MEASUREMENT AND TECHNICAL REPORT

MINIMED, INC.
12744 San Fernando Road
Sylmar, CA 91342

DATE: 26 July 2000

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	TGMS Potentiostat Transmitter Device, Model MMT-7700	
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:

(*) FCC Part 15, Paragraph 15.231(c)(e)

Report Prepared by:

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

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1 GENERAL INFORMATION

1.1 Product Description

TGMS Potentiostat Transmitter Device, Model MMT-7700

DESCRIPTION OF EUT:		Glucose Transmitter		
Components of EUT				
Description	Model Number		Serial Number	FCC ID Number
Glucose Transmitter	MMT-7700		--	OH27700U
OPERATING MODE(S):		On-off keyed 418 MHz		
I/O CABLES				
CONNECTION	Glucose sensor cable/connector			
SHIELD	Yes			
CONNECTORS	Custom glucose sensor connector			
TERMINATION TYPE	Crimp and solder			
LENGTH	3 and ½ inches			
REMOVABLE	No			
POWER CORDS	N/A			
POWER INTERFACE				
FREQUENCY/AC/DC VOLTAGE:		N/A		
OSCILLATOR FREQUENCIES				
FREQUENCY	EUT LOCATION		DESCRIPTION OF USE	
418 MHz, 940 kHz, 32768 Hz	RF Xmtr PCBA, PSAT PCBA, PSTAT		Transmitter carrier, microcontroller clk., RTC	
POWER SUPPLY	N/A			
POWER LINE FILTERS	N/A			
CRITICAL EMI COMPONENTS	N/A			
INTERFACING AND/OR SIMULATORS PERIPHERAL EQUIPMENT:				
DESCRIPTION	MANUFACTURER	MODEL #	SERIAL #	FCC ID
Glucose sensor assembly	MiniMed	MMT-7002	--	--

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
	2.	Radiated Emissions, EN55022: 1992 Class B limit, 30 - 1,000 MHz, 10 meters
X	3.	Radiated Emission per FCC Part 15, Paragraph 15.231(c)(e)
	4.	Engineering evaluations
X	5.	20 dB Bandwidth

(*) EUT battery operated.

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 TGMS Potentiostat Transmitter Device, Model MMt-7700 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 LIST/DATA

Not performed - EUT battery operated.

See following page(s).

4 RADIATED EMISSION EQUIPMENT LIST/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).

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS* measurements were performed at the following test location :

☐ - Test not applicable

■ - Roof (Small Open Area Test Site)

Testing was performed at a test distance of:

■ - 3 meters

Test Equipment Used :

	Model No.	Manufacturer	Description	Serial No.	Prop. No.	Cal Due Date
■ -	8566B	Hewlett Packard	Spectrum Analyzer	2115A00842	720	03/01
■ -	85662B	Hewlett Packard	Spectrum Analyzer Display	2112A02185	721	03/01
■ -	3115	EMCO	Antenna, Double Ridge Guide	2495	251	10/00
■ -	AFD3-0208-40-ST	Miteq, Inc.	Pre-Amplifier (30 dB gain), 2 to 8 GHz	155382	367	*
■ -	3146	EMCO	Antenna, LPA	--	244	10/00

Remarks: (*) Verified internally.

REPORT No: S0273 TESTED BY: Chip Fleury SPEC: FCC Part 15, Paragraph 15.231(e)

CUSTOMER: MiniMed TEST DIST: 3 Meters

E U T: TGMS, Transmitter MMT 7700 TEST SITE: 3

EUT MODE: Tx every two second (S/W controlled) BICONICAL: N/A

DATE: 6-Jul-00 LOG: 244

NOTES: Duty Cycle= 26% OTHER: 251

RBW and VBW = 100 kHz below 1 GHz.

RBW and VBW = 1 MHz above 1 GHz.

With test plug installed. No emissions detectable except fundamental and 4 th & 5th harmonic.

