



Memorandum

To:

cc:

From: J. Effland
R. Groves

Subject: Saturation Measurements of Single-Ended SIS Mixer/Preamp for ALMA Band 6

Introduction

History

Equipment Setup

Results

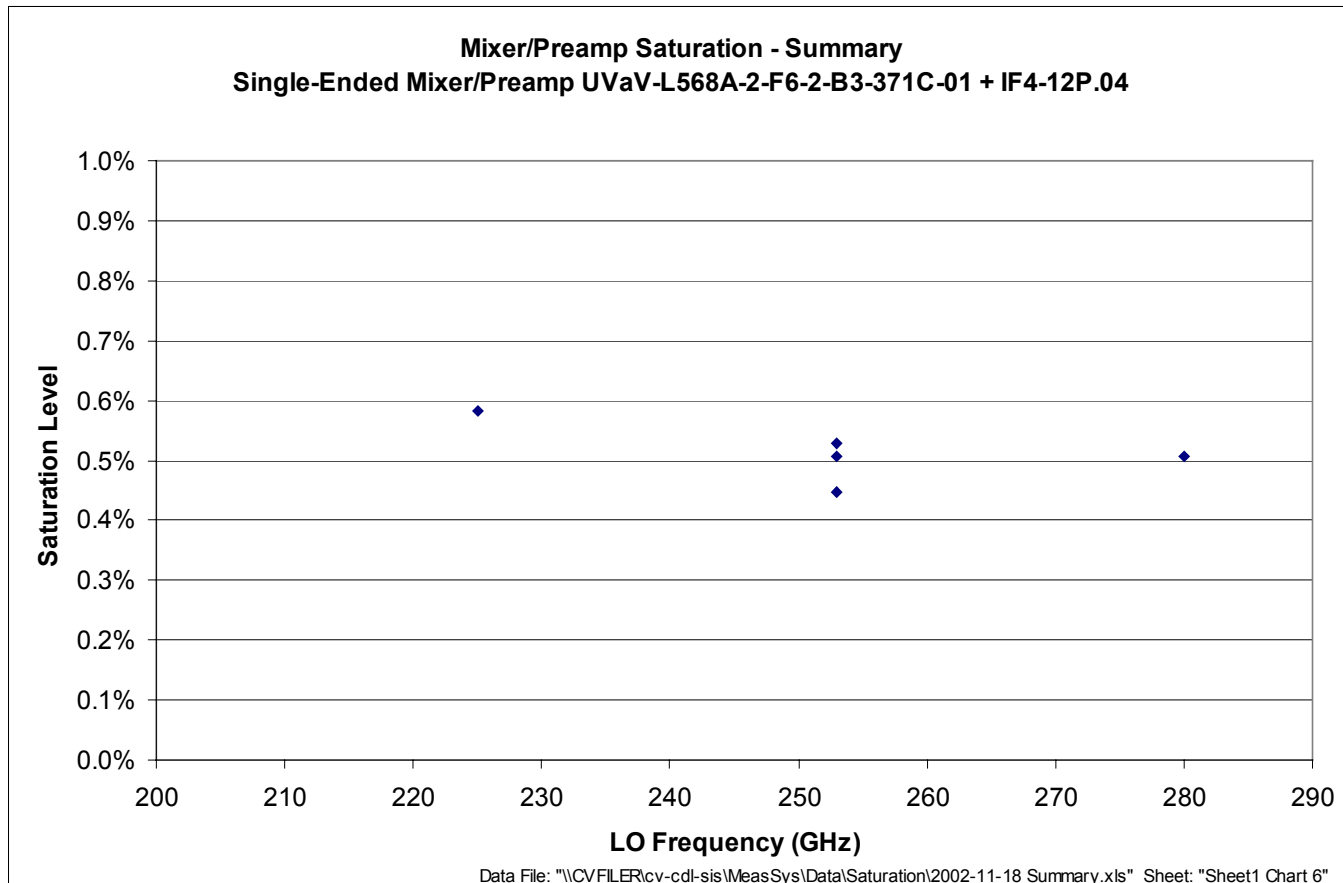


Figure 1: Summary data for single-ended mixer/preamp saturation vs. LO frequency

