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# **THE EUROPEAN PREFERRED PARTS LIST (EPPL) AND ITS MANAGEMENT**

**ESCC Document No. 12300**

Issue 4	December 2025
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Document Custodian: European Space Agency – see <https://escies.org>

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<a href="#">1764</a>	Document upissued to incorporate changes per DCR.

### FOREWORD

An objective of the ESCC, as stated in the Charter, is to “implement a system for rationalising the diversity of components for space use, based on the usage of a European preferred parts list, giving preference to European components offering competitive performance and costs”.

The fulfilment of this objective actively promotes the selection of parts for which there is an established body of data demonstrating their suitability for space application. Further, the [EPPL](#) supports the component engineering disciplines of part selection and type reduction.

The [EPPL](#) is issued, and published in ESCIES, with the approval and under the authority of the SCSB. The [EPPL](#) is subject to technical review and oversight by the EPPL Technical Authority (TA) and the EPPL Manager both appointed by the SCSB. The PSWG is tasked by the SCSB with overall supervision of the EPPL processes.

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## 1 DESCRIPTION, OBJECTIVES AND PURPOSE OF THE EPPL

### 1.1 DESCRIPTION OF THE EPPL

The European Preferred Parts List (EPPL) (ref. REP007) is a product of ESCC and is under strict configuration control. Each release of the EPPL is the result of a review performed by the EPPL Technical Authority (TA) which confirms compliance with the listing and maintenance requirements outlined in this document.

The EPPL comprises three distinct lists:

- (a) **EPPL 1:** This list includes all ESCC qualified or capability approved components (i.e. those included in the ESCC QPL (Qualified Parts List) (ref. REP005)). An exception to this may be made where EPPL 1 refers to a list of qualified components from another qualification system (including non-European systems) on the condition that the ESCC Executive, TA and SCSB all agree (see Para. 5(a)).
- (b) **EPPL 2:** This list contains only ESCC Enhanced Grade (EG) components (Ref. ESCC No. 25700). These are European EEE components approved by the TA for inclusion in EPPL 2 from Manufacturers holding either ESCC Technology Flow Qualification or ESCC Process Capability Approval (PCA) (as listed on the ESCC QML (ref. REP006) or ESCC PCAL (ref. REP008) respectively).

Certified Manufacturers with EG components listed in EPPL 2 have an ESCC approved Enhanced Grade Definition ensuring visibility of their component processes, testing, traceability and changes to the ESCC Executive (as detailed in ESCC No. 25700).

**NOTE:** EG components listed in EPPL 2 are not ESCC qualified but they are controlled through the ESCC Executive's oversight of the Manufacturer's quality system and Enhanced Grade Technical Review Board (EG-TRB).

- (c) **EPPL 3:** This list contains selected European non-qualified EEE components for which the potential to satisfy space application requirements has been demonstrated but which have not yet achieved full ESCC qualification or certification. This includes components evaluated in accordance with the appropriate ESCC specifications or validated through testing in accordance with the requirements of other space component qualification systems.

**NOTE:** Components listed in EPPL 3 are not controlled under the responsibility of the ESCC Executive, nor are they subject to the requirements of an ESCC Manufacturer's certified domain. Their inclusion in the EPPL and suitability for space applications are based solely on the data package received during the initial EPPL application request or during EPPL maintenance, which has been accepted by the TA.

## 1.2 OBJECTIVES AND PURPOSE OF THE EPPL

Components listed in the [EPPL](#) shall be:

- available in the mid- to long-term
- backed by sufficient and substantiated technical information
- be free from any particular technical, quality, workmanship, reliability, procurement or import restriction risks.

ECSS-Q-ST-60 requires the use of the [EPPL](#) as the preferred selection tool for all 3 classes of EEE components i.e.:

- EPPL 1 is the primary preferred source for the highest class, Class 1, components
- EPPL 1, EPPL 2 and EPPL 3 are the preferred sources for the lower classes, Class 2 and 3, components

However, EPPL 2 and EPPL 3 may also serve as a suitable source for the selection of Class 1 components, contingent on user assessment and project approval.

The inclusion of EG components in EPPL 2 provides users with opportunities for lower cost and reduced procurement time, while maintaining a high level of quality and control since these components originate from controlled ESCC-certified Manufacturers.

