4
MQA

ESA PSS-01-60 Issue 2
November 1988

Component selection, procurement and control for ESA space systems

Prepared by:
Product Assurance & Safety Department
European Space Research and Technology Centre
Noordwijk, The Netherlands

Note: This preliminary release of Issue 2 of PSS-01-60 will be superseded by the officially released version wich may include editorial changes.

Approved by:

L. Tedeman

european space agency / agence spatiale européenne
8-10, rue Mario-Nikis, 75738 PARIS CEDEX, France

THIS IS AN INFORMAL DOCUMENT WHICH IS A DRAFT PSS DOCUMENT AND IS ONLY TOBE USED FOR ESA PROJECTS WHERE THIS DRAFT IS EXPLICITLY CALLED UP IN THE CONTRACT.

THIS DOCUMENT DOES NOT YET REPRESENT ESA POLICY.

ABSTRACT

This specification establishes the requirements for a component selection, procurement and control programme and is to be applied by contractors and subcontractors to ESA space systems in which the use of components with specific reliability and quality requirements is mandatory.

DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. date	Page	Change Item	Approved DCR no.

TABLE OF CONTENTS

SECTION 1: SCOPE

This specification establishes the requirements for component selection, control and procurement for ESA space systems in which the use of components with specific reliability and quality requirements is mandatory.

PAGE INTENTIONALLY LEFT BLANK

SECTION 2: GENERAL

2.1 APPLICABLE DOCUMENTS

The following documents are applicable to the extent specified herein:

ESA PSS-01-0	Product Assurance & Safety policy and basic requirements for ESA space systems.
ESA PSS-01-20	Quality assurance requirements for ESA space systems.
ESA PSS-01-40	System safety requirements for ESA space systems.
ESA PSS-01-70	Material and process selection and quality control for ESA space systems.
ESA PSS-01-301	Derating requirements and application rules for electronic components.
ESA PSS-01-603	ESA preferred parts list.
ESA PSS-01-605	The capability approval programme for hermetic thin-film hybrid microcircuits.
ESA PSS-01-606	The capability approval programme for hermetic thick-film hybrid microcircuits.
ESA PSS-01-608	Generic specification for hybrid microcircuits.
ESA/SCC	Specification system (Basic, Sectional, Generic, Detail).
ESA/SCC QPL	Qualified parts list.

Note: The ESA/SCC Specification System is considered part of the ESA PSS-01 specification system.

2.2 DEFINITIONS

The definitions listed in Annex A shall apply.

PAGE INTENTIONALLY LEFT BLANK

SECTION 3: COMPONENT PROGRAMME MANAGEMENT

3.1 GENERAL

The contractor shall establish and implement throughout the duration of the contract a component-management programme which ensures full compliance with the requirements of this specification.

3.2 COMPONENT PROGRAMME POLICY

In establishing his component programme, the contractor shall include the following policy items:
- —maximisation of the use of European components;
- —use of the ESA/SCC specification system and the preparation of new ESA/SCC specifications;
- —implementation of a stringent component-standardisation programme.

3.3 ORGANISATION

The contractor shall designate an individual or organisation to be responsible for managing the component programme. The designee shall have the authority and adequate resources to perform the management, component engineering, procurement, quality assurance and administrative functions required. Qualified personnel shall be allocated to his team in sufficient number to permit the timely completion of all tasks. The management structure shall provide clear and definitive interfaces between the component group, the project team, subcontractors, manufacturers and any procurement agency that may be used for the execution of the programme.

3.4 COMPONENT CONTROL PLAN

The contractor shall prepare a Component Control Plan which describes in detail the proposed approach, methods, procedures and organisation he will adopt to be compliant with the requirements defined in this specification. Specifically, this plan shall include, but not be limited to, a detailed description of the following items:
- —organisational structure, responsibility descriptions and management approach,
- —major tasks and methods of implementation;
- —programme for standardisation and control of component selection,
- —component evaluation and testing approach;

—component testing level and lot acceptance;
—component quality assurance activities;
—requirements on and system for the control of subcontractors, procurement agents (if any) and manufacturers;
—radiation control programme (if required);
—procurement system, including rationale for selection;
—programme planning with schedule of tasks linked to spacecraft programme milestones;
—reporting and deliverables;
—compliance matrix.

