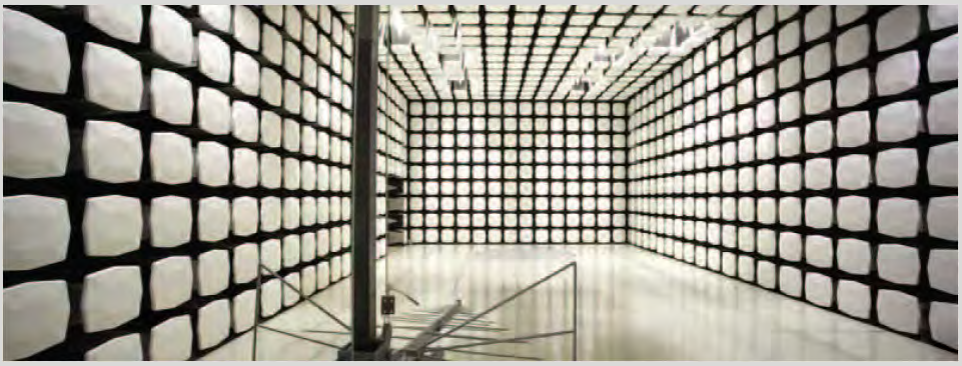
Spacelabs Healthcare, Inc.

96281-C09W

FCC 95H:2014

Report #: SPAC0516.3



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

NORTHWEST EMC

WTD 12.5.23

CERTIFICATE OF TEST

Last Date of Test: May 15, 2014
Spacelabs Healthcare, Inc.
Model: 96281-C09W

Test Description	Specification	Test Method	Pass/Fail
Field Strength of Fundamental	FCC 95H:2014	ANSI/TIA/EIA-603-C-2004	Pass
Field Strength of Spurious Emissions	FCC 95H:2014	ANSI/TIA/EIA-603-C-2004	Pass
Output Power	FCC 95H:2014	ANSI/TIA/EIA-603-C-2004	Pass
Occupied Bandwidth	FCC 95H:2014	ANSI/TIA/EIA-603-C-2004	Pass
Frequency Stability	FCC 95H:2014	ANSI/TIA/EIA-603-C-2004	Pass

Deviations From Test Standards

None

Approved By:

Rod Munro, Operations Manager

NVLAP®

NVLAP Lab Code: 200629-0

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.

NORTHWEST EMC
REV 2012.08.02

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

NORTHWEST EMC

REV 2012.05.24

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 - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

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

Korea

KCC / 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.

Hong Kong

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

Vietnam

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

Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards.

SCOPE

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

MEASUREMENT UNCERTAINTY

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 WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. 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 16-4-1 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.

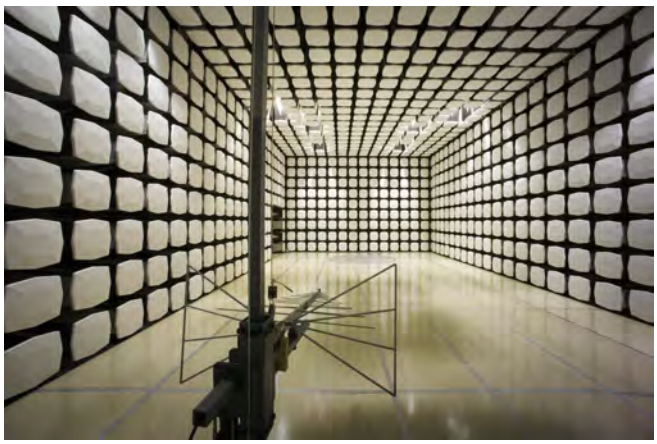
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	4.00	-4.00
AC Powerline Conducted Emissions (dB)	2.70	-2.70

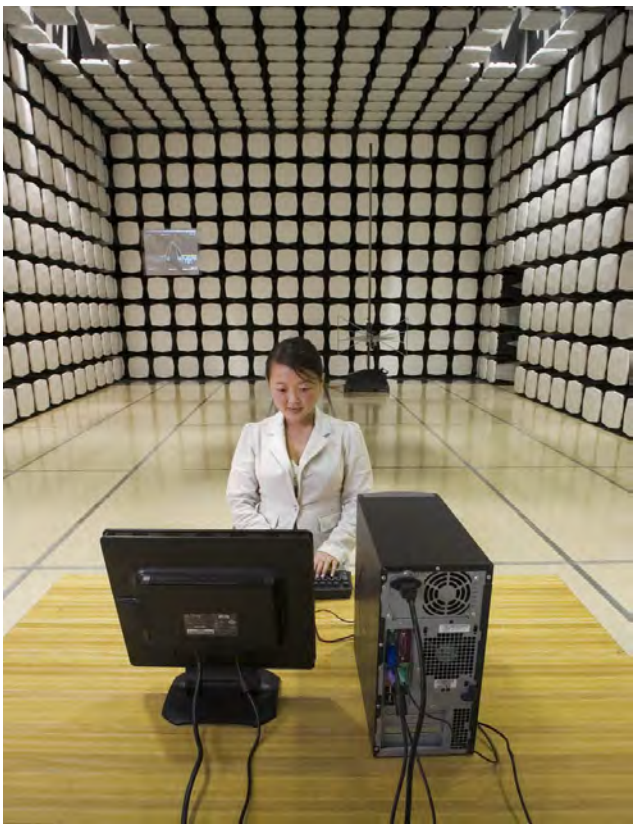
NORTHWEST EMC

REV 2013.06.28

FACILITIES

Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	**California** Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	**New York** Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	**Minnesota** Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	**Washington** Labs NC01-05,SU02,SU07 19201 120th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0





PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Spacelabs Healthcare, Inc.
Address:	35301 SE Center Street
City, State, Zip:	Snoqualmie, WA 98065
Test Requested By:	Jon Scott
Model:	96281-C09W
First Date of Test:	February 19, 2014
Last Date of Test:	May 15, 2014
Receipt Date of Samples:	February 17, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

The 96281-C09W is a body-worn telemetry transmitter operating in the 1395 - 1400 MHz and 1427 - 1432 MHz bands.

Testing Objective:

To demonstrate compliance with FCC 95H requirements for a medical telemetry device operating in the 1395 - 1400 MHz and 1427 - 1432 MHz bands.

CONFIGURATIONS

Configuration SPAC0516- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AriaTele Transmitter	Spacelabs Healthcare, Inc.	96281-B09	B1409B

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
ECG/Telemetry Lead Set	No	0.64m	No	AriaTele Transmitter	Terminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Configuration SPAC0516- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AriaTele Transmitter	Spacelabs Healthcare, Inc.	96281-C09	B1406B

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
ECG/Telemetry Lead Set	No	0.64m	No	AriaTele Transmitter	Terminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2/18/2014	Field Strength of Spurious Emission	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	2/21/2014	Occupied Bandwidth	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	2/21/2014	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT returned to manufacturer.
4	4/10/2014	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT returned to manufacturer.
5	5/15/2014	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

Channels Tested

Transmitting at 1397.45 MHz - Wide Band
Transmitting at 1429.05 MHz - Wide Band

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

SPAC0516 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	1395 MHz	Stop Frequency	1432 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
NC01 Cables	N/A	3115 Horn Cable	NC2	10/24/2013	12 mo
Antenna, Horn	EMCO	3115	AHM	6/19/2012	24 mo
Spectrum Analyzer	Agilent	E4440A	AAW	2/21/2013	24 mo

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

TEST DESCRIPTION

Per FCC 95.1115(2), the maximum radiated field strength for a WMTS transmitter is 740 mV/m using an average detector and a 1 MHz measurement bandwidth. Measurements were taken in dBuV/m, and the limt for Field Strength of the Fundamental was converted to dBuV/m, equalling 117.4 dBuV/m.

The Field Strength of the Fundamental was measured in the far-field at an FCC Listed Semi-anechoic Chamber. Spectrum analyzer and linearly polarized antennas were used to measure the radiated field strength of the fundamental.

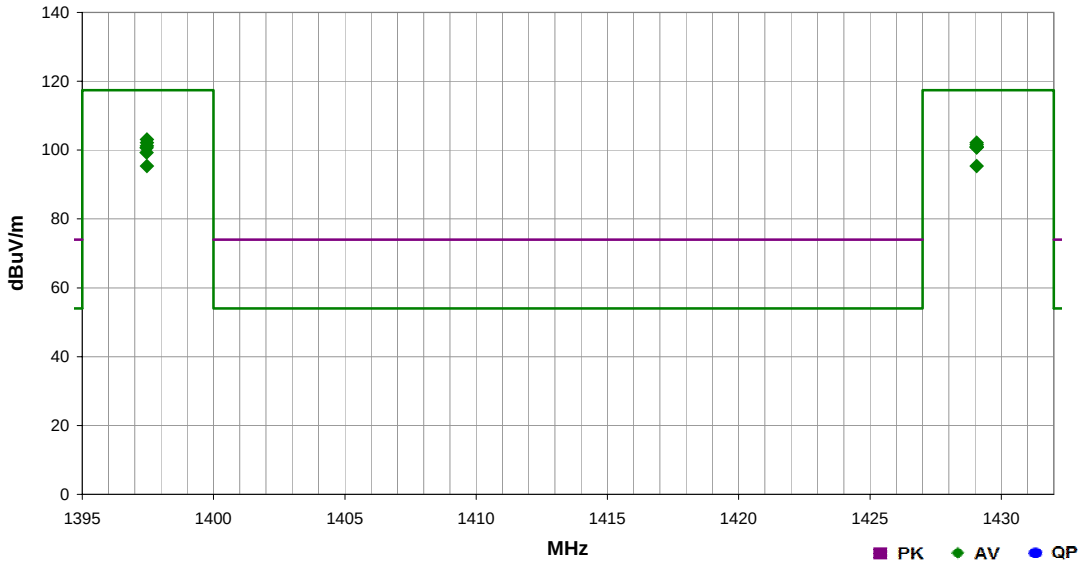
The orientation of the EUT and measurement antenna were manipulated to maximize the level of emissions. The turntable azimuth was varied to maximize the level of radiated emissions. The height of the measurement antenna was also varied from 1 to 4 meters. The amplitude and frequency of the emissions were noted.

FIELD STRENGTH OF FUNDAMENTAL

Work Order:	SPAC0516	**Date:**	02/21/14		
Project:	None	**Temperature:**	24 °C		
Job Site:	NC01	**Humidity:**	29% RH		
Serial Number:	B1406B	**Barometric Pres.:**	1024 mbar	**Tested by:**	Richard Mellroth
EUT:	96281-C09				
Configuration:	3				
Customer:	Spacelabs Healthcare, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting at 1397.45 MHz - Wide Band and 1429.05 MHz - Wide Band. See comments next to data points for EUT channel and orientation.				
Deviations:	No deviations.				
Comments:	None				

Test Specifications	**Test Method**
FCC 95H:2014	ANSI/TIA/EIA-603-C-2004

Run #	58-59	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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)	Comments
1397.460	72.7	30.4	1.2	345.0	3.0	0.0	Horz	AV	0.0	103.1	117.4	-14.3	CH: 1397.45 MHz, WB, EUT on Side
1397.460	71.8	30.4	1.2	58.0	3.0	0.0	Horz	AV	0.0	102.2	117.4	-15.2	CH: 1397.45 MHz, WB, EUT Flat
1429.057	71.7	30.5	1.2	1.0	3.0	0.0	Horz	AV	0.0	102.2	117.4	-15.2	CH: 1429.05 MHz, WB, EUT on Side
1429.058	71.1	30.5	1.1	329.0	3.0	0.0	Horz	AV	0.0	101.6	117.4	-15.8	CH: 1429.05 MHz, WB, EUT Flat
1397.457	70.8	30.4	1.8	70.0	3.0	0.0	Vert	AV	0.0	101.2	117.4	-16.2	CH: 1397.45 MHz, WB, EUT Flat
1429.058	70.6	30.5	1.7	66.0	3.0	0.0	Vert	AV	0.0	101.1	117.4	-16.3	CH: 1429.05 MHz, WB, EUT Flat
1429.060	70.4	30.5	1.5	78.0	3.0	0.0	Vert	AV	0.0	100.9	117.4	-16.5	CH: 1429.05 MHz, WB, EUT on Side
1429.058	70.3	30.5	1.2	351.0	3.0	0.0	Vert	AV	0.0	100.8	117.4	-16.6	CH: 1429.05 MHz, WB, EUT Standing
1397.455	70.3	30.4	1.0	88.0	3.0	0.0	Vert	AV	0.0	100.7	117.4	-16.7	CH: 1397.45 MHz, WB, EUT on Side
1397.455	68.9	30.4	1.3	256.0	3.0	0.0	Vert	AV	0.0	99.3	117.4	-18.1	CH: 1397.45 MHz, WB, EUT Standing
1397.460	65.0	30.4	2.2	161.0	3.0	0.0	Horz	AV	0.0	95.4	117.4	-22.0	CH: 1397.45 MHz, WB, EUT Standing
1429.057	64.9	30.5	2.2	0.0	3.0	0.0	Horz	AV	0.0	95.4	117.4	-22.0	CH: 1429.05 MHz, WB, EUT Standing

FIELD STRENGTH OF 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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

Channels Tested

Transmitting at 1397.45 MHz, Wide Band (50 kHz)
Transmitting at 1429.05 MHz, Wide Band (50 kHz)

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

SPAC0516 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12400 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
HP Filter	Micro-Tronics	HPM50111	HHI	1/18/2013	24 mo
Notch Filter	K&L Microwave	3TNF-1000/2000-N/N	HHN	8/28/2013	12 mo
LP Filter	Micro-Tronics	LPM50004	LFF	11/14/2013	24 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	12/6/2013	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	10/24/2013	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAB	10/24/2013	12 mo
Antenna, Horn	EMCO	3160-07	AHP	NCR	0 mo
Antenna, Horn	EMCO	3115	AHM	6/19/2012	24 mo
Antenna, Biconilog	EMCO	3142	AXJ	5/16/2012	36 mo
NC01 Cables	N/A	Standard Gain Horn Cable	NC3	12/6/2013	12 mo
NC01 Cables	N/A	3115 Horn Cable	NC2	10/24/2013	12 mo
NC01 Cables	N/A	Bilog Cables	NC1	10/24/2013	12 mo
Spectrum Analyzer	Agilent	E4440A	AAW	2/21/2013	24 mo

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

TEST DESCRIPTION

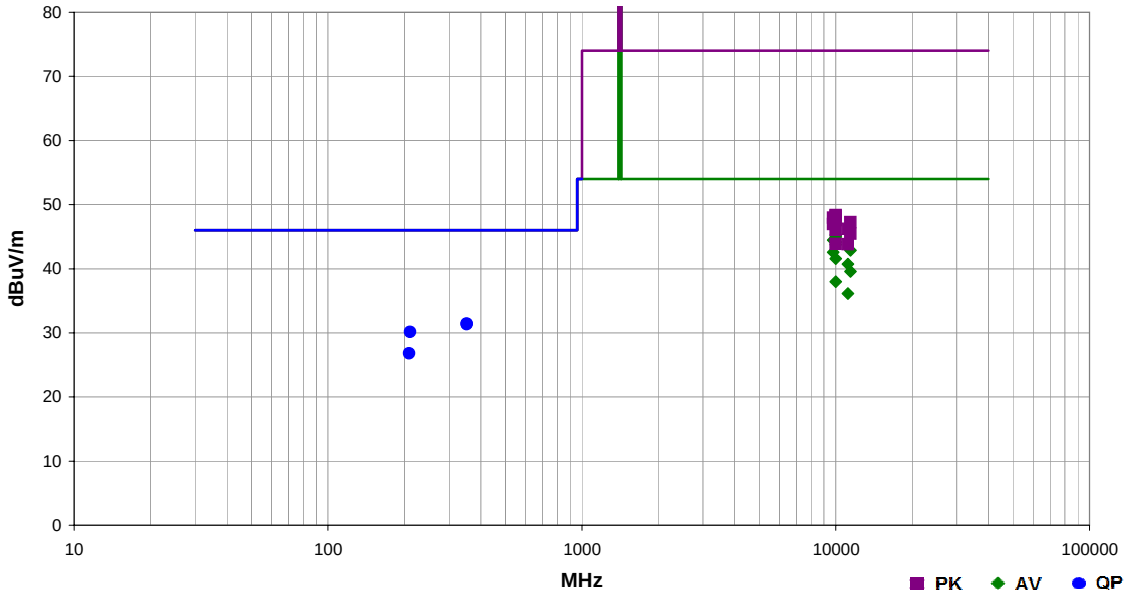
The EUT was configured for mid band transmit frequencies for the 1395-1400 MHz band and 1429-1432 MHz band. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

FIELD STRENGTH OF SPURIOUS EMISSIONS

Work Order:	SPAC0516	**Date:**	02/19/14		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	29% RH		
Serial Number:	B1406B	**Barometric Pres.:**	1017 mbar	**Tested by:**	Richard Mellroth
EUT:	96281-C09				
Configuration:	3				
Customer:	Spacelabs Healthcare, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	See comments next to data points below for EUT channel and orientaion.				
Deviations:	No deviations.				
Comments:	None				

