

# NORTHWEST EMC

## Parallel Wireless Inc.

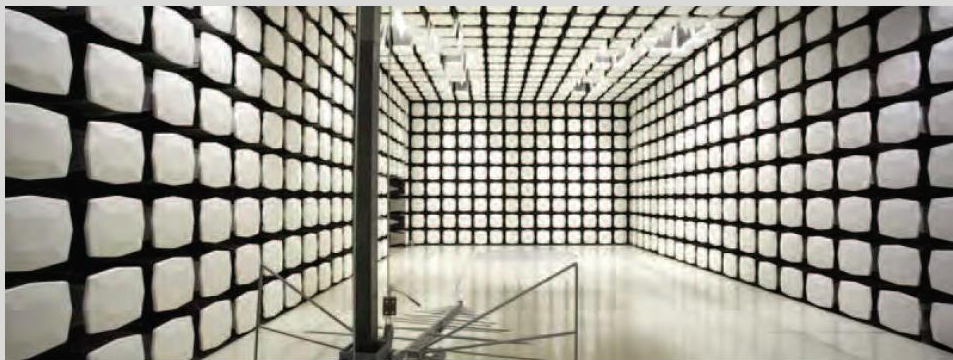
CWS-3050-12

FCC 27:2016

FCC 27.53:2016

Converged Wireless System Base Station

Report # KMWC0074



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.

# CERTIFICATE OF TEST

Last Date of Test: November 08, 2016  
Parallel Wireless Inc.  
Model: CWS-3050-12

## Radio Equipment Testing

### Standards

Specification	Method
FCC 27:2016	ANSI/TIA/EIA-603-D-2010
FCC 27.53:2016	

### 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 Bands 12 and 17	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	Yes	Pass	

### 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

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## United States

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**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

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## Canada

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**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.

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## European Union

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**European Commission** – Validated by the European Commission as a Notified Body under the R&TTE Directive.

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## Taiwan

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**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.

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## 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

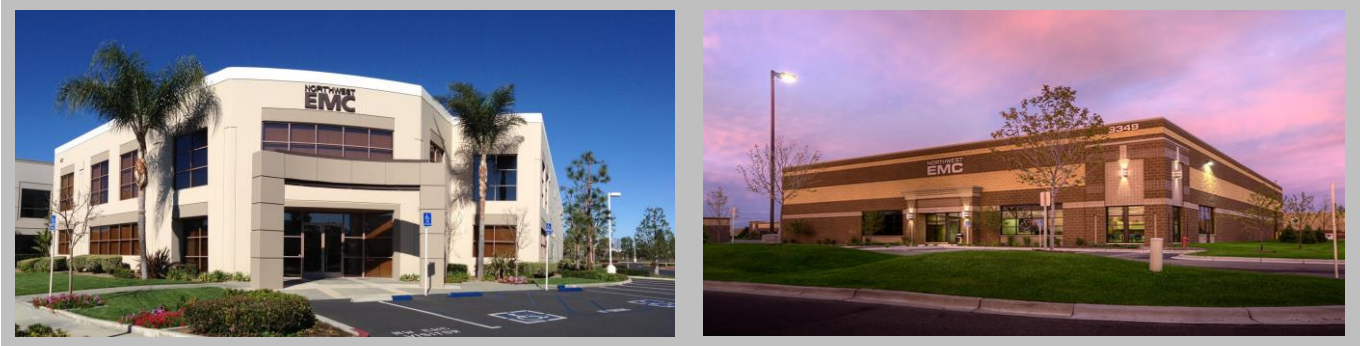
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement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

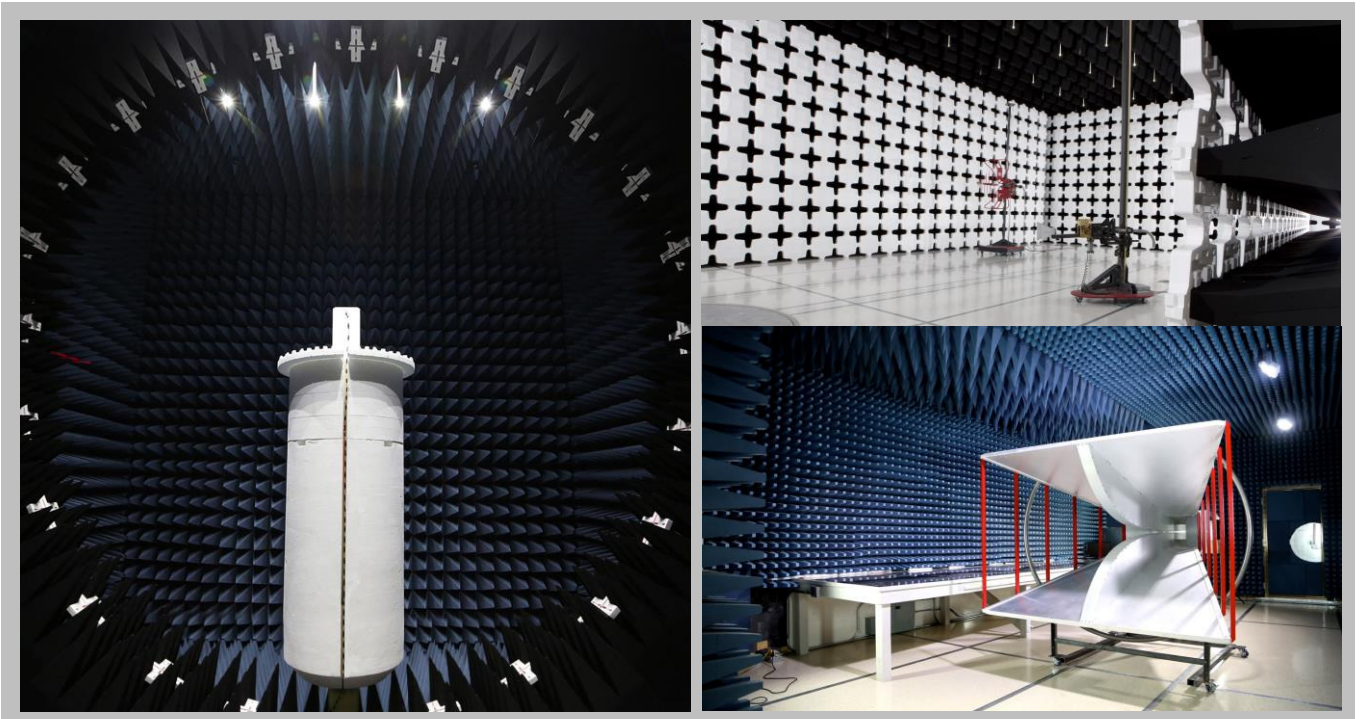
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

<b>Test</b>	<b>+ MU</b>	<b>- MU</b>
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



<b>California</b> Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>New York</b> Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	<b>Oregon</b> Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> 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/RRR, 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 of KMW Communications
<b>Model:</b>	CWS-3050-12
<b>First Date of Test:</b>	August 29, 2016
<b>Last Date of Test:</b>	November 08, 2016
<b>Receipt Date of Samples:</b>	August 29, 2016
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

## Information Provided by the Party Requesting the Test

### Functional Description of the EUT:

Tower based Converged Wireless System Base Station operating in LTE Band 12 and Band 17 with 5 MHz and 10 MHz channel bandwidths.

### Testing Objective:

To demonstrate compliance of the Cellular radio to FCC Part 27 requirements.

# CONFIGURATIONS

## Configuration KMWC0074- 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-3050-12	K163300001

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	5m	No	CWS-3050-12 Tower	DC Mains
RF Output Cable x2	Yes	5m	No	CWS-3050-12 Tower	High Power Terminator
Ethernet Cable	No	2.5m	No	CWS-3050-12 Tower	Laptop
AC Cable	No	1.5m	No	AC Mains	Laptop Power Supply
DC Cable	No	2.0m	Yes	Laptop	Laptop Power Supply

## Configuration KMWC0074- 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-3050-12	K163300001

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	5m	No	CWS-3050-12 Tower	DC Mains
Ethernet Cable	No	2.5m	No	CWS-3050-12 Tower	Unterminated
AISG Cable	Yes	3m	No	CWS-3050-12 Tower	Unterminated
AISG (ALM) Cable	Yes	6.1m	No	CWS-3050-12 Tower	Unterminated
RF Output Cable x2	Yes	5m	No	CWS-3050-12 Tower	High Power Terminator
Optical Cable	No	10m	No	CWS-3050-12 Tower	Unterminated
Ground Braid	No	2m	No	CWS-3050-12 Tower	Ground



# CONFIGURATIONS

## Configuration KMWC0077- 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-3050-12	K163300001

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	5m	No	CWS-3050-12 Tower	DC Mains
RF Output Cable x2	Yes	5m	No	CWS-3050-12 Tower	High Power Terminator
Ethernet Cable	No	2.5m	No	CWS-3050-12 Tower	Laptop
AC Cable	No	1.5m	No	AC Mains	Laptop Power Supply
DC Cable	No	2.0m	Yes	Laptop	Laptop Power Supply

## Configuration KMWC0077- 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-3050-12	K163300001

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	5m	No	CWS-3050-12 Tower	DC Mains
Ethernet Cable	No	2.5m	No	CWS-3050-12 Tower	Unterminated
AISG Cable	Yes	3m	No	CWS-3050-12 Tower	Unterminated
AISG (ALM) Cable	Yes	6.1m	No	CWS-3050-12 Tower	Unterminated
RF Output Cable x2	Yes	5m	No	CWS-3050-12 Tower	High Power Terminator
Optical Cable	No	10m	No	CWS-3050-12 Tower	Unterminated
Ground Braid	No	2m	No	CWS-3050-12 Tower	Ground

# MODIFICATIONS

## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	8/29/2016	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.
2	8/29/2016	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	8/29/2016	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.
4	8/29/2016	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	8/29/2016	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.
6	8/31/2016	Out of Band Emissions - LTE Band 12	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	9/12/2016	Intermodulation	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.
8	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.
9	11/8/2016	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.
10	11/8/2016	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.
11	11/8/2016	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.
12	11/8/2016	Out of Band Emissions – LTE Band 17	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.
13	11/8/2016	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.
14	11/8/2016	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.
15	11/8/2016	Intermodulation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

# CONDUCTED OUTPUT POWER - BAND 12

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 - BAND 12

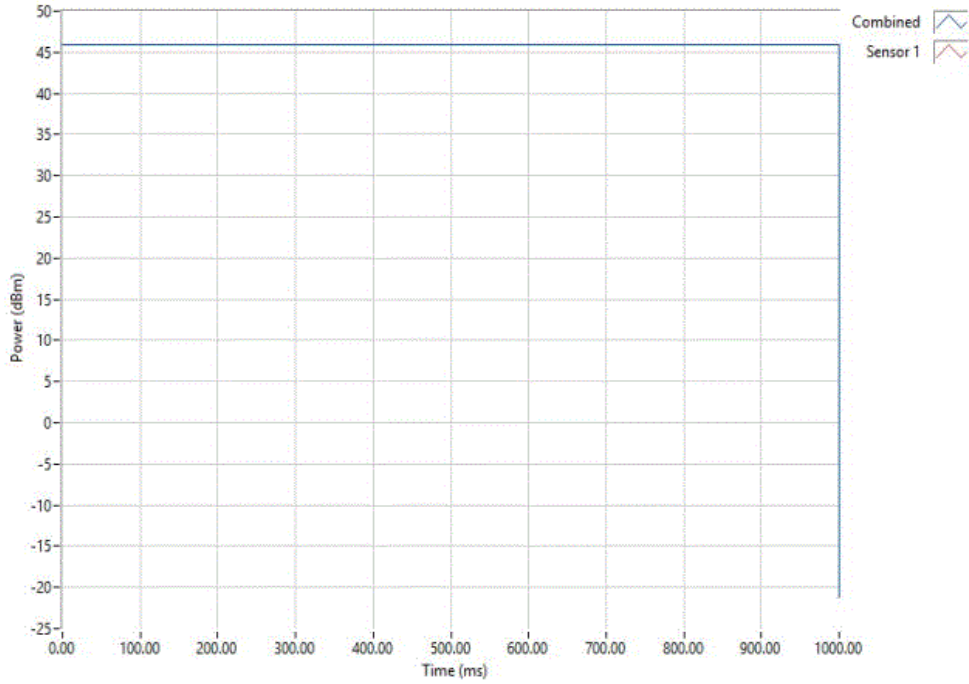


XMIT 2016.05.06

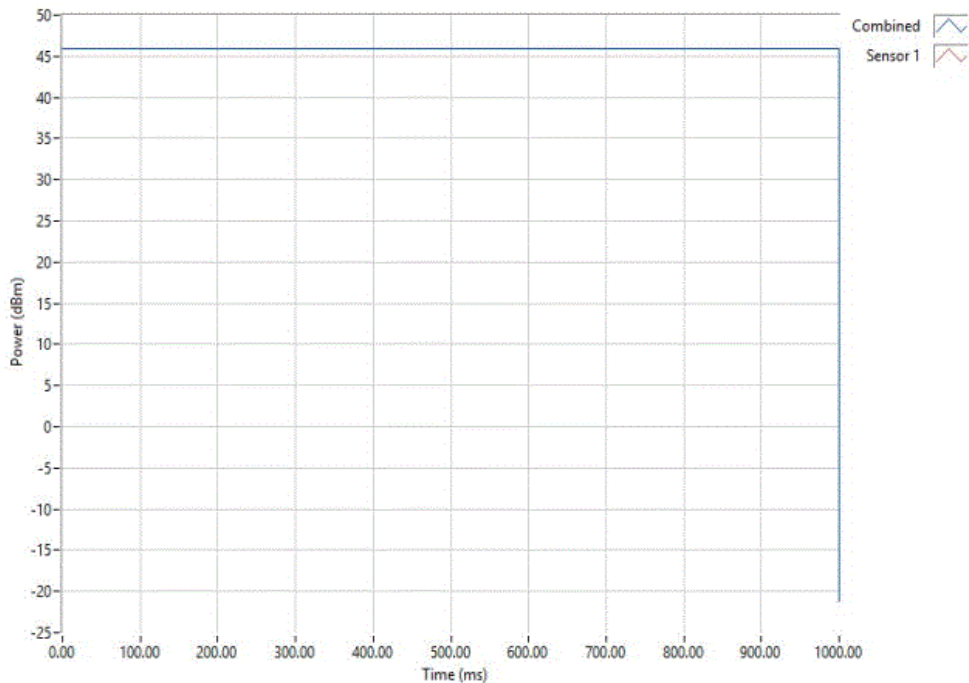
EUT: CWS-3050-12		Work Order: KMWC0074					
Serial Number: K163300001		Date: 08/29/16					
Customer: Parallel Wireless Inc.		Temperature: 21.4 °C					
Attendees: Andy Ku		Humidity: 46.4% RH					
Project: None		Barometric Pres.: 1017 mbar					
Tested by: Johnny Candelas		Power: 48 VDC					
Job Site: OC13							
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 = 54.8dB 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
Antenna Port 1							
	Low Channel LTE5, 731.5 MHz	45.9	100	0	45.9	60	Pass
	Mid Channel LTE5, 737.5 MHz	45.98	100	0	46.0	60	Pass
	High Channel LTE5, 743.5 MHz	45.9	100	0	45.9	60	Pass
	Low Channel LTE10, 734 MHz	45.97	100	0	46.0	60	Pass
	Mid Channel LTE10, 737.5 MHz	45.98	100	0	46.0	60	Pass
	High Channel LTE10, 741 MHz	46	100	0	46.0	60	Pass
Antenna Port 2							
	Low Channel LTE5, 731.5 MHz	45.99	100	0	46.0	60	Pass
	Mid Channel LTE5, 737.5 MHz	45.95	100	0	46.0	60	Pass
	High Channel LTE5, 743.5 MHz	45.96	100	0	46.0	60	Pass
	Low Channel LTE10, 734 MHz	46	100	0	46.0	60	Pass
	Mid Channel LTE10, 737.5 MHz	45.98	100	0	46.0	60	Pass
	High Channel LTE10, 741 MHz	46	100	0	46.0	60	Pass
Antenna Port 1 MIMO							
	Low Channel LTE5, 731.5 MHz	45.99	100	0	46.0	60	Pass
	Mid Channel LTE5, 737.5 MHz	45.98	100	0	46.0	60	Pass
	High Channel LTE5, 743.5 MHz	45.98	100	0	46.0	60	Pass
	Low Channel LTE10, 734 MHz	45.98	100	0	46.0	60	Pass
	Mid Channel LTE10, 737.5 MHz	46	100	0	46.0	60	Pass
	High Channel LTE10, 741 MHz	45.99	100	0	46.0	60	Pass
Antenna Port 2 MIMO							
	Low Channel LTE5, 731.5 MHz	45.93	100	0	45.9	60	Pass
	Mid Channel LTE5, 737.5 MHz	45.97	100	0	46.0	60	Pass
	High Channel LTE5, 743.5 MHz	45.97	100	0	46.0	60	Pass
	Low Channel LTE10, 734 MHz	45.92	100	0	45.9	60	Pass
	Mid Channel LTE10, 737.5 MHz	45.97	100	0	46.0	60	Pass
	High Channel LTE10, 741 MHz	45.92	100	0	45.9	60	Pass
Linear Sum of the Power							
		Port 1 (mW)	Port 2 (mW)	Sum (mW)	Sum (dBm)		
	Low Channel LTE5, 731.5 MHz	39719.2	39174.2	78893.3	48.97	0	49.0
	Mid Channel LTE5, 737.5 MHz	39627.8	39536.7	79164.5	48.99	0	49.0
	High Channel LTE5, 743.5 MHz	39627.8	39536.7	79164.5	48.99	0	49.0
	Low Channel LTE10, 734 MHz	39627.8	39084.1	78711.9	48.96	0	49.0
	Mid Channel LTE10, 737.5 MHz	39810.7	39536.7	79347.4	49.00	0	49.0
	High Channel LTE10, 741 MHz	39719.2	39084.1	78803.2	48.97	0	49.0

# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 1, Low Channel LTE5, 731.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.9	100	0	45.9	60	Pass	

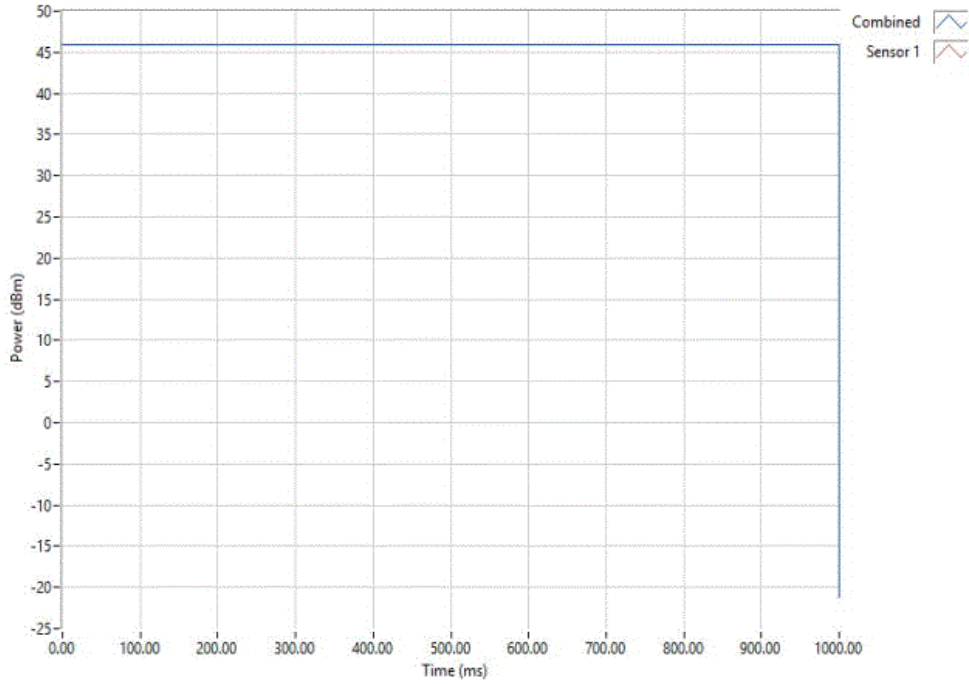


Antenna Port 1, Mid Channel LTE5, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

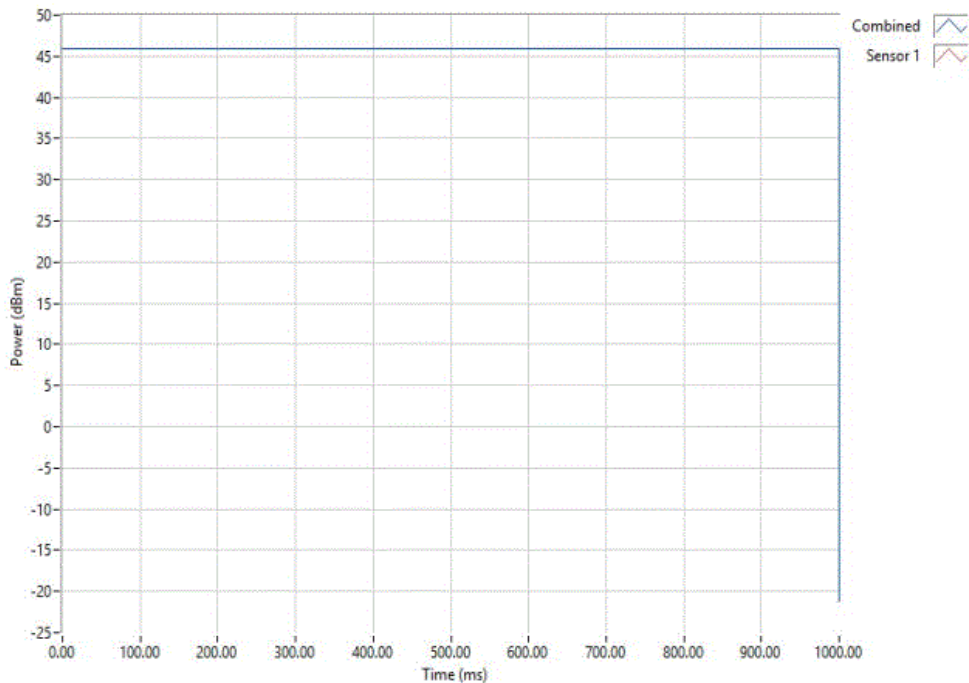


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 1, High Channel LTE5, 743.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.9	100	0	45.9	60	Pass	

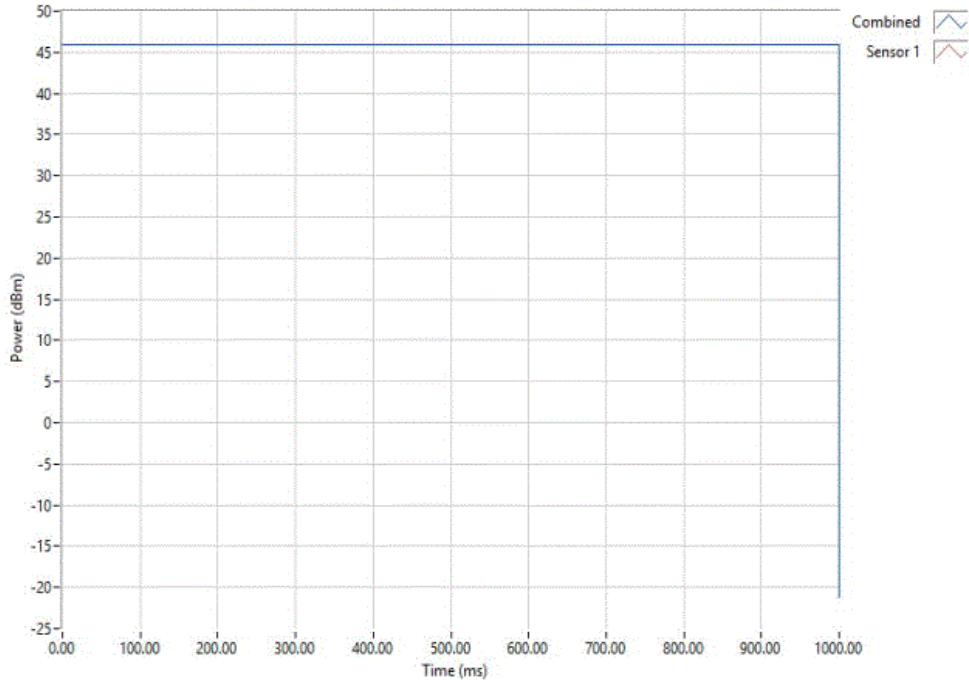


Antenna Port 1, Low Channel LTE10, 734 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	

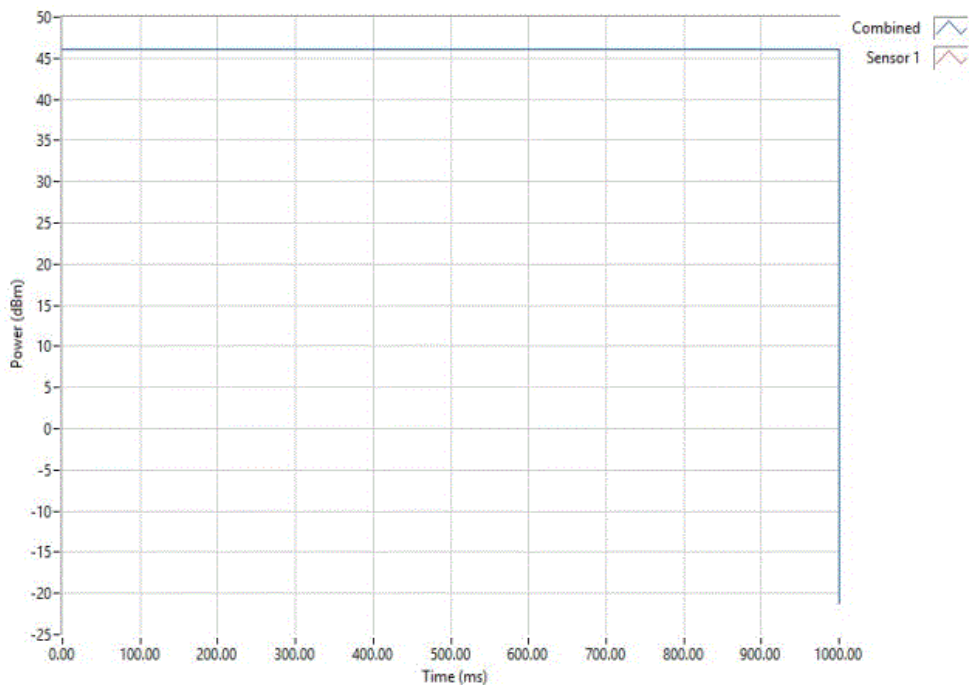


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 1, Mid Channel LTE10, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

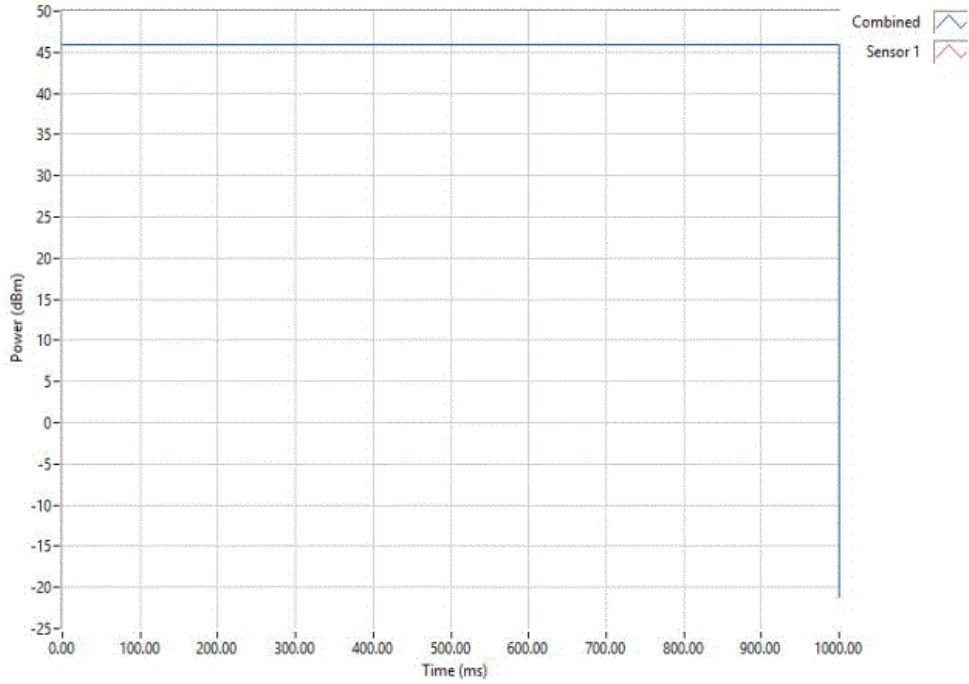


Antenna Port 1, High Channel LTE10, 741 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
46	100	0	46	60	Pass	

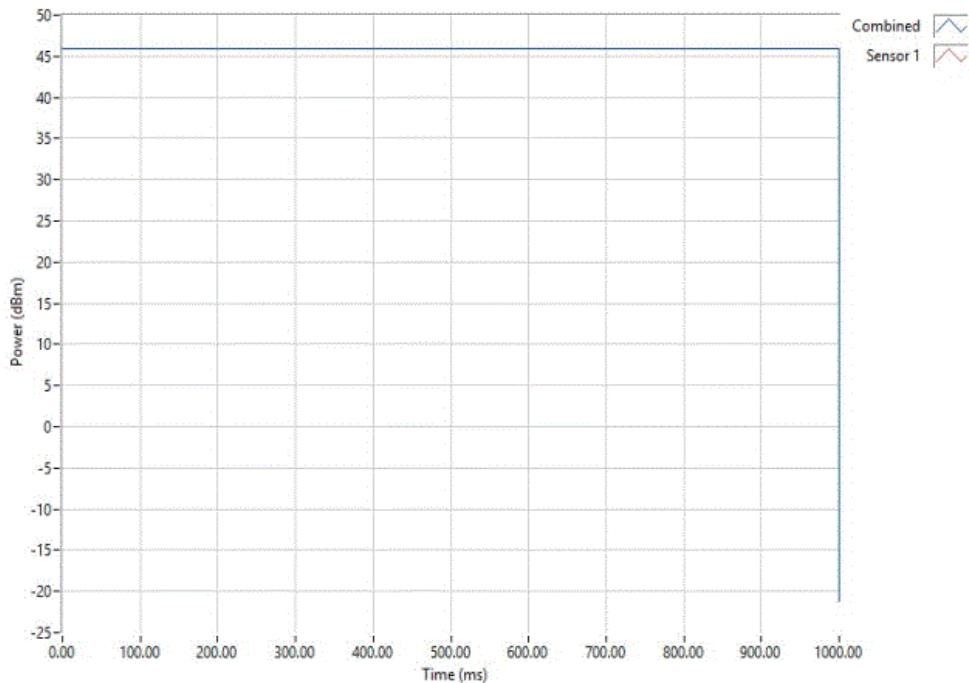


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 2, Low Channel LTE5, 731.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	



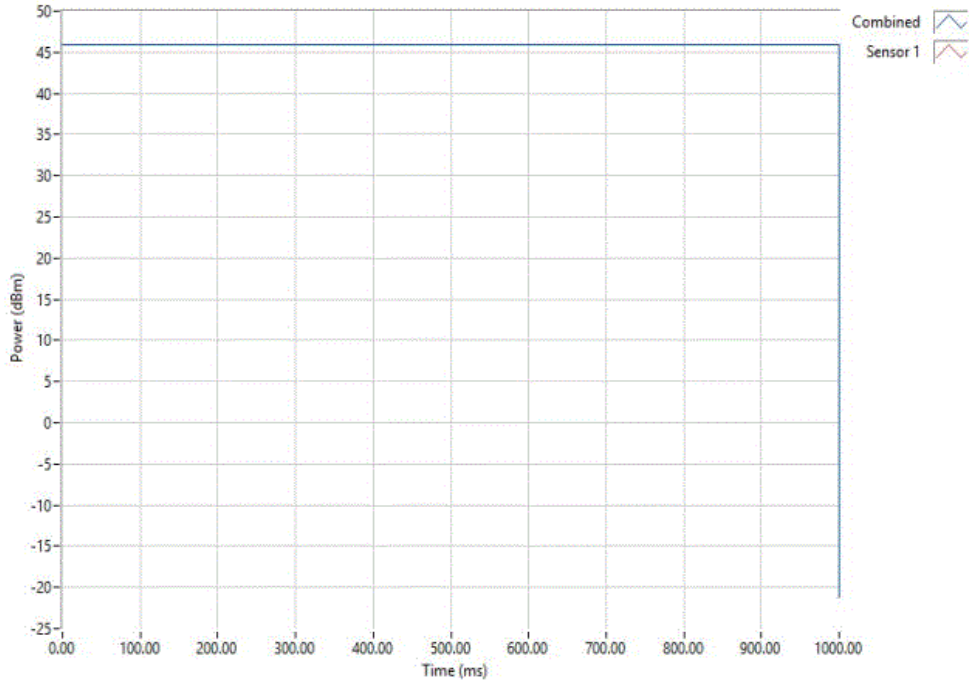
Antenna Port 2, Mid Channel LTE5, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.95	100	0	46	60	Pass	



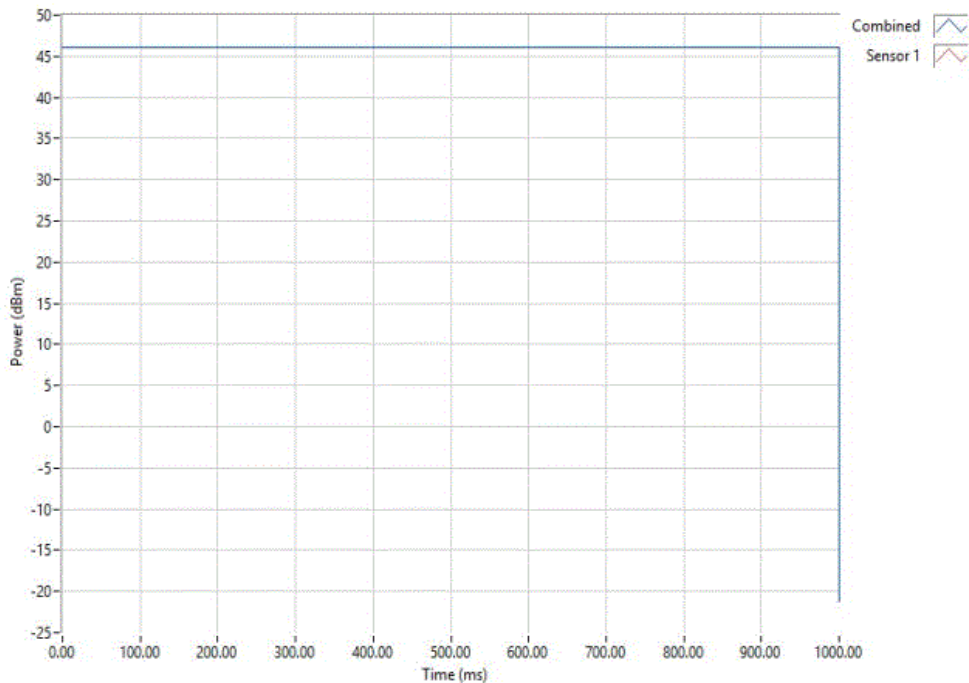


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 2, High Channel LTE5, 743.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.96	100	0	46	60	Pass	

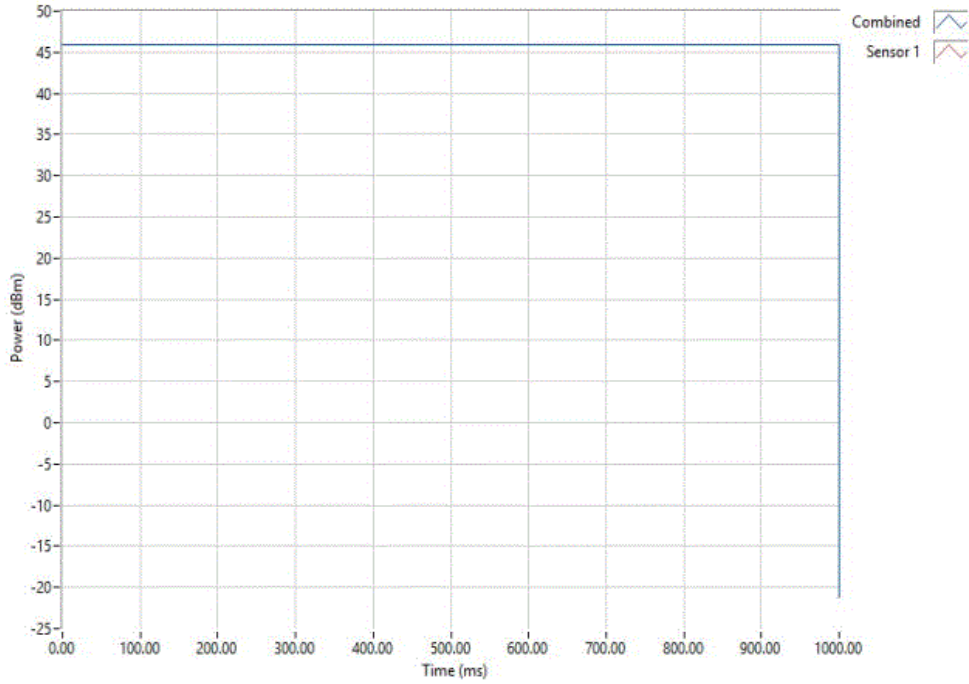


Antenna Port 2, Low Channel LTE10, 734 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
46	100	0	46	60	Pass	

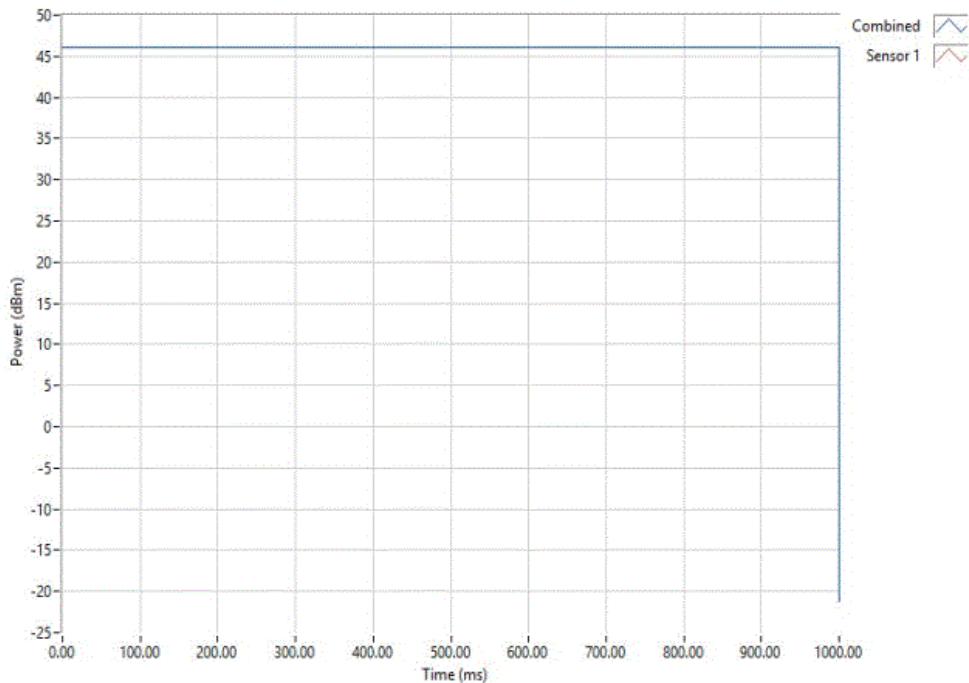


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 2, Mid Channel LTE10, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

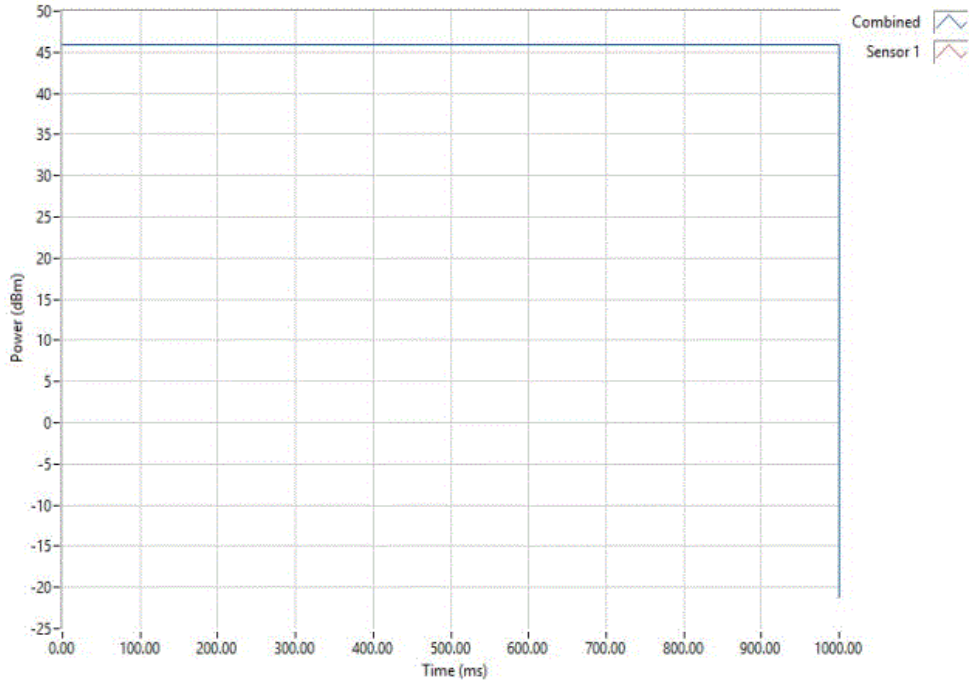


Antenna Port 2, High Channel LTE10, 741 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
46	100	0	46	60	Pass	

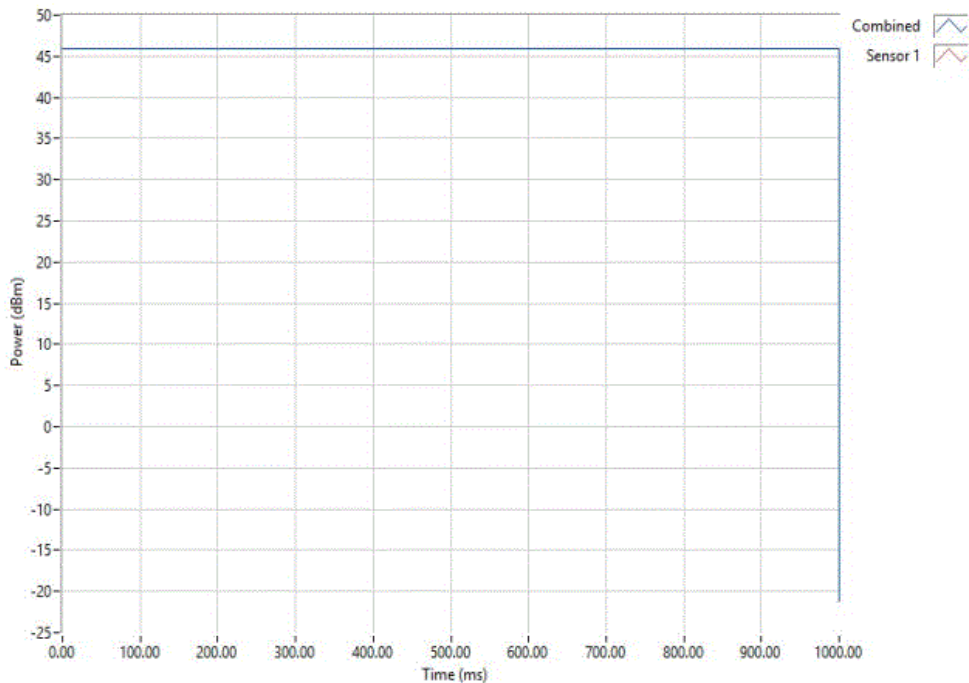


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 1 MIMO, Low Channel LTE5, 731.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	

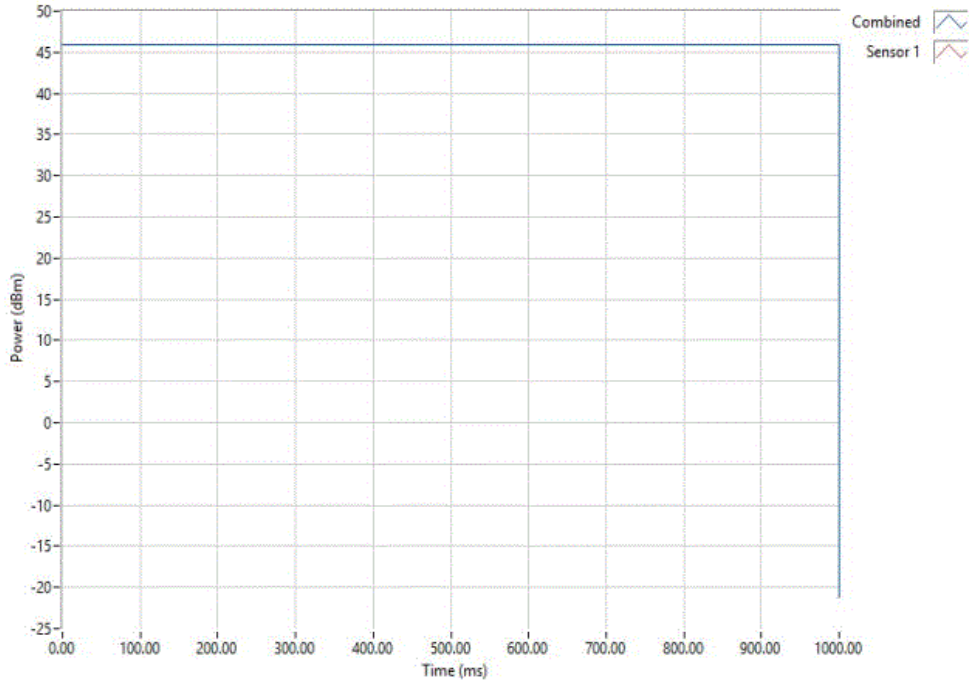


Antenna Port 1 MIMO, Mid Channel LTE5, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

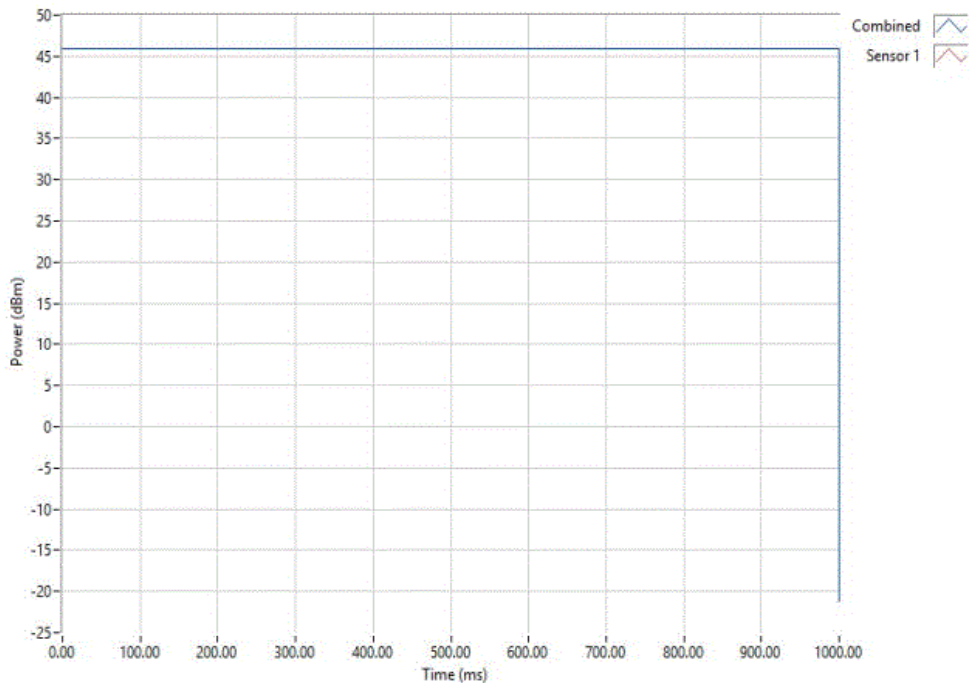


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 1 MIMO, High Channel LTE5, 743.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

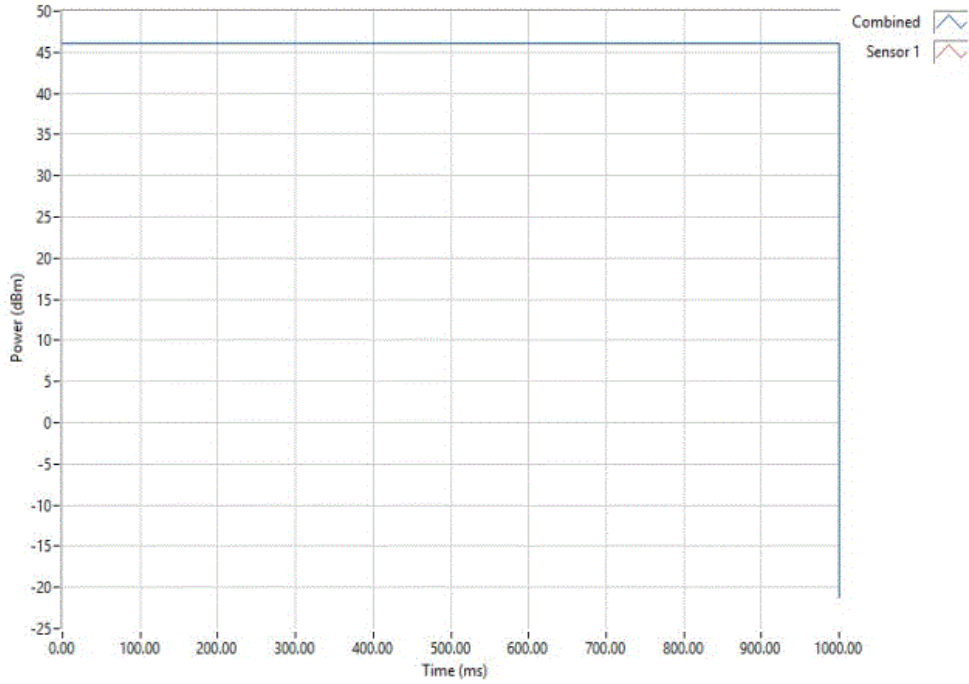


Antenna Port 1 MIMO, Low Channel LTE10, 734 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	

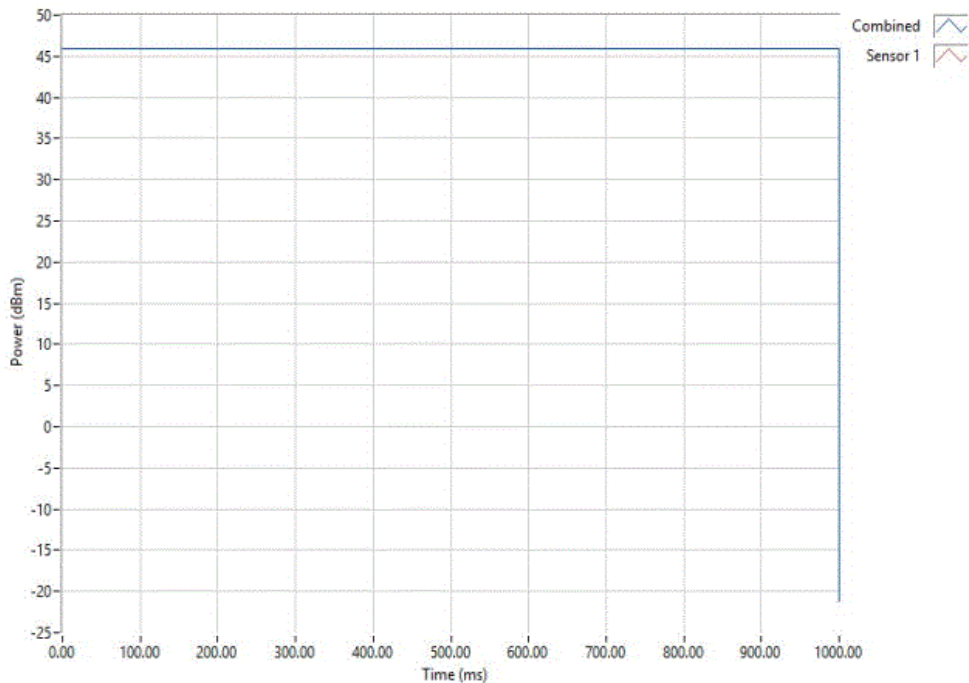


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 1 MIMO, Mid Channel LTE10, 737.5 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	46	100	0	46	60	Pass

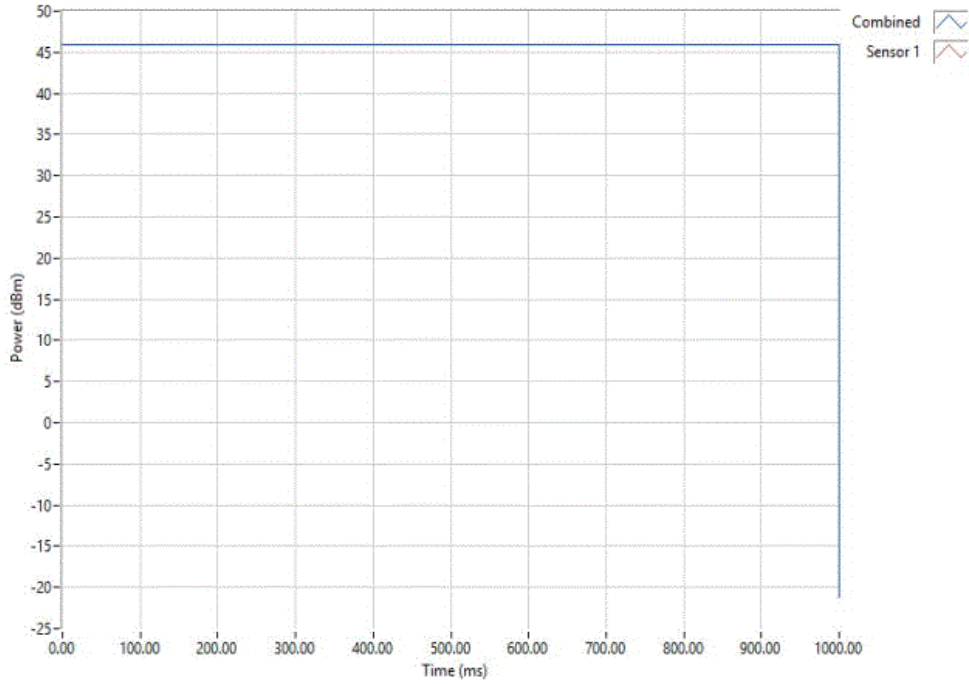


Antenna Port 1 MIMO, High Channel LTE10, 741 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
	45.99	100	0	46	60	Pass

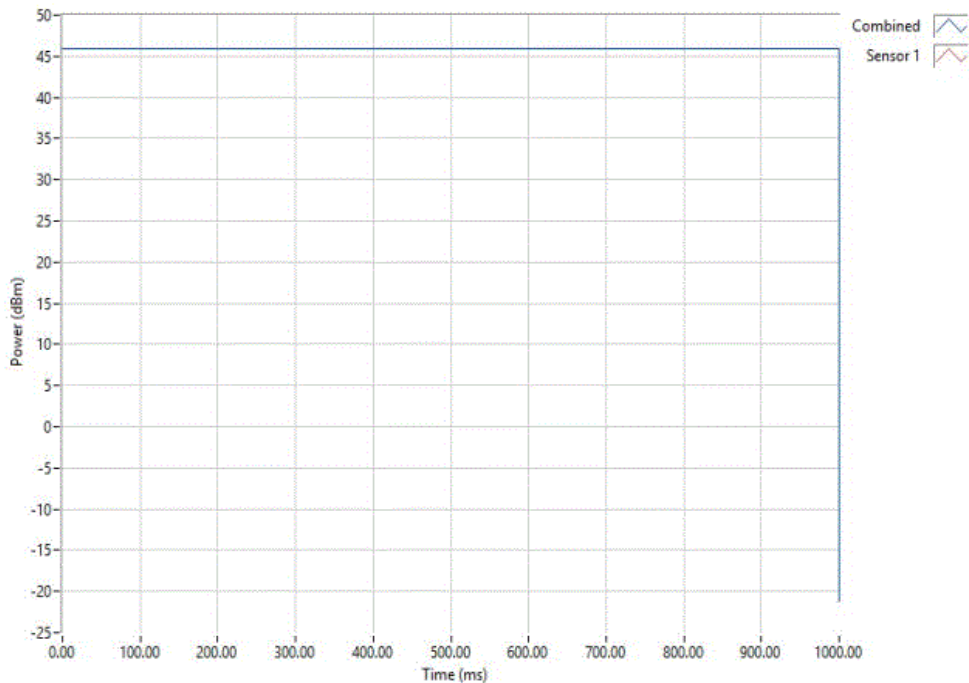


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 2 MIMO, Low Channel LTE5, 731.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.93	100	0	45.9	60	Pass	

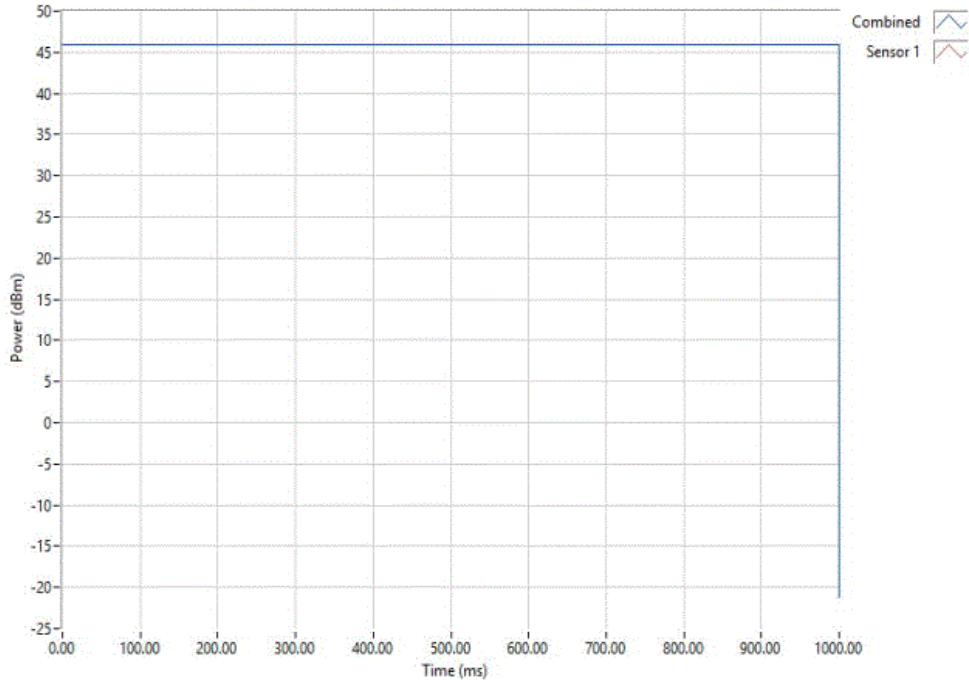


Antenna Port 2 MIMO, Mid Channel LTE5, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	

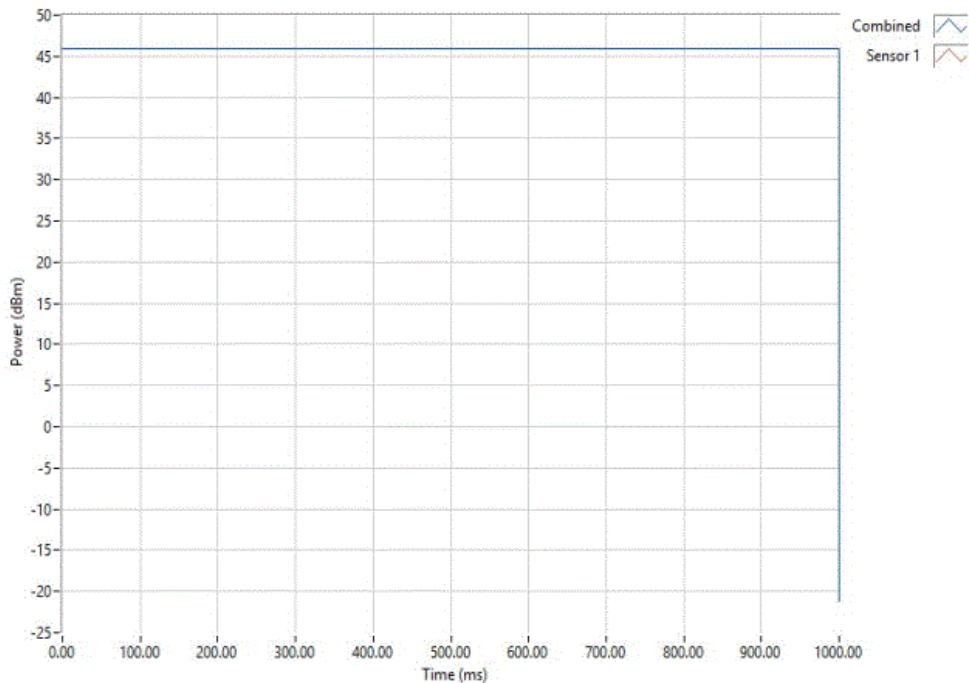


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 2 MIMO, High Channel LTE5, 743.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	

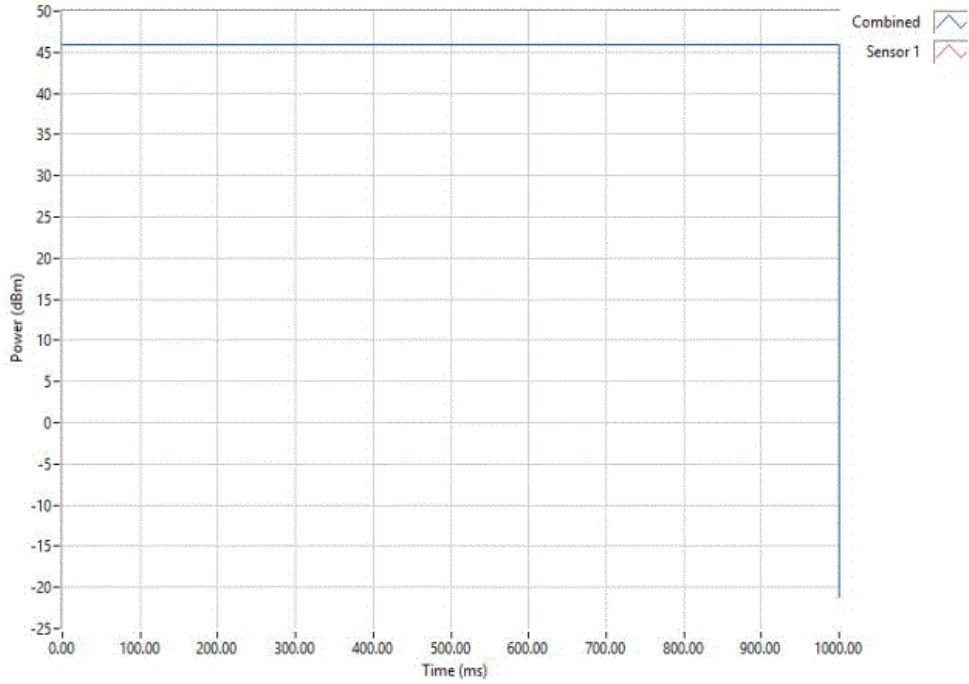


Antenna Port 2 MIMO, Low Channel LTE10, 734 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.92	100	0	45.9	60	Pass	

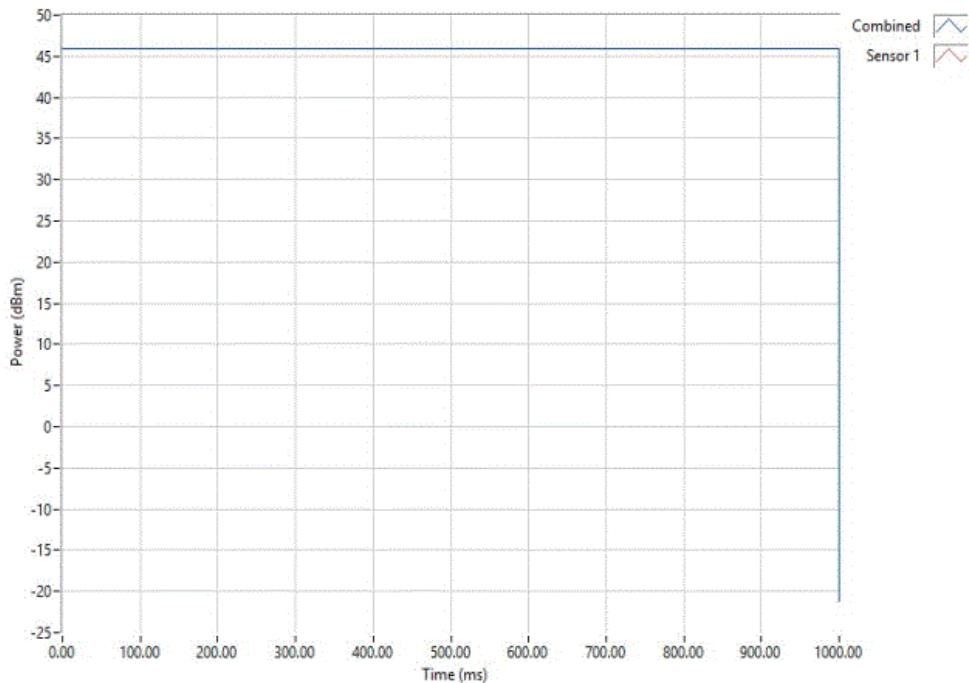


# CONDUCTED OUTPUT POWER - BAND 12

Antenna Port 2 MIMO, Mid Channel LTE10, 737.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	



Antenna Port 2 MIMO, High Channel LTE10, 741 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.92	100	0	45.9	60	Pass	





# CONDUCTED OUTPUT POWER - BAND 17

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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
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.

