



# One year operation of ALBA IOT's

Jesús Ocampo on behalf of RF team:

Francis Pérez, Bea Bravo and  
Ángela Salom

1. Overview of ALBA RF transmitters
2. Interlocks and hours of operation
3. Incidents
  - Broken tubes
  - IOT detuning



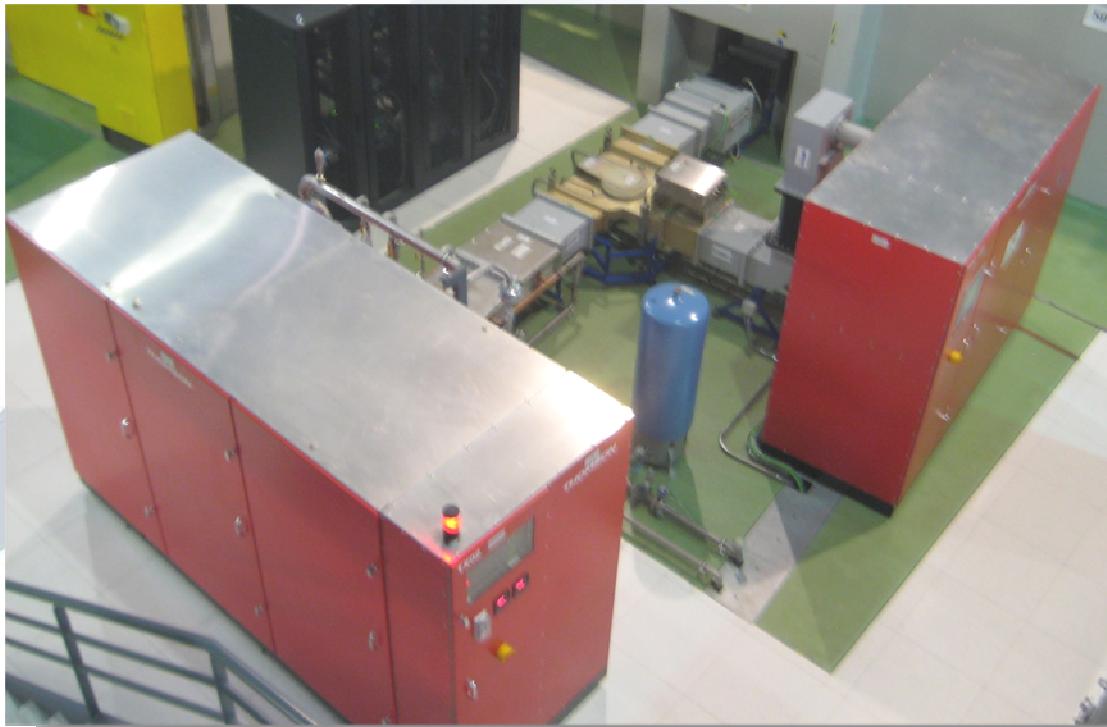
# ALBA transmitters

## HVPS

- 38kV, 4A
- PSM regulation

## Amplifier

- 80 kW CW each
- IOT: 23 dB



## 50 kW Configuration

- Less stress on the tube
  - Better operation stability
  - Longer life expectancy

## 80 kW Configuration

- Maximize output power

	Conf. 50 kW	Conf. 80 kW
<b>Cathode voltage</b>	-32 kV	-36 kV
<b>DC beam current</b>	0.15 A	0.2 A
<b>Gain</b>	22.9 dB	23.4 dB
<b>Efficiency</b>	48.5 %	47.1 %