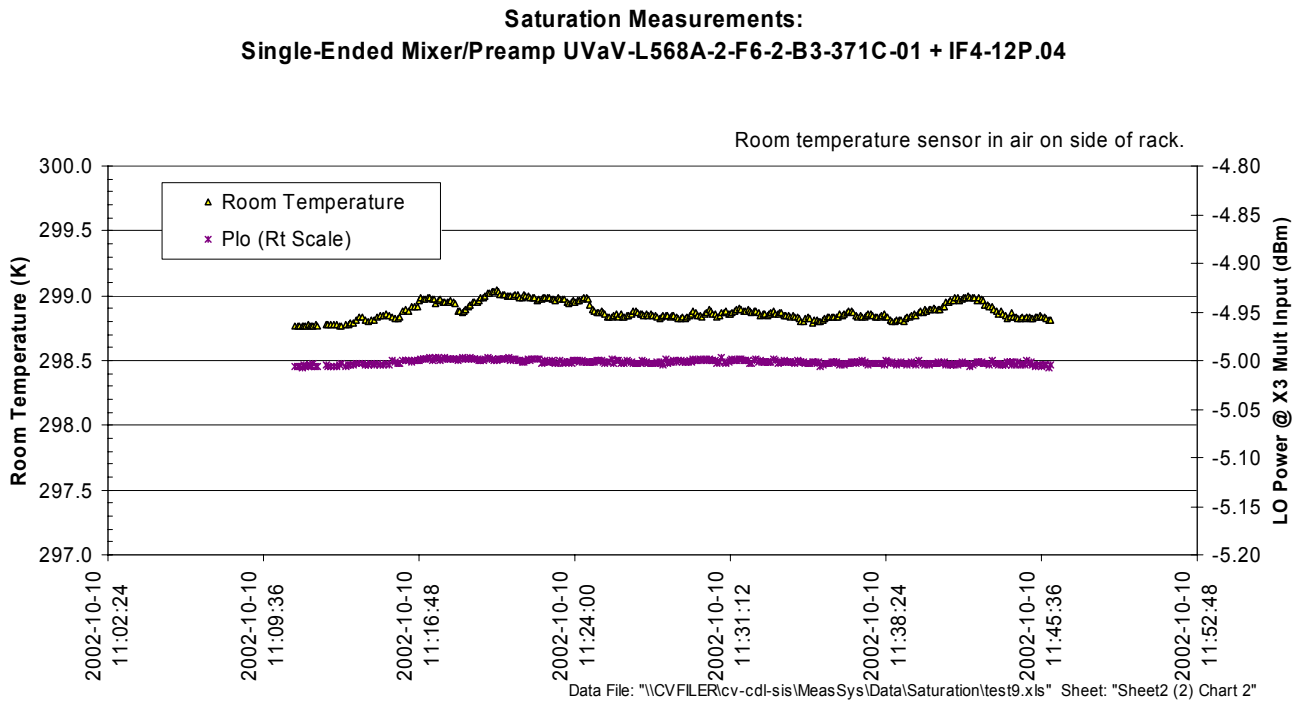
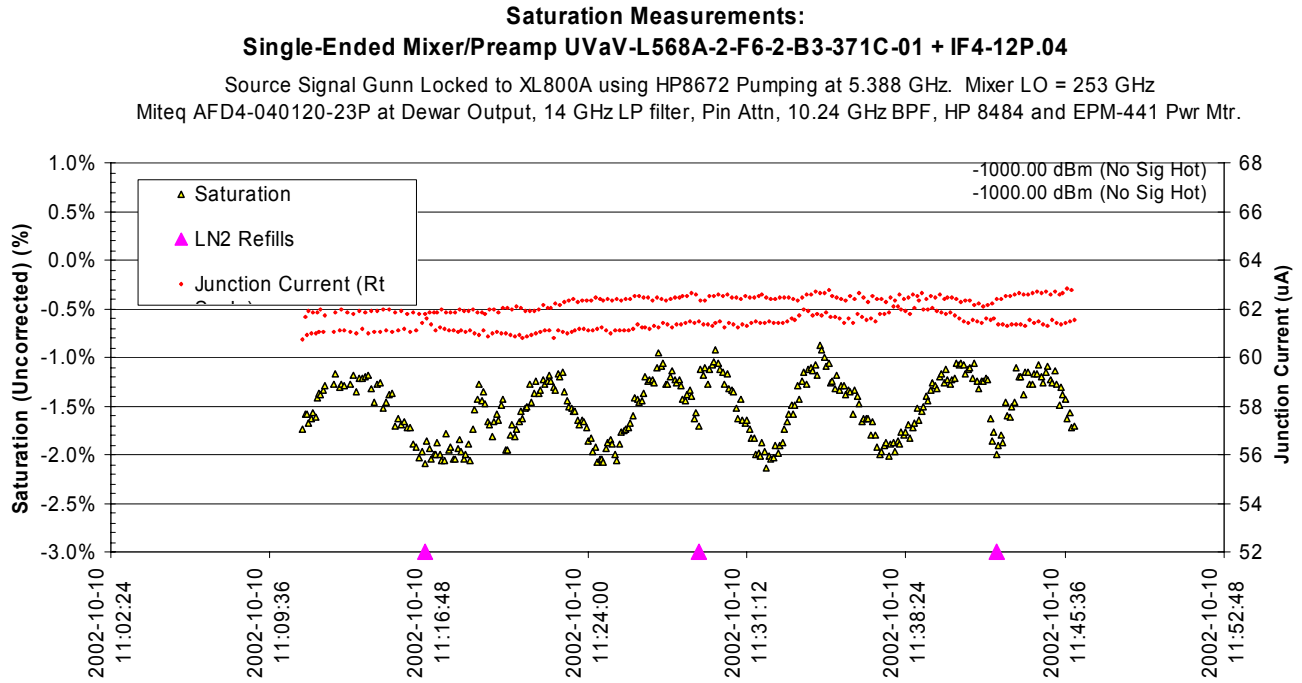
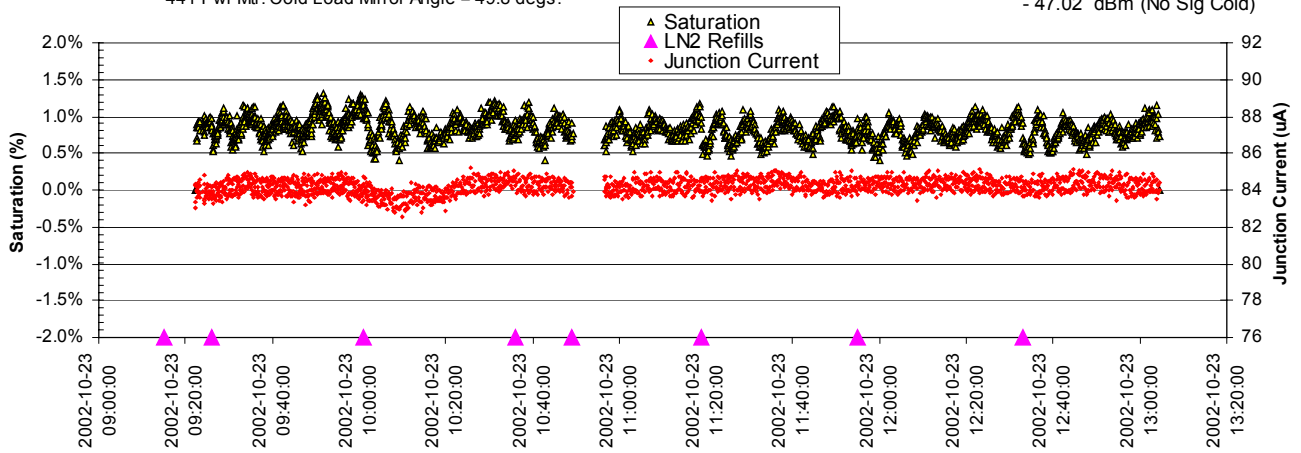


