APPLICATION FOR EXTENSION OF ESCC TECHNOLOGY FLOW QUALIFICATION APPROVAL

Technology Flow: Crystal SAW Filters within NORSF-C1 (crystal) and NORSF-A1 (assembly) processes

Executive Member: ESA Date: 24/01/2022

Appl. No. 313E

1 Technology Flow submitted for Qualification Approval:

SUMMARY DESCRIPTION	TEST STRUCTURES	COMPONENTS PROPOSED FOR QUALIFICATION
Crystal SAW filters		**3502/002, all variants**
Technology Flow as in REP 006 (QML) Paragraph 5.3 with details as in Box 14 (below)	Transversal SAW filter designs. Package Type A (3502/002). SQF-6200.	

2 Component Manufacturer
KONGSBERG SPACE ELECTRONICS

3 Location of Manufacturing Plant(s)
Knudsrødveien 7
N-3189 Horten
Norway

4 Date of original qualification approval:
Date: **24/08/2011**
Certificate Ref No. **313**

5 ESCC Specifications used for Maintenance of qualification testing:
Generic: **3502**
Detail(s): **3502/002**

6 Deviations to LVT testing and Detail Specification used:
No ☒ Yes ☐ (supply details in Box 15)
Deviation from current Specifications:
No ☒ Yes ☐ (Supply details) Box 20?

7 Qualification Extension Report reference and date:
NORS\5006\TPF\QUR033_1, 16-Feb-2021, SQF-4560
NORS\5006\TPF\QUR036_1, 12-Jan-2022. SQF-6200

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
Several	ESCC		See Annex 3 (confidential)	
Several	ESCC-equivalent	LAT 3 (DPA)	See Annex 3 (confidential)	

9 **PID** changes since start of qualification
None ☐
Minor* ☐
Major* ☒
*Provide details in box:
See box 19

10 Current **PID** Verified by: **S. Hernandez,ESA**
Name of Executive Representative
Ref No: **PID 630 + PID 534 (for crystal manufacturing and assembly manufacturing , respectively)**
Issue: **8 and 8, respectively** Date: **14-Jan-2022 and 14-Jan-2022**
Rev Date: **30/06/2020**

11 Current Manufacturing facilities surveyed by: **S. Hernandez,ESA** on **08/04/2022**
(Name of Executive Representative) (Date)

Satisfactory: Yes ☒ No ☐ Explain

Report Reference: MoM-SAW-TF-042022

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

Ref. No's and purposes:

13

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 ESA as the responsible Executive Member for ESCC qualification status to be extended to the component(s) listed herein.

Date: 26/04/2022

(Signature of the Executive Coordinator)

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Continuation of Boxes above:

Technology Flow Abstract.
1.Technology Flow – unchanged vs. initial qualification in 2011
2. Design – unchanged vs. initial qualification in 2011
3. Fabrication – unchanged vs. initial qualification in 2011
4. Assembly – unchanged vs. initial qualification in 2011
5. Test – unchanged vs. initial qualification in 2011
6. Radiation – unchanged vs. initial qualification in 2011

CONTINUATION OF BOX 9 – PID EVALUATION
The technical note NORS\SAW\SAWTFQ\TPF\TNO021 issue 5 of 26-Jan-2022 provides the PID change record summary

15

Non compliance to ESCC requirements:

No.:	Specification	Paragraph	Non compliance

16

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

17

Executive Manager Disposition

Application Approval: Yes ☒ No ☐

Action / Remarks:

Date:

Britta Schade

Digitally signed by Britta Schade
Date: 2022.04.28 17:39:42 +02'00'

B. Schade: Head of the Product Assurance and Safety Department

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

Tests conducted in compliance with:

- ESCC 3502 generic specification; Chart F4 (for ESCC/QPL parts);
- PID- 534 issue 8 (for ESCC/QML parts)
  PID- 630 issue 8 (for ESCC/QML parts)
-
- TFD (for ESCC/QML parts) TNO629 issue 6

Tests vehicle identification/description:

NORS/SAW/SQF6200/DJF/ESCC350200201SQF6200 Package type A 21 pcs from date code 2126	Re-qualification 2022
NORS/SAW/SQF4560/DJF/ESCC350200201SQF4560 Package type A 9 pcs from date codes 2027	Qualification maintenance 2021