Test Specifications	**Test Method**
FCC 95H:2014	ANSI/TIA/EIA-603-C-2004

Run #	47-49	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	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)	Comments
10003.360	47.6	-2.3	1.2	280.0	3.0	0.0	Horz	AV	0.0	45.3	54.0	-8.7	CH: 1429.05 MHz, WB, EUT Standing
10003.370	47.3	-2.3	1.4	42.0	3.0	0.0	Vert	AV	0.0	45.0	54.0	-9.0	CH: 1429.05 MHz, WB, EUT Flat
9782.165	46.8	-2.3	1.2	238.0	3.0	0.0	Horz	AV	0.0	44.5	54.0	-9.5	CH: 1397.45 MHz, WB, EUT Standing
10003.350	46.5	-2.3	1.3	20.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	CH: 1429.05 MHz, WB, EUT Standing
10003.350	46.1	-2.3	1.2	328.0	3.0	0.0	Horz	AV	0.0	43.8	54.0	-10.2	CH: 1429.05 MHz, WB, EUT on Side
11432.400	44.8	-1.9	1.2	30.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1	CH: 1429.05 MHz, WB, EUT Flat
9782.155	44.9	-2.3	1.2	200.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4	CH: 1397.45 MHz, WB, EUT Flat
10003.370	43.9	-2.3	1.7	148.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	CH: 1429.05 MHz, WB, EUT Flat
11179.620	42.5	-1.8	1.1	171.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	CH: 1397.45 MHz, WB, EUT Standing
11432.420	41.5	-1.9	1.2	323.0	3.0	0.0	Horz	AV	0.0	39.6	54.0	-14.4	CH: 1429.05 MHz, WB, EUT Standing
352.254	28.7	2.7	2.1	136.0	3.0	0.0	Vert	QP	0.0	31.4	46.0	-14.6	CH: 1397.45 MHz, WB, EUT Standing
352.254	28.6	2.7	2.2	116.0	3.0	0.0	Vert	QP	0.0	31.3	46.0	-14.7	CH: 1429.05 MHz, WB, EUT Standing
210.948	32.9	-2.8	2.1	127.0	3.0	0.0	Vert	QP	0.0	30.1	46.0	-15.9	CH: 1397.45 MHz, WB, EUT Standing
10003.350	40.3	-2.3	1.2	325.0	3.0	0.0	Vert	AV	0.0	38.0	54.0	-16.0	CH: 1429.05 MHz, WB, EUT on Side
11179.620	37.9	-1.8	1.2	350.0	3.0	0.0	Vert	AV	0.0	36.1	54.0	-17.9	CH: 1397.45 MHz, WB, EUT Flat
208.895	29.6	-2.8	1.2	131.0	3.0	0.0	Vert	QP	0.0	26.8	46.0	-19.2	CH: 1429.05 MHz, WB, EUT Standing
10003.340	50.7	-2.3	1.2	280.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	CH: 1429.05 MHz, WB, EUT Standing
10003.530	50.6	-2.3	1.4	42.0	3.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	CH: 1429.05 MHz, WB, EUT Flat
9782.060	50.3	-2.3	1.2	238.0	3.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	CH: 1397.45 MHz, WB, EUT Standing
10003.390	50.0	-2.3	1.2	328.0	3.0	0.0	Horz	PK	0.0	47.7	74.0	-26.3	CH: 1429.05 MHz, WB, EUT on Side
10003.380	49.9	-2.3	1.3	20.0	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	CH: 1429.05 MHz, WB, EUT Standing
11432.530	49.2	-1.9	1.2	30.0	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	CH: 1429.05 MHz, WB, EUT Flat
9782.185	49.3	-2.3	1.2	200.0	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	CH: 1397.45 MHz, WB, EUT Flat
11179.520	48.0	-1.8	1.1	171.0	3.0	0.0	Horz	PK	0.0	46.2	74.0	-27.8	CH: 1397.45 MHz, WB, EUT Standing
10003.500	48.4	-2.3	1.7	148.0	3.0	0.0	Horz	PK	0.0	46.1	74.0	-27.9	CH: 1429.05 MHz, WB, EUT Flat
11432.320	47.4	-1.9	1.2	323.0	3.0	0.0	Horz	PK	0.0	45.5	74.0	-28.5	CH: 1429.05 MHz, WB, EUT Standing
10003.310	46.2	-2.3	1.2	325.0	3.0	0.0	Vert	PK	0.0	43.9	74.0	-30.1	CH: 1429.05 MHz, WB, EUT on Side
11179.590	45.6	-1.8	1.2	350.0	3.0	0.0	Vert	PK	0.0	43.8	74.0	-30.2	CH: 1397.45 MHz, WB, EUT Flat

OUTPUT POWER

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
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
40GHz DC Block	Fairview Microwave	SD3379	AMJ	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

The peak output power was measured with the EUT set to the middle transmit frequency in each band. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate.

OUTPUT POWER

EUT:	96281-C			**Work Order:**	SPAC0516
Serial Number:	B1404B			**Date:**	05/15/14
Customer:	Spacelabs Healthcare, Inc.			**Temperature:**	24°C
Attendees:	None			**Humidity:**	37%
Project:	None			**Barometric Pres.:**	1017 mb
Tested by:	Richard Mellroth	**Power:**	Battery	**Job Site:**	NC06

TEST SPECIFICATIONS	Test Method
FCC 95H:2014	ANSI/TIA/EIA-603-C-2004

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

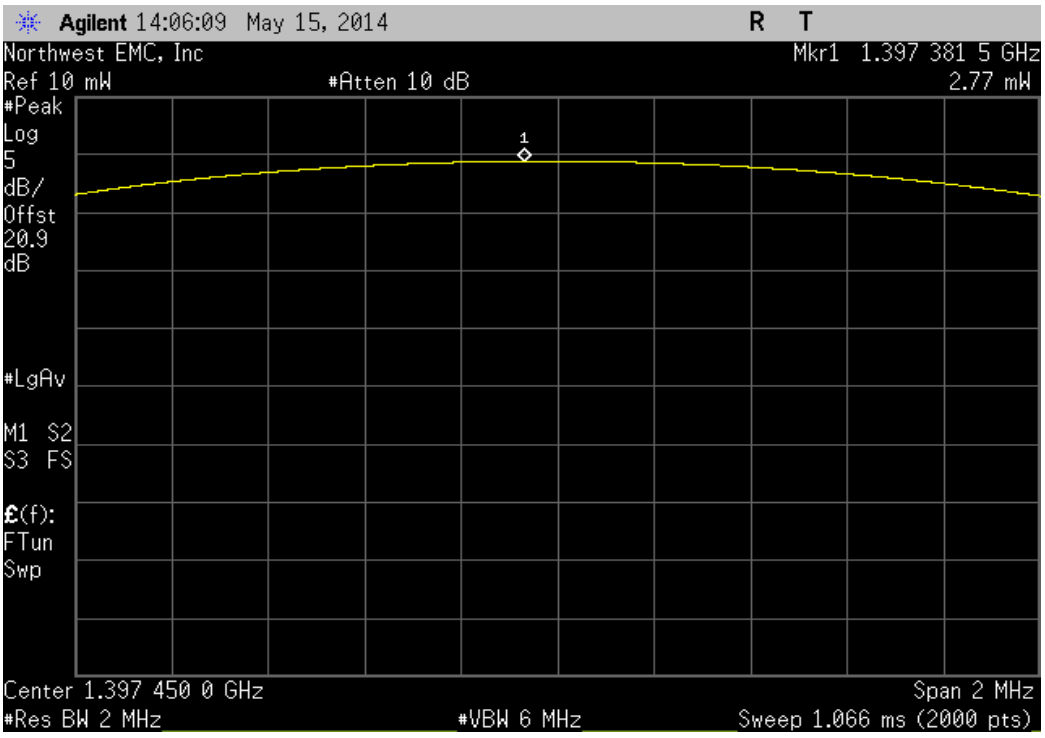
No deviations.

Configuration #	5	Signature

	Value	Limit	Result
Wide Band			
Mid Channel 1397.45 MHz	2.769 mW	N/A	Pass
Mid Channel 1429.05 MHz	2.944 mW	N/A	Pass

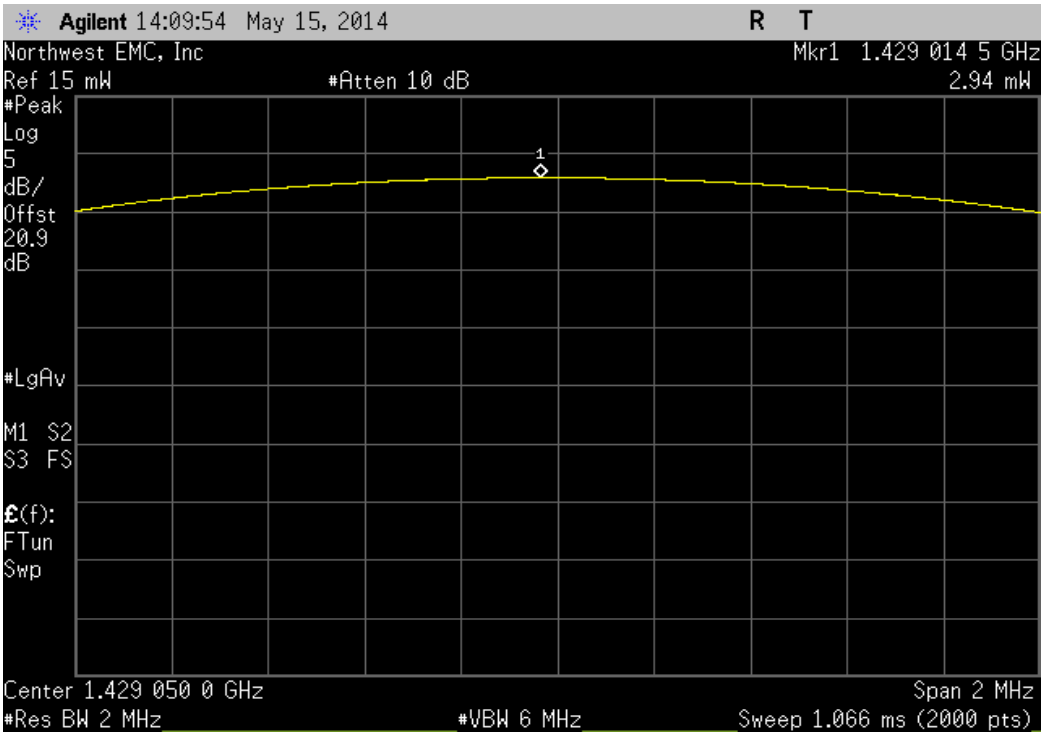
Wide Band, Mid Channel 1397.45 MHz

				Value	Limit	Result
				2.769 mW	N/A	Pass



Wide Band, Mid Channel 1429.05 MHz

				Value	Limit	Result
				2.944 mW	N/A	Pass



OCCUPIED BANDWIDTH

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
Near Field Probe Set	Com-Power	PS-400	IPE	NCR	0
Attenuator, 10db, 'SMA'	S.M. Electronics	SA18H-10	REJ	12/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

Per 47 CFR 2.1049, the 99% bandwidth was measured utilizing the analyzer's peak detector and measuring the carrier's 20 dB occupied bandwidth.

The antenna is integral to the EUT, so a radiated measurement was made using a spectrum analyzer and a near field probe. At 300Hz the spectrum analyzer's resolution bandwidth was sufficiently narrow to plot the actual bandwidth of the signal and not the filter response curve of the spectrum analyzer. The resolution bandwidth was >1% of the 20dB bandwidth and the video bandwidth was greater than or equal to the resolution bandwidth.

The occupied bandwidth was measured with the EUT configured for continuous modulated operation at the low and high channel of each of the operational bands.

OCCUPIED BANDWIDTH

EUT:	96281-C09			**Work Order:**	SPAC0516
Serial Number:	B1406B			**Date:**	02/21/14
Customer:	Spacelabs Healthcare, Inc.			**Temperature:**	24.1°C
Attendees:	None			**Humidity:**	31%
Project:	None			**Barometric Pres.:**	1008 mb
Tested by:	Matthew Barnes	**Power:**	Battery	**Job Site:**	NC04

TEST SPECIFICATIONS	Test Method
FCC 95H:2014	ANSI/TIA/EIA-603-C-2004

COMMENTS

Maximized fundamental

DEVIATIONS FROM TEST STANDARD

No deviations.

Configuration #	3	Signature

		Value	Limit	Result
Normal Voltage				
	Low Channel, 1397.45 WB	17.41 kHz	≤ 300 kHz	Pass
	High Channel, 1429.05 WB	17.532 kHz	≤ 300 kHz	Pass

OCCUPIED BANDWIDTH

Normal Voltage, Low Channel, 1397.45 WB						
				Value	Limit	Result
				17.41 kHz	≤ 300 kHz	Pass

Normal Voltage, High Channel, 1429.05 WB						
				Value	Limit	Result
				17.532 kHz	≤ 300 kHz	Pass

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
Temp./Humidity Chamber	Tenney	T6S	TBG	8/23/2013	12
Near Field Probe Set	Com-Power	PS-400	IPE	NCR	0
Attenuator, 10db, 'SMA'	S.M. Electronics	SA18H-10	REJ	12/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

Variation of Supply Voltage
The primary supply voltage was varied from the manufacturers stated battery end point voltage(1.86V) to +10% (3.30V) maximum of the nominal battery voltage(3V).

Variation of Ambient Temperature
Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30º to +50° C) and at 10°C intervals.

The testing was conducted on one of three units that all contain the same radio module, the same data is being used in the other unit reports. The measurement was made with a direct connection between the EUT antenna port and the test equipment. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

FREQUENCY STABILITY

EUT:	96281-B09			**Work Order:**	SPAC0516
Serial Number:	B1409B			**Date:**	04/10/14
Customer:	Spacelabs, Inc			**Temperature:**	24.1°C
Attendees:	None			**Humidity:**	31%
Project:	None			**Barometric Pres.:**	1008
Tested by:	Matthew Barnes	**Power:**	Battery	**Job Site:**	NC04

TEST SPECIFICATIONS	Test Method
FCC 95H:2014	ANSI/TIA/EIA-603-C-2004

COMMENTS

Maximizing fundamental

DEVIATIONS FROM TEST STANDARD

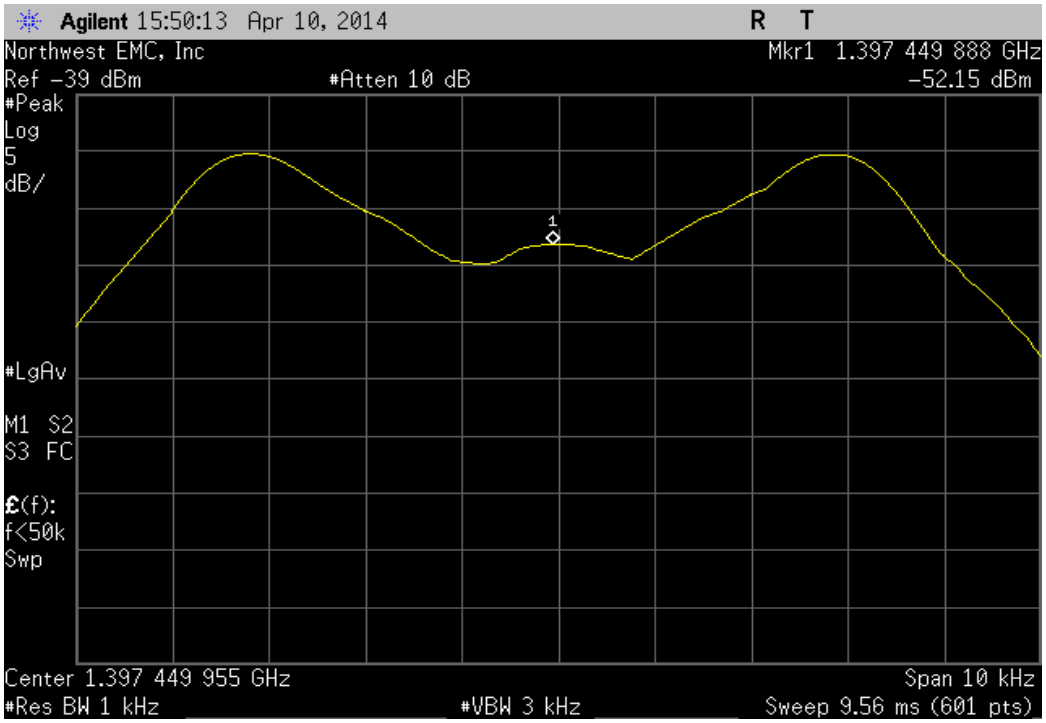
No deviations.

