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External Manufacturing – Quality Management Requirements

Overview

This document defines Oracle product quality management requirements for external manufacturers.

Audience

This document is intended for Oracle’s external manufacturers (EM) of systems and/or components and the sub-tier suppliers.



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INTRODUCTION

This document defines the Oracle requirements for quality management for products that are externally manufactured.

External manufacturers and Oracle will define the mutually agreed upon Quality Plan inclusive of quality data, action plans, and continuous improvement plans along with tracking progress to defined schedules.

This document does not preclude any additional activity agreed by the operations and/or product teams documented within the Product Award Letter (PAL), the Statement of Work (SOW), and the Advanced Quality Planning (AQP) matrix 913-3592 supporting product quality management.

1.0 General Requirements

1.1 ISO Registration

The supplier's quality management system, including the supplier's sub-tier suppliers, will conform to the latest release version of ISO 9001 and the supplier will maintain certification of such conformance, obtained through an accredited ISO 9001 registration body.

The scope of the supplier's ISO 9001 certification shall be relevant to the type of products, including services to be provided by the supplier per the contract documentation as well as all supplier locations where work related to those products is performed.

If certification under the ISO 9000 series is no longer generally appropriate, the supplier will become certified under another Oracle approved standard and/or an agreed upon governance equal to or better than ISO 9000 certification.

1.2 Industry Standards

The supplier shall comply with all industry standards referenced in this specification, the Product Award Letter (PAL), the Statement of Work (SOW), and the Advanced Quality Planning (AQP) matrix 913-3592. This may include but is not limited to standards such as NIST, FOCI, IPC or MIL standards as applicable.

1.3 Security

Suppliers who develop, manufacture and distribute Oracle products shall meet and comply, as applicable to Oracle's security standards and practices.

Suppliers who handle any Oracle High Value Asset (HVA) are required to comply with all of the requirements of PROC-10090, *Physical Security, Control, Traceability and Destruction of Supply Chain* High Value Assets within the External Manufacturer's site and its contracted sub-tiers (including destruction sources).

All sub-tier components shall be verified and qualified as original and not counterfeit prior to incorporation in the external manufacturer's process.

When agreed upon targeted parts will include tamper evident packaging and protection in the supply chain for Oracle's products where applicable as defined with the operations team.

1.4 Safety and Regulatory Compliance

The supplier shall comply with all safety and regulatory requirements referenced in this specification, in the Product Award Letter (PAL), the Statement of Work (SOW), the Advanced Quality Planning (AQP) matrix 913-3592, and the product documentation. It is expected that the external manufacturer and its sub-tier suppliers adhere to such standards as applicable.

1.5 Counterfeit Prevention and Detection

Counterfeit material can contain unauthorized reproductions or alterations misrepresented to be authentic and/or used material represented as new with false identification such as lot/date codes, serial numbers, material performance, hidden cosmetic defects etc.

Oracle reduces the likelihood of unauthorized modifications at each stage in the supply chain and protects systems and components prior to taking delivery of such systems/components by employing preemptive supply chain agreements with our suppliers.

Suppliers are required to document and implement a counterfeit avoidance process that is intended to prevent, detect and deter unauthorized material from entering the supply chain. The plan shall be compliant to standards AS5553 and DFARS 252.246-7007

This includes but is not limited to:

Purchasing only from Oracle's Approved Manufacturer List (AML)

Developing and manufacturing Oracle parts as authorized by Oracle

Utilizing only authorized sub-tier suppliers

Refrain from any activity deemed as unauthorized use, distribution or misuse of Oracle products

Refrain from activities that constitute counterfeiting, unauthorized gray market and/or any other unauthorized activities involving Oracle products

Train personnel on counterfeit detection

1.5.1 Supplier Management of Sub-tier Suppliers for Counterfeit Detection

Suppliers will ensure sub-tier suppliers have active counterfeit detection and prevention programs.

Suppliers will prevent sub-tier suppliers from any activity deemed as unauthorized use, distribution or misuse of Oracle products.

Suppliers will prevent sub-tier suppliers from activities that constitute counterfeiting, using the unauthorized gray market and/or any other unauthorized activities involving Oracle products.

1.6 Assets

Suppliers shall track all Oracle assets, including tooling and report to Oracle upon request.

1.7 Incoming Shipments

The supplier shall inspect incoming shipments for (as a minimum):

The purchase order reference, the part number, the quantity and the Oracle supplier name on the label match the original purchase order information.

That boxes are factory sealed with no damage, are unopened and there is no evidence of tampering.

Special attention shall be given to tamper evident labels: that they are present, intact and untouched.

If any shipment fails to pass inspection the supplier will report the discrepancies to Oracle and the Oracle supplier.

The supplier will hold the effected materials in a separate location until it receives further instruction.

2.0 Defect-Free Program

The supplier will implement a documented defect free quality program that promotes continuous reduction in product defect rates to achieve a goal of zero defects as a primary objective and apply that program to all products supplied to Oracle, including all materials or components incorporated into those products (sub-tier parts).

The supplier will also impose this defect free quality program requirement in documented agreements with all sub-tier suppliers providing materials or components used by the supplier to manufacture products to be included in Oracle's final production and manufacturing of product.

2.1 Elements of the Defect-Free Quality Program

The external manufacturer and its sub-tier suppliers shall create control plans for all the products the supplier provides to Oracle, including components, sub-assemblies, and top-level assemblies, documenting all steps of manufacturing and inspection/test/measurement processes. The control plans shall detail the steps that are taken to assure conformance of products to specified requirements, starting at incoming material receipt, continuing through the manufacturing process steps, and extending through outgoing inspection where applicable.

The external manufacturer and its suppliers shall submit the control plans to Oracle for review and obtain documented Oracle approval of control plans for each product prior to the start of volume release, sustaining production against Oracle purchases.

Control plans will clearly document the supplier's manufacturing process steps (including rework, replace, retest steps, sub-tier material supplier process steps and sub-contracted process steps) and the sequence in which they occur. This data should tie to the supplier(s) traceability program.

The control plan shall include the Critical to Process (CTP) parameters and Critical to Function (CTF) product characteristics that are to be controlled and provide an outline of the key elements of the supplier's control methodologies.

2.2 Minimum Requirements for Control Plans

1 Supplier identity: Supplier's business name and address of the product manufacturing location.

2 Product identify: Oracle part number/revision, supplier part number/revision, part description.

3 Control plan approval information (supplier and Oracle): Approver's names, title, approval dates.

4 Part drawing: Identifying all CTFs and any drawing note requirements to be monitored for compliance.

5 Process step name: (i.e. incoming inspection, numerical control tool operations, bending, staking, painting, assembly, test, final inspection, packaging, etc.)