The [EPPL](#) is intended to assist space hardware manufacturers and projects in their selection of EEE European components suitable for space applications. Therefore, the [EPPL](#) supports component type selection as an effective way to improve component procurement activities, increase the volume of preferred component types used, and maintain the highest level of quality of component for use on space projects.

The [EPPL](#) also serves as a platform for European Manufacturers to promote their high-reliability, non-qualified components and increase their sales in the global market.

The [EPPL](#) contributes to the promotion and recognition of EEE component development activities, including ESCC evaluation and qualification activities as coordinated by the ESCC Executive.

The possibility of including a recognized list of non-European, qualified components in the [EPPL](#) could be used as leverage for mutual recognition of this European Manufacturer based list in another non-European qualification system, which could promote and increase the sales of European Manufacturer's components outside of Europe.

## 2 SCOPE

This document defines the content of the [EPPL](#) and outlines the rules for establishing and maintaining the list of preferred and suitable EEE components to be used by European manufacturers of spacecraft hardware and associated equipment.

The inclusion of a component in the [EPPL](#) does not automatically imply its suitability for any specific application. A project review and approval of all selected EEE components remains necessary.

This document also defines the operating rules for the management, administration, and maintenance of the [EPPL](#).

The [EPPL](#) applies to all parties, at all levels, involved in the realization of space segment hardware and its interfaces.

### 3 APPLICABLE DOCUMENTS

#### 3.1 ESCC SPECIFICATIONS

The following ESCC Specifications form part of, and shall be read in conjunction with, this specification:

ESCC No. [21300](#), Basic Specification: Terms, Definitions, Abbreviations, Symbols and Units

ESCC No. [22500](#), Guidelines for Displacement Damage Irradiation Testing.

ESCC No. [22600](#), Requirements for the Evaluation of Standard Electronic Components for Space Application

ESCC No. [22900](#), Total Dose Steady-State Irradiation Test Method.

ESCC No. [25100](#), Single Event Effects Test Method and Guidelines

ESCC No. [25700](#), Requirements for ESCC Enhanced Grade Components

#### 3.2 OTHER (REFERENCE) DOCUMENTS

The following documents are also applicable to the extent specified herein:

ESCC No. [00000](#) Charter of the European Space Components Coordination

[REP005](#) ESCC Qualified Parts List (QPL)

[REP006](#) ESCC Qualified Manufacturer List (QML)

[REP007](#) European Preferred Parts List (EPPL)

[REP008](#) ESCC Process Capability Approved List (PCAL)

ECSS-Q-ST-60 Space Product Assurance: Electrical, Electronic and Electromechanical (EEE) Components

ECSS-Q-ST-60-15 Space Product Assurance: Radiation Hardness Assurance - EEE Components

[MIL-STD-750](#) Test Methods for Semiconductor Devices.

[MIL-STD-883](#) Test Methods and Procedures for Micro-electronics.

JESD-201A Environmental and Electrical Compliance for Surface Mount Solder Process

GEIA-STD-0005-2 Standard for the Implementation of Tin Whisker Mitigation



#### 4 **TERMS, DEFINITIONS AND ABBREVIATIONS**

The terms, definitions and abbreviations specified in ESCC Basic Specification No. 21300 shall apply. In addition, the following shall apply:

##### Definitions:

- **European EEE Component within the ESCC System**  
In order to be considered a European EEE component within the ESCC system, the following conditions must apply:
  - The component originates from a country with an ESA Agreement, including ESA Member States, Associate Members, and Cooperating States. Such a component must be commercially available to the user industry without selective export restrictions.
  - **Ownership and Intellectual Property:** The design and intellectual property (know-how) must be developed and owned by an entity established in a country with an ESA Agreement.
  - **Materials and Sub-components:** Primary materials and sub-components shall be sourced from countries with an ESA Agreement whenever possible.
  - **Fabrication and Assembly:** Fabrication and assembly shall be carried out in facilities located within ESA Agreement countries.
  - **Quality Assurance and Screening:** Inspection, testing, and screening shall be performed in facilities located within ESA Agreement countries.
  - **Evaluation, Qualification, Periodic and Lot Validation Testing:** Testing and qualification activities shall be conducted in facilities within ESA Agreement countries.
  - **Sales and Distribution:** Sales shall be managed by an entity established in a country with an ESA Agreement.
  - **Point of Contact and Traceability:** The ESCC Executive must have a designated contact within the Manufacturer's organization in a country with an ESA Agreement. This individual shall be knowledgeable of the overall manufacturing process, traceability, and documentation.