3.5 PLANNING

The contractor shall ensure that the component programme is thoroughly planned, documented and implemented in a timely manner and that back-up plans are initiated whenever there is evidence of possible schedule or technical problems.

3.6 MANAGEMENT COMMUNICATION DATA SYSTEM

If the contract so specifies, the contractor shall implement and maintain a data system which can provide component data and information to ESA in an electronic format compatible with the ESA PA database system.

3.7 EXPERIENCE SUMMARY REPORT

To improve the quality and reliability of components and to establish economic and efficient procurement requirements for future projects, the contractor shall collect, evaluate and present in an experience summary report any relevant information resulting from the experience gained during the execution of his component programme.

This report shall include:

—conditions, structure and policies applied (e.g. procurement systems, users, agents, schedule, testing level);
—evaluation of actual procurement including statistics on quantities, controls, schedule and performances;
—presentation of nonconformances/problem areas;
—recommendations.

SECTION 4: COMPONENT ENGINEERING

4.1 GENERAL

The contractor shall be responsible for the selection of components that are capable of meeting the performance, lifetime, stability, environmental, material, safety, quality and reliability conditions defined in the contract.

4.2 MATERIALS

The contractors shall ensure that exposed materials of components meet the requirements of ESA PSS-01-70 regarding outgassing, flammability, toxicity or other criteria as required for the intended use.

4.3 PROHIBITED COMPONENTS

Components containing materials that may constitute a safety hazard are prohibited from being used without prior approval by ESA for each individual application. Examples are components containing those hazardous materials listed in ESA PSS-01-701 such as:

(a) Beryllium
(b) Cadmium
(c) Lithium
(d) Magnesium
(e) Radioactive material
(f) Pure tin (both electroplated and fused)

4.4 UNAUTHORISED COMPONENTS

Use of components with known instability shall be avoided and requires ESA approval for each application. Examples of unstable components are:

(a) Wet electrolytic capacitors (except CLR 79 type);
(b) Plastic encapsulated semiconductors;
(c) Hollow core resistors;
(d) Wire-link fuses.

4.5 RADIATION-SENSITIVE COMPONENTS

Cosmic-ray effects as well as total-dose radiation effects must be considered in the selection and application of components exposed to a radiation environment. The acceptable radiation hardness must be specified for susceptible components as appropriate. Radiation tests may be required on samples from each lot or each wafer of material for devices which are susceptible to significant parameter variations due to applicable radiation level exposure.

Specific information as to the radiation control programme, including identification, planning, test and control, shall be included in the Component Control Plan.

4.6 COMPONENT APPROVAL

All components used in ESA flight-standard hardware require ESA approval according to the procedure outlined in Paragraph 4.11 herein. Components will be approved by ESA if at least one of the subsequent criteria applies:

(a) They have been qualified according to the requirements of the ESA/SCC System.
(b) They have successfully passed a component-evaluation and approval programme as outlined in Paragraph 5.9 herein.
(c) They have received circuit-type approval as outlined in ESA PSS-01-608.

Components will be approved, provided an equivalence to the ESA/SCC qualification requirements can be demonstrated via existing data or by similarity to qualified components.

The contractor shall review all components selected for their actual qualification status prior to procurement.

4.7 COMPONENT SELECTION

4.7.1 TYPE REDUCTION AND STANDARDISATION

The contractor shall establish and implement a programme for the control of the selection of components. This programme shall ensure maximum use of preferred and qualified components and shall restrict the number of component types to a minimum. Such a programme shall be planned and enforced in the design phase, so as to permit effective component standardisation.

