

# NORTHWEST EMC

**Parallel Wireless Inc.**

**CWS-3050-13**

**FCC 27:2016**

**Converged Wireless System Base Station**

**Report # KMWCC0075.1**



NVLAP Lab Code: 200676-0

*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. This Report may only be duplicated in its entirety*

# CERTIFICATE OF TEST

Last Date of Test: September 14, 2016

Parallel Wireless Inc.

Model: CWS-3050-13

## Radio Equipment Testing

### Standards

Specification	Method
FCC 27:2016	ANSI/TIA/EIA-603-D-2010

### Results

Method Clause	Test Description	Applied	Results	Comments
2.2.1	Conducted Output Power	Yes	Pass	
2.2.1	Peak to Average Ratio	Yes	Pass	
2.2.2	Frequency Stability	Yes	Pass	
2.2.3	Occupied Bandwidth	Yes	Pass	
2.2.12	Out of Band Emissions - LTE Band 13	Yes	Pass	
2.2.13	Spurious Emissions at the Antenna Terminals	Yes	Pass	
2.2.13	Band Edge Compliance	Yes	Pass	
2.2.13	Intermodulation	No	N/A	Not required for single channel band.

### Deviations From Test Standards

None

### Approved By:



Victor Ratinoff, 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.*

# REVISION HISTORY

Revision Number	Description	Date	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** - Accredited by A2LA to ISO / IEC 17065 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

**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

## European Union

**European Commission** – Validated by the European Commission 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

**MSIP / 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:

<http://www.nwemc.com/accreditations/>

<http://gsi.nist.gov/global/docs/cabs/designations.html>

# 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 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 included as part of the applicable test description page. 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.

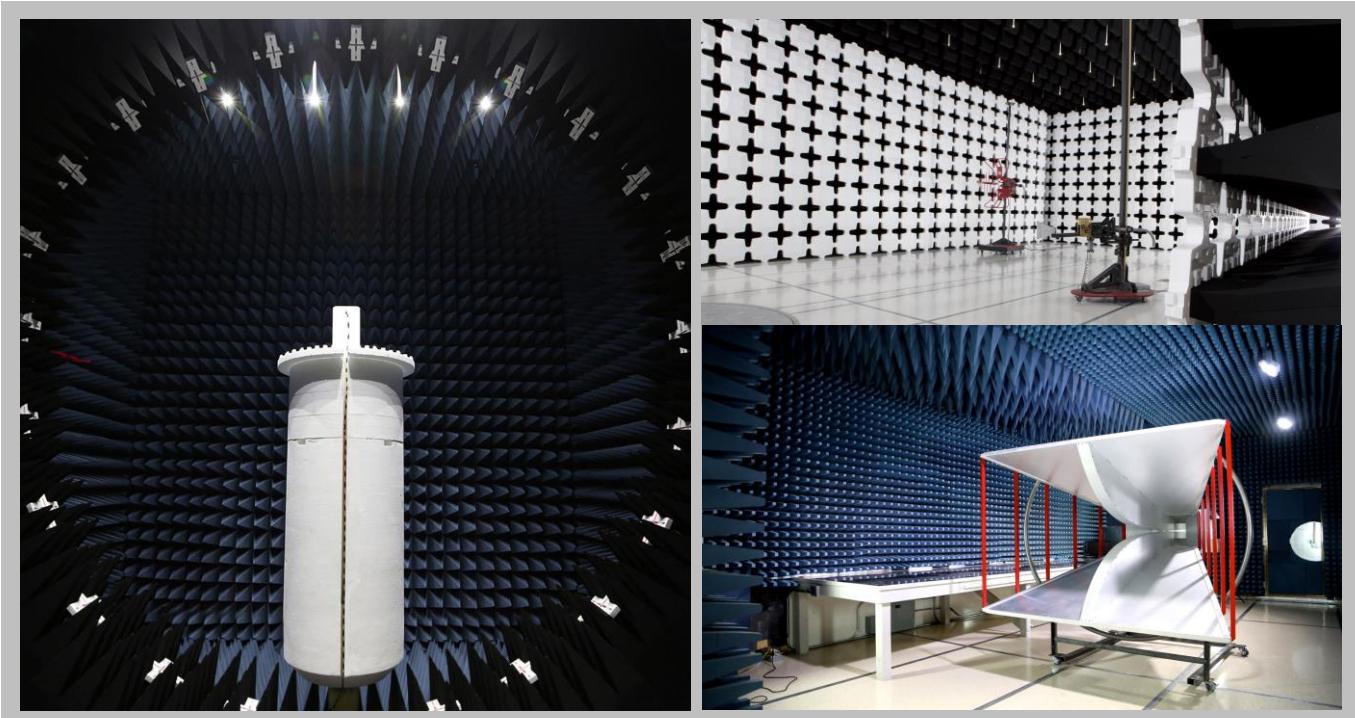
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

<u>Test</u>	<u>+ MU</u>	<u>- MU</u>
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 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)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

# FACILITIES



California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 98011 (425)984-6600
<b>NVLAP</b>					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code: 201049-0	NVLAP Lab Code: 200629-0
<b>Innovation, Science and Economic Development Canada</b>					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
<b>BSMI</b>					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA</b>					
US0158	US0175	N/A	US0017	US0191	US0157



# PRODUCT DESCRIPTION

## Client and Equipment Under Test (EUT) Information

<b>Company Name:</b>	Parallel Wireless Inc.
<b>Address:</b>	1 Tara Blvd., Suite #404
<b>City, State, Zip:</b>	Nashua, NH 03062
<b>Test Requested By:</b>	Edward Lee
<b>Model:</b>	CWS-3050-13
<b>First Date of Test:</b>	September 12, 2016
<b>Last Date of Test:</b>	September 14, 2016
<b>Receipt Date of Samples:</b>	September 12, 2016
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

## Information Provided by the Party Requesting the Test

<b>Functional Description of the EUT:</b>
Tower based Converged Wireless System Base Station operating in LTE Band 13 with single channel capability operating in 5 MHz, 10 MHz channel bandwidths.
<b>Testing Objective:</b>
To demonstrate compliance of the Cellular radio to FCC Part 27 requirements for LTE Band 13.

# CONFIGURATIONS

## Configuration KMWC0075- 1

Software/Firmware Running during test	
Description	Version
eNB2440_20160729_v0_1_41.pkg	41

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Converged Wireless System Base Station	Parallel Wireless Inc.	CWS-3050-13	K162600005

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
High Power Terminator	Telcon	KTMO400800060	1111-0064
Laptop	Samsung	NP300V5A	HGHS93-JBA00674K
Laptop Power Supply	Delta Electronics, Inc.	SADP-90FH D	CNBA4400215ABZ040C18685

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Cable	No	5.0m	No	CWS-3050-13 Tower	DC Mains
RF Output Cable x2	Yes	5.0m	No	CWS-3050-13 Tower	High Power Terminator
Ethernet Cable	No	2.5m	No	CWS-3050-13 Tower	Laptop
AC Cable	No	1.5m	No	AC Mains	Laptop Power Supply
DC Cable	No	2.0m	Yes	Laptop	Laptop Power Supply

## Configuration KMWC0075- 2

Software/Firmware Running during test	
Description	Version
eNB2440_20160729_v0_1_41.pkg	41

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Converged Wireless System Base Station	Parallel Wireless Inc.	CWS-3050-13	K162600005

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
High Power Terminator	Telcon	KTMO400800060	1111-0064
High Power Terminator	Telcon	KTMO400800060	1111-0004

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Cable	No	5.0m	No	CWS-3050-13 Tower	DC Mains
Ethernet Cable	No	2.5m	No	CWS-3050-13 Tower	Unterminated
AISG Cable	Yes	3.0m	No	CWS-3050-13 Tower	Unterminated
AISG (ALM) Cable	Yes	6.1m	No	CWS-3050-13 Tower	Unterminated
RF Output Cable x2	Yes	5.0m	No	CWS-3050-13 Tower	High Power Terminator
Optical Cable	No	10.0m	No	CWS-3050-13 Tower	Unterminated
Ground Braid	No	2.0m	No	CWS-3050-13 Tower	Ground

# MODIFICATIONS

## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/12/2016	Conducted Output Power	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	9/12/2016	Peak to Average Ratio	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	9/12/2016	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	9/12/2016	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.
5	9/12/2016	Band Edge Compliance	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.
6	9/12/2016	Spurious Emissions at the Antenna Terminals	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.
7	9/14/2016	Out of Band Emissions – LTE Band 13	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

# CONDUCTED 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.	Cal. Due
Power Supply - DC	Hewlett Packard	6574A	TPX	NCR	NCR
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Meter - Power	ETS Lindgren	7002-006	SRB	12/14/2015	12/14/2016

## CLIENT PROVIDED EQUIPMENT

Description	Manufacturer	Model	Last Cal.	Cal. Due
High Power Attenuator - 30dB	Aeroflex/Weinschel	53-30-43	NCR	NCR
Attenuator - 20dB	N/A	N/A	NCR	NCR
Power Divider	Fairview Microwave	MP8748-2	NCR	NCR
50Ohm Terminator	Aeroflex/Weinschel	1455-4	NCR	NCR
High Power Terminator	Telcon	KTMO400800060	NCR	NCR

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The RF output power was measured with the EUT set to the modes called out in the datasheet. The power measurement was made using a direct connection between the RF output of the EUT and an RF Power Sensor which only measures across the high time of the burst of the carrier.

The observed duty cycle was noted but not needed to calculate the ERP.

ERP = Max Measured Power + Antenna gain (dBi)

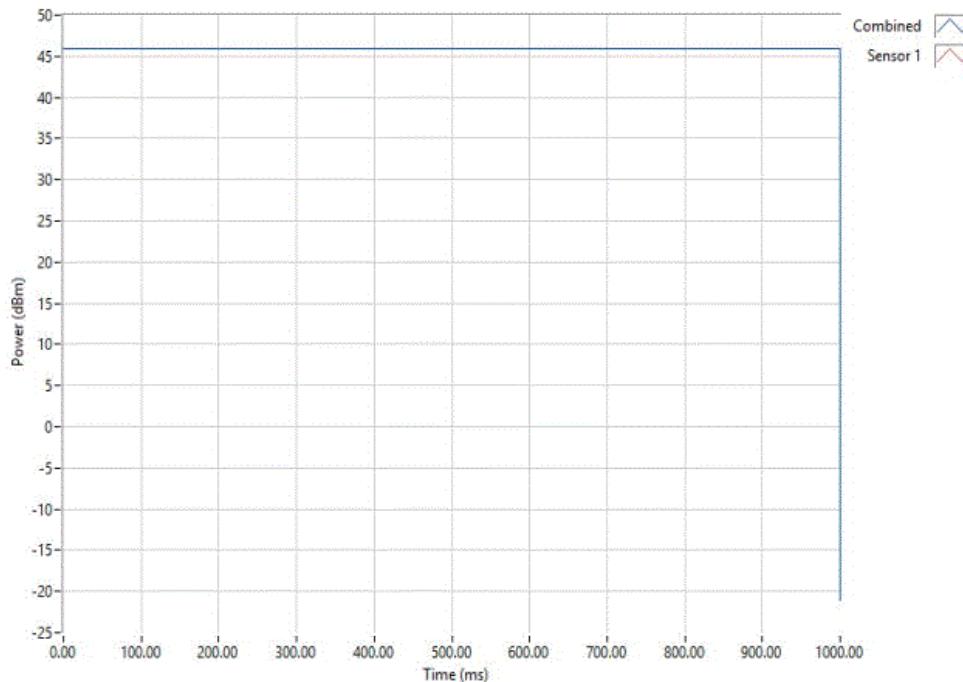
The measurements from Port 1 and Port 2 were summed to determine the total average power in ERP.

# CONDUCTED OUTPUT POWER

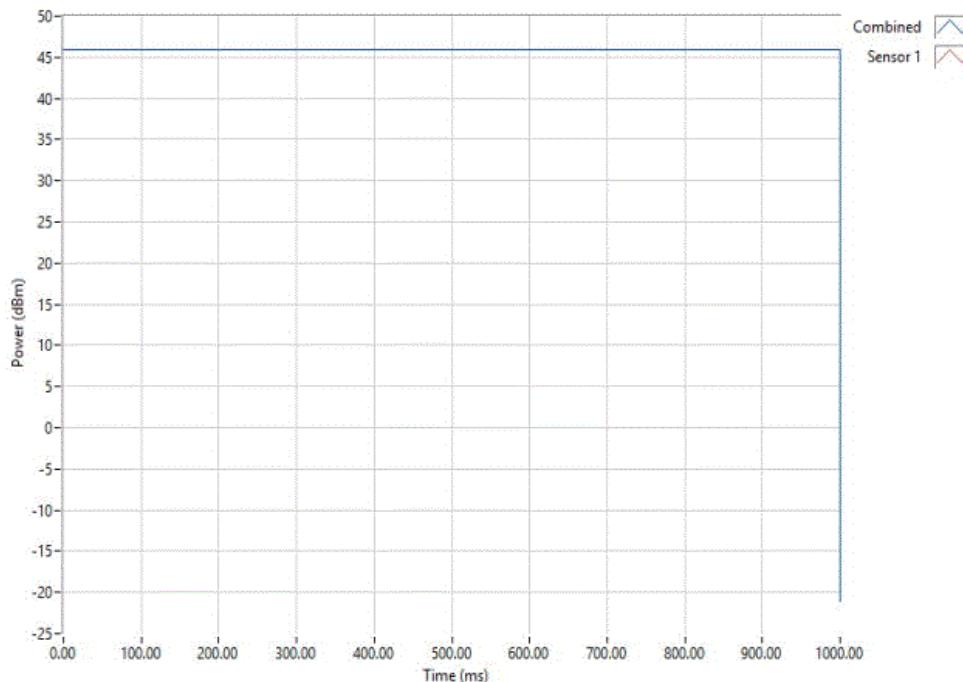
EUT:	CWS-3050-13	Work Order:	KMWC0075					
Serial Number:	K162600005	Date:	09/12/16					
Customer:	Parallel Wireless Inc.	Temperature:	21.2 °C					
Attendees:	Andy Ku	Humidity:	45.5% RH					
Project:	None	Barometric Pres.:	1017 mbar					
Tested by:	Johnny Candelas	Power:	48VDC					
TEST SPECIFICATIONS		Test Method	ANSI/TIA/EIA-603-D-2010					
FCC 27:2016								
COMMENTS								
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 55dB total. Antenna Gain is assumed to be 0, per specification antenna gain will be re-evaluated during final installation taking height into account. MIMO measurements taken separately and a linear summation was performed below.								
DEVIATIONS FROM TEST STANDARD								
None								
Configuration #	1	Signature						
		Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
SISO								
Antenna Port 1								
Low Channel LTE5, 748.5 MHz	45.93	100	0	45.9	60	Pass		
High Channel LTE5, 753.5 MHz	45.99	100	0	46.0	60	Pass		
Single Channel LTE10, 751 MHz	45.95	100	0	46.0	60	Pass		
Antenna Port 2								
Low Channel LTE5, 748.5 MHz	45.93	100	0	45.9	60	Pass		
High Channel LTE5, 753.5 MHz	45.93	100	0	45.9	60	Pass		
Single Channel LTE10, 751 MHz	45.98	100	0	46.0	60	Pass		
MIMO								
Antenna Port 1								
Low Channel LTE5, 748.5 MHz	45.96	100	0	46.0	60	Pass		
High Channel LTE5, 753.5 MHz	45.96	100	0	46.0	60	Pass		
Single Channel LTE10, 751 MHz	45.97	100	0	46.0	60	Pass		
Antenna Port 2								
Low Channel LTE5, 748.5 MHz	45.99	100	0	46.0	60	Pass		
High Channel LTE5, 753.5 MHz	45.96	100	0	46.0	60	Pass		
Single Channel LTE10, 751 MHz	45.97	100	0	46.0	60	Pass		
Linear Sum of the Power		Port 1 (mW)	Port 2 (mW)	Sum (mW)	Sum (dBm)			
Low Channel LTE5, 748.5 MHz	39445.7	39719.2	79164.9	48.99	0	49.0	60	Pass
High Channel LTE5, 753.5 MHz	39445.7	39445.7	78891.5	48.97	0	49.0	60	Pass
Single Channel LTE10, 751 MHz	39536.7	39536.7	79073.3	48.98	0	49.0	60	Pass

# CONDUCTED OUTPUT POWER

SISO, Antenna Port 1, Low Channel LTE5, 748.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.93	100	0	45.9	60	Pass	

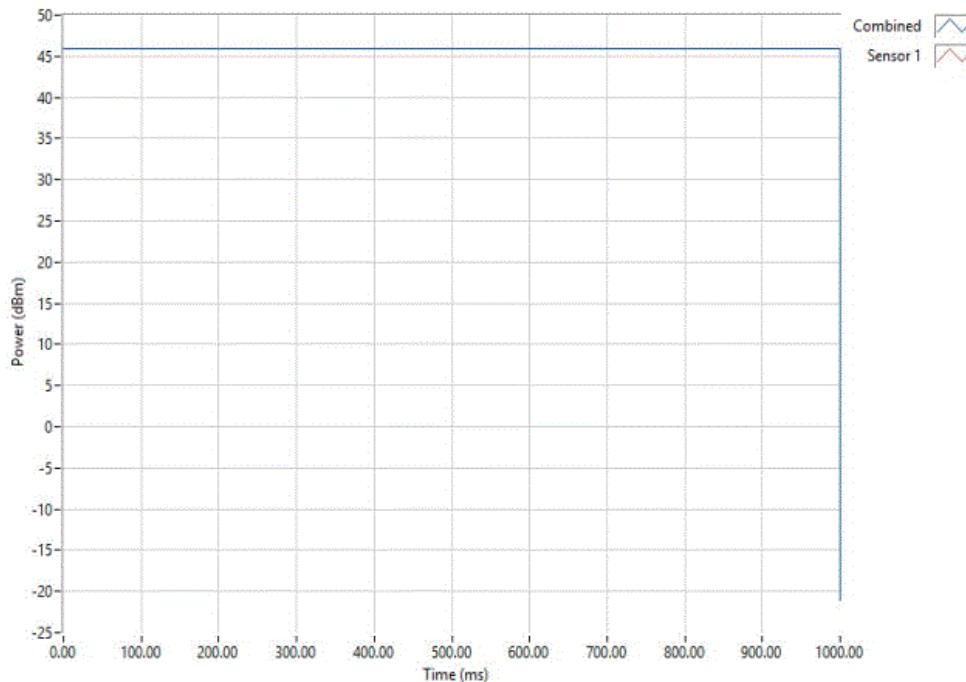


SISO, Antenna Port 1, High Channel LTE5, 753.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	

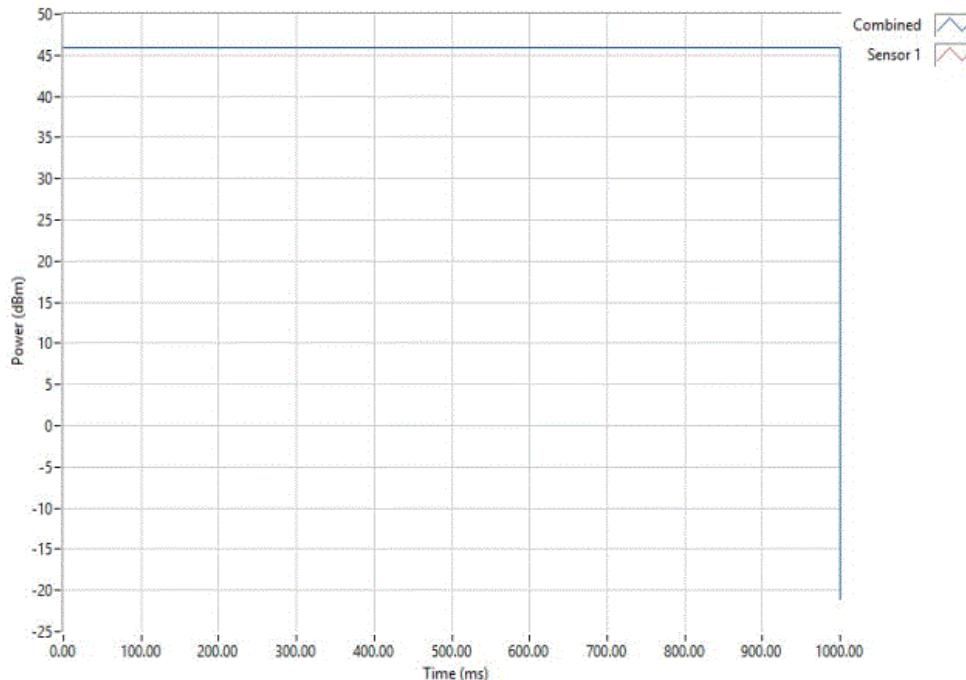


# CONDUCTED OUTPUT POWER

SISO, Antenna Port 1, Single Channel LTE10, 751 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.95	100	0	46	60	Pass	

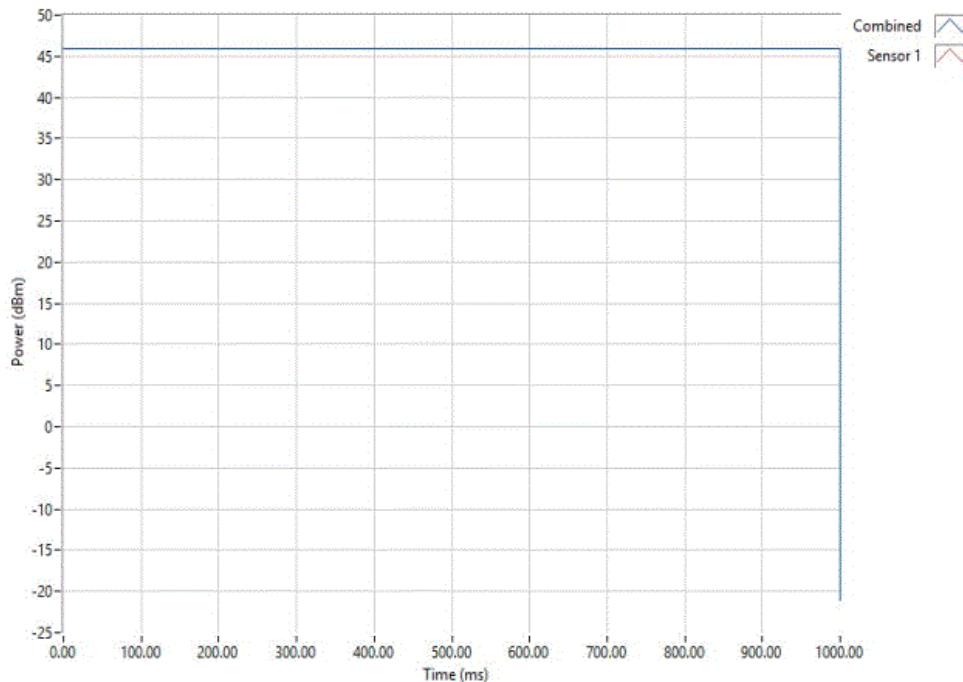


SISO, Antenna Port 2, Low Channel LTE5, 748.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.93	100	0	45.9	60	Pass	

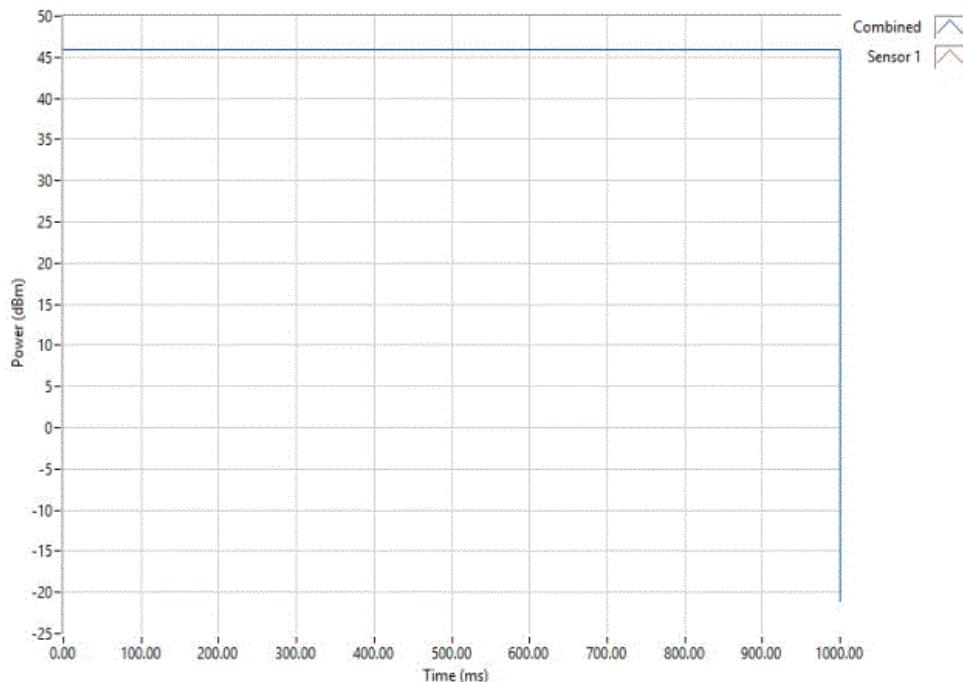


# CONDUCTED OUTPUT POWER

SISO, Antenna Port 2, High Channel LTE5, 753.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.93	100	0	45.9	60	Pass	

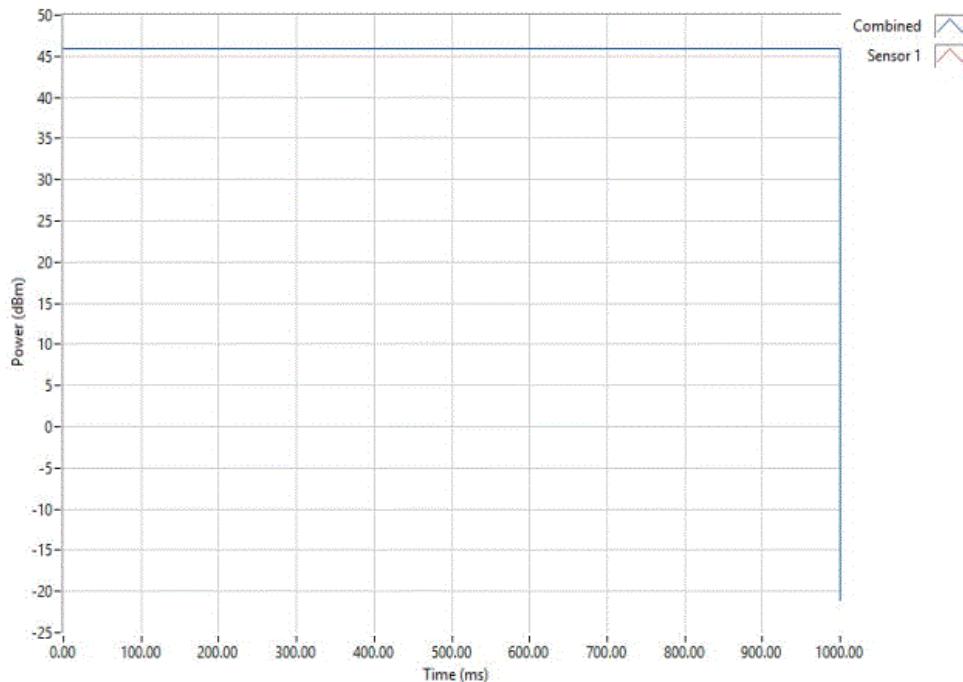


SISO, Antenna Port 2, Single Channel LTE10, 751 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

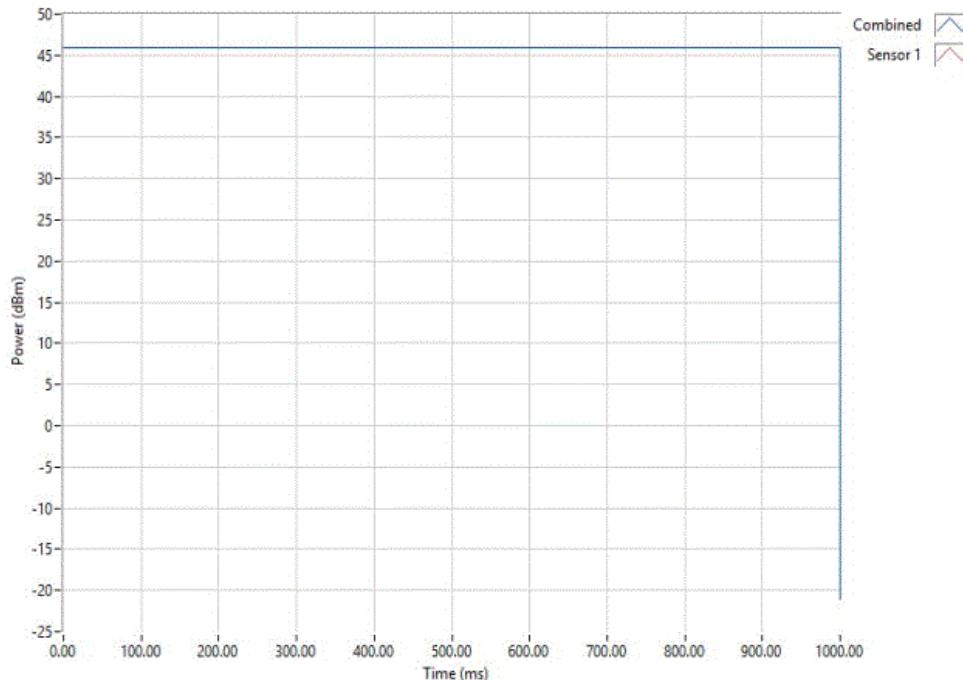


# CONDUCTED OUTPUT POWER

MIMO, Antenna Port 1, Low Channel LTE5, 748.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.96	100	0	46	60	Pass	

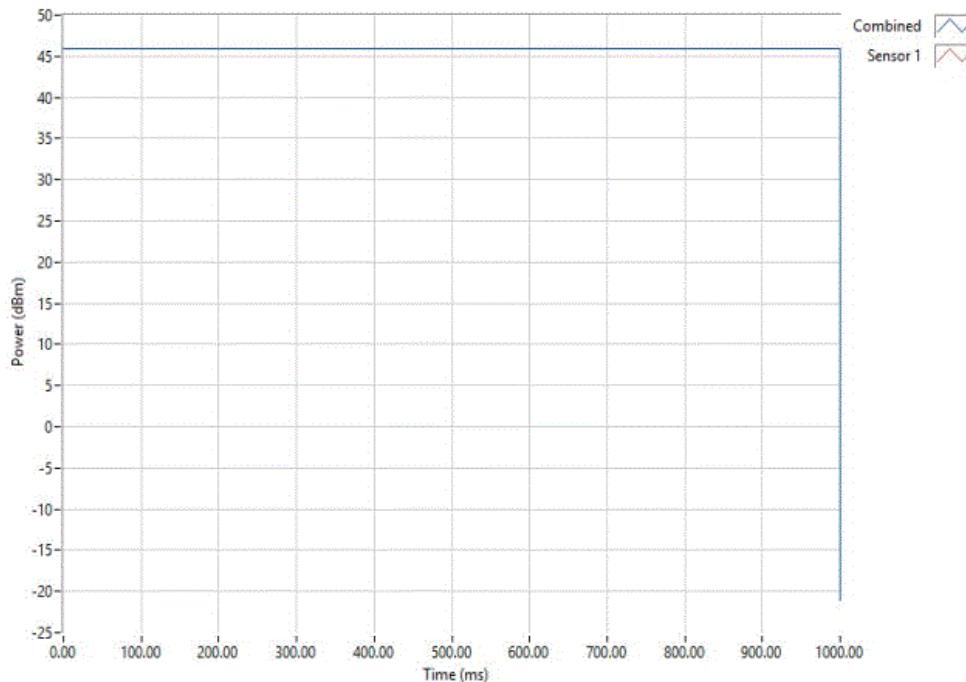


MIMO, Antenna Port 1, High Channel LTE5, 753.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.96	100	0	46	60	Pass	

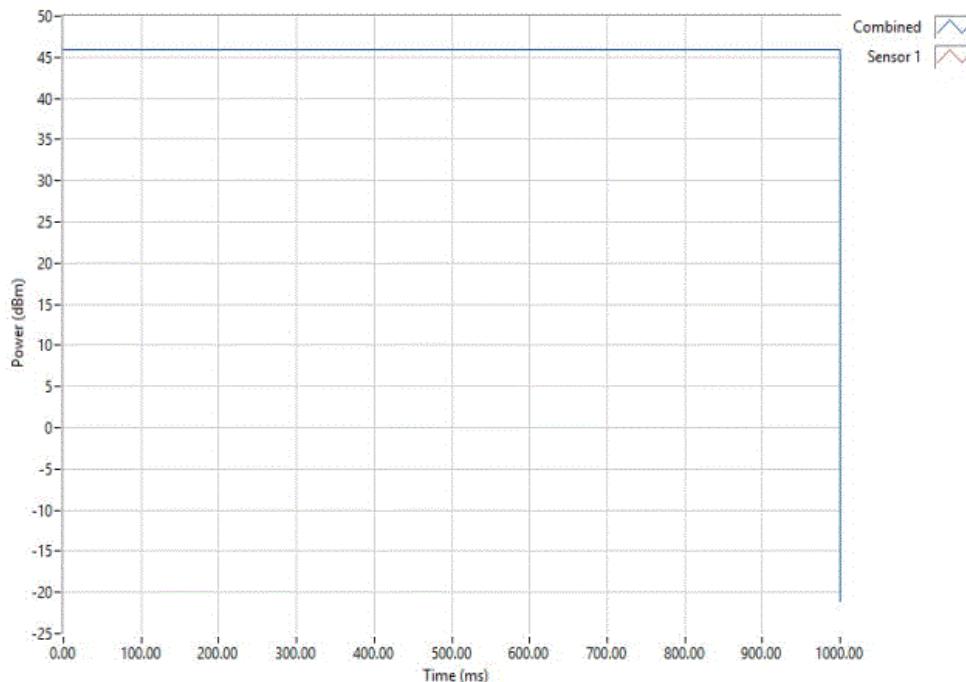


# CONDUCTED OUTPUT POWER

MIMO, Antenna Port 1, Single Channel LTE10, 751 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	

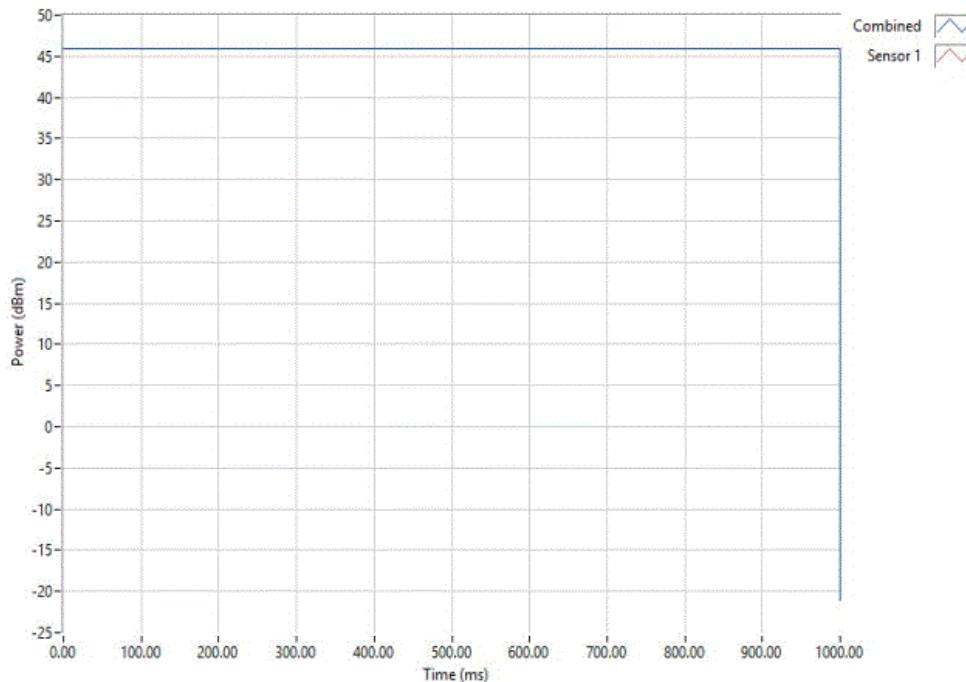


MIMO, Antenna Port 2, Low Channel LTE5, 748.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	

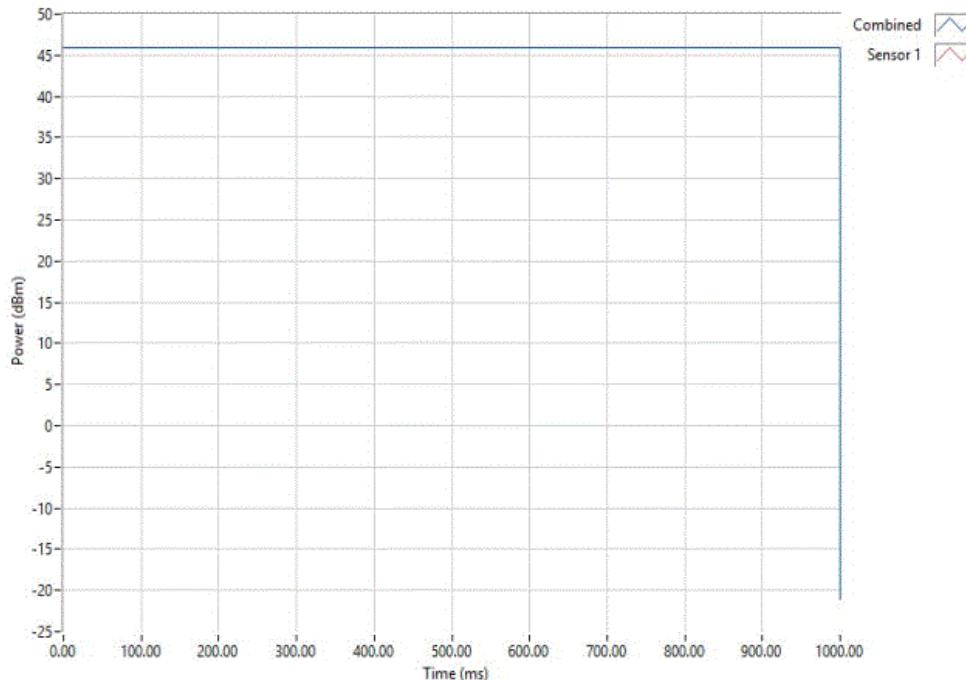


# CONDUCTED OUTPUT POWER

MIMO, Antenna Port 2, High Channel LTE5, 753.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.96	100	0	46	60	Pass	



MIMO, Antenna Port 2, Single Channel LTE10, 751 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	



# PEAK TO AVERAGE RATIO

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
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016

## CLIENT PROVIDED EQUIPMENT

Description	Manufacturer	Model	Last Cal.	Cal. Due
High Power Attenuator - 30dB	Aeroflex/Weinschel	53-30-43	NCR	NCR
Attenuator - 20dB	N/A	N/A	NCR	NCR
Power Divider	Fairview Microwave	MP8748-2	NCR	NCR
50Ohm Terminator	Aeroflex/Weinschel	1455-4	NCR	NCR
High Power Terminator	Telcon	KTMO400800060	NCR	NCR

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Ratio was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed 13 dB.

The spectrum analyzer settings were as follows:

Span set to encompass the entire emission bandwidth, centered on the transmit channel.

