



CERTIFICATION TEST REPORT

FOR THE

GUARDIAN 600 MHZ, 20603

FCC PART 15 SUBPART C 15.242

COMPLIANCE

DATE OF ISSUE: APRIL 13, 2000

PREPARED FOR:

Medical Data Electronics
12723 Wentworth Street
Arleta, CA 91331

P.O. No: 24508
W.O. No: 73700

Report No: FC00-029

DOCUMENTATION CONTROL:

Tracy Phillips
Documentation Control Supervisor
CKC Laboratories, Inc.

PREPARED BY:

Joyce Walker
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: February 28 &
March 15 & 30, 2000

APPROVED BY:

Dennis Ward
Director of Laboratories
CKC Laboratories, Inc.

This report contains a total of 29 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc.

TABLE OF CONTENTS

Administrative Information	3
Summary Of Results.....	4
Equipment Under Test (EUT) Description.....	4
Measurement Uncertainty.....	4
EUT Operating Frequency.....	4
Peripheral Devices	4
Report Of Measurements.....	5
Table 1: Six Highest Fundamental Emission Levels.....	5
Table 2: Six Highest Spurious Emission Levels	6
Table A : List Of Test Equipment	7
EUT Setup	8
Test Instrumentation And Analyzer Settings.....	8
Table B : Analyzer Bandwidth Settings Per Frequency Range.....	8
Spectrum Analyzer Detector Functions.....	9
Peak	9
Quasi-Peak.....	9
Average.....	9
Test Methods	10
Radiated Emissions Testing.....	10
Occupied Bandwidth	11
Sample Calculations	11
Appendix A : Information About The Equipment Under Test.....	12
I/O Ports.....	13
Crystal Oscillators	13
Printed Circuit Boards	13
Cable Information.....	14
Required EUT Changes To Comply.....	14
Photograph Showing Radiated Emissions.....	15
Photograph Showing Radiated Emissions.....	16
Appendix B : Measurement Data Sheets	17
Occupied Bandwidth Plot.....	18
Occupied Bandwidth Plot.....	19
Occupied Bandwidth Plot.....	20

CKC Laboratories, Inc. has Certificates of Accreditation from the following agencies:
DATEch (Germany); A2LA (USA); FCC (USA); VCCI (Japan); BSMI (Taiwan); HOKLAS (Hong Kong).
CKC Laboratories, Inc. has Letters of Acceptance through an MRA for the following agencies:
ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); TUV Rheinland-Germany; TUV Rheinland-Korea; TUV Rheinland-Russia; Radio Communications Agency (RA); NEMKO (Norway).

ADMINISTRATIVE INFORMATION

DATE OF TEST: February 28 & March 15 & 30, 2000

PURPOSE OF TEST: To demonstrate the compliance of the Guardian 600 MHz, 20603, with the requirements for FCC Part 15 Subpart C 15.242 devices.

MANUFACTURER: Medical Data Electronics
12723 Wentworth Street
Arleta, CA 91331

REPRESENTATIVE: Bill Costello

TEST LOCATION: CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

TEST PERSONNEL: Skip Doyle

TEST METHOD: ANSI C63.4 1992

FREQUENCY RANGE TESTED: 30 – 6200 MHz

EQUIPMENT UNDER TEST:

Guardian 600 MHz

Manuf: Medical Data Electronics
Model: 20603
Serial: N/A
FCC ID: EHC20603

SUMMARY OF RESULTS

The Medical Data Electronics Guardian 600 MHz, 20603, was tested in accordance with ANSI C63.4 1992 for compliance with FCC Part 15 Subpart C 15.242.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15 Subpart C 15.242. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Handheld multiparameter telemetry transmitter.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 4 dB measurement uncertainty.

EUT OPERATING FREQUENCY

The EUT was operating at 608 – 614 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

REPORT OF MEASUREMENTS

The following tables report the six highest worst case levels recorded during the tests performed on the Guardian 600 MHz, 20603. All readings taken are peak readings unless otherwise noted by a “Q” or “A”. The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Six Highest Fundamental Emission Levels									
FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
608.109	103.0	19.6	-27.8	5.3		100.1	106.0	-5.9	VQ
611.048	105.7	19.7	-27.8	5.3		102.9	106.0	-3.1	VQ
611.048	104.6	19.7	-27.8	5.3		101.8	106.0	-4.2	VQ
613.960	106.5	19.7	-27.8	5.3		103.7	106.0	-2.3	VQ
613.960	105.2	19.7	-27.8	5.3		102.4	106.0	-3.6	VQ
613.961	104.5	19.7	-27.8	5.3		101.7	106.0	-4.3	HQ

Test Method: ANSI C63.4 1992
Spec Limit : FCC Part 15.242(b)
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Tested in all 3 orthogonal planes.

- Fundamental of the low channel is 608.1 MHz. Spec. Limit = 0.200 Watts Peak 100.3 dBuV = 0.103514 Watts Peak Power
- Fundamental of the middle channel is 611.0 MHz. Spec. Limit = 0.200 Watts Peak 103.0 dBuV = 0.141254 Watts Peak Power
- Fundamental of high channel is 613.9 MHz. Spec. Limit = 0.200 Watts Peak 103.9 dBuV = 0.156675 Watts Peak Power

Table 2: Six Highest Spurious Emission Levels

FREQUENCY MHz	METER READING dBμV	CORRECTION FACTORS				CORRECTED READING dBμV/m	SPEC LIMIT dBμV/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
609.605	45.2	19.7	-27.8	5.3		42.4	46.0	-3.6	HQ
611.068	42.7	19.7	-27.8	5.3		39.9	46.0	-6.1	HQ
611.967	42.2	19.7	-27.8	5.3		39.4	46.0	-6.6	VQ
612.611	43.3	19.7	-27.8	5.3		40.5	46.0	-5.5	HQ
614.821	42.0	19.8	-27.8	5.4		39.4	46.0	-6.6	HQ
616.976	42.0	19.8	-27.8	5.4		39.4	46.0	-6.6	V

Test Method: ANSI C63.4 1992
Spec Limit : FCC Part 15.209/15.242(c)
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table.

