CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Laser Interferometer Gravitational Wave Observatory (LIGO) Project

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Refer to:	LIGO-T040190-00
Date:	September 23, 2004

Demod Preamp Board Test Procedure

Required equipment:

The required equipment is.

- Dual power supply ±24V
- Oscilloscope
- Network analyzer (1 Hz to 100 kHz)
- Spectrum analyzer (100 kHz bandwidth)

Preparations:

Test Engineer	Date	Pass

Write down revision, serial number and whether it is a mode cleaner board or a interferometer common mode board.

Board	Revision	Serial
D040179		

Hook up the ±24V power supply to JP1.

Power up the board and check that the current drawn from the ±24V power supply is between 0.025 A and 0.035 A.

Power supply	Current	Nominal
+24V		0.03
–24V		0.03

Test for oscillations:

Use scope on all outputs and make sure they are not oscillating.

Output	Channel 1	Channel 2
Check		

Noise spectra:

Ground inputs of channel 1 and 2. Measure the noise density at the corresponding outputs. Write down the values divided by the gain at 100 Hz, 1 kHz, 10 kHz and 100 kHz (referred input noise). Attach hardcopies of the measured spectra; see Appendix A1 for typical examples.

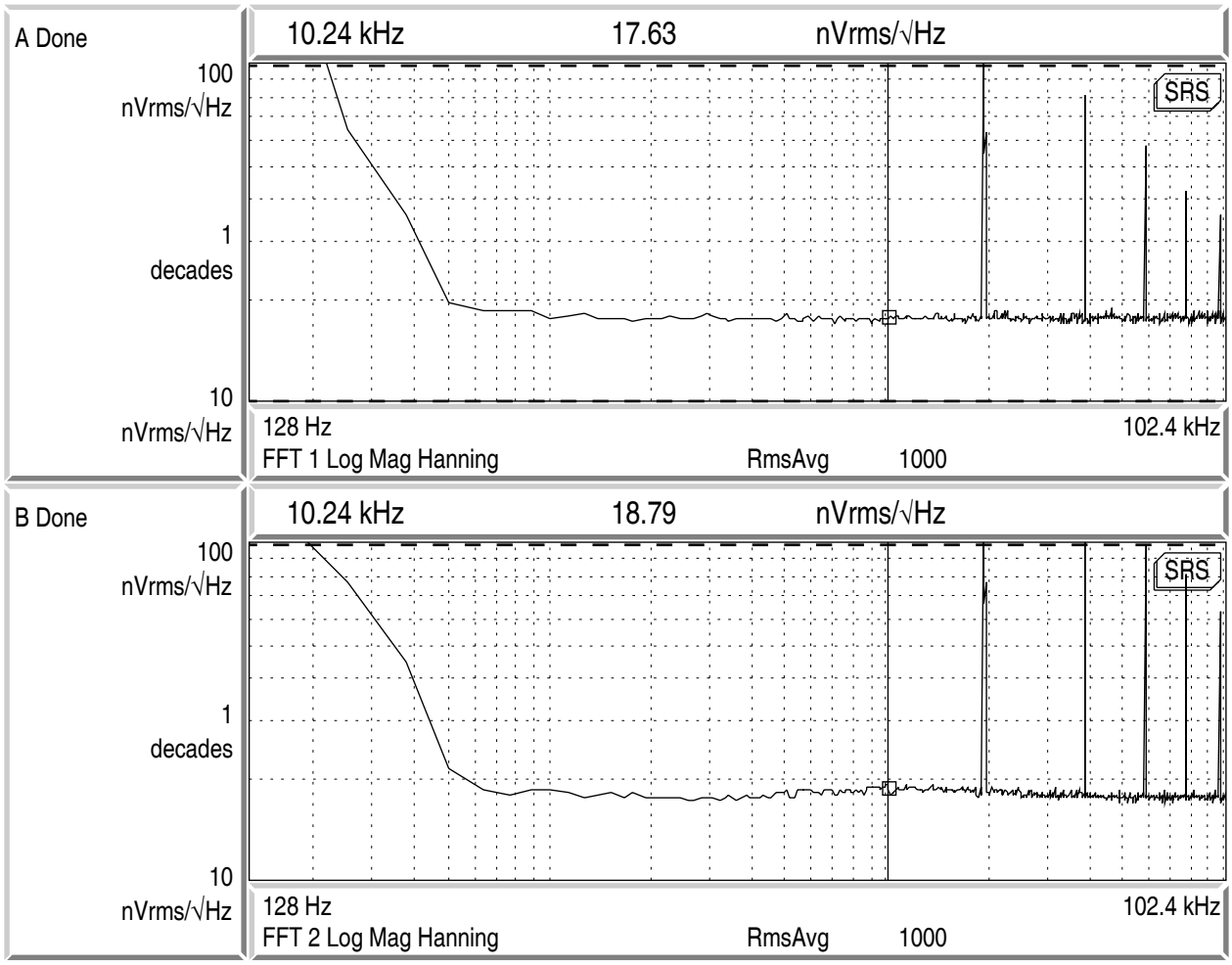
Frequency	Channel 1	< [nV/√Hz]	Channel 1	< [nV/√Hz]
100 Hz		3.0		3.0
1 kHz		3.0		3.0
10 kHz		3.0		3.0
100 kHz		3.0		3.0

