TransCell 1900 CB
Frequency Stability Test
Addendum

December 19, 2000

1.0 SCOPE

This document is an addendum to the TransCell 1900 CB system test results submitted for FCC Part 24 approval. This test was performed to document the frequency stability measurements for FCC 47 CFR Part 2.995 Frequency Stability.

2.0 APPLICABLE DOCUMENTS

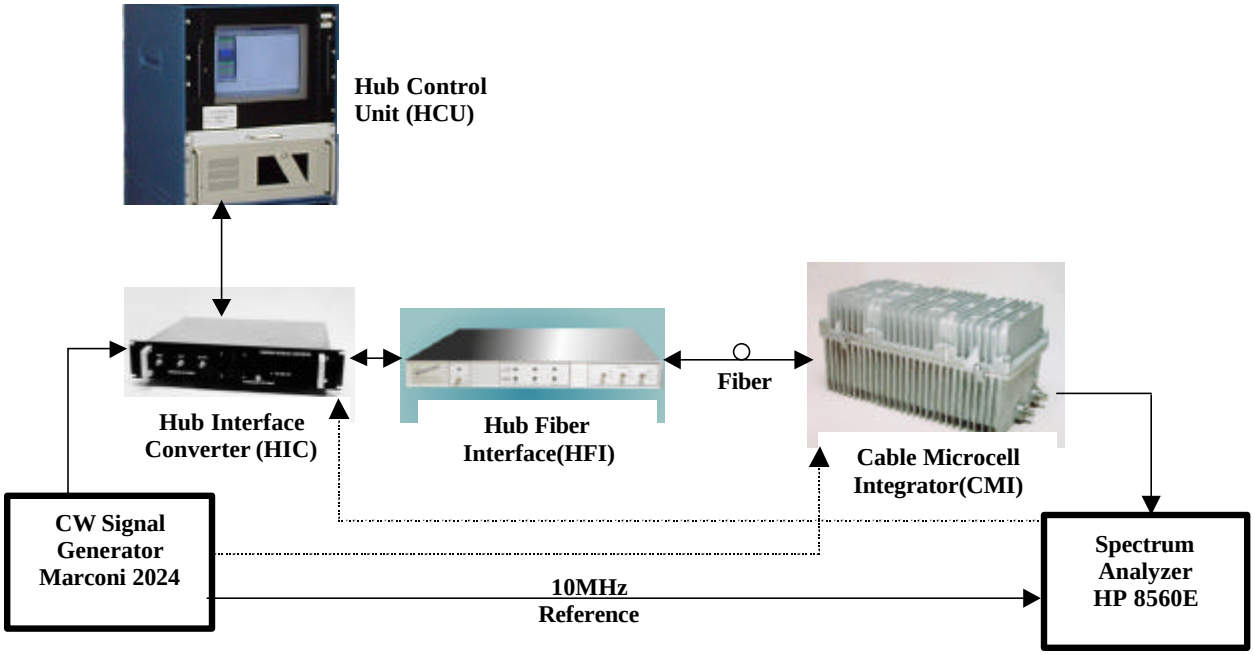
The Test Setup and parameters are based in part on the *TransCell 1900 CB System Specification, 1000016*

3.0 TEST RESOURCE REQUIREMENTS

The test setup contained Commercial-Off-The-Shelf (COTS) test equipment and hardware.

4.0 TEST CONFIGURATIONS

The following is the test setup for the TransCell 1900 CB system. The test equipment listed below was the equipment used in the testing.

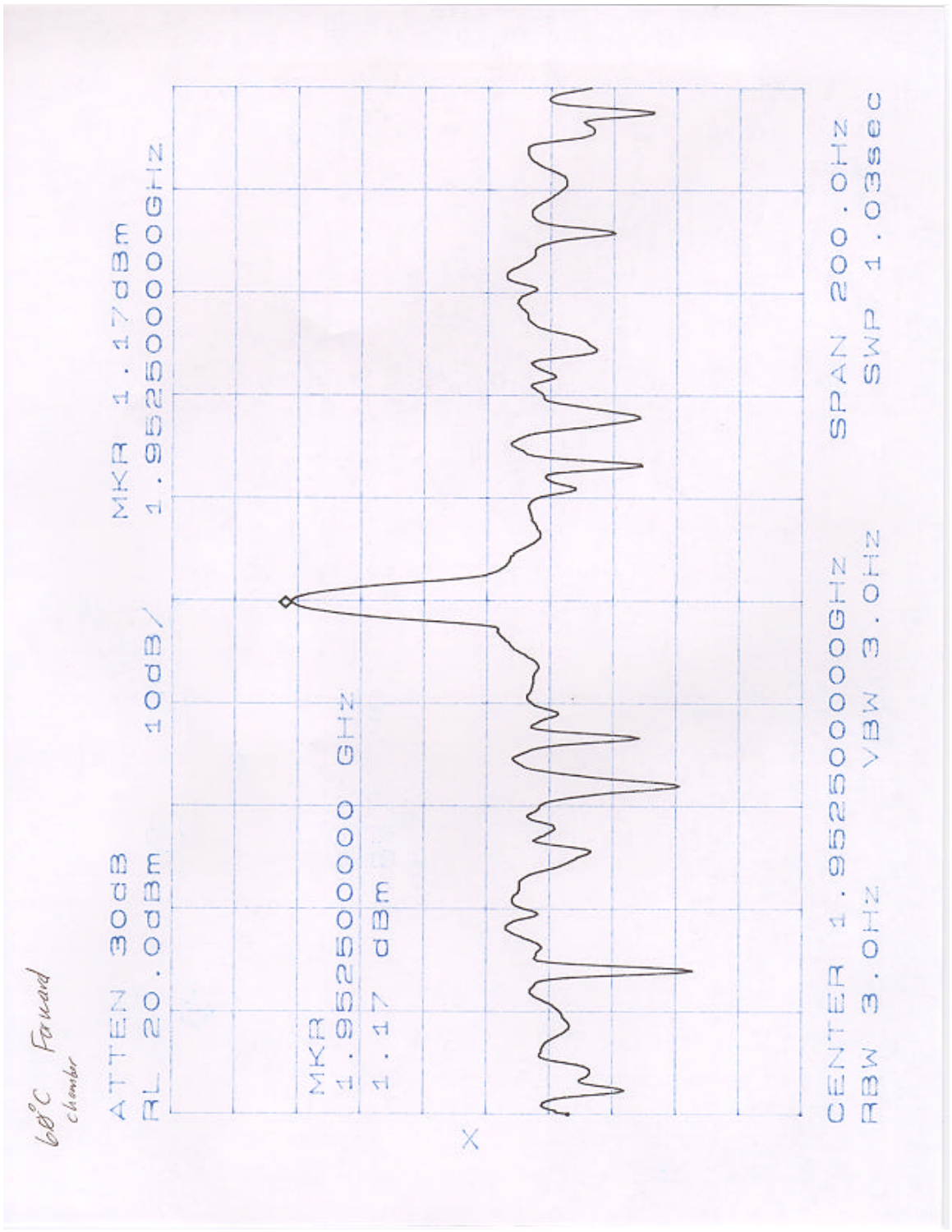


5.0 DETAIL TEST SETUP INFORMATION

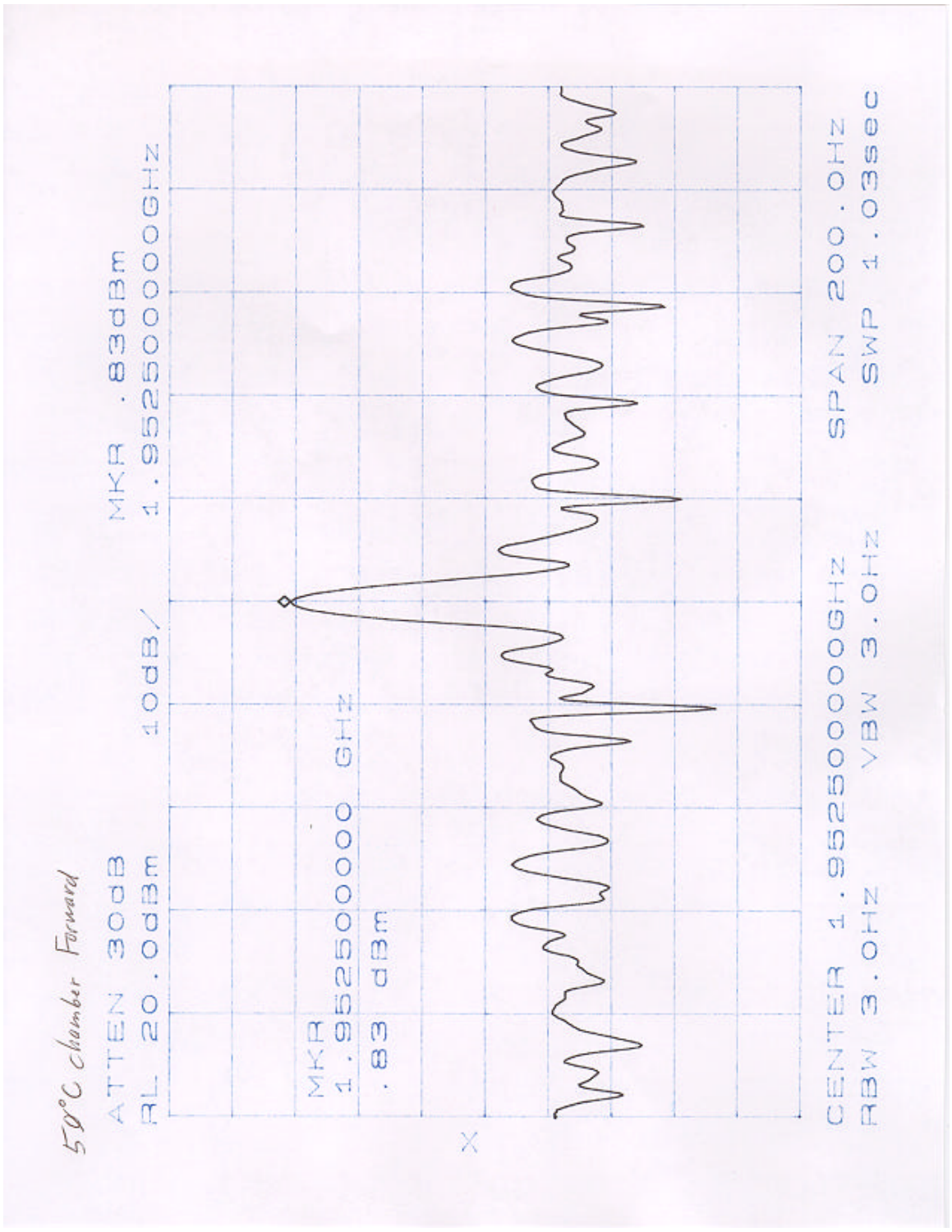
The Signal Generator was setup, so that the power level of the CW signal going into the HIC is –2dBm for the forward signal path and –93dBm going into the CMI for the reverse signal path. The signal output of the CMI was set up for its operational power and passed through a 30dB attenuator going to the spectrum analyzer to prevent damage to the instrument.

6.0 TEST RESULTS

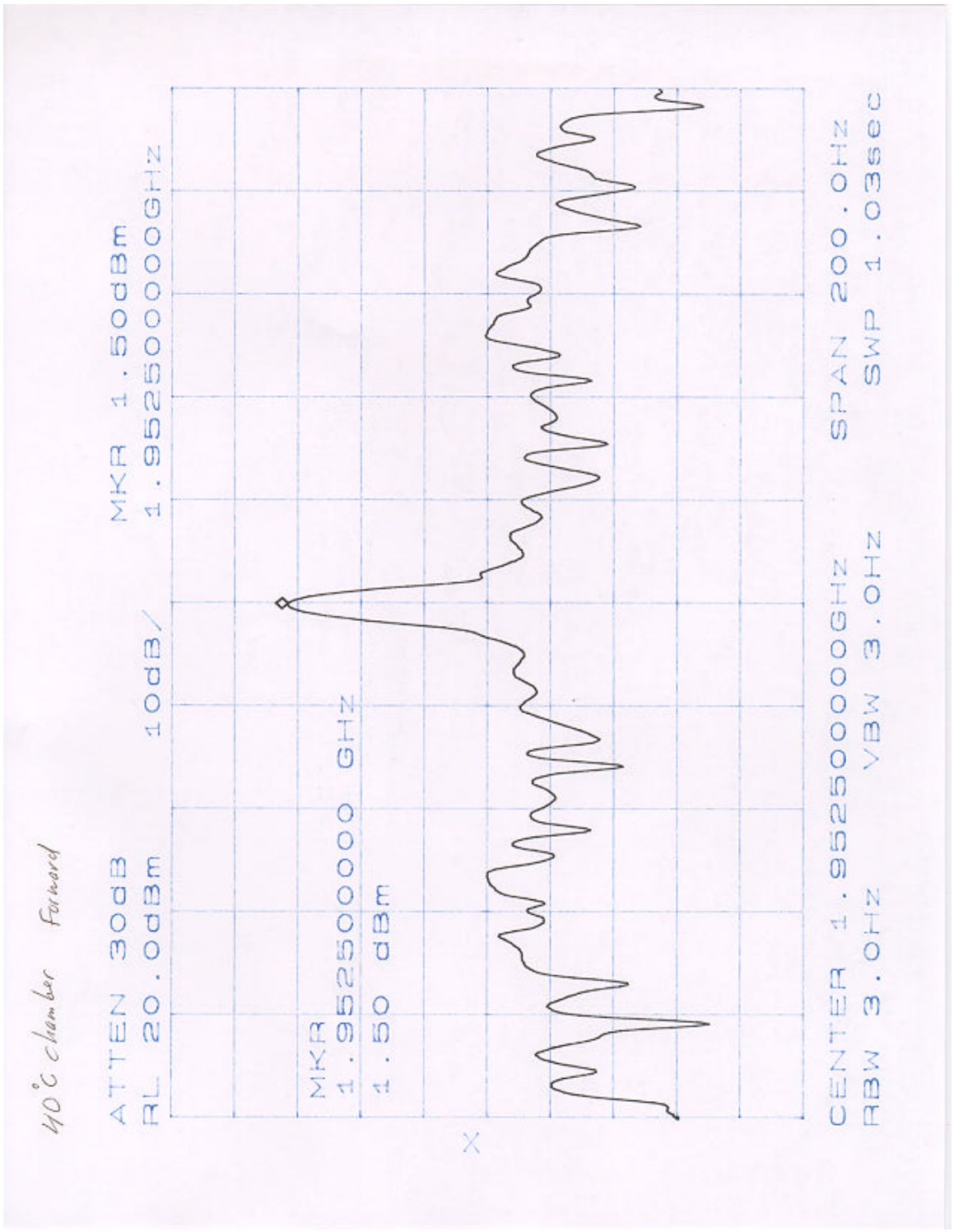
The test results are attached to this document. They show that the frequency stability did not vary from the center frequency over the operating temperature range and within the required FCC temperature range requirements. The reverse and forward paths use the same references.



