National Radio Astronomy Observatory

VLA Test Memo 224

K Band Receiver Suckout Problem
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February 11, 2000

A chronic problem with a high receiver temperature at certain frequencies in the K band receivers, otherwise known as a "suckout," was traced to poor mating between the feed horn and a transition coupling called the front end window cover. The problem was resolved by chamfering the shoulder of a raised area at the center of the cover.

T (receiver), normally about 25 K, went off scale during "HPSOIDA" tests of the new K band receiver serial no 12. The suckout could be moved in frequency by adjusting the window cover, but no manner of polishing the interfacing surfaces would remove the problem. An example of the suck out problem is shown in Figure 1. Operating under the theory that the suckout was a result of an impedance mismatch most likely introduced by uneven mechanical connection, the shoulder on the window cover (Figure 2) was chamfered with a hand file. The suckout was completely removed as a result as shown in (Figure 3). The plan now is to change the drawing for the window cover to provide for the chamfered shoulder during machining.

HPSOIDA is a PC-controlled test, which takes power meter measurements while sweeping through the test band with a frequency generator and mixer. The operator is prompted when to install hot and cold loads and the "cal" inputs are controlled automatically.

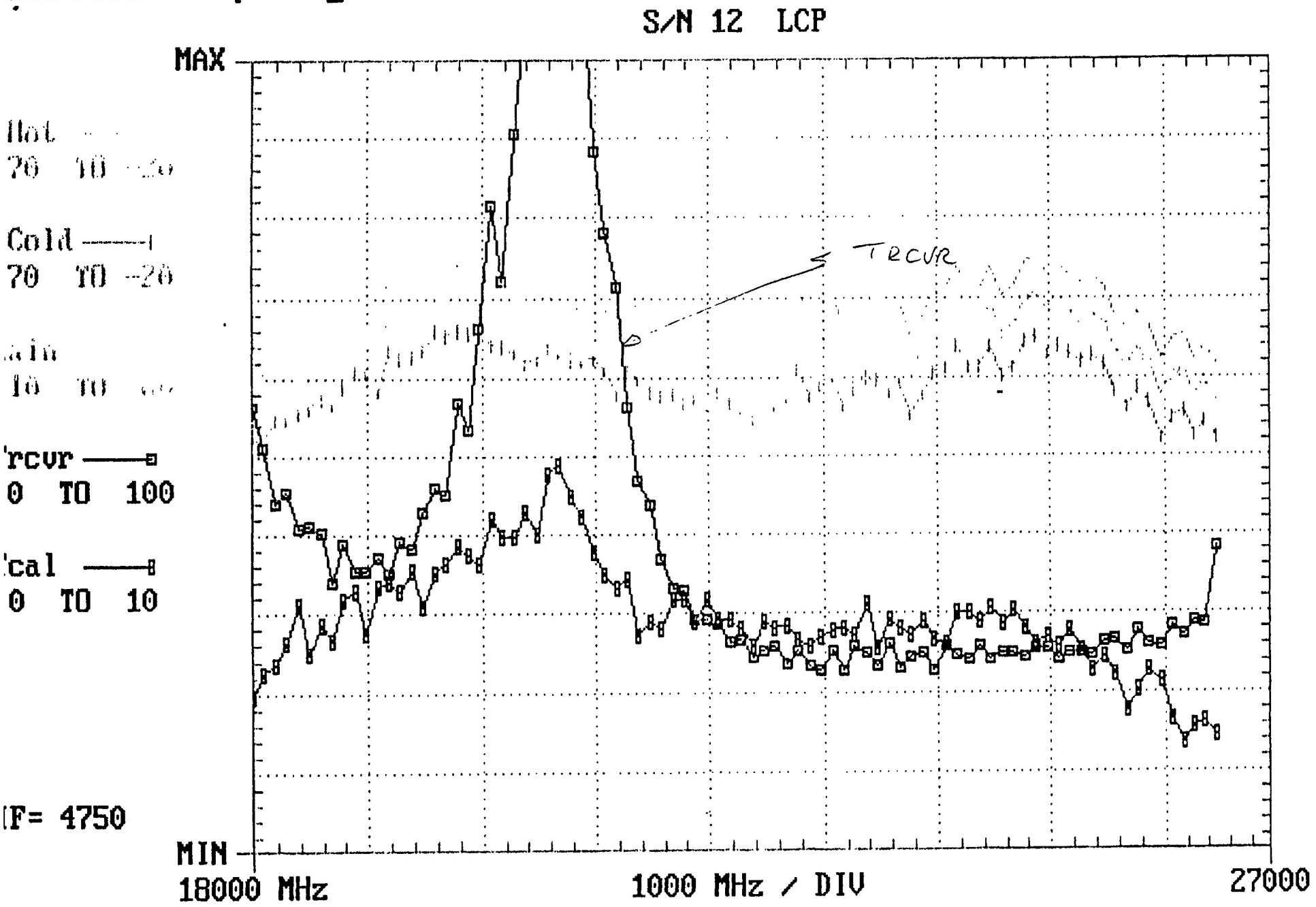
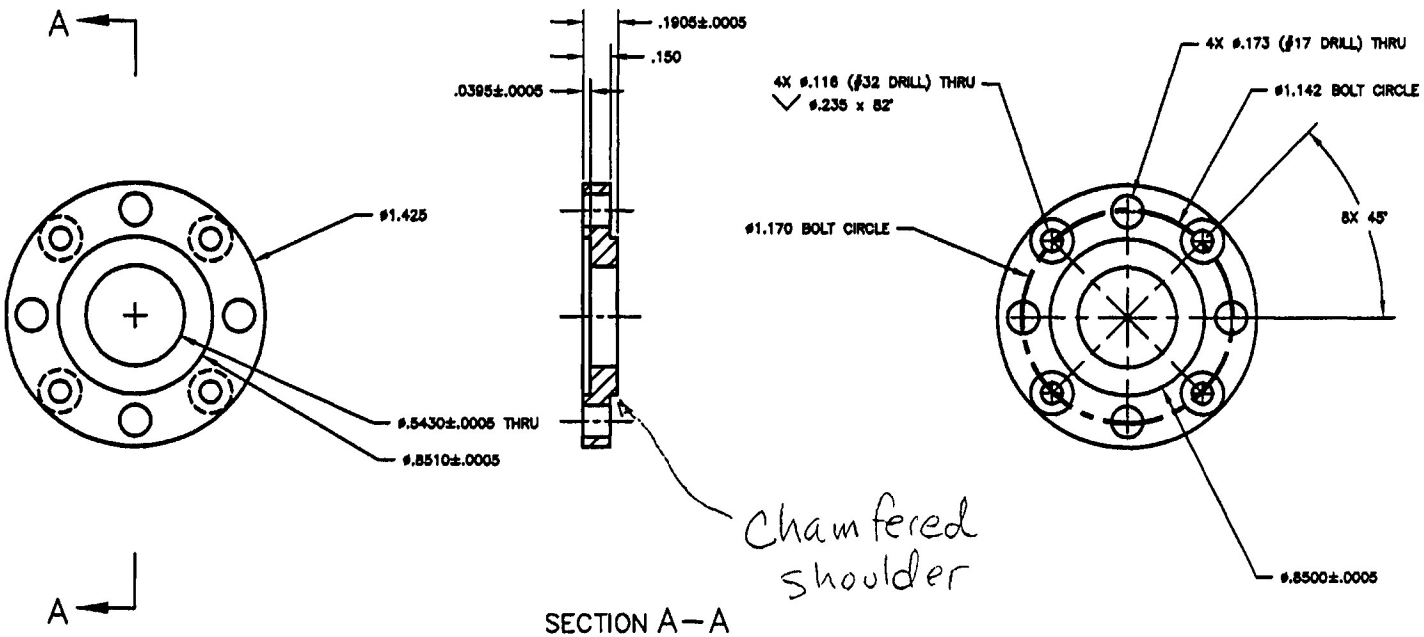

