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FCC Parts 22 Test Report
for
Wireless Link
on the
Fixed Wireless Cellular Desktop Phone
Model: FWT-8100
FCC ID: NJIFW8100

Report #: 20451372
Date of Report: April 28, 2001

Job #: J20045137
Date of Test: April 18 to April 23, 2001

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Reviewer: David Chernomordik	EMC Manager David Chernomordik	Review Date: 4/30/01

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1.0 Introduction

1.1 Test Summary

FCC RULE	DESCRIPTION OF TEST	RESULT	PAGE
2.1046	RF Power Output	Passed	6
22.913	ERP	Passed	7
2.1047	Modulation Requirements	Passed	9
22.915(d)(1)	Audio Filter Characteristics	Passed	12
2.1049 22.917(b)(d)	Emission Limitation, Occupied Bandwidth	Passed	15
2.1051, 22.917(e) 22.917(f)	Out of Band Emissions at Antenna Terminals Mobile Emissions In Base Frequency Range	Passed	17
2.1053	Field Strength of Spurious Radiation	Passed	19
15.107	Line Conducted Emissions	Passed	20
2.1055	Frequency Stability vs. Temperature	Passed	21
2.1055	Frequency Stability vs. Voltage	Passed	22
2.1093	Specific Absorption Rate	Passed	See separate report

Tested By: Suresh Kondapalli — Date: 4/30/01

Approved By: David Chernomordik, Ph.D., EMC Site Manager — Review Date: 4/30/01

1.2 Product Description

The Wireless Link FWP-8100 is a Fixed Wireless Cellular Desktop Phone is a stand-alone telephone with digital TDMA and analog AMPS cellular transceiver radio system built-in. It provides extended telephone service bringing subscriber wireless access to a cellular network.

For more information, please refer to the attached product description.

Use of Product	Cellular Desktop Phone
Whether quantity (>1) production is planned	[X] Yes, [ ] No
Cellular Phone standards	[X] AMPS [X] TDMA
Type(s) of Emission	40K0F8W, 40K0F1D, 30K0G7D
Allowed Deviation	12± 10% (AMPS mode)
Range of RF Output	27.8 dBm AMPS Mode, 35.4dBm TDMA Mode
Frequency Range	824 - 849 MHz (AMPS & TDMA)
Antenna(e) & Gain	0 dBi
Detachable antenna ?	[ ]Yes [X] No
Receiver L.O. frequency	988.38, 1001.19, 1013.61 MHz
External input	[X] Audio [ ] Digital Data

1.3 Related Submittal(s) Grants

[X] None

[ ] DOC for computer section, a separate DOC is prepared.

2.0 RF Power Output
FCC 2.1046

2.1 Test Procedure

The transmitter output was connected to a calibrated coaxial attenuator, the other end of which was connected to a spectrum analyzer. Transmitter output was read off the spectrum analyzer in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the spectrum analyzer reading. A HP power meter was also used to measure the RF power.

Tests were performed at three frequencies (low, middle, and high channels) and on all power levels which can be setup on the transmitters.

2.2 Test Equipment

Hewlett Packard 8481A Power Sensor, 435B Power Meter
Hewlett Packard HP8566B Spectrum Analyzer, 100 Hz - 22 GHz
Tektronix 2784 Spectrum Analyzer, 100 Hz – 40 GHz

