NATIONAL CERTIFICATION LABORATORY
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FCC REPORT OF TYPE ACCEPTANCE

for

Berkeley Varitronics Systems, Inc.
3 Price Drive
Edison, NJ 08817

FCC ID: GBL-PCS19

February 15, 1997

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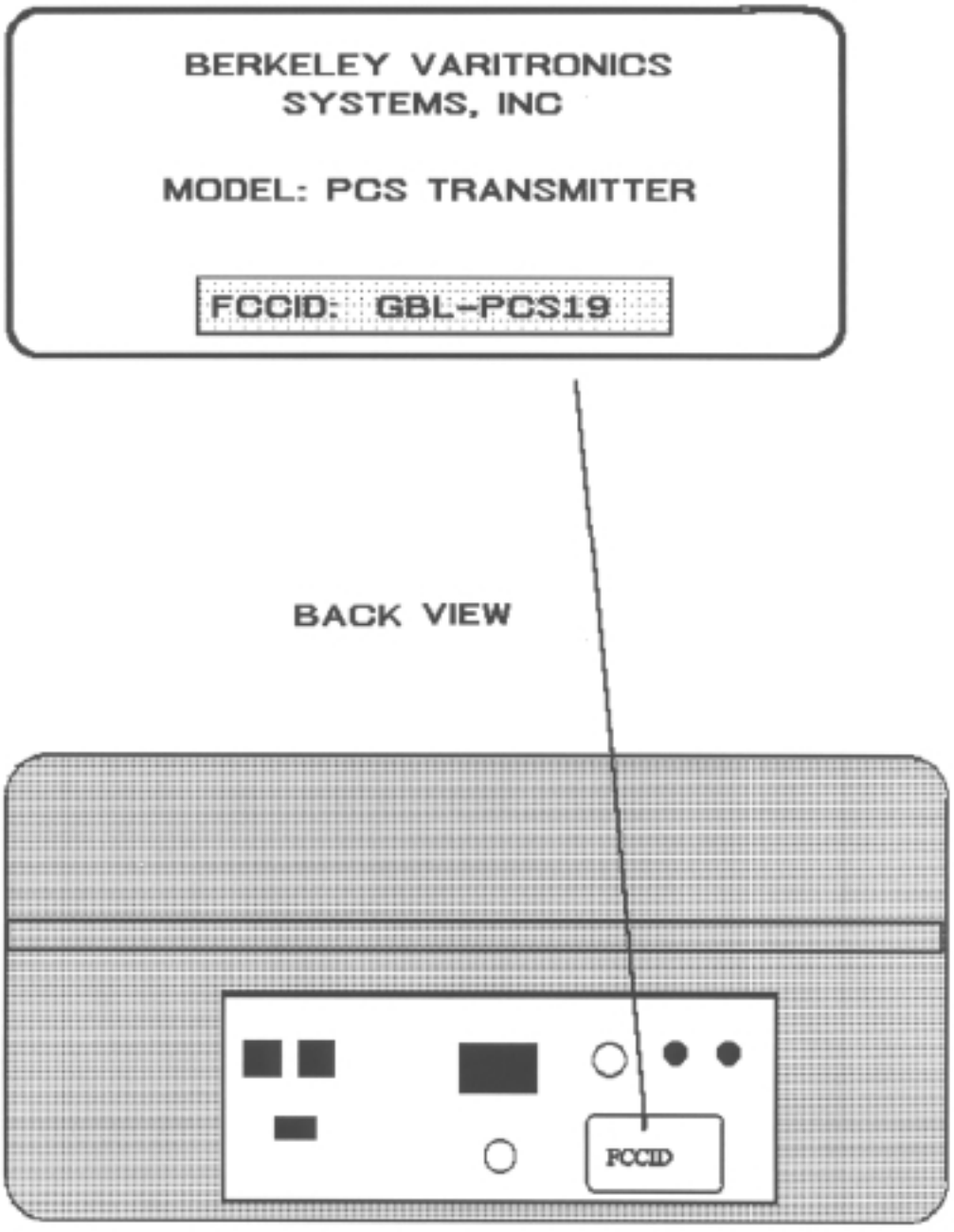
EXHIBITS

FCC LABEL AND LOCATION



1.0 Introduction

This report has been prepared on behalf of Berkeley Varitronics Systems, Inc. to support the attached Application for Type Acceptance of a PCS Transmitter, for use under FCC Part 24, in the Personal Communication Service. The Equipment Under Test was the Berkeley Varitronics Systems, Inc. ***10 Watt PCS Transmitter.***

Radio-Noise Emissions tests were performed according to Part 2, Subpart J and 24.238 of the FCC Rules. The measuring equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

Testing was performed at National Certification Laboratory in Ellicott City, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch. FCC acceptance was granted on May 26, 1993.

