Ventana Medical Systems, Inc.

Symphony Slide Staining System RFID

EMC Test Report

March 15, 2006

Report No. VENT0023

Report Prepared By

NORTHWEST EMC

www.nwemc.com
1-888-EMI-CERT

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: March 15, 2006
Ventana Medical Systems, Inc.
Model: Symphony Slide Staining System RFID

Emissions				
Test Description	**Specification**	**Test Method**	**Pass**	**Fail**
Radiated Spurious Emissions	FCC 15.209(a):2005-9	ANSI C63.4:2003	☒	☐
Conducted Emissions	FCC 15.107 Class B:2005-10	ANSI C63.4:2003	☒	☐
Field Strength of Fundamental	FCC 15.225(a) Field Strength of Fundamental:2005-9	ANSI C63.4:2003	☒	☐
Frequency Stability	FCC 15.225(c) Frequency Stability:2005-9	ANSI C63.4:2003	☒	☐

Modifications made to the product
See the Modifications section of this report

Test Facility

The measurement facilities used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066
Fax: 844-3826

Northwest EMC, Inc.
41 Tesla; Irvine, CA 91618
Phone: (949) 861-8918
Fax: 861-8923

These site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Dean Ghizzone, President

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0

Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.

CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

TÜV Product Service: Included in TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories, available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV's CARAT Program requirements. Certificate No. USA0401C.

TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.

NEMKO: 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).

Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment, Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.

Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

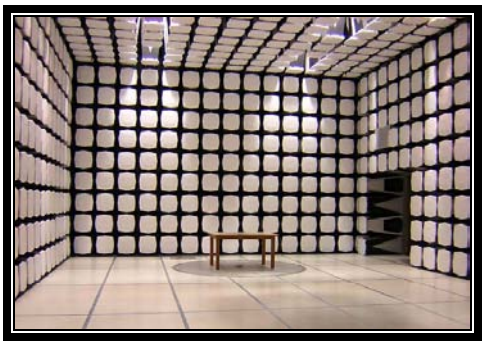
VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071 and R-1025, Irvine: C-2094 and R-1943, Sultan: R-871, C-1784 and R-1761).*

BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.

GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

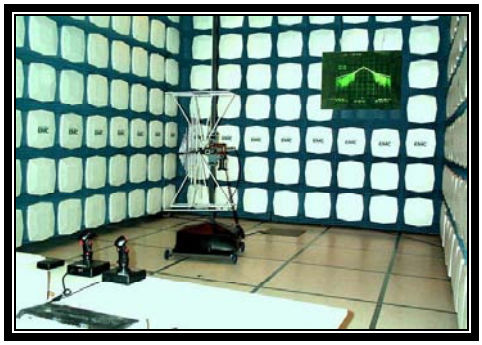
SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/scope.asp



California – Orange County Facility
Labs OC01 – OC13

41 Tesla Ave. Irvine, CA 92618
(888) 364-2378 Fax: (503) 844-3826



Oregon – Evergreen Facility
Labs EV01 – EV10

22975 NW Evergreen Pkwy. Suite 400 Hillsboro, OR 97124
(503) 844-4066 Fax: (503) 844-3826

Washington – Sultan Facility
Labs SU01 – SU07

14128 339th Ave. SE Sultan, WA 98294
(888) 364-2378

Party Requesting the Test	
Company Name:	Ventana Medical Systems, Inc.
Address:	1910 E. Innovation Park Drive
City, State, Zip:	Tucson, AZ 85737
Test Requested By:	Bill Richards
Model:	Symphony Slide Staining System RFID
First Date of Test:	January 20, 2006
Last Date of Test:	March 08, 2006
Receipt Date of Samples:	January 20, 2006
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	13.56MHz

Functional Description of the EUT (Equipment Under Test):

High Volume Tissue Slide Staining System

Client Justification for EUT Selection:

The product is a representative production sample.

Client Justification for Test Selection:

RFID radio operating at 13.56 MHz. Installed in a slide staining system. Uses up to 16 antennas that can be grouped into 3 different types. That consists of the Multiplexed Antenna, the Coverslipper Antenna and the Limonene Antenna. The Multiplexed Antenna can be used in one of two configurations, the Reagent Drawer Board A, or the Reagent Drawer Board B. Both configurations of the Multiplexed Antenna were tested. Seeking TCB certification under 15.225. The highest gain of each type of antenna, and the lowest gain antenna was tested.

EUT Photo

CONFIGURATION 1 VENT0023

Software/Firmware Running during test	
Description	**Version**
Secura Key - eTag Host	**3.08**

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Symphony Slide Staining System RFID	Ventana Medical Systems, Inc.	Beta #1	16
RFID module	Secura Key	unknown	none

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Cover Slipper Antenna	Ventana Medical Systems, Inc.	2137500	none
Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)	Ventana Medical Systems, Inc.	2217100	none
Multiplexed Antenna - Reagent Drawer Board B (Antenna 16)	Ventana Medical Systems, Inc.	2137000	none
PCB Limonene Antenna (Antenna 21)	Ventana Medical Systems, Inc.	2142300	none

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Mains	PA	2.0m	No	Symphony Slide Staining System RFID	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 VENT0023

Software/Firmware Running during test	
Description	**Version**
Secura Key - eTag Host	**3.08**

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Symphony Slide Staining System RFID	Ventana Medical Systems, Inc.	Beta #1	16
RFID module	Secura Key	unknown	none

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
PCB Limonene Antenna	Ventana Medical Systems, Inc.	2142300	none

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Remote Test PC	Gateway	EV06 Lab PC	n/a

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Mains	PA	2.0m	No	Symphony Slide Staining System RFID	AC Mains
Antenna cable	Yes	0.85m	No	PCB Limonene Antenna	adapter cable
Adapter cable	Yes	0.45m	No	Antenna Cable	RFID module
Data and Power cable	No	0.6m	No	RFID module	Serial cable and DC leads
Serial cable	Yes	3.0m	No	Data and Power Cable	Remote Test PC
DC Leads	No	1.5m	No	Data and Power Cable	DC Power Supply
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	1/20/2006	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	1/20/2006	Field Strength of Spurious Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	1/23/2006	Verification Radiated Emissions for Integral Receiver	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	1/23/2006	Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	3/3/2006	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Schedule testing was completed.

RADIATED SPURIOUS EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION
Continuous Carrier Test Mode

MODE USED FOR FINAL DATA
Continuous Carrier Test Mode

ANTENNAS TESTED
Cover Slipper Antenna
Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)
Multiplexed Antenna - Reagent Drawer Board B (Antenna 16)
Limonene Antenna (Antenna 21)

ANTENNA USED FOR FINAL DATA
Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)

POWER SETTINGS INVESTIGATED
230VAC/50Hz

POWER SETTINGS USED FOR FINAL DATA
230VAC/50Hz

FREQUENCY RANGE INVESTIGATED			
Start Frequency	150 kHz	Stop Frequency	1000MHz

SAMPLE CALCULATIONS
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Loop	EMCO	6502	AOA	5/4/2005	24
Antenna, Biconilog	EMCO	3142	AXK	7/31/2005	24
Pre-Amplifier	Miteq	AM-1551	AOX	8/2/2005	13
Spectrum Analyzer	Agilent	E4443A	AAR	6/9/2005	12

MEASUREMENT BANDWIDTHS				
	Frequency Range	**Peak Data**	**Quasi-Peak Data**	**Average Data**
	(MHz)	**(kHz)**	**(kHz)**	**(kHz)**
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

NORTHWEST EMC

RADIATED SPURIOUS EMISSIONS DATA SHEET

ACQ-2006.01.20
EMI 2005.9.18

EUT:	Symphony Slide Staining System RFID	Work Order:	VENT0023
Serial Number:	16, Beta #1	Date:	01/23/06
Customer:	Ventana Medical Systems, Inc.	Temperature:	20
Attendees:	None	Humidity:	25%
Project:	None	Barometric Pres.:	30.077
Tested by:	Jonathan Peng	Power: 230VAC/50Hz	Job Site: OC08

TEST SPECIFICATIONS	Test Method
FCC 15.209(a):2005-9	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS

Multiplexed Antenna - Reagent Drawer Board A (Antenna 10); RF Transmitter Modulation On; Harmonics of 13.56 MHz, up to 10th harmonic.