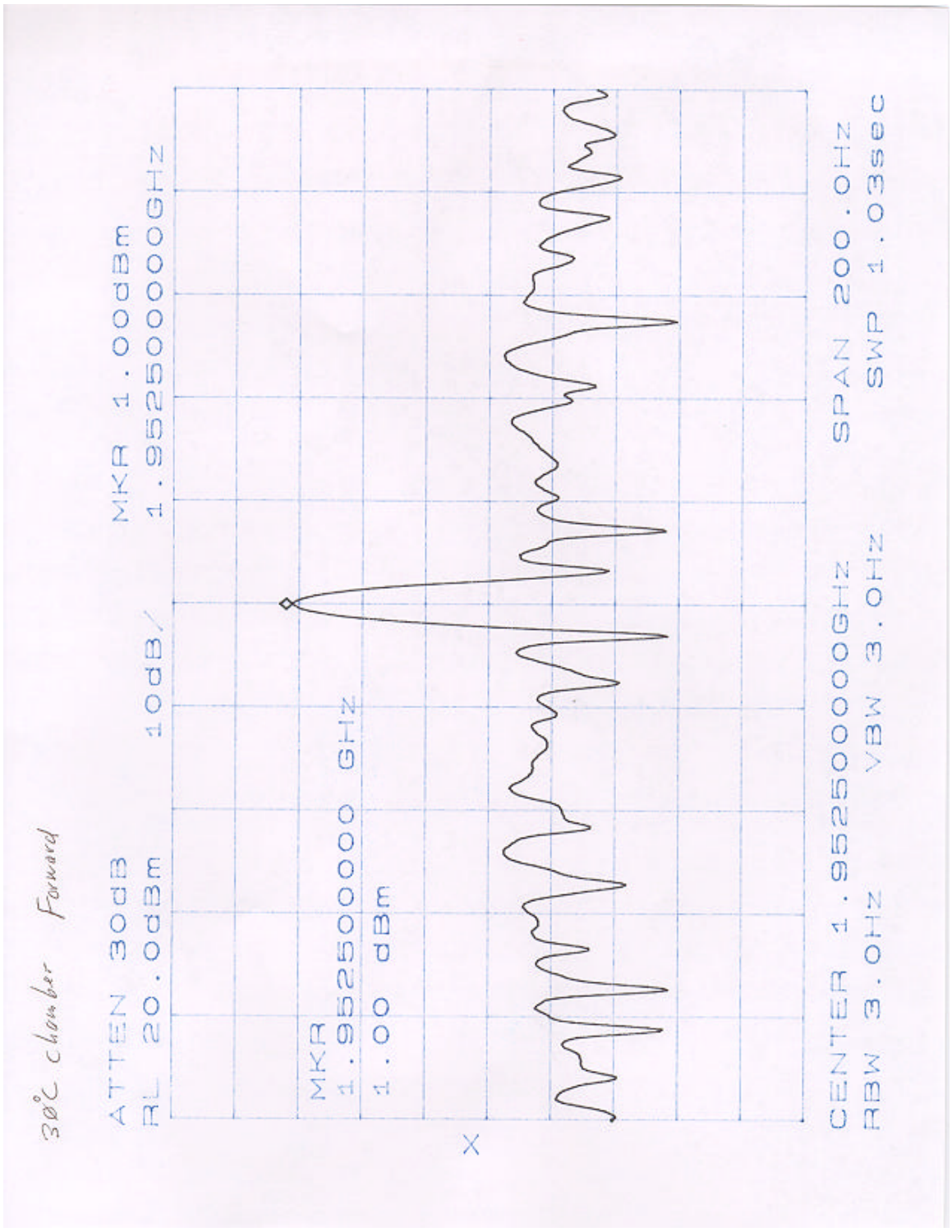
60 °C Environment Temperature, Forward Signal Path



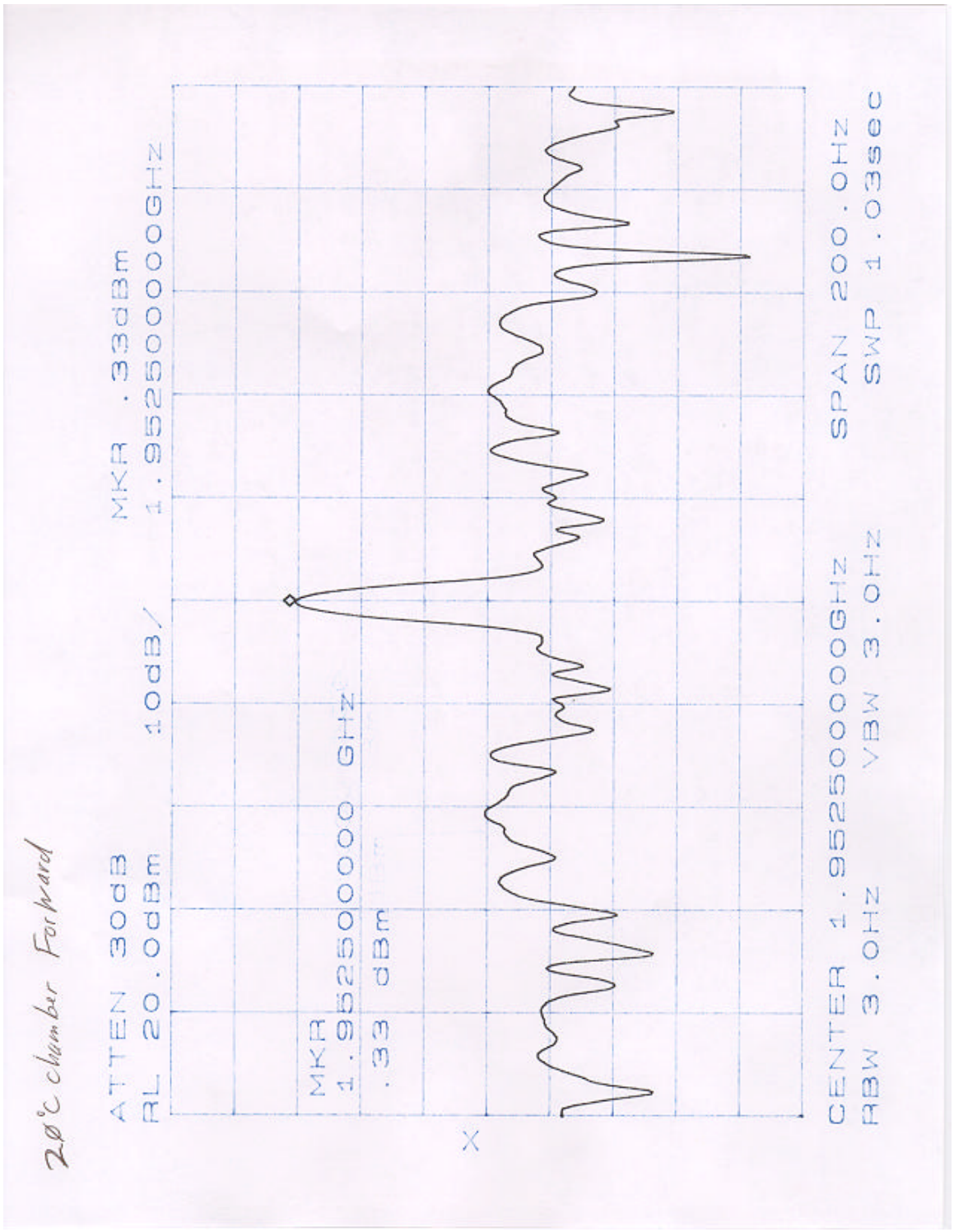
50 °C Environment Temperature, Forward Signal Path



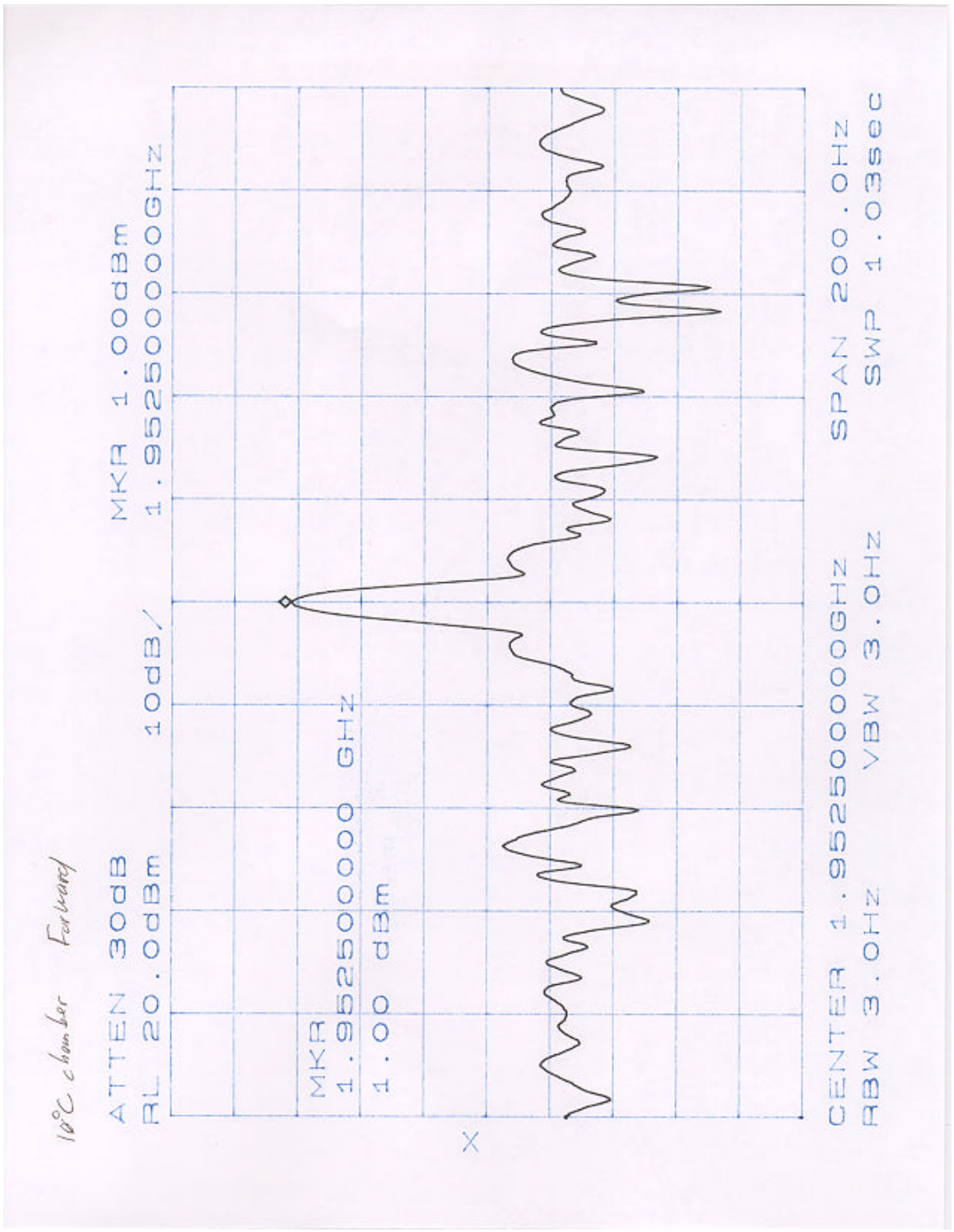
40 °C Environment Temperature, Forward Signal Path



