ESCC	**APPLICATION FOR EXTENSION OF ESCC PROCESS CAPABILITY APPROVAL** **CAPABILITY DOMAIN: Microwave Hybrid Integrated Circuits (MHIC) and High Density Integrated (HDI) RF Systems in Package (RF-SiP) using LTCC multilayer** **Executive Member:** German Space Agency at DLR **Date:** 14.11.2024	Page 1 Appl. No. 341 D Rev. 1

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Capability domain submitted for approval

Capability Domain Description	Capability Abstract Number	Based on Technology	Test Structures	Component Proposed for Qualification
Microwave Hybrid Integrated Circuits (MHIC) and High Density Integrated (HDI) RF Systems in Package (RF-SiP) using LTCC multilayer	Attached as Appendix	**MHIC and LTCC iaw. PID**	**Option 2**	**SPC MHIC-DET5-LSBD MHIC-HPA-23GHz**

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Component Manufacturer
Tesat-Spacecom GmbH & Co.KG
Gerberstraße 49
D-71522 Backnang

3

Location of manufacturing plant(s)
Gerberstraße 49
D-71522 Backnang

4

ESCC Specifications used for Process Capability Approval

ESCC 2566000, Issue 3

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Report reference:
Maintenance of Process Capability Approval (Hybrid Line) 2023, Doc. No. TD02036183, 23.11.2023

63.1546.023.72QPR102 Iss. B, 23.04.2024

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PID used for manufacturing Approval Testing Lot

Reference No.: 63.0200.005.00PID

Issue: K Revision: -

Date: 30.04.2021

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PID Changes since start of Capability Approval

None ☐
Minor* ☐ * provide details in Box 12
Major* ☒

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Current PID Verified by: B. Gökgöz, DLR
Name of Executive Representative

Ref. No.: 63.0200.005.00PID

Issue: M Revision: -

Date: 27.08.2024

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Current Manufacturing Facilities and Quality System audited by:

B. Gökgöz, DLR (Name of Executive Representative) on 09.07.2024 (Date) Tesat-AUD-DLR-2024 (Report Reference Number)

Satisfactory: Yes ☒ No ☐ Corrective Actions Closed Out: Yes ☐ No ☐ N/A ☒

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Quality and Reliability Data

Evaluation testing performed Yes ☒ No ☐

IPC & SPC Based Lot Release Acc. To "Category 1 / Option 2" Certificate,
Doc. No. 63.0175.200.05NOT Iss. B

IPC & SPC Based Lot Release Acc. To "Category 1 / Option 2" Certificate – ADVANTEST "Verimod" - 2020 Terrestrial Products

Report Ref. No.: _____ date: _____
Equivalent data: None (provide details)
Certification: yes

Failure Analysis, DPA, NCCS: Yes ☒ No ☐
(supply data)

Ref. Nos. and purpose:
NCCS MHIC: 2DTES201 Iss. A / 16.05.2022 / NCCS

DPA:
40D23-262_MHI-DET5-LSBD Iss. A / 23.05.2023 / DPA
40D23-542_IPM (LTCC) Iss. A / 14.11.2023 / DPA
40D23-747_MHIC-HPA-23GHz Iss. A / 09.02.2024 / DPA
40D23-748_MHIC-HPA-23GHz Iss.A / 22.02.2024 / DPA
40D24-035_MHIC-HPA-23GHz Iss. A / 28.02.2024 / DPA
40D24-036_MHIC-HPA-23GHz Iss. A / 29.02.2024 / DPA

	APPLICATION FOR EXTENSION OF ESCC PROCESS CAPABILITY APPROVAL **CAPABILITY DOMAIN: Microwave Hybrid Integrated Circuits (MHIC) and High Density Integrated (HDI) RF Systems in Package (RF-SiP) using LTCC multilayer** **Executive Member:** German Space Agency at DLR **Date:** 14.11.2024	Page 2 Appl. No. 341 D Rev. 1