1.1 Summary

The Berkeley Varitronics Systems, Inc. ***10 Watt PCS Transmitter*** complies with the technical standards for transmitters operating under FCC Rules Part 24.238, in the PCS Service.

2.0 Description of Equipment Under Test (EUT)

The EUT Features:

1.85 - 2.1 GHz Operation

10 Watts Max Power Rating

50 kHz minimum Tuning Steps

CW Signal Output only

400 milliwatts minimum Power Rating

50 Ohm RF Impedance

Absolute RF Output Power Display

120 VAC Operation

3.0 Test Program

Testing was performed on the EUT to demonstrate performance to the following FCC Rule Parts:

24.238 ---------- Power Rating

2.993 ---------- Radiated Harmonics & Spurious Levels

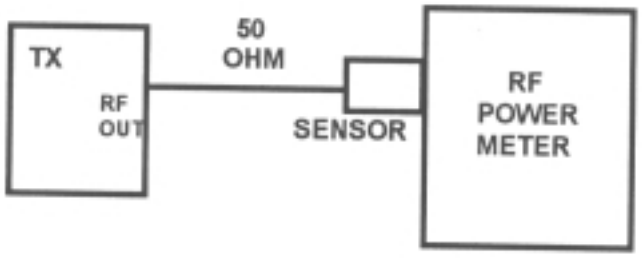
2.991 ---------- Conducted Harmonics & Spurious Levels

2.995 ---------- Frequency Stability

The following Section 4.0 of this report provides Testing Configurations and Data.

FCC Part 24.238 Power Output Rating

Test Configuration

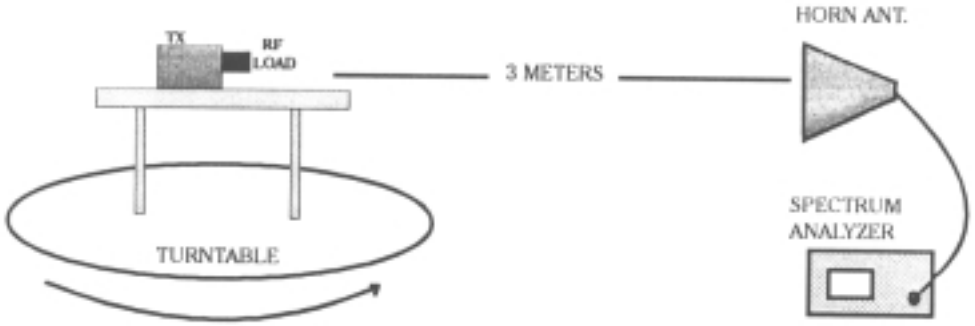


RF Power Reading = <u>10 Watts Max / 400 mW Min</u>

RADIATED EMISSIONS MEASUREMENT

TEST CONFIGURATION

RADIATED EMISSIONS ARE TAKEN ON A 3-METER OUTDOOR SITE



PEAK CARRIER FIELD STRENGTH
CALCULATION FOR HALF-WAVE DIPOLE @ 3 METERS

$$FS\ (V/m) = \sqrt{\frac{(49.2 * 10\ \ WATTS)}{3\ METERS}} = 7.39\ V/m\ @\ 3\ M$$

$$= 137\ dBuV/m\ @\ 3M$$

$$FS\ (V/m) = \sqrt{\frac{(49.2 * .4\ \ WATTS)}{3\ METERS}} = 1.47\ V/m\ @\ 3\ M$$

$$= 123\ dBuV/m\ @\ 3M$$

FCC PART 2.993 - RADIATED SPURIOUS EMISSIONS

Power Level = 40 dBm
Frequency of Carrier = 2.028 GHz
Limit = 43 + 10 (log 10 Watts) dB = 53 dBc