Configuration #	2	Signature	Matthew W Barnes

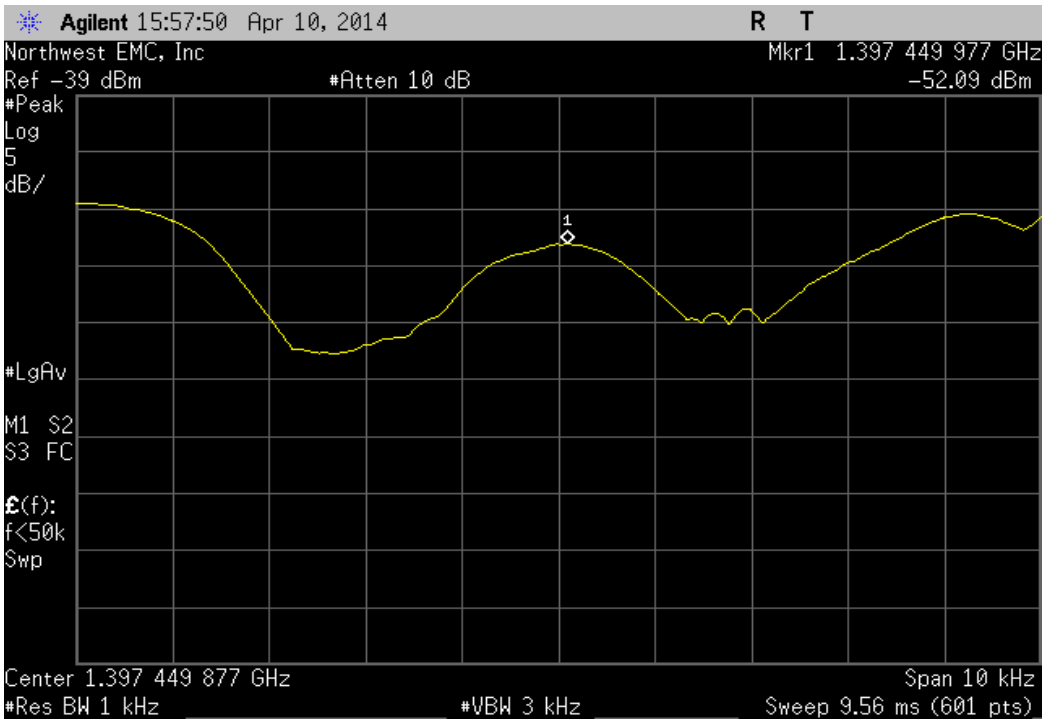
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
Maximum Voltage (3.30V)					
Low Channel, 1397.45 NB	1397.449888	1397.45	0.1	100	Pass
Low Channel, 1397.45 WB	1397.449977	1397.45	0	100	Pass
High Channel, 1429.05 NB	1429.049905	1429.05	0.1	100	Pass
High Channel, 1429.05 WB	1429.04994	1429.05	0	100	Pass
End Point Voltage (1.86V)					
Low Channel, 1397.45 NB	1397.45002	1397.45	0	100	Pass
Low Channel, 1397.45 WB	1397.449944	1397.45	0	100	Pass
High Channel, 1429.05 NB	1429.049921	1429.05	0.1	100	Pass
High Channel, 1429.05 WB	1429.049927	1429.05	0.1	100	Pass
Extreme Temperature +50°C					
Low Channel, 1397.45 NB	1397.449989	1397.45	0	100	Pass
Low Channel, 1397.45 WB	1397.449909	1397.45	0.1	100	Pass
High Channel, 1429.05 NB	1429.050054	1429.05	0	100	Pass
High Channel, 1429.05 WB	1429.05001	1429.05	0	100	Pass
Extreme Temperature +40°C					
Low Channel, 1397.45 NB	1397.449987	1397.45	0	100	Pass
Low Channel, 1397.45 WB	1397.449977	1397.45	0	100	Pass
High Channel, 1429.05 NB	1429.050075	1429.05	0	100	Pass
High Channel, 1429.05 WB	1429.049924	1429.05	0	100	Pass
Extreme Temperature +30°C					
Low Channel, 1397.45 NB	1397.450021	1397.45	0	100	Pass
Low Channel, 1397.45 WB	1397.450018	1397.45	0	100	Pass
High Channel, 1429.05 NB	1429.04997	1429.05	0	100	Pass
High Channel, 1429.05 WB	1429.050026	1429.05	0	100	Pass
Extreme Temperature +20°C					
Low Channel, 1397.45 NB	1397.450139	1397.45	0.1	100	Pass
Low Channel, 1397.45 WB	1397.450094	1397.45	0.1	100	Pass
High Channel, 1429.05 NB	1429.050088	1429.05	0.1	100	Pass
High Channel, 1429.05 WB	1429.050193	1429.05	0.1	100	Pass
Extreme Temperature +10°C					
Low Channel, 1397.45 NB	1397.450221	1397.45	0.2	100	Pass
Low Channel, 1397.45 WB	1397.450377	1397.45	0.3	100	Pass
High Channel, 1429.05 NB	1429.050288	1429.05	0.2	100	Pass
High Channel, 1429.05 WB	1429.050294	1429.05	0.2	100	Pass
Extreme Temperature 0°C					
Low Channel, 1397.45 NB	1397.450471	1397.45	0.3	100	Pass
Low Channel, 1397.45 WB	1397.450493	1397.45	0.4	100	Pass
High Channel, 1429.05 NB	1429.050589	1429.05	0.4	100	Pass
High Channel, 1429.05 WB	1429.050511	1429.05	0.4	100	Pass
Extreme Temperature -10°C					
Low Channel, 1397.45 NB	1397.450672	1397.45	0.5	100	Pass
Low Channel, 1397.45 WB	1397.45056	1397.45	0.4	100	Pass
High Channel, 1429.05 NB	1429.050672	1429.05	0.5	100	Pass
High Channel, 1429.05 WB	1429.05061	1429.05	0.4	100	Pass
Extreme Temperature -20°C					
Low Channel, 1397.45 NB	1397.450171	1397.45	0.1	100	Pass
Low Channel, 1397.45 WB	1397.450059	1397.45	0	100	Pass
High Channel, 1429.05 NB	1429.050071	1429.05	0	100	Pass
High Channel, 1429.05 WB	1429.05006	1429.05	0	100	Pass
Extreme Temperature -30°C					
Low Channel, 1397.45 NB	1397.44917	1397.45	0.6	100	Pass
Low Channel, 1397.45 WB	1397.449009	1397.45	0.7	100	Pass
High Channel, 1429.05 NB	1429.049121	1429.05	0.6	100	Pass
High Channel, 1429.05 WB	1429.049043	1429.05	0.7	100	Pass

FREQUENCY STABILITY

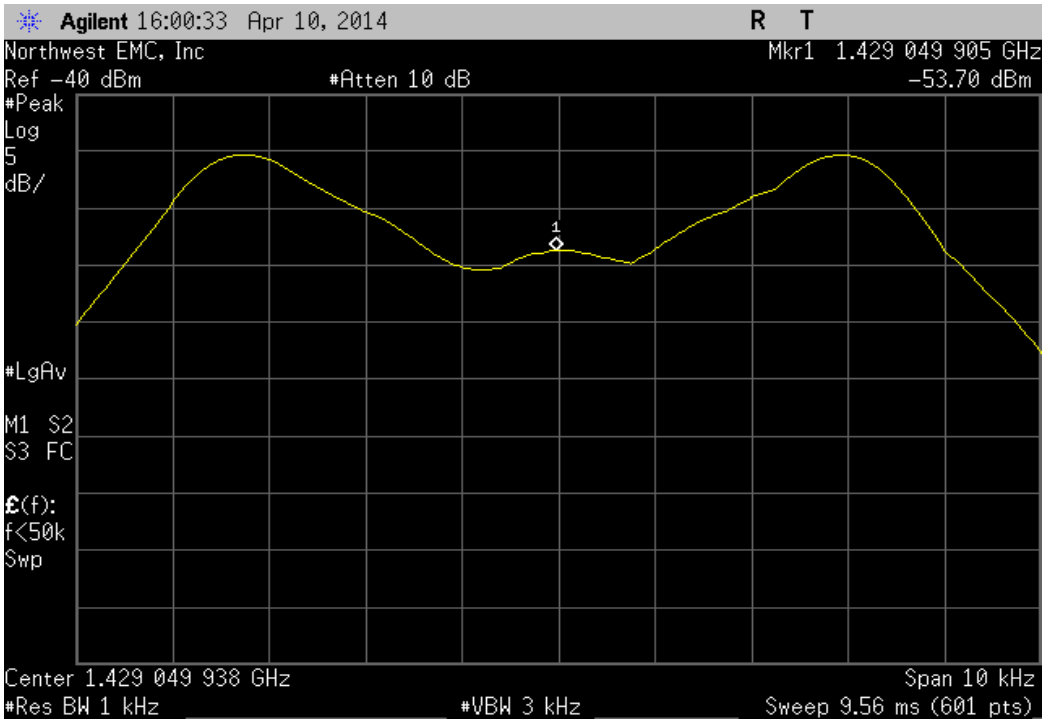
Maximum Voltage (3.30V), Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449888	1397.45	0.1	100	Pass



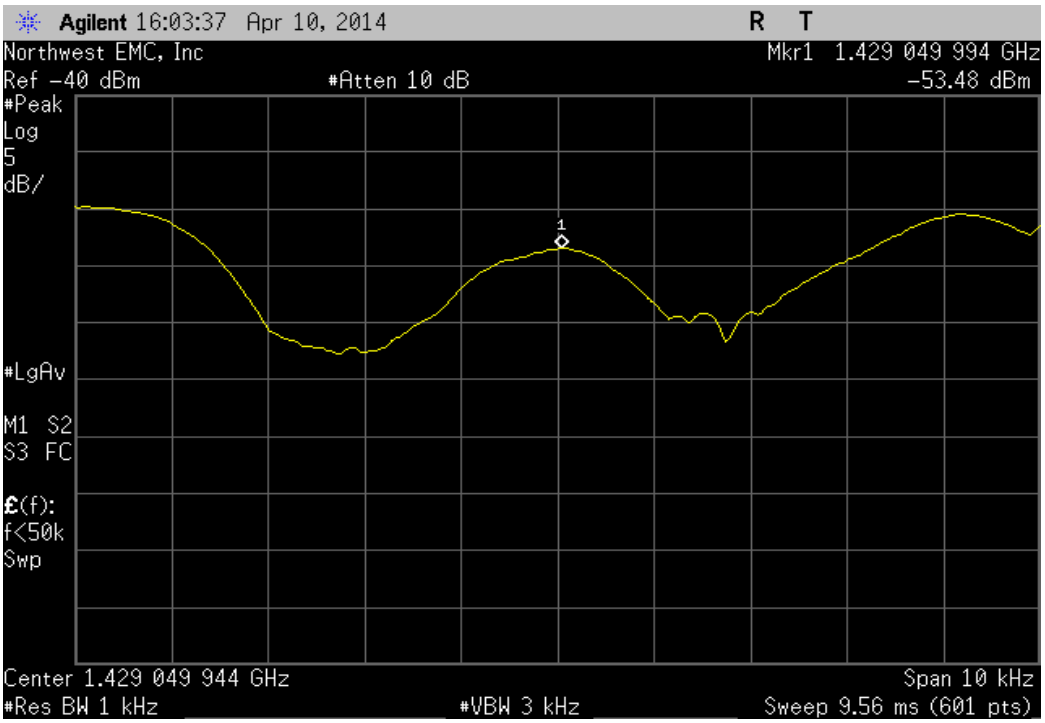
Maximum Voltage (3.30V), Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449977	1397.45	0	100	Pass



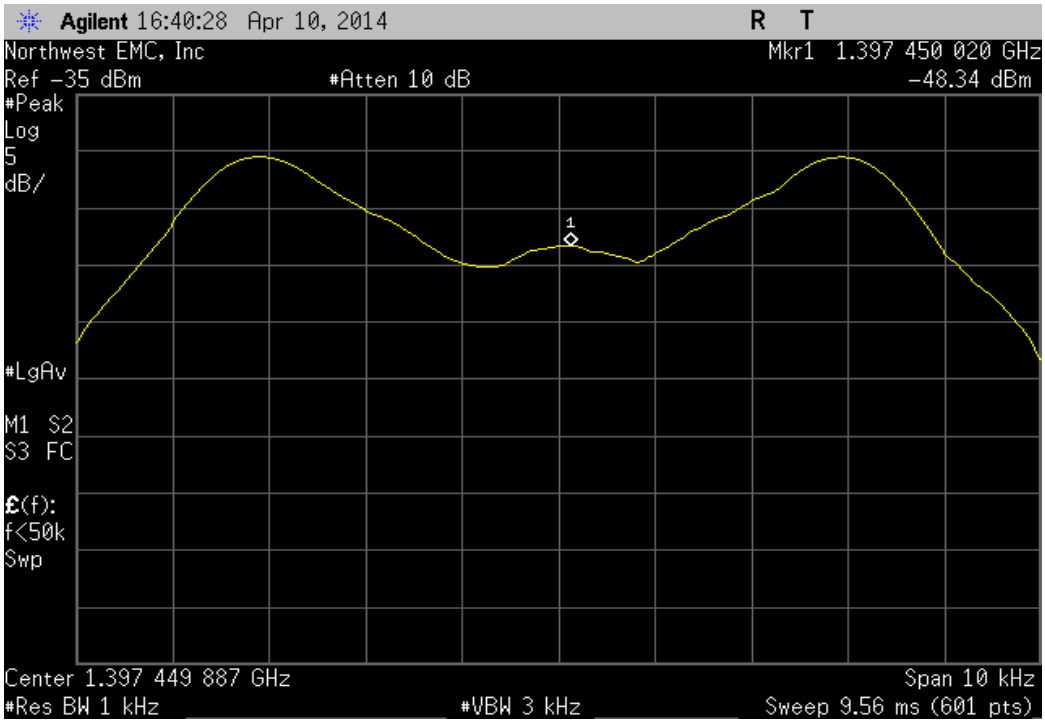
Maximum Voltage (3.30V), High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.049905	1429.05	0.1	100	Pass



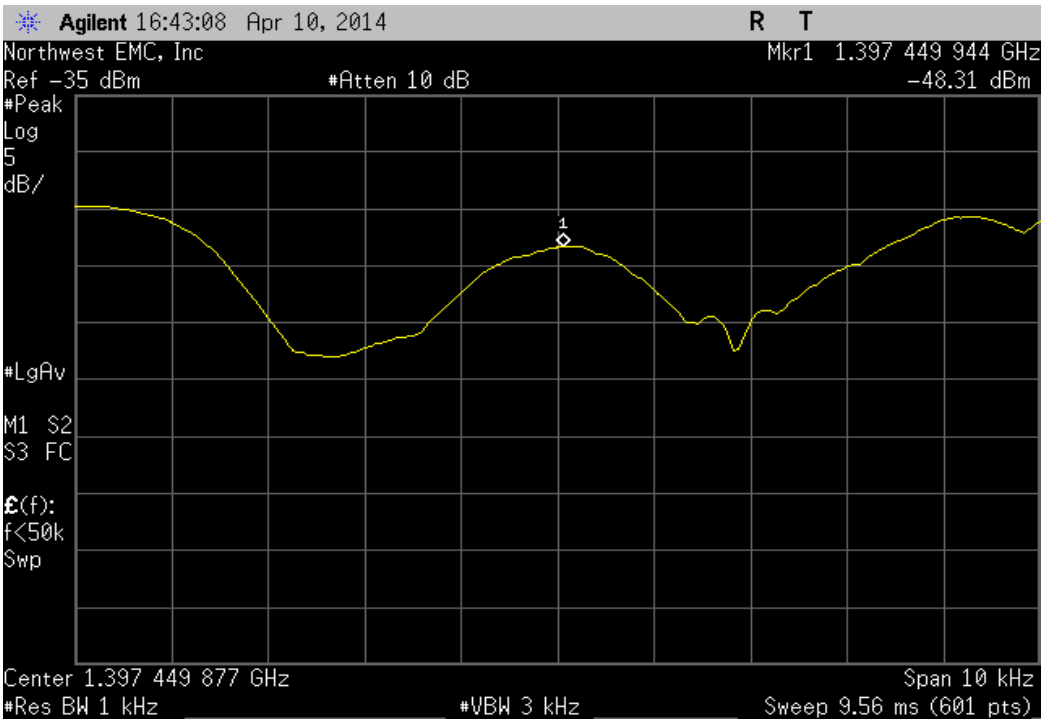
Maximum Voltage (3.30V), High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.04994	1429.05	0	100	Pass



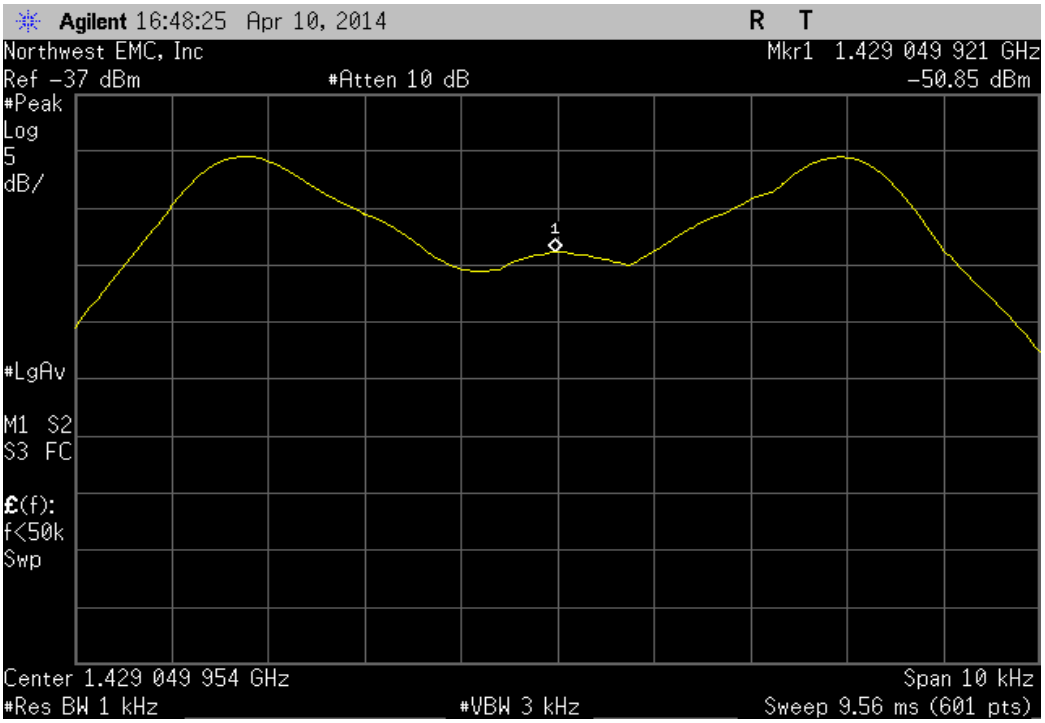
End Point Voltage (1.86V), Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.45002	1397.45	0	100	Pass