- Spurious Emissions with fundamental at low channel 608.1 MHz.
- Spurious Emissions with fundamental at middle channel 611.0 MHz.
- Spurious Emissions with fundamental at high channel 613.9 MHz.

TABLE A
LIST OF TEST EQUIPMENT

Barn Lab

1. Bicon Antenna, A & H, Model SAS 200/542, S/N 156. Calibration date: May 20, 1999.
Calibration due date: May 20, 2000.
2. Log Periodic Antenna, A & H, Model SAS-200/510, S/N 154. Calibration date: May 20, 1999. Calibration due date: May 20, 2000.
3. Preamp, HP, Model 8447D, S/N 1937A02604. Calibration date: April 3, 2000. Calibration due date: April 3, 2001.
4. Preamp, HP, Model 8449B, S/N 3008A00301. Calibration date: October 27, 1999. Calibration due date: October 27, 2000.
5. QP Adapter, HP, Model 85650A, S/N 2811A01267. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
6. SA Display Section, HP, Model 8566B, S/N 2403A08241. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
7. Spectrum Analyzer, RF Section, HP, Model 8566B, S/N 2209A01404. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
8. Horn Antenna, EMCO, Model 3115, S/N 4085. Calibration date: February 7, 2000. Calibration due date: February 7, 2001.

EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Table 1 for fundamental emissions and Table 2 for spurious emissions. Additionally, a complete description of all the ports and I/O cables is included on the information sheets contained in Appendix A.

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

I/O cables were connected to the EUT in the manner required for normal operation of the system. Excess cabling was bundled in the center in a serpentine fashion using 30-40 centimeter lengths.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect the radiated emissions data for the Guardian 600 MHz, 20603. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. The horn antenna was used for scans above 1000 MHz. All antennas were located at a distance of 3 meters from the edge of the EUT.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

TABLE B : ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	6.2 GHz	1 MHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 and 2 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Guardian 600 MHz, 20603.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

When the frequencies exceed 1 GHz, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated emissions data of the Guardian 600 MHz, 20603, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the FCC Part 15, Subpart C emissions limits to determine compliance.

Preliminary and final measurements were taken in order to better ensure that all emissions from the EUT were found and maximized.

Radiated Emissions Testing

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode with the I/O cables and line cords facing the antenna. The frequency range of 30 MHz - 88 MHz was then scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks which were at or near the limit were recorded. The frequency range of 100 - 300 MHz was scanned with the biconical antenna in the same manner, and the peaks recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 - 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 - 1000 MHz was again scanned. Frequencies above 1 GHz were scanned using the horn antenna. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

For the final radiated scan, the equipment was again positioned with its I/O cables facing the antenna. A thorough scan of all frequencies was manually made using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurements was then made.

Using the peak readings from both scans as a guide, the test engineer then maximized the readings with respect to the table rotation, antenna height and configuration of the cables. Maximizing of the cables was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

FCC Part 15.215(c) - Occupied Bandwidth Measurements

Tested in accordance with ANSI C63.4 1992 13.1.7.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the emissions readings in Tables 1 and 2. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula:

$$\begin{aligned} & \text{Meter reading (dB}\mu\text{V)} \\ & + \text{Antenna Factor (dB)} \\ & + \text{Cable Loss (dB)} \\ & - \text{Distance Correction (dB)} \\ & - \text{Pre-amplifier Gain (dB)} \\ & = \text{Corrected Reading (dB}\mu\text{V/m)} \end{aligned}$$

This reading was then compared to the applicable specification limit to determine compliance.

A typical data sheet will display the following in column format:

#	Freq MHz	Rdng dB μ V	Cable	Amp	Bicon	Horn	Log	Dist	Corr dB μ V/m	Spec	Margin	Polar
---	-------------	--------------------	-------	-----	-------	------	-----	------	----------------------	------	--------	-------

means reading number

Freq MHz is the frequency in MHz of the obtained reading.

Rdng dB μ V is the reading obtained on the spectrum analyzer in dB μ V.

Amp is short for the preamplifier factor or gain in dB.

Bicon is the biconical antenna factor in dB.

Log is the log periodic antenna factor in dB.

Horn is the horn antenna factor in dB.

Cable is the cable loss in dB of the coaxial cable on the OATS.

Dist is the distance factor (in dB). It is used when testing at a different test distance than the one stated in the spec.

Corr dB μ V/m is the corrected reading which is now in dB μ V/m (field strength).

Spec is the specification limit (dB) stated in the agency's regulations.

Margin is the closeness to the specified limit in dB; + is over and - is under the limit.

Polar is the Polarity of the antenna with respect to earth.

