



**TEST DATA  
ON**

**50 kHz TO 18 GHz  
ULTRA BROAD BAND  
LOW INSERTION LOSS  
HIGH ISOLATION**

**INDUCTIVE AND RESISTIVE  
BIAS T's**

**INDUCTIVE BIAS T:  
AMC MODEL No: BT-50K18 OPT. PS  
(SERIAL No: MC906013)**

**RESISTIVE BIAS T:  
AMC MODEL No: BT-50K18 OPT. PS, RES  
(SERIAL No: MC906014)**

**TESTED, REPORTED AND PREPARED  
BY  
FRANK RETHMEIER, RENE AFABLE, AND RAYMOND SICOTTE**

**April 15, 2000**

**WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)**

**E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)**

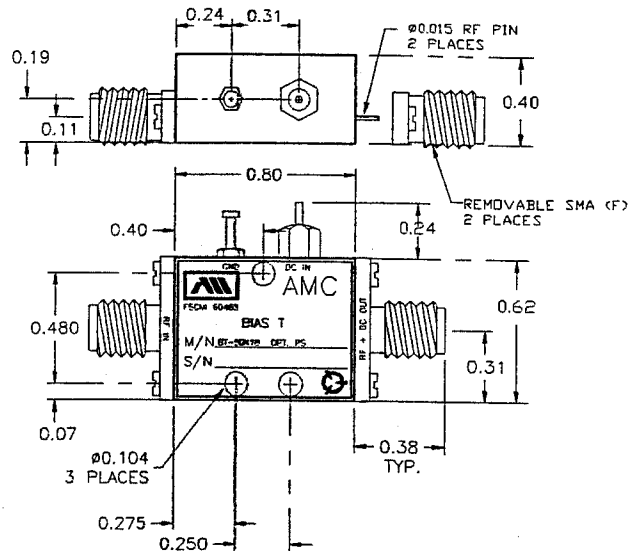
**7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938**



**AMERICAN MICROWAVE  
CORPORATION**

**KEY FEATURES:**

- ULTRA BROAD BAND
- LOW LOSS
- HIGH ISOLATION
- SMALL SIZE

**AMC MODEL No: BT-50K18 OPT. PS****SPECIFICATIONS:**

- FREQUENCY RANGE : 50 kHz TO 18 GHz
- USABLE FREQUENCY RANGE : 15 kHz TO 22 GHz
- INSERTION LOSS : 0.75 dB TYPICAL  
1.0 dB MAXIMUM
- RETURN LOSS (VSWR) : 1.75 : 1 TYPICAL  
2.0 : 1 MAXIMUM
- ISOLATION (RF IN TO DC IN) : 60 dB MINIMUM (10 MHz TO 18 GHz)
- BIAS PORT RESISTANCE : 2.5 OHMS MAXIMUM  
(INDUCTIVE MODEL ONLY)
- MAXIMUM DC VOLTAGE : 15 V
- MAXIMUM DC CURRENT : 200 mA
- SIZE : 0.80" x 0.62" x 0.40"
- WEIGHT : 0.75 oz. TYPICAL

**April 15, 2000**

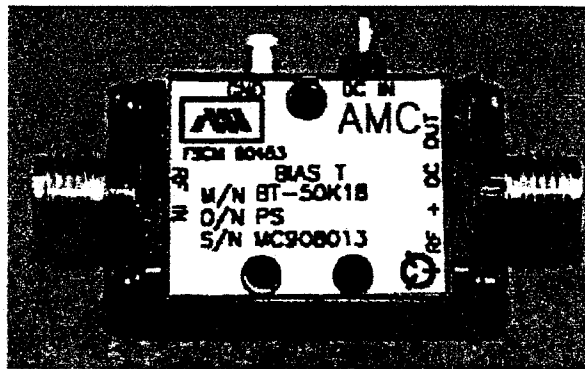


50 kHz TO 18 GHz

INDUCTIVE

BIAS T

USABLE TO 15 kHz



BT-50K18 OPT. PS

April 15, 2000

7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938

SUMMARY TEST DATA

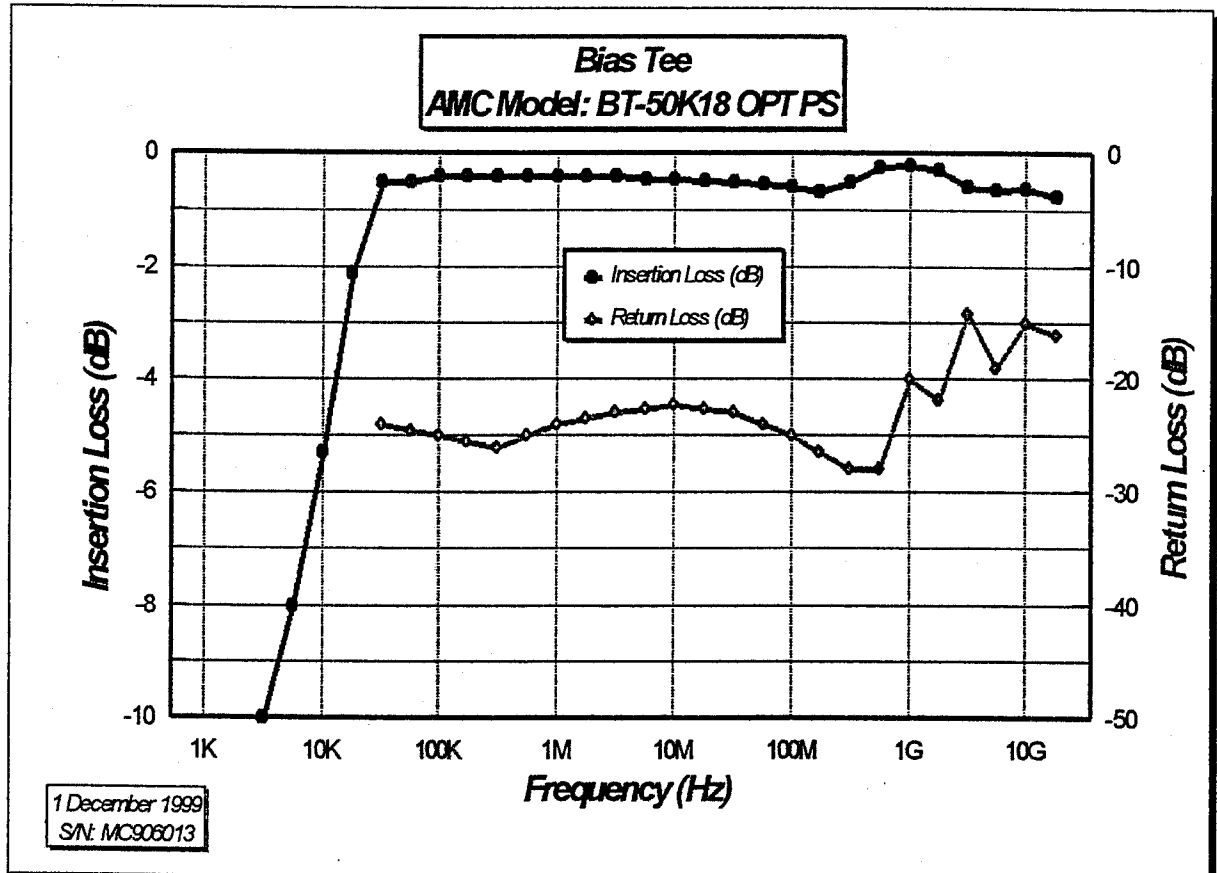


MODEL NUMBER  
SERIAL NUMBER  
ENGINEER

: BT-50K18 OPT. PS  
: MC906013  
: Frank Rethmeier

INSERTION LOSS & RETURN LOSS\*

RF IN - RF + DC OUT



RF IN: INPUT ARM

April 15, 2000

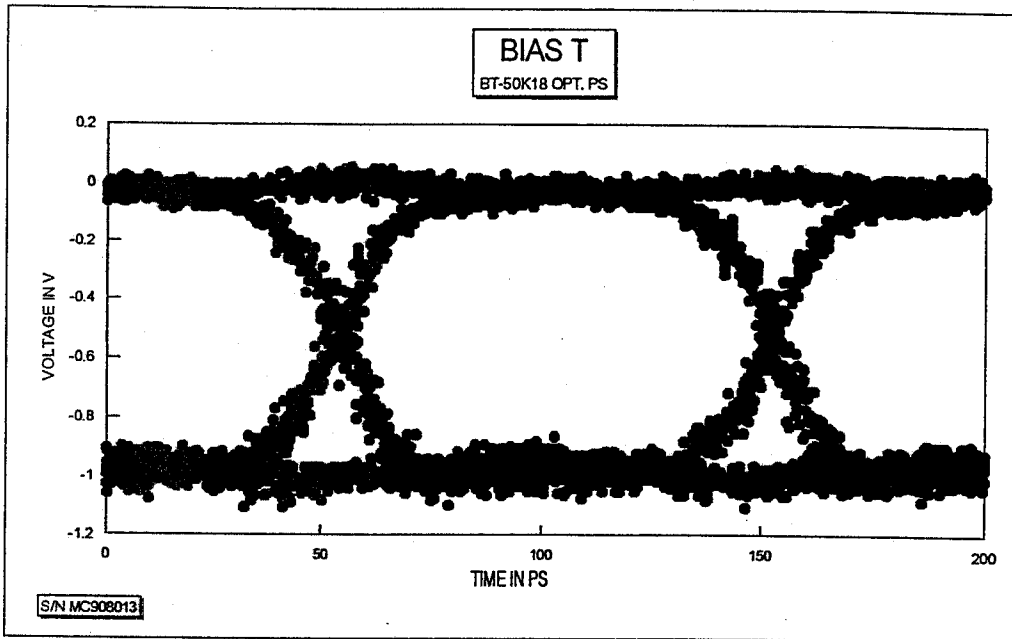
### SUMMARY TEST DATA



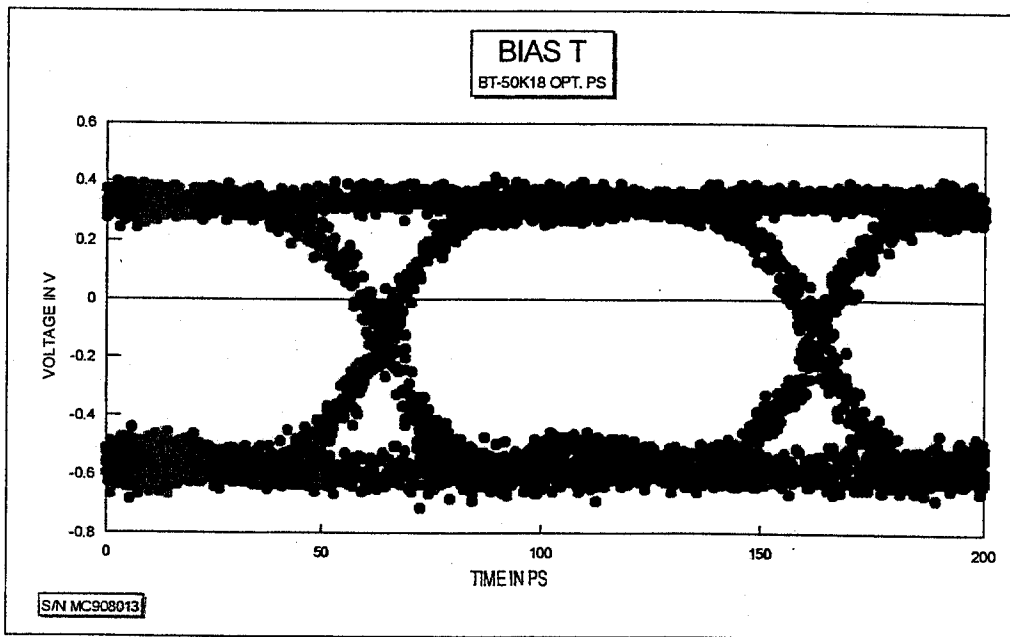
MODEL NUMBER : BT-50K18 OPT. PS  
SERIAL NUMBER : MC906013  
ENGINEER : Raymond Sicotte

### EYE Pattern Distortion\*

At 10 Gbit/Sec Data Rate with long  $2^{31}-1$  Pseudo Random Data Stream



Baseline data of the equipment without the Bias T



Eye pattern after inserting the Bias T

As measured on a 50 GHz Sampling Scope (courtesy of Dr. Gary Carter)

April 15, 2000

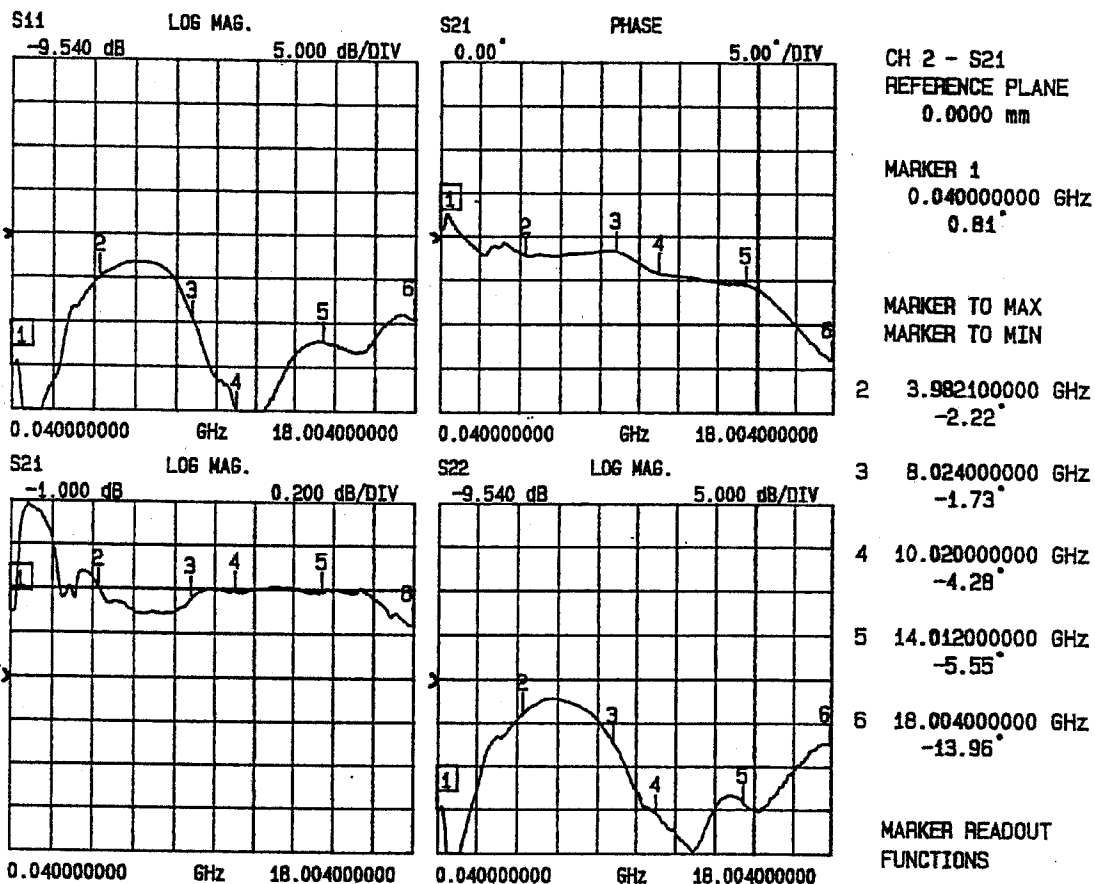
SUMMARY TEST DATA



MODEL NUMBER  
SERIAL NUMBER  
ENGINEER

: BT-50K18 OPT. PS  
: MC906013  
: Frank Rethmeier

**RETURN LOSS, PHASE SHIFT\*, INSERTION LOSS**  
RF IN - RF + DC OUT\*\*



FREQUENCY	S11	S21, PHASE	S21, MAGNITUDE	S22
40 MHz	-24.5 dB	0.81°	-0.70 dB	-24.6 dB
4 GHz	-14.2 dB	-2.22°	-0.60 dB	-13.2 dB
8 GHz	-19.4 dB	-1.73°	-0.64 dB	-17.0 dB
10 GHz	-30.6 dB	-4.28°	-0.61 dB	-25.1 dB
14 GHz	-21.8 dB	-5.55°	-0.61 dB	-24.0 dB
18 GHz	-19.0 dB	-13.96°	-0.75 dB	-16.8 dB

\*REFERENCE IS THE PHASE OF A UNIT WITH A MICROSTRIP LINE ONLY AND WITHOUT ANY COMPONENTS.  
RF IN: INPUT ARM

April 15, 2000

SUMMARY TEST DATA



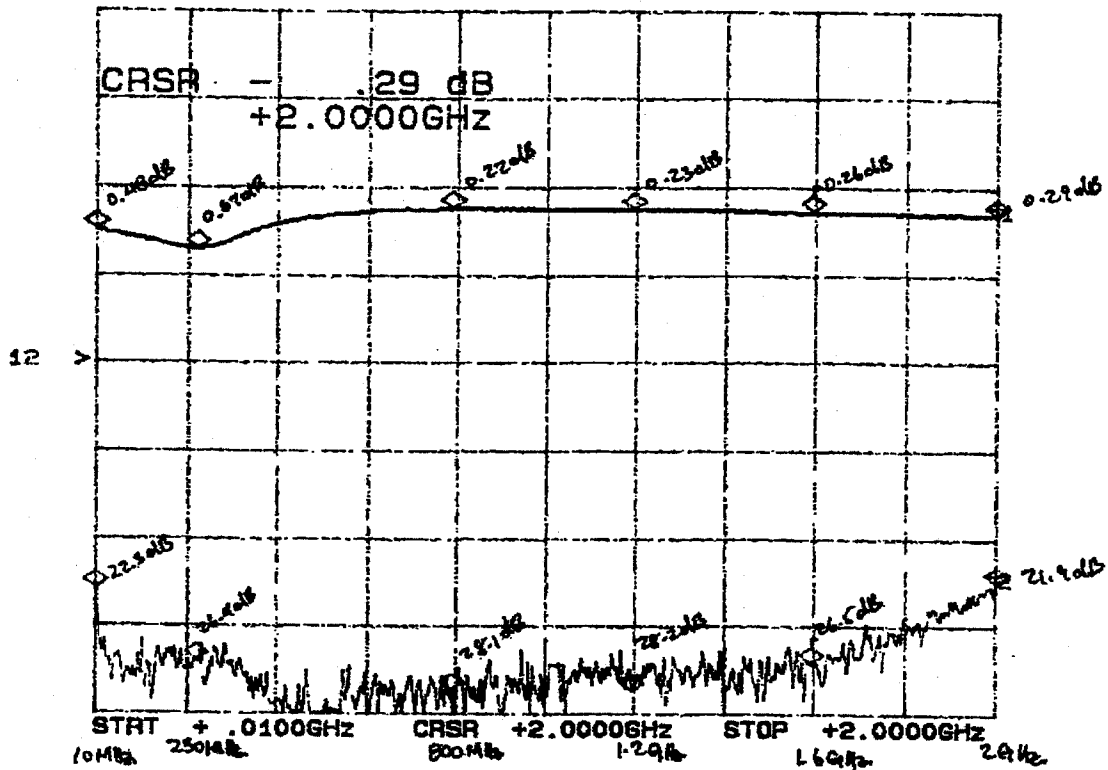
MODEL NUMBER  
SERIAL NUMBER  
ENGINEER

: BT-50K18 OPT. PS  
: MC906013  
: Frank Rethmeier

INSERTION LOSS & RETURN LOSS\*

RF IN - RF + DC OUT

CH1: A -M - .29 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 21.99 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.48 dB	22.3 dB
0.23 GHz	0.67 dB	26.4 dB
0.8 GHz	0.22 dB	28.1 dB
1.2 GHz	0.23 dB	28.2 dB
1.6 GHz	0.26 dB	26.5 dB
2.0 GHz	0.29 dB	21.9 dB

F IN: INPUT ARM

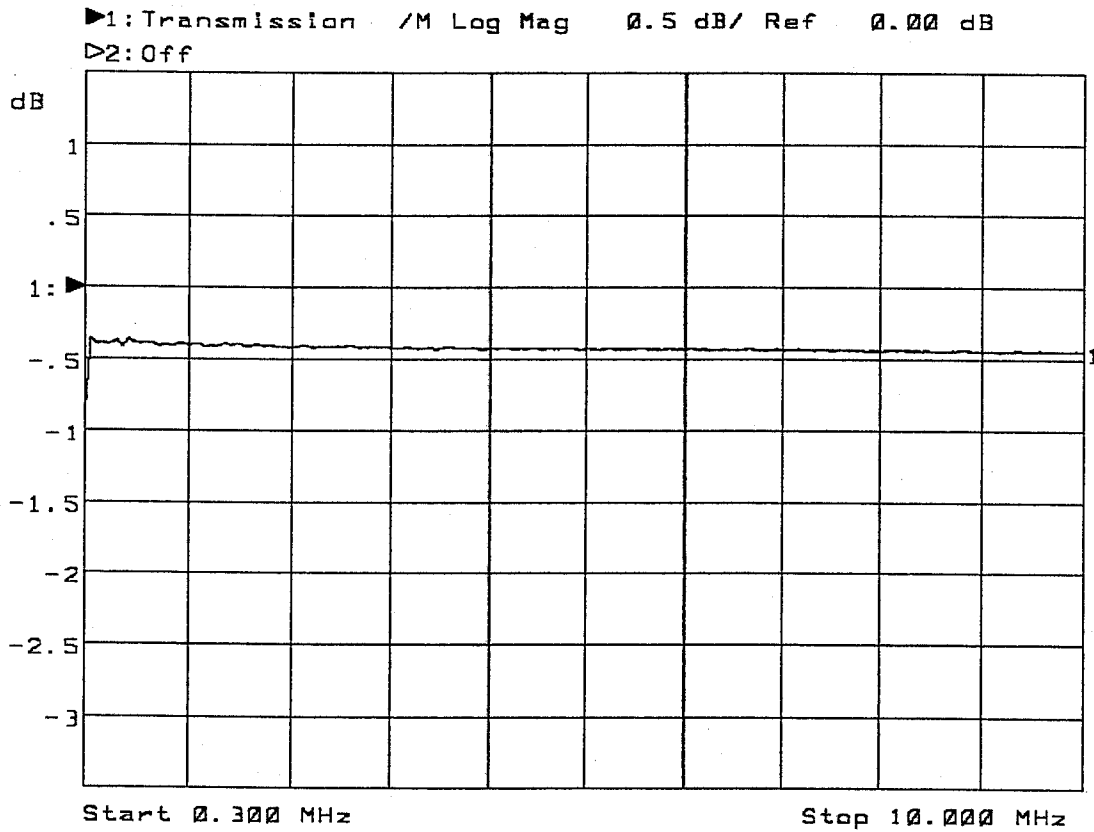
April 15, 2000

### SUMMARY TEST DATA



MODEL NUMBER : BT-50K18 OPT. PS  
SERIAL NUMBER : MC906013  
ENGINEER : Frank Rethmeier

### INSERTION LOSS\* RF IN - RF + DC OUT



\*RF IN: INPUT ARM

April 15, 2000





**SUMMARY TEST DATA**

**MODEL NUMBER**  
**SERIAL NUMBER**  
**ENGINEER**

: BT-50K18 OPT. PS  
 : MC906013  
 : Frank Rethmeier

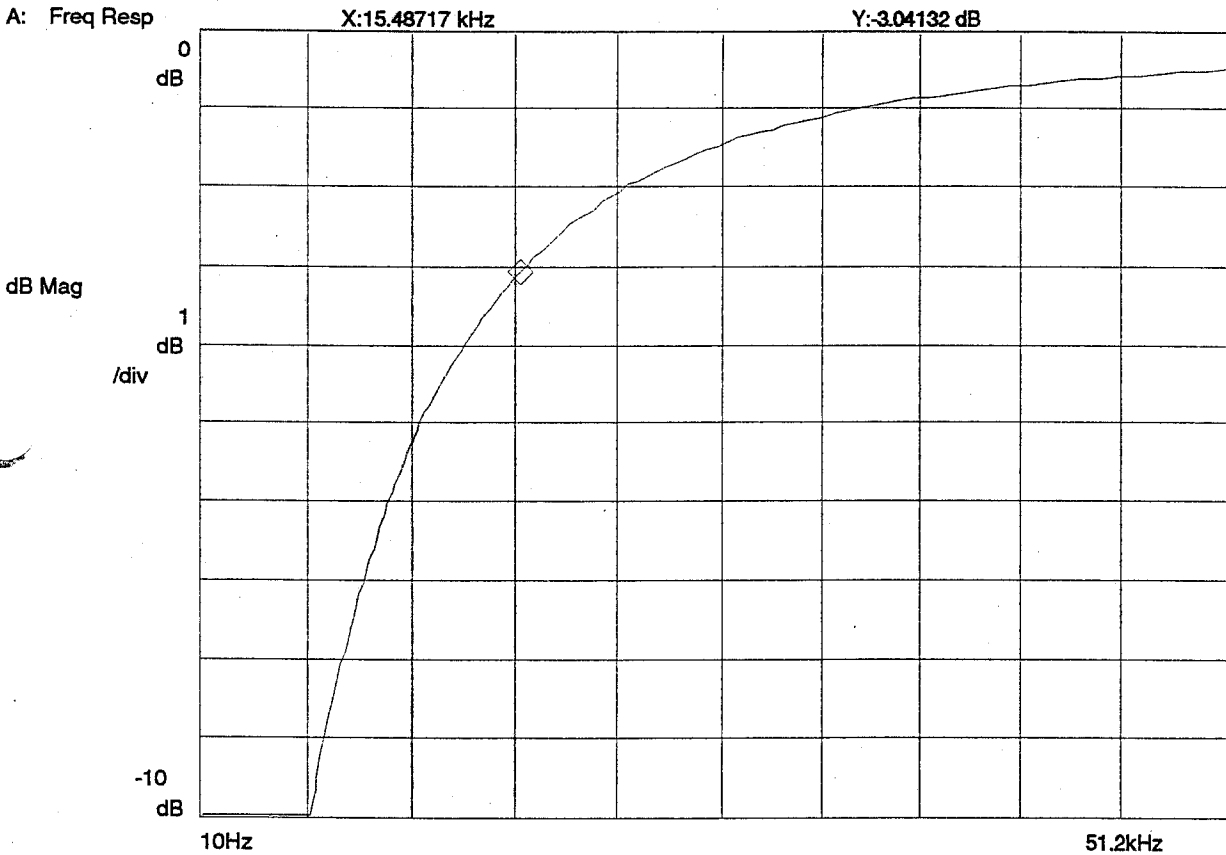
**INSERTION LOSS\***  
**RF IN - RF + DC OUT**

Trac Coord  
 [SINE]

Data A: Freq Response  
 Coord A: dB Mag

Data B: CH2 Lin Spec  
 Coord B: dB Mag

Date: 07-27-98 Time: 06:40:00 PM



FREQUENCY	INSERTION LOSS
15.49 kHz	3.04 dB

\*RF IN: INPUT ARM

April 15, 2000

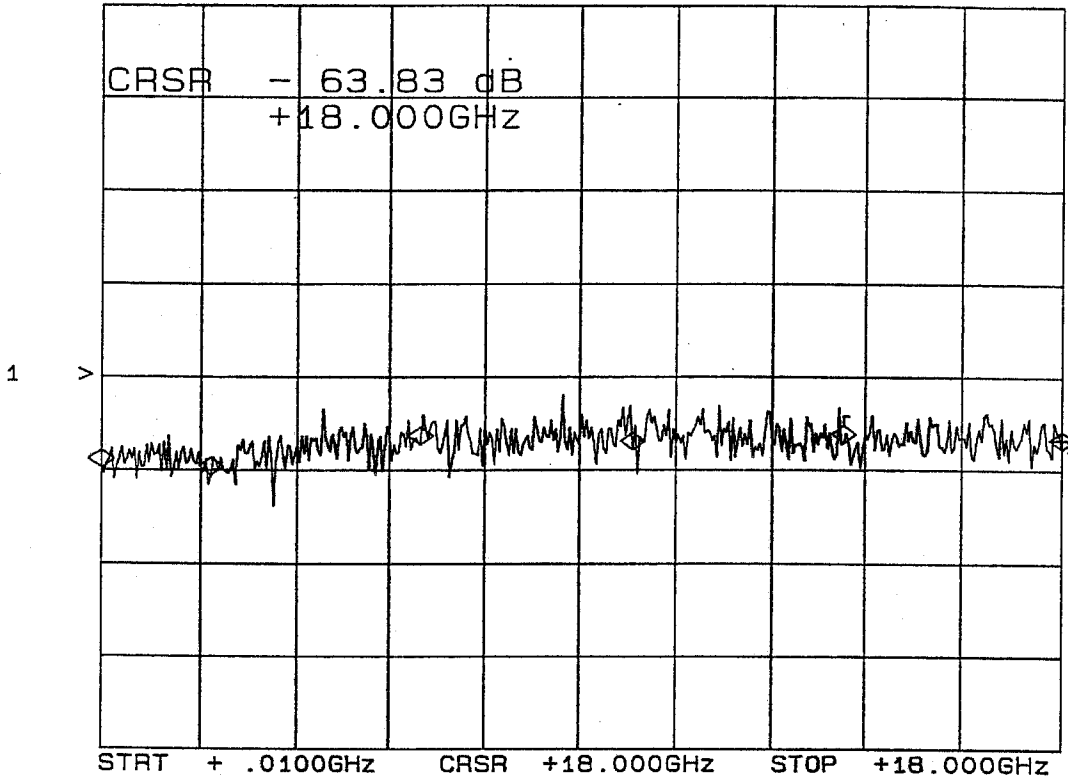


**SUMMARY TEST DATA**

MODEL NUMBER : BT-50K18 OPT. PS  
 SERIAL NUMBER : MC906013  
 ENGINEER : Frank Rethmeier

**ISOLATION\***  
 RF IN - DC IN

CH1: C -M A - 63.83 dB  
 5.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
0.01 GHz	64.9 dB
2.0 GHz	65.2 dB
6.0 GHz	63.6 dB
10.0 GHz	63.9 dB
14.0 GHz	63.5 dB
18.0 GHz	63.8 dB