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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: 14.11.2024

Burak Gökgöz

Digital signiert von Burak Gökgöz
DN: PostalCode=51147, O=Deutsches Zentrum fuer Luft- und Raumfahrt e. V. (DLR), STREET=Linder Höhe, S=Nordrhein-Westfalen, C=DE, CN=Burak Gökgöz, E=burak.goekgoez@dlr.de
Grund: Ich bin der Verfasser dieses Dokuments
Ort: Bonn
Datum: 2024.11.27 11:06:47+01'00'
Foxit PDF Reader Version: 2024.2.2

i.A. Burak Gökgöz, DLR
(Signature of the Executive Coordinator)

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Continuation of Boxes above:

PID Changes since start of Process Capability Approval

Change Log History – Approved by Audits

Issue	Detail of Change	Date
A	Initial issue	2002-11-05
B	see change record issue B	2003-12-11
C	see change record issue C	2006-02-23
C1	Intermediate issue	
D	see change record issue D	2008-11-07
E	see change record issue E	2009-12-01
F	see change record issue F	2012-04-16
G	see change record issue G	2014-03-03

Issue H / 02.06.2016
- Major: LTCC included
- Minor: Editorial changes

Issue I / 29.06.2018
- Major: MHIC: Plasma Cleaning included
- Major: LTCC reorganized
- Minor: Editorial changes, restructuring of document.

Issue J / 28.04.2020
- Major: Production of ring-base MHIC change to production line of LTCC
- Minor: Editorial changes, update of organisational information, inventory list,issues of documents and Flight Project information for Nov. 2017- Jan. 2020.

Issue K / 30.04.2021
- Major: Consolidation of MHICs lines (ring-base & LTCC) and relocation to new building
- Minor: Complete restructuring of the PID accordingly to ring-base and LTCC content. Consolidation of procurement specification list, manufacturing specification lit, test specification list and equipment list. Updating of produced MHIC list.

Issue L / 27.10.2023
- Major: Extension of capability domain, as per Delta Qualification report 63.1546.023.72QPR102 Iss. A, 29.02.2024
- Minor: Update of organization chart and information
  Update list of produced lots since last MoQ
  Exceptions as agreed during the audit in July 2022 (exception for Chip-User LAT, exception for high/low Temperature test)

Issue M / 27.08.2024
- Minor: Update of Process Capability abstract, organization chart, description of role of ESCC Chief Inspector and non-conformance treatment added, SEC sample selection, notes relat4ed to x-ray inspection, PIND testing and wire bond size (changes as agreed during audit)

ESCC	**APPLICATION FOR EXTENSION OF ESCC PROCESS CAPABILITY APPROVAL** **CAPABILITY DOMAIN: Microwave Hybrid Integrated Circuits (MHIC) and High Density Integrated (HDI) RF Systems in Package (RF-SiP) using LTCC multilayer** **Executive Member:** German Space Agency at DLR **Date:** 14.11.2024	Page 3 Application No. 341 D Rev. 1

Non compliance to ESCC requirements: 13

No.:	Specification	Paragraph	Non compliance

Additional tasks required to achieve full compliance for ESCC Capability Approval or rationale for acceptability of noncompliance: 14

Executive Manager Disposition: 15

Application Approval: Yes ☒ No ☐

Action/Remarks:

Date:

B. Schade: Head of the Quality Department

ESCC	**APPLICATION FOR EXTENSION OF ESCC PROCESS CAPABILITY APPROVAL** **CAPABILITY DOMAIN: Microwave Hybrid Integrated Circuits (MHIC) and High Density Integrated (HDI) RF Systems in Package (RF-SiP) using LTCC multilayer** **Executive Member:** German Space Agency at DLR **Date:** 14.11.2024	Page 4 Application No. 341 D Rev. 1

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 Generic and Detail specifications (including issue number and date) used during 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.