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	
CRT was displaying:	N/A
Power Supply Manufacturer:	N/A
Power Supply Part Number:	N/A
AC Line Filter Manufacturer:	N/A
AC Line Filter Part Number:	N/A
Line voltage used during testing:	N/A

I/O PORTS	
Type	#
ECG	
SPO	
ISP	

CRYSTAL OSCILLATORS	
Type	Freq In MHz
TCXO	16 mhz
Processor type	6.144 mhz
Processor type	4.00 mhz

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
ECG/RF	403868 REV E1	RX 72.166667MHZ	6	
		TX 16 MHZ		
CPU/PS	403047 REV D	6.144 MHZ	6	
SPO2	403274 REV C	4.00 MHZ	4	
DISPLAY	403664 REV A	N/A	2	

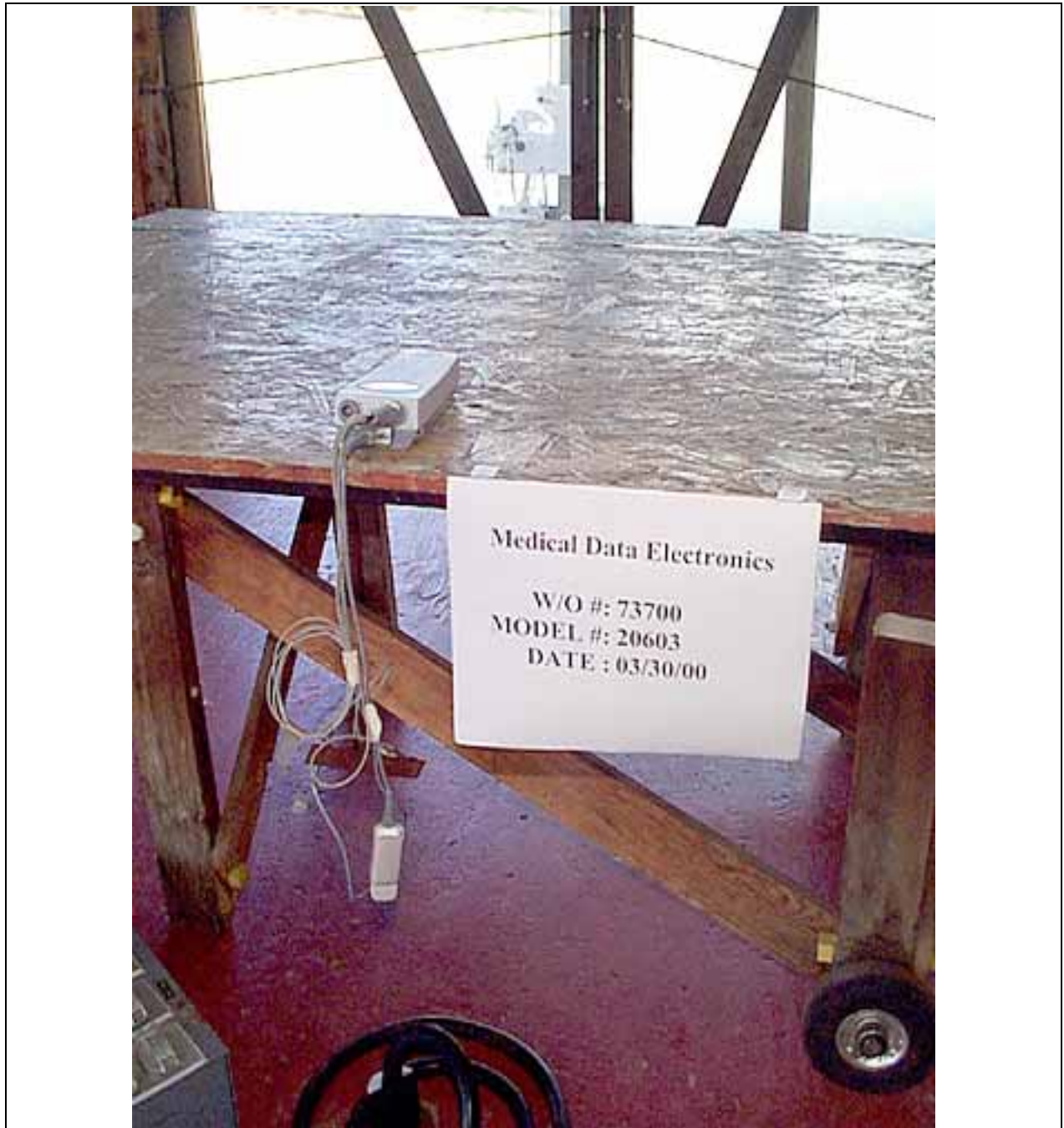
CABLE INFORMATION

Cable #:	1	Cable(s) of this type:	
Cable Type:	ECG	Shield Type:	SINGLE BRAID
Construction:	5 LEAD SHIELDED	Length In Meters:	.5
Connected To End (1):	TRANSMITTER	Connected To End (2):	PATIENT
Connector At End (1):	6 PIN CONN.	Connector At End (2):	BUTTON SNAPS
Shield Grounded At (1):	TRANSMITTER	Shield Grounded At (2):	N/A
Part Number:	403282-000	Number of Conductors:	5
Notes and/or description:			

Cable #:	2	Cable(s) of this type:	
Cable Type:	SP02	Shield Type:	SINGLE BRAID
Construction:	6 LEAD SHIELDED	Length In Meters:	.5
Connected To End (1):	TRANSMITTER	Connected To End (2):	N/A
Connector At End (1):	DB9	Connector At End (2):	N/A
Shield Grounded At (1):	TRANSMITTER	Shield Grounded At (2):	N/A
Part Number:	350 500-0077	Number of Conductors:	6
Notes and/or description:			

REQUIRED EUT CHANGES TO COMPLY:
None.