RF IN: INPUT ARM

April 15, 2000

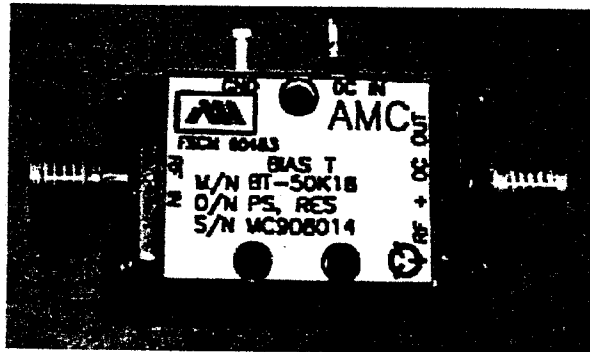


50 kHz TO 18 GHz

RESISTIVE

**BIAS T**

USABLE TO 15 kHz



BT-50K18 OPT. PS, OPT. RES

April 15, 2000

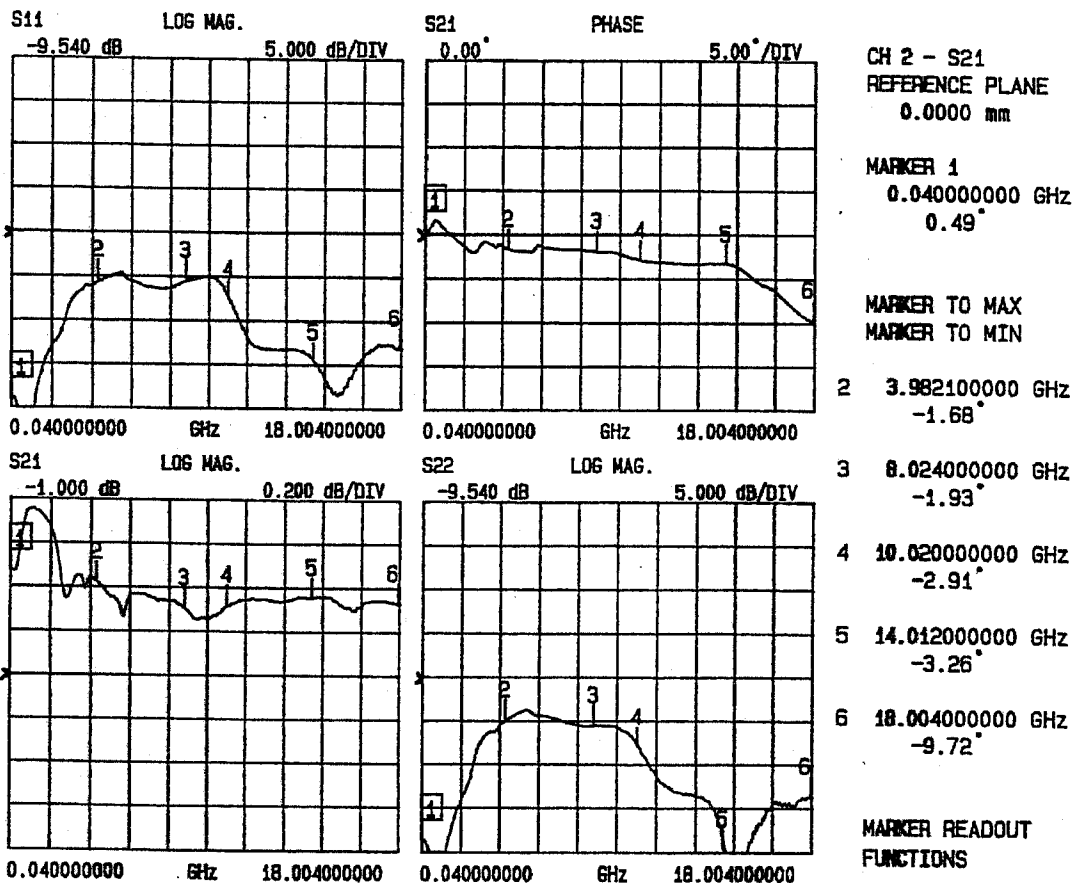
SUMMARY TEST DATA



MODEL NUMBER  
SERIAL NUMBER  
ENGINEER

: BT-50K18 OPT. PS, RES  
: MC906014  
: Frank Rethmeier

**RETURN LOSS, PHASE SHIFT\*, INSERTION LOSS**  
RF IN - RF + DC OUT\*\*



FREQUENCY	S11	S21, PHASE	S21, MAGNITUDE	S22
40 MHz	-28.3 dB	0.49°	-0.52 dB	-28.2 dB
4 GHz	-15.0 dB	-1.68°	-0.57 dB	-14.4 dB
8 GHz	-14.9 dB	-1.93°	-0.68 dB	-15.0 dB
10 GHz	-17.2 dB	-2.91°	-0.67 dB	-17.5 dB
14 GHz	-24.3 dB	-3.26°	-0.63 dB	-29.3 dB
18 GHz	-22.5 dB	-9.72°	-0.66 dB	-23.2 dB

\*REFERENCE IS THE PHASE OF A UNIT WITH A MICROSTRIP LINE ONLY AND WITHOUT ANY COMPONENTS.  
RF IN: INPUT ARM

April 15, 2000

SUMMARY TEST DATA

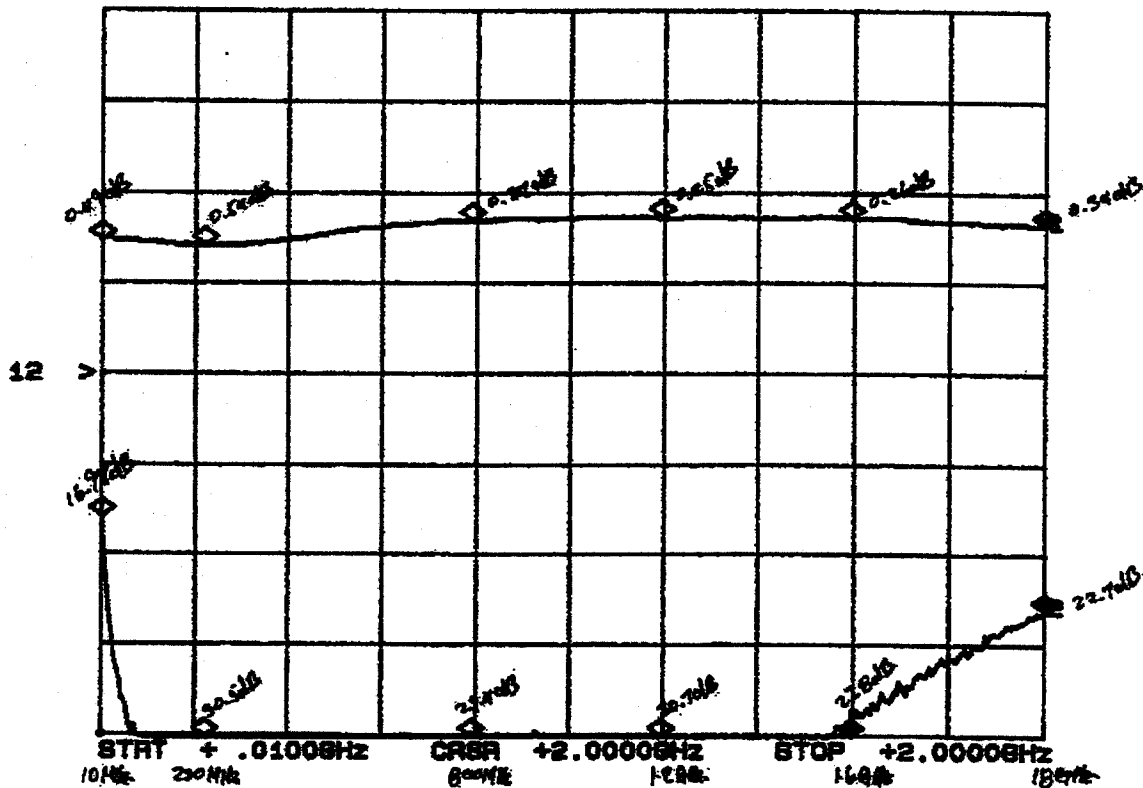


MODEL NUMBER : BT-50K18 OPT. PS, RES  
 SERIAL NUMBER : MC906014  
 ENGINEER : Frank Rethmeier

INSERTION LOSS & RETURN LOSS\*

RF IN - RF + DC OUT

CH1: A -M = 2.34 dB      CH2: B -M = 22.72 dB  
 1.0 dB/ REF = 2.00 dB      5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.49 dB	17.0 dB
0.23 GHz	0.54 dB	30.5 dB
0.8 GHz	0.27 dB	29.4 dB
1.2 GHz	0.25 dB	30.7 dB
1.6 GHz	0.25 dB	27.8 dB
2.0 GHz	0.34 dB	22.7 dB

F IN: INPUT ARM

April 15, 2000



SUMMARY TEST DATA



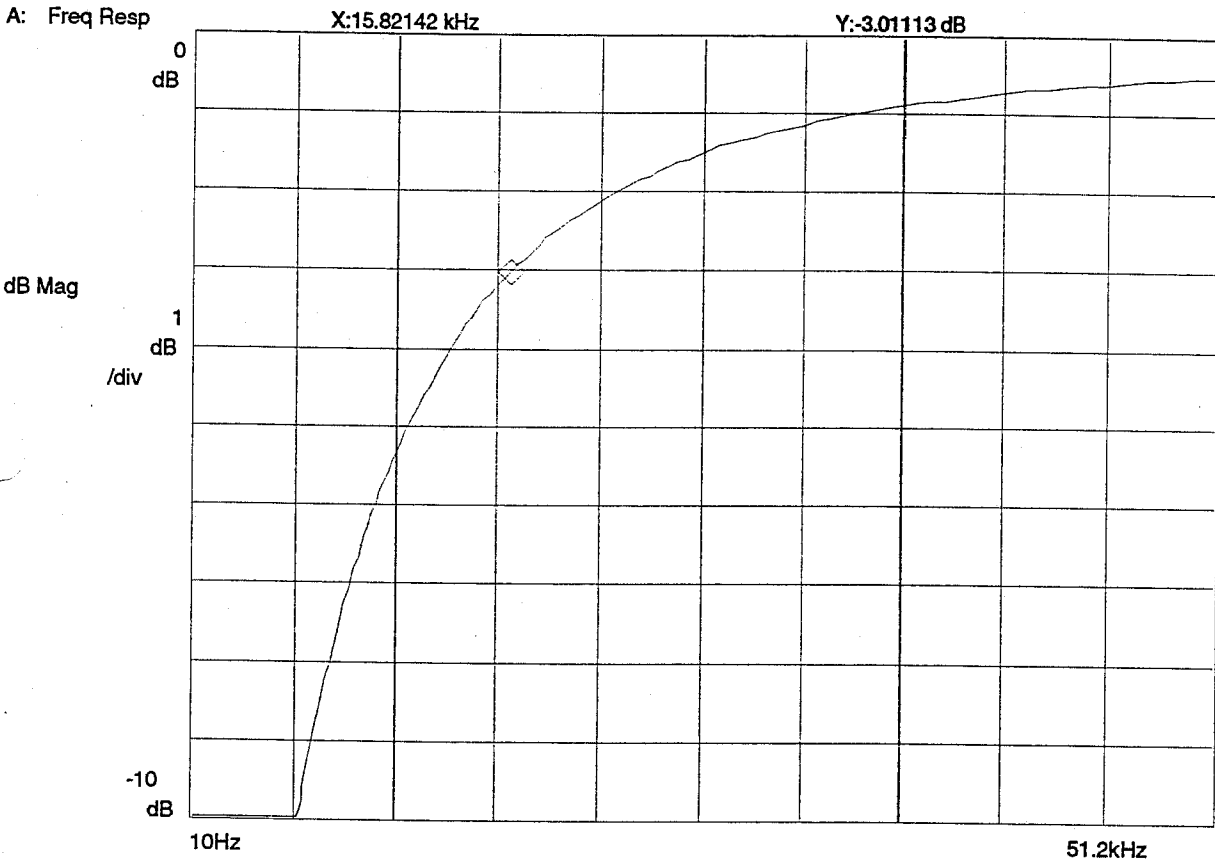
MODEL NUMBER  
SERIAL NUMBER  
ENGINEER

: BT-50K18 OPT. PS, RES  
: MC906014  
: Frank Rethmeier

**INSERTION LOSS\***  
RF IN - RF + DC OUT

Scale Ref Lvl A: 0 Ref Pos A: Top  
Date: 07-27-98 Time: 05:23:00 PM

Ref Lvl B: -25 Ref Pos B: Top



FREQUENCY	INSERTION LOSS
15.82 kHz	3.01 dB

\*RF IN: INPUT ARM

April 15, 2000

SUMMARY TEST DATA

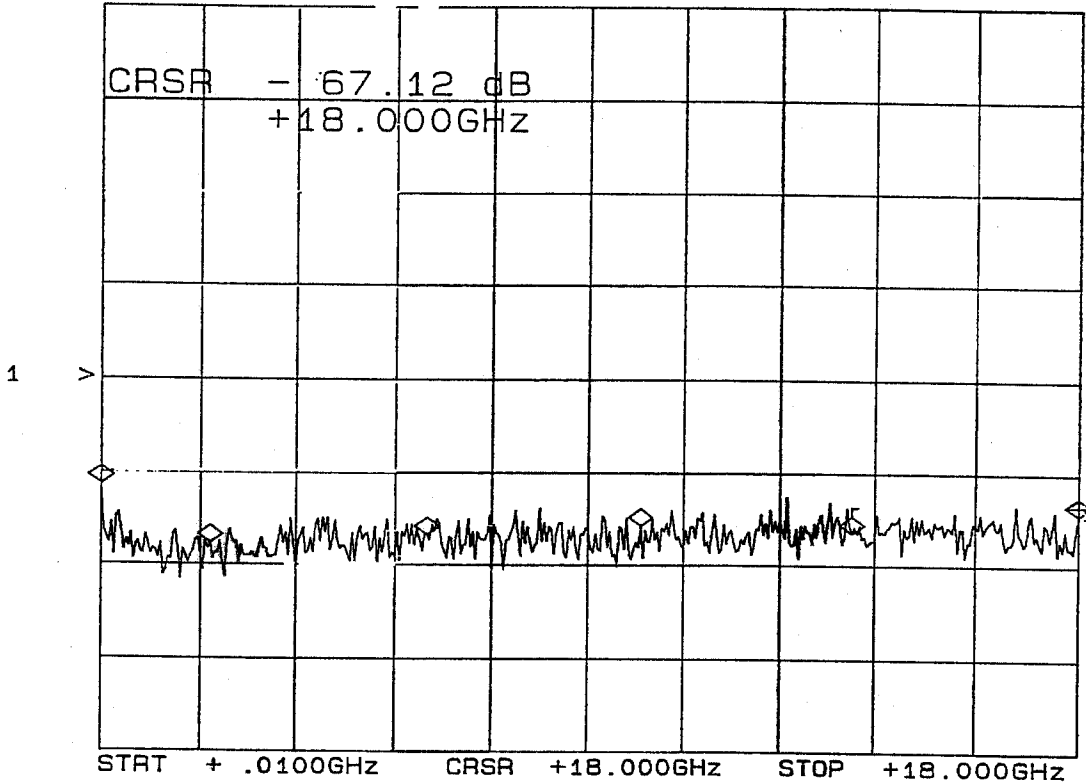


MODEL NUMBER  
SERIAL NUMBER  
ENGINEER

: BT-50K18 OPT. PS, RES  
: MC906014  
: Frank Rethmeier

**ISOLATION\***  
RF IN - DC IN

CH1: C -M A - 67.12 dB  
5.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
0.01 GHz	65.6 dB
2.0 GHz	68.3 dB
6.0 GHz	68.3 dB
10.0 GHz	67.9 dB
14.0 GHz	68.2 dB
18.0 GHz	67.1 dB

\*RF IN: INPUT ARM

April 15, 2000



PRIVATE & CONFIDENTIAL

  
AMERICAN MICROWAVE  
CORPORATION

**STEP BY STEP**  
**DEVELOPMENT OF**  
**50 kHz TO 18 GHz**  
**INDUCTIVE**  
**AND**  
**10 MHz TO 18 GHz**  
**RESISTIVE**  
**BIAS T's**  
**IN SWN-2184-1A HOUSING**

- INDUCTIVE BIAS T (BT-50K18) PAGE 2 - 31
- RESISTIVE BIAS T (BT-50K18 OPT. RES) PAGE 32 - 34

TESTED, REPORTED & PREPARED  
BY  
FRANK RETHMEIER  
RENE AFABLE

**July 27, 1999**

WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)

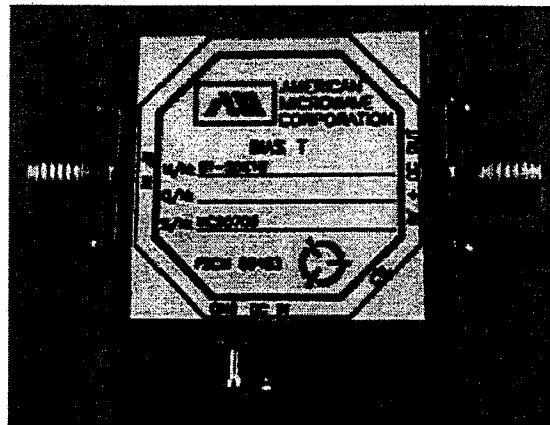
E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)

7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938

**AMERICAN MICROWAVE  
CORPORATION**

**DEVELOPMENT OF  
50 kHz TO 18 GHz  
INDUCTIVE  
BIAS T**

**USABLE TO 15 kHz**



**BT-50K18**

**July 27, 1999**

**WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)**

**E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)**

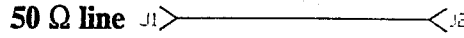
**7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938**

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



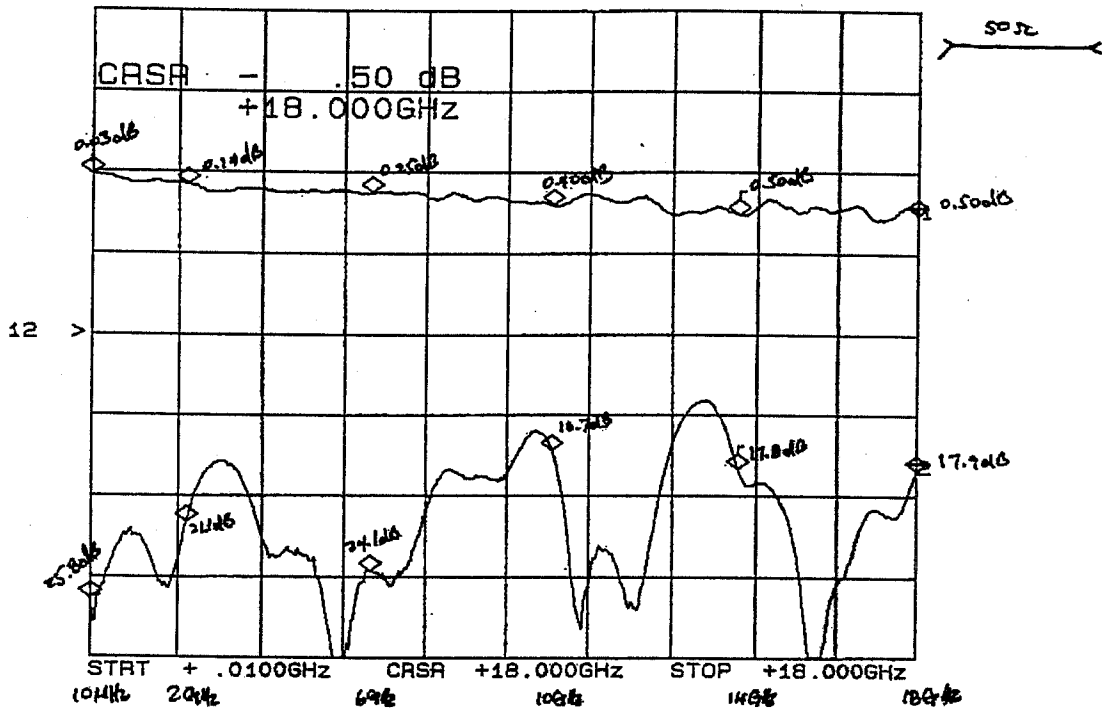
STEP 1

INSERTION LOSS & RETURN LOSS\*  
J1-J2



(A)

CH1: A -M = .50 dB  
1.0 dB/ REF = 2.00 dB  
CH2: R -M = 17.93 dB  
5.0 dB/ REF = 9.54 dB



1 of 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.03 dB	25.8 dB
2.0 GHz	0.14 dB	21.1 dB
6.0 GHz	0.25 dB	24.1 dB
10.0 GHz	0.40 dB	16.7 dB
14.0 GHz	0.50 dB	17.9 dB
18.0 GHz	0.50 dB	17.9 dB

\*J1: INPUT ARM

July 27, 1999

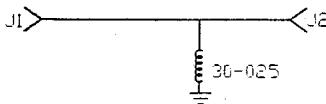
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



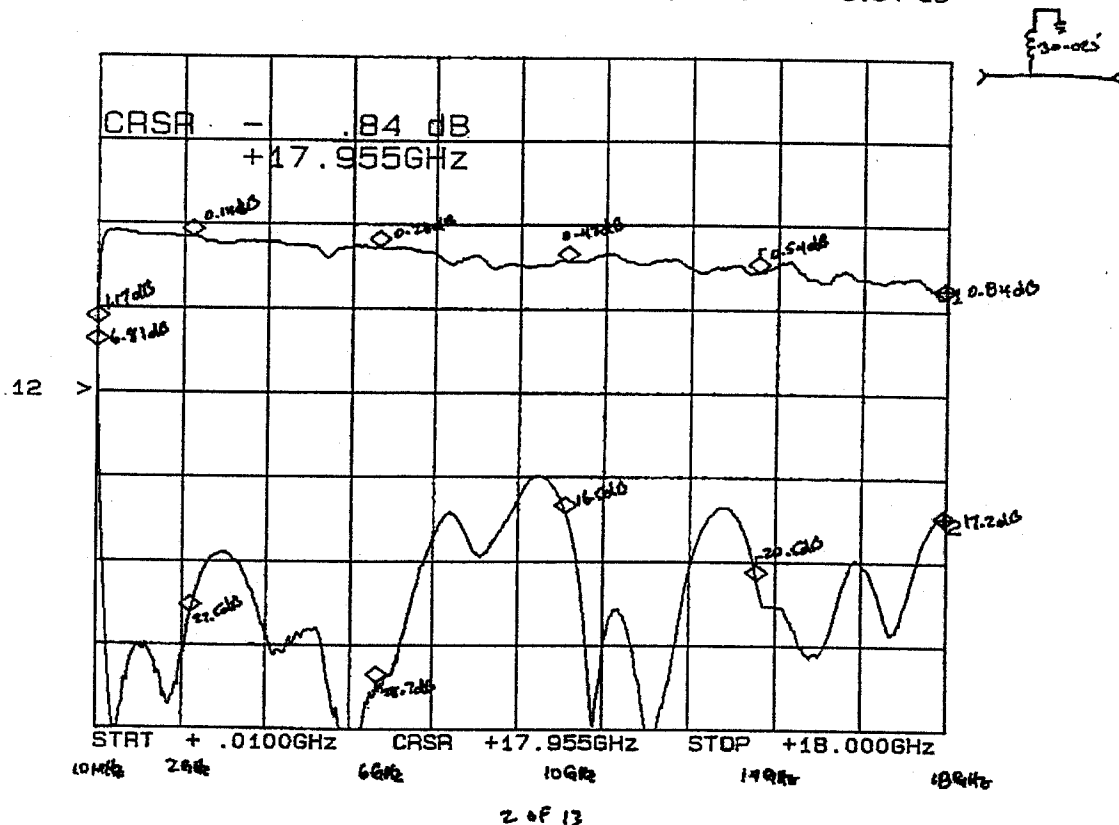
STEP 2 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .84 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 17.26 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	1.17 dB	6.81 dB
2.0 GHz	0.14 dB	22.5 dB
6.0 GHz	0.26 dB	28.7 dB
10.0 GHz	0.42 dB	16.5 dB
14.0 GHz	0.54 dB	20.5 dB
18.0 GHz	0.84 dB	17.2 dB

\*J1: INPUT ARM

July 27, 1999

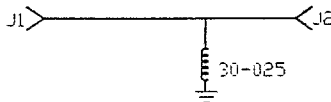
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



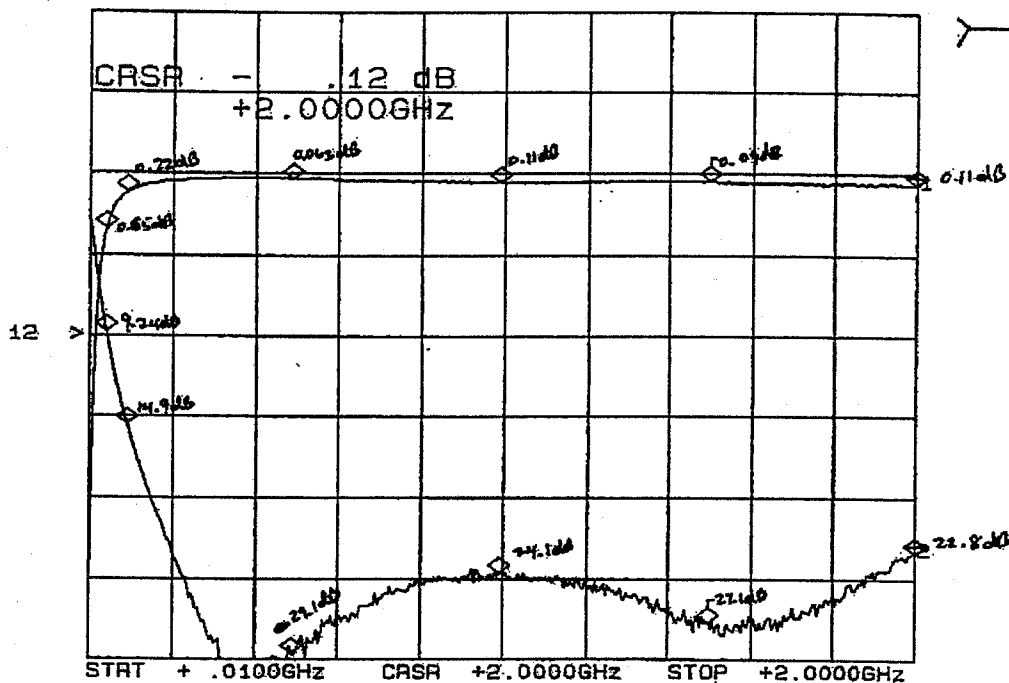
STEP 2 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .12 dB      CH2: B -M - 22.89 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



3 of 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.05 GHz	0.65 dB	9.24 dB
0.1 GHz	0.22 dB	14.9 dB
0.5 GHz	0.06 dB	29.1 dB
1.0 GHz	0.11 dB	24.1 dB
1.5 GHz	0.09 dB	27.1 dB
2.0 GHz	0.11 dB	22.8 dB

\*J1: INPUT ARM

July 27, 1999

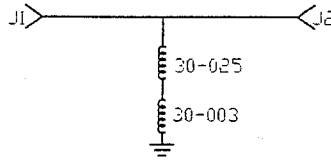
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



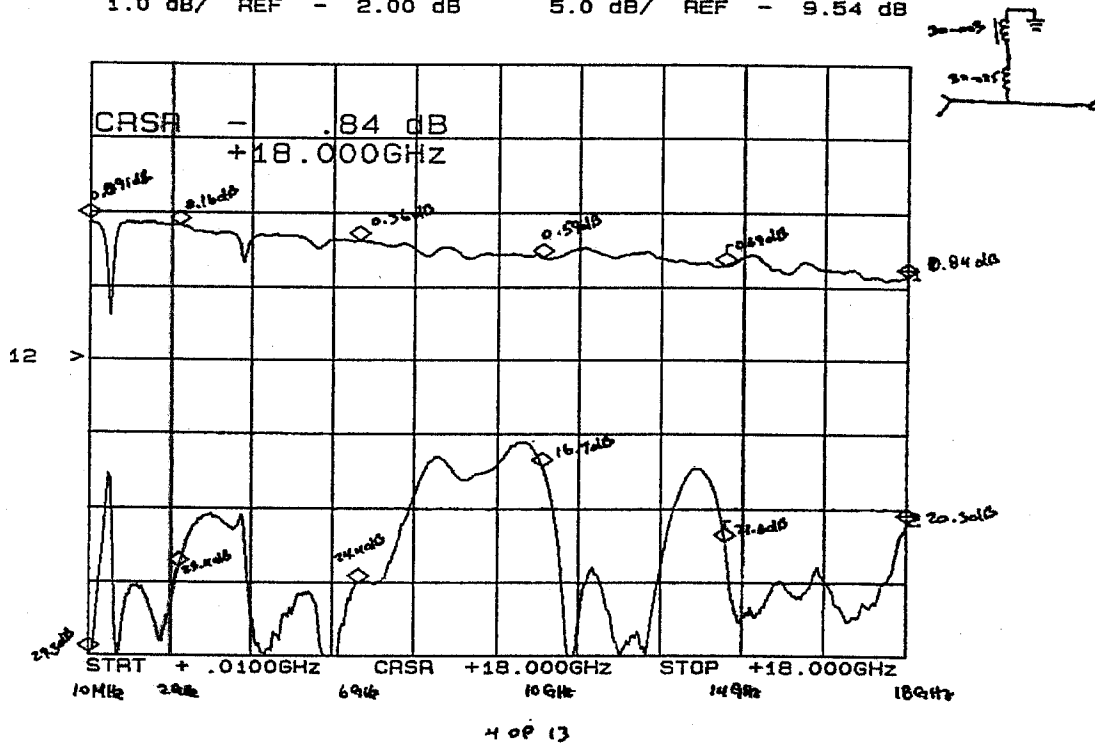
STEP 3 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .84 dB      CH2: B -M - 20.37 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.09 dB	29.3 dB
2.0 GHz	0.16 dB	23.4 dB
6.0 GHz	0.36 dB	24.4 dB
10.0 GHz	0.59 dB	16.7 dB
14.0 GHz	0.69 dB	21.6 dB
18.0 GHz	0.84 dB	20.3 dB

