



**Intertek Testing Services**  
ETL Testing Laboratories

**RadioShack, A Division of Tandy Corporation**

Application  
For  
Type Acceptance  
**(FCC ID: AAO21-1704)**

April 27, 98

WO# 9801559  
CKL/at  
April 27, 98

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FCC ID: AAO21-1704

**Intertek Testing Services Hong Kong Ltd.**

2/E, Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.  
Telephone (852) 2746 8600 Fax (852) 2785 5487



# INTERTEK TESTING SERVICES

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# INTERTEK TESTING SERVICES

## MEASUREMENT/TECHNICAL REPORT

**Application:** RadioShack, A Division of Tandy Corporation  
**Trade Name:** RadioShack  
**Model No.:** 21-1704  
**Date:** April 27, 98

This report concerns (check one:) Original Grant  Class II Change

Equipment Type: CB Radio Station (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes  No

If yes, defer until: \_\_\_\_\_  
date

Company Name agrees to notify the Commission by: \_\_\_\_\_  
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

C. K. Lam  
Intertek Testing Services.  
2/F., Garment Centre,  
576 Castle Peak Road,  
Kowloon, Hong Kong.  
Phone: 852-2746-8218  
Fax: 852-2785-5487

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# INTERTEK TESTING SERVICES

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## INTERTEK TESTING SERVICES

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### STATEMENT OF CONFORMITY

This unit has been found to conform with the following parts of the 47 CFR as detailed below:

- 2.911 This report is certified by a qualified individual. This signature is located in the Measurement Section.
- 2.983 The name of the applicant and identification of the equipment is provided on Form 731. The product will be produced in mass quantities. The technical description information is included in Exhibit 1, Exhibit 8 to 12.
- 2.985 RF power data is located in Exhibit 3.1.
- 2.987 Modulation characteristics are detailed in Exhibit 4.0.
- 2.989 Occupied bandwidth measurements are detailed in Exhibit 5.0.
- 2.993 The field strength of spurious emissions was measured and the data is recorded in Exhibit 6.0.
- 2.995 The frequency stability of the unit, with respect to voltage and temperature variation, was measured and the results are recorded in Exhibit 7.0.
- 2.997 The frequency range investigated was from the lowest frequency present in the device to higher than the tenth harmonic of the carrier frequency.

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**EXHIBIT 1**

**GENERAL DESCRIPTION**

## INTERTEK TESTING SERVICES

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### 1.0 General Description

#### 1.1 Product Description

The 21-1704 is a 40 Channel mobile citizen Band (CB) transceiver. The unit is powered from 13.8 Vdc.

Transmitter portion:

- i) Type of emission: 6K00A3E
- ii) Frequency Range: 26.965 MHz to 27.405 MHz
- iii) Maximum Power Rating: 4 Watt

Receiver Portion:

- i) Type of Receiver: Superheterodyne receiver
- ii) Tuning Frequency: 26.965 MHz to 27.405 MHz
- iii) Local oscillator: 26.965 - 27.405
- iv) IF: 10.695MHz and 455KHz

The brief circuit description is listed in the following page.

## INTERTEK TESTING SERVICES

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### 1.2 Related Submittal(s) Grants

This is an Application for Type Acceptance of the transmitter portion of a CB Transceiver. The receiver section of the CB Transceiver is subject to certification process and the same FCC ID: AAO21-1704 is used. A separate application has been prepared for the receiver section.

### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurement were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure of maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna the EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

### 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. The test facility and site measurement data have been fully placed on file with the FCC.

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**EXHIBIT 2**

**SYSTEM TEST CONFIGURATION**

## INTERTEK TESTING SERVICES

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### 2.0 System Test Configuration

#### 2.1 Justification

The device was configured for testing in a typical fashion (as a customer would normally use it). The device was mounted to a cardboard box, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes. When the radiated emissions are measured.

The device was powered by a DC power supply adjusted to give 13.8 Vdc.

For measuring spurious and harmonic emissions of the transmitter, a 50 $\Omega$  load was connected to the antenna terminal.

The frequency range from 25 MHz to 1 GHz was searched for spurious emissions from the device. Harmonic emissions of the transmitter were investigated up to 5 GHz. Only those emissions reported were detected. All other emissions were at least 20 dB below the applicable limits.

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### 2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered on, a signal is transmitted.

### 2.3 Special Accessories

- 1.) One 8Ω speaker with 1m cable connected to speaker jack.
- 2.) One 8Ω resistive load with 1m cable connected to PA jack.

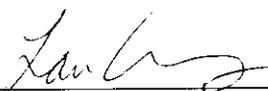
### 2.4 Equipment Modification

Any modification installed previous to testing by RadioShack, A Division of Tandy Corporation will be incorporated in each production model sold/leased in the United States.

No modification were installed by Intertek Testing Services.

*Confirmed by:*

*C. K. Lam*  
*Assistant Manager*  
*Intertek Testing Services*  
*Agent for RadioShack, A Division of Tandy Corporation*

 Signature

April 27, 1998 Date

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**EXHIBIT 3**

**RF POWER OUTPUT**

## INTERTEK TESTING SERVICES

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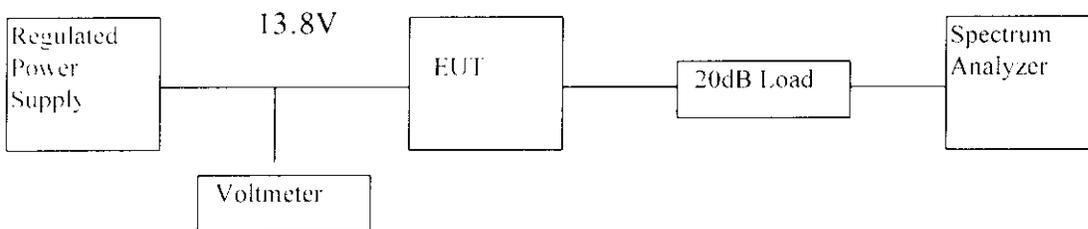
### 3.0 RF Power Output (Section 2.985(a))

#### A. Equipment Used

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	35-30L
Voltmeter	Fluke	87
Spectrum Analyzer	Hewlett Packard	8591EM
20dB RF Load	Bird	8304-200-N

#### B. Testing Procedure

- 1) Setup the test equipment in the following configuration:



- 2) Measure the power of all channels (40 channels) by Spectrum Analyzer in Watt.
- 3) Calculate the actual power by times the measured power with a correction factor, 104.7\*  
ie. Actual Power = measured Power \* 104.7

\* The Correction Factor is included the 20dB Load and cable loss between EUT and 20dB load.

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**Table 1 (Cont'd...)**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Transmission Power**

Channel	Frequency (MHz)	Measured Power (mW)	Net Power (W)	Limit (W)	Margin (W)
16	27.155	32.3	3.38	4	-0.62
17	27.165	32.3	3.38	4	-0.62
18	27.175	32.3	3.38	4	-0.62
19	27.185	32.3	3.38	4	-0.62
20	27.205	32.3	3.38	4	-0.62
21	27.215	32.3	3.38	4	-0.62
22	27.225	32.3	3.38	4	-0.62
23	27.255	32.3	3.38	4	-0.62
24	27.235	32.3	3.38	4	-0.62
25	27.245	32.3	3.38	4	-0.62
26	27.265	32.3	3.38	4	-0.62
27	27.275	32.1	3.36	4	-0.64
28	27.285	31.7	3.32	4	-0.68
29	27.295	31.7	3.32	4	-0.68
30	27.305	31.7	3.32	4	-0.68

Notes: Negative sign in the margin column shows the value below limits.

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**INTERTEK TESTING SERVICES**

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**Table 1 (Cont'd...)**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Transmission Power**

Channel	Frequency (MHz)	Measured Power (mW)	Net Power (W)	Limit (W)	Margin (W)
31	27.315	31.7	3.32	4	-0.68
32	27.325	31.7	3.32	4	-0.68
33	27.335	31.7	3.32	4	-0.68
34	27.345	31.5	3.30	4	-0.70
35	27.355	31.5	3.30	4	-0.70
36	27.365	31.5	3.30	4	-0.70
37	27.375	31.1	3.26	4	-0.74
38	27.385	31.1	3.26	4	-0.74
39	27.395	31.1	3.26	4	-0.74
40	27.405	31.1	3.26	4	-0.74

Notes: Negative sign in the margin column shows the value below limits.

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**INTERTEK TESTING SERVICES**

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**Table 1**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Transmission Power**

Channel	Frequency (MHz)	Measured Power (mW)	Net Power (W)	Limit (W)	Margin (W)
1	26.965	33.0	3.45	4	-0.55
2	26.975	33.0	3.45	4	-0.55
3	26.985	33.0	3.45	4	-0.55
4	27.005	32.6	3.41	4	-0.59
5	27.015	32.6	3.41	4	-0.59
6	27.025	32.6	3.41	4	-0.59
7	27.035	32.6	3.41	4	-0.59
8	27.055	32.6	3.41	4	-0.59
9	27.065	32.6	3.41	4	-0.59
10	27.075	32.3	3.38	4	-0.62
11	27.085	32.3	3.38	4	-0.62
12	27.105	32.3	3.38	4	-0.62
13	27.115	32.3	3.38	4	-0.62
14	27.125	32.3	3.38	4	-0.62
15	27.135	32.3	3.38	4	-0.62

Notes: Negative sign in the margin column shows the value below limits.

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**EXHIBIT 4**

**MODULATION CHARACTERISTICS**

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### 4.0 Modulation Characteristics

In order to satisfy the 2.987 requirement, Modulation Frequency Response, Modulation Limit Characteristics and Over Modulation Transient Response, are attached in Exhibit 4.1, 4.2 & 4.3.

Plots for each tests are included in the following sections.

## INTERTEK TESTING SERVICES

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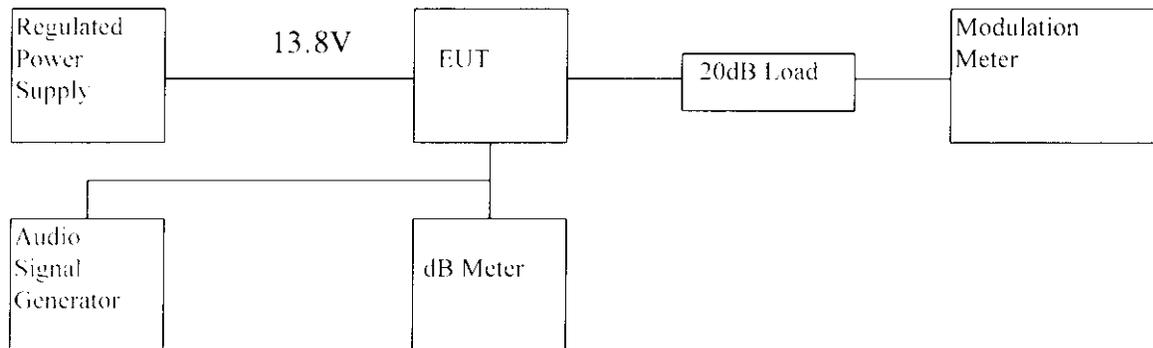
### 4.1 Modulation Frequency Response

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
Modulation Meter	Marconi Instrument	2945

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the audio signal generator frequency to 2kHz and adjust level to obtain 50% modulation. And then adjust the frequency to obtain the maximum audio frequency response of the EUT.
- 3) Adjust the level of audio signal generator to give 50% modulation at the maximum audio frequency response and take this level as the 0dB reference level.
- 4) The frequency of the audio signal generator is changed from 400Hz to 10kHz and adjust the level to obtain the 50% modulation at each frequency.
- 5) Record the level at each frequency reference to 0dB Level.