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS

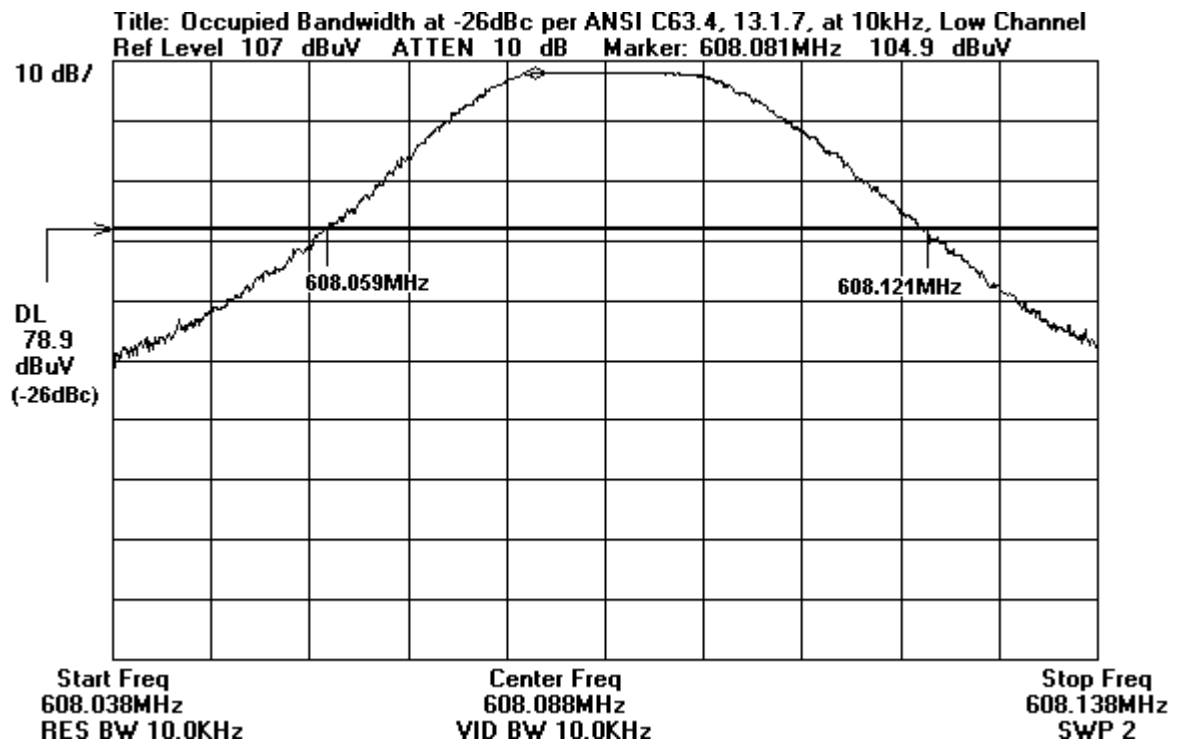


Radiated Emissions - Back View

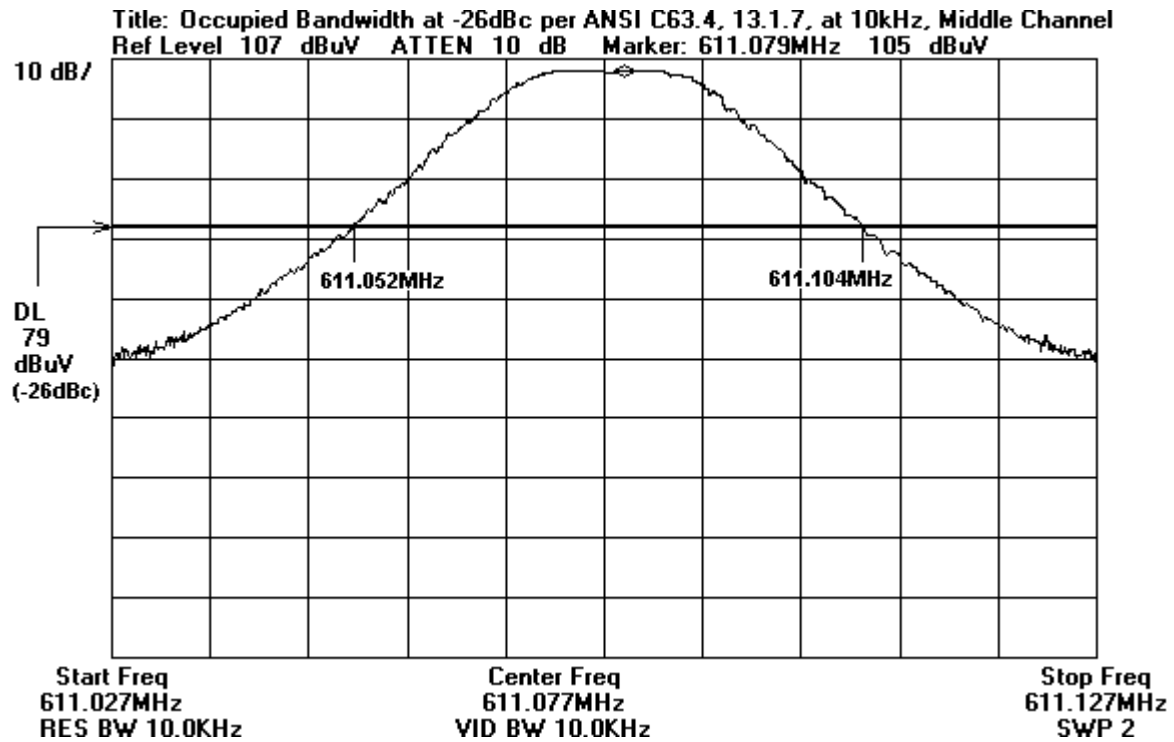
APPENDIX B

MEASUREMENT DATA SHEETS

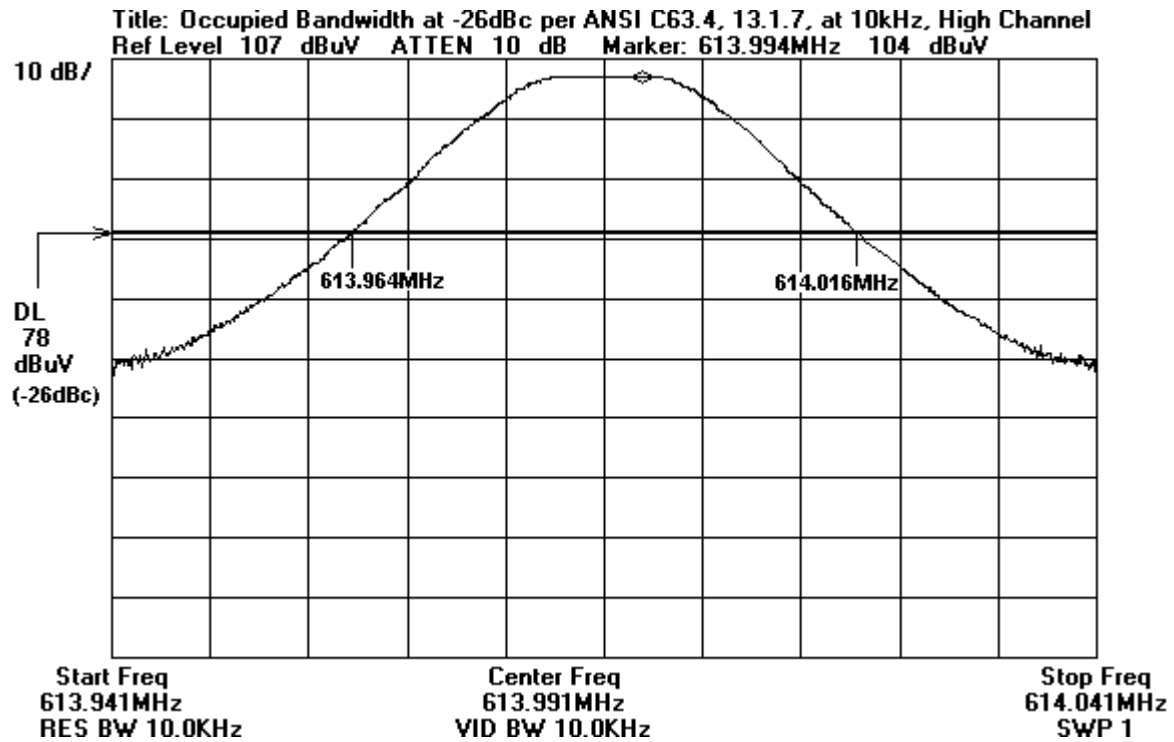
Occupied Bandwidth Plot



Occupied Bandwidth Plot



Occupied Bandwidth Plot



Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 209-966-5240

Customer: **Medical Data Electronics**
 Specification: **FCC 15.242**
 Work Order #: **73700**
 Test Type: **Maximized Emissions**
 Equipment: **Multiparameter Telemetry Transmitter**
 Manufacturer: Medical Data
 Model: 20603
 S/N: N/A

Date: 02/28/2000
 Time: 12:33:40
 Sequence#: 1
 Tested By: Skip Doyle

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multiparameter Telemetry Transmitter	Medical Data	20603	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Fundamental is 608.1MHz Spec. Limit = 0.200 Watts Peak 100.3 dBuV = 0.103514 Watts Peak Power

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Amp dB	Bicon dB	Log dB	Cable dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	608.109M	103.0	-27.8	+0.0	+19.6	+5.3	+0.0	100.1	106.0	-5.9	Vert
	QP								Standing		
