

*Electromagnetic Emissions Test Report  
and  
pursuant to*

*Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7  
FCC Part 15 Subpart C*

*on the  
Animas Corporation  
Transmitter  
Model: Io Meter/Controller*

UPN: *Not provided at time of test*  
FCC ID: *Not provided at time of test*

GRANTEE: Animas Corporation  
200 Lawrence Drive  
West Chester, PA 19380

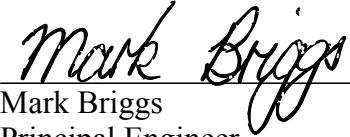
TEST SITE: Elliott Laboratories, Inc.  
684 W. Maude Ave  
Sunnyvale, CA 94086

REPORT DATE: November 21, 2007

REISSUE DATE: February 20, 2008

FINAL TEST DATE: February 19, 2008

AUTHORIZED SIGNATORY:

  
\_\_\_\_\_  
Mark Briggs  
Principal Engineer



2016-01

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**REVISION HISTORY**

Rev #	Date	Comments	Modified By
1	November 29, 2007	Initial Release	Gary Izard
2	December 17, 2007	Added test equipment list for 99% bandwidth. Changed test dates to include date for 99% bandwidth measurement. Updated report date.	Mark Briggs
3	February 20, 2008	Modified 99% bandwidth data with new plots using RB=3kHz (page 9-11 of Exhibit 2). Updated results table on page 7 to reflect 61kHz measurement of 99% bandwidth. Updated test dates on cover page and on page 7 to show testing done on February 19,2008.	Mark Briggs

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## SCOPE

An electromagnetic emissions test has been performed on the Animas Corporation model Io Meter/Controller pursuant to the following rules:

Industry Canada RSS-Gen Issue 2

RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Animas Corporation model Io Meter/Controller and therefore apply only to the tested sample. The sample was selected and prepared by Ulrich Kraft of Lifescan Inc - A Johnson & Johnson Co.

## OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

### ***STATEMENT OF COMPLIANCE***

The tested sample of Animas Corporation model Io Meter/Controller complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2  
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"  
FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

**TEST RESULTS SUMMARY**
**DEVICES OPERATING IN THE 902 – 928 / 2400 – 2483.5 / 5725 – 5850 MHz BANDS**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.249 (a)	RSS 210 A2.9 (1)	Fundamental Signal Strength	86.5 dB $\mu$ V/m (21.1 mV/m)	50mV/m @ 3m	Complies
15.249 (a) / 15.209	RSS 210 A2.9 (1) & Table 2	Radiated Spurious Emissions, 30 – 10,000 MHz	41.1dB $\mu$ V/m (113.5 $\mu$ V/m) @ 5527.8MHz	Harmonics 500uV/m @ 3m or general limits	Complies (-12.9dB)
15.249 (a)	RSP 100 RSS GEN 4.4.1	99% Bandwidth	61kHz	Information only	Complies

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Integral antenna	Unique or integral	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	32.5dB $\mu$ V/m (42.2 $\mu$ V/m) @ 280.000MHz	15.109 / RSS GEN Table 1	Complies (-13.5dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	Not applicable – battery powered device		

**MEASUREMENT UNCERTAINTIES**

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

**EQUIPMENT UNDER TEST (EUT) DETAILS****GENERAL**

The Animas Corporation model Io Meter/Controller is a glucose blood monitor and a remote controller that is designed to measure blood glucose and as a remote controller to a insulin pump. Since the EUT would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.0 Volts battery operated, without external power supply.

A sample was received on October 31, 2007 and tested on October 31, 2007 and December 5, 2007. The 99% bandwidth was re-measured on February 19, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
LifeScan	Io Meter/Controller	DV4+ build	AAWSV001 (Tx Mode)
LifeScan	Io Meter/Controller	DV4+ build	AAWSV008 (Rx Mode)

**OTHER EUT DETAILS**

The following EUT details should be noted: transmission level is set at -5dBm

**ANTENNA SYSTEM**

The antenna system used with the Animas Corporation model Io Meter/Controller is integral to the device.

**ENCLOSURE**

The EUT enclosure is primarily constructed of plastic. It measures approximately 5.8 cm wide by 2.3 cm deep by 9.7 cm high.

**MODIFICATIONS**

The EUT did not require modifications during testing in order to comply with emissions specifications.

***SUPPORT EQUIPMENT AND INTERFACE CABLING***

No support equipment was used during testing. The manufacturer stated that the RF functions of the EUT are automatically disabled when the device is connected via USB. All radio-related EMC measurements (transmitter fundamental signal field strength, spurious emissions and receiver spurious emissions) were made with the device operating in a stand-alone mode.

An evaluation of the digital device emissions with the EUT connected to a host PC is contained in a separate test report, reference Elliott R70011.

***EUT OPERATION***

EUT1 was used for Tx testing and set to continuously transmit a PN9 bit pattern on the specified channel (low, center or high). EUT2 was used for Rx testing and set to continuously receive on the specified channel (low, center or high).