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 2**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Modulation Frequency Response (Section 2.987(a))**

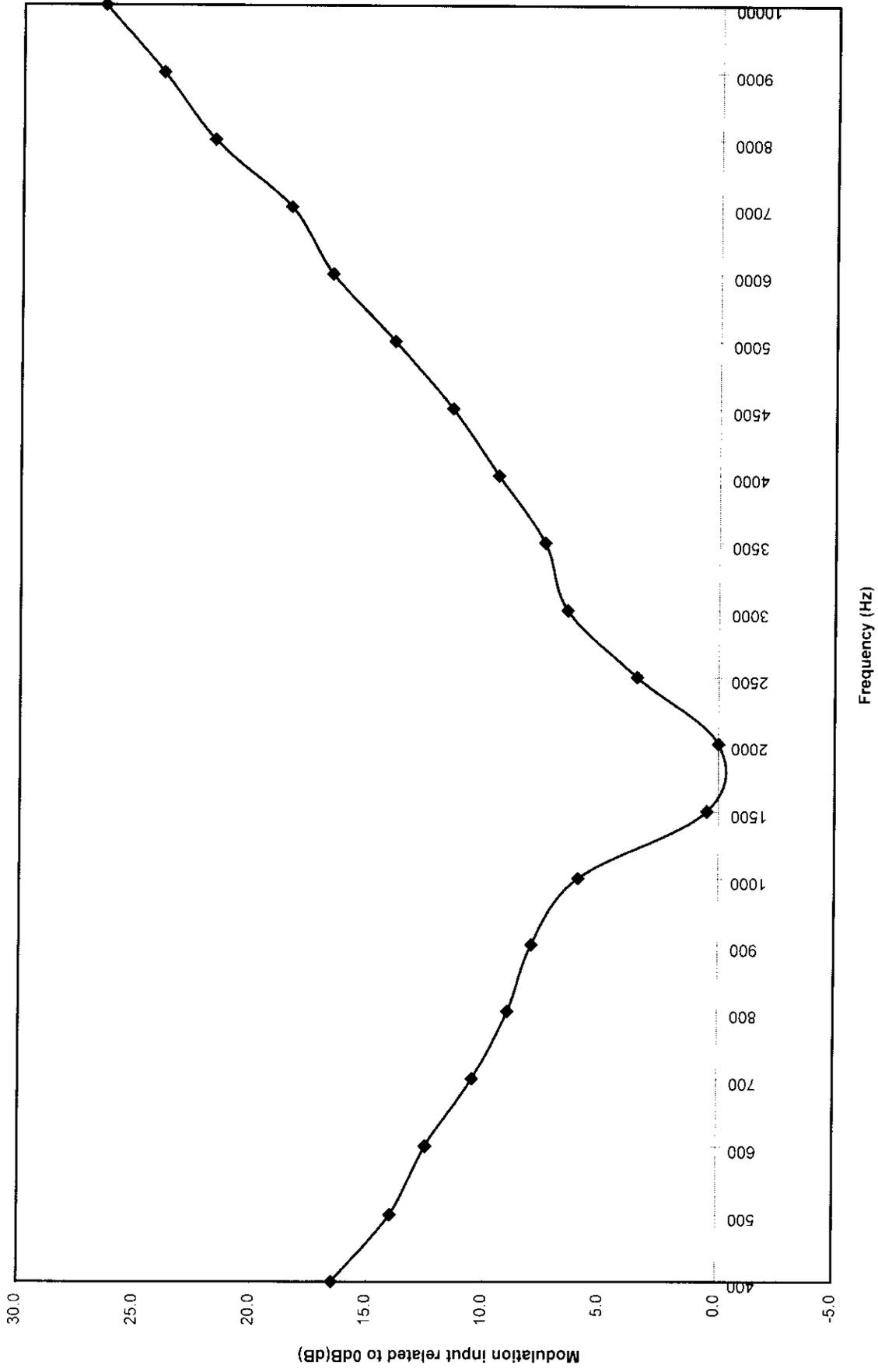
Test Channel : 19  
0 dB Level : -54.0 dBm  
Modulation Output : 50%

<b>Modulation Frequency (Hz)</b>	<b>Modulation input relative to max. output. (dB)</b>
400	16.5
500	14.0
600	12.5
700	10.5
800	9.0
900	8.0
1000	6.0
1500	0.5
2000	0.0
2500	3.5
3000	6.5
3500	7.5
4000	9.5
4500	11.5
5000	14.0
6000	16.7
7000	18.5
8000	21.8
9000	24.0
10000	26.5

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

Modulation Frequency Response



FCCID:AAO21-1704

## INTERTEK TESTING SERVICES

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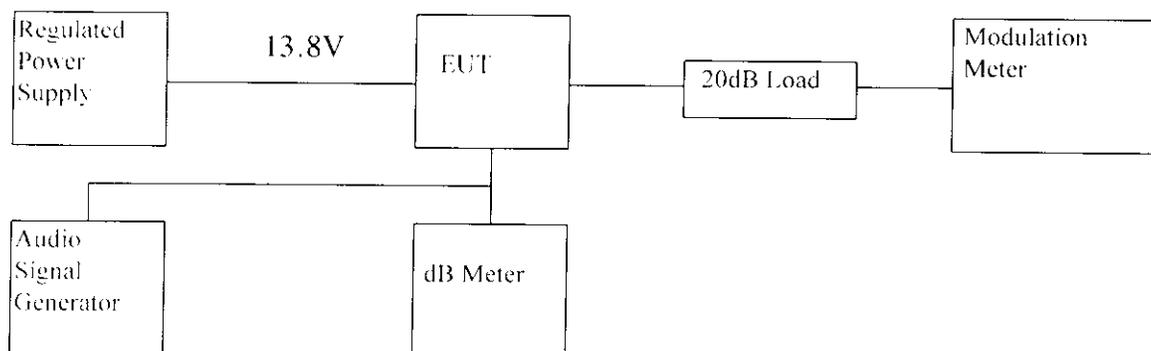
### 4.2 Modulation Limiting Characteristics (Section 2.987(b))

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
Modulation Meter	Marconi	2950

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the frequency of the audio signal generator to 400Hz and adjust the level from -70dBm to 0dBm. Record the output modulation index.
- 3) Repeat the above procedure with frequency 400Hz, 1200Hz, 1500Hz, 2500Hz & 5000Hz.

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 3**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Modulation Limiting Characteristics**

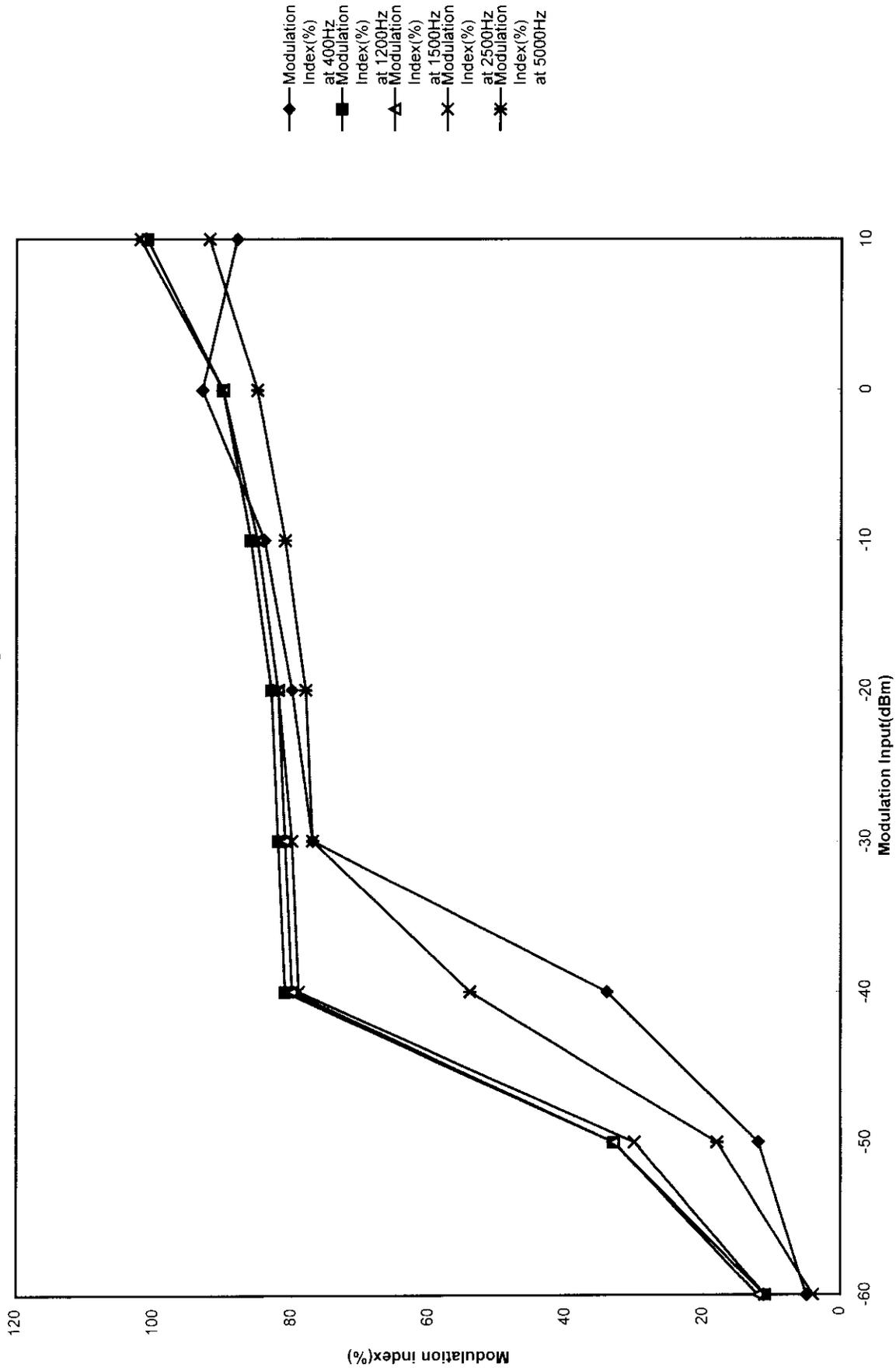
Test Channel : 19

<b>Modulation Input (dBm)</b>	<b>Modulation Index(%) at 400Hz</b>	<b>Modulation Index(%) at 1200Hz</b>	<b>Modulation Index(%) at 1500Hz</b>	<b>Modulation Index(%) at 2500Hz</b>	<b>Modulation Index(%) at 5000Hz</b>
-60	5	11	12	11	4
-50	12	33	33	30	18
-40	34	81	80	79	54
-30	77	82	81	80	77
-20	80	83	82	82	78
-10	84	86	85	85	81
0	93	90	90	90	85
10	88	101	102	102	92

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

# Modulation Limiting Characteristic



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## INTERTEK TESTING SERVICES

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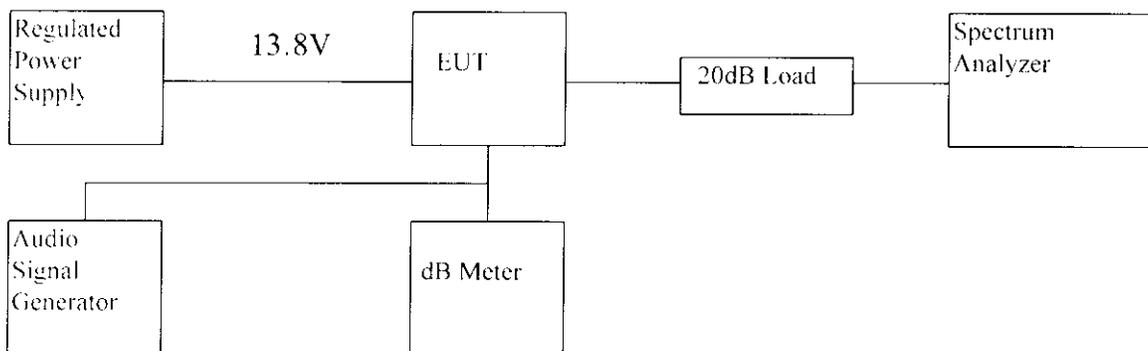
### 4.3 Over Modulation Transient Response (Section 2.987(b))

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
Spectrum Analyzer	Hewlett Packard	8951EM

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the frequency of the audio signal generator to 2.5kHz at level 16dB greater than required for 50% modulation.
- 3) Use the other audio signal generator pulse the previous signal at one P.P.S. with pulse width of 0.5 second.
- 4) Tune the spectrum analyzer to the channel on which the transmitter is set and adjust the setting as for the measurement of occupied bandwidth.
- 5) And then tune the spectrum analyser to adjacent channel(+/-10kHz) and use "Zero-scan" to observe the transients caused by the pulsed modulation.