ata File: C:\QB45\K_BAND\KL120209.714
S/N 12 LCP
MAX
Hot
70 TO -20
Cold
70 TO -20
Gain
10 TO 60
'rcvr
0 TO 100
'cal
0 TO 10
IF= 4750
MIN
18000 MHz
1000 MHz / DIV
27000
'eed # 14...full
'RESS C TO CONTINUE
TRCVR

FIGURE 1

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES
2. REQUIRED PER ASSEMBLY: 1

REV	DATE	DRAWN BY	APPRV'D BY	DESCRIPTION
A	7/23/97	K. TATE	J. RUFF	CHANGED ø.141 HOLES TO ø.173
B	9/15/98	K. TATE	P. LILJE	ADDED ±.0005 TOLERANCE
C	3/2/99	K. TATE	P. LILJE	CHANGED OUTER DIAMETER



SECTION A–A

FIGURE 2

ACAD : 80122M15

D80122P01	ASSEMBLY
NEXT ASSEMBLY	DWG. TYPE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
1°
.005
.01

MATERIAL : BRASS PLATE

FINISH :

VLA — SUBSYSTEM: K-BAND

TITLE: K-BAND 18–26.5 GHz FRONT END WINDOW COVER

NATIONAL RADIO ASTRONOMY OBSERVATORY
SOCORRO, NEW MEXICO 87801

DRAWN BY	K. TATE	DATE 12/11/98
DESIGNED BY	P. LILJE	DATE 12/11/98
APPROVED BY	P. LILJE	DATE 12/11/98

SHEET NUMBER 1 OF 1 | DRAWING NUMBER C80122M15 | REV. C | SCALE 2/1

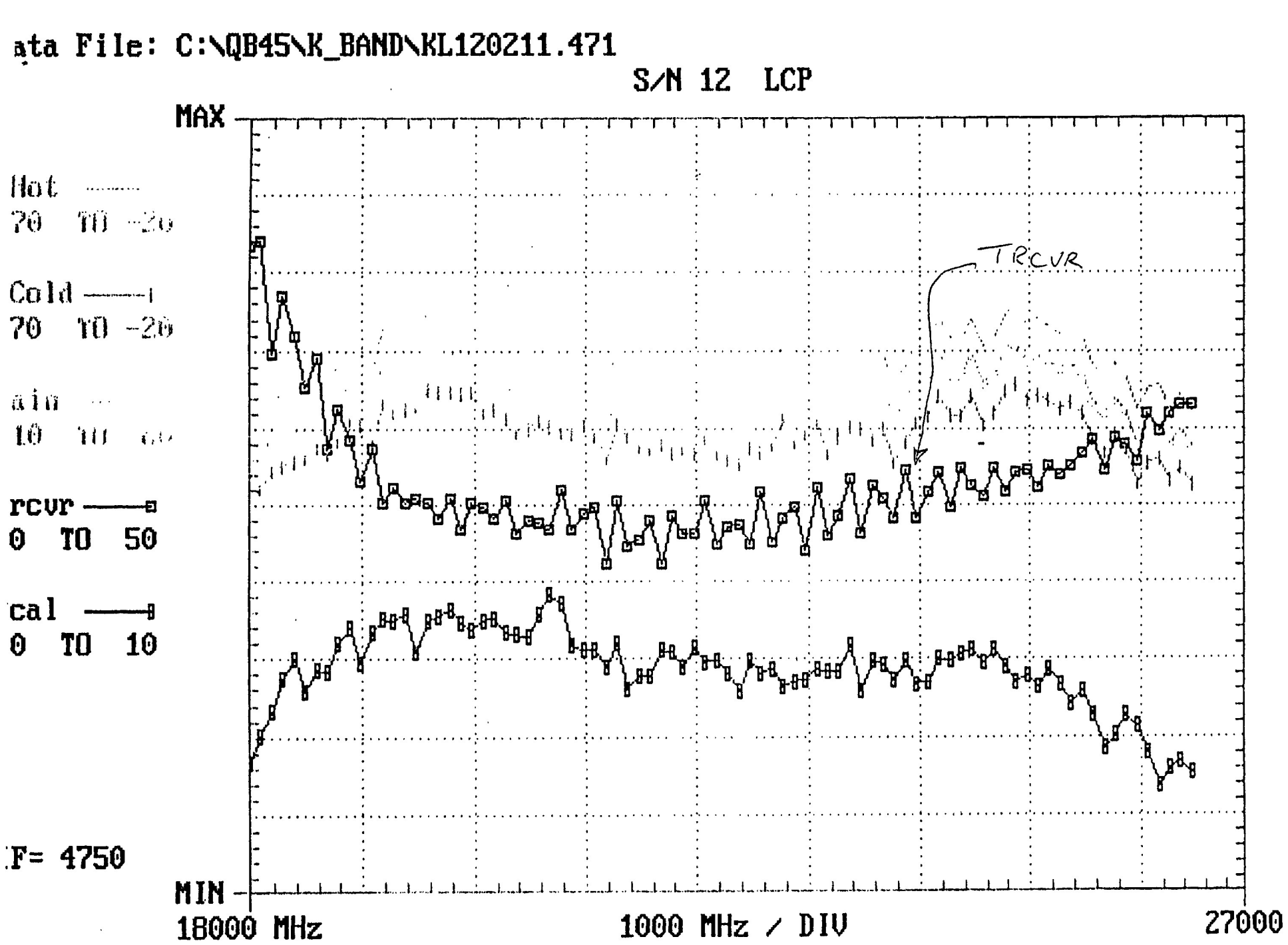

ata File: C:\QB45\K_BAND\KL120211.471
S/N 12 LCP
MAX
Hot
70 TO -20
Cold
70 TO -20
ain
10 TO
rcvr
0 TO 50
cal
0 TO 10
F= 4750
MIN
18000 MHz
1000 MHz / DIV
27000
TRCVR
eed #14 ...fully fitted
EST RUN FINISHED. PRESS C TO CONTINUE

FIGURE 3