MEASUREMENT AND TECHNICAL REPORT

MINIMED TECHNOLOGIES
18000 Devonshire Street
Northridge, CA 91325

DATE: 15 May 2001

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	MMT511 Infusion Pump	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: **Defer until:**	No: X
Company Name **agrees to notify the Commission by: of the intended date of announcement of the product so that the grant can be issued on that date.**	N/A	
Transition Rules Request per 15.37?	Yes:	*No: X

(*) FCC Part 15, Paragraphs 15.205; 15.209; 15.231(b); and 15.231(c)

Report Prepared by:

TÜV PRODUCT SERVICE
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 546 3999
Fax: 858 546 0364

TABLE OF CONTENTS

1 GENERAL INFORMATION

1.1 Product Description

EUT Description: Battery Powered Portable Drug Infusion Pump

EUT Name: Paradigm

Model No.: MMT-511 Serial No.: N/A

Power Requirements

Voltage: 1.5VDC (AAA Battery)

Typical Installation and/or Operating Environment

Worn on belt or pocket by user

EUT Operating Modes to be Tested --

1. 25U/Hr Basal Rate

EUT System Components --

Description	Model #	Serial #	FCC ID #
N/A			

Support Equipment --

Description	*Model #*	*Serial #*	*FCC ID #*
Keyfob Remote	MMT-503	N/A	OH2503

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*
2MHz		ì Processor	
32.763kHz		ASIC	
44Hz		ASIC	

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
N/A			

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*
N/A		

Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*
N/A				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

N/A

1 GENERAL INFORMATION (continued)

1.2 Related Submittal/Grant

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

Test Performed:

1. Conducted Emissions, FCC Part 2, Paragraphs 2.989, 2.991 and Part 22, Paragraph 22,816
2. Radiated Emissions EN55022: 1992 Class B limit, 30 - 1,000 MHz, 10 meters

X 3. Radiated Emission per FCC Part 15, Paragraph 15.109(a), 15.205, 15.209, & 15.231(b); 15.231(c)

4. Frequency Stability, Part 2, Paragraph 2.995, and Part 87, Paragraph 87.133
RF Output Power, Part 2, Paragraph 2.985, Part 22, Paragraph 22.917

Both Conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8 - M1983. Radiated testing was performed at an antenna-to-EUT distance of 3 meters (1 - 25 GHz).

1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV PRODUCT SERVICE
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 619 546 3999
Fax: 619 546 0364

The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emission in the following configuration:

See Block Diagram.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Block Diagram.

3 CONDUCTED EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

VDC unit.

4 RADIATED EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

See following page(s).