Transfer functions:

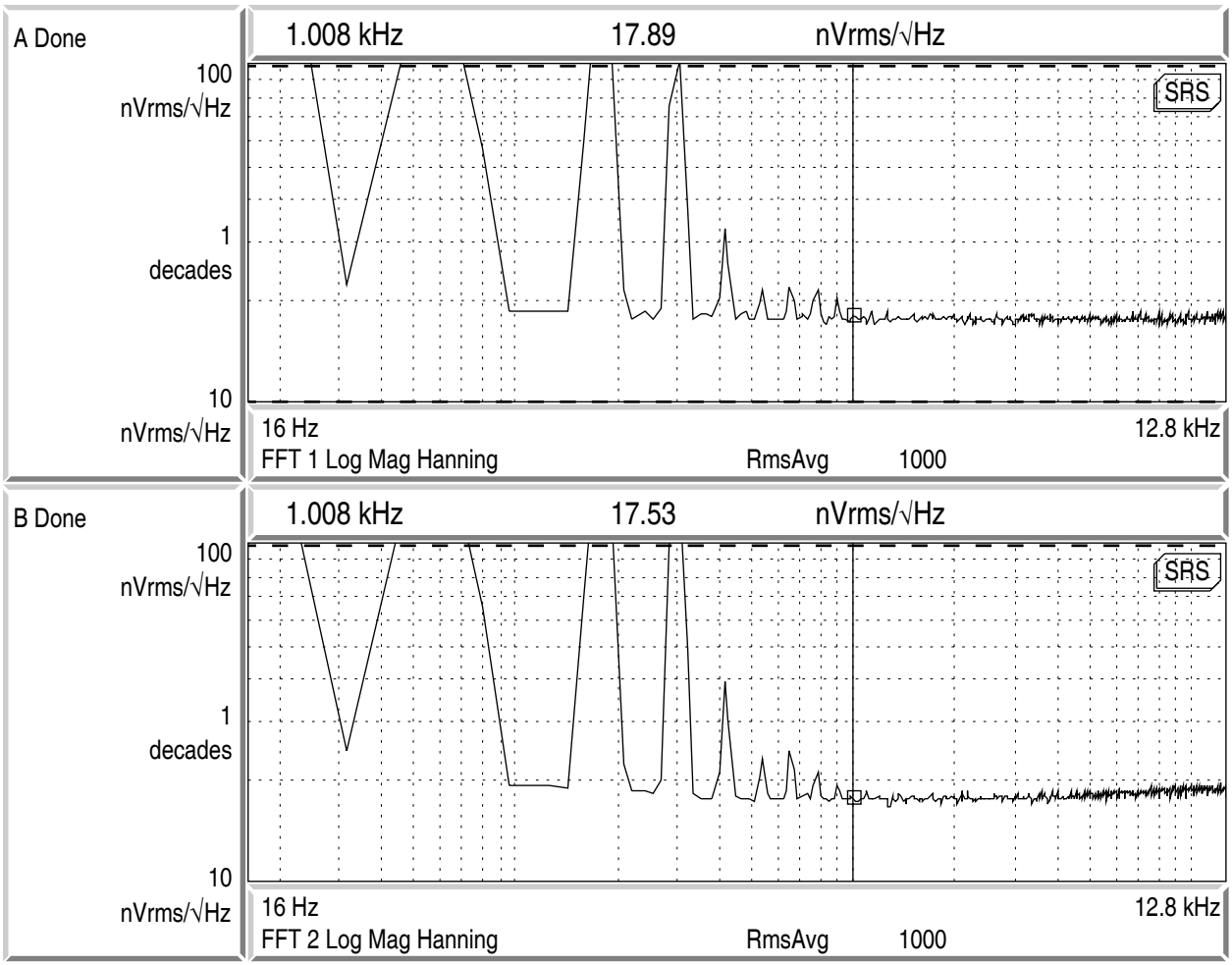
Use a network analyzer to measure the transfer function of each channel. Sweep the frequency from 100 kHz down to 1 Hz with 10 mV source amplitude. Write down the dc gain and make sure the transfer function is flat, i.e., no more than 1 dB error and no more than 3° of phase at 10 kHz (100 kHz for the mode cleaner). Attach hardcopies of the measured transfer function; see Appendix A2 for typical examples.