The largest difference between the following two traces was calculated:

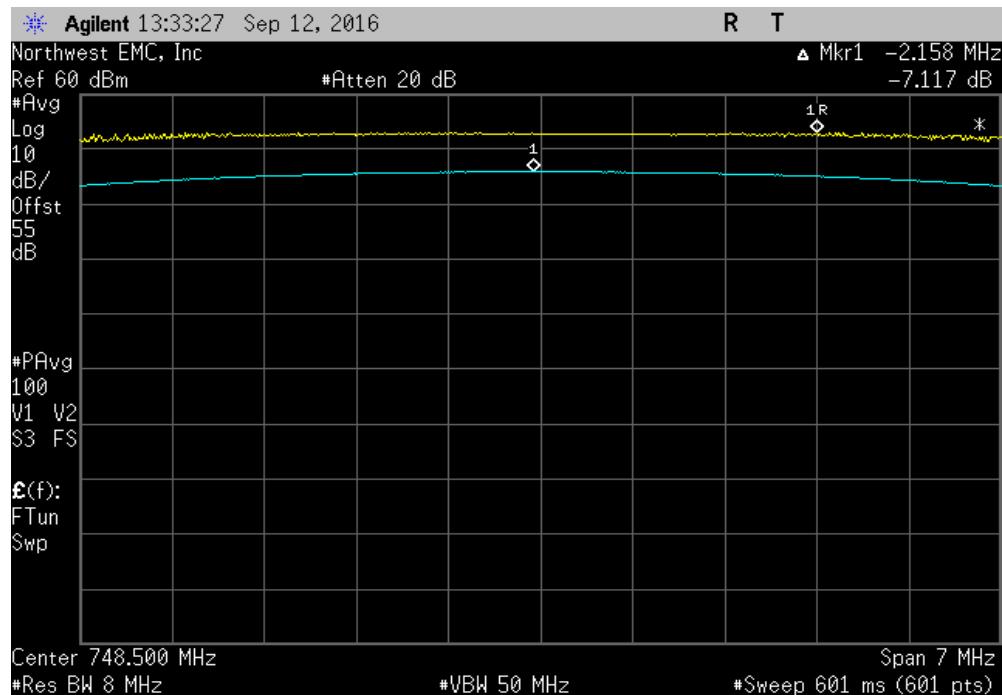
- 1st Trace: Peak detector and trace max-hold.
- 2nd Trace: The same procedure and settings as was used for conducted Output Power.

# PEAK TO AVERAGE RATIO

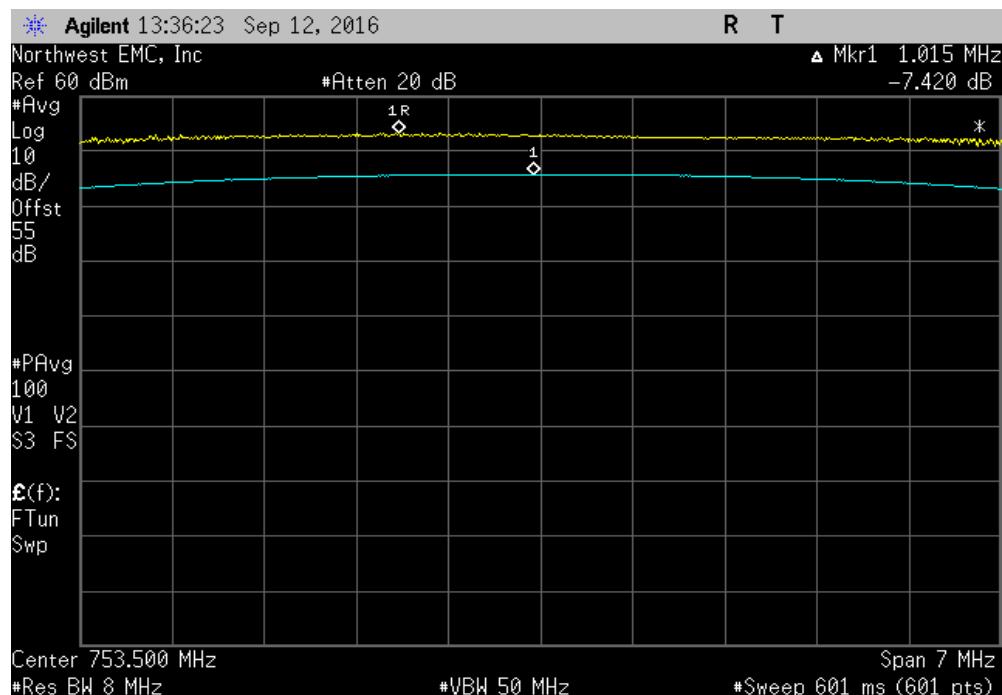
EUT:	CWS-3050-13		Work Order:	KMW0075	
Serial Number:	K16260005		Date:	09/12/16	
Customer:	Parallel Wireless Inc.		Temperature:	21.2 °C	
Attendees:	Andy Ku		Humidity:	45.5% RH	
Project:	None		Barometric Pres.:	1017 mbar	
Tested by:	Johnny Candelas	Power:	48VDC	Job Site:	OC01
TEST SPECIFICATIONS			Test Method		
FCC 27:2016			ANSI/TIA/EIA-603-D-2010		
COMMENTS					
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 55dB total.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	1	Signature			
			Value (dB)	Limit < (dB)	Results
Antenna Port 1					
Low Channel LTE5, 748.5 MHz			7.117	13	Pass
High Channel LTE5, 753.5 MHz			7.420	13	Pass
Single Channel LTE10, 751 MHz			9.757	13	Pass
Antenna Port 2					
Low Channel LTE5, 748.5 MHz			7.078	13	Pass
High Channel LTE5, 753.5 MHz			7.397	13	Pass
Single Channel LTE10, 751 MHz			9.699	13	Pass

# PEAK TO AVERAGE RATIO

Antenna Port 1, Low Channel LTE5, 748.5 MHz				Value (dB)	Limit < (dB)	Results
				7.117	13	Pass



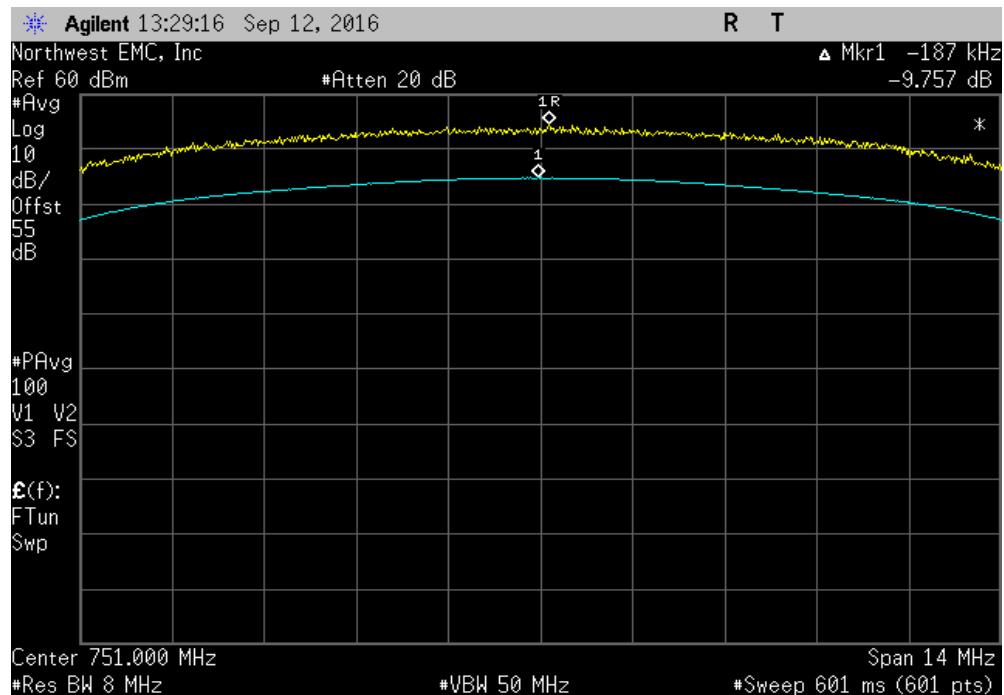
Antenna Port 1, High Channel LTE5, 753.5 MHz				Value (dB)	Limit < (dB)	Results
				7.420	13	Pass



# PEAK TO AVERAGE RATIO

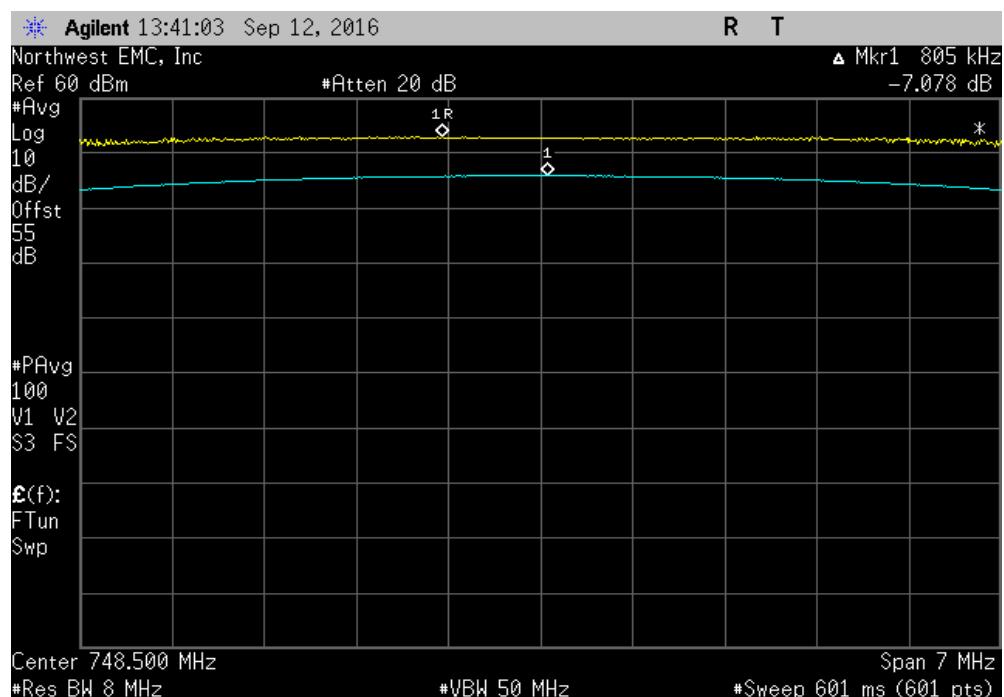
Antenna Port 1, Single Channel LTE10, 751 MHz

	Value (dB)	Limit < (dB)	Results
	9.757	13	Pass



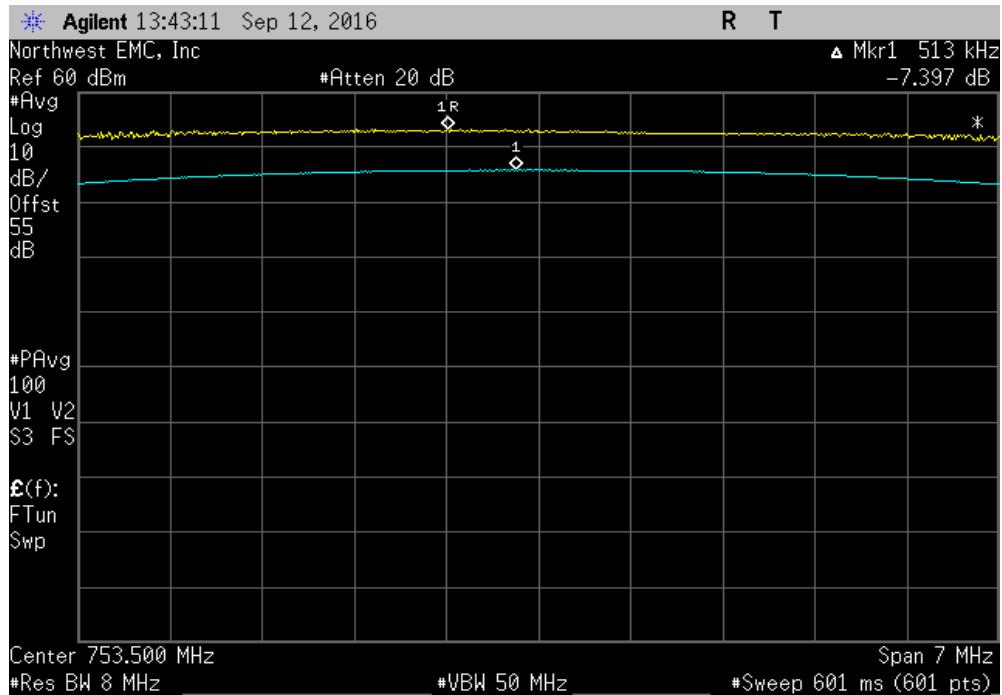
Antenna Port 2, Low Channel LTE5, 748.5 MHz

	Value (dB)	Limit < (dB)	Results
	7.078	13	Pass

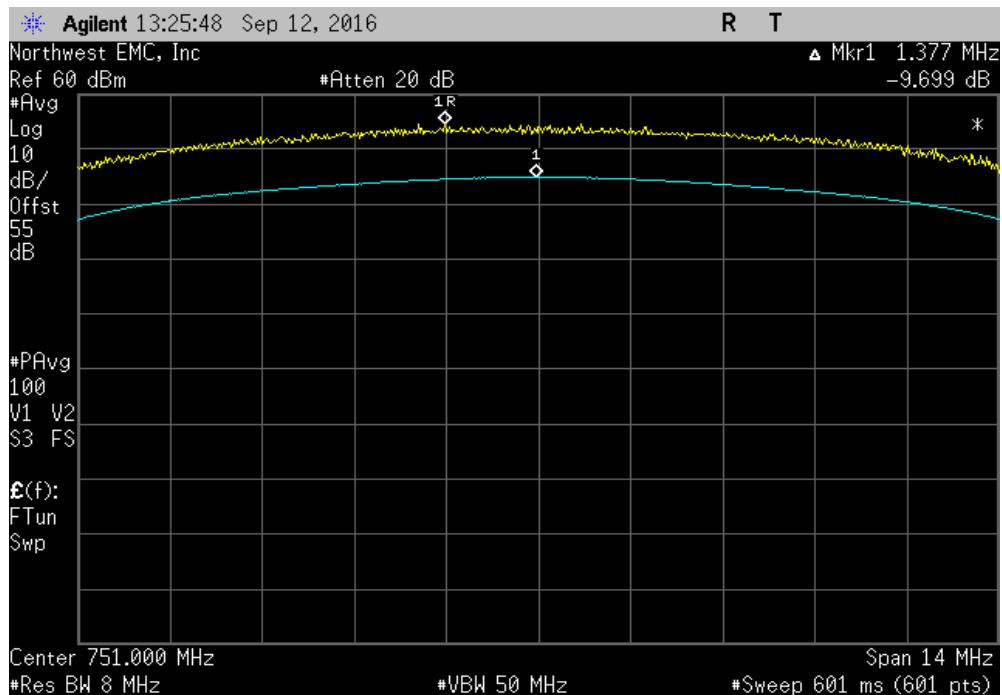


# PEAK TO AVERAGE RATIO

Antenna Port 2, High Channel LTE5, 753.5 MHz		
	Value (dB)	Limit < (dB)
	7.397	13



Antenna Port 2, Single Channel LTE10, 751 MHz		
	Value (dB)	Limit < (dB)
	9.699	13



# 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.	Cal. Due
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPHS-32-3.5-SCT/AC	TBE	NCR	NCR
Thermometer	Omega Engineering, Inc.	HH311	DUC	10/3/2014	10/3/2017
Power Supply - DC	Hewlett Packard	6574A	TPX	NCR	NCR
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016

## CLIENT PROVIDED EQUIPMENT

Description	Manufacturer	Model	Last Cal.	Cal. Due
High Power Attenuator - 30dB	Aeroflex/Weinschel	53-30-43	NCR	NCR
Attenuator - 20dB	N/A	N/A	NCR	NCR
Power Divider	Fairview Microwave	MP8748-2	NCR	NCR
50Ohm Terminator	Aeroflex/Weinschel	1455-4	NCR	NCR
High Power Terminator	Telcon	KTMO400800060	NCR	NCR

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

Testing was done with an absence of modulation in a CW mode of operation.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30° to +50° C) at 10°C intervals.

Per the requirements of FCC Part 27.54:

“The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.”

No specific limits are provided in either FCC 27.54, the product specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 1ppm will still allow the radio to be operating within the band.

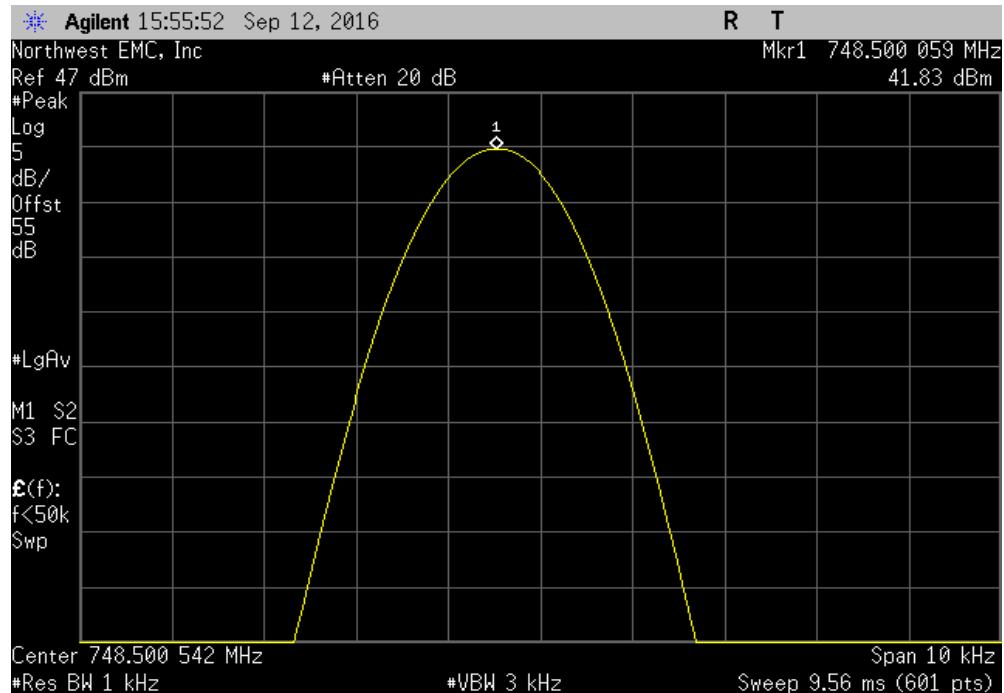
# FREQUENCY STABILITY

EUT:	CWS-3050-13		Work Order:	KMW0075	
Serial Number:	K162600005		Date:	09/12/16	
Customer:	Parallel Wireless Inc.		Temperature:	21.2 °C	
Attendees:	Andy Ku		Humidity:	45.5% RH	
Project:	None		Barometric Pres.:	1017 mbars	
Tested by:	Johnny Candelas	Power:	48VDC	Job Site:	OC01
TEST SPECIFICATIONS	Test Method				
FCC 27:2016	ANSI/TIA/EIA-603-D-2010				
COMMENTS	Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 55dB total.				
DEVIATIONS FROM TEST STANDARD	None				
Configuration #	1	Signature		Measured Value (MHz)	Assigned Value (MHz)
Antenna Port 1				Error (ppm)	Limit (ppm)
Normal Temperature and Voltage				Results	
Low Channel LTE5, 748.5 MHz	748.500059	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500051	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Voltage, 55.2 VDC					
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500051	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Voltage, 40.8 VDC					
Low Channel LTE5, 748.5 MHz	748.500059	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500067	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Temperature, -30°C					
Low Channel LTE5, 748.5 MHz	748.500192	748.5	0.3	1	Pass
High Channel LTE5, 753.5 MHz	753.500184	753.5	0.2	1	Pass
Single Channel LTE10, 751 MHz	751.000183	751	0.2	1	Pass
Extreme Temperature, -20°C					
Low Channel LTE5, 748.5 MHz	748.500294	748.5	0.4	1	Pass
High Channel LTE5, 753.5 MHz	753.500301	753.5	0.4	1	Pass
Single Channel LTE10, 751 MHz	751.000294	751	0.4	1	Pass
Extreme Temperature, -10°C					
Low Channel LTE5, 748.5 MHz	748.500478	748.5	0.6	1	Pass
High Channel LTE5, 753.5 MHz	753.500468	753.5	0.6	1	Pass
Single Channel LTE10, 751 MHz	751.000483	751	0.6	1	Pass
Extreme Temperature, 0°C					
Low Channel LTE5, 748.5 MHz	748.500045	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.50005	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000005	751	0.1	1	Pass
Extreme Temperature, +10°C					
Low Channel LTE5, 748.5 MHz	748.500512	748.5	0.7	1	Pass
High Channel LTE5, 753.5 MHz	753.500517	753.5	0.7	1	Pass
Single Channel LTE10, 751 MHz	751.000045	751	0.1	1	Pass
Extreme Temperature, +20°C					
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500501	753.5	0.7	1	Pass
Single Channel LTE10, 751 MHz	751.000045	751	0.1	1	Pass
Extreme Temperature, +30°C					
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.50005	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Temperature, +40°C					
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.50005	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000066	751	0.1	1	Pass
Extreme Temperature, +50°C					
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500051	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Antenna Port 2					
Normal Temperature and Voltage					
Low Channel LTE5, 748.5 MHz	748.500059	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500067	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Voltage, 55.2 VDC					
Low Channel LTE5, 748.5 MHz	748.500059	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500067	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Voltage, 40.8 VDC					
Low Channel LTE5, 748.5 MHz	748.500059	748.5	0.1	1	Pass
High Channel LTE5, 753.5 MHz	753.500005	753.5	0.1	1	Pass
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass
Extreme Temperature, -30°C					
Low Channel LTE5, 748.5 MHz	748.500192	748.5	0.3	1	Pass
High Channel LTE5, 753.5 MHz	753.500201	753.5	0.3	1	Pass
Single Channel LTE10, 751 MHz	751.000194	751	0.3	1	Pass
Extreme Temperature, -20°C					
Low Channel LTE5, 748.5 MHz	748.500292	748.5	0.4	1	Pass
High Channel LTE5, 753.5 MHz	753.5003	753.5	0.4	1	Pass
Single Channel LTE10, 751 MHz	751.000311	751	0.4	1	Pass

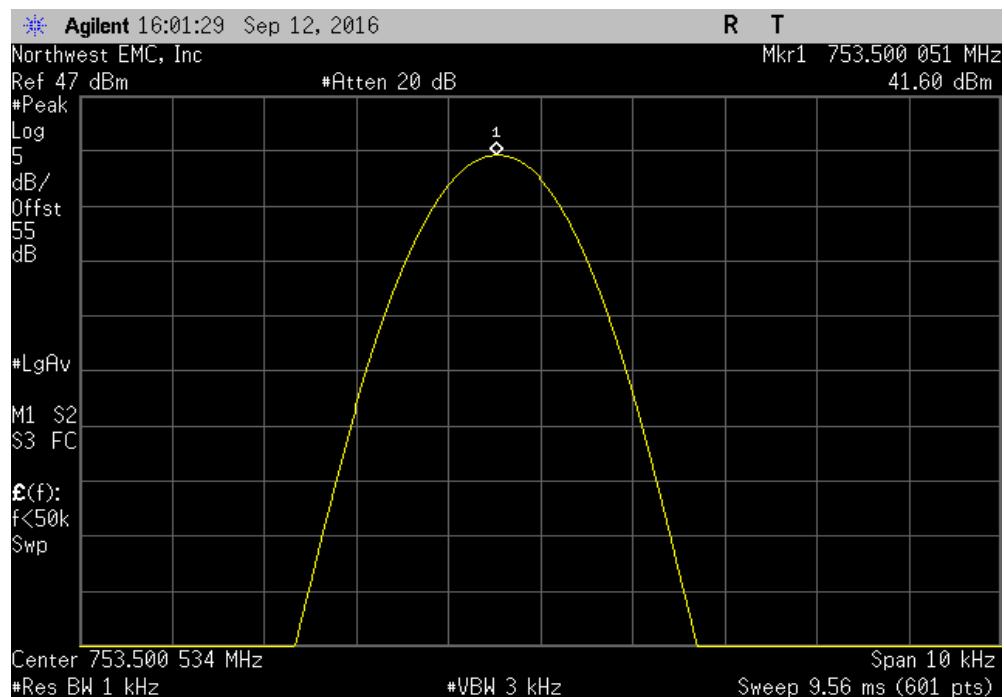
<b>Extreme Temperature, -10°C</b>						
Low Channel LTE5, 748.5 MHz	748.500475	748.5	0.6	1	Pass	
High Channel LTE5, 753.5 MHz	753.500485	753.5	0.6	1	Pass	
Single Channel LTE10, 751 MHz	751.000478	751	0.6	1	Pass	
<b>Extreme Temperature, 0°C</b>						
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass	
High Channel LTE5, 753.5 MHz	753.50005	753.5	0.1	1	Pass	
Single Channel LTE10, 751 MHz	751.000045	751	0.1	1	Pass	
<b>Extreme Temperature, +10°C</b>						
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass	
High Channel LTE5, 753.5 MHz	753.500051	753.5	0.1	1	Pass	
Single Channel LTE10, 751 MHz	751.000045	751	0.1	1	Pass	
<b>Extreme Temperature, +20°C</b>						
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass	
High Channel LTE5, 753.5 MHz	753.500067	753.5	0.1	1	Pass	
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass	
<b>Extreme Temperature, +30°C</b>						
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass	
High Channel LTE5, 753.5 MHz	753.50005	753.5	0.1	1	Pass	
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass	
<b>Extreme Temperature, +40°C</b>						
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass	
High Channel LTE5, 753.5 MHz	753.50005	753.5	0.1	1	Pass	
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass	
<b>Extreme Temperature, +50°C</b>						
Low Channel LTE5, 748.5 MHz	748.500058	748.5	0.1	1	Pass	
High Channel LTE5, 753.5 MHz	753.500067	753.5	0.1	1	Pass	
Single Channel LTE10, 751 MHz	751.000061	751	0.1	1	Pass	

# FREQUENCY STABILITY

Antenna Port 1, Normal Temperature and Voltage, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500059	748.5	0.1	1	Pass

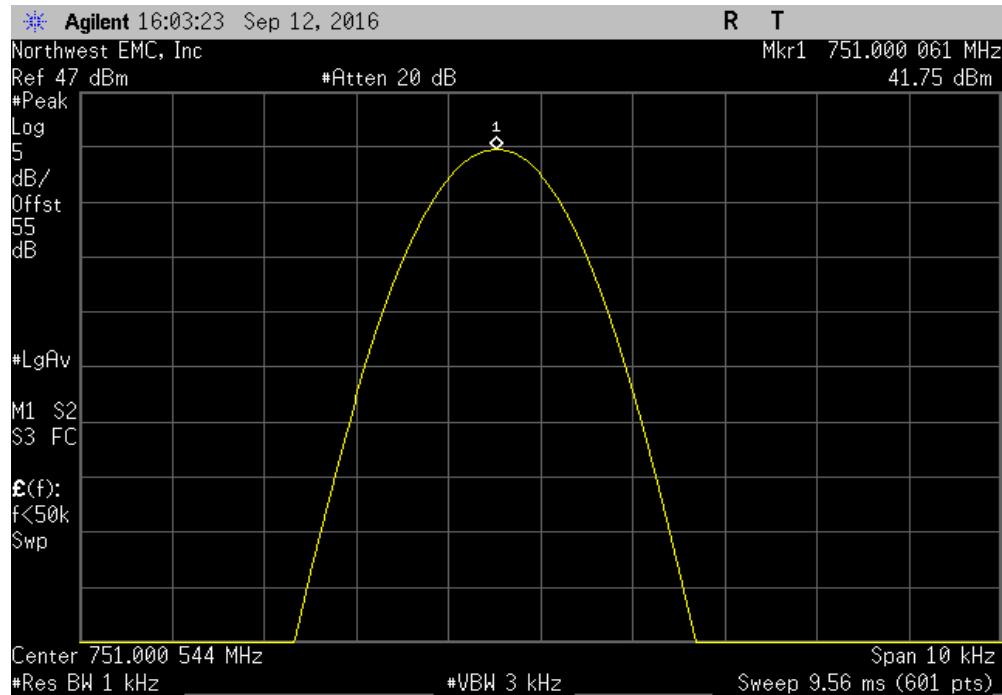


Antenna Port 1, Normal Temperature and Voltage, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500051	753.5	0.1	1	Pass

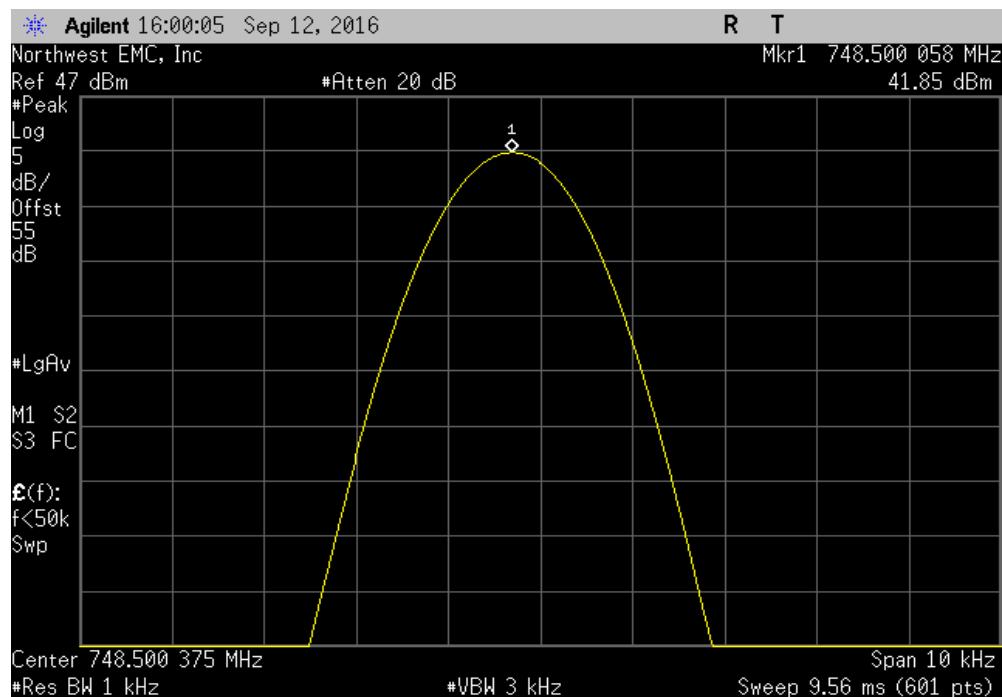


# FREQUENCY STABILITY

Antenna Port 1, Normal Temperature and Voltage, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

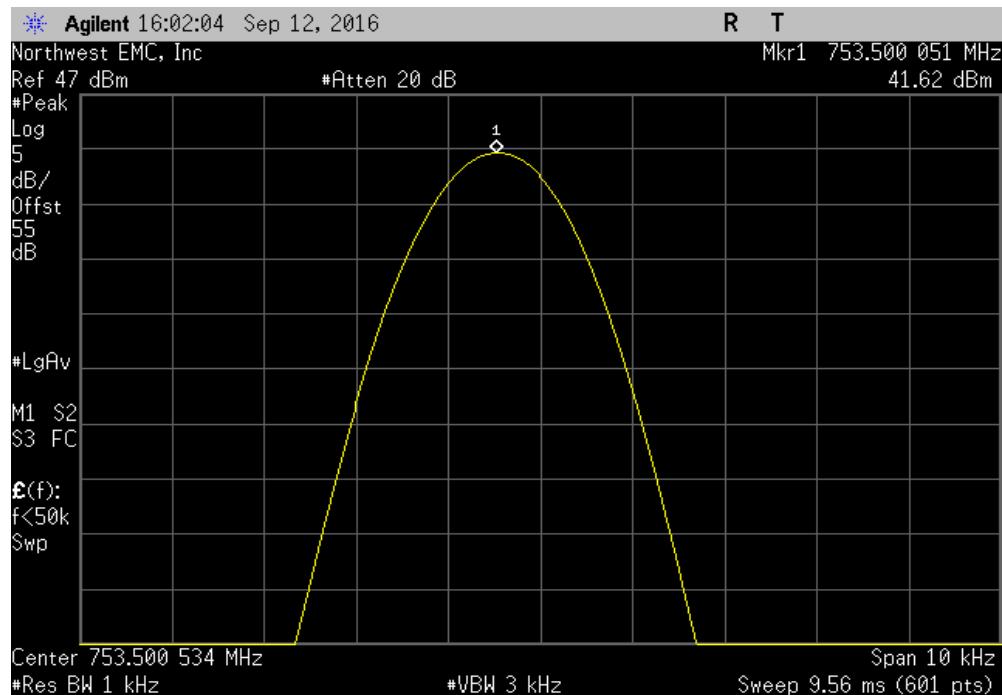


Antenna Port 1, Extreme Voltage, 55.2 VDC, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

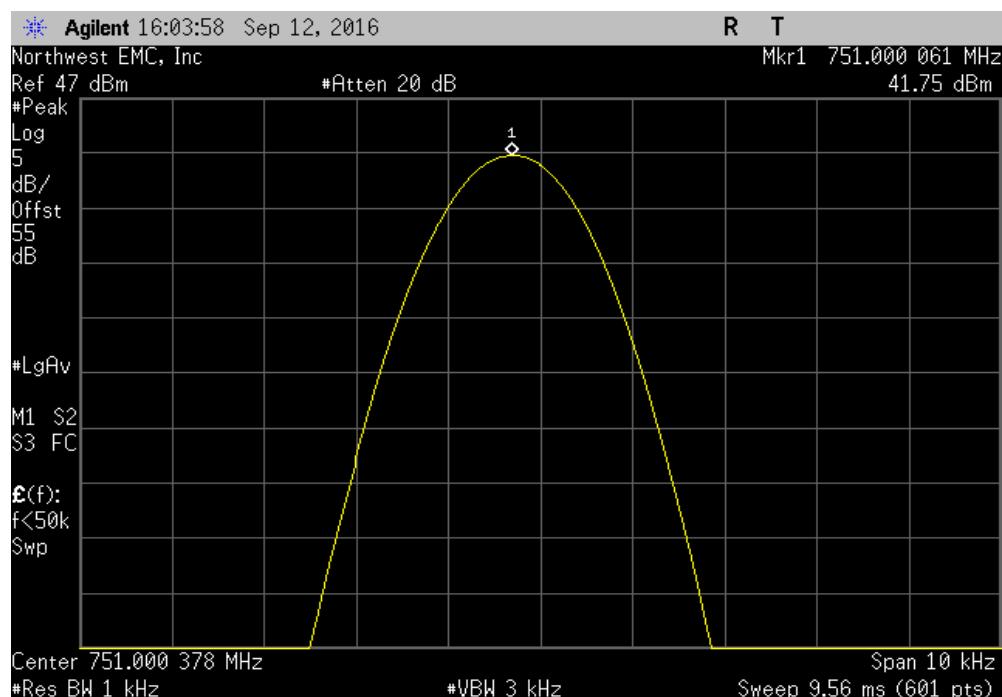


# FREQUENCY STABILITY

Antenna Port 1, Extreme Voltage, 55.2 VDC, High Channel LTE5, 753.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
753.500051	753.5	0.1	1	Pass	

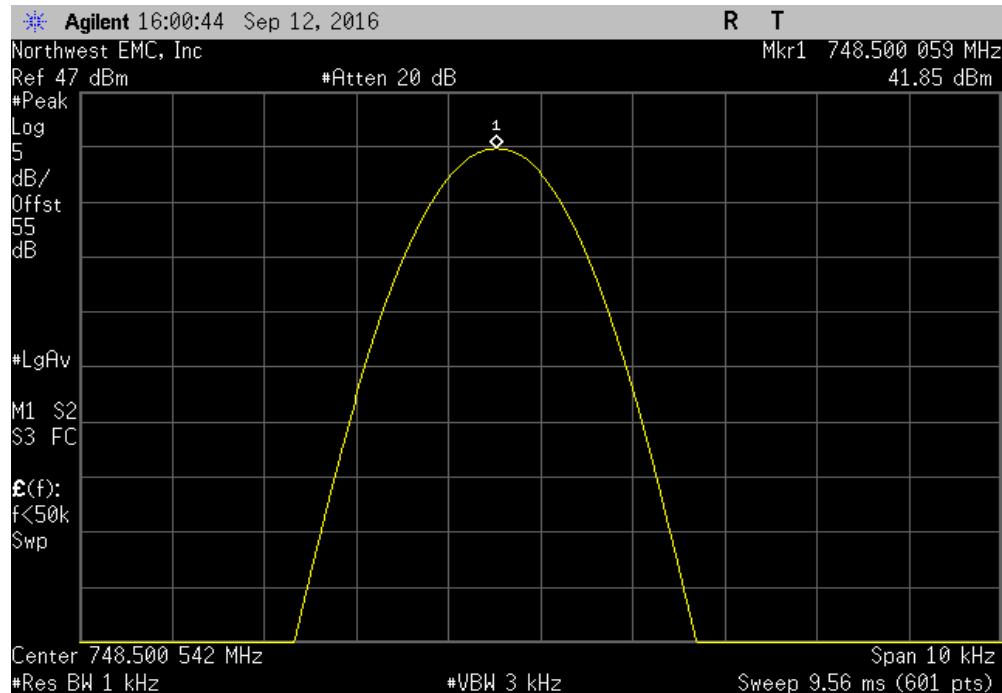


Antenna Port 1, Extreme Voltage, 55.2 VDC, Single Channel LTE10, 751 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
751.000061	751	0.1	1	Pass	

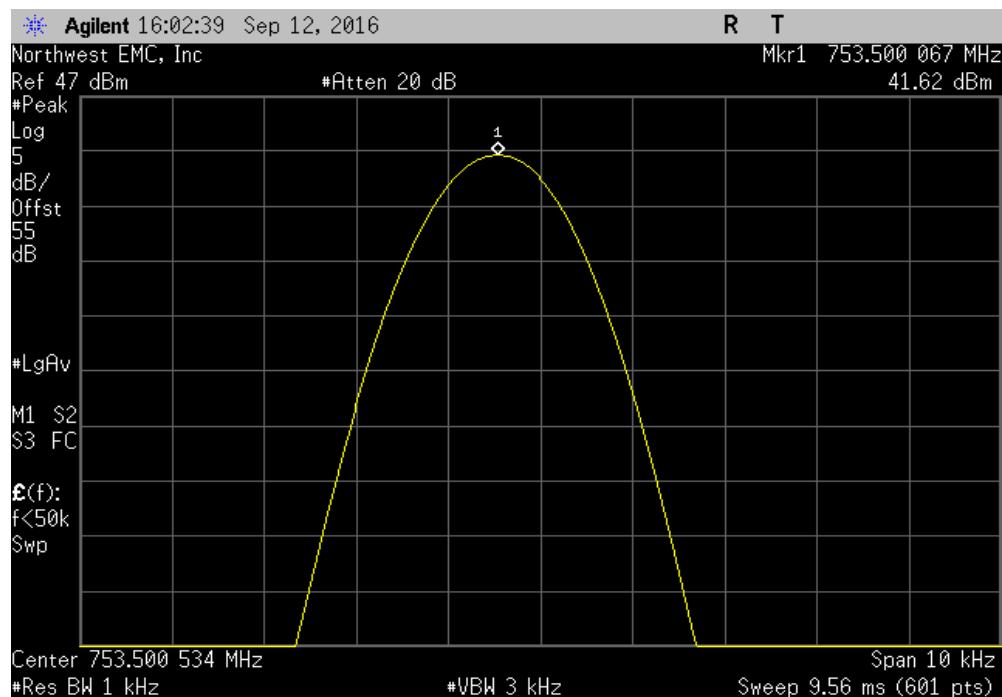


# FREQUENCY STABILITY

Antenna Port 1, Extreme Voltage, 40.8 VDC, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500059	748.5	0.1	1	Pass

