Supplier Quality Manual

Contents

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This manual will be reviewed and updated on a regular basis. The latest released version is available to all suppliers at the HARMAN Supplier Portal. The current web location for this site is:

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1. Introduction

The high expectations and standards placed by HARMAN International and its customers on the quality of the products and delivery performance require high supplier capability. Fundamental to the common success for supplier, customer and HARMAN is target-oriented partnership-based cooperation between HARMAN and the supplier.

HARMAN expects not only a zero defect and zero ppm philosophy from suppliers, but also excellent performance regarding delivery performance, cost competitiveness, technological support, best-in-class problem solving process and cooperation /communication.

This Supplier Quality Manual (SQM) describes the expectations placed by HARMAN on its suppliers regarding quality and delivery performance, as well as the formalities and processes which must be followed in partnership with HARMAN. Quality and environment-relevant processes from concept phase to series production or series delivery of supplied parts are detailed within.

Supplier shall establish document, implement and maintain a management system in accordance with HARMAN requirements and applicable international quality, environmental and safety standards.

1.1. Scope

These requirements are valid for all suppliers of HARMAN delivering or planning to deliver production material that will directly impact the quality of HARMAN Automotive and HARMAN Lifestyle final product to HARMAN or to HARMAN´s Manufacturing Service partners. These guidelines are valid for all HARMAN locations, worldwide. The general requirements outlined herein do not supersede conflicting requirements in the HARMAN contract, or drawing, including applicable engineering specifications and process specifications, or applicable long-term agreements. Elements of this Supplier Quality Manual, that are relevant only for one of the division Automotive or Lifestyle are indicated as such.

NOTE: In this document, HARMAN International will be referred to simply as HARMAN. HARMAN's Automotive Division will be referred to as AUTO, and HARMAN's Lifestyle Division will be referred to as LS.

1.2. General Language Requirement

All supplier documentation submitted to HARMAN must be issued in English. For HARMAN internal product transfers from one HARMAN location to another HARMAN location, documentation previously submitted in languages other than English must be resubmitted in English.

1.3. WEB Portals

HARMAN may ask a supplier to use the internet portal program to exchange data for APQP/PPAP activities, production traceability, customer complaints, audit findings and inspections. Upon receipt HARMAN request, supplier shall confirm and complete the tasks within the required due date.

2. General Management System Requirement

2.1. General Quality Management System Requirement

All parties concerned must contribute towards achieving and implementing the objectives of the HARMAN quality policy and quality principles and must promote continual improvement.

HARMAN requires all our suppliers to develop, implement, and improve a quality management system certified to ISO 9001 in the actual valid revision. Suppliers in automotive shall have the ultimate objective of becoming certified to IATF 16949. Therefore, the following sequence should be applied to achieve this requirement:

a. Certification to ISO 9001 through third-party audits; unless otherwise specified by HARMAN, suppliers shall demonstrate conformity to ISO 9001 by maintaining a third-party certification issued by a certification body bearing the accreditation mark of a recognized IAF MLA (International Accreditation Forum Multilateral Recognition Arrangement) member and where

the accreditation body's main scope includes management system certification to ISO/IEC 17021;

b. Certification to ISO 9001 with compliance to other customer-defined QMS requirements (such as Minimum Automotive Quality Management System Requirements for Sub-Tier Suppliers [MAQMSR] or equivalent) through second-party audits;

c. Certification to ISO9001 with compliance to IATF 16949 through second-party audits;

d. Certification to IATF 16949 through third-party audits (valid third-party certification of the supplier to IATF 16949 by an |ATF-recognized certification body).

At the HARMAN Supplier Selection and Supplier Evaluation process the Quality Management System, which is implemented at the supplier, might be taken into consideration.

Suppliers must inform HARMAN of changes of the status of their quality management system certification not later than one month after this change. Upon request, supplier shall provide HARMAN copies of such certificates.

The suppliers in AUTO shall adhere to requirements and procedures defined in followings:

- Advanced Product Quality Planning and Control Plan (APQP),
- Production Part Approval Process (PPAP),
- Measurement System Analysis (MSA),
- Statistical Process Control (SPC),
- AIAG CQI-19 Sub tier Supplier Management
- AIAG CQI-20 Effective Problem-Solving Guide,
- AIAG & VDA FMEA-Handbook,
- Volume 2, Securing the Quality of Supplies Production process and product approval (PPA),
- VDA volume 5 – Capability of Measurement Processes
- VDA volume 6.3 – Process Audit
- VDA volume 6.5 – Product Audit
- VDA 8D – Problem Solving in 8 Disciplines
- VDA Field Failure Analysis
- VDA EOS – Electrical Overstress in the Automotive Industry
- VDA Product creation – A process description covering special characteristics (SC)
- VDA Product Integrity
- Automotive SPICE (if applicable)

HARMAN requires Suppliers of products with firmware, drivers and/or embedded software to implement and maintain a process for software quality assurance for their products. A software development assessment methodology shall be utilized to assess the software development process. The suppliers are requested to retain documented information of a software development capability self-assessment.

Suppliers must also guarantee that sub-suppliers have provided for adequate quality-assurance measures and will commit themselves to fulfilling their obligations per this Supplier Quality Manual. Suppliers to HARMAN are solely responsible for all purchased subcomponents used in their products, even if the sub-supplier or subcomponent was directed by HARMAN.

2.2. General Environmental Management System Requirements

HARMAN has established an environmental management system in accordance with ISO 14001 requirements. The HARMAN environmental policy contains a commitment to continuously improve environmental performance and to prevent environmental pollution and uphold relevant laws and regulations. HARMAN transfers this self-commitment to all suppliers.

HARMAN, therefore, requires its suppliers to develop and uphold an environmental management system and to undertake continual improvement. Suppliers must inform HARMAN of changes of the status of their environmental management system certification not later than one month after this change.

2.3. Environmental Regulatory Compliance

2.3.1. In General

Supplier shall abide and be responsible by the laws, regulations, technology standards relating to environmental protection, including but not limited to RoHS, WEEE, REACH, pollution prevention, appropriate disposal of wasters. For products in LS Supplier shall submit evidence of compliance. Any failure of compliance must be counter-measured within 24 hours.

2.3.2. Compliance Matrix – LS only

Where applicable Supplier shall strictly comply with HARMAN requirement defined in the compliance matrix, including but not limited to provision of the relevant documents and test reports.

2.4. General Regulatory Compliance

In general, HARMAN expects that all suppliers comply with all applicable national and international legal requirements.

2.5. Electrostatic Discharge – ESD

Electronic components can be damaged through electrostatic discharge. HARMAN requires suppliers to monitor overall suitable protection measures, it is necessary to apply expert knowledge. HARMAN requires applicable suppliers, manufacturers to strictly adhere to norms and regulations, such as ANSI/ESD 20/20 or IEC61340 and shall perform, demonstrate continuous improvement to maintain the ESD control system. Suppliers must inform HARMAN of changes of the status of their ESD certification no later than one month after this change.

2.6. Moisture Sensitivity Device - MSD

To avoid damage from moisture absorption and exposure to high temperature solder reflow process, HARMAN requires applicable suppliers, manufactures to strictly adhere to norms and regulations, such as IPC/JEDEC J-STD-020E, IPC/JEDEC J-STD-033 and shall perform, demonstrate continuous improvement to maintain the MSD control system.

2.7. Product Safety & Conformity Representative (PSCR)

2.7.1. General requirements

Every organization within the automotive supply chain is obliged to ensure the safety and conformity of its products. To this end, in the respective countries and regions current legal statutes on product integrity must be observed, also the justifiable safety expectations of the general public must be fulfilled. With products conspicuously “unsafe” in the market, or whose conformity to legal requirements is questionable, those responsible are obliged to initiate the necessary actions.

In order to be aware of and to understand the many demands addressed a product safety representative, comprehensive information and qualification is necessary.

2.7.2. Product Safety Officer - PSO

The supplier shall appoint a Product Safety Officer (PSO) who acts as a central point of contact to HARMAN. One PSO shall be designated per supplier’s production plant. This requirement needs to be cascaded down to entire supply chain.

