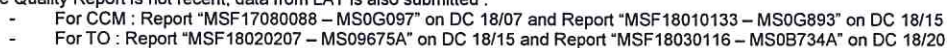

		APPLICATION FOR ESCC TECHNOLOGY FLOW QUALIFICATION			Page 1 Appl. No. 356
Component Title: Molded SMD Custom Magnetics Components, Toroidal (TO) or Linear (CCM) Winding Technology		Executive Member: CNES		Date: 18/12/2018	
Technology Flow submitted for qualification					1
Summary Description of Technology flow	Detailed Technology Flow Description No.	BASED On Technology	Test Structures	Components Proposed for Qualification	
The Technology Flow covers custom magnetic components at Exxelia, Illange, France. See QML document.	These SMD inductors, chokes and transformers use toroidal winding (TO technology) or linear winding (CCM technology) assembled on a lead frame and molded with epoxy resin.	CCM (Types 4, 5, 6, 20 and 25) TO (Types 10, 12, 16, 20, 25, 30, 36)	CCM 6 and 25 TO 25, 30 and 36	3201 011 var. 01 to 05 3201 012 var. 01 to 07	
Component Manufacturer		Location of Manufacturing Plant	ESCC Specification used for Qualification		
Exxelia SAS		13, Parc d'activités du Beau Vallon, F-57110 Illange	Generic: 3201 Issue 5 Detail/s: 3201/011 issue 1 3201/012 issue 1		
Qualification Report Reference and date:			PID used for manufacturing Qualification Lot		
For TO : MSF14100643-MSASF26 and MSF14100644-MSASF27 (06/15) For CCM : MSF15060625-MSASF25 and MSF16020697-MSASF24 (01/17) Date: Click here to enter a date.			Ref No: PID 100 (*) for TO and PID 101 (**) for CCM Issue: (*) Issue 2 / (**) Issue 2 Date: 01/07/2014		
PID changes since Original Qualification or last extension of Qualification.		Current PID	Verified by:		
None <input checked="" type="checkbox"/> Minor* <input type="checkbox"/> Major* <input type="checkbox"/> *Provide detail QUR 723 refers		CNES	Name of Executive Representative		
		Ref No: PID 100 (*) for TO and PID 101 (**) for CCM			
		Issue: (*) Issue 3 / (**) Issue 3			
		Date: 01/02/2018			
Current Manufacturing facilities surveyed by:		C. Doucet and B. Marty, CNES; S. Hernandez, D. Lacombe and F. Martinez, ESA			12/07/2017
Audit report ESCC-AUD-EXM2017-01		(Name of Executive Responsible)			(Date)
Satisfactory: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Corrective Actions closed out: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>			
Quality and Reliability Data			Failure analysis, DPA, NCCS available		
Evaluation testing performed: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Report Ref. No.: "Rapport Evaluation" Date: 01/09/2017			(supply data)		
Equivalent Data:			Ref. Nos. and purpose:		
Certification:					



	APPLICATION FOR ESCC TECHNOLOGY FLOW QUALIFICATION		Page 3
Component Title: Molded SMD Custom Magnetics Components, Toroidal (TO) or Linear (CCM) Winding Technology		Appl. No.	
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Non compliance to ESCC requirements:

13

No.:	Specification	Paragraph	Non compliance

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

14

N/A


Executive Manager Disposition

15

Application Approval: Yes ☒ No ☐

Action / Remarks:

Date:


 B. Schade, Head of ESA Product Assurance and safety Department

4.1 EXXELIA4.1.1 Contact Information

Address	ESCC Chief Inspector
Exxelia 16, Parc d'Activités du Beau Vallon F-57970 Illange France	Mr. D. Martin Tel: +33 3 82 59 17 35 EMAIL: dominique.martin@exxelia.com

4.1.2 Qualification

Current Qualification Certificate No.	In QML since:	Type Designation
		Molded smd custom magnetic components, toroidal (TO) or linear (CCM) winding technology