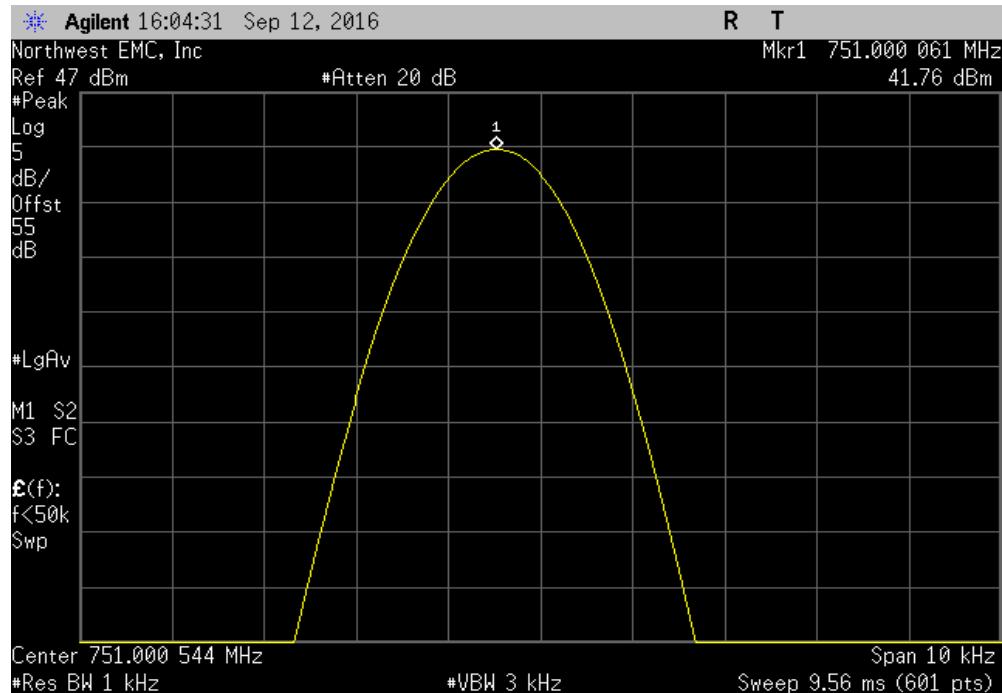


Antenna Port 1, Extreme Voltage, 40.8 VDC, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500067	753.5	0.1	1	Pass

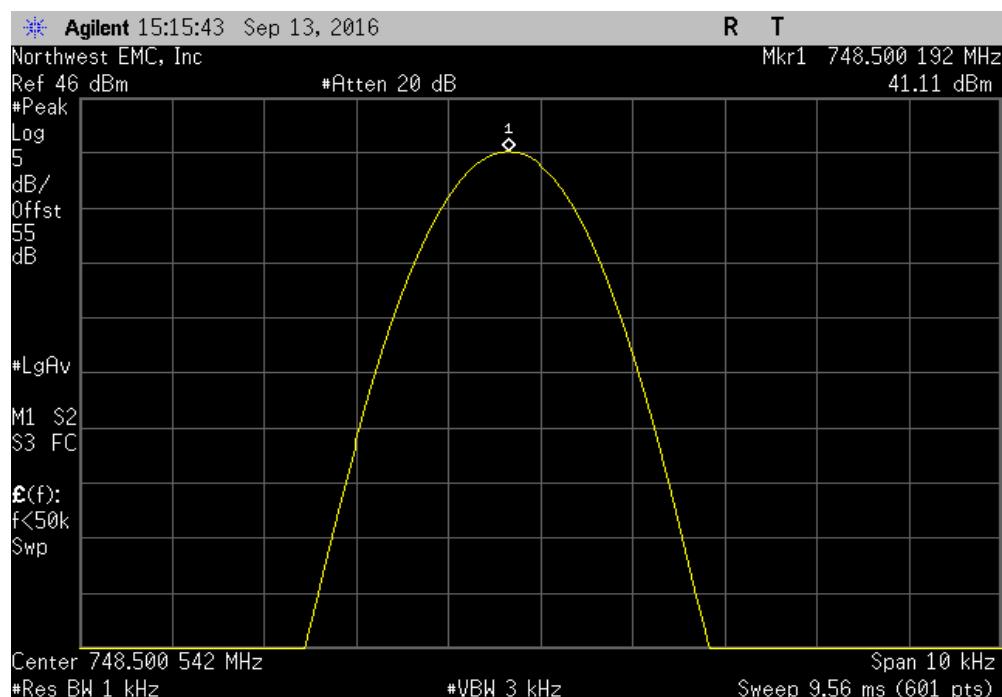


# FREQUENCY STABILITY

Antenna Port 1, Extreme Voltage, 40.8 VDC, Single Channel LTE10, 751 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
751.000061	751	0.1	1	Pass	

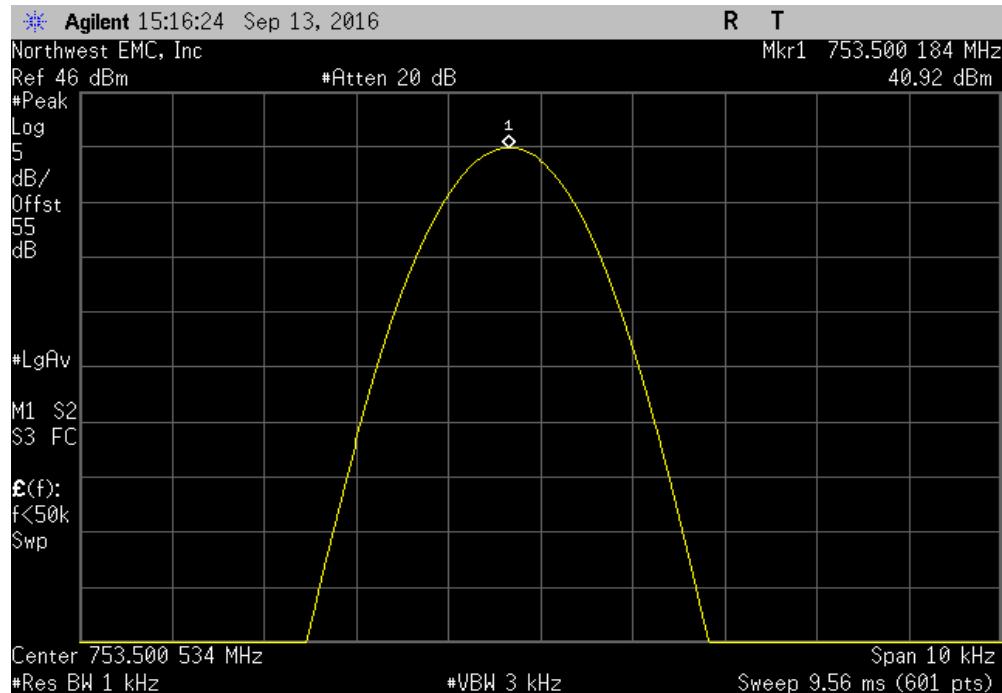


Antenna Port 1, Extreme Temperature, -30°C, Low Channel LTE5, 748.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
748.500192	748.5	0.3	1	Pass	

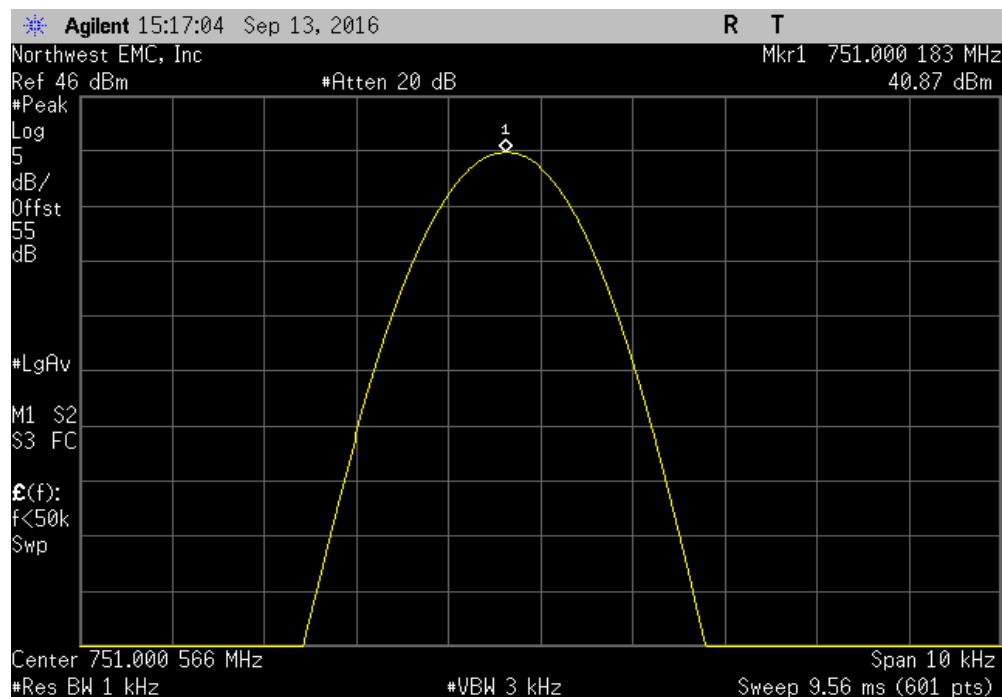


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -30°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500184	753.5	0.2	1	Pass

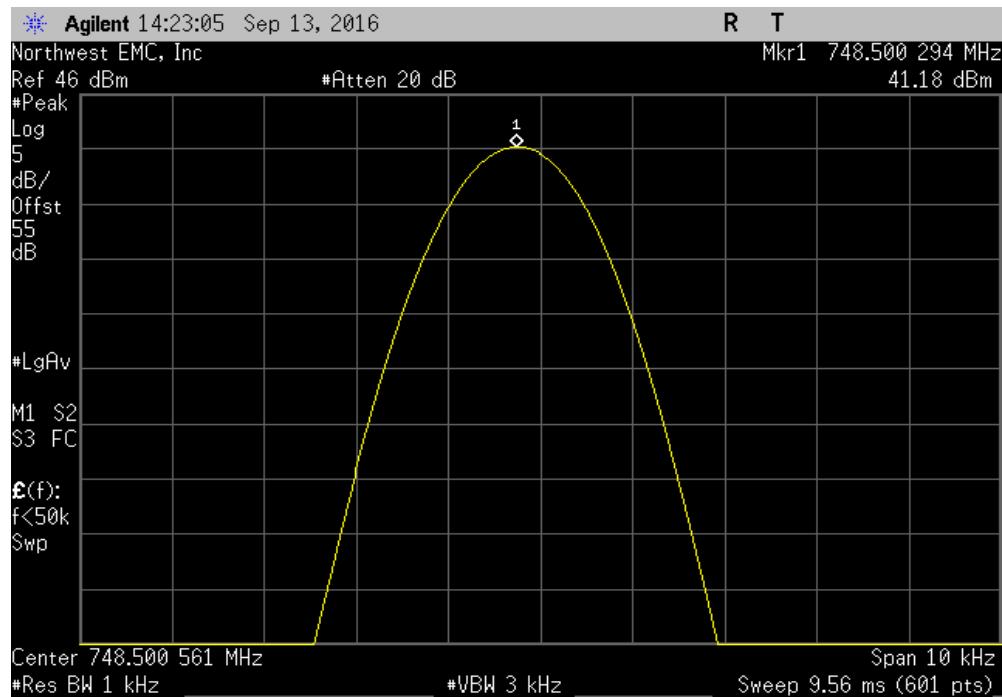


Antenna Port 1, Extreme Temperature, -30°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000183	751	0.2	1	Pass

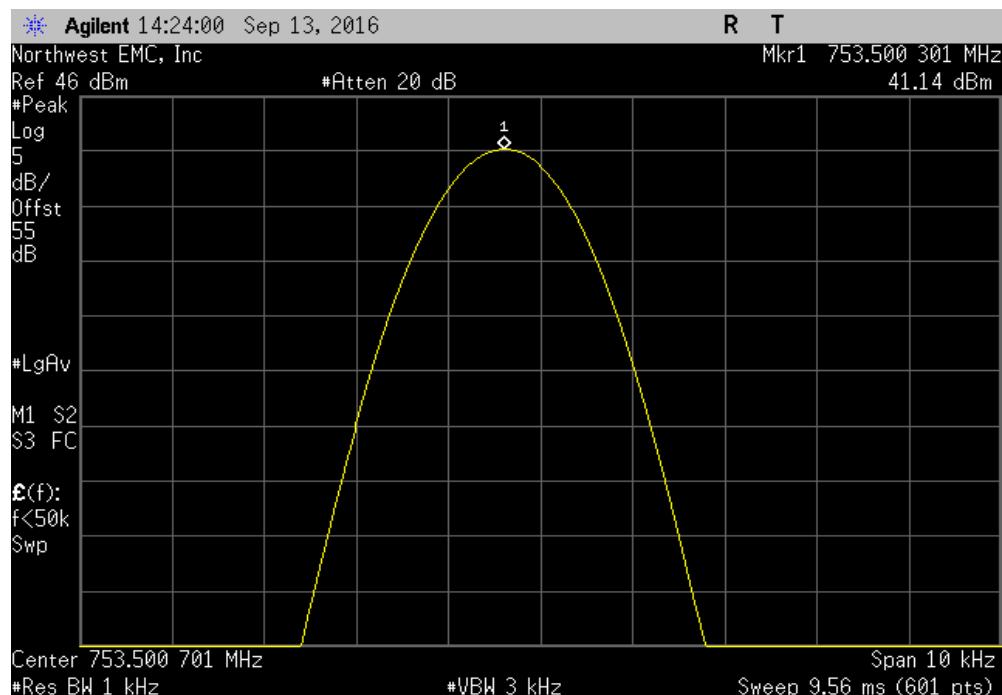


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -20°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500294	748.5	0.4	1	Pass

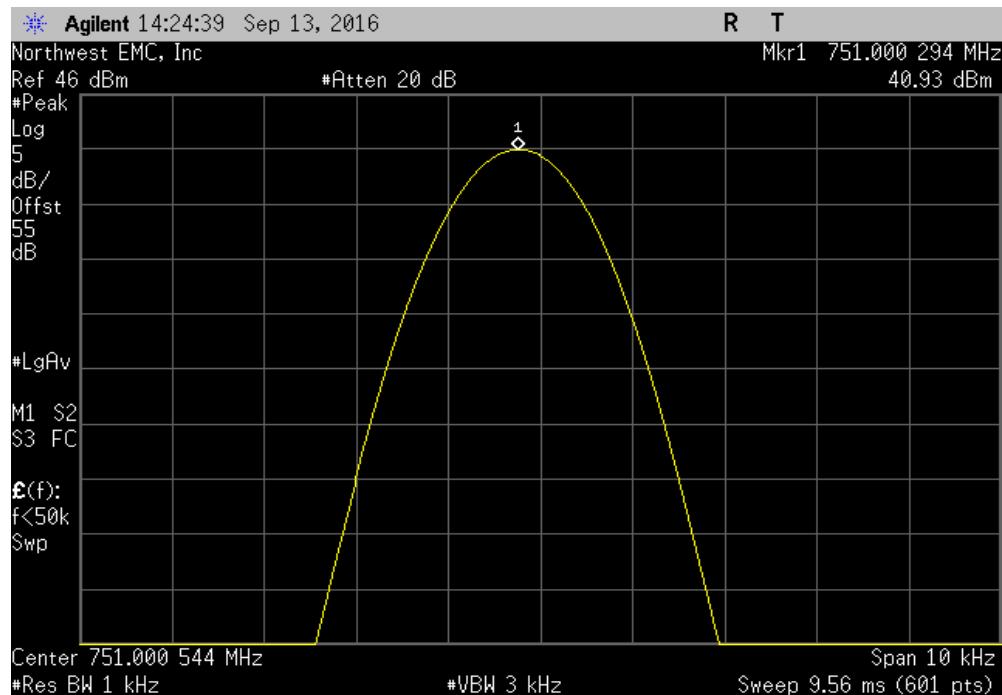


Antenna Port 1, Extreme Temperature, -20°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500301	753.5	0.4	1	Pass

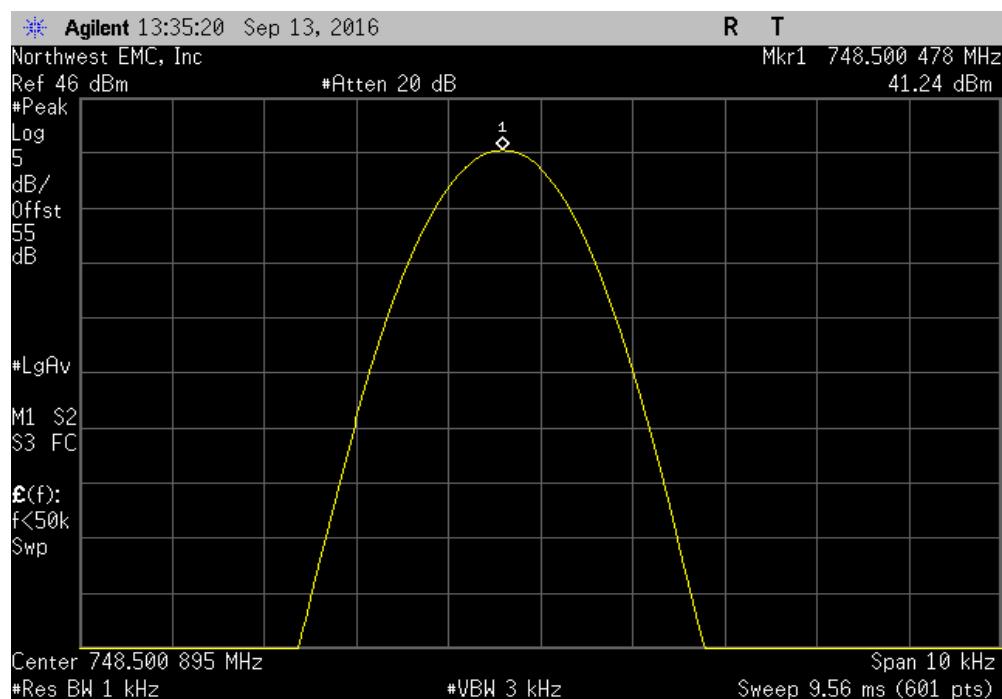


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -20°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000294	751	0.4	1	Pass

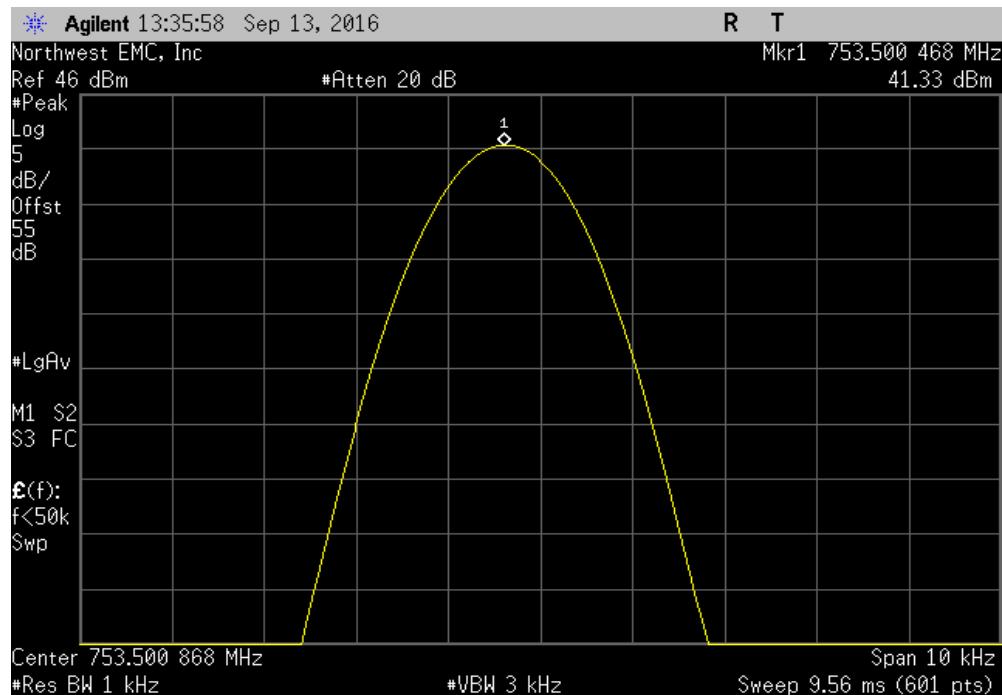


Antenna Port 1, Extreme Temperature, -10°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500478	748.5	0.6	1	Pass

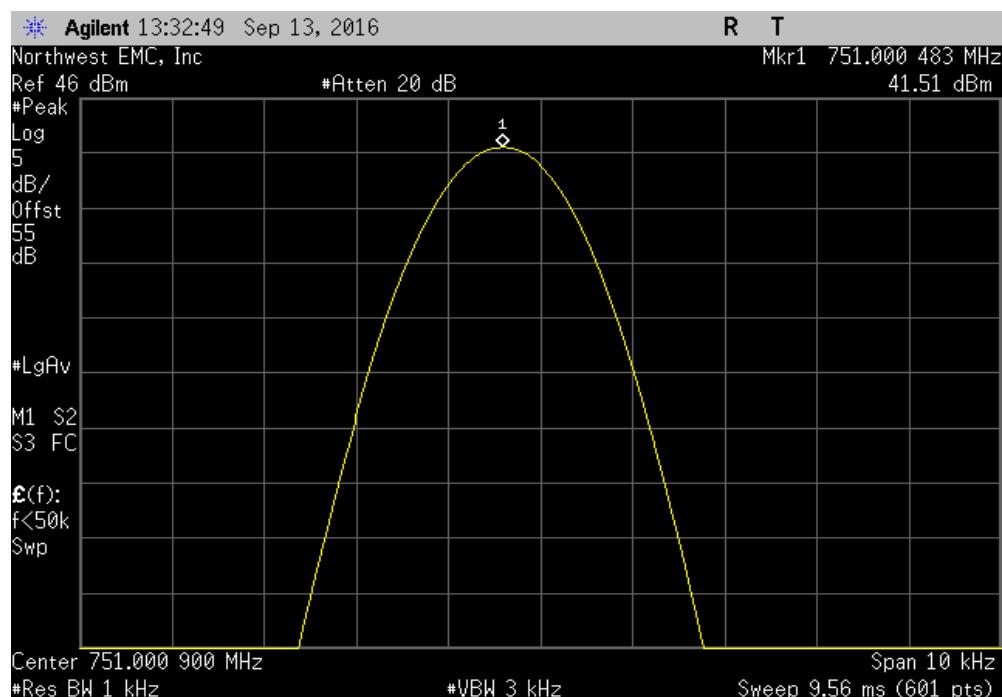


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -10°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500468	753.5	0.6	1	Pass

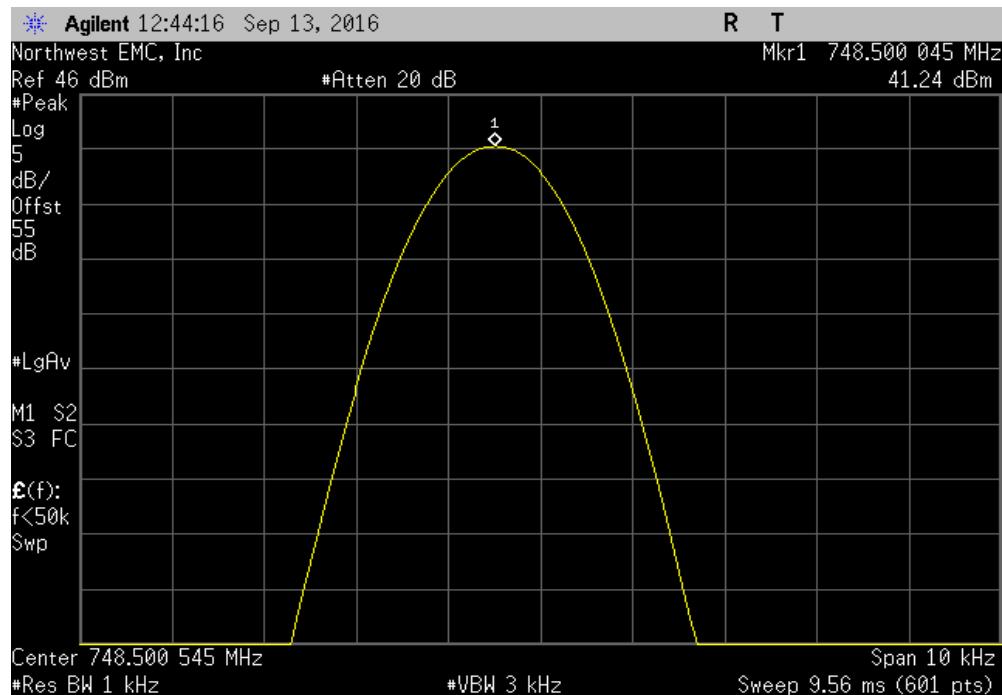


Antenna Port 1, Extreme Temperature, -10°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000483	751	0.6	1	Pass

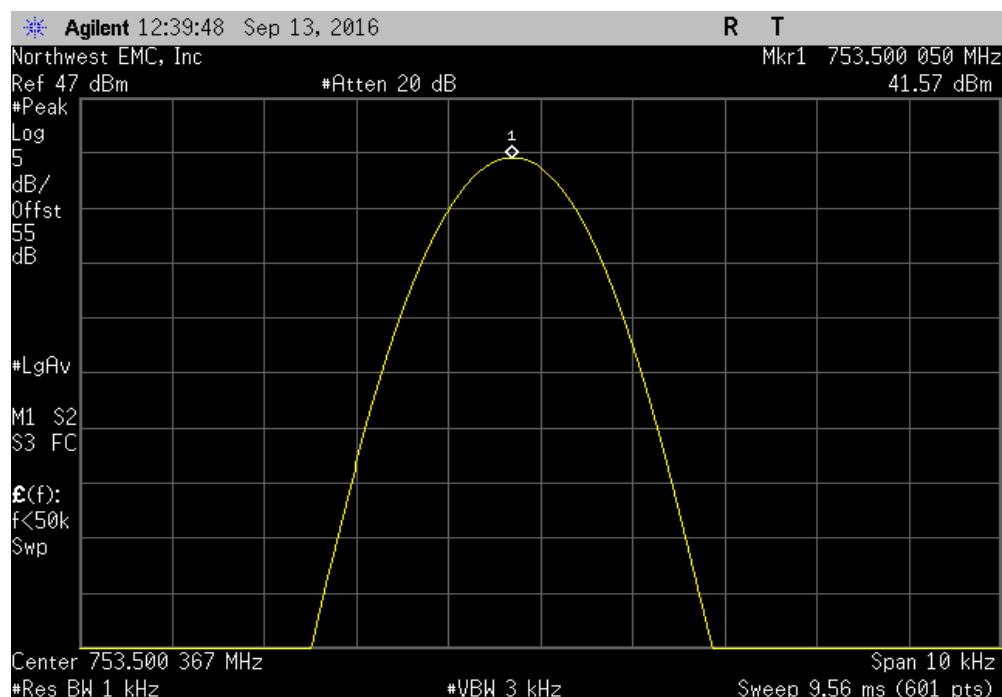


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, 0°C, Low Channel LTE5, 748.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
748.500045	748.5	0.1	1	Pass	

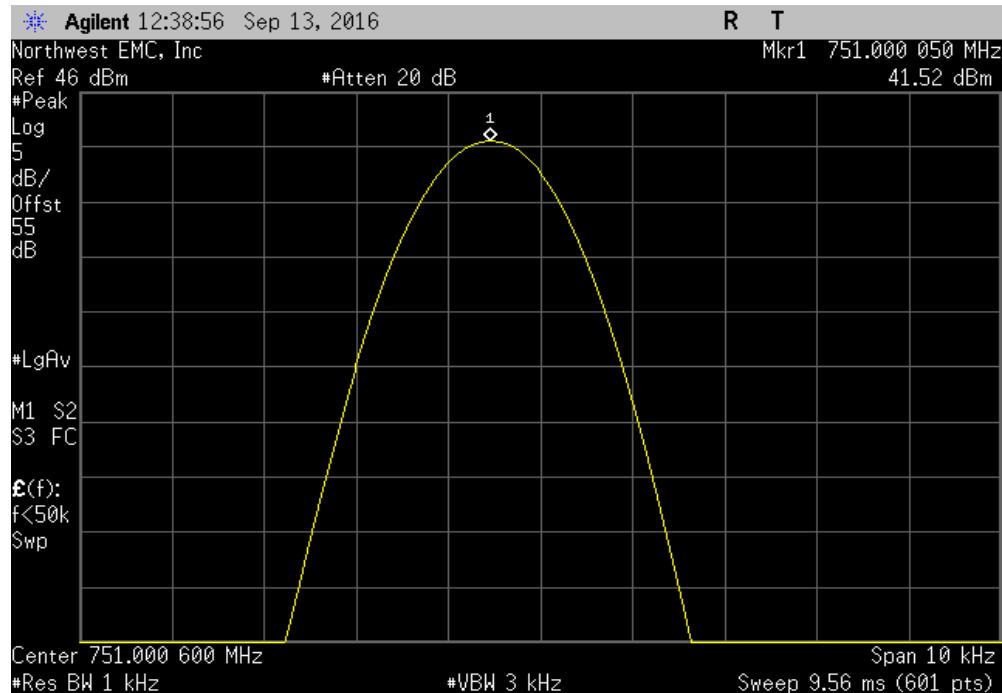


Antenna Port 1, Extreme Temperature, 0°C, High Channel LTE5, 753.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
753.50005	753.5	0.1	1	Pass	

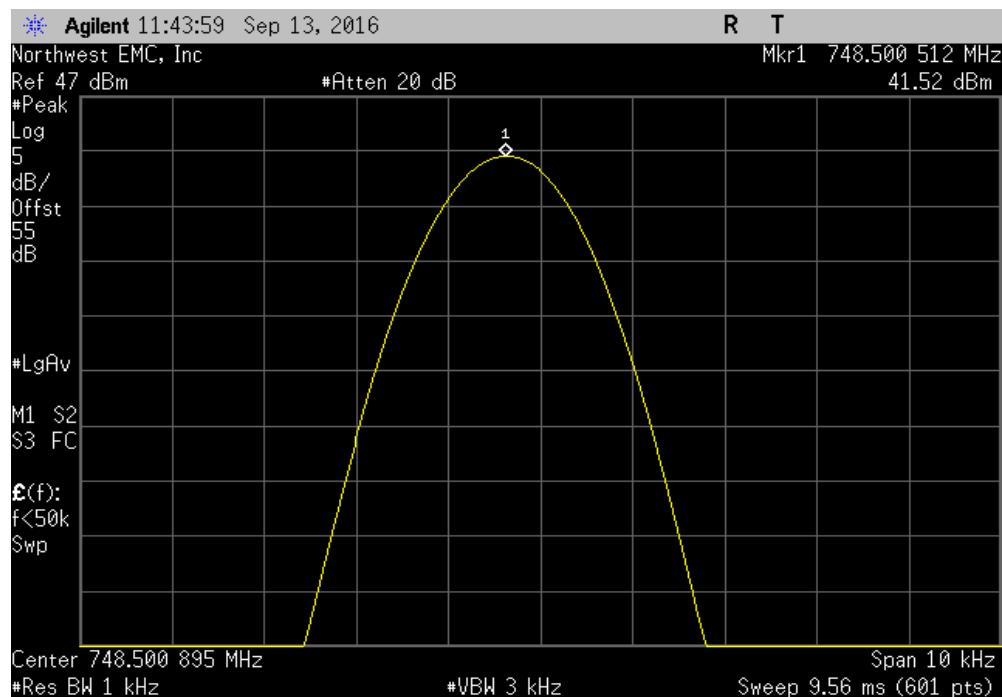


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, 0°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.00005	751	0.1	1	Pass

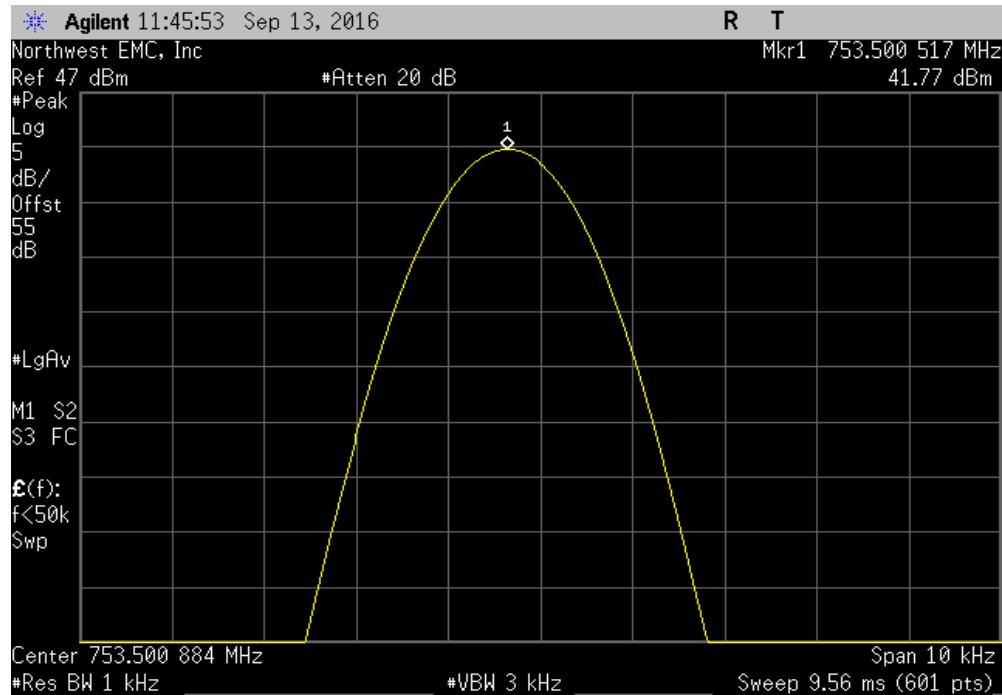


Antenna Port 1, Extreme Temperature, +10°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500512	748.5	0.7	1	Pass

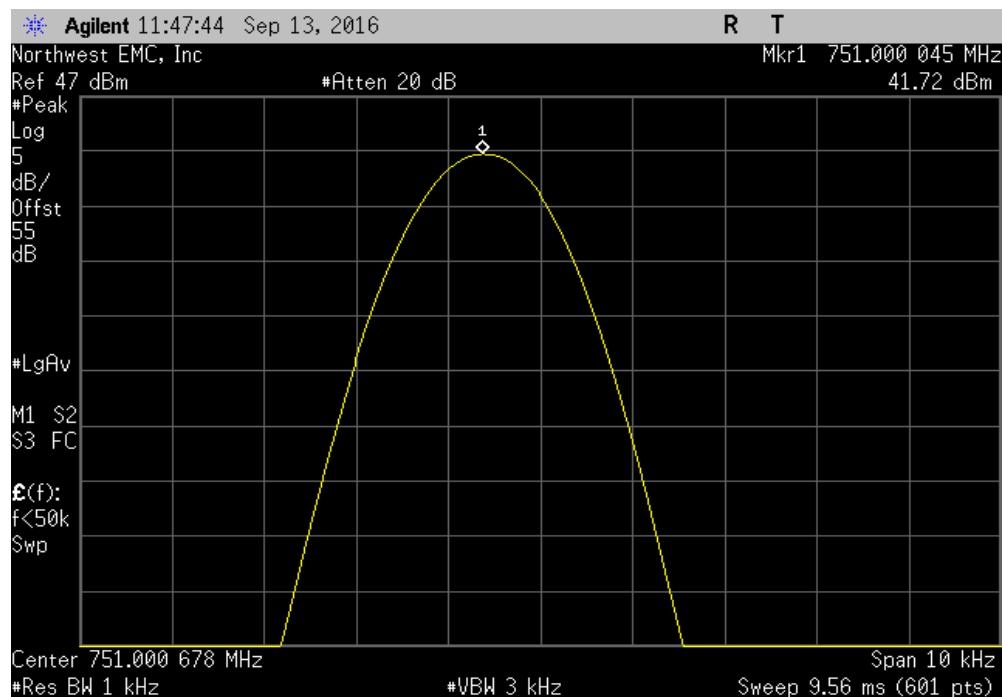


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +10°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500517	753.5	0.7	1	Pass

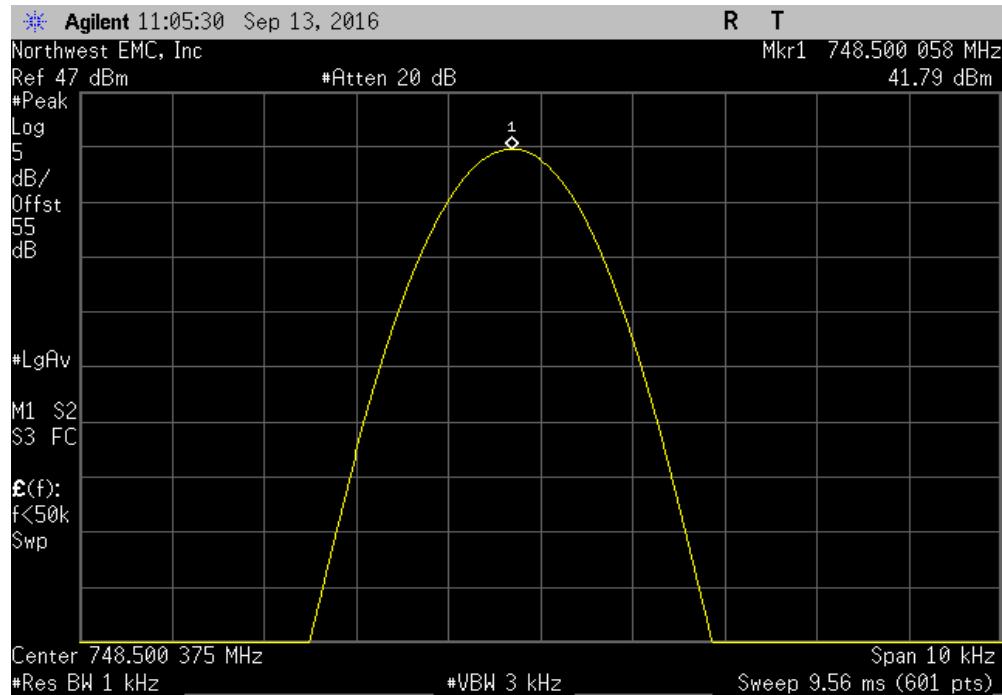


Antenna Port 1, Extreme Temperature, +10°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000045	751	0.1	1	Pass

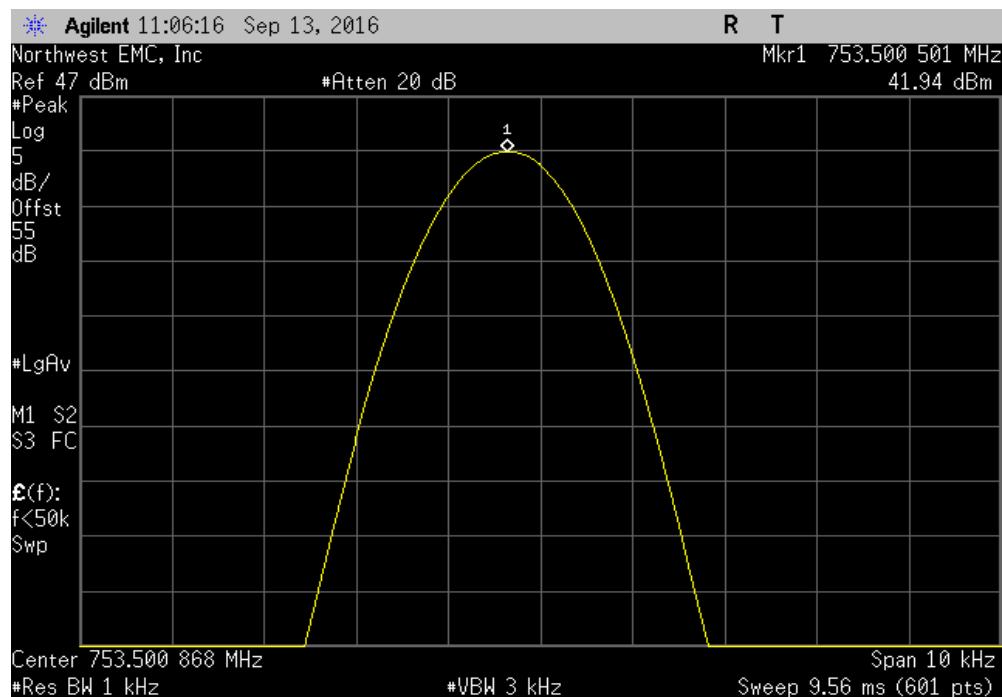


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +20°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