2.3 Test Results

AMPS Mode

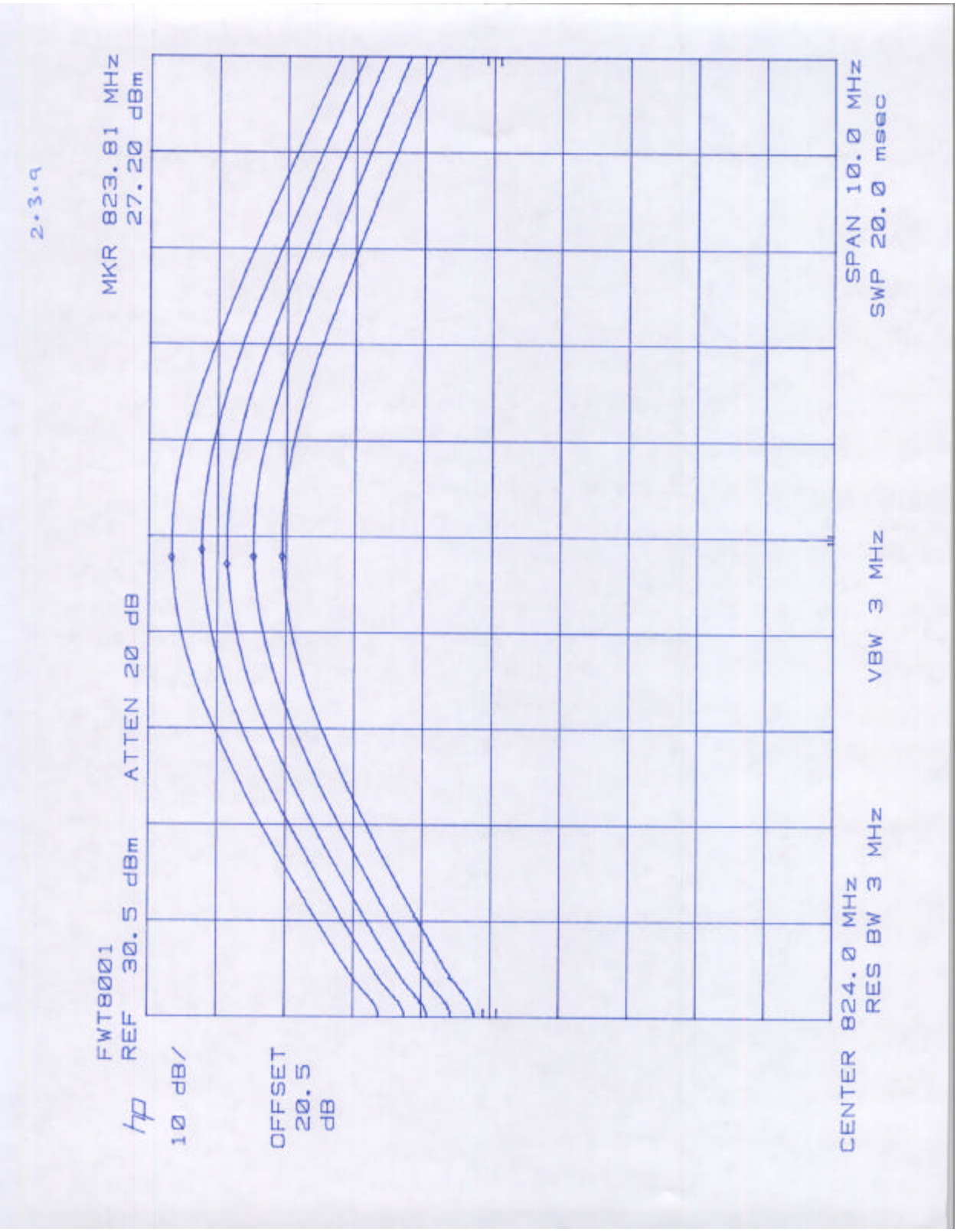
Frequency (MHz)	Measured Power (dBm)
824	26.9
836.5	26.5
849	24.4

