FCC Type Acceptance Application

Submitted By:	Pyramid Communications 15182 Triton Lane #102 Huntington Beach, CA 92649 Mahesh Kiwalkar, RF Engineer
Prepared:	March 10, 2006
Pyramid Model #:	SVR-200
Transmitter Type:	LRUSVR-200LA
Test Site:	15182 Triton Lane #102 Huntington Beach, CA 92649 Timco Engineering Inc. 849 NW State Road 45 Newberry FL 32669

Prepared in accordance with the requirements of FCC Rules and Regulations Part 2, Subpart F, Paragraphs 2.983 through 2.999 and applicable Portions of parts 22 and 90

Form References

1. Name of Applicant

   Pyramid Communications
   15182 Triton Lane #102
   Huntington Beach, CA 92649 [Form 731 section 1]
   Applicant is a vendor.

2. Identification of equipment

   LRUSVR-200LA [Form 731 Section 1]
   Low Band Transceiver [Form 731 (7) (a)]

3. Production Planned

   Normal mass production, 500pcs/lot

4. Technical Description

   (a) Types of emission
   20K0F3E

   (b) Frequency range
   29-40 MHz [Form 731 (10) (a)]
   36-50 MHz

   (c) Range of operation power

   100mW – 2W continuously variable [Form 731(10)(b)]

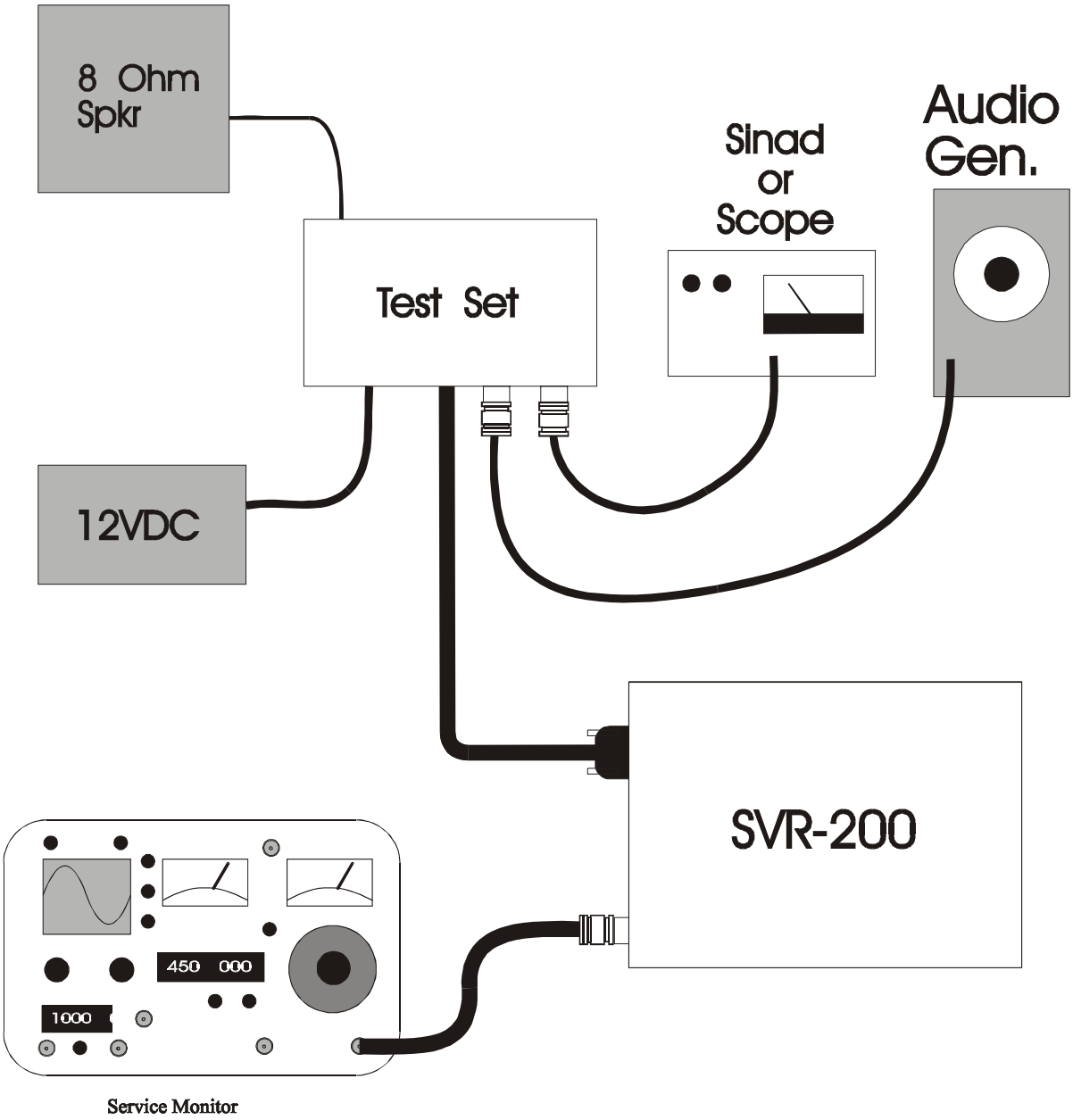
   (d) Maximum power

   2W

   (e) DC voltage and current to final RF amplifier

   9.0 VDC @ 1A

SVR Test set


8 Ohm
Spkr
Test Set
Sinad
or
Scope
Audio
Gen.
12VDC
SVR-200
450 000
1000
Service Monitor

Knob on the front of the test set needs to be switched on and it then controls the volume of the audio when a speaker is connected to the test set.
Enable is switched to ON position to turn on the SVR.
When COR is switched to ON position, SVR goes into Transmit mode.

