

REVISION HISTORY				
REV.	CO #	REASON AND DESCRIPTION ON CHANGE	CO ORIGINATOR (DEPARTMENT)	RELEASE DATE (MM/DD/YY)
35	ECO-26145	Minor change to: replace obsolete QAP0062 with released QAP0056	David Meredith (DCC)	07/10/13
36	ECO-27328	Update section 6.3 Infrastructure & Work Environment, Section 6.3.2 Contingency plans & Section 6.4 Employee Safety to reflect current practice.	Rich Hess (EH&S)	11/04/13
37	ECO-38367	Updated scope to: -Reflect current All Programmable context, -Correct AS9003 to AS9100 Remove separate treatment for Communications Design Center (CDC) in several sections of the document. (Now part of TL9000 corporate certification) Updated Management Section to reflect recent organization and title changes Updated links to internal websites in Employee Motivation Section (6.2.2.4) Added 3 documents to the Level 2 documents table (NPI, Customer Operations, and Worldwide Technical Support). Updated appendix A	Don Sabin (Quality Systems)	12/17/15
38	CO-0004094	Renamed document CDC0006 to IPD0001	Jeffrey Lin (IP Design Solutions)	12/07/16
39	CO-0006709	<ul style="list-style-type: none"> <li>Updated Sections 4 through 10 to include new and revised requirements from TL9000:2016 (R6) <ul style="list-style-type: none"> <li>Renumbered and renamed the sections to match TL9000:2016 clauses</li> <li>Added new requirements in sections 4,6 and 7</li> <li>Updated management org. chart in section 5</li> <li>Added revised requirements in relevant sections</li> </ul> </li> <li>Updated Appendix A and Appendix B <ul style="list-style-type: none"> <li>Renumbered and renamed the requirements and clauses to match TL9000:2016</li> <li>Updated References</li> </ul> </li> </ul>	Ankita Chaturvedula Stella Lim (Quality Systems)	09/28/17
40	CO-0013436	<ul style="list-style-type: none"> <li>Updated Quality policy in section 1.3</li> <li>Updated scope to reflect the current Adaptive Intelligence context</li> <li>Updated terminology in Key Process, Figure 1 in Section 4.4</li> <li>Updated management org. chart in section 5</li> <li>Added statement to document non-applicable clauses of TL9000: 2016 (R6) in section 4.3</li> <li>Added scope statement to section 4.3</li> </ul>	Ankita Chaturvedula Don Sabin (Quality Systems)	12/11/18
41	CO-0015728	<ul style="list-style-type: none"> <li>Remove reference to CUS0001 as removing as Controlled Spec. Moving to Desktop Procedure</li> </ul>	Sandy McCarthy (Customer Ops)	02/27/19



**TITLE:** Xilinx Quality Manual

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# Quality Manual

## 1. Company Vision, Mission, and Quality Policy

### 1.1. Vision

To put a programmable logic device in every piece of electronic equipment within the next 10 years. To build a high tech company that sets a standard for managing high tech companies.

### 1.2. Mission

To enable customers worldwide to attain the fastest time-to-market, flexible product lifecycle management and total cost management by focusing on programmable logic solutions consisting of industry-leading silicon, software and IP, and services resulting in a financially sound company.

### 1.3. Quality Policy

“Xilinx is committed to deliver products with **highest levels of quality** to multiple markets of the Adaptable Intelligent World, on time **every time**. We achieve this through **partnerships** with customers, suppliers and technology stakeholders with our culture of **innovation and operational excellence**.”

## 2. Key Programs and Quality Objectives

Xilinx customers select our products for the following reasons:

- They are the most advanced in the industry
- They represent the most cost effective solution
- They have the best Quality and Reliability in the industry

### 2.1. Key Programs

Xilinx key programs have been defined by executive management and sponsored by the CEO.

### 2.2. Objectives and Targets

Xilinx product roadmap is the primary element in setting quality objectives and targets. Metrics, owners, and targets are defined in the Management Review (QAP0133) procedure. Key objectives are established taking into account several factors relevant to the product roadmap.

These factors include:

- Market requirements
- Customer requirements
- Technology
- Manufacturing
- Industry standards

## 2.3. Quality Leadership

Each year, functional groups develop strategic plans. These plans are communicated, as appropriate, throughout the organization and are used to drive departmental, team and individual goals. Quality planning activities such as process, product, and quality improvement programs are initiated by various sources.

## 3. Scope

Xilinx is the inventor of the FPGA, programmable SoCs, and now, the ACAP. Our highly-flexible programmable silicon, enabled by a suite of advanced software and tools, drives rapid innovation across a wide span of industries and technologies - from consumer to cars to the cloud. Xilinx delivers the most dynamic processing technology in the industry, enabling rapid innovation with its adaptable, intelligent computing.

This Quality Manual defines the Xilinx Quality Management System (QMS). The QMS ensures quality throughout all lifecycle stages of our products and services. It is structured around the quality standards to which Xilinx is certified, ISO9001, TL9000, and MIL-PRF 38535 Class Q and N. The QMS contains processes consistent with the requirements contained within other industry standards including ISO/TS16949:2002 and AS9100.

## 4. Context of the Organization

### 4.1 Understanding the Organization and its context

Xilinx determines external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended results of its QMS. Xilinx monitors and reviews information about these external and internal issues.

### 4.2 Understanding the needs and expectations of the interested parties

Interested parties that are relevant to the QMS and their requirements are captured by Xilinx. Information about these interested parties is monitored and reviewed.

### 4.3 Determining the Scope of the QMS

External and internal issues, requirements of relevant interested parties, products and services of Xilinx are considered while establishing the scope of the QMS.

## Scope Statements:

TL9000:2016 – H R6.0/R5.5:

Development, Manufacturing, and Technical & Customer Support of FPGA, programmable SoCs, and Adaptive Compute Acceleration Platform (ACAP) excluding board products.

Processes – IP Development, Software Tool Development, IC Development, Technology Development, NPI, Wafer Planning, Supplier Management, Customer Support, Worldwide Technical Support (WTS), RMA & Customer Quality Support, Management, Human Resources, IT, Facilities / EHS, Quality Systems

Product Category: 8.1.2 - INTEGRATED CIRCUITS

### NON-APPLICABLE CLAUSES (TL9000:2016)

8.5.1.C.1 Product and Service Delivery – Xilinx is not responsible for any product or service delivery at customer site.

## ISO9001:2015

Development, Manufacturing, and Technical & Customer Support of FPGA, programmable SoCs, and Adaptive Compute Acceleration Platform (ACAP) products.

Processes – IP Development, Software Tool Development, IC Development, Board Development, Technology Development, NPI, Wafer Planning, Supplier Management, Board Operations, Customer Support, Worldwide Technical Support (WTS), RMA & Customer Quality Support, Management, Human Resources, IT, Facilities / EHS, Quality Systems

## Certified Sites

- 2100 Logic Drive, San Jose, CA 95124 US
- 3100 Logic Drive, Longmont, CO 80503 US
- 5 Changi Business Park Vista, Singapore 486040 Singapore
- Block A, B, C, 8<sup>th</sup> & 13<sup>th</sup> Floors, Meenakshi Tech Park, Survey No. 39, Gachibowli(V), Seri Lingampally (M), Hyderabad 500 084 India

## 4.4 QMS and its processes

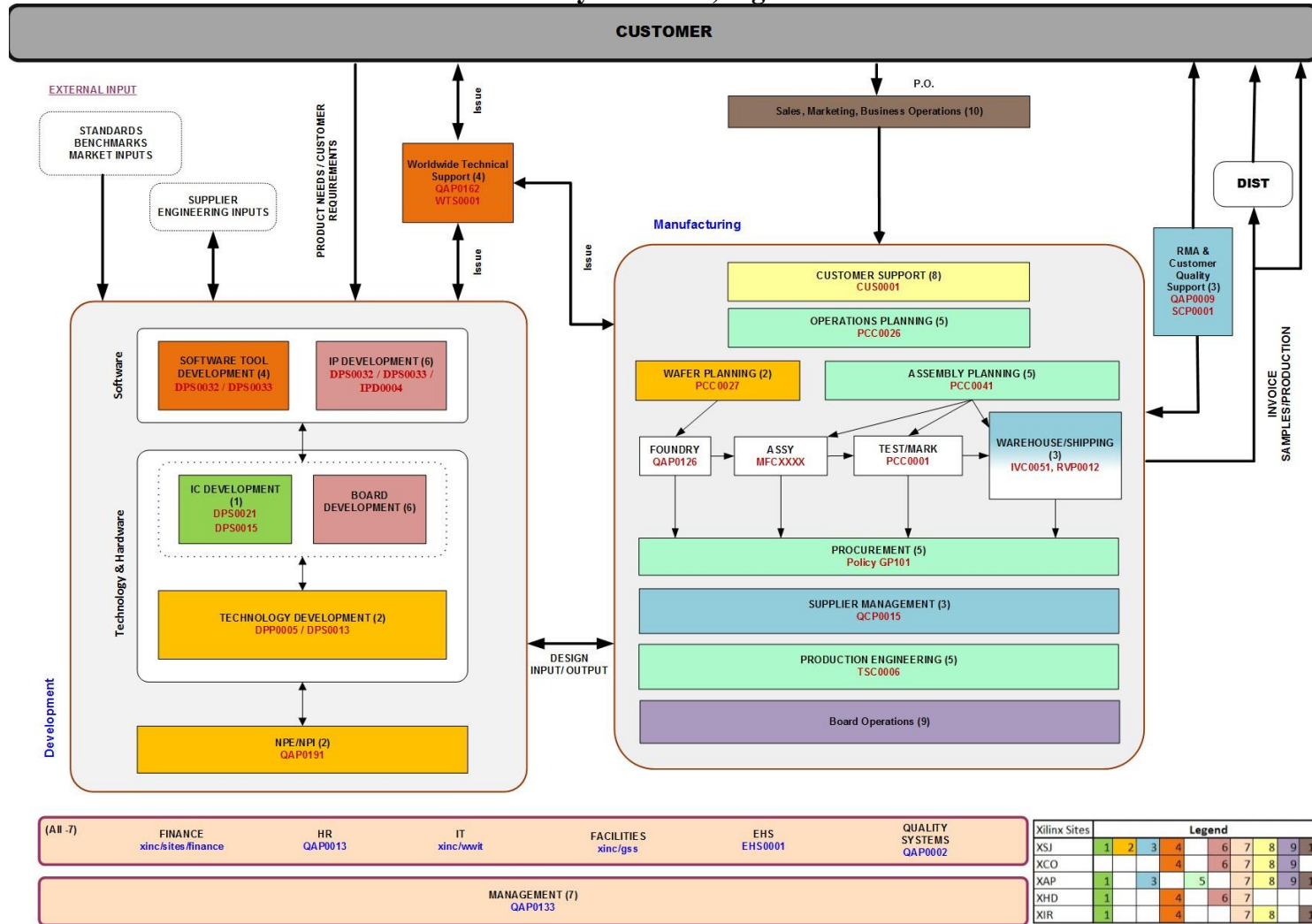
Xilinx has established, documented, implemented and maintains a QMS and continually improves its effectiveness in accordance with the requirements of ISO9001. Key processes are defined in a set of corporate procedures. Figure 1 shows the key processes, their sequence and interaction. These processes support the implementation of the QMS. Criteria and methods needed to ensure that both the operation and control of these processes are effective have been defined within this



