ECI: Development and Qualification of European Microwave Monolithic Double-Balanced Mixers

Activity Summary

COMPANY PRESENTATIONS

OMMIC
Website: www.ommic.com
Address: 22 avenue Descartes, 94453 Limeil Brévannes (France)
Contact Person: Derek Smith (+33 1 45 10 69 22)

OMMIC is a European provider of advanced III-V based MMICs for the Space, Military and Telecommunications markets and is the only commercial supplier of a complete offering from Epitaxy to Foundry Services as well as Standard and Custom MMICs. OMMIC is based in France and is part of the Royal Philips Electronics Group.

Alcatel Alenia Space
Website: www.alcatel.com/space
Address: 26 avenue JF. Champollion, 31037 Toulouse (France)
Contact Person: Dominique Langrez (+33 5 34 35 58 17)

Alcatel Alenia Space, a leader in satellites systems and at the forefront of orbit infrastructures, combines the experience and know-how of Alcatel Space with that of Alenia Spazio.

ESA Technical Officer: Laurent Marchand (+31 71 565 4282)

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 particular, a European supplier for GaAs Double-Balanced Mixers components is considered to be essential in the context of the Galileo programme, where availability, cost and schedule are of primary concerns.

OMMIC and Alcatel intend to develop and qualify the MMICs using technologies that have already been used for space payloads and/or have been evaluated by the European Space Agency. These same technologies have already been fully qualified by OMMIC and are used today to manufacture commercial products for the telecom market as well as for the Space segment.

The design and qualification of the circuit is to be performed by ALCATEL ALENIA SPACE drawing on its established experience of design and qualification for the Space Industry. OMMIC will be responsible for the manufacture of the MMICs, the on wafer testing the delta qualification of the chosen OMMIC MMIC technology and will co-ordinate the project.

The mixers will be qualified in accordance with the requirements of ESCC 2439010. It is the intention of OMMIC to add the mixers to OMMIC's list of catalogue products and to make them available to the European Space community.

The main specifications of the 2 double balanced mixers that will be the result of this project are:

Electrical specifications, Ta=+25°C, LO drive=+15dBm

	MIXER 1			MIXER 2			
Parameter	**Min.**	**Typ.**	**Max.**	**Min.**	**Typ.**	**Max.**	**Units**
Frequency range, RF & LO	1 – 5.0			4.0 – 8.0			GHz
Frequency range, IF	DC – 3.0			DC – 3.0			GHz
Conversion Loss		7	10		7	9	dB
Noise Figure (SSB)		7	10		7	9	dB
LO to RF isolation	35	42		30	40		dB
LO to IF isolation	27	36		35	42		dB
IP3 (input)	15	18		13	17		dBm
IP2 (input)	45	50		40	55		dBm
1dB Gain compression (input)	5	10		6	10		dBm

