

## **ENGINEERING EXHIBIT**

### **Application for Auxiliary Antenna License**

prepared for

#### **Liberman Broadcasting of Houston License LLC**

KTJM(FM) Port Arthur, TX

Facility ID 20489

Ch. 253C 98.5 MHz 100 kW 537 m

*Liberman Broadcasting of Houston License LLC* (“*Liberman*”) is licensee of KTJM(FM), Ch. 253C, Port Arthur, TX (BLH-20071113AGU). *Liberman* has completed construction related to an auxiliary antenna for KTJM, as authorized in its construction permit (“CP,” file number BXPB-20080117AAY). The CP authorizes an auxiliary antenna side-mounted at the main KTJM site, with 100 kW effective radiated power (“ERP”) and an antenna height above average terrain (“HAAT”) of 537 meters.

The transmitting antenna is manufactured by Dielectric, model number DCRM-10B77. As with the main antenna, the auxiliary antenna is shared with *Liberman’s* station KQQK(FM) (Ch. 300C, Beaumont, TX). KQQK is also authorized to employ the same side-mounted antenna as an auxiliary antenna under a separate CP (BXPB-20080117AAZ). A separate license application for KQQK is being filed contemporaneously with the instant KTJM application. The shared KTJM/KQQK auxiliary antenna consists of ten circularly polarized sections, spaced at intervals of 0.751 wavelength on KTJM’s frequency (98.5 MHz). **Table 1** supplies a summary of the antenna gain and transmission line loss figures, and shows that the required KTJM transmitter power output is 28.8 kW to achieve 100 kW ERP.

Upon construction of the KTJM and KQQK auxiliary facilities, the applicant conducted spurious emissions measurements with both stations simultaneously utilizing the shared antenna. A spectrum analyzer was employed to verify system performance with respect to occupied bandwidth, harmonic attenuation, and intermodulation products between the two stations. No intermodulation emissions were detectable. The measurements showed that the KTJM and KQQK auxiliary facilities

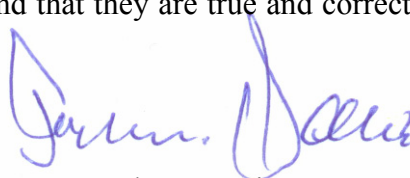
are in compliance with Sections 73.317(b) through 73.317(d) of the FCC's rules, as summarized in the following.

- §73.317(b): Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive was found to be attenuated at least 25 dB below the level of the unmodulated carrier.
- §73.317(c): Any emission appearing on a frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz was found to be attenuated at least 35 dB below the level of the unmodulated carrier.
- §73.317(d): Any emission appearing on a frequency removed from the carrier by more than 600 kHz was found to be attenuated at least  $43 + 10 \log_{10}(\text{Power, in watts})$  dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

The existing transmitter combiner system for the main antenna is also employed for auxiliary antenna operations. For shared use, the auxiliary antenna is engaged by switching the combiner's output to feed the auxiliary antenna instead of the main antenna. Manufacturer's measured test data of the transmitter combining system is supplied in the attached **Appendix 1**.

### **Certification**

The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.



Joseph M. Davis, P.E.  
April 3, 2009

**Chesapeake RF Consultants, LLC**  
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Manassas, VA 20112  
703-650-9600

### List of Attachments

Table 1	Auxiliary Antenna / Line System Gains and Losses
Appendix 1	Combiner Measured Data

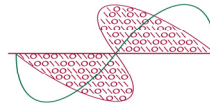


Table 1

**Auxiliary Antenna / Line System Gains and Losses**

prepared for

**Liberman Broadcasting of Houston License LLC**

KTJM(FM) Port Arthur, TX

Construction Permit File Number: BXPB-20080117AAY

<b>Authorized Effective Radiated Power:</b>	<b>100 kW</b>	<b>20.00 dBk</b>
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**Antenna System**

Dielectric DCRM-10B77	Power Gain:	4.5	6.53 dB
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<b>Antenna Input Power:</b>	<b>22.2 kW</b>	<b>13.47 dBk</b>
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**Line and Other Losses**

Transmission Line	Loss:	0.94 dB
Dielectric Rigid 6 inch		

Combiner	Loss:	0.18 dB
Dielectric		

<b>Total Losses:</b>	<b>1.12 dB</b>
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<b><u>Transmitter Power Output:</u></b>	<b>28.8 kW</b>	<b>14.59 dBk</b>
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## **Appendix 1**

### **Combiner Measured Data**

#### **Liberman Broadcasting of Houston License LLC**

KTJM(FM) Port Arthur, TX

Facility ID 20489

Ch. 253C 98.5 MHz 100 kW 537 m

# Dielectric

Date

2/28/06

Item

98.5/107.9 FM COMBINER

Work order number

2817850

Part number

102256

Sales order number

82640

Customer

LIBERMAN

Customer Specs.

Customer part number

Comments:

Frequency

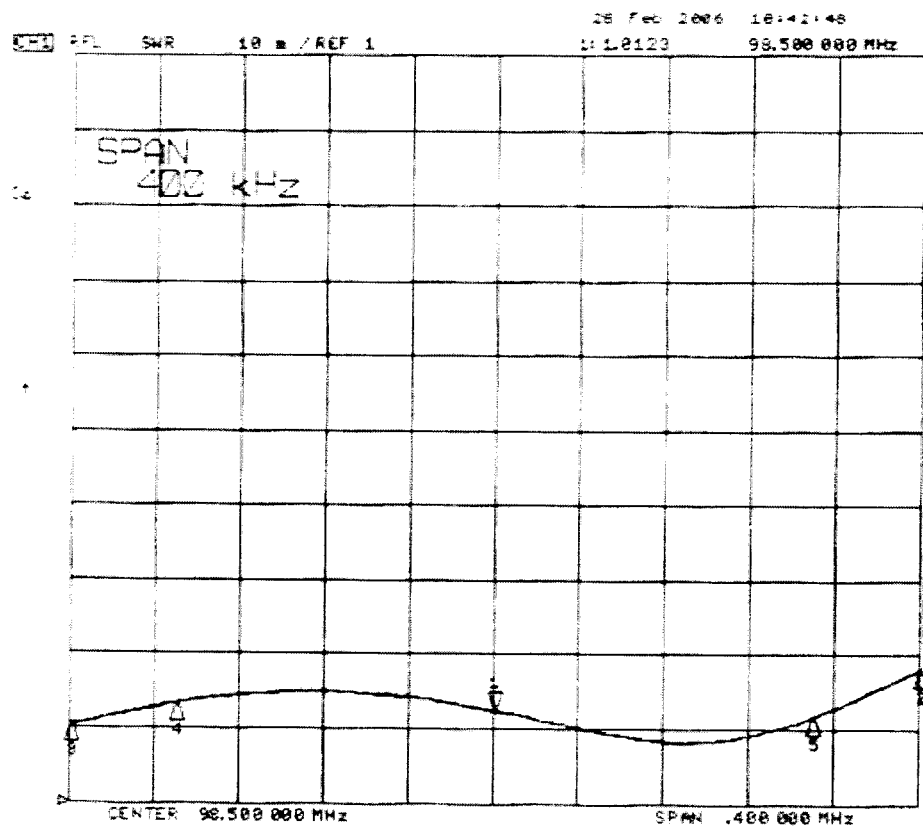
98.5/107.9+-2MHZ

Call Sign

Tested by

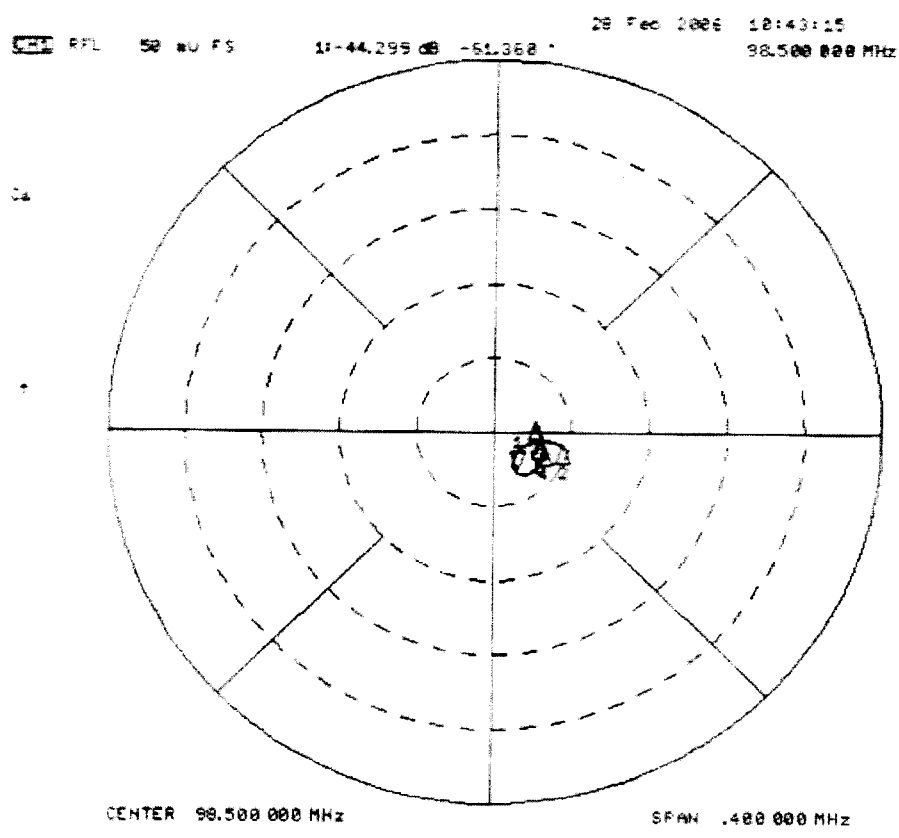
DALLAS MUSZYNSKI

985



VSWR

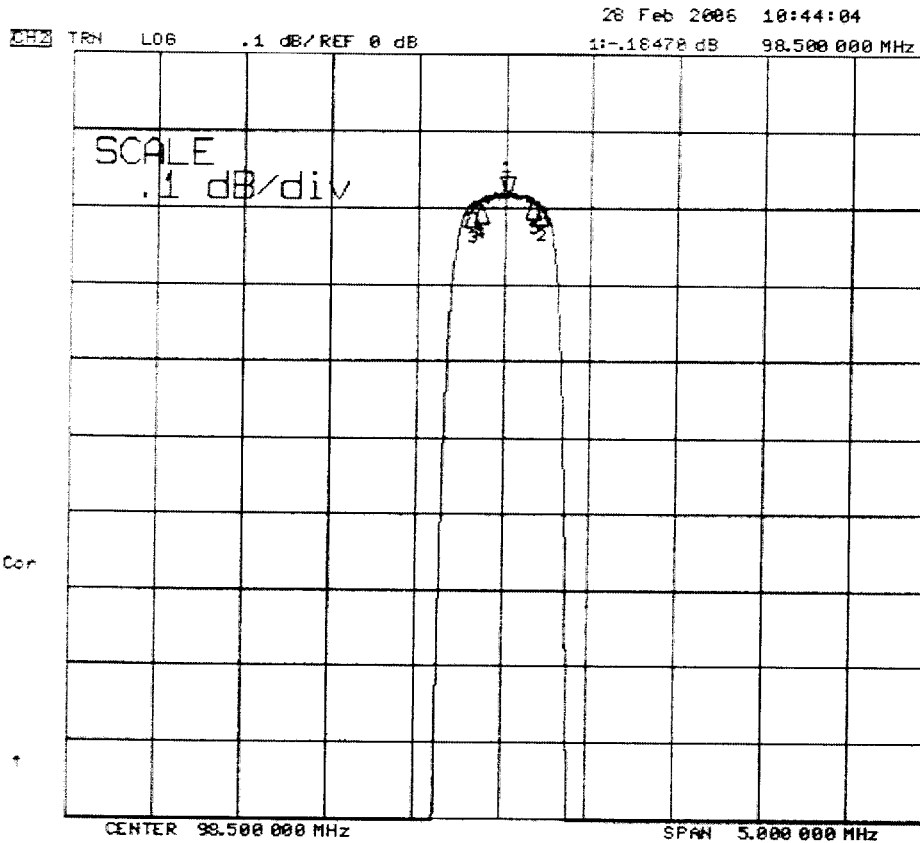
- CH1 Markers
- 2: 1.0116  
98.7000 MHz
  - 3: 1.0132  
98.3000 MHz
  - 4: 1.0132  
98.3500 MHz
  - 5: 1.0116  
98.6500 MHz



Return Loss

- CH1 Markers
- 2: -40.919 dB  
-11.902 °  
98.7000 MHz
  - 3: -45.499 dB  
-13.664 °  
98.3000 MHz
  - 4: -43.503 dB  
-19.218 °  
98.3500 MHz
  - 5: -44.633 dB  
-13.628 °  
98.6500 MHz

