Section 11: Test Data

Overview

This section contains the test data that show that the Honeywell Transceiver, TR-1 Part Number 930-2001-001 and 930-2000-001 is in compliance with all applicable FCC CFR 47, Part 87 technical standards and Regulations.

Contents

11. Test Data

11.1 Equipment under Test Information

11.1.1 Description of Unit Tested

The following model and serial number was tested and documented within this test report:

- Model Number(s): RDR-4000(M) System Transceiver (TR-1)
- Part Number: Honeywell Part Number 930-2001-001 (930-2000-001 is an identical box, but given a different PN due to different customer).
- Serial Number: LRU S/N: TR00124M

11.1.2 System Description

Unit under test is a 9.3-9.5 GHz Doppler pulse radar aircraft weather radar system.

11.1.3 Pulse Characteristics

Pulse Rate	200pps
Pulse Width	5.2us
Rise Time	0.275
Fall Time	0.075

11.1.4 Emission Designation

The Unit under Test operates in the following modes or configurations:

1. 2M00P0N
2. 250KP0N

11.1.5 Technical Information

11.1.5.1 Equipment Type

Installation Type:	Mobile
Device Type:	Transceiver

11.1.5.2 Equipment Specifications

Input Power Requirements:	200 Vdc
Temperature Range:	-40 to +60 degrees C
Humidity Range:	N/A

11.1.5.3 Power & Antenna Specifications

RF Power Output at Antenna Port:	35 W Minimum 40 W Average 80 W Peak
Output Power is:	Fixed
Antenna is:	Removable
RF Connector Type:	Waveguide
Number of Antennas:	1
Antenna Type & Gain:	30 inch flat plate Slotted Array, 35dBi
Beamwidth	3.3 º (V and H)
Antenna Bias:	N/A

11.1.5.4 Frequency Summary

Operating Frequency Range:	9336 – 9376 MHz
Channel Bandwidth:	41.6 MHz

Channel Spacing: N/A

11.1.5.5 Agency Information

Necessary Bandwidth: 8M00 (3M00) (125K)
Emissions Designator: P0N
FCC Equipment Class: TNB
FCC I.D. Number: AOI33M0P0NRDR4000

11.2 Test Equipment List

Test cases within this section were completed utilizing the support and test equipment in Table 11-1. Calibration of equipment, where required, was completed and tracks to NIST.

Table 11-1 Test Equipment List

Instrument Name	Manufacturer	Model Number	Serial Number	Calibration Due
Environmental Chamber	Thermotron	S-16	14789	13 Nov 05
Chamber Controller	Thermotron	2800	203228	13 Nov 05
Waveguide – Coax Adapter	Hewlett Packard	X281C	N/A	N/A
Variable Power Supply	Xantrex	XFR300-4	71976	8 Jun 05
Spectrum Analyzer	Hewlett Packard	E4408B	MY41440421	1 Oct 05
Sweep Generator	Hewlett Packard	HP8352	N/A	N/A
DataTrac	JcAIR Test Systems	400H	J610	11 Nov 05
Peak Power Meter	Boonton	4400A	207175	6 Oct 05
Peak Power Meter Sensor	Boonton	57518	207176	21 Oct 05
Spectrum Analyzer	Agilent	E4446A	US44300437	23 Jan 07
Preamplifier	Hewlett Packard	83051A	3332A00284	21 Jan 06
Preamplifier	Hewlett Packard	8447D	2944A08601	21 Jul 05
Cable, Hi Frequency	Pasternack	N/A	N/A	8 Feb 07
Cable, Hi Frequency	Pasternack	N/A	N/A	8 Feb 07
RG-214 Cable Set	Various	N/A	N/A	5 Oct 06
BiLog Antenna	Chase	CBL6111C	2452	16 Mar 06
Horn Antenna 1-18 GHz	EMCO	3115	6154	14 Dec 05
Horn Antenna 18-26 GHz	Hewlett Packard	84125-80008	942126-003	1 Jul 05
Horn Antenna 26-40 GHz	Hewlett Packard	84125-80001	951559-008	12 Jul 05
Attenuator	Weinschel	75A-10-12	352	10 Mar 06
Attenuator	Weinschel	75A-20-12	341	10 Mar 06

11.3 RF Output Power

11.3.1 Applicable FCC Rules

FCC CFR 47, Subpart 2.1046 – Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with applicable tune-up procedures to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8).

FCC CFR 47, Subpart 87.131 – Power must be determined by direct measurement, with authorized emissions and maximum power stated.

11.3.2 Test Configuration

Peak RF output power testing from the transmitter (TR-1) was accomplished by transmitting a continuous (correct emission and duty cycle) pulse train containing all the pulse groups utilized within

the transmitter during proper operation and functionality. In this way, each mode of possible transmission is represented during testing. In addition, RS-429 communication was active between the transmitter and Datatrac 400H.

A Boonton Peak Power Meter and power head was used to characterize and measure the RF output signal from the transmitter under test as shown in Figure 11-1. Test setup photographs and facility locations of testing are contained in Section 12 of this document.

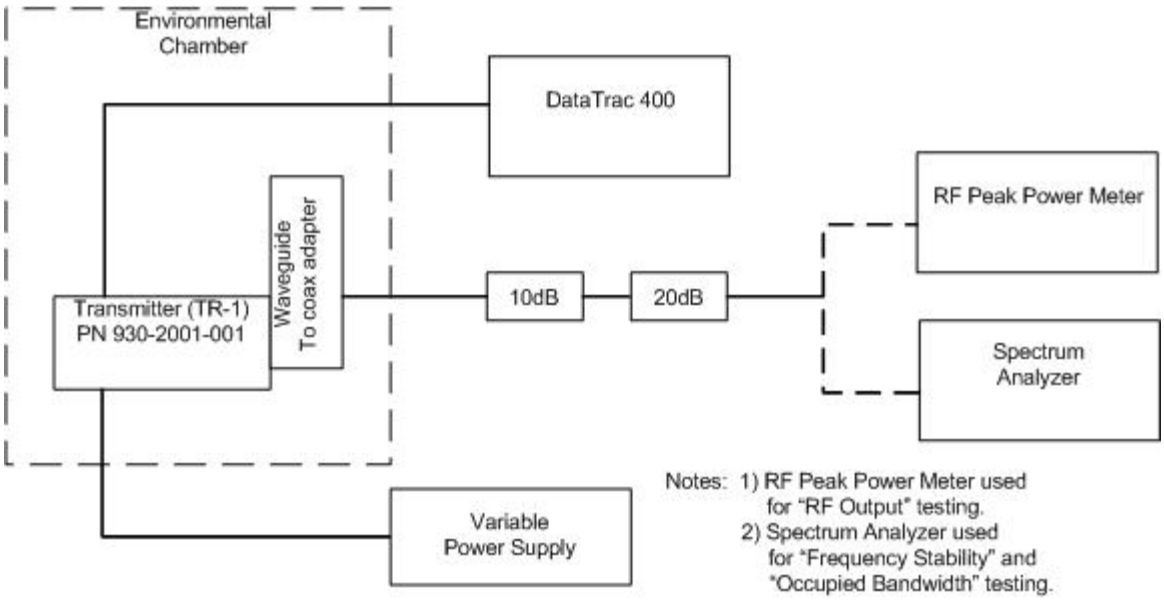

Figure 11-1 Configuration Setup

11.3.3 Results Summary

The measured RF output power of the transceiver while transmitting a continuous pulse train is depicted in Figures 11-2 through 11-12 for the nominal 200 Vdc input power over a temperature range of -40 degrees to +60 degrees Celsius with a minimum and maximum average power measurement of 46.22dBm to 46.59 dBm, respectively. In addition, the RF output power measurements were made over input DC voltages of 170 Vdc and 230 Vdc for the same temperature ranges, as shown in Table 11-2.

Table 11-2 RF Output Power over Input Voltage

Measurements are Average Power in dBm			
Temperature (C)	**170 Vdc Input**	**200 Vdc Input**	**230 Vdc Input**
-40	46.37	46.3	46.32
-30	46.1	46.22	46.17
-20	46.59	46.59	46.46
-10	46.25	46.32	46.3
0	46.19	46.23	46.31
+10	46.27	46.22	46.74
+20	46.51	46.56	46.56
+30	46.58	46.51	46.54
+40	46.51	46.45	46.35
+50	46.6	46.56	46.53
+60	46.57	46.5	46.58

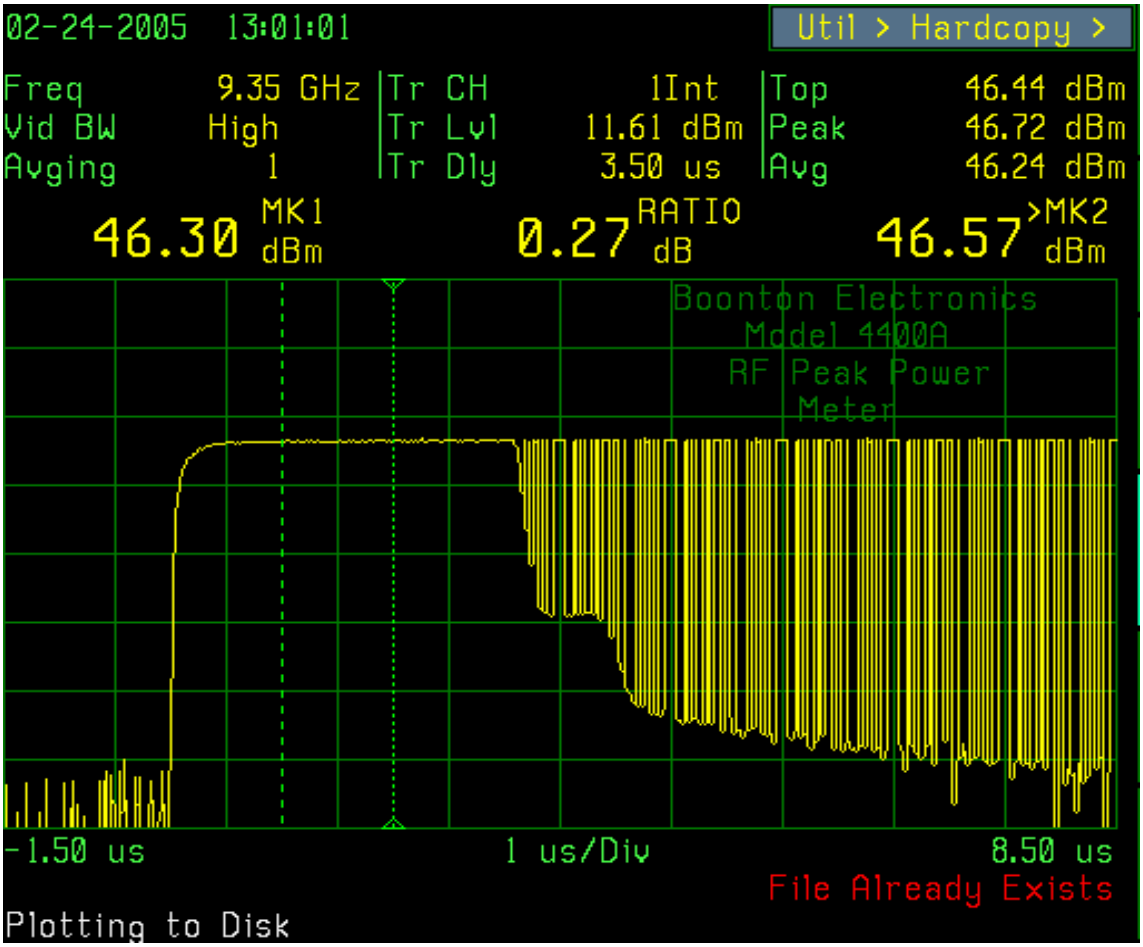

Figure 11-2 RF Output Power @ -40C

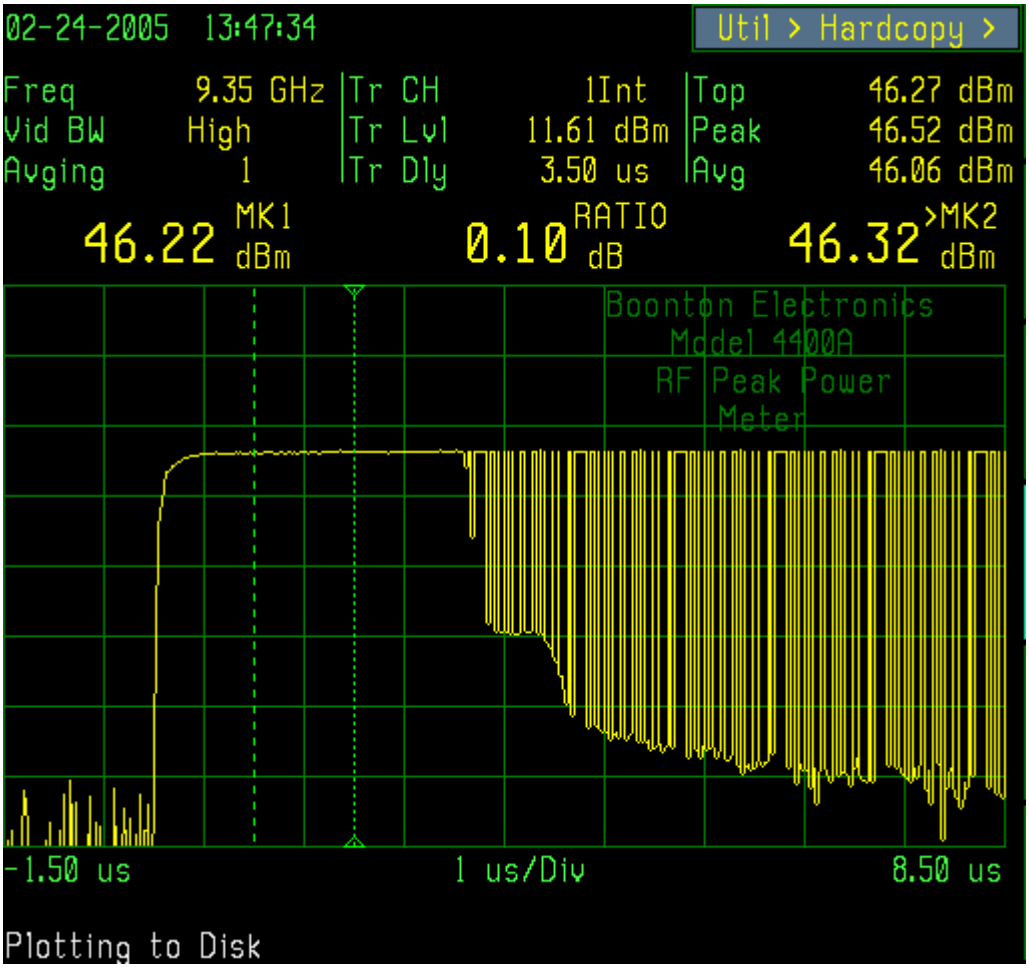

Figure 11-3 RF Output Power @ -30C

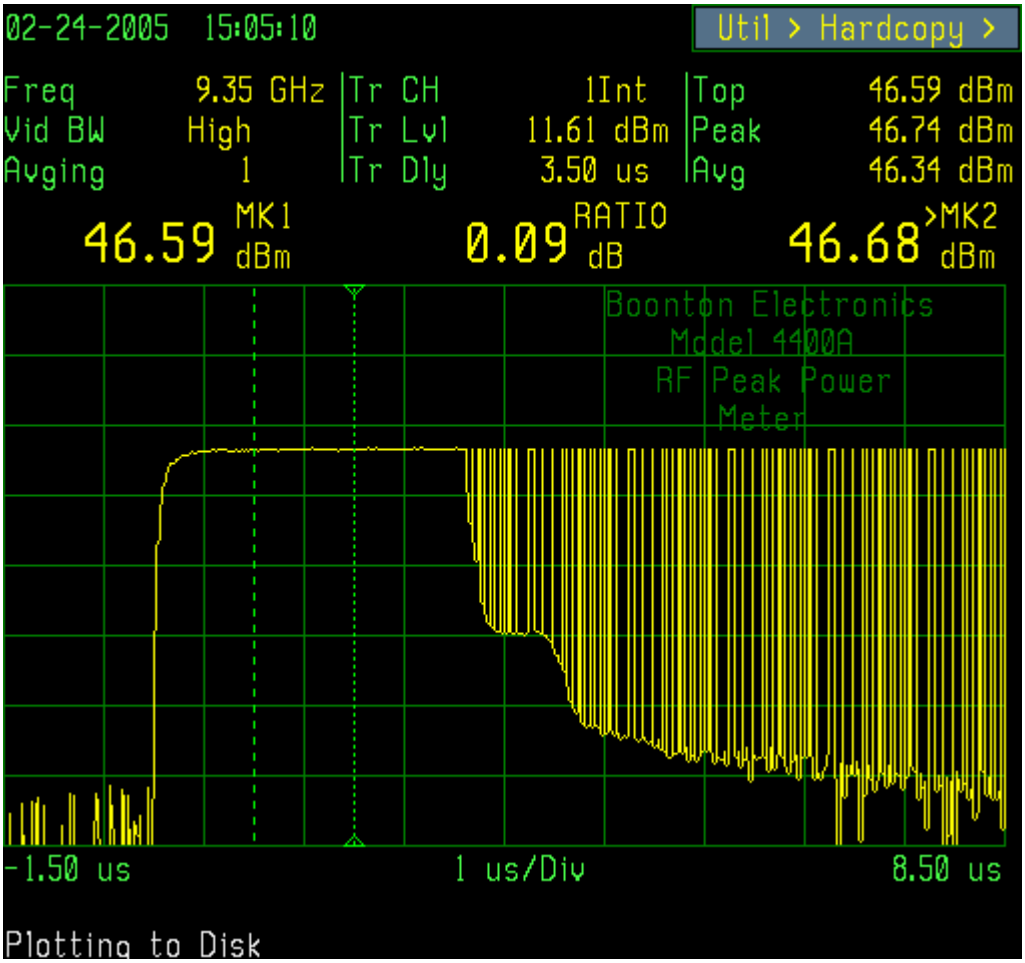

Figure 11-4 RF Output Power @ -20C

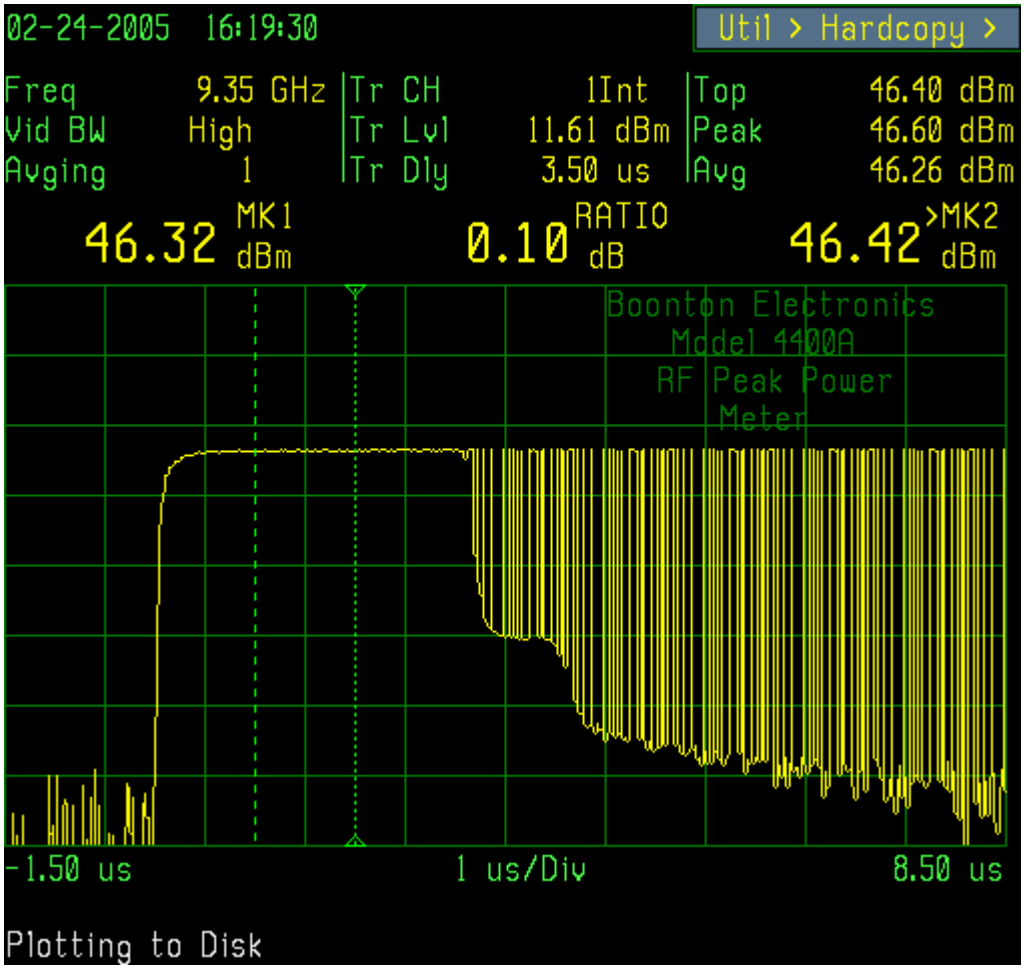

Figure 11-5 RF Output Power @ -10C

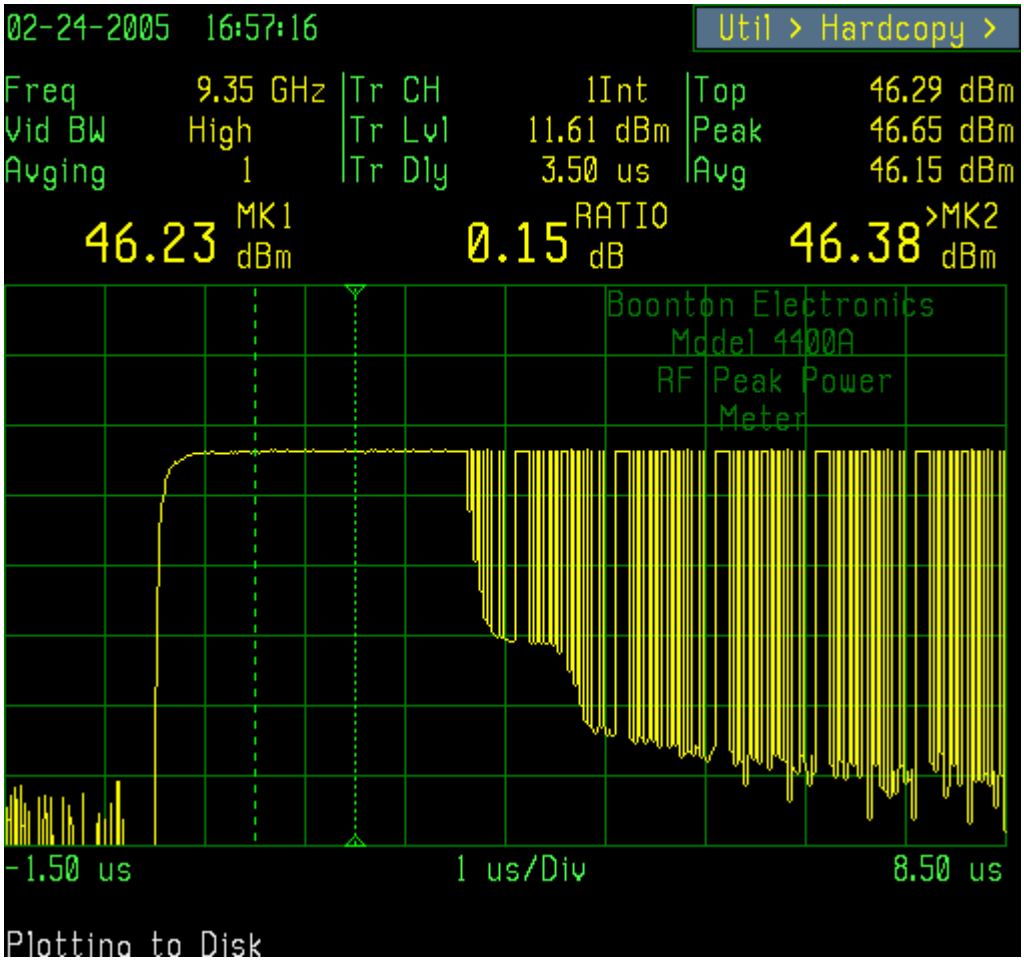

Figure 11-6 RF Output Power @ 0C

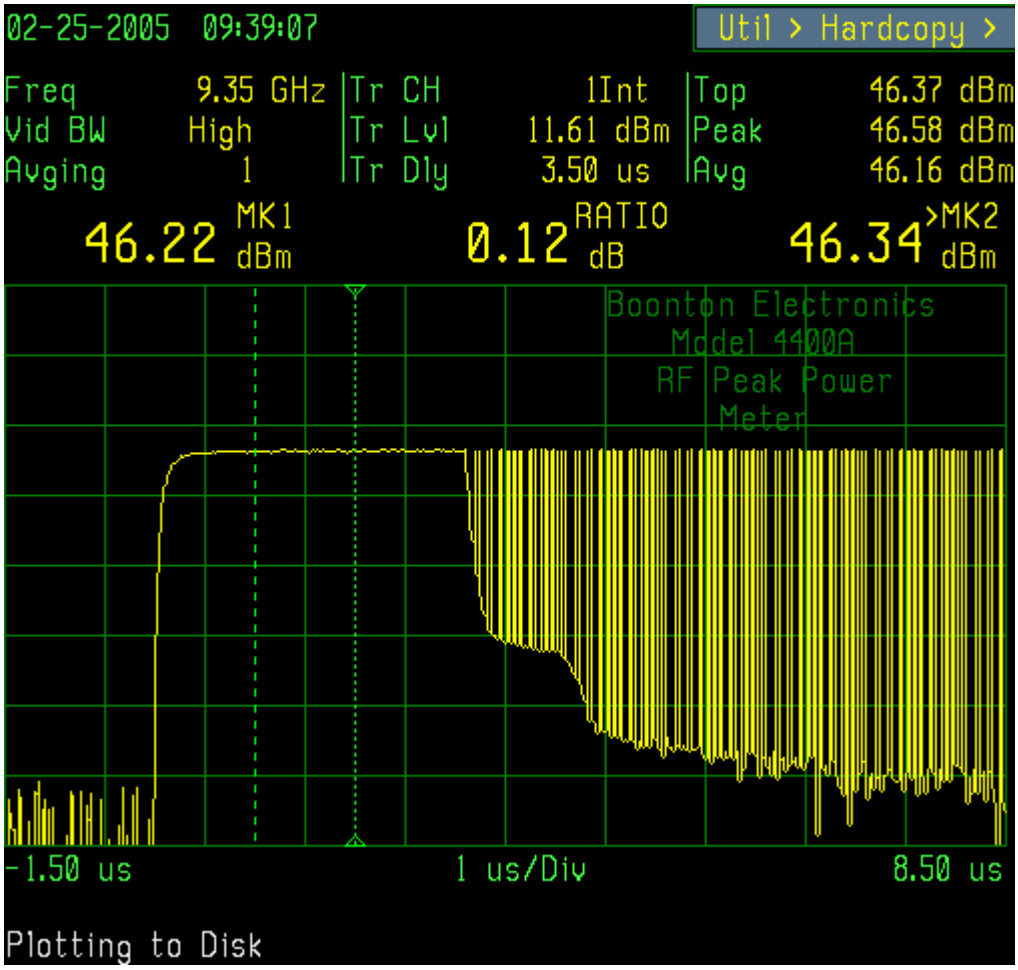

Figure 11-7 RF Output Power @ +10C

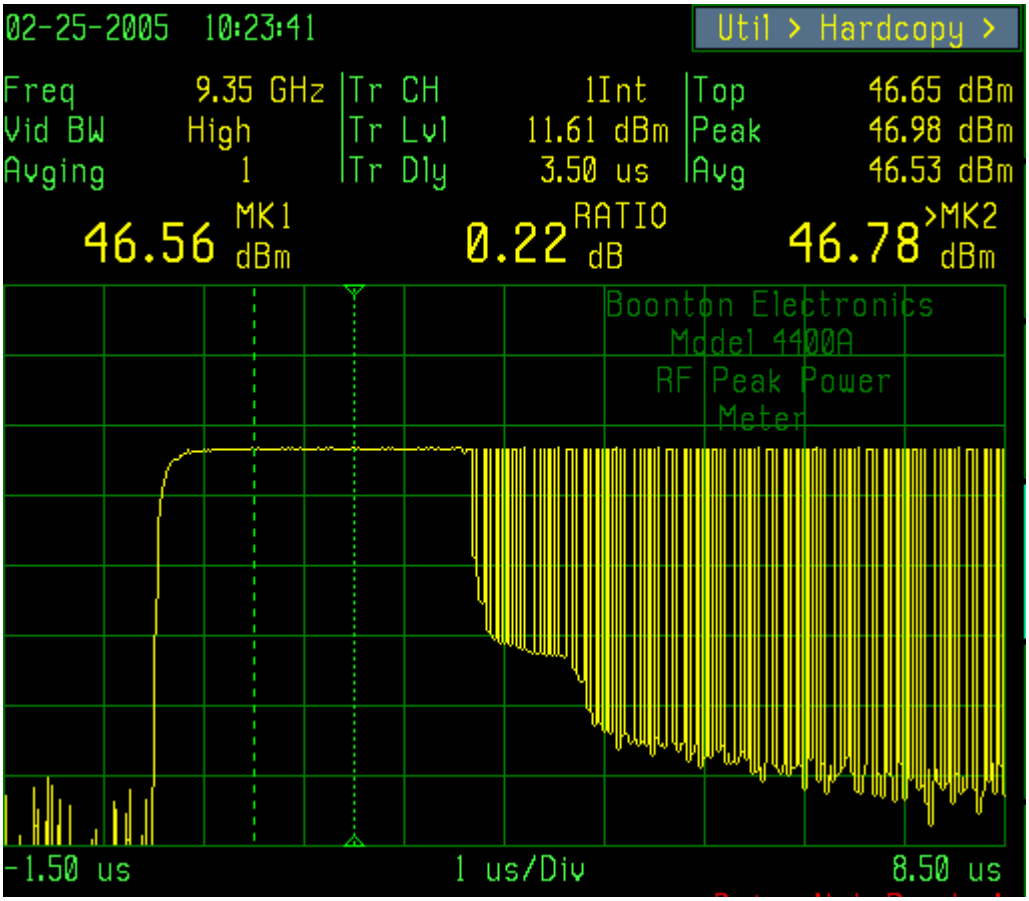

Figure 11-8 RF Output Power @ +20C

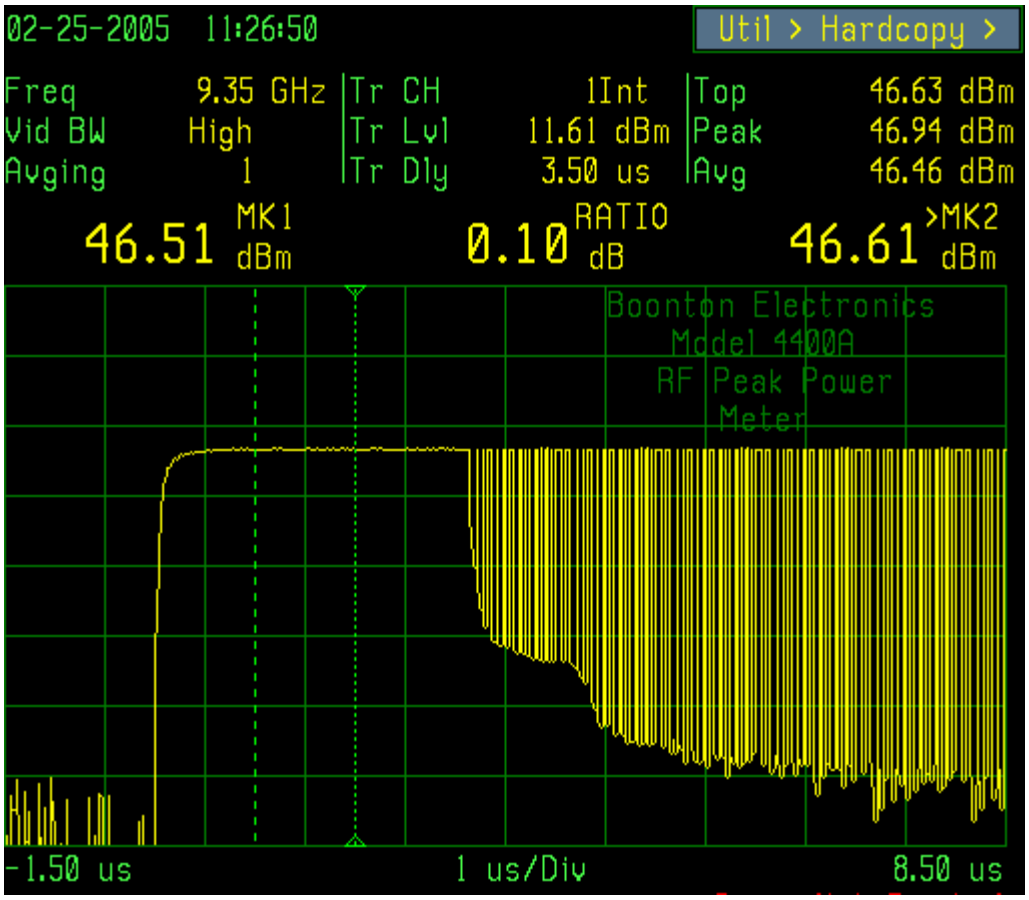

Figure 11-9 RF Output Power @ +30C

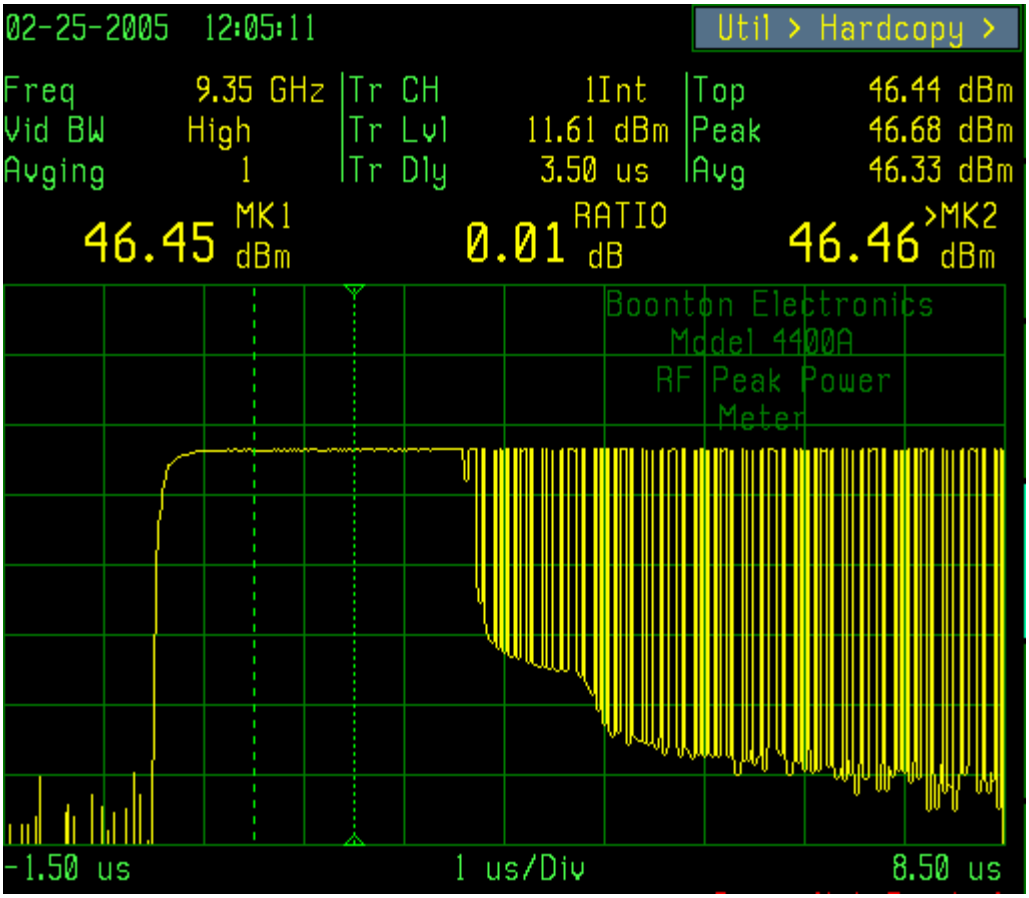

Figure 11-10 RF Output Power @ +40C

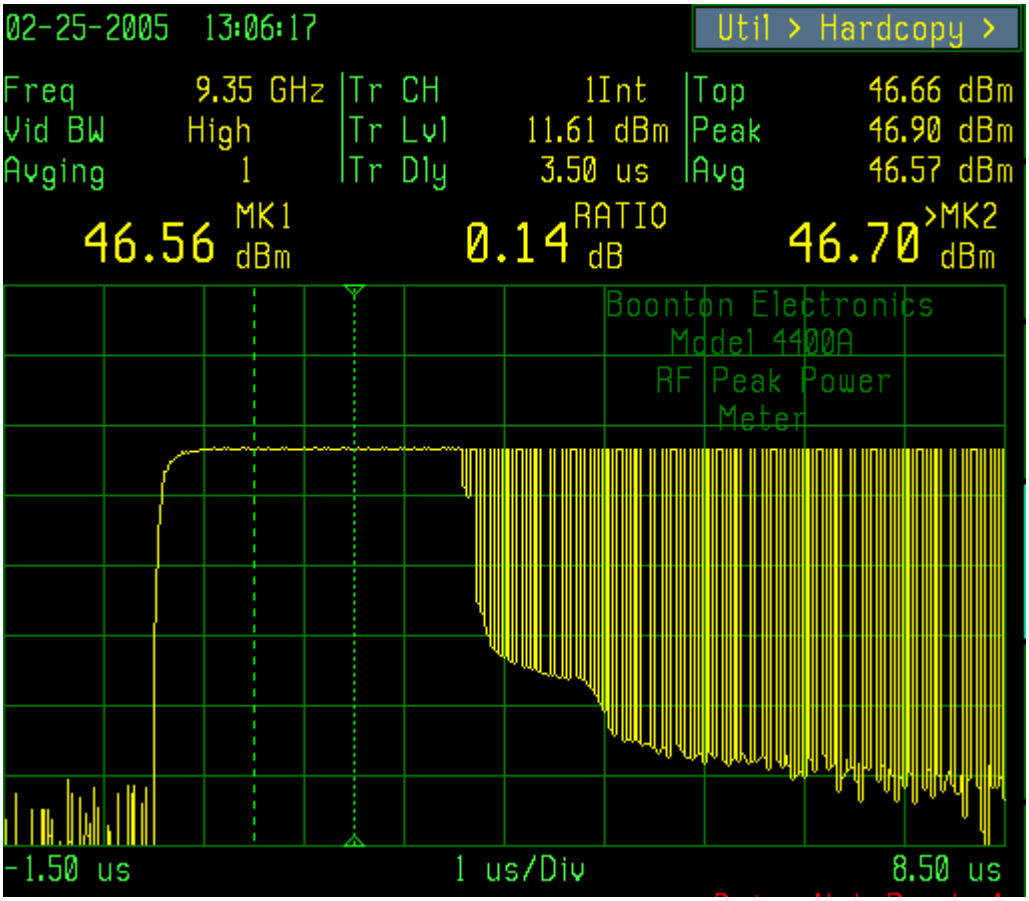

Figure 11-11 RF Output Power @ +50C

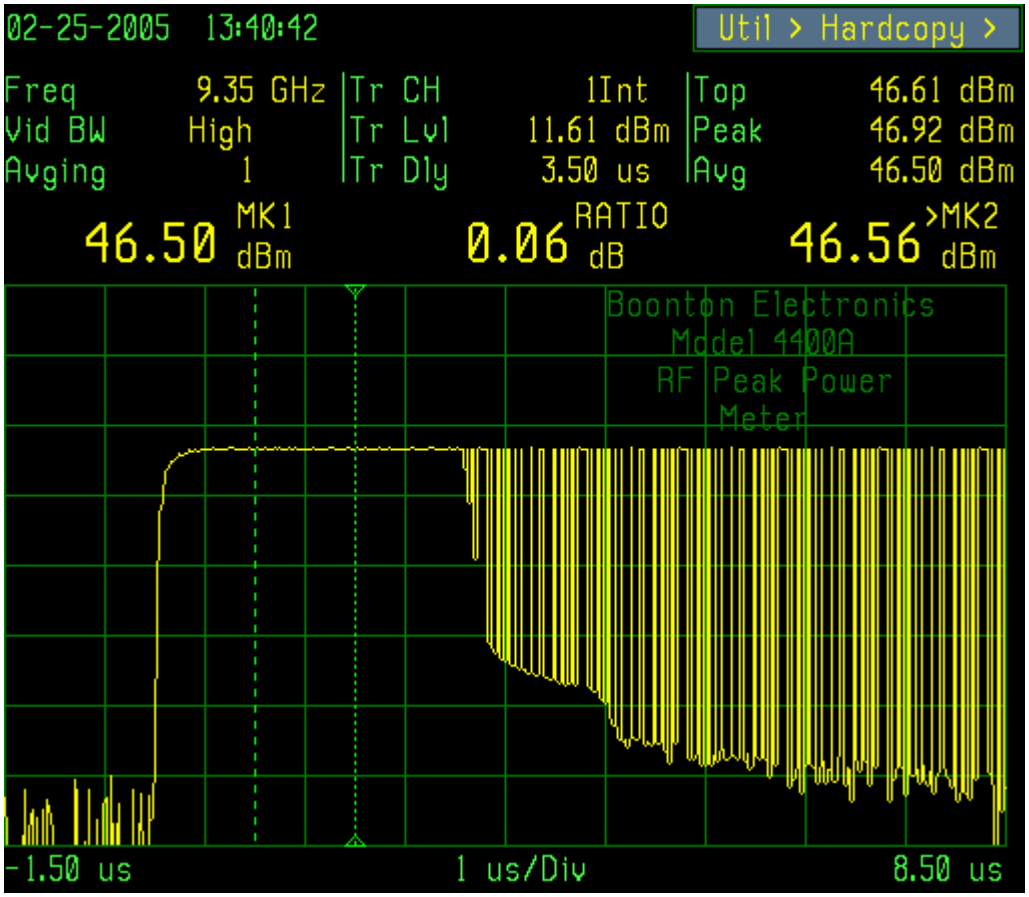

Figure 11-12 RF Output Power @ +60C

11.4 Occupied Bandwidth

11.4.1 Applicable FCC Rules

FCC CFR 47, Subpart 2.1049 - Occupied bandwidth is defined as 99% of the total mean power, measured according to Subpart 2.1049 (i), which requires full loading of the baseband, modulated such that the occupied bandwidth is consistent with that expected during normal operation.

FCC CFR 47, Subpart 87.135 – Occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5 percent of the total mean power of a given emission.

11.4.2 Test Configuration

Occupied power testing from the transmitter (TR-1) was accomplished by transmitting a continuous (correct emission and duty cycle) pulse train containing all the pulse groups utilized within the transmitter during proper operation and functionality. In this way, each mode of possible transmission is represented during testing. In addition, RS-429 communication was active between the transmitter and Datatrac 400H.

An HP spectrum analyzer was used to characterize and measure the occupied bandwidth from the

transmitter under test as shown in Figure 11-1. Test setup photographs and facility locations of testing are contained in Section 12 of this document.

11.4.3 Results Summary

The measured Occupied Bandwidth of the transceiver while transmitting a continuous pulse train is 41.6 MHz as depicted in Figure 11-13.

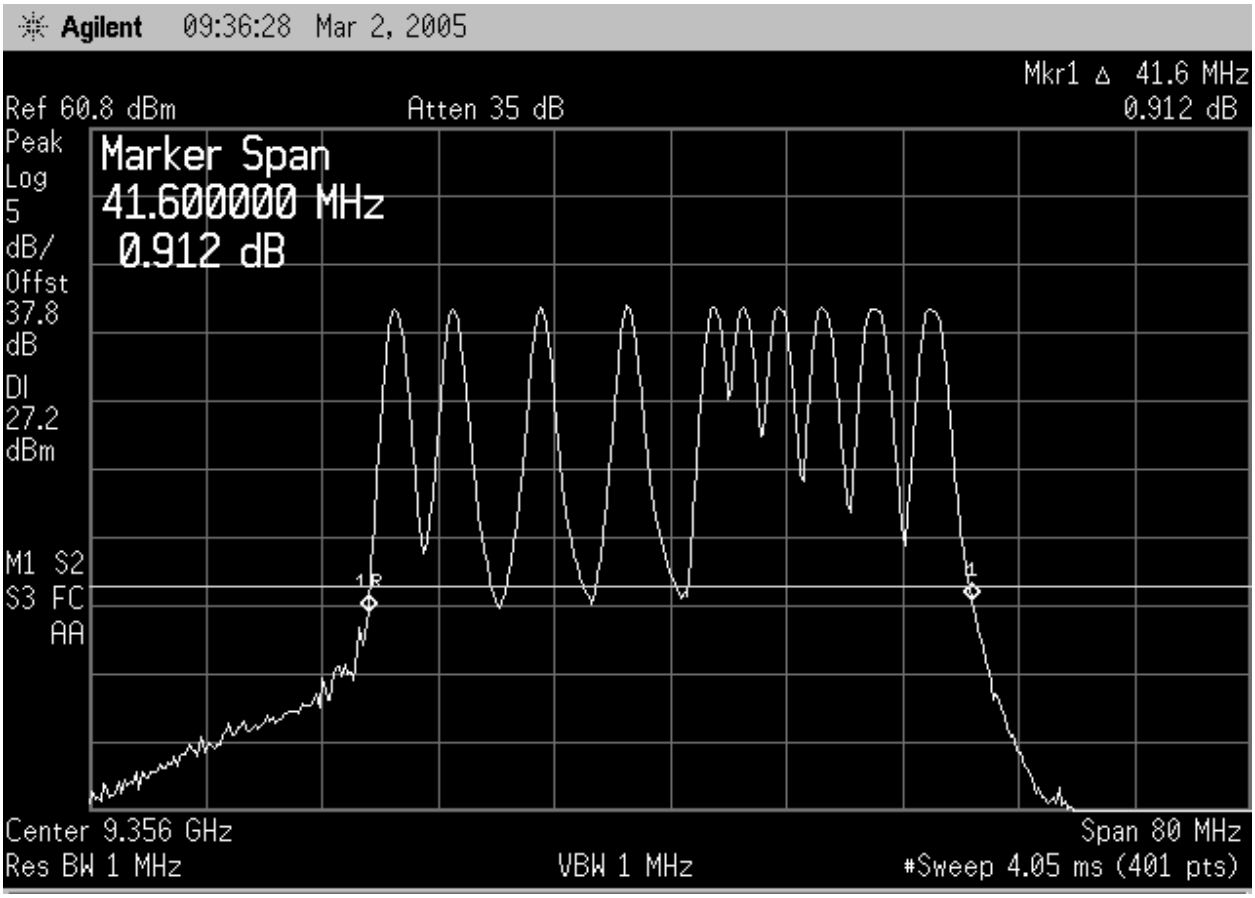

Figure 11-13 Occupied Bandwidth

11.5 Spurious Emissions – Antenna Terminals

11.5.1 Applicable FCC Rules

FCC CFR 47, Subpart 2.1051 – The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in 2.1049 as appropriate.