4.1.3 Applicable Documents

ESCC Generic Specification No.3201

ESCC Detail Specification Nos. 3201/011 (CCM technology), 3201/012 (TO technology)

Exxelia. Process Identification Document PID 100 (TO technology) et PID 101 (CCM technology)

4.1.4 List of Qualified Components

The component type variants and range of magnetic components applicable to the toroid TO technology are as follows:

Variant Number	Type	Design Domain	Electrical Characteristics	No. of Terminals	Terminal Finish	Weight Max (g)
01	TO10	Note 1	Note 2	10	Sn60Pb40	3.1
02	TO12	Note 1	Note 2	10	Sn60Pb40	5.9
03	TO16	Note 1	Note 2	12	Sn60Pb40	11.6
04	TO20	Note 1	Note 2	14	Sn60Pb40	21.8
05	TO25	Note 1	Note 2	18	Sn60Pb40	41.2
06	TO30	Note 1	Note 2	22	Sn60Pb40	80.4
07	TO36	Note 1	Note 2	24	Sn60Pb40	172.1

The component type variants and range of magnetics components applicable to the linear CCM technology are as follows:

Variant Number	Type	Design Domain	Electrical Characteristics	Total Power Max (W)	No. of Terminals (3)	Terminal Finish (4)	Weight Max (g)
01	CCM4	Note 1	Note 2	≤ 18	12	Sn60Pb40	5.1
02	CCM5	Note 1	Note 2	≤ 40	16	Sn60Pb40	7.4
03	CCM6	Note 1	Note 2	≤ 50	16	Sn60Pb40	12.1
04	CCM20	Note 1	Note 2	≤ 120	16	Sn60Pb40	21.4
05	CCM25	Note 1	Note 2	≤ 150	20	Sn60Pb40	44.2

NOTES:

- The design domain for components produced in accordance with these specifications includes the following items:
 - Development of customized electrical functions:
 - Single or multi-coupled inductors
 - Common mode chokes
 - Power transformers (flyback, forward, push-pull, half/full bridge, specific architectures)
 - Signal transformers
 - Pulse transformers
 - Current/voltage measurement transformers
 - Specific magnetic functions within environment and thermal requirements
 - Temperature range: -55°C $+125^{\circ}\text{C}$
 - Power, losses, and component heating:
 - Maximum power depends on component heating. The heating is calculated from losses and thermal resistances for each Variant according to the electrical function. The thermal resistances are given in Maximum Ratings
 - The maximum temperature rise at $T_{\text{amb}} = +100^{\circ}\text{C}$ is $+25^{\circ}\text{C}$.
 - Examples of maximum power per Variant are given above.
 - Dielectric strength:
 - Single insulation: 500Vrms
 - Reinforced insulation for CCM technology: 1000Vrms
- All electrical characteristics applicable to a particular component design are specified in the document: *Specific Component Design Sheet* provided by the manufacturer.

4.1.5 Technology Flow Abstract1. Manufacturing process

The manufacturing process is described in the documents PID 100 (TO technology) and PID 101 (CCM technology)

Process summary:

- Toroidal wind for TO technology
- Linear winding for CCM technology
- High temperature soldering on the lead frame
- Transfert molding
- Magnetic core assembly for CCM technology
- Leads forming

Manufacturing site :

Exxelia 16 Parc d'Activités du Beau Vallon F57970 Illange France

2. Basic information

Leads: Brass with copper layer and SnPb finishing

Molding: Epoxy resin

Wire: 180 °C magnet wire

Magnetic core: Chosen during design phase to meet customer requirements

Formats component types: See Details specifications 3201/011 and 3201/012

3. Design

The magnetics components are design according to design rules and following a design process both described in the Exxelia documents PID 100 and PID 101.

The design rules ensure maximum operating temperature below 125°C and dielectric strength

4. Control and testing

The control and test are performed in Exxelia Illange.

They are performed according to the document *Specific Component Design Sheet* and the generic ESCC specification 3201 and the ESCC detail specification 3201/011 and 3201/012.

5. Radiation characteristics

TO and CCM magnetics components are not sensitive to radiations.