98.5



Insertion Loss

CH2 Markers

2: -19.978 dB  
98.7000 MHz

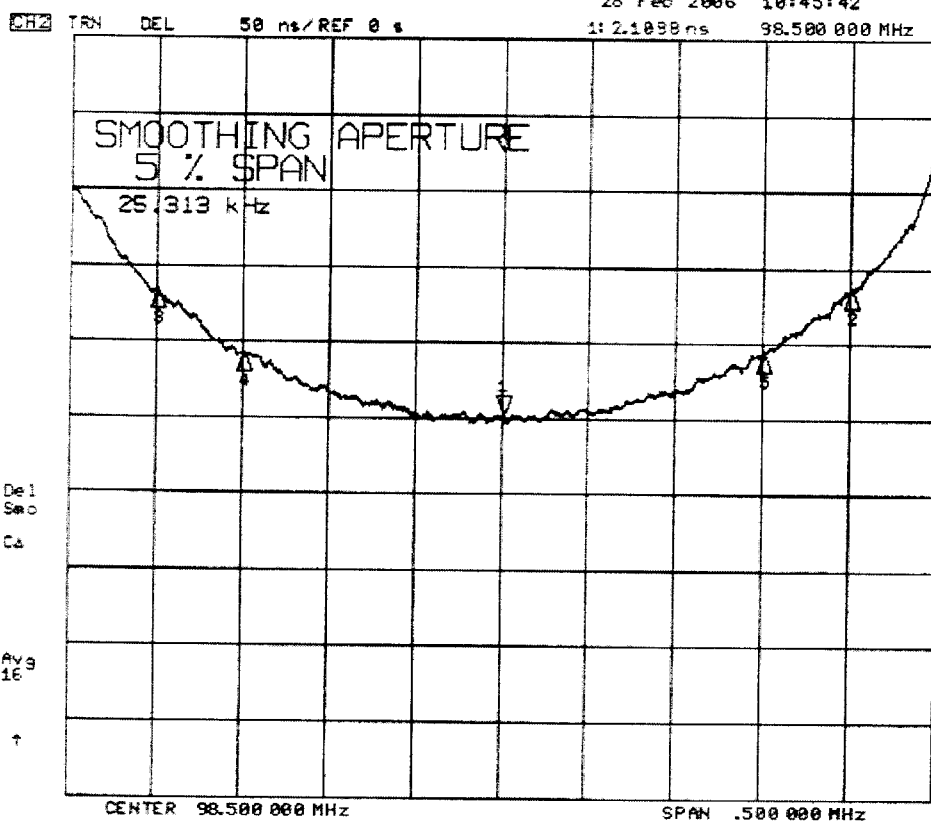
3: -20.128 dB  
98.3000 MHz

4: -19.700 dB  
98.3500 MHz

5: -18.900 dB  
98.6500 MHz

Cor

↑



Group Delay

CH2 Markers

2: 85.145 ns  
98.7000 MHz

3: 83.488 ns  
98.3000 MHz

4: 42.649 ns  
98.3500 MHz

5: 43.854 ns  
98.6500 MHz

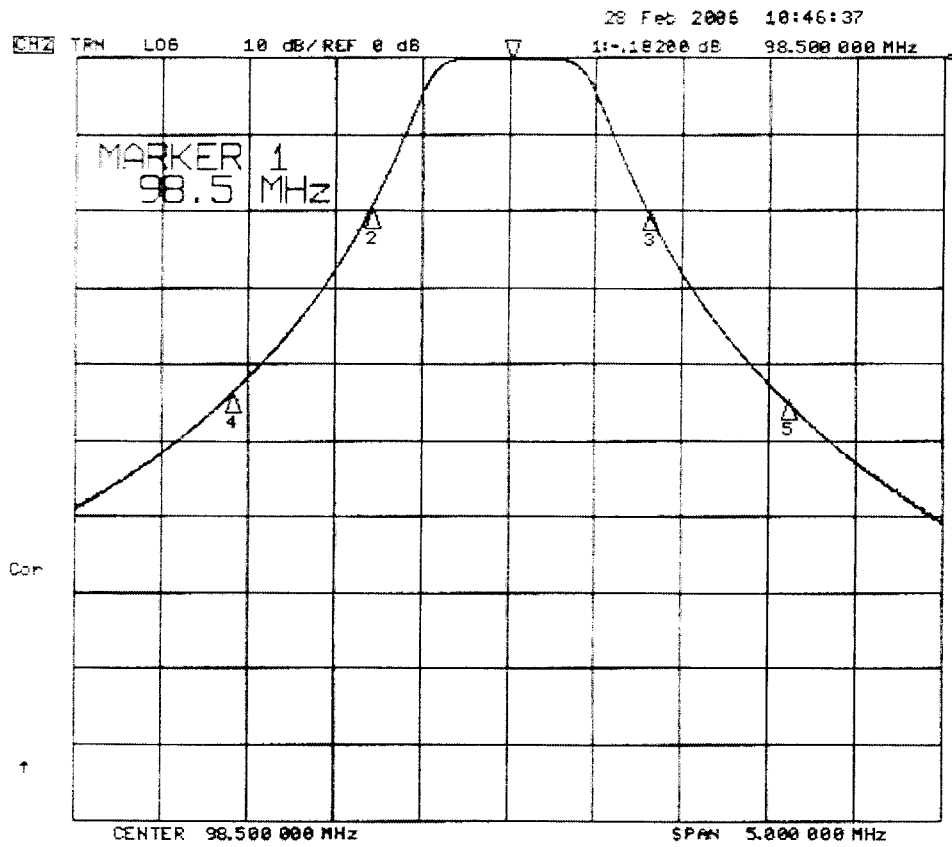
Del  
Sec  
Ca

Avs  
16

↑

98.5

filter Response



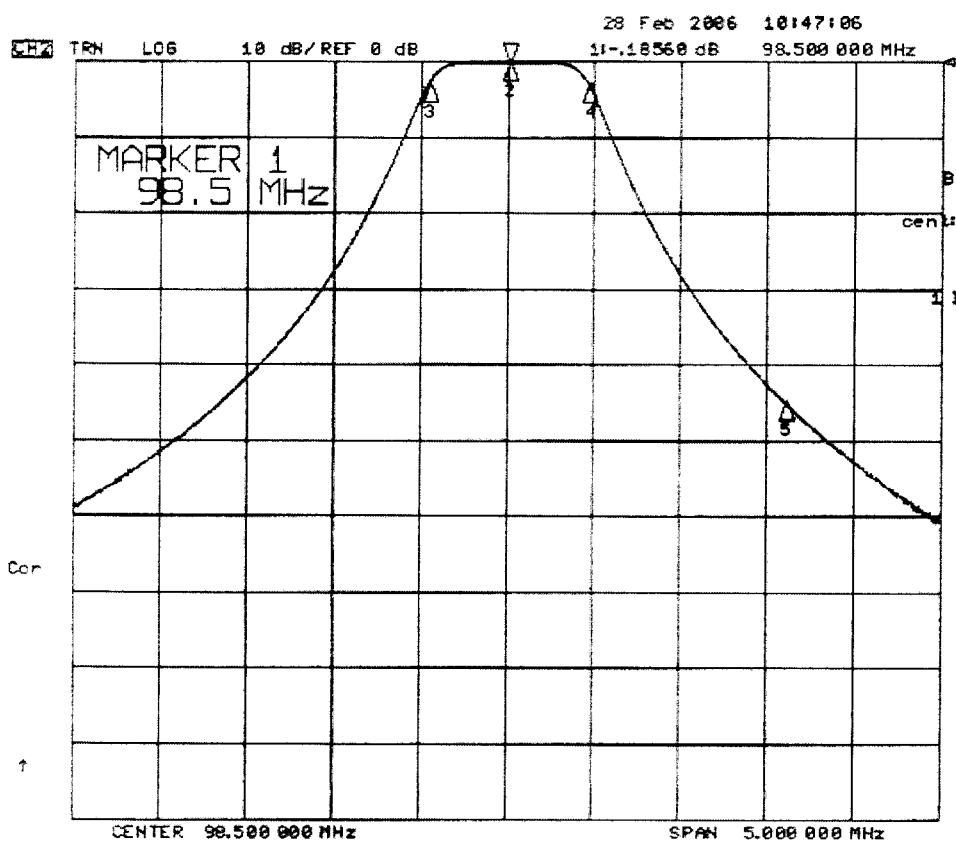
CH2 Markers

2: -19.885 dB  
97.7000 MHz

3: -20.287 dB  
99.3000 MHz

4: -43.984 dB  
96.9000 MHz