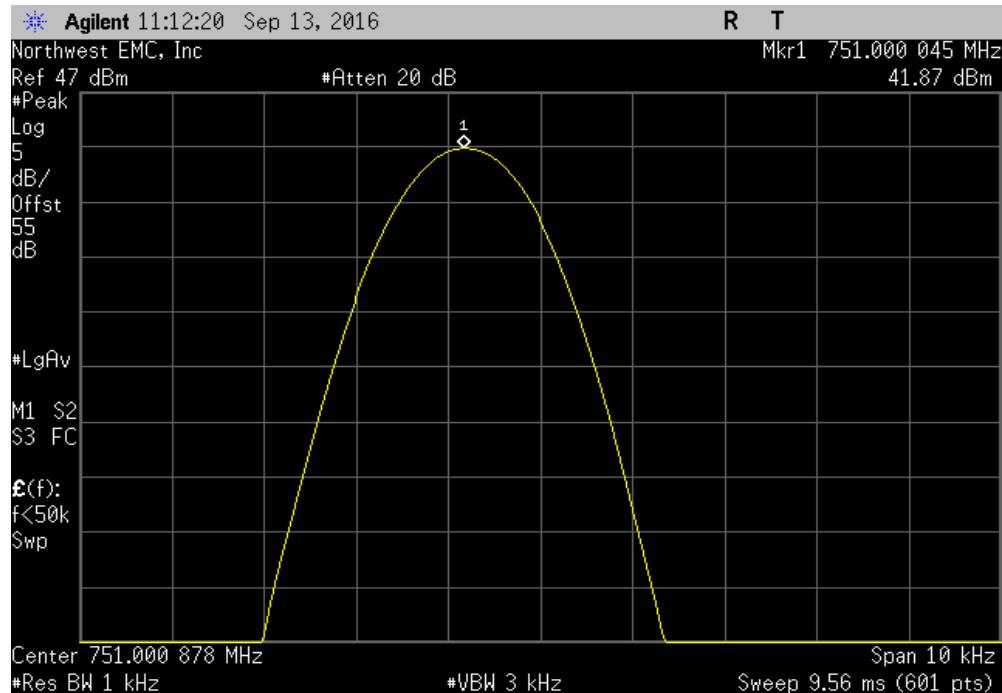


Antenna Port 1, Extreme Temperature, +20°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500501	753.5	0.7	1	Pass

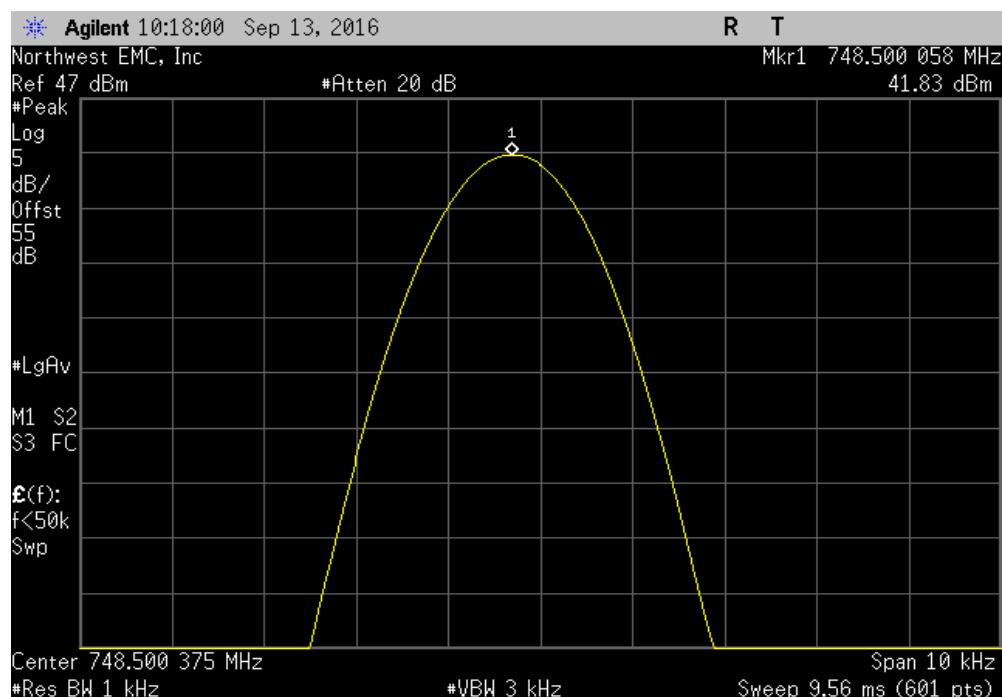


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +20°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000045	751	0.1	1	Pass

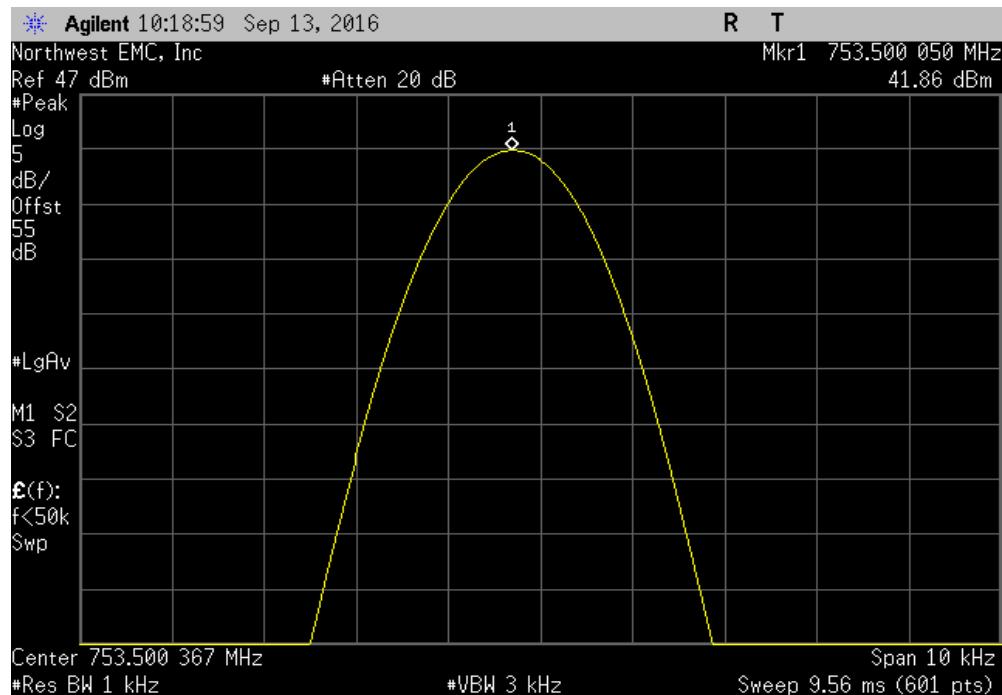


Antenna Port 1, Extreme Temperature, +30°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

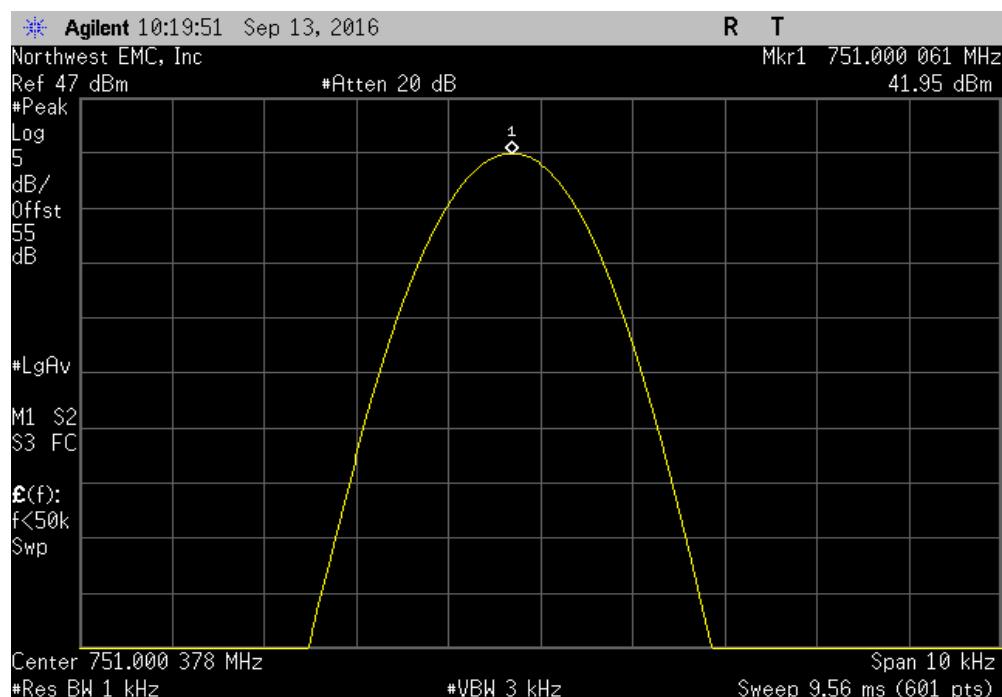


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +30°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.50005	753.5	0.1	1	Pass

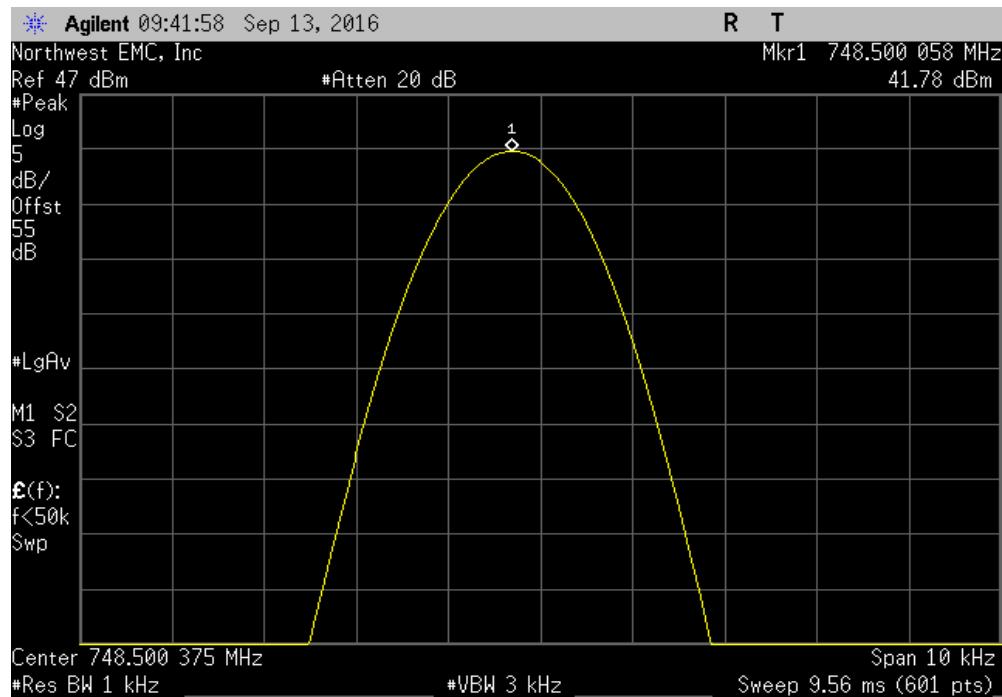


Antenna Port 1, Extreme Temperature, +30°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

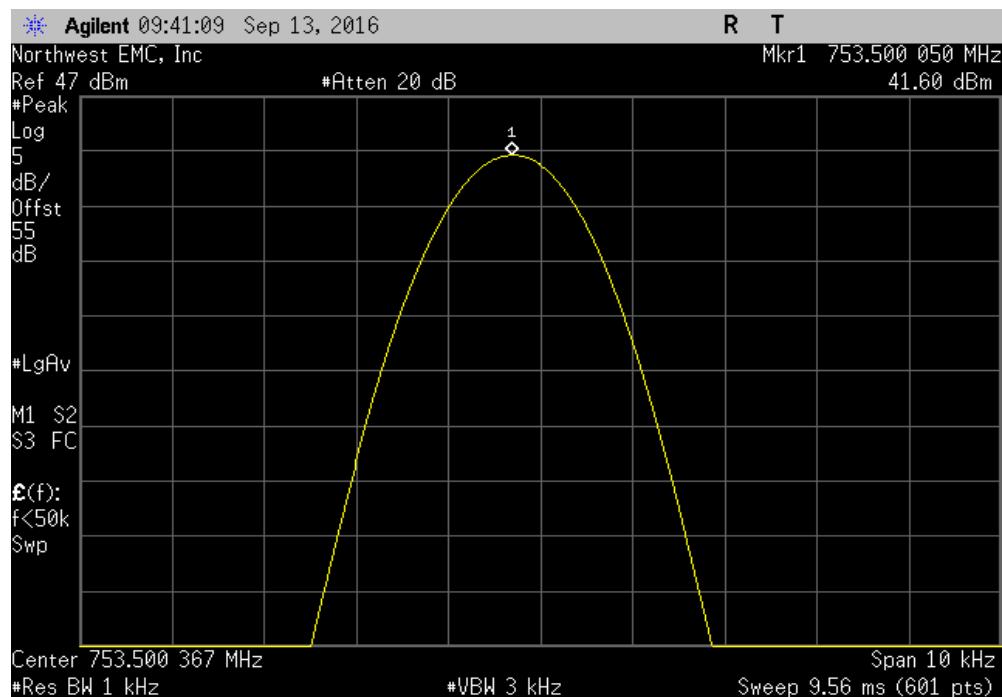


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +40°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

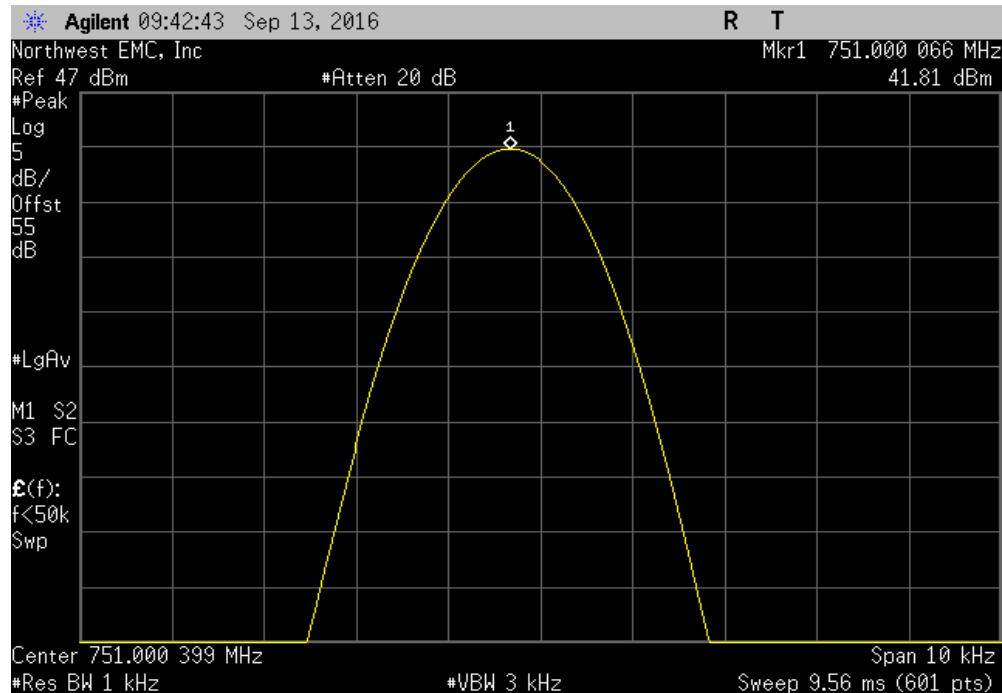


Antenna Port 1, Extreme Temperature, +40°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.50005	753.5	0.1	1	Pass

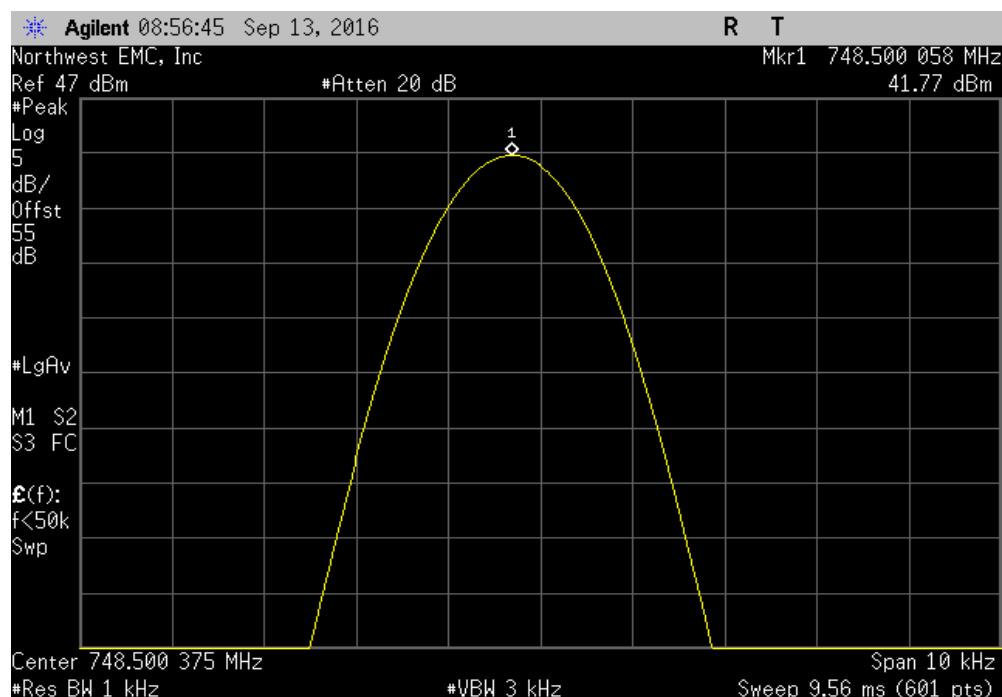


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +40°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000066	751	0.1	1	Pass

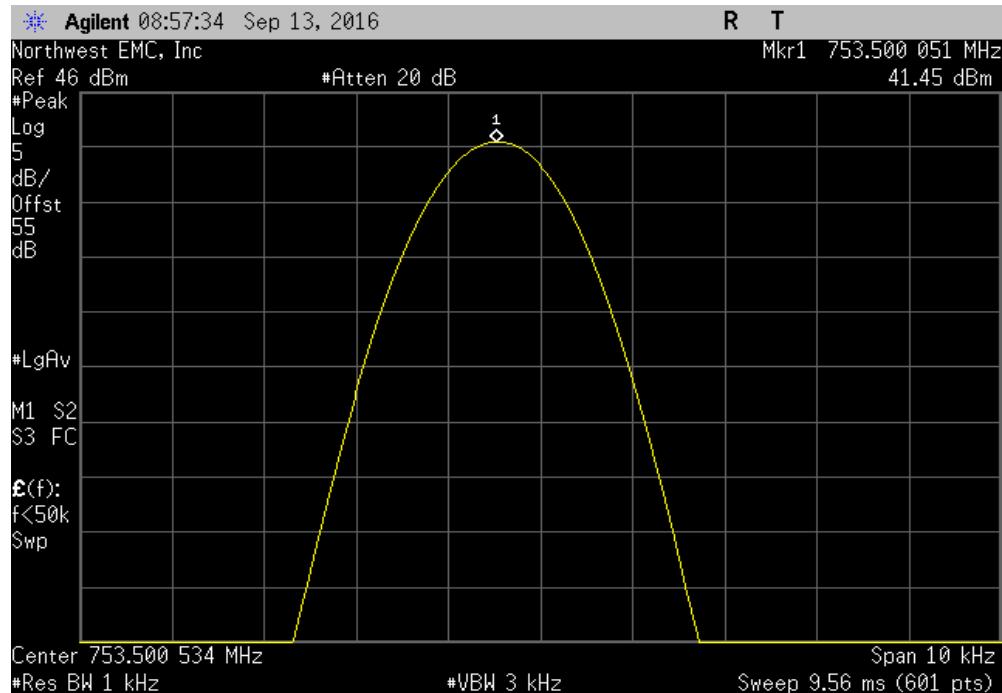


Antenna Port 1, Extreme Temperature, +50°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

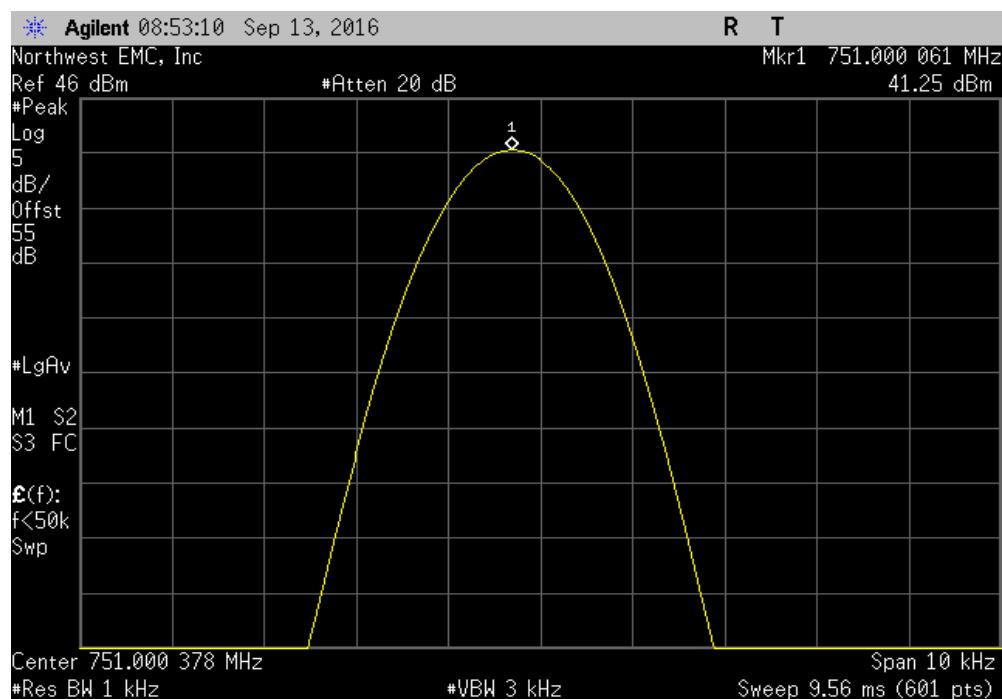


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +50°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500051	753.5	0.1	1	Pass

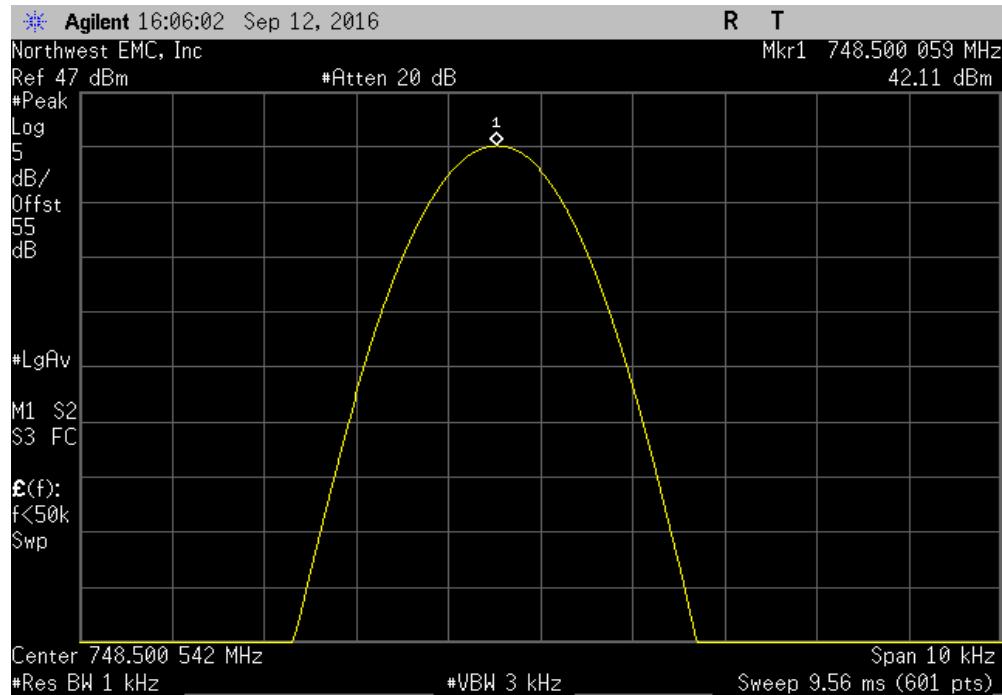


Antenna Port 1, Extreme Temperature, +50°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

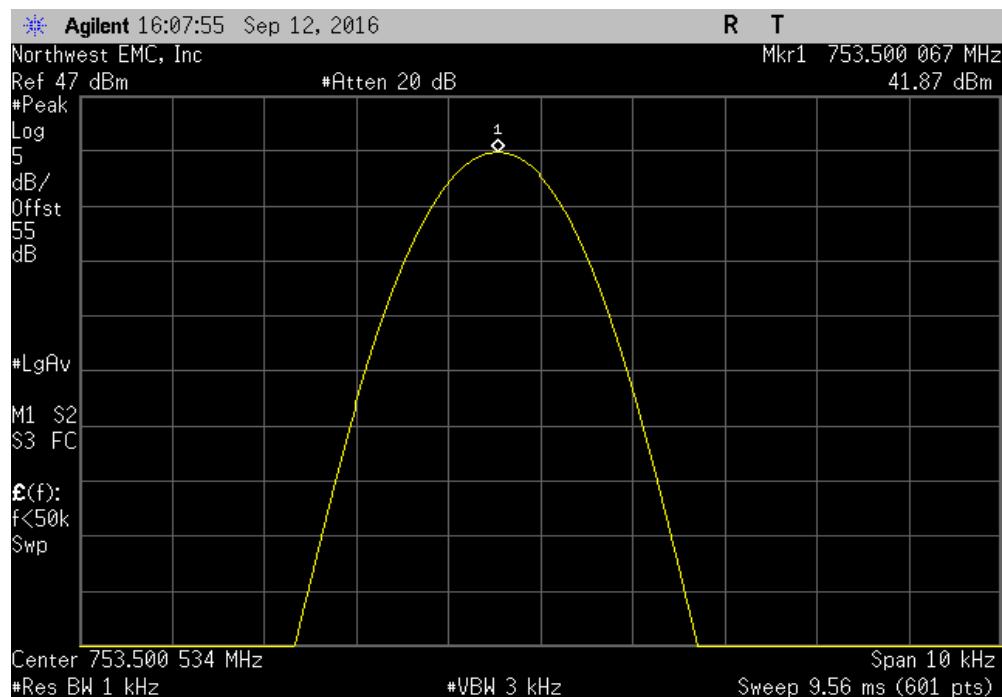


# FREQUENCY STABILITY

Antenna Port 2, Normal Temperature and Voltage, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500059	748.5	0.1	1	Pass

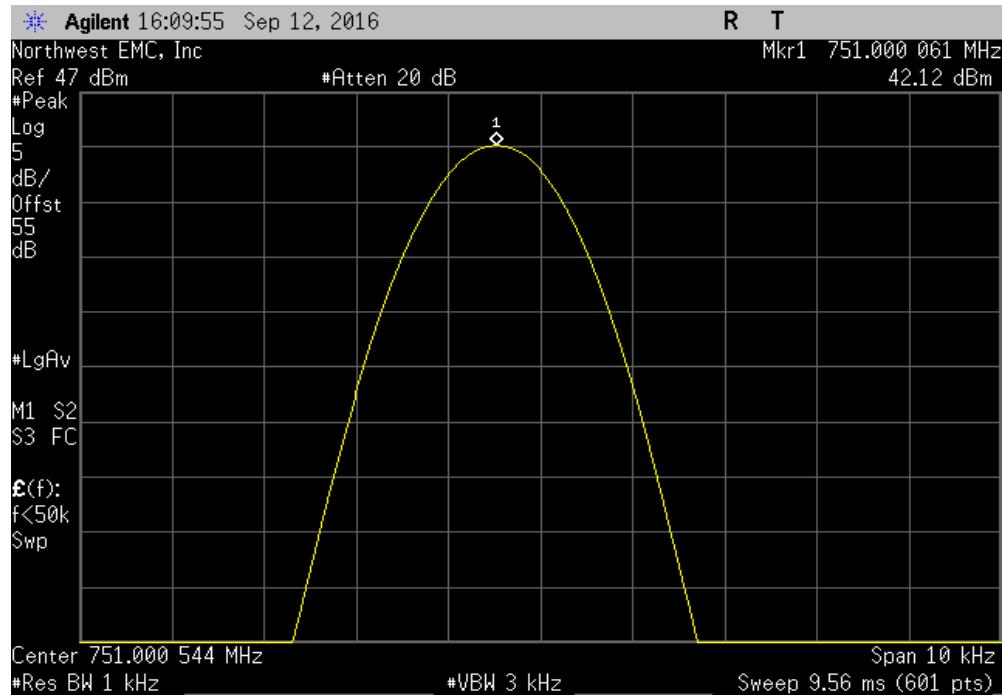


Antenna Port 2, Normal Temperature and Voltage, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500067	753.5	0.1	1	Pass

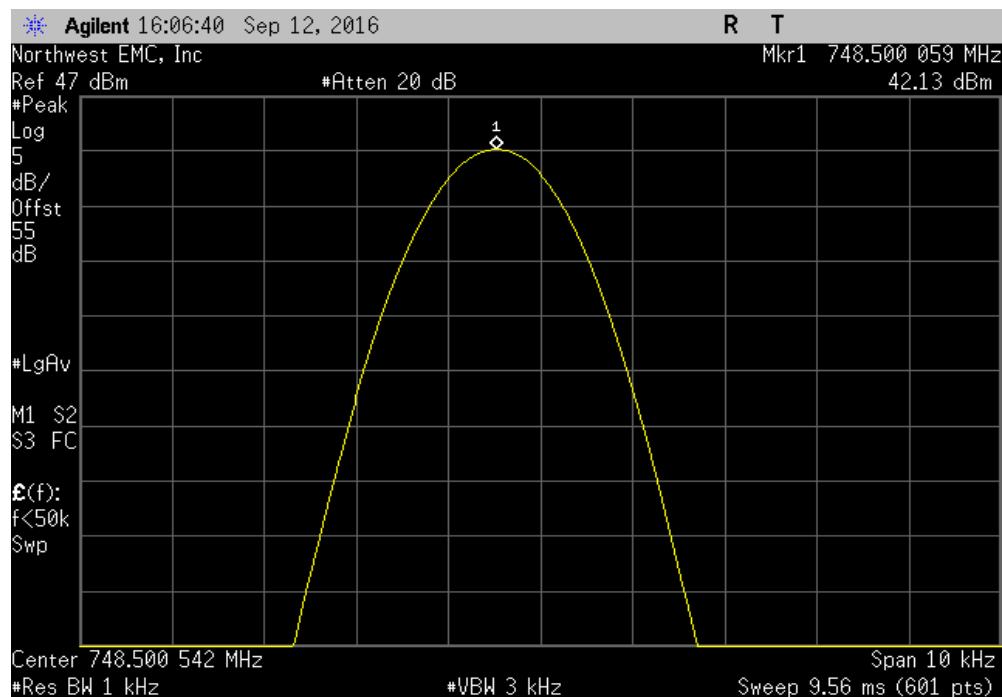


# FREQUENCY STABILITY

Antenna Port 2, Normal Temperature and Voltage, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

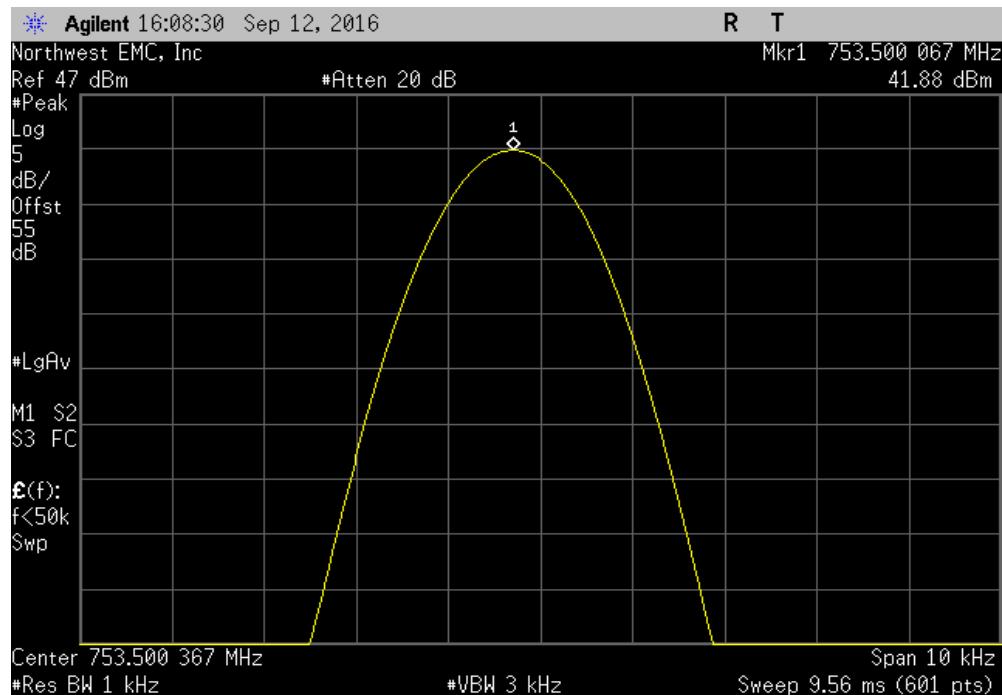


Antenna Port 2, Extreme Voltage, 55.2 VDC, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500059	748.5	0.1	1	Pass

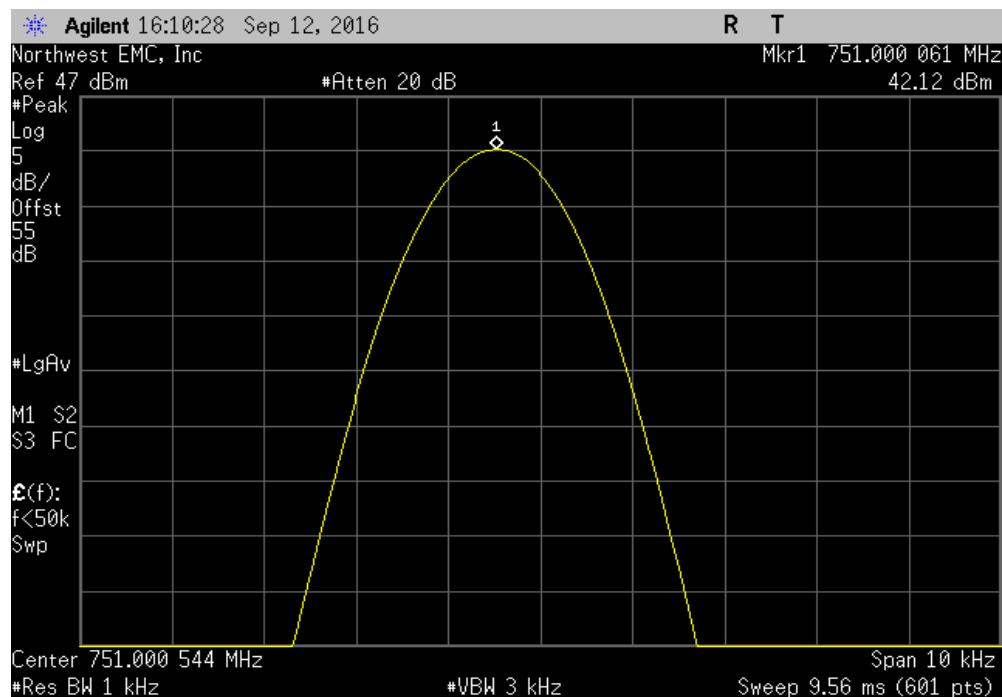


# FREQUENCY STABILITY

Antenna Port 2, Extreme Voltage, 55.2 VDC, High Channel LTE5, 753.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
753.500067	753.5	0.1	1	Pass	

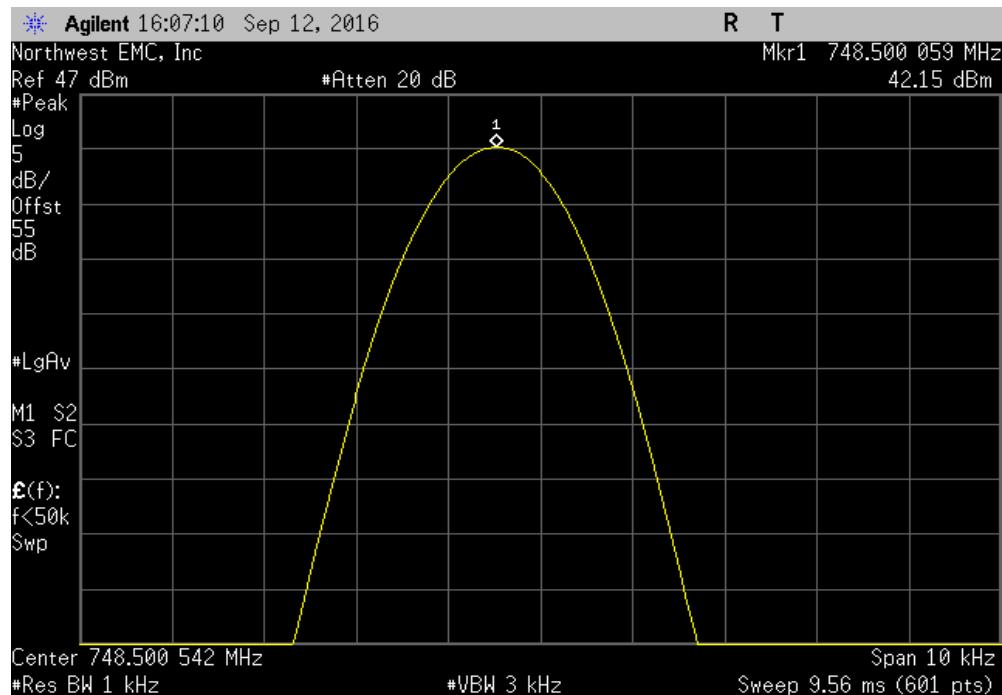


Antenna Port 2, Extreme Voltage, 55.2 VDC, Single Channel LTE10, 751 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
751.000061	751	0.1	1	Pass	

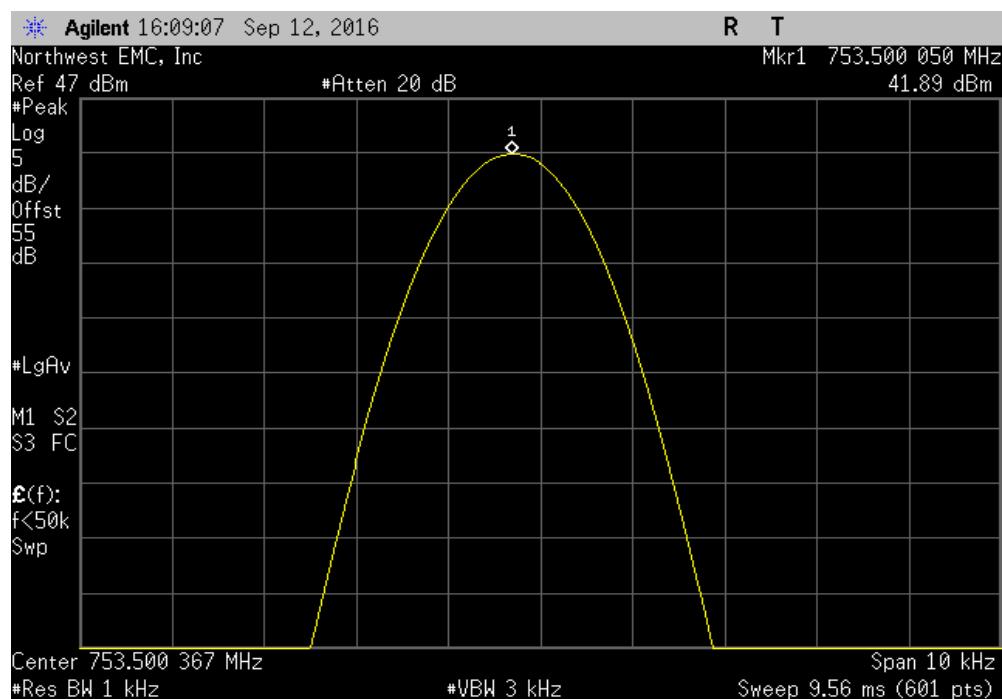


# FREQUENCY STABILITY

Antenna Port 2, Extreme Voltage, 40.8 VDC, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500059	748.5	0.1	1	Pass

