



L3HARRIS™

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BUSINESS PARTNER QUALITY ASSURANCE REQUIREMENTS

The **requirements** become an integral part of all purchase orders (PO) to the extent specified here-in. Materials and documentation received that does not conform to the requirements as invoked, will be subject to rejection or such other measures deemed necessary by the L3Harris Quality Assurance representative. Referenced on the purchase order line item(s) is the specific quality requirement that applies, shown as **QA Code(s)**. Supplier, Vendor, and Business Partner (BP) are used interchangeably. For QA Code questions, please submit questions to an L3Harris Telemetry & RF Products (L3Harris T&RF) Supplier Quality representative at the following email address: SUPPLIERQUALITY.TRF@L3Harris.COM. For Source/Inspection requests, please submit requests to SOURCEINSPECTION.TRF@L3Harris.COM, and contact the L3Harris Buyer.

01 QUALITY PROGRAM AND INSPECTION SYSTEM REQUIREMENTS (QMS)

BUSINESS PARTNER OBLIGATION

Compliance with the provisions of one or more of these specifications in no way relieves the BP of the final responsibility for furnishing acceptable supplies or services, as specified. The BP is responsible for flowing down the applicable requirements to assure that appropriate sub-tier BPs also conform to L3Harris requirements.

PURCHASE ORDER AND CONTRACT REVIEW

Perform contract and record reviews to ensure that all relevant documentation, requirements, and revisions are available and understood.

Provide purchase order acknowledgement back to the L3Harris Buyer.

RIGHT OF ACCESS

L3Harris reserves the right of access for their representatives, their customer, and regulatory authorities (accompanied by L3Harris representatives) to all facilities supporting the order and to all records applicable to the order. Access allowed only upon mutual agreement and with cause and shall be at a reasonable time during regular business hours and in accordance with (IAW) BP's schedule.

QUALITY MANAGEMENT SYSTEM (QMS)

Implement or maintain a quality management system or inspection system in accordance with (IAW) the latest revision of ISO 9001 or AS9100 or a Quality Management System approved by L3Harris survey/audit process. BP shall ensure that individuals processing this order are aware of their contribution to product conformity, safety, and ethical behavior.

NOTE: BPs that maintain a QMS accredited by a third party may receive order preference. Locate the U.S. accreditation body for management systems at ANSI-ASQ National Accreditation Board, <http://www.anab.org>.

CALIBRATION SYSTEM

As relevant to the product or process, maintain a documented calibration system that is compliant to the prevailing industry requirements IAW one or more of the following standards:

- ISO/IEC 10012
- ANSI/NCSL Z540.1
- ISO/IEC 17025

QA CODE 01 (continued on next page)



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L3HARRIS FURNISHED INSPECTION AND/OR PRODUCTION TOOLING

The BP shall be responsible for the protection, calibration, and care, other than normal wear, of all production and inspection tooling and equipment furnished or owned by L3Harris for use in performance of Purchase Order requirements. All tooling shall be subject to surveillance and/or inspection upon notice. Said tooling or replacement tooling of equal quality shall be returned in an acceptable condition upon demand or notice.

QUALIFIED PRODUCTION LIST (QPL) VERIFICATION

BPs, including Distributors, providing QPL parts shall supply the prime manufacturer's name and QPL number, as applicable to Purchase Order requirements. When providing parts that use an industrial or military specification (mil-spec) part number, per a particular specification, if your part number is different from the number used in the specification, supplier shall provide both part numbers on the shipping documentation.

CONTROL OF NONCONFORMING SUPPLIES

- Provide and maintain an effective documented system for the control of nonconforming supplies including their identification, segregation, and disposition, to prevent the use, shipment, or co-mingling with conforming supplies.
- The BP shall not knowingly ship product that deviates from the drawing, specification limits, or design intent without written authorization via a waiver/deviation form. Submittal of any proposed waiver/deviation shall be per waiver/deviation requests section below.
- Notify the Buyer upon identification of any nonconformance applicable to the product shipment requested on the Purchase Order and upon identification of nonconformances applicable to the supplies previously provided.
- Previous dispositions of a similar nonconformance shall **NOT** be considered as precedents and shall require separate documentation and dispositions.
- Conduct material review when identifying nonconforming material.
- When material requires **Return to Vendor (RTV)**, the BP is responsible for providing information, such as Return Material Authorization, shipping address, shipping account, method of shipment, etc.
- When material requires **Rework**, the BP has authority to proceed with correction without Buyer's quality representative approval, unless otherwise defined in contract flow downs.
- **Rework** is defined as a disposition category in which the nonconforming product has additional operations that are not part of the basic production process flow, which will bring product into full compliance with applicable drawing or specification to eliminate the nonconformance.
- When material requires **Repair** or **Use As Is**, and is a revision-controlled item manufactured to an L3Harris drawing, Source Control Document (SoCD), or Specification Control Document (SCD), the BP is **NOT** authorized to proceed or deliver item/product without Buyer's written Quality representative approval.
- **Repair** is defined as a Material Review Board (MRB) disposition in which nonconforming product is corrected by using alternative manufacturing techniques, methods, materials, or processes, which may not bring product into full compliance with the physical requirements of the drawing or specifications but may meet the functional requirements.
- **Use as Is (UAI)** is defined as a disposition in which it is determined that non-conforming product may be used "As Is" to meet the requirements of its application without additional rework even though it does not meet all the requirements of the drawing.

NOTICE OF PREVIOUS REJECTION

When the BP submits previously rejected material from the Buyer, the BP's shipping document shall contain the Return Material Authorization (RMA) number.

