QSM 000
Rev. V
Texas Instruments Quality Policy Manual

Printed specifications are not controlled documents.
Verify Revision before using.

FOREWORD

Texas Instruments (TI) is changing the world, one chip at a time. Our analog and embedded processing products power electronics across every industry and help to make the world smarter, safer, greener, healthier and more fun.

This Quality System Manual defines the policies and procedures used to ensure that our products and services meet our customers' requirements, in the pursuit of business excellence.

This Manual is intended for use by all TI semiconductor group (SCG) operations worldwide involved in the design, manufacture, and support of TI SCG products and services. Herein after, the use of "TI" is intended and understood as TI SCG.

The policies and procedures contained in this Manual are based on the requirements of our customers as well as on International and National Standards.

TI's commitment to customer satisfaction is communicated through the TI Quality Policy:

> Quality is foundational to achieving our business objectives. We are committed to satisfying applicable requirements and providing quality products to customers around the world by:
> - Encouraging and expecting the creative involvement of every TIer
> - Listening to our customers
> - Continuously improving and innovating our products, processes and services

Maintenance of this document is the responsibility of the Vice President of WW SC Quality. All questions regarding this document should be directed to:

Vice President / Manager of WW SC Quality
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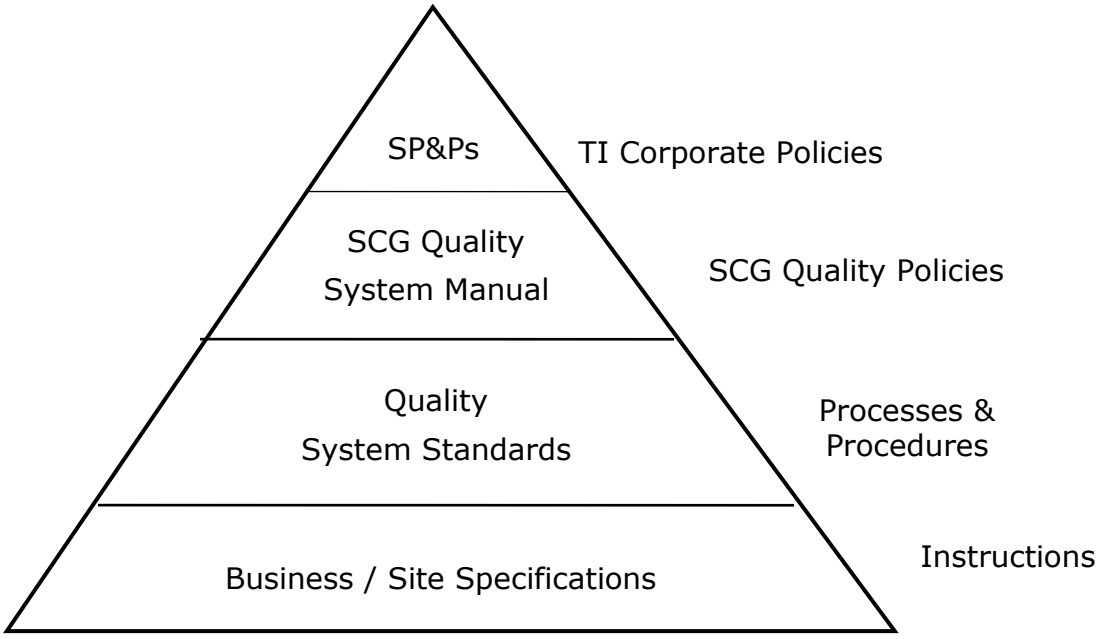
Dallas, Texas

TI QUALITY MANAGEMENT SYSTEM

TI Worldwide Corporate Policies are described in Standard Policies and Procedures (SP&Ps). The Quality System Manual (QSM) defines the TI quality system policies. The details of how these policies are implemented as well as the processes are described in Quality System Standards (QSS). Instructions for specific organization / manufacturing activities are described in SBE specific or site / local specifications.