# Quality Manual

manual and the QMS procedures. Senior management ensures the availability of resources and information necessary to support the operation and monitoring of these processes. Senior management is responsible to monitor, measure, analyze and implement actions necessary to achieve planned results and continual improvement of these processes. Risks and opportunities identified are addressed, for the effective implementation of the QMS. Control of outsourced processes is defined within the QMS ensuring conformity to all requirements, including customer requirements.

Key Processes, Figure 1



## **5. Leadership**

### **5.1 Leadership and Commitment**

#### **5.1.1 General**

Senior management is defined as the CEO, executive staff, and their staff. The Vice President, Quality, Product, and Test Engineering has implementation authority and responsibility for the Quality Management System.

At Xilinx, Senior Management is committed to developing, implementing, reviewing, and maintaining an effective and documented quality management system. This commitment includes: communicating the importance of meeting customer as well as statutory and regulatory requirements to the organization; establishing the quality policy and quality objectives; conducting management reviews; and ensuring availability of resources. Senior management promotes the use of the process approach and risk-based thinking.

Senior management reviews the product realization processes and the support processes to assure their effectiveness and efficiency.

#### **5.1.2 Customer Focus**

Senior management ensures that customer requirements are determined and met with the aim of enhancing customer satisfaction. Customer focus is one of the company values, which govern all aspects of conducting business at Xilinx.

## **5.2 Policy**

Senior management ensures that the quality policy is appropriate to the purpose of the organization. The quality manual includes a commitment to comply with requirements and to continually improve the QMS. The quality policy is communicated throughout the organization and is reviewed for continuing suitability during the annual strategic development process.

## 5.3 Organizational Roles, Responsibilities and Authorities

### 5.3.1 Responsibility and Authority

Executive Staff\*

**XILINX**  
Executive Management Team

 <b>Victor Peng</b> President & CEO	 <b>Ivo Bolsens</b> SVP & CTO	 <b>Kevin Cooney</b> SVP & CIO	 <b>Lorenzo A. Flores</b> EVP & CFO	 <b>Catia Hagopian</b> SVP & General Counsel	 <b>Liam Madden</b> EVP, Hardware & Systems Product Development
 <b>Emre Onder</b> SVP, Marketing	 <b>Matt Poirier</b> SVP, Corporate Development & Investor Relations	 <b>Saliil Rajee</b> EVP, Software & IP Products	 <b>Marilyn Stiborek Meyer</b> SVP, Global Human Resources	 <b>Vincent Tong</b> EVP, Global Operations & Quality, Asia Pacific Executive Leader	 <b>Mark Wadlington</b> SVP, Global Sales

\* See Xilinx 411 People Search for responsibility and authority of all employees



## 5.3.2 Responsibility for Quality

Managers with the responsibility and authority for corrective action are promptly informed of products or processes, which do not conform to requirements.

Every employee of Xilinx is responsible for his or her actions in support of the quality policy. Every employee has the ability and responsibility to issue a “quality action request” to bring appropriate attention to any situation having a negative impact on quality at Xilinx.

## 6 Planning

### 6.1 Actions to address Risks and Opportunities

Xilinx considers its interested parties and their requirements, internal and external issues when determining its risks and opportunities. Actions to address the risks and opportunities are identified and evaluated for effectiveness.

### 6.2 Quality Objectives and planning to achieve them

Quality objectives, including those needed to meet requirements for product are established at relevant functions and levels within the organization. Quality objectives are measurable and consistent with the quality policy and are included in the business plan. Metrics, owners, and targets are defined in the Management Review (QAP0133) procedure.

### 6.3 Planning of Changes

Quality system planning is carried out in order to meet the requirements of ISO9001 as well as the quality objectives. Changes to the QMS are planned and implemented in such a way to maintain the integrity of the QMS.

## 7 Support

### 7.1 Resources

#### 7.1.1 General

Xilinx is committed to provide adequate resources for implementing, maintaining and continually improving the effectiveness of the QMS in order to enhance customer satisfaction by meeting customer requirements.

#### 7.1.1.1 Business Continuity Planning

Xilinx Business Continuity Plan (the “BCP”) - Xilinx developed the BCP to serve as a framework for our analysis, planning and response to business interruptions that could have an adverse impact on the conduct of our business operations. Although the immediate consequences of a major event causing disruption to our business are unpredictable, each critical function is chartered with identifying its critical processes which are rolled up into the BCP for Xilinx. Each

critical function then propagates their corporate and internal requirements down to the extent they require for adequate mitigation and resiliency. The BCP is intended to provide reasonable assurance of the continuity of operations with respect to critical functions at the company to the extent reasonably possible. (BCP 0001).

## 7.1.2 People

Employees performing work affecting product quality shall be competent on the basis of appropriate education, training, skills, and experience.

## 7.1.3 Infrastructure

The Global Site Services department (GSS) designs, maintains, & operates all Xilinx facilities to provide a safe, comfortable, and productive work environment for all employees. Through comprehensive planning, maintenance and repair programs, GSS provides reliable building and critical infrastructure systems.

Global Site Services provides service & support in the following areas:

- Construction/Project Management
- Global Real Estate
- Professional/Engineering Services
- Operations & Maintenance
- Environmental Health & Safety
- Contingency Planning & Emergency Response
- Global Security

### 7.1.3.1 Plant, facility and equipment planning

A multidisciplinary approach is used to develop plant, facility and equipment plans. Plant layouts optimize material travel; handling and value added use of floor space and facilitate synchronous material flow. Methods shall be developed and implemented to evaluate and monitor the effectiveness of existing operations.

The infrastructure and work environment of Xilinx is planned and supported by:

- Manufacturing engineering maintains all equipment specific to manufacturing.
- Manufacturing operations maintains the work environment necessary to achieve conformity to product requirements.
- IT maintains systems/network
- Technical Services maintains all phones / faxes / computers / printers
- Lab technicians maintain equipment specific to the reliability and failure analysis labs.

## 7.1.4 Environment for the operation of processes

Providing a safe and healthy work environment for employees, service providers and visitors that extends beyond minimum compliance requirements has always been a fundamental Xilinx priority.

The mitigation of risk is a key component of our EHS Management Program. Risk assessment methods are used to determine priorities and setting objectives for eliminating hazards and reducing risks. Where possible, risks are eliminated through the selection and design of facilities, equipment and processes.

Xilinx maintains its premises in a state of order, cleanliness and repair consistent with the product and manufacturing process needs.

## 7.1.5 Monitoring and Measuring Resources

### 7.1.5.1 General

Xilinx determines the monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide evidence of conformity of product to determined requirements. Processes are established to ensure that monitoring and measurement can be carried out and are carried out in a manner that is consistent with the monitoring and measurement requirements. All inspection, measurement and test equipment used in the manufacturing and end-point acceptance inspection of Xilinx products shall be placed into the Xilinx Calibration System. The system (QAP0015) specifies measurement equipment to be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards. The basis used for calibration or verification shall be recorded where no such standards exist. Measurement equipment shall be adjusted or re-adjusted as necessary, assigned a calibration control number, and given a calibration sticker to enable the calibration status to be determined. Measurement equipment shall be safeguarded from adjustments that would invalidate the measurement result. Measurement equipment shall be protected from damage and deterioration during handling, maintenance and storage. A recall system is used to ensure that all such identified equipment is calibrated within the prescribed interval, or is withdrawn from use (and suitably identified) until calibrated. Records are maintained to provide evidence of conformity of product to determined requirements. The organization assesses and records the validity of the previous measuring results when the equipment is found not to conform to requirements. The organization shall take appropriate action on the equipment and any product affected. Computer software used in the monitoring and measurement of specified requirements shall be confirmed prior to initial use and reconfirmed as necessary. Equipment used to perform calibration are traceable to national or international standards.

