APPLICATION FOR EXTENSION OF ESCC QUALIFICATION APPROVAL

Component Title: Capacitors, Fixed, Chip, Ceramic Dielectric, type II, based on types 0805, 1206, 1210, 1812, 2220

Executive Member: CNES Date: 05/05/2015

Appl. No. 110M

1 Components (including series and families) submitted for Extension of Qualification Approval:

ESCC COMPONENT NO.	VARIANTS	RANGE OF COMPONENTS	BASED ON	TEST VEHICLE / S	COMPONENT SIMILAR
3009 008	03, 06, 07	See box 14	0805	300900807C683KC 300900807C104MA 300900807C473JE 300900807C104KC AN12ZD0104KT2	
3009 009	03, 06, 07		1210	300900907C474KA 300900907C334JC	
3009 010 - 3009 011	03, 06, 07		1812 1812 2220 2220	300901007C474KE 300901007C105KD 300901107C105KE AN15ZD0105KT2	
3009 023	03, 06, 07		1206		x

2 Component Manufacturer

TPC
A division of AVX Corporation

3 Location of Manufacturing Plant(s)

Avenue du Colonel Prat
21850 SAINT APOLLINAIRE - FRANCE

4 Date of original qualification approval:

Date: 01/02/1983

Certificate Ref No. 110

Click here to enter text.

5 ESCC Specifications used for Maintenance of qualification testing:

Generic: 3009 Issue: 1

Detail(s): 3009/008 Issue: 3
3009/009
3009/010
3009/011

6 Deviations to LVT testing and Detail Specification used:

No ☐ Yes ☒ (supply details in Box 15)

Deviation from current Specifications:

No ☒ Yes ☐ (Supply details)

7 Qualification Extension Report reference and date:

Dossier de maintien de la qualification 110L (Type 2), 29/01/2015

8 Summary of procurement or equivalent test results during current validity period in support of this application (those to ESCC listed first)

Project Name	Testing Level	LAT	Date code	Quantity Delivered
EADS (90% TESAT)			April 2013 to March 2015	402 914 parts
TAS				
ALTER				
TTI, ARROW, RUAG				

9 **PID** changes since start of qualification

None ☐
Minor* ☒
Major* ☐ *Provide details in box:

10 Current **PID** Verified by: CNES
Name of Excutive Representative

Ref No: 1G2 PID 100 15WQ
Issue: 15 Date:
Rev Date: 28/04/2015

11 Current Manufacturing facilities surveyed by: ESA and CNES on 19/04/2012
(Name of Executive Representative) (Date)

Satisfactory: Yes ☒ No ☐ Explain See appended status of actions

Report Reference: QES/LB/120601, 25/06/2012

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

Ref. No's and purposes: Adhesion test failures due to test handling: See reports 004.QB.076L-C and 004.QB.114-a

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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 evidence (except as stated in box 15;) - that the reports and data are available at the ESCC Executive and therefore applies on behalf of CNES as the responsible Executive Member for ESCC qualification status to be extended to the component(s) listed herein.

Date: 13/05/2015

JP. BUSSENOT

(Signature of the Executive Coordinator)

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Continuation of Boxes above:

Style	Detail Spec.	Model	Variants (1)	Capacitance Range (pF)	Rated Volt. (V)	Tolerance (±%)
0805	3009/008	A_12G	03, 06	820 to 47 000 820 to 27 000 820 to 10 000	25 50 100	5, 10, 20
		A612Z	07	2 700 to 100 000 2 700 to 68 000 2 700 to 47 000	25 50 100	
1210	3009/009	A_13G	03, 06	3 900 to 220 000 3 900 to 120 000 3 900 to 47 000	25 50 100	
		A613Z	07	3 900 to 470 000 3 900 to 330 000 3 900 to 220 000	25 50 100	
1812	3009/010	A_14G	03, 06	6 800 to 470 000 6 800 to 270 000 6 800 to 82 000	25 50 100	
		A614Z	07	22 000 to 1 000 000 22 000 to 680 000 22 000 to 470 000	25 50 100	
2220	3009/011	A_15G	03, 06	18 000 to 1 000 000 18 000 to 680 000 18 000 to 180 000	25 50 100	
		A615Z	07	100 000 to 2 200 000 100 000 to 1 500 000 100 000 to 1 000 000	25 50 100	
1206	3009/023	A_20G	03, 06	2 200 to 100 000 2 200 to 68 000 2 200 to 22 000	25 50 100	
		A620Z	07	3 300 to 220 000 3 300 to 150 000 3 300 to 100 000	25 50 100	