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 4**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Over modulation Transient Response**

<b>Channel</b>	<b>Adjacent Frequency (MHz)</b>	<b>Transient Level with respect to TP in (dB)</b>	<b>Transient Duration (ms)</b>
1	26.955	-43.1	20.5
1	26.975	-41.0	15.4
19	27.175	-35.4	17.9
19	27.195	-40.7	15.4
40	27.395	-32.4	30.7
40	27.415	-36.7	30.7

Remark: '-' sign in the Transient Level respect to the carrier Level column mean below the carrier level.

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

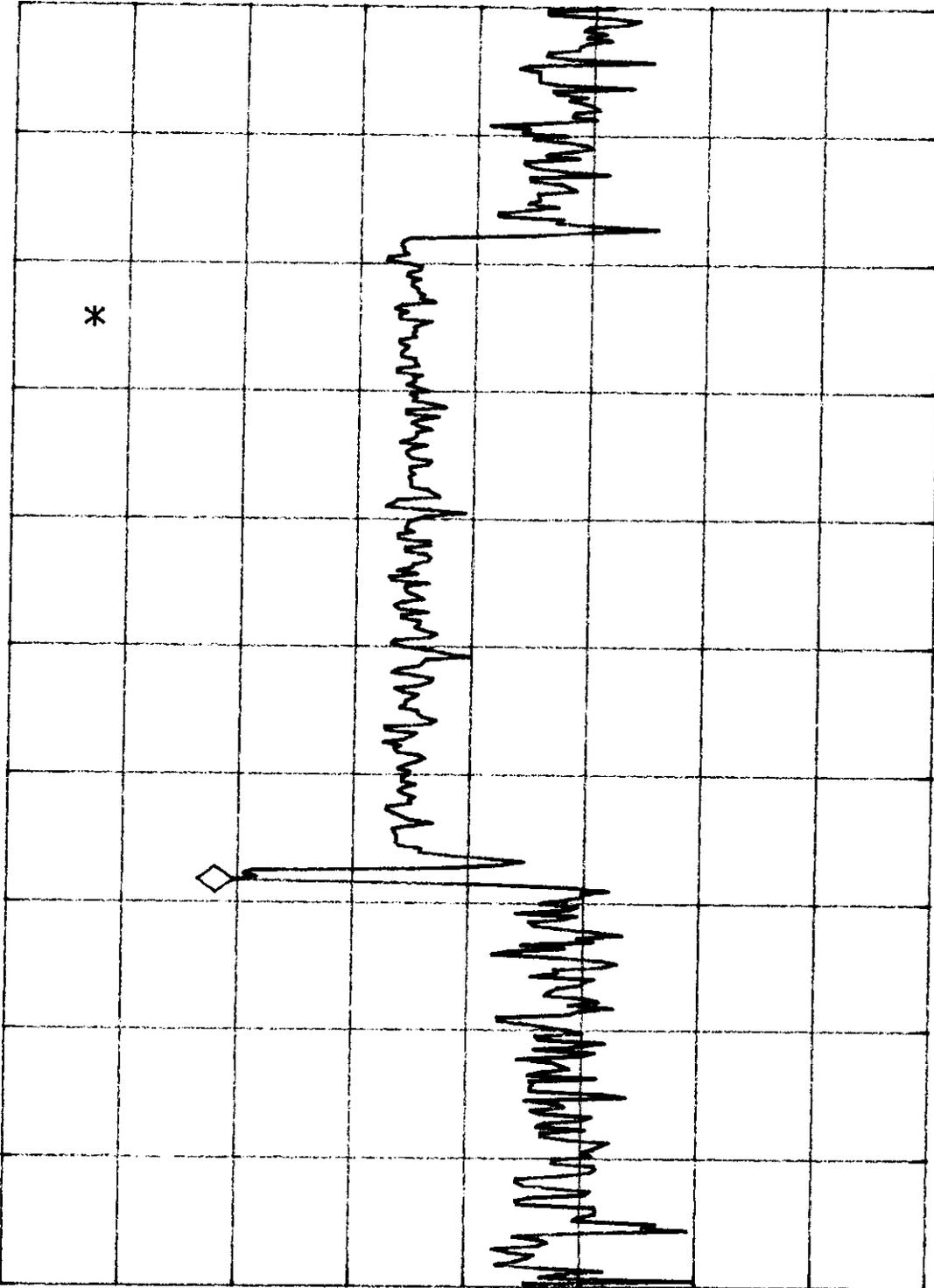
Channel 1

hp

MKR 317.50 msec  
-29.71 dBm

REF -10.0 dBm #AT 30 dB

PEAK LOG 10 dB/



VA SB  
SC FC  
CORR

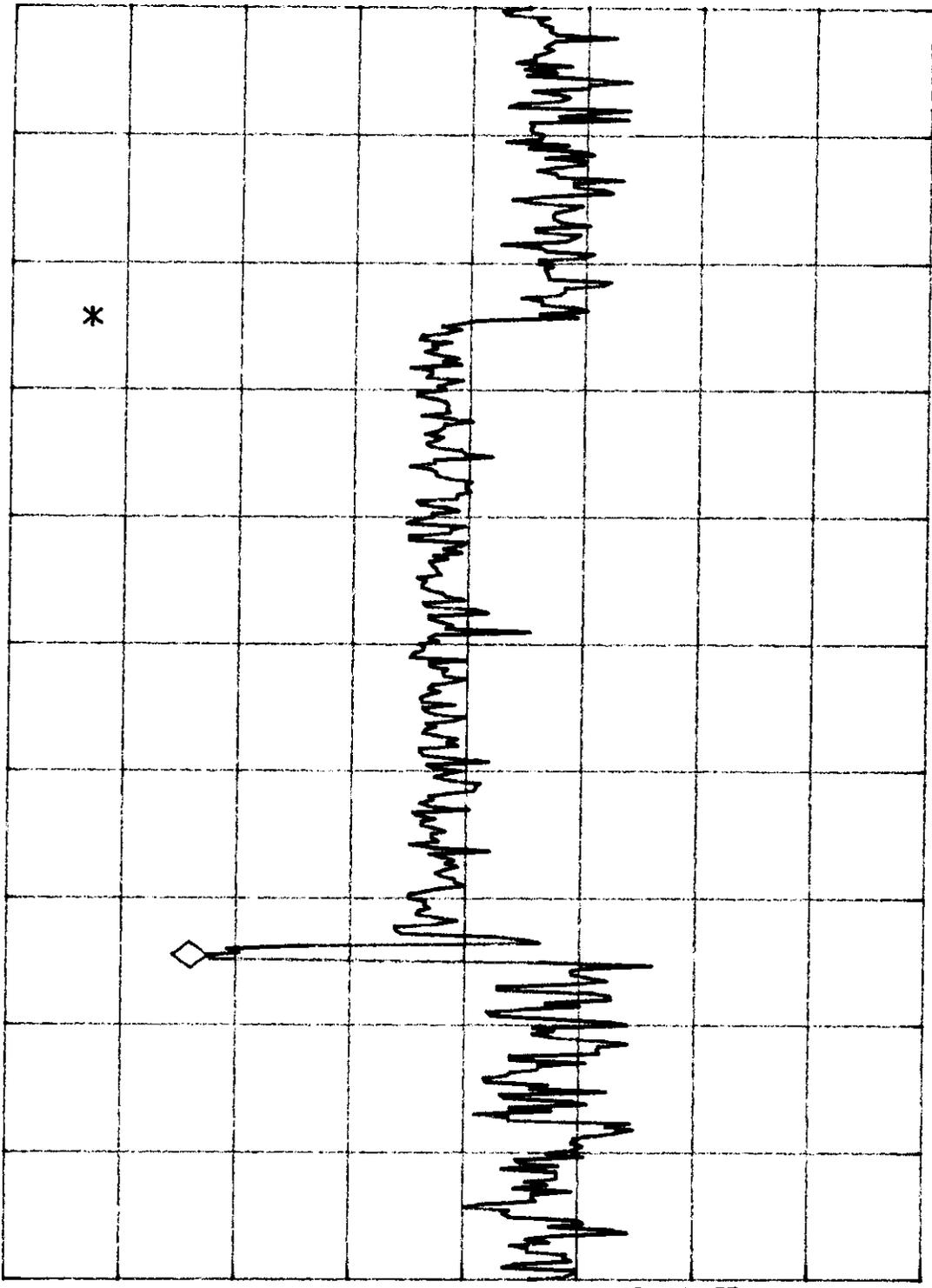
CENTER 26.955000 MHz  
 #RES BW 300 Hz  
 VBW 300 Hz  
 #SWP 1.00 sec  
 SPAN 0 Hz