4.7.2 COMPONENT DERATING

When components are selected, derating shall be taken into account. All components shall be derated in the manner outlined in ESA PSS-01-301. Project-specific stresses, such as temperature, radiation, etc., shall be reviewed as a means of assessing whether additional derating is required.

4.7.3 PREFERRED COMPONENTS

The ESA Preferred Parts List (PPL), ESA PSS-01-603, shall be used as the primary basis for component selection. Components selected from this list will be approved for use within ESA spacecraft, provided that the conditions for a particular application are met.

4.7.4 NON PPL-LISTED COMPONENTS

If a component that is not listed in ESA PSS-01-603 is selected, a detailed justification for its use must be provided, together with the Part Approval Document.

The selection of non-PPL-listed components shall be based on knowledge regarding technical performance, qualification status or qualifiability, and history of previous use in similar applications. Preference shall be given to components from sources that will necessitate the least evaluation/qualification effort.

In these circumstances preference shall be given to the following components in the order shown:

(a) Components qualified by ESA/SCC (see ESA/SCC QPL);
(b) Components approved for European space programmes;
(c) Components which have met qualification requirements of non-European standards for space-flight use;
(d) All other components.

All components for which further substantiation is required shall be submitted to the evaluation and approval programme identified herein.

4.8 HYBRID CIRCUITS

Hermetic hybrid circuits shall be procured in accordance with ESA PSS-01-608 plus the relevant detail specification. They shall be procured from sources the capability of which has been approved for all relevant technologies in accordance with ESA PSS-01-606 for thick film and ESA PSS-01-605 for thin film. If hybrid circuits are acquired from a source not having ESA approval for all hybrid processes and assembly technologies, an evaluation and acceptance testing programme shall be performed as defined in ESA PSS-01-606 or PSS-01-605 or Paragraph 5.9 herein.

All add-on components shall be selected in the manner defined in Paragraph 4.7 and shall meet the requirements of ESA PSS-01-608. All hybrid circuits, including all add-on components, shall be entered in Parts Approval Documents (PAD).

4.9 OFF-THE-SHELF COMPONENTS

Components from stocks that have a lot/date code which indicates that more than five years will have elapsed from date of manufacture to date of intended installation in equipment shall meet the following requirements:

- quality requirements specified herein and verified by data review shall be met;
- additional 100% electrical measurement of critical parameters and 100% visual inspection shall be performed;
- additional hermeticity test on a sample basis shall be performed (AQL = 0.65);
- DPA shall be performed in cases where no available DPA report covers the component lot (as required in Paragraph 5.5.2) or in cases where degradation of the components during storage may have occurred.

No re-lifing is necessary for ESA/SCC qualified components.

4.10 PROCUREMENT REQUIREMENTS

4.10.1 PROCUREMENT SPECIFICATION

Each type of component used by the contractor shall be controlled by a procurement specification, or series of specifications, which must be approved by ESA. The contractor shall make maximum use of the approved procurement specifications issued under the ESA/SCC System. Other existing specifications may be used only when no approved ESA/SCC specification is available and shall be equivalent to the ESA/SCC standard. The specification or changes to it shall be submitted to ESA for approval. Whenever a new procurement specification has to be established, it shall be prepared and included in the system in accordance with the relevant ESA/SCC requirements. When a specification change affects an approved ESA/SCC specification or when a new specification is prepared, ESA approval shall be obtained.

4.10.2 COMPONENTS SCREENING AND BURN-IN

All components to be incorporated into flight-standard hardware shall be subjected to a screening test. The screening-test requirements shall be so designed that accumulated stress will not jeopardise component reliability.

Depending on component and flight-hardware categories, the following minimum requirements with respect to ESA/SCC test levels shall apply:

(a) Active components in maintainable, non-critical flight hardware or single experiments:
Level - C

(b) Active components in flight-standard hardware (not (a) above):
Level - B

(c) Passive components:
Level - B: crystals, filters, cermet-fuses, relays and switches
Level - C: others

All screening tests shall be performed at the component manufacturer's premises or at a source approved for the performance of screening.

