ELITE ELECTRONIC ENGINEERING COMPANY
1516 CENTRE CIRCLE
DOWNERS GROVE, ILLINOIS 60515-1082

ELITE PROJECT: 24949 DATES TESTED: February 7, 1997

TEST PERSONNEL: R. Klouda

TEST SPECIFICATION: FCC "Code of Federal Regulations" Title 47 Part 74 and Part 2, Para. 2.993

AMENDMENT TO ENGINEERING TEST REPORT NO. 19167

MEASUREMENT OF FREQUENCY RESPONSE AND OCCUPIED BANDWIDTH FOR A MODEL REPLY DL KEYPAD TRANSMITTER

FOR: Fleetwood Electronics
Holland, Michigan

PURCHASE ORDER NO.: P8540

Report By: Neil J. Hurley

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Registered Professional
Engineer of Illinois - 44894

ENGINEERING TEST REPORT NO. 19167

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1.0 INTRODUCTION:

This amendment describes additional tests which were performed for the Model Reply DL Keypad Transmitter (test item). The frequency response and occupied bandwidth tests were repeated using a acoustic source. The tests were performed at the peak modulating frequency and at M= 15 kHz per the FCC request. The Unit #4 which was set to transmit at 800.2 MHz was used for these tests. The test item was powered by a 9.0 volt DC battery. The tests were performed for Fleetwood Group, Inc. of Holland, Michigan.

1.2 PURPOSE: The test series was performed to determine if the test item meets the type acceptance test requirements of the FCC "Code of Federal Regulations" Title 47, Part 74.

1.3 SUBCONTRACTOR IDENTIFICATION: This series of tests was performed by the Elite Electronic Engineering Company, radio interference consultants of Downers Grove, Illinois.

2.0 TEST EQUIPMENT:

A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

3.0 REQUIREMENTS, PROCEDURES AND RESULTS:

3.1 AUDIO FREQUENCY RESPONSE MEASUREMENTS:

3.1.1 REQUIREMENTS: This measurement determines the audio frequency response characteristics up to 15 kHz using an acoustic source.

3.1.2 PROCEDURES: The audio frequency response was measured

by establishing a constant sound pressure level at the transmitter's microphone and measuring the FM deviation on the output RF signal.

An acoustic source was setup approximately 30 cm from the input microphone. The sound level was adjusted for a mid-range FM deviation at the audio frequency of maximum deviation. The sound pressure level required to achieve this level was measured with a sound pressure level meter. Next, while maintaining the same sound pressure level, the frequency was varied. The FM deviation was measured and recorded at several frequencies across the range in order to determine the frequency response.

3.1.3 RESULTS: The data from the audio frequency response measurements are presented on Data Page A-101. The frequency where the maximum response occurred was determined to be 3.5 kHz. The frequency response at 15 kHz was approximately 13 dB below the response at 3.5 kHz.

3.2 OCCUPIED BANDWIDTH MEASUREMENTS:

3.2.1 REQUIREMENTS: In accordance with paragraph 74.209(c); The mean power of any emission shall be attenuated below the mean output power in accordance with the following schedule:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth of 200 kHz: at least 25 decibels;

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth of 200 kHz: at least 35 decibels;

(3) On any frequency removed from the assigned frequency by more than 250 percent: at least 43 plus 10 log (mean output power in

watts) decibels or 80 decibels, whichever is the lesser attenuation.

3.2.2 PROCEDURES: The measurement receiver was connected to a probe antenna which was placed near the test item. The unit was set to transmit continuously. The transmitter was modulated from an acoustic source at an audio frequency of maximum deviation at a level which produced maximum deviation. The spectrum analyzer display was adjusted to show the occupied BW which was then plotted. The acoustic source was turned off. The unmodulated RF signal was plotted on the same graph to established the reference level for the BW mask. The measurement was repeated with the modulated level at 50% and then at 16 dB greater than 50% of the maximum deviation point. The test was repeated with the modulating frequency changed to 15 kHz. The same 16 dB greater than 50% of the maximum deviation sound pressure level established for the maximum deviation frequency measurement was used for the 15kHz measurement. The sound pressure level was set with the sound level meter.