FCC CFR 47, Subpart 87.139 – Except for ELT's and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the frequency bands 1435-1535 MHz and 2310-2390 MHz or digital modulation (G7D) for differential GPS, the mean power of any emission must be attenuated below the mean power of the transmitter (pY) as follows:

1. When the frequency is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth the attenuation must be at least 25 dB.
2. When the frequency is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth the attenuation must be at least 35 dB.
3. When the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth the attenuation for aircraft station transmitters must be at least 40 dB; and the attenuation for aeronautical station transmitters must be at least 43 + 10Log 10 pY dB.

11.5.2 Test Configuration

Spurious emissions at the antenna terminal testing from the transmitter (TR-1) was accomplished by transmitting a continuous (correct emission and duty cycle) pulse train containing all the pulse groups utilized within the transmitter during proper operation and functionality. In this way, each mode of possible transmission is represented during testing. In addition, RS-429 communication was active between the transmitter and Datatrac 400H.

An Agilent spectrum analyzer was connected via 30 dB of attenuation to the antenna port to characterize and measure the spurious emissions from the transmitter under test as shown in Figure 11-14. Test setup photographs and facility locations of testing are contained in Section 12 of this document.

11.5.3 Results Summary

The measured Spurious Emissions at the Antenna Port is graphically depicted in Figure 11-15, with a tabularized summary provided in Table 11-3. As shown in the table summary, there was 1 frequency (8704 MHz), table line item 19, which required an average measurement as shown in Figure 11-16. After which, the signal was -28 dB down from the limit. The test results provided show the device under test meeting the regulatory requirement.

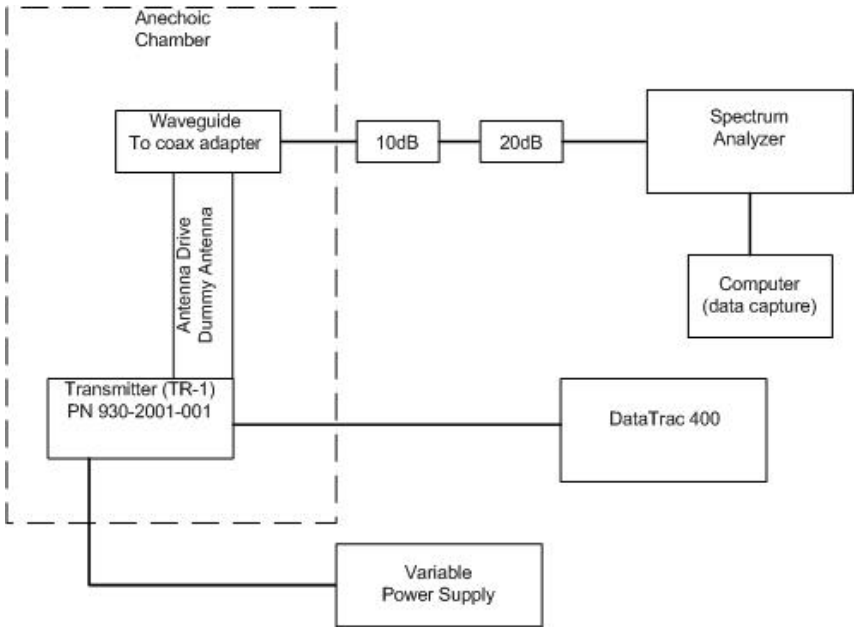

Figure 11-14 Configuration Setup, Spurious Antenna

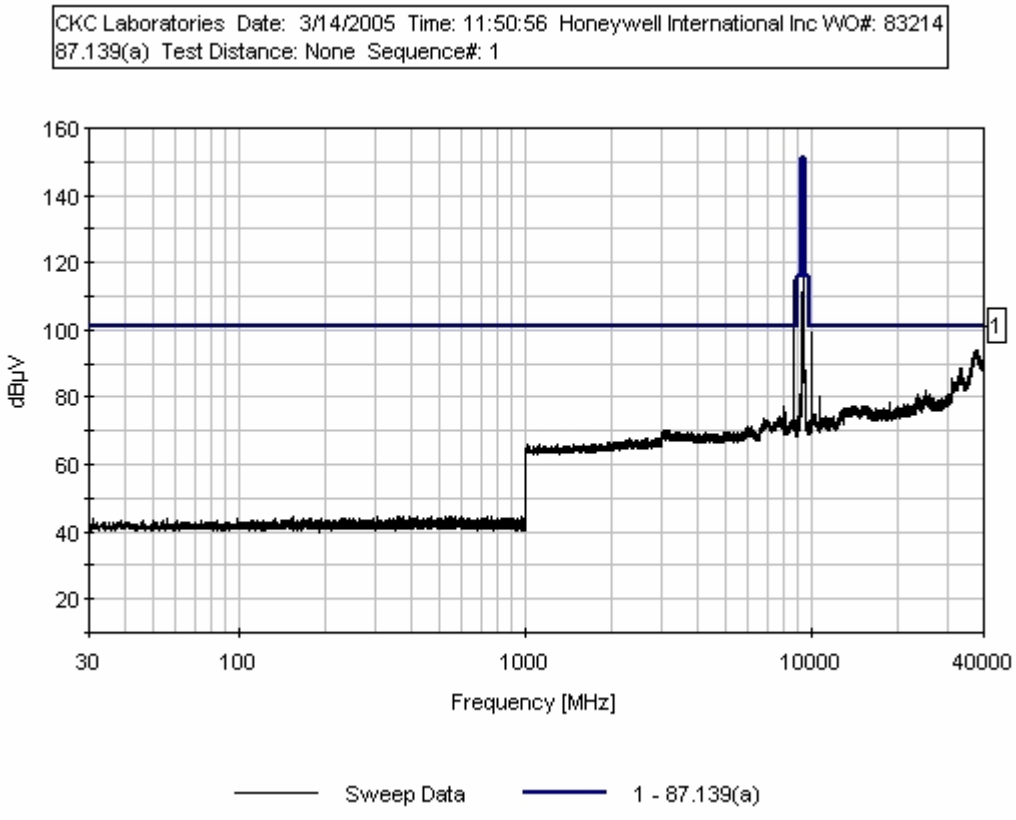

Figure 11-15 Spurious Emissions at Antenna Port

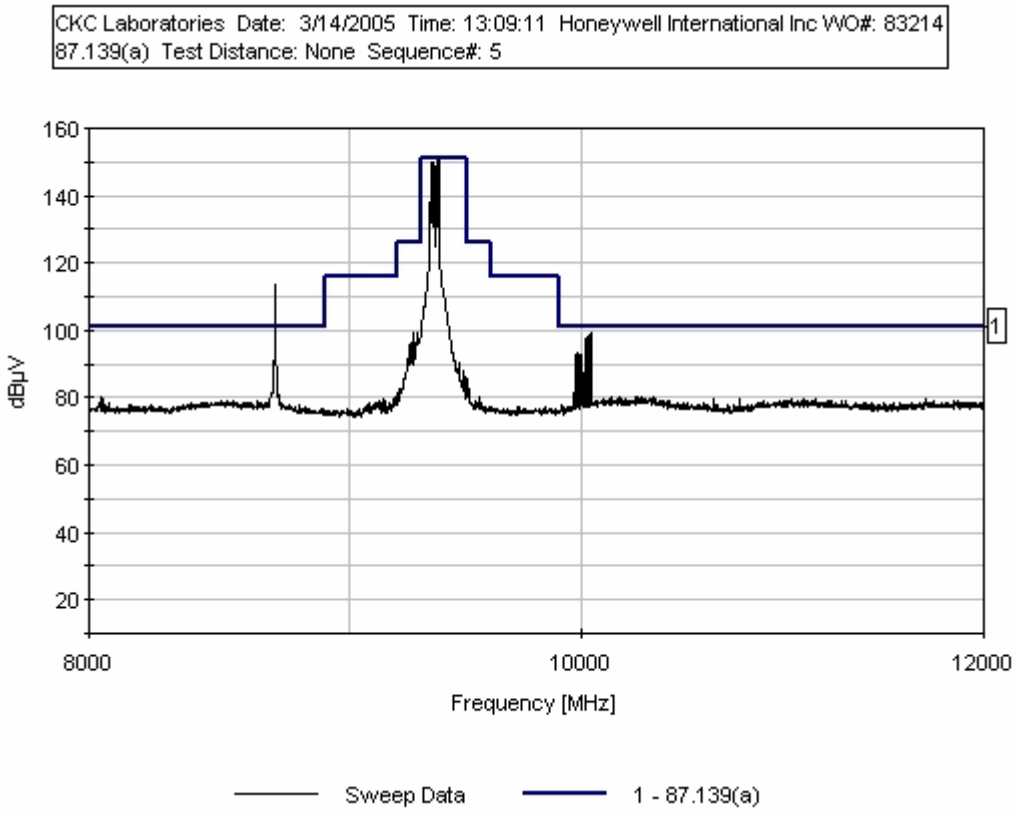

Figure 11-16 Spurious Emissions at Antenna Port (Fundamental)

Table 11-3 Tabular Summary of Spurious Emissions at Antenna Port

Measurement Data: Reading listed by order taken. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	8703.696M	82.9	+9.3	+20.0	+2.6		+0.0	114.8	101.0	+13.8	None
2	10044.040 M	66.5	+9.9	+20.0	+2.8		+0.0	99.2	101.0	-1.8	None
3	10036.030 M	65.6	+9.9	+20.0	+2.8		+0.0	98.3	101.0	-2.7	None
4	10029.020 M	65.5	+9.9	+20.0	+2.8		+0.0	98.2	101.0	-2.8	None
5	10014.000 M	64.9	+9.9	+20.0	+2.8		+0.0	97.6	101.0	-3.4	None
6	10023.010 M	64.7	+9.9	+20.0	+2.8		+0.0	97.4	101.0	-3.6	None

7	9969.961M	64.4	+9.9	+20.0	+2.8	+0.0	97.1	101.0	-3.9	None
8	9341.333M	114.5	+9.3	+20.0	+2.7	+0.0	146.5	151.0	-4.5	None
9	9369.361M	114.4	+9.3	+20.0	+2.7	+0.0	146.4	151.0	-4.6	None
10	9366.358M	114.4	+9.3	+20.0	+2.7	+0.0	146.4	151.0	-4.6	None
11	9363.355M	114.4	+9.3	+20.0	+2.7	+0.0	146.4	151.0	-4.6	None
12	9353.345M	114.4	+9.3	+20.0	+2.7	+0.0	146.4	151.0	-4.6	None
13	9373.365M	114.3	+9.3	+20.0	+2.7	+0.0	146.3	151.0	-4.7	None
14	9347.339M	113.4	+9.3	+20.0	+2.7	+0.0	145.4	151.0	-5.6	None
15	9360.352M	112.0	+9.3	+20.0	+2.7	+0.0	144.0	151.0	-7.0	None
16	10001.990 M	60.1	+9.9	+20.0	+2.8	+0.0	92.8	101.0	-8.2	None
17	9977.969M	59.2	+9.9	+20.0	+2.8	+0.0	91.9	101.0	-9.1	None
18	9989.981M	58.9	+9.9	+20.0	+2.8	+0.0	91.6	101.0	-9.4	None
19	8704.000M Ave	40.5	+9.3	+20.0	+2.6	+0.0	72.4	101.0	-28.6	None
20	18673.600 M	45.7	+10.2	+20.2	+4.0	+0.0	80.1	101.0	-20.9	None
21	18718.000 M	45.3	+10.2	+20.2	+4.0	+0.0	79.7	101.0	-21.3	None
22	18674.100 M	46.5	+10.2	+20.2	+4.0	+0.0	80.9	101.0	-20.1	None
23	18717.900 M	42.7	+10.2	+20.2	+4.0	+0.0	77.1	101.0	-23.9	None
24	8049.100M	45.7	+9.9	+19.9	+2.4	+0.0	77.9	101.0	-23.1	None
25	8046.900M	45.4	+9.9	+19.9	+2.4	+0.0	77.6	101.0	-23.4	None
26	8044.700M	44.8	+9.9	+19.9	+2.4	+0.0	77.0	101.0	-24.0	None
27	8041.500M	44.1	+9.9	+19.9	+2.4	+0.0	76.3	101.0	-24.7	None
28	8038.000M	41.1	+9.9	+19.9	+2.4	+0.0	73.3	101.0	-27.7	None
29	8034.000M	40.5	+9.9	+19.9	+2.4	+0.0	72.7	101.0	-28.3	None
30	8071.100M	42.2	+9.8	+19.9	+2.4	+0.0	74.3	101.0	-26.7	None

31	10044.200 M	66.2	+9.9	+20.0	+2.8	+0.0	98.9	101.0	-2.1	None
32	10036.400 M	65.7	+9.9	+20.0	+2.8	+0.0	98.4	101.0	-2.6	None
33	10029.300 M	65.6	+9.9	+20.0	+2.8	+0.0	98.3	101.0	-2.7	None
34	10023.000 M	65.1	+9.9	+20.0	+2.8	+0.0	97.8	101.0	-3.2	None
35	10018.100 M	65.1	+9.9	+20.0	+2.8	+0.0	97.8	101.0	-3.2	None
36	10014.100 M	64.6	+9.9	+20.0	+2.8	+0.0	97.3	101.0	-3.7	None
37	9970.100M	64.9	+9.9	+20.0	+2.8	+0.0	97.6	101.0	-3.4	None

11.6 Spurious Emissions – Field Strength

11.6.1 Applicable FCC Rules

FCC CFR 47, Subpart 2.1053 –Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuitry, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

FCC CFR 47, Subpart 87.139 – Except for ELT's and when using single sideband (R3E, H3E, J3E), or frequency modulation (F9) or digital modulation (F9Y) for telemetry or telecommand in the frequency bands 1435-1535 MHz and 2310-2390 MHz or digital modulation (G7D) for differential GPS, the mean power of any emission must be attenuated below the mean power of the transmitter (pY) as follows:

1. When the frequency is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth the attenuation must be at least 25 dB.
2. When the frequency is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth the attenuation must be at least 35 dB.
3. When the frequency is removed from the assigned frequency by more than 250 percent of the authorized bandwidth the attenuation for aircraft station transmitters must be at least 40 dB; and the attenuation for aeronautical station transmitters must be at least 43 + 10Log 10 pY dB.

11.6.2 Test Configuration

Spurious emissions, field strength radiated measurements from the transmitter (TR-1) was accomplished by transmitting a continuous (correct emission and duty cycle) pulse train containing all the pulse groups utilized within the transmitter during proper operation and functionality. In this way, each mode of possible transmission is represented during testing. In addition, RS-429 communication was active between the transmitter and Datatrac 400H.

An Agilent spectrum analyzer was connected to various antennas, which were placed 1 meter from the device under test and 1 meter above the ground plane. The test setup to measure the spurious emission field strength from the transmitter under test is shown in Figure 11-17. Test setup photographs and facility locations of testing are contained in Section 12 of this document.

11.6.3 Results Summary

The measured Spurious Emissions of Field Strength was completed through radiated means in both the vertical and horizontal polarizations from 30 MHz to 40 GHz as graphically depicted in Figures 11-18 through 11-25, with a tabularized summary provided in Tables 11-4 through 11-10. As shown in the table summary, the test results provided show the device under test meeting the regulatory requirements.

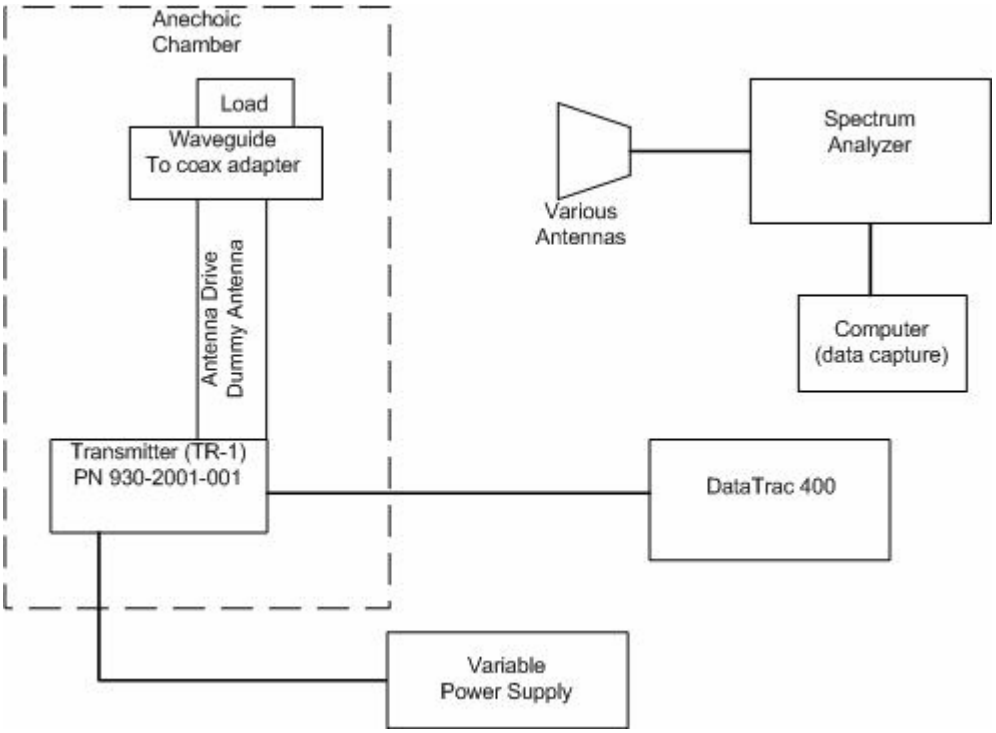

Figure 11-17 Configuration Setup for Spurious Emissions, Field Strength

Table 11-4 Spurious Emissions, Field Strength 30 MHz to 1 GHz Horizontal

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	144.096M	62.1	+1.4	+11.9	-26.3		+10.0	59.1	94.0	-34.9	Horiz
2	47.857M	59.5	+0.7	+10.2	-26.5		+10.0	53.9	94.0	-40.1	Horiz
3	96.216M	53.8	+1.1	+9.3	-26.5		+10.0	47.7	94.0	-46.3	Horiz

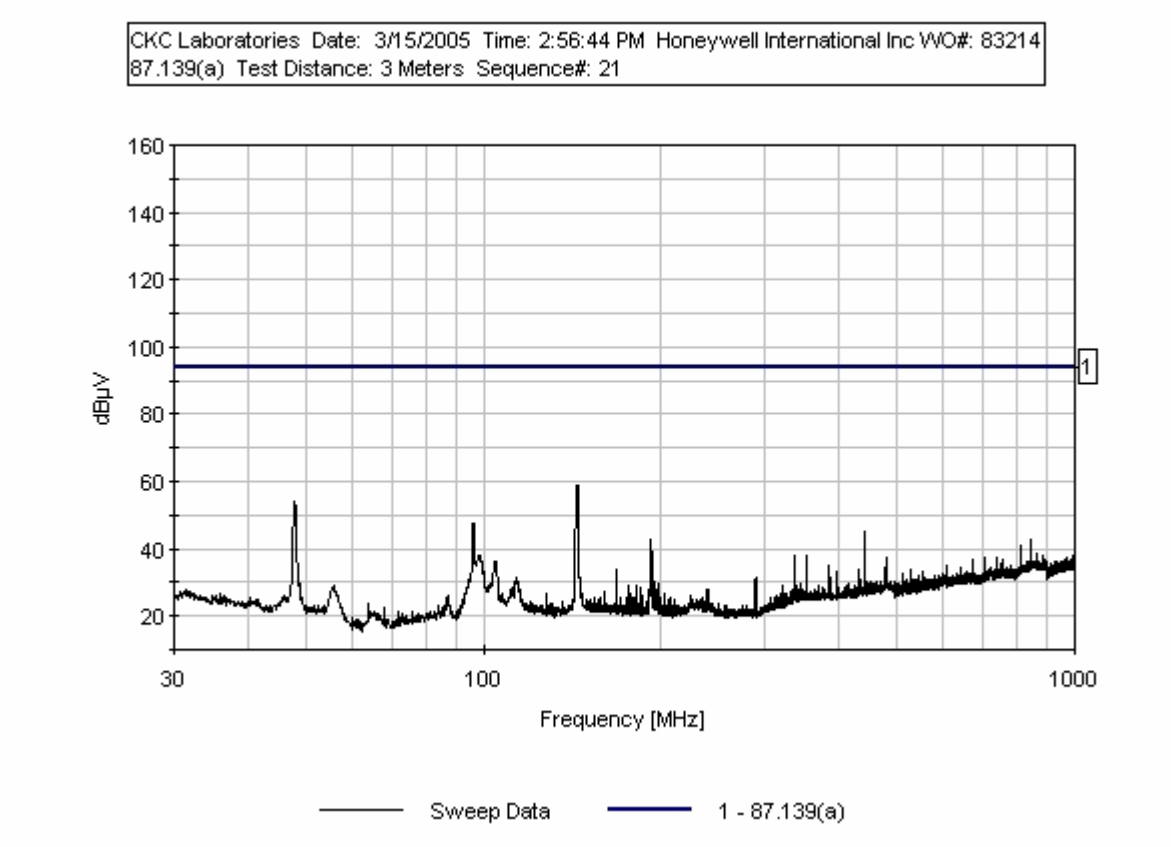

Figure 11-18 Spurious Emissions, Field Strength 30 MHz to 1 GHz Horizontal

Table 11-5 Spurious Emissions, Field Strength 30 MHz to 1 GHz Vertical

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	47.968M	76.9	+0.7	+10.1	-26.5		+10.0	71.2	94.0	-22.8	Vert
2	48.049M	75.6	+0.7	+10.1	-26.5		+10.0	69.9	94.0	-24.1	Vert
3	143.596M	72.3	+1.4	+11.9	-26.3		+10.0	69.3	94.0	-24.7	Vert
4	95.883M	71.2	+1.1	+9.3	-26.5		+10.0	65.1	94.0	-28.9	Vert
5	37.986M	62.6	+0.5	+14.5	-26.4		+10.0	61.2	94.0	-32.8	Vert

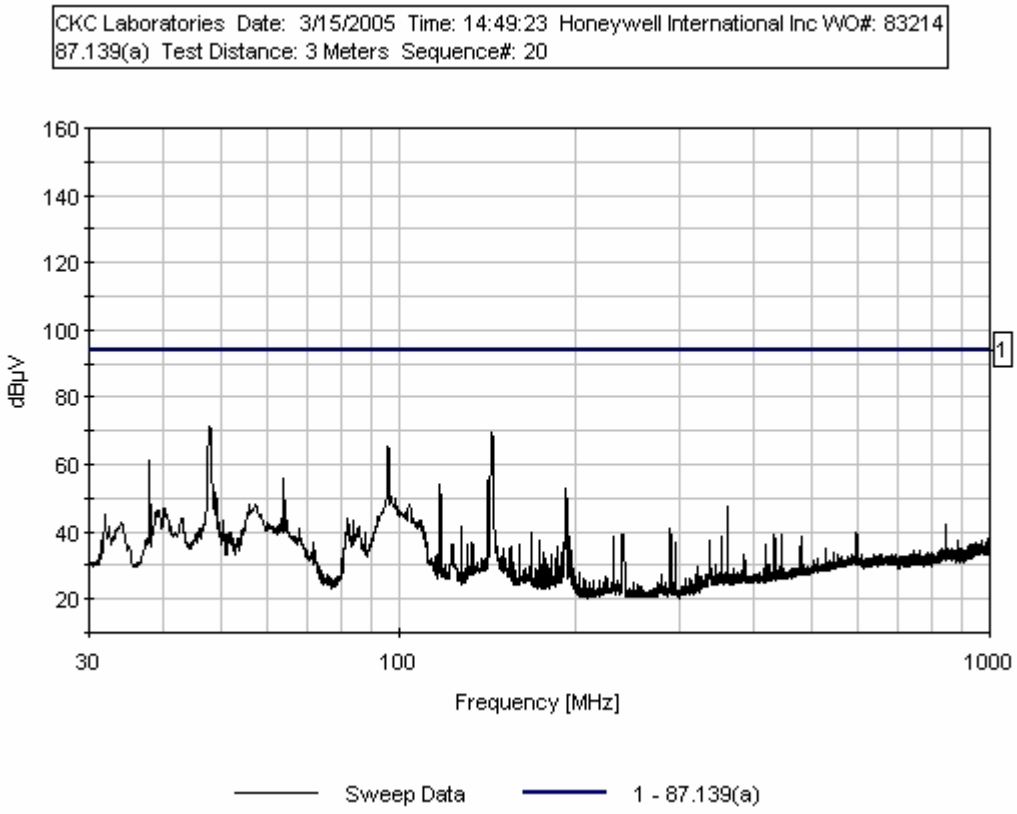

Figure 11-19 Spurious Emissions, Field Strength 30 MHz to 1 GHz Vertical

Table 11-6 Spurious Emissions, Field Strength 1 GHz to 18 GHz Horizontal

Measurement Data: Reading listed by frequency. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	18706.000 M	59.9	+4.0	-26.1	+3.6	+38.8	+0.0	80.2	101.0	-20.8	Vert

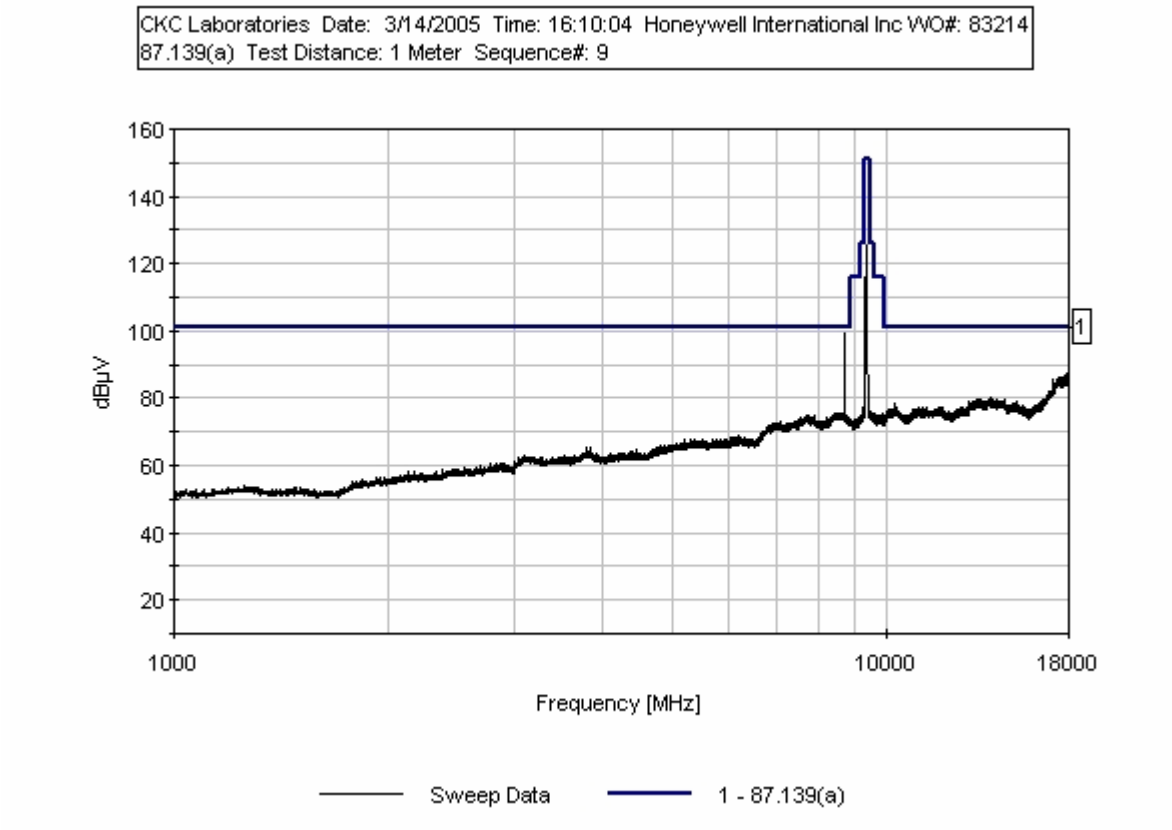

Figure 11-20 Spurious Emissions, Field Strength 1 GHz to 18 GHz Horizontal

Table 11-6 Spurious Emissions, Field Strength 1 GHz to 18 GHz Vertical

Measurement Data: Reading listed by frequency. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	8703.696M	65.2	+9.3 +2.4	+2.6	+39.6	-25.0	+0.0	94.1	94.0 initial	+0.1	Vert
2	8703.963M	72.3	+9.3 +2.4	+2.6	+39.6	-25.0	+0.0	101.2	94.0 maximized	+7.2	Vert

3	8703.963M Ave	34.7	+9.3 +2.4	+2.6	+39.6	-25.0	+0.0	63.6	94.0 average	-30.4	Vert
4	16727.710 M	47.4	+10.1 +3.5	+3.6	+42.9	-27.4	+0.0	80.1	94.0 maximized	-13.9	Vert
5	16953.940 M	47.6	+10.1 +3.6	+3.7	+44.3	-27.1	+0.0	82.2	94.0 maximized	-11.8	Vert
6	17008.990 M	47.2	+10.1 +3.6	+3.7	+44.5	-27.1	+0.0	82.0	94.0 maximized	-12.0	Vert
7	17039.620 M	48.4	+10.1 +3.6	+3.7	+44.5	-27.0	+0.0	83.3	94.0 maximized	-10.7	Vert
8	17080.940 M	48.5	+10.1 +3.6	+3.7	+44.5	-26.9	+0.0	83.5	94.0 maximized	-10.5	Vert
9	17086.850 M	48.1	+10.1 +3.6	+3.7	+44.5	-26.9	+0.0	83.1	94.0 maximized	-10.9	Vert
10	17107.510 M	47.9	+10.1 +3.6	+3.7	+44.6	-26.9	+0.0	83.0	94.0 maximized	-11.0	Vert
11	17109.480 M	48.0	+10.1 +3.6	+3.7	+44.6	-26.9	+0.0	83.1	94.0 maximized	-10.9	Vert
12	17125.220 M	48.7	+10.1 +3.6	+3.7	+44.6	-26.8	+0.0	83.9	94.0 maximized	-10.1	Vert
13	17251.180 M	48.2	+10.1 +3.6	+3.8	+45.2	-26.6	+0.0	84.3	94.0 maximized	-9.7	Vert
14	17399.760 M	48.1	+10.1 +3.6	+3.8	+47.0	-26.3	+0.0	86.3	94.0 maximized	-7.7	Vert
15	17425.340 M	49.0	+10.1 +3.6	+3.8	+46.9	-26.2	+0.0	87.2	94.0 maximized	-6.8	Vert
16	17445.020 M	47.8	+10.1 +3.6	+3.8	+46.9	-26.2	+0.0	86.0	94.0 maximized	-8.0	Vert
17	17494.220 M	47.6	+10.2 +3.6	+3.8	+46.7	-26.1	+0.0	85.8	94.0 maximized	-8.2	Vert
18	17502.100 M	47.5	+10.2 +3.6	+3.8	+46.7	-26.1	+0.0	85.7	94.0 maximized	-8.3	Vert
19	17524.730 M	47.5	+10.2 +3.6	+3.8	+46.6	-26.1	+0.0	85.6	94.0 maximized	-8.4	Vert
20	17534.570 M	47.2	+10.2 +3.6	+3.8	+46.6	-26.1	+0.0	85.3	94.0 maximized	-8.7	Vert

21	17565.070 M	47.6	+10.2 +3.6	+3.8	+46.5	-26.0	+0.0	85.7	94.0 maximized	-8.3	Vert
22	17644.780 M	47.7	+10.2 +3.6	+3.8	+46.4	-25.9	+0.0	85.8	94.0 maximized	-8.2	Vert
23	17739.240 M	47.6	+10.2 +3.6	+3.8	+46.5	-25.8	+0.0	85.9	94.0 maximized	-8.1	Vert
24	17812.060 M	47.6	+10.2 +3.6	+3.9	+46.5	-25.7	+0.0	86.1	94.0 maximized	-7.9	Vert
25	17867.160 M	47.5	+10.2 +3.6	+3.9	+46.3	-25.7	+0.0	85.8	94.0 maximized	-8.2	Vert
26	17924.230 M	47.5	+10.2 +3.6	+3.9	+46.2	-25.6	+0.0	85.8	94.0 maximized	-8.2	Vert
27	17938.010 M	48.4	+10.2 +3.6	+3.9	+46.2	-25.6	+0.0	86.7	94.0 maximized	-7.3	Vert

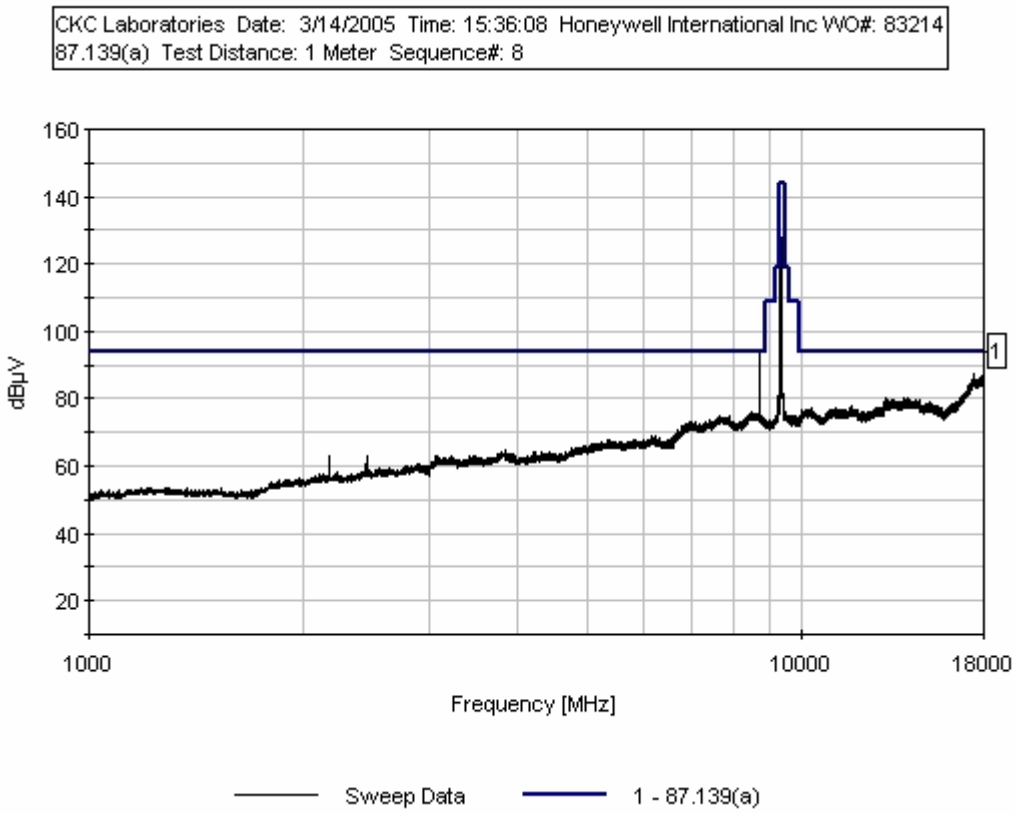

Figure 11-21 Spurious Emissions, Field Strength 1 GHz to 18 GHz Vertical

Table 11-7 Spurious Emissions, Field Strength 18 GHz to 26 GHz Horizontal

Measurement Data: Reading listed by amplitude. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	18718.000 M	72.8	+4.0	+3.6	+38.8	-24.7	+0.0	94.5	94.0 maximized	+0.5	Horiz
2	18732.820 M	72.6	+4.0	+3.6	+38.8	-24.7	+0.0	94.3	94.0 maximized	+0.3	Horiz
3	18747.600 M	72.6	+4.0	+3.6	+38.8	-24.7	+0.0	94.3	94.0 maximized	+0.3	Horiz
4	18726.800 M	72.5	+4.0	+3.6	+38.8	-24.7	+0.0	94.2	94.0 maximized	+0.2	Horiz
5	18706.060 M	72.5	+4.0	+3.6	+38.8	-24.7	+0.0	94.2	94.0 maximized	+0.2	Horiz
6	18739.580 M	72.4	+4.0	+3.6	+38.8	-24.7	+0.0	94.1	94.0 maximized	+0.1	Horiz
7	18694.010 M	72.3	+4.0	+3.6	+38.8	-24.8	+0.0	93.9	94.0 maximized	-0.1	Horiz
8	18682.180 M	71.8	+4.0	+3.6	+38.7	-24.8	+0.0	93.3	94.0 maximized	-0.7	Horiz
9	18674.220 M	71.5	+4.0	+3.6	+38.7	-24.8	+0.0	93.0	94.0 maximized	-1.0	Horiz
10	18693.690 M	67.1	+4.0	+3.6	+38.8	-24.8	+0.0	88.7	94.0	-5.3	Horiz
11	18682.680 M	67.0	+4.0	+3.6	+38.7	-24.8	+0.0	88.5	94.0	-5.5	Horiz
12	18705.710 M	66.8	+4.0	+3.6	+38.8	-24.7	+0.0	88.5	94.0	-5.5	Horiz
13	18726.730 M	66.4	+4.0	+3.6	+38.8	-24.7	+0.0	88.1	94.0	-5.9	Horiz
14	18739.740 M	65.2	+4.0	+3.6	+38.8	-24.7	+0.0	86.9	94.0	-7.1	Horiz
15	18732.730 M	65.1	+4.0	+3.6	+38.8	-24.7	+0.0	86.8	94.0	-7.2	Horiz
16	18717.720 M	64.4	+4.0	+3.6	+38.8	-24.7	+0.0	86.1	94.0	-7.9	Horiz

17	18747.750 M	64.2	+4.0	+3.6	+38.8	-24.7	+0.0	85.9	94.0	-8.1	Horiz
18	18674.670 M	61.0	+4.0	+3.6	+38.7	-24.8	+0.0	82.5	94.0	-11.5	Horiz
19	18747.600 M Ave	27.7	+4.0	+3.6	+38.8	-24.7	+0.0	49.4	94.0	-44.6	Horiz
20	18726.800 M Ave	26.7	+4.0	+3.6	+38.8	-24.7	+0.0	48.4	94.0	-45.6	Horiz
21	18739.580 M Ave	26.4	+4.0	+3.6	+38.8	-24.7	+0.0	48.1	94.0	-45.9	Horiz
22	18732.820 M Ave	26.2	+4.0	+3.6	+38.8	-24.7	+0.0	47.9	94.0	-46.1	Horiz
23	18694.010 M Ave	26.1	+4.0	+3.6	+38.8	-24.8	+0.0	47.7	94.0	-46.3	Horiz
24	18718.000 M Ave	25.8	+4.0	+3.6	+38.8	-24.7	+0.0	47.5	94.0	-46.5	Horiz
25	18674.220 M Ave	25.4	+4.0	+3.6	+38.7	-24.8	+0.0	46.9	94.0	-47.1	Horiz
26	18706.060 M Ave	25.1	+4.0	+3.6	+38.8	-24.7	+0.0	46.8	94.0	-47.2	Horiz
27	18682.180 M Ave	25.0	+4.0	+3.6	+38.7	-24.8	+0.0	46.5	94.0	-47.5	Horiz

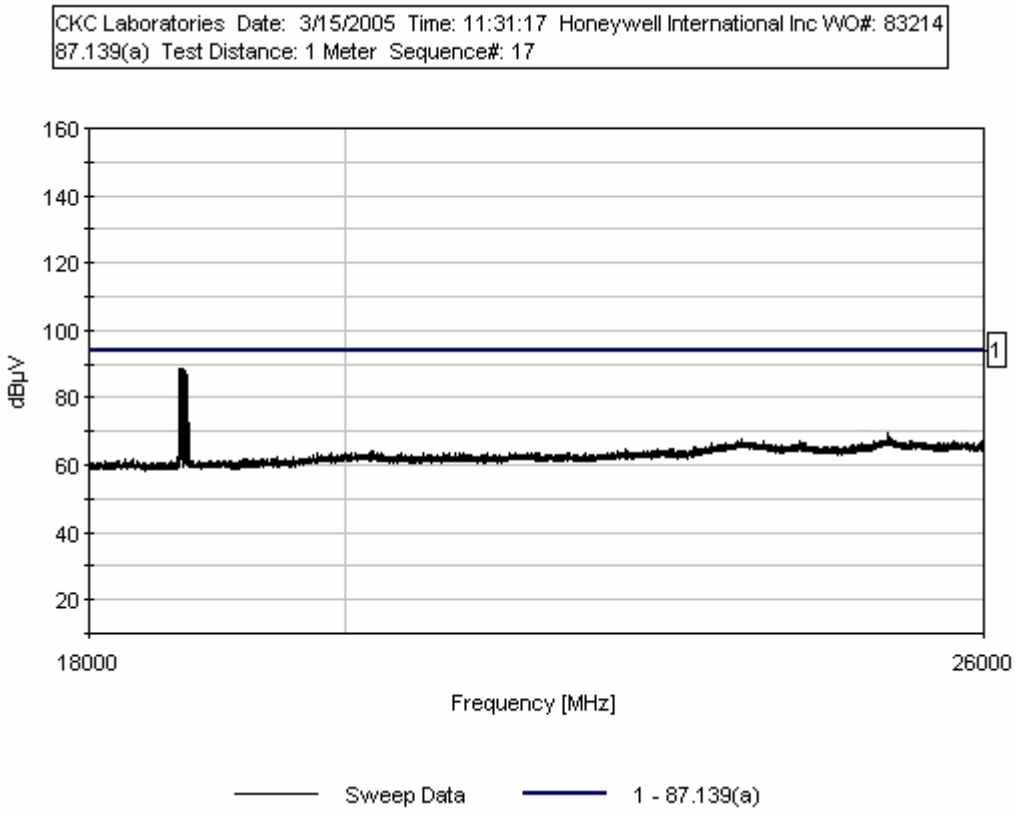

Figure 11-22 Spurious Emissions, Field Strength 18 GHz to 26 GHz Horizontal

Table 11-8 Spurious Emissions, Field Strength 18 GHz to 26 GHz Vertical

Measurement Data: Reading listed by margin. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	18717.900 M	72.7	+4.0	+3.6	+38.8	-24.7	+0.0	94.4	94.0 maximized	+0.4	Vert
2	18705.900 M	72.7	+4.0	+3.6	+38.8	-24.7	+0.0	94.4	94.0 maximized	+0.4	Vert
3	18726.700 M	72.7	+4.0	+3.6	+38.8	-24.7	+0.0	94.4	94.0 maximized	+0.4	Vert
4	18721.900 M	72.5	+4.0	+3.6	+38.8	-24.7	+0.0	94.2	94.0 maximized	+0.2	Vert
5	18732.800 M	72.5	+4.0	+3.6	+38.8	-24.7	+0.0	94.2	94.0 maximized	+0.2	Vert
6	18694.000 M	72.5	+4.0	+3.6	+38.8	-24.8	+0.0	94.1	94.0 maximized	+0.1	Vert

7	18739.600 M	72.4	+4.0	+3.6	+38.8	-24.7	+0.0	94.1	94.0 maximized	+0.1	Vert
8	18747.500 M	72.2	+4.0	+3.6	+38.8	-24.7	+0.0	93.9	94.0 maximized	-0.1	Vert
9	18674.000 M	71.7	+4.0	+3.6	+38.7	-24.8	+0.0	93.2	94.0 maximized	-0.8	Vert
10	18726.530 M Ave	37.4	+4.0	+3.6	+38.8	-24.7	+0.0	59.1	94.0	-34.9	Vert
11	18722.130 M Ave	36.7	+4.0	+3.6	+38.8	-24.7	+0.0	58.4	94.0	-35.6	Vert
12	18717.670 M Ave	36.7	+4.0	+3.6	+38.8	-24.7	+0.0	58.4	94.0	-35.6	Vert
13	18694.340 M Ave	36.5	+4.0	+3.6	+38.8	-24.8	+0.0	58.1	94.0	-35.9	Vert
14	18733.030 M Ave	36.4	+4.0	+3.6	+38.8	-24.7	+0.0	58.1	94.0	-35.9	Vert
15	18674.330 M Ave	36.3	+4.0	+3.6	+38.7	-24.8	+0.0	57.8	94.0	-36.2	Vert
16	18706.300 M Ave	35.6	+4.0	+3.6	+38.8	-24.7	+0.0	57.3	94.0	-36.7	Vert
17	18747.000 M Ave	34.7	+4.0	+3.6	+38.8	-24.7	+0.0	56.4	94.0	-37.6	Vert
18	18739.100 M Ave	34.3	+4.0	+3.6	+38.8	-24.7	+0.0	56.0	94.0	-38.0	Vert
19	18682.100 M Ave	33.6	+4.0	+3.6	+38.7	-24.8	+0.0	55.1	94.0	-38.9	Vert
^	18682.100 M	72.2	+4.0	+3.6	+38.7	-24.8	+0.0	93.7	94.0 maximized	-0.3	Vert