### 7.1.5.2 Measurement Traceability

#### Measurement System Analysis

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Statistical studies are conducted to analyze the variation present in the results of each type of measuring and test equipment system. This applies to key measurement systems referenced in the control plan. The analytical methods and acceptance criteria used shall conform to those in customer reference manuals on measurement systems analysis.

### **Calibration/Verification records**

Records of the calibration / verification activity for all gauges, measuring and test equipment needed to provide evidence of conformity of product requirements, including customer and employee owned equipment shall include:

- Equipment identification, including the measurement standard against which the equipment is calibrated
- Revisions following engineering changes
- Any out of specification readings as received for calibration / verification
- An assessment of the impact of out of specification condition
- Statements of conformity to specification after calibration / verification
- Notification to the customer if suspect product or material has been shipped

### **7.1.5.3 Laboratory Requirements**

#### **Internal laboratory**

Internal laboratories shall have a defined scope that includes its capability to perform the required inspection, test, or calibration services. The laboratory scope shall be included in the QMS documentation. The laboratory shall specify and implement technical requirements for adequacy of the laboratory procedures, competency of the laboratory employees, testing of the product, capability to perform these services correctly, traceable to the relevant process standard, and review of the related records.

#### **External laboratory**

External laboratories used for inspection, test, or calibration services shall have a defined laboratory scope that includes its capability to perform the required inspection, test, or calibration and either have evidence that it is acceptable to the customer or be accredited to ISO/IEC 17025.

### **7.1.6 Organizational Knowledge**

Organizational knowledge necessary for the operation of its processes is available to individual organizations within Xilinx to the extent necessary. This knowledge is considered when addressing changing needs and trends.

## **7.2 Competence**

Department managers:

- Determine the necessary competence for employees performing work affecting product quality. In manufacturing, a competency model approach is used to document the specific training requirements.
- Make training available to employees or take other actions to satisfy competency needs.
- Evaluate the effectiveness of the actions taken. Demonstration of competency or certification measures training effectiveness of manufacturing operators.
- Ensure that employees are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives.
- Ensure that appropriate records of education, training, skills and experience are maintained. Training completed through the Xilinx training department is recorded in the online training record database.

## 7.2.1 Product Design Skills

Employees with product design responsibility are competent to achieve design requirements and are skilled in applicable tools and techniques. Department managers with product design responsibility determine the applicable tools and techniques.

## 7.2.2 Training

Human Resources has established and maintained documented procedures for identifying training needs and achieving competence of all employees (QAP0013). Employees performing specific assigned tasks shall be qualified, as required, with particular attention to the satisfaction of customer requirements.

ESD training is provided to all employees with functions that involved any handling storage, packaging, preservation, or delivery of ESD sensitive products. The individual department management defines the training requirements for ESD.

### Training on the job

The organization provides on-the-job training for employees in any new or modified job affecting product quality, including contingent workforce employees. Employees whose work can affect quality shall be informed about the consequences to the customer of nonconformity to quality requirements.

## 7.2.3 Employee Motivation and Empowerment

Xilinx is committed to employee motivation as a means of driving quality objective results, and promoting the principles of continual improvement and innovation consistent with the philosophy of the learning organization. A number of processes have been developed in order to support this. The effectiveness of the various processes, which support motivation process, are measured via surveys and accessed via PDP feedback.

- Strategic Talent Management <http://xinc/sites/hrweb/performance-development-process/Pages/default.aspx>
- Ross Freeman Award <http://xinc/sites/rossfreeman/Pages/Default.aspx>
- Patents reward [http://web/legal/intellectual\\_property/PatentAwards.htm](http://web/legal/intellectual_property/PatentAwards.htm)
- Day One Orientation covers: mission and vision of Quality org, focus on customer needs, how you impact quality, corporate quality objectives.
- Community Engagement <http://www.xilinx.com/about/community-engagement.html>
- Employee Resource Center <http://xinc/sites/employeeresourcecenter/default.aspx>

## 7.3 Awareness

Xilinx employees are made aware of the quality policy and objectives through the Quality Awareness Training (provided online as a part of compliance training).

## 7.4 Communication

Internal communication is one of the effective tools for measuring the Quality Management System. The Integrated Platform Development (IPD), Strategic Planning and Architecture (SPA), Platform Performance Review (PPR), and the Business Review meetings are the main forums for internal communication. Other forums include:

- Daily Production Meetings
- Cross Functional Teams
- Staff meetings
- New Product Introduction (NPI) Meetings

## 7.5 Documented Information

### 7.5.1 General

The QMS documentation is detailed in this Quality Manual. The Quality Manual includes the quality policy and quality objectives. Documents needed to ensure effective planning, operation, and control of processes, are included in the QMS, including documents required by ISO9001. Records are maintained as required (RRP0001).

### 7.5.2 Creating and Updating

Identification, format, review and approval when creating or updating documented information is described in DCC0013 and DCC0003.

### 7.5.3 Control of Documented Information

Xilinx operates a comprehensive document and data control system to control QMS documentation and to ensure required approvals. The procedure, Formal Document Release and

Change Control (DCC0003) defines the document and data control system requirements. Level 1, level 2, and certain level 3, at the discretion of the quality systems manager, documents as defined in section 4.2.5 will be controlled within the document control systems. Documented procedures are in place to control document approval prior to issue, review, update and re-approve documents, to ensure that changes and the current revision status of documents is identified, relevant versions of applicable documents are available at points of use, documents remain legible and readily identifiable, and documents of external origin are identified and their distribution controlled. Obsolete documents are identified and controlled to prevent unintended use. Documents required for the operation of the QMS are managed by the Document Control function within the Quality Systems organization, and are available online at the internal Document Control home page <http://dochome/>. External documents such as military documents, industry standards, and handbooks required for the operation of the QMS are available within Document Control (DCC0001).

### 7.5.3.1 Document Retention

Documented information is maintained to provide evidence of conformity to requirements and of the effective operation of the QMS. Quality documents shall remain legible and be readily identifiable and retrievable. Procedure, Record Retention Requirements (RRP0001) defines controls needed for the identification, storage, protection, retrieval, retention time and disposition or records. These controls shall satisfy regulatory and customer requirements.

Xilinx Customer Document Review Procedure (SCP0001) defines the process used to assure the timely review, distribution and implementation of all customer engineering specifications and changes based on customer required schedule. Timely review should be as soon as possible, and shall not exceed two working weeks.

## 7.5.3.2 QMS Documentation Structure

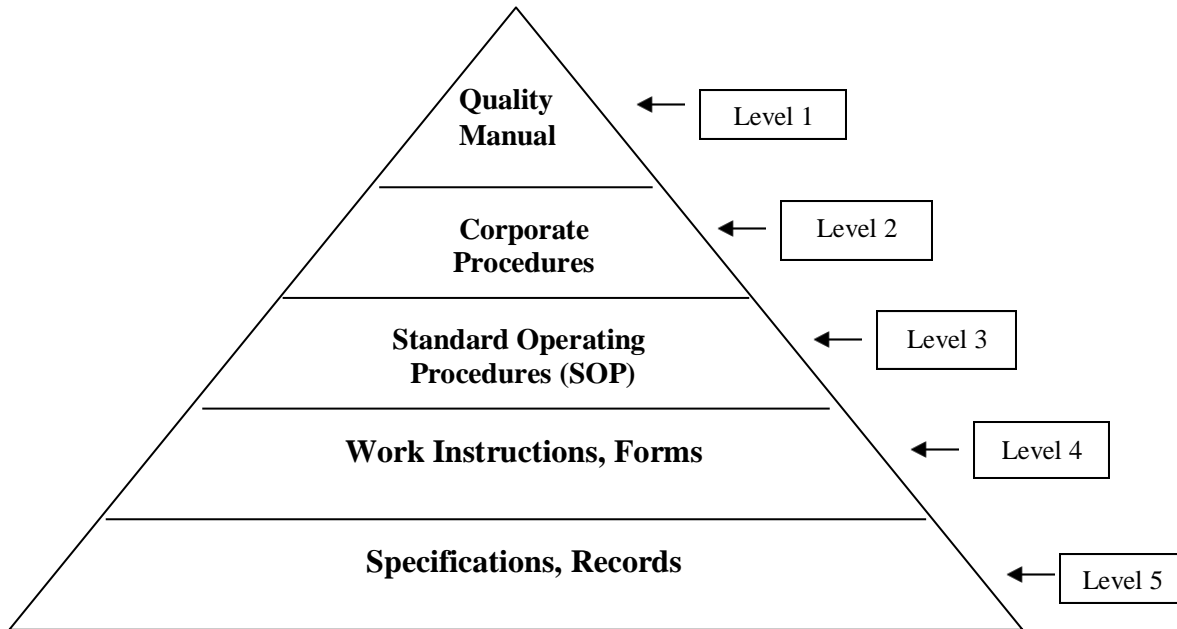


Figure 2. Key Reference Documents

Level 2 Corporate Procedures	Title	ISO 9001 References
DCC0003	Formal Document Release & Change Control	7.5
QAP0013	Motivation, Training and Development	7.2
QAP0056	Corporate Quality/EHS Audit	9.2
QAP0060	Material Review Board (MRB)	8.7, 10.2
QAP0014	Continuous Improvement Action	10.2
DPS0021	Product Design	8.3
DPS0032	IDS Release Process	8.3
IPD0001	IP Design Solutions Handbook	8.3
QAP0133	Management Review	9.3
QCP0015	Corporate Supplier Management	8.4
QAP0191	New Product Introduction	8.3
WTS0001	WTS Organization Analysis Document	8.2

Level 1 – Quality Manual – QAP0002

Level 2 – Corporate Procedures – Global procedures defining requirements of top level processes

Level 3 - Standard Operating Procedures – Procedures (global or local) defining requirements of key sub-processes to level 2 procedures.