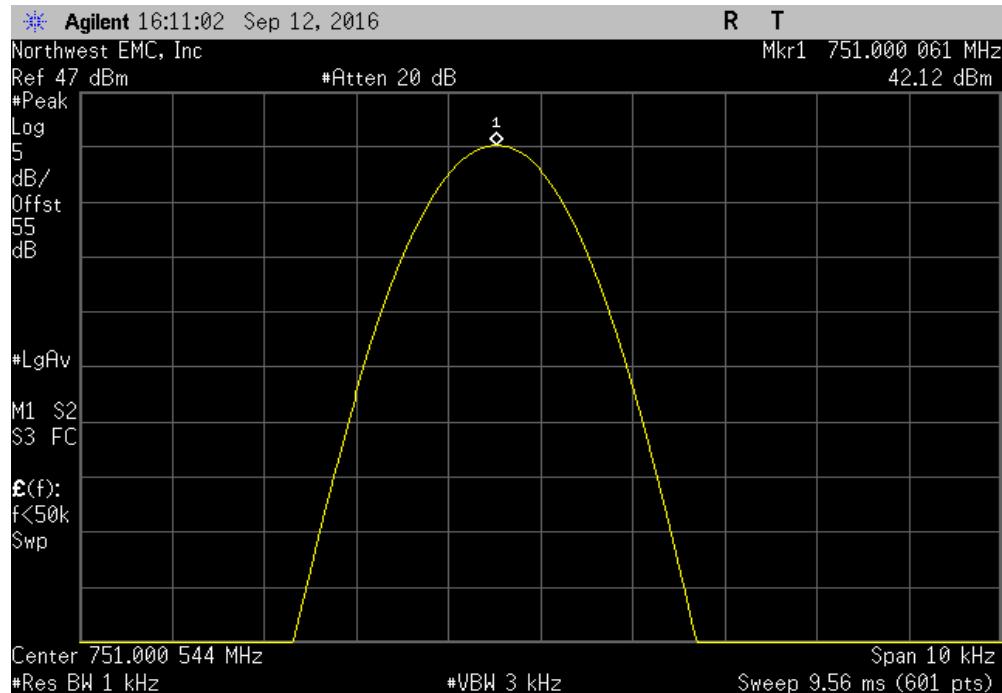


Antenna Port 2, Extreme Voltage, 40.8 VDC, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.50005	753.5	0.1	1	Pass

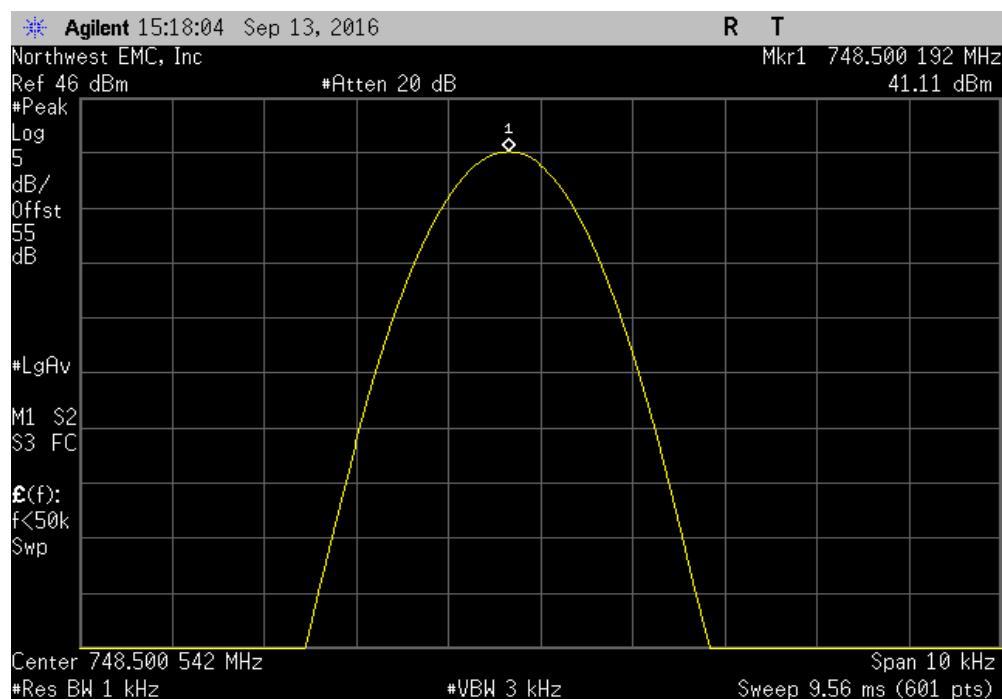


# FREQUENCY STABILITY

Antenna Port 2, Extreme Voltage, 40.8 VDC, Single Channel LTE10, 751 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
751.000061	751	0.1	1	Pass	

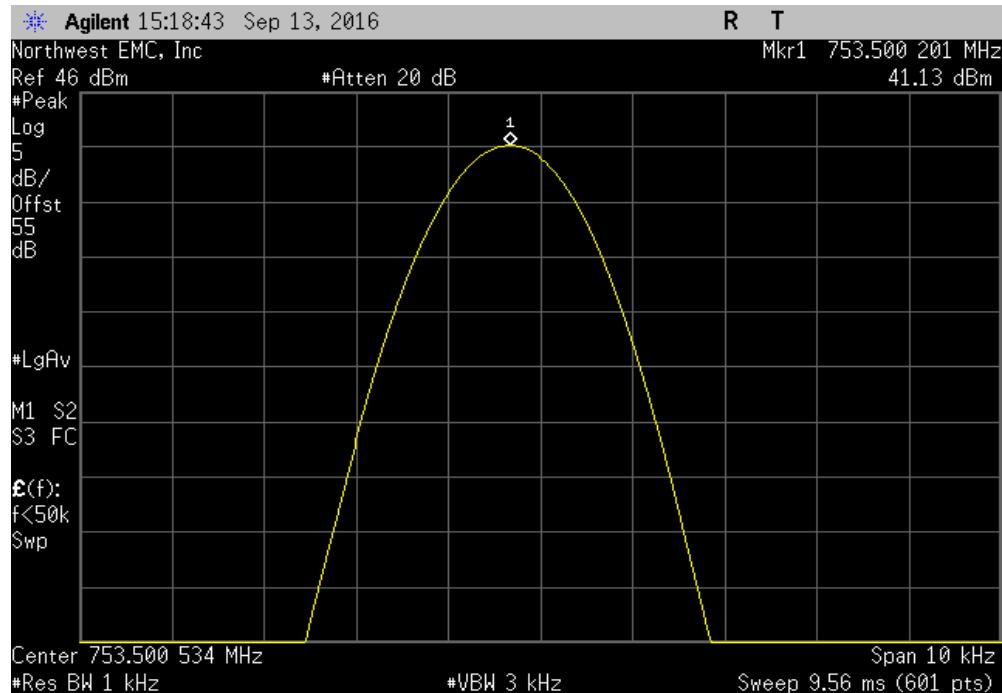


Antenna Port 2, Extreme Temperature, -30°C, Low Channel LTE5, 748.5 MHz					
Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
748.500192	748.5	0.3	1	Pass	

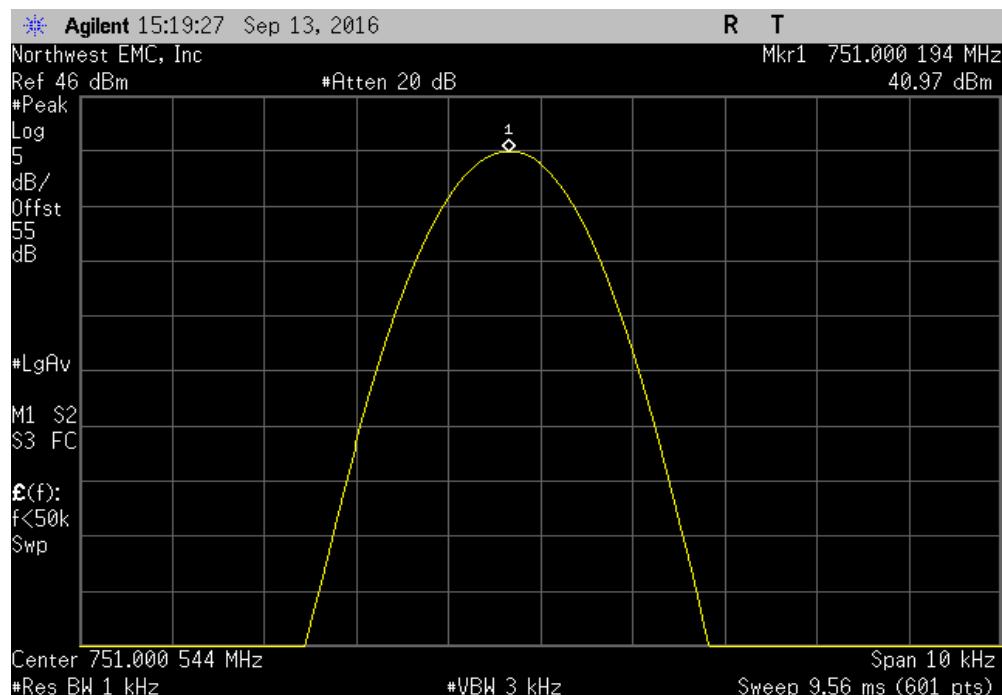


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -30°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500201	753.5	0.3	1	Pass

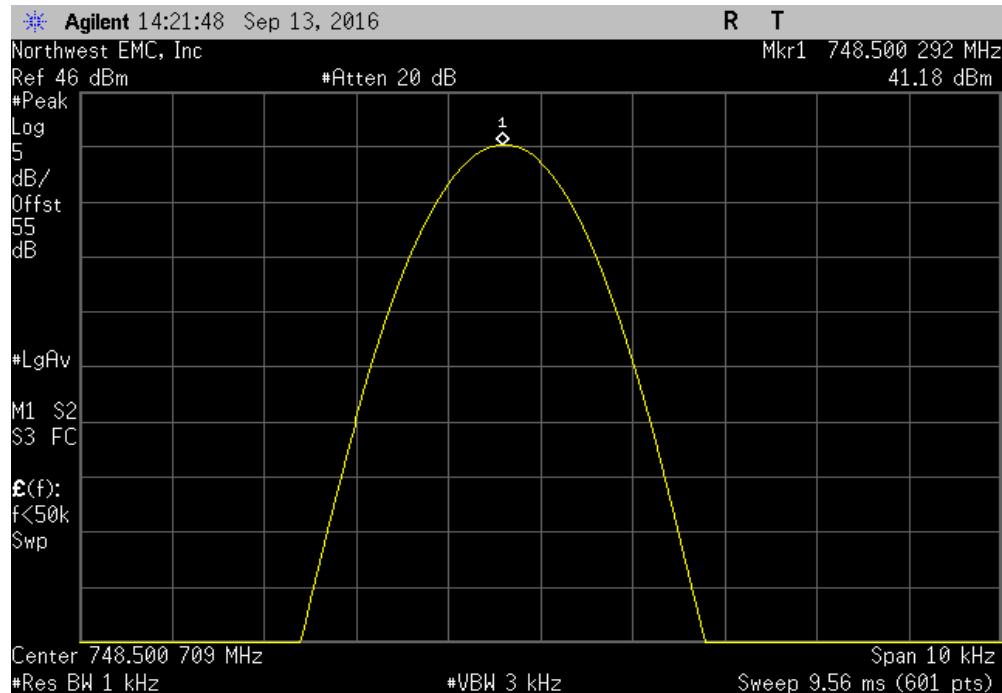


Antenna Port 2, Extreme Temperature, -30°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000194	751	0.3	1	Pass

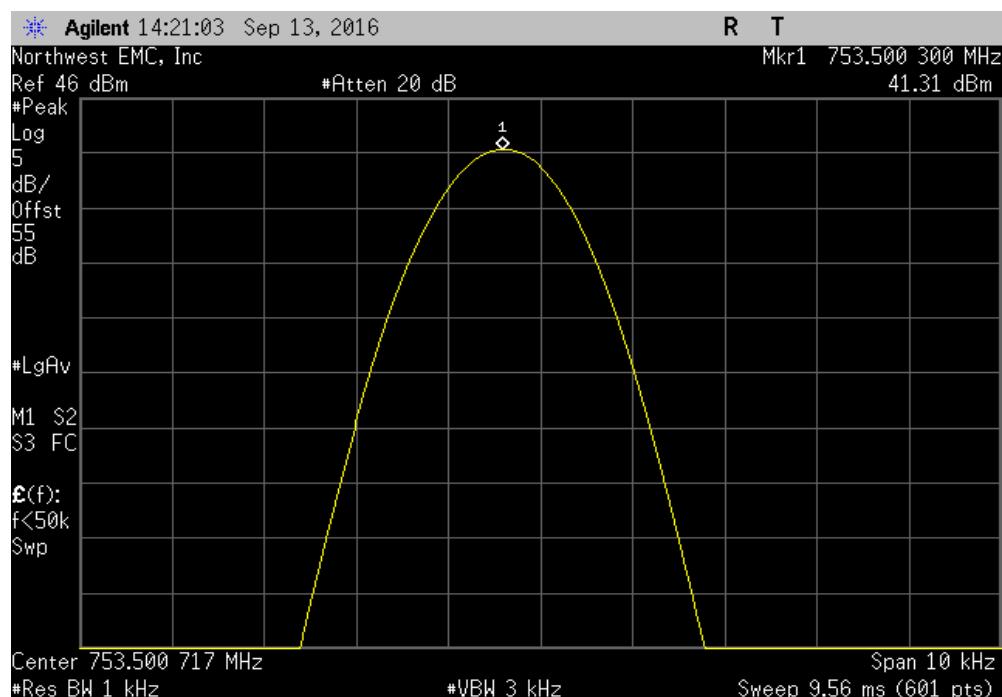


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -20°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500292	748.5	0.4	1	Pass

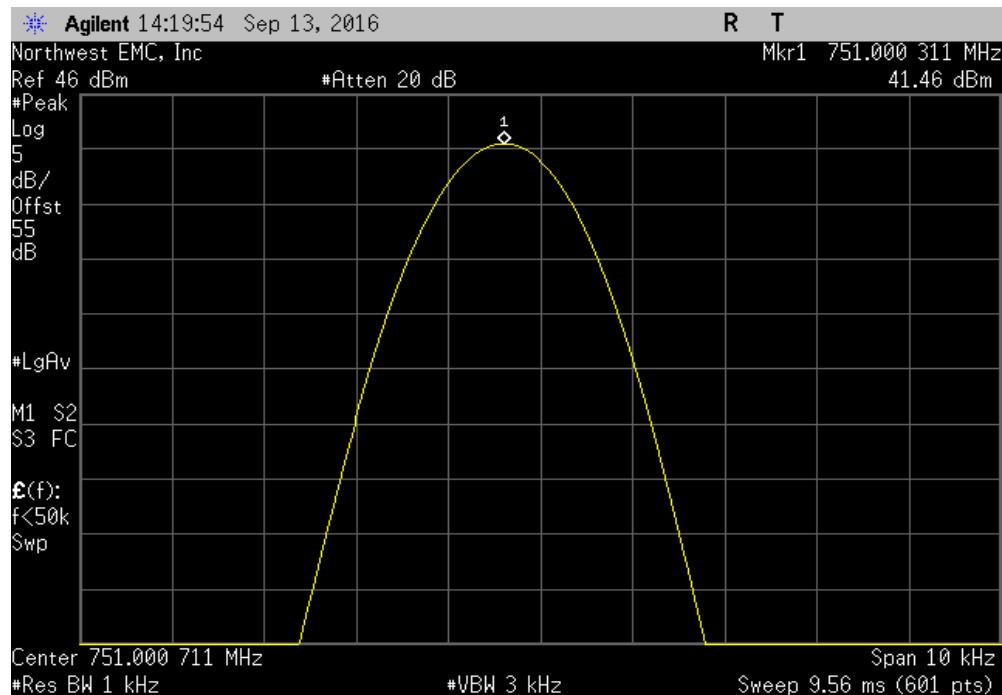


Antenna Port 2, Extreme Temperature, -20°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.5003	753.5	0.4	1	Pass

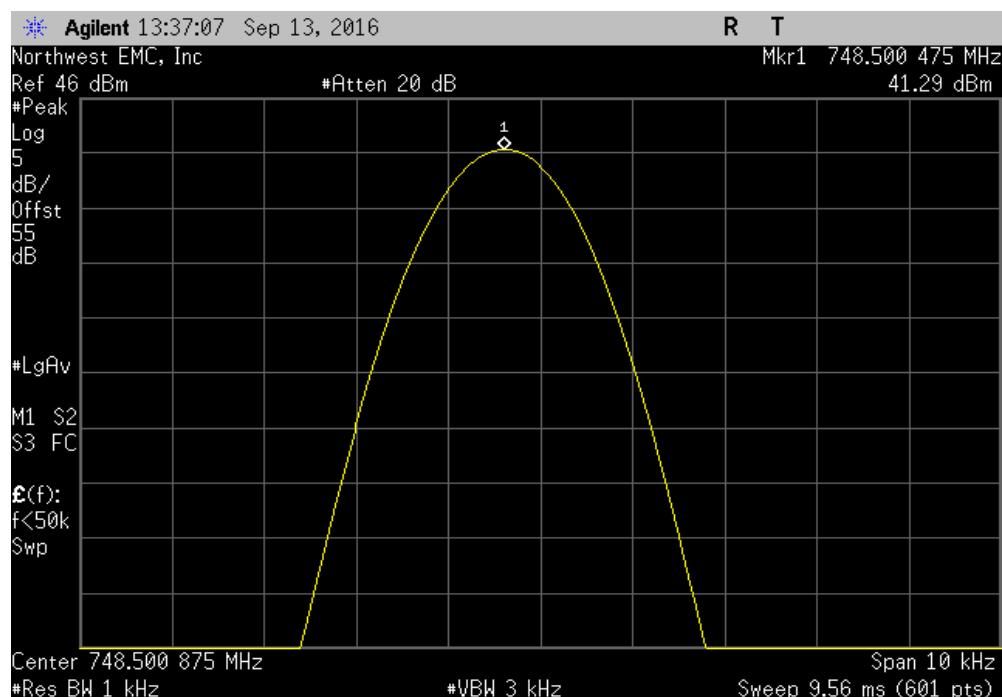


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -20°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000311	751	0.4	1	Pass

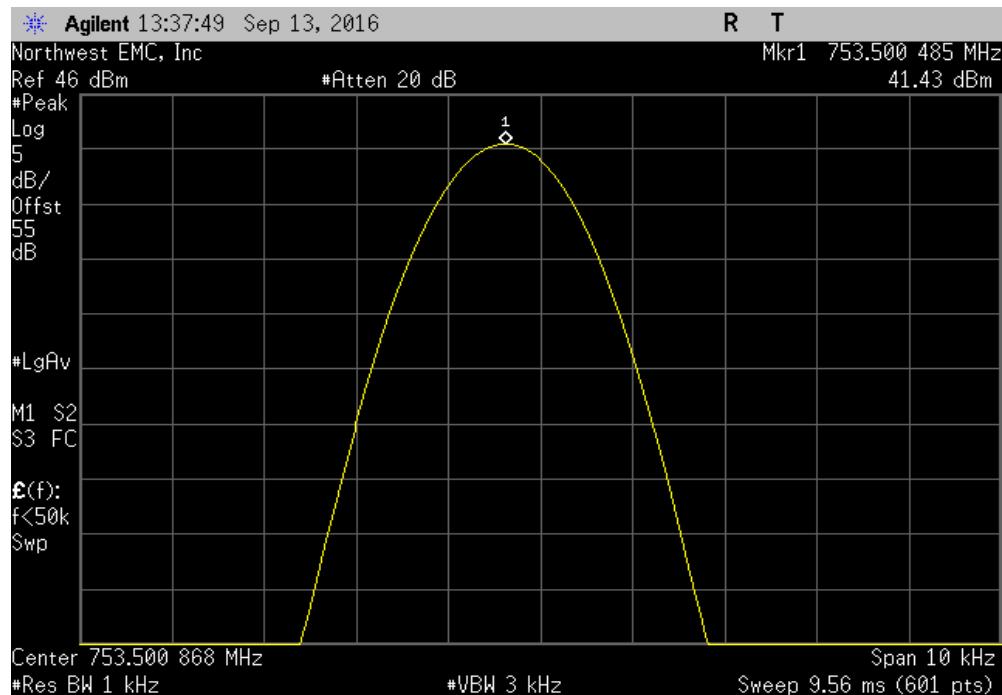


Antenna Port 2, Extreme Temperature, -10°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500475	748.5	0.6	1	Pass

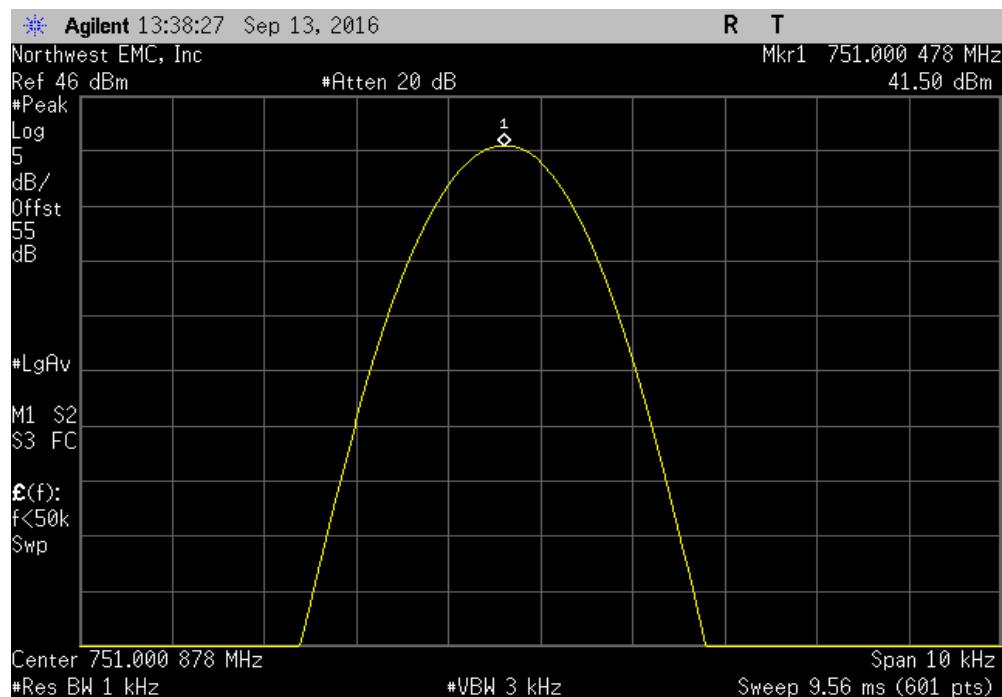


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -10°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500485	753.5	0.6	1	Pass

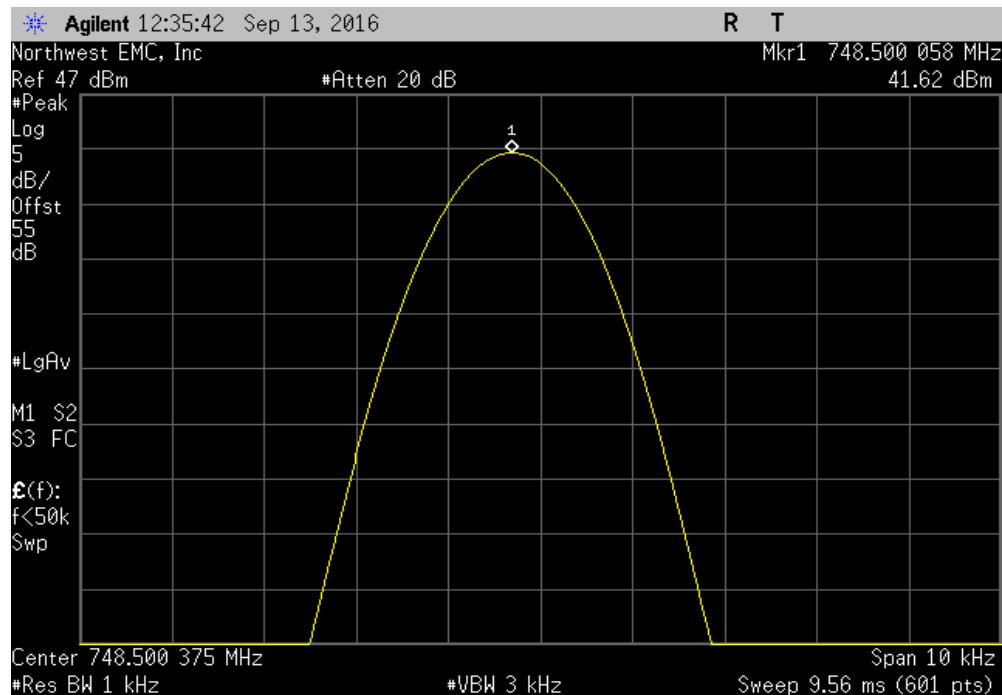


Antenna Port 2, Extreme Temperature, -10°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000478	751	0.6	1	Pass

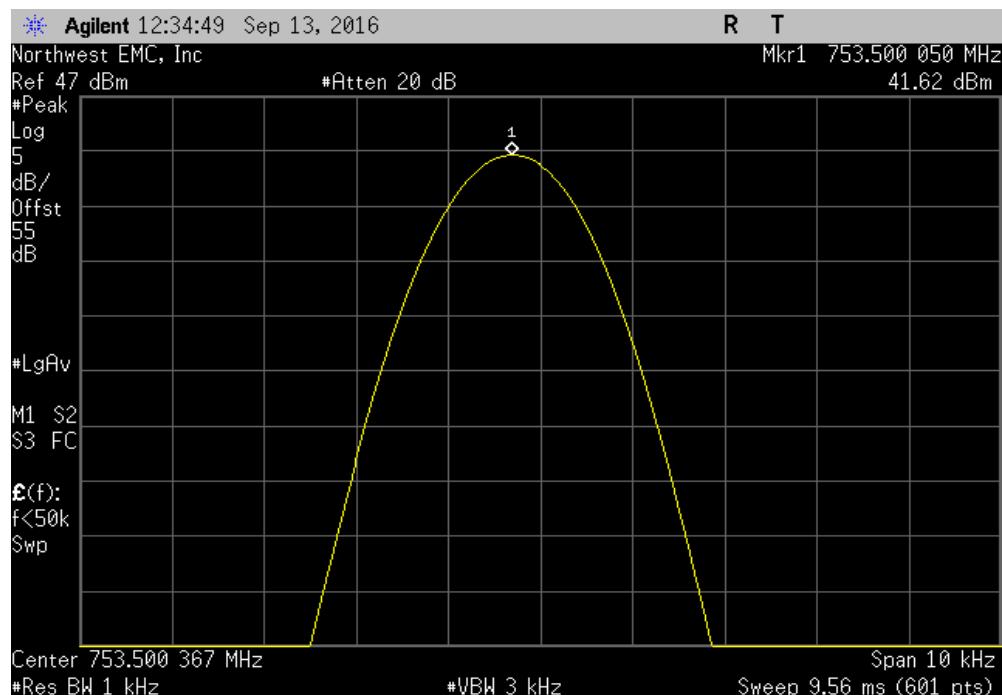


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, 0°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

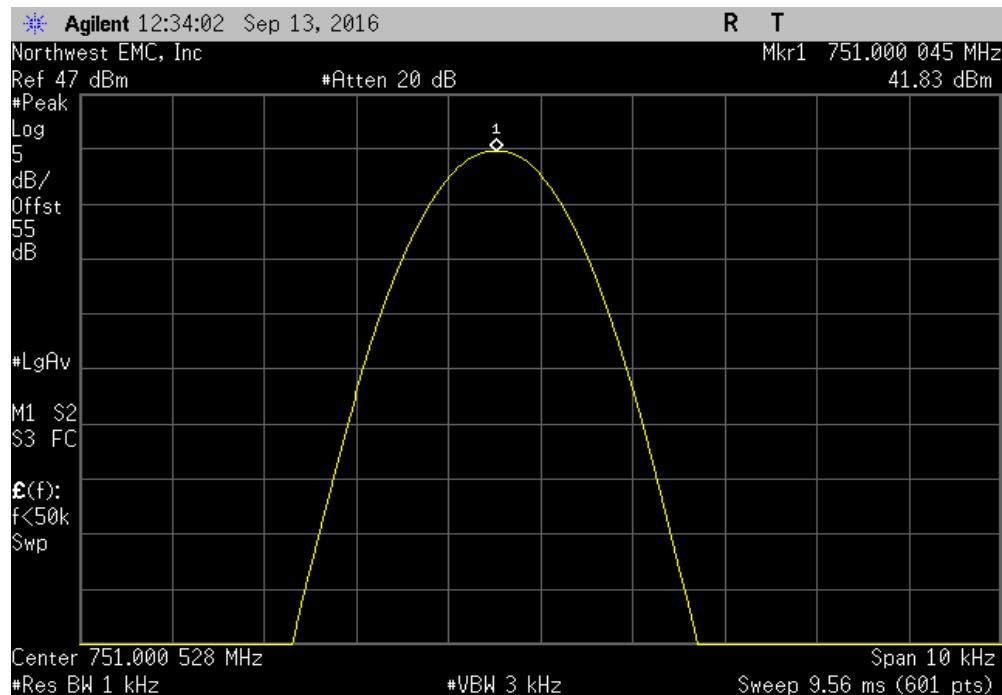


Antenna Port 2, Extreme Temperature, 0°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.50005	753.5	0.1	1	Pass

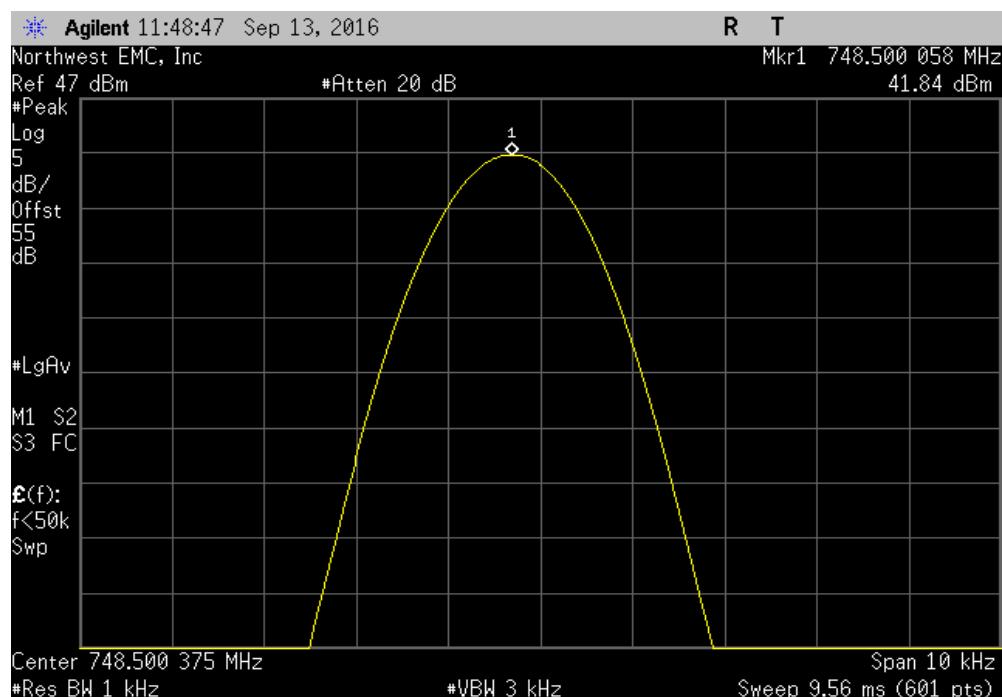


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, 0°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000045	751	0.1	1	Pass

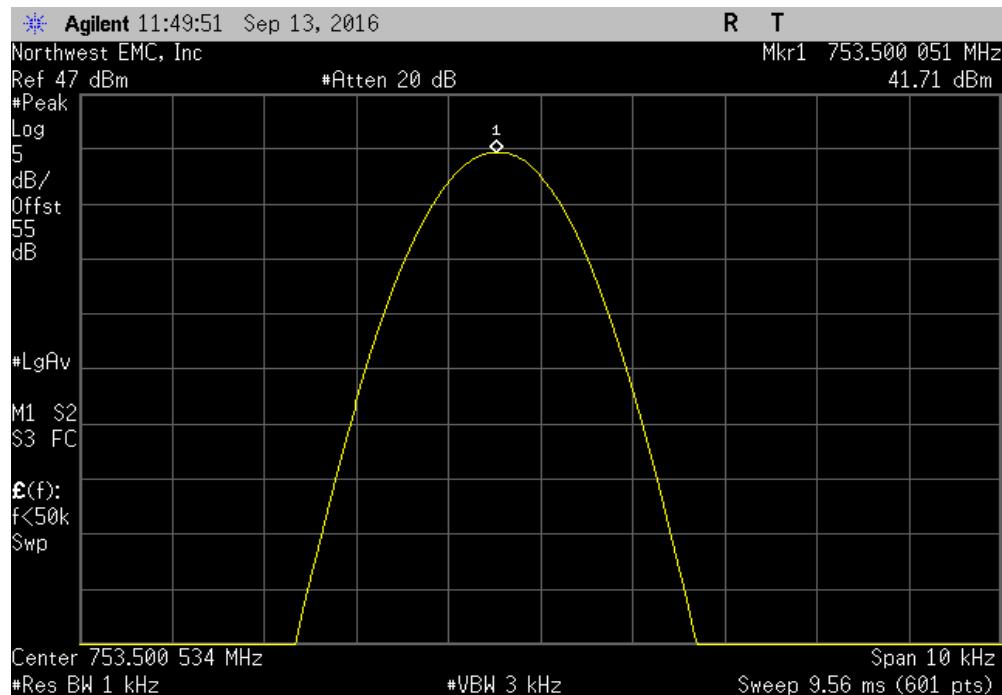


Antenna Port 2, Extreme Temperature, +10°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

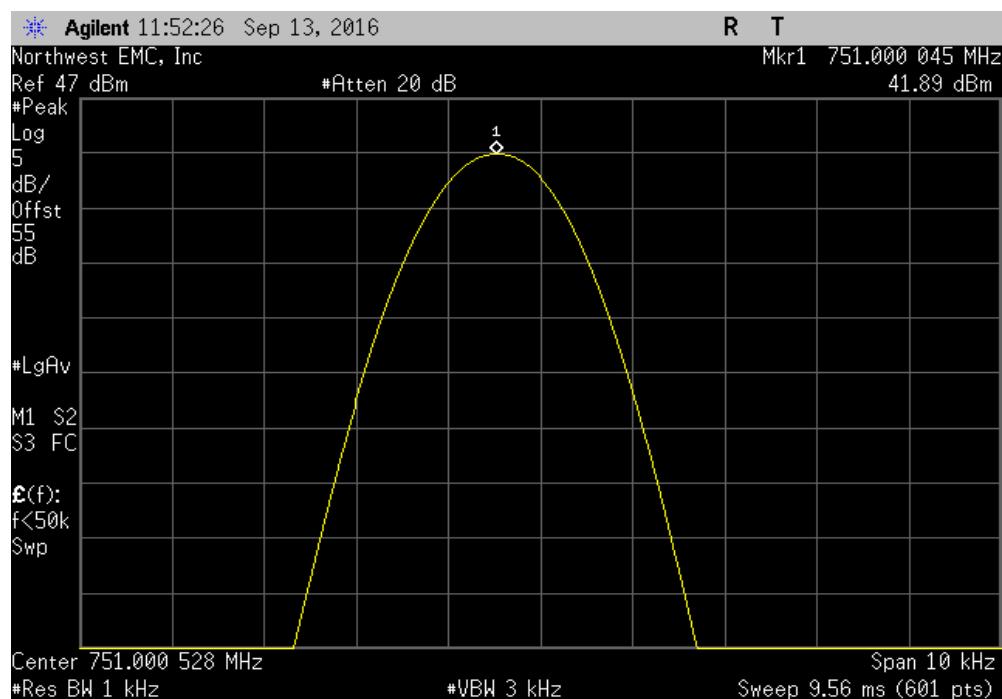


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +10°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500051	753.5	0.1	1	Pass

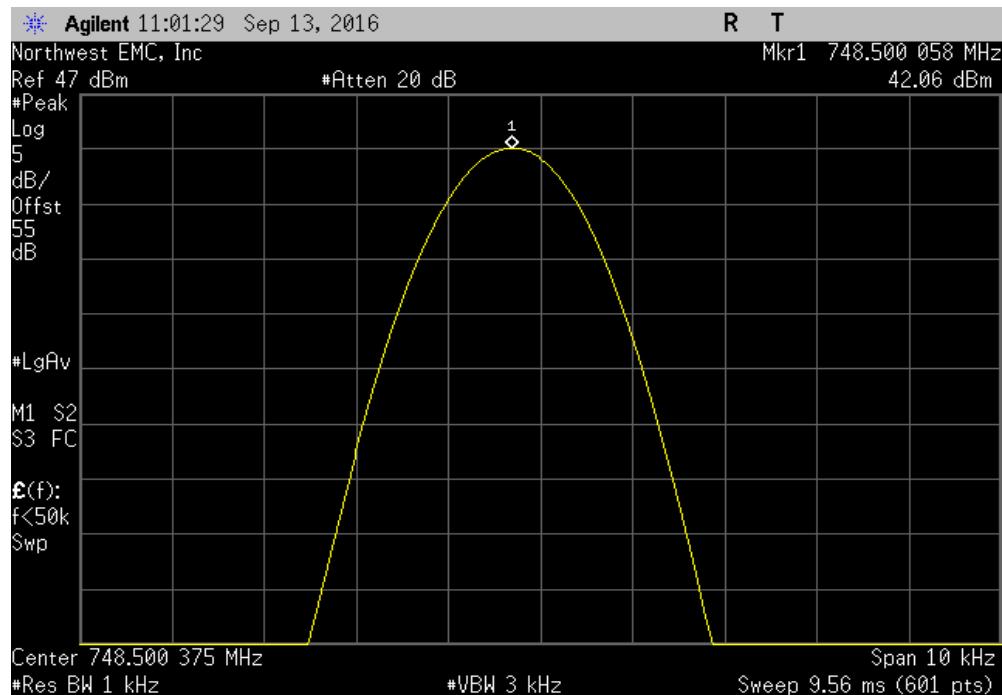


Antenna Port 2, Extreme Temperature, +10°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000045	751	0.1	1	Pass

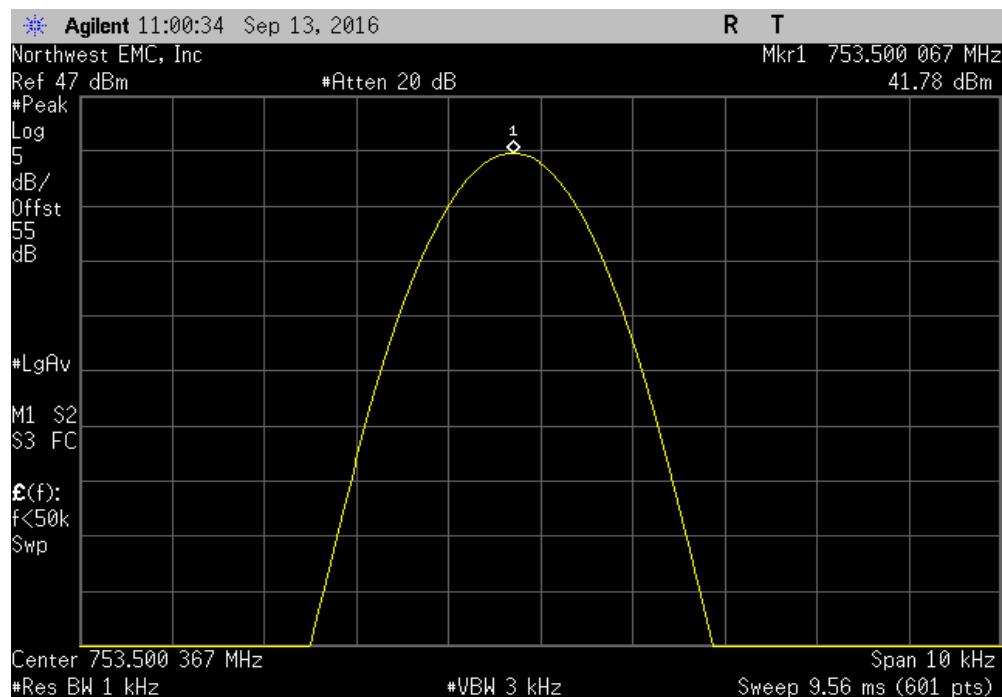


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +20°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