4.10.3 GROUND SUPPORT EQUIPMENT

The requirements for components in ground support equipment shall be specified per project and be in accordance with the reliability and safety requirements.

4.10.4 LOT ACCEPTANCE TESTING (LAT)

All components shall be subjected to Lot Acceptance Testing (LAT) as defined in the ESA/SCC specifications. The appropriate lot acceptance level shall be as defined below:

(a) LAT1: If LAT1 has not been carried out within the previous 24 months then LAT1 shall be performed.

(b) LAT2: If neither LAT1 nor LAT2 has been carried out within the previous 12 months then LAT2 shall be performed.

(c) LAT3: In all cases not included in (a) or (b) above, LAT3 shall be performed.

The lot acceptance testing level shall be specified in the Part Approval Document.

4.11 APPLICATION FOR COMPONENT-TYPE APPROVAL

The contractor shall complete a Part Approval Document (PAD) in accordance with the format given in Annex B for all component types requested for use in flight-standard hardware. It is the responsibility of the Contractor to ensure that all information necessary to obtain the approval of the PAD is supplied to ESA before procurement. A minimum of twenty working days shall be included in the contractor's schedule to allow for the ESA review of the PAD.

4.12 DECLARED COMPONENT LIST

The contractor shall submit an issued version of a Declared Components List (DCL) with the Critical Design Review (CDR) documentation. This DCL shall contain all component types needed for the current design and shall be kept under configuration control. The information in the DCL shall be presented in the format given in Annex C.

SECTION 5: COMPONENT QUALITY ASSURANCE

5.1 GENERAL

The quality assurance requirements defined in specification ESA PSS-01-20 shall be applicable. The contractor shall implement a system to ensure that the approval conditions for all components used are kept current with that of the original application.

5.2 MANUFACTURER SELECTION

The contractor shall ensure that the components are procured from manufacturers qualified for the type concerned or from manufacturers who are deemed suitable after evaluation according to Paragraph 5.9.2.4.

5.3 CONTROL OF COMPONENT MANUFACTURERS

The contractor shall be responsible for the maintenance of manufacturer surveillance and control throughout the procurement programme. As a minimum, the requirements defined in ESA PSS-01-20 shall be met, supplemented with any additional surveillance or control measures considered necessary to ensure that the manufacturer meets the obligations defined in the purchase order and procurement specification(s). All major inspection points shall be identified in the Part Approval Document (PAD).

5.4 PROCUREMENT DOCUMENTATION

The contractor shall review the procurement documentation as required by ESA PSS-01-20.

5.5 INCOMING/ACCEPTANCE INSPECTION

5.5.1 GENERAL

An incoming or acceptance (at source) inspection shall be performed on all components as specified in ESA PSS-01-20 to verify compliance with the procurement specifications according to clearly established acceptance/rejection criteria. This inspection shall include as a minimum:

(a) Review of the documentation delivered by the manufacturer;
(b) External visual inspection;
(c) Electrical measurement of critical parameters;
(d) Destructive physical analysis (see Subsection 5.5.2).

The contractor's procurement plan shall define the activities to be performed and where they are to be performed. Any component or lot of components not meeting the acceptance criteria shall be dispositioned in accordance with ESA PSS-01-20 (non-conformance control). The results of the incoming/acceptance inspection and any additional test performed shall be documented and held on file at the contractor's facility for a duration determined by the contract.

5.5.2 DESTRUCTIVE PHYSICAL ANALYSIS (DPA)

Destructive Physical Analysis shall be performed by the contractor on three samples from each date code of the component types listed below:
—discrete semiconductors
—integrated circuits
—filters
—variable capacitors/resistors
—ceramic capacitors
—tantalum capacitors
—relays
—crystals
—hybrids
—switches
—high-voltage components
—high-frequency components
—opto-electronic components.