Below is a representation of the structure of the TI Quality System Hierarchy:



1.0 PURPOSE

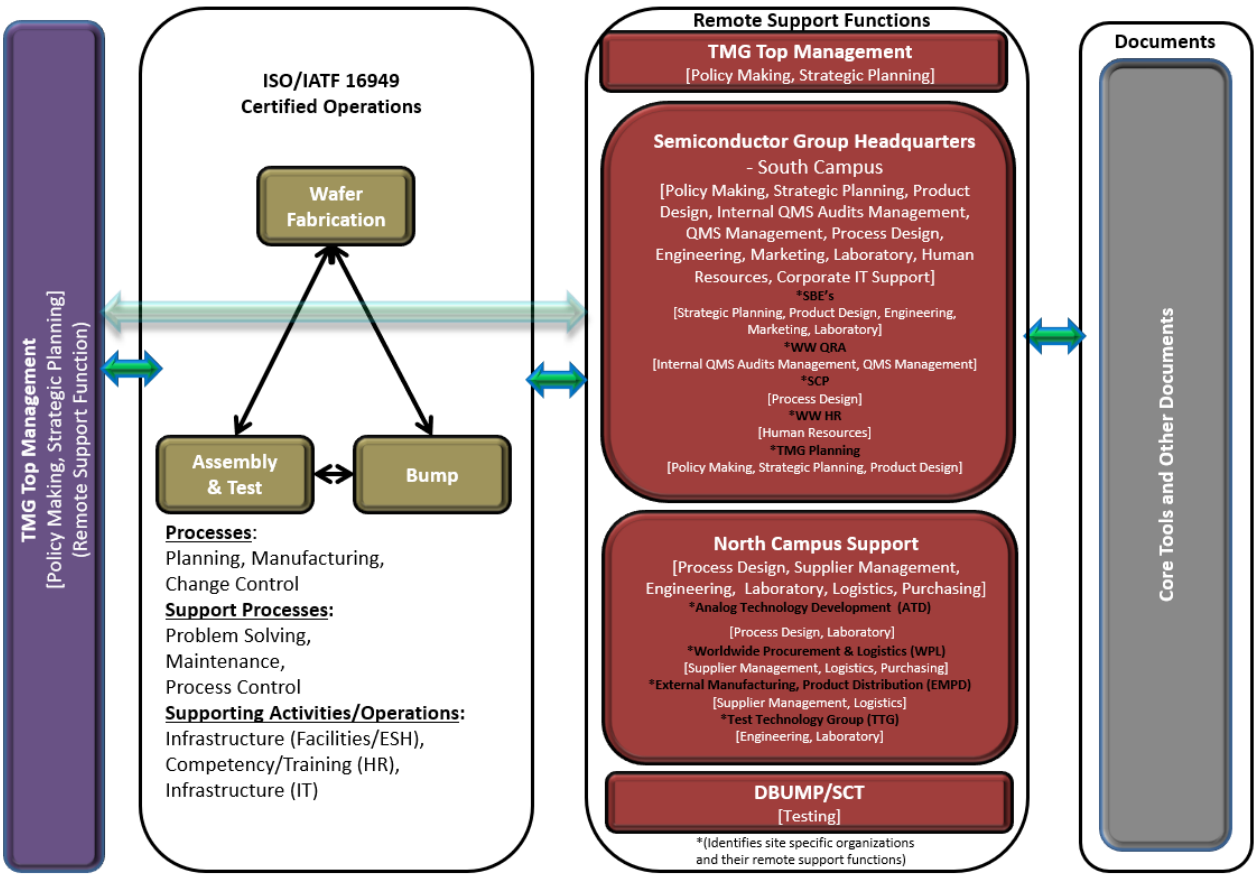
This document describes the policies and requirements of the TI Quality Management System and represents the top tier document.

2.0 SCOPE

This document applies to all TI sites and business entities that design, develop and/or manufacture integrated circuits.

The following diagram is a representation of the scope of the TI SCG quality management system.

QSM 000 Business Model



Information about TI products is available on ti.com.

3.0 REFERENCES

SP&P 08-09-01	Customer Satisfaction Through Total Quality
IATF 16949:2016	Automotive Quality Management System Standard
ISO 9001:2015	Quality Management Systems
IEC QC 080000	Electrical and Electronic Components and Products Hazardous Substance Process Management System Requirements (HSPM)

(Cross Reference)

(CSR Cross Reference Matrix)

4.0 QUALITY MANUAL DOCUMENTATION

This Quality Policy Manual is written to meet the requirements of our customers and is compliant with ISO 9001 and IATF 16949. It is supported by documented procedures,

work instructions, and process flows that define specific activities needed to implement the quality management system and the quality policy.

A (Cross Reference)

exists to map the ISO 9001 and IATF 16949 clauses to specific sections of this document and to the applicable lower level TI specifications.