RF Power Output/Frequency

Minimum Standard
Power: 2W
Frequency Tolerance: ± 20ppm maximum

Measurements

Frequency (MHz)	Power (mW)	Error (ppm)
30.1	2.00	+0.99
40.1	2.00	+0.75
50.1	2.00	+1.4

To the best of my knowledge this
Data is accurate:
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Modulation Characteristics

Frequency response of the audio modulating circuits. The SVR-200 is designed to interface to a variety of mobile radios; the receiver audio that is available may or may not be de-emphasized. Therefore PC programming provides for flat audio response, or +6db/octave pre-emphasis; both responses were measured and plotted.

Frequency	Flat	+6db/octave pre-emphasis
200	-8	-22
300	0	-11
400	+0.3	-7.5
500	+0.5	-6
1000	0	0
1500	-0.25	+2.5
2000	-0.5	+4.5
2500	-0.75	+6
3000	-1.75	+6
3500	-5	+3
4000	-12	-1
4500	-20	-9
5000	-26	-15

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Transmit Audio Response

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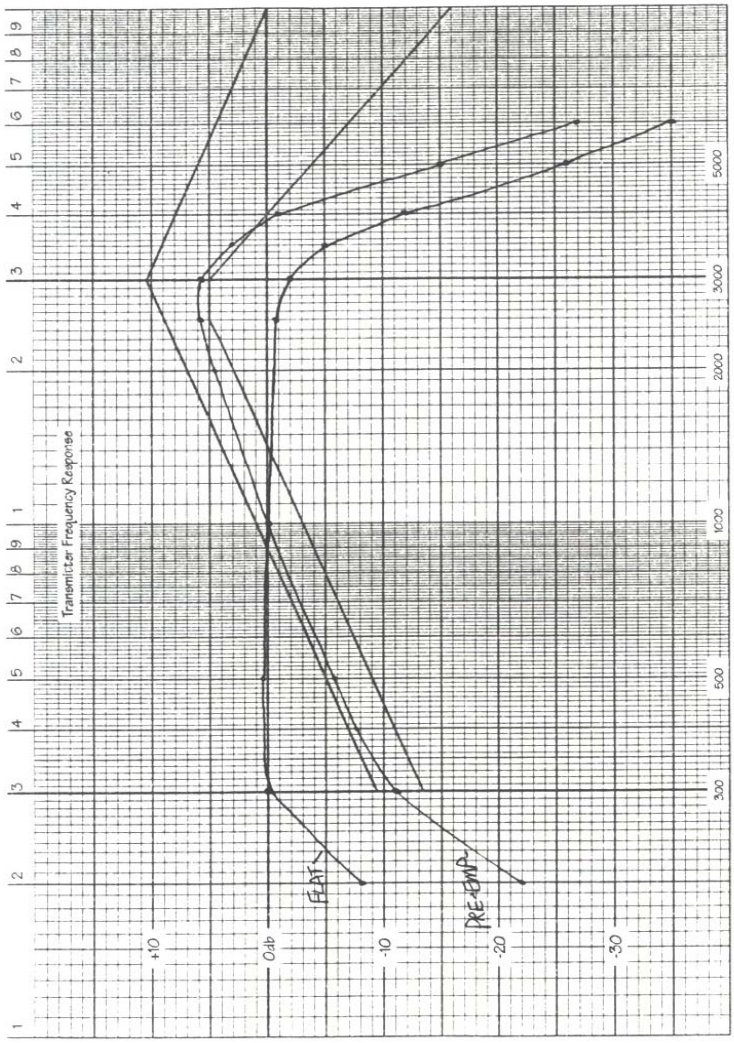

LRU-SVR200M

Exhibit F Subpart 2.9878 (a)(1)

Transmit Audio Response

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Audio Low pass Filter Response

Frequency	Response
1000	0 db
2000	-0.46
3000	-2.6
4000	-10.3
5000	-26.7
6000	-45.6
7000	-52.7
8000	-52.7 {Noise Floor}
9000	-52.7
10000	-52.7
12000	-52.7
14000	-52.7
16000	-52.7
18000	-52.7
20000	-52.7

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Modulation Characteristics
Limiter Response
5kHz Maximum Deviation

30.1 MHz

Input Level	300 Hz	1.0kHz	2.5 kHz
0dB	1.60	1.60	1.60
2	2.01	2.08	2.00
4	2.52	2.60	2.60
6	3.04	3.25	2.84
8	3.76	3.88	3.06
10	4.55	3.97	3.10
12	4.60	4.02	3.16
14	4.62	4.10	3.20
16	4.71	4.15	3.22
18	4.72	4.12	3.24
20	4.75	4.20	3.24
22	4.76	4.20	3.26
24	4.75	4.20	3.26
26	4.75	4.20	3.25
28	4.75	4.20	3.26
30	4.75	4.20	3.26

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Modulation Characteristics
Limiter Response
5kHz Maximum Deviation

40.1 MHz

Input Level	300 Hz	1.0kHz	2.5 kHz
0dB	1.60	1.60	1.60
2	2.03	2.04	2.07
4	2.53	2.60	2.60
6	3.16	3.30	2.97
8	3.93	3.84	3.14
10	4.52	3.99	3.25
12	4.61	4.03	3.31
14	4.65	4.11	3.34
16	4.67	4.17	3.35
18	4.68	4.17	3.40
20	4.68	4.20	3.41
22	4.71	4.24	3.41
24	4.76	4.25	3.38
26	4.76	4.28	3.42
28	4.76	4.33	3.36
30	4.77	4.33	3.4

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Modulation Characteristics
Limiter Response
5kHz Maximum Deviation

50.1 MHz

Input Level	300 Hz	1.0kHz	2.5 kHz
0dB	1.60	1.60	1.60
2	2.18	2.08	2.07
4	2.83	2.52	2.64
6	3.47	3.40	3.03
8	4.07	3.72	3.10
10	4.31	3.89	3.18
12	4.45	4.03	3.21
14	4.53	4.12	3.24
16	4.58	4.16	3.28
18	4.63	4.20	3.3
20	4.68	4.20	3.34
22	4.69	4.24	3.32
24	4.69	4.25	3.31
26	4.66	4.25	3.33
28	4.65	4.26	3.42
30	4.69	4.23	3.44