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken on October 31, 2007 at the Elliott Laboratories Open Area Test Site #1 or semi anechoic chamber #1 located at 684 West Maude Avenue, Sunnyvale, California or 41039 Boyce Road, Fremont, California Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

**CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

**RADIATED EMISSIONS CONSIDERATIONS**

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

## MEASUREMENT INSTRUMENTATION

### RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

### INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

### LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

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**FILTERS/ATTENUATORS**

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

**ANTENNAS**

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

**ANTENNA MAST AND EQUIPMENT TURNTABLE**

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

**INSTRUMENT CALIBRATION**

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

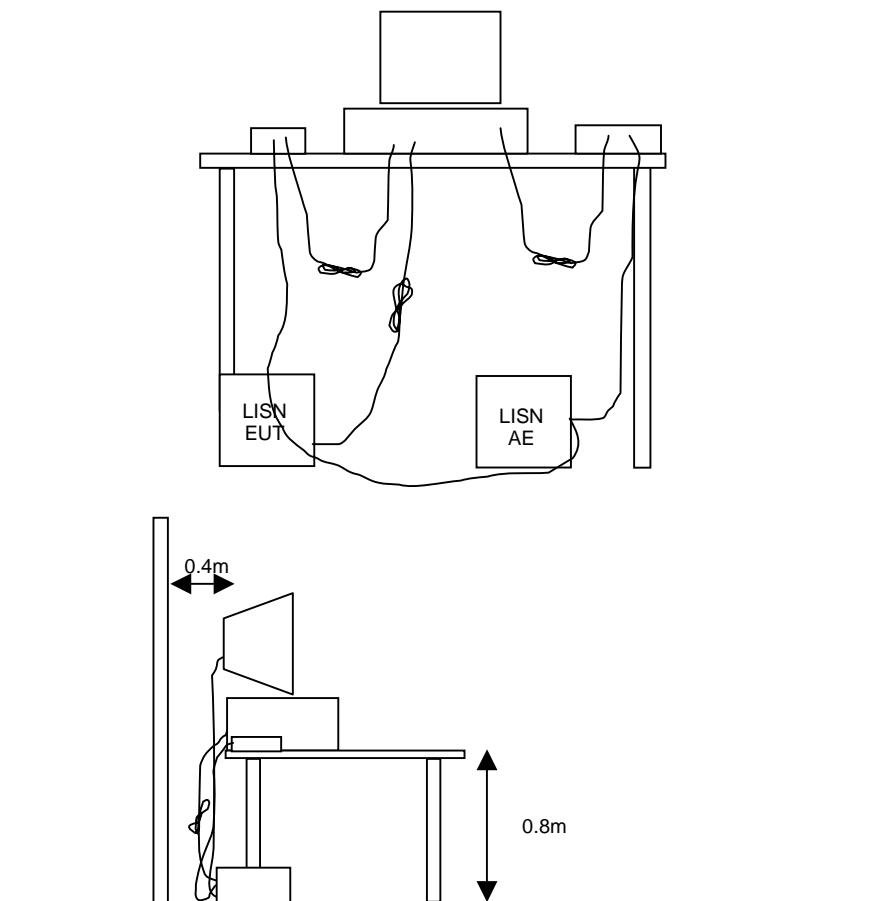
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

### CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.



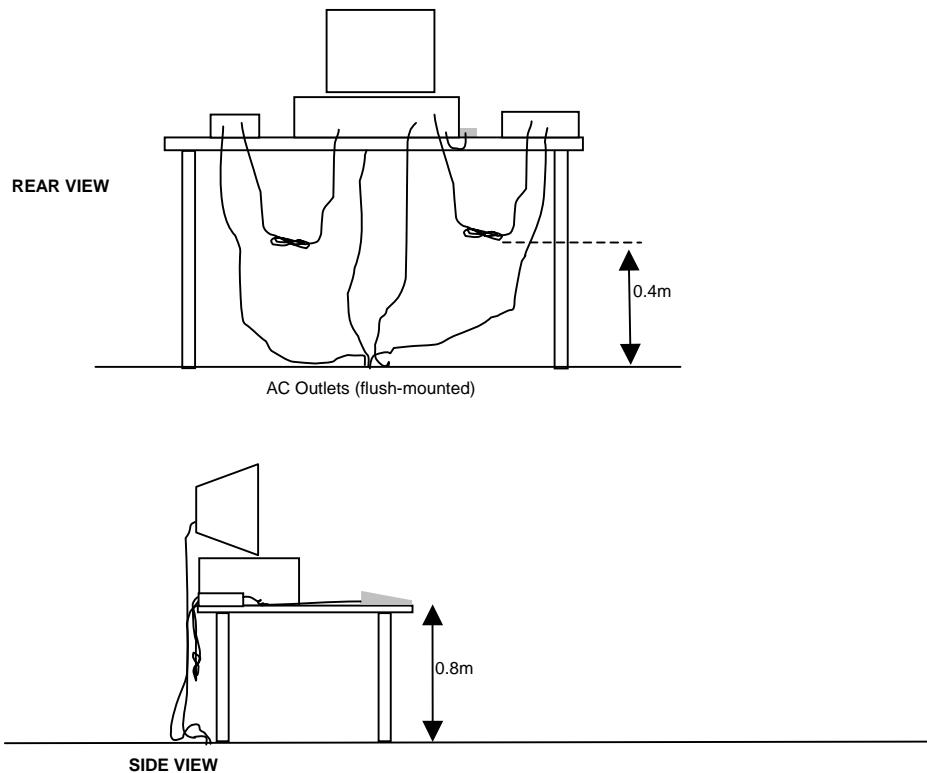
**RADIATED EMISSIONS**

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

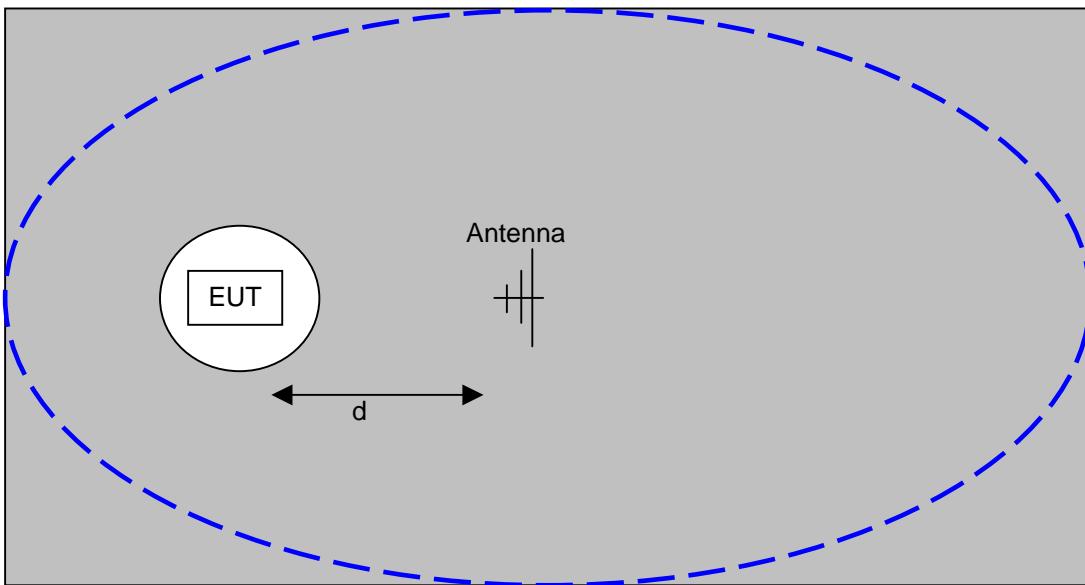
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

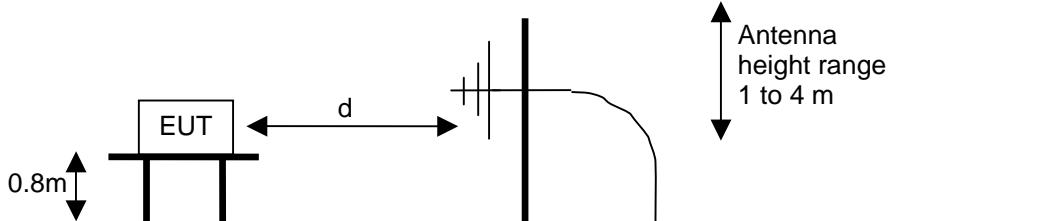
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



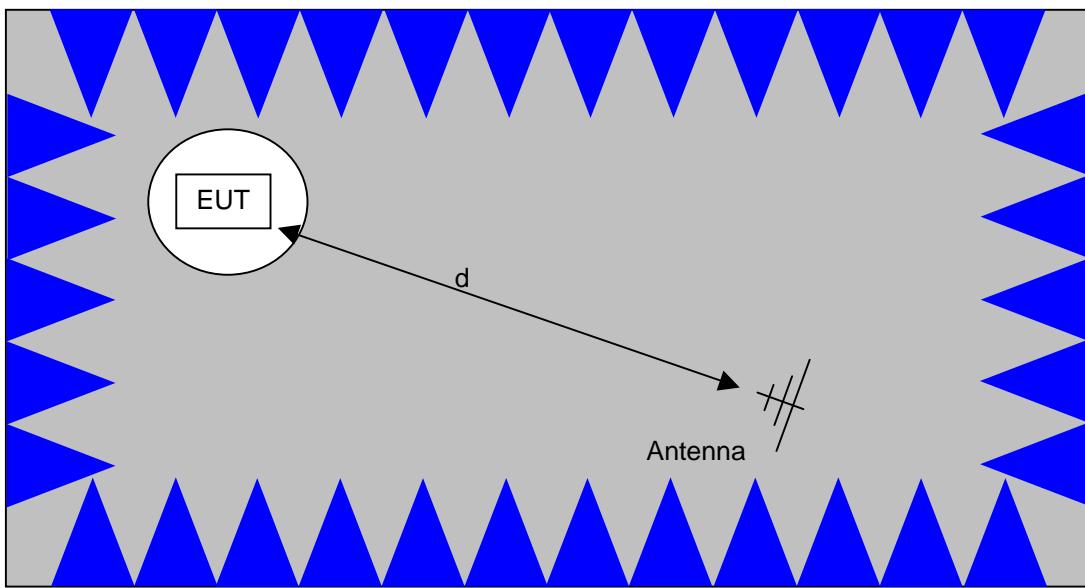
Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.