A (CSR cross reference matrix) exists to map Customer Specific Requirements clauses to specific sections of this document and to the applicable lower level TI specifications.

5.0 POLICIES

5.1 REVIEW OF EXTERNAL REQUIREMENTS

External requirements include those provided by customers as well as expectations from other interested parties that are relevant to the quality management system. Customer engineering specifications/standards and other documents of external origin received by TI are distributed, reviewed, and where necessary, implemented in a timely manner. TI reviews customer requirements prior to committing to supply product or accepting changes to existing orders, and communicates with customers, as appropriate, regarding:

- Determination that the external requirements are clearly defined
- An assessment of TI's ability to meet the customer's needs
- Decisions regarding price and delivery
- Negotiation and agreement with the customer on requirements, pricing, and delivery
- Modification of standard product flows and creation of special flows to meet customer requirements
- Assessment and provisions for confidentiality

5.2 COMPETENCE AND ORGANIZATIONAL KNOWLEDGE

The organizational knowledge necessary for the operation of processes and achievement of product conformity to requirements are determined and documented.

Personnel are hired based on their ability to perform the work defined in their job descriptions. Competence is determined on the basis of the employee's education, training, skills and / or experience. Additional training may be provided for personnel to sustain and further develop the skill set in performing work affecting product quality and customer satisfaction. Such training is defined and measured by the supervisor.

TI is committed to using awareness, motivation and empowerment as a means of driving quality, continual improvement, and innovation in our products and processes. Personnel will have a clear understanding of their roles and responsibilities within their organization and how they contribute to the achievement of the goals and quality objectives.

The responsibility and authority of personnel who manage, perform, and verify work affecting conformity to product requirements and/or represent the needs of the customer in internal functions are defined. In particular, management of production operations will identify personnel who have responsibility for ensuring product quality.

5.3 PURCHASING AND SUPPLIER MANAGEMENT

The quality of TI products is dependent on the quality of purchased materials and services. TI requires suppliers of critical products and services to develop, implement, and improve a quality management system certified to ISO 9001 and other applicable quality management system standards.

The purchase process is documented and structured to meet the following requirements:

- Ensure that purchasing documents clearly describe the product and services ordered
- Ensure that purchased products and services conform to purchase requirements
- Communicate to suppliers the appropriate product, quality, and delivery requirements
- Ensure that purchased materials and services meet government, safety, and environmental regulations
- Ensure that finished product, direct materials, and packing materials meet the provisions of regulatory and customer requirements

All TI groups/organizations utilizing purchased materials and services will work with the established supplier management organizations, as applicable; to ensure that the supplier management process in place is structured to cover the following:

- Identify and select suppliers with the capability to meet TI needs
- Establish criteria for selection, evaluation, qualification, and certification of suppliers
- Perform supplier quality management system development
- Ensure continuity of supply
- Ensure that critical materials and services are purchased only from approved sources
- Monitor and provide feedback on supplier performance
- Monitor product quality and delivery performance (including use of premium freight, as applicable)

Occasionally, customers may ask to verify product at one of TI's supplier sites. TI manages these requests on a case-by-case basis and coordinates with the supplier, as appropriate. However, even when a customer performs such an inspection, TI is still responsible for the quality of all products delivered by TI to the customer.

5.4 PROCESS MANAGEMENT

Manufacturing, development and business processes are carried out under controlled conditions, which includes appropriate documentation of the process, use of suitable equipment, the availability and use of monitoring and measuring equipment, use of production scheduling and work flow tracking processes, and the implementation of process release activities. Key process equipment is identified and maintained.

Manufacturing, development and business processes are defined in controlled specifications, work instructions, and process flows which detail the specific procedures to be used for each process. The group that owns the process is responsible for determining the level of documentation necessary for control of the process.

Methods such as Failure Mode and Effects Analysis (FMEA), feasibility reviews, or other risk assessment techniques are used to identify potential risks. FMEA's are based on the AIAG FMEA manual and customer requirements as applicable. Preventive actions needed to address critical risks are included as part of product and process development plans, are integrated into manufacturing process control systems, or into plant layout and construction plans.

