



**Quality Program Requirements for ADTRAN Contract
Manufacturers**



Foreword

ADTRAN designs and manufactures telecommunications equipment that has an enviable reputation for high reliability and quality content--a reputation that will be maintained and enhanced. This reputation is due to equipment design, production standards, and commitment by all management and operating personnel to the quality concept.

The elements contained in this document are those employed by ADTRAN to achieve its basic quality goals, which are probably best described as good commercial quality practice and are fundamental to any form of management or quality control. This document shall serve as both a requirement and a general guide to the extent of quality control that ADTRAN anticipates from Electronic Manufacture Services/Contract Manufacturers (CM) Suppliers.

ADTRAN will assist CM Supplier in any reasonable manner to establish an understanding of and compliance with our contract requirements. The Contract Manufacturer must be particularly cautioned that no departure from any specification is permitted without a contract change. Clarification of this or any other ADTRAN document affecting contract compliance may be obtained through the ADTRAN International Operations Organization.

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Reference

- IPC-J-STD-033 Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices
- IPC/EIA/JEDEC J-STD-002 Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires
- Industry Standard Code 39 Barcode Labels and Printing
- ANSI/ISO/ASQ Q9001-2008: Quality Management Systems (QMS) Requirements
- TL 9000 Quality Management System Requirements
- IPC-A-610 Acceptability of Electronic Assemblies
- IP-CM-770 Guidelines for Printed Board Component Mounting
- ANSI/ESD S20.20 Electrostatic Discharge Control Program Standard
- Q-50 Workmanship Standard
- Q-100 Quality Program Requirements for ADTRAN Suppliers
- ISO 2859 Sampling Procedures for Inspection by Attributes Package
- QA10-16 PCB Impedance Testing
- ISO 14001 Environmental management systems – Requirements
- ISO 18001 Occupational Health and Safety Management System
- ISO 26000 Guidance on Social Responsibility
- ANSI (American National Standards Institute) QS 9000 Requirements



1.0 GENERAL

1.1 Intent

The intent of this document is best defined as GOOD COMMERCIAL PRACTICE. When viewed in this context, the requirements herein can be readily and economically satisfied by competent commercial Contract Manufacturers and Purchased Assembly Suppliers.

1.2 Scope

When specified in the contract, the requirements contained in this document must be adhered to by ADTRAN Contract Manufacturers. In the event a Contract Manufacturer desires an exception to the requirements contained herein, a request delineating the exception must be submitted for ADTRAN approval prior to acceptance of a contract. If a conflict exists between the provisions of this document and those of the contract, the contract shall take precedence.

1.3 CM Qualification

Qualified Contract Manufacturers will be determined by supplier capability and product evaluations, compliance of procured material with ADTRAN requirements, and the promptness and effectiveness of corrective action taken. Continued qualification will be contingent upon continued quality of performance, satisfactory results of Quality System Audits, and/or external TL9000 audit reports.

1.4 ADTRAN Supplier Capability Assessments (SCA)

Contract Manufacturer facilities and operations may be surveyed either before or after the placement of contract. The capabilities to meet ADTRAN requirements and to supply a product of consistent quality will be evaluated. Audits may be scheduled and conducted if required, to determine compliance with our purchase requirements and the requirements of this document.

1.5 ADTRAN Source Inspection

ADTRAN reserves the right to Source Inspect product at the Contract Manufacturer's facility after reasonable notice of such inspection. Final acceptance of all material will be made at ADTRAN regardless of the results of Source Inspection.

1.6 Deviations and Substitutions

ADTRAN expects the supplier to comply with the requirements of the purchase order. No deviations and/or substitutions in material, design, specifications, or operating performance are permissible unless documented by a purchase order change. Such changes are permissible for single lots if approved by the ADTRAN Non-Conforming Material Report, Waiver or Deviation process.

1.6.1 Operational Change Verification

The supplier shall notify ADTRAN when significant process changes are made to operations used in the production of a product or material purchased by ADTRAN. Examples of major process changes include a new operator, new machine, new technique, materials, and a change in sub-suppliers.

1. ADTRAN shall be notified prior to the change being made on any ADTRAN product.
2. A critical examination shall be made of the first unit(s) processed after the change is implemented.



3. Notification to ADTRAN may be in the form of a letter or email.
4. The notification shall identify the type of change, date of change, and impact to ADTRAN.
5. The notification shall be sent to the Purchasing Commodity Manger, the Purchasing Buyer and/or Supplier Quality Engineer.

1.7 Independent Distributors/Brokers (D/B)

Upon request from ADTRAN the CM may source parts/components from its D/B for use in an ADTRAN product. The follow requirements shall apply for D/B used by the CM to supply materials on the behalf of ADTRAN.

1.7.1 The CM shall obtain in writing (email, deviation, etc.) ADTRAN'S approval prior to initiating a purchase on the behalf of ADTRAN and or using the material in an ADTRAN product.

1.7.2 The CM shall have a documented program for the selection, approval and control of Independent Distributors/Brokers.

1. D/B materials shall be subjected to an incoming inspection routine with the results of the inspection documented and, upon request, available for review by ADTRAN.

1.8 Raw Material Sales (RMS) to Contract Manufacturer (CM)

ADTRAN may sell raw material to be used in the fabrication of ADTRAN assemblies. When this is required, the CM will provide a purchase order with an agreed quantity and price. The purchase order will be entered as an ADTRAN sales order and processed for shipment.