Only the Low Channel for each channel bandwidth was tested, the Mid & High Channels were previously tested in this band.

# CONDUCTED OUTPUT POWER - BAND 17

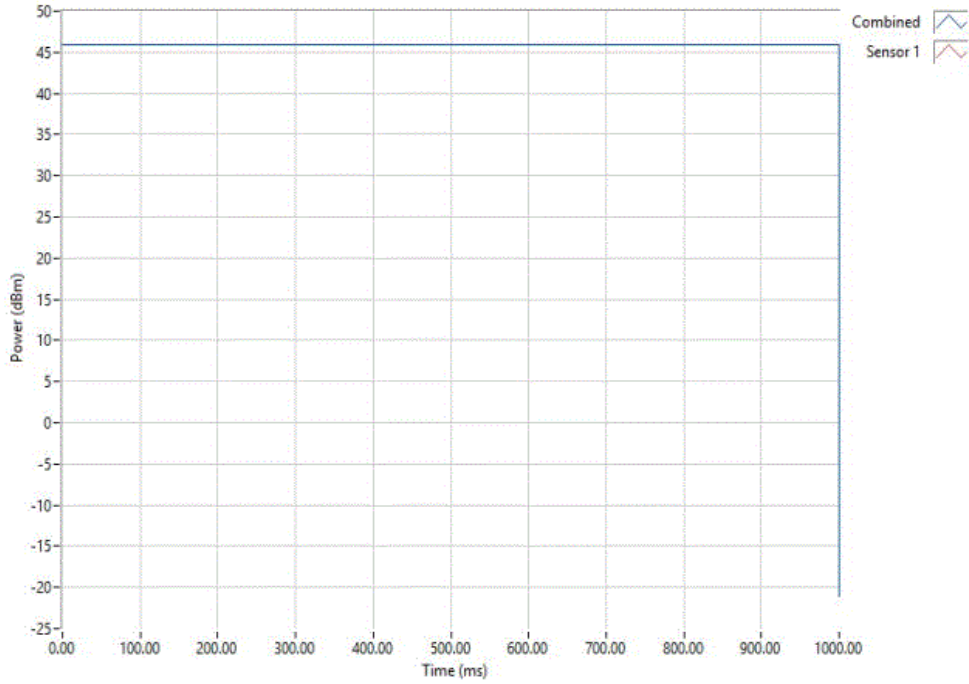


XMIT 2016.05.06

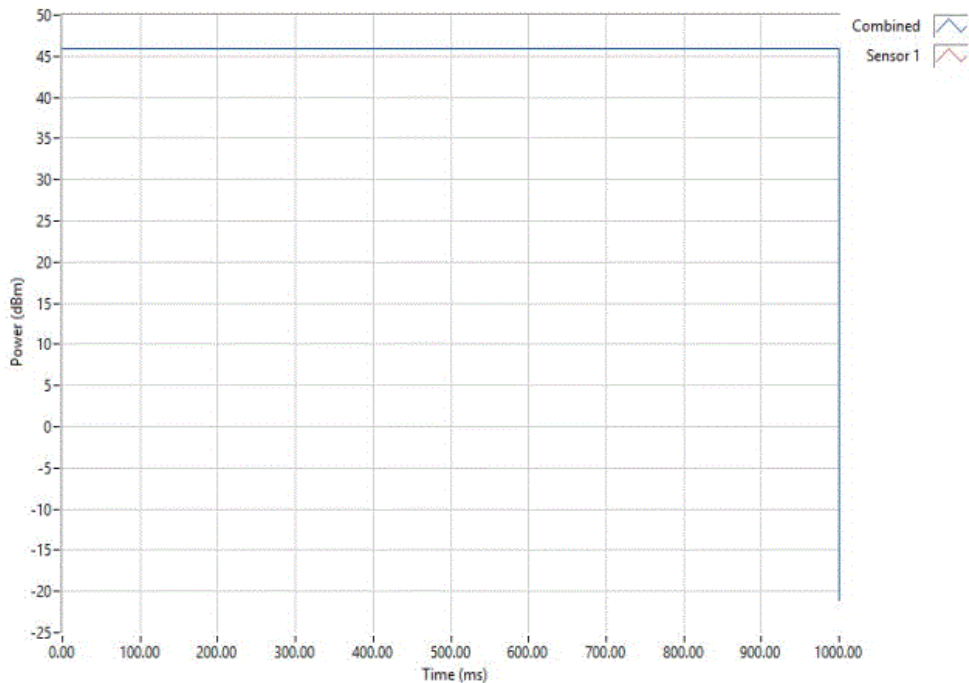
EUT: CWS-3050-12		Work Order: KMWC0077					
Serial Number: K163300001		Date: 11/08/16					
Customer: Parallel Wireless Inc.		Temperature: 20.8 °C					
Attendees: Edward Lee		Humidity: 49% RH					
Project: None		Barometric Pres.: 1018 mbar					
Tested by: Johnny Candelas		Power: 48 VDC					
Job Site: OC13							
<b>TEST SPECIFICATIONS</b>							
FCC 27:2016		Test Method					
		ANSI/TIA/EIA-603-D-2010					
<b>COMMENTS</b>							
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 54.9dB 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.							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
Configuration #	1	Signature 					
		Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results
<b>Antenna Port 1</b>							
	Low Channel LTE5, 736.5 MHz	45.97	100	0	46.0	60	Pass
	Low Channel LTE10, 739 MHz	45.99	100	0	46.0	60	Pass
<b>Antenna Port 2</b>							
	Low Channel LTE5, 736.5 MHz	46.00	100	0	46.0	60	Pass
	Low Channel LTE10, 739 MHz	46.00	100	0	46.0	60	Pass
<b>Antenna Port 1 MIMO</b>							
	Low Channel LTE5, 736.5 MHz	45.99	100	0	46.0	60	Pass
	Low Channel LTE10, 739 MHz	45.99	100	0	46.0	60	Pass
<b>Antenna Port 2 MIMO</b>							
	Low Channel LTE5, 736.5 MHz	45.98	100	0	46.0	60	Pass
	Low Channel LTE10, 739 MHz	46.00	100	0	46.0	60	Pass
<b>Linear Sum of the Power</b>							
		Port 1 (mW)	Port 2 (mW)	Sum (mW)	Sum (dBm)		
	Low Channel LTE5, 736.5 MHz	39719.155	39627.803	79346.958	49.00	0	Pass
	Low Channel LTE10, 739 MHz	39719.155	39810.717	79529.872	49.01	0	Pass

# CONDUCTED OUTPUT POWER - BAND 17

Antenna Port 1, Low Channel LTE5, 736.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.97	100	0	46	60	Pass	

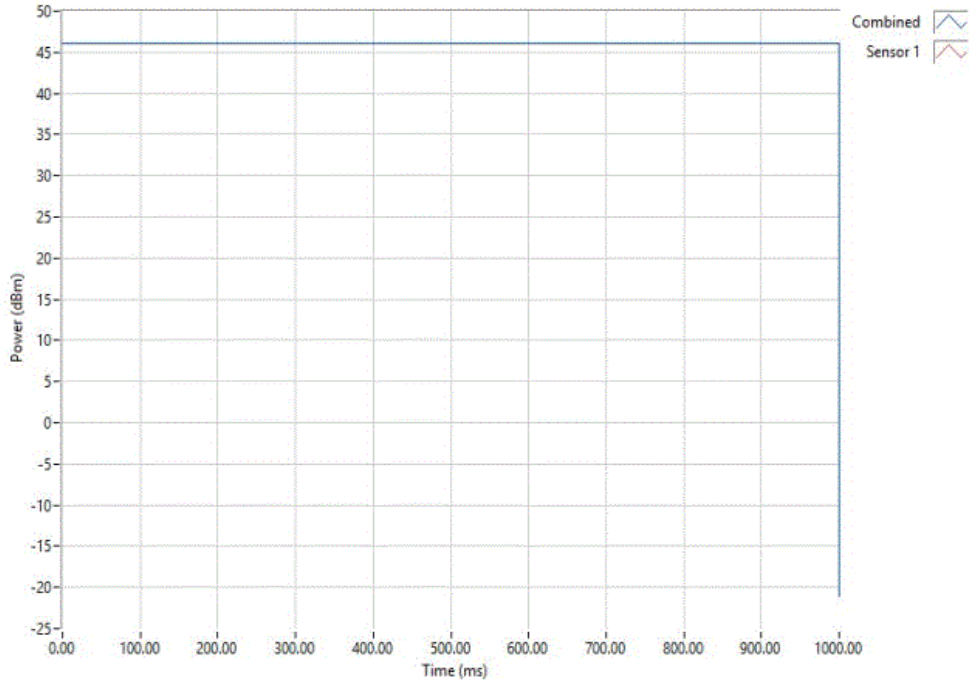


Antenna Port 1, Low Channel LTE10, 739 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	

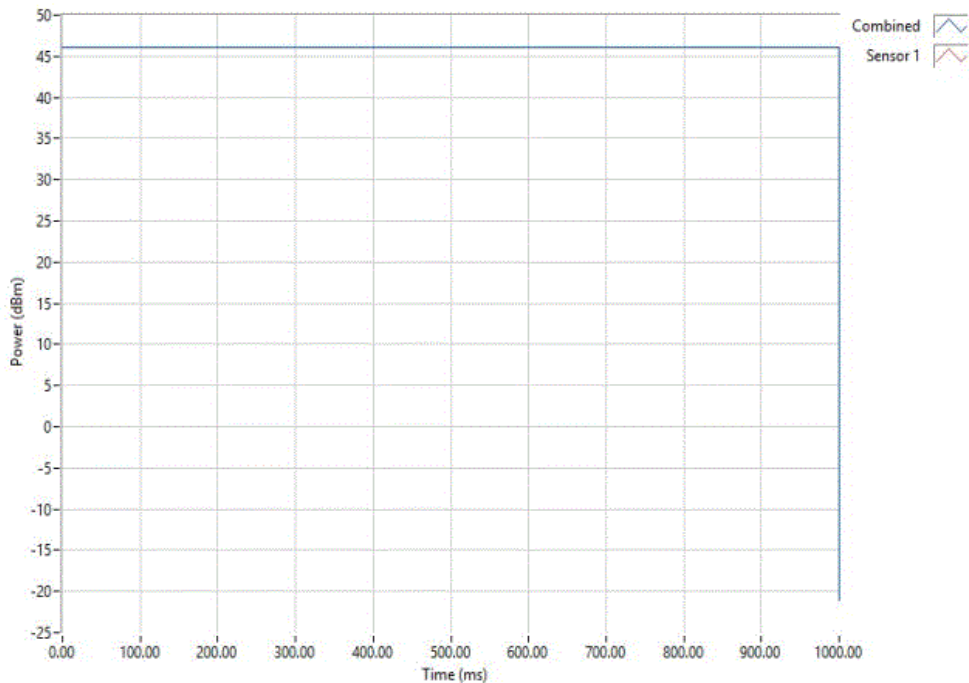


# CONDUCTED OUTPUT POWER - BAND 17

Antenna Port 2, Low Channel LTE5, 736.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
46	100	0	46	60	Pass	

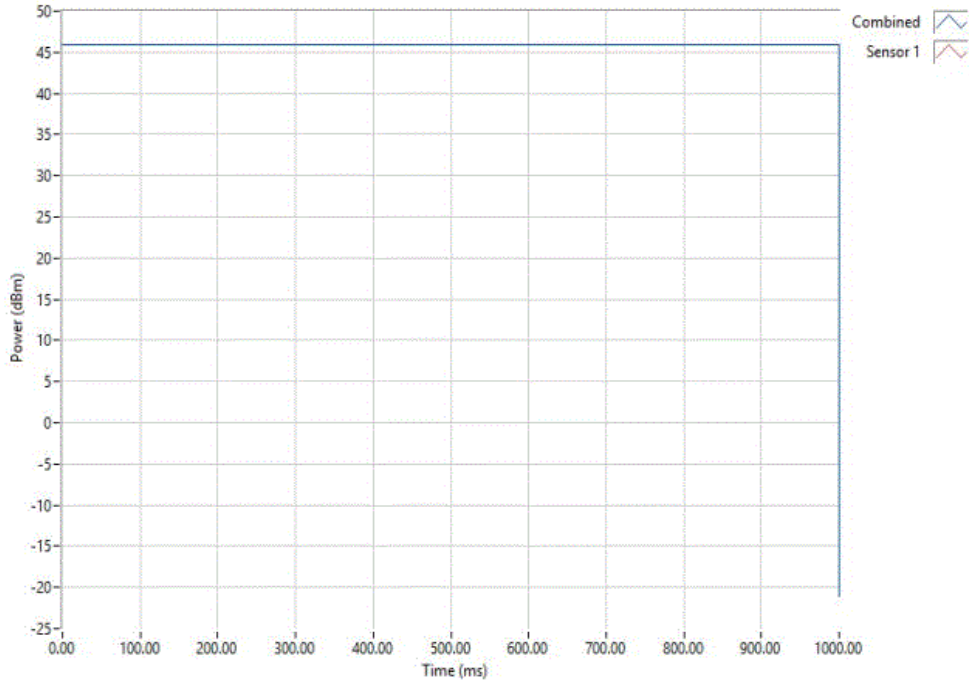


Antenna Port 2, Low Channel LTE10, 739 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
46	100	0	46	60	Pass	

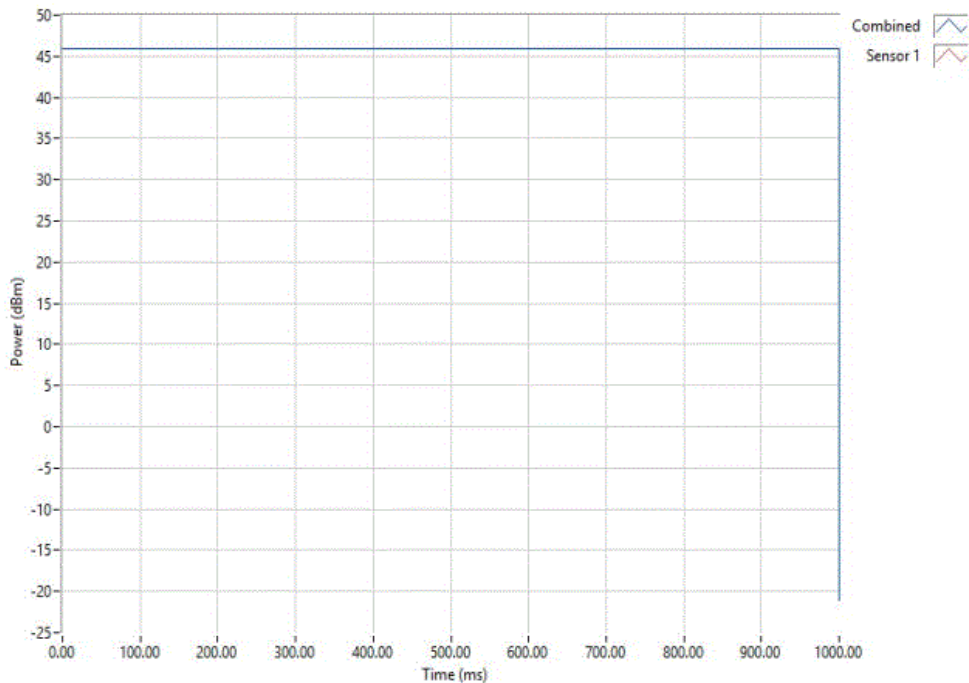


# CONDUCTED OUTPUT POWER - BAND 17

Antenna Port 1 MIMO, Low Channel LTE5, 736.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	

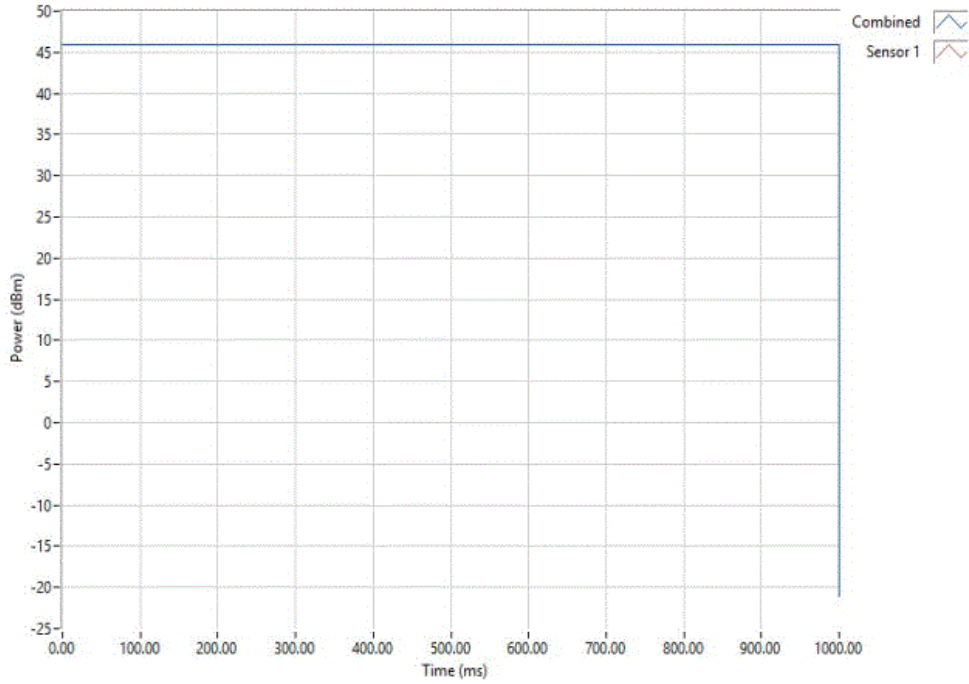


Antenna Port 1 MIMO, Low Channel LTE10, 739 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.99	100	0	46	60	Pass	

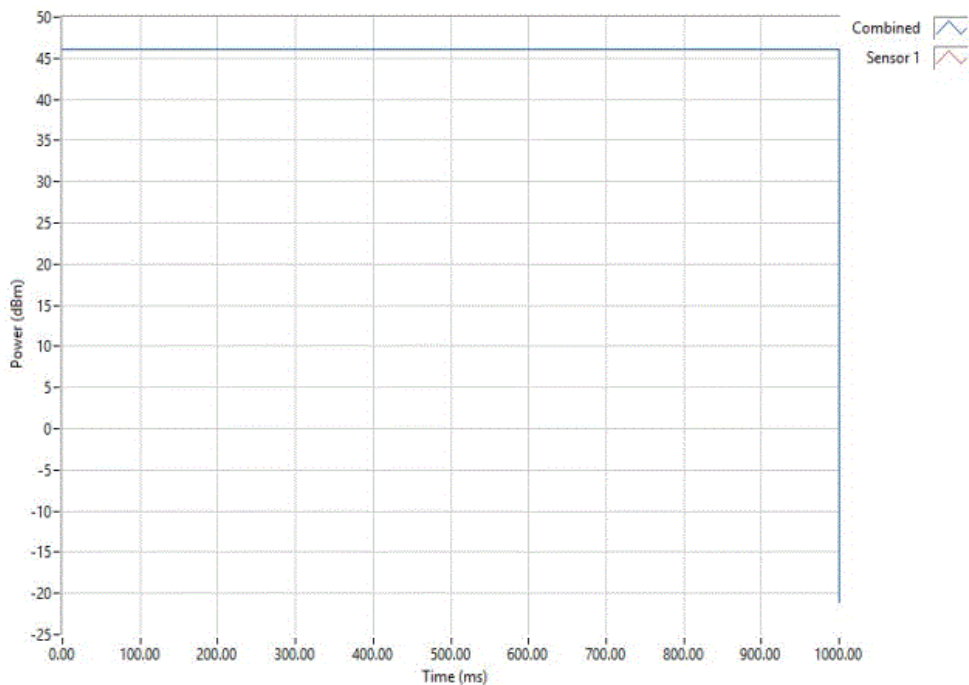


# CONDUCTED OUTPUT POWER - BAND 17

Antenna Port 2 MIMO, Low Channel LTE5, 736.5 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
45.98	100	0	46	60	Pass	



Antenna Port 2 MIMO, Low Channel LTE10, 739 MHz						
Avg Cond Pwr (dBm)	Duty Cycle (%)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Results	
46	100	0	46	60	Pass	



# PEAK TO AVERAGE RATIO - BAND 12

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 - BAND 12



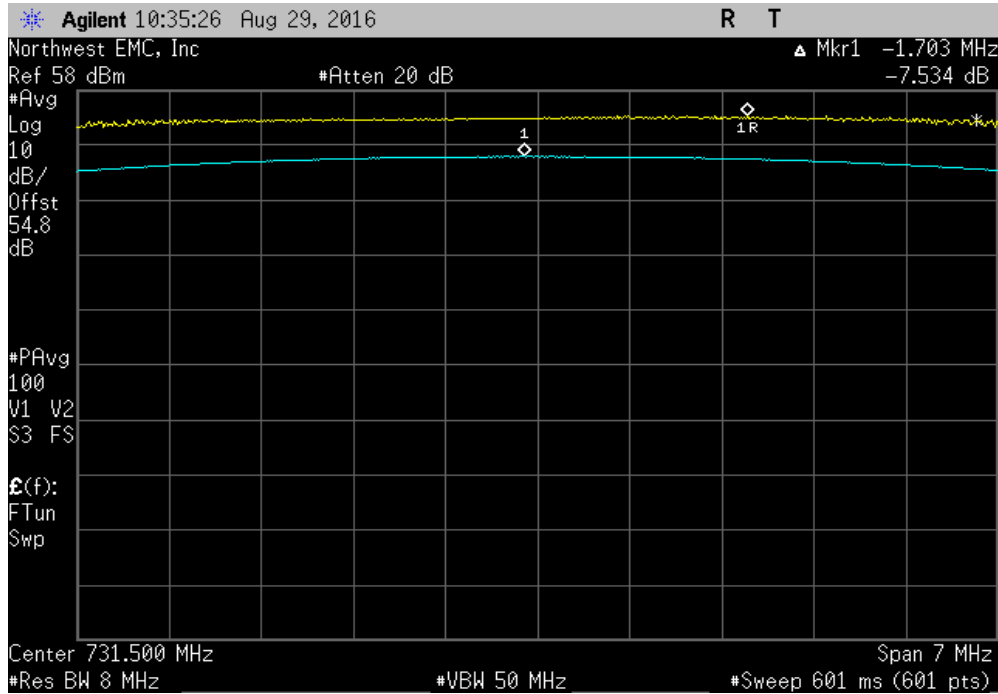
XMIT 2016.05.06

EUT: CWS-3050-12		Work Order: KMWC0074	
Serial Number: K163300001		Date: 08/29/16	
Customer: Parallel Wireless Inc.		Temperature: 21.4 °C	
Attendees: Andy Ku		Humidity: 46.4% RH	
Project: None		Barometric Pres.: 1017 mbar	
Tested by: Johnny Candelas		Power: 48 VDC	
		Job Site: OC13	
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 = 54.8dB total.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value (dB)	Limit < (dB) Results
Antenna Port 1			
	Low Channel LTE5, 731.5 MHz	7.534	13 Pass
	Mid Channel LTE5, 737.5 MHz	7.116	13 Pass
	High Channel LTE5, 743.5 MHz	7.341	13 Pass
	Low Channel LTE10, 734 MHz	9.562	13 Pass
	Mid Channel LTE10, 737.5 MHz	9.766	13 Pass
	High Channel LTE10, 741 MHz	9.945	13 Pass
Antenna Port 2			
	Low Channel LTE5, 731.5 MHz	7.490	13 Pass
	Mid Channel LTE5, 737.5 MHz	7.092	13 Pass
	High Channel LTE5, 743.5 MHz	7.348	13 Pass
	Low Channel LTE10, 734 MHz	9.912	13 Pass
	Mid Channel LTE10, 737.5 MHz	9.704	13 Pass
	High Channel LTE10, 741 MHz	10.351	13 Pass

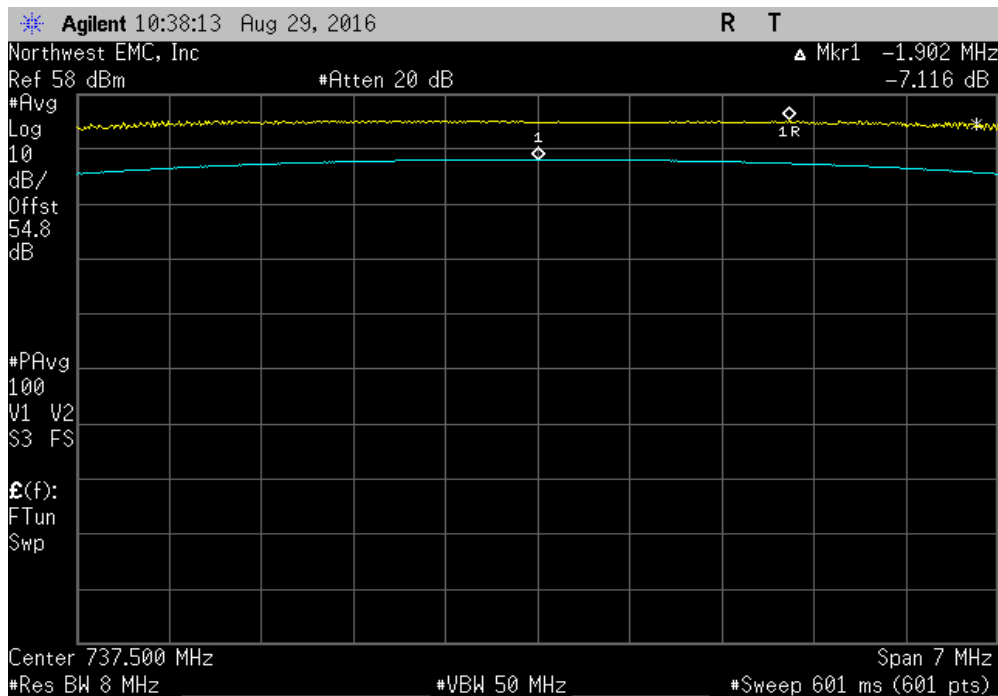


# PEAK TO AVERAGE RATIO - BAND 12

Antenna Port 1, Low Channel LTE5, 731.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.534	13	Pass

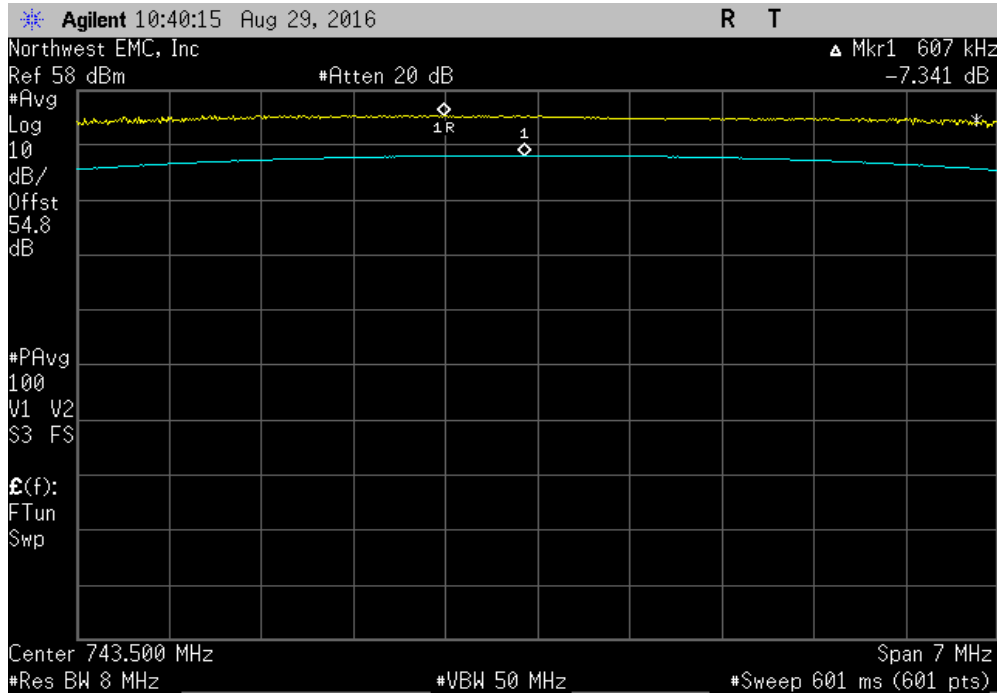


Antenna Port 1, Mid Channel LTE5, 737.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.116	13	Pass

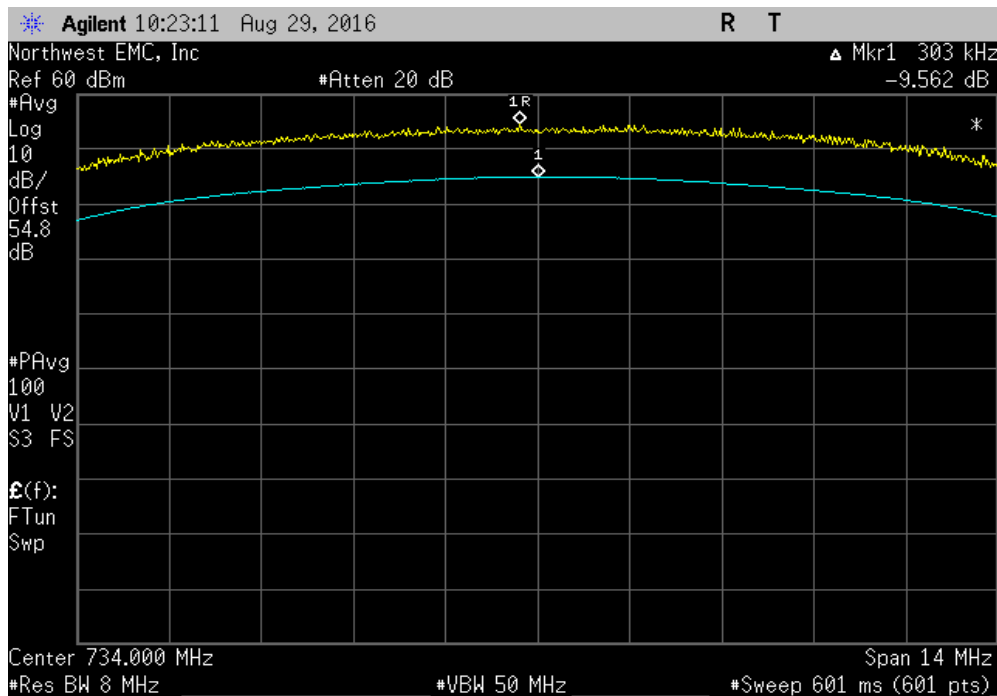


# PEAK TO AVERAGE RATIO - BAND 12

Antenna Port 1, High Channel LTE5, 743.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.341	13	Pass

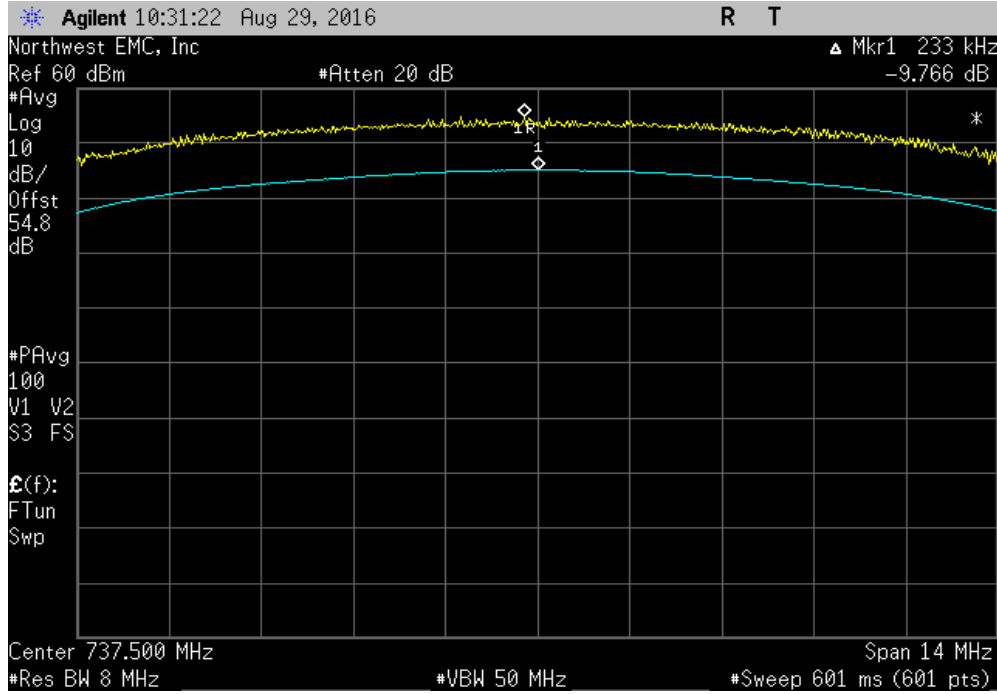


Antenna Port 1, Low Channel LTE10, 734 MHz			
	Value (dB)	Limit < (dB)	Results
	9.562	13	Pass

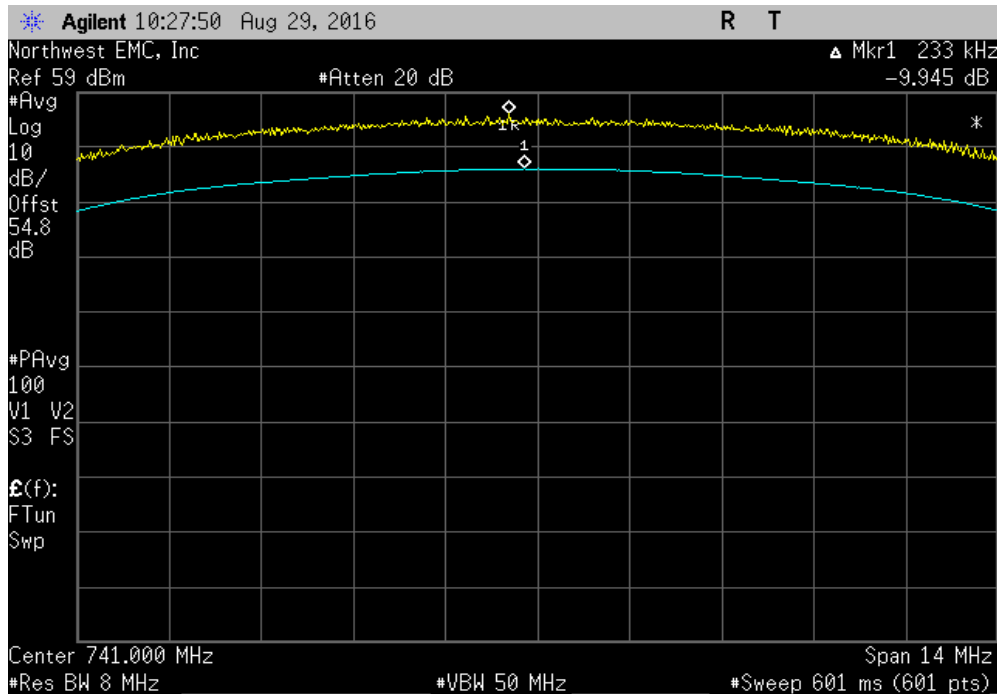


# PEAK TO AVERAGE RATIO - BAND 12

Antenna Port 1, Mid Channel LTE10, 737.5 MHz						
				Value (dB)	Limit < (dB)	Results
				9.766	13	Pass

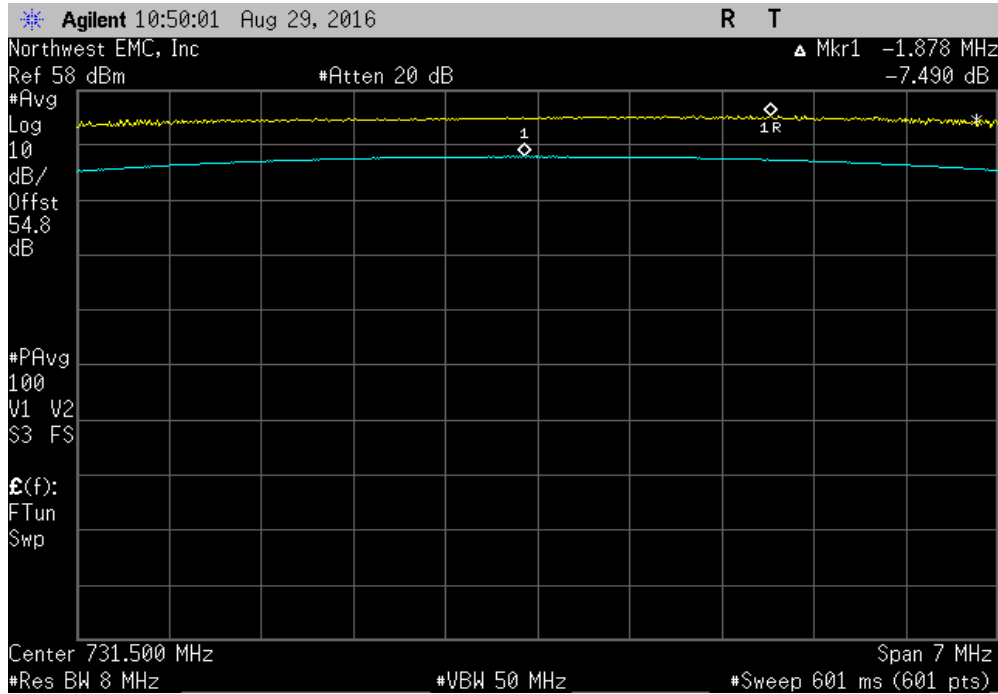


Antenna Port 1, High Channel LTE10, 741 MHz						
				Value (dB)	Limit < (dB)	Results
				9.945	13	Pass

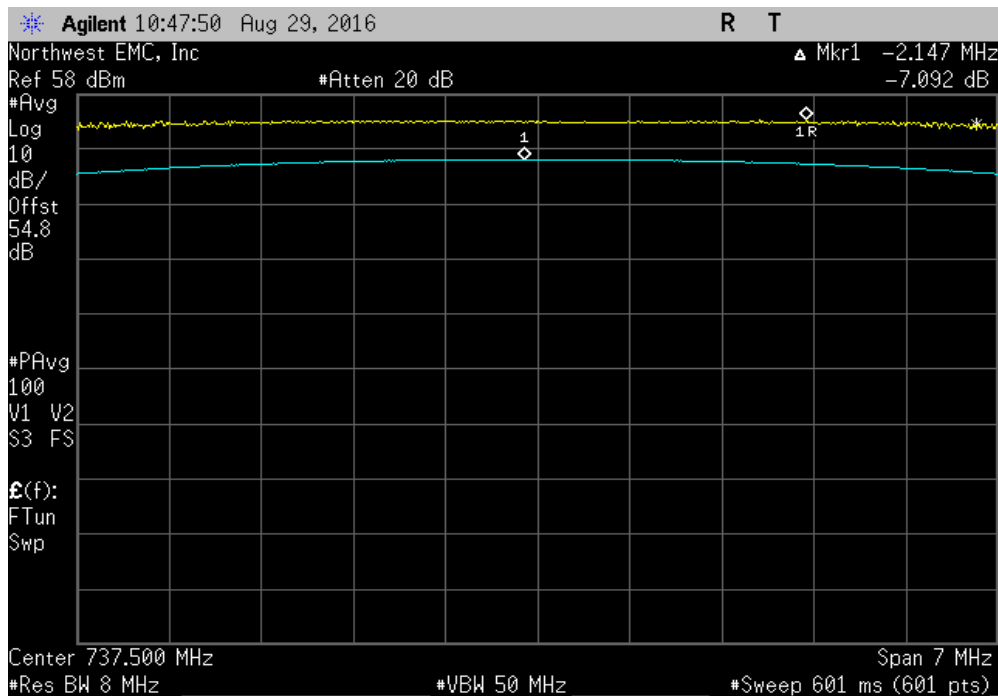


# PEAK TO AVERAGE RATIO - BAND 12

Antenna Port 2, Low Channel LTE5, 731.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.490	13	Pass

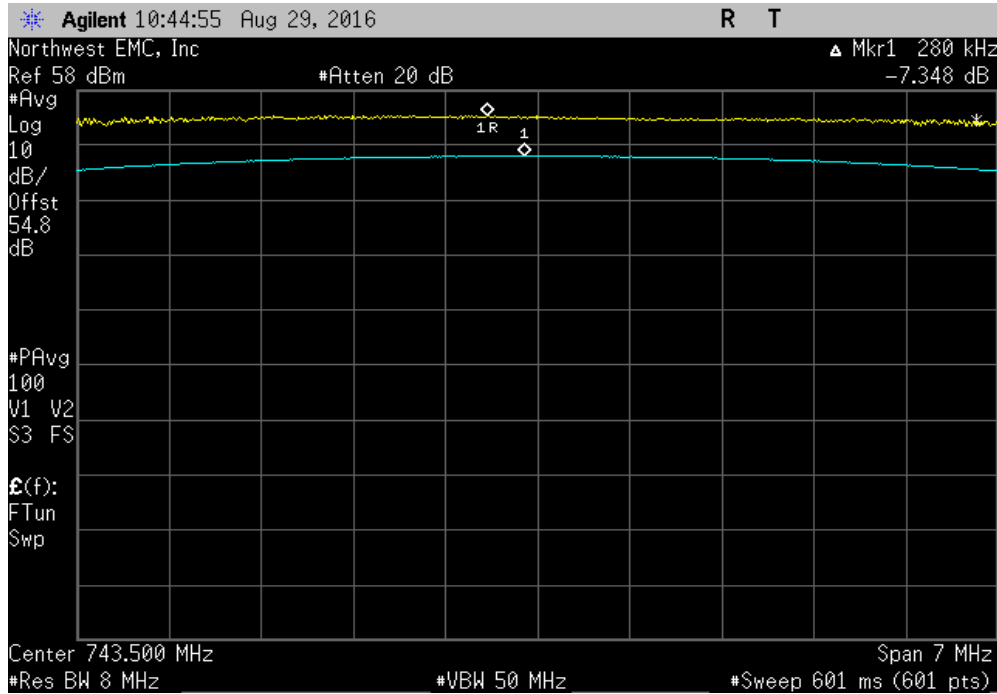


Antenna Port 2, Mid Channel LTE5, 737.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.092	13	Pass

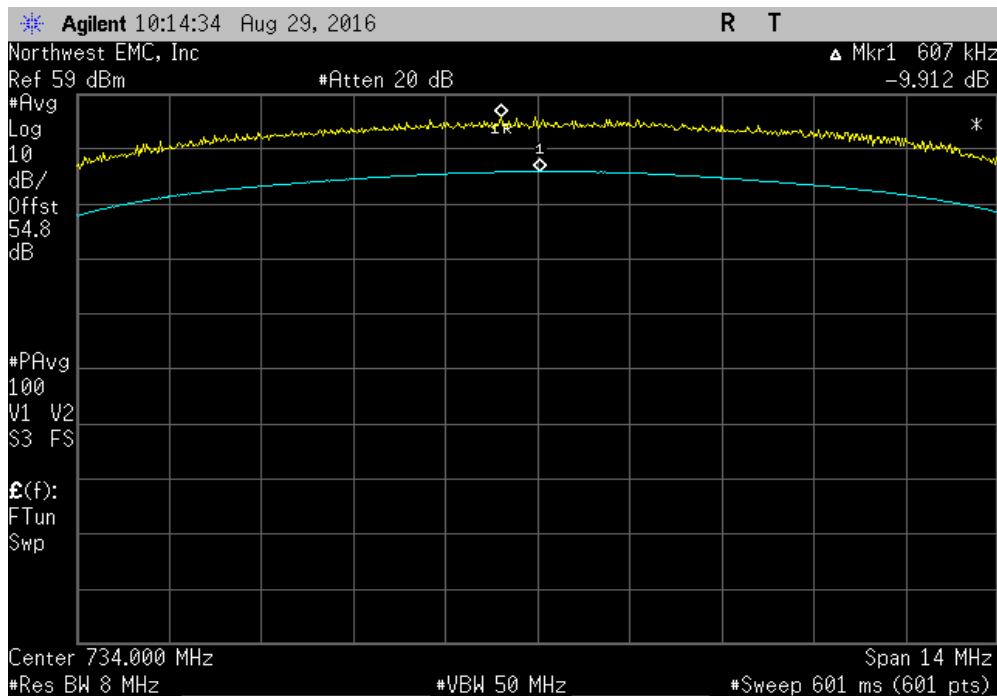


# PEAK TO AVERAGE RATIO - BAND 12

Antenna Port 2, High Channel LTE5, 743.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.348	13	Pass

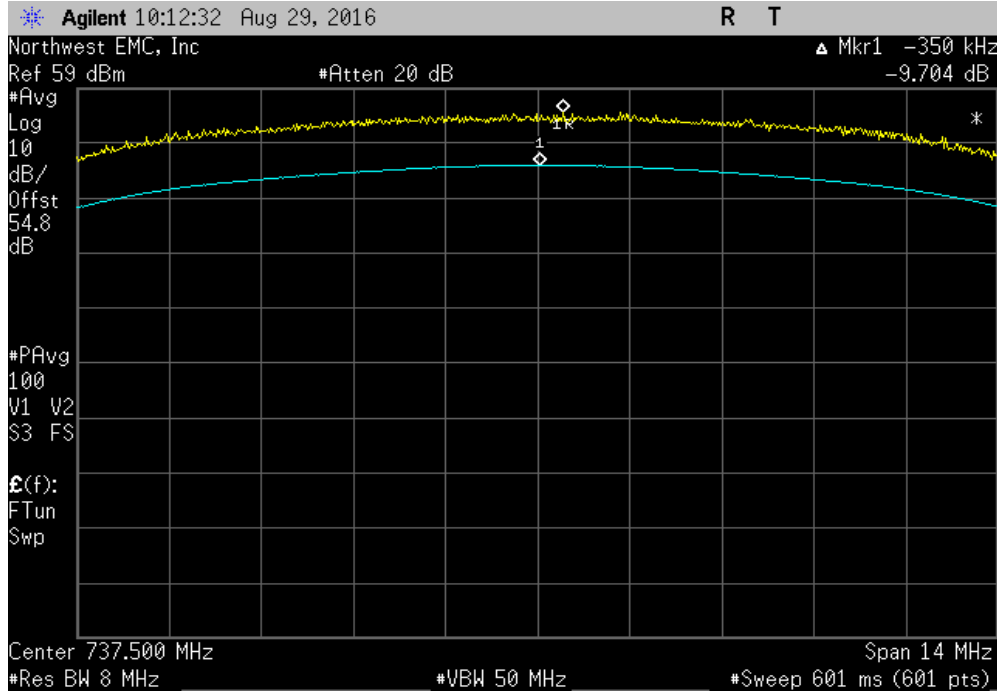


Antenna Port 2, Low Channel LTE10, 734 MHz			
	Value (dB)	Limit < (dB)	Results
	9.912	13	Pass

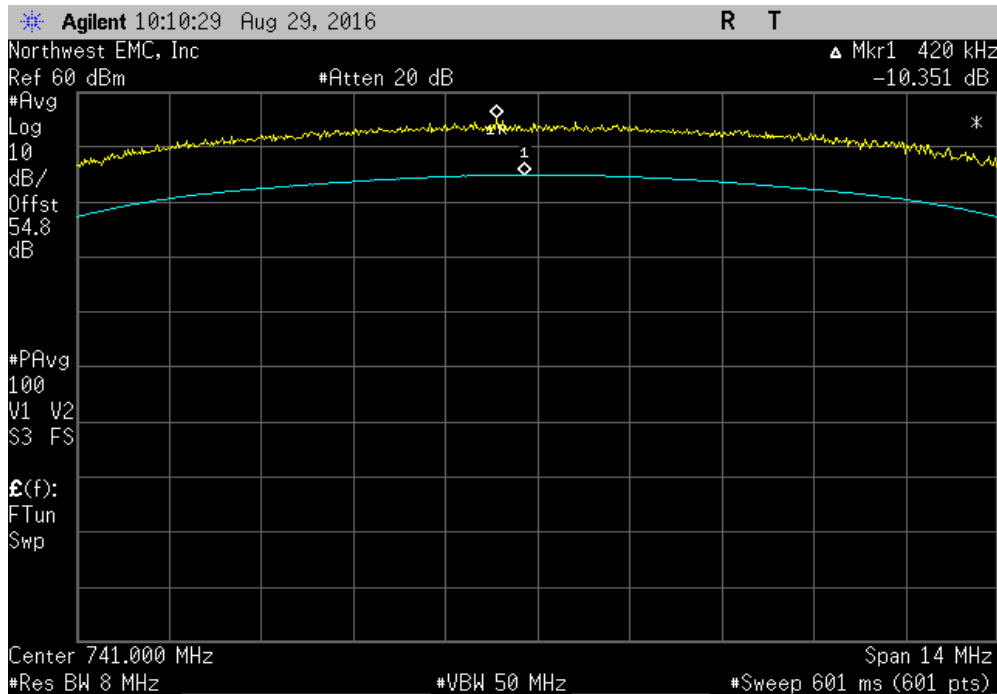


# PEAK TO AVERAGE RATIO - BAND 12

Antenna Port 2, Mid Channel LTE10, 737.5 MHz			
	Value (dB)	Limit < (dB)	Results
	9.704	13	Pass



Antenna Port 2, High Channel LTE10, 741 MHz			
	Value (dB)	Limit < (dB)	Results
	10.351	13	Pass



# PEAK TO AVERAGE RATIO - BAND 17

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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
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	AFD	7/29/2016	7/29/2017

## 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.

Only the Low Channel for each channel bandwidth was tested, the Mid & High Channels were previously tested in this band.

# PEAK TO AVERAGE RATIO - BAND 17



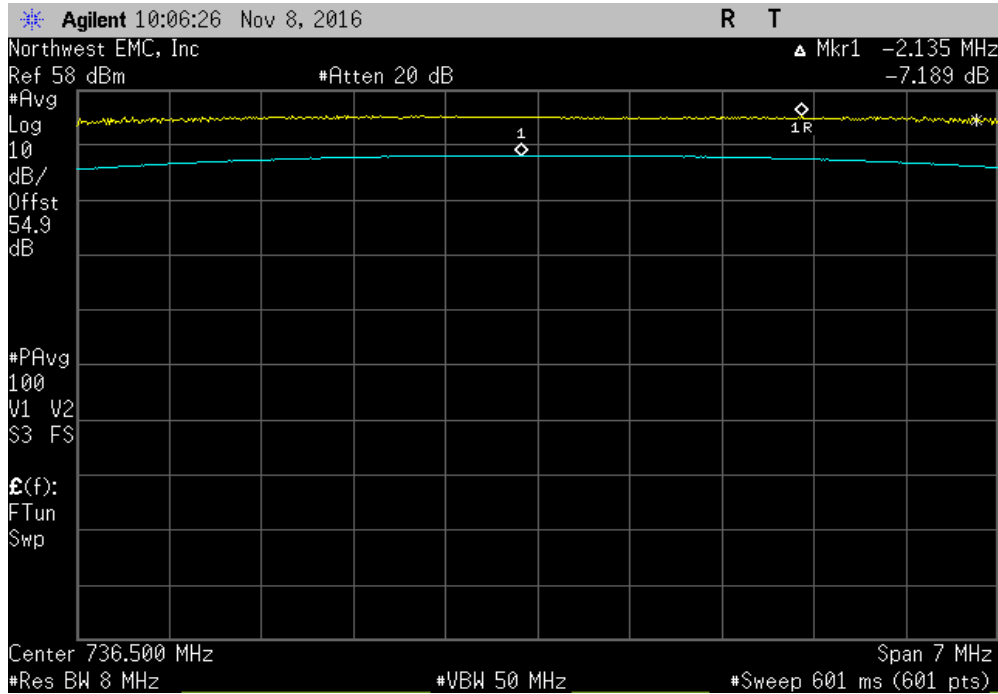
XMIT 2016.05.06

EUT: CWS-3050-12		Work Order: KMWC0077		
Serial Number: K163300001		Date: 11/08/16		
Customer: Parallel Wireless Inc.		Temperature: 20.8 °C		
Attendees: Edward Lee		Humidity: 49% RH		
Project: None		Barometric Pres.: 1018 mbar		
Tested by: Johnny Candelas		Power: 48 VDC		
		Job Site: OC13		
TEST SPECIFICATIONS				
FCC 27:2016		Test Method		
		ANSI/TIA/EIA-603-D-2010		
COMMENTS				
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 54.9dB total.				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	1	Signature 		
		Value (dB)	Limit < (dB)	Results
Antenna Port 1	Low Channel LTE5, 736.5 MHz	7.189	13	Pass
	Low Channel LTE10, 739 MHz	10.204	13	Pass
Antenna Port 2	Low Channel LTE5, 736.5 MHz	7.208	13	Pass
	Low Channel LTE10, 739 MHz	9.71	13	Pass

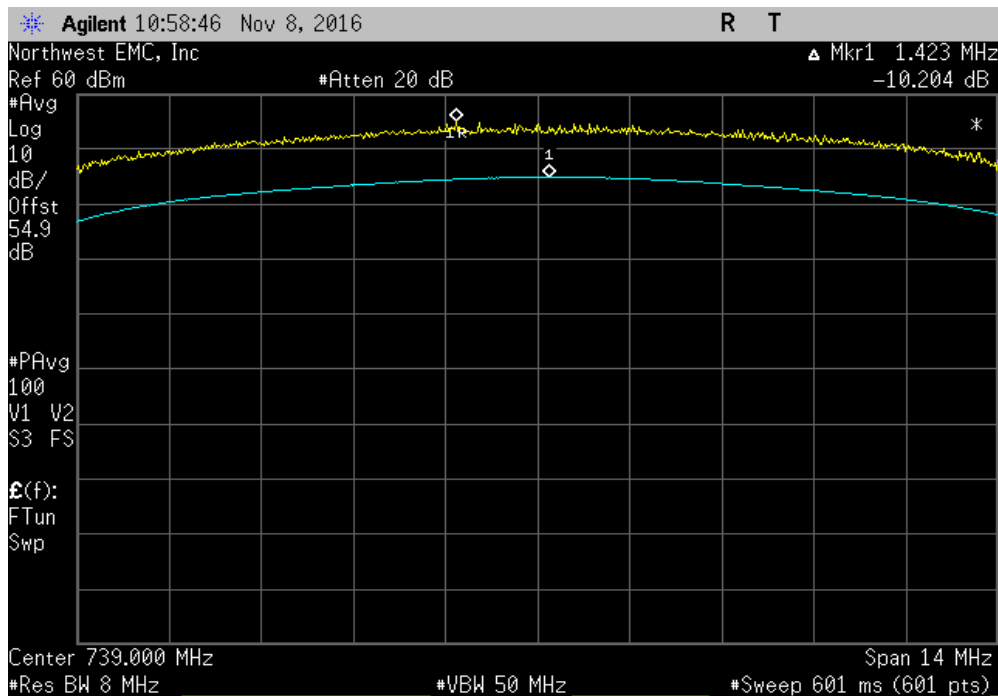


# PEAK TO AVERAGE RATIO - BAND 17

Antenna Port 1, Low Channel LTE5, 736.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.189	13	Pass

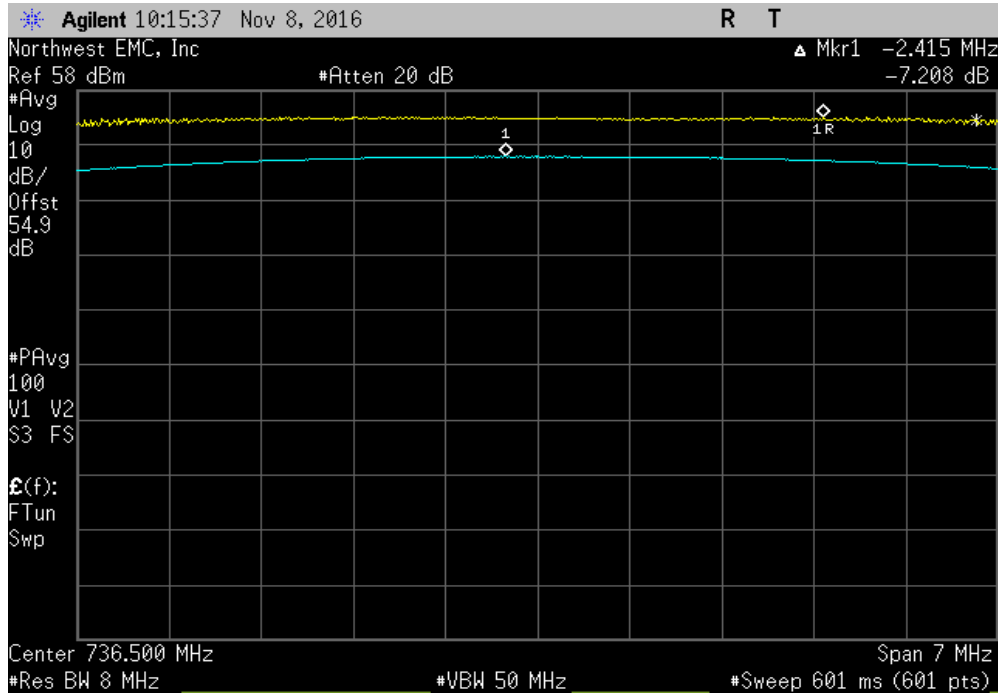


Antenna Port 1, Low Channel LTE10, 739 MHz			
	Value (dB)	Limit < (dB)	Results
	10.204	13	Pass

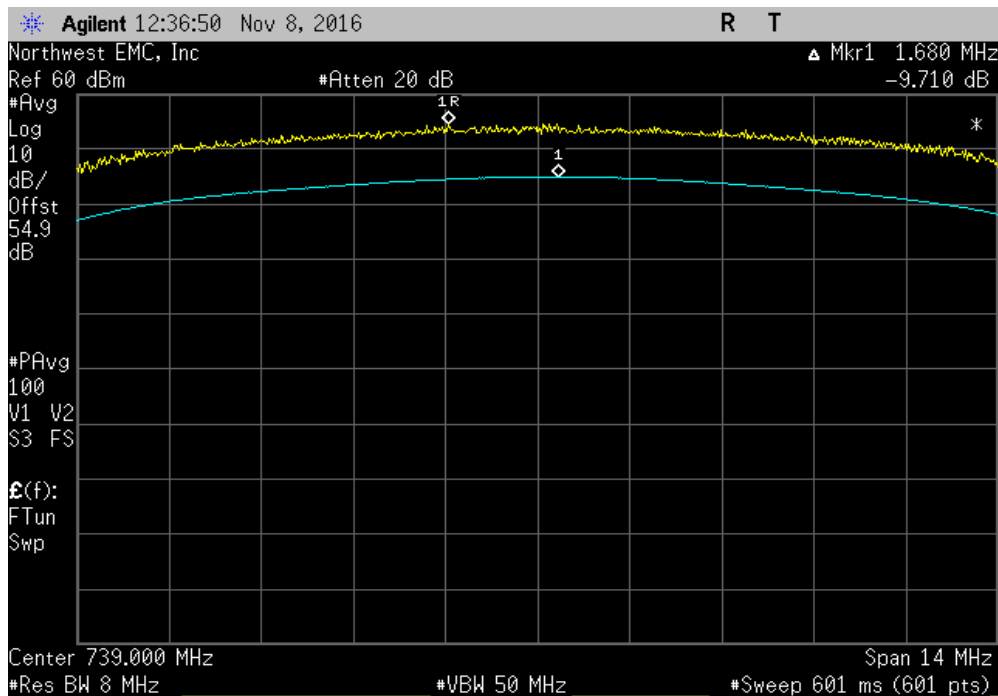


# PEAK TO AVERAGE RATIO - BAND 17

Antenna Port 2, Low Channel LTE5, 736.5 MHz			
	Value (dB)	Limit < (dB)	Results
	7.208	13	Pass



Antenna Port 2, Low Channel LTE10, 739 MHz			
	Value (dB)	Limit < (dB)	Results
	9.71	13	Pass



# FREQUENCY STABILITY

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

## TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	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.

Measurements were made at the edges of the main transmit bands as called out on the data sheets. 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) and 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



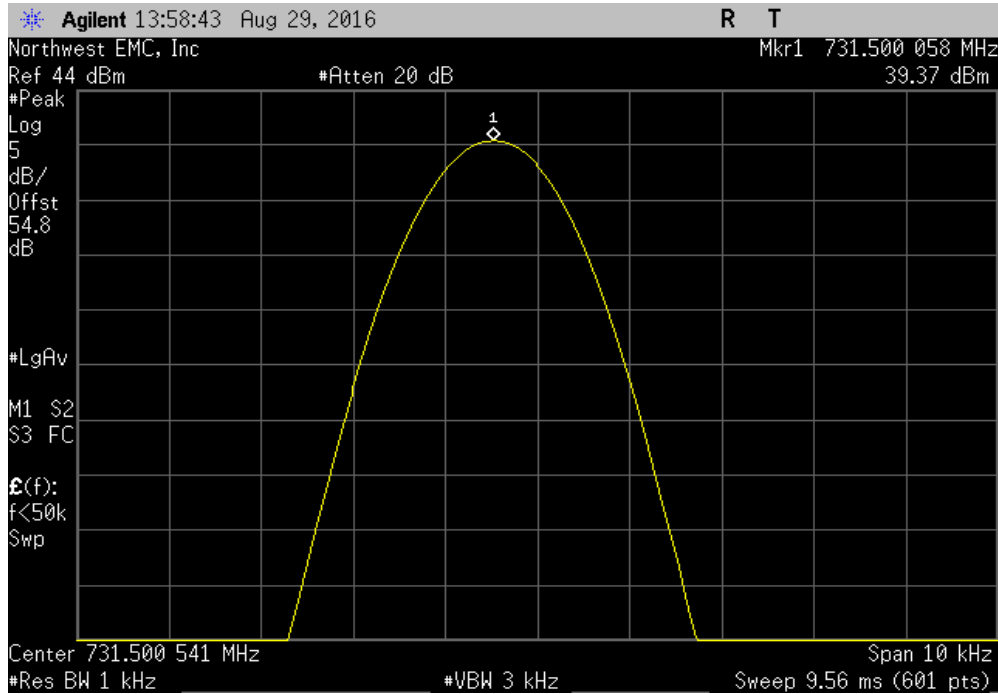
XMit 2016.05.06

EUT: CWS-3050-12		Work Order: KMWC0074				
Serial Number: K163300001		Date: 08/29/16				
Customer: Parallel Wireless Inc.		Temperature: 21.4 °C				
Attendees: Andy Ku		Humidity: 46.4% RH				
Project: None		Barometric Pres.: 1017 mbar				
Tested by: Johnny Candelas		Power: 48 VDC				
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 = 54.8dB total.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1	Signature 				
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
Antenna Port 1						
Normal Temperature and Voltage						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Voltage, 55.2 VDC						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500054	743.5	0.1	1	Pass
Extreme Voltage, 40.8 VAC						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, -30°C						
	Low Channel, 731.5 MHz	731.500057	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, -20°C						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, -10°C						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, 0°C						
	Low Channel, 731.5 MHz	731.500041	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, +10°C						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500485	737.5	0.7	1	Pass
	High Channel, 743.5 MHz	743.500004	743.5	0	1	Pass
Extreme Temperature, +20°C						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500054	743.5	0.1	1	Pass
Extreme Temperature, +30°C						
	Low Channel, 731.5 MHz	731.500057	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500067	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500054	743.5	0.1	1	Pass
Extreme Temperature, +40°C						
	Low Channel, 731.5 MHz	731.50006	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, +50°C						
	Low Channel, 731.5 MHz	731.500043	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500067	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500054	743.5	0.1	1	Pass
Antenna Port 2						
Normal Temperature and Voltage						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Voltage, 55.2 VDC						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.50005	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Voltage, 40.8 VAC						
	Low Channel, 731.5 MHz	731.500057	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.50005	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, -30°C						
	Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass
Extreme Temperature, -20°C						
	Low Channel, 731.5 MHz	731.500041	731.5	0.1	1	Pass
	Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass
	High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass

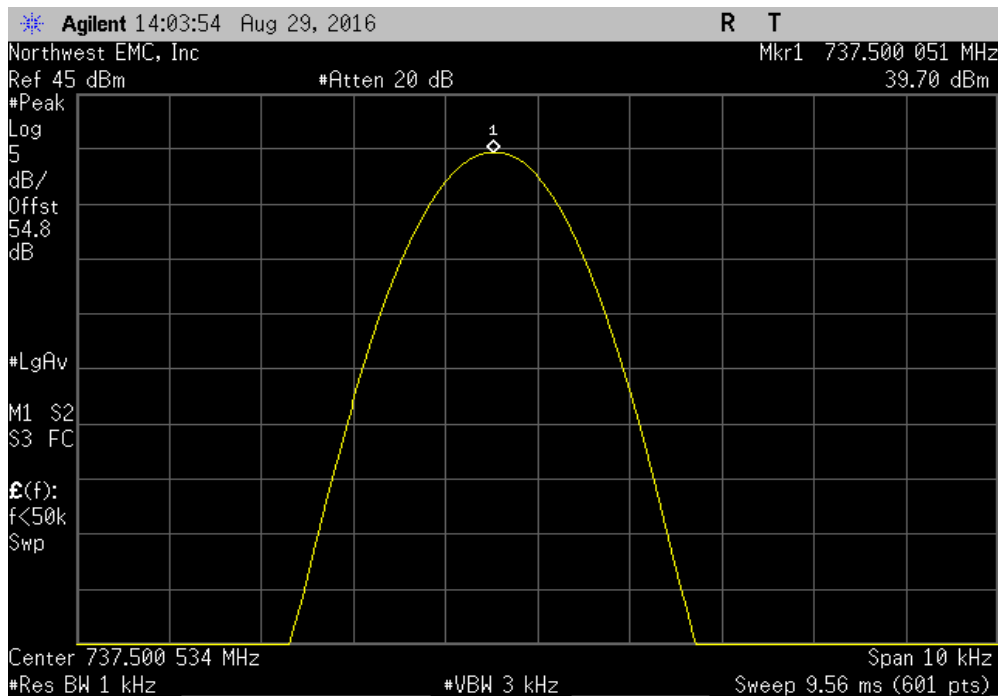
<b>Extreme Temperature, -10°C</b>						
Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass	
<b>Extreme Temperature, 0°C</b>						
Low Channel, 731.5 MHz	731.500057	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass	
<b>Extreme Temperature, +10°C</b>						
Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.500067	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass	
<b>Extreme Temperature, +20°C</b>						
Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass	
<b>Extreme Temperature, +30°C</b>						
Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.500051	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500054	743.5	0.1	1	Pass	
<b>Extreme Temperature, +40°C</b>						
Low Channel, 731.5 MHz	731.50006	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.500067	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass	
<b>Extreme Temperature, +50°C</b>						
Low Channel, 731.5 MHz	731.500058	731.5	0.1	1	Pass	
Mid Channel, 737.5 MHz	737.50005	737.5	0.1	1	Pass	
High Channel, 743.5 MHz	743.500055	743.5	0.1	1	Pass	

# FREQUENCY STABILITY

Antenna Port 1, Normal Temperature and Voltage, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

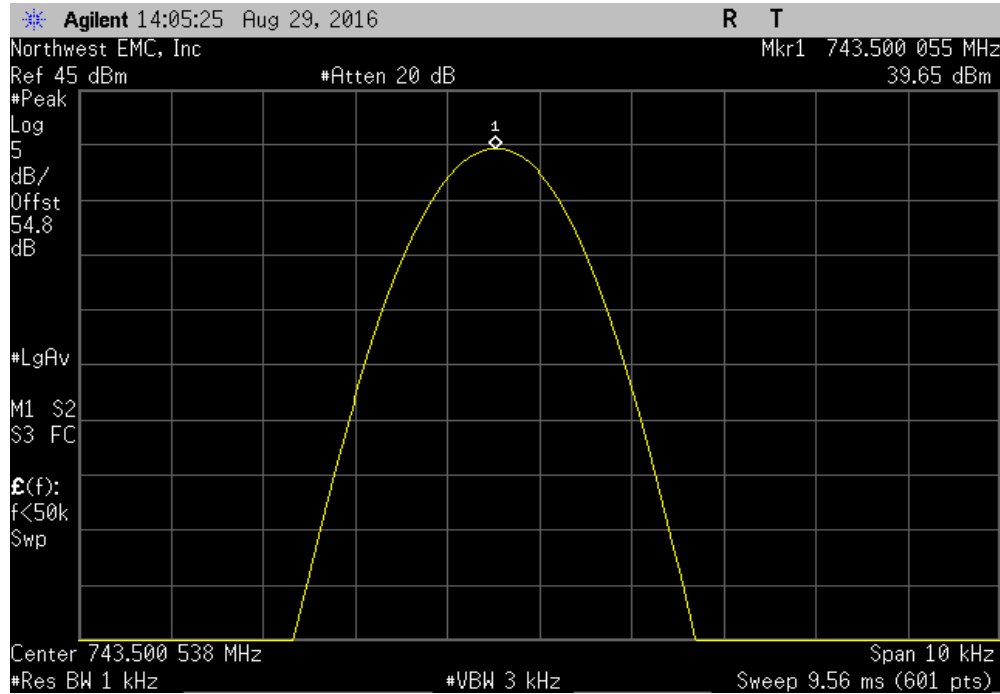


Antenna Port 1, Normal Temperature and Voltage, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

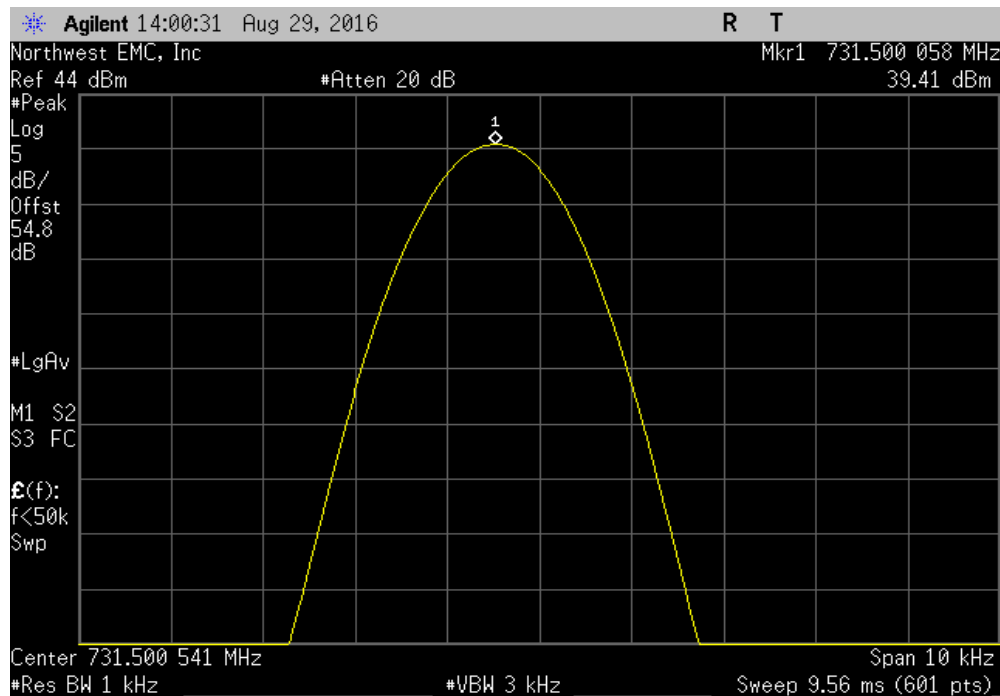


# FREQUENCY STABILITY

Antenna Port 1, Normal Temperature and Voltage, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

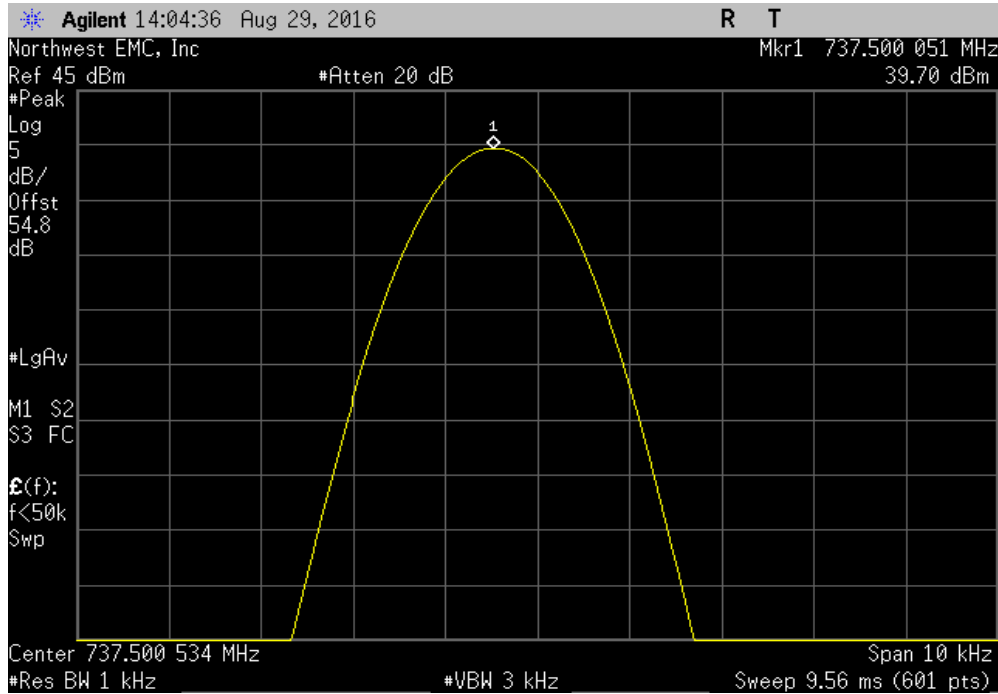


Antenna Port 1, Extreme Voltage, 55.2 VDC, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

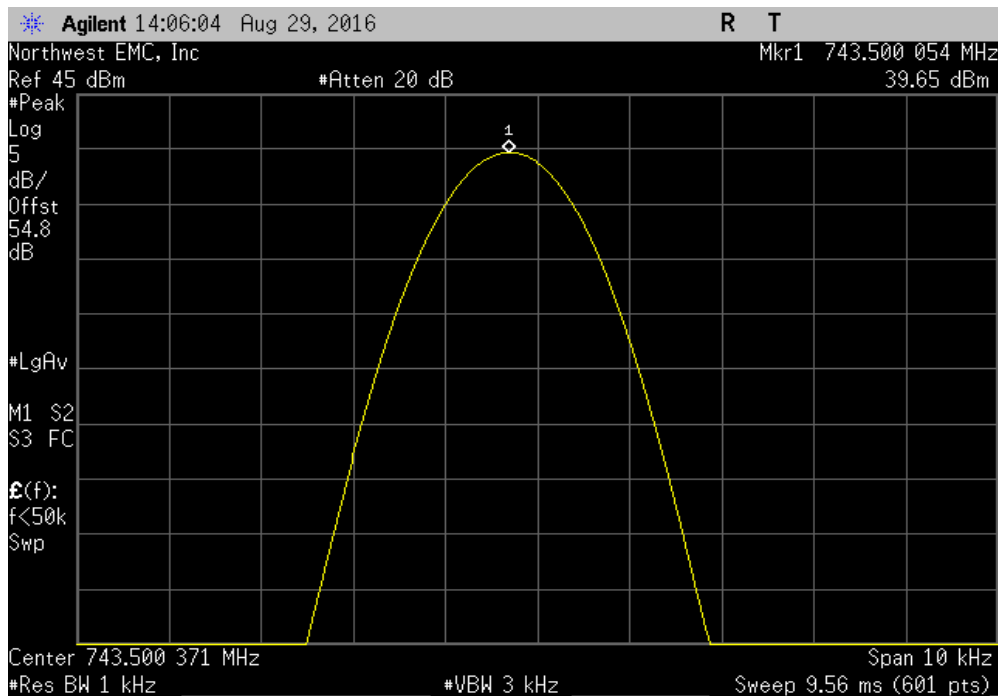


# FREQUENCY STABILITY

Antenna Port 1, Extreme Voltage, 55.2 VDC, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	



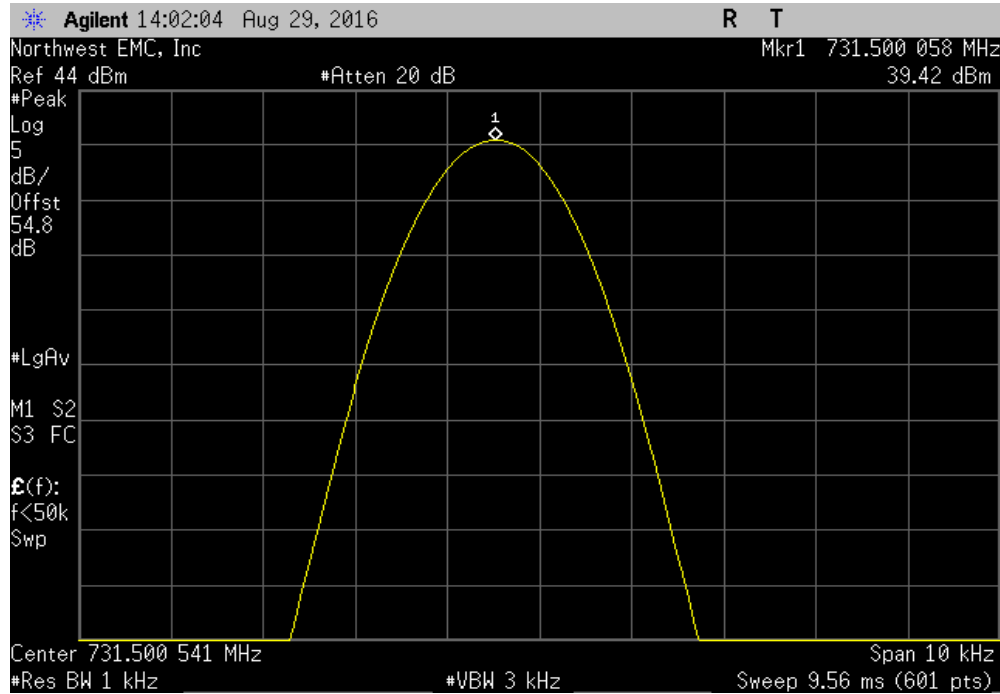
Antenna Port 1, Extreme Voltage, 55.2 VDC, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500054	743.5	0.1	1	Pass	



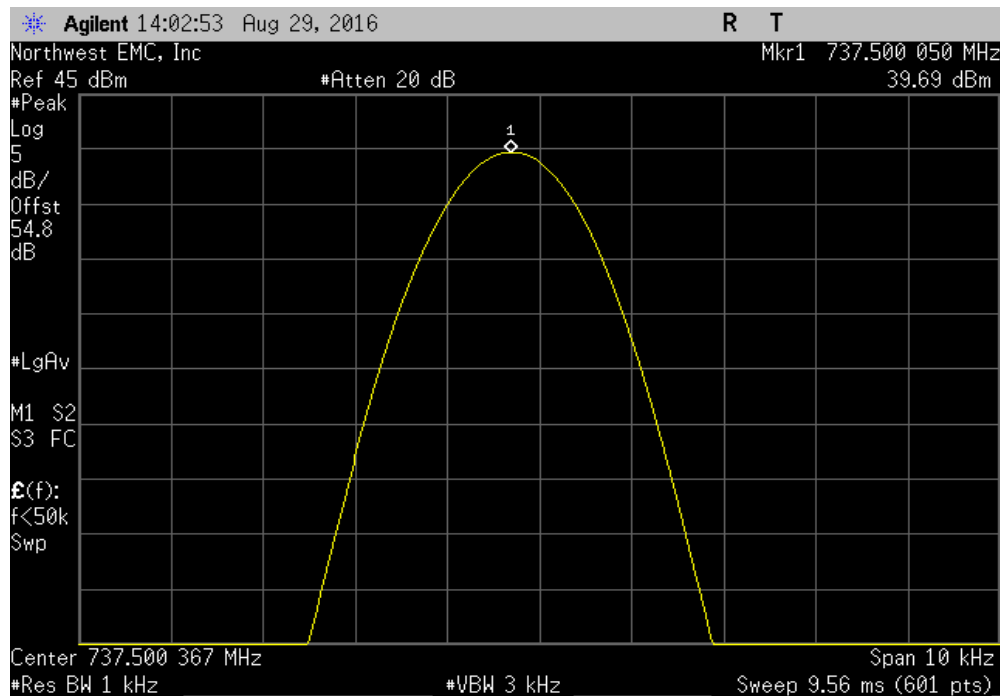


# FREQUENCY STABILITY

Antenna Port 1, Extreme Voltage, 40.8 VAC, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

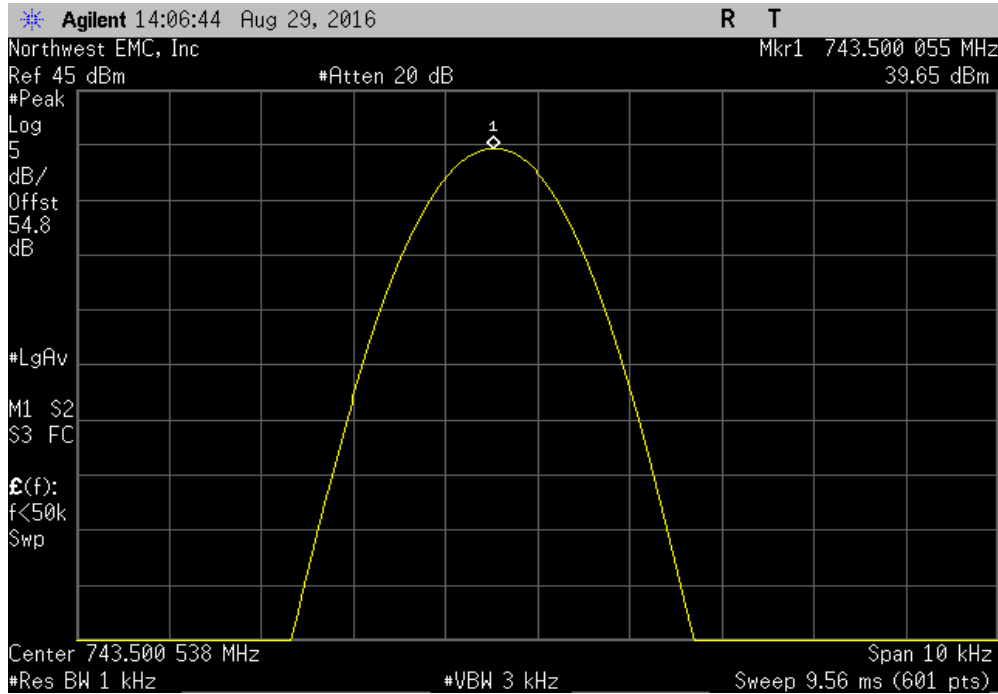


Antenna Port 1, Extreme Voltage, 40.8 VAC, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500005	737.5	0.1	1	Pass	

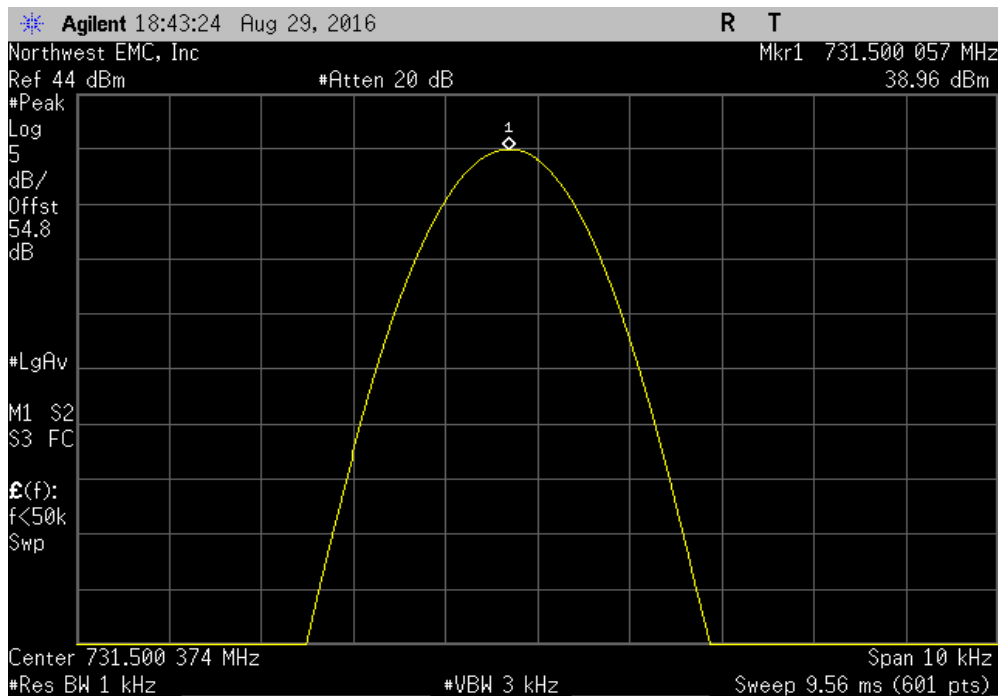


# FREQUENCY STABILITY

Antenna Port 1, Extreme Voltage, 40.8 VAC, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

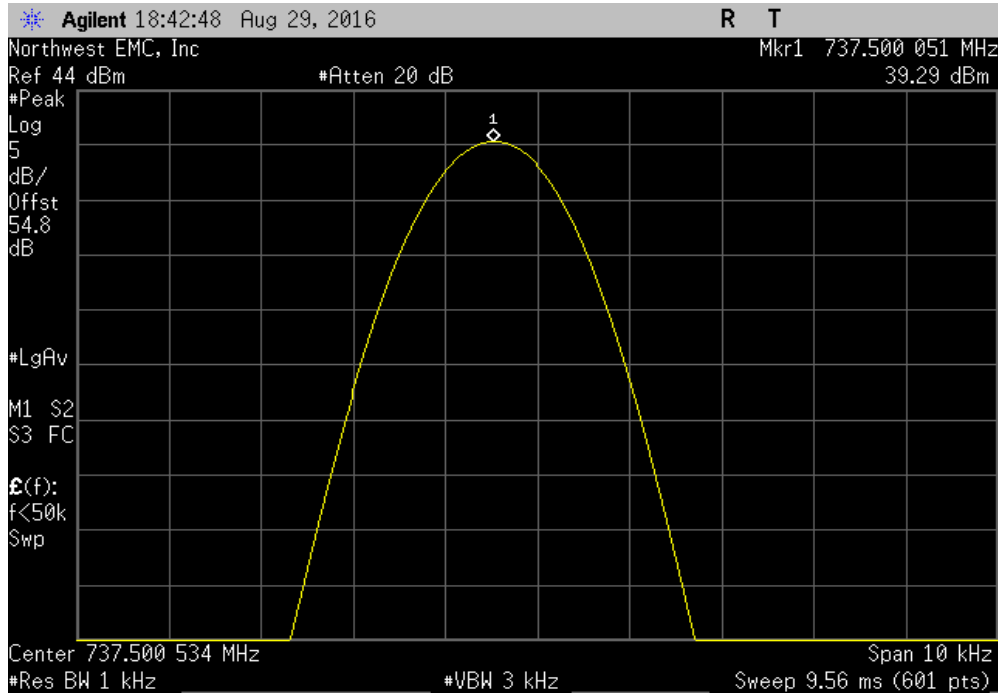


Antenna Port 1, Extreme Temperature, -30°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500057	731.5	0.1	1	Pass	

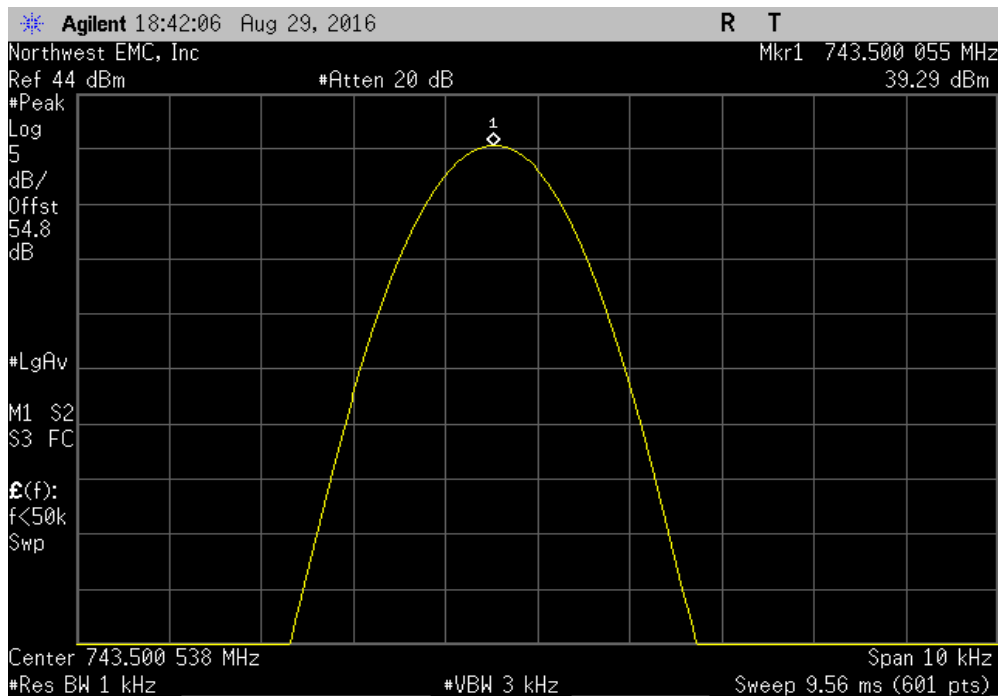


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -30°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

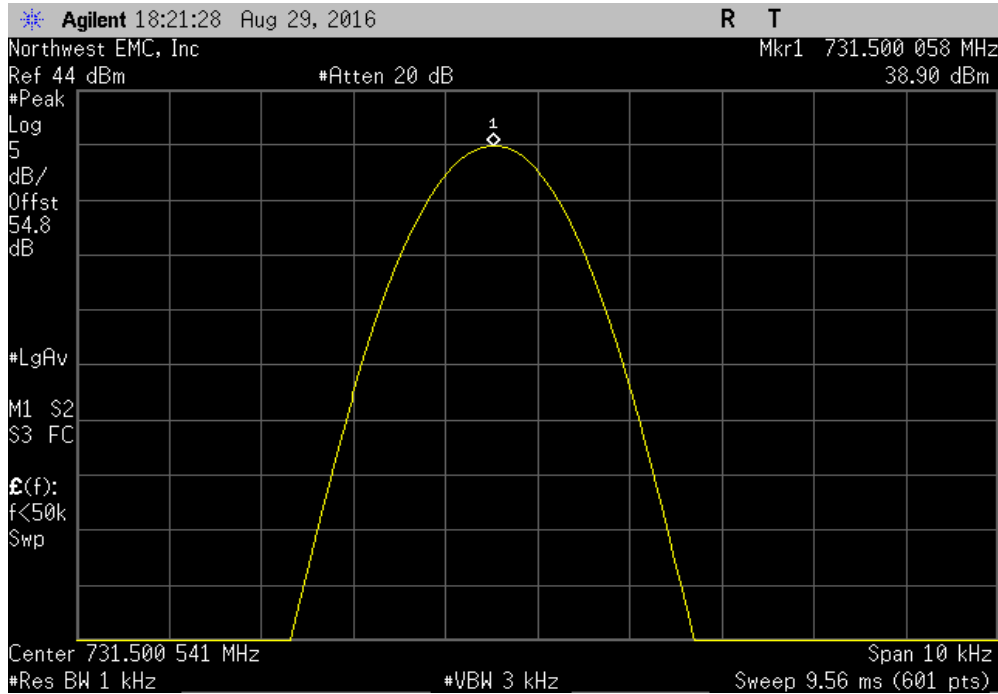


Antenna Port 1, Extreme Temperature, -30°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

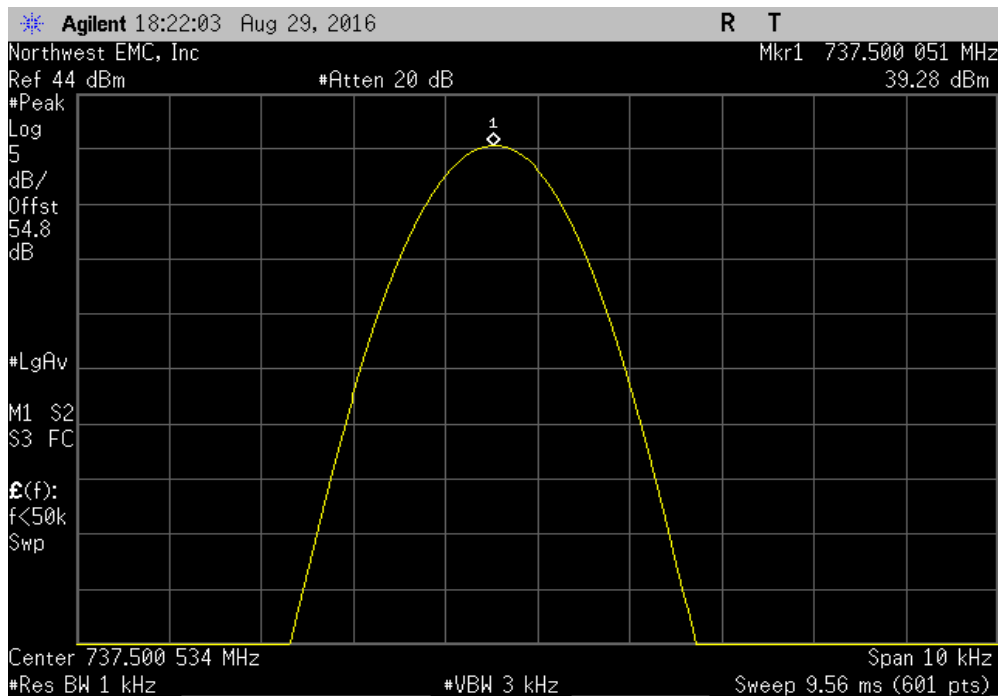


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -20°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

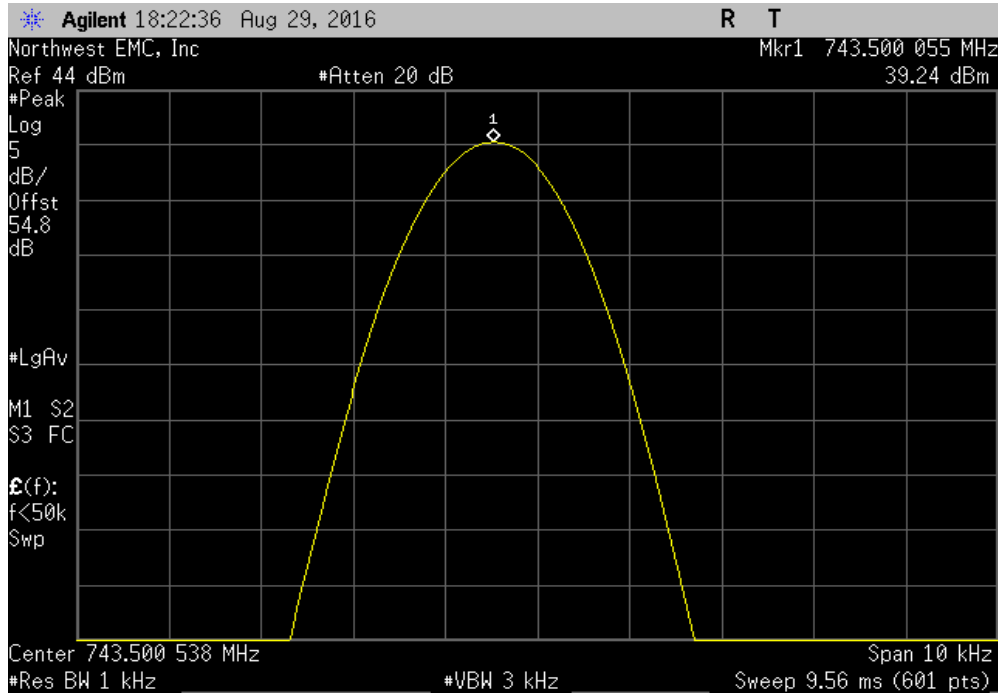


Antenna Port 1, Extreme Temperature, -20°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

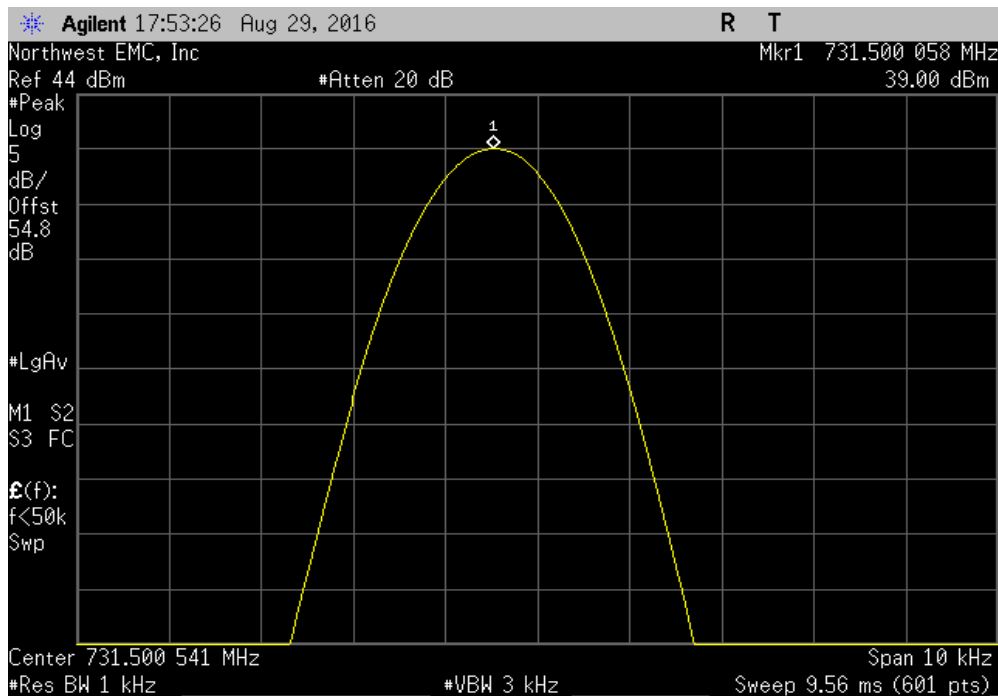


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -20°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

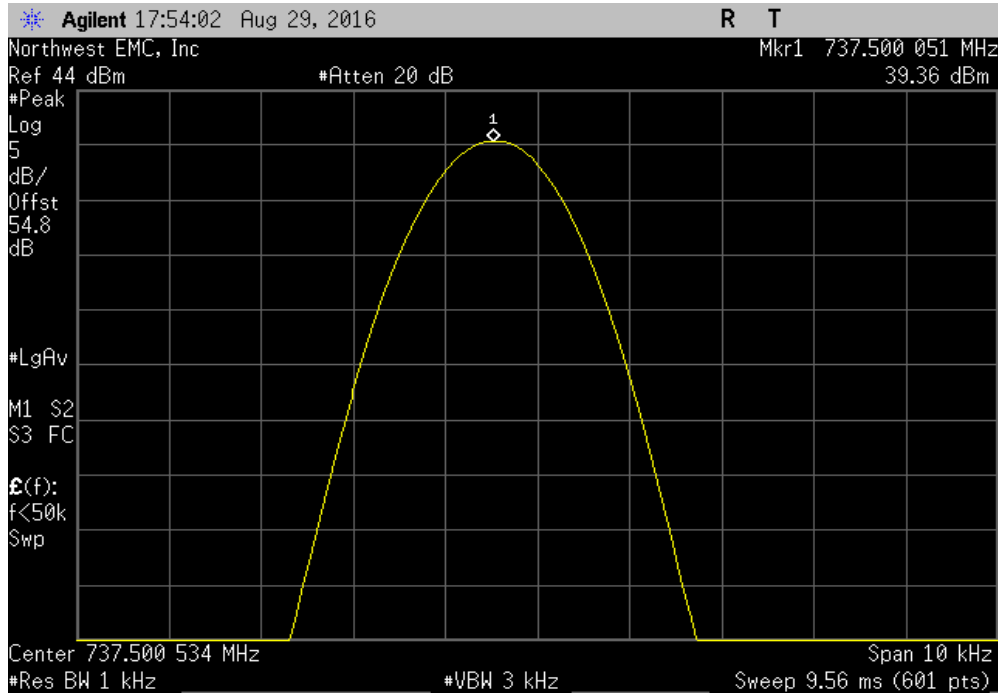


Antenna Port 1, Extreme Temperature, -10°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

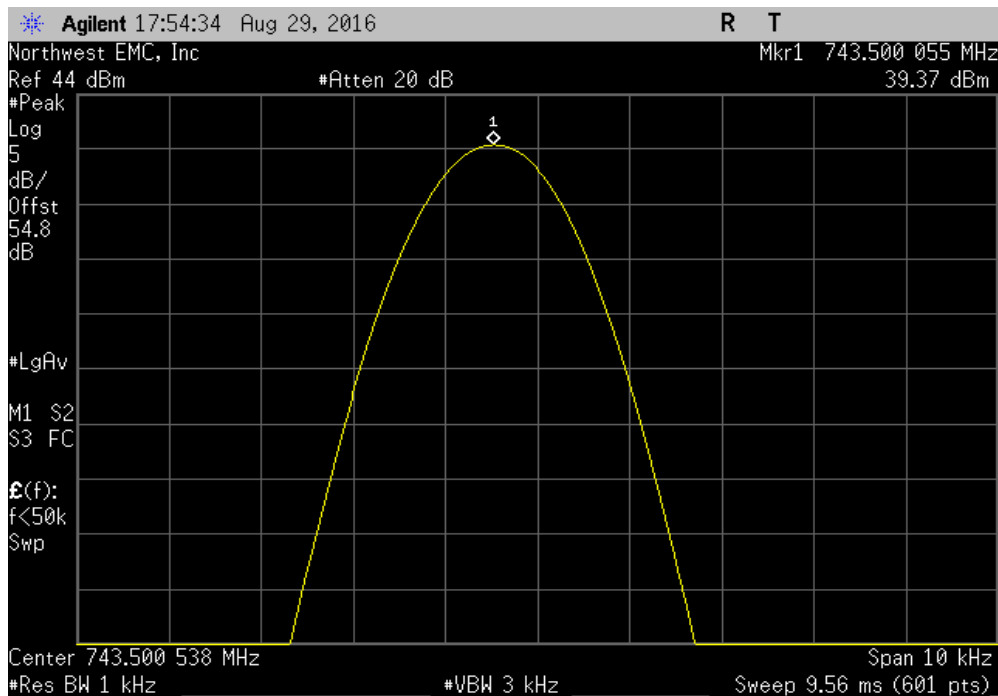


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, -10°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

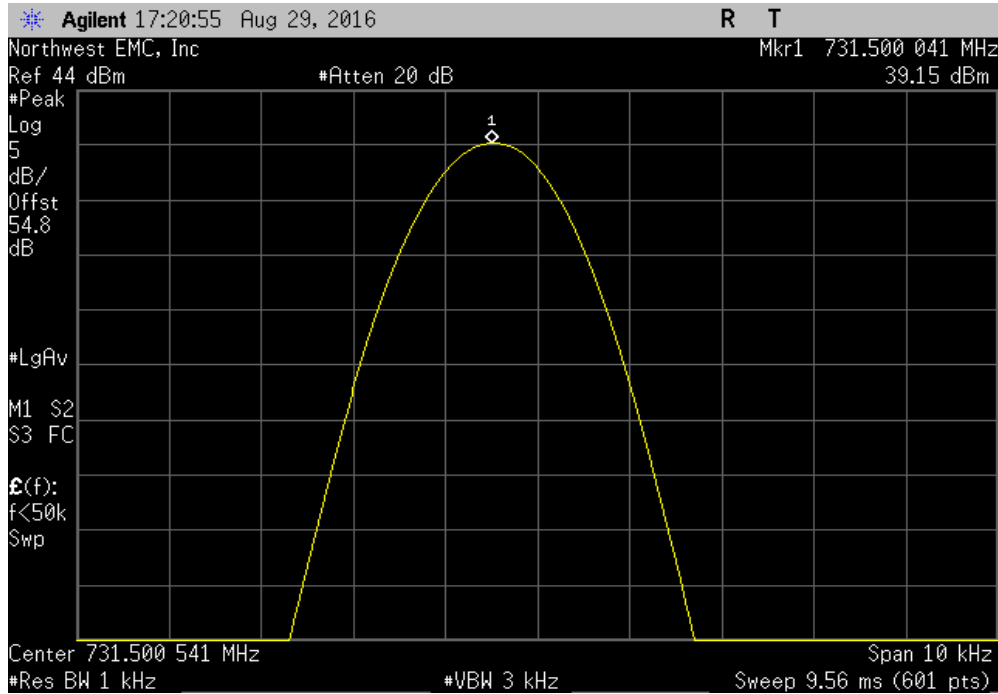


Antenna Port 1, Extreme Temperature, -10°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

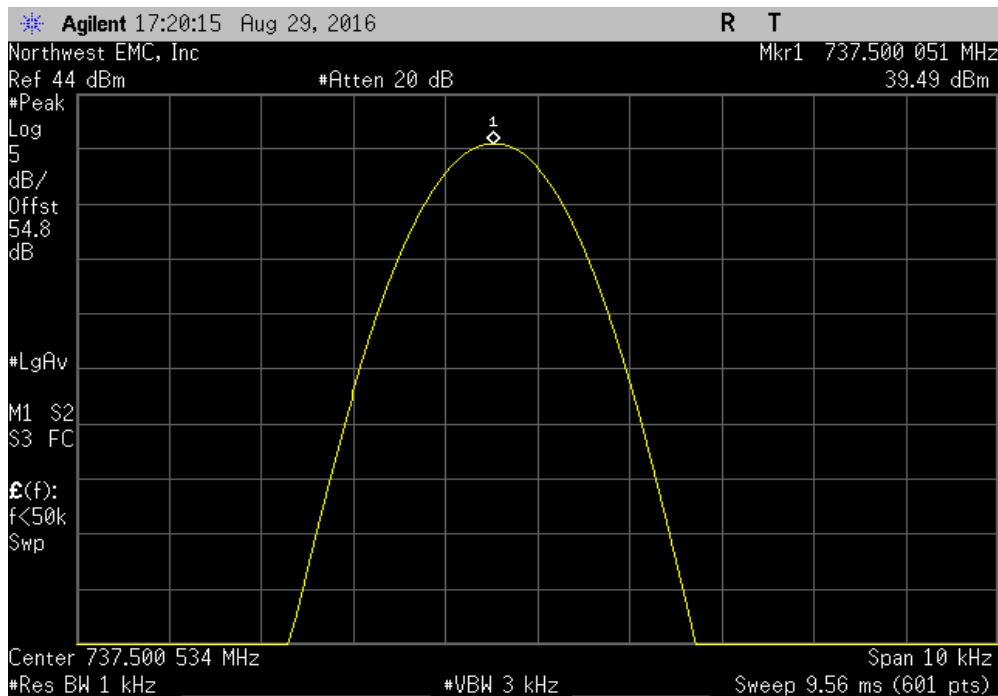


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, 0°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500041	731.5	0.1	1	Pass	

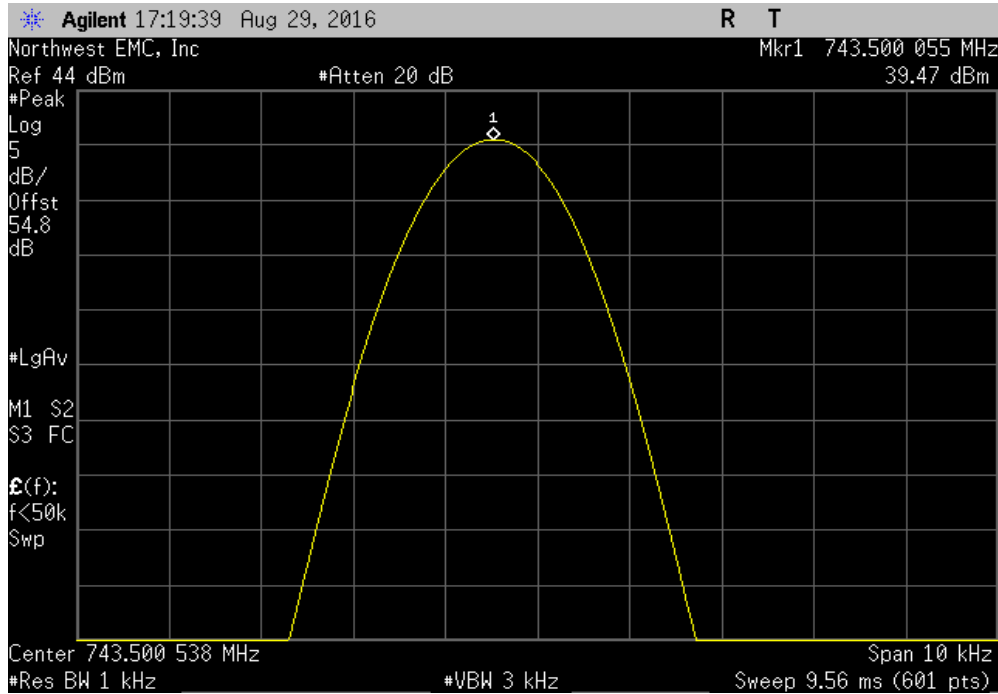


Antenna Port 1, Extreme Temperature, 0°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

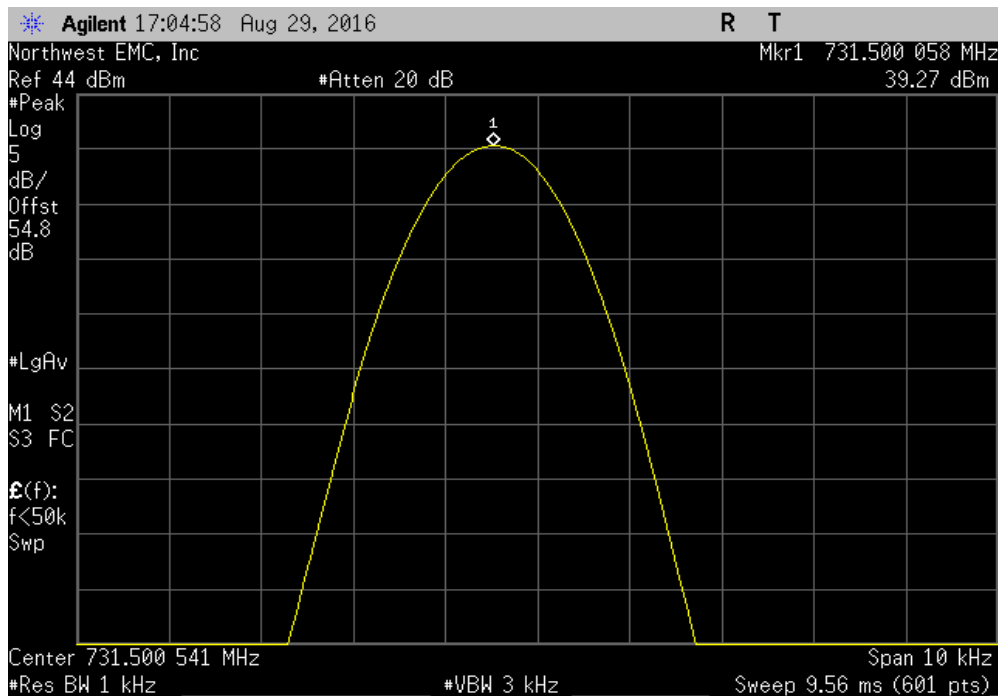


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, 0°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	



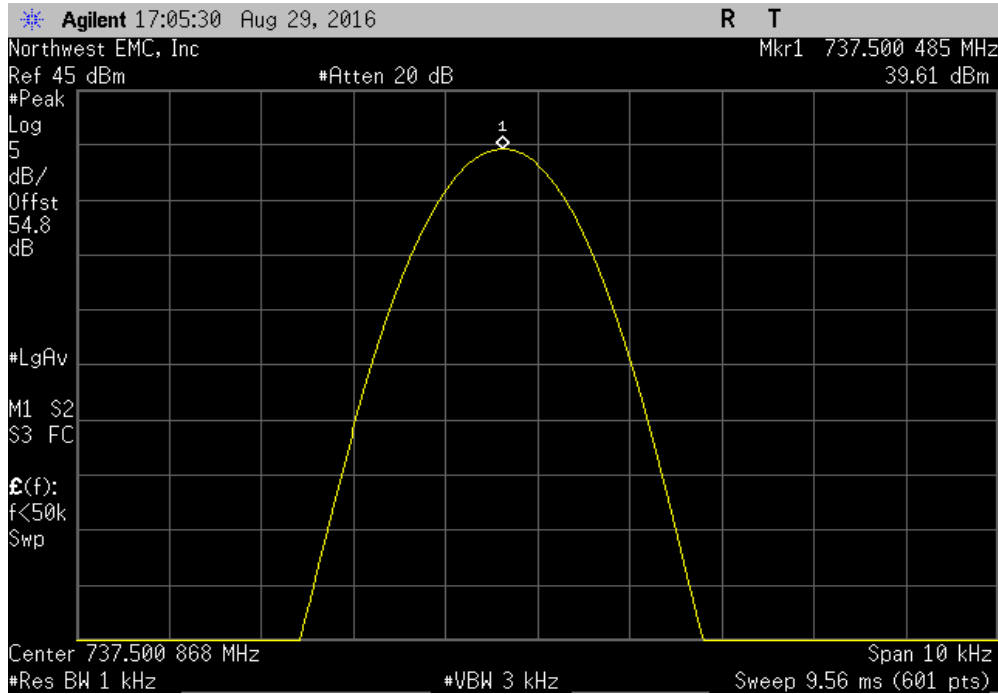
Antenna Port 1, Extreme Temperature, +10°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	



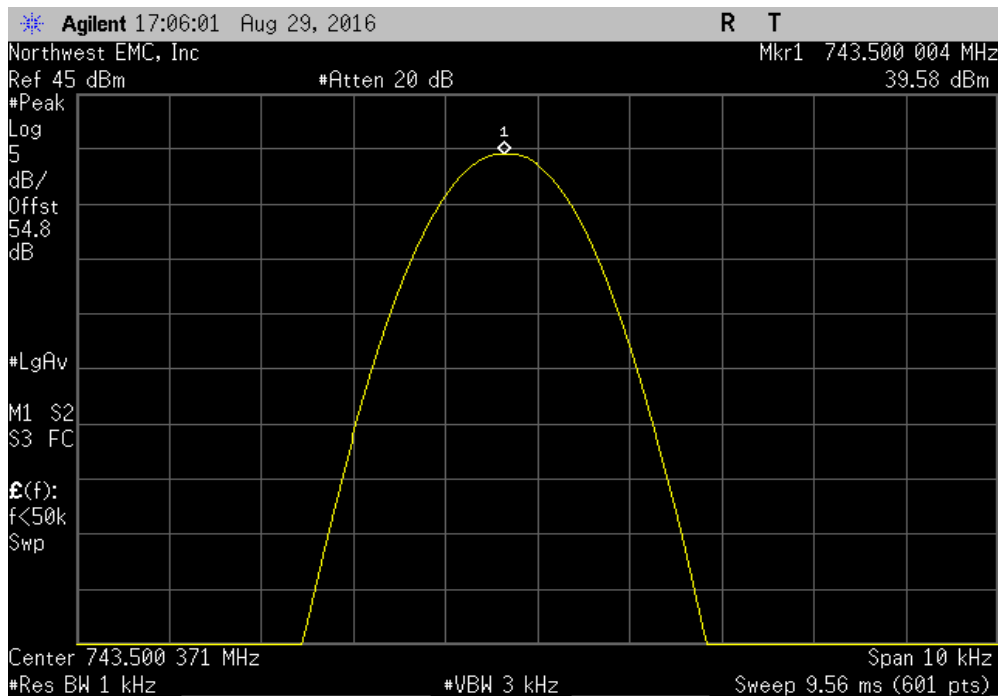


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +10°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500485	737.5	0.7	1	Pass	

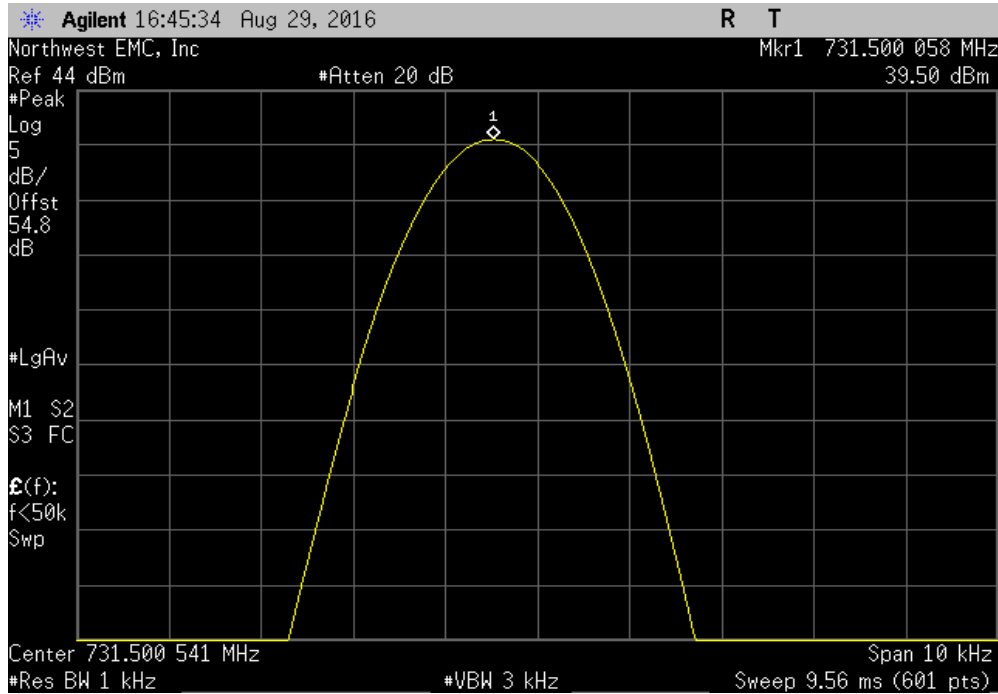


Antenna Port 1, Extreme Temperature, +10°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500004	743.5	0	1	Pass	

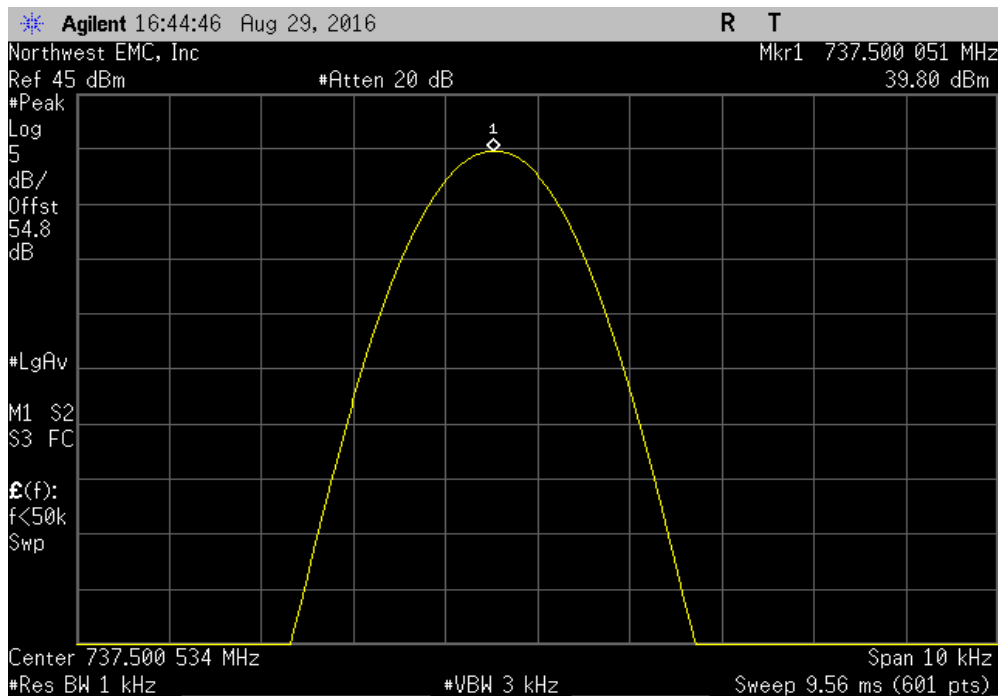


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +20°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

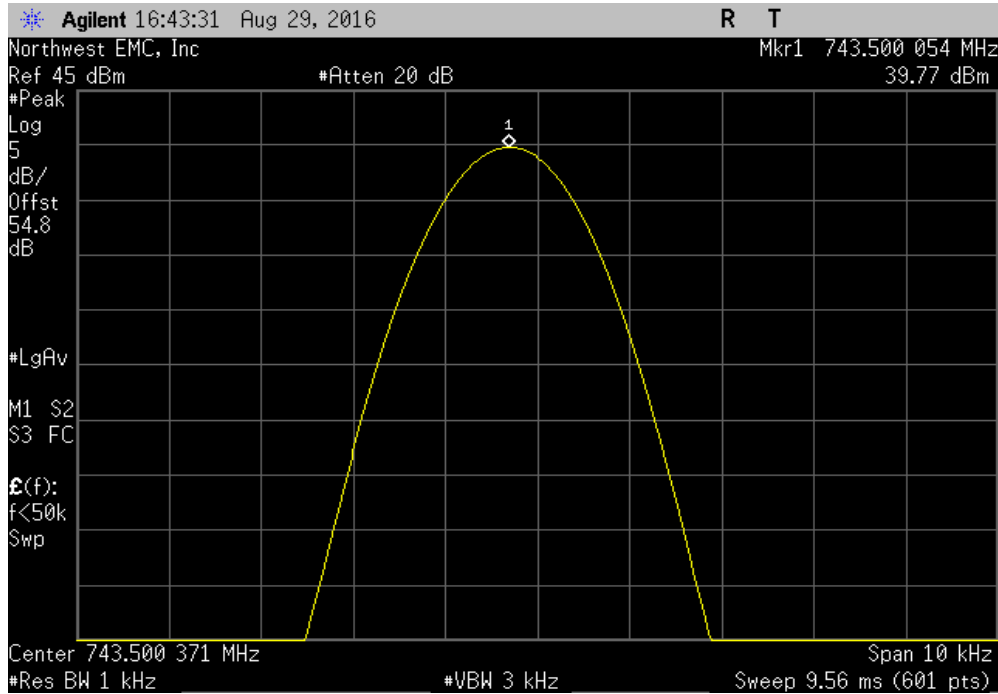


Antenna Port 1, Extreme Temperature, +20°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

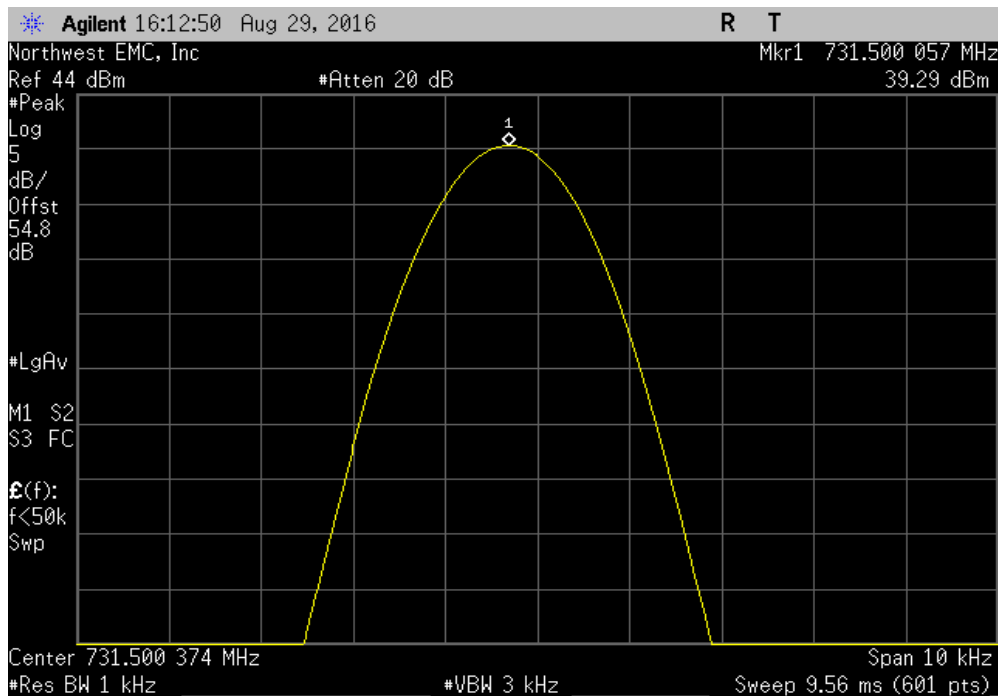


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +20°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500054	743.5	0.1	1	Pass	

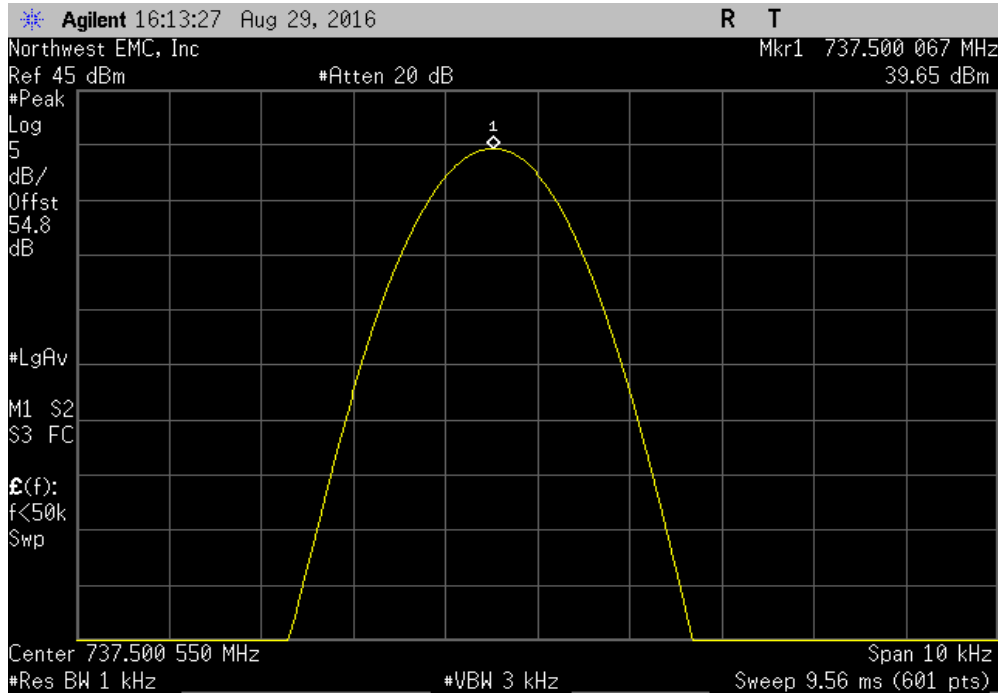


Antenna Port 1, Extreme Temperature, +30°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500057	731.5	0.1	1	Pass	