2.7.2.1. Knowledge

The PSO shall have proven knowledge about:

- Functionality of the supplied component, the details of production at own site and proper use in the vehicles or with the respective subsequent client in the supply chain (Tier 2 and subsequent Tiered suppliers). If necessary, material usage recommendations (e.g. raw materials, materials) must be coordinated and agreed within the aforementioned requirement.
- Product Safety Act and the Product Liability Act.
- Risks Assessment methods and their application.

Based on this, a suitable, supplier-specific training concept can be set up for the qualification of multiple product safety representatives within the scope of a company-specific PSB network, provided that comparable content is conveyed, comprehended, and documented accordingly.

2.7.2.2. Tasks

The PSO shall have following tasks:

- Contributing to, developing, and setting priorities for eliminating or preventing product safety-relevant defects in the product development phase (error prevention).
- Working independently, initiating and verifying product, process, and engineering-relevant decisions in the course of product development and additional product enhancement (e.g. FMEA or risk assessment procedures) provided that there is an impact relevant to safety.
- Preparing, maintaining, and enhancing “lessons learned” checklists for the qualified review of designs, production, processes, or for the material properties under product-safety relevant aspects.
- Executing or initiating and assessing component or material analyses with the goal of detecting indications of deviations relevant to product safety at an early stage.
- Independently executing or initiating regular inspections of processes, production, material, and products of the current series for the confirmation of product safety for proper and predictable use or misuse and the introduction as well as tracking of (immediate) measures in the case of relevant deviations.
- Assessing the probability and frequency of failure of the affected product in the event of failure.
- In the event of a complaint, the planned remedial measures, their implementation and long-term effectiveness shall be verified. The effectiveness of the measures shall be reviewed, confirmed, and documented in writing by the supplier PSO.
- In the event of a complaint or voluntary declaration, communication shall be directed via the person responsible for component QA. The respective contact persons shall be determined in advance for downstream clients in the supply chain (tier N).
- The PSO shall advise with respect to the quality and confidentiality of the information (clear information regarding the error pattern, limitation, probability of failure, etc.).

2.7.2.3. Competencies

The PSO should report directly to management, the plant manager or the quality assurance manager. The PSO should be able to initiate the blocking of components or materials of the current series in the event of safety and image-relevant complaints, etc. (also if these threaten series application for reasons of safety), including resource control with regard to bench tests, validation, analyses, etc.

2.7.3. Product Safety & Conformity Representative - PSCR

In the meanwhile, the automotive industry is not only asking for a PSO, but also for a Conformity Officer. The positions can be held by separate persons, or also be held by one person. I case one person holds both positions, this person would be the so called PSCR – Product Safety & Conformity Representative (see VDA Product Integrity).

2.8. Supply Chain Security Control – LS only

Supplier shall establish and implement the supply chain security control system to avoid the product illegally leaked from their manufacturing factory. The Supply Chain Security focus areas include:

- Business Partners
- Container Security & Inspection
- Physical Access Controls
- Personnel Security
- Procedural Security
- Security Training & Threat Awareness
- Physical Security
- IT Security

If Supplier fails to comply with this section, Supplier is subjected to take following liability in terms of impact to HARMAN business:

- In the case of a proven unauthorized sale of HARMAN's product(s) on any channels due to the lack of control system from the supplier, the supplier should be penalized.
- If it has been discovered that the management team of the supplier(s) is involved in mass unauthorized sales of HARMAN's product(s) in any channels, the supplier should be penalized.

2.9. General Production Identification & Traceability Requirement

2.9.1. Introduction

All suppliers to HARMAN shall have an effective lot definition and traceability procedure. This procedure shall be applied for Product and Component traceability during all stages of production and shipment.

Delivered product must be traceable back to Supplier process, operation equipment, quality and process inspection/test data and the raw material. The definition of lot shall be set up based on supplier's risk assessment which influencing the process and sub-component/material. Suppliers shall ensure that their lot traceability system maintains its integrity throughout all influencing process and entire extended supply chain, including not only raw material, but also purchased components/products.

Traceability and quality records shall be maintained in accordance with Production Record and Retention provisions in this manual.

All traceability documentation must proceed through a database and the data must be available for analysis within 24 hours.

Supplier shall maintain a product change history to keep a history of all changes to the product delivered to HARMAN

2.9.2. Serial Number

Where applicable Supplier shall assign a unique Serial Number (SN) and/or a Secret Serial Number (SSN) on each of product according to the applicable HARMAN Serial Number Barcode System and Label Guidelines.

2.9.3. Raw Materials and Sub-Components

Documentation of raw material or component sourcing is to trace to the sourcing supplier's identifying Lot/batch. Supplier shall ensure that Sub-tier Suppliers comply with the equivalent of this provision.

2.10. General Packaging, Labelling, Handling, Storage and Shipment Requirement for final Assembly – LS only

Labelling

Supplier shall strictly follow HARMAN requirement for labelling. Accompanying products shall be legible and clearly identify the product(s) being delivered.

Specified labelling

Supplier shall provide labelling where specified by HARMAN and HARMAN shall review and approve the label contents and placement of such labelling.

Label integrity

Packaging and labelling operations shall be controlled to ensure label integrity, proper labelling is applied, and packaging is properly conducted.

Over-labelling

Supplier shall not use over-labelling or similar corrective measures unless approved by Harman in writing.

Double seal
Supplier shall not double seal the beauty box and master carton box unless approved by Harman in writing.

Packaging
Supplier and HARMAN shall collaborate to ensure that the packaging and shipping containers for the Product(s) are designed and constructed to protect the Product(s) from alteration or damage during the customary conditions of processing, storage, and handling, including repackaging, and return transport for repairable Service Parts.

2.11. General Disaster Recovery & Business Continuity Plan

Suppliers shall implement a Risk Management and Disaster Recovery Plan for potential catastrophes or work interruptions that would interrupt the supply of their product to HARMAN. This Disaster Recovery Plan shall comply with IATF 16949 requirements for Contingency Plans and include at a minimum contingency plan to address interruptions due to material supply, transportation, computer, personnel or sub-supplier issues.

The Recovery Plan should take a proactive approach including a plan of action, checklist of activities, communication plans, escalation procedures, and organization with teams, roles, and responsibilities. A Disaster Recovery Plan must be in place for all manufacturing sites and operations involved in producing and shipping product to HARMAN. Supplier must immediately notify HARMAN of the course of action during any period of actual interruption as well as the chain of command contacts.

3. Supplier Approval

HARMAN has a defined procedure for evaluating, qualifying and selecting new suppliers.

A supplier may be the manufacturer of the product to be delivered or a distributor of products as appointed by the manufacturer. The target is to use a supplier only after it has been established that they can fulfil HARMAN requirements. Depending on the product for which the supplier is to be sourced, specific documentation may be required from the supplier and other activities may be introduced.

Appropriate registration documents are forwarded to the supplier by Purchasing. The supplier must complete this registration package and return them to SQE (AUTO: SQE.auto@harman.com; LS: SQE.Lifestyle@harman.com). Following receipt of the documents, SQE will check for accuracy and completeness and review. SQE will evaluate the supplier's quality management system and certifications along with any quality related requirements. SQE and Procurement will determine whether the supplier meets HARMAN’s minimum requirements. If minimum requirements are met, SQE will determine whether an audit is required. If HARMAN’s minimum requirements are not met, the supplier approval request will be rejected within HARMAN.

A potential supplier may be requested to perform a self-assessment according to HARMAN´s audit procedure or applicable industry standards (e.g. VDA 6.3). The supplier provides a report of the observations and findings during the self-assessment to HARMAN. In case of a subsequent HARMAN audit supplier´s self-assessment report will be used as a baseline document.

SQE determines whether a HARMAN audit is necessary after considering the component technology, component risk, component complexity, vendor quality registration status, etc. If an audit is found necessary, SQE will conduct this audit using the appropriate audit forms. Purchasing may accompany SQE on this audit if desired.

HARMAN reserves right to delegate the execution of a HARMAN audit to a third party chosen by HARMAN. The supplier shall provide access for supplier facilities during the audit. A corrective action plan must be generated for the findings at the self-assessment as well as for the findings at the HARMAN-audit.

If the supplier does not pass the audit, then the supplier approval request will be rejected and/or a follow up maybe required is by SQE with the supplier, so that the supplier would be able to pass the re-audit.

After positive results from an overall evaluation (registration documents, audit result, etc.) a sample order (one component/project) may be placed with the supplier.