1.8.1 RMS Material Date Code Requirements

RMS material is NOT subject to date code requirements specified in Q100. Batteries, epoxies and other perishable items are subject to manufacturer shelf life guidelines. The use of Aluminum Electrolytic capacitors and Printed Circuit Boards (PCBs) will follow the below mentioned criteria.

- WVR: Blanket Engineering Waiver, denoted by a purple sticker with the letters WVR. This applies only to electrolytic capacitors in class codes 3136 & 3137.
 - ADTRAN'S Q100 document requires that all electrolytic capacitors be used within the 18 month DC threshold. However, the managers of ADTRAN'S Power Supply and Reliability groups have agreed to deviate from the Q100 requirement and grant a blanket waiver for parts whose DC falls between 18 and 36 months. No further paperwork needs to be filed for this material and they can be used in all ADTRAN products and locations.



- PCBs
 - Hot Air Solder Leveling (HASL) ≤ date code + 24 mo. (without solderability testing)
 - Electroless Nickel Immersion Gold (ENIG) ≤ date code + 18 mos. (without solderability testing)
 - Immersion Silver (ImAg) ≤ date code + 12 mo. (without solderability testing)

NOTE: Material outside these limits does not mean its scrap but its use shall be strictly approved by ADTRAN Engineering via Q100 deviation/waiver process and may require additional testing.

1.8.2 Non-Conforming RMS Material

All material used on ADTRAN product shall be listed in the ADTRAN Approved Vendors List (AVL) and be defect free. RMS is material determined to be wrong/discrepant/damaged upon initial receipt.

1. The CM shall document the finding and report the discrepancy to ADTRAN International Operations and Supplier Quality (SQ) Engineering. The report shall include the following information at a minimum:
 - ADTRAN PN
 - MFR PN
 - Quantity received and Quantity defective
 - Sales Order and Purchase Order
 - Problem description
 - Digital images of PN label and any other images helpful to problem description and root cause
2. The CM will also be responsible for filing a discrepancy report in BaaN session, "Maintain RMS Discrepancy", adsfco147m000.
3. If replacement material is NOT required, the purchase order will be credited at the same unit cost the supplier was invoiced.

1.8.3 Obsolete RMS Material

Obsolete components due to Engineering Change Orders (ECOs), changes in production schedules or AVL changes may or may not be returned to ADTRAN.

1. If the components can be consumed on other ADTRAN products, then ADTRAN will issue a purchase order to the CM for the component at the cost paid by the supplier.
2. If the components cannot be used, the CM will be authorized to scrap the material and a purchase order will be issued by ADTRAN to cover the cost of the component.

1.9 Return to Stock Materials

In conjunction with the RMS process ADTRAN may require materials to be returned as part of a buyback, purge, or ECO change. Appendix 1 provides the process flow for RTS materials.

1. The process flow is predicated on an ADTRAN representative being at the CM to approve the shipment of the product.
2. In the absence of an onsite ADTRAN representative the CM shall notify the ADTRAN Business Unit Manager or the ADTRAN International Operations



Coordinator of the RTS and provide inspection reports to the ADTRAN Supplier Quality Engineer for final acceptance of the material.

1.10 First Article Inspection (FAI) Requirements

First Articles are required for all New Product Introduction (NPI) Assemblies, subassemblies and mechanical and formed part numbers. This may include current assemblies that incur major changes in Form-Fit-Function.

1.10.1 FAI Compliance

The CM/supplier shall meet the requirements of the Bill of Material (BOM), assembly drawing(s), engineering specification(s) and Purchase Order. All dimensions are to be considered critical.

1.10.2 FAI Report

A completed ADTRAN First Article Inspection (FAI) Report form (Q110-1, page 1 and 2) shall accompany all shipments of First Article units (Identify the container or box that will contain the FAI documentation with a First Article low adhesive label).

1. The FAI report shall provide actual measurements in comparison to the specifications. A working print of the BOM and all assembly drawings shall be included in the FAI documentation package.
2. FAI documentation and shipment tracking must be forwarded to ADTRAN electronically to the following email address: FIRST_ARTICLE@ADTRAN.COM.
3. First Article units shall be properly labeled by a First Article low adhesive label. The First Article label (One per overpack) will need to be placed beside the blisterpack label. If multiple overpack boxes are used a First Article label will need to be placed on each overpack box. Each overpack box must be sent with the proper paperwork to ensure receipt and payment. A minimum of 5 units will need to be shipped to ADTRAN for first article inspection.

1.10.3 Deviations to Specifications

A request for deviation to a drawing or specification must be submitted and approved in writing by ADTRAN prior to first article submission. Once approved, the deviation must be clearly documented and attached to the ADTRAN First Article Inspection Report.

1.10.4 Review of FAI Submissions

The first articles shall be inspected for workmanship and labels will be scanned to assure proper barcode printing.

1. ADTRAN will review and approve/reject all First Article submissions. The CM may be required to re-submit First Articles based on engineering review.
2. The ADTRAN International Operations department will notify the CM of disposition of all First Articles submissions in documented form (i.e. email, fax, etc.).

1.11 PCB Impedance Testing

ADTRAN had developed PCBs that will require impedance test verification prior to production usage. PCBs requiring impedance testing will contain Test points for Impedance Tolerance verification. The following shall apply for PCBs requiring impedance test verification.



