DOCUMENT CHANGE REQUEST

DCR number 518	Changes required for: General	Originator: Anastasia Pesce
Date: 2009/05/13	Date sent: 2009/05/13	Organisation: ESA/ESTEC
Status: IMPLEMENTED		

Title:	Recommendations on the use of the ESCC Specification System for the Evaluation and		
Number:	23100	Issue:	1

Other documents affected:

Page:

Modified title and all pages

(Note this DCR and Issue 2 Draft E replaces DCR 385 and Issue 2 Draft C which is withdrawn following significant changes in the content and the ESCC Policy arising from the review of DCR 385 at PSWG and SCSB.)

Paragraph:

Modified title and all pages

(Note this DCR and Issue 2 Draft E replaces DCR 385 and Issue 2 Draft C which is withdrawn following significant changes in the content and the ESCC Policy arising from the review of DCR 385 at PSWG and SCSB.)

Original wording:

Proposed wording:

Complete rewrite per Issue 2 Draft E attached.

Justification:

23100 has existed since 1982 (ESA/SCC) as an advisory document to aid in the treatment of non-standard components so that work performed follows a structured approach and enables the smoothest transition to a standard component and, subsequently, possible selection as a preferred part and possible ESCC qualification. The present ESCC issue is the last ESA/SCC issue under an ESCC coversheet and, as such, the content is couched in ESA/SCC and ESA-PSS terminology and consequently requires updating. The principle of providing such advice remains sound as the ESCC System, like ESA/SCC before it, is intended to be a self standing and complete system. This specification thus deals with applying the ESCC System approach at the earliest opportunity during procurement with consequential standardisation benefits.

The requirement to maintain this advisory specification within ESCC was confirmed by SCSB and PSWG were given the action (SCSB AI 20.4) to refine a proposed Issue 2 (Draft C) put forward for consideration by ESA under DCR 385. Consequently a policy decision was taken to remove the concept of non-standard as opposed to standard components and instead refer to unqualified components. Other changes were proposed to reduce the differences of approach between ESCC and ECSS in terms of manufacturer assessment, component evaluation and lot validation. A new Draft E for Issue 2 was consequently prepared by ESA, tabled to PSWG and reported at SCSB # 22 (March 2009) with the PSWG

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recommendation for acceptance. SCSB members considered this submission under Agenda item 3.3 "Documents to be Approved" and accepted the PSWG recommendation. Accordingly Issue 2 Draft E is approved for issue.

For clarity DCR 385 (and associated 23100 Issue 2 Draft C) is withdrawn and replaced by this DCR (and associated approved 23100 Issue 2 Draft E)

(Note this DCR is approved by the Technical Secretary reflecting the recorded SCSB decision.)

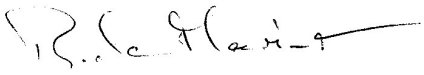
Attachments:

23100_2E.pdf, null

Modifications:

N/A

Approval signature:



Date signed:

2009-05-13

RECOMMENDATIONS ON THE USE OF THE ESCC SPECIFICATION SYSTEM FOR THE EVALUATION AND PROCUREMENT OF UNQUALIFIED COMPONENTS

ESCC Basic Specification No. 23100

Issue 2 - DRAFT E	February 2009

Document Custodian: European Space Agency - see https://escies.org

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DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION

TABLE OF CONTENTS

1. PURPOSE

This specification provides the ESCC recommendations in respect of procurement, for flight or ground segment space application of unqualified EEE components and for associated evaluation activities.

(The recommendations are promulgated under the auspices of the Space Components Steering Board representing European international and national space agencies, user industry and component manufacturers.)

2. SCOPE

The purpose of the ESCC recommendations is to achieve maximum standardisation of the approval procedures applied to the procurement of unqualified components. The scope of the recommendations is such that:

a) The assessment and evaluation of components during procurement contributes to an increasing body of information which can serve, where appropriate, as a basis for selection for entry into the ESCC EPPL and for the ESCC qualification of components.
b) Work performed in the frame of a particular project or programme is not repeated unnecessarily when the same component is procured by a subsequent project.

