ITS Intertek Testing Services
ETL SEMKO

FCC Part 90 Test Report
for
Communication Network Interface, Inc.
on the
Radio Packet Modem
Model: CNI-903M
FCC ID: N79CNI-903M-1

Test Report #: 20459191
Date of Report: April 23, 2001

Job #: J20045919
Date of Test: April 14, 2001

Total No of Pages Contained in this Report: 21 + Data Sheets

NVLAP®

NVLAP Laboratory Code: 200201-0

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Communication Network Interface, Inc., Model No. CNI-903M
FCC ID: N79CNI-903M-1

Date of Test: April 14, 2001

1.0 Summary of Tests

FCC ID: N79CNI-903M-1
Model No.: CNI-903M

FCC RULE	DESCRIPTION OF TEST	RESULTS
2.1046	RF Power Output	Passed
90.205	Effective Radiated Power	Passed
2.1049, 90.209(b)(5), 90.210	Occupied Bandwidth, Bandwidth Limitation, Emission Masks	Passed
2.1051	Spurious Emissions at Antenna Terminals	Passed
2.1053, 15.109	Field Strength of Spurious Radiation	Passed
15.107	Line Conducted Emissions	Passed
2.1055	Frequency Stability vs. Temperature	Passed
2.1055	Frequency Stability vs. Voltage	Passed
2.914	Transient Frequency Behavior	N/A

Test Engineer: Xi-Ming Yang Date: 4/30/01
Xi-Ming Yang

EMC Site Manager: David Chernomordik Date: 4/30/01
David Chernomordik, Ph.D.
EMC Site Manager

2.0 General Description

2.1 Product Description

The CNI-903M, RPM (Radio Packet Modem) is a digital data communication equipment in acordance with Mobitex specification. The frequency it uses ranges from 896 MHz to 902 MHz for transmission and from 935 MHz to 941 MHz for reception.

A production version of the sample was received on April 14, 2001 in good condition.

Overview of Radio Packet Modem

Applicant	Communication Network Interface, Inc.
Trade Name & Model No.	CNI / CNI-903M
FCC Identifier	N79CNI-903M-1
Use of Product	Digital Data Communication (Two-Way Pager)
Type of Modulation	GMSK
Bit Rate	8000 bps
Max. Allowed Deviation	2 kHz
RF Output	2W
The dc voltage applied to and current into the several elements of the final RF amplifying device	Voltage: 3V Current: 1A
Frequency Range	896 – 902 MHz
Max. Number of Channels	
Antenna(e) & Gain	0 dBi
Detachable Antenna?	[X] Yes [ ] No
Receiver L.O. Frequency	896 – 902 MHz
External Input	[ ] Audio [X] Digital Data

2.2 Related Submittal(s) Grants

None.

2.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is site 3. This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

3.0 RF Power Output, Radiated Power
FCC § 2.1046

3.1 Test Procedure

The transmitter output was connected to a calibrated coaxial attenuator, the other end of which was connected to a spectrum analyzer. The resolution bandwidth and the video bandwidth of the spectrum analyzer were setup to 3 MHz and 7 MHz respectively. The attenuator was included in spectrum analyzer OFFSET function. Transmitter output power was read off the spectrum analyzer in dBm.

The Radiated Power was measured by the substitution method using half-wave dipole connected to a generator. EIRP (in dBm) was calculated as follow:

$$EIRP = V1 - V2 + Vg + G$$

Where V1 is the Spectrum Analyzer Reading when measured Field Strength from the EUT
V2 is the Spectrum Analyzer Reading when measured Field Strength from the generator
Vg is the generator output (on the end of the cable connected to an antenna)
G is 2.1 dBi – the gain of the half-wave dipole.

3.2 Test Equipment

EMCO Log Periodic Antenna, 3148
CDI Roberts Antenna
Hewlett Packard 8481A Power Sensor, 435B Power Meter
Hewlett Packard HP8566B Spectrum Analyzer, 100 Hz - 22 GHz
Tektronix 2782 Spectrum Analyzer, 100 Hz - 40 GHz

3.3 Test Results

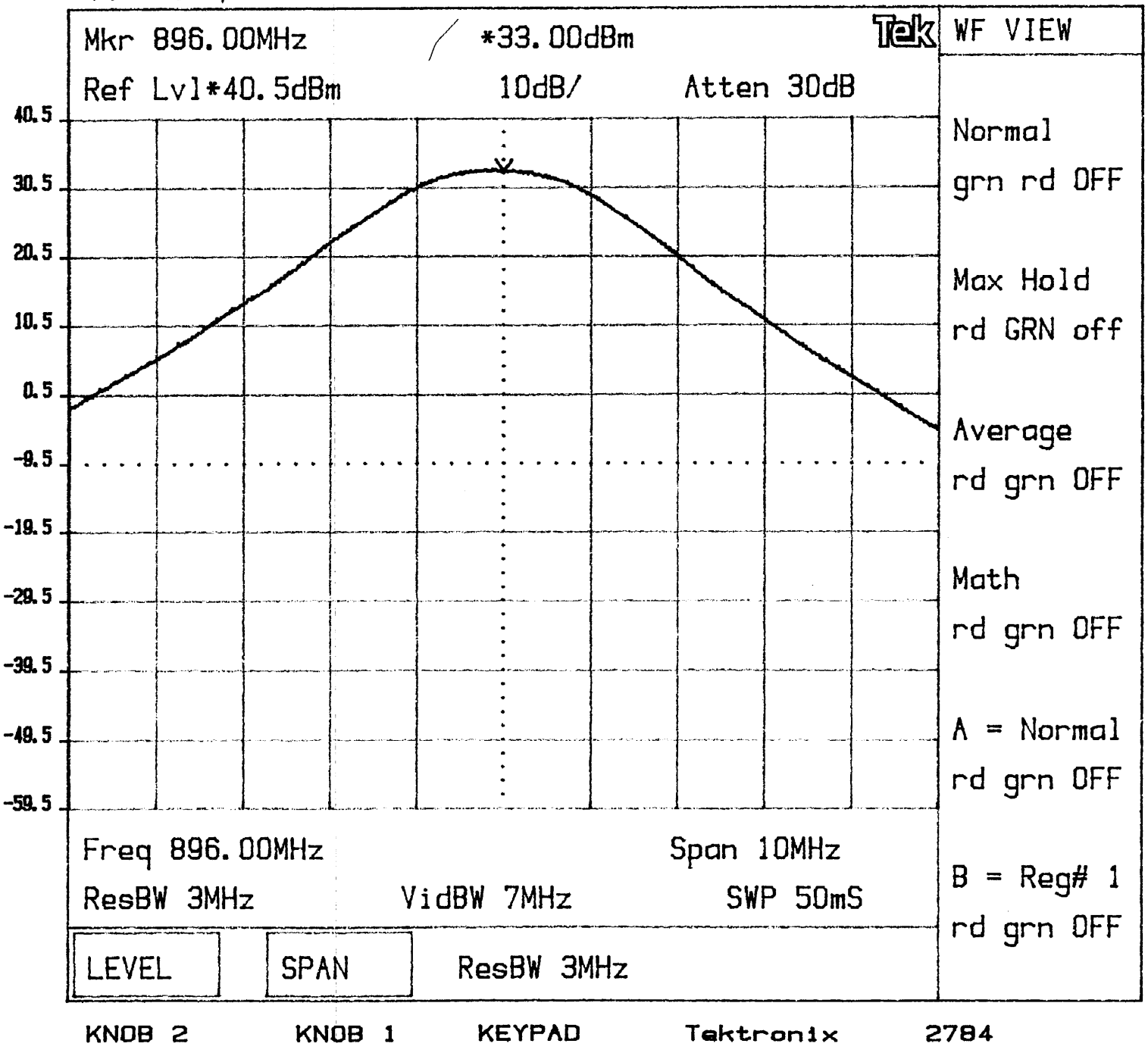
Results: Passed

Refer to the attached plots .for conducted output power.

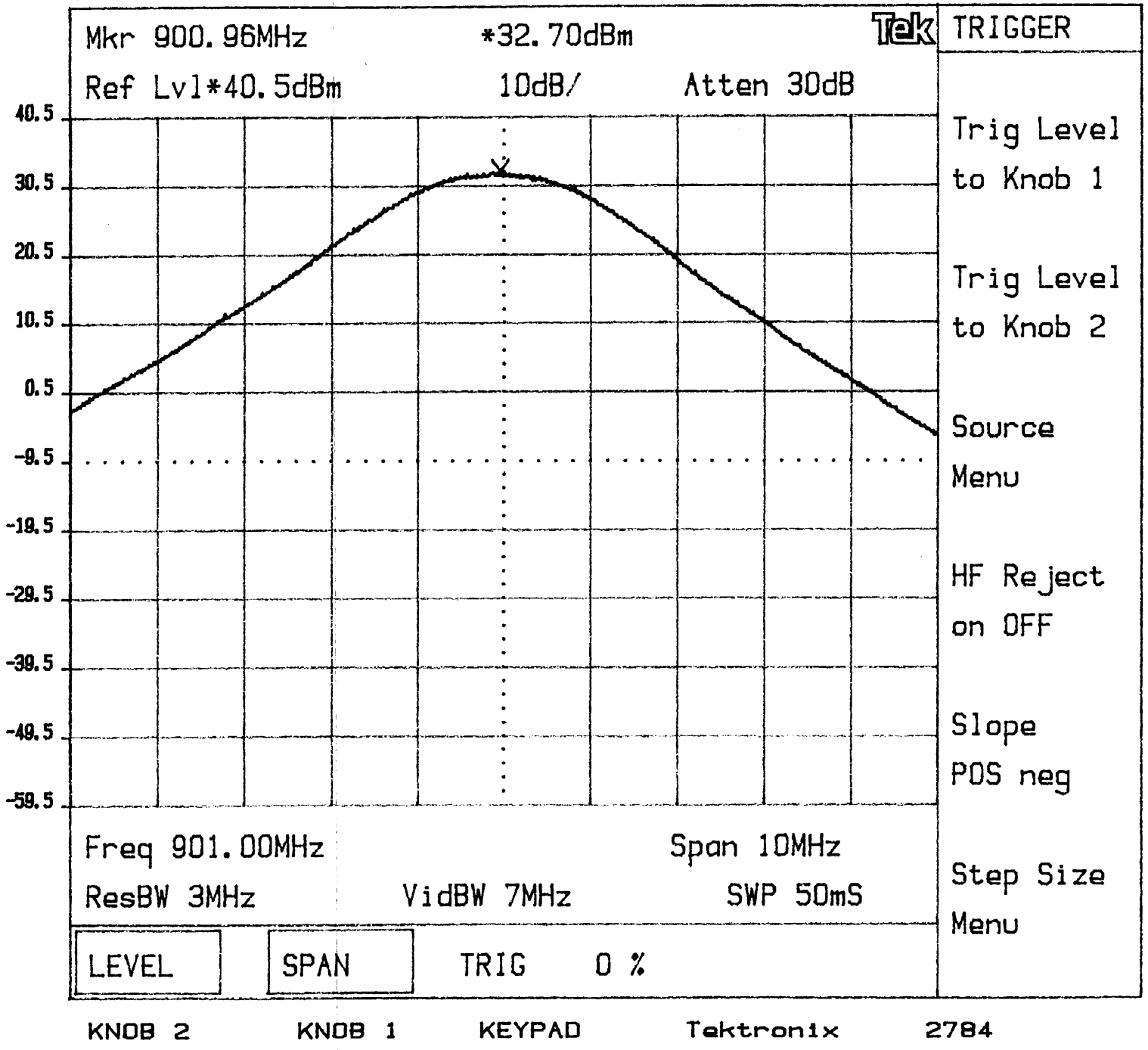
Plot Number	Description
3–1	Low Channel
3-2	Middle Channel
3-3	High Channel