1. The CM shall perform impedance test verification prior to production, and the results of the testing shall be included in the supplier's weekly quality report.
2. For CMs performing the impedance test verification ADTRAN shall provide the CM a copy of procedure QA10-16 as a reference procedure.
3. The CM shall be responsible for ensuring that the requirements of QA10.16 are implemented within their internal testing procedures.



2.0 OTHER BUSINESS REQUIREMENTS

2.1 Direct Turnkey Suppliers.

Direct Turnkey are suppliers which ADTRAN has authorized the CM to place purchased orders, and schedule and change material deliveries directly with the supplier.

2.1.1 The CM is restricted from any interactions with the ADTRAN supplier for on cost, engineering and process changes, and quality related issues and improvements.

2.1.2 The CM shall immediately notify ADTRAN International Operations Organization of Direct Turnkey Supplier issues (delivery, quality, etc.), and include a status of the issue.

1. Notification may be in the form of a telephone message, email, or fax.

2.2 Full Turnkey Suppliers

Turnkey suppliers are suppliers listed on the ADTRAN AVL, in which the CM is authorized to purchase and receive parts directly from the supplier for use in an ADTRAN product.

2.2.1 The CM shall be responsible for addressing quality issues associated with a turnkey supplier and shall notify ADTRAN of the quality issues. Notification may be in the form of an email. The CM may be required to report the status of open turnkey supplier's issues in a formal report.

2.2.2 When quality issues directly impact ADTRAN production requirements the CM shall immediately notify ADTRAN, and include a status of the corrective actions.

2.2.3 When quality issues are not addressed in accordance with CM requirements the CM shall escalated the issue to ADTRAN Supplier Quality Engineering Organization for final corrective action and resolution of the issue.

2.2.4 Other issues that cannot be satisfactorily resolved between the CM and the supplier shall be escalated to the ADTRAN International Operations for final corrective action and resolution of the issue.

2.3 Open Source Suppliers

Open source suppliers are supplier listed on the CM's AVL and listed as a sub-supplier to the CM on the ADTRAN AVL. The CM is authorized to use the parts in the production of an ADTRAN product.

2.3.1 Initial Approval: The CM shall request ADTRAN'S approval to approach a supplier on providing an ADTRAN commodity. The CM should provide information on the supplier's capability to provide the commodity.

1. The CM shall not provide any ADTRAN'S proprietary information (documents, drawings, etc.) to the supplier without ADTRAN's approval.

2.3.2 Qualification: ADTRAN and the CM shall decide the method of open source supplier qualification. Qualification criteria shall include:



1. Supplier Capability Assessment (may be performed by CM and/or ADTRAN).
2. FAI submittal in accordance with Section 1.10.
3. ADTRAN 1st production buy-off (performed at CM and as an incoming inspection at ADTRAN).

2.3.3 The CM shall be responsible for addressing open source supplier quality issues identified during production, Finished Goods and in the field.

1. ADTRAN shall be notified of product and customer affecting issues (i.e., issues affecting the form fit, or function of a product).

2.4 Direct Fulfillment (DF) Requirements

ADTRAN is committed to offering our customers exceptional quality and service. To ensure timely shipments to its customers ADTRAN may establish a DF agreement with the supplier. When this agreement is made the supplier is ultimately responsible for product quality and safety.

1. The supplier shall ensure that only products that meet the requirements set forth in the product and this specification will be acceptable for direct fulfillments order.
2. Unless otherwise specified, prior to first DF shipment the product shall be submitted to ADTRAN in accordance with Section 1.10 "First Article Inspection Requirements.
3. Products approved for DF shall be subjected to internal supplier Out-of-Box audits.
4. To ensure that products are being shipped in accordance with ADTRAN specifications to the customer, all products are subject to audit at the supplier's location.

3.0 ADTRAN SUPPLIER CORRECTIVE ACTION REQUIREMENTS

When it has been determined that corrective action is required from a supplier, an External Supplier Corrective Action Request (ECAR) will be submitted to the responsible supplier.

3.1 Supplier ECAR Actions:

3.1.1 The supplier shall use the (10 – 20 Rule) for addressing an ECAR. (See Note 1).

- 10 business days from the receipt of the ECAR to provide immediate actions for correcting the nonconformance.
- 20 business days for submitting a final corrective action plan.

Note 1: Based on the severity of issue, the response time may change. For a customer impacting condition, the response time is 5 Business days.

3.1.2 If final root cause cannot be provided by the response due date, at a minimum the corrective action should be completed and submitted to Purchasing.

3.1.3 The final corrective action response shall include the following information:

- The initial actions taken to contain the problem



- A description of the root cause of the problem
- The proposed corrective action or solution to the problem
- The actual or planned implementation date of the corrective action
- The plans for verifying that the corrective action was effective, and
- The actual or planned date of the verification of effectiveness

3.1.4 Inadequate and/or untimely responses to ECAR will result in additional actions on the behalf of ADTRAN. Actions may include demerits to supplier performance rating, probation, and/or disqualification.

4.0 SUPPLIER QUALITY MANAGEMENT SYSTEM

ADTRAN suppliers should have an established-documented and maintained Quality Management System (QMS) which complies with the requirements of an accredited QMS such as:

- ANSI (American National Standards Institute) QS 9000 Requirements
- ISO (International Organization of Standards) 9001 QMS Requirements
- TL (Telecommunications) 9000 QMS Requirements

ADTRAN is an ISO 9001/TL9001 registered company. The ADTRAN Quality Policy may be viewed at: [ADTRAN Company Web site - Quality Policy](#).