SQE and PRC will re-evaluate the vendor responses and performance at project execution. If this order result is positive and finally approved via PPAP, the supplier approval will be considered complete. For further business, HARMAN Supplier-Management-Team will select the supplier according to the supplier selection process. HARMAN will inform the supplier of the result of the approval process. In case the approval is denied, the supplier may be granted a defined timeframe to implement improvements and to reapply for approval. A supplier approval given by HARMAN does not imply an obligation for HARMAN to place any orders at the respective supplier.

4. Supplier Blocking

HARMAN has a defined procedure for blocking a supplier. All departments at HARMAN can initiate the process for blocking a supplier. Potential reasons for applying for blockage could be, e.g.:

- Insufficient quality performance,
- Insufficient supply performance,
- Insufficient project work,
- Ineffective Controlled Shipping level 2 (see chapter “Controlled Shipping”),
- Repeatedly bad rating (C or B) with regards to the supplier evaluation without any recognizable improvement (see chapter “Supplier Evaluation”),
- No improvements from implemented supplier development activities,
- No improvement after execution of Supplier Quality Improvement Plan – SQIP.

5. Quality assurance in all Phases of Cooperation

In all phases of cooperation, from concept-phase to product and process development-phases, and finally to mass production, all necessary actions to assure quality need to be performed at the supplier.

5.1. Quality Assurance in the Concept Phase

In the concept phase, the supplier is obligated to check the requirements from HARMAN (inclusive applicable GCSR – generic customer specific requirements) with respect to product and process requirements, manufacturability, time schedule, capacity and quality targets (PPM) for feasibility.
The supplier shall complete a feasibility study and provide the results to HARMAN Procurement using the HARMAN Form F1834959 if requested.

5.2. Quality Assurance in the Phase of Product- and Process-Development and Verification

5.2.1. Determination of special Product- and Process-Characteristics

During product and process development, the supplier must consider special characteristics as defined by HARMAN.

These special characteristics may relate to product, process or both. In addition to special characteristics specified by HARMAN, additionally the supplier must identify characteristics deemed critical. In case that the special product characteristics are not given by HARMAN, the supplier must identify special characteristics on its own. The special characteristics must be highlighted in appropriate documents, like FMEA, control-plan, drawings, etc. Special product characteristics should be guaranteed with one of the following methods: systematic failure avoidance (Poka Yoke), 100% inspection, statistical process control (SPC), process capability monitoring, and Measurement system analysis for testing and measurement equipment.

For customer designated special characteristics as noted on HARMAN drawings or specifications, quality records must be retained by the supplier for 100% of the product produced. These records must be made available to HARMAN upon request.

5.2.2. Measures for Quality Assurance in the Phase of Product- and Process-Development

During the product and process development phase, the supplier is expected to mitigate risk by utilizing risk rating and risk management tools. The goal is to ensure that from the start of mass-production until end of mass production the delivered products/parts comply with the specification and are produced with controlled and capable processes. Applicable risk management tools are:

- APQP
- PPAP
- Sub-supplier development and management
- Mfg. process readiness checklist
- Mass Production Approval (MPA)
- Safe Launch Plan (SLP)

5.2.2.1. Communication in the Phase of Product- and Process-Development

Individuals from HARMAN cross-functional team, project management, engineering, procurement and SQE at HARMAN will be assigned to be the contact to the supplier in the phase of product and process-development. The supplier shall forward a project/organization chart to HARMAN that shows the persons and respective competences of the team involved in the project that will interact with the respective HARMAN team members. It is the project manager at the supplier who is to be held responsible for the overall coordination and the respective activities.

5.2.2.2. NPI Sample General Requirement - LS only

Supplier shall build the sample according to HARMAN PM issued NPI sample request and maintain a traceability control system for NPI sample control:

- Where applicable assign unique serial number for each of NPI samples build during the new product development stage according to HARMAN serial number barcode system and labelling guideline (document reference# 997-0086 latest version).
- The serial number of each NPI samples shall link to the BT/Wi-Fi MAC address used (if applicable).
- Keep the NPI sample distribution list when and where the NPI samples were distributed/shipped and get the receipt and/or confirmation for record.

5.2.2.3. Advanced Product Quality Planning APQP

On-time approval of Production Part Approval Process documents (PPAP) must be guaranteed through the use of an APQP process. All relevant activities must be scheduled, executed and verified. The project plan must include proper risk mitigation activities and back-up plans. In case of schedule delays or development issues, a suitable recovery plan must be crafted and executed leading to project success. Project scope, division of responsibilities, technical requirements and project schedule should be determined as early as possible. For component being classified by HARMAN as critical, the Project progress will be tracked against the agreed upon schedule using the HARMAN APQP workbook. These project audits may be done either during a meeting or, if applicable, through a review of respective documents.

5.2.2.4. Maturity Assurance

Beyond the use of APQP, the supplier is expected to utilize comprehensive program management tools to ensure product and process maturity are in line with the HARMAN program development plan. The HARMAN APQP guidelines specify gateway reviews which summarize progress at key program milestones. The supplier is expected to manage development activities to ensure completion of critical tasks and supporting sub-tasks such that project status remains as planned (green). The supplier shall provide frequent updates on project status. In case of a critical task suffer a delay, immediate notification to HARMAN is required.

5.2.2.5. Mass Production Approval (MPA)

In the course of Production Part Approval Process (PPAP), a Mass Production Approval shall be executed at the supplier. The HARMAN MPA tool will be used for this. During the MPA, HARMAN and potentially the HARMAN's customer require full access to all areas referenced in the Control Plan at the supplier's manufacturing location.

During the MPA, products shall be produced with production conditions at the supplier. Production rate, first pass yield and final yield will be measured during the MPA production run. According to the findings and the overall result of the MPA, corrective actions requests will be presented to the supplier by HARMAN. If necessary, a follow up audit to verify corrective actions will be arranged.

Build quantity of the MPA will be determined by the HARMAN Supplier Quality Engineer prior to the build. In most cases, 300 pieces (minimum) or a single production shift will be required.

5.2.2.6. Run@Rate

Typically, a Run@Rate will be performed together with the MPA. The HARMAN Run@Rate tool will be used for this. The purpose of this activity is to verify that the supplier's actual manufacturing process, while operating under mass production operating conditions, is:

a) Capable of producing quality components per HARMAN requirements,
b) Capable of meeting or exceeding the contracted capacity on a sustained basis.

The Run@Rate could be either executed by HARMAN SQE or by the supplier itself according to the HARMAN procedure with the help of the respective HARMAN templates.

5.2.2.7. Production Part Approval Process (PPAP)

5.2.2.7.1. In General

The PPAP - procedure shall provide evidence that all requirements in the drawings and specifications are met and that the product is produced with a controlled and capable process. The PPAP submission must be made and approved by HARMAN before the start of mass production. All changes in product or process that are required for approval as defined in AIAG/VDA must be PPAP approved. The PPAP procedure is the final verification for the product and the production process leading to the final approval for mass production. The PPAP procedure must be done according to the regulations given by the current revision of the AIAG PPAP manual.

In general, Supplier is expected to complete PPAP Level 3.

Applicable PPAP submission levels are as follows:

1. Custom Parts – Custom parts are those which are fully defined by HARMAN released prints. These maybe unique parts or catalogue parts with modifications. Custom parts require the submission of a full level 3 PPAP.
2. Catalogue or Off-The-Shelf Parts – Catalogue parts are those which are fully defined by supplier prints and for which HARMAN does not specify changes to either design or process parameters. For catalogue parts, only a level 4 PPAP needs to be submitted to HARMAN. The specific requirements for this level 4 PPAP will be given either by a commodity specific template "PPAP requirement" or individually by the assigned HARMAN SQE. At least the PSW must be submitted to HARMAN.
3. Critical Components – Critical components will be defined by HARMAN. Those components which are rated as critical will require APQP reporting. During the APQP process, the HARMAN SQE, along with the supplier, will determine PPAP requirements.

HARMAN defines commodity specific PPAP requirements. The procurement will forward those requirements - to the supplier along with the purchase order if applicable. These templates should be used by the supplier, procurement and finally SQE as a list to check PPAP contents and completeness.