6 Manufacturing equipment: machine type, tooling, special fixtures, etc. required at each process step

7 Product characteristics to be controlled and acceptance criteria: i.e. dimensional features (nominal dimensions and tolerances), visual/cosmetic requirements, critical to function parameters, functional/performance requirements, etc.

8 Critical to Process parameters to be controlled and acceptable limits: i.e. plating bath concentrations, solder paste volume, cure times/temps, etc.

9 Inspection/test/monitoring equipment used: i.e. visual, calipers, coordinate measurement machines, go/no-go gauges, in circuit tester, temperature recorder, etc.

10 Control frequency: i.e., sampling plan, time, or product quantity internal between inspections is 100%.

11 Lot acceptance criteria: C=0, sampling plan, accept/reject criteria where lot means a batch of similar products or prototypes processed together uniformly through the supplier's manufacturing processes.

12 Responsible control function: i.e. production operator, QA inspector, etc.

13 Control records: type of reports, charts or other output records that are created and retained as quality records and the objective evidence the supplier is effectively executing to control plan requirements.

14 Reaction plan: action to be taken in the event product or process non-conformances and/or out of control (OOC) conditions are detected.

15 Nonconforming material handling and disposition process: method for controlling defective product.

16 Process characterization design of experiments for process steps or materials that are new, unique, or different from any leveraged processes.

2.3 Measuring and Reporting Quality Performance

The supplier will measure and report quality performance by:

1 Generating Defect per Million (DPM) or yield (% conforming to specifications) production goals based on statistical data, (ii) record actual DPM or yield performance results, and (iii) publish trend charts of actual DPM or yield performance versus goals at regular intervals (monthly at a minimum) for each critical process step.

2 Monitor DPM or yield performance rates for each critical process step through the Product life cycle using statistical process controls ("SPC"). Typically this requirement is minimally met using X Bar R charts or similar statistically valid methods of monitoring process variation and determining whether the variation in DPM or yield performance over time is in or out of control relative to both (i) upper and lower control limits calculated by natural variation in DPM or yield metrics from a statistically significant prior period of production and (ii) SPC pattern rules per Table 1 below for determining special cause changes in process variation over time

Table 1: Control Chart Pattern Rules

Rule	Rule Name	Pattern
1	Beyond Limits	One or more points beyond the control limits
2	+ or - 2 σ	2 out of 3 consecutive points at + or - 2 σ or beyond
3	+ or - 1 σ	4 out of 5 consecutive points at + or - 1 σ or beyond
4	Shift	7 or more consecutive points on one side of the average
5	Trend	7 consecutive points trending up or trending down
6	Mixture	8 consecutive points with no points between + or - 1 σ
7	Stratification	15 consecutive points between + or - 1 σ
8	Over-control	14 consecutive points alternating up and down

2.4 Reporting

The supplier shall provide a report to Oracle upon request to include:

- 1 Actual DPM or yield performance versus established goals trend charts for each identified critical process step and for the aggregate of all critical process steps.
- 2 Pareto charts identifying the defect types and quantity of failures due to each identified defect type in descending order of prevalence for the same time ;period as that of the information set forth in 1 above.
- 3 Corrective action plans for any defect types shown on the defect Pareto charts and DPM or yield charts.

3.0 Quality Audits

The supplier will maintain a documented internal quality audit process program that requires specified, frequent periodic audits to evaluate and promote consistent compliance to the supplier's defect free quality program, including audits specifically focused on ensuring manufacturing, inspection and test processes are consistently executed in compliance with the supplier's published (Oracle approved) control plan and the supplier's manufacturing work instructions applicable to each product and major subassembly inclusive of field replaceable units (FRU) and customer replaceable units (CRU).

Minimum frequency of internal supplier audits is to be annual.

The supplier will provide both internal and external audit schedules and records of audits performed, including audit findings and corresponding corrective actions, and verifications of corrective action implementation for audit findings upon Oracle's request.

4.0 Hardware Reliability

The supplier will provide:

- 1 A method of determining the on-going reliability metrics and levels defined in the specification of all purchased materials, components, and sub-tier components used in the manufacturer of products.
- 2 Reliability validation against applicable specifications at a mutually agreed upon frequency.
- 3 Additional reliability testing at sub-tier suppliers to specified component classifications and Oracle reserves the right to require a specific method of measurement.
- 4 Material Certifications of Conformance (C of C).

5.0 Processes

5.1 Process Documentation

The supplier will develop and maintain documented manufacturing procedures and work instructions for each product and major subassembly including assembly, test, and inspection sub-processes.

Those work instructions to align with and support consistent execution of manufacturing processes in accordance with the supplier's (Oracle approved) control plans.

The supplier will ensure all employees and contractors are trained and qualified to execute the manufacturing procedures and instructions. Oracle reserves the right to review all training records and may request manufacturing procedure and training documentation improvements to improve yields and quality performance. The supplier will provide this documentation to Oracle for review upon Oracle's request.

6.0 Change Management and Implementation

The supplier will have documented processes for part, process, and documentation change management and change implementation.

7.0 Inspections and Testing

7.1 First Article Requirements

First Article means a sample part or assembly for the purpose of inspection, from the approved process, is provided to measure that all engineering, design, quality, reliability, and specification requirements are verified and recorded, per specification requirements.

The supplier will comply with Oracle's First Article Inspection (FAI) requirements as documented in the Oracle AQP matrix specifications or product specifications.

The supplier shall make FAI and corresponding sample(s) available to Oracle upon request.

7.2 Incoming Inspection

The supplier will carry out Incoming Quality Control (IQC) using an industry recognized, statistically valid sampling plan (such as ANSI/ASQ Z1.4, ANSI/ASQ Z1.9, ISO 3951 or ISO 2859) providing assurance of product conformance equal to or better than Squeglia "C=0", a 0.65% AQL level sampling.

The supplier will obtain written approval from Oracle to implement any alternate sampling plans, providing substantiation of equivalent or better confidence of detection of non-conforming material as part of supplier's submitted alternate proposed sampling plan.

The supplier is required to demonstrate on-going sub-tier process capabilities greater than 1.33 CpK for all CTF and CTP product features or continuous successful ongoing inspection per Oracle approved IQC sampling plan by its sub-tier suppliers.

The supplier will submit evidence of compliance with this requirement to Oracle for initial approval and upon Oracle request thereafter.