TEST RESULTS

LIMIT: -53 dB FROM PEAK CARRIER (84 dBuV/m @ 3 M)

COMPONENT	FREQUENCY (GHZ)	RESULT (dB FROM PEAK)
HARMONIC	4.056	- 57
HARMONIC	6.084	- 60
HARMONIC	8.112	- 58
HARMONIC	10.140	- 63
HARMONIC	12.168	- 66
HARMONIC	14.196	- 70
HARMONIC	16.224	- 71
HARMONIC	18.252	- 73
HARMONIC	20.280	- 77

FCC PART 2.993 - RADIATED SPURIOUS EMISSIONS

Power Level = 26 dBm
Frequency of Carrier = 2.028 GHz
Limit = 43 + 10 (log .4 Watts) dB = 39 dBc

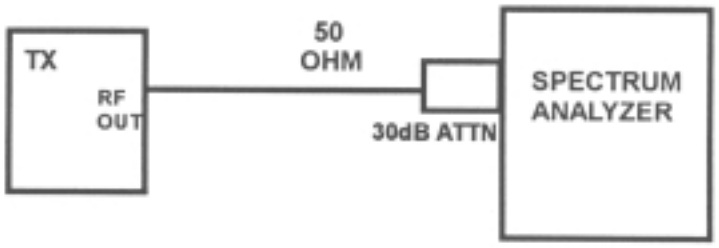
TEST RESULTS

LIMIT: -39 dB FROM PEAK CARRIER (84 dBuV/m @ 3 M)

COMPONENT	FREQUENCY (MHZ)	RESULT (dB FROM PEAK)
HARMONIC	4.056	- 59
HARMONIC	6.084	- 63
HARMONIC	8.112	- 62
HARMONIC	10.140	- 66
HARMONIC	12.168	- 70
HARMONIC	14.196	- 67
HARMONIC	16.224	- 70
HARMONIC	18.252	- 75
HARMONIC	20.280	- 78