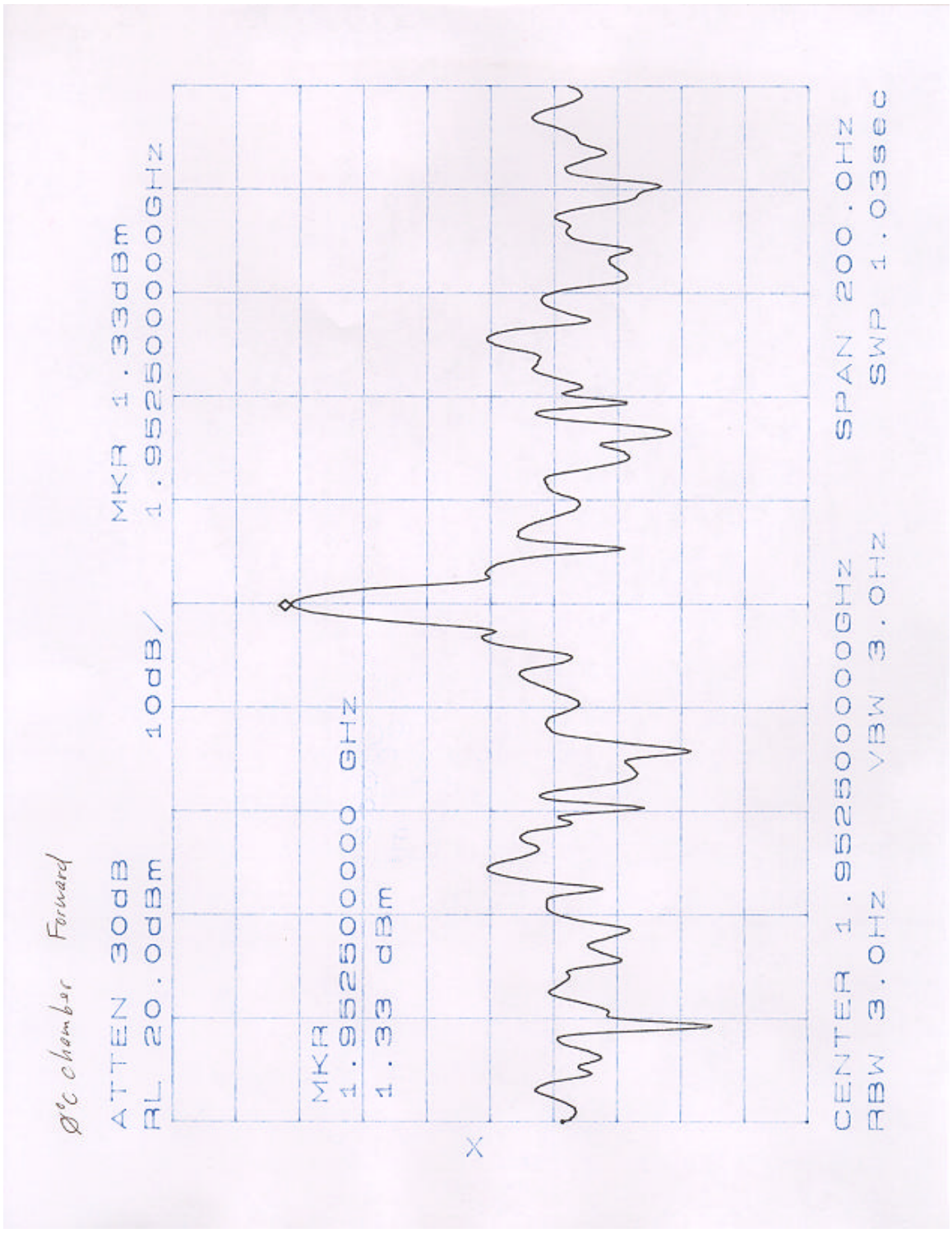
30 °C Environment Temperature, Forward Signal Path



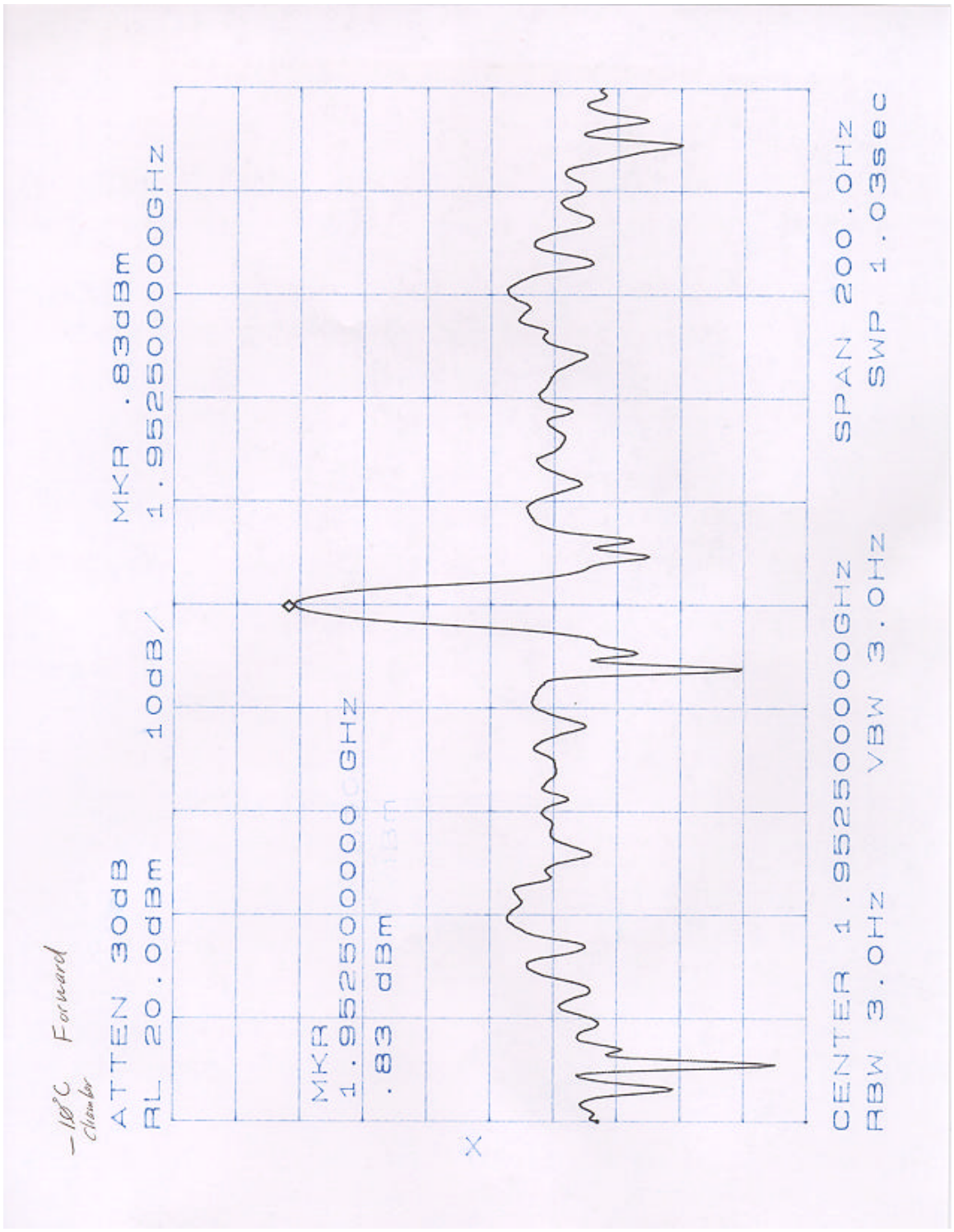
20 °C Environment Temperature, Forward Signal Path



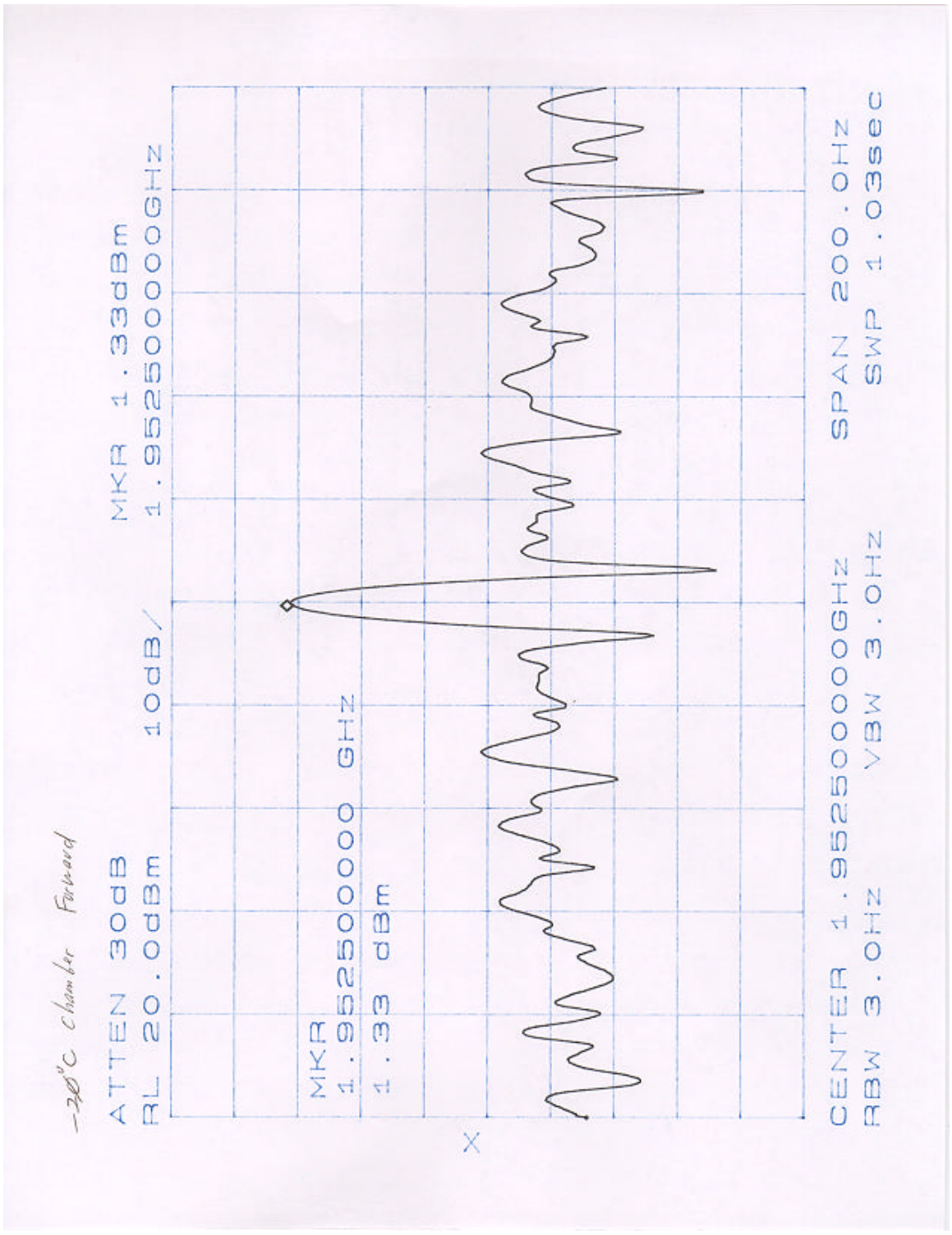
10 °C Environment Temperature, Forward Signal Path



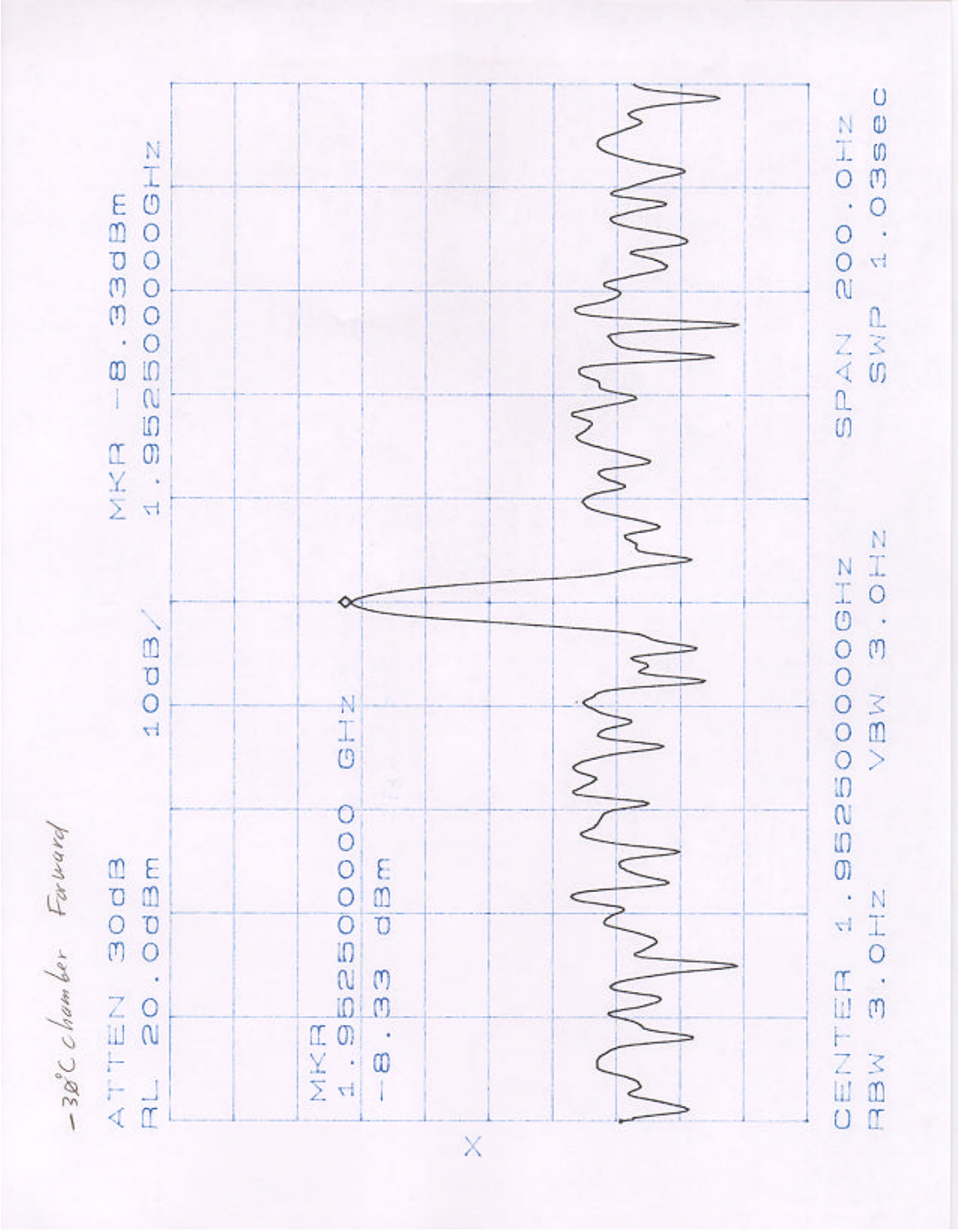
0 °C Environment Temperature, Forward Signal Path