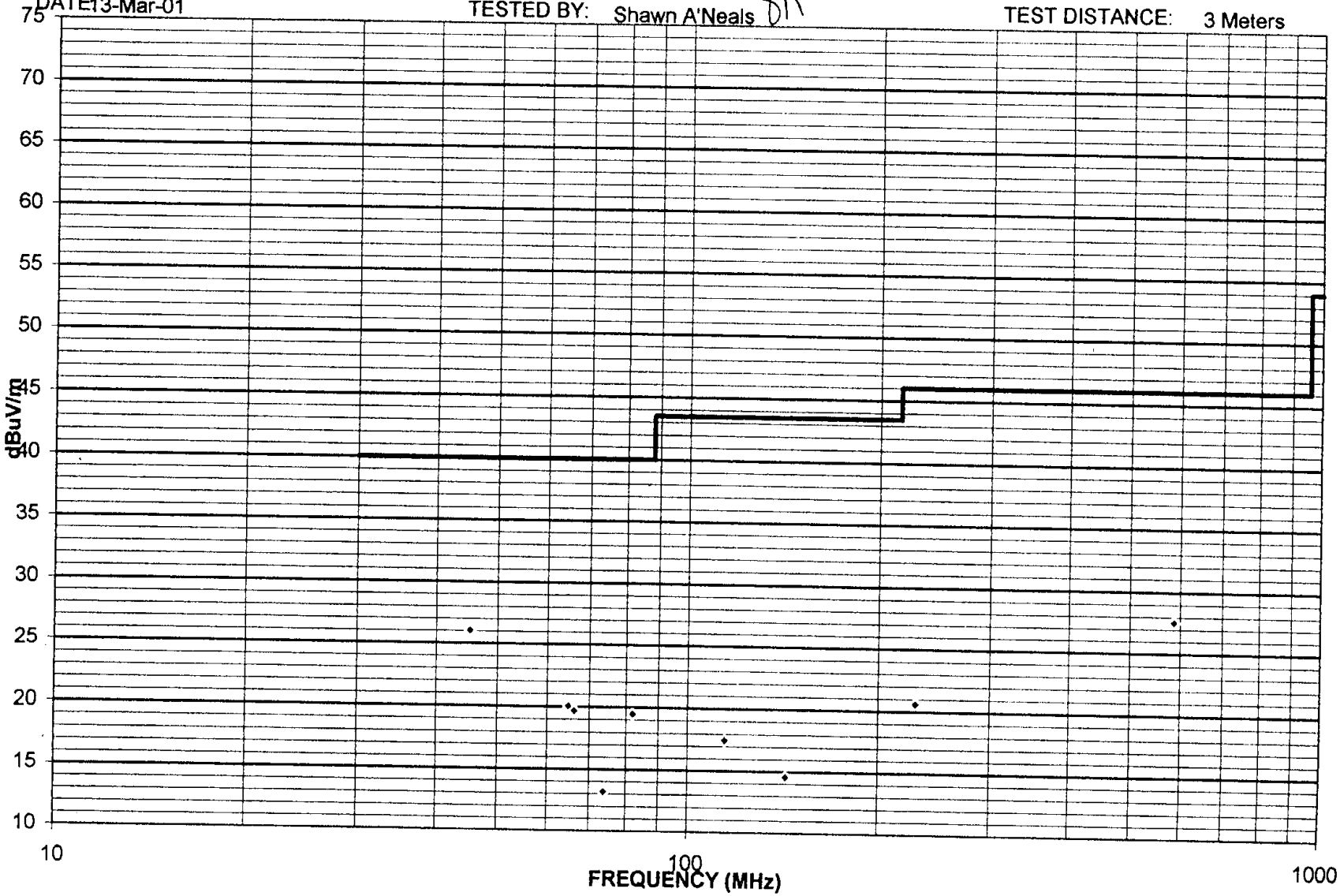
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

REPORT NOSC101681
COMPANY:Minimed
EUTMMT 511 Insulin Pump
EUT MODE35 Units per Hour Basal
DATE13-Mar-01

SPEC: FCC Part 15 para 15.109(a)

TESTED BY: Shawn A'Neals

TEST DISTANCE: 3 Meters



REPORT No: SC101681 SPEC: FCC Part 15 para 15.109(a)