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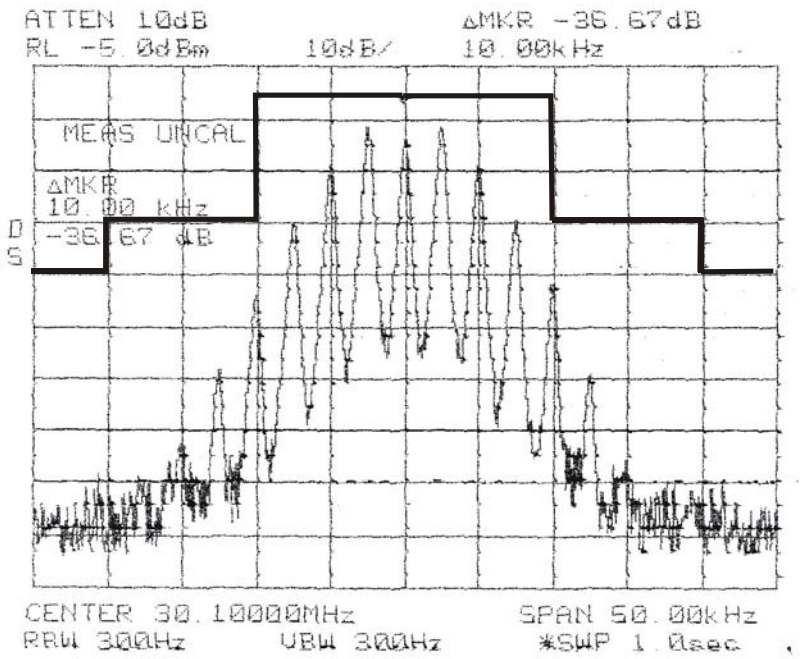
Occupied Bandwidth
20 kHz Channel Spacing

30.1 MHz

Emission 20K0F3E

The SVR-200 transmits voice and single tone frequencies in the 300-3000 bandwidth; emissions are amplitude limited and band limited by high pass and low pass filters per the previous sections. The following plot was made with a 2.5 kHz tone at 16db above 50% level for 1kHz (per EIA-152C).



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Occupied Bandwidth
20 kHz Channel Spacing

40.1 MHz

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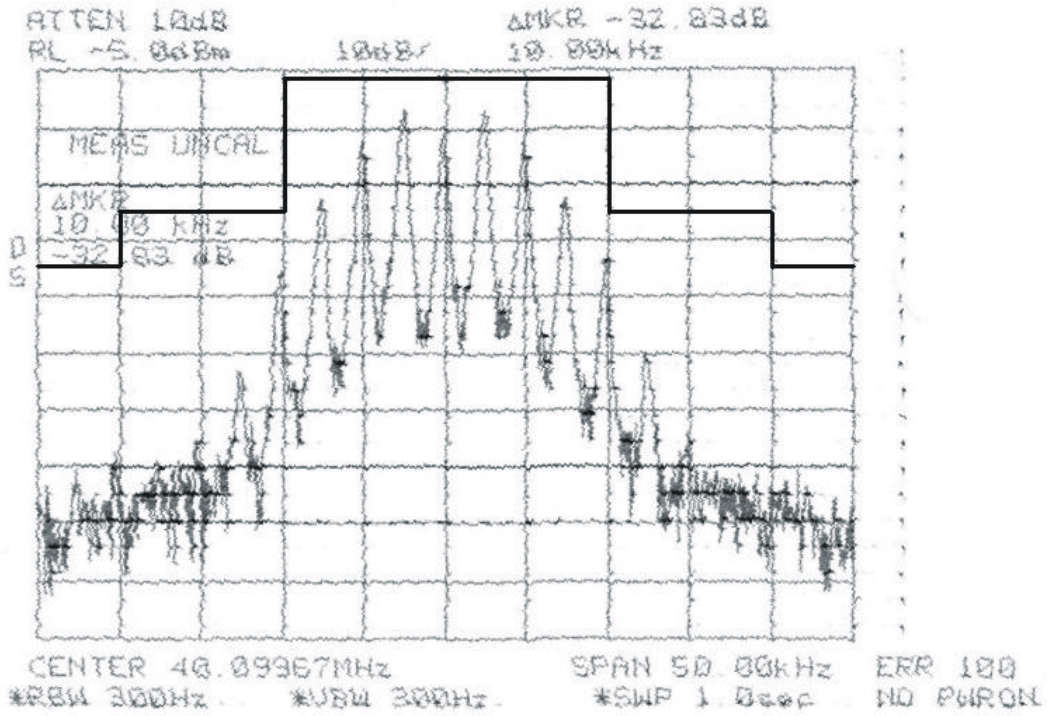