5.5 PRODUCT ASSURANCE

Procedures exist to ensure the conformity of the product to defined requirements, including:

- Product safety considerations
- Appropriate inspections and tests
- Control of suspect and nonconforming material
- Requirements for handling, storage, packaging, preservation and delivery of products
- Requirements for protection of product from deterioration caused by ESD
- Inventory management controls including product tracking and FIFO processes

5.6 DOCUMENT CONTROL QUALITY MANAGEMENT SYSTEM DOCUMENTATION

All documents, specifications, and procedures documented information required by the TI Quality Management System shall be controlled. A documented procedure shall be established to create, update and approve controlled documents. This procedure governs the creation, approval, and updates to documents and ensures that changes and the current revision are identified. Systems are in place to ensure that the most current version of appropriate documents are available to personnel who need them at their points of use. Documents shall remain legible and readily identifiable. Documents which are obsolete are identified to prevent their unintended use.
When external specifications from TI's customers are included in a TI specification system, their control is defined in that specification system. For other specifications or documents, such as government or industry specifications, the most recent version available is used when referenced within a TI specification, unless otherwise stated.

5.7 PRODUCT / INVENTORY CONTROL

Product is identified from raw materials through all stages of production and shipment to the customer.

The tracking procedure includes:

- Assignment of a unique identifier to each lot or batch of material
- Recording the completion of each process step and the inspection and test status
- Recording of pass/fail quantities
- Identification of key process information as defined in work instructions
- Recording of key process parametric data as defined in work instructions
- Traceability to key raw materials and the production process as needed

5.8 ENVIRONMENTAL CONTROL

A Restricted Chemical and Material (RCM) policy exists based on the requirements of IEC QC080000. Where wafers, exposed die, unsealed devices, or components are handled or processed, environmental controls are defined to ensure product integrity, support defect reduction, and promote a safe working environment. TI uses appropriate storage methods for materials and product to prevent unintended damage.

5.9 CHANGE MANAGEMENT

After formal product/process release, continual improvement strategies are emphasized, and as a result, there may be a need to modify, update, or discontinue the product/process. When this occurs, the change management system is used to plan, qualify, and implement the change. Where practical, analysis is performed on potential impact to the systems in which the product/process is used and the effect of changes on product already delivered.

A formal, documented change process is used to ensure that the appropriate validations are completed and modifications documented prior to implementing the change. When a product/process change requires customer notification, a formal product change notification process is used.

5.10 CONTINUITY OF SUPPLY

Prior to the implementation of a manufacturing source shutdown or the withdrawal of product from the market affecting the continuous source of a qualified supply of products or services (end of life), each business entity identifies affected products and manages the withdrawal process. Affected customers and distributors are notified using the change notification process.

5.11 MANUFACTURING PROCESS DEVELOPMENT

TI develops manufacturing processes to support its product needs. The input to process development includes an evaluation of future product and technology requirements. When a new process is targeted for development, a documented phase review process

similar to that for product development is used including cross-functional teams, project plans, formal reviews at critical stages, as well as verification and validation of the process prior to release. Tools such as error proofing, process FMEAs and preliminary process capability studies are utilized during this process, where appropriate.

5.12 INSPECTION, MEASUREMENT AND TEST

There are a variety of inspection and test points defined within each process to verify that the process is in control, that product, process and customer requirements are being met, and to provide feedback for continual improvement. Results of inspections and tests are documented.

When nonconformities occur, they are addressed according to specific procedures defined in each work area (see Corrective Action). Nonconforming product is identified, documented, segregated, reviewed, and dispositioned (including rework) according to work area procedures. Emphasis is placed on creating procedures to prevent mixing of production materials.

When inspection, measuring and test equipment, test hardware, or test software is used in the development or manufacture of semiconductor products, a measurement capability analysis is done. The equipment and software are initially verified and then maintained and calibrated, where applicable, to ensure that it is capable of providing consistent, accurate measurements. Appropriate statistical studies (e.g., MSA) are utilized for analysis of measurements of critical characteristics or those that are part of the control plan. As appropriate, data are made available for customer review.

Any internal laboratories utilized in supporting or facilitating inspection, measurement, and test activities, are required to have documented laboratory scope statements describing the specific tests, evaluations, and calibrations it is qualified to perform and the methods and standards utilized, and any special requirements of personnel and equipment. All laboratory facilities (production, engineering development, test and measurement, etc.) will meet corporate requirements for compliance with ESD standards.

5.13 CUSTOMER RETURNS

In the event that a customer experiences issues or failures with a TI product, including embedded software, a thorough and timely analysis of the reported problem will be undertaken, including execution of appropriate corrective actions. Appropriate communication with customers and within TI will occur during the testing and analysis.

