



# SUPPLIER QUALITY ASSURANCE REQUIREMENTS MANUAL

**“SQAR”**

**Revision: AH**

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**SQM Statement:**

**Panasonic Avionics is committed to continual improvement in quality, cost, delivery, and service.**

Panasonic Avionics, a division of Panasonic North America strives to satisfy customers with quality products and services delivered on time that conform to world-class quality levels. The need and total satisfaction of our customers is our primary goal. We continually seek out competitive suppliers to enhance our ability to manufacture more effectively in order to maintain our leadership in our selected avionics marketplace. We are committed to developing long-term supplier relationships with suppliers that will ensure continual success and growth of both companies.

**Supply Chain Policy:**

- **Implementation of Global Procurement Activities**

The Company globally establishes partnerships with suppliers to respond to production activities on a global scale and works to create the functions and values our customers demand based on relationships of mutual trust and through diligent studies and cooperation.

- **Implementation of CSR (Corporate Social Resp) Procurement**

Complying with laws and regulations, social norms, and corporate ethics, the Company promotes procurement activities together with suppliers that fulfill their social responsibilities, such as human rights, labor, safety and health, global environmental conservation, information security.

<https://www.panasonic.com/global/corporate/management/procurement/for-suppliers.html>

- **Procurement Activities Working Closely with Suppliers**

In order to achieve product values expected by customers, the Company serves as the contact point of suppliers with respect to information, such as the market trends of materials and goods, new technologies, new materials, and new processes, and works to ensure and maintain the quality of purchased goods, realize competitive prices, and respond to market changes.

## Introduction

For nearly a century, the Matsushita name has been synonymous with superb manufacturing quality. Matsushita began its expansion into the field of avionics in 1979, quickly establishing itself as a market leader by being one of the first companies to market video equipment and offer passenger control units (PCUs) to the airline industry.

Matsushita Avionics Systems Corporation was established in 1979 as a wholly-owned subsidiary to the Panasonic Corporation, and in 2005 became Panasonic Avionics Corporation. Today, we are the world's leading supplier of inflight entertainment and communications (IFEC) solutions.

## Our Technology

The avionics technology that now distinguishes our IFEC solutions was inspired, in part, by the development of an ultra-thin radio that launched portable electronics. Matsushita's interest in avionics was raised when the use of surface-mount technology made it possible to build an incredibly reliable, wafer-thin radio.

The idea was to develop it as a product for use in a market where reliability, compactness, and light-weight would be particularly valuable. This beginning was the impetus for Panasonic's vision of providing IFEC solutions.

## Our Basic Business Principles

In 1929, our founder Konosuke Matsushita penned his Seven Basic Business Principles, based on his belief that success can only be achieved if all employees understand what they are doing and why. It was his desire that everyone in the organization have a sense of purpose, a clear direction, and a firm basis for tackling problems in an ever-changing world. He believed that these principles, based on a philosophy that respects nature and society, are applicable to any country in the world, at any time.

More than eight decades later, Panasonic employees around the world find these principles as relevant in our age of digital and wireless technologies as when Matsushita first wrote them. We support these principles in everything we do. All of our employees around the world aim to continually provide valuable ideas to enrich people's lives and contribute to the advancement of society through our development, manufacturing, sales, and service activities.

**Contribution to Society:** We will conduct ourselves at all times in accordance with the Basic Management Objective, faithfully fulfilling our responsibilities as industrialists to the communities in which we operate.

**Fairness and Honesty:** We will be fair and honest in all our business dealings and personal conduct. No matter how talented and knowledgeable we may be, without

personal integrity, we can neither earn the respect of others, nor enhance our own self-respect.

**Cooperation and Team Spirit:** We will pool our abilities to accomplish our shared goals. No matter how talented we are as individuals, without cooperation and team spirit we will be a company in name only.

**Untiring Effort for Improvement:** We will strive constantly to improve our ability to contribute to society through our business activities. Only through this untiring effort can we fulfill our Basic Management Objective and help to realize lasting peace and prosperity.

**Courtesy and Humility:** We will always be cordial and modest, respecting the rights and needs of others in order to strengthen healthy social relationships and improve the quality of life in our communities.

**Adaptability:** We will continually adapt our thinking and behavior to meet the ever-changing conditions around us, taking care to act in harmony with nature to ensure progress and success in our endeavors.

**Gratitude:** We will act out of a sense of gratitude for all the benefits we have received, confident that this attitude will be a source of unbounded joy and vitality, enabling us to overcome any obstacles we encounter.

This manual defines the quality requirements of Panasonic Avionics, commonly referred to by division acronyms names such as PAC or ABU. This manual applies to all current and future suppliers of material, parts, assemblies and services. The manual serves as an outline of minimal quality system activities and quality performance expectations required in the delivery of supplier parts and services. This manual shall also convey to the supplier a broader understanding in how to become an approved supplier, and additionally provides guidance for continual improvement to become preferred suppliers.

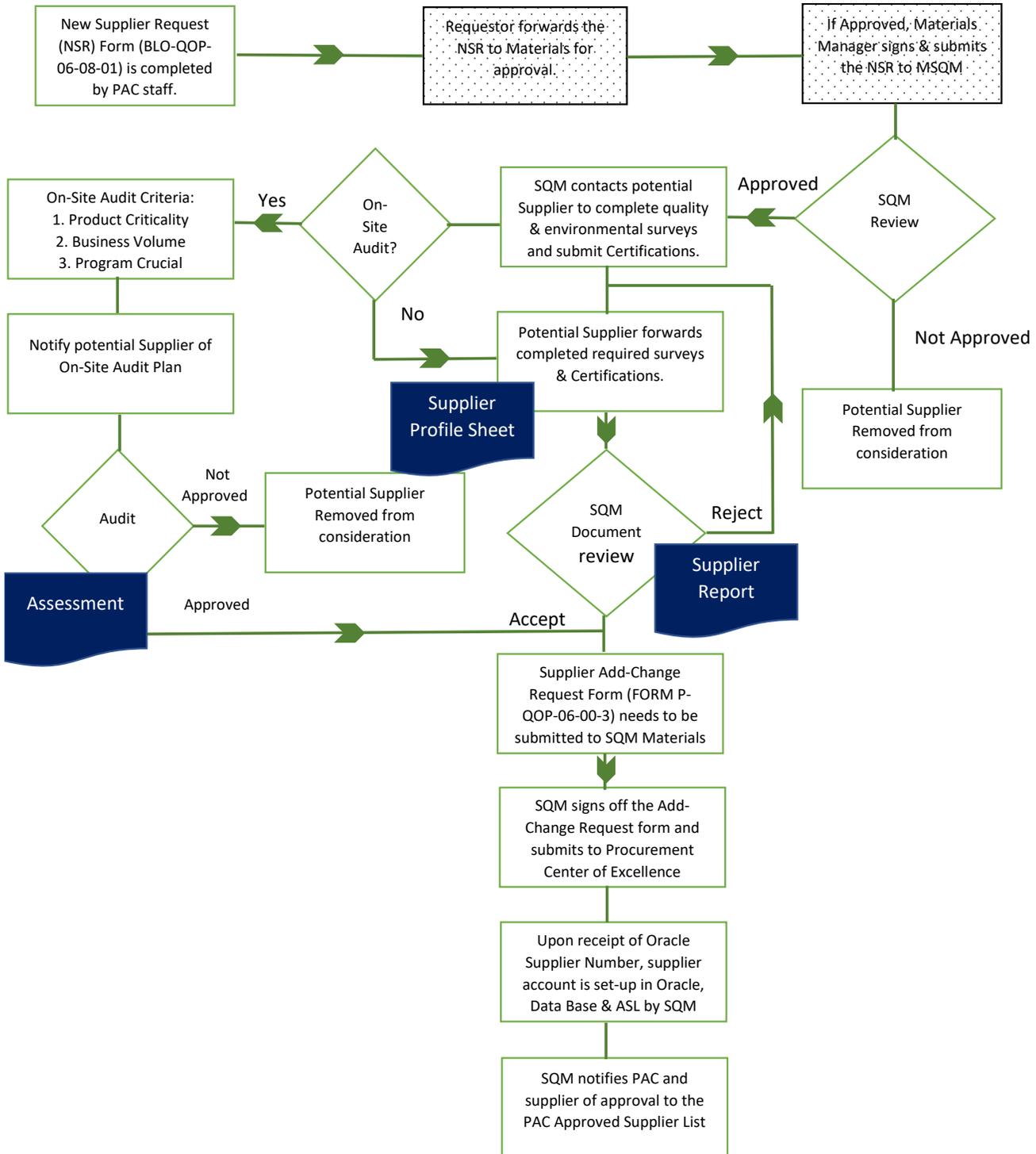
The goals of this manual are as follows:

- 1) Communicate Panasonic Avionics (ABU & PAC) expectations, common goals, and minimum requirements to all suppliers to assure the quality of the supplied parts, products or services.
- 2) Based on effective planning and communication, develop an overall plan to assure smooth production of supplied parts.
- 3) Define procedures and documents that suppliers must follow and use to assure the effectiveness of the quality system.

**Manual Administration Responsibilities**

Panasonic Avionics (ABU & PAC)	Supplier
<p>Supplier Quality Representative:</p> <ul style="list-style-type: none"> <li>● Implementing appropriate aspects of this manual.</li> <li>● Keeping the integrity and maintenance of the manual.</li> <li>● Managing the revision process and assuring that the latest revision is on the system.</li> <li>● Educating suppliers on the applications of this manual.</li> </ul> <p>Procurement Representative (ABU Procurement &amp; PAC Materials):</p> <ul style="list-style-type: none"> <li>● Ensuring Suppliers are aware of location to find latest revision of this manual.</li> <li>● Support in the education of supplier on the application of this manual.</li> </ul>	<ul style="list-style-type: none"> <li>● Maintain a Quality System that meets the general intent, as applicable, of the Panasonic Avionics SQAR</li> <li>● Controlling any internal release copies of the manual and ensuring appropriate flow down requirements to sub tier providers.</li> <li>● Understanding the content and requirements of this manual as applicable to your business.</li> <li>● Assuring all related departments or sub-suppliers are trained in regard to its guidelines and requirements.</li> <li>● Making sure that they use the forms provided in this manual. However, supplier may substitute its own forms if they receive agreement for substitution from the division contact prior to its use and ensuring the new form meets all requirements defined by Panasonic Avionics.</li> </ul>

**Supplier Approval Process  
(PAC Only)**



### 1.0 Purpose

The purpose of this manual is to outline Panasonic Avionics requirements and expectations for suppliers to assure the quality and availability of supplied parts and services on a consistent basis. This document establishes “Quality Assurance” requirements for Purchase Orders issued by Panasonic Avionics Corp (PAC) and Avionics Business Division (ABU), also referred to as Panasonic (Buyer), to all suppliers, also referred to as Seller.

**Note:** *Software Supplier Specific call-out will be notated with a “\*\*\*”*

### 2.0 Objective

The objective is to work with suppliers to achieve Panasonic Avionics goals of receiving defect-free products, on-time deliveries, and competitive costs through continual improvement of processes and product performance.

### 3.0 General Requirements

All documents including drawings and specifications, whether issued by Buyer, Industry, Government or, Buyer’s Customers are considered part of the Purchase Order requirements.

- 3.1 Purchase Order shall be to current released documents as of P.O issue date unless otherwise noted.
- 3.2 Seller is responsible for Certification of all Off-The-Shelf and Catalogue items, including testing equipment, to meet Quality and Safety requirements.
- 3.3 It is emphasized that the quality management system requirements specified in this document are supplementary (not alternative) to contractual and applicable law and regulatory requirements.
- 3.4 Seller shall use Buyer’s customer approved sources for any special processes called out or referenced on any specification, drawing, sub-level drawing or referenced technical data.
- 3.5 A Certificate of Conformance (C of C) shall be included with each shipment to Panasonic. The C of C shall include the following:
  - 1. Part number and revision, Change Notices, packing slip/shipper number, and Buyer’s Purchase Order Number.
  - 2. Shall identify Manufacturing location and/or place of origin
  - 3. A statement that all supplied products and/or services have been certified by Quality Assurance to meet all requirements, applicable drawings/specification of the purchase order.
  - 4. Shall be in English. *Note: Japan destination shipments may have Japanese and English subtitles.*

Complete inspection records shall be on file and available for review. Inspection procedures, processing and control of parts conform in all respects to applicable specifications, standards, and/or drawings. *Note: Ref. Section 8.5 for further Test Report/Certification requirements.*

- 3.6 Sellers and their Sub-Tier Suppliers shall comply with all Purchase Order requirements and its referenced documents. Seller shall flow down the requirements of this document to their sub-tier suppliers.
- 3.7 \*\* Software suppliers shall follow the release procedures, as detailed in the BL-WI-51-00-05 External Component SRR (ECSRR) Procedures document.
- 3.8 \*\* Software suppliers shall document product defects, as described in BL-WI-51-00-10 Internal Issues Tracker Procedure for Third-Party Users.
- 3.9 \*\* Software practitioners (e.g., engineering, quality, testers) shall be qualified by education, experience, and training appropriate for the criticality, complexity, customer and regulatory requirements, and other relevant attributes of the associated software product and activities.