The following exceptions may apply to the definition of a European EEE component within the ESCC system:

- The ESCC Executive may grant exceptions on a case-by-case basis.
- **Materials or Sub-components:** Materials or sub-components may be procured from outside ESA Agreement countries if no suitable European alternatives are available. The assessment will consider availability, the share of non-European content in the final product, and the risks of export control.
- **Complex Supply Chains:** For complex technologies such as microelectronics, some fabrication or assembly steps may be performed in non-European countries (i.e. without an ESA Agreement) if the capability is not available in Europe and the risk of future export restrictions is low. In such cases, the Manufacturer must demonstrate complete control, traceability, and documentation over the entire supply chain, from raw materials to final delivery.

Abbreviations:

Charter	Charter of the European Space Components Coordination (see ESCC No. <a href="#">00000</a> )
ECSS	European Coordination for Space Standardisation
EEE	Electrical, Electronic and Electro-mechanical
EG	ESCC Enhanced Grade
EG-CD	Enhanced Grade Component Document
EG-TRB	Enhanced Grade Technology Review Board
EPPL	European Preferred Parts List (ref. <a href="#">REP007</a> )
ESA	European Space Agency
ESCC	European Space Components Coordination
ESCIES	European Space Components Information Exchange System, <a href="https://escies.org">https://escies.org</a>
PCA	ESCC Process Capability Approval (ref. <a href="#">REP008</a> )
PSWG	Policy and Standards Working Group
QML	ESCC Qualified Manufacturers List (ref. <a href="#">REP006</a> )
QPL	ESCC Qualified Parts List (ref. <a href="#">REP005</a> )
SCSB	Space Components Steering Board
TA	Technical Authority for the EPPL
SEE	Single Event Effects
TID	Total Ionizing Dose
TNID	Total Non-Ionizing Dose
NSA	National Space Agency (that has an ESCC executive agreement with ESA; Ref. ESCC No. <a href="#">00000</a> )

## 5

**RULES FOR INCLUSION, MAINTENANCE AND REMOVAL**

The rules to add, keep, revise or remove a component entry in the [EPPL](#) are detailed below for each separate list in the [EPPL](#): EPPL 1, EPPL 2, EPPL 3.

**NOTE:** EPPL maintenance refers to the necessary work to be done by the Manufacturer every two years in order to maintain a particular component entry in the [EPPL](#).

**(a) EPPL 1:**

EPPL 1 includes by definition and by reference all European ESCC qualified components listed within the latest version of the ESCC [QPL](#). The management of maintenance and removal is handled under the responsibility of the existing ESCC qualification system.

EPPL 1 may also include selected qualified components or lists of qualified components from non-European qualification systems on the following conditions:

- The other qualification system reciprocally recognizes a list of ESCC components from European Manufacturers that could have a potential market in that region.
- The components on the list are of interest to ESA projects.
- Each component entry will require approval from the SCSB following a recommendation from the TA. Maintenance of the entry in EPPL 1 should be discussed with the corresponding non-European Agency on a minimum basis of one meeting per year.

(b) **EPPL 2:**

EPPL 2 includes only EG components. These are components from component families defined in the EG Definition from certified ESCC [QML](#) or ESCC [PCAL](#) Manufacturers.

In order for a component to be listed, the Manufacturer shall make a request to the ESCC Executive, preferably at the time of the two-yearly Manufacturer's certification maintenance. For each request, in addition to the data package requirements of ESCC No. [25700](#), the Manufacturer shall also provide the required EPPL Content Component Information (see Para. 10), i.e. the proposed content of the publicly available information to be included in EPPL 2.

**NOTE:** Once Enhanced Grade Certification has been granted by the ESCC Executive, it is not necessary for the Manufacturer to provide any additional data to justify the EG components' suitability for inclusion in EPPL 2. The Enhanced Grade Definition and the Enhanced Grade Component Document (EG-CD) will have already been reviewed as part of the EG certification process and are deemed sufficient justification.