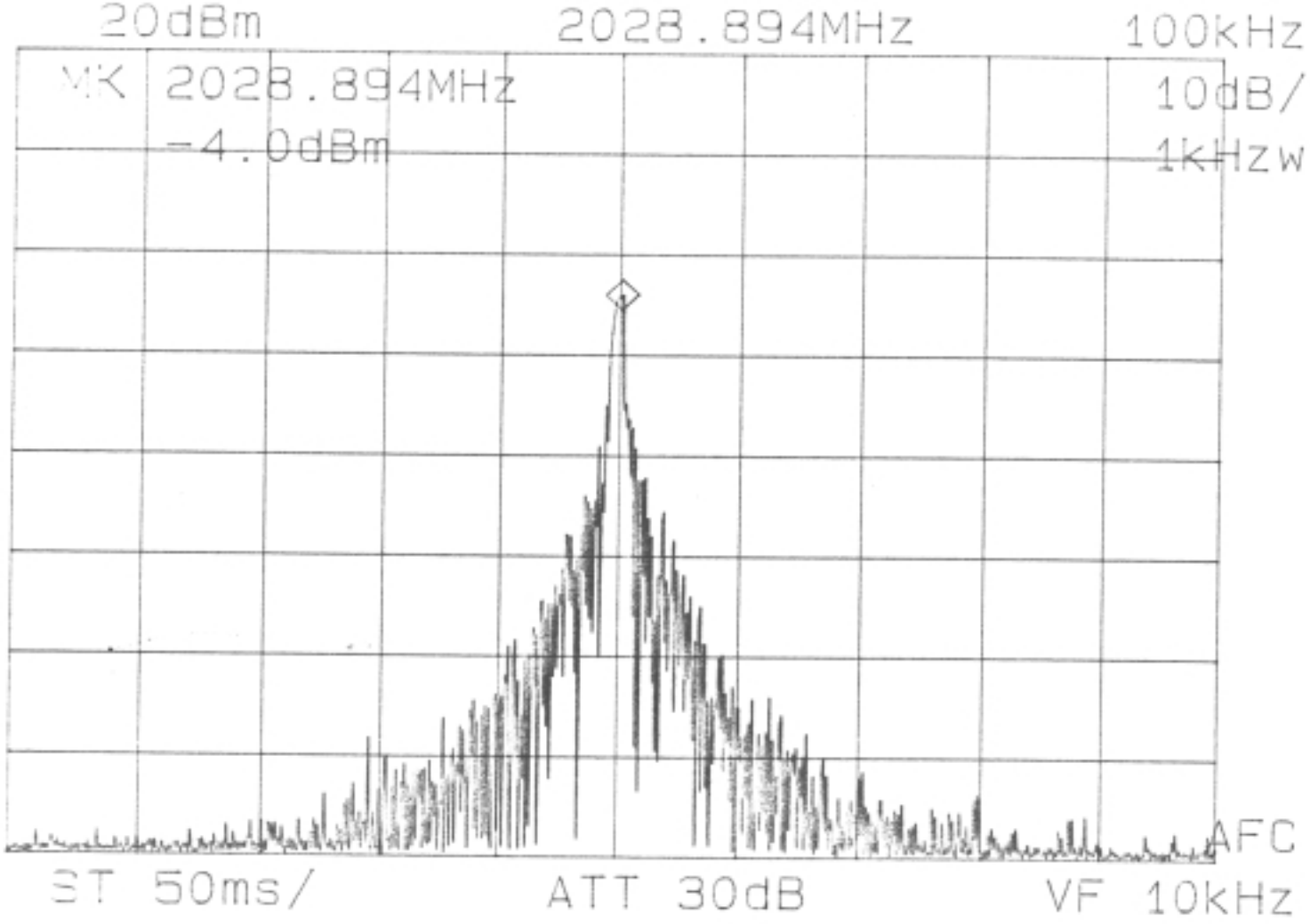
CONDUCTED EMISSIONS MEASUREMENT

TEST CONFIGURATION