\*Measurements by P. Sánchez

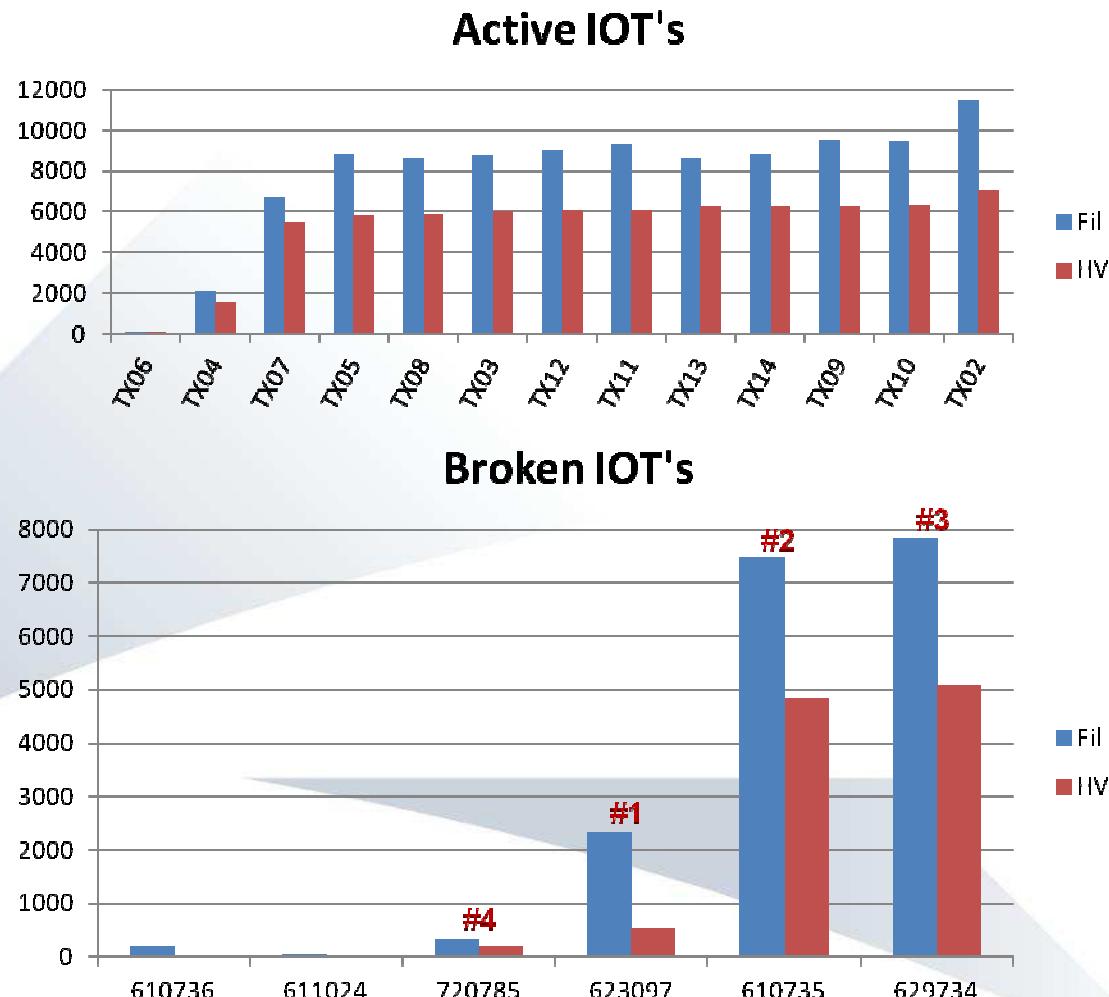


# IOT operation and interlocks

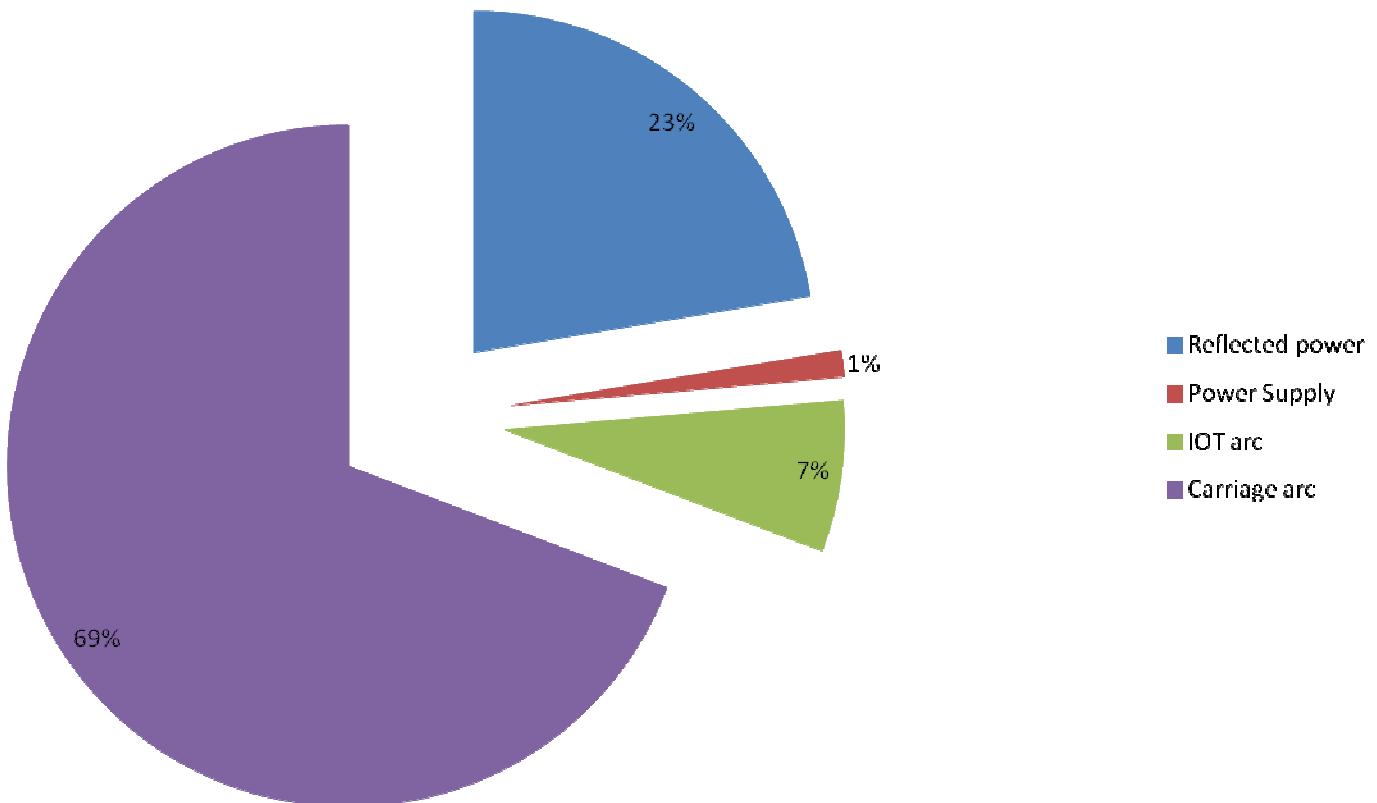


# Hours of operation

TX	Status	SN	Fil	HV
TX06	Active	720105	105	55
TX04	Active	610737	2084	1504
TX07	Active	634238	6697	5501
TX05	Active	617551	8819	5833
TX08	Active	617302	8663	5892
TX03	Active	608802	8783	6010
TX12	Active	623096	9014	6062
TX11	Active	620408	9322	6069
TX13	Active	623098	8661	6248
TX14	Active	623099	8808	6261
TX09	Active	617549	9537	6272
TX10	Active	617550	9435	6292
TX02	Active	499443	11489	7064
TX05	Broken	610736	200	25
TX07	Broken	611024	58	34
	Broken	720785	332	193
TX07	Broken	623097	2316	515
TX04	Broken	610735	7468	4851
TX06	Broken	629734	7828	5080
	Spare	723734	151	55
	Spare	499413	1639	1101



