

Measurement/Technical Report

Spacelabs Medical Model 90343/90347 Digital Telemetry Transmitter

FCC ID: CM676A90343-05

March 9, 1999

This report concerns (check one):		Original Grant <input checked="" type="checkbox"/>	Class II Change <input type="checkbox"/>
Equipment Type: <u>Model 90343/90347 Digital Telemetry Transmitter</u>			
Deferred grant requested per 47 CFR 0.457 (d)(1)(ii)?		yes <input type="checkbox"/>	no <input checked="" type="checkbox"/>
If yes, defer until:		<u>N/A</u>	date
<u>Spacelabs Medical</u> agrees to notify the Commission by:		<u>N/A</u>	date
of the intended date of announcement of the product so that the grant can be issued on that date.			
Transition Rules Request per 15.37:		yes <input type="checkbox"/>	no <input checked="" type="checkbox"/>
If no, assumed Part 15, Subpart B for unintentional radiators - new 47 CFR [10-1-92] provision.			
Report prepared by:	Northwest EMC, Inc. 120 South Elliott Road, Suite 300 Newberg, OR 97132 (503) 537-0728 fax: (503) 537-0735		
Report No. SPAC0197			

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1.0 General Information

1.1 Product Description

Manufactured BySpacelabs Medical
Address..... 15220 NE 40th Street, Redmond, WA 98073
Test Requested By:Stephen Cantwell
Model Model 90343/90347 Digital Telemetry Transmitter
FCC IDCM676A90343-05
Serial Number(s).....340-200250
Date of TestMarch 8, 1999 through March 9, 1999
Job NumberSPAC0197

This application is being submitted in support of an equipment authorization request for the Spacelabs Medical Model 90343 and 90347 Enhanced Digital Telemetry Transmitter (FCC ID: CM676A90343-05), in accordance with Part 2 and Part 15 of the Federal Communications Commission's Rules and Regulations.

The Model 90343 is a multi-parameter biomedical telemetry transmitter that is used for the transmission of a patient's vital signs data, including the electrocardiogram (ECG), blood oxygen saturation (SpO₂), and non-invasive blood pressure (NIBP). This physiological data is encoded in a digital format and used to FSK-modulate a crystal controlled, RF carrier. This device is intended for use within the confines of medical facilities. It is not intended for off-premise vehicular use.

The Model 90347 transmitter is a lesser version of the 90343. It utilizes the same RF and ECG circuit boards, but lacks the SPO₂ circuit board and the NIBP interface. Making it a single parameter (ECG only) device.

This battery (9 volt alkaline type) powered UHF transmitter is worn by the patient. It operates on a 50 kHz system channel spacing. It utilizes unused UHF television channels from 608 to 614 MHz in accordance with 47 CFR 15.242. The RF signal from this transmitter is radiated on one of the patient ECG lead wires. Which, at a 3 meter distance, produces a field strength of approximately 150 milli volts per meter (3mW power). The allowable field strength for this class of device as authorized under the amendment to the FCC Rules (FCC 97-397) is 200 milli volts per meter (7.3 mW power) at 3 meters.

This transmitter's RF design is based on Spacelabs Medical's Model 90340 UHF telemetry transmitter (FCC ID: CM676A90340), and has had the RF passive components sized for the higher UHF operation. The transmitted RF signal is received by a Model 90478 digital telemetry receiver. The receiver down-converts and demodulated the vital signs information to base band. Whereby they are processed for display in any of the Spacelabs Medical (SMI) Patient Care Management System (PCMS™) patient monitors.

Product Description con't

Clocks/Oscillators Frequencies

- RF BOARD (90343/90347)
- RF Carrier: 608 to 614 MHz
- Fixed Crystal Oscillator: 152 to 153.5 MHz
- Watch Crystal 32 kHz
- Frame Rate 120 Hz
- Super Frame 2.5 Hz
- Low battery warning lamp 0.5 Hz

SPO2 BOARD (90343 only)

- Processor crystal 32 kHz
- Processor clock 4.194 MHz
- A to D converter 2.45 MHz
- SPO2 drive 1.024 kHz
- SPO2 sample rate 1.048 MHz

1.2 Related Submittals/Grants

This product belongs to the same family of telemetry transmitters as the FCC ID: CM676A90340 and CM676A90343. The differences lie in the operating frequency range and increase of the output power by 3 dB to overcome a predicted increased path loss.