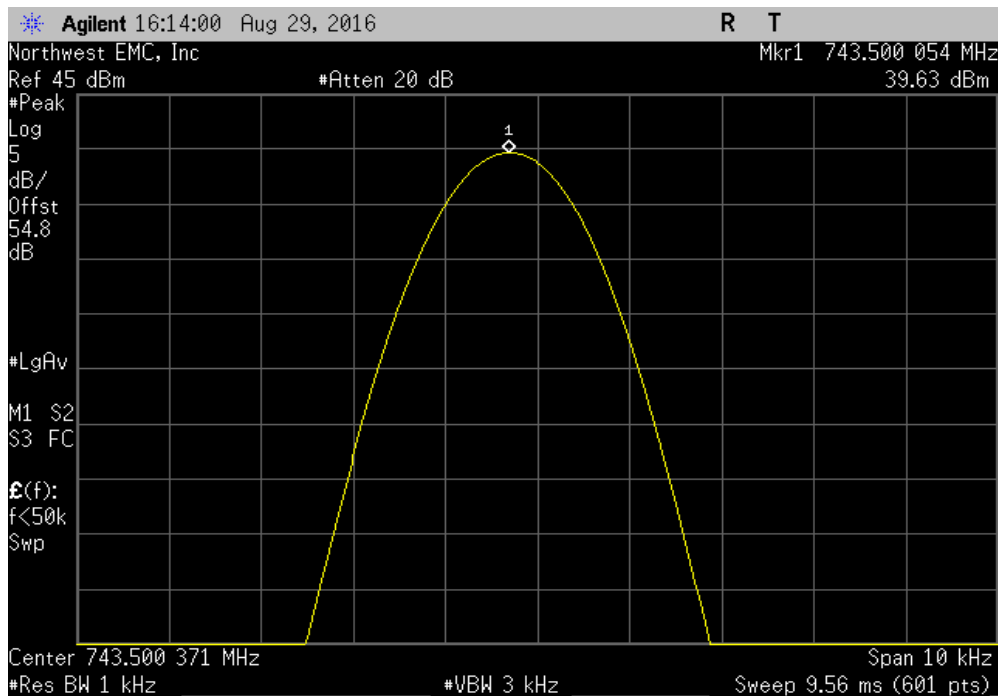


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +30°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500067	737.5	0.1	1	Pass	

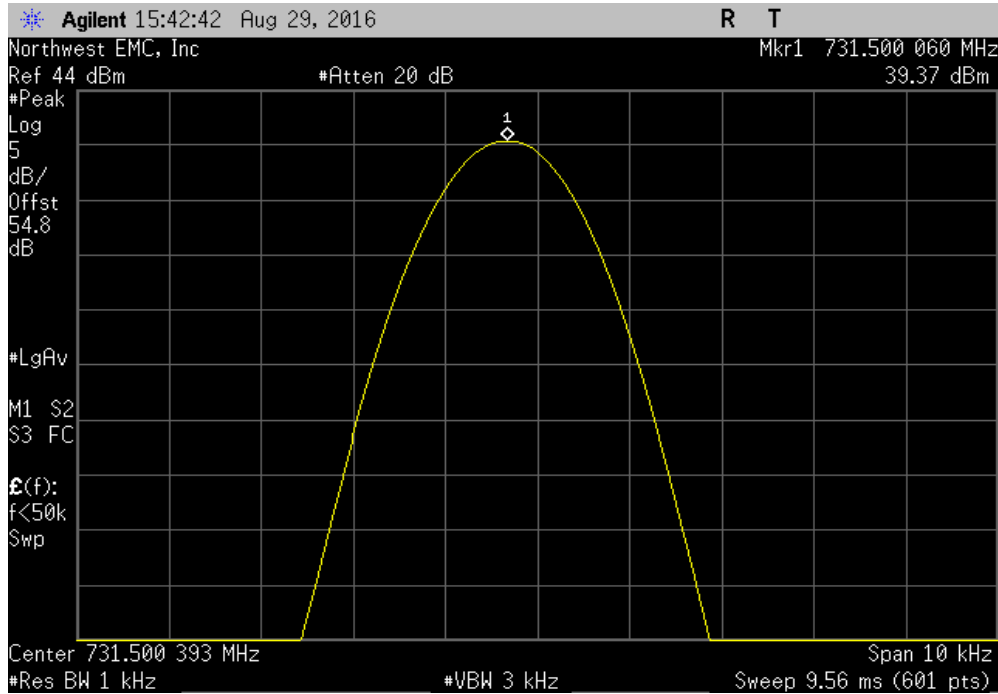


Antenna Port 1, Extreme Temperature, +30°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500054	743.5	0.1	1	Pass	

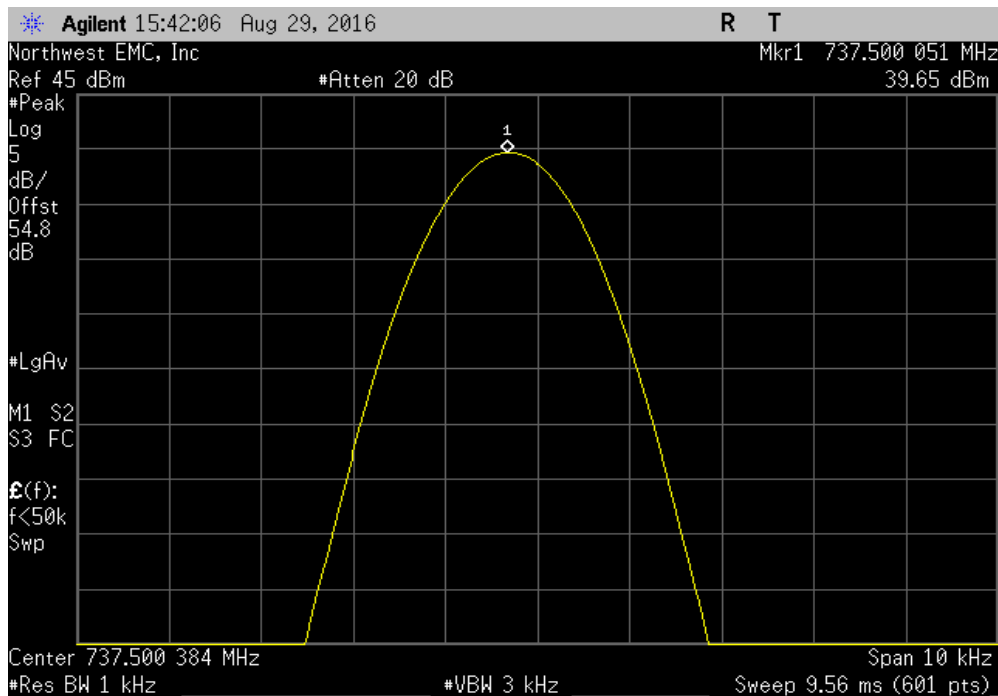


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +40°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.50006	731.5	0.1	1	Pass	

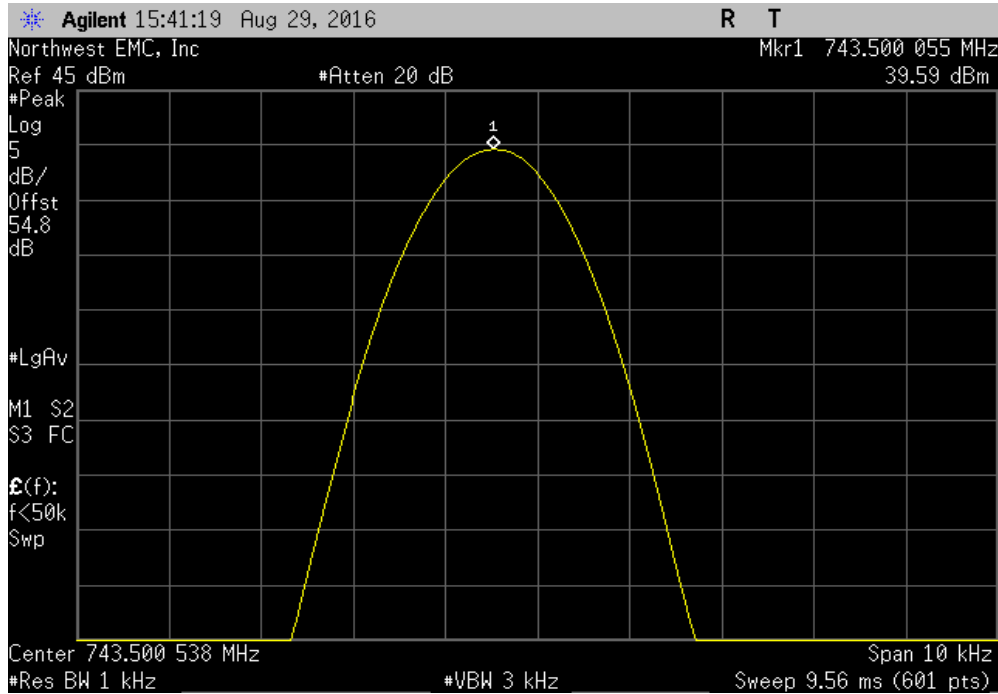


Antenna Port 1, Extreme Temperature, +40°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

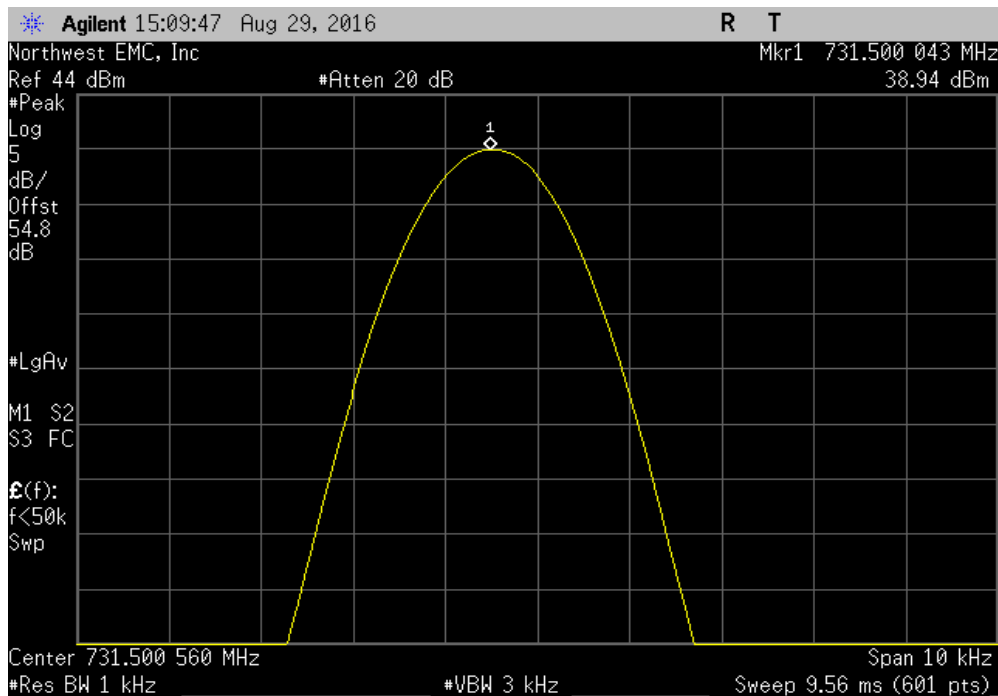


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +40°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

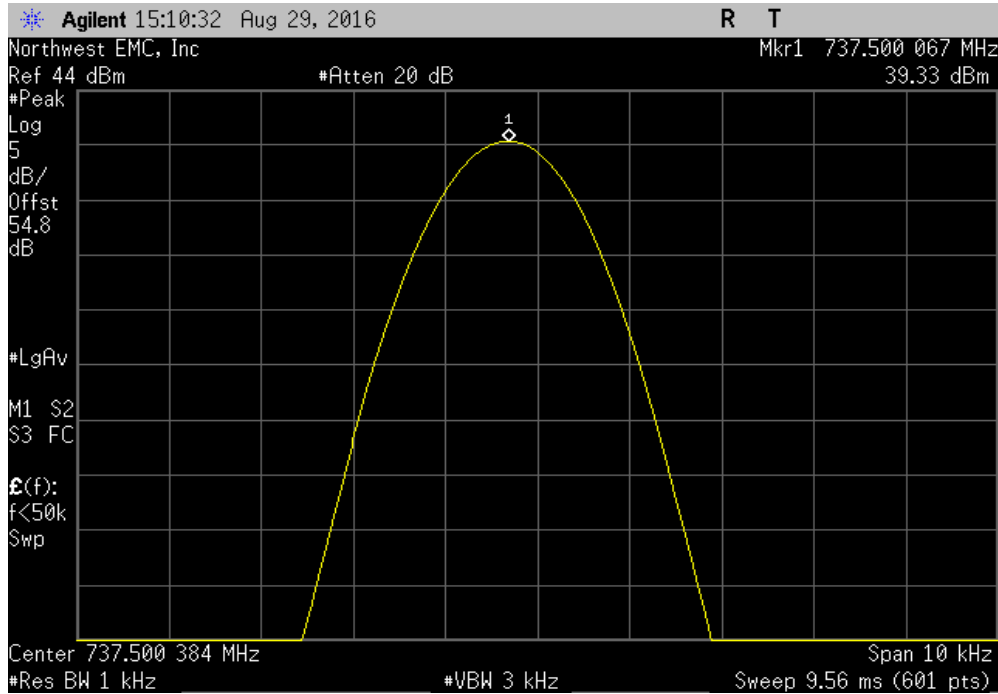


Antenna Port 1, Extreme Temperature, +50°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500043	731.5	0.1	1	Pass	

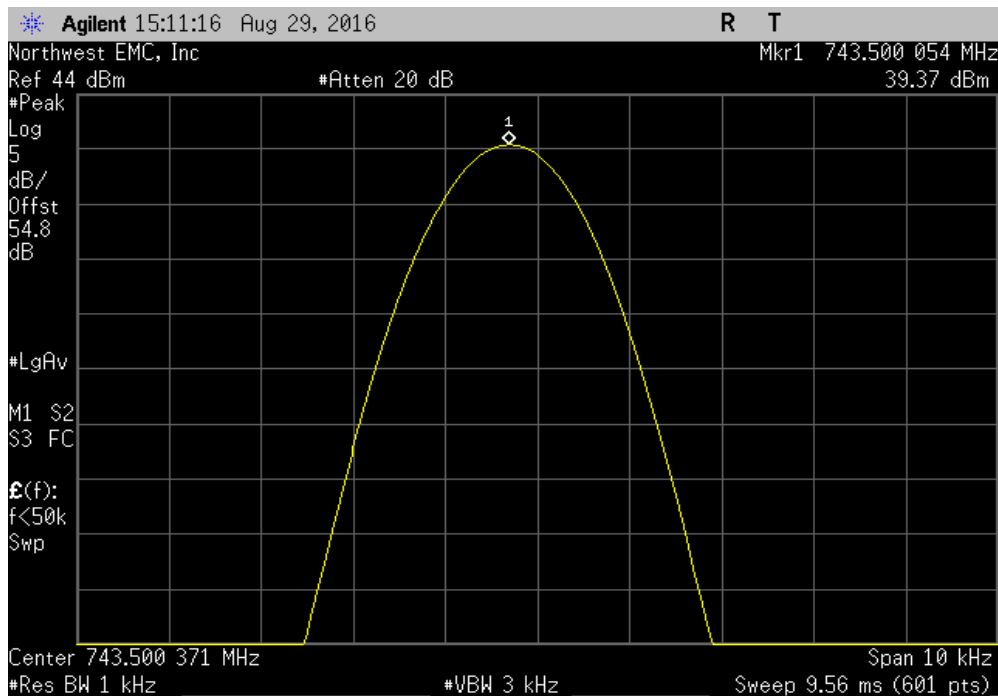


# FREQUENCY STABILITY

Antenna Port 1, Extreme Temperature, +50°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500067	737.5	0.1	1	Pass	

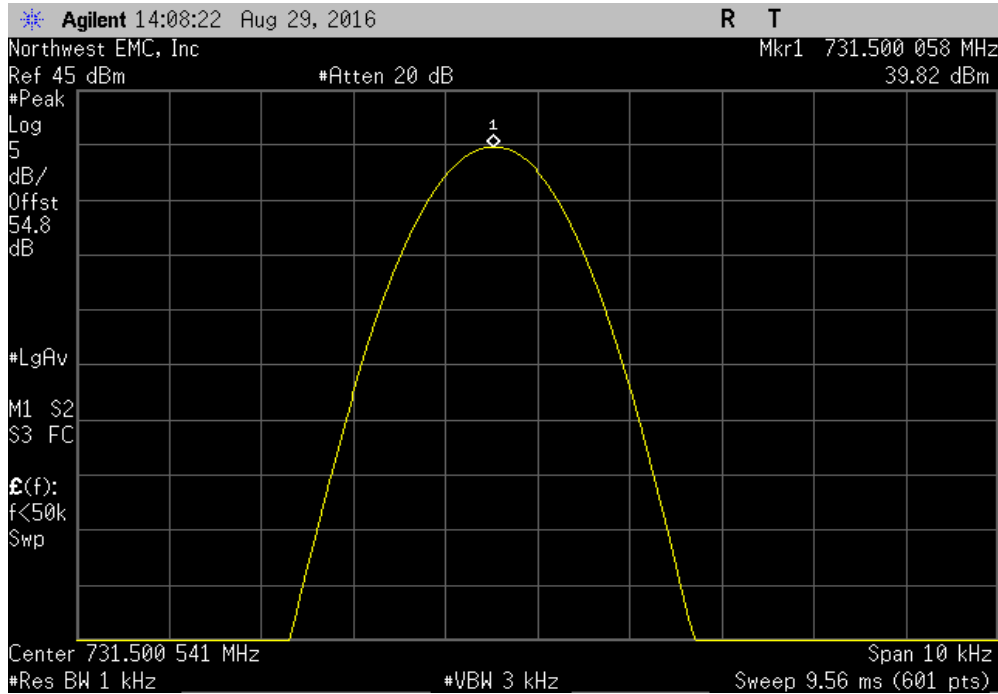


Antenna Port 1, Extreme Temperature, +50°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500054	743.5	0.1	1	Pass	

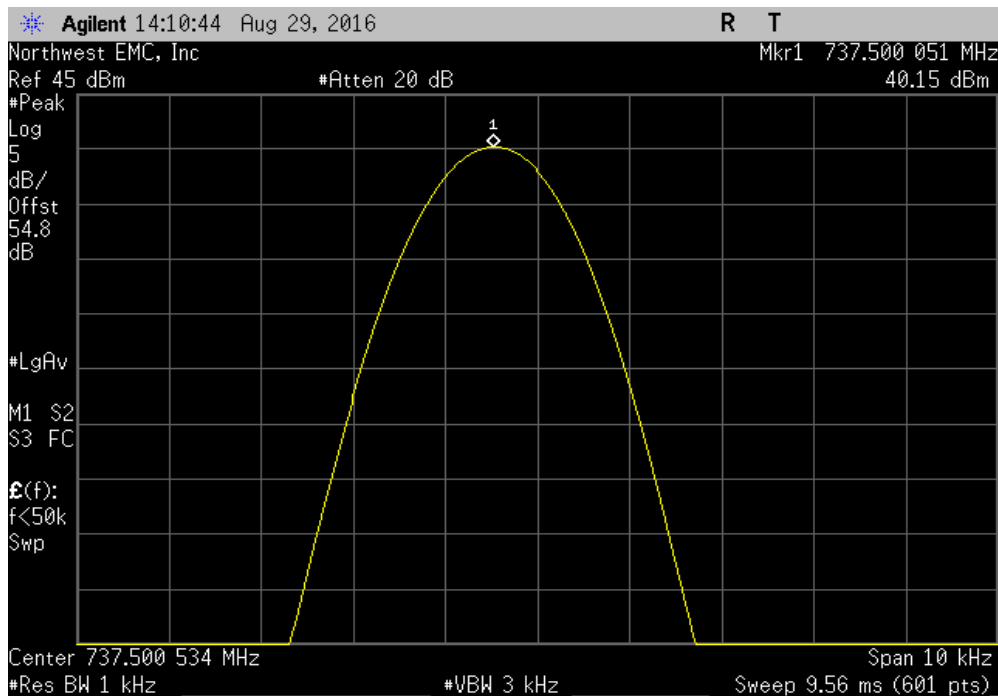


# FREQUENCY STABILITY

Antenna Port 2, Normal Temperature and Voltage, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	



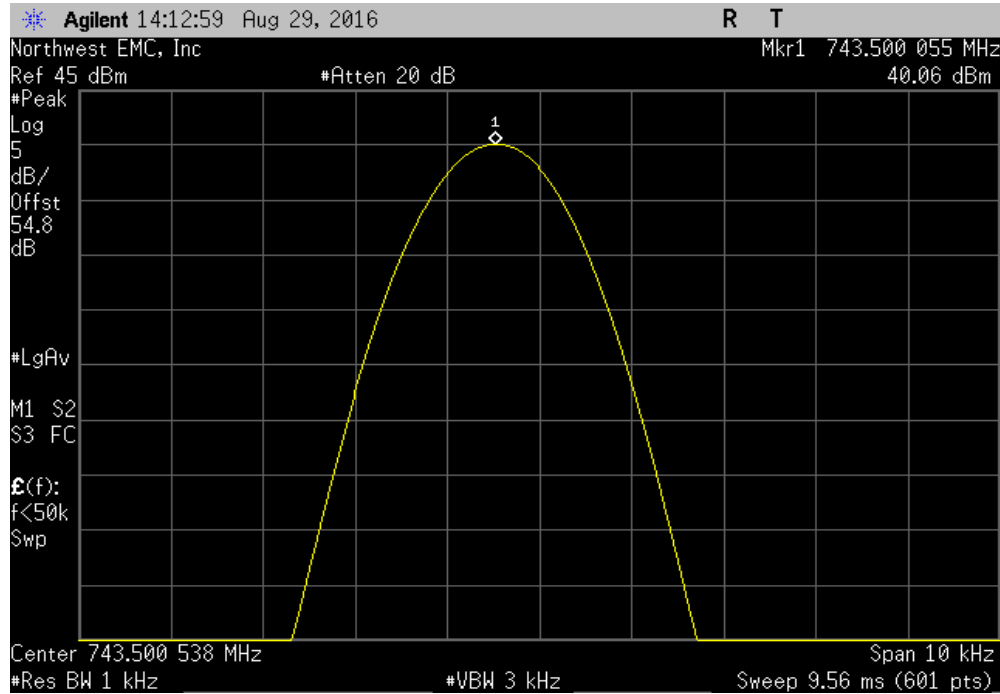
Antenna Port 2, Normal Temperature and Voltage, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	



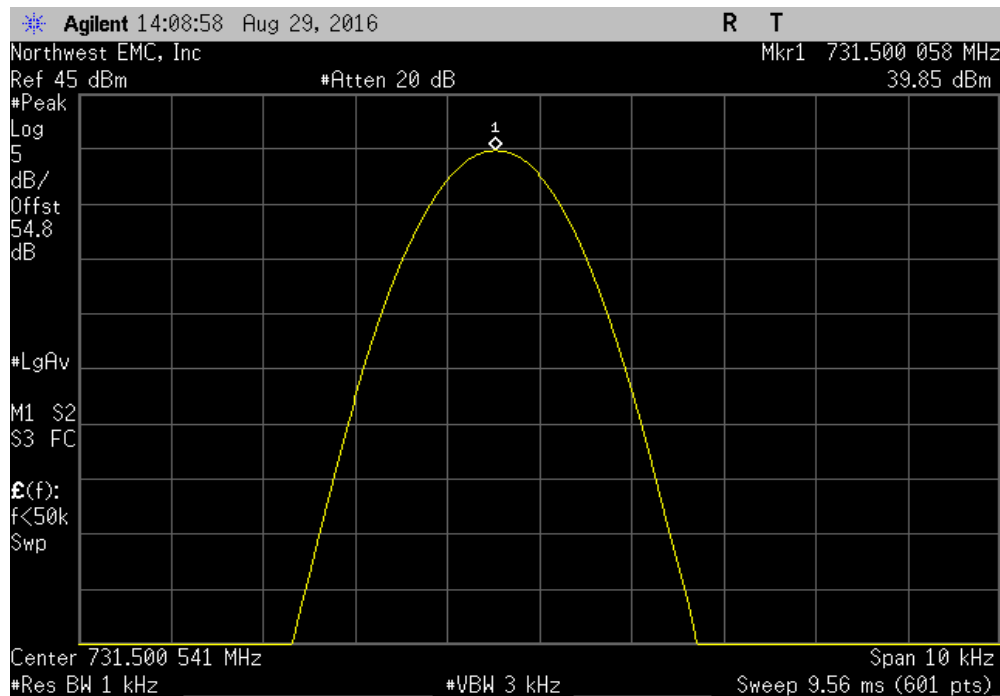


# FREQUENCY STABILITY

Antenna Port 2, Normal Temperature and Voltage, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

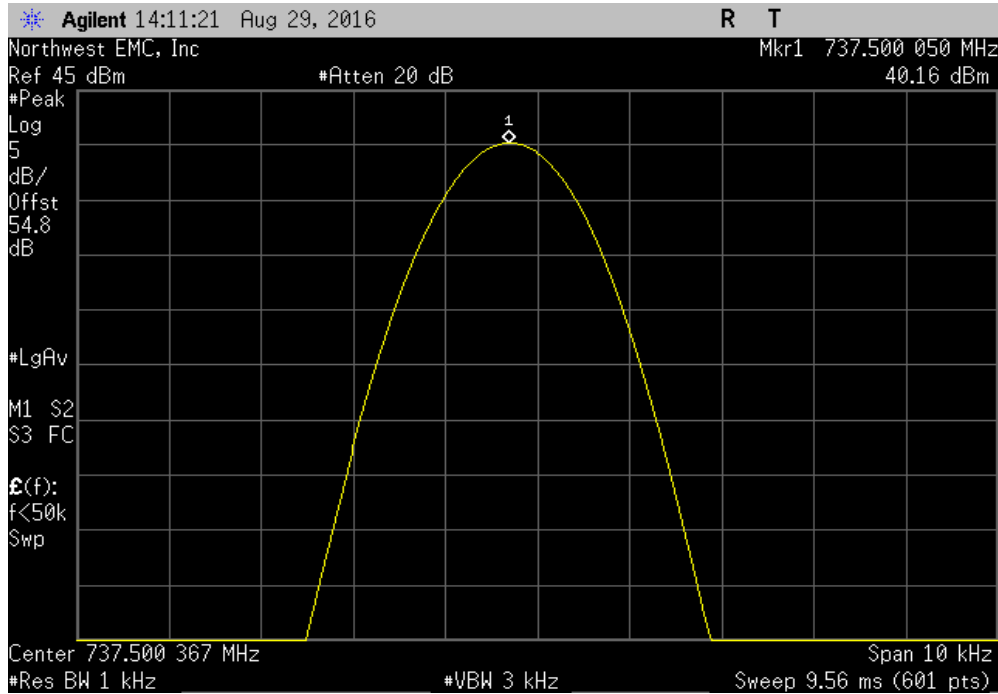


Antenna Port 2, Extreme Voltage, 55.2 VDC, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

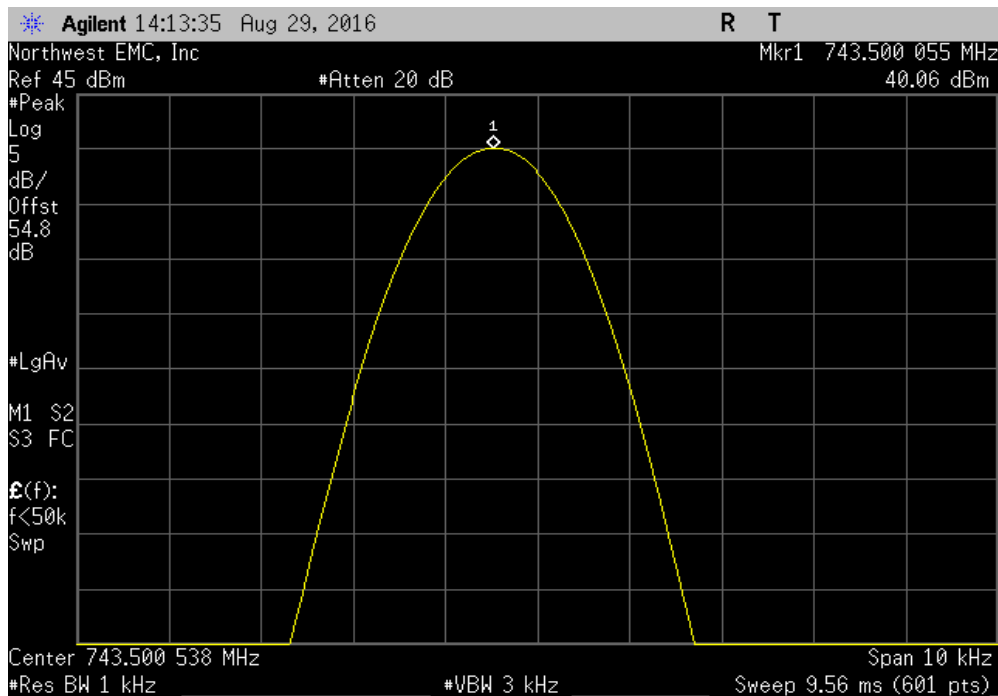


# FREQUENCY STABILITY

Antenna Port 2, Extreme Voltage, 55.2 VDC, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.50005	737.5	0.1	1	Pass	

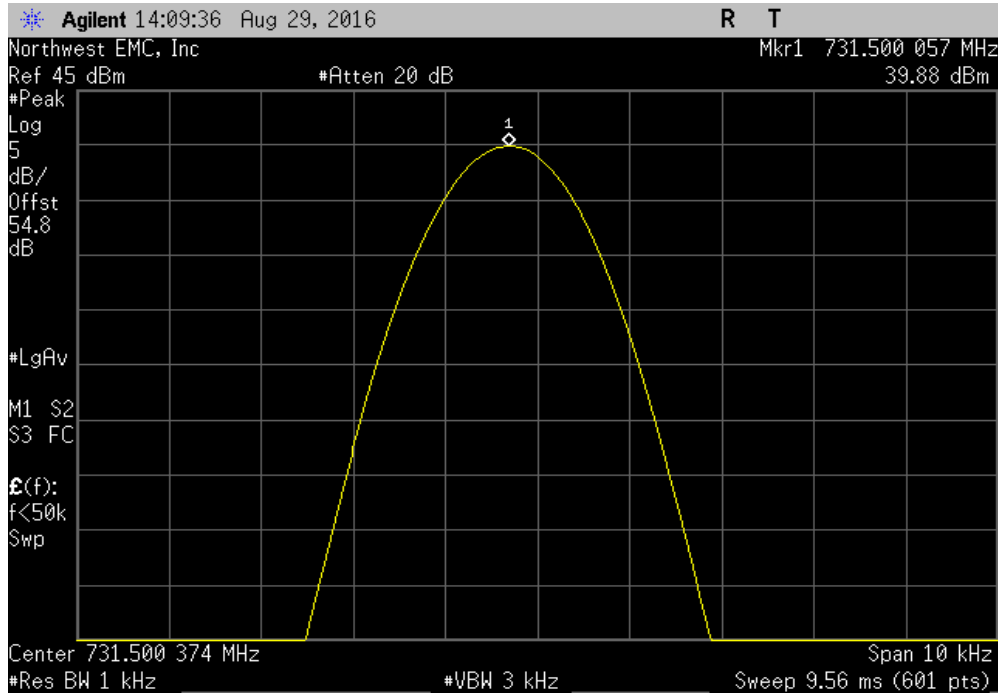


Antenna Port 2, Extreme Voltage, 55.2 VDC, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

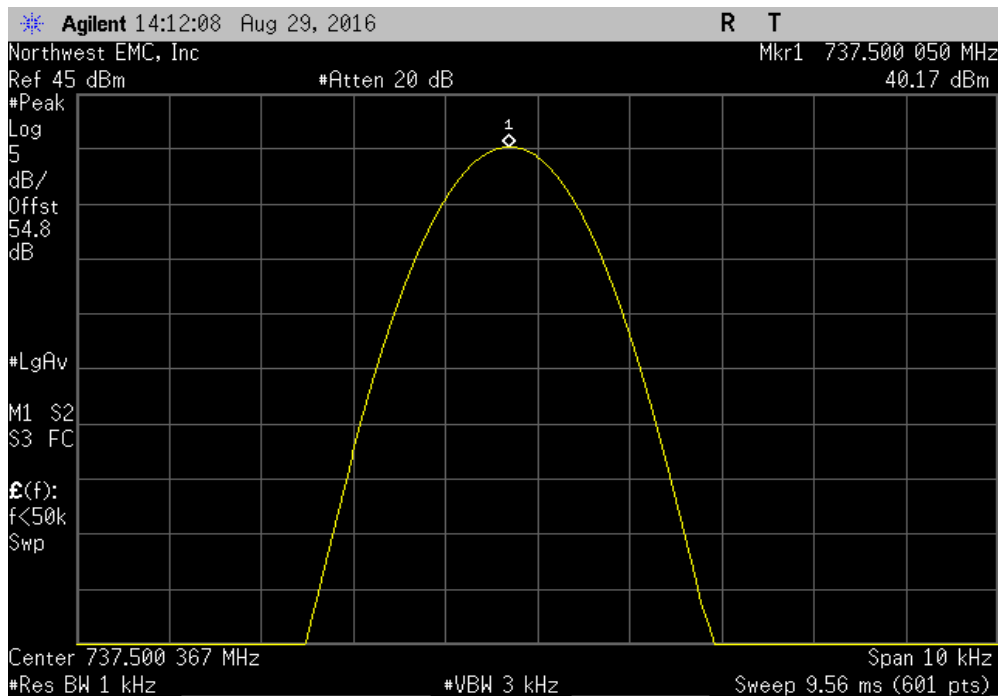


# FREQUENCY STABILITY

Antenna Port 2, Extreme Voltage, 40.8 VAC, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500057	731.5	0.1	1	Pass	

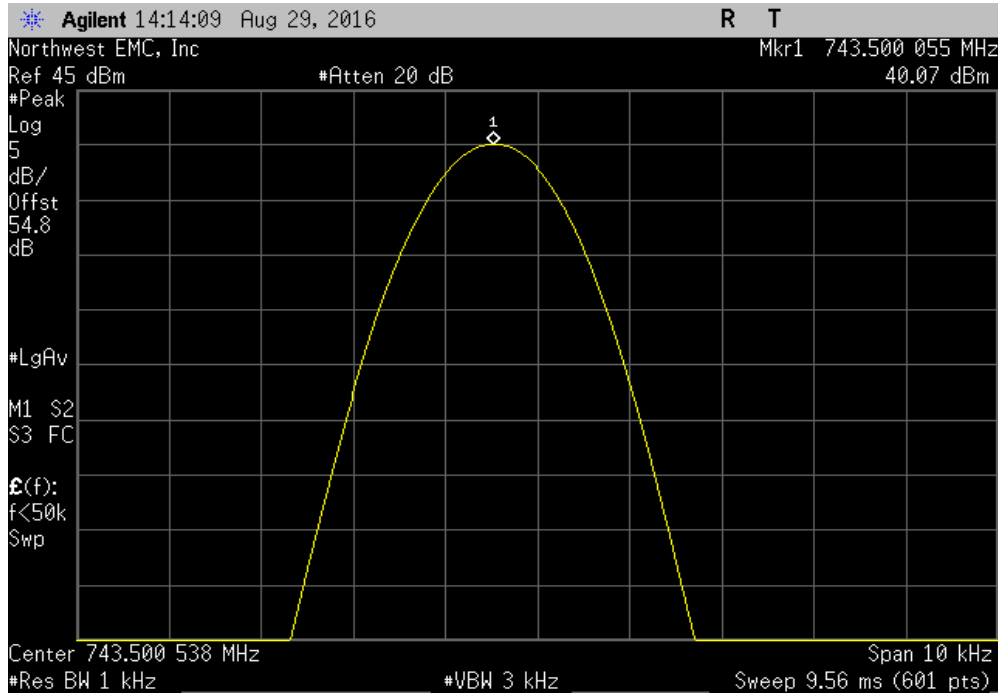


Antenna Port 2, Extreme Voltage, 40.8 VAC, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500005	737.5	0.1	1	Pass	

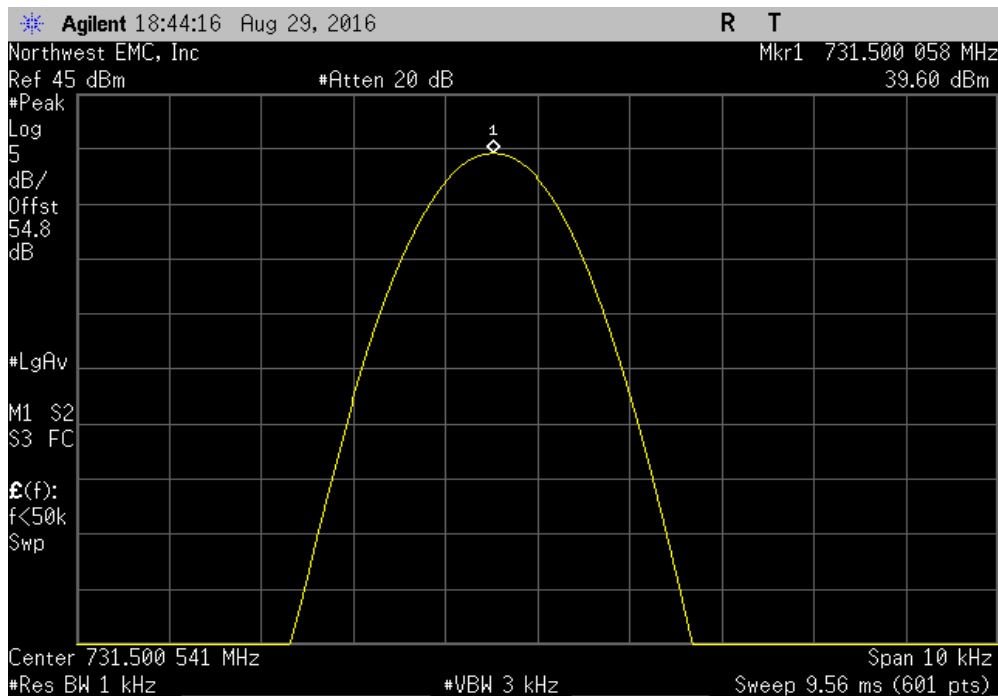


# FREQUENCY STABILITY

Antenna Port 2, Extreme Voltage, 40.8 VAC, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

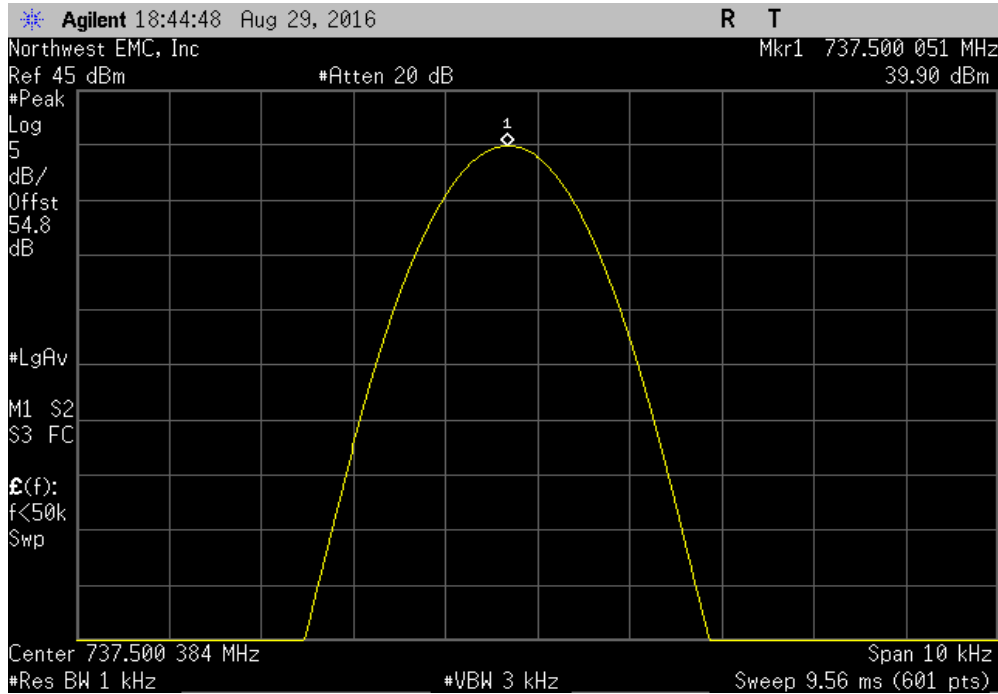


Antenna Port 2, Extreme Temperature, -30°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

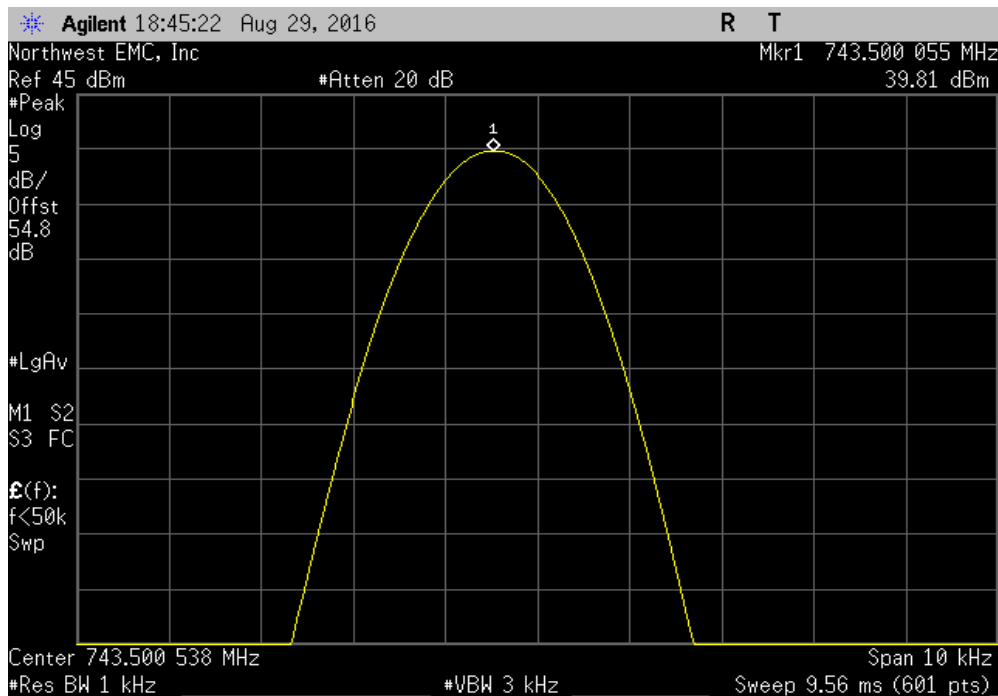


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -30°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

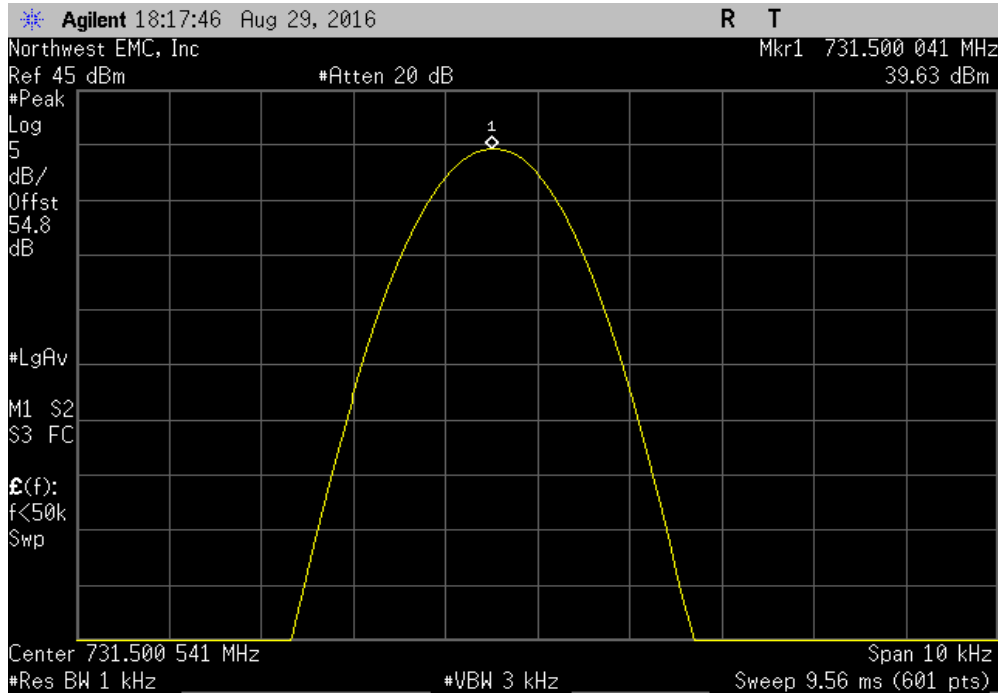


Antenna Port 2, Extreme Temperature, -30°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

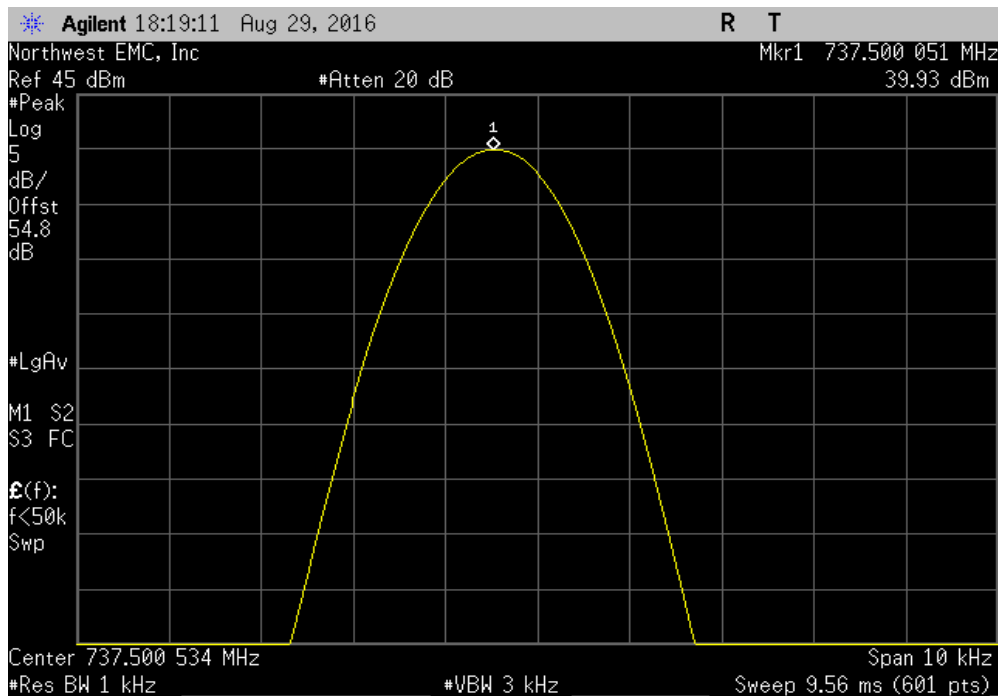


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -20°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500041	731.5	0.1	1	Pass	

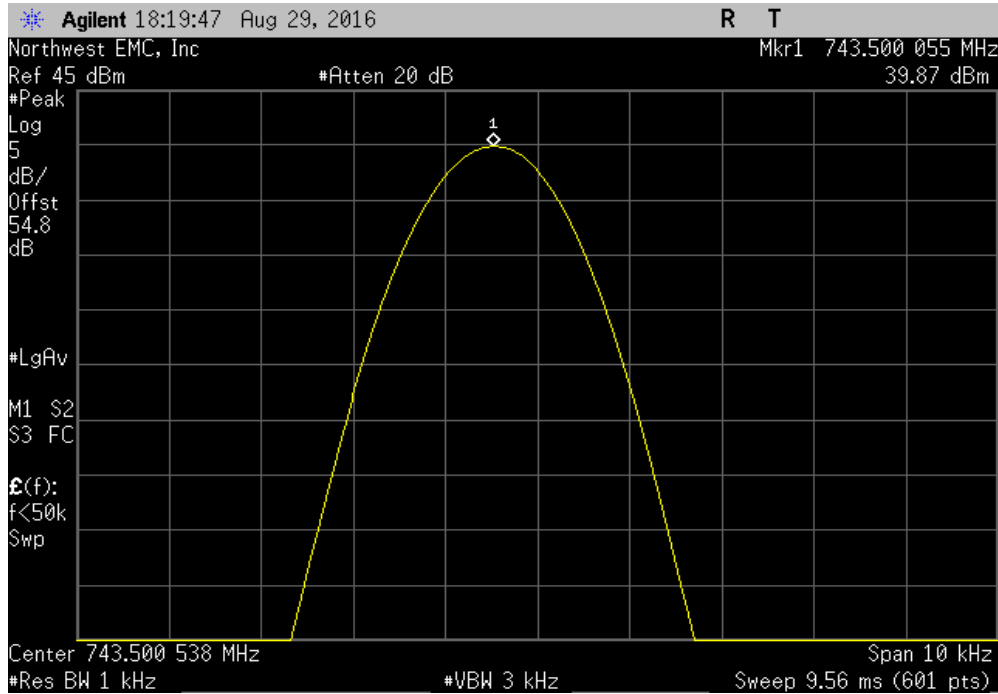


Antenna Port 2, Extreme Temperature, -20°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

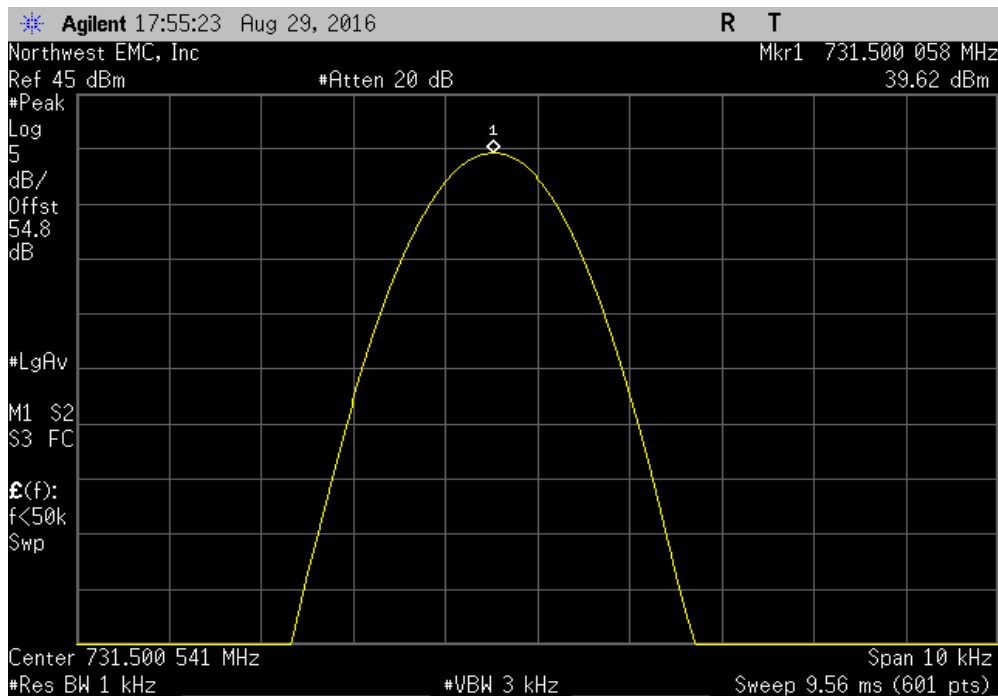


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -20°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

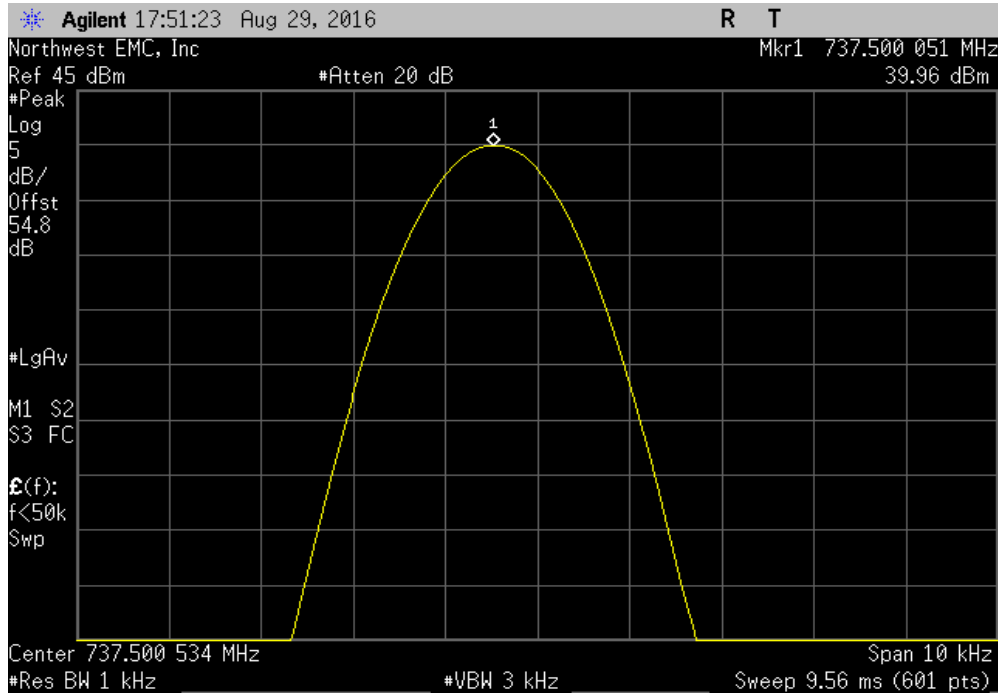


Antenna Port 2, Extreme Temperature, -10°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

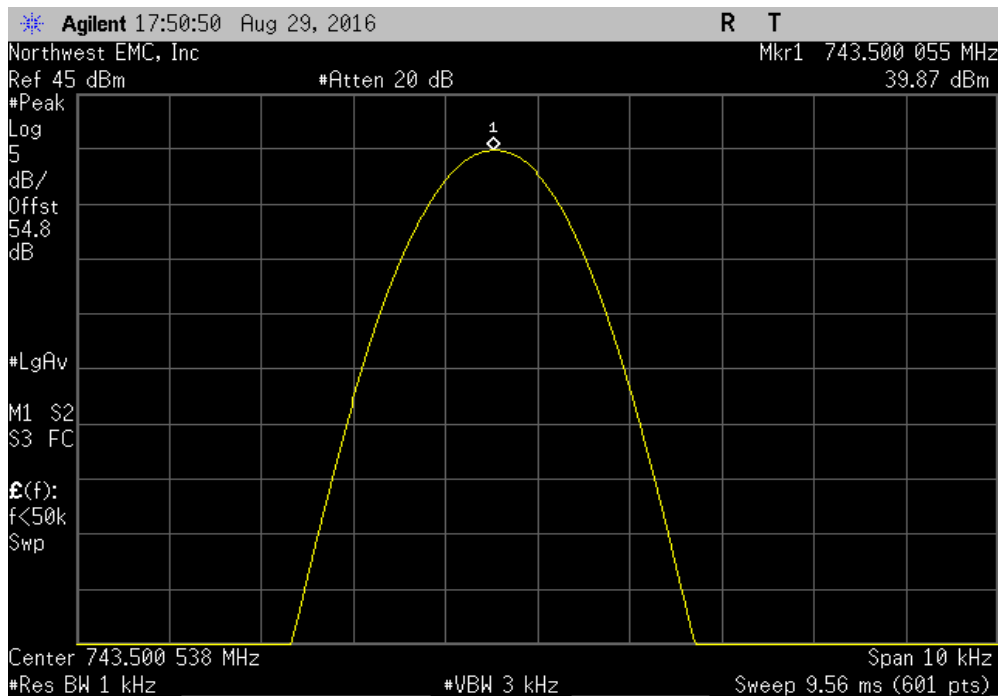


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, -10°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	



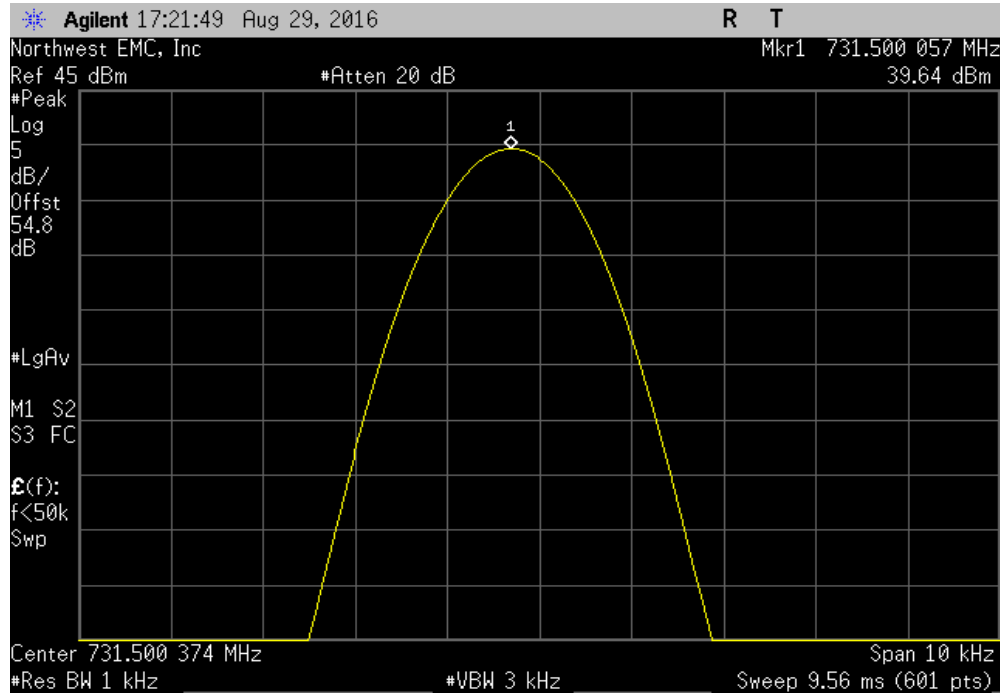
Antenna Port 2, Extreme Temperature, -10°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	



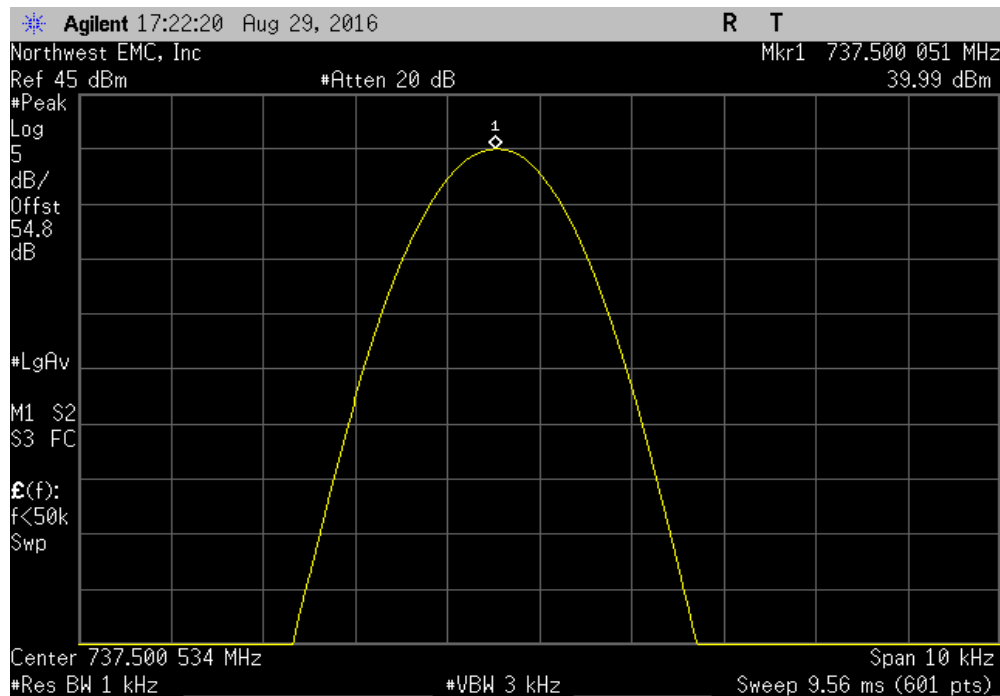


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, 0°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500057	731.5	0.1	1	Pass	

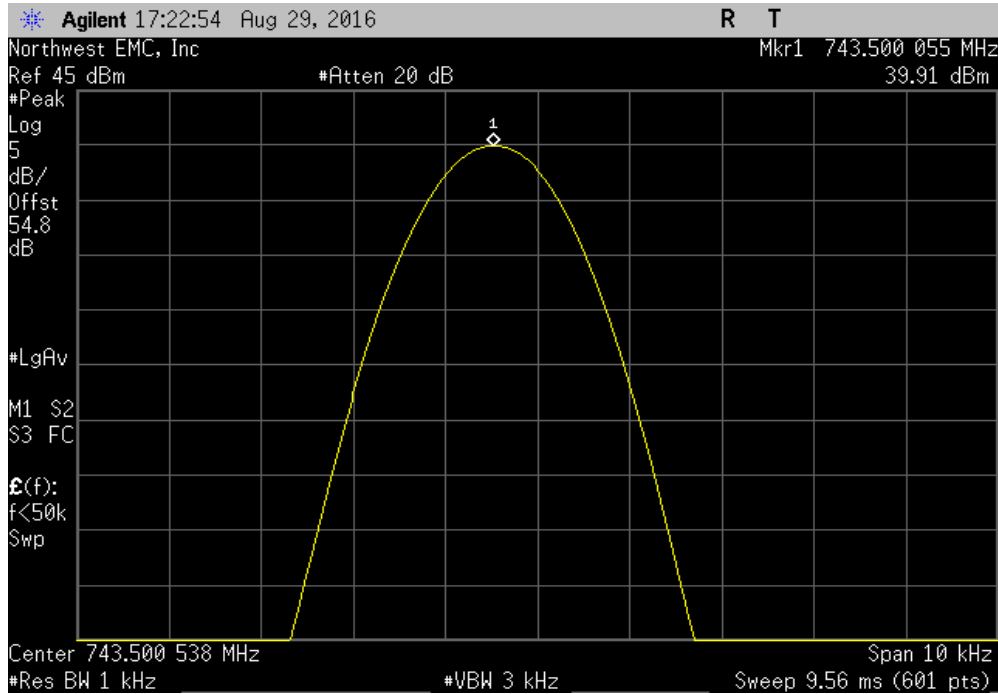


Antenna Port 2, Extreme Temperature, 0°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