CUSTOMER: Minimed TEST DIST: 3 Meters

E U T: MMT 511 Insulin Pump TEST SITE: 2

EUT MODE: 35 Units per Hour Basal BICONICAL: 738

DATE: 13-Mar-01 TESTED BY: Shawn A'Neals LOG PERIODIC: 738

NOTES: Quasi-Peak with 120 KHz measurement bandwidth. RCVR: 427

S/N : 550

Temperature: 22 Relative Humidity: 46

EUT MARGIN -13.9 dB at 45.15 MHz ver 1.8

FREQUENCY (MHz)	VERTICAL measured (dBuv)	HORIZONTAL measured (dBuV)	CORRECTION FACTOR (dB/m)	MAXIMUM CORRECTED (dBuV/m)	SPECIFIED LIMIT (dBuV/m)	EUT MARGIN (dB)	EUT ROTATION (degrees)	ANTENNA HEIGHT (meters)
45.15	8	3	18.1	**26.1**	40	-13.9	0	1
64.83	9	4.1	11.1	**20.1**	40	-19.9	0	1
66.22	9.2	0.07	10.5	**19.7**	40	-20.3	0	1
73.83	4.1	0.2	9.1	**13.2**	40	-26.8	0	1
81.92	10	0.6	9.5	**19.5**	40	-20.5	0	1
114.53	3.6	-1.5	13.9	**17.5**	43.5	-26.0	180	1
143.17	2.5	-0.7	12.1	**14.6**	43.5	-28.9	0	1
229.07	4.8	-1	15.8	**20.6**	46	-25.4	90	1