Frequency	Channel 1	Nominal	Channel 2	Nominal
dc gain [db]		20		20
10 kHz phase		–2°		–2°

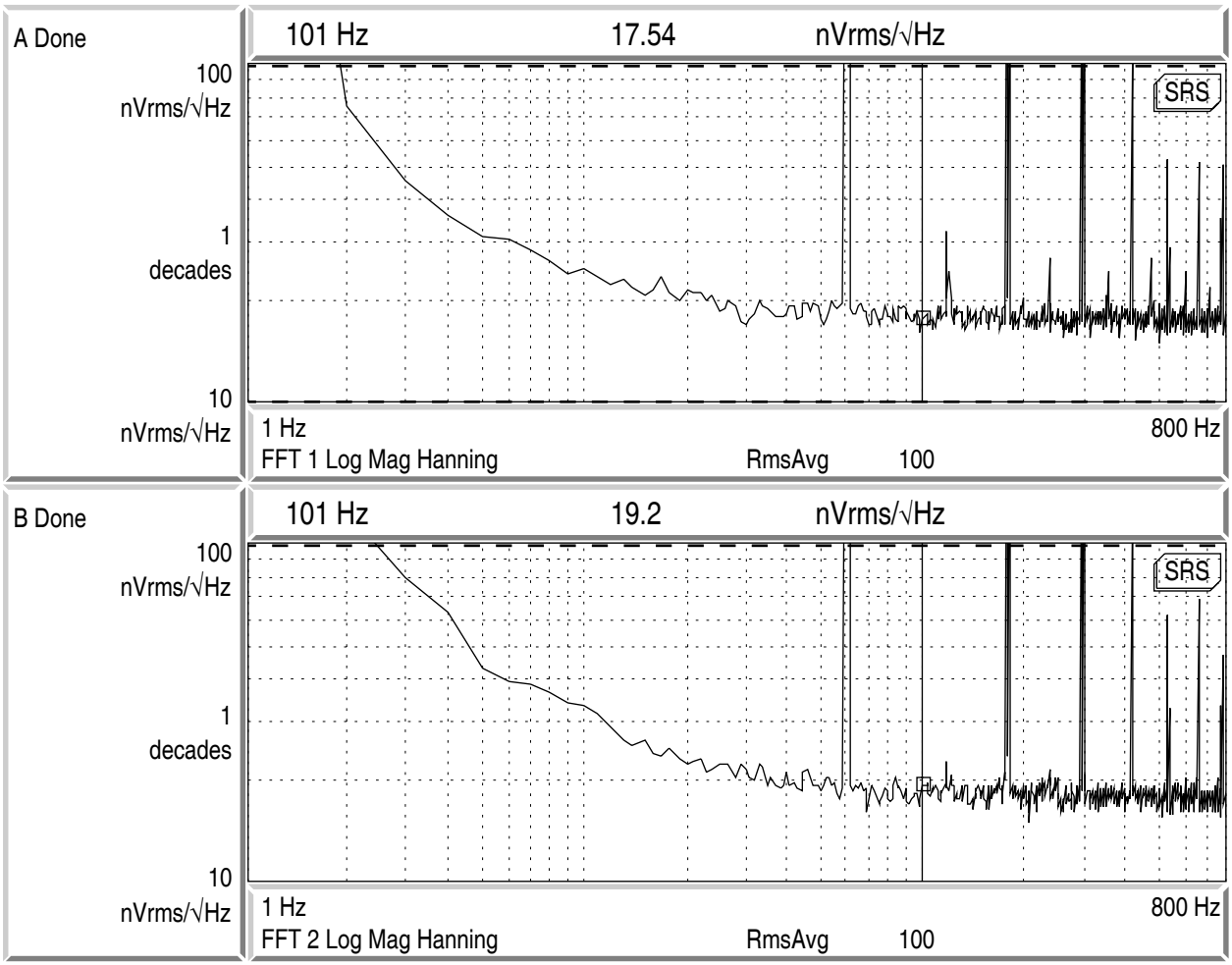
Appendix A1: Noise spectra



Noise spectra for channel 1 (top) and channel 2 (bottom).