\*J1: INPUT ARM

July 27, 1999

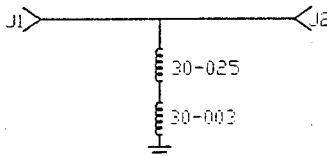
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



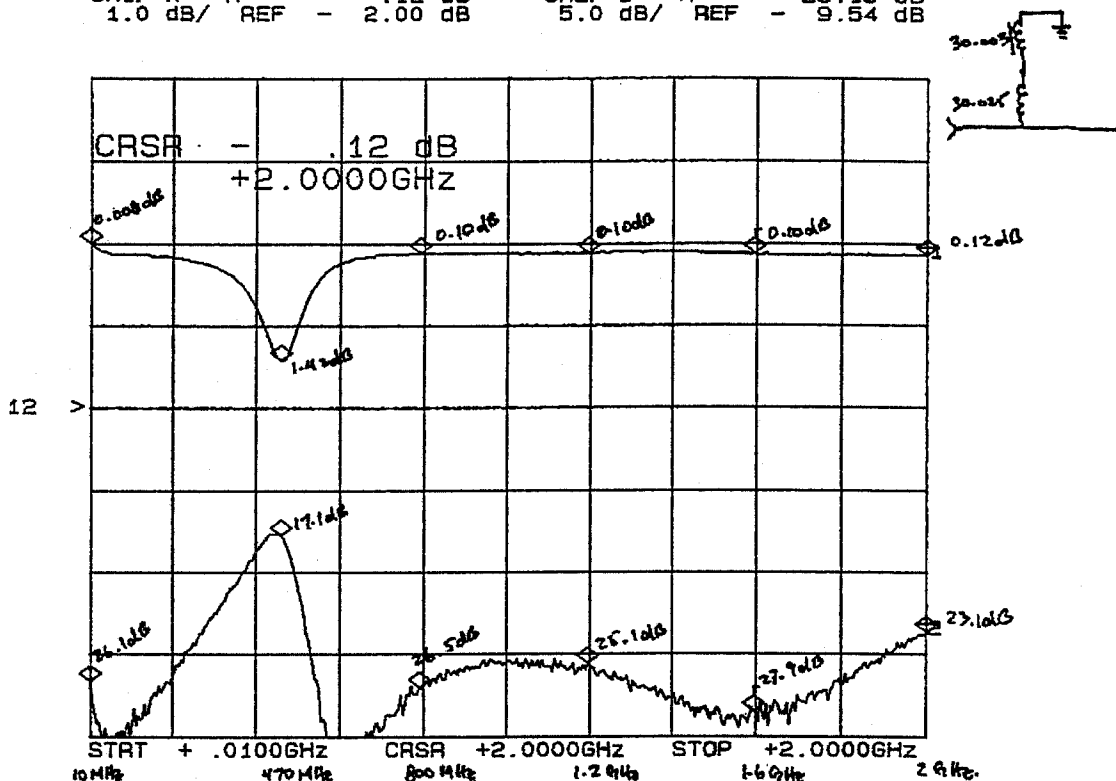
STEP 3 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .12 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 23.15 dB  
5.0 dB/ REF - 9.54 dB



5 of 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.008 dB	26.1 dB
0.47 GHz	1.42 dB	17.1 dB
0.8 GHz	0.10 dB	26.5 dB
1.2 GHz	0.10 dB	25.1 dB
1.6 GHz	0.10 dB	27.9 dB
2.0 GHz	0.12 dB	23.1 dB

\*J1: INPUT ARM

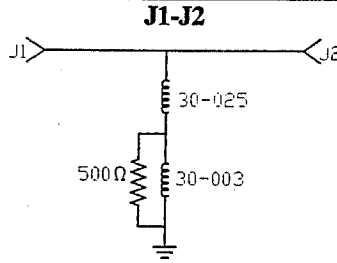
July 27, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

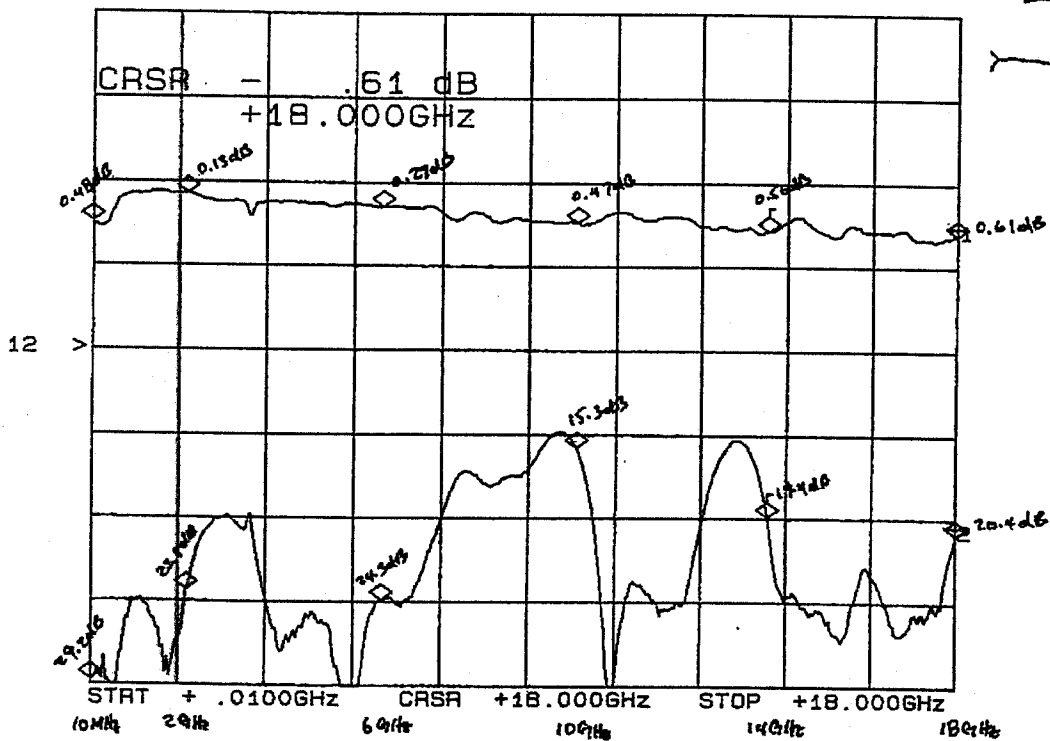


STEP 4 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*



CH1: A -M REF - .61 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M REF - 20.48 dB  
5.0 dB/ REF - 9.54 dB



6 of 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.48 dB	29.2 dB
2.0 GHz	0.13 dB	23.8 dB
6.0 GHz	0.27 dB	24.3 dB
10.0 GHz	0.47 dB	15.3 dB
14.0 GHz	0.56 dB	19.4 dB
18.0 GHz	0.61 dB	20.4 dB

\*J1: INPUT ARM

July 27, 1999



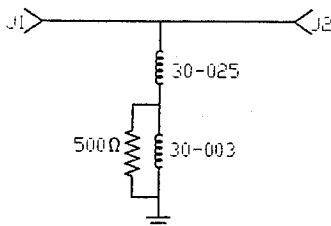
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 4 (10 MHz TO 2 GHz)

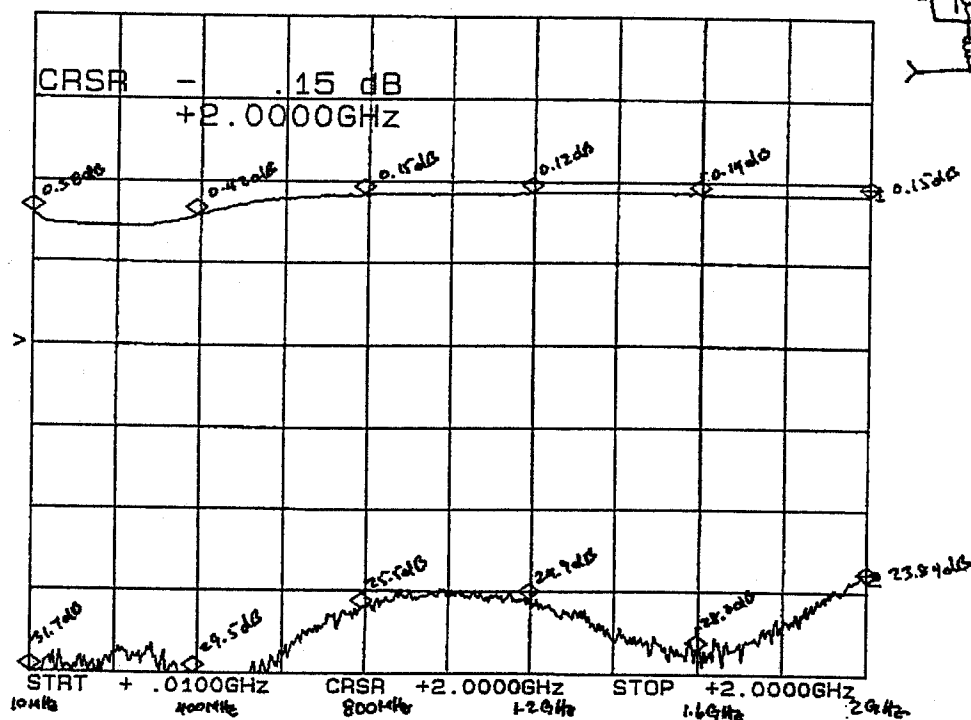
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .15 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M - 23.84 dB  
5.0 dB/ REF - 9.54 dB



7 of 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.38 dB	31.7 dB
0.4 GHz	0.42 dB	29.5 dB
0.8 GHz	0.15 dB	25.5 dB
1.2 GHz	0.12 dB	24.9 dB
1.6 GHz	0.14 dB	28.0 dB
2.0 GHz	0.15 dB	23.8 dB

\*J1: INPUT ARM

July 27, 1999

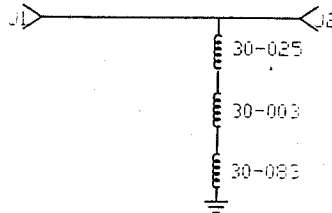
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 5 (10 MHz TO 18 GHz)

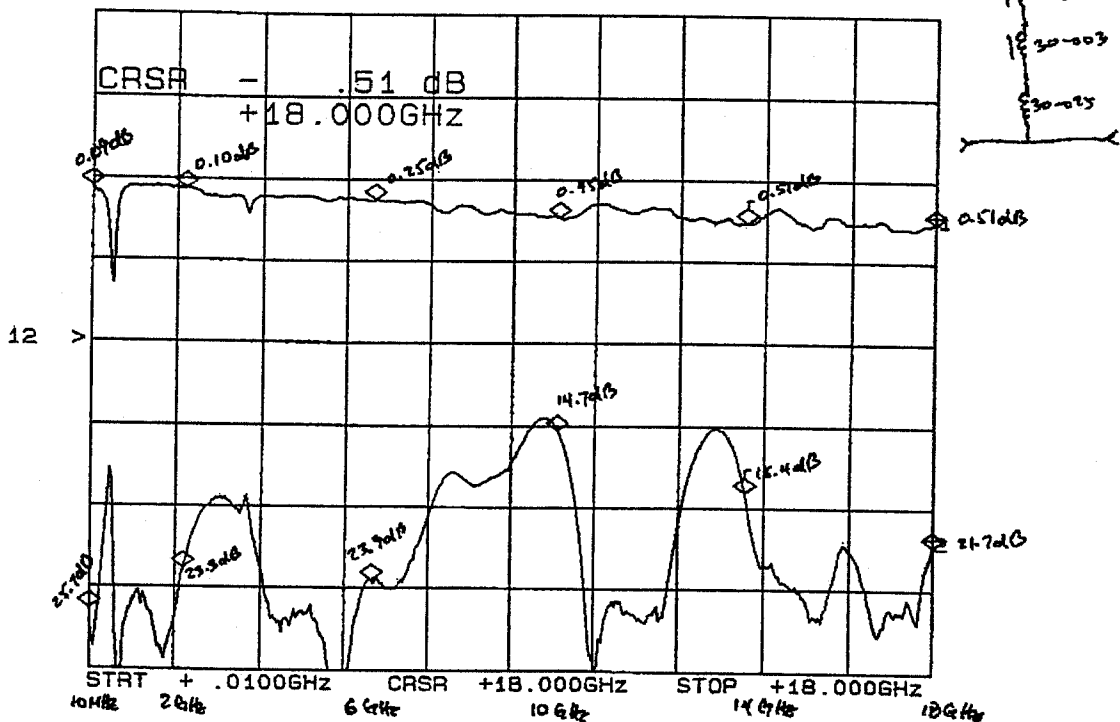
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .51 dB REF - 2.00 dB  
1.0 dB/

CH2: B -M - 21.77 dB REF - 9.54 dB  
5.0 dB/



8 of 12

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.09 dB	25.7 dB
2.0 GHz	0.10 dB	23.3 dB
6.0 GHz	0.25 dB	23.9 dB
10.0 GHz	0.45 dB	14.7 dB
14.0 GHz	0.51 dB	18.4 dB
18.0 GHz	0.51 dB	21.7 dB

\*J1: INPUT ARM

July 27, 1999

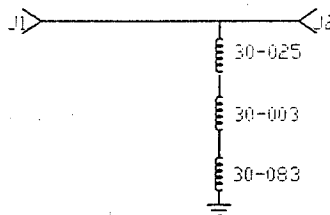
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



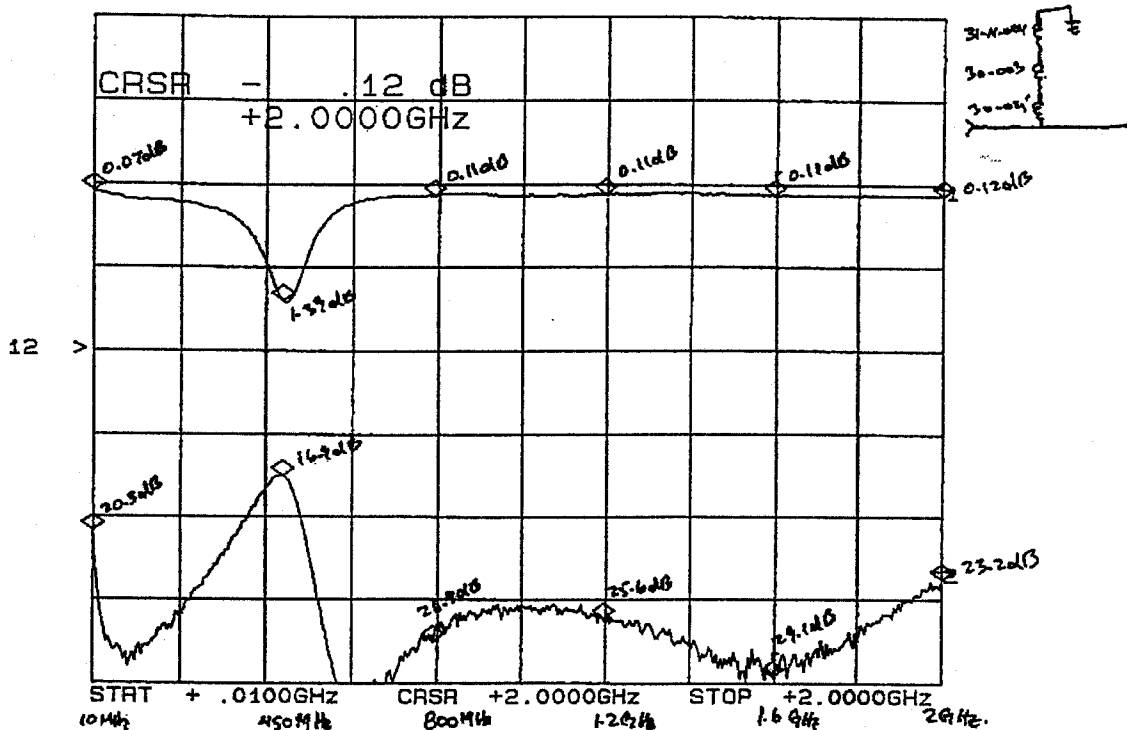
STEP 5 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .12 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 23.24 dB  
5.0 dB/ REF - 9.54 dB



9 of 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.07 dB	20.3 dB
0.45 GHz	1.39 dB	16.9 dB
0.8 GHz	0.11 dB	26.9 dB
1.2 GHz	0.11 dB	25.6 dB
1.6 GHz	0.11 dB	29.1 dB
2.0 GHz	0.12 dB	23.2 dB

\*J1: INPUT ARM

July 27, 1999

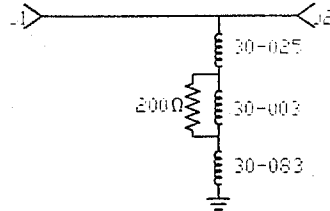
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 6 (10 MHz TO 18 GHz)

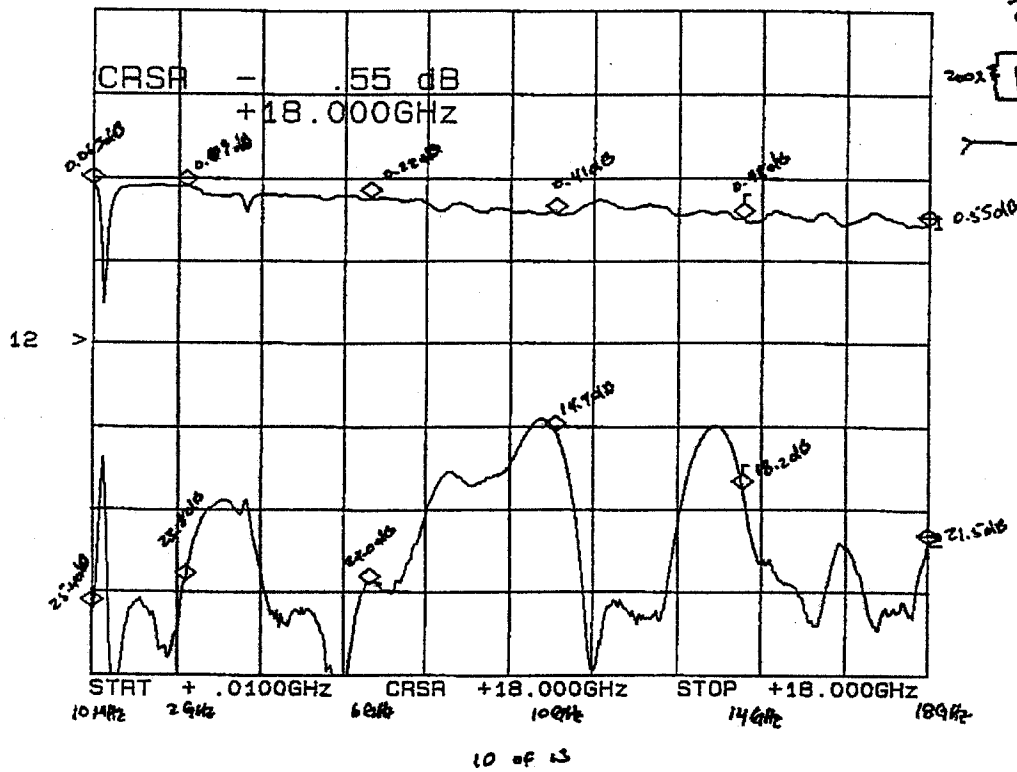
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF - .55 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M REF - 21.56 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.06 dB	25.4 dB
2.0 GHz	0.09 dB	23.8 dB
6.0 GHz	0.22 dB	24.0 dB
10.0 GHz	0.41 dB	14.7 dB
14.0 GHz	0.48 dB	18.2 dB
18.0 GHz	0.55 dB	21.5 dB

\*J1: INPUT ARM

July 27, 1999

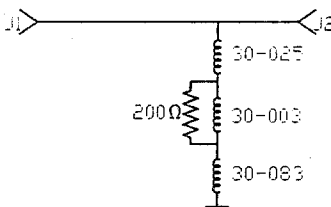
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 6 (10 MHz TO 2 GHz)

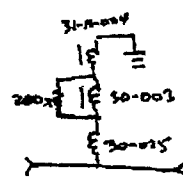
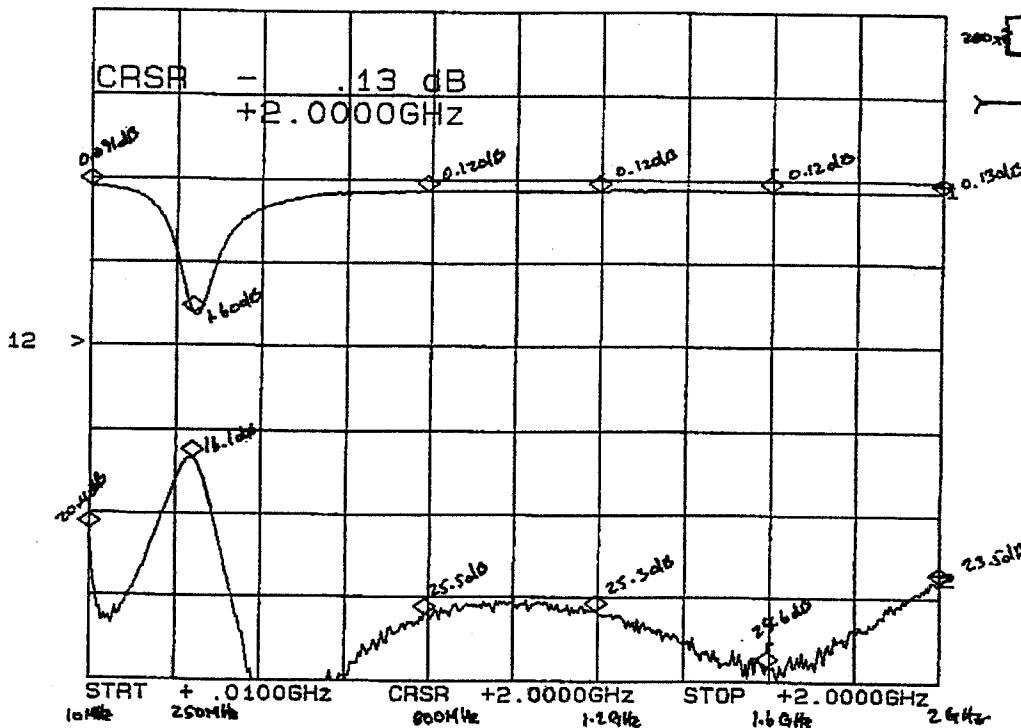
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF - .13 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M REF - 23.50 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.09 dB	20.4 dB
0.25 GHz	1.60 dB	16.1 dB
0.8 GHz	0.12 dB	25.5 dB
1.2 GHz	0.12 dB	25.3 dB
1.6 GHz	0.12 dB	28.6 dB
2.0 GHz	0.13 dB	23.5 dB

\*J1: INPUT ARM

July 27, 1999

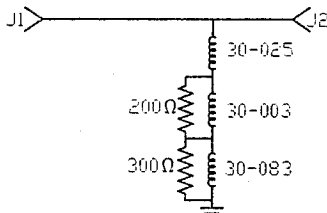
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



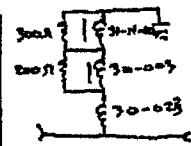
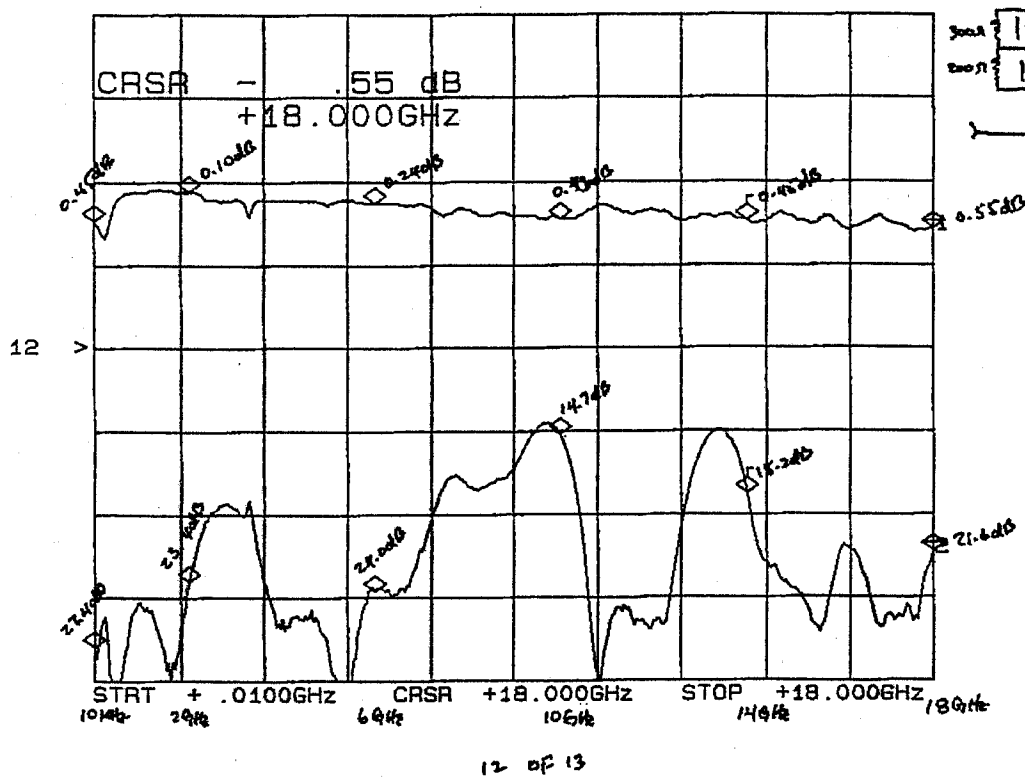
STEP 7 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .55 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 21.69 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.45 dB	27.4 dB
2.0 GHz	0.10 dB	23.4 dB
6.0 GHz	0.24 dB	24.0 dB
10.0 GHz	0.43 dB	14.7 dB
14.0 GHz	0.45 dB	18.2 dB
18.0 GHz	0.55 dB	21.6 dB

\*J1: INPUT ARM

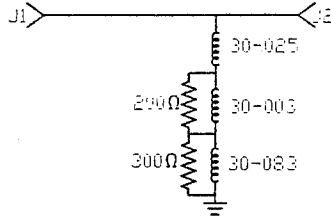
July 27, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

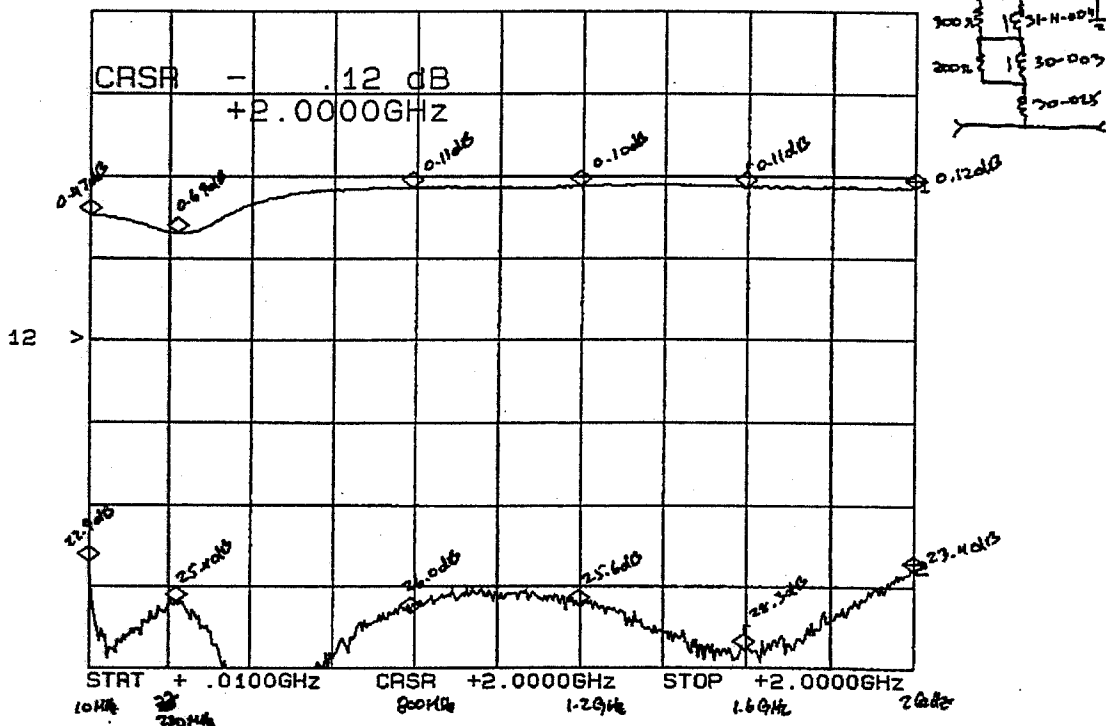


STEP 7 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .12 dB      CH2: B -M - 23.49 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



13 OF 13

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.47 dB	22.9 dB
0.23 GHz	0.69 dB	25.4 dB
0.8 GHz	0.11 dB	26.0 dB
1.2 GHz	0.10 dB	25.6 dB
1.6 GHz	0.11 dB	28.3 dB
2.0 GHz	0.12 dB	23.4 dB

\*J1: INPUT ARM

July 27, 1999

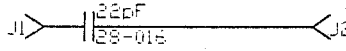
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 8 (10 MHz TO 18 GHz)