# IOT interlocks

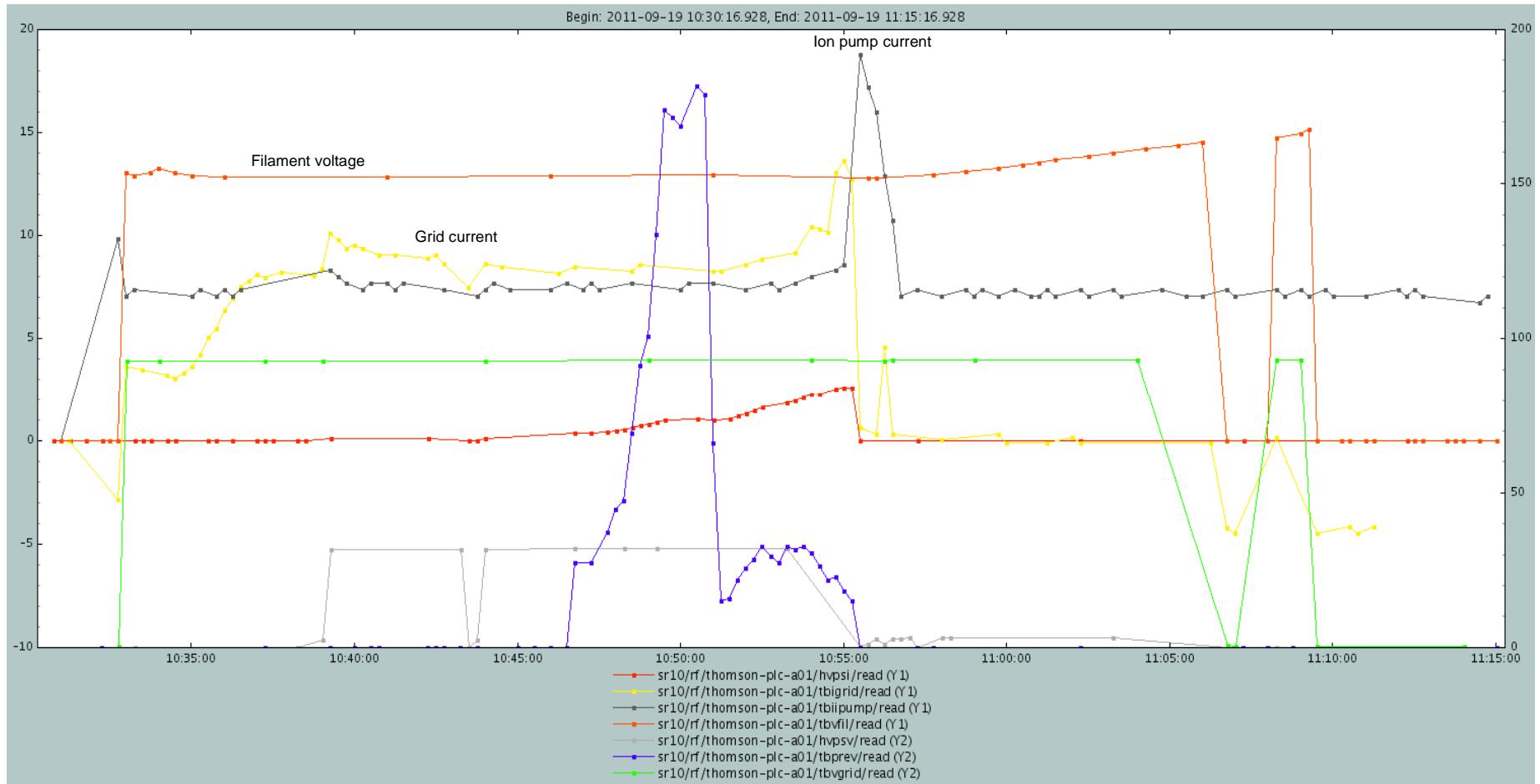




4  
broken  
tubes



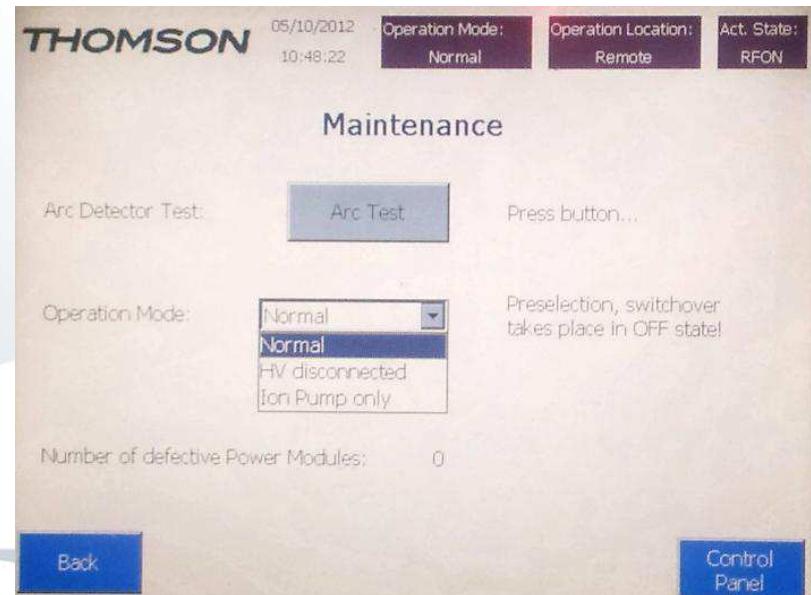
**Broken tube #1**



# Broken tube #1