EUT OPERATING MODES

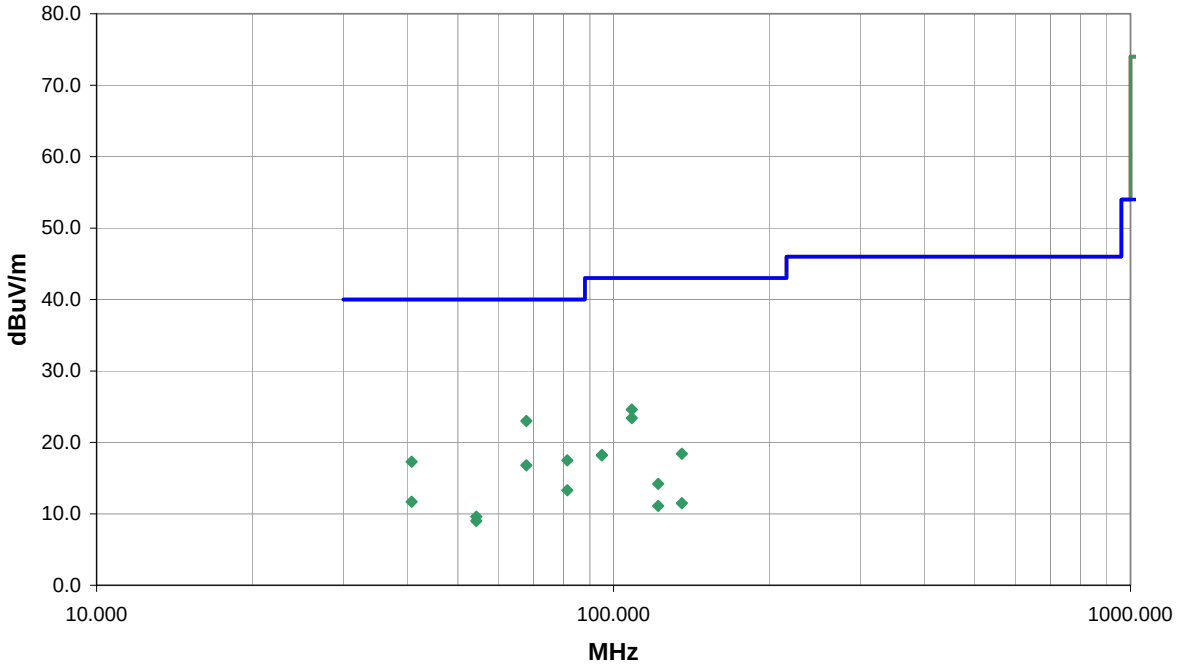
Continuous Carrier Test Mode

DEVIATIONS FROM TEST STANDARD

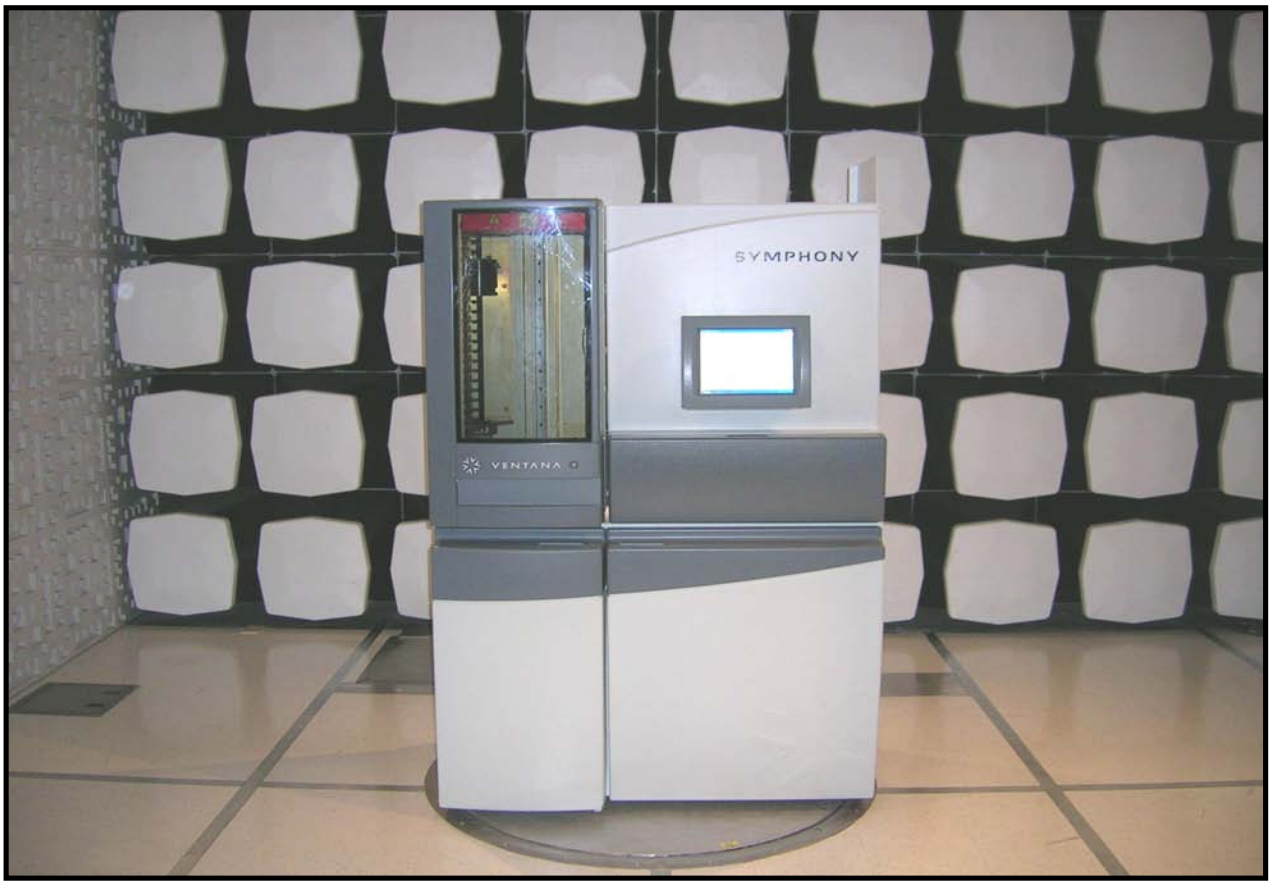
No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
67.800	31.2	-8.2	316.0	2.0	3.0	0.0	H-Bilog	QP	0.0	23.0	40.0	-17.0
108.480	31.3	-6.7	349.0	1.0	3.0	0.0	V-Bilog	QP	0.0	24.6	43.0	-18.4
108.480	30.1	-6.7	4.0	1.0	3.0	0.0	H-Bilog	QP	0.0	23.4	43.0	-19.6
81.360	25.2	-7.7	347.0	1.0	3.0	0.0	V-Bilog	QP	0.0	17.5	40.0	-22.5
40.680	19.9	-2.6	33.0	1.0	3.0	0.0	V-Bilog	QP	0.0	17.3	40.0	-22.7
67.800	25.0	-8.2	336.0	2.2	3.0	0.0	V-Bilog	QP	0.0	16.8	40.0	-23.2
135.600	25.8	-7.4	27.0	1.0	3.0	0.0	H-Bilog	QP	0.0	18.4	43.0	-24.6
94.920	24.7	-6.5	1.0	1.8	3.0	0.0	H-Bilog	QP	0.0	18.2	43.0	-24.8
94.920	24.7	-6.5	8.0	1.0	3.0	0.0	V-Bilog	QP	0.0	18.2	43.0	-24.8
81.360	21.0	-7.7	349.0	1.0	3.0	0.0	H-Bilog	QP	0.0	13.3	40.0	-26.7
40.680	14.3	-2.6	354.0	1.0	3.0	0.0	H-Bilog	QP	0.0	11.7	40.0	-28.3
122.040	21.7	-7.5	338.0	1.0	3.0	0.0	V-Bilog	QP	0.0	14.2	43.0	-28.8
54.240	16.5	-6.9	326.0	3.2	3.0	0.0	H-Bilog	QP	0.0	9.6	40.0	-30.4
54.240	15.9	-6.9	359.0	3.5	3.0	0.0	V-Bilog	QP	0.0	9.0	40.0	-31.0
135.600	18.9	-7.4	343.0	2.7	3.0	0.0	V-Bilog	QP	0.0	11.5	43.0	-31.5
122.040	18.6	-7.5	6.0	1.0	3.0	0.0	H-Bilog	QP	0.0	11.1	43.0	-31.9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CONDUCTED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Continuous Carrier Test Mode

POWER SETTINGS INVESTIGATED

230VAC/50Hz

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIC	2/16/2005	13
Receiver	Schaffner	SCR 3101	ARC	5/4/2005	13
Spectrum Analyzer	Hewlett Packard	8593E	AAP	12/21/2005	13

MEASUREMENT BANDWIDTHS

	Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

NORTHWEST EMC

CONDUCTED EMISSIONS DATA SHEET

ACQ-2006.01.20
EMI 2005.9.18

EUT:	Symphony Slide Staining System RFID			Work Order:	VENT0023
Serial Number:	16, Beta #1			Date:	01/23/06
Customer:	Ventana Medical Systems, Inc.			Temperature:	20
Attendees:	None			Humidity:	25%
Project:	None			Barometric Pres.:	30.077
Tested by:	Jonathan Peng	Power:	230VAC/50Hz	Job Site:	OC08

