

BRIMROSE

brimrose corporation of america

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BRIMROSE CORPORATION OF AMERICA

FOR CUSTOMER SERVICE

CALL (410) 472-7070

FOR WARRANTY REPAIRS
OR TECHNICAL SUPPORT

WARRANTY

Brimrose Corporation of America warrants that its products shall be free from defects in material and workmanship for a period of one year from the date of shipment thereof, or, the product's stated total lifetime, whichever occurs first. Within the warranty period Brimrose Corporation of America will repair or replace such products which are returned to it with its prior written authorization and which are determined by Brimrose Corporation of America to be defective. This warranty does not apply to any product which has been subjected to misuse, negligence, accident or misapplication; modified by unauthorized persons; improperly installed; or used in environments or circumstances which exceed the products guidelines as determined by Brimrose Corporation of America. Brimrose Corporation of America's responsibility is limited only to the replacement of products as described above. Furthermore, if the warranty seals are tampered with this voids the warranty. In this case, repair of the product will only be undertaken at the discretion of Brimrose Corporation of America. All authorized returned materials must be shipped back in the original container with the original shipping documents and inspection sheet.

Currently on Red
Master (Topica)
System as SF
Freq. generation

2015.02.23

-Jim

Newport

GuruGear™

QUALITY ASSURANCE DEPARTMENT

CERTIFICATE OF INSPECTION

Customer's Name **RICE UNIVERSITY**
Customer's Purchase Order Number **414392**
Description of Order **Acousto-Optic Frequency Shifter**
Part Numbers **TEF-1300-200-550**
Quantity Delivered **One**
Serial Numbers **0808-AO-8576**

The undersigned certifies that all articles included in each shipment under the above Purchase Order are in accordance with said Purchase Order and with all requirements, specifications and drawings referenced therein; and that records of inspection and test providing objective evidence of the foregoing are on file.

Mark Diezler
QUALITY ASSURANCE SUPERVISOR

2/28/08
DATE

mdies@ter@brimrose.com

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SET UP FOR AOMs: FREQUENCY SHIFTER, MODULATOR, Q-SWITCH

1. To maximize performance of the Acousto Optic cell it is necessary to properly align the cell with the incoming laser beam. Mounting the bragg cell on a multi-axis stage will facilitate this alignment. The AO cell (AOM) positioner needs the following degrees of freedom (refer to Figure A).
 - A. Rotation around the z axis
 - B. Movement along the x, y, z translations

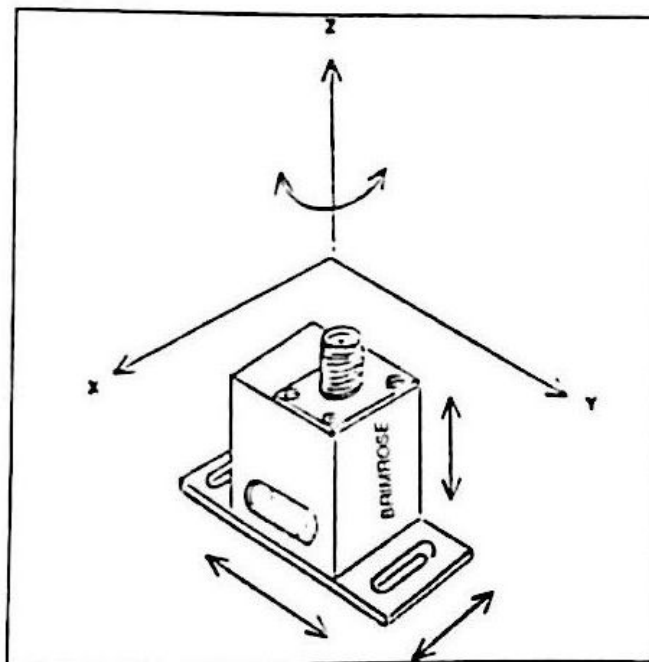


Figure A

2. Connect the Bragg Cell's SMA connector to the output SMA connector of the RF driver using a 50 ohm impedance matched cable. Adjust, if applicable, the RF output of the driver to its minimum value. Apply power to the RF driver; if applicable, increase RF power slowly until the maximum RATED power level of the bragg cell is reached.

WARNING: DO NOT APPLY POWER TO RF DRIVER IF IT IS NOT CONNECTED TO THE BRAGG CELL.
NEVER EXCEED THE MAXIMUM SPECIFIED RF POWER LEVEL FOR THE BRAGG CELL.