Sample delivery dates will be communicated to the supplier via the purchase order (P.O.). Upon the delivery date of the PPAP order, the supplier must forward all documents for PPAP and samples to

HARMAN. For this, templates according to PPAP (AIAG) must be used. All requirements for dimensions and product specifics, which are given by the product specification, must be verified and documented. It is expected, that PPAP samples meet all specification at the time of PPAP delivery specified in the P.O. Design and process iterations for development purposes must be scheduled into the program schedule such that they occur prior to the PPAP delivery date. Should product or process changes (including corrections for dimensional deviations) be executed after the PPAP delivery, all requirements for dimensions and product specifics must be verified again. Variations for this must be agreed together with the assigned HARMAN SQE.

If the qualification is not complete and approved prior to the target date or is repeatedly done in an insufficient manner, HARMAN has the right - to appoint an external agency for the completion of the qualification. This is specifically cited regarding the physical measurement of the parts. In this case, the supplier will bear the costs incurred for these services.

In addition to AIAG PPAP requirements, HARMAN requires the supplier to submit:

- A completed and signed Quality Assurance Agreement (ppm agreement),
- Adequate information about processing of complaints (reject handling, contacts for RMA - Return Materials Authorization, failure analysis procedure (inclusive NTF - no trouble found), defined procedure to ensure required TAT - Turn Around Time, etc.),
- Product-/Process- and/or Tool-history.

5.2.2.7.2. International Material Data System (IMDS) – AUTO only

To make the declaration of substances in the component material, data must be entered (published) into the International Material Data System (IMDS) or must be sent via IMDS to the HARMAN accounts which defined at HARMAN IMDS supplier guideline. Further information for this can be found at www.mdsystem.com. The reference ID-number from IMDS must be included on the PSW form. Failure to complete this entry on the PSW will result in PPAP rejection.

5.2.2.7.3. Approval

HARMAN Supplier Quality Engineering is solely responsible for the disposition of PPAP submissions. Three PPAP statuses are possible:

Approved → Deliveries of parts are approved.

Interim Approved → In cases where the parts meet requirements but there may be additional data required or minor issues with the PPAP submission, e.g. lack of process capabilities, marginal GR&R, the Supplier Quality Engineer may approve the PPAP but require the supplier to provide containment actions with 100% inspection/test plan and corrective action related to the observed issue to grant full PPAP approval. HARMAN SQE permits shipment of material for production requirements on a limited time or piece quantity, the supplier shall regard as a temporary approval until the information is received and approved by the HARMAN SQE. Any additional or improved documentation must be submitted with a revised PSW to HARMAN SQE.

Rejected → Where delivery of mass production parts is not allowed. A new PPAP submission is required. If nevertheless parts are required, the supplier shall submit Deviation Approval Request to HARMAN for authorization.

The supplier and the responsible buyer at HARMAN will receive a copy of the signed PSW page from the Supplier Quality Engineer.

As noted previously, PPAPs will not be approved with data showing that parts do not meet all specifications and requirements. If engineering or other issues exist that need to be negotiated, approved, or modified, then a PPAP will not be approved until these issues are resolved and all documentation supports the configuration of the parts as submitted for PPAP.

5.3. Quality Assurance in the Launch Phase

HARMAN expects from its supplier's additional quality assurance measures during the launch phase. This is necessary in order to guarantee the quality of the parts in this critical phase.

5.3.1. Safe Launch at the Supplier

The safe launch at the supplier will be achieved through additional and extra activities. To ensure a safe launch, the supplier shall implement extra activities such as 100% inspection, tightened sampling schemes, tight control limits, increased numbers of inspection steps, tighten inspection/test criteria, etc.

Related Safe launch quality data such as process records, inspection results, Yield data, Failure analysis results and effectiveness of countermeasures on failures during safe launch period shall be regularly evaluated using statistical method. These additional quality assurance activities should be ongoing until a quality target, defined in advance, is achieved and sustainable.

For components, which are classified by HARMAN as critical component, the procedure “Safe Launch Plan” (SLP) will be applied. This procedure describes the selection of SLP activities, the monitoring and reporting of the quality levels as well as the procedure to stop these SLP activities.

5.3.2. Safe launch at HARMAN

HARMAN reserves the right to request on-site presence of a supplier resident quality engineer during the launch phase. If necessary, person should be onsite to monitor the process at the HARMAN plant. In case of any fault occurrences, Resident engineer should be able to start and support the problem-solving process as soon as possible.

5.4. Quality Assurance in Mass Production Phase

- With the support of applicable quality tools, the supplier must guarantee that supplied products meet the required and stipulated quality targets during the complete phase of mass production.
- Supplier shall continuously monitor process capability for all special characteristics. Records of these shall be made available to HARMAN upon request.
- In case of an identified quality setback, supplier shall investigate the root cause(s) and identify and implement containment action and corrective action to avoid any negative impact on supplies to HARMAN. HARMAN expects to be informed by supplier proactively about those issues. HARMAN reserves to request an 8D report irrespective of the impact of the quality setback.
- Quality setbacks may include:
  - Negative result in ongoing reliability monitoring.
  - Epidemical fails observed on same or comparable products at other customers (epidemical fails are assumed when ppm-rate target agreed with HARMAN is exceeded by factor 3 related to a specific date code, lot code, …).
- Process capability for any identified critical characteristic falls below the Cpk value of less than 1.67.
- Process capability for any identified critical characteristic falls below 75% relative to Cpk value reported to HARMAN in the PPAP.
- Overall production and test yield fall significantly lower than that observed and reported during MPA and Run@Rate influencing the supply situation for HARMAN.

Supplier shall notify any event of quality set back to HARMAN SQE (in LS) or to plant SQA (in AUTO).

5.4.1. Quality Assurance in Mass Production with the Execution of Statistical Process Control (SPC)

With the help of SPC for specific product and process characteristics it must be proven that the product is produced with capable and controlled processes. For the machine capability c_{mk} as well as for process capability c_{pk} the value of ≥ 1.67 (auto) / 1.33 (LS) must be maintained and verified. In the case of capability values of ≥ 1,67 (AUTO) / 1.33 (LS) cannot be achieved, a 100% inspection is required. AIAG/VDA standards provide requirements and methods for the calculation of capability.

5.4.2. Shelf-Life Control

Supplier shall define the shelf-life control process for the materials or products that have a limited or specified shelf life, the Supplier shall furnish data that shows the cure or manufacture date, expiration date or shelf life, lot or batch number, and when applicable any special handling or storage requirements.

5.5. Control of Non-Confirming Materials

5.5.1. Control of faulty products at suppliers

The Supplier must ensure that all Non-Conforming Product is clearly labelled and segregated in all processes and areas of the Supplier's operation. Systems must exist to positively insure that Non-Conforming Product is not inadvertently used in production or shipped to HARMAN or its customers. No rework will be allowed except as given in section 5.6.

5.5.2. Control of faulty products at HARMAN

In case the Supplier discover that there is a possibility that Non-Conforming Material has been delivered to HARMAN, the Supplier is responsible to:

- Immediately inform SQE (LS) / plant SQA (AUTO) to which the suspect material has been shipped. This notification cannot be considered complete until a written response has been received from all HARMAN facilities involved.

This notification must have preliminary information within a “Quality Alert” first, followed by detailed 7D or 8D format Corrective Action Report. Those disciplines which are not yet complete must be presented as planned activities with milestones and supporting subtasks.

5.6. Control of Repair & Rework

5.6.1. Authorization for Repair and Rework

Under normal production circumstances, only Repair or Rework, which has been approved in the process documentation and embodied in the sample or approval parts supplied to HARMAN is authorized.

Supplier shall request deviation approval for any other repair or rework that is needed to avoid supply shortage. Any unauthorized repair or rework process is prohibited.

5.6.2. Refurbished material – LS only

Refurbished Material shall only be used in any Product(s) when there is prior written approval from HARMAN.

5.6.3. General requirements for Repair and Rework

Where rework or repair is necessary, the supplier must develop written procedures for the rework/repair operation. These procedures must provide for relevant monitoring, inspection, and testing steps after rework, in order to ensure conformance to all applicable requirements. Reworked product shall be re-tested and audited through the standard production monitoring system. This applies to both individual parts and assemblies.