Note: The list of component types identified above may not be complete when new technologies are considered. ESA therefore reserves the right to amend this list as necessary.

The contractor shall prepare and implement DPA procedures for inspecting the materials, design, construction and workmanship of the component. These procedures shall be approved by ESA. DPA shall not be performed by the manufacturer of the component. Independent laboratories may perform DPA when approved and controlled by the contractor. If not requested otherwise by the contract, three additional samples from each lot/date code shall be procured and supplied to ESA.

For certain families of components the contractor may request leave to carry out DPA on representative samples of the family rather than on each variant. These requests will be considered on a case-by-case basis by ESA.

All DPA activities shall be completed before installation of components into flight-standard hardware. The contractor shall submit one copy of the DPA report to ESA within one month of completion for review. If the contract specifies the provision of component data in an electronic format to a database system, then the DPA summary shall be loaded into that system.

The DPA sample size may be reduced, but such reduction shall be subject to ESA approval.

5.6 COMPONENT FAILURES

All components which are found to be defective after despatch from the manufacturer shall be dispositioned in accordance with specification ESA PSS-01-20 (non-conformance control).

5.7 PROBLEM NOTIFICATIONS

The contractor shall review, investigate, resolve and follow-up any Component Problem Notification received. He shall initiate Problem Notifications regarding component quality and application problems identified during testing at manufacturers' premises, during incoming/acceptance inspection and during all levels of equipment testing which are of general concern.

5.8 COMPONENT HANDLING AND STORAGE

The contractor shall establish and implement procedures for handling and storage of components in order to prevent possible degradation.

As a minimum, the following areas shall be covered:

(a) Control of environment such as temperature, humidity and cleanliness.
(b) Appropriate measures and facilities for segregating and protecting components during incoming/acceptance inspection, storage and delivery to manufacturing.
(c) Control measures to ensure that components susceptible to electrostatic discharge are identified and handled only by properly trained personnel using antistatic packaging materials and other means, including procedures.

5.9 COMPONENT EVALUATION AND APPROVAL PROGRAMME

5.9.1 GENERAL

If a valid and acceptable approval cannot be demonstrated, a component-evaluation and approval testing programme as defined below shall be implemented. The content and extent of such a programme requires approval of ESA prior to its implementation. This programme will form part of the PAD.

5.9.2 COMPONENT EVALUATION

5.9.2.1 GENERAL

The evaluation programme shall cover the following elements:
—design and application assessment;
—constructional analysis;
—manufacturer assessment;
—evaluation testing.

Reduction or complete omission of any element of the evaluation requirements may be approved by ESA on the basis of documentary evidence provided to substantiate the reduction or omission. It is the responsibility of the contractor concerned to ensure that sufficient data are made available to ESA to demonstrate that all aspects of the application and the mission operational life requirements have been fully considered and that, where any doubt exists, inspections and/or tests are proposed to be included within an evaluation and qualification testing programme to remove the concern.

5.9.2.2 DESIGN AND APPLICATION ASSESSMENT

A Design and Application Assessment shall be performed:
(a) To identify those electrical parameters essential for the intended application. This assessment shall be supported by the practical results obtained from evaluation samples to demonstrate that the component type is suitable for the application. These tests shall take into account the derating requirements contained in ESA PSS-01-301 and any special electrical, mechanical or environmental conditions not normally tested or checked, but which are necessary for the intended application.
(b) To demonstrate why a fully qualified component cannot be used. This shall also include a comparison with other partially or non-qualified alternatives and the reasons for the selection of this particular component type.

The Design and Application Assessment Report shall be included as an independent section of the Evaluation Report.