**NOTE:** The EG-CD is only available to the ESCC Executive (and the Technical Authority) on a confidential basis and is considered proprietary information.

The TA will ensure that the components proposed for inclusion in EPPL 2 fall under the ESCC certified Enhanced Grade Definition.

Information relating to the maintenance of EG certification or the removal of EG components from EPPL 2 shall be provided by the certified Manufacturer through their representative National Space Agency (NSA) (or to ESA (see Para. 6.5)) during their two-yearly maintenance of EG certification (see ESCC No. [25700](#)). However, new inclusions, revisions, or removal of EG components may be requested by the Manufacturer at any time if the waiting time would negatively impact a user or the Manufacturer (e.g. a quality issue; an update to an EG Procurement Specification; new variants or options to be included that are important for the Manufacturer's market, etc.).

The TA may remove any component entries from EPPL 2 if non-conformances or quality issues would negatively impact space programmes or users (see Para. 7.4).

If the EG-TRB confirms an issue with a particular EG component(s) that would negatively affect EG certification, or if the Manufacturer wishes to remove the EG certification from an EG component(s), the Manufacturer shall immediately inform the ESCC Executive of the details. The affected EG component(s) will subsequently be removed from EPPL 2.

See also Para. 7.4 for details on the removal of EG component entries from EPPL 2.

(c) **EPPL 3:**

Only European EEE components may be listed in EPPL 3 (see Para. 4 for the definition of a European EEE component).

The initial inclusion of a component within EPPL 3 is based on the review by the TA of a Manufacturer's technical application data package for the component. The maintenance of the component within EPPL 3 is based on a subsequent two-yearly review of updated information.

The Manufacturer must have performed an evaluation of the component according to an ESCC evaluation specification or have performed an equivalent validation test campaign according to a specification from an appropriate space qualification system.

The request for EPPL 3 component entry from the Manufacturer should be submitted through their representative NSA (or to ESA (see Para. 6.5)).

The application data package should include the following information:

- ESCC European Component justification and, if applicable, a request for exception
- Space heritage details
- Confirmation of European component origin
- Relevant information on the manufacturing, assembly, and testing (processes and facilities)
- Traceability information
- The applicable procurement document
- A constructional analysis report
- Evaluation or validation test reports (including electrical characterization, endurance test results, environmental test data (i.e. vibration, mechanical shock, temperature, etc.), radiation effects test data (as applicable for the technology)).

**NOTE:** The Manufacturer's application data package is considered proprietary information and shall only be available to their representative NSA (or to ESA (see Para. 6.5)) and the TA on a confidential basis.

The Manufacturer shall also provide the EPPL Content Component Information (see Para. 10).

Every two years, the Manufacturer shall provide a request for maintenance extension through their representative NSA (or to ESA (see Para. 6.5)), with updated data on the EPPL 3 listed component including:

- recent test reports
- the latest issue/revision of the applicable procurement document
- if applicable, a revision/update of the EPPL 3 component entry (i.e. the modified EPPL Content Component Information; see Para. 10) with any new/removed variants/options or additional information
- supporting justifications for any changes

If the request for maintenance extension is not received, the component entry will be removed from EPPL 3 by the TA.

When necessary, a request for revision or removal may be made by the Manufacturer through their representative NSA (or to ESA (see Para. 6.5)), at any time before the next maintenance period.

See also Para. 7.4 for details on the removal of EG component entries from EPPL 3.

## **6 MANAGEMENT OF THE EPPL**

The following roles and responsibilities apply to the management of the [EPPL](#).

### **6.1 SCSB**

The SCSB appoints the members of the TA as well as the EPPL Manager. The SCSB shall make decisions on any specific requests from the TA, as reported by the EPPL Manager, that have a relevant or strategic impact on the publication of the [EPPL](#).

### **6.2 EPPL MANAGER**

The EPPL Manager is responsible for the review process and the publication of the [EPPL](#) with up-to-date information in accordance with the latest review outcomes. The EPPL Manager shall liaise between NSA's, Manufacturers and the TA to ensure all application requests are complete, reviewed, and that final approval has been agreed upon by all TA members. The EPPL Manager serves as a focal point between the SCSB and the TA, reporting any issues, questions, difficult approvals, or mutual recognition of non-European systems that require discussion at the SCSB level.