5.14 ESD

All TI operations worldwide that handle, test, or ship ESD sensitive devices or assemblies containing such devices employ electrostatic discharge (ESD) prevention methods or procedures.

5.15 PERFORMANCE EVALUATION, IMPROVEMENT, AND CUSTOMER SATISFACTION

Organizations evaluate the performance and effectiveness of the Quality Management System, using and analyzing appropriate data and information arising from monitoring and measurement.

Organizations determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and to enhance customer satisfaction. Organizations have documented processes for continual improvement.

Performance indicators of customer satisfaction are based on objective evidence, including periodic evaluation of internal and external performance indicators and customer feedback.

5.16 QUALITY RECORDS

Records are maintained to document effective implementation of the Quality Management System and provide evidence of conformity to requirements. Documented procedures define the type of records needed, location and manner of

collection, retention times, retention responsibility, storage media and disposal requirements. Records are stored under appropriate security and environmental control to ensure they remain legible, readily identifiable, and accessible. The control of records meets statutory, regulatory and customer requirements.

5.17 AUDITS

Periodic internal audits are performed to ensure compliance to stated requirements, the effective implementation and operation of the Quality Management System, and the identification of opportunities for continual improvement. Audits are conducted at planned intervals and are performed by qualified internal auditors independent of the area being assessed. Results of audits are documented and corrective actions are implemented and evaluated for effectiveness. Audit results form part of the management review.

5.18 LEADERSHIP RESPONSIBILITIES

Top management has the responsibility for supporting the development, implementation and effectiveness of the quality management system. Top management ensures that the quality management system remains relevant to the company's objectives and the needs and expectations of TI's customers and interested parties, and that it promotes continual improvement and customer satisfaction.

Top management is responsible for communicating the quality policy and the importance of meeting customer as well as statutory and regulatory requirements to personnel within their respective organizations. They will ensure that the quality policy is understood and applied to the daily work of the organization through the establishment of goals and quality objectives.

Top management is responsible for communication of business plans and organizational goals within their respective organizations and reporting back to the organization on the performance and effectiveness of the quality management system.

Top management conducts periodic reviews to ensure that the quality management system has been effectively implemented, that it continues to support the TI quality policy, and that it meets the needs of our customers and interested parties, and the requirements of the standards on which the quality management system is based.

5.19 NEW PRODUCT QUALIFICATION AND APPROVAL

A formal project review and approval, by responsible management, is completed and documented at critical points in the development process.

5.20 MANAGEMENT OF EXTERNAL MANUFACTURING

Operations involved in the subcontracting of the manufacture or test of products, (e.g. foundry, assembly, test, module or chip supplier) will adhere to specified purchasing and supplier management requirements, and will develop and maintain specific procedures where necessary to ensure the quality and conformity of the subcontracted product.

5.21 QUALITY AND OPERATIONAL PLANNING

In order to effectively implement and control the processes necessary to ensure product conformity and the effectiveness of the quality management system, TI employs a defined strategy for quality and operational planning.

Quality planning is designed to ensure the ongoing effectiveness of the quality management system, and is focused on actions which address risks and opportunities, periodic changes deemed necessary, and the achievement of quality objectives. Quality objectives are determined annually as an output of TI's policy deployment objectives process.

Operational planning focuses on control of the processes needed to meet the requirements for the provision of products.

TI's quality management system and operational planning are represented by the

business process model (BPM) in section 2 of this policy manual. The BPM shows the processes needed for the successful execution of product realization.

5.22 NONCONFORMITY AND CORRECTIVE ACTION

When nonconformities occur in the process, product, quality management system, or when customer complaints or returns are received, containment and appropriate correction and corrective action will be taken immediately. Additionally, problem solving and error-proofing methodologies are applied as appropriate. Managers with responsibility and authority for corrective action will be promptly informed when products or processes become noncompliant with specified requirements.

5.23 INFRASTRUCTURE

All TI operations responsible for the development of plant, facility and equipment plans will maintain the infrastructure necessary to support conformity to product requirements. This planning will include contingencies necessary to satisfy customer requirements in the event of unplanned or emergency occurrences affecting facilities, equipment, utilities or labor.

5.24 PRODUCT DEVELOPMENT

Product development at TI is accomplished using a structured new product development process which is compliant with ISO 9001 or IATF 16949, as applicable. This includes a detailed description of the development phases and the minimum deliverables for each phase.