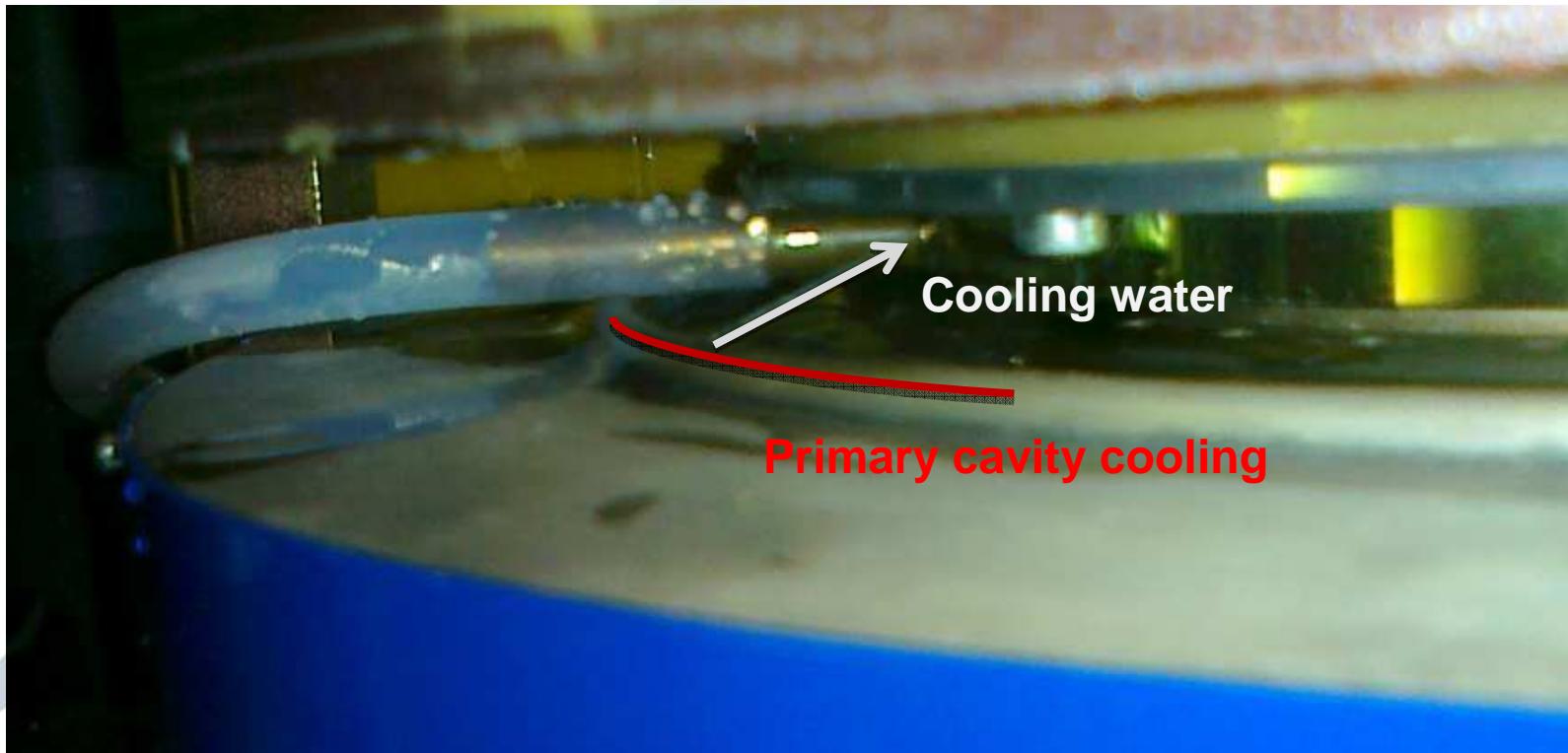
- Solutions:

- Keep ion pump on all the time
- Startup procedure
  - HV conditioning
  - Pulsed RF conditioning
  - CW RF conditioning