587.00	2.2	-1	25.4	**27.6**	46	-18.4	180	1

REPORT No: S101793 TESTED BY: Alan Laudani SPEC: FCC Part 15, Para 15.205, 15.209, & 15.231(b)

CUSTOMER: Minimed TEST DIST: 3 meters

E U T: MMT511 TEST SITE: 3

EUT MODE: Continuous Transmit w/"Earth is calling" BICONICAL: N/A

DATE: 23-Mar-01 LOG: 244

NOTES: Duty Cycle= 33% OTHER: 251

sn FCC02

v.beta1

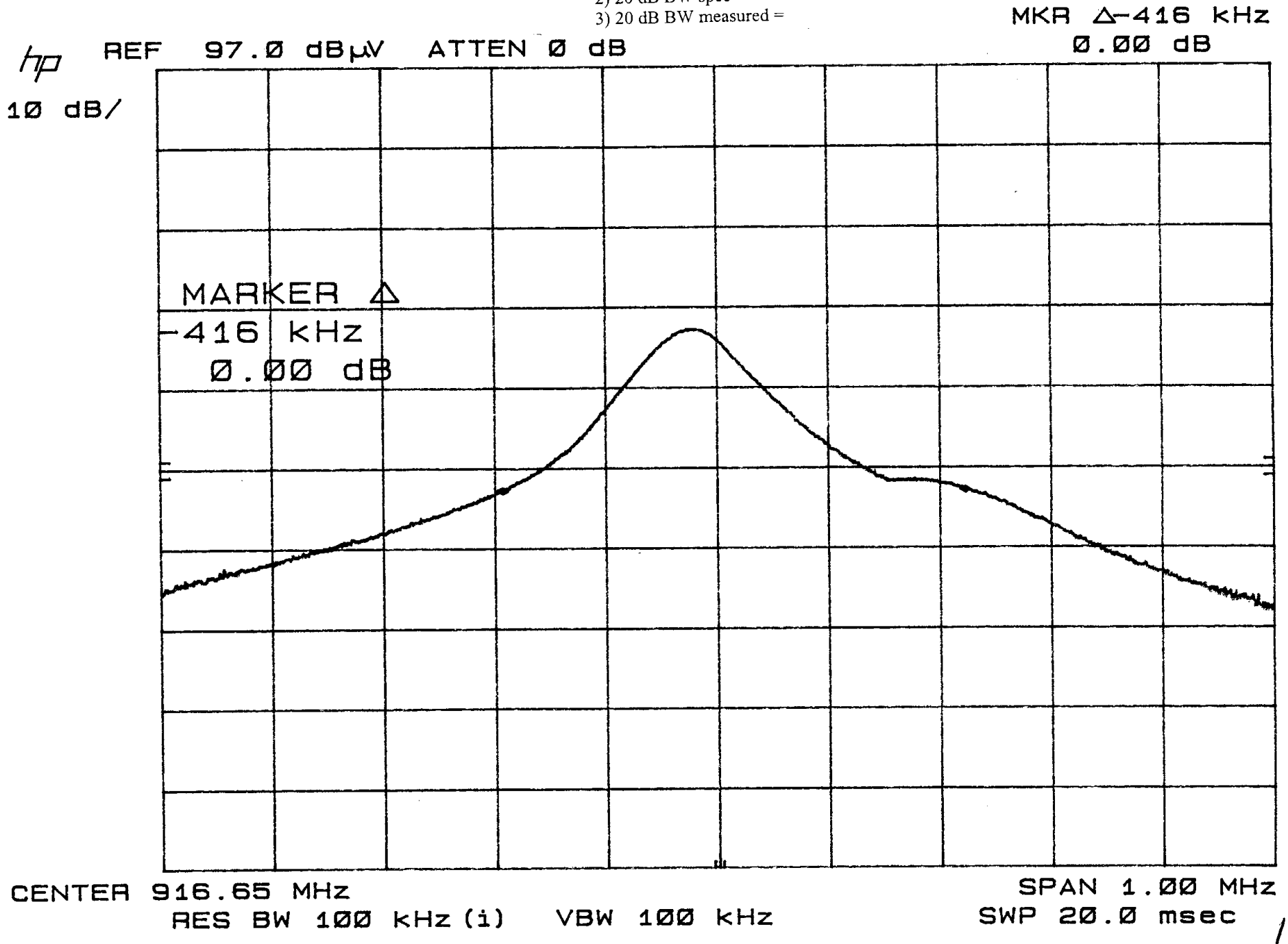
FREQ (MHz)	VERTICAL (dBuv)		HORIZONTAL (dBuv)		CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)		EUT Rotatio	Antenna Height
	pk	av	pk	av		pk	av	pk	av	pk	av		
916.65	55.7	46	56.5	46.8	27.0	**83.5**	**73.8**	102	82	-18.5	-8.2	300	1
1833.31	1.2	-8.46	5.2	-4.46	32.4	**37.6**	**27.9**	82	62	-44.4	-34	160	1
2749	8	-1.66	2	-7.66	36.5	**44.5**	**34.8**	74	54	-29.5	-19		
3665	1.8	-7.86	-0.1	-9.76	39.5	**41.3**	**31.6**	74	54	-32.7	-22		
4583	0	-9.66	-4	-13.7	41.0	**41.0**	**31.3**	74	54	-33	-23		