Channel 1

AP

MKR 255.00 msec  
-27.64 dBm

REF -10.0 dBm #AT 30 dB



PEAK  
LOG  
10  
dB/

VA SB  
SC FC  
CORR

CENTER 27.975000 MHz #RES BW 300 Hz

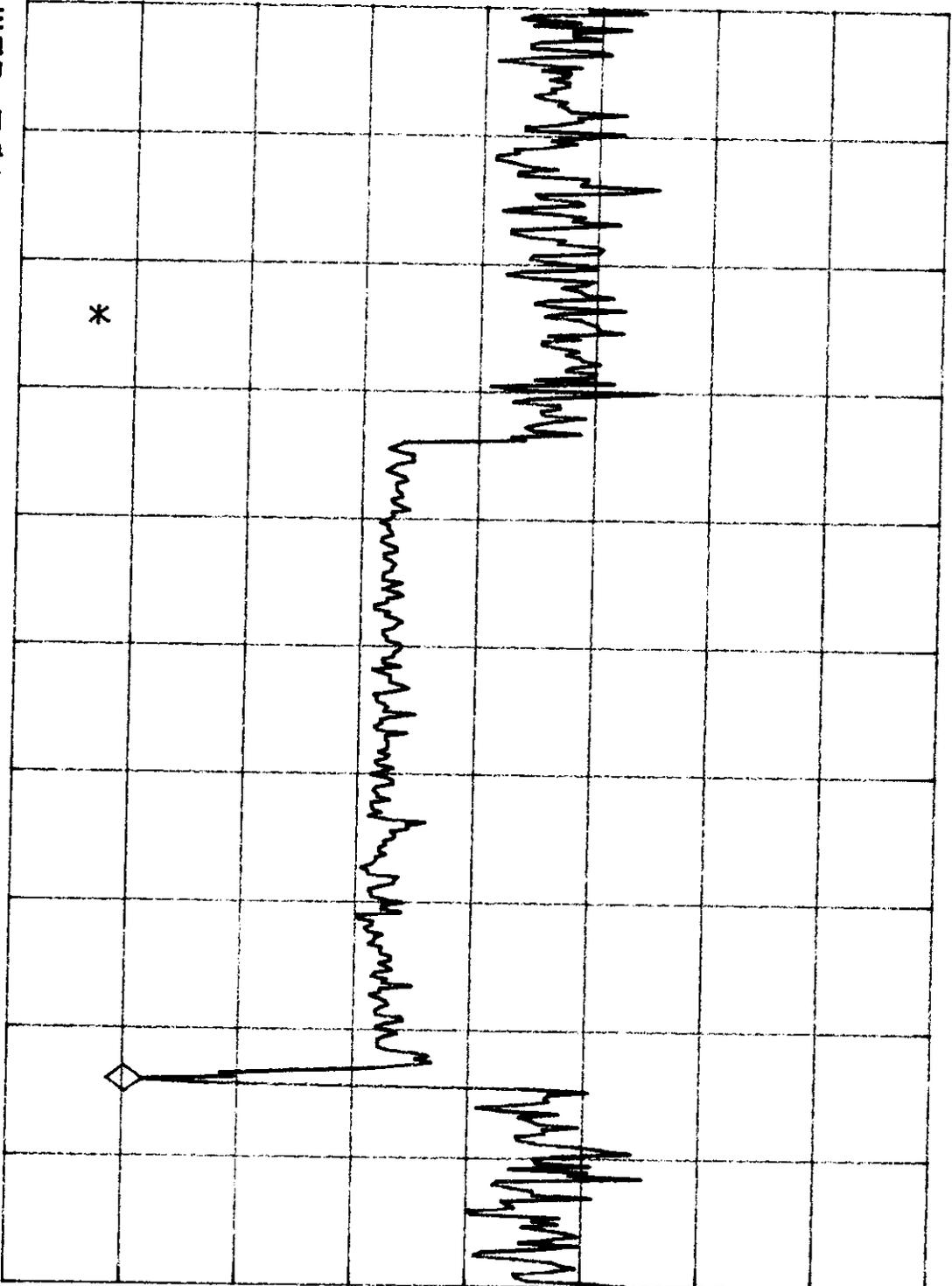
#VBW 3 MHz #SWP 1.00 sec SPAN 0 Hz

Channel 19

MKR 160.00 msec  
-22.02 dBm

#AT 30 dB

-10.0 dBm



SPAN 0 HZ  
#SWP 1.00 sec

#VBW 3 MHz

CENTER 27.175000 MHZ

#RES BW 300 HZ

hpo  
REF -10.0 dBm  
PEAK  
LOG  
10  
dB/

VA SB  
SC FC  
CORR

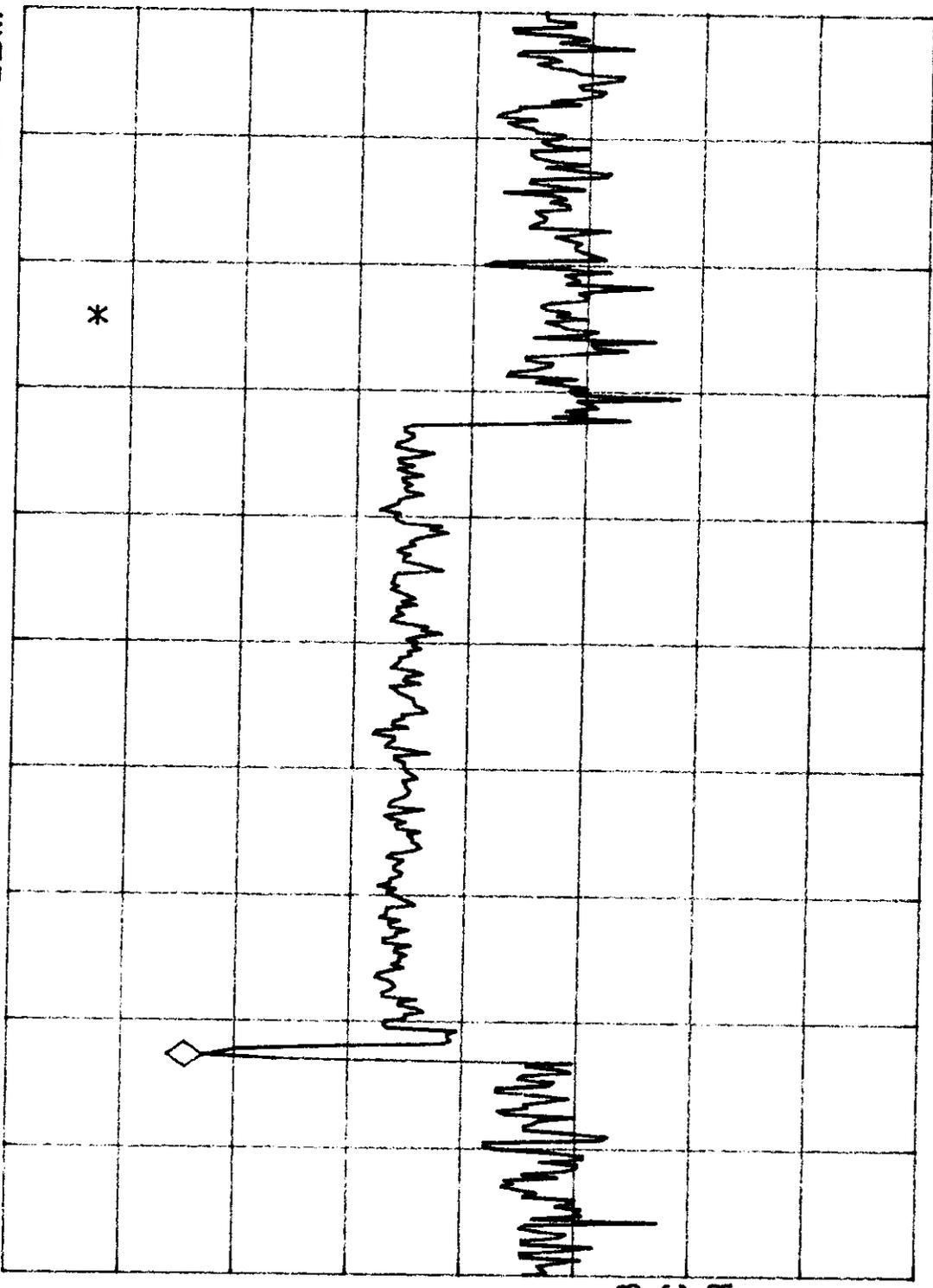
Channel 19

77

MKR 172.50 msec  
-27.29 dBm

#AT 30 dB

REF -10.0 dBm



PEAK  
LOG  
10  
dB/

VA SB  
SC FC  
CORR

CENTER 27.195000 MHZ  
#RES BW 300 HZ  
#VBW 3 MHZ  
#SWP 1.00 sec  
SPAN 0 HZ

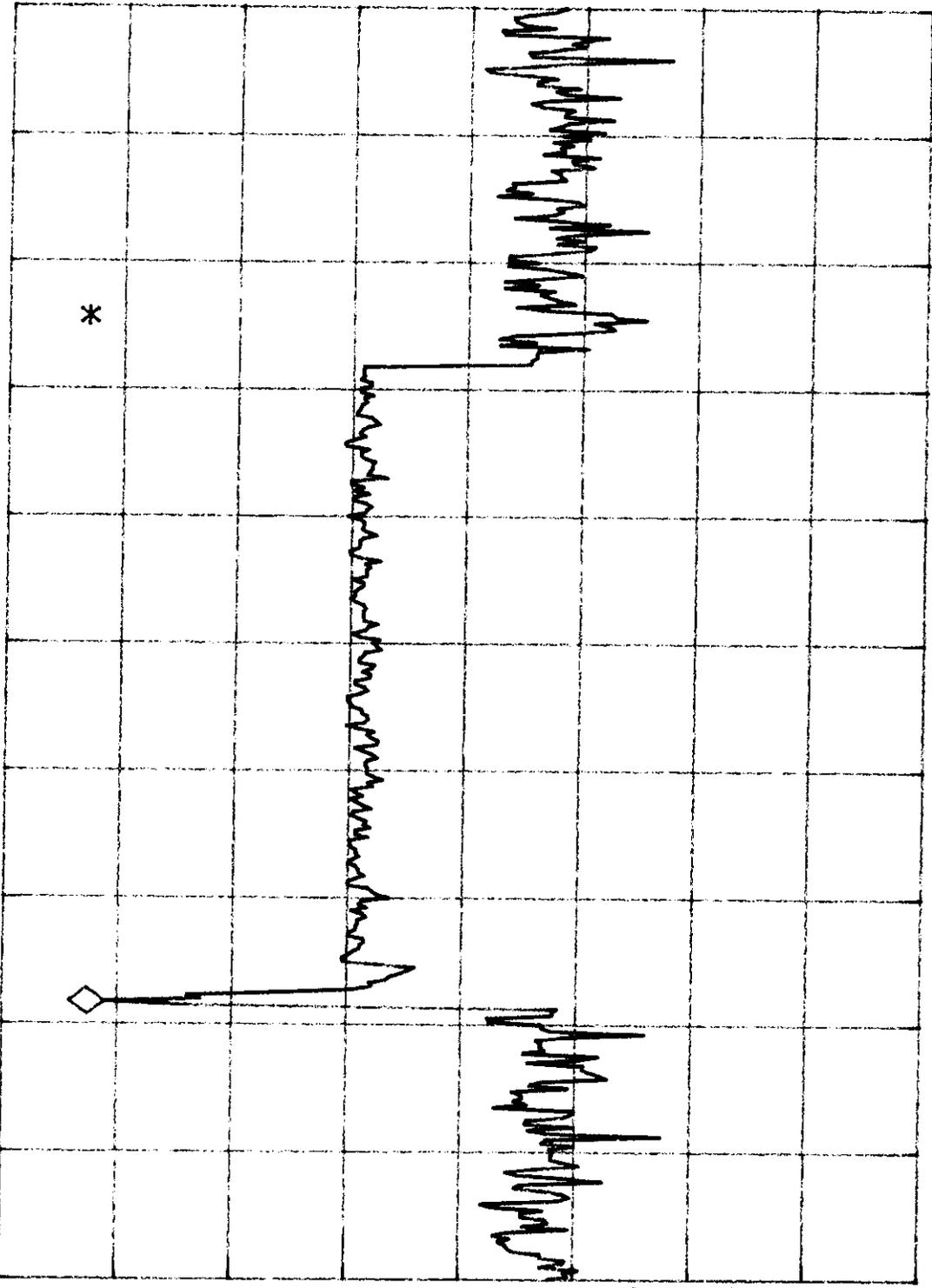
Channel 40

7/0

MKR 217.50 msec  
-18.99 dBm

#AT 30 dB

REF -10.0 dBm



PEAK  
LOG  
10  
dB/

VA SB  
SC FC  
CORR

CENTER 27.395000 MHz  
 #RES BW 300 Hz  
 #VBW 3 MHz  
 #SWP 1.00 sec  
 SPAN 0 Hz