#### 4.0 Prohibited Practices

- 4.1 Seller shall not make design and product changes, substitutions or repairs, regardless of design being controlled by Buyer or the Seller, unless approved by Buyer in writing.
  - 4.2 Seller shall not make any changes in facility and/or production line location, or significant process/service/capability changes unless the Buyer has been informed in writing prior to changes. This does not apply to efforts of incremental process improvements or clerical changes such as correcting errors on documents. Seller shall submit a Process Change Notice (PCN) for such notifications; Form BLO- QOP-06-08-11
- Note: Suppliers to ABU (Osaka) need to ask procurement departments in ABU about form.*
- 4.3 Seller shall not subcontract or relocate any work to outside of USA or outside of Japan. If seller is located in Japan, written permission must be issued by Buyer. Seller's declaration of intention shall include subcontractor's name, address, telephone number, name of Quality Manager (or designee), part name(s) and part number(s) affected by the change.
  - 4.4 Seller shall not sell or transfer any excess inventory of Panasonic to a third party without prior notification and authorization. Seller is held responsible for strict control of Buyer's inventory.
  - 4.5 Seller shall not procure products and services from unapproved sources. Seller shall have QMS supplier program to approve and control sources. Panasonic may designate sources, but seller is expected to manage per their QMS.
  - 4.6 Inspections and Audits shall not relieve Sellers and their Sub-Tiers of any issues associated with their products/services.
  - 4.7 Seller's statistical methods for product acceptance shall be in accordance with the guidance provided by AS 9138\*. Buyer reserves the right to disallow statistical methods for product acceptance.

Note 1: \* A1 table should be at a Probability of Conformance at 99.95%

Note 2: Suppliers to ABU (Osaka) need to ask procurement departments in ABU.

**Note 3:** Safety or critical parts should be reviewed and accepted prior to start of the production process.

4.7.1 The seller shall describe the applicable acceptance sample inspection process on the control plans and/or Certification of Conformance.

- 4.8** Serial numbers shall not be altered, duplicated, or replaced without prior written authorization from Buyer.
- 4.9** Products that Panasonic Avionic hold design control, the supplier shall work with Panasonic to ensure agreement has been reach on serial number assignment and control.
- 4.10** \*\* Software supplier's deliverable shall not include any software/components to the SOW that they did not develop inside their own software that is release to PAC unless previously approved by PAC.

## 5.0 References

Seller is responsible to obtain all industry relevant documents at own cost

<u>Document ID#</u>	<u>Document Name</u>
<b>ISO/IEC 17025</b>	General requirements for the Competence of Testing and Calibration Laboratories
<b>ISO 19011:2011</b>	Guidelines for Auditing Management Systems
<b>ISO 14001:2015</b>	Environmental Management Systems- Requirements
<b>AS9100</b>	Quality Management Systems- Aerospace – Requirements
<b>AS9102</b>	Aerospace- First Article Inspections – Requirement
<b>AS9120</b>	Quality Management Systems- Aerospace – Requirements for Stockist Distributors
<b>AS9115</b>	Quality Management Systems – Aerospace – Requirements for Aviation, Space and Defense Organizations-Deliverable Software
<b>AS9117</b>	Delegated Product Release Verification
<b>AS9131</b>	Quality Systems Non-Conformance Documentation
<b>AS 9145</b>	Requirements for Advanced Production Planning and PPAP
<b>AS9146</b>	Foreign Object Damage (FOD) prevention program requirements
<b>AS9162</b>	Operator Self-Verification Program
<b>AS5553</b>	Counterfeit Electrical, Electronic, and Electromechanical parts
<b>RTCA DO 160E</b>	Environmental Conditions and Test Procedures for Airborne Equipment
<b>RTCA DO 178B/C</b>	Software Considerations in Airborne Systems and Equipment Certification
<b>ATA Spec 300</b>	Specification for Packaging of Airline Supplies
<b>14 CFR Part 121.303</b>	FAA “Operating Requirements: Airplane Instruments and Equipment” (FAA Standard Handbook)
<b>14 CFR Part 145.217</b>	FAA “Repair Stations: Contract Maintenance” (FAA Standards and Handbook)
<b>14 CFR Part 145.223</b>	FAA “Repair Stations: FAA Inspections” (FAA Standards and Handbook)
<b>AS 9138</b>	QMS Statistical Product Acceptance Requirements
<b>N/A</b>	Panasonic Group Chemical Substances Management Rank Guidelines
<b>ATP-HA1000</b>	PRODUCTION UNIT ACCEPTANCE TEST PROCEDURE FOR Seat and Shipside Harness Assemblies
<b>IPC-A-600</b>	Acceptability of Printed Boards – Class 2 (latest rev)
<b>IPC-A-610</b>	Acceptability of Electronic Assemblies – Class 2 (latest rev)
<b>IPC/WHMA-A-620</b>	Requirements and Acceptance of Cable and Wire Harness Assy. (Latest Rev.)
<b>IPC 6012</b>	Qualification and Performance Specification for Rigid Printed Boards (Latest Rev.)
<b>IPC 6018</b>	Qualification and Performance Specification for High Frequency Printed Circuit Boards
<b>IPC 640</b>	Acceptance Requirements for Optical Fiber, Cable & Hybrid Wiring Harness Assemblies
<b>IPC J-STD-001D</b>	Requirements for Soldered Electrical and Electronic Assemblies- Class 2 (Latest Rev)
<b>ANSI/ESD S20.20</b>	ESD Association Standard for Development of an ESD Control Program

**6.0 Supplier Selection and Approval**

**6.1 Supplier Pre-Award Survey**

The purpose of the pre-award survey is to evaluate a potential supplier for quality requirements, financial stability, and manufacturing capability.

Once a potential candidate is identified, the Materials department will send a copy of the “Material Supplier Quality Management Survey” form (Ref. BLO-QOP-06-08-4) to the supplier. All applicable areas of the form shall be completed. Panasonic Avionics REQUIRES Seller shall have a Quality Management System registered to the AS9100 standard by an approved IAQG Certification body or as a minimum be compliant to the requirements of AS9100 standards.

Panasonic has set forth Green Procurement Standards. All suppliers are expected to establish an environmental management system and ensure comprehensive chemical substance management, as well as to expedite resource recycling, biodiversity conservation, greenhouse gas emissions reductions, and water resource conservation (as applicable). We ask suppliers to establish, maintain and improve an environmental management system based on the acquisition of ISO 14001 certification. More information can be found on this initiative at activities/green procurement.

<https://www.panasonic.com/global/corporate/management/procurement/green.html> 

Sellers located outside of USA, in place of Federal Aviation Administration (FAA) requirements, shall be compliant to European Aviation Safety Agency (EASA) and applicable National Aviation Authority (NAA)/Civil Aviation Authority (CAA) requirements.

**6.2 Supplier Non-Disclosure**

Suppliers are required to submit a signed Panasonic Avionics Non-Disclosure Agreement prior to formal Bid package submission. Panasonic Avionics Purchasing Representative is responsible for ensuring that the above requirements have been satisfactorily completed, as well as, assessing the financial risk of the potential supplier.

**6.3 Supplier Quality System Assessment**

In order to become an approved supplier, the quality system of the potential supplier must be reviewed and approved by Panasonic Avionics supplier quality representative. This may require conducting an on-site quality system audit by a team that may include, but not be limited to, Materials Supplier Quality/Project/Commodity Management and subject matter experts. The Panasonic Avionics Supplier Assessment tool shall be used is based on AS 9100 standard and Business Best practices.

Responsibilities (Panasonic Avionics and/or Avionics Business Division (ABU) :

Materials department is responsible for:

- Supporting the audit schedule.

Materials Supply Quality representative (or ABU Quality and procurement) is responsible for:

- Coordinating the audit schedule.

- Providing an audit agenda and conducting an audit.
- Issuing the final audit report and requesting corrective actions (where applicable).
- Verifying the effectiveness of corrective actions.
- Performing follow-up audits (where applicable).

Responsibilities (Supplier):

- Providing resources needed by the audit team.
- Developing and submitting corrective actions responses within 30 days of the conclusion of the audit, or as defined by the PAC corrective action report.
- Closing all findings discovered from the audit.

Panasonic Avionics may accept, as proof of a compliant quality system, a recent satisfactory survey or an audit by a mutually recognized authority. Therefore, a holder of an applicable quality system certification may not be subjected to an on-site audit provided their certificate of authorization covers the scope of material being procured.

Should corrective action be required, the supplier must develop and submit their plan for corrective action plan within the define time period specified in the corrective action request. The auditor will review the supplier corrective action plan for acceptability. Panasonic Avionics may perform a follow-up audit, if necessary, within a specified time appropriate to the corrective action commitment. If needed, a request for the extension of time must be submitted in writing to the attention of the auditor. The request for extension will be reviewed and approved at the discretion of the auditor. All findings discovered during the audit must be closed and must receive auditor approval prior to final supplier approval.

**Note:** A supplier score as “Conditional” on the PAC QMS Assessment shall not preclude a supplier from being considered as an approved source. Conditional means the supplier had one of more area of deficiencies according to the assessment but does not represent the supplier’s capabilities as a whole. Conditional scores only signify open actions exist.

## 7.0 Communication

- 7.1 All communications related to the fulfillment of Purchase Order(s) shall be carried out through the Buyer’s Procurement office or the department, which places the Purchase Order(s). Any Changes to the technical and quality requirements are not valid unless authorized in writing by Buyer.
- 7.2 Buyer’s Supplier Quality department reserves the right to contact Sellers and Sellers’ sub-tier Suppliers, per agreement of the Seller, for all quality related questions, issues, request for failure analysis, corrective/preventive actions or any other quality related concerns.
- 7.3 Seller shall promptly notify Buyer in writing, of any changes of the Quality Management System Representative, or any senior leadership changes, i.e. President or reporting structure changes that affect the Quality Organization.

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- 7.4 Seller shall notify Panasonic of any significant changes to their Quality Management System such as changes of third-party registration, and/or probationary status of third-party Quality System registration(s).
- 7.5 No awarded part contract may be moved, relocated, outsourced from the intended facility without prior written authorization from the Panasonic Material department. *Reference paragraph 4.2,*
- 7.5.1 The supplier will need to notify Panasonic if any significant changes are made in the manufacturing processes such as equipment, methods, inspection techniques, etc. (including special processes such as heat treat, plating, welding, coating, etc.); any changes in the sub-tier suppliers used to produce or service the product; any changes of location used to produce or service the product; and if so required, obtain Panasonic's approval*
- 7.6 Unless specified in a written agreement between Buyer and Seller, the Seller shall have an English language translation of their Quality Manual and top-level Procedures.
- 7.7 Buyer reserves the right to request from Seller to translate additional documents and records as deemed necessary by Buyer's customers and Buyer's regulatory agencies.
- 7.8 All Quality System Data (i.e., Certificate of Conformance) requested and/or submitted shall be in English
- 7.9 \*\* Software supplier shall ensure that they communicate at a minimum compliant to the PAC SOW requirements. This may include specified formats and durations.
- 7.10 The Supplier is responsible for ensuring that all persons are aware of Panasonic requirements as applicable pertaining to product or service conformity and product safety requirements as defined by PAC contractual documents.

## 8.0 Technical Review

Suppliers should carefully review Panasonic Avionics drawings and specifications (Hardware/ Software) to ensure that they understand and can meet all requirements. If clarification of requirements is needed, contact appropriate department in the Panasonic Avionics before submitting a quote or producing any orders. Suppliers may request a formal technical review meeting.

**Note: *Drawing clarifications (Including SCI, ATP's, etc.) are to be resolved before production parts are made. In no case shall drawings or specifications be superseded by any informal agreements. All issues that are not covered on the existing drawing(s) must be communicated through a purchase order, a revised drawing, or an approved deviation.***

*Note: Deviations: Product intended for Structures Engineering, form L-WI-04-59-02. All other product group shall use PSCR (Panasonic supplier change request: Ref. P-WI-50-03-20). Please note that product with PMA will have no deviations approved without drawing changes.*

**Order of precedence:** *if a requirement of an applicable drawing or specification is in conflict with a requirement specified herein, the applicable engineering drawing or specification shall prevail.*

8.1 *Key or Critical to Quality (CTQ) Characteristics & Process Capability*

Key Characteristics or CTQs are the key measurable characteristics of a product or process whose performance standards or specification limits must be met in order to satisfy the end customer. They align design or improvement efforts with end customer requirements, and therefore may require application of statistical measures for capability assessment and control. Special emphasis must be given to KC or CTQs and supplier quality documentation (control plan, process documentation, etc.) must consider KC or CTQs. The supplier documentation regarding KC or CTQs must be subject to review and approval by Panasonic Avionics Quality Representative.

Due to the additional control requirements (capability studies, repeatability and reproducibility, process control, etc.), KC or CTQ designations are applied selectively to ensure proper focus of supplier resources. Panasonic Avionics may specify key and/or critical characteristics, which are defined below as:

8.1.1 *Key Characteristics or Critical Characteristics (Typically noted the Engineering Drawing, SOW)*

Critical characteristics are dimensions for which reasonably anticipated variation could significantly affect the product's safety or compliance with agency regulations. The Panasonic Avionics Quality and/or Engineering Representatives may define critical characteristics.

- 1) Supplier shall review Panasonic Avionics the requirements for Supplier of Safety/Critical Components, for more clarification on requirements.

The drawings and/or documentation shall specifically identify critical features of the component. The engineering drawing identification may include ONE of these symbols, but is not limited to:



- 2) Process Control methods shall be deployed such as   SPC techniques on normal production, where applicable.

- 3) Process capability study (if required) must be approved in the Pre-production/ 1<sup>st</sup> Article stage by the Panasonic Avionics Supplier Quality Representative and maintained on an on-going basis for continual improvement.

Panasonic Avionics requires that suppliers must maintain process capability indices  $C_p \geq 1.0$  and  $C_{pk} \geq 1.33$  for both short- and long-term. Short-term capability studies are based on measurements collected from one operating run. Long-term capability studies consist of measurements, which are collected over a longer period of time. However, the data is analyzed with a control chart for evidence that the process is operating in a state of statistical control. If no special causes are found, then process capability indices can be calculated.

A minimum sample size of 30 is required. See table below for requirements.