* AOM is symmetric w/ respect to diffract order

Set-Up For Frequency Shifter/Modulator/Q-Switch
Page 2

3. Set the incoming collimated laser beam as shown in Figure B.
 - A. It is necessary to shape the laser beam to a size equal to but not larger than the acoustic beam height (transducer electrode height). This can be done using the proper lenses.
With regard to Modulators, the laser beam must be focused down to a size indicated in the device specifications as "Beam Diameter Inside Crystal" to achieve the specified rise time and modulation bandwidth.
 - B. Position the focused beam into the approximate center of the bragg cell crystal element.
 - C. Turn the bragg cell toward the laser beam with an angle adjusted to the bragg angle stated on the test data sheet. (Q_0)
 - D. Position the laser beam as close as possible to the transducer of the cell. You will not be able to see the transducer; however, this is the label side of the device. This can be accomplished by using the "Y" direction of the translation stage.

Using the "Z" direction of the translation, move the cell vertically until the laser beam intersects the acoustic beam. This will be evident by the emergence of the first order diffracted light from the bragg cell.

- F. Maximize the intensity of the first order diffracted beam by slightly varying any or all of the "x, y, z" transitions.

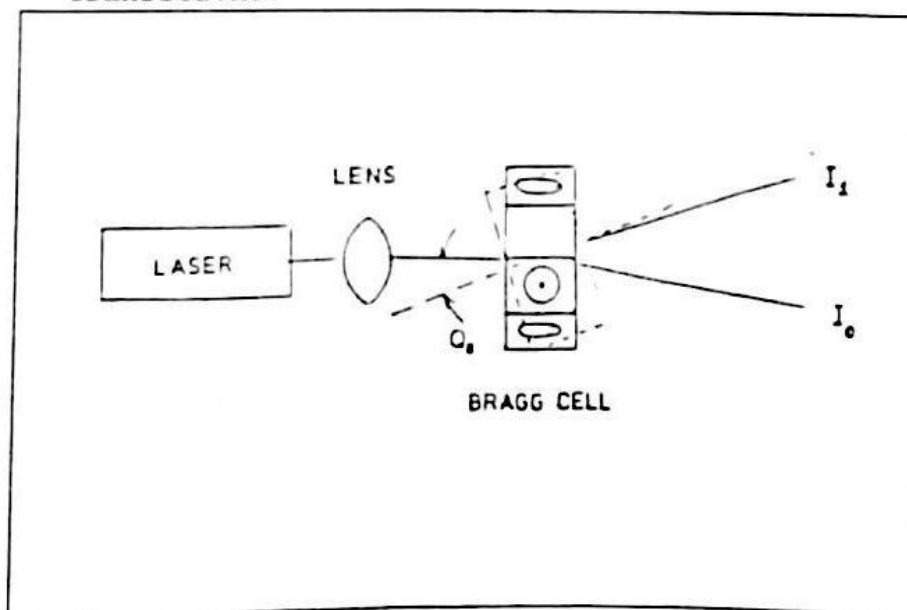
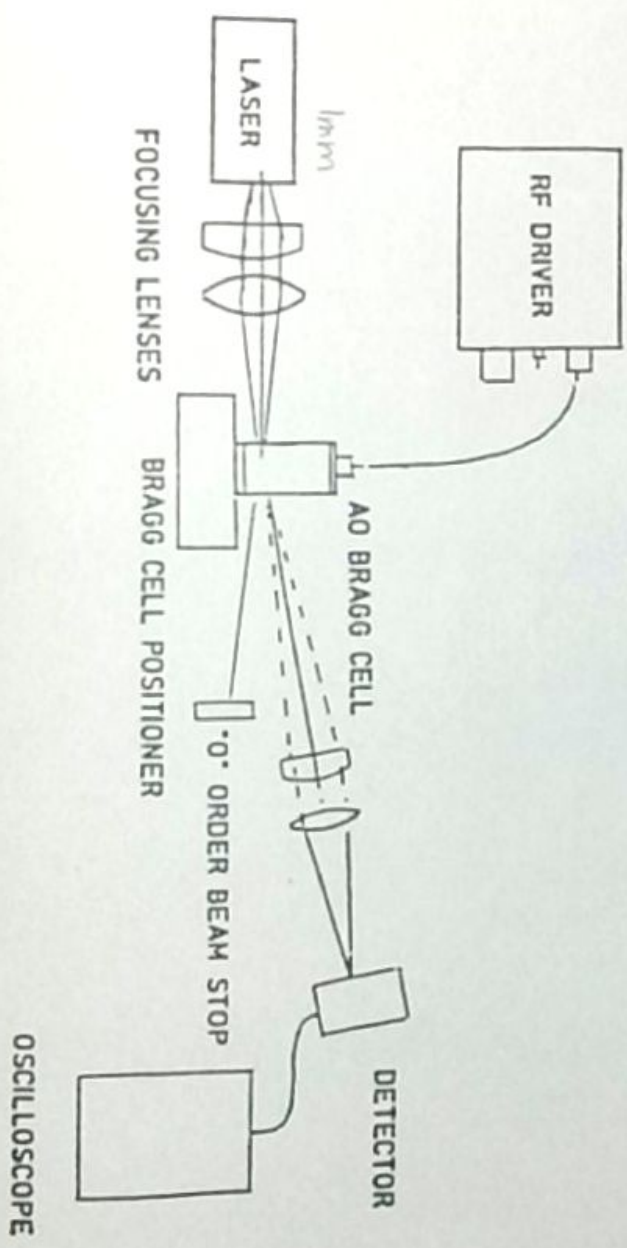