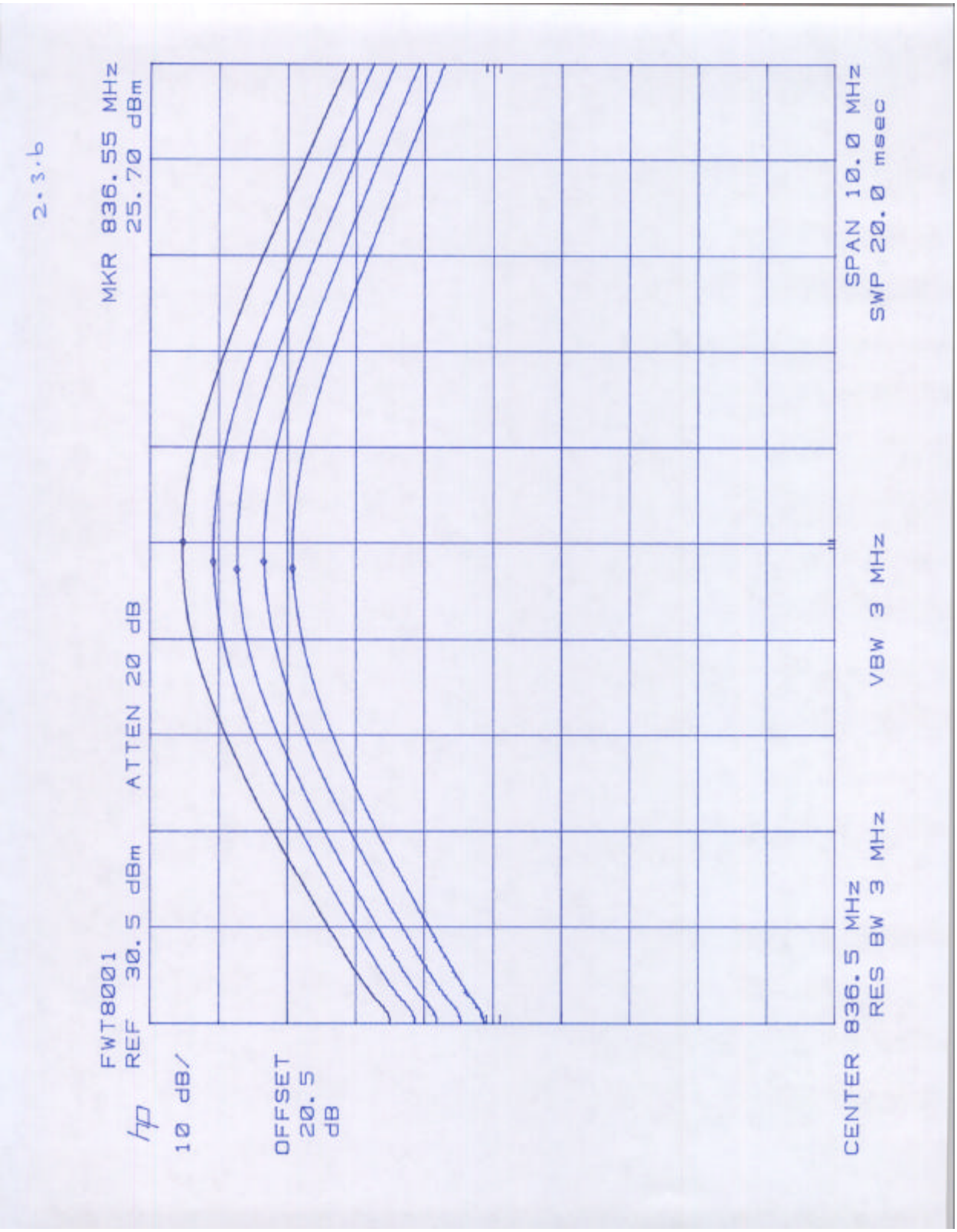
TDMA Mode

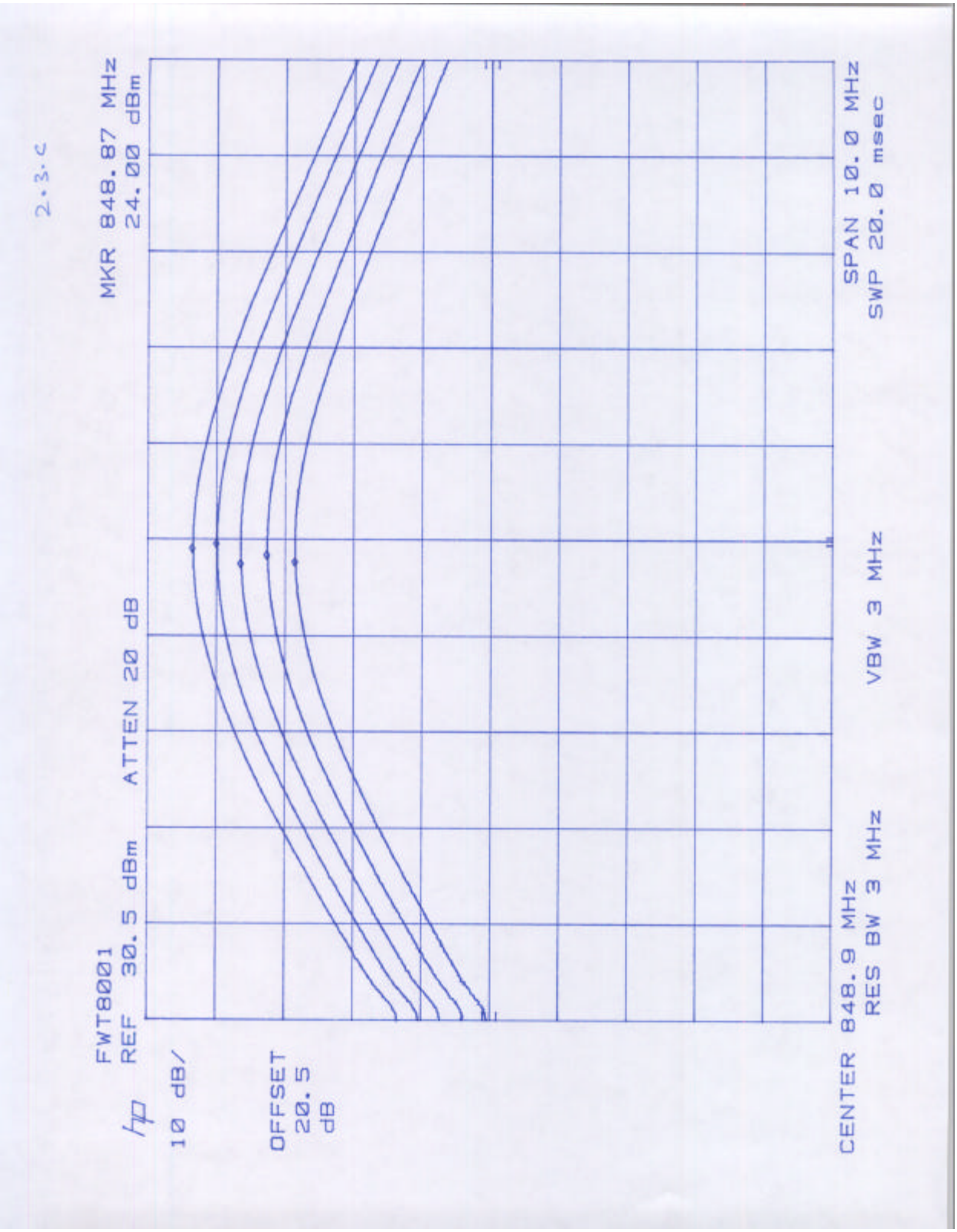
Frequency (MHz)	Measured Power (dBm)
824	35.4
836.5	34.7
849	34.1