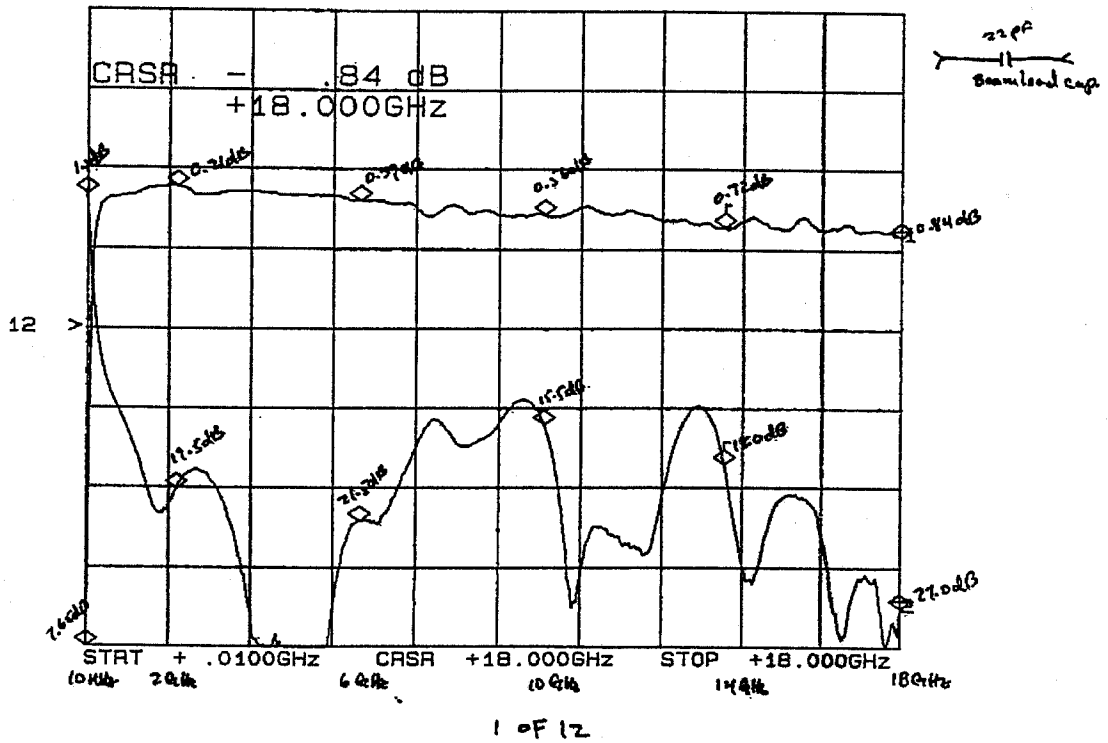
INSERTION LOSS & RETURN LOSS\*

J1-J2



ⓑ

CH1: A -M REF = .84 dB 1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 27.00 dB 5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	7.65 dB	1.1 dB
2.0 GHz	0.21 dB	19.5 dB
6.0 GHz	0.39 dB	21.5 dB
10.0 GHz	0.56 dB	15.5 dB
14.0 GHz	0.72 dB	18.0 dB
18.0 GHz	0.84 dB	27.0 dB

\*J1: INPUT ARM

July 27, 1999

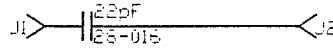


STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

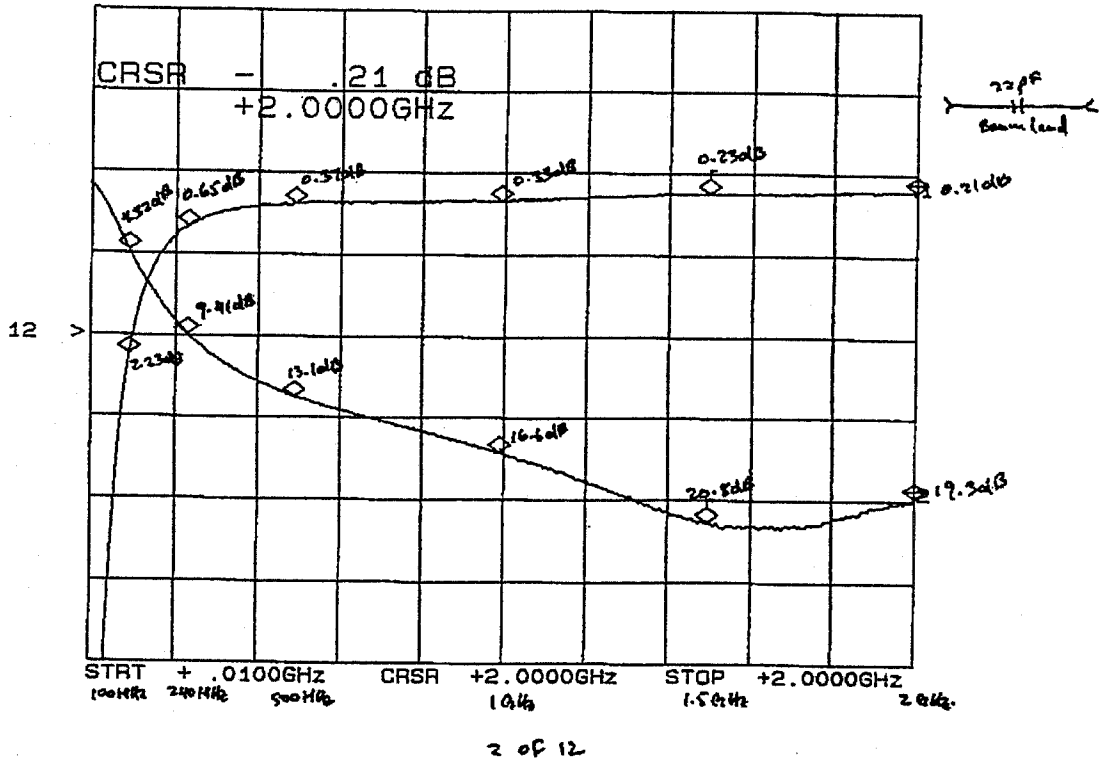


STEP 8 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .21 dB      CH2: B -M - 19.34 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.1 GHz	2.23 dB	4.3 dB
0.24 GHz	0.65 dB	9.4 dB
0.5 GHz	0.37 dB	13.1 dB
1.0 GHz	0.33 dB	16.6 dB
1.5 GHz	0.23 dB	29.8 dB
2.0 GHz	0.21 dB	19.3 dB

\*J1: INPUT ARM

July 27, 1999

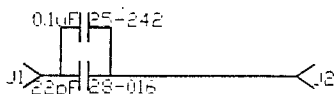
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



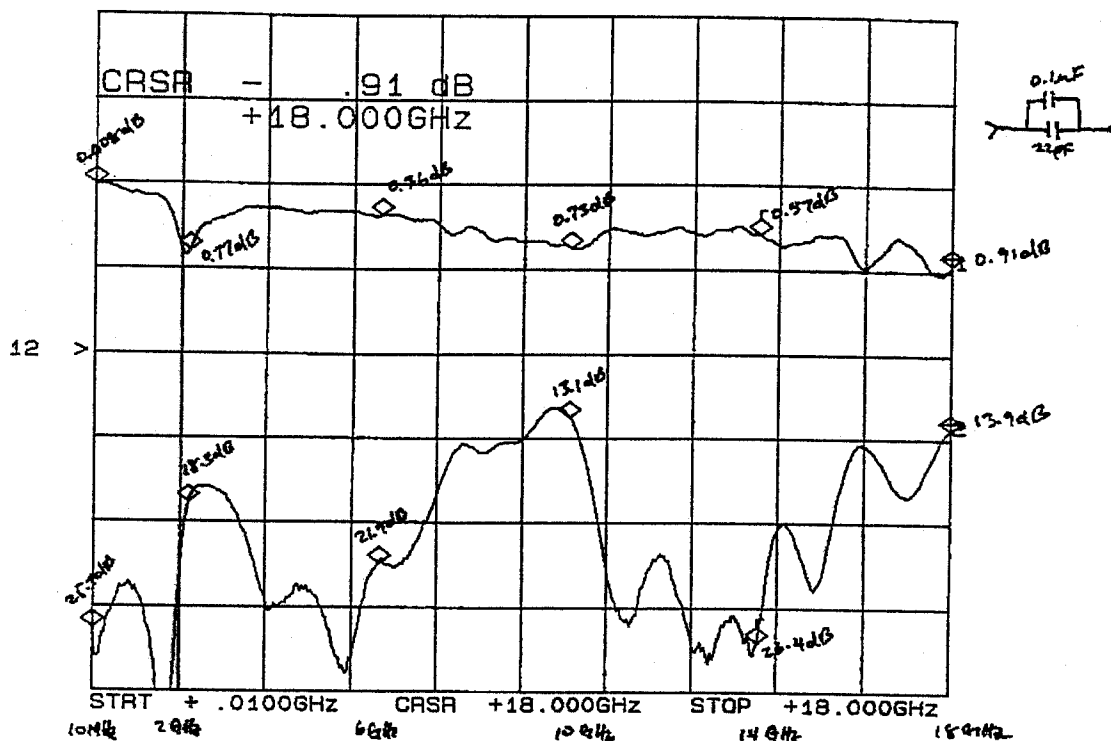
STEP 9 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .91 dB      CH2: B -M - 13.92 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



3 OF 12

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.008 dB	25.7 dB
2.0 GHz	0.77 dB	18.3 dB
6.0 GHz	0.36 dB	21.9 dB
10.0 GHz	0.73 dB	13.1 dB
14.0 GHz	0.57 dB	26.4 dB
18.0 GHz	0.91 dB	13.9 dB

\*J1: INPUT ARM

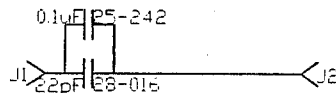
July 27, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

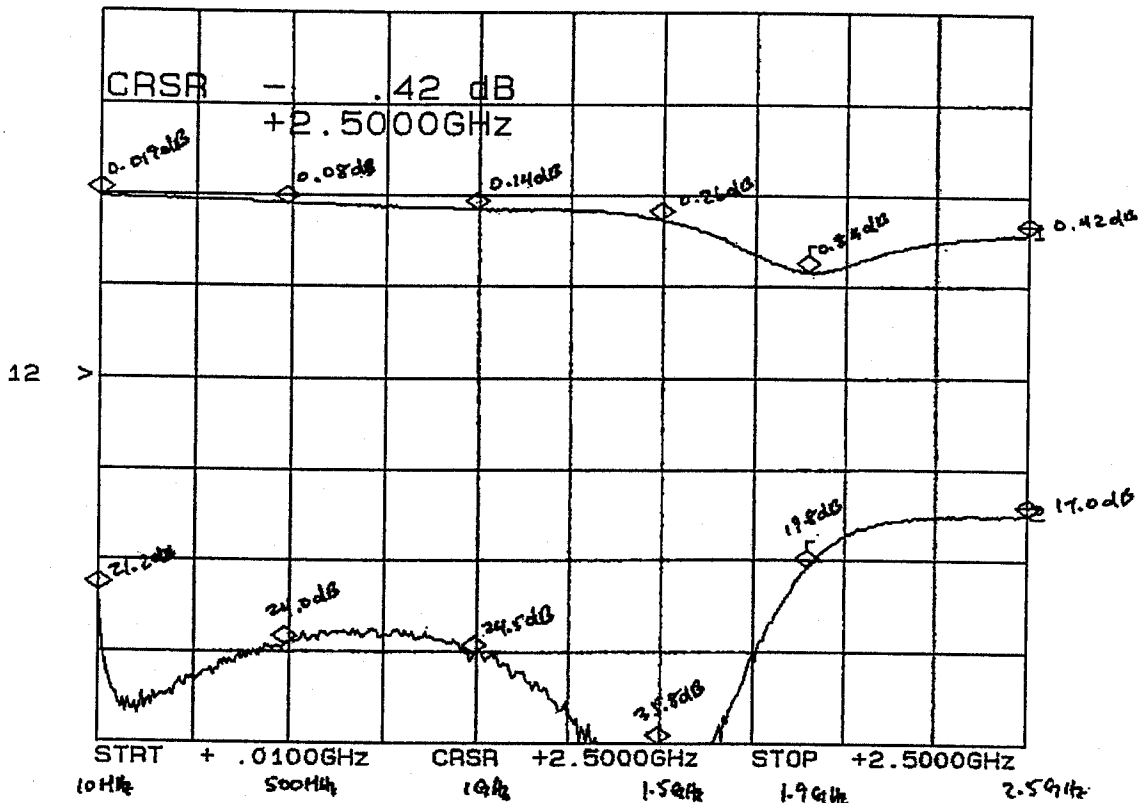


STEP 9 (10 MHz TO 2.5 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = .42 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 17.03 dB  
5.0 dB/ REF = 9.54 dB



4 of 12

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.02 dB	21.2 dB
0.5 GHz	0.08 dB	24.0 dB
1.0 GHz	0.14 dB	24.5 dB
1.5 GHz	0.26 dB	35.8 dB
1.9 GHz	0.84 dB	19.8 dB
2.5 GHz	0.42 dB	17.0 dB

\*J1: INPUT ARM

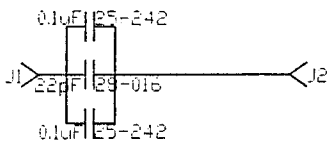
July 27, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



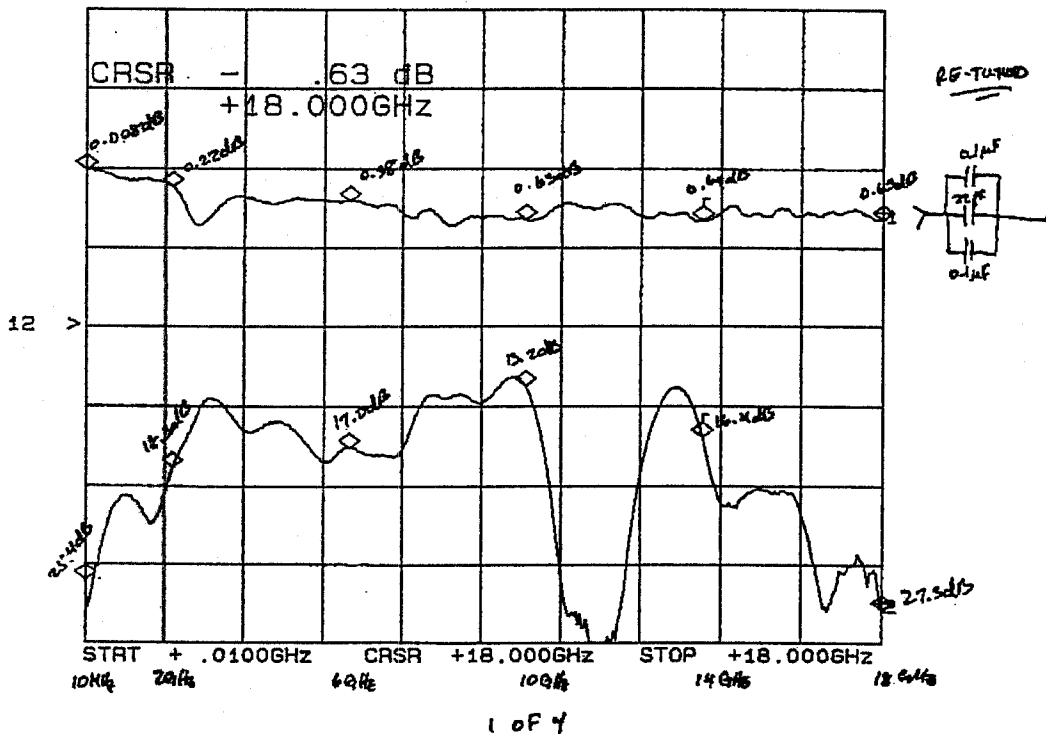
STEP 10 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .63 dB      CH2: B -M - 27.38 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB

(C)



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.008 dB	25.4 dB
2.0 GHz	0.22 dB	18.3 dB
6.0 GHz	0.38 dB	17.0 dB
10.0 GHz	0.63 dB	13.2 dB
14.0 GHz	0.64 dB	16.4 dB
18.0 GHz	0.63 dB	27.3 dB

\*J1: INPUT ARM

July 27, 1999

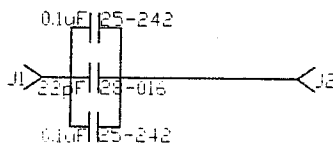
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



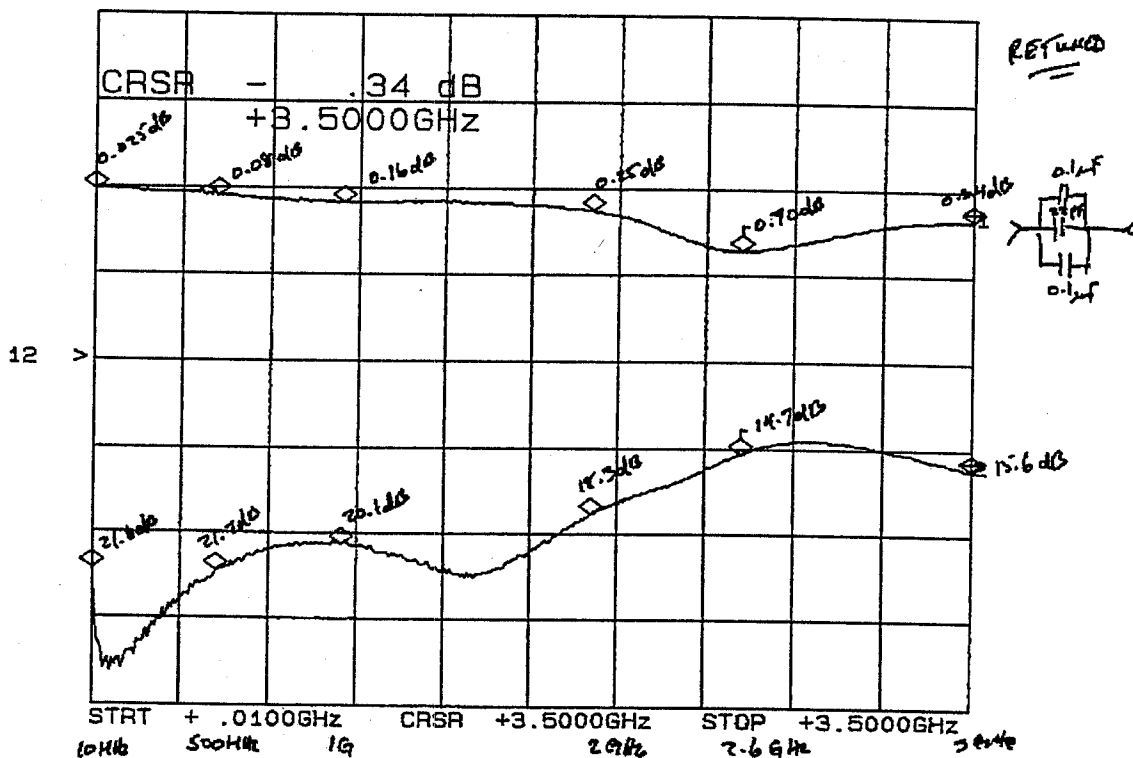
STEP 10 (10 MHz TO 3 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .34 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 15.69 dB  
5.0 dB/ REF - 9.54 dB



2 OF 4

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.03 dB	21.6 dB
0.5 GHz	0.08 dB	21.7 dB
1.0 GHz	0.16 dB	20.1 dB
2.0 GHz	0.25 dB	18.3 dB
2.6 GHz	0.70 dB	14.7 dB
3.0 GHz	0.34 dB	15.6 dB

\*J1: INPUT ARM

July 27, 1999

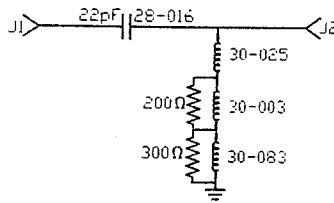
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



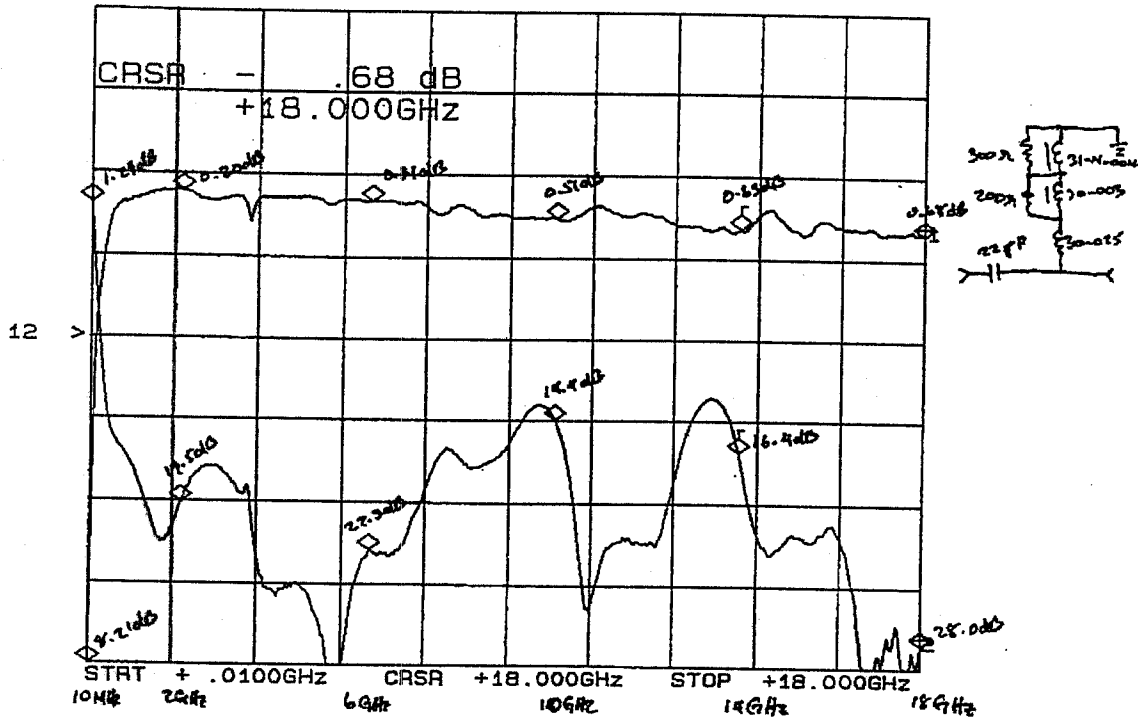
STEP 11 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF - .68 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M REF - 28.09 dB  
5.0 dB/ REF - 9.54 dB



7 of 12

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	8.21 dB	1.3 dB
2.0 GHz	0.20 dB	19.5 dB
6.0 GHz	0.31 dB	22.3 dB
10.0 GHz	0.51 dB	14.4 dB
14.0 GHz	0.63 dB	16.4 dB
18.0 GHz	0.68 dB	28.0 dB

\*J1: INPUT ARM

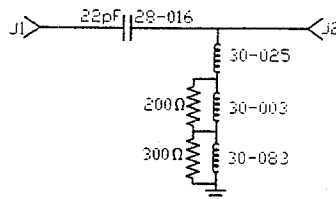
July 27, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

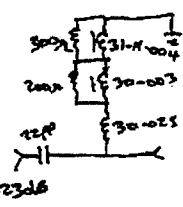
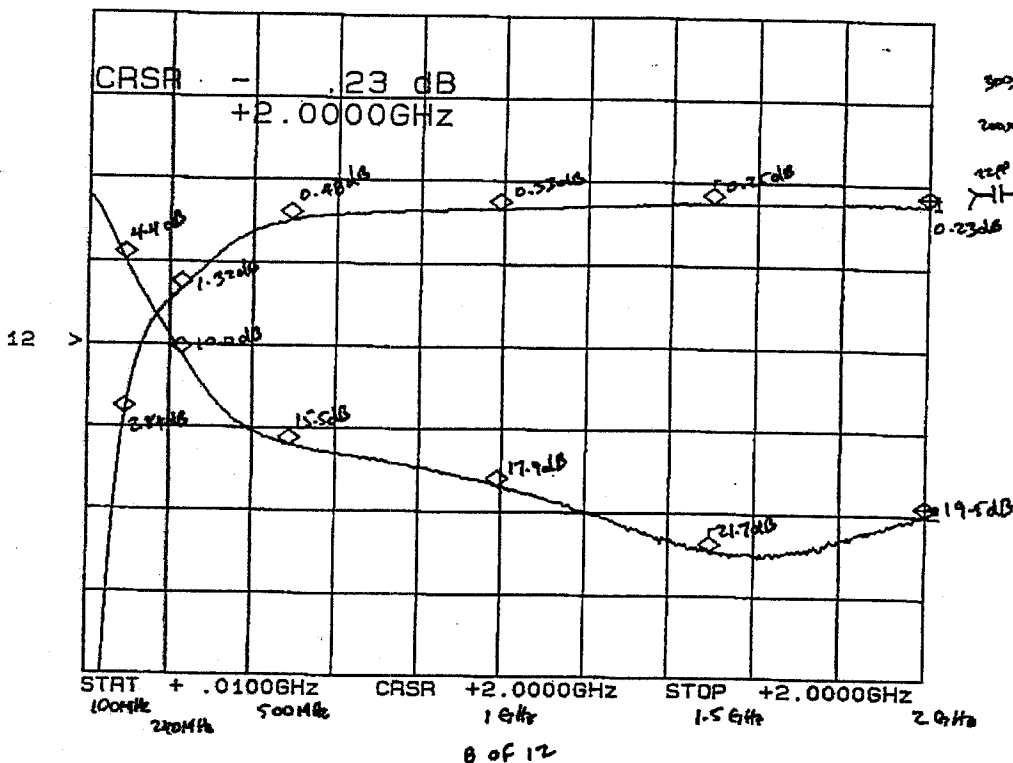


STEP 11 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .23 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 19.51 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.1 GHz	2.84 dB	4.4 dB
0.24 GHz	1.32 dB	10.0 dB
0.5 GHz	0.48 dB	15.5 dB
1.0 GHz	0.33 dB	17.9 dB
1.5 GHz	0.25 dB	21.7 dB
2.0 GHz	0.23 dB	19.5 dB

\*J1: INPUT ARM

July 27, 1999

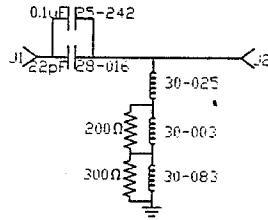
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 12 (10 MHz TO 18 GHz)

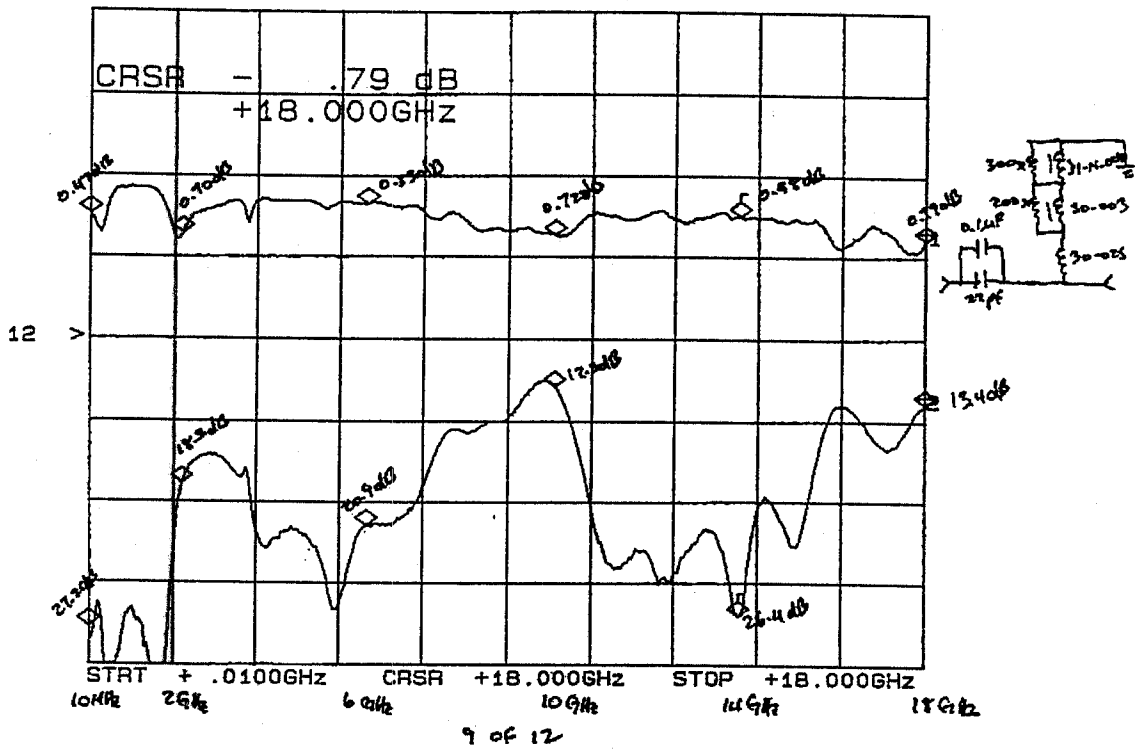
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF - .79 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M REF - 13.43 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.47 dB	27.2 dB
2.0 GHz	0.70 dB	18.3 dB
6.0 GHz	0.33 dB	20.9 dB
10.0 GHz	0.72 dB	12.3 dB
14.0 GHz	0.48 dB	26.4 dB
18.0 GHz	0.79 dB	13.4 dB

