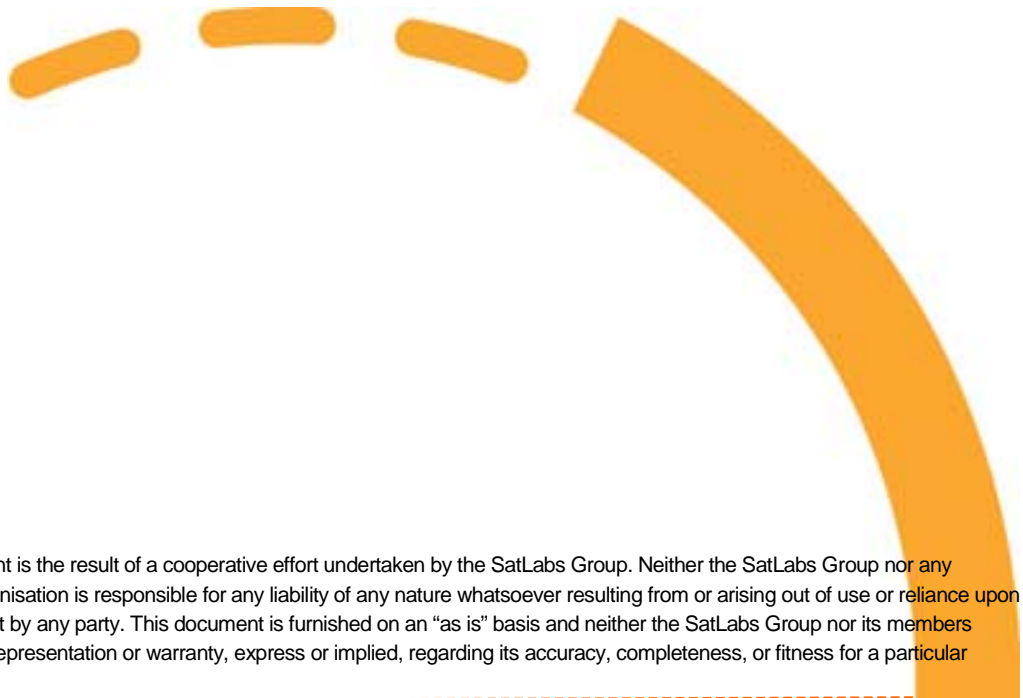




1 Watt Ka-band DVB-RCS transmitter power MMIC line-up

version v2.2



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1. Introduction

This document describes the final version of the SatLabs Group agreed target specification of a MMIC device line-up for the transmitter section of future low cost Ka-band DVB-RCS terminals. The document summarizes the results of the various discussions between-, and contributions of-, the members of SatLabs WG#1.

The final spec has now become generic, leaving the choice of the number of devices and the overall gain budget of the line-up open to proposal of the tendering parties.

2. Mixer/Driver MMIC device or devices

The function of this section may be implemented into one or two separate packaged devices. Main considerations for this choice are electrical stability, overall noise/gain budget, unwanted harmonic spur output level and of course cost.

On a sub-system level, the choice of implementation of an intermediate, cost effective [micro-strip] filter should be taken into account.

The mixer topology might be of a balanced sub-harmonic or fundamental with LO-doubler type, depending on considerations among which mentioned above.

3. SSPA MMIC device

This device has been specified before. Following final changes to the specs have been made:

- Linear gain has to be proposed as it should match to the mixer/driver devices and considerations mainly about the performance of [low cost micro strip] filters, stability and noise output power.
- Operational output power level has been re-defined as the level where acceptable spectral re-growth [side-lobes of the PSK spectrum] occurs.
- Temperature dependency of gain and power output level has been added.
- Maximum noise output density in the 20 GHz RX band of the system has been added.
- Minimum power efficiency has been specified.