All measurement tools and instruments shall be calibrated and traceable to a certified agency (e.g., National Bureau of Standards, BMS, NIST, etc.)

If the CpK value of a CTF feature or CTP parameter is less than 1.33, the supplier will inspect such feature or parameter respectively on 100% of units containing the feature or affected parameter before shipping.

When the volume production of a specific part or component is too low to carry out a process capability study, the part or component shall be inspected per an Oracle approved inspection plan.

This shall be continued until the minimum CpK study sample size required per Oracle specification 923-3402, Mechanical Part and Sub-Assembly Qualification and Approval Process is produced and inspected as required to fulfill CpK study requirements for that part.

For products with built in self-test, the supplier shall

1 Comply with the product self-test requirements per the supplier's procedures as reviewed and approved by the assigned Oracle supplier engineer.

2 Ensure that the product meets or exceeds the specification and/or data sheet.

3 Document all test modes and expected output.

4 Make the documented test modes and results available to Oracle upon request as such to adhere to traceability for the parts tested.

7.3 Dock-to-Stock Capability

If a supplier's incoming inspection procedure allows purchased material to achieve dock-to-stock (DTS) status, (i.e. suspending IQC inspection requirements) it shall be based on statistically valid sampling plans and records (available upon request) showing consistent lot acceptance history prior to conferring DTS status to any purchased materials.

The procedure as managed by the supplier will include ongoing statistically valid procedures to re-instate incoming inspection or modify the scope or frequency of inspection/test procedure in response to measured variation in purchased material quality levels over time.

In-process or outgoing issues with purchased material should be traceable to a trigger that includes a review of dock-to-stock status.

7.4 Data Tracking and Retrieving

Upon Oracle's request, the Supplier will provide acceptance rates (yields, DPMs) incoming inspection data, manufacturing data, reject data in Pareto form, CTO CpKs, TF CpKs, RCCA data reliability verification or other Oracle requested data promptly and within no more than seventy-two (72) hours or within a mutually agreed upon timeframe. Supplier will provide a list of materials that the Supplier uses or plans to use in the agreed-upon time frame. Supplier shall retain the historical data requirements as noted in this specification.

8.0 Visual Mechanical Inspections (VMI)

The EM is responsible for ensuring that all products shipping to Oracle's customers meet the VMI criteria specified in the Global Cosmetics Quality and Workmanship standards, 923-2001.

EMs are responsible to fully understand the Oracle cosmetic standard and incorporate the requirements into their operator training and operating procedures

All measurement tools and instruments shall be calibrated and traceable to a certified agency (e.g. National Bureau of Standards, BMS, NIST, etc.).

9.0 Out of Box Quality

When requested, external manufacturers shall perform a continual sampling of outgoing product quality. The process shall ensure that a closed loop feedback mechanism is in place to drive quality improvements back into the Manufacturing build/assembly and test process when anomalies are detected.

9.1 Post Pack Audit (PPA) Testing

Mutually agreed upon post-pack audit plans are to be defined by the operations team. If PPA is applicable, the testing shall be carried out on systems that were packed in finished goods then randomly identified for post-pack audit systems.

When performed, the test shall include a functional and a non-functional check.

If there are test failures, each shall be logged and tracked to closure with a defined root cause and corrective action plan.

Adherence to the test process shall include a clearly defined escalation path.

The test process details shall be included in the platform quality plan. A statistically valid measurement process shall be used to measure test performance. Any changes to the test process shall be controlled by a documented process.

The process shall detail the escalation process that will be followed if the failure rate or nature of the failure (such as safety risk) is deemed to be unacceptable.

9.1.2 Post Pack Audit (PPA) Sample Plan

The number of systems tested shall be based on a defined sample plan.

The sample plan shall have a clearly defined process to allow the quantity of systems being tested to increase or decrease depending on the number of failures experienced.

10.0 Quality Plan or Product Reliability Compliance Plan

When mutually agreed, the Oracle product life-cycle management (PLM) processes require that suppliers produce and maintain a quality plan or an Oracle approved product reliability compliance plan that includes milestone and deliverables. The plan details how the supplier will monitor and control product quality to meet the defined quality targets.

This requirement may also be detailed in the contractual documentation between Oracle and the supplier, including but not limited to the Product Award Letter (PAL) and/or Statement of Work (SOW).

The Oracle operations team shall review and agree the specific details of the quality plan

Oracle shall approve the content of the quality plan before the product reaches the revenue release, sustaining volume/customer order-able milestone.

10.1 Contents of the Quality or Product Reliability Compliance Plan

The supplier quality plan shall detail, at a minimum:

- The supplier functions to be represented on the team, along with their roles/responsibilities
- The name and role of the person accountable for achieving the quality goals at each applicable site
- A communication plan, including a schedule for quality review meetings/minutes/postings, email aliases, and dial-in numbers, as applicable
- The product metrics and targets internal to the external manufacturer (EM)
- The data external to the EM to be reviewed, typically sub-tier data, customer data, applicable data from Oracle internal manufacturing and other quality data as determined by Oracle goals.
- The metrics review methodology and schedule
- The action tracking, review, and closure mechanism
- The information archiving requirements
- Applicable Oracle and/or supplier documentation and procedures including manufacturing build assembly and test process flows
- Ongoing reliability test (ORT) plans and product compliance testing plans
- General site and sub-tier supplier quality control processes

10.2 Approval of the Quality Plan or Product Reliability Compliance Plan

The Oracle operations team shall review and agree the specific details of the quality plan which shall, as a minimum, meet the definitions outlined in this document.

Oracle shall approve the content of the quality plan before the product reaches the revenue release, sustaining volume/customer order-able milestone.

Ongoing validation of performance to the plan by the EM is the responsibility of Oracle supplier engineering.

11.0 Setting Product Goals

11.1 In-Process Goals

The initial in-process test goals at revenue release, sustaining volume may be carried over from the NPI phase of the product and may have been set by the Oracle product engineer (PE), or the supplier. However, after revenue release the supplier is responsible for setting in-process goals based on the documented test process coverage model.

The product goals shall be recorded in the platform quality plan and in the documentation reviewed at regular quality review meetings.

11.2 Dead on Arrival (DOA) and Early Life Failure (ELF) Goals

Oracle sets the DOA and ELF goals. These are the main product quality goals against which Oracle measures the platform's field performance. The initial goals are set in and are regularly revised as part of ongoing quality reviews throughout the production life.

The product goals shall be reviewed at the end of each quarter to enable accurate targets to be published at the start of the following quarter.