### **6.3 TECHNICAL AUTHORITY (TA)**

The TA members are responsible for reviewing all requests for inclusion, revision, removal, and maintenance for the [EPPL](#). The TA comprises members from the ESCC Executive and NSA's, ESA members acting as the ESCC Qualifying Authority, and the EPPL Manager. The TA may request support from appropriate component experts (in technology, radiation, packaging, mounting, etc.) for the review process.

### **6.4 NATIONAL SPACE AGENCY**

The NSA (that has an ESCC executive agreement with ESA; Ref. ESCC [00000](#)) is responsible for supporting the ESCC Executive with the EPPL application process for Manufacturers within that country. The NSA is responsible for screening and recommending valid EPPL entry requests from a Manufacturer to the EPPL Manager. For Manufacturers in countries where no NSA has signed an ESCC executive agreement, ESA is responsible for the support and recommending the requests.

### **6.5 MANUFACTURER**

The Manufacturer shall process requests for EPPL entry and updates (inclusion, maintenance, revision, and removal) through their representative NSA. For Manufacturers in countries with no ESCC executive agreement, requests should be submitted to ESA. The Manufacturer shall also be prepared to respond to requests for information from their representative NSA or the EPPL Manager.

## **7 EPPL ENTRY REQUEST PROCESS (EPPL 2 AND EPPL 3)**

A Manufacturer wishing to add, revise, or remove an EPPL entry shall present a request to the appropriate contact as follows:

- (a) For EPPL 2: to the ESCC Executive. The ESCC Executive will screen the request and, if relevant, forward it to the EPPL Manager for TA review and action
- (b) For EPPL 3: to their representative NSA (or to ESA (see Para. 6.5)). The NSA (or ESA) will screen the request and, if relevant, forward it to the EPPL Manager for TA review and action.

Contact details for the NSA and the EPPL Manager are provided on the [ESCIES](#) webpage in the dedicated [EPPL section](#). Request forms and relevant online tools are also available on the [ESCIES](#) website.

The EPPL Manager and the NSA/ESA shall be able to communicate with the Manufacturer before and after the TA review to request additional information, clarification, or updates on the status of the request.

### **7.1 NEW ADDITIONS TO EPPL 2 OR EPPL 3**

A Manufacturer's request to add a new component entry within EPPL 2 or EPPL 3 shall include the following:

- (a) The request data package.  
For EPPL 2 entries, the request data package (see Para. 5(b)) is reviewed by the ESCC Executive during the Manufacturer's EG certification process (see ESCC No. [25700](#))  
For EPPL 3 entries, the application data package (see Para. 5(c)) is reviewed by the TA.
- (b) The EPPL Content Component Information (see Para. 10).

### **7.2 REVISIONS TO EPPL 2 OR EPPL 3 ENTRIES**

Revisions of EPPL entries may be requested by the Manufacturer at any time.

For EPPL 2: The modified EPPL Content Component Information (see Para. 10) shall be provided (see Para. 7) with supporting justification for the changes. For minor updates that do not impact potential users, the revisions should be included in the two-yearly Maintenance of EG Certification process (see Para. 5(b)).

For EPPL 3: The modified EPPL Content Component Information (see Para. 10) shall be provided (see Para. 7) with supporting justification for the changes. For minor updates that do not impact potential users, the revisions should be included in the request for maintenance extension activity (see Para. 5(c)).

### 7.3 MAINTENANCE IN THE EPPL 2 OR EPPL 3

For EPPL 2 or EPPL 3 entries, during the two-yearly EPPL maintenance cycle, the Manufacturer shall provide (see Para. 7) the following:

- (a) Extension Data Package:  
For EPPL 2: the Maintenance of EG Certification data package (see Para. 5(b)).  
For EPPL 3: the maintenance extension data package; see Para. 5(c).
- (b) The latest EPPL Content Component Information (see Para. 10) including:
  - the latest issue/revision of the applicable procurement specification/document
  - the latest maintenance and validation testing summary details
  - details of any revisions or updates to the entry

### 7.4 REMOVAL FROM EPPL 2 OR EPPL 3

**NOTE:** For EPPL 1, the removal of a component entry is handled under the responsibility of the existing ESCC qualification system.