Detail Specification reference: 3502/002

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Subgroup 1	Mechanical Shock	☒	MIL-STD-883, 2002, B	2126	6	0	
	Vibration	☒	MIL-STD-883, 2007, A	2126	6	0	
	Constant Acceleration	☒	MIL-STD-883, 2001, B	2126	6	0	
	Seal	☒	MIL-STD-883, 1014, CH2	2126	6	0	
	External Visual Inspection	☒	MIL-STD-883, 2009	2126	6	0	
	Temperature Cycling	☒	MIL-STD-883, 1010, B	2126	6	0	
	Moisture Stress	☒	ESCC 3502, 8.12 MIL-STD-883, 1010, B	2126	6	0	
	Seal	☒	MIL-STD-883, 1014, CH2	2126	6	0	
	External Visual Inspection	☒	MIL-STD-883, 2009	2126	6	0	
Subgroup 2	Operating Life	☒	MIL-STD-883, 1005	2126	6	0	
	Seal	☒	MIL-STD-883, 1014, CH2	2126	6	0	
	External Visual Inspection	☒	MIL-STD-883, 2009	2126	6	0	
Subgroup 3	Internal Water Vapour Content	☒	MIL-STD-883, 1018	2126	1	0	
	Permanence of Marking	☐	ESCC 24800				N/A as the packages are laser-marked
	Terminal Strength	☒	IEC 60068-2-20, test Ta	2126	3	0	
	Internal Visual Inspection	☒	MIL-STD-883, 1013	2126	3	0	
	Bond Strength	☒	MIL-STD-883, 2011	2126	3	0	
	Solderability	☒	MIL-STD-883, 2003	2126	3	0	
Additional tests		☐					
		☐					
		☐					