^	608.109M	103.2	-27.8	+0.0	+19.6	+5.3	+0.0	100.3	106.0	-5.7	Vert
									Standing		
^	608.111M	103.1	-27.8	+0.0	+19.6	+5.3	+0.0	100.2	106.0	-5.8	Vert
									Side		
^	608.017M	99.0	-27.8	+0.0	+19.6	+5.3	+0.0	96.1	106.0	-9.9	Vert
									Flat		
5	608.111M	102.9	-27.8	+0.0	+19.6	+5.3	+0.0	100.0	106.0	-6.0	Vert
	QP								Side		
6	608.116M	102.5	-27.8	+0.0	+19.6	+5.3	+0.0	99.6	106.0	-6.4	Horiz
									Flat		
7	608.112M	98.9	-27.8	+0.0	+19.6	+5.3	+0.0	96.0	106.0	-10.0	Horiz
									Side		
8	608.109M	94.8	-27.8	+0.0	+19.6	+5.3	+0.0	91.9	106.0	-14.1	Horiz
									Standing		

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 209-966-5240

Customer: **Medical Data Electronics**
 Specification: **FCC 15.209**
 Work Order #: **73700**
 Test Type: **Maximized Emissions**
 Equipment: **Multiparameter Telemetry Transmitter**
 Manufacturer: Medical Data
 Model: 20603
 S/N: N/A

Date: 02/28/2000
 Time: 13:52:43
 Sequence#: 2
 Tested By: Skip Doyle

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multiparameter Telemetry Transmitter	Medical Data	20603	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Fundamental is 611.0MHz Spec. Limit = 0.200 Watts Peak 103.0 dBuV = 0.141254 Watts Peak Power