Refer to the table below for EIRP test data

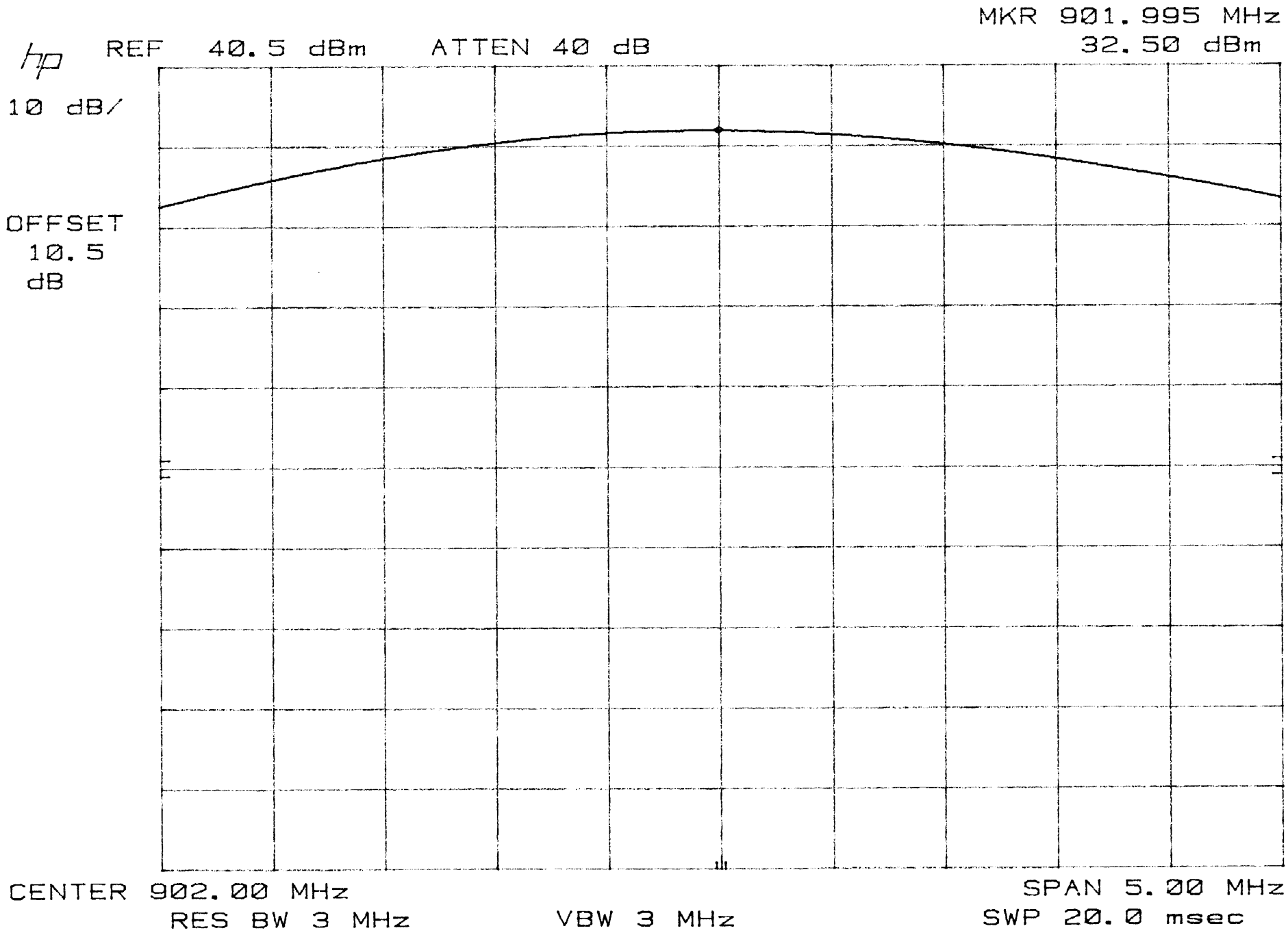
Plot 3-1


Mkr 896.00MHz
*33.00dBm
Tek
WF VIEW
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
Normal
grn rd OFF
Max Hold
rd GRN off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 896.00MHz
Span 10MHz
ResBW 3MHz
VidBW 7MHz
SWP 50mS
LEVEL
SPAN
ResBW 3MHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

Plot 3-2


Mkr 900.96MHz
*32.70dBm
Tek
TRIGGER
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
Trig Level to Knob 1
Trig Level to Knob 2
Source Menu
HF Reject on OFF
Slope POS neg
Step Size Menu
Freq 901.00MHz
Span 10MHz
ResBW 3MHz
VidBW 7MHz
SWP 50mS
LEVEL
SPAN
TRIG 0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

3-3


MKR 901.995 MHz
32.50 dBm
REF 40.5 dBm
ATTEN 40 dB
10 dB/
OFFSET
10.5
dB
CENTER 902.00 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 5.00 MHz
SWP 20.0 msec

Effective Isotropic Radiated Power
(measured by substitution method)

Frequency MHz	Antenna polarization H/V	Spectrum Analyzer reading (EUT) dB(uV)	Spectrum Analyzer reading (Sig Gen & Tuned Dipole) dB(uV)	Signal Generator Power dBm	Effective Isotropic Radiated Power (EUT) dBm
896	V	106.0	86.0	9.5	31.6
899	V	106.5	86.1	9.5	32.0
902	V	106.6	85.3	9.5	32.9

4.0 Occupied Bandwidth, Bandwidth Limitation, Emission Masks
FCC §2.1049, 90.209(b)(5), 90.210

4.1 Test Procedure

The antenna was disconnected from the transmitter and the short cable was connected to the transmitter RF output.

The RF output was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set up at least 10 times higher then the authorized bandwidth of the transmitter. The spectrum analyzer reading was recorded and plotted. This reading is used as a reference for emission mask measurements.

The resolution bandwidth of the spectrum analyzer was set up to 100 Hz and the spectrum of the transmitting signal was recorded. This spectrum was compared to the required emission mask.

The emission designator was defined as 9K40F1D, where 9.4 kHz is the Necessary Bandwidth.
The Necessary Bandwidth was calculated using the formula B = 2(M+D), where M is the modulation frequency and D is the deviation. According the Specification, the EUT uses GMSK modulation with BT=0.3, Bit Rate equals 8000 bps, and deviation equals 2 kHz. For this type of modulation, the modulation frequency can be defined as 8000/3 = 2.7 kHz. This corresponds to B = 2(2.7 + 2) = 9.4 kHz

4.2 Test Equipment

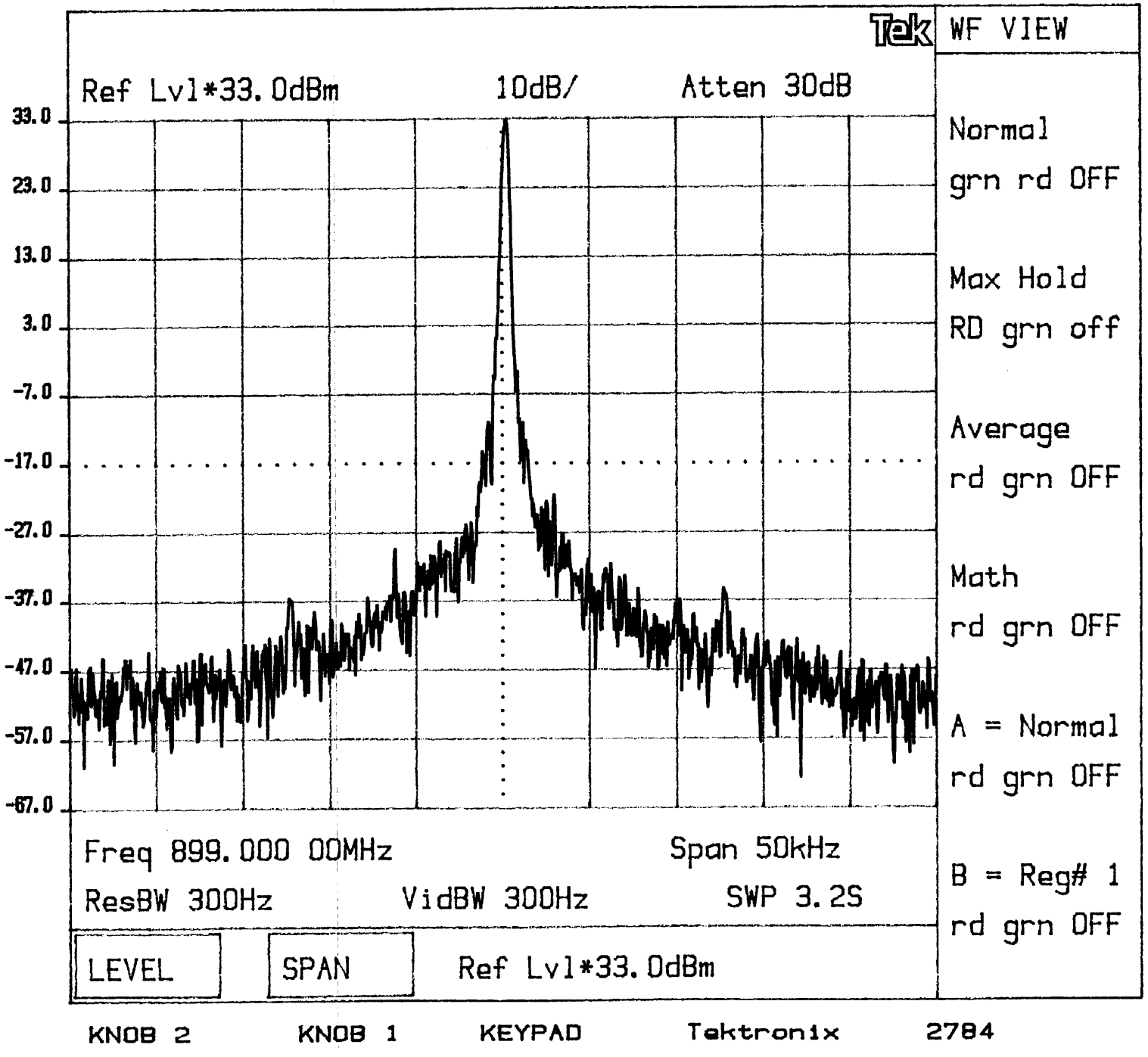
Hewlett Packard 8481A Power Sensor, 435B Power Meter
Hewlett Packard HP8566B Spectrum Analyzer, 100 Hz - 22 GHz
Tektronix 2782 Spectrum Analyzer, 100 Hz - 40 GHz

4.3 Test Results

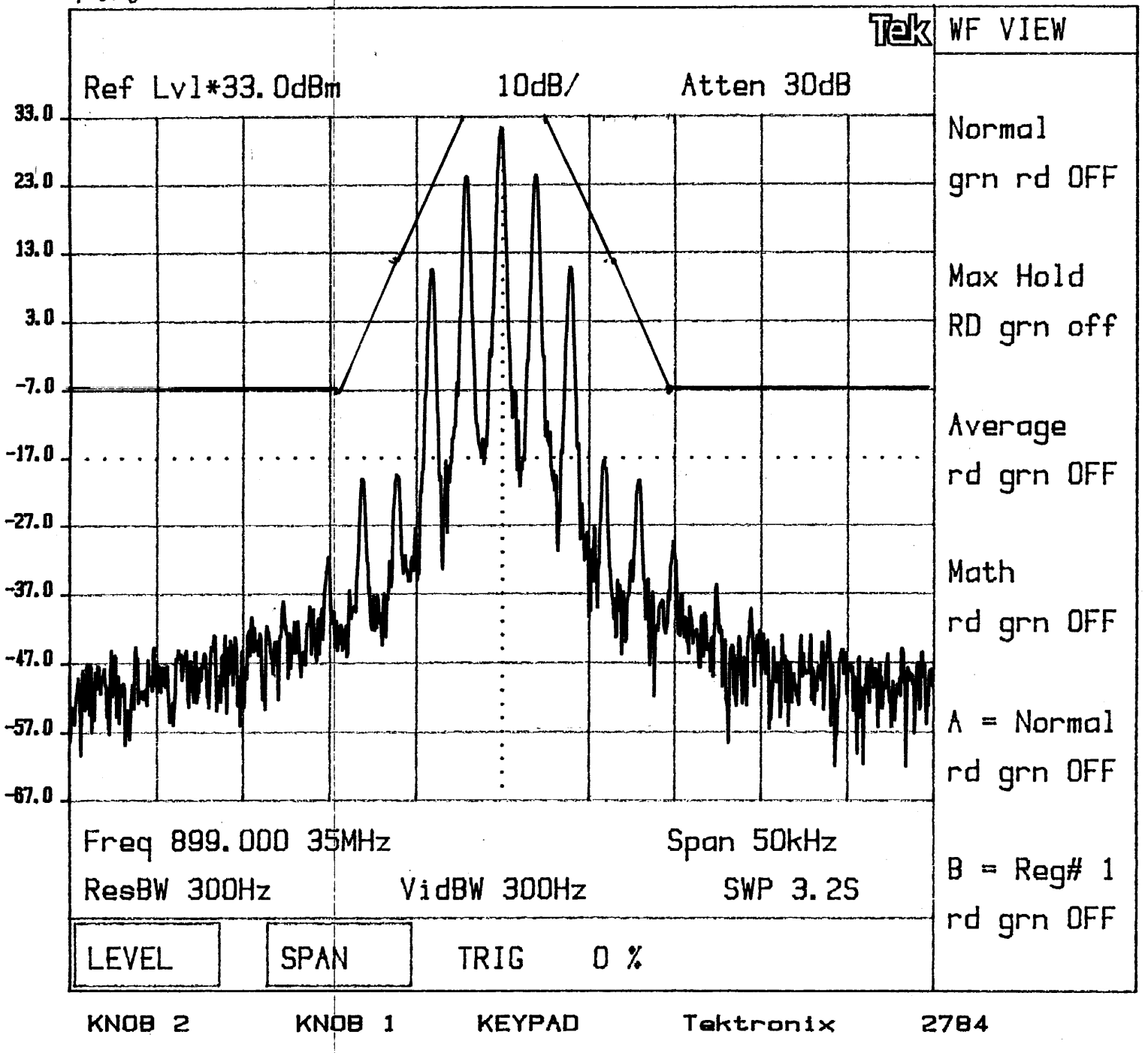
Plot Number	Description
4-1	Unmodulated
4-2	Modulated (00.11.00,11...) 50 kHz Span
4-3	Modulated (00.11.00.11...) 100 kHz Span
4-4	Modulated (00.11.00.11...) 200 kHz Span
4-5	Modulated (00.11.00.11...) 1 MHz Span
4-6	Random Modulated