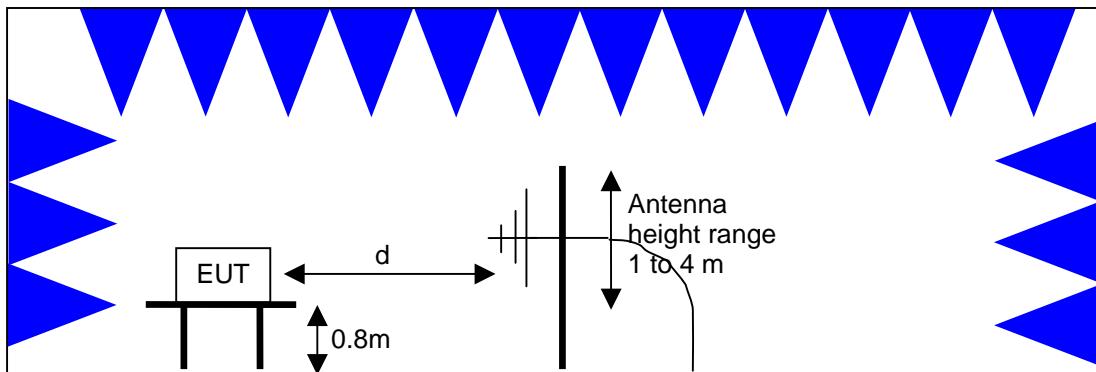


Test Configuration for Radiated Field Strength Measurements  
OATS- Plan and Side Views



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements  
Semi-Anechoic Chamber, Plan and Side Views

**BANDWIDTH MEASUREMENTS**

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

**SPECIFICATION LIMITS AND SAMPLE CALCULATIONS**

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

**GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands<sup>1</sup> (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

<sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

**RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS - 15.249 and RSS 210 A2.9**

The table below shows the limits for the fundamental emission and for its harmonics. Harmonics that fall in restricted bands<sup>1</sup> and all other spurious emissions are subject to the general limits of RSS 210 and FCC Part 15 Subpart C.

Frequency Range (MHz)	Limit for Fundamental @ 3m	Limit for Harmonics @ 3m
902 – 928	50,000 uV/m 94dBuV/m	500 uV/m 54dBuV/m

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG10} (D_m/D_s)$$

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40 * \text{LOG10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

<sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

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The margin of a given emission peak relative to the limit is calculated as follows:

$$R_C = R_f + F_d$$

and

$$M = R_C - L_S$$

where:

$R_f$  = Receiver Reading in dBuV/m

$F_d$  = Distance Factor in dB

$R_C$  = Corrected Reading in dBuV/m

$L_S$  = Specification Limit in dBuV/m

$M$  = Margin in dB Relative to Spec

#### **SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION**

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30} P}{3} \text{ microvolts per meter}$$

3

where P is the eirp (Watts)

*EXHIBIT 1: Test Equipment Calibration Data*

1 Page

**Radiated Emissions, 30 - 10,000 MHz, 31-Oct-07****Engineer: Suhaila Khushzad, Rafael Varelas**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	26-Mar-08
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	01-Dec-07
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	09-Oct-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	08-Oct-08
EMCO	Antenna, Horn, 1-18 GHz	3117	1662	21-Mar-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	15-Nov-07
Hewlett Packard	Preamplifier	8447D OPT 010	1826	25-May-08
Rohde & Schwarz	Test Receiver, 9 kHz-2750 MHz	ESCS 30	1337	21-Sep-08
Hewlett Packard	SpecAn 9 KHz-26.5 GHz, Non-Program	8563E	284	21-Jun-08
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	07-Jun-08
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	03-Jan-08

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**Radio Spurious Emissions(99% Band Edge), 05-Dec-07****Engineer: Suhaila Khushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	24-May-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08

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*EXHIBIT 2: Test Measurement Data*

17 Pages



## *EMC Test Data*

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
		Account Manager:	Richard Gencev
Contact:	Amy Smith		
Emissions Standard(s):	RSS 210, FCC 15.249/15.209, EN 61326	Class:	B
Immunity Standard(s):	N/A	Environment:	-

## **EMC Test Data**

For The

## **Animas Corporation**

Model

Io Meter/Controller

Date of Last Test: 2/19/2008



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
		Account Manger:	Richard Gencev
Contact:	Amy Smith		
Emissions Standard(s):	RSS 210, FCC 15.249/15.209, EN 61326	Class:	B
Immunity Standard(s):	N/A	Environment:	-

### EUT INFORMATION

***The following information was collected during the test session(s).***

#### General Description

The EUT is a glucose blood monitor and a remote controller that is designed to measure blood glucose and as a remote controller to a insulin pump. Since the EUT would be placed on a table top or hand-held during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.0 Volts battery operated, without option for an external power supply.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Animas Corporation	Io Meter/Controller	DV4+ build	AAWSV001 (Tx Mode)	
Animas Corporation	Io Meter/Controller	DV4+ build	AAWSV008 (Rx Mode),	
Animas Corporation	Io Meter/Controller	DV4+ build	AAWSV00B (BGTest)	

#### Other EUT Details

The following EUT details should be noted: RF transmission level at antenna input is set at -5dBm

#### EUT Antenna (Intentional Radiators Only)

The antenna is integral to the device.

#### EUT Enclosure

The EUT enclosure is primarily constructed of plastic . It measures approximately 5.8 cm wide by 2.3 cm deep by 9.7 cm high.

#### Modification History

Mod. #	Test	Date	Modification
1	-	-	None made

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
		Account Manger:	Richard Gencev
Contact:	Amy Smith		
Emissions Standard(s):	RSS 210, FCC 15.249/15.209, EN 61326	Class:	B
Immunity Standard(s):	N/A	Environment:	-

### Test Configuration #1 (Digital Device Tests)

*The following information was collected during the test session(s).*

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
IBM	Thinkpad T42	Laptop PC	L3-C6X0X 0507	-
Epson	Stylus	Printer	ADA0013241	BKMFBP952A

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
n.a.		-	-	-

#### Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
EUT USB	Laptop USB	USB cable	Shielded	2.0
Laptop DC	AC-DC adapter	AC/DC Power cable	unshielded	1.5
Laptop parallel	Printer	-	Shielded	2.0

#### EUT Operation During Emissions Tests

A special test strip that used 2 fixed resistors to simulate an actual blood sample strip was inserted into the EUT. The EUT was making measurements on that sample in a 1s interval, calculating the glucose value and sending this data to the laptop PC via the USB interface. In this mode both NEC and TI microcontrollers are active.