TEST SPECIFICATIONS	Test Method
FCC 15.107 Class B:2005-10	ANSI C63.4:2003

TEST PARAMETERS	
Cable or Line Tested	L1

COMMENTS

Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)

EUT OPERATING MODES

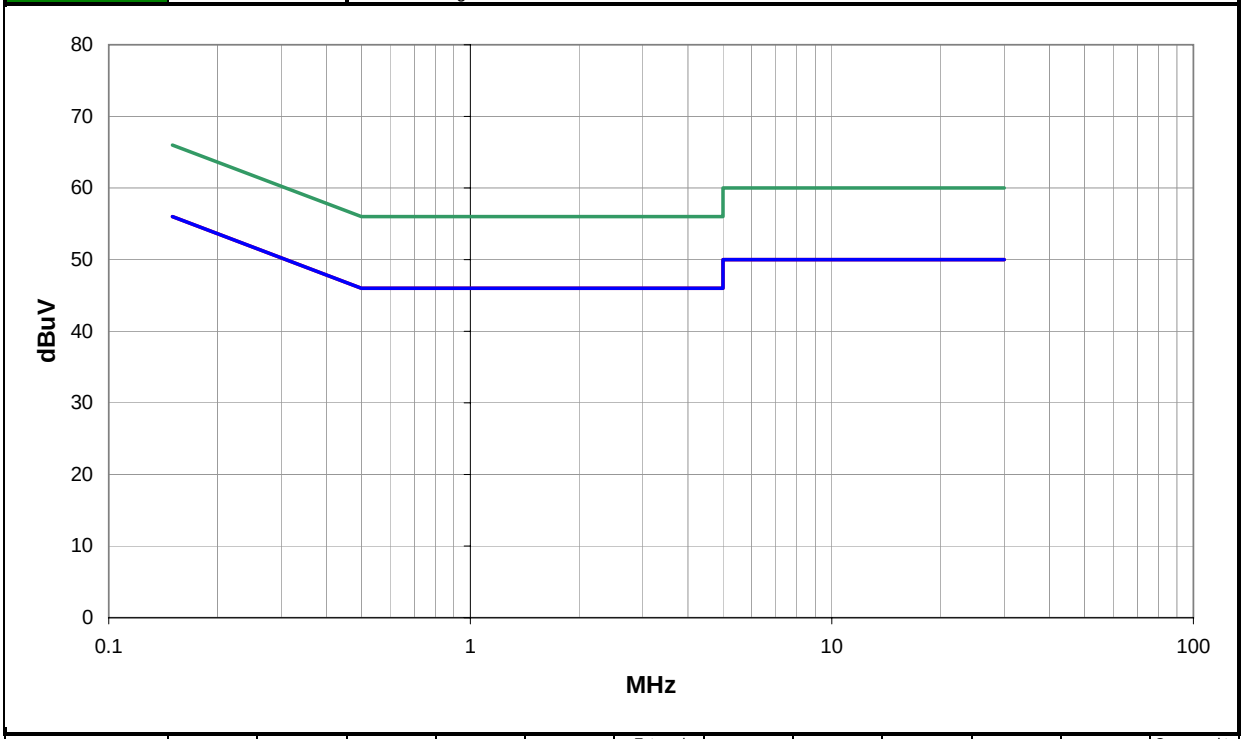
Continuous Carrier Test Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)

No emissions attributed to the Transmitter operation were observed above the noise floor.

NORTHWEST
EMC

CONDUCTED EMISSIONS DATA SHEET

ACQ-2006.01.20
EMI 2005.9.18

EUT:	Symphony Slide Staining System RFID			**Work Order:**	VENT0023
Serial Number:	16, Beta #1			**Date:**	01/23/06
Customer:	Ventana Medical Systems, Inc.			**Temperature:**	20
Attendees:	None			**Humidity:**	25%
Project:	None			**Barometric Pres.:**	30.077
Tested by:	Jonathan Peng	**Power:**	230VAC/50Hz	**Job Site:**	OC08

TEST SPECIFICATIONS	Test Method
FCC 15.107 Class B:2005-10	ANSI C63.4:2003

TEST PARAMETERS	
Cable or Line Tested	N

COMMENTS

Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)

EUT OPERATING MODES

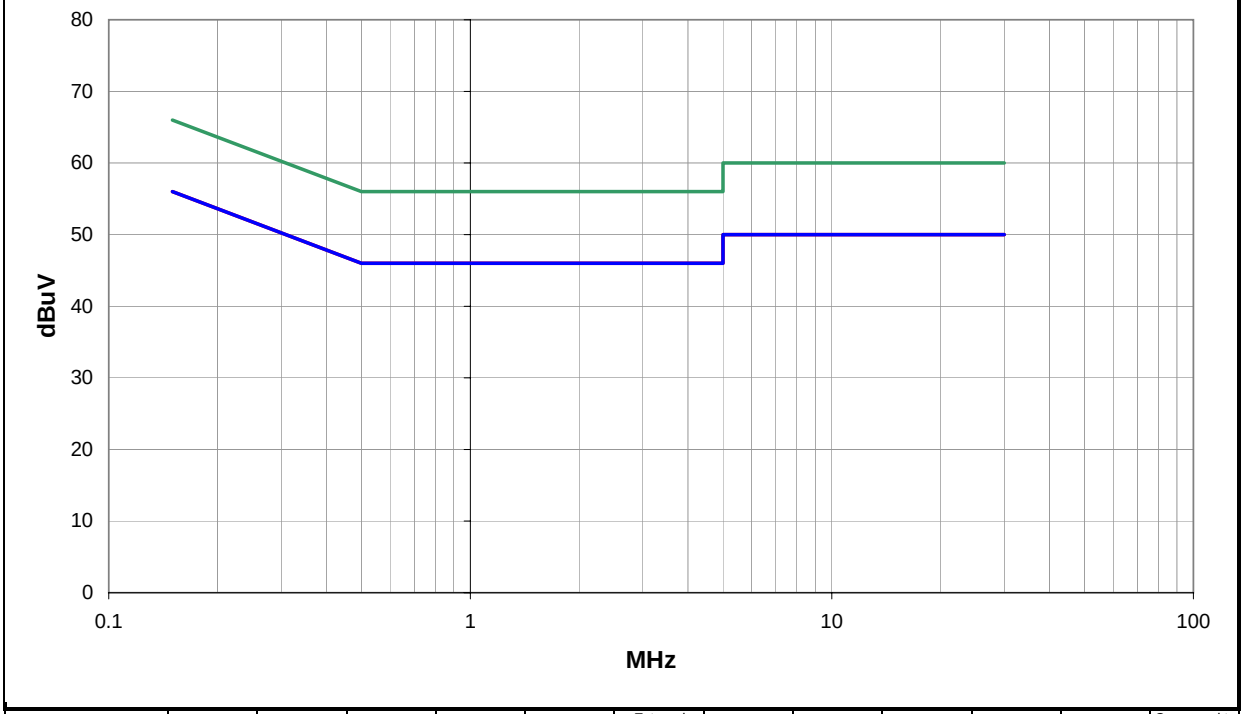
Continuous Carrier Test Mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	5
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)		Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)

No emissions attributed to the Transmitter operation were observed above the noise floor.


SYMPHONY
VENTANA


SYMPHONY
VENTANA

FIELD STRENGTH OF FUNDAMENTAL

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION
Continuos Carrier test mode

MODE USED FOR FINAL DATA
Continuos Carrier test mode

POWER SETTINGS INVESTIGATED
230VAC/50Hz

ANTENNAS USED FOR FINAL DATA
Cover Slipper Antenna
Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)
Multiplexed Antenna - Reagent Drawer Board B (Antenna 16)
Limonene Antenna (Antenna 21)

FREQUENCY RANGE INVESTIGATED			
Start Frequency	13.553 MHz	Stop Frequency	13.567 MHz

SAMPLE CALCULATIONS
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Loop	EMCO	6502	AOA	5/4/2005	24
Spectrum Analyzer	Agilent	E4443A	AAR	6/9/2005	12

MEASUREMENT BANDWIDTHS				
	Frequency Range	**Peak Data**	**Quasi-Peak Data**	**Average Data**
	(MHz)	**(kHz)**	**(kHz)**	**(kHz)**
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003).