Cp	Cpk	Process is	Actions
< 1.00	< 1.00	Not Capable	<ul style="list-style-type: none"> <li>● Process is unstable</li> <li>● 100% Inspection</li> <li>● Improve Process Variations</li> </ul>
≥ 1.00	1.00 – 1.33	Capable	<ul style="list-style-type: none"> <li>● Process is stable</li> <li>● Increased Sampling Frequency</li> <li>● Improve Process Variation</li> </ul>
	> 1.33	Capable	<ul style="list-style-type: none"> <li>● Process is stable</li> <li>● Continue to Improve Process Variations</li> </ul>

**Note:** *Panasonic Avionics may not always specify KCs/CTQ's; however, it is expected that supplier's deploy standard control practices to produce a conforming product*

## 8.2 Workmanship of Electrical & Electronic Components

Workmanship is defined as a description of the work to be performed and the codes, standards, procedures, etc., to be followed during a proposed fabrication/installation. Panasonic Avionics requires that all of its suppliers, contractors and service providers establish and maintain adequate workmanship acceptability based on the following standards \*. (\* Note: All standards Reference shall to be to current revision unless otherwise noted)

### Circuit Board Assemblies

- **IPC-A-610** Acceptability of Electronic Assemblies – Class 2
- **IPC J-STD-001D** Requirements for Soldered Electrical and Electronic Assemblies-Class 2

### Printed Circuit Board

- **IPC-A-600** Acceptability of Printed Boards – Class 2
- **IPC 6011** Generic Performance Specification for Printed Boards
- **IPC 6012A** Qualification and Performance Specification for Rigid Printed Boards - Class 2

*Note: Cross Section requirements shall be completed that represents the board's complexity. (Smallest Holes)*

- **IPC 6018** Qualification and Performance Specification for High Frequency (Microwave) Printed Boards - Class 2.

### Harness/Wire Assemblies

- **IPC/WHMA-A-620** Requirements and Acceptance of Cable and Wire Harness Assemblies – Class 2
- **IPC-A-640** Acceptance Requirements for Optical Fiber, Cable, and Hybrid Wiring Harness Assemblies

### Electrostatic Discharge Control

- **ANSI /ESD S.2020** ESD Association Standard for an ESD Control Program

As appropriate, Industry Workmanship standards for manufacturing performance shall be deployed in effort to meet the above Acceptability Standards. The Panasonic Avionics will use the above industry standards for inspection/acceptance of all electrical and electronic component assemblies unless otherwise specified in the Engineering drawing or SOW.

### 8.3 Shelf Life of Non-metallic Raw Materials and Parts

Supplier must indicate any applicable shelf life, manufacturing/cure date, or expiry date limitation on their certificate of conformance, and on all containers and packages according to applicable standards AS9100 requirements;

- 8.3.1 As applicable to Seller's products, Seller shall systematically control time, temperature, environmentally sensitive and hazardous Materials within a defined acceptable range that will include any "special" storage or handling conditions, when required.
- 8.3.2 For materials with limited shelf-life, Seller shall show on each container and also on the certificate, the cure or manufacturing date, expiration date or shelf life and lot's batch number.
- 8.3.3 It is Seller's responsibility to assure that upon delivery of age sensitive materials to Buyer, the materials will have 80% of their remaining shelf life as a minimum, unless otherwise specified.
  - 8.3.3.1 Seller shall be responsible to apply the above requirements to any in-house Vendor Managed Inventory or pre-kitted inventory.

### 8.4 Supplier Welding Requirements

*This section is not applied if the drawing, spec sheet, SOW or other documents do not request.*

Welding of supplied components shall be performed and documented in accordance with the requirements of American Welding Society (AWS). The supplier shall comply with the appropriate standard, practices and guidelines which have been written in accordance with the American National Standards Institute (ANSI). Supplier shall reference NADCAP Requirements as applicable.

### 8.5 Certifications:

*This section is not applied if the drawing, spec sheet, SOW or other documents do not request*

#### Metallic Material & Process Certification

Material Inspection Certificates from Original Raw Material Manufacturers are required to be provided for each individual heat code and must accompany each shipment from Suppliers. It is acceptable for EN10204 Inspection Certificates to have either handwritten or electronic signatures. The responsible person(s) name and position (title) must be on the Inspection Certificate. Copies of those Material Inspection Certificates shall be kept on file at the supplier's facility and are required to be retained for 20 years.

Finished Part Certificates of Conformance

**EN 10204 Type 3.1 Inspection Certificate of Conformance shall, as a minimum:**

- a) Be issued by an authority, which is independent of manufacturing (QA Department).
- b) Details specific results of inspection and testing necessary to meet the requirements of the order. This means that the products referred to as being inspected and tested are the actual items supplied and is a verification of the products and the process.
- c) Must be signed by the person responsible for document validation (QA Department).
- d) Shall identify Manufacturing location and/or place of origin
- e) Shall be in English

Certifications: Test Equipment -Safety

Seller shall provide evidence of product certification for assuring public safety and protecting the safety of consumers as defined by:

Underwriters Laboratories “UL” (USA) Certification and UL 61010-1 or UL 60950-1.

European Conformity “CE” (EU/EEA) Declaration and/or Equipment Tag to EN 61010-1 or EN 60950-1.

Seller shall contact the appropriate agency to obtain the documents which will specify proper safety procedures.

Test Reports and Certifications

- 8.5.1 Seller shall furnish all certifications, test reports and samples issued by Seller or Seller’s sub-tier sources with the initial delivery of product(s) on the Purchase Order.
- 8.5.2 Seller is responsible for verifying certifications furnished by Seller’s sub-tier sources for their adequacy and compliance to the Purchase Order and the requirements herein.
- 8.5.3 To assure adequacy and authenticity of all certifications furnished by Seller, the certifications and test reports shall include the name of the issuing organization and shall be signed by an official of the issuing organization.
- 8.5.4 Seller may provide FAA 8130 or EASA form 1 in lieu of C of C, as long as all above required data is provided.
- 8.5.5 Seller shall maintain all certifications of their products/materials for Traceability Audits. Required standards or specifications shall be referenced as applicable.

- 8.5.6 Traceability is required to trace back to a specific raw material certification/test report that represents the raw material from which each of the products was manufactured.
- 8.5.6.2 If a supplier elects to use more than one lot of raw material, they must ensure that the specific lot is documented, and provide positive traceability to each individual product.
- 8.5.6.3 Records shall be retrievable and available within a 72- hour period.
- 8.5.6.4 If parts are subject to any special processes, Seller shall furnish appropriate certificates. Required standards or specifications shall be referenced as applicable.

## **8.6 \*\* Software**

- 8.6.1 Software development should always occur in multiple phases where the requirements of each phase are to be determined by Panasonic and the Supplier. Each phase should include a formal software drop to Panasonic and be tested per testing requirements stated below.
- 8.6.2 The software supplier is required to support/develop software demos which may include the use of some/all of the following:
- QT viewer software that is supplied by Panasonic.
  - QT simulator in Qt Creator software
  - Physical simulator units with program seat hardware (this must be evaluated on a case-by-case basis, due to resource and hardware limitations)
  - Android tablet that closely matches seatback LRU HW spec (for Qt/Android and Native Android work)
- 8.6.3 Software supplier agrees to permit Panasonic to inspect all source code artifacts, documentation scripts, and test procedures at any point during the project.

## 9.0 Product Safety Design Requirements

- 9.1 Airborne Equipment (Line Replaceable Unit) and Ground Support Equipment (GSE) shall be maintained under a Panasonic Avionics part number, and must be designed, tested and qualified to the following Buyer's procedure without compromising airworthiness, safety, and reliability of Buyer's products and services:
  - 9.1.1 Product Safety and Reliability Checklist (To obtain a copy, please contact Buyer). Supplier should reference these documents to ensure their designed components / boards / products meet Panasonic's requirements. Recommended to be completed prior to Design release, but certainly by FAI (First Article Inspection)
- 9.2 Components defined as "Safety Parts" are those electrical components or assemblies used in power circuit or safety circuit, whose proper operation is critical to the safe performance of the system or circuit (To obtain a guideline of "Safety Parts", please contact Buyer). (Ref: Panasonic's Safety Parts and Operations Procedure).
- 9.3 For any design change affecting Product Safety and/or Reliability, the Product Safety and Reliability Checklist shall be re-conducted and resubmitted for review and approval by buyer.
- 9.4 Dielectric Withstand and Insulation Resistance testing shall be conducted 100% on all Airborne Equipment (Line Replacement Unit) including seat and shipside harness assemblies per ATP-HA1000 before shipment.
- 9.5 Seller must provide the following documents to Buyer's Design Engineering:
  - 9.5.1 Certificate of Conformance
  - 9.5.2 Product Specification
  - 9.5.3 Product Safety and Reliability Checklist for review and approval
  - 9.5.4 Test Data
  - 9.5.5 Schematic(s) and Gerber files, unless otherwise specified
  - 9.5.6 Bill of Material (BOM) otherwise specified
  - 9.5.7 For Commercial off-the-shelf (COTS) product, provide the compliance industry Safety standard such as, UL, IEC, EN standards and/or other standards where applicable. (Note: Supplier is required to provide any, and all industry certification documents)
- 9.6 \*\* The determination of software requirements shall include required safety requirements.

## 10.0 Prevention of Counterfeit Materials

Seller shall ensure the prevention of the use and delivery of counterfeit parts. Only new and authentic materials shall be procured through Seller's approved sources. Sellers of electronic/electrical devices shall follow the guidance of AS5553 in effort to mitigate any risk within the supply chain.

- 10.0.1 The seller, regardless of the source, must provide PAC evidence that parts are Original Component/Equipment and can authenticate traceability of the components to the applicable OCM/OEM.
  - 10.0.1.1 The seller shall alert PAC of parts without OEM traceability. The seller will be required to provide acceptable independent test certifications that verify part specification.
- 10.0.2 Seller shall immediately notify the buyer in writing upon knowledge of any potential counterfeited parts and /or supplier's delivery of counterfeited items.
- 10.0.3 Seller must have a documented process in place for handling Counterfeit occurrences and shall provide evidence of external database reporting in case of an event to GIDEP and/or ERAI

## 10.1 Positive Material Identification – Metals

Suppliers are required to ensure that all parts they provide Panasonic Avionics are made from the correct material. Positive Material Identification (PMI) requirements have become an increasingly problematic area for the industry. Suppliers will additionally need to ensure that they incorporate a PMI program on their own purchased components and raw materials that are used on Panasonic Avionics finished product.

### General Guidelines /Requirements

The purpose of a PMI program is to ensure that the correct alloy is supplied and used in accordance with design specifications.

- PMI shall be performed at the point in time that ensures that proper alloy materials have been used in the locations specified by the design.
- Supplier of designated part numbers of Alloy Material are required to perform routine PMI lot testing based on representative sampling.
- PMI verification shall not be considered a substitute for any required Metallurgical Test Reports (MTRs). PMI test results shall be kept on file.
- When specifications require that the carbon content be determined so that "L" (Low Carbon) or "H" (High Carbon) grades may be distinguished, analysis for carbon shall be conducted in accordance with ASTM E353 or by use of an Optical Emission Tester.

## 11.0 Subcontracted Secondary/Special Processes

Supplier shall maintain supplier surveys and certifications copies of all subcontracted services. Secondary special process providers are preferred to be NADCAP certified, or as applicable per contract (or Statement of Work) Suppliers of Special processes shall be qualified, listed, and under a suppliers AVL management process.

Any outside processes performed in effort to achieve the desired specification in accordance to the Panasonic Avionics engineering drawings must be disclosed if an outside subcontractor is used in both the First Article report, as well as any Supplier Quality plans.

The supplier is expected to flow-down requirements effecting the procurement of any PAC parts or Services required to provide a finished acceptable product. It is expected that the supplier will ensure any applicable requirements are imposed throughout the entire supply chain.

PAC reserves the right to review any special process suppliers.

Supplier Nadcap Requirement Note: Nadcap recognizes AS9001 Quality system approval performed by certification body approved by the IAQG and listed on the IAQG.ORG. Where no existing quality system approval exists, Nadcap accreditation would require a AC7004 assessment. The above is a requirement prior to the process certification by Nadcap.

## 12.0 Customer Owned Production Tooling, Gages, and Test Equipment

### 12.1 Production Tooling, Test Fixtures (In-Circuit, Functional) Approval and Maintenance

The supplier is responsible, at all times, for the care, maintenance, safekeeping, and proper use of Panasonic Avionics owned tooling that is in their possession. Supplier responsibilities include the prompt reporting of any loss, damage or destruction of tooling. Seller shall be responsible for ascertaining the accuracy and stability of Panasonic furnished equipment used for product acceptance. Panasonic's property also includes, but is not limited to, intellectual property, furnished information and data for design, production, testing and inspection.

Subject to the terms of the purchasing documents, the supplier may be liable when tooling deficiencies are disclosed. The supplier is also responsible for the accuracy of all tooling.

It is the supplier's sole responsibility to ensure that the tool will ultimately produce acceptable parts or assemblies. Tooling acquired or purchased by the Panasonic Avionics must be labeled by the supplier as defined by the division.

As a minimum, the tooling shall include:

- a) Panasonic Avionics Name
- b) Unique Tooling Part Number and Revision
- c) Identification of "Where used"

Such tooling may not be scrapped or relocated without written notification to Panasonic Avionics. Panasonic Avionics reserves the right to take possession it's tooling at any time if deemed necessary.

Unless otherwise specified, supplier tool changes and/or major refurbishments shall be submitted to Panasonic Avionics Materials group with quotes, if requesting reimbursement. Tools shall not be used for normal production parts or assemblies prior to its final approval. This process also requires first off-tool parts samples submission (1<sup>st</sup> Article) as described in section 15 of this manual.