5: -44.960 dB  
100.100 MHz



Bandwidth/EC Plot

CH2 Markers

Band: .918056 MHz

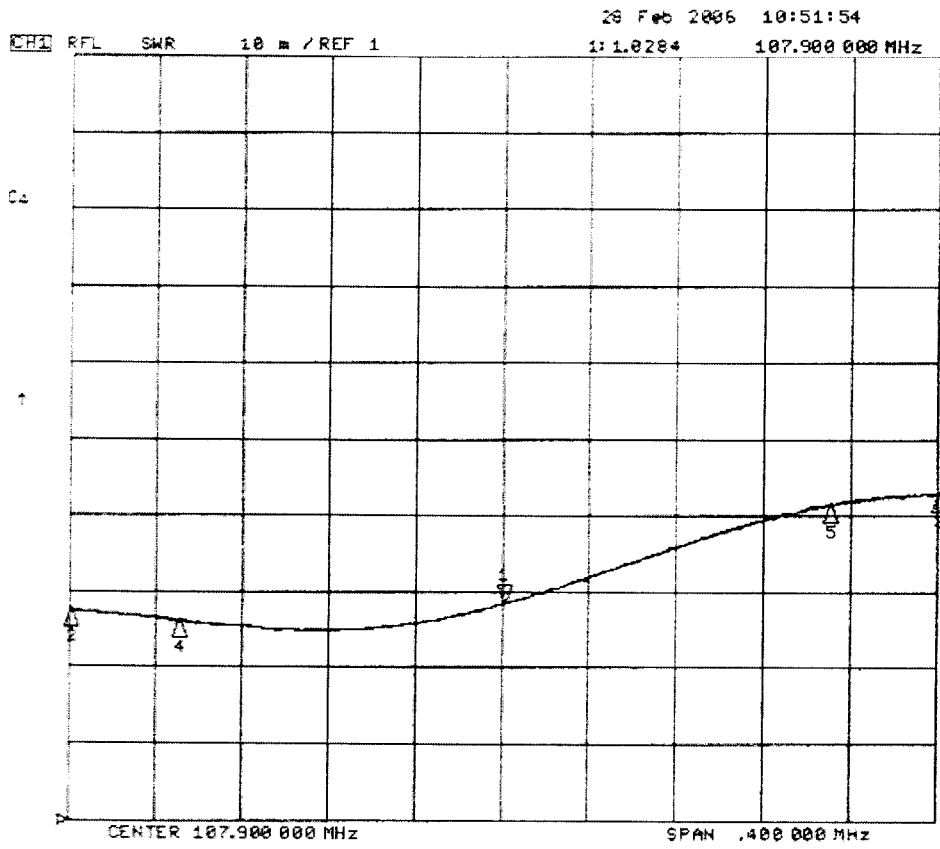
cent: 98.500356 MHz

Q: 107.29

1 loss: -18.560 dB

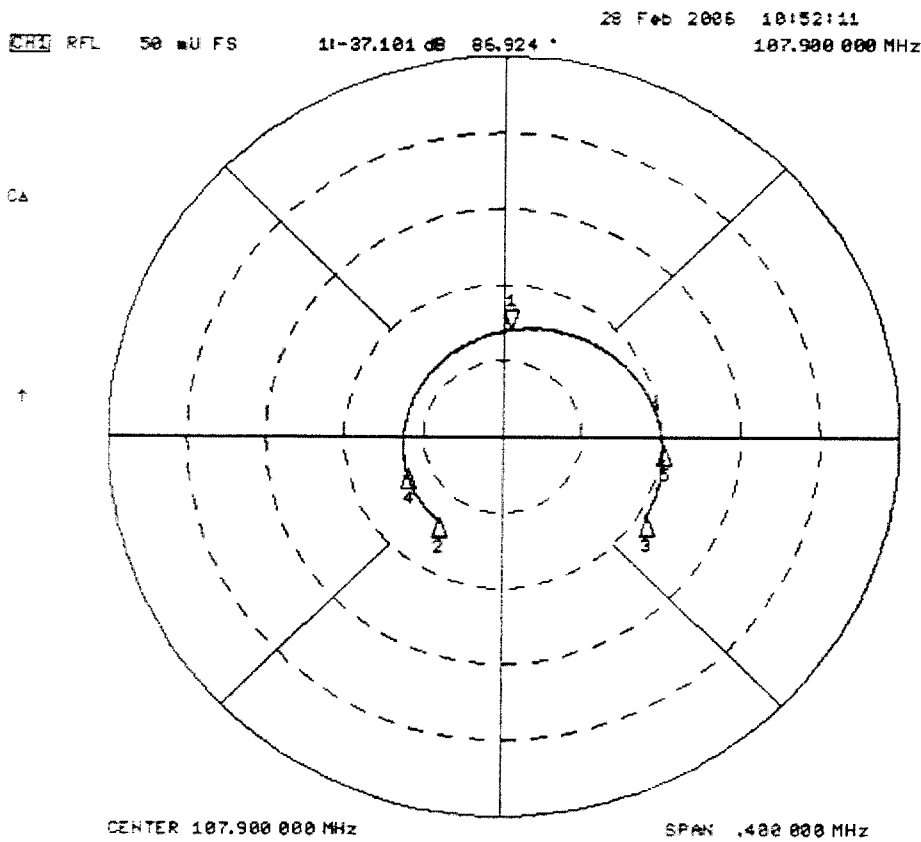


107.9



VSWR

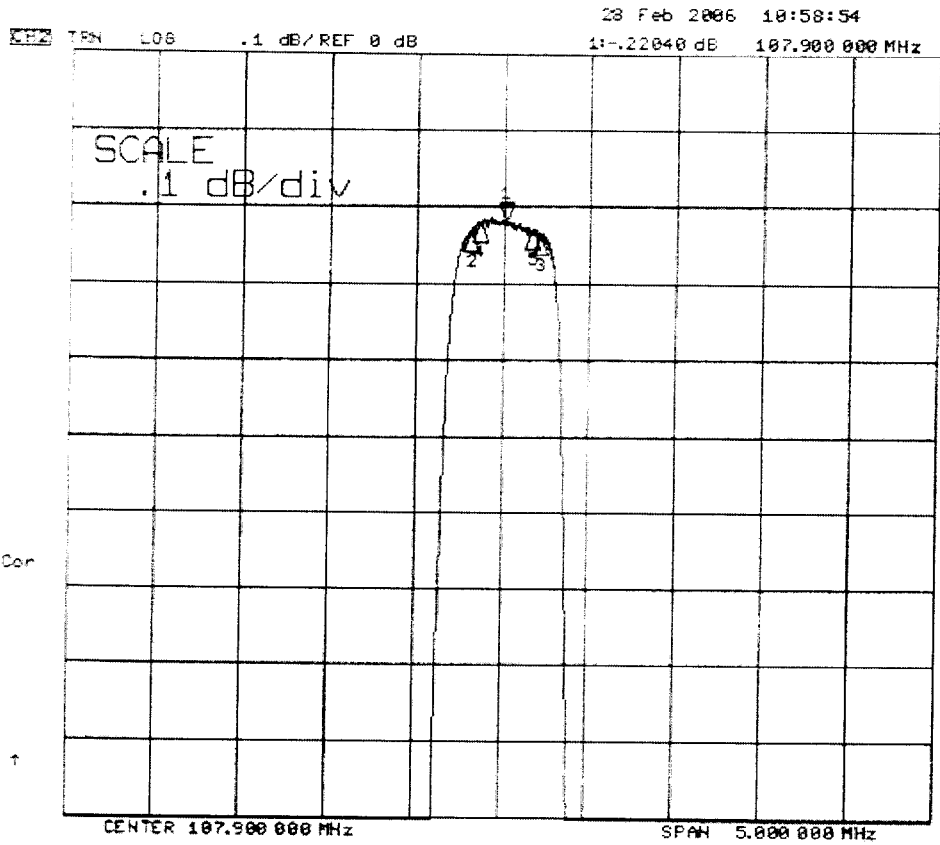
CH1 Markers  
2: 1.0275  
107.700 MHz  
3: 1.0428  
108.100 MHz  
4: 1.0262  
107.750 MHz  
5: 1.0414  
108.050 MHz



Return Loss

CH1 Markers  
2: -37.315 dB  
-126.89 °  
107.700 MHz  
3: -33.585 dB  
-30.394 °  
108.100 MHz  
4: -37.763 dB  
-159.69 °  
107.750 MHz  
5: -33.817 dB  
-4.8141 °  
108.050 MHz