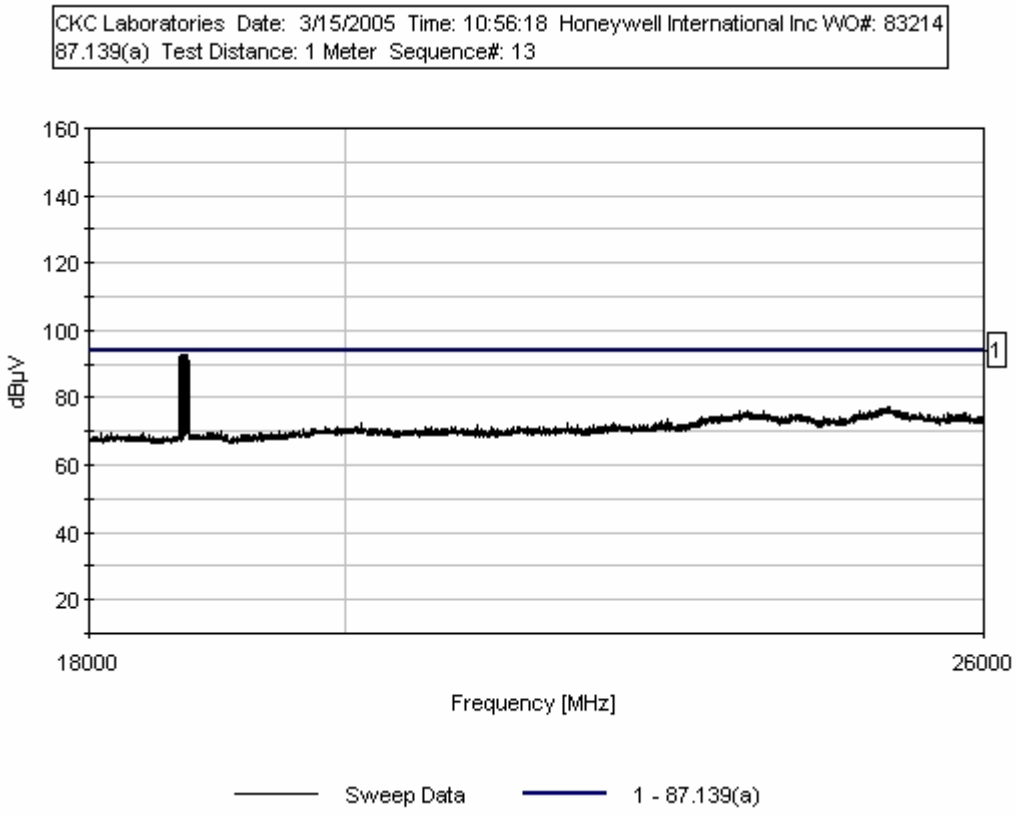

Figure 11-23 Spurious Emissions, Field Strength 18 GHz to 26 GHz Vertical

Table 11-9 Spurious Emissions, Field Strength 26 GHz to 40 GHz Horizontal

Measurement Data: Reading listed by frequency. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	28010.800 M	68.7	+5.2	+4.3	-26.0	+41.9	+0.0	94.1	94.0 maximized	+0.1	Horiz
2	28010.800 M	27.2	+5.2	+4.3	-26.0	+41.9	+0.0	52.6	94.0	-41.4	Horiz
3	28023.200 M	69.3	+5.2	+4.3	-26.0	+41.9	+0.0	94.7	94.0 maximized	+0.7	Horiz
4	28023.520 M	60.1	+5.2	+4.3	-26.0	+41.9	+0.0	85.5	94.0	-8.5	Horiz
5	28041.000 M	69.5	+5.2	+4.3	-26.0	+41.9	+0.0	94.9	94.0 maximized	+0.9	Horiz

6	28041.540 M	60.3	+5.2	+4.3	-26.0	+41.9	+0.0	85.7	94.0	-8.3	Horiz
7	28058.560 M	60.9	+5.2	+4.3	-26.0	+41.9	+0.0	86.3	94.0	-7.7	Horiz
8	28059.100 M	69.6	+5.2	+4.3	-26.0	+41.9	+0.0	95.0	94.0 maximized	+1.0	Horiz
9	28059.100 M	26.9	+5.2	+4.3	-26.0	+41.9	+0.0	52.3	94.0	-41.7	Horiz
10	28059.100 M	27.6	+5.2	+4.3	-26.0	+41.9	+0.0	53.0	94.0	-41.0	Horiz
11	28077.000 M	69.7	+5.2	+4.3	-26.0	+41.9	+0.0	95.1	94.0 maximized	+1.1	Horiz
12	28077.000 M	26.5	+5.2	+4.3	-26.0	+41.9	+0.0	51.9	94.0	-42.1	Horiz
13	28082.400 M	67.4	+5.2	+4.3	-26.0	+41.9	+0.0	92.8	94.0 maximized	-1.2	Horiz
14	28082.400 M	27.0	+5.2	+4.3	-26.0	+41.9	+0.0	52.4	94.0	-41.6	Horiz
15	28089.590 M	62.3	+5.2	+4.3	-26.0	+41.9	+0.0	87.7	94.0	-6.3	Horiz
16	28090.200 M	70.3	+5.2	+4.3	-26.0	+41.9	+0.0	95.7	94.0 maximized	+1.7	Horiz
17	28090.200 M	27.3	+5.2	+4.3	-26.0	+41.9	+0.0	52.7	94.0	-41.3	Horiz
18	28090.200 M	28.5	+5.2	+4.3	-26.0	+41.9	+0.0	53.9	94.0	-40.1	Horiz
19	28099.400 M	70.5	+5.2	+4.3	-26.0	+41.9	+0.0	95.9	94.0 maximized	+1.9	Horiz
20	28099.400 M	28.1	+5.2	+4.3	-26.0	+41.9	+0.0	53.5	94.0	-40.5	Horiz
21	28099.600 M	63.5	+5.2	+4.3	-26.0	+41.9	+0.0	88.9	94.0	-5.1	Horiz
22	28109.600 M	71.0	+5.2	+4.3	-26.0	+41.9	+0.0	96.4	94.0 maximized	+2.4	Horiz
23	28109.600 M	28.2	+5.2	+4.3	-26.0	+41.9	+0.0	53.6	94.0	-40.4	Horiz

24	28109.600 M	26.3	+5.2	+4.3	-26.0	+41.9	+0.0	51.7	94.0	-42.3	Horiz
25	28109.610 M	64.2	+5.2	+4.3	-26.0	+41.9	+0.0	89.6	94.0	-4.4	Horiz
26	28121.400 M	71.4	+5.2	+4.3	-26.0	+41.9	+0.0	96.8	94.0 maximized	+2.8	Horiz
27	28121.400 M	26.7	+5.2	+4.3	-26.0	+41.9	+0.0	52.1	94.0	-41.9	Horiz
28	28122.620 M	63.6	+5.2	+4.3	-26.0	+41.9	+0.0	89.0	94.0	-5.0	Horiz
29	37348.200 M	65.9	+6.3	+5.5	-25.5	+44.5	+0.0	96.7	94.0 maximized	+2.7	Horiz
30	37363.850 M	54.9	+6.3	+5.5	-25.6	+44.5	+0.0	85.6	94.0	-8.4	Horiz
31	37364.100 M	67.3	+6.3	+5.5	-25.6	+44.5	+0.0	98.0	94.0 maximized	+4.0	Horiz
32	37364.100 M Ave	39.5	+6.3	+5.5	-25.6	+44.5	+0.0	70.2	94.0	-23.8	Horiz
33	37364.100 M Ave	38.9	+6.3	+5.5	-25.6	+44.5	+0.0	69.6	94.0	-24.4	Horiz
34	37387.880 M	55.5	+6.3	+5.5	-25.6	+44.6	+0.0	86.3	94.0	-7.7	Horiz
35	37388.000 M	67.5	+6.3	+5.5	-25.6	+44.6	+0.0	98.3	94.0 maximized	+4.3	Horiz
36	37388.000 M Ave	39.8	+6.3	+5.5	-25.6	+44.6	+0.0	70.6	94.0	-23.4	Horiz
37	37411.900 M	54.3	+6.3	+5.5	-25.7	+44.6	+0.0	85.0	94.0	-9.0	Horiz
38	37412.100 M	67.6	+6.3	+5.5	-25.7	+44.6	+0.0	98.3	94.0 maximized	+4.3	Horiz
39	37412.100 M Ave	38.4	+6.3	+5.5	-25.7	+44.6	+0.0	69.1	94.0	-24.9	Horiz
40	37427.920 M	53.1	+6.3	+5.5	-25.7	+44.6	+0.0	83.8	94.0	-10.2	Horiz
41	37435.900 M	67.6	+6.3	+5.5	-25.7	+44.7	+0.0	98.4	94.0 maximized	+4.4	Horiz

42	37435.900 M Ave	37.8	+6.3	+5.5	-25.7	+44.7	+0.0	68.6	94.0	-25.4	Horiz
43	37435.930 M	54.9	+6.3	+5.5	-25.7	+44.7	+0.0	85.7	94.0	-8.3	Horiz
44	37443.930 M	55.0	+6.3	+5.5	-25.8	+44.7	+0.0	85.7	94.0	-8.3	Horiz
45	37444.100 M	67.2	+6.3	+5.5	-25.8	+44.7	+0.0	97.9	94.0 maximized	+3.9	Horiz
46	37453.700 M	67.7	+6.3	+5.5	-25.8	+44.7	+0.0	98.4	94.0 maximized	+4.4	Horiz
47	37453.700 M Ave	41.5	+6.3	+5.5	-25.8	+44.7	+0.0	72.2	94.0	-21.8	Horiz
48	37453.940 M	55.9	+6.3	+5.5	-25.8	+44.7	+0.0	86.6	94.0	-7.4	Horiz
49	37465.800 M	66.9	+6.3	+5.5	-25.8	+44.7	+0.0	97.6	94.0 maximized	+3.6	Horiz
50	37465.950 M	55.1	+6.3	+5.5	-25.8	+44.7	+0.0	85.8	94.0	-8.2	Horiz
51	37480.300 M	66.8	+6.3	+5.5	-25.9	+44.8	+0.0	97.5	94.0 maximized	+3.5	Horiz
52	37480.970 M	56.1	+6.3	+5.5	-25.9	+44.8	+0.0	86.8	94.0	-7.2	Horiz
53	37494.980 M	56.0	+6.3	+5.5	-25.9	+44.8	+0.0	86.7	94.0	-7.3	Horiz
54	37496.400 M	66.5	+6.3	+5.5	-25.9	+44.8	+0.0	97.2	94.0 maximized	+3.2	Horiz

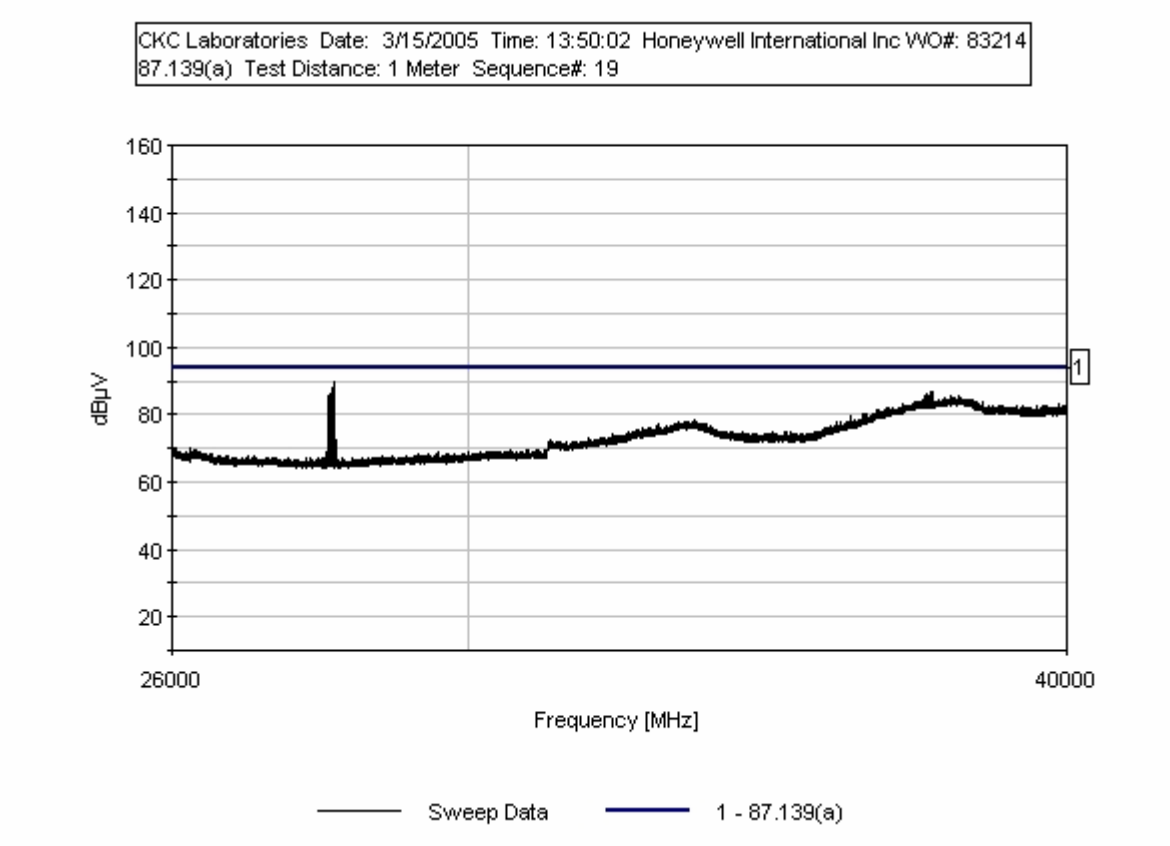

Figure 11-24 Spurious Emissions, Field Strength 26 GHz to 40 GHz Horizontal

Table 11-10 Spurious Emissions, Field Strength 26 GHz to 40 GHz Vertical

Measurement Data: Reading listed by amplitude. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	28109.830 M	68.4	+5.2	+4.3	-26.0	+41.9	+0.0	93.8	94.0 maximized	-0.2	Vert
2	28099.190 M	67.8	+5.2	+4.3	-26.0	+41.9	+0.0	93.2	94.0 maximized	-0.8	Vert
3	28041.130 M	65.2	+5.2	+4.3	-26.0	+41.9	+0.0	90.6	94.0 maximized	-3.4	Vert
4	28059.390 M	64.5	+5.2	+4.3	-26.0	+41.9	+0.0	89.9	94.0 maximized	-4.1	Vert
5	28023.120 M	63.9	+5.2	+4.3	-26.0	+41.9	+0.0	89.3	94.0 maximized	-4.7	Vert

6	28059.890 M	55.2	+5.2	+4.3	-26.0	+41.9	+0.0	80.6	94.0	-13.4	Vert
7	28098.260 M	54.6	+5.2	+4.3	-26.0	+41.9	+0.0	80.0	94.0	-14.0	Vert
8	28041.540 M	54.2	+5.2	+4.3	-26.0	+41.9	+0.0	79.6	94.0	-14.4	Vert
9	28109.940 M	54.1	+5.2	+4.3	-26.0	+41.9	+0.0	79.5	94.0	-14.5	Vert
10	28023.190 M	53.6	+5.2	+4.3	-26.0	+41.9	+0.0	79.0	94.0	-15.0	Vert
11	39896.920 M	49.7	+7.0	+6.0	-25.8	+45.7	+0.0	82.6	94.0 noise floor	-11.4	Vert
12	28109.830 M Ave	28.7	+5.2	+4.3	-26.0	+41.9	+0.0	54.1	94.0	-39.9	Vert
13	28059.390 M Ave	27.7	+5.2	+4.3	-26.0	+41.9	+0.0	53.1	94.0	-40.9	Vert
14	28099.190 M Ave	27.1	+5.2	+4.3	-26.0	+41.9	+0.0	52.5	94.0	-41.5	Vert
15	28023.120 M Ave	26.8	+5.2	+4.3	-26.0	+41.9	+0.0	52.2	94.0	-41.8	Vert
16	28041.130 M Ave	25.9	+5.2	+4.3	-26.0	+41.9	+0.0	51.3	94.0	-42.7	Vert

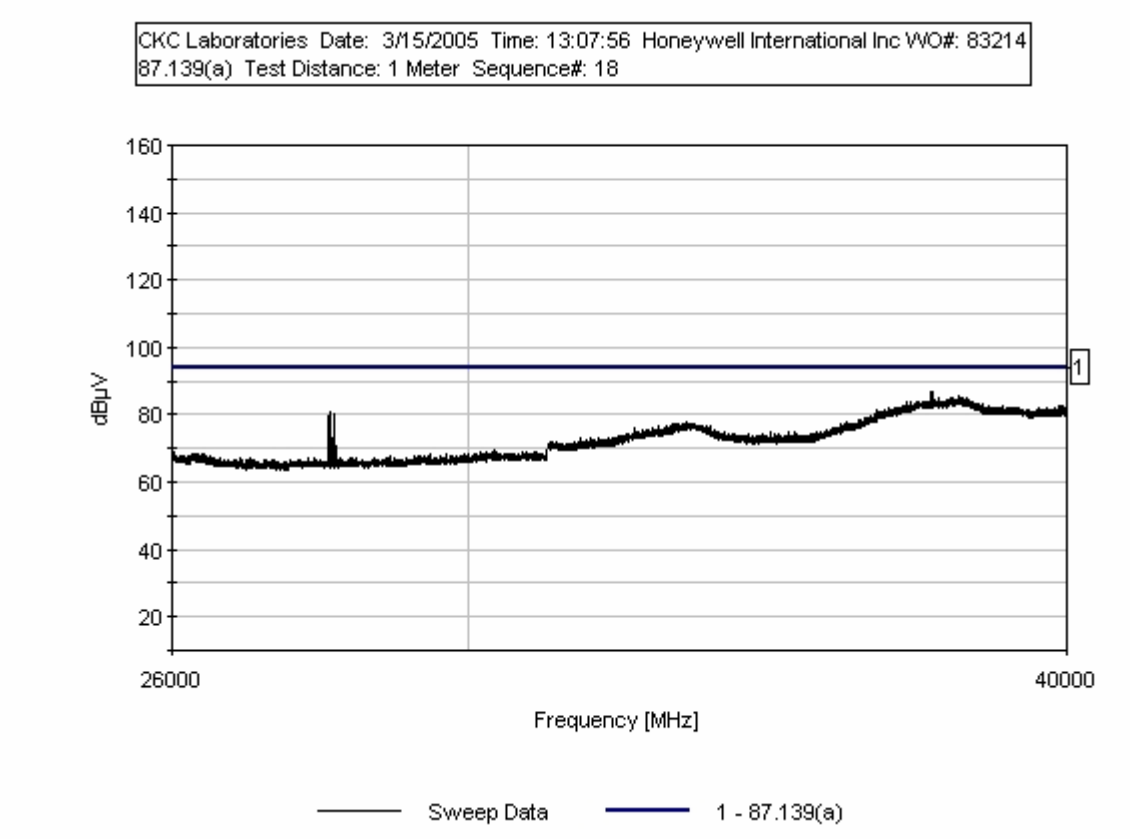

Figure 11-25 Spurious Emissions, Field Strength 26 GHz to 40 GHz Vertical

11.7 Frequency Stability – Temperature

11.7.1 Applicable FCC Rules

FCC CFR 47, Subpart 2.1055 - Measured over the temperature range of -40 to +60 C. Frequency measurements shall be made at the extremes and at intervals of not greater than 10 degrees C throughout the range. Only the frequency determining portions of the transmitter need be subjected to this test.

FCC CFR 47, Subpart 87.133 – The carrier frequency of each transmitting station must be maintained within the tolerances outline in the table of 87.133. For the band of 2450 to 10500 MHz, the tolerance shall be maintained to 1250 ppm.

11.7.2 Test Configuration

Frequency stability over temperature testing from the transmitter (TR-1) was accomplished by transmitting a continuous (correct emission and duty cycle) pulse train containing all the pulse groups utilized within the transmitter during proper operation and functionality. In this way, each mode of possible transmission is represented during testing. In addition, RS-429 communication was active between the transmitter and Datatrac 400H.

An HP spectrum analyzer was used to characterize and measure the frequency stability from the transmitter under test as shown in Figure 11-1. Test setup photographs and facility locations of testing are contained in Section 12 of this document.

11.7.3 Summary

The measured frequency stability of the transceiver while transmitting a continuous pulse train is depicted in Figures 11-26 through 11-36 (lower band edge) and 11-37 through 11-47 (upper band edge) for the nominal 200 Vdc input power over a temperature range of -40 degrees to +60 degrees Celsius with a worse case stability measurement of 350 kHz. Results were obtained by measuring both the low and high fundamental band edges and are summarized in Table 11-11.

Table 11-11 Frequency Stability vs. Temperature

Measurements are in GHz at Nominal Input Voltage		
Temperature (C)	**Lower Band Edge**	**Upper Band Edge**
-40	9.335475	9.3763
-30	9.3355	9.3764
-20	9.335525	9.3765
-10	9.335475	9.3764
0	9.335475	9.3764
+10	9.33545	9.37635
+20	9.33545	9.3765
+30	9.335425	9.37635
+40	9.3354	9.37655
+50	9.3355	9.3766
+60	9.33575	9.37665
Minimum	9.3354	9.3763
Maximum	9.33575	9.37665
Freq. Tolerance	0.00035	0.00035