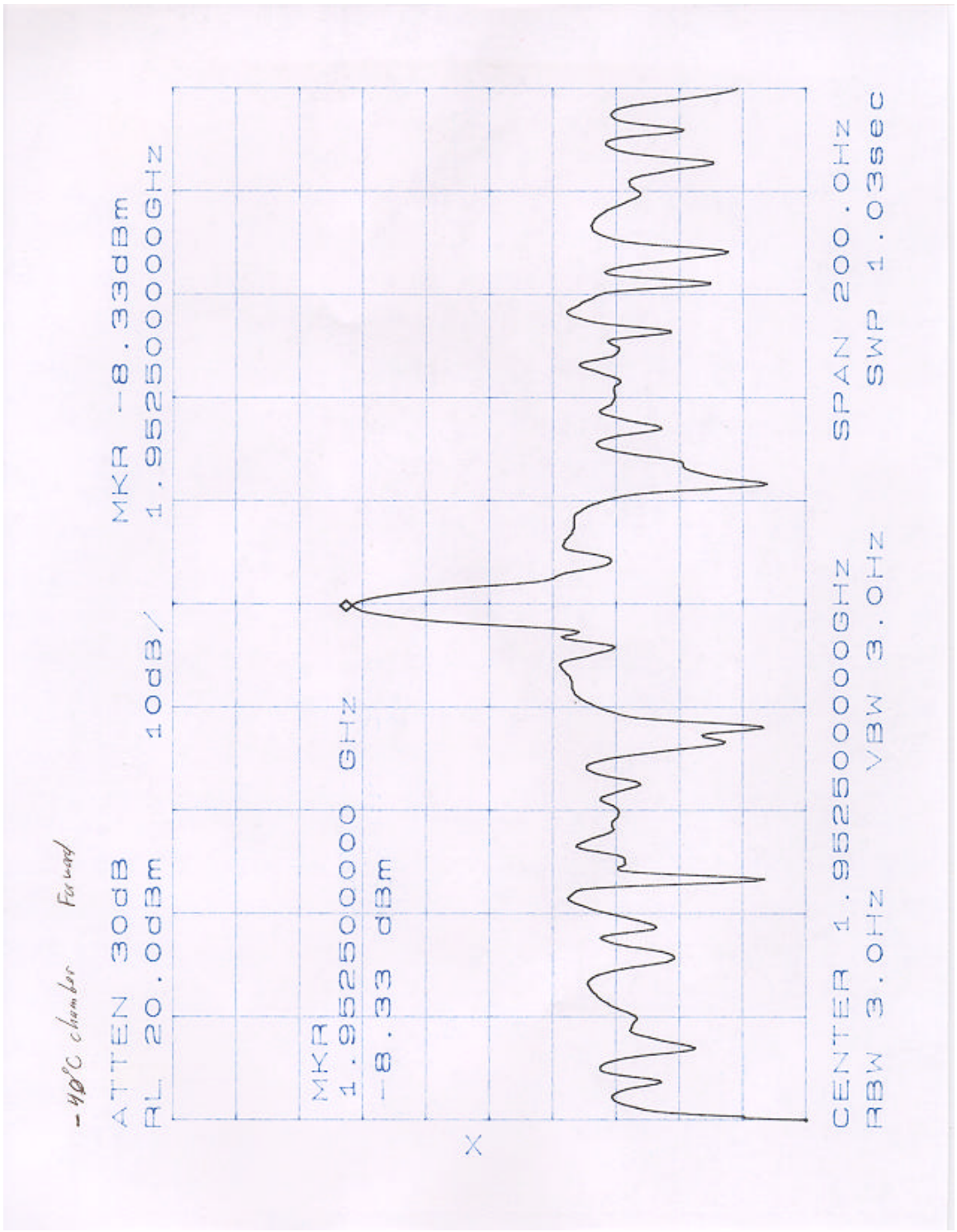
-10 °C Environment Temperature, Forward Signal Path



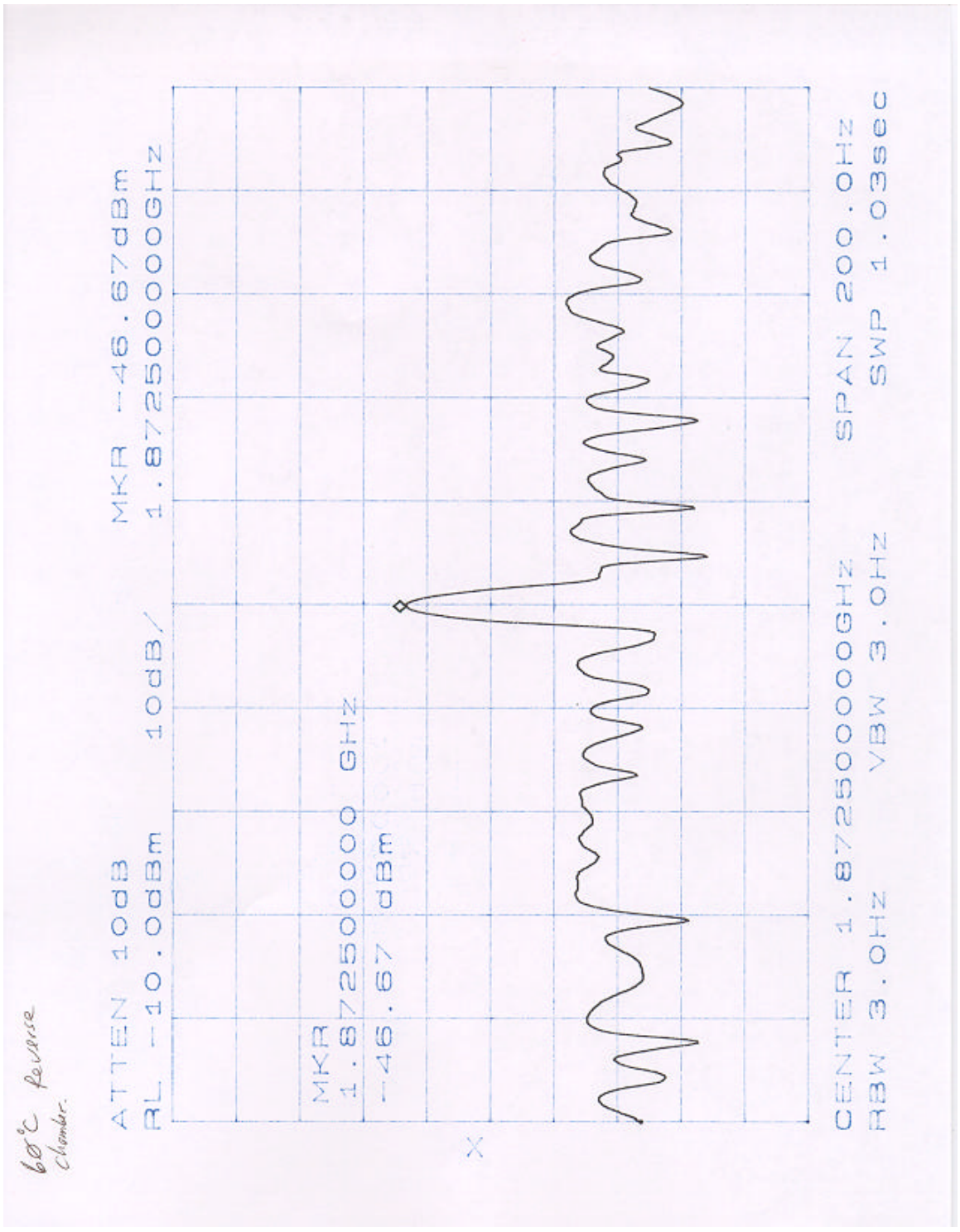
-20 °C Environment Temperature, Forward Signal Path



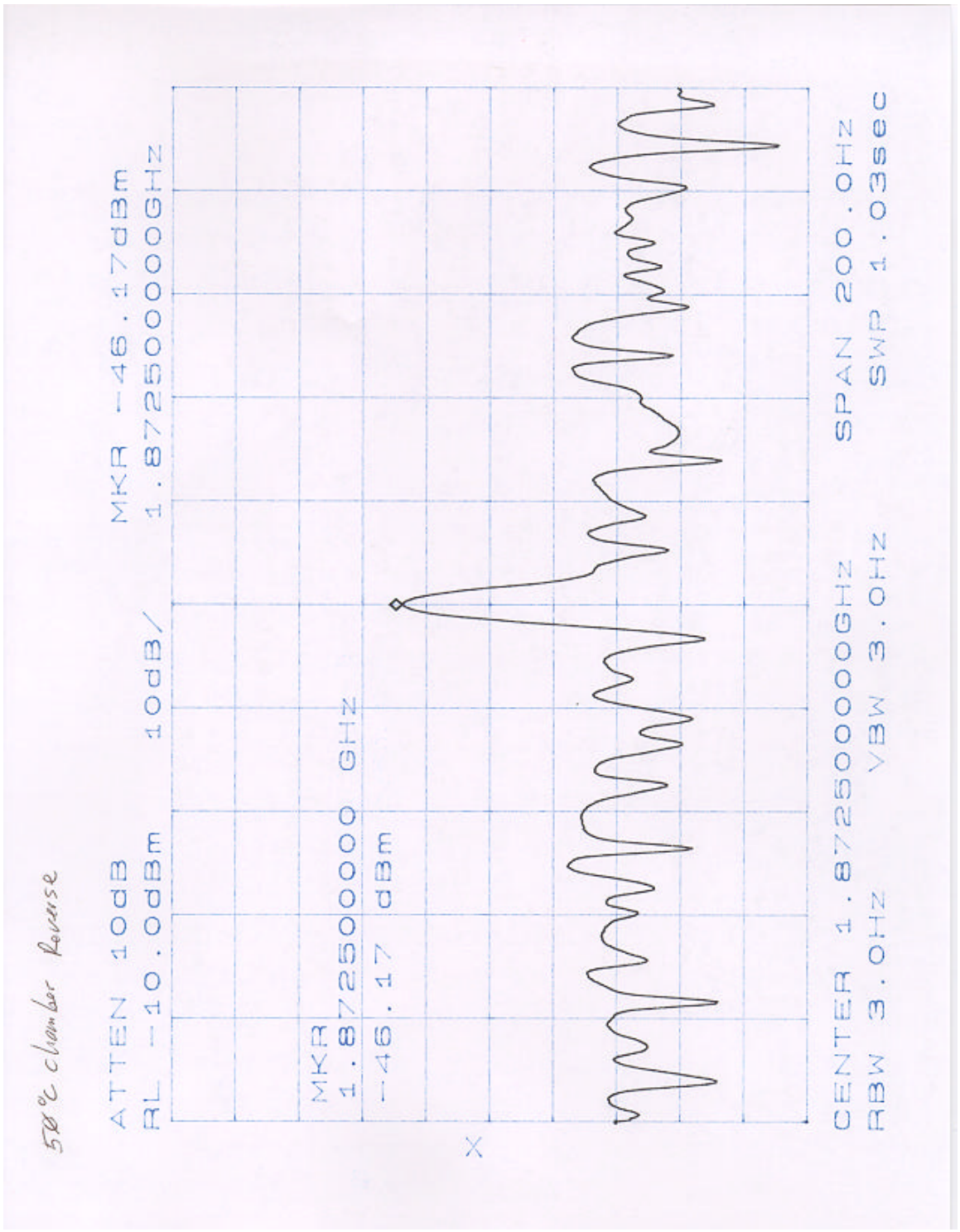
-30 °C Environment Temperature, Forward Signal Path



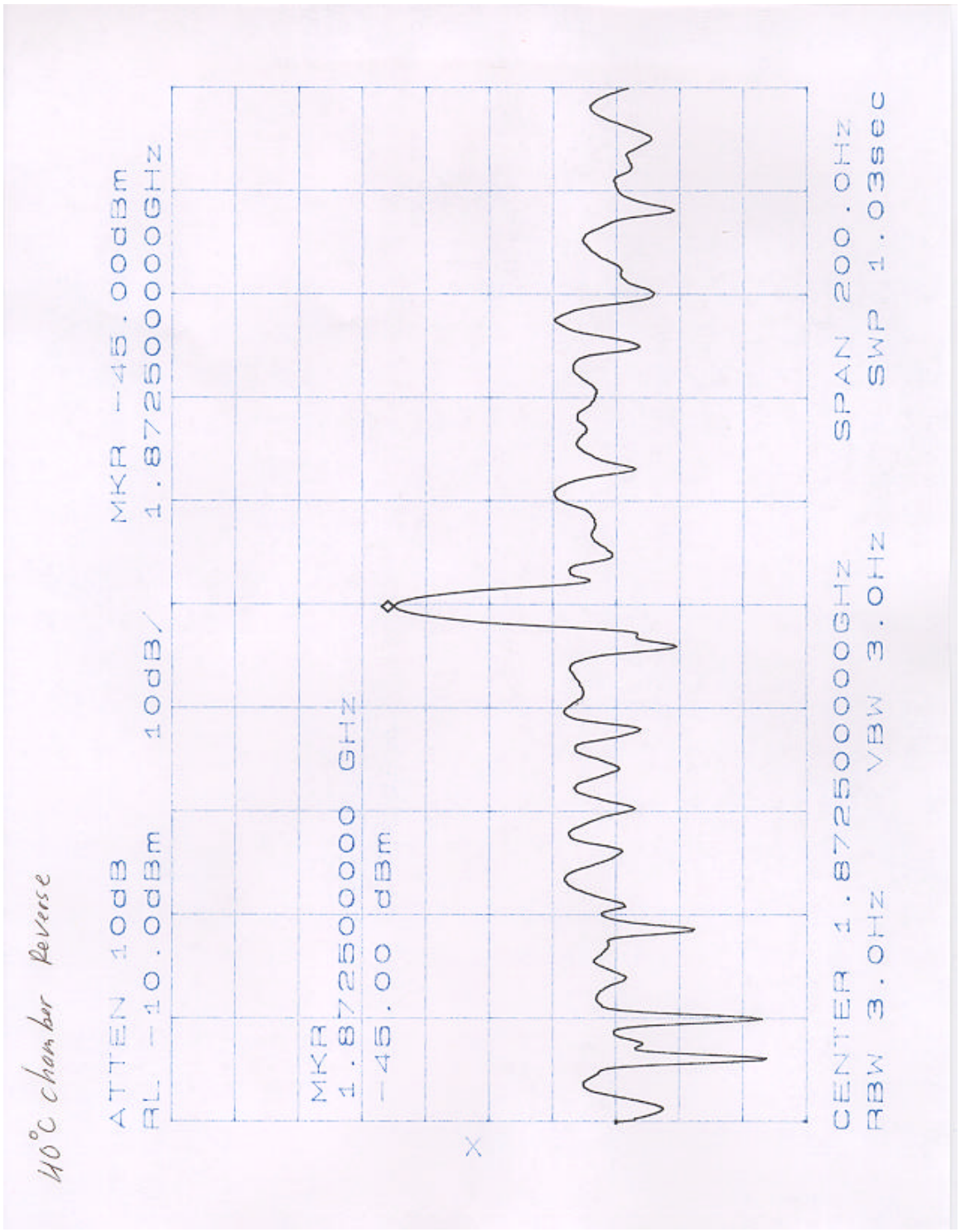
-40 °C Environment Temperature, Forward Signal Path



