Ventana Medical Systems, Inc.

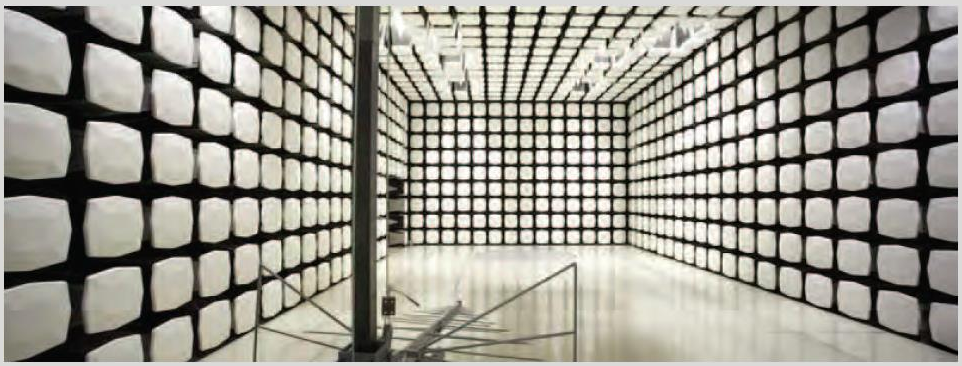
HE600 System

FCC 15.207:2023

FCC 15.225:2023

13.56 MHz Radio

Report: VENT0079.0 Rev. 0, Issue Date: May 1, 2023



CERT #3310.04

CERTIFICATE OF TEST

Last Date of Test: January 26, 2023
Ventana Medical Systems, Inc.
EUT: HE600 System

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2023	ANSI C63.10:2013
FCC 15.225:2023	

Results

Test Description	Result	Specification Section(s)	Method Section(s)	Comments
Powerline Conducted Emissions	Pass	15.207	6.2	
Emissions Bandwidth (20 dB)	Pass	15.215(c)	6.9.2	
Field Strength of Fundamental	Pass	15.225(a)-(c)	6.4	
Field Strength of Spurious Emissions (Less Than 30 MHz)	Pass	15.225(d), 15.209	6.4	
Field Strength of Spurious Emissions (Greater Than 30 MHz)	Pass	15.225(d), 15.209	6.5	
Frequency Stability	Pass	15.225(e), 15.31(e), 15.215(c), 2.1055	6.8	

Deviations From Test Standards

None

Approved By:

Johnny Candelas, Operations Manager

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. 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. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information. As indicated in the Statement of Work sent with the quotation, Element's standard process is to always use the latest published version of the test methods even when earlier versions are cited in the test specification. Issuance of a purchase order was de facto acceptance of this approach. Otherwise, the client would have advised Element in writing of the specific version of the test methods they wanted applied to the subject testing.

REVISION HISTORY

Revision Number	Description	Date (yyyy-mm-dd)	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Each laboratory is accredited by A2LA to ISO / IEC 17025, and as a product certifier to ISO / IEC 17065 which allows Element to certify transmitters to FCC and IC specifications.

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB) and as a CAB for the acceptance of test data.

European Union

European Commission – Recognized as an EU Notified Body validated for the EMCD and RED Directives.

United Kingdom

BEIS – Recognized by the UK as an Approved Body under the UK Radio Equipment and UK EMC Regulations.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIT / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

SCOPE

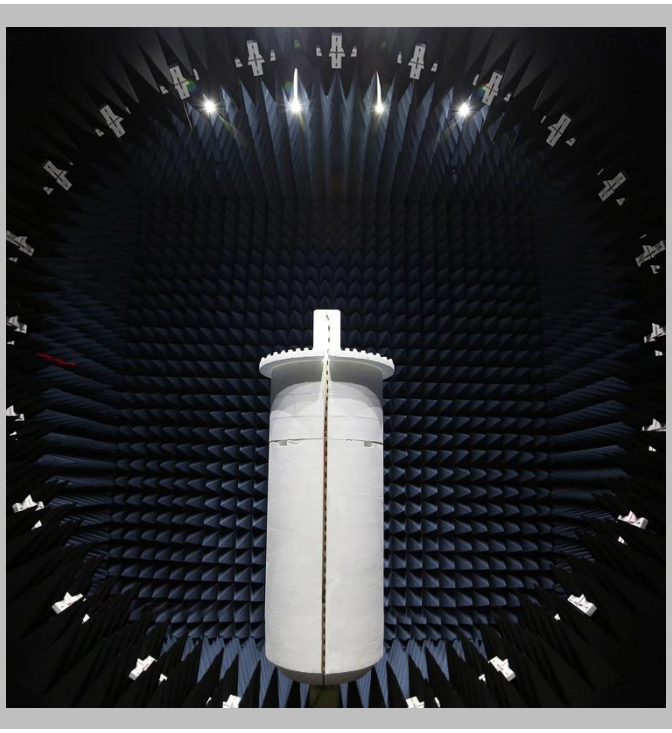
For details on the Scopes of our Accreditations, please visit:

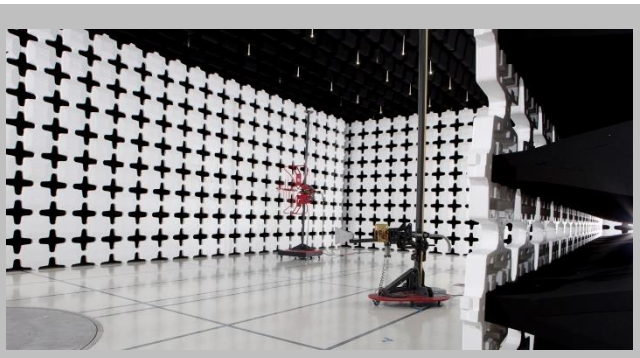
California Minnesota Oregon Texas Washington

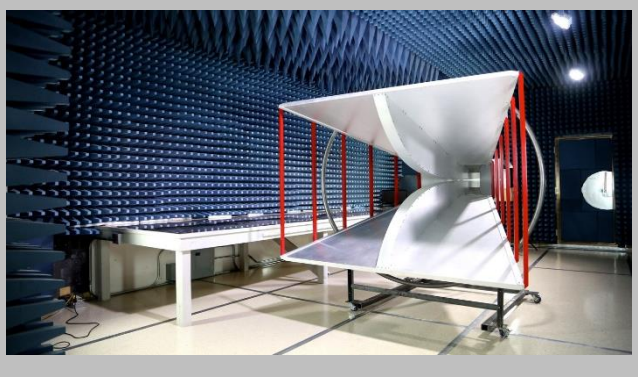
FACILITIES

element
2020.12.15

California	Minnesota	Oregon	Texas	Washington
Labs OC01-17 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-11 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs EV01-12 6775 NE Evergreen Pkwy #400 Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
A2LA				
Lab Code: 3310.04	Lab Code: 3310.05	Lab Code: 3310.02	Lab Code: 3310.03	Lab Code: 3310.06
Innovation, Science and Economic Development Canada				
2834B-1, 2834B-3	2834E-1, 2834E-3	2834D-1	2834G-1	2834F-1
BSMI				
SL2-IN-E-1154R	SL2-IN-E-1152R	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI				
A-0029	A-0109	A-0108	A-0201	A-0110
Recognized Phase I CAB for ISED, ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA				
US0158	US0175	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

element
TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document QM205.4.6. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) can be found in the table below. A lab specific value may also be found in the applicable test description section. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	1.2 dB	-1.2 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.1 dB	-5.1 dB
AC Powerline Conducted Emissions (dB)	3.2 dB	-3.2 dB

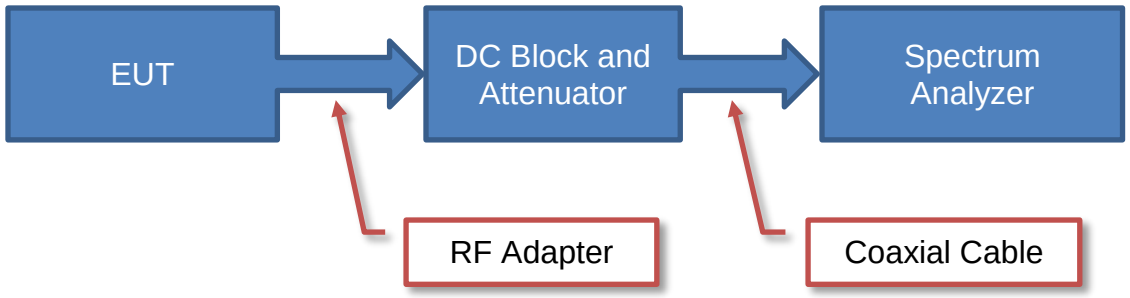
TEST SETUP BLOCK DIAGRAMS

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

Unless otherwise stated, measurements were made using the bandwidths and detectors specified. No video filter was used.

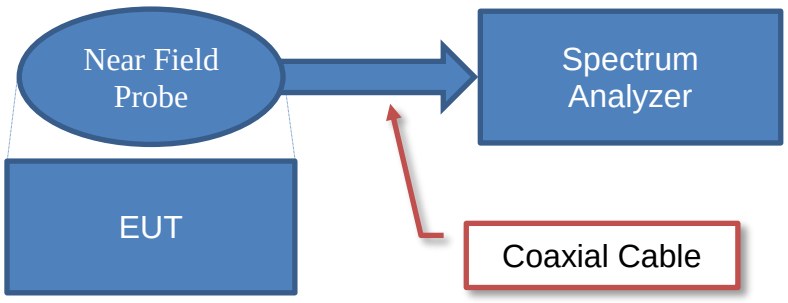
Antenna Port Conducted Measurements



Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

Near Field Test Fixture Measurements

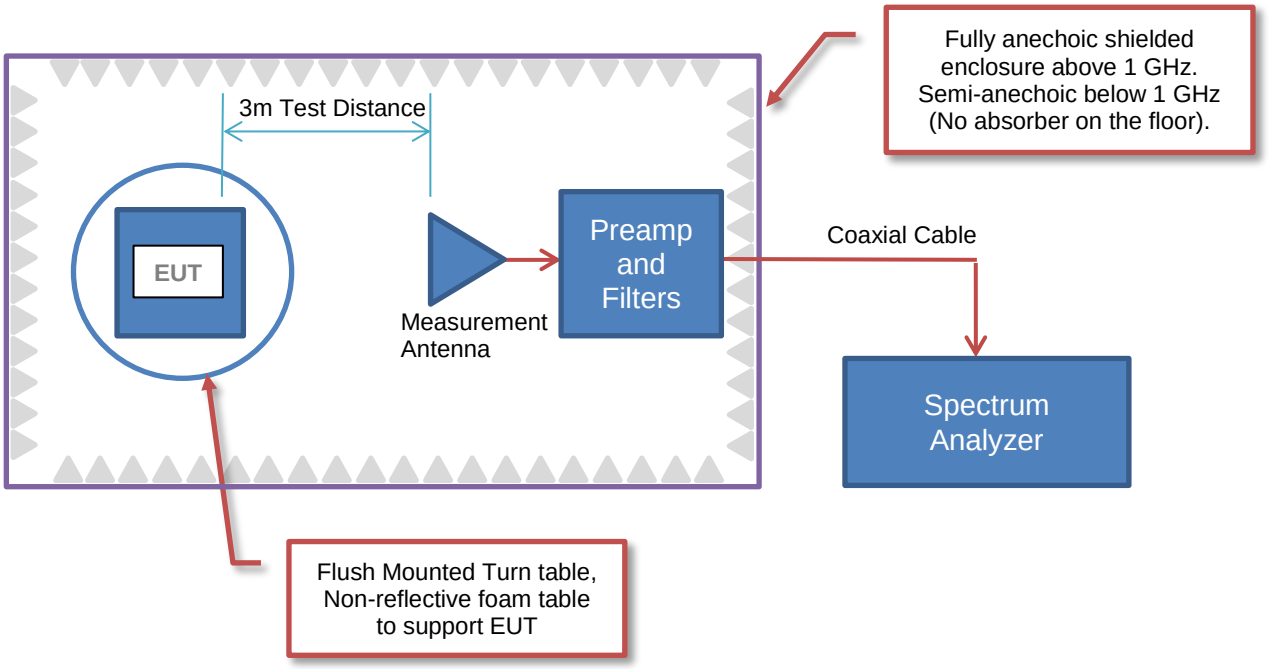


Sample Calculation (logarithmic units)