QA CODE 01 (continued on next page)



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CORRECTIVE ACTION REQUESTS

- **Supplier Corrective Action (SCAR) Issuance and BP Responsibilities.** L3Harris, at its discretion, may issue a SCAR when nonconforming items, services, or systematic quality concerns exist. A SCAR is typically issued when the degree of severity warrants such action (e.g., customer complaints, line stoppage, repeat issues, and negative trends). The BP shall provide a response within the specified timeframe, with immediate containment, root cause, corrective action, and the effectivity of its implementation. If additional time for investigation and response is required, BP is to notify L3Harris representative to request a due date extension.
- **Response Failure.** Noncompliance with this requirement could result in escalation to BP's Leadership and cause adverse impact to BP's ratings and/or non-placement of future Purchase Orders, until the issue or concern is resolved.

PRODUCTION PROCESS VERIFICATION

Use a representative item from the first production run of a new part or assembly to verify that the production process, documentation, and tooling can produce items that meet requirements. Repeat this activity when changes occur that invalidate the original results. Refer to this activity as First Article Inspection (FAI). The BP shall retain documented information on the results.

CHANGE CONTROL

- Provide, in writing, advance notification to L3Harris Buyer, any change(s) in the BP's manufacturing baseline, which includes BP's name, address, manufacturing facility, manufacturing location, cage code, materials, or L3Harris approved processes. This applies to the business partner's facility or the business partner's sub-tier facilities with potential impact that could affect the customer's contracted product. This includes, but is not limited to, fabrication assembly, handling, testing, facility location, or introduction of a new sub-tier BP.
- Parts or material procured to L3Harris drawings or specifications (does not include commercial-off-the-shelf (COTS) or QPL (Qualified Parts List)) require **Buyer notification of any proposed change(s) to the manufacturing** baseline, which may affect the performance, quality, reliability, or interchangeability of such parts or material. Any proposed changes to the manufacturing baseline, L3Harris specifications, drawings, or purchase order requirements shall be submitted to L3Harris Buyer and require either a waiver/deviation approval IAW the waiver and deviation requirements section below, or a drawing change request via an L3Harris ECO, in advance, prior to BP product completion. Failure to notify L3Harris may jeopardize continued approval as an L3Harris BP.

PART AND/OR MATERIAL SUBSTITUTION/EQUIVALENCY

L3Harris prohibits part and/or material substitution or the use of equivalent material without written request for deviation approval.

PART AND/OR MATERIAL OVERAGE

BPs providing revision-controlled items procured to an L3Harris drawing, SoCD, or SCD are permitted to deliver parts or materials previously manufactured that are compliant to the current L3Harris purchase order. Any waiver or deviation, even if previously accepted, must be requested again.

OBsolete PARTS PROHIBITED

For BPs providing cavity devices, there shall be no known use of obsolete parts by the Original Component Manufacturer (OCM) in the design. Following approval of the design baseline, the supplier, at time of quote or upon awareness, shall notify L3Harris of any impending parts obsolescence for evaluation. The BP shall ensure communication of this requirement through their supply chain that supports the item(s) on this order.

WAIVER OR DEVIATION REQUESTS

All waiver or deviation requests shall be submitted to L3Harris Buyer and must be approved by the L3Harris Mission Assurance Representative (or designee) and/or appropriate L3Harris Engineering (or designee) discipline in writing, in advance prior to the manufacturing, completion, or delivery of hardware. The approved waiver or deviation, and all supporting data, MUST accompany the receipt of material, hardware, or software. Waivers or deviations are approved only on the specific L3Harris Purchase Order against which they are submitted (not by part number/revision) and are not authorized for future or follow-on orders.

QA CODE 01 (continued on next page)



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PACKAGING BERYLLIUM COPPER, ALBEMET OR ANY OTHER BERYLLIUM COMPOSITE MATERIAL REQUIREMENTS:

All material and components shipped to L3Harris Technologies, Inc. must be processed in a manner that maintains surface Beryllium cleanliness levels below 25 micrograms per square foot prior to packaging. L3Harris Technologies, Inc. reserves the right to analyze incoming shipments for conformance to this requirement. Each individual package shall be labeled with a Beryllium warning label. This label shall be conspicuous and shall notify any and all recipients of the package that the package contains Beryllium and that Beryllium is considered hazardous. In cases where the P.O. specifies more specific information about the warning label the P.O. content shall be adhered to.

When deliverable item contains Beryllium but is not made from Beryllium, and it may be plated, coated, or have other coatings. If the Supplier is aware that the part contains Beryllium, they shall mark the Packing Slip or parts with "Contains Beryllium". For Commercial parts, if the supplier is not aware that the part contains Beryllium, L3Harris Receiving will mark individual packages with a "Contains Beryllium" label upon receipt or receiving inspection.

DOCUMENTATION AVAILABILITY/RECORD RETENTION REQUIREMENTS

- Maintain test reports, inspection records, C of C from subtier(s), or verifiable documentation of quality, indicating conformance to applicable specification. Documentation and/or records shall be available for review by the Buyer, Government, and/or Regulatory Authorities upon request.
- Retain reports, records, or verifiable documentation for a period of **seven (7) years** after completion of this purchase order or subcontract unless otherwise specified in the purchase order or contract.

02 BUSINESS PARTNER'S ACCEPTANCE INSPECTION (Certificate of Conformance (C of C))

Submit with each shipment a Certificate of Conformance (C of C) stating that the materials furnished to L3Harris are in conformance with applicable requirements of the purchase order, drawings, and specifications. All C of Cs provided to L3Harris shall include, or provide reference to, other documents that include, at a minimum:

- a. Business Partner Name
- b. L3Harris Purchase Order (PO) number
- c. L3Harris Part Number as specified on the purchase order.
- d. Manufacturer's Name & Part Number
- e. Part Revision Level
 - Revision controlled items procured to a Source Control Document (SoCD), or Specification Control Document (SCD) also require:
 - i. L3Harris Part Number & Revision Letter (SoCD and SCD)
 - ii. Manufacturer's CAGE code (SoCD only)
 - iii. Serial numbers (SoCD only where document calls for serialized marking)
- f. Quantity of item(s)
- g. Date and signature, or stamp of authorized BP representative

NOTE 1: All supporting paperwork provided (e.g., test reports, etc.) requires traceability to the BP's C of C.