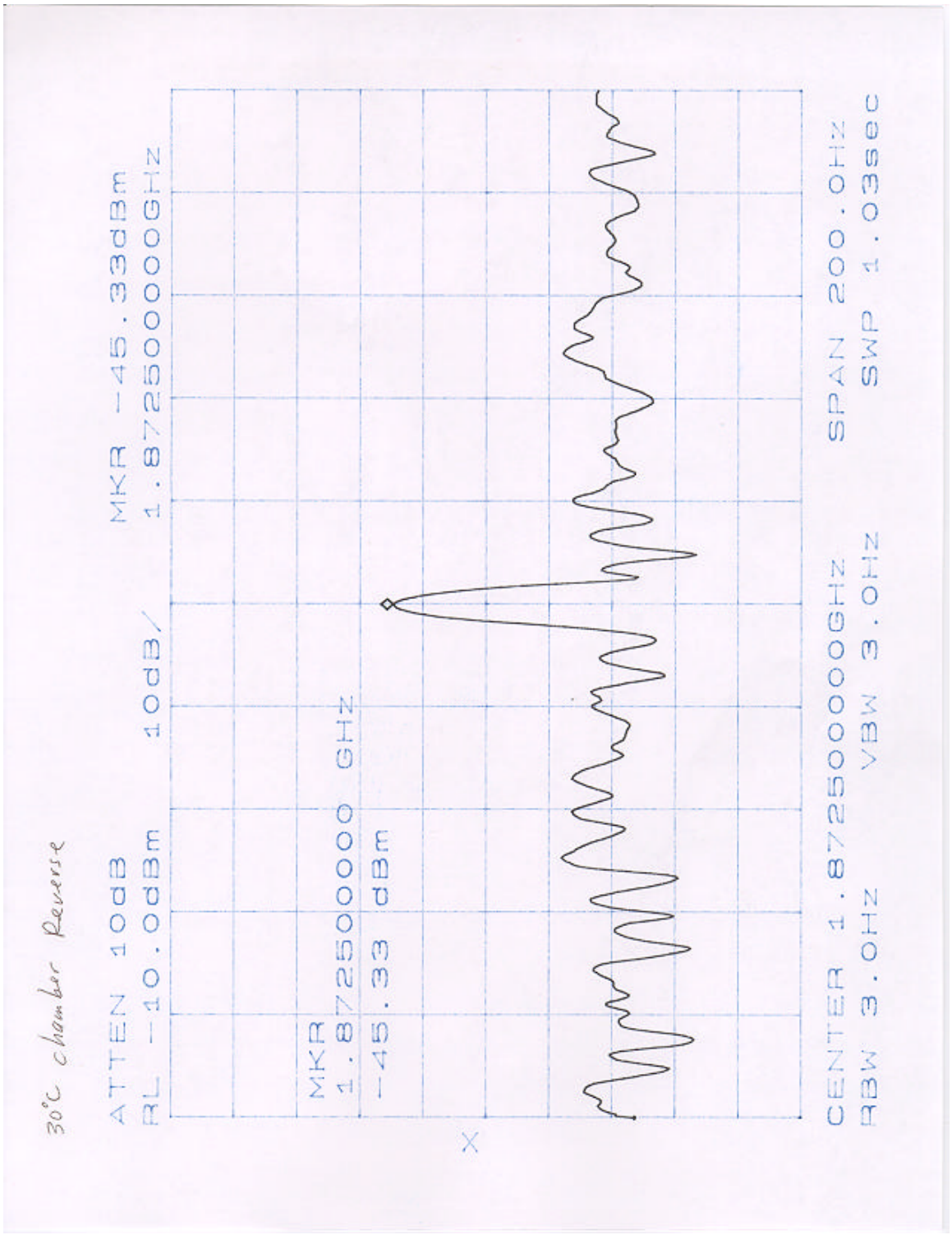
60 °C Environment Temperature, Reverse Signal Path



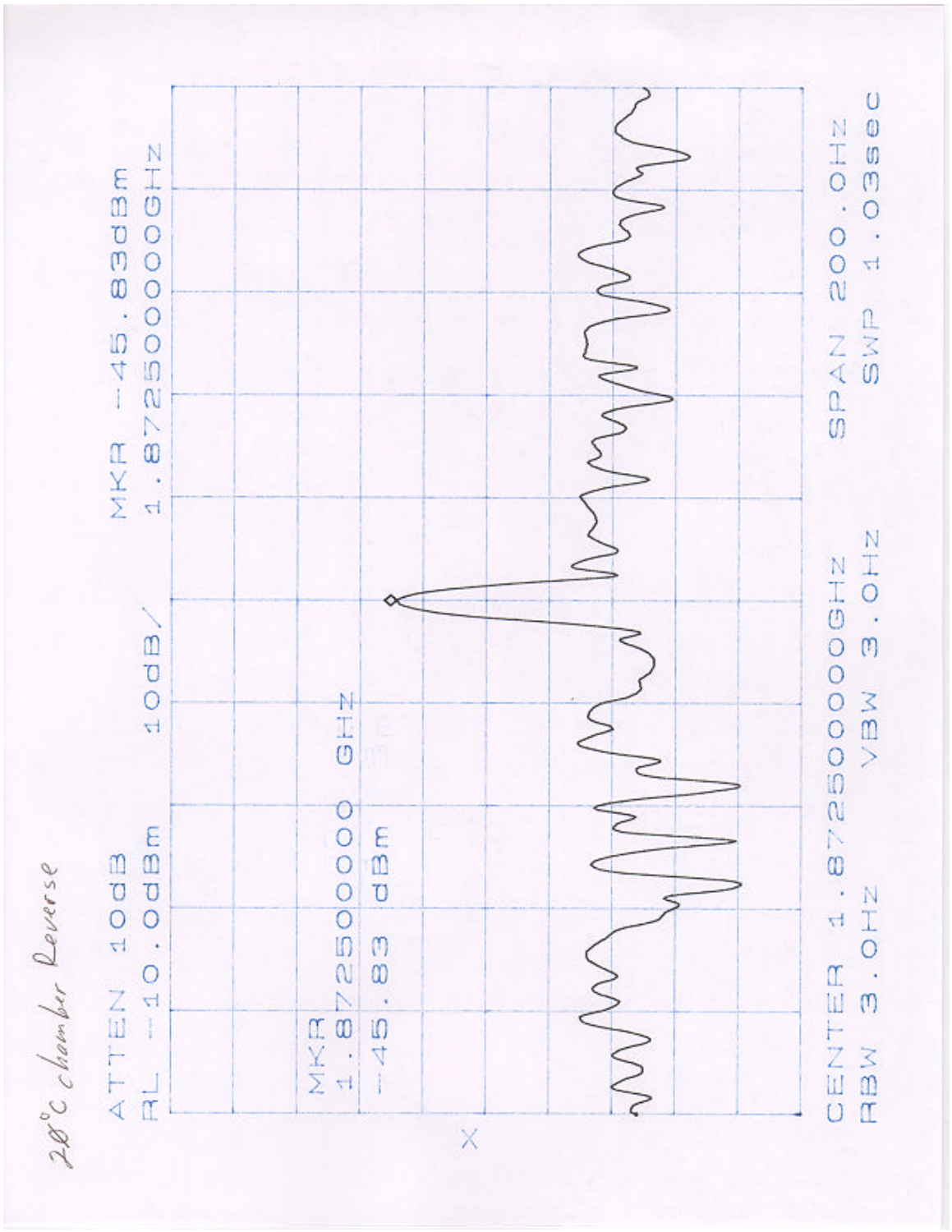
50 °C Environment Temperature, Reverse Signal Path



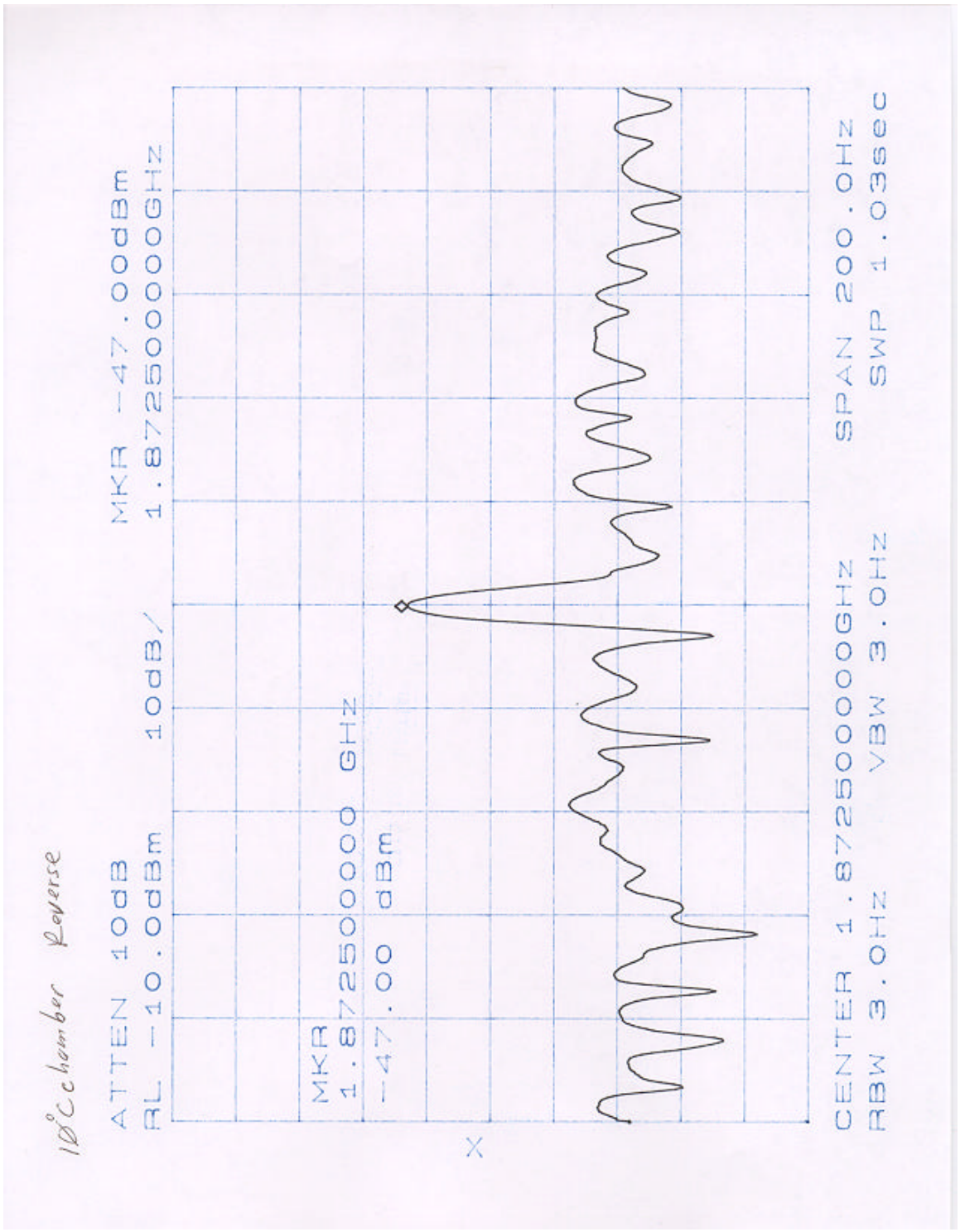
40 °C Environment Temperature, Reverse Signal Path