The EUT had only one frequency channel available, it was therefore tested only at that frequency. Due to the low level emissions, as specified in CFR 47, Section 15.31(f)(2), measurements were made at a closer distance. The test results were then extapolated, as specified, by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

NORTHWEST EMC

FIELD STRENGTH OF FUNDAMENTAL DATA SHEET

PSA 2006.01.05
EMI 2006.1.16

EUT:	Symphony Slide Staining System RFID			Work Order:	VENT0023
Serial Number:	16, Beta #1			Date:	01/20/06
Customer:	Ventana Medical Systems, Inc.			Temperature:	22
Attendees:	None			Humidity:	30%
Project:	None			Barometric Pres.:	30.27
Tested by:	Jaemi SUh	Power:	230VAC/50Hz	Job Site:	OC08

TEST SPECIFICATIONS	Test Method
FCC 15.225(a) Field Strength of Fundamental:2005-9	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	2

COMMENTS

Cover Slipper Antenna

EUT OPERATING MODES

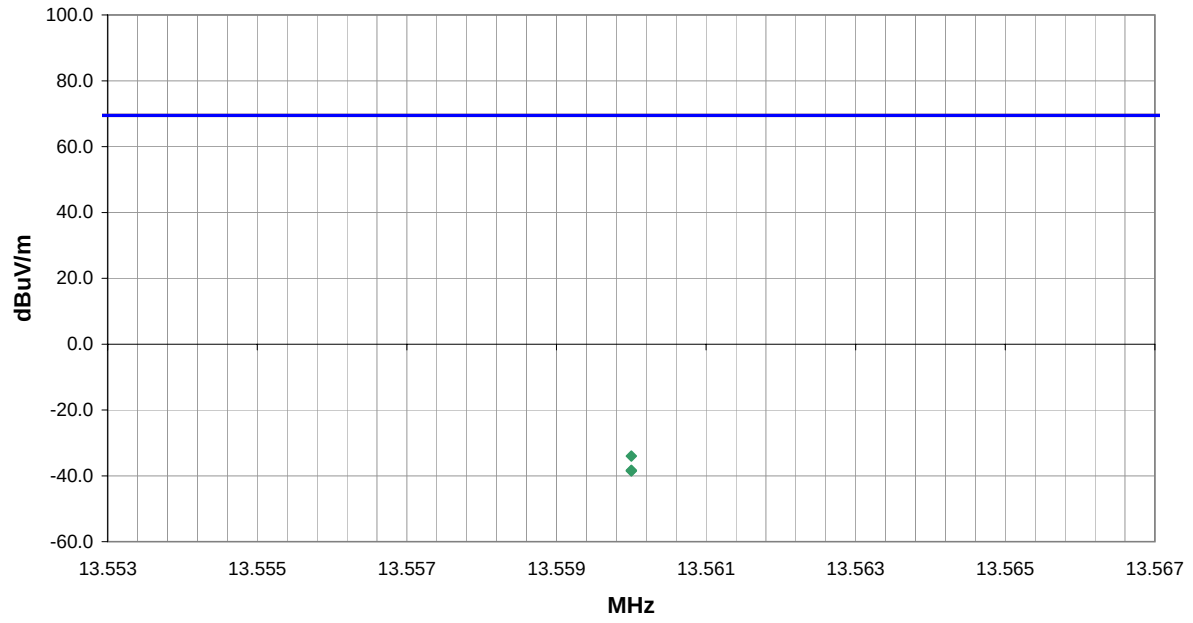
Continuos Carrier test mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
13.560	2.3	10.7	107.0	1.0	2.0	0.0	Z-Axis	QP	-47.0	-34.0	84.0	-118.0
13.560	-2.2	10.7	172.0	1.7	2.0	0.0	Y-Axis	QP	-47.0	-38.5	84.0	-122.5
13.560	-2.0	10.7	173.0	1.2	2.0	0.0	X-Axis	QP	-47.0	-38.3	84.0	-122.3

NORTHWEST EMC

FIELD STRENGTH OF FUNDAMENTAL DATA SHEET

PSA 2006.01.05
EMI 2006.1.16

EUT:	Symphony Slide Staining System RFID			Work Order:	VENT0023
Serial Number:	16, Beta #1			Date:	01/20/06
Customer:	Ventana Medical Systems, Inc.			Temperature:	22
Attendees:	None			Humidity:	30%
Project:	None			Barometric Pres.:	30.27
Tested by:	Jaemi SUh	Power:	230VAC/50Hz	Job Site:	OC08

TEST SPECIFICATIONS	Test Method
FCC 15.225(a) Field Strength of Fundamental:2005-9	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	2

COMMENTS

Multiplexed Antenna - Reagent Drawer Board A (Antenna 10)

EUT OPERATING MODES

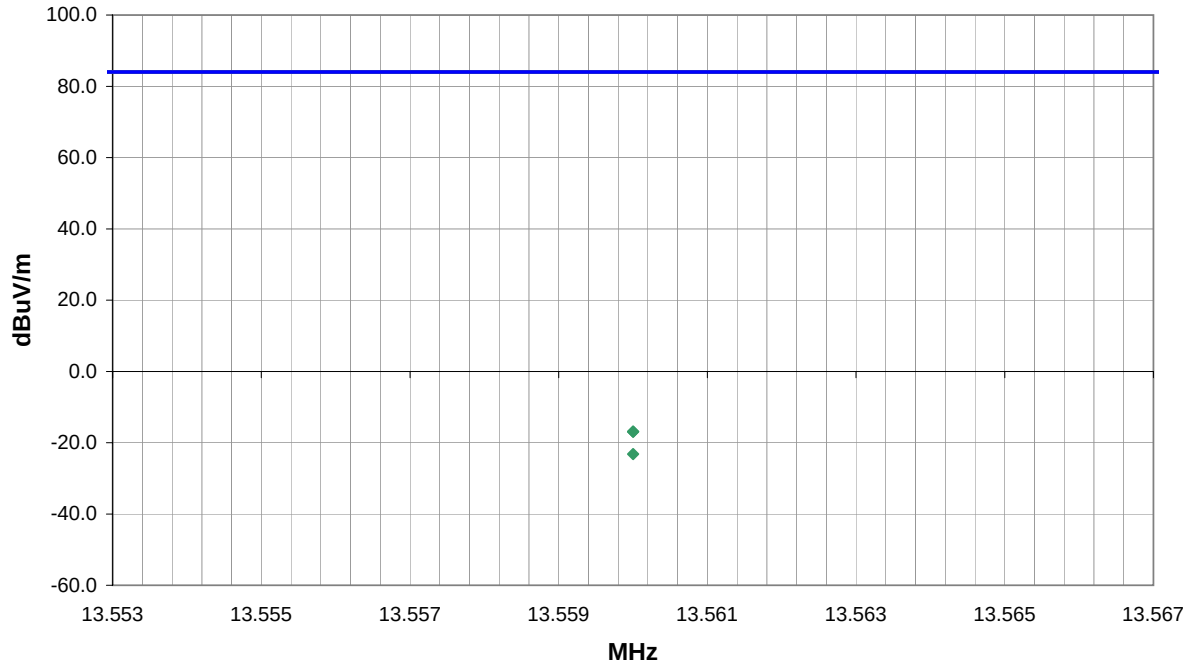
Continuos Carrier test mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
13.560	19.4	10.7	197.0	1.0	2.0	0.0	Y-Axis	QP	-47.0	-16.9	84.0	-100.9
13.560	19.4	10.7	203.0	1.0	2.0	0.0	Z-Axis	QP	-47.0	-16.9	84.0	-100.9
13.560	13.1	10.7	167.0	1.0	2.0	0.0	X-Axis	QP	-47.0	-23.2	84.0	-107.2

NORTHWEST EMC

FIELD STRENGTH OF FUNDAMENTAL DATA SHEET

PSA 2006.01.05
EMI 2006.1.16

EUT:	Symphony Slide Staining System RFID			Work Order:	VENT0023
Serial Number:	16, Beta #1			Date:	01/20/06
Customer:	Ventana Medical Systems, Inc.			Temperature:	22
Attendees:	None			Humidity:	30%
Project:	None			Barometric Pres.:	30.27
Tested by:	Jaemi SUh	Power:	230VAC/50Hz	Job Site:	OC08

TEST SPECIFICATIONS	Test Method
FCC 15.225(a) Field Strength of Fundamental:2005-9	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	2

COMMENTS

Limonene Antenna (Antenna 21)