NOTE 2: When BP is a distributor, or BP dropships an order directly from the Original Component Manufacturer (OCM) or Original Equipment Manufacturer (OEM), then the OCM or OEM C of C will satisfy this requirement as long as full traceability is maintained from the original purchase order to the Distributor, to the OCM or OEM.

Original Component Manufacturer (OCM): An entity that designs and/or engineers a part and is pursuing or has obtained the intellectual property rights to that part.

Original Equipment Manufacturer (OEM): A company that manufactures products that it has designed from purchased components and sells those products under the company's brand name.



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03 SOURCE INSPECTION

L3Harris source inspection prior to shipment from BP's facility. If listed, items covered on this Purchase Order are subject to surveillance and inspection by the Buyer's representative at the point of manufacture. This will include surveillance of the product and BP's systems, procedures, and facilities, as mutually agreed between BUYER and SELLER.

Provide the necessary access, equipment, and resources to accomplish the source inspection, on a non-interference basis.

Final inspection and acceptance of source-inspected material will be at the Buyer's facility unless otherwise specified on the Purchasing document. Provide reasonable advance notice to permit scheduling of Source Inspection. Provide evidence of the Buyer's Source Inspection performed with each shipment.

04 IN-PROCESS INSPECTION

L3Harris inspection during manufacturing process. If listed, items covered on this Purchase Order are subject to in-process inspection by the Buyer's Quality Representative. Provide evidence of this in-process inspection performed with each shipment. The Buyer's Quality Representative shall designate the required inspection points on the BP's flow plan/traveler/router upon receipt and prior to manufacturing, as mutually agreed between BUYER and SELLER. BPs of items considered cavity or hybrid devices are subject to additional process oversight and monitoring. Performance history of cavity or hybrid devices determines the level of oversight and monitoring. As a minimum, prior to application of conformal coat material, hermetic sealing (pre-cap) or any permanent closure, the BP shall present the product to the Buyer for inspection.

05 FIRST ARTICLE INSPECTION (Standard BP Format FAI)

BPs of L3Harris build to print items, which are L3Harris revision controlled (i.e., cables, housing, filters, PWB), shall select one item from the first production LOT against this purchase order for performing a documented FAI. Inspect and record drawing or specification parameters on a First Article Inspection Report (FAIR). First Article Inspection Reports **ARE** required when part revision has changed (except Direct Drawing Changes (DDCs)), a lapse in part production from the same BP has exceeded 2 years, by Buyer request, or there has been a change in the BP production process. Provide a hard copy FAIR as part of the delivery package with every shipment; and, if available, include a balloon drawing as part of FAIR. **NOTE:** The two-year date is determined by the completion date on the FAIR.

05A FIRST ARTICLE INSPECTION (AS9102 Format FAI)

BPs of L3Harris build to print items, which are L3Harris revision controlled (i.e., cables, housing, filters, PWB), shall select one item from the first production LOT against this purchase order for performing a documented FAI. Inspect and record drawing or specification parameters on a First Article Inspection Report (FAIR) IAW the Required (R) and Conditionally Required (CR) guidelines of AS9102. First Article Inspection Report format shall be **IAW AS9102 forms or equivalent**. First Article Inspection Reports **ARE** required when part revision has changed (except Direct Drawing Changes (DDCs)), a lapse in part production from the same BP has exceeded 2 years, by Buyer request, or there has been a change in the BP production process. Provide a hard copy FAIR as part of the delivery package with every shipment; and, if available, include a balloon drawing as part of FAIR. **NOTE:** The two-year date is determined by the completion date on the FAIR.



06 WORKMANSHIP STANDARD

BPs providing revision-controlled items procured to an L3Harris drawing, Source Control Document (SoCD), or Specification Controlled Document (SCD) shall ensure use of certified, qualified, trained personnel and resources in the processing of material defined in Buyer's documentation. The material and workmanship shall conform to the latest revision of the applicable standard(s) or as indicated on the drawing(s) or per the following:

- Business Partners supplying Equipment shall conform to MIL-HDBK-454, (*Standard General Requirements for Electronic Equipment*)
- Business Partners supplying Cabling and Harnessing shall conform to IPC/WHMA-A-620, (*Requirements and Acceptance for Cable and Wire Harness Assemblies*)
- Business Partners supplying Printed Wiring Assemblies (PWA) shall conform to ANSI/J-STD-001, (*Requirements for Soldered Electrical and Electronic Assemblies*)
- Business Partners supplying Printed Wiring Assemblies (PWA) shall conform to ANSI/IPC-A-610, (*Acceptability of Electronic Assemblies*)
- Business Partners supplying Printed Wiring Boards (PWB) shall conform to IPC-A-600, (*Acceptability of Printed Boards*)
- Business Partners supplying Hybrid Microcircuits shall conform to MIL-PRF-38534, (*General Specification for Hybrid Microcircuits*)
- Business Partners supplying Hybrid Microcircuits with exposed Printed Wiring Boards (PWB's) shall ensure the PWB meets the requirement of ANSI/IPC-A-610 and ANSI/J-STD-001
- Business Partners supplying Monolithic Microcircuits shall conform to MIL-PRF-38535, (*General Specification for Monolithic Microcircuits*)

CONTRACT MANUFACTURER'S

- If drawing or document calls out L3Harris workmanship standards (i.e., BI-Q-001 (Workmanship Manual) or 17010136 (Workmanship Standard replaced by BI-Q-001)) BP shall request a copy of the document to ensure compliance herein.