v.beta2

FREQ (MHz)	VERTICAL (dBuv) pk	VERTICAL (dBuv) av	HORIZONTAL (dBuv) pk	HORIZONTAL (dBuv) av	CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m) pk	MAX LEVEL (dBuV/m) av	SPEC LIMIT (dBuV/m) pk	SPEC LIMIT (dBuV/m) av	MARGIN (dB) pk	MARGIN (dB) av	EUT Rotation	Antenna Height	Notes
418.035	56.2	44.5	64.4	52.7	18.9	**83.3**	**71.6**	92.3	72.3	-9	-0.7	341	1	
836.07	25.9	14.2	24.6	12.9	26.3	**52.2**	**40.5**	72.3	52.3	-20.1	-12	138	1.1	w/o pre-amp, noise floor
1254.105	24.2	12.5	24.3	12.6	29.1	**53.4**	**41.7**	72.3	52.3	-18.9	-11	320	1.8	w/o pre-amp, noise floor
1672.14	18.9	7.2	14	2.3	31.6	**50.5**	**38.8**	74	54	-23.5	-15	223	1.2	used p/n 367 pre-amp
2090.175	8.1	2.3	7.4	1.6	34.0	**42.1**	**36.3**	72.3	52.3	-30.2	-16	210	1	used p/n 367 pre-amp
1672.14	24.1	12.4	26	14.3	31.6	**57.6**	**45.9**	72.3	52.3	-14.7	-6.4	320	1.8	w/o pre-amp, noise floor

Emissions Test Conditions: 20 dB Bandwidth

The *20 dB Bandwidth* measurements were performed at the following test location :

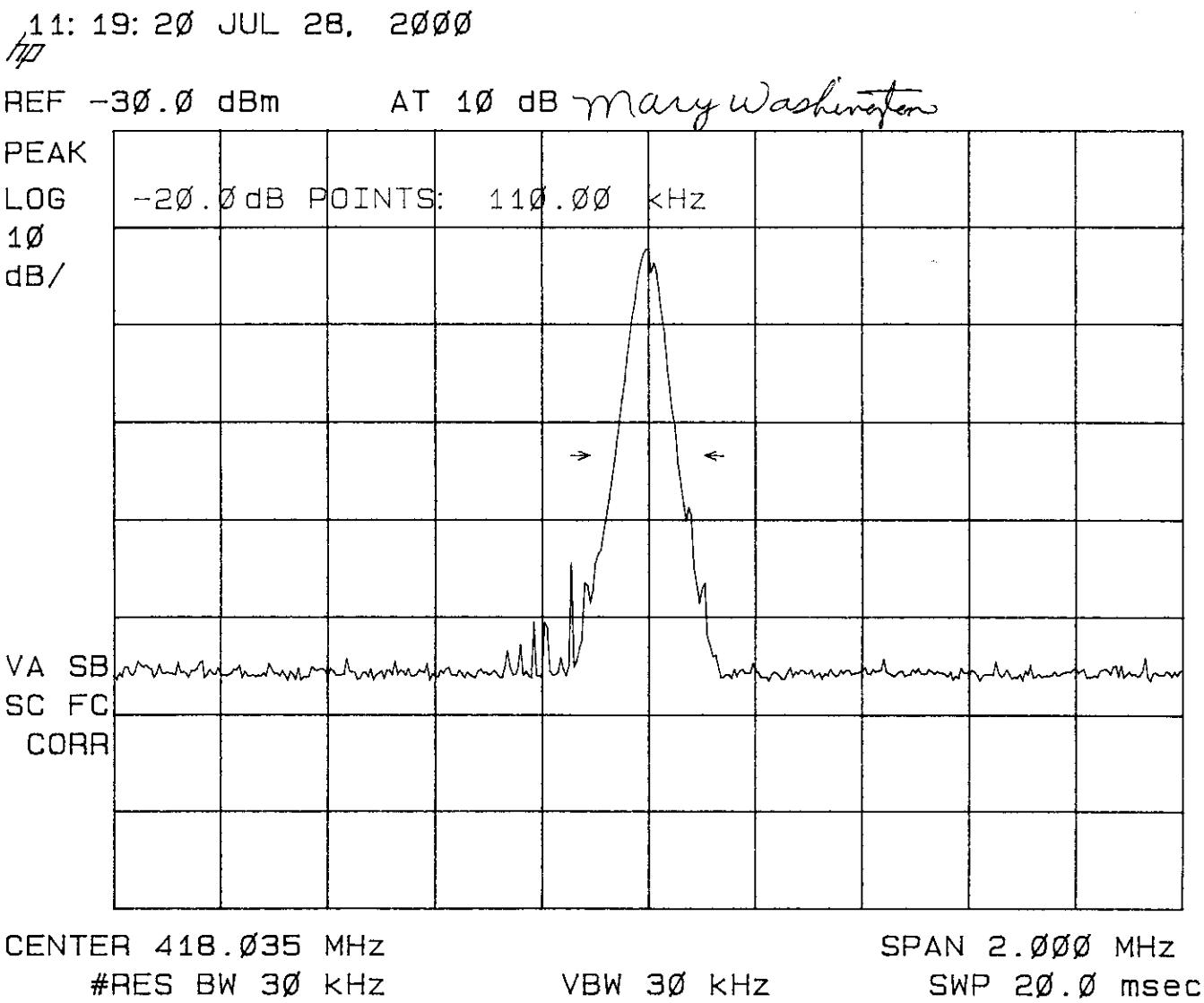
☐ - Test not applicable

■ - SR3 - Shielded Room, 12’ x 20’ x 8’, Metal Chamber

Test Equipment Used :