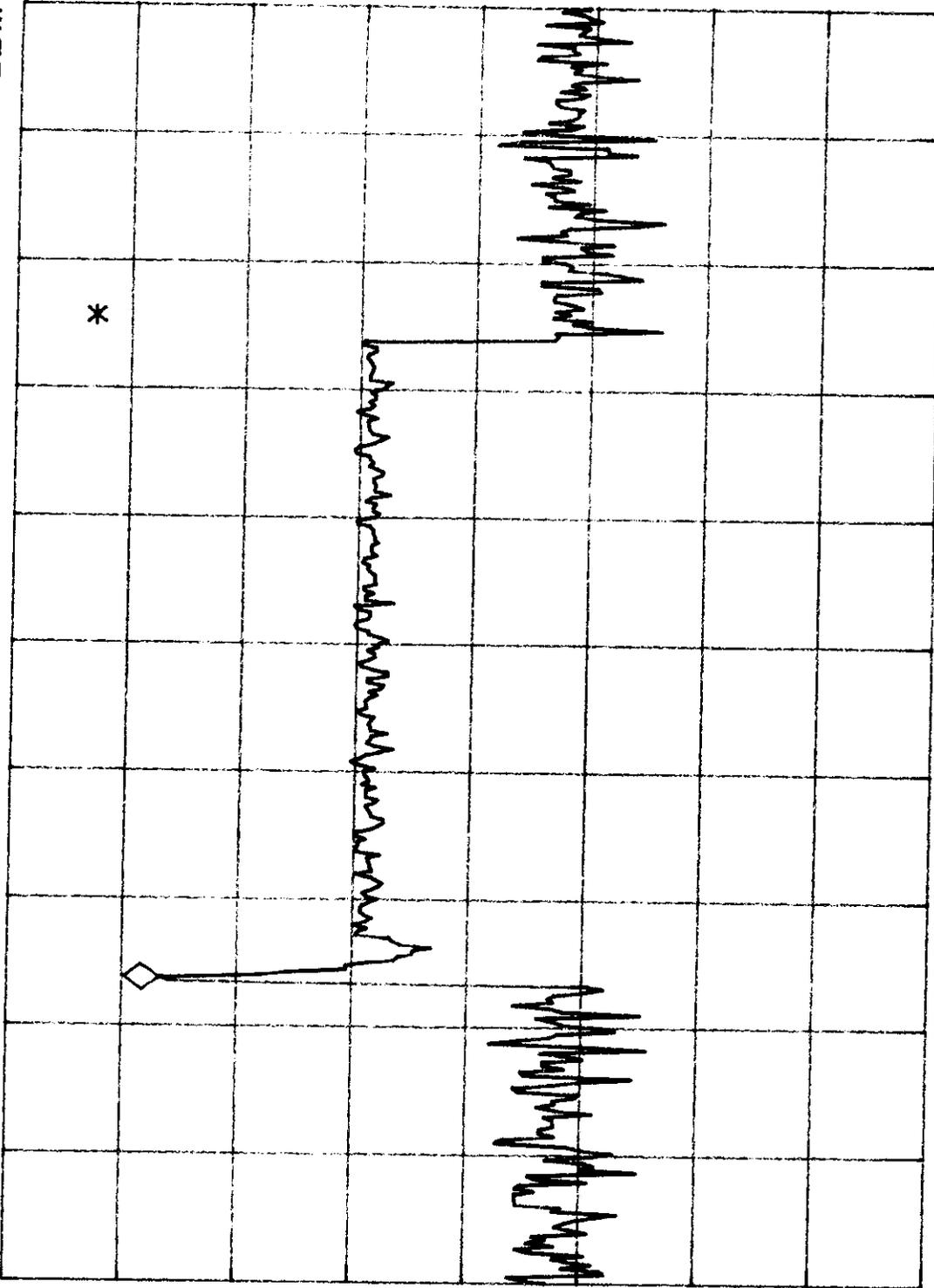
Channel 40

hp

MKR 237.50 msec  
-23.34 dBm

REF -10.0 dBm #AT 30 dB

PEAK LOG 10 dB/



VA SB  
SC FC  
CORR

CENTER 27.415000 MHz  
#RES BW 300 Hz

SPAN 0 Hz  
#SWP 1.00 sec

#VBW 3 MHz

**INTERTEK TESTING SERVICES**

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**EXHIBIT 5**

**OCCUPIED BANDWIDTH**

## INTERTEK TESTING SERVICES

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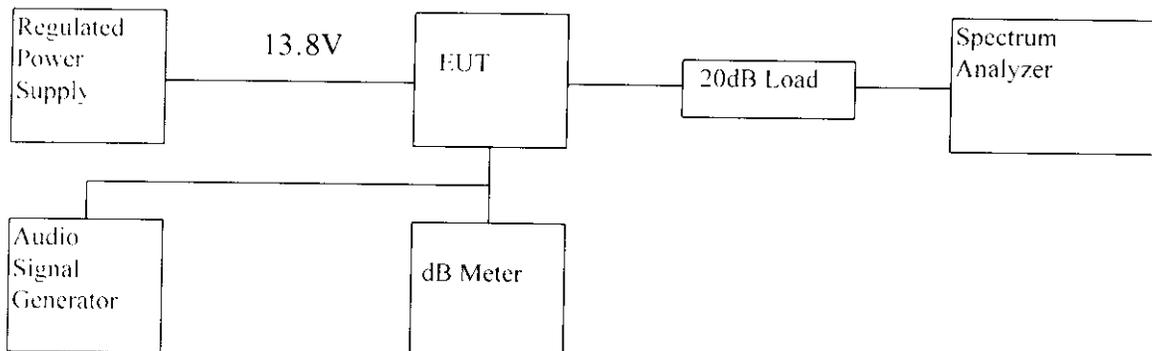
### 5.0 Occupied Bandwidth (Section 2.989 & Section 95.633)

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
Spectrum Analyzer	Hewlett Packard	8951EM

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the level of audio signal generator to obtain 16 dB greater than required for 50% modulation.
- 3) The occupied bandwidth is measured with the spectrum analyzer set at 5kHz/div scan and 10dB/div.

#### C. Test Result

The occupied Bandwidth is measured to be 6.00 kHz.

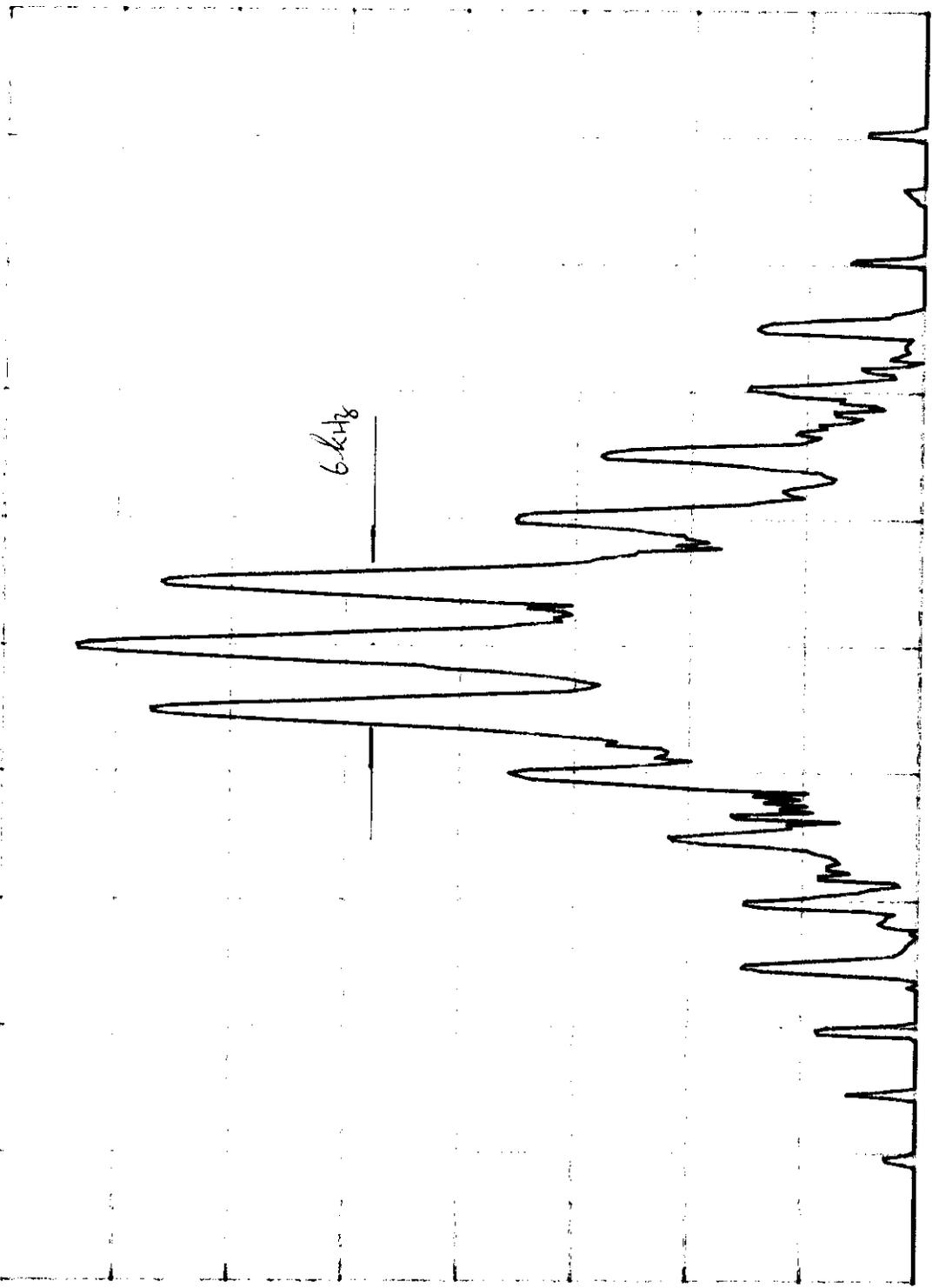
Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