(1) Variant 01 (AgPd), replaced in 2013 with variant 03 (AgPdPt), is removed from TPC PID

Note that in order to facilitate deliveries, minimum values have been harmonized on the basis that a lower value may be delivered with a qualified process using either a higher voltage product or a compatible temperature characteristics (i.e. a variant 06 design against a variant 07 order) provided that the maximum chip thickness is compliant. See appended modified QPL pages

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Non compliance to ESCC requirements:

No.:	Specification	Paragraph	Non compliance
1	3009		CECC equivalent data provided – LVT performed on products designed, manufactured as per ESCC PID (and screened against ESCC specifications as indicated)

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

ESCC Chart V requirements have been compared to CECC 32100 periodic testing applicable to both type I (NPO) and type II (2C1 and X7R) ceramics :
- In ESCC 3009 LAT 1, Environmental / Mechanical Subgroup, 12 Components must be mounted and subjected to Adhesion (4parts) and Rapid Change of Temperature (8 parts, 10 cycles) followed with Visual Inspection and Climatic Sequence (12 parts),
- Using CECC 32100 and 32101-801, for each ceramic type (NPO and X7R at TPC)
  . 20 parts must be mounted and subjected to Adhesion followed with Rapid Change of Temperature (5 cycles) and Climatic Sequence (1 reject allowed)
  . 45 parts must be mounted and subjected to steady state damp heat : 3 times 15 parts at rated voltage, 5V and with no voltage applied (1 reject allowed)

In addition 15 parts are mounted and subjected to the 85°C / 85%RH test under 1.5V during 500hrs (1 reject allowed). CECC requires many other tests which are not mentioned since they are not relevant to ESCC maintenance activities.
AVX TPC has modified CECC life test conditions, originally 1,5 Un – 1 000 hours, to performed the test at 2 Un on 40 parts as well as Rapid Change of Temperature has been extended to 10 cycles in order to be compliant with ESCC testing requirements.
The combination of the CECC Environmental / Mechanical / Endurance periodic testing and ESCC LAT1 / LAT2 is considered to form a good basis for this maintenance activity.

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Executive Manager Disposition

Application Approval: Yes ☐ No ☐

Action / Remarks:

Date:

Signature, ESA Representative

ANNEX 1: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION 18

Tests conducted in compliance with:

- ESCC 3009 generic specification; Chart V (for ESCC/QPL parts);
- Or PID-TFD (for ESCC/QML parts)

Tests vehicle identification/description:

300900807C104MA DC 1416 300900807C683KC DC 1343 & DC 1419	300900807C473JE DC 1417 300900807C104KC DC 1345
300900907C474KA DC 1349 300900907C334JC DC 1412 300901007C474KE DC 1351 & DC 1408	300901007C105KD DC 1348 (LAT 2) 300901107C105KC (no BI) DC 1327 & DC 1424 300901107C105KE DC 1429

Detail Specification reference: 3009/008/009/010/011

Chart V	Test	Tick when done	Conditions	Date Code	Tested Qty	No. of Rejects	Comments if not performed. Comments on Rejection
Environmental / Mechanical Subgroup	Mounting	☒	IEC 384-1	1416 1417 1349 1412 1351 1345 1408 1327 1429	20 20 20 20 20 20 20 20 20	0	
	Adhesion	☒	ESCC 3009, Para. 9.5	1416 1417 1349 1412 1351 1345 1408 1327 1429	20 20 20 20 10 20 20 20 10	1 0 1 0 0 0 0 0 0	See reports for Adhesion Test handling problems
	Rapid Change of Temperature	☒	IEC 68-2-14	1416 1417 1349 1412 1351 1345 1408 1327 1429	19 20 19 20 10 20 20 20 10	0	