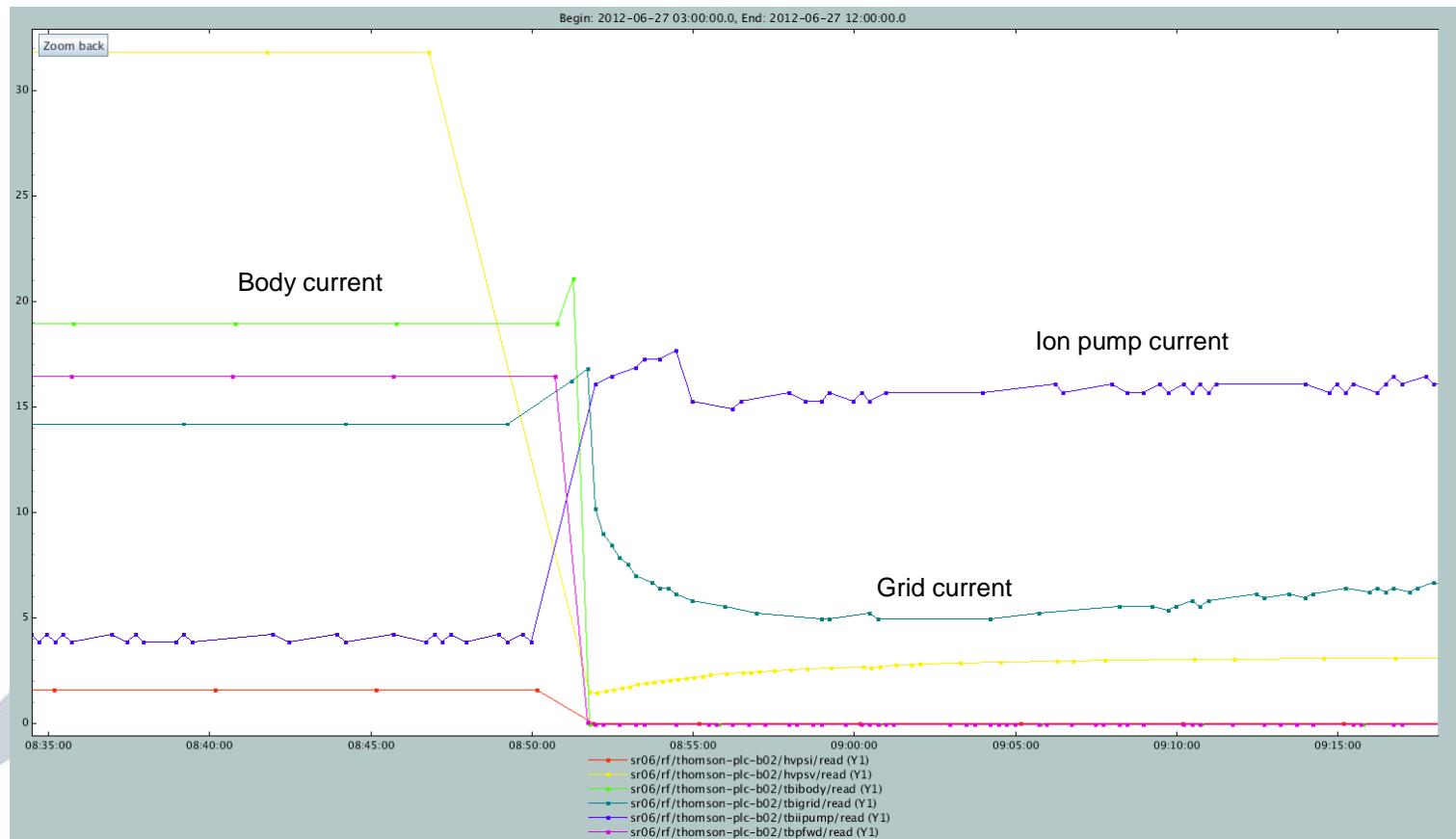
# Broken tube #2

- Broken chariot cooling wets the tube's ceramic.
- Arc interlock with ion pump current peak