Measured Value		Measured Level		Reference Level Offset
71.2	=	42.6	+	28.6

TEST SETUP BLOCK DIAGRAMS

Emissions Measurements



Sample Calculation (logarithmic units)

Radiated Emissions:

Measured Level (Amplitude)		Factor: Antenna Factor		Factor: Cable Factor		Factor: Amplifier Gain		Distance Adjustment Factor		External Attenuation		Field Strength
42.6	+	28.6	+	3.1	-	40.8	+	0.0	+	0.0	=	**33.5**

Conducted Emissions:

Measured Level (Amplitude)		Factor: Transducer Factor		Factor: Cable Factor		External Attenuation		Adjusted Level
26.7	+	0.3	+	0.1	+	20.0	=	**47.1**

Radiated Power (ERP/EIRP) – Substitution Method:

Measured Level into Substitution Antenna (Amplitude dBm)		Substitution Antenna Factor (dBi)		EIRP to ERP (if applicable)		Measured power (dBm ERP/EIRP)
10.0	+	6.0	-	2.15	=	**13.9/16.0**

PRODUCT DESCRIPTION

Client and Equipment under Test (EUT) Information

Company Name:	Ventana Medical Systems, Inc.
Address:	1910 E Innovation Park Dr
City, State, Zip:	Tucson, AZ 85755
Test Requested By:	Connor Creitz
EUT:	HE600 System
First Date of Test:	January 18, 2023
Last Date of Test:	January 26, 2023
Receipt Date of Samples:	January 18, 2023
Equipment Design Stage:	Production
Equipment Condition:	No Damage
Purchase Authorization:	Verified

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
InVitro Diagnostic System

Testing Objective:
To demonstrate compliance to FCC Part 15.225 specifications.

POWER SETTINGS AND ANTENNAS

The power settings, antenna gain value(s) and cable loss (if applicable) used for the testing contained in this report were provided by the customer and will affect the validity of the results. Element assumes no responsibility for the accuracy of this information. The power settings below reflect the maximum power that the EUT is allowed to transmit at during normal operation.

ANTENNA INFORMATION

Type	Provided by:	Frequency	Dimensions (Length x Width)	Number of Turns
PCB	FIEG	13.56 MHz	30mm x 26mm	3

The EUT was tested using the power settings provided by the manufacturer which were based upon: Test software settings

Test software/firmware installed on EUT: 1.9.5.19281

SETTINGS FOR ALL TESTS IN THIS REPORT

Radio	Modulation	Protocol	Power Setting (mW)
RFID	ASK	ISO15693	200 ± 1dB

CONFIGURATIONS

Configuration VENT0079-1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
InVitro Diagnostic System	Ventana Medical Systems, Inc.	HE600	6000922

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable	No	4m	No	HE600 System	AC Mains

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2023-01-18	Field Strength of Fundamental	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
2	2023-01-18	Field Strength of Spurious Emissions (Less Than 30 MHz)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
3	2023-01-19	Field Strength of Spurious Emissions (Greater Than 30 MHz)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
4	2023-01-25	Emissions Bandwidth (20 dB)	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
5	2023-01-25	Frequency Stability	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Element following the test.
6	2023-01-26	Powerline Conducted Emissions	Tested as delivered to test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT.

The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10.

In the event that the operating frequency of 13.56 MHz is causing the product to fail the FCC 15.207 limits, the following guidance can be used:

FCC KDB 174176 D01 AC Conducted FAQ v01r01, June 3, 2015 Section Q5:

> For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:
>
> (1) perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;
>
> (2) retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band.
>
> All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2013.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Gauss Instruments	TDEMI 30M	ARO	2022-04-06	2023-04-06
Cable - Conducted Cable Assembly	Northwest EMC	OCP, HFP, AWC	OCPA	2022-07-28	2023-07-28
Power Supply	Pacific Power	3120AFX-2L	SMT	NCR	NCR
LISN	Fischer Custom Communications	FCC-LISN-50-50-4-02-BNC	LJB	10/19/2022	10/19/2023

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	3.2 dB	-3.2 dB

CONFIGURATIONS INVESTIGATED

VENT0079-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-26
Customer:	Ventana Medical Systems, Inc.	Temperature:	22.9°C
Attendees:	Neil Trujillo	Relative Humidity:	27.1%
Customer Project:	None	Bar. Pressure (PMSL):	1027 mbar
Tested By:	Mark Baytan	Job Site:	OC06
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

All (16) radios transmitting simultaneously.

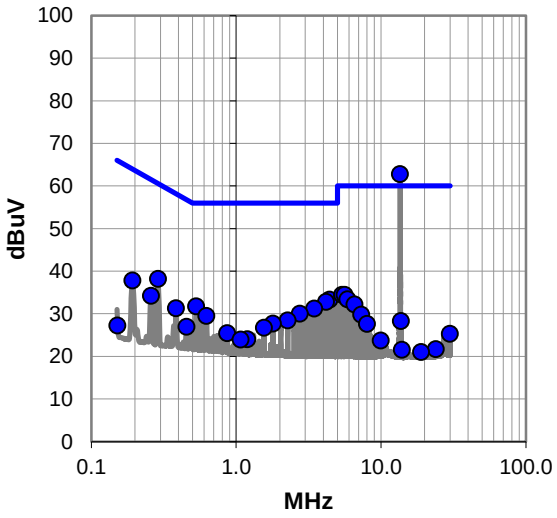
EUT OPERATING MODES

Transmitting 13.56 MHz RFID

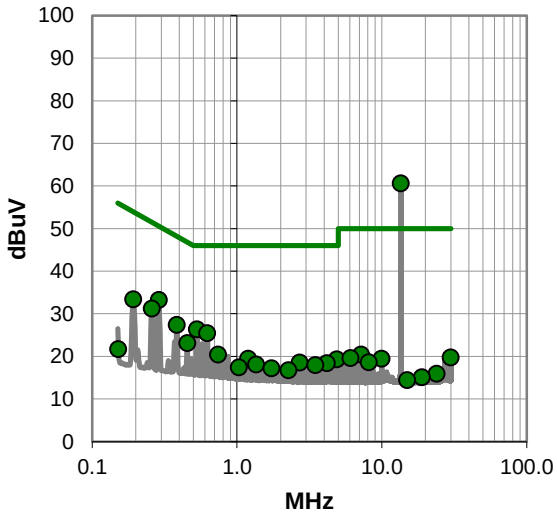
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	42.7	20.1	62.8	60.0	2.8
0.289	18.4	19.8	38.2	60.6	-22.4
4.425	13.4	19.9	33.3	56.0	-22.7
4.187	12.9	19.9	32.8	56.0	-23.2
0.528	11.9	19.8	31.7	56.0	-24.3
3.469	11.3	19.9	31.2	56.0	-24.8
5.382	14.5	19.9	34.4	60.0	-25.6
5.620	14.5	19.9	34.4	60.0	-25.6
2.750	10.2	19.8	30.0	56.0	-26.0
0.193	17.8	20.0	37.8	63.9	-26.1
0.625	9.7	19.8	29.5	56.0	-26.5
5.863	13.5	19.9	33.4	60.0	-26.6
0.385	11.5	19.8	31.3	58.2	-26.9
0.258	14.4	19.8	34.2	61.5	-27.3
2.274	8.6	19.8	28.4	56.0	-27.6
6.577	12.3	19.9	32.2	60.0	-27.8
1.793	7.9	19.8	27.7	56.0	-28.3
1.555	7.0	19.7	26.7	56.0	-29.3
0.454	7.1	19.8	26.9	56.8	-29.9
7.295	9.9	19.9	29.8	60.0	-30.2
0.866	5.6	19.8	25.4	56.0	-30.6
13.719	8.2	20.1	28.3	60.0	-31.7
1.194	4.3	19.7	24.0	56.0	-32.0
1.075	4.2	19.7	23.9	56.0	-32.1
8.014	7.6	20.0	27.6	60.0	-32.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	40.5	20.1	60.6	50.0	10.6
0.289	13.4	19.8	33.2	50.6	-17.4
0.528	6.5	19.8	26.3	46.0	-19.7
0.258	11.4	19.8	31.2	51.5	-20.3
0.193	13.4	20.0	33.4	53.9	-20.5
0.625	5.6	19.8	25.4	46.0	-20.6
0.385	7.6	19.8	27.4	48.2	-20.8
0.454	3.3	19.8	23.1	46.8	-23.7
0.739	0.6	19.8	20.4	46.0	-25.6
1.195	-0.3	19.7	19.4	46.0	-26.6
4.897	-0.6	19.9	19.3	46.0	-26.7
2.709	-1.3	19.8	18.5	46.0	-27.5
4.187	-1.5	19.9	18.4	46.0	-27.6
1.360	-1.6	19.7	18.1	46.0	-27.9
3.482	-2.0	19.9	17.9	46.0	-28.1
1.030	-2.3	19.7	17.4	46.0	-28.6
1.731	-2.6	19.8	17.2	46.0	-28.8
2.274	-3.1	19.8	16.7	46.0	-29.3
7.185	0.5	19.9	20.4	50.0	-29.6
29.879	-0.9	20.6	19.7	50.0	-30.3
6.101	-0.3	19.9	19.6	50.0	-30.4
9.981	-0.6	20.0	19.4	50.0	-30.6
8.128	-1.4	20.0	18.6	50.0	-31.4
23.895	-4.5	20.4	15.9	50.0	-34.1
0.152	1.6	20.1	21.7	55.9	-34.2

CONCLUSION

Evaluation

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-26
Customer:	Ventana Medical Systems, Inc.	Temperature:	22.9°C
Attendees:	Neil Trujillo	Relative Humidity:	27.1%
Customer Project:	None	Bar. Pressure (PMSL):	1027 mbar
Tested By:	Mark Baytan	Job Site:	OC06
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

All (16) radios transmitting simultaneously.