4.1 Supplier Quality and System Certifications

The supplier shall provide ADTRAN copies of its quality and other system registered certifications.

4.1.1 At a minimum the latest version of the supplier certificates shall be provided when an update or release of the certificate is made.

5.0 SUPPLIER ENVIRONMENTAL & HEALTH AND SAFETY MANAGEMENT SYSTEM

ADTRAN suppliers should have an established-documented and maintained Environmental Management System (EMS). In addition to having an established EMS the supplier should have an established Corporate Social Responsibility (CSR) Program. The EMS and CSR program should comply with the requirements of an accredited standard such as:

- ISO 14001 Environmental management systems – Requirements
- ISO 18001 Occupational Health and Safety Management System
- ISO 26000 Guidance on Social Responsibility

ADTRAN is an ISO 14001 company, and has established a CSR program that focused on the “Sustainability” aspects of an environmental and sociability system. ADTRAN Environmental Policy and Sustainability commitment may be viewed at: [ADTRAN Company Web site - Environmental Policy-Sustainability](#).

5.1 Supplier Environmental, Health, and Safety (EH&S) Certifications

The supplier shall provide ADTRAN copies of its EH&S system registered certifications.

1. At a minimum the latest version of the supplier certificates shall be provided when an update or release of the certificate is made.

6.0 SUPPLIER CAPABILITY ASSESSMENT ELEMENTS



ADTRAN has established 25 business element requirements for procurement and for ensuring that purchased items and supplier processes conform to the product/material drawing, specification, and procurement requirements.

Note: Some business elements may not be applicable to a supplier; for example Section 6.10 "Moisture Sensitive Devices/materials" may not be applicable to a metal supplier.

6.1 Quality System and Management Responsibility

- The supplier shall have a documented quality system procedure to ensure product conformance. The supplier shall establish and maintain documented procedures for planning and implementing internal quality audits to verify quality activities and the effectiveness of the quality system. The internal audit shall be conducted at prescribed intervals with results reported at the management review.
- Resources for the implementation of a Quality Management System will be required from the supplier.
- Internal Quality audits must be formally planned, performed at pre-specified intervals and communicated to management during management reviews. The supplier must also perform formal procedure reviews at a pre-determined frequency to ensure that the documentation is current and relevant.

6.2 Development and Design

- The supplier should establish and maintain a documented product development procedure to control the design process from the initial product conception to the final product release. This procedure should include a flow chart overview of the design cycle, and the design review documentation templates.
- For each individual design project, a milestone plan detailing the development phases and their duration and design review dates should be created and agreed upon with the customer. Any modifications to this plan after the initial release must have the customer's approval.
- The initial design phase should include detailed customer specifications, including all applicable standards (those defined by the customer and those which are considered mandatory for the product given its intended use – Compliance Marking (CE), Network Equipment Building System (NEBS), etc.) and target costs. Both the supplier design manager and the customer representative should sign off. These specifications should be available to all members of the design team.

6.3 Document and Data Control

- The supplier shall establish and maintain a documented procedure to control all documents related to the requirements of the supplier's quality system. The procedure shall not only address the control of the supplier's documents, but also the control of customer supplied documents.
- The supplier shall maintain a master list, identifying the current revision status of all controlled documents.
- Pertinent and current issues of appropriate documents shall be available at the locations where the operations that impact quality are being performed.
- The supplier shall establish and maintain a documented procedure for the identification, collection, indexing, access, filing, storage, maintenance, and disposal of quality records.



6.4 Change Management

- The supplier shall establish and maintain a formal documented procedure to control elements related to the requirements of a formal change control system. The procedure shall not only address the control of the supplier's documents, but also the control of customer supplied documents (such as drawings, Specifications, etc.). The procedure shall describe the review, approval, release, distribution and revision of change documents in a timely and controlled manner.
- Engineering Change Orders (ECO) whether design / procedural, issued on a temporary or permanent basis must be adequately controlled and communicated to all affected organizations.
- Records of the changes and the results of the review of changes including any necessary actions shall be maintained.
- The supplier must have an internal process capable of transmitting applicable change (ECO) requirements from a customer to all downstream suppliers in an effective and timely manner.

6.5 Supply Chain Management (Purchasing)

- The supplier shall ensure the adequacy of specified purchase requirements prior to communicating with the supplier. The documented purchasing procedure shall include product requirement definition.
- The supplier shall establish and implement the inspection or other activities necessary for ensuring that purchased product meets specified purchase requirements.
- The supplier shall establish criteria for selecting suppliers including the quality system and specified quality assurance requirements.
- The supplier shall have a documented procedure for generating purchase orders. Purchasing information shall describe the product to be purchased, including the appropriate requirements needed for approval of product. Suppliers must also ensure compliance to special instructions that are requested by ADTRAN and be capable of flowing down ADTRAN requirements to second tier Suppliers.
- The supplier must be able to demonstrate an effective Purchase Order (PO)/material requirement process.
- The supplier must have a defined process on escalating delivery requirements with their downstream suppliers. The process must define the appropriate times to escalate and establish the steps involved.

6.6 Supplier Management

- The supplier shall establish and maintain a formal documented process to qualify vendors. This procedure shall define the criteria for the qualification/disqualification of a vendor.
- The supplier shall have a documented procedure to evaluate risk analysis and maintain the ability to communicate to management the risk within the supply chain.



