Development & Space Validation of a European Termination Insensitive Mixer Activity Summary

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1 COMPANY PRESENTATION

CHELTON Telecom & Microwave (C-TM) trading as COBHAM Microwave (Diodes and Modules Business Unit)

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The Diodes and Modules Business Unit of COBHAM, located in Les Ulis, France (south of Paris), is currently designing, manufacturing and commercialising RF & Microwave components for Hi-Rel applications, such as silicon PIN diodes, varactors, MOS capacitors, functions and sub-systems (mixers, amplifiers, diode limiters, switches, duplexers…). COBHAM already holds ESCC qualifications, as listed in the ESCC Qualified Parts List (QPL), and several products are also listed in the ESCC European Preferred Parts List (EPPL).

2 OVERVIEW / SCOPE OF ACTIVITY

This activity is part of the European Component Initiative put in place by ESA with the aim to develop and qualify in Europe some critical space components in order to improve the autonomy of the European space industry.

In this instance, a European supplier for hybrid termination insensitive mixer components is considered to be advantageous in the context of a number of current and future satellite programmes.

This activity targets the design, development and space validation of such a mixer by COBHAM. COBHAM has in-house all the required design and process expertise, as well as all the necessary resources and facilities to perform the activity. This component is intended for listing in the ESCC EPPL, per two termination insensitive mixers already listed in the frame of a previous activity (MXF-01 and MXF-02).

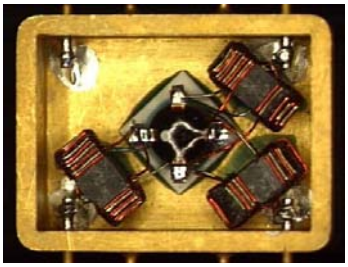
In this context, the primary aims of the activity are:

- minimised development time and cost
- minimised risk
- ECSS standards compliant procurement of active, passive parts and materials
- preference and priority for European parts and technologies
- secured future manufacturing with respect to qualification maintenance, product and technology obsolescence and export regulations.

The specifications of the developed hybrid termination insensitive mixer are based on the following typical characteristics:

MXF-03

- Frequency	1-3500 MHz
- VSWR	< 2.0:1 midband
- Isolation	35 dB midband
- Max. Imput Power @ 25°C	350 mW max
- LO Power	+24 dBm max
- Package:	Hermetic Flat-Pack



The activity is planned to be completed by the end of the first quarter of 2010.

3 ACTIVITY APPROACH AND WORK STRUCTURE

The activity approach and work structure for the Development & Space Validation of European Termination Insensitive Mixer are based on the ESA Statement of Work ref TEC-QCT/2008SoW04/LM.

The work breakdown structure is divided into 4 major technical tasks and one management task.

Task 1 consists of research and analysis of existing termination insensitive mixer microcircuits as a reference for the subsequent technology trade-off analysis and design selection.

WP11 - Based on COBHAM's own expertise with such products, data will be gathered and analysed in order to assess the technical requirements of the mixers and to propose and justify the best design and technology.

WP12 & WP13 - Design and technology trade-offs will be done in parallel. Minimisation of development time, cost and risk, will be the key drivers. Other factors to be considered are priority to European sources, technology limits compatibility (including derating requirements) and pin to pin compatibility with existing solutions.

A **PDR** (Preliminary Design Review) will conclude this first Task

Task 2 consists of the preparation of the hybrid documentation, the design finalisation and preparing the procurement plan.

WP21 - The hybrid documentation will be prepared in accordance with the SoW and ECSS requirements and will be supported by the first results obtained from prototypes from the design activity.

WP22 - The proposed best design, after PDR approval, will be completed, taking into account adequate derating, variations in process parameters and end of life performance of the constituent parts. This WP will include the Components Procurement Plan for the fabrication of a first lot of mixers.

A **CDR** (Critical Design Review) will conclude this second task

Task 3 involves the fabrication of a first lot of hybrid mixers and their screening, validation of COBHAM's operations as the hybrid manufacturer and circuit type approval. Procurement and fabrication activities will be done according to a high quality standard equating to flight models (FM).

WP31

- Subtask ST311: Procurement of the components, materials and parts, after PDR approval, including all necessary testing activities.
- Subtask ST312: Manufacturing of the first lot of the mixer.
- Subtask ST313: Screening as defined for level 1 testing.

WP32 – Hybrid manufacturer validation as defined for a category 2 manufacturer.

Task 4 involves the fabrication and the screening of a second functional lot of hybrid mixers, as well as the Lot Acceptance Testing of the 2 lots as defined in ECSS-Q-ST-60-05 for a category 2 manufacturer. The Hybrid Data Package, as well as the final versions of the detail specifications and datasheets, will be prepared for the final presentation at ESTEC.

Task 5 contains all the management and reporting activities.