Results: Passed

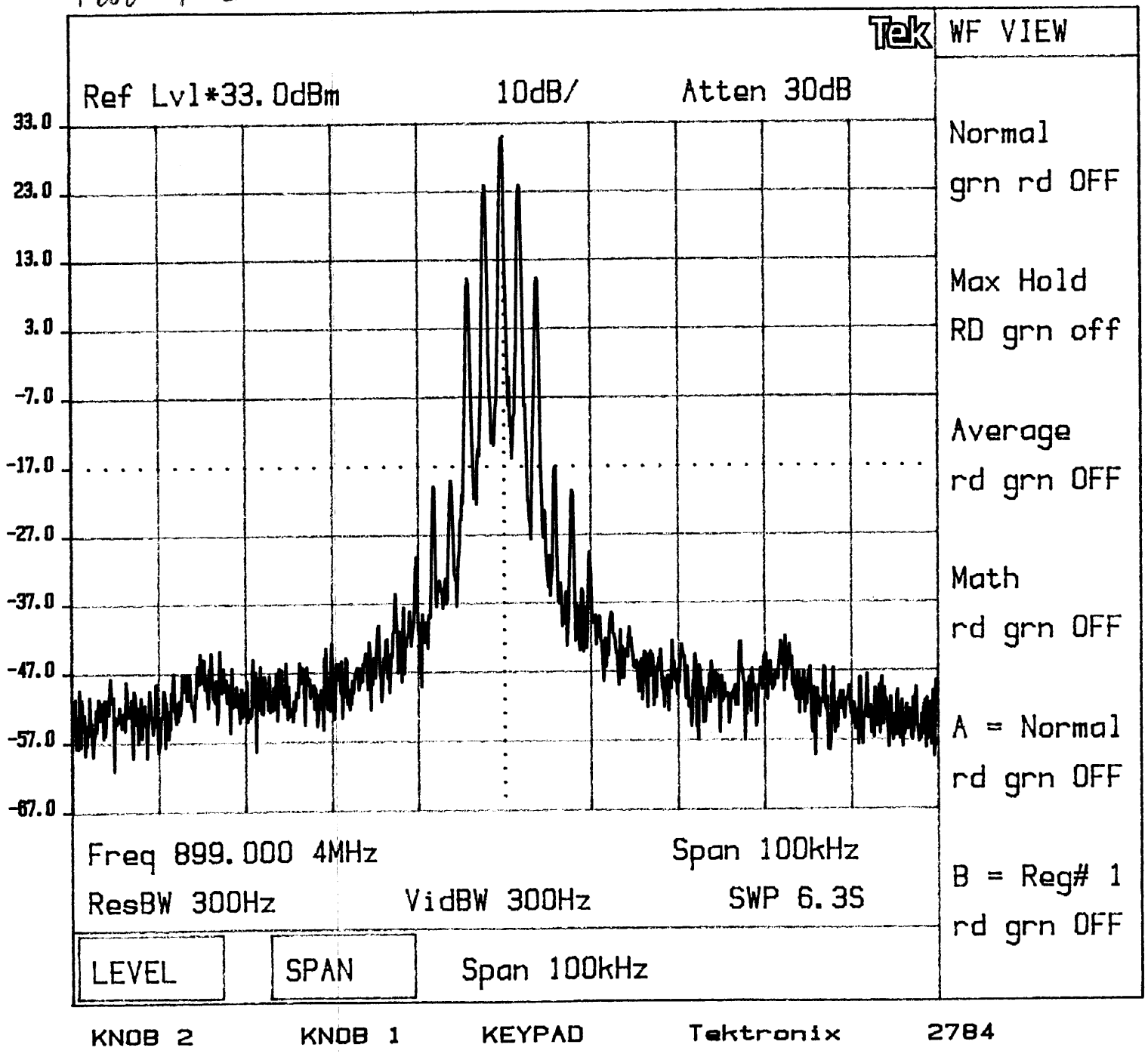
Plot 4-1


Tek
WF VIEW
Ref Lvl*33.0dBm
10dB/
Atten 30dB
33.0
23.0
13.0
3.0
-7.0
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 899.000 00MHz
Span 50kHz
ResBW 300Hz
VidBW 300Hz
SWP 3.2S
LEVEL
SPAN
Ref Lvl*33.0dBm
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

Plot 4-2


Tek
WF VIEW
Ref Lvl*33.0dBm
10dB/
Atten 30dB
33.0
23.0
13.0
3.0
-7.0
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 899.000 35MHz
Span 50kHz
ResBW 300Hz
VidBW 300Hz
SWP 3.2S
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

Plot 4-3


Tek
WF VIEW
Ref Lvl*33.0dBm
10dB/
Atten 30dB
33.0
23.0
13.0
3.0
-7.0
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 899.000 4MHz
Span 100kHz
ResBW 300Hz
VidBW 300Hz
SWP 6.3S
LEVEL
SPAN
Span 100kHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
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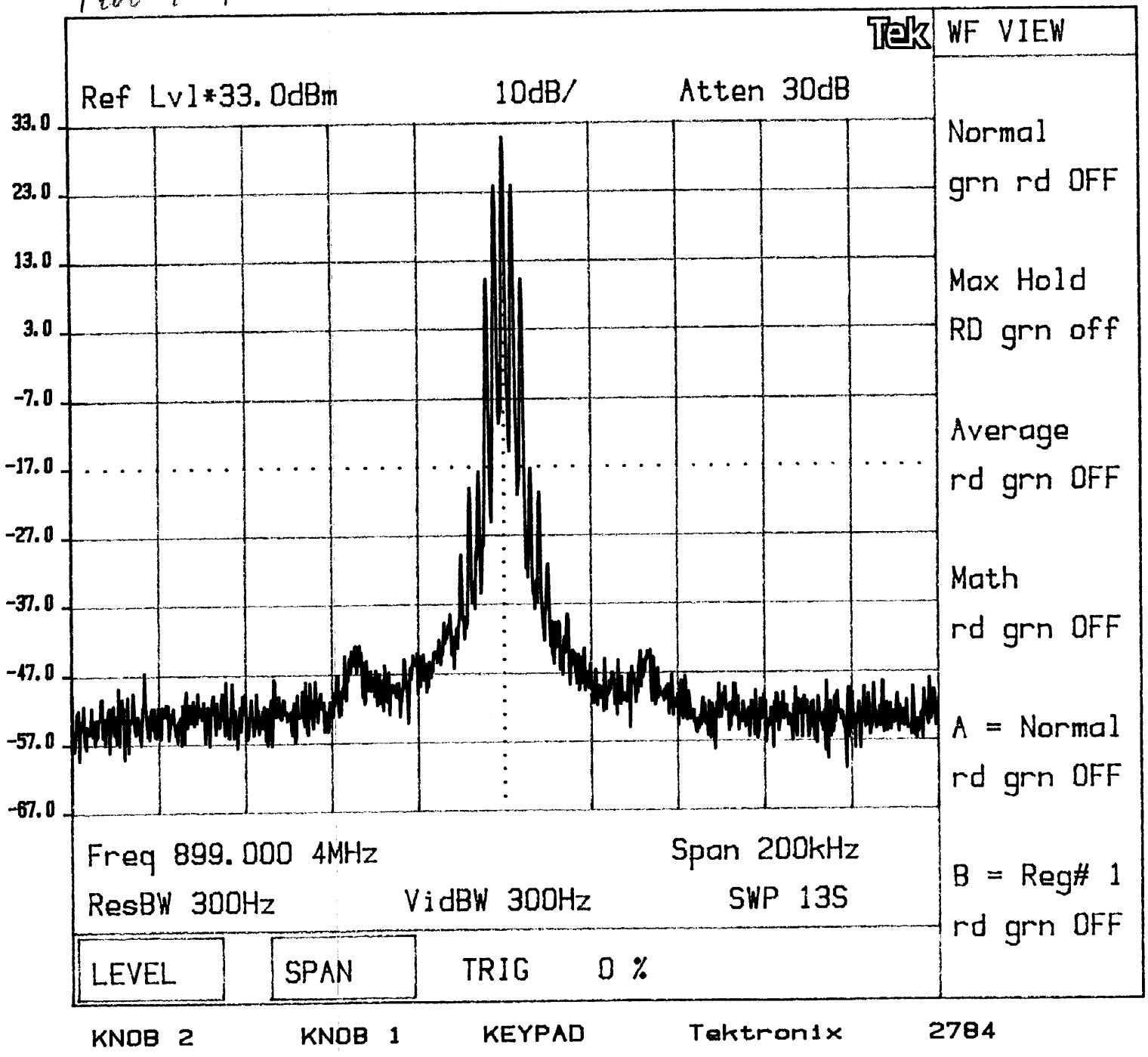
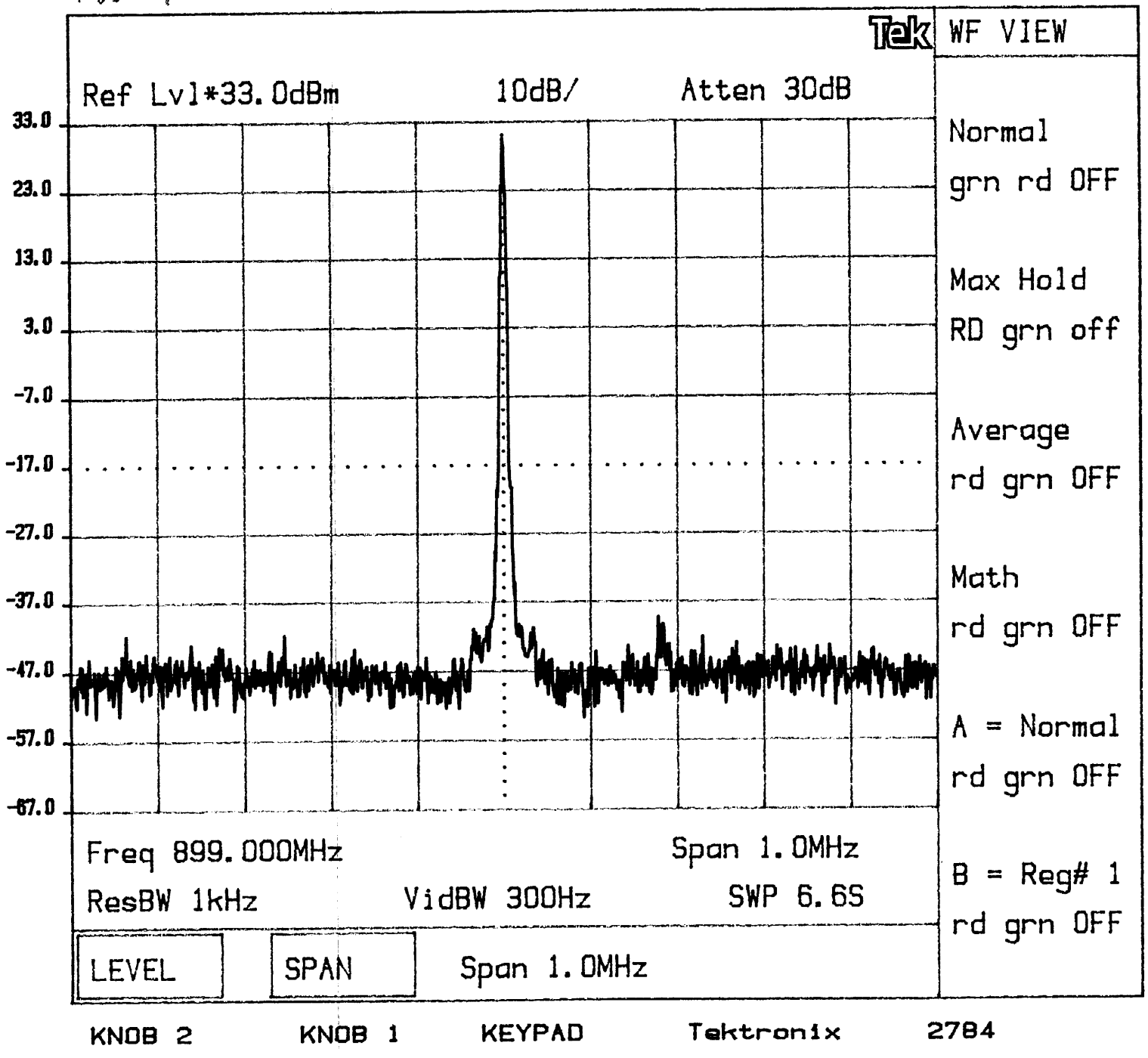
Plot 4-4