Figure 2: Phase change of ripple in saturation data when cold load is refilled. Cold load mirror angle at 30°.

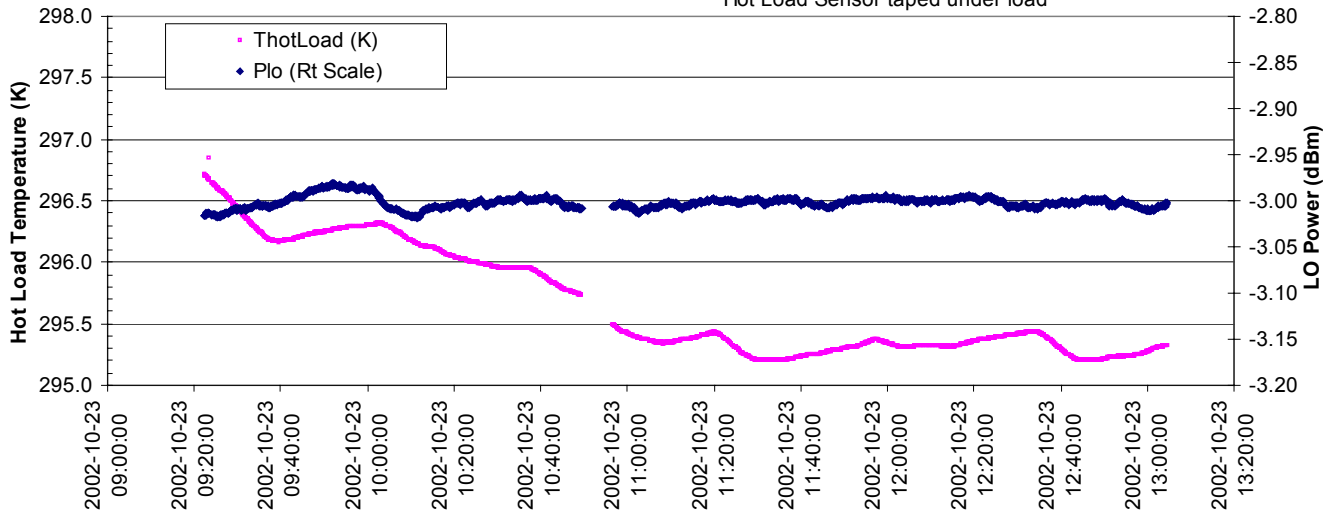
**Saturation Measurements:
Single-Ended Mixer/Preamp UVaV-L568A-2-F6-2-B3-371C-01 + IF4-12P.04**

Source Signal Gunn Locked to XL800A using HP8672 Pumping at 5.388 GHz. Mixer LO = 253 GHz Miteq
AFD4-040120-23P at Dewar Output, 14 GHz LP filter, Pin Attn = 13 dB, 10.24 GHz BPF, HP 8484 and EPM-44.09 dBm (No Sig Hot)
441 Pwr Mtr. Cold Load Mirror Angle = 49.8 degs. - 47.02 dBm (No Sig Cold)