\*J1: INPUT ARM

July 27, 1999

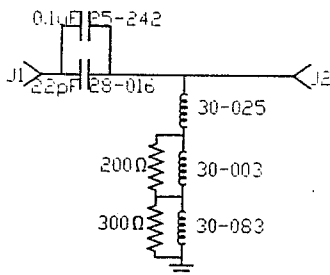


STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

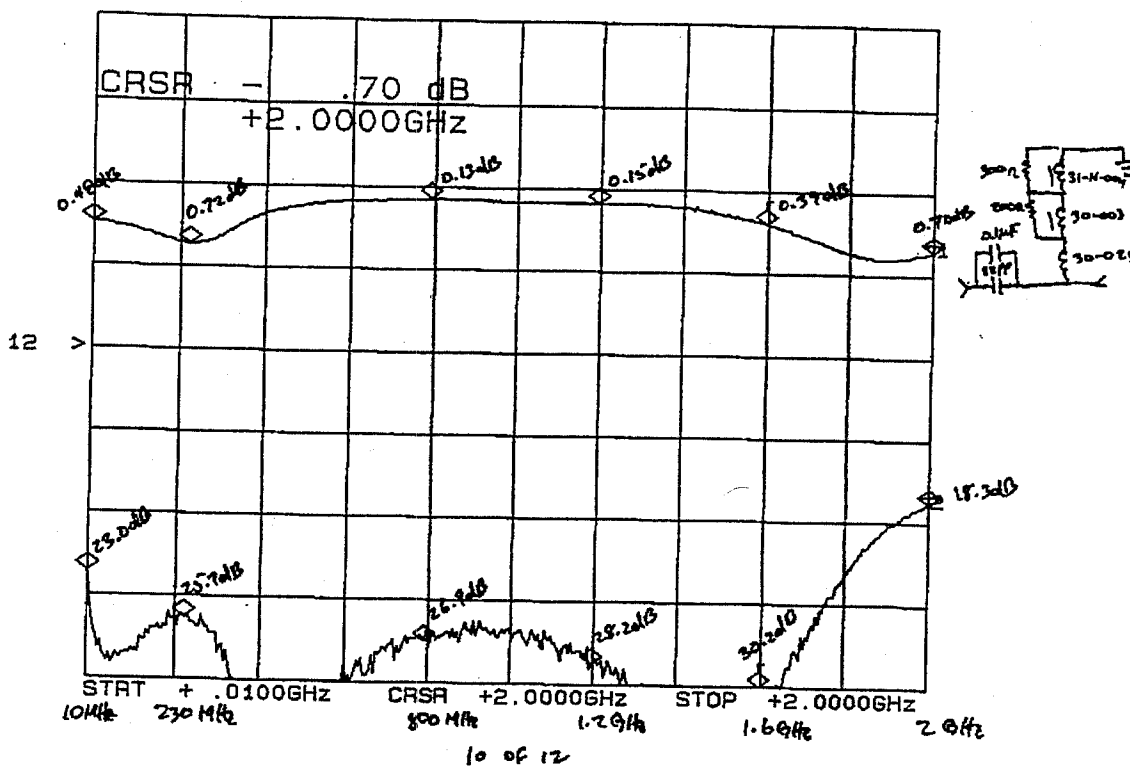


STEP 12 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .70 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 18.35 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.48 dB	23.0 dB
0.23 GHz	0.72 dB	25.7 dB
0.8 GHz	0.13 dB	26.9 dB
1.2 GHz	0.15 dB	28.2 dB
1.6 GHz	0.39 dB	30.2 dB
2.0 GHz	0.70 dB	18.3 dB

\*J1: INPUT ARM

July 27, 1999

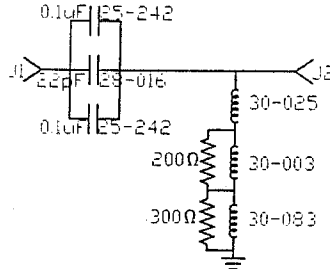
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



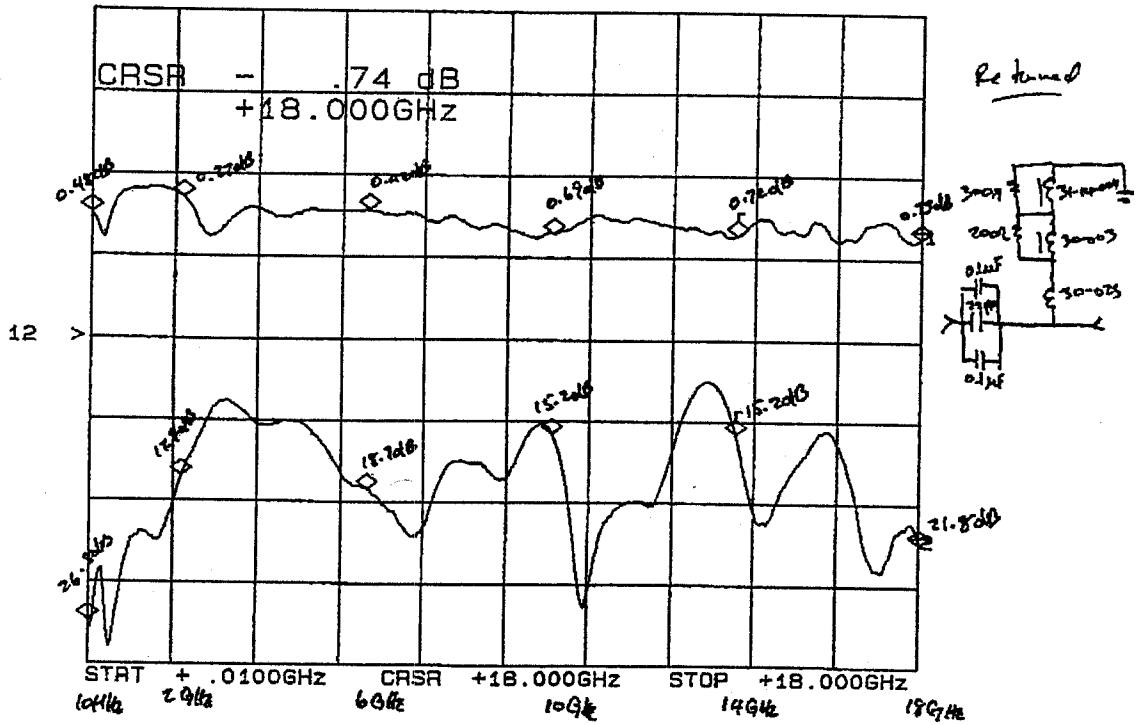
STEP 13 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - .74 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 21.87 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.48 dB	26.8 dB
2.0 GHz	0.27 dB	17.9 dB
6.0 GHz	0.42 dB	18.7 dB
10.0 GHz	0.69 dB	15.2 dB
14.0 GHz	0.72 dB	15.2 dB
18.0 GHz	0.73 dB	21.8 dB

\*J1: INPUT ARM

July 27, 1999

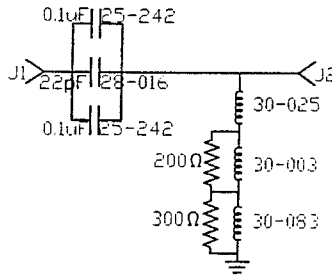
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 13 (10 MHz TO 3 GHz)

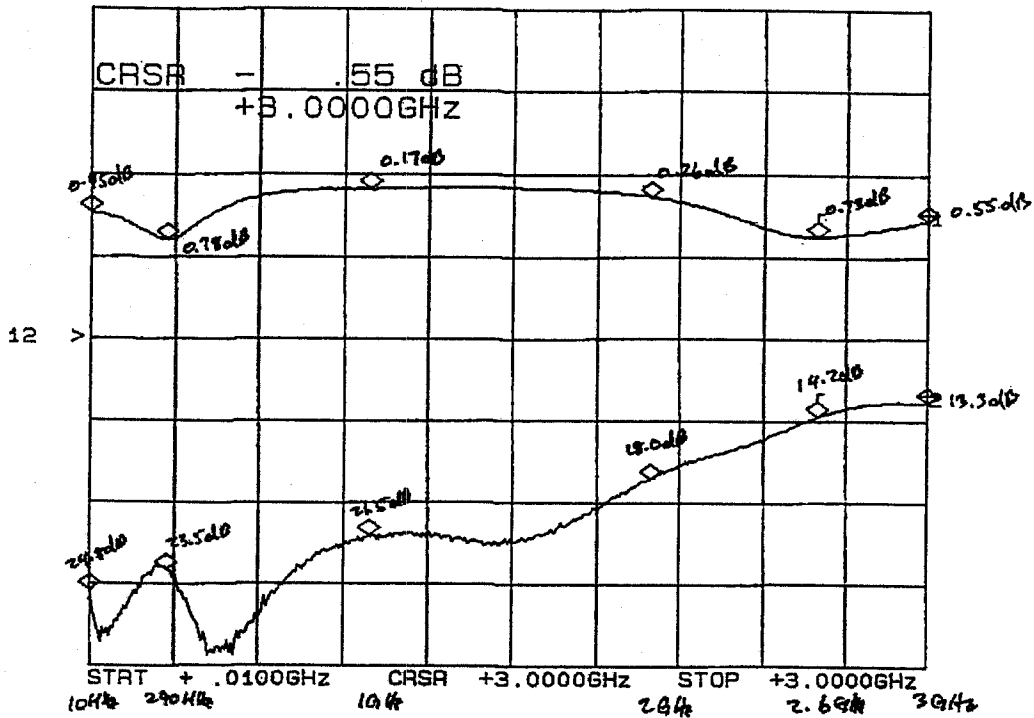
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF = .55 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 13.34 dB  
5.0 dB/ REF = 9.54 dB



4 of 4

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.45 dB	24.8 dB
0.29 GHz	0.78 dB	23.5 dB
1.0 GHz	0.17 dB	21.5 dB
2.0 GHz	0.26 dB	12.0 dB
2.6 GHz	0.73 dB	14.2 dB
3.0 GHz	0.55 dB	13.3 dB

\*J1: INPUT ARM

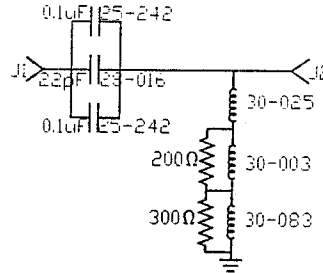
July 27, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

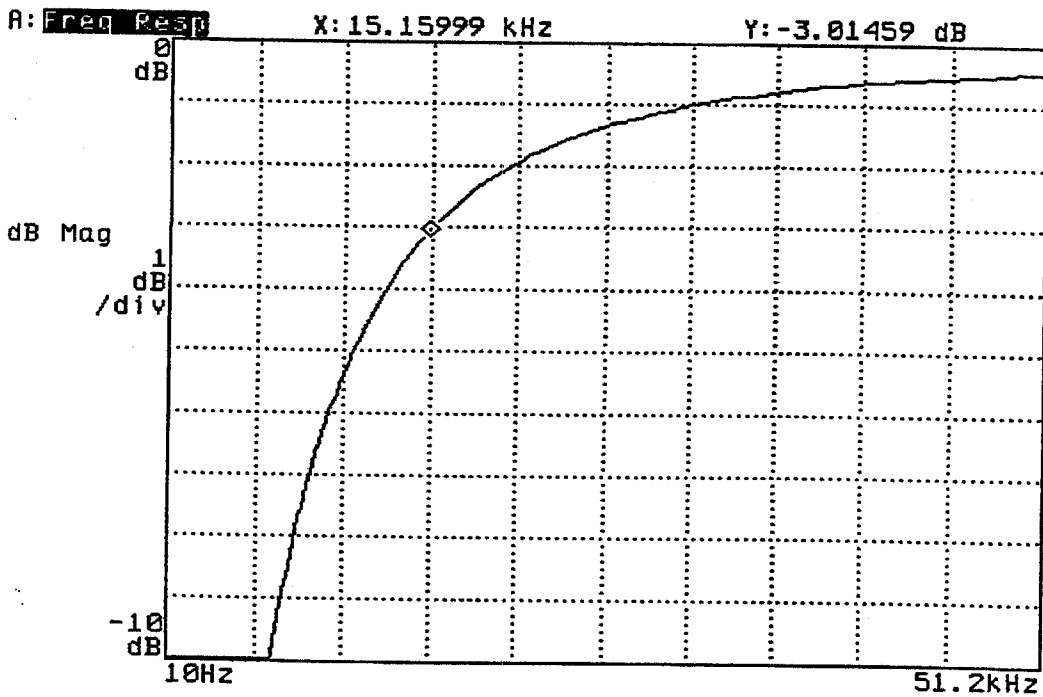


STEP 13 (10 Hz TO 51.2 kHz)

INSERTION LOSS\*  
J1-J2



Scale      Ref Lvl A: 0      Ref Lvl B: -13  
             Ref Pos A: Top      Ref Pos B: Top  
 Date: 07-16-98      Time: 07:00:00 PM



FREQUENCY	INSERTION LOSS
15.16 kHz	3.01 dB

\*J1: INPUT ARM

July 27, 1999

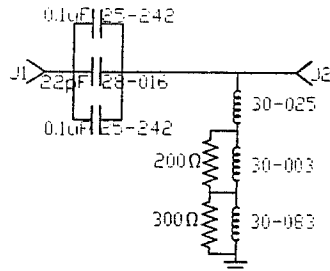
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



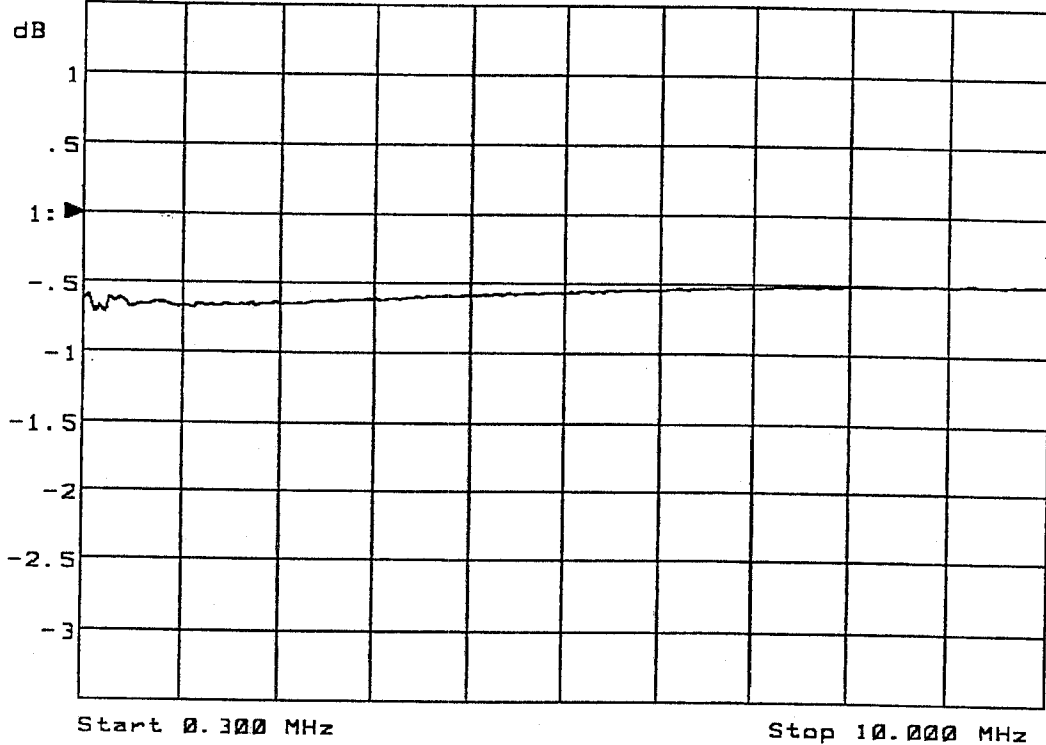
STEP 13 (300 kHz TO 10 MHz)

INSERTION LOSS\*

J1-J2



▶1: Transmission /M Log Mag 0.5 dB/ Ref 0.00 dB  
▷2: Off



\*J1: INPUT ARM

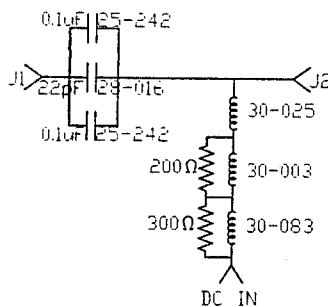
July 27, 1999

**STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's**

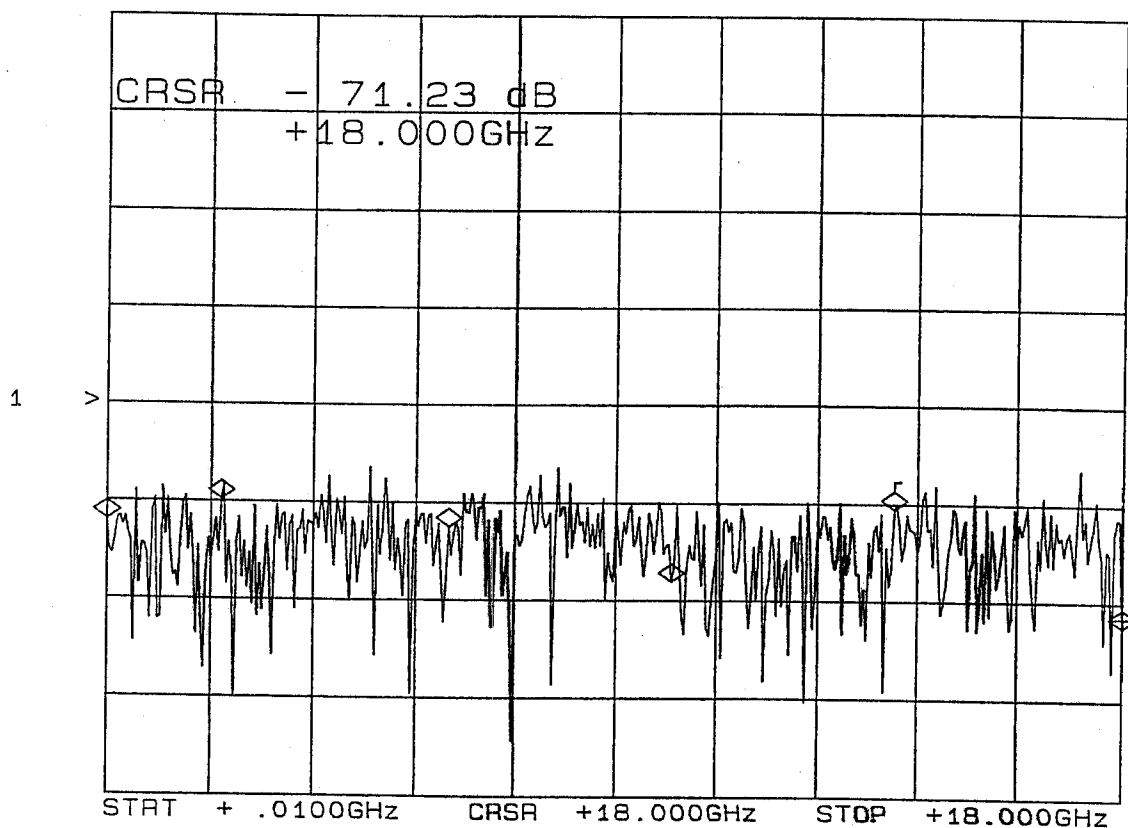


**STEP 13 (10 MHz TO 18 GHz)**

**ISOLATION\*  
J1-DC IN**



CH1: A -M - 71.23 dB  
5.0 dB/ REF - 60.00 dB



\*J1: INPUT ARM

July 27, 1999

**AMERICAN MICROWAVE  
CORPORATION**

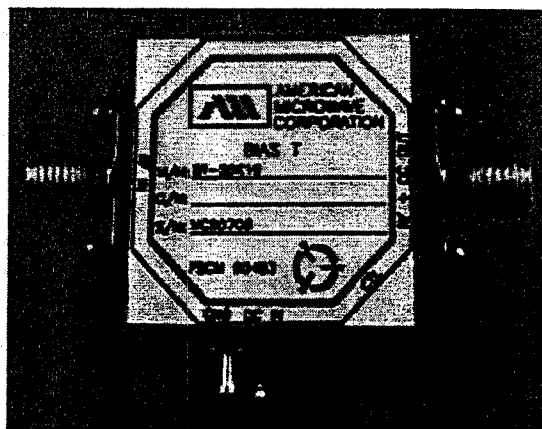
**DEVELOPMENT OF**

**10 MHz TO 18 GHz**

**RESISTIVE**

**BIAS T**

**USABLE TO 15 kHz**



**BT-50K18 OPT. RES**

**July 27, 1999**

**WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)**

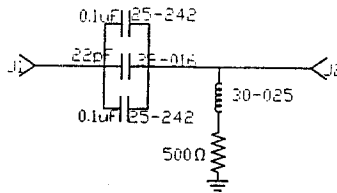
**E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)**

**7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938**

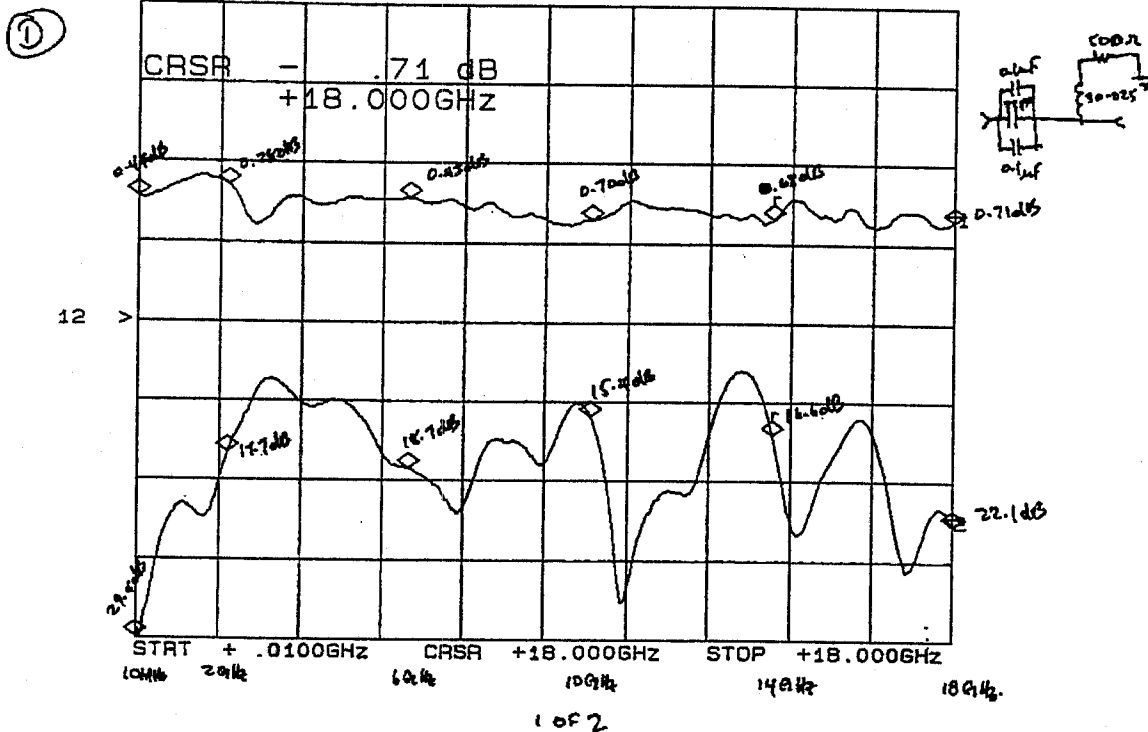
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = .71 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 22.19 dB  
5.0 dB/ REF = 9.54 dB



1 of 2

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.44 dB	29.4 dB
2.0 GHz	0.28 dB	17.7 dB
6.0 GHz	0.43 dB	18.7 dB
10.0 GHz	0.70 dB	15.4 dB
14.0 GHz	0.68 dB	16.6 dB
18.0 GHz	0.71 dB	22.1 dB

\*J1: INPUT ARM

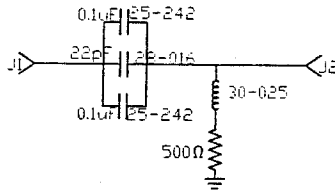
July 27, 1999



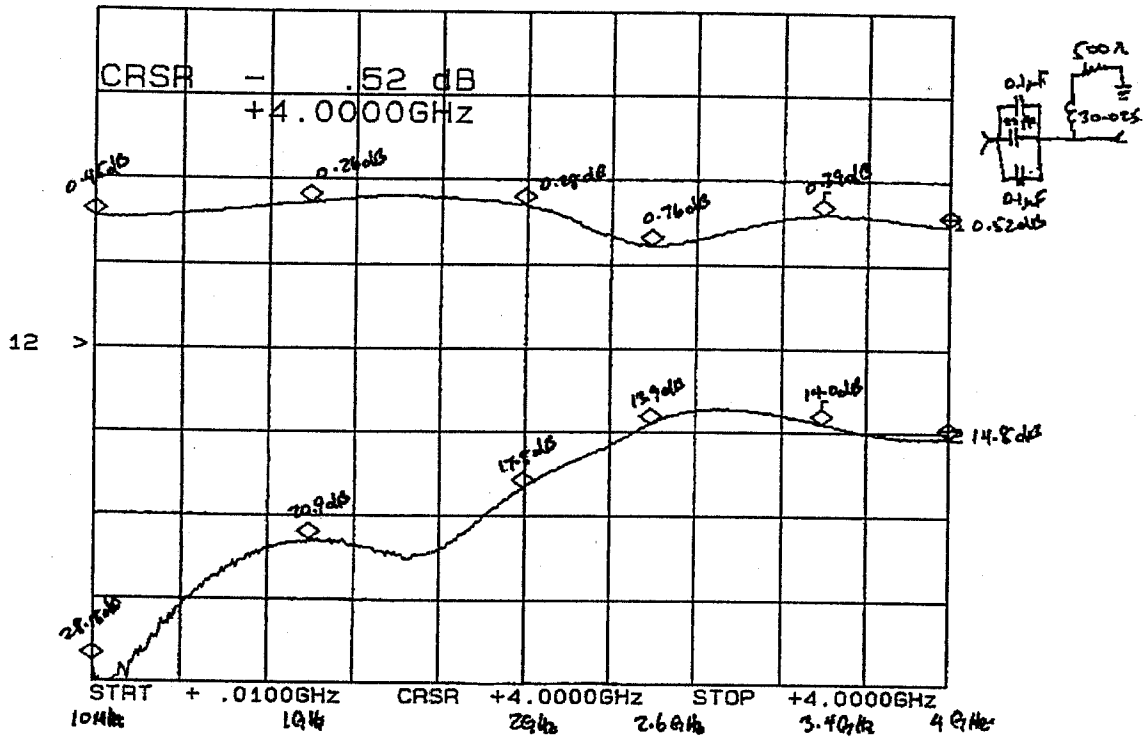
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .52 dB      CH2: B -M - 14.82 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



2 of 2

FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.45 dB	28.2 dB
1.0 GHz	0.26 dB	20.9 dB
2.0 GHz	0.28 dB	17.8 dB
2.6 GHz	0.76 dB	13.9 dB
3.4 GHz	0.39 dB	14.0 dB
4.0 GHz	0.52 dB	14.8 dB

\*J1: INPUT ARM

July 27, 1999



PRIVATE & CONFIDENTIAL

**STEP BY STEP**  
**DEVELOPMENT OF**  
**50 kHz TO 18 GHz**  
**INDUCTIVE AND RESISTIVE**  
**BIAS T's**  
**IN SWN-2181-2A HOUSING**  
**(USING A 0.5 TO 1.0 pF BEAMLEAD CAPACITOR)**

- **INDUCTIVE BIAS T (BT-50K18 OPT. PS)**      **PAGE 2 - 26**
- **RESISTIVE BIAS T (BT-50K18 OPT. PS, OPT. RES)**      **PAGE 27 - 32**

**TESTED, REPORTED & PREPARED**  
**BY**  
**FRANK RETHMEIER**  
**RENE AFABLE**

**July 29, 1999**

**WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)**

**E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)**

**7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938**

**AMERICAN MICROWAVE  
CORPORATION**

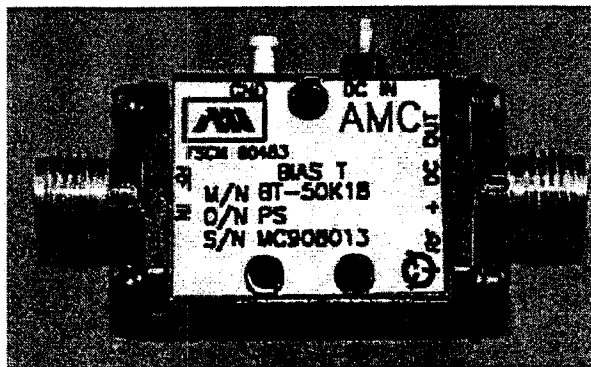
**DEVELOPMENT OF**

**50 kHz TO 18 GHz**

**INDUCTIVE**

**BIAS T**

**USABLE TO 15 kHz**



**BT-50K18 OPT. PS**

**July 29, 1999**

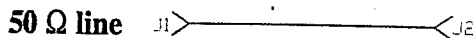
7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

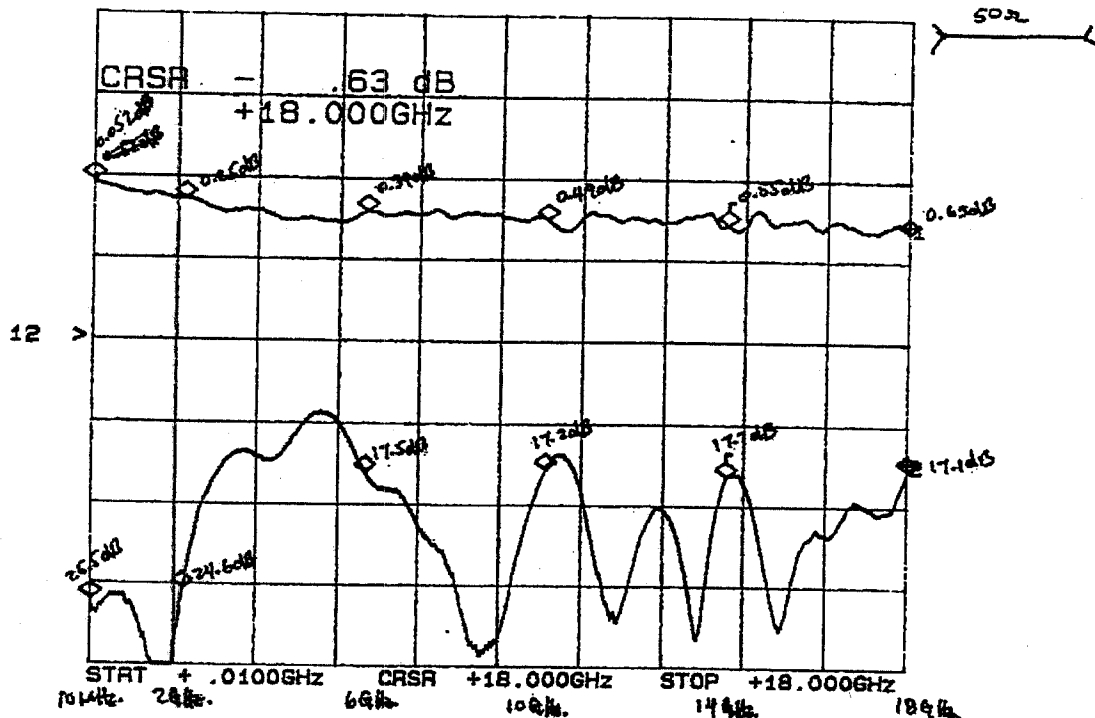


STEP 1

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M = .63 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M = 17.18 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.05 dB	25.5 dB
2.0 GHz	0.25 dB	24.6 dB
6.0 GHz	0.39 dB	17.5 dB
10.0 GHz	0.49 dB	17.2 dB
14.0 GHz	0.55 dB	17.7 dB
18.0 GHz	0.63 dB	17.1 dB