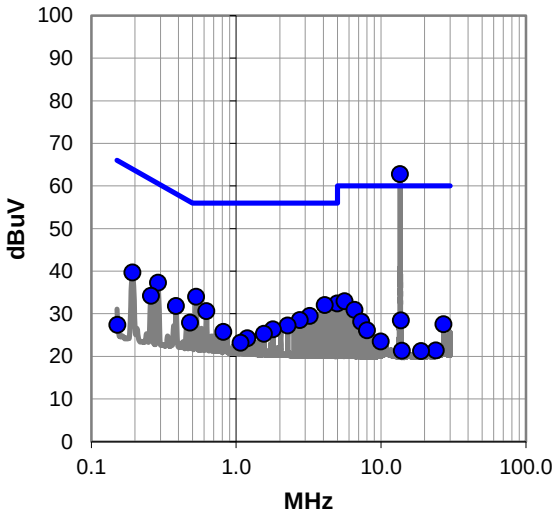
EUT OPERATING MODES

Transmitting 13.56 MHz RFID

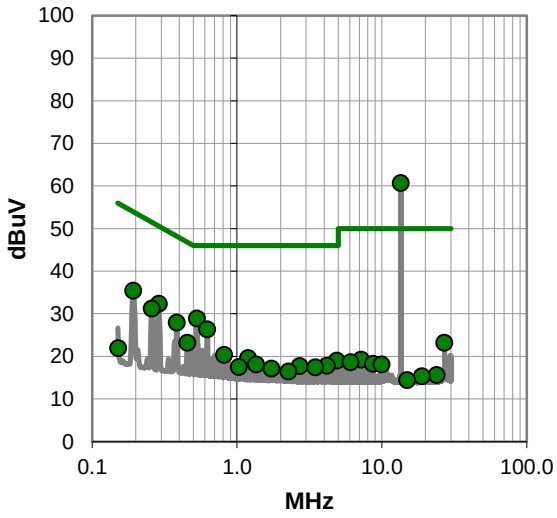
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	42.7	20.1	62.8	60.0	2.8
0.528	14.2	19.8	34.0	56.0	-22.0
0.289	17.5	19.8	37.3	60.6	-23.3
4.996	12.5	19.9	32.4	56.0	-23.6
4.097	12.1	19.9	32.0	56.0	-24.0
0.193	19.7	20.0	39.7	63.9	-24.2
0.625	10.8	19.8	30.6	56.0	-25.4
0.385	12.0	19.8	31.8	58.2	-26.4
3.229	9.7	19.8	29.5	56.0	-26.5
5.622	13.0	19.9	32.9	60.0	-27.1
0.258	14.4	19.8	34.2	61.5	-27.3
2.751	8.7	19.8	28.5	56.0	-27.5
0.480	8.1	19.8	27.9	56.3	-28.4
2.272	7.4	19.8	27.2	56.0	-28.8
6.578	11.0	19.9	30.9	60.0	-29.1
1.793	6.5	19.8	26.3	56.0	-29.7
0.817	5.9	19.8	25.7	56.0	-30.3
1.554	5.6	19.7	25.3	56.0	-30.7
13.719	8.3	20.1	28.4	60.0	-31.6
1.194	4.5	19.7	24.2	56.0	-31.8
7.295	8.2	19.9	28.1	60.0	-31.9
27.085	6.8	20.7	27.5	60.0	-32.5
1.075	3.5	19.7	23.2	56.0	-32.8
8.012	6.1	20.0	26.1	60.0	-33.9
9.978	3.5	20.0	23.5	60.0	-36.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.560	40.6	20.1	60.7	50.0	10.7
0.528	9.1	19.8	28.9	46.0	-17.1
0.289	12.5	19.8	32.3	50.6	-18.3
0.193	15.4	20.0	35.4	53.9	-18.5
0.625	6.5	19.8	26.3	46.0	-19.7
0.258	11.4	19.8	31.2	51.5	-20.3
0.385	8.1	19.8	27.9	48.2	-20.3
0.454	3.4	19.8	23.2	46.8	-23.6
0.817	0.5	19.8	20.3	46.0	-25.7
1.195	-0.1	19.7	19.6	46.0	-26.4
27.085	2.5	20.7	23.2	50.0	-26.8
4.898	-0.9	19.9	19.0	46.0	-27.0
1.358	-1.6	19.7	18.1	46.0	-27.9
4.186	-2.1	19.9	17.8	46.0	-28.2
2.710	-2.1	19.8	17.7	46.0	-28.3
1.029	-2.2	19.7	17.5	46.0	-28.5
3.484	-2.5	19.9	17.4	46.0	-28.6
1.731	-2.7	19.8	17.1	46.0	-28.9
2.272	-3.4	19.8	16.4	46.0	-29.6
7.185	-0.7	19.9	19.2	50.0	-30.8
6.101	-1.3	19.9	18.6	50.0	-31.4
8.696	-1.8	20.0	18.2	50.0	-31.8
9.979	-1.9	20.0	18.1	50.0	-31.9
0.152	1.8	20.1	21.9	55.9	-34.0
23.895	-4.8	20.4	15.6	50.0	-34.4

CONCLUSION

Evaluation

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-26
Customer:	Ventana Medical Systems, Inc.	Temperature:	22.9°C
Attendees:	Neil Trujillo	Relative Humidity:	27.1%
Customer Project:	None	Bar. Pressure (PMSL):	1027 mbar
Tested By:	Mark Baytan	Job Site:	OC06
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

All (16) radios transmitting simultaneously. Antennas replaced and terminated with 50 ohm resistors.

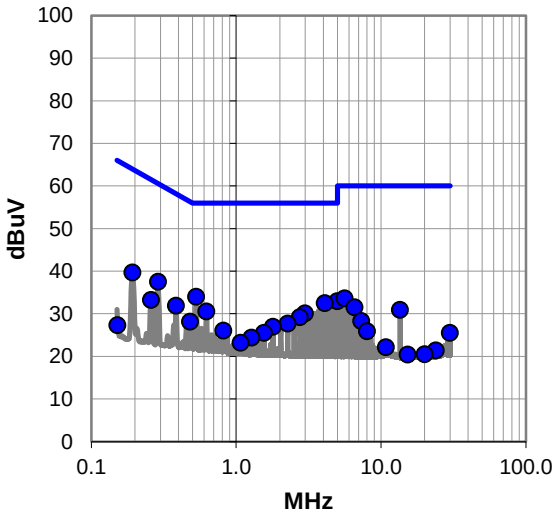
EUT OPERATING MODES

Transmitting 13.56 MHz RFID

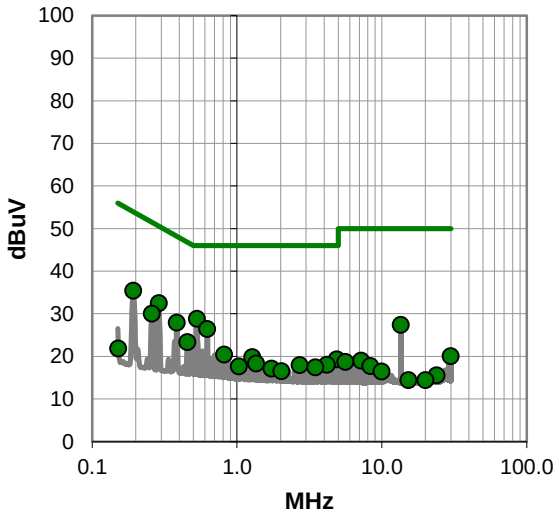
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.528	14.2	19.8	34.0	56.0	-22.0
0.289	17.7	19.8	37.5	60.6	-23.1
4.996	13.0	19.9	32.9	56.0	-23.1
4.097	12.6	19.9	32.5	56.0	-23.5
0.193	19.7	20.0	39.7	63.9	-24.2
0.625	10.7	19.8	30.5	56.0	-25.5
2.990	10.3	19.8	30.1	56.0	-25.9
0.385	12.1	19.8	31.9	58.2	-26.3
5.622	13.7	19.9	33.6	60.0	-26.4
2.751	9.4	19.8	29.2	56.0	-26.8
0.481	8.3	19.8	28.1	56.3	-28.2
0.258	13.4	19.8	33.2	61.5	-28.3
2.271	7.9	19.8	27.7	56.0	-28.3
6.578	11.6	19.9	31.5	60.0	-28.5
13.560	10.8	20.1	30.9	60.0	-29.1
1.795	7.1	19.8	26.9	56.0	-29.1
0.817	6.2	19.8	26.0	56.0	-30.0
1.557	5.8	19.7	25.5	56.0	-30.5
1.278	4.7	19.7	24.4	56.0	-31.6
7.297	8.4	19.9	28.3	60.0	-31.7
1.075	3.5	19.7	23.2	56.0	-32.8
8.014	5.9	20.0	25.9	60.0	-34.1
29.980	4.9	20.6	25.5	60.0	-34.5
10.817	2.1	20.0	22.1	60.0	-37.9
23.896	1.0	20.4	21.4	60.0	-38.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.528	9.0	19.8	28.8	46.0	-17.2
0.289	12.7	19.8	32.5	50.6	-18.1
0.193	15.4	20.0	35.4	53.9	-18.5
0.625	6.6	19.8	26.4	46.0	-19.6
0.385	8.1	19.8	27.9	48.2	-20.3
0.258	10.2	19.8	30.0	51.5	-21.5
13.560	7.3	20.1	27.4	50.0	-22.6
0.454	3.5	19.8	23.3	46.8	-23.5
0.817	0.6	19.8	20.4	46.0	-25.6
1.278	0.1	19.7	19.8	46.0	-26.2
4.898	-0.6	19.9	19.3	46.0	-26.7
1.360	-1.4	19.7	18.3	46.0	-27.7
4.184	-1.9	19.9	18.0	46.0	-28.0
2.710	-1.9	19.8	17.9	46.0	-28.1
1.030	-2.1	19.7	17.6	46.0	-28.4
3.484	-2.5	19.9	17.4	46.0	-28.6
1.731	-2.7	19.8	17.1	46.0	-28.9
2.033	-3.3	19.8	16.5	46.0	-29.5
29.980	-0.6	20.6	20.0	50.0	-30.0
7.185	-0.9	19.9	19.0	50.0	-31.0
5.622	-1.2	19.9	18.7	50.0	-31.3
8.336	-2.3	20.0	17.7	50.0	-32.3
9.979	-3.6	20.0	16.4	50.0	-33.6
0.152	1.7	20.1	21.8	55.9	-34.1
23.895	-4.9	20.4	15.5	50.0	-34.5

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-26
Customer:	Ventana Medical Systems, Inc.	Temperature:	22.9°C
Attendees:	Neil Trujillo	Relative Humidity:	27.1%
Customer Project:	None	Bar. Pressure (PMSL):	1027 mbar
Tested By:	Mark Baytan	Job Site:	OC06
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

All (16) radios transmitting simultaneously. Antennas replaced and terminated with 50 ohm resistors.