- The supplier shall have a documented process for corrective action that provides feedback to suppliers on all quality and performance issues.

6.7 Receiving

- The supplier shall have a documented procedure to ensure that incoming material conforms to specified requirements prior to its usage. If incoming inspection is not required, the supplier must demonstrate adequate controls and justification in place to ensure that the qualities of the material received are acceptable.
- The supplier shall establish and maintain a specific area that clearly segregates incoming material from material already received.
- The supplier shall ensure that there is a documented process to accurately label crates, boxes, shipping containers, etc.
- The supplier must establish a process that tracks the recall and replacement of non-conforming material that is in current production.

6.8 Demand and Production Planning

- The supplier shall establish and maintain a forecasting procedure that is capable of handling the requirements placed by ADTRAN. This procedure shall define the prescribed interval to update the accuracy of the forecast.
- The supplier shall have a Material Requirements Planning (MRP) system. The MRP system shall have the ability to feed into the purchasing of materials, synchronize demand and supply.
- The supplier must have a procedure to track delivery performance on a weekly basis and maintain a feedback system on performance for its customers.
- The supplier shall have a process for capacity planning.
- The supplier must have an effective process that handles material shortages and helps prioritize and expedite a recovery effort to bring back production up to speed.

6.9 Inventory Management

- The supplier should have a documented inventory management process that addresses access control of the warehouse, the provisioning of materials that are impacted by engineering change, and excess/obsolete inventory review process.
- The supplier shall establish an inventory monitoring and management system. Whenever appropriate, the inventory items should be categorized based on their value and/or lead-time. The inventory items should be properly identified with their part number.
- The supplier should establish a mechanism to monitor the materials in their supply chain. In case of materials shortage, a proper escalation process should be in place to resolve the key shortage issue including a notification to ADTRAN.

6.10 Moisture Sensitive Devices/materials (MSD)

- The supplier shall establish a documented program as to how its handle MSD materials in accordance with the JEDEC requirements (J-STD-033).



- The supplier shall have procedures and facilities for opening, inspecting, sealing and storing packages containing MSDs in accordance with JEDEC requirements.
- Some method of dry storage facilities (dry nitrogen, dry air, and desiccant) shall be available as required in the component storage area, manufacturing assembly areas, and repair areas.

6.11 Process Control

- The supplier shall establish documented procedures defining all manufacturing steps for a product.
- A formal sign-off process is required prior to placing new equipment into manufacturing operations. Records for all process change and equipment must be maintained.
- The supplier shall establish and maintain a documented procedure to promptly advise the customer prior to transferring work to another location than that described in the quality plan or otherwise initially agreed to with the customer.
- The supplier shall develop a planned preventive maintenance system requiring procedures, predicative maintenance and replacement schedules.
- In case of components or materials that are MSD or Electrostatic Sensitive Devices (ESD), procedures must clearly indicate the process for handling, storage, packaging, transportation and review of these materials.
- Traceability for all materials must be clearly identified. This requirement includes all raw material, Work-In-Progress (WIP) and finished goods. The processes should be established in accordance with Industry procedures such as IPC-A-610, IP-PA-770, and ANSI 20.20.
- Production materials that are build up as a kit for an aggregate assembly must be tracked and controlled to ensure accuracy and completeness prior to issuance to the production floor. Verification of the work instructions, identification and part shortage issues for kits must be clearly defined.
- All points to be soldered (terminal, leads, stranded wire, etc.) shall meet the solderability requirements defined in IPC ANSI / J-STD-002 - 4.2 and 4.3.

6.12 Corrective Action and Non-Conforming Processes

- The supplier shall establish and document a system to control product that does not conform to specified requirements and ensure that the problem is contained, root cause is determined and preventive measures are established. The system should provide for identification, evaluation, and disposition of non-conforming product.
- Adequate facilities should be provided to analyze the root cause of non-conforming product. The throughput period should be agreed upon with the customer – normally two weeks. For products that have failed external to the supplier's manufacturing facility.
- A full Failure Mode Analysis (FMA) must be carried out. The quality organization must be responsible for determining the failure mode, the root cause analysis and the corrective/preventive actions taken to prevent a recurrence. Subsequent to



this, a detailed failure analysis report should be issued to the customer for each failure mode.

- All corrective action results must be made available at internal management reviews and available to the customer upon request.
- The supplier shall establish a documented Return Material Authorization (RMA) process for customer returned material.

6.13 Process Improvement Program

- The supplier shall establish and maintain a documented Quality Improvement Program to improve the quality and reliability of the processes/product. The program shall be active and contain a prioritized list of scheduled quality/reliability issues being addressed.

6.14 Inspection and Testing

- Test plans shall be documented (including a flow diagram for all inspection points) and all results must be recorded. The test plan should also include acceptance criteria for the tests and inspections.
- Inspection and testing results shall be recorded and analyzed using control charts or a similar technique as appropriate for the purpose of identifying problem areas and monitoring the effectiveness of the quality system.
- Repair or rework product shall be inspected in accordance with the defined quality plan. Repair and return products shall also be subjected to the appropriate test(s) to ensure conformance to product specification.
- Records shall be maintained to provide evidence that the inspection and testing have been completed. All inspection or testing activity shall have detailed documentation, status identification and be available for inspection personnel.
- Product should not be shipped until all inspecting and testing activities have been completed and verified as conforming to specific requirements. ADTRAN requires an out of box audit of product using an approved sampling plan per ISO 2859 – International Standards: “Sampling Procedures”. All products must have a documented test plan.