EUT OPERATING MODES

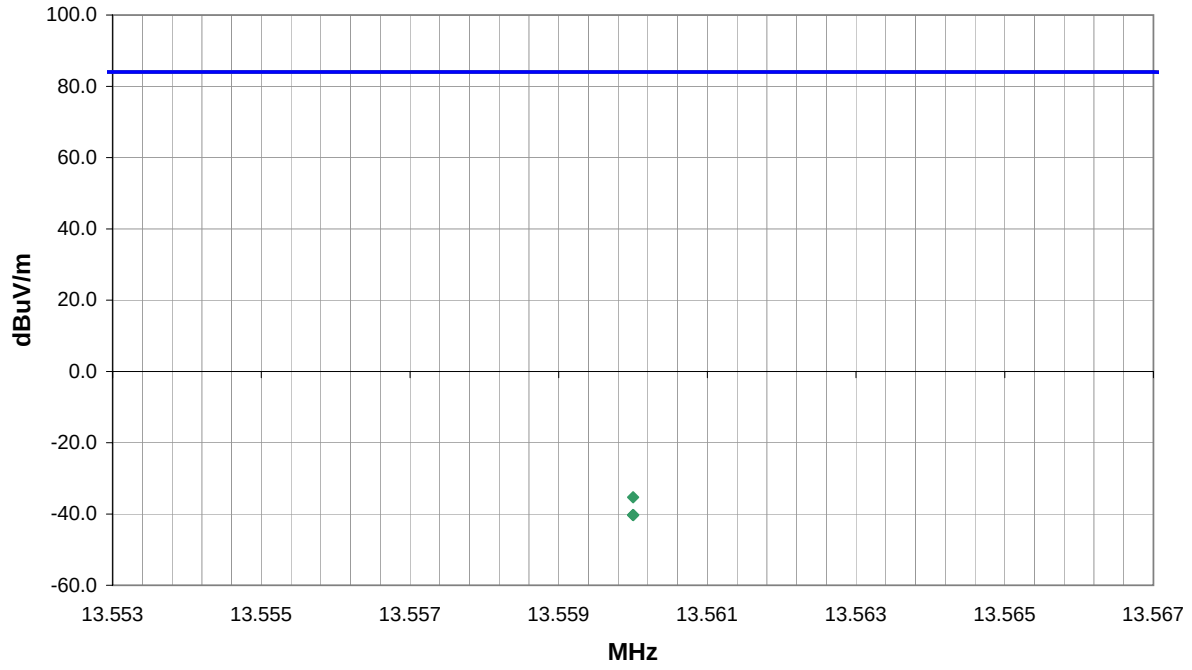
Continuos Carrier test mode

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
13.560	1.0	10.7	57.0	1.6	2.0	0.0	Z-Axis	QP	-47.0	-35.3	84.0	-119.3
13.560	-4.0	10.7	77.0	1.0	2.0	0.0	Y-Axis	QP	-47.0	-40.3	84.0	-124.3
13.560	-4.0	10.7	50.0	2.2	2.0	0.0	X-Axis	QP	-47.0	-40.3	84.0	-124.3

NORTHWEST EMC

FIELD STRENGTH OF FUNDAMENTAL DATA SHEET

PSA 2006.01.05
EMI 2006.1.16

EUT:	Symphony Slide Staining System RFID			Work Order:	VENT0023
Serial Number:	16, Beta #1			Date:	01/20/06
Customer:	Ventana Medical Systems, Inc.			Temperature:	22
Attendees:	None			Humidity:	30%
Project:	None			Barometric Pres.:	30.27
Tested by:	Jaemi Suh	Power:	230VAC/50Hz	Job Site:	OC08

TEST SPECIFICATIONS	Test Method
FCC 15.225(a) Field Strength of Fundamental:2005-9	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	2

COMMENTS

Multiplexed Antenna - Reagent Drawer Board B (Antenna 16)

EUT OPERATING MODES

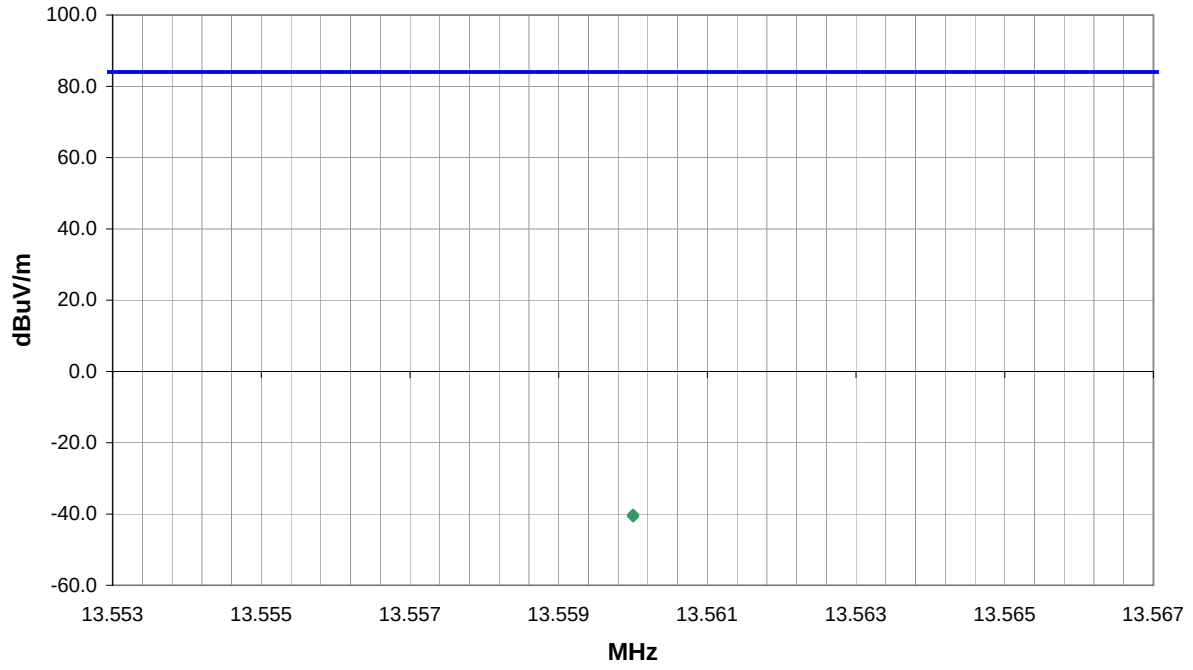
Continuos Carrier test mode

DEVIATIONS FROM TEST STANDARD

No deviations.

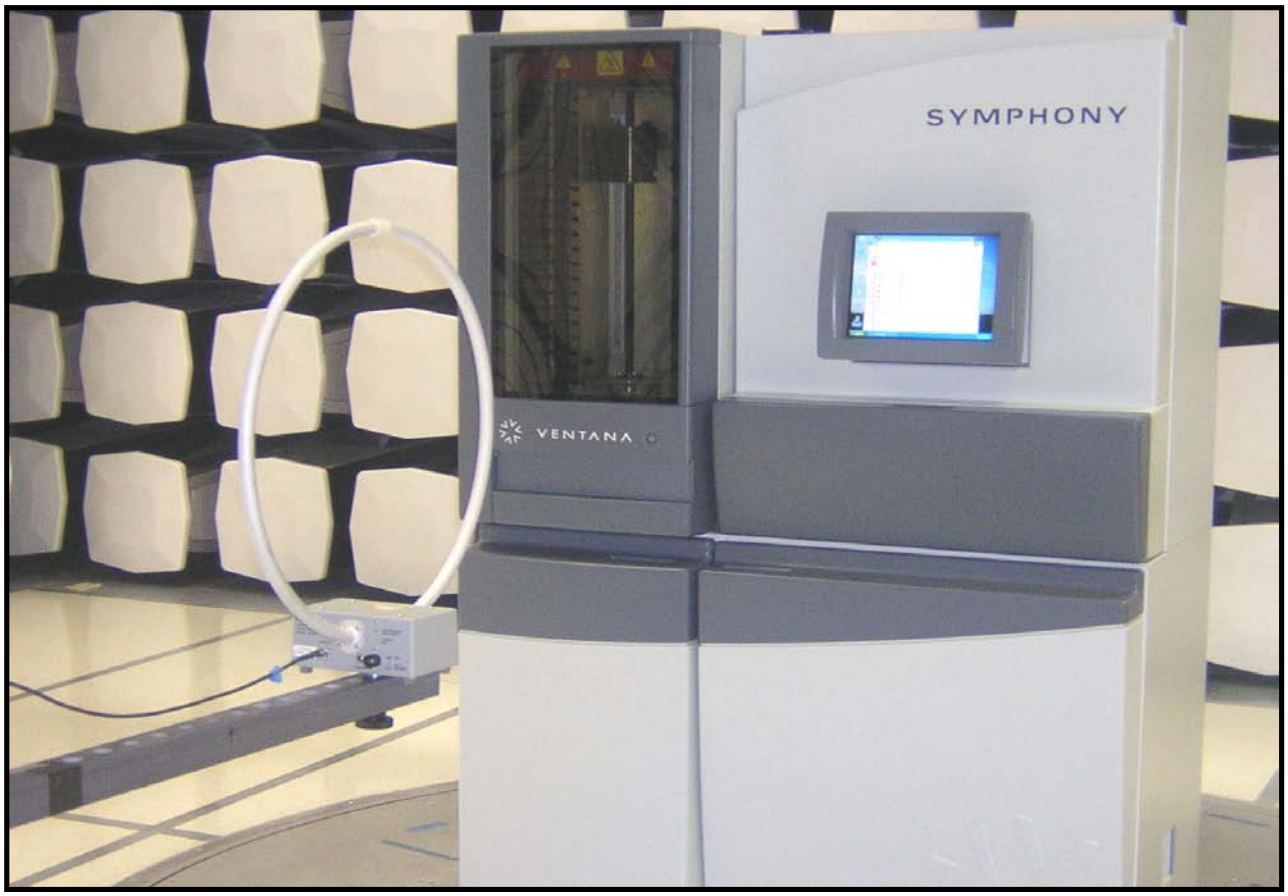
Run #	2
Configuration #	1
Results	Pass

Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
13.560	-3.9	10.7	68.0	1.0	2.0	0.0	Y-Axis	QP	-47.0	-40.2	84.0	-124.2
13.560	-4.0	10.7	62.0	1.0	2.0	0.0	Z-Axis	QP	-47.0	-40.3	84.0	-124.3
13.560	-4.4	10.7	68.0	1.0	2.0	0.0	X-Axis	QP	-47.0	-40.7	84.0	-124.7