Panasonic furnished equipment for product acceptance shall be periodically re-inspected and calibrated to assure continued accuracy at Seller's cost and according to Seller's Quality system unless otherwise agreed.

## 12.2 Tool Design Changes

Approved tool designs must be maintained by the supplier to the current configuration of the tools and within the requirements of the applicable design specifications. Major modifications or refurbishments must be authorized and approved by Panasonic Avionics. At contract completion, Panasonic Avionics Material group shall provide the supplier with tooling and tooling design disposition instructions. Original tool designs are considered the property of Panasonic Avionics and suppliers must provide copies of the designs upon request.

Suppliers shall notify Panasonic Avionics Materials representative when tool design modification is required. All significant tool modifications, such as rebuilds, require notification to Panasonic Materials team. Such major modifications will be required sample submission (1<sup>st</sup> Article) per section 15.0 of this manual.

## 12.3 Control of Inspection and Test Equipment:

The supplier shall assume responsibility for all required calibration needs of any tools and/or equipment. The supplier shall assign and track gauges and equipment per a structured and documented gage calibration and maintenance program. The supplier is responsible, at all times, for the care, maintenance, safekeeping, and proper use of any Panasonic issued tools and equipment, if applicable. Supplier responsibilities include the prompt reporting of any loss, damage or destruction of gages and test equipment if Panasonic issued.

12.3.1 Unless purchased or leased by Recipient, the loaned equipment shall at all times remain the sole property of PAC.

12.3.2 Recipient shall not permit any third party to obtain possession of the loaned equipment.

12.3.3 Recipient agrees to indemnify and hold PAC harmless from and against any claims arising from recipient's use of the loaned equipment.

### 13.0 Product Identification & Traceability

- 13.1 The supplier shall establish and maintain documented procedures for identifying the product by suitable means from receipt and during all stages of production and delivery.
- 13.2 Parts that have been identified as “Safety Critical” must have defined control points within the submitted Control Plan. **(Note:** Reference Panasonic Avionics Instruction; How to Write a Control Plan, P-WI-06-08-03)
- 13.3 \*\*The software Configuration identification process shall provide a method to uniquely identify software configuration items throughout the software life cycle, as defined in Software Configuration Management Plan (560000-204)
- 13.4 \*\* Prototype, incremental, or experimental software should be uniquely identified and distinguished from formally released production software.
- 13.5 \*\* The software supplier shall establish and maintain configuration status accounting documented information to review, record, manage, and conduct product configuration audit on:
  - a. the status of software, the support environment, and related hardware items;
  - b. the change requests and the implementation of approved changes;
  - c. each formal software baseline
  - d. the software releases and the differences between each release.
- 13.6 \*\* The organization shall identify the software configuration with the target system in which it is installed.
- 13.7 \*\* The release of software products shall include documentation defined in the SOW to identify software configuration and functionality, support delivery, installation, and utilization as required to satisfy customer use.
- 13.8 \*\* The software supplier shall establish and maintain a change control system for software products, which provides the capability to:
  - a. Identify uniquely the version of each configuration item;
  - b. Identify the configuration of software products and baselines during development, and upon release, delivery, or installation;
  - c. Manage access and changes to all baseline-controlled items;
  - d. Provide coordination for the updating of multiple products in one or more locations, as required; and
  - e. Identify and track to closure all actions and changes resulting from a problem report.

#### 14.0 Calibration Measuring & Test Equipment

All suppliers shall comply with the calibration system described by ISO 10012 and ISO 17025 or equivalent. Inspection gages and test equipment must be controlled as part of the supplier's "Periodic Calibration" system prior to use in production. Periodic tool inspection cycle, based on use and location, shall be sufficient to ensure accurate measurements. Specifically; Seller shall:

- 14.1 Establish a documented calibration procedure in accordance with, or as a minimum, compliant to AS9100 requirements, clause 7.1.5 "Monitoring and Measuring Resources".
- 14.2 Shall maintain a register of its monitoring and measuring devices.
- 14.3 Define the calibration process by including the details of equipment type, identification number, and locations of usage, frequency of checks, calibration methods, environmental conditions, acceptance criteria, record keeping and retention time.
- 14.4 Implement an established Inspection system, receiving through final, according to, or as a minimum, compliant to AS9100 requirements, customer specifications and applicable industry standards without compromising airworthiness, safety, and/or reliability of Panasonic's products and services.
- 14.5 If Seller is certified to EASA / FAA PART 145 and/or EASA / FAA PART 21 and/or similar regulatory approval, Seller shall establish and maintain an inspection system according to the requirements of its applicable agency.
- 14.6 Seller shall keep all inspections and calibration records available for evaluation (Audit) by Panasonic's customers and Panasonic's regulatory agencies.
- 14.7 Recipient agrees that it will not permit equipment loaned for software services to be serviced by non-PAC personnel without the prior written consent of PAC. In the event the loaned equipment requires calibration services, Recipient shall send the loaned equipment to a PAC FAA-certified airworthiness repair station at Recipient's sole cost and expense.

#### 15.0 Production Part Approval Process (PPAP)

The purpose of part approval process is to determine if the supplier has understood all design, material, and performance requirements of the part and that their process has the capability to produce required part quality on a consistent basis in normal production. The submission can be required for the following situations:

- 1) New part from an existing or new supplier.
- 2) Existing part from a new supplier.
- 3) Process or engineering change.
- 4) New tooling or modification to existing tooling.
- 5) New location for tooling or manufacturing.

### 15.1 Submission Levels

The supplier shall submit the items and/or records according to Panasonic Avionics specified submission levels. Panasonic Avionics Supplier Quality or ABU Quality Representative, with the support of engineering, is responsible for identifying the level of submission required for approval. Panasonic Avionics will communicate such requirements in the contractual Statement of Work or other formal notification, if required.

	Prototype	Submission Level		
		Level 1	Level 2	Level 3
Tooling Approval – if req'd (Section 6.1)				X
F/A Submission <u>Only</u> (n = sample size)			X (n≥1)	X (n≥1)
First Article Inspection Report (Section 15.3-4)			X	X
Control Plan (Section 15.6)			x	X
Material & Process Certification (Section 8.5)			X	X
Limit and Master Samples – if required (Section 15.9)				X
Part Marking (Section 5.10)		X	X	X
Labeling & Packaging (Section 17.0)		X	X	X
Process Capability (Section 8.1.1)				X
Process FMEA				X
Measurement Systems Analysis Study				X
Special Processes Requirements (Controls, Traceability, etc)				X

Note: Default minimum is Level 2 for all fabricated parts to PAC Eng. Drawings, unless otherwise specified

*Large "X" requires to be on-file – submission as requested; Small "x" requires to be on file Generally, Level 1 is used for standard, off the shelf parts or catalog type items from distributors, e.g. machine screws, washers, resistors, etc. Level 2 is used for all "non-critical" parts that are made to Panasonic Avionics drawings or specifications. Level 3 is used for all "critical" parts that are made to Panasonic Avionics drawings or specifications.*

### 15.2 Production Part Submission Warrant

Suppliers required to complete a Panasonic PPAP will be sent an approval form. The PPAP approval form is required to be completed and shall be included as the initial page of the PPAP package contents.

### 15.3 Prototype Submission Requirements

The purpose of prototype evaluation is to determine that the supplier can manufacture the part per the design requirements. If clarification of requirements is needed, then the supplier shall contact Design Engineering through the Panasonic Avionics Materials Representative. Supplier shall also provide feedback to Design Engineering if the manufacturing process is not capable of meeting defined design requirements.

Design Engineering is responsible for verifying supplier submitted prototype characteristics are in accordance with the drawing. The supplier and Panasonic Avionics Materials group will be notified through Design Engineering of a prototype rejection.

#### 15.3.1 Full Layout of Prototype (n ≥ 1)

Full layout of at least one sample (n ≥ 1) is required on Inspection Report with sample submission. Follow sections 15.4 for how and what is disclosed on the Inspection Report. Where applicable, identify CTQs on the Inspection report. The supplier may substitute their completed First Article form if the form is appropriate for the commodity and the above intent has been met.

#### 15.3.2 Re-submission of Samples

Prototype designs are identified by numeric revision level on the drawing. Any modification in the design at this stage causes numeric revision to change and hence requires supplier to re-submit the samples with the inspection measurements of the modified characteristics only.

### **15.4 First Article Submission Requirements**

The purpose of 1<sup>st</sup> Article submission is to make sure that samples (Pilot Run) meet all drawing requirements and all involved manufacturing processes have enough proven ability to run the part in the normal production on a continual basis. Suppliers shall not deliver 1<sup>st</sup> article samples to the Panasonic Avionics that do not meet all dimension requirements without prior approval from the Panasonic Avionics Supplier Quality Representative. Approval of samples by Panasonic Avionics does not mitigate the supplier's responsibility to continue supplying conforming parts per the drawing or purchase order requirements.

The submitted sample will be subjected to validation of results at the specific Panasonic Avionics division. The Panasonic or ABU Quality Representative is responsible for reviewing the supplier submitted measurement results with Design Engineering, validating the results, notifying supplier of a rejection/acceptance of the samples, and notifying Purchasing of a rejection/acceptance of the purchase order.

Prior to the delivery of first production product(s), seller shall provide a First Article Inspection Report documenting the results of Seller's First Article Inspection and/or Test of the product and each sub-tier component *in* accordance with AS9102, including First Article Inspection results of all sub-tier builds and components.

- 15.4.1 First Article Inspection Report shall include the following (as applicable):
1. AS9102 Forms 1, 2, and 3
  2. Copy of Panasonic's drawing with bubbled identifiers for all design characteristics
  3. ATP/Test Data when applicable
  4. Special processes Certificate of Conformance when applicable
  5. Sub-Tier suppliers' Certificates of Conformance when applicable
  6. Seller's Certificate of Conformance
  7. Raw Material Certifications
- 15.4.2 Panasonic's inspection and acceptance of a first of model or "Delta" First Article is required prior to delivery of subsequent orders or any subsequent change that invalidates the previous first article inspection result.
- 15.4.3 Panasonic reserves the right to accept or reject the First Article Inspection report.
- 15.4.4 Each First Article product shall be completely processed per Purchase Order and clearly identified as a First Article sample. If supplier is authorized to ship FA part within larger lot, then FA part must be identified within lot.
- 15.4.5 The seller shall perform a full FAI or partial FAI for affected characteristics, when any of the following events occur:
1. A change in the design affecting fit, form, or function of the part.
  2. A change in manufacturing source(s), process(s), inspection method(s), location of manufacture, tooling or materials, that may affect fit, form or function.
  3. A change in numerical control program or translation to another media that may affect fit, form, or function.
  4. A natural or man-made event, which may adversely affect the manufacturing process.
  5. A lapse in production for two years or as specified by Panasonic.
- 15.4.6 With each delivery of product(s), Seller shall maintain a copy of Seller's final inspection report(s) and/or records showing the actual results (dimensions, values, etc.) obtained by seller during final inspection of the delivered product(s).
- 15.4.7 Panasonic requires all FAIR submissions electronic via Net-Inspect.  
<https://net-inspect.com/>  
*Note: Direct Suppliers to Panasonic Osaka (ABU) are excluded from the Net Inspect submission protocol requirement*

## 15.5 **Full Layout of First Article (n≥1)**

Supplier shall provide evidence that dimensional verifications, which are required by the design and the control plan, have been completed and results indicate compliance with specified requirements.

15.5.1 The supplier shall record all actual measurements and indicate evaluation judgment on a First Article Inspection Report. Typically, this will include full layout of 1 sample minimum with strict reference to the drawing and/or specification. The layout must include all drawing notes and dimensions.

15.5.2 All dimensional characteristics and special notes from the drawings shall be identified with sequential numbers (1, 2, 3...) which corresponds to the columns on the Inspection Report. Panasonic prefers that features shall be identified starting in the top left corner of the drawing and proceed from left to right and from top to bottom, however alternative logical flow sequences are acceptable. A copy of the drawing marked with sequence numbers shall be submitted with the inspection report.

15.5.3 All critical characteristics shall be identified in the Inspection Report.

15.5.4 If required, the process capability indices (Cp, Cpk) values shall be provided. A minimum sample size n=30 is required to perform a process capability study. If lot/sample size is less than 30, then critical characteristics shall be measured 100% and measurement results shall be submitted for evaluation. In lieu of section 8.1.1, when Cp & Cpk values are less than 1.00, a corrective action response shall be submitted on the additional sheet and until such response is proven valid, corresponding characteristic(s) shall be measured 100% by supplier.

## 15.6 **Control Plan**

The control plan describes the actions that are required at each phase of the process including receiving of material, in-process, out-going (e.g. labeling, packaging, shipping, etc.), and periodic requirements to assure that all process outputs will be in a state of control.

A single control plan may apply to a group or family of products that are produced by the same process, material, and source. Some of the advantages of developing a control plan are:

- 1) It provides a structured discipline to identify process characteristics and their source of variation; therefore, it reduces waste and improves quality of products during design, manufacturing, and assembly.
- 2) It focuses resources on process and products related to characteristics that are important to end-customer.
- 3) It can be considered as a tool to communicate process-related changes between PAC and its supplier.

An initial draft of the control plan (Form P-WI-06-08-03-1) can be submitted with the submission of the 1<sup>st</sup> Article samples. However, final approval of the control plan will be given after the approval of the samples. In any case, initial/final draft of the control plan

must be submitted prior to the submission of the 1<sup>st</sup> Article sample. Using the control plan as a guide, the Panasonic Avionics division may conduct a process audit.

*Note: The supplier may use their own control plan form if responsible Panasonic quality department representative has approved in writing.*

### **15.7 Material & Process Certifications**

The supplier shall submit all material and process certifications with the sample submission. This requirement is for 1<sup>st</sup> Article and change FAI submission only and, if not specified by purchase order or drawing, may not be required for normal production shipments.

