

COMMUNICATION CERTIFICATION LABORATORY

TEST REPORT: 73-6645

FCC ID: OJC6000-W916RT01

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Exhibit 6: Test Report

TEST REPORT FROM:

COMMUNICATION CERTIFICATION LABORATORY
1940 W. Alexander Street
Salt Lake City, Utah
84119-2039

Type of Report: Certification

TEST OF: 6000-4

FCC ID: OJC6000-W916RT01

To FCC PART 15, Subpart C
Section 15.249

Test Report Serial No: 73-6645

Applicant:

Health Sense International Inc.
657 Newmark Avenue
P.O. Box 293
Coos Bay, OR 97420

Date of Test: April 22, 1999

Issue Date: May 3, 1999

CERTIFICATION OF ENGINEERING REPORT

This report has been prepared by Communication Certification Laboratory to determine compliance of the device described below with the notification requirements of FCC Part 15, Subpart C Section 15.249. This report may be reproduced in full, partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

- Applicant: Health Sense International Inc.
- Manufacturer: Health Sense International Inc.
- Trade Name: REDEEM
- Model Number: 6000-4
- FCC ID: OJC6000-W916RT01

On this 3rd day of May 1999, I, individually, and for Communication Certification Laboratory, certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge, and are made in good faith.

Although NVLAP has recognized that the Communication Certification Laboratory EMC testing facilities are in good standing, NVLAP does not endorse the product described in this report.

COMMUNICATION CERTIFICATION LABORATORY

Checked by: William S. Hurst, P.E.
Vice President

Tested by: Roger J. Midgley
EMC Engineering Manager

SECTION 1.0 CLIENT INFORMATION

1.1 Client Information:

Company Name: Health Sense International Inc.
657 Newmark Avenue
P.O. Box 293
Coos Bay, OR 97420

Contact Name: Norman A. Roberts
Title: Production & Engineering Manager

SECTION 2.0 EQUIPMENT UNDER TEST (EUT)**2.1 Identification of EUT:**

Trade Name: REDEEM
Model Name or Number: 6000-4
Serial Number: N/A
Options Fitted: N/A
Country of Manufacture: U.S.A.

2.2 Description of EUT:

The REDEEM transmitter is a professional incontinence management system designed to sense a fluid release from patient in a nursing home or hospital. The transmitter (model 6000-4) is attached to a Sense'R Strip that recognizes a wet condition in the patient bed. When a wet condition is detected the transmitter is activated and sends a coded transmission to the companion REDEEM receiver (model 6000-3) located at the nurse's station. The transmitter receives power from a 9-volt battery.

This application is for the transmitter portion only; the receiver portion was tested and complies with the Declaration of Conformity procedures according to FCC Part 15 Subpart B.

2.3 Modification Incorporated/Special Accessories on EUT:

There were no modifications or special accessories required to comply with the specification.

Signature: _____

Typed Name: Norman A. Roberts _____

Title: Production & Engineering Manager _____

SECTION 3.0 TEST SPECIFICATION, METHODS & PROCEDURES**3.1 Test Specification:**

Title: FCC PART 15, Subpart C (47 CFR 15).
Section 15.249

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz and 24.0-24.25 GHz.

Purpose of Test: The tests were performed to demonstrate Initial compliance.

3.2 Methods & Procedures:**3.2.1 § 15.249**

(a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902 - 902 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

(b) Field strength limits are specified at a distance of 3 meters.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics; shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

(d) As shown in § 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

(e) Parties considering the manufacture, importation, marketing or operation of equipment under this section should also note the

requirements in § 15.37(d).

3.2.2 § 15.207 Conducted Limits

(a) For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with the provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

3.3 Test Procedure

The line conducted and radiated emissions testing was performed according to the procedures in ANSI C63.4 (1992). Line conducted and radiated emissions testing was performed at CCL's anechoic chamber located at 1940 W. Alexander Street in Salt Lake City, Utah. This site has been fully described in a report submitted to the FCC, and was accepted in a letter dated March 1, 1999 (31040/SIT).