Repair/Rework General Requirements:

1. Repair/Rework area:
    a. A dedicated repair/rework area for the product shall be established.
    b. Tools suitable for the repair/rework shall be readily available.
2. Training and qualifications:
    a. Only trained and qualified personnel shall conduct repair/rework on HARMAN products. Training records must be available for review upon request by HARMAN.
3. Traceability:
    a. Traceability shall be established with appropriate labelling/identification to ensure that products subjected to repair/rework can later be identified to aid in potential future problem solving. In addition, traceability of components used shall be maintained at the same or higher level as that used for production.
4. Inspection and Testing:
    a. Suppliers must submit a “Control Plan” for repair/rework process” that identifies relevant monitoring, inspection, and testing steps after rework, in order to ensure conformance to all applicable requirements.

5.7. Deviation Approval

Suppliers are expected to strictly adhere to the production process and materials documented within the PPAP. When a deviation from the process or materials is needed, or the characteristics of the supplied product are out of specification, the supplier must obtain written approval from HARMAN prior to shipment. The request for deviation must be delivered providing enough time for evaluation and validation of the change / non-conformity. The request must contain explicit details of the change / non-conformity including:

1. Header information
    a. Part number
    b. Part description
    c. Where used report
    d. Manufacturing location
    e. Dates of manufacture
    f. Contact information
2. Description of the change / Non-conformity
3. Complete list of parametric differences resulting from the change
4. Reason for the change / non-conformity
5. Proposed Control Plan and PFMEA
6. Validation results
7. Schedules
8. Method of change / non-conformity identification (package labels, date codes, etc.)
9. Expected duration (Time and Quantity)
10. Plan for returning to normal production of conforming goods.

Deviation approval is considered as a temporary change request; therefore, the supplier shall inform HARMAN procurement. After HARMAN has determined the change / non-conformity is acceptable, written approval will be granted. This approval process may be lengthy as it may require notification or approval from HARMAN's customer.

5.8. Scrap Control – LS only

5.8.1. General Requirement

Supplier shall establish, implement and maintain a process to ensuring a proper disposal process of all key commodities, semi-product and finished goods, including battery, PCBA, BT/Wi-Fi module, cable assembly, adaptors, speakers, IC, Housings, microphone, QSG, gift box, etc... All materials (including the raw materials, semi products, finished goods) shall be physically destructed by a hydraulic process.

- Finished goods and sub-assemblies: All components on the failure FG or sub-assemblies should be destroyed by a hydraulic press and required to be totally destructed.
- Key Components: All failed components are to be destroyed by a hydraulic press and are required to be totally damaged.
- Paper Product: Shred into pieces by a paper cutting and shredding machine.
- Kit components: should be destroyed by a hydraulic press and required to be totally destructed.
- Batteries: Destroyed according to the related battery disposal regulation required.

5.8.2. Scrap Control Process

- Supplier notifies HARMAN SQE by written notice with material scrap list.
- Harman SQE and/or OPM may onsite witness the scrap process.
- Together with HARMAN SQE, Supplier Finance, Quality and Warehouse people shall onsite witness the scrap and sign off the scrap sheet.
- All materials, semi-product, finished goods shall be physically destroyed w/o function before scrap.
- Supplier shall provide the COS (Certificate of Scrap) w/ photo after scrap and GM signature for HARMAN SQE record.

5.9. HARMAN Inspection – LS only

Where applicable HARMAN may choose to perform Source Inspection (SI) or AQL inspection at the Supplier manufacture site before shipment of Product(s) designated to a HARMAN region distribution center. Audits will be in accordance to the ISO2589 Sampling Plan, Single Inspection, and Normal Inspection, Level II, AQL. If HARMAN chooses to perform source inspection at Supplier's site, Supplier shall provide HARMAN reasonable access to inspect, review and audit the site(s) where the Products are tested, handled, stored, distributed, designed and manufactured. This includes access to the Product(s) and all related manufacturing information. Supplier shall provide the outgoing inspection report with the photos of the products, outside packaging and labelling at least 3 days prior the shipment, except when special circumstances warrant a shorter time.

If HARMAN deems source inspection needed in the case of a supplier shipment lot failure, supplier will be required to absorb cost of such audit activities (excluding first three NPI shipments) after SOP. In the event of shipment rejected by HARMAN, supplier is subjected to the product recall, replacement or rework/repair and the associated cost.

HARMAN Sourcing Inspection and/or Region AQL inspection does not release the supplier's liability from breach, hence, if any failures caught in the field, the supplier shall still take full responsibility for such failures. HARMAN is entitled to return, or request replacement of the defective units and costs and expenses thereof shall be borne by the supplier.

5.10. Shipment Control

5.10.1. General

In Controlled Shipping (CS) it is required by HARMAN that a supplier put in place a redundant inspection process to sort for a specific non-conformance, while implementing a root-cause problem solving process. This redundant inspection is in addition to normal controls and actions implemented via the HARMAN Q-Notification process and controls dictated by the Control Plan. Any additional cost associated with controlled shipping is the responsibility of the supplier. Any deviations to this requirement must be approved by HARMAN SQA.

HARMAN may require the use of a third-party contractor (CS level 2) to conduct and manage the controlled shipping activity. A third-party containment process is generally required when the supplier's own containment process, CS level 1, has proven to be ineffective. The third-party contractor may be directed by HARMAN. If the third-party contractor is selected by the supplier, HARMAN SQA maintains the right of approval for the supplier selected. HARMAN will require access to all CS level 2 data. Availability and formats are to be determined at the time CS level 2 begins.

The data obtained from the third-party inspection process as well as any additional audits are critical as both a means to measure the effectiveness of the secondary inspection process and the corrective actions taken to eliminate the initial non-conformance. The Controlled Shipping inspection may be required to be performed outside the supplier's facilities at a facility deemed appropriate by HARMAN. CS level 2 may also be used to clean the material in pipeline and stock at both the supplier and HARMAN locations.

In cases where CS level 2 needs to be maintained over a long period of time because the containment and corrective actions are ineffective, and for this reason, supplier might be put on "no new business" and in worst cases on "active de-source" at HARMAN.

5.10.2. Controlled Shipping Determination

HARMAN SQA makes the determination whether the supplier can effectively correct the nonconforming material situation through the HARMAN Q-Notification process and isolate HARMAN from the problem. One or several of the following issues may be considered for implementation of Controlled Shipping Level 1 or Level 2:

- Repeat, late or insufficient response to HARMAN Q Notifications, DMN's.
- Supplier's current controls are not sufficient to ensure conformance to requirements.
- Duration, quantity, and/or severity of the problem.
- Internal/External Supplier data.

- Major Disruptions and/or Downtime.
- Quality Problem in the field (i.e. Warranty).
- Controlled Shipping Level 1 failures.

5.10.3. Controlled Shipping Process

The following steps will take place when HARMAN places a supplier in Controlled Shipping:

- HARMAN will notify the supplier that Controlled Shipping is required. An explanation for the requirement and description of the process steps will be reviewed at this time. The required third-party provider, if applicable, is also communicated.
- The supplier confirms requirements are understood and provides a plan of action to implement the Controlled Shipping process. Planned reporting mechanisms are also presented at this time by the supplier.
- HARMAN SQA reviews the plan and approves or rejects it. If the plan is rejected, HARMAN SQA provides feedback on adjustments required. Upon plan approval, HARMAN SQA provides exit criteria to supplier. The duration of Controlled Shipping will typically be 20 working days with zero defects at the CS inspection station following implementation of permanent corrective actions as described in HARMAN Q-Notification process.

Please refer to HARMAN Controlled Shipping Process procedure for further details including requirements, expectations, exit criteria etc.

6. Complaint Handling, Failure Analysis & Problem Solving

6.1. General

To support HARMAN's zero-defect strategy and ensure excellent performance during pre-series and series production phases it is essential that suppliers define, introduce and maintain highly effective and efficient problem-solving processes.

Supplier shall align their complaint handling, failure analysis and problem-solving process to established industry standards, HARMAN's customer specific requirements defined in this manual and applicable OEM customer requirements.
In particular, these include:

- IATF 16949, "Quality management system requirements for automotive production and relevant service part organizations"
- VDA - Field failure analysis
- VDA - 8D – Problem Solving in 8 Disciplines

Problem solving methodology shall be team-oriented, based on factual knowledge and utilize appropriate statistical methods for analysis of data.

Supplier shall utilize their complaint handling, failure analysis and problem-solving process in processing of quality complaints, logistics complaints and audit findings. All written communication between HARMAN and supplier and all documents shall be in English language.

