Report Reference:

APPLICATION FOR EXTENSION OF ESCC QUALIFICATION APPROVAL

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Component Title: Capacitors, Ceramic, Chip, Type I, sizes 0402 to 2220 Appl. No. 03/12/2018 323B rev8 2 Date: Executive Member: CNES 1 Components (including series and families) submitted for Extension of Qualification Approval: BASED TEST COMPONENT RANGE OF COMPONENTS VARIANTS COMPONENT ON VEHICLE / S SIMILAR NO. 3009/003 06 All values 16V to 100V **CEC2 02S** 300900306C47C0KE See box 14 for qualified 300900306-1801KC ranges. 300900406C1002FC 3009/004 **CEC4 02S** 06 3009/005 06 **CEC6 02S** 3009/006 06 All values 16V to 100V **CEC7 02S** 300900606-273KE 3009/022 06 CFC12 02S **CEC14 02S** 3009/037 06 All values 16V to 100V CEC2 04S to See comment in box 14 3009/040 01 to 06 300904001C33C0JC **CEC14 04S** 300904001C22C0JC 300904206-3000FY (*) 25V and 50V All values 10V to 25V, size 0402 **CEC19 02S** 3009/042 **CEC19 04S** 300904206-1000FA products share the 3009/040 300904206-100FC (*) same design. 300904013-1200FX Manufactured and tested as a 50V part Component Manufacturer 4 2 Location of Manufacturing Plant(s) 3 Date of original qualification approval: EXXELIA **EXXELIA Technologies** 1, rue des Temps Modernes 24/10/2012 77600 CHANTELOUP EN BRIE FRANCE 323 Certificate Ref No. 7 5 6 Deviations to LVT testing and Detail Specification Qualification Extension Report ESCC Specifications used for Maintenance of qualification testing: used: reference and date: Reports 15/0725 & 16/0735-A - CEC2 02S 47pF, 100V Reports 16/0035 & 16/0736-A - CEC4 02S 10nF, 50V Reports 16/0089 & 16/0737 - CEC14 04S 33pF, 50V (supply details in Box Generic: 3009 Issue: 1 to 4 No Yes × 15) Detail(s): 3009/003 5 & 7 Deviation from current Specifications: Report 16/0297 - CEC14 04S 22pF, 50V 3009/004 Report QUAL 0402-04-2017, 25 August 2017 3009/006 SERMA Analysis report 16-3722-100, October 2016 3009/040 Report 18/1365 - CEC2 02S 1.8nF 50V Report 18/1366 - CEC7 02S 27nF 100V 3009/042 (Supply details) Issue 2 No Yes X 3009/040 Issue 8 Summary of procurement or equivalent test results during current validity period in support of this application (those to ESCC listed first) Date code Quantity Delivered Project Name **Testing Level** LAT **ALTER Technology** C 136 mots Thales Alenia Space **EREMS** Total 20 700 parts EM 6 lots (85% 0603, 7% 1210, В 3 lots 5% 0805) PID changes since start of qualification 9 Current PID Verified by: CNES 10 Name of Excutive Representative None PID 623.03.390 Ref No: 18/10/2018 Issue: Rev.I Date: Major' *Provide details in box: Rev Date: 18/09/2018 11 28/11/2018 CNES Current Manufacturing facilities surveyed by: (Date) (Name of Executive Representative) Satisfactory: \boxtimes No Explain

(M. CNES/DSO/AQ/CQ-2018.0022700) See implementation status in appendix



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Failure Analysis, DPA, NCCS available:

Yes

No

(Supply data)

NCCS 2CETE605 dealing with delay in delivering maintenance data is appended NCCS 1CETE606 dealing with verification of qualification data is also appended

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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:

03/12/2018

JP. BUSSENOT

(Signature of the Executive Coordinator)

Continuation of Boxes above:

Box 1, Range of Components:

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| Style | Detail Spec. | Model | Variants | Capacitance Range (pF) | Rated Volt. (V) | Tolerance (pF, ±%) |
|-------|----------------------|------------------------|----------|--|-----------------------|----------------------------------|
| 0805 | 3009/003 3009/040 | CEC2 02S CEC2 04S | 06 02 | 10 to 2 700 10 to 2 200 1 to 1 800 1 to 1 200 | 16 25 50 100 | < 10pF 0,25 – 0,5 – 1 (pF) |
| 1210 | 3009/004 3009/040 | CEC4 02S CEC4 04S | 06 04 | 10 to 15 000 10 to 13 000 10 to 12 000 10 to 6 800 | 16 25 50 100 | ≥ 10pF 1, 2, 5, 10 (%) |
| 1812 | 3009/005 3009/040 | CEC6 02S CEC6 04S | 06 05 | 100 to 33 000 100 to 30 000 100 to 22 000 100 to 12 000 | 16 25 50 100 | |
| 2220 | 3009/006 3009/040 | CEC7 02S CEC7 04S | 06 06 | 470 to 68 000 470 to 56 000 470 to 47 000 470 to 27 000 | 16 25 50 100 | |
| 1206 | 3009/022 3009/040 | CEC12 02S CEC12 04S | 06 03 | 10 to 6 800 10 to 6 200 1 to 5 600 1 to 3 900 | 16 25 50 100 | |
| 0603 | 3009/037 3009/040 | CEC14 04S | 06 01 | 10 to 1 000 10 to 680 1 to 560 1 to 330 | 16 25 50 100 | |
| 0402 | 3009/042 3009/040 | CEC19 02S CEC19 04S | 06 13 | 12 to 330 12 to 120 12 to 100 | 10 16 25 | |

ESCC 3009/040 covering Ceruflex variants was not originally proposed with the initial qualification. Based on customers' orders and performance of Lot Acceptance test on the two CEC14 04S test vehicles, qualification might be extended to Ceruflex SnPb / NiBa variants.

Box 7. Qualification Extension Report

Box 7. Qualification Extension Report
Testing originally performed by EXXELIA did not conform to the agreement made with CNES, i.e. to perform a single LAT1 on the two lots 0805
47pF 100V DC1539 and 1210 10nF 50V DC 1602 (2 x 21 parts). EXXELIA only performed environmental / mechanical tests on these two lots and data
were therefore extended to LAT1 as reflected in EXXELIA reports 16/0735-A and 16/0736-A, both dated January 2017. NCCS 2CETE605 refers.
EXXELIA reports 18/365 and 18/366 dated October 2018 are part of the qualification programme initiated on the new DL1 production line. Available
data cover currently ESCC qualified 50V and 100V ranges. Extended endurance tests (4Un) have been performed for evaluation purpose and are
included in these reports. Reports should be read in conjunction with reports 18/1368 and 18/1369 dated October 2018 for type II types covered with
certificate 324, DL1 production line is introduced in PID 623.03.390 revision J, August 2018. Procedures dedicated to DL1 line are identified in the appended summary presentation of the activity.

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| Non comp | pliance to ESCC_requirements: | | | 15 |
|------------|---|---|--|----|
| No.: | Specification | Paragraph | Non compliance | |
| | | | | |
| Additiona | I tasks required to achieve full compliance for | ESCC qualification or rationale for acceptability | r of | 16 |
| noncomp | liance: | | | |
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| Executive | e Manager Disposition | | | 17 |
| | on Approval: Yes 🗹 No 🗆 | | | _ |
| Action / F | Remarks: | | | |
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| | | | 6.01 | |
| Date: | | | B. Schade, Head of ESA Product Assurance | ce |
| | | | and Safety Department | |



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

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:

| CEC2 02S 47pF 100V DC 1539 | CEC14 04S 33pF 50V DC 1605 CEC14 04S 22pF 50V DC 1613 |
|----------------------------|--|
| CEC4 02S 10nF 50V DC 1602 | |