Figure B

$$\frac{16 D \omega_0}{\lambda} = f$$

70 μ m

RECOMMENDED TEST SET-UP



Ahn Carla

pack #contact
A

ACOUSTO OPTIC FREQUENCY SHIFTER

MODEL NO.: TEF-1300-200-550

SERIAL NO.: 0808-AO-8576

RMA MD 490908
-01

req'd
 $2w_0 = 600 \mu\text{m}$
f

$\frac{1}{\lambda^2}$

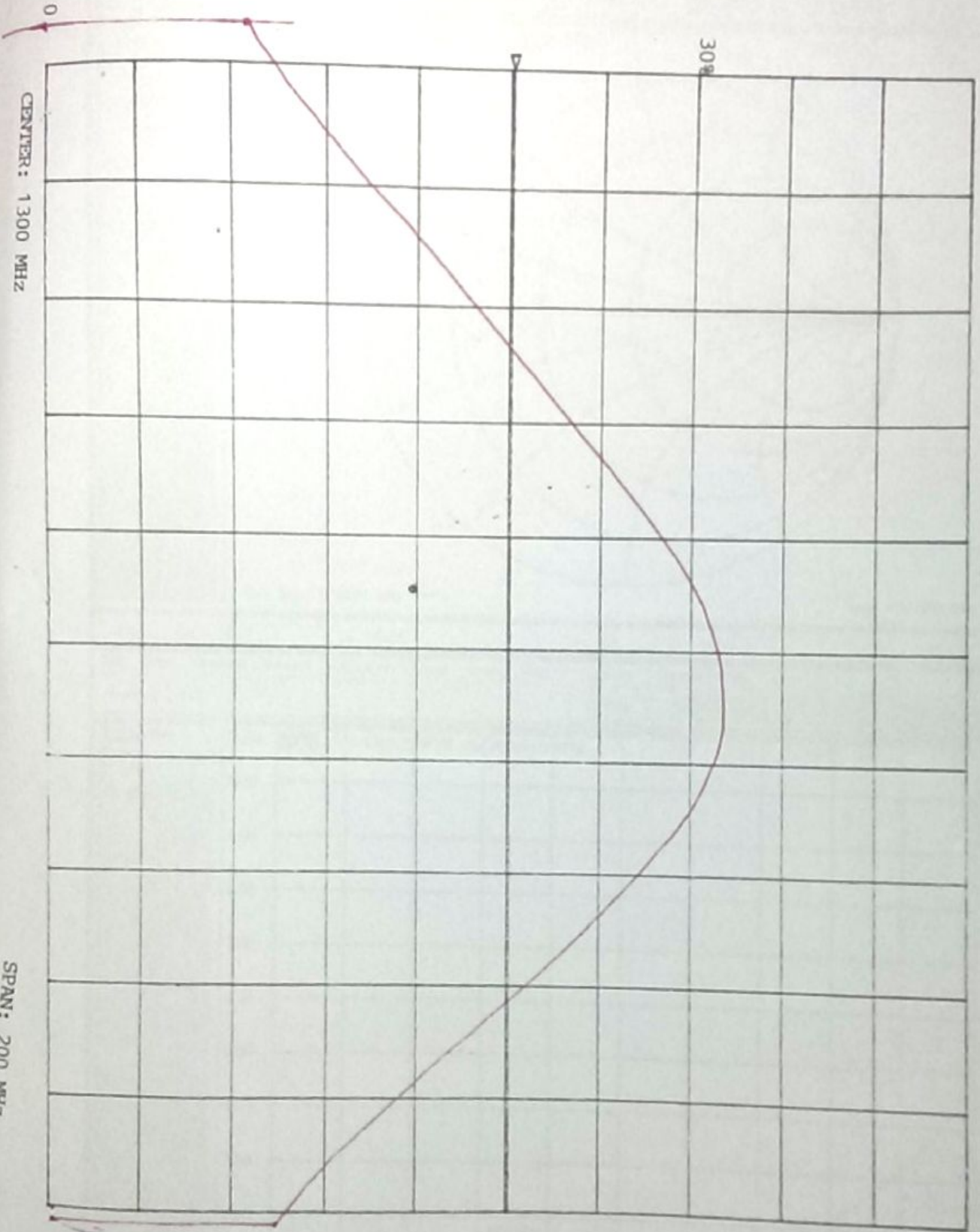
$\frac{1}{\lambda^2}$

	SPECIFICATIONS	TEST DATA
Laser Wavelength	450 - 700 μm	543 μm
Substrate	TeO ₂	TeO ₂
Optical Power Density	5 W/mm ²	5 W/mm ²
Center Frequency	1300 MHz	1300 MHz
Bandwidth (3dB)	200 MHz	200 MHz
Active Aperture	0.075 mm	0.075 mm
Optical Transmission	95%	95%
Extinction Ratio	> 1000:1	> 1000:1
Diffraction Efficiency	~ 30%	30
Wave Front Distortion	$\lambda/10$	$\lambda/10$
Bragg Angle	85 mrad @ 550nm	85 mrad @ 550nm
Separation Angle	170 mrad	170 mrad
Acoustic Velocity m/sec	4.2E+3	4.2E+3
Maximum RF Power	1 Watt	1 Watt
Input Impedance	50 ohms	50 ohms
V S W R	2:1:1	2:1:1
Optical Polarization	Horizontal or Vertical	Vertical
RF Connector	SMA	SMA

~ 4.9°

went up to 1.2W

Bandwidth/Diffraction efficiency plot. Data taken with vertically polarized 543nm laser
TEF-1300-200-550
s/n: 0808-Ao-8576