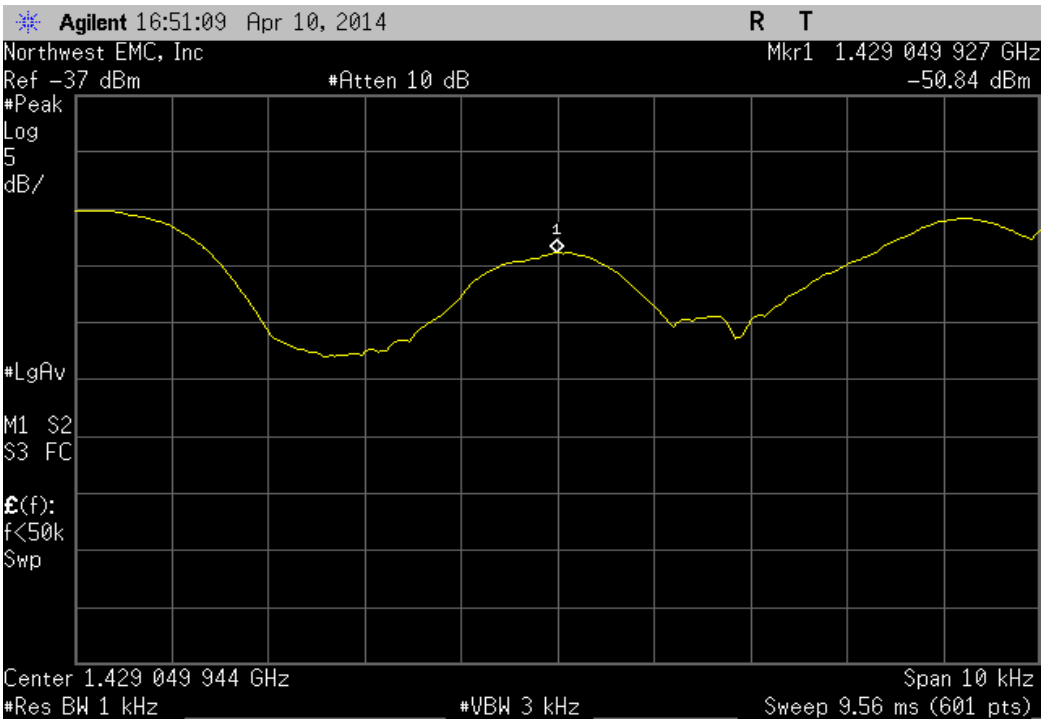
End Point Voltage (1.86V), Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449944	1397.45	0	100	Pass



End Point Voltage (1.86V), High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.049921	1429.05	0.1	100	Pass

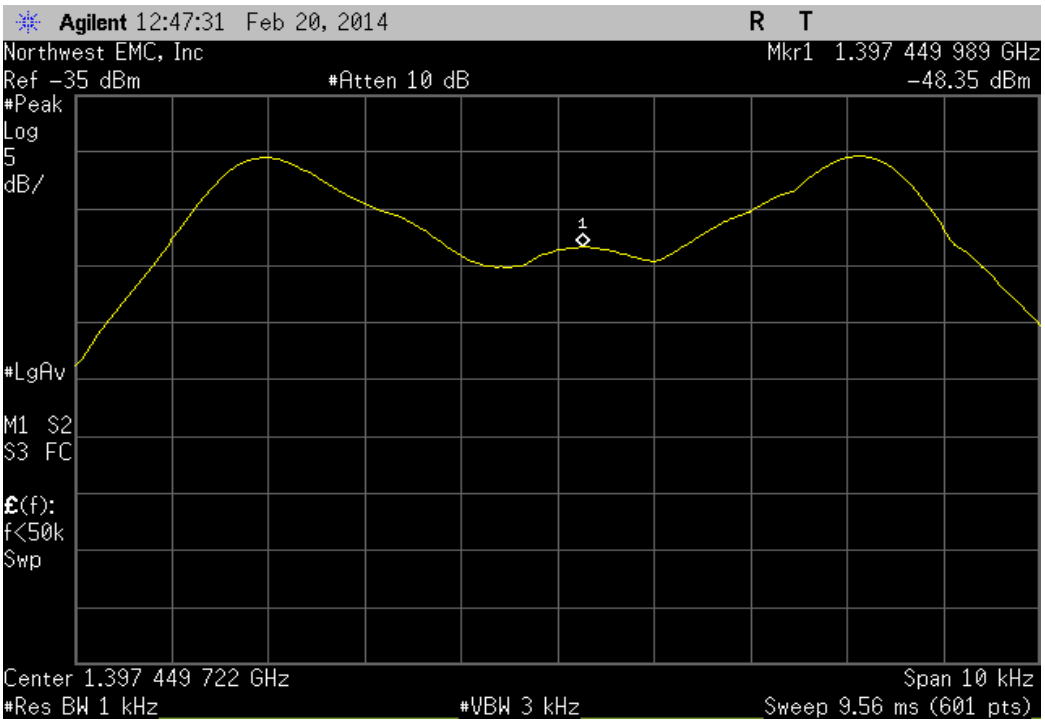


End Point Voltage (1.86V), High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.049927	1429.05	0.1	100	Pass

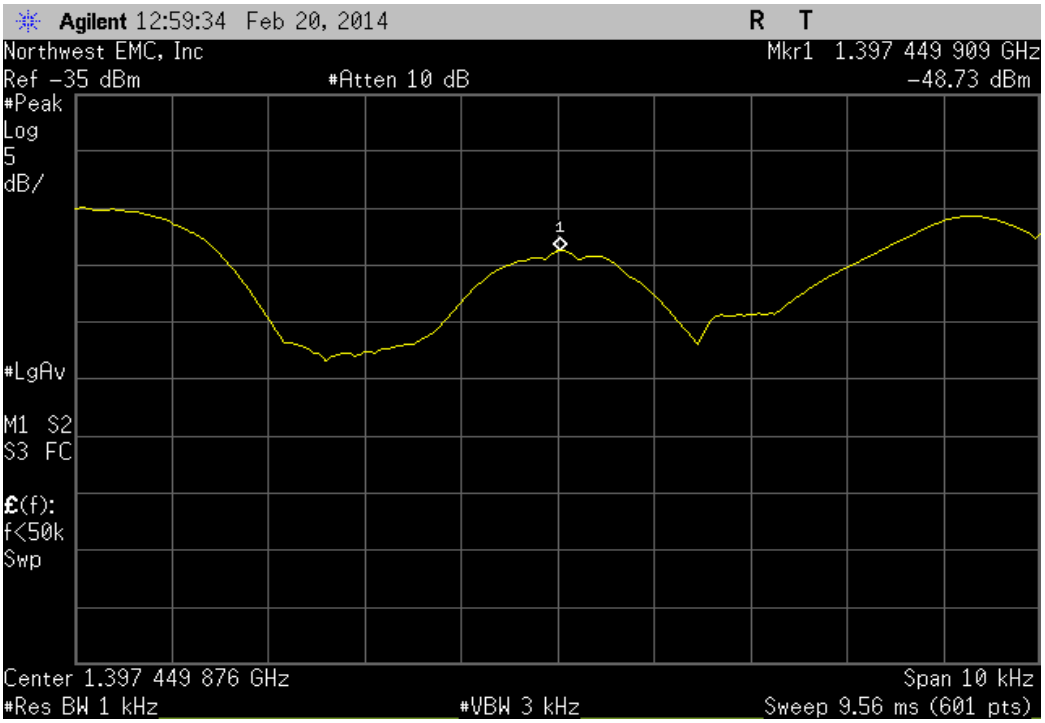


FREQUENCY STABILITY

Extreme Temperature +50°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449989	1397.45	0	100	Pass

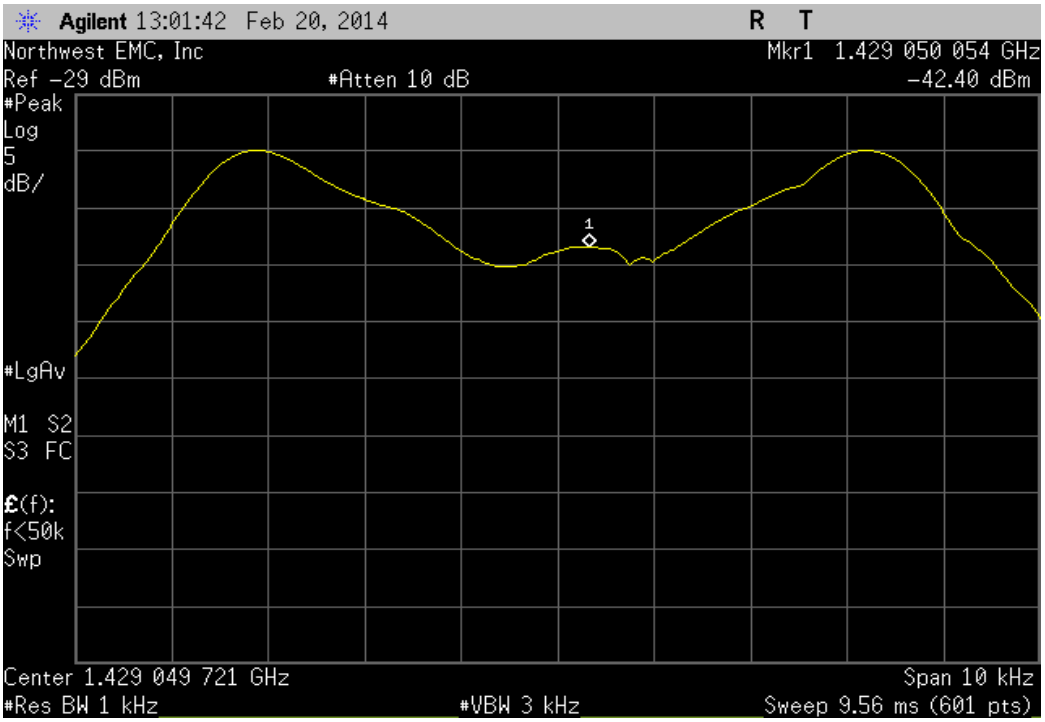


Extreme Temperature +50°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449909	1397.45	0.1	100	Pass

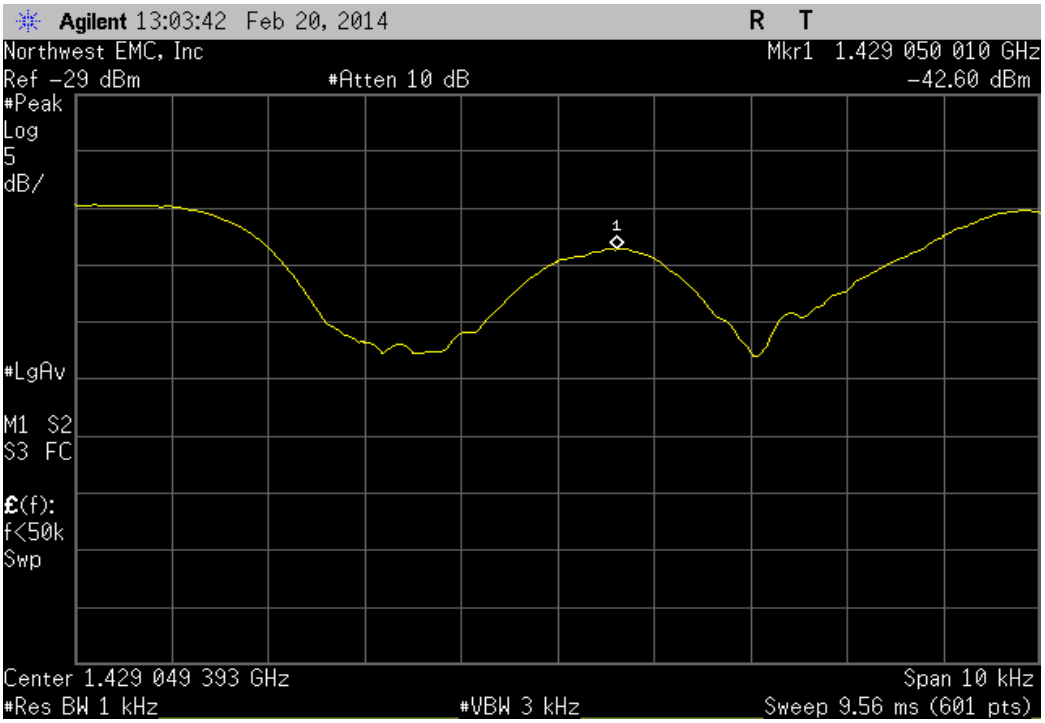


FREQUENCY STABILITY

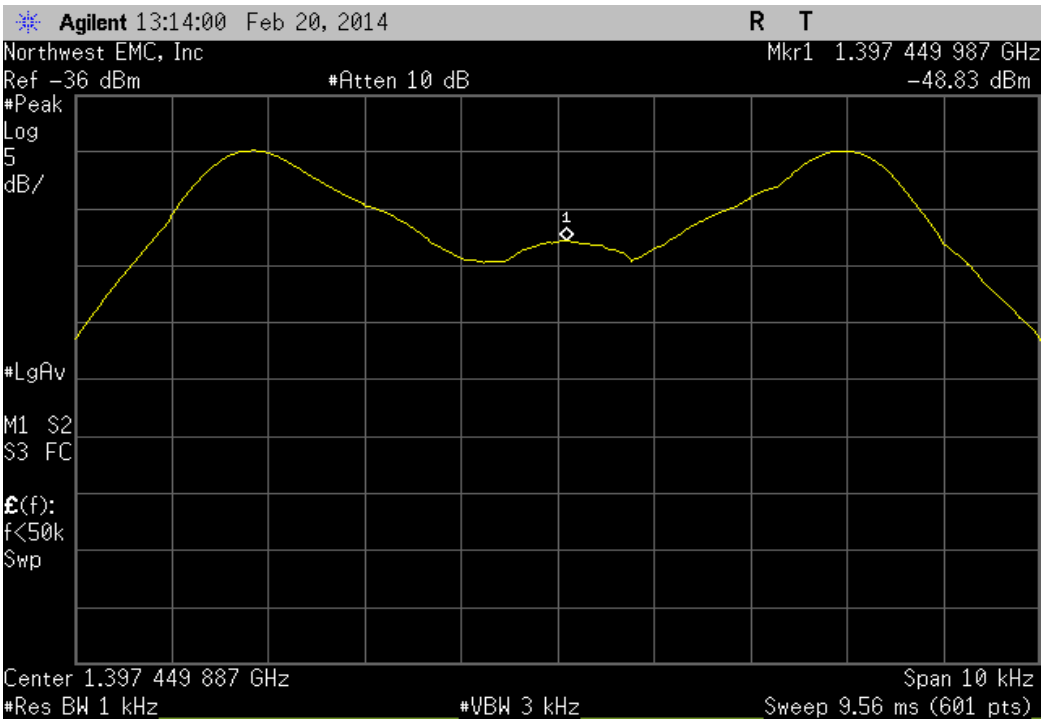
Extreme Temperature +50°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050054	1429.05	0	100	Pass



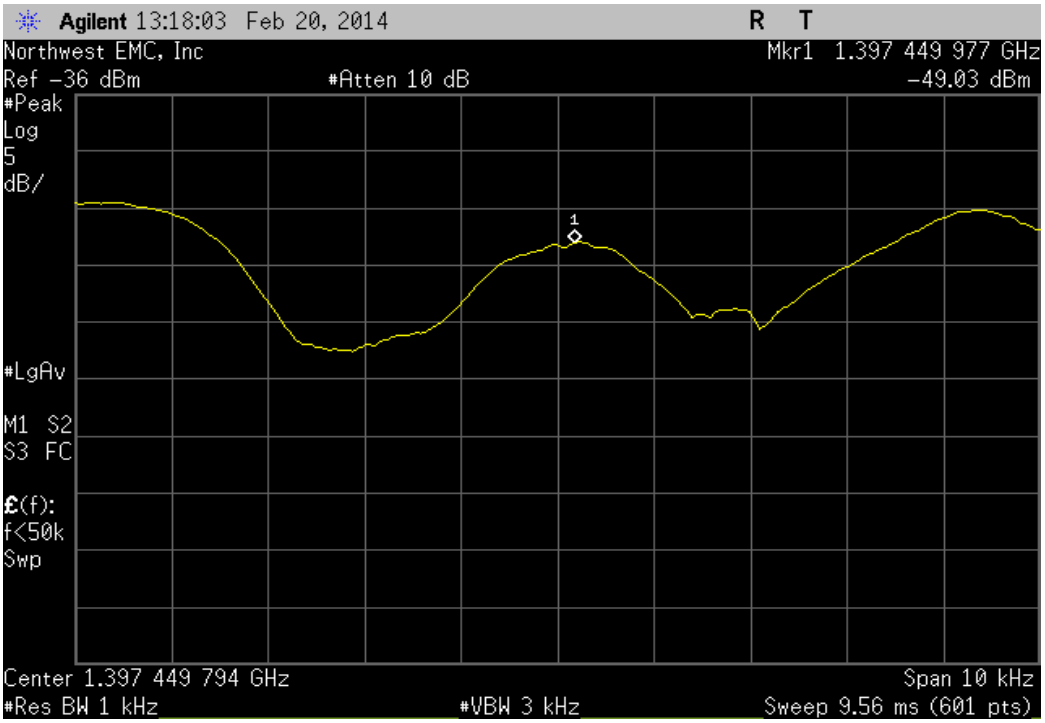
Extreme Temperature +50°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.05001	1429.05	0	100	Pass



Extreme Temperature +40°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449987	1397.45	0	100	Pass

