





11

The undersigned hereby certifies on behalf of the ESCC Executive, that the above information is correct; that the appropriate documentation has been evaluated; that full compliance to all ESCC requirements is evidenced except as stated in box 13; that the reports and data are available at the ESCC Executive and therefore applies for ESCC Capability Approval status to be given to the capability domain defined herein.

Date: 22/05/2025

Fontaine
LyaSignature numérique
de Fontaine Lya
Date : 2025.05.22
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(Signature of the ESCC Executive Coordinator)

12

Continuation of Boxes above:

Box 10

NCCS 2CTDP302 deals with cracks observed on capacitors during LAT DPA, on one batch of SRAM modules, due to bad wettability of the capacitor batch, that led to an excessive stress applied during mounting. It was closed with corrective actions to improve the Mounting Aptitude Test (MAT) for procurement of passive components, and to update the rework procedure to highlight the prohibition of rework for type 2 capacitors.

THE PROCESS CAPABILITY APPROVAL OF 3D PLUS IN BUC IS PROPOSED TO BE RENEWED and EXTENDED FOR THE SUPPLY OF NON HERMETIC MICROELECTRONIC MODULES USING 3D STACKING ASSEMBLY TECHNOLOGY IN ACCORDANCE WITH THE ESCC 2566001 Issue1.

* The following materials/ processes extensions have been approved:

- Capability extension of the SAC SMD assembly line (new component package type)
- Use of PCBs without milling, or with controlled milling
- New SnSb SMD Assembly Process
- Use of UV laser for module etching and marking, for standard metallization

* These new materials /processes have been inserted in the new PID 3300-0546 Rev.15 after successful extensive Evaluation / Approval testing programmes including DPAs:

- Evaluation testing report ref. 3320-0895-1 (27/03/2024) according to the testing programme defined in the document ref. 3320-0319-1
- Evaluation testing report ref. 3320-0897-1 (25/05/2024) according to the testing programme defined in the document ref. 3320-0271-2
- Evaluation testing report ref. 3320-0896-1 (25/05/2024) according to the testing programme defined in the document ref. 3320-0277-1
- Evaluation testing report ref. 3320-1186-1 (20/11/2024) according to the testing programme defined in the document ref. 3320-0911-1

* The new procedures and updated procedures have been reviewed, approved and addressed in the PID rev.15.



APPLICATION FOR ESCC CAPABILITY APPROVAL (or its EXTENSION)

Page 3

CAPABILITY DOMAIN: Non Hermetic 3D Stacking Assembly Technology

Application No
351D

Executive Member: CNES

Date: 20/05/2025

Non compliance to ESCC requirements:

13

No.:	Specification	Paragraph	Non compliance
			None

Additional tasks required to achieve full compliance for ESCC Capability Approval or rationale for acceptability of noncompliance:

14

Disposition:

15

Application Approval: Yes ☒ No ☐

Action/Remarks:

Date: 26/06/2025

Signature, ESA Representative
A. Zadeh: Head of the Avionics and EEE Division

**APPLICATION FOR ESCC CAPABILITY APPROVAL**

Page 4

CAPABILITY DOMAIN: Non Hermetic 3D Stacking Assembly TechnologyApplication No
351D**Executive Member:****CNES**

Date: 20/05/2025

NOTES ON THE COMPLETION OF THE APPLICATION FORM FOR ESCC CAPABILITY APPROVAL [or its EXTENSION, see BOX 12 below]