Note:
HARMAN is using same raw materials and semi-finished products across our worldwide operations. This may include the transfer of materials from site to site. To simplify complaint handling processes HARMAN reserves to issue complaints to our suppliers from any site where HARMAN is processing related parts or products independently from which site received the original supplier shipment. This also includes HARMAN contracted manufacturing partners.

6.2. Schedule / Timeline Requirements

HARMAN will notify supplier of defective material using HARMAN´s quality notification system. HARMAN will indicate where the reported failure was first observed: e.g. at HARMAN Inspections, during Production/Test, or at the customer.

Timeline requirements:

- Immediately after receiving initial complaint information from HARMAN, supplier shall identify immediate containment action(s).
- If requested by HARMAN, supplier shall ensure availability of a resident engineer at the affected HARMAN plant latest 48 after the initial notification was issued.
- If supplier´s return process requires a RMA for return shipments, supplier shall provide the RMA to HARMAN within one working day after the initial notification was issued.
- Supplier shall initiate its internal problem solving immediately after receiving the notification from HARMAN and establish an internal problem-solving team.
- Within 2 working days after receiving notification from HARMAN, supplier shall provide an initial containment action report. By this time the disciplines D1 thru D3 should be completed by supplier and the results shall be included in the report.
- Within 14 calendar days after receiving defective parts – or alternatively a comprehensive failure information (e.g. dimensional reports, pictures, error-logs…) - from HARMAN, supplier shall provide a final 8D report. By this time also the disciplines D4 thru D7 shall be completed by supplier and the results shall be included in the report.
- If supplier is not able to provide a final 8D report within 14 calendar days, an interim report must be provided. Additionally, supplier shall provide a detailed time-schedule for completing the 8D.
- If permanent corrective actions include design changes or major process changes that are subject to the PCN / CR approval, HARMAN recognizes that the final implementation of these actions may be depending on factors outside supplier´s direct influence. In those cases, completion of D6 may be delayed to a date agreed with HARMAN in advance.

6.3. Containment Action

Immediate containment action shall ensure that further shipment of affected parts to HARMAN is avoided and affected parts at HARMAN or within the supply chain can be identified and segregated. Supplier shall identify the range of product that may be affected in terms of serial number range, date code or identification of affected shipments. Supplier shall provide information about the potentially affected product range latest within the 8D report and actualize this information continuously based on findings during failure confirmation and FA.

Supplier shall ensure that the supply to HARMAN will not be disrupted. This may be achieved by implementing appropriate additional inspections that can effectively screen-out affected parts or by rework of affected parts. Supplier shall define and document those processes in work instructions and control plan and provide sufficient training to all operators involved.

Supplier shall ensure that all reworked products meet the applicable specification requirements and successfully pass all tests and inspections defined in the serial production control plan.

Supplier shall ensure that all reworked parts can be identified by serial number or marking of individual parts, packing units and shipment containers. Markings must be agreed with HARMAN in advance. All rework activities (except those that have been approved by HARMAN within APQP/PPAP) are subject to approval by HARMAN. For this purpose, HARMAN reserves to request submission of all related documents and records by supplier as well as an on-site process review at supplier.

HARMAN reserves to impose its Controlled Shipping procedure on suppliers to implement and monitor redundant inspections related to observed quality issues.

6.4. Failure Confirmation

Supplier’s failure confirmation strategy shall follow the generic approach displayed below. This approach follows the requirements of VDA volume “Field failure analysis”.

I. Evaluate HARMAN´s complaint information related to key questions:
   - Has HARMAN´s description of the failure symptom been understood?
   - Is the occurrence mode of the failure known (sporadic, permanent, under specific application loads, under specific environmental conditions …)?

- Is the instant of failure observation known (HARMAN incoming inspection, HARMAN production/test, OEM plant, field …)?

II. Record “as received” part status, including
- date code/lot code/serial number information
- externally observable characteristics
- part internal log files, data content of memory devices

III. Perform standard tests and inspections as specified in control plan
- end-of-line tests
- functional tests
- dimensional and appearance inspection
- out-of-box audit

IV. Perform failure-oriented tests
- tailored tests emulating application conditions at HARMAN
- cyclic tests to reproduce sporadic failures

V. Perform tests under load
- tests coverage for tests under load shall be similar to that of the standard tests
- peripheral and environmental conditions during test shall be varied according to operational limits defined in part specifications, datasheets, drawings or similar documents
- load factors typically include temperature range and gradients, variation in supply voltage, vibration, humidity, physical loads
- combinations and interactions of load factors have to be considered

If failure of the complaint part can be reproduced during standard tests (stage III) the failure-oriented tests and tests under load may be skipped and the root cause analysis can be started (applies analogously to stage IV).

If the failure cannot be confirmed during stages III thru V the complaint part can be identified as “OK based on part analysis”.

HARMAN reserves to re-test parts deemed “OK based on part analysis” in the application environment to verify supplier´s Failure confirmation.

HARMAN reserves to request a joint analysis at HARMAN to expedite failure confirmation by supplier. Supplier shall ensure that such joint analysis can be supported within 5 working days after HARMAN´s request.

6.5. Root Cause Analysis

Supplier shall use a systematic approach for root cause analysis based on findings during failure confirmation, review of production and test records, and physical analysis. Applicable methods include 5-Why-Methodology, Ishikawa-Diagrams, FTA and process mapping. In general, non-destructive analysis methods should be preferred over those that might destroy the failure condition.

Supplier shall identify all root causes that contributed to the issue observed, including

- Occurrence root cause(s), i.e. reason(s) that resulted in creation and propagation of a non-conforming characteristic or an inherent weakness of the product, as well as
- Escape root cause(s), i.e. reason(s) that resulted in non-detection of a non-conforming characteristic or an inherent weakness of the product before shipment.
- Systemic root cause(s), i.e. systemic reason(s) that allowed occurrence and escape of the non-conformity.

6.6. Corrective Action

Supplier shall identify corrective actions for all identified occurrence and escape root causes and devise a plan and schedule for implementation. All corrective actions shall be validated, and effectivity shall be confirmed using applicable statistical methods. Immediate containment actions must be kept in place until effectivity of the corrective actions has been confirmed.

Supplier shall identify the first date code/lot code/serial number and shipment of parts including each corrective action and provide this information to HARMAN within discipline D6 of the 8D report.

Supplier shall evaluate whether the planned corrective action constitutes a supplier-initiated change, that needs notification. In that case supplier must initiate the PCN process independently. Implementation of those actions prior to PCN approval is subject to the deviation approval process as defined in this manual.

6.7. Preventive Action

Supplier shall ensure that findings/knowledge gained while executing disciplines D2 thru D6 of the 8D process are extended across similar products and processes and will be considered in quality planning. This should include review of related FMEAs, standard operating procedures, design rules and similar documents as well as the consideration in the lessons learned process. Supplier shall identify which parts or part families supplied to HARMAN are considered herein.

6.8. Supplier Problem Solving Performance

HARMAN measures effectivity of supplier´s problem solving process based on quality performance data and 8D reporting. Insufficient performance might result in escalation and – ultimately – blocking of suppliers for new business.

6.9. Communication and Escalation

Each supplier must provide contact information (phone number and email address) for the appropriate responding resource. HARMAN reserves the right to contact any point of contact and escalate communications to the extent necessary to address any issues that may arise with respect to the goods supplied by the supplier.

6.10. Regular Reports from Supplier, Quality Improvement Plan

In cases where the product risk or production history warrants additional HARMAN attention, periodic quality reports will be requested from the supplier. Normally these reports will be requested on a monthly basis, but they may be requested more frequently if the situation warrants. HARMAN will generally not mandate a format for these reports but prefers, if available, to use a standard report format that the supplier uses internally. This allows HARMAN to better understand the types of metrics and reporting systems that the supplier normally uses. However, it is expected that these reports will contain certain basic information related to the components produced for HARMAN and, in particular, the components which are causing the heightened level of attention. This basic information would include such items as:

- Quality Trends, (preferably in PPM), for HARMAN In-plant Failures, initial/0-KM Issues at End Customer, and End-Customer Field Return failures.
- Failure Pareto analyses
- Corrective Action Tracking in terms of Containment and Permanent Corrective Actions and Post Corrective Action performance.
- Response time metrics for Containment, Analysis and Permanent Corrective Actions, (how long to implement?)
- The duration of the reporting period will be agreed upon with the involved HARMAN Quality personnel.