	Model No.	Manufacturer	Description	Serial No.	Prop. No.	Cal Due Date
■ -	8568B	Hewlett Packard	Spectrum Analyzer	3303A00365	430	0501
■ -	CBL6111	Chase	Antenna Bilog	1013	460	*

Remarks: (*) Verified internally.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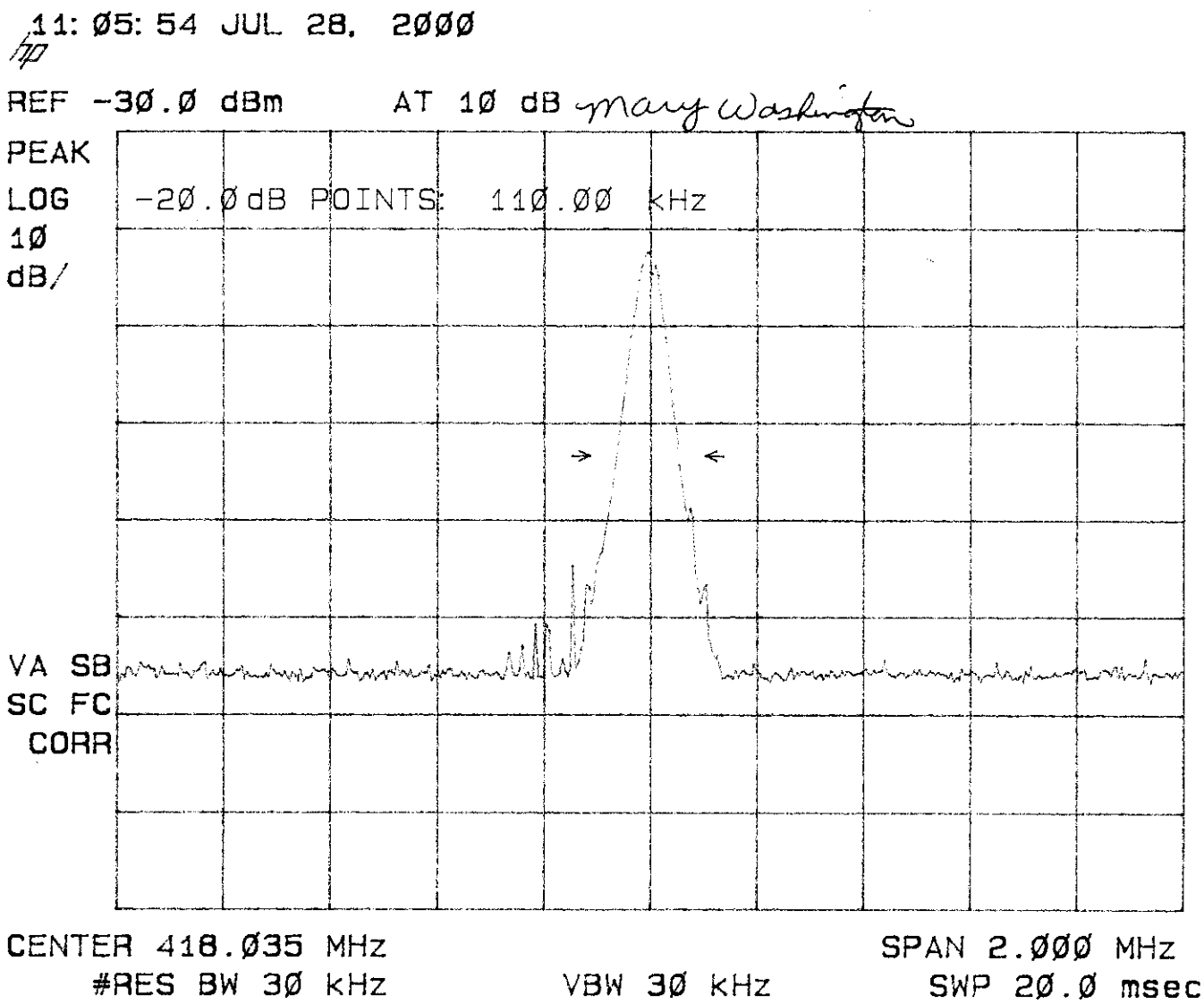
VBW 3Ø kHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec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VA SB
SC FC
CORR
CENTER 418.Ø35 MHz
#RES BW 3Ø kHz
VBW 3Ø kHz
SPAN 2.ØØØ MHz
SWP 2Ø.Ø msec