When the product is not an Oracle design, the goals may be specified by the original equipment manufacturer (OEM) with Oracle's documented mutual agreement.

11.3 Ongoing Reliability Test (ORT) Goals

The ORT process involves monitoring a sample of current production material and verifying that the reliability of the product meets the mean time between failure (MTBF) goal. If ORT is required, the Oracle product engineer (PE) calculates the probability ratio sequential test (PRST) goals using the Field Replaceable Unit (FRU) reliability data from Oracle's MTBF tool database and the procedure defined in SCO Quality: Ongoing Reliability Testing Policy, 914-1736.

For externally manufactured platforms, the supplier is responsible for executing the ORT testing process and for completing and posting the ORT PRST plots.

12.0 Product Qualification

12.1 Reliability Prediction

Where applicable, upon Oracle's request, Supplier will perform a Mean Time Between Failures (MTBF), or Mean Time To Failures (MTTF), or Failures In Time (FIT) reliability prediction in accordance with Mil-Hdbk-217 or Telcordia SR-332, IEC TR 62380, or JEDEC Publication based on the preliminary Product bill of materials. Results of the reliability prediction will be submitted to Oracle for review. Components will comply with the reliability section of the applicable Component Engineering Requirements (CER) Specifications.

12.2 Product Qualification Planning

Supplier will submit to Oracle for approval detailed Product qualification plans inclusive of sub-tier supplier components, materials, and processes consistent with this specification, Oracle's applicable AQP Specifications. Supplier will include documenting sufficient qualification tests, inspections, and analysis to support Supplier demonstration of Product compliance to Oracle specifications. Upon completion of qualification plan execution, Supplier will provide a report documenting results of the qualification. Supplier will clearly identify any qualification results that do not comply with Oracle specification as non-conforming in the qualification report provided to Oracle.

12.3 Test Inspection Equipment & Correlation

Supplier test equipment will be calibrated to standards derived from an appropriately accredited national institution through the Product and Component life cycles. Supplier test equipment selected for use in a particular application shall have adequate accuracy, range, resolution, and stability for the intended purpose. Supplier will perform Gauge Repeatability and Reproducibility ("GR&R") studies to demonstrate adequacy of the selected test equipment to ensure accurate measurements in the intended use. Supplier will define test parameters and implement a calibration plan. Correlation between test equipment, models, and sites shall be evident in data provided to Oracle upon request.

12.4 Qualification Samples

Supplier will supply qualification samples to Oracle per the AQP Specifications and, where applicable, as mutually agreed upon between Oracle and Supplier.

12.5 Oracle Testing

The Product will undergo qualification testing with the specific test architecture(s) determined by Oracle to verify the Product's conformance to the following: (a) reliability levels; (b) quality levels; and (c) the Specifications. The qualification process may contain, but is not limited to, the following steps: data sheet review, characterization, physical analysis, quality assessment, soft-error rate (SER) evaluation, in circuit test (ICT), board functional test (BFT), product/process verification test (PVT), reliability qualification testing (RQT), supplier quality assessment, pilot and on-going reliability testing (e.g., ORT), post pack audit (PPA), initial system test (IST), final system test (FST), rack level testing. In case of any non-conformance and depending on the type and/or quantity of failures found, Oracle may reasonably decide to not qualify or to disqualify the Product.

12.6 New Product Introduction (NPI) Review

During NPI phase Supplier will demonstrate production capabilities or provide a detailed plan to meet Oracle's production demand requirements. Supplier may not start volume production for Oracle until Oracle has provided approval in writing. Supplier and sub-tier suppliers shall demonstrate (a) process capability; (b) manufacturing capacity sufficient to satisfy Oracle's forecasted demand and any upside support requirements specified in the Agreement, Award Letter or Product Schedules; and (c) compliance to Oracle Product and AQP Specifications, applicable sub-tier material or Component Specifications.

12.7 Initial Supplier Survey and Quality/Technical Audit Gaps

Supplier will demonstrate to Oracle's satisfaction that it has corrected all unacceptable items identified on any Supplier survey performed by Oracle within five (5) days following completion of the initial survey. Supplier will also demonstrate to Oracle's satisfaction that it has corrected all unacceptable items identified on any subsequent Quality/Technical Audits performed by Oracle at Supplier's manufacturing or product development facilities, which may include but are not limited to, Supplier Engineering Technical Audits (SETA), Product Revenue Readiness Release (R3P) Audits, within the corrective action time lines specified in corresponding Oracle audit processes.

12.8 3rd Party Original Design Manufacturer (ODM)/Joint Design Manufacturer (JDM) Design Verification Testing (DVT)

For Products undergoing design and development requested by Oracle, Supplier will conduct design verification testing (DVT) to ensure the integrity of each Product design, as well as to provide for adequate test equipment development. DVT will be detailed in the corresponding statement of work (SoW). That testing will include, but not be limited to, reliability demonstration testing, stress testing for margin characterization and performance testing through Benchmarks or other industry standard testing. A design review between Oracle and Supplier shall occur at the end of each identified build phase.

Further all serial traceability information for any and all testing should be provided in a form which allows ingestion by Oracle's test data management system (TDMS)

12.9 Agency Testing and Manufacturing Site Certifications

Supplier will perform all testing required by worldwide governmental and regulatory agencies and obtain all necessary approvals, including but not limited to, Korea Certification (KC), China Compulsory Certification (CCC), China Quality Certification (CQC), Conformité Européenne (CE), International Electrotechnical Commission (IEC), Japanese Standards Association, Underwriter Laboratory and Canadian Standards Association, to ship the Product worldwide, and Product functionality testing. Supplier agrees to make all test results and any supporting documentation available upon Oracle's request, within no more than seventy-two (72) hours. Supplier will work expeditiously with Oracle's compliance engineer to resolve any compliance issue. Supplier will maintain the applicable standards and certifications throughout the Product's life cycle.

Supplier will also obtain all required manufacturing site certifications.

These include but are not limited to:

Quality Management Systems ISO 9001

Environmental Management Systems ISO 14001

Occupational Health and Safety Systems ISO 45001

Information Security Management Systems ISO 27001

Business Continuity Management Systems ISO 22301 and ISO 22318

Responsible Business Alliance (RBA) Validated Audit Program (VAP) Audit - Platinum Certificate

ISO 20400 Sustainable Procurement

ISO 14064 Green House Gas (GHG) Reporting Certifications

ISO 14064-1 Greenhouse gas emissions and removals

ISO 14064-3 Verification and validation of greenhouse gas statements

12.10 Technology Transitions

Supplier will

- (a) promptly notify Oracle of any upcoming transitions in the Product materials, design or manufacture that are either industry-wide or Supplier-specific;
- (b) implement the mutually agreed transition plan and schedule;
- (c) support Oracle's implementation of the transition via Oracle's PLCP.
- (d) Provide Oracle qualification schedules, and plan for any new technology or transitions.