### **15.8 Sample Shipment Identification**

The supplier must identify the 1st article submission and clearly identify on the packaging or another agreed upon method as defined by Panasonic Avionics Procurement/Supplier Quality Representative. Samples are to be sent to Panasonic Avionics as defined by Procurement Representative.

### **15.9 Limit and Master Samples**

When specified by Panasonic Avionics Procurement/Supplier Quality Representative, a limit sample is required for the approval of appearance characteristics of the part. Appearance characteristics may include but not be limited to finish, color, etc. A minimum of 3 limit samples is required for approval (if requested). Panasonic Avionics Quality is responsible for reviewing the limit sample with Design Engineering and notifying the supplier of its approval. In such case, an approved sample will be kept in Panasonic Avionics inspection area for reference and the other one will be sent to the supplier.

Panasonic Avionics obtains a master sample from the approved sample shipment. The master sample represents the final approval of all processes, methods, materials, machines, and location that shall be used by the supplier for normal production. Supplier shall not make any changes to these conditions prior to receiving a formal approval from Panasonic Avionics.

### **15.10 Marking, Product Serialization**

Unless, otherwise specified in the Engineering drawing; Parts are marked in a fashion that identifies supplier's name, date of manufacturing and unique part serialization. Serial numbers shall not be altered, duplicated, or replaced without prior written authorization from Panasonic. It is recommended that the Supplier use an alpha-number format starting with Suppliers initials, Julian Date Code and unique part serial number starting with "001", when possible. When physical limitation exists on part itself, information shall be recorded on part packaging. The supplier shall use permanent ink marking.

15.10.1 **Note:** In the United States, the marking statute, Section 304, Tariff Act of 1930, as amended (19 U.S.C. 1304) requires that, unless excepted, every article of foreign origin (or its container) imported into the U.S. shall be marked with its country of origin. Goods must be marked in English.

### 15.11 Analysis of failures (supplier's manufacturing process and/or returned product)

Suppliers must analyze all failures found in supplier's manufacturing process during pre-production and 1<sup>st</sup> mass production lot even if CPK is more than 1.33. Suppliers are expected to assess all failures in effort to ensure that no potential or epidemic failure rate exist due to a design error or reliability issues. Suppliers must also analyze failures returned from Panasonic as required.

## 16.0 Production Requirements:

### 16.1 Manufacturing & Quality Requirements

In order to ensure manufacturing control, the supplier shall establish and document process standards and criteria for all aspects of the manufacturing operation. When required and appropriate, all such standards shall be referenced in an approved control plan. Any changes or improvements in process monitoring or controls necessitates an update of the control plan, and thus makes it a living document. Panasonic Avionics Supplier Quality Representatives or ABU quality departments shall approve all control plan revisions.

**Note: Suppliers to ABU must follow ABU's requirements.**

1. Panasonic Avionics recommends that a supplier review the acceptable process control methods as defined in AS 9138
2. In-process Inspection sampling plans may be used to evaluate product quality. The use of following established plans is encouraged:
  - AS 9138 for Attribute or Variable Data
3. Final Inspection shall be 100%, unless Panasonic approves an alternate plan.
4. The supplier is responsible for ensuring parts, regardless of their process sources process sources (i.e. sub-supplier or subcontractor) meet all design, drawing and specifications requirements using recognized industry best workmanship practices.

### 16.2 Cosmetic Guidelines (Molded Plastic, Metal, Painted Products/Parts & LCD)

The following reference documents shall be used to provide guidance on acceptable levels of cosmetic allowance for discrete and/or sub-assemblies parts.

- Structures Business Unit Parts – Doc. # 137845
- Antenna; LRU's – Doc # 138281

### 16.3 Manufacturing/Test Acceptance Software

The Supplier shall have a process to ensure the proper configuration control and operation of manufacturing inspection/test software (i.e. ATP) is used. Product Acceptance test software changes must be submitted, and approved through our PSCR process, unless otherwise contractually defined and mutually agreed upon between PAC and the supplier.

#### 16.4 **\*\* Software Acceptance Criteria**

- 16.4.1 All software-related deliverables listed in the deliverables section of the project requirements shall be addressed and approved by the PAC Project Manager.
- 16.4.2 All technical documentations deliverables shall be reviewed and approved by the PAC Project Manager.
- 16.4.3 The Supplier to provide QA/final test results for each software drop as defined in SOW.
- 16.4.4 Non-compliant items must be identified if the Supplier has been unable to test due to hardware/software configuration limitations.
- 16.4.5 Each new drop should include a detailed change report that describes:
  - The original issue number, issue description, issue resolution and components changed.
  - The original CRD requirement numbers, requirement description, resolutions, components changed and any deviations from the CRD with a plan for completing the requirement.
  - The amount of hours spent for each change.
  - A rev.txt file within the interactive loadable itself that details the revisions of each change and the modules that were updated.
  - A change impact analysis for each software change

### 17.0 **Packaging and Labeling**

#### 17.1 General Labeling & Packaging Requirements:

- Unless otherwise specified, bulk packaging is not permitted; all material must be individually packaged in accordance with ATA-300 Category III shipping container requirements as a minimum, with the exception of standard parts (SAE, AN, MS, NAS, AGS, JAN type hardware).
  - Individual Shipping Packages are required not exceed 35LBS whenever possible.
- Packing list that references the purchase order number, release number (if a blanket PO), part number, revision number, and shipping quantity must be included with every shipment.
- Parts must be segregated and packaged in a manner that will prevent shipping or handling damage.
- When specified, products are to be put in single (or double) plastic bags to avoid contamination.
- Each part number should be boxed/bagged separately. (Suppliers must package and ship to P.O line item quantities. Supplier cannot combine same part numbers line items in bulk shipments. Item must be packed per PO lines.

- Customs regulations state that every foreign product must be labeled, in English, with the country of origin. This marking must be:

- a.) Clearly and visibly located on the product, and
- b.) Written legibly and permanently.

#### 17.2 Packaging of Electrical and Electronic Assemblies:

The selection of materials and methods must protect the assemblies from bumping, tumbling, dropping of individual units, or groups of units in a packing container. A supplier shall as a minimum:

- a) Package ESD Sensitive assemblies in a Shielded (Conductive) bag.
  - i. Ref. ANSI /ESD S541
- b) Package Boards in transport/shipping boxes with dividers. Boards are to be in separate divider slots.
- c) No Stacking acceptable.
- d) The use of bubble pack shall be at the discretion of the supplier
- e) All PCBA shall be packaged individually
- f) Seller shall provide protection to safely maintain leads and terminals in the manufactured condition under handling and transportation environments.
- g) Deviations from the above requirements due to PCBA size and/or complexity must have the approval of the Divisional Quality representative.
- h) The use of pink poly ESD bags is prohibited for the primary ESD container.
  - a. Pink Poly” is a term commonly used to refer to polyethylene (plastic) treated with an antistatic agent to prevent triboelectric charging when in contact with other materials. Pink poly may be used only as a secondary material, but NEVER as primary material or placed in direct contact with ESDS parts/units to avoid possible contamination and/or corrosion. Amine/amide free material is required.
- i) The outside packaging containing ESD sensitive items shall have an ESD warning label. This same label shall be used to seal shielded bags.

Electrostatic Discharge (ESD) sensitive materials, assemblies, parts, components, etc., shall have a sealed conductive primary container that is ESD compliant. ESD warning labels shall be visible at the point of access. Dust caps used in conjunction with ESD material shall be ESD compliant as defined in ANSI/ESD S20.20.

#### 17.3 Documentation (Regular Shipments)

- The supplier shall provide a copy of the Certificate of Conformance (C of C) assuring that all work performed in connection with the purchase order conforms to drawing and purchase order requirements.
- Seller shall provide evidence of any applicable test reports/data/disposition for the following that is specified within an ATP, such as, but not limited to completion of:

Vibration Test completion  
Burn-In and/or any required accelerated life testing  
Dielectric withstanding Voltage  
Insulation Resistance  
Ground Bonding  
Fiber Optics testing

- Material /Process/Test Report Certifications – See Section 8.5
- If specified, provide an evidence of statistical process capability for critical characteristics.

17.4 Seller and Seller’s Sub-Tiers are responsible for all packaging related damages and failures.

17.4.1 Use of newspapers for packaging products is prohibited.

**In-Bound Product Shipment Labeling & Bar-Coding Standardization**

17.5 To ensure that all incoming product can be received, inspected and stocked in a timely and accurate manner, Panasonic Avionics is implementing the following standards for product shipment labeling & barcoding with all Suppliers & Vendors.

17.5.1 Suppliers shall ensure compliance to Panasonic Supply Shipping Label Guidelines Bulletin MSQM 101

17.5.2 All Packaged parcels must identify the quantity in each individual container.

17.5.3 While product packing slip contain more information than noted below; the following information must be on the suppliers packing slip.

**Packing Slip Requirements - Must Contain Following Information**

1. Packing Slip number
2. Panasonic Purchase Order number
3. Panasonic Part Number/Quantity Shipped/ REV
4. Purchase Order line Number
5. Tracking Number (*Packing Slip Preferred; On parcel acceptable*)
  - a. *Tracking number may not be required if supplier utilizes their own transport carrier (i.e. local company truck delivery).*
6. Barcode serial number list (for serialized parts)
7. Supplier Lot Numbers (If applicable)
8. Country of Origin must be noted (Where goods are Manufactured)
  - a. *Preferred on Packing slip, however location acceptable on other parts of parcel (Product Packaging).*

**For Sellers whose product is shipped directly to Boeing - Seller's Pack Slip shall contain the following information (when applicable):**

Sellers Name, Address and Phone Number

Sold to and/or Ship to (as applicable)

Customer Purchase Order Number and Line number

Date Parts Shipped

Part Number shown on purchase order

Part nomenclature

Unit of measure

Total quantity shipped and quantity in each container

Packing slip number

Warranty data and certification data (as applicable)

Rejection Tag (if applicable)

Note:

Bill of Lading (Required on Direct Shipments)

Multiple Boxes with the same Packing slip must reference BOX 1 OF 2, BOX 2 OF 2, etc. (as applicable). Packing slips are required on outside of box #1 and inside each additional box.

**For Sellers whose product is shipped directly to Boeing - Seller shall label all units, intermediate and shipping containers as follows (when applicable):**

Suppliers Name

Part number shown on Purchase Order

Part Nomenclature

Customer Purchase Order Number

Quantity of Part in container

Unit of Measure

Serial number

Precautionary Handling, Label or Marking as required for Safety

Country of Origin

Name and Address of Consignee

Name and address of Consigner

Box Number

Total boxes in shipment

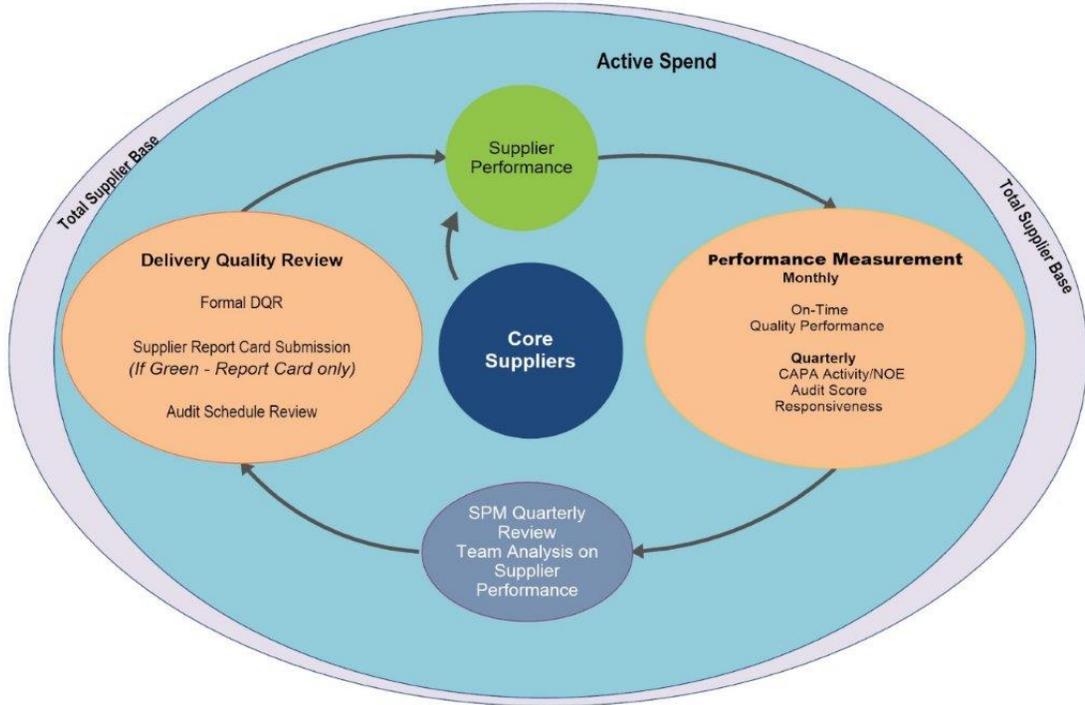
**18.0 Foreign Object Debris, Contamination, Preservation and Cleanliness**

Panasonic requires supplier to have an active housekeeping program in place to prevent any risk of FOD or Product Contamination. While we subscribe to known methodologies such as 5S, we also acknowledge other programs exist that can achieve the same objective. However, the supplier is expected to have a structured, active and effective program in place to reduce the risk of FOD and/or product contamination that meets a minimum of AS9146.

In order to mitigate product stock degradation, Panasonic requires organizations to ensure appropriate considerations have been taken in effort to maintain all original OEM product properties. Stored product should be assessed for product condition at appropriate intervals, and FIFO methodologies shall be considered. Organizations should consider an appropriate inventory management system to optimize stock rotation.