\*J1: INPUT ARM

July 29, 1999

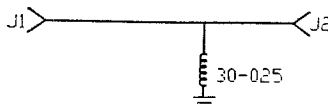
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



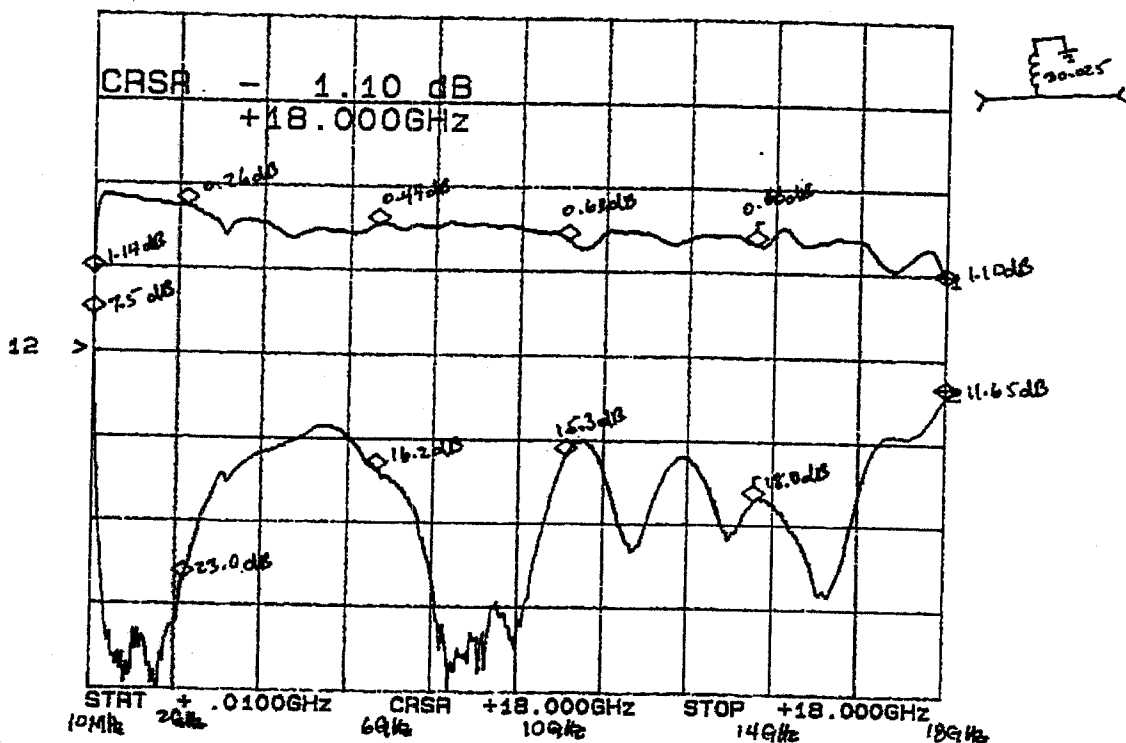
STEP 2 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - 1.10 dB      CH2: B -M - 11.65 dB  
1.0 dB/ REF - 2.00 dB      5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	1.14 dB	7.5 dB
2.0 GHz	0.26 dB	23.0 dB
6.0 GHz	0.44 dB	16.2 dB
10.0 GHz	0.61 dB	15.3 dB
14.0 GHz	0.66 dB	18.0 dB
18.0 GHz	1.10 dB	11.7 dB

\*J1: INPUT ARM

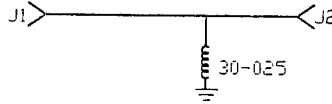
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

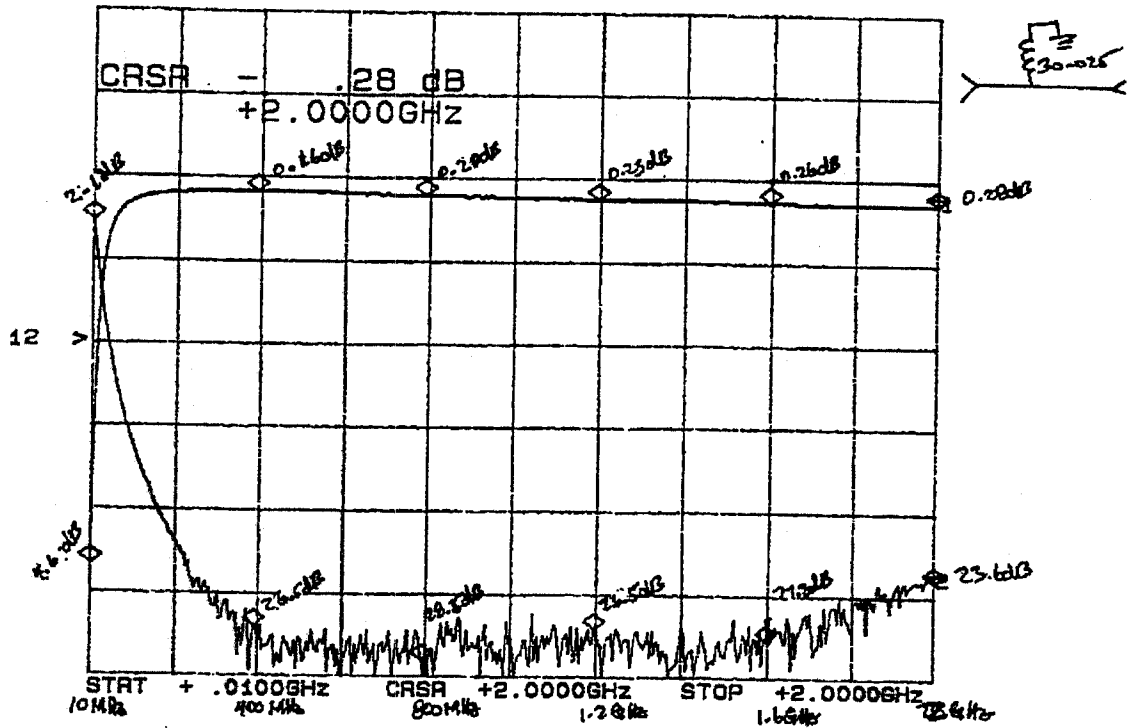


STEP 2 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - .28 dB  
1.0 dB/ REF - 2.00 dB  
CH2: B -M - 23.64 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	4.60 dB	2.1 dB
0.4 GHz	0.16 dB	26.5 dB
0.8 GHz	0.20 dB	28.5 dB
1.2 GHz	0.23 dB	26.5 dB
1.5 GHz	0.26 dB	27.2 dB
2.0 GHz	0.28 dB	23.6 dB

\*J1: INPUT ARM

July 29, 1999

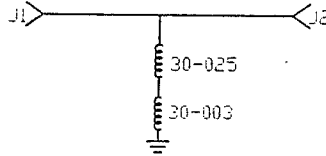
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



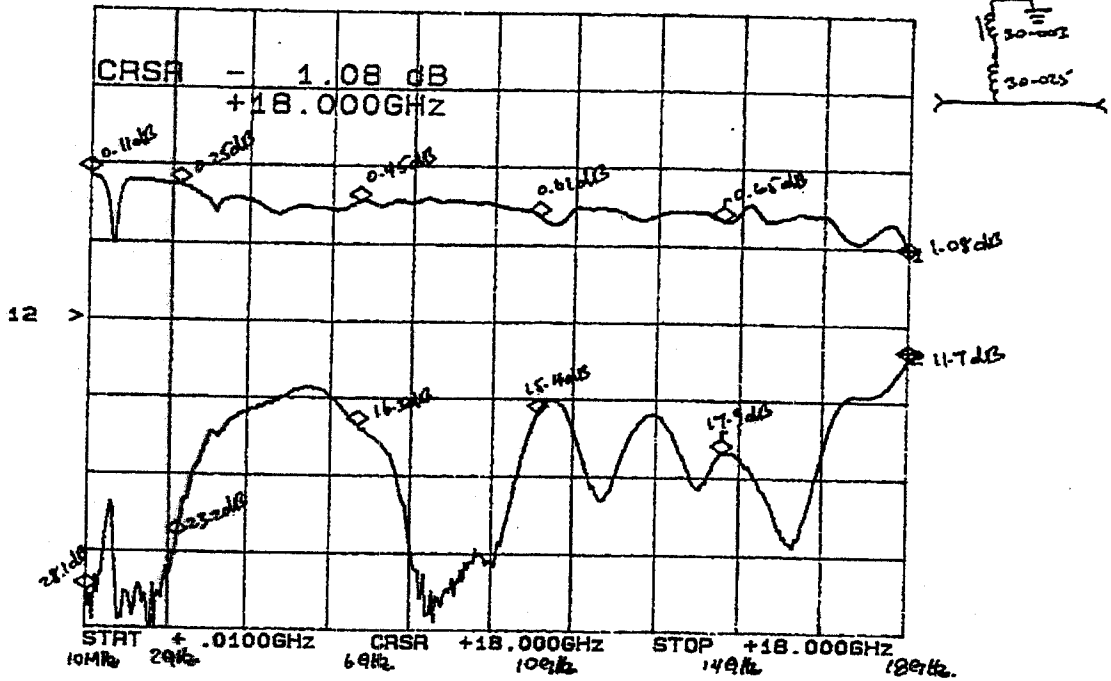
STEP 3 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF = 1.08 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 11.70 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.11 dB	28.1 dB
2.0 GHz	0.25 dB	23.2 dB
6.0 GHz	0.45 dB	16.3 dB
10.0 GHz	0.61 dB	15.4 dB
14.0 GHz	0.65 dB	17.9 dB
18.0 GHz	1.08 dB	11.7 dB

\*J1: INPUT ARM

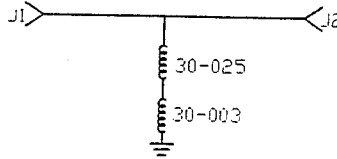
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

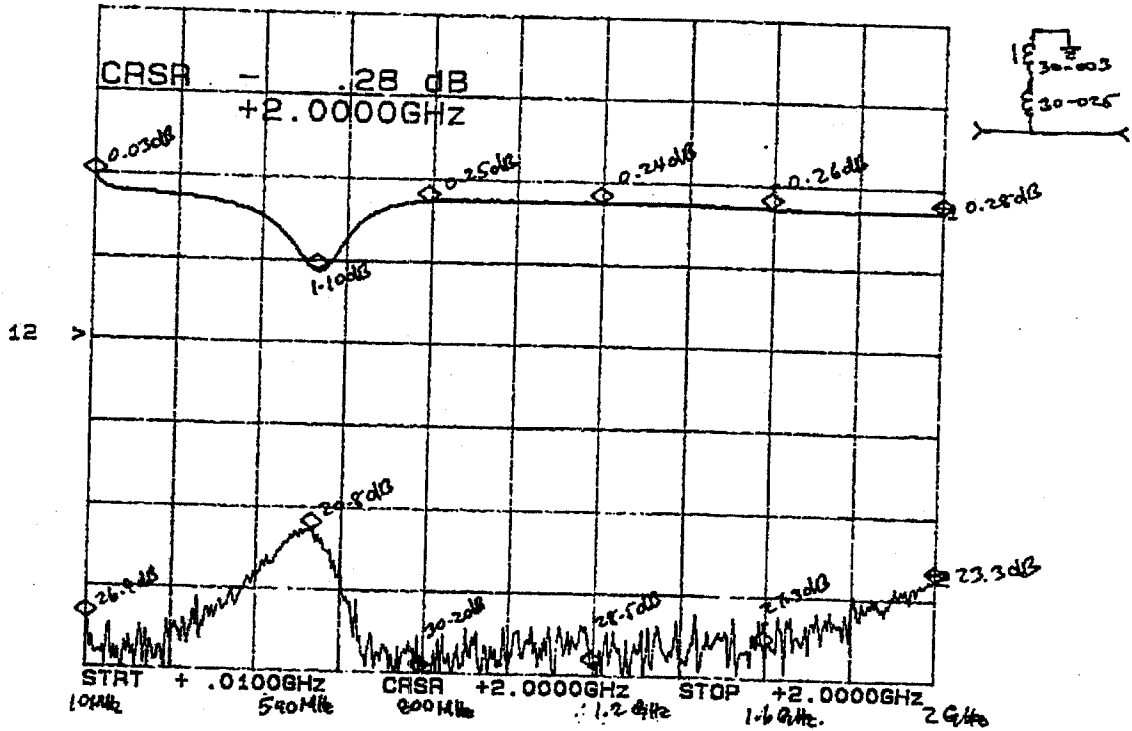


STEP 3 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 2.28 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 23.30 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.03 dB	26.9 dB
0.54 GHz	1.10 dB	20.8 dB
0.8 GHz	0.25 dB	30.2 dB
1.2 GHz	0.24 dB	28.5 dB
1.6 GHz	0.26 dB	27.3 dB
2.0 GHz	0.28 dB	23.3 dB

\*J1: INPUT ARM

July 29, 1999

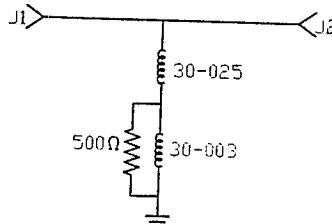


STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



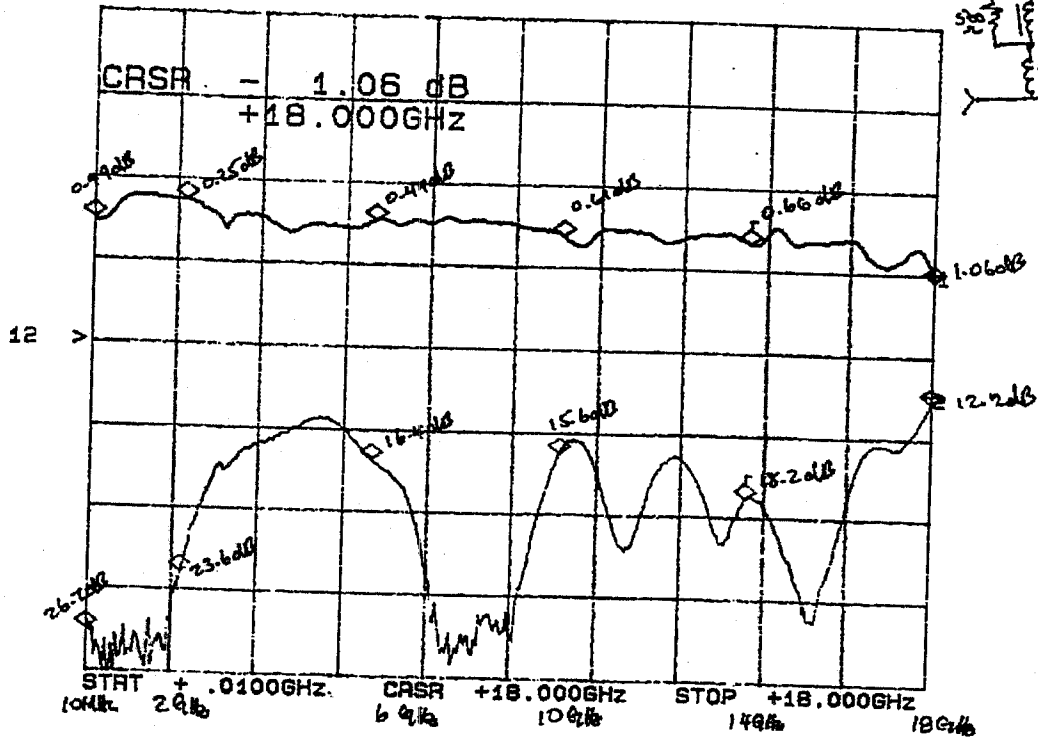
STEP 4 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 1.06 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 12.27 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.49 dB	26.7 dB
2.0 GHz	0.25 dB	23.6 dB
6.0 GHz	0.44 dB	16.4 dB
10.0 GHz	0.61 dB	15.6 dB
14.0 GHz	0.66 dB	18.2 dB
18.0 GHz	1.06 dB	12.2 dB

\*J1: INPUT ARM

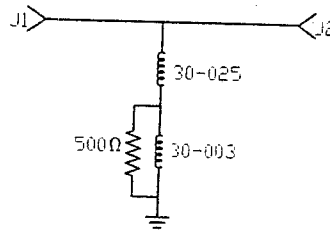
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

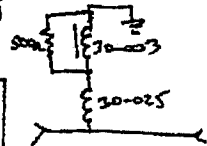
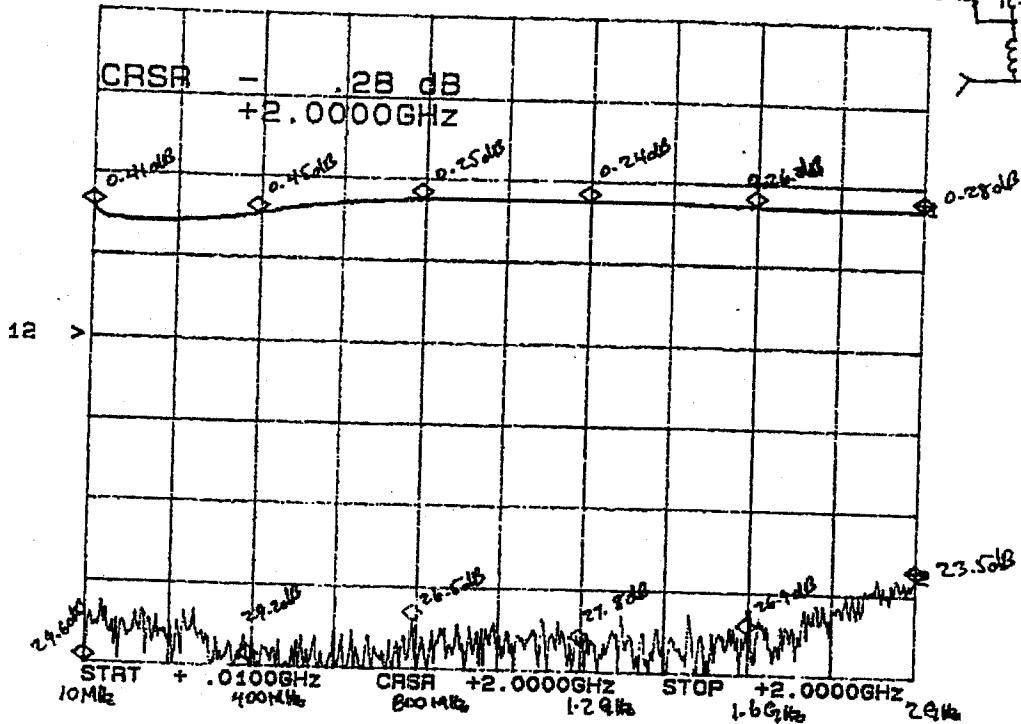


STEP 4 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = .28 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 23.51 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.41 dB	29.6 dB
0.4 GHz	0.45 dB	29.2 dB
0.8 GHz	0.25 dB	26.5 dB
1.2 GHz	0.24 dB	27.8 dB
1.6 GHz	0.26 dB	26.9 dB
2.0 GHz	0.28 dB	23.5 dB

\*J1: INPUT ARM

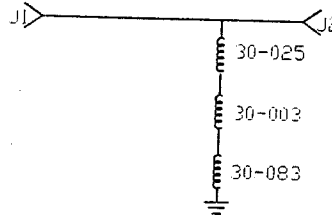
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

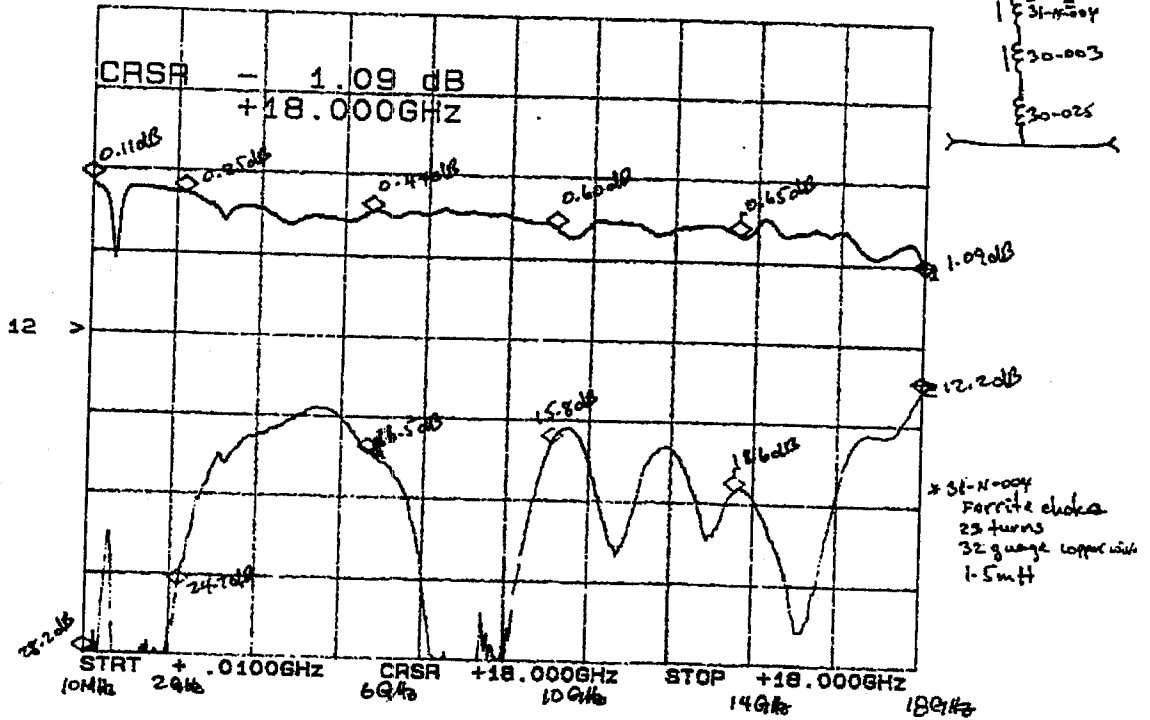


STEP 5 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 1.09 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 12.26 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.11 dB	28.2 dB
2.0 GHz	0.25 dB	24.7 dB
6.0 GHz	0.44 dB	16.5 dB
10.0 GHz	0.60 dB	15.8 dB
14.0 GHz	0.65 dB	13.6 dB
18.0 GHz	1.09 dB	12.2 dB

\*J1: INPUT ARM

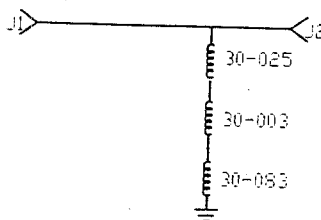
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

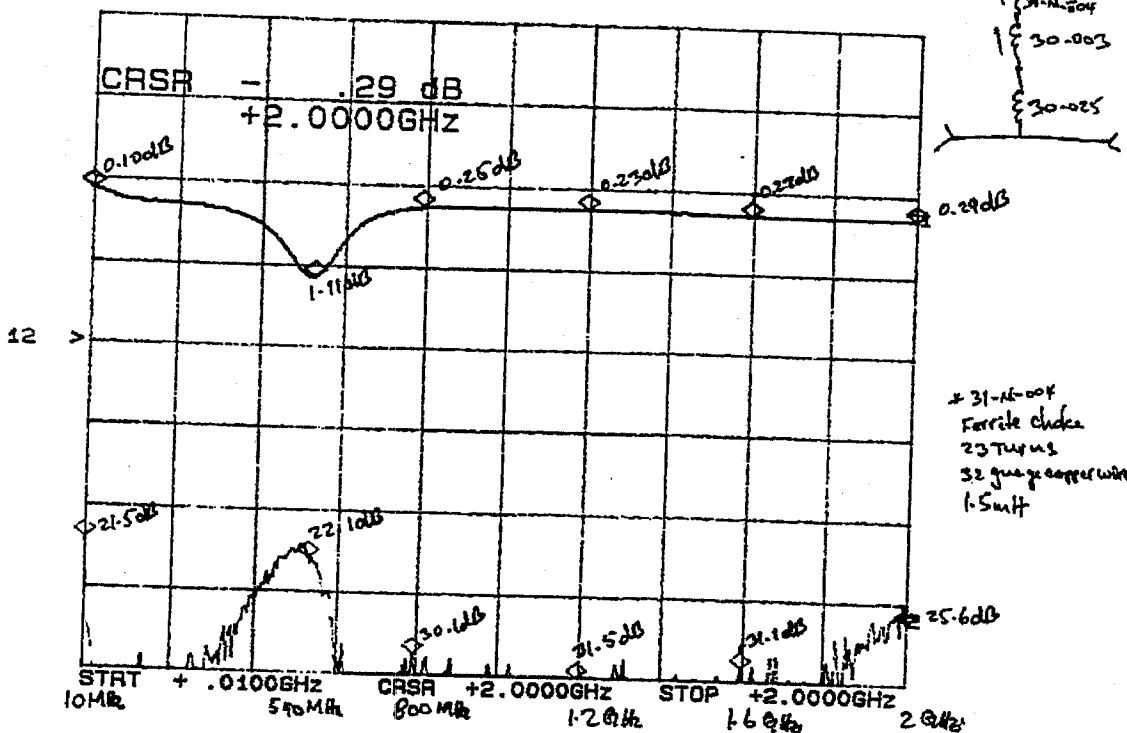


STEP 5 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = .29 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 25.60 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.10 dB	21.5 dB
0.54 GHz	1.11 dB	22.1 dB
0.8 GHz	0.25 dB	30.1 dB
1.2 GHz	0.23 dB	31.5 dB
1.6 GHz	0.27 dB	31.1 dB
2.0 GHz	0.29 dB	25.6 dB

\*J1: INPUT ARM

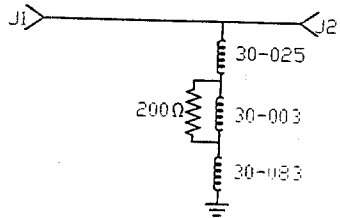
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



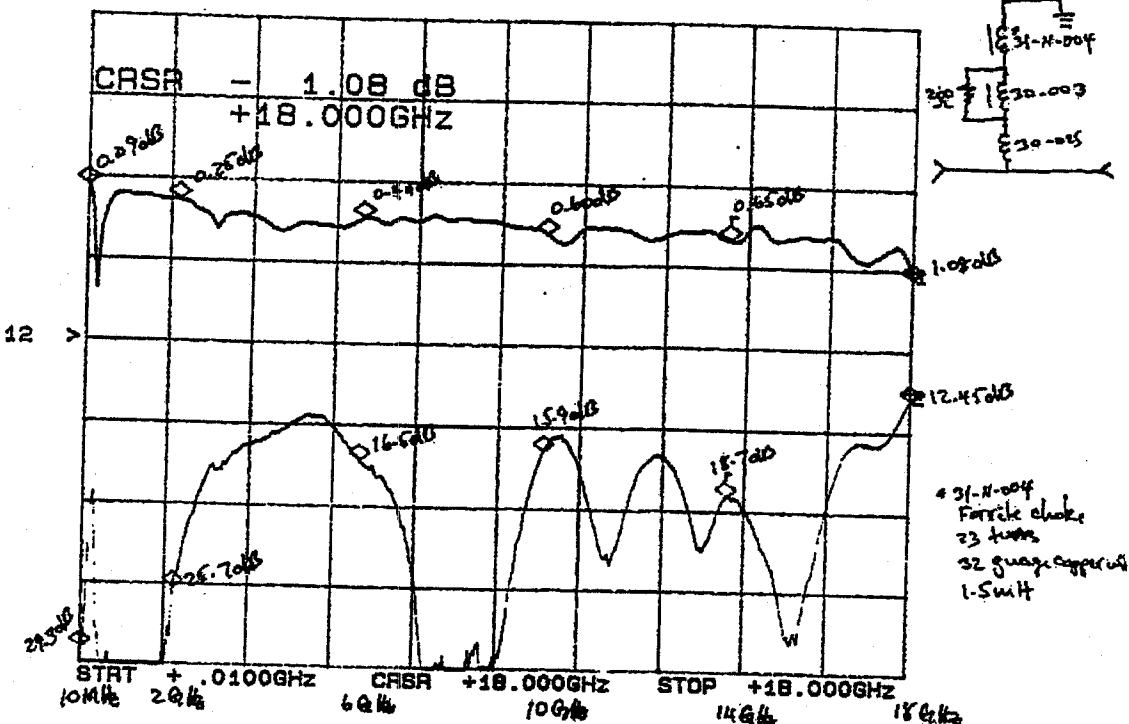
STEP 6 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 1.08 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 12.45 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.09 dB	29.3 dB
2.0 GHz	0.25 dB	25.7 dB
6.0 GHz	0.44 dB	16.5 dB
10.0 GHz	0.60 dB	15.9 dB
14.0 GHz	0.65 dB	18.7 dB
18.0 GHz	1.08 dB	12.5 dB

\*J1: INPUT ARM

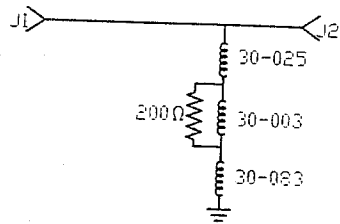
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