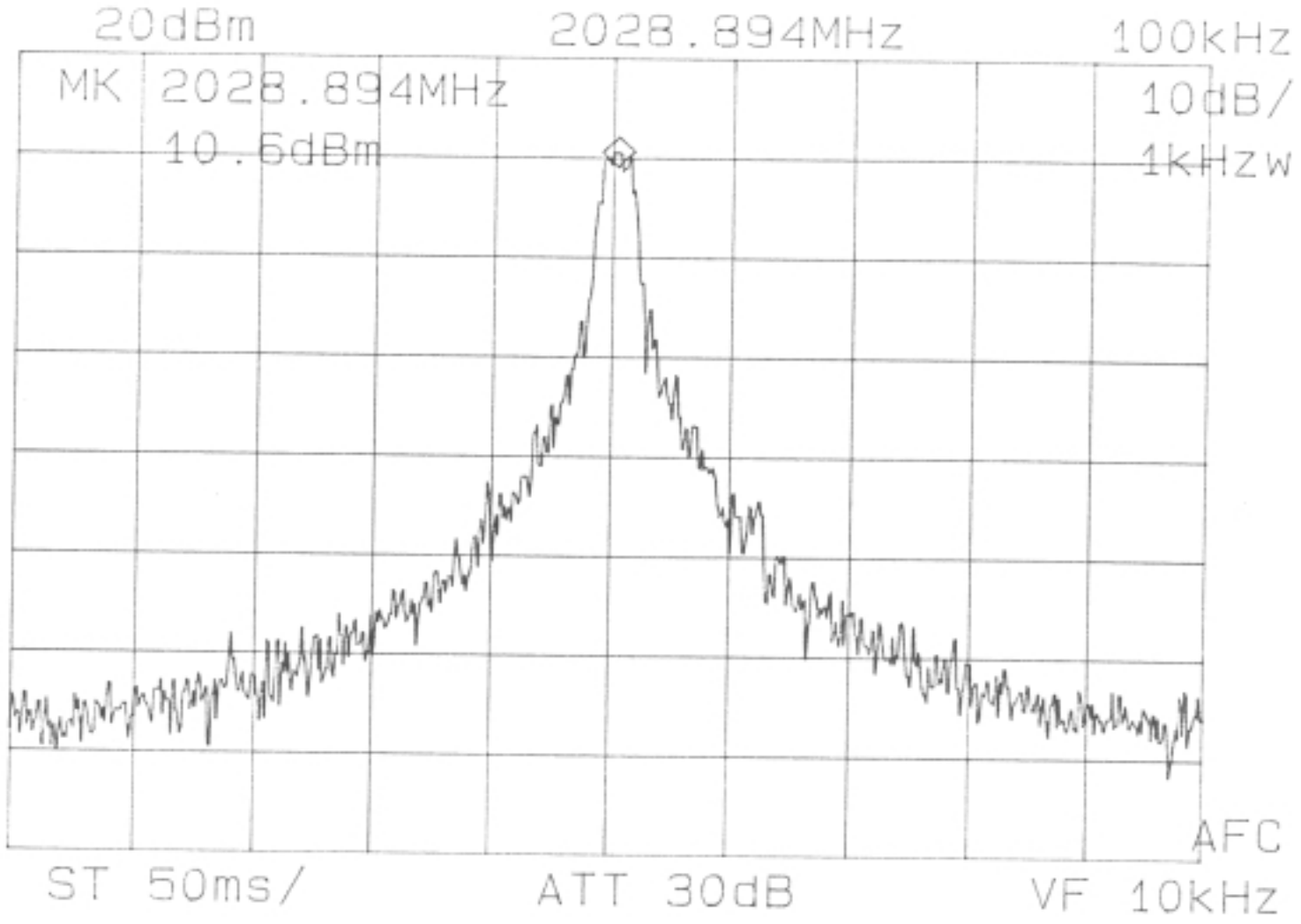
CARRIER OUTPUT LEVEL (30 dB EXT. ATTN)