**19.0 Supplier Performance Feedback**

Panasonic Avionics suppliers will be monitored continuously based on lot/product quality, on-time delivery, and other attributes as defined by the specific division. Panasonic Avionics will periodically issue a report to “Core” suppliers that will include an overall rating of their performance. If an adverse trend in performance is detected, then actions will be taken to review the supplier’s status. If warranted, the Materials Supplier Quality department will contact the supplier to request a plan for corrective actions; such actions may include the request for suppliers to disclose internal performance data and improvement initiatives to resolve issue (s). The diagram below outlines the general process. (next page)



Panasonic Avionics Quality department has the right to redefine inspection levels where performance has improved or deteriorated. Based on overall performance or verifying the validity of the corrective actions, a supplier may be subjected to an onsite audit by Supplier

Quality. During such audit, quality and business systems, control plans, or process capability studies may be evaluated to determine a supplier's capabilities to meet performance criteria.

#### 19.1 Supplier Disqualification/Requalification

Suppliers may be considered for disqualification for reasons such as, but not limited to, breach of contract, performance issues, excessive SQAR compliance violations, PAC deemed excessive supply chain risk, etc. Additionally, suppliers who have been inactive for more than two years shall be re-qualified before a new order is placed with them. Supplier may be requested to complete QMS Assessment Survey (Form BLO-QOP-06-08-4) and submit to a Panasonic Avionics Quality Representative, who then reviews and lets the Materials Group know the renewed status of the supplier. The suppliers must submit a new 1<sup>st</sup> Article samples to be requalified for approval.

**Note: Suppliers to ABU must follow ABU's requirements.**

#### 19.2 Nonconforming Product or Material

It is the responsibility of the supplier to ensure that only conforming product is delivered to Panasonic Avionics. In the event that a product nonconformance is identified, Panasonic Avionics will notify the supplier. The supplier is required to immediately inspect, segregate, and correct similar parts within its own facilities to assure that Panasonic Avionics will not receive additional shipments of suspect product until the cause of the nonconformance has been identified and controlled. Any product rejected due to the fault of the supplier will be subjected to one of the following actions:

- Return to supplier at supplier's cost.
- 100% inspection at supplier's cost.
- Return to supplier for rework at supplier's cost.

Panasonic Avionics may issue a Supplier Corrective Action Request (see Division's SCAR Program) when nonconforming material is discovered. Suppliers shall begin to resolve issues associated with discrepant parts immediately upon identification by the Division. Issue resolution shall include as a minimum segregation of discrepant part, root cause analysis, rework, and define actions to alleviate the problem from reoccurring. Standard corrective action responses shall be requested within 30 days of its issue date unless the SCAR has specified as urgent. If an urgent and/or emergency status has been given, it's the discretion of the Panasonic Avionics Quality to assign the appropriate response time. Panasonic Avionics may rework locally any supplier error that would jeopardize production delivery dates being achieved. The supplier will be billed for the agreed upon material and labor costs associated with the rework.

##### 19.2.1 Notice of Escape

It is expected that the supplier will create a document notification to Panasonic through an internal escalation nonconformance reporting system. Additionally, the supplier shall notify Panasonic using a timely documented "Notification of Escape" (e.g. Reference AS 9131) for any product that is considered non-conforming that has been delivered to any and all Buyers. The supplier will also need to provide details of the products' nonconformance, quantities, the actual or potential extent of the severity and impact on the Panasonic's product, if known.

The Seller shall have an established written procedure that conforms to the requirements of AS9131, Quality Systems Non-Conformance Documentation, and require their sub-tier suppliers to provide advance notification to Panasonic for escaped nonconforming products and make arrangements for Panasonic approval of Seller's nonconforming material.

19.2.1.1 The advance notification of escape to Panasonic shall, by Seller and/or its sub-tier, occur immediately upon discovery of the non-conformity.

Sellers to provide notification within three (3) days of known or suspected nonconformance escapement discovery at a minimum and within 10 days of discovery for formal notification.

**Note:** *Product related to COMAC C919 production, notification must occur within one (1) day.*

The advance notification shall include details of product information, nature of nonconformity, manufacturing date lot and part traceability information to the point of Origin, containment plan and actions in all locations and en route.

19.2.1.2 If an issue is identified, which might cause any aircraft Certificate of Airworthiness to be revoked because of an alleged defect of the Product, Seller shall, under the supervision of Panasonic, undertake all necessary actions to remedy such situation. Such actions may include, but are not limited to the development of modifications, inspections and repair solutions, including providing additional Parts, for new and in-service aircraft. Notwithstanding the above, if a possible unsafe condition is identified, Seller shall immediately notify Panasonic of the unsafe condition.

19.2.2 MRB Authority – Panasonic owned IP

At any level, the decision of safety, reliability, impact to next assembly, or deviation (from design) cannot be made by the organization. The organization shall provide timely contact to the PAC for their assistance.

The supplier will need to obtain the Panasonic's disposition of the products' nonconformance or Panasonic will need to provide an approval for the supplier to disposition the product(s)

19.2.3 Seller Safety Issues

Original Equipment Manufacturers (OEM) and Maintenance Service Providers shall inform Panasonic of safety incidents as they fall within the definitions stated below, discovered during the repair/maintenance of Seller's products.

Repair/Maintenance of any product identified with a safety related failure as defined by the below alert factors shall be stopped and the unit shall be quarantined for root cause analysis and corrective / preventive measures.

**Definitions/Alert factors:**

19.2.3.1 **Product Integrity** – The assurance that Seller’s product does not compromise personal safety and/or equipment safety

19.2.3.2 **Product Incident** – Any incident that indicates a product may or could be unsafe. Potential incidents to be reported may be determined by the following alert factors:

- Personal injury of any nature or death;
- Fire
- Smoke emanating from, in, or on a product
- Electrical shock
- Visible sparking from or in a product
- Explosion or implosion of a product
- Leakage of any chemical substances from a product
- Unusual wearing of, deterioration of, or stress upon a product or any component of a product
- Accumulation or circulation of toxic or noxious gases
- Emission of X-ray radiation, Ultraviolet Rays, Infrared Rays and Radio Frequency Energy
- Evidence of burnt or charred components
- A condition which, in the opinion of the person initially receiving a report or learning of the incident or potential defect leads to the belief that there could be an event or defect that could involve a safety problem.

19.2.3.3 Panasonic shall be informed of the safety related failure so a Product Incident Report (PIR) can be issued to the Product Safety Officer (PSO).

19.2.3.4 A Tear Down Report (TDR) shall be issued to Panasonic’s procurement agent identifying the safety related failure including detailed photos, root cause, corrective and preventive action before the unit is processed for repair

19.2.3.5 Panasonic’s Product Safety Office shall disposition the unit after the TDR is issued and deems the incident closed.

19.2.4 **Failure Analysis Report Request**

It is important to note that the Non-Conformance Report (NCR) coded with a Resp. Code 005/205 has been identified as Supplier Responsibility. As part of the disposition process, an FA box may be checked “Yes” which is located on the bottom right of the NCR. If this exists, Panasonic is requiring a Failure Analysis report on the non-conformance. It is expected that the Supplier conduct a formal investigation and provide a Failure Analysis report. The report shall include any objective evidence to support the analysis and associated corrective actions. The Failure Analysis report shall be submitted within a time frame requested by Panasonic.

If you have a standard Failure Analysis process, please make sure the reports are titled “Failure Analysis Report” which is preferred. A supplier may also choose to utilize a common 8D approach in the standard corrective action system, but it should be clearly

noted that the response is supporting a failure analysis report request. The identification of the report is important to our Supplier Responsiveness tracking.

Please copy the following Supplier Performance Engineering team when sending the Failure Analysis Report.

### **19.3 Supplier Request for Waiver/Deviation**

Supplier can make a request to Panasonic Avionics to accept the product with a minor waiver. However, the Supplier/seller shall understand that once Panasonic gets PMA approval on product, we can no longer accept part not complying with the drawings unless engineering agrees to change the drawing and we get approval for the change.

A submitted waiver should not affect form, fit, or function of the product. Requests will be considered only for unusual circumstances. They will not be accepted on a routine basis.

19.3.1 Request must be made by completing and submitting “Waiver/Deviation Request for Non-conformance”. Corrective actions must be provided to prevent recurrence.

19.3.2 Additional Lots with the same discrepancy will not be accepted without prior approval of the Supplier Quality Representative. If a certain characteristic is impossible to meet, then supplier shall request Design Engineering to revise the drawing by issuing a deviation. Deviation is a written authorization to depart from the originally specified requirements of a product prior to its production. The supplier must secure approval in writing prior to delivering a shipment to Panasonic Avionics.

19.3.3 The acceptance or rejection of deviant material or characteristics is at the sole discretion of Panasonic Avionics.

### **20.0 Supplier Process, Material, and Subcontractor Changes:**

All processes, tooling, machines, and/or layouts that were used on the approved submitted samples shall not be changed or modified without an approval from Panasonic Avionics. It is the responsibility of the supplier to keep the entire process the same as it was on the approved submitted samples. Examples of Panasonic Supplier Change Request (PSCR) may include, but are not limited to:

- Material change (including those not originally specified on the drawing).
- Subcontractor and/or its process change.
- Dimensional Specification Issues

A PSCR (or advanced notice such as PCN) is not required for relocation of small tools, jigs, fixtures that are not part of the main production line and do not affect process or part quality. Such notices are also not required for regular replacement of perishable tools (e.g. drill bits, weld tips, etc.) or preventative or predictive maintenance.

It is the responsibility of the supplier to give Panasonic Avionics enough time to evaluate the request for approval prior to making a change. Time duration can vary depending on complexity of change request, PMA status, and other factors including workload demand. A submission

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does not constitute that any approval will be granted. Initiate PSCR by completing (Form P-WI-50-03-20-1, 2) and submitting to Panasonic Avionics Purchasing Representative. Supplier will be notified of the status of the request. Panasonic Avionics holds the right to reject any shipment from the unapproved process.

## **21.0 Acceptable Signatures**

- 21.1 Only actual signatures rendered in ink by the signing official, a facsimile of an actual signature, electronic signature (i.e. Acrobat® digital signature) or a machine or computer graphics generated facsimile signature are acceptable to Panasonic.
- 21.2 Seller may use a quality inspection stamp in lieu of a signature, providing such stamp(s) identify the Seller and the Seller's authorized individual to whom the stamp is assigned, and that the issue, use and control of such stamp(s) are governed by Seller's documented procedures.
- 21.3 For computer generated certifications, Seller shall establish a documented system for control of certifications that do not bear original signatures or where name(s) of authorized official(s) are computer generated. This system may be verified on-site by Panasonic's quality representative.

## **22.0 Production Records Requirements**

- 22.1 Unless otherwise approved by Panasonic in writing, Seller shall retain all required records for a minimum of Twenty (20) years after completion of the last installation of parts/services or the life of the product, whichever time period is longer.
- 22.2 The record retention requirement applies to all Suppliers that have accepted a Purchase Order from Panasonic.
- 22.3 The related documents and records include and are not limited to: Design, Procurement, Resources, Materials, Manufacturing, Testing, Processing, Inspection, Audits, Preservation of Products, packaging, Shipping Certificates, Panasonic APQP/PPAP's (SQAR Level 1-3) and records of Seller's sub-tier suppliers.
- 22.4 If a Seller is no longer holding "Approved" status with Panasonic, all above mentioned documents shall be submitted to Panasonic's procurement agent upon termination of business relationship within Thirty (30) days or sooner, depending on urgency of the request.
- 22.5 Seller's record retention system shall include appropriate controls at Seller's sub-tier sources, showing the date, lot #, serial number, revision letter, or other positive identifications that provide objective evidence of incorporation of all changes in product(s) and process(s). Such records shall be subject to verification by and shall be available to Panasonic for review upon request.
- 22.6 Seller's shipping records shall include packing slip, certification of conformance (which can be included as part of the packing slip), evidence of Seller's product acceptance and all purchase order requirements.
- 22.7 Based on written mutual agreement, Panasonic can maintain the records for Seller if Seller is unable to hold the records for the minimum requested retention time.

## **23.0 Right of Entry**

- 23.1 The Seller and its sub-tier suppliers shall allow representatives of Panasonic, the Federal Aviation Administration (FAA), European Aviation Safety Agency (EASA), National Aviation Authority (NAA), other applicable regulatory agencies, and Panasonic's customers to conduct audits and verify the quality of work, records, and materials at the Seller and its sub-tier suppliers' location(s).
- 23.2 Use of Panasonic specified sub-tier sources does not relieve the Seller of compliance to all applicable technical and quality requirements for products/services provided to Panasonic.

## **24.0 Source Inspection, DPRV, and Operator Self-Inspection**

### **24.1 Source Inspection**

When source inspection is required, Seller shall notify Panasonic sufficiently in advance of the availability of product for source inspection so that it can be scheduled at Seller's facility prior to the Purchase Orders' specified delivery due date.

Seller's measuring, testing or any other required equipment(s)/tool(s), facilities, and personnel shall be made available for use by Panasonic's representative when requested during source inspection.

### **24.2 Delegated Product Release Verification (DPRV)**

PAC suppliers that have shown a high capability in the systems and processes used to control supplied product, may be delegated authority to verify that the parts or services they provide meet all specified requirements. The process is known as the Delegated Product Release Verification (DPRV) process

Supplier shall understand that the Delegated Product Release Verification (DPRV) is a process whereby a supplier is delegated the authority to act on behalf of Panasonic Avionics to verify and release products/services.

The DPRV inspections shall be performed on each release of product. DPRV shall be performed after final inspection, as close to shipment as practical; conducted as an independent process by someone other than the person who performed the final inspection, unless waived by Panasonic.