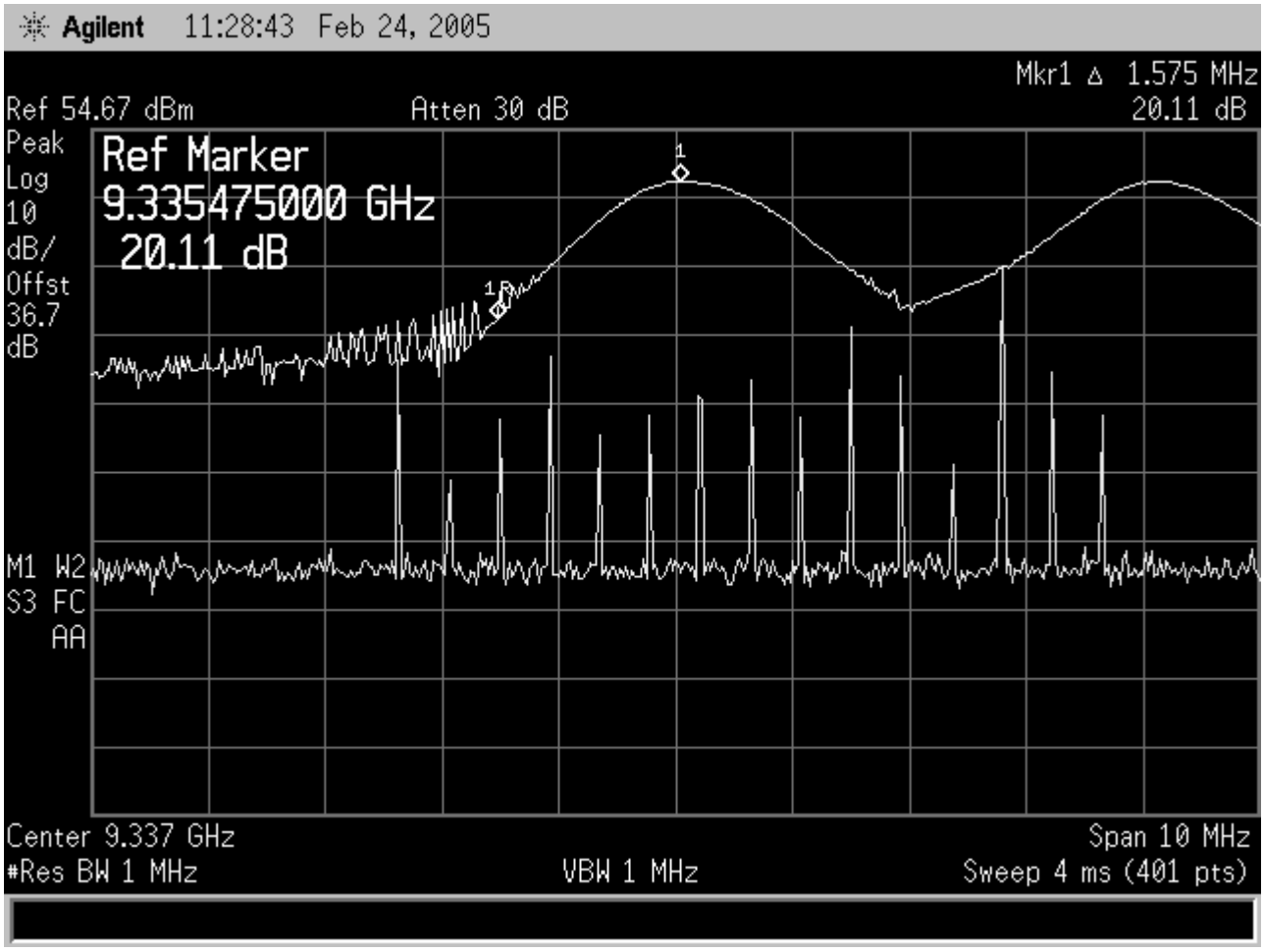

Figure 11-26 Frequency Stability, Lower Edge @ -40C

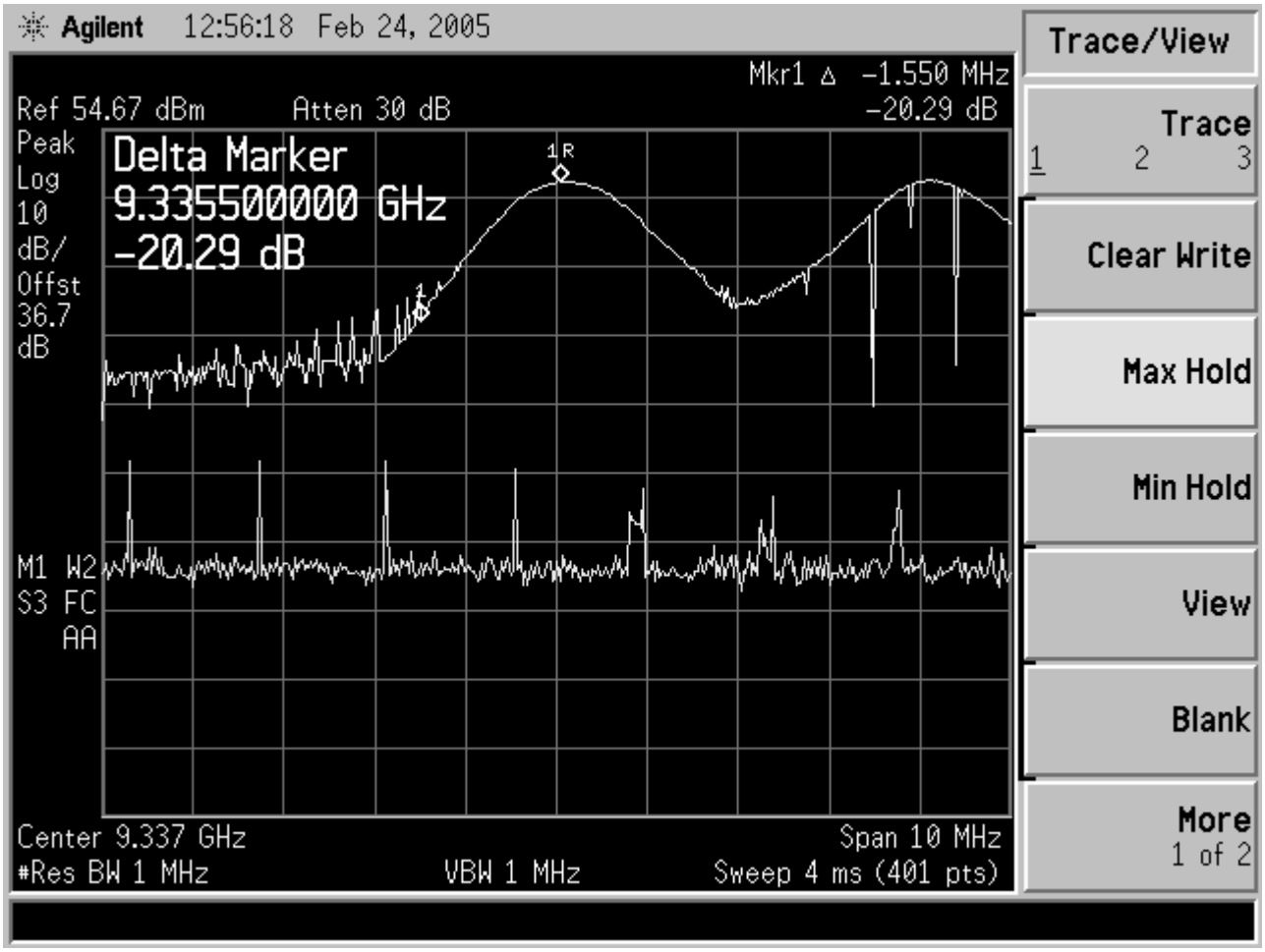

Figure 11-27 Frequency Stability, Lower Edge @ -30C

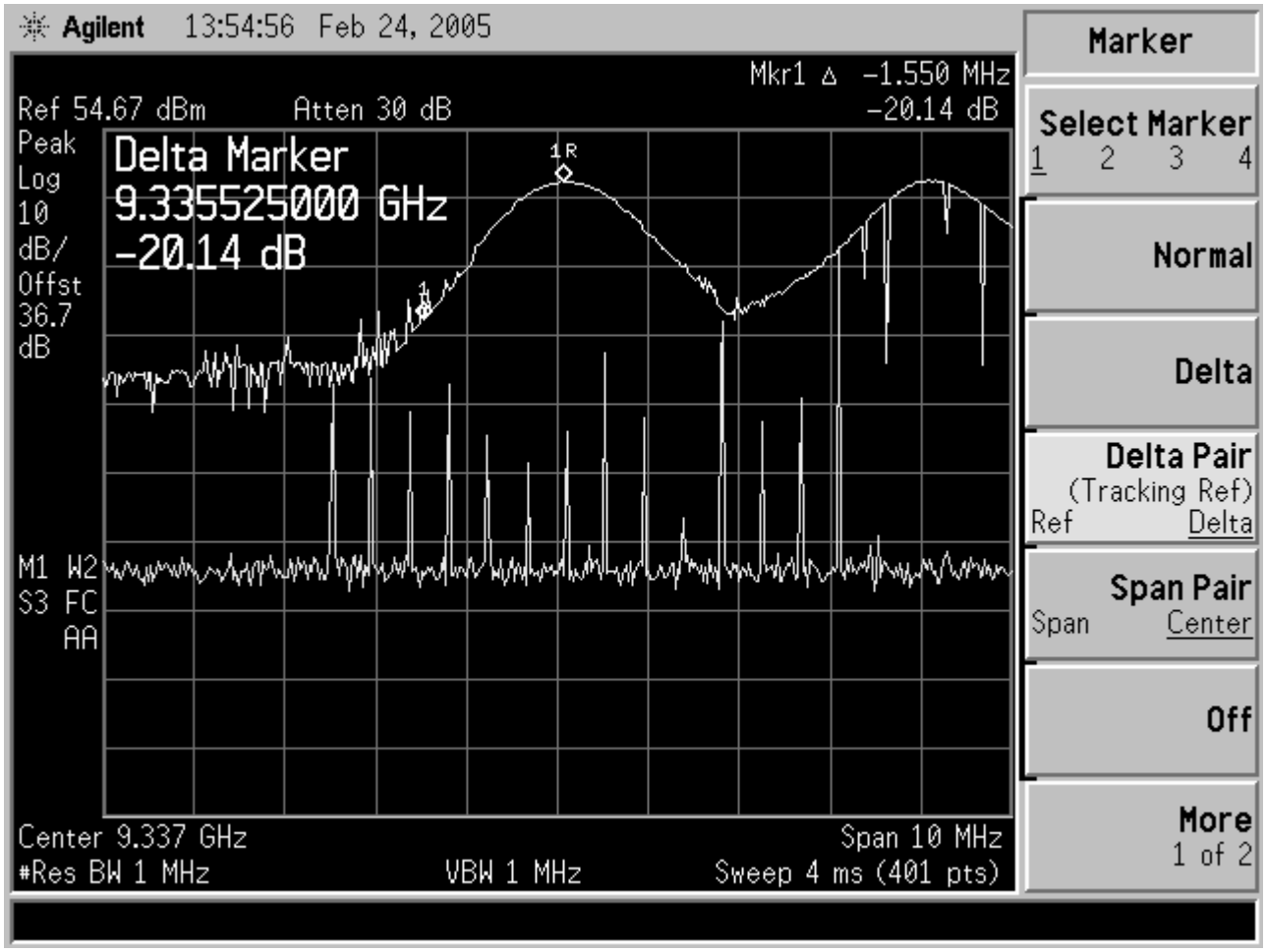

Figure 11-28 Frequency Stability, Lower Edge @ -20C

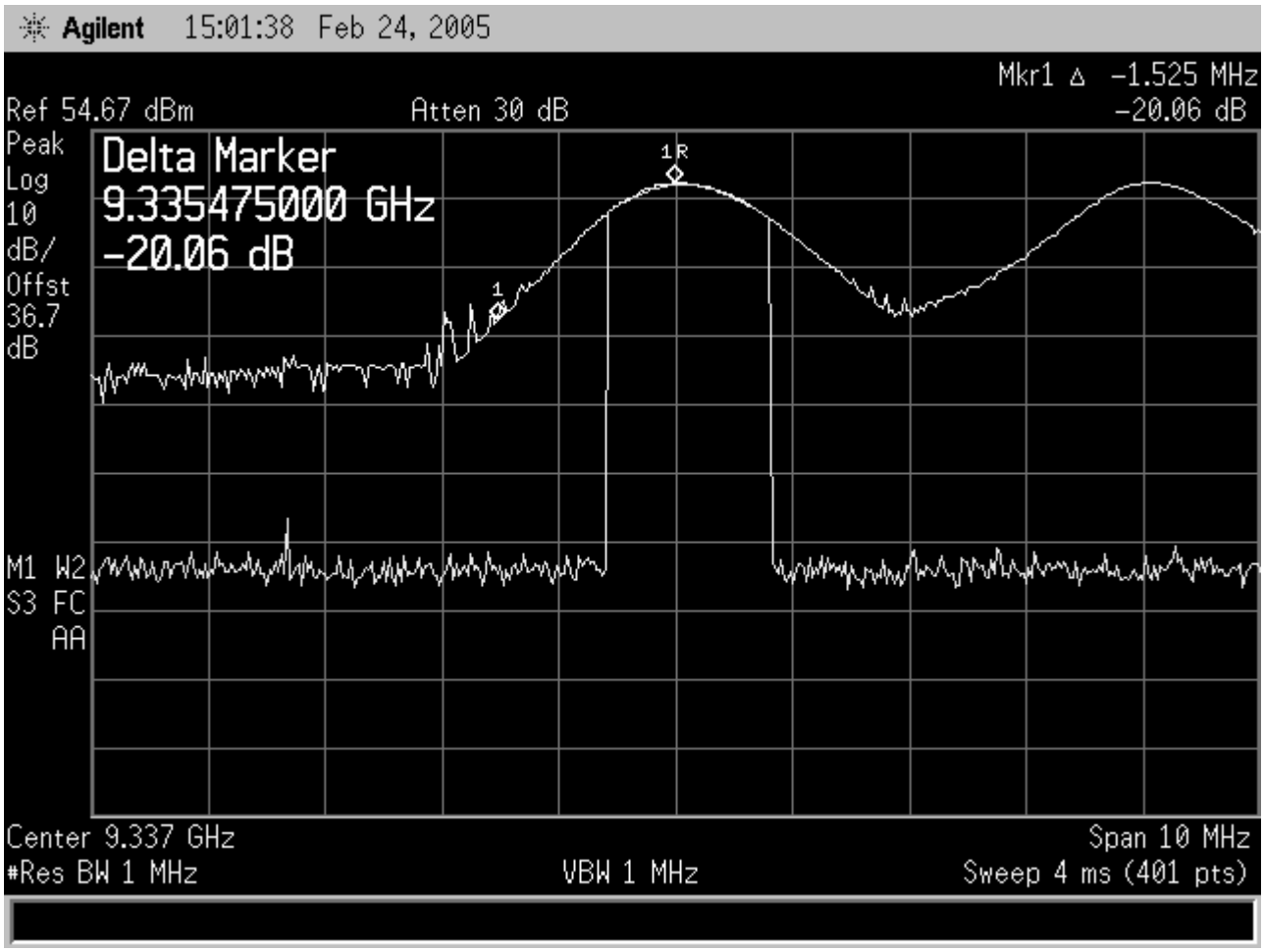

Figure 11-29 Frequency Stability, Lower Edge @ -10C

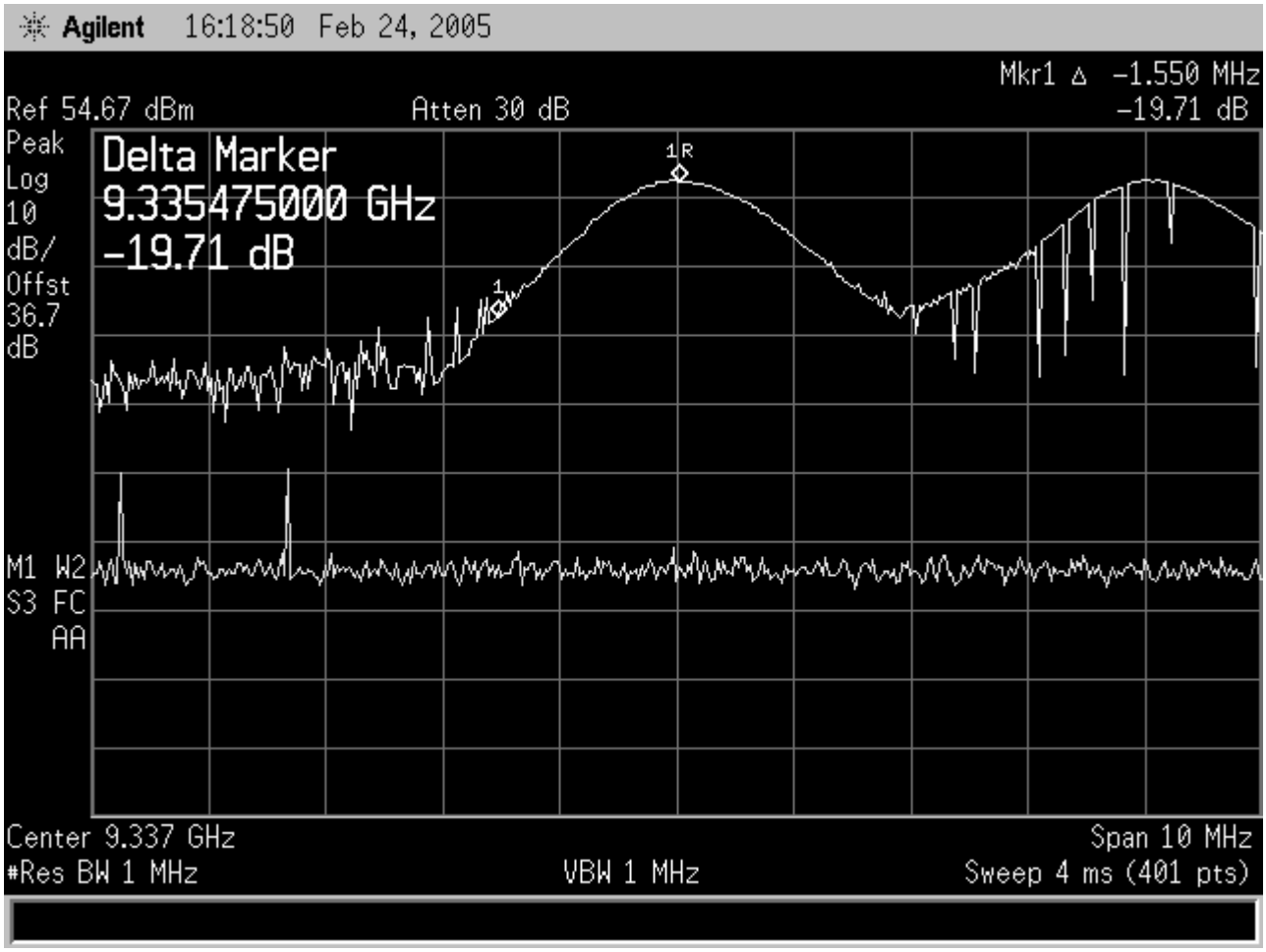

Figure 11-30 Frequency Stability, Lower Edge @ 0C

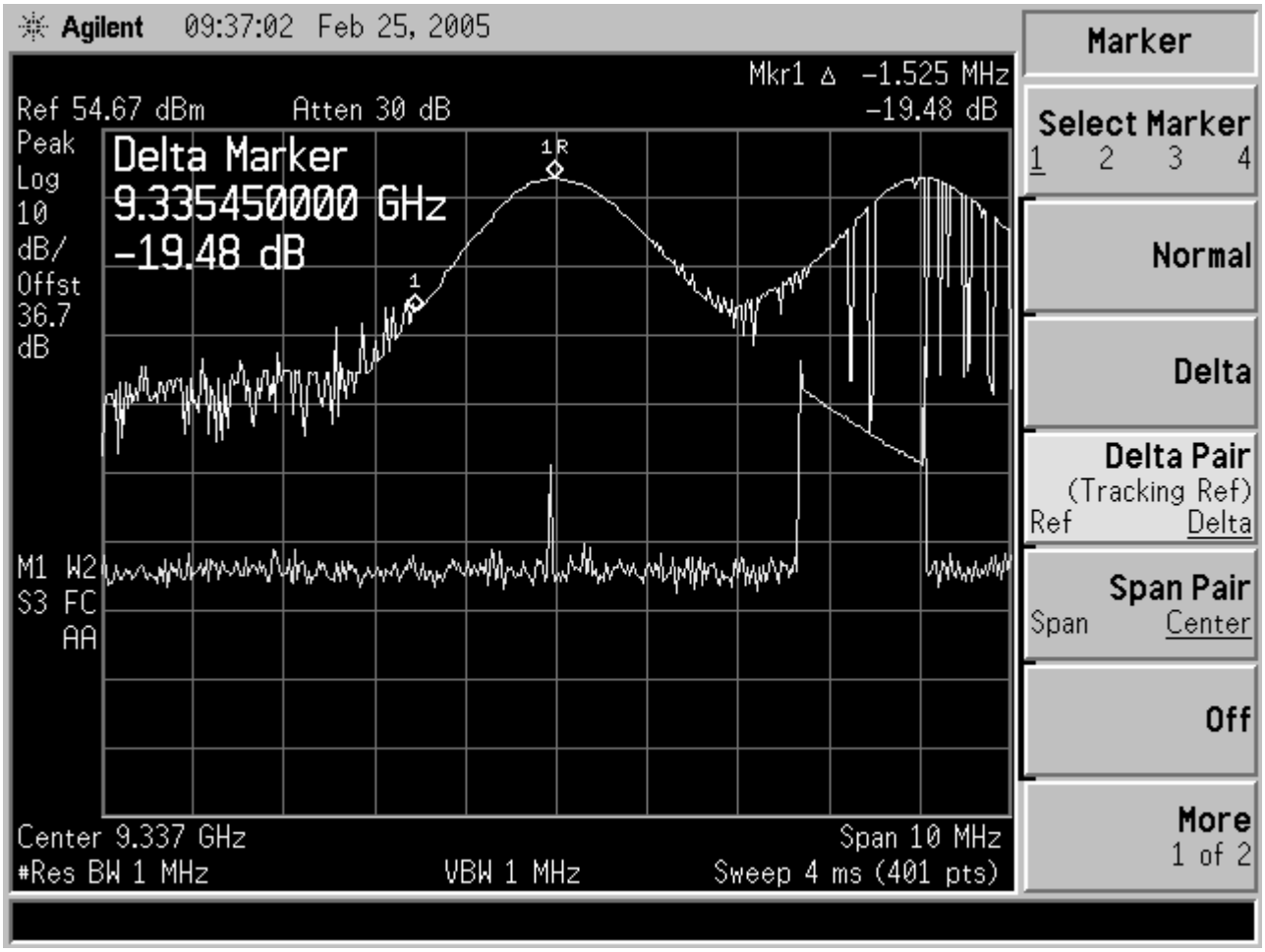

Figure 11-31 Frequency Stability, Lower Edge @ +10C

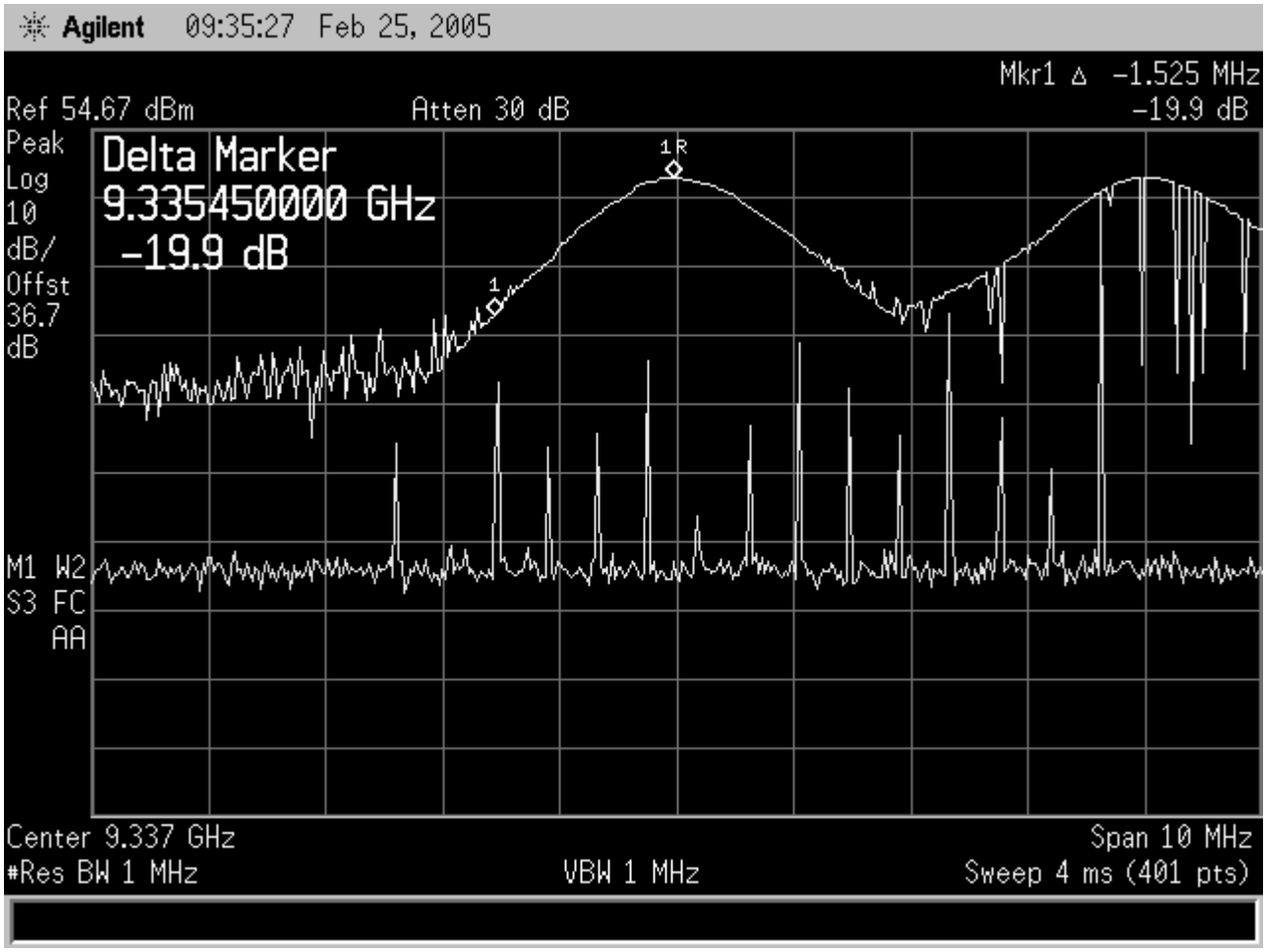

Figure 11-32 Frequency Stability, Lower Edge @ +20C

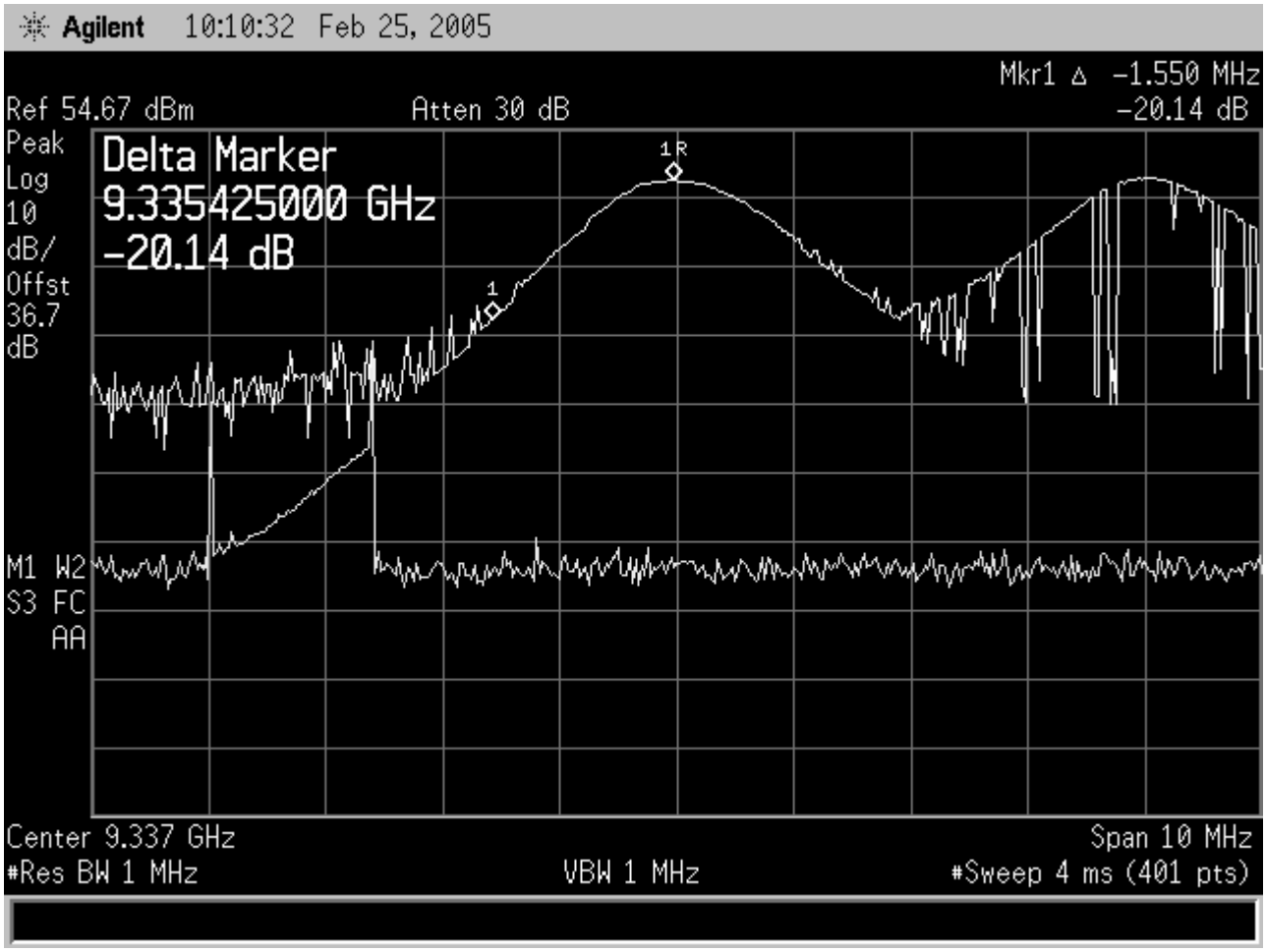

Figure 11-33 Frequency Stability, Lower Edge @ +30C

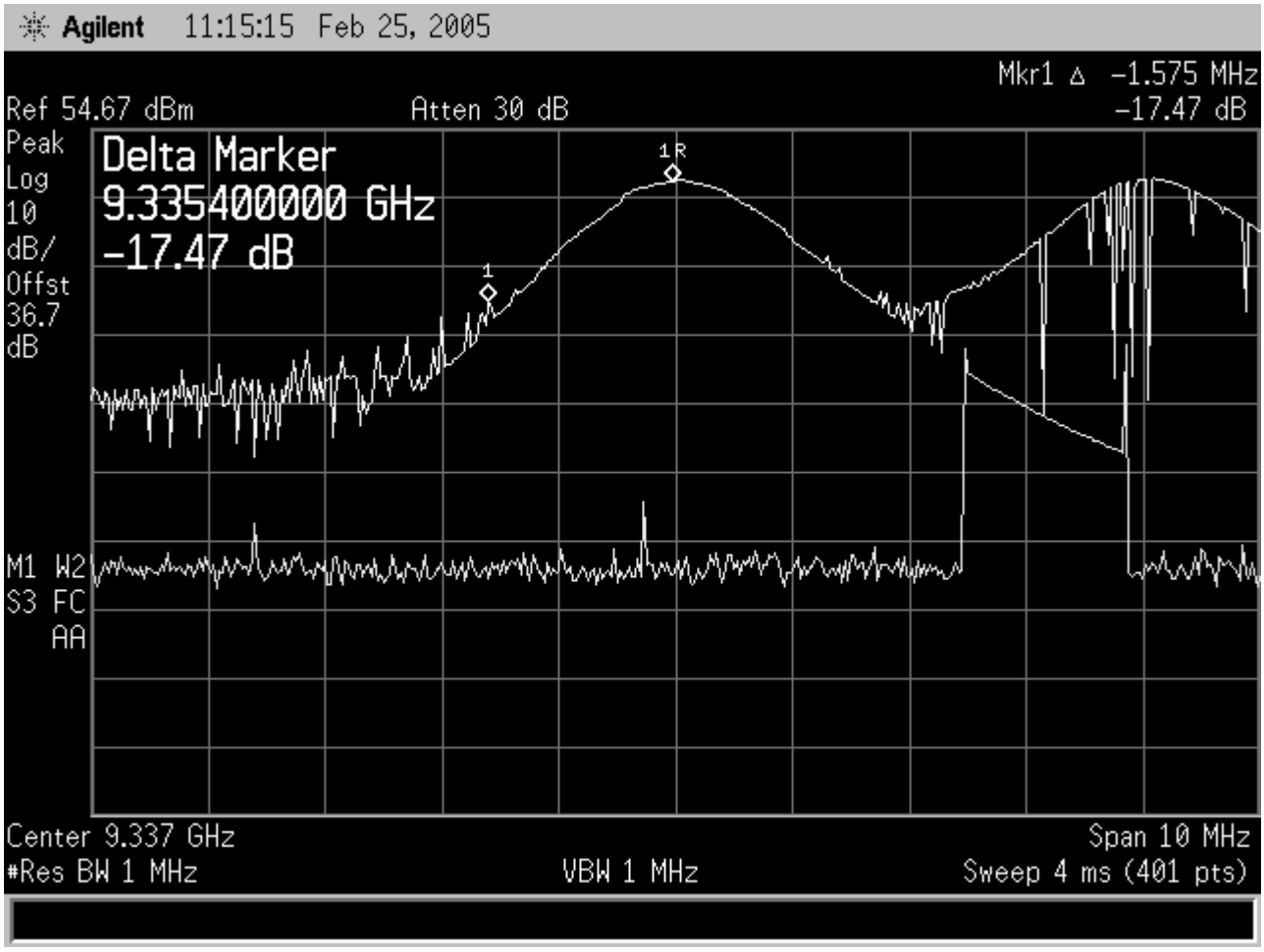

Figure 11-34 Frequency Stability, Lower Edge @ +40C

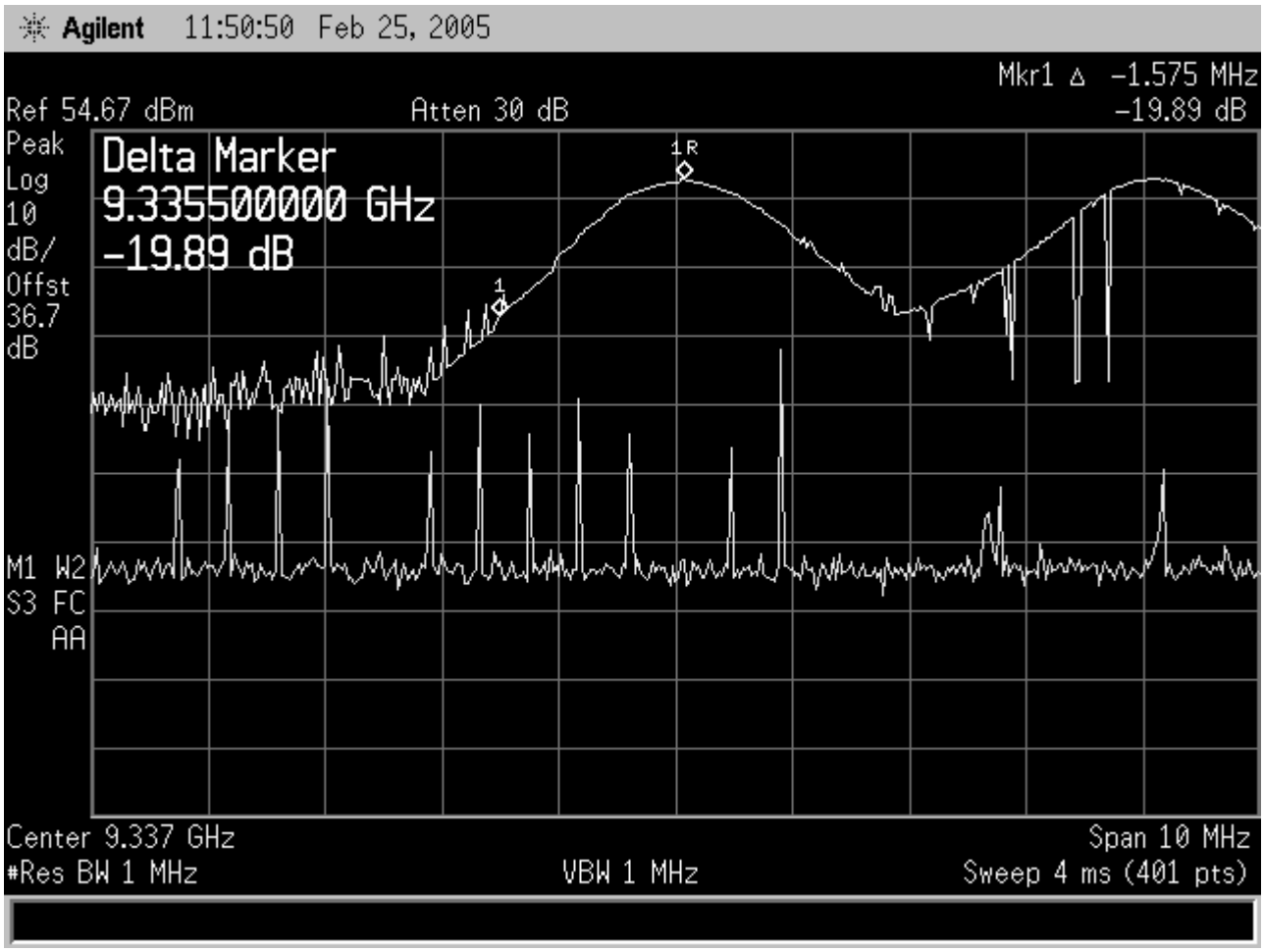

Figure 11-35 Frequency Stability, Lower Edge @ +50C

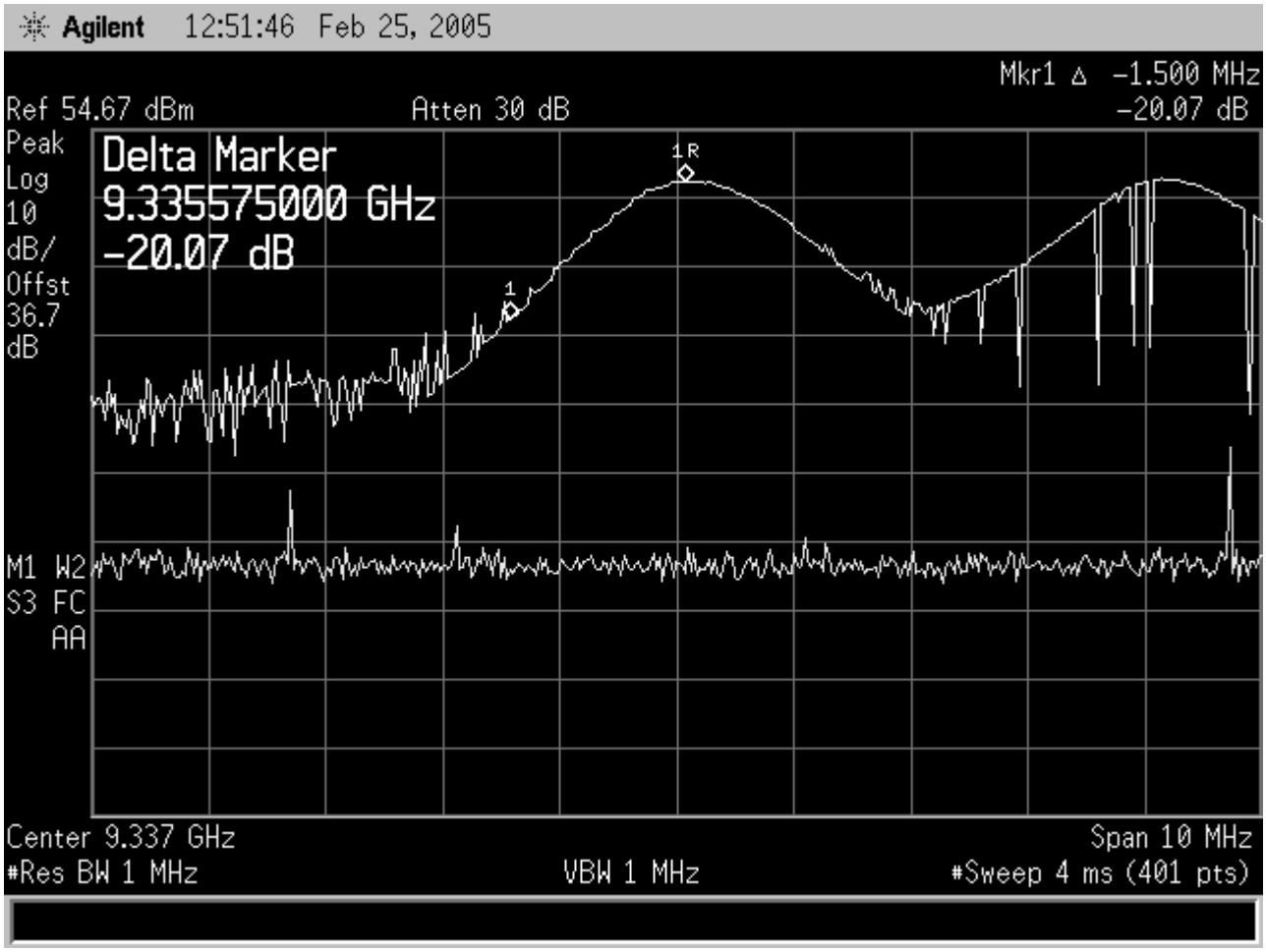

Figure 11-36 Frequency Stability, Lower Edge @ +60C

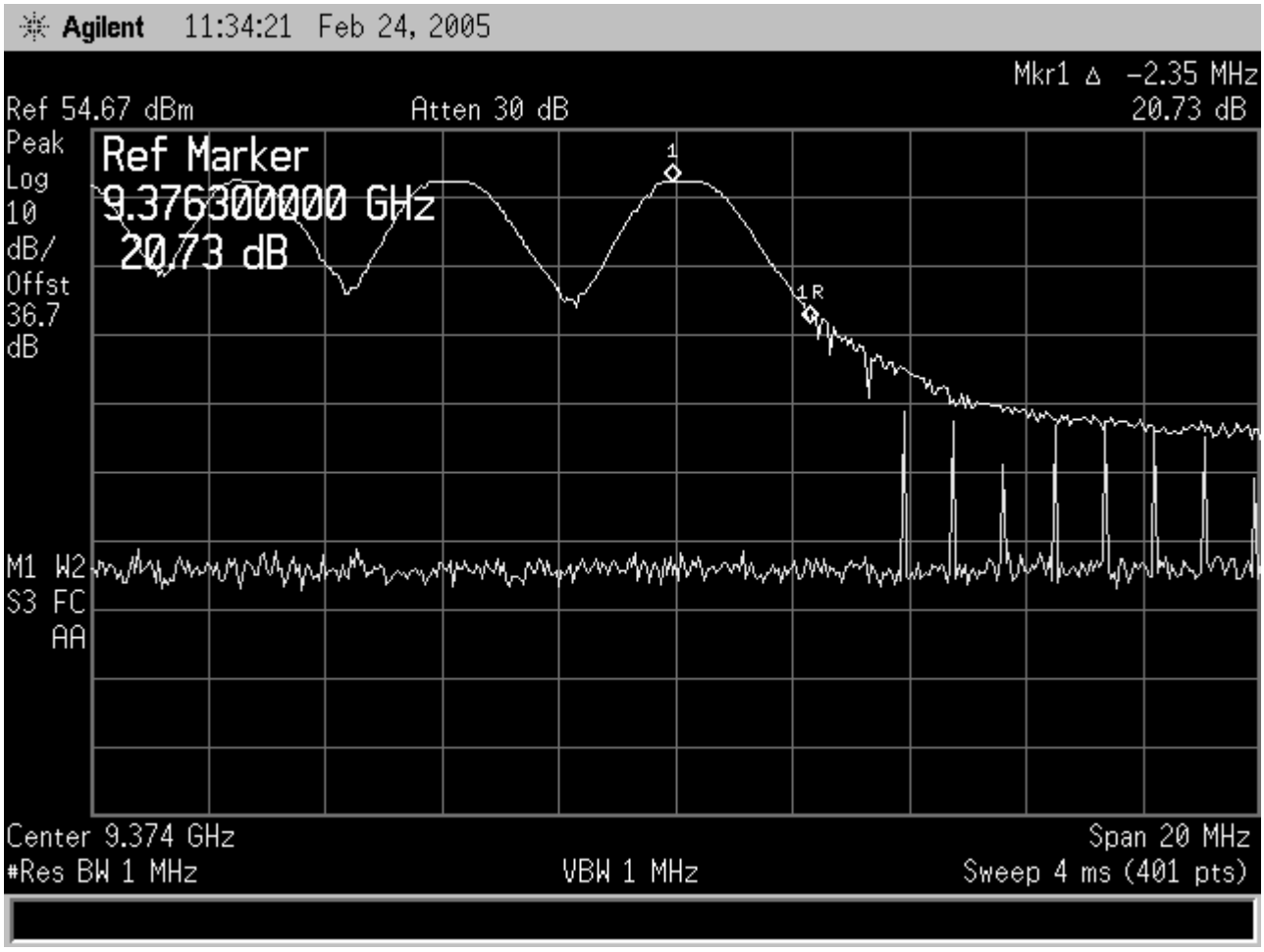

Figure 11-37 Frequency Stability, Upper Edge @ -40C

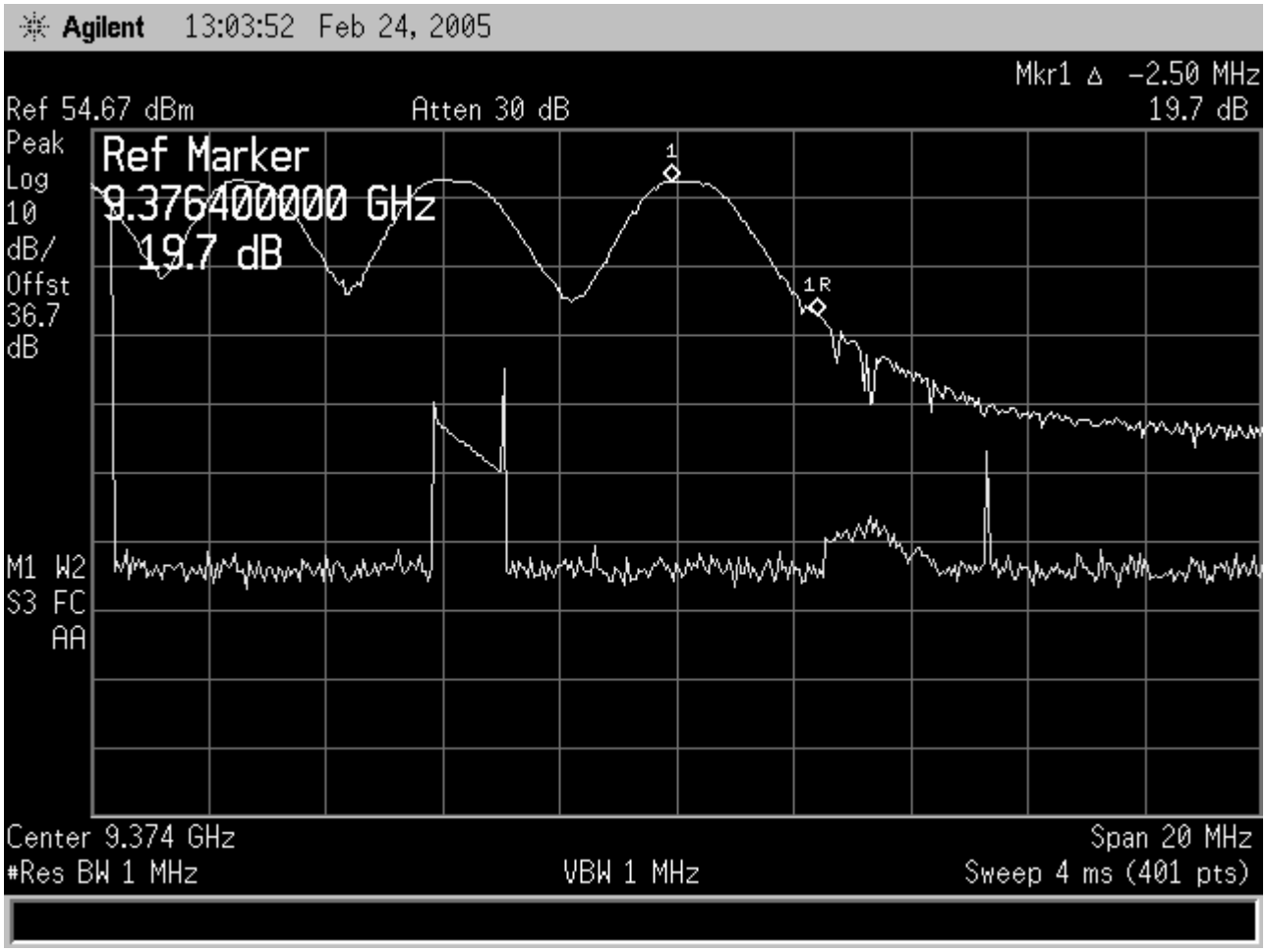

Figure 11-38 Frequency Stability, Upper Edge @ -30C

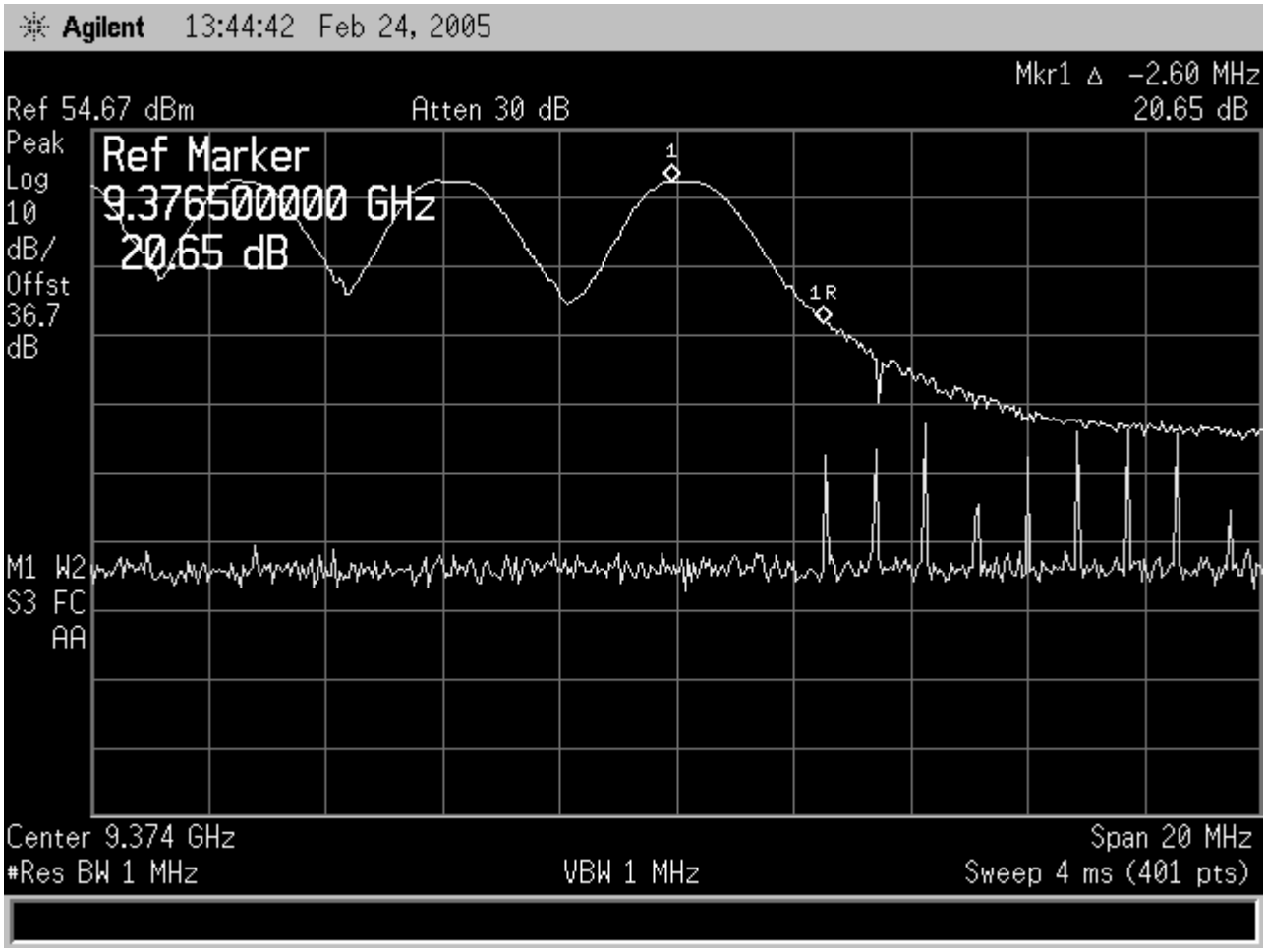

Figure 11-39 Frequency Stability, Upper Edge @ -20C

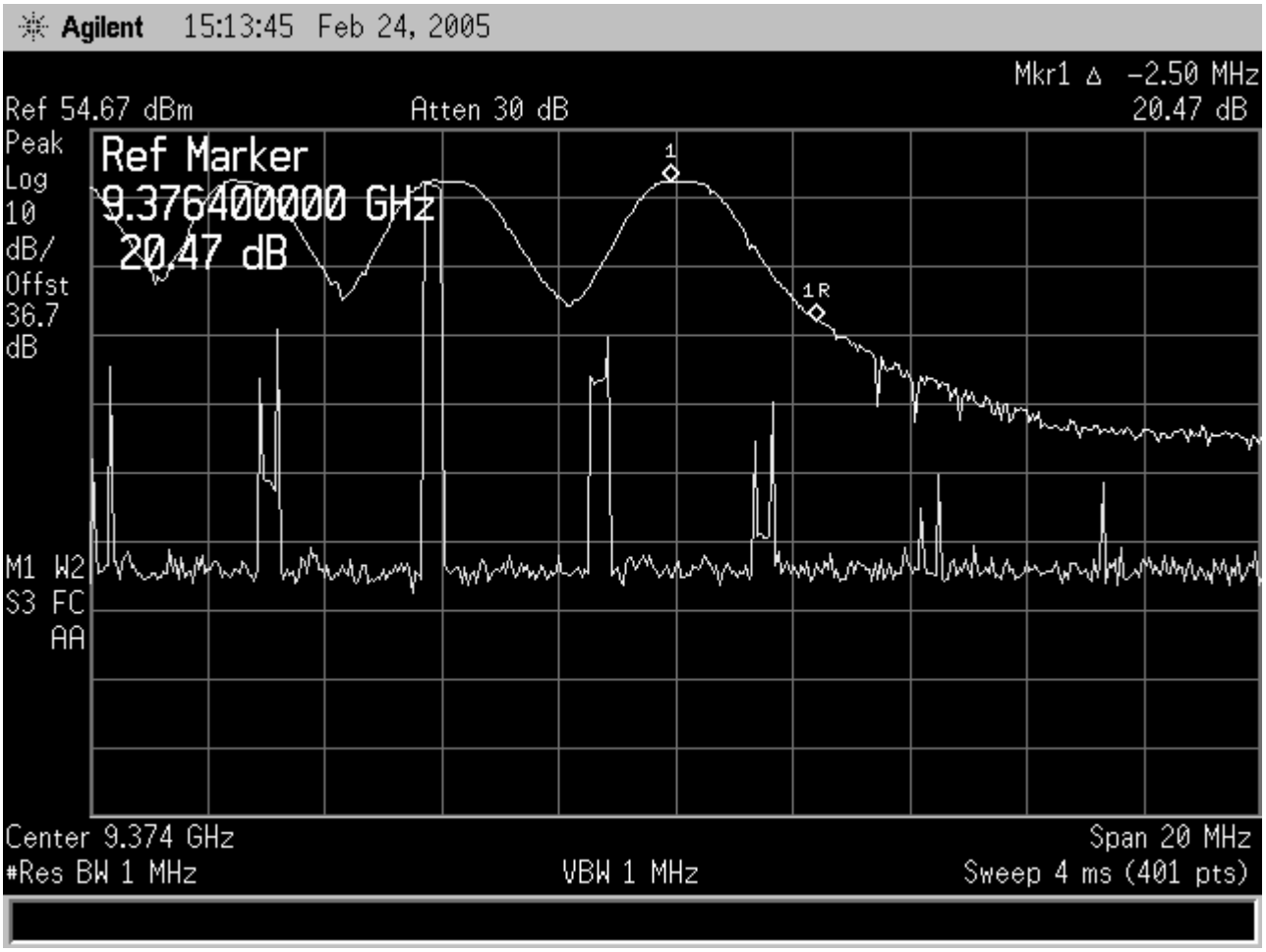

Figure 11-40 Frequency Stability, Upper Edge @ -10C

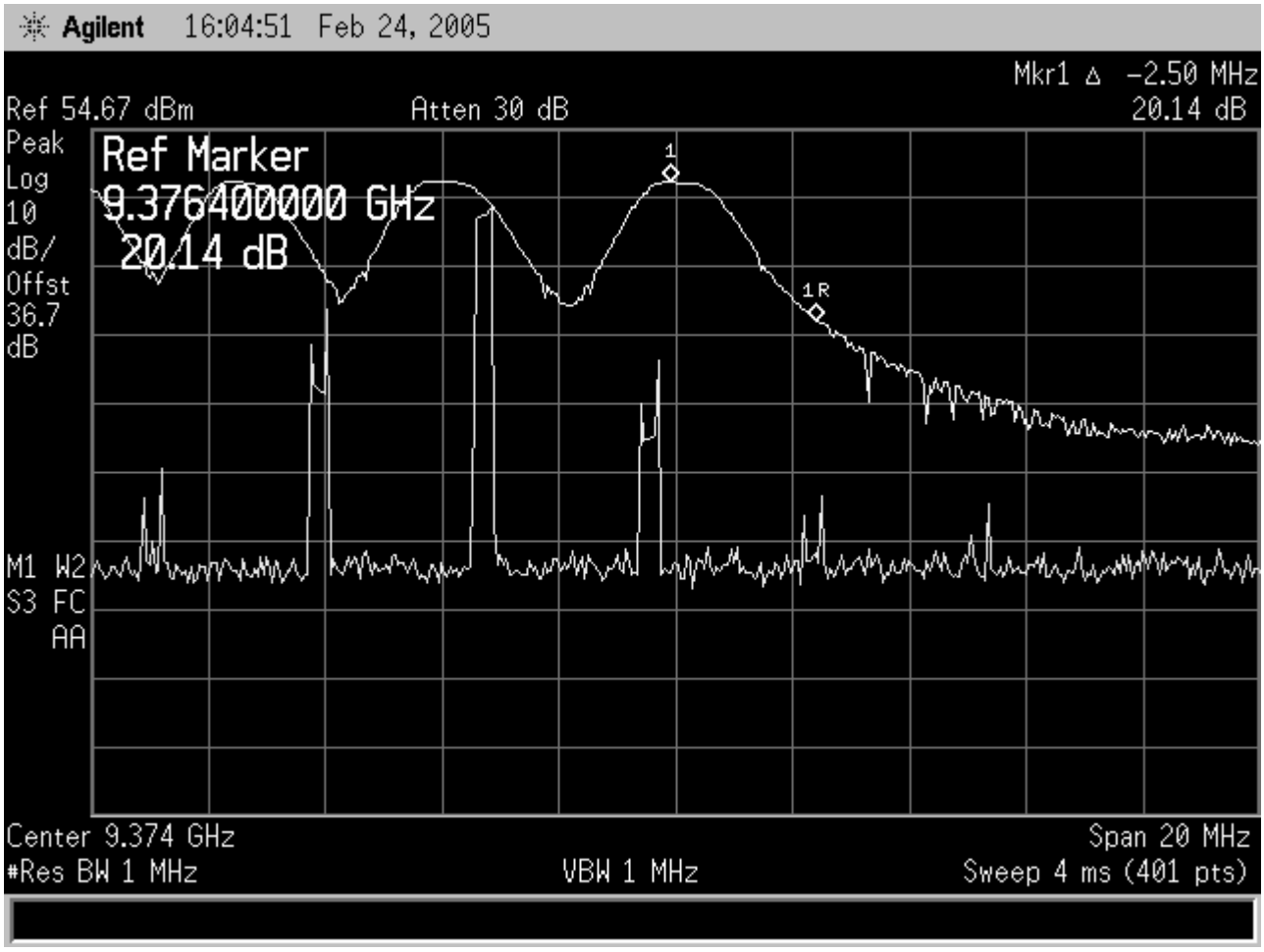

Figure 11-41 Frequency Stability, Upper Edge @ 0C

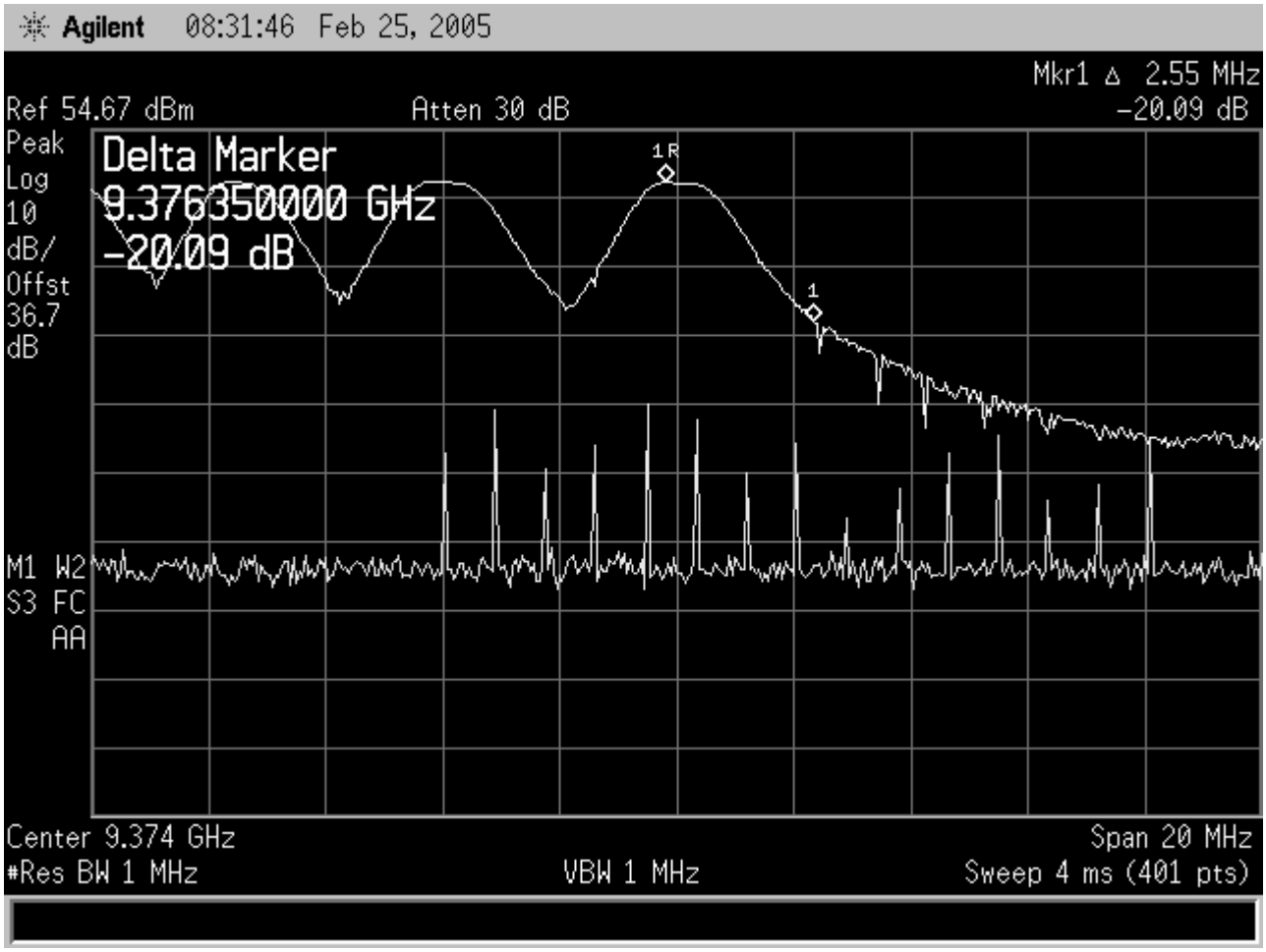

Figure 11-42 Frequency Stability, Upper Edge @ +10C

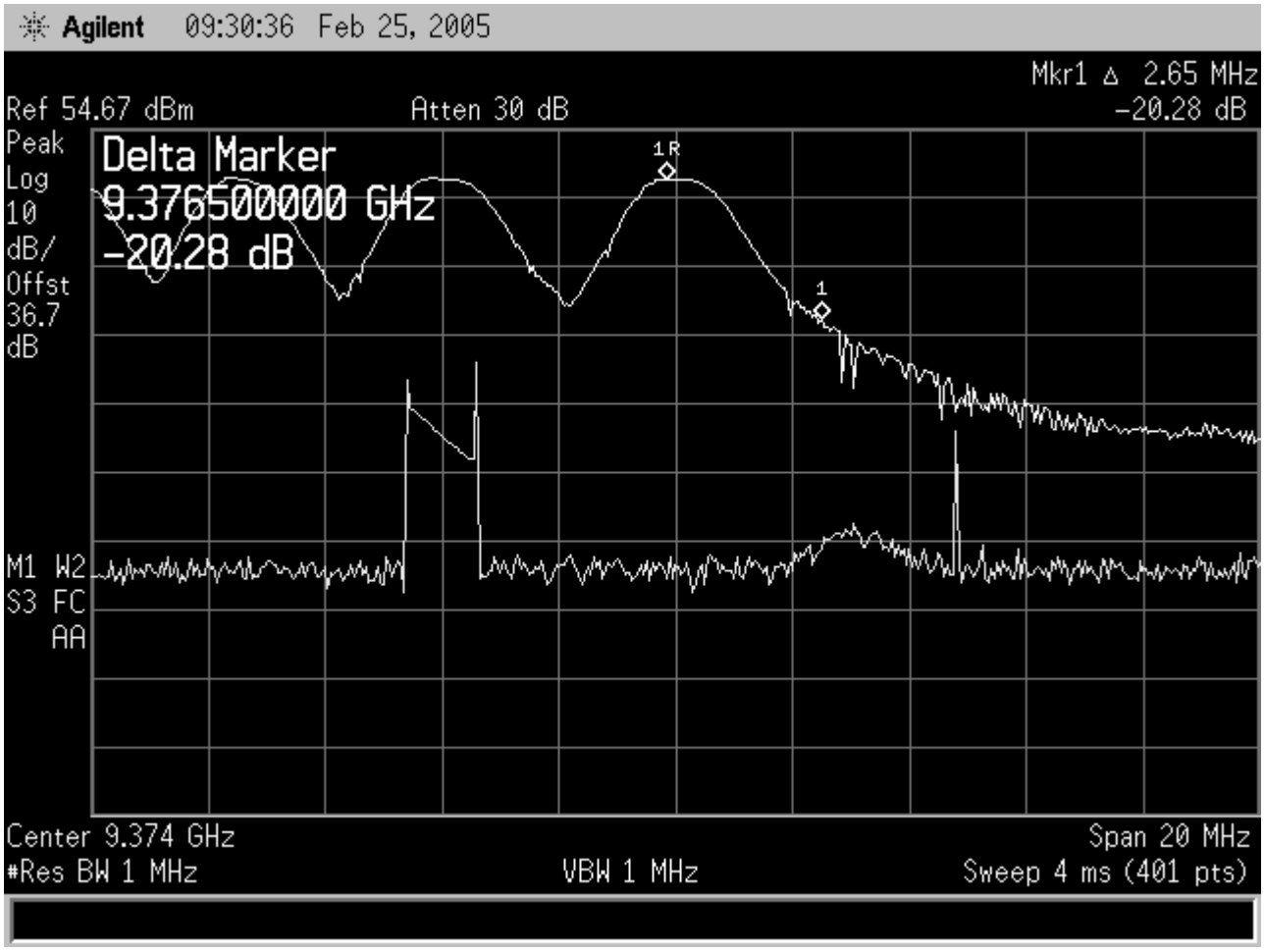

Figure 11-43 Frequency Stability, Upper Edge @ +20C

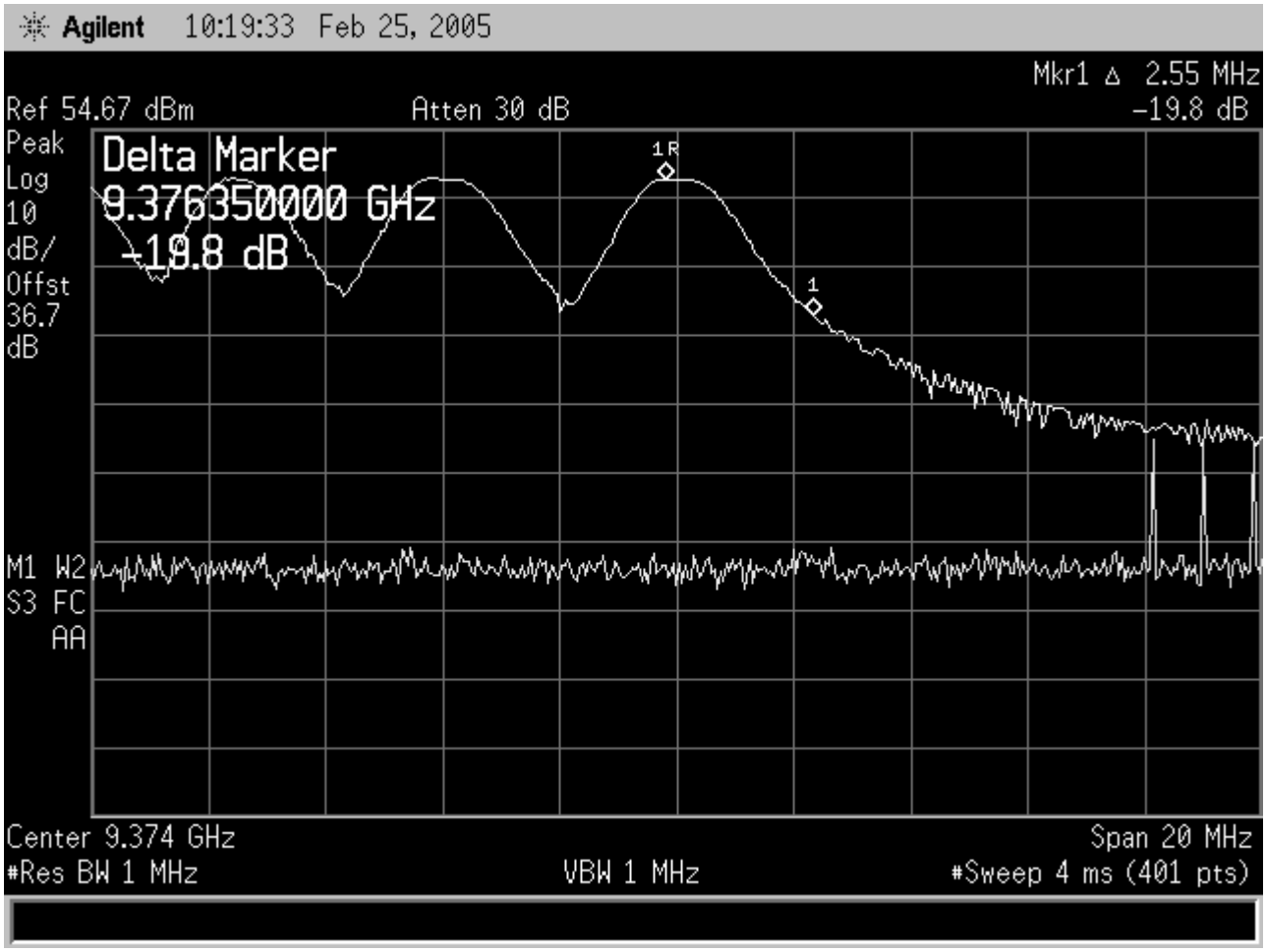

Figure 11-44 Frequency Stability, Upper Edge @ +30C

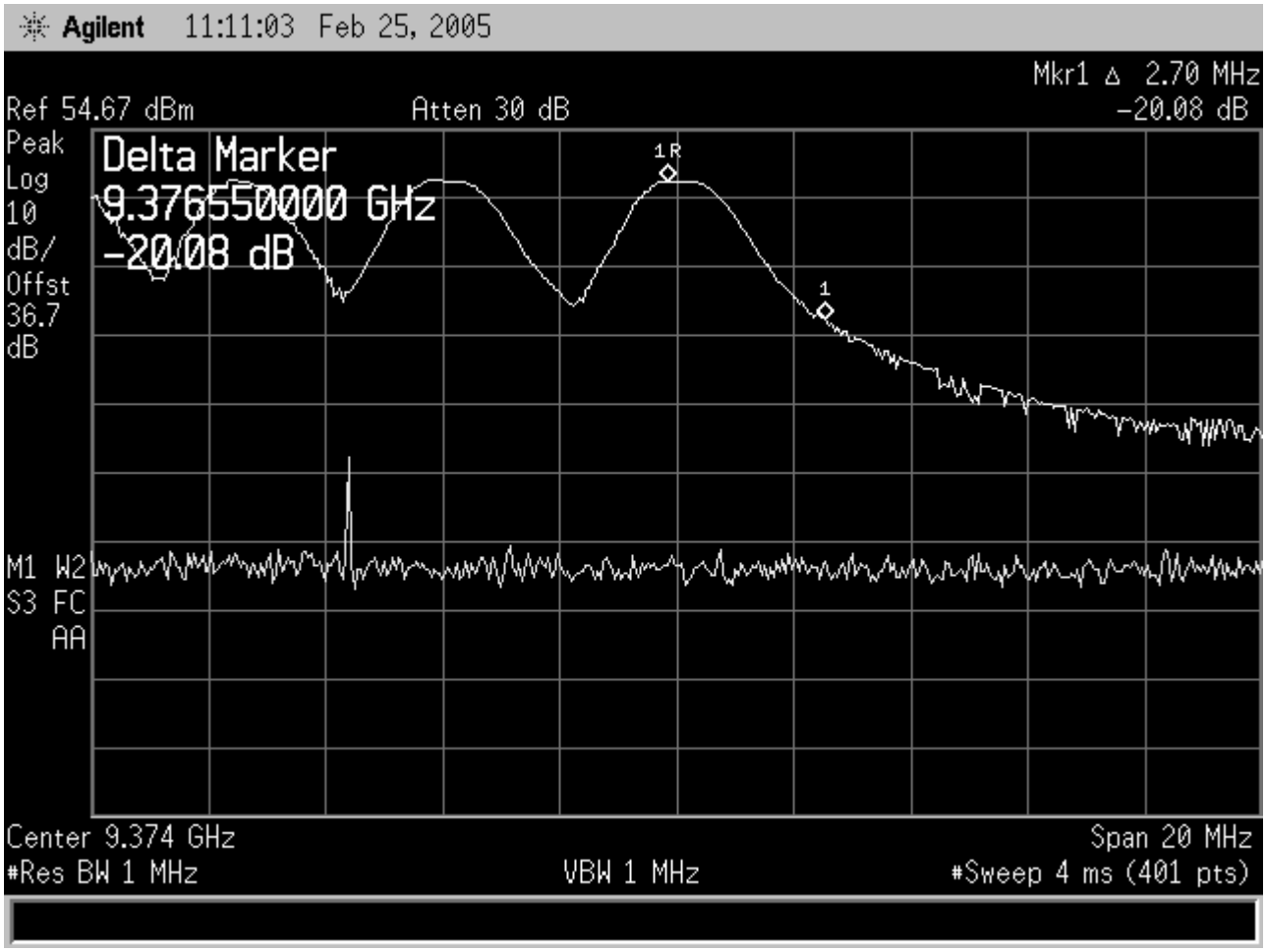

Figure 11-45 Frequency Stability, Upper Edge @ +40C

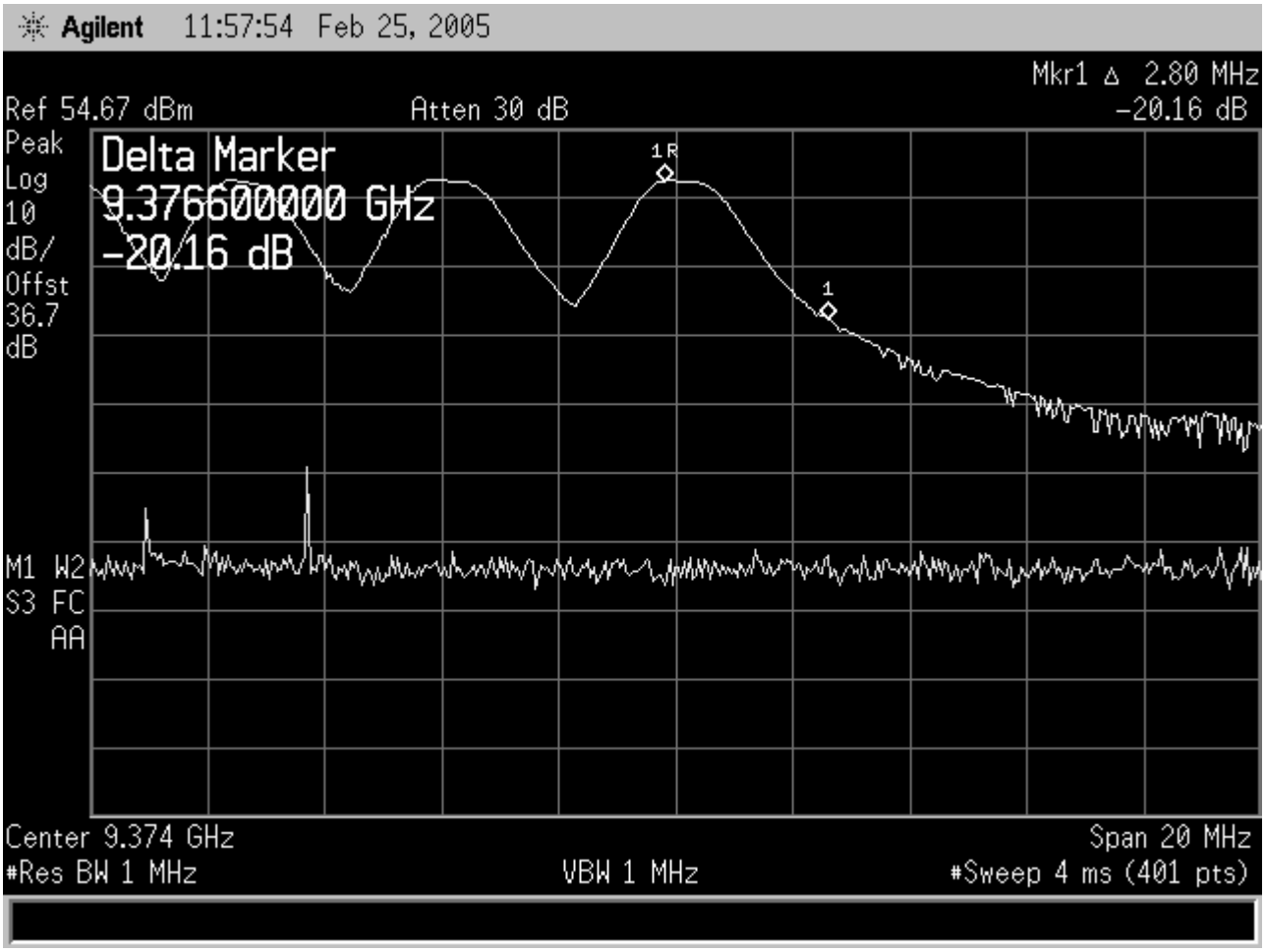

Figure 11-46 Frequency Stability, Upper Edge @ +50C

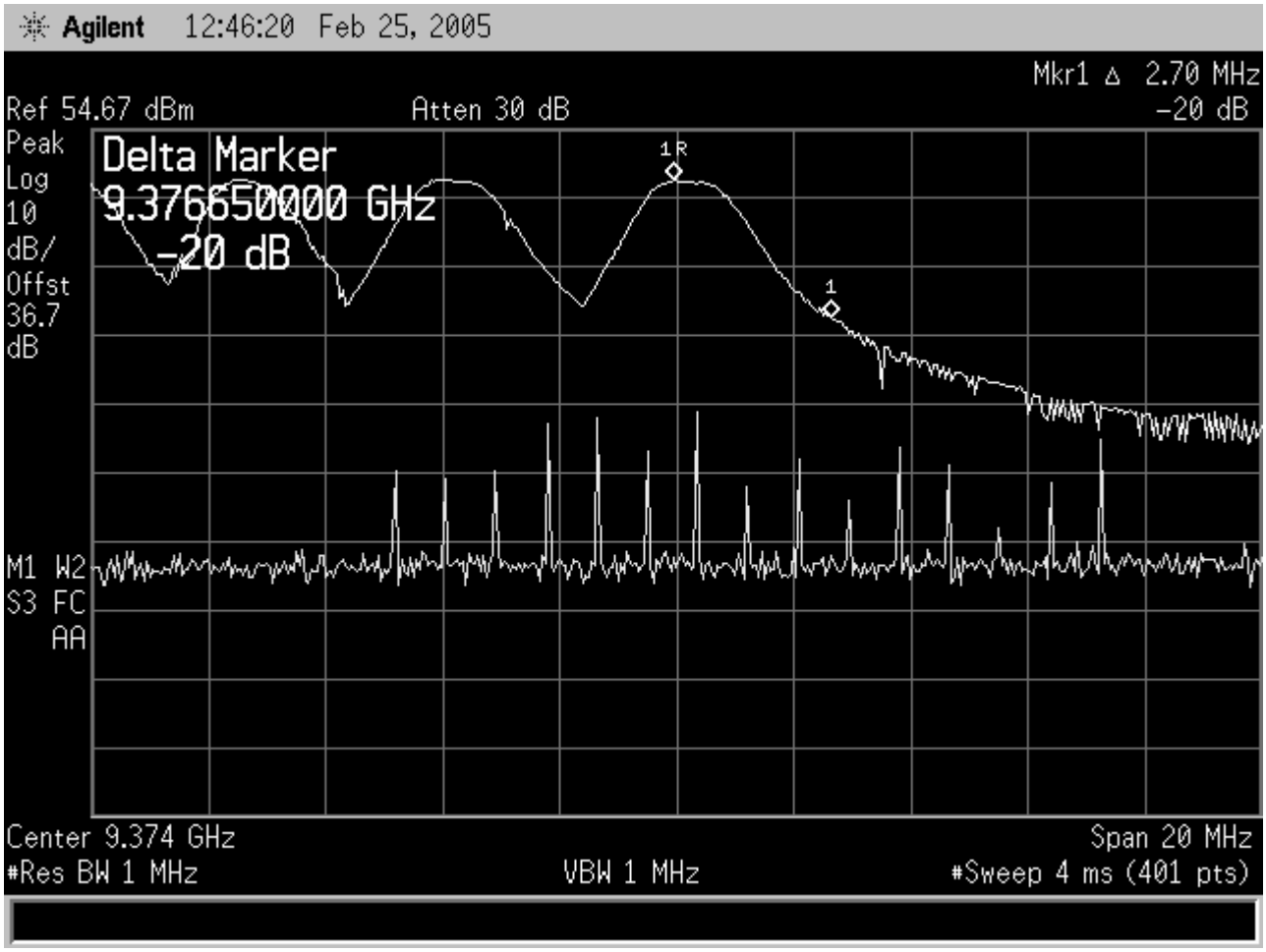

Figure 11-47 Frequency Stability, Upper Edge @ +60C

11.8 Frequency Stability – Voltage Variation

11.8.1 Applicable FCC Rules

FCC CFR 47, Subpart 2.1055(d) - The frequency stability shall be measured with variation of primary supply voltage as follows: 1) Vary primary voltage from 85 to 115 percent of the nominal value for other than hand carried equipment. 3) The supply voltage shall be measured at the input to the cable provide with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