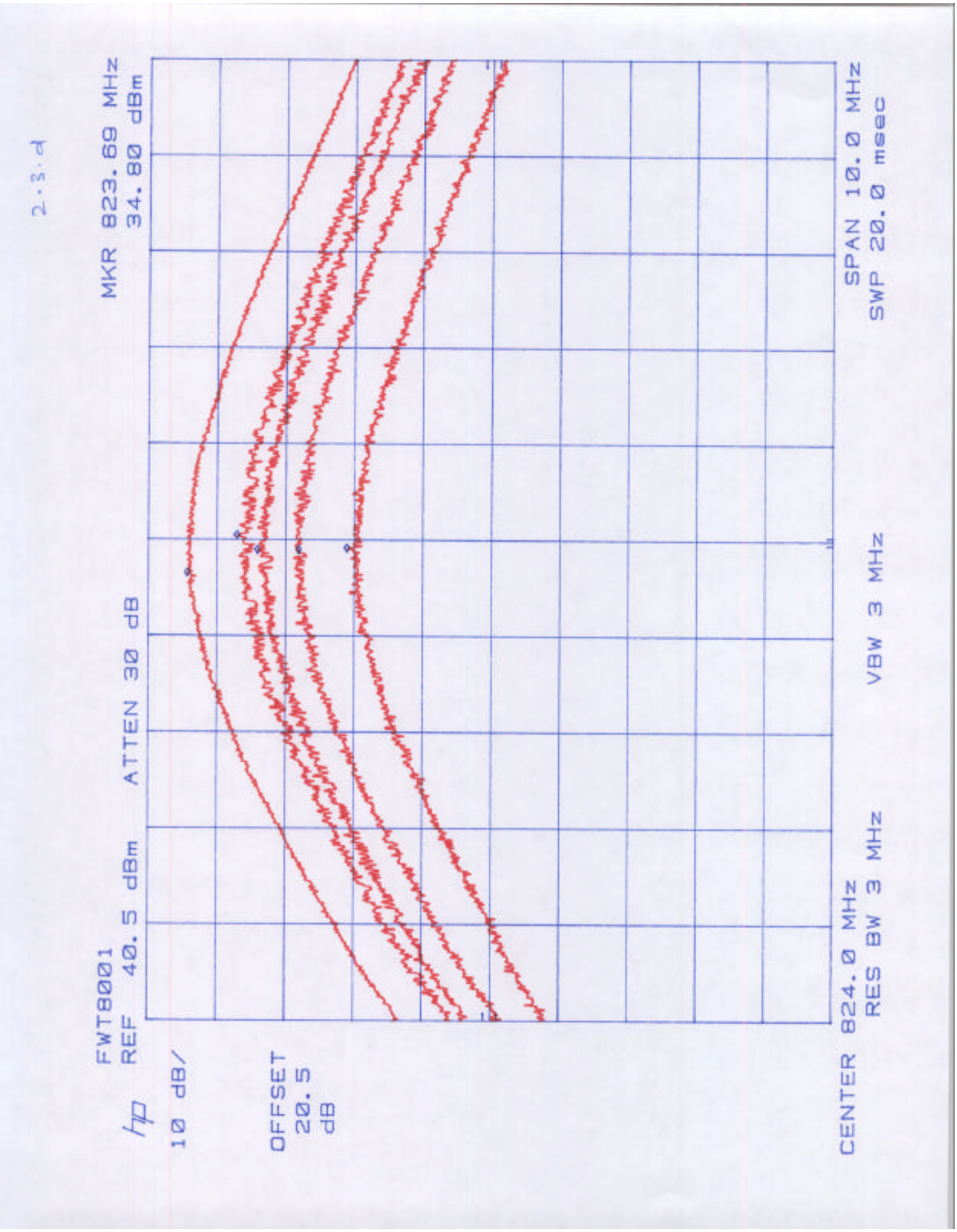
For more details, refer to the attached plots:

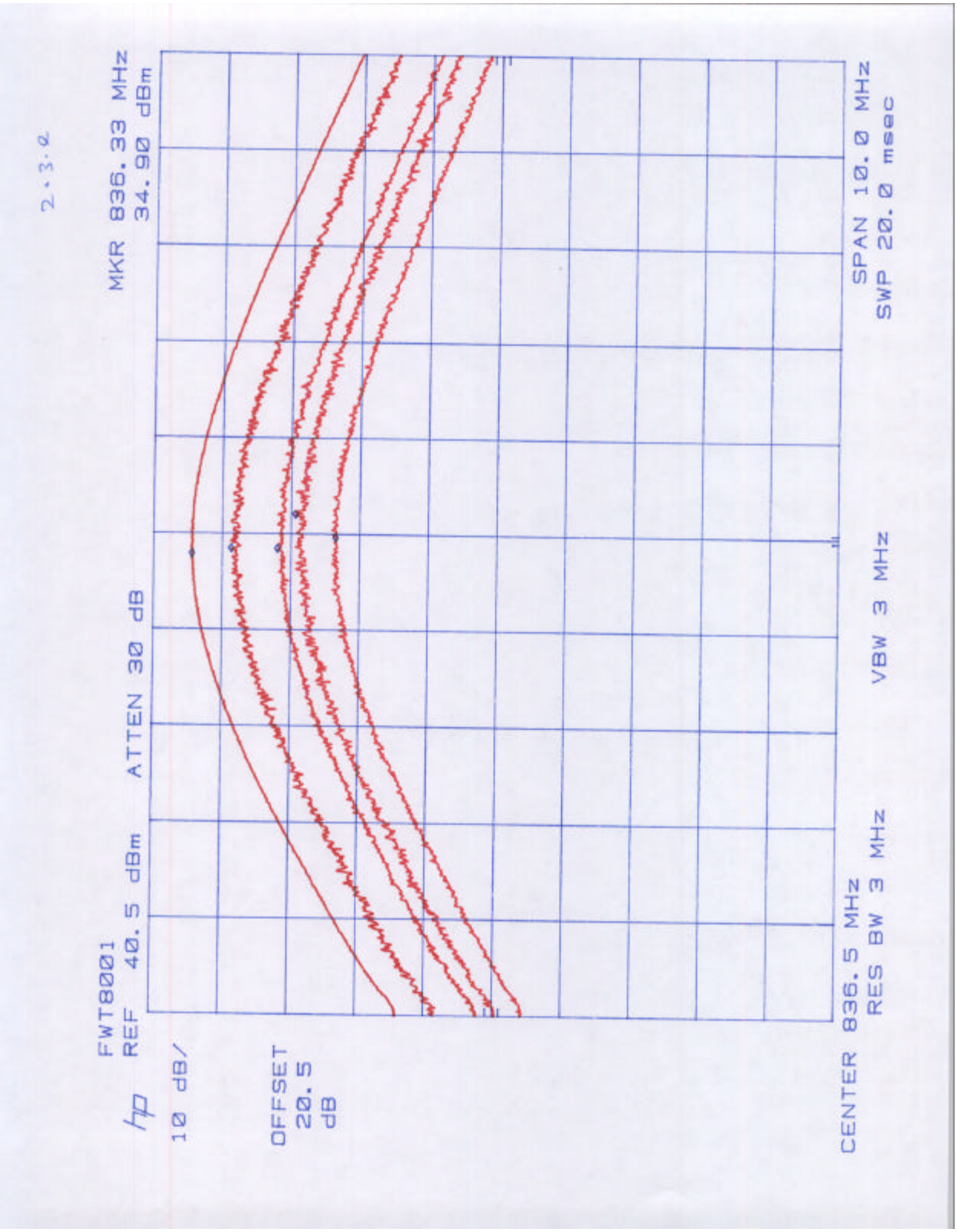
AMPS Mode	
Plot Number	Description
2.3.a	Low Channel
2.3.b	Middle Channel
2.3.c	High Channel
TDMA Mode	
Plot Number	Description
2.3.d	Low Channel
2.3.e	Middle Channel
2.3.f	High Channel