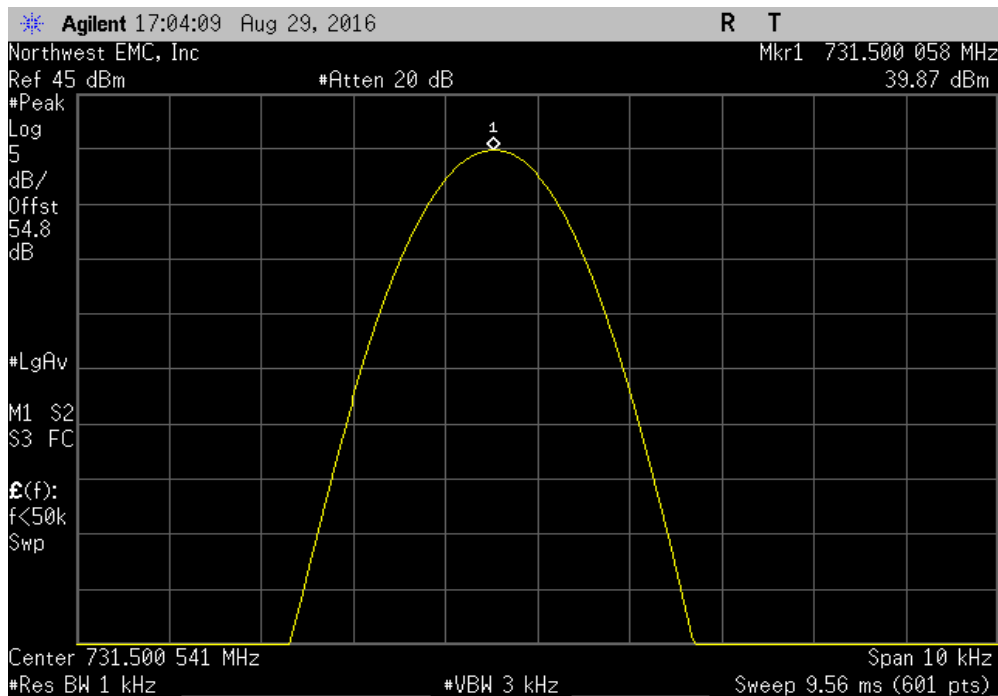


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, 0°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

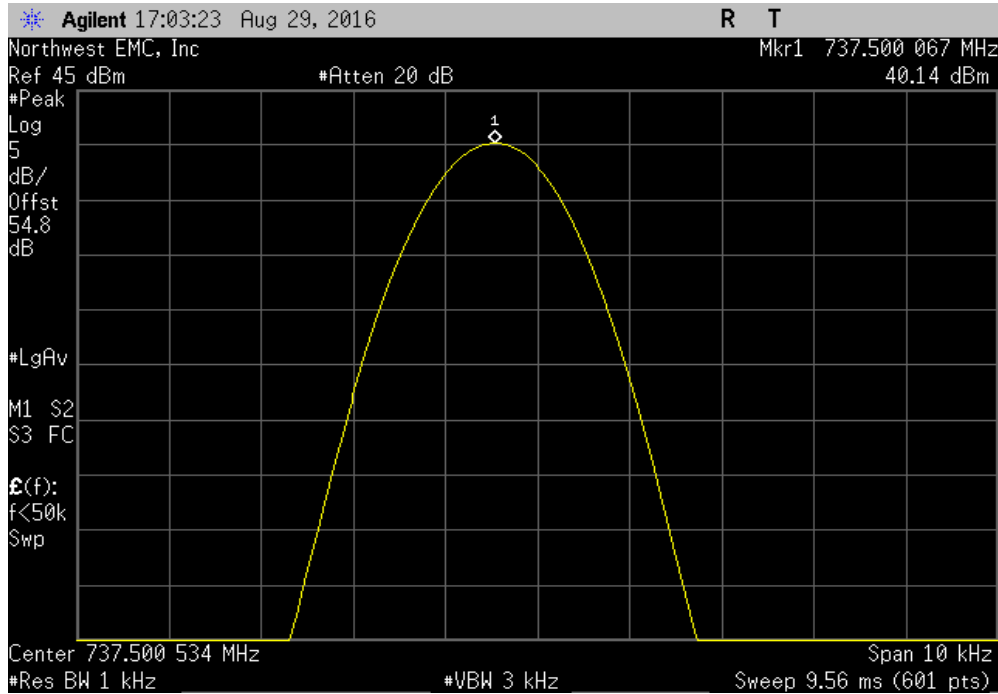


Antenna Port 2, Extreme Temperature, +10°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

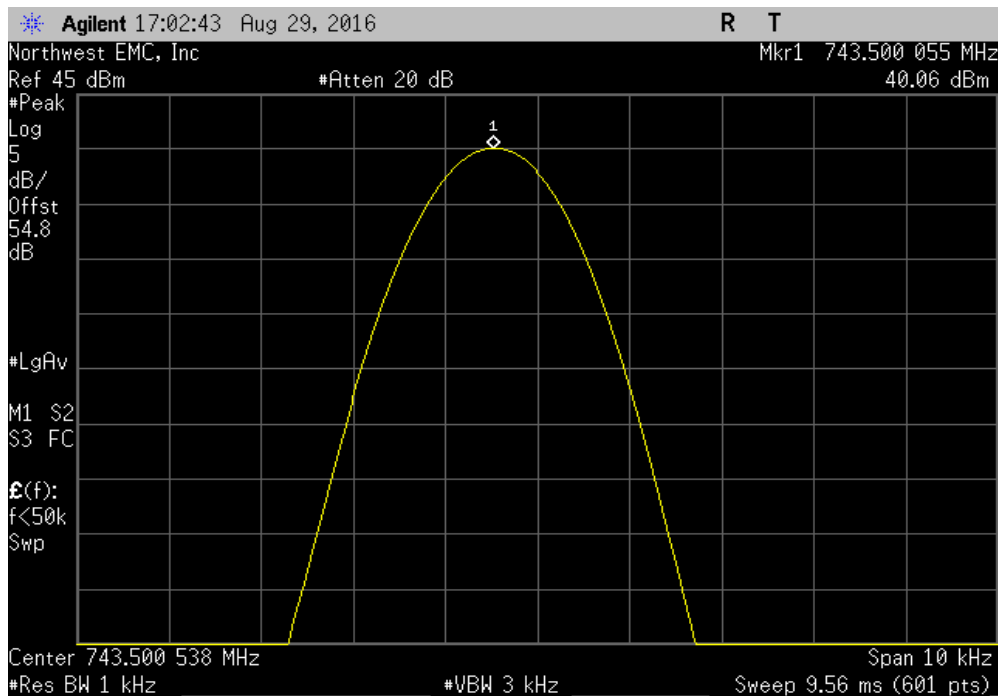


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +10°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500067	737.5	0.1	1	Pass	

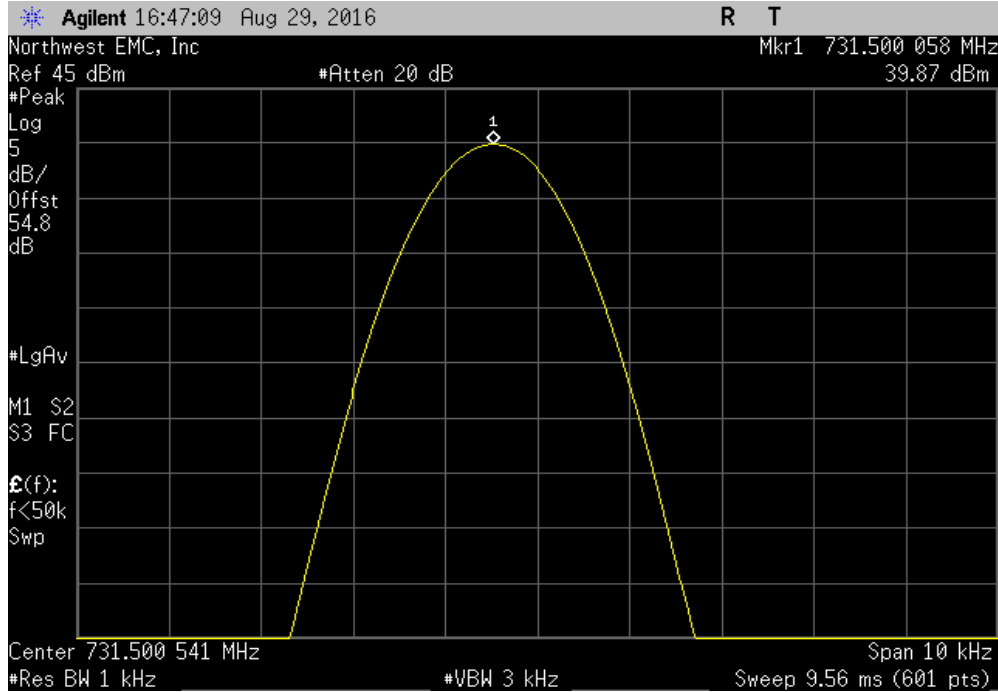


Antenna Port 2, Extreme Temperature, +10°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

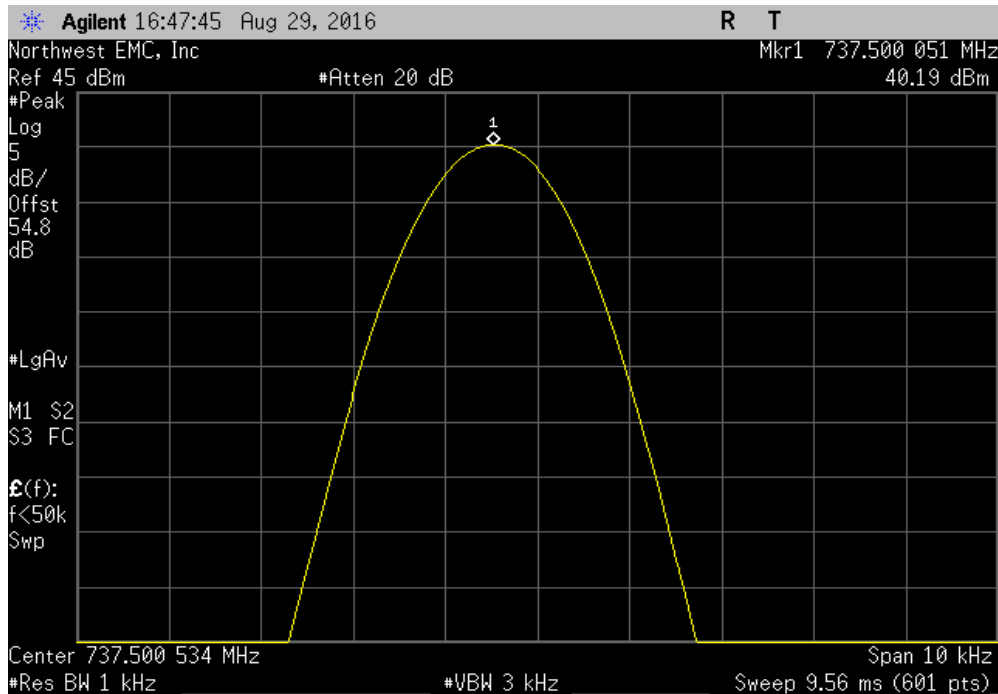


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +20°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

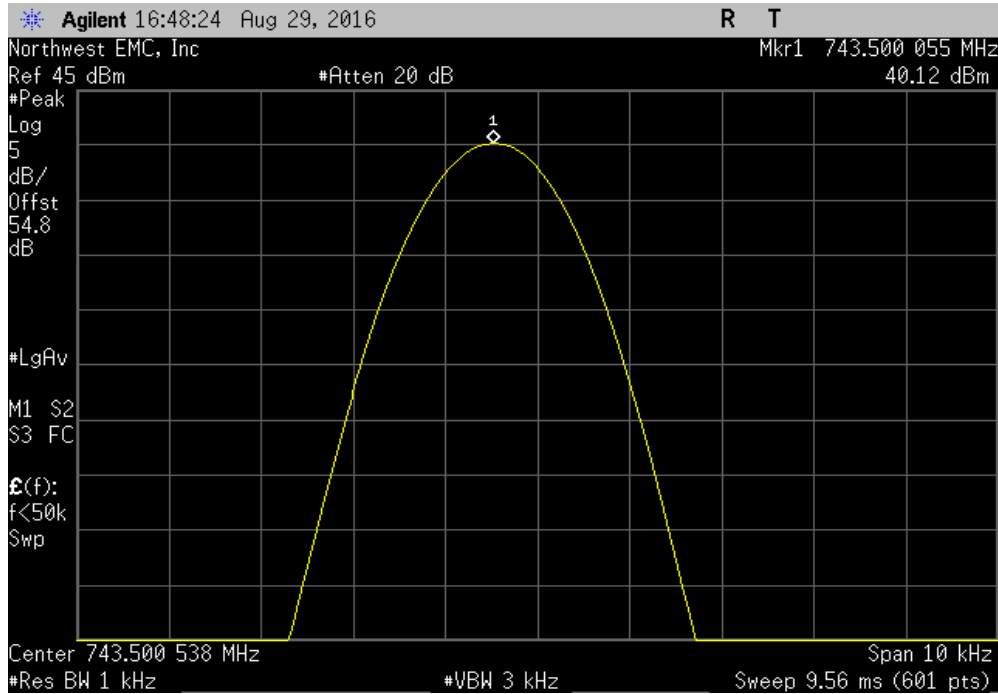


Antenna Port 2, Extreme Temperature, +20°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

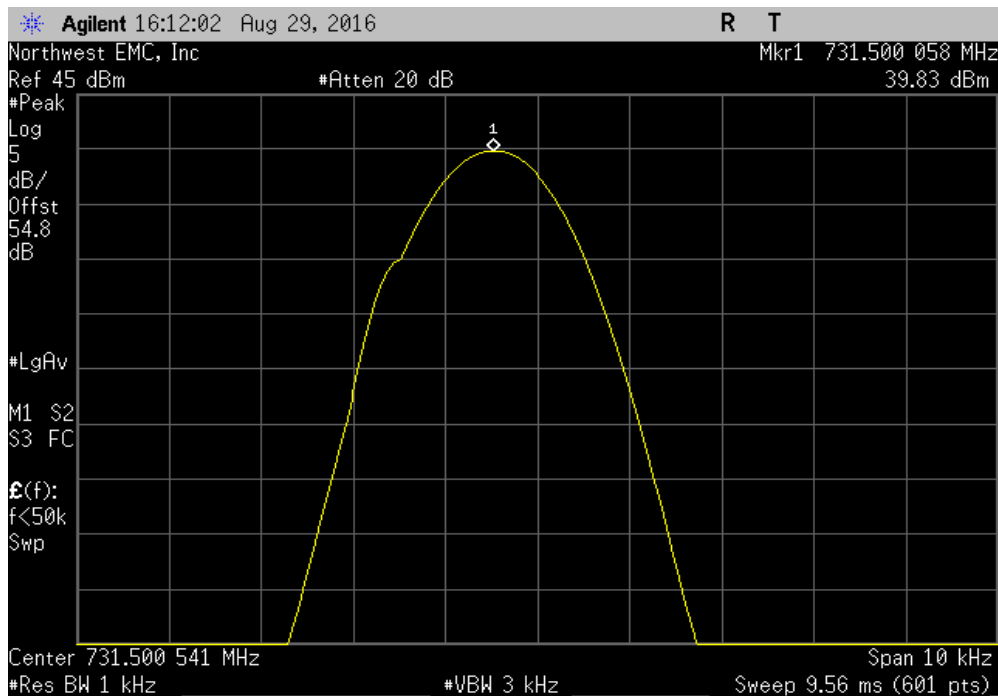


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +20°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	

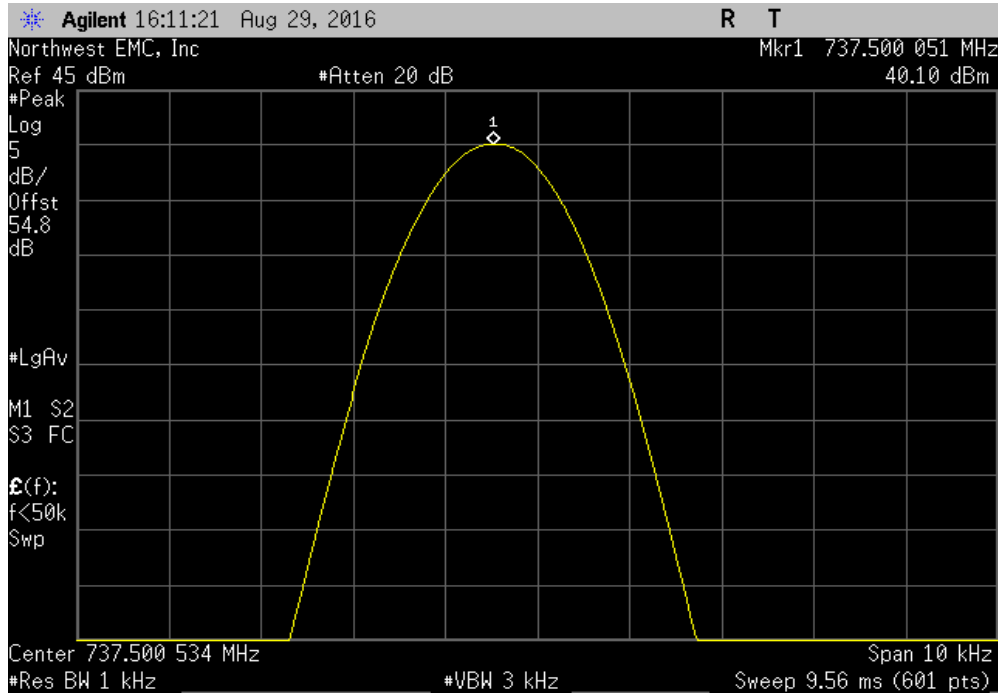


Antenna Port 2, Extreme Temperature, +30°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	

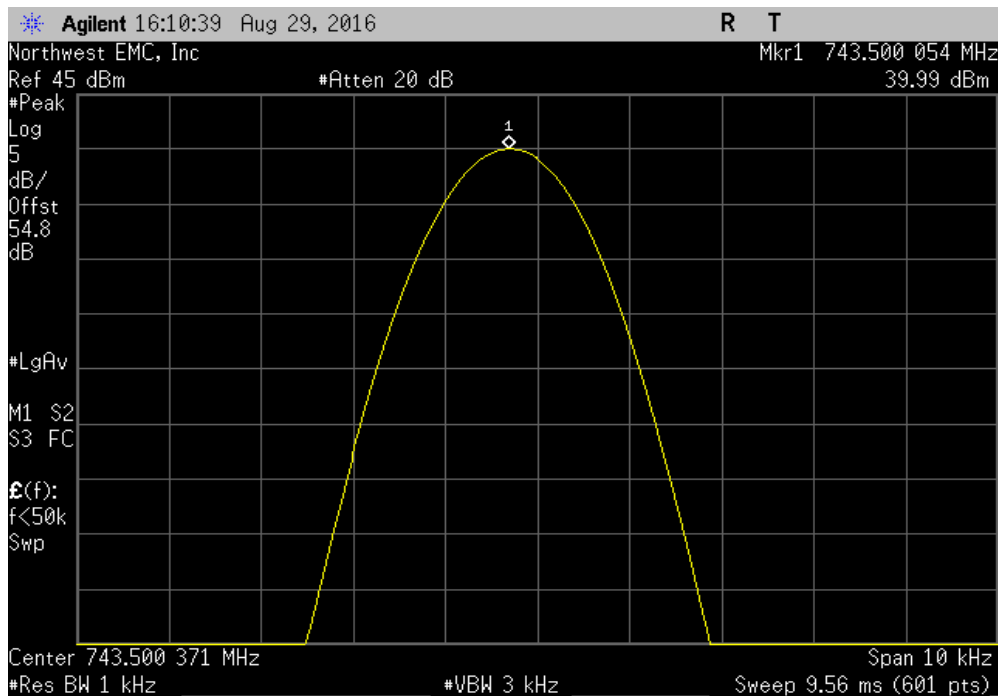


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +30°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500051	737.5	0.1	1	Pass	

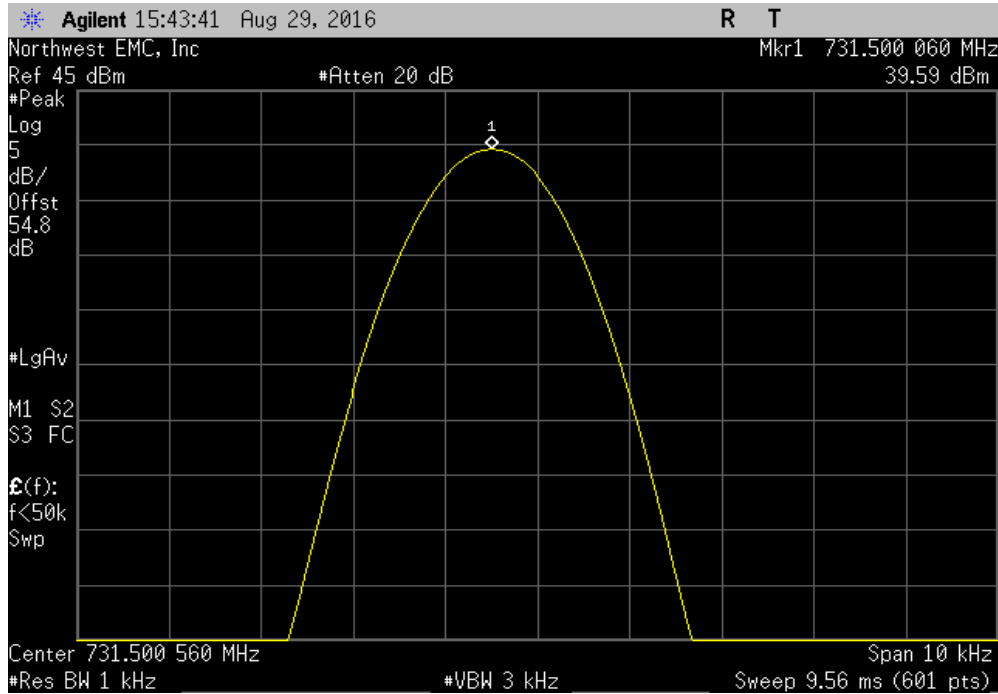


Antenna Port 2, Extreme Temperature, +30°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500054	743.5	0.1	1	Pass	

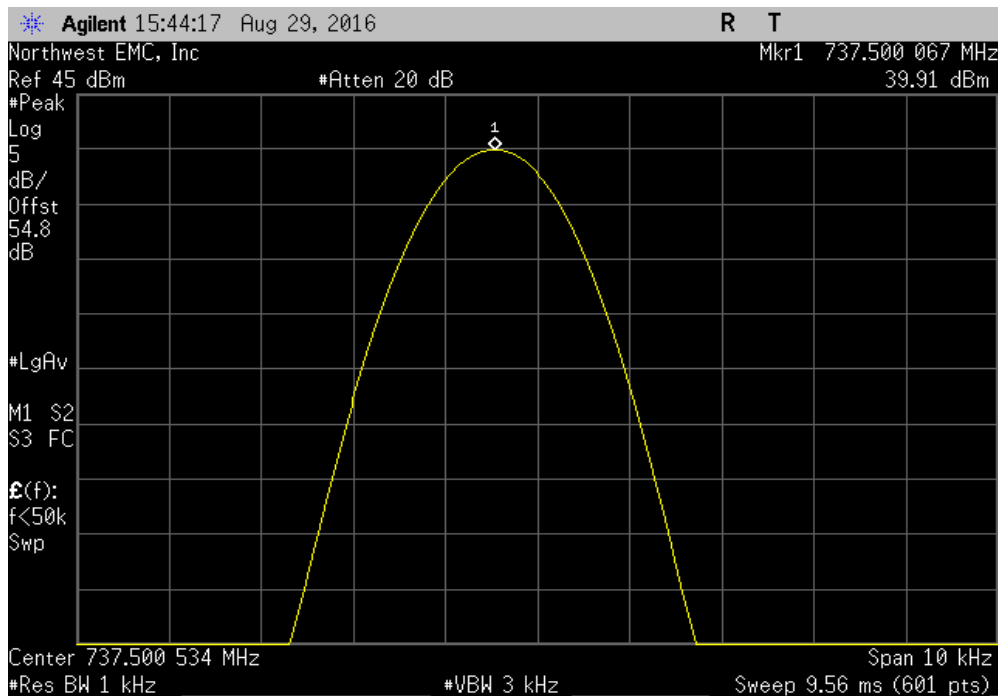


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +40°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.50006	731.5	0.1	1	Pass	

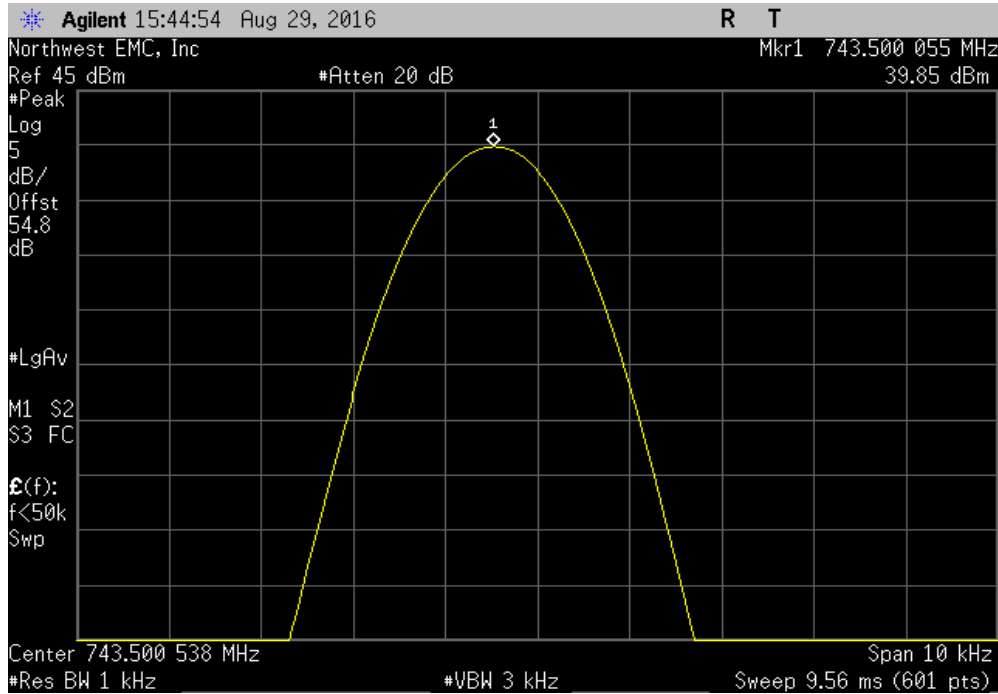


Antenna Port 2, Extreme Temperature, +40°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.500067	737.5	0.1	1	Pass	

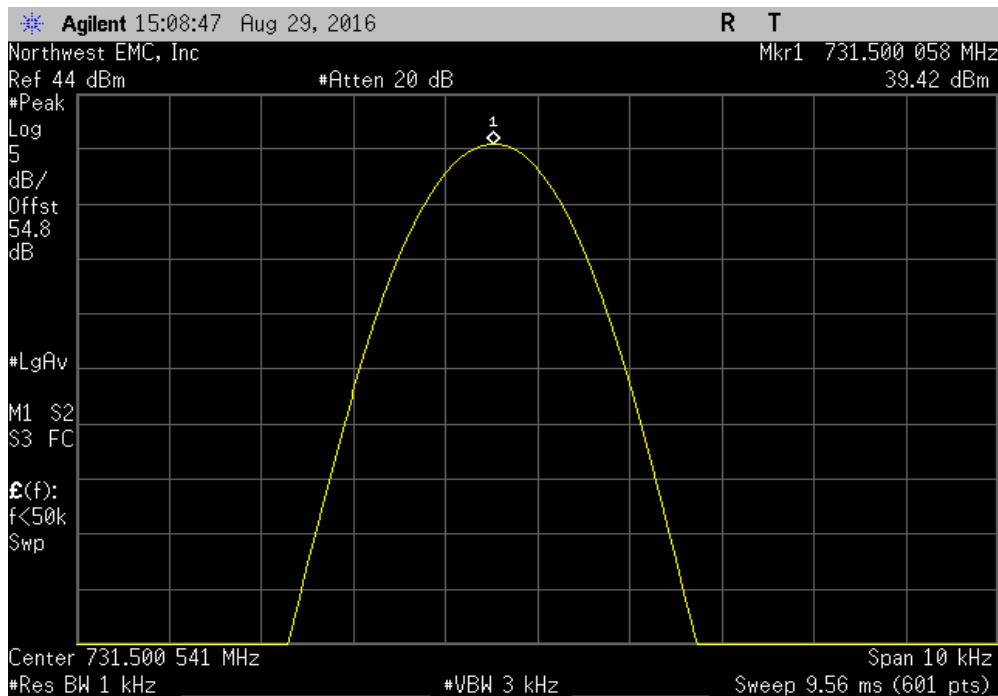


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +40°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	



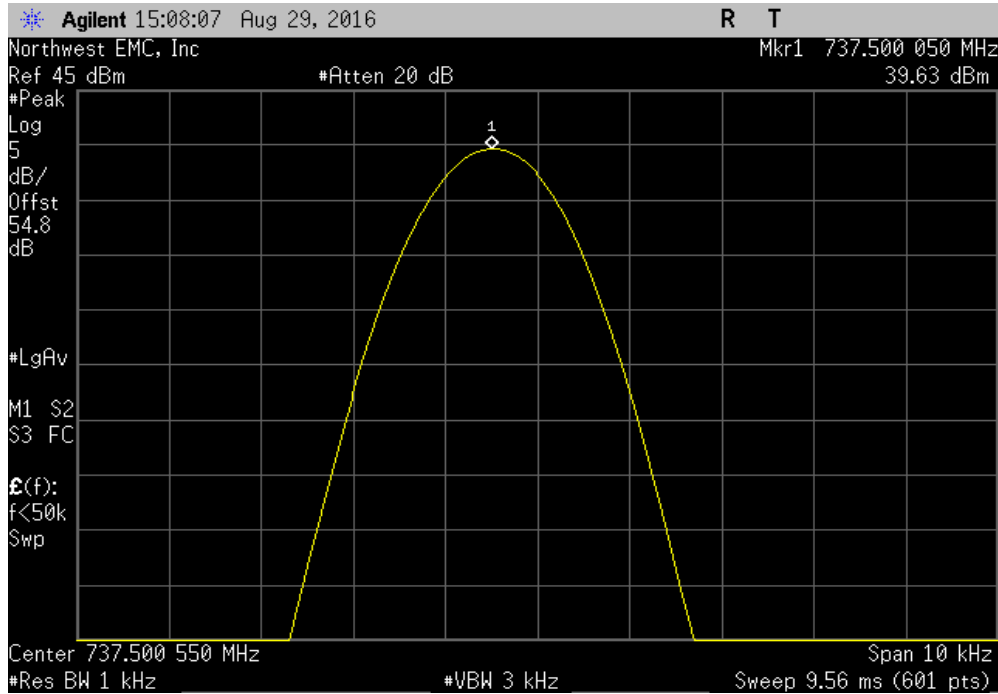
Antenna Port 2, Extreme Temperature, +50°C, Low Channel, 731.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	731.500058	731.5	0.1	1	Pass	



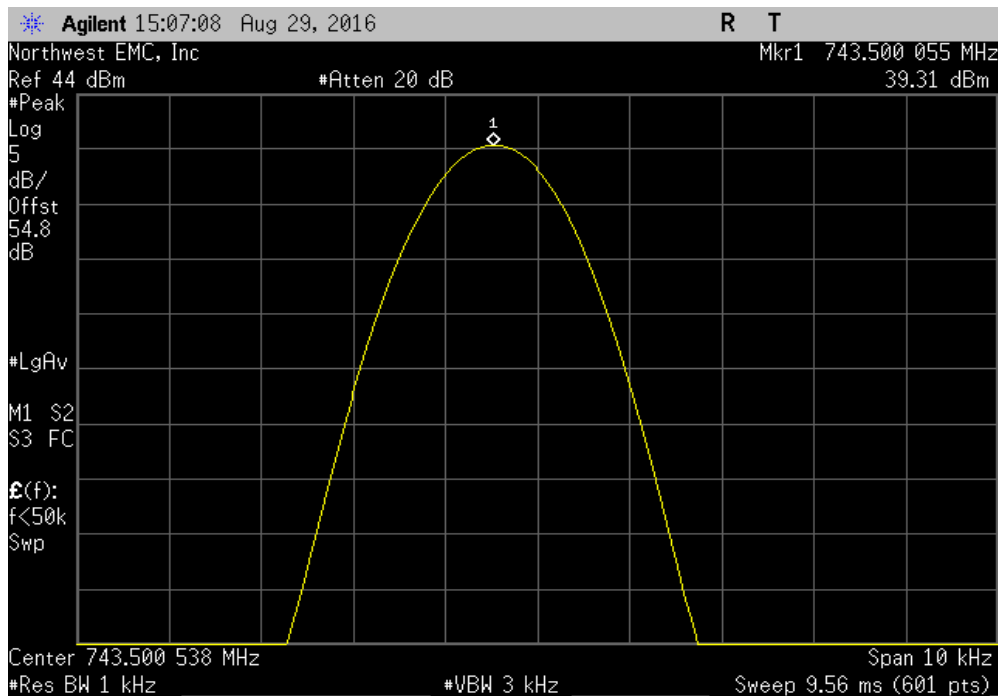


# FREQUENCY STABILITY

Antenna Port 2, Extreme Temperature, +50°C, Mid Channel, 737.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	737.50005	737.5	0.1	1	Pass	



Antenna Port 2, Extreme Temperature, +50°C, High Channel, 743.5 MHz						
	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results	
	743.500055	743.5	0.1	1	Pass	



# OCCUPIED BANDWIDTH - BAND 12

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 - BAND 12

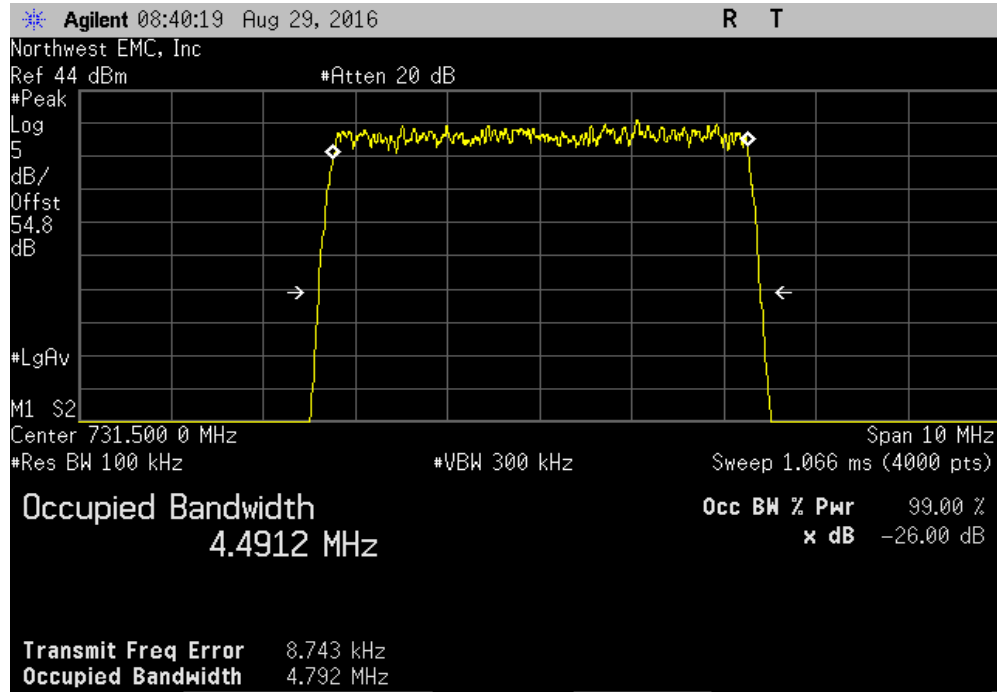


XMIT 2016.05.06

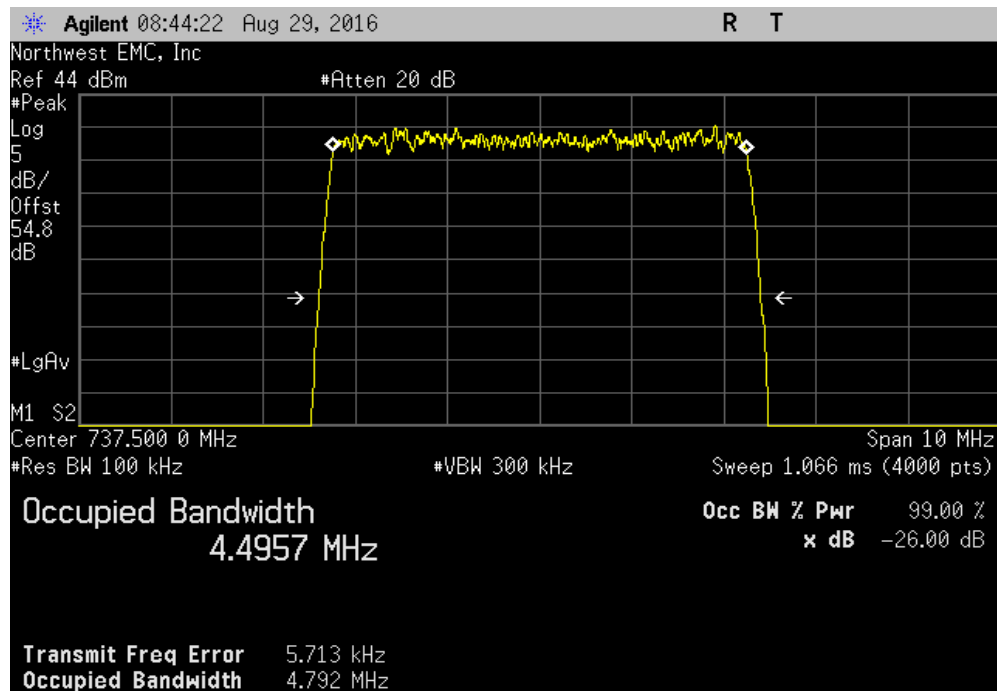
EUT: CWS-3050-12		Work Order: KMWC0074	
Serial Number: K163300001		Date: 08/29/16	
Customer: Parallel Wireless Inc.		Temperature: 21.4 °C	
Attendees: Andy Ku		Humidity: 46.4% RH	
Project: None		Barometric Pres.: 1017 mbar	
Tested by: Johnny Candelas		Power: 48 VDC	
		Job Site: OC13	
TEST SPECIFICATIONS		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 = 54.8dB total.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value	Limit
Antenna Port 1			
	Low Channel LTE5, 731.5 MHz	4.792 MHz	N/A
	Mid Channel LTE5, 737.5 MHz	4.792 MHz	N/A
	High Channel LTE5, 743.5 MHz	4.784 MHz	N/A
	Low Channel LTE10, 734 MHz	9.562 MHz	N/A
	Mid Channel LTE10, 737.5 MHz	9.556 MHz	N/A
	High Channel LTE10, 741 MHz	9.550 MHz	N/A
Antenna Port 2			
	Low Channel LTE5, 731.5 MHz	4.826 MHz	N/A
	Mid Channel LTE5, 737.5 MHz	4.805 MHz	N/A
	High Channel LTE5, 743.5 MHz	4.786 MHz	N/A
	Low Channel LTE10, 734 MHz	9.609 MHz	N/A
	Mid Channel LTE10, 737.5 MHz	9.554 MHz	N/A
	High Channel LTE10, 741 MHz	9.582 MHz	N/A

# OCCUPIED BANDWIDTH - BAND 12

Antenna Port 1, Low Channel LTE5, 731.5 MHz						
				Value	Limit	Result
				4.792 MHz	N/A	N/A

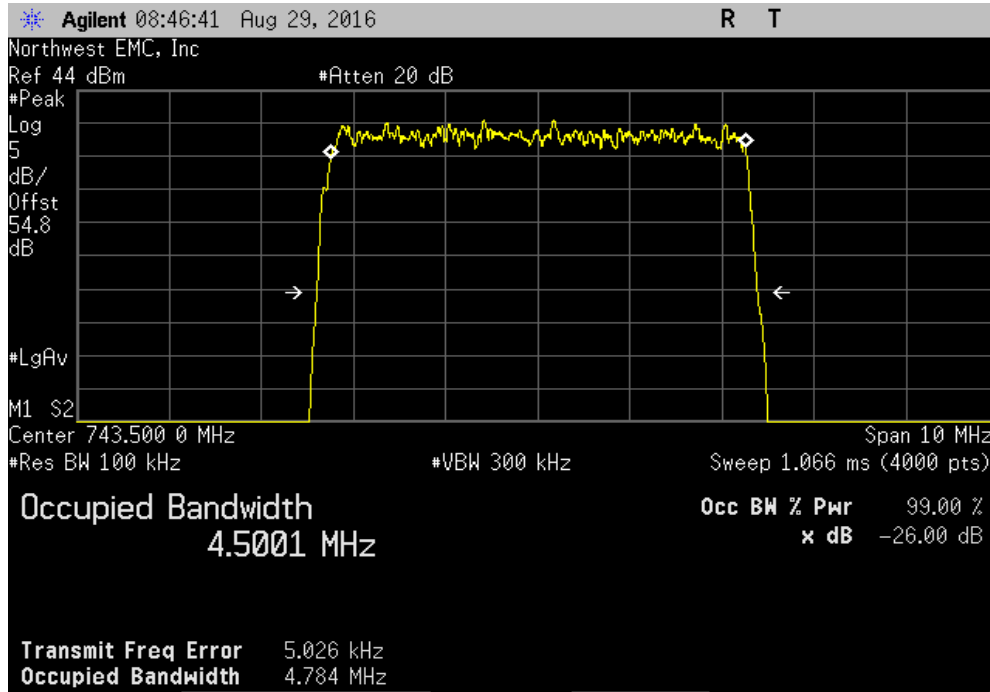


Antenna Port 1, Mid Channel LTE5, 737.5 MHz						
				Value	Limit	Result
				4.792 MHz	N/A	N/A

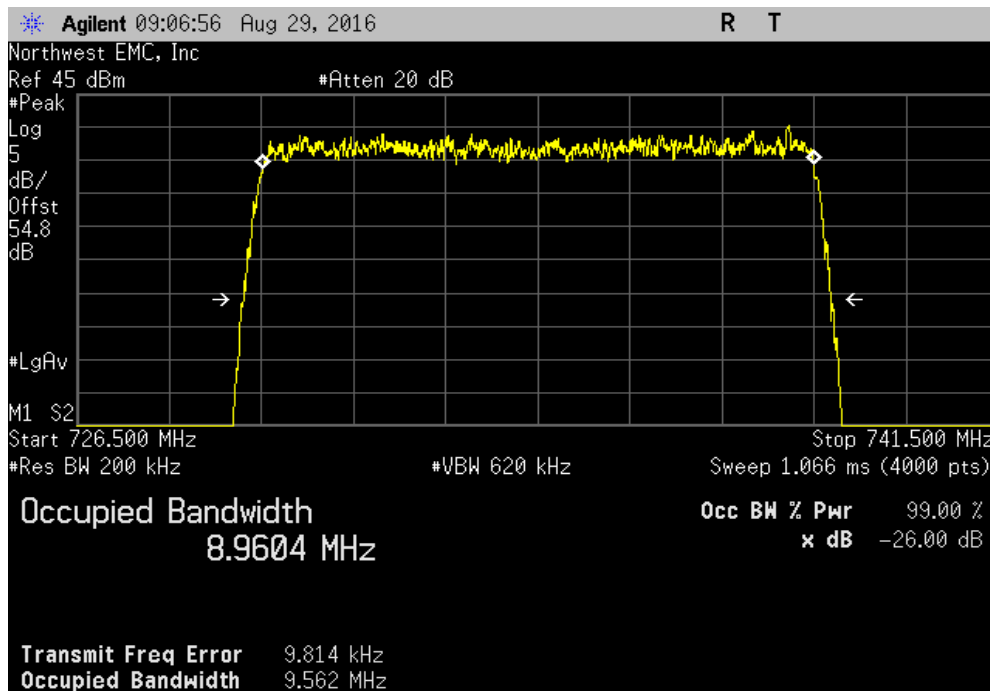


# OCCUPIED BANDWIDTH - BAND 12

Antenna Port 1, High Channel LTE5, 743.5 MHz						
				Value	Limit	Result
				4.784 MHz	N/A	N/A

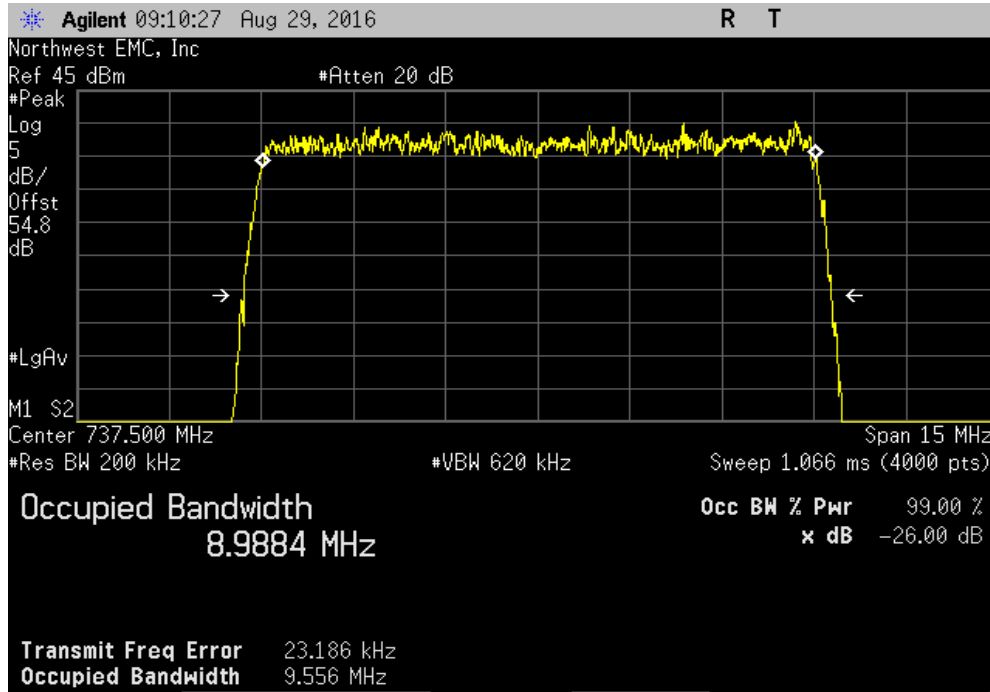


Antenna Port 1, Low Channel LTE10, 734 MHz						
				Value	Limit	Result
				9.562 MHz	N/A	N/A

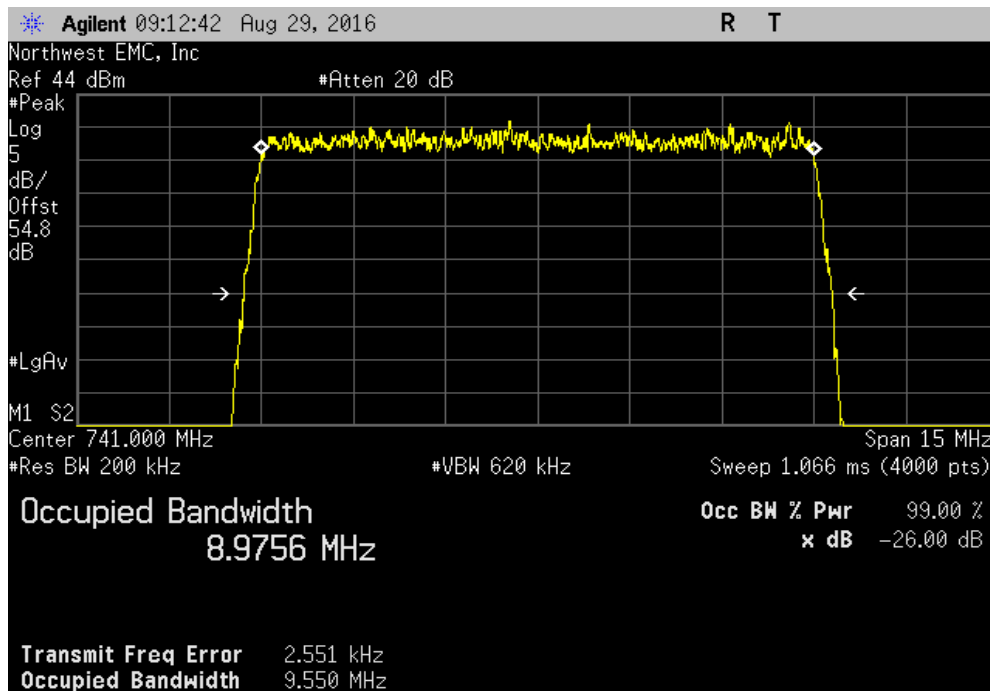


# OCCUPIED BANDWIDTH - BAND 12

Antenna Port 1, Mid Channel LTE10, 737.5 MHz						
				Value	Limit	Result
				9.556 MHz	N/A	N/A

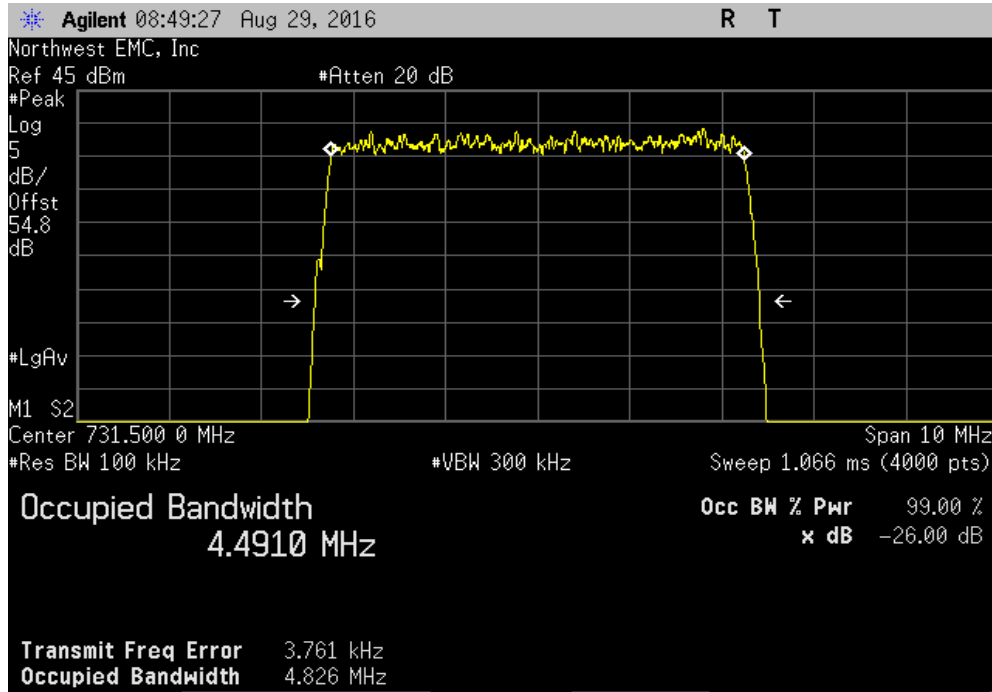


Antenna Port 1, High Channel LTE10, 741 MHz						
				Value	Limit	Result
				9.550 MHz	N/A	N/A

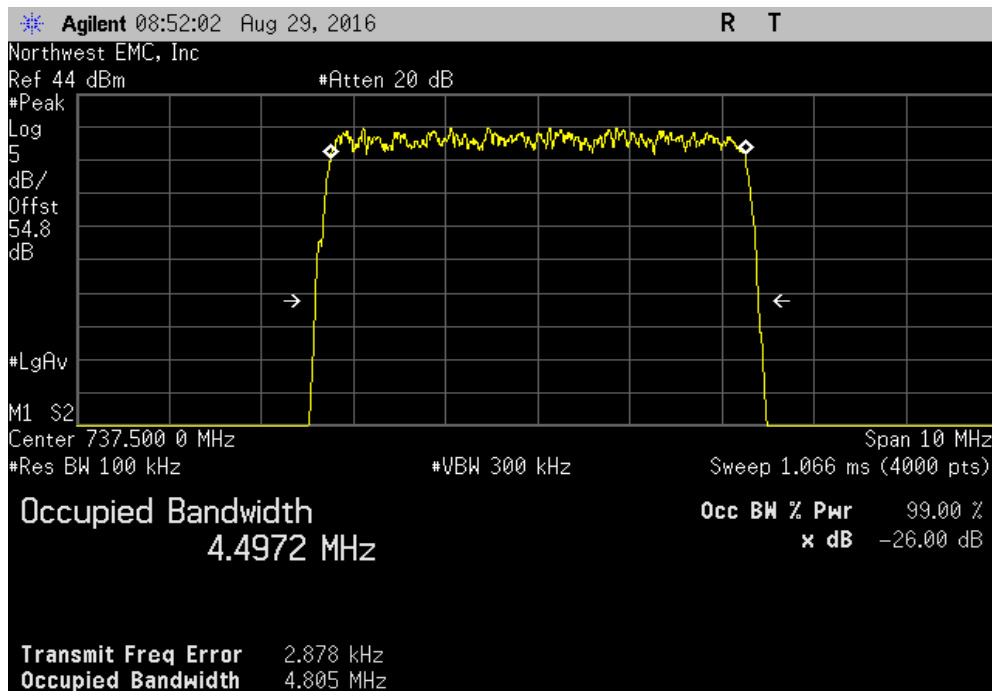


# OCCUPIED BANDWIDTH - BAND 12

Antenna Port 2, Low Channel LTE5, 731.5 MHz						
				Value	Limit	Result
				4.826 MHz	N/A	N/A

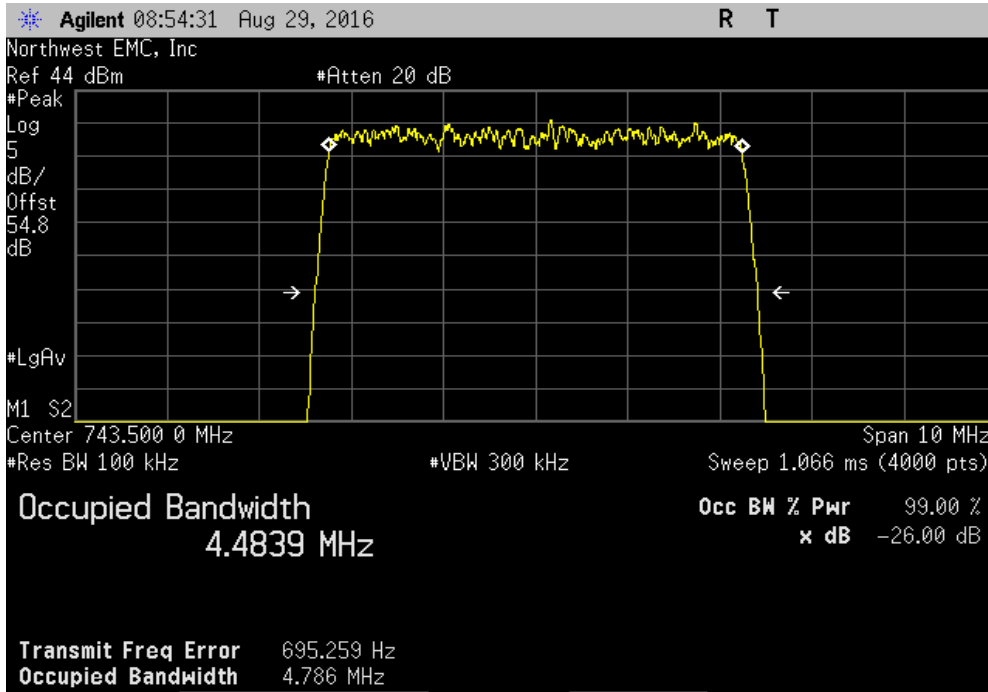


Antenna Port 2, Mid Channel LTE5, 737.5 MHz						
				Value	Limit	Result
				4.805 MHz	N/A	N/A

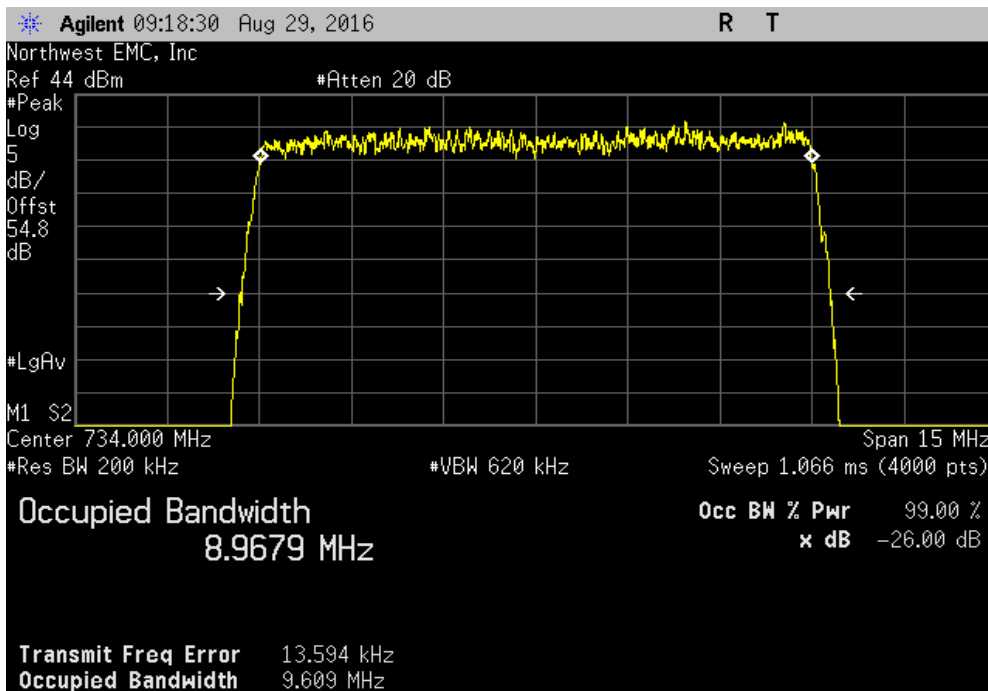


# OCCUPIED BANDWIDTH - BAND 12

Antenna Port 2, High Channel LTE5, 743.5 MHz						
				Value	Limit	Result
				4.786 MHz	N/A	N/A



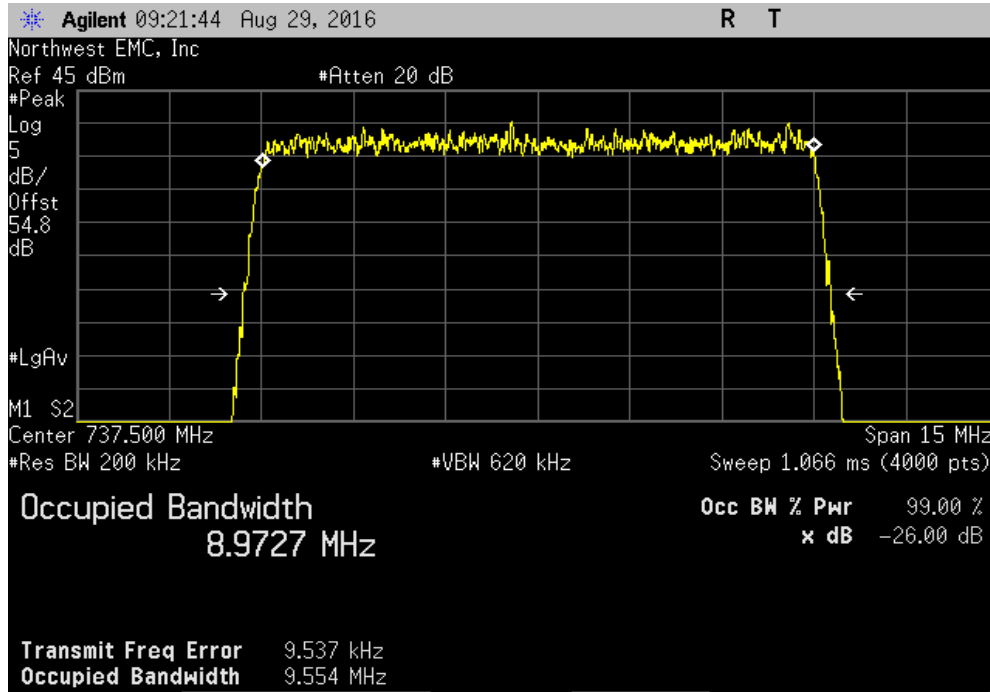
Antenna Port 2, Low Channel LTE10, 734 MHz						
				Value	Limit	Result
				9.609 MHz	N/A	N/A



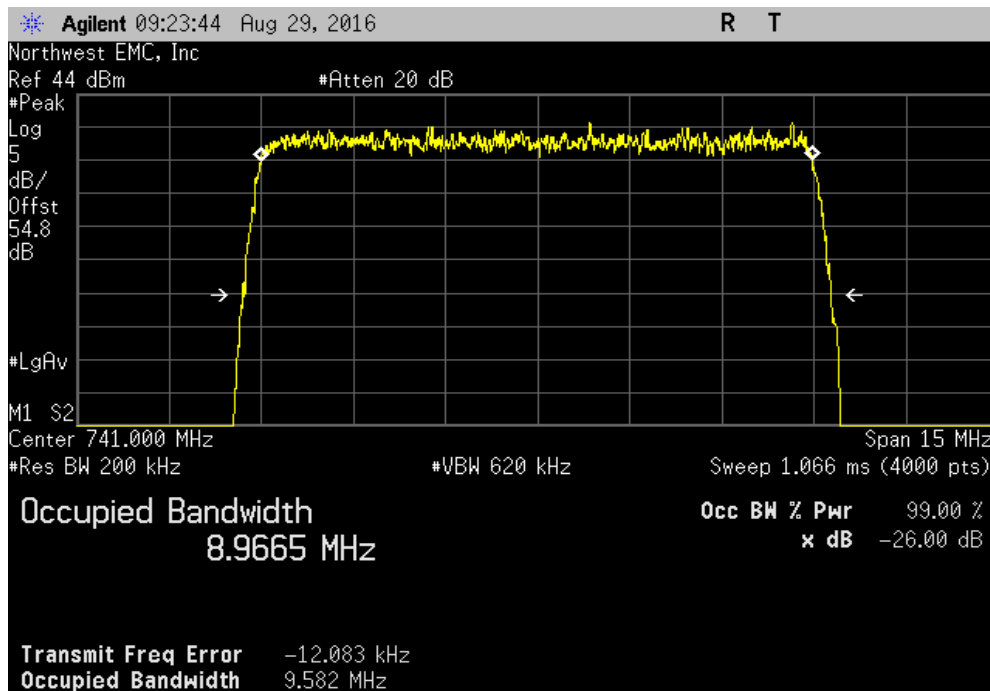


# OCCUPIED BANDWIDTH - BAND 12

Antenna Port 2, Mid Channel LTE10, 737.5 MHz						
				Value	Limit	Result
				9.554 MHz	N/A	N/A



Antenna Port 2, High Channel LTE10, 741 MHz						
				Value	Limit	Result
				9.582 MHz	N/A	N/A



# OCCUPIED BANDWIDTH - BAND 17

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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
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	AFD	7/29/2016	7/29/2017

## 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.

Only the Low Channel for each channel bandwidth was tested, the Mid & High Channels were previously tested in this band.