3. RELATED DOCUMENTS

3.1 APPLICABLE DOCUMENTS

ESCC 20100	Requirements for Qualification of Standard Electronic Components for Space Application
ESCC 20200	Component Manufacturer Evaluation
ESCC 20800	New ESCC Specifications and Change Requests
ESCC 21700	General Requirements for the Marking of ESCC Components
ESCC 22600	Requirements for the Evaluation of Standard Electronic Components for Space Application
ESCC 22900	Total Dose Steady-State Irradiation Test Method
ESCC 24600	Minimum Quality System Requirements
ESCC 25100	Single Event Effects Test Method and Guidelines
ESCC REP001	List of Published ESCC Documents and Specifications

3.2 REFERENCE DOCUMENTS

ESCC 10400	Organisation and Basic Rules of the Components Technology Board
ESCC 12300	The European Preferred Parts List (EPPL) and its Management
ECSS-Q-ST-60	Electrical, Electronic and Electromechanical (EEE) Components
ISO 9001	Quality management systems -- Requirements

4. TERMS AND DEFINITIONS

4.1 DEFINITIONS

Unqualified Component	A (EEE) component which is not listed in the ESCC QML or QPL, or other international or national space component qualification system.

4.2 ABBREVIATIONS

AQP	Annual Qualification Programme
CTB	Component Technology Board
DPA	Destructive Physical Analysis
ECSS	European Cooperation for Space Standardisation
EEE	Electrical, Electronic and Electro-mechanical
EPPL	European Preferred Parts List
ESCIES	European Space Components Information Exchange System (https://escies.org)
QML	Qualified Manufacturers List
QPL	Qualified Parts List
SCSB	Space Components Steering Board
TA	Technical Authority (for the EPPL)

5. RECOMMENDATIONS

The ESCC recommendations for unqualified components are that:

5.1 GENERAL

The procurement for space application be carried out, by the companies and project teams concerned, based on a set of established requirements to mitigate the risk of utilising unsuitable components, leading to their premature failure in flight or ground segment use. Typically such requirements should form part of an overall product assurance plan for the space project.

5.2 ECSS SYSTEM

The procurement for space application be carried out in accordance with the requirements of the ECSS System and in particular by the application of ECSS-Q-60.

5.3 UTILISATION OF ESCC SPECIFICATIONS

Where a suitable ESCC Detail Specification exists it is utilised in conjunction with its associated Generic and applicable referenced Basic Specifications to procure the component.

Where a suitable ESCC Detail Specification does not exist, a procurement specification is prepared in the ESCC format, thus utilising the availability of the applicable Generic and Basic specifications. Further, that the Detail specification, once agreed with the manufacturer, is submitted to the ESCC Executive for harmonisation and issue within the ESCC System.

(Noting that this should be the case where future repeat usage of the component is considered to be likely and the manufacturer is willing to supply against the requirements of the ESCC System. Submission may be either by the user or the manufacturer and be made to the ESCC Executive Secretariat. Refer to ESCC Basic Specification No. 20800 for further details.)

5.4 COMPONENT IDENTIFICATION AND MARKING

Where a component is procured using applicable, formally issued ESCC specifications and is deemed fully compliant with all the procurement requirements specified within the specifications, the component should be identified by the ESCC component number. Component marking should be in accordance with the provisions of ESCC Basic Specification No. 21700.

(Noting that ESCC Specifications are under the custody of ESA and are formally issued on behalf of the SCSB by the ESCC Executive Secretariat. Current, valid issues are listed in the ESCC REP001 and are available from ESCIES.)

5.5 DETAILED EVALUATION

Where the suitability of the component to be procured and/or the associated manufacturer is not fully established and visible for space application, the component should be subjected to a Detailed Evaluation based on the ESCC methodology outlined in ESCC Basic Specification No. 20100 comprising an evaluation of the Manufacturer and an evaluation of the component.