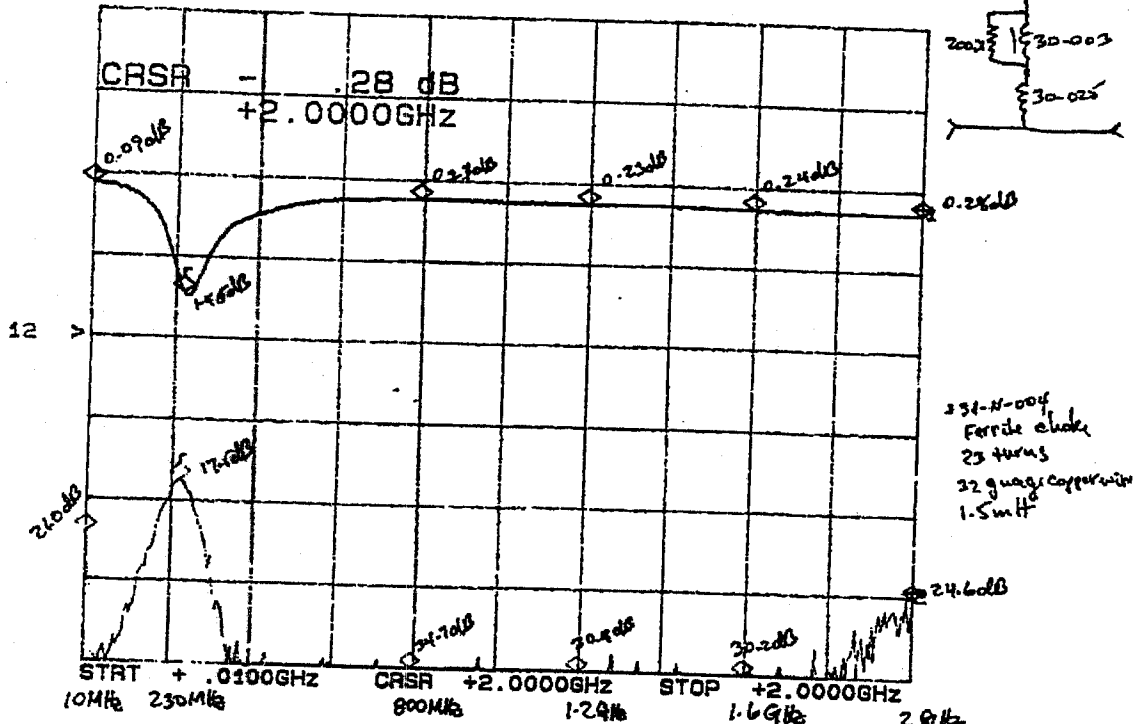
STEP 6 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = .28 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 24.62 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.09 dB	21.0 dB
0.23 GHz	1.45 dB	17.5 dB
0.8 GHz	0.22 dB	34.7 dB
1.2 GHz	0.23 dB	30.4 dB
1.6 GHz	0.24 dB	30.2 dB
2.0 GHz	0.28 dB	24.6 dB

\*J1: INPUT ARM

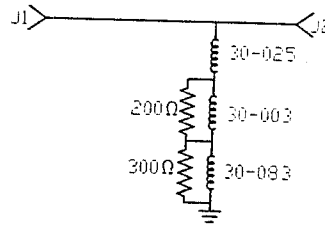
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



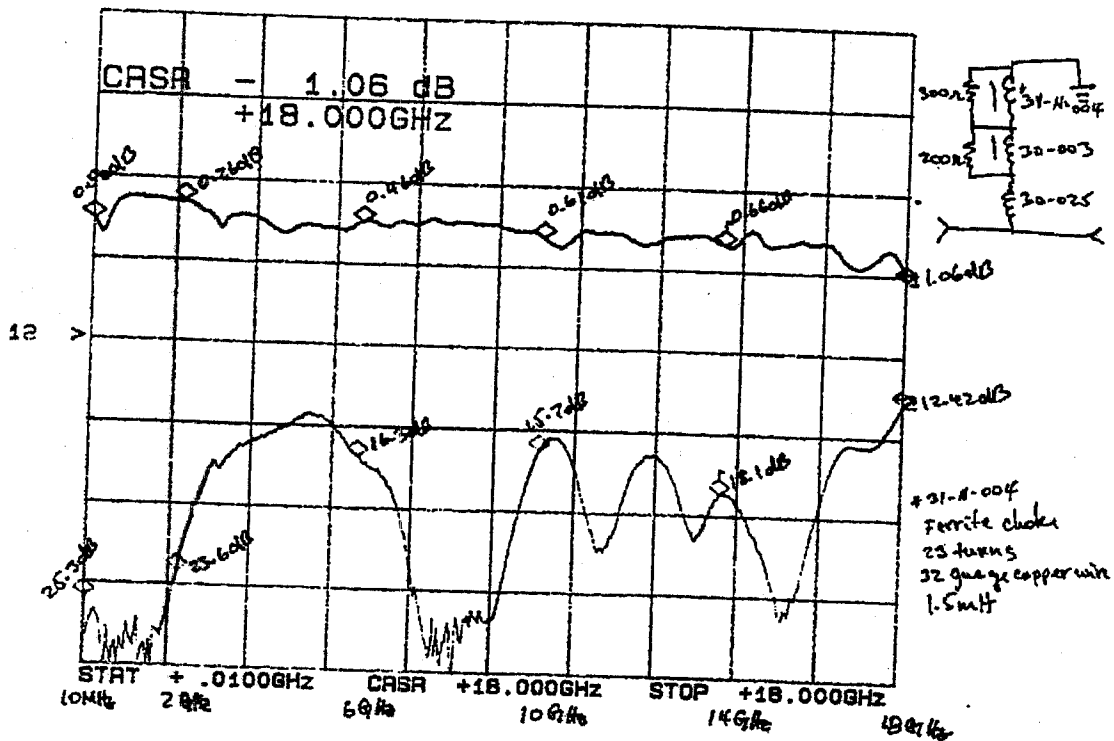
STEP 7 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 1.06 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 12.42 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.50 dB	25.3 dB
2.0 GHz	0.26 dB	23.6 dB
6.0 GHz	0.46 dB	16.3 dB
10.0 GHz	0.61 dB	15.7 dB
14.0 GHz	0.66 dB	18.1 dB
18.0 GHz	1.06 dB	12.4 dB

\*J1: INPUT ARM

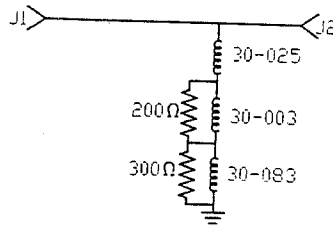
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



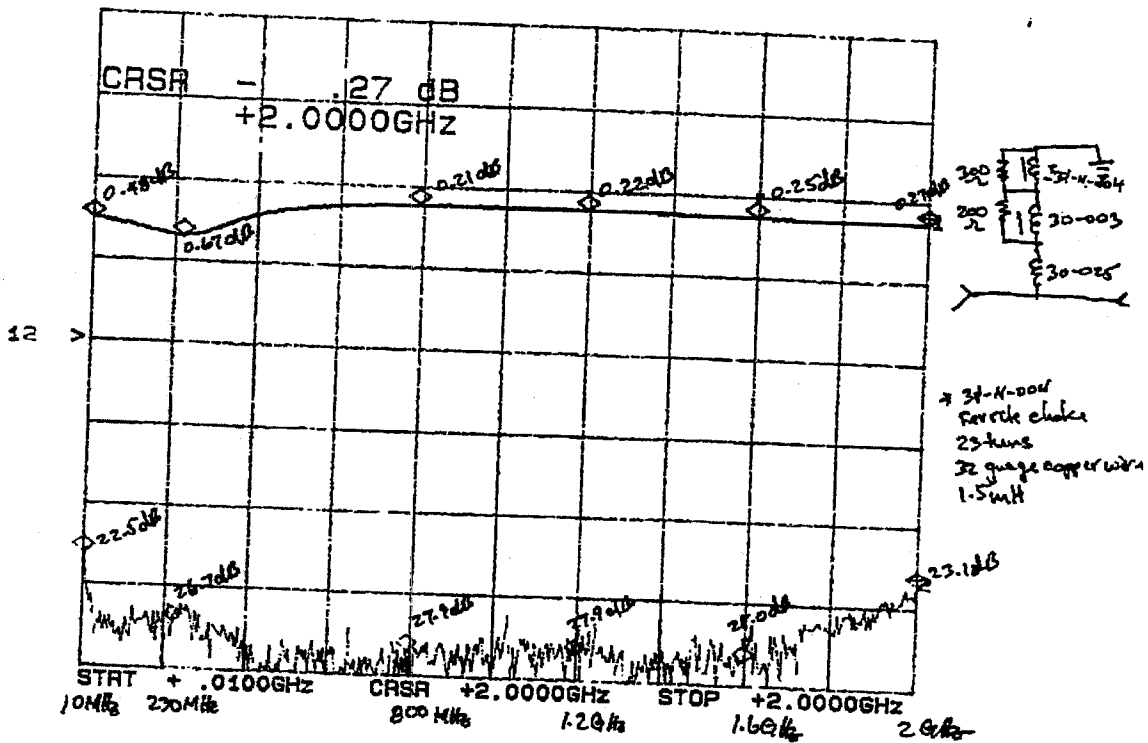
STEP 7 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 2.27 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 23.12 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.48 dB	22.5 dB
0.23 GHz	0.67 dB	26.7 dB
0.8 GHz	0.21 dB	27.9 dB
1.2 GHz	0.22 dB	27.9 dB
1.6 GHz	0.25 dB	28.0 dB
2.0 GHz	0.27 dB	23.1 dB

\*J1: INPUT ARM

July 29, 1999

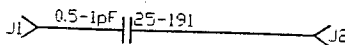


STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

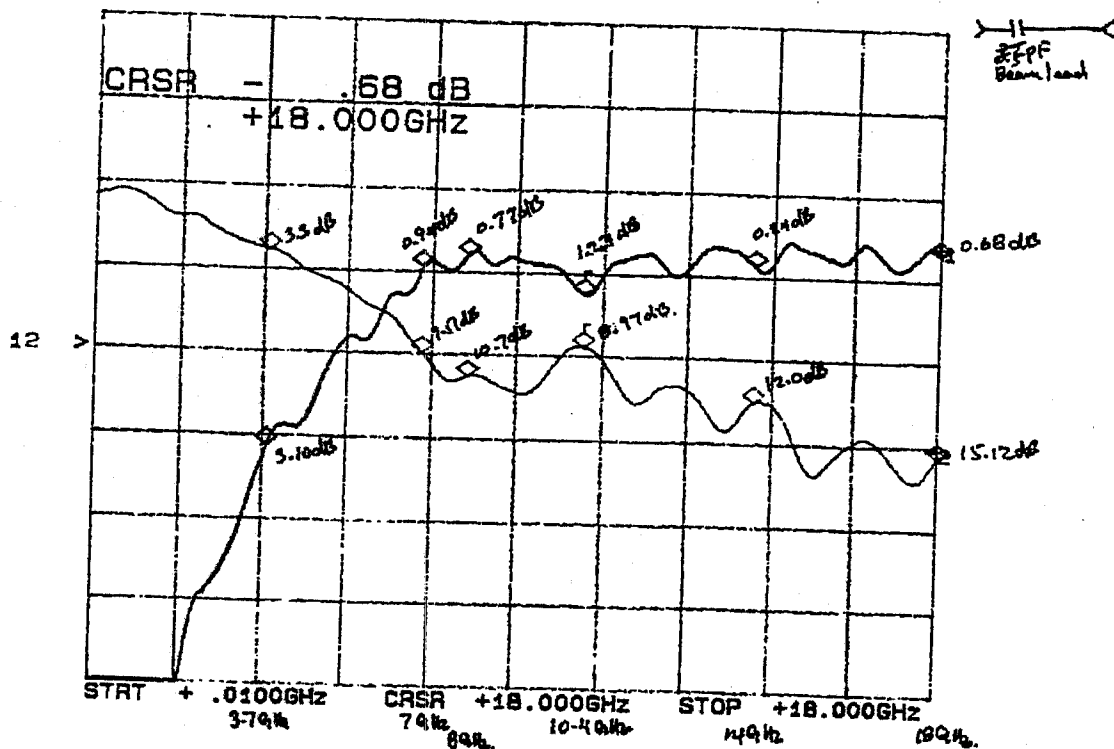


STEP 8

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = .68 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 15.12 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
3.7 GHz	3.10 dB	3.3 dB
7.0 GHz	0.94 dB	9.5 dB
8.0 GHz	0.77 dB	10.7 dB
10.4 GHz	1.23 dB	9.0 dB
14.0 GHz	0.84 dB	12.0 dB
18.0 GHz	0.68 dB	15.1 dB

\*J1: INPUT ARM

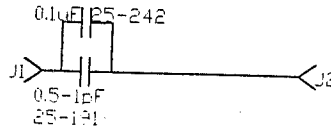
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

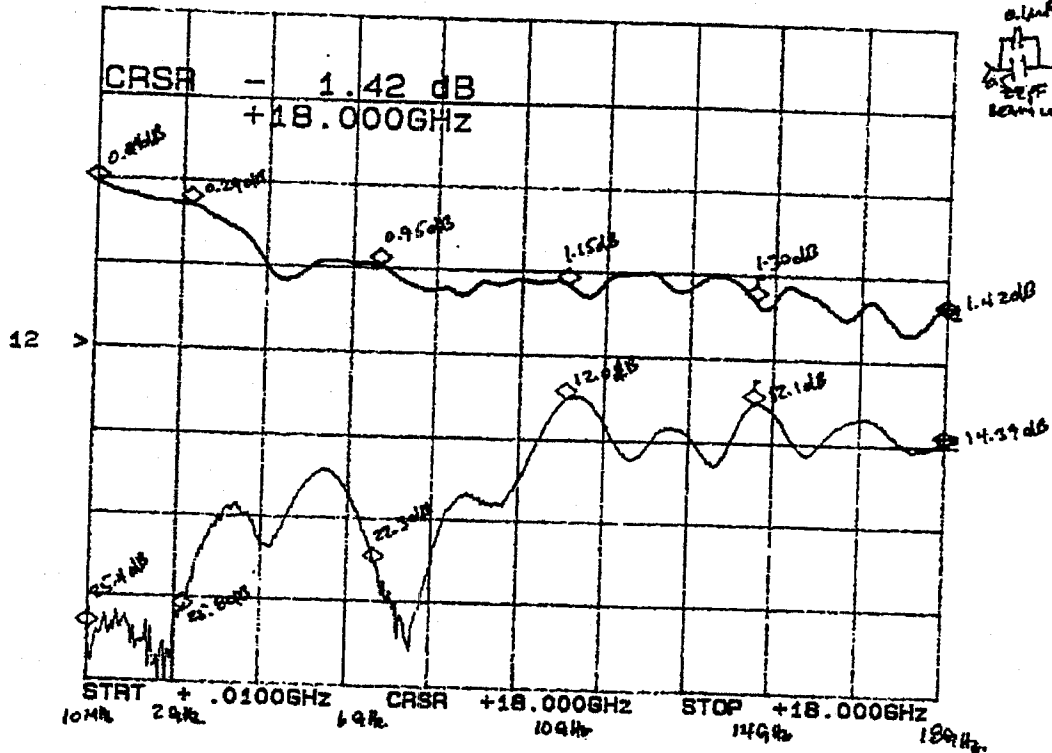


STEP 9

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 1.42 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 14.39 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.04 dB	25.4 dB
2.0 GHz	0.29 dB	25.8 dB
6.0 GHz	0.95 dB	22.3 dB
10.0 GHz	1.15 dB	12.0 dB
14.0 GHz	1.30 dB	12.1 dB
18.0 GHz	1.42 dB	14.4 dB

\*J1: INPUT ARM

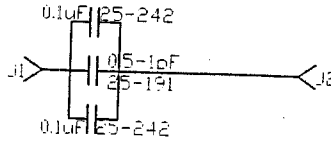
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

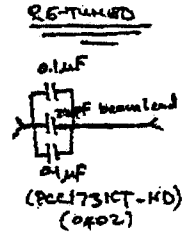
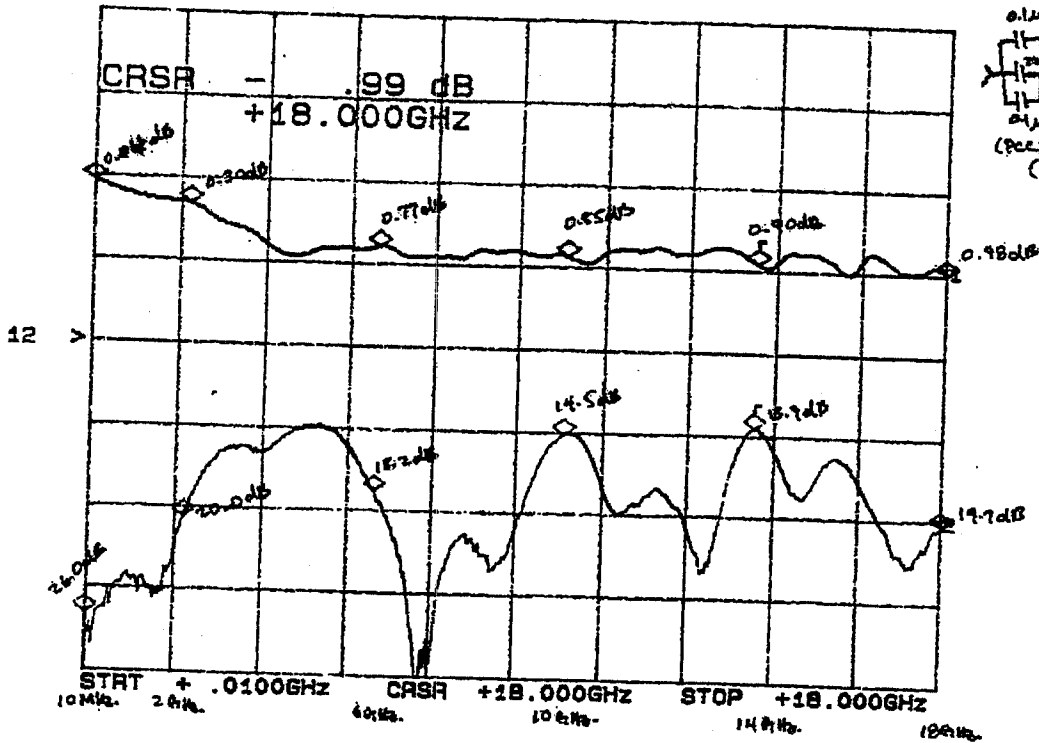


STEP 10

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 2.00 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 19.77 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.04 dB	26.0 dB
2.0 GHz	0.30 dB	20.0 dB
6.0 GHz	0.77 dB	18.2 dB
10.0 GHz	0.85 dB	14.5 dB
14.0 GHz	0.90 dB	13.9 dB
18.0 GHz	0.98 dB	19.7 dB

\*J1: INPUT ARM

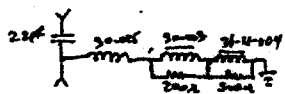
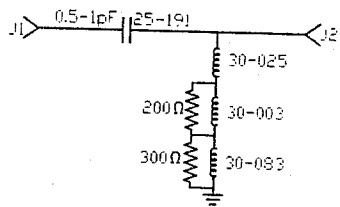
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's

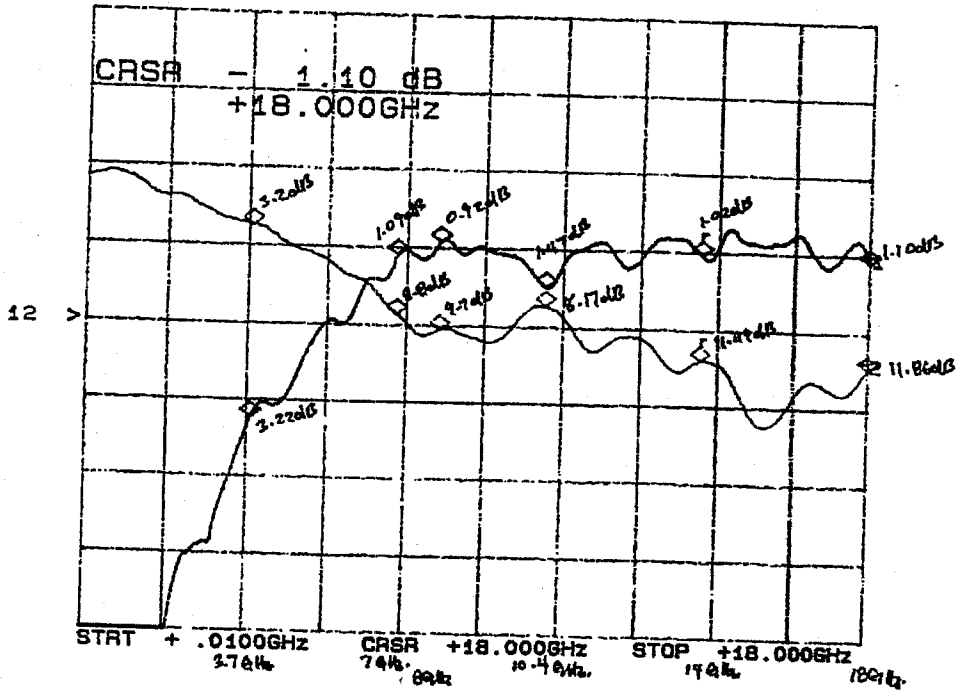


STEP 11

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 1.10 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 11.86 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
3.7 GHz	3.22 dB	3.2 dB
7.0 GHz	1.09 dB	8.8 dB
8.0 GHz	0.92 dB	9.7 dB
10.4 GHz	1.47 dB	8.2 dB
14.0 GHz	1.02 dB	11.5 dB
18.0 GHz	1.10 dB	11.9 dB

J1: INPUT ARM

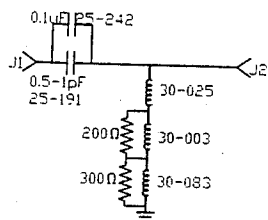
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



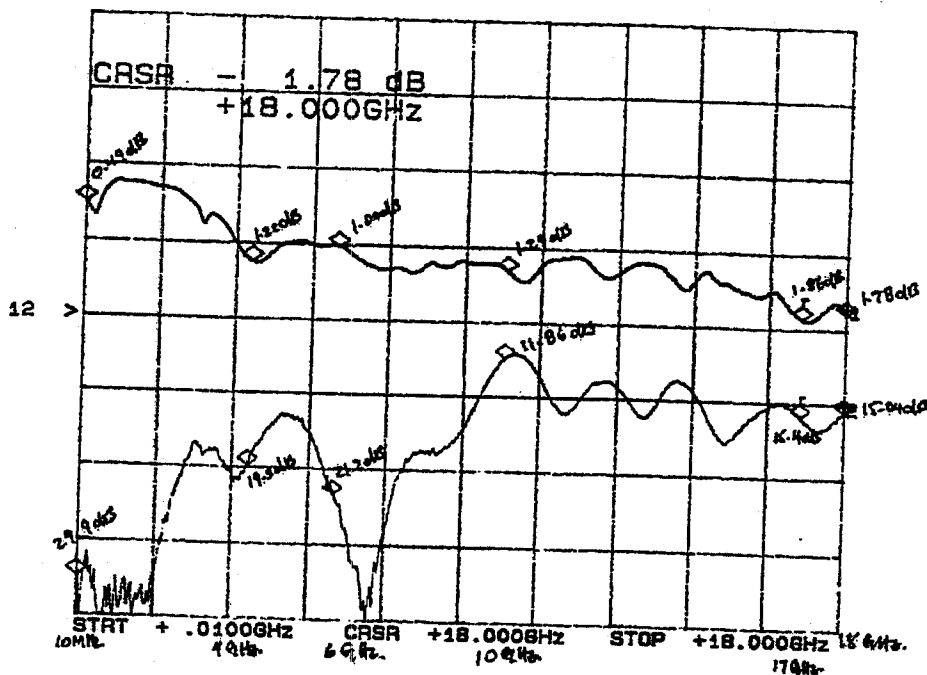
STEP 12 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M - 1.78 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M - 15.04 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.1 GHz	0.49 dB	29.9 dB
4.0 GHz	1.22 dB	19.3 dB
6.0 GHz	1.00 dB	21.2 dB
10.0 GHz	1.29 dB	11.9 dB
17.0 GHz	1.86 dB	15.4 dB
18.0 GHz	1.78 dB	15.0 dB

\*J1: INPUT ARM

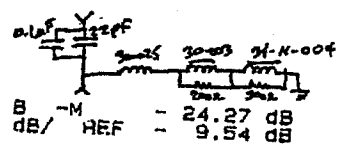
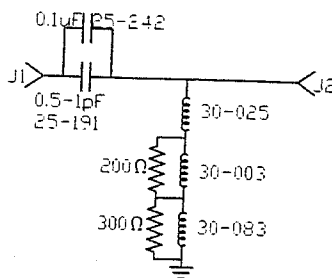
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



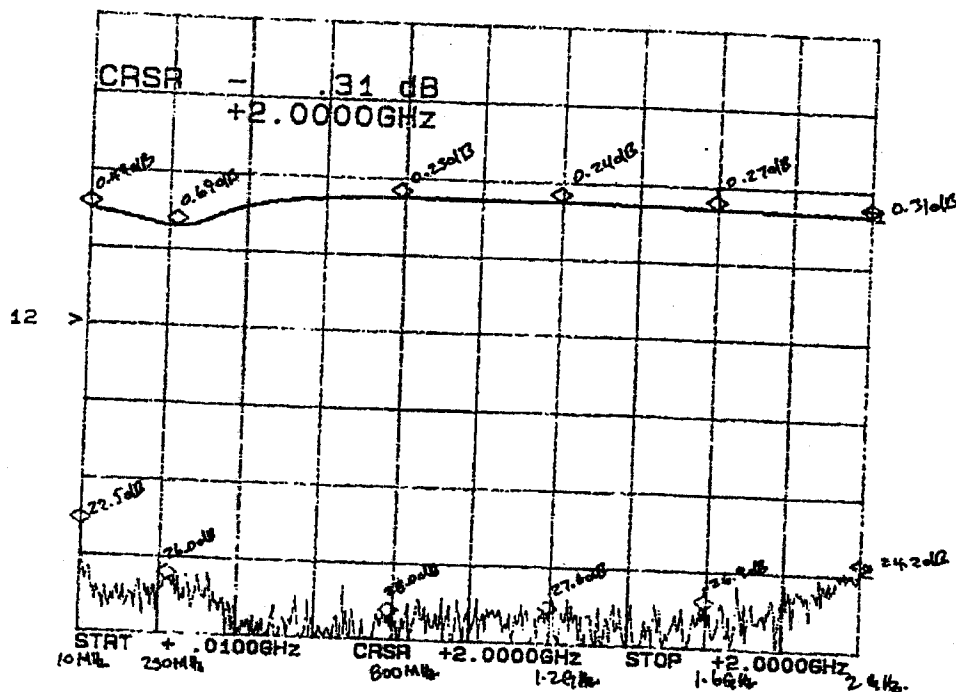
STEP 12 (10 MHz TO 2 GHz)

INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = -0.31 dB  
1.0 dB/ REF = 2.00 dB

CH2: B -M REF = 24.27 dB  
5.0 dB/ REF = 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.49 dB	22.5 dB
0.23 GHz	0.69 dB	26.0 dB
0.8 GHz	0.23 dB	28.0 dB
1.2 GHz	0.24 dB	27.6 dB
1.6 GHz	0.27 dB	26.9 dB
2.0 GHz	0.31 dB	24.2 dB

\*J1: INPUT ARM

July 29, 1999

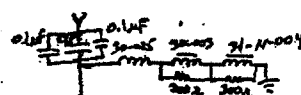
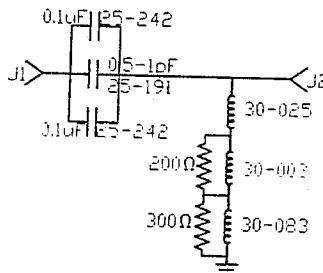
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 13 (10 MHz TO 18 GHz)

INSERTION LOSS & RETURN LOSS\*

J1-J2

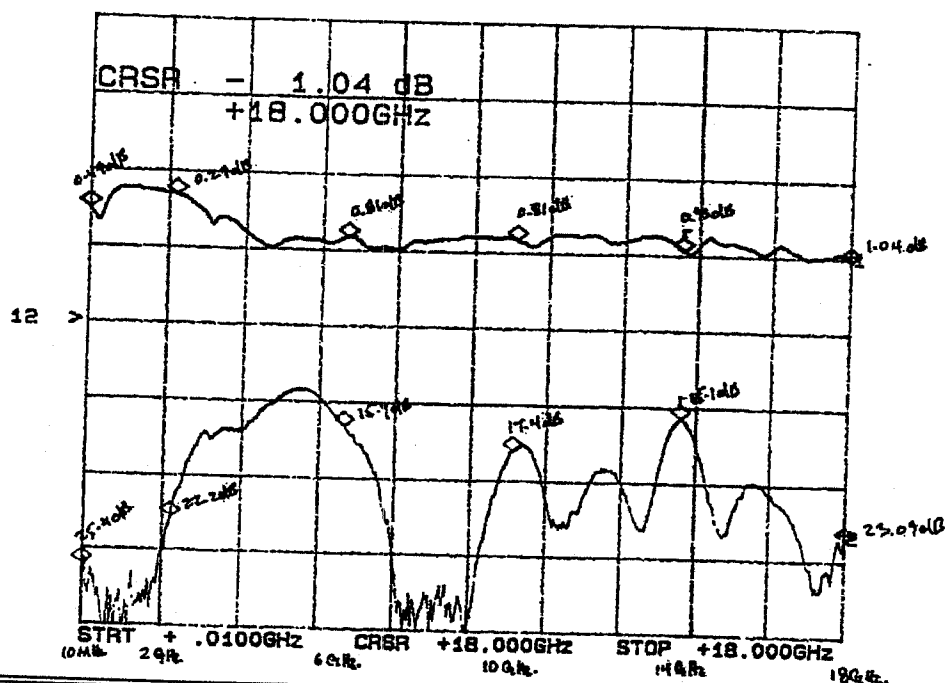


Step/99

CH1: A -M - 1.04 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M - 23.08 dB  
5.0 dB/ REF - 9.54 dB

RE-TUNED AFTER  
ROUTING, CHECKS



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.49 dB	25.4 dB
2.0 GHz	0.29 dB	22.2 dB
6.0 GHz	0.81 dB	15.9 dB
10.0 GHz	0.81 dB	17.4 dB
14.0 GHz	0.93 dB	15.1 dB
18.0 GHz	1.04 dB	23.1 dB

\*J1: INPUT ARM

July 29, 1999

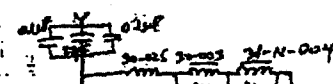
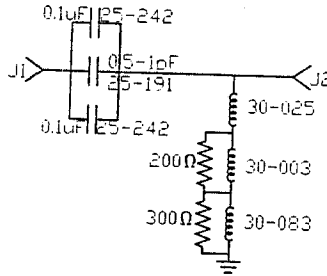
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 13 (10 MHz TO 2 GHz)