4.1 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:

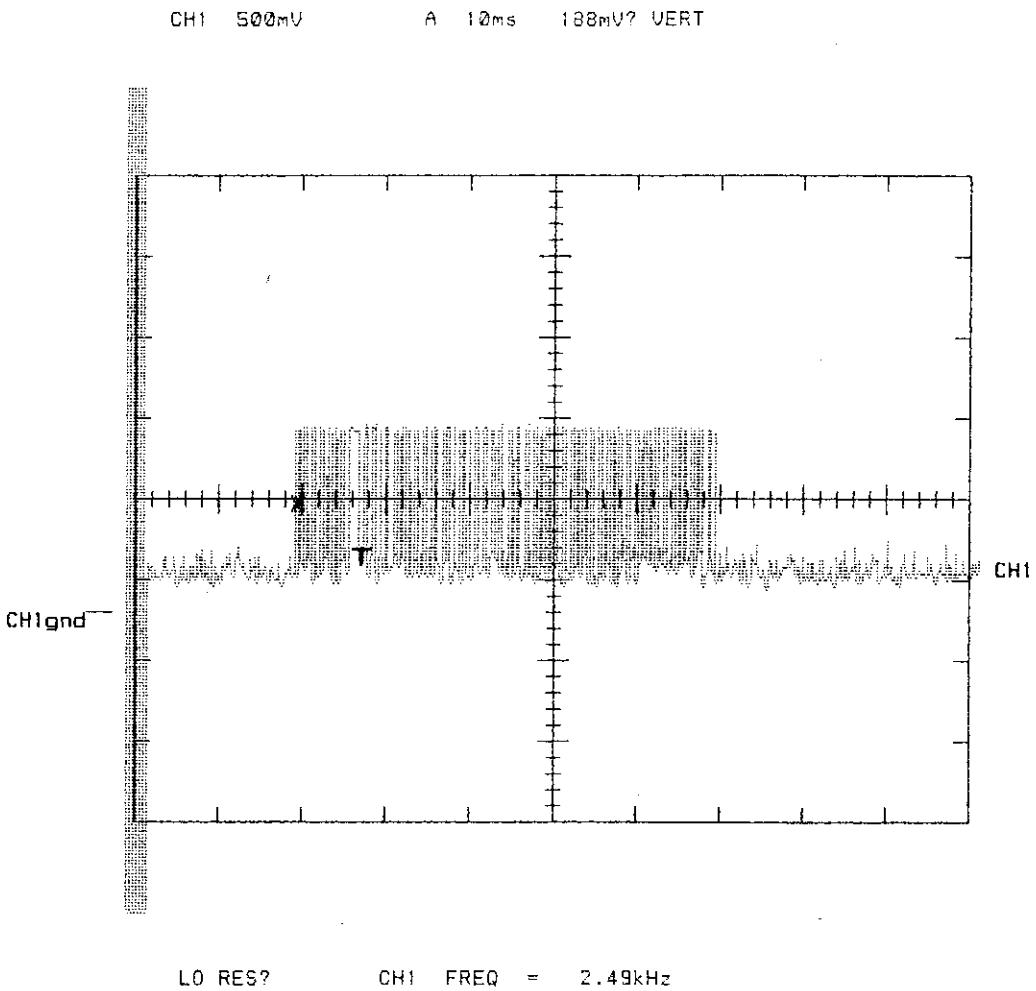
CMRL = 29.4 dBuV + 9.2dB = 1.4 dB - 20 dB/M - 0.0 dB

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.

CLIENT: MINIMED DUTY CYCLE MEASUREMENT
REPORT NO: 0273
NOTE: EUT on its side and transmitting every 2 seconds (software controlled).



Minimed uses Manchester code therefore there is always one off bit for every on bit.
So, for Minimed, the total bit packet is 50.78 mS long. The total on bits are 25.9 mS.
This packet transmits once every 5 minutes and sends 8 packets, one every 10 S.
So, duty cycle over 100 mS is as follows:

Bit Package = 50.78 mS
On Bits = 25.9 mS
Duty cycle over (100 mS) = 25.9 mS/100 mS

5 SUMMARY:

All tests according to the regulations cited on page 1 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 1.

☐ - **Does not** fulfill the general approval requirements cited on page 1.

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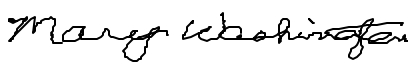
- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Mary Washington
(EMC Engineer)