FIELD STRENGTH OF FUNDAMENTAL


SYMPHONY
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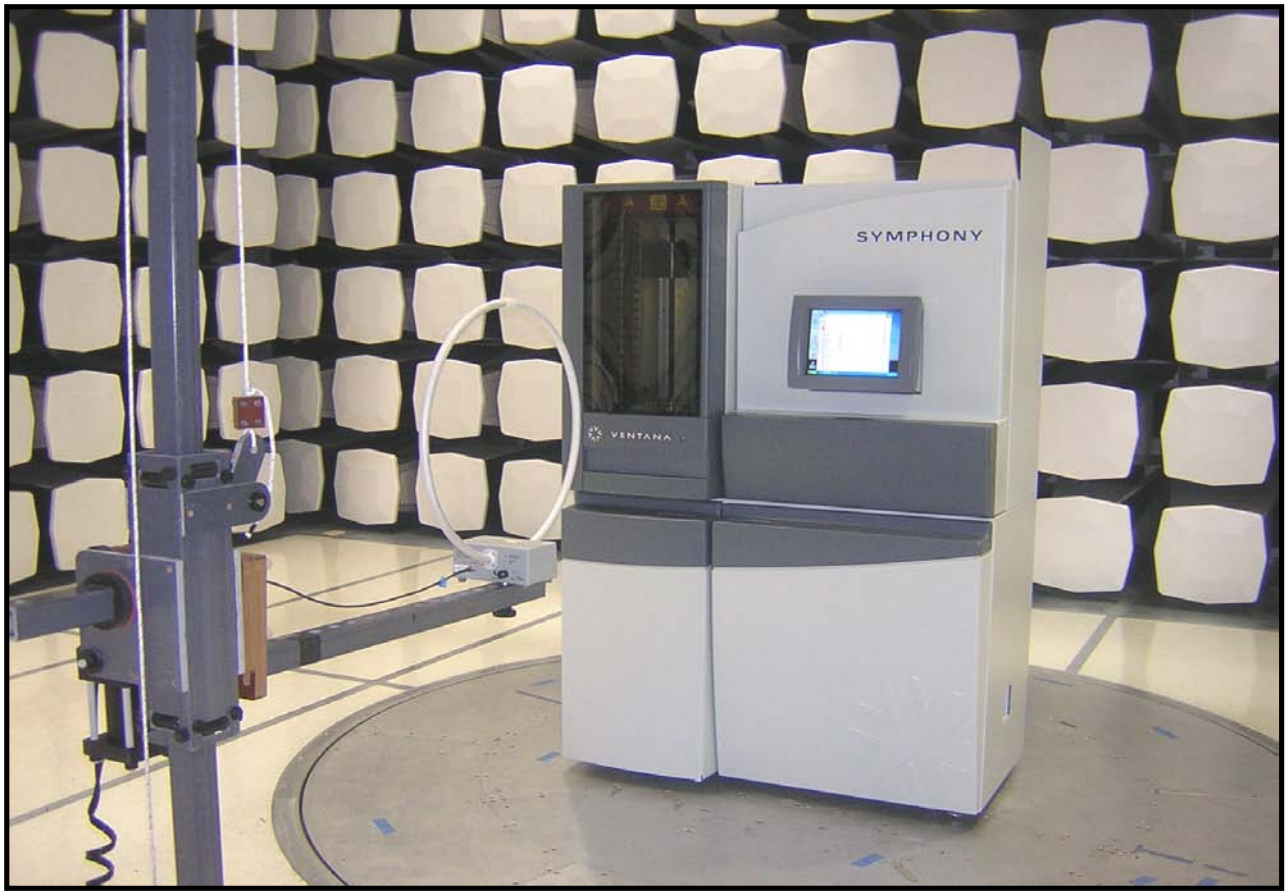
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