5.25 SOFTWARE QUALITY ASSURANCE

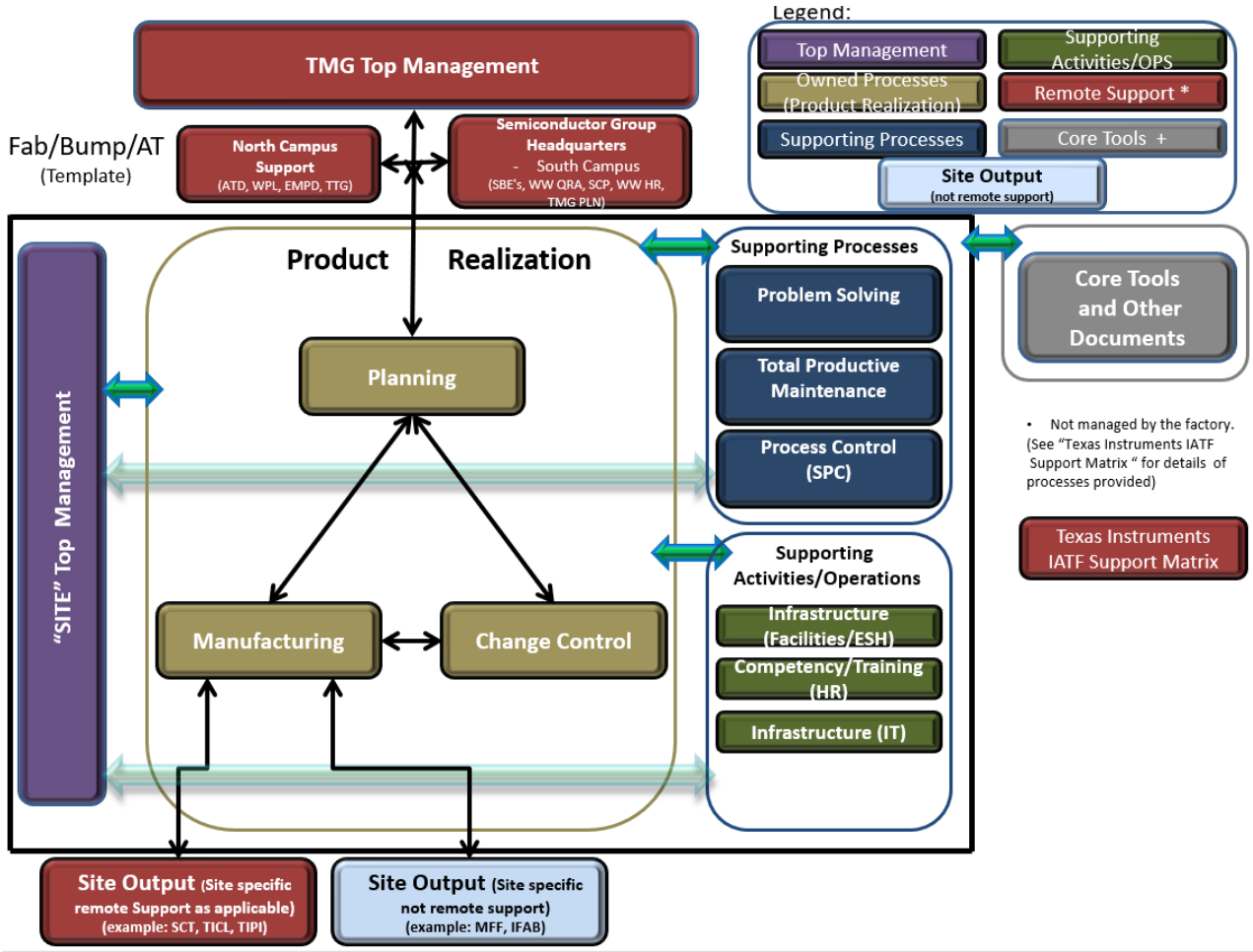
All TI operations responsible for the development of software products or related services will document their activity requirements to include:

- The integrity of the development process
- Continuous compliance to customer requirements
- Configuration management (base-lining software products and maintaining their revision status)
- Quality control activities

6.0 One Make Business Process Model Template

Below in Appendix A is a BPM template that may be used when creating a site-specific process map and modified as needed for the specific site.