MINIMED FCC PART 15, PARA. 15.231(c) 23 March 2001 BANDWIDTH

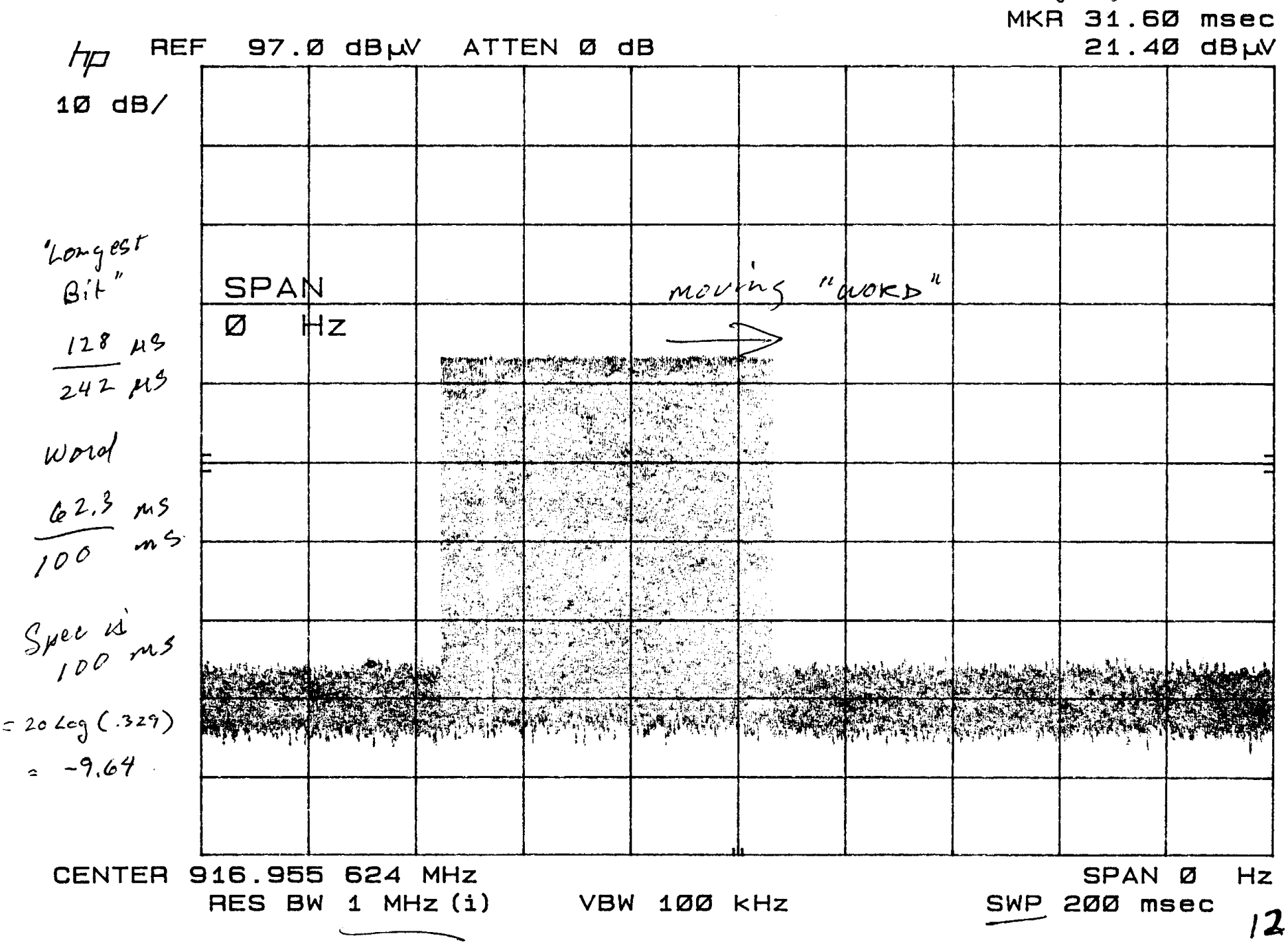
NOTE(S): 1) f_o = 916.65

2) 20 dB BW spec =

3) 20 dB BW measured =



MINIMED Duty Cycle



12

Emissions Test Conditions: FCC Part 15, Paragraph 15.109(a); 15.205; 15.209; and 15.231(b); 15.231(c)

The measurements were performed at the following test location :

☐ - Test not applicable

Canyon #3, Carroll Canyon, San Diego
SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Radiated Emissions Testing was performed at a test distance of:

3 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
3115	251/453	Antenna, Double Ridge Guide	EMCO	9412-4363	10/01
3146	244	Antenna, Log Periodic Dipole	EMCO	1063	0202
85660B	407	Spectrum Analyzer	Hewlett Packard	2311A02209	11/01
AA-190-06.00.0	729	Frequency Cables	United Microwave Pro	--	*
AA-190-30.00.0	732	Frequency Cables	United Microwave Pro	--	*
CBL6111	460	Antenna, Bilog	Chase	--	Verified
8566B	744	Spectrum Analyzer	Hewlett Packard	--	09/01
ESVS30	427	Receiver	Rhode & Schwarz	--	11/01
LPB 2520 / A	738	LPB	Antenna Research	--	05/30/01
HP 8568B	187/188	Spectrum Analyzer	Hewlett Packard	--	11/01

Remarks: _____

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna , cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

Corrected Meter Reading Limit (CMRL) = SAR + AF + CL - AG - DC

Where, SAR = Spectrum Analyzer Reading
AF = Antenna Factor
CL = Cable Loss
AG = Amplifier Gain (if any)
DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

CMRL = 29.4 dBuV + 9.2dB = 1.4 dB - 20 dB/M - 0.0 dB

CMRL = 20.0 dBuV/M

This result is well below the FCC and CSA Class A limit of 29.5 dbuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.