To complete the minimum system configuration requirements of ANSI C63.4 the PC was also connected to a second peripheral (parallel printer). A fresh set of batteries was installed in the EUT prior to the test session.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
		Account Manger:	Richard Gencev
Contact:	Amy Smith		
Emissions Standard(s):	RSS 210,FCC 15.249/15.209, EN 61326	Class:	B
Immunity Standard(s):	N/A	Environment:	-

### Test Configuration # 2 (Transmitter/Receiver Tests)

*The following information was collected during the test session(s).*

#### Support Equipment

The manufacturer stated that the RF functions of the EUT are automatically disabled when the device is connected via USB. All radio-related EMC measurements (transmitter fundamental signal field strength, spurious emissions and receiver spurious emissions) were made with the device operating in a stand-alone mode.

#### Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
n.a.	-	-	-	-

Note: The USB data port was not connected during testing. The manufacturer stated that the RF functions of the EUT are automatically disabled when USB is connected and therefore would not normally be connected.

#### EUT Operation During Emissions Tests

During emissions testing the EUT1 was used for Tx testing and set to continuously transmit a PN9 bit pattern on the specified channel. EUT2 was used for Rx testing and set to continuously receive on the specified channel.



## *EMC Test Data*

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
		Account Manager:	Richard Gencev
Contact:	Amy Smith		
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	B

## Radiated Emissions (Class B Digital Device)

## Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/31/2007 19:17

Test Engineer: Rafael Varelas

Test Location: SVOATS #1

Config. Used: 1

Config Change: None

EUT Voltage: 3.0V DC

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

### Ambient Conditions:

Temperature: 13.9 °C  
Rel. Humidity: 80 %

## Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	RE, 30 - 1000MHz, Maximized Emissions	FCC Class B	Pass	34.3dB $\mu$ V/m @ 454.886MHz (-11.7dB)

## Modifications Made During Testing

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
		Account Manager:	Richard Gencev
Contact:	Amy Smith		
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	B

### Run #1: Preliminary Radiated Emissions, 30-1000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
454.886	34.3	V	46.0	-11.7	QP	180	1.0	
239.994	32.5	H	46.0	-13.5	QP	135	1.3	
199.842	28.9	H	43.5	-14.6	QP	125	1.1	
729.012	31.4	V	46.0	-14.6	QP	55	1.0	
233.330	30.9	H	46.0	-15.1	QP	130	1.4	
246.658	30.3	H	46.0	-15.7	QP	300	1.0	
31.959	21.8	V	40.0	-18.2	QP	35	1.1	
363.035	16.4	V	46.0	-29.6	QP	350	1.7	
415.408	15.3	H	46.0	-30.7	QP	15	1.1	

### Run #2: Maximized Readings From Run #1

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
454.886	34.3	V	46.0	-11.7	QP	180	1.0	
239.994	32.5	H	46.0	-13.5	QP	135	1.3	
199.842	28.9	H	43.5	-14.6	QP	125	1.1	
729.012	31.4	V	46.0	-14.6	QP	55	1.0	
233.330	30.9	H	46.0	-15.1	QP	130	1.4	
246.658	30.3	H	46.0	-15.7	QP	300	1.0	



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

### RSS 210 and FCC 15.249 Fundamental Field Strength

#### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/31/2007

Config. Used: 2

Test Engineer: Suhaila Khushzad

Config Change: None

Test Location: SVOATS #1

EUT Voltage: 3.0V DC

#### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Measurements were made with the EUT in a constant transmit mode on the low, center and high channels. Low Channel is #1, Center Channel is #8, High Channel #16

Ambient Conditions: Temperature: 13.9 °C  
Rel. Humidity: 80 %

#### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (Tx Mode)	30 - 1000 MHz - Fundamental Signal Field Strength	FCC Part 15.249	Pass	86.5dB $\mu$ V/m (21134.9 $\mu$ V/m) @ 911.550MHz (-7.5dB)

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

Run # 1: Fundamental On all 3 Channels with all 3 Orientation

Power Setting : -5dBm

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

### Fundamental Signal Field Strength

Frequency	Level	Pol	FCC 15.249		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
921.289	85.2	V	94.0	-8.8	QP	237	1.2	EUT Flat
911.550	85.1	H	94.0	-8.9	QP	118	1.0	EUT Flat
903.018	84.0	H	94.0	-10.0	QP	115	1.0	EUT Flat
921.289	84.0	H	94.0	-10.0	QP	113	1.0	EUT Flat
911.550	83.9	V	94.0	-10.1	QP	137	1.2	EUT Flat
903.018	83.2	V	94.0	-10.8	QP	92	1.4	EUT Flat

Frequency	Level	Pol	FCC 15.249		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
911.550	86.5	V	94.0	-7.5	QP	153	1.0	EUT Upright
921.289	86.1	V	94.0	-7.9	QP	133	1.0	EUT Upright
903.018	85.7	V	94.0	-8.3	QP	149	1.0	EUT Upright
911.550	85.7	H	94.0	-8.3	QP	243	1.0	EUT Upright
903.018	85.0	H	94.0	-9.0	QP	239	1.0	EUT Upright
921.289	82.2	H	94.0	-11.8	QP	250	1.0	EUT Upright