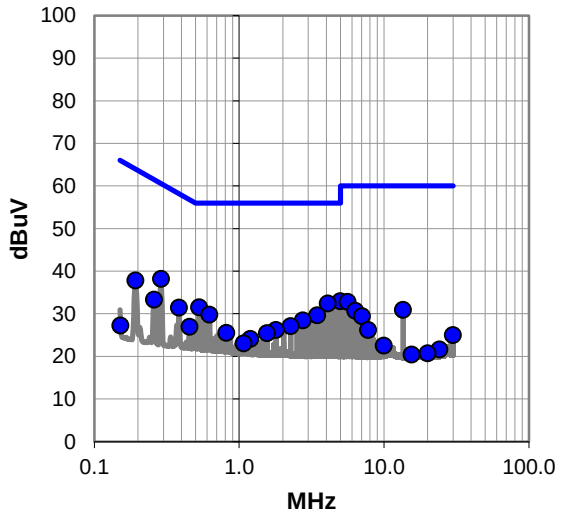
EUT OPERATING MODES

Transmitting 13.56 MHz RFID

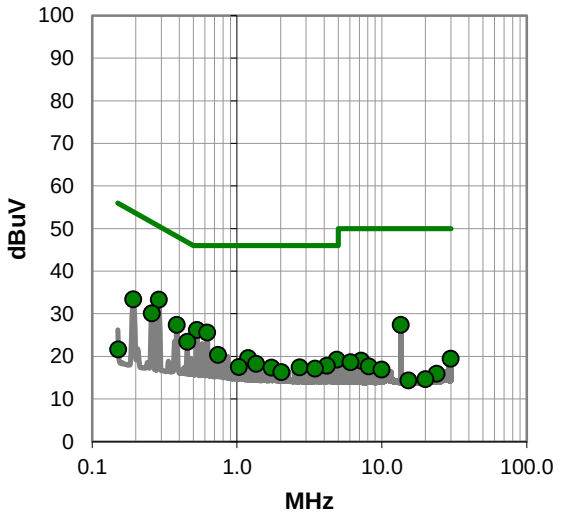
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.289	18.4	19.8	38.2	60.6	-22.4
4.996	13.0	19.9	32.9	56.0	-23.1
4.097	12.5	19.9	32.4	56.0	-23.6
0.528	11.7	19.8	31.5	56.0	-24.5
0.193	17.8	20.0	37.8	63.9	-26.1
0.625	10.0	19.8	29.8	56.0	-26.2
3.469	9.7	19.9	29.6	56.0	-26.4
0.385	11.6	19.8	31.4	58.2	-26.8
5.622	12.9	19.9	32.8	60.0	-27.2
2.750	8.6	19.8	28.4	56.0	-27.6
0.258	13.5	19.8	33.3	61.5	-28.2
2.272	7.3	19.8	27.1	56.0	-28.9
13.560	10.8	20.1	30.9	60.0	-29.1
6.339	10.8	19.9	30.7	60.0	-29.3
1.793	6.4	19.8	26.2	56.0	-29.8
0.454	7.1	19.8	26.9	56.8	-29.9
0.817	5.7	19.8	25.5	56.0	-30.5
7.056	9.5	19.9	29.4	60.0	-30.6
1.554	5.7	19.7	25.4	56.0	-30.6
1.195	4.4	19.7	24.1	56.0	-31.9
1.075	3.3	19.7	23.0	56.0	-33.0
7.774	6.2	20.0	26.2	60.0	-33.8
29.980	4.4	20.6	25.0	60.0	-35.0
9.979	2.5	20.0	22.5	60.0	-37.5
24.184	1.2	20.4	21.6	60.0	-38.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.289	13.5	19.8	33.3	50.6	-17.3
0.528	6.4	19.8	26.2	46.0	-19.8
0.625	5.8	19.8	25.6	46.0	-20.4
0.193	13.4	20.0	33.4	53.9	-20.5
0.385	7.6	19.8	27.4	48.2	-20.8
0.258	10.3	19.8	30.1	51.5	-21.4
13.560	7.3	20.1	27.4	50.0	-22.6
0.454	3.6	19.8	23.4	46.8	-23.4
0.740	0.5	19.8	20.3	46.0	-25.7
1.195	-0.1	19.7	19.6	46.0	-26.4
4.898	-0.7	19.9	19.2	46.0	-26.8
1.360	-1.5	19.7	18.2	46.0	-27.8
4.186	-2.1	19.9	17.8	46.0	-28.2
1.030	-2.2	19.7	17.5	46.0	-28.5
2.710	-2.4	19.8	17.4	46.0	-28.6
1.731	-2.5	19.8	17.3	46.0	-28.7
3.469	-2.8	19.9	17.1	46.0	-28.9
2.033	-3.5	19.8	16.3	46.0	-29.7
29.879	-1.2	20.6	19.4	50.0	-30.6
7.185	-0.9	19.9	19.0	50.0	-31.0
6.101	-1.3	19.9	18.6	50.0	-31.4
8.127	-2.4	20.0	17.6	50.0	-32.4
9.979	-3.1	20.0	16.9	50.0	-33.1
23.895	-4.5	20.4	15.9	50.0	-34.1
0.152	1.5	20.1	21.6	55.9	-34.3

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

The fundamental carrier of the EUT was maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The reference point of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2021-09-03	2023-09-03
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2022-06-13	2023-06-13
Receiver	Rohde & Schwarz	ESCI	ARG	2022-08-19	2023-08-19

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

12.06 MHz TO 15.06 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

VENT0079-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-18
Customer:	Ventana Medical Systems, Inc.	Temperature:	19.5°C
Attendees:	Neil Trujillo	Relative Humidity:	42.6%
Customer Project:	None	Bar. Pressure (PMSL):	1025 mb
Tested By:	Mark Baytan	Job Site:	OC08
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	1	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

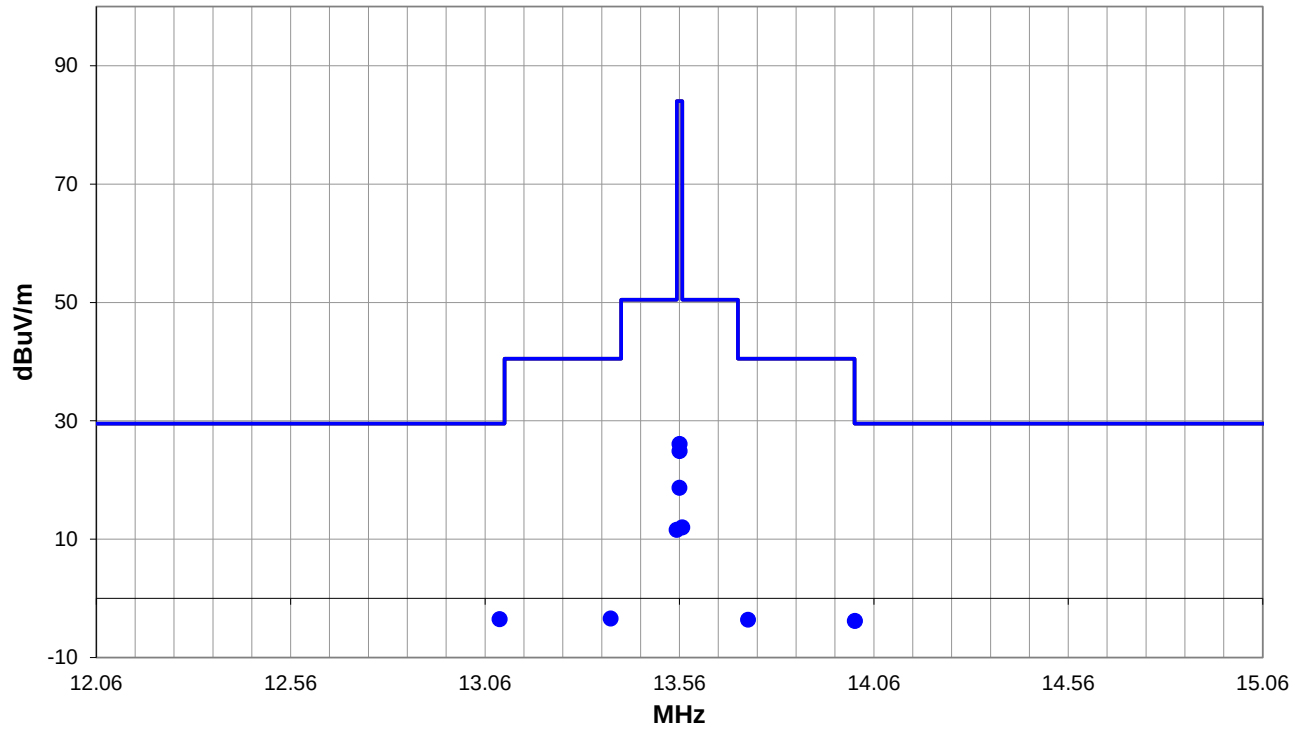
All (16) radios transmitting simultaneously. Testing performed on one EUT axis as equipment is floor standing.

EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 1 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #1

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
13.097	3.6	12.0	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	-3.5	29.5	-33.0
14.011	3.4	11.9	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	-3.8	29.5	-33.3
13.567	19.2	11.9	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	12.0	50.5	-38.5
13.553	18.8	11.9	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	11.6	50.5	-38.9
13.383	3.7	12.0	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	-3.4	40.5	-43.9
13.736	3.6	11.9	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	-3.6	40.5	-44.1
13.560	33.3	11.9	1.0	192.0	10.0	0.0	Perp to EUT	QP	-19.1	26.1	84.0	-57.9
13.560	32.1	11.9	1.0	218.0	10.0	0.0	Para to GND	QP	-19.1	24.9	84.0	-59.1
13.560	25.9	11.9	1.0	330.0	10.0	0.0	Para to EUT	QP	-19.1	18.7	84.0	-65.3

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e), 15.31(f)(2), and RSS-GEN, 6.5, measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2021-09-03	2023-09-03
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2022-06-13	2023-06-13
Receiver	Rohde & Schwarz	ESCI	ARG	2022-08-19	2023-08-19

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

9 kHz TO 30 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

VENT0079-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-18
Customer:	Ventana Medical Systems, Inc.	Temperature:	19.5°C
Attendees:	Neil Trujillo	Relative Humidity:	42.6%
Customer Project:	None	Bar. Pressure (PMSL):	1025 mb
Tested By:	Mark Baytan	Job Site:	OC08
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

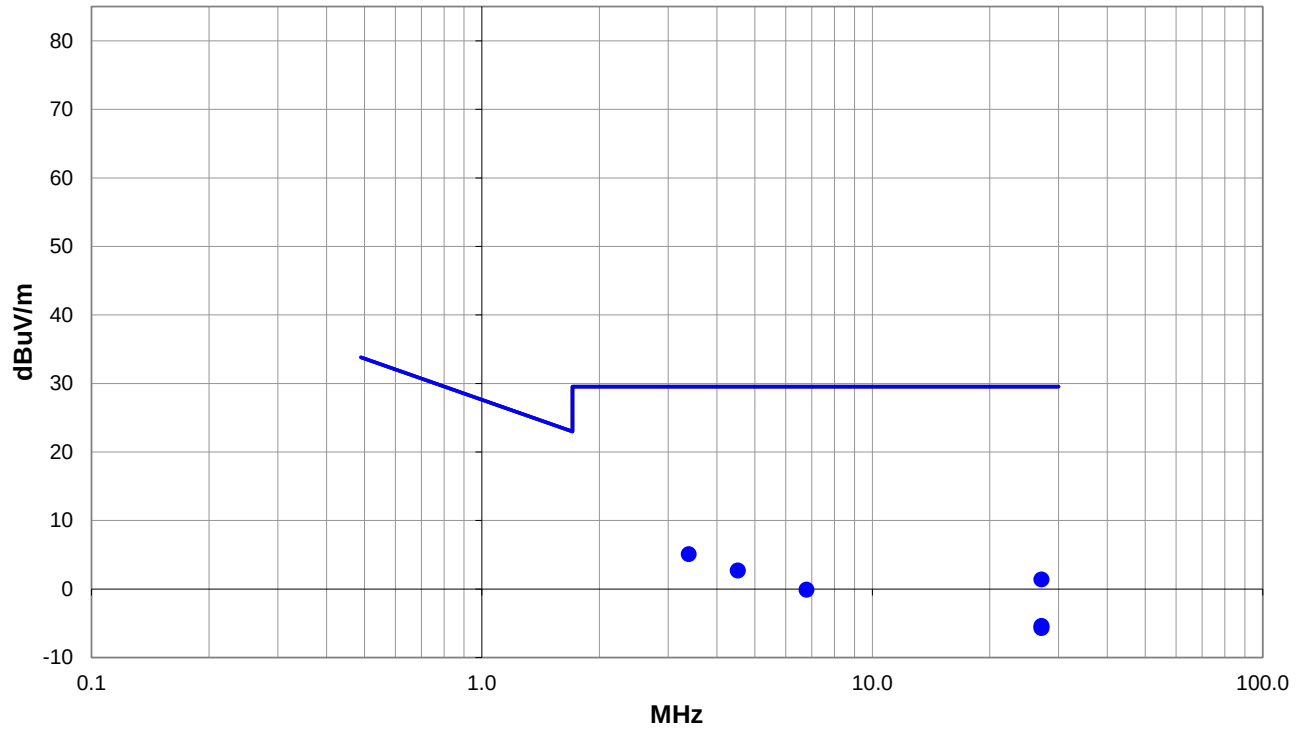
All (16) radios transmitting simultaneously. Testing performed on one EUT axis as equipment is floor standing.

EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 2 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHz)

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #2

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
3.386	12.9	11.3	1.0	240.0	10.0	0.0	Perp to EUT	QP	-19.1	5.1	29.5	-24.4
4.521	10.4	11.4	1.0	120.0	10.0	0.0	Perp to EUT	QP	-19.1	2.7	29.5	-26.8
27.118	10.3	10.2	1.0	228.0	10.0	0.0	Perp to EUT	QP	-19.1	1.4	29.5	-28.1
6.781	7.4	11.6	1.0	171.0	10.0	0.0	Perp to EUT	QP	-19.1	-0.1	29.5	-29.6
27.123	3.5	10.2	1.0	21.0	10.0	0.0	Para to GND	QP	-19.1	-5.4	29.5	-34.9
27.123	3.2	10.2	1.0	231.0	10.0	0.0	Para to EUT	QP	-19.1	-5.7	29.5	-35.2

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3142B	AXK	2022-04-19	2024-04-19
Cable	Northwest EMC	10kHz-1GHz RE Cables	OCH	2022-02-11	2023-02-11
Amplifier - Pre-Amplifier	Miteq	AM-1402	AOZ	2022-02-11	2023-02-11
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFE	2022-04-05	2023-04-05
Filter - Low Pass	Micro-Tronics	LPM50004	LFT	2023-01-12	2024-01-12

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.6 dB	-4.6 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

220VAC/60Hz

CONFIGURATIONS INVESTIGATED

VENT0079-1

MODES INVESTIGATED

Transmitting 13.56 MHz RFID

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

EUT:	HE600 System	Work Order:	VENT0079
Serial Number:	6000922	Date:	2023-01-19
Customer:	Ventana Medical Systems, Inc.	Temperature:	19.5°C
Attendees:	Neil Trujillo	Relative Humidity:	40.7%
Customer Project:	None	Bar. Pressure (PMSL):	1024 mb
Tested By:	Mark Baytan	Job Site:	OC10
Power:	220VAC/60Hz	Configuration:	VENT0079-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

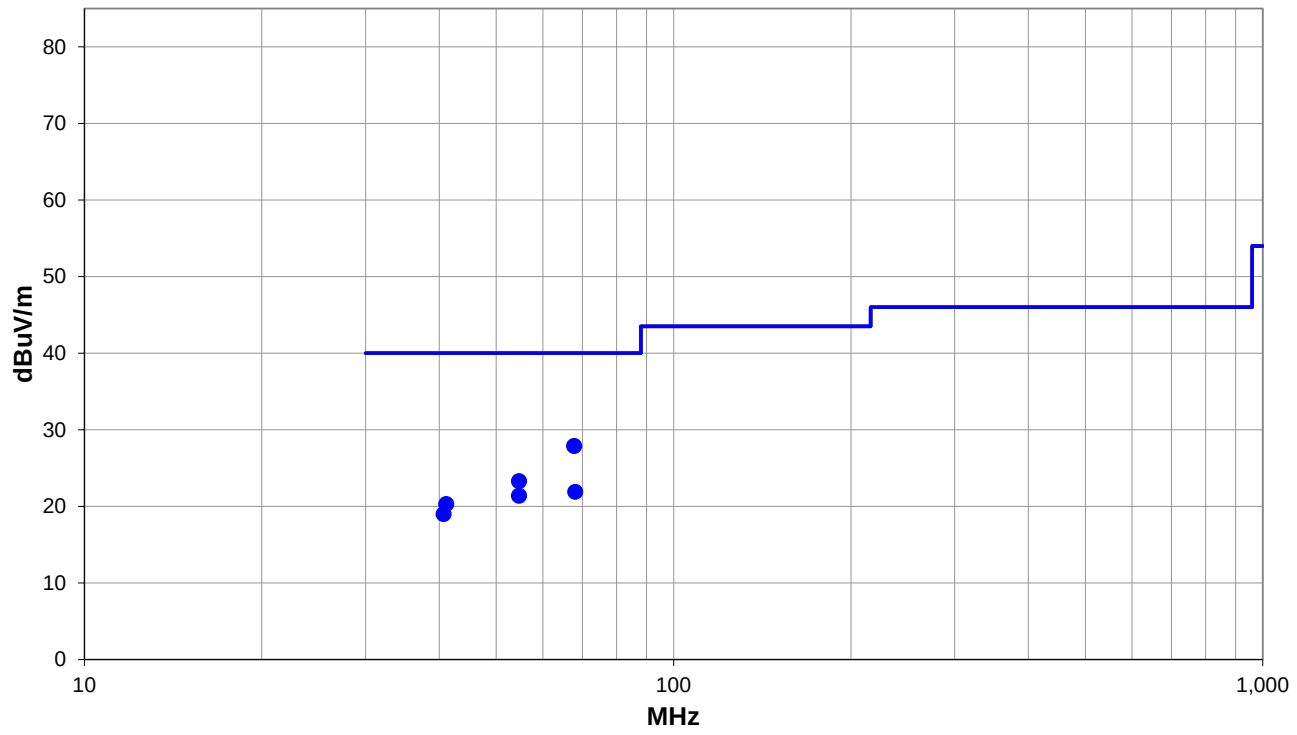
All (16) radios transmitting simultaneously. Testing performed on one EUT axis as equipment is floor standing.

EUT OPERATING MODES

Transmitting 13.56 MHz RFID

DEVIATIONS FROM TEST STANDARD

None



Run #: 2 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHz)

element
WTD.2022.07.28.0
EmiR5 2022.07.06.0
PSA-ESCI 2022.08.23.0

RESULTS - Run #2

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
67.776	31.5	-3.6	1.0	14.0	3.0	0.0	Vert	QP	0.0	27.9	40.0	-12.1
54.660	25.8	-2.5	3.74	321.0	3.0	0.0	Horz	QP	0.0	23.3	40.0	-16.7
68.090	25.5	-3.6	3.06	103.0	3.0	0.0	Horz	QP	0.0	21.9	40.0	-18.1
54.657	23.9	-2.5	1.0	61.0	3.0	0.0	Vert	QP	0.0	21.4	40.0	-18.6
41.106	19.2	1.1	1.0	327.0	3.0	0.0	Vert	QP	0.0	20.3	40.0	-19.7
40.692	17.6	1.4	3.89	301.0	3.0	0.0	Horz	QP	0.0	19.0	40.0	-21.0

CONCLUSION

Pass

Tested By

FREQUENCY STABILITY

XMit 2022.02.07.0

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.	Cal. Due
Meter - Temperature/Humidity	Omega Engineering, Inc.	HH414	DVB	2022-11-21	2025-11-21
Meter - Multimeter	Gossen	M249A	SLM	2023-01-05	2024-01-05
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPHS-32-3.5-SCT/AC	TBE	NCR	NCR
Power Supply - DC	Hewlett Packard	6574A	TPX	NCR	NCR
Power Supply	Pacific Power	3120AFX-2L	SMT	NCR	NCR
Probe - Near Field Set	EMCO	7405	IPI	NCR	NCR
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2022-02-14	2023-02-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	2022-10-21	2023-10-21

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made on the single transmit frequency as called out on the data sheets. Testing was done while the EUT was continuously polling.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage while at ambient temperature. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range of -20 ° to +50° C and at 10°C intervals.