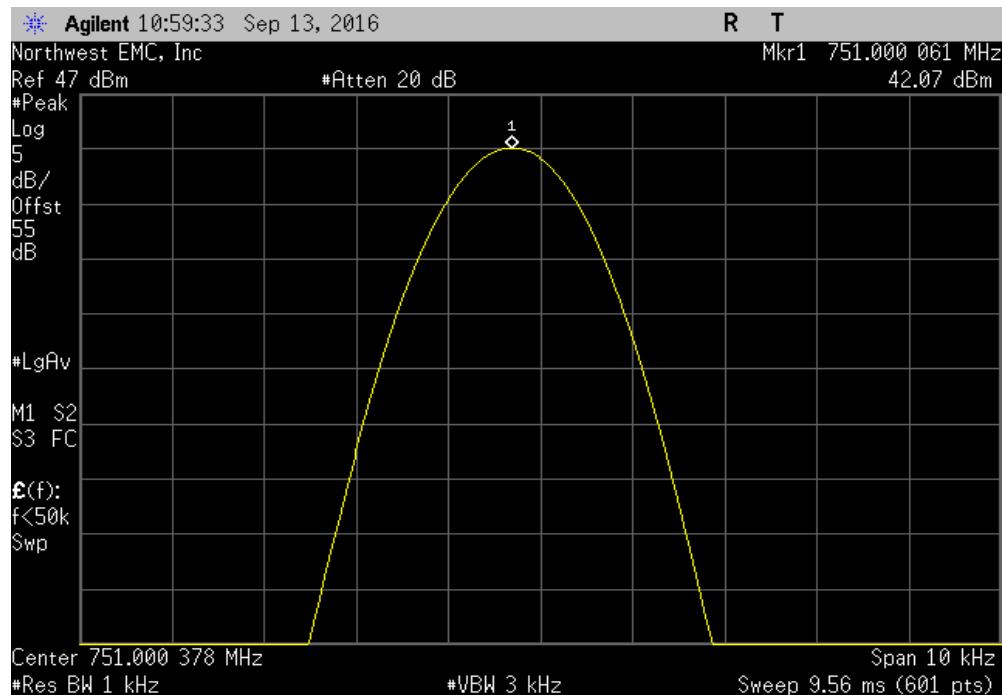


Antenna Port 2, Extreme Temperature, +20°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500067	753.5	0.1	1	Pass

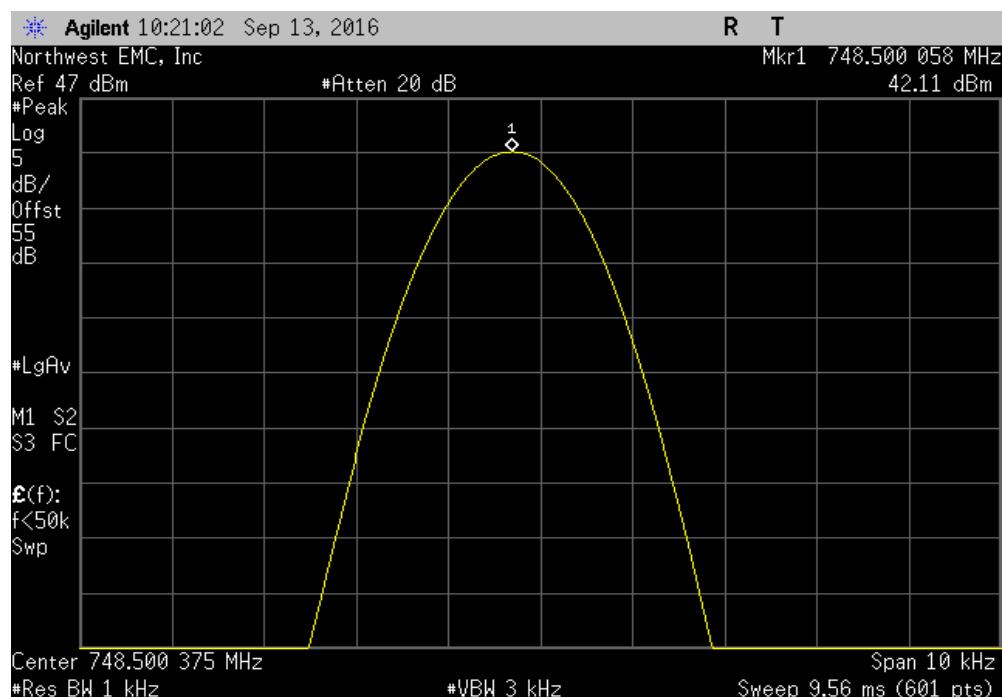


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +20°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

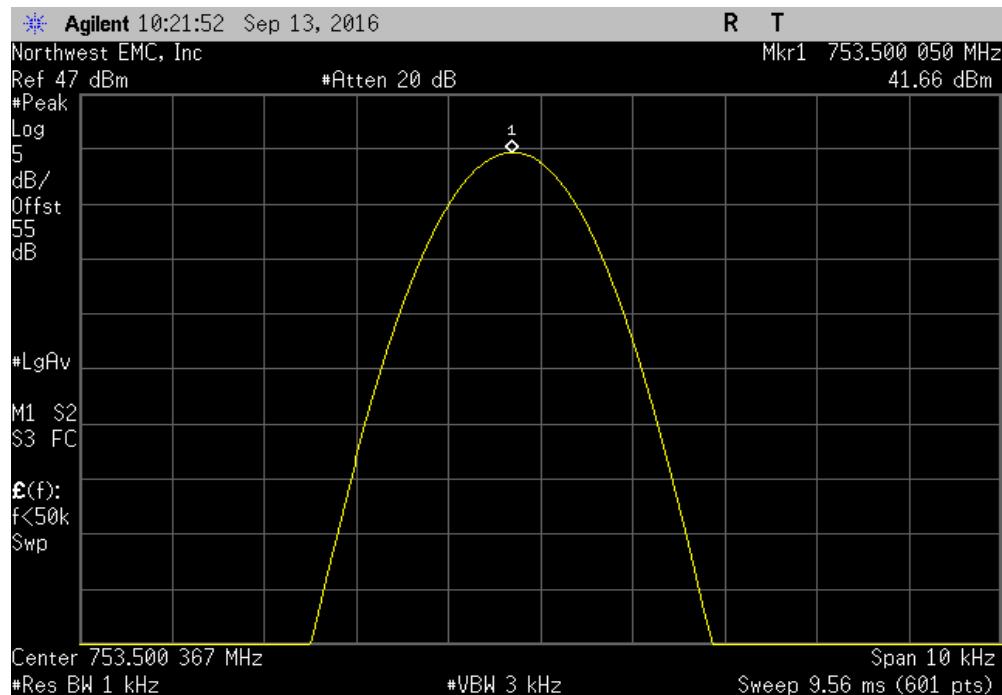


Antenna Port 2, Extreme Temperature, +30°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

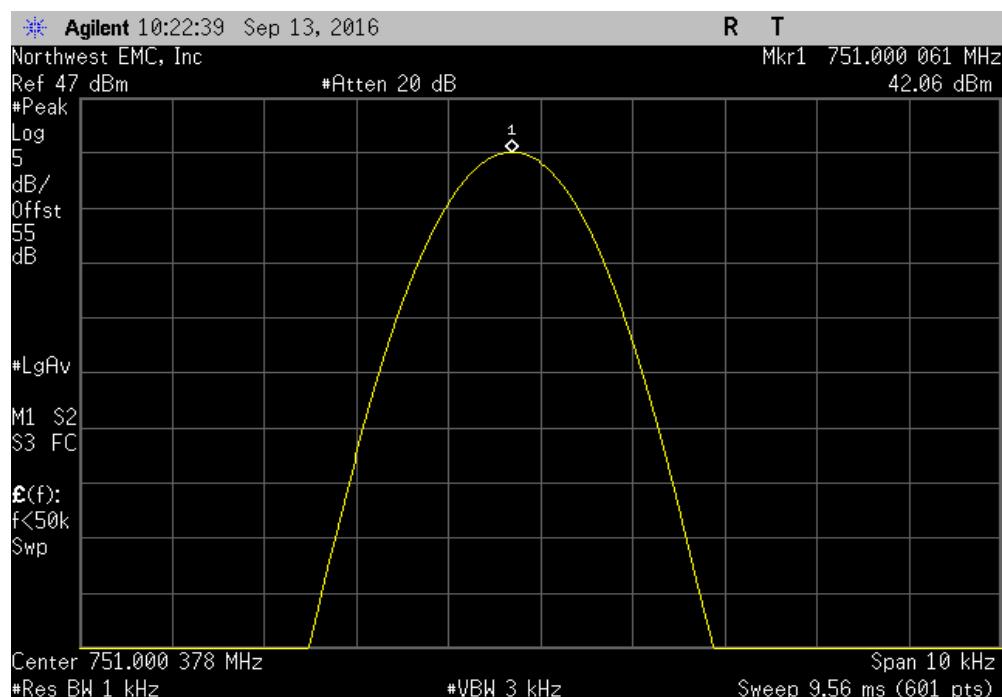


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +30°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.50005	753.5	0.1	1	Pass

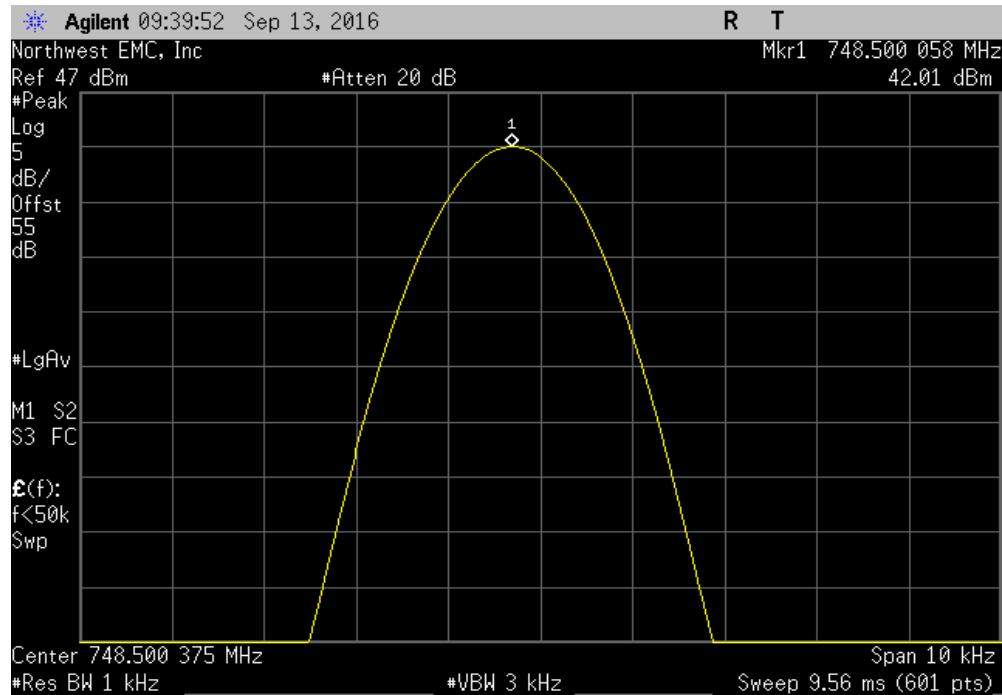


Antenna Port 2, Extreme Temperature, +30°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

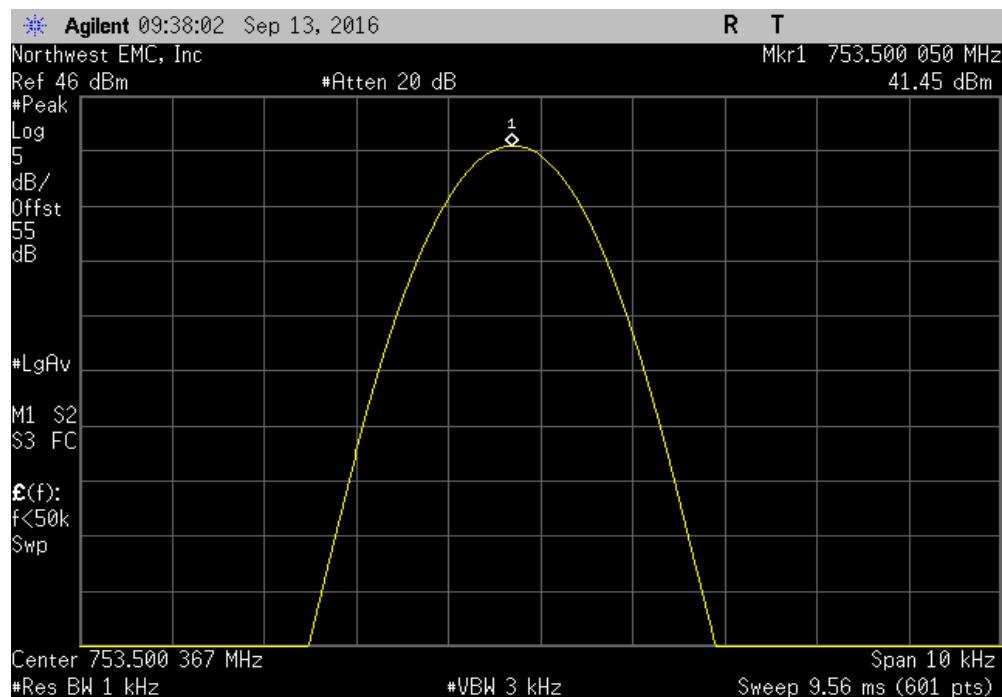


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +40°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

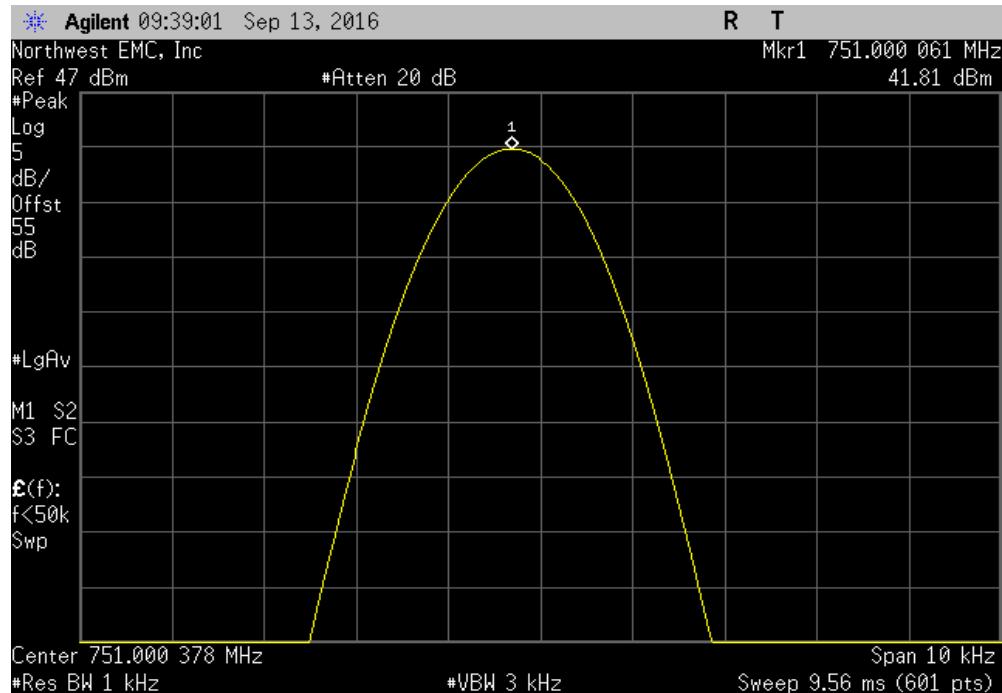


Antenna Port 2, Extreme Temperature, +40°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.50005	753.5	0.1	1	Pass

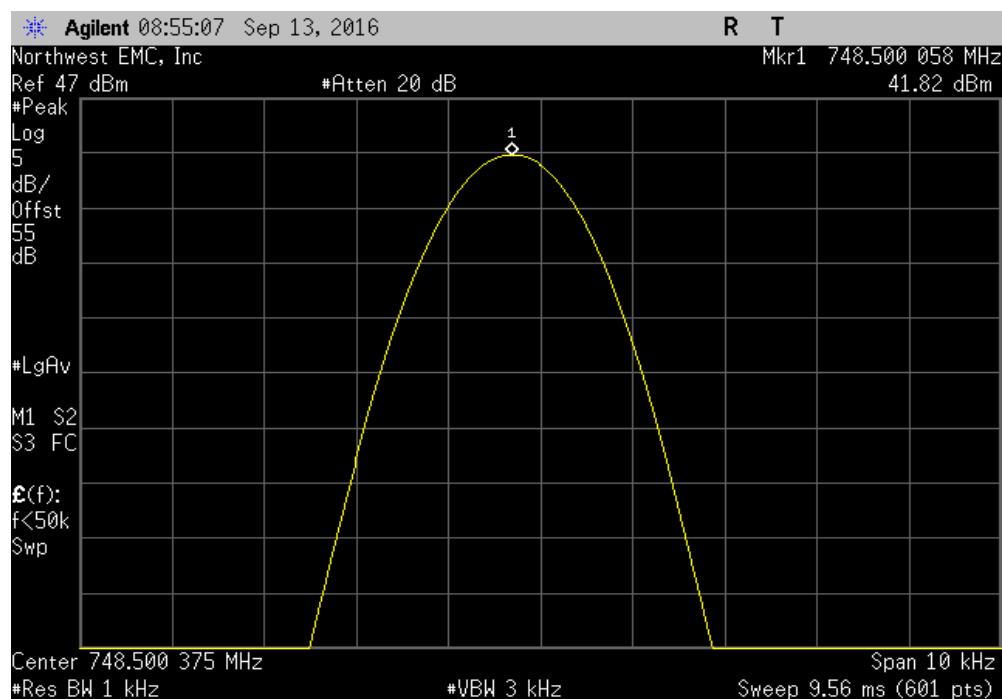


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +40°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	Pass

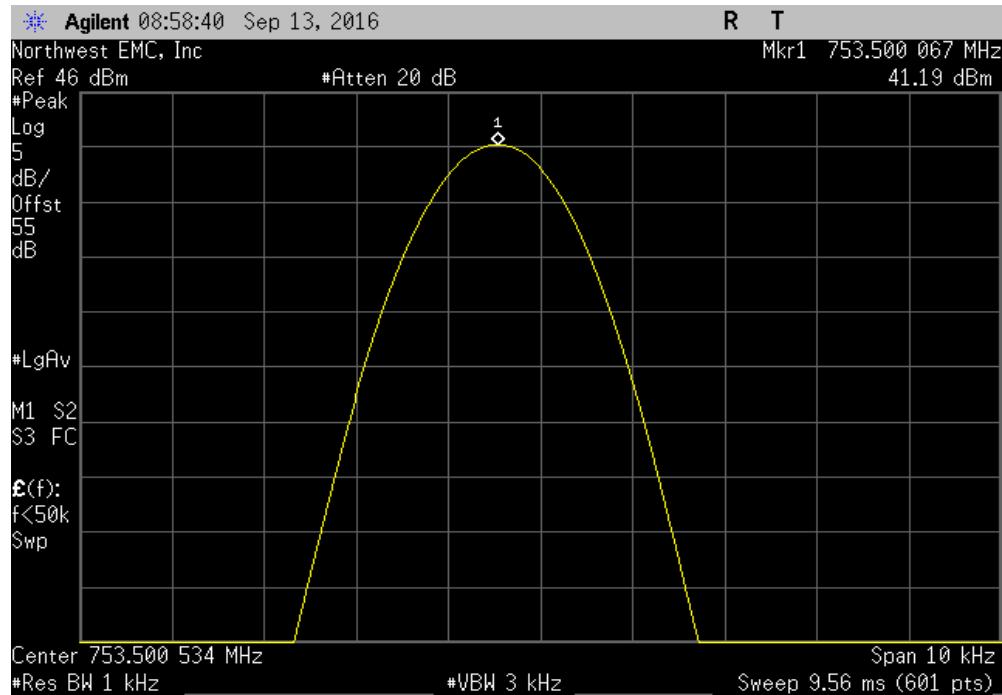


Antenna Port 2, Extreme Temperature, +50°C, Low Channel LTE5, 748.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	748.500058	748.5	0.1	1	Pass

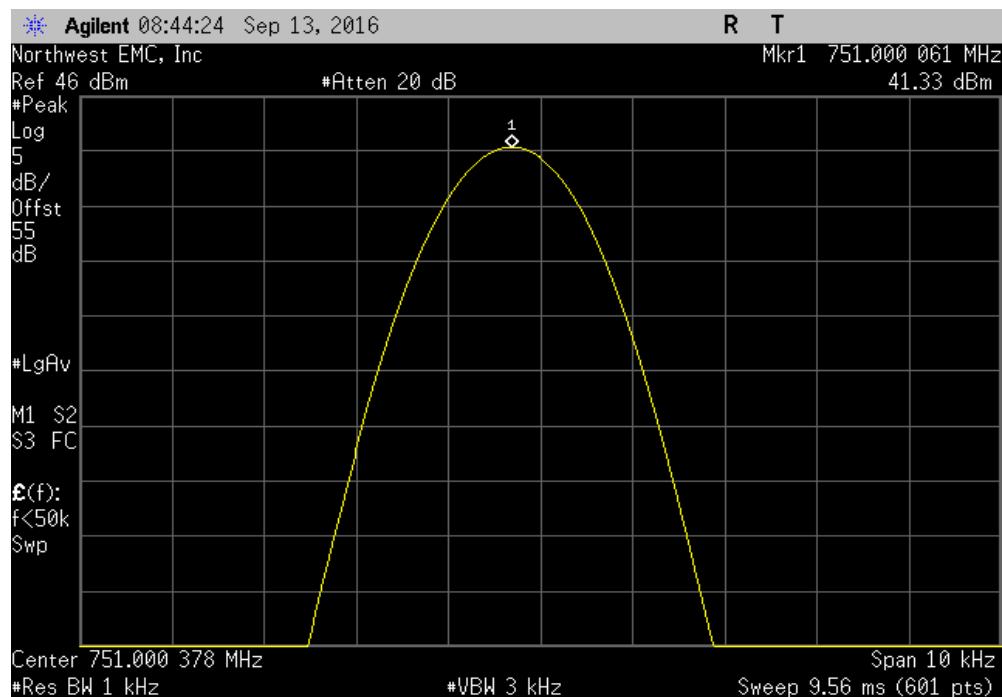


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +50°C, High Channel LTE5, 753.5 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	753.500067	753.5	0.1	1	Pass



Antenna Port 2, Extreme Temperature, +50°C, Single Channel LTE10, 751 MHz					
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
	751.000061	751	0.1	1	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.	Cal. Due
Power Supply - DC	Hewlett Packard	6574A	TPX	NCR	NCR
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016

## CLIENT PROVIDED EQUIPMENT

Description	Manufacturer	Model	Last Cal.	Cal. Due
High Power Attenuator - 30dB	Aeroflex/Weinschel	53-30-43	NCR	NCR
Attenuator - 20dB	N/A	N/A	NCR	NCR
Power Divider	Fairview Microwave	MP8748-2	NCR	NCR
50Ohm Terminator	Aeroflex/Weinschel	1455-4	NCR	NCR
High Power Terminator	Telcon	KTMO400800060	NCR	NCR

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spectrum analyzer settings were as follows:

- RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process to determine the RBW based on the emissions bandwidth (B).
- VBW = > RBW
- A peak detector was used
- Trace max hold.

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 26 dB emission bandwidth.

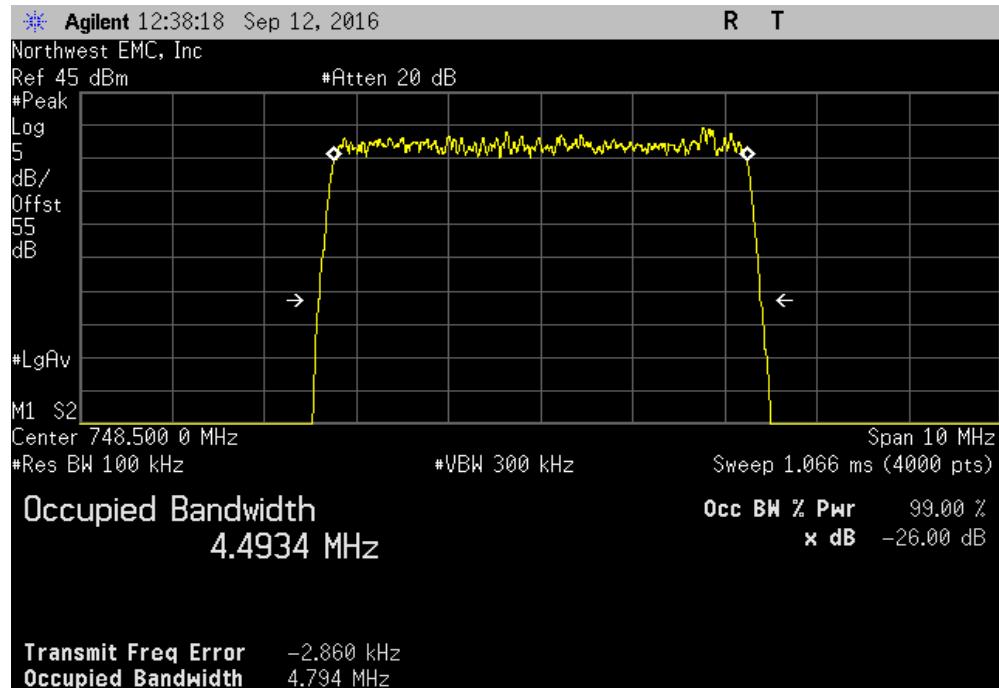
There is no required limit to be met in the rule part for this test. The purpose of the test is to report the results.

# OCCUPIED BANDWIDTH

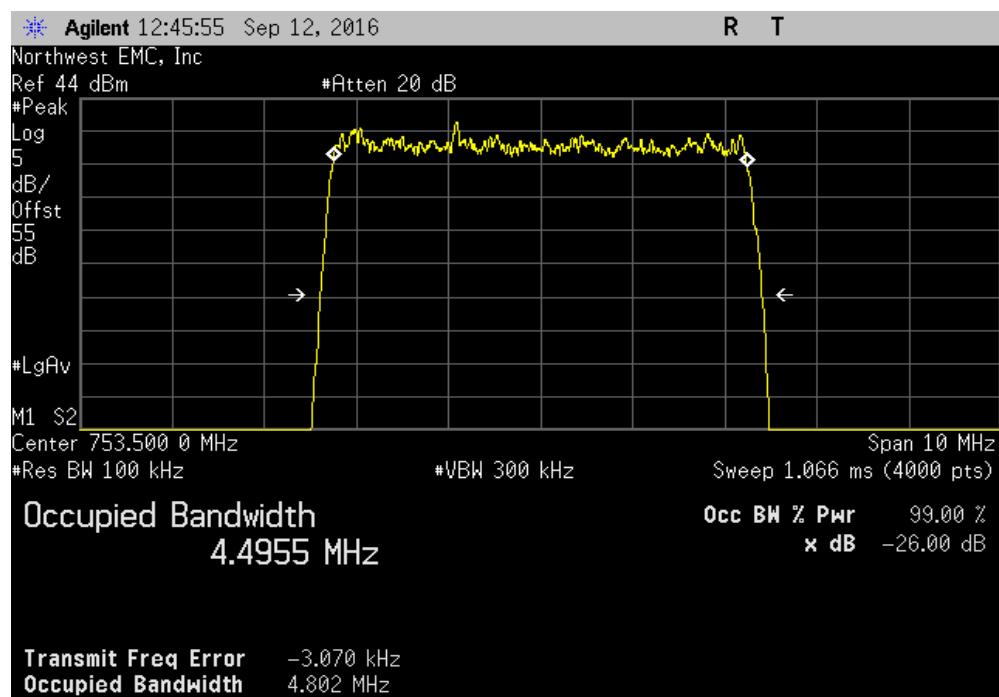
EUT:	CWS-3050-13		Work Order:	KMW0075	
Serial Number:	K162600005		Date:	09/12/16	
Customer:	Parallel Wireless Inc.		Temperature:	21.2 °C	
Attendees:	Andy Ku		Humidity:	45.5% RH	
Project:	None		Barometric Pres.:	1017 mbar	
Tested by:	Johnny Candelas	Power:	48VDC	Job Site:	OC01
TEST SPECIFICATIONS			Test Method		
FCC 27:2016			ANSI/TIA/EIA-603-D-2010		
COMMENTS					
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 55dB total.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	1	Signature			
			Value	Limit	Result
Antenna Port 1					
Low Channel LTE5, 748.5 MHz			4.794 MHz	N/A	N/A
High Channel LTE5, 753.5 MHz			4.802 MHz	N/A	N/A
Single Channel LTE10, 751 MHz			9.549 MHz	N/A	N/A
Antenna Port 2					
Low Channel LTE5, 748.5 MHz			4.792 MHz	N/A	N/A
High Channel LTE5, 753.5 MHz			4.808 MHz	N/A	N/A
Single Channel LTE10, 751 MHz			9.593 MHz	N/A	N/A

# OCCUPIED BANDWIDTH

Antenna Port 1, Low Channel LTE5, 748.5 MHz		
	Value	Limit
	4.794 MHz	N/A

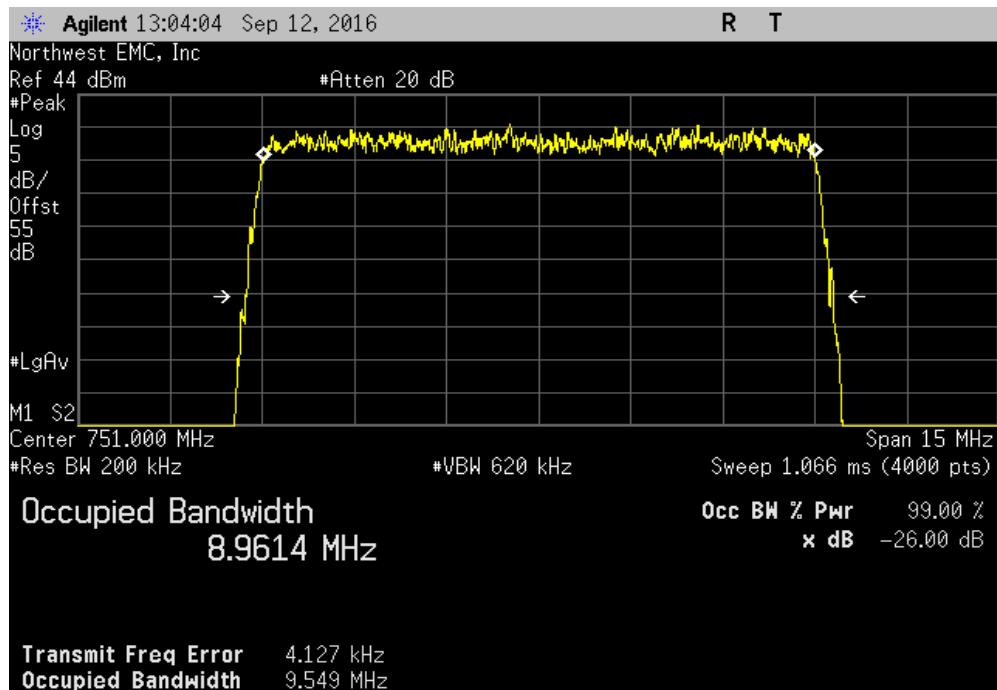


Antenna Port 1, High Channel LTE5, 753.5 MHz		
	Value	Limit
	4.802 MHz	N/A

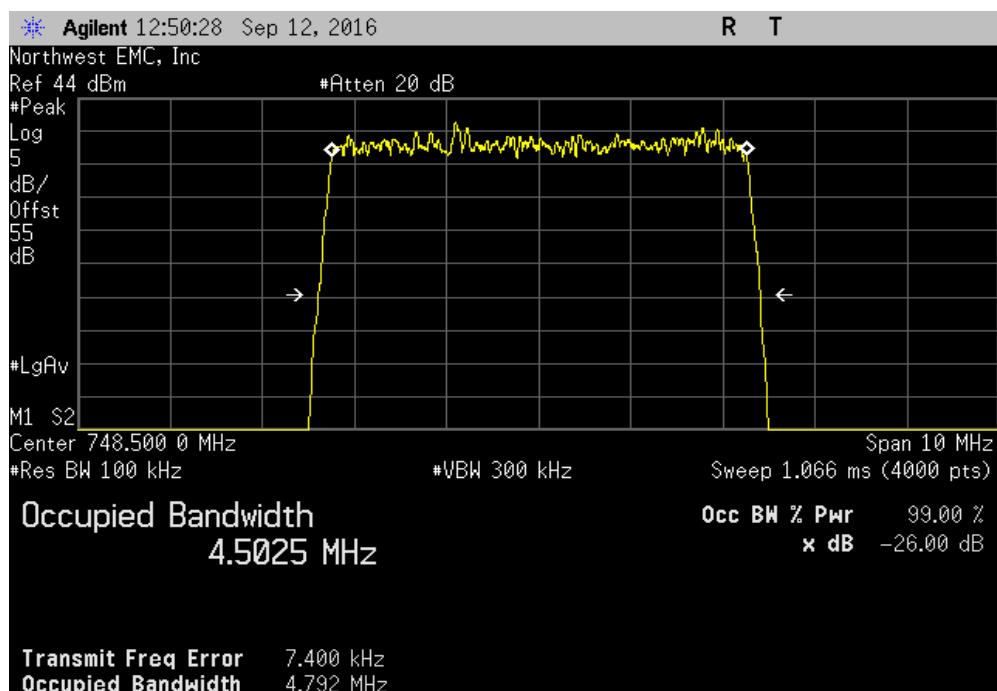


# OCCUPIED BANDWIDTH

Antenna Port 1, Single Channel LTE10, 751 MHz		
	Value	Limit
	9.549 MHz	N/A

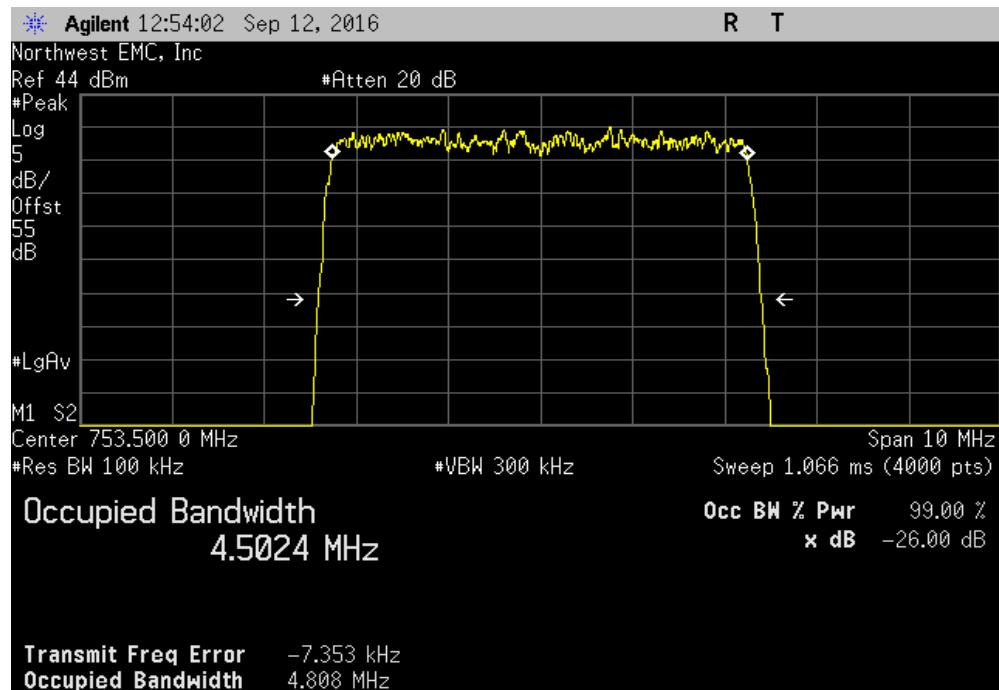


Antenna Port 2, Low Channel LTE5, 748.5 MHz		
	Value	Limit
	4.792 MHz	N/A

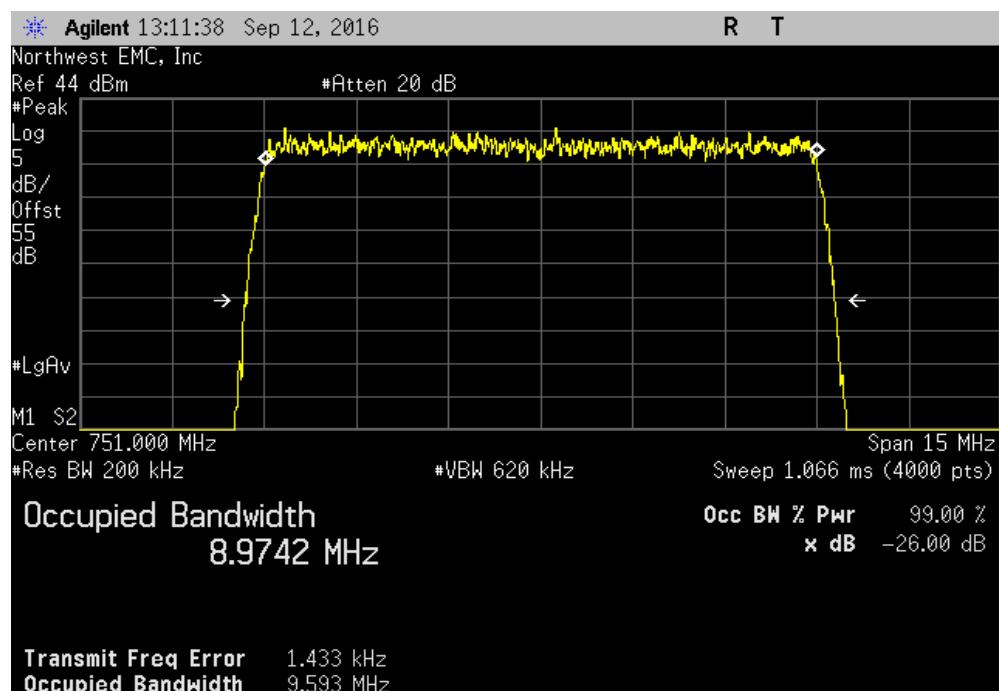


# OCCUPIED BANDWIDTH

Antenna Port 2, High Channel LTE5, 753.5 MHz		
	Value	Limit
	4.808 MHz	N/A



Antenna Port 2, Single Channel LTE10, 751 MHz		
	Value	Limit
	9.593 MHz	N/A



# OUT OF BAND EMISSIONS - LTE BAND 13

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.