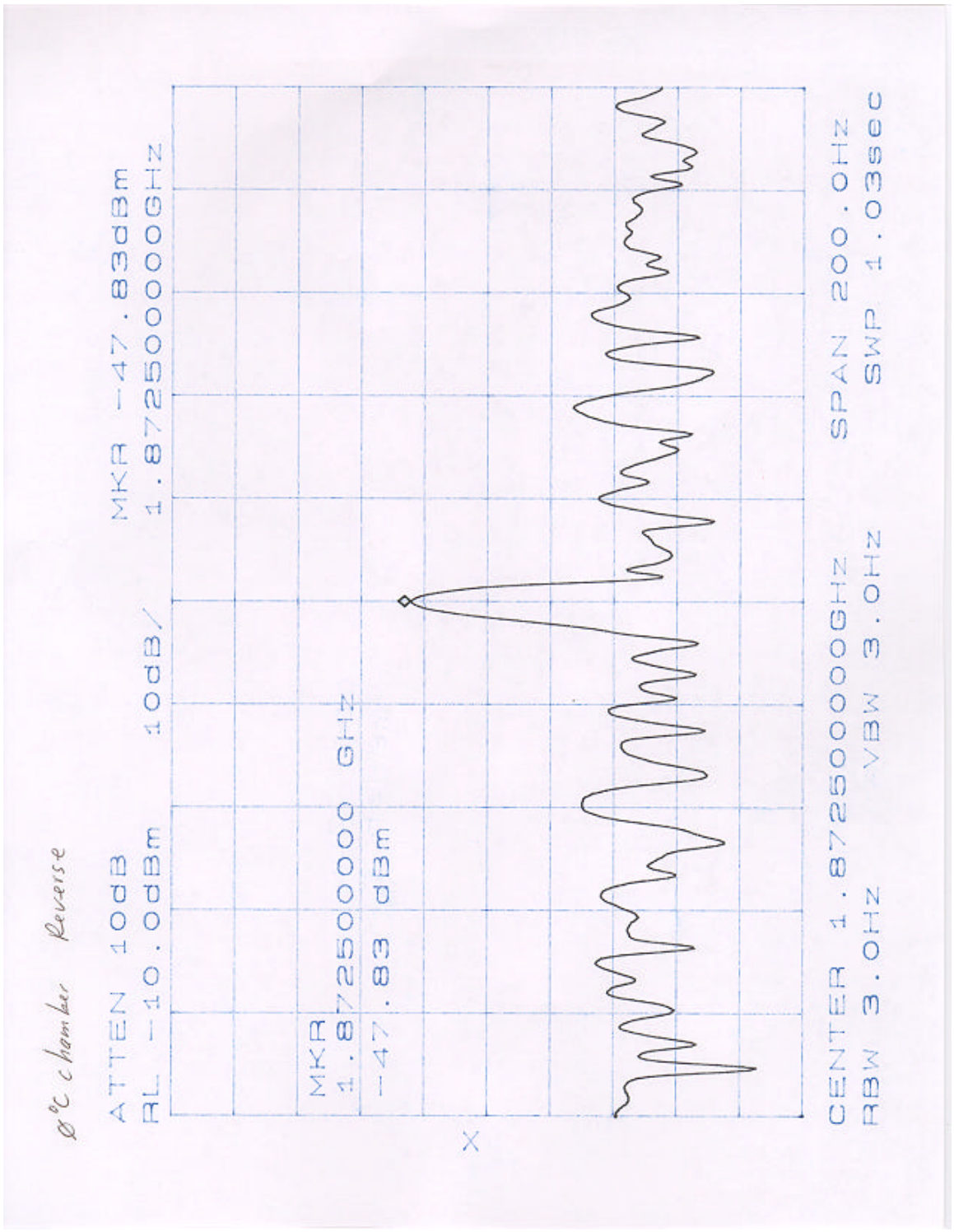
30 °C Environment Temperature, Reverse Signal Path



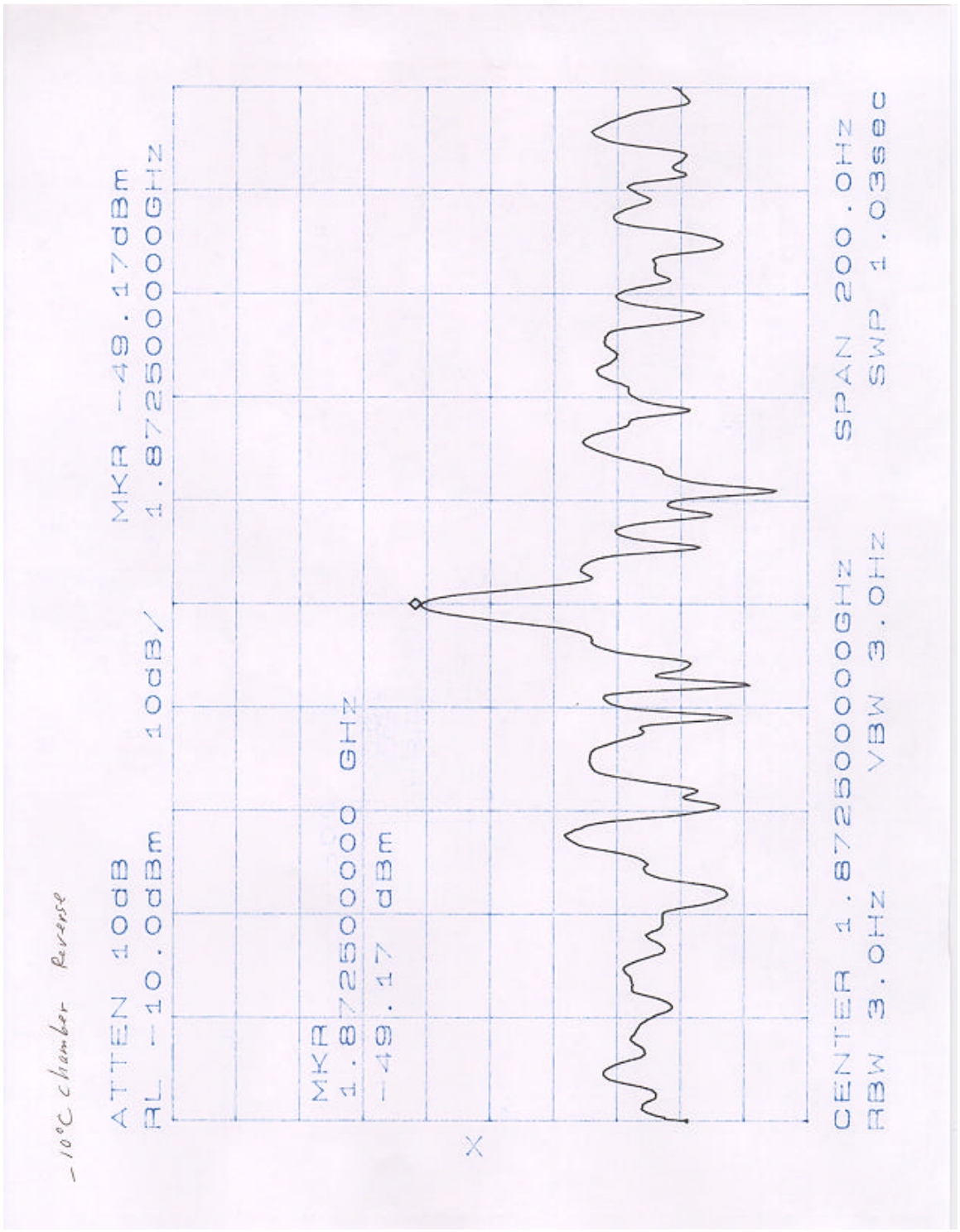
20 °C Environment Temperature, Reverse Signal Path



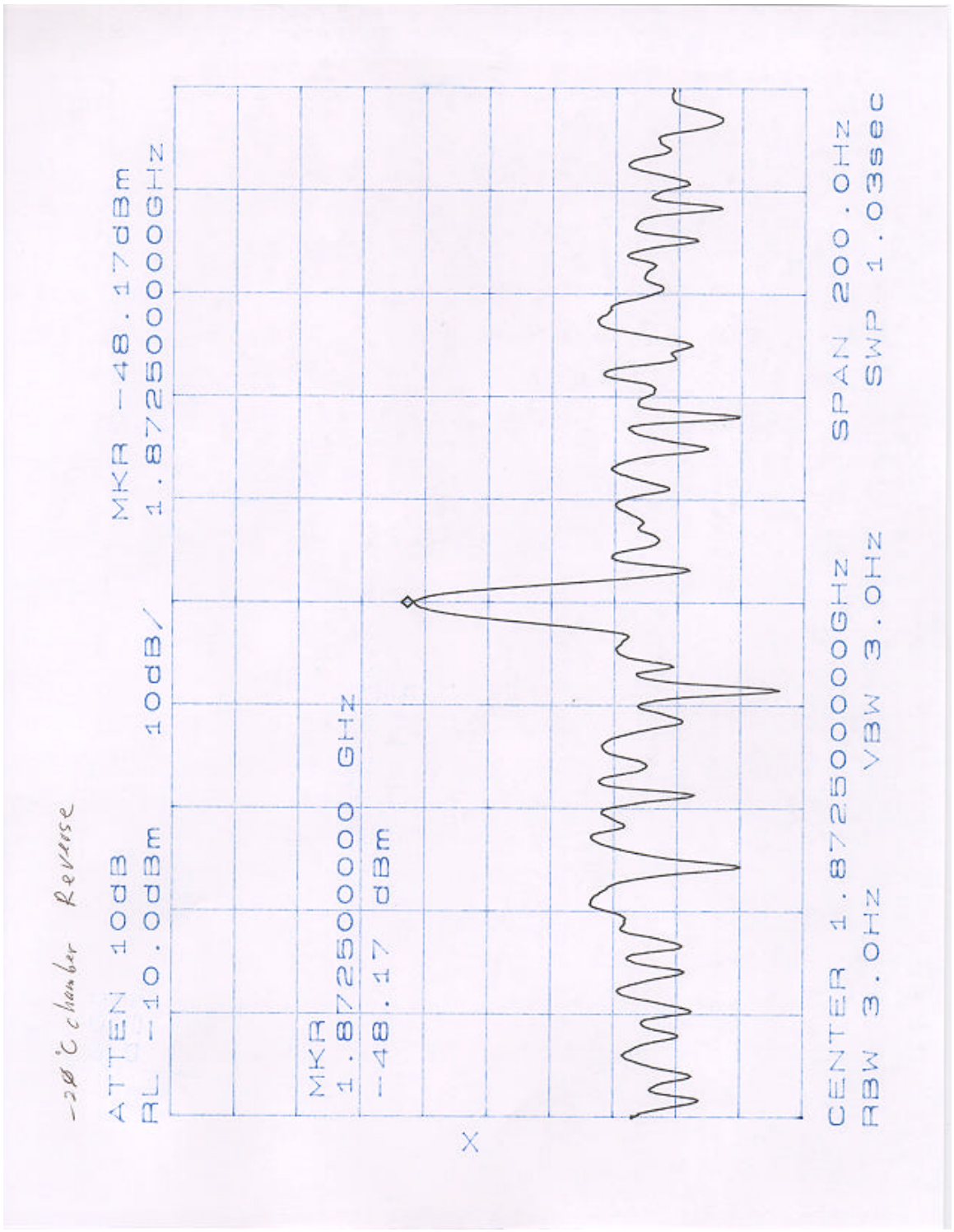
10 °C Environment Temperature, Reverse Signal Path



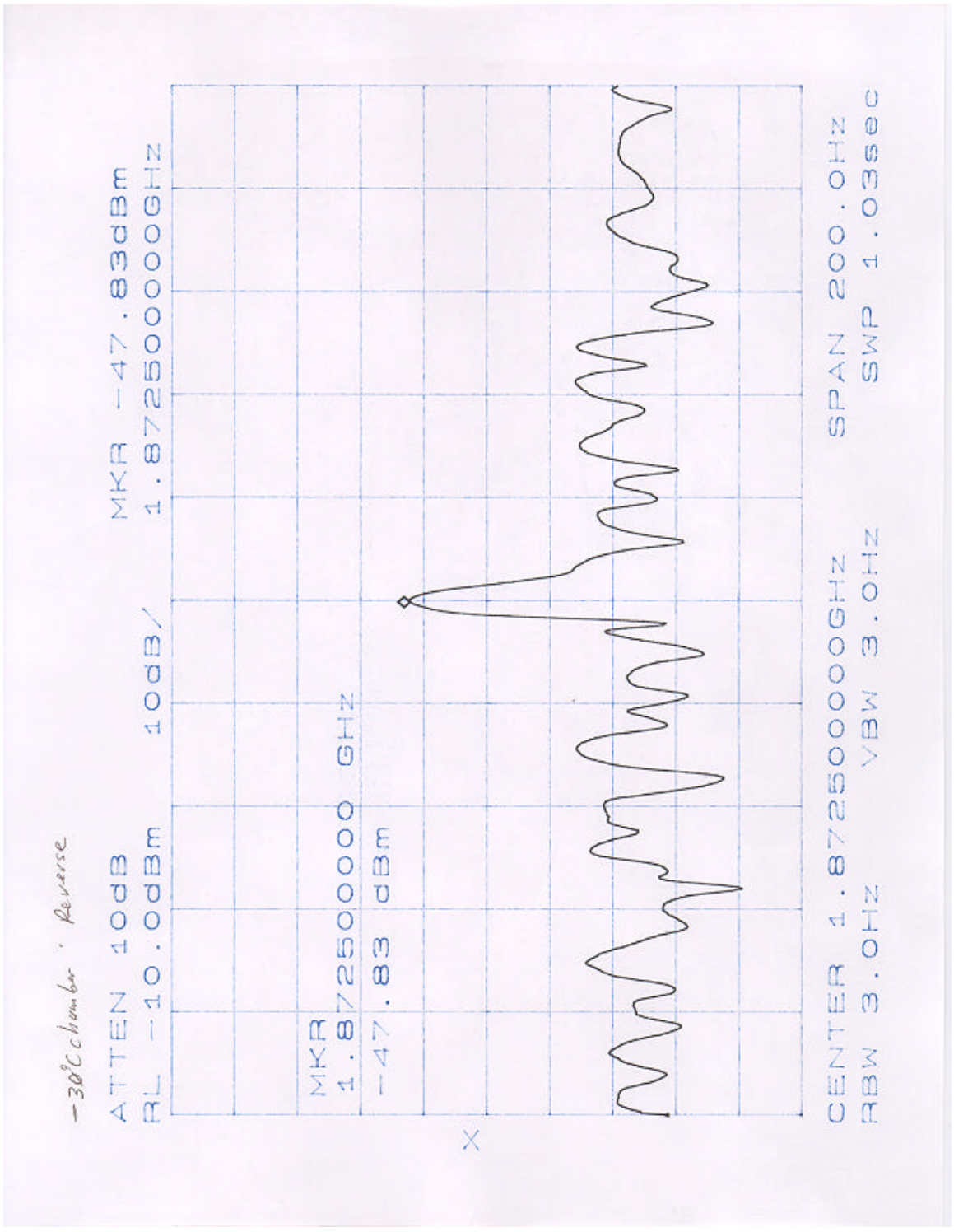
0 °C Environment Temperature, Reverse Signal Path