107.9



Insertion Loss

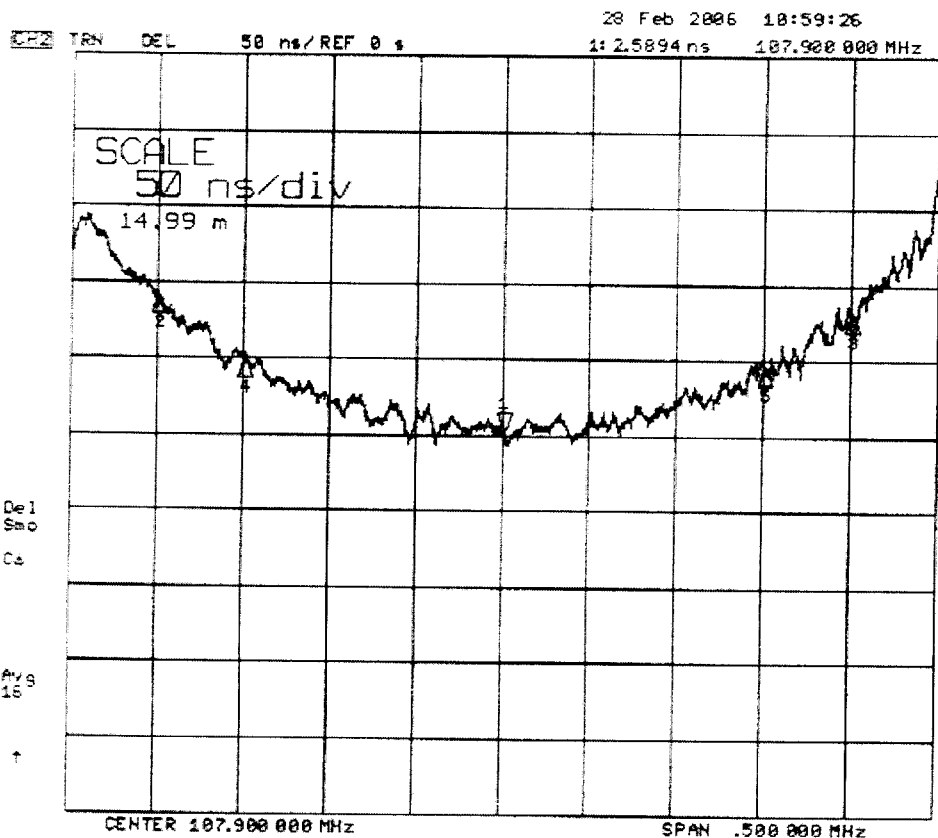
CH2 Markers

2: -.23470 dB  
107.700 MHz

3: -.23930 dB  
108.100 MHz

4: -.22350 dB  
107.750 MHz

5: -.23100 dB  
108.050 MHz



group delay

CH2 Markers

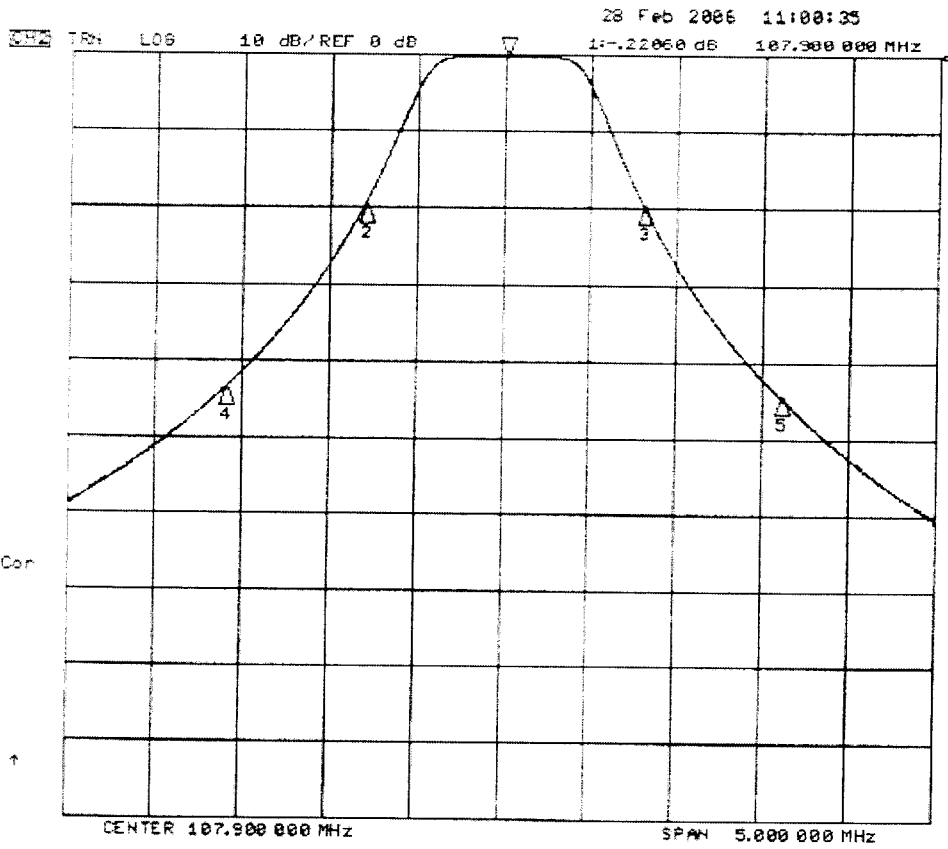
2: 91.365 ns  
107.700 MHz

3: 81.378 ns  
108.100 MHz

4: 49.567 ns  
107.750 MHz

5: 45.069 ns  
108.050 MHz

107-9



filter Response

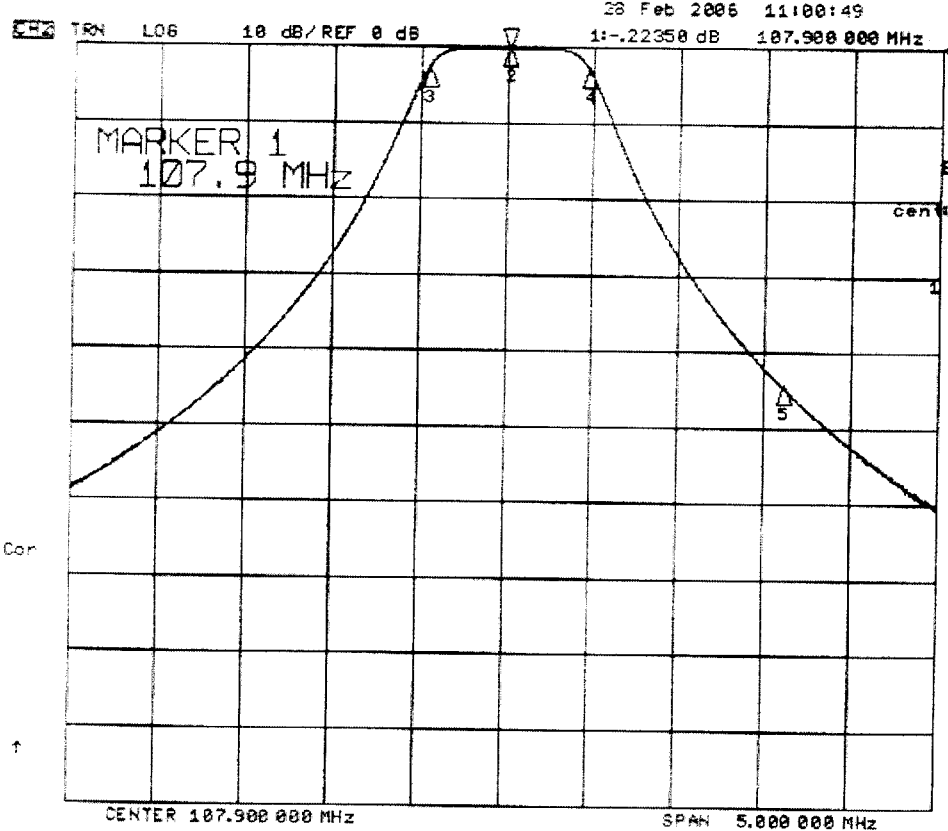
CH2 Markers

2: -19.668 dB  
107.100 MHz

3: -19.698 dB  
108.700 MHz

4: -43.558 dB  
106.300 MHz

5: -44.464 dB  
109.500 MHz



Bandwidth/Fc  
Plot

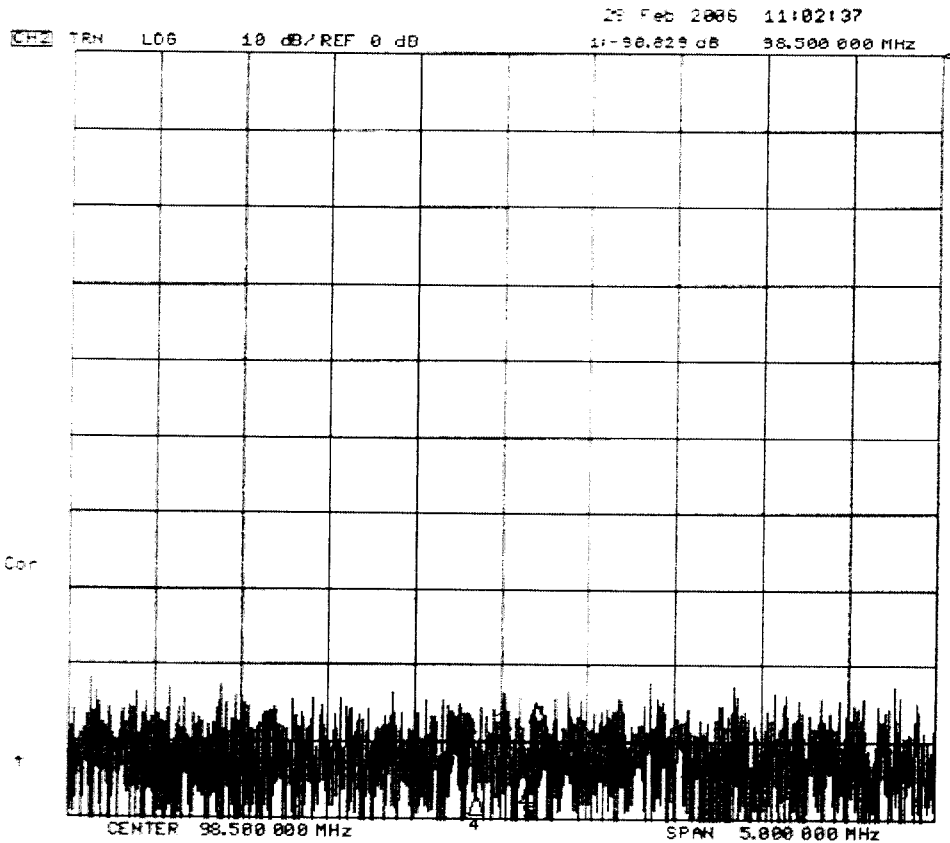
CH2 Markers