# OCCUPIED BANDWIDTH - BAND 17

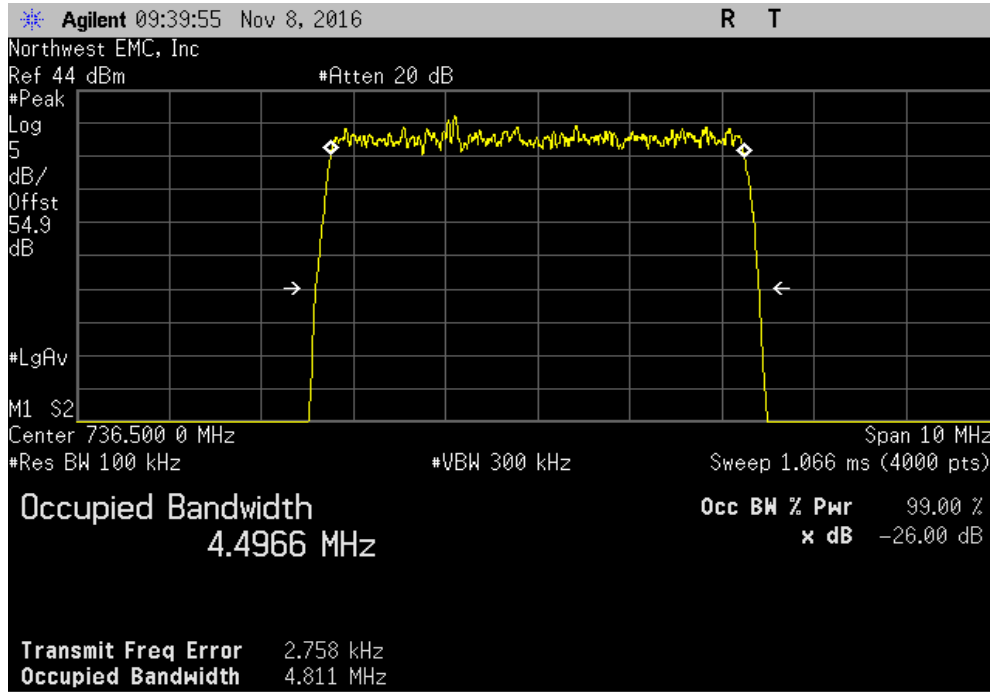


XMIT 2016.05.06

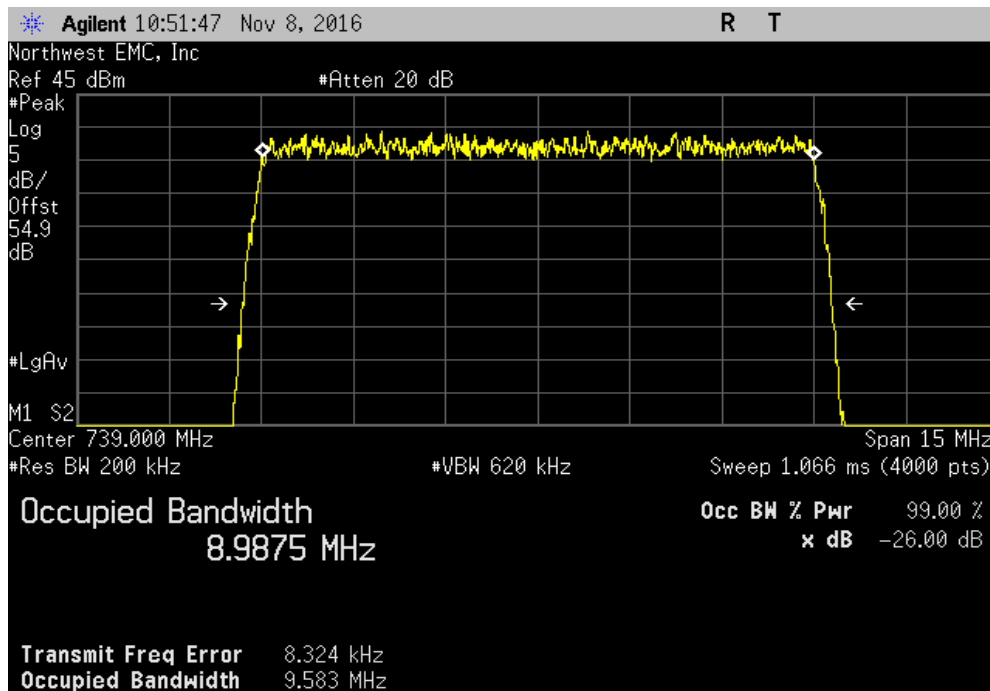
EUT: CWS-3050-12		Work Order: KMWC0077
Serial Number: K163300001		Date: 11/08/16
Customer: Parallel Wireless Inc.		Temperature: 20.8 °C
Attendees: Edward Lee		Humidity: 49% RH
Project: None		Barometric Pres.: 1018 mbar
Tested by: Johnny Candelas	Power: 48 VDC	Job Site: OC13
<b>TEST SPECIFICATIONS</b>		
FCC 27:2016		Test Method: ANSI/TIA/EIA-603-D-2010
<b>COMMENTS</b>		
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 54.9dB total.		
<b>DEVIATIONS FROM TEST STANDARD</b>		
None		
Configuration #	1	Signature 
		<b>Value      Limit      Result</b>
Antenna Port 1	Low Channel LTE5, 736.5 MHz	4.811 MHz      N/A      N/A
	Low Channel LTE10, 739 MHz	9.583 MHz      N/A      N/A
Antenna Port 2	Low Channel LTE5, 736.5 MHz	4.796 MHz      N/A      N/A
	Low Channel LTE10, 739 MHz	9.577 MHz      N/A      N/A

# OCCUPIED BANDWIDTH - BAND 17

Antenna Port 1, Low Channel LTE5, 736.5 MHz						
			Value	Limit	Result	
			4.811 MHz	N/A	N/A	

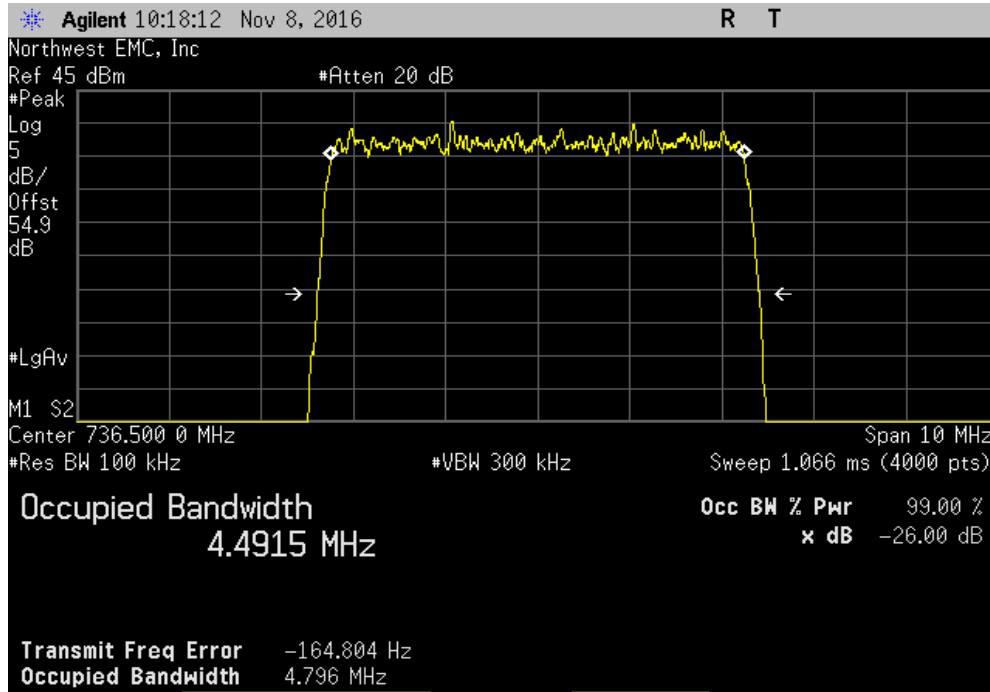


Antenna Port 1, Low Channel LTE10, 739 MHz						
			Value	Limit	Result	
			9.583 MHz	N/A	N/A	

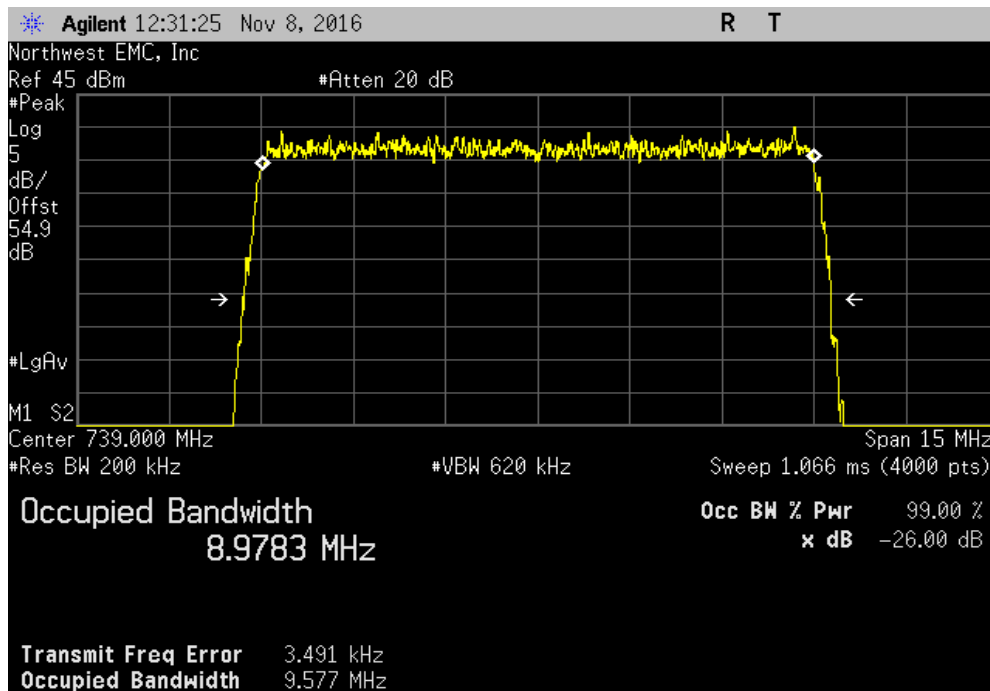


# OCCUPIED BANDWIDTH - BAND 17

Antenna Port 2, Low Channel LTE5, 736.5 MHz						
				Value	Limit	Result
				4.796 MHz	N/A	N/A



Antenna Port 2, Low Channel LTE10, 739 MHz						
				Value	Limit	Result
				9.577 MHz	N/A	N/A



# OUT OF BAND EMISSIONS - LTE BAND 12

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 at LTE5, Low Ch (731.5MHz), Mid Ch (737.5MHz), and High Ch (743.5MHz)

Transmitting at LTE10, Low Ch (734MHz), Mid Ch (737.5MHz), and High Ch (741MHz)

## POWER SETTINGS INVESTIGATED

48 VDC

## CONFIGURATIONS INVESTIGATED

KMWC0074 - 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
Attenuator	S.M. Electronics	SA18H-10	REN	3/28/2016	12 mo
Attenuator	S.M. Electronics	SA6-20	REO	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	LPM50004	HGK	3/28/2016	12 mo
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HFR	3/3/2016	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	AAY	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 12

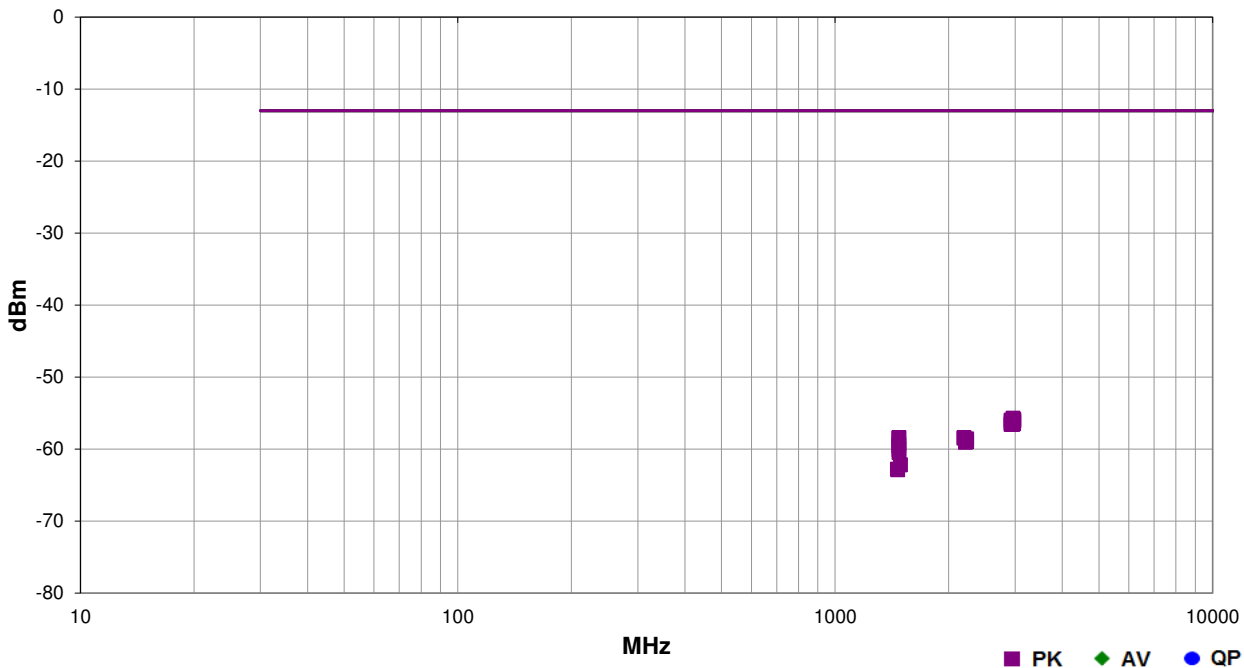


PSA-ESCI 2016.07.22  
EmiR5 2016.07.22.1

<b>Work Order:</b>	KMWC0074	<b>Date:</b>	08/31/16	
<b>Project:</b>	None	<b>Temperature:</b>	19 °C	
<b>Job Site:</b>	OC07	<b>Humidity:</b>	42% RH	
<b>Serial Number:</b>	K163300001	<b>Barometric Pres.:</b>	1011 mbar	
<b>EUT:</b>	CWS-3050-12			
<b>Configuration:</b>	2			
<b>Customer:</b>	Parallel Wireless Inc.			
<b>Attendees:</b>	Andy Ku			
<b>EUT Power:</b>	48 VDC			
<b>Operating Mode:</b>	Transmitting at LTE5, Low Ch (731.5MHz), Mid Ch (737.5MHz), and High Ch (743.5MHz) Transmitting at LTE10, Low Ch (734MHz), Mid Ch (737.5MHz), and High Ch (741MHz)			
<b>Deviations:</b>	None			
<b>Comments:</b>	2x40W			

<b>Test Specifications</b>	<b>Test Method</b>
FCC 27.53:2016	ANSI/TIA/EIA-603-D-2010

Run #	15	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	ERP (Watts)	ERP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2961.950	3.1	0.0	Vert	PK	2.70E-09	-55.7	-13.0	-42.7	Dual Carrier Edge to Edge LTE5-LTE10, EUT Horz
2975.983	1.0	52.0	Vert	PK	2.58E-09	-55.9	-13.0	-42.9	Dual Carrier Edge to Edge LTE5, EUT Horz
2964.358	3.3	32.0	Horz	PK	2.58E-09	-55.9	-13.0	-42.9	Dual Carrier Edge to Edge LTE5-LTE10, EUT on Side
2926.158	2.6	91.0	Vert	PK	2.52E-09	-56.0	-13.0	-43.0	Low Ch, EUT Horz, LTE5
2962.833	1.0	122.0	Vert	PK	2.52E-09	-56.0	-13.0	-43.0	High Ch, EUT Horz, LTE10
2949.833	1.0	21.0	Horz	PK	2.52E-09	-56.0	-13.0	-43.0	Dual Carrier Edge to Edge LTE5, EUT on Side
2974.925	1.0	256.0	Horz	PK	2.47E-09	-56.1	-13.0	-43.1	Dual Carrier Edge to Edge LTE5, EUT on Side
2926.933	1.0	82.0	Horz	PK	2.47E-09	-56.1	-13.0	-43.1	Dual Carrier Edge to Edge LTE5-LTE10, EUT on Side
2938.108	2.2	0.0	Horz	PK	2.41E-09	-56.2	-13.0	-43.2	Low Ch, EUT on Side, LTE10
2952.358	1.0	255.0	Horz	PK	2.41E-09	-56.2	-13.0	-43.2	Mid Ch, EUT on Side, LTE10
2972.433	1.0	310.0	Horz	PK	2.36E-09	-56.3	-13.0	-43.3	High Ch, EUT on Side, LTE5
2935.850	1.4	240.0	Vert	PK	2.36E-09	-56.3	-13.0	-43.3	Low Ch, EUT Horz, LTE10
2965.442	1.0	68.0	Horz	PK	2.36E-09	-56.3	-13.0	-43.3	High Ch, EUT on Side, LTE10
2948.308	1.0	65.0	Vert	PK	2.36E-09	-56.3	-13.0	-43.3	Dual Carrier Edge to Edge LTE5, EUT Horz

	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	ERP (Watts)	ERP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
	2927.900	2.7	219.0	Horz	PK	2.36E-09	-56.3	-13.0	-43.3	Dual Carrier Edge to Edge LTE5, EUT on Side
	2947.808	1.0	305.0	Vert	PK	2.25E-09	-56.5	-13.0	-43.5	Mid Ch, EUT Horz, LTE5
	2926.975	2.0	10.0	Horz	PK	2.25E-09	-56.5	-13.0	-43.5	Low Ch, EUT on Side, LTE5
	2972.833	1.0	34.0	Vert	PK	2.25E-09	-56.5	-13.0	-43.5	High Ch, EUT Horz, LTE5
	2927.167	2.4	272.0	Vert	PK	2.25E-09	-56.5	-13.0	-43.5	Dual Carrier Edge to Edge LTE5, EUT Horz
	2949.958	1.0	275.0	Horz	PK	2.20E-09	-56.6	-13.0	-43.6	Mid Ch, EUT on Side, LTE5
	2951.808	3.2	168.0	Vert	PK	2.20E-09	-56.6	-13.0	-43.6	Mid Ch, EUT Horz, LTE10
	2926.508	1.9	349.0	Vert	PK	2.20E-09	-56.6	-13.0	-43.6	Dual Carrier Edge to Edge LTE5-LTE10, EUT Horz
	1475.217	2.0	183.0	Vert	PK	1.45E-09	-58.4	-13.0	-45.4	Mid Ch, EUT Horz, LTE5
	2195.100	3.5	1.0	Horz	PK	1.45E-09	-58.4	-13.0	-45.4	Low Ch, EUT on Side, LTE5
	1474.750	2.4	264.0	Vert	PK	1.42E-09	-58.5	-13.0	-45.5	Mid Ch, EUT on Side, LTE5
	2194.000	2.8	238.0	Vert	PK	1.42E-09	-58.5	-13.0	-45.5	Low Ch, EUT Horz, LTE5
	2230.850	1.0	347.0	Vert	PK	1.39E-09	-58.6	-13.0	-45.6	High Ch, EUT Horz, LTE5
	2214.058	1.0	191.0	Vert	PK	1.26E-09	-59.0	-13.0	-46.0	Mid Ch, EUT Horz, LTE5
	2231.117	3.7	344.0	Horz	PK	1.26E-09	-59.0	-13.0	-46.0	High Ch, EUT on Side, LTE5
	2214.567	1.0	217.0	Horz	PK	1.24E-09	-59.1	-13.0	-46.1	Mid Ch, EUT on Side, LTE5
	1475.108	1.0	67.0	Horz	PK	1.18E-09	-59.3	-13.0	-46.3	Mid Ch, EUT on Side, LTE5
	1474.792	1.0	237.0	Horz	PK	1.10E-09	-59.6	-13.0	-46.6	Mid Ch, EUT Horz, LTE5
	1475.042	1.0	229.0	Vert	PK	9.82E-10	-60.1	-13.0	-47.1	Mid Ch, EUT Vert, LTE5
	1475.250	1.0	132.0	Horz	PK	8.95E-10	-60.5	-13.0	-47.5	Mid Ch, EUT Vert, LTE5
	1488.333	1.0	107.0	Horz	PK	6.05E-10	-62.2	-13.0	-49.2	High Ch, EUT on Side, LTE5
	1488.717	1.0	346.0	Vert	PK	6.05E-10	-62.2	-13.0	-49.2	High Ch, EUT Horz, LTE5
	1461.233	1.0	52.0	Horz	PK	5.27E-10	-62.8	-13.0	-49.8	Low Ch, EUT on Side, LTE5
	1465.092	1.0	311.0	Vert	PK	5.15E-10	-62.9	-13.0	-49.9	Low Ch, EUT Horz, LTE5



# OUT OF BAND EMISSIONS - LTE Band 17

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 at LTE5: Low Ch(736.5MHz) and LTE10: Low Ch(739MHz)

## POWER SETTINGS INVESTIGATED

48 VDC

## CONFIGURATIONS INVESTIGATED

KMWC0077 - 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
Generator - Signal	Keysight	N5182B	TFX	4/16/2015	36 mo
Antenna - Double Ridge	EMCO	3115	AHB	3/21/2016	24 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFA	10/17/2016	12 mo
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HFR	3/3/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIR	6/23/2016	24 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	8/15/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	HGO	3/28/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	HGP	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	9/19/2016	12 mo
Cable	ESM Cable Corp.	30-1GHz cables	OCW	9/19/2016	12 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	4/11/2016	12 mo

## MEASUREMENT BANDWIDTHS

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

## TEST DESCRIPTION

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


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. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axes. 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.

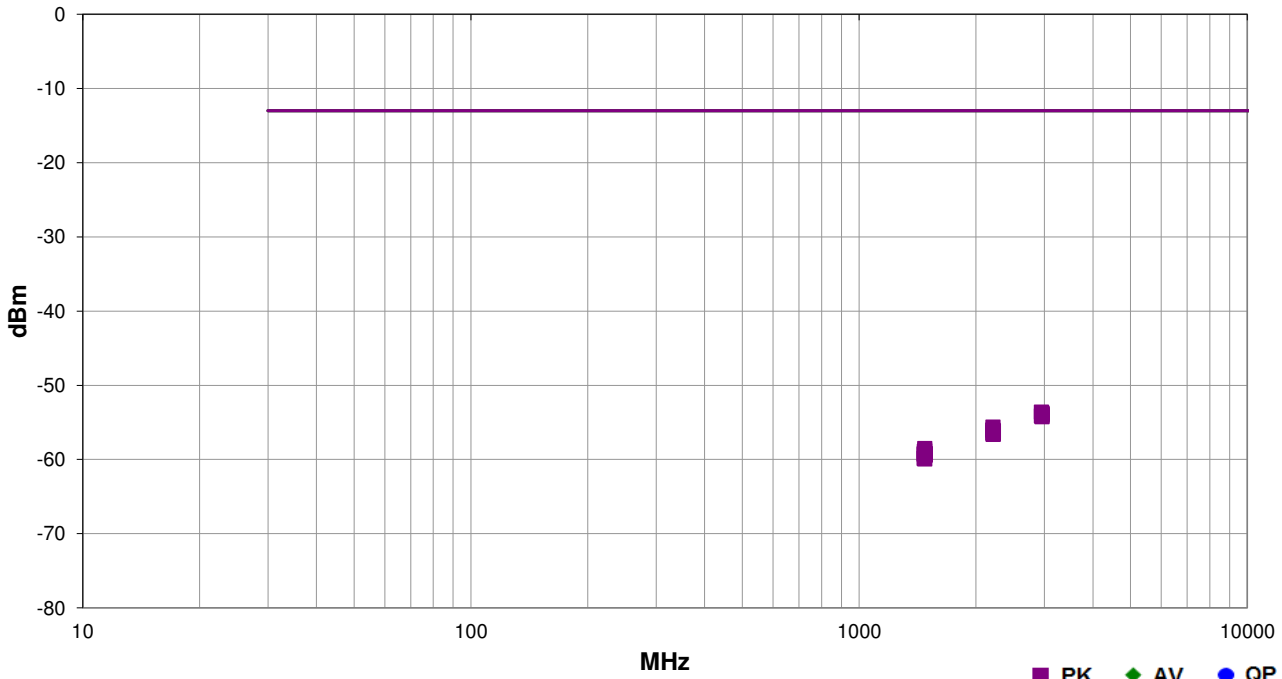
# OUT OF BAND EMISSIONS - LTE Band 17



PSA-ESCI 2016.07.22  
EmiR5 2016.08.26

<b>Work Order:</b>	KMWC0077	<b>Date:</b>	11/08/16	
<b>Project:</b>	None	<b>Temperature:</b>	21.5 °C	
<b>Job Site:</b>	OC07	<b>Humidity:</b>	48.4% RH	
<b>Serial Number:</b>	K163300001	<b>Barometric Pres.:</b>	1017 mbar	
<b>Tested by:</b>	Mark Baytan			
<b>EUT:</b>	CWS-3050-12			
<b>Configuration:</b>	2			
<b>Customer:</b>	Parallel Wireless Inc.			
<b>Attendees:</b>	Edward Lee			
<b>EUT Power:</b>	48 VDC			
<b>Operating Mode:</b>	Transmitting at LTE5: Low Ch(736.5MHz) and LTE10: Low Ch(739MHz)			
<b>Deviations:</b>	None			
<b>Comments:</b>	Power Level Setting 40W.			

<b>Test Specifications</b>	FCC 27.53:2016	<b>Test Method</b>	ANSI/TIA/EIA-603-D-2010
<b>Run #</b>	4	<b>Test Distance (m)</b>	3
<b>Antenna Height(s)</b>	1 to 4(m)		<b>Results</b>
			Pass



Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2947.950	1.0	360.0	Horz	PK	4.34E-09	-53.6	-13.0	-40.6	EUT on Side, LTE5 Low Ch
2954.908	1.0	283.0	Vert	PK	4.24E-09	-53.7	-13.0	-40.7	EUT on Side, LTE10 Low Ch
2958.820	4.0	211.0	Horz	PK	4.14E-09	-53.8	-13.0	-40.8	EUT on Side, Dual Carrier Narrowband LTE5
2953.575	2.4	173.0	Horz	PK	4.05E-09	-53.9	-13.0	-40.9	EUT on Side, LTE10 Low Ch
2955.120	1.0	243.0	Horz	PK	4.05E-09	-53.9	-13.0	-40.9	EUT on Side, Dual Carrier Wideband LTE5
2957.400	1.0	348.0	Vert	PK	3.95E-09	-54.0	-13.0	-41.0	EUT on Side, Dual Carrier Narrowband LTE5
2948.483	1.0	114.0	Vert	PK	3.86E-09	-54.1	-13.0	-41.1	EUT on Side, LTE5 Low Ch
2957.870	3.8	344.0	Vert	PK	3.78E-09	-54.2	-13.0	-41.2	EUT on Side, Dual Carrier Wideband LTE5
2211.300	1.0	169.0	Horz	PK	2.74E-09	-55.6	-13.0	-42.6	EUT on Side, LTE5 Low Ch
2209.542	1.0	179.0	Vert	PK	2.50E-09	-56.0	-13.0	-43.0	EUT on Side, LTE5 Low Ch
2217.058	1.0	287.0	Horz	PK	2.44E-09	-56.1	-13.0	-43.1	EUT on Side, LTE10 Low Ch

	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
	2215.000	1.0	98.0	Vert	PK	2.28E-09	-56.4	-13.0	-43.4	EUT on Side, LTE10 Low Ch
	2214.320	1.0	199.0	Vert	PK	2.28E-09	-56.4	-13.0	-43.4	EUT on Side, Dual Carrier Narrowband LTE5
	2217.860	1.0	173.0	Vert	PK	2.28E-09	-56.4	-13.0	-43.4	EUT on Side, Dual Carrier Wideband LTE5
	2215.010	1.0	316.0	Horz	PK	2.22E-09	-56.5	-13.0	-43.5	EUT on Side, Dual Carrier Wideband LTE5
	2214.010	1.0	57.0	Horz	PK	2.17E-09	-56.6	-13.0	-43.6	EUT on Side, Dual Carrier Narrowband LTE5
	1475.110	3.8	123.0	Vert	PK	1.40E-09	-58.5	-13.0	-45.5	EUT on Side, Dual Carrier Narrowband LTE5
	1475.700	1.0	83.0	Horz	PK	1.31E-09	-58.8	-13.0	-45.8	EUT on Side, Dual Carrier Narrowband LTE5
	1471.400	1.0	157.0	Vert	PK	1.28E-09	-58.9	-13.0	-45.9	EUT on Side, LTE5 Low Ch
	1470.650	1.0	13.0	Horz	PK	1.19E-09	-59.2	-13.0	-46.2	EUT on Side, LTE5 Low Ch
	1474.983	3.1	185.0	Horz	PK	1.19E-09	-59.2	-13.0	-46.2	EUT Vert, LTE5 Low Ch
	1480.530	1.8	217.0	Horz	PK	1.19E-09	-59.2	-13.0	-46.2	EUT on Side, Dual Carrier Wideband LTE5
	1471.475	1.3	349.0	Vert	PK	1.17E-09	-59.3	-13.0	-46.3	EUT Vert, LTE5 Low Ch
	1479.542	1.0	6.0	Horz	PK	1.17E-09	-59.3	-13.0	-46.3	EUT on Side, LTE10 Low Ch
	1478.140	3.4	61.0	Vert	PK	1.17E-09	-59.3	-13.0	-46.3	EUT on Side, Dual Carrier Wideband LTE5
	1478.350	1.1	155.0	Vert	PK	1.14E-09	-59.4	-13.0	-46.4	EUT on Side, LTE10 Low Ch
	1470.633	1.0	179.0	Horz	PK	1.04E-09	-59.8	-13.0	-46.8	EUT Horz, LTE5 Low Ch
	1475.417	1.0	195.0	Vert	PK	1.02E-09	-59.9	-13.0	-46.9	EUT Horz, LTE5 Low Ch

# SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS - BAND 12



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 OF THE ANTENNA TERMINALS - BAND 12

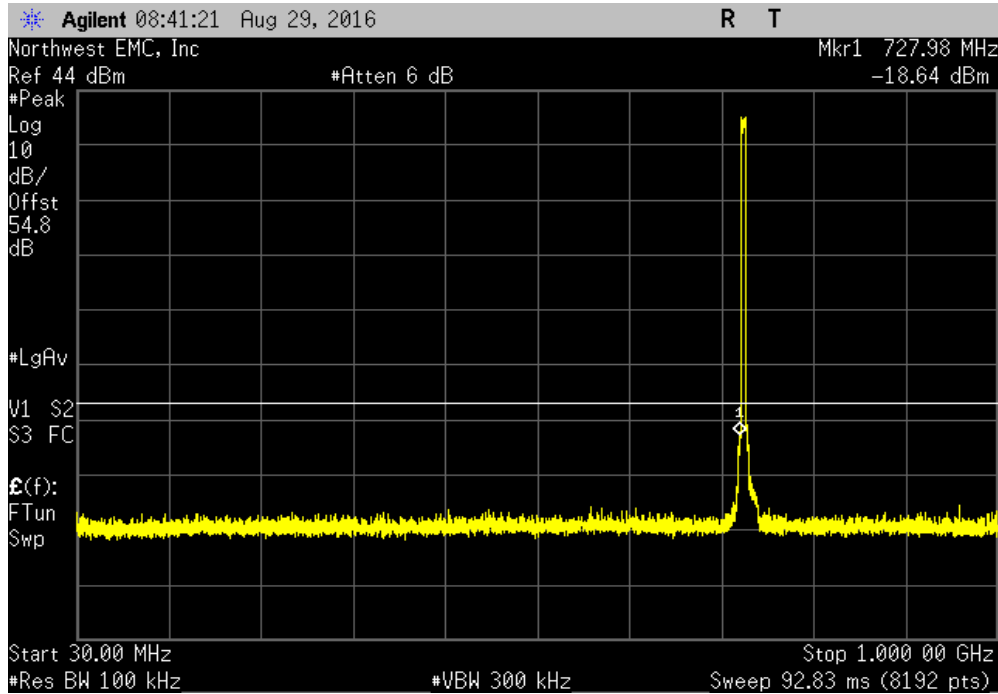


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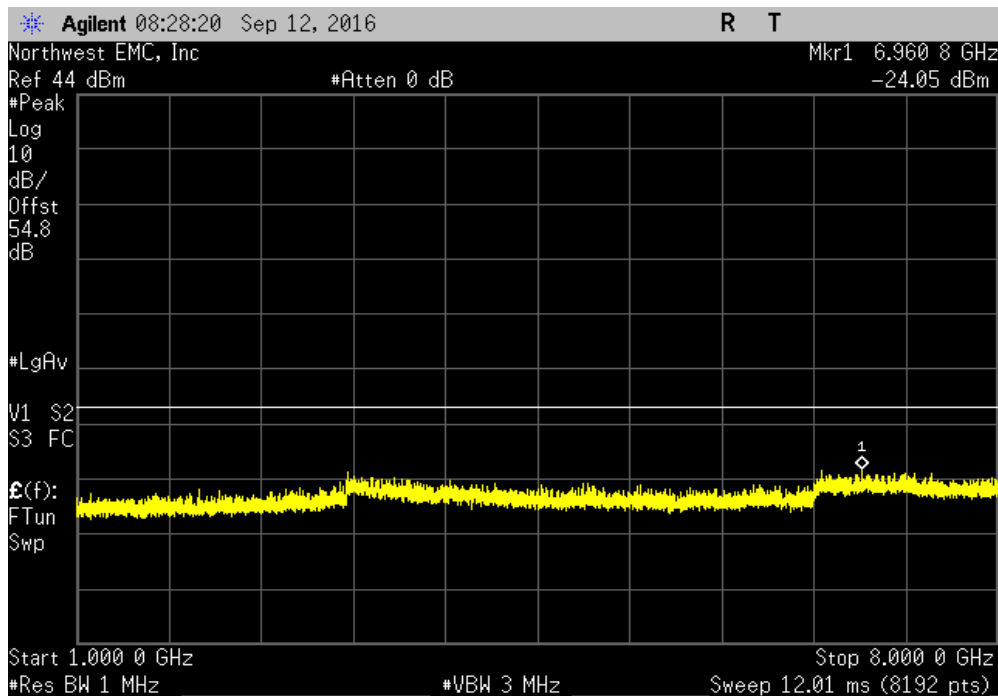
EUT: CWS-3050-12		Work Order: KMWC0074			
Serial Number: K163300001		Date: 09/12/16			
Customer: Parallel Wireless Inc.		Temperature: 21.1 °C			
Attendees: Andy Ku		Humidity: 50.2% RH			
Project: None		Barometric Pres.: 1015 mbar			
Tested by: Johnny Candelas		Power: 48 VDC			
Job Site: OC13					
TEST 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 = 54.8dB total.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	1	Signature 			
		Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
Antenna Port 1					
	Low Channel LTE5, 731.5 MHz	30 MHz - 1 GHz	-18.64	-13	Pass
	Low Channel LTE5, 731.5 MHz	1 GHz - 8 GHz	-24.05	-13	Pass
	Mid Channel LTE5, 737.5 MHz	30 MHz - 1 GHz	-27.37	-13	Pass
	Mid Channel LTE5, 737.5 MHz	1 GHz - 8 GHz	-24.21	-13	Pass
	High Channel LTE5, 743.5 MHz	30 MHz - 1 GHz	-17.95	-13	Pass
	High Channel LTE5, 743.5 MHz	1 GHz - 8 GHz	-24.51	-13	Pass
	Low Channel LTE10, 734 MHz	30 MHz - 1 GHz	-21.67	-13	Pass
	Low Channel LTE10, 734 MHz	1 GHz - 8 GHz	-24.52	-13	Pass
	Mid Channel LTE10, 737.5 MHz	30 MHz - 1 GHz	-26.87	-13	Pass
	Mid Channel LTE10, 737.5 MHz	1 GHz - 8 GHz	-24.5	-13	Pass
	High Channel LTE10, 741 MHz	30 MHz - 1 GHz	-22.74	-13	Pass
	High Channel LTE10, 741 MHz	1 GHz - 8 GHz	-24.5	-13	Pass
Antenna Port 2					
	Low Channel LTE5, 731.5 MHz	30 MHz - 1 GHz	-23.70	-13	Pass
	Low Channel LTE5, 731.5 MHz	1 GHz - 8 GHz	-24.25	-13	Pass
	Mid Channel LTE5, 737.5 MHz	30 MHz - 1 GHz	-28.49	-13	Pass
	Mid Channel LTE5, 737.5 MHz	1 GHz - 8 GHz	-24.19	-13	Pass
	High Channel LTE5, 743.5 MHz	30 MHz - 1 GHz	-17.71	-13	Pass
	High Channel LTE5, 743.5 MHz	1 GHz - 8 GHz	-24.52	-13	Pass
	Low Channel LTE10, 734 MHz	30 MHz - 1 GHz	-21.25	-13	Pass
	Low Channel LTE10, 734 MHz	1 GHz - 8 GHz	-23.96	-13	Pass
	Mid Channel LTE10, 737.5 MHz	30 MHz - 1 GHz	-26.08	-13	Pass
	Mid Channel LTE10, 737.5 MHz	1 GHz - 8 GHz	-24.45	-13	Pass
	High Channel LTE10, 741 MHz	30 MHz - 1 GHz	-22.67	-13	Pass
	High Channel LTE10, 741 MHz	1 GHz - 8 GHz	-24.77	-13	Pass

# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 1, Low Channel LTE5, 731.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-18.64	-13	Pass	

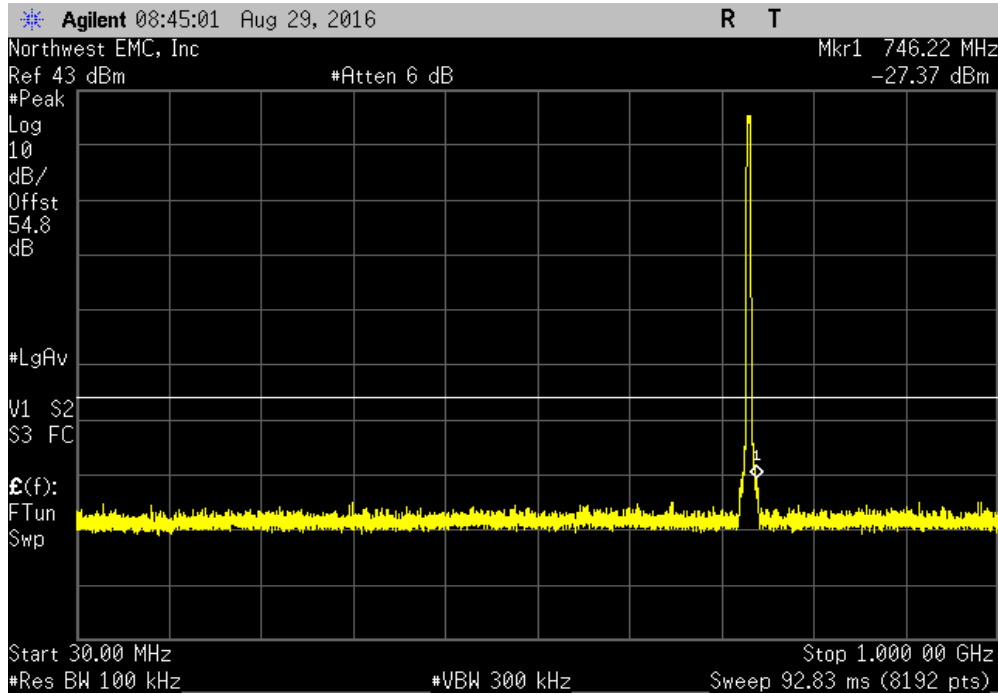


Antenna Port 1, Low Channel LTE5, 731.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.05	-13	Pass	

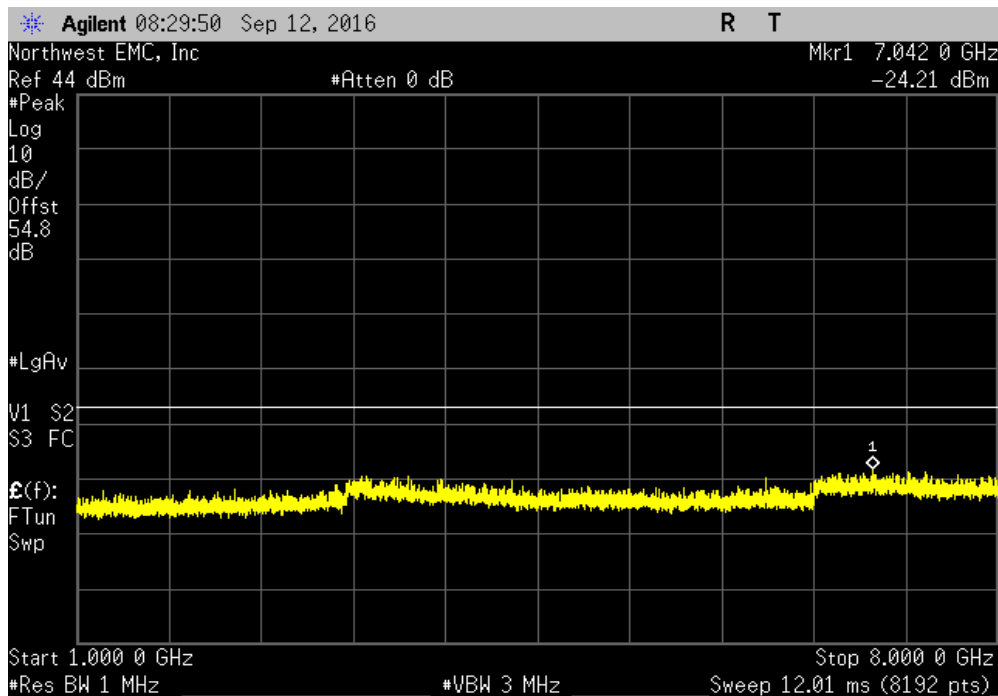


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 1, Mid Channel LTE5, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-27.37	-13	Pass	

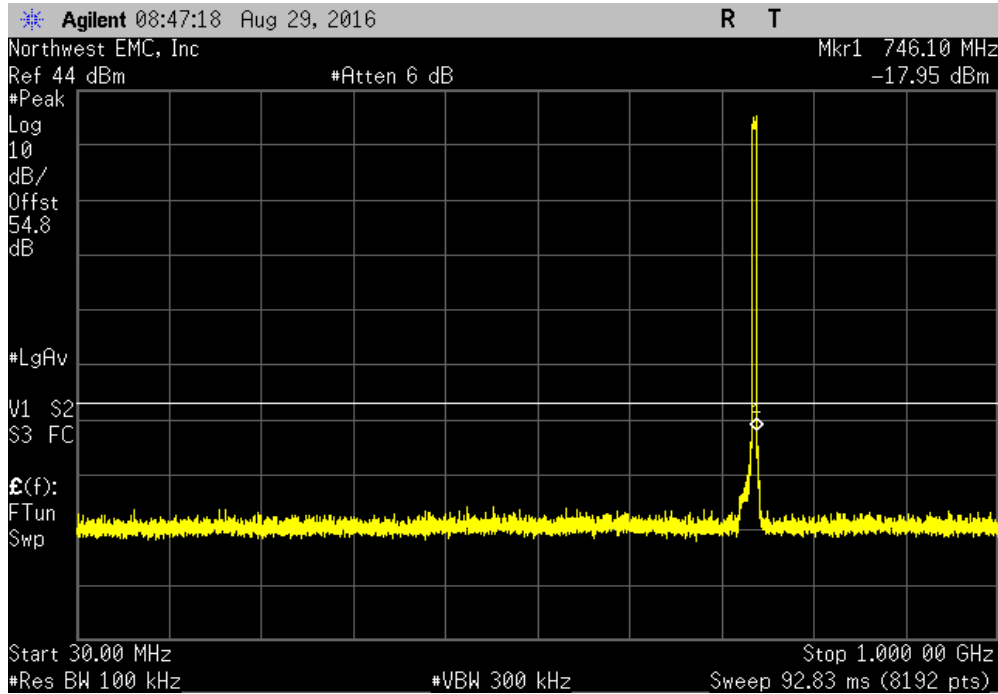


Antenna Port 1, Mid Channel LTE5, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.21	-13	Pass	

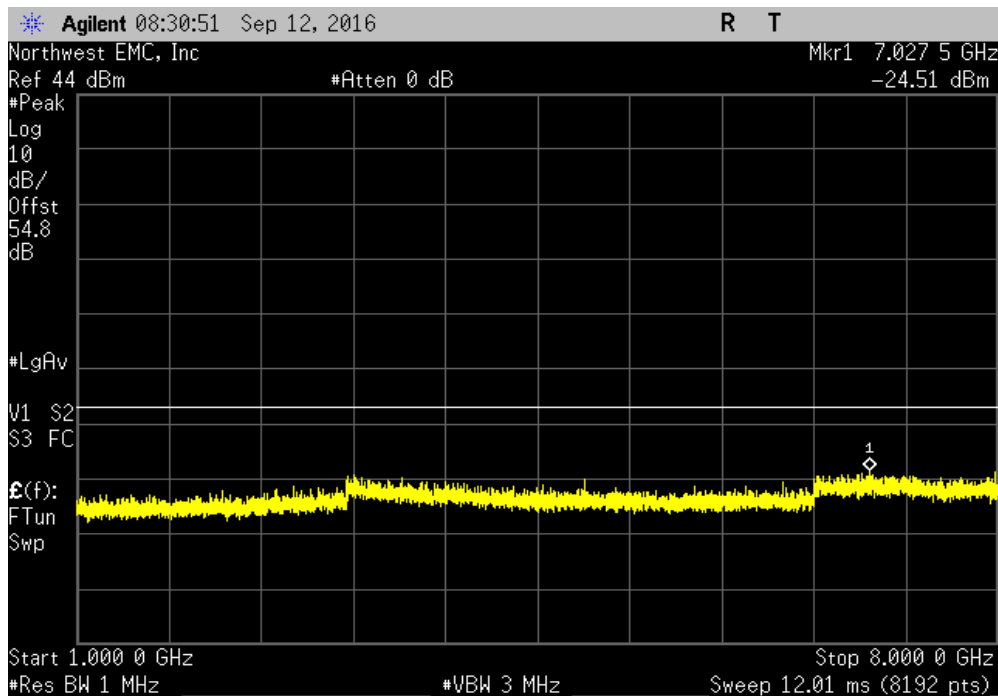


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 1, High Channel LTE5, 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-17.95	-13	Pass	



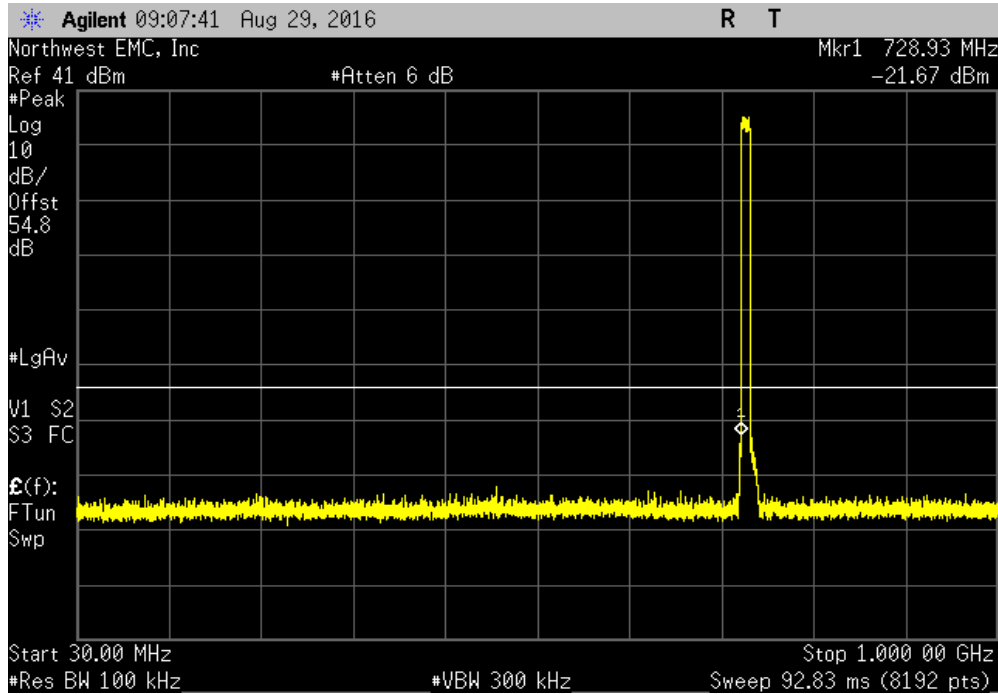
Antenna Port 1, High Channel LTE5, 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.51	-13	Pass	



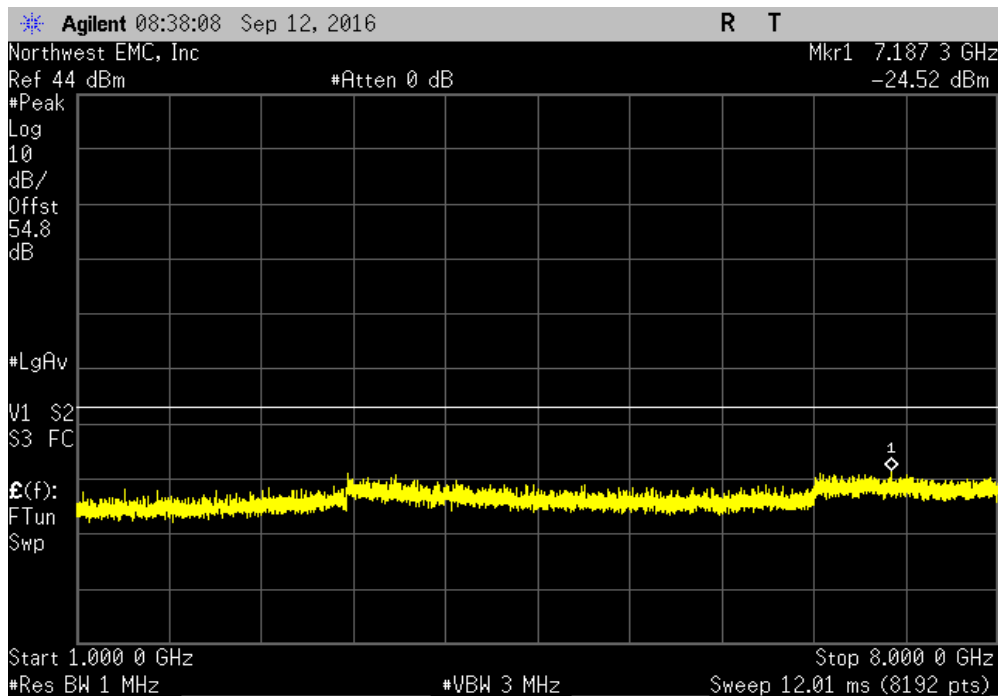


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 1, Low Channel LTE10, 734 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-21.67	-13	Pass	

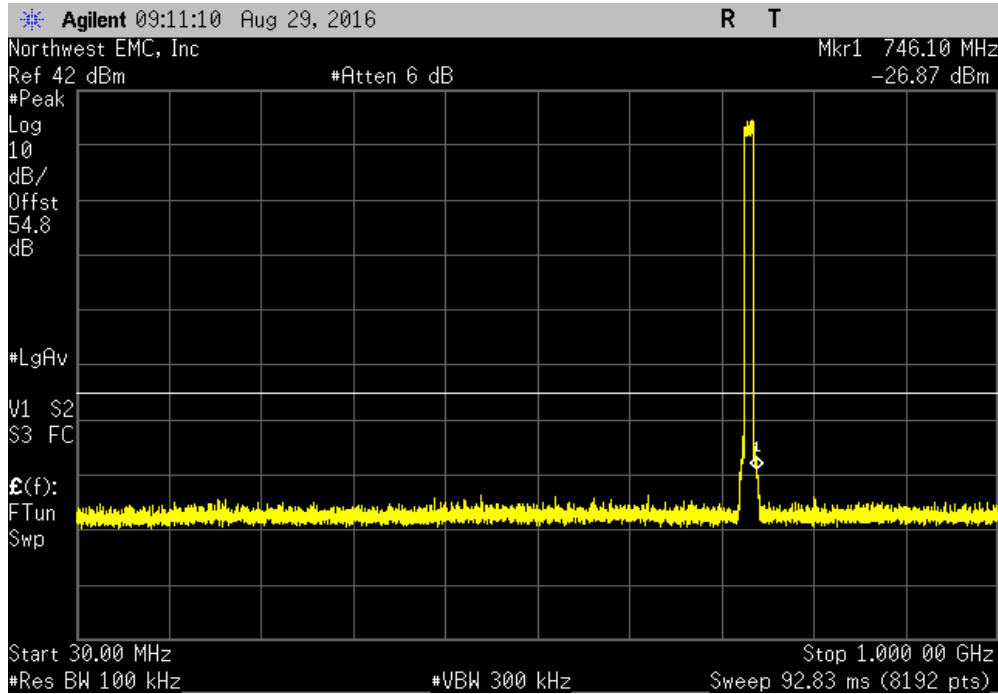


Antenna Port 1, Low Channel LTE10, 734 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.52	-13	Pass	

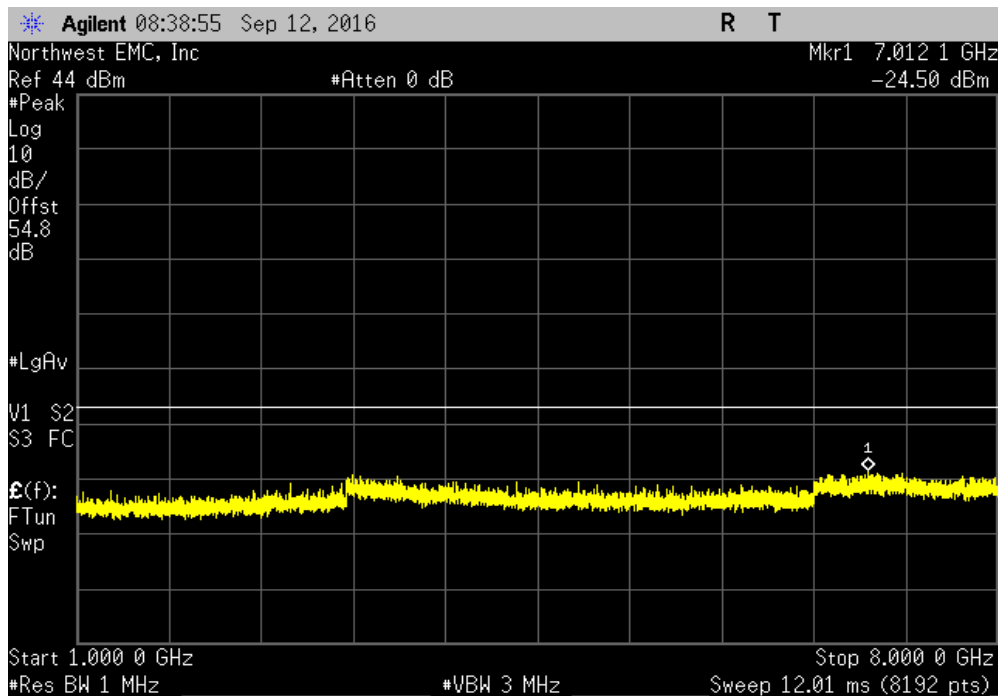


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 1, Mid Channel LTE10, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-26.87	-13	Pass	

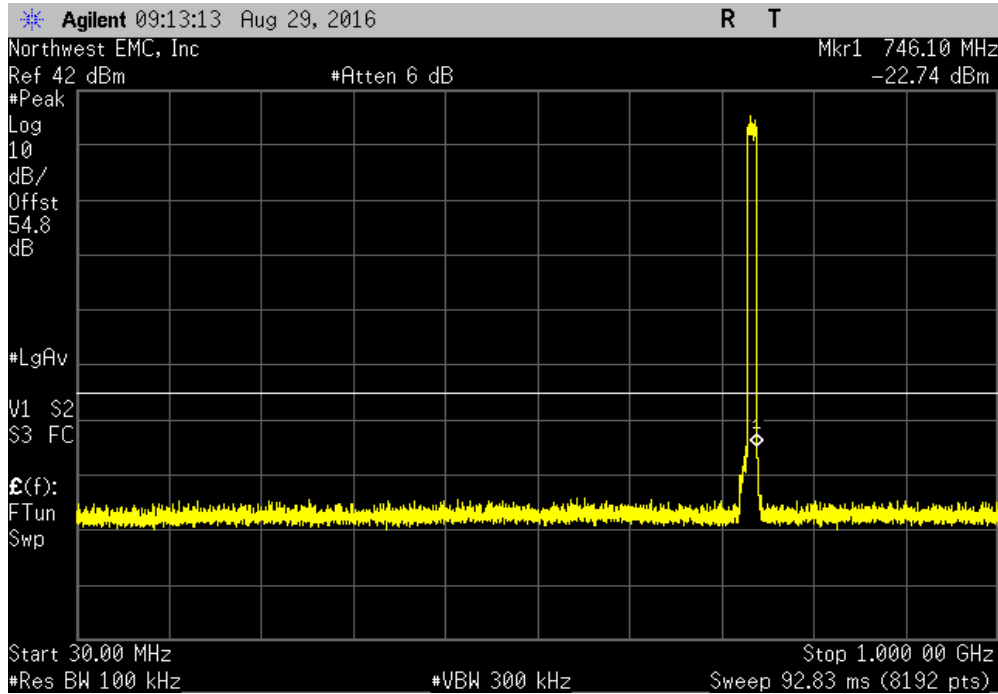


Antenna Port 1, Mid Channel LTE10, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.50	-13	Pass	

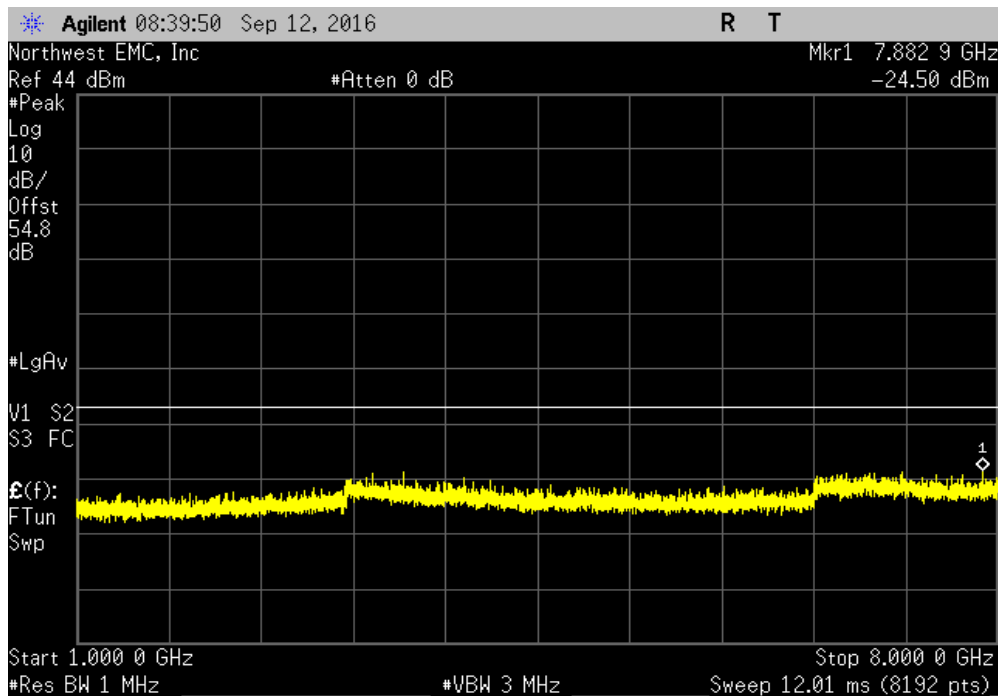


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 1, High Channel LTE10, 741 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-22.74	-13	Pass	

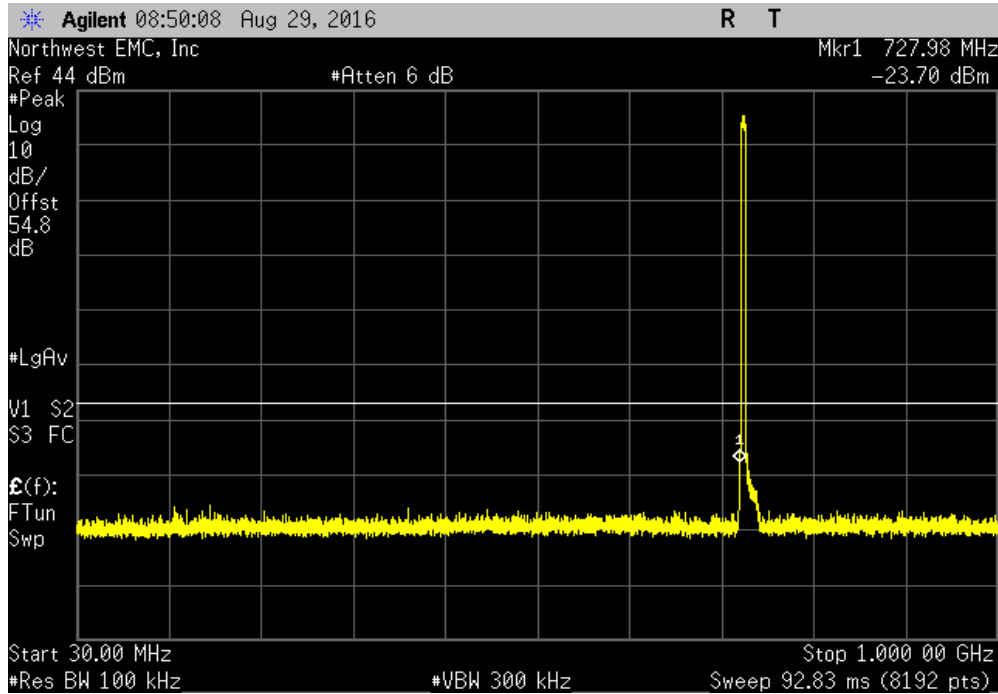


Antenna Port 1, High Channel LTE10, 741 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.50	-13	Pass	

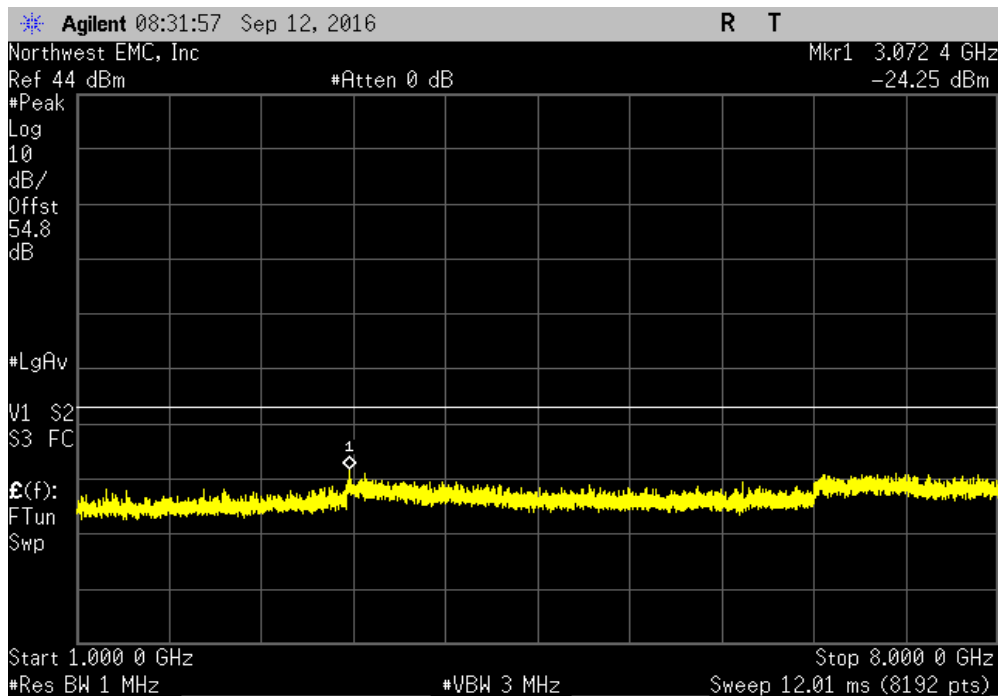


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 2, Low Channel LTE5, 731.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-23.70	-13	Pass	



Antenna Port 2, Low Channel LTE5, 731.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.25	-13	Pass	