*Channel 1*

REF 20.0 dBm #AT 30 dB

PEAK  
LOG  
10  
dB/



VA SB  
SC FC  
CORR

CENTER 26.96500 MHz #RES BW 300 Hz  
SPAN 50.000 kHz #SWP 2.00 sec  
#VBW 3 MHz

hp

Channel 18

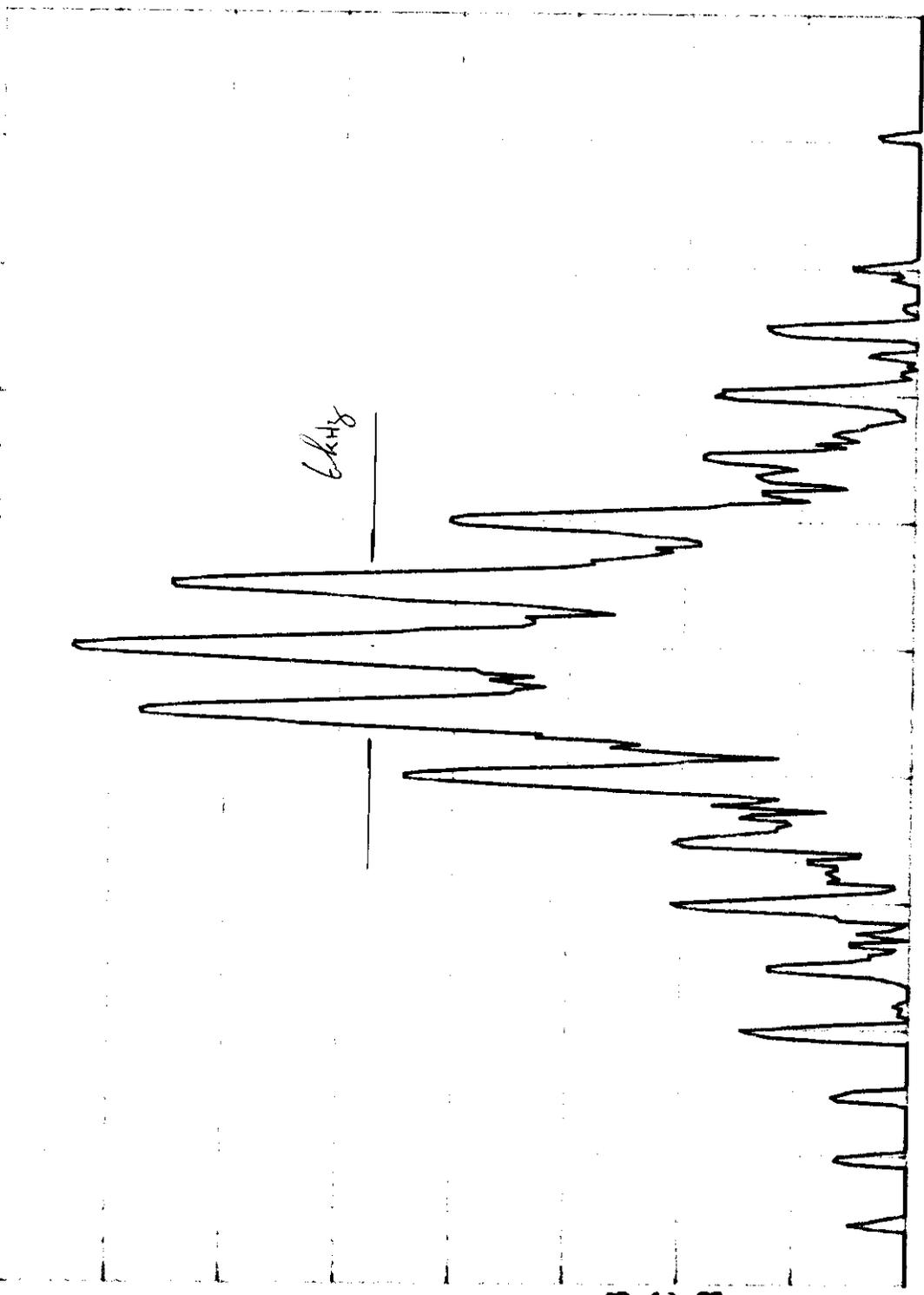
REF 20.0 dBm #AT 30 dB

PEAK

LOG

10

dB



VA SB  
SC FC  
CORR

CENTER 27.18500 MHz

#RES BW 300 Hz

SPAN 50.00 KHz

#SWP 2.00 sec

#VBW 3 MHz

hp

Channel 40

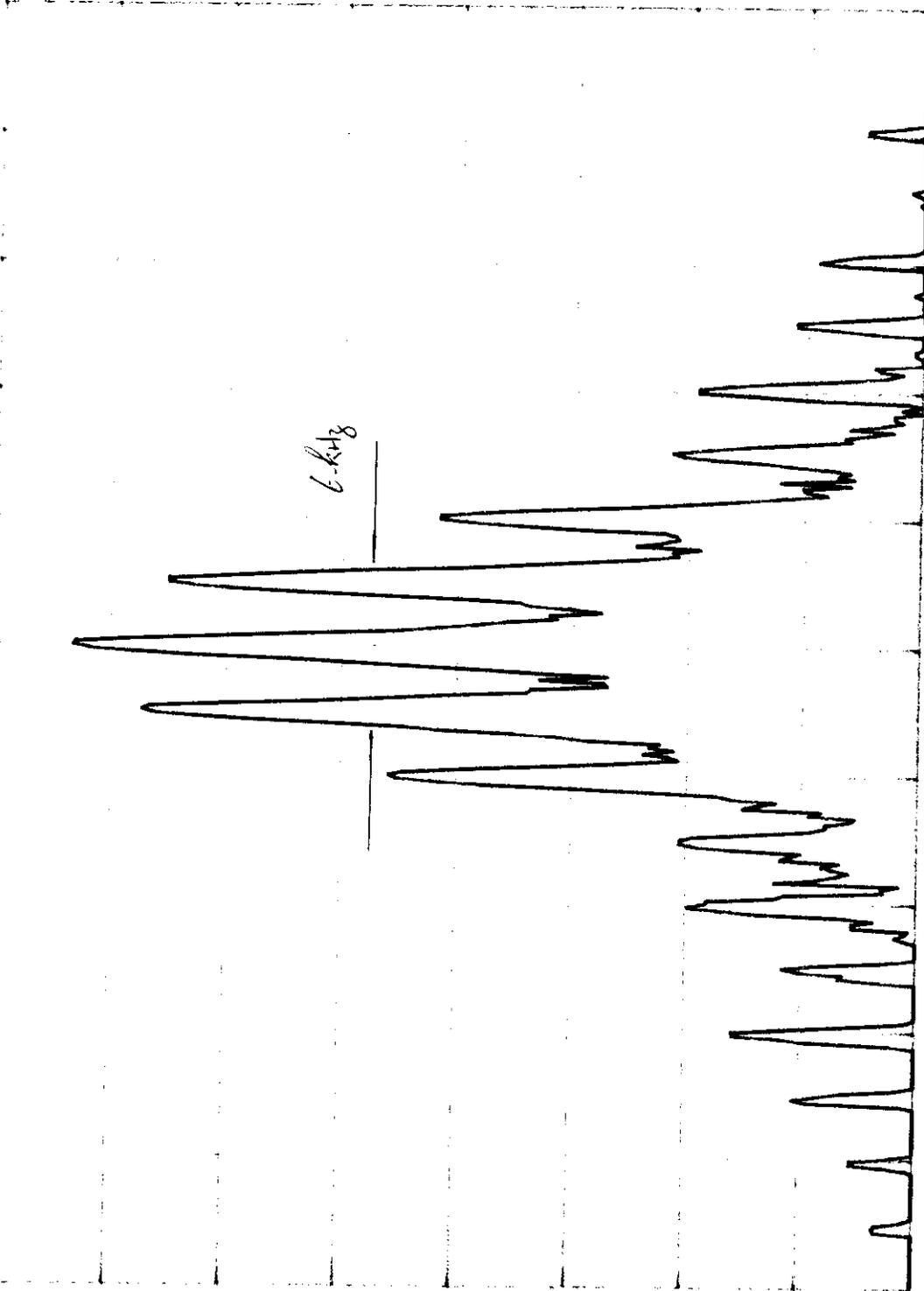
REF 20.0 dBm #AT 30 dB

PEAK

LOG

10

dB/



VA SB  
SC FC  
CORR

CENTER 27.40500 MHz

#RES BW 300 Hz

#VBW 3 MHz

SPAN 50.00 KHZ

#SWP 2.00 sec

**INTERTEK TESTING SERVICES**

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**EXHIBIT 6**

**SPURIOUS EMISSION**

## INTERTEK TESTING SERVICES

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### 6.0 Spurious Emission

In order to satisfy the 2.991 & 2.993 requirement, the spurious emission from the antenna terminal and from the EUT are measured and shown in the Exhibit 6.1 & 6.2

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## INTERTEK TESTING SERVICES

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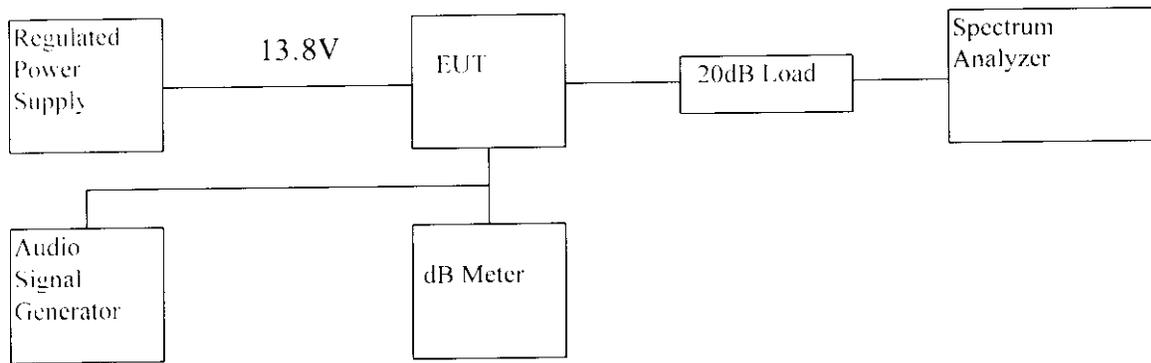
### 6.1 Spurious emission at the antenna terminal (Section 2.991 & Section 95.631)

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
Audio Signal Generator	Leader	LFG-1300S
dB meter	Leader	LMV-182A
20 dB RF Load	Bird	8304-200-N
RF Filter	Tailithic	3VF
Spectrum Analyzer	Hewlett Packard	8951EM

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the level of audio signal generator to obtain 16 dB greater than required for 50% modulation.
- 3) Plot the graph of emissions with 50kHz span.
- 4) Measure the emissions relative to TP in region  $CARRIER \pm 4kHz$  to  $CARRIER \pm 20kHz$  from the plot.
- 5) Record the emissions relative to TP from region  $CARRIER \pm 20kHz$  to 1000MHz.

## INTERTEK TESTING SERVICES

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### C. Test Result

**RadioShack, A Division of Tandy Corporation**

**RadioShack 21-1704**

**Table 5(a)**

- 1) Unwanted emission from CARRIER  $\pm$  4kHz to Carrier  $\pm$  20kHz (Refer to the plots)

Region	Unwanted emission		
	Channel 1	Channel 19	Channel 40
CARRIER $\pm$ 4kHz to $\pm$ 8kHz	< 25dB	< 25dB	< 25dB
CARRIER $\pm$ 8kHz to $\pm$ 20kHz	< 35dB	< 35dB	< 35dB

- 2) Unwanted emission from CARRIER  $\pm$  20kHz to 1000MHz

**Table 5(b): Channel 1**

Frequency (MHz)	Emission relative to TP (dB)	Limit (dB)	Margin (dB)
53.930	-64.9	-60	-4.9
80.895	-82.7	-60	-22.7
107.86	-80.0	-60	-20.0
134.825	-81.3	-60	-21.3
161.790	-84.1	-60	-24.1
188.755	-85.0	-60	-25.0
215.720	-87.4	-60	-27.4
242.685	-89.9	-60	-29.9
242.685	-85.8	-60	-25.8

- Remark:
1. '-' sign in margin column shows the value below the limits.
  2. Any emissions and other harmonics which are attenuated more than 20dB below the permissible value need not be recorded.

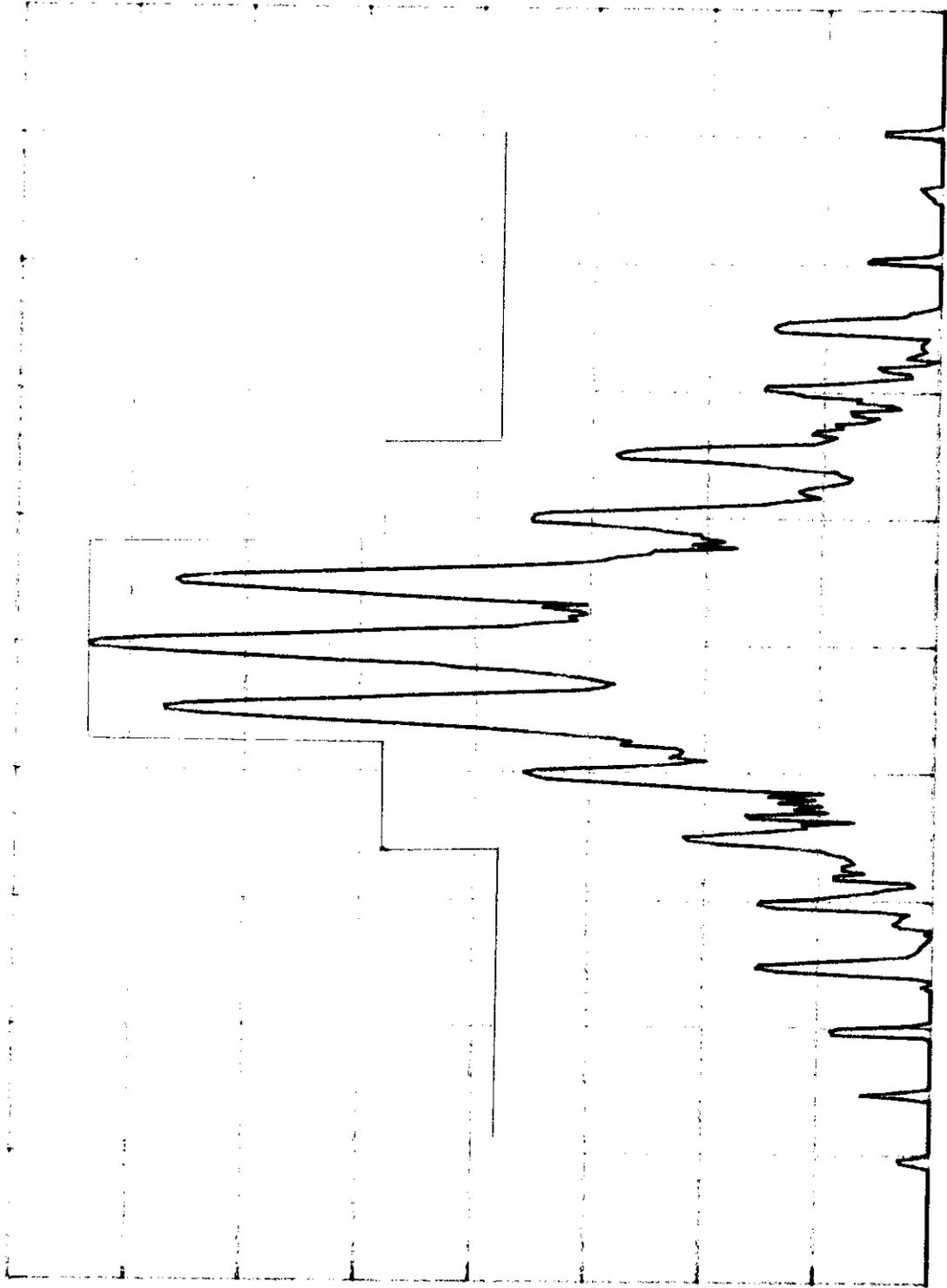
Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