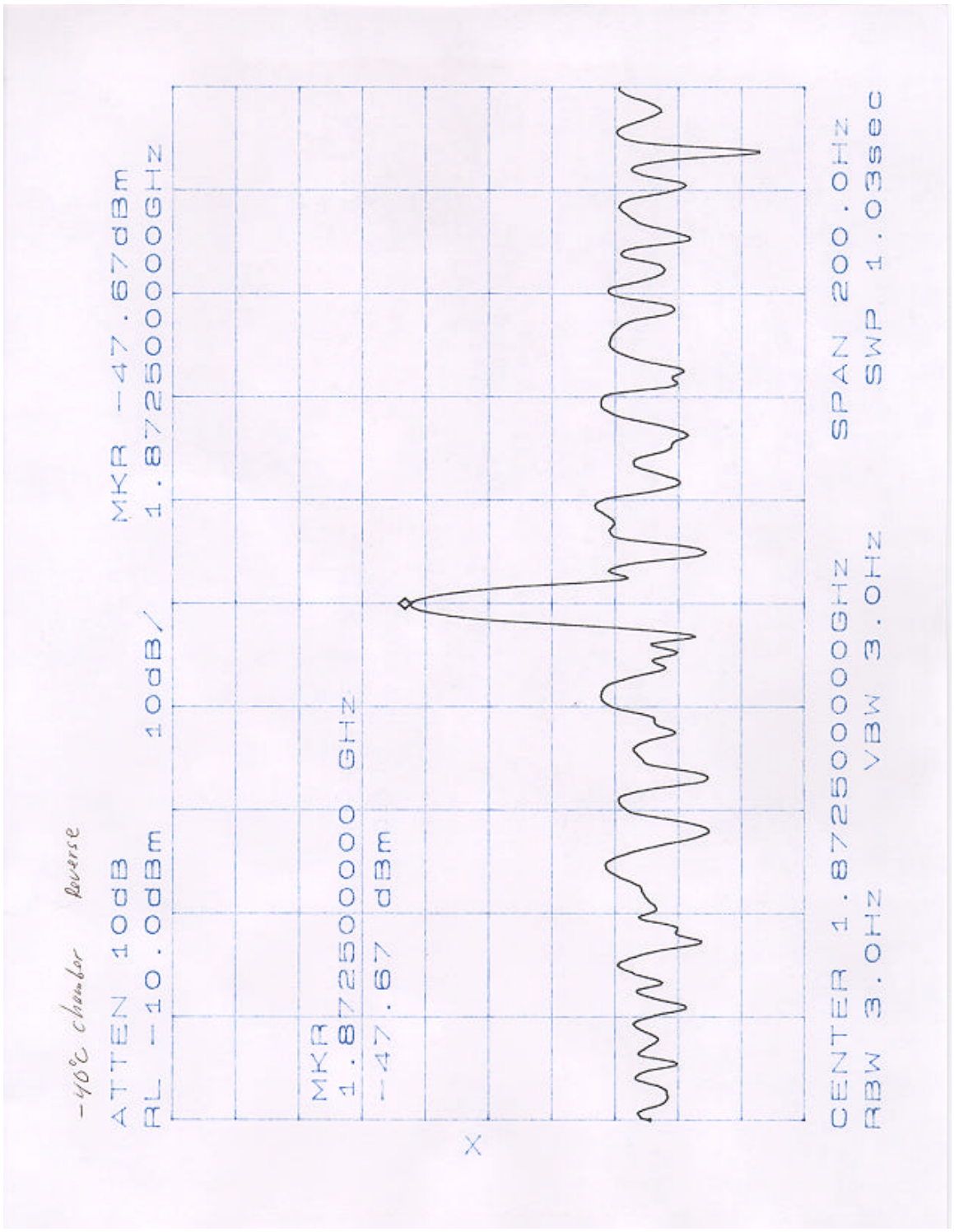
-10 °C Environment Temperature, Reverse Signal Path



-20 °C Environment Temperature, Reverse Signal Path



-30 °C Environment Temperature, Reverse Signal Path



-40 °C Environment Temperature, Reverse Signal Path

4.3 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

4.3.1 Test Procedure

Tests were performed in accordance with ANSI C63.4-1992. Per CFR 24.238, all measurements were performed using average detection and a 30kHz resolution bandwidth and correlated to a 1MHz resolution bandwidth to analyze the bandwidth to the worst case. All measurements below 1 GHz were performed using peak detection and bandwidths per ANSI C63.4-1992.

The CMI power output level was set to the rated maximum (7.5 watts; three carriers) for all measurements.

4.3.2 Instrumentation Used

Description	Model/Mfr.
Spectrum Analyzer	8593E/HP
CDMA Generator	E4432B/HP
Coupler	3202B-20/ Narda
Load	TRM-2143-M0-SMA-07 Midwest Microwave

4.3.3 Results

Per CFR 24.238, out-of-block emissions are required to be a minimum of $43 + 10 \cdot \log(P)$ below the fundamental power, where P is the transmitter power in watts. In terms of an absolute power level, the limit is calculated by:

$P_{lim} = 10 \cdot \log(P) - (43 + 10 \cdot \log(P))$ = -43 dBW = -13 dBm.

All emissions were below the required limit. The spurious signals were evaluated from DC to 20GHz (10th Harmonic) per CFR 24.238. The highest measured levels are tabulated below. In addition, the occupied bandwidth plots presented in Figures 4-1 through 4-2 show that Part 24 limits are met for PCS transmit channels at the edge of the block.

CMI Transmit Channel (Center Freq)	Spurious Emission Frequency, MHz	Detected Amplitude, dBm	Setup Insertion Loss, dB	Spurious Emission Amplitude, dBm	Part 24 Limit, dBm
Channel 50 (1932.5 MHz)	1754.2	-39.2	22	-17.2	-13.0
	1922.7	-52.8	22	-30.8	-13.0
Channel 250 (1942.5 MHz)	1744.2	-38	22	-16	-13.0
	1932.7	-52.2	22	-30.2	-13.0
Channel 350 (1947.5 MHz)	1759.2	-40.5	22	-18	-13.0
	1937.7	-52.8	22	-30.8	-13.0

Note: all measurements were performed at a transmitter fundamental output power of 38.75 dBm (7.5 watts) average (three carriers).

TransCell 1900 CB
Frequency Stability Test
Addendum

January 3, 2001

1.0 SCOPE

This document is an addendum to the TransCell 1900 CB system test results submitted for FCC Part 24 approval. This test was performed to document the frequency stability measurements for FCC 47 CFR Part 2.995 Section D Frequency Stability measurement by variation of primary supply voltage. This test was performed in conjunction with the safety testing of the TransCell 1900 CB products.

2.0 APPLICABLE DOCUMENTS

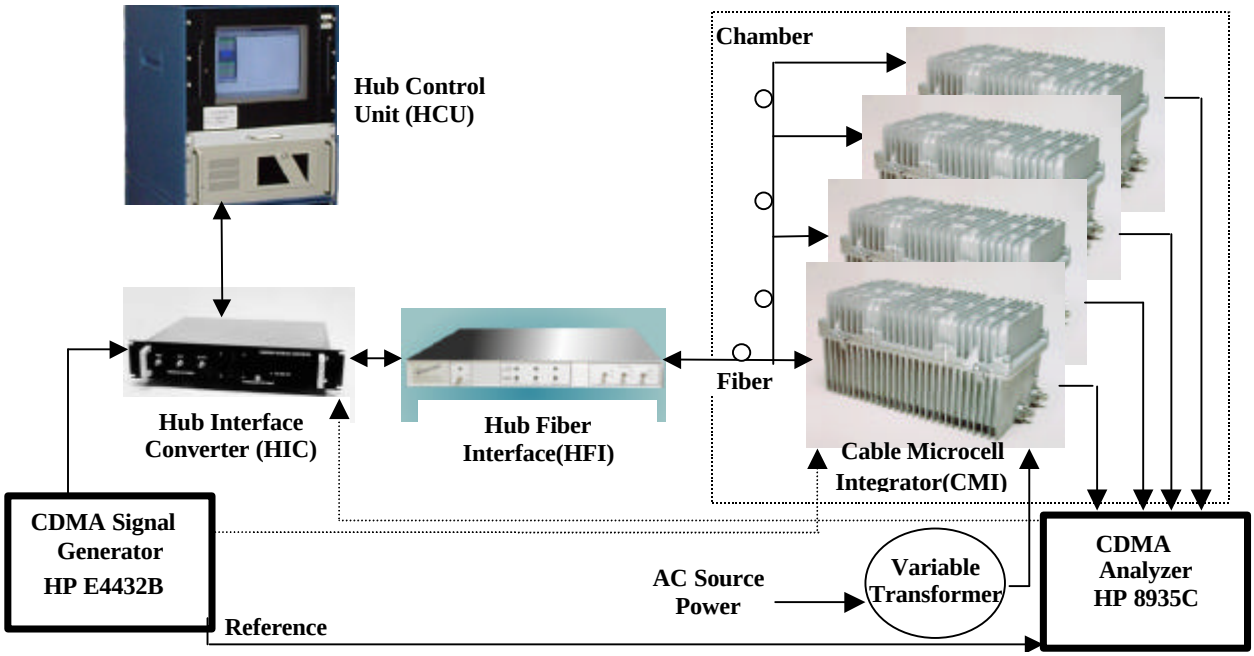
The Test Setup and parameters are based in part on the *TransCell 1900 CB System Specification, 1000016*

3.0 TEST RESOURCE REQUIREMENTS

The test setup contained Commercial-Off-The-Shelf (COTS) test equipment and hardware. The requirement for FCC 47 CFR Part 2.995 Section D Frequency Stability measurement by variation of primary supply voltage is 93.5VAC (85%) to 253VAC (115%) since the nominal voltages are 110VAC to 220VAC to operate the CMI.

4.0 TEST CONFIGURATIONS

The following is the test setup used for the TransCell 1900 CB system Frequency Stability variation of primary supply voltage testing. The test equipment listed below was the equipment used in the testing. All configurations of the CMI were placed within the environmental chamber and the voltages varies at the temperature extremes (exceeding FCC requirements). The TransCell 1900 CB systems were monitored as the voltages were varied beyond the FCC requirements stated above. The supply voltages to the CMIs were varied from 76.5VAC to 280VAC while monitoring the frequency stability and system performance. The variable transformers used were the STACO Energy Products, 3PN2210 for the 110VAC variance, and General Radio, 50-B for the 220 variance.