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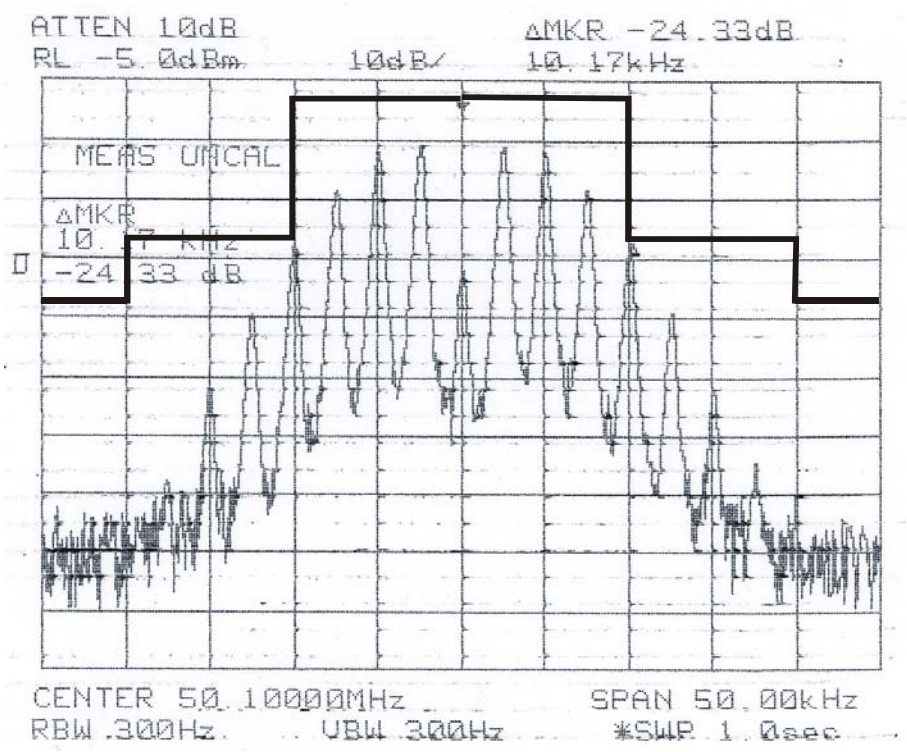
Occupied Bandwidth
20kHz Channel Spacing
50.1 MHz

Emission 20K0F3E

The SVR-200 transmits voice and single tone frequencies in the 300-3000 bandwidth; emissions are amplitude limited and band limited by high pass and low pass filters per the previous sections. The following plot was made with a 2.5 kHz tone at 16db above 50% level for 1kHz (per EIA-152C).



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Spurious emission at the antenna terminal at 2W

Minimum Standard

-46dbc

Measurements

Power 2W

Frequency	**Level**
30.1	0 dB
60.2	- 54.50 dbc
40.1	0 dB
80.2	- 54.84 dbc
50.1	0 dB
100.2	-52dbc

All other spurious signals were at least 20dB below the FCC limit.
Frequency spectrum was investigated out to the 10th harmonic

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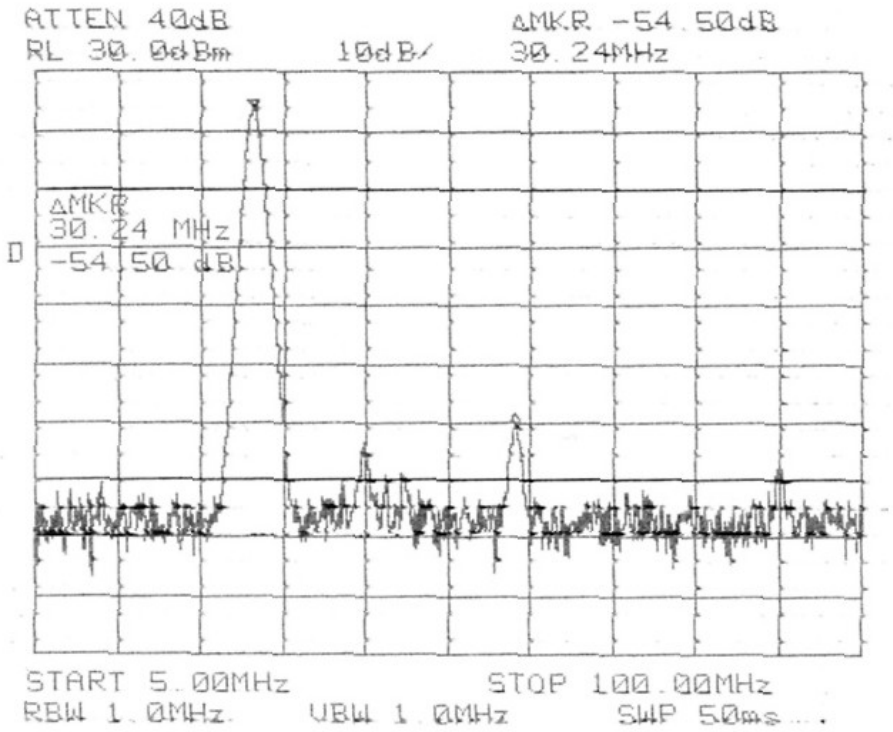
Signed:

30.1 MHz



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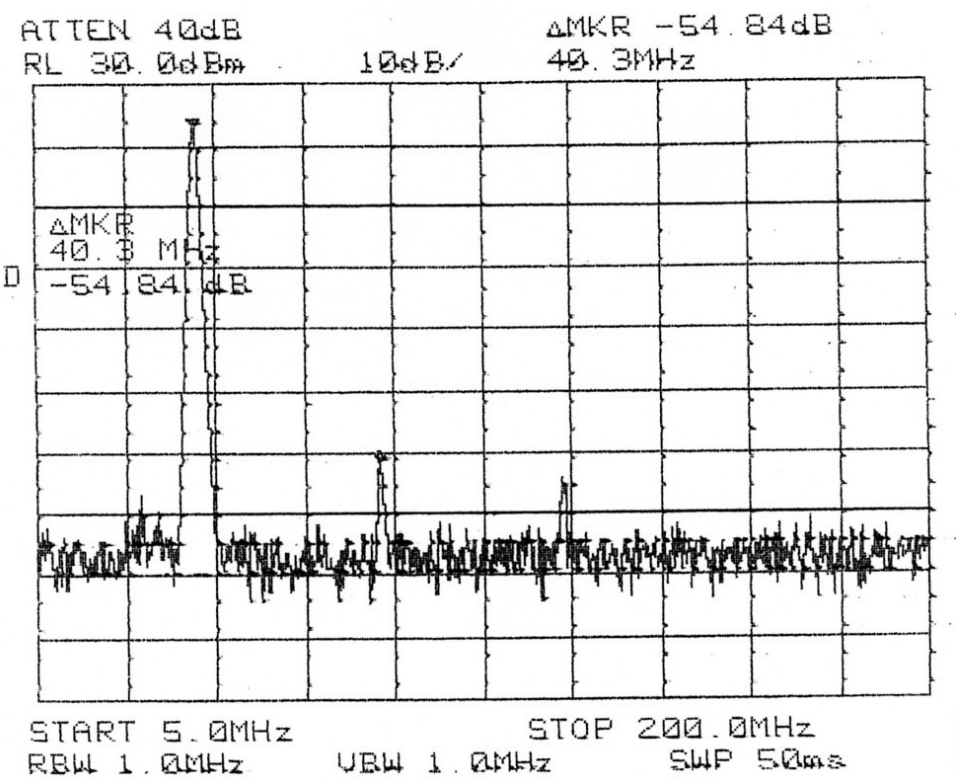
40.1 MHz