The DPRV shall consist of, but not limited to:

- 24.2.1. Confirmation that product conforms to Contract / purchase order.
- 24.2.2. Documentation review.
- 24.2.3. Verification that all required product realization operations and inspections are complete.
- 24.2.4. When applicable, verification that product nonconformance has been properly documented and processed, in accordance with Panasonic contractual requirements.
- 24.2.5. Verification that Panasonic's requirements for First Article Inspection (FAI) and/or Production Part Approval Process (PPAP) have been satisfied.

- 24.2.6 Physical product verification, including verification of product marking/identification and visual examination. DPRV shall validate special requirements, critical items, and key characteristics were identified by Panasonic.
- 24.2.7 Sampling plans for product verification may be used with approval from the Panasonic.
- 24.2.8 Shipping / release documentation.

24.2.8.1 DPRV personnel shall validate and record the completion of the verification activity. When required.

Panasonic may provide a Delegated Product Release Verification Checklist to document completion of the DPVR validations, otherwise the supplier can utilize their own checklist to satisfy Panasonic's DPRV process criteria.

Specific stamps, identification numbers, etc. shall be used for product release.

Product and/or documentation nonconformances detected during the DPRV process shall be processed in accordance with Panasonic nonconformance and corrective action procedures.

#### 24.3 DPRV Maintenance

Suppliers with delegated authority for inspection will be subject to periodic Product Verification Audits to monitor on-going compliance with requirements.

DPRV programs shall follow the baseline requirements as defined in AS 9117 - Delegated Product Release

Panasonic maintains the right to inspect any product upon receipt or at any other time, due to criticality or any other factor, or cancel the program at any time.

#### 24.4 Operator Self-Verification Program

If a supplier utilizes an Operator Self-inspection program, the supplier shall comply with the requirements set forth in industry standard AS9162 "Aerospace Operator Self Verification Programs. PAC reserves the right to independently conduct a surveillance audit on such program. (Ref. Section 16 Requirements)

### 25.0 Corrective and Preventative Action

- 25.1 Seller shall not ship any nonconforming product(s) to Panasonic without written approval.
- 25.2 Per Panasonic's prior approval, any product(s) found to be nonconforming to Purchase Order or other applicable requirements at Seller's facility, shall be documented by Seller and submitted to Buyer for disposition by Buyer's Material Review Board (MRB).
- 25.3 In case of Panasonic receiving non-conforming materials from the Seller, or Panasonic's discovery of product field failures, malfunctioning products, or request from Panasonic's customer(s), Panasonic may request from the Seller to conduct a formal investigation and provide failure analysis reports with objective evidence to identify the root cause(s) of the non-conformities within a time frame approved by Panasonic.
- 25.4 When deemed necessary by the Panasonic, the Seller shall provide a Corrective and Preventive Action (CAPA) report with verifiable documents that include implementation and target dates, for nonconformities reported by the Panasonic to Seller.

25.4.1 If a seller receives formal request for a correction actions response (SCAR); the supplier is expected to utilize basic problem-solving methodologies to determine root cause. Quality tools are expected to be deployed to resolve issues. Methods such as 5 Why's is expected to find root cause, and an 8D methodology is encouraged to track CAPA progress.

25.5 Per request of Panasonic, Seller shall take immediate action to implement and document below requirements on CAPA report:

25.5.1 Detailed Description of Nonconformity

25.5.2 100% Containment of suspect parts/products/raw materials at all locations and in-transit

25.5.3 Immediate Recovery Plan

25.5.4 Root Cause Analysis of Non-Conformities / Determination of Failure Modes

**Note:** Supplier is strongly encouraged to deploy industry accepted Quality tools to find root cause. Evidence of such techniques shall accompany CAPA report.

25.5.5 Corrective Action Measures

25.5.6 Preventive Action Plans

**Note:** Poke-Yoke plans and/or preventative actions shall be noted

25.5.7 Verification Method(s)/Technique(s) to Confirm Effectiveness of Corrective and Preventive Action(s)

25.6 Product(s) rejected by Panasonic and resubmitted by Seller shall be clearly identified as re-submitted product(s) and must also be documented on Seller's shipping documents that product(s) delivered are either "replacement" or "reworked" product(s).

25.6.1 Seller's documents shall include reference to Panasonic's rejection document number and Seller's copy of corrective and preventive action report.

25.6.2 This is also applicable to any rejections noted by Panasonic's source inspector on inspections performed at Seller's facility.

25.7 Collaboration Model of Purchasing/CAPA process (Fig. 1)

**Note: Suppliers to ABU must follow ABU's requirements.**

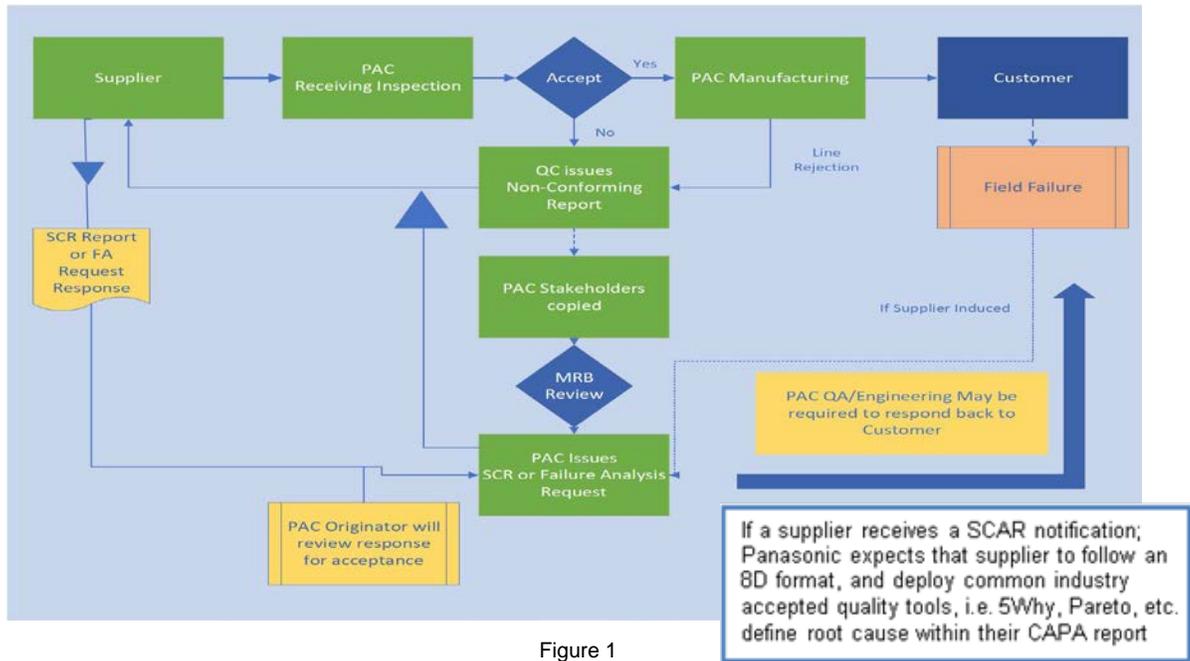


Figure 1

25.8 \*\* Software Impact Definitions & Response Time

Service requests for problems received by the service provider will be given a Severity Code based on how critical the problem is. The Impact Code will be the basis for scheduling work on the backlog and assigning resources to the request.

The impact code is determined as per the table below based on Frequency and Severity:

		Severity		
		High	Medium	Low
Frequency of Occurrence	High	Critical	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Planning

Below table outlines the service ticket levels and respective initial response time and target resolution time.

Description	Initial Response Time	Target Resolution Time
Critical	Immediate	4 Hours**
High	1 Hour*	8 Hours**
Medium	4 Hours*	24 Hours**
Low	8 Hours*	48 Hours**

Time notated with an asterisk (\*\*\*) will be considered business hours.

## 26.0 Change of Charges

26.1 If seller is not in agreement with Panasonic’s determination of root cause(s) of the rejection(s), Seller can submit a request for Change of Charges (COC)/ Responsibility to the Panasonic’s initiator within 20 business days from the date of notification. Submission alone will not remove supplier responsibility; only an PAC “Approved” Change of Charge form will remove supplier responsibility. For Japanese suppliers, refer to the contract.

## 27.0 Annual Internal Audit

27.1 Seller shall conduct Internal Audits in accordance with AS9100, clause (9.2.2) Internal Audits, at least once a year.

## 28.0 Annual Management Review

28.1 Seller shall conduct Management Reviews in accordance with AS9100, clause (9.3) Management Review, at least once a year.

## 29.0 FAA Anti-Drug and Alcohol Misuse Prevention Program (applicable to USA suppliers)

29.1 FAA approved Anti-Drug and Alcohol Misuse Prevention program is required for those groups/companies located in USA that perform maintenance on aircraft and aircraft parts/LRU’s.

29.2 The Drug and Alcohol testing program rule applies to Sellers that are under contract to supply work or services or parts to Panasonic. It is also the Seller’s responsibility to flow down these requirements to their sub-tier supplier(s).

**Note:** “The certificate holder (FAA Air Agency) certifies that it will comply with the requirements of 14 CFR Part 121 appendices I and J and 49 CFR Part 40 for its Anti-drug and Alcohol Misuse Prevention Program”.

### 30.0 Environmental Health and Safety Management System

- 30.1 Seller shall have an Environmental Management System (EMS) according to, or as a minimum, to be in compliance with Local, State, and Federal requirements. Programs are preferred to be structured and comply with ISO 14001.
- 30.2 Seller shall have an active Facility Employee Safety program that complies with Local, State and Federal requirements such as OSHA. Such program shall be in good standing. Safety programs are recommended to be in compliance to a structured program such as OHSAS 18001.

### 31.0 Environmental/Chemical Substance Management

- 31.1 Seller and its sub-tier suppliers shall adhere to Environmental Policies and implement control of Chemical Substances, as listed in Table 1 of Chemical Substances Management Rank Guidelines, that comply with global and Panasonic's requirements without compromising airworthiness safety and reliability of Panasonic's products and services.
- 31.2 Sellers and Contractors shall comply with 29 CFR 1910.1200 and 1926.59. Contractor shall provide (email) Material Safety Data Sheet (MSDS) to the Safety Department at [Safety.Security@panasonic.aero](mailto:Safety.Security@panasonic.aero) prior to first shipment for each chemical, flammable and compressed gas brought into the facility. Upon review and approval, the MSDS shall be given to the Safety Manager to scan into the intranet file for MSDS's. (Not applicable for Japanese suppliers)
- 31.3 Sellers shall electronically register to Panasonic's "Gp-web", Green Products Website, data base to receive a password ID.
- 31.4 Upon receipt of the password ID, Sellers are responsible to register all materials and products that are furnished by them to any of the Panasonic's facilities at: <https://eww.qpscmn.panasonic.co.jp/prtl>
- 31.5 Sellers will be evaluated based on their adherence to Panasonic's environmental requirements.
- 31.6 Sellers can access the latest version of Panasonic's Environmental Policy and requirements at: <http://panasonic.com/global/corporate/sustainability/eco.html>

For current version of Chemical Substances Management; Reference **Chemical Substance tab**

Green Procurement

- Level1: Substance contained in products that is prohibited.
- Level 2: Substance not in Level 1, but will become prohibited
- Level 3: Any substance that is under review for prohibition by legislation

If there are any questions or seller has concerns about product in any levels, contact the Corporate Environmental Compliance Group at: [EnvironmentalComplianceGroup@panasonic.aero](mailto:EnvironmentalComplianceGroup@panasonic.aero)

For Japanese suppliers, contact ABU Engineering Administration Group at:

- [pn-request@panasonic.aero](mailto:pn-request@panasonic.aero)
- 31.7 Sellers should have in place a Conflict Minerals policy when applicable. Sellers should have available to the Panasonic the EiCC/Gesi template or equivalent when requested. Sellers should when possible only buy 3TG minerals that are conflict free.
- 31.8 Sellers shall meet the requirements of the European Union Waste Framework Directive and where applicable register parts or complex objects into the Substance of Concern in articles, as such or in complex objects (Products)(SCIP) database. The SCIP database requires importers of articles or complex objects to register those articles if they contain a substance of Very High concern above the threshold of .01% and their downstream suppliers

### 32.0 RoHS Certification of Compliance

- 32.1 Panasonic Avionics Corporation (PAC) is committed to protecting the environment and complying with the European Directive (EU) regarding the Restriction of Hazardous Substances (RoHS).

PAC is requiring all suppliers to provide a RoHS C of C with all shipments of parts being delivered to PAC. The RoHS C of C should be included with all other documents provided with shipments. The RoHS C of C can be combined into a standard part C of C, it does not need to be a standalone document.

The format of the C of C is up to the supplier, however must contain the following:

- ✓ Supplier Company name/Logo
- ✓ Part Number
- ✓ RoHS Status (compliant, Non-compliant) reference Eu RoHS directive
- ✓ Any RoHS exemptions, identifying exemption number
- ✓ Signature of company representative and date

### 33.0 Information Security

Suppliers shall implement effective information security programs in orders to handle and manage customer information, personal information, and information assets such as technologies, quality, products and services provided. Suppliers shall formulate policies concerning information security and disclose them on the website or in any other means. In addition, suppliers shall conduct risk assessment and take corrective measures by establishing management systems.

The organization is expected to assess internal systems, monitor and improve information systems to ensure adequate data protection exists.