5.5.1 Manufacturer Evaluation

The procurement for space application be from a component manufacturer with a demonstrable quality management system typically based on ISO 9001 and preferably with a valid existing third party certification. Further, that the manufacturing process for the space lot is subject to the controls of the quality management system and that this is aligned to the extent necessary with the minimum quality system requirements given in ESCC Basic Specification No. 24600.

Where a procurement is planned from a manufacturer for whom an assessment is deemed necessary, that an audit is performed based on the ESCC methodology outlined in ESCC Basic Specification No. 20200.

5.5.2 Component Evaluation

Where the suitability of the:

– design margins,
– constituent materials,
– construction,
– performance, including radiation resistance, or
– intrinsic reliability

of the component is not fully established and visible for space application that an evaluation programme is undertaken. Further, that the evaluation test programme should be in accordance with, or based on, the ESCC requirements given in ESCC Basic Specification No. 22600 and, where it exists, the applicable ancillary Basic Specification. For radiation assessment that the work is conducted in accordance with the requirements of ESCC Basic Specifications Nos. 22900 and 25100.

5.6 LOT VALIDATION

5.6.1 General

A component lot procured for flight use is subject to a sample testing plan over and above the specified

lot screening tests so as to validate the lot's suitability for use.

The following should be taken into consideration in establishing the lot validation:

– the availability of existing pertinent test data where the suitability of such data is assessed, at a minimum, in accordance with the criteria given in ECSS-Q-ST-60.
– the performance of the validation testing should be either by the manufacturer, the user, a third party assessment service or an appropriate combination thereof.
– where ESCC specifications are used the validation testing should comprise one or more of the tests or test sequences defined in the applicable Generic (noting any deviations in the applicable Detail specification) for Lot Validation Testing or Lot Acceptance Testing. (The use of the former term is in those Generics employing periodic testing for qualified manufacturers.)
– the performance of a DPA on a suitable sample from the lot, in a manner so as to conform, at a minimum, to the requirements stipulated for DPA in ECSS-Q-ST-60.

Where ESCC specifications are used, the contract or purchase order conditions should specify that the manufacturer shall not knowingly deliver components which are not capable of passing all the tests specified for lot validation or lot acceptance testing, as applicable, irrespective of whether the tests are to be performed.

5.6.2 Radiation

A component lot procured for flight use is subject to an assessment of radiation sensitivity and where the technology is assessed as being at risk in the project application a radiation lot verification test programme is conducted. For total dose effects the work should be performed in accordance with ESCC Basic Specification No. 22900. For semiconductor components, per the applicable Generic specification, this is associated with wafer lot acceptance testing which forms part of the lot screening requirements. For single event effects the work should be performed in accordance with ESCC Basic Specification No. 25100.

5.7 HARMONISATION

Members and Observers of ESCC encourage the constituents they represent to contribute successful results from the procurement activities of unqualified components to the harmonisation task. Namely that suitable components and the data to hand are proposed to the EPPL TA or to the CTB for inclusion respectively in the EPPL or future AQPs, leading to subsequent inclusion in the ESCC QML or QPL. Further, that problems encountered are shared by those members who participate in the ESA Alert System.

In the overall interests of standardisation and future evolution, that results from procurement, particularly of unqualified components are brought to the attention of the CTB and its working groups dealing with the strategic dossiers. By this means the dossiers can be enhanced as more knowledge is gained from the early use of emerging technologies.

5.7.1 European Preferred Parts List

Submission of component proposals for inclusion in the EPPL should be in accordance with ESCC Procedure No. 12300.

5.7.2 CTB

Bringing information into the realm of the CTB for consideration in the frame of strategic dossiers or within the frame of an AQP should be in accordance with ESCC Procedure No. 10400.

5.7.3 ESCIES

Data arising in the course of procurement activities is shared within the ESCC community by preparing

the data in a form fit for web dissemination and by contributing it to ESCIES. Inter alia, such data would include DPA reports, radiation test reports, part approval documents and evaluation test reports.