Tek
WF VIEW
Ref Lvl*33.0dBm
10dB/
Atten 30dB
33.0
23.0
13.0
3.0
-7.0
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 899.000 4MHz
Span 200kHz
ResBW 300Hz
VidBW 300Hz
SWP 13S
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

Plot 4-5


Tek
WF VIEW
Ref Lvl*33.0dBm
10dB/
Atten 30dB
33.0
23.0
13.0
3.0
-7.0
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 899.000MHz
Span 1.0MHz
ResBW 1kHz
VidBW 300Hz
SWP 6.6S
LEVEL
SPAN
Span 1.0MHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
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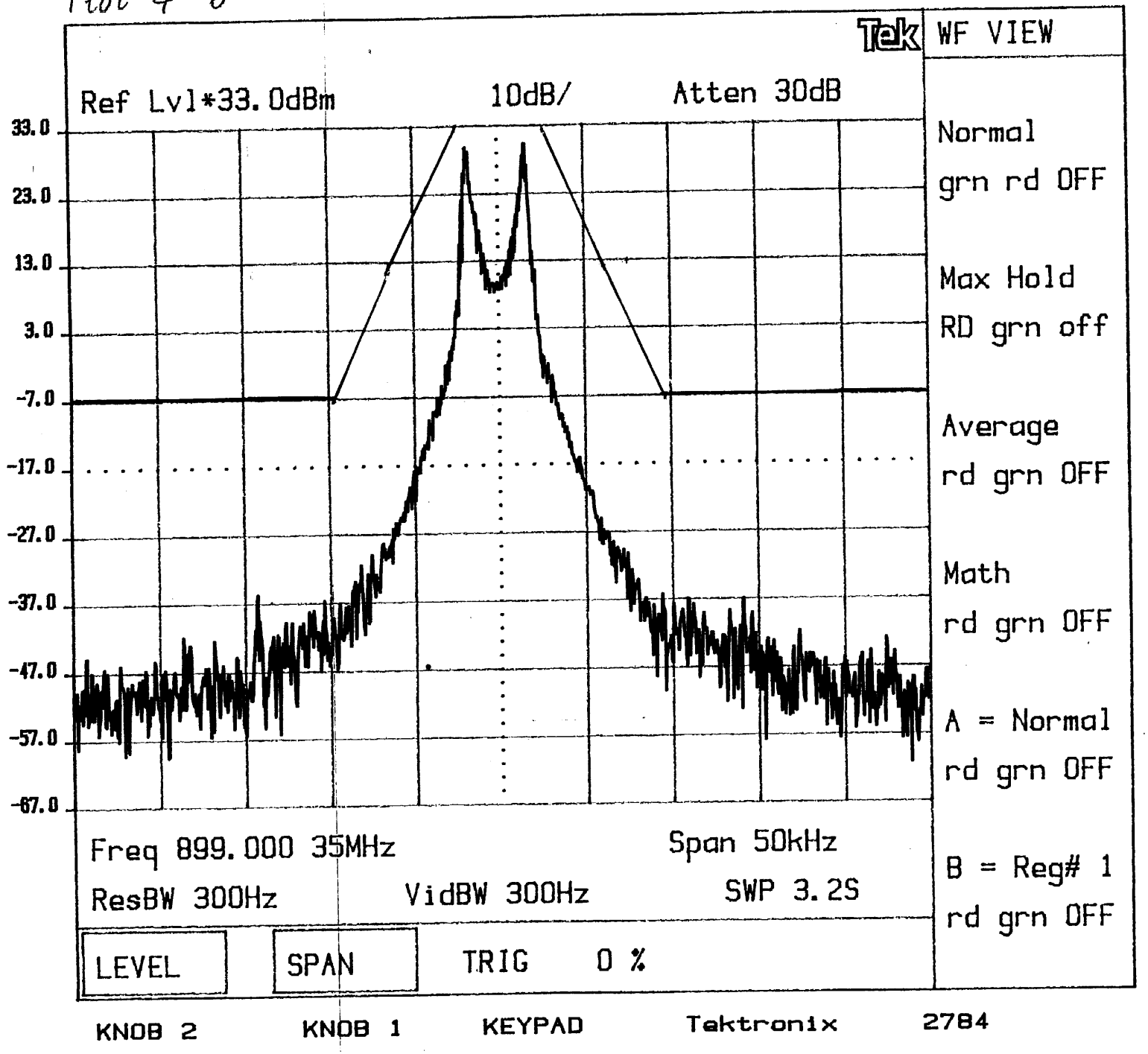
Plot 4-6


Tek
WF VIEW
Ref Lvl*33.0dBm
10dB/
Atten 30dB
33.0
23.0
13.0
3.0
-7.0
-17.0
-27.0
-37.0
-47.0
-57.0
-67.0
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
Freq 899.000 35MHz
Span 50kHz
ResBW 300Hz
VidBW 300Hz
SWP 3.2S
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

5.0 Out-of-Band Emissions at Antenna Terminals

FCC §2.1051

The power of emissions must be attenuated below the power of the unmodulated carrier (P) on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth - at least (43 + 10 log P) dB.

5.1 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show the out-of- band emissions, if any, up to 10th harmonic.

5.2 Test Equipment

HP 8566B Spectrum Analyzer, 100 Hz - 22 GHz
HP 7470A Plotter

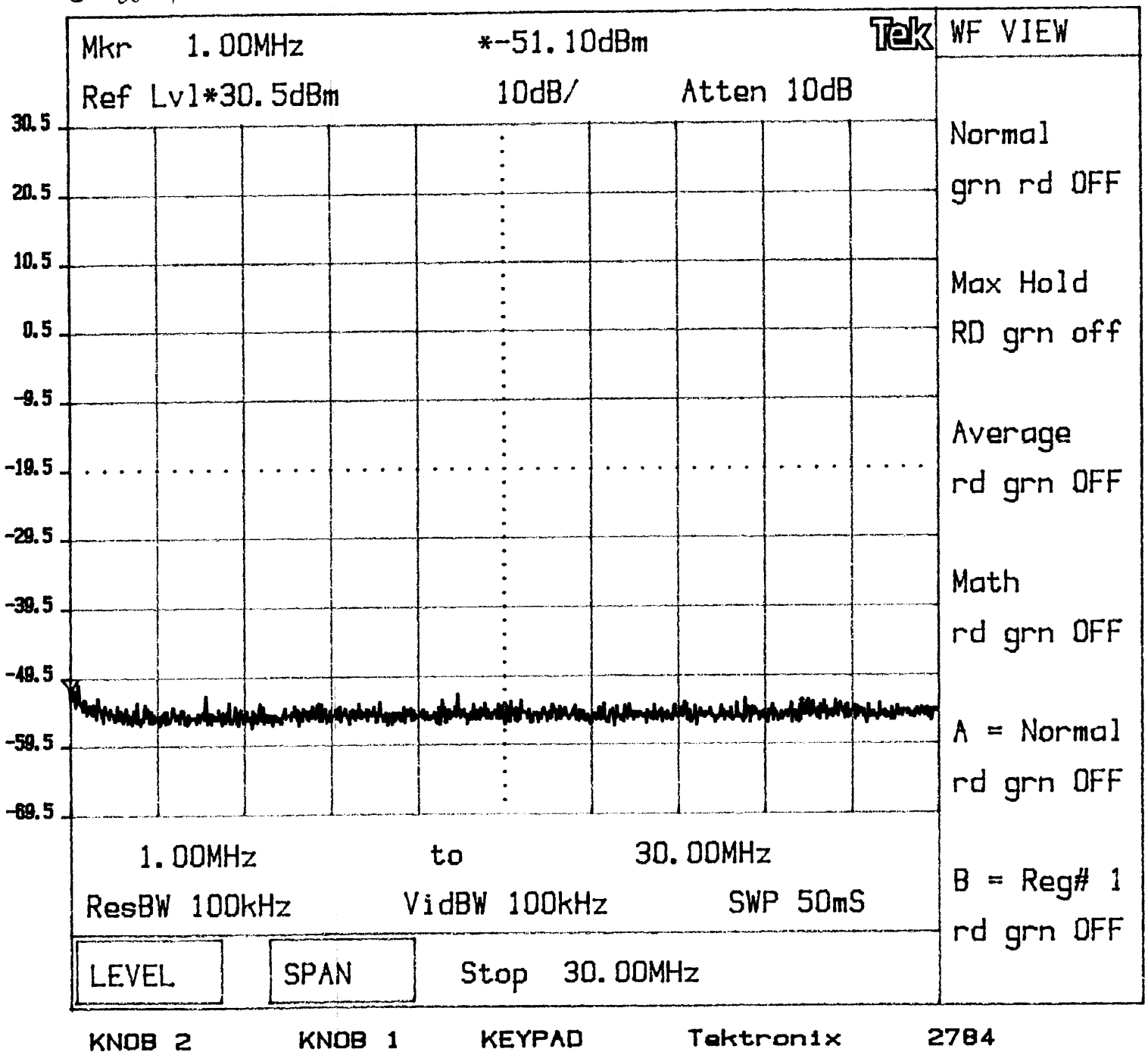
5.3 Test Results

Refer to the attached plots.

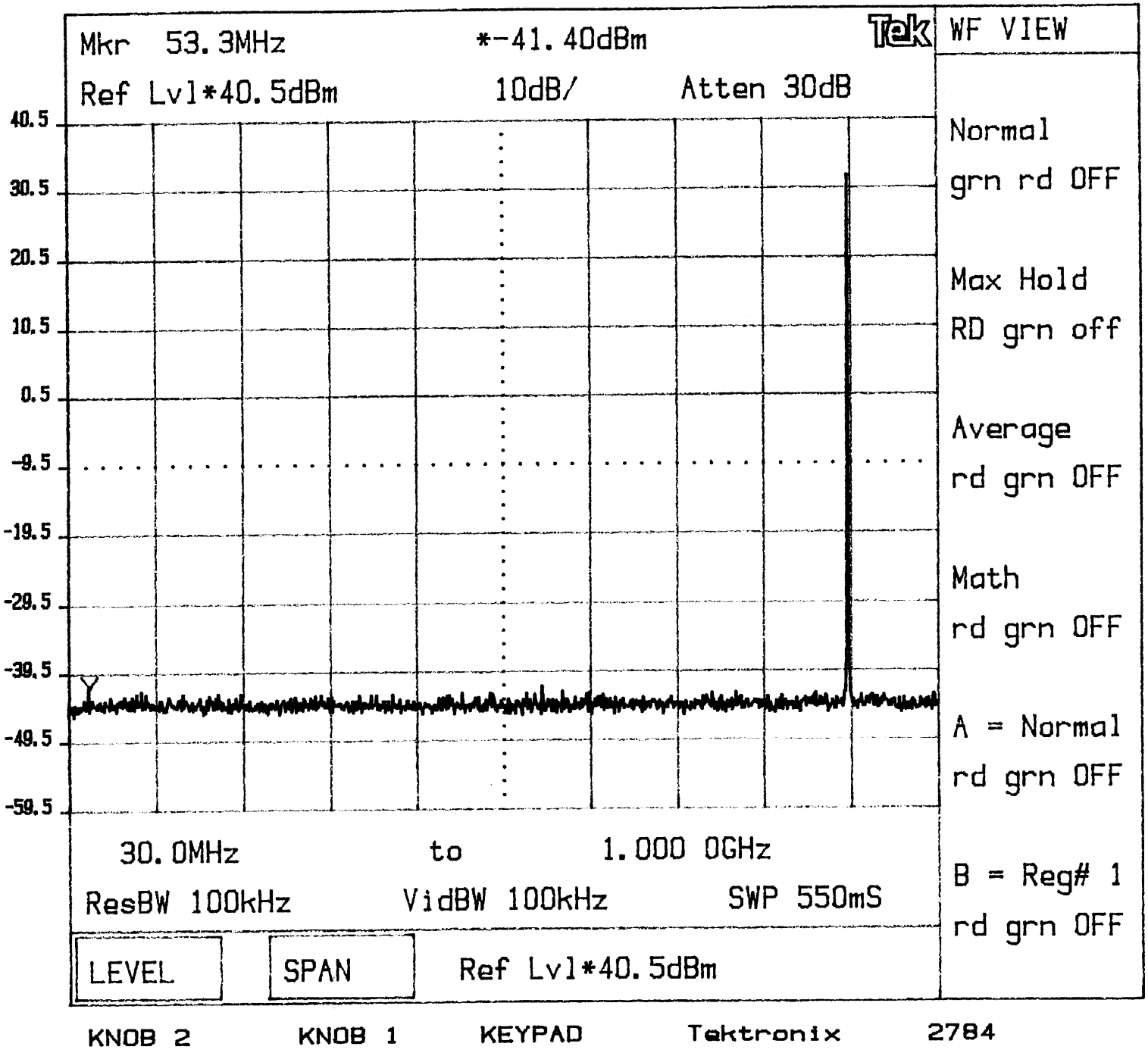
Plot Number	Description
5-a-1	Low Channel , 1 MHz –30 MHz
5-a-2	Low Channel, 30 MHz – 1 GHz
5-a-3	Low Channel, 1 GHz – 10 GHz
5-b-1	Middle Channel, 1 MHz –3 0 MHz
5-b-2	Middle Channel, 30 MHz – 1 GHz
5-b-3	Middle Channel, 1 GHz – 10 GHz
5-c-1	High Channel , 1 MHz –100 MHz
5-c-2	High Channel, 100 MHz – 1 GHz
5-c-3	High Channel, 1 GHz – 2.5 GHz
5-c-4	High Channel, 2.5 GHz – 10 GHz