5.9.2.3 CONSTRUCTIONAL ANALYSIS

Constructional analysis shall be performed on a minimum of three components, normally taken from the manufacturer's current standard product. The primary aim of constructional analysis is to provide an early indication of a component's probability of meeting the requirements and the operational goals of the programme concerned. It is therefore essential that:

(a) the standard of fabrication and assembly be fully assessed to identify any area where modifications are required or where specific tests or inspection points should be included within the procurement specification or during procurement;
(b) potential failure modes be identified in order to assess the need for additional tests;
(c) assurance be obtained that no use has been made of materials or processes that are likely to deteriorate over time and that may result in a malfunction.

The findings of the analysis shall be contained in a Constructional Analysis Report and shall be included as an independent section of the overall Evaluation Report.

5.9.2.4 MANUFACTURER ASSESSMENT

The purpose of the evaluation of a manufacturer is to assess his capability, to ensure the adequacy of his organisation, plant and facilities, and to ascertain his fitness to supply components to the appropriate specifications for space application. This evaluation shall be performed against a checklist and shall include, but not necessarily be limited to, a survey of:

(a) the overall manufacturing facility and its organisation and management;
(b) the manufacturer's system for inspection and manufacturing control, including all relevant specifications, procedures and documents;
(c) the production line used for the component.

The manufacturer's organisation, facilities, production control and inspection system shall meet the requirements of ESA/SCC Specification 20200 or equivalent for non-European manufacturers. A manufacturer evaluation report shall be produced which complies with the requirements identified in ESA/SCC Specification 20200. The complete manufacturer evaluation report shall be included as a section of the Evaluation Report.

5.9.2.5 EVALUATION TESTING

On completion of the Design and Application Assessment, Constructional Analysis and Manufacturer Evaluation or the submission of documentary evidence for substitution of any of these evaluation requirements, evaluation testing shall be carried out. This assessment shall determine which inspections or tests are required to provide the confidence that the component type under evaluation will, when assembled and tested in accordance with the procurement specification, successfully meet the mission requirements. As a minimum, sufficient data must be available on completion of the evaluation programme to demonstrate component stability. In addition, evaluation testing will be required where any of the previous stages have identified any anomaly reflecting a design, material or process weakness that could shorten the active life of the component concerned and that may not be identified during the final production testing or screening tests included in the procurement specifications. Because of the wide range of possible anomalies or weaknesses for which evaluation testing would be required, it is not possible to define the precise test regime to be followed; however, the types of testing to be considered would include:

- **Electrical stress**, such as accelerated life testing, high-temperature reverse bias or endurance testing, normally used to assess stability;
- **Mechanical stress**, including shock, vibration and centrifuge, to evaluate the robustness of the assembly;
- **Environmental stress**, such as thermal shock or cycling, high- or low-temperature storage, seal tests, solderability tests etc., to evaluate package integrity or a particular facet of the design expected to be susceptible to temperature extremes;
- **Radiation testing** for total dose and cosmic ray sensitivity, if required by the particular project. The proposed test regime, the test methods and sample size shall be defined in the component evaluation programme and approved by ESA prior to the test commencement.

After completion of the evaluation testing, a final review of the proposed procurement specification shall be carried out to determine whether the results obtained have an impact on the content of the procurement specification. The full details of the evaluation testing, the results achieved and an overall assessment of the complete evaluation programme shall be included in the Evaluation Report, which, once completed, shall be submitted to ESA for approval. If the contract specifies the provision of component data in an electronic format to a database system, then the evaluation report summary shall be loaded into that system.

5.9.3 TYPE APPROVAL TESTING

For all components where compliance with the approval requirements of Paragraph 4.7 cannot be demonstrated, type approval testing shall be

performed. Test groups and standards, sample size and acceptance criteria shall meet the programme defined by ESA/SCC for LAT1. All components selected for type approval testing shall meet the requirements of ESA/SCC testing level B. Modifications to the programme may be proposed to suit a particular technology or to reflect the results of the evaluation programme. Proposed modifications should be included in the Parts Approval Document.

On completion of the type approval test programme, a report including the manufacturer's documentation shall be submitted to ESA for approval.