CCL participates in the National Voluntary Laboratory Accreditation Program (NVLAP) and has been accepted under NVLAP Lab Code:100272-0, which is effective until September 30, 1999.

For radiated emissions testing that is performed at distances closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

SECTION 4.0 OPERATION OF EUT DURING TESTING**4.1 Operating Environment:**

Power Supply: 9 VDC
AC Mains Frequency: N/A
Current Rating: N/A

4.2 Operating Modes:

Each mode of operation was exercised to produce worst case emissions. The worst case emissions were with the 6000-4 powered up in the transmit mode.

The 6000-4 operates on 9 VDC supplied via a battery; therefore, conducted emissions' testing is not required.

4.3 EUT Exercise Software:

The 6000-4 used internal firmware to produce the worst case emissions.

SECTION 5.0 SUMMARY OF TEST RESULTS**5.1 FCC PART 15, Subpart C Section 15.249****5.1.1 Summary of Tests:**

Section	Test Performed	Frequency Range (MHz)	Result
15.249 (a)	Radiated Emissions	30 to 10,000	Complied
15.207	Line Conducted Emissions (Hot Lead to Ground)	0.45 to 30	Not Applicable
15.207	Line Conducted Emissions (Neutral Lead to Ground)	0.45 to 30	Not Applicable

5.2 Result

In the configuration tested, the EUT complied with the requirements of the specification.

SECTION 6.0 MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS**6.1 General Comments:**

This section contains the test results only. Details of the test methods used and a list of the test equipment used during the measurements can be found in Appendix 1 of this report.

6.2 Average Factor:

The 6000-4 uses a pulsed emission to transmit therefore the field strength readings were reduced by an average factor of -17.7 dB. This was calculated as shown below.

PULSE DESENSITIZATION

With the resolution bandwidth set to 100 kHz or 1 MHz, the 6000-4 transmitter produces a pulse spectrum on the spectrum analyzer. This occurs because the bandwidth of the analyzer is greater than or equal to the PRF. Because the bandwidth is greater than or equal to $1/t_{eff}$, the displayed amplitude is essentially a peak reading. Therefore, the pulse desensitization (aP) equals zero. Because the pulse desensitization equals zero, no correction factor is needed to obtain a peak reading.

AVERAGE FACTOR

The pulse repetition period is greater than 100 msec; therefore, the total on time in a 100 msec span was used to calculate the average factor. The pulse train consists of 24 pulses, each pulse is 540 μ s in duration; therefore, the total on time in any 100 msec is 12.96 msec ($24 \times 540 \mu$ s).

The average factor for the SST transmitter is -17.7 dB. This factor is derived using the following formula:

$$\text{Time on in 100 ms} = 12.96 \text{ msec}$$

$$20 \log \frac{\text{Time on in 100 msec}}{100 \text{ msec}} = 20 \log 0.1296 = -17.7 \text{ dB}$$

Shown in Appendix 2 is the pulse train that was used to compute this average factor.

6.3 Test Results:**6.3.1 Radiated Interference Level Data - (Vertical Polarity)**

Frequency MHz	Detector	Receiver Reading dB μ V	Average Factor dB	Correction Factor dB	Field Strength dB μ V/m	Limit dB μ V/m
916.4	Peak	74.8	-17.7	34.7	91.8	94.0
1836.0	Peak	33.7	-17.7	32.2	48.2	54.0
2750.0 *	Peak	21.2	-17.7	36.7	40.2	54.0
3666.0 *	Peak	13.1	-17.7	40.0	35.4	54.0
4582.5 *	Peak	11.0	-17.7	41.4	34.7	54.0
5499.0	Peak	11.4 **	-17.7	45.8	39.5	54.0
6415.5	Peak	12.7 **	-17.7	49.8	44.8	54.0
7332.0 *	Peak	12.8 **	-17.7	45.3	40.4	54.0
8248.5 *	Peak	13.6 **	-17.7	46.6	42.5	54.0
9165.0 *	Peak	13.3 **	-17.7	48.1	43.7	54.0
Note 1: * Emissions within restricted bands						
Note 2: ** No emission detected, noise floor reading from spectrum analyzer						