6.15 Inspection, Measuring and Test Equipment

- The supplier shall establish processes to ensure that the measurement and test equipment is acceptable for use, maintained to suitable accuracy and protected from damage and deterioration during handling and storage.
- All applicable equipment in the calibration program shall be clearly identified with necessary information to enable calibration, traceability and status.
- Measurement and test equipment shall be verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards.
- Any out of calibration measurement or test equipment shall be documented and the status shall be clearly identified. The supplier shall have a procedure to address active equipment found to be out of calibration.



- Any contracted calibration services or labs shall be accredited to the appropriate national or international standards within the industry.
- The supplier shall have a defined and effective Preventive Maintenance program that addresses all production and non-production related services and equipment that could impact the product received by ADTRAN.

6.16 Field Quality and Customer Returns

- The supplier shall establish a documented procedure to address the return and repair process. This procedure should include the movement (steps taken) of material through all operations.
- The supplier shall have the capability to track field turnaround time.
- Failure analysis should be conducted for each ADTRAN complaint and a documented FMA process must be available.
- For No-Trouble-Found (NTF) cases, ADTRAN should be notified in an appropriate manner. For cases that have been confirmed as a quality issue, a formal corrective action process should be applied to each complaint/return, and ADTRAN should be notified of the result of the FMA and corrective action plan.
- Customer returns and complaints must be recorded, and proper statistic techniques should be applied to monitor ADTRAN'S return rate.

6.17 Customer Support and Satisfaction

- The supplier must have a documented procedure for Customer Support. The procedure must include elements or sections that describe technical support, points of contact, dedicated account managers (where applicable), forms/duration of support, geographical region of support (where applicable) and a customer complaint system.
- An effective Customer Satisfaction process must be in place with well-defined metrics that quantifies customer satisfaction surveys and customer complaint response times. Suppliers must have a formal and effective customer complaint system.
- The Customer Satisfaction process must define clearly the interface with the Management Review process. Metrics such as number of complaints, response times and survey results must also be used to communicate the effectiveness of the customer satisfaction process at the Management Review.

6.18 Reliability Program

- The supplier must establish and maintain a design reliability program to predict and measure the reliability of new or modified products. As necessary the program must include the review of software reliability and reliability testing on work in process to ensure compliance. The program must also ensure that if the results do not meet ADTRAN expectations, corrective actions must be implemented. As part of this program, the product's life cycle should be determined with both the early life, Mean Time Between Failure (MTBF) and steady state failure rates defined.
- The supplier must ensure that all sub-components meet the reliability requirements specified for the products intended use. There should be documented criteria



regarding the selection process for commercial, industrial and military grade components.

- The design change procedure shall specify the reliability levels required for the individual products. When an ECO is introduced, and if ADTRAN or the supplier reliability manager deems it necessary, the reliability level should be re-assessed.

6.19 Disaster Planning and Security

- The supplier shall ensure that copies of Quality records / data / software are stored either off-site or within fireproof storage on-site. The supplier must also ensure that disaster recovery and contingency plans are documented and available for review by ADTRAN.
- Quality records shall be maintained to demonstrate conformance to specified requirements (reference throughout the quality elements where a "Record" is required).
- Emergency action plans that are approved, tested and reviewed for (fire, flood, hurricane, tornado, terrorist, etc.) must be clearly defined and in place.
- Security policies governing an employee/non-employee's access to buildings/facilities shall be clearly defined and enforced.
- The supplier shall assure that adequate security protocols (i.e., security guards, card-access, photo identification, visitor's badges, etc.) are in place for all buildings/facilities.
- Procedures shall be in place to notify Customs authorities if the supplier notes anomalies in shipments or illegal imports.
- The supplier shall ensure that policies are in place to control the following Information Technology (IT) applications: Firewall access, encryption, phone and voicemail, e-mail and virus protection. IT servers shall be backed up regularly and overall IT disaster contingency and recovery plans shall be well defined.

6.20 Environmental Health and Safety (EH&S)

- The supplier should have an effective system in place for assuring compliance to applicable (supplier and customer) legal requirements.
- The facility should have a management process, with clearly defined roles and responsibilities for managing Environmental, Health and Safety issues.
- ADTRAN customer contracts may require or encourage suppliers to establish environmental management systems, preferably certified by an accredited external registrar.
- The facility should have established health and safety programs to ensure the well-being of personnel and property.

6.20.1 Corporate Social Responsibility (CSR)

- The supplier should have agreed on a program, and communicated an explicit commitment to CSR.
- The supplier should have a common definition of CSR as it relates to their company, their sector and broader societal trends.



- The supplier should conduct regularly review progress on the company's performance against CSR goals, objectives and targets.

6.21 Training (Human Resources)

- The supplier shall establish and maintain a documented procedure for identifying and training all personnel (including temporary personnel) performing activities affecting quality.
- Appropriate records of training shall be maintained for all employees performing activities affecting quality, and will include an employee training plan, training status, continuous improvement training, re-certification status (as applicable), problem solving training and customer satisfaction training.
- The supplier shall determine the personnel resources and capabilities required, prior to accepting a customer's order or committing to a customer delivery. The supplier shall provide adequate and capable personnel resources for management, performance of work, and verification activities to satisfy order requirements.
- The supplier must have a policy that requires a background check on employees, contractors or interns.