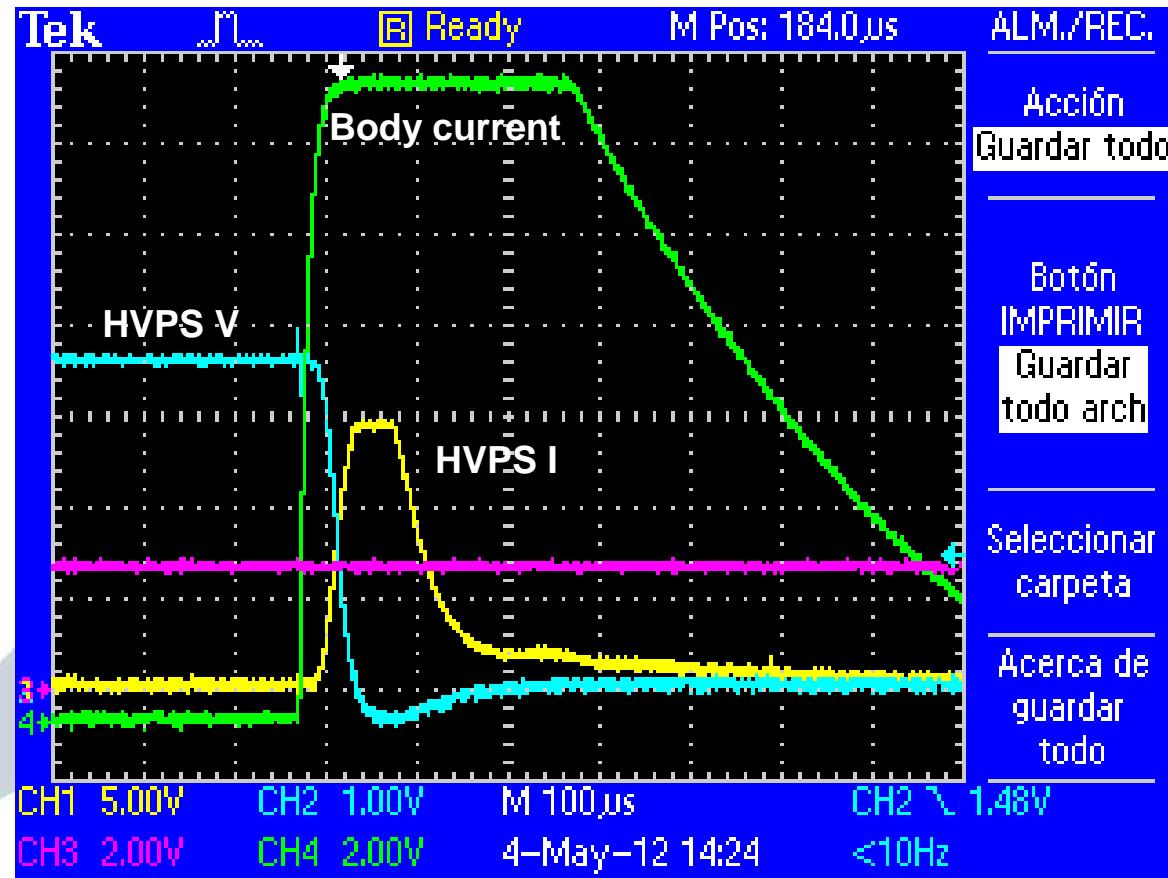


# Broken tube #3

- 3 arcs in one hour
- Arc interlock with sudden ion pump increase

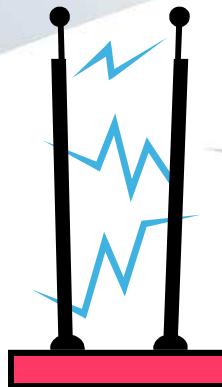
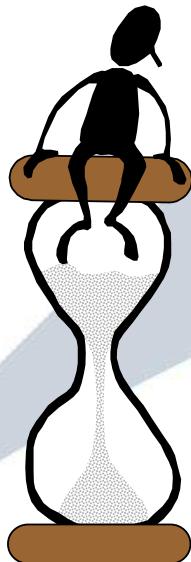


# Broken tube #3



# Broken tube #3

- Solutions
  - Wait 15 min before resetting a faulty tube
  - If arching persists, condition the tube with lower voltage
  - In the future, recondition the IOT in the high power RF-LAB



# Broken tube #4

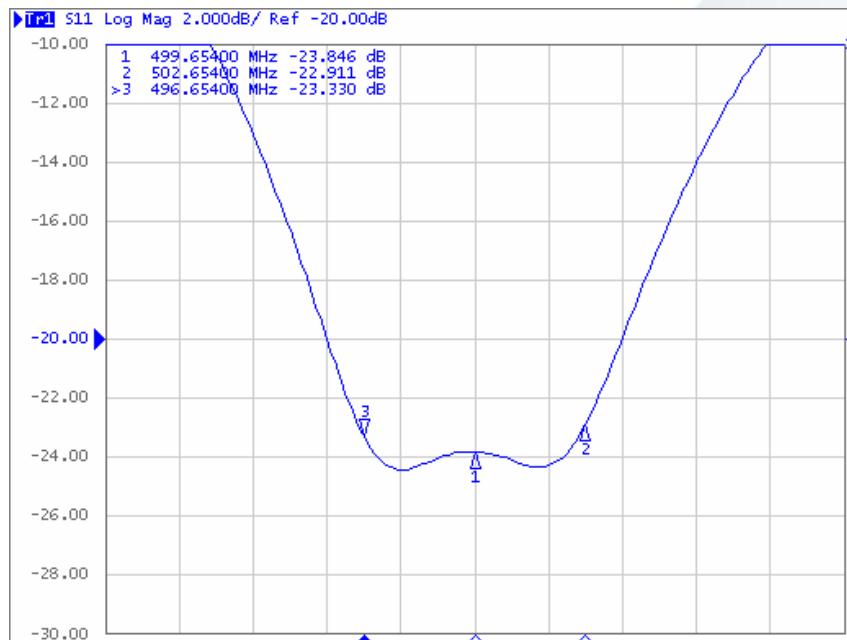
- Tilt sensor activated during transportation from Thales
- SAT not approved
- Returned to manufacturer