Results: Passed

5-a-1


Mkr 1.00MHz
*-51.10dBm
Tek
WF VIEW
Ref Lvl*30.5dBm
10dB/
Atten 10dB
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
1.00MHz
to
30.00MHz
ResBW 100kHz
VidBW 100kHz
SWP 50mS
LEVEL
SPAN
Stop 30.00MHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

5-a-2


Mkr 53.3MHz
*-41.40dBm
Tek
WF VIEW
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
30.0MHz
to
1.000 0GHz
ResBW 100kHz
VidBW 100kHz
SWP 550mS
LEVEL
SPAN
Ref Lvl*40.5dBm
KNOB 2
KNOB 1
KEYPAD
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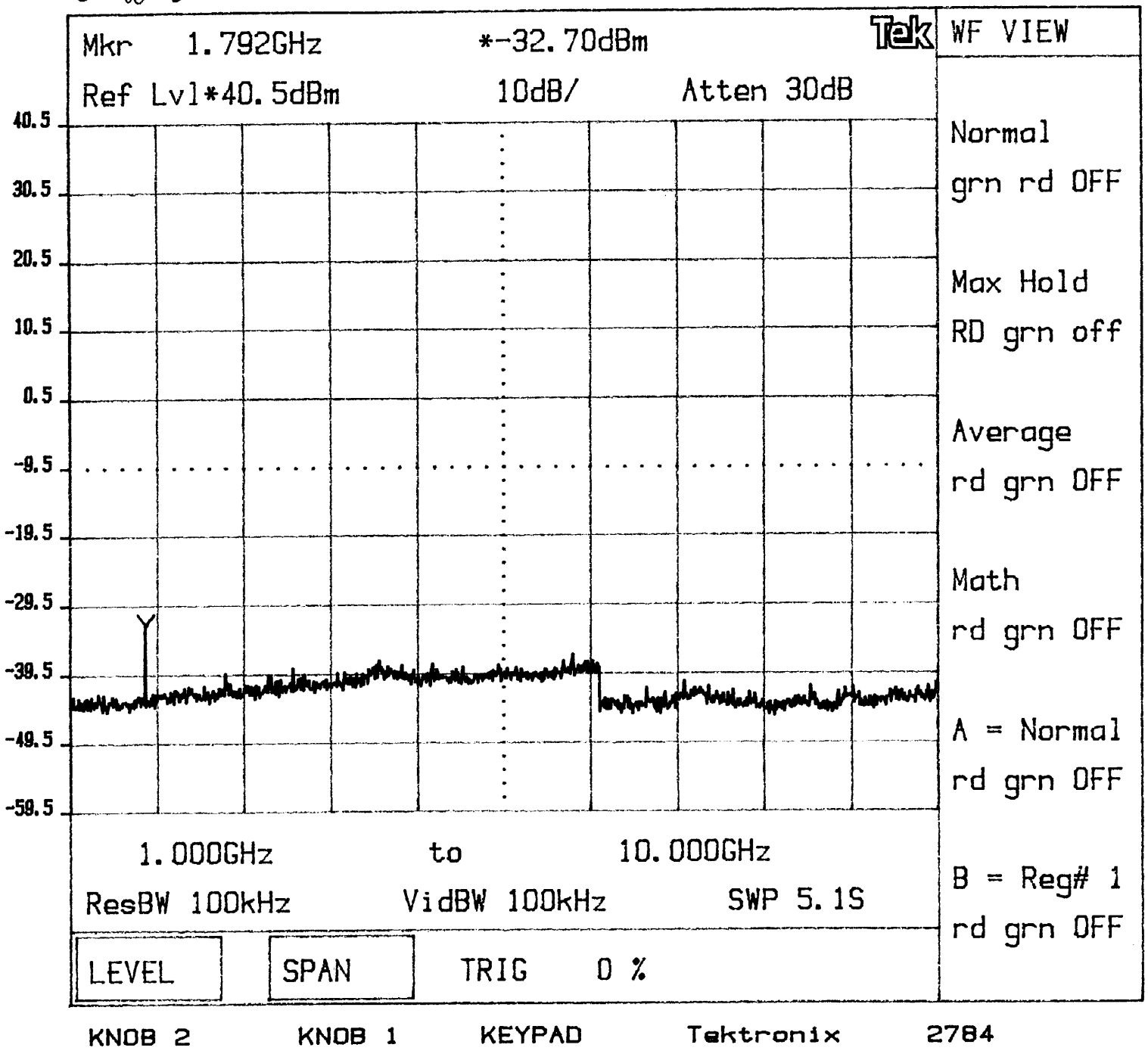
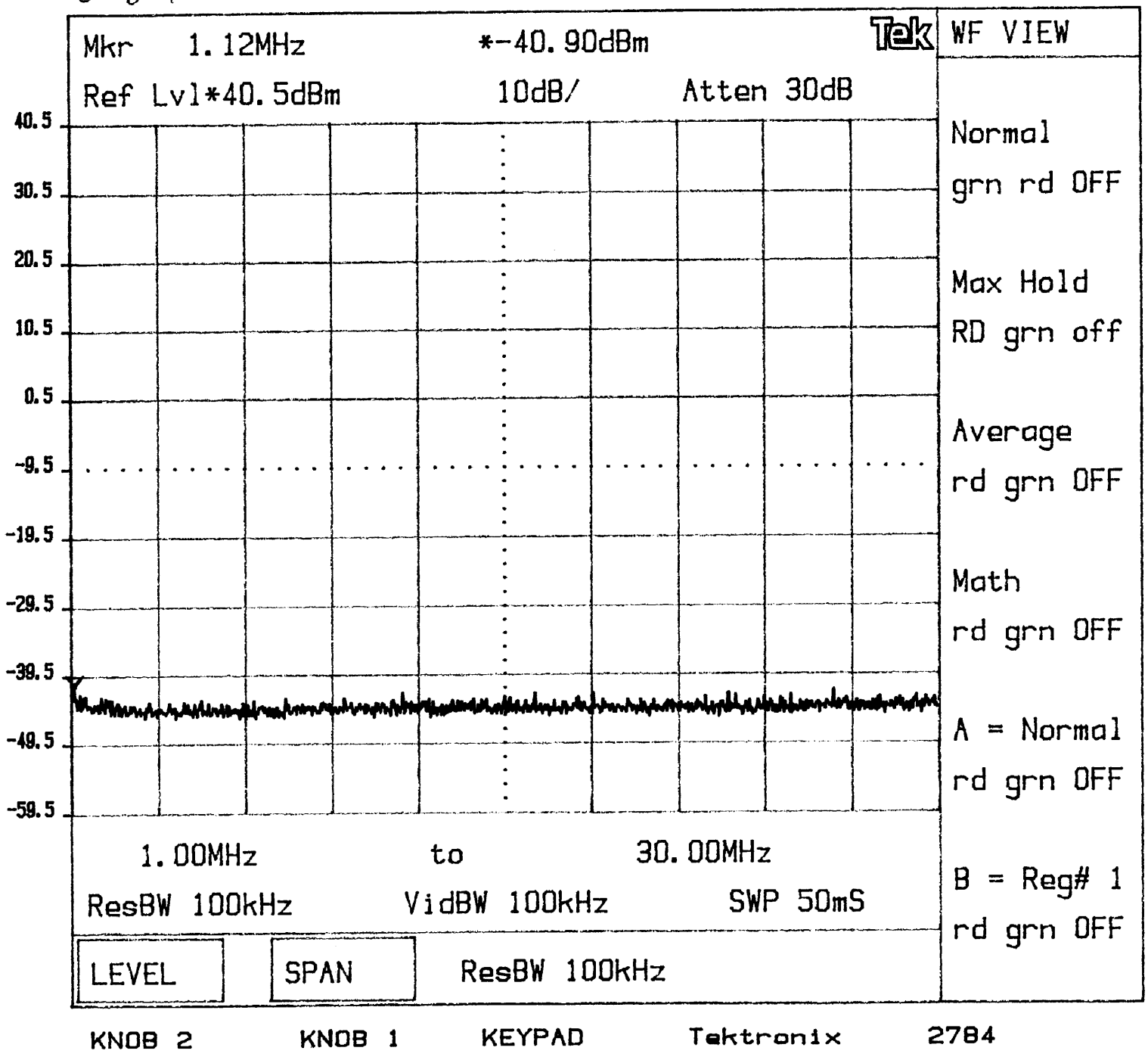
5-a-3


Mkr 1.792GHz
*-32.70dBm
Tek
WF VIEW
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
1.000GHz
to
10.000GHz
ResBW 100kHz
VidBW 100kHz
SWP 5.1S
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