ANNEX 3 KSE SAW FILTER PRODUCTION OVERVIEW JAN 2022

Production Orde	Prod. Start Date	Project ID	Item	Item2	Design type	Quantity Delivere	LAT componets	ESCC	Note
300003524	24.02.2020	2131	S53161	SAW FILTER SQF-6300	Band pass filter	7	-	NO	Customer spec
300003528	20.01.2020	1887	99589	SAW FILTER SQF-6610	Band pass filter	1	-	YES	
300003529	20.01.2020	1887	99651	SAW FILTER SQF-6611	Band pass filter	1	-	YES	
300003530	20.01.2020	1887	99658	SAW FILTER SQF-6612	Band pass filter	1	-	YES	
300003614	16.03.2020	1757	87890	SAW FILTER SQF-3830	Notch filter	6	-	YES	
300003615	26.06.2020	1757	88787	SAW FILTER SQF-3950	Band pass filter	19	-	YES	
300003616	30.03.2020	1757	88785	SAW FILTER SQF-3940	Band pass filter	18	-	YES	
300003617	30.03.2020	1757	88783	SAW FILTER SQF-3930	Band pass filter	20	-	YES	
300003618	26.06.2020	1757	91168	SAW FILTER SQF-4560	Band pass filter	20	-	YES	
300003620	30.03.2020	1758	87332	SAW FILTER SQF-3760	Band pass filter	8	-	YES	
300003621	30.03.2020	1758	91745	SAW FILTER SQF-4710	Band pass filter	10	-	YES	
300003622	02.03.2020	1758	91640	SAW FILTER SQF-4700	Band pass filter	10	-	YES	
300003705	01.06.2020	2090	S51688	SAW FILTER SQF-4880	Band pass filter	30	1 Life + 1 DPA	NO	Customer spec
300003706	01.06.2020	2090	S51689	SAW FILTER SQF-4890	Band pass filter	31	1 DPA	NO	Customer spec
300003707	01.06.2020	2090	S51690	SAW FILTER SQF-4900	Band pass filter	32	1 DPA	NO	Customer spec
300003708	01.06.2020	2090	S51691	SAW FILTER SQF-4910	Band pass filter	38	1 Life + 1 DPA	NO	Customer spec
300003709	01.06.2020	2090	S51692	SAW FILTER SQF-4920	Band pass filter	30	1 DPA	NO	Customer spec
300003710	01.06.2020	2090	S51693	SAW FILTER SQF-4930	Band pass filter	34	1 DPA	NO	Customer spec
300003711	01.06.2020	2090	S51694	SAW FILTER SQF-4940	Band pass filter	30	1 Life + 1 DPA	NO	Customer spec
300003758	23.06.2020	2026	99836	SAW FILTER SQF-6630	Band pass filter	2	-	YES	
300003820	02.11.2020	TTC GEN	93325	SAW FILTER SQF-5400	Band pass filter	11	-	YES	
300003822	02.11.2020	TTC GEN	93327	SAW FILTER SQF-5405	Band pass filter	10	-	YES	
300003863	16.06.2020	2179	S53087	SAW FILTER SQF-5770	Band pass filter	6	2 DPA	NO	Customer spec
300003990	04.08.2020	1770	99468	SAW FILTER SQF-6580	Band pass filter	1	-	YES	
300003991	04.08.2020	1770	99850	SAW FILTER SQF-6581	Band pass filter	1	-	YES	
300003992	04.08.2020	1770	99863	SAW FILTER SQF-6582	Band pass filter	1	-	YES	
300003994	04.08.2020	1770	99472	SAW FILTER SQF-6600	Band pass filter	1	-	YES	
300003995	04.08.2020	1770	99477	SAW FILTER SQF-6601	Band pass filter	1	-	YES	
300004043	23.09.2020	2140	S54178	SAW FILTER SQF-5490	Band pass filter	55	2 DPA	NO	Customer spec
300004193	12.10.2020	2076	99834	SAW FILTER SQF-6620	Band pass filter	7	-	YES	
300004207	20.11.2020	2076	96852	SAW FILTER SQF-6130	Band pass filter	18	-	YES	
300004208	08.03.2021	2076	96854	SAW FILTER SQF-6140	Band pass filter	20	-	YES	
300004209	06.04.2021	2076	96856	SAW FILTER SQF-6150	Band pass filter	19	-	YES	
300004210	08.01.2021	2076	96858	SAW FILTER SQF-6160	Band pass filter	21	-	YES	
300004211	25.01.2021	2076	96860	SAW FILTER SQF-6170	Band pass filter	23	-	YES	
300004212	08.02.2021	2076	96862	SAW FILTER SQF-6180	Band pass filter	19	-	YES	
300004213	26.03.2021	2076	96864	SAW FILTER SQF-6190	Band pass filter	23	-	YES	
300004214	02.12.2020	2076	99943	SAW FILTER SQF-6640	Band pass filter	24	-	YES	
300004215	20.11.2020	2076	96866	SAW FILTER SQF-6200	Band pass filter	163	-	YES	
300004216	20.11.2020	2076	96899	SAW FILTER SQF-6210	Band pass filter	4	-	YES	
300004217	08.12.2020	2076	96901	SAW FILTER SQF-6220	Band pass filter	3	-	YES	
300004218	20.11.2020	2076	96905	SAW FILTER SQF-6240	Band pass filter	6	-	YES	
300004219	20.11.2020	2076	96907	SAW FILTER SQF-6250	Band pass filter	5	-	YES	
300004220	08.12.2020	2076	96909	SAW FILTER SQF-6260	Band pass filter	5	-	YES	
300004221	04.01.2021	2076	96913	SAW FILTER SQF-6280	Band pass filter	3	-	YES	
300004222	04.01.2021	2076	96911	SAW FILTER SQF-6270	Band pass filter	4	-	YES	
300004223	20.11.2020	2076	96903	SAW FILTER SQF-6230	Band pass filter	5	-	YES	
300004226	04.01.2021	2076	96915	SAW FILTER SQF-6290	Band pass filter	2	-	YES	
300004311	08.01.2021	2150	100517	SAW FILTER SQF-6720	Band pass filter	8	-	YES	
300004313	08.01.2021	2150	100519	SAW FILTER SQF-6730	Band pass filter	18	-	YES	
300004315	08.01.2021	1955	100546	SAW FILTER SQF-6740	Band pass filter	7	-	YES	
300004441	14.01.2021	2026	99947	SAW FILTER SQF-6650	Band pass filter	3	-	YES	
300004442	14.01.2021	2026	99951	SAW FILTER SLC-6670	Band pass filter	3	-	YES	
300004532	13.01.2021	2225	S53087	SAW FILTER SQF-5770	Band pass filter	5	2 DPA	NO	Customer spec
300004596	25.01.2021	2026	99949	SAW FILTER SLC-6660	Band pass filter	3	-	YES	
300004713	25.01.2021	2026	99836	SAW FILTER SQF-6630	Band pass filter	8	-	YES	
300004716	22.02.2021	2026	99953	SAW FILTER SQF-6680	Band pass filter	3	-	YES	
300004721	22.02.2021	2026	100872	SAW FILTER SQF-6681	Band pass filter	1	-	YES	
300004742	01.03.2021	2044	100889	SAW FILTER SLC-6690	Band pass filter	2	-	YES	
300004920	20.04.2021	1715	96233	SAW FILTER SQF-6070	Band pass filter	2	-	YES	
300005034	10.05.2021	2026	99949	SAW FILTER SLC-6660	Band pass filter	1	-	YES	
300005125	31.05.2021	2026	99947	SAW FILTER SQF-6650	Band pass filter	4	-	YES	
300005126	31.05.2021	2026	99951	SAW FILTER SLC-6670	Band pass filter	4	-	YES	
300005127	21.06.2021	2026	99949	SAW FILTER SLC-6660	Band pass filter	20	-	YES	
300005128	05.07.2021	2026	99953	SAW FILTER SQF-6680	Band pass filter	13	-	YES	
300005306	07.06.2021	5006	96866	SAW FILTER SQF-6200	Band pass filter	23	-	YES	
300005533	13.09.2021	2221	96762	SAW FILTER SLC-6120	Band pass filter	2	-	YES	
300005624	13.09.2021	2221	101689	SAW FILTER SLC-2520	Band pass filter	2	-	YES	
300005652	13.09.2021	2026	100872	SAW FILTER SQF-6681	Band pass filter	2	-	YES	
300005884	18.10.2021	2026	100872	SAW FILTER SQF-6681	Band pass filter	17	-	YES	
300005938	20.12.2021	2189	S54471	SAW FILTER SQF-6790	Band pass filter	1	-	YES	
					Total delivered:	961			

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.