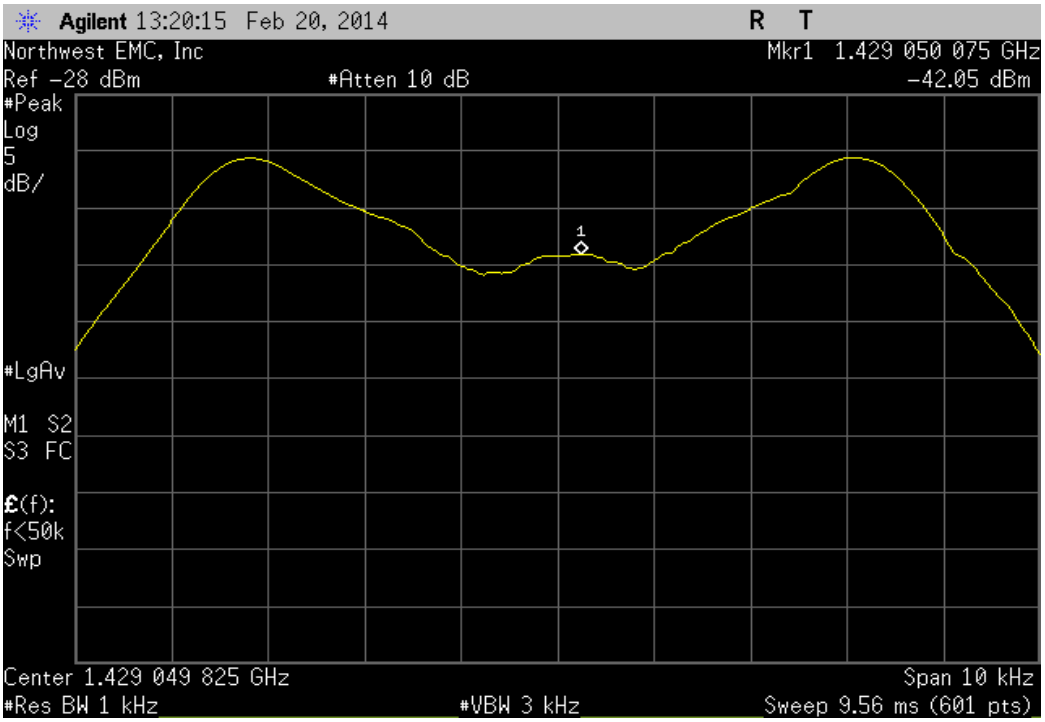


Extreme Temperature +40°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449977	1397.45	0	100	Pass

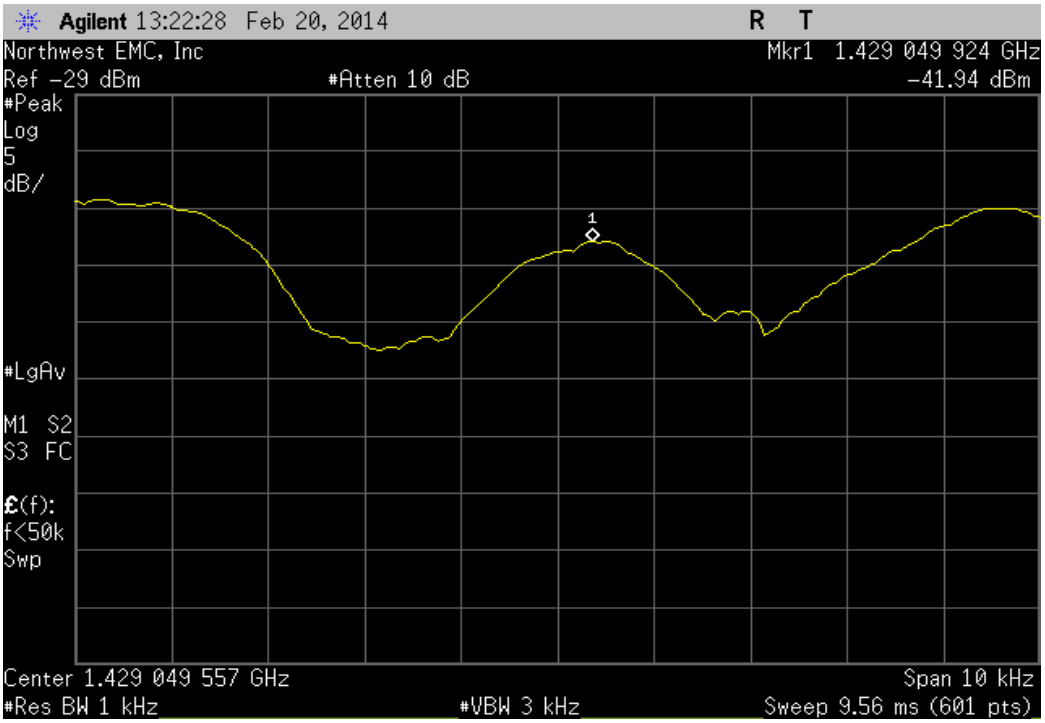


FREQUENCY STABILITY

Extreme Temperature +40°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050075	1429.05	0	100	Pass

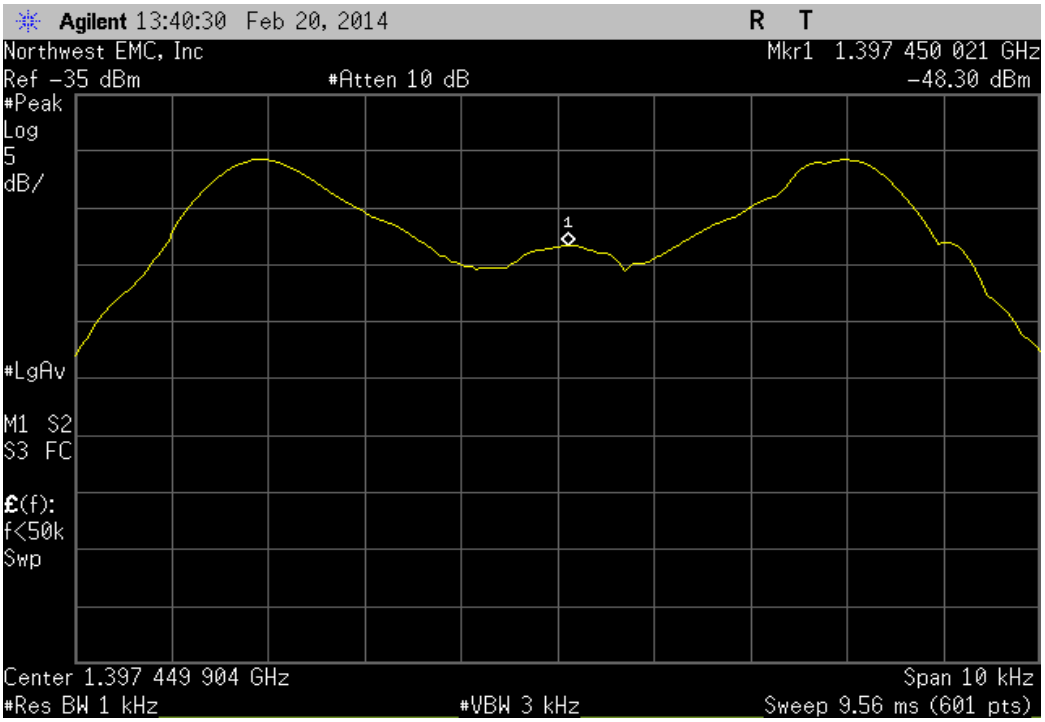


Extreme Temperature +40°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.049924	1429.05	0	100	Pass

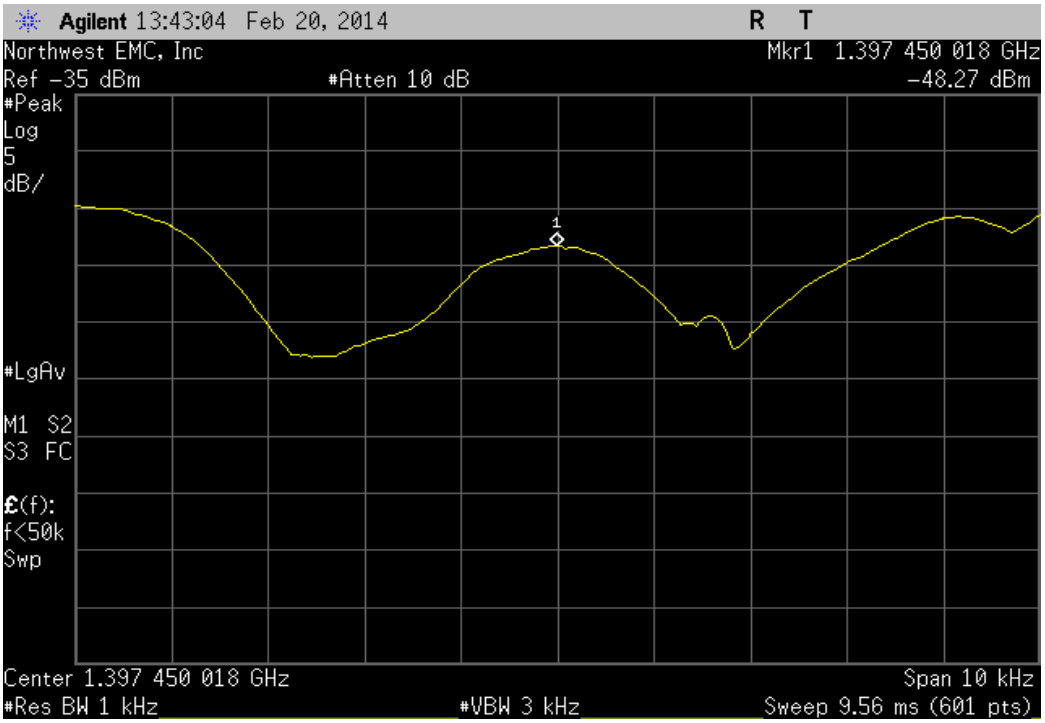


FREQUENCY STABILITY

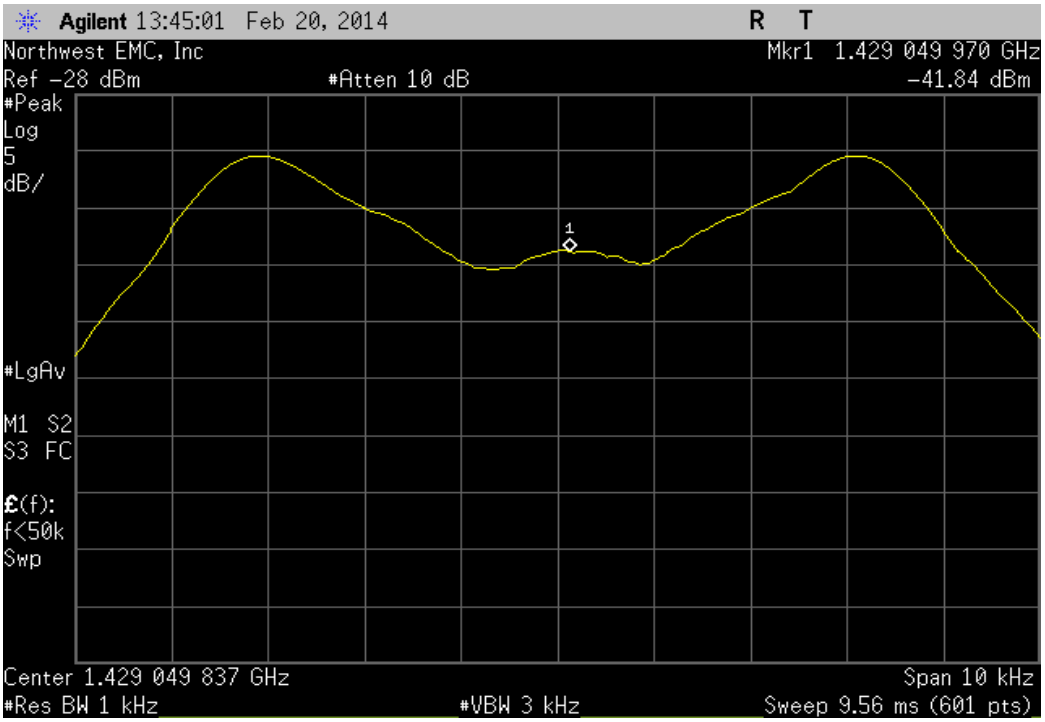
Extreme Temperature +30°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450021	1397.45	0	100	Pass



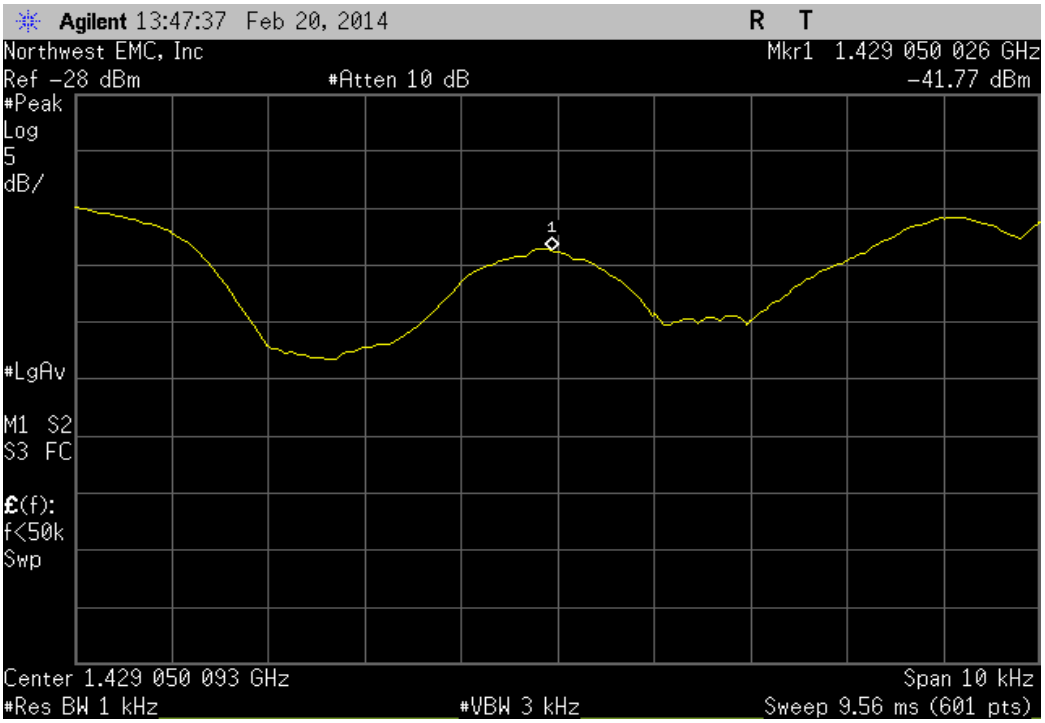
Extreme Temperature +30°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450018	1397.45	0	100	Pass



Extreme Temperature +30°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.04997	1429.05	0	100	Pass

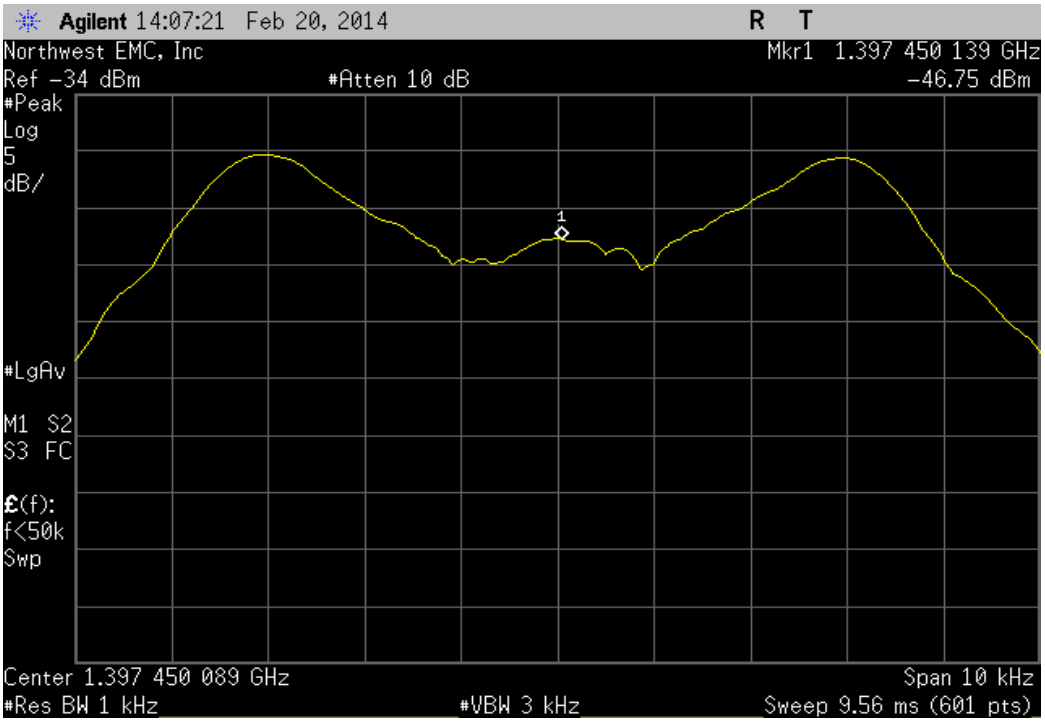


Extreme Temperature +30°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050026	1429.05	0	100	Pass

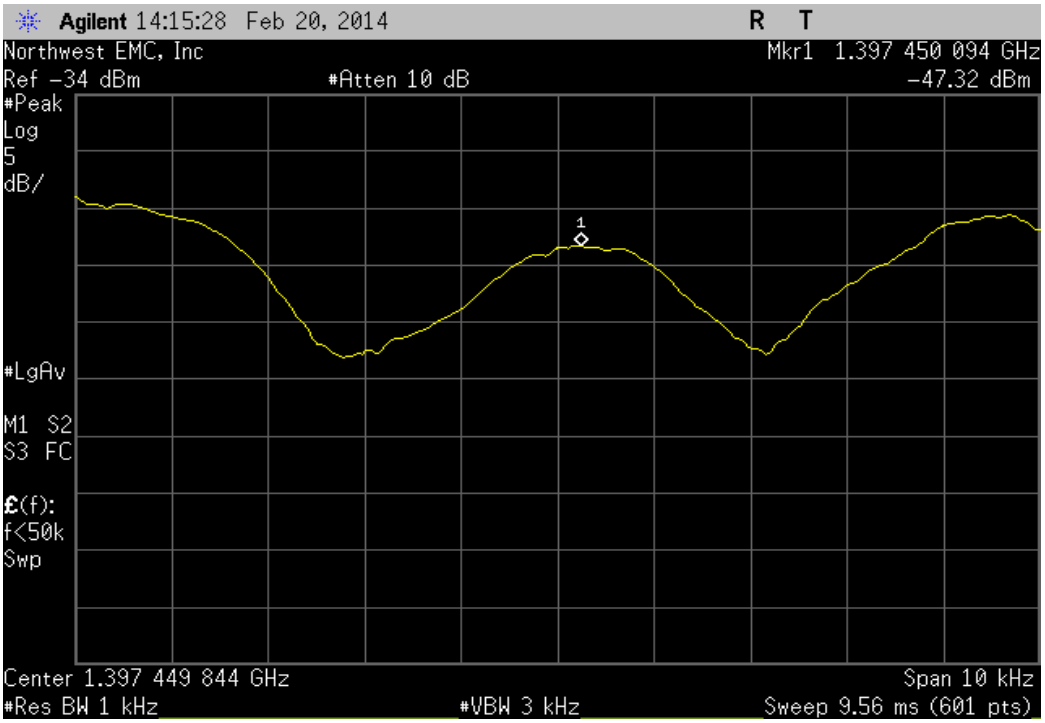


FREQUENCY STABILITY

Extreme Temperature +20°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450139	1397.45	0.1	100	Pass