5-b-1


Mkr 1.12MHz
*-40.90dBm
Tek
WF VIEW
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
1.00MHz
to
30.00MHz
ResBW 100kHz
VidBW 100kHz
SWP 50mS
LEVEL
SPAN
ResBW 100kHz
KNOB 2
KNOB 1
KEYPAD
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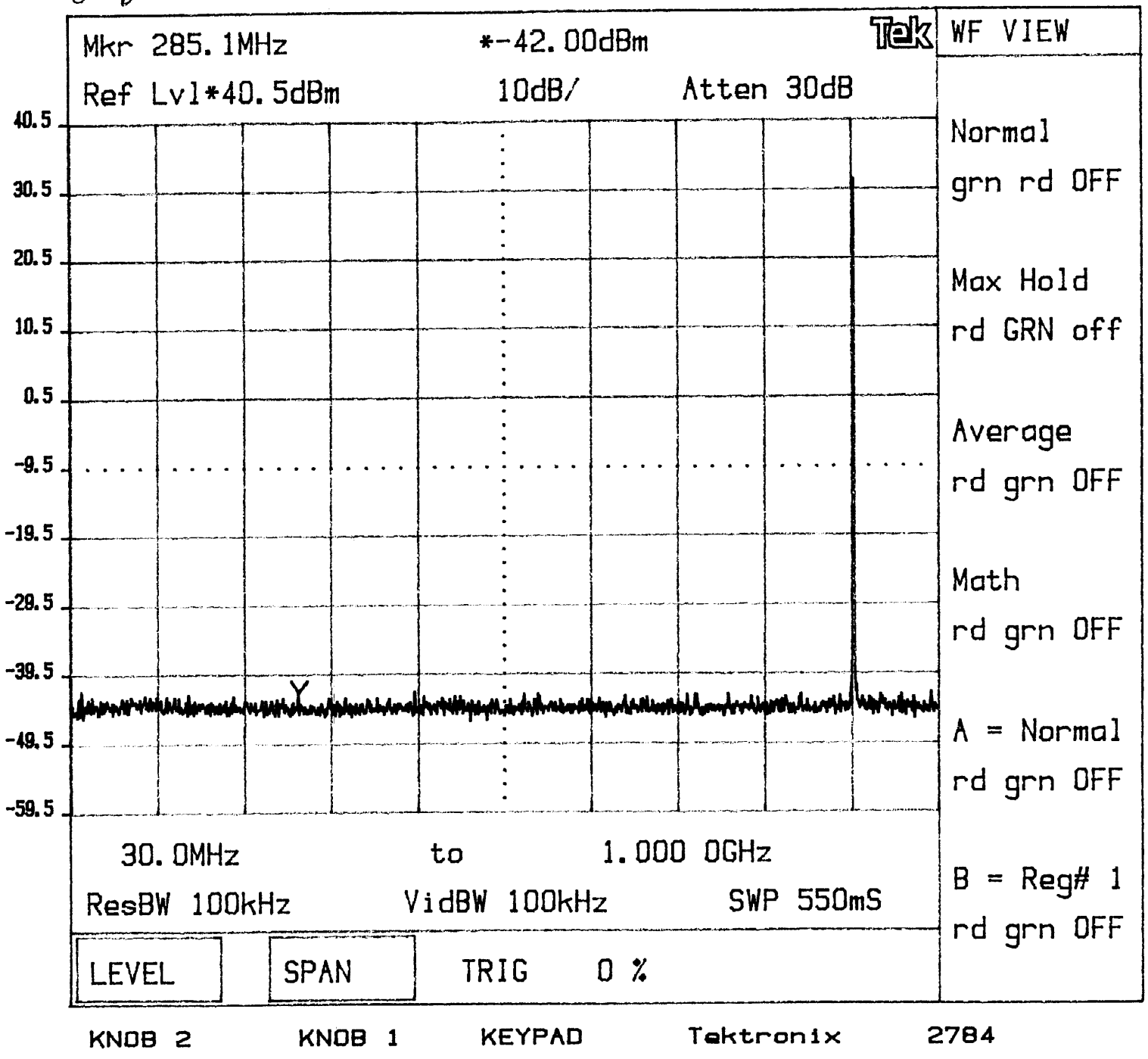
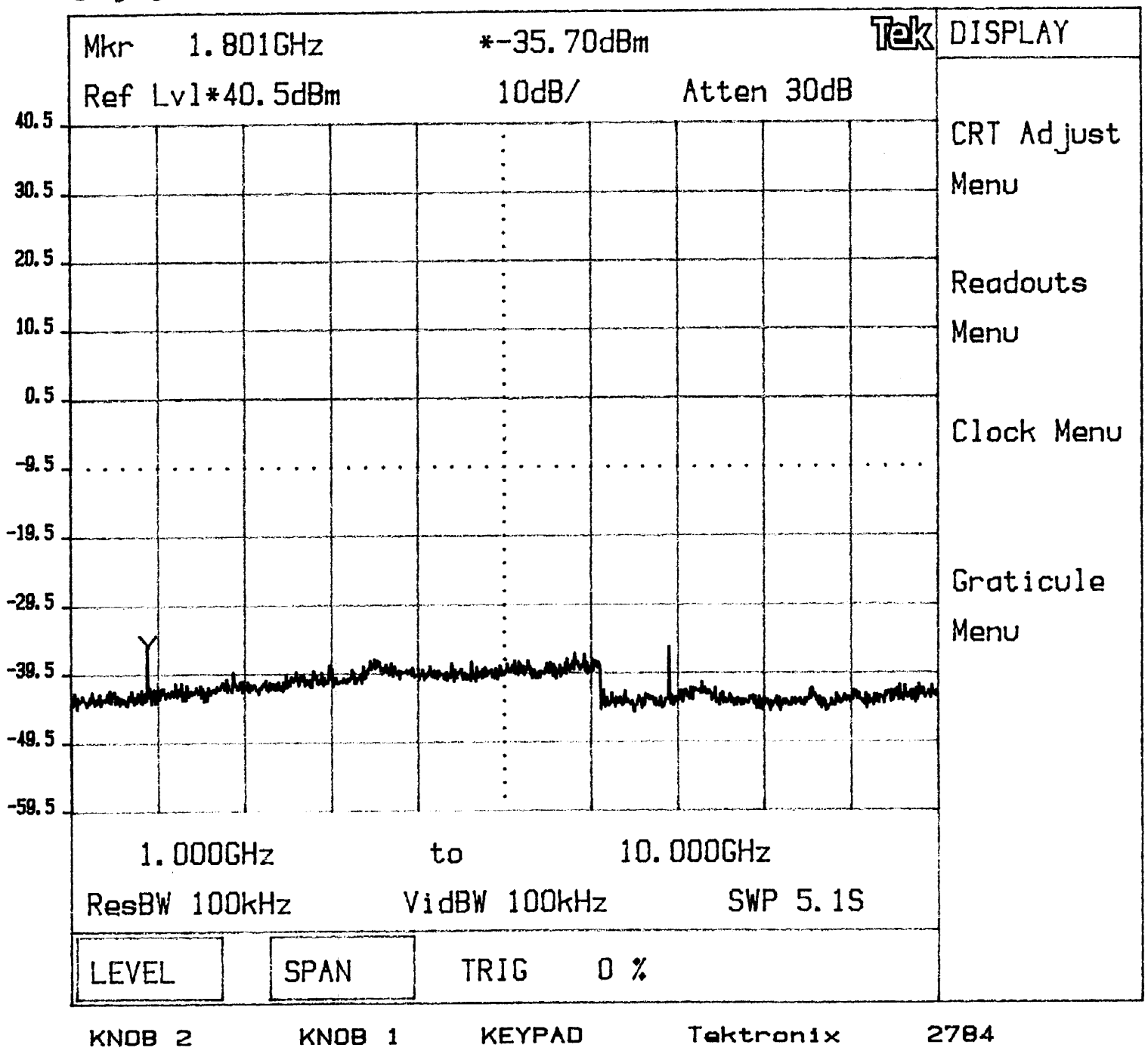
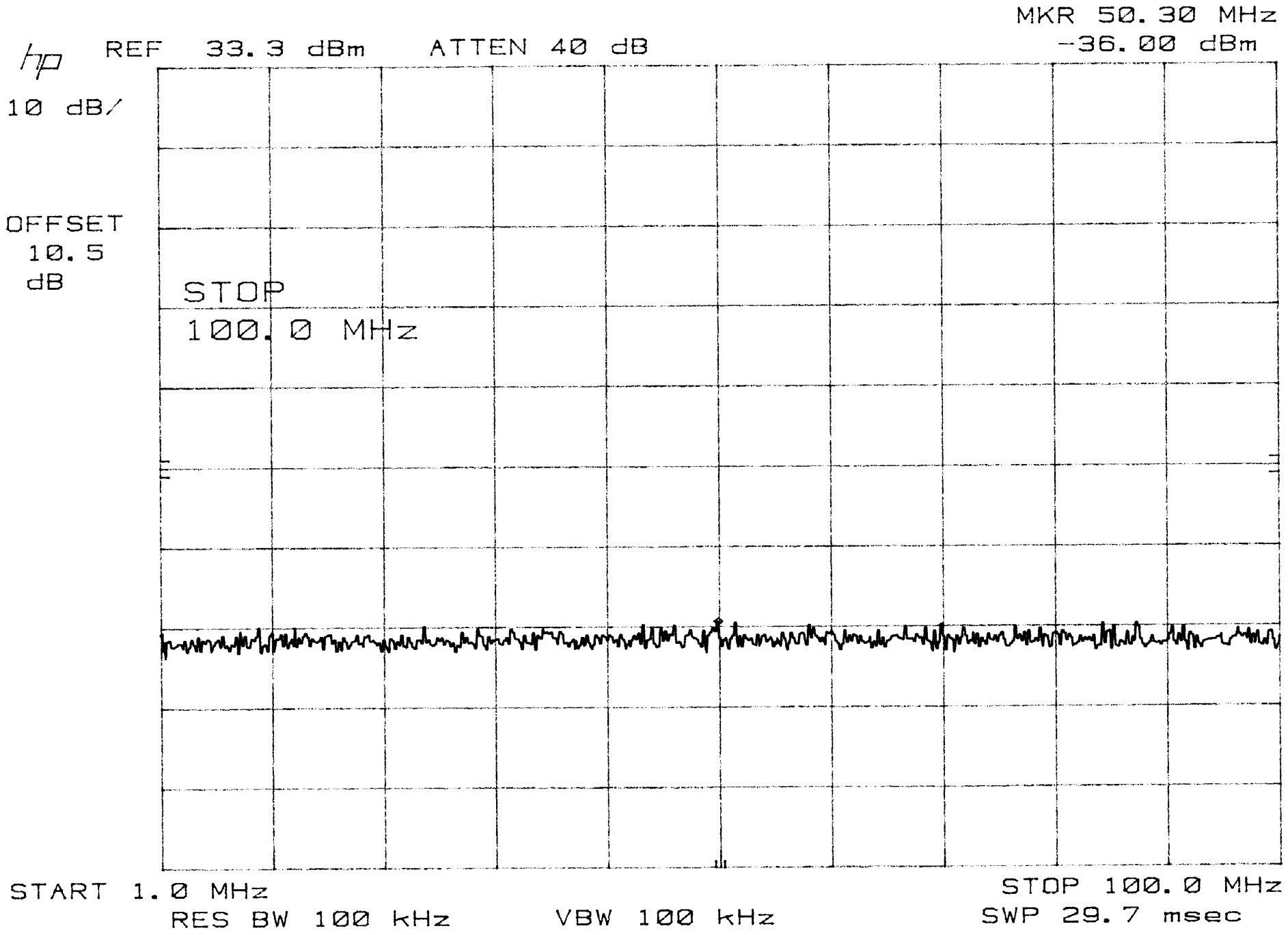
5-6-2


Mkr 285.1MHz
*-42.00dBm
Tek
WF VIEW
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
Normal
grn rd OFF
Max Hold
rd GRN off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg# 1
rd grn OFF
30.0MHz
to
1.000 0GHz
ResBW 100kHz
VidBW 100kHz
SWP 550mS
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

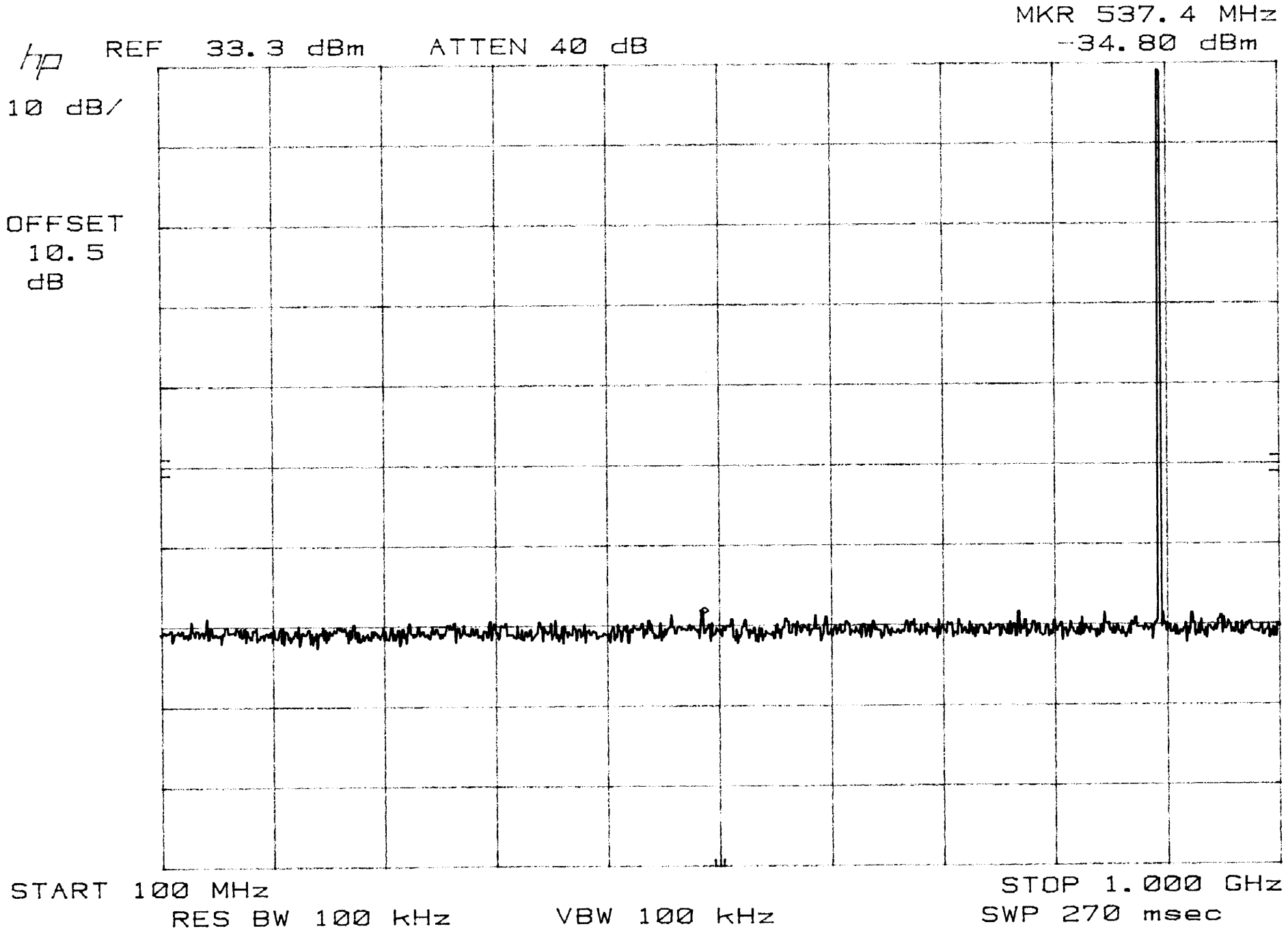
5-b-3


Mkr 1.801GHz
*-35.70dBm
Tek
DISPLAY
Ref Lvl*40.5dBm
10dB/
Atten 30dB
40.5
30.5
20.5
10.5
0.5
-9.5
-19.5
-29.5
-39.5
-49.5
-59.5
CRT Adjust Menu
Readouts Menu
Clock Menu
Graticule Menu
1.000GHz
to
10.000GHz
ResBW 100kHz
VidBW 100kHz
SWP 5.1S
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784