Level 4– All other procedures not defined as level 1, 2 or 3 above, work instructions, and forms.



Level 5 - -Specifications, technical drawings, reports, data, records, etc.

## **8 Operation**

### **8.1 Operational Planning and Control**

Xilinx product life cycle model includes processes defining product definition, design and development, qualification, ongoing manufacture and delivery, and obsolescence. Process maps are shown in figure 1. Planning of product realization is consistent with the requirements of the QMS (DPS0021, DPS0032, IPD0001).

Management determines quality objectives and requirements for the product and the need to establish processes, documents, and resources required for verification, validation, monitoring, inspection, and testing specific to the product and the criteria for product acceptance. Records are defined to provide evidence that the product realization process and the resulting product meet QMS and customer requirements.

#### **8.1.1 Product Security**

Xilinx shall establish and maintain methods for the identification and analysis of security risks and vulnerabilities for products throughout their life cycle. It is done through IT firewall, security built into the device during design.

#### **8.1.2 Planning of product realization – customer requirements**

Customer requirements and references to its technical specifications shall be included in the planning of product realization as a component of the quality plan.

#### **8.1.3 Acceptance criteria**

Acceptance criteria shall be defined by the organization and, where required, approved by the customer. Acceptance level shall be zero defects for attribute data sampling.

#### **8.1.4 Confidentiality**

The organization shall ensure the confidentiality of projects under development, and related product information.

#### **8.1.5 End of life planning**

QAP0135 describes the discontinuance of manufacturing and/or support of products like: responsibility for any future residual support issues and disposition of the organization's parts and assemblies.

## 8.1.6 Tools management

Xilinx shall ensure that internally developed software or tools used on the product life cycle are subject to the appropriate quality methods(s). There will be a proposal of requirement, testing and documentation of tool before any final release.

## 8.2 Requirements for Products and services

### 8.2.1 Customer Communication

At Xilinx, customer communication is vital to customer satisfaction. The organization has determined effective arrangements for communicating with customers regarding product information, inquiries, contracts or order handling, including amendments, customer complaints, customer feedback and product quality alert notifications and replacement of products.

#### 8.2.1.1 Customer communication – customer specified format

Xilinx shall have the ability to communicate necessary information, including data, in a customer-specified language and format.

#### 8.2.2 Determining the requirements for products and services

Xilinx defines product requirements. Product requirements include those specified by the customer, those not stated by the customer but necessary for the intended use, statutory and regulatory requirements related to the product, delivery and post delivery activities, and any additional requirements defined by Xilinx.

##### 8.2.2.1 Customer-designated special characteristics

Currently, Xilinx will not accept business on any products or services in which the customer requirements include designation, documentation, or control of special characteristics. Processes will be updated to demonstrate conformity to customer requirements for designation, documentation and control of special characteristics if business including these requirements is accepted in the future.

#### 8.2.3 Review/change of requirements for products and services

Xilinx reviews product related requirements per the customer drawing, order entry, and customer service procedures (SCP0001, CUS0002). These reviews are conducted prior to any commitment to supply a product to the customer and ensure that product requirements are defined, contract or order requirements differing from those previously expressed are resolved, and the organization has the ability to meet the defined requirements. Records of the results of the review and actions arising from the review are maintained. Where the customer provides no documented statement

of requirement, the customer requirements are confirmed before acceptance. Where product requirements are changed, the organization shall ensure that relevant documents are amended and that relevant employees are made aware of the changed requirements.

### **8.2.3.1 Review of requirements of products and services - waiver**

Waiving the requirement stated in 8.2.3 for a formal review shall require customer authorization.

### **8.2.3.2 Organization manufacturing feasibility**

Xilinx investigates, confirms, and documents the manufacturing feasibility of the proposed product in the contract review process, including risk analysis.

## **8.3 Design and Development of products and services**

### **8.3.1 General**

#### **IC Design and Development**

A documented IC design flow describing the general guidelines and procedures of the Xilinx design process is established and maintained through Document Control. This is documented in DPS0021, IC Design Flow.

#### **Software Design and Development**

Software design processes are established and documented by the Design Software Division. These processes are described in the IDS Release Process (DPS0032)

### **8.3.2 Design and development planning**

The organization shall plan and control the design and development of product. During the design and development planning, the organization determines the design and development stages, the review, verification and validation that are appropriate to each design and development stage, and the responsibilities and authorities for design and development. The organization manages the interfaces between all groups involved in design and development to ensure effective communication and clear assignment of responsibility. Planning output is updated as the design and development progresses. At the corporate level, there will be project plan, risk management plan, test plan, integration plan, configuration management plan and migration plan. Development process quality measurement shall be established and maintained.

#### **8.3.2.1 Multidisciplinary approach**

Xilinx uses a multidisciplinary approach to prepare for product realization including development / finalization and monitoring of special characteristics (key parameters), development and review of FMEAs, including actions to reduce potential risks, and development and review of control plans.

### 8.3.3 Design and Development Inputs

Inputs relating to product requirements are determined and records are maintained. Inputs include: functional and performance requirements, applicable statutory and regulatory requirements, information derived from previous similar designs, and other requirements essential for design and development. These inputs are reviewed for adequacy. Requirements are complete, unambiguous and not in conflict with each other.

#### 8.3.3.1 Product design input

The organization identifies, documents, and reviews the product design inputs requirements. This includes customer requirements (contract review), identification, traceability, packaging, targets for product quality, life, reliability, durability, maintainability, timing and cost. The organization shall have a process to deploy information gained from previous design projects, competitor analysis, supplier feedback, internal input, field data, and other relevant sources for current and future projects of a similar nature.

#### 8.3.3.2 Manufacturing process design input

The organization identifies, documents, and reviews the manufacturing process design inputs requirements including product design output data, targets for productivity, process capability and cost, customer requirements, if any, and experience from previous developments.

#### 8.3.3.3 Special characteristics

See section 8.2.1.1.

### 8.3.4 Design and development controls

Systematic reviews of design and development are performed in accordance with planned arrangements to evaluate the ability of the results of design and development to meet requirements and to identify any problems and propose necessary actions. Participants shall include representatives of functions concerned with the design and development stages being reviewed. To confirm the design, the product shall be stress tested, system tested before release; under abnormal conditions. Records of the results of the reviews and any necessary actions shall be maintained.

#### 8.3.4.1 Monitoring

Measurements at specified stages of design and development shall be defined, analyzed, and reported with summary results as an input to management review.

## 8.3.4.2 Design and development verification

Verification shall be performed in accordance with planned arrangements to ensure that the design and development outputs have met the design and development input requirements. Records of the results of the verification and necessary actions shall be maintained.

## 8.3.4.3 Design and development validation

Design and development validation shall be performed in accordance with planned arrangements to ensure that the resulting product is capable of meeting the requirements for the specified application or intended use, where known. Wherever practicable, validation shall be completed prior to the delivery or implementation of the product. Records of the results of validation and any necessary actions shall be maintained.

Design and development validation shall be performed in accordance with customer requirements including program timing.

## 8.3.4.4 Prototype program

When required by the customer, Xilinx will have a prototype program and control plan. Xilinx will use, wherever possible, the same suppliers, tooling and manufacturing processes as will be used in production. All performance testing activities shall be monitored for timely completion and conformity to requirements. While services may be outsourced, the organization shall be responsible for the outsourced services, including technical leadership.

## 8.3.4.5 Product approval process

Xilinx shall conform to a product and manufacturing process approval procedure recognized by the customer. This product and manufacturing process approval procedure shall also be applied to suppliers.

## 8.3.5 Design and Development Outputs

The outputs of design and development shall be provided in a form that enables verification against the design and development input and shall be approved prior to release. Design and development outputs shall meet the input requirements for design and development, provide appropriate information for purchasing, production and for service provision, contain or reference product acceptance criteria, and specify the characteristics of the product that are essential for its safe and proper use. Records of the results of the design output shall be maintained.

### 8.3.5.1.1 Product design outputs

The product design output shall be expressed in terms that can be verified and validated against product design input requirements. The product design output may include DFMEA, reliability results, product special characteristics and specifications, product error-proofing as appropriate, product definition including drawings or mathematically based data, product design reviews results, system architecture, system detailed design, source code, user documentation and diagnostic guidelines where appropriate.

### 8.3.5.1.2 Manufacturing process design output

The manufacturing process design output is expressed in terms that can be verified against manufacturing process design input requirements and validated. The manufacturing process design output shall include: specifications and drawings, manufacturing process flow chart and layout, manufacturing process FMEAs, control plans, work instructions, process approval acceptance criteria, data for quality, reliability, maintainability, and measurability, results of error-proofing activities as appropriate, and methods of rapid detection and feedback of product and manufacturing process nonconformities.

### 8.3.6 Design and Development changes

Design and development changes are identified and records are maintained. The changes (change management process) shall be identified, reviewed, verified, validated as appropriate, and approved before implementation. The review of design and development changes includes evaluation of the effect of the changes on constituent parts and product already delivered. Records of the results of the review of changes and necessary actions shall be maintained.