Detail Specification reference:

3009/003/004/040

| Chart V | Test | Tick when done | Conditions | Date Code | Tested Qty | No. of Rejects | Comments if not performed. Comments on Rejection |
|---------------------------------------|---|----------------------|---------------------------|------------------------------|------------------|-------------------|--|
| | Mounting | × | IEC 384-1 | 1539 1602 1605 | 12 x 3 | 0 | |
| al Subgroup | Adhesion | × | ESCC 3009, Para. 9.5 | 1539 1602 1605 | 4 x 3 | 0 | |
| / Mechanica | Rapid Change of Temperature | × | IEC 68-2-14 | 1539 1602 1605 | 8 x 3 | 0 | |
| Environmental / Mechanical Subgroup | Visual Inspection | \boxtimes | ESCC 3009, Para. 9.1 | 1539 1602 1605 | 12 x 3 | 0 | |
| Envi | Climatic Test Sequence | | ESCC 3009, Para. 9.8 | 1539 1602 1605 | 12 x 3 | 0 | |
| group | Mounting | ⊠ | IEC 384-1 | 1539 1602 1605 | 10 10 20 | 0 | |
| Endurance Subgroup | Operating Life | | ESCC 3009, Para. 9.10 | 1539 1602 1605 | 10 10 20 | 0 | |
| Endura | Electrical Measurements during Endurance Testing | | ESCC 3009, Para. 9.4.5 | 1539 1602 1605 | 10 10 20 | 0 | |
| Electrical Subgroup (Elect. Meas.) | Mounting | × | IEC 384-1 | 1539 1602 1605 1613 | 3 3 6 6 | 0 | |
| | Temperature Coefficient (Type I) | × | ESCC 3009, Para. 9.11 | 1539 1602 1605 1613 | 3 3 6 6 | 0 | |

| | Temperature Characteristic (Type II) | | ESCC 3009, Para. 9.12 | | | | NA |
|--|--|---|-----------------------|------------------------------|------------------|---|----|
| Electrical Subgroup (Ass. / Capab. Tests) | Solderability | × | IEC 68-2-20 | 1539 1602 1605 1613 | 2 2 4 4 | 0 | |
| Electrical (Ass. / Ca | Permanence of Marking | | ESCC 24800 | | | | NA |
| nal , | | | | | | | |
| Additional Tests | | | | | | | |
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ESCC

APPLICATION FOR ESCC QUALIFICATION APPROVAL

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ANNEX 1 bis: LIST OF TESTS DONE TO SUPPORT QUALIFICATION of 0402 chip size

Tests conducted in compliance with:

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

Tests vehicle identification/description:

| | CEC19 02S 10pF 50V DC 1611 |
|-----------------------------|--|
| CEC19 04S 120pF 16V DC 1614 | CEC19 02S 330pF 10V DC 1611 CEC19 02S 100pF 25V DC 1611 |

Detail Specification reference:

3009/040/042

| Chart F4 | Test | Tick when done | Conditions | Date Code | Tested Qty | No. of Rejects | Comments if not performed. Comments on Rejection |
|-------------------------------------|--|----------------------|-----------------------|------------------------------|---------------------------|------------------------|--|
| dnoubqn | Mounting | × | IEC 60384-1, 4.33 | 1614 1611 1611 1611 | 26 26 26 26 | 1 0 4 0 | 5 tombstoning parts |
| Environmental / Mechanical Subgroup | Rapid Change of Temperature | ⊠ | IEC 60068-2-14 | 1614 1611 1611 1611 | 25 26 22 26 | 0 | |
| ımental / Me | Steady State Humidity | × | ESCC 3009, Para. 8.2 | 1614 1611 1611 1611 | 25 26 22 26 | 0 | |
| Enviror | Visual Inspection | ⊠ | ESCC 3009, Para. 8.5 | 1614 1611 1611 1611 | 25 26 22 26 | 0 | |
| roup | Mounting | ⊠ | IEC 60384-1, 4.33 | 1614 1611 1611 1611 | 52 52 52 52 | 1 0 2 0 | 1 lost part - 2 tombstoning parts - |
| Endurance Subgroup | Operating Life | ⊠ | ESCC 3009, Para. 8.9 | 1614 1611 1611 1611 | 51 52 50 52 | 0 | |
| roup | Mounting | Ø | IEC 60384-1, 4.33 | 1614 1611 1611 1611 | 6 6 6 | 1 1 0 0 | 1 lost part 1 tombstoning part - |
| Electrical Subgroup | Capacitance- Temperature Characteristics | ⊠ | ESCC 3009, Para. 8.10 | 1614 1611 1611 1611 | 6 0 (*) 6 (**) 6 | 0 | Done prior to mounting. (*) NA to low value 10pF. (**) OK after initial meas. pb |
| Elec | Robustness of Terminations | × | ESCC 3009, Para. 8.7 | 1614 1611 1611 1611 | 5 5 6 | 0 3 (***) 0 0 | (***) 20N applied instead of 5N – test not performed again based on other lots results |
| Ass. / Capab Subgr | Solderability | ⊠ | IEC 60068-2-58 | 1614 1611 1611 1611 | 6 6 6 | 0 | |

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| Permanence of Marking | ESCC 24800 | | NA |
|-----------------------|------------|--|----|
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ANNEX 1 ter: LIST OF TESTS DONE TO SUPPORT PRODUCTION OF 0603 to 2220 50V and 100V ranges on DL1 Line

Tests conducted in compliance with:

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

Tests vehicle identification/description:

| CEC2 02S 1.8nF 50V Lot V1804L004 (0805) | CEC7 02S 27nF 100V Lot V1804L001 (2220) |
|---|---|
| | |

Detail Specification reference:

3009/003/006

| Chart F4 | Test | Tick when done | Conditions | Date Code | Tested Qty | No. of Rejects | Comments if not performed Comments on Rejection |
|--|--|----------------------|--------------------------|--------------------------|--------------------|-------------------|--|
| Environmental / Mechanical Subgroup | Mounting | ⊠ | IEC 60384-1, 4.33 | LV1804L004 LV1804L001 | 24 24 | 0 | |
| | Rapid Change of Temperature | ⊠ | IEC 60068-2-14 | LV1804L004 LV1804L001 | 24 24 | 0 | |
| Environ | Steady State Humidity | ⊠ | ESCC 3009, Para. 8.2 | LV1804L004 LV1804L001 | 24 24 | 0 | |
| Mec | Visual Inspection | ⊠ | ESCC 3009, Para. 8.5 | LV1804L004 LV1804L001 | 24 24 | 0 | |
| onb | Mounting | × | IEC 60384-1, 4.33 | LV1804L004 LV1804L001 | 12 + 12 12 + 12 | 0 | |
| Endurance | Operating Life | ⊠ | ESCC 3009, Para. 8.9 | LV1804L004 LV1804L001 | 12 + 12 12 + 12 | 0 | 2000H / 2Un on 12 parts 2000H / 4Un on 12 parts |
| Iroup | Mounting | × | IEC 60384-1, 4.33 | LV1804L004 LV1804L001 | 3 | 0 | |
| Electrical Subgroup | Capacitance- Temperature Characteristics | ⊠ | ESCC 3009, Para. 8.10 | LV1804L004 LV1804L001 | 6 | 0 | Done prior to mounting. |
| Elect | Robustness of Terminations | ⊠ | ESCC 3009, Para. 8.7 | LV1804L004 LV1804L001 | 3 | 0 | |
| b. | Solderability | Ø | IEC 60068-2-58 | LV1804L004 LV1804L001 | 3 6 | 0 | |
| Ass. / Capab. Subgroup | Permanence of Marking | | ESCC 24800 | | | | NA |



Box 22

Additional Comments.

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| | 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. |