To the best of my knowledge this
Data is accurate:
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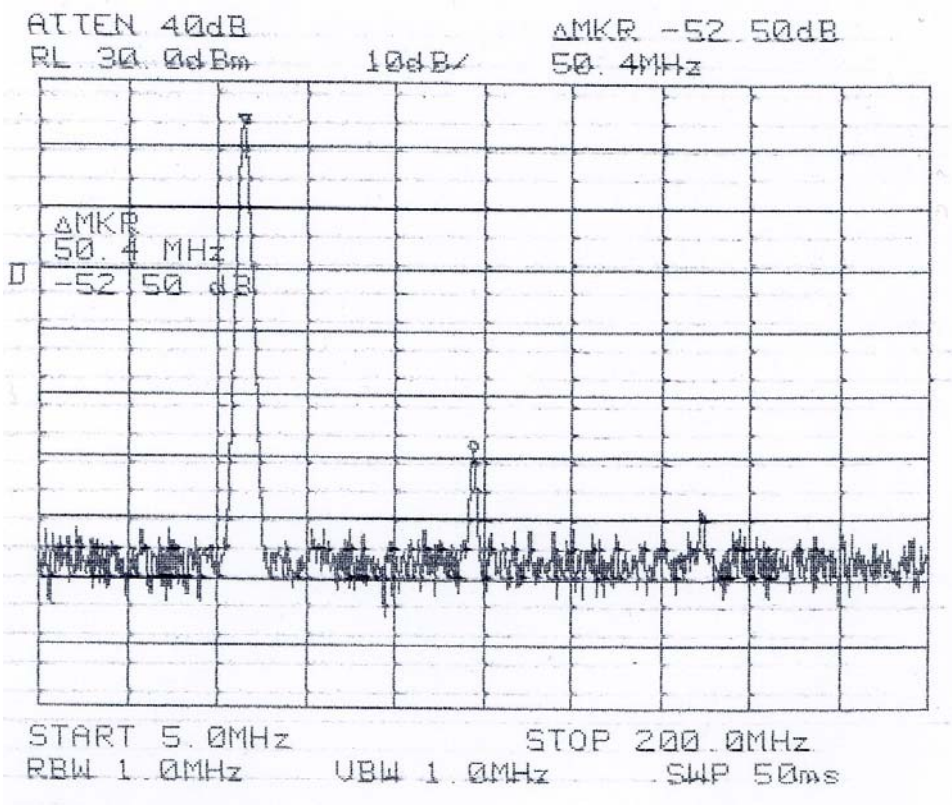
MKiwalkar

50.1 MHz



To the best of my knowledge this
Data is accurate:
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Minimum Standard

± 20 ppm (±600Hz)

(a) Frequency stability over Temperature

30.1 MHz

Temp (°C)	Frequency	Error
-30	30.10007	+1.74
-20	30.10007	+1.74
-10	30.10006	+1.99
0	30.10005	+1.49
+10	30.10004	+1.33
+20	30.10004	+1.33
+30	30.10004	+1.33
+40	30.10006	+1.99
+50	30.10006	+1.99
+60	30.10002	+0.66

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Minimum Standard

± 20 ppm (±800 Hz)

(b) Frequency stability over Temperature

40.1 MHz

Temp (°C)	Frequency	Error
-30	40.10006	+1.49
-20	40.10008	+1.99
-10	40.10007	+1.74
0	40.10006	+1.49
+10	40.10004	+0.99
+20	40.10003	+0.75
+30	40.10003	+0.75
+40	40.10003	+0.75
+50	40.10003	+0.75
+60	40.10004	+0.99

To the best of my knowledge this
Data is accurate:
Signed:

Minimum Standard

± 20 ppm (±1000 Hz)

(c) Frequency stability over Temperature

50.1 MHz

Temp (°C)	Frequency	Error
-30	50.10038	+7.58
-20	50.10028	+5.58
-10	50.10012	+2.39
0	50.10004	+0.80
+10	50.09996	-0.80
+20	50.09993	-1.39
+30	50.09993	-1.39
+40	50.09993	-1.39
+50	50.09991	-1.79
+60	50.09989	-2.19

To the best of my knowledge this
Data is accurate:
Signed:

Minimum Standard

± 20 ppm

(a) Frequency stability with variation in primary supply voltage

30.1 MHz

Voltage	% Standard	Frequency	Error (ppm)
11.56	-15 %	30.10002	0.66
12.24	-10 %	30.10003	0.99
12.92	-5 %	30.10003	0.99
13.6	0 %	30.10003	0.99
14.28	5 %	30.10000	0.00
14.96	10 %	30.10001	0.33
15.64	15 %	30.09998	0.66

To the best of my knowledge this
Data is accurate:
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Minimum Standard

± 20 ppm

(b) Frequency stability with variation in primary supply voltage

40.1 MHz

Voltage	% Standard	Frequency	Error (ppm)
11.56	-15 %	40.10004	+0.997
12.24	-10 %	40.10004	+0.997
12.92	-5 %	40.10004	+0.997
13.6	0 %	40.10004	+0.997
14.28	5 %	40.10004	+0.997
14.96	10 %	40.10004	+0.997
15.64	15 %	40.10004	+0.997