13.0 Approved Manufacturer List (AML)

The Oracle AML identifies which vendors and parts may be used against a given Oracle part number, for use in Oracle products.

Only parts listed within the AML can be used on Oracle products.

Parts not listed on Oracle's AML cannot be used.

14.0 Managing and Controlling Part Changes

In the event the Supplier or a sub-tier supplier proposes to change form, fit, function, quality, life cycle, JEDEC/ECIA/IPC standards, manufacturing site, or End of Life (EOL) component on an Oracle qualified Product or to the manufacturing process for material, Component or Product, the Supplier shall provide Oracle through Oracle's Part and Process Change Notification (PPCN) tool or other mutually agreed tools, at least ninety (90) days prior to proposed change implementation date. PPCNs received from sub-tier suppliers will be provided to Oracle within two (2) business days of receipt by the Supplier regardless of product life cycle phase.

Changes to correct problems in an Oracle product build and test will not be made without Oracle's prior written consent.

The product, process, quality, lifecycle change notice will contain sufficient detail for Oracle to understand the scope, timing, and impact of the proposed change.

Oracle suppliers and their subtiers shall follow the PPCN process defined in the Supply Chain Product and Process Change Notification Procedure, 923-2465 and 923-2349 Sub-tier Management Roles and Responsibilities to communicate changes to Oracle.

15.0 Qualification Testing

Platform/process changes are required through the product life cycle. Each change shall be fully reviewed to understand the potential impact on both in-process and field quality. The review shall ensure that the long-term reliability of the platform will not be adversely affected by the change and that all manufacturing processes are verified.

When the change is deemed to have a potential long-term reliability implication, a reliability qualification test (RQT) shall be completed. Refer to SCO Chief Quality Office: Hardware Reliability Qualification Testing (RQT) Procedure, 914-1746, for guidelines on how to perform this test.

The product engineer and the supplier engineer define the qualification testing performed to ensure that the manufacturing process can accept the new change (ex: process verification testing).

16.0 Managing Manufacturing Product Quality

16.1 Product Quality Management Metrics

The following shows the required metrics used to measure manufactured product quality:

Metrics		Data Collection Method			Response Plan		
Quality or Process	Control Indicators	Checking item	Frequency	Responsibility	Action	Doc. Resource location	Status
Sub-Tier Control Chart	EM to agree with sub-tier	EM to specify	Weekly	EM Oracle audit	EM to take action on out of control (OOC) condition	EM web portal	
Sub-Assy Control Chart	UCL LCL	In control	Weekly	EM Oracle audit	EM to address	EM web portal	
System Assy Control Chart	UCL LCL	In control	Weekly	EM Oracle audit	EM to address	EM web portal	
Systems Assy Yields	Pareto Charts	FRU DPM Key component DPM	Weekly	EM Oracle audit	EM to address	EM web portal	
PPA Yield Report	Platform DPM	Platform DPMs	Weekly	EM Oracle audit	EM to address	EM web portal	
ORT PRST Plots	Accept Reject lines	Status Trends	On Failure or weekly	EM	Action at EM quality meeting	EM web portal	
Customer Data (DOA / ELF, etc.)	Platform DPM	Platform DPMs	Monthly	Oracle PE to analyze	Action at EM quality meeting	Designated EM or Oracle web portal	
Non-Conforming Corrective Action Tool (NCAT) Aging report	Aging goal		Weekly	Oracle PE and SE	Actionees escalated	NCAT tool	

16.2 Product Acceptance

16.2.1 Acceptance Rates

Products will not be deemed accepted by Oracle unless the Products meet the minimum acceptance rates in the applicable Award Letter or Quality Plan.

16.2.2 Failure to Meet Minimum Acceptance Rates

If the Product(s) fails to meet the minimum acceptance rates set forth in the applicable Award Letter or Quality Plan, Oracle, at its option and without liability, may take all or some of the following steps:

- (a) cancel an Oracle new product introduction;
- (b) terminate the applicable Award Letter;
- (c) reject the Product until the minimum acceptance rates are met;

(d) implement a screening program as described below, and (e) reschedule or cancel any affected Purchase Orders for the Product.

If Product(s) does not meet the minimum acceptance rates, Supplier will implement immediate, comprehensive failure analysis, root cause investigation and corrective actions as described in this document at Supplier's expense to correct the problem.

16.2.3 Rejection

Oracle is entitled to whole lot rejection of all Product units of the same form, fit or function if any of the Product units fail to meet the applicable acceptance criteria.

16.2.4 Oracle Initiated Screening

If Product does not meet the minimum acceptance rates of the applicable Award Letter or Quality Plan, Oracle may implement, or require the Supplier to implement or support, special screening (i.e., source inspection, 100% incoming inspection or 100% inspection of Oracle received inventory of the affected Product) at locations Oracle deems appropriate and Supplier will reimburse Oracle for the costs of the screening, which may include, but are not limited to the following: all direct labor costs, either of Oracle employees or temporary service personnel; all supervisory and engineering support costs directly related to set up and management of the processes; all materials directly associated with the screen (including, without limitation, test cables, tools, etc.); rental expenses, if any, for equipment used in the process; expenses associated with rented space if Oracle facilities cannot accommodate the process activities; and/or any additional freight cost incurred due to material movement.

17.0 Sustaining Production

Supplier will undertake the following during sustaining volume production:

17.1 Inspection/Test Responsiveness and Improvement

Supplier's inspection/test processes will be scalable to respond to quality-related events outside of established control limits or trends experienced in Supplier's production on mutually agreed-upon time frames.

17.2 Outgoing Quality Levels

Oracle and Supplier will agree to a statistically valid method for inspection sampling of the out-going quality of every shipment prior to delivery to Oracle. This will be documented in the Product quality control plan. Supplier will also document in the plan what measure will be taken to correct any quality-related events outside of established control limits.

Oracle reserves the right to require Supplier to screen one hundred percent (100%) of any product lots not meeting the agreed-upon quality levels. This may include electrical/functional testing and shall be done at the one hundred percent (100%) level.