MECHANICAL HARDWARE

- Deburring – BPs of mechanical hardware shall perform de-burring for drilled and threaded holes. BPs shall ensure the hardware workmanship meets the drawing requirements when subjected to Inspection under magnification (7x magnification) upon receipt at L3Harris.
- Thru-Hole measurement – It is recommended that thru-holes be checked with a pin gage to ensure expected dimension is acceptable.

SPECIAL PROCESS (MATERIAL FINISH, REBALLING, ETC.)

Special processes are those yielding product that cannot adequately be evaluated for conformance to requirements through inspection or non-destructive testing, such as welding, plating, painting, heat-treating, bonding, chem.-film, etc.

- To provide assurance to specifications, the BP, at a minimum, shall demonstrate control over these processes and/or their sub-tiers' processes. As applicable, the BP shall provide adequate training for personnel, certifications, destructive testing of samples, and detailed procedures.
- BP's special processors must meet the requirements within the drawing. (e.g., International Traffic in Arms Regulations (ITAR), material specifications, etc.).
- All BPs and/or BP subtiers are required to provide a certificate of conformance (C of C) to L3Harris (each shipment) stating that the requirements of the specified material finishing or coating have been achieved, and the results or conditions are documented, as detailed in QA Code 02 or QA Code 13.
- Upon request, make available copies of special process procedures and BP approvals.
- If the BP uses facilities other than their own for special processes, that facility shall be subject to the same conditions as stated herein. The certificate of conformance from the special processing manufacturer shall be referenced or traceable on the BP's certificate of conformance.



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07 PHYSICAL AND CHEMICAL ANALYSIS FOR BUSINESS PARTNERS OF L3HARRIS BUILD TO PRINT MACHINED FABRICATED PARTS

L3Harris reserves the right to validate test reports for raw Materials provided against the purchase order.

- **Manufactured Articles-Raw Material Test Reports**

Maintain on file, and assure availability for Buyer's review upon request, results of chemical and/or physical analysis reports required to satisfy specification requirements for raw materials used in the manufacture of articles delivered under this Purchase Order. The test report number shall be referenced on the BP's Certificate of Conformance.

- **Raw Material – Chemical and Physical Test Results**

Each shipment of raw material shall be accompanied by legible and reproducible copies of the applicable chemical and physical test results identifiable to the material specifications identified in this Purchase Order. Test reports furnished shall contain the signature of an authorized representative of the agency performing the tests and evidence of conformance to specification requirements. The test report number shall be referenced on the BP's Certificate of Conformance.

- **Mill or Foundry Physical and Chemical Test Reports**

These reports, which identify the foundry performing the smelting operation and demonstrate conformance to all applicable specifications for all metals used in the fabrication of the ordered material, shall be maintained on file, and a true copy thereof (either carbon or photographic) shall be supplied with each shipment. **The test report number shall be referenced on the BP's Certificate of Conformance.**

08 RADIOGRAPHIC INSPECTION

NOTE: Used on assemblies with solder joints where joints are unable to be visually inspected or if radiographic inspection is required by source control drawing.

The material on this Purchase Order requires radiographic inspection by a laboratory certified to MIL-HDBK-728//5 ASTM E1742/E1742M and approved by the Buyer. The radiographs shall be interpreted and evaluated to specifications and standards by the certified laboratory as required by the drawing and/or the Purchase Order. The radiographs shall be filed and stored at the BP, and a soft copy of the laboratory X-ray report, at a minimum, shall accompany the material delivered to L3Harris.

09 PRINTED WIRING BOARD (PWB) REQUIREMENTS

For documentation submittal, it is preferred that all required documentation tie or connect to order(s) delivered (e.g., via WO, reference number or LDC). All waiver, deviation, or overage processing shall comply with QA Code 01. The BP shall manufacture PWBs or Substrates in accordance with the drawing or any special instruction(s) on the purchase order. In the absence of fabrication specifications, contact the Buyer for a Purchase Order change notice.

Material Requirements:

1. Single-ply glass core stack-ups are prohibited, unless specified on the drawing or approved by L3Harris.

Documentation Requirements:

1. Provide OEM certificate of conformance (C of C) for all materials used to manufacture delivered item.
2. Provide electrical test C of C per LDC (Printed Board Electrical Test Report IAW IPC-9252).
3. Provide PWB plating finish thickness report per LOT (XRF).
4. Provide layer view stack up (construction configuration). **NOTE:** N/A to single layer and substrates.
5. Provide impedance test report per panel when impedance test is specified on the drawing.

QA CODE 09 (continued on next page)



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Coupon Requirements:

1. Lot Conformance (LC) coupons shall be manufactured in accordance with the table(s) below.
NOTE: Use of Legacy A is acceptable, unless otherwise stated in the table(s).
2. BP shall produce and deliver a set of coupons traceable to every panel of boards delivered to L3Harris. Each coupon shall be traceable to the LOT # and/or Lot Date Code, panel serial number, and the drawing part number & revision number.

Items Fabricated IAW IPC-6012		
Coupon	Description	Notes
AB/R	Rework Simulation/Plated Hole Evaluation/Internal Annular Ring (Registration)	Legacy coupon per Appendix B is acceptable.
B/R	Plated Hole Evaluation/Internal Annular Ring (Registration)	Type 4 only.
G	Solder Mask Adhesion	Not required if solder mask or solder dams are not used.
P	Plating Adhesion	
S	Thru Hole Solderability	Not required when PTHs are not specified.
W	SMT Solderability, Final Finishing Thickness	Plating thickness
D	Thermal Shock	NOTE: Not applicable to substrates.
Z	Impedance	Z coupon or equivalent is required when impedance requirement is a callout on the drawing

Items Fabricated IAW IPC-6018		
Coupon	Description	Notes
AB/R	Rework Simulation/Plated Hole Evaluation/Internal Annular Ring (Registration)	Legacy coupon per Appendix B is acceptable.
B/R	Plated Hole Evaluation/Internal Annular Ring (Registration)	Type 5 and 6 only.
G	Solder Mask Adhesion	Not required if solder mask or solder dams are not used.
P	Plating Adhesion	
S	Thru Hole Solderability	Not required when PTHs are not specified.
W	SMT Solderability, Final Finishing Thickness	Plating thickness
D	Thermal Shock	All Types. NOTE: Not applicable to substrates.
Z	Impedance	Z coupon or equivalent is required when impedance requirement is a callout on the drawing.