1.3 Tested System Details

EUT and Peripherals

<u>Item</u>	<u>FCC ID</u>	<u>Description and Serial No.</u>
EUT	CM676A90343-05	Spacelabs Medical Model 90343/90347 Digital Telemetry Transmitter, Serial No. 340-200250.

Cables:

<u>Item</u>	<u>Descriptions</u>
ECG Lead Set	24 inches in length, unshielded. Part Number 012-0285-01.
SpO2 Adapter Cable	39 inches in length, unshielded. Part No. 012-0589-00.
NIPB Cable	58 inches in length, unshielded. Part No. 012-0588-00.

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance of 3 meters. Please reference Appendix I for further detail on Test Methodology.

1.5 Test Facility

The Open Area Test Site and conducted measurement facility used to collect the radiated and conducted data is located at

Northwest EMC, Inc.
30475 NE Trails End Ln
Newberg, OR 97132
(503) 537-5566
Fax: 537-5562

The Open Area Test Site, and conducted measurement facility is located in Newberg, OR, at the address shown above. These sites have been fully described in reports filed with the FCC (Federal Communications Commission), and accepted by the FCC in letters maintained in our files.

Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Lab Code: 200059-0.

Northwest EMC, Inc. has been assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

FCC ID: CM676A90343-05

3.0 System Test Configuration

3.1 Justification

The EUT, using the test software described below was exercised and operated in a diagnostic mode using simulated data. The EUT was operated at the high and low frequencies of the band and was tested with a new battery.

3.2 EUT Exercise Software

The diagnostics software executes on the CPU (Motorola 68CK16Z4) of the Transmitter's SpO2 printed circuit board assembly (PCBA) at a clock rate of 4.194 MHz via the internal Phase Locked Loop (PLL) on the CPU. The clock to the CPU is a standard watch crystal (32.768 kHz). A pulse width modulator (PWM) is used to drive the SpO2 red and infrared diodes at 2.048 Hz rate. The CPU buses used for drive, gain, baseband signal output (numerical SpO2 and NIBP data), and SpO2 sampling operate at 2.097 MHz. These buses control the digital-to-analog converters (DACs) for drive current, gain, baseband signal output to the RF modulator. With simulated ECG waveform data inputted into the ECG PCBA, all functions are activated in the diagnostics software and represent a worst case data scenario. Under normal operation, the analog-to-digital converter (A/D) and drive circuitry will power down momentarily to conserve power-this does not occur in the test software.

3.3 Special Accessories

None.

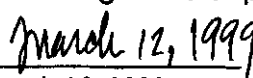
3.4 Equipment Modifications

The following modifications were required to achieve EMI compliance:

- RF Shield was placed over the crystal oscillator and frequency multiplier section to control LO emissions
- Added 10pS capacitors on ECG leads to control high frequency spurious emissions.

The manufacturer certifies that he will incorporate these changes into all production units.


J.S. Wiley, Product Development Director


March 12, 1999

3.5 Configuration of Tested System

The EUT was connected to a standard patient cable assembly and placed on a non conductive table 0.8 meters above the reference plane.

3.0 System Test Configuration

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3.3 Special Accessories

None.

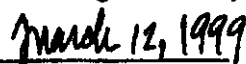
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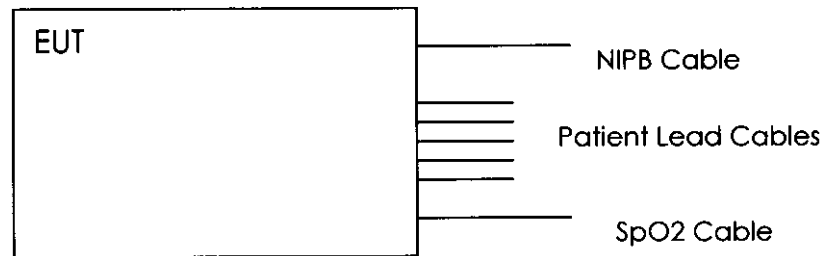

J.S. Wiley, Product Development Director


March 12, 1999

3.5 Configuration of Tested System

The EUT was connected to a standard patient cable assembly and placed on a non conductive table 0.8 meters above the reference plane.