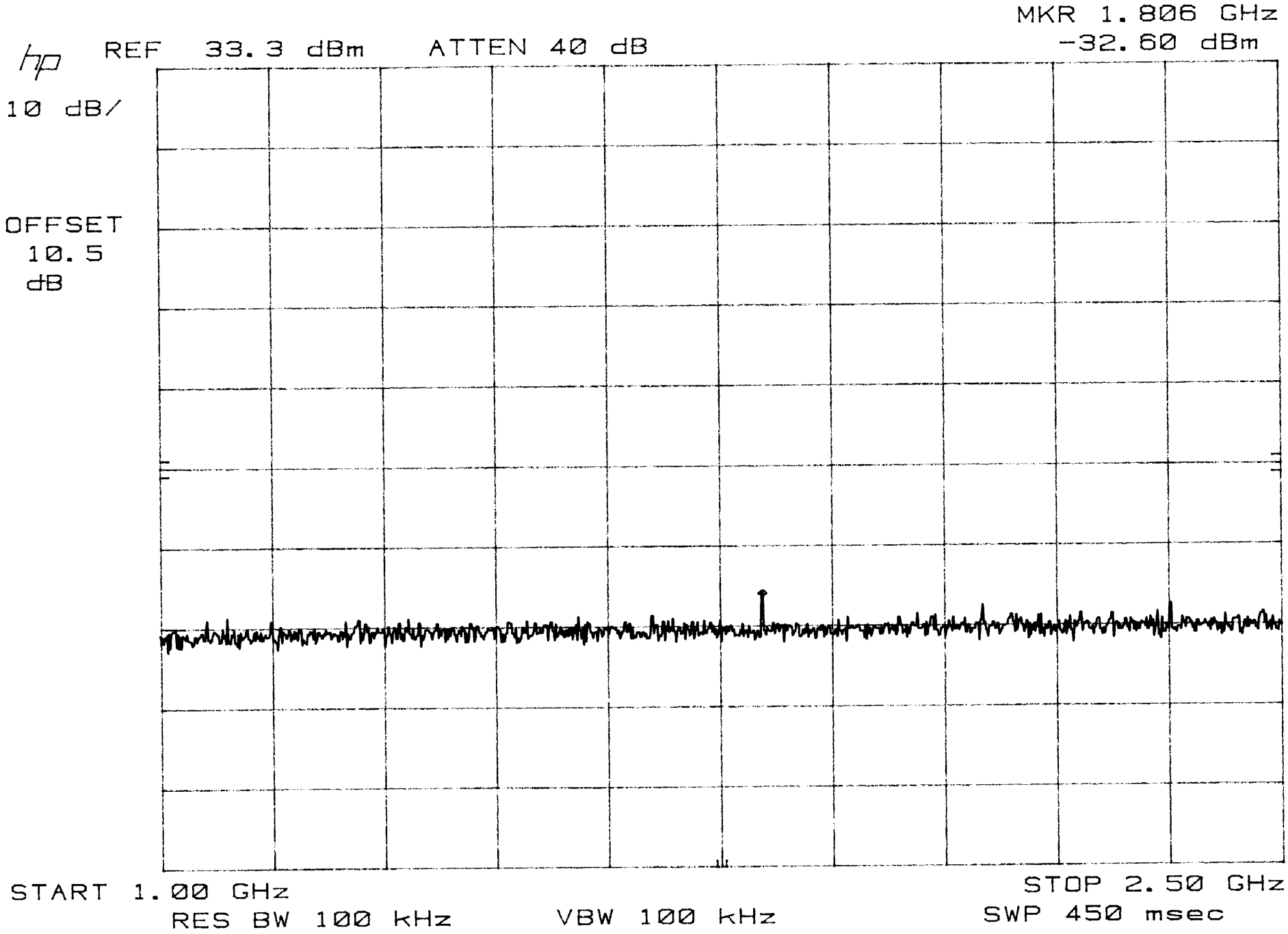
5-C-1


MKR 50.30 MHz
-36.00 dBm
hp
REF 33.3 dBm
ATTEN 40 dB
10 dB/
OFFSET
10.5
dB
STOP
100.0 MHz
START 1.0 MHz
STOP 100.0 MHz
RES BW 100 kHz
VBW 100 kHz
SWP 29.7 msec

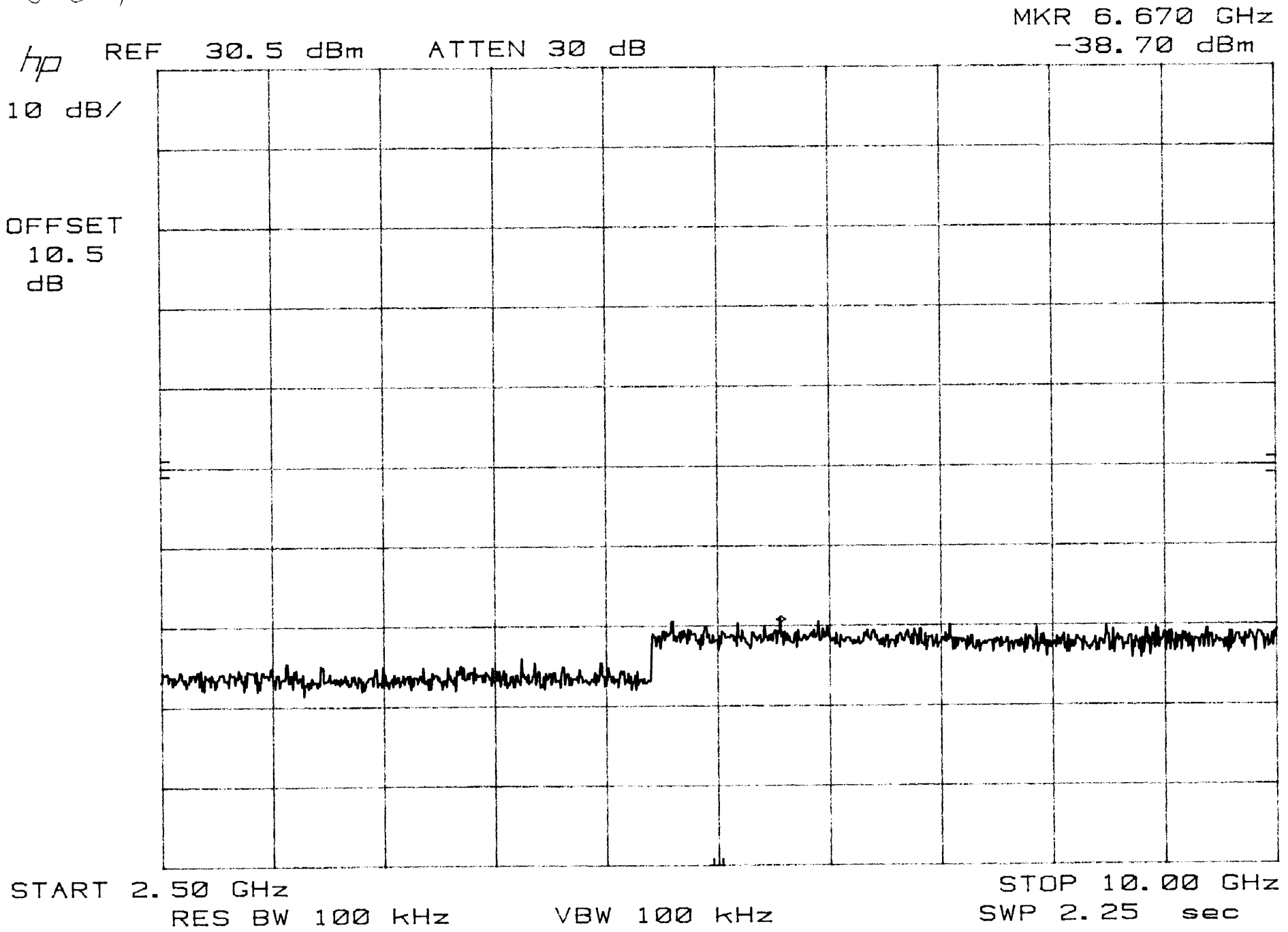
5-C-2


MKR 537.4 MHz
-34.80 dBm
REF 33.3 dBm
ATTEN 40 dB
10 dB/
OFFSET
10.5
dB
START 100 MHz
STOP 1.000 GHz
RES BW 100 kHz
VBW 100 kHz
SWP 270 msec

5-C-3


MKR 1.806 GHz
-32.60 dBm
REF 33.3 dBm
ATTEN 40 dB
10 dB/
OFFSET
10.5
dB
START 1.00 GHz
STOP 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
SWP 450 msec

5-C-4


MKR 6.670 GHz
-38.70 dBm
REF 30.5 dBm
ATTEN 30 dB
10 dB/
OFFSET
10.5
dB
START 2.50 GHz
RES BW 100 kHz
VBW 100 kHz
STOP 10.00 GHz
SWP 2.25 sec

6 Field Strength of Spurious Radiation

FCC §2.1053, §15.109

6.1 Test Procedure

The transmitter was placed on a wooden turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3 orthogonal axis and the maximum emissions were recorded.

The Field Strength (FS) in the frequency range up to tenth harmonic of the fundamental frequency was measured.
At the frequencies where the FS exceed 62.3 dBuV/m, the EIRP of spurious emissions was measured by the substitution method using the double-ridged horn antenna. The FS=62.3 dBuV/m corresponds to the EIRP equal –33 dBm which is 20 less than the limit (-13 dBm).

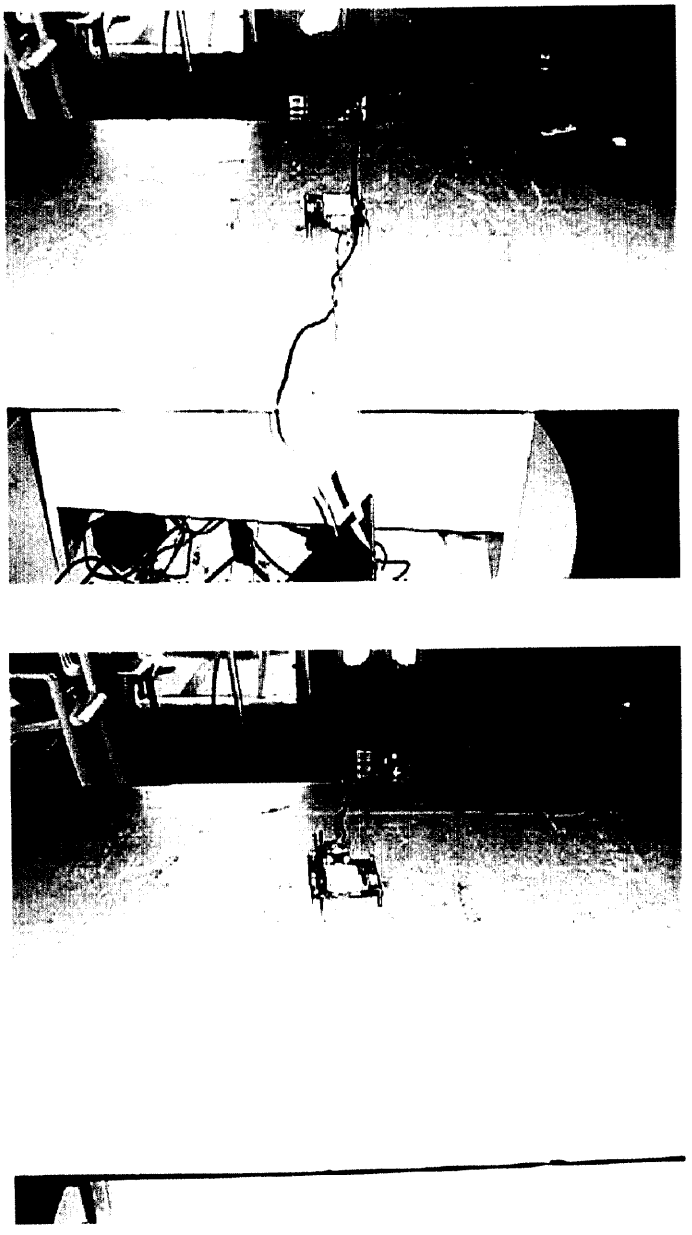
The spurious harmonic attenuation was calculated as the difference between EIRP at the fundamental frequency and at the spurious emission frequency or as difference between FS in dB(uV/m) at the fundamental frequency and at the spurious emission frequency (if FS is less than 62.3 dBuV/m)..