6.22 ESD Sensitive Materials

- Ownership of the ESD process is essential and reflects on the level of management commitment. It is imperative that all employees who come in direct contact with ESD sensitive components undergo formal ESD training and re-training in order to raise ESD awareness.
- The supplier shall establish and maintain a formal documented ESD program. ESD audits at a pre-determined frequency should be performed to ensure compliance to the program. External ESD audits must be performed where necessary to ensure supplier compliance.

6.23 Order Management and Logistics

- In terms of the supply base, delivery performance must be available for feedback on supplier performance. In terms of the customers, delivery performance must be current, maintained and available for review upon demand.
- The supplier shall have an effective process for conducting root cause analysis, corrective and preventive action on missed shipments/ delivery.
- The supplier shall establish an effective process for analyzing commitments and customer notifications on customer orders when there is a change in a supply constraint.
- The supplier shall establish an effective process for notifying the customer of missed commitments when product is sourced to multiple facilities (locations).
- The supplier shall establish a process to provide a timely response to informal customer delivery requests based on priority. The same tools used in the commitment process should be used.
- ADTRAN and the supplier will communicate all critical order management, shipping and invoicing information via Electronic Data Interchange (EDI) unless otherwise agreed upon.



6.24 New Product Introduction (NPI) & Transfer Process

- The New Product Introduction process must be formalized and should establish clear guidelines on product development, testing requirements, prototype launch and production hand-off. The process shall also establish the planning involvement by the senior management team.
- The NPI process must also establish internal “metrics” to track the performance (and success) of the NPI projects. These metrics must provide one with an overview of the projects, schedules, and performance and completion rates.
- The Quality Plans established during NPI must be adequate and data collected during this phase must be maintained.
- The supplier shall establish a well-defined and documented transfer process (globally and locally), identifying (at a minimum): roles for transfer teams, a corporate knowledge base, delineation of corporate/local responsibilities and guidelines for ensuring supply chain continuity for customers.

6.25 Firmware Control

- The supplier shall establish a development environment, configuration management and change management tools for firmware.
- The supplier shall maintain defects and the defect records should be recorded in a defect management system and tracked through to closure.
- The supplier shall have documented requirements for the firmware, which have been reviewed and baseline defined.
- Where appropriate the supplier should evaluate the use of Power on Self-Test (POST) and Built in Self-Test (BIST) designed into the firmware.