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Amp dB	Bicon dB	Log dB	Cable dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	611.048M	105.7	-27.8	+0.0	+19.7	+5.3	+0.0	102.9	106.0	-3.1	Vert
	QP								Flat		
^	611.041M	105.8	-27.8	+0.0	+19.7	+5.3	+0.0	103.0	106.0	-3.0	Vert
									Flat		
^	611.041M	104.7	-27.8	+0.0	+19.7	+5.3	+0.0	101.9	106.0	-4.1	Vert
									Side		
^	611.039M	103.1	-27.8	+0.0	+19.7	+5.3	+0.0	100.3	106.0	-5.7	Vert
									Stand		
5	611.048M	104.6	-27.8	+0.0	+19.7	+5.3	+0.0	101.8	106.0	-4.2	Vert
	QP								Side		
6	611.047M	103.2	-27.8	+0.0	+19.7	+5.3	+0.0	100.4	106.0	-5.6	Horiz
	QP								Flat		
^	611.047M	103.3	-27.8	+0.0	+19.7	+5.3	+0.0	100.5	106.0	-5.5	Horiz
									Flat		
^	611.039M	101.9	-27.8	+0.0	+19.7	+5.3	+0.0	99.1	106.0	-6.9	Horiz
									Side		
^	611.040M	96.7	-27.8	+0.0	+19.7	+5.3	+0.0	93.9	106.0	-12.1	Horiz
									Stand		
10	611.048M	103.0	-27.8	+0.0	+19.7	+5.3	+0.0	100.2	106.0	-5.8	Vert
	QP								Stand		

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa CA, 95338 • 209-966-5240

Customer: **Medical Data Electronics**
 Specification: **FCC 15.242**
 Work Order #: **73700**
 Test Type: **Maximized Emissions**
 Equipment: **Multiparameter Telemetry Transmitter**
 Manufacturer: Medical Data
 Model: 20603
 S/N: N/A

Date: 02/28/2000
 Time: 15:18:55
 Sequence#: 3
 Tested By: Skip Doyle

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multiparameter Telemetry Transmitter	Medical Data	20603	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Fundamental is 613.9 MHz. Spec. Limit = 0.200 Watts Peak 103.9 dBuV = 0.156675 Watts Peak Power

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBuV	Amp dB	Bicon dB	Log dB	Cable dB	Dist Table	Corr dBuV/m	Spec dBuV/m	Margin dB	Polar Ant
1	613.960M	106.5	-27.8	+0.0	+19.7	+5.3	+0.0	103.7	106.0	-2.3	Vert
	QP								Flat		
^	613.952M	106.7	-27.8	+0.0	+19.7	+5.3	+0.0	103.9	106.0	-2.1	Vert
									Flat		
^	613.952M	105.3	-27.8	+0.0	+19.7	+5.3	+0.0	102.5	106.0	-3.5	Vert
									Side		
^	613.951M	101.8	-27.8	+0.0	+19.7	+5.3	+0.0	99.0	106.0	-7.0	Vert
									Stand		
5	613.960M	105.2	-27.8	+0.0	+19.7	+5.3	+0.0	102.4	106.0	-3.6	Vert
	QP								Side		
6	613.961M	104.5	-27.8	+0.0	+19.7	+5.3	+0.0	101.7	106.0	-4.3	Horiz
	QP								Side		
^	613.953M	104.6	-27.8	+0.0	+19.7	+5.3	+0.0	101.8	106.0	-4.2	Horiz
									Side		
^	613.955M	102.3	-27.8	+0.0	+19.7	+5.3	+0.0	99.5	106.0	-6.5	Horiz
									Flat		
^	613.952M	95.1	-27.8	+0.0	+19.7	+5.3	+0.0	92.3	106.0	-13.7	Horiz
									Stand		

Test Location: CKC Laboratories • A Clouds Rest • Mariposa Ca, 95338 • 209-966-5240

Customer: **Medical Data Electronics**

Specification: **FCC 15.209**

Work Order #: **73700**

Date: 03/30/2000

Test Type: **Maximized Emissions**

Time: 13:28:00

Equipment: **Multiparameter Telemetry Transmitter**

Sequence#: 9

Manufacturer: Medical Data

Tested By: Skip Doyle

Model: 20603

S/N: N/A

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multiparameter Telemetry Transmitter	Medical Data	20603	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Spurious Emissions with Fundamental at Low Channel 608MHz.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Amp Cable dB	Bicon Amp dB	Log Horn dB	Cable dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	1824.322M	49.2	+0.0 +6.2	+0.0 -35.4	+0.0 +27.3	+0.0	+0.0	47.3	54.0	-6.7	Horiz
2	609.712M	41.6	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	38.8	46.0	-7.2	Horiz
3	606.540M	40.9	-27.8 +0.0	+0.0 +0.0	+19.6 +0.0	+5.3	+0.0	38.0	46.0	-8.0	Horiz
4	608.979M QP	40.5	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	37.7	46.0	-8.3	Horiz
^	608.951M	44.6	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	41.8	46.0	-4.2	Horiz
6	608.956M	39.7	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	36.9	46.0	-9.1	Vert
7	1824.305M	45.9	+0.0 +6.2	+0.0 -35.4	+0.0 +27.3	+0.0	+0.0	44.0	54.0	-10.0	Vert
8	607.242M QP	38.3	-27.8 +0.0	+0.0 +0.0	+19.6 +0.0	+5.3	+0.0	35.4	46.0	-10.6	Horiz
^	607.232M	44.3	-27.8 +0.0	+0.0 +0.0	+19.6 +0.0	+5.3	+0.0	41.4	46.0	-4.6	Horiz
10	599.200M	37.4	-27.8 +0.0	+0.0 +0.0	+19.5 +0.0	+5.2	+0.0	34.3	46.0	-11.7	Vert
11	597.170M	37.0	-27.8 +0.0	+0.0 +0.0	+19.5 +0.0	+5.2	+0.0	33.9	46.0	-12.1	Vert
12	601.300M	36.2	-27.8 +0.0	+0.0 +0.0	+19.5 +0.0	+5.2	+0.0	33.1	46.0	-12.9	Vert
13	609.681M	35.8	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	33.0	46.0	-13.0	Vert