PAGE INTENTIONALLY LEFT BLANK

ANNEX A

DEFINITIONS

Component
A device that performs an electronic, electrical or electromechanical function and consists of one or more elements so joined together that they cannot normally be disassembled without destruction. The term component may be interchanged with the word part.

Declared Components List (DCL)
List of all component types used in a project and their manufacturers.

Destructive Physical Analysis (DPA)
A series of inspections, tests and analyses performed on a sample of components to verify that the material, design and workmanship used for its construction, as well as the construction itself, meet the requirements of the relevant specification and are suitable for the intended application.

Critical Flight Hardware
Critical flight hardware is an equipment performing a safety or reliability critical function. (See definitions in ESA PSS-01-40.)

Lot Acceptance Tests
A series of tests performed on a sample selected from the procurement lot to ensure that the lot concerned meets the defined quality requirements.

Preferred Parts List
List of component types/manufacturers preferred by an authoritative organisation.

Procurement Agency
An organisation performing procurement of hi-rel components under contract for third parties.

Part Approval Document
Format for collecting component data as basis for approval. Consists of the PAD-format (see annex B) and supporting documents.

PAGE INTENTIONALLY LEFT BLANK

ANNEX B

FORMAT FOR PART APPROVAL DOCUMENT

PAGE INTENTIONALLY LEFT BLANK

PART APPROVAL DOCUMENT

PROJECT: Sheet 1 of [ ] Doc No: Issue: Date:

Approval requested by:
Family: Fcode [ ] Group: Gcode [ ]
Component Number: Similar to Style:

Technology/Characteristics (range, case, tolerance, voltage, etc)

Generic Specification: Issue: Rev:
Detail Specification: Issue: Rev:

Testing Level: Procured by:

Manufacturer/Country: Man/C [ ]
Backup Manufacturer: BMan/C [ ]

APPROVAL STATUS

SCC qualified (Y/N) [ ] Certificate number: Valid until:
Other approvals:
Appears in ESA PPL (Y/N) [ ] Project PPL
Further evaluation necessary (Y/N) [ ]

PROCUREMENT INSPECTIONS

SEM [ ] Precap [ ] Batch acceptance [ ] Other inspection
DPA [ ] Sample size ESA sample size
LAT: SCC level [ ] (1, 2 or 3) Other

RADIATION HARDNESS DATA

N/A [ ] Insensitive [ ] Sensitive [ ] Data Available [ ]

Data reference

Radiation evaluation test will be performed (Y/N) [ ]
Total Dose [ ] SEU [ ] Transients [ ] Latch up [ ]

Acceptance test per lot is required (Y/N) [ ]
Total Dose [ ] SEU [ ] Transients [ ] Latch up [ ]

Specification [
Equipment [
Methods [
Other [

Approval Prime Contractor Date
Approval ESA Date

PART APPROVAL DOCUMENT

PROJECT: Sheet 2 of [ ] Doc No:
Issue: Date:

Approval requested by:
Family: Fcode [ ] Group: Gcode [ ]
Component Number: Similar to Style:
Testing level:

DETAILS OF SPECIFICATION MODIFICATIONS PENDING

DETAILS OF EVALUATION PROGRAMME PLANNING

Evaluation programme under:
Design assessment (Y/N) [ ] Manufacturer audit (Y/N) [ ]

Constructional Analysis (Y/N) [ ] Sample size .....
If [N] entered above, provide rationale:

Evaluation Testing (Y/N) [ ] Sample Size .....
If [N], provide rationale for evaluation acceptance:

TYPE APPROVAL TESTING

SCC LAT 1 [ ] Other [ ] (Give details below)

Approval Prime Contractor ..... Date .....
Approval ESA ..... Date .....

GUIDANCE NOTE FOR COMPLETION OF PART APPROVAL DOCUMENT

One PAD shall be completed per component type, specification, variant, testing level and procurement occasion. Range of values and more than one tolerance or voltage (for passive parts) may be entered on one PAD.

