regards customers as satisfied if the total score is 75 or above, Satisfaction Rate=Number of satisfied customers/ Total number of customers responding to the survey.

Customer Satisfaction Questionnaire Survey Items

Survey Items		2019	2020	2021	2022	2023
Service (7%)	Sales Support	4.4	4.5	4.7	4.6	4.8
	Technical Support	4.3	4.5	4.6	4.4	4.7
	Logistics Support	4.4	4.4	4.7	4.6	4.8
	Price	3.2	3.4	3.3	3.2	3.4
Technology (6%)	Performance/Competitiveness	4.4	4.1	4.8	4.5	4.4
	Roadmap	4.3	3.9	4.6	4.4	4.6
Quality (45%)	Yield	3.6	3.8	4.1	4.1	4.2
	Reliability	3.7	4.1	4.4	4.1	4.2
	Quality System	4.0	3.5	4.2	4.1	4.2
	Customer Complaint	3.8	4.2	4.6	4.2	4.3
	HSF system	4.1	4.2	4.5	4.6	4.6
Delivery (35%)	Acknowledged PO Time	4.1	4.2	4.6	4.7	4.7
	Update Delivery Ahead of Time	4.0	4.0	4.6	4.4	4.7
	On Time Delivery	4.0	3.9	4.5	4.8	4.6
	Lead Time	3.6	3.3	4.2	4.2	4.4
Design Service (7%)	Layout Sign-off Service	4.4	4.4	4.7	4.6	4.9
	Device Model	3.7	4.0	4.5	4.4	4.4
	PDK(ADS/MWO/Cadence)	3.5	4.0	4.3	4.4	4.6
	Measurement Support	3.9	3.9	4.5	4.5	4.5
	Design Kit Content & Completeness	3.9	4.1	4.5	4.5	4.6
Average		3.9	3.9	4.4	4.4	4.5
Score		78.9	79.0	88.7	87.2	89.2