The requirement of a frequency tolerance of ±0.01% is equivalent to 100 ppm
The formula to check for compliance is:

ppm = (Measured Frequency / Measured Nominal Frequency - 1) * 1,000,000

FREQUENCY STABILITY

element

TbtTx 2022.06.03.0 XMit 2022.02.07.0

EUT:	**HE600 System**			**Work Order:**	**VENT0079**
Serial Number:	**6000922**			**Date:**	**25-Jan-23**
Customer:	**Ventana Medical Systems, Inc.**			**Temperature:**	**21.1 °C**
Attendees:	**Neil Trujillo**			**Humidity:**	**38.9% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Mark Baytan**	**Power:**	**24 VDC**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.225:2023	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

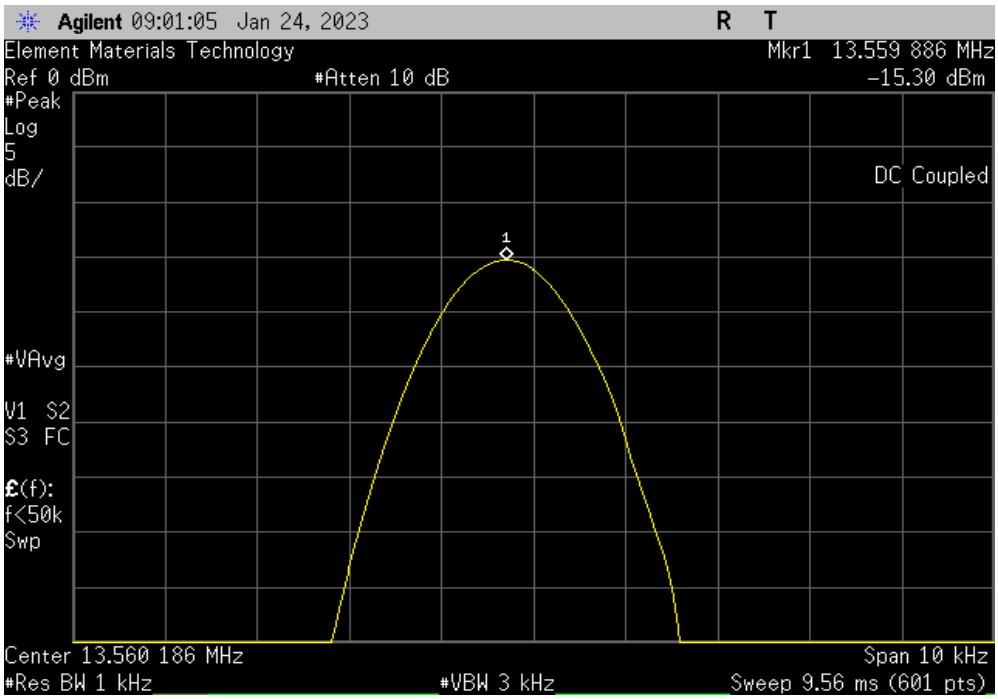
None

Configuration #	**1**	*Signature*

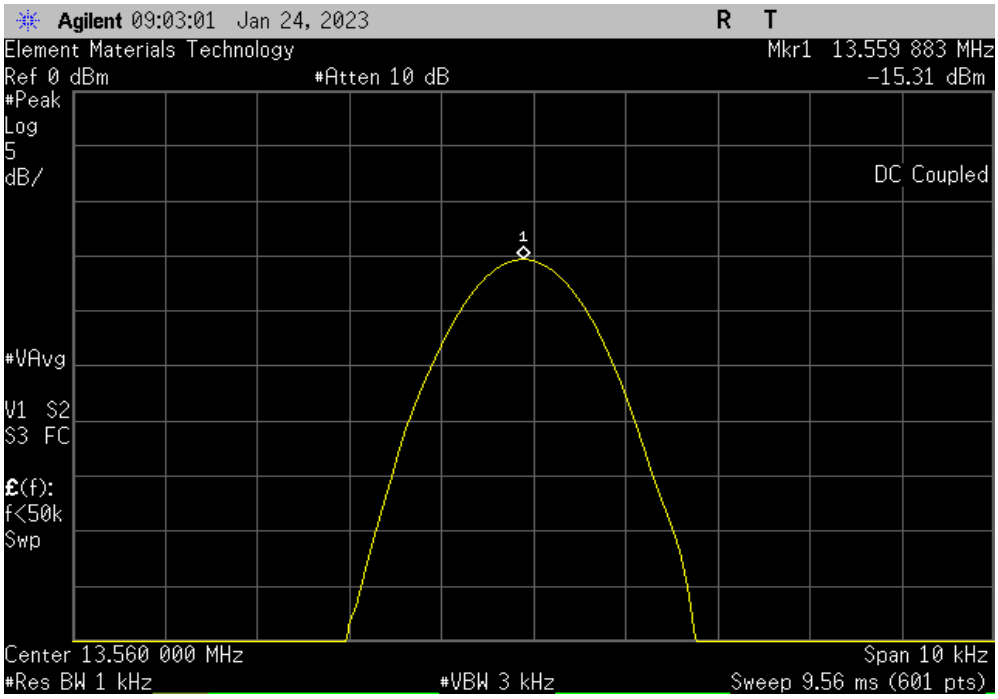
	Measured Value (MHz)	**Nominal Value (MHz)**	**Error (ppm)**	**Limit (ppm)**	**Results**
13.56 MHz RFID					
Normal Voltage	13.559886	13.559886	0.0	100	Pass
Extreme Voltage +15%	13.559883	13.559886	0.2	100	Pass
Extreme Voltage -15%	13.559883	13.559886	0.2	100	Pass
Extreme Temperature +50°C	13.55985	13.559886	2.7	100	Pass
Extreme Temperature +40°C	13.559867	13.559886	1.4	100	Pass
Extreme Temperature +30°C	13.559884	13.559886	0.1	100	Pass
Extreme Temperature +20°C	13.559883	13.559886	0.2	100	Pass
Extreme Temperature +10°C	13.559928	13.559886	3.1	100	Pass
Extreme Temperature 0°C	13.55995	13.559886	4.7	100	Pass
Extreme Temperature -10°C	13.5599	13.559886	1.0	100	Pass
Extreme Temperature -20°C	13.559867	13.559886	1.4	100	Pass

FREQUENCY STABILITY

13.56 MHz RFID, Normal Voltage						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559886	13.559886	0.0	100	Pass

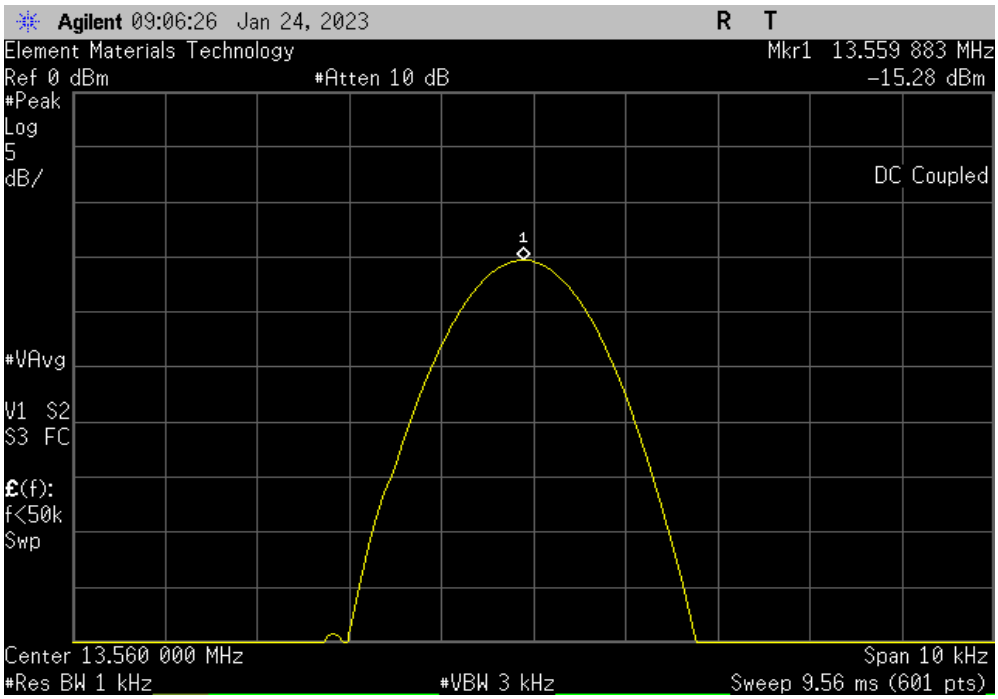


13.56 MHz RFID, Extreme Voltage +15%						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559883	13.559886	0.2	100	Pass

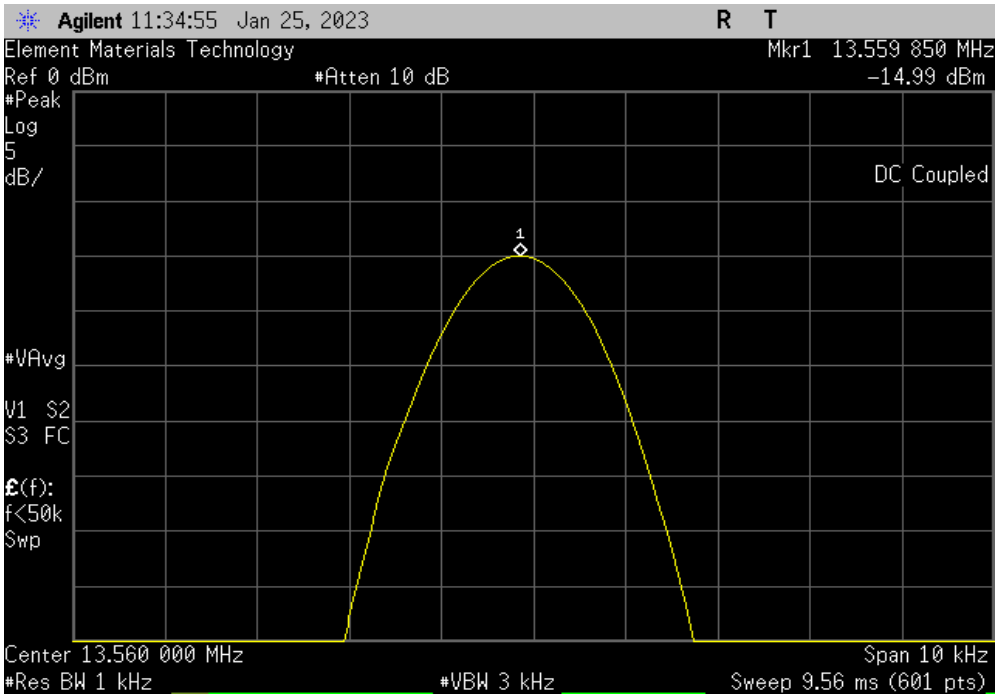


FREQUENCY STABILITY

13.56 MHz RFID, Extreme Voltage -15%						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559883	13.559886	0.2	100	Pass