3.2.3 RESULTS: The plots of the emissions near the fundamental frequency of 800MHz are presented on data pages A-102 through A-105. As can be seen from these data pages, the transmitter met the occupied bandwidth requirements.

4.0 CONCLUSION:

It was found that the Fleetwood Electronics Model Reply DL Keypad Transmitter, did comply with the audio frequency response requirements and the occupied bandwidth requirements of the FCC "Code of Federal Regulations" Title 47, Part 74.

5.0 CERTIFICATION:

Elite Electronic Engineering Company certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specification.

TABLE I: TEST EQUIPMENT LIST

ELITE ELECTRONIC ENGINEERING Page: 1

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due Date
Equipment Type: AMPLIFIERS								
AAA1	AUDIO AMPLIFIER	MCINTOSH	M75	---	0.02-100KHZ		NOTE 1	
Equipment Type: ANTENNAS								
NLA1	3' LOOP ANTENNA	STODDART	MX936/VRM	---	0.15-1000MHZ		I/O	
Equipment Type: CONTROLLERS								
CDA0	COMPUTER	HEWLETT PACKARD	9836	2143A00699	---		N/A	
Equipment Type: METERS								
MYD0	SOUND LEVEL METER	BRUEL & KJAER	2209	699280	0.002-70KHZ		NOTE 1	
Equipment Type: PRINTERS AND PLOTTERS								
HLI0	X-Y PLOTTER W/ HPIB	HEWLETT PACKARD	7440A	2929L08284	---		N/A	
Equipment Type: RECEIVERS								
RAA0	SPECTRUM ANALYZER	HEWLETT PACKARD	3585A	1750A03840	20HZ-40MHZ	01/28/97	12	01/28/98
RAE0	SPECTRUM ANALYZER	HEWLETT PACKARD	8566A	1904A00175	100HZ-22GHZ	01/30/97	12	01/30/98
RYA0	MODULATION METER	RADIOMETER	AFM3	238195	7-1000MHZ	05/03/96	24	05/03/98
Equipment Type: SIGNAL GENERATORS								
GAD2	SIGNAL GENERATOR	HEWLETT PACKARD	650A	4194	9HZ-10MHZ	09/11/96	6	03/11/97

Cal. Interval: Listed in Months I/O: Initial Only N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

ENGINEERING TEST REPORT NO. 19167

DATA SHEET

MANUFACTURER : Fleetwood Electronics
TEST ITEM : Transmitter
MODEL : Reply DL Keypad
SERIAL NUMBER : None Assigned
TEST PERFORMED : FCC Part 74 Frequency Response
DATE TESTED : February 7, 1997

AUDIO RESPONSE - FREQUENCY VS. OUTPUT:

Acoustic Sound Pressure Level = 66 dB re 20uPa/cm^2

Freq (kHz)	FM Deviation (kHz)	Change Relative to Freq. of Max. Dev. (dB)
1.0	28	-1.5
3.5*	40	0.0
10.0	21	-5.6
15.0	9	-13.0