17.3 Process Control

Supplier will maintain documented controls of its manufacturing process consistent with the Supplier's quality control plans submitted to and approved by Oracle. Supplier will notify Oracle within seventy-two (72) hours in any case where inspection, test, or process control results for Product CTFs or process CTPs as identified in Supplier's Oracle approved control plan has fallen below, reached, or exceeded the control limits or is otherwise statistically in an out of control condition.

17.4 Statistical Samples

Upon Oracle's request, Supplier will provide identified samples with actual readings for all variable characteristics from a designated lot.

17.5 On-Going Reliability Testing (ORT)

Supplier and sub-tier suppliers will establish a mutually agreed ORT plan and schedule to ensure the Product meets Oracle's Specifications at all times.

17.6 Scrap and Rework

Supplier is responsible for scrap or rework costs of Products and Components that occur:

- In Supplier's or sub-tier supplier's factory,
- In Oracle's factory,
- During customer installation,
- Within seven (7) days following customer installation unless a longer period is specified in other documentation, except to the extent that

Supplier is not responsible for scrap or rework costs when the supplier has demonstrated through root cause analysis and to Oracle's reasonable satisfaction that the failure was caused by Oracle.

17.7 Support

Upon Oracle's request, Supplier will provide reasonable on-site support to solve problems with rejected product. On-site support may include sorting and screening failed product.

17.8 Root Cause Analysis

Supplier will conduct all root cause analysis (8D methodology) of all failures that occur in Oracle's or Oracle Contractor's factory to resolve all failures. For failures determined to be caused solely by Oracle's design or Oracle physical damage, Oracle will pay the cost for resolution.

17.9 Multiple Returns

Supplier will identify, monitor, analyze and take corrective action on multiple returns, which are identified as Product of the same serial number returned to Supplier with a similar failure symptom three (3) times, unless otherwise specified, as reported by Oracle or the Supplier's testing. Returns and rework of the same SN is not allowed unless mutually agreed upon with Oracle. Oracle and Supplier will agree on a means to measure and frequency of performance reporting in this area. Supplier will perform and report failure analysis results, root cause(s) and corrective actions (8D methodology) for all instances of multiple returns.

If Supplier's system of serial number identification of product requires assignment of a new serial number each time a unit of product is returned to and repaired by Supplier, then Supplier will maintain the traceability to all serial numbers previously assigned to the same physical unit of Product to enable consistent identification of all instances of multiple returns.

Traceability of material pass or fail is required for all units including when re-use is authorized.

Oracle will have the option of requiring replacement, rather than repair, of any defective unit that meets the multiple return criteria at no cost to Oracle for in-warranty Product. Returns for ECO upgrade only (and not due to failure or rejection at Oracle manufacturing locations or at Oracle Customers (field returns) will not be considered in the multiple returns count.

18.0 Platform (Product) Quality Review

18.1 General

The platform quality plan shall include a regular, detailed quality review meeting to be held on a mutually agreed upon cadence. This meeting may be separate from or included as part of the Operations team meetings.

The external manufacturer shall facilitate the platform quality review.

All status and reports shall be available to the quality review team eight (8) hours before the start time.

A record of the meeting shall be kept with action items, ownership and timelines clearly defined.

18.2 Quality Review Content

The platform quality review is to include at a minimum:

- The data gathered from the systems and sub-assembly test stages
- Sub-tier data
- ORT process status
- Outputs from any outgoing quality audit stages
- NCAT closure information
- Any other quality issues arising from ongoing qualifications or testing
- DOA and ELF
- Open product issues including NCAT issues and resolution cycle time metrics
- Other quality data as appropriate
-

18.3 Additional Data

Additional data to be presented by the EM includes:

- In-process test data, using the most appropriate statistical process control (SPC) charting method, with SPC trigger techniques driving any actions and activities.
- Yield Pareto charts for each test stage, with details of the top failing assemblies and the top failing symptoms and failure analysis findings.
- Potential corrective actions are discussed with target resolution dates, agreed and tracked to completion to address the top failing parts each meeting.

19.0 Oracle Data and Monitoring

19.1 Test Effectiveness and Efficiency

At the start of each Oracle business quarter (unless otherwise documented in the quality plan), the Oracle product engineer ensures an analysis is performed on the fallout of the product throughout the test process to review whether the test process time and sequencing as documented in the product's test coverage matrix is as efficient as possible.

This review includes:

- Analysis of the test escapes (field failures, out-of-box quality failures, internal customer failures and ORT failures)
- Time to fail analysis
- Review of the current test software against the latest available diagnostics
- The analysis is presented to the quality meeting, whose members agree to any appropriate modification for improving the process effectiveness or efficiency and plans its implementation. Any changes to the product test coverage shall be documented.

19.2 Failure Analysis, Root Cause Investigation and Corrective Action (FA/RCCA)

19.2.1 FA/RCCA General Support Requirements

Supplier acknowledges that the Products, Services and Components provided by Supplier under Agreement with Oracle may be used by Oracle customers in mission critical environments and that Supplier's compliance with Oracle's FA/RCCA is critical for Oracle to support its customers in such environments. Supplier will, at their own cost, implement and maintain a mutually agreeable FA/RCCA process, participate in Oracle's corrective action process, and comply with Oracle FA/RCCA including without limitation:

- (a) compliance with agreed-upon turnaround times for defective Products and Components as set forth in Section 19.2.3 below;

- (b) implementation of Oracle FA/RCCA tracking and reporting tools;
- (c) adoption of systematic, consistent failure analysis, root cause, corrective and preventive action processes that incorporate the methods and procedures documented in Oracle Specification 923-3148 Root Cause and Corrective Action (RC/CA) Guidelines for Oracle and Oracle Suppliers
- (d) systematic means of documenting, tracking, and reporting recurrence of issues across the Product and Component life;
- (e) maintenance of sufficient personnel with the requisite skills to consistently comply with the FA/RCCA requirements and support timely and effective response to Oracle quality issues and FA/RCCA requests communicated via NCAT, e-mail, meeting minutes, quarterly management reviews, and via other reporting tools or at meetings as mutually agreed;
- (f) identification of designated Supplier FA/RCCA contacts whose responsibilities will include FA/RCCA response status updates, ongoing FA/RCCA training, over-seeing implementation and maintenance of FA/RCCA sub-tier requirements throughout the life of the program;
- (g) where directed by Oracle, adoption of processes to receive failed Products directly from Oracle customers; and
- (h) implementation of the foregoing with respect to sub-tier suppliers, including but not limited to, Component, raw material, surface finishing, plating, painting, and heat treatment sub-tier suppliers.