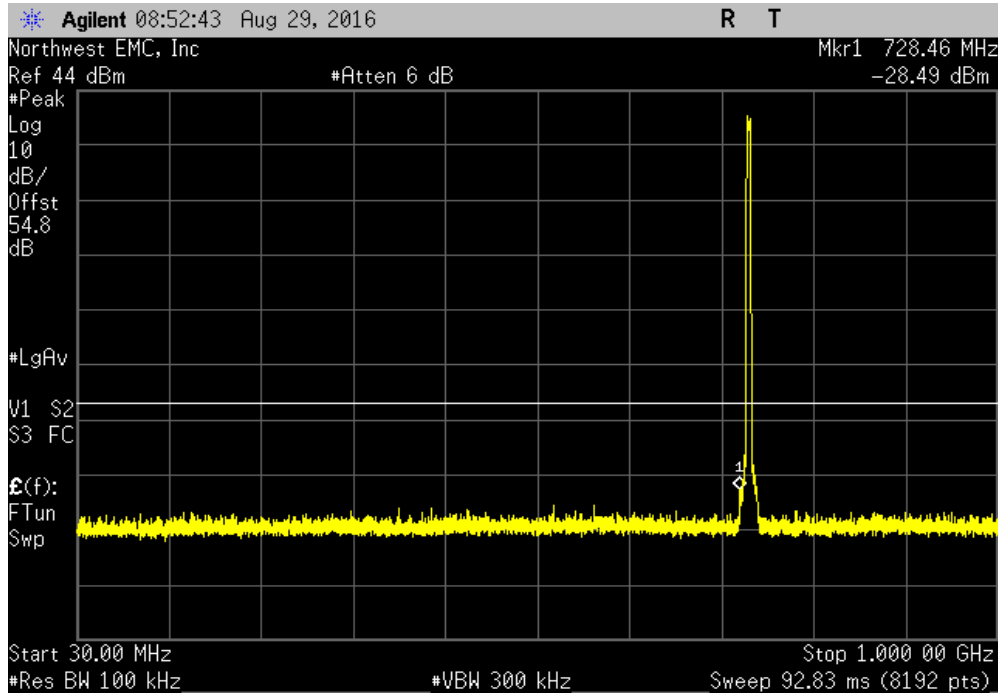


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

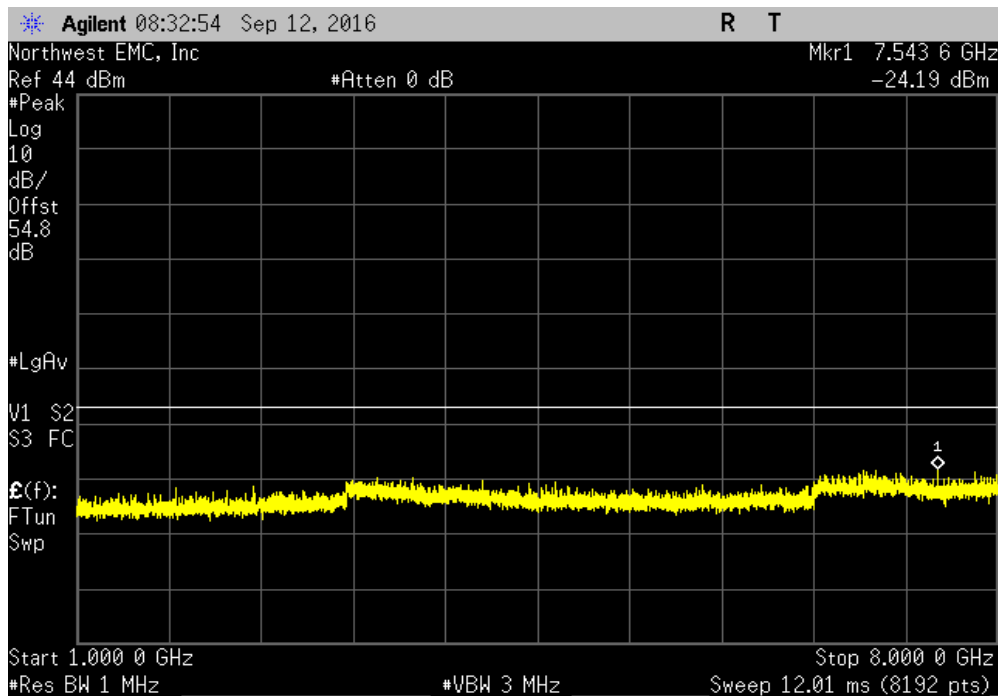


XMR 2016.05.06

Antenna Port 2, Mid Channel LTE5, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-28.49	-13	Pass	

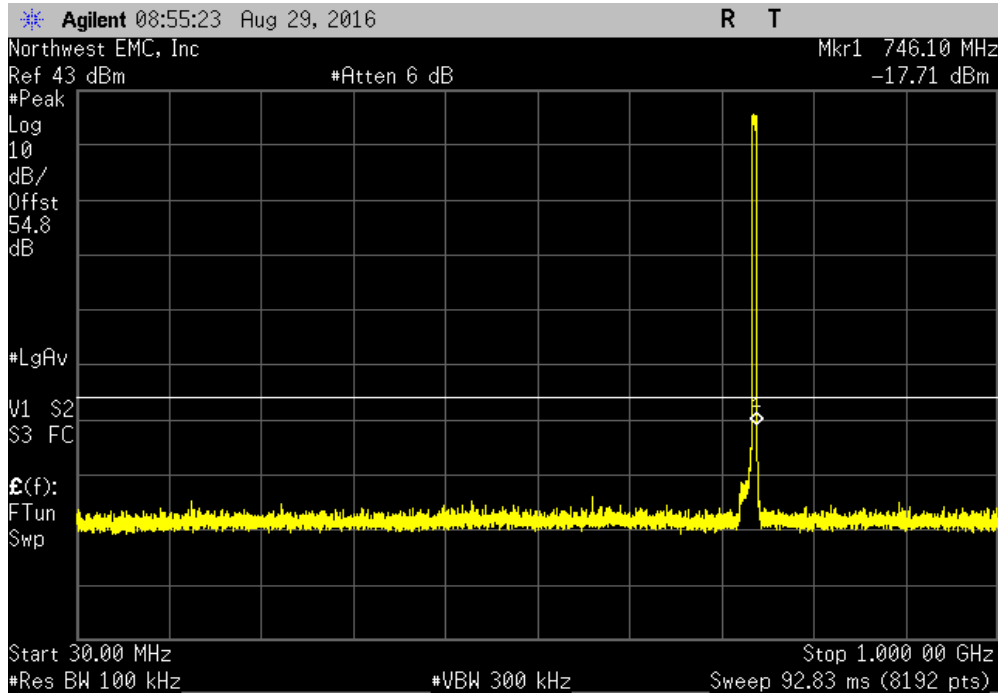


Antenna Port 2, Mid Channel LTE5, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.19	-13	Pass	

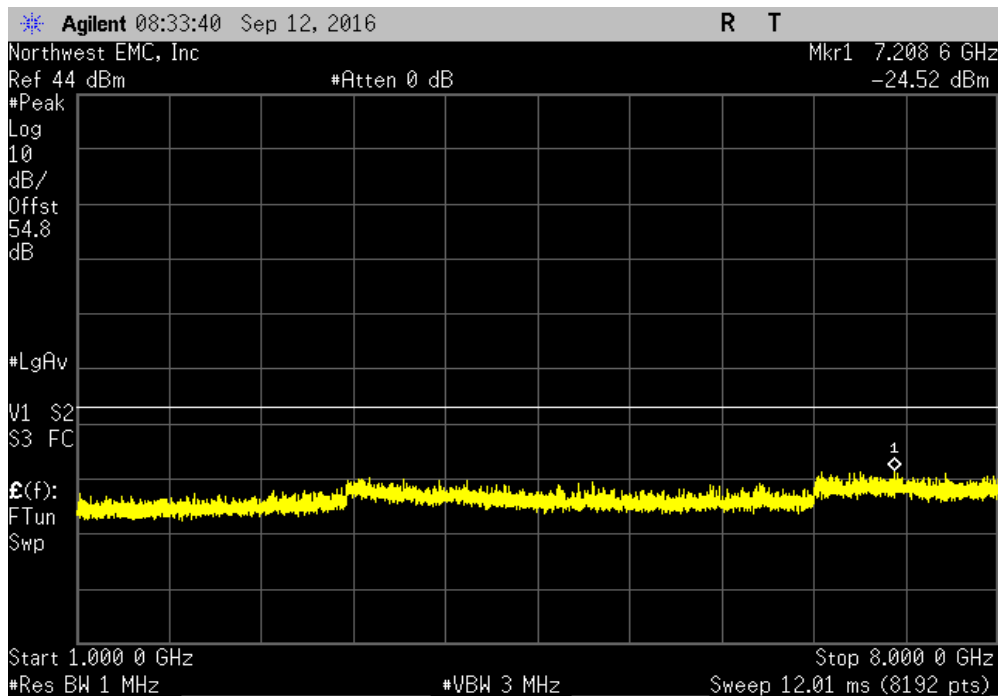


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 2, High Channel LTE5, 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-17.71	-13	Pass	

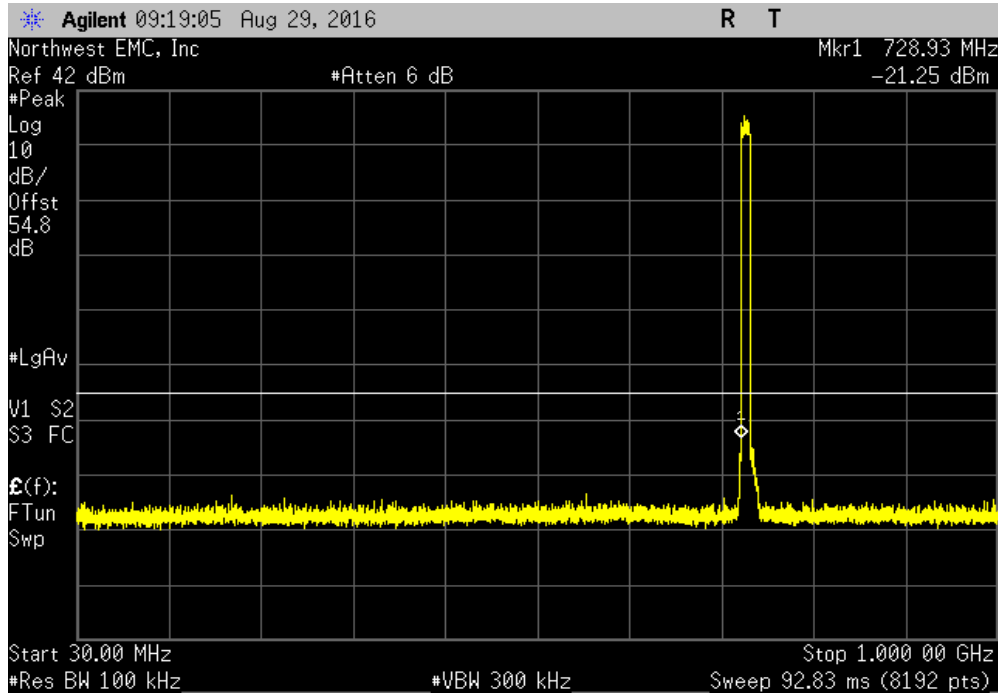


Antenna Port 2, High Channel LTE5, 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.52	-13	Pass	

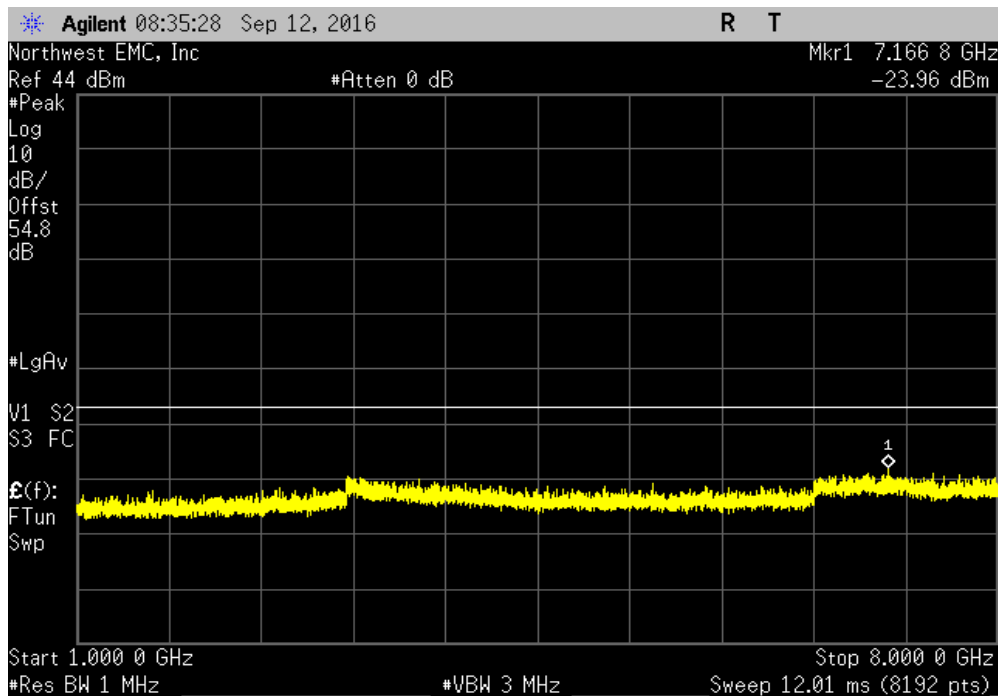


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 2, Low Channel LTE10, 734 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-21.25	-13	Pass	

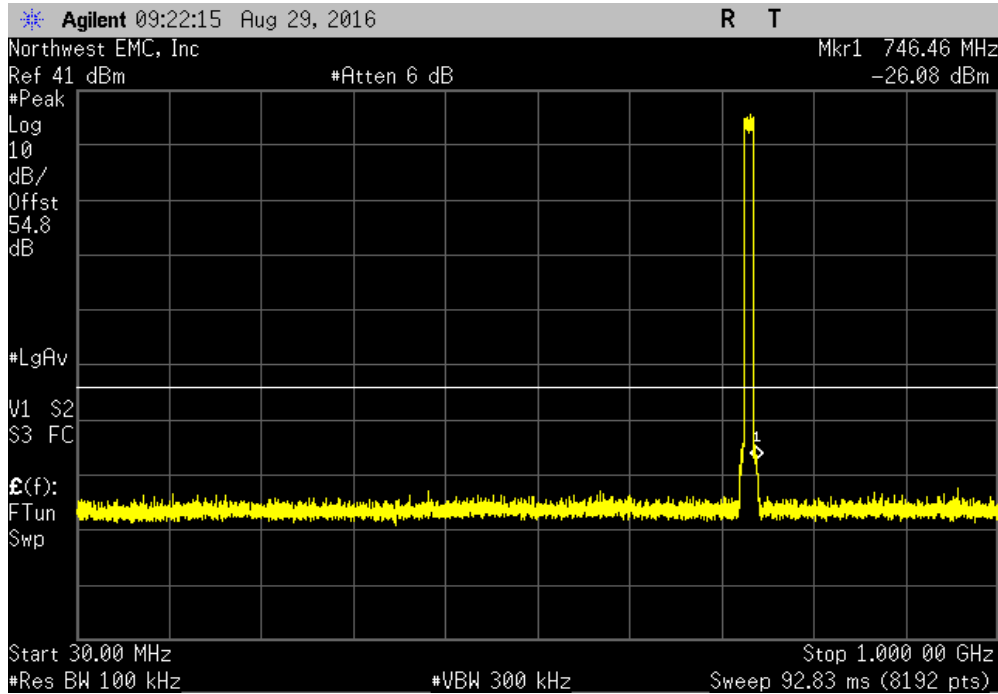


Antenna Port 2, Low Channel LTE10, 734 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.96	-13	Pass	

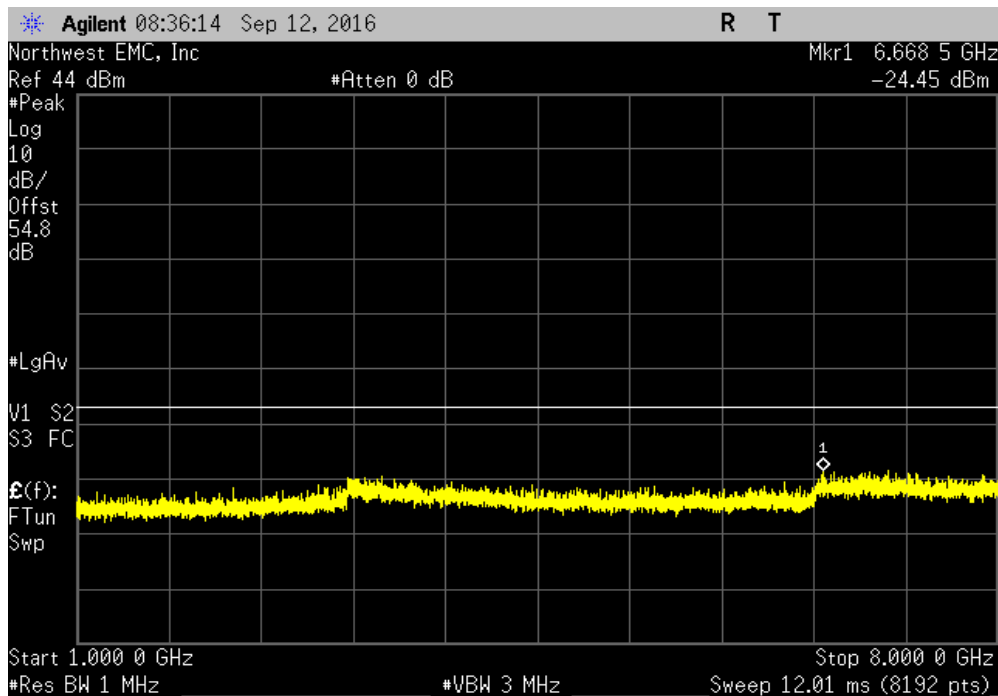


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 2, Mid Channel LTE10, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-26.08	-13	Pass	



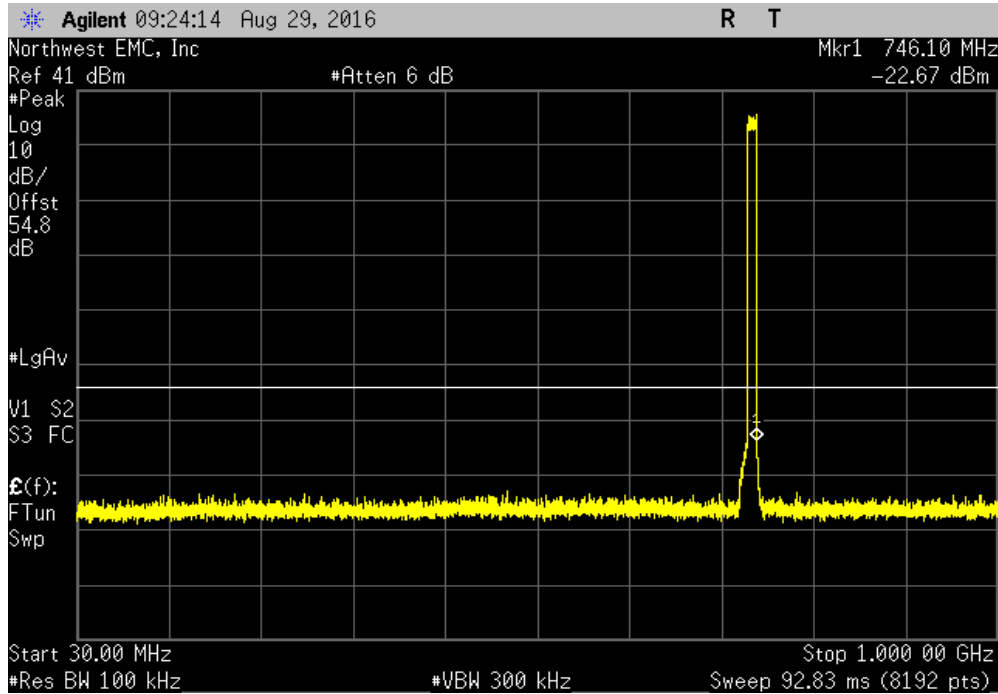
Antenna Port 2, Mid Channel LTE10, 737.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.45	-13	Pass	



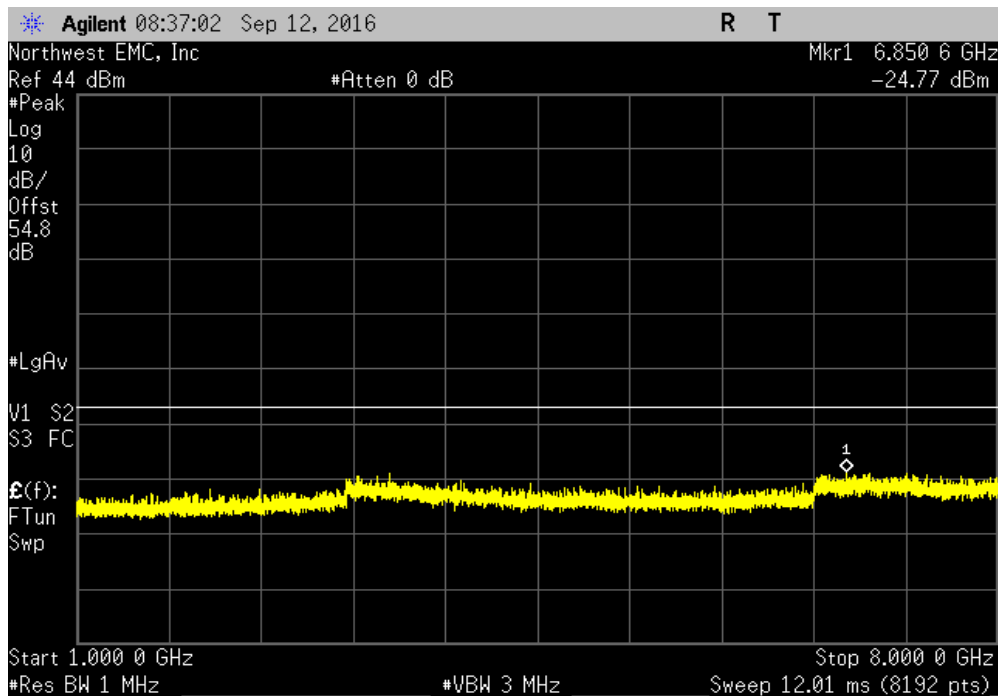


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 12

Antenna Port 2, High Channel LTE10, 741 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-22.67	-13	Pass	



Antenna Port 2, High Channel LTE10, 741 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.77	-13	Pass	



# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 17



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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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
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	AFD	7/29/2016	7/29/2017

## 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.

Only the Low Channel for each channel bandwidth was tested, the Mid & High Channels were previously tested in this band.

# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 17

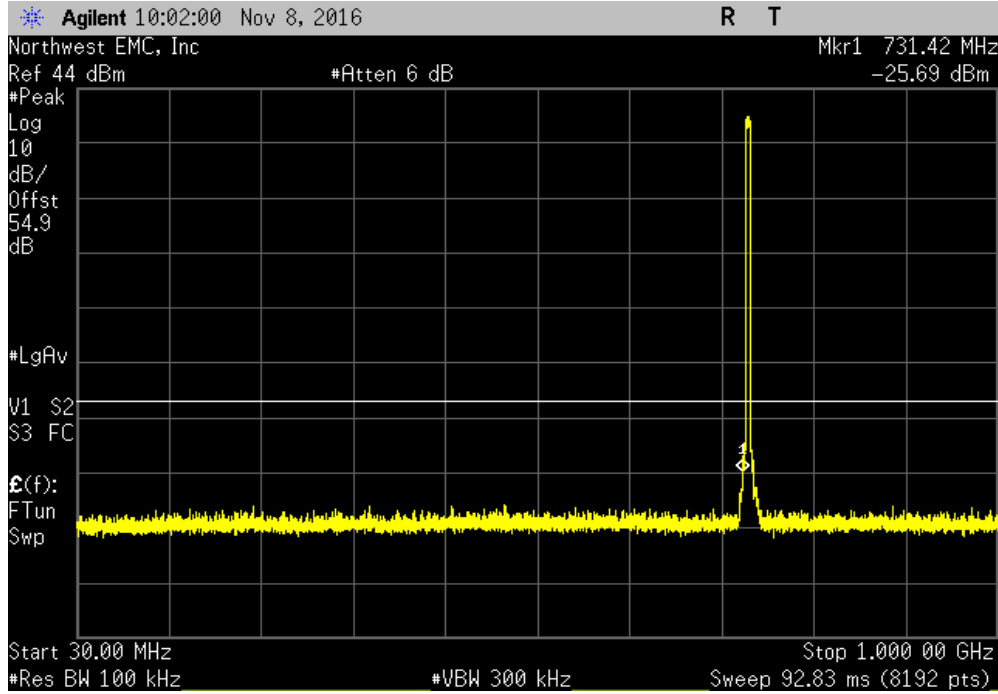


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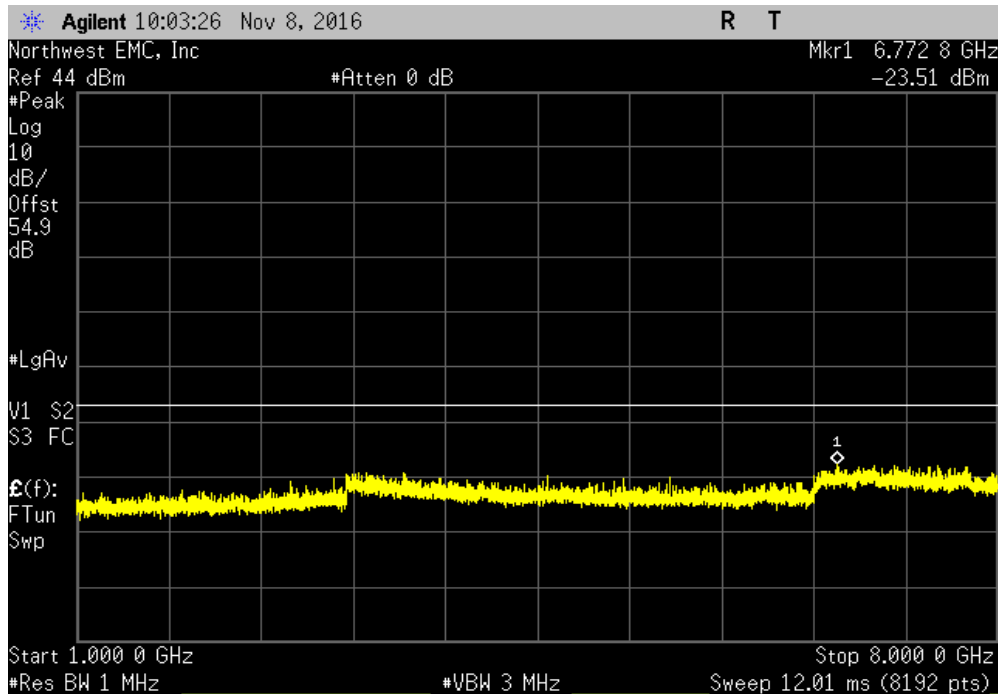
EUT: CWS-3050-12		Work Order: KMWC0077			
Serial Number: K163300001		Date: 11/08/16			
Customer: Parallel Wireless Inc.		Temperature: 20.8 °C			
Attendees: Edward Lee		Humidity: 49% RH			
Project: None		Barometric Pres.: 1018 mbar			
Tested by: Johnny Candelas		Power: 48 VDC			
Job Site: OC13					
TEST 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 = 54.9dB total.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	1	Signature 			
		Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
Antenna Port 1					
	Low Channel LTE5, 736.5 MHz	30 MHz - 1 GHz	-25.69	-13	Pass
	Low Channel LTE5, 736.5 MHz	1 GHz - 8 GHz	-23.51	-13	Pass
	Low Channel LTE10, 739 MHz	30 MHz - 1 GHz	-26.01	-13	Pass
	Low Channel LTE10, 739 MHz	1 GHz - 8 GHz	-23.53	-13	Pass
Antenna Port 2					
	Low Channel LTE5, 736.5 MHz	30 MHz - 1 GHz	-26.74	-13	Pass
	Low Channel LTE5, 736.5 MHz	1 GHz - 8 GHz	-22.95	-13	Pass
	Low Channel LTE10, 739 MHz	30 MHz - 1 GHz	-25.08	-13	Pass
	Low Channel LTE10, 739 MHz	1 GHz - 8 GHz	-23.19	-13	Pass

# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 17

Antenna Port 1, Low Channel LTE5, 736.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-25.69	-13	Pass	

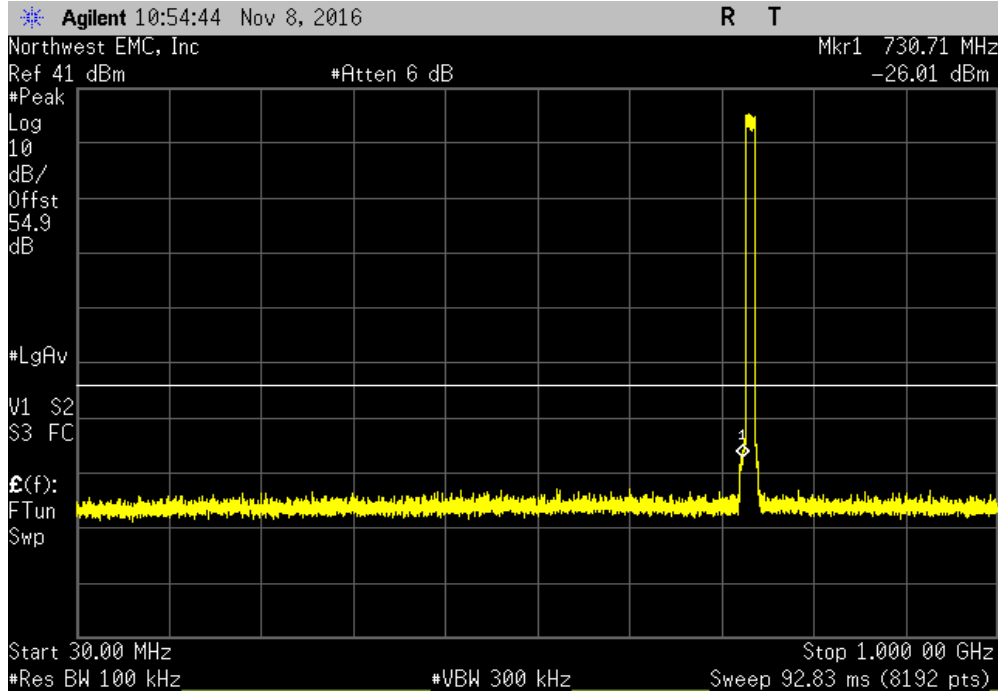


Antenna Port 1, Low Channel LTE5, 736.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.51	-13	Pass	

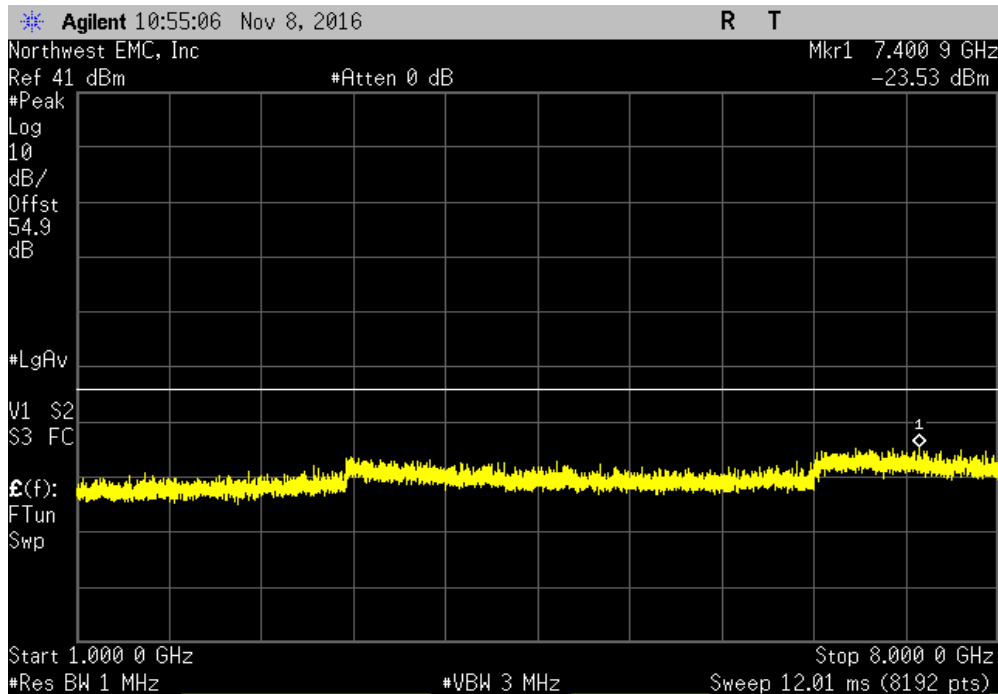


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 17

Antenna Port 1, Low Channel LTE10, 739 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-26.01	-13	Pass	

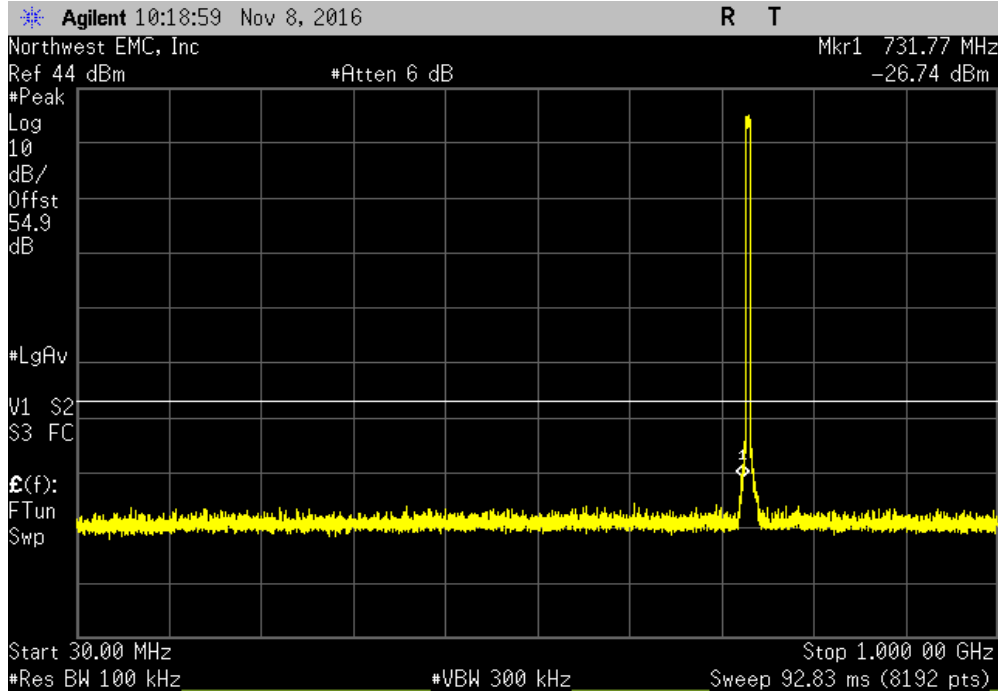


Antenna Port 1, Low Channel LTE10, 739 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.53	-13	Pass	

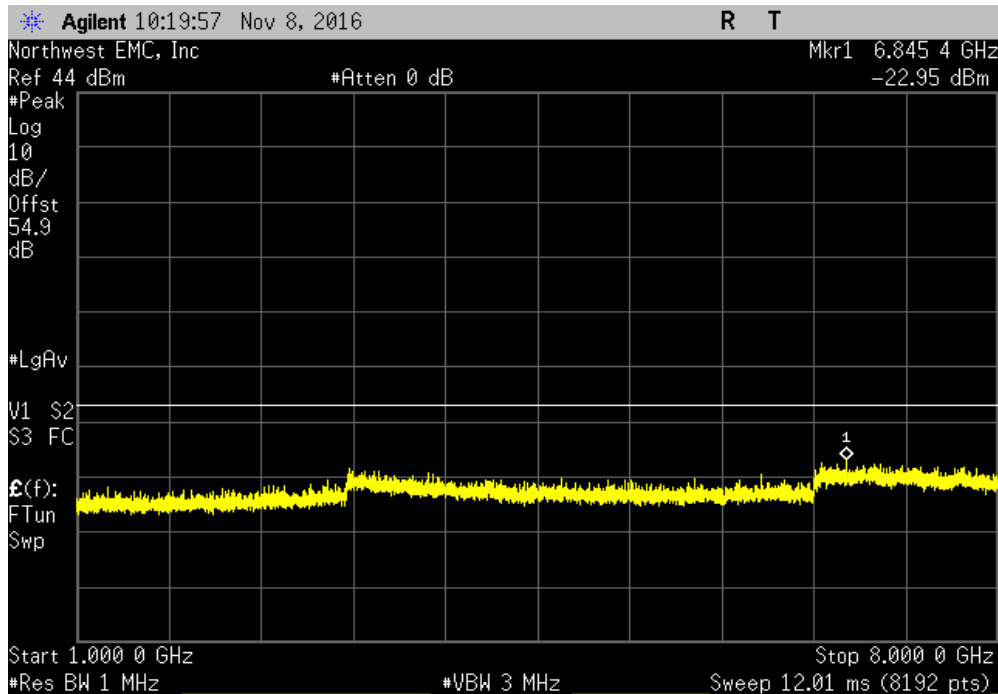


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 17

Antenna Port 2, Low Channel LTE5, 736.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-26.74	-13	Pass	

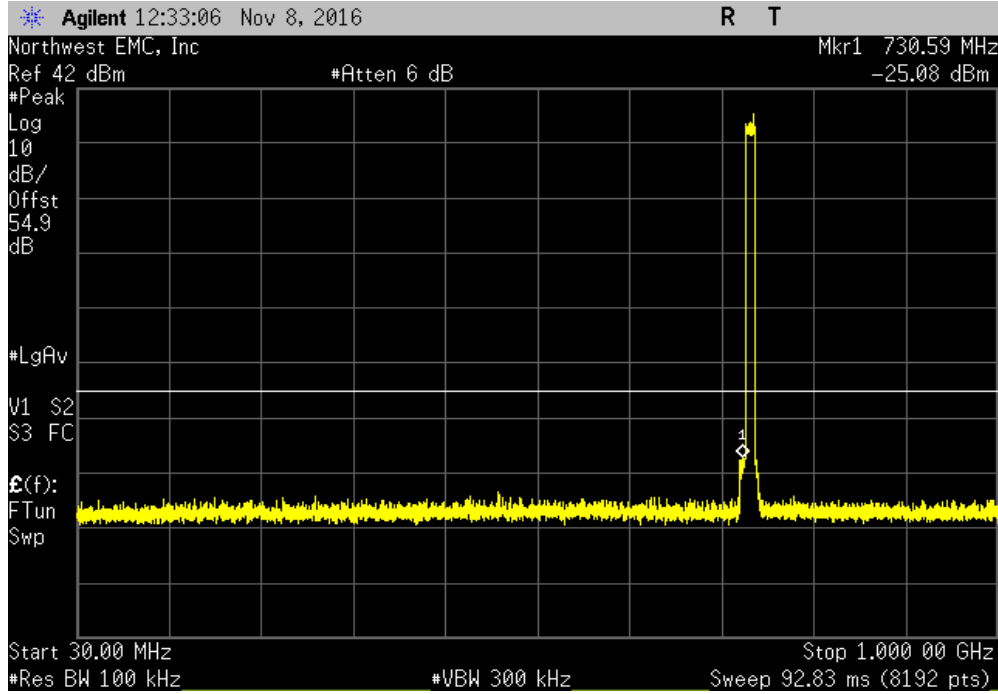


Antenna Port 2, Low Channel LTE5, 736.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-22.95	-13	Pass	

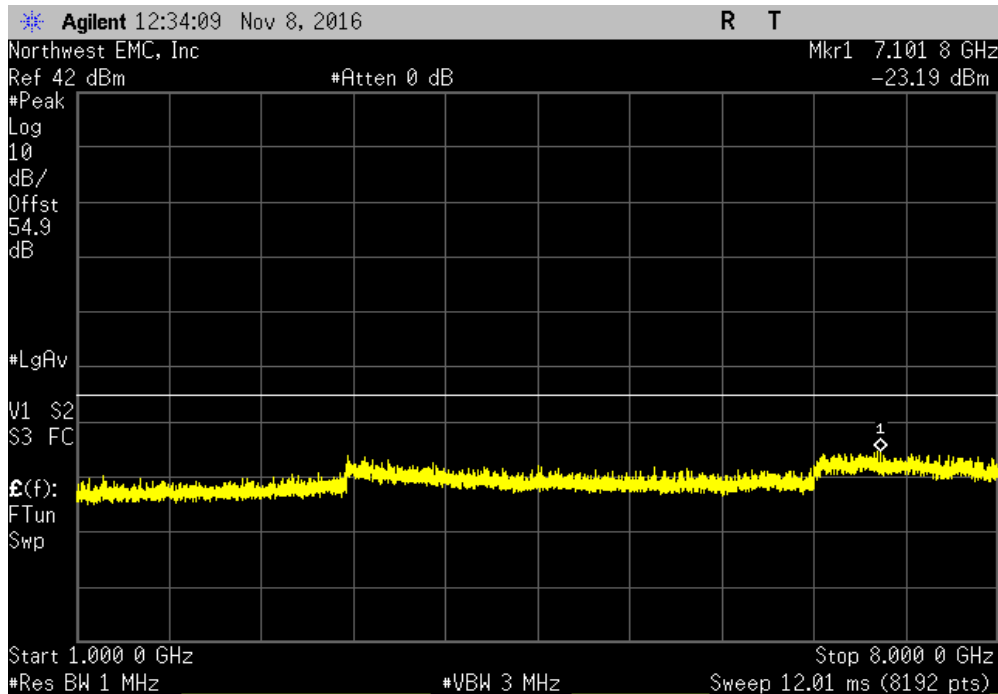


# SPURIOUS EMISSIONS OF THE ANTENNA TERMINALS - BAND 17

Antenna Port 2, Low Channel LTE10, 739 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-25.08	-13	Pass	



Antenna Port 2, Low Channel LTE10, 739 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.19	-13	Pass	



# BAND EDGE COMPLIANCE - BAND 12

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 edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.


The spectrum was scanned below the lower band edge and above the higher band edge. The resolution bandwidth was set to 30 kHz per the specification. 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 - BAND 12

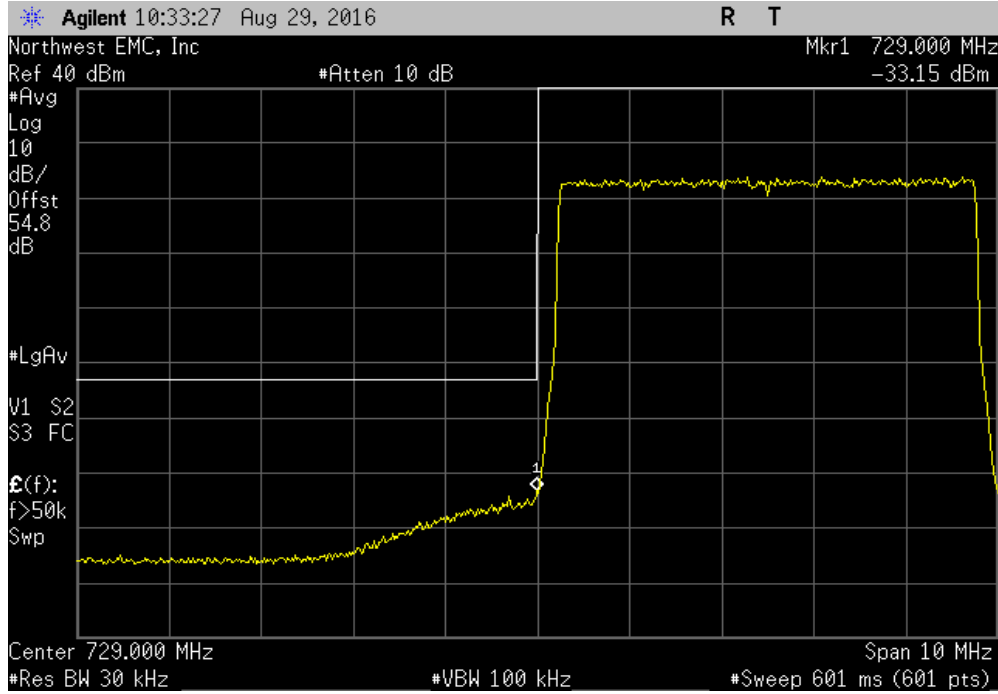


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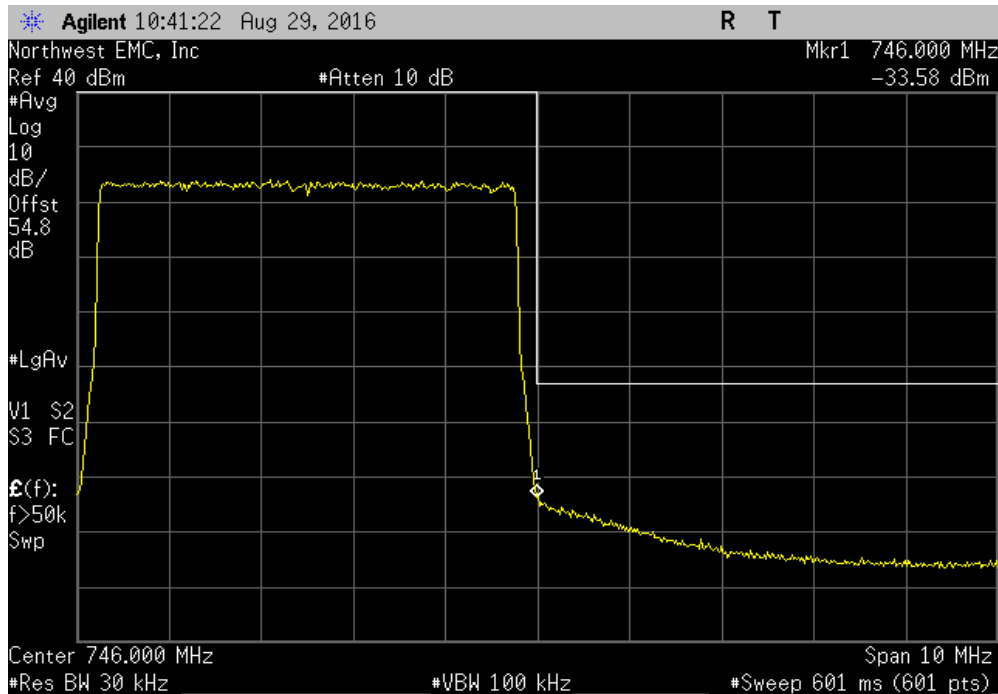
EUT: CWS-3050-12		Work Order: KMWC0074				
Serial Number: K163300001		Date: 08/29/16				
Customer: Parallel Wireless Inc.		Temperature: 21.4 °C				
Attendees: Andy Ku		Humidity: 46.4% RH				
Project: None		Barometric Pres.: 1017 mbar				
Tested by: Johnny Candelas		Power: 48 VDC				
Job Site: OC13		Test Method				
TEST SPECIFICATIONS		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 = 54.8dB total.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1	Signature 				
		Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
Antenna Port 1						
		Low Channel LTE5, 731.5 MHz	724 MHz - 734 MHz	-33.15	-13	Pass
		High Channel LTE5, 743.5 MHz	741 MHz - 751 MHz	-33.58	-13	Pass
		Low Channel LTE10, 734 MHz	719 MHz - 739 MHz	-36.33	-13	Pass
		High Channel LTE10, 741 MHz	736 MHz - 756 MHz	-37.40	-13	Pass
Antenna Port 2						
		Low Channel LTE5, 731.5 MHz	724 MHz - 734 MHz	-32.92	-13	Pass
		High Channel LTE5, 743.5 MHz	741 MHz - 751 MHz	-34.00	-13	Pass
		Low Channel LTE10, 734 MHz	719 MHz - 739 MHz	-37.52	-13	Pass
		High Channel LTE10, 741 MHz	736 MHz - 756 MHz	-37.08	-13	Pass

# BAND EDGE COMPLIANCE - BAND 12

Antenna Port 1, Low Channel LTE5, 731.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
724 MHz - 734 MHz	-33.15	-13	Pass	

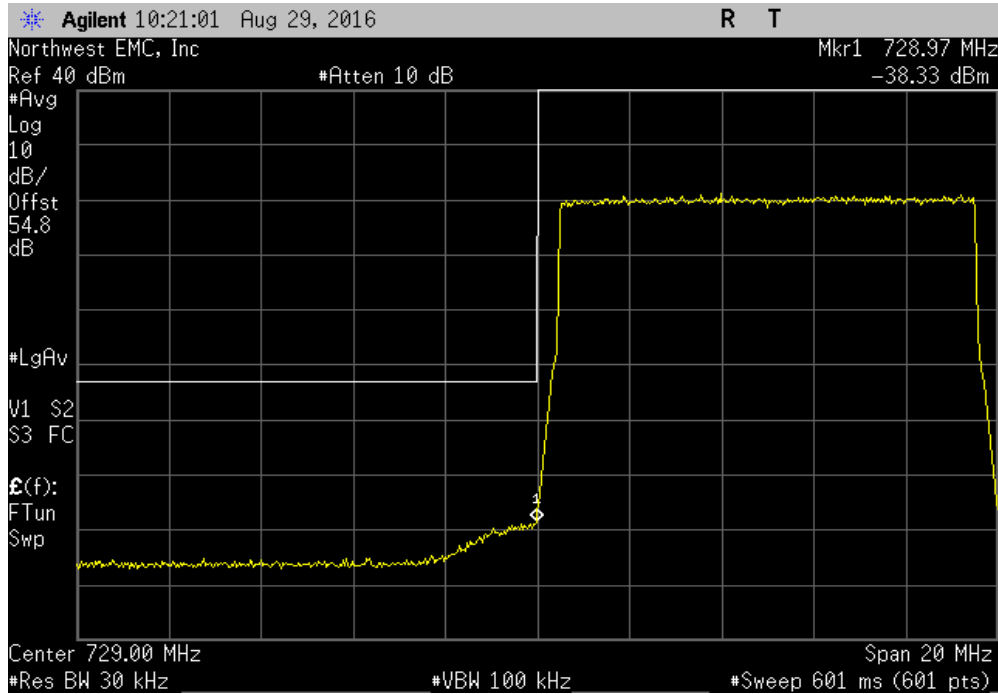


Antenna Port 1, High Channel LTE5, 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
741 MHz - 751 MHz	-33.58	-13	Pass	

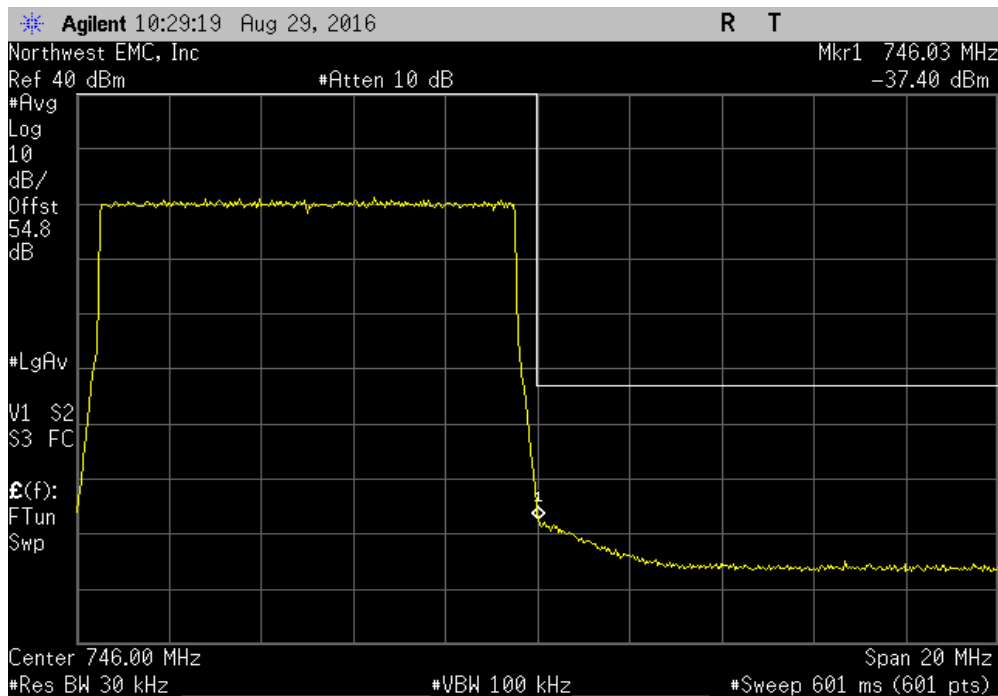


# BAND EDGE COMPLIANCE - BAND 12

Antenna Port 1, Low Channel LTE10, 734 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
719 MHz - 739 MHz	-38.33	-13	Pass	

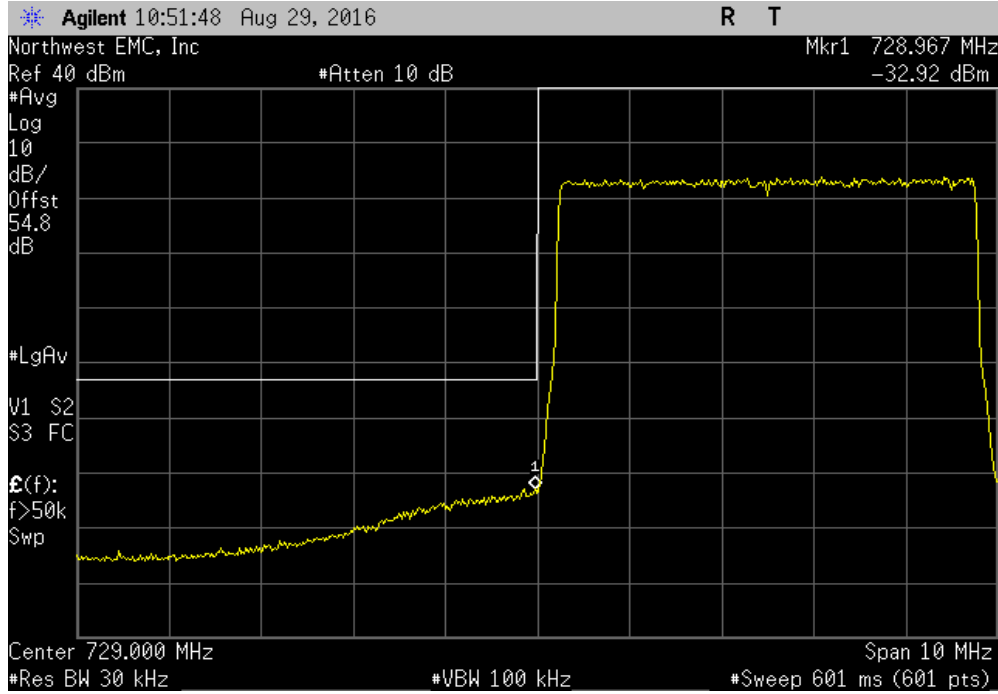


Antenna Port 1, High Channel LTE10, 741 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
736 MHz - 756 MHz	-37.40	-13	Pass	

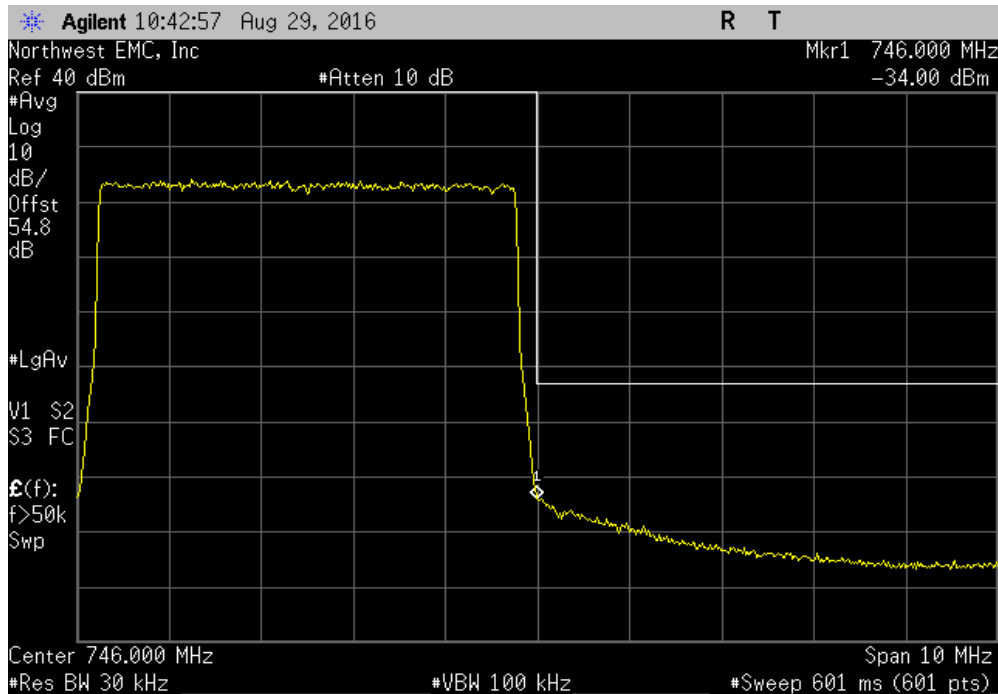


# BAND EDGE COMPLIANCE - BAND 12

Antenna Port 2, Low Channel LTE5, 731.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
724 MHz - 734 MHz	-32.92	-13	Pass	

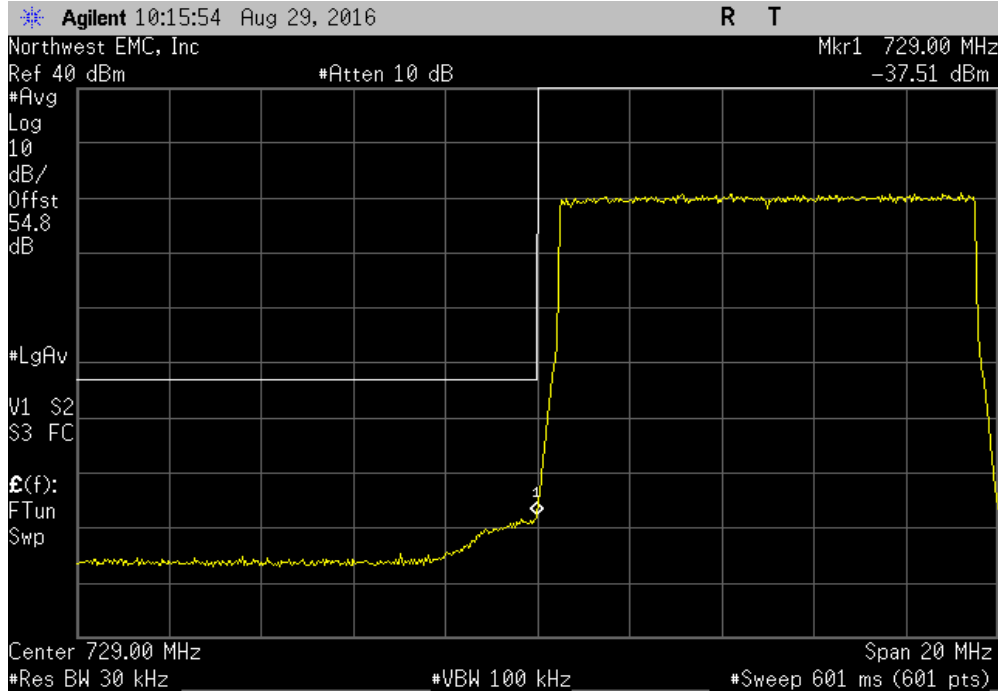


Antenna Port 2, High Channel LTE5, 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
741 MHz - 751 MHz	-34.00	-13	Pass	

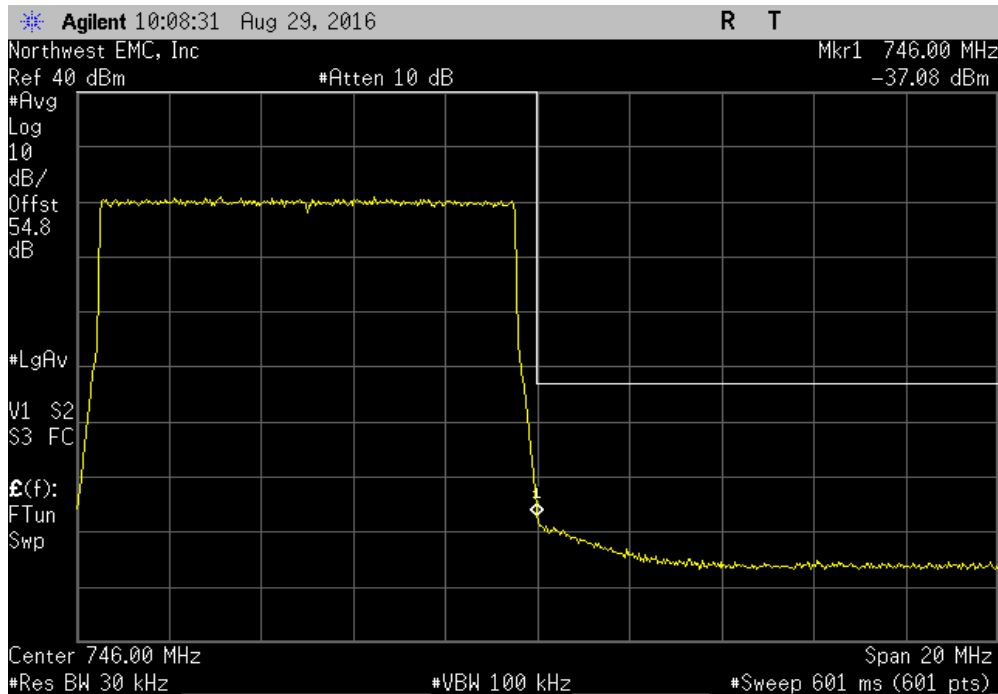


# BAND EDGE COMPLIANCE - BAND 12

Antenna Port 2, Low Channel LTE10, 734 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
719 MHz - 739 MHz	-37.52	-13	Pass	



Antenna Port 2, High Channel LTE10, 741 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
736 MHz - 756 MHz	-37.08	-13	Pass	



# BAND EDGE COMPLIANCE - BAND 17

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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
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	AFD	7/29/2016	7/29/2017

## 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 edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.


The spectrum was scanned below the lower band edge and above the higher band edge. The resolution bandwidth was set to 30 kHz per the specification. 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.

Only the Low Channel for each channel bandwidth was tested, the High Channel was previously tested in this band.