UNMODULATED **.4 WATTS** **1 KHZ RES. BW**



CARRIER OUTPUT LEVEL (30 dB EXT. ATTN)

UNMODULATED **10 WATTS** **1 KHZ RES. BW**



FCC PART 2.991 - CONDUCTED SPURIOUS EMISSIONS

Power Level = 40 dBm
Frequency of Carrier = 2.028 GHz
Limit = 43 + 10 (log 10 Watts) dB = 53 dBc

TEST RESULTS

LIMIT: -53 dB FROM PEAK CARRIER (-13 dBm)

COMPONENT	FREQUENCY (MHZ)	RESULT (dB FROM PEAK)
HARMONIC	4.056	- 56
HARMONIC	6.084	- 58
HARMONIC	8.112	- 59
HARMONIC	10.140	- 63
HARMONIC	12.168	- 65
HARMONIC	14.196	- 64
HARMONIC	16.224	- 68
HARMONIC	18.252	- 66
HARMONIC	20.280	- 70

FCC PART 2.991 - CONDUCTED SPURIOUS EMISSIONS

Power Level = 26 dBm
Frequency of Carrier = 2.028 GHz
Limit = 43 + 10 (log .4 Watts) dB = 39 dBc

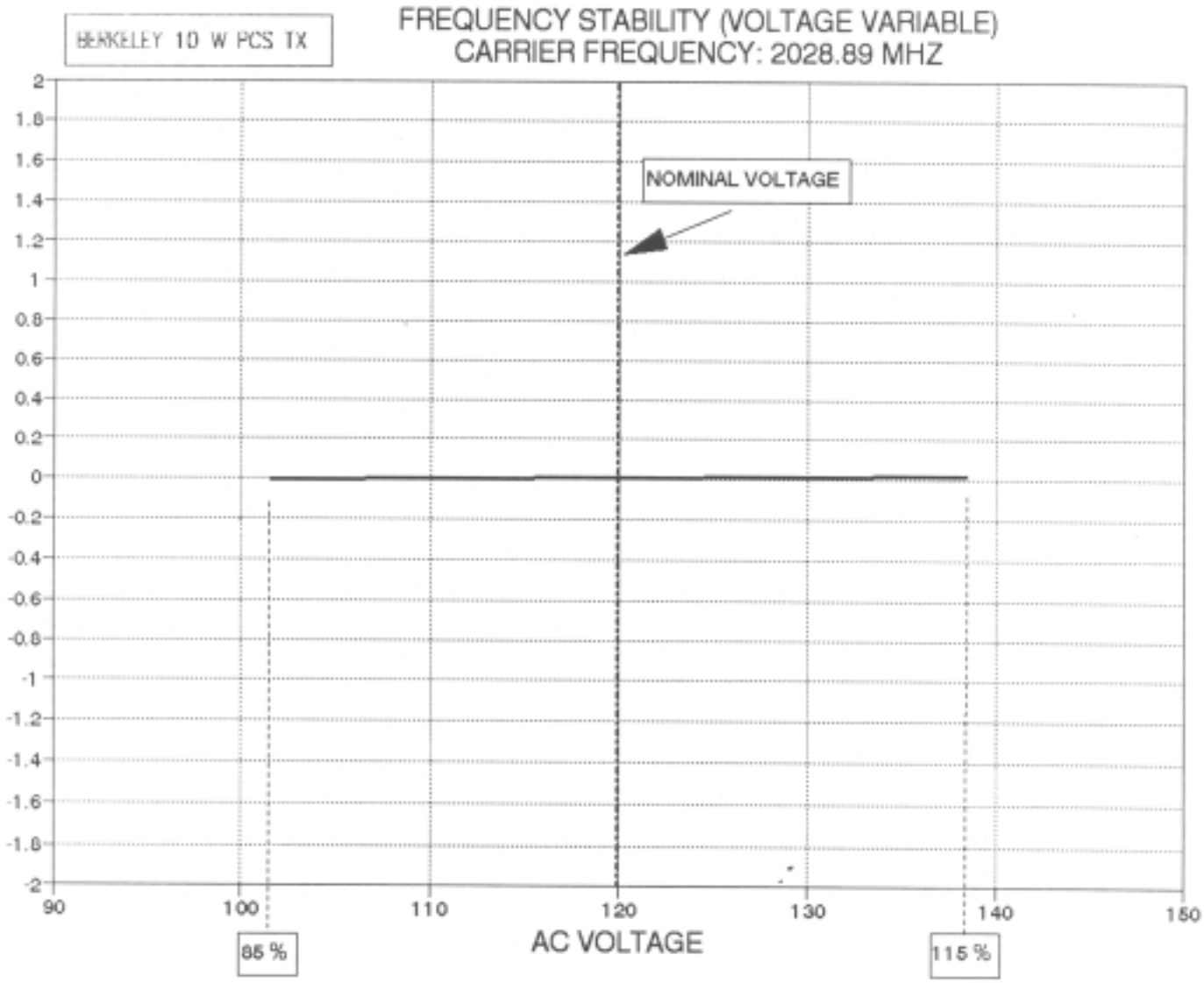
TEST RESULTS

LIMIT: -39 dB FROM PEAK CARRIER (-13 dBm)

COMPONENT	FREQUENCY (MHZ)	RESULT (dB FROM PEAK)
HARMONIC	4.056	- 55
HARMONIC	6.084	- 56
HARMONIC	8.112	- 58
HARMONIC	10.140	- 57
HARMONIC	12.168	- 60
HARMONIC	14.196	- 64
HARMONIC	16.224	- 63
HARMONIC	18.252	- 68
HARMONIC	20.280	- 69

FCC PART 2.995 - FREQUENCY STABILITY

The following charts reveal the Frequency Tolerance of the transmitter carrier frequency as a function of Temperature and Supply Voltage. The charts confirm the rated tolerance of +/- 1 kHz.


BERKELEY 10 W PCS TX
FREQUENCY STABILITY (VOLTAGE VARIABLE)
CARRIER FREQUENCY: 2028.89 MHZ
NOMINAL VOLTAGE
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
90
100
110
120
130
140
150
85 %
AC VOLTAGE
115 %