Doc. No:	Sequential unique number
Issue:	Identify issue of document
Date:	Date of issue
Project:	Name of project using the component
Approval requested by:	Name of company submitting the PAD
Family:	Capacitor, resistor, etc. (see ESA database)
Group:	Ceramic, tantalum, etc. (see ESA database)
Component number:	In accordance with procurement spec.
Similar to style:	Commercial or military equivalent
Technology/Characteristics:	Describe the components covered by this PAD
Generic specification:	Enter relevant specifications with issue and revisions
Detail specification:	Enter relevant specification with issue and revisions
Testing level:	Enter testing level/quality level/class/failure rate according to spec
Procured by:	Name of procuring company or agent
Manufacturer/country:	Manufacturer code (for ESA/SCC qualified comp. ref. to QPL may be entered) (see ESA database)
Approval status:	Enter information about known approvals (SCC, used in other projects, etc.)
Further evaluation:	Enter Y/N as applicable
Procurement inspections:	Enter Y/N as relevant
DPA sample size:	Enter number (normally 3)
ESA sample size:	Enter agreed number (if not otherwise agreed, 3 pcs)
LAT:	Identify level
Radiation hardness data:	
N/A	Tick if no radiation requirements applicable
Insensitive Sensitive Data available	Tick as applicable
Radiation evaluation test	Y/N as applicable. Tick type.

Radiation acceptance test: Specification etc.	Y/N as applicable. Tick type. Give relevant information about test methods, sample sizes, etc. (or refer to relevant documents)
Approval Prime contractor	Signify acceptance by Prime
Approval ESA	ESA approval to commence procurement
Details of specification modifications pending:	Enter precis of DCRs/specification modifications outstanding
Evaluation programme:	Enter evaluation programme plan number
Type approval testing:	Tick as applicable. Give additional information as necessary
Approval Prime Contractor:	Signify acceptance of Prime
Approval ESA:	Signify ESA approval

ANNEX C

FORMAT FOR DECLARED COMPONENT LIST

PAGE INTENTIONALLY LEFT BLANK

DECLARED COMPONENT LIST

PROJECT: ..... **FAMILY:** ..... **GROUP:** .....

COMPONENT NUMBER	SIMILAR TO STYLE	DETAIL SPECIFICATION	ISSUE /REV	GENERIC SPECIFICATION	MANUFACTURER /COUNTRY	PAD No.

DCL number

Issue: ..... Date: .....
Rev.: ..... Date: .....

GUIDANCE NOTE FOR COMPLETION OF DECLARED COMPONENTS LIST

DCL. No:	Document registration number
Issue:	Identify issue of document
Date:	Date of issue
Rev:	Identify revision of document
Date:	Date of revision
Project:	Name of project
Family:	Capacitor, resistor, etc. (see ESA database)
Group:	Ceramic, tantalum, etc. (see ESA database)
Component number:	In accordance with procurement specification
Similar to style:	Commercial or military equivalent
Generic specification:	Enter relevant specifications with issue and revisions
Detail specification:	Enter relevant specifications with issue and revisions
Manufacturer/country:	Manufacturer code (see ESA database)
PAD:	Part Approval Document Number

ANNEX D

CONTRACTOR DELIVERABLES

	Para 3.4	Component Control Plan
	Para 3.7	Experience Summary Report
*	Para 4.3	Application to use prohibited components
*	Para 4.4	Request for approval of non-authorised components
*	Para 4.7.4	Justification for use of non-ESA-PPL components
*	Para 4.10.1	Procurement specifications (non SCC, new or modified)
	Para 4.11	PAD Sheets
	Para 4.12	DCL
	Para 5.5.2	DPA Procedures
	Para 5.5.2	DPA Reports
	Para 5.5.2	DPA Samples
*	Para 5.7	Problem Notification
*	Para 5.9.1	Component Evaluation and Approval Programmes
*	Para 5.9.2	Evaluation Reports
*	Para 5.9.3	Type Approval Test Reports

*: as applicable