# BAND EDGE COMPLIANCE - BAND 17

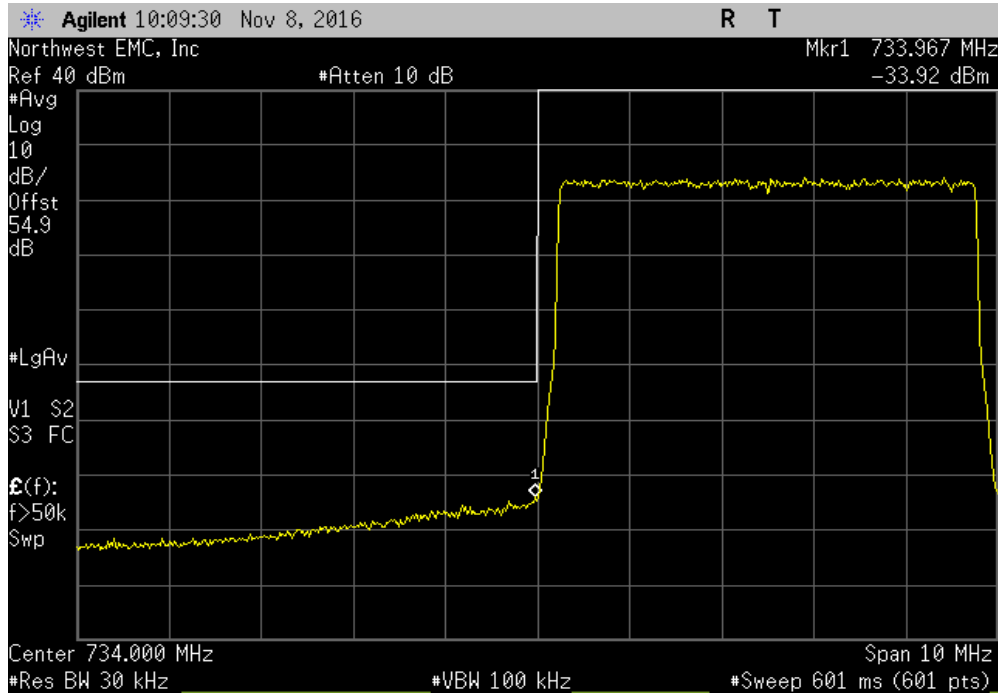


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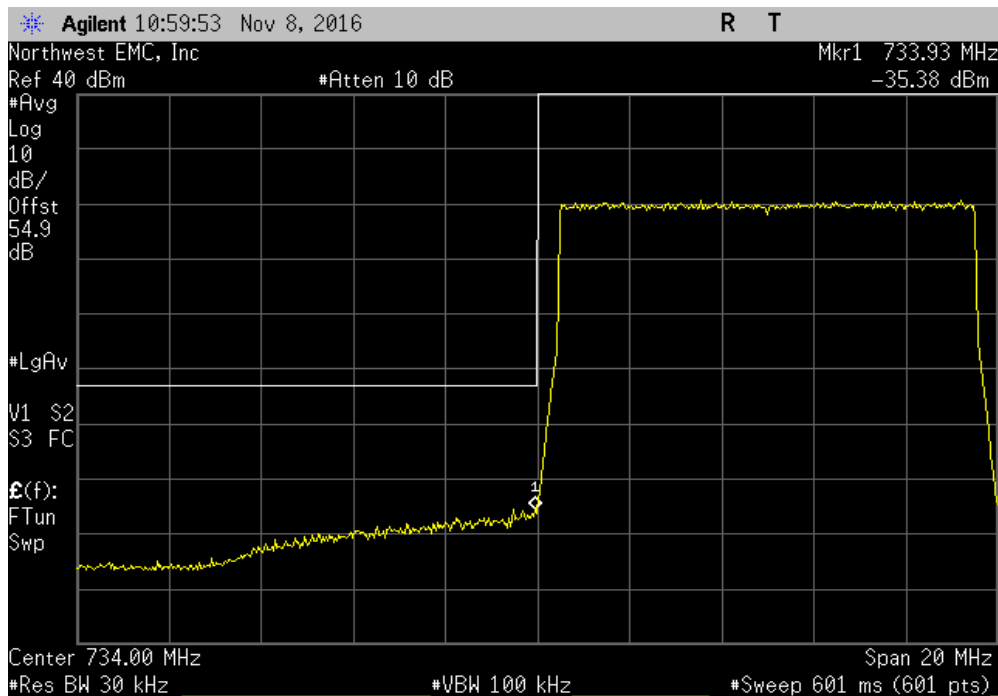
EUT: CWS-3050-12		Work Order: KMWC0077			
Serial Number: K163300001		Date: 11/08/16			
Customer: Parallel Wireless Inc.		Temperature: 20.8 °C			
Attendees: Edward Lee		Humidity: 49% RH			
Project: None		Barometric Pres.: 1018 mbar			
Tested by: Johnny Candelas		Power: 48 VDC			
Job Site: OC13					
TEST 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 = 54.9dB total.					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	1	Signature 			
		Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result
Antenna Port 1					
	Low Channel LTE5, 736.5 MHz	729 MHz - 739 MHz	-33.92	-13	Pass
	Low Channel LTE10, 739 MHz	724 MHz - 744 MHz	-35.38	-13	Pass
Antenna Port 2					
	Low Channel LTE5, 736.5 MHz	729 MHz - 739 MHz	-35.38	-13	Pass
	Low Channel LTE10, 739 MHz	724 MHz - 744 MHz	-36.88	-13	Pass

# BAND EDGE COMPLIANCE - BAND 17

Antenna Port 1, Low Channel LTE5, 736.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
729 MHz - 739 MHz	-33.92	-13	Pass	



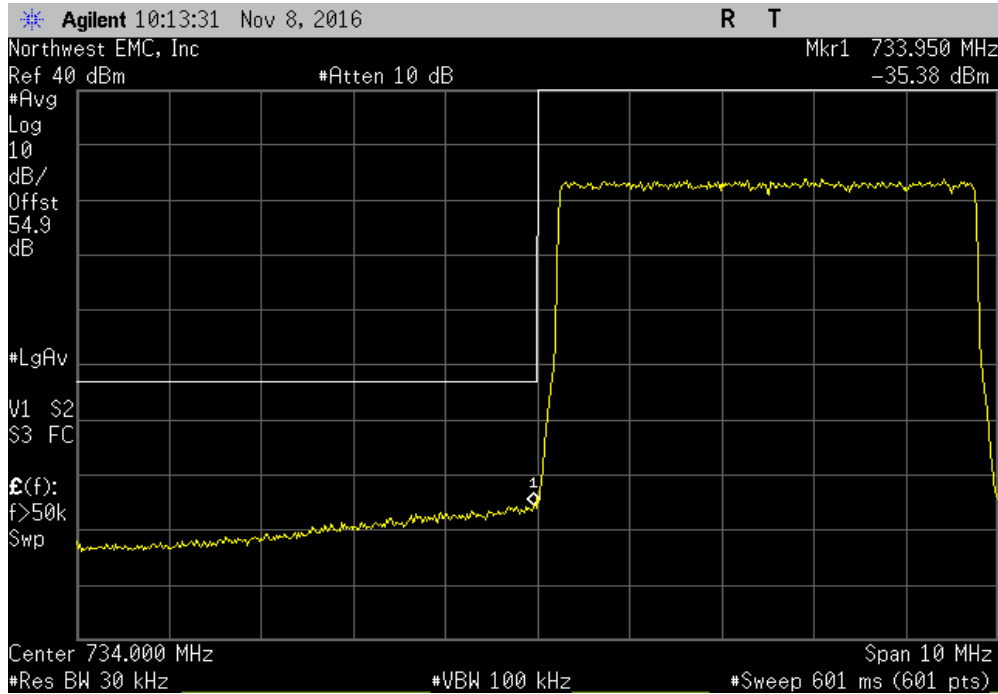
Antenna Port 1, Low Channel LTE10, 739 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
724 MHz - 744 MHz	-35.38	-13	Pass	



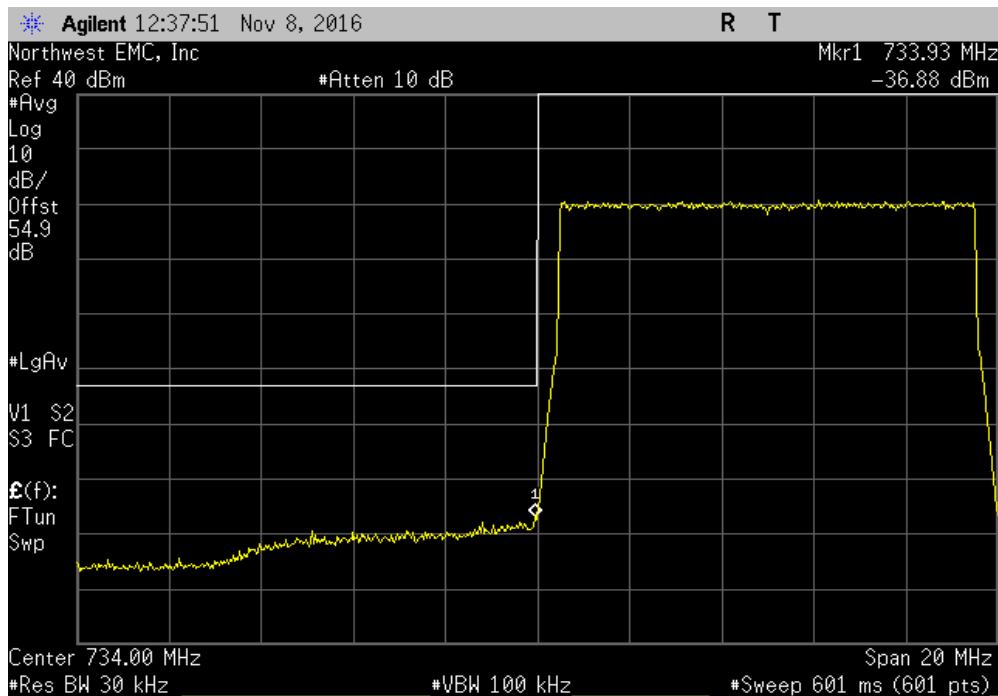


# BAND EDGE COMPLIANCE - BAND 17

Antenna Port 2, Low Channel LTE5, 736.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
729 MHz - 739 MHz	-35.38	-13	Pass	



Antenna Port 2, Low Channel LTE10, 739 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
724 MHz - 744 MHz	-36.88	-13	Pass	



# INTERMODULATION - BAND 12

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 appropriate resolution bandwidth and no video filtering were made for each modulation type.

Since the EUT does not have an RF Input, the EUT was configured with two modulated carriers, 1 at the edge of the band and the 2nd either adjacent or at max separation possible. The purpose of the test is to insure that no additional signals are creating by having multiple carriers in the passband of the EUT.

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 spurious conducted emissions limits. Measurements close to the limit were re-measured using a RMS average detector.

# INTERMODULATION - BAND 12

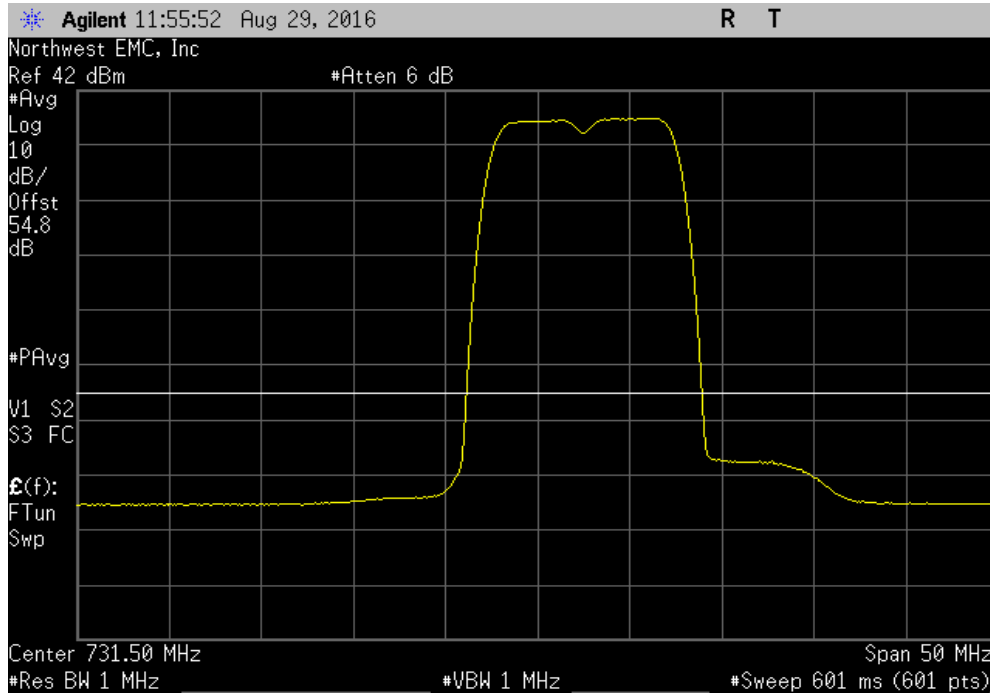


XMIT 2016.05.06

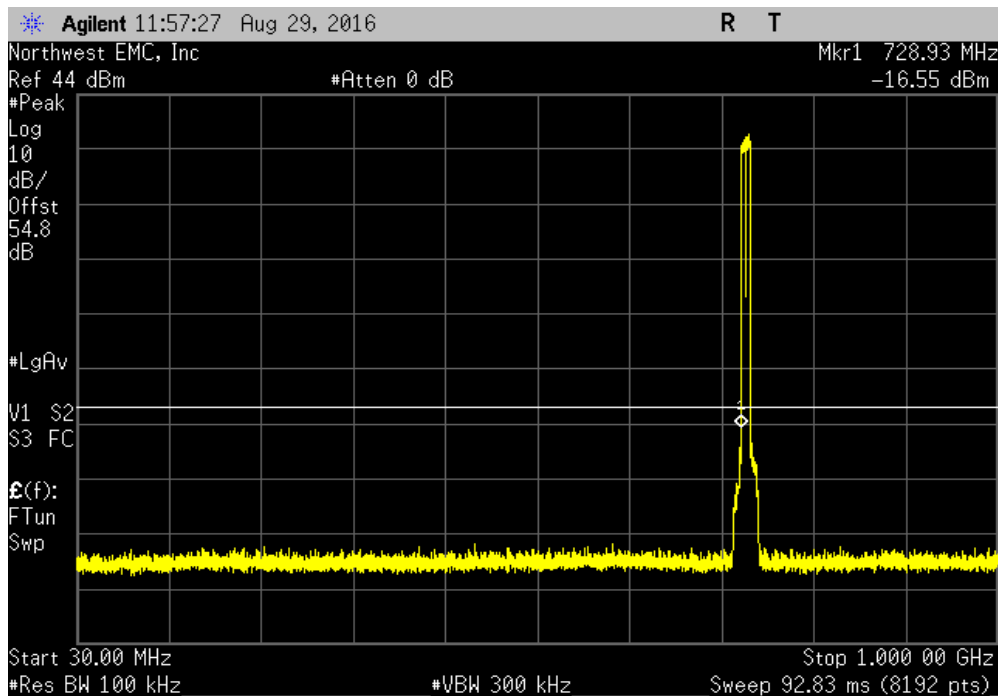
EUT: CWS-3050-12		Work Order: KMWC0074	
Serial Number: K163300001		Date: 09/12/16	
Customer: Parallel Wireless Inc.		Temperature: 21.1 °C	
Attendees: Andy Ku		Humidity: 50.2% RH	
Project: None		Barometric Pres.: 1015 mbar	
Tested by: Johnny Candelas		Power: 48 VDC	
Job Site: OC13			
TEST SPECIFICATIONS		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 = 54.8dB total.			
LTE5, 743.5 MHz, High Band Edge, max offset secondary channel was not performed because it is the exact same as LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature	
		Frequency Range	Max Value (dBm) Limit ≤ (dBm) Result
Antenna Port 1			
		LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel	30 MHz - 1 GHz -16.55 -13 Pass
		LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel	1 GHz - 8 GHz -23.80 -13 Pass
		LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel	Fundamental N/A N/A N/A
		LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel	30 MHz - 1 GHz -16.84 -13 Pass
		LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel	1 GHz - 8 GHz -24.23 -13 Pass
		LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel	30 MHz - 1 GHz -20.22 -13 Pass
		LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel	1 GHz - 8 GHz -23.90 -13 Pass
		LTE10, 734 MHz, Low Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE10, 734 MHz, Low Band Edge, adjacent secondary channel	30 MHz - 1 GHz -21.72 -13 Pass
		LTE10, 734 MHz, Low Band Edge, adjacent secondary channel	1 GHz - 8 GHz -24.12 -13 Pass
		LTE10, 734 MHz, Low Band Edge, max offset secondary channel	Fundamental N/A N/A N/A
		LTE10, 734 MHz, Low Band Edge, max offset secondary channel	30 MHz - 1 GHz -22.65 -13 Pass
		LTE10, 734 MHz, Low Band Edge, max offset secondary channel	1 GHz - 8 GHz -24.27 -13 Pass
		LTE10, 741 MHz, High Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE10, 741 MHz, High Band Edge, adjacent secondary channel	30 MHz - 1 GHz -23.94 -13 Pass
		LTE10, 741 MHz, High Band Edge, adjacent secondary channel	1 GHz - 8 GHz -24.44 -13 Pass
		LTE10, 741 MHz, High Band Edge, max offset secondary channel	Fundamental N/A N/A N/A
		LTE10, 741 MHz, High Band Edge, max offset secondary channel	30 MHz - 1 GHz -21.94 -13 Pass
		LTE10, 741 MHz, High Band Edge, max offset secondary channel	1 GHz - 8 GHz -24.08 -13 Pass
Antenna Port 2			
		LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel	30 MHz - 1 GHz -16.45 -13 Pass
		LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel	1 GHz - 8 GHz -24.04 -13 Pass
		LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel	Fundamental N/A N/A N/A
		LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel	30 MHz - 1 GHz -16.64 -13 Pass
		LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel	1 GHz - 8 GHz -24.43 -13 Pass
		LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel	30 MHz - 1 GHz -19.11 -13 Pass
		LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel	1 GHz - 8 GHz -23.34 -13 Pass
		LTE10, 734 MHz, Low Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE10, 734 MHz, Low Band Edge, adjacent secondary channel	30 MHz - 1 GHz -24.83 -13 Pass
		LTE10, 734 MHz, Low Band Edge, adjacent secondary channel	1 GHz - 8 GHz -24.14 -13 Pass
		LTE10, 734 MHz, Low Band Edge, max offset secondary channel	Fundamental N/A N/A N/A
		LTE10, 734 MHz, Low Band Edge, max offset secondary channel	30 MHz - 1 GHz -22.47 -13 Pass
		LTE10, 734 MHz, Low Band Edge, max offset secondary channel	1 GHz - 8 GHz -24.47 -13 Pass
		LTE10, 741 MHz, High Band Edge, adjacent secondary channel	Fundamental N/A N/A N/A
		LTE10, 741 MHz, High Band Edge, adjacent secondary channel	30 MHz - 1 GHz -23.14 -13 Pass
		LTE10, 741 MHz, High Band Edge, adjacent secondary channel	1 GHz - 8 GHz -24.24 -13 Pass
		LTE10, 741 MHz, High Band Edge, max offset secondary channel	Fundamental N/A N/A N/A
		LTE10, 741 MHz, High Band Edge, max offset secondary channel	30 MHz - 1 GHz -24.58 -13 Pass
		LTE10, 741 MHz, High Band Edge, max offset secondary channel	1 GHz - 8 GHz -24.26 -13 Pass

# INTERMODULATION - BAND 12

Antenna Port 1, LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

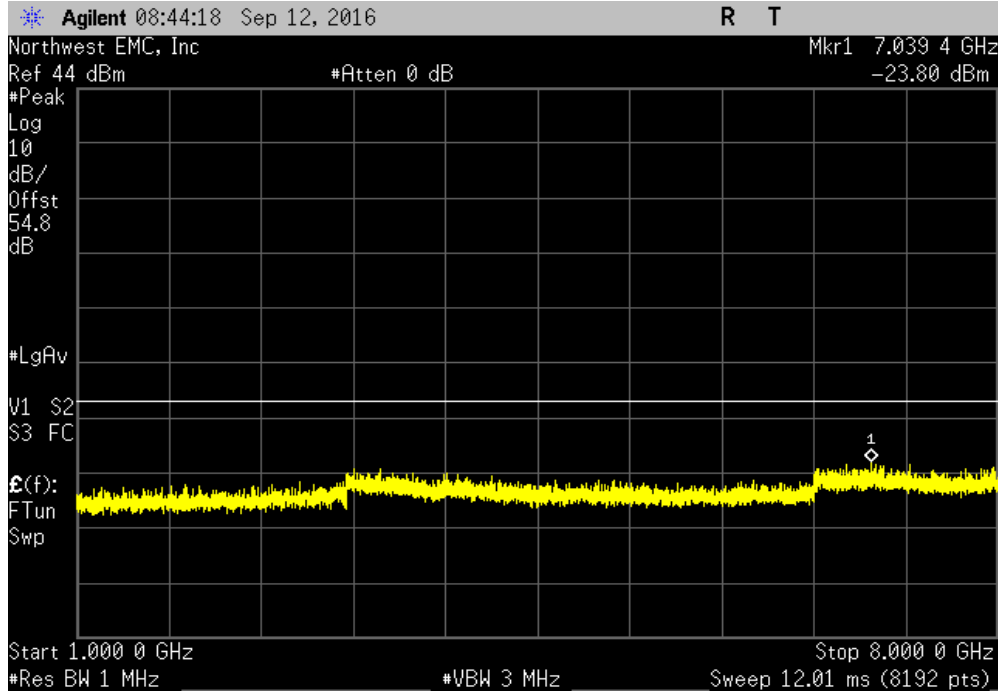


Antenna Port 1, LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-16.55	-13	Pass	

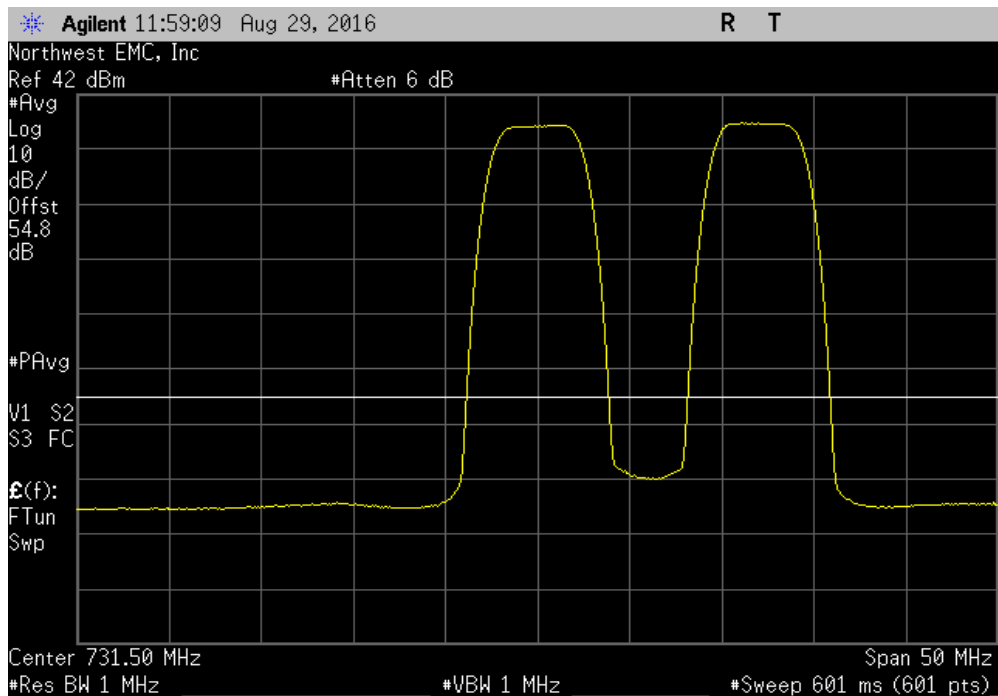


# INTERMODULATION - BAND 12

Antenna Port 1, LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-23.80	-13	Pass		

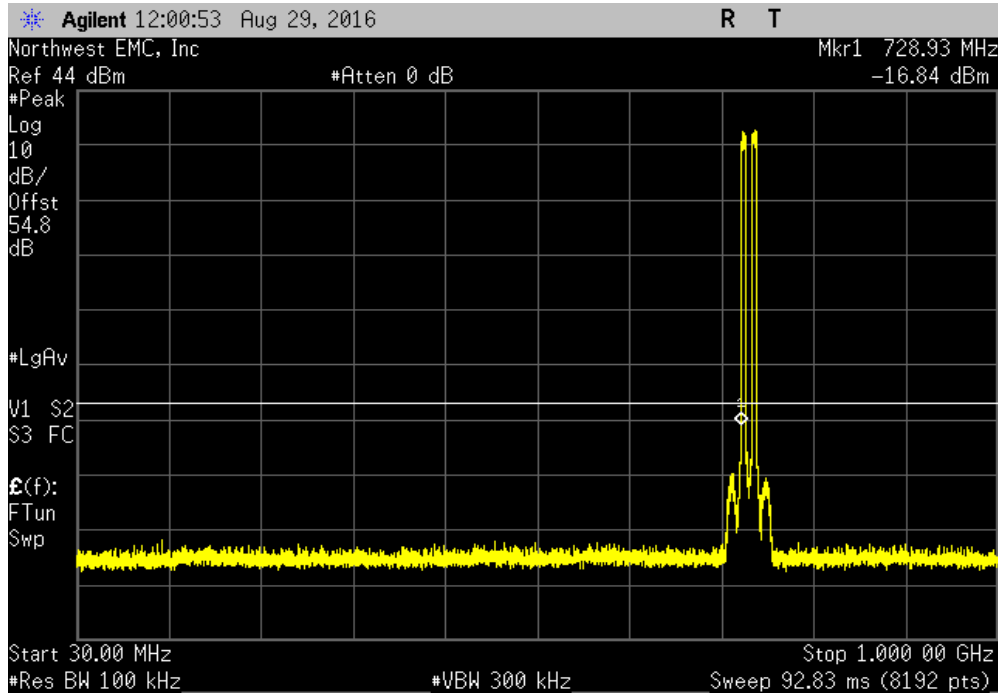


Antenna Port 1, LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		

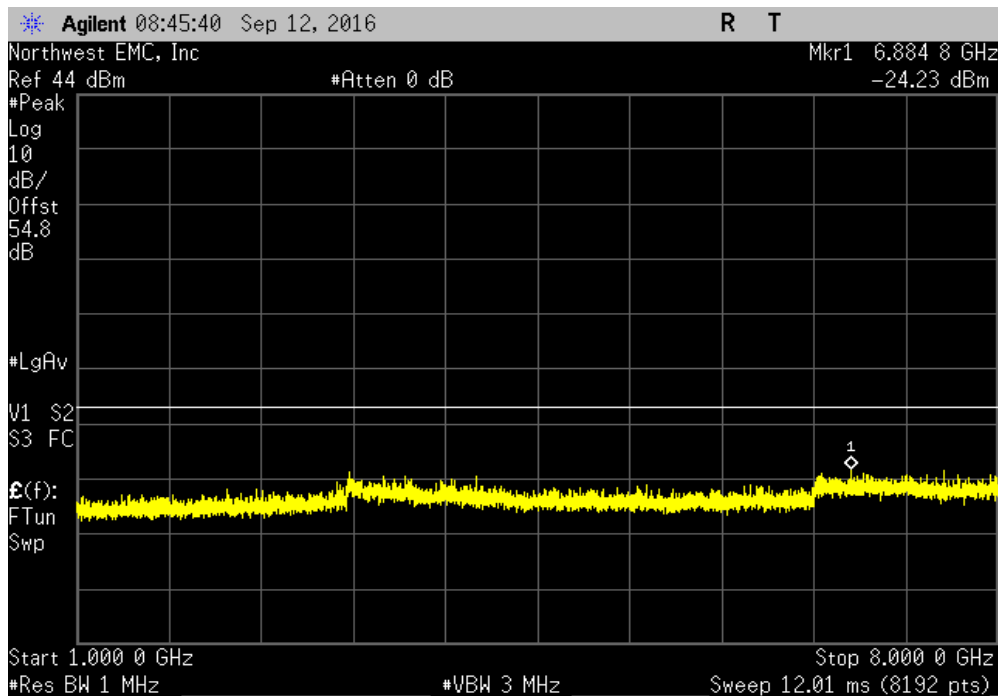


# INTERMODULATION - BAND 12

Antenna Port 1, LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-16.84	-13	Pass	

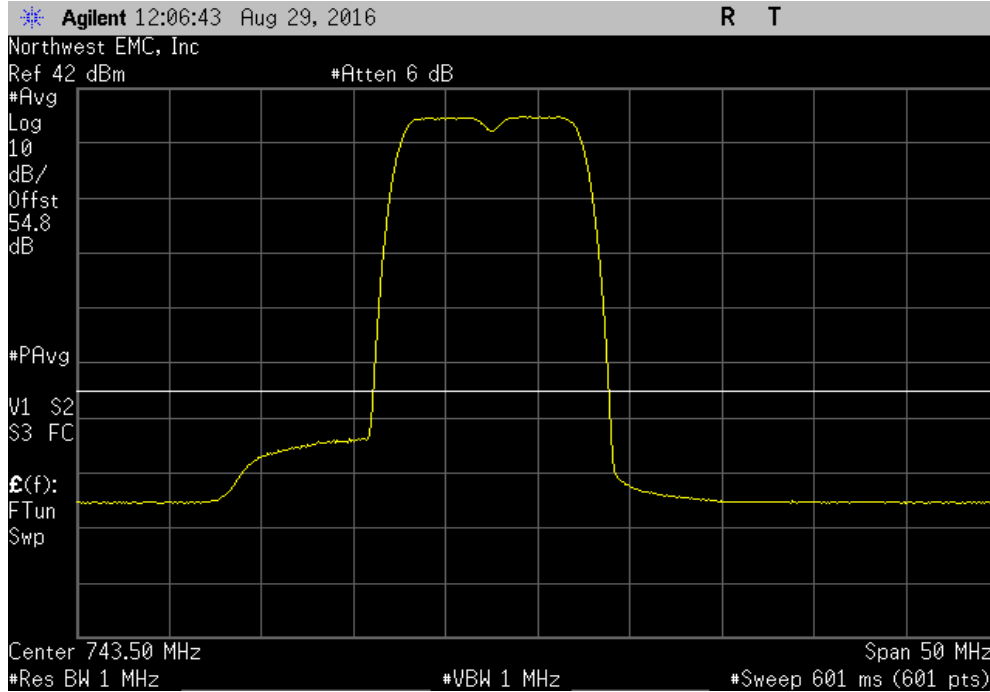


Antenna Port 1, LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.23	-13	Pass	

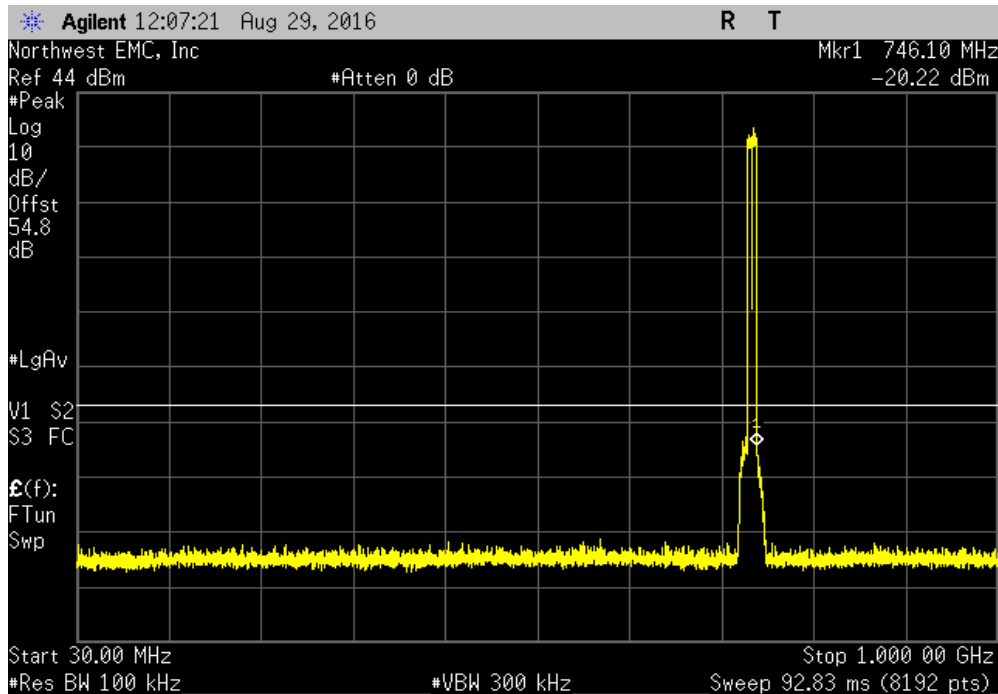


# INTERMODULATION - BAND 12

Antenna Port 1, LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

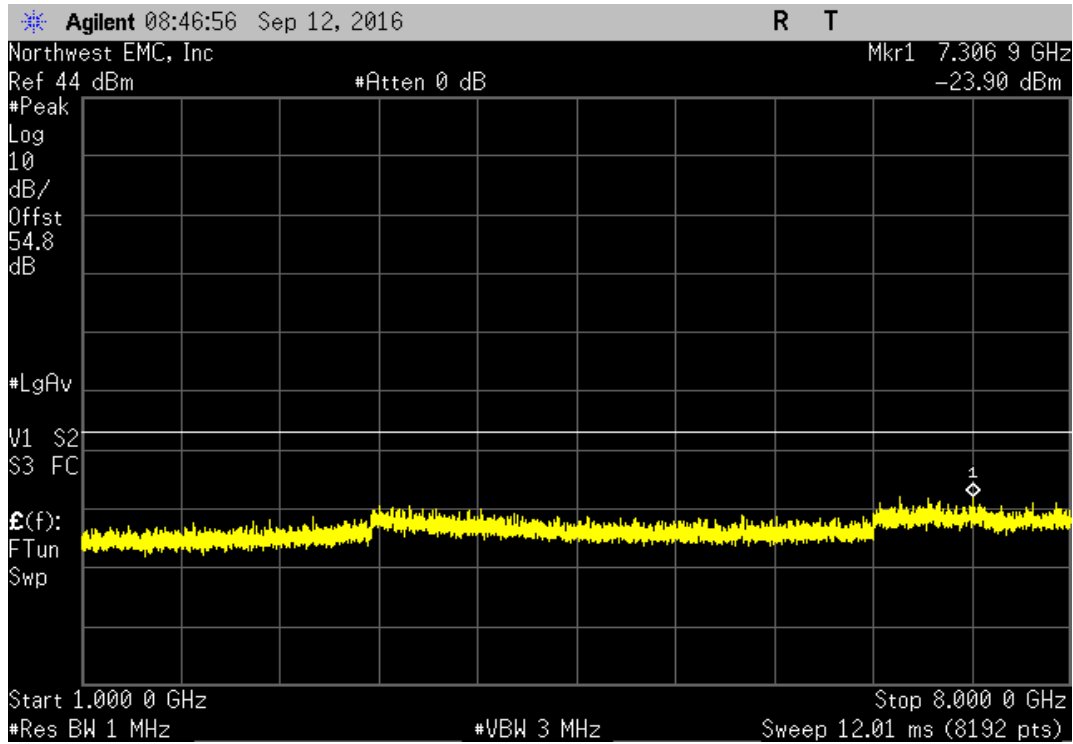


Antenna Port 1, LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-20.22	-13	Pass	



# INTERMODULATION - BAND 12

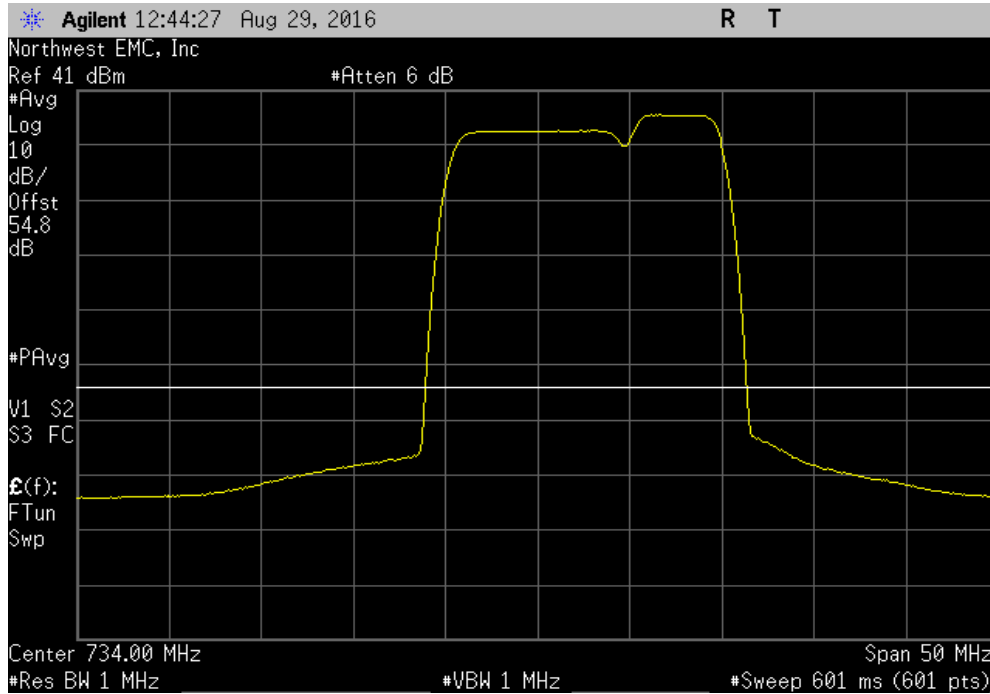
Antenna Port 1, LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel						
Frequency		Max Value		Limit		Result
Range		(dBm)		≤ (dBm)		
1 GHz - 8 GHz		-23.90		-13		Pass



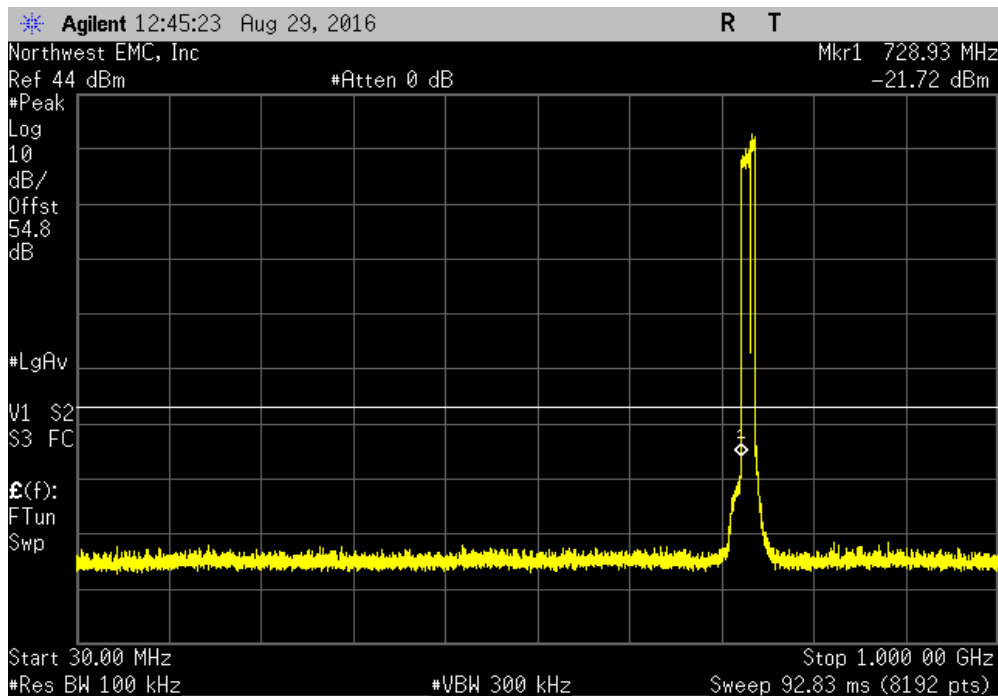


# INTERMODULATION - BAND 12

Antenna Port 1, LTE10, 734 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

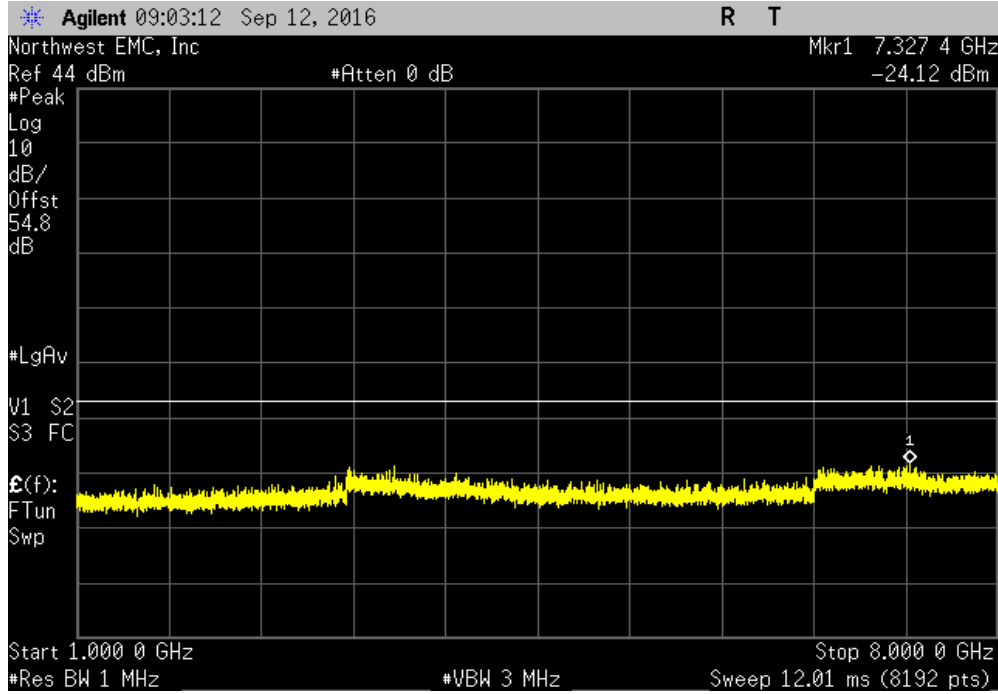


Antenna Port 1, LTE10, 734 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-21.72	-13	Pass	

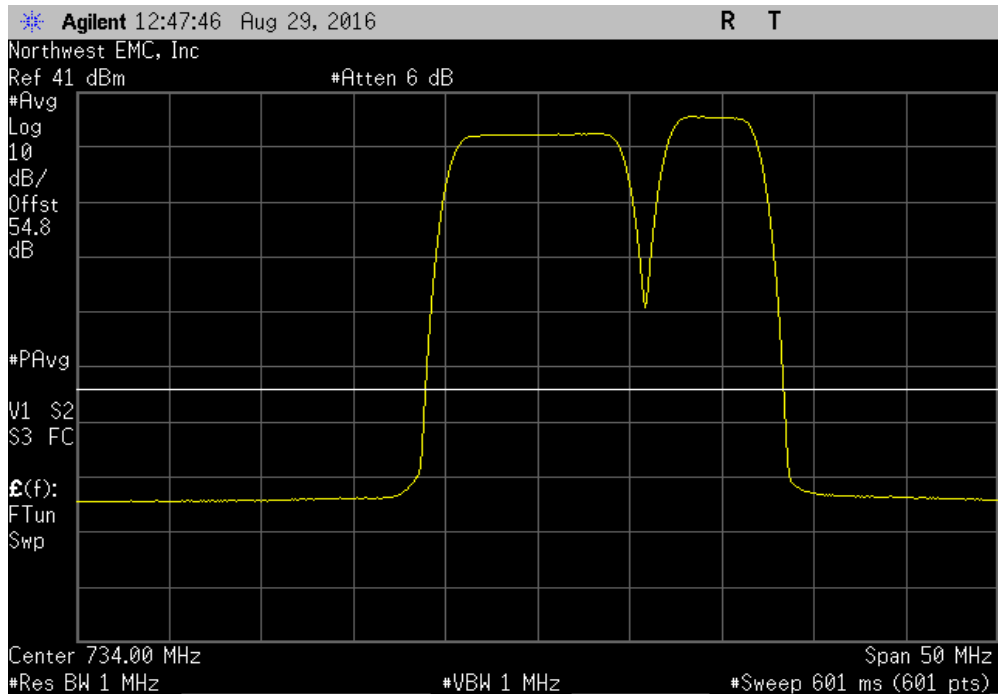


# INTERMODULATION - BAND 12

Antenna Port 1, LTE10, 734 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-24.12	-13	Pass		

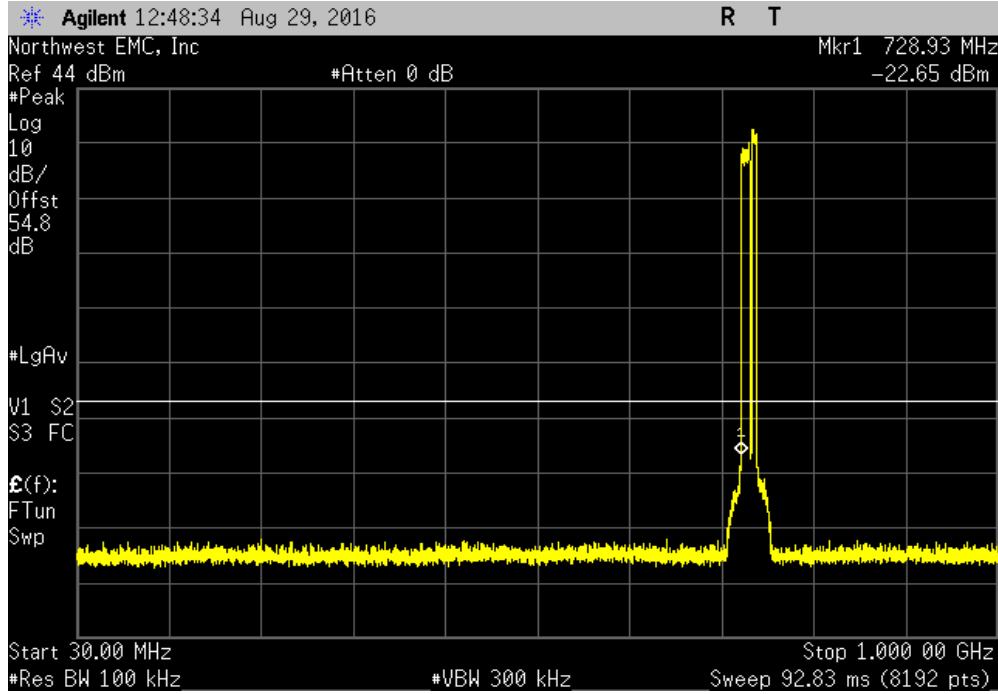


Antenna Port 1, LTE10, 734 MHz, Low Band Edge, max offset secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		

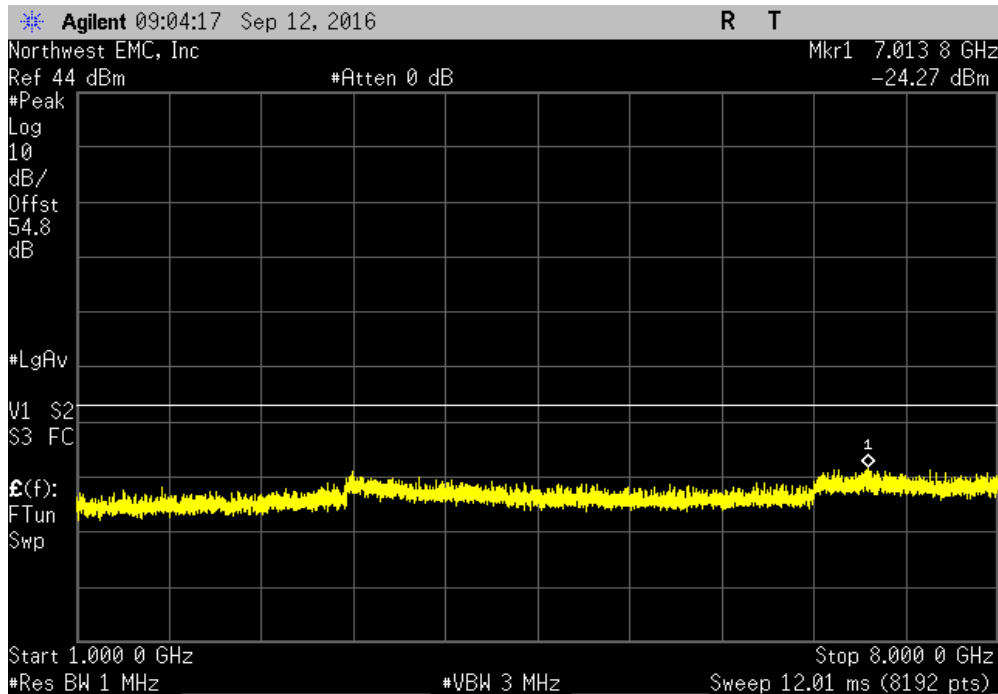


# INTERMODULATION - BAND 12

Antenna Port 1, LTE10, 734 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-22.65	-13	Pass	

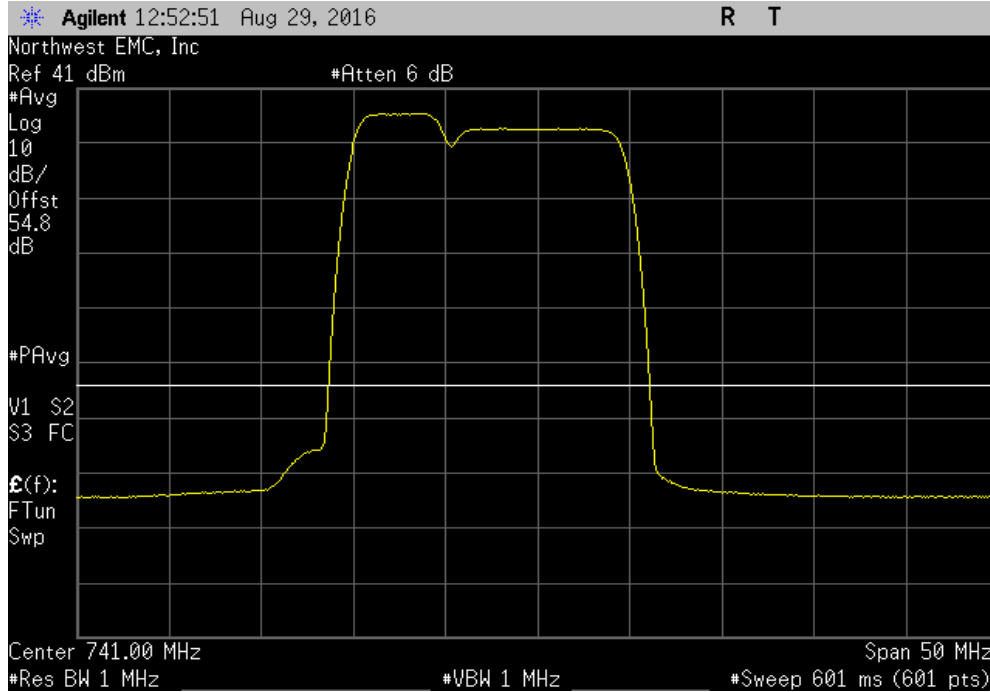


Antenna Port 1, LTE10, 734 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.27	-13	Pass	

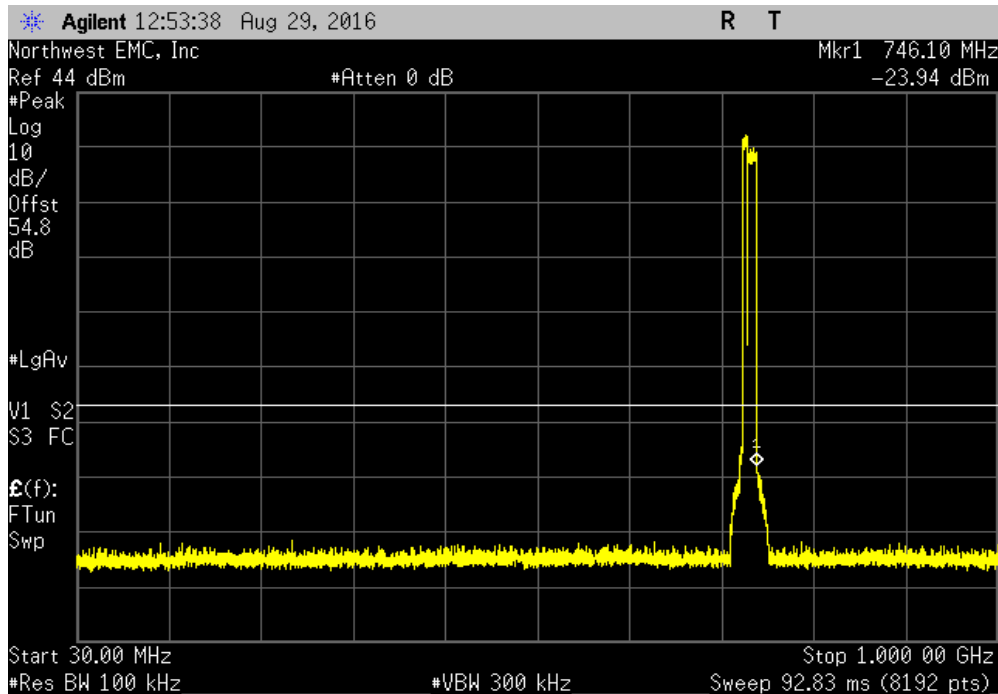


# INTERMODULATION - BAND 12

Antenna Port 1, LTE10, 741 MHz, High Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

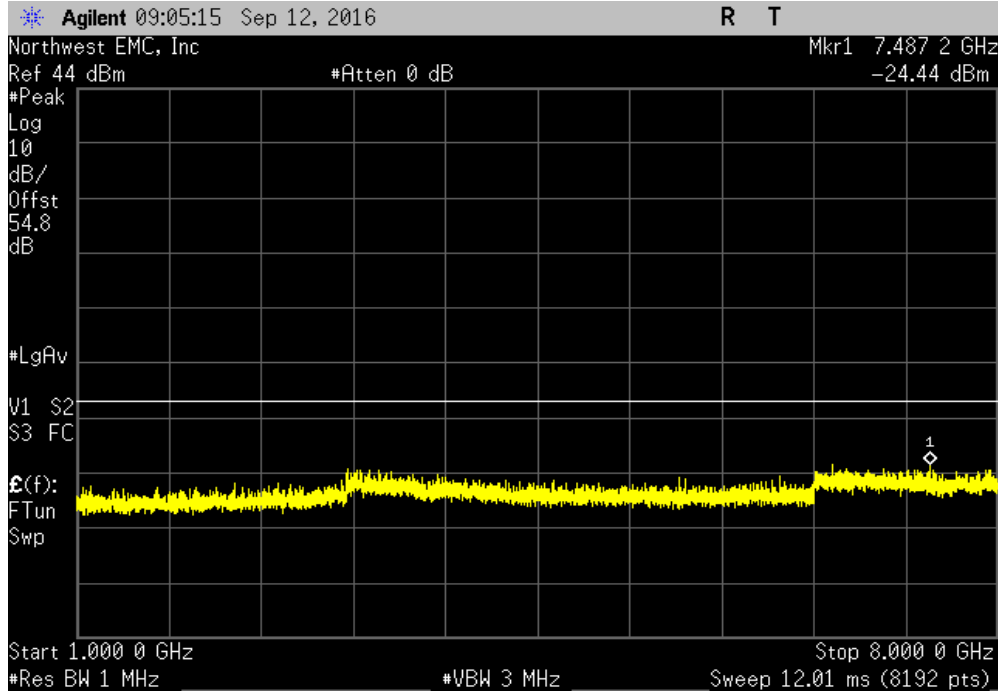


Antenna Port 1, LTE10, 741 MHz, High Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-23.94	-13	Pass	

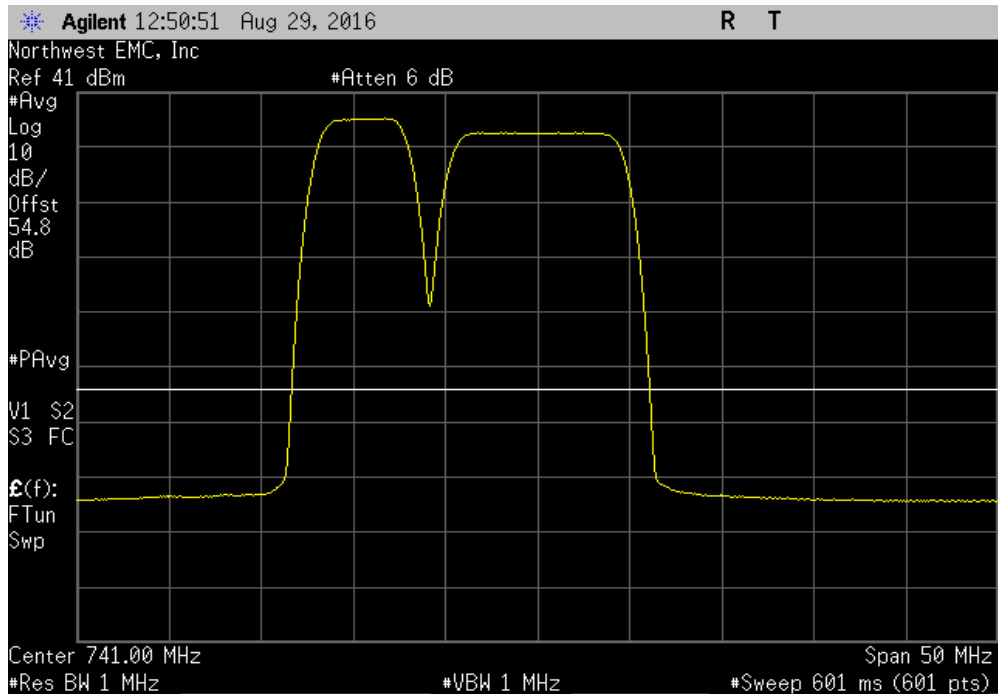


# INTERMODULATION - BAND 12

Antenna Port 1, LTE10, 741 MHz, High Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-24.44	-13	Pass		

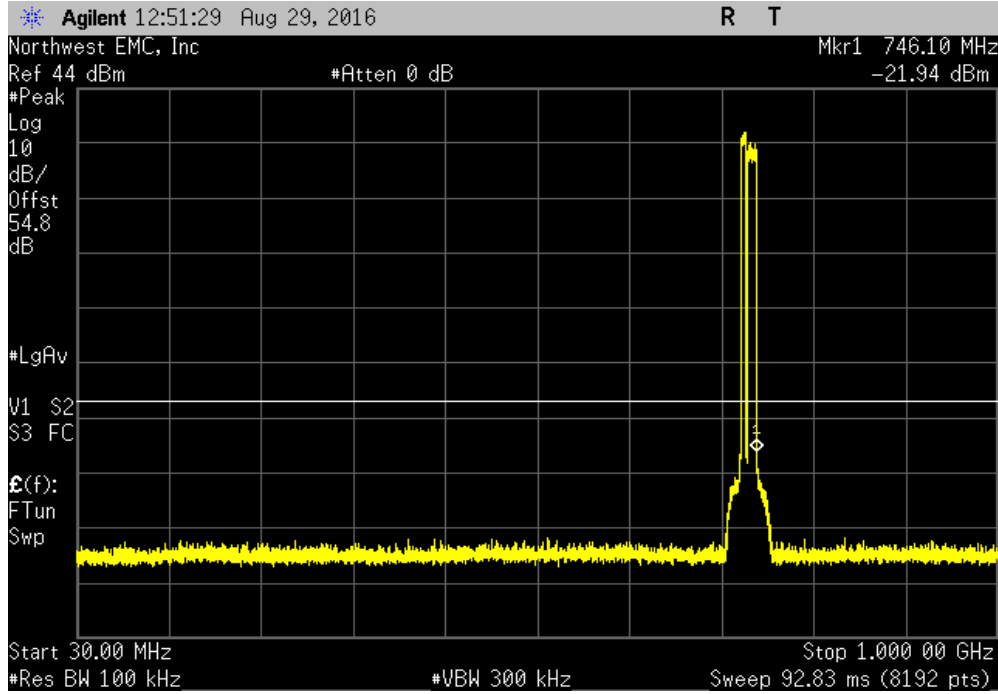


Antenna Port 1, LTE10, 741 MHz, High Band Edge, max offset secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		

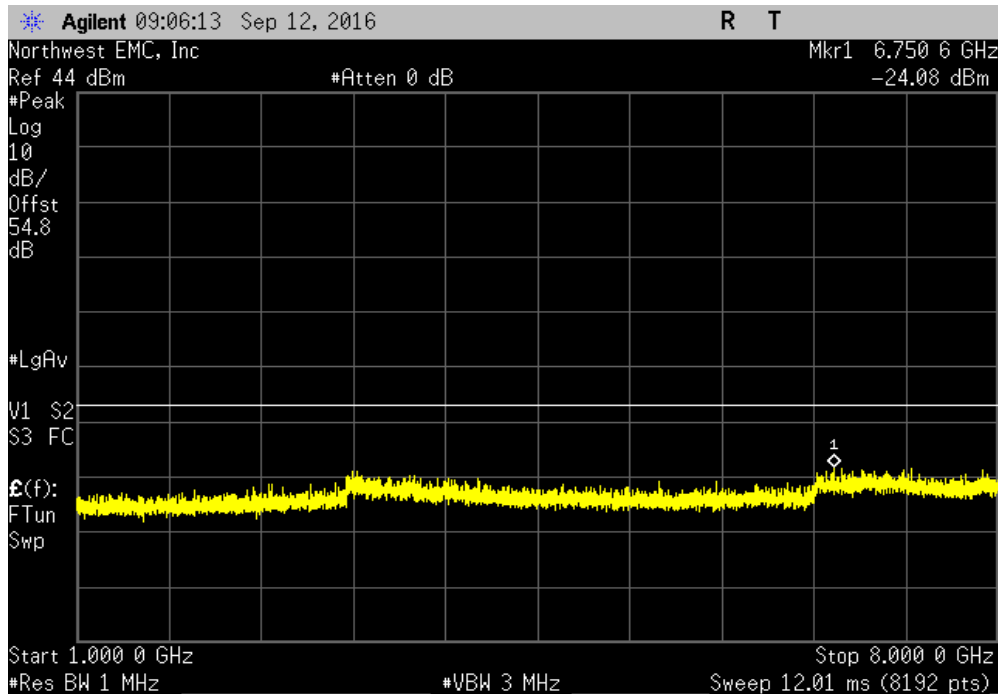


# INTERMODULATION - BAND 12

Antenna Port 1, LTE10, 741 MHz, High Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-21.94	-13	Pass	

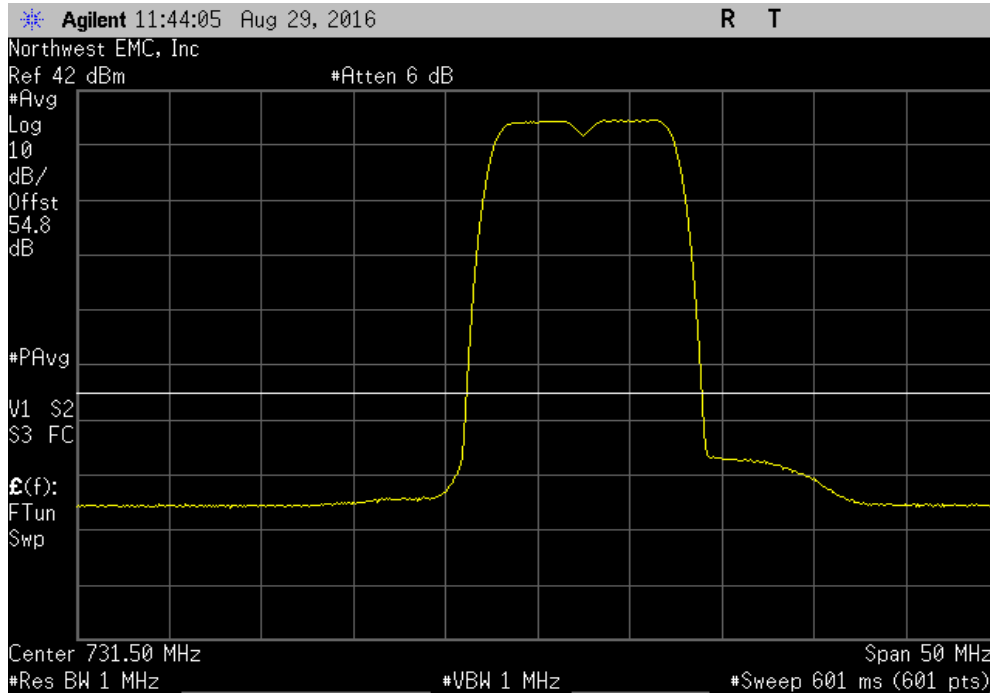


Antenna Port 1, LTE10, 741 MHz, High Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.08	-13	Pass	

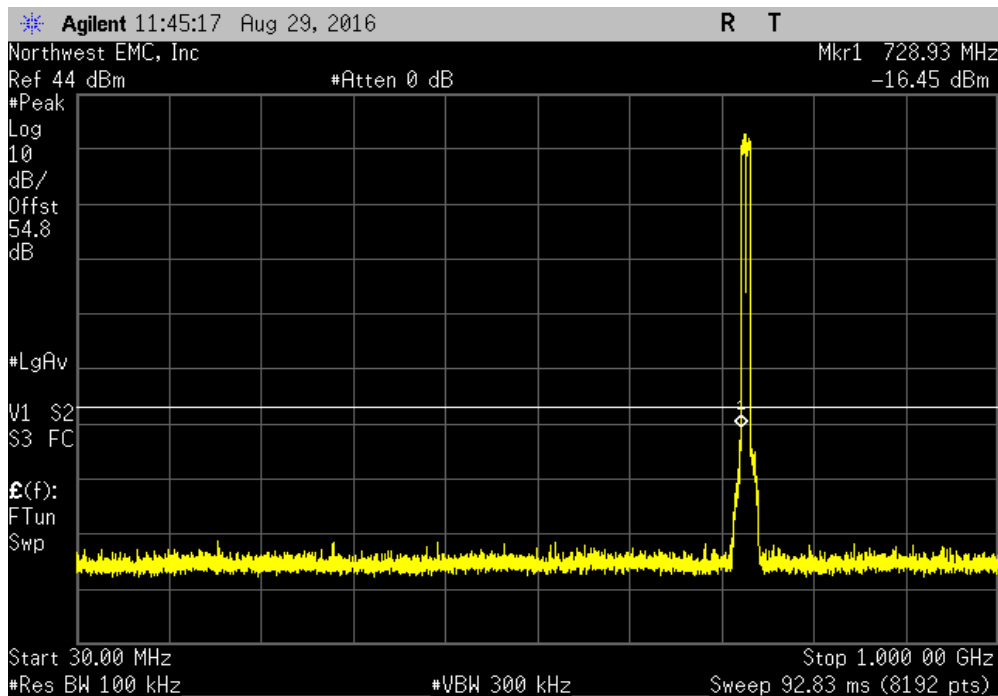


# INTERMODULATION - BAND 12

Antenna Port 2, LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