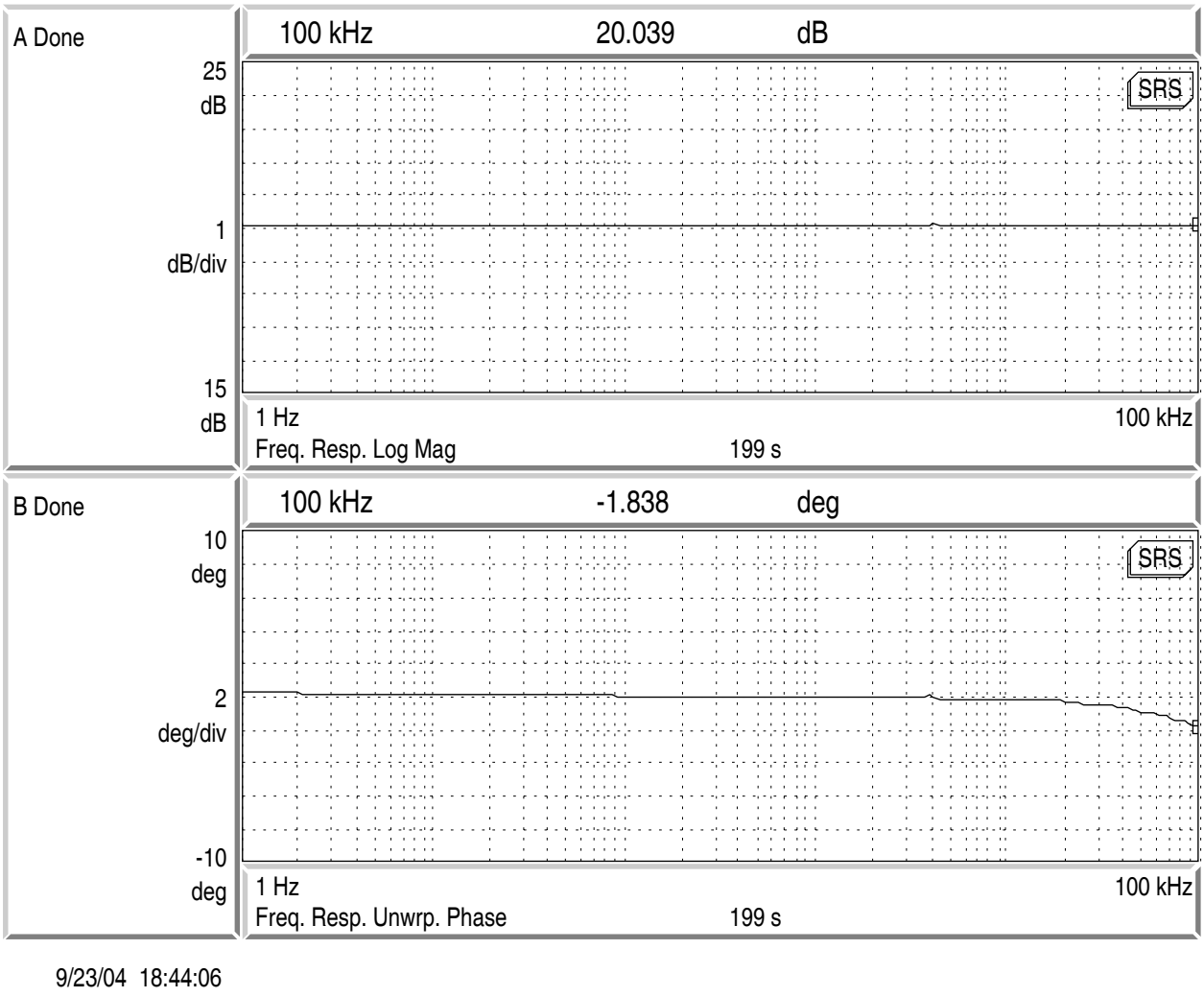


Noise spectra for channel 1 (top) and channel 2 (bottom).