3: .925674 MHz

center 107.904345 MHz

Q: 116.57

1 loss: -22350 dB



Isolation  
98.5 to 107.9

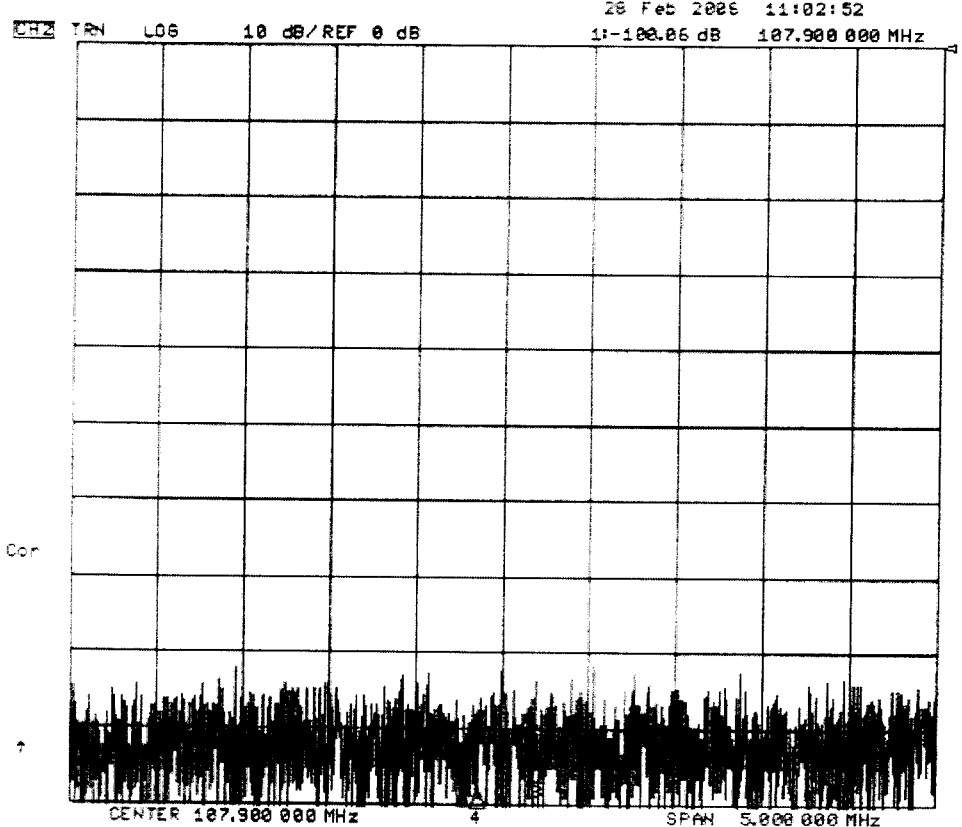
CH2 Markers

2:-98.871 dB  
98.7000 MHz

3:-96.517 dB  
98.3000 MHz

4:-97.384 dB  
98.3500 MHz

5:-95.673 dB  
98.6500 MHz



Isolation  
107.9 to 98.5

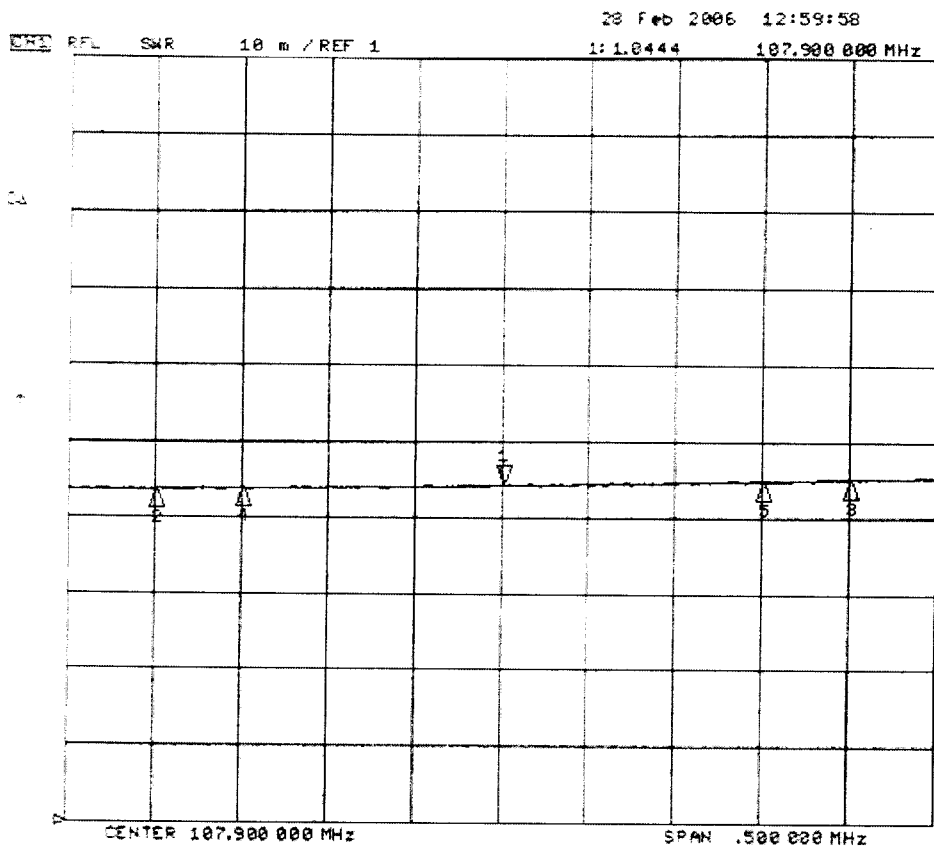
CH2 Markers

2:-98.824 dB  
107.700 MHz

3:-94.669 dB  
108.100 MHz

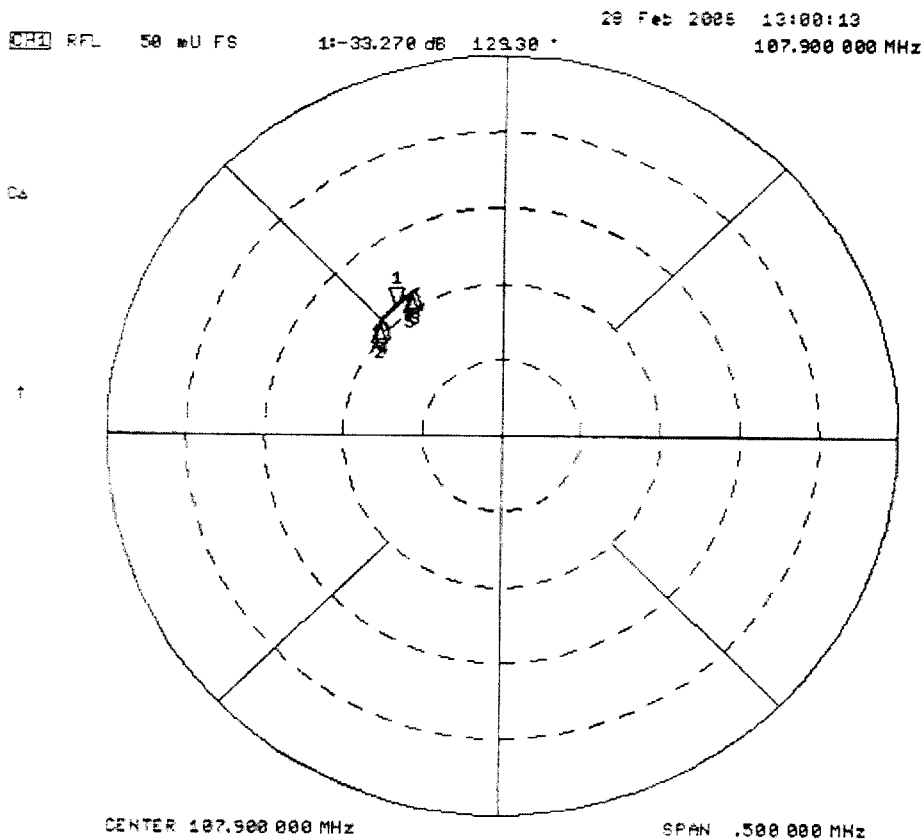
4:-98.185 dB  
107.750 MHz

5:-87.545 dB  
108.050 MHz



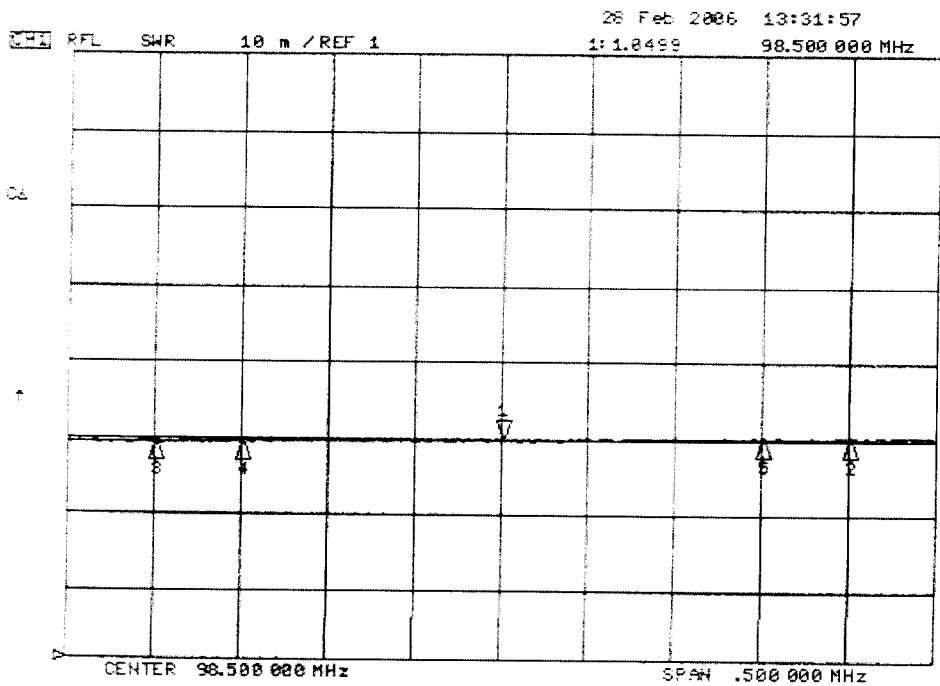
VSWR  
 107.9 Bypass mode

CH1 Markers  
 1: 1.0436  
 107.700 MHz  
 2: 1.0450  
 108.100 MHz  
 4: 1.0439  
 107.750 MHz  