6.2 Test Equipment

EMCO 3143 Biconical Antennas
EM LPA-25 Log Periodical Antenna
EMCO 3115 Horn Antenna
HP 8566B Spectrum Analyzer
Preamplifiers

6.3 Test Configuration Setup

Radiated Emissions Test Setup



Communication Network Interface, Inc., Model No. CNI-903M Date of Test: April 14, 2001
FCC ID: N79CNI-903M-1

6.4 Test Results

See attached.

Radiated Emissions Test Data

Company	CNI	**Model #:**	CNI-903M		**Req.**	FCC 2.993	
EUT:	Radio Packet Modem	**FCC ID:**	**N79CNI-903M-1**		**Test Dist.**	3	meters
Project #:	J20045919	**Test Date:**	April 14, 2001		**TP**	2.00	**Watt**
Test Mode:	Tx @ 902 MHz	**Engineer:**	Xi Ming Y.		**Min. Attn.**	**46.01**	**dBc**

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	1	7	8	8	3	13	12	0	0	0
Model:	EMCO 3143	EM LPA-25	EMCO 3115	CDI_P1000	MC 15542	ACO/400	NPS366	None	None	None

Frequency	Reading	Detector	Ant. #	Amp. #	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	Net	ERP	Attn.	Margin
MHz	dB(µV)	P/A/Q			H/V	dB(1/m)	dB	dB	dB(µV/m)	mW	dBc	dB
902.00	106.6	Peak	7	0	V	22.5	0.0	2.0	131.1		0.0	N/A
1804.00	60.4	Peak	8	8	V	26.7	29.3	2.6	60.4		70.7	-24.7
2706.00	47.1	Peak	8	8	V	30.6	28.4	3.4	52.7		78.4	-32.4
3608.00	37.7	Peak	8	8	V	33.0	27.8	3.8	46.7		84.4	-38.4
4510.00	39.0	Peak	8	8	V	34.0	27.9	4.3	49.4		81.7	-35.7
5412.00	31.0	Peak	8	8	V	35.4	28.3	4.6	42.7		88.4	-42.4
6314.00	33.0	Peak	8	8	V	37.1	28.0	5.2	47.3		83.8	-37.8
7216.00	34.0	Peak	8	8	V	37.0	28.0	5.5	48.5		82.6	-36.6
8118.00	34.0	Peak	8	8	V	37.5	27.2	6.1	50.4		80.7	-34.7
9020.00	35.0	Peak	8	8	V	39.7	26.8	6.6	54.5		76.6	-30.6

Notes:
a) O.C.F.: Other Correction Factor
b) Insert. Loss = Cable A + Cable B + Cable C + Transducer.
c) Net = Reading + Antenna Factor - Pre-Amp + Insert. Loss.
d) Attn. = Field Strength (Fundamental) - Field Strength (Harmonics).
e) Negative signs (-) in Margin column signify levels below the limits.

Radiated Emissions Test Data

Company:	CNI	**Model #:**	CNI-903M		**Req.**	FCC 2.993	
EUT:	Radio Packet Modem	**FCC ID:**	**N79CNI-903M-1**		**Test Dist.**	3	**meters**
Project #:	J20045919	**Test Date:**	April 14, 2001		**TP**	2.00	**Watt**
Test Mode:	Tx @ 899 MHz	**Engineer:**	Xi Ming Y.		**Min. Attn.**	**46.01**	**dBc**

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	1	7	8	8	3	13	12	0	0	0
Model:	**EMCO 3143**	**EM LPA-25**	**EMCO 3115**	**CDI_P1000**	**MC 15542**	**ACO/400**	**NPS366**	**None**	**None**	**None**

Frequency	**Reading**	**Detector**	**Ant.**	**Amp.**	**Ant. Pol.**	**Ant. Factor**	**Pre-Amp**	**Insert. Loss**	**Net**	**ERP**	**Attn.**	**Margin**
MHz	dB(μV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB(μV/m)	mW	dBc	dB
899.00	106.5	Peak	7	0	V	22.4	0.0	1.8	130.7		0.0	N/A
1798.00	60.0	Peak	8	8	V	26.7	29.4	2.4	59.7		71.0	-25.0
2697.00	46.0	Peak	8	8	V	30.6	28.4	3.4	51.6		79.1	-33.1
3596.00	38.0	Peak	8	8	V	33.0	27.8	3.8	47.0		83.7	-37.7
4495.00	42.7	Peak	8	8	V	34.5	27.9	4.0	53.3		77.4	-31.4
5394.00	38.0	Peak	8	8	V	35.4	28.3	4.6	49.7		81.0	-35.0
6293.00	38.0	Peak	8	8	V	37.1	28.0	5.2	52.3		78.4	-32.4
7192.00	34.0	Peak	8	8	V	37.0	27.9	5.5	48.6		82.1	-36.1
8091.00	34.6	Peak	8	8	V	37.5	27.2	6.1	51.0		79.7	-33.7
8990.00	35.5	Peak	8	8	V	37.8	27.0	6.3	52.6		78.1	-32.1

Notes:

a) O.C.F.: Other Correction Factor
b) Insert. Loss = Cable A + Cable B + Cable C + Transducer.
c) Net = Reading + Antenna Factor - Pre-Amp + Insert. Loss.
d) Attn. = Field Strength (Fundamental) - Field Strength (Harmonics).
e) Negative signs (-) in Margin column signify levels below the limits.

Radiated Emissions Test Data

Company:	CNI	**Model #:**	CNI-903M		**Req.**	FCC 2.993	
EUT:	Radio Packet Modem	**FCC ID:**	**N79CNI-903M-1**		**Test Dist.**	3	meters
Project #:	J20045919	**Test Date:**	April 14, 2001		**TP**	2.00	Watt
Test Mode:	Tx @ 896 MHz	**Engineer:**	Xi Ming Y.		**Min. Attn.**	46.01	dBc

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	1	7	8	8	3	13	12	0	0	0
Model:	EMCO 3143	EM LPA-25	EMCO 3115	CDI_P1000	MC 15542	ACO/400	NPS366	None	None	None

Frequency	Reading	Detector	Ant. #	Amp. #	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	Net	ERP	Attn.	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB(µV/m)	mW	dBc	dB
896.00	106.0	Peak	7	0	V	22.4	0.0	1.8	130.2		0.0	N/A
1792.00	59.8	Peak	8	8	V	26.7	29.4	2.4	59.5		70.7	-24.7
2688.00	45.8	Peak	8	8	V	30.6	28.4	3.4	51.4		78.8	-32.8
3584.00	40.0	Peak	8	8	V	33.0	27.8	3.8	49.0		81.2	-35.2
4480.00	40.9	Peak	8	8	V	34.5	27.9	4.0	51.5		78.7	-32.7
5376.00	37.9	Peak	8	8	V	35.4	28.3	4.6	49.6		80.6	-34.6
6272.00	38.5	Peak	8	8	V	37.1	28.0	5.2	52.8		77.4	-31.4
7168.00	34.2	Peak	8	8	V	37.0	27.9	5.5	48.8		81.4	-35.4
8064.00	35.0	Peak	8	8	V	37.5	27.2	6.1	51.4		78.8	-32.8
8960.00	35.4	Peak	8	8	V	37.8	27.0	6.3	52.5		77.7	-31.7

Notes:

a) O.C.F.:Other Correction Factor
b) Insert. Loss = Cable A + Cable B + Cable C + Transducer.
c) Net = Reading + Antenna Factor - Pre-Amp + Insert. Loss.
d) Attn. = Field Strength (Fundamental) - Field Strength (Harmonics).
e) Negative signs (-) in Margin column signify levels below the limits.

Communication Network Interface, Inc., Model No. CNI-903M
FCC ID: N79CNI-903M-1

Date of Test: April 14, 2001

Radiated Emissions Test Data

Company:	CNI	**Model #:**	CNI-903M	**Standard_**	**FCC § 15B**		
EUT:	Radio Packet Modem	**FCC ID:**	**N79CNI-903M-1**	**Limits**	2		
Project #:	J20045919	**Test Date:**	April 14, 2001	**Test Distance_**	3	meters	
Test Mode:	Rx	**Engineer:**	Xi-Ming Y.	**Duty Relaxation**	0	dB	

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	10	7	8	2	8	0	22	0	0	0
Model:	EMCO 3104	EM LPA-25	EMCO 3115	HP 8447D	CDI_P1000	None	Gm_M+L	None	None	None

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(μV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(μV/m)	dB(μV/m)	dB
159.7	11.0	Peak	10	0	V	14.6	0.0	1.6	0.0	27.2	43.5	-16.3
270.3	22.0	Peak	7	0	H	15.5	0.0	2.0	0.0	39.5	46.0	-6.5
401.4	16.0	Peak	7	0	H	16.3	0.0	2.6	0.0	34.9	46.0	-11.1
896.0	12.0	Peak	7	0	H	23.3	0.0	4.2	0.0	39.5	46.0	-6.5
899.0	13.0	Peak	7	0	H	23.3	0.0	4.2	0.0	40.5	46.0	-5.5
902.0	12.6	Peak	7	0	H	23.4	0.0	4.2	0.0	40.2	46.0	-5.8
1792.0	31.4	Peak	8	8	H	26.9	29.4	0.0	0.0	28.9	54.0	-25.1
1798.0	31.0	Peak	8	8	V	26.7	29.4	0.0	0.0	28.3	54.0	-25.7
1804.0	32.9	Peak	8	8	V	26.7	29.3	0.0	0.0	30.3	54.0	-23.7

Notes:	
	a) D.C.F.:Distance Correction Factor
	b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
	c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Transducer Loss - Duty Relaxation (transmitter only).
	d) Negative signs (-) in Margin column signify levels below the limits.
	e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

Results: Passed

7.0 Line Conducted Emissions

FCC § 15.107

7.1 Test Procedure

Not applicable, the EUT is battery powered.

7.2 Test Configuration Setup – Line Conducted Emissions

Not applicable, the EUT is battery powered.

Communication Network Interface, Inc., Model No. CNI-903M Date of Test: April 14, 2001
FCC ID: N79CNI-903M-1

7.3 Test Results

See attached test data.

Results: Not applicable, the EUT is battery powered.

8.0 Frequency Stability vs Temperature

FCC § 2.1055

8.1 Test Procedure

The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feedthrough attenuator. The EUT was placed inside the temperature chamber. The DC leads, RF output cable, exited the chamber through an opening
After the temperature stabilized for approximately 20 minutes, the frequency of the output signal was recorded from the counter.

8.2 Test Equipment

Temperature Chamber, -50C to +100C
Hewlett Packard 5383A Frequency Counter
Tektronix 2784 Spectrum Analyzer
Goldstar DC Power Supply, GR303

8.3 Test Results

Refer to the test data below.

Temperature, C	Difference (Hz)
+50	5
+40	320
+30	580
+20	629
+10	940
0	980
-10	980
-20	990
-30	935

Results: Passed

Communication Network Interface, Inc., Model No. CNI-903M Date of Test: April 14, 2001
FCC ID: N79CNI-903M-1

9.0 Frequency Stability vs Voltage

FCC §2.995(d)(2)

9.1 Test Procedure

An external variable DC power supply was connected to the EUT. The frequency of the transmitter was measured for 115% of the DC nominal value and for 85% of the nominal value.

9.2 Test Equipment

Hewlett Packard 5383A Frequency Counter
Tektronix 2784 Spectrum Analyzer
Goldstar DC Power Supply, GR303

9.3 Test Results

Refer to the test data below.

Voltage, VDC	Difference (Hz)
4.8	641
4.2	629
3.6	665

Results: Passed

Note: Battery end at 3.6 VDC

10.0 Transient Frequency Behavior

FCC §90.214

10.1 Test Procedure

Test was performed according the TIA/EIA/IS-102.CAAA, Section 2.2.18. The transmitter was continuously transmitting a modulated signal (FSK, 2400 bits/sec.). The generator was generating FM signal (1 kHz tone, 12.5 kHz deviation). Several plots were made on the FM demodulator output with the EUT turned ON and OFF.

10.2 Test Results

Results: Not Applicable

11.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / J20045919	SS	April 23, 2001	Original document