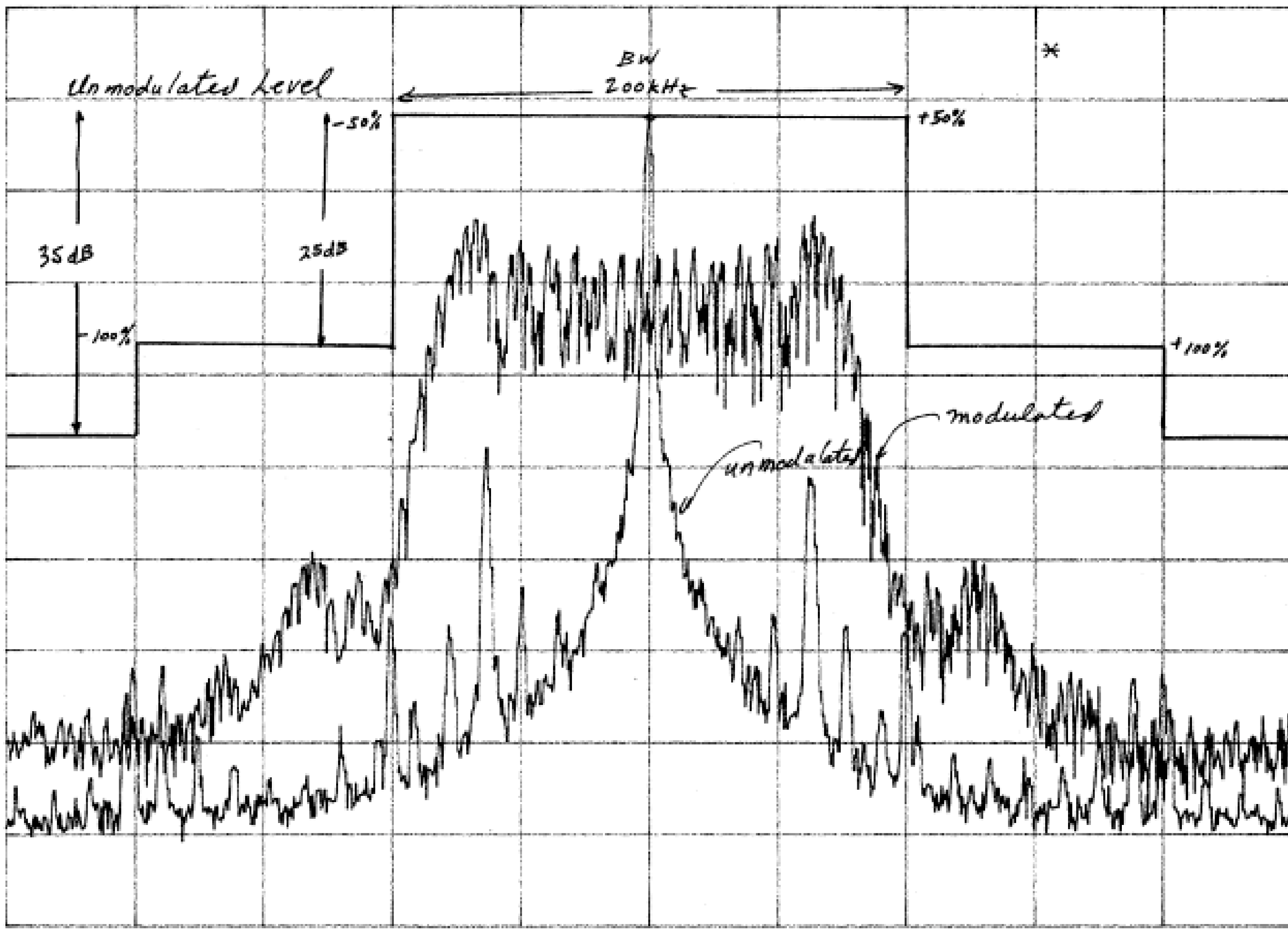
* - Frequency of max. deviation. Acoustic level set to produce an FM deviation just above the mid-range.