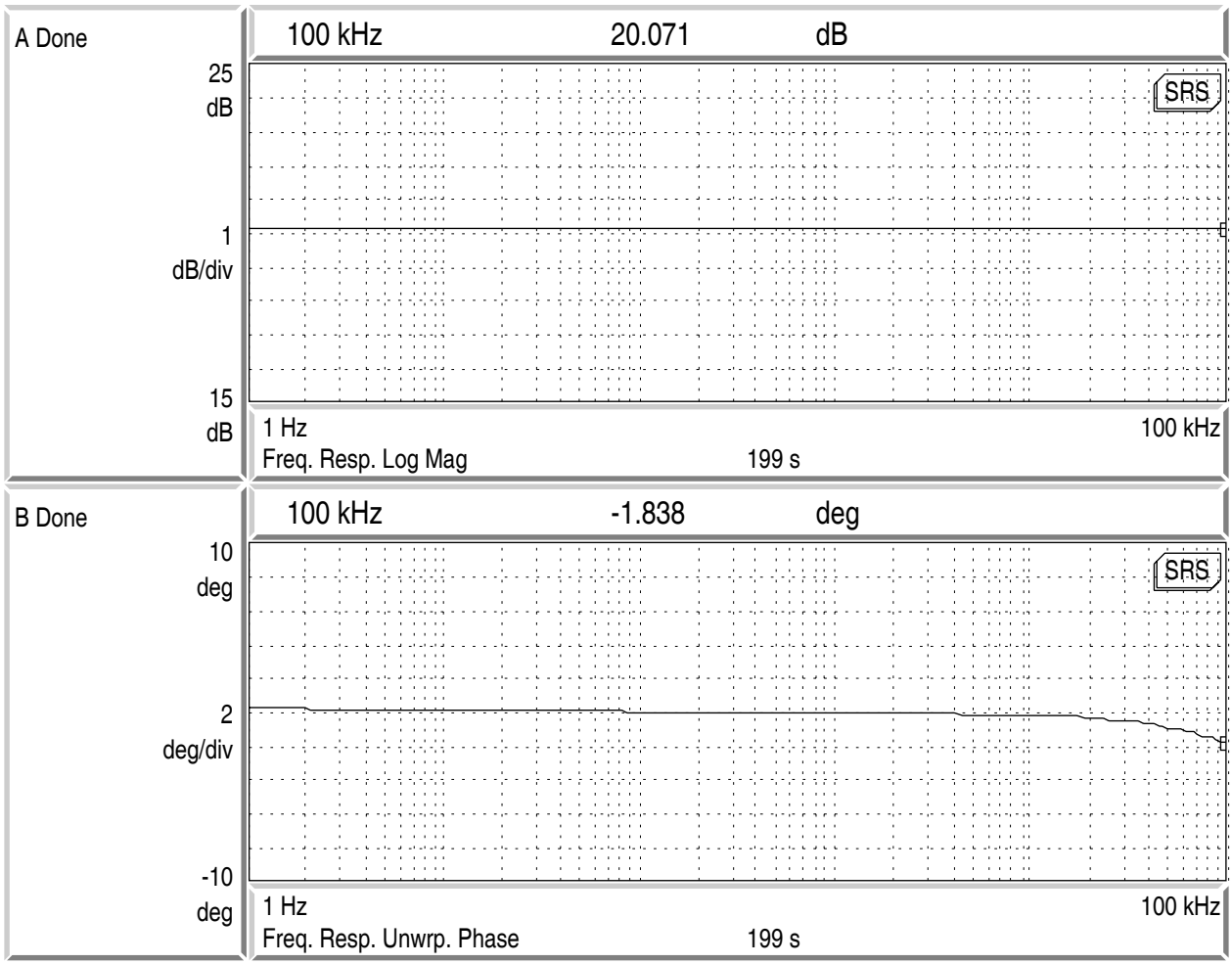


Noise spectra for channel 1 (top) and channel 2 (bottom).