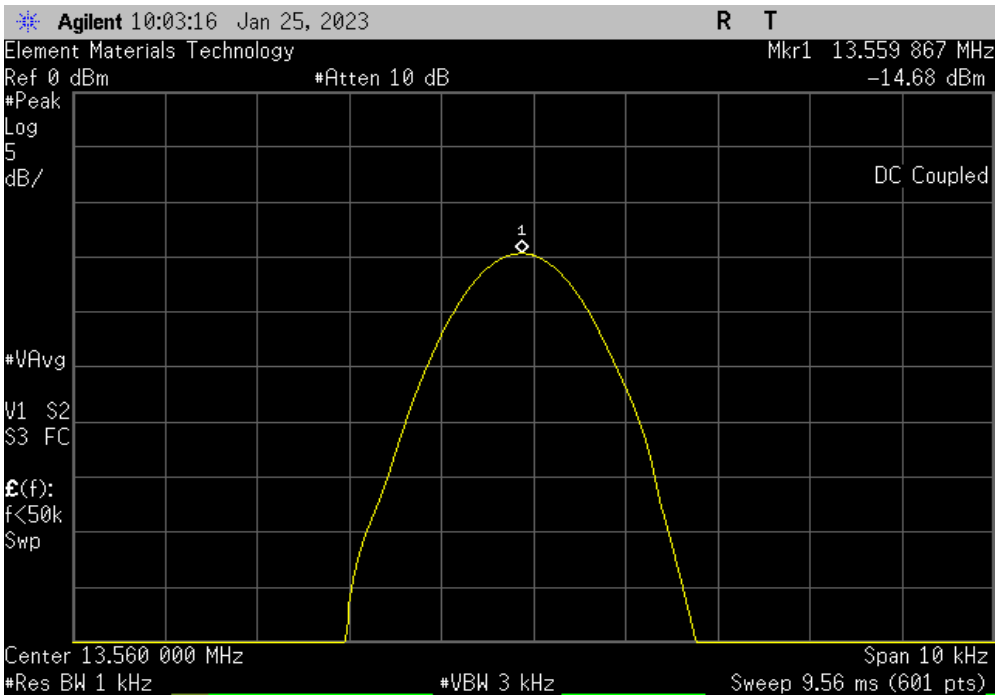


13.56 MHz RFID, Extreme Temperature +50°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.55985	13.559886	2.7	100	Pass

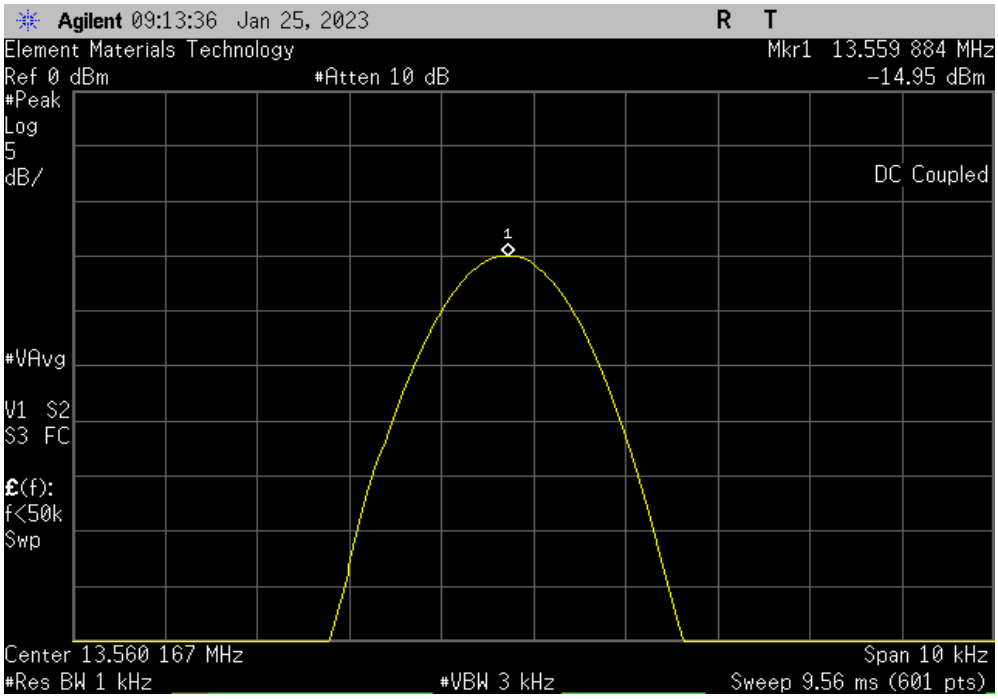


FREQUENCY STABILITY

13.56 MHz RFID, Extreme Temperature +40°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559867	13.559886	1.4	100	Pass

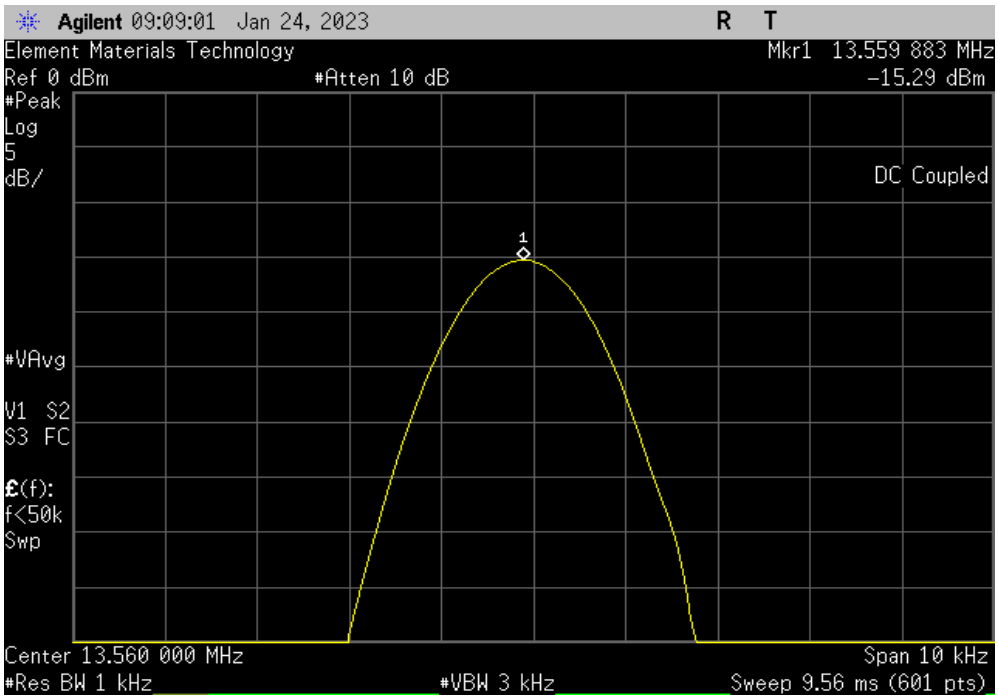


13.56 MHz RFID, Extreme Temperature +30°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559884	13.559886	0.1	100	Pass

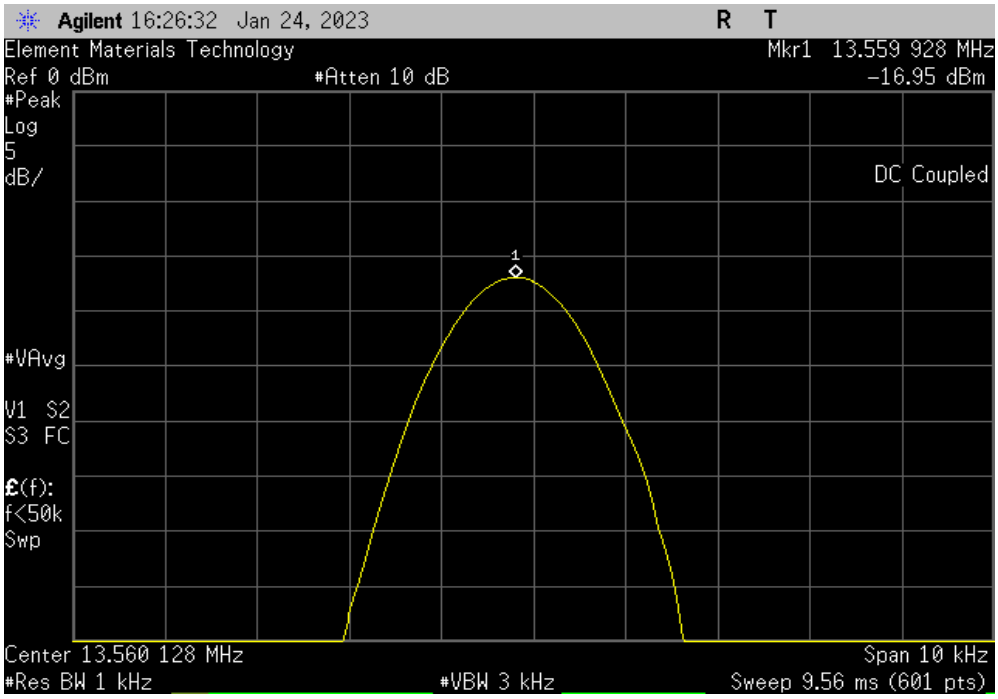


FREQUENCY STABILITY

13.56 MHz RFID, Extreme Temperature +20°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559883	13.559886	0.2	100	Pass