Channel 1

REF 20.0 dBm #AT 30 dB

PEAK  
LOG  
10  
dB/



VA SB  
SC FC  
CORR

CENTER 26.96500 MHz  
#RES BW 300 Hz

SPAN 50.00 KHz  
#SWP 2.00 sec

#VBW 3 MHz

Channel 19

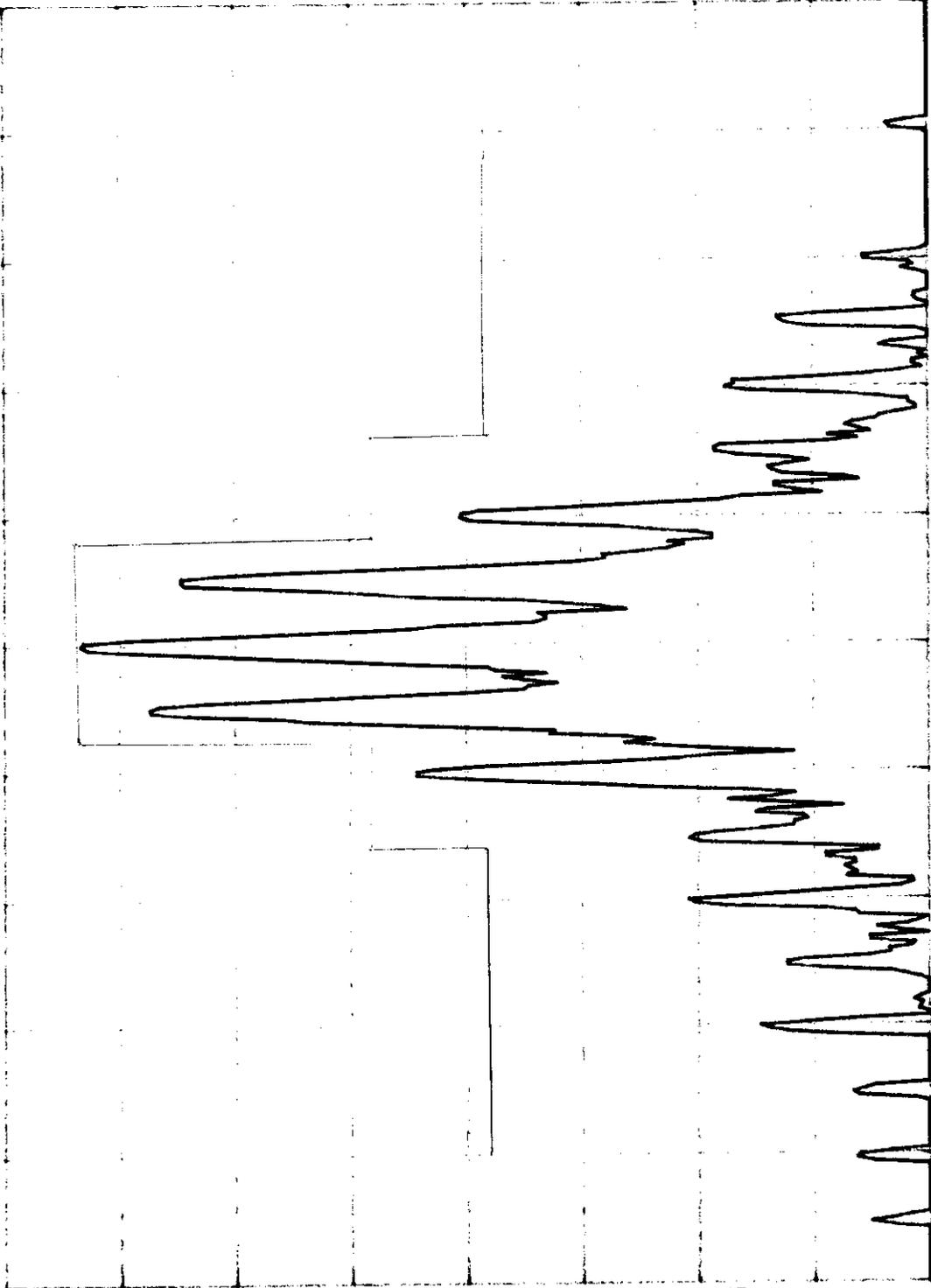
REF 20.0 dBm #AT 30 dB

PEAK

LOG

10

dB/



VA SB  
SC FC  
CORR

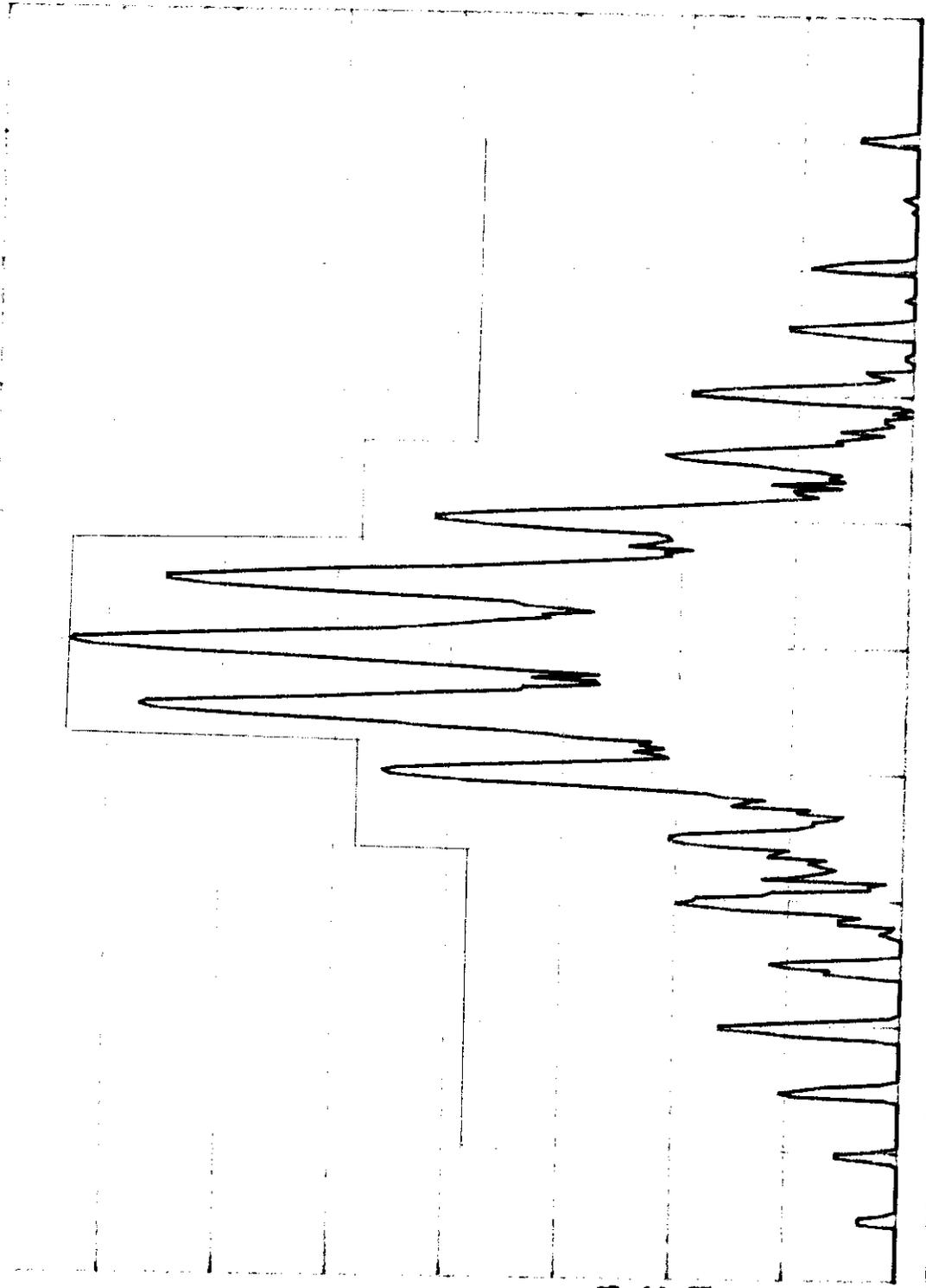
CENTER 27.18500 MHZ #RES BW 300 HZ  
SPAN 50.00 KHZ #SWP 2.00 sec  
#VBW 3 MHZ

70

REF 20.0 dBm #AT 30 dB

PEAK  
LOG  
10  
dB/

Channel 40



VA SB  
SC FC  
CORR

CENTER 27.40500 MHz  
#RES BW 300 Hz

SPAN 50.00 KHZ  
#SWP 2.00 sec

#VBW 3 MHz

---

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**INTERTEK TESTING SERVICES**

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**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Table 5(c): Channel 19**

<b>Frequency (MHz)</b>	<b>Emission relative to TP (dB)</b>	<b>Limit (dB)</b>	<b>Margin (dB)</b>
54.370	-64.3	-60	-4.3
81.555	-85.4	-60	-25.4
108.740	-80.1	-60	-20.1
135.925	-84.2	-60	-24.2
163.110	-84.4	-60	-24.4
190.295	-87.0	-60	-27.0
217.480	-86.1	-60	-26.1
244.665	-92.1	-60	-32.1
271.850	-88.0	-60	-28.0

- Remark: 1. '-' sign in margin column shows the value below the limits.
2. Any emissions and any other harmonics which are attenuated more than 20dB below the permissible value need not be recorded.

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**INTERTEK TESTING SERVICES**

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**Table 5(d): Channel 40**

<b>Frequency (MHz)</b>	<b>Emission relative to TP (dB)</b>	<b>Limit (dB)</b>	<b>Margin (dB)</b>
54.810	-64.1	-60	-24.1
82.215	-89.9	-60	-29.9
109.620	-82.6	-60	-22.6
137.025	-84.4	-60	-24.4
164.430	-78.9	-60	-18.9
191.835	-88.4	-60	-28.4
219.240	-88.3	-60	-28.3
246.645	-91.4	-60	-31.4
274.050	-85.6	-60	-25.6

- Remark: 1. '-' sign in margin column shows the value below the limits.
2. Any emissions and any other harmonics which are attenuated more than 20dB below the permissible value need not be recorded.

Test Engineer: Test Engineer

Date of Test: Date of Test

## INTERTEK TESTING SERVICES

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### 6.2 Field Strength of Spurious Radiation (Section 2.993)

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
Antenna	CDI	B100,B200,B300
Test receiver	Rohde & Schwarz	ESVS30
RF Filter	Tailithic	3VF

#### B. Testing Procedure

Radiated emission measurements were performed according to the procedures in ANSI C63.4(1992). All measurements were performed in Open Area Test Sites located at Roof Top of Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

**INTERTEK TESTING SERVICES**

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**D. Test Result**

**Table 6**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704  
Radiated Spurious Emissions**

Channel : 1

The output power of transmitter is 35.4 dBm

<b>Antenna Polarity</b>	<b>Frequency (MHz)</b>	<b>Reading (dB<math>\mu</math>V)</b>	<b>Antenna Factor (dB)</b>	<b>Net at 3m (dB<math>\mu</math>V/m)</b>	<b>ERP (dBm)</b>	<b>ERP to related TOP*</b>
V	53.929	40.4	11	51.4	-43.8	-79.2
H	80.894	39.7	6	45.7	-49.5	-84.9
H	107.859	36.8	13	49.8	-45.4	-80.8
H	134.824	49.7	13	62.7	-32.5	-67.9
H	161.788	43.2	16	59.2	-36.0	-71.4
H	188.753	35.3	16	51.3	-43.9	-79.3
H	215.718	43.8	17	60.8	-34.4	-69.8
H	242.682	41.7	19	60.7	-34.5	-69.9
H	269.647	28.1	22	50.1	-45.1	-80.5
H	296.612	40.3	22	62.3	-32.9	-68.3
H	323.577	40.7	24	64.7	-30.5	-65.9
H	350.541	39.8	24	63.8	-31.4	-66.8
H	377.507	30.2	24	54.2	-41.0	-76.4
H	404.471	25.1	24	49.1	-46.1	-81.5
H	431.436	19.0	26	45.0	-50.2	-85.6
H	458.401	21.4	26	47.4	-47.8	-83.2
H	566.239	21.8	28	49.8	-45.4	-80.8