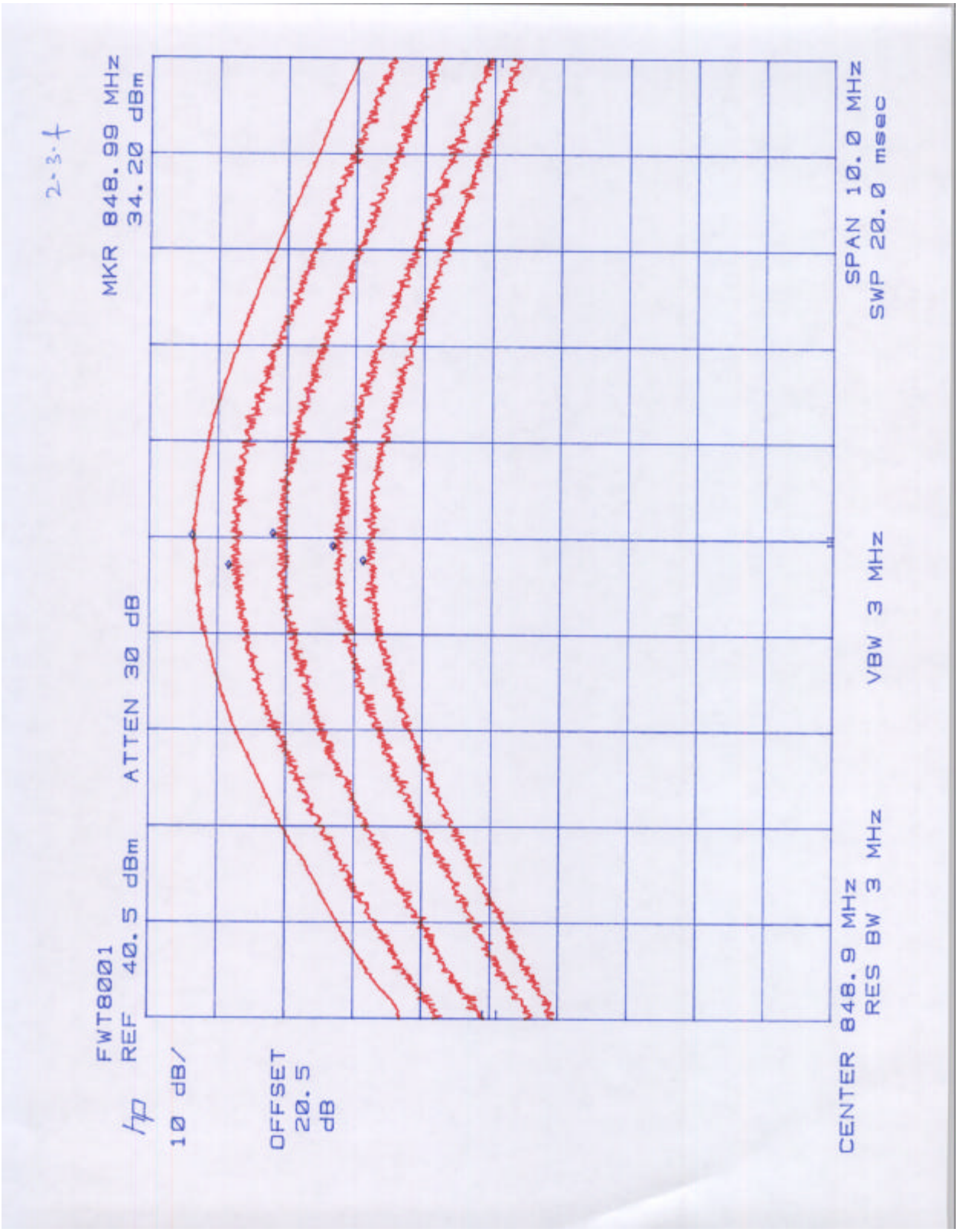

2.3.9
FWT8001
REF 30.5 dBm
ATTEN 20 dB
MKR 823.81 MHz
27.20 dBm
10 dB/
OFFSET
20.5
dB
CENTER 824.0 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 10.0 MHz
SWP 20.0 msec


2.3.b
FWT8001
REF 30.5 dBm
ATTEN 20 dB
MKR 836.55 MHz
25.70 dBm
10 dB/
OFFSET
20.5
dB
CENTER 836.5 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 10.0 MHz
SWP 20.0 msec


2.3.c
FWT8001
REF 30.5 dBm
ATTEN 20 dB
MKR 848.87 MHz
24.00 dBm
10 dB/
OFFSET
20.5
dB
CENTER 848.9 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 10.0 MHz
SWP 20.0 msec


2-3-d
FWT8001
REF 40.5 dBm
ATTEN 30 dB
MKR 823.69 MHz
34.80 dBm
10 dB/
OFFSET
20.5
dB
CENTER 824.0 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 10.0 MHz
SWP 20.0 msec


2.3.a
FWT8001
REF 40.5 dBm
ATTEN 30 dB
MKR 836.33 MHz
34.90 dBm
10 dB/
OFFSET
20.5
dB
CENTER 836.5 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 10.0 MHz
SWP 20.0 msec


2-3-f
FWT8001
REF 40.5 dBm
ATTEN 30 dB
MKR 848.99 MHz
34.20 dBm
10 dB/
OFFSET
20.5
dB
CENTER 848.9 MHz
RES BW 3 MHz
VBW 3 MHz
SPAN 10.0 MHz
SWP 20.0 msec

3.0 Radiated Power

FCC 22.913

The Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

3.1 Test Procedure

The EUT was positioned on a non-conductive turntable, 0.8m above the ground plane on an open test site. The radiated emission at the fundamental frequency was measured at 3m distance with a test antenna and spectrum analyzer. During the measurement, the resolution and video bandwidths of the spectrum analyzer were set to 100 kHz (for frequencies below 1 GHz) and 1 MHz (for frequencies above 1 GHz).

Worst case emission was recorded with the rotation of the turntable and the raising and lowering of the test antenna. The spectrum analyzer reading was recorded and the field strength (E_1 in dBuV/m) was calculated.