FCC CFR 47, Subpart 87.133 – The carrier frequency of each transmitting station must be maintained within the tolerances outline in the table of 87.133. For the band of 2450 to 10500 MHz, the tolerance shall be maintained to 1250 ppm.

11.8.2 Test Configuration

Frequency stability over input voltage testing from the transmitter (TR-1) was accomplished by transmitting a continuous (correct emission and duty cycle) pulse train containing all the pulse groups

utilized within the transmitter during proper operation and functionality. In this way, each mode of possible transmission is represented during testing. In addition, RS-429 communication was active between the transmitter and Datatrac 400H.

An HP spectrum analyzer was used to characterize and measure the frequency stability from the transmitter under test as shown in Figure 11-1. Test setup photographs and facility locations of testing are contained in Section 12 of this document.

11.8.3 Summary

The measured frequency stability of the transceiver while transmitting a continuous pulse train is depicted in Figures 11-48 through 11-69 (170 Vdc input power) and 11-70 through 11-91 (230 Vdc input power) for both 170 and 230 Vdc input power over a temperature range of -40 degrees to +60 degrees Celsius with a worse case stability measurement of 1.0 MHz. Results were obtained by measuring both the low and high fundamental band edges and are summarized in Table 11-12.

Table 11-12 Frequency Stability vs. Input Voltage and Temperature

Measurements are in GHz at Indicated Input Voltage				
	170 Vdc Input Voltage		**230 Vdc Input Voltage**	
Temperature (C)	**Lower Band Edge**	**Upper Band Edge**	**Lower Band Edge**	**Upper Band Edge**
-40	9.335425	9.3764	9.335425	9.37645
-30	9.335475	9.37635	9.335425	9.37645
-20	9.335525	9.37645	9.335525	9.3764
-10	9.335525	9.37635	9.33545	9.3764
0	9.335375	9.37645	9.335475	9.37645
+10	9.335425	9.37635	9.335525	9.3764
+20	9.335425	9.3764	9.33545	9.3765
+30	9.3355	9.3764	9.33545	9.3764
+40	9.335425	9.37655	9.335425	9.3765
+50	9.33545	9.3766	9.335525	9.37645
+60	9.335625	9.37665	9.3356	9.3766
Minimum	9.335375	9.37565	9.335425	9.3764
Maximum	9.335625	9.37665	9.3356	9.3766
Freq. Tolerance	0.00025	0.001	0.000175	0.0002