 5: 1.0447  
 108.050 MHz



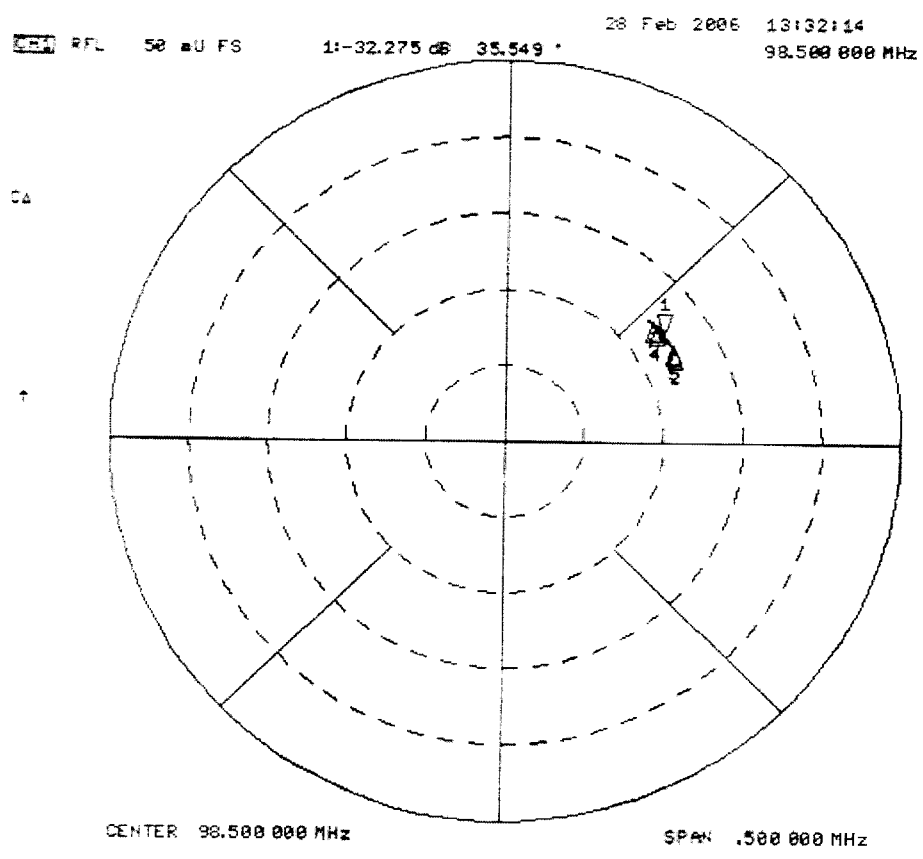
Return Loss

CH1 Markers  
 2: -33.405 dB  
 137.46 °  
 107.700 MHz  
 3: -33.100 dB  
 121.00 °  
 108.100 MHz  
 4: -33.360 dB  
 135.61 °  
 107.750 MHz  
 5: -33.175 dB  
 122.87 °  
 108.050 MHz



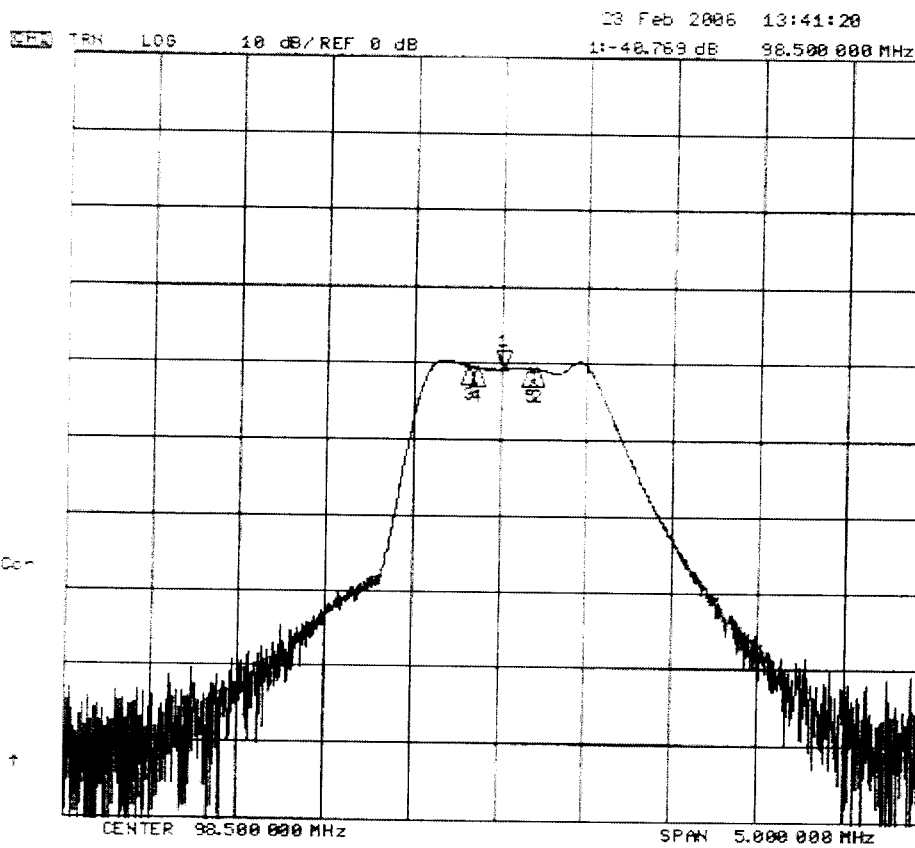
98.5  
 VSWR BYPASS mode

- CH1 Markers
- 2: 1.0501  
98.7000 MHz
  - 3: 1.0495  
98.3000 MHz
  - 4: 1.0494  
98.3500 MHz
  - 5: 1.0502  
98.6500 MHz



- CH1 Markers
- 2: -32.237 dB  
38.020 °  
98.7000 MHz
  - 3: -32.354 dB  
40.666 °  
98.3000 MHz
  - 4: -32.332 dB  
39.335 °  
98.3500 MHz
  - 5: -32.249 dB  
31.741 °  
98.6500 MHz