QA CODE 09 (continued on next page)



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Items Fabricated IAW IPC-6013		
Coupon	Description	Notes
AB/R	Rework Simulation/Plated Hole Evaluation/Internal Annular Ring (Registration)	Legacy coupon per Appendix B is acceptable.
G	Solder Mask Adhesion	Not required if solder mask or solder dams are not used.
P	Plating Adhesion	
S	Thru Hole Solderability	
W	SMT Solderability, Final Finishing Thickness	Plating thickness; Only required if design has SMT mounting features.
Z	Impedance	Z coupon or equivalent is required when impedance requirement is a callout on the drawing.

Solder Sample Requirement:

1. Provide a detached PWB solder sample per order. There shall be no cross sections routed out and any drilled or punched holes shall be filled with epoxy.

Microsection Requirements:

BP shall manufacture and deliver microsections for all panels produced (All IPC Classes).

1. Create microsection mounts with identification traceable to the panel or lot date code (LDC)
2. Provide a microsection report consisting of:
 - a. Acceptance criteria or overall results clearly and visibly identified on the documents provided.
 - b. Finished layer stack up measurements.
 - c. Photos (color soft copies preferred) of entire sectioned plated through-hole barrels with identification to the panel serial number.

Packaging Requirements:

1. Each PWB shall be heat-sealed in an individual electro-static discharge or moisture barrier bag (ESD or MBB) IAW MIL-PRF-81705, with a non-corrosive Type II Desiccant IAW MIL-D-3464, and a Humidity Indicator Card (HIC) IAW J-STD-033.
2. It is preferred that each bag have adequate space between the heat seal and the PWB to allow opening and resealing of the bag a minimum of three times.
3. Labeling of each bag shall include L3Harris part number and date code, at a minimum.

Failure Threshold:

1. Failure of more than 20% of parts on a panel for the same type of defect shall cause the LOT to be suspect. Manufacturer shall contact L3Harris Buyer regarding all suspect LOTs for potential referee or additional evaluation testing. No referee testing is allowed without written approval from L3Harris. Delivery of boards from suspect lots shall not be accepted without L3Harris approval.

Additional PWB manufacturing requirements and clarifications when not specified on L3Harris drawing:

1. Plated thru-hole diameters are after plating. Panels shall be drilled individually, and stacking is prohibited. Only new drill bits shall be used.
2. When etch back requirements are not called out on the drawing: CLASS 3 and 3A PWBs made from materials of Polyimide or Epoxy Glass with four (4) or more layers shall have etch back IAW IPC-6012.
3. There shall be no breakout of panel frames when shipping PWBs in panel form/format.



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09A PRINTED WIRING BOARD (PWB) THERMAL TEST REQUIREMENTS

BP shall conduct the following:

1. Thermal cycle PWB per IPC-TM-650 Method 2.6.7.2, using certified independent test facility.
2. Test each panel. All via structures used in the design shall be included in the D coupon.
3. BP shall consider a change in resistance of 10% or more as a reject.
4. If there are failures, BP shall notify L3Harris Buyer for further direction.
5. Use condition-D for epoxy-based materials. Use condition-E for Rogers RO4000 and AD1000. Use condition-F for polyimide materials. If IPC-TM-650 does not list the material used on this board, the BP shall contact L3Harris Buyer for further direction.
6. Submit a copy of the test results with the certificate of conformance. Test result must clearly note pass or fail on the front page.

10 CERTIFIED TEST DATA

Test data report shall include the following items listed below as applicable to the delivered part type:

- Summary (attribute) data, quantity accepted and/or rejected, test quantity, and parameters tested.
- Certified test report stating all tests were conducted in accordance with governing specification, and the results meet the specified requirements. Also, when required by governing specification, report shall include actual (variable) readings taken from measuring instrumentation on required test quantity and test parameters.

11 IDENTIFICATION

MARKING PERMANENCY

Where marking requirements are applicable per drawing, specification, or purchase order flow down, the items supplied shall meet marking permanency requirements of said specification or drawing, such as part numbers and identification. Permanent, non-conductive epoxy-based inks are preferred, such as those conforming to MIL-I-43553.

After testing for marking permanency per specification requirements, there shall be no deterioration or discoloration of the markings such that legibility is impaired, and there shall be no deleterious mechanical or electrical damage or deterioration of the material or finishes caused by the markings.

- **Business Partners with MIL-PRF certifications**
BP is authorized to follow their standard process.
- **Business Partners (Distributors) of MATERIALS or PARTS**
Material or parts are based on the manufacturer's specifications, and the marking permanency shall be as specified above, or as a minimum, IAW the manufacturer's specifications.
- **Business Partners of MATERIALS, PARTS, SUBASSEMBLIES, and ASSEMBLIES**
For material, parts subassemblies or assemblies, BP shall identify product with the Buyer's specification/drawing and revision level or BP part number as referenced on the applicable purchase order. This marking shall be as required by the specification or drawing.
- **Business Partners of PRINTED CIRCUIT BOARDS AND MULTI-LAMINATE BOARDS**
For printed circuit and multi-laminate boards, marking shall be IAW QA Code 09, 09A, and drawing, as applicable.
- **Business Partners of "BAG AND TAG" ITEMS (too small for part number application)**
For "bag and tag" items, the part number, with appropriate revision for L3Harris Build-To-Print items, shall be applied to the individual bag, container, or packaging, IAW Handling and Packaging Requirements (QA Code 12).