FLEETWOOD 2-7-97
KEYPAD UNIT#4

MOD FREQ = 3.5kHz
ACOUSTIC LEVEL TO PRODUCE MAX. DEVIATION

MKR 800.199 5 MHz
REF −17.2 dBm ATTEN 10 dB −29.20 dBm

10 dB/

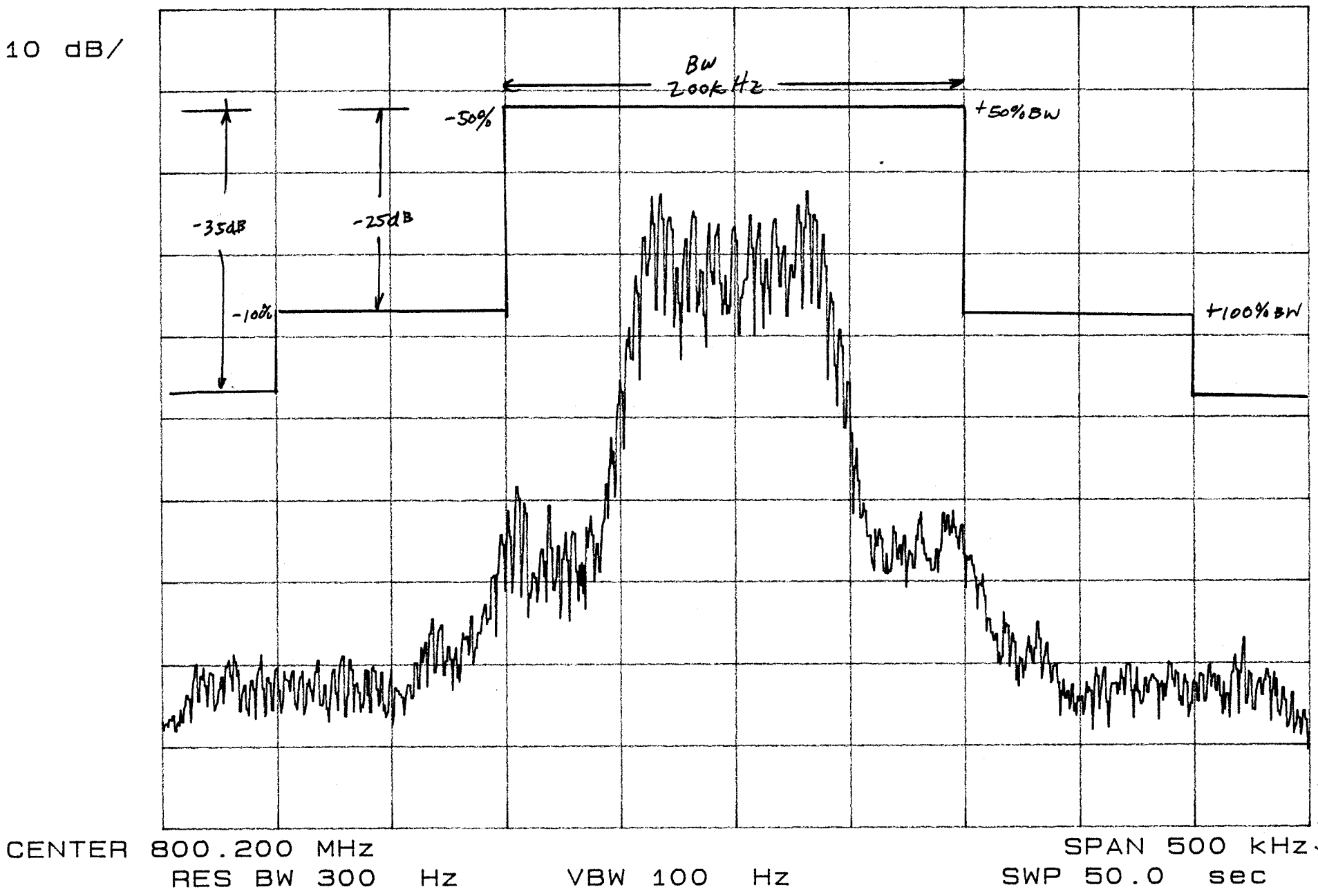


CENTER 800.200 MHz SPAN 500 kHz
RES BW 300 Hz VBW 100 Hz SWP 50.0 sec