6.3.2 Radiated Interference Level Data - (Horizontal Polarity)

Frequency MHz	Detector	Receiver Reading dB μ V	Average Factor dB	Correction Factor dB	Field Strength dB μ V/m	Limit dB μ V/m
916.4	Peak	73.5	-17.7	34.7	90.5	94.0
1836.0	Peak	30.8	-17.7	32.2	45.3	54.0
2750.0 *	Peak	24.1	-17.7	36.7	43.1	54.0
3666.0 *	Peak	12.4	-17.7	40.0	34.7	54.0
4582.5 *	Peak	11.0	-17.7	41.4	34.7	54.0
5499.0	Peak	11.4 **	-17.7	45.8	39.5	54.0
6415.5	Peak	12.7 **	-17.7	49.8	44.8	54.0
7332.0 *	Peak	12.8 **	-17.7	45.3	40.4	54.0
8248.5 *	Peak	13.6 **	-17.7	46.6	42.5	54.0
9165.0 *	Peak	13.3 **	-17.7	48.1	43.7	54.0

Note 1: * Emissions within restricted bands

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.4 Sample Field Strength Calculation:

The field strength is calculated by adding the Correction Factor (Antenna Factor + Cable Factor), to the measured level from the receiver. The receiver amplitude reading is compensated for any amplifier gain. The basic equation with a sample calculation is shown below:

$$FS = RA + CF \quad \text{Where}$$

FS = Field Strength

RA = Receiver Amplitude Reading (Receiver Reading -
Amplifier Gain)

CF = Correction Factor (Antenna Factor + Cable Factor)

Assume a receiver reading of 42.5 dB μ V is obtained from the receiver, an amplifier gain of 26.5 dB and a correction factor of 8.5 dB. The field strength is calculated by subtracting the amplifier gain and adding the correction factor, giving a field strength of 24.5 dB μ V/m, $FS = (42.5 - 26.5) + 8.5 = 24.5$ dB μ V/m

APPENDIX 1 TEST PROCEDURES AND TEST EQUIPMENT**Radiated Interference Emissions:**

The radiated emission from the intentional radiator was measured using a spectrum analyzer with a quasi-peak adapter for peak and quasi-peak readings. A preamplifier with a fixed gain of 26 dB and a power amplifier with a fixed gain of 22 dB were used to increase the sensitivity of the measuring instrumentation. The quasi-peak adapter uses a bandwidth of 120 kHz, with the spectrum analyzer's resolution bandwidth set at 1 MHz, for readings in the 30 to 1000 MHz frequency range. For peak emissions above 1000 MHz the spectrum analyzer's resolution bandwidth was set to 1 MHz and the video bandwidth was set to 3 MHz. For average emissions above 1000 MHz the spectrum analyzer's resolution bandwidth was set to 1 MHz and the video bandwidth was set to 1 Hz.

A biconilog antenna was used to measure the frequency range of 30 to 1000 MHz and a Double Ridge Guide Horn antenna was used to measure the frequency range 1 GHz to 10 GHz, at a distance of 3 meters from the EUT. The readings obtained by these antennas are correlated to the levels obtained with a tuned dipole antenna by adding antenna factors.