**Saturation Measurements:
Single-Ended Mixer/Preamp UVaV-L568A-2-F6-2-B3-371C-01 + IF4-12P.04**

Hot Load Sensor taped under load

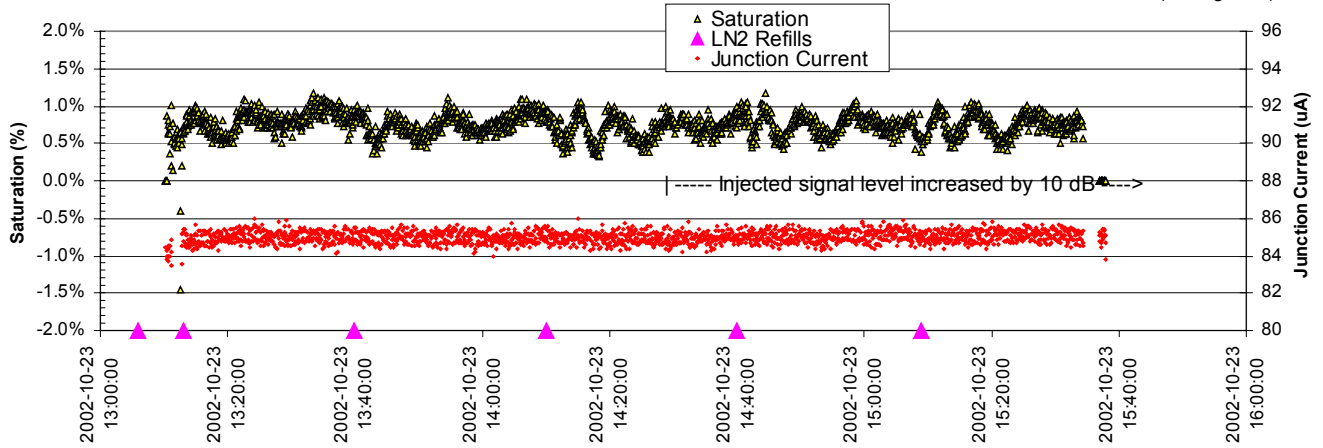


Data File: "\\cvfiler\shares\cv-cdl-sis\MeasSys\Data\Saturation\test20.xls" Sheet: "Sheet1 Chart 2"

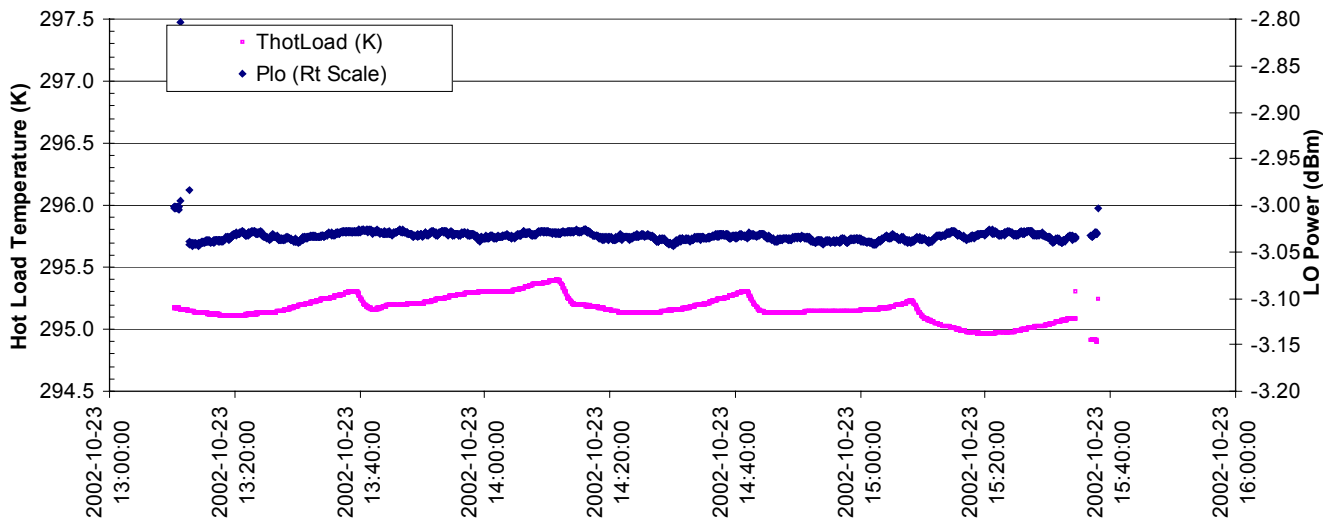
Figure 3: Frequency change of ripple in saturation data when cold load is refilled. Cold load mirror angle at 44°.

Saturation Measurements: Single-Ended Mixer/Preamp UVaV-L568A-2-F6-2-B3-371C-01 + IF4-12P.04

Source Signal Gunn Locked to XL800A using HP8672 Pumping at 5.388 GHz. Mixer LO = 253 GHz Miteq AFD4-040120-23P at Dewar Output, 14 GHz LP filter, Pin Attn = 3 and 13 dB, 10.24 GHz BPF, HP 8484 -34.35 dBm (No Sig Hot) and EPM-441 Pwr Mtr. Cold Load Mirror Angle = 49.8 degs. -37.30 dBm (No Sig Cold)



Saturation Measurements: Single-Ended Mixer/Preamp UVaV-L568A-2-F6-2-B3-371C-01 + IF4-12P.04



Data File: "\\cvfiler\shares\cv-cdl-sis\MeasSys\Data\Saturation\test21.xls" Sheet: "Sheet1 Chart 2"