11.8.3.1 170 Vdc Input Voltage Data

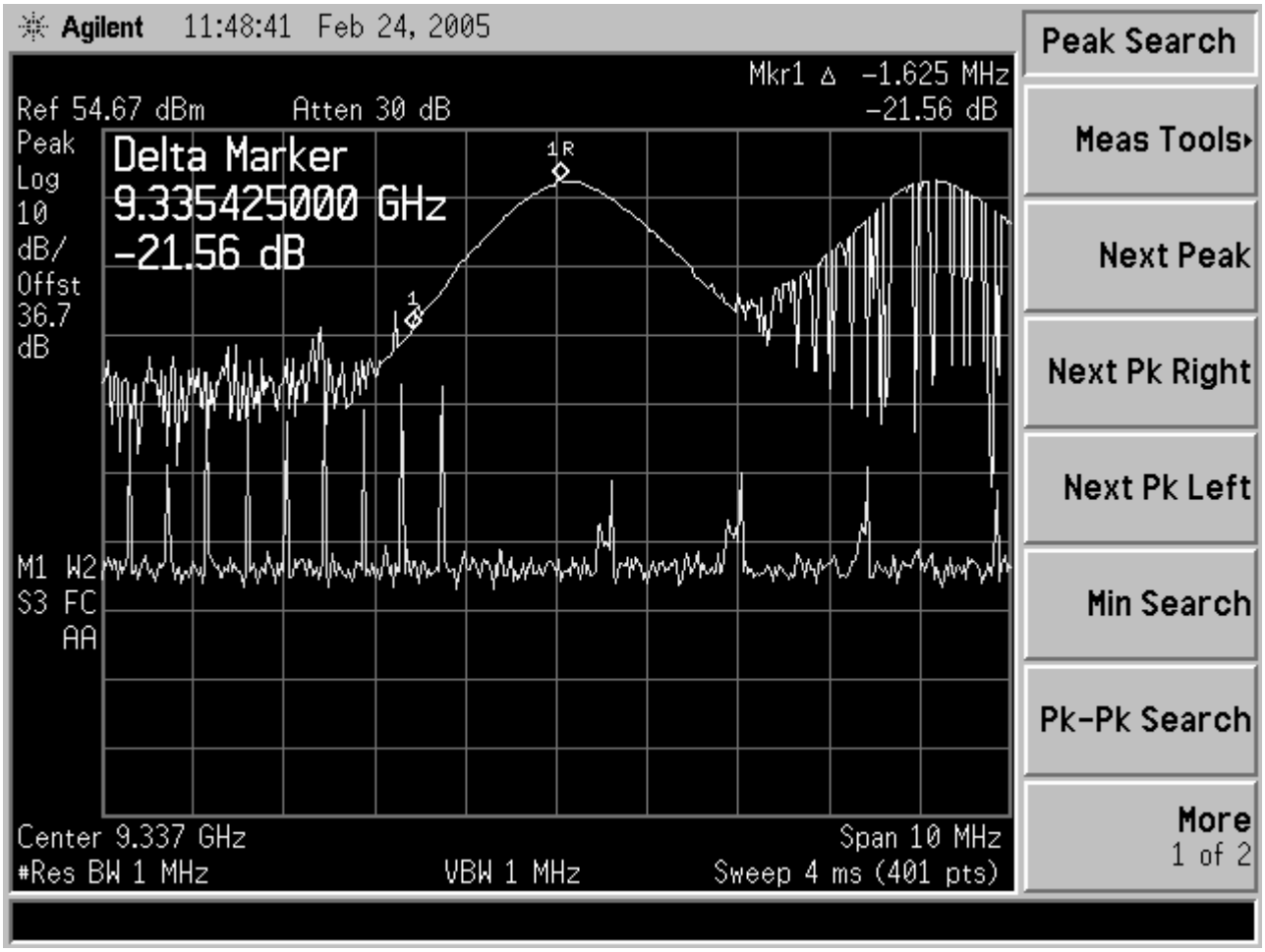

Figure 11-48 Frequency Stability, 170 Vdc Lower Edge @ -40C

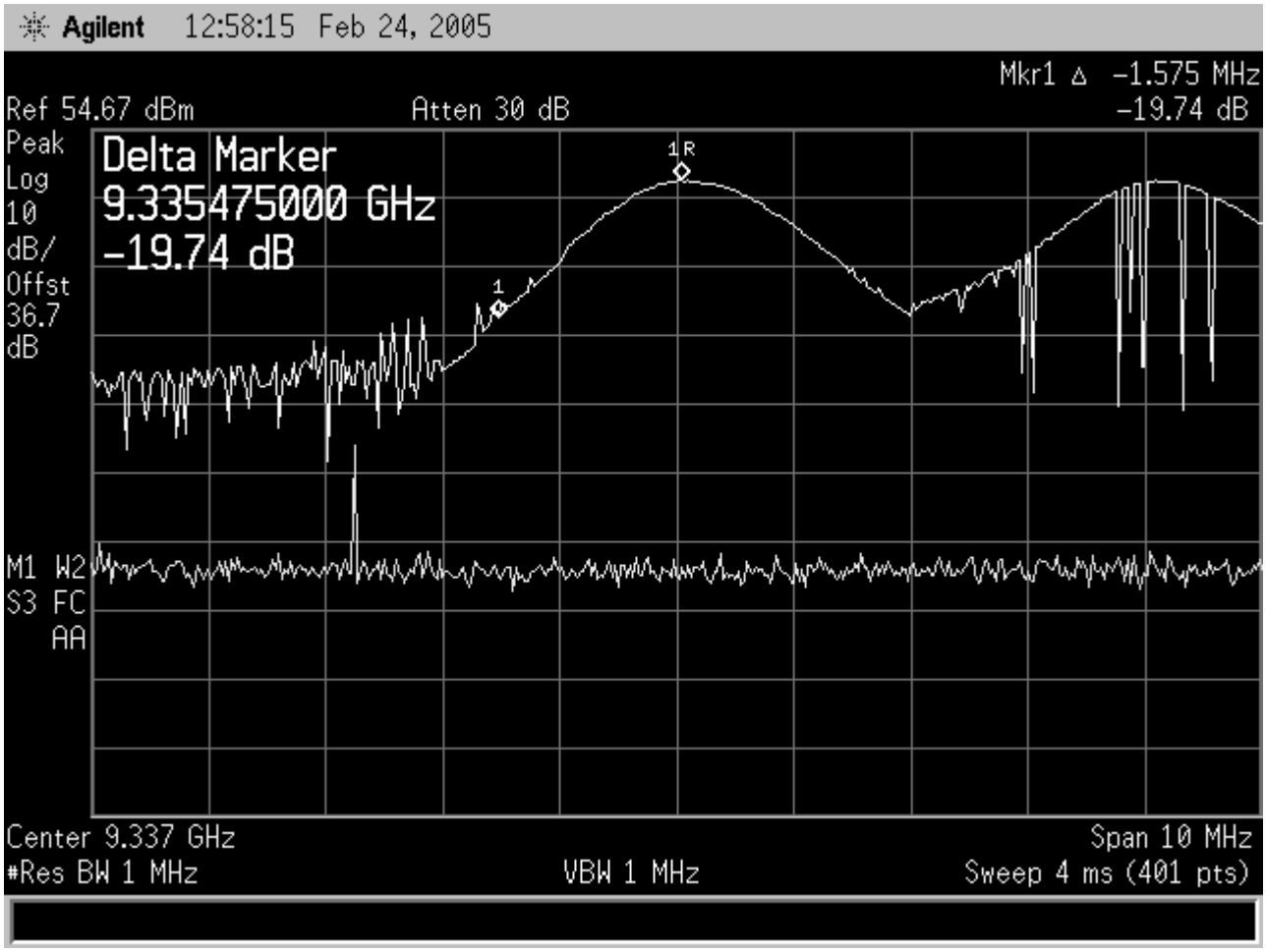

Figure 11-49 Frequency Stability, 170 Vdc Lower Edge @ -30C

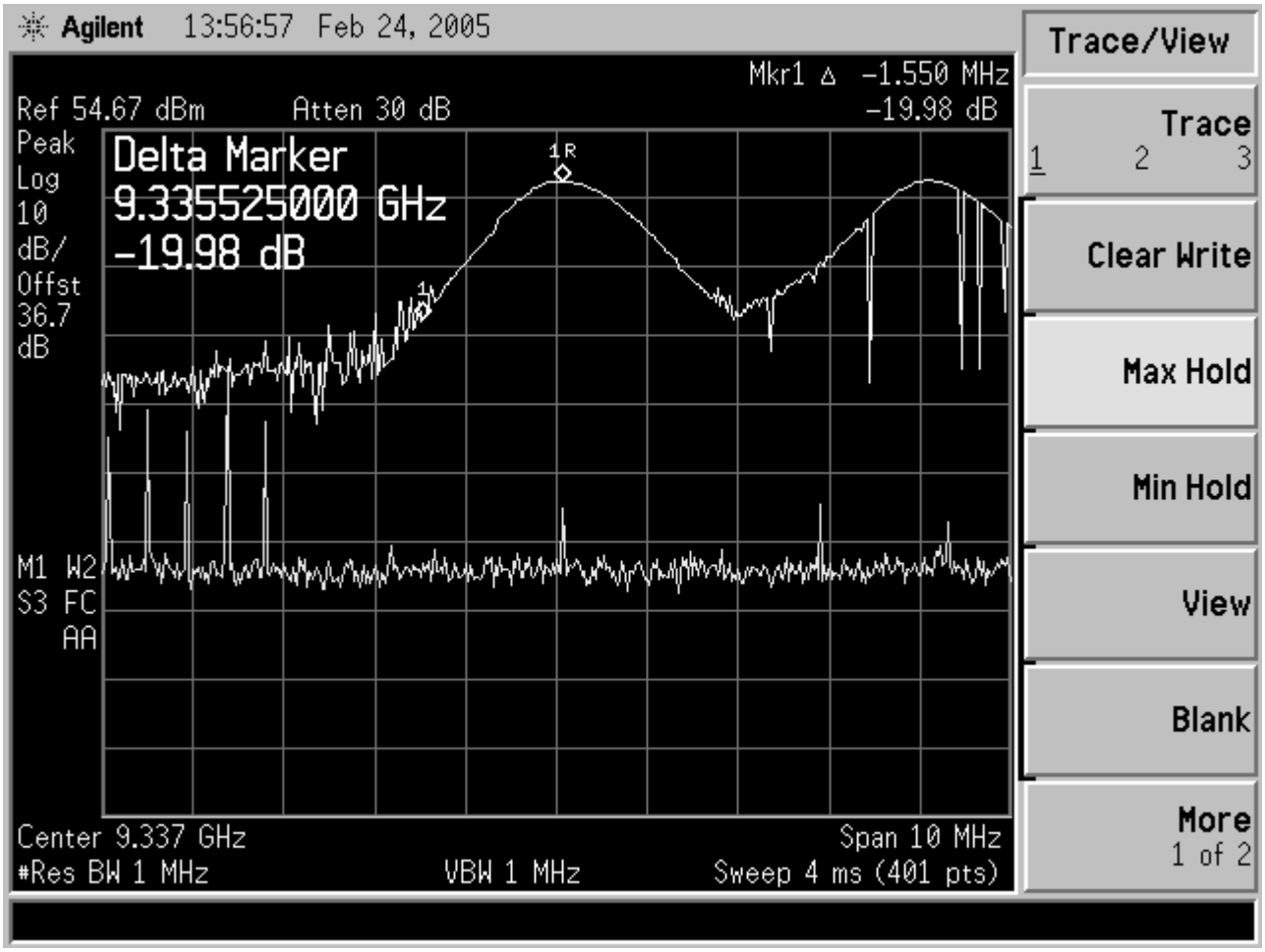

Figure 11-50 Frequency Stability, 170 Vdc Lower Edge @ -20C

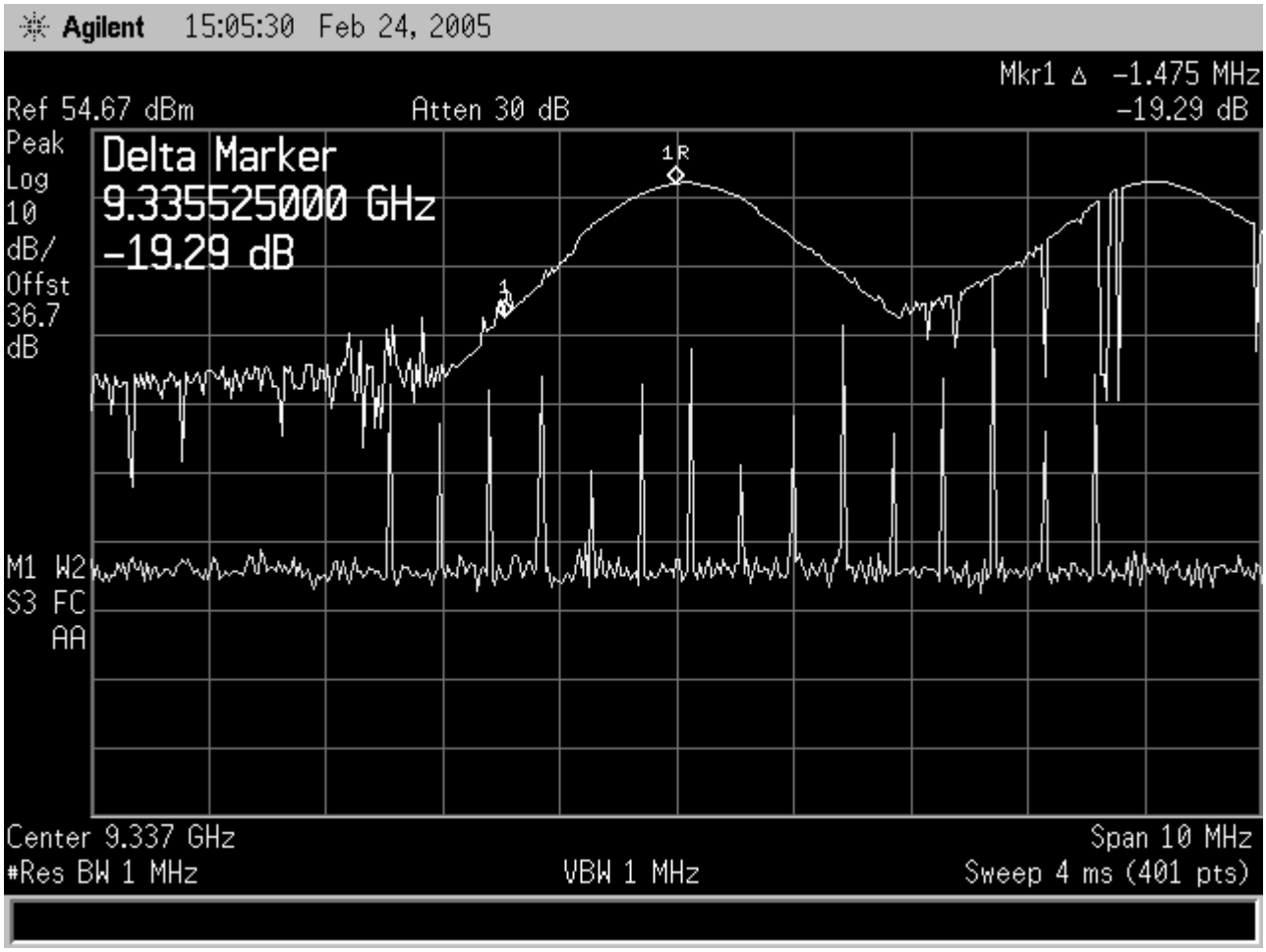

Figure 11-51 Frequency Stability, 170 Vdc Lower Edge @ -10C

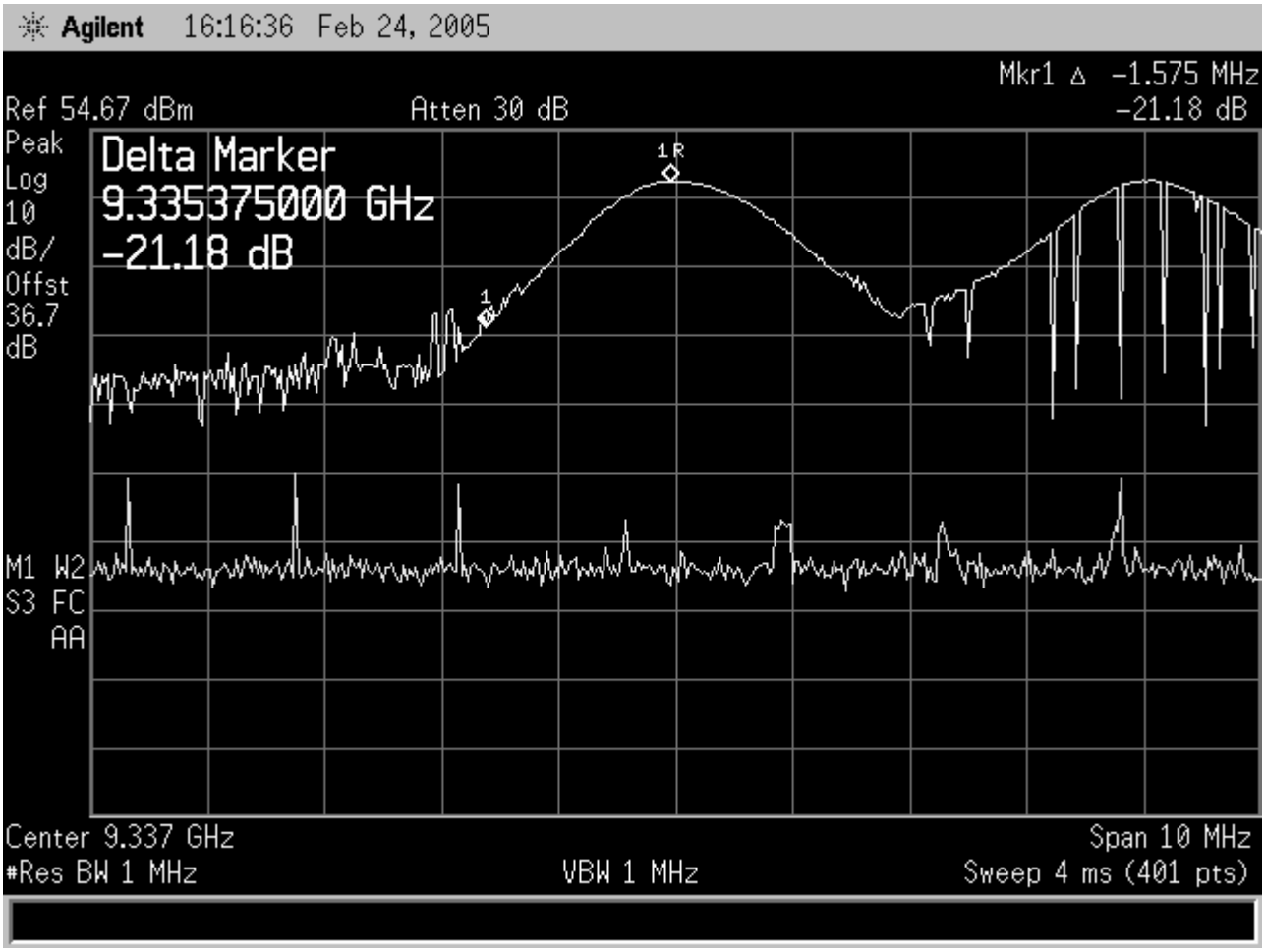

Figure 11-52 Frequency Stability, 170 Vdc Lower Edge @ 0C

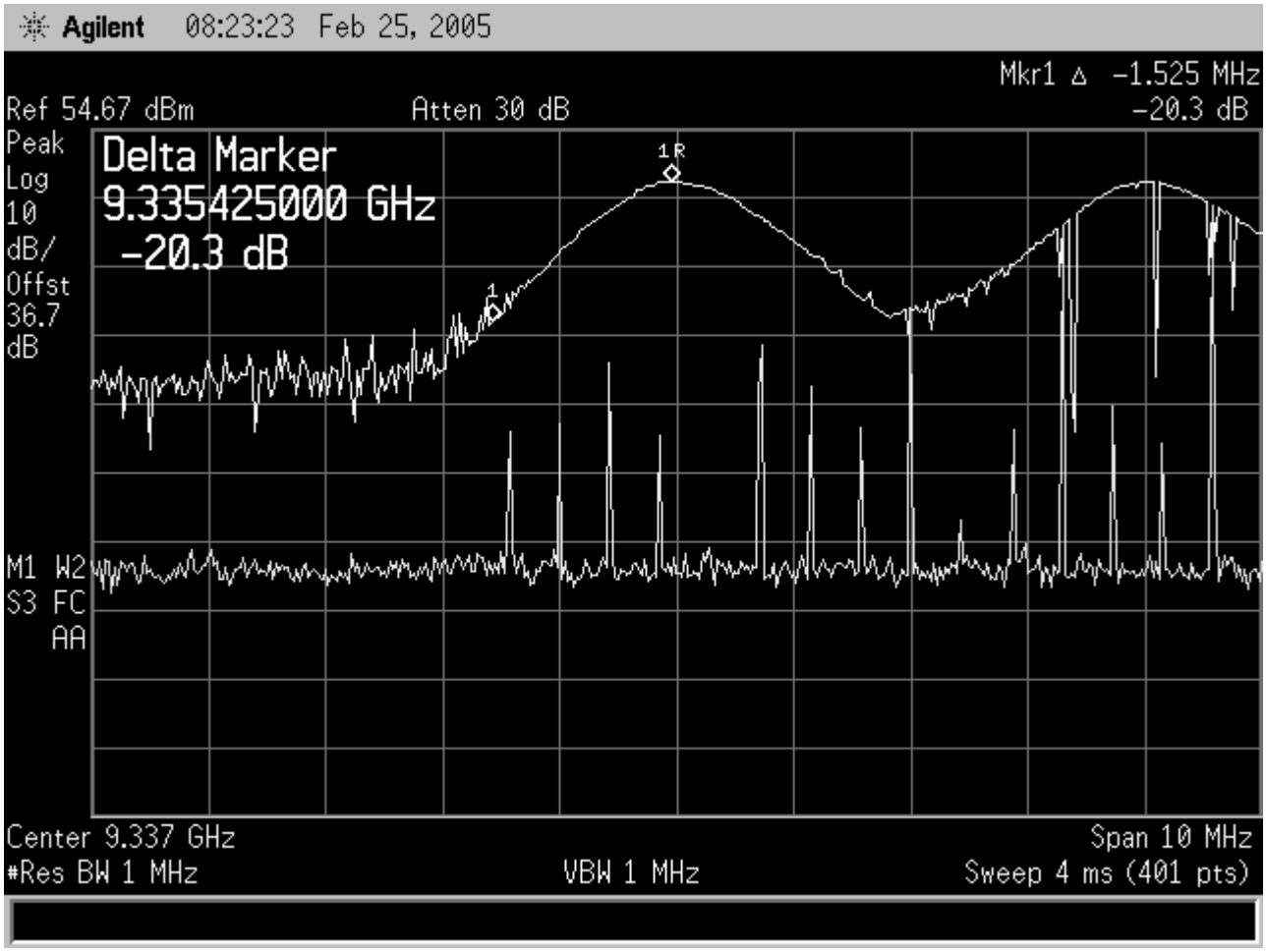

Figure 11-53 Frequency Stability, 170 Vdc Lower Edge @ +10C

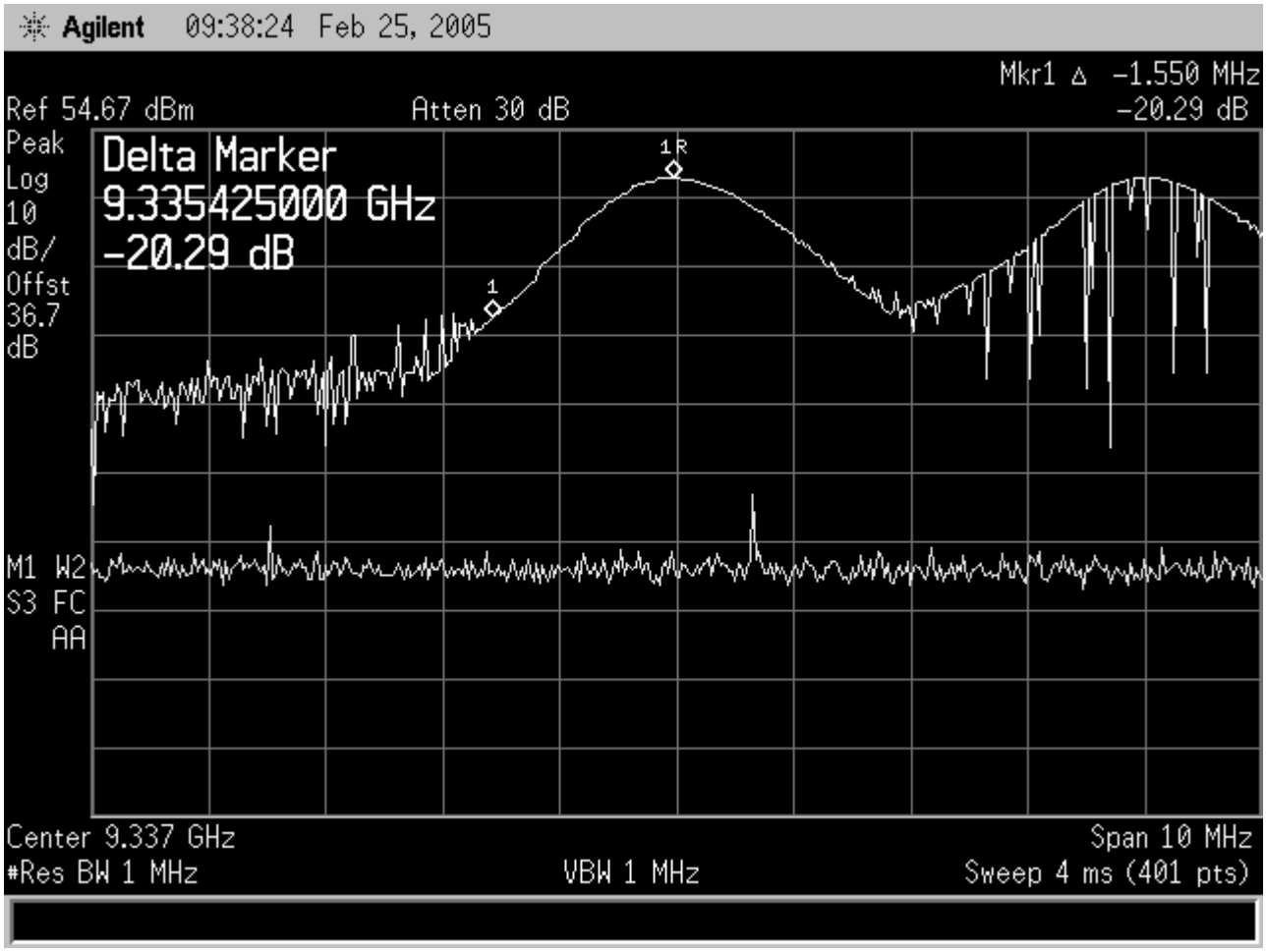

Figure 11-54 Frequency Stability, 170 Vdc Lower Edge @ +20C

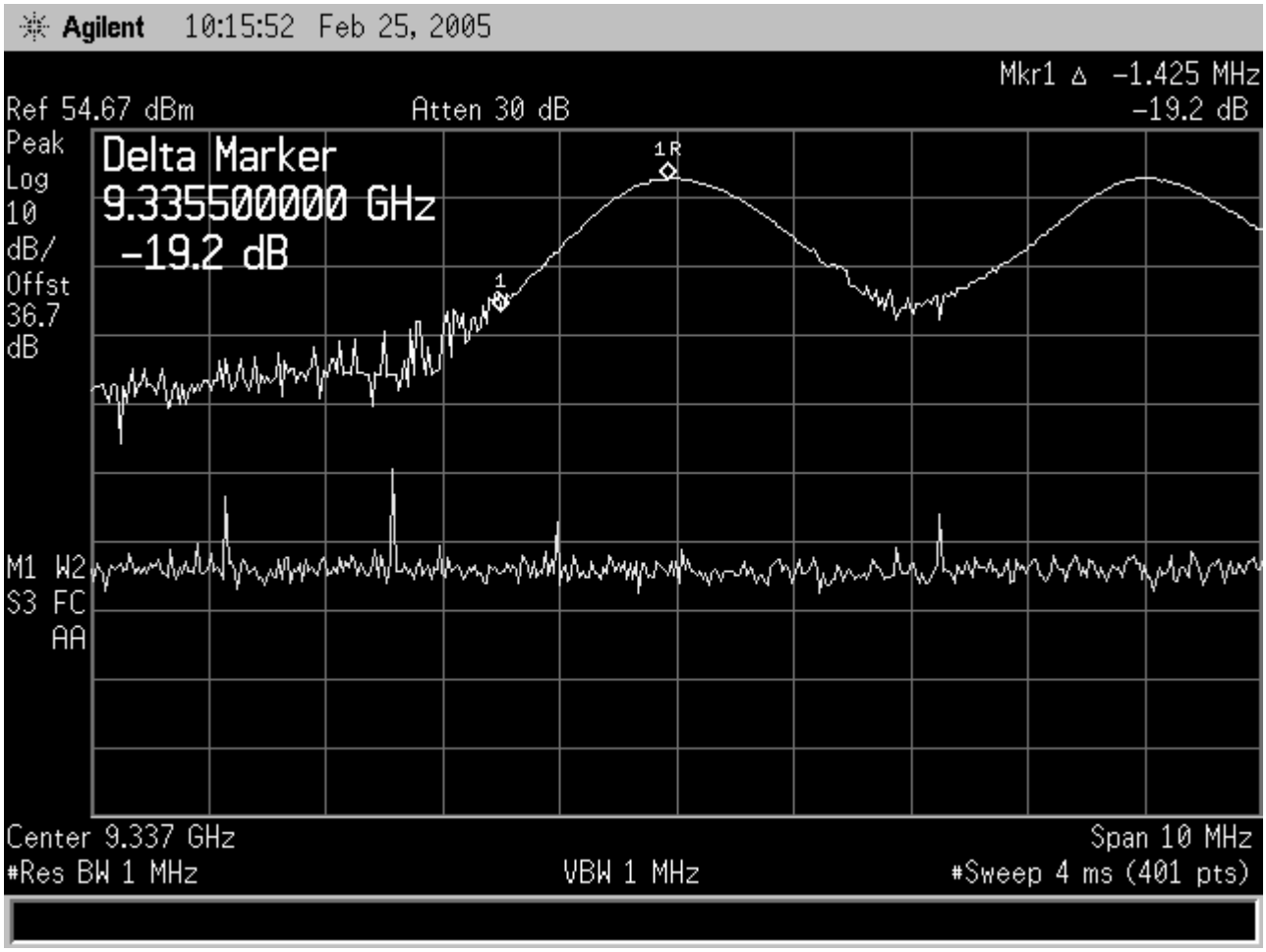

Figure 11-55 Frequency Stability, 170 Vdc Lower Edge @ +30C

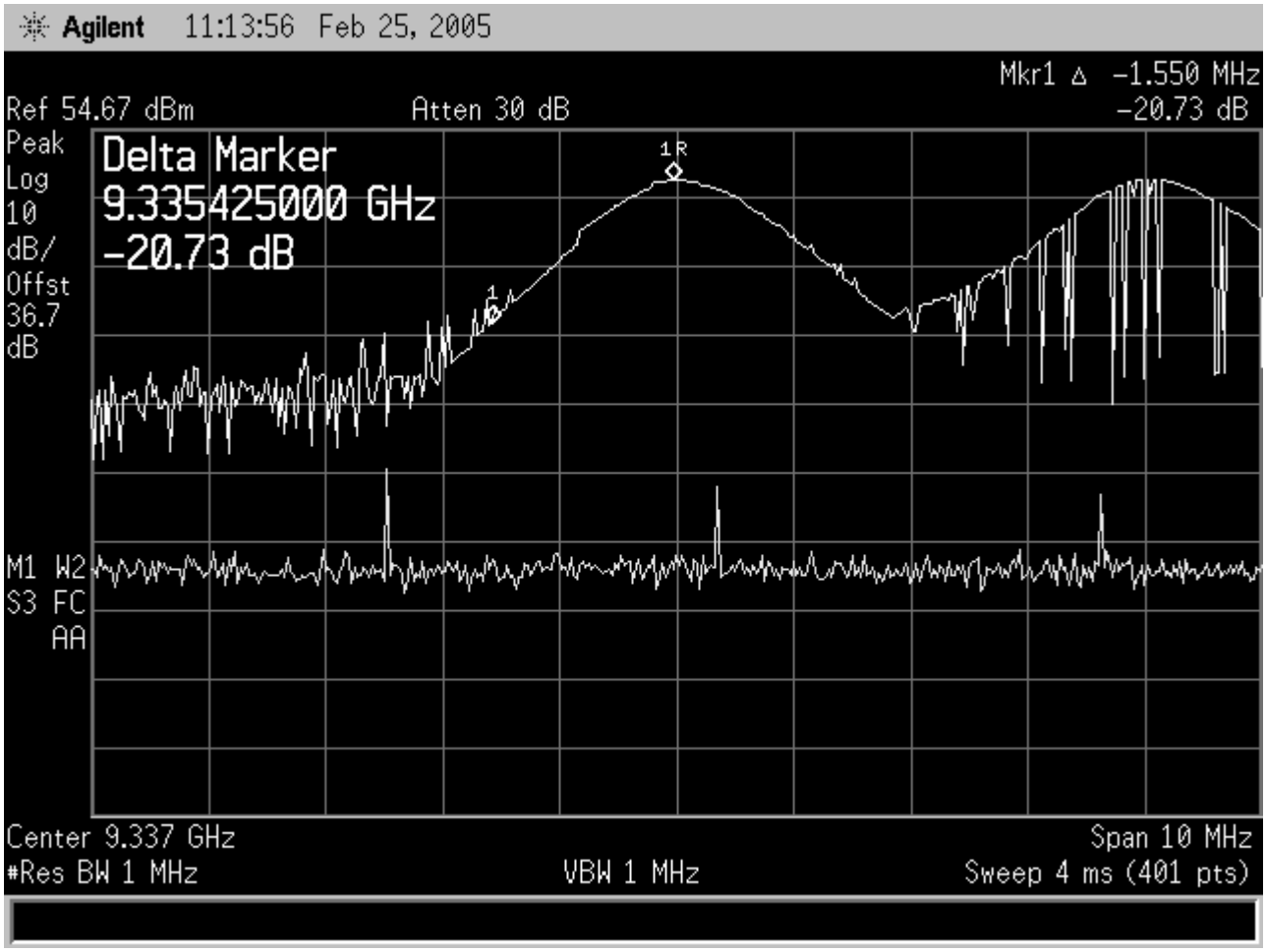

Figure 11-56 Frequency Stability, 170 Vdc Lower Edge @ +40C

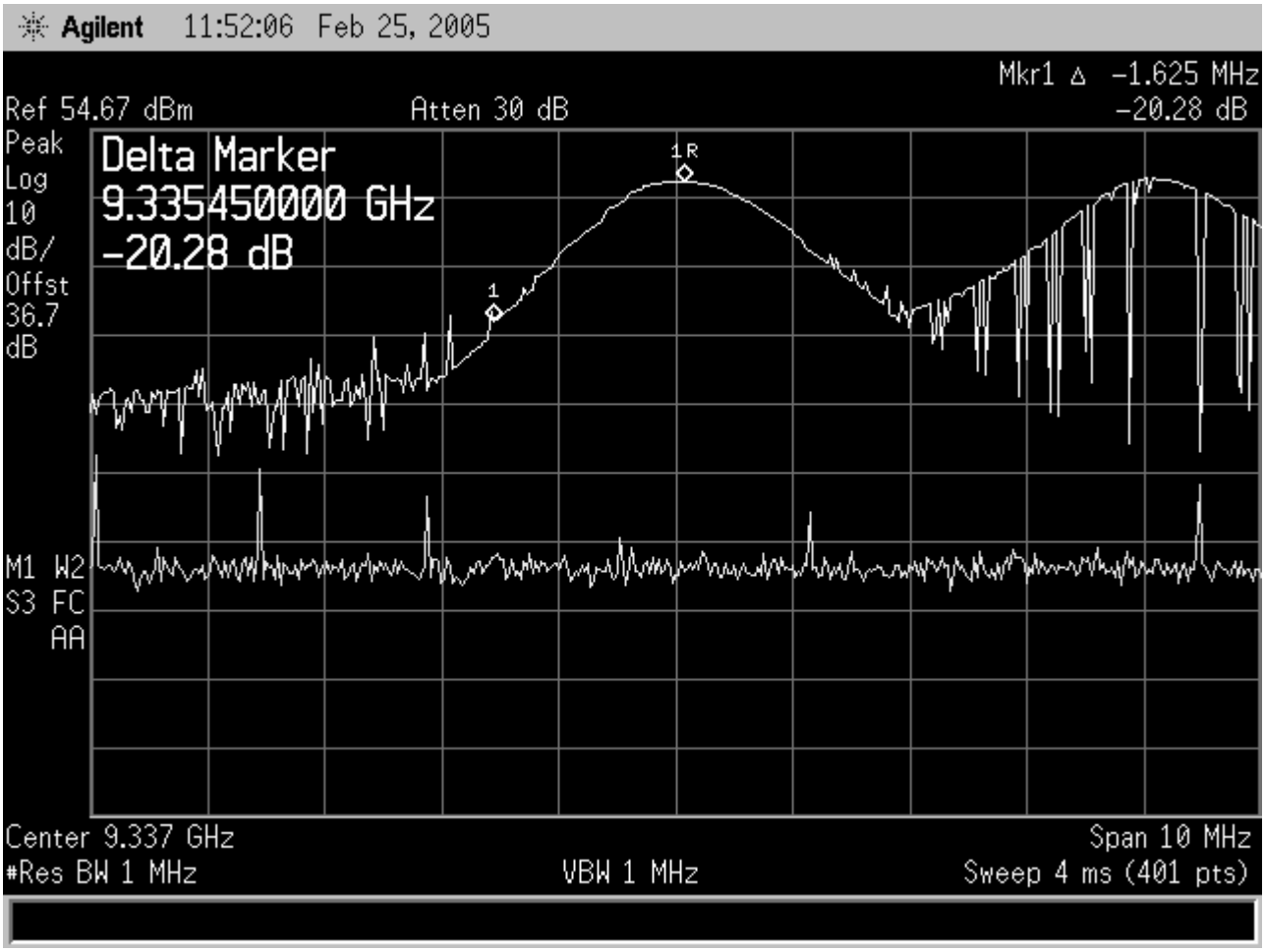

Figure 11-57 Frequency Stability, 170 Vdc Lower Edge @ +50C

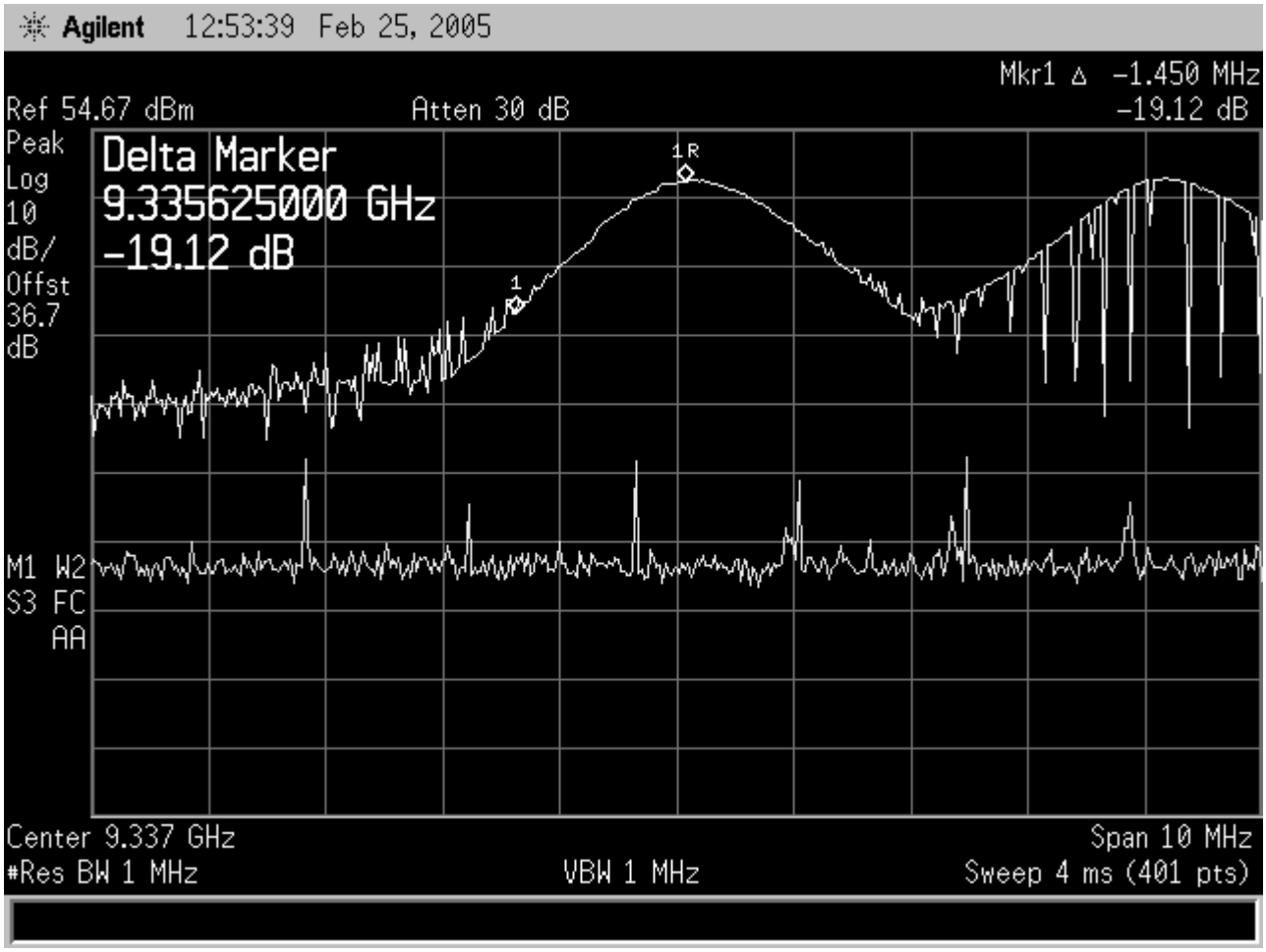

Figure 11-58 Frequency Stability, 170 Vdc Lower Edge @ +60C

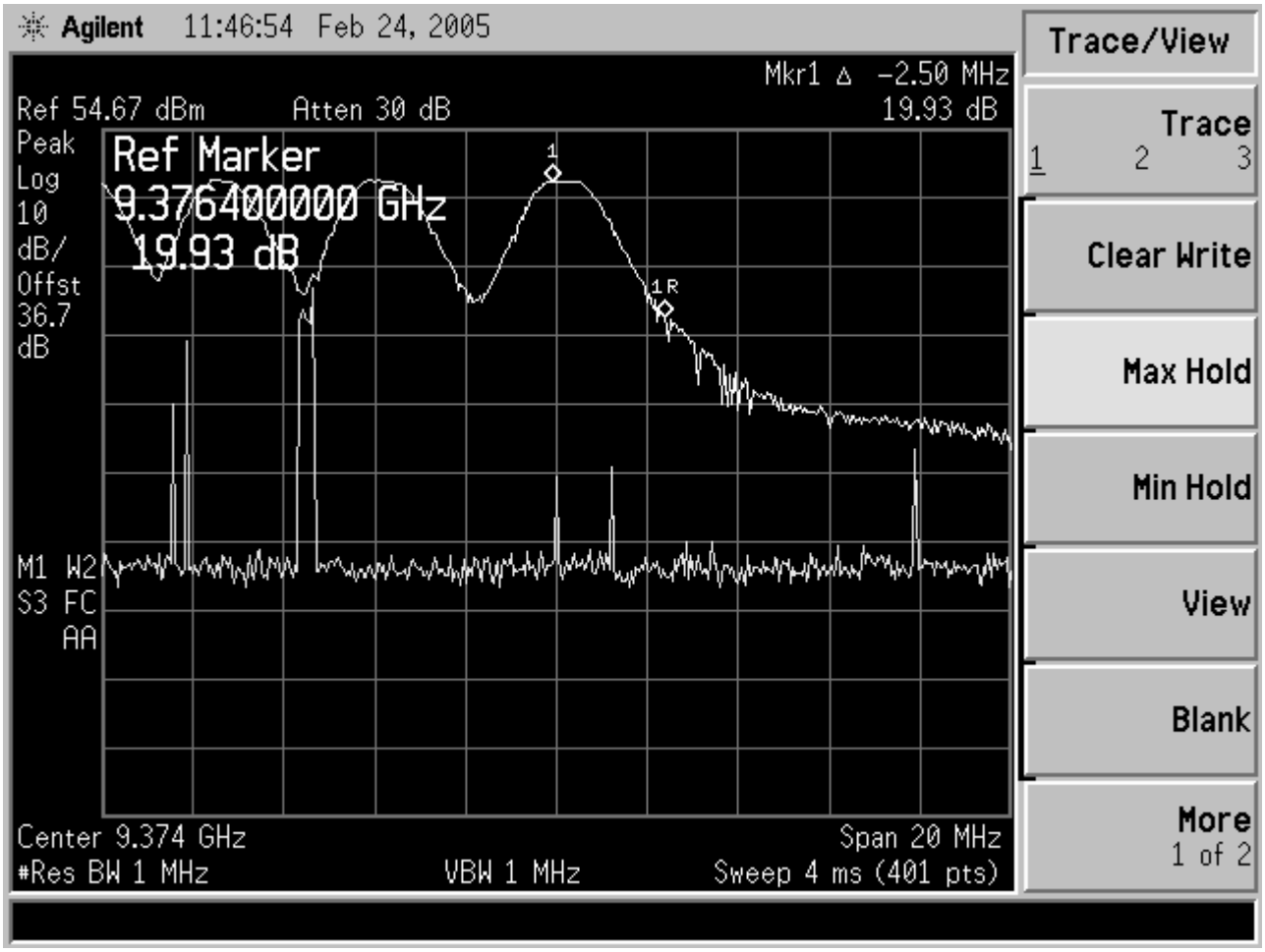

Figure 11-59 Frequency Stability, 170 Vdc Upper Edge @ -40C

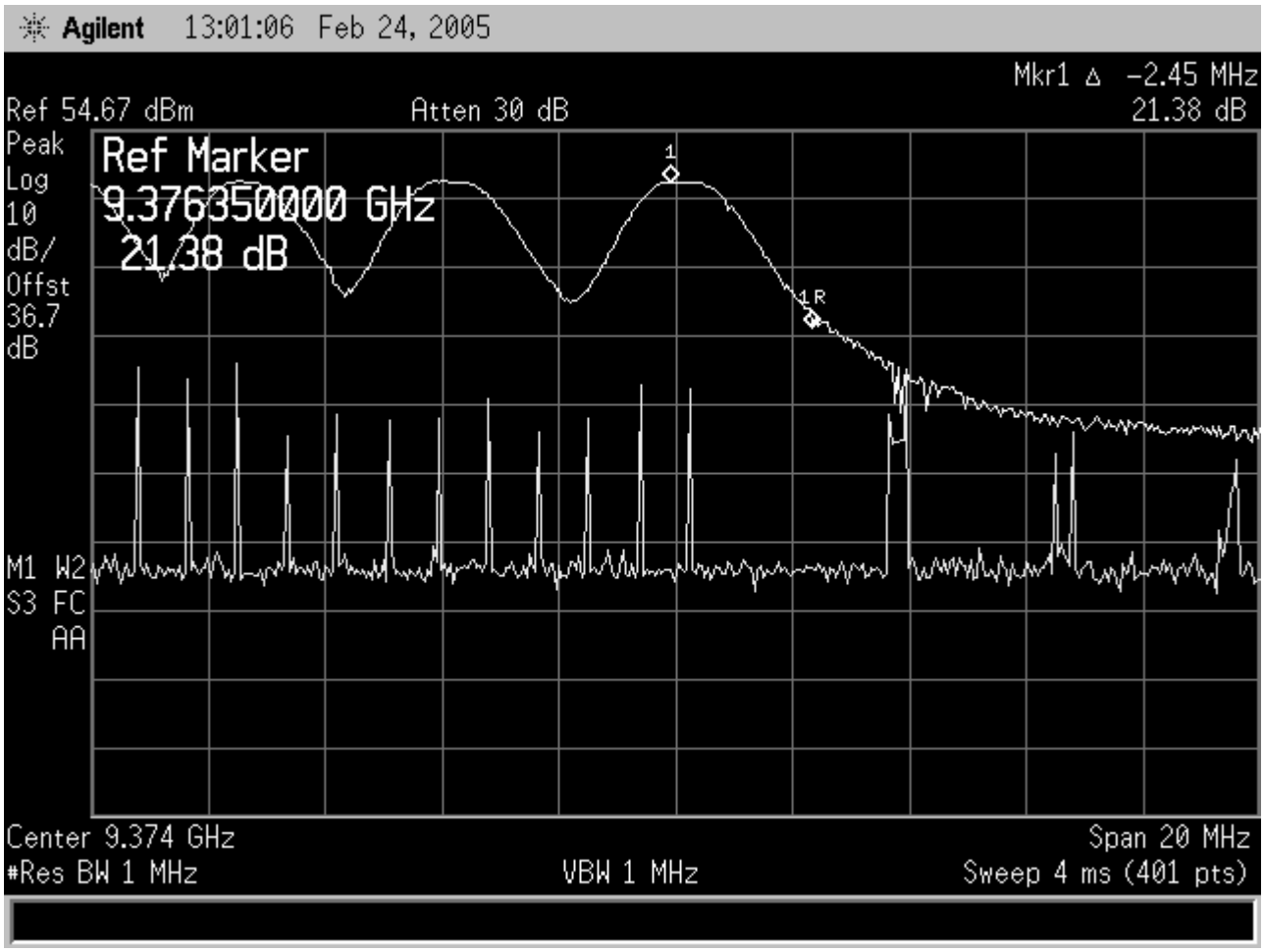

Figure 11-60 Frequency Stability, 170 Vdc Upper Edge @ -30C

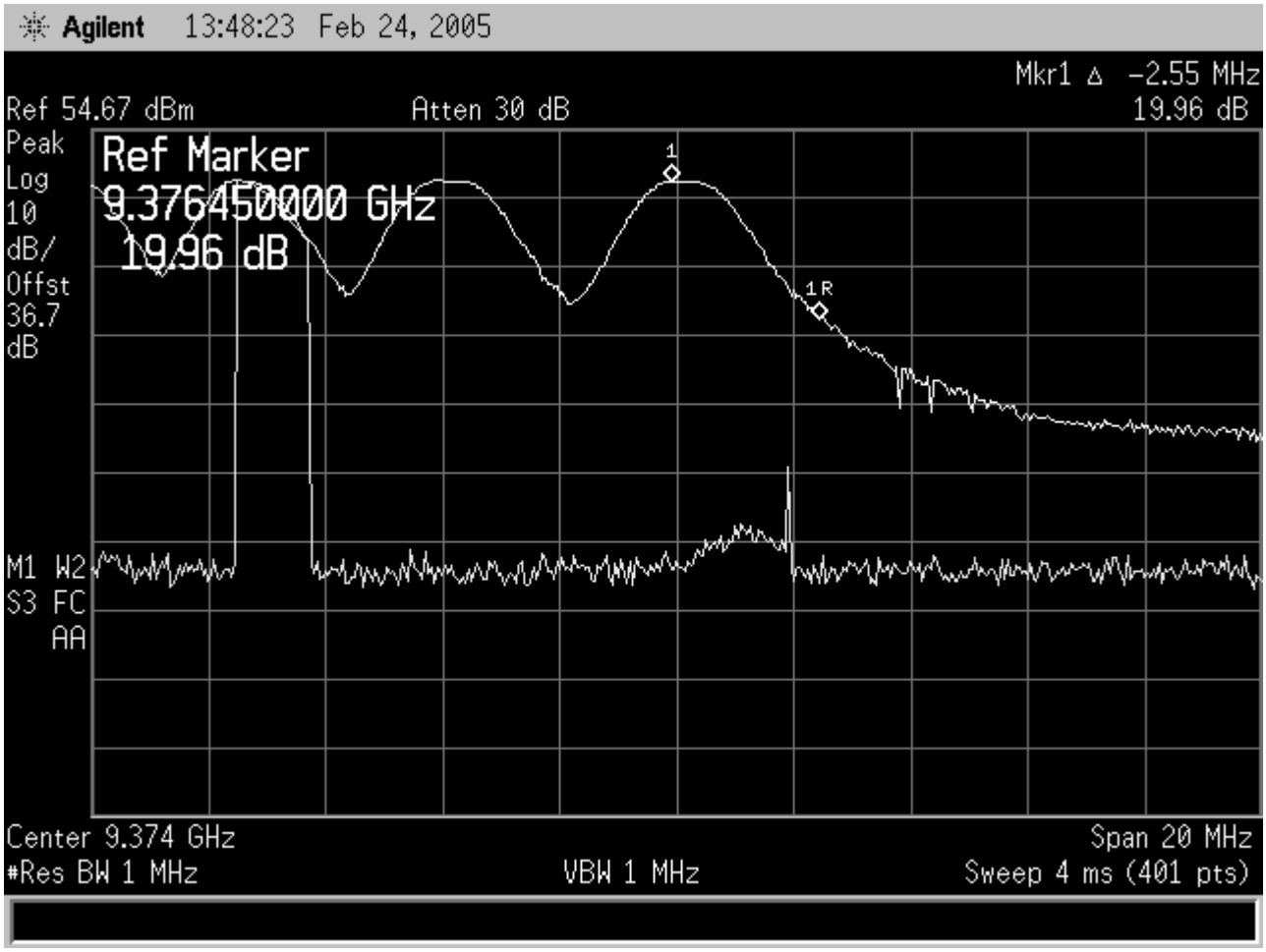

Figure 11-61 Frequency Stability, 170 Vdc Upper Edge @ -20C

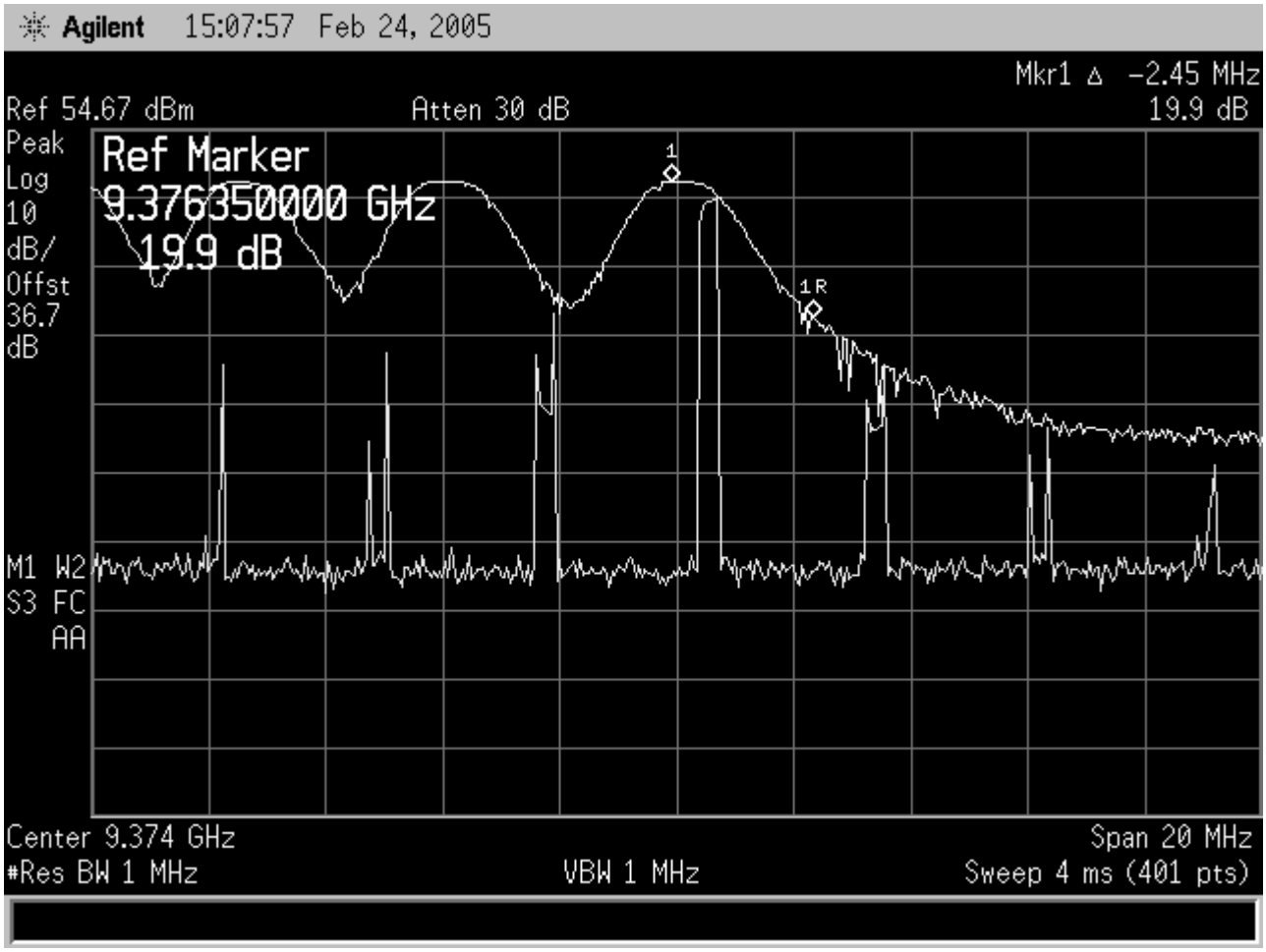