19.2.2 Defective Product Returned to Supplier

If Oracle returns defective Product to Supplier, Supplier will promptly initiate investigation to identify the true root cause(s) of both (a) the defect and (b) escape of the defective product through Supplier's inspection and test processes, and implement appropriate actions necessary to minimize recurrence of the defect and prevent further delivery of similarly defective Products to Oracle and Oracle Customers. Supplier and sub-tier suppliers will conduct a detailed failure analysis of the returned defective product, report the failure analysis data and conclusions to Oracle and implement identified corrective and preventive actions within the response times set forth in this document.

Where mutually agreeable, Supplier will perform root cause analysis for Product defects that are visually apparent, including, but not limited to, physical damage or cosmetic workmanship non-conformances, without requiring Oracle return of the defective Product to Supplier, based on Oracle providing Supplier with clear photographs and detailed documented description of such defects sufficient to support Supplier's root cause analysis and corrective action efforts.

Corrective actions may include but are not limited to the following: Component, sub-assembly and/or final assembly level burn-in to remove any latent failures; special screening inspections or tests in the Supplier's process; and/or extended test time for 100% of Oracle systems.

19.2.3 Response Times

The FA/RCCA response times are as follows, except to the extent that response times are otherwise agreed to between Oracle and Supplier pursuant to the scorecard process/profile, and unless otherwise specified in the FA/RCCA or CPAS Response Time Schedule in the Specifications, which can be modified as agreed by both parties:

19.2.3.1

Initial response reporting failure analysis results and status of attempts to duplicate or confirm the Oracle reported defect within one (1) business day of receipt of a non-conforming Product or Component.

19.2.3.2

Determine what failed, down to FRU/CRU or Component level as appropriate, depending on the Product supplied; report back with screen containment plan including risk assessment to minimize exposure within three (3) business days after receipt of a non-conforming Product or Component.

19.2.3.3

Root cause analysis of failure and identified corrective and preventive actions to address the root cause(s) within seven (7) days after receipt of a non-conforming Product or Component.

19.2.3.4

Implementation of corrective and preventive actions as soon as commercially feasible, but in no event more than thirty (30) days after receipt of a non-conforming Product or Component. Supplier will take corrective action for all known non-conforming Product, Services, or Components prior to shipment to Oracle

19.2.3.5

Supplier will preserve and maintain, in accordance with the retention period for quality records set forth in this document, all data associated with Product failure analysis (including defect frequencies) and corrective actions (including effective dates and control data) and to make that data available to Oracle within 24 business hours of request at no charge.

19.2.3.6

The requirements of this specification apply to reworked material and resubmitted source inspected Lots. Supplier will not use any non-conforming raw material, Components, or Products, or mix reworked material with new material, unless specifically authorized in writing and in advance by Oracle.

19.3 Corrective Actions and Closures

The quality review meeting includes a review of progress and closure of NCAT issues to ensure that failure analysis (FA) work is progressing and that the corrective actions undertaken are adequate for all failure mechanisms on every applicable platform and every manufacturing site.

While doing this, the team shall be aware of both the current failure rate and the trend of the failure rate for the failed product or assembly.

In reviewing the progress of FA, the team shall ensure that an FA report is posted within NCAT within the timelines laid down in the NCAT procedure.

The timeliness and effectiveness of NCAT closures are two key metrics used by Oracle to measure the performance of the EM and as such may be reflected in the supplier scorecard.

Refer to Corrective and Preventive Action Procedure, 923-3644 for additional information on the NCAT process.

20.0 Quality Records

Each platform quality plan lists all the specific quality records required. In addition, there may be other quality records such as EM quality meetings and reviews. The supplier is responsible for maintenance and control of quality records as determined in the quality plan.

20.1 Record Keeping

All inspection, test and quality records and documentation for raw materials, components, and products that are related to the requirements of document will be retained by the supplier for the longer of (a) the period of time required under any applicable law or regulation; (b) ten (10) years; or (c) otherwise required by a particular Oracle Specification or agreed by the parties in a written document such as an Agreement, SOW, Award Letter or Product Schedule.

21.0 Product Test Software Controls

At each EM, the EM or Oracle defines and controls the tools and processes used to control test software developed by the EM/Oracle. The EM is to verify that their software source control and release process provides sufficient control and software of sufficient quality to meet Oracle's business requirements.

As needed, the EM submit change requests to Oracle and tracks these requests through Oracle's defined interfaces and tools.

22.0 Quality and Workmanship Standards

The EM is responsible for ensuring that all products shipping to Oracle's customers meet the workmanship criteria specified 923-2001 Global Cosmetics Quality and Workmanship standards.

EMs are responsible to fully understand the Oracle cosmetic standard and incorporate the requirements into their operator training and operating procedures.

23.0 Stop Ship and Purge

In response to quality issues and concerns it might be necessary to screen or rework material to prevent unsuitable material from reaching Oracle's customers.

In such cases, both Oracle and the EM product teams shall support the activities of a stop ship or purge team.

Refer to 923-1826 Stop Ship and Purge (SSP) Process for Hardware for details.

24.0 Sub-tier Controls

24.1 General

Oracle suppliers and their sub-tier suppliers shall follow 923-2349 Sub-tier Management Roles and Responsibilities as directed for Core and Non-Core Materials.

24.2 New Sub-tier Suppliers

Supplier will have documented processes that demonstrate its technical and business capability to select suppliers, qualify and disqualify its suppliers.

Upon Oracle's request, Supplier will promptly and within no more than seventy-two (72) hours, provide the data that supports the supplier selection and qualification of a sub-tier supplier for Products, Components, services and materials.

All new Component sub-tier suppliers shall be approved by Oracle for use on Oracle products, as documented in Oracle's Approved Manufacturer List (AML) for that component.

24.3 Sustaining Sub-tier Suppliers

Supplier will maintain documented processes to ensure sub-tier suppliers for Products, Components, Services and materials will meet or exceed Oracle's Specifications including, requirements for First Article inspection, incoming inspection, CpK thresholds, Product Change Notices (PCNs), Product traceability and Corrective Preventive Action System (NCAT). Upon Oracle's request, Supplier will promptly within no more than seventy-two (72) hours make available the relevant documentation, including all necessary contract flow down provisions in its sub-tier supplier agreements.

24.4 Sub-tier Data

Within no more than seventy-two (72) hours of Oracle's initial request and, as frequently thereafter as reasonably requested by Oracle, Supplier will

(a) provide quality and performance metrics of all sub-tier suppliers as required to demonstrate compliance with applicable Oracle's Specifications and

(b) conduct quality and performance audits of its sub-tier suppliers to ensure they meet or exceed Oracle's quality and performance metrics.