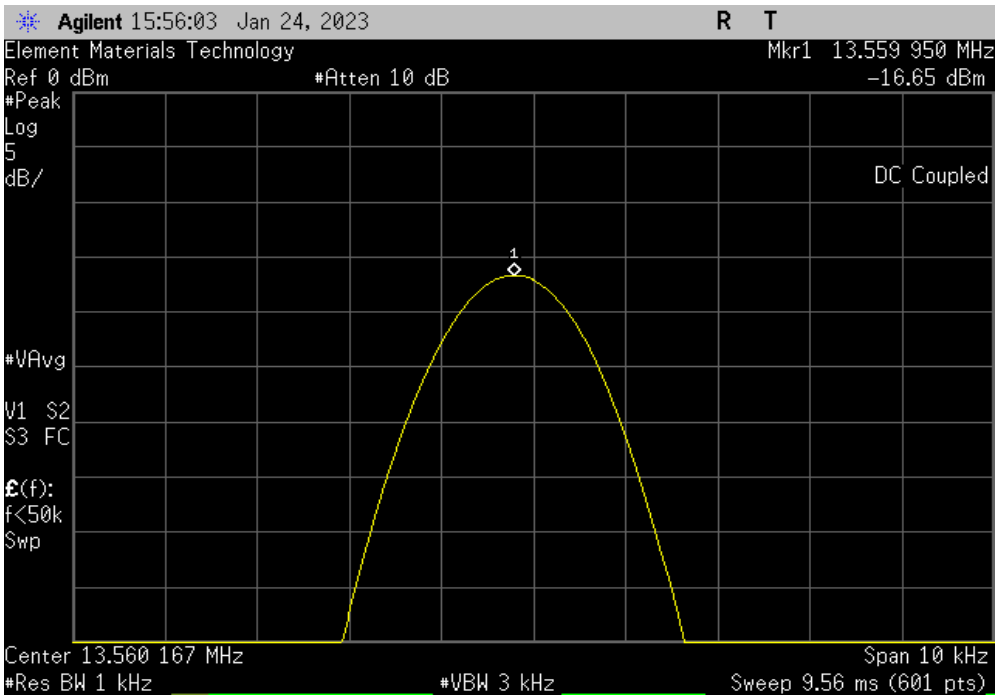


13.56 MHz RFID, Extreme Temperature +10°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559928	13.559886	3.1	100	Pass

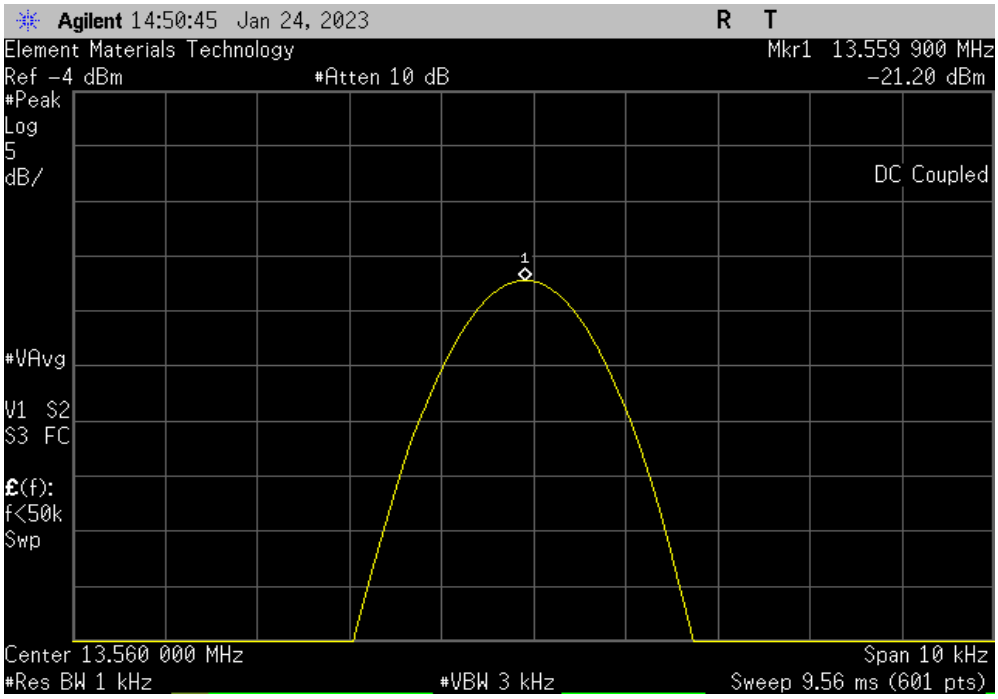


FREQUENCY STABILITY

13.56 MHz RFID, Extreme Temperature 0°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.55995	13.559886	4.7	100	Pass

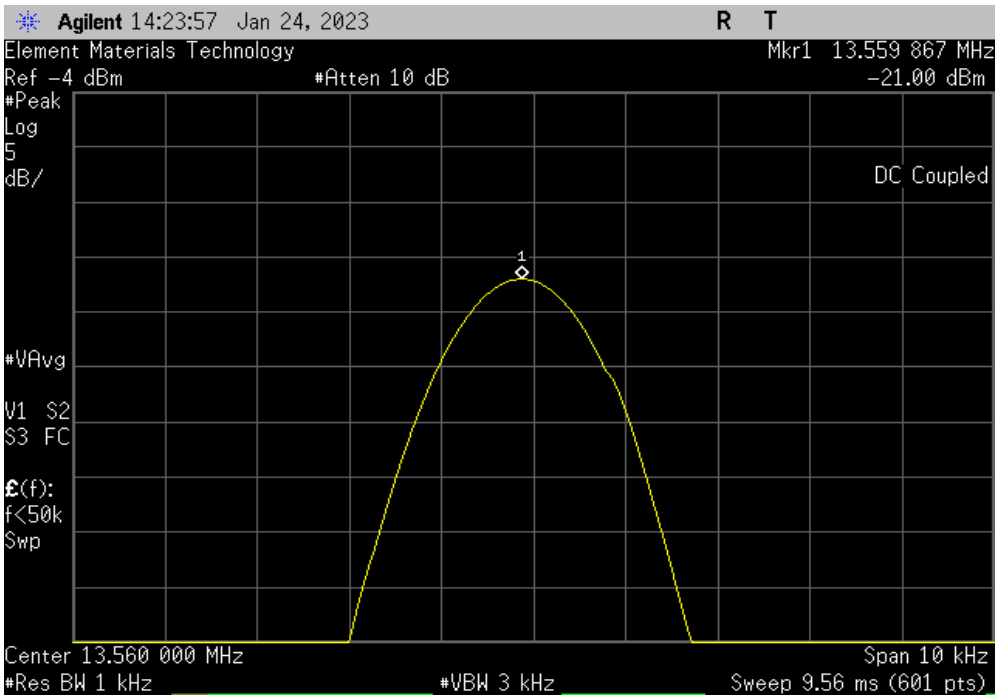


13.56 MHz RFID, Extreme Temperature -10°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.5599	13.559886	1.0	100	Pass



FREQUENCY STABILITY

13.56 MHz RFID, Extreme Temperature -20°C						
		Measured Value (MHz)	Nominal Value (MHz)	Error (ppm)	Limit (ppm)	Results
		13.559867	13.559886	1.4	100	Pass



EMISSIONS BANDWIDTH (20 DB)

XMit 2022.02.07.0

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.	Cal. Due
Power Supply - DC	Hewlett Packard	6574A	TPX	NCR	NCR
Meter - Multimeter	Gossen	M249A	SLM	2023-01-05	2024-01-05
Power Supply	Pacific Power	3120AFX-2L	SMT	NCR	NCR
Probe - Near Field Set	EMCO	7405	IPI	NCR	NCR
Cable	Micro-Coax	UFD150A-1-0720-200200	OCA	2022-02-14	2023-02-14
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	2022-10-21	2023-10-21

TEST DESCRIPTION

A near-field probe was placed near the transmitter. A low-loss coaxial cable was used to connect the near-field probe to the spectrum analyzer.

As defined in FCC 15.215 Part (c), intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise by specified in the specific rule section under which the equipment operates, is contained within the frequency band designed in the rule section under which the equipment is operated.

The 20 dB bandwidth must be contained within the band 13.110-14.010 MHz. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) of the spectrum analyzer was set to the range of 1% to 5% of the emissions bandwidth (EBW) and video bandwidth (VBW) bandwidth was set to at least 3 times the resolution bandwidth. The analyzer sweep time was set to auto and a peak detector was used.

The spectrum analyzer bandwidth measurement function was used to measure the 20 dB bandwidth.

EMISSIONS BANDWIDTH (20 DB)

XMit 2022.02.07.0

EUT:	**HE600 System**			**Work Order:**	**VENT0079**
Serial Number:	**6000922**			**Date:**	**25-Jan-23**
Customer:	**Ventana Medical Systems, Inc.**			**Temperature:**	**21.1 °C**
Attendees:	**Neil Trujillo**			**Humidity:**	**38.9% RH**
Project:	**None**			**Barometric Pres.:**	**1026 mbar**
Tested by:	**Mark Baytan**	**Power:**	**24 VDC**	**Job Site:**	**OC13**

TEST SPECIFICATIONS	**Test Method**
FCC 15.225:2023	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

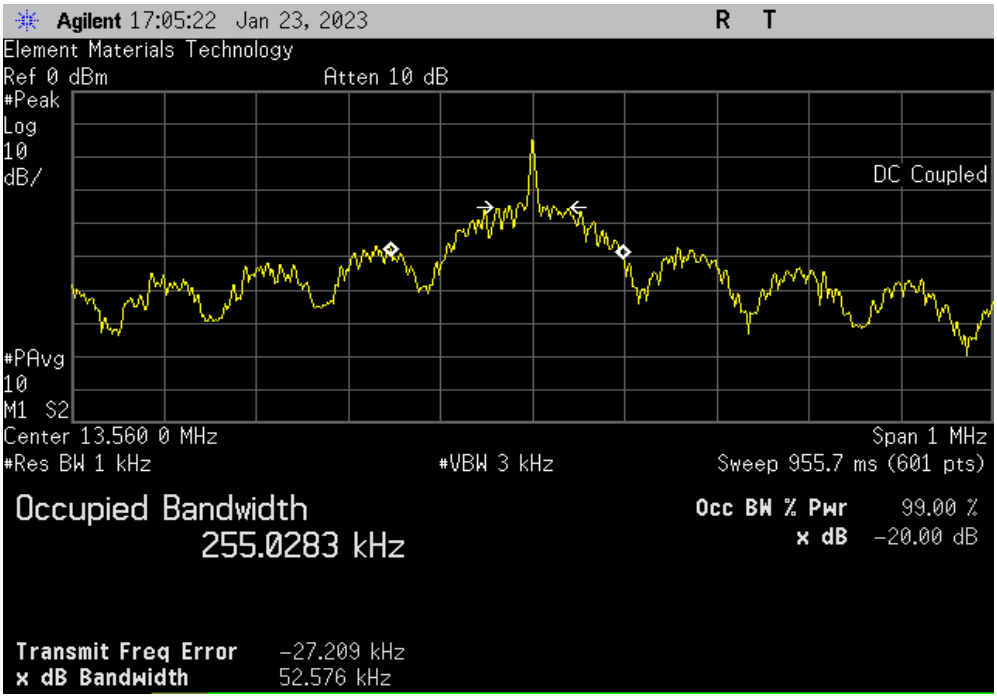
Configuration #	**1**	*Signature*

	Value	**Limit 13.110<20 dB BW>14.010 MHz**	**Result**
13.56 MHz RFID	52.576 kHz	Within	Pass

EMISSIONS BANDWIDTH (20 DB)

XMit 2022.02.07.0

13.56 MHz RFID						
					Limit	
				Value	13.110<20 dB BW>14.010 MHz	Result
				52.576 kHz	Within	Pass



End of Test Report