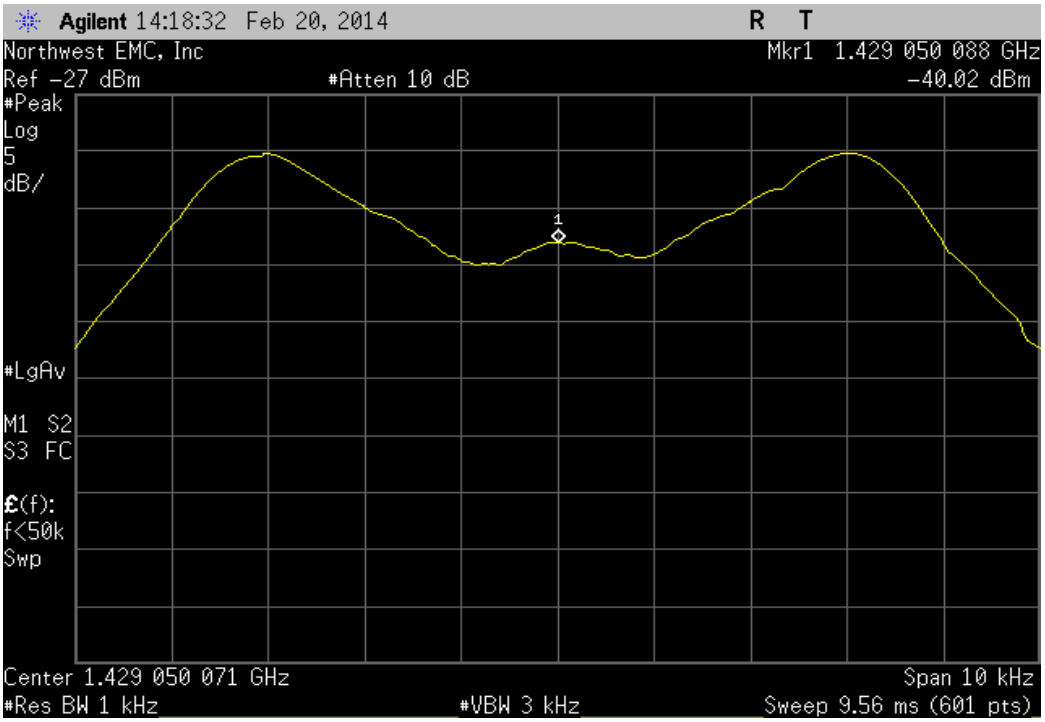


Extreme Temperature +20°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450094	1397.45	0.1	100	Pass

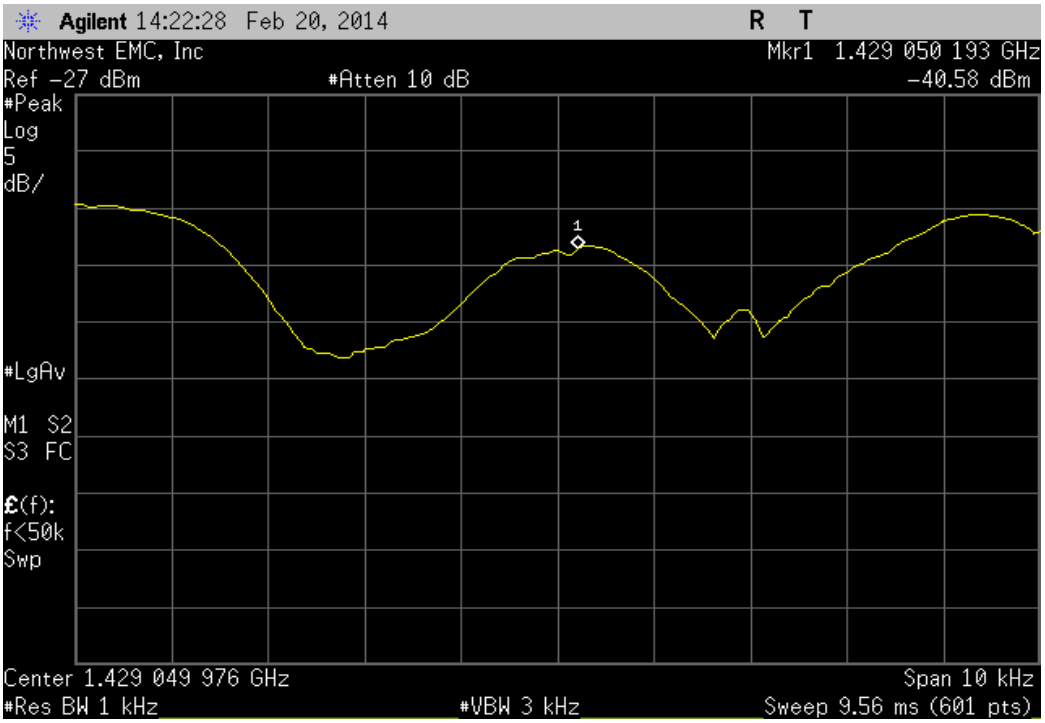


FREQUENCY STABILITY

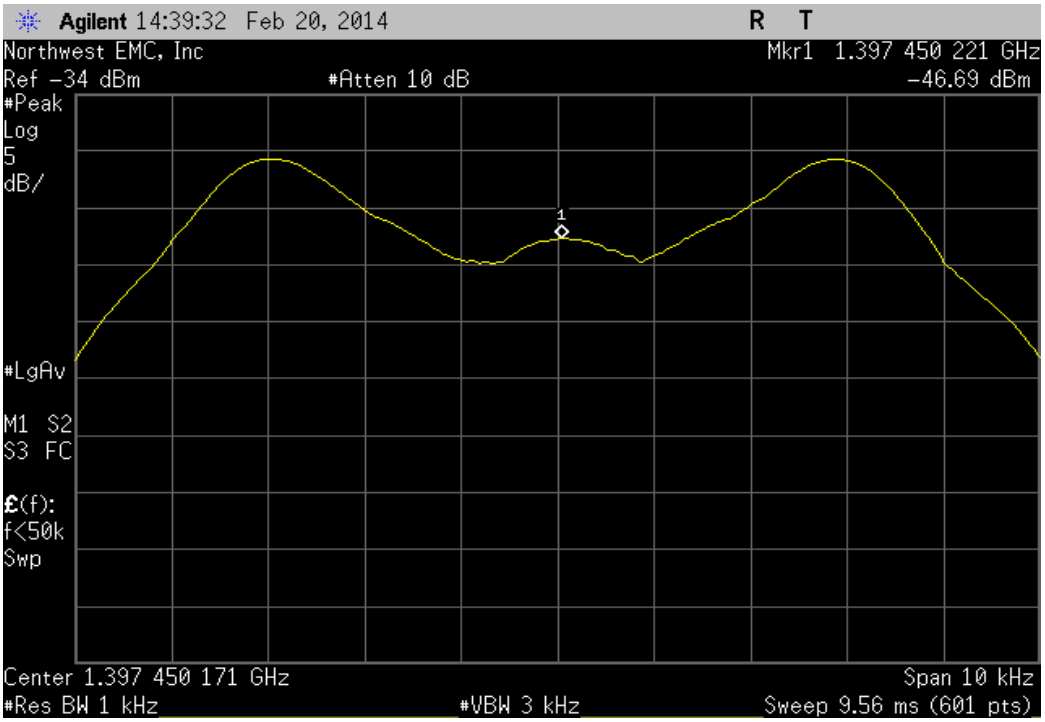
Extreme Temperature +20°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050088	1429.05	0.1	100	Pass



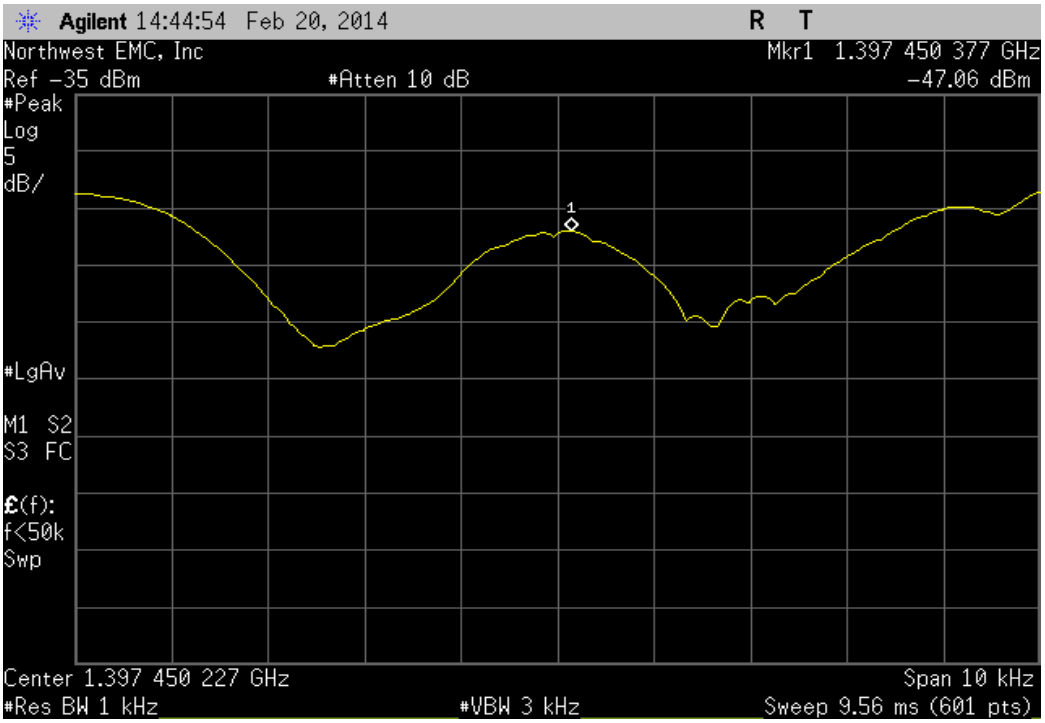
Extreme Temperature +20°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050193	1429.05	0.1	100	Pass



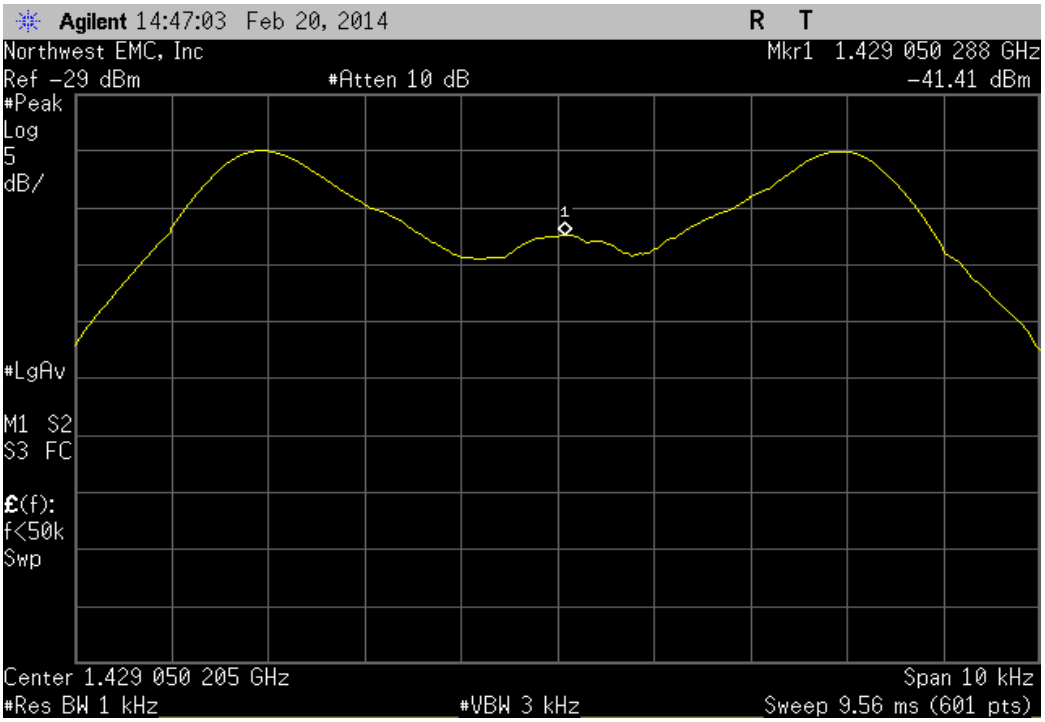
Extreme Temperature +10°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450221	1397.45	0.2	100	Pass



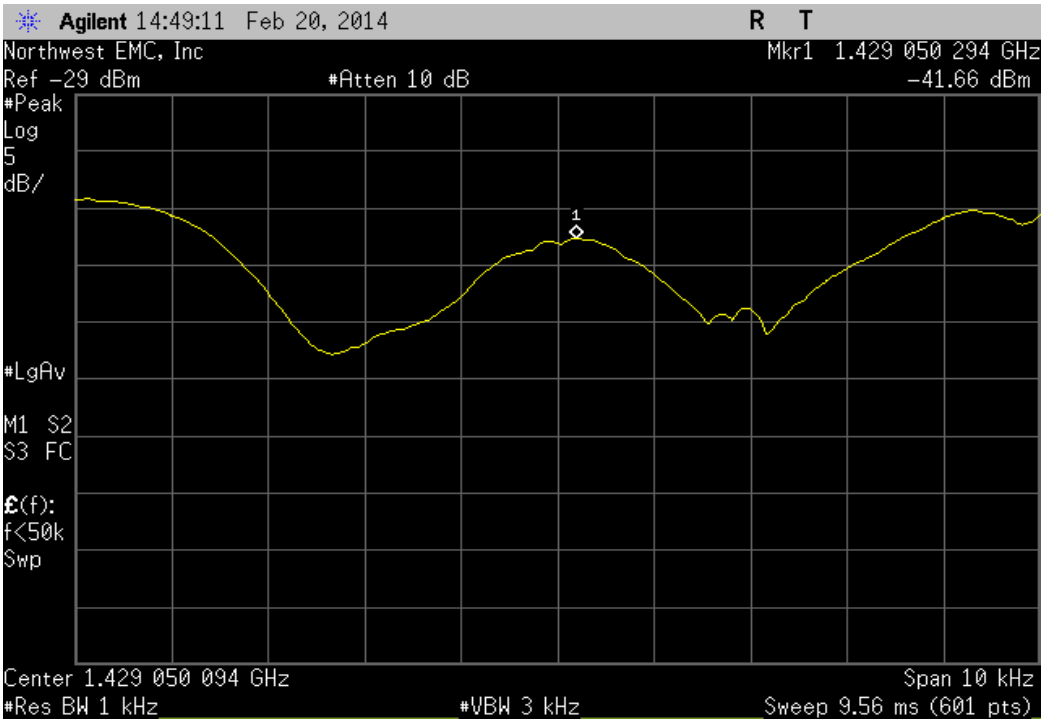
Extreme Temperature +10°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450377	1397.45	0.3	100	Pass



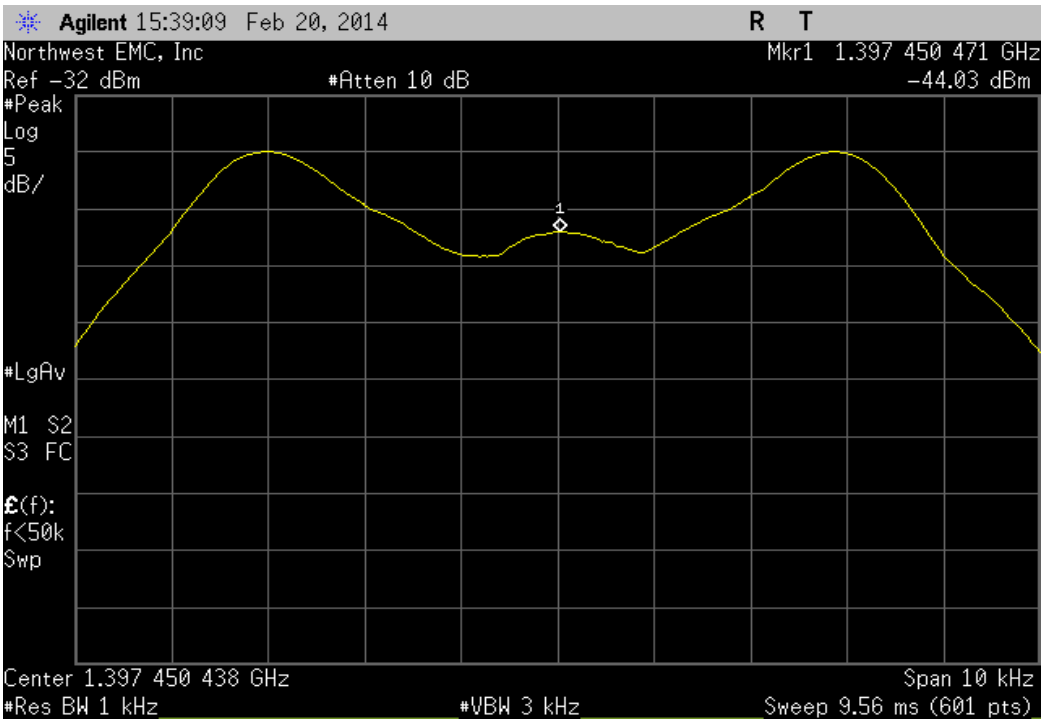
Extreme Temperature +10°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050288	1429.05	0.2	100	Pass