ERP was measured using a substitution method. The EUT was replaced by half-wave dipole connected to a signal generator. The spectrum analyzer reading was recorded and the field strength (E_2 in dBuV/m) was calculated.

ERP was calculated as follows:

$$ERP = E_1 - E_2 + P_g,$$

where E_1 & E_2 are field strength in dBuV/m when measured from EUT & generator accordingly; P_g is the generator output in dBm

3.2 Test Equipment

Hewlett Packard HP8566B Spectrum Analyzer
EMCO 3148 Log Periodic Antenna
CDI Robert's Antenna
Rohde & Schwarz SMH 44 signal generator

3.3 Test Results

Passes	Refer to the attached data sheets.

Field Strength of Fundamental

Frequency MHz	**Antenna Polarity**	**Detector**	**SA Reading dB(µV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Field Strength dB(µV/m)**
AMPS Mode						
824.04	V	Peak	98.8	23.0	6.0	127.8
836.55	V	Peak	96.5	23.3	6.0	125.8
848.97	V	Peak	96.7	23.3	6.0	126.0
TDMA Mode						
824.04	V	Peak	107.6	23.0	6.0	136.6
836.55	V	Peak	106.6	23.3	6.0	135.9
848.97	V	Peak	105.5	23.3	6.0	135.0

Radiated Power (Substitution Method)

Frequency MHz	**Antenna Polariz.**	**Field Strength (EUT) dBµV/m**	**Field Strength (Sig. Gen. +Tuned Dipole) dBµV/m**	**Signal Generator Output dBm**	**ERP dBm**
AMPS Mode					
824.04	V	127.8	113.5	10.0	24.3
836.55	V	125.8	113.4	10.0	22.4
848.97	V	126.0	113.3	10.0	22.7
TDMA Mode					
824.04	V	136.6	113.5	10.0	33.0
836.55	V	135.9	113.4	10.0	32.5
848.97	V	135.0	113.3	10.0	31.7

4.0 Modulation Deviation Limiting

FCC 2.1047, 22.915(b)(c)

4.1 Test Procedure

The RF output of the transceiver was connected to the input of a FM deviation meter through sufficient attenuation so as not to overload the meter or distort the readings. An audio signal generator with a variable attenuator on the output was coupled into the external microphone jack of the transceiver, or alternatively, the microphone element was removed and the generator output was connected to the microphone wires by clip leads.

At three different modulating frequencies, the output level of the audio generator was varied and the FM deviation level was recorded (Table 4.1a).

In addition, the audio signal was adjusted to obtain 8 kHz deviation at 1 kHz modulation frequency. Then the input signal was increased in 1 step by 20 dB and the peak deviation and steady state deviation were recorded. This test was performed at modulation frequencies from 300 Hz to 3 kHz.

4.2 Test Equipment

Marconi 2955A Radio Communication Test Set
Leader LFG-1300S Function Generator
LMV-182 AC Millivoltmeter

4.3 Test Results

The deviation is not to exceed 12 kHz. The EUT passed the test. See test data in table 4.1a.

Table 4.1a

Modulation Deviation Limiting			
Output Level (mV)	FM Deviation in kHz at Indicated Modulating Frequency		
	3000 Hz	1000 Hz	300 Hz
10.0	3.18	3.9	0.79
15.0	4.5	5.68	1.02
20.0	5.8	7.3	1.22
30.0	7.0	9.5	1.70
40.0	7.4	10.4	2.6
60.0	7.6	11.1	3.7
70.0	7.7	00.3	4.3
80.0	7.8	11.4	4.8
90.0	7.9	11.4	5.4
100.0	7.9	11.5	5.8
110.0	7.3	11.5	6.2
150.0	7.3	11.5	7.2
160.0	7.3	11.5	7.3
170.0	7.3	11.5	7.5
180.0	7.3	11.5	7.6
190.0	7.3	11.5	7.7
200	7.3	11.4	7.8
250	7.3	10.8	7.8
300	7.4	10.2	10.9
400	8.19	9.5	9.8
450	7.7	9.5	10.8
500	7.8	9.5	10.6
600	7.6	9.4	10.6

Middle Channel: 836.52 MHz