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- **Business Partners of FABRICATED MACHINED PARTS**

For fabricated detailed machined parts, it is preferred that the BPs name or logo be included adjacent to the part number and revision level marking in the drawing as applicable. If the part is too small for a name or logo, the BP shall default to “Bag and Tag”.

- **Business Partners of Wire**

Marking for each spool of wire shall be legible and permanent with the following information:

1. Purchase Order Number
2. Gauge
3. L3Harris Part Number
4. Military Specification Number (as applicable)

12 HANDLING and PACKAGING REQUIREMENTS

FOREIGN OBJECTION ELIMINATION (FOE) AWARENESS/CLEANLINESS

Maintain a Foreign Object Elimination (FOE) Control program/process, or equivalent, and ensure work is processed or manufactured in a manner preventing foreign objects or materials from entering and remaining in deliverable items, to preclude the potential for Foreign Object Damage (FOD). Provide **appropriate** FOE training to employees performing operations.

Prohibit the use of staples in packing or provided with documentation.

When providing multiple LOTs or Date Codes, it is preferred that the BP segregate, package, and label each LOT or Date Code individually.

After fabrication, ensure removal of smudges, loose, spattered, or excess solder; metal chips; dust; dirt; fibers; or any other foreign material. Foreign material includes any particles that could loosen or become dislodged during the normal expected life of the equipment.

Ensure removal of all corrosive materials. Cleaning processes shall have no deleterious effect on the equipment or parts.

ELECTRICAL OVERSTRESS (EOS) OR ELECTROSTATIC DISCHARGE (ESD)

BPs of items being delivered that are susceptible to Electrical Overstress (EOS) or Electrostatic Discharge (ESD) shall ensure the items contracted under this Purchase Order are considered electro-static sensitive and must be handled and packaged IAW ANSI/ESD S20.20, ANSI/EIA-625 or equivalent. Clear and legible labeling on the packaging must indicate the contents are EOS/ESD susceptible.

Enclose all electronic items with ESD and moisture barrier bags with correct moisture sensitive level identified, as applicable. Ensure wrappings, cartons, boxes, and other containers, as applicable, are ESD/EOS controlled.

NOTE: As a supplement to ANSI/ESD-S20.20 requirements, BP should control relative humidity (RH) from 30% to 70% and ionizers should be used when the RH falls below 40%, with no device or circuit card handling allowed if the humidity falls below 25%.

MOISTURE SENSITIVE DEVICES

For devices that are moisture sensitive, the BP shall handle, package, and mark the moisture sensitive (MSL) items IAW J-STD-033.

QA CODE 12 (continued on next page)



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PACKING AND PACKAGING ACCEPTANCE

Packing and packaging shall conform to the requirement of the L3Harris drawing or specification for the part or material being purchased and to any special requirements delineated within the specific quality provisions invoked by the Purchase Order.

Packing and packaging of COTS items shall be in accordance with BP's or manufacturer's specifications.

In those cases, where packing and packaging requirements are not defined as stated above, it is preferred that packing and packaging, in general, conform to the following requirements:

1. Each bag shall have adequate space between the heat seal and the product to allow opening and resealing of the bag a minimum of three times.
2. Pink Polyethylene Plastic bags and Staples are non-authorized packaging materials and shall not be used for compliance with the L3Harris Foreign Object Elimination program.
3. Packing and packaging procedures, practices, and methods in effect at all BPs shall be subject to review and approval by the Buyer's quality representative.

MACHINED PRODUCTS (MECHANICAL HARDWARE)

BPs supplying machined product, (i.e., housings, frames, etc.) as the deliverable item, may wrap product in clear anti-static bubble-wrap for protection prior to other packing methods (bagging, boxing). Individual wrapping is required, however, for all products.

NON-CORROSION

Protect packaged material or product against corrosion IAW MIL-STD-2073 (MIL-P-116).

Packaging material used shall be non-abrasive, chemically neutral (pH 6.5 to 7.5), and have a water-soluble acidity of not more than 0.02% equivalent sulfur trioxide.

PHYSICAL PROTECTION & CUSHIONING

Physical protection of items packaged shall be accomplished using cushioning, bracing, or blocking, as applicable, to prevent rupture of flexible barriers, free movement within rigid or semi-rigid containers, and physical damage due to transmission of shock and vibration.

Cushioning material used to pack suitably protected products shall be dry and dust-free and shall not cause or promote corrosion or static electricity and should be fungus-resistant.

Preferred cushioning materials are antistatic bubble pack (bubble wrap), Styrofoam, or approved type cellulose, etc. The use of shredded newspaper, or crumbled paper, etc. is not desirable but may be permissible if items so cushioned are enclosed in sealed bags.

13 CERTIFICATE OF CONFORMANCE

Provide a certificate of conformance with each shipment, which shall include at a minimum:

- Business Partner Name
- Business Partner Part Number or Manufacturer Part Number
- L3Harris Part Number
- Quantity Delivered
- Statement that the materials furnished to L3Harris are in conformance with applicable requirements of the purchase order, drawings, specifications, and/or supporting documentation is on file and shall be made available to L3Harris, Customer, or Government Representatives upon request.



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14 SHELF-LIFE LIMITED ITEM (Age Sensitive Material)

L3Harris considers this item to be age sensitive and requires shelf-life data submittal with the item.