Figure 3.1: Configuration of Tested System



4.0 Block Diagram Description

General Overview

The Model 90343 consists of three major printed circuit board assemblies (PCBAs). The ECG PCBA (part number 670-0285-01) acquires the patient's ECG via skin electrodes that are interconnected to this PCBA through 5 lead wires. The ECG analog signal is conditioned and band-limited, and then routed to the RF PCBA (part number 670-0933-00).

The Model 90343 also includes a PCBA for acquiring and computing the patient's blood oxygen saturation value (SpO₂). This SpO₂ PCBA (part number 670-0916-00) interfaces with selected standard pulse oximetry sensors which emit red and infrared (Ir) light through a patient tissue bed that includes arterial blood flow. These light sources are detected by photodiodes embedded in the same sensor. The ration of the amount of absorbed red light to the amount of absorbed Ir light is used to compute the patient's blood oxygen saturation value and arterial pulse value. This PCBA is also used to communicate with a separate SMI patient monitoring product, the Model 90217 Ambulatory Blood Pressure (ABP) Monitor. The Model 90217 ABP monitor can be programmed to episodically or on demand, measure the patient's blood pressure non-invasively. This non-invasive blood pressure (NIBP) value is stored in the Model 90217. This NIBP value can also be transferred to the Model 90343 via a communications port on each product. The Model 90347 is identical to the Model 90343, except it does not include the SpO₂ PCBA. All other PCBAs are the same between both products.

5.0 Radiated Emissions Data

The following data lists the most significant emission frequencies, total (corrected) levels, and specification margins. Correction factors, antenna height, table azimuth, etc., are contained in the data sheets immediately following. Explanation of the correction factors is given in paragraph 5.2 of this report. Complete graphs and data sheets may be referenced on the following pages. Minimum margins are listed below:

FCC Part 15.242c Specification Limits

Model 90343 (Transmit 614 MHz - High Frequency)

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
1533.000	PK	48.3	54.0	5.7	Vertical
1840.000	PK	47.1	54.0	6.9	Vertical
767.448	QP	38.8	46.0	7.2	Horizontal
306.987	QP	38.6	46.0	7.4	Horizontal
767.461	QP	37.6	46.0	8.4	Vertical
1687.000	PK	45.1	54.0	8.9	Vertical

Judgment: Passed, minimum margin of 5.7 dB.

Model 90347 (Transmit 608 MHz - Low Frequency)

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
304.022	QP	32.7	46.0	13.3	Horizontal
608.045	QP	91.3	106.0	14.7	Horizontal
912.053	QP	30.1	46.0	15.9	Horizontal
608.045	QP	89.8	106.0	16.2	Vertical
152.012	QP	25.9	43.5	17.6	Horizontal
1216.090	PK	36.4	54.0	17.6	Vertical

Judgment: Passed, minimum margin of 13.3 dB.

Test Personnel:



Tester Signature

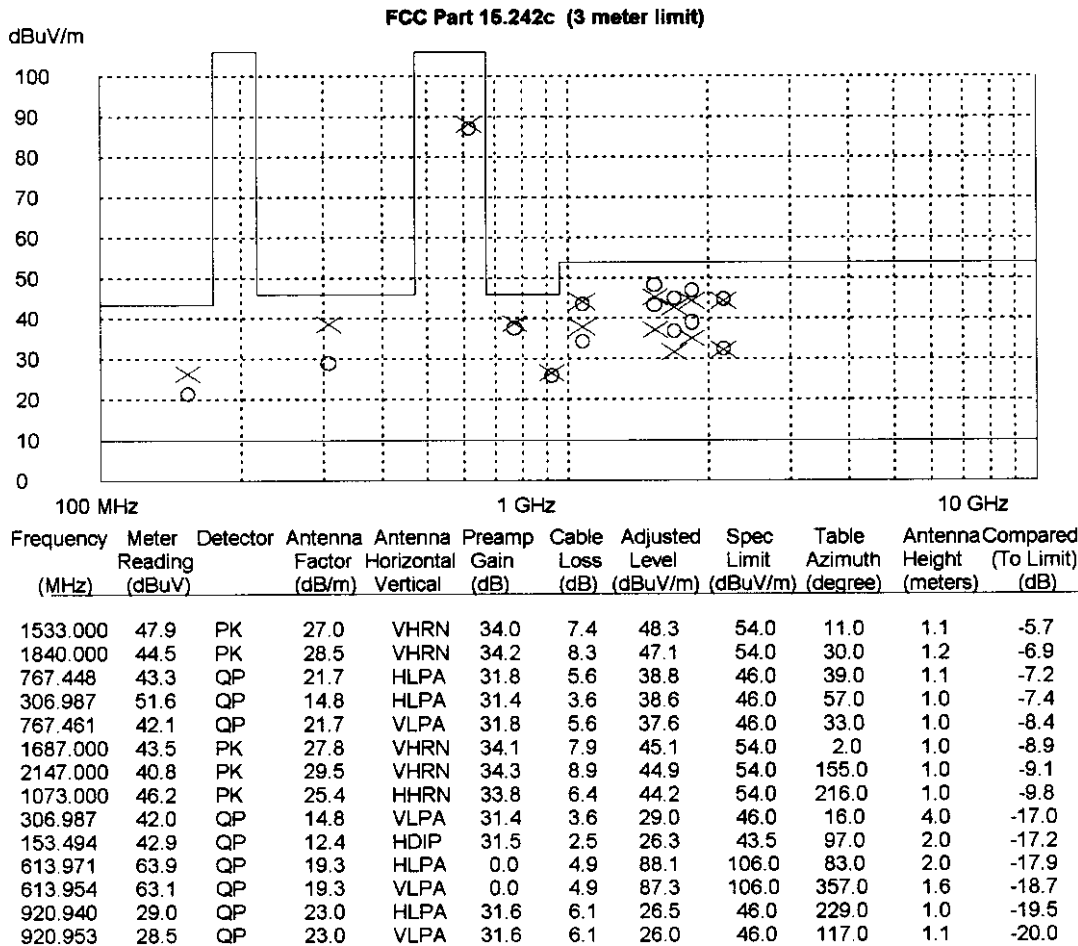
Typed/Printed Name: Dan Haas

Northwest EMC, Inc.

Version 98.2, Mar. 1999

EUT Name: 90343
 Serial Number: 343-003
 Manufacturer: Spacelabs Medical
 Job Number: SPAC0197
 Test Date: 03-08-1999
 Tested By: Dan Haas, TE10m OATS
 Test Distance: 3 meters.
 Comments: Transmit @ 614 MHz

Horizontal= X
 Vertical = O



Temperature 70F 42% Humidity

Northwest EMC, Inc.

Version 98.2, Mar. 1999

Equipment Tested: 90343
Serial Number: 343-003
Manufacturer: Space Labs Medical
Job Number: SPAC0197
Test Date: 03-08-1999
Tested By: Dan Haas, TE10m OATS
Test Distance: 3 meters.
Comments: Transmit @ 614 MHz

FCC Part 15.242c (3 meter limit)