Figure 11-62 Frequency Stability, 170 Vdc Upper Edge @ -10C

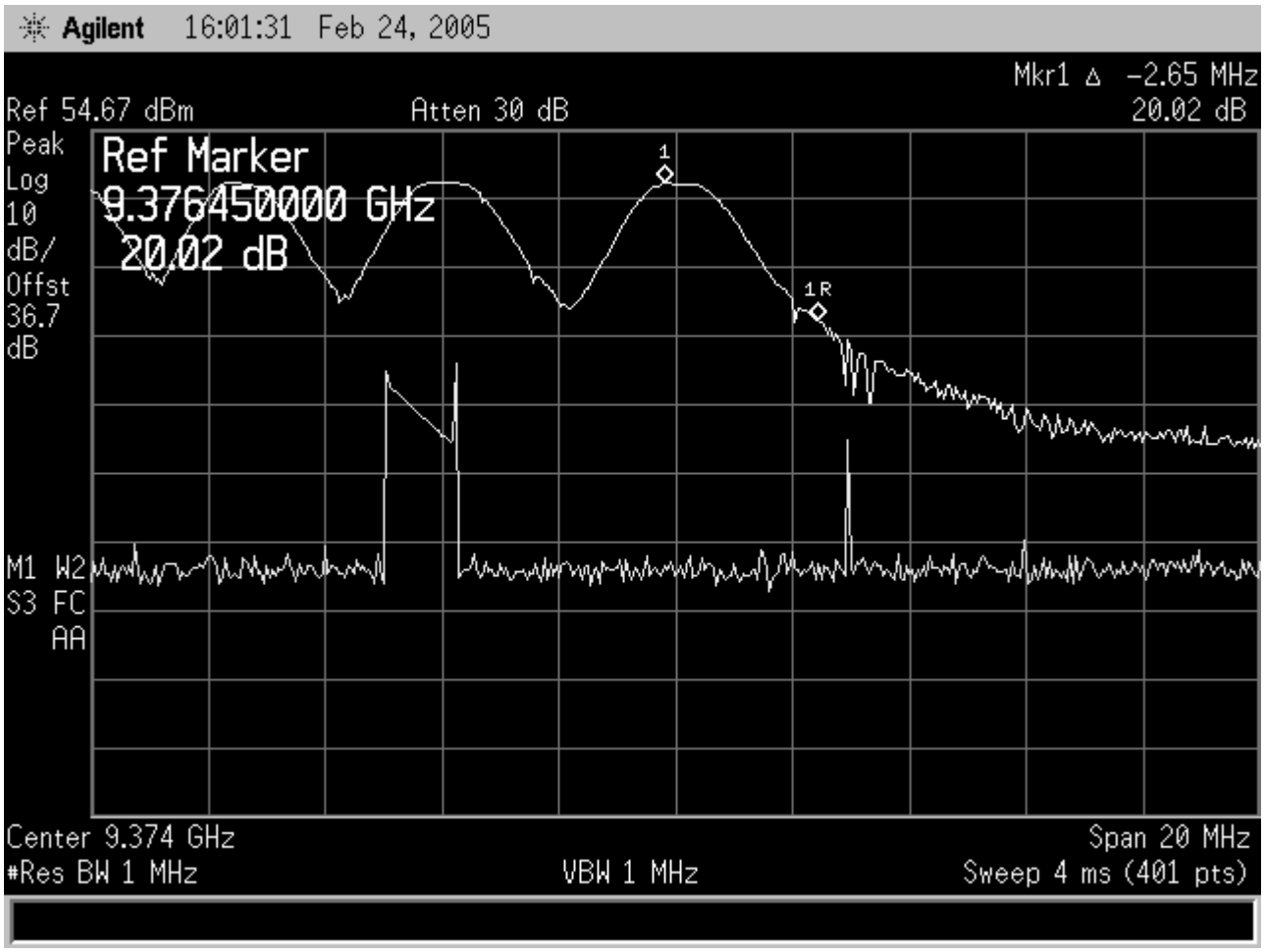

Figure 11-63 Frequency Stability, 170 Vdc Upper Edge @ 0C

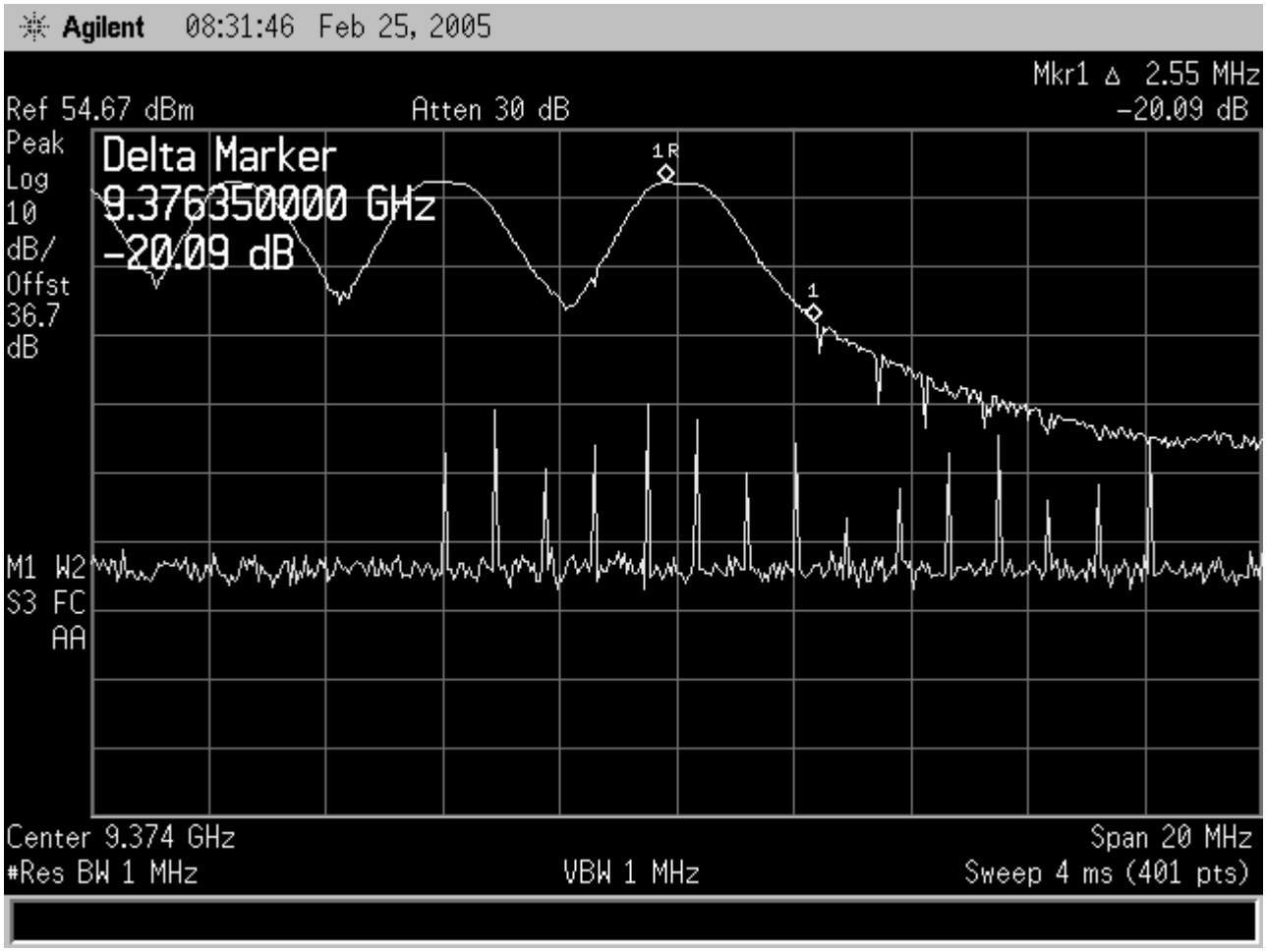

Figure 11-64 Frequency Stability, 170 Vdc Upper Edge @ +10C

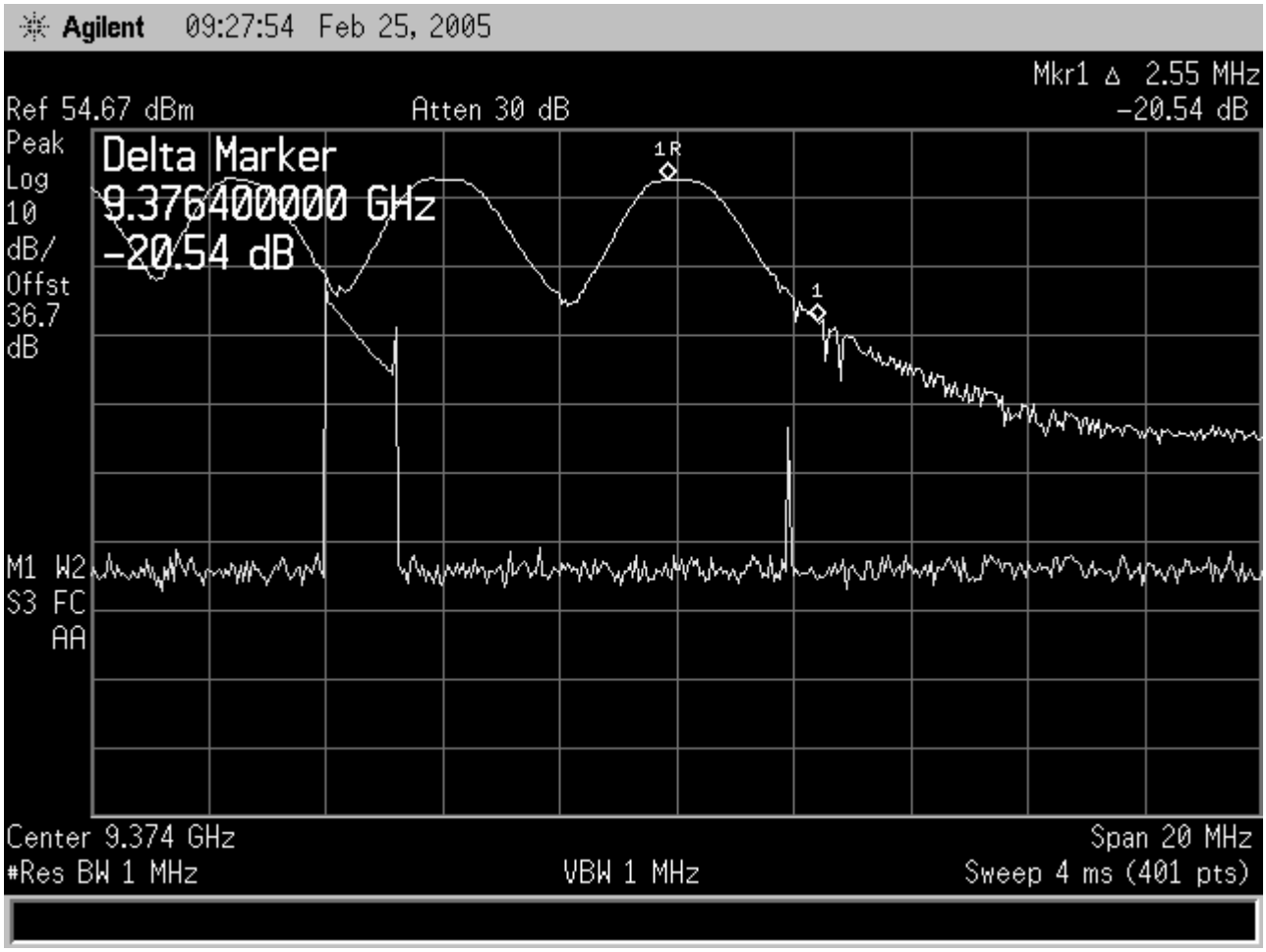

Figure 11-65 Frequency Stability, 170 Vdc Upper Edge @ +20C

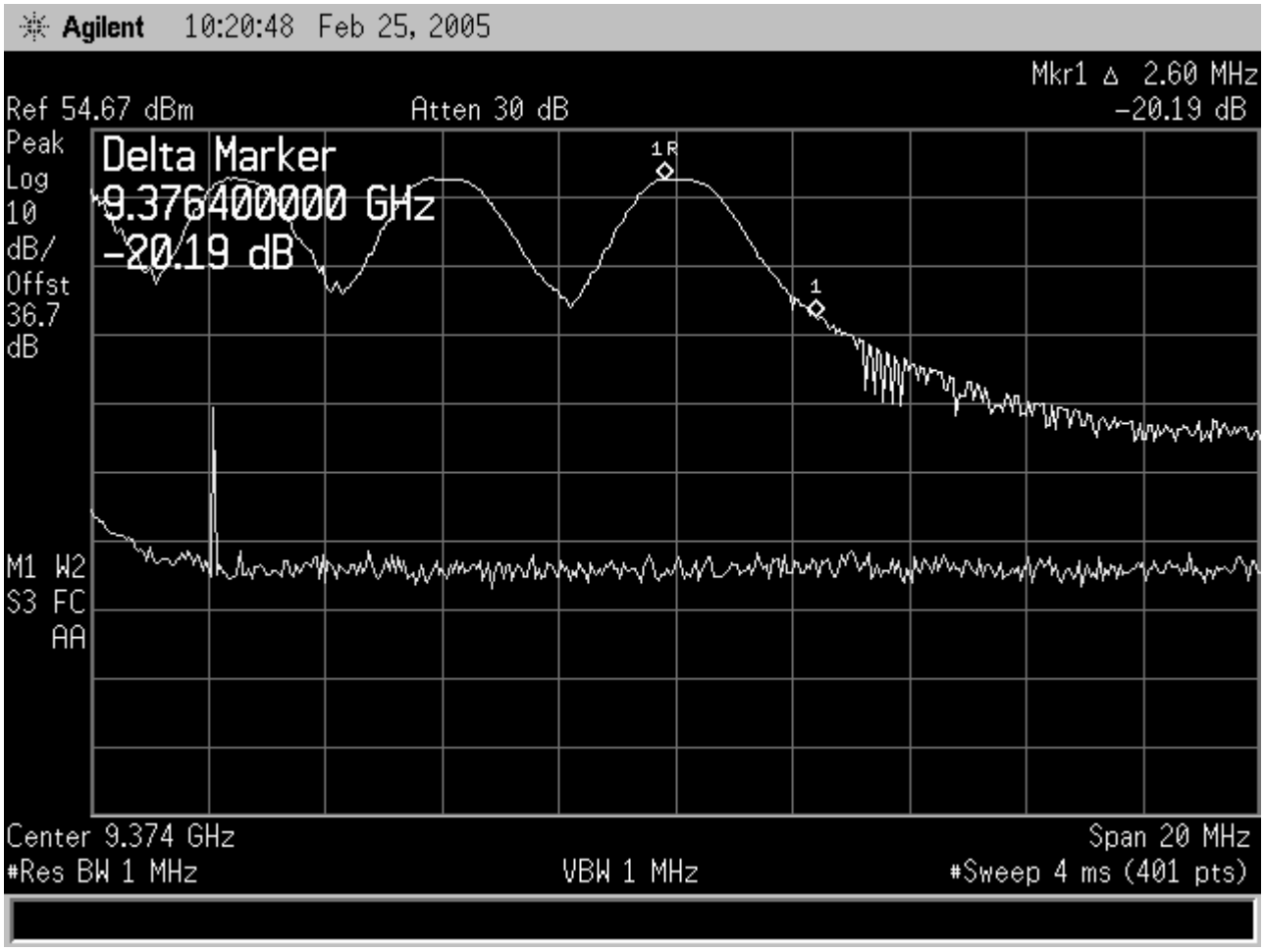

Figure 11-66 Frequency Stability, 170 Vdc Upper Edge @ +30C

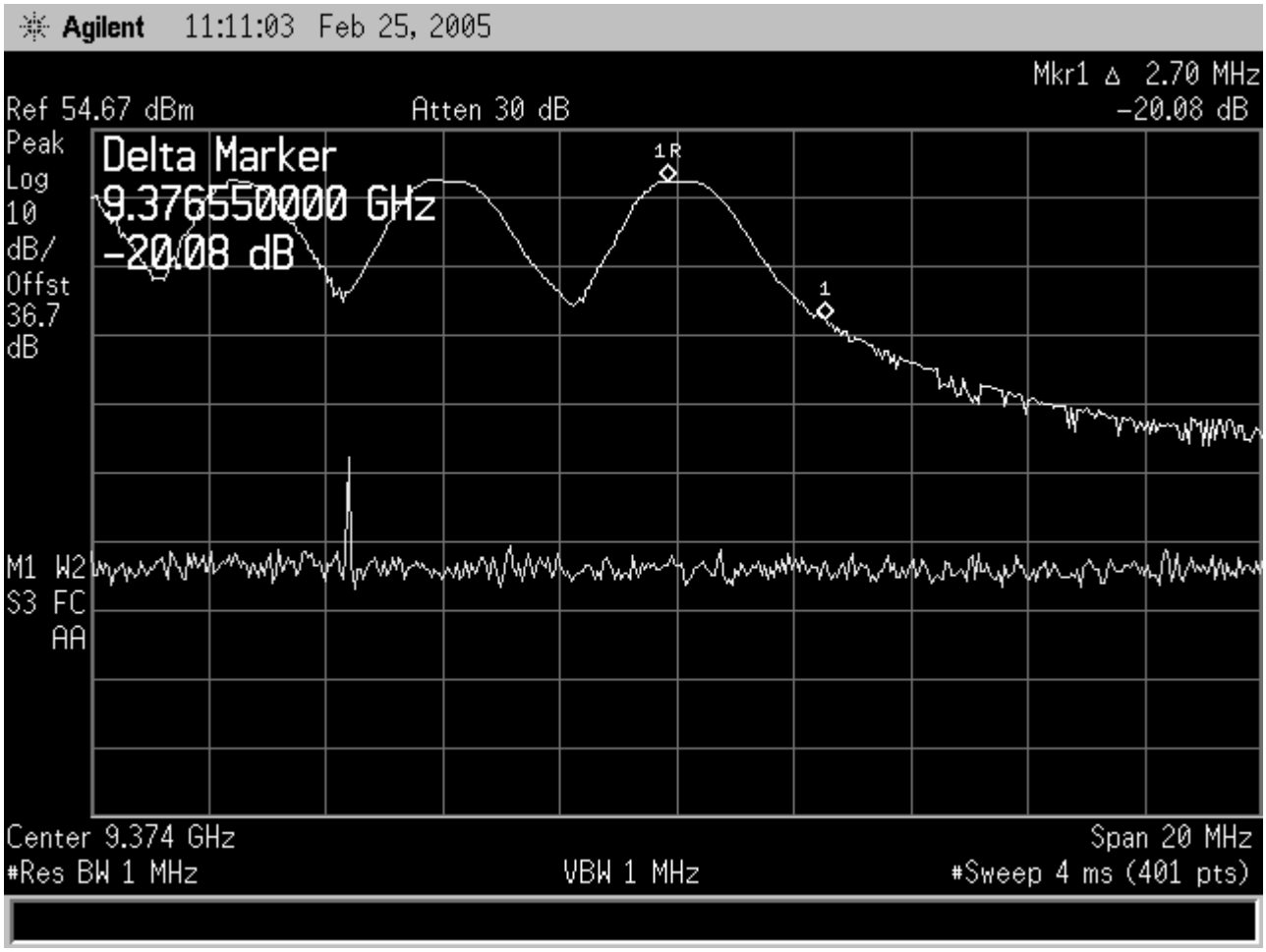

Figure 11-67 Frequency Stability, 170 Vdc Upper Edge @ +40C

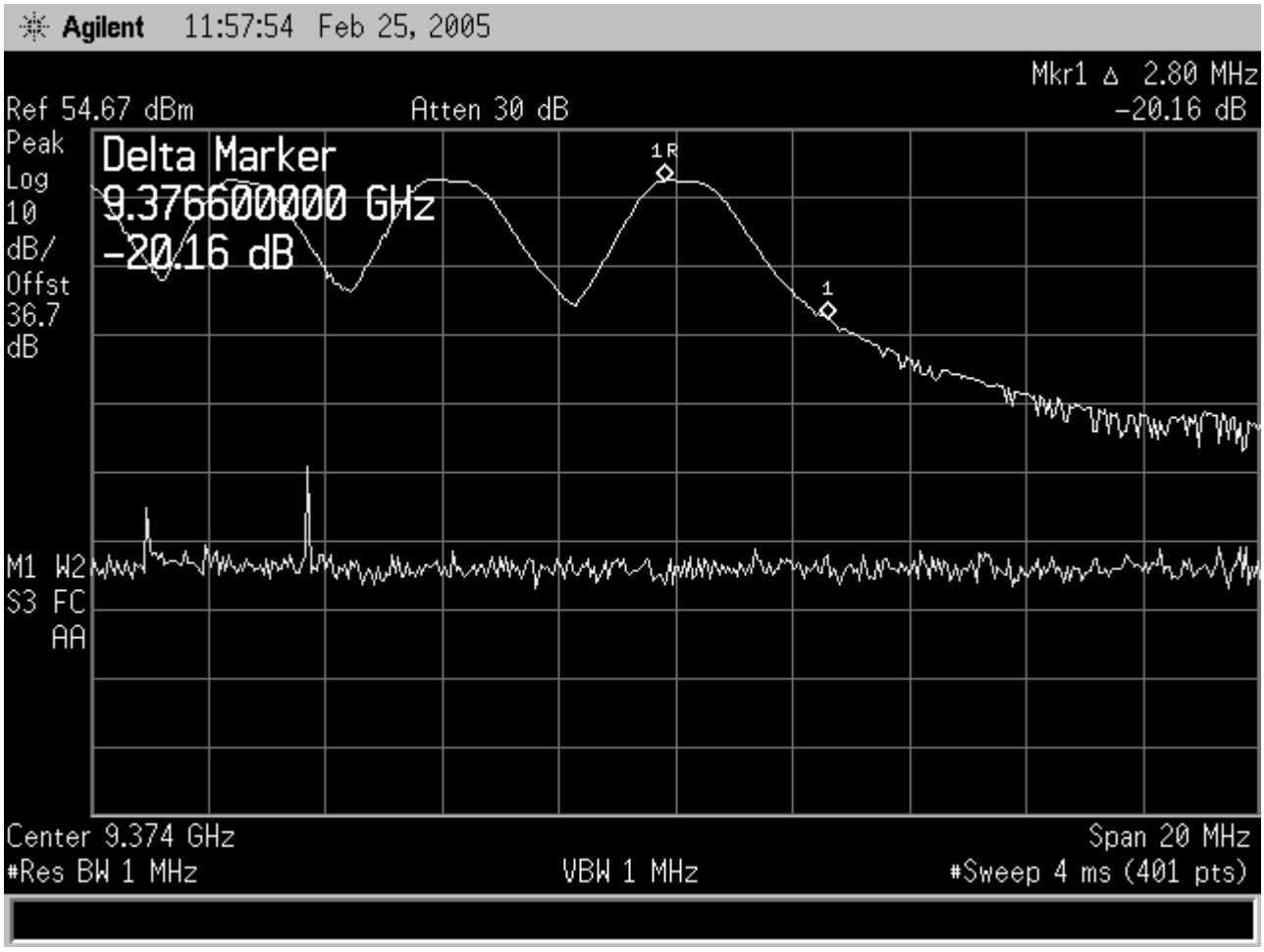

Figure 11-68 Frequency Stability, 170 Vdc Upper Edge @ +50C

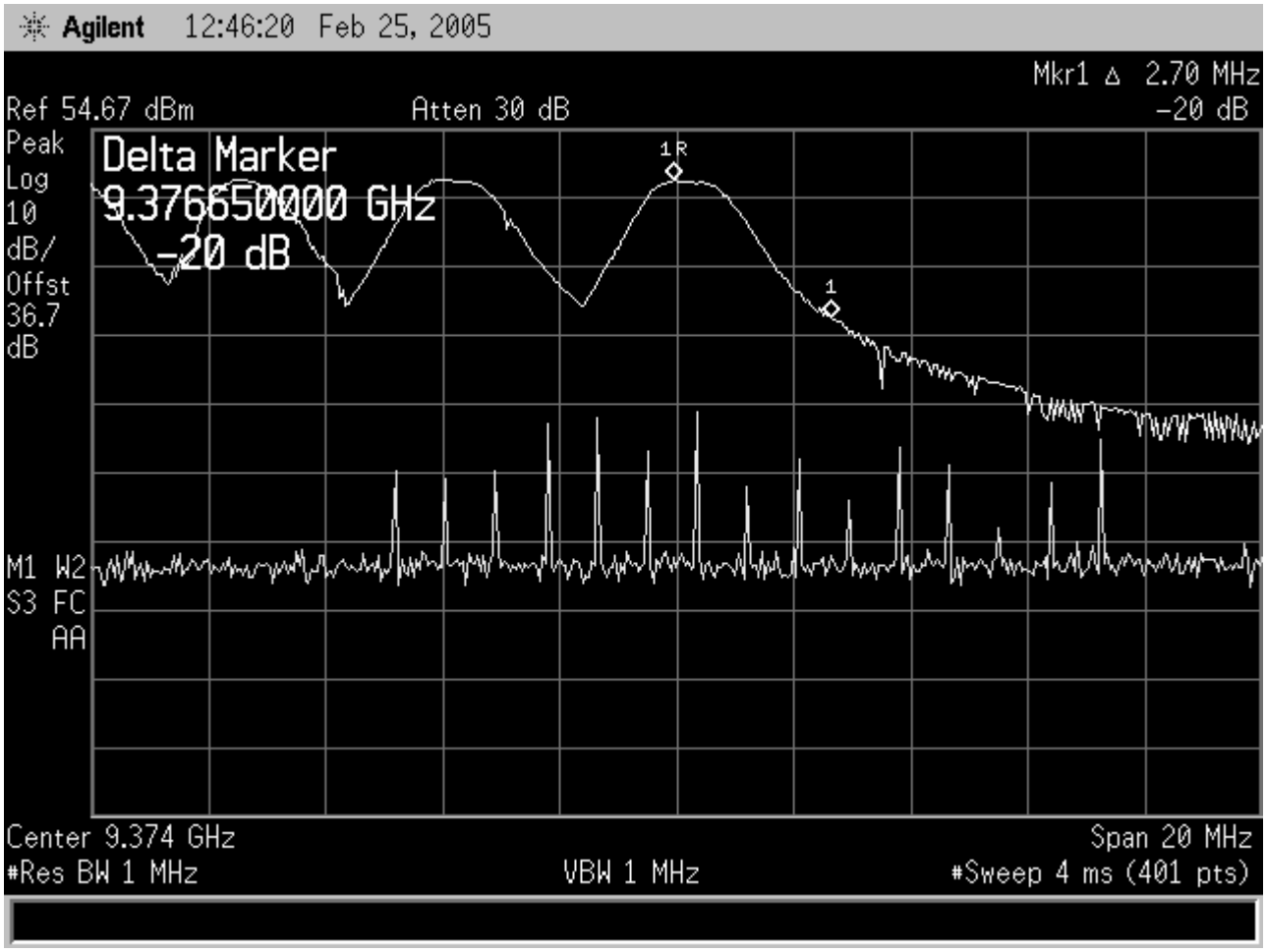

Figure 11-69 Frequency Stability, 170 Vdc Upper Edge @ +60C

11.8.3.2 230 Vdc Input Voltage Data

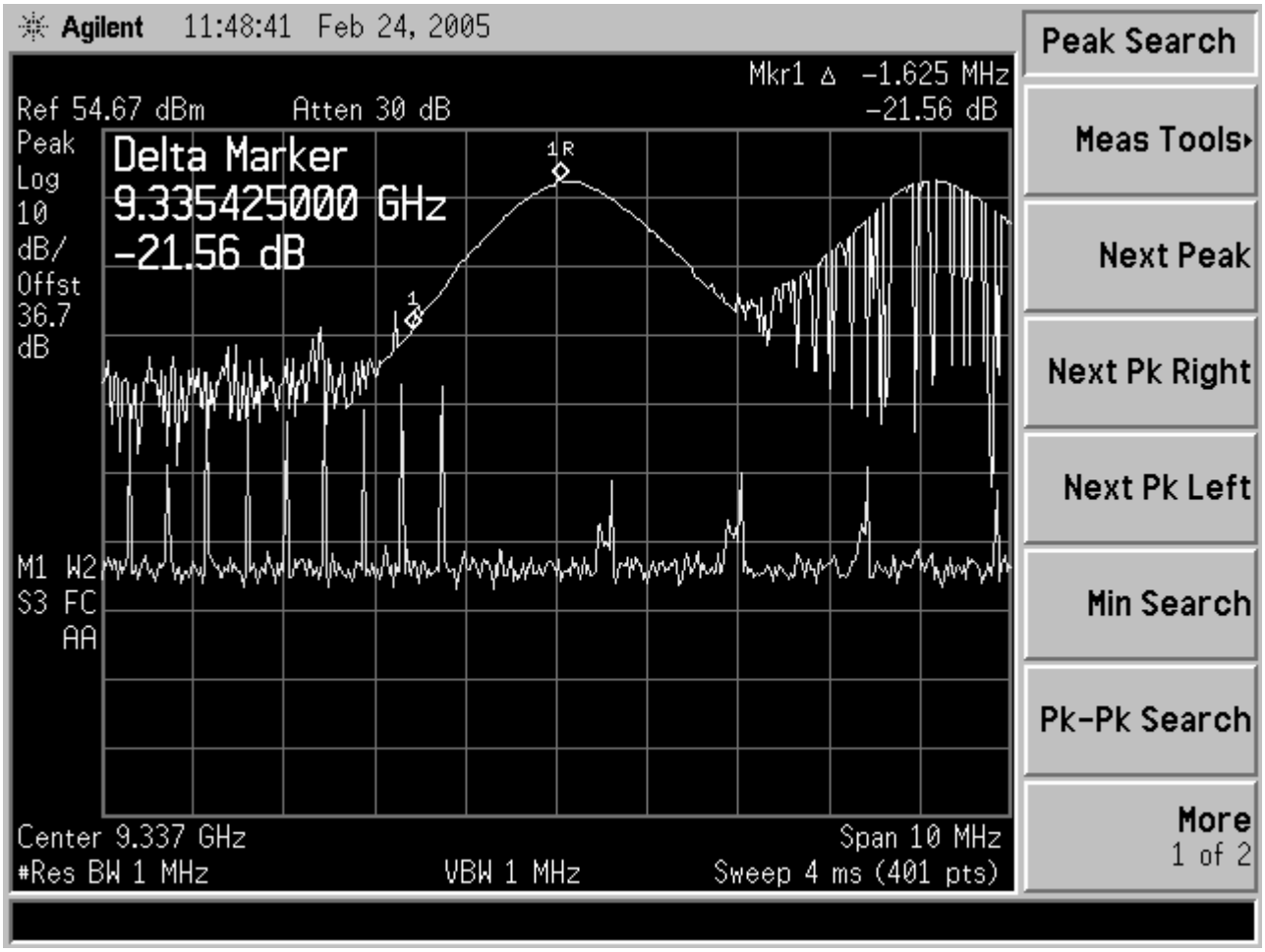

Figure 11-70 Frequency Stability, 230 Vdc Lower Edge @ -40C

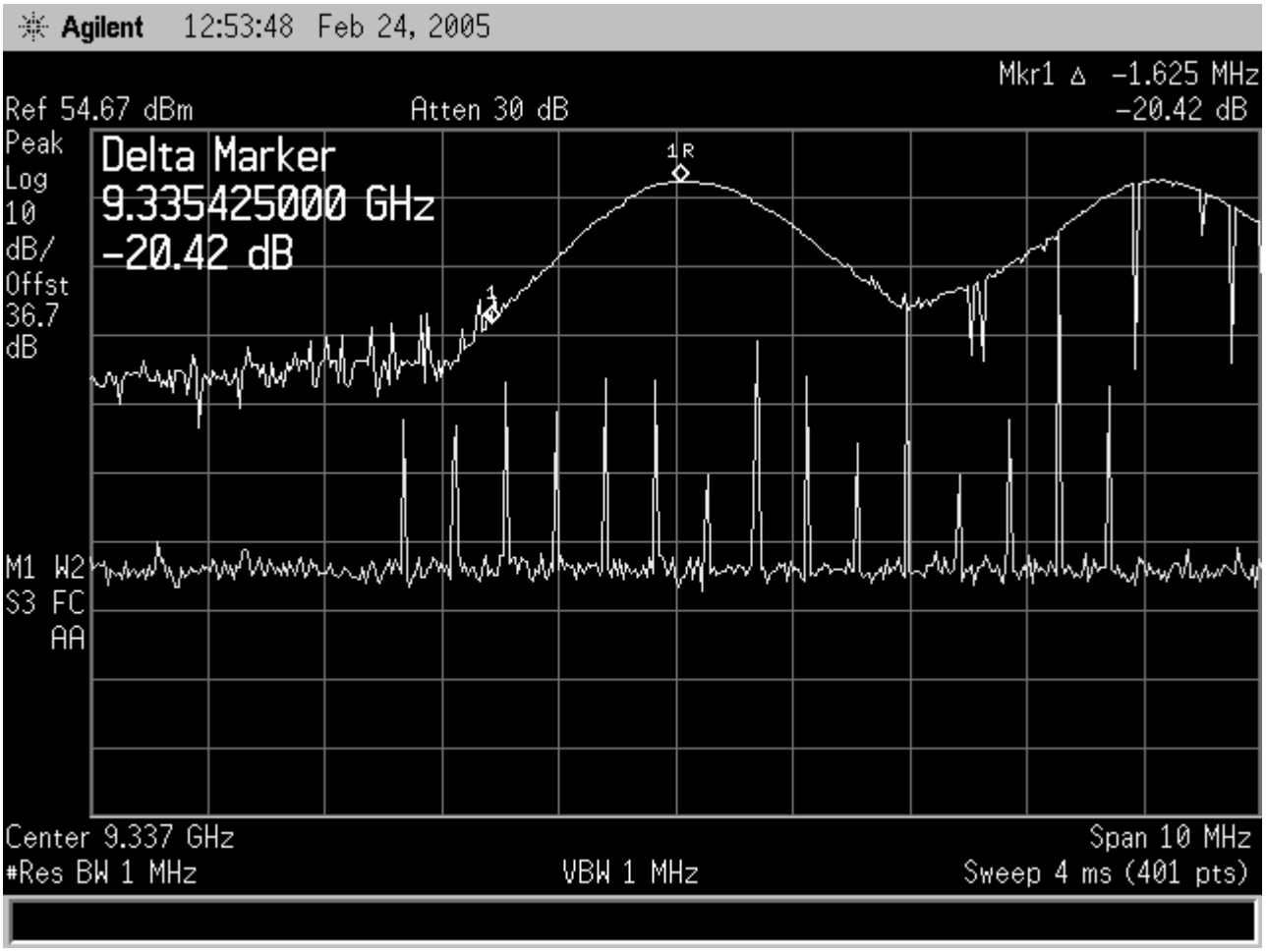

Figure 11-71 Frequency Stability, 230 Vdc Lower Edge @ -30C

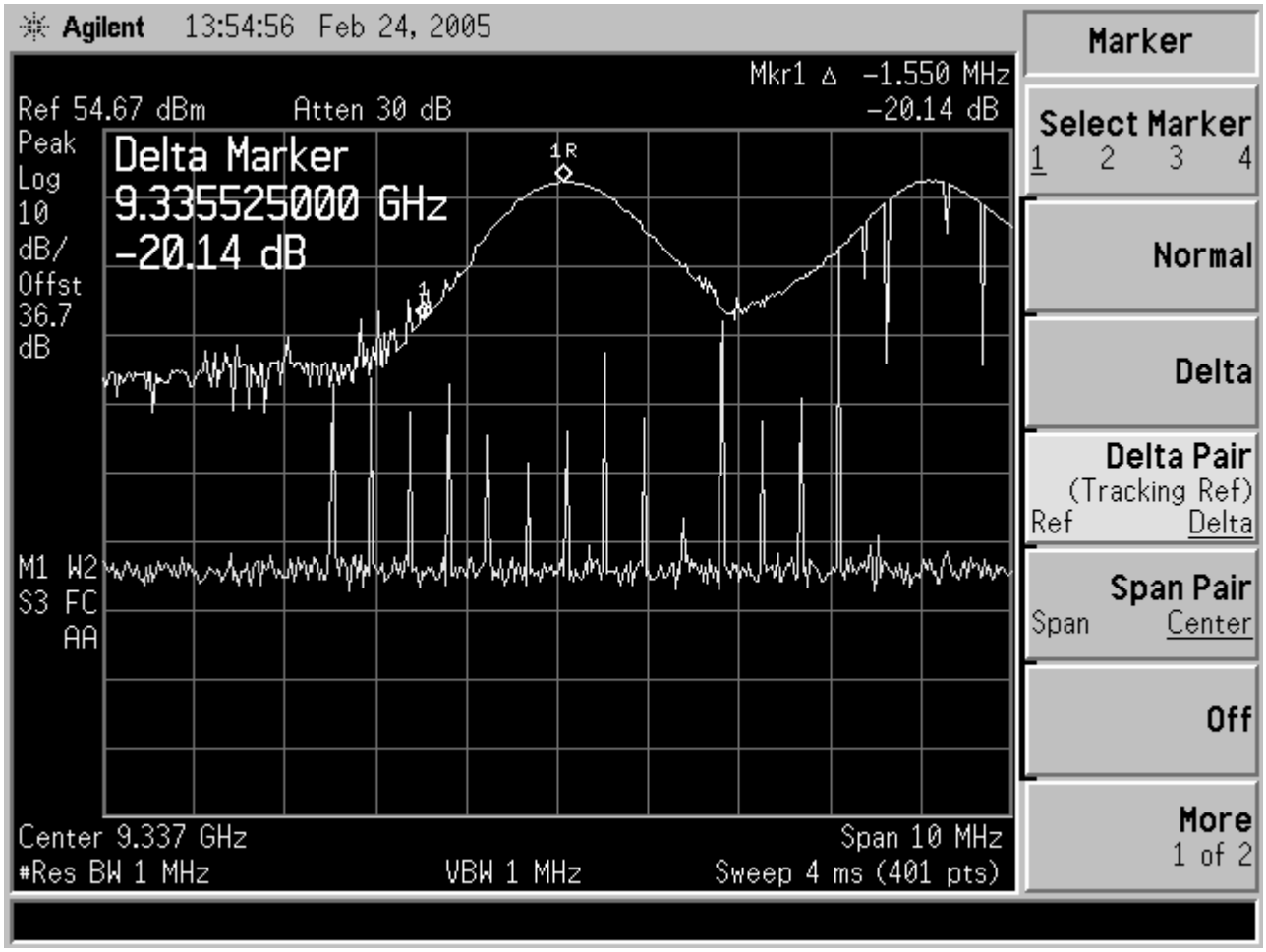

Figure 11-72 Frequency Stability, 230 Vdc Lower Edge @ -20C

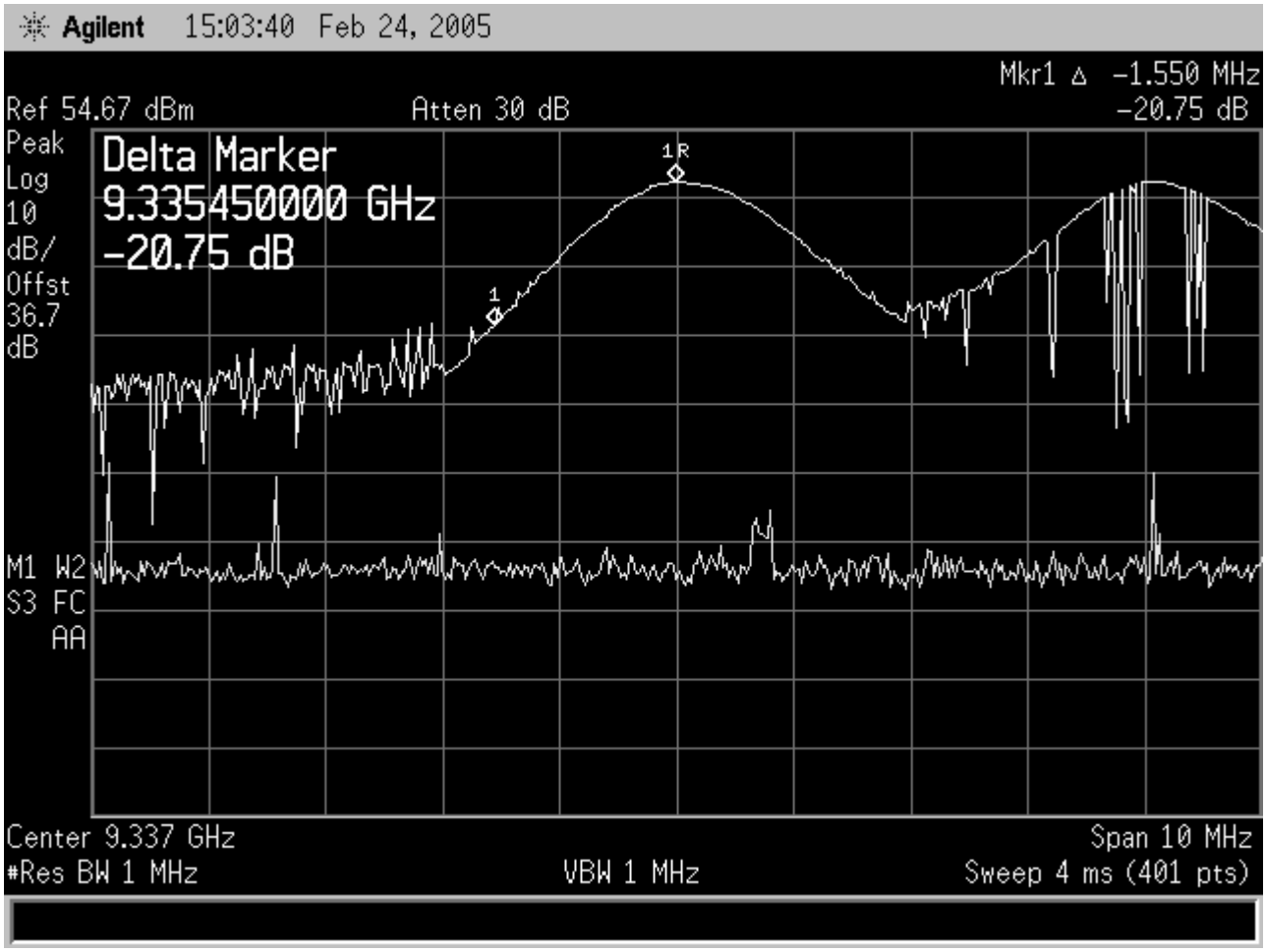

Figure 11-73 Frequency Stability, 230 Vdc Lower Edge @ -10C

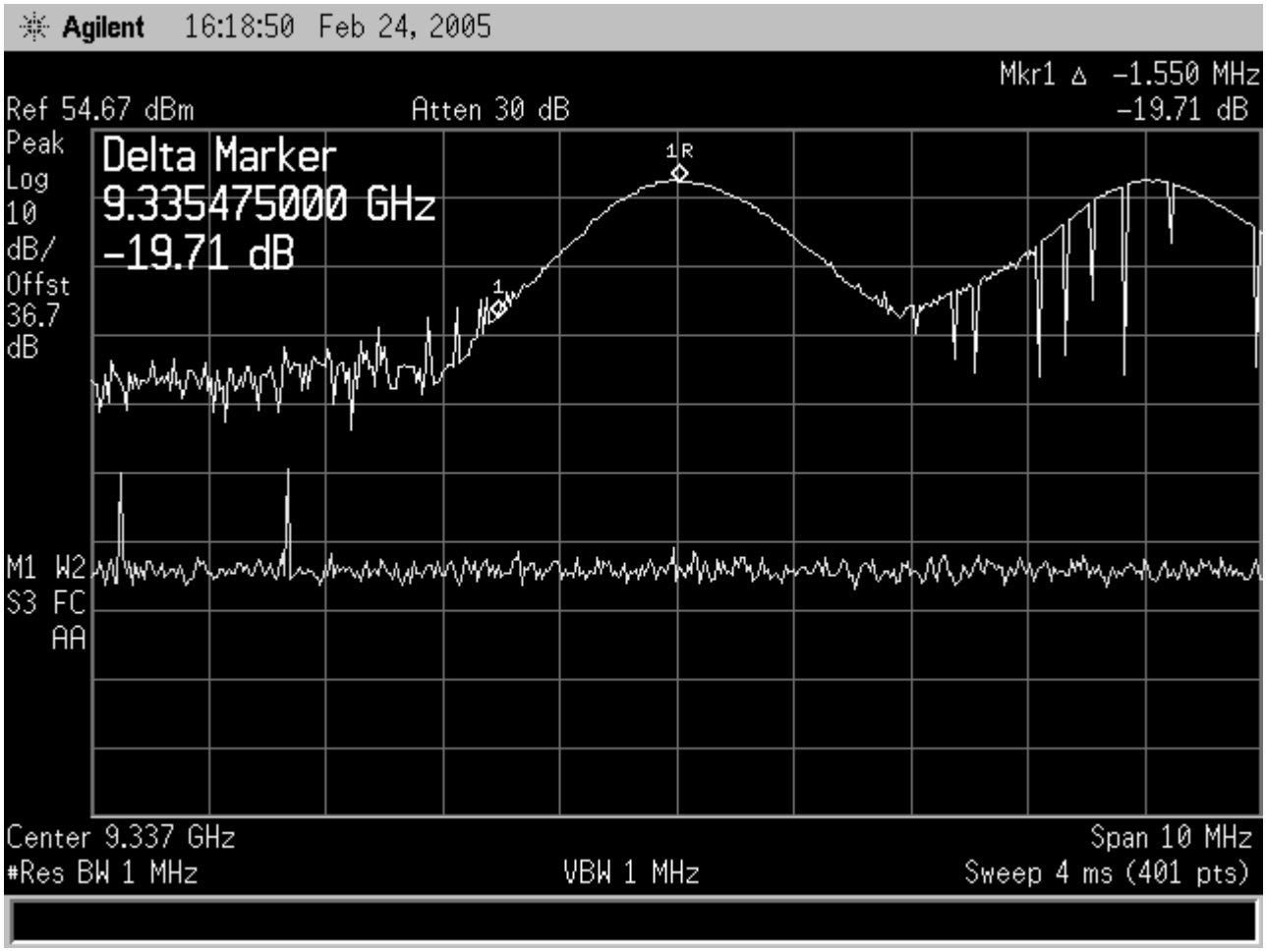

Figure 11-74 Frequency Stability, 230 Vdc Lower Edge @ 0C

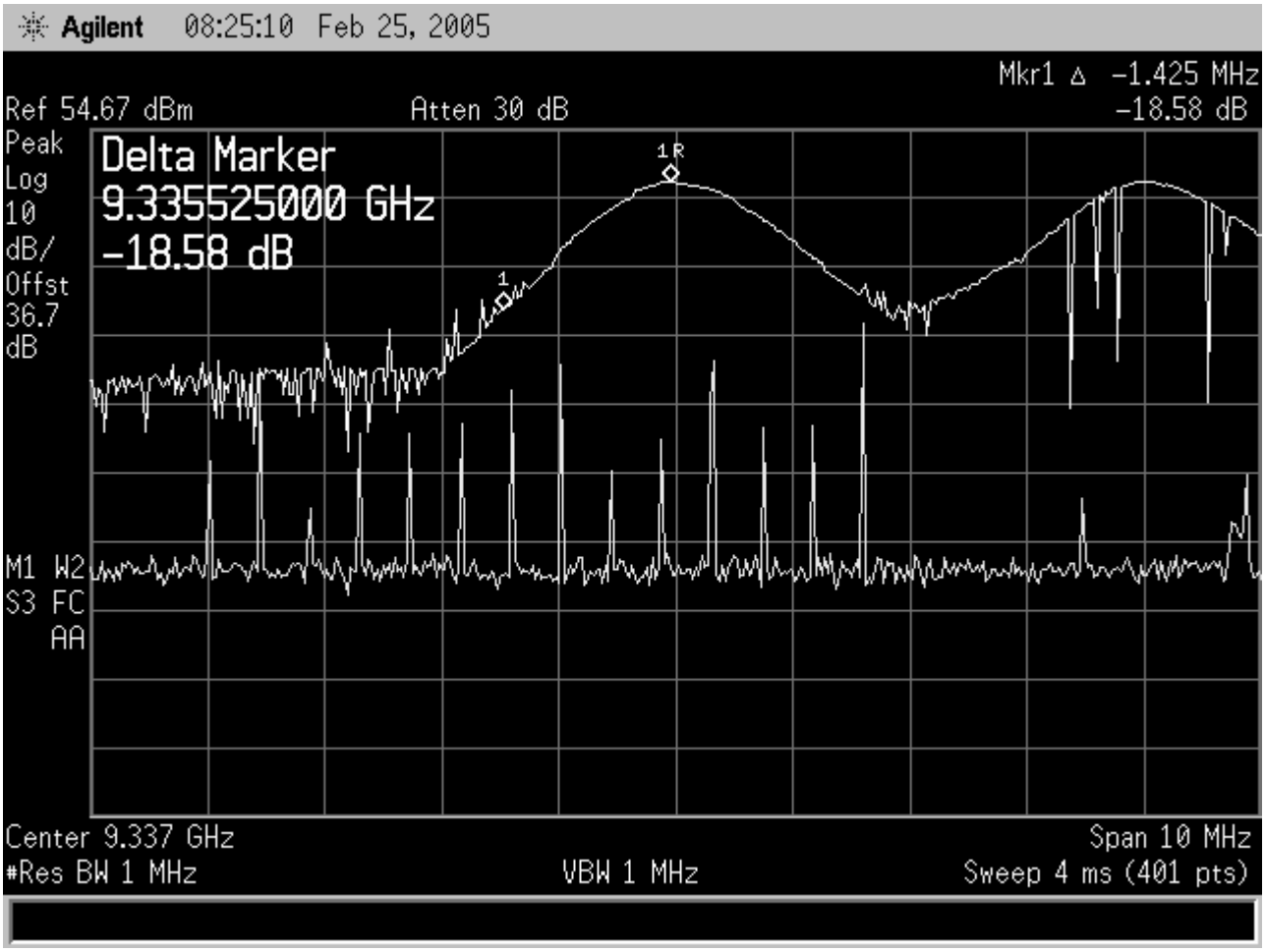

Figure 11-75 Frequency Stability, 230 Vdc Lower Edge @ 10C

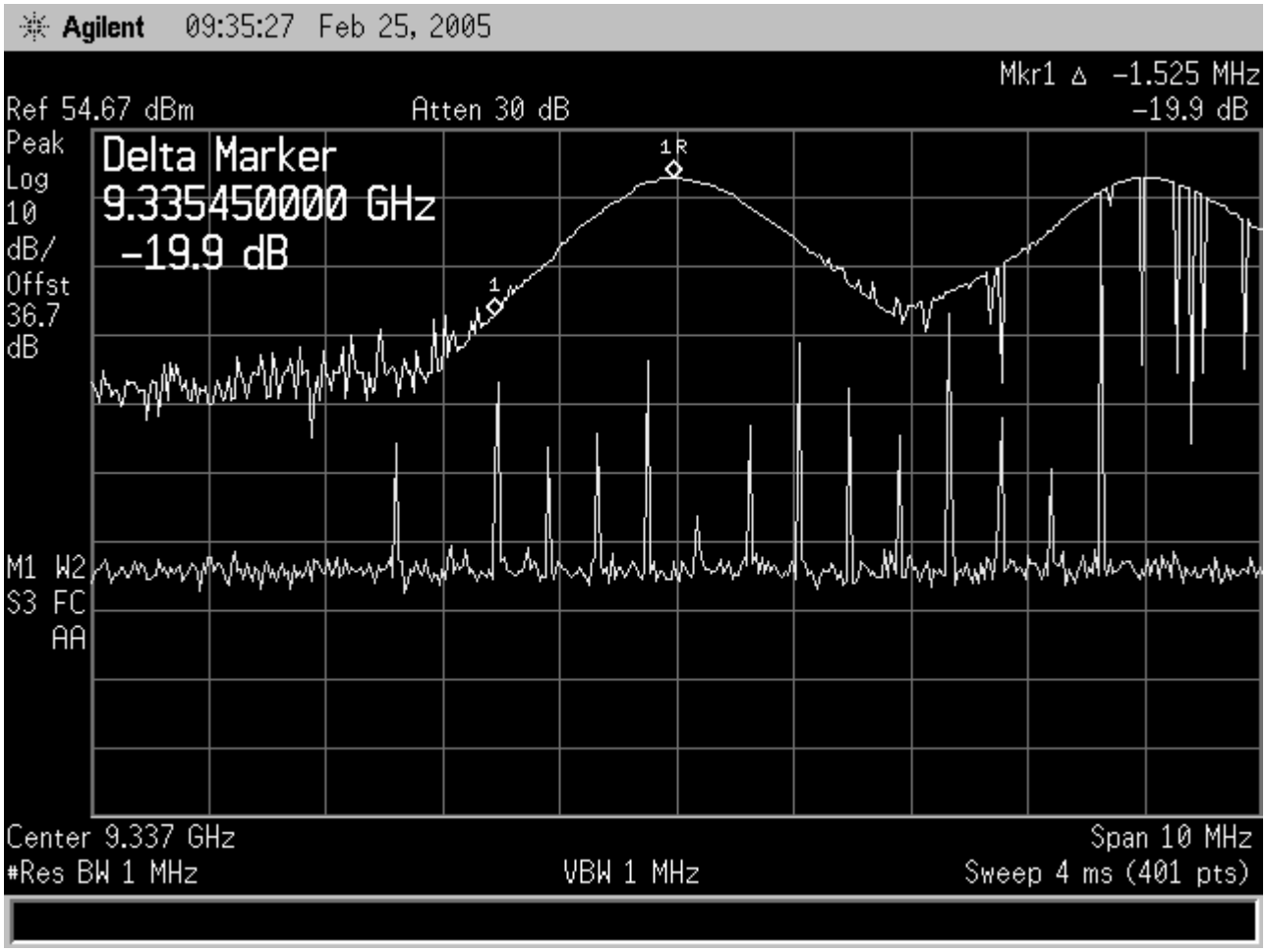

Figure 11-76 Frequency Stability, 230 Vdc Lower Edge @ 20C