14	912.149M	30.0	-27.3 +0.0	+0.0 +0.0	+23.5 +0.0	+6.7	+0.0	32.9	46.0	-13.1	Vert
15	1216.215M	46.3	+0.0 +4.9	+0.0 -35.8	+0.0 +24.8	+0.0	+0.0	40.2	54.0	-13.8	Vert
16	1216.212M	46.2	+0.0 +4.9	+0.0 -35.8	+0.0 +24.8	+0.0	+0.0	40.1	54.0	-13.9	Horiz
17	606.534M	34.8	-27.8 +0.0	+0.0 +0.0	+19.6 +0.0	+5.3	+0.0	31.9	46.0	-14.1	Vert
18	610.492M	33.2	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	30.4	46.0	-15.6	Vert

Test Location: CKC Laboratories • A Clouds Rest • Mariposa Ca, 95338 • 209-966-5240

Customer: **Medical Data Electronics**
 Specification: **FCC 15.209**
 Work Order #: **73700**
 Test Type: **Maximized Emissions**
 Equipment: **Multiparameter Telemetry Transmitter**
 Manufacturer: Medical Data
 Model: 20603
 S/N: N/A

Date: 03/30/2000
 Time: 14:08:59
 Sequence#: 8
 Tested By: Skip Doyle

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multiparameter Telemetry Transmitter	Medical Data	20603	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Spurious Emissions with Fundamental at Mid Channel 611MHz.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Amp Cable dB	Bicon Amp dB	Log Horn dB	Cable dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	609.605M	45.2	-27.8	+0.0	+19.7	+5.3	+0.0	42.4	46.0	-3.6	Horiz
	QP		+0.0	+0.0	+0.0						
^	609.593M	47.3	-27.8	+0.0	+19.7	+5.3	+0.0	44.5	46.0	-1.5	Horiz
			+0.0	+0.0	+0.0						
3	609.594M	44.4	-27.8	+0.0	+19.7	+5.3	+0.0	41.6	46.0	-4.4	Vert
	QP		+0.0	+0.0	+0.0						
^	609.611M	47.4	-27.8	+0.0	+19.7	+5.3	+0.0	44.6	46.0	-1.4	Vert
			+0.0	+0.0	+0.0						
5	612.611M	43.3	-27.8	+0.0	+19.7	+5.3	+0.0	40.5	46.0	-5.5	Horiz
	QP		+0.0	+0.0	+0.0						
^	612.577M	45.8	-27.8	+0.0	+19.7	+5.3	+0.0	43.0	46.0	-3.0	Horiz
			+0.0	+0.0	+0.0						
7	612.610M	43.2	-27.8	+0.0	+19.7	+5.3	+0.0	40.4	46.0	-5.6	Vert
	QP		+0.0	+0.0	+0.0						
^	612.613M	45.3	-27.8	+0.0	+19.7	+5.3	+0.0	42.5	46.0	-3.5	Vert
			+0.0	+0.0	+0.0						
9	611.967M	42.2	-27.8	+0.0	+19.7	+5.3	+0.0	39.4	46.0	-6.6	Vert
	QP		+0.0	+0.0	+0.0						
^	611.934M	46.8	-27.8	+0.0	+19.7	+5.3	+0.0	44.0	46.0	-2.0	Vert
			+0.0	+0.0	+0.0						
11	610.403M	40.4	-27.8	+0.0	+19.7	+5.3	+0.0	37.6	46.0	-8.4	Vert
	QP		+0.0	+0.0	+0.0						
^	610.396M	46.6	-27.8	+0.0	+19.7	+5.3	+0.0	43.8	46.0	-2.2	Vert
			+0.0	+0.0	+0.0						
13	611.906M	40.4	-27.8	+0.0	+19.7	+5.3	+0.0	37.6	46.0	-8.4	Horiz
	QP		+0.0	+0.0	+0.0						

^	611.895M	45.5	-27.8	+0.0	+19.7	+5.3	+0.0	42.7	46.0	-3.3	Horiz
			+0.0	+0.0	+0.0						
15	610.353M	39.8	-27.8	+0.0	+19.7	+5.3	+0.0	37.0	46.0	-9.0	Horiz
	QP		+0.0	+0.0	+0.0						
^	610.356M	45.9	-27.8	+0.0	+19.7	+5.3	+0.0	43.1	46.0	-2.9	Horiz
			+0.0	+0.0	+0.0						
17	1833.257M	45.9	+0.0	+0.0	+0.0	+0.0	+0.0	44.1	54.0	-9.9	Vert
			+6.3	-35.4	+27.3						
18	1222.157M	48.8	+0.0	+0.0	+0.0	+0.0	+0.0	42.7	54.0	-11.3	Horiz
			+4.9	-35.8	+24.8						
19	598.785M	36.6	-27.8	+0.0	+19.5	+5.2	+0.0	33.5	46.0	-12.5	Vert
			+0.0	+0.0	+0.0						
20	1222.172M	45.9	+0.0	+0.0	+0.0	+0.0	+0.0	39.8	54.0	-14.2	Vert
			+4.9	-35.8	+24.8						
21	1833.253M	38.0	+0.0	+0.0	+0.0	+0.0	+0.0	36.2	54.0	-17.8	Horiz
			+6.3	-35.4	+27.3						