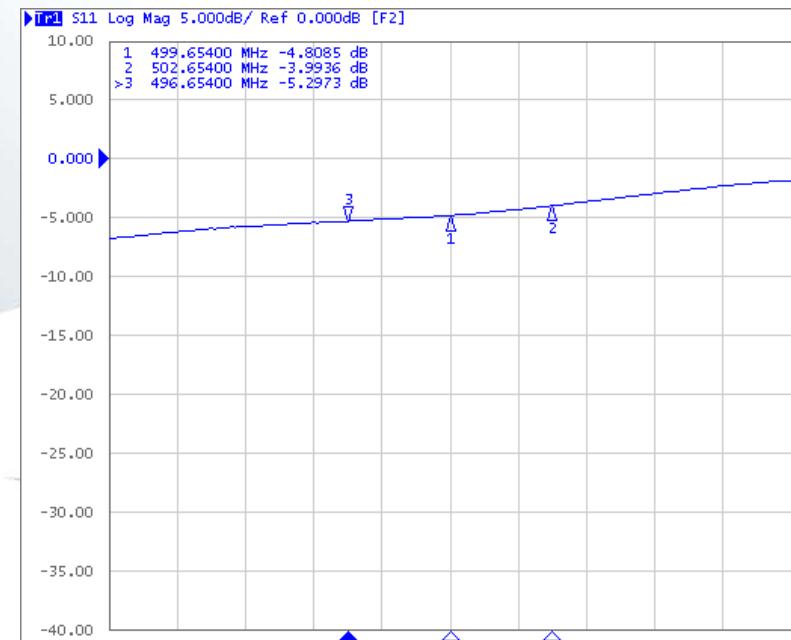
IOT  
detuning

## TX14 Input tuning

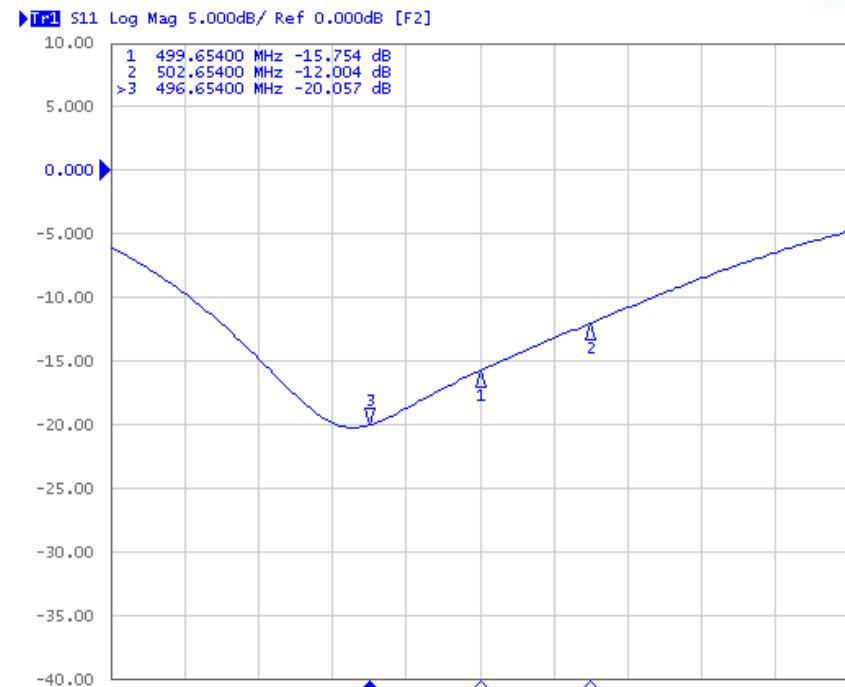
September 2009



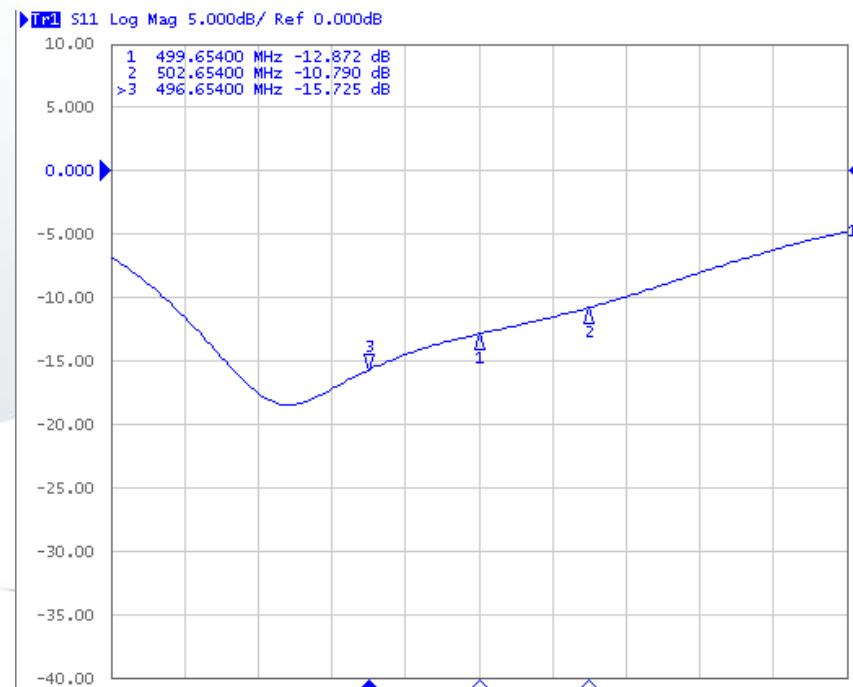
September 2012



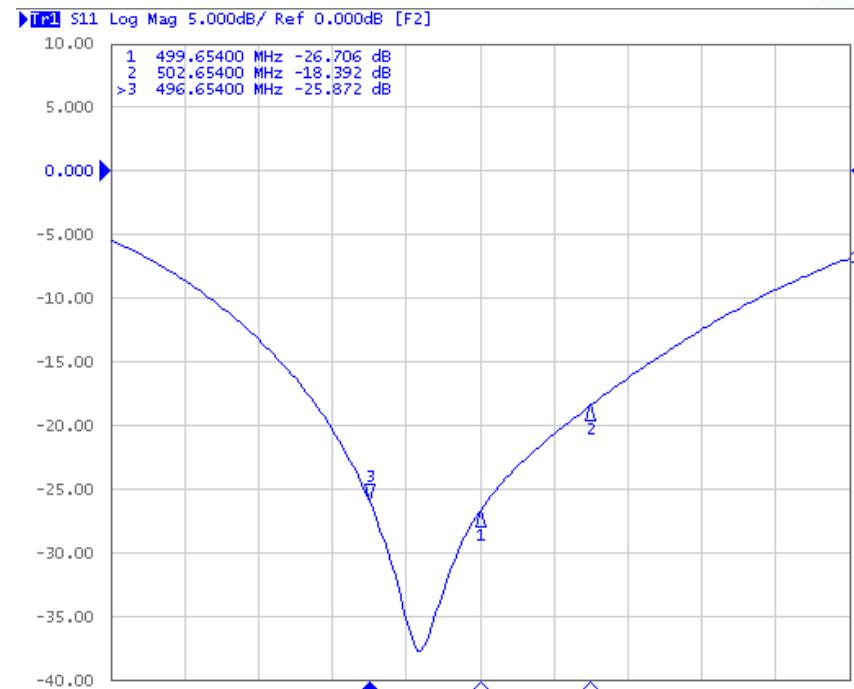
**TX03**



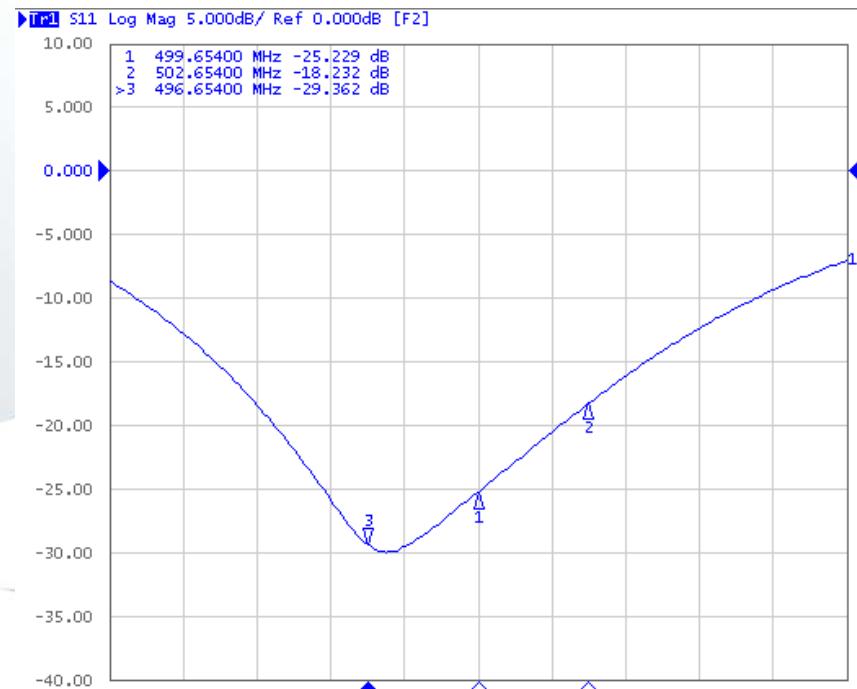