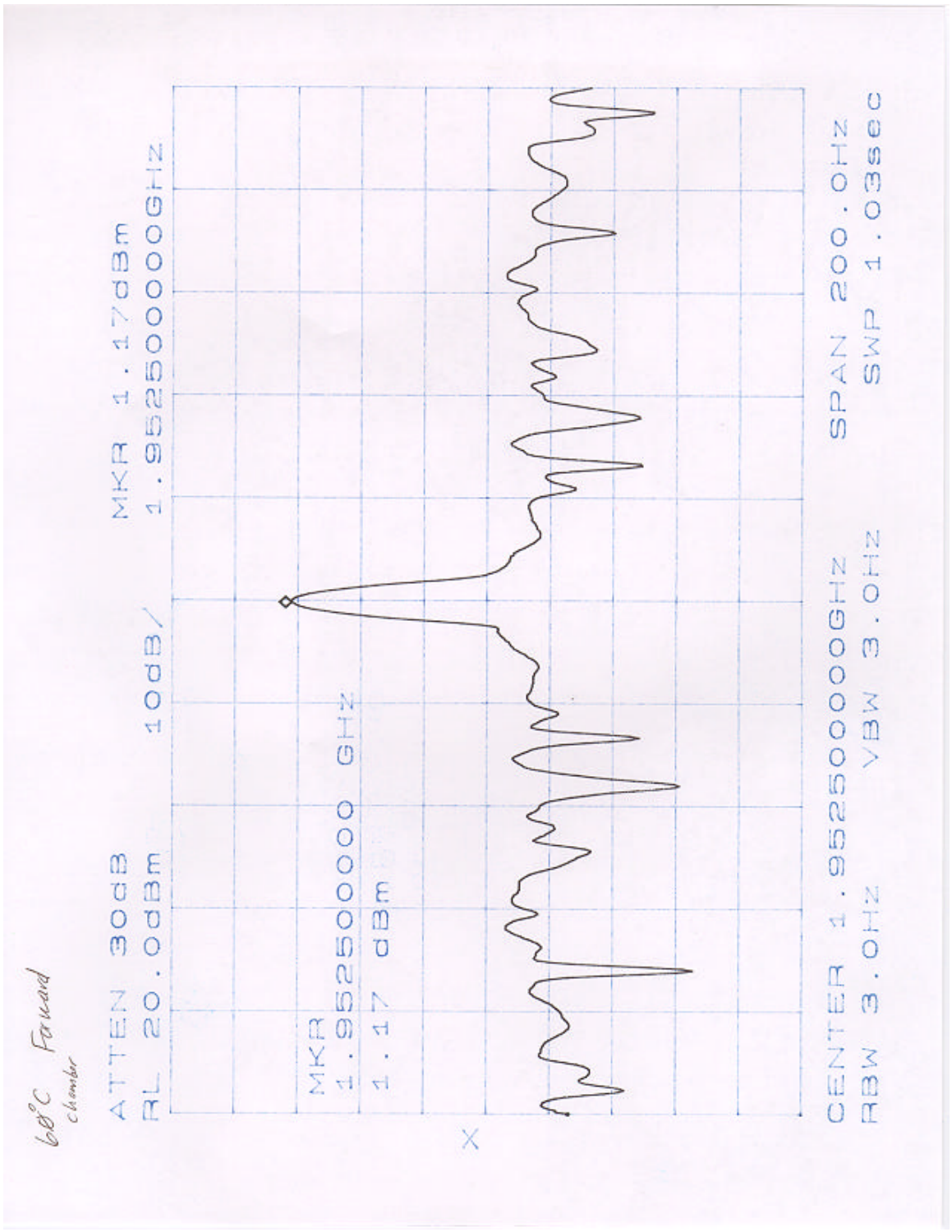


5.0 DETAIL TEST SETUP INFORMATION

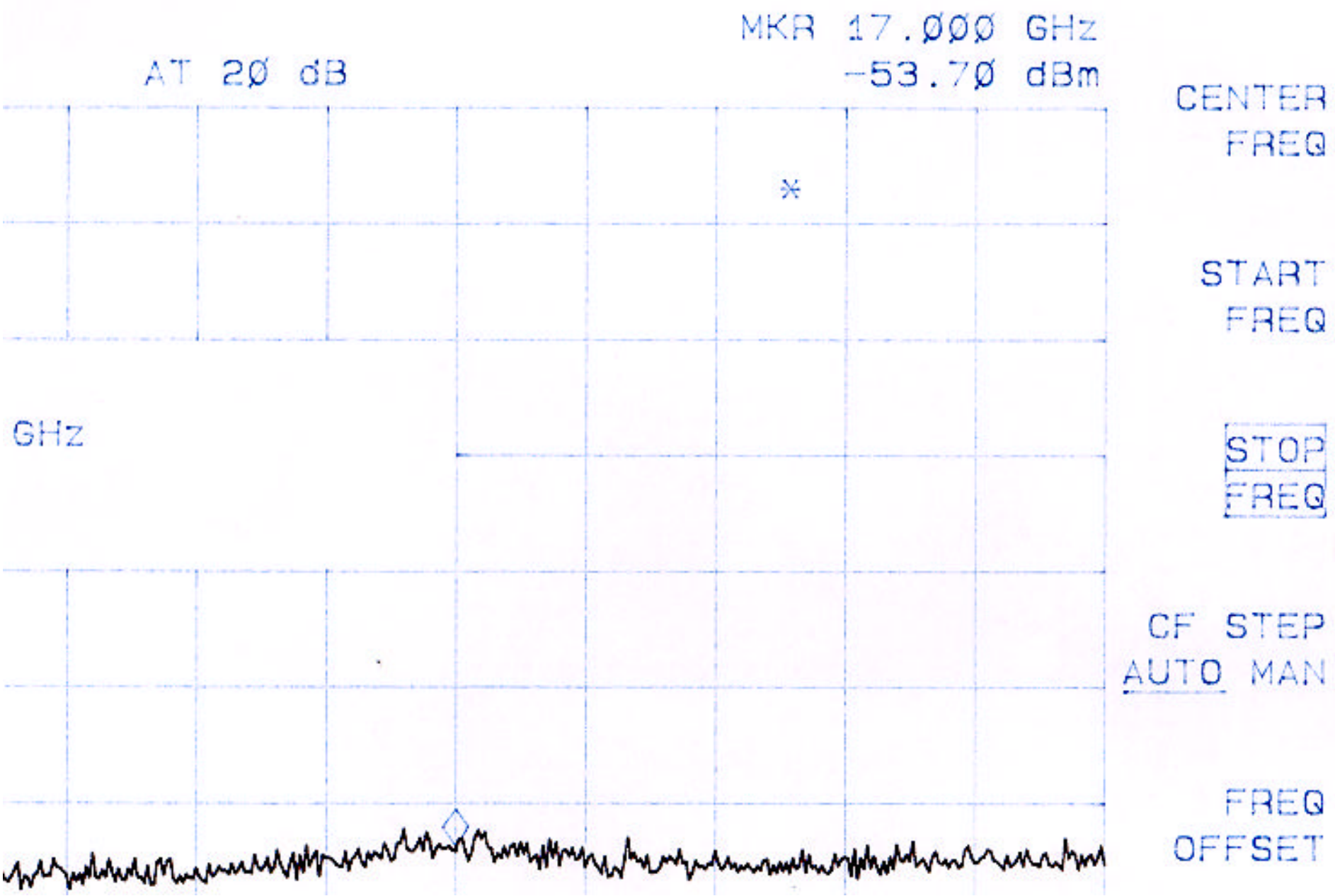
The CDMA Signal Generator was setup, so that the power level of the CDMA signal going into the HIC is –2dBm for the forward signal. The signal output of the CMI was set up for its operational power and passed through a 30dB attenuator going to the CDMA analyzer to prevent damage to the instrument. Frequency Stability was measured/monitored via the analyzer via the frequency error function.

6.0 TEST RESULTS

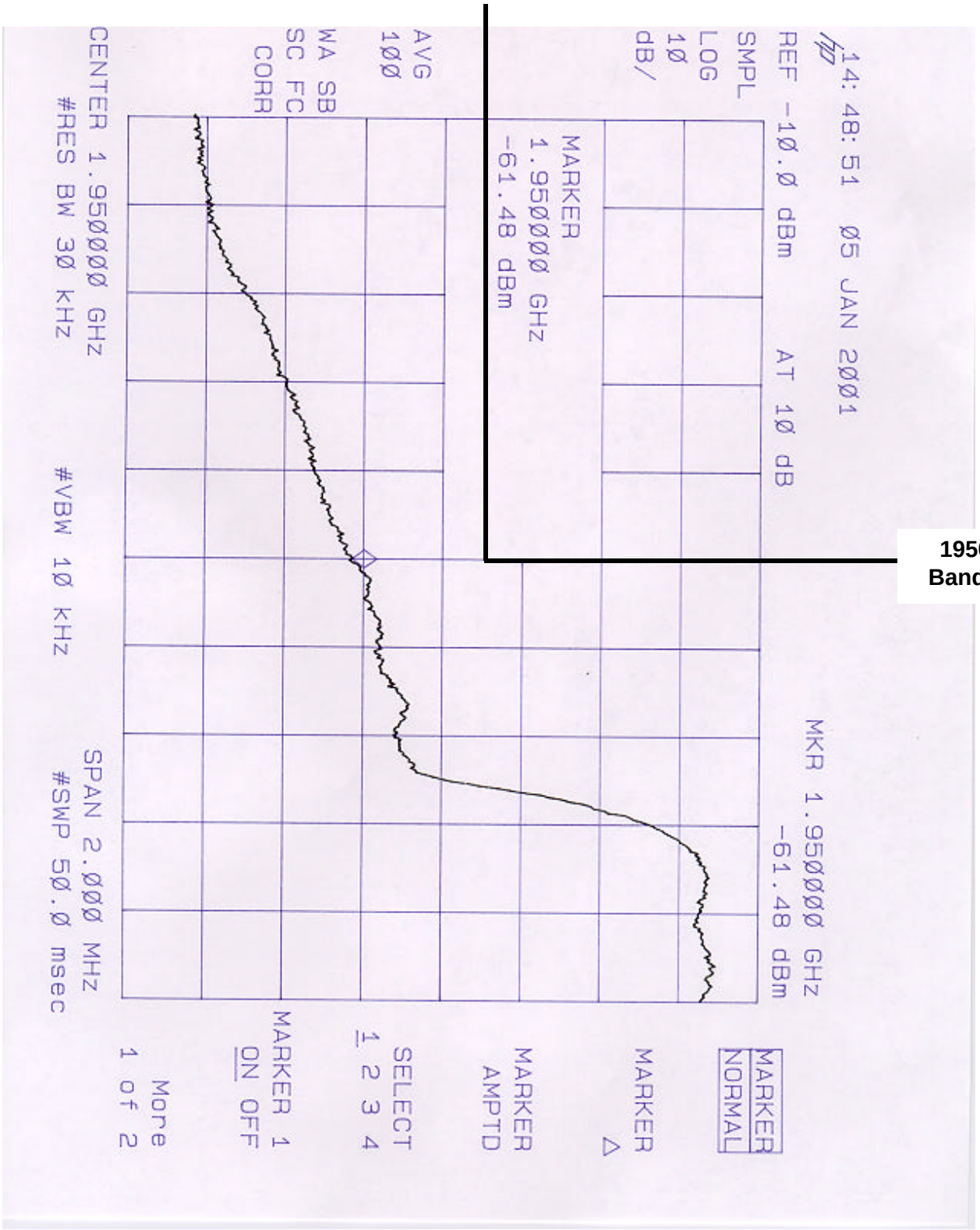
The Phase locked loops remained locked over the variance of the supply voltage from 76.5VAC to 280VAC exceeding the FCC 47 CFR Part 2.995 Section D Frequency Stability measurement by variation of primary supply voltage. The CDMA signal did not drift from the center frequency at any of the limits. The CDMA analyzer measured a zero hertz variance and maintained system performance over these limits.



60 °C Environment Temperature, Forward Signal Path

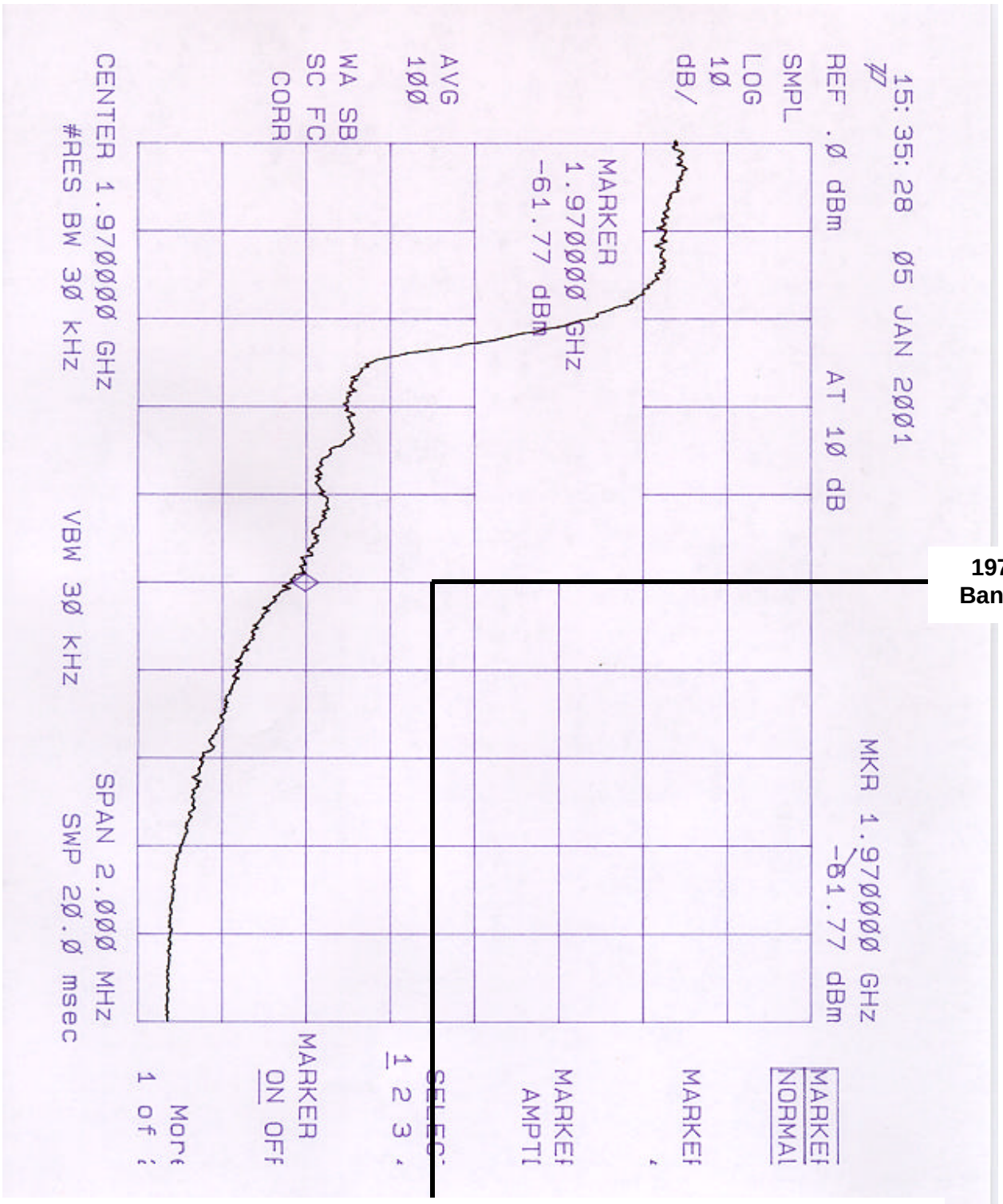

Ø3, 2ØØ1
MKR 17.ØØØ GHz
AT 2Ø dB
-53.7Ø dBm
CENTER FREQ
START FREQ
GHz
STOP FREQ
CF STEP
AUTO MAN
FREQ OFFSET

-45dBm (FCC Part 24 Spec)
10log[7.5] + 43dB = 51.75dBc
38.75dBm – 51.75dB –32dB (Path Loss) = -45dBm



1950MHz Band Edge

Figure 4-1 Occupied Bandwidth, Channel 425



1970MHz Band Edge

-45dBm (FCC Part 24 Spec)
10log[7.5] + 43dB = 51.75dBc
38.75dBm – 51.75dB –32dB (Path Loss) = -45dBm

Figure 4-2 Occupied Bandwidth, Channel 775