To the best of my knowledge this
Data is accurate:
Signed:

Minimum Standard

± 20 ppm

(c) Frequency stability with variation in primary supply voltage

50.1 MHz

Voltage	% Standard	Frequency	%Error
11.56	-15 %	50.10001	+0.20
12.24	-10 %	50.10002	+0.40
12.92	-5 %	50.10003	+0.60
13.6	0 %	50.10007	+1.40
14.28	5 %	50.10006	+1.20
14.96	10 %	50.10005	+1.00
15.64	15 %	50.10004	+0.80

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Data is accurate:
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Receiver conducted Spurious at antenna port:

Minimum Standard

2nW -57 dBm

Frequency	Rx spur (nW)	Rx spur (dBm)
30.1	0.039	-74
40.1	0.199	-67
50.1	0.050	-73

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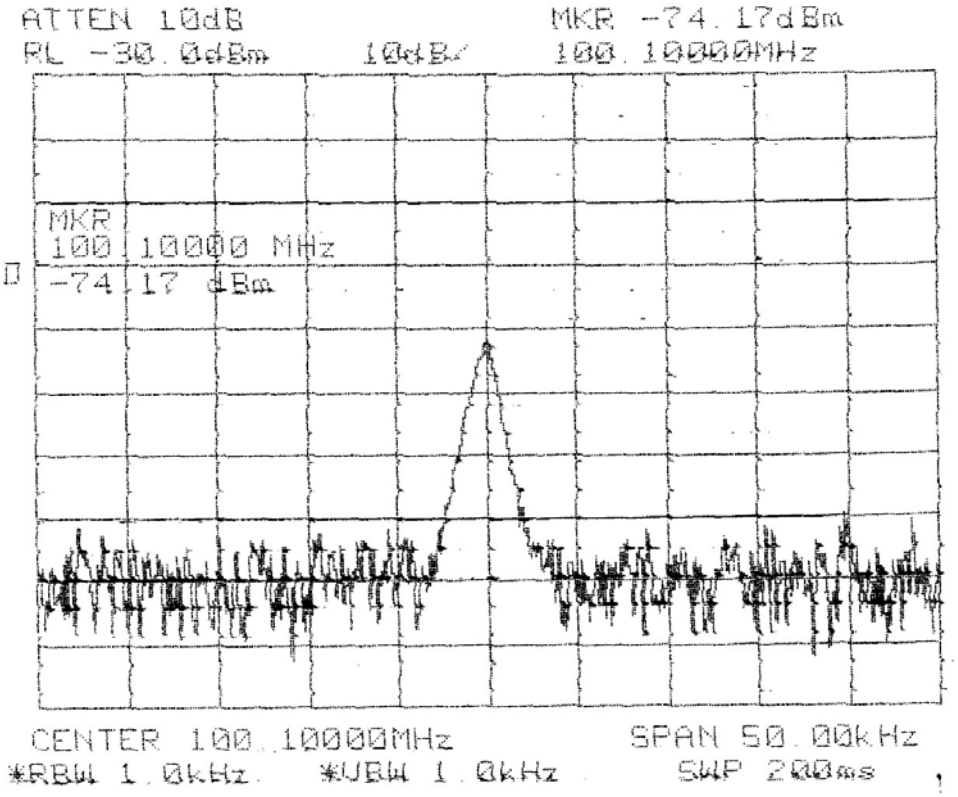
30.1 MHz +70 MHz High Side Injection



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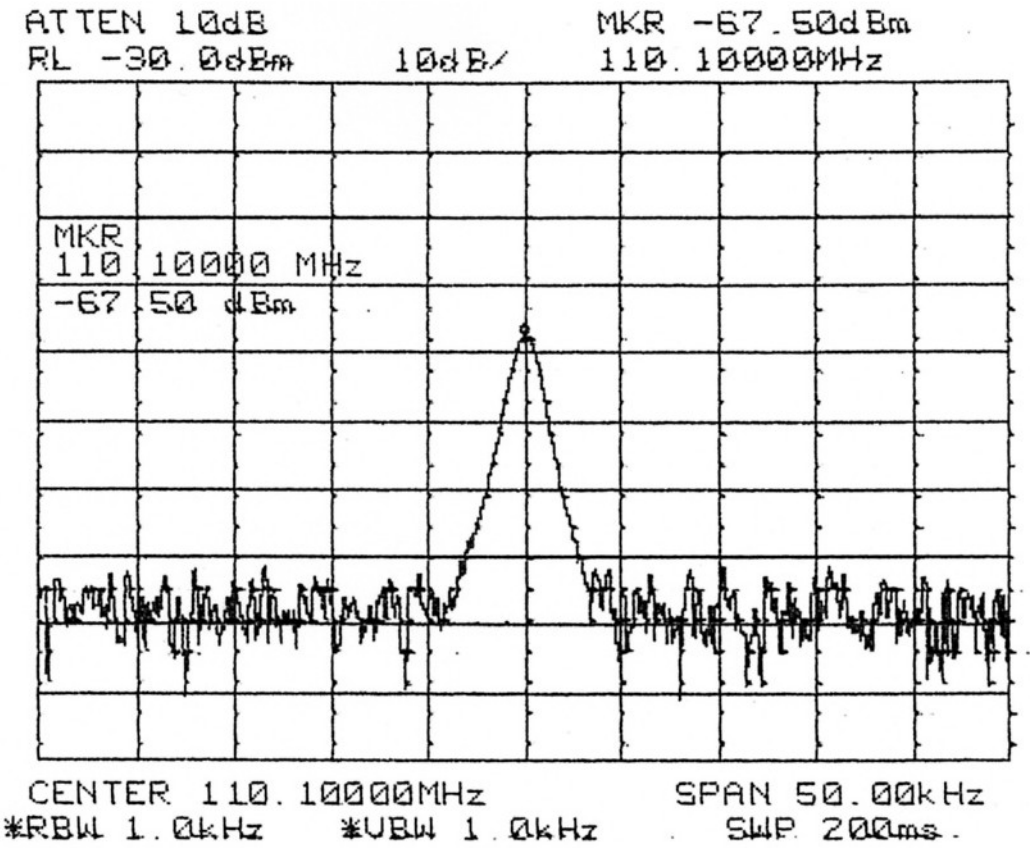
40.1 MHz + 70 MHz High Side Injection