BPs of material or items with a shelf life shall ensure that, at the time of receipt at L3Harris, the item shall have a minimum of 50% of the specified shelf life remaining. The BP shall clearly state the data required to determine the length of shelf life and date of expiration on the item and/or container and C of C, as follows:

- Part Number
 - Date of Manufacture (DOM) and Manufacturer Storage-Shelf Life from stated date
- OR
- Date of Manufacture (DOM) and Expiration date

15A TRACEABILITY

Provide traceability as part of the C of C for material on this procurement as follows:

- Manufacturer Name (mandatory)

AND one or more of the following (mandatory)

- Manufacturer's LOT Date Code (LDC) (When multiple LDCs all must be recorded on C of C)
- Manufacturer's LOT Number
- Manufacturer's Job Number
- Date of Manufacture

Example LDC formats: YYYY/WW, YY/WW (YY= Two-digit year; YYYY= Four-digit year; WW= Two-digit week)

For mixed lot date code shipments, ensure one date code per line on the packing list and/or CofC.

L3Harris prefers newest date code available.

NOTE 1: When the BP is a distributor, the OEM or OCM name shall be documented on the distributor's C of C and be traceable to the OEM or OCM within the distributor's process.

NOTE 2: For parts not meeting the traceability requirements, the BP is required to notify L3Harris for further review.

NOTE 3: When item is an "ASIC", a "Module", "Assembly", or "Printed Wiring Assembly", traceability may be limited to the serialization of the item, unless otherwise specified by the drawing, purchase order or other QA code(s).

15B TRACEABILITY (Date Code < 12 Months) **

Provide traceability same as QA Code 15A except for the requirement that Manufacturer's LOT Date Code or Date of Manufacture or Manufacture Date shall be less than 12 months old at time of receipt. L3Harris prefers newest LDC available.

15C TRACEABILITY (Date Code < 36 Months) **

Provide traceability same as QA Code 15A except for the requirement that Manufacturer's LOT Date Code or Date of Manufacture or Manufacture Date shall be less than 36 months old at time of receipt. L3Harris prefers newest LDC available.



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15D TRACEABILITY (Single Date Code) – “NO PARTIAL SHIPMENTS”

Provide traceability same as QA Code 15A with the added requirement that all devices delivered under the same line item be from a single Manufacturer’s LOT Date Code, Date of Manufacture, Manufacture Date. L3Harris prefers newest DATE CODE available.

NOTE 1: Partial shipments are NOT acceptable.

15E TRACEABILITY (WAFER LOT)

Provide traceability same as QA Code 15A with the following added requirement:

- Manufacturer’s LOT Number (mandatory)
- Manufacturer’s Wafer LOT or Batch (mandatory)

15F TRACEABILITY (OEM or OCM)

Provide traceability same as QA Code 15A with the added requirement that if the BP is a distributor, the OEM or OCM C of C shall be provided.

15G TRACEABILITY (SPECIFIC DATE CODE RESTRICTION)

Provide traceability same as QA Code 15A except for the requirement that Manufacturer’s LOT Date Code, Date of Manufacture, Manufacture Date shall follow purchase order item text, (e.g., DATE CODE of “YYWW” or newer required).

16 PROHIBITED MATERIAL REQUIREMENTS

Prohibit the use of **pure Cadmium, pure Zinc, or pure Tin.**

- BPs of **ELECTRONIC, ELECTRICAL, ELECTRO-MECHANICAL**, and/or piece part(s), and assemblies (including internal hardware) shall have NEITHER internal nor external surfaces coated with pure Cadmium, Zinc, or tin layer. Electronic part terminals and leads coated with a tin alloy shall contain a minimum of 3 percent (3%) lead (Pb) or silver (Ag).
- BPs of **METALLIC MECHANICAL** parts and/or piece parts, hardware, or materials shall **NOT** be manufactured using pure tin nor contain a plating finish of pure Cadmium, Zinc, or Tin. Tin alloy plating finish **shall** contain a minimum of three percent (3%) lead (Pb) or silver (Ag).

Provide a written C of C with each shipment along with a copy of the OEM certificate, which attests that the products contained therein meet the requirements of the Purchase Order. The C of C shall mean that the BP has contacted the OEM or verified that the product meets the specified minimum 3% lead requirement. This requirement does not apply to MIL-SPEC parts.

NOTE: Upon product or material receipt at L3Harris, L3Harris performs a prohibited materials verification.



17 PARTICLE IMPACT NOISE DETECTION (PIND)

Reduction of risk due to foreign contaminants in devices with lids or cavities:

- A purchase order requiring PIND testing or BPs of devices with a lid or cavity shall implement a Particle Impact Noise Detection (PIND) cleaning procedure prior to lid sealing. The BP shall use double-sided tape, place unit to be cleaned upside down (towards the tape) on the transducer, and run a PIND test IAW MIL-STD-883, 2020 condition A. If there is a strike indication, repeat test until the run is complete without any indications. Results of testing including number and types of particles along with number of tests shall be recorded by the BP. Deviations from this requirement shall be approved by L3Harris in writing prior to lid seal. The manufacturer or approve test lab shall perform PIND testing and PIND test data shall be delivered with the parts.
- Particle Impact Noise Detection Testing (PIND) Devices listed in this order shall be 100% Particle Impact Noise Detection (PIND)-tested per:

Part Type	Description
MICROCIRCUITS	MIL-STD-883, Method 2020, Test Condition "A"
HYBRIDS	MIL-STD-883, Method 2020, Test Condition "A" or "B"
TRANSISTORS	MIL-STD-750, Method 2052, Condition "A"
DIODES	MIL-PRF-19500
RELAYS	MIL-PRF-39016, Rev. E, Appendix "B", and the Manufacturer's Approved Procedure

18 HYBRID DEVICES

Subcontract Business Partners of hybrid devices (including formed lead packages):

When the AID does not specify packaging criteria, the BP shall ensure each device is individually packaged in specialized containers, part number PP2525 Corestate Pillow Pak manufactured by Conductive Container Inc. (CCI), or L3Harris approved equivalent shall be used. Packages shall be clearly marked with ESD warning and sealed with non-static generating tape or other equivalent means to ensure adequate protection against physical damage.