Appendix A – One Make Business Process Model Template



Minimum approvals required for revisions to this spec:

(Control Click the following list name(s) to see specific approvers)

Owning Group: SCQ CCB Team

Quality VP Audit Team SC Quality Directors

REVISION HISTORY

V, ECN 24255001, Jim Taylor 09-11-24, updated QSM 000 BPM changing SCT to DBUMP/SCT to match remote support matrix. Updated the FAB/BUMP/AT BPM Template, adding button for Site Output for non-remote support outputs Like MFF and IFAB. updated, converted 09-25-24

U, ECN 23129000, Jim Taylor 05-09-23, updated QSM 000 BPM to add Corporate IT Support under south campus to align to align with IATF Remote Support Matrix. updated, converted 05-18-23

T, ECN 23108000, Jim Taylor/Cindy Spence 04-17-23, updated QSM 000 BPM to reflect the new North Campus Support groups. Removed DLP, added SBE, WW QRA, WW HR, updated wording below them, updated One Make BPM Template to match the Remote support Matrix. Changed EM to EMPD. Cross Reference Map updated, converted 04-27-23

S, ECN 22020000, System Admin 01-20-22, update only to create ECN, not routed for review, converted 01-21-22

R, ECN, Jim Taylor 11-15-21, correct Cross Reference hyperlink, red text intentionally left from Rev Q, converted

Q, ECN 21274002, Jim Taylor 09-23-21, BPM update, 1) Updated QSM 000 BPM to reflect the remote support site specific organizations and their remote support functions. 2) Added section 6.0 referencing Appendix A with verbiage about the template. 3) Updated the One Make Fab and A/T BPM templates in Appendix A creating a single template for Fab and A/T sites. Links to (SP&P 08-09-01) and (CSR Cross Reference Matrix) were updated to new active links, converted 10-12-21

P, ECN 21056001, Jim Taylor 02-25-21, BPM update, updated QSM 000 BPM to reflect the new North Campus Support group moved SC Packaging into Semiconductor Group Headquarters block aligning with the One Make BPM updates, updated the One make fab and A/T BPM templates in Appendix A to align with North Campus support and support matrix, converted 03-06-21

O, ECN 20321001, Shawn Smith/Jim Taylor, BPM update, removed sales from (South Campus button), SC packaging button changed from "Product Design" to "Process Design" added "Laboratory" to ATD button, updated A/T BPM Template changed ATD remote support button to SC Packaging, changes to align with Remote support matrix version 012720, converted 11-25-20

N, ECN 20149000, Shawn Smith/Jim Taylor 5-28-20, updating BPM Templates Appendix A. Update wording in not managed by factory statement and added button linking to remote support matrix. Updated section 5.21 reference section 2 instead of 4, converted 06-06-20

M, ECN 19134001, Tom Strohm 5-14-19, updating the BPM flows, converted 05-19-19

L, ECN 19099000, Tom Strohm 4-08-19, updating the Quality Policy and the BPM flows, converted 04-18-19

K, ECN 17345000, Jim Davenport 12-08-17, adding a link to the CSR cross reference matrix, converted 12-20-17

J, ECN 17187002, Julia Murray 07-06-17, wording correction sec 5.6, converted 07-07-17. Red text from previous revision intentionally left red.

I, ECN 17090000, Martin Branum, Mahjoub Abdelgadir, Dave Coley 03-31-17, revisions to align with ISO 9001:2015 and IATF 16949, converted 04-22-17

H, ECN 16148000, Tom Strohm 05-12-16, revised scope statement, revised model, added factory BPM templates, converted 06-07-16

G, ECN 16089002, Tom Strohm 03-29-16, full review, updated forward, added QSS023-000 to Key specs supporting BPM, aligned common language with the GQG, 5.19 update, converted 04-07-16

F, ECN 13275001, Martin Branum 10-02-13, converted 10-11-13

E, ECN 12349001, Julia Murray 12-14-12, add hyperlink for cross reference information, converted 12-15-12

D, ECN 12342004, Julia Murray 12-07-12, add VP approver list, converted 12-08-12

C, ECN 12341000, Martin Branum 12-06-12, minor update to Appendix A, converted 12-07-12

B, ECN 12307001, Donna Hanson 11-01-12, converted 11-08-12

A, ECN 12226011, Julia Murray for Martin Branum 08-13-12, update various sections, converted 08-29-12

- ECN 11349001, Quality Systems Integration Team; 12-15-11, converted 01-25-12

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