For EPPL 2, the removal of an EG component entry is controlled as detailed in ESCC No. [25700](#) under the responsibility of the TA and/or the ESCC Executive.

For EPPL 3, a component entry shall be removed under the following situations:

- (a) TA becomes aware of any issues that could potentially impact component reliability or performance.
- (b) TA cannot verify that the component meets the EPPL maintenance requirements.
- (c) The component no longer fulfils the EPPL objectives.
- (d) The Manufacturer requests the removal of the component entry (for any reason).

**NOTE:** The Manufacture may provide (see Para. 7) last-time-buy notice information to be included in the EPPL 3 component entry if considered appropriate.

## 8 USER RESPONSIBILITY

Components included in the [EPPL](#) meet the appropriate criteria of this document at the time of their inclusion. However, it remains the User's responsibility to determine that the selected component adequately fulfils all relevant application and mission requirements.

## 9 EPPL PUBLICATION

The [EPPL](#) is published under the responsibility of the TA twice a year (as a minimum).

The latest issue of the [EPPL](#) (as well as all previous issues) is available on the ESCIES web site at: <https://escies.org>.

A "what's new" section of the [EPPL](#) will provide details of new entries, changes and deletions applied within the latest issue.

**10 EPPL CONTENT COMPONENT INFORMATION**

Each component entry in the EPPL shall contain the following information

**NOTE:** All information included in the EPPL shall be considered suitable for public use.

- (a) **Manufacturer's Name and Country:**  
The name of the company that manufactures the component and the country where the company is located.
- (b) **Component Family Code:**  
This is the highest-level classification of an EEE component, which defines its primary function. To ensure consistency and facilitate data management, each component family is assigned a unique category code that corresponds to the standardized EEE component table used for ESCC-qualified components, as follows:

Family Code	Component Description
01	Capacitors
02	Connectors
03	Crystals and Oscillators
04	Diodes
05	Filters
06	Fuses
07	Inductors
08	Microcircuits
09	Relays
10	Resistors
11	Thermistor Sensors
12	Transistors
13	Wires and Cables
14	Transformers
18	Optoelectronics
20	Thermostats
30	RF Passive
40	Hybrids and Modules
50	Cable Assembly
99	Miscellaneous

- (c) **Sub-Family Description:**  
A sub-classification within the designated component family, defining the component's technology, construction, or specific function. This provides a more granular level of categorisation.
- (d) **Part Description:**  
A concise summary of the component's key characteristics, function, and technology providing specific, critical information to quickly identify the component's role and capabilities without the need to consult a detailed datasheet.



- (e) **Part Range (or coverage):**  
Details of the specific range of values, variants, and options for a component that are covered by the EPPL entry. This includes, as applicable, package type(s), quality level and other specific relevant parameters. It is used to group similar components to avoid listing every single part number individually. Full details of the available options are referenced and described within the corresponding listed procurement specification/document.
- (f) **Part Number:**  
The Manufacturer's complete part number or series of numbers covered by the EPPL entry. This is the definitive, unique identifier for the component and may include a range of part numbers to cover a family of components. Full details of the part numbering for the available options are included within the corresponding listed procurement specification/document.
- (g) **Procurement Specification/Document Information:**  
The applicable procurement document/specification that contains all necessary information for acquiring the component, which must be publicly and freely available.  
  
For all EPPL entries, a publicly available link to the current issue/revision of the procurement specification/document shall be provided.  
  
For EPPL 1 entries, all ESCC specifications are available on the [ESCIES](#) website.  
  
For EPPL 2 and EPPL 3 entries, the current issue/revision of the procurement document/specification shall be indicated.
- (h) **Validation and Maintenance Testing:**  
For EPPL 2 EG component entries: include a reference(s) to a summary of the tests included in the applicable EG Validation Testing plan and Maintenance of EG Certification plan performed for both initial validation and ongoing maintenance, demonstrating that the component has stable, long-term processes suitable for space applications. A publicly available link to the latest version of this document(s) is provided.  
  
For EPPL 3 component entries: either include a validation testing summary (or a publicly available link, if available), or a reference to a specification from a qualification system under which it was tested (e.g. ESCC Generic specifications).