	Visual Inspection	☒	ESCC 3009, Para. 9.1	1416 1417 1349 1412 1351 1345 1408 1327 1429	19 20 19 20 20 20 20 20 10	0	
	Climatic Test Sequence	☒	ESCC 3009, Para. 9.8	1416 1417 1349 1412 1351 1345 1408 1327 1429	19 20 19 20 20 20 20 20 20	0	
Endurance Subgroup	Mounting	☒	IEC 384-1	1416 1343 1419 1417 1349 1412 1351 1345 1408 1327 1424 1348 1429	40 20 40 40 40 40 50 40 40 40 40 20 50	0	
	Operating Life	☒	ESCC 3009, Para. 9.10	1416 1343 1419 1417 1349 1412 1351 1345 1408 1327 1424 1348 1429	40 20 40 40 40 40 50 40 40 40 40 20 50	0	All endurance tests 2000H except DC1348 (LAT2 – 1000H)
	Electrical Measurements during Endurance Testing	☒	ESCC 3009, Para. 9.4.5	1416 1343 1419 1417 1349 1412 1351 1345 1408 1327 1424 1348 1429	40 20 40 40 40 40 50 40 40 40 40 20 50	0	

Electrical Subgroup (Elect. Meas.)	Mounting	☐	IEC 384-1				
	Temperature Coefficient (Type I)	☐	ESCC 3009, Para. 9.11				Not applicable
	Temperature Characteristic (Type II)	☒	ESCC 3009, Para. 9.12	1411 1425 1452	6 6 6	0	300902307C154KA 300900903C154JC 300900807C104KA
Electrical Subgroup (Ass. / Capab. Tests)	Solderability	☒	IEC 68-2-20	1411 1425 1452	4 4 4	0	300902307C154KA 300900903C154JC 300900807C104KA
	Permanence of Marking	☐	ESCC 24800				Not applicable
Additional Tests	85/85 Humidity Low voltage	☒	CECC 32101-801	1416 1343 1419 1417 1349 1412 1351 1345 1408 1327 1424 1429	15 10 11 15 15 15 20 15 15 15 15 20	0	1 000H, 1.5V
	85/85 Humidity	☒	CECC 32101-801	1416 1343 1417 1412 1345 1408 1327 1424	15 15 15 15 15 15 15 15	0	1 000H, 50V
	40/93 Humidity 56 days	☒	CECC 32101-801	1416 1343 1419 1417 1349 1412 1345 1408 1327 1429	3x15 10 15 3x15 15 15 3x15 3x15 3x15 15	0	0V, 5V, Un Un 0V 0V, 5V, Un Un 0V 0V, 5V, Un 0V, 5V, Un 0V, 5V, Un Un