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamplifier Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
153.494	38.0	QP	12.4	VDIP	31.5	2.5	21.4	43.5	355.0	3.0	-22.1
153.494	42.9	QP	12.4	HDIP	31.5	2.5	26.3	43.5	97.0	2.0	-17.2
306.987	51.6	QP	14.8	HLPA	31.4	3.6	38.6	46.0	57.0	1.0	-7.4
306.987	42.0	QP	14.8	VLPA	31.4	3.6	29.0	46.0	16.0	4.0	-17.0
613.954	63.1	QP	19.3	VLPA	0.0	4.9	87.3	106.0	357.0	1.6	-18.7
613.971	63.9	QP	19.3	HLPA	0.0	4.9	88.1	106.0	83.0	2.0	-17.9
767.448	43.3	QP	21.7	HLPA	31.8	5.6	38.8	46.0	39.0	1.1	-7.2
767.461	42.1	QP	21.7	VLPA	31.8	5.6	37.6	46.0	33.0	1.0	-8.4
920.940	29.0	QP	23.0	HLPA	31.6	6.1	26.5	46.0	229.0	1.0	-19.5
920.953	28.5	QP	23.0	VLPA	31.6	6.1	26.0	46.0	117.0	1.1	-20.0
1073.000	39.8	AV	25.4	HHRN	33.8	6.4	37.8	54.0	255.0	1.0	-16.2
1073.000	45.6	PK	25.4	VHRN	33.8	6.4	43.6	54.0	214.0	1.1	-10.4
1073.000	36.4	AV	25.4	VHRN	33.8	6.4	34.4	54.0	214.0	1.1	-19.6
1073.000	46.2	PK	25.4	HHRN	33.8	6.4	44.2	54.0	216.0	1.0	-9.8
1533.000	43.0	AV	27.0	VHRN	34.0	7.4	43.4	54.0	11.0	1.1	-10.6
1533.000	36.7	AV	27.0	HHRN	34.0	7.4	37.1	54.0	212.0	1.1	-16.9
1533.000	44.8	PK	27.0	HHRN	34.0	7.4	45.2	54.0	212.0	1.1	-8.8
1533.000	47.9	PK	27.0	VHRN	34.0	7.4	48.3	54.0	11.0	1.1	-5.7
1687.000	30.0	AV	27.8	HHRN	34.1	7.9	31.6	54.0	340.0	1.3	-22.4
1687.000	35.3	AV	27.8	VHRN	34.1	7.9	36.9	54.0	2.0	1.0	-17.1
1687.000	43.5	PK	27.8	VHRN	34.1	7.9	45.1	54.0	2.0	1.0	-8.9
1687.000	41.1	PK	27.8	HHRN	34.1	7.9	42.7	54.0	340.0	1.3	-11.3
1840.000	44.5	PK	28.5	VHRN	34.2	8.3	47.1	54.0	30.0	1.2	-6.9
1840.000	41.8	PK	28.5	HHRN	34.2	8.3	44.4	54.0	226.0	3.0	-9.6
1840.000	36.4	AV	28.5	VHRN	34.2	8.3	39.0	54.0	30.0	1.2	-15.0
1840.000	32.4	AV	28.5	HHRN	34.2	8.3	35.0	54.0	226.0	3.0	-19.0
2147.000	40.3	PK	29.5	HHRN	34.3	8.9	44.4	54.0	220.0	1.0	-9.6
2147.000	28.4	AV	29.5	VHRN	34.3	8.9	32.5	54.0	155.0	1.0	-21.5
2147.000	28.1	AV	29.5	HHRN	34.3	8.9	32.2	54.0	220.0	1.0	-21.8
2147.000	40.8	PK	29.5	VHRN	34.3	8.9	44.9	54.0	155.0	1.0	-9.1

Temperature 70F 42% Humidity

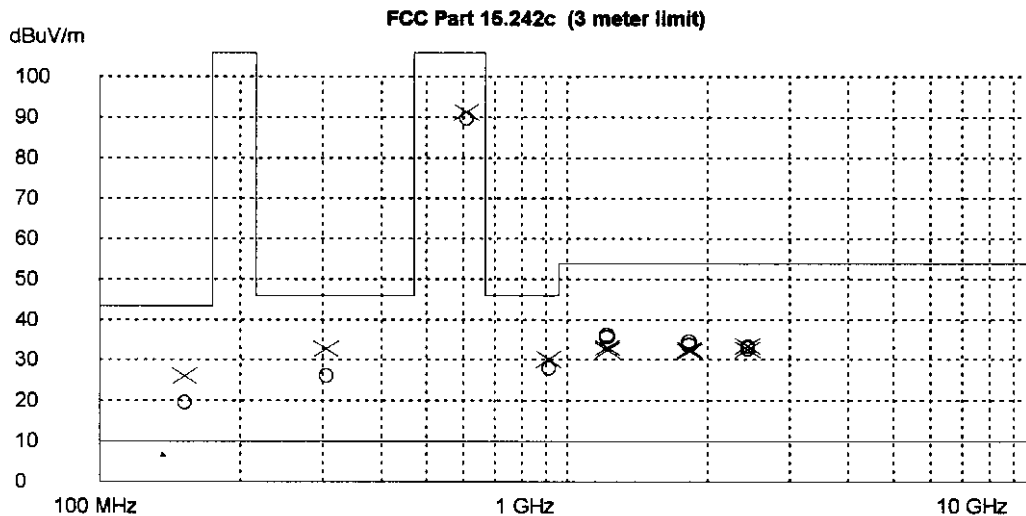


Northwest EMC, Inc.