Marker 2 of 3

Marker 1 1.30000000 GHz

Marker 4

Marker 5

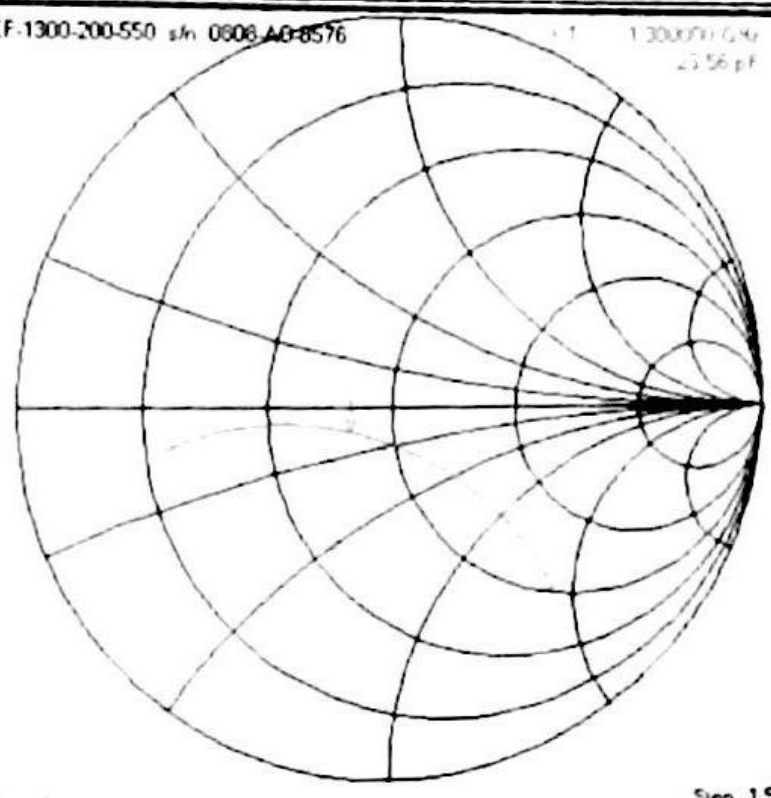
Marker 6

OH

S11 Smith
1.000U/
1.000U

TEF-1300-200-550 s/n 0808-AD-8576

1.300000 GHz 24.71 Ω
23.56 pF 5.136 Ω



Ch1 Start 1.10000 GHz

Step 1.50000 GHz

Status CH1 S11 C 1 Port

LCL

Format 2 of 3

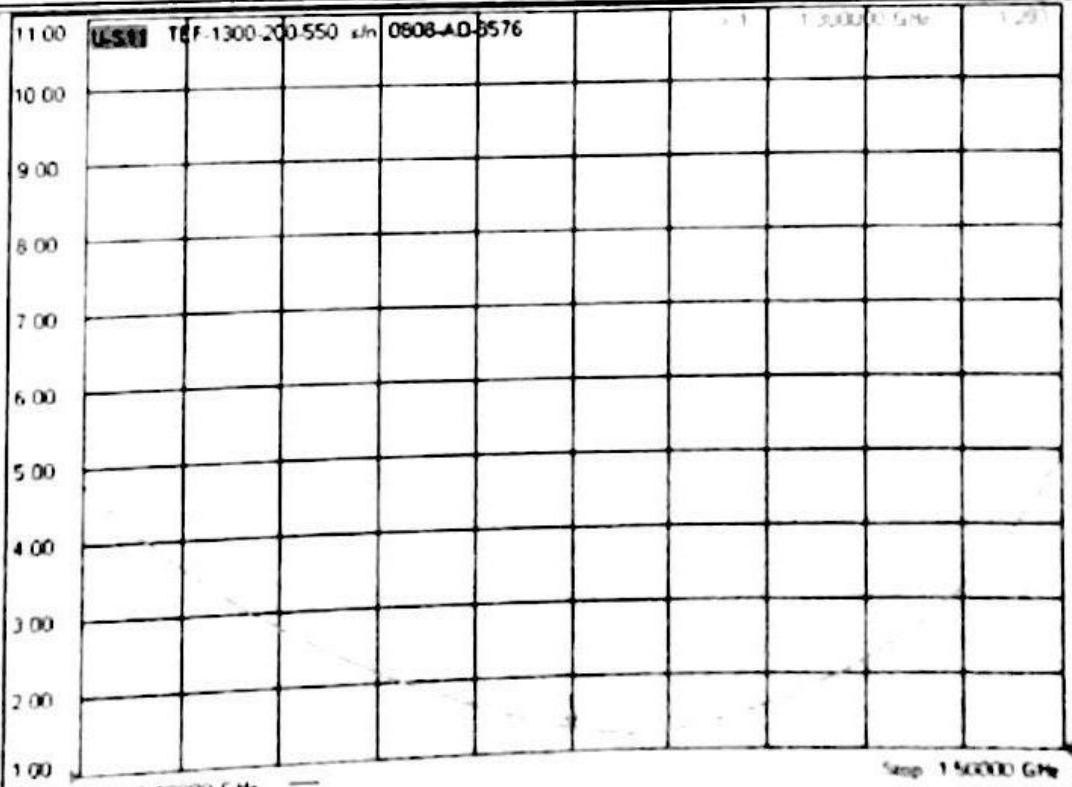