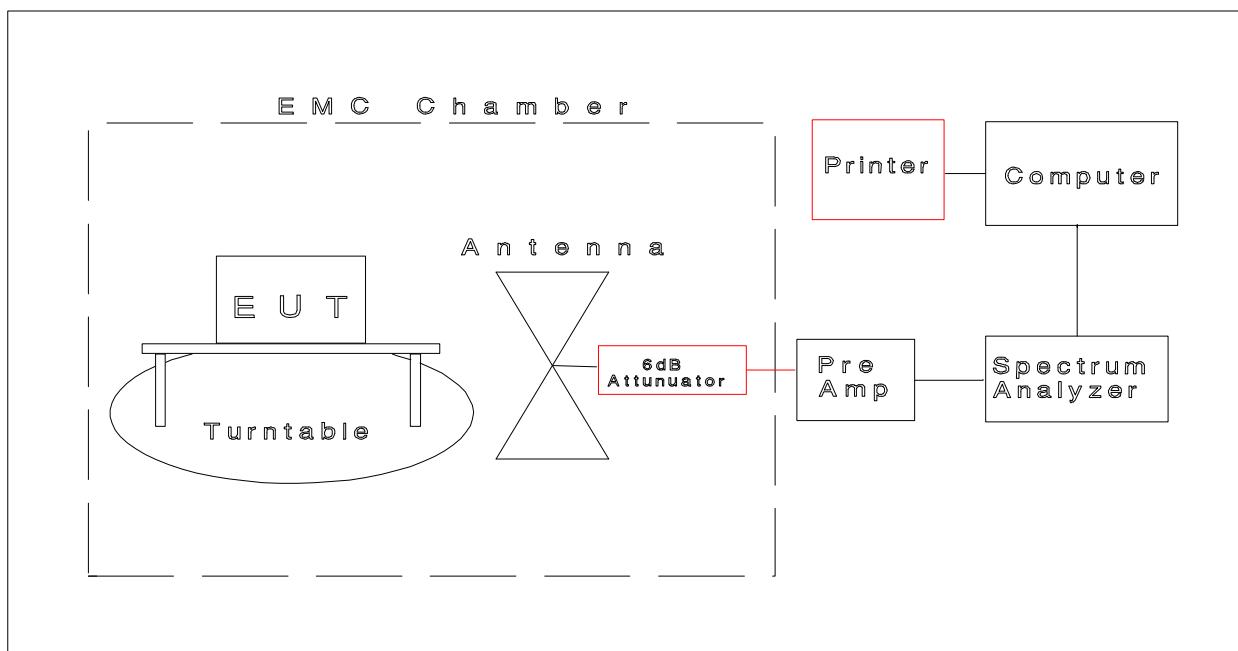
The configuration of the intentional radiator was varied to find the maximum radiated emission. The EUT was connected to the peripherals listed in Section 2.4 via the interconnecting cables listed in Section 2.5. These interconnecting cable were manipulated manually by a technician to obtain worst case radiated emissions. The intentional radiator was rotated 360 degrees, and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission. Where there were multiple interface ports all of the same type, cables are either placed on all of the ports or cables added to these ports until the emissions do not increase by more than 2 dB.