Frequency	Level	Pol	FCC 15.249		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
921.289	84.1	V	94.0	-9.9	QP	52	1.1	EUT on its Side
903.018	84.0	H	94.0	-10.0	QP	291	1.0	EUT on its Side
911.550	82.5	H	94.0	-11.5	QP	294	1.0	EUT on its Side
911.550	82.4	V	94.0	-11.6	QP	168	1.0	EUT on its Side
921.289	81.5	H	94.0	-12.5	QP	199	1.0	EUT on its Side
903.018	81.3	V	94.0	-12.7	QP	156	1.0	EUT on its Side



## *EMC Test Data*

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

## RSS 210 99% Bandwidth Measurements

## Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 2/19/2008 Config. Used: 2  
Test Engineer: Mehran Birgani Config Change: None  
Test Location: Chamber #2 EUT Voltage: 3 V DC

## General Test Configuration

The receiving antenna was put on top of the EUT and the antenna was directly connected to the spectrum analyzer. All measurements were made on a single chain.

All measurements have been corrected to allow for the cable loss.

Ambient Conditions: Temperature: 16.5 °C  
Rel. Humidity: 61 %

## Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	99% Bandwidth	RSS GEN	-	61

## Modifications Made During Testing

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.

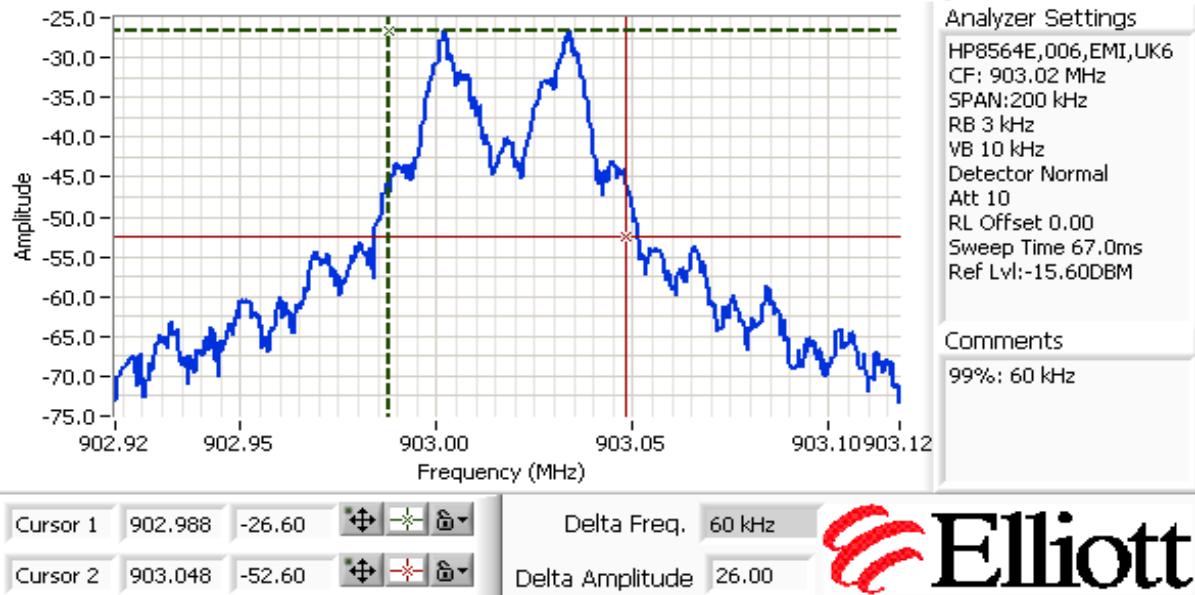
Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

**Run # 1: Signal Bandwidth**

Power Setting : -5dBm, Transmitting PN9 Data

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz)	6dB	99%
-5dB	903.018	3kHz	-	60.0	
-5dB	911.55	3kHz	-	60.0	
-5dB	921.299	3kHz	-	61.0	