Polar

Linear Mag

SWR

Real

S11: SWR
1.000U/
1.000U



Ch1 Start 1.10000 GHz

Step 1.50000 GHz

Status CH1 S11 C 1 Port

LCL

Marker 2 of 3

Marker 1 1.10000000 GHz

Marker 4

Marker 5

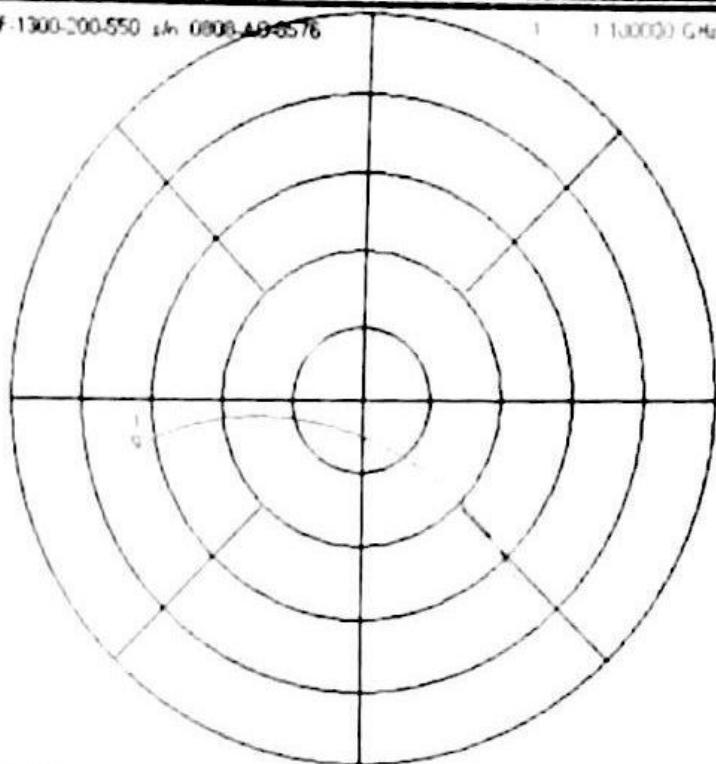
Marker 6

Off

S11 Plot
10000
10000

TEF-1300-200-550 uH 0808-AD-8576

1 1.10000 GHz -4.417 dB