Version 98.2, Mar. 1999

EUT Name: 90347
 Serial Number: 347-001
 Manufacturer: Spacelabs Medical
 Job Number: SPAC0197
 Test Date: 03-08-1999
 Tested By: Dan Haas, TE10m OATS
 Test Distance: 3 meters.
 Comments: Transmit @ 608MHz

Horizontal= X
 Vertical = O



Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamp Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
304.022	45.9	QP	14.7	HLPA	31.4	3.5	32.7	46.0	46.0	1.0	-13.3
608.045	67.3	QP	19.2	HLPA	0.0	4.8	91.3	106.0	331.0	1.7	-14.7
912.053	32.7	QP	22.9	HLPA	31.6	6.1	30.1	46.0	245.0	1.0	-15.9
608.045	65.8	QP	19.2	VLPA	0.0	4.8	89.8	106.0	356.0	1.5	-16.2
152.012	42.8	QP	12.2	HDIP	31.5	2.4	25.9	43.5	287.0	2.3	-17.6
1216.090	37.6	PK	25.9	VHRN	33.9	6.8	36.4	54.0	147.0	1.0	-17.6
912.053	30.6	QP	22.9	VLPA	31.6	6.1	28.0	46.0	308.0	3.0	-18.0
1216.090	37.0	AV	25.9	VHRN	33.9	6.8	35.8	54.0	147.0	1.0	-18.2
1824.000	32.2	PK	28.4	VHRN	34.2	8.3	34.7	54.0	8.0	1.0	-19.3
304.013	39.4	QP	14.7	VLPA	31.4	3.5	26.2	46.0	200.0	2.0	-19.8
1824.000	31.3	AV	28.4	VHRN	34.2	8.3	33.8	54.0	8.0	1.0	-20.2
2432.000	28.7	PK	29.9	HHRN	34.4	9.2	33.4	54.0	142.0	3.0	-20.6
2432.000	28.7	PK	29.9	VHRN	34.4	9.2	33.4	54.0	58.0	1.0	-20.6
1216.090	34.2	PK	25.9	HHRN	33.9	6.8	33.0	54.0	182.0	1.0	-21.0
2432.000	28.1	AV	29.9	VHRN	34.4	9.2	32.8	54.0	58.0	1.0	-21.2
1824.000	30.1	PK	28.4	HHRN	34.2	8.3	32.6	54.0	204.0	2.0	-21.4
2432.000	27.9	AV	29.9	HHRN	34.4	9.2	32.6	54.0	142.0	3.0	-21.4
1216.090	33.6	AV	25.9	HHRN	33.9	6.8	32.4	54.0	182.0	1.0	-21.6
1824.000	29.6	AV	28.4	HHRN	34.2	8.3	32.1	54.0	204.0	2.0	-21.9
152.012	36.6	QP	12.2	VDIP	31.5	2.4	19.7	43.5	195.0	1.8	-23.8

Temperature 70F 42% Humidity

Northwest EMC, Inc.

Version 98.2, Mar. 1999

Equipment Tested: 90347
Serial Number: 347-001
Manufacturer: Spacew Labs Medical
Job Number: SPAC0197
Test Date: 03-08-1999
Tested By: Dan Haas, TE10m OATS
Test Distance: 3 meters.
Comments: Transmit @ 608MHz

FCC Part 15.242c (3 meter limit)

Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Horizontal Vertical	Preamplifier Gain (dB)	Cable Loss (dB)	Adjusted Level (dBuV/m)	Spec Limit (dBuV/m)	Table Azimuth (degree)	Antenna Height (meters)	Compared (To Limit) (dB)
152.012	42.8	QP	12.2	HDIP	31.5	2.4	25.9	43.5	287.0	2.3	-17.6
152.012	36.6	QP	12.2	VDIP	31.5	2.4	19.7	43.5	195.0	1.8	-23.8
304.013	39.4	QP	14.7	VLPA	31.4	3.5	26.2	46.0	200.0	2.0	-19.8
304.022	45.9	QP	14.7	HLP A	31.4	3.5	32.7	46.0	46.0	1.0	-13.3
608.045	67.3	QP	19.2	HLP A	0.0	4.8	91.3	106.0	331.0	1.7	-14.7
608.045	65.8	QP	19.2	VLPA	0.0	4.8	89.8	106.0	356.0	1.5	-16.2
912.053	32.7	QP	22.9	HLP A	31.6	6.1	30.1	46.0	245.0	1.0	-15.9
912.053	30.6	QP	22.9	VLPA	31.6	6.1	28.0	46.0	308.0	3.0	-18.0
1216.090	37.6	PK	25.9	VHRN	33.9	6.8	36.4	54.0	147.0	1.0	-17.6
1216.090	37.0	AV	25.9	VHRN	33.9	6.8	35.8	54.0	147.0	1.0	-18.2
1216.090	34.2	PK	25.9	HHRN	33.9	6.8	33.0	54.0	182.0	1.0	-21.0
1216.090	33.6	AV	25.9	HHRN	33.9	6.8	32.4	54.0	182.0	1.0	-21.6
1824.000	30.1	PK	28.4	HHRN	34.2	8.3	32.6	54.0	204.0	2.0	-21.4
1824.000	32.2	PK	28.4	VHRN	34.2	8.3	34.7	54.0	8.0	1.0	-19.3
1824.000	31.3	AV	28.4	VHRN	34.2	8.3	33.8	54.0	8.0	1.0	-20.2
1824.000	29.6	AV	28.4	HHRN	34.2	8.3	32.1	54.0	204.0	2.0	-21.9
2432.000	27.9	AV	29.9	HHRN	34.4	9.2	32.6	54.0	142.0	3.0	-21.4
2432.000	28.7	PK	29.9	HHRN	34.4	9.2	33.4	54.0	142.0	3.0	-20.6
2432.000	28.7	PK	29.9	VHRN	34.4	9.2	33.4	54.0	58.0	1.0	-20.6
2432.000	28.1	AV	29.9	VHRN	34.4	9.2	32.8	54.0	58.0	1.0	-21.2

Temperature 70F 42% Humidity



5.2 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured level. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where :

- FS = Field Strength
- RA = Measured Level
- AF = Antenna Factor
- CF = Cable Attenuation Factor
- AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/meter.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/meter}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } ((32 \text{ dBuV/m})/20) = 39.8 \text{ } \mu\text{V/m}$$

5.3 Measurement Bandwidths

Peak Data

150 kHz - 30 MHz.....	10 kHz
30 MHz - 1000 MHz.....	100 kHz
1000 MHz - 2000 MHz.....	1000 kHz

Quasi-peak Data

150 kHz - 30 MHz.....	9 kHz
30 MHz - 1000 MHz.....	120 kHz

All radiated measurements are quasi-peak unless otherwise stated. A video filter was not used.
All conducted measurements are peak unless otherwise stated. A video filter was not used.

6.0 Measurement Equipment

Instrument	Model	Serial No.	Freq Range	Last Cal	Cal Due
Spectrum Analyzer	HP 8567A	2718A00358	10 kHz - 1.5 GHz	04/21/98	04/21/99
Quasi Peak Adapter	HP 85650A	2811A01175	10 kHz - 1000 MHz	02/20/98	02/20/99
Pre-Amplifier	AR LN1000	15224	100 kHz - 1300 MHz	07/20/98	07/20/99
Bicon Antenna	EMCO 3110	1240	30 MHz - 200 MHz	12/29/98	12/29/99
LPA Antenna	EMCO 3146	9212-3486	200 MHz - 1000 MHz	12/30/98	12/30/99
Horn Antenna	EMCO 3115	9804-5441	1 GHz - 18 GHz	04/14/98	04/14/99
Spectrum Analyzer	HP 8594E	3543A02557	9 kHz - 2.9 GHz	04/03/98	04/03/99
Pre-Amplifier	ASI8732N	103	1 GHz - 2 GHz	07/08/98	07/08/99
Dipole Antenna	Roberts	264	28 MHz - 1000 MHz	09/30/97	09/03/00

Appendix I: Measurement Procedures

Each frequency was measured in both the horizontal and vertical antenna polarization's.

The EUT position was maximized for each frequency, for both the horizontal and vertical antenna polarization's, using a remotely controlled turntable.

The antenna height was varied from 1 - 4 meters at each frequency, for both the horizontal and vertical positions to maximize the emission level.

The cable and peripheral positions were manipulated to ensure maximum levels at each frequency for both horizontal and vertical antenna polarization's.

Measurements are made at an antenna to EUT distance of 3 meters.

Appendix II: Test Setup Photos



Declaration of Conformity

Product Identification: 90478 (Digital Telemetry Receiver Module)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Responsible Party: Spacelabs Medical

Address: 15220 NE 40th Street
Redmond, WA 98052
Phone No: (425)867-2038

Date

Name, Title

Report No: SPAC0191

Tested By: Northwest EMC, Inc.
NVLAP Code: 200059-0