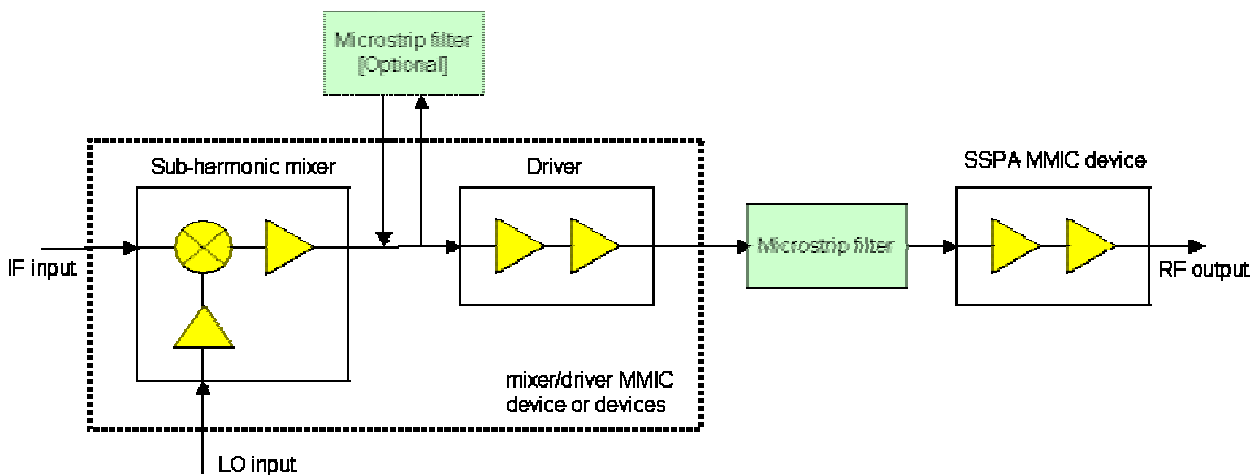
4. Total cost price target

The total cost price of the complete 1 W MMIC device line-up to DVB-RCS ODU manufacturers should be 22 Euro maximum in large production quantities [e.g. > 250kpcs/yr], according following split:

- Mixer/Driver MMIC device or devices : 10 Euro max
- SSPA MMIC device : 12 Euro max

5. Validation of project deliverables

The deliverables of the project should include tech. notes with a full performance assessment to the target specifications as well as a significant number of evaluation samples for performance evaluation by other parties. Sufficient proof has to be delivered that the proposed MMIC's are truly suitable for implementation in a proven and fully released mass volume process.



Ka-band mixer/driver MMIC device or devices						
parameter	symbol	min	typ	max	unit	conditions
						package baseplate @ 25 °C unless noted differently
IF input frequency range	f,IF	1.0		3.0	GHz	
LO input frequency range	f,LO	13.50		14.25	GHz	
RF output frequency range	f,RF	29.5		30.0	GHz	
Conversion gain	G	tdb		tdb	dB	
Conversion gain vs temperature	dG/dT			-0.04	dB/K	
Conversion gain flatness over freq. range	dG			± 0.5 pp	dB	
Noise figure	F			15	dB	
3rd order IP on IF input	IP3i	15			dBm	
Output power @ Spurs* level > 65 dBc	Po	tdb			dBm	operational output power
LO drive level	Pi,LO		6		dBm	
2*LO to RF isolation		-40			dBc	
LO to RF isolation		-40			dBc	
IF/LO/RF port return loss into 50 Ohm	RL	12			dB	
Supply voltage	Vdd		tdb		V	single rail supply
Reliability		1.E+06			h	package baseplate @ 60 °C
Package			SMD			for reflow soldering into softboard microstrip application environment
* Spurs = abs[n*IF ± m*LO], in-band						

TARGET SPECIFICATION v2.2						
1 Watt Ka-band SSPA MMIC device						
parameter	symbol	min	typ	max	unit	conditions
Frequency range	f	29.5		30.0	GHz	package baseplate @ 25 °C unless noted differently
Linear gain	G	tdb		tdb	dB	
Gain vs temperature	dG/dT			-0.04	dB/K	in linear mode
Gain flatness over frequency range	dG			± 0.5 pp	dB	in linear mode
Noise figure	F			10	dB	
3rd order IP on output	IP3o	38			dBm	
Output power level @ SR** > 17 dBc	Po	31			dBm	operational output power
Output power vs temperature	dPo/dT			-0.01	dBm/K	
Noise output power density < 20 GHz	Pn,RX			-150	dBm/Hz	input 50 Ohm terminated
Input return loss into 50 Ohm	RLi	10			dB	
Output return loss into 50 Ohm	RLo	15			dB	
Supply voltage positive rail	Vdd		tdb		V	
Supply voltage negative rail	Vgg		tdb		V	
Power added efficiency	PAE	15			%	@ operational output power
Reliability		1.E+06			h	package baseplate @ 60 °C
Package			SMD			for reflow soldering into softboard microstrip application environment
** Spectral Regrowth level [SSB]						

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