If there is a risk to quality, Supplier will assess the impact and engage in activities to ensure the quality of the Product or Component, including stop ship purge pre-assessment.

Supplier will (a) ensure its sub-tier suppliers maintain and make available to Oracle as requested historical quality data, and (b) will communicate any findings around improvement plans and associated data relating to Supplier's sub-tier suppliers.

Supplier will communicate and implement sub-tier supplier improvement plans as required based upon the sub-tier demonstrated quality & availability performance.

25.0 Scorecard Process

Oracle will evaluate quality performance metrics through Oracle's scorecard process, quarterly management reviews and regularly scheduled quality forums that may vary in frequency by supplier or commodity. Prior to these meetings, Supplier will provide Oracle with a detailed analysis including the root cause and failure analysis of the most significant quality issues and the proposed corrective action using statistically valid and agreed to methods (including Pareto charts). Supplier will provide Product and process improvement plans at the quarterly reviews in response to items raised by Oracle at prior forums.

26.0 Management Review

Executive representatives from both parties will meet no less than quarterly to review major elements of this specification and to jointly agree upon enhanced performance metrics. The agenda will include reviewing Supplier's process and product road maps, improvement initiatives, schedules, and organizational updates, as well as Supplier's performance against metrics set forth in this document.

27.0 Glossary

ACRONYM	DECODED
AML	Approved Manufacturer List
AQP	Advanced Quality Planning
BFT	Board Functional Test
CCC	China Compulsary Certification
CE	Conformite Europeenne
CER	Component Engineering Requirements
C of C	Certificate of Conformance
CPAS	Corrective and Preventive Action System
CQC	China Quality Certification
CRU	Customer Replaceable Unit

CTF	Critical to Function
CTP	Critical to Process
DOA	Dead On Arrival
DPM	Defect Per Million
DTS	Dock to Stock
DVT	Design Verification Test
ECO	Engineering Change Order
ELF	Early Life Failure
EOL	End Of Life
EM	External Manufacturer
FA	Failure Analysis
FAI	First Article Inspection
FIT	Failure In Time
FRU	Field Replaceable Unit
FST	Final System Test
GR&R	Gauge Repeatability & Reproducibility
HVA	High Value Asset
IEC	International Electrotechnical Commission
IQC	Incoming Quality Control
ICT	In Circuit Test
IST	Initial System Test
JDM	Joint Design Manufacturer
KC	Korea Certification
LCL	Lower Control Limit
MTBF	Mean Time Between Failure
MTTF	Mean Time To Failure
NCAT	Non Conformance Action Tool
NPI	New Product Introduction

ODM	Original Design Manufacturer
OOC	Out Of Control
ORT	Ongoing Reliability Test
PAL	Product Award Letter
PCN	Product Change Notice
PE	Product Engineer
PLM	Product Lifecycle Management
PLCP	Product Life Cycle Planning
PPA	Post Pack Audit
PPCN	Part and Process Change Notification
PVT	Product/Process Verification Test
QA	Quality Assurance
RBA	Responsible Business Alliance
RCCA	Root Cause Corrective Action
RQT	Reliability Qualification Test
R3P	Product Revenue Readiness
SER	Soft Error Rate
SETA	Supplier Engineering Technical Audit
SOW	Statement of Work
SPC	Statistical Process Control
SSP	Stop Ship and Purge
TDMS	Test Data Management System
UCL	Upper Control Limit
VAP	Validated Audit Program
VMI	Visual Mechanical Inspection

RELATED INFORMATION

REFERENCE DOCUMENTS AND RECORDS	DOCUMENT NUMBER
SCO Chief Quality Office: Hardware: Reliability Qualification Testing (RQT) Procedure	914-1746
Stop Ship and Purge (SSP) Process	923-1826
Global Cosmetics Quality and Workmanship Standards	923-2001
Supply Chain Product and Process Change Notification (PPCN) Request Procedure	923-2465
Corrective and Preventive Action Procedure	923-3644
Sub-tier Management Roles and Responsibilities	923-2349

DOCUMENT HISTORY AND APPROVALS

Dash	Rev	Date	Description of Change	Originator
01	A	24 Jun 2004	Initial release.	N/A
02	A	20 Oct 2005	Doc title changed; all refs to VSP changed to SSG; separated info re EM and IM products in some sections; 'supplier' replaced with 'platform' in some sections; info in Section 6 re early warning (EW) removed and replaced with PITT info; added new info in Section 6 re SCO reviews; original Section 9, Supplier Quality Management removed; other changes to text throughout.	N/A
03	A	21 Dec 2005	Added new section for R3P in Section 3.3; changed review list in Section 4.1; added new Section 4.7; removed weekly critical-to-quality review section (Section 6.2.2) and adjusted associated xrefs and text accordingly. Added docs, as appropriate, to Related Information; added URLs on page 7; made other minor editorial changes.	N/A
04		25 Oct 2013	Updated from Sun to Oracle, modified document from both internal and external to just external manufacturers and removed obsolete references/processes.	N/A
05		July 5, 2022	Revised contents of the entire document. Incorporated contents of the quality exhibit. Added sections on Security, Safety and Regulatory Compliance. Removed SCO: Test and Assembly Process Design Process (PDP), 923-3293). as a reference. Update document to Redwood format.	N/A
06		Sept 18, 2024	Added 923-2349 statement to section 24, sub-tier controls. Removed obsolete 923-3663 PPA document from reference section. Clarified CpK for low volumes in section 7.2 Incoming Inspection. Added section 1.5 Counterfeit detection. Added section 1.6 Assets. Added 1.7 Incoming Shipments. Updated 12.8 Design Verification Testing. Added manufacturing site certifications to section 12.9. Removed reference to 913-3558.	N/A
07		Oct 15, 2024	Section 9.0 PPA, added “when required” Section 10.0 added product reliability compliance plan and mutually agreed Section 11.3 added 'if required' to ORT Section 12.5 added rack level testing	N/A

		<p>Section 12.7 removed DDR audit</p> <p>Section 12.9: added ISO 20400 Sustainable Procurement</p> <p>ISO 14064 Green House Gas (GHG) Reporting Certifications; ISO 14064-1 Greenhouse gas emissions and removals; ISO 14064-3 Verification and validation of greenhouse gas statements</p> <p>Section 19.2.3.2: removed DRU</p> <p>Section 19.2.3.5: changed 72 hours to 24 business hours</p> <p>Added section 27 - glossary</p>	
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