Test Location: CKC Laboratories • A Clouds Rest • Mariposa Ca, 95338 • 209-966-5240

Customer: **Medical Data Electronics**
 Specification: **FCC 15.209**
 Work Order #: **73700**
 Test Type: **Maximized Emissions**
 Equipment: **Multiparameter Telemetry Transmitter**
 Manufacturer: Medical Data
 Model: 20603
 S/N: N/A

Date: 03/30/2000
 Time: 15:10:40
 Sequence#: 7
 Tested By: Skip Doyle

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Multiparameter Telemetry Transmitter	Medical Data	20603	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
----------	--------------	---------	-----

Test Conditions / Notes:

Device: Multiparameter Telemetry Transmitter, Model: 20603 on the 80 cm wood table at the center of the Barns turntable for Intentional Radiator testing to FCC Part 15.242. Equipment is battery powered at 9VDC. Two I/O cables are bundled and hanging off the table. Spurious Emissions with Fundamental at High Channel 614MHz.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	Amp Cable dB	Bicon Amp dB	Log Horn dB	Cable dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	611.068M	42.7	-27.8	+0.0	+19.7	+5.3	+0.0	39.9	46.0	-6.1	Horiz
	QP		+0.0	+0.0	+0.0						
^	611.067M	45.0	-27.8	+0.0	+19.7	+5.3	+0.0	42.2	46.0	-3.8	Horiz
			+0.0	+0.0	+0.0						
3	612.492M	42.6	-27.8	+0.0	+19.7	+5.3	+0.0	39.8	46.0	-6.2	Horiz
			+0.0	+0.0	+0.0						
4	614.821M	42.0	-27.8	+0.0	+19.8	+5.4	+0.0	39.4	46.0	-6.6	Horiz
	QP		+0.0	+0.0	+0.0						
^	614.816M	45.8	-27.8	+0.0	+19.8	+5.4	+0.0	43.2	46.0	-2.8	Horiz
			+0.0	+0.0	+0.0						
6	616.976M	42.0	-27.8	+0.0	+19.8	+5.4	+0.0	39.4	46.0	-6.6	Vert
			+0.0	+0.0	+0.0						
7	611.067M	41.5	-27.8	+0.0	+19.7	+5.3	+0.0	38.7	46.0	-7.3	Vert
	QP		+0.0	+0.0	+0.0						
^	611.067M	45.1	-27.8	+0.0	+19.7	+5.3	+0.0	42.3	46.0	-3.7	Vert
			+0.0	+0.0	+0.0						
9	616.977M	40.7	-27.8	+0.0	+19.8	+5.4	+0.0	38.1	46.0	-7.9	Horiz
			+0.0	+0.0	+0.0						
10	614.878M	40.6	-27.8	+0.0	+19.8	+5.4	+0.0	38.0	46.0	-8.0	Vert
	QP		+0.0	+0.0	+0.0						
^	614.813M	46.6	-27.8	+0.0	+19.8	+5.4	+0.0	44.0	46.0	-2.0	Vert
			+0.0	+0.0	+0.0						
12	615.594M	40.5	-27.8	+0.0	+19.8	+5.4	+0.0	37.9	46.0	-8.1	Vert
			+0.0	+0.0	+0.0						
13	613.202M	40.6	-27.8	+0.0	+19.7	+5.3	+0.0	37.8	46.0	-8.2	Horiz
	QP		+0.0	+0.0	+0.0						

^	613.196M	45.4	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	42.6	46.0	-3.4	Horiz
15	3990.985M	33.8	+0.0 +12.2	+0.0 -33.6	+0.0 +33.3	+0.0	+0.0	45.7	54.0	-8.3	Vert
16	615.588M QP	39.2	-27.8 +0.0	+0.0 +0.0	+19.8 +0.0	+5.4	+0.0	36.6	46.0	-9.4	Horiz
^	615.577M	44.8	-27.8 +0.0	+0.0 +0.0	+19.8 +0.0	+5.4	+0.0	42.2	46.0	-3.8	Horiz
18	613.273M QP	38.8	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	36.0	46.0	-10.0	Vert
^	613.241M	45.3	-27.8 +0.0	+0.0 +0.0	+19.7 +0.0	+5.3	+0.0	42.5	46.0	-3.5	Vert
20	1841.990M	44.0	+0.0 +6.3	+0.0 -35.4	+0.0 +27.4	+0.0	+0.0	42.3	54.0	-11.7	Horiz
21	4604.998M Ave	22.5	+0.0 +14.7	+0.0 -32.5	+0.0 +32.9	+0.0	+0.0	37.6	54.0	-16.4	Vert
^	4604.970M	34.8	+0.0 +14.7	+0.0 -32.5	+0.0 +32.9	+0.0	+0.0	49.9	54.0	-4.1	Vert
23	1228.006M	42.4	+0.0 +4.9	+0.0 -35.8	+0.0 +24.9	+0.0	+0.0	36.4	54.0	-17.6	Vert
24	1228.002M	42.2	+0.0 +4.9	+0.0 -35.8	+0.0 +24.9	+0.0	+0.0	36.2	54.0	-17.8	Horiz