## 8.4 Control of externally provided processes, products and services

### 8.4.1 General

The Xilinx purchasing system described in POLICY GP101, and General Flow for Purchasing Process ensures that products, materials, and services purchased from suppliers and subcontractors conform to requirements including applicable regulatory requirements. Purchasing and Inventory Control department reviews the purchase requisitions to ensure the appropriate level of management approval per Xilinx Corporate Policies and Procedure Spending Authorization Policy.

The type and extent of control applied to the supplier and the purchased product shall be dependent upon the effect of the purchased product on subsequent product realization or the final product.

The organization evaluates and selects suppliers based on their ability supply products in accordance with the organization's requirements. Criteria for selection, evaluation, monitoring of performance and re-evaluation are established (QCP0015). Records of evaluations and any necessary actions arising from the evaluation shall be maintained.

## 8.4.1.1 Regulatory conformity

All purchased products or materials used in product shall conform to applicable regulatory requirements.

## 8.4.1.2 External provider performance management

Xilinx performs external provider performance management activities for key external providers so that their quality performance is tracked and feedback is provided to them to drive continual improvement. For key external providers, alignment towards conformity to TL9000 / IATF16949 is required.

## 8.4.1.3 Customer-approved sources

Where specified by the contract, Xilinx shall purchase products, materials or services from approved sources. The use of customer designated sources does not relieve the organization of the responsibility for ensuring the quality of purchased products.

## 8.4.2 Type and Extent of Control

Xilinx has established and implemented inspection or other activities necessary to ensure that purchased products meets specified purchase requirements. If Xilinx or its customer intends to perform verification at the supplier's premises, the intended verification arrangements and method of product release will be stated in the purchasing information.

### 8.4.2.1 Incoming product quality

Incoming product quality is assured by utilizing one or more of the following methods:

- Evaluation of supplier statistical data
- Receiving inspection sampling plans
- Second or third party assessments coupled with records of acceptable delivered product quality
- Part evaluation by a designated laboratory

### 8.4.2.2 Supplier monitoring

Supplier performance is monitored through the following indicators:

- Delivered product quality
- Customer disruptions including field returns
- Delivery schedule performance
- Special status customer notifications related to quality or delivery issues

Quality and delivery performance ratings shall be transmitted to the suppliers based on supplier activity. Purchasing and Supplier Quality Assurance shall administer the evaluation of supplier performance.

An Approved Vendor List (AVL) of suppliers of products, materials, and services that may impact product quality is maintained per QCP0015, Approved Vendor List (AVL) procedure. Requirements for approval of subcontractors and suppliers are defined in QCP0015, Supplier/Subcontractor Qualification/Certification and Quality Systems Guidelines.

Outsource processes that affect product conformity, are listed in the approved vendors lists (FRC0806).

Where specified in the contract, Xilinx's customer or the customer's representative shall be afforded the right to verify at Xilinx' and/or Xilinx' subcontractor's facilities that subcontracted products conform to specified requirements.

### **8.4.3 Information for External Providers**

Purchasing information shall describe the product to be purchased, including where appropriate requirements for approval of product, procedures, processes and equipment, requirements for qualification of employees, and QMS requirements. Xilinx ensures the adequacy of specified purchase requirements prior to their communication to the supplier. Purchasing is also responsible for ongoing support, risk analysis, supply base management, and contract definition and ensuring that proprietary, usage and licensing agreements are completed.

## **8.5 Production and Service Provision**

### **8.5.1 Control of Production and Service Provision**

Manufacturing processes at Xilinx are carried out under controlled conditions. Controlled conditions include:

- Information describing the characteristics of the product
- Work instructions, as necessary
- Use of suitable equipment
- Use of monitoring and measuring devices
- Implementation of monitoring and measurement
- Validation and periodic reevaluation of the ability to achieve planned results
- Implementation of actions to prevent human error
- Implementation of release, delivery and post-delivery activities



## 8.5.1.1 Control plan

Xilinx shall develop control plans for the processes that produce products supplied to our customers. In the case of outsourced processes, Xilinx shall ensure that the suppliers develop control plans. Control plans shall take into account the DFMEA and manufacturing PFMEAs.

Control plans shall list the controls used for manufacturing process control, include methods for monitoring of control over special characteristics (key parameters), include any customer required information, and initiate a specified reaction plan when the process becomes unstable or not statistically capable. Control plans shall be reviewed and updated when changes occur affecting product, manufacturing process, measurement, logistics, supply sources or FMEA.

Xilinx generated control plans and FMEAs will be maintained within the document control system (see section 7.5.3). Supplier owned control plans and FMEAs will be maintained within the supplier's document control system. Supplier documents will be requested and used as required then returned or destroyed. Additionally, these documents will be reviewed during the annual quality audits as indicated in the Corporate Supplier Management Procedure (QCP0015).

## 8.5.1.2 Work instructions

Documented work instructions for all employees having responsibilities for the operation of processes that impact product quality are to be accessible for use at the workstation. These instructions shall be derived from sources such as the quality plan, the control plan and the product realization process. Documented information shall be maintained where it describes the content of testing / retesting, the frequency of testing / retesting.

## 8.5.1.3 Verification of job set-ups

Job set ups shall be verified when performed. Work instructions shall be available for set-up employees.

## 8.5.1.4 Operational Changes

Each time a significant change is made in the established operation, the organization has processes to control and react to changes that impact product realization (QAP0167). The effects of any change, including those caused by suppliers, shall be assessed, verified, and validated to ensure compliance to customer requirements before implementation. The organization shall maintain a record of the date on which each change is implemented in production. A critical examination shall be made of the first unit(s) processes after the change. The implementation of changes includes updated documents.

Changes with impact on form, fit, and function will be notified to customers prior to implementation and where required, customer approval and additional customer verification requirements will be met (QAP0009).

## 8.5.1.5 Preventive and predictive maintenance

Operations shall identify key process equipment and provide resources for machine maintenance and develop an effected planned total preventive maintenance system (EQP0040). As a minimum, this system shall include planned maintenance activities, packaging and preservation of equipment, tooling and gauging, availability of replacement parts for key manufacturing equipment, documenting, evaluating and improving maintenance objectives. Operations shall utilize predictive maintenance methods to continually improve the effectiveness and the efficiency of production equipment.

## 8.5.1.6 Management of production tooling

Xilinx provides resources for tool and gauge design, fabrication and verification activities through the use of our fab and assembly subcontractor partners. Xilinx's supplier management process (QCP0015) reviews the subcontractors' system for production tooling management including:

- Maintenance and repair facilities and employees
- Storage and recovery
- Set-up
- Tool-change programs for perishable tools
- Tool design modification documentation, including engineering change level,
- Tool modification and revision documentation
- Toll identification, defining the status, such as production, repair or disposal
- Monitor system for all activities that are outsourced

## 8.5.1.7 Production scheduling

Production scheduling is order driven to meet customer requirements.

## 8.5.1.8 Feedback of information from service

After sales support includes customer problem resolution and is defined in the General RMA Process Procedure (QAP0004).

## 8.5.1.9 Service agreement with customer

Currently, Xilinx does not provide after sales service through a service agreement. Processes will be updated to meet customer requirements if service agreements are accepted in the future.

## 8.5.1.10 Validation of processes for production and service provision

Xilinx validates processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement. Validation demonstrates the ability of the processes to achieve planned results. Xilinx establishes defined criteria for review and approval of the process, approval of equipment and qualification of employees, use of specific methods and procedures, requirements for records and re-validation. The primary validation of integrated circuits is through use of electrical test data. Software first articles are validated prior to volume manufacturing.

The requirements of 8.5.1.9 apply to all processes for production and service provision.

## 8.5.2 Identification and Traceability

Xilinx maintains comprehensive and inclusive product identification and traceability processes, procedures and systems. Xilinx processes encompass the planning, testing and inspection; consequently, these systems also incorporate inspection and test status.

Identification and traceability is maintained down to the individual device level by means of device marking criteria, electronic WIP tracking system, and a paper system (e.g., lot travelers, labels, inspection stamps).

## 8.5.3 Property belonging to customers or external providers

The control of customer property is outlined in the procedures referenced in the document reference table. Customer supplied items are identified, safeguarded from loss or damage and, handled in the same manner as other incoming products to ensure conformance to requirements. If customer property is lost or damaged, or found unsuitable for use, this status is recorded and promptly reported to customers.

### 8.5.3.1 Customer-owned production tooling

Customer owned tools; manufacturing, test, inspection tooling and equipment shall be permanently marked so that the ownership of each item is visible, and can be determined.

## 8.5.4 Preservation

Detailed procedures have been established and maintained to preserve the conformity of product during internal processing and delivery to the intended destination. This preservation includes identification, handling, packaging, storage and protection. Preservation also applies to the constituent parts of a product. These procedures include proper methods for adding or removing product from tubes or trays, methods for transport of product from one location to another, methods to prevent electrostatic discharge damage. Cleanliness to the extent necessary to prevent deterioration or damage of product is required at all locations where product is processed or stored.

All products shall be packaged for shipment from Xilinx in a manner to prevent mechanical, electrical, or electrostatic damage to devices. Full compliance to specific customer and Xilinx requirements regarding packing materials and labeling requirements are maintained.

### 8.5.4.1 Storage and inventory

The condition of product in stock shall be assessed at appropriate planned intervals in order to detect deterioration. The inventory management system shall optimize inventory turns over time and assure stock rotation. Obsolete product shall be controlled in a similar manner to nonconforming product.