985



Isolation to  
Backst

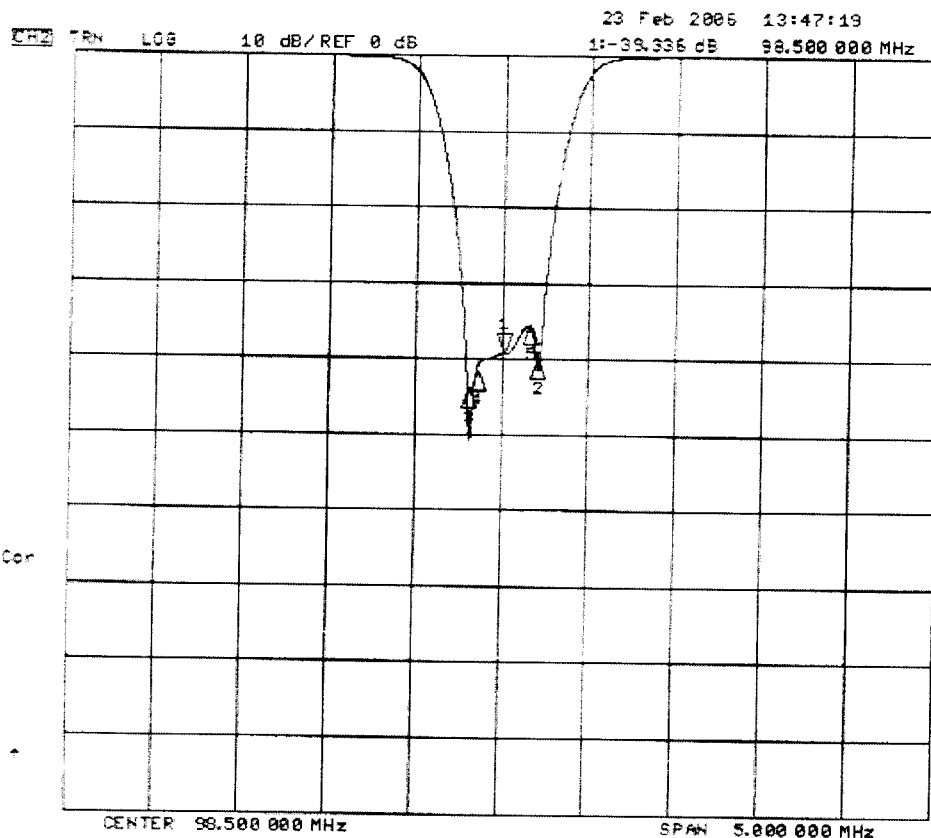
CH2 Markers

2:-40.642 dB  
98.7000 MHz

3:-40.385 dB  
98.3000 MHz

4:-40.599 dB  
98.3500 MHz

5:-40.583 dB  
98.6500 MHz



Isolation to  
Resect

CH2 Markers

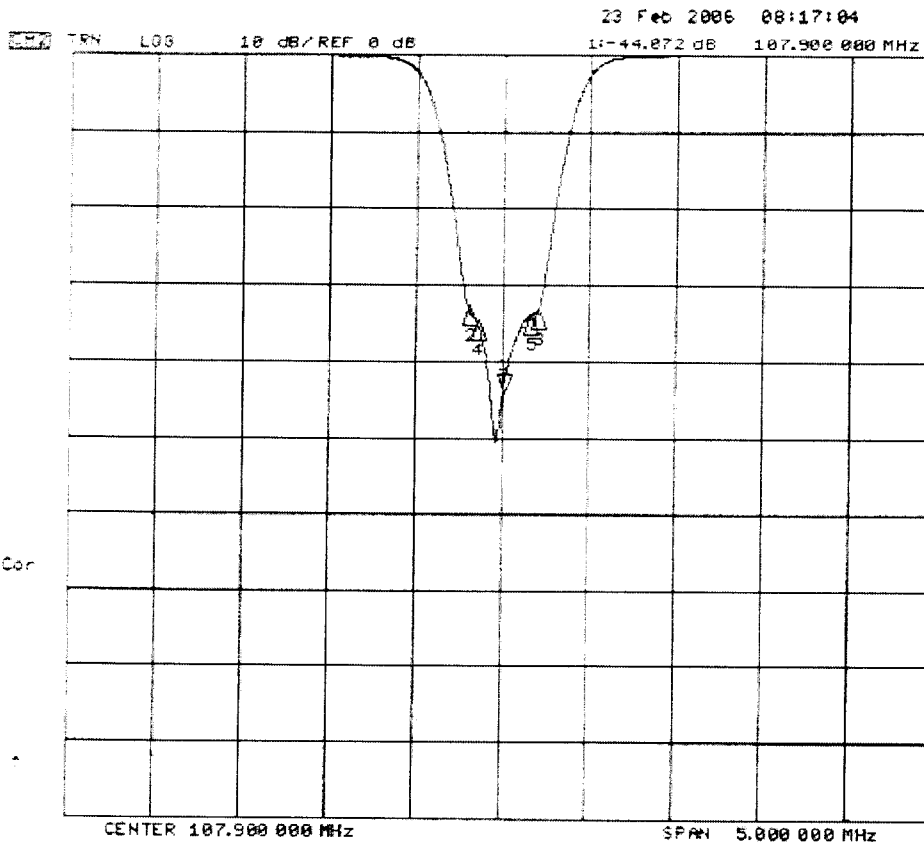
2:-40.243 dB  
98.7000 MHz

3:-44.225 dB  
98.3000 MHz

4:-41.851 dB  
98.3500 MHz

5:-35.718 dB  
98.6500 MHz

107.9



Isolation to Reject

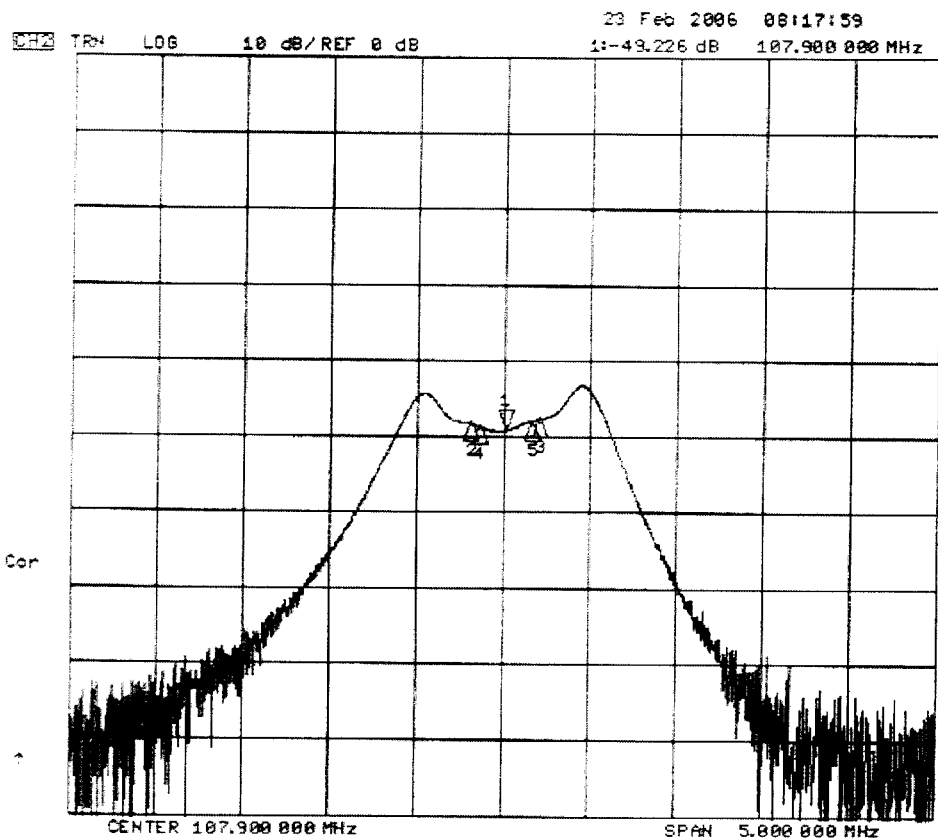
CH2 Markers

2: -32.988 dB  
107.700 MHz

3: -33.343 dB  
108.100 MHz

4: -34.772 dB  
107.750 MHz

5: -33.988 dB  
108.050 MHz



Isolation to  
Beatest

CH2 Markers

2: -48.271 dB  
107.700 MHz

3: -47.773 dB  
108.100 MHz

4: -48.696 dB  
107.750 MHz

5: -48.069 dB  
108.050 MHz