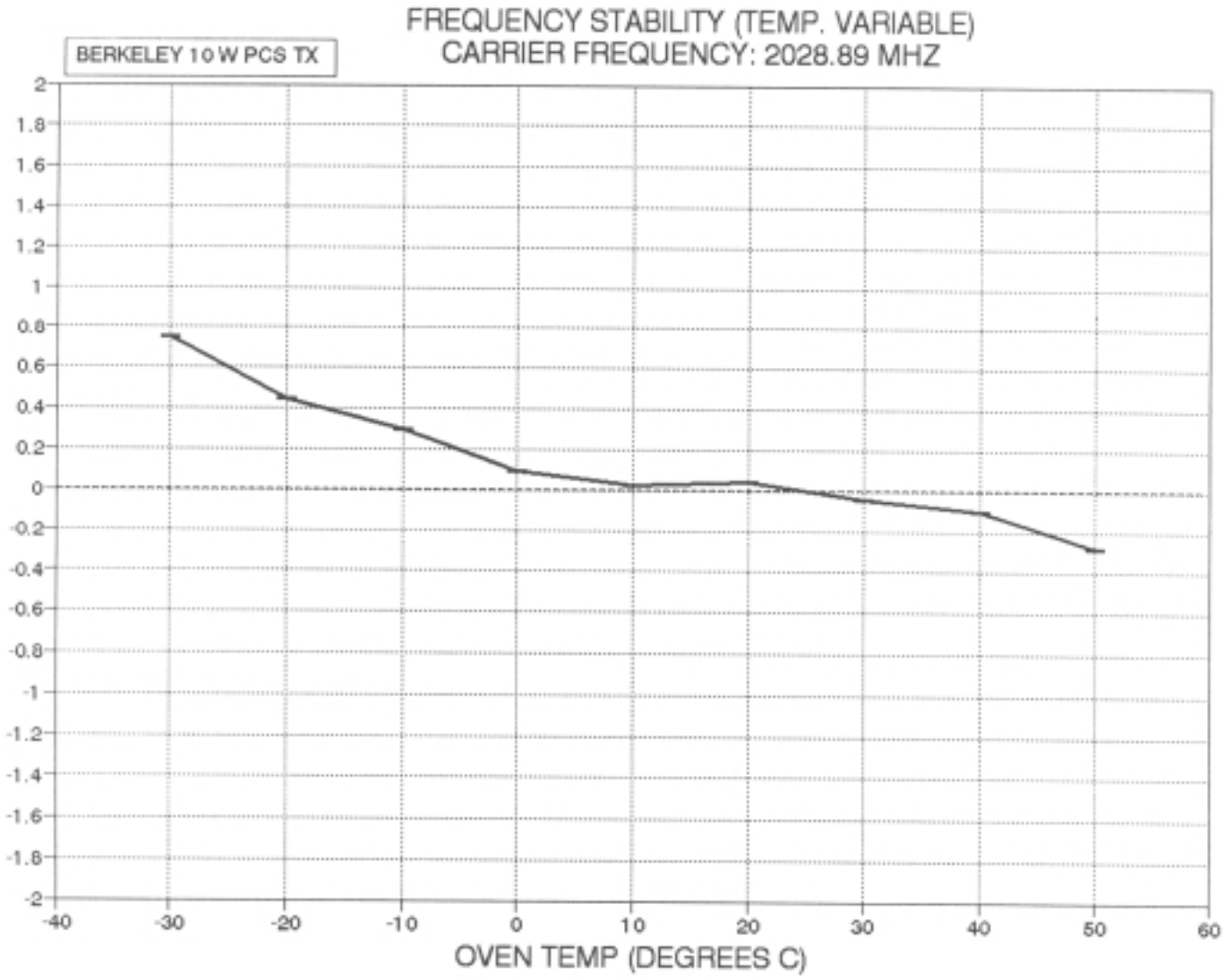

FREQUENCY STABILITY (TEMP. VARIABLE)
CARRIER FREQUENCY: 2028.89 MHZ
BERKELEY 10 W PCS TX
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-40
-30
-20
-10
0
10
20
30
40
50
60
OVEN TEMP (DEGREES C)

Table 1

Measurement Equipment Used

The following equipment is used to perform measurements:

EQUIPMENT	SERIAL NUMBER
EMCO Model 3115 Double Ridgeguide Horn Antenna	3807
EMCO Model 3110 Biconical Antenna	1619
EMCO Model 3146 Log Periodic Antenna	1222
HP 8482B Power Sensor	
Thermotron S-16 Temperature Chamber	534-84
HP 437B Power Meter	10238-F29
Bird 8306-300-N 30dB Attenuator	29198-39151-5
Advantest TR4133B Spectrum Analyzer	54432A
Decibel DB4303B 100 Watt/50 ohm RF Load	D34512-1