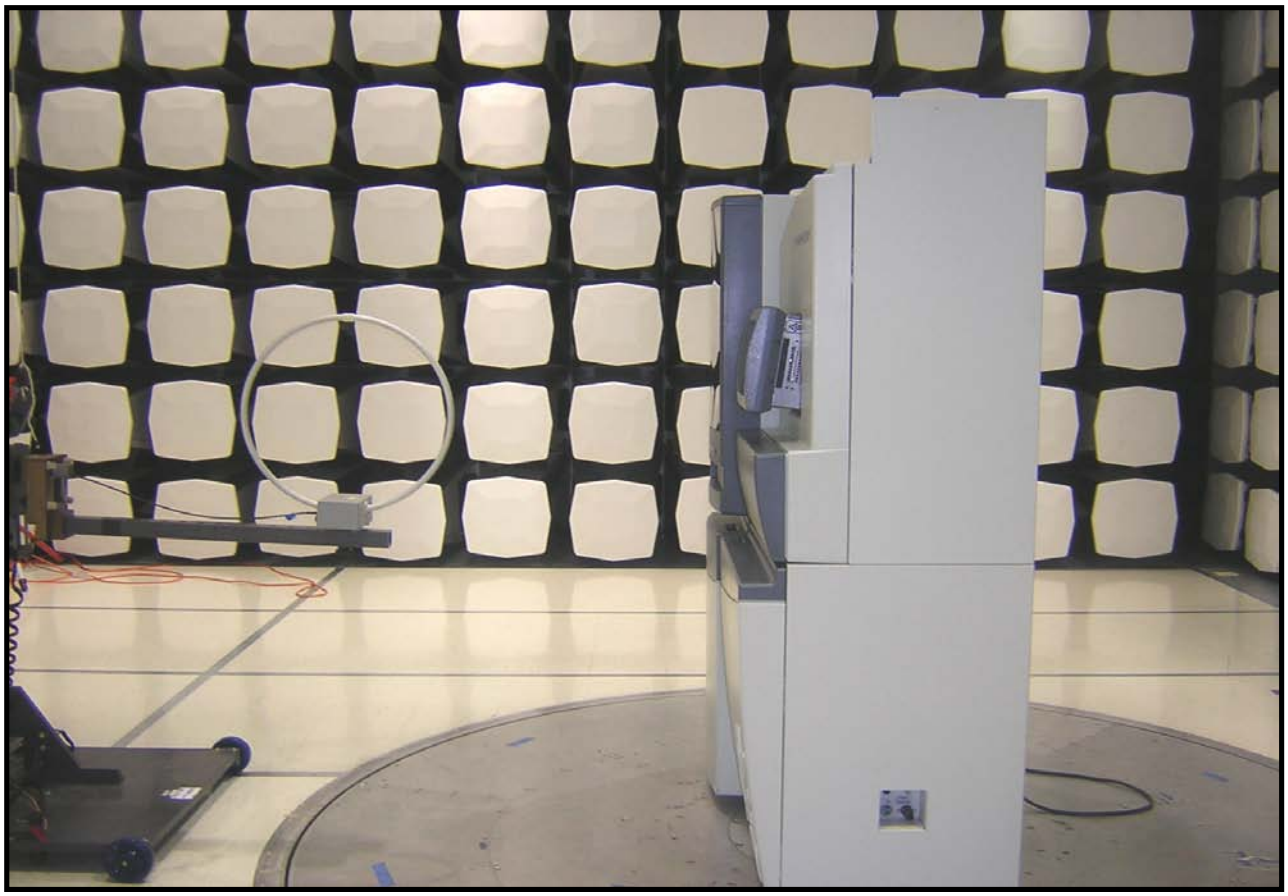
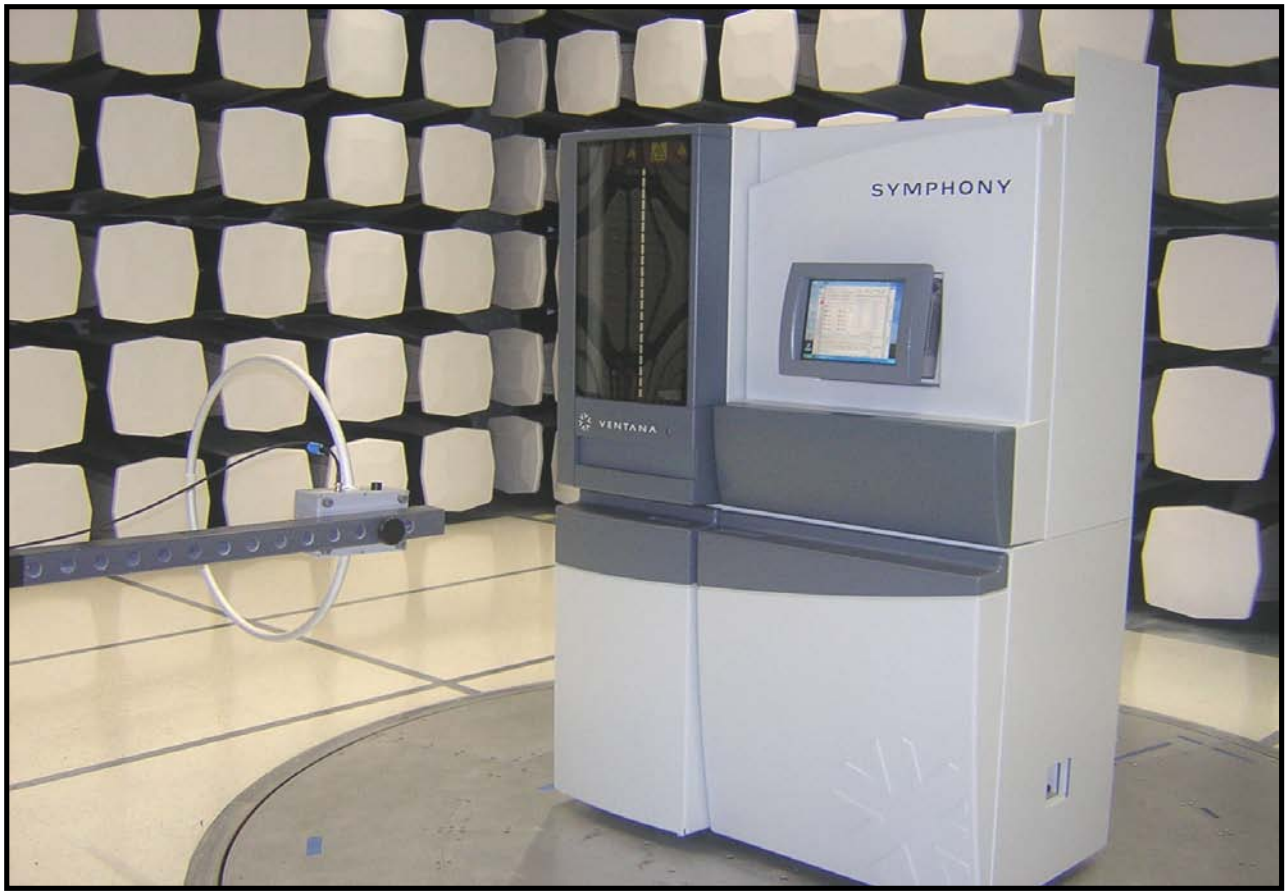
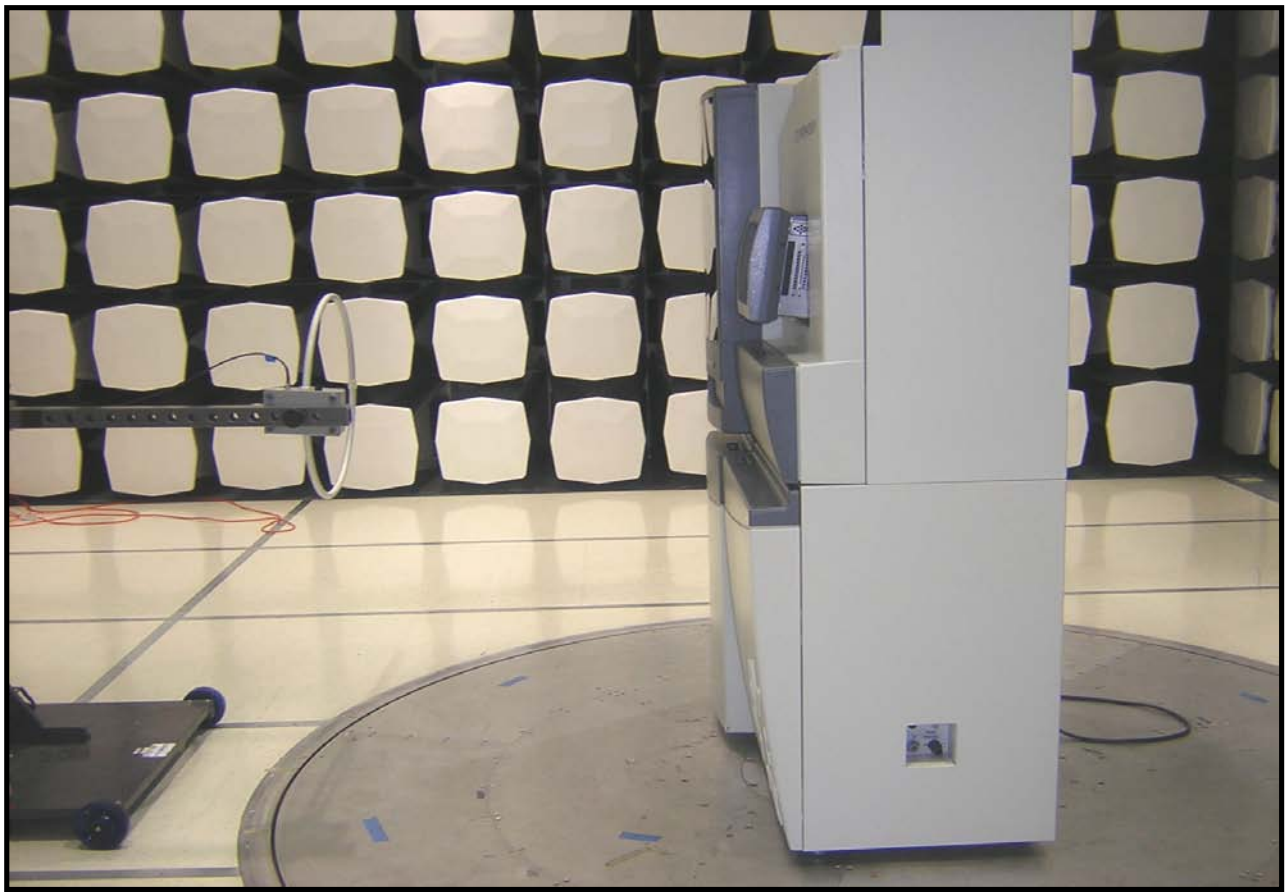
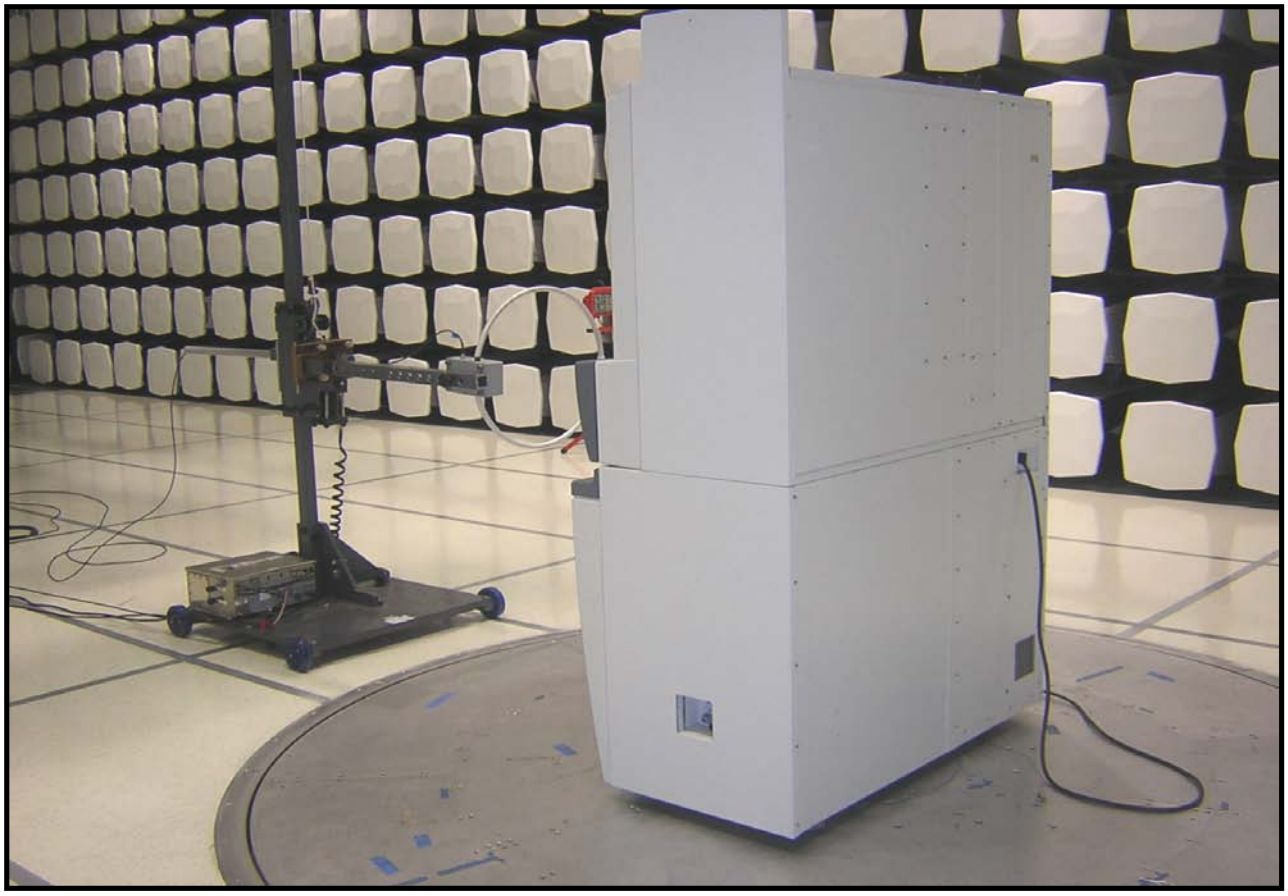
FIELD STRENGTH OF FUNDAMENTAL