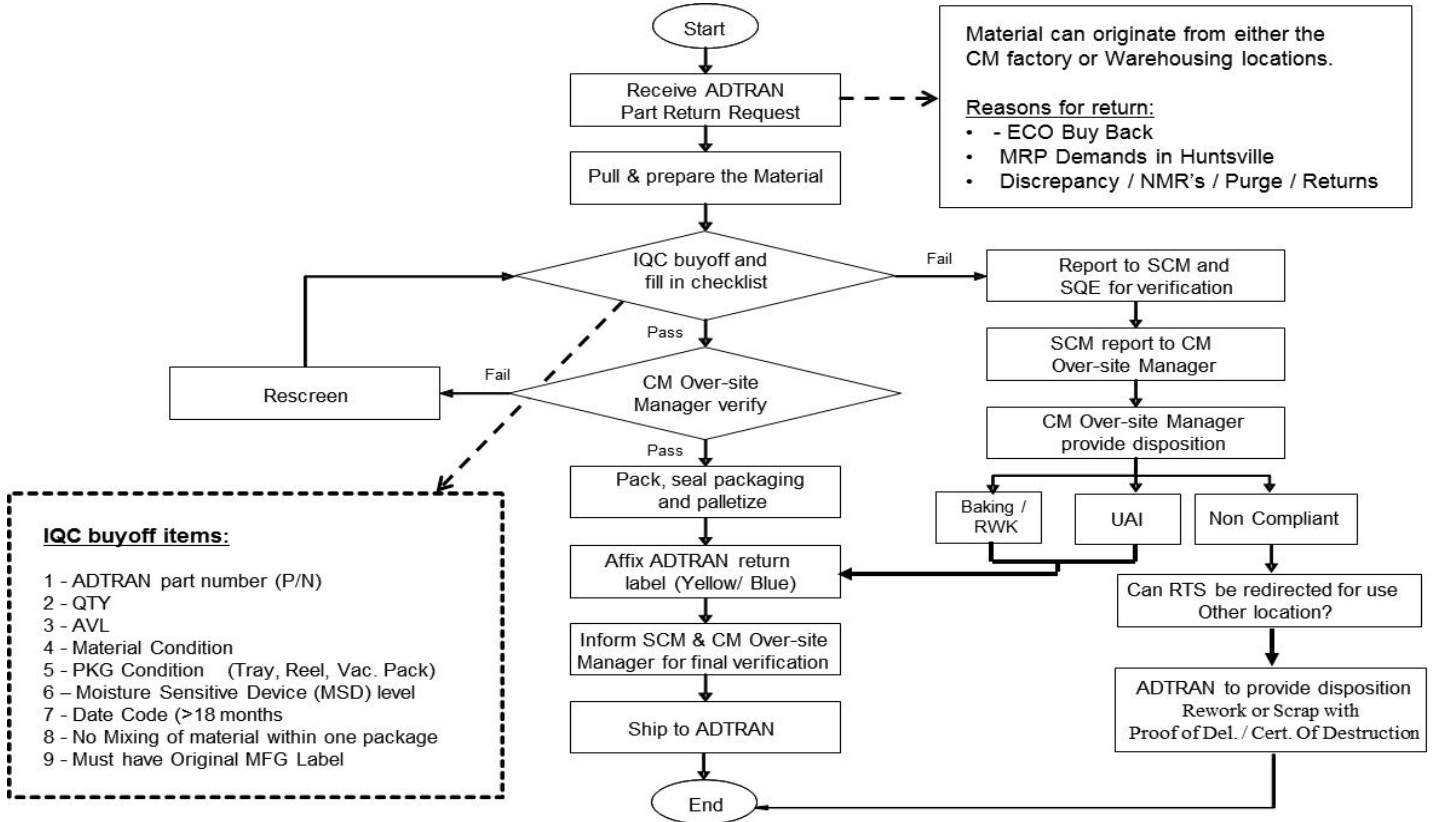
REVISION HISTORY

Revision	Author	DATE	Description
A		8/12/1997	Release
B	Unknown	9/1/2000	Revised signature line on the "Foreword" to reflect current manager. Deleted section 1.5, "ADTRAN Outsource Process Engineering Technician (OPET)," and renumbered remaining sections. In new section 1.5, removed the word "only." In section. 2.4, added "IPC-A-610 and" to 4 th paragraph. In section 2.4, 5 th para., revised sentence to reflect only the IPC ANSI/J-STD-002 procedure. Revised section 2.5, 1 st para., to clarify ADTRAN'S and Suppliers' roles in calibrating new equipment. Revised section 2.8, 6 th para. To reflect approval of alternate labels.
C	Unknown	4/21/2004	General update to Outsource Manufacturing guidelines. Specifics include a) Revised signature line on the "Foreword" to reflect current manager of Outsource Manufacturing. B) Replaced term subcontractor with Contract Manufacturer. C) Updated Section 2.0 to comply with new TL9000 requirements. D) Added section 2.2 – Contract Manufacturer Training.
D	A. Gurrero	1/19/2010	ADD, 1.7 RMS Material requirements for Contract Manufacturers; ADD, 1.8 First Article requirements for Contract Manufacturers; ADD, SQE Manager to sign-off ADD, FORM Q110-1, rev A; Change, 2.5 Process Control: "ADTRAN BOM notes or special instructions will supersede all other criteria.
E	G. Giles	04/18/2012	Document reformat; Added documentation and specification references; Updated Approvers titles; Sec 1.2 changed title from applicability to scope; Sec 1.3: extended qualification requirements to include Purchased Assembly suppliers; Sec 1.4: header from ADTRAN Quality Audits to SCA; Sec 1.6: added subsection on operational changes; Sec 1.7: new; Sec 1.9: new; Sec 2.0: new; Sec 3.0: new; Sec 4.0: total rewrite of QSM elements to include ADTRAN business requirements; Added Attachment 1 to show RTS process flow; Forms: corrected document page numbers.
F	M. Davis/ G. Giles	7/15/14	Foreword: removed Purchased Assembly Suppliers and all references (now defined in specification Q120), changed Outsourced Manufacturing and Business Operations to International Operations; Sec 1.8.1: changed requirements for inspection of Electrolytic Capacitors;. Sec 1.10: changed requirement for first article labeling; Section 1.11: new (PCB Impedance Testing requirements); Section 2.4: new (Direct Fulfillment requirements); Section 4: new (QMS requirements); Section 5: new (EMS-CSR requirements); Section 6: was Section 4, revised element 20 to include CSR requirements.



Appendix A

CM Return To Stock (RTS) Process





CM First Article Inspection Report (Q110-1)

Part No. _____ Rev. ____ Sheet ____ of ____

Part Name _____ Date _____

Contract MFR _____ Originator _____

Work Order No. _____ Purchase Order No. _____ (If applicable)

Quantity Shipped: _____ Test(s) conducted ICT FVT Hi POT Visual Inspection

ADTRAN Assembly DWGs/specification(s) used	

First Article unit(s) Serial Number			

Remarks

1st Submission 2nd Submission Tooling Rebuilt/Refurbish

Certification Of Compliance
I certify that the parts furnished on the above shipment meet all the necessary Engineering Instructions, Mechanical Specifications and Necessary Requirements, and that the above parts have been inspected by this Company. A copy of all working documentation used for verification to include deviation notices, assembly and label placement drawing(s), BOM and any other written instructions shall be included with this First Article Shipment.
Quality Manager _____ Date _____



For ADTRAN use only

Disposition: Approved Rejected Conditional Approval

Resubmission of 1st Article Required? YES NO

Remarks

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Reference Document	Zone # BOM POS#	Assembly Drawing Dimension or BOM note Requirement	Measured Actual Dimension, enter V for visual verification	Test Result PASS?	Remarks
<input type="checkbox"/> DWG <input type="checkbox"/> BOM POS <input type="checkbox"/> OTHER				<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> DWG <input type="checkbox"/> BOM POS <input type="checkbox"/> OTHER				<input type="checkbox"/> Yes <input type="checkbox"/> No	
<input type="checkbox"/> DWG <input type="checkbox"/> BOM POS <input type="checkbox"/> OTHER				<input type="checkbox"/> Yes <input type="checkbox"/> No	
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