Content and frequency of reporting will be agreed between HARMAN SQA/SQE and supplier.

In addition, where supplier performance is deemed to require improvement, HARMAN may place the supplier on a Supplier Improvement Plan (SIP) in accordance with HARMAN procedure.

6.11. Resident Engineer

Under certain circumstances, HARMAN will request the supplier to provide on-site engineering services. Arrangements for resident engineering will typically be made during the APQP stage of product development; however, HARMAN reserves the right to request supplier resident engineering support in response to quality-related events that occur during series production. It is expected that the supplier will provide an appropriate expert for the required position. The resident engineer shall be equipped, at the supplier’s expense, with tools necessary to carry out his duties.

While on HARMAN properties, the supplier resident engineer is expected to be aware of and follow all HARMAN codes of conduct and ethics as well as all laws applicable to the location. Failure to do so will result in the discharge of the resident engineer at which time the supplier will be expected to provide a suitable replacement.

7. Management of Sub-tier Suppliers

7.1. Sub-Supplier Management

The suppliers are responsible for managing the quality of the sub-suppliers. The requirements provided by HARMAN shall be cascaded to supplier's supply chain as appropriate. These terms apply to distributers as well.

Supplier shall implement, maintain and ensure oversight and monitoring of their Sub-tier Suppliers following a documented, risk-based approach that complies with Supplier's own internal procedures and Quality Management System and HARMAN's Specifications, including without limitation, audit rights of the Sub-Tier Supplier. HARMAN may elect to provide input into this risk assessment of Supplier's Sub-tier Suppliers and may require Supplier to escalate the risk and consequently the oversight as applicable for the Product.

7.2. EMS (Electronics Manufacturing Service) Supplier Requirements

To define the manufacturing systems, guidelines and requirements for HARMAN designed electronic module, electronic assembly, and printed circuit board assembly (PCBA) suppliers to HARMAN OEM Business will adhere to the following guidelines.

- 2042711 Manufacturing guidelines for HARMAN EMS supplier

8. HARMAN Audits

8.1. HARMAN Audits in AUTO

HARMAN employs several audit tools to ensure suppliers meet appropriate quality levels. These tools are used at various stages throughout the supplier development process, for re-qualification, for mass production approval as well as in case of any problems during mass production. Audits may be conducted by external auditors or by HARMAN employees.

Audit types are as follows:

"Use case"	Assessment type	Tool / questionnaire
Initial supplier qualification; supplier re-qualification; new site release	HW: VDA 6.3 SW: Aspice	HW: VDA 6.3 SW: ASPICE
Production process release (APQP)	HARMAN MPA; VDA 6.3;	MPA questionnaire; VDA6.3;
Capacity verification	R@R	HARMAN R@R; appropriate supplier R@R templates
Supplier development (IATF 16949)	IATF 16949	Checklist, report, or similar
SIP; actual quality issues	As appropriate (e.g. MPA process walk)	Checklist, report, or similar
Corporate Social Responsibility – CSR	As appropriate	Checklist, report, or similar

The supplier will make available appropriate management personnel as well as technical personnel for each phase of the above audits. Supplier shall perform self-assessment at least 1 week before HARMAN audit and supplier's self-assessment will be baseline documents for HARMAN onsite audit. Complete access must be granted to all phases of the manufacturing process, to include clean rooms, laboratories, storage areas, etc. The audit team will be limited in sensitive areas; however, the supplier must accommodate at least two auditors in all areas. Appropriate protective equipment/clothing will be provided to HARMAN personnel for access to these areas. (Where special protective gear or clothing is

required, it will be the supplier's responsibility to ensure that this is available in sizes appropriate to the inspection team members.)

Suppliers can best prepare for these audits by conducting an internal review/audit using the HARMAN evaluation/assessment documents. These documents are available through the Supplier Quality Engineering Department.

In general HARMAN expects an action plan to address each non-conformance of the audits within two weeks, to include completion dates agreed upon by HARMAN personnel.

8.2. HARMAN Audits in LS

Harman may elect to conduct on-site assessments of its suppliers and sub-tier suppliers.

Supplier Initial Risk Assessment (SIRA)
HARMAN may request the Supplier to provide a copy of its quality management system certificate and/or complete a self-assessment of its business and quality management system.

Quality System Audit (QSA)
HARMAN and/or any third-party consultant designated by HARMAN shall have reasonable access to observe and inspect Supplier's facility, Manufacturing and quality control processes.

Quality Process Audit (QPA)
HARMAN have the right to conduct the process audit at supplier's manufacturing site to ensure the manufacture process is under control and the products are manufactured according to HARMAN specification.

Supply Chain Security Audit (SCSA)
HARMAN have the right to conduct the supply chain security audit at supplier's manufacturing site to ensure the supply chain security control management system.

Social Responsibility Audit (SRA)
Supplier shall strictly obey and adhere to all rules, regulations and local laws standards.

Period Audit
HARMAN have the right to conduct at least one audit each contract year. Supplier shall provide HARMAN access to inspect, review and audit the site(s) where the Products are tested, handled, stored, distributed, designed and/or Manufactured, including access to the Products and all related design, product development and/or Manufacturing Records.

For-Cause Audits
For-Cause audits shall be for the purpose of investigating a potential quality problem or significant complaint regarding a Product potentially attributable to Manufacturing or other operations at Supplier.

9. Change Management

9.1. Changes initiated by HARMAN

Changes initiated by HARMAN shall be performed in accordance with the normal HARMAN practices. This will typically include detailed Design interaction as well as Procurement/ Purchasing activities to handle updating quotes and / or contracts, where necessary. Validation program requirements or PPAP requirements will be negotiated with the HARMAN SQE organization, with input from Design Engineering, Program Management, or the Purchasing/Procurement organizations as required. Supplier shall ensure that changes are implemented to according to the schedule that was aligned with HARMAN.

9.2. Changes initiated by Supplier

In the case of changes initiated by the supplier, which will include changes to raw material, manufacturing materials, processes, manufacturing facility or manufacturing locations, sub-contractor or sub-supplier, packaging as well as any design changes (specification), the Supplier shall submit a

Product Change Notification (PCN) or a Supplier Change Request (SCR) to HARMAN. In AUTO this PCN shall be sent to their HARMAN Procurement contact. In addition to this, for electronic parts this PCN needs to be submitted to PCN_supplier_in-box@harman.com. In LS the Supplier shall submit a SCR (Supplier Change Request) or Product Change Notification (PCN) through HARMAN PM during NPI or OPM during mass production. It is required that the supplier notifies HARMAN as far in advance as possible to give HARMAN the opportunity to examine the consequences and, if required, to introduce suitable measures.

Implementation of such change is only permitted after approval by HARMAN. Supplier shall ensure supply of HARMAN approved product until PCN becomes effective and related PPAP is approved.

The SCR/PCN shall contain following information:

- Product Identification (e.g. supplier part number, affected product lines incl. specific package types, product family),
- Detailed description of change(s),
- PCN tracking number,
- Reasons for changes(s) (e.g. commercial, quality, capacity),
- Name, address, telephone, email of supplier contact,
- Implementation date for change,
- Anticipated impact on form, fit, function, or reliability,
- Supplier Qualification plan results, where applicable,
- Customer parts number(s),
- Date, if required, when qualification samples are available,
- Date, if required, when final qualification data are available,
- Last date, if applicable, of manufacture of the unchanged product.

In addition to the above information, HARMAN requires to know the following:

- Scheduled start of mass production,
- Scheduled delivery date to HARMAN,
- Availability of PPAP documents,
- Whether this change was already implemented at any other product supplied to HARMAN,
- Whether this change was already approved by any other automotive customer
- Risk evaluation by the supplier
- FIT rate comparison before and after PCN. (AUTO only)

For electronic components, the supplier should include changes in technical documentation such as datasheet, errata sheet, or applications note as well as firmware changes.

Where appropriate, the supplier may be asked to provide samples for HARMAN qualification. HARMAN Qualification requirements and PPAP requirements will be aligned with the HARMAN Supplier Quality engineering, with input from Design Engineering, Program Management, Test Qualification or the Purchasing/Procurement organizations as required.