## 8.5.5 Post-Delivery Activities

Refer section 8.2.1

## 8.5.6 Control of Changes

Refer sections 8.3.6 and 8.5.1.4

## 8.6 Release of Products and Services

At Xilinx product quality and reliability is monitored and measured at every stage of the process from the Design & Development of the product, through to Manufacturing Processes, Planning for Product Realization, Management Review and Preventive Action. Detailed documentation shall be retained.

Evidence of conformity with acceptance criteria is maintained. Records indicate the person(s) authorizing release of product.

Product release and service delivery occurs after planned arrangements have been satisfactorily completed, unless otherwise approved by a relevant authority and where applicable by the customer.

### 8.6.1 Layout inspection and functional testing

A layout inspection and a functional verification to applicable customer engineering material and performance standards shall be performed for each product as specified in the control plans. Results are available for customer review.

### 8.6.2 Appearance items

Currently, Xilinx does not manufacture parts designated as appearance items. Processes will be updated to meet customer requirements if business including appearance items is accepted in the future.

## 8.7 Control of nonconforming outputs

Non-conforming materials or products are segregated and identified to prevent its unintended use pending investigation of root cause, and to assess to what extent the non-conformance may impact other products, processes or services. Lots that are placed on Lot-On-HOLD (LOH), a lot disposition review by the engineering team is required.

When materials, products, processes and services are found to be nonconforming to applicable procedures, specifications, drawings, or customer contractual agreements, a Material Review Board (MRB) may be initiated by a Xilinx employee to evaluate and disposition the matter. The MRB disposition process (QAP0060) includes the control of rework, customer notification, and customer waiver as appropriate.

Nonconforming product can be dealt with by one or more of the following ways:

- By taking action to eliminate the detected nonconformity.
- Segregation, containment, return or suspension of provision of products
- By authorizing its use, release or acceptance under concession by a relevant authority and, where applicable, by the customer.
- By taking action to preclude its original intended use or application.

Records of the nonconformity and subsequent actions taken, including concessions obtained, are maintained. When nonconforming product is corrected it shall be re-verified to demonstrate conformity to the requirements. When nonconforming product is detected after delivery or use has started, Xilinx shall take action appropriate to the effects, or potential effects, of the nonconformity.

#### **8.7.1 Control of nonconforming product – unidentified status**

Product with unidentified or suspect status shall be classified as nonconforming product.

#### **8.7.2 Control of reworked product**

Instructions for rework, including re-inspection requirements, shall be accessible to and utilized by the appropriate employees.

#### **8.7.3 Customer information**

Customers shall be informed promptly in the event that nonconforming product has been shipped.

#### **8.7.4 Customer waiver**

Xilinx shall obtain a customer waiver prior to further processing whenever the product or manufacturing process is different from that which is currently approved. The waiver record shall contain the expiration date or quantity authorized. Xilinx shall ensure compliance with the original or superseding specifications and requirements when the waiver expires. Material shipped on a waiver shall be properly identified on each shipping container. This applies equally to a purchased product. Xilinx shall agree with any requests from suppliers before submission to the customer.

## **9 Performance Evaluation**

### **9.1 Monitoring, Measurement, Analysis and Evaluation**

#### **9.1.1 General**

Management plans and implements the monitoring, measurement, analysis and improvement processes needed to ensure conformity of products, services, and the QMS, and to continually improve the QMS. These processes define necessary methodologies, including statistical techniques, and the extent of their use.

Process measurements shall be identified, documented and monitored by the respective process owners, to ensure continued suitability and promote increased effectiveness of processes. When planned results are not achieved, correction and corrective actions shall be taken, as appropriate. Xilinx shall retain appropriate documented information as evidence of the results.

### **9.1.1.1 Identification of statistical tools**

Xilinx reviews internal processes for the application of statistical technique especially statistical process control (SPC) during advance quality planning. Implementation of SPC will be performed in accordance with the requirements define within the Policy and Process Control Quality System (QAP0126).

Statistical techniques are used as necessary to control the manufacturing processes of Xilinx, its wafer foundries, assembly and test subcontractors. Subcontractors are responsible for the implementation and review of SPC within their processes, and are monitored by Xilinx.

Xilinx works with individual wafer foundries and assembly subcontractors to define critical parameters to be monitored and supplied to Xilinx on a periodic basis.

### **9.1.1.2 Knowledge of basic statistical concepts**

Basic statistical concepts such as variation, control (stability), process capability and over adjustment shall be understood and utilized by employees in areas where processes require statistical techniques.

## **9.1.2 Customer Satisfaction**

Senior management has established processes to measure and monitor customer satisfaction and to continually use this information to improve performance. This includes customer perception as to whether the organization has met customer requirements. The methods used to collect this data include:

- Delivery performance
- Customer Visits
- Customer Scorecards
- Customer Case Management
- Customer Complaint
- RMA Process
- CIA (Continuous Improvement Action Reports)
- Supplier Audits
- Distributor Audits
- Web Surveys

### **9.1.2.1 Customer satisfaction – realization process evaluation**

Customer satisfaction is also monitored through the continual evaluation of the realization process. Performance indicators based on objective data include:

- Delivered part quality performance
- Customer disruptions including field returns
- Delivery schedule performance
- Customer notifications related to quality or delivery issues

Xilinx does not monitor incidents of premium freight as it is Xilinx and industry standard practice to ship all products via fastest (air) methods. Xilinx monitors the performance of manufacturing process to demonstrate compliance with customer requirements for product quality and efficiency of the process.

### 9.1.3 Analysis and evaluation

Data on the QMS processes is collected, reported, and analyzed through Management and other Reviews, by the Continuous Improvement Action Systems, and through internal audits. The analysis of data provides information relating to customer satisfaction, conformity to product requirements, the performance and effectiveness of the QMS, characteristics and trends of processes, the performance of external providers and the need for improvement to the QMS. Data is also collected through the following Xilinx Customer Satisfaction programs:

- Customer Complaints / Scorecards
- RMA Process
- Customer Visits
- Supplier / Distributor Audits
- Delivery of product performance
- Cycle time of manufacturing

The analysis on all of the above determines if planning has been implemented effectively, the effectiveness of actions taken to address risks and opportunities, and highlights the areas that need to be addressed for continual improvement of the QMS.

#### 9.1.3.1 Analysis and use of data

Trend analysis of nonconforming product including no trouble found products (NTF), shall be performed on a defined, regular basis and results utilized as input for corrective action and continual improvement.

Trends in quality and operational performance shall be compared with progress toward objectives and lead to action to support the following:

- Development of priorities for prompt solutions to customer related problems.

- Determination of key customer related trends and correlation for status review, decision making and longer term planning.
- An information system for the timely reporting of product information arising from usage.

### 9.1.3.2 Sustainability Assessment

On an annual basis, Xilinx publishes a copy of the Corporate Responsibility Report using the GRI Sustainability Reporting Guidelines; it is a comprehensive sustainability reporting standard in the world for organizations to report economic, environmental, social and governance performance. The report is available on the Xilinx website.

## 9.2 Internal Audit

Internal auditing of Xilinx processes, operations, QMS, and records is a key constituent of the Quality System. Internal quality audits are prioritized, scheduled, performed, reported, and followed up in accordance with the requirements of QAP0056. This includes the responsibilities and requirements for planning, conducting, reporting results, and maintaining audit records. Internal audits determine if the QMS conforms to the requirements of ISO9001, TL9000, and to the QMS requirements established by Xilinx. Internal audits also determine if the QMS is effectively implemented and maintained. Audit planning takes into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits. Audit planning defines the audit criteria, scope, frequency and methods used. The audit process ensures objectivity and impartiality. Auditors do not audit their own work. Audit findings are entered into the CIA system to ensure that management of the audited area takes actions without undue delay to eliminate detected non-conformities. Follow up activities include the verification of the actions taken. Internal quality audit recommendations and results are reviewed as part of management review.

### 9.2.1 Internal Audit types

Quality management system audit - The QMS is audited to verify compliance with all QMS requirements

Manufacturing process audit - Each manufacturing process is audited to determine its effectiveness (QCP0015, QCP0059).

Product Audit - Product audits are conducted at appropriate stages of production and delivery to verify conformity to all specified requirements such as product dimensions, functionality, packaging, and labeling at a defined frequency. (QCP0044)

### 9.2.2 Internal audit plans

Internal audits cover all quality management related processes and activities. Internal audits are scheduled according to an annual plan. The internal audit program shall include all applicable Requirements and Measurements Handbook requirements. When non-conformities or customer complaints occur, the audit frequency shall be appropriately increased (QAP0056).



### 9.2.3 Internal audit qualification

Internal auditors shall be qualified to audit the requirements of the applicable standard.

## 9.3 Management Review

### 9.3.1 General

Senior management reviews the organization's QMS to ensure its continuing suitability, adequacy and effectiveness and alignment with the strategic direction of the organization (QAP0133). The review includes assessing opportunities for improvement and the need for changes to the QMS, including the Quality policy and Quality objectives. Reviews are scheduled at least annually, depending on the specific forum. Agendas are organized around the key initiatives and business needs, as defined in QAP0133. All required review topics are covered over the course of the year.

#### 9.3.1.1 Quality Management System performance

These reviews shall include all requirements of the QMS and its performance trends as an essential part of the continual improvement process. Part of the management review includes the monitoring of quality objectives, including cost of poor quality. Results are recorded providing evidence of achievement of the quality objectives and customer satisfaction with product supplied.