## **MODES OF OPERATION**

Transmitting LTE5 Low Ch 748.5MHz and High Ch 753.5MHz and LTE10 at 751MHz

## **POWER SETTINGS INVESTIGATED**

48VDC

## **CONFIGURATIONS INVESTIGATED**

KMWC0075 - 2

## **FREQUENCY RANGE INVESTIGATED**

Start Frequency 30 MHz Stop Frequency 8000 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
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HFR	3/3/2016	12 mo
Attenuator	S.M. Electronics	SA6-20	REO	3/28/2016	12 mo
Attenuator	S.M. Electronics	SA18H-10	REN	3/28/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	8/15/2016	12 mo
Cable	ESM Cable Corp.	1-8GHz cables	OCX	8/15/2016	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	8/15/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	HGP	3/28/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	HGO	3/28/2016	12 mo
Antenna - Biconilog	EMCO	3142	AXB	11/6/2015	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	8/15/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIR	6/23/2016	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAV	11/5/2015	12 mo

## **TEST DESCRIPTION**

The EUT was tested with shielded terminations on the RF output ports instead of antennas..

For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated spurious emissions that utilizes an antenna substitution method:

At an approved test site, the transmitter is placed on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of spurious emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a 1/2 wave dipole that is successively tuned to each of the highest spurious emissions for emissions below 1 GHz, and a horn antenna for emissions above 1 GHz. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the antenna and its gain; the power (dBm) into an ideal 1/2 wave dipole antenna is determined for each radiated spurious emission.

# OUT OF BAND EMISSIONS - LTE BAND 13

**NORTHWEST**  
**EMC**

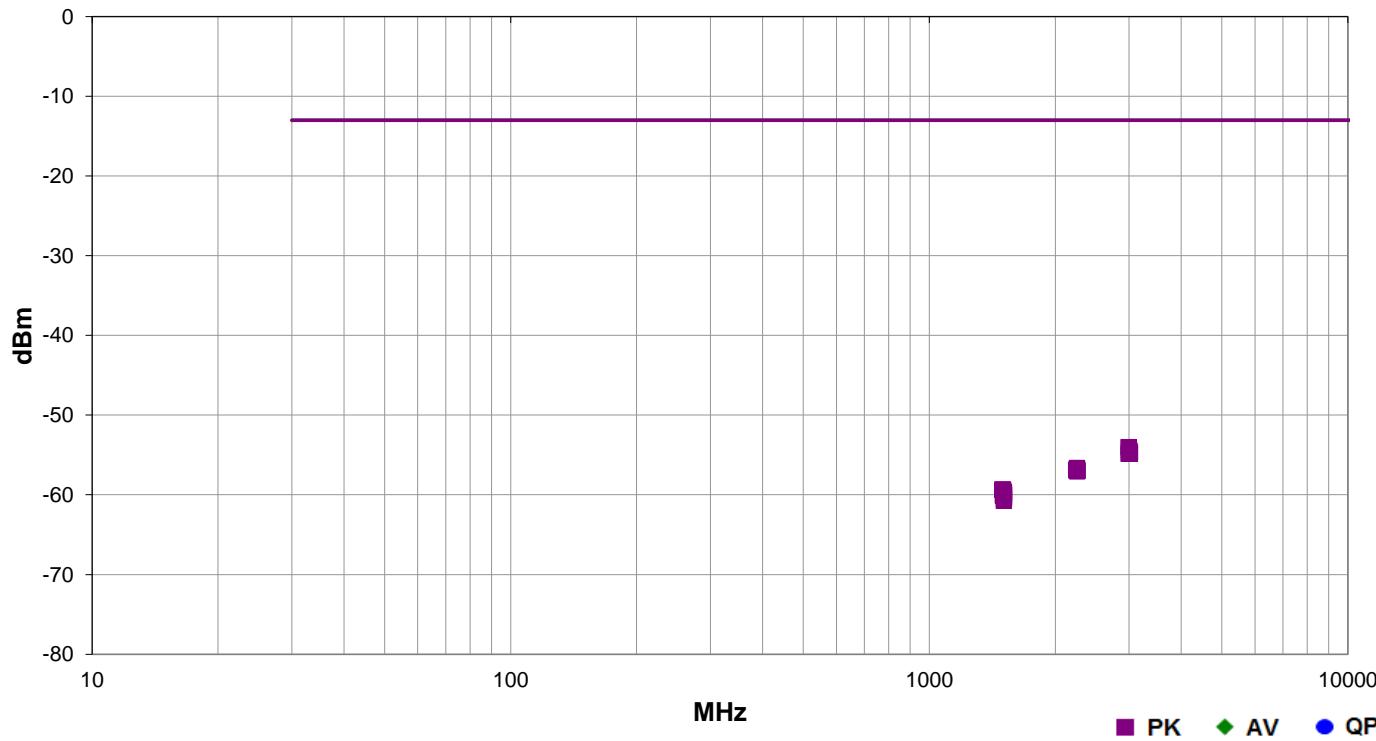
PSA-ESCI 2016.07.22

EmiR5 2016.07.22.1

Work Order:	KMWC0075	Date:	09/14/16	
Project:	None	Temperature:	20.2 °C	
Job Site:	OC07	Humidity:	46.3% RH	
Serial Number:	K162600005	Barometric Pres.:	1020 mbar	Tested by: Mike Tran
EUT:	CWS-3050-13			
Configuration:	2			
Customer:	Parallel Wireless Inc.			
Attendees:	Andy Ku			
EUT Power:	48VDC			
Operating Mode:	Transmitting LTE5 Low Ch 748.5MHz and High Ch 753.5MHz and LTE10 at 751MHz			
Deviations:	None			
Comments:	None			

Test Specifications	Test Method
FCC 27:2016	ANSI/TIA/EIA-603-D-2010

Run #	7	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass



	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2993.000	1.0	16.0	Horz	PK	3.95E-09	-54.0	-13.0	-41.0	-41.0	EUT on Side, LTE5, Low Ch
3004.983	1.0	132.0	Horz	PK	3.61E-09	-54.4	-13.0	-41.4	-41.4	EUT on Side, LTE10
3002.558	3.5	179.0	Vert	PK	3.61E-09	-54.4	-13.0	-41.4	-41.4	EUT on Side, LTE10
3016.158	1.0	154.0	Vert	PK	3.44E-09	-54.6	-13.0	-41.6	-41.6	EUT on Side, LTE5, High Ch
3015.917	1.0	89.0	Horz	PK	3.29E-09	-54.8	-13.0	-41.8	-41.8	EUT on Side, LTE5, High Ch

	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
	2994.517	2.8	210.0	Vert	PK	3.29E-09	-54.8	-13.0	-41.8	EUT on Side, LTE5, Low Ch
	2253.967	2.9	166.0	Vert	PK	2.17E-09	-56.6	-13.0	-43.6	EUT on Side, LTE10
	2243.667	1.0	241.0	Horz	PK	2.08E-09	-56.8	-13.0	-43.8	EUT on Side, LTE5, Low Ch
	2259.800	1.0	310.0	Horz	PK	2.03E-09	-56.9	-13.0	-43.9	EUT on Side, LTE5, High Ch
	2246.533	1.0	360.0	Vert	PK	2.03E-09	-56.9	-13.0	-43.9	EUT on Side, LTE5, Low Ch
	2259.992	2.8	313.0	Vert	PK	1.98E-09	-57.0	-13.0	-44.0	EUT on Side, LTE5, High Ch
	2255.158	1.0	170.0	Horz	PK	1.98E-09	-57.0	-13.0	-44.0	EUT on Side, LTE10
	1494.633	1.0	224.0	Vert	PK	1.17E-09	-59.3	-13.0	-46.3	EUT on Side, LTE5, Low Ch
	1500.683	1.0	109.0	Horz	PK	1.17E-09	-59.3	-13.0	-46.3	EUT on Side, LTE10
	1505.050	1.0	359.0	Vert	PK	1.09E-09	-59.6	-13.0	-46.6	EUT on Side, LTE5, High Ch
	1508.225	2.1	100.0	Vert	PK	1.06E-09	-59.7	-13.0	-46.7	EUT Horz, LTE5, High Ch
	1501.433	1.0	277.0	Vert	PK	1.02E-09	-59.9	-13.0	-46.9	EUT on Side, LTE10
	1508.492	2.2	36.0	Vert	PK	9.93E-10	-60.0	-13.0	-47.0	EUT Vert, LTE5, High Ch
	1506.383	1.0	271.0	Horz	PK	9.71E-10	-60.1	-13.0	-47.1	EUT on Side, LTE5, High Ch
	1499.400	1.0	184.0	Horz	PK	9.71E-10	-60.1	-13.0	-47.1	EUT on Side, LTE5, Low Ch
	1508.283	1.0	140.0	Horz	PK	9.06E-10	-60.4	-13.0	-47.4	EUT Vert, LTE5, High Ch
	1507.217	2.0	56.0	Horz	PK	8.46E-10	-60.7	-13.0	-47.7	EUT Horz, LTE5, High Ch

# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS



XMit 2016.05.06

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
Filter - High Pass	Micro-Tronics	HPM50108	HGX	7/25/2016	7/25/2017
Power Supply - DC	Hewlett Packard	6574A	TPX	NCR	NCR
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016

## CLIENT PROVIDED EQUIPMENT

Description	Manufacturer	Model	Last Cal.	Cal. Due
High Power Attenuator - 30dB	Aeroflex/Weinschel	53-30-43	NCR	NCR
Attenuator - 20dB	N/A	N/A	NCR	NCR
Power Divider	Fairview Microwave	MP8748-2	NCR	NCR
50Ohm Terminator	Aeroflex/Weinschel	1455-4	NCR	NCR
High Power Terminator	Telcon	KTMO400800060	NCR	NCR

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. Analyzer plots utilizing a 1 MHz resolution bandwidth and no video filtering were made for each mode listed in the datasheet.

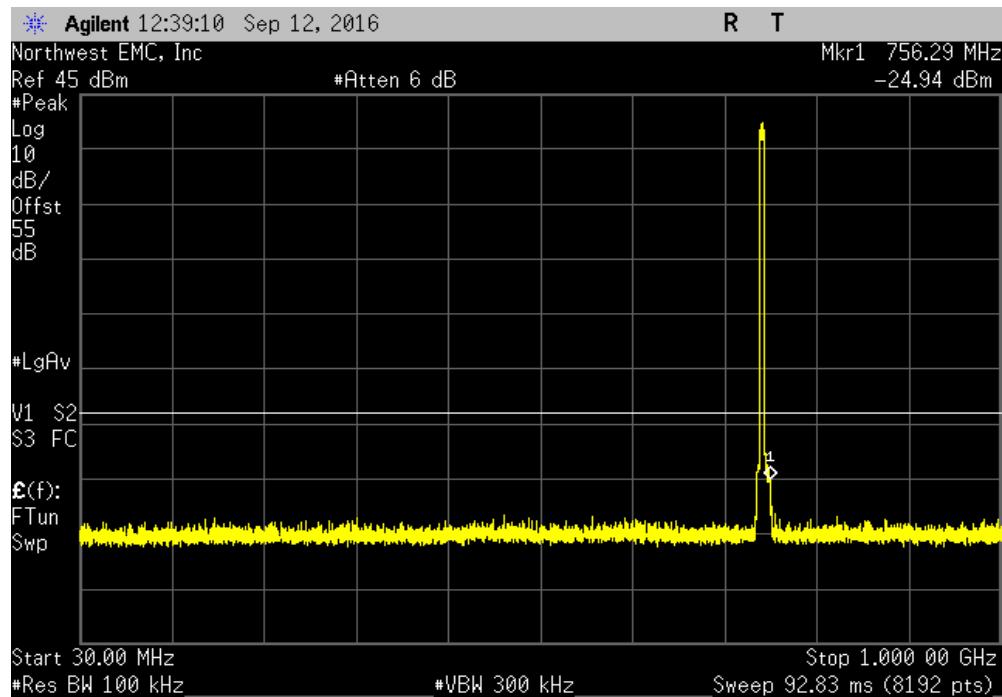
The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than or equal to the limit.

# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

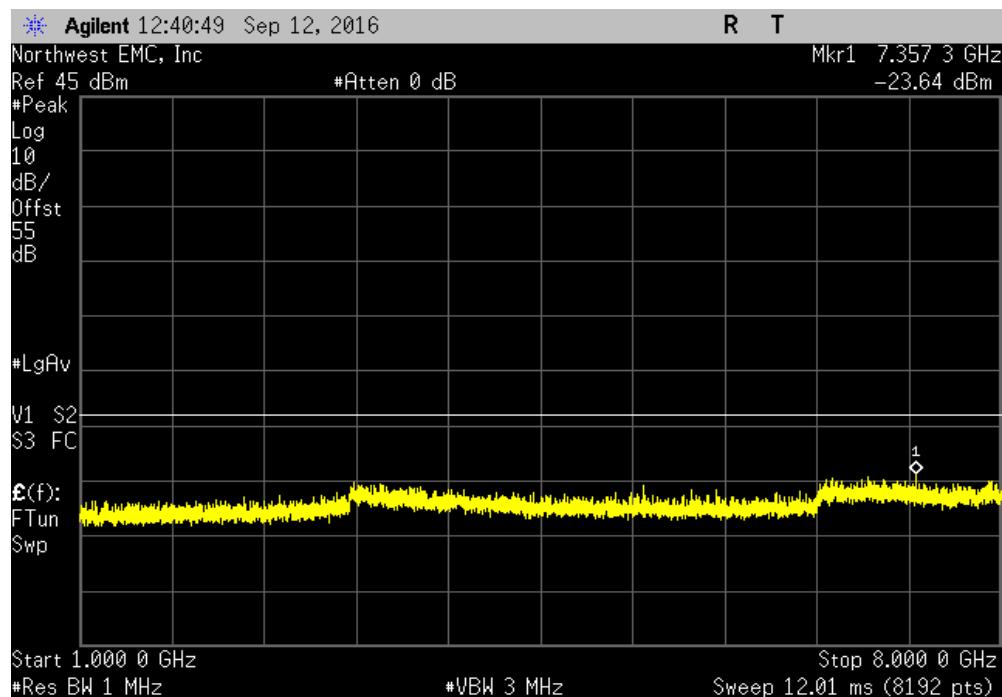
EUT:	CWS-3050-13		Work Order:	KMW0075		
Serial Number:	K162600005		Date:	09/12/16		
Customer:	Parallel Wireless Inc.		Temperature:	21.2 °C		
Attendees:	Andy Ku		Humidity:	45.5% RH		
Project:	None		Barometric Pres.:	1017 mbar		
Tested by:	Johnny Candelas	Power:	48VDC	Job Site:	OC01	
TEST SPECIFICATIONS			Test Method			
FCC 27:2016			ANSI/TIA/EIA-603-D-2010			
COMMENTS						
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 55dB total.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1	Signature	Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
Antenna Port 1						
Low Channel LTE5, 748.5 MHz	30 MHz - 1 GHz	-24.94	-13	Pass		
Low Channel LTE5, 748.5 MHz	1 GHz - 8 GHz	-23.64	-13	Pass		
High Channel LTE5, 753.5 MHz	30 MHz - 1 GHz	-29.20	-13	Pass		
High Channel LTE5, 753.5 MHz	1 GHz - 8 GHz	-24.14	-13	Pass		
Single Channel LTE10, 751 MHz	30 MHz - 1 GHz	-30.27	-13	Pass		
Single Channel LTE10, 751 MHz	1 GHz - 8 GHz	-23.94	-13	Pass		
Antenna Port 2						
Low Channel LTE5, 748.5 MHz	30 MHz - 1 GHz	-29.62	-13	Pass		
Low Channel LTE5, 748.5 MHz	1 GHz - 8 GHz	-24.22	-13	Pass		
High Channel LTE5, 753.5 MHz	30 MHz - 1 GHz	-27.52	-13	Pass		
High Channel LTE5, 753.5 MHz	1 GHz - 8 GHz	-23.77	-13	Pass		
Single Channel LTE10, 751 MHz	30 MHz - 1 GHz	-31.56	-13	Pass		
Single Channel LTE10, 751 MHz	1 GHz - 8 GHz	-23.66	-13	Pass		

# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Antenna Port 1, Low Channel LTE5, 748.5 MHz				
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result	
30 MHz - 1 GHz	-24.94	-13	Pass	

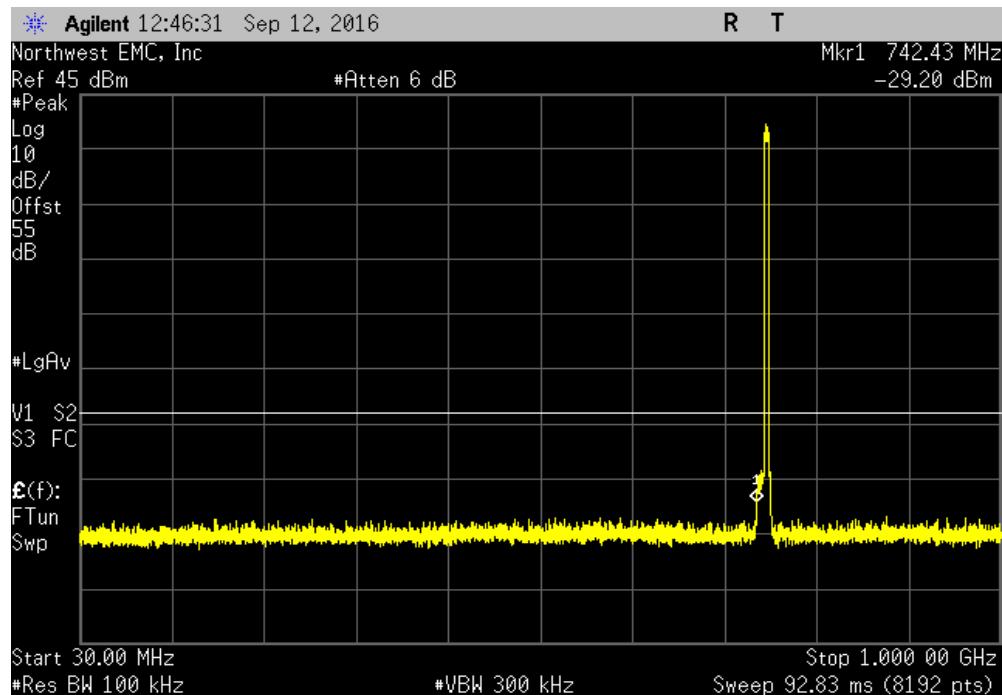


Antenna Port 1, Low Channel LTE5, 748.5 MHz				
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result	
1 GHz - 8 GHz	-23.64	-13	Pass	

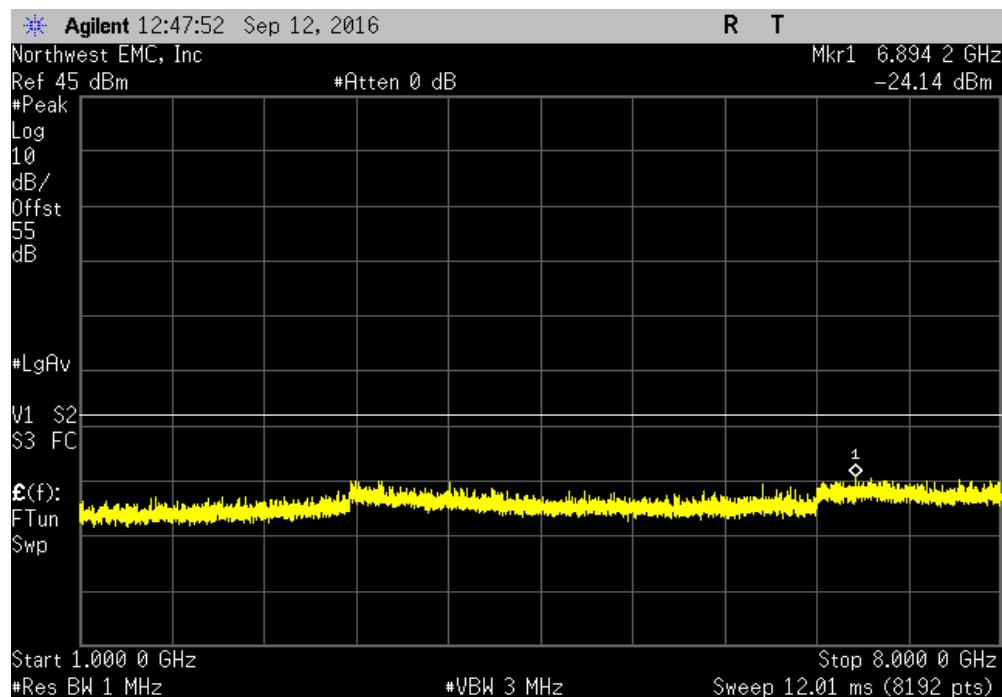


# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Antenna Port 1, High Channel LTE5, 753.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-29.20	-13	Pass	

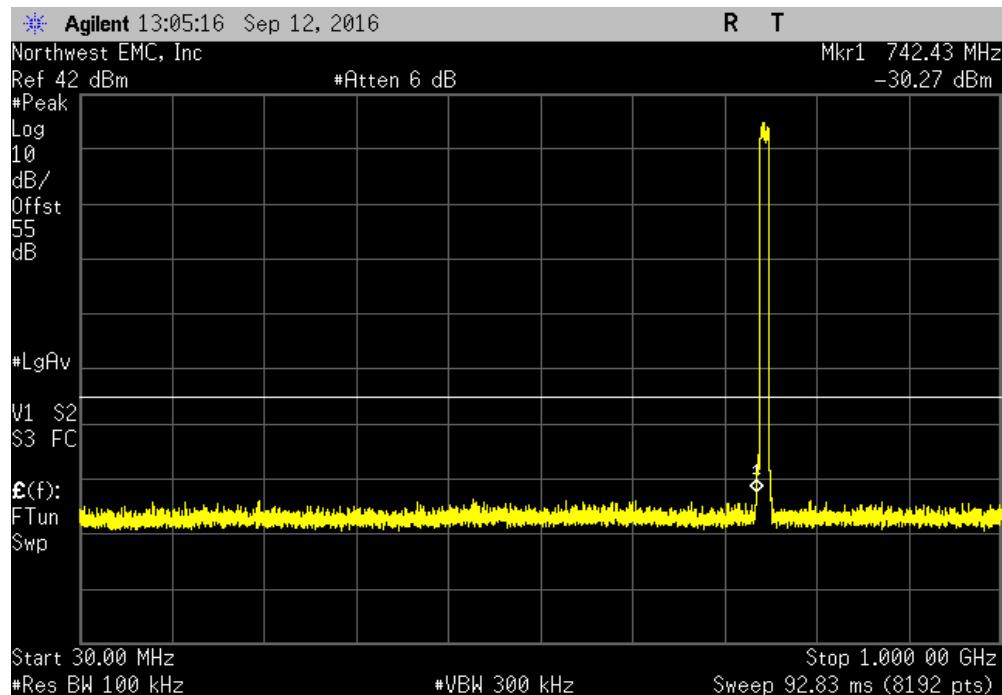


Antenna Port 1, High Channel LTE5, 753.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.14	-13	Pass	

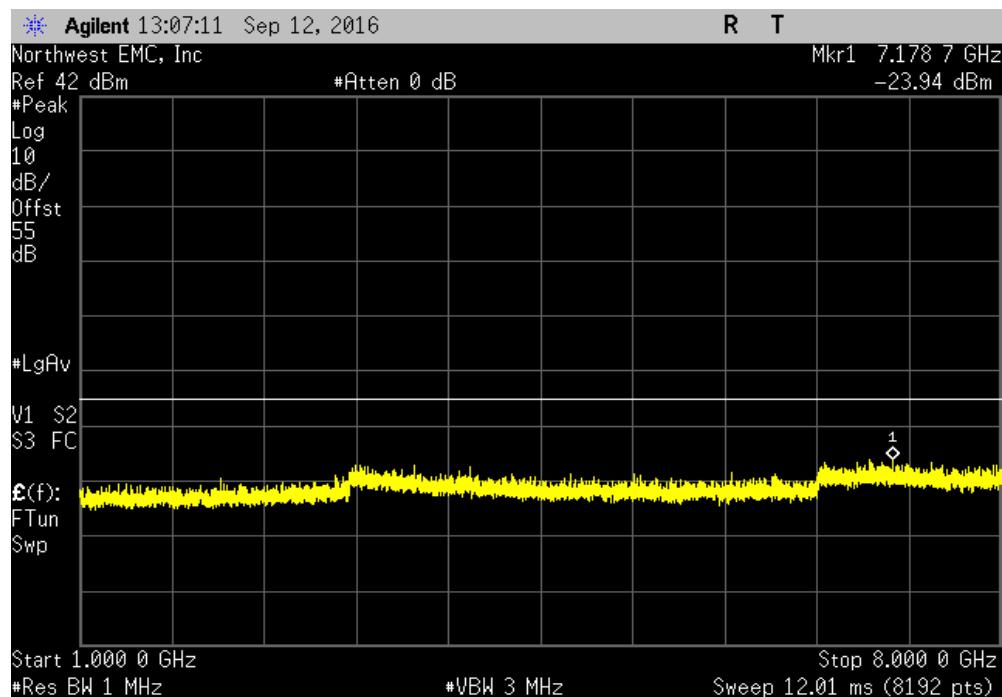


# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Antenna Port 1, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result	
30 MHz - 1 GHz	-30.27	-13	Pass	

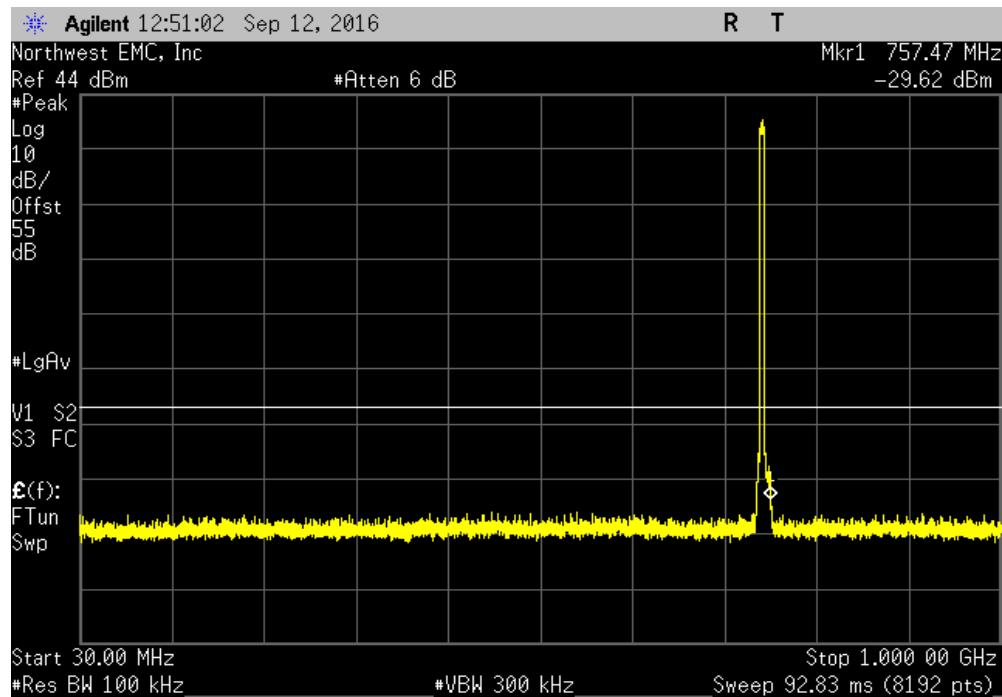


Antenna Port 1, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result	
1 GHz - 8 GHz	-23.94	-13	Pass	

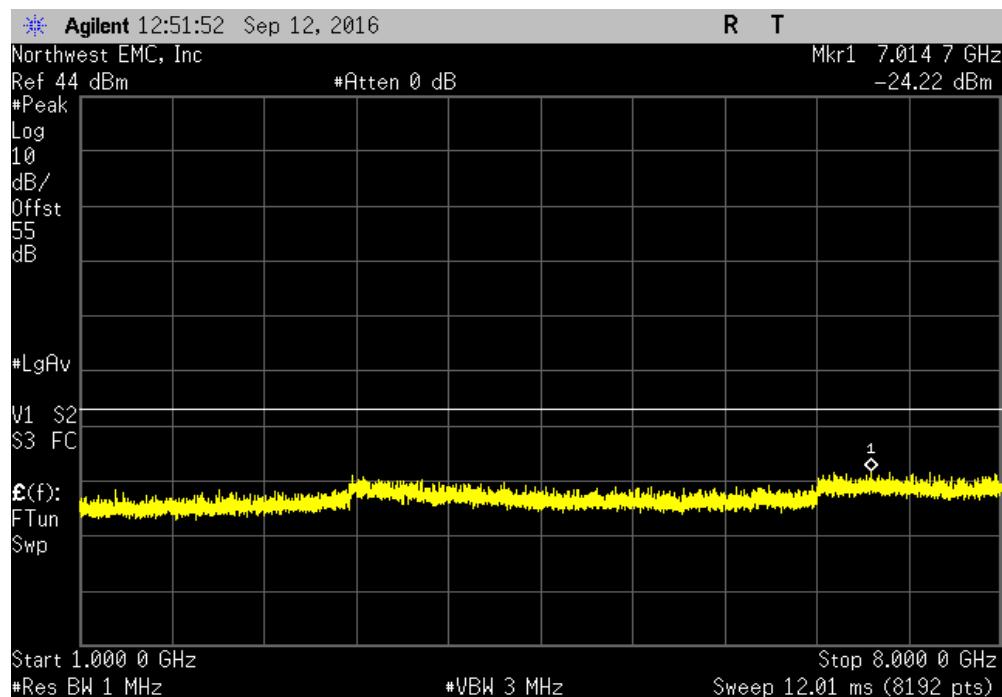


# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Antenna Port 2, Low Channel LTE5, 748.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-29.62	-13	Pass	

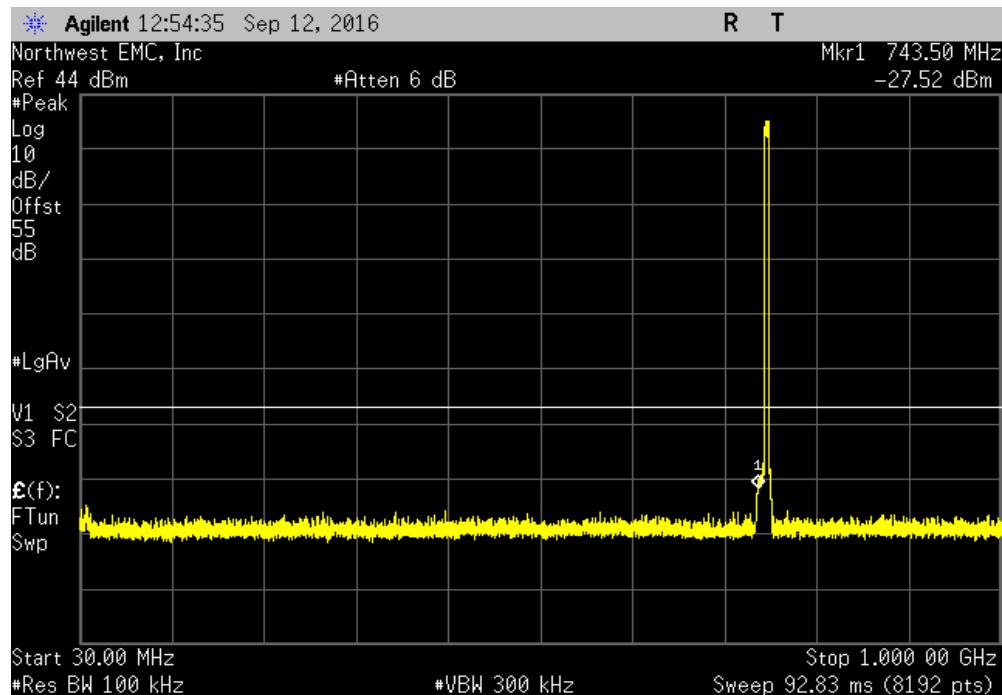


Antenna Port 2, Low Channel LTE5, 748.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.22	-13	Pass	

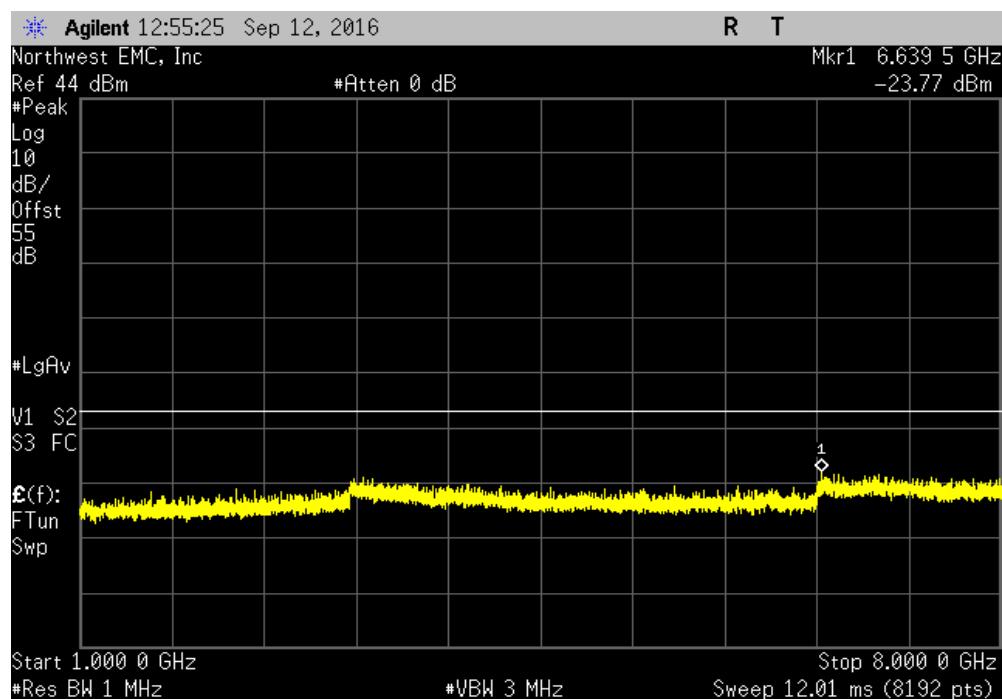


# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Antenna Port 2, High Channel LTE5, 753.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-27.52	-13	Pass	

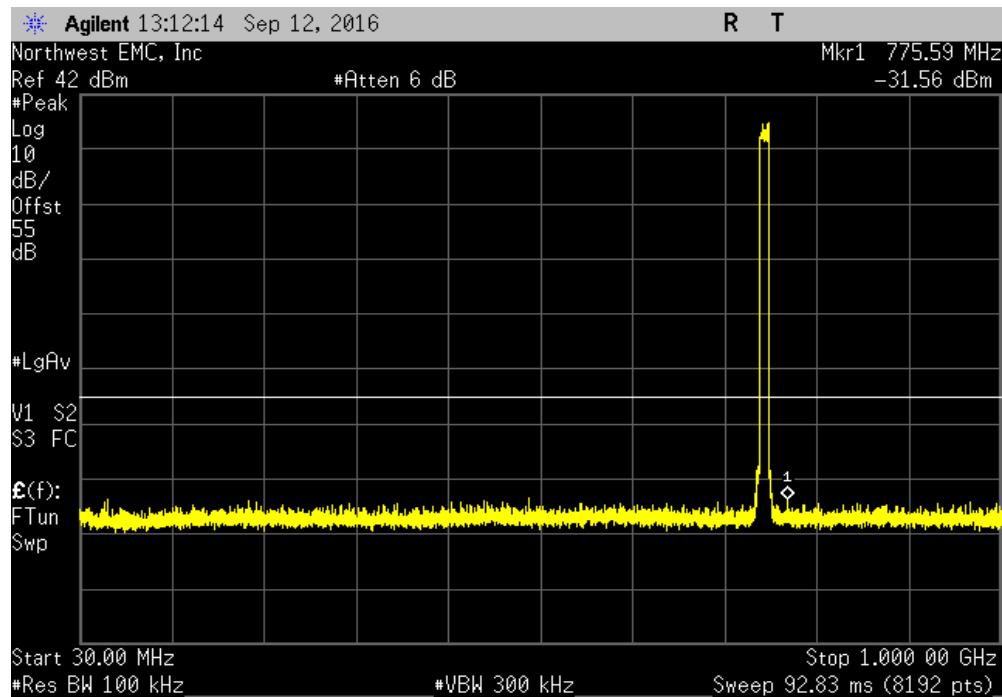


Antenna Port 2, High Channel LTE5, 753.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.77	-13	Pass	

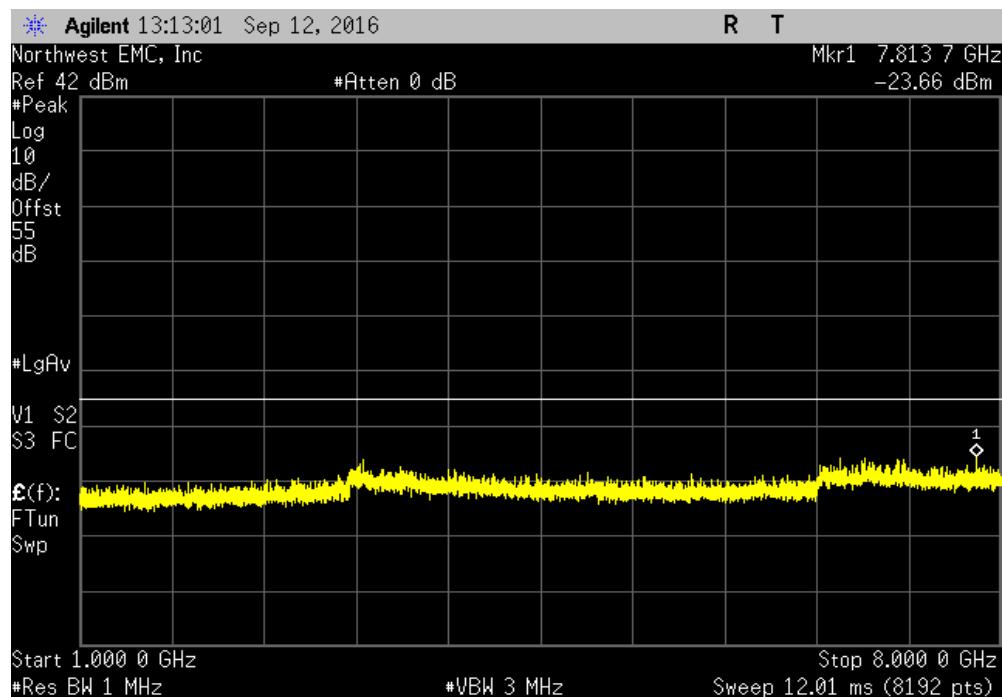


# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Antenna Port 2, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-31.56	-13	Pass	



Antenna Port 2, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.66	-13	Pass	



# BAND EDGE COMPLIANCE

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
Generator - Signal	Agilent	E8257D	TGU	2/5/2015	2/5/2018
Cable	Fairview Microwave	SCA1814-0101-120	OCZ	NCR	NCR
Block - DC	Aeroflex	INMET 8535	AMO	4/4/2016	4/4/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFA	11/19/2015	11/19/2016

## CLIENT PROVIDED EQUIPMENT

Description	Manufacturer	Model	Last Cal.	Cal. Due
High Power Attenuator - 30dB	Aeroflex/Weinschel	53-30-43	NCR	NCR
Attenuator - 20dB	N/A	N/A	NCR	NCR
Power Divider	Fairview Microwave	MP8748-2	NCR	NCR
50Ohm Terminator	Aeroflex/Weinschel	1455-4	NCR	NCR
High Power Terminator	Telcon	KTMO400800060	NCR	NCR

## TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The spurious RF conducted emissions at the authorized bands per FCC 27.53(c)(3) were measured with the EUT transmitting at the data rate(s) listed in the datasheet.