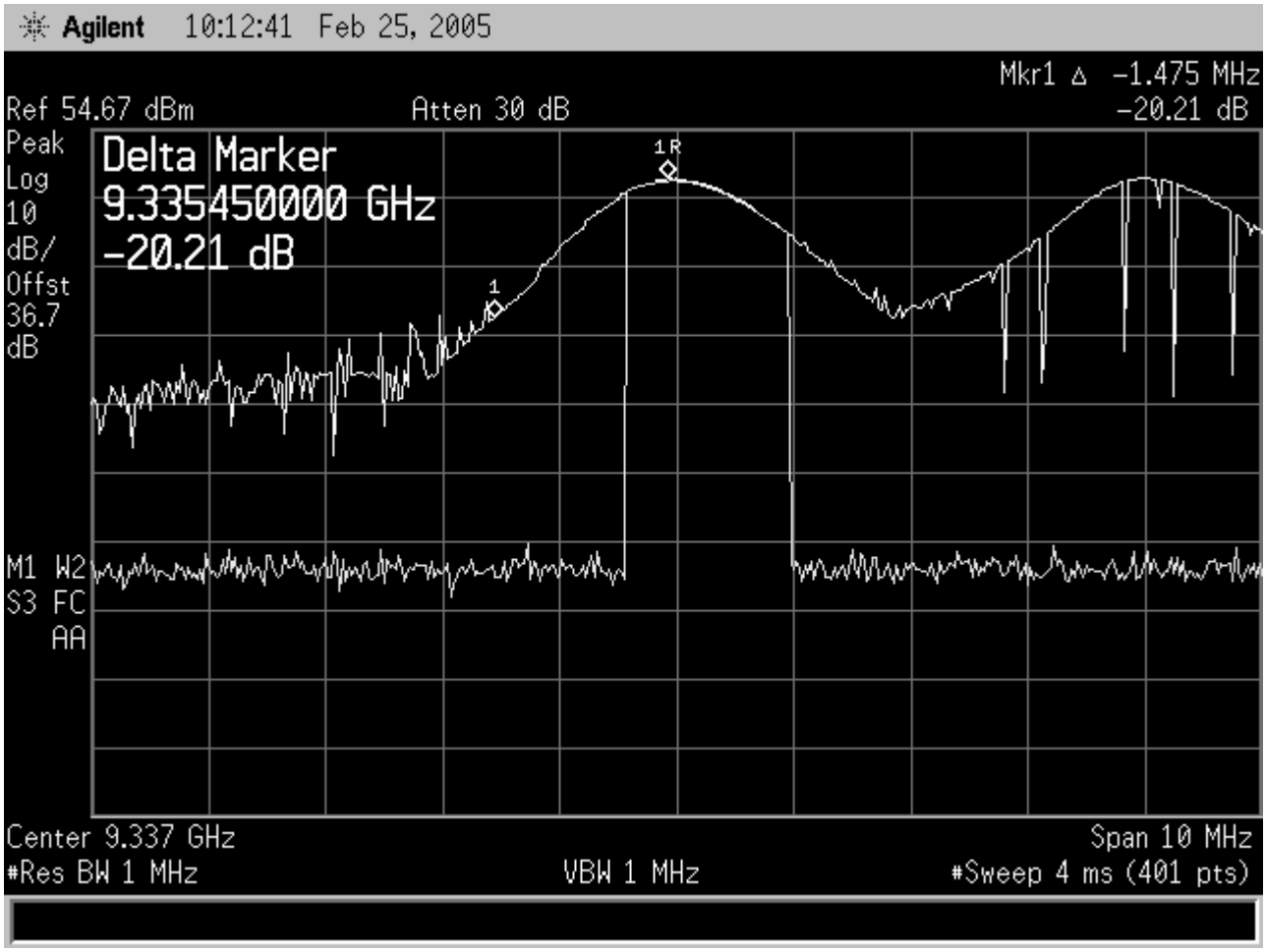

Figure 11-77 Frequency Stability, 230 Vdc Lower Edge @ 30C

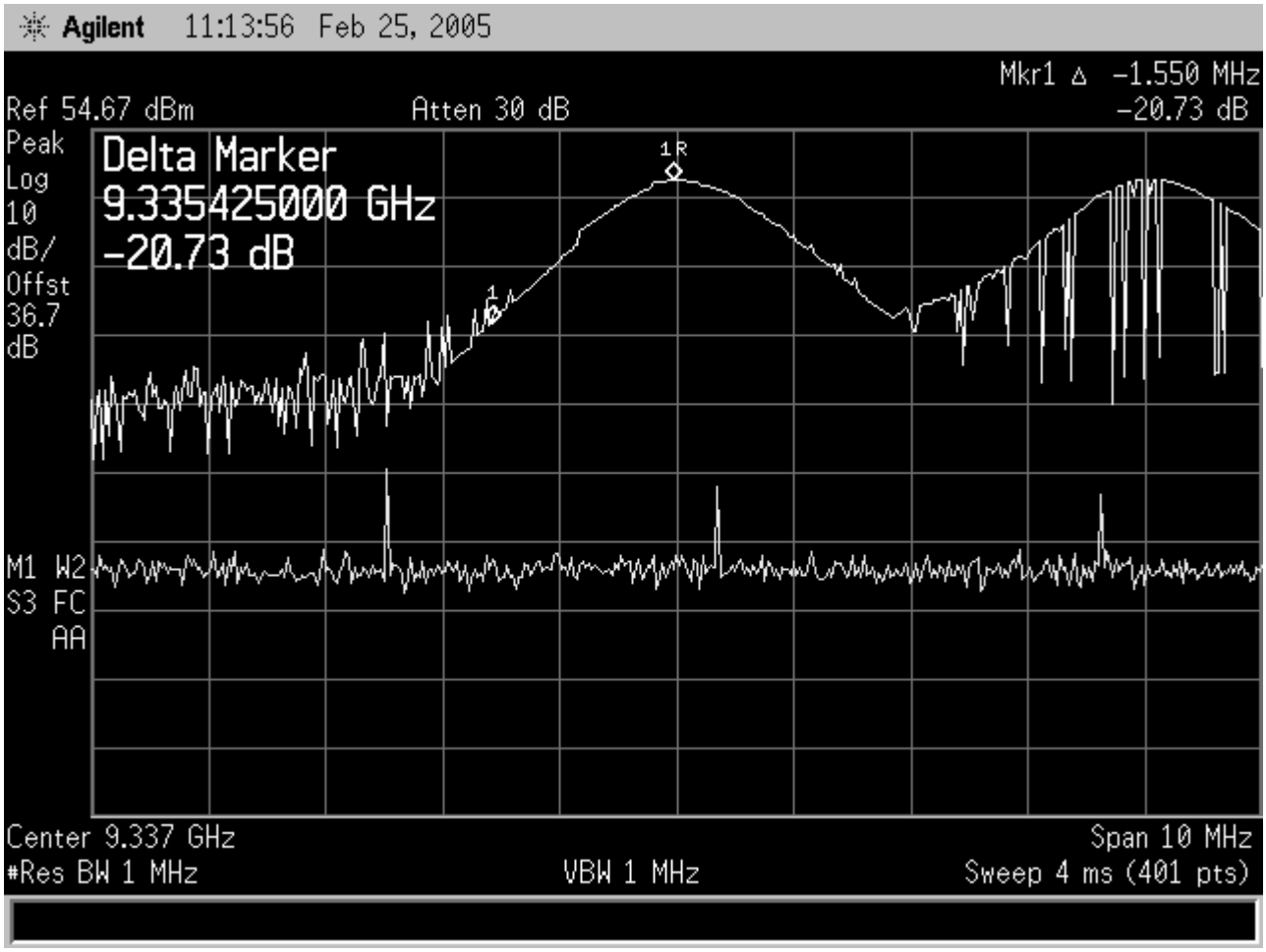

Figure 11-78 Frequency Stability, 230 Vdc Lower Edge @ 40C

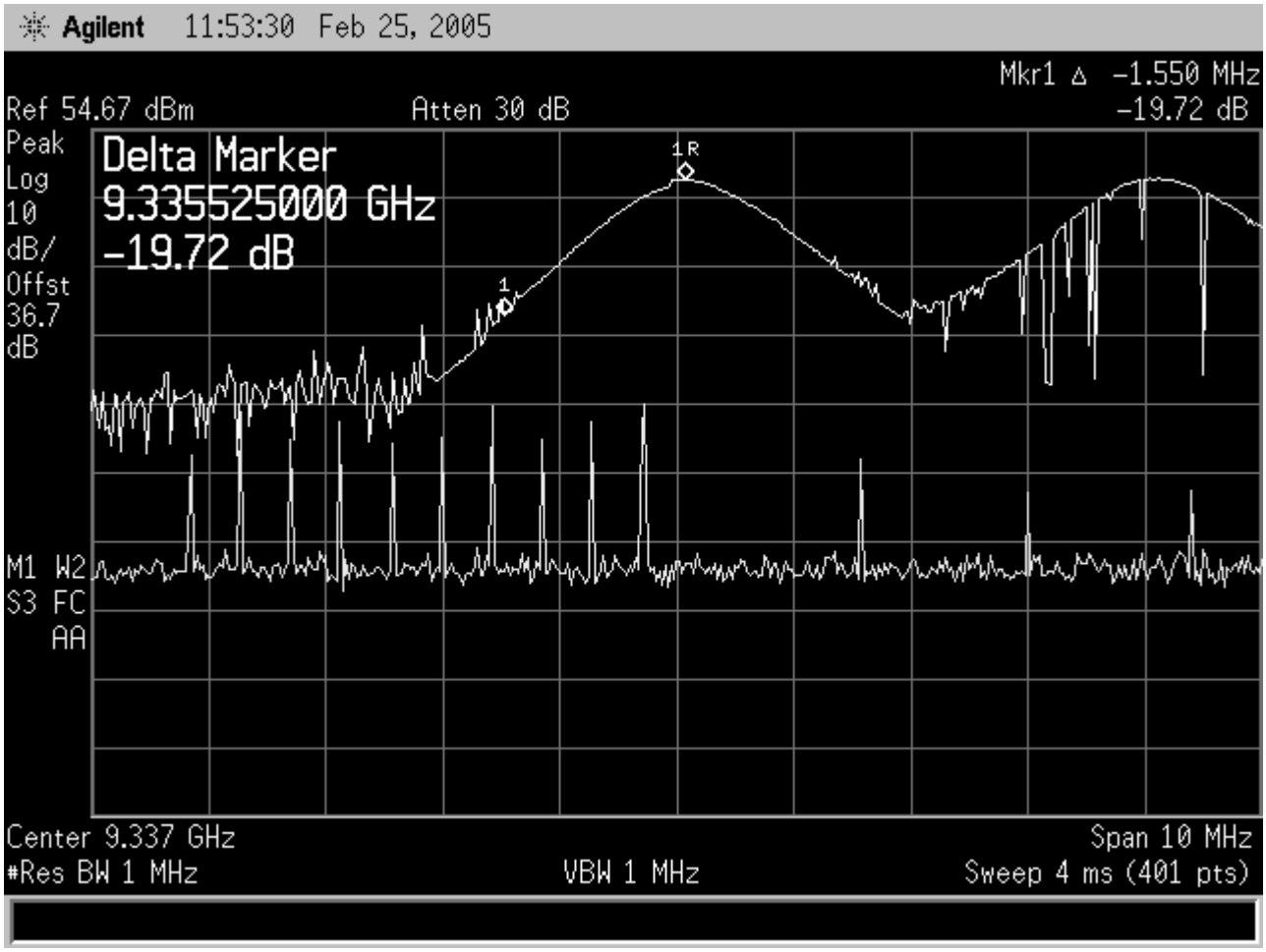

Figure 11-79 Frequency Stability, 230 Vdc Lower Edge @ 50C

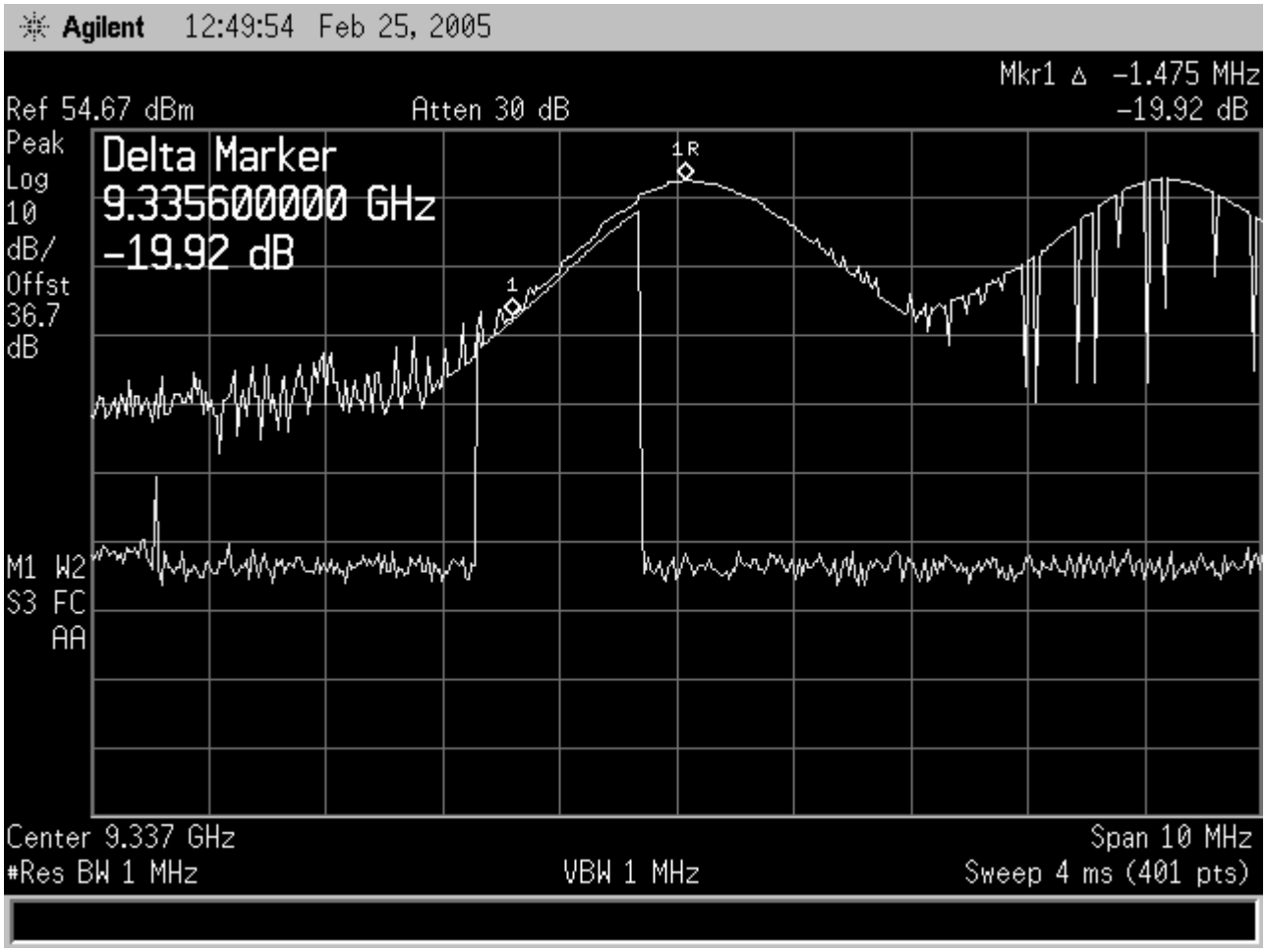

Figure 11-80 Frequency Stability, 230 Vdc Lower Edge @ 60C

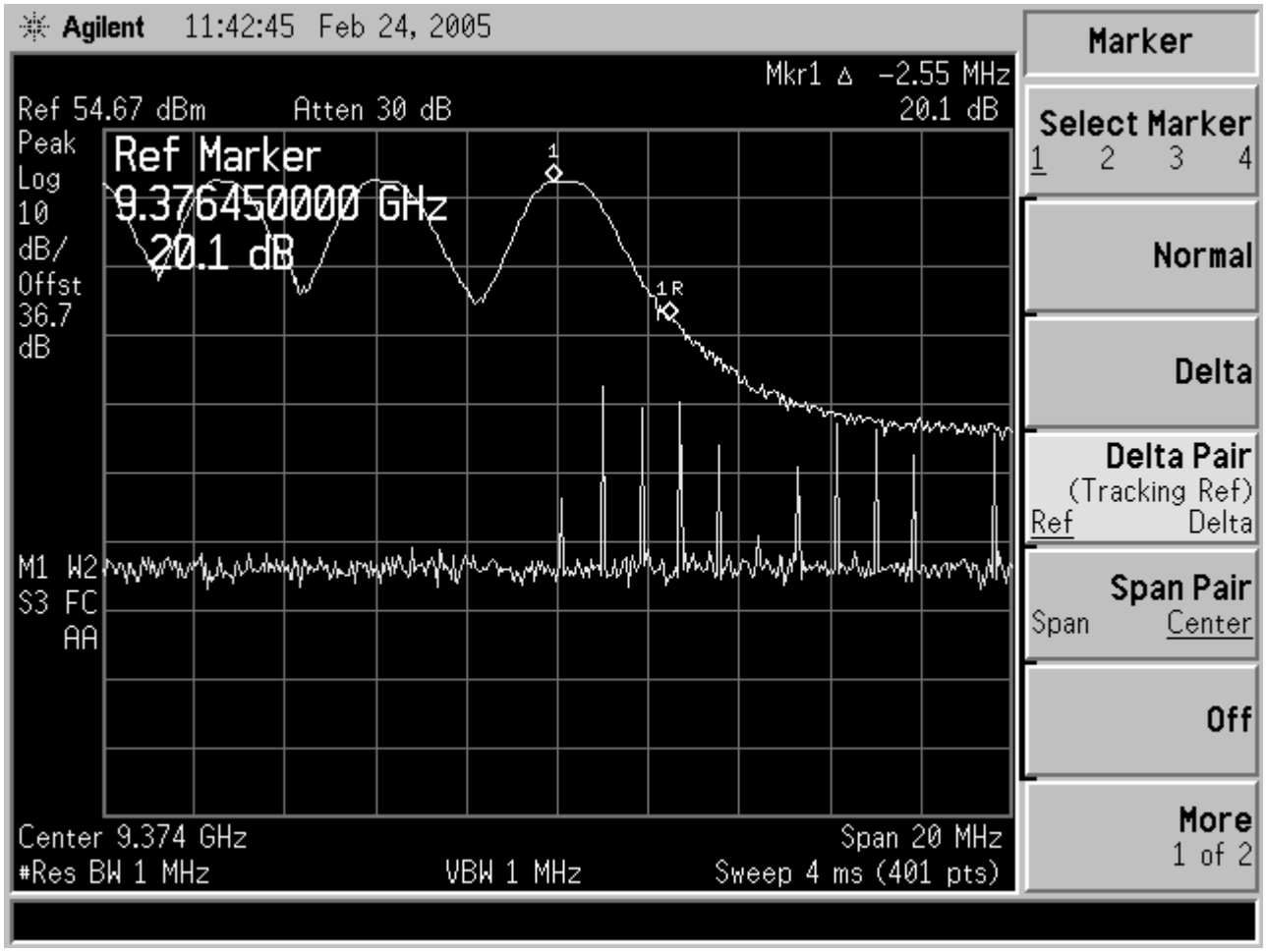

Figure 11-81 Frequency Stability, 230 Vdc Upper Edge @ -40C

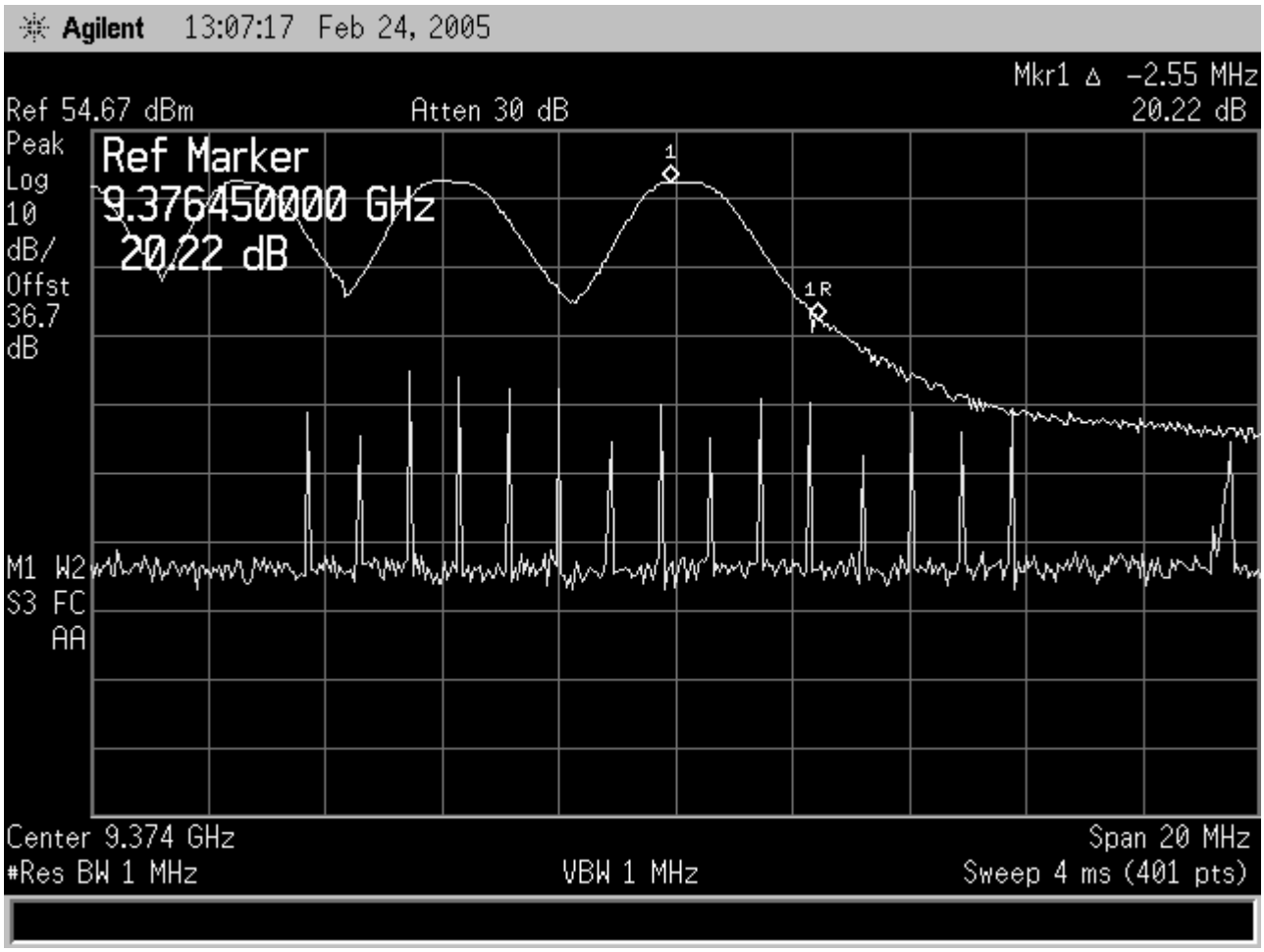

Figure 11-82 Frequency Stability, 230 Vdc Upper Edge @ -30C

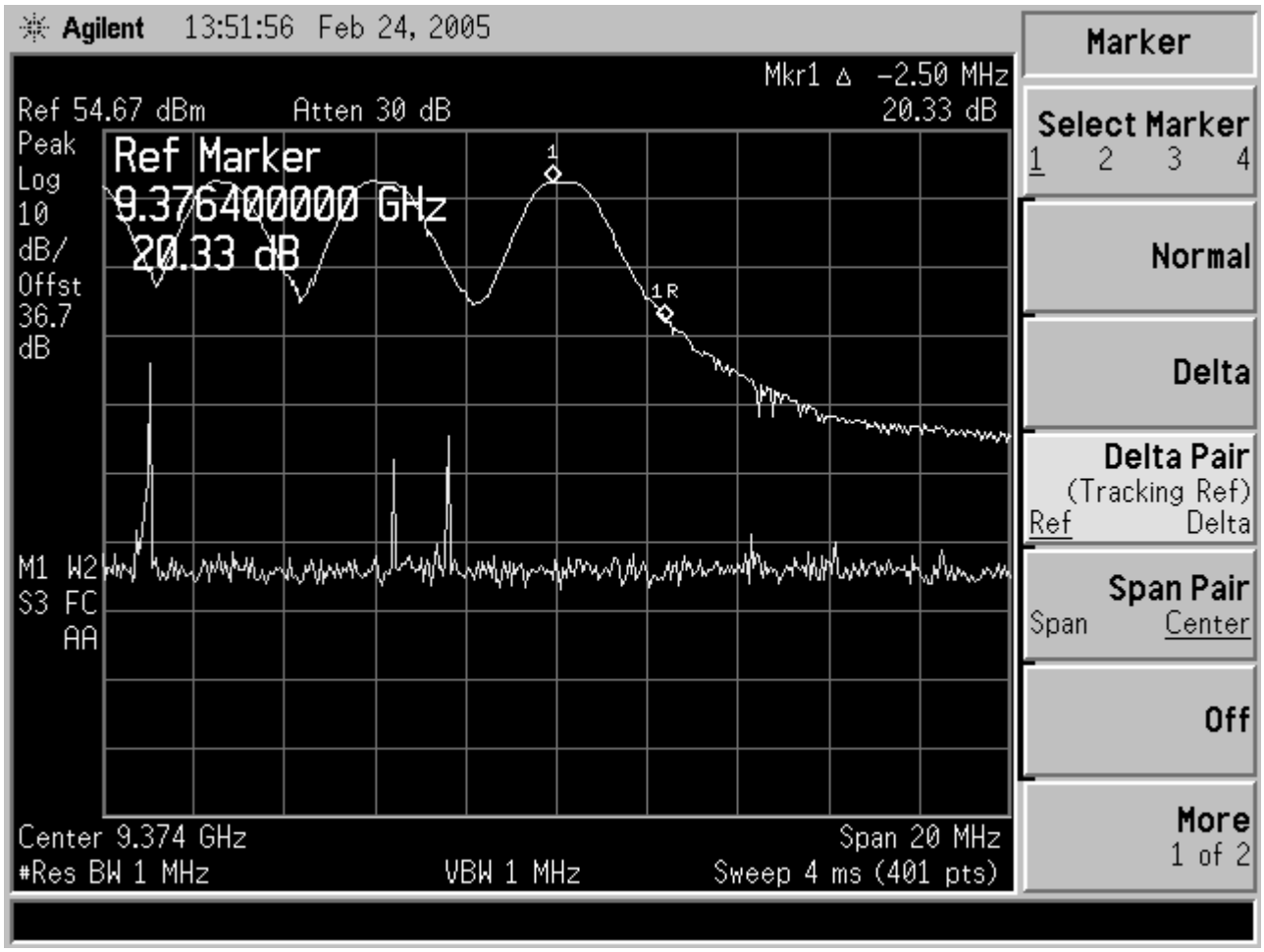

Figure 11-83 Frequency Stability, 230 Vdc Upper Edge @ -20C

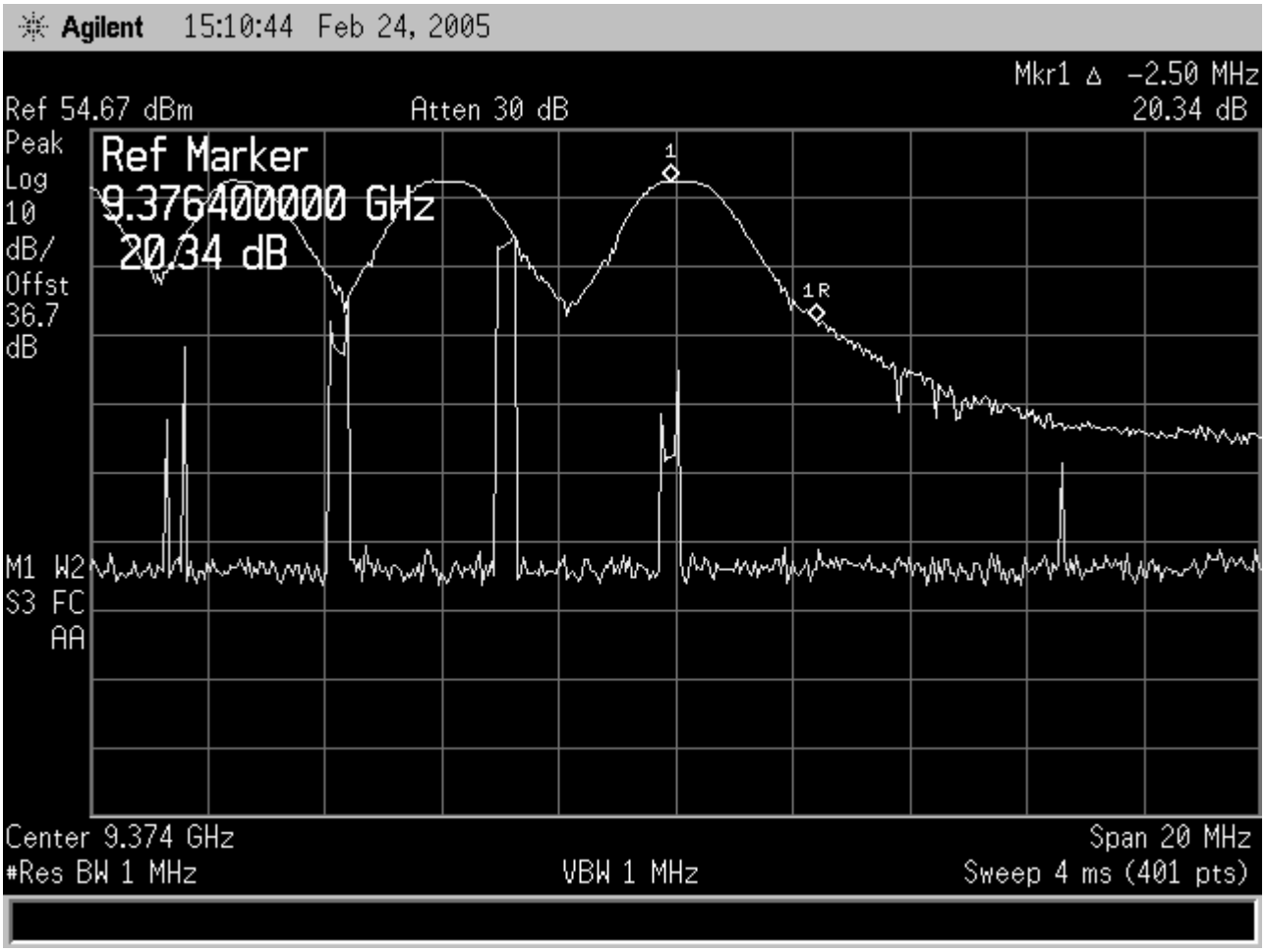

Figure 11-84 Frequency Stability, 230 Vdc Upper Edge @ -10C

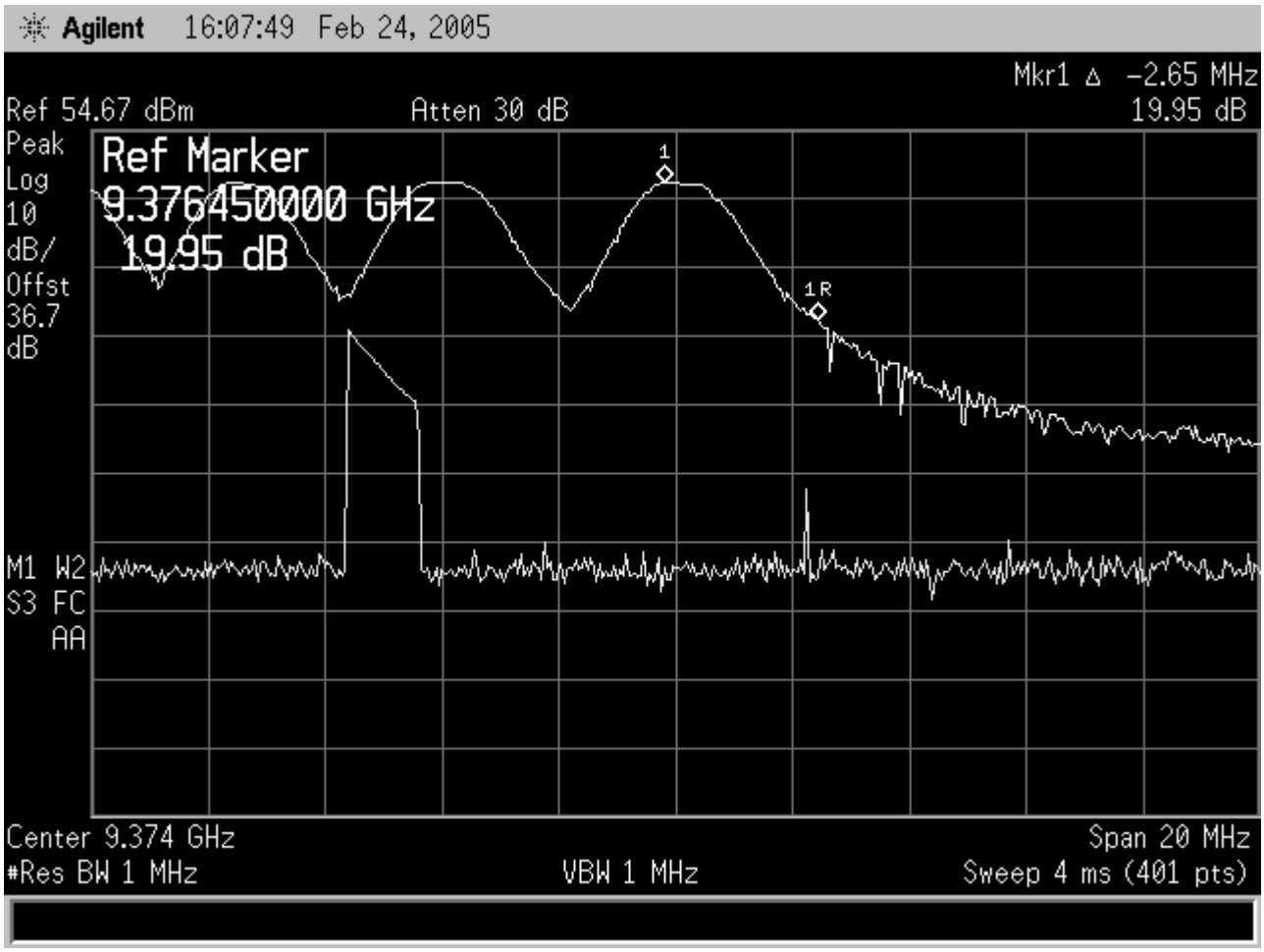

Figure 11-85 Frequency Stability, 230 Vdc Upper Edge @ 0C

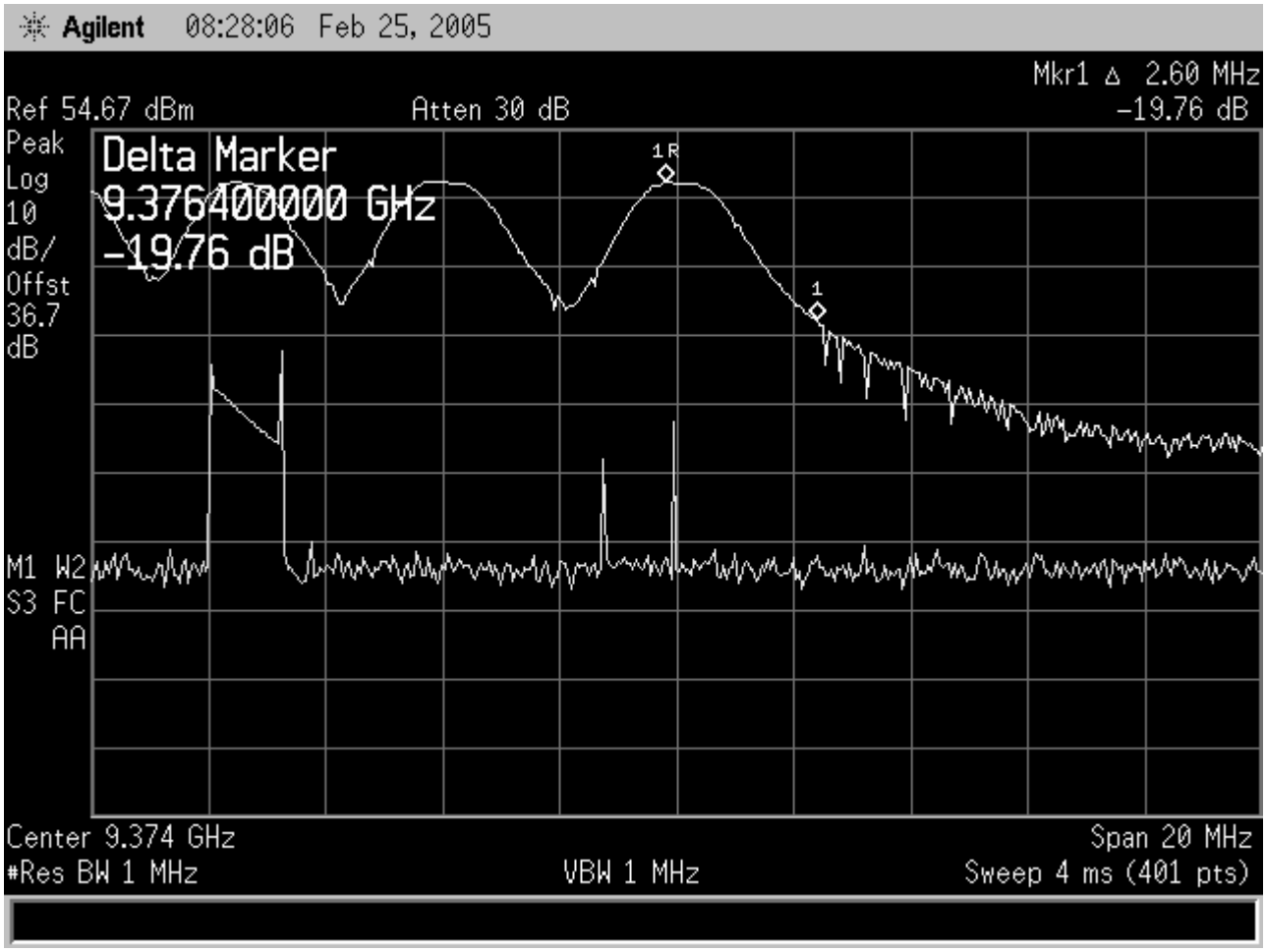

Figure 11-86 Frequency Stability, 230 Vdc Upper Edge @ +10C

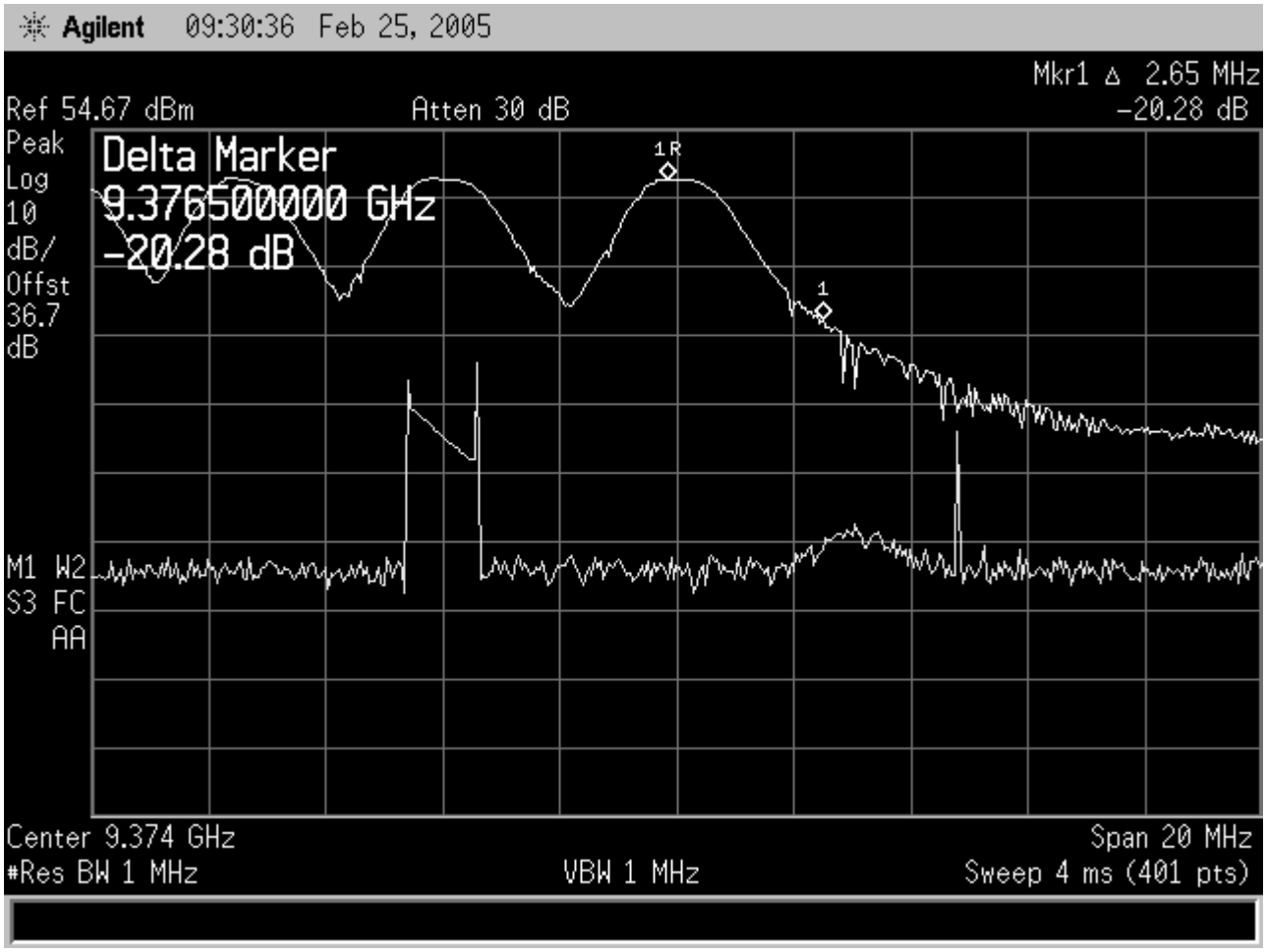

Figure 11-87 Frequency Stability, 230 Vdc Upper Edge @ +20C

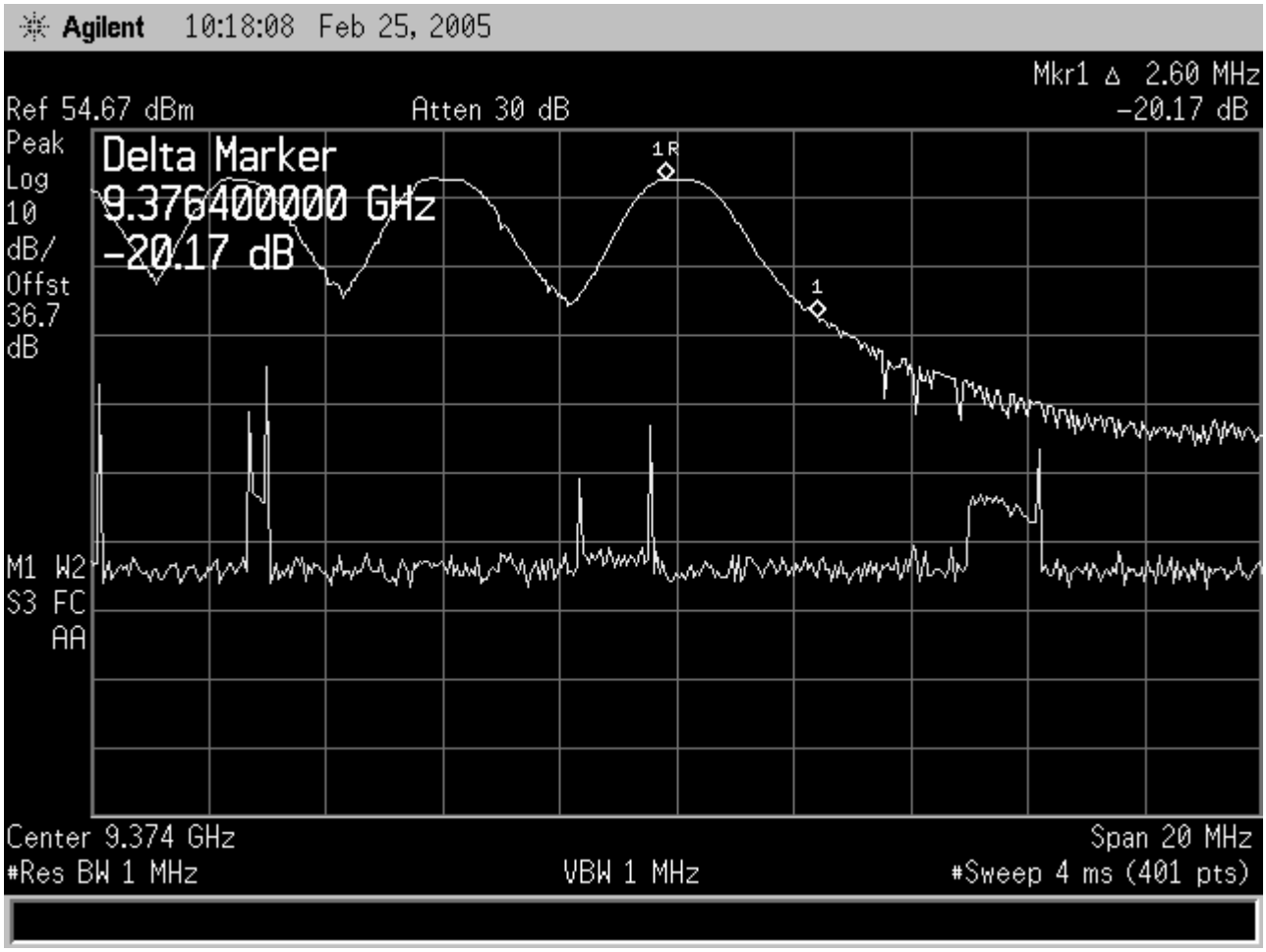

Figure 11-88 Frequency Stability, 230 Vdc Upper Edge @ +30C

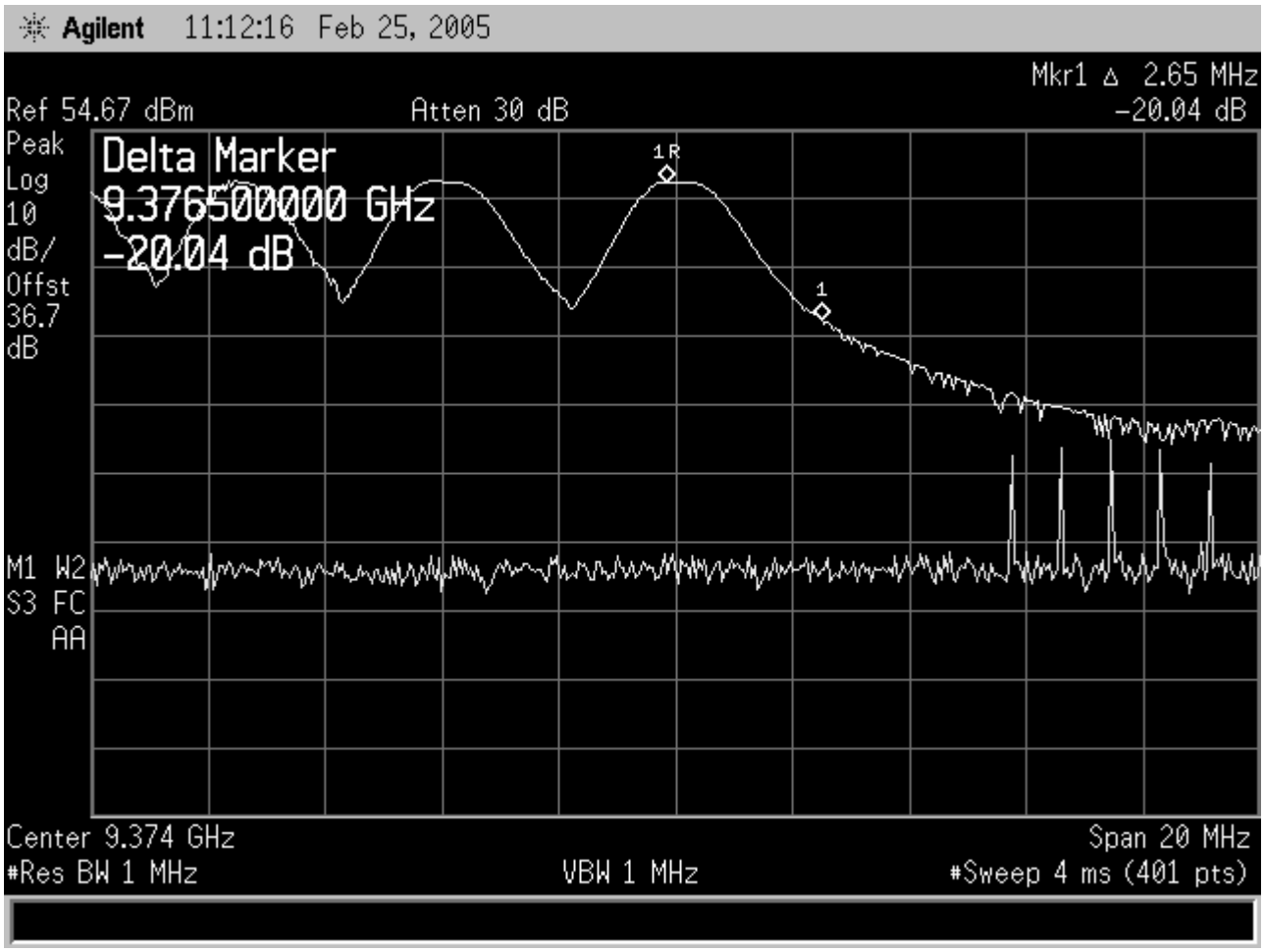

Figure 11-89 Frequency Stability, 230 Vdc Upper Edge @ +40C

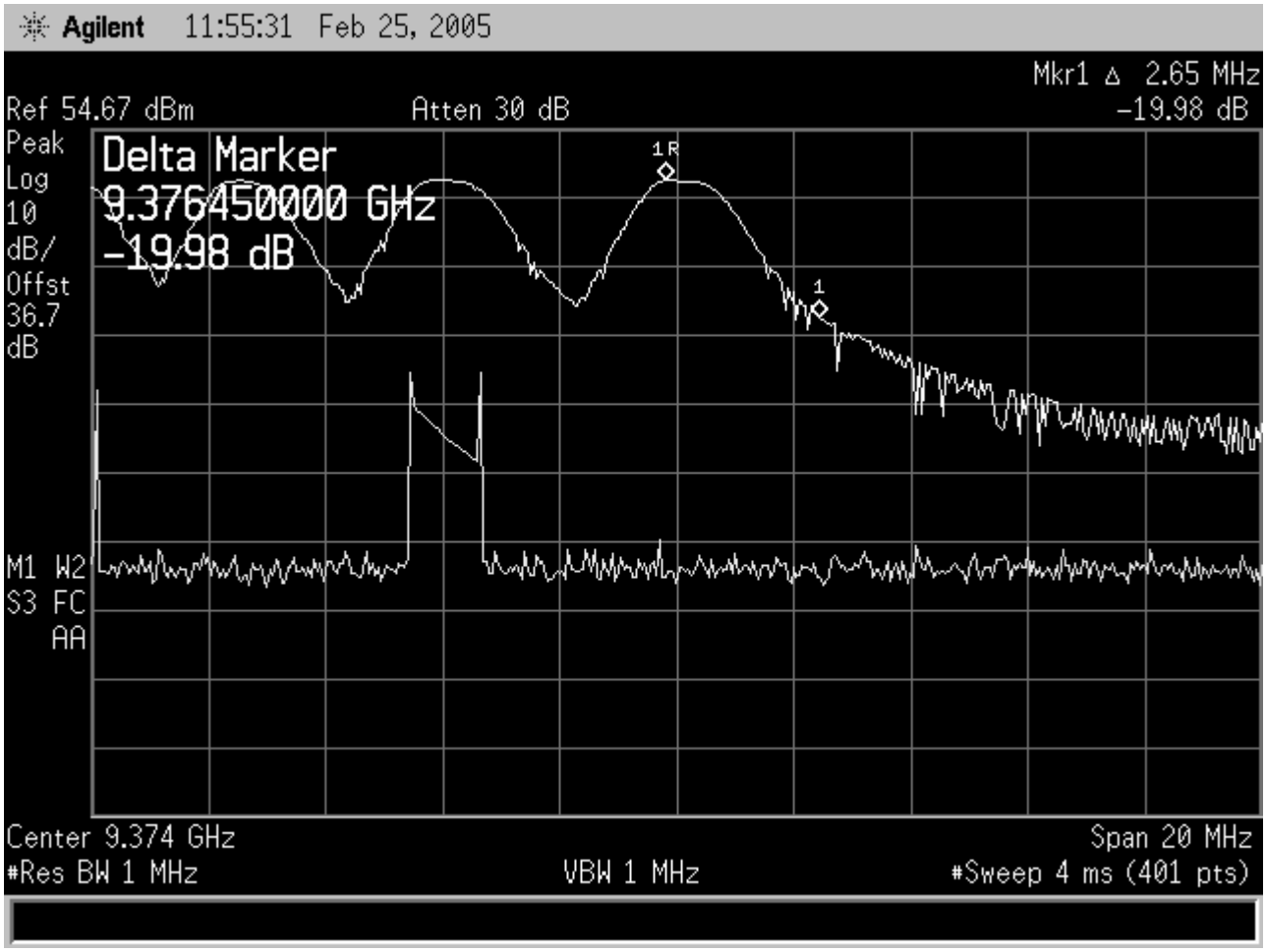

Figure 11-90 Frequency Stability, 230 Vdc Upper Edge @ +50C

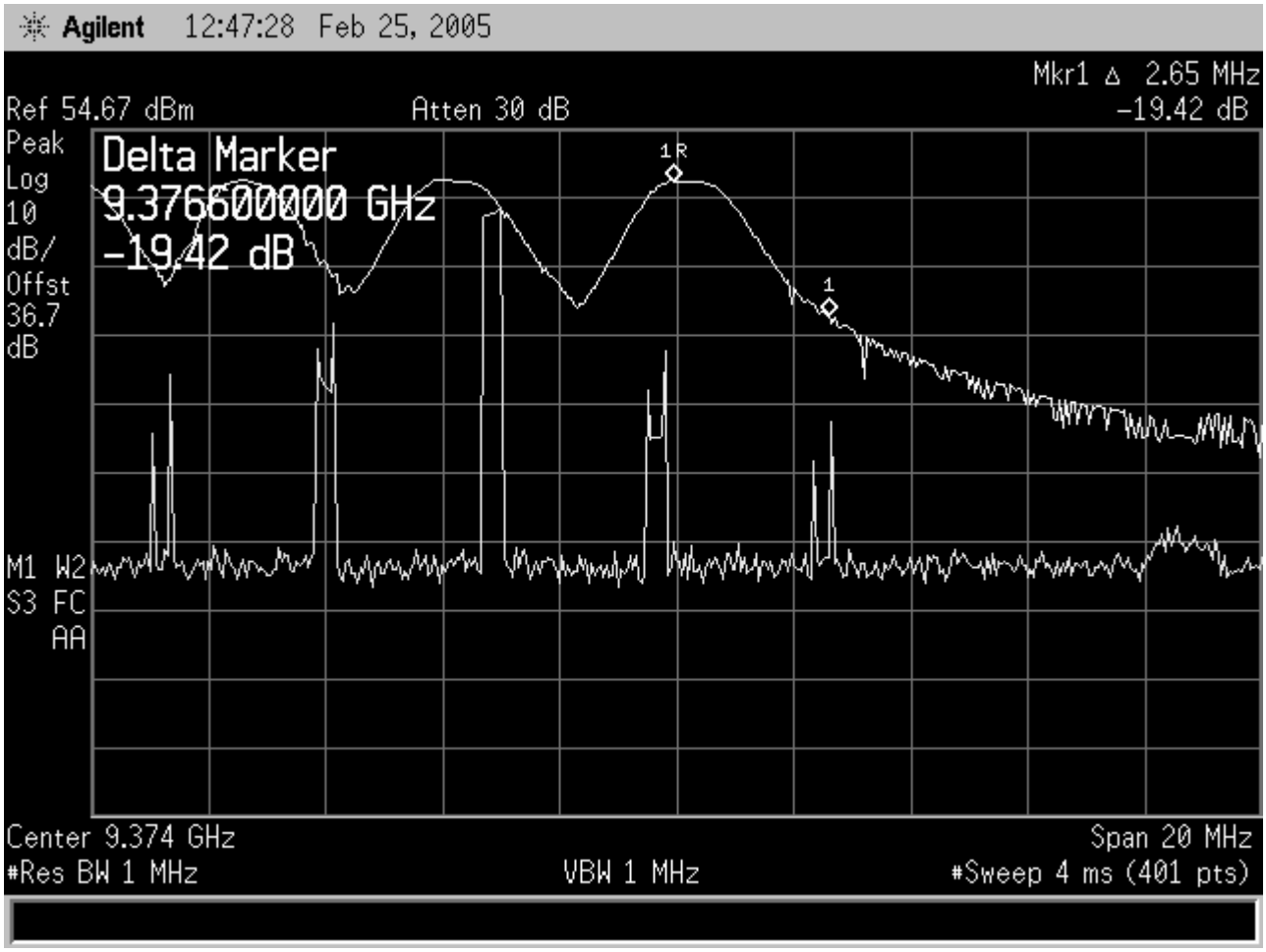

Figure 11-91 Frequency Stability, 230 Vdc Upper Edge @ +60C