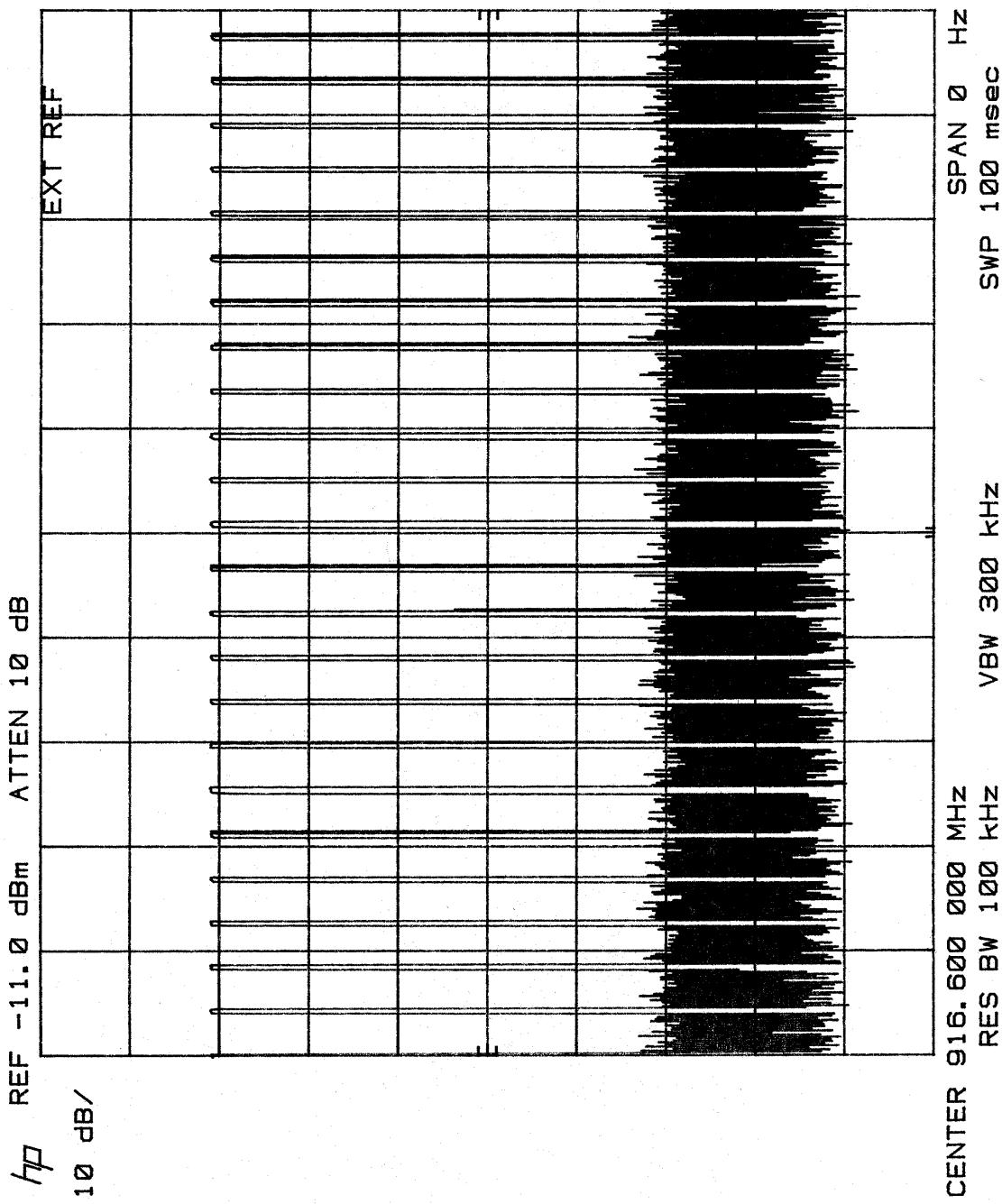
Desktop intentional radiator is measured on a non-conducting table one meter above the ground plane. The table is placed on a turntable which is level with the ground plane. The turntable has slip rings, which supply AC power to the intentional radiator. For equipment normally placed on floors, the equipment shall be placed directly on the turntable.

Type of Equipment	Manufacturer	Model Number	Serial Number
Anechoic Chamber	CCL	N/A	N/A
Test Software	CCL	Radiated Emissions	Revision 1.3
Spectrum Analyzer	Hewlett Packard	8566B	2230A01711
Quasi-Peak Detector	Hewlett Packard	8565A	3107A01582
Biconilog Antenna	EMCO	3141	1045
Double Ridged Guide Antenna	EMCO	3115	9409-4355
Radiated Emissions Cable Anechoic Chamber	CCL	Cable B	N/A
Pre-Amplifier	Hewlett Packard	8447D	1937A03151
Power-Amplifier	Hewlett Packard	8447E	2434A01975
6 dB Attenuator	Hewlett Packard	8491A	32835

All the equipment listed above is calibrated every 12 months by an independent calibration laboratory or by CCL personal following outlined calibration procedures.