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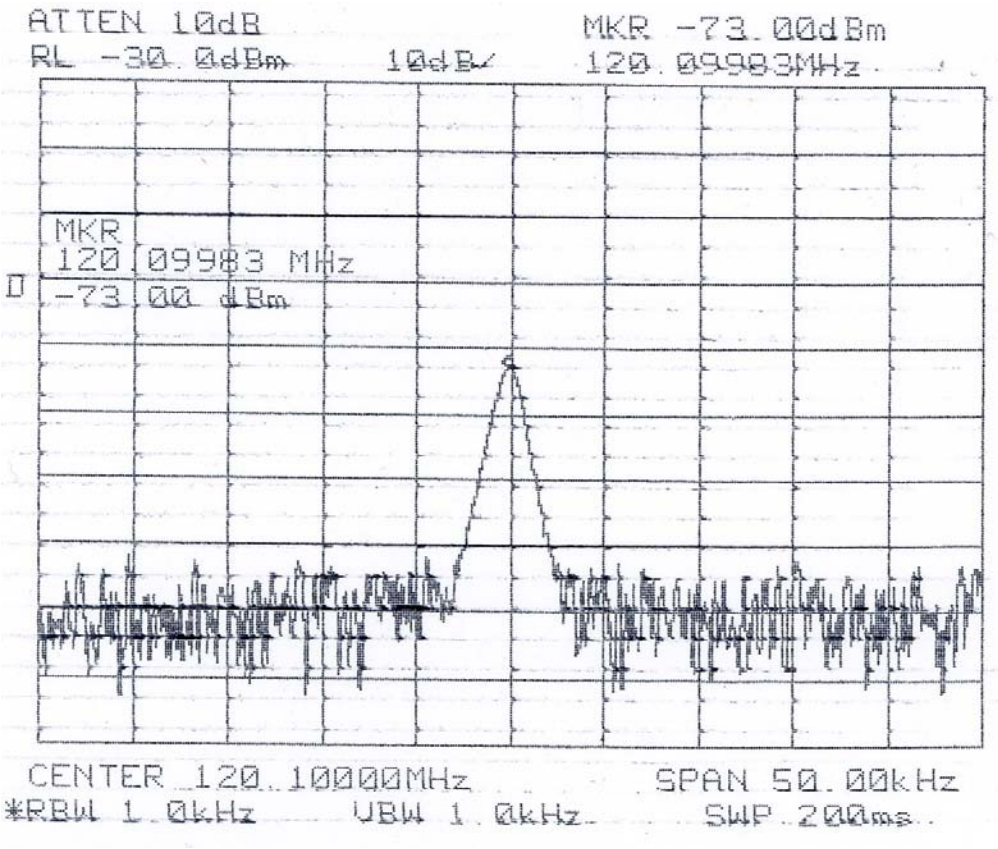
50.1 MHz + 70 MHz High Side Injection



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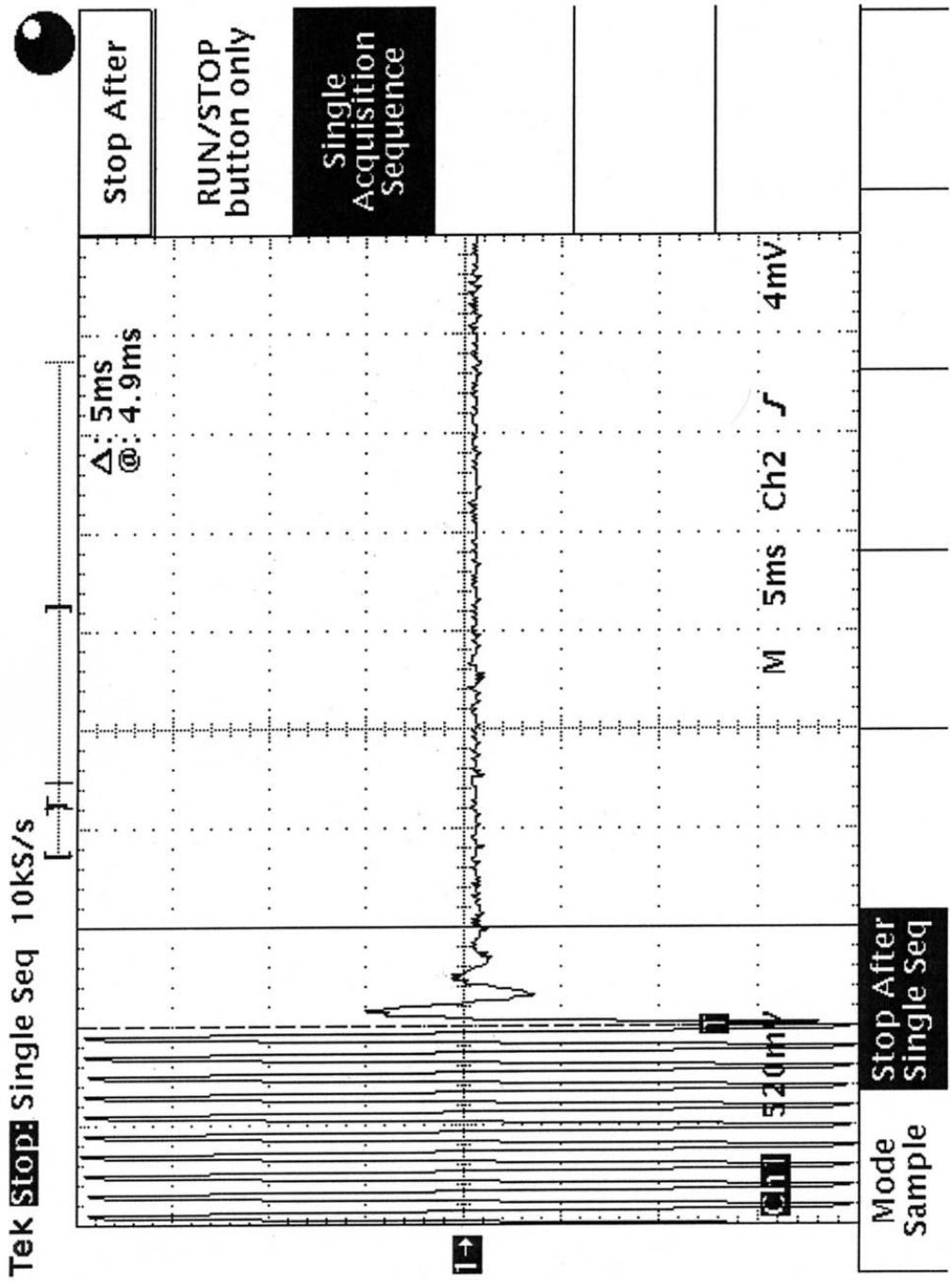
Transient Frequency Behavior