NOTES ON THE COMPLETION OF THE APPLICATION FORM FOR ESCC QUALIFICATION EXTENSION APPROVAL

ENTRIES

Form heading	shall indicate: - the title of the component as given in its detail specification or the name of the series, family; - the Executive Member; - the entering date; - the certificate number and its sequential suffix.
Box 1	shall provide details given in the table; in particular there shall be listed: - the variants or range of variants; - the range of components (the ESCC code is recommended to indicate the values or values range, the tolerance, the voltage, etc); the designation given in the detail specification as 'base on'; - under Test Vehicle enter either an ESCC code or the specific characteristic capable of identifying the component tested (e.g., voltage of coil for a relay); - under component similar enter a cross if relevant.
Box 2; 3 and 4	As per QPL entry; otherwise, an explanation of the changes must be supplied.
Box 5	Will show the ESCC Generic and Detail specifications, including issue number and revision letter, current at the time the tests reported were performed. If the specifications are different from those current on the date of the application, see Box 6.
Box 6	Will show the deviations from the Generic and Detail Specifications listed in Box 5, in particular deviations from testing. In case of deviations this must be listed in Box 15. In case the referenced specification in Box 5 have currently a different issue and/or revision indicate also whether the test data deviates or not from such current documents.
Box 7	Must reference the report(s) supplied in support of the application.
Box 8	Should provide the details of procurement to the full ESCC System, documentation of all of which should already have been delivered to the ESCC Executive under the terms of the relevant Generic Specification. An appropriate table has been drawn in this box.
Box 9	If the PID evolved after the Original Qualification or after the last Extension of Qualification, adequate details of such evolution shall be provided together with the reasons for the changes. Major changes shall be clearly marked.
Box 10	Identify the current PID issue status, date and actual date of verification. The date of verification of the current PID should be arranged as close as possible to the required date of extension.
Box 11	This box can be completed only after a physical visit to the plant to confirm that no unexplained changes occurred and that the practices, procedures, material, etc. used in manufacturing the components are as described in the PID. This survey shall be carried out in accordance with the requirements of ESCC Basic Specification No. 20200 and its findings shall be recorded.
Box 12	Provide details of, or reference to, any Destructive Physical Analysis (DPA) and Failure Analysis reports as well as any Nonconformance(s) (NCCS) occurred during the qualification validity period, stating if established corrective action have produced satisfactory results.
Box 13	Enter only the name of the Executive Member (i.e., CNES, DLR, ESTEC, etc.) and the signature of the responsible Executive Coordinator.
Box 14	To be used when there is a need to expand any of the boxes from 1 through 12. Identify box affected and reference the Box 14 in the relevant Box. Box 14 can be broken into 14a, 14b, etc. if several boxes have to be expanded.
Box 15	Fill in Table as requested.
Box 16	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 17	All Executive Manager recommendations on the application itself, special conditions or restrictions, modifications of the QPL or QML entry, letters to the manufacturer, etc. shall be entered clearly in Box 19, signed by the representative for ESA, and dated.
Box 18	Fill in Table as requested.
Box 19	Confidential Details of PID changes including those of a confidential nature, shall be provided.
Box 20	State noncompliance with reference to specification(s) and paragraph(s). To simplify reference in Box 16 each nonconformance shall be sequentially numbered. If relevant state 'None'.
Box 21	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 22	Additional Comments.

ESCC Audit performed at AVX TPC in April 2012 – Status Report – 30th of April 2015

Action Closed in 2013

No.	Ref.	F/O/C	Domain	Description	Corrective action	Status
6	00-QA-18	O	External Standards/Documents	There is two groups of external documents. The first group is made of the controlled documents. An external company checks the potential updates every 3 months and provides AVX-TPC with the new version when available. Applicable documents listed in contracts with the customers or related to catalogue products belong to this group. The second group, or "not controlled" documents, are not checked regularly and only, in principle, when used but no requirement was found ensuring that this verification was systematically done.	Add in procedure 00ED01 that a revision of standard used must be identified on the document whatever is the control status (controlled or uncontrolled) of this standard Add a flag into the Intranet network and each folders on the screen to remain visible at all the time to anyone using a standard,	***Action Closed.*** Flagg present on Intranet pages. Reference to Standard present in « Demande d'Essais » and "Rapport d'Essais"
7	00-QA-18	F	External Standards/Documents	The test method/standard revision number is not necessarily specified in test reports. For "not controlled" documents this may lead to traceability issues.	Write the revision of standard used in all documents including reliability reports and qualification reports, To be added to procedure 00ED01 ANNEXE 1.	***Action Closed.*** Requirement is in place. No comment on this matter during TPC internal audits.
9	00 ED 01	O	Control of process changes	In the frame of a major process change, a PCN is to be raised. However the definition of a major process change was found to be limited to: - Customer definition if specified by the latter - Line move. For ESCC products, AVX need to define more explicitly what are the major process changes that would lead to: - a request for approval sent to the Executive prior to any implementation and, - an immediate update of the PID once approved by the Executive.	Update procedure 00GM01 Management des Projets & PCN PDN. Updated with rev 2	***Action Closed.*** Per procedure 00GM01 rev. 2 dated April 2012. Note that the Chief Inspector is currently Product Quality.