PCS TRANSMITTER FUNCTIONAL BLOCK DIAGRAM

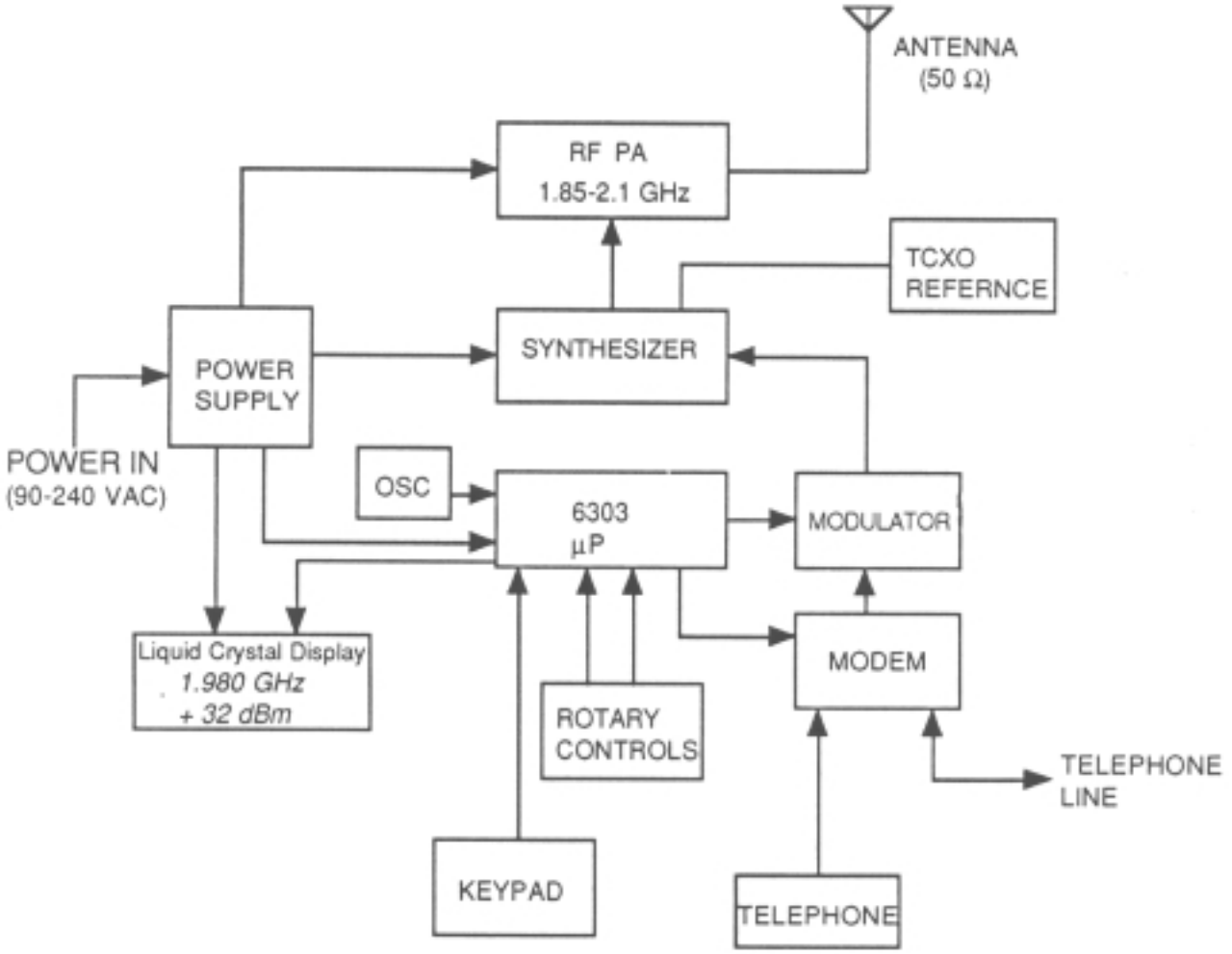


Figure 14