Minimum Standard		20K0F3E
T1	5mS	±25 kHz
T2	20mS	±12.5 kHz
T3	5 mS	±25 kHz

Transient Frequency Response

T1	5 mS	+10 kHz
T2	10 mS	within FCC limits per Part 90.214
T3	700 uS	within ±12.5 kHz

Transient Frequency Behavior



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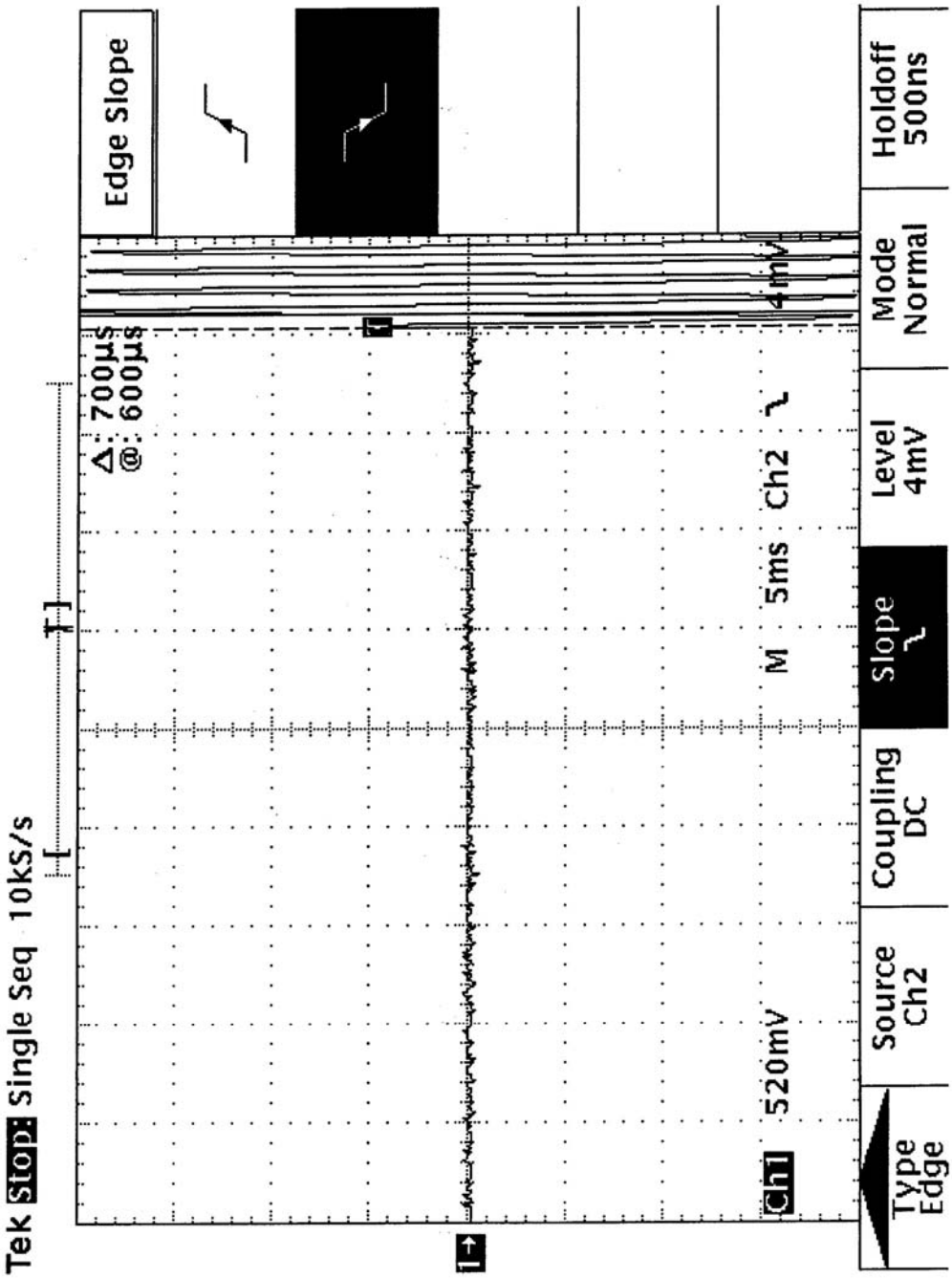
Transient Frequency Behavior



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