Figure 4: No change in saturation level with 10 increase in injected signal

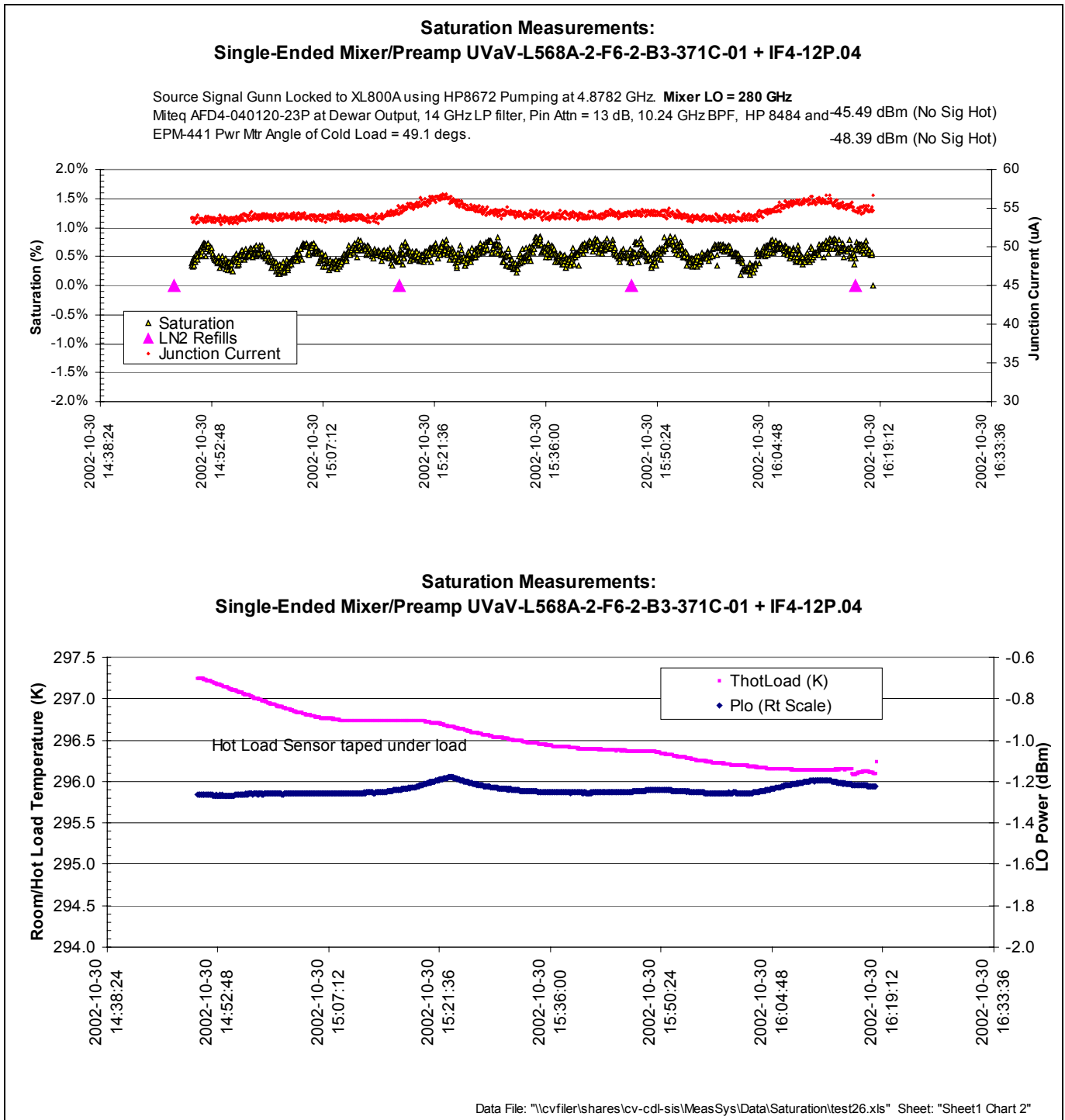


Figure 5: Saturation with LO = 280 GHz