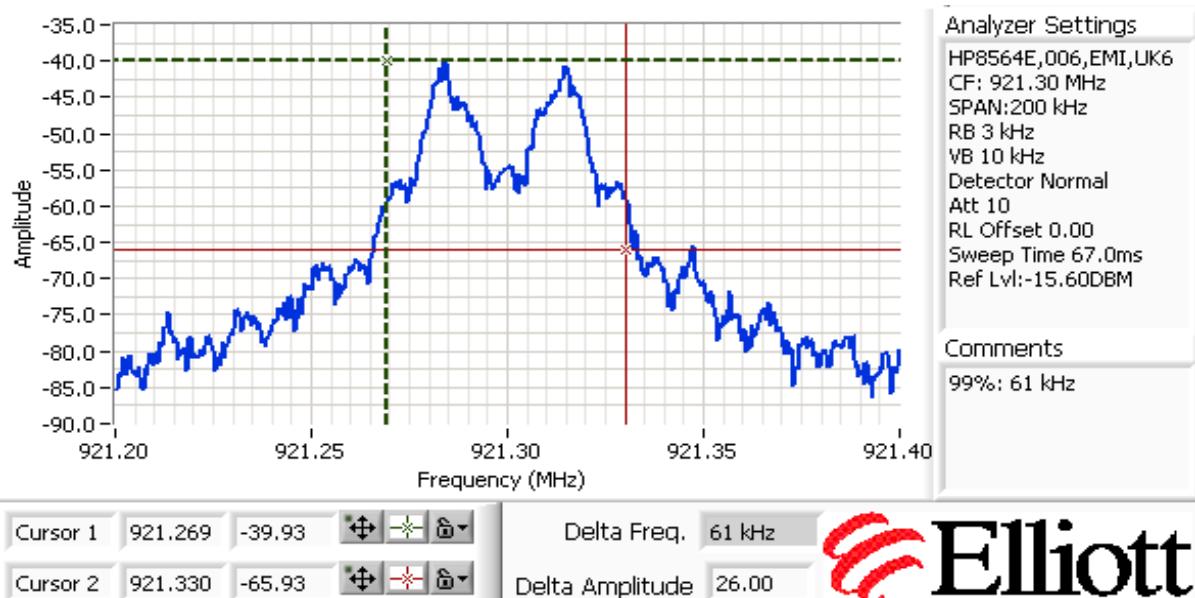
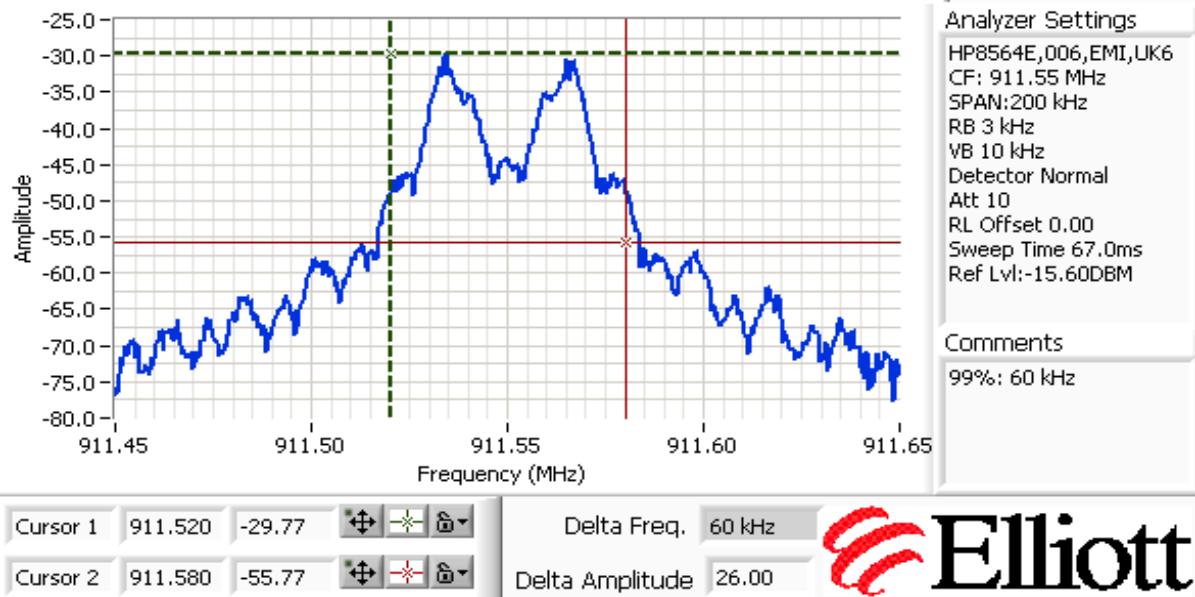
Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB &gt; 1% of the span and VB &gt; 3xRB



Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

Run # 1: Signal Bandwidth

Power Setting : -5dBm, Transmitting PN9 Data





## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210,FCC 15.249/15.209, EN 61326	Class:	N/A

### RSS 210 and FCC 15.249 Radiated Spurious Emissions

#### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/31/2007

Config. Used: 2

Test Engineer: Suhaila Khushzad

Config Change: None

Test Location: SVOATS #1

EUT Voltage: 3.0V DC

#### General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing. Preliminary testing had demonstrated that, for spurious emissions, the upright orientation of the EUT was worst-case.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Measurements were made with the EUT in a constant transmit mode on the low, center and high channels. Low Channel is #1, Center Channel is #8, High Channel #16

Ambient Conditions: Temperature: 13.9 °C  
Rel. Humidity: 80 %

#### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (Tx Mode)	30 - 10000 MHz - Radiated Spurious Emissions	FCC Part 15.209 / 15.249, RSS 210	Pass	41.1dB $\mu$ V/m (113.5 $\mu$ V/m) @ 5527.8MHz (-12.9dB)

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

Run # 1a: Radiated Spurious Emissions, 30 - 10000 MHz. Center Channel @ 911.55 MHz

1 Device in Tx Mode (EUT Up-Right)

Power Setting : -5dBm

### Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.249	Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
1823.150	39.8	V	54.0	-14.2	AVG	90	1.6
5469.230	38.5	H	54.0	-15.5	AVG	175	1.0
9876.920	37.7	H	54.0	-16.3	AVG	360	1.0
9438.620	37.6	H	54.0	-16.4	AVG	359	1.0
7958.150	35.9	H	54.0	-18.1	AVG	0	1.0
1823.170	32.6	H	54.0	-21.4	AVG	192	1.8
2726.090	32.6	H	54.0	-21.4	AVG	3	1.5
2735.950	29.9	V	54.0	-24.1	AVG	149	1.0
9438.620	48.8	H	74.0	-25.2	PK	359	1.0
9876.920	48.8	H	74.0	-25.2	PK	360	1.0
7958.150	47.2	H	74.0	-26.8	PK	0	1.0
5469.230	46.7	H	74.0	-27.3	PK	175	1.0
1823.150	44.3	V	74.0	-29.7	PK	90	1.6
2726.090	42.6	H	74.0	-31.4	PK	3	1.5
1823.170	41.3	H	74.0	-32.7	PK	192	1.8
2735.950	41.2	V	74.0	-32.8	PK	149	1.0