\* "TOP" is Transmitter Output Power

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**INTERTEK TESTING SERVICES**

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**D. Test Result**

**Table 7**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704  
Radiated Spurious Emissions**

Channel : 19

The output power of transmitter is 35.3 dBm

<b>Antenna Polarity</b>	<b>Frequency (MHz)</b>	<b>Reading (dB<math>\mu</math>V)</b>	<b>Antenna Factor (dB)</b>	<b>Net at 3m (dB<math>\mu</math>V/m)</b>	<b>ERP (dBm)</b>	<b>ERP to related TOP*</b>
V	54.369	40.0	11	51.0	-44.2	-79.5
H	81.554	38.6	7	45.6	-49.6	-84.9
H	108.739	37.7	13	50.7	-44.5	-79.8
H	135.924	50.6	13	63.6	-31.6	-66.9
H	163.109	41.1	17	58.1	-37.1	-72.4
H	190.294	35.3	16	51.3	-43.9	-79.1
H	217.479	44.5	17	61.5	-33.7	-69.0
H	244.664	40.6	20	60.6	-34.6	-69.9
H	271.849	26.3	22	48.3	-46.9	-82.2
H	299.034	38.0	22	60.0	-35.2	-70.5
H	326.218	40.5	24	64.5	-30.7	-66.0
H	353.404	39.9	24	63.9	-31.3	-66.6
H	380.586	30.7	24	54.7	-40.5	-75.8
H	407.774	25.2	24	49.2	-46.0	-81.2
H	434.958	20.6	25	45.6	-49.6	-84.9
H	462.143	22.0	26	48.0	-47.2	-82.5
H	598.067	21.1	29	50.1	-45.1	80.4

\* "TOP" is Transmitter Output Power

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

**INTERTEK TESTING SERVICES**

**D. Test Result**

**Table 8**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704  
Radiated Spurious Emissions**

Channel : 40

The output power of transmitter is 35.1 dBm

Antenna Polarity	Frequency (MHz)	Reading (dB $\mu$ V)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	ERP (dBm)	ERP to related TOP*
V	54.809	40.8	11	51.8	-43.4	-78.5
H	82.214	39.3	7	46.3	-48.9	-84.0
H	109.619	38.2	13	51.2	-44.0	-79.1
H	137.024	51.1	13	64.1	-31.1	-66.2
H	164.429	40.4	17	57.4	-37.8	-72.9
H	197.834	36.3	16	52.3	-42.9	-78.0
H	219.239	43.7	17	60.7	-34.5	-69.6
H	246.644	41.8	20	61.8	-33.4	-68.5
H	274.048	27.3	22	49.3	-45.9	-81.0
H	304.453	39.4	22	61.4	-33.8	-68.9
H	328.858	41.3	24	65.3	-29.9	-65.0
H	356.263	41.4	24	65.4	-29.8	-64.8
H	383.668	28.3	24	52.3	-42.9	-78.0
H	411.072	24.1	25	49.1	-46.1	-81.2
H	438.478	20.7	26	46.7	-48.5	-83.6
H	465.882	23.2	26	49.2	-46.0	-81.1
H	575.502	22.7	28	50.7	-44.5	79.6

\* "TOP" is Transmitter Output Power

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

FCC ID: AAO21-1704

**INTERTEK TESTING SERVICES**

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**EXHIBIT 7**

**FREQUENCY STABILITY**

## INTERTEK TESTING SERVICES

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### 7.0 Frequency Stability

The frequency tolerance was tested in normal condition & over extreme ambient conditions with respect to voltage and temperature variation.

## INTERTEK TESTING SERVICES

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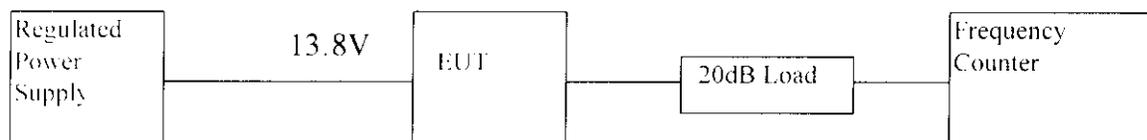
### 7.1 Frequency Tolerance (Section 95.625)

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
20 dB RF Load	Bird	8304-200-N
Frequency Counter	Phillips	PM6668

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Measure all transmit channel frequencies in MHz.

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 9**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704  
Frequency Tolerance**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Measured Frequency (MHz)</b>	<b>Tolerance (%)</b>
1	26.96500	26.96492	-0.00030
2	26.97500	26.97492	-0.00030
3	26.98500	26.98492	-0.00030
4	27.00500	27.00492	-0.00030
5	27.01500	27.01492	-0.00030
6	27.02500	27.02492	-0.00030
7	27.03500	27.03492	-0.00030
8	27.05500	27.05492	-0.00030
9	27.06500	27.06492	-0.00030
10	27.07500	27.07492	-0.00030
11	27.08500	27.08492	-0.00030
12	27.10500	27.10493	-0.00026
13	27.11500	27.11493	-0.00026
14	27.12500	27.12493	-0.00026
15	27.13500	27.13493	-0.00026
16	27.15500	27.15493	-0.00026
17	27.16500	27.16493	-0.00026
18	27.17500	27.17493	-0.00026
19	27.18500	27.18493	-0.00026
20	27.20500	27.20493	-0.00026
21	27.21500	27.21493	-0.00026
22	27.22500	27.22493	-0.00026
23	27.25500	27.25493	-0.00026
24	27.23500	27.23493	-0.00026
25	27.24500	27.24493	-0.00026
26	27.26500	27.26493	-0.00026

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 9 (Cont'd...)**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704  
Frequency Tolerance**

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Measured Frequency (MHz)</b>	<b>Tolerance (%)</b>
27	27.27500	27.27493	-0.00026
28	27.28500	27.28493	-0.00026
29	27.29500	27.29493	-0.00026
30	27.30500	27.30493	-0.00026
31	27.31500	27.31493	-0.00026
32	27.32500	27.32493	-0.00026
33	27.33500	27.33493	-0.00026
34	27.34500	27.34493	-0.00026
35	27.35500	27.35493	-0.00026
36	27.36500	27.36493	-0.00026
37	27.37500	27.37493	-0.00026
38	27.38500	27.38493	-0.00026
39	27.39500	27.39493	-0.00026
40	27.40500	27.40493	-0.00026

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

## INTERTEK TESTING SERVICES

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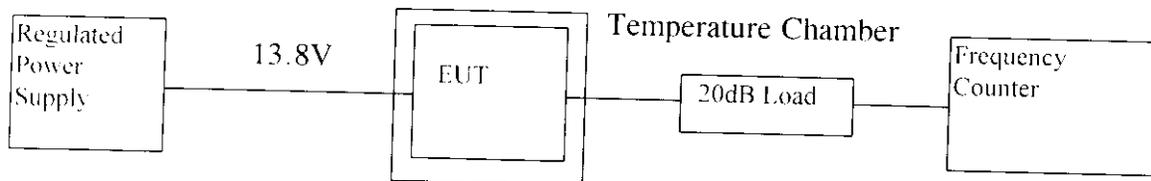
### 7.2 Frequency Stability - Temperature (Section 2.995)

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
20 dB RF Load	Bird	8304-200-N
Frequency Counter	Phillips	PM6668

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Set the Temperature Chamber to  $-30^{\circ}\text{C}$  and stabilize the EUT temperature for one hour. Apply standard input voltage of 13.8 volts with transmitter ON for two minutes.
- 3) Measure the channel frequency of channel 1, 19, 40 in MHz.
- 4) Turn the EUT OFF
- 5) Repeat the above procedure with  $10^{\circ}\text{C}$  intervals form  $-30^{\circ}\text{C}$  to  $50^{\circ}\text{C}$

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 10**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Frequency Deviation with Temperature Variation**

Channel : 1

Temperature (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	% Deviation
-30	26.96500	26.96476	-0.00089
-20	26.96500	26.96474	-0.00096
-10	26.96500	26.96448	-0.00193
0	26.96500	26.96470	-0.00111
10	26.96500	26.96485	-0.00056
20	26.96500	26.96487	-0.00048
30	26.96500	26.96491	-0.00033
40	26.96500	26.96486	-0.00052
50	26.96500	26.96498	-0.00007

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 11**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Frequency Deviation with Temperature Variation**

Channel : 19

Temperature (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	% Deviation
-30	27.18500	27.18476	-0.00088
-20	27.18500	27.18474	-0.00096
-10	27.18500	27.18450	-0.00184
0	27.18500	27.18476	-0.00088
10	27.18500	27.18485	-0.00055
20	27.18500	27.18487	-0.00048
30	27.18500	27.18490	-0.00037
40	27.18500	27.18489	-0.00040

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 12**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Frequency Deviation with Temperature Variation**

Channel : 40

Temperature (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	% Deviation
-30	27.40500	27.40476	-0.00088
-20	27.40500	27.40474	-0.00095
-10	27.40500	27.40449	-0.00186
0	27.40500	27.40475	-0.00091
10	27.40500	27.40485	-0.00055
20	27.40500	27.40487	-0.00047
30	27.40500	27.40491	-0.00033
40	27.40500	27.40492	-0.00029
50	27.40500	27.40497	-0.00011

Test Engineer: Wilson S. K. Loke

Date of Test: April 16, 98

## INTERTEK TESTING SERVICES

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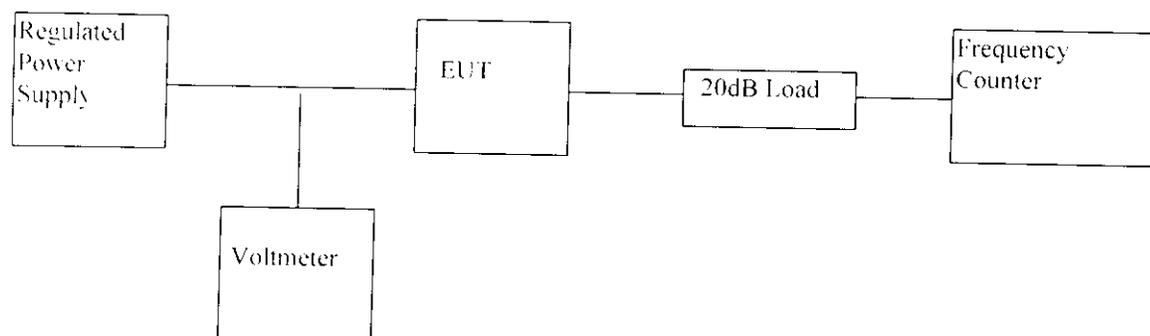
### 7.3 Frequency Stability - Voltage (Section 2.995)

#### A. Test Equipment

Equipment	Brand Name	Model No.
Regulated Power Supply	PAD	30-35L
20 dB RF Load	Bird	8304-200-N
Voltage meter	Fluke	87
Frequency Counter	Phillips	PM6668

#### B. Testing Procedure

- 1) Set-up the test equipment in the following configuration:



- 2) Vary the level of regulated power supply from 85% to 115% of EUT.
- 3) Measure the channel frequency of channel 1, 19, 40 in MHz at each input power level.

---

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**INTERTEK TESTING SERVICES**

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**C. Test Result**

**Table 13**

**RadioShack, A Division of Tandy Corporation  
RadioShack 21-1704**

**Frequency Deviation with Voltage Variation**

Channel : 1

Voltage (V)	Assigned Frequency (MHz)	Measured Frequency (MHz)	% Deviation
11.7	26.96500	26.96489	-0.00041
13.8	26.96500	26.96492	-0.00030
15.9	26.96500	26.96489	-0.00041

Channel : 19

Voltage (V)	Assigned Frequency (MHz)	Measured Frequency (MHz)	% Deviation
11.7	27.18500	27.18489	-0.00040
13.8	27.18500	27.18493	-0.00026
15.9	27.18500	27.18489	-0.00040

Channel : 40

Voltage (V)	Assigned Frequency (MHz)	Measured Frequency (MHz)	% Deviation
11.7	27.40500	27.40489	-0.00040
13.8	27.40500	27.40493	-0.00026
15.9	27.40500	27.40489	-0.00040