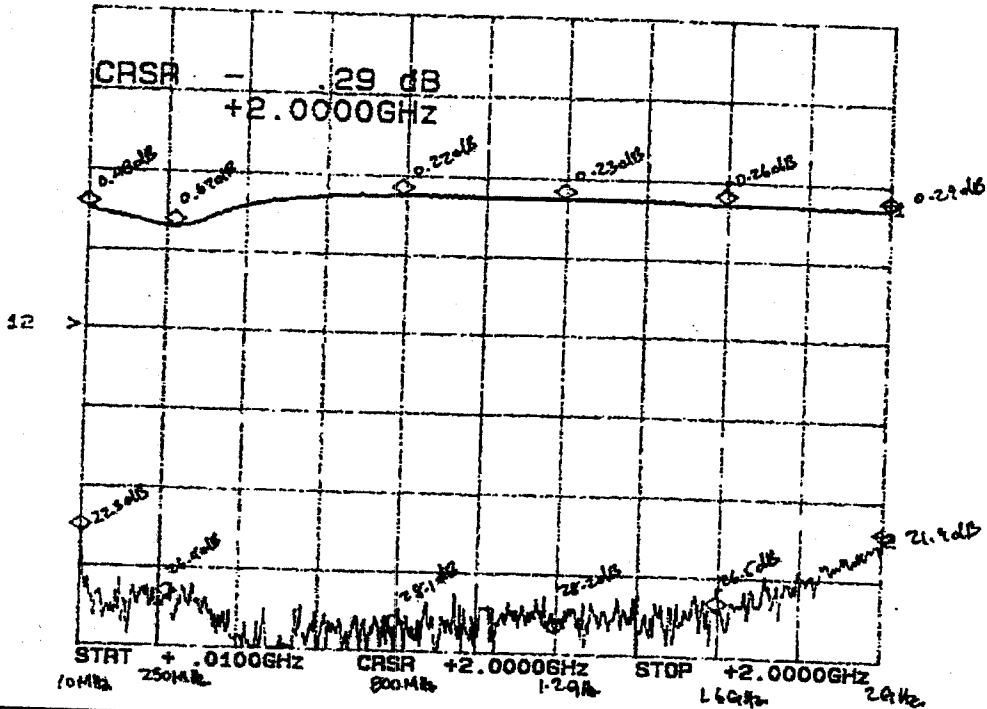
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M REF - .29 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M REF - 21.99 dB  
5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.48 dB	22.3 dB
0.23 GHz	0.67 dB	26.4 dB
0.8 GHz	0.22 dB	28.1 dB
1.2 GHz	0.23 dB	28.2 dB
1.6 GHz	0.26 dB	26.5 dB
2.0 GHz	0.29 dB	21.9 dB

\*J1: INPUT ARM

July 29, 1999

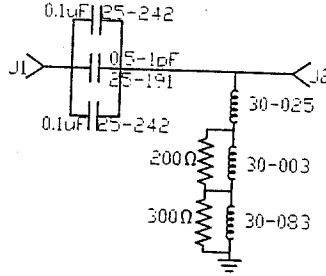


STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



STEP 13 (10 Hz TO 51.2 kHz)

INSERTION LOSS\*  
J1-J2

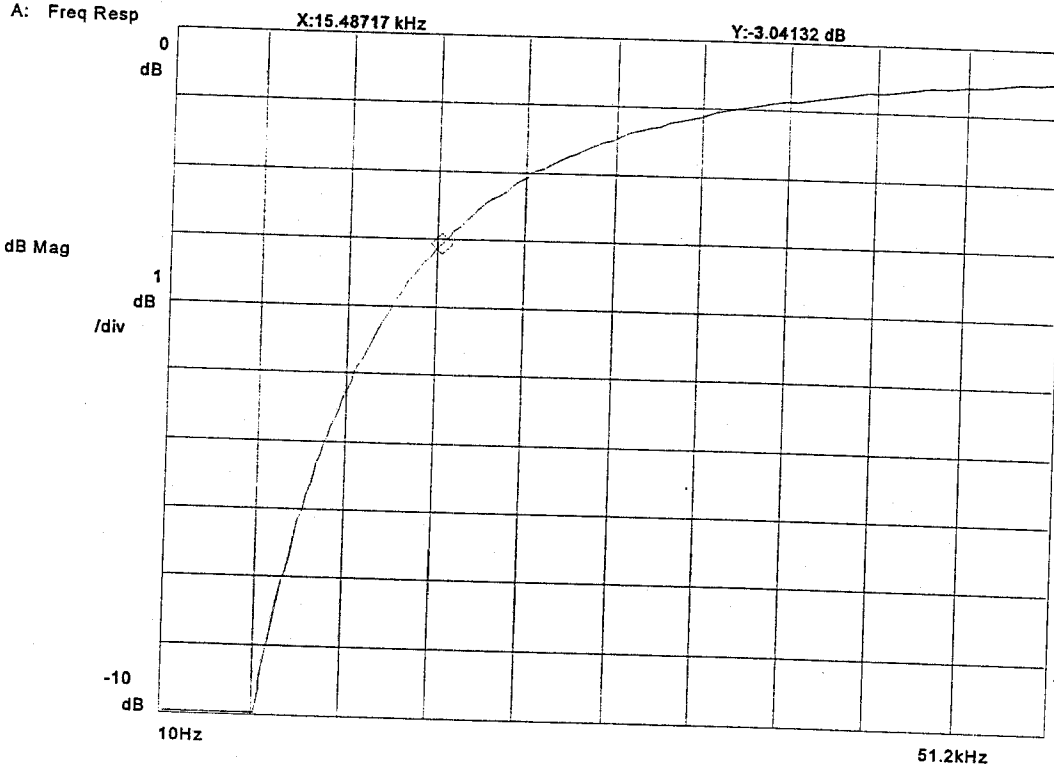


Trac Coord  
[SINE]

Data A: Freq Response  
Coord A: dB Mag

Data B: CH2 Lin Spec  
Coord B: dB Mag

Date: 07-27-98 Time: 06:40:00 PM



FREQUENCY	INSERTION LOSS
15.49 kHz	3.04 dB

\*J1: INPUT ARM

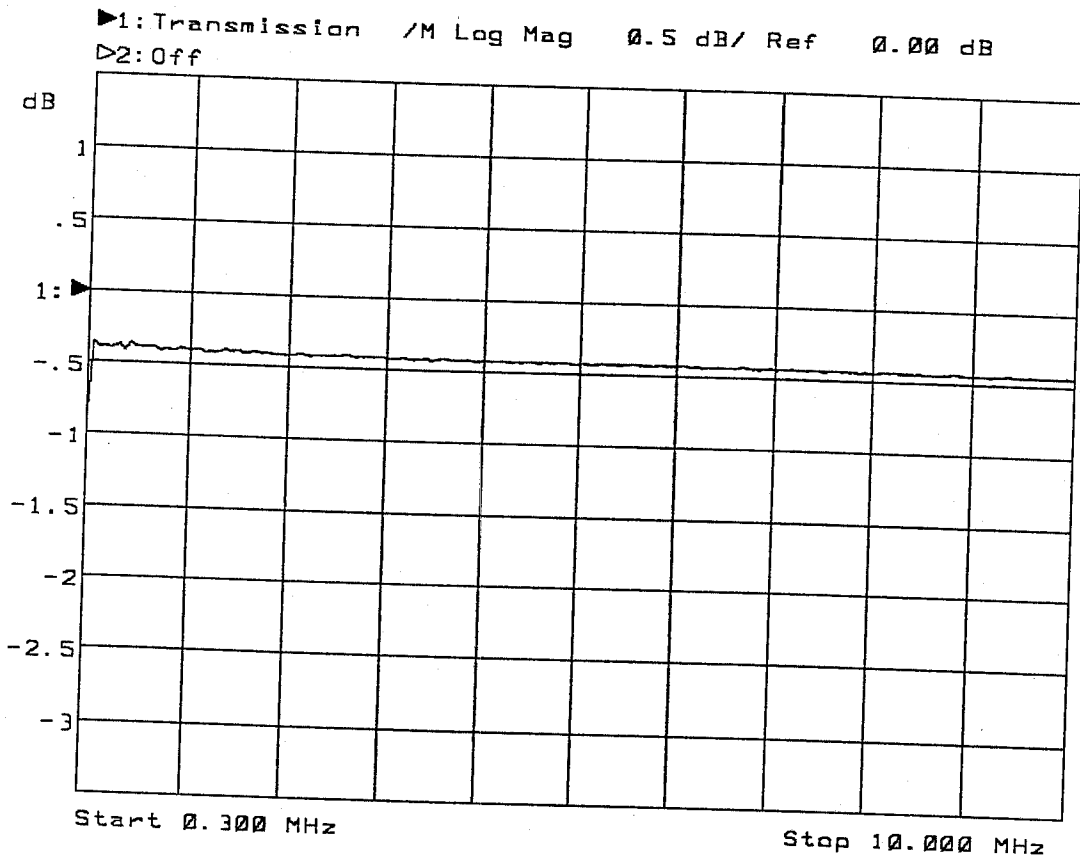
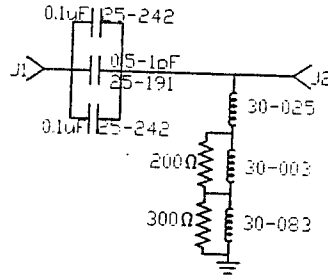
July 29, 1999

# STEP BY STEP DATA ON THE DEVELOPMENT OF BIAS T's



## STEP 13 (300 kHz TO 10 MHz)

### INSERTION LOSS\* J1-J2



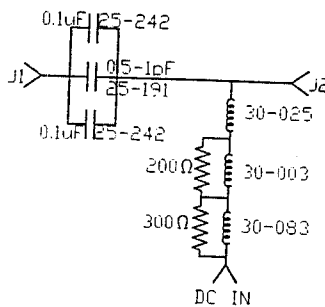
\*J1: INPUT ARM

July 29, 1999

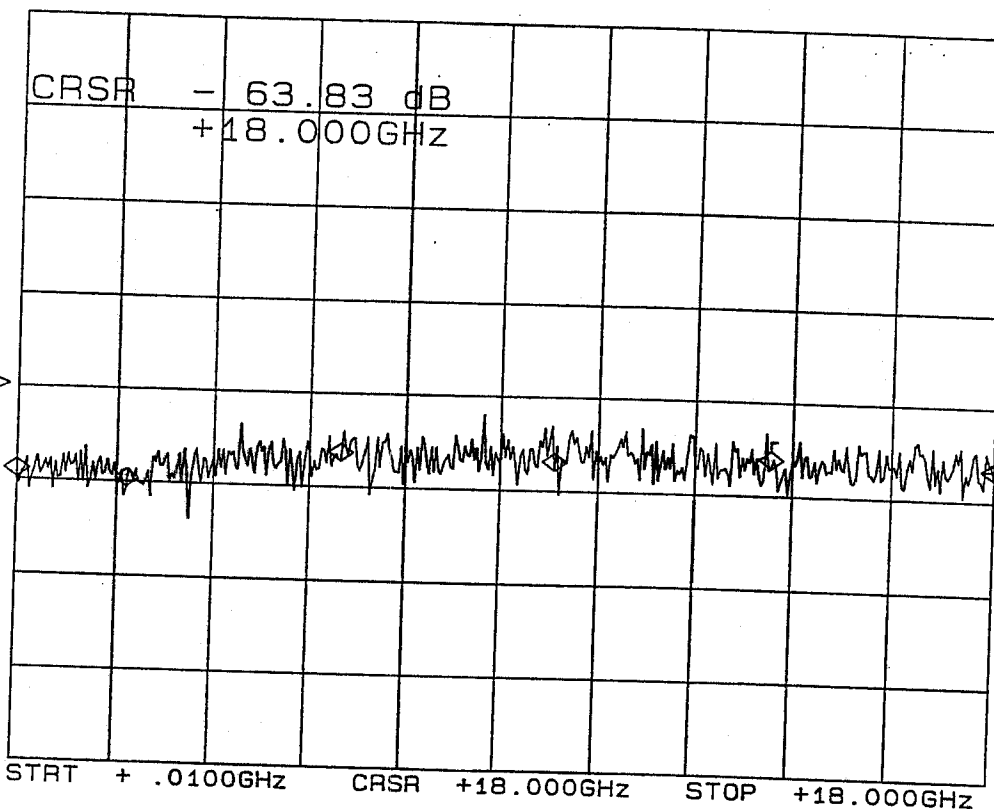
**STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's**



**ISOLATION\*  
J1-DC IN**



CH1: C -M A - 63.83 dB  
5.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
0.01 GHz	64.9 dB
2.0 GHz	65.2 dB
6.0 GHz	63.6 dB
10.0 GHz	63.9 dB
14.0 GHz	63.5 dB
18.0 GHz	63.8 dB

\*J1: INPUT ARM

July 29, 1999



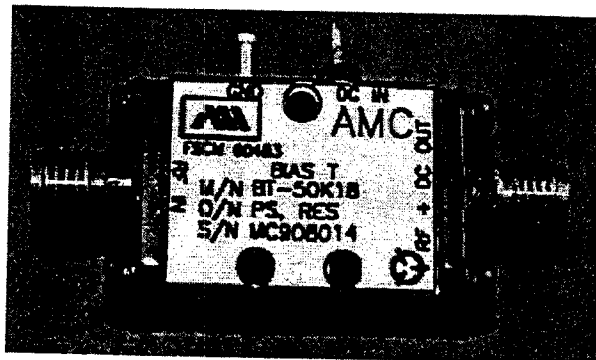
# DEVELOPMENT OF

## 50 kHz TO 18 GHz

### RESISTIVE

# BIAS T

### USABLE TO 15 kHz



BT-50K18 OPT. PS, OPT. RES

July 29, 1999

WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)

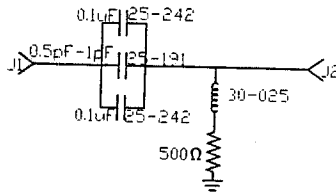
E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)

7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938

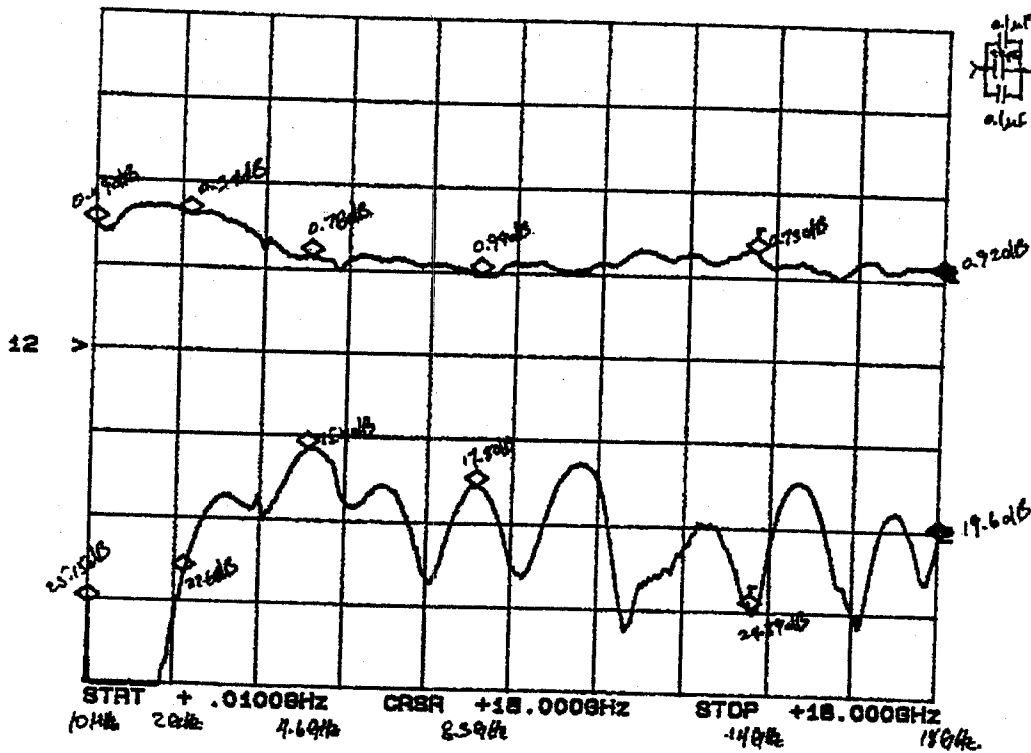
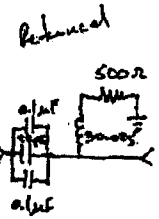
STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



INSERTION LOSS & RETURN LOSS\*  
J1-J2



CH1: A -M REF = 2.00 dB  
1.0 dB/ REF = 2.00 dB  
CH2: B -M REF = 9.54 dB  
5.0 dB/ REF = 19.88 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.49 dB	25.2 dB
2.0 GHz	0.34 dB	22.6 dB
6.0 GHz	0.78 dB	15.4 dB
10.0 GHz	0.99 dB	17.8 dB
14.0 GHz	0.73 dB	24.9 dB
18.0 GHz	0.92 dB	19.6 dB

\*J1: INPUT ARM

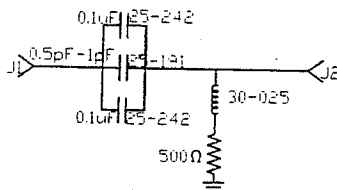
July 29, 1999

STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's



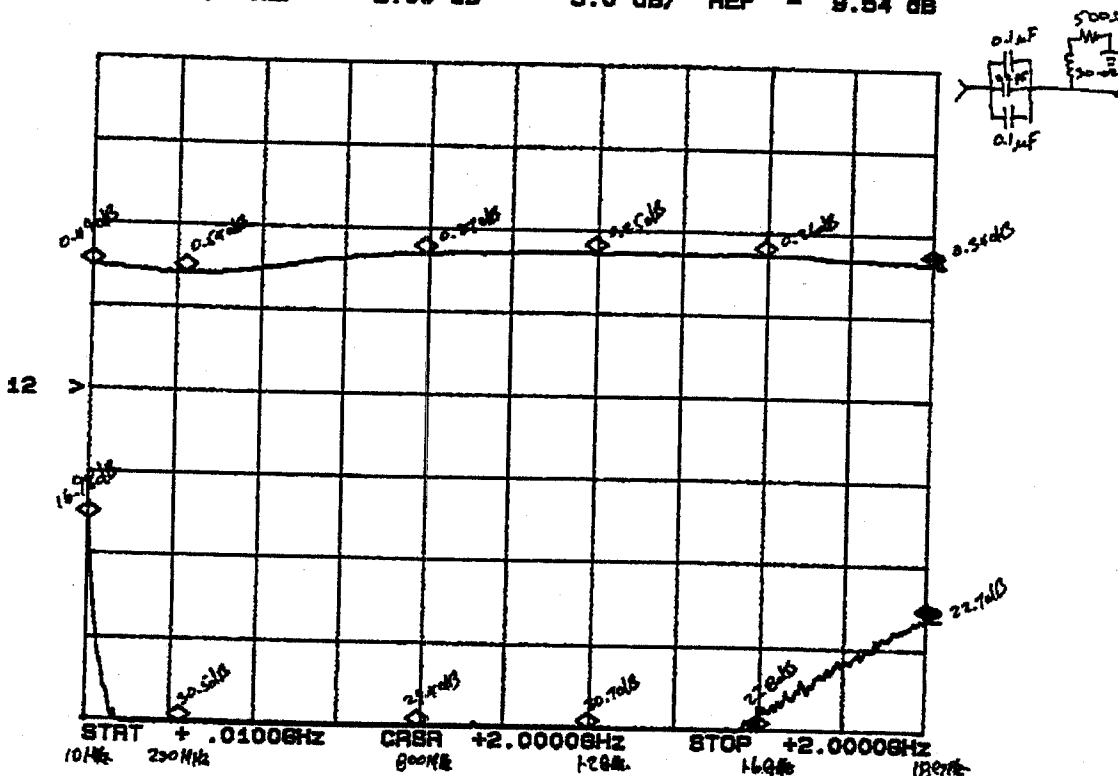
INSERTION LOSS & RETURN LOSS\*

J1-J2



CH1: A -M - 0.34 dB  
1.0 dB/ REF - 2.00 dB

CH2: B -M - 22.72 dB  
8.0 dB/ REF - 8.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.01 GHz	0.49 dB	17.0 dB
0.23 GHz	0.54 dB	30.5 dB
0.8 GHz	0.27 dB	29.4 dB
1.2 GHz	0.25 dB	30.7 dB
1.6 GHz	0.26 dB	27.8 dB
2.0 GHz	0.34 dB	22.7 dB

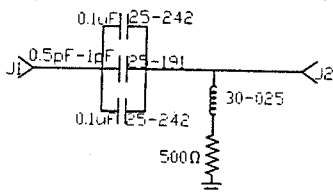
\*J1: INPUT ARM

July 29, 1999

**STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's**



**INSERTION LOSS\*  
J1-J2**



Scale

Ref Lvl A: 0

Ref Lvl B: -25

Ref Pos A: Top

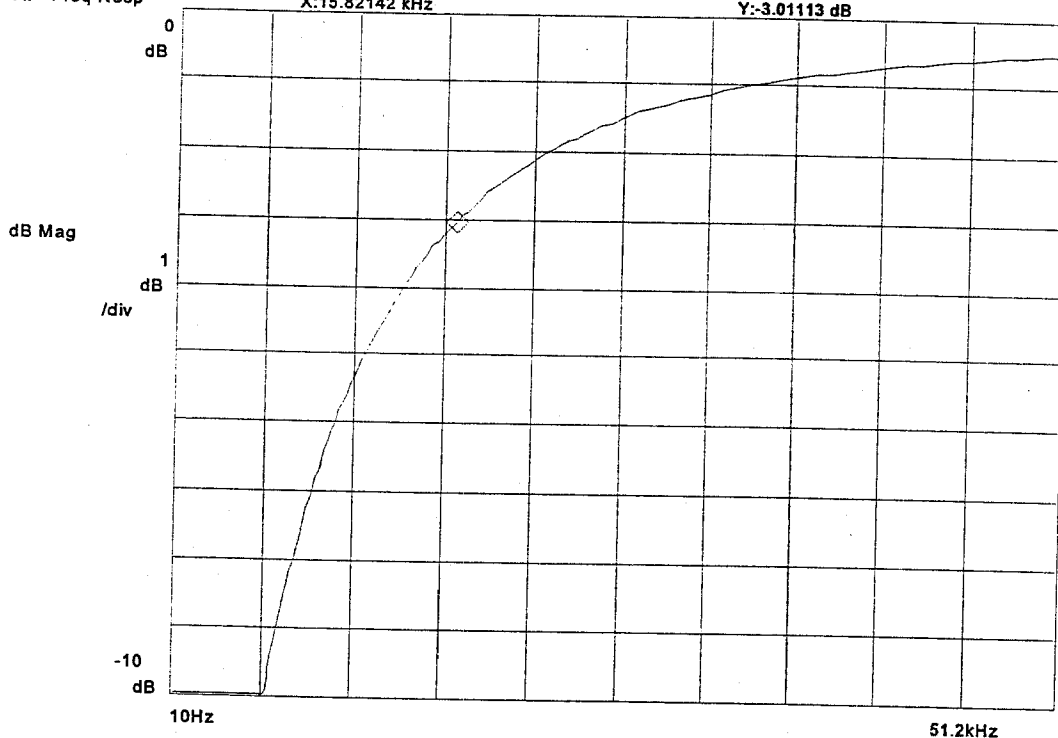
Ref Pos B: Top

Date: 07-27-98 Time: 05:23:00 PM

A: Freq Resp

X:15.82142 kHz

Y:-3.01113 dB



FREQUENCY	INSERTION LOSS
15.82 kHz	3.01 dB

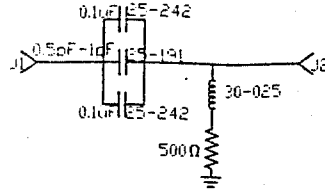
\*J1: INPUT ARM

July 29, 1999

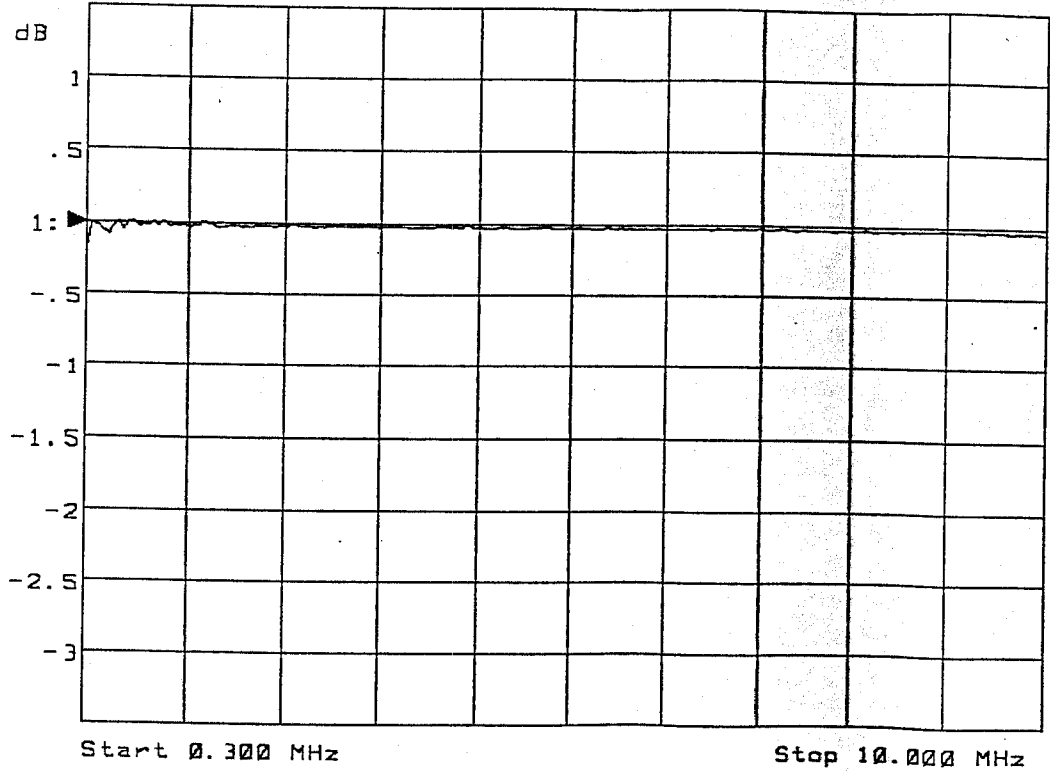
# STEP BY STEP DATA ON THE DEVELOPMENT OF BIAS T's



## INSERTION LOSS\* J1-J2



►1: Transmission /M Log Mag 0.5 dB/ Ref 0.00 dB  
▷2: Off



\*J1: INPUT ARM

July 29, 1999

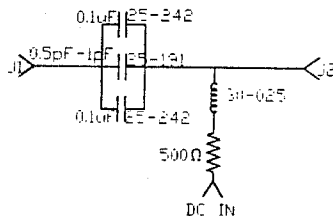


**STEP BY STEP DATA  
ON THE  
DEVELOPMENT OF BIAS T's**

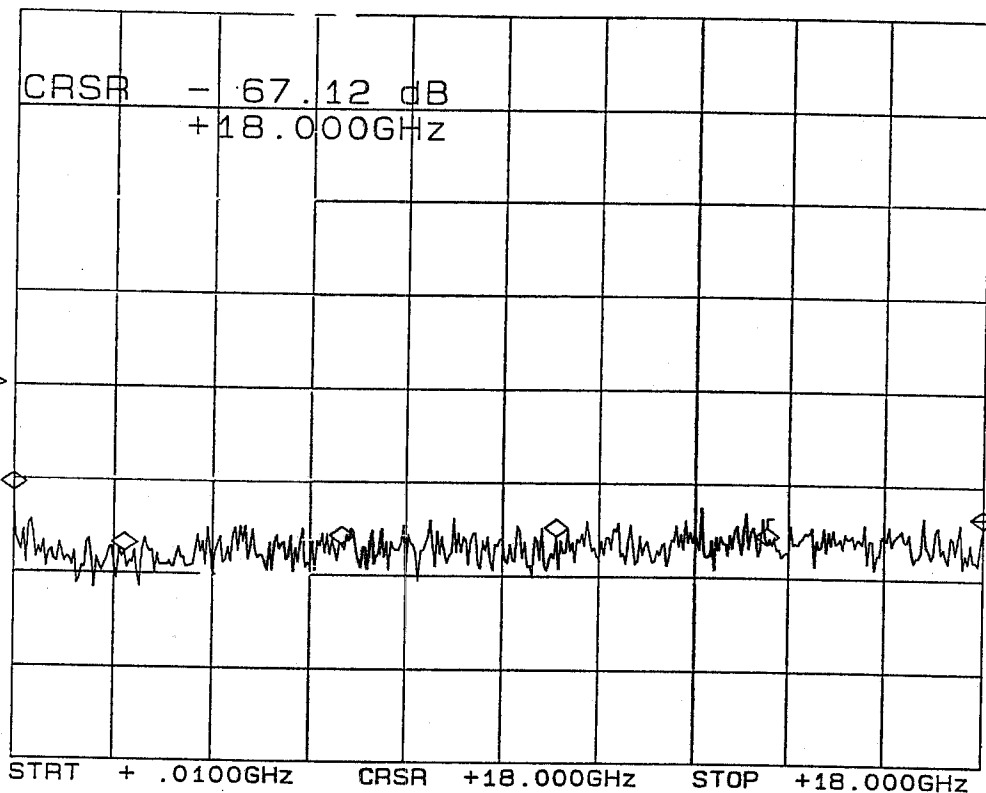


**ISOLATION\***

**J1-DC IN**



CH1: C -M A - 67.12 dB  
5.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
0.01 GHz	65.6 dB
2.0 GHz	68.8 dB
6.0 GHz	68.3 dB
10.0 GHz	67.9 dB
14.0 GHz	68.2 dB
18.0 GHz	67.1 dB

\*J1: INPUT ARM

July 29, 1999