ESCC Audit performed at AVX TPC in April 2012 – Status Report – 30th of April 2015

No.	Ref.	F/O/C	Domain	Description	Corrective action	Status
14	00 LS 16	F	Incoming Inspection	Procedure 00LS16 allows the possibility of a waiver for the acceptance of a not fully conform raw material / piece part lots if agreed by the production department. These waivers are recorded on specific forms. For ESCC products, a formal definition and scope of what is acceptable/ not acceptable need to be implemented. See also Finding # 21	See also F # 21 , to update 00QA 03 to reinforce the chief inspector decision with NC ==> done to complete 00LS 16 § 8,4,2 with quality product manager and chief inspector agreement ==> 28/09/2012	***Action Closed.*** Procedures 00QA03 issue 8 dated 20/04/2012 and 00LS16 issue 7 dated 05/09/2012 refer.
16	00 MM 03	O	training	Provisions are taken to ensure that a re-training is performed after a long absence (essentially for medical reasons) but nothing appears to be in place for other situations (e.g. when an operator to another production line for a certain period of time)	manage the qualification period with expiry date in the qualification data base , done 5 /9 /2012	***Action Closed.*** Procedure 03MM03 issue 5 dated 18/09/2012 refers. Currently, validity of certification is limited to *3 years* (Cf. Qualification Data Base)
18	00 QA 03	O	Non-conformance management	Two systems co-exist for the management of the non - conformances. The ceramic department has its own database but is also using in parallel "RNC" reports to record some of the non-conformances. It appears that RNC reports are not systematically transferred into the database. In addition, ESCC non-conformances are not visible or not identified as such in the ceramic database. Non-conformances at incoming control are processed with a RNC report and recorded in a specific database.	"Base Qualité" must be filled with NCR Evaluation : make that all lines are fully filled	***Action Closed.*** For practical reasons TPC ceramic department decided to maintain its own "data base" using the existing Excel file. Customers' complaints are treated using 8D or customer specific format.

ESCC Audit performed at AVX TPC in April 2012 – Status Report – 30th of April 2015

No.	Ref.	F/O/C	Domain	Description	Corrective action	Status
21	Incoming Control	F	Line	When a non-conformance occurs on procured goods, the use of the concerned lot may be authorized with a waiver. This waiver is traceable through the incoming control database, but not visible to the users. For use in ESCC products, material/ piece part lots accepted with a waiver need to be identified and accepted by the Chief Inspector.	SQA base to update, waiver handling to be reviewed in accordance, to record and trace the waiver. Creation of a specific labeling and modification of the data base AQF for extraction of Waivers.	***Action Closed.*** Procedure 00LS16 issue 7 refers. SQA data base automatically generates a label. *No concrete example available at this stage.*
26	Termination plating	O	Line	The lead proportion appears to be systematically measured by the operator but not necessarily verified.	Updating of the specification ref 1A-BNI--** FQ : The tin lead data measured every batch will be followed in the same file than the thickness in order to make maintenance of batch if needed,	***Action Closed.*** 10% minimum is checked and recorded as per specification 1A-BNI-510-22FQ issue 22 dated 22/10/2012
27	Termination plating	O	Line	The overall 'cosmetic' aspect (e.g. peeling paint, spots of rust, cleanliness) of the plating rooms appears to be improvable; AVX should consider a renovation in order to avoid a risk of contamination of the line in the future.	No up-grading of the BaNi area approved in TPC master plan. Other up-grading of building C to incorporate activities currently in building D have a higher priority in 2013.	***Action Closed.*** *It has to be noted that next move for these activities could be a transfer to the Czech Republic plant...* Note that the floor of the BaNi area was cleaned in March 2014.
28	Test Laboratory	F	Line	It was found that during the burn-in operation the capacitors are not monitored individually. Only the global voltage and consumption can be and are actually measured at board level which is not necessarily sufficient to detect individual failures in real time or to monitor drifts.	Add power control for burn in operation . CMER accepted n°ITPCC 13001 Status 01/10/2012 : the oven is at the maintenance for upgrading.	***Action Closed.*** Two ovens are equipped to visualize the power conditions (no recording). A third oven might be equipped if production volume increases.

ESCC Audit Report ESA QCS/LB/120601 dated 25th of June 2012