1.904 uS



Ch1 Start 1.10000 GHz

Stop 1.50000 GHz

Status CH1 S11

C 1-Port

LCL

Marker 2 of 3

Marker 1 1.50000000 GHz

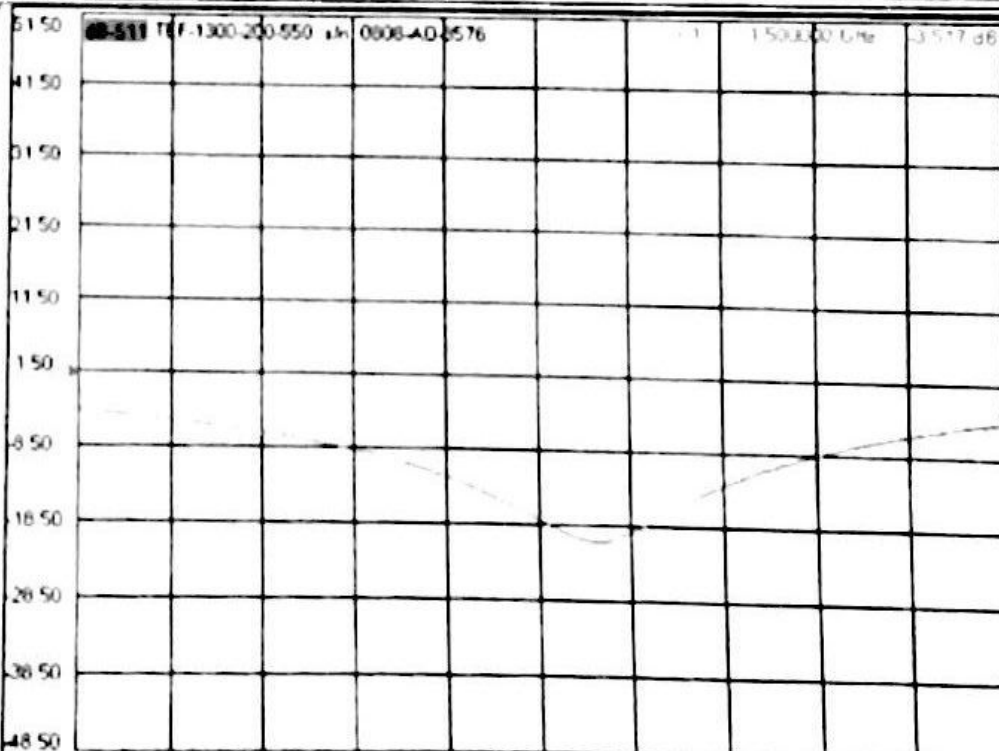
Marker 4

Marker 5

Marker 6

Off

S11 Log Mag
10.000dB
1.500dB



Ch1 Start 1.10000 GHz

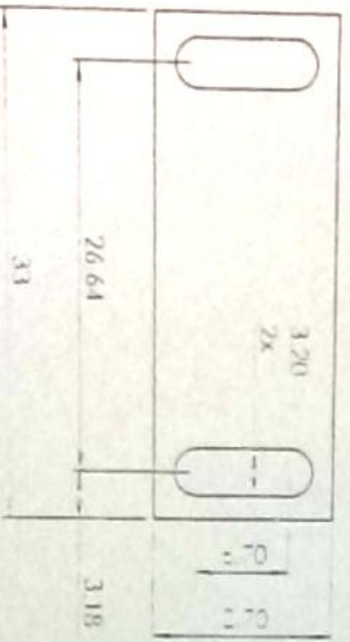
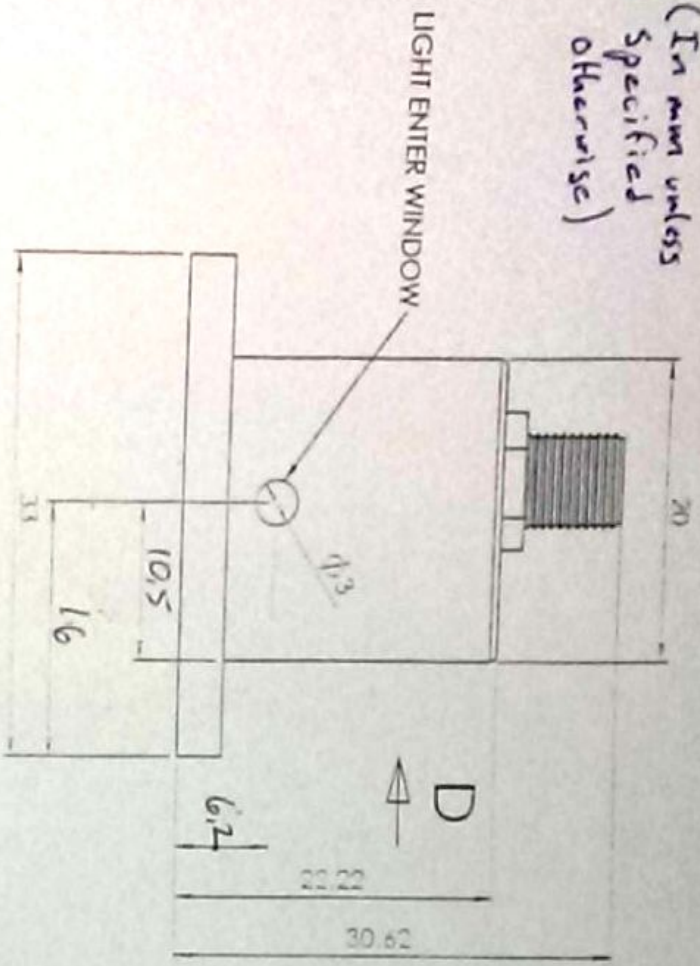
Stop 1.50000 GHz

Status CH1 S11

C 1-Port

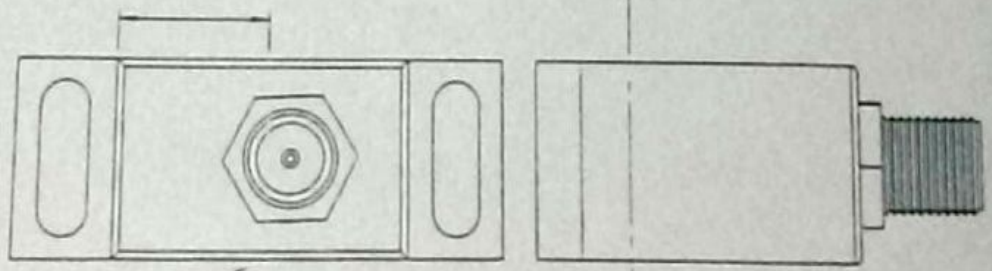
LCL

(In mm unless
 specified
 otherwise)



Laser Path

Bragg Angle



+1 Order

REVISION	DATE
1.0	12/15/2003
1.1	11/05/2007

0808 A08576
 BRIMROSE CORP. OF AMERICA

(case #200)

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