19 MANUFACTURING READINESS REVIEW (MRR)

Business Partners (BP) of L3Harris build to print items, which are L3Harris revision controlled shall support MRR's on the purchase order identified part number. Reviews are required to be held prior to the start of manufacturing. The BP shall contact TRF Buyer and SQ to schedule the review. The BP shall request an MRR at least ten (10) days prior to the start of manufacturing. The MRR shall be conducted at the BP's site or remotely as mutually agreed. MRR coordination shall include, at a minimum, a representative from T&RF Supplier Quality and BP OPS/Quality. The review may cover, but is not limited to the following:

- Purchase order review – This review should occur within five (5) business days of PO acceptance.
- Manufacturing documentation/traveler/router review
- Supplier quality requirements review.
- Manufacturing process review – MRB, counterfeit avoidance, inspections, tooling, automation, packaging, and shipping
- PPAP (APQP) – as applicable
- Material review (availability/milestones)



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20 KNOWN PROHIBITED MATERIAL – BERYLLIUM

This product/item is known to contain Beryllium. Follow the guidelines in this document under quality code 01 for PACKAGING BERYLLIUM COPPER, ALBEMET OR ANY OTHER BERYLLIUM COMPOSITE MATERIAL REQUIREMENTS:

Manager Purchasing

Date

Supplier Quality Representative

Date



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BUSINESS PARTNER QUALITY ASSURANCE REQUIREMENTS CHANGE HISTORY

This section provides the details of changes to L3Harris Business Partner Quality Assurance Requirements, QASF-185.

Rev.	Summary	Date
1	Initial release	11/21/2012
2	#13 added as a placeholder	12/04/2012
3	#10 Certified Test Data: deletions and addition of bulleted item, #15 A-E Traceability: Added Exceptions	01/09/2013
4	#5 First Article Inspection: Added "which are L3 TW Revision Controlled Items" #7 Physical and Chemical Analysis: Added L3 TW build to print. #14 Shelf Life: Added Exception #15 A-E Traceability: Added or date of manf or manf date, Added to exceptions ...or gaskets, thermal pads and tubing. Added to Note 1, added new Note 2 #15F Traceability (OEM/OCM): added section to address OEM/OCM	04/12/2013
5	#1 Control of Nonconforming Supplies: Added multiple sections to Control of Nonconforming Supplies #3 Source Selection: Modified section #4 In-Process Inspection: Added subject to this requirement, and as mutually agreed between Buyer and Seller #15 A, B, C, E Traceability: Added Note 3 #15F Traceability: Modified Note 2	05/24/2013
6	#6 Special Process: added of build to print machine, metal parts, #7 Added to all sections: The test report number shall be referenced on the Business Partners C of C. #8 PWB Requirements: Total re-write of section. #15 A-F Traceability: Modified all sections. Added Date to the signature line	01/07/2014
7	#2 Business Partners Acceptance Inspection (C of C): Note added. #6 Workmanship Standard: Added: The C of C from the special processing supplier shall be referenced/traceable on the manf C of C.	02/20/2014
8	#2 Business Partners Acceptance Inspection (C of C): Added: Mechanical Hardware Note.	05/22/2014
9	#1 Added note to MATERIAL section for substitute material, #2 added additional C of C requirements. Added overall revision page to end.	07/16/2014
10	#2 Add requirement to obtain serial number on C of C for SoCD components that call for serialization within the document	09/03/2014
11	#2 Material: Updated the counterfeit clause. #9 significant changes: e.g., Change Solder Samples required from two to one. #6 Add L3 TW to BUILD TO PRINT reference	06/04/2015
12	Fixed formatting throughout; Added Codes 13, Modified 02 to add Manufacture Name and Manufacture P/N, 06- Added verbiage to build in production not Engineering environment and not with Engineering resources, Special Processing : added reference to BI-Q-045, 12- added section for Moisture Sensitive Devices	11/20/2015
13	Changed Logo from L3 TW to L3, # 09-Minor edits (1, 4, 7) #11 Added Marking Requirements for Distributors #15 C Changed to 36 Months #15G Added	03/09/2016
14	#1 Updated Right of Access, added L3 to Inspection and/or Production Tooling, modified Corrective action requests. # 6 Added standards for Hybrid Microcircuits and Monolithic Microcircuits #9 Revised total section	07/14/2016



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Rev.	Summary	Date
15	#9 Materials/Hardware: #2 added date code # 3 added new P/N will require 2 PWB solder samples.	08/22/2016
16	#01 Control of Nonconforming Supplies, clarifying Revision Controlled items #09 updated and added 09 A New QA Code flow down: PWB Thermal Testing Requirements	11/07/2016
17	Revision 17, required to remove the track changes within the document. No change to context	11/14/2016
18	#06 Special Processing allowing BPs to select special processor	12/12/2016
19	Q4 RCCA Continuous Improvement Project updates – Input/Feedback from internal and external customers. Entire QA code document updated.	03/13/2018
20	Input/Feedback from internal Quality and Purchasing department. Updated 01, 05, 05A, 06, 09, 11, 12, removed 15B and rebranded to L3Harris.	08/16/2019
21	Updated QA code 01, 06, and 10	03/09/2020
22	Revised QA Code 05, 05A, and 09.	09/25/2020
23	Revised QA Code 01 and 09.	03/31/2021
24	LN Glitch prevented release of version 23. Updated QA Code 10.	03/31/2021
25	Revised QA Code 01 to include Beryllium identification. Added QA Code 19 flow down for Manufacturing Readiness Reviews Added QA Code 15B for LDC less the 12 months. Revised QA Code 15A for LDC clarifications Added QA Code 20 for known Beryllium	07/30/2024