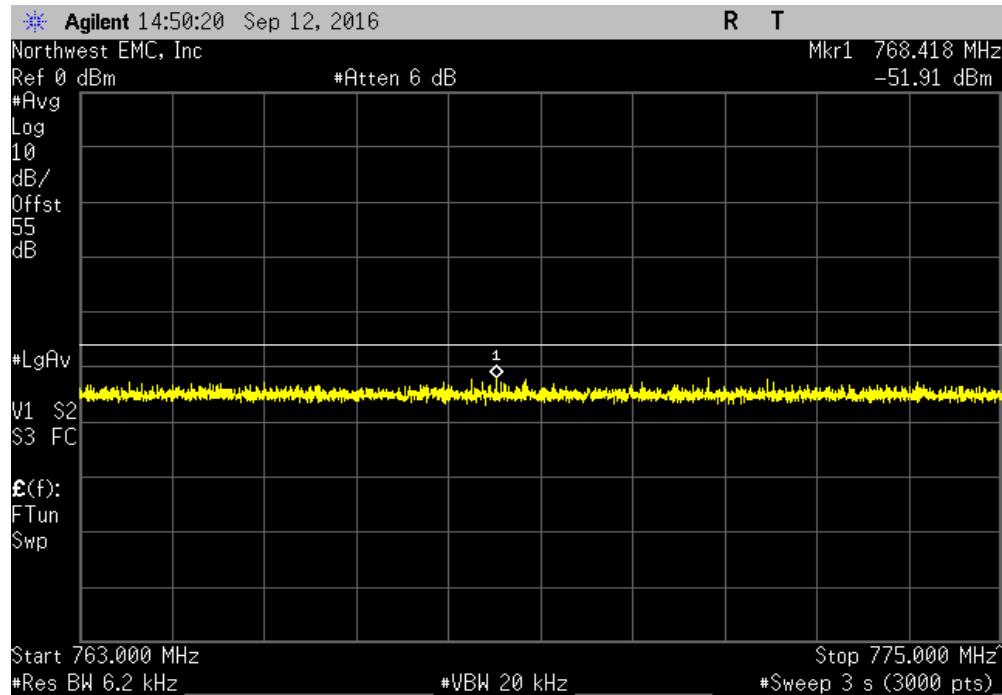
An average RMS detector was used to match the method used during Output Power. The screen capture shows the margin between the measured value and the limit at the band edge.

# BAND EDGE COMPLIANCE

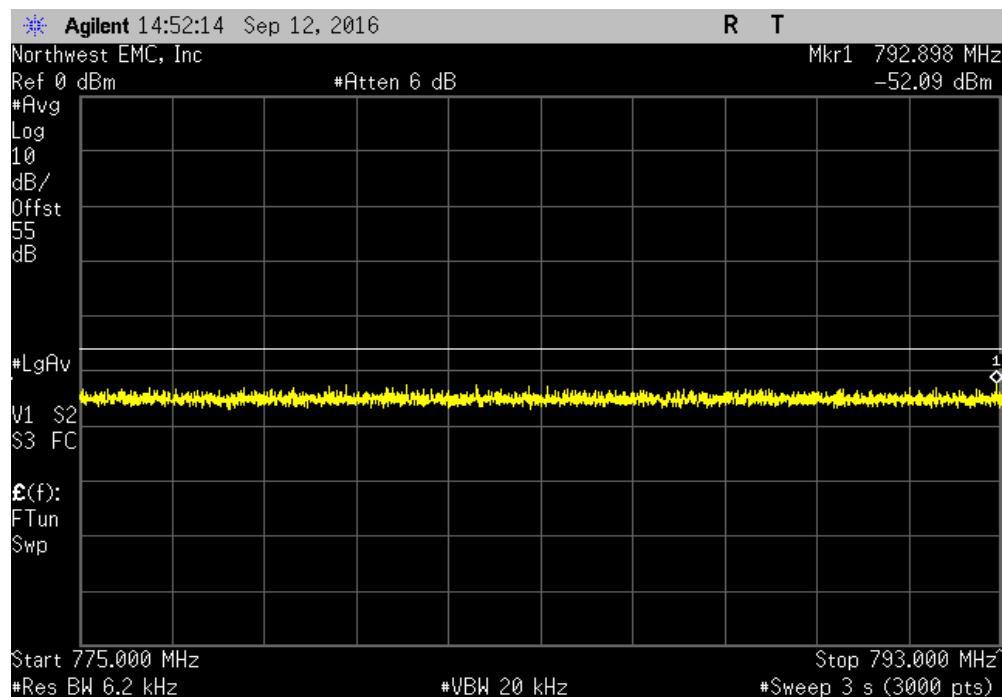
EUT:	CWS-3050-13		Work Order:	KMW0075																																																																																									
Serial Number:	K162600005		Date:	09/12/16																																																																																									
Customer:	Parallel Wireless Inc.		Temperature:	21.2 °C																																																																																									
Attendees:	Andy Ku		Humidity:	45.5% RH																																																																																									
Project:	None		Barometric Pres.:	1017 mbar																																																																																									
Tested by:	Johnny Candelas	Power:	48VDC	Job Site:	OC01																																																																																								
TEST SPECIFICATIONS			Test Method																																																																																										
FCC 27:2016			ANSI/TIA/EIA-603-D-2010																																																																																										
COMMENTS																																																																																													
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 55dB total.																																																																																													
DEVIATIONS FROM TEST STANDARD																																																																																													
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Configuration #	1	Signature																																																																																											
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# BAND EDGE COMPLIANCE

SISO, Antenna Port 1, Low Channel LTE5, 748.5 MHz			
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
763 MHz - 775 MHz	-51.91	-46	Pass

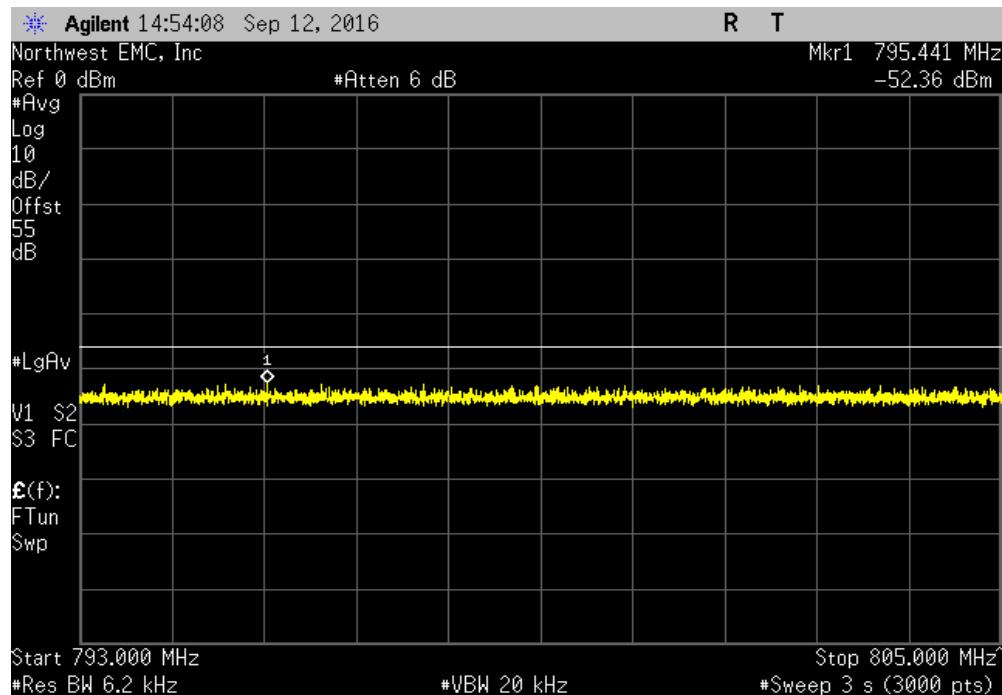


SISO, Antenna Port 1, Low Channel LTE5, 748.5 MHz			
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
775 MHz - 793 MHz	-52.09	-46	Pass

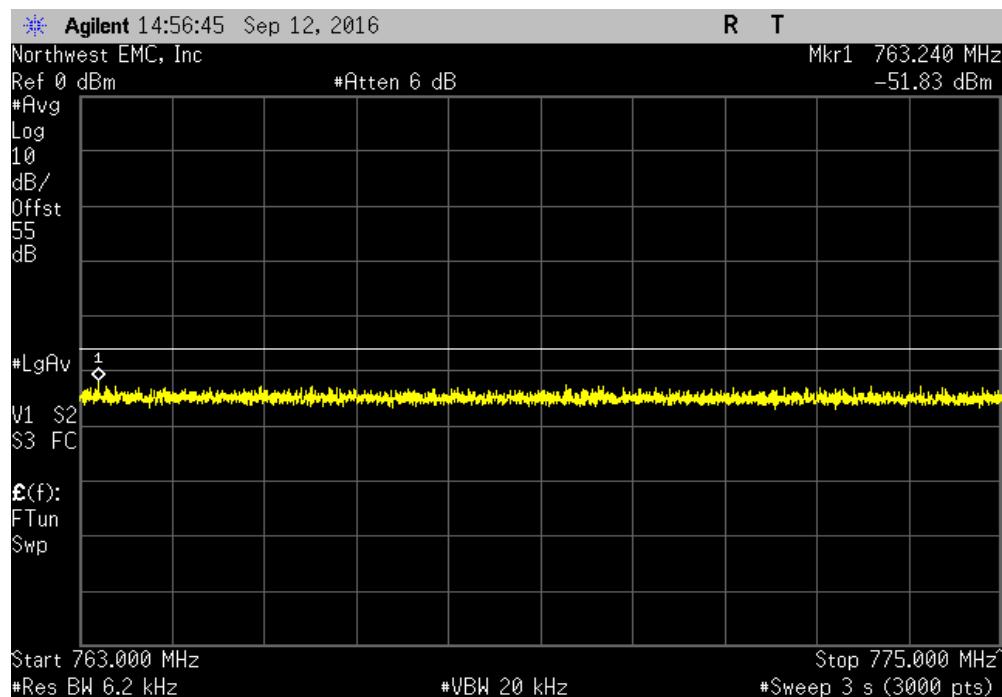


# BAND EDGE COMPLIANCE

SISO, Antenna Port 1, Low Channel LTE5, 748.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
793 MHz - 805 MHz	-52.36	-46	Pass

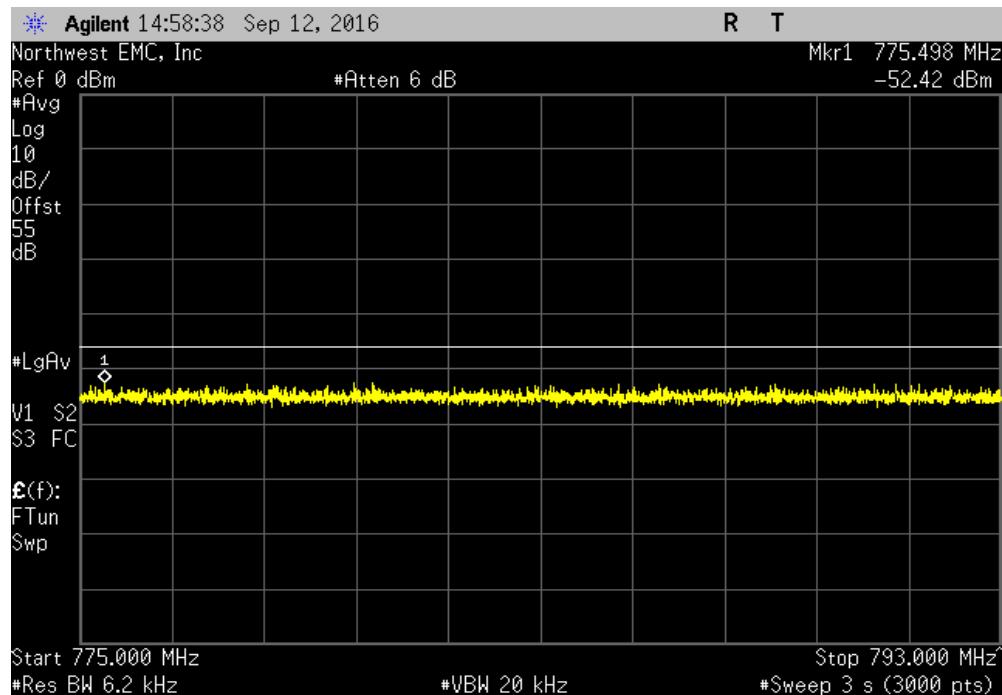


SISO, Antenna Port 1, High Channel LTE5, 753.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
763 MHz - 775 MHz	-51.83	-46	Pass

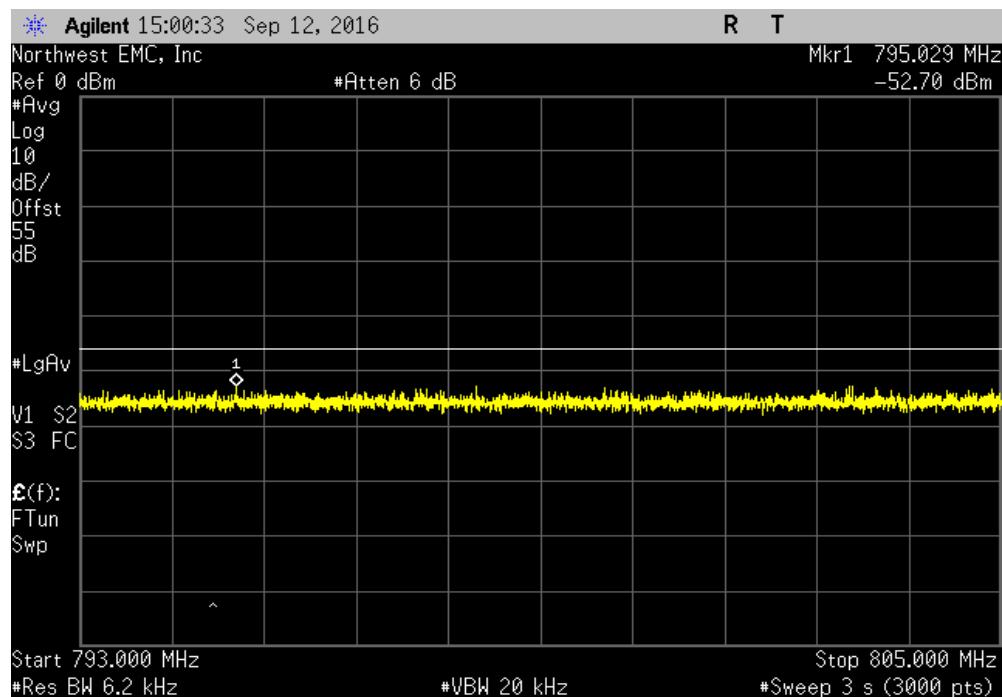


# BAND EDGE COMPLIANCE

SISO, Antenna Port 1, High Channel LTE5, 753.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
775 MHz - 793 MHz	-52.42	-46	Pass

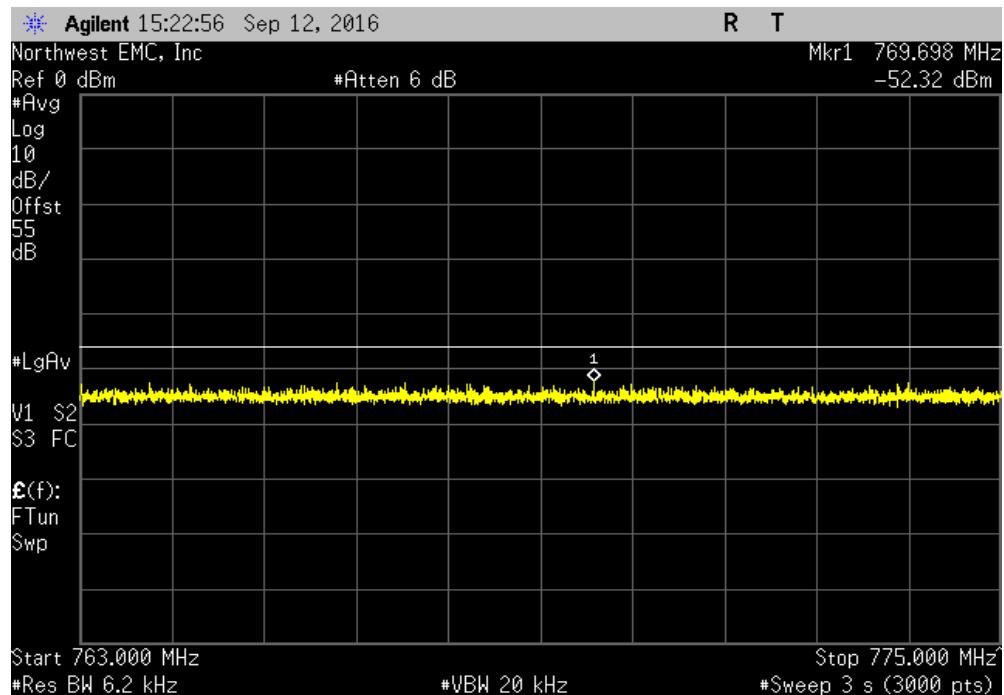


SISO, Antenna Port 1, High Channel LTE5, 753.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
793 MHz - 805 MHz	-52.70	-46	Pass

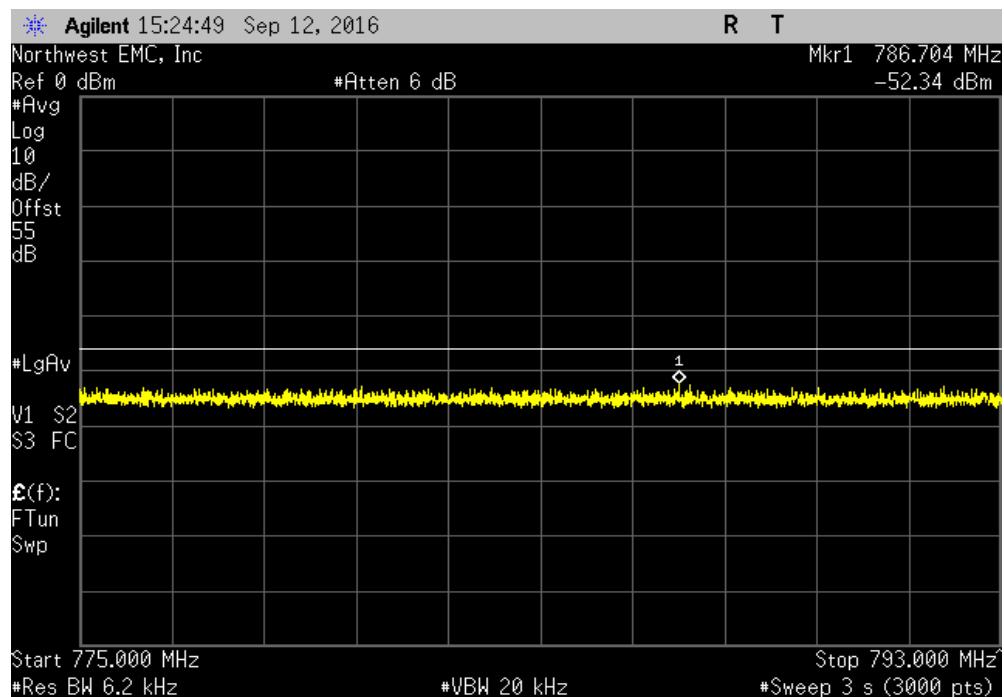


# BAND EDGE COMPLIANCE

SISO, Antenna Port 1, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
763 MHz - 775 MHz	-52.32	-46	Pass	

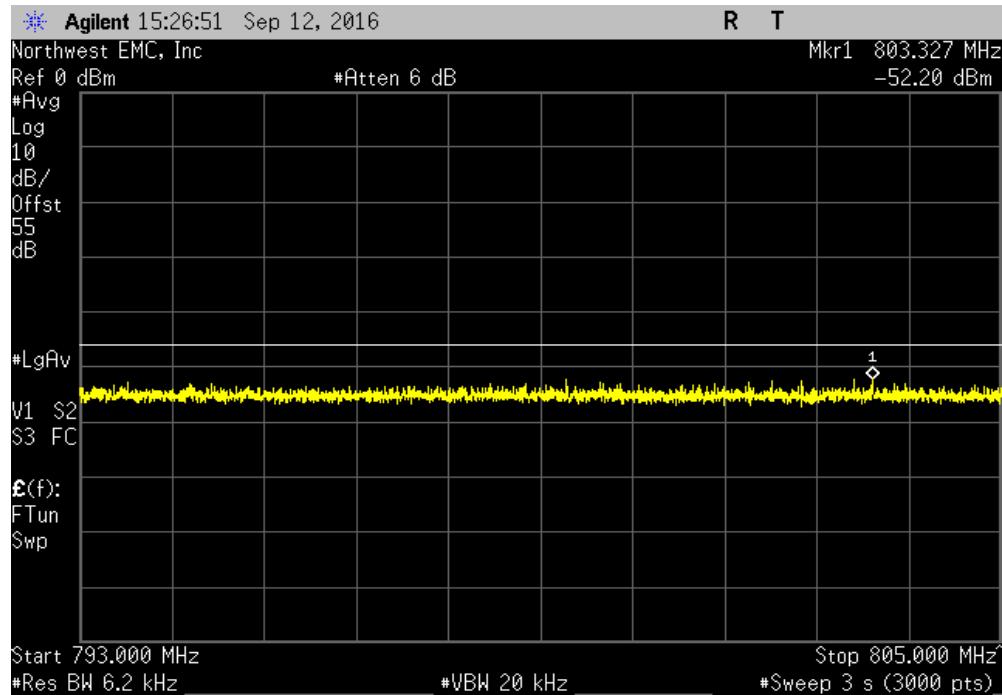


SISO, Antenna Port 1, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
775 MHz - 793 MHz	-52.34	-46	Pass	

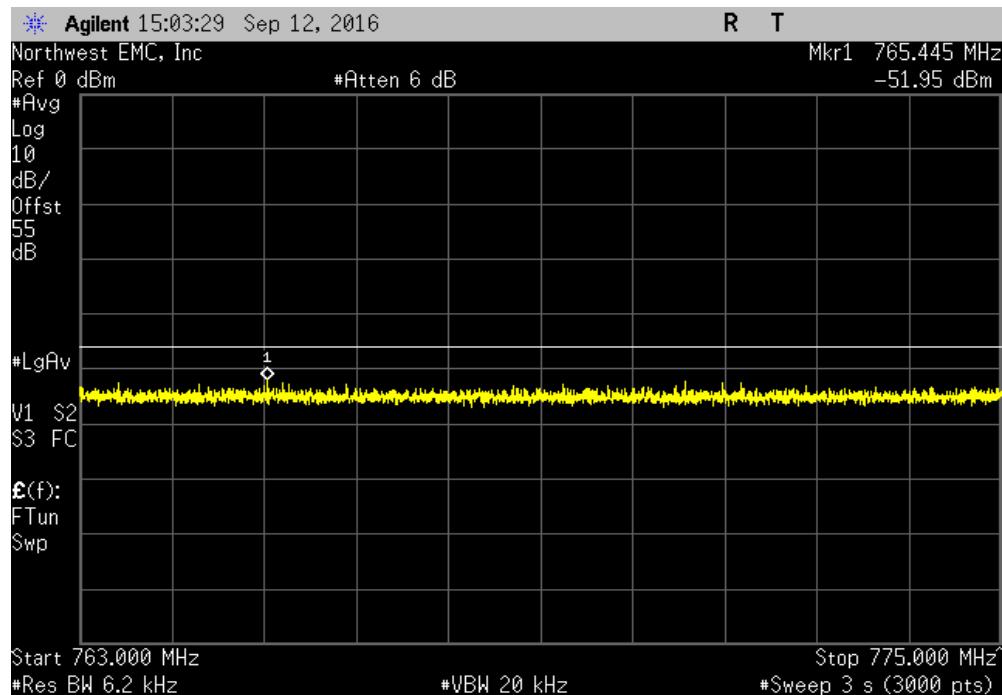


# BAND EDGE COMPLIANCE

SISO, Antenna Port 1, Single Channel LTE10, 751 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
793 MHz - 805 MHz	-52.20	-46	Pass

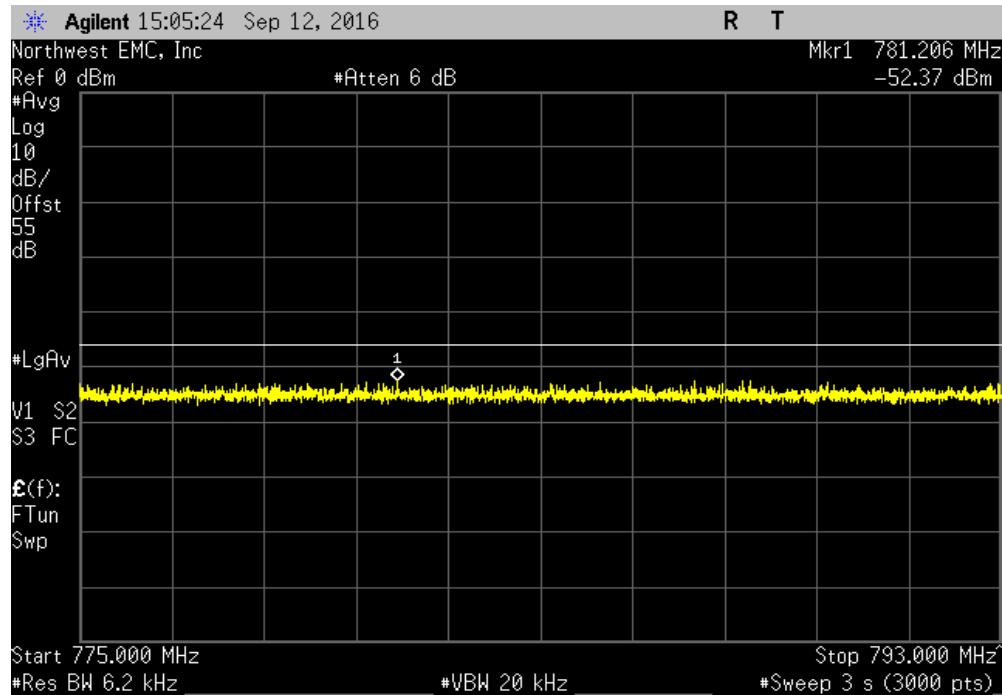


SISO, Antenna Port 2, Low Channel LTE5, 748.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
763 MHz - 775 MHz	-51.95	-46	Pass

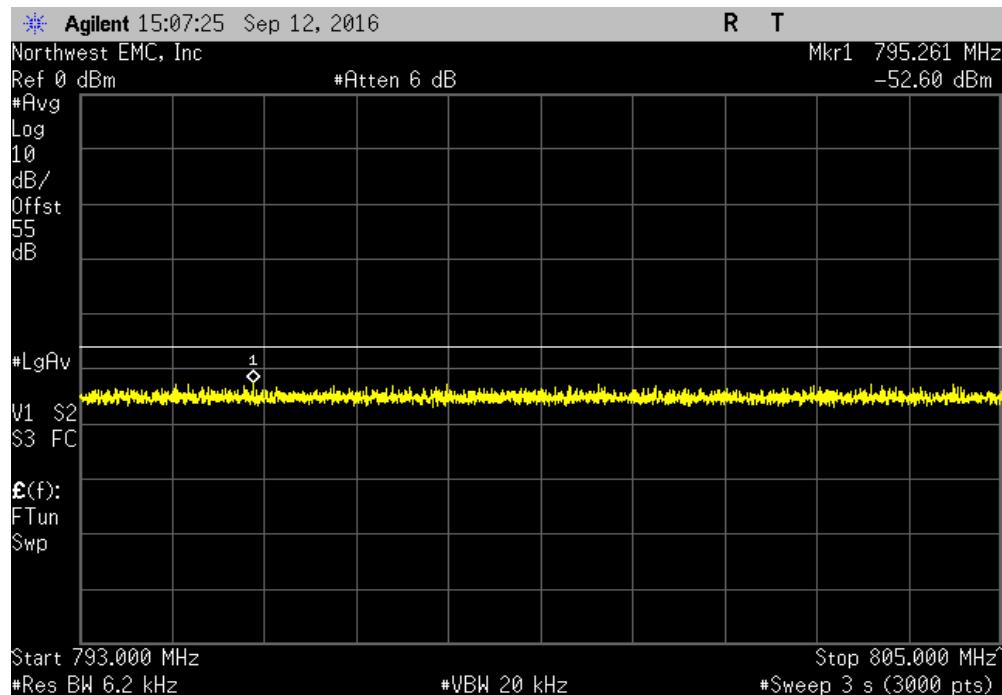


# BAND EDGE COMPLIANCE

SISO, Antenna Port 2, Low Channel LTE5, 748.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
775 MHz - 793 MHz	-52.37	-46	Pass

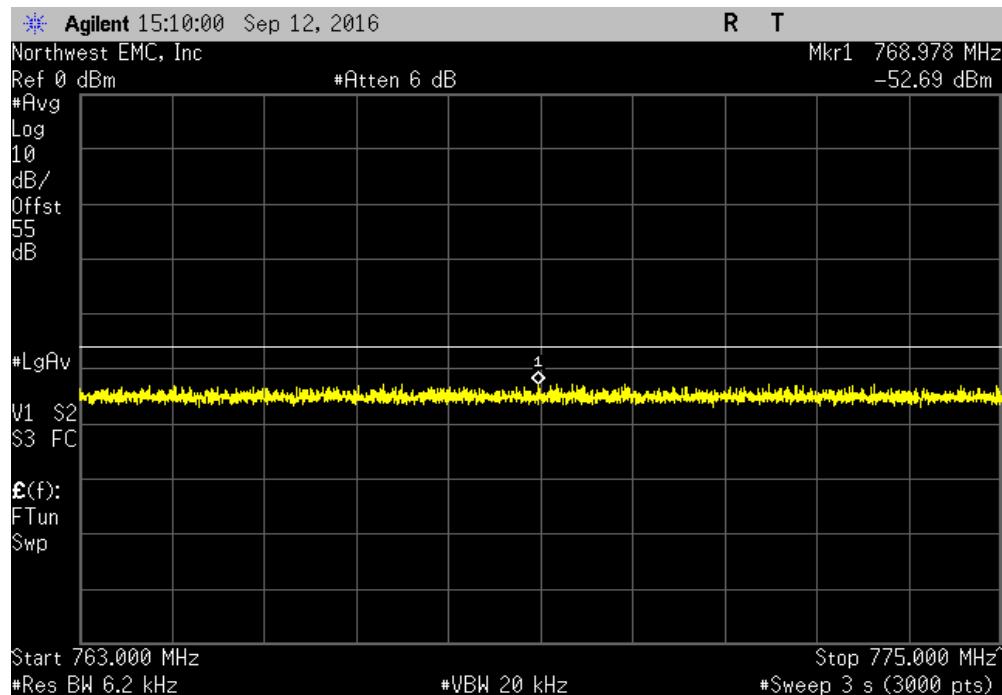


SISO, Antenna Port 2, Low Channel LTE5, 748.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
793 MHz - 805 MHz	-52.60	-46	Pass

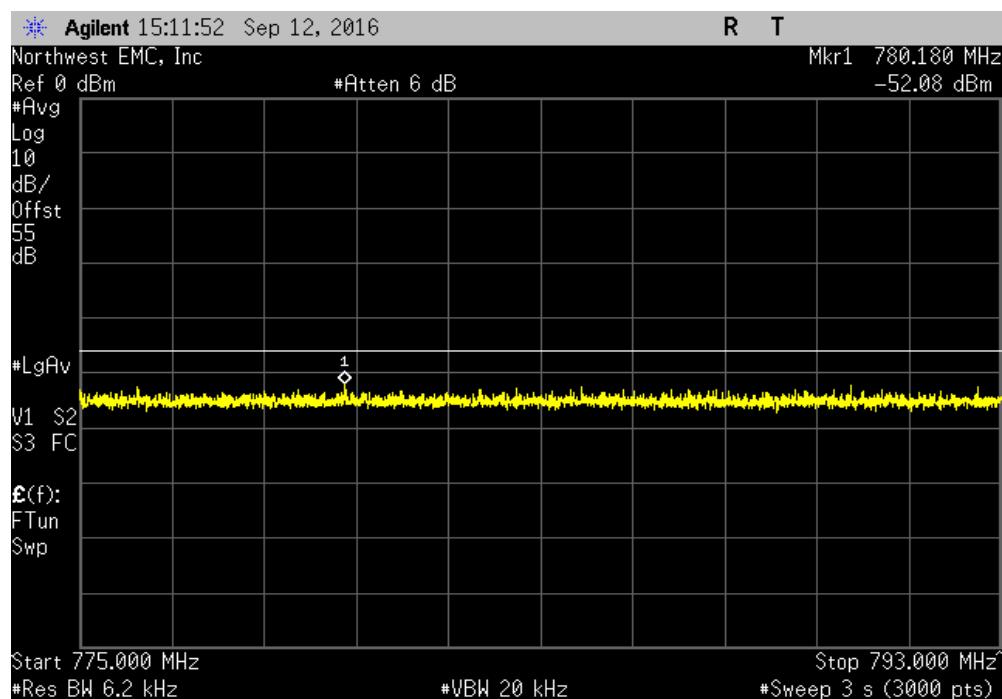


# BAND EDGE COMPLIANCE

SISO, Antenna Port 2, High Channel LTE5, 753.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
763 MHz - 775 MHz	-52.69	-46	Pass

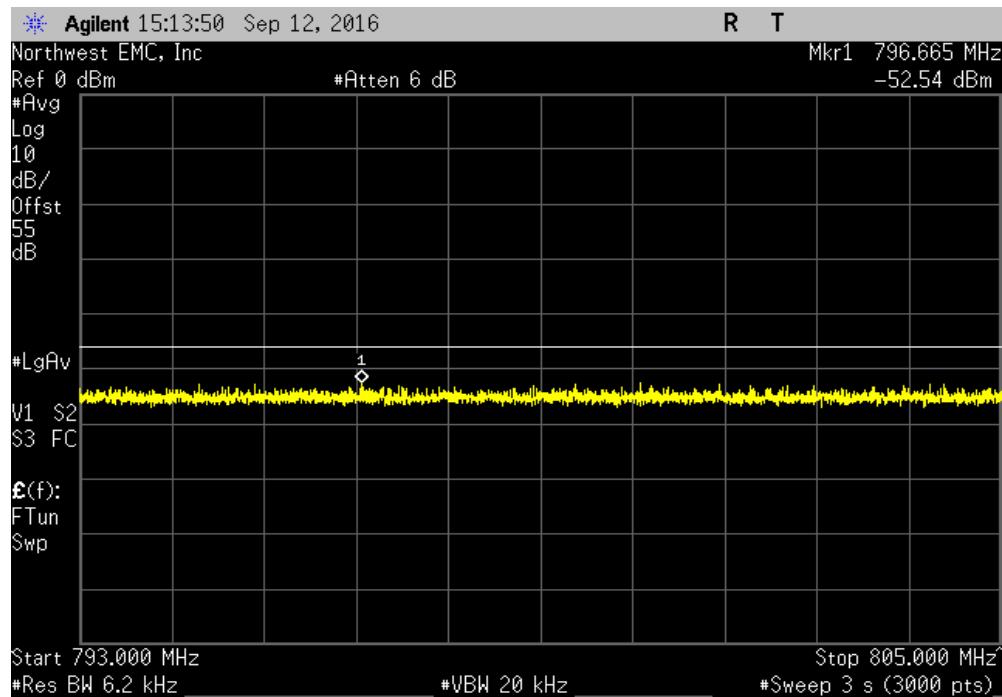


SISO, Antenna Port 2, High Channel LTE5, 753.5 MHz			
Frequency Range	Max Value (dBm)	Limit $\leq$ (dBm)	Result
775 MHz - 793 MHz	-52.08	-46	Pass

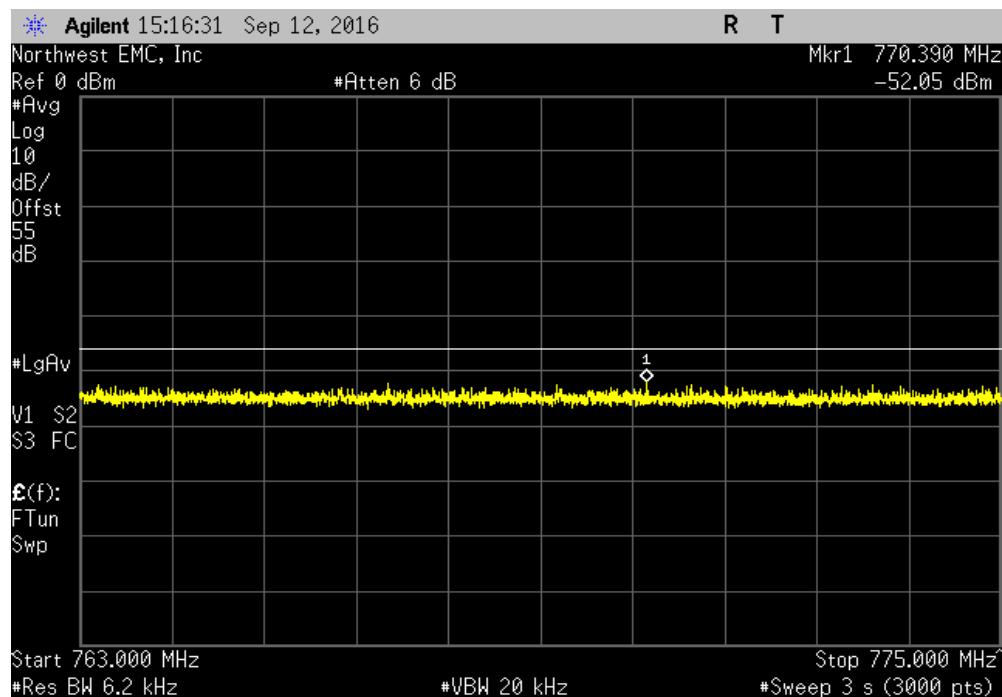


# BAND EDGE COMPLIANCE

SISO, Antenna Port 2, High Channel LTE5, 753.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
793 MHz - 805 MHz	-52.54	-46	Pass	



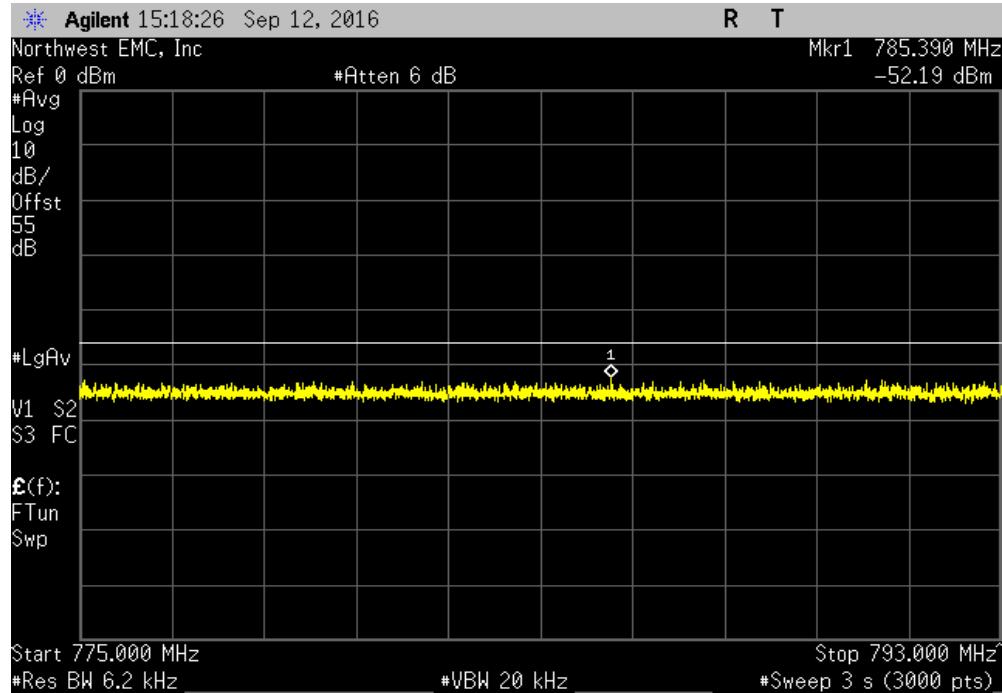
SISO, Antenna Port 2, Single Channel LTE10, 751 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
763 MHz - 775 MHz	-52.05	-46	Pass	



# BAND EDGE COMPLIANCE

SISO, Antenna Port 2, Single Channel LTE10, 751 MHz

Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
775 MHz - 793 MHz	-52.20	-46	Pass



SISO, Antenna Port 2, Single Channel LTE10, 751 MHz

Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
793 MHz - 805 MHz	-52.37	-46	Pass