**TX05**



## TX06

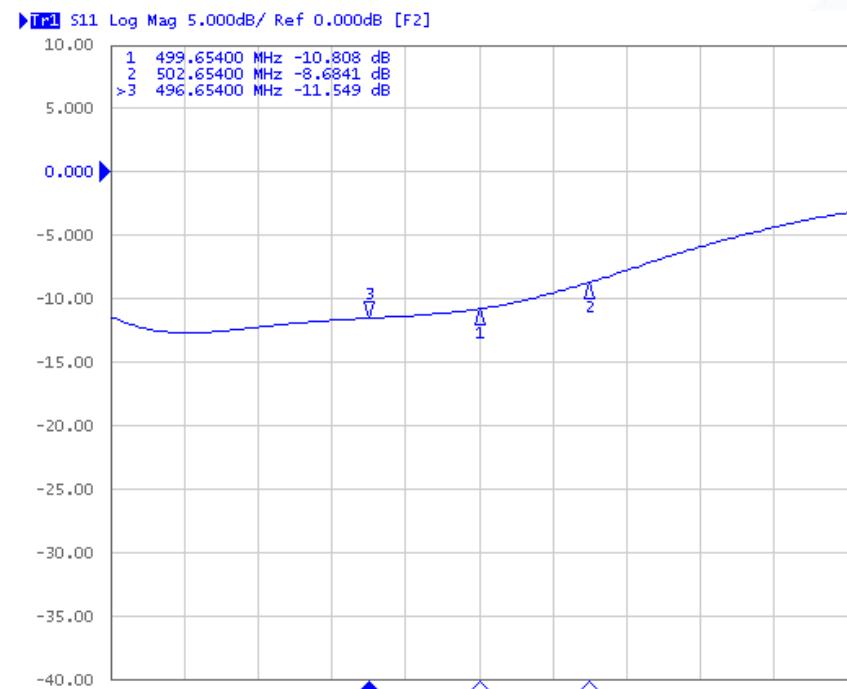


## TX07

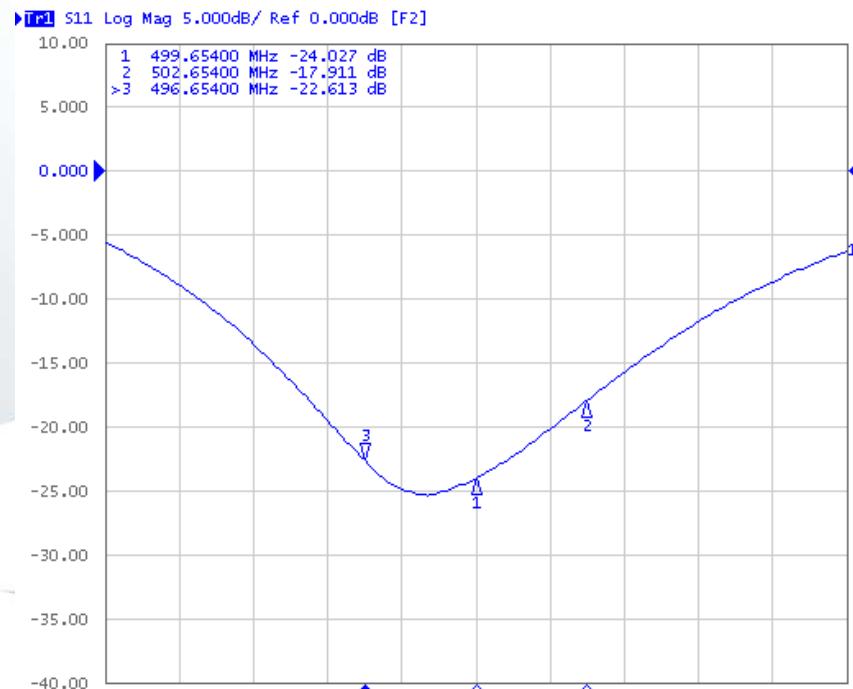


# IOT detuning

**TX11**



**TX13**



# IOT detuning



- Solution:
  - Re-tuning once a year of all tubes





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