GENERAL	Whenever possible, all entries should be typed and in any case be suitable for legible reproduction by normal means.
ENTRIES Form heading	shall indicate: - the title of the capability domain or the technology as given in the Capability Abstract - the Executive Member; - the entering date; - the serial number and the suffix of the form.
Box 1	shall provide under capability domain description the full name or a description statement of the capability domain – the number of the Capability Abstract document – the basic technology used for capability approval – the test structures specification numbers or identification numbers – the components which successfully passed component approval test and are proposed for qualification within the domain. N.B. The capability abstract shall be attached as an Appendix.
Box 2 and 3	Manufacturer's name and location of the plant(s) where the capability domain is situated.
Box 4	The ESCC basic specifications (including issue number and date) used during Process Capability Approval.
Box 5	Reference to test report(s) submitted in support of the application for capability approval and components proposed for qualification.
Box 6	Enter details to identify the PID that was applicable at the time of manufacturing of samples for capability approval testing.
Box 7	If the PID has been changed during or after capability approval testing, adequate details shall be provided together with the reasons for change. Major changes shall be clearly identified.
Box 8	The box serves to identify the current PID and the Executive Representative that has verified it together with the date of this verification.
Box 9	The box can be completed only after a physical visit to the plant to confirm that the practices, procedures, material, etc. used in manufacturing the components are as described in the PID. This audit shall be carried out in accordance with the requirements of ESCC Basic Specification No. 20200 and the results shall be formally recorded. The report number shall be referenced.
Box 10	Details entered shall be sufficient to evidenced that an evaluation programme according to ESCC Basic Specification No. 24300 has been performed and that the results thereof are summarised in the audit and test reports. If the evaluation programme has not been carried out according to established ESCC Specifications, the applicant Executive Member shall provide alternative data and declare the assessed degree of satisfactory compliance with the ESCC requirements. Reference shall be made to the reports on Destructive Physical Analysis (DPA), Failure Analysis reports as well as any Non Conformance (NCCS) issued during the Evaluation and/or capability approval testing.
Box 11	Enter the name of the Executive Member (i.e., CNES, DLR, ESTEC, etc.) and the signature and date of the responsible Executive Coordinator.
Box 12	To be used when there is a need to expand any of the boxes from 1 through 10. Identify the Box affected and reference Box 12 in the relevant Box. Box 12 can be broken into 12a, 12b, etc. if several boxes have to be expanded. In the case of Application for the Extension of Capability Approval, the Box 12 may be used to provide a summary of lots of component types (types, date codes, quantity) manufactured and tested within the capability domain. Refer to ESCC 24300, paragraph 9.4.3 for complete requirements.
Box 13	State noncompliance with reference to specification(s) and paragraph(s). To simplify reference in Box 14 each nonconformance shall be sequentially numbered. If relevant state 'None'.
Box 14	Any additional action deemed necessary by the Executive Member to bring the submitted data to a standard likely to be accepted by the ESCC Executive should be listed herein or the reason(s) to accept the noncompliance.
Box 15	All Executive Manager recommendations on the application itself, special conditions or restrictions, modifications of the ESCC QPL entry, letters to the manufacturer, etc. shall be entered clearly in Box 15, signed by the representative for ESA, and dated.

Appendix : Capability Abstract :

The associated **Process Identification Document (PID)** is Ref. **3300-0546-15**.

Since the Rev.11 of the PID, ESCC N°2566001 standard is the reference for the definition and evolution of the Process Capability Approval (PCA).

This PCA covers the 3D PLUS Buc activities on manufacturing, tuning, testing, inspection and Quality Assurance of 3D stacked products used for 3D PLUS catalogue and custom products.

According to the PID, the 3D PLUS modules are manufactured by stacking several layers of active and passive components. Two manufacturing flows are defined as follows:

- Flow 1 for the stacking of memories with TSOP packages.
- Flow 2 for the stacking of thin PCBs (Flex) populated with EEE components. These components are assembled by soldering when used in packages or by wire bonding when used in dice form.

Flow 2 allows a large diversity of packages (TSOP, PQFP, FBGA...) enabling the design and manufacturing of complex products.

Then, modules are screened, according to the PID, and to the generic procurement specification ECSS-Q-ST-60-05C.

The repair provision conditions as well as the criteria for lot rejection are also given in the PID.

The procurement of passive and active components, materials and mechanical parts are performed following internal procurement specifications and incoming instructions, as detailed in PID. Commercial EEE active components evaluation is in conformance with ECSS-Q-ST-60-13C standard.

For Module Lot Acceptance Test (Module LAT), 3D PLUS follows the ECSS-Q-ST-60-05C adapted to non-hermetic and cavity free modules.