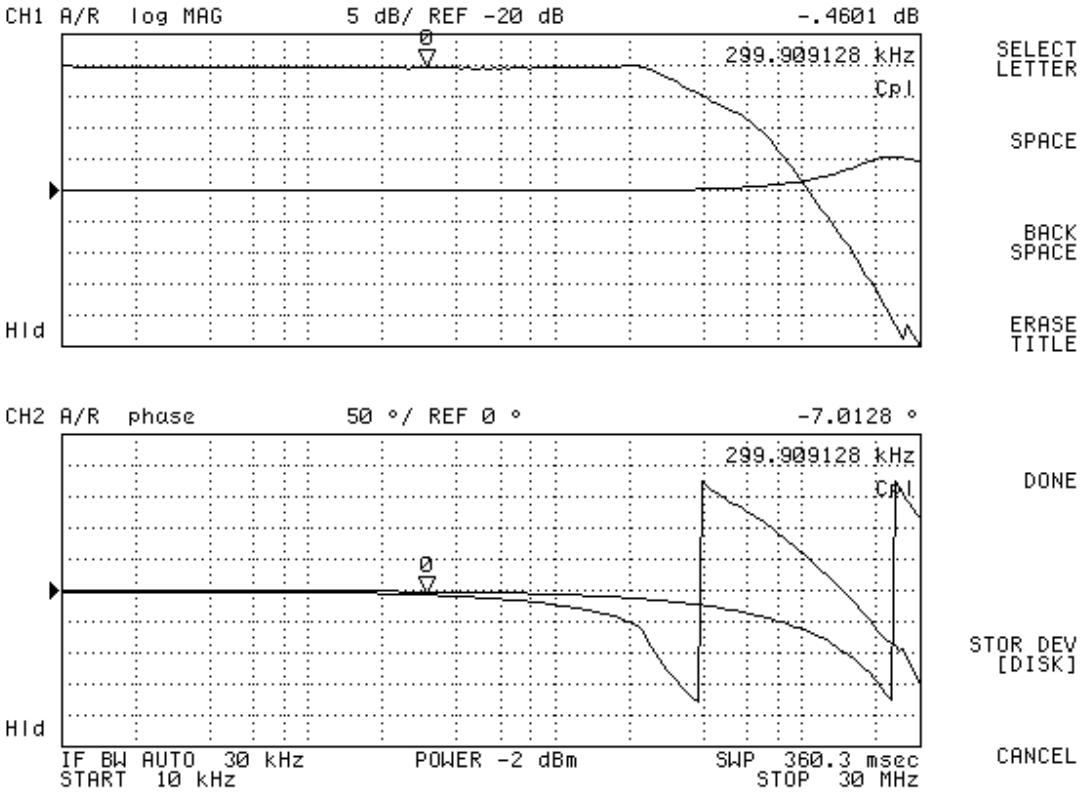
Appendix A2: Transfer functions



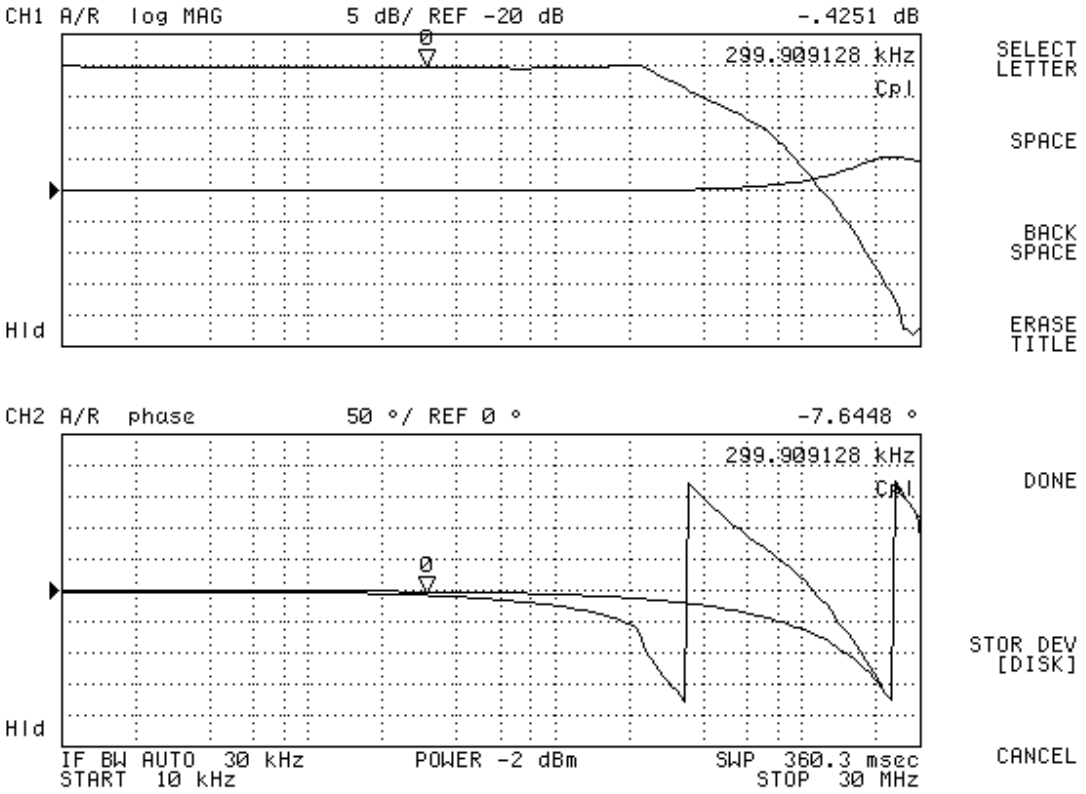
Transfer function of channel 1. (This board had a 10MHz butterworth filter.)



Transfer function of channel 2. (This board had a 10MHz butterworth filter.)



Transfer function of channel 1. (This board had a 10MHz butterworth filter.) Flat(er) trace is measured against a BNC barrel.



Transfer function of channel 2. (This board had a 10MHz butterworth filter.) Flat(er) trace is measured against a BNC barrel.