EIR 19167A

FLEETWOOD 2-7-97
KEYPAD UNIT #4

MOD FREQ = 3.5kHz
ACOUSTIC LEVEL TO PRODUCE 50% MAX. DEVIATION

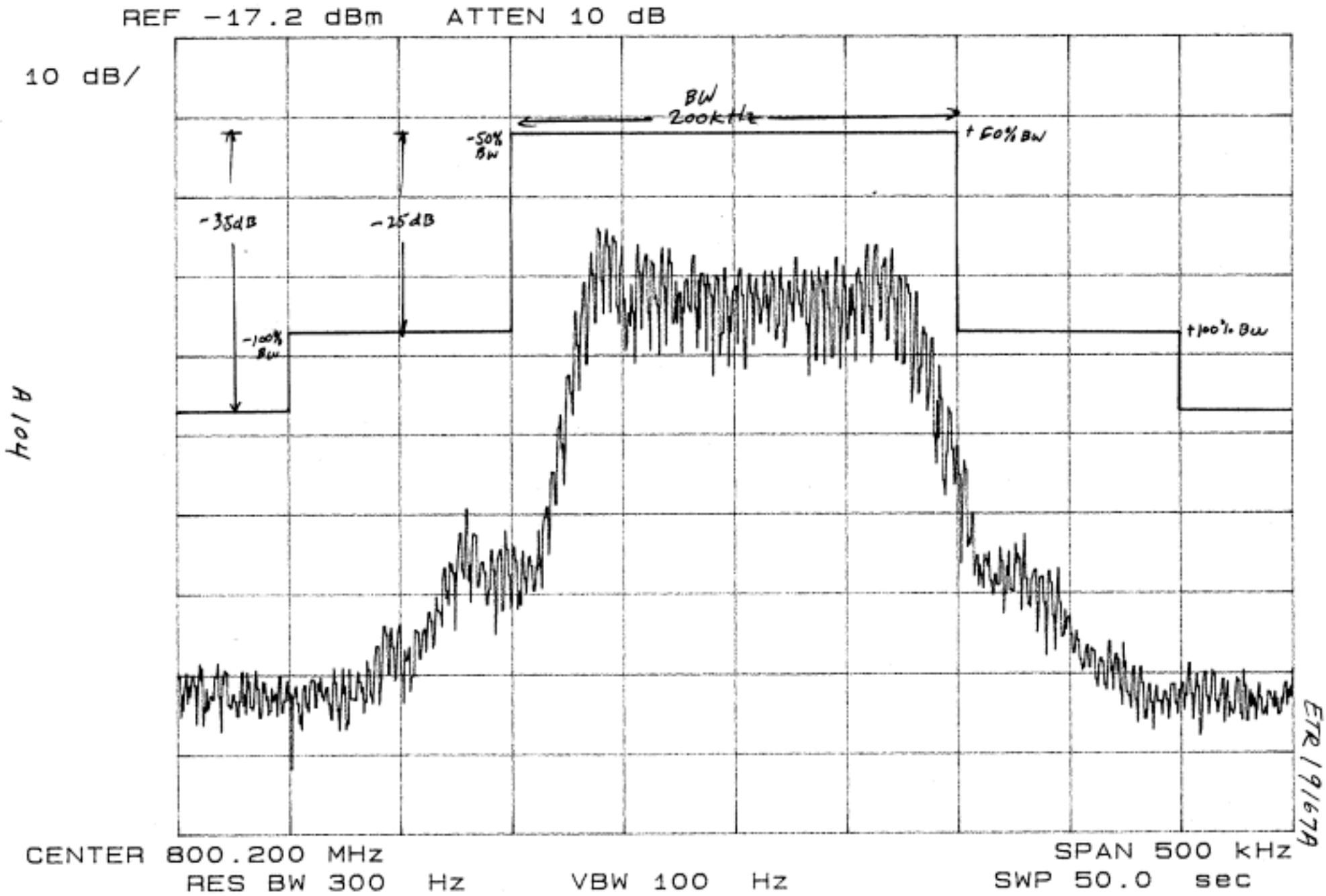


A 103

ETR 1/16/98

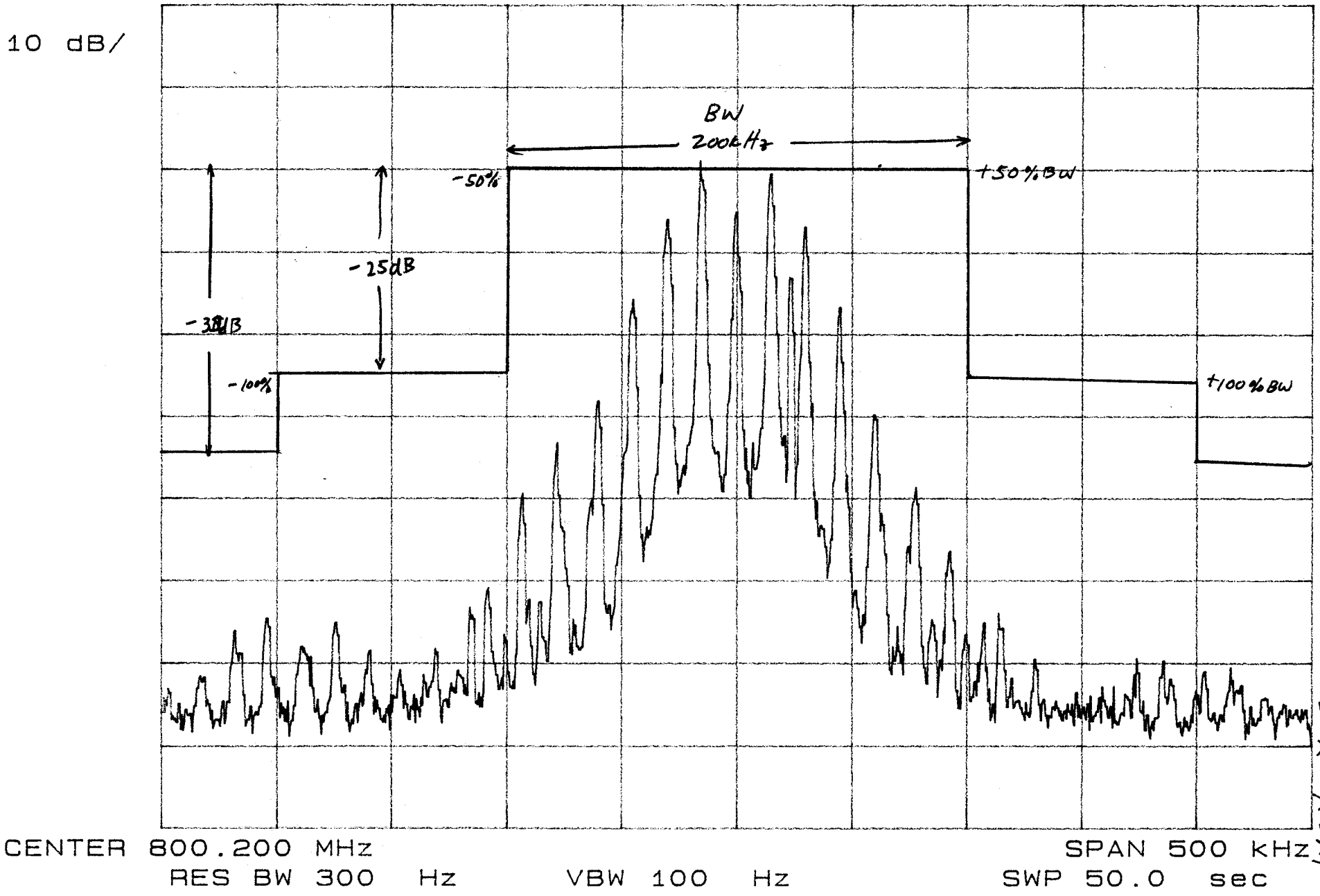
FLEETWOOD 2-7-97
KEYPAD UNIT #4

MOD FREQ = 3.5 kHz
ACOUSTIC LEVEL TO PRODUCE +16 dB above 50% max deviation.



FLEETWOOD 2-7-97
KEYPAD UNIT #4

MOD FREQ = 15kHz
ACOUSTIC LEVEL SET TO +16dB ABOVE ~~MA~~ 50% Max. deviation
Based on 3.5kHz measurement.



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ETR 191674