Additional PCN requirements for Active, passive components, including LEDs – AUTO only

To meet our OEM directions, the supplier shall always add the ZVEI/DQM ID and the Type of Change (description), when providing a new PCN to HARMAN. Supplier shall always list all changes, not only the major change triggering the PCN and re-send the shrunken DQM Matrix.xls accordingly.

For details please follow the link to the ZVEI: http://www.zvei.org

9.3. Supplier Changes Notification & Approval Requirement – LS only

The following table shows examples of changes that do or do not require supplier notification to HARMAN of an impending change. This list is not all-inclusive and maybe used as a point of reference, since the Harman-specific supplier change requirements are governed by internal procedures. OPM and SQE will guide the suppliers as necessary to ensure seamless changes that can be assessed and given the appropriate consideration.

Table 1, Supplier Change Reference Table

Changes Requiring HARMAN Notification & Approval	Changes Do Not Require HARMAN Notification & Approval
Production Facility – Create new building, change buildings or move production to another location.	N/A
Equipment – Change type of equipment or accessary (e.g. injection molding machine, ultrasonic welding machine, movement of equipment within the facility that affects a validation, change or reduction of frequency/method of preventive maintenance, change machine or tool design, change of machine program, change of process parameters, software changes that control quality records and/or production machine software programs as this constitutes a process change.	Movement of existing equipment within a facility that does not require re-validation per the supplier's quality system. An increase in the calibration would be needed with notification to Harman on or preventive maintenance frequency. Changes to software that do not interface with building or testing Harman products.
Subcontractor Change	N/A
Change Inspection Requirements – All changes in inspection method, frequency, sampling methods, etc.	Changes that increase frequency or increase detectability, i.e. the use of equipment with higher accuracy and precision may be implemented with notification to Harman to follow. Traceability increase
Manufacturing Materials – Change manufacturing materials that come in contact with product or ship with the product to the end customer such as coolant, machine lubricants, polishing compound, cleaning solutions, etc.	A documentation change that does not impact manufacturing methods or processing of component or finish goods
Manufacturing Process Flow – Re-sequencing changes to established router, additions/deletions, etc.	Process or equipment adjustments within a previously validated range (PV) and which are considered routine Changes that increase frequency or increase detectability, i.e. the use of equipment with higher accuracy and precision may be implemented with notification to Harman to follow.
Rework and/or Reprocessing not outlined on the original approved control plan or specification – A loop added to route product back to a previous step for the purpose of repeating work done to bring product into specification.	N/A
Forming Operations – Casting, forging, wrought operations as related to metals (e.g., changing configurations, release agents, mold, or die materials are reportable changes) and compression molding, ram extrusion, or injection molding as related to polymers.	N/A
Raw Materials	A material/component primary package label change that increases information and does not impact indications (note: all labeling/literature changes for finish product do require Harman approval)
Management Change – Change in the organizational management structure with notification to Harman. These changes include but are not limited to, changes in management with executive responsibility, or changes in management	N/A

responsibility for the compliance, quality or quality systems.	
Logistics - Changes to logistics, distribution, shipping channel or method (especially for sensitive materials).	N/A
Company Name	N/A
Obsolescence – Obsolete, end of life, product Discontinuation, etc.	N/A

9.4. Product Discontinuation

If a product is to be discontinued, the supplier must inform HARMAN of such in writing as early as possible (at least 6 months before Last Time Buy date and 12 months before production stop). This notification must be delivered in the form of a Product Termination Notice (PTN) to the HARMAN Procurement / Purchasing who is currently responsible for this component and for affecting the Automotive Divisions for electronic parts, submit this PCN in addition to the email address: PCN_supplier_in-box@harman.com(AUTO) or SPCN_lifestyle@harman.com (LS). The supplier shall provide information such as last time buy schedule and replacement recommendation.

The supplier shall provide failure analysis support for discontinued parts to HARMAN.

10. Requalification of Product/Process at Suppliers

To ensure conformity to all specified requirements the Supplier must carry out a regular requalification for the supplied components.

All parts being delivered to HARMAN shall be subjected to a regular and planned requalification. Therefore, a layout inspection (complete measurement of all product dimensions shown on the design records), a functional verification to applicable requirements and verification of reliability features and parameters shall be performed as specified in the control plans.

Their manufacturing processes shall be subjected to a regular and planned requalification as well. Scope and frequency shall be planned by the supplier and be specified in the Control Plan. Complexity and criticality shall be taken into consideration. It shall be agreed with the assigned SQE at HARMAN. Higher frequencies may be implemented in case of target deviations (e.g. exceeding ppm action limits) with impact on the end customer. A formation of part families for requalification planning and execution is permissible.

Requalification planning shall be done during APQP already. Plan shall be provided within PPAP documents.

The results of the requalification shall be documented. The results shall be submitted on demand to the responsible SQE at HARMAN.

In addition to this requalification, additional or specific periodic validation may be required by HARMAN, HARMAN customers or for regulatory compliance purposes. In these cases, supplier shall comply with these requirements, as appropriate. HARMAN and HARMAN customer´s requirements will be provided to the suppliers specifically. Requirements that are related to regulatory compliance issues need to be determined by the suppliers themselves.

11. Supplier Performance Evaluation

HARMAN will make frequent supplier evaluations. The target of the supplier evaluations is to identify and report good and bad supplier performances in the area of Quality, Delivery, Cost and Technology/Engineering. It´s also to make opportunities for improvements visible and transparent. The results of these evaluations will be reported internally at HARMAN and to the supplier. At HARMAN these results will be taken into account in the sourcing process and awarding of new business. At the supplier it is expected that measures will be defined that lead to continuous improvements of these evaluation results.

12. Supplier Improvement Program - SIP

SIP is a HARMAN program used to improve the performance of the supply base in the area of Quality, Delivery, Cost and/or Technology by utilizing audits, data analysis, and by driving systemic changes in areas/functions, where issues have been identified. The program addresses systemic issues and is driven by root cause analysis, supplier action plans, and aggressive deliverables and targets with consequences identified for failure to meet these targets.

During SIP, HARMAN is expecting:

- Leadership engagement, accountability, commits resources.
- Cross functional team approach.
- The supplier is recommended to perform an effective analysis of root cause using quality tools like 3 Leg 5 Why Method and/or Cause-Effect Analysis or other similar quality tools.
- Develop sufficiency plans to address the gaps.
- Develops a method to track implementation of the initiatives and resulting improvements.
- Implements a lesson learned process across their Corporation using the Read across format or other similar tool(s).

13. Record & Sample Retention

All records of the quality system and manufacturing records shall be maintained at the manufacturer or at other locations that are reasonably accessible to the responsible HARMAN upon request. The records shall be legible and shall be stored so as to prevent loss and minimize deterioration. Records stored in automated data processing systems shall be backed up.

Documents, records, data and reference- or master-samples that are elements of the PPAP submission, must be maintained for the length of at least one year after the discontinuation of the delivery of the product to HARMAN for mass production and service part demands.

Records of the mass production phase of the delivered product e.g. test charts, control cards, measurement reports have to be maintained for the length of at least one year after the delivery of the product, to which the records belong to.

Quality records for critical characteristics shall be retained for the length of at least 15 years (AUTO) / 3 years (LS) after the discontinuation of delivery of the product.

Quality requirement documents and quality records must be maintained for the length of at least 15 years (AUTO) / 3 years (LS) after the discontinuation of the delivery of the product to HARMAN for series and spare part demands.

In LS all records shall be retained for a period of time equivalent to the design and expected life of the device, but in no case less than 10 years from the date of release for commercial distribution by HARMAN.

14. Training

The supplier’s personnel performing specific assigned tasks shall be qualified based on appropriate education training, and/or experience as required. Training records for all employees shall be maintained in accordance with a documented training procedure. Training effectiveness shall be practically reviewed by the supplier using various methods, such as pre-and post testing and audits/appraisals of performance, as necessary.

Should quality assurance problems arise with fulfilling the requirement from this SQM or other Quality-standards, HARMAN may support the supplier with regard to training or by referring him to possible training courses. HARMAN may also initiate training sessions for the supplier if he is unable to fulfil the requirements from this SQM.

15. Change History

Revision	Released	Modification Documentation
1st	January 2021	1st revision **

**Replacement for automotive Supplier Quality Manual 1555499; 6th edition
Replacement for SQM LS, revision A