4. ATTESTATION STATEMENT

ATTESTATION STATEMENT:

SUMMARY:

All tests per *FCC Part 15, Paragraphs 15.205; 15.209; 15.231(b); and 15.231(c)* were

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of *FCC Part 15, Paragraphs 15.205; 15.209; 15.231(b); and 15.231(c).*

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

Jim Owen
(EMC Engineer)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

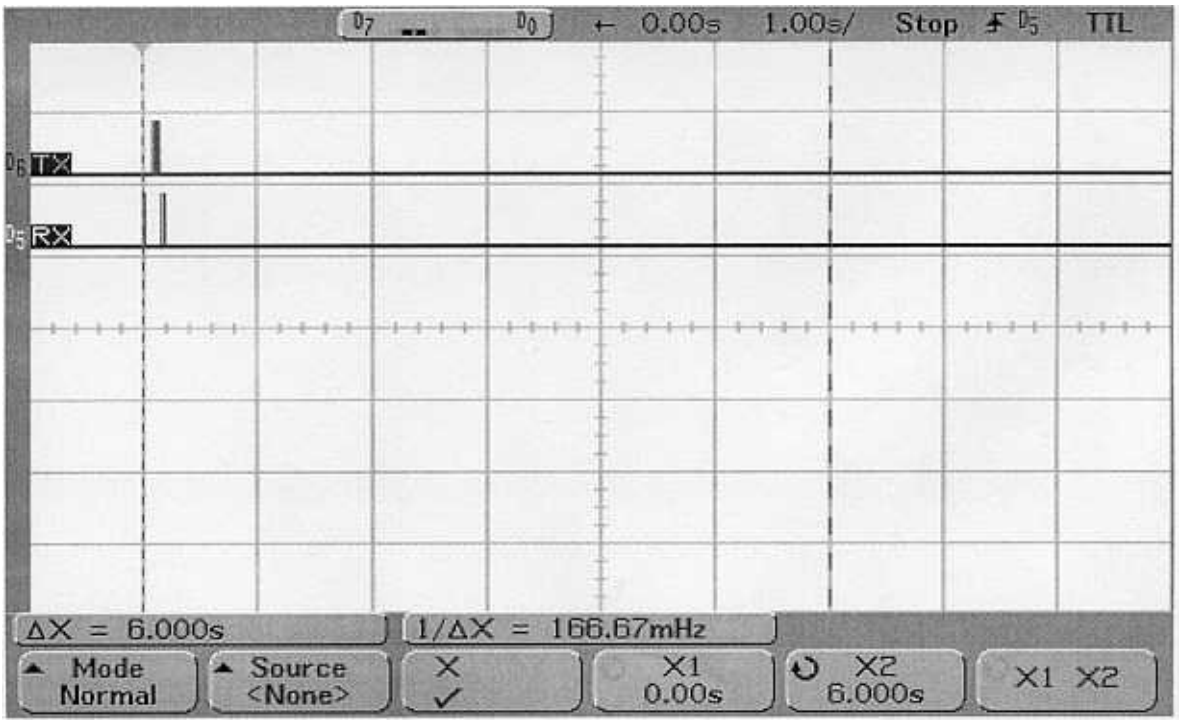


FIGURE 1 – SINGLE COMMAND

Test Equipment: AGILENT 54622D Mixed Signal Oscilloscope
MID # 11134 CAL: 11/20/00, NEXT CAL: 5/19/01

Test Date : 5/3/01

Description: Figure 1 illustrates a single command from the perspective of a Paradigm Pump RF Board. RX (Pin 21 U3) receives the transmitted data from an RF Cradle. Following is a transmission from the RF board at TX (Pin 5 U3). The final reception is the Acknowledge to end RF communications. Six seconds is shown to illustrate that there is at least five seconds whereby no RF occurs after RF communication ends.

Tester:

Michael Ortega 5/10/01
Michael Ortega
Engineer III, Electronic
Minimed Inc.

Witness:

5.10.01
Name Date
ROBERT VITH
SR. TEST ENGINEER
MINIMED, INC.