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

Run #1b: Low Channel @ 903.018 MHz

1 Device in Tx Mode (EUT Up-Right)

Power Setting : -5dBm

### Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.249	Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
5418.020	39.5	V	54.0	-14.5	AVG	130	1.7
1805.990	38.5	V	54.0	-15.5	AVG	88	1.0
5417.960	37.9	H	54.0	-16.1	AVG	192	1.9
1806.070	33.0	H	54.0	-21.0	AVG	213	1.1
2709.580	31.9	V	54.0	-22.1	AVG	117	1.5
2708.260	31.7	H	54.0	-22.3	AVG	71	1.5
5418.020	47.3	V	74.0	-26.7	PK	130	1.7
5417.960	46.3	H	74.0	-27.7	PK	192	1.9
2709.580	44.0	V	74.0	-30.0	PK	117	1.5
2708.260	43.8	H	74.0	-30.2	PK	71	1.5
1805.990	42.9	V	74.0	-31.1	PK	88	1.0
1806.070	40.1	H	74.0	-33.9	PK	213	1.1

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

Run #1c: High Channel @ 921.299 MHz

1 Device in Tx Mode (EUT Up-Right)

Power Setting : -5dBm

### Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.249	Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
5527.770	41.1	V	54.0	-12.9	AVG	113	1.8
960.000	30.1	V	46.0	-15.9	QP	175	1.0
5527.930	37.9	H	54.0	-16.1	AVG	174	2.0
960.000	29.7	H	46.0	-16.3	QP	175	1.0
1842.610	36.1	V	54.0	-17.9	AVG	108	1.3
2765.200	33.8	H	54.0	-20.2	AVG	330	1.9
1842.700	33.4	H	54.0	-20.6	AVG	261	1.2
2762.840	31.5	V	54.0	-22.5	AVG	245	1.6
5527.770	48.4	V	74.0	-25.6	PK	113	1.8
5527.930	46.4	H	74.0	-27.6	PK	174	2.0
2765.200	45.1	H	74.0	-28.9	PK	330	1.9
2762.840	43.2	V	74.0	-30.8	PK	245	1.6
1842.700	42.5	H	74.0	-31.5	PK	261	1.2
1842.610	42.3	V	74.0	-31.7	PK	108	1.3

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210,FCC 15.249/15.209, EN 61326	Class:	N/A

### RSS 210/FCC 15.109 Radiated Emissions (Receive-Mode)

#### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/31/2007

Config. Used: 2

Test Engineer: Rafael Varelas

Config Change: None

Test Location: SVOATS #1

EUT Voltage: 3.0V DC

#### General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing. Preliminary testing had demonstrated that, for spurious emissions, the upright orientation of the EUT was worst-case.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions: Temperature: 13.9 °C  
Rel. Humidity: 80 %

#### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	RE, 30 - 3000 MHz - Rx Mode	FCC Part 15.109 / RSS 210	Pass	32.5dB $\mu$ V/m (42.2 $\mu$ V/m) @ 280.000MHz (-13.5dB)

#### Modifications Made During Testing

No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.



## EMC Test Data

Client:	Animas Corporation	Job Number:	J69625
Model:	Io Meter/Controller	T-Log Number:	T69763
Contact:	Amy Smith	Account Manager:	Richard Gencev
Standard:	RSS 210, FCC 15.249/15.209, EN 61326	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 3000 MHz.

Run #1a: Low Channel @ 903.018 MHz

Frequency	Level	Pol	15.209 / 15.249		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
280.006	31.2	V	46.0	-14.8	QP	215	1.7	
280.006	29.7	H	46.0	-16.3	QP	355	1.6	
260.007	29.4	V	46.0	-16.6	QP	350	1.0	
260.007	25.4	H	46.0	-20.6	QP	160	1.0	
246.658	21.3	H	46.0	-24.7	QP	120	1.5	
246.658	17.9	V	46.0	-28.1	QP	255	1.0	

Run #1b: Center Channel @ 911.55 MHz

Frequency	Level	Pol	15.209 / 15.249		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
280.000	32.5	H	46.0	-13.5	QP	280	1.7	
260.000	30.4	V	46.0	-15.6	QP	145	1.0	
280.000	30.2	V	46.0	-15.8	QP	10	1.5	
260.000	27.7	H	46.0	-18.3	QP	340	1.8	
246.658	18.4	H	46.0	-27.6	QP	325	1.2	
246.658	16.6	V	46.0	-29.4	QP	4	1.6	

Run #1c: High Channel @ 921.299 MHz

Frequency	Level	Pol	15.209 / 15.249		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
255.014	31.6	V	46.0	-14.4	QP	275	1.1	
255.014	30.7	H	46.0	-15.3	QP	85	1.3	
281.016	30.4	H	46.0	-15.6	QP	35	1.1	
281.016	28.3	V	46.0	-17.7	QP	220	1.3	
248.012	26.1	H	46.0	-19.9	QP	215	1.3	
248.012	21.5	V	46.0	-24.5	QP	60	1.0	