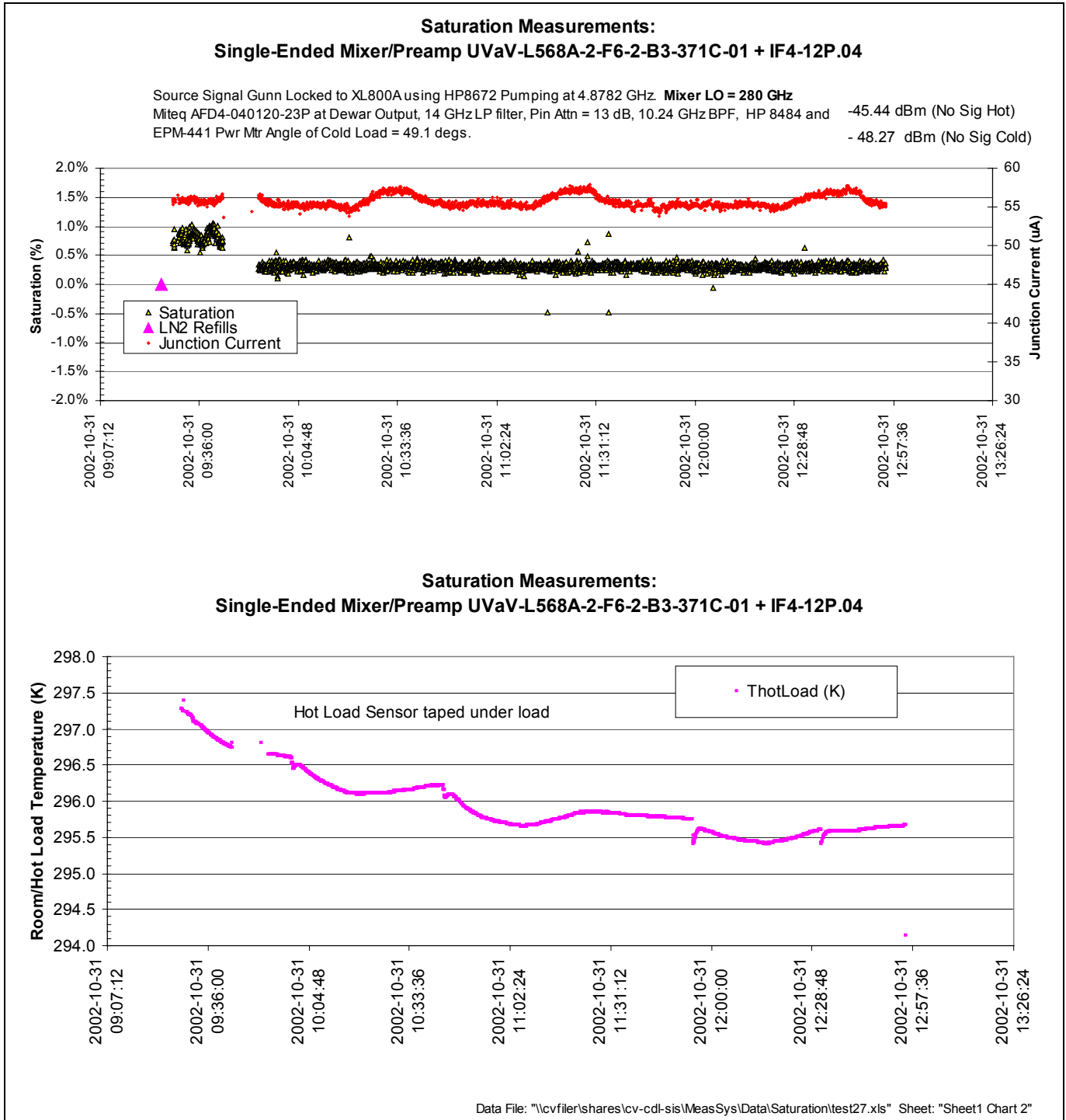


Figure 6: System calibration by injecting signal after mixer/preamp (Port 4 in Figure 7)