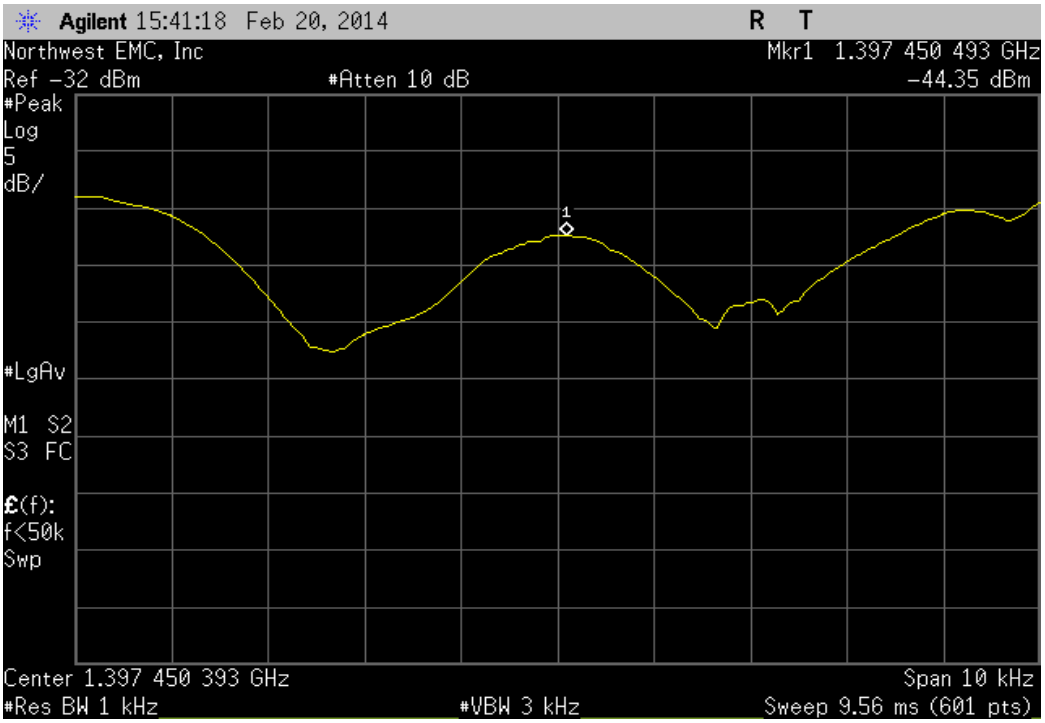
Extreme Temperature +10°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050294	1429.05	0.2	100	Pass



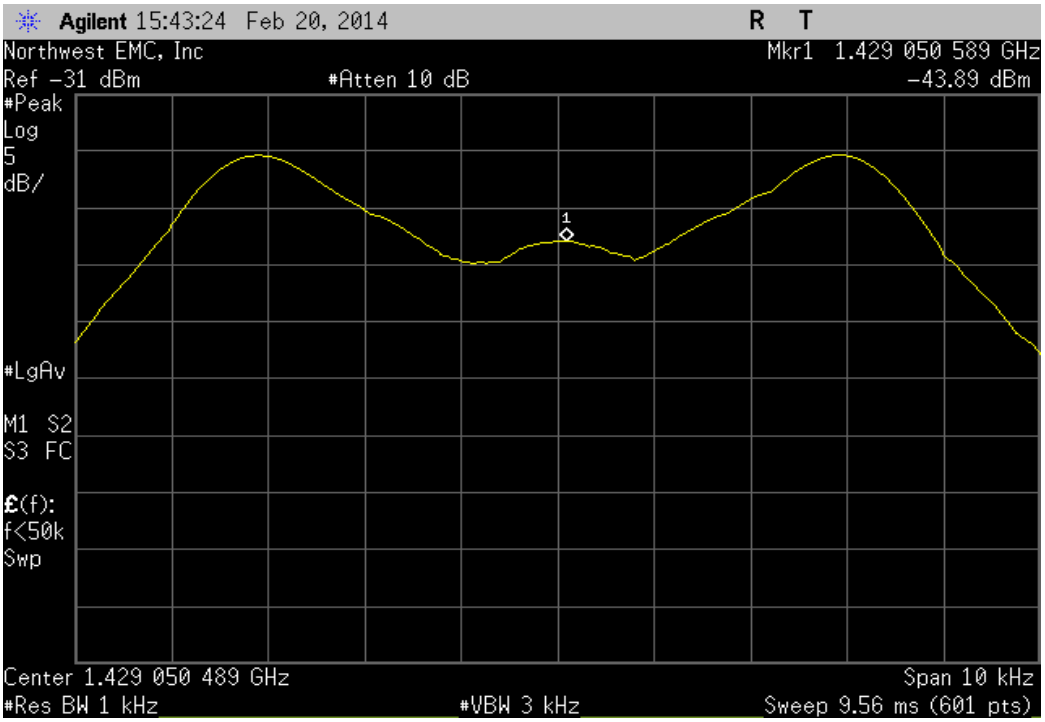
Extreme Temperature 0°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450471	1397.45	0.3	100	Pass



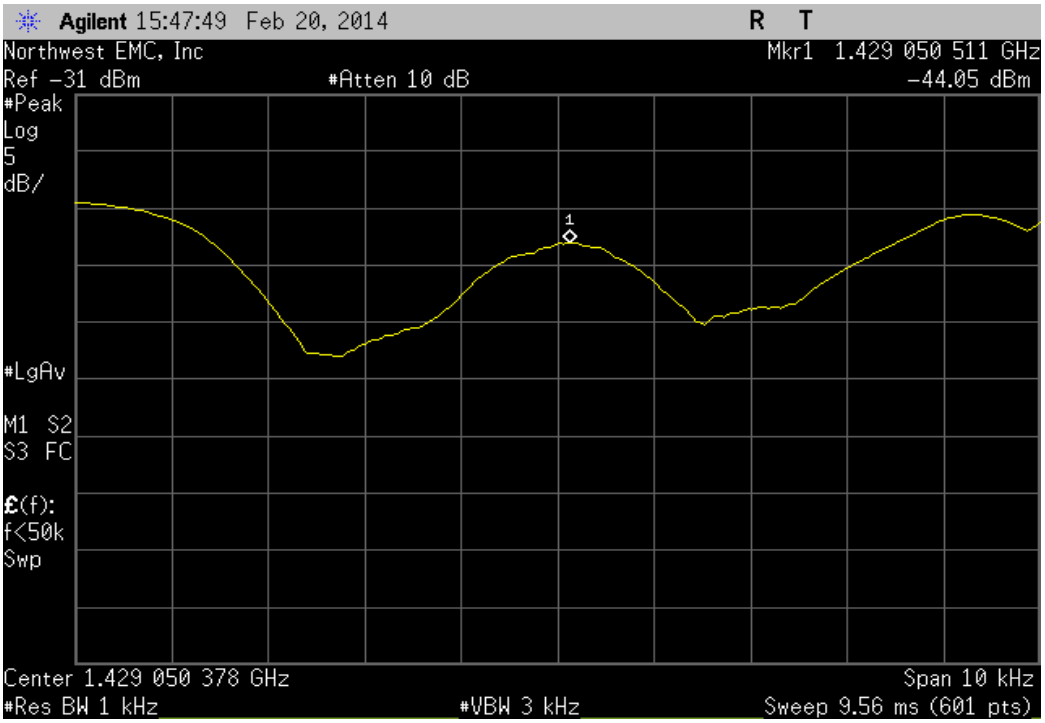
Extreme Temperature 0°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450493	1397.45	0.4	100	Pass



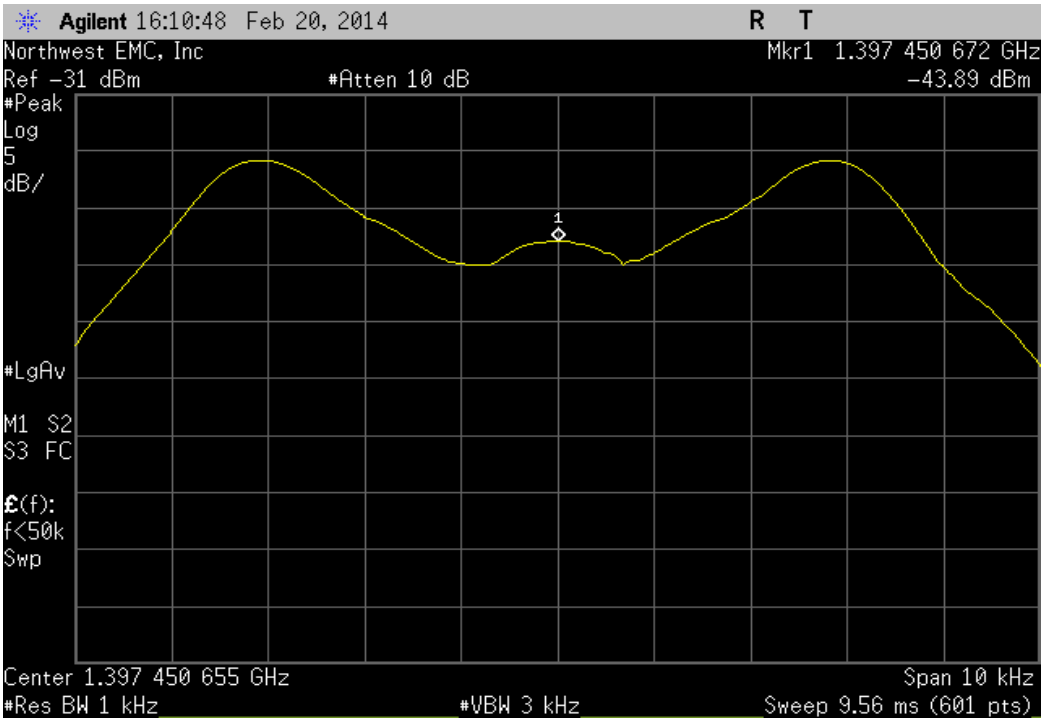
Extreme Temperature 0°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050589	1429.05	0.4	100	Pass



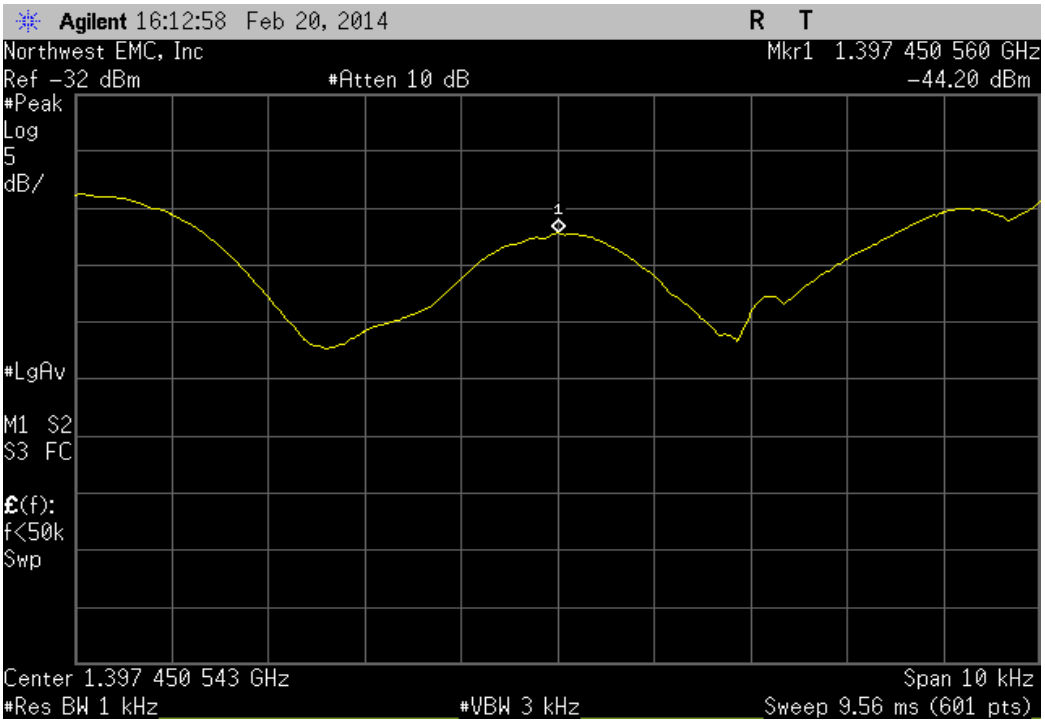
Extreme Temperature 0°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050511	1429.05	0.4	100	Pass



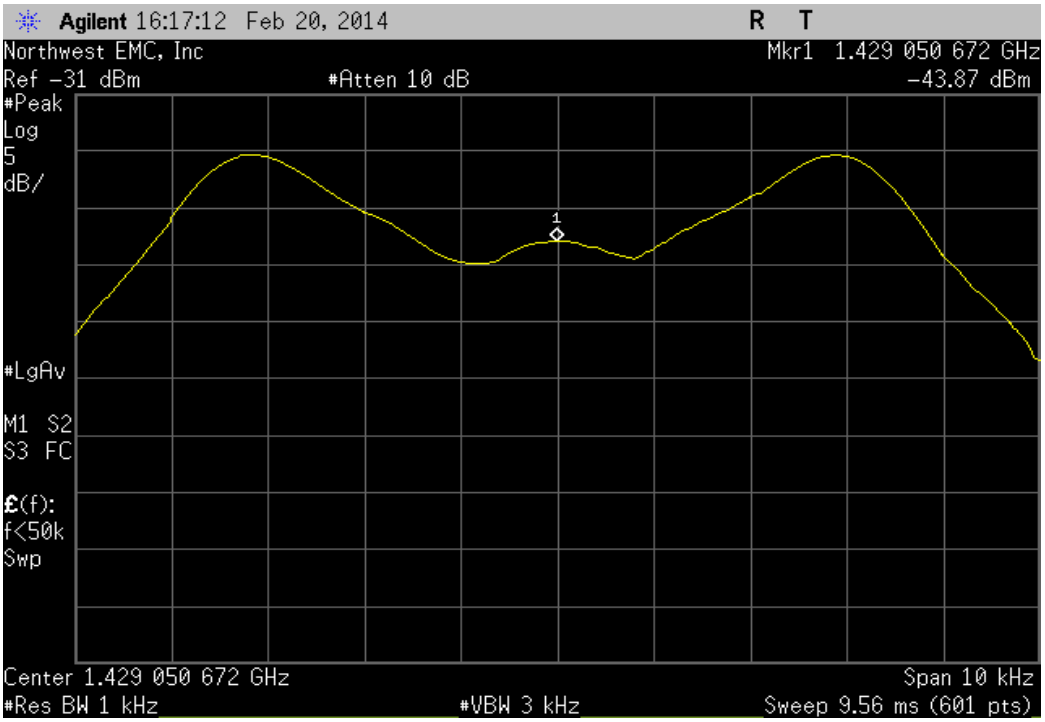
Extreme Temperature -10°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450672	1397.45	0.5	100	Pass



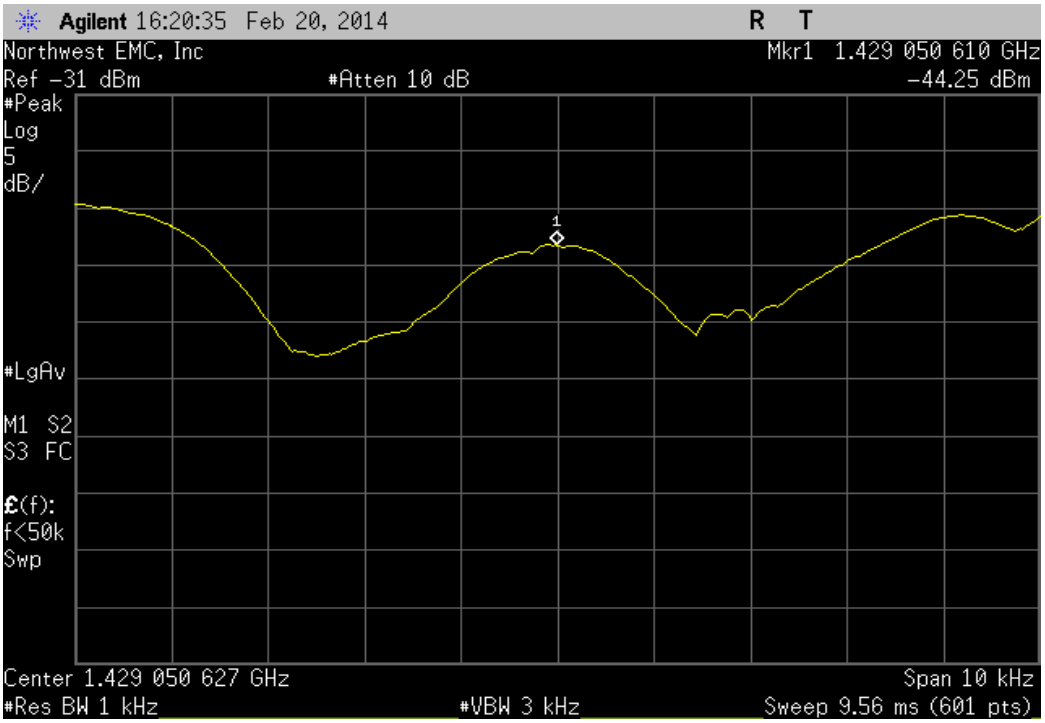
Extreme Temperature -10°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.45056	1397.45	0.4	100	Pass