(i) Radiation:

Only applicable for component technologies known to be susceptible to degradation in space radiation environments:

A summary of available radiation test data regarding TID, TNID, and SEE based on the radiation sensitivity defined in ECSS-Q-ST-60-15.

The Manufacturer shall provide all available information pertaining to performance in radiation environments, especially for component technologies known to be susceptible to degradation in space radiation environments. The goal is to provide all relevant information on radiation performance to allow the user to quickly evaluate any potential lack of radiation test data for their application. The absence of any particular information highlights a potential need for additional radiation tests by the user.

**NOTE:** The provided radiation information does not guarantee component performance, and the user is responsible for interpreting the data and verifying its applicability to their mission requirements.

- **TID (Total Ionizing Dose):** The minimum information to be provided is:
  - Test condition: biased and/or unbiased
  - The TID level at which the component survived, in rad(Si): e.g. 20krad(Si)
  - Whether this information is based on the worst-part response or a statistical approach (see ECSS-Q-ST-60-15 for more information): e.g. 20krad(Si) [worst part] or 20krad(Si) [statistical approach]
  - Dose rate in rad(Si)/h: e.g. 360 rad(Si)/h
  - Test report reference(s), including issue/revision
  - Whether the tests were conducted in accordance with a specification or guideline, and which one: e.g. ESCC No. [22900](#), MIL-STD-883 method 1019, MIL-STD-750 method 1019
  - Or if the part is considered immune
- **TNID (Total Non-Ionizing Dose):** The minimum information to be provided is:
  - Test condition: biased and/or unbiased
  - The TNID level at which the component survived, in particle fluence per cm<sup>2</sup> for a given monoenergetic particle energy in MeV: e.g. 3x10<sup>10</sup> protons/cm<sup>2</sup> at 50 MeV (equivalent proton fluence)
  - Whether this information is based on the worst-part response or a statistical approach (see ECSS-Q-ST-60-15 for more information): see TID above
  - Test report reference(s), including issue/revision
  - Whether the tests were conducted in accordance with a specification or guideline, and which one: e.g. ESCC No. [22500](#), MIL-STD-883 method 1017, MIL-STD-750 method 1017, MIL-STD-883 method 1017
  - Or if the part is considered immune

- **SEE (Single Event Upset): The minimum information to be provided is:**
  - ❖ **DSEE (Destructive SEE (e.g. SEL, SEB, SEGR, SEDR)), for each characterized DSEE:**
    - If applicable, the LET threshold in Silicon and cross-section saturation value in  $\text{cm}^2$ : e.g. SEL  $\text{LET}_{\text{th}}(\text{Si}) > 42 \text{ MeV} \cdot \text{cm}^2/\text{mg}$  -  $\text{XS}_{\text{sat}} = 3 \times 10^{-3} \text{ cm}^2$
    - Or if applicable, the maximum safe operating area (SOA) for immunity up to a given LET: e.g. SEGR/SEB SOA:  $V_{\text{gs}} < 0\text{V}$  and  $V_{\text{ds}} < 30\text{V}$  for immunity up to  $60 \text{ MeV} \cdot \text{cm}^2/\text{mg}$
    - Test report reference(s), including issue and revision number
    - If the tests were conducted in accordance with a specification or guideline, and which one: e.g. ESCC No. [25100](#), MIL-STD-750 method 1080
    - Or if the part is considered immune to destructive effects
  - ❖ **NDSEE (Non-destructive SEE (e.g. SEU, SET, SEFI, MBU/MCU)), for each characterized NDSEE:**
    - List of each effect tested
    - Test report reference(s), including issue and revision number for each effect tested
- (j) Pure Tin:  
For EPPL 1: see ESCC No. [22600](#).  
  
For EPPL 2:  
EPPL 2 shall declare for each listed EG component whether pure tin is present in its construction or not. For EPPL 2 EG component entries, the use of matte pure tin is acceptable subject to the recommendation of the EG-TRB and acceptance by the ESCC Executive. In such cases, the pure tin (i.e. with  $> 97\%$  tin content) shall either pass the JESD-201A Class 2 requirements or meet the GEIA-STD-0005-2 Level 2B requirements.  
  
For EPPL 3: component entries, pure tin is not permitted.
- (k) Remarks:  
Any specific remark concerning the component that may be useful for users, such as relevant application notes, mounting recommendations, last-time-buy information, etc.