#### 9.3.2 Management review inputs

Inputs to management review include: the status of actions from previous reviews, changes in external and internal issues that are relevant to the QMS, information on the performance and effectiveness of the QMS including customer satisfaction and feedback from relevant interested parties, the extent to which quality objectives have been met, process performance and conformity of products, nonconformities & corrective actions, monitoring and measurement results, audit results, the performance of external providers, the adequacy of resources, the effectiveness of actions taken to address risks and opportunities and area for improvement.

#### 9.3.3 Management review outputs

The output from management review includes decisions and actions related to opportunities for improvement, any need for changes to the QMS, and resource needs.

#### 9.3.4 Other Reviews

- Technology Review Board (TRB): A committee, established to oversee the QML (Qualified Manufacturing Line) Program. Xilinx High Reliability and Military products are qualified, processed, and manufactured in accordance with the QML Program requirements. Reference QAP0093 for additional TRB information.
- The Board of Directors has its own Internal Audit committee responsible for review of business processes, with particular emphasis on financial reporting and accounting methods.

- The Director of WW Compliance has responsibility for implementing the requirements of Sarbanes Oxley Exclusion 404; Import / Export compliance and other financial compliance activities.
- The VP & General Council is responsible for legal compliance and is accountable to the Board of Directors in these matters.

## 10 Improvement

### 10.1 General

Xilinx shall determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and enhance customer satisfaction. It is the responsibility of the functional managers to implement methods to encourage employee participation in improvement activities.

### 10.2 Nonconformity and Corrective Action

The corrective action process incorporates a systematic step-by-step corrective action problem solving approach (8-D process) used to identify the cause of nonconformity, eliminate the cause and prevent recurrence. A documented procedure (QAP0014) defines requirements for reviewing nonconformities, determining their causes, evaluating the need for action to prevent recurrence, determining and implementing action, recording of the results of actions taken, and reviewing corrective action taken. Xilinx shall, if necessary, update risks and opportunities and make changes to the QMS.

#### 10.2.1 Problem solving

Xilinx has a defined process for problem solving leading to root cause identification and elimination. Xilinx will use a customer prescribed problem-solving format if it exists.

#### 10.2.2 Error proofing

The use of error proofing methods are encouraged within the corrective action process.

#### 10.2.3 Corrective action impact

The organization shall evaluate the need for action to eliminate the cause(s) of the nonconformity, in order that it does not recur or occur elsewhere. Application of corrective actions and controls implemented to other similar processes and products, to eliminate the cause of nonconformity.

#### 10.2.4 Rejected product test / analysis

Xilinx analyzes parts rejected by the customer's manufacturing plants, engineering facilities and dealerships. Xilinx minimizes the cycle time of this process. Records of these analyses are kept and made available upon request. Xilinx performs analysis and initiates corrective action to prevent recurrence.

## **10.2.5 Preventive Action**

As part of a continuous drive for improvement within our processes data is collected and analyzed to eliminate the causes of potential nonconformities in order to prevent their occurrence. The preventive action process (QAP0014) addresses potential nonconformity cause, actions to prevent occurrence, records of results of action taken, and the review of action taken. Xilinx reviews the findings at various levels of management review and take appropriate action to address areas of concern.

## **10.3 Continual Improvement**

The continual improvement process is a companywide methodology to improve the suitability, adequacy and effectiveness of the QMS through the use of the quality policy, quality objectives, audit results, analysis and evaluation of data, corrective and preventive actions and management review. Outcome of the analysis is reviewed with management and appropriate actions are taken to implement the necessary improvements.

It is the responsibility of the functional managers to promote the principles of continual improvement throughout their functions and encourage their respective organizations to take full responsibility for implementing this.

### **10.3.1 Continual improvement of the organization**

Continual improvement is employed companywide. Some of the key process areas for continual improvement include IC Development, Supplier management and NPI.

### **10.3.2 Manufacturing process improvement**

Manufacturing process improvement shall continually focus upon control and reduction of variation in product characteristics and manufacturing process parameters.

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### APPENDIX A: XILINX DOCUMENTS CROSS REFERENCE TABLES

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
TITLE		QAP0002	
PURPOSE		QAP0002, ISO9001, TL9000, TS16949	
SCOPE		QAP0002	
REFERENCED DOCUMENTS		QAP0002	
RESPONSIBILITY		QAP0002	QAP0133
REQUIRMENTS		QAP0002	
CONTEXT OF THE ORGANIZATION	4.0	QAP0002	
QUALITY MANAGEMENT SYSTEMS	4.4	QAP0002, ANSI/NCSL Z540-1-1994, MIL-PRF-38535, MIL-STD-883, ISO9001, TL9000, TS16949	QAP0133, QAP0093
GENERAL	4.1	QAP0002, ANSI/NCSL Z540-1-1994, MIL-PRF-38535, MIL-STD-883, ISO9001, TS16949, TL9000, ISO/TS16949 Semiconductor Commodity	QAP0133, QAP0093, Sequence and interactions of Xilinx overall processes: Top level flow attached
DOCUMENTATION REQUIREMENTS	7.5	QAP0002, ISO9001, TS16949, TL9000	RRP0001
CONTROL OF DOCUMENTS CONTROL OF CUSTOMER SUPPLIED DOCUMENTS AND DATA	7.5.3	MIL-PRFC-38535	DCC0003, DPS0018 SCP0001, EAP0001, QAP0120,
DATA CONTROL	7.5	ISO 9001, TS16949, TL9000	DCC0001
CONTROL OF QUALITY RECORDS	7.5		RRP0001

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**XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)**

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
LEADERSHIP	5.0	QAP0002	
LEADERSHIP AND COMMITMENT	5.1	QAP0002	QAP0133, QAP0093
CUSTOMER FOCUS CUSTOMER RELATIONSHIP DEVELOPMENT CUSTOMER COMMUNICATION PROCEDURE	5.2	QAP0002, ISO9001, TS16949, TL9000	QAP0133 QAP0150  QAP0150, EBC
QUALITY POLICY	5.2	QAP0002, ISO9001, TS16949, TL9000	
PLANNING	6.0	QAP0002, ISO9001, TS16949, TL9000	QAP0133
ACTIONS TO ADDRESS RISKS AND OPPORTUNITIES	6.1	QAP0002	
QUALITY OBJECTIVES  QUALITY MANAGEMENT PLANNING LONG AND SHORT TERM QUALITY PLANNING	6.2	QAP0002, ISO9001, TS16949, TL9000	QAP0133, QAP0034, QAP0056 QAP0151
CUSTOMER INPUT  EXTERNAL PROVIDER INPUT  RESPONSIBILITY, AUTHORITY, and COMMUNICATION RESPONSIBILITY AND AUTHORITY INTERNAL COMMUNICATION ORGANIZATION PERFORMANCE FEEDBACK	5.2   5.3	QAP0002, ISO9001, TS16949, TL9000	QAP0150, Customer Input (MRL, EBC, Quality Initiative), Six Months Business Review (Fab. and Assembly),  Takes place in Quarterly Review Meetings, Published on Bulletin Boards and Intranet

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**XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)**

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
MANAGEMENT REVIEW RESOURCE MANAGEMENT PROVISION OR RESOURCES HUMAN RESOURCES	9.3 7.1 7.1 7.1.2	QAP0002, ISO9001, TS16949 QAP0002, ISO9001, TS16949, TL9000 QAP0002, ISO9001, TS16949, TL9000 QAP0002, ISO9001, TS16949, TL9000, Human Resources Website	DPS0021,DPS0032,QAP0093, QAP0133  QAP0133
ORGANIZATIONAL KNOWLEDGE COMPETENCE, AWARENESS AND TRAINING  INTERNAL COURSE DEVELOPMENT QUALITY IMPROVEMENT CONCEPTS TRAINING REQUIREMENTS AND AWARENESS	7.1.6 7.2, 7.3	QAP0002 QAP0002, ISO9001, TS16949, TL9000, Human Resources Website Human Resources Website	QAP0013  QAP0013, TRP0008, Quality 101, Quality Systems Training, Competency Models, Oracle OTA Quality 101: Quality Systems Training , SPC, Problem Solving, Design for Experiments
ESD TRAINING ADVANCED QUALITY TRAINING TRAINING CONTENT OPERATOR QUALIFICATIONS	7.2 7.2 7.2 7.2		QAP0003  OJT Training (XSJ), EHS0021, EHS0002 TRP0008, QAP0013 EHS0001, EHS0005, EHS0020, EHS0024, MAC0029, TRP documents. QAP0070, TSC0020
INFRASTRUCTURE/ WORK ENVIRONMENT	7.1.3, 7.1.4	QAP0002, ISO9001, TS16949, TL9000	
PRODUCT REALIZATION PLANNING OF PRODUCT REALIZATION	8.0 8.1	QAP0002, ISO9001, TS16949, TL9000 QAP0002, ISO9001, TS16949, TL9000, MIL-PRF-38535, MIL-STD-883, QAP0002	DPS0021, DPS0032, SCP0002, PCC0001, ,, MAC0062, QAP0034, PCC0029, IVC0051 DPS0021, DPS0032, QAP0152, DPS0021, DPS0032, QAP0152 BCP0001-XXXX (all BCPs) , Incident Management Action Guide (XSJ) QAP0009, QAP0135, RRP0001, DPS0018, SCP0002
LIFE CYCLE MODEL NEW PRODUCT INTRODUCTION DISASTER RECOVERY  END OF LIFE PLANNING	8.1		