[https://www.panasonic.com/global/corporate/management/procurement/for-suppliers/pdf/securitystandard\\_e.pdf](https://www.panasonic.com/global/corporate/management/procurement/for-suppliers/pdf/securitystandard_e.pdf)

As a recommendation, suppliers should consider alignment with the ISO 27001 standard—the internationally applicable Information Security Management System

### 34.0 Business Continuity

The supplier shall have a business continuity plan which would allow for the safeguarding, storage and recovery of engineering drawings, electronic media, and production tooling in the event of damage or loss. The plan should include plans to satisfy Panasonic requirements in the event of significant natural disasters, labor disruptions, and other major equipment or facilities issue that would risk product quality or delivery performance.

### 35.0 Forms & Appendixes (Separate Attachments):

ID #	TITLE
FORM BLO-QOP-06-08-1	Materials Supplier Quality Management (MSQM) Request for New Supplier
FORM BLO-QOP-06-08-3	PAC On-Site Supplier Assessment
FORM BLO- QOP-06-08-11	PROCESS CHANGE NOTIFICATION
P-WI-06-08-03-1	Control Plan Methodology
Work Inst. P-WI-06-08-03	CONTROL PLAN
FORM P-WI-50-03-20-1	PANASONIC SUPPLIER CHANGE REQUEST
FORM P-WI-50-03-20-2	PANASONIC SUPPLIER CHANGE REQUEST (checklist)
FORM L-WI-04-59-02	REQUEST FOR DEVIATION, WAIVER OR DRAWING CHANGE
FORM L-WI-48-10-02-1	Supplier Environmental Management System Survey
MSQM 101	Panasonic Supply Shipping Label Guidelines Bulletin

**Note: Suppliers to ABU will need to contact the appropriate Quality representative for compliance instructions and/or process forms.**

### 36.0 Revision History

REV	DATE	DESCRIPTION	SECTION/PAGE	AUTHOR	MANAGER
NEW	03-Jul-06	Initial Release (Replacing SQAR-2 and -3)	N/A	Peter Shaybani	Sandra Stipp
A	11-Aug-06	Added EN to AS9100; Added note about suppliers outside of USA.	Sec. 3/P. 4	Peter Shaybani	Sandra Stipp
	11-Aug-06	Modified Paragraph to include EASA requirements.	Sec. 10/P. 5	Peter Shaybani	Sandra Stipp
	11-Aug-06	Added paragraph for non-USA seller may provide EASA form1 instead of C of C as long as it contains all required data.	Sec. 20/P. 7	Peter Shaybani	Sandra Stipp
	11-Aug-06	Added All <b>USA</b> based Panasonic Avionics Suppliers instead of All Panasonic Avionics Suppliers	Sec. 23/P. 8	Peter Shaybani	Sandra Stipp
B	29-Aug-06	Rewrote Sec. 23 in its entirety.	Sec.23/P. 8	Sandra Stipp	Sandra Stipp
C	04-Jan-07	Added additional requirements	Sec. 7/P. 5	Peter Shaybani	Sandra Stipp
D	31-Jan-07	Per request from PAC Bothell Repair Station:  Changed 14 CFR Part 121.303 (H) FAA" Fabrication: Inspection Systems Requirements" to 14 CFR Part 121.303 FAA" Operating Requirements: Airplane Instruments and Equipment".  Changed 14 CFR Part 145.45 FAA" Repair Stations: Inspection System Requirements" to 14 CFR Part 145.217 FAA" Repair Stations: Contract Maintenance"	Sec. 3/P. 4	Peter Shaybani	Sandra Stipp





		<p>Added:...in accordance with Section 6.6. Added reference to ARP9013 Added: statement on serial numbers Revised section 9.1 Added: Source inspection notification Deleted ISO 9000 Deleted Sec 15 and 16 Deleted Sec 17.6 and 17.7 Deleted prior sampling and inspection and PO reference Deleted Statement "Mark or label and/or label unit container with the following date" Added new text to 20.5 Fig 1 added of Collaboration Model of Purchasing/CAPA process Added Section 27.7</p>	<p>Sec 5.11 Sec 6.2 and 6.3 Sec 9.1 Sec 10.1 and 11.1 Sec 15 and 16 Sec 17.6 and 17.7 Sec 17.8  Sec 19.8  Sec 20.5  Sec 20.7 Sec 24.1 and 25.1 Sec.27.7</p>		
AC	11-28-2016	<p>Revised Header from Corporate Quality to Corporate Materials Group</p> <p>Added introduction to SQM and Supply Chain Philosophy</p> <p>Added Introduction section</p> <p>Added Manual Administration Table</p> <p>Added Supplier Approval Process Flowchart</p> <p>Revised Purpose Statement</p> <p>Section 4.0; Removed 4.6 (Vibro-Engraving...etc.)</p> <p>Section 4.3: Added requirements for PCN</p> <p>References; Added EIA 2020 STANDARD; Added IPC, AS 9145 REFERENCES</p> <p>Section 6:0: Added Supplier Selection and approval</p> <p>Section 7.0: Merged Language into new communication sections.</p> <p>Section 8.0: Added Technical review section</p> <p>Section 8.1: Added CTQ call-out and requirements: Added process capability expectations: Added Workmanship default requirements; Revised shelf life requirements. Added Welding default standard. Define Certification criteria.</p> <p>Section 10.0: Added PMI section</p> <p>Section 11: Merges Special process call-out into Sub-contracted secondary processes</p> <p>Section 12.0 Added more clarification around Customer owned tooling</p> <p>Section 15.0: Added Production Part Approval Process (PPAP)</p> <p>Section 16.0 Add Clarification on Supplier Inspection /acceptance requirements</p> <p>Section 17: Added clarification on Pink Poly: Add Reference to EIA 2020</p> <p>clarified new Labeling Requirements</p> <p>Section 18.0 Added New FOD section</p> <p>ADDED Section 19.0 ON Supplier Performance, and requalification</p> <p>Added Section 19.2.2 ON mrb Authority</p> <p>Revised Section 19.3to add more clarification around Deviation process.</p>	<p>Header</p> <p>Page 5</p> <p>Page 6</p> <p>Page 8</p> <p>Page 9</p> <p>Section 1.0: Page 10</p> <p>Section 4.0: Page 11</p> <p>Section 4.3: Page 11</p> <p>Section 5.0: Page 12</p> <p>Section 6.0: Page 13-14</p> <p>Section 7.0: Page 15</p> <p>Section 8.0; Page 15-17</p> <p>Section 8.1: page 17-20</p> <p>Section 10.0: Page 21</p> <p>Section 10.0: Page 21</p> <p>Section 12: Page 22-23</p> <p>Section 15: Page 24-30</p> <p>Section 16: Page 31</p> <p>Section 17: Page 32</p> <p>Section 17.5: Page 33-34</p> <p>Section 18.0: Page 35</p> <p>Section 19.0: Page 35</p> <p>Section 19.2.2: Page 37</p> <p>Section 19.3: Page 38-39</p>	Edward Alluis	David Latting

		<p>Revised Section 25. CAPA to include more detail around acceptable methods</p> <p>Added Form and Appendixes: Referenced new How to write A control Plan; PCN notices, supplier Assessment</p>	<p>Section 25: Page 41</p> <p>Forms &amp; Appendix: Pg. 46</p>		
AD	April 12, 2018	<p>Relocate Section 4.2.1-3 under newly titled Section 10.0 (Prevention of Counterfeit Materials).</p> <p>Revised Section 6.1 Panasonic "Green" procurements link. Updated 6.3 Assessment team to match titles in the Assessment tool.</p> <p>Revised Section 6.3 to define suppliers to be responsive within 30 days, or as defined by PAC.</p> <p>Section 7.2 added "Quality"; Section 7.4 adjusted Section reference number</p> <p>Section 10.0 now has the former section 4.2.1-3. Also, changed Section title to match AS9100D. Undated Section 10.1 to make a metal/alloy verification program not optional. Supplier must have some form of PMI program.</p> <p>Section 11.0 Emphasized on the preferred use of NADCAP suppliers.</p> <p>Section 17.0; Emphasized on the Packing weighted not to exceed 35LBS.</p> <p>Section 17.5.1 Removed previous generic label information and reference the use of the General label Guideline, MSQM 101.</p> <p>Section 17.5.2 Updated Packing Slip "Must have"</p> <p>Section 19.0 Added General Performance Measurement model to communicated measurement method to supply base.</p> <p>Section 19.1 Revised more general details on Supplier Disqualification due to performance issues.</p> <p>Added Section 32.0; RoHS Certification Compliance</p>	<p>Page Reference omitted due to Section Call-out</p>	Edward Alluis	David Latting
AE	Feb 6, 2019	<p>Cover Page; Approval change to Head of Procurement. Add Sr. Manage of Procurement Center of Excellence</p> <p>Supply Chain Policy – Add link to CSR</p> <p>Updated Section 3.5 to incorporate CofC requirements in Section 8.5.5 and 8.5.6. Renumber Section 8.5.4-7</p> <p>Update Section 4.8 &amp; 5.0 to include revised AS 9138 and add IPC 6018</p> <p>Add Section 7.7 requiring all Quality Data submitted to be in English.</p> <p>Update Section 8.0; Add reference to software and updated PSCR document number P-WI-50-03-20</p> <p>Update 8.2 to include ref. to IPC 6018 for High Freq. Bare Boards. Restructured table.</p> <p>Update Section 8.5; Add in requirement that Cert's need to be in English.</p> <p>Update Section 8.5.7 (Add 1-3) clarification on FAA traceability requirements.</p> <p>Added 10.0.1 in effort to clarify Seller of parts without OEM traceability.</p> <p>Updated 15.1-5 to require sample size of <math>(n \geq 1)</math></p>	<p>Page Reference omitted due to Section Call-out</p>	Edward Alluis	Marzena Erkelens

		<p>Update 15.4.4 to require FA sample to be identified if submitted in larger shipment lot.</p> <p>Add 15.4.7 defining FAIR submission process</p> <p>Update Section 16.0 to revise AS 9138 standard. Added Note 4</p> <p>Add Section 16.2 Cosmetic Part acceptance guidelines</p> <p>Add Section 16.3 Manf. /Test Acceptance Software</p> <p>Removed 17.2 a) Reference to 2003; correct to "ANSI" ESD "S" standard.</p> <p>Update Section 18. Add "Preservation" reference. Add second paragraph</p> <p>Update 19.2.1 Changed "Should" to "Shall"</p> <p>Add Section 33.0; Information Security; Link to Panasonic ISM Criteria (CSR)</p> <p>Add Section 34.0 Business Continuity Plan (CSR)</p>			
AF		<p>Updated Section 17.5 Packing Slip Requirements. Item 5. Revised Section 18.0; Added reference to AS9146</p>	<p>Page Reference omitted due to Section Call-out</p>	<p>Edward Alluis</p>	<p>Marzena Erkelens</p>
AG		<p>Removed 4.3. Updated content of 4.3 based on FAA input. Removed requirement that Supplier need to notify and get approval of all quality systems changes. Moved to Section 7.4</p> <p>Edit Section 5.0; Add Ref. to AS9117</p> <p>Update Section 15.2 on PPAP submission</p> <p>Section 15.8-9 Grammar corrections</p> <p>Updated Section 17.5 on COO clarification</p> <p>Added 15.4.7.1 Stating preferred FAIR submission protocol via Net-Inspect</p> <p>Add Section 24.2-24.3 on DPRV requirements</p>	<p>Page Reference omitted due to Section Call-out</p>	<p>Edward Alluis</p>	<p>Marzena Erkelens</p>
AH		<p>Updated Section 1.0; Included Software designator **</p> <p>Added 3.7-9 Software Suppliers</p> <p>Added 4.10-11 Software Suppliers</p> <p>Corrected Number typo in Section 4.7.1</p> <p>Section 5.0; Added Ref. to AS9162 and AS5553</p> <p>Updated Section 6.1 to call out IAQG Certification</p> <p>Added 7.5.1 on Special Process transfers</p> <p>Move Statement from MRB Authority to Section 7.5.1</p> <p>Added Section 7.9 on Software SOW compliance</p> <p>Added Note 7.10 addressing AS9100 8.4.3 (M)</p> <p>Revised Section 8.1 to include "KC" Designation</p> <p>Updated Section 8.2 to include workmanship compliance to IPC-640, and ANSI/ESD 2020</p> <p>Added 8.6 Software</p> <p>Added Section 9.6 Software requirements and Safety</p> <p>Added Reference in Section 10. To AS5553</p> <p>Updated Section 11.0; Special Processes</p> <p>Added Section 12.3.1-12.3.3 on PAC loaned Equip.</p> <p>Added Software Traceability Requirement in Section 13.3-13.8</p>	<p>Page Reference omitted due to Section Call-out</p>	<p>Edward Alluis</p>	<p>Marzena Erkelens</p>

		<p>Added in Section 14.7 on PAC loaned equip.</p> <p>Clarified "First Model or Delta" reference in section 15.4.2</p> <p>Removed Section 15.4.7 on FAIR signature due to Net Inspect requirement</p> <p>Allowed flexibility on FAIR bubble callout diagram sequence on 15.5.2</p> <p>Added 16.4 Software Acceptance Criteria</p> <p>Revised Section 17.3 to clarify test report deliverable requirements within ATP</p> <p>Updated Supplier Performance Model in Section 19.0</p> <p>Update 19.2.1.1; Added Comac specific requirement on NOE notification</p> <p>Revised Section 19.2.2 (Moved to Section to 7.4)</p> <p>Added clarification on NOE duration in section 19.2.1</p> <p>Added Failure Analysis callout in Section 19.2.4</p> <p>Added PPAP/APQP as part of production record retention requirements Section 22.0</p> <p>Added Operator Self-Inspection in Section 24.0 (24.4)</p> <p>Updated graph in Section 25.7</p> <p>Added 25.8 Software Impact &amp; Response time</p> <p>Added clarification on Change of Charge submission in Section 26</p> <p>Updated Section 31.6 on Environmental policy</p> <p>Added Section 31.8 for European Union Waste framework directive</p>			
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