FREQUENCY STABILITY

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Chamber Temp. & Humidity Controller	ESZ / Eurotherm	Dimension II	TBC	8/24/2005	12
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	TBA	8/24/2005	12
Multimeter	Tektronix	DMM912	MMH	12/8/2005	13
DC Power Supply	Topward	TPS-2000	TPD	NCR	0
Spectrum Analyzer	Hewlett-Packard	8593E	AAN	1/25/2006	13

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Variation of Supply Voltage

The primary supply voltage was varied from 85% to 115% of nominal. The EUT obtains its power from the 12VDC bus internal to a host system, so a DC lab supply was used to vary the supply voltage up to 115% of 12V and down to 85% of 12V.

Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-20° to +50° C) and at 10°C intervals.

The measurement was made using a direct connection to a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

NORTHWEST EMC

FREQUENCY STABILITY

XMit 2006.03.01

EUT:	Symphony Slide Staining System RFID			Work Order:	VENT0023
Serial Number:	None			Date:	03/03/06
Customer:	Ventana Medical Systems, Inc.			Temperature:	See table
Attendees:	None			Humidity:	30%
Project:	None			Barometric Pres.:	29.85
Tested by:	Rod Peloquin	Power:	See table	Job Site:	EV06 & EV09

TEST SPECIFICATIONS	Test Method
FCC 15.225(c) Frequency Stability 2005-9	ANSI C63.4 2003

COMMENTS

DEVIATIONS FROM TEST STANDARD

Configuration #	2	Signature

Modes of Operation and Test Conditions	Value	Limit	Result
Frequency Stability	0.00628%	+/-0.01% of Carrier	Pass

FREQUENCY STABILITY

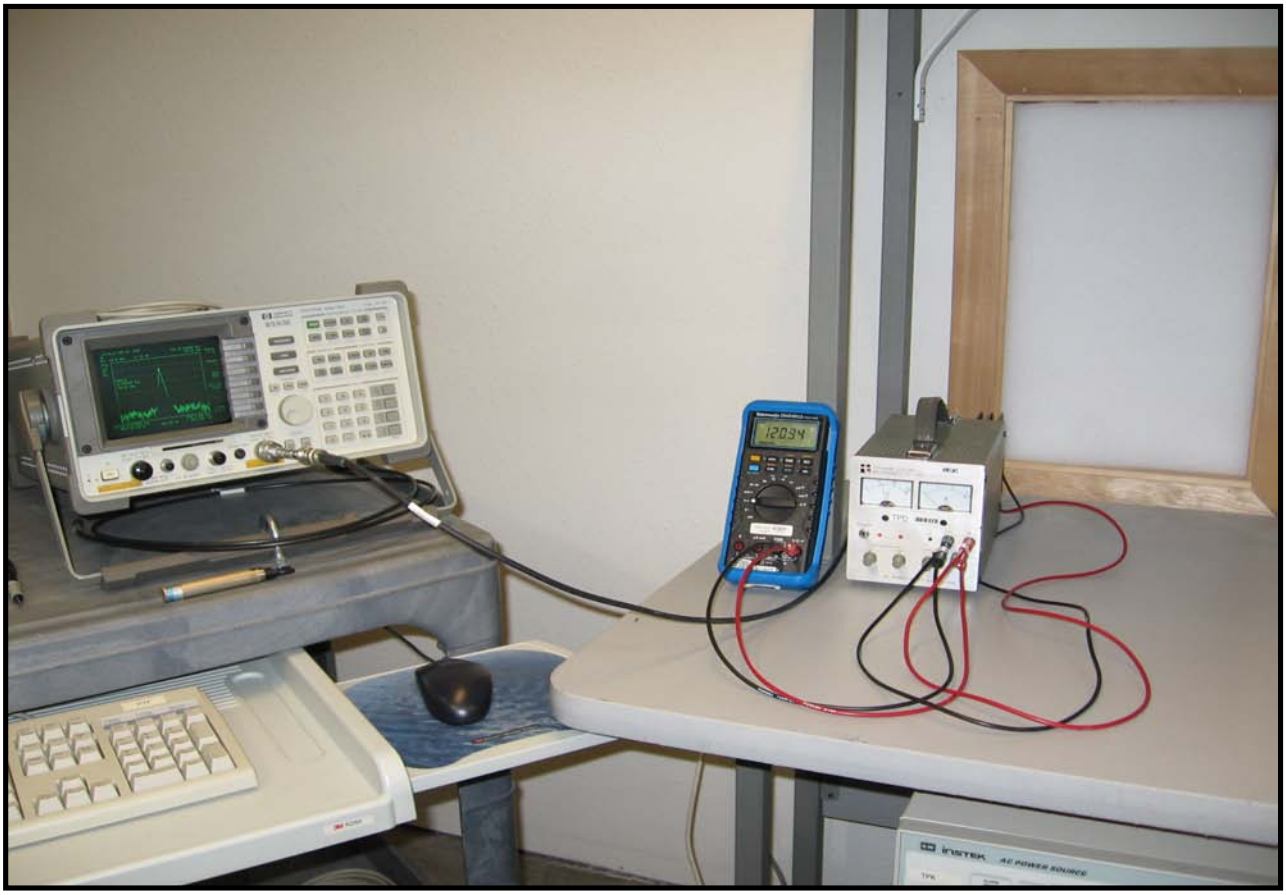
Frequency Stability					
Result:	Pass	**Value:**	0.0063%	**Limit:**	+/-0.01% of Carrier

Frequency Stability with Variation of Ambient Temperature (Primary Supply = 12Vdc)

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)	Specification (%)
50	13.560000	13.560702	0.005177	+/-0.01
40	13.560000	13.560727	0.005361	+/-0.01
30	13.560000	13.560757	0.005583	+/-0.01
20	13.560000	13.560792	0.005841	+/-0.01
10	13.560000	13.560827	0.006099	+/-0.01
0	13.560000	13.560852	0.006283	+/-0.01
-10	13.560000	13.560847	0.006246	+/-0.01
-20	13.560000	13.560822	0.006062	+/-0.01

Frequency Stability with Variation of Primary Supply Voltage (Ambient Temperature = 20°C)

Voltage (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (%)	Specification (%)
13.8 (115%)	13.560000	13.560792	0.005841	+/-0.01
13.2 (110%)	13.560000	13.560792	0.005841	+/-0.01
12.6 (105%)	13.560000	13.560792	0.005841	+/-0.01
12.0 (100%)	13.560000	13.560792	0.005841	+/-0.01
11.4 (95%)	13.560000	13.560792	0.005841	+/-0.01
10.8 (90%)	13.560000	13.560792	0.005841	+/-0.01
10.2 (85%)	13.560000	13.560792	0.005841	+/-0.01



FREQUENCY STABILITY