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### XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
CUSTOMER RELATED PROCESSES	8.2	QAP0002, ISO9001, TS16949, TL9000	
DETERMINATION OF REQUIREMENTS RELATED TO THE PRODUCT	8.2.2	QAP0002, ISO9001, TS16949, TL9000, QML	SCP0002, SCP0001, CUS0002, DPS0021, DPS0032
REVIEW OF REQUIREMENTS	8.2.3	QAP0002, ISO9001, TS16949, TL9000, QML	, SCP0001, SCP0002
CUSTOMER COMMUNICATION	8.2.1	QAP0002, ISO9001, TS16949, TL9000,	QAP0009, QAP0069, QAP0150, QAP0060, QAP0009
NOTIFICATION ABOUT PROBLEMS		TL9000 Measurements Handbook	EHS0007
PROBLEM SEVERITY		Table A7 shows required problem report severity classifications required for product category 8.1.2	SPW, Xilinx.com, Customer Hotline QAP0060, , QAP0136 QAP0060, QAP0069, QAP0060, QAP0118
PROBLEM ESCALATION	8.2.1		
CUSTOMER FEEDBACK			
ORGANIZATIONS RECALL PROCESS			
DESIGN AND DEVELOPMENT	8.3	QAP0002, ISO9001, TS16949, TL9000	DPS0021, DPS0032. IPD0001, QAP0191
DESIGN AND DEVELOPMENT PLANNING	8.3.2	QAP0002, ISO9001, TS16949, TL9000	
PROJECT PLAN			PDD, SRB
REQUIREMENTS TRACABILITY			PDD, SRB
TEST PLANNING			FPGA: TSP0068, TSP0100
RISK MANAGEMENT PLAN			TSP0100 PDD
INTEGRATION PLANNING			CPLD: TSP0059, DPS0021, DPS0032
ESTIMATION			CSD: TSP00058
MIGRATION PLANNING			
DESIGN AND DEVELOPMENT PROCESS			
QUALITY MEASUREMENT PLANNING AND IMPLEMENTATION			
DESIGN AND DEVELOPMENT INPUTS	8.3.3	QAP0002, ISO9001, TS16949, TL9000	DPS0021, DPS0032
CUSTOMER AND SUPPLIER INPUT			SRB Phase 0, PDD (Product Design Document)
DESIGN AND DEVELOPMENT REQUIREMENTS			PDD, PDS
CONTENT OF REQUIREMENTS			Data Sheet, MAC0029, B) NOT APPLICABLE
DESIGN AND DEVELOPMENT OUTPUTS	8.3.5	QAP0002, ISO9001, TS16949, TL9000	DPS0021, DPS0032
DESIGN AND DEVELOPMENT REVIEW	8.3.4		DPS0021, DPS0032
DESIGN AND DEVELOPMENT VERIFICATION	8.3.4	QAP0002, ISO9001, TS16949	DPS0021, DPS0032
DESIGN AND DEVELOPMENT VALIDATION	8.3.4	QAP0002, ISO9001, TS16949, AEC-Q100	DPS0021, DPS0032, QAP0034

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### XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
CONTROL OF DESIGN AND DEVELOPMENT CHANGES	8.3.6	QAP0002, ISO9001, TS16949	DPS0021, DPS0032
CHANGE MANAGEMENT PROCESS			DPS0015, Change Control Board
INFORMING CUSTOMERS			QAP0009
PROBLEM RESOLUTION CONFIGURATION MANAGEMENT			SRB PROJECT MANAGEMENT, MMSI Control, Design Fixes
COMPONENT CHANGES			MSC1001
PURCHASING	8.4, 8.4.1, 8.4.2, 8.4.3	QAP0002, ISO9001, TS16949, TL9000	QCP0015, QAP0009, QAP0034, MSC1006 POLICY GP101, QCP0015, QAP0056
PURCHASING PROCEDURES		QAP0002	QAP0099, , POLICY GP101, QAP0150, QAP0056, DPS0021, DPS0032, QCP0015, BCP, Quality Business Review
PRODUCTION AND SERVICE CONTROL OF PRODUCTION AND SERVICE	8.5 8.5.1	QAP0002, ISO9001, TS16949, TL9000	CPD: Control Plans, FME: FMEA plans
ORGANISATION SUPPORT PROGRAM SERVICE RESOURCES EMERGENCY SERVICE INSTALLATION PLAN			QAP0004, Customer Training WTS0001, QAP0167 CUSTOMER SERVICE GROUP DATA BOOK / DATA SHEET CUSTOMER TRAINING



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### XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
VALIDATION OF PROCESSES FOR PRODUCTION AND SERVICES	8.5		100% Test is Validation
IDENTIFICATION AND TRACEABILITY  PRODUCT IDENTIFICATION  TRACEABILITY FOR RECALL  TRACEABILITY OF DESIGN CHANGES	8.5.2	QAP0002, ISO9001, TS16949, TL9000, MIL-PRF-38535	PCC0001, MAC0062 IVC0048, MAC0011, MMSI, CXDB, TEST PROGRAMS  Component Recall:QAP0118  MAC0011, , DPS0015, XAMS, MMSI
CUSTOMER PROPERTY	8.5.3		EAP0001, , QAP0120, QAP146,
PRESERVATION OF PRODUCT  ANTI-STATIC PROTECTION PACKAGING AND LABELING AUDIT  DETERIORATION	8.5.4	QAP0002, ISO9001, TS16949, TL9000	QAP0003, IVC0031, IVC0035, MAC0029, MAC0002 QAP0003, TSP0007 QCP0044, IVC0051, IVC0031  IVC0035
CONTROL OF CHANGES	8.5.6	QAP0002, ISO9001, IATF16949, TL9000	QAP0167
CONTROL OF MONITORING AND MEASURING DEVICES  IDENTIFIED EQUIPMENT	7.1.5	QAP0002, ISO9001, TS16949, TL9000, ANSI/NCSI/NCSL ZX540-1-1994	QAP0015, QAP0056, TSP0058, TSP0059, TSP0068  QAP0015

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### XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
MEASUREMENT, ANALYSIS, AND IMPROVEMENT	9.1	QAP0002, ISO9001, TS16949, TL9000	QAP0126, DPS0021, DPS0032, QAP0034
MONITORING AND MEASUREMENT	9.1	QAP0002, ISO9001, TS16949, TL9000	
CUSTOMER SATISFACTION CUSTOMER SATISFACTION DATA	9.1.2	QAP0002, ISO9001, TS16949, TL9000	QAP0150, QAP0133 CUSTOMER SCORECARDS, Web Support
INTERNAL AUDIT	9.2	QAP0002, ISO9001, TS16949, TL9000	QAP0056
MONITORING AND MEASUREMENT OF PROCESSES	9.1	QAP0002, ISO9001, TS16949, TL9000	QAP0056, QAP0133
MONITORING AND MEASUREMENT OF PROCESSES	9.1	AEC-Q001, AEC-Q002	DPS0021, DPS0032, QAP0126, QAP0127, DPS0021: Design phase completion hand off, SRB, FAB YIELD, ASSEMBLY SPC, DPS0032
MONITORING AND MEASUREMENT OF PRODUCT	8.6	QAP0002, ISO9001, TS16949, TL9000	DSP0021, TSP0100, TSP0007, EQP0113, TSP0037, TSP0068, QAP0014, QAP0126, QAP0127, QAP0149, PCC0001, PCC0029, MAC0062
INSPECTION AND TEST DOCUMENTATION INSPECTION AND TEST RECORDS PERIODIC RETESTING CONTENT OF TESTING FREQUENCY OF TESTING TESTING OF REPAIR AND RETURN PRODUCTS			QAP0034 Quarterly Monitors QAP0034 RETURN PRODUCT – RMA PROCESS
CONTROL OF NON-CONFORMING PRODUCT	8.7	QAP0002, ISO9001, TS16949, TL9000	QAP0014, QAP0060, , QAP0149
ANALYSIS OF DATA TREND ANALYSIS OF NON-CONFORMING PRODUCT	9.1.3	QAP0002, ISO9001, TS16949, TL9000	QAP0014, QAP0069, QAP0060, QAP0133, QAP0149, TSP0007
FIELD PERFORMANCE DATA SUSTAINABILITY ASSESSMENT			QAP0120, QAP0189, WTS0001 Corporate Responsibility Report

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**XILINX DOCUMENTS CROSS REFERENCE TABLES (continued)**

GENERAL REQUIREMENT	ISO9001 TL9000 TS16949	XILINX REFERENCE SPECIFICATIONS	XILINX REFERENCE SPECIFICATIONS
IMPROVEMENT	10	QAP0002, ISO9001, TS16949, TL9000	
GENERAL	10.1	QAP0002, ISO9001, TS16949, TL9000	CI projects
CORRECTIVE ACTION	10.2	QAP0002, ISO9001, TS16949, TL9000	QAP0014, QAP0133
CONTINUAL IMPROVEMENT	10.3	QAP0002, ISO9001, TS16949, TL9000	CI projects

**APPENDIX B: REFERENCED DOCUMENTS**

- ISO9001: Quality Management Systems
- TL9000: Quality Management System Requirements Handbook
- TL9000: Quality Management System Measurements Handbook
- Mil-Prf-38535 Part Manufacturers And Service Providers for Integrated Circuits
- Failure Mode and Effects Analysis (FMEA) AIAG manual
- ISO/TS16949:2002
- Other documents are referenced in the table of contents of Appendix-A