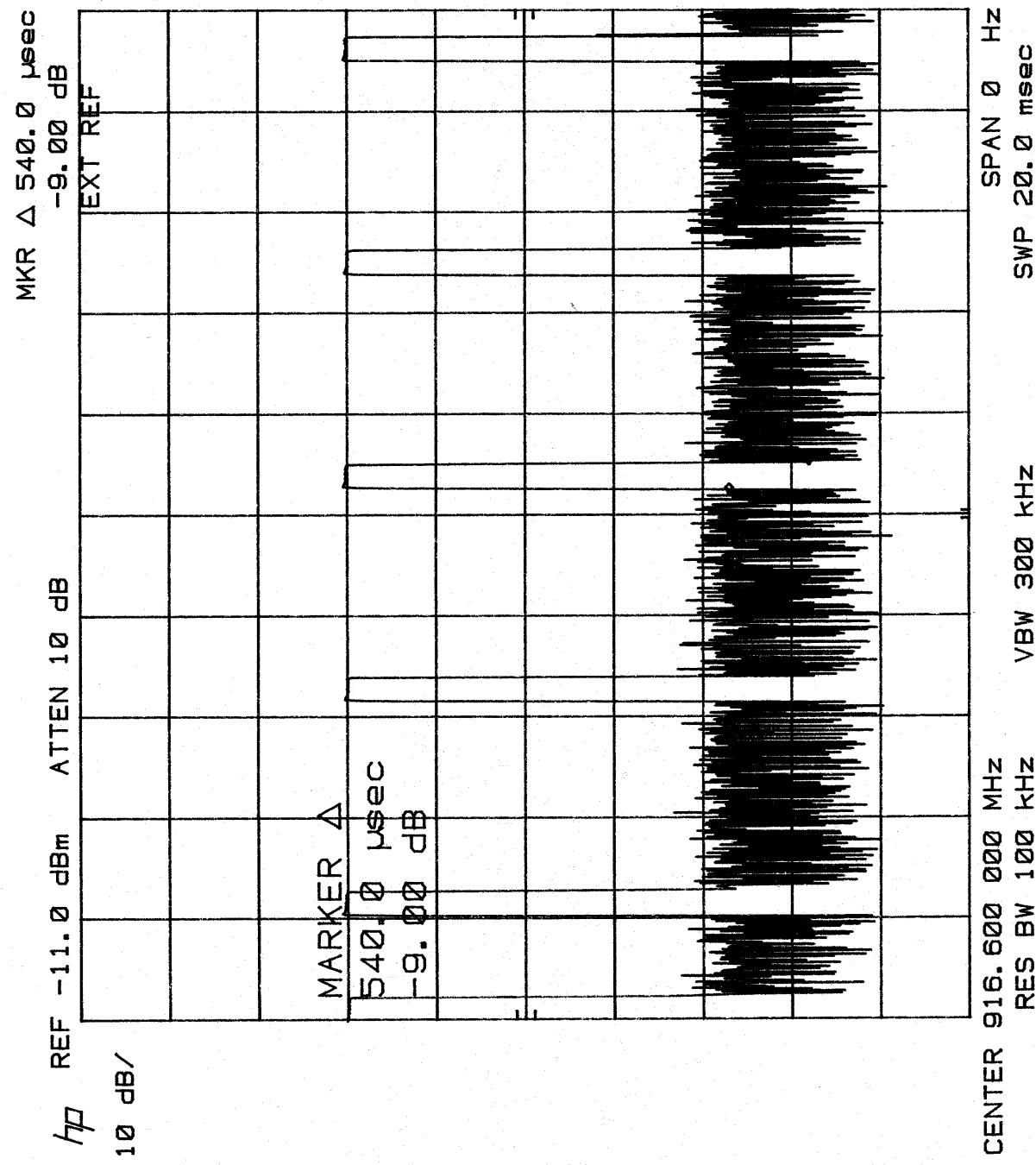
R a d i a t e d E m i s s i o n s T e s t



APPENDIX 2 SPECTRUM ANALYZER PLOTS:

Pulse Train Plot (100 msec)

Exhibit 6



Pulse Train Plot (20 msec)

Exhibit 6