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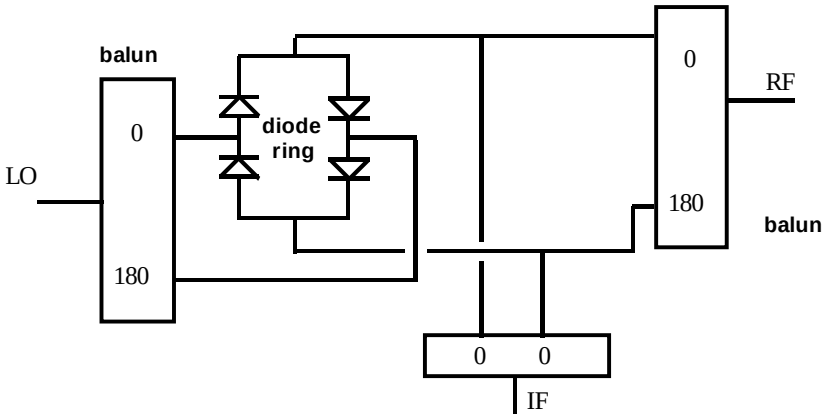
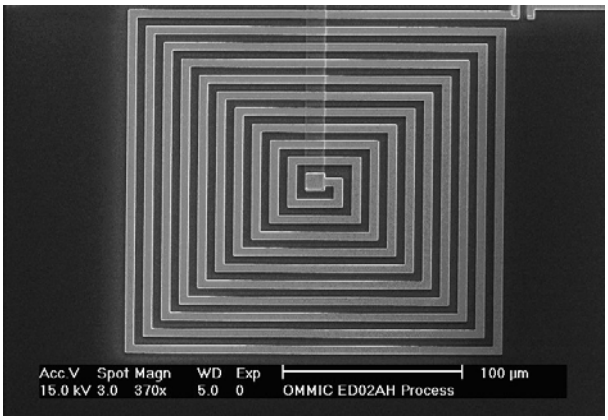
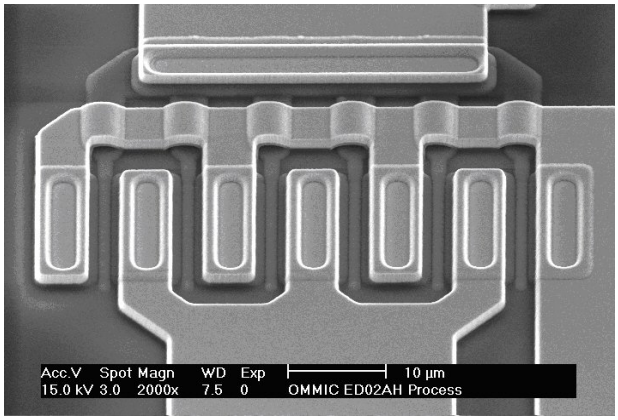
The double balanced mixers will be based on a cold diode quad for the mixing part and on double spiral inductors for baluns to obtain the power splitting and phase shifting required.

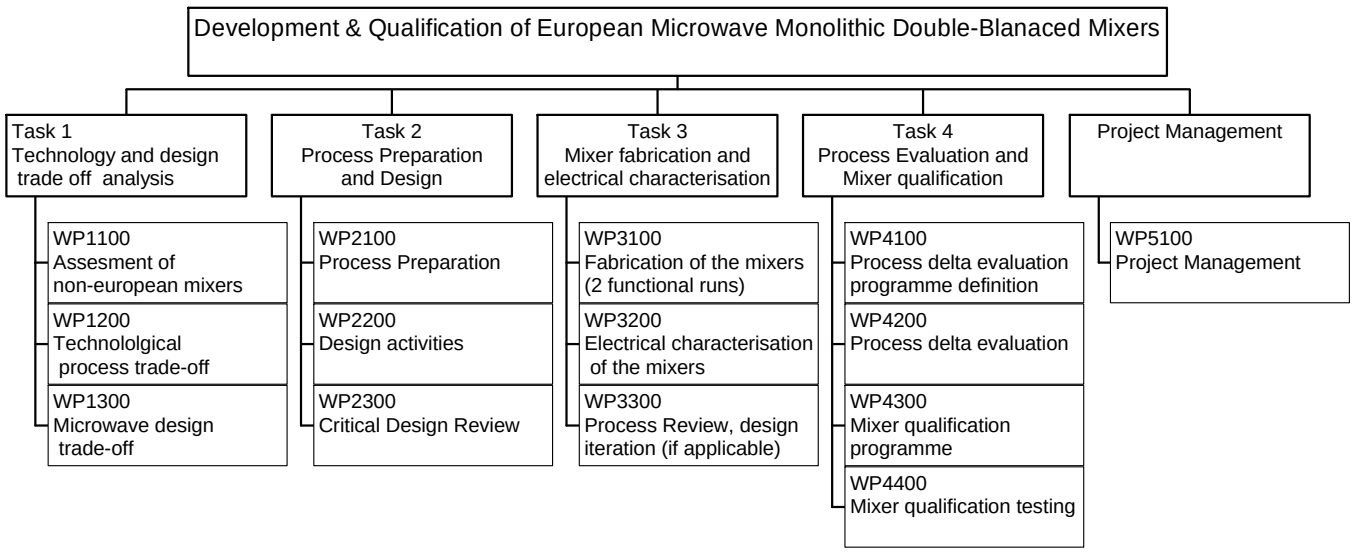






ACTIVITY APPROACH AND WORK STRUCTURE.

The approach to the project and the breakdown into work packages is described below:



TIMESCALES.

The project started in November 2005 with a planned duration of 18 months.