Extreme Temperature -10°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050672	1429.05	0.5	100	Pass

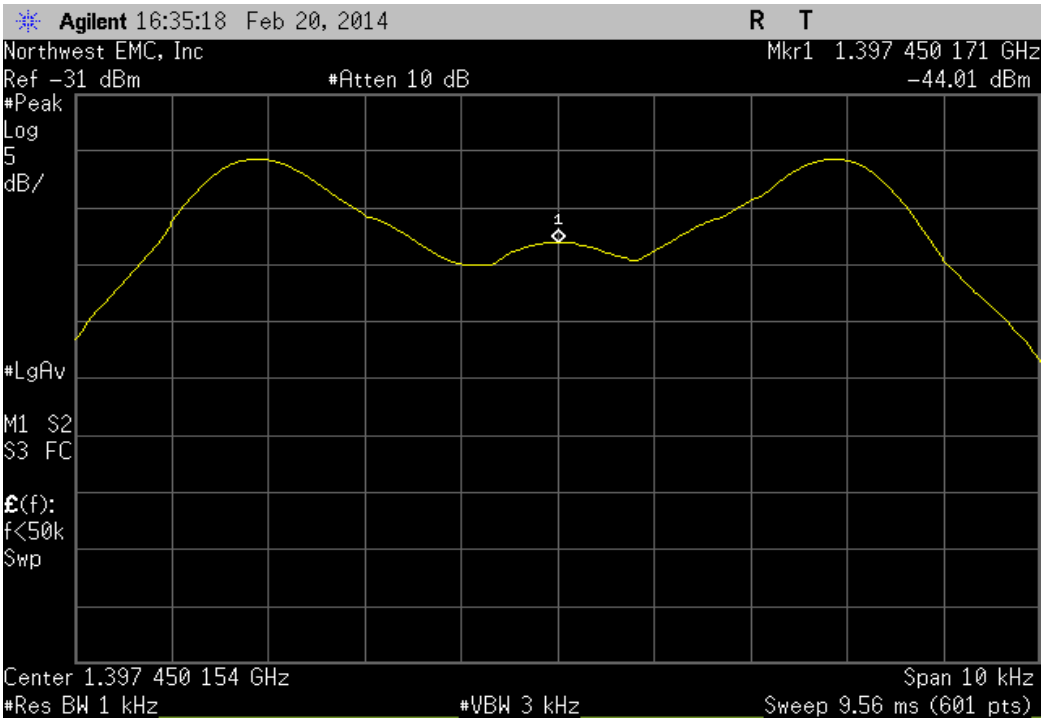


Extreme Temperature -10°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.05061	1429.05	0.4	100	Pass

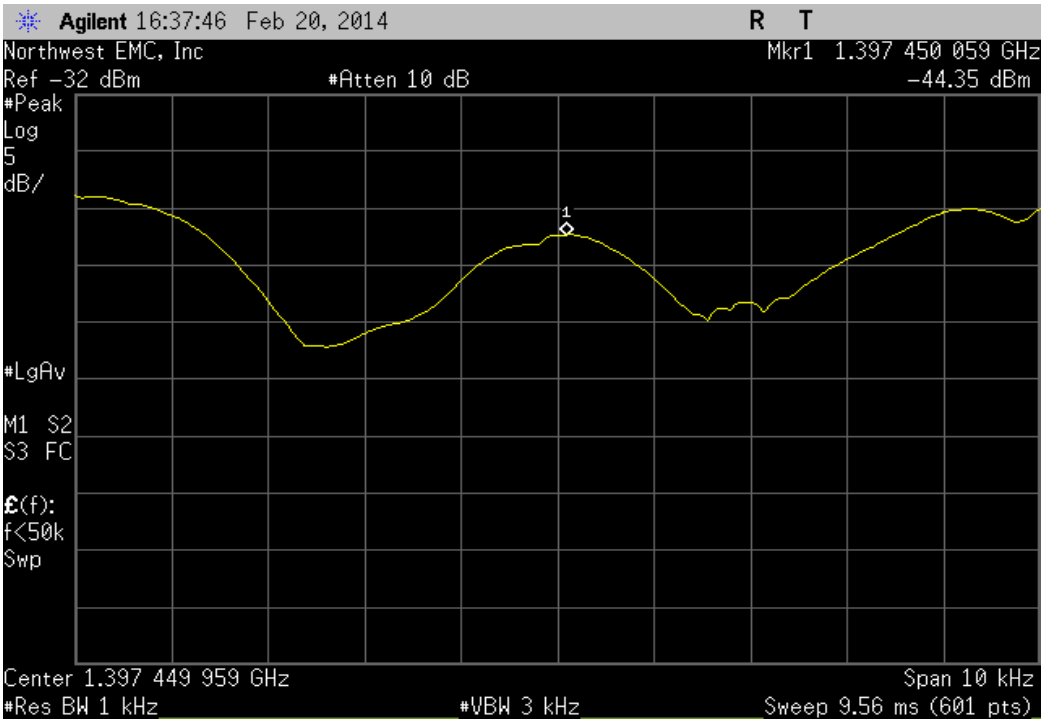


FREQUENCY STABILITY

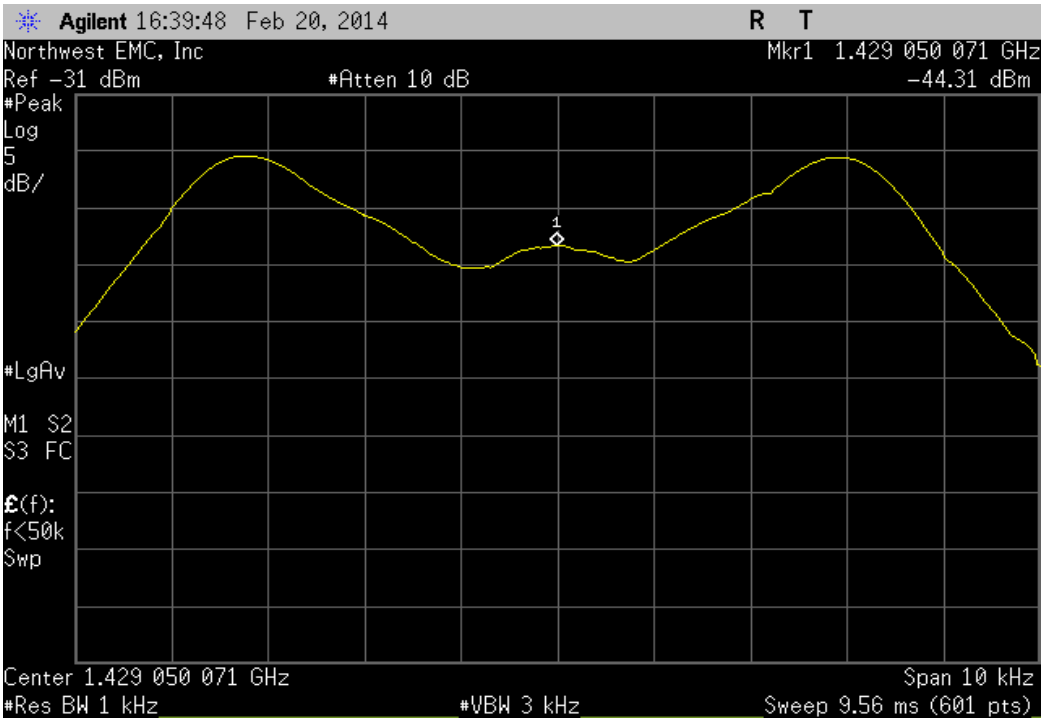
Extreme Temperature -20°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450171	1397.45	0.1	100	Pass



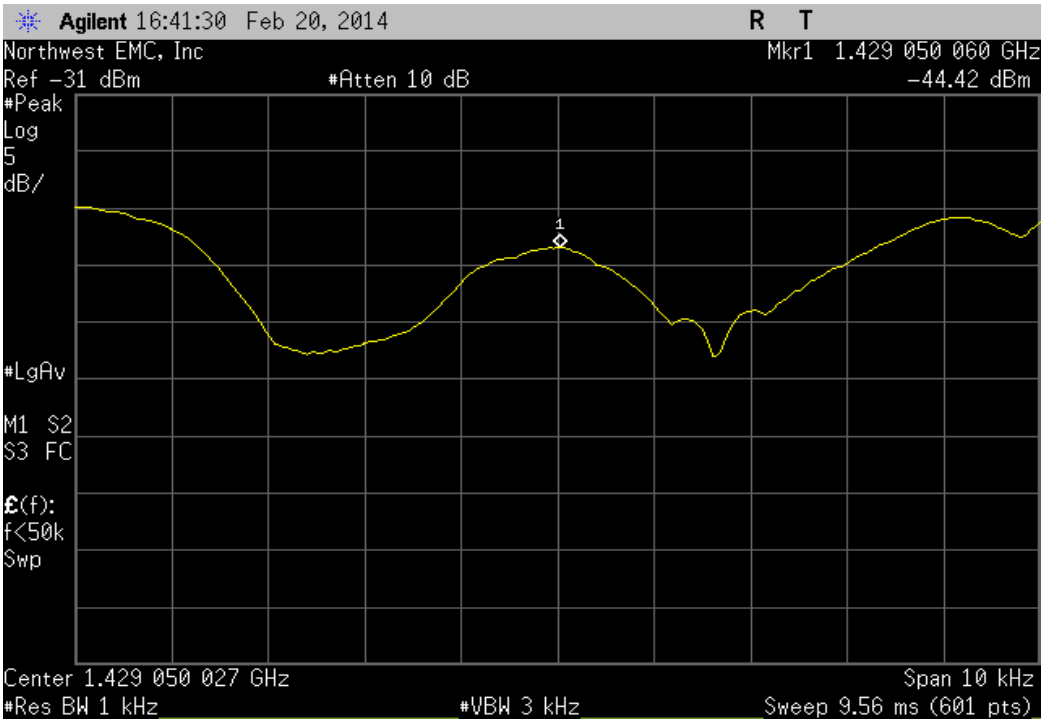
Extreme Temperature -20°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.450059	1397.45	0	100	Pass



Extreme Temperature -20°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.050071	1429.05	0	100	Pass

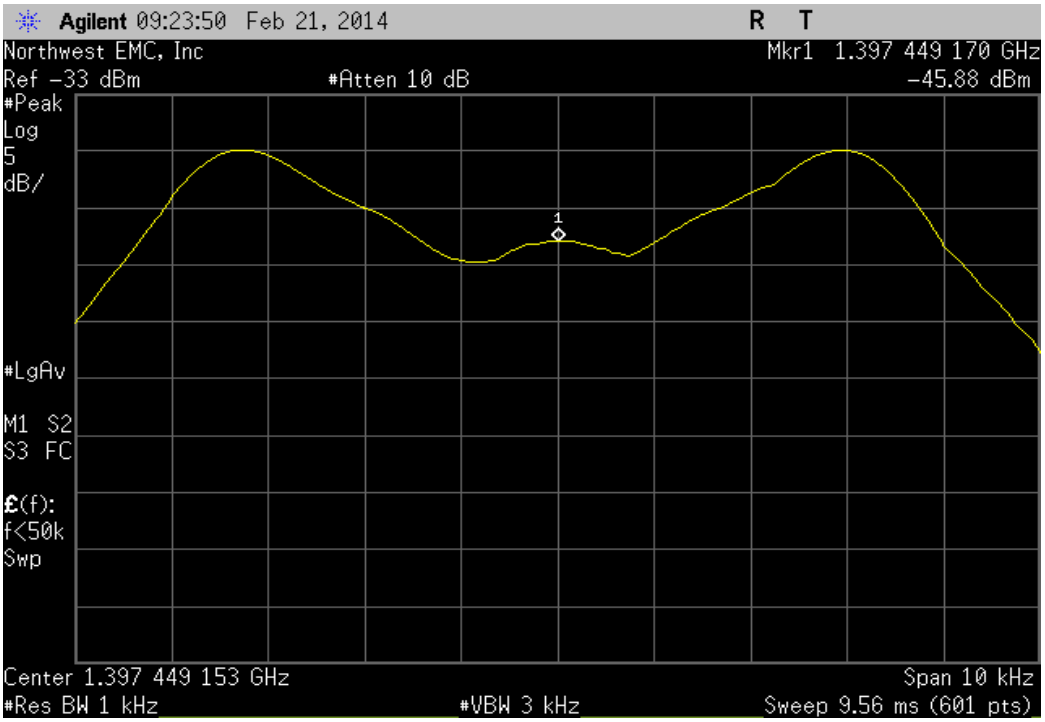


Extreme Temperature -20°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.05006	1429.05	0	100	Pass

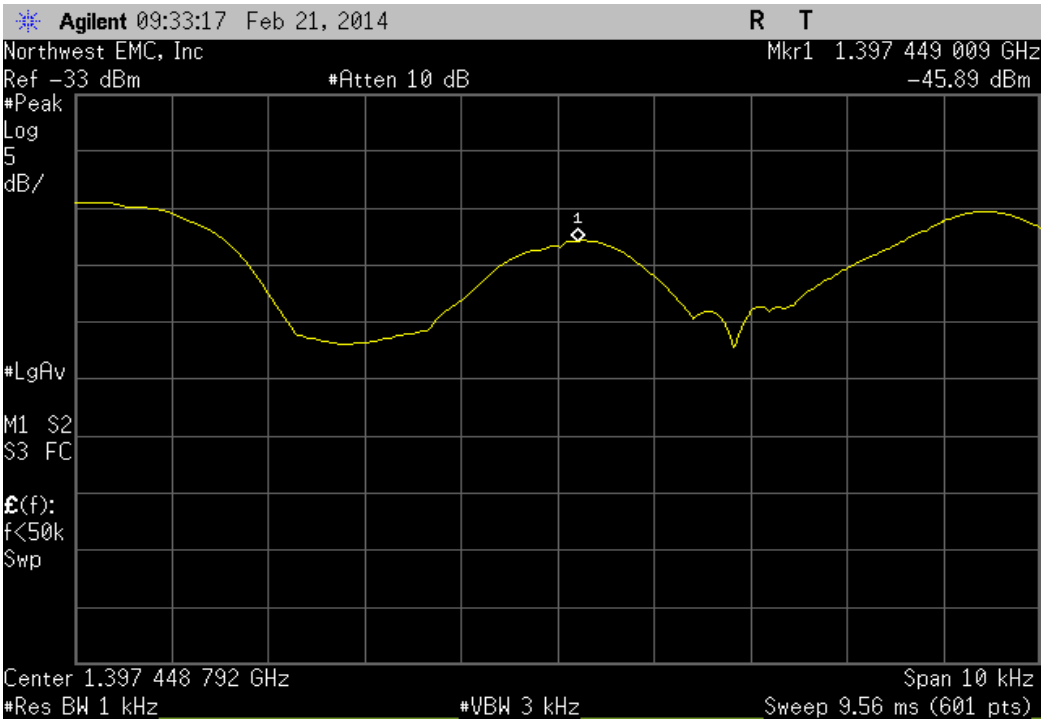


FREQUENCY STABILITY

Extreme Temperature -30°C, Low Channel, 1397.45 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.44917	1397.45	0.6	100	Pass

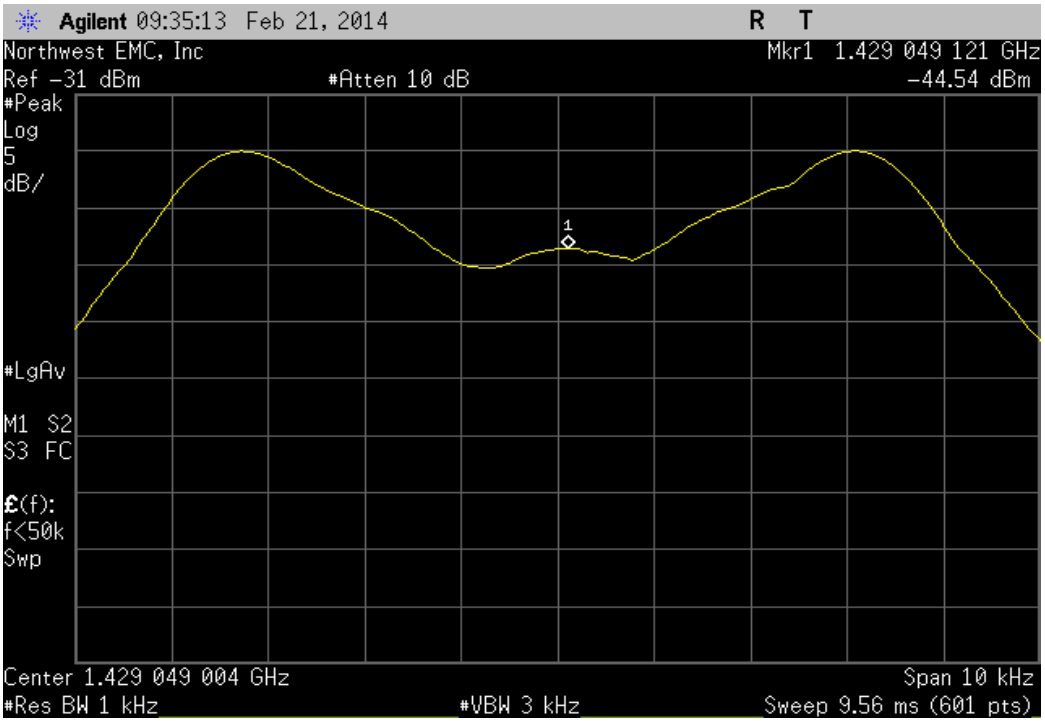


Extreme Temperature -30°C, Low Channel, 1397.45 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1397.449009	1397.45	0.7	100	Pass



FREQUENCY STABILITY

Extreme Temperature -30°C, High Channel, 1429.05 NB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.049121	1429.05	0.6	100	Pass



Extreme Temperature -30°C, High Channel, 1429.05 WB						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		1429.049043	1429.05	0.7	100	Pass