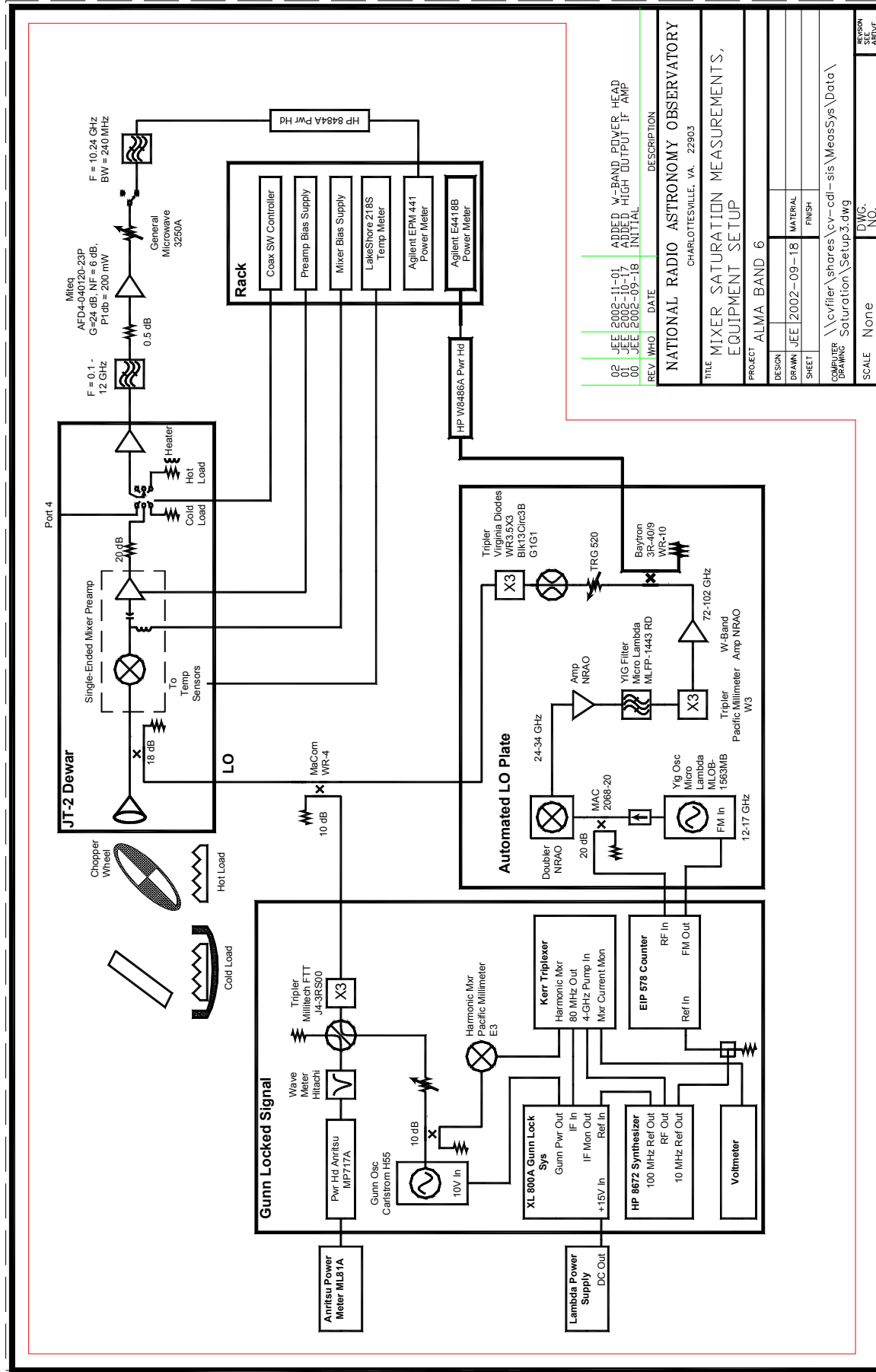


Figure 7: Mixer Saturation Measurement Setup

REV	WHO	DATE	DESCRIPTION
02	JEE	2002-11-01	ADDED W-BAND POWER HEAD
01	JEE	2002-10-17	ADDED HIGH OUTPUT IF AMP
00	JEE	2002-09-18	INITIAL

PROJECT		ALMA BAND 6	
TITLE			
MIXER SATURATION MEASUREMENTS, EQUIPMENT SETUP			
PROJECT			
NATIONAL RADIO ASTRONOMY OBSERVATORY			
CHARLOTTEVILLE, VA. 22903			
DESIGN	JEE	2002-09-18	MATERIAL
DRAWN	JEE	2002-09-18	FINISH
COMPUTER DRAWING			
\\cvfiler\shares\cv-cdl-sis\MeasSys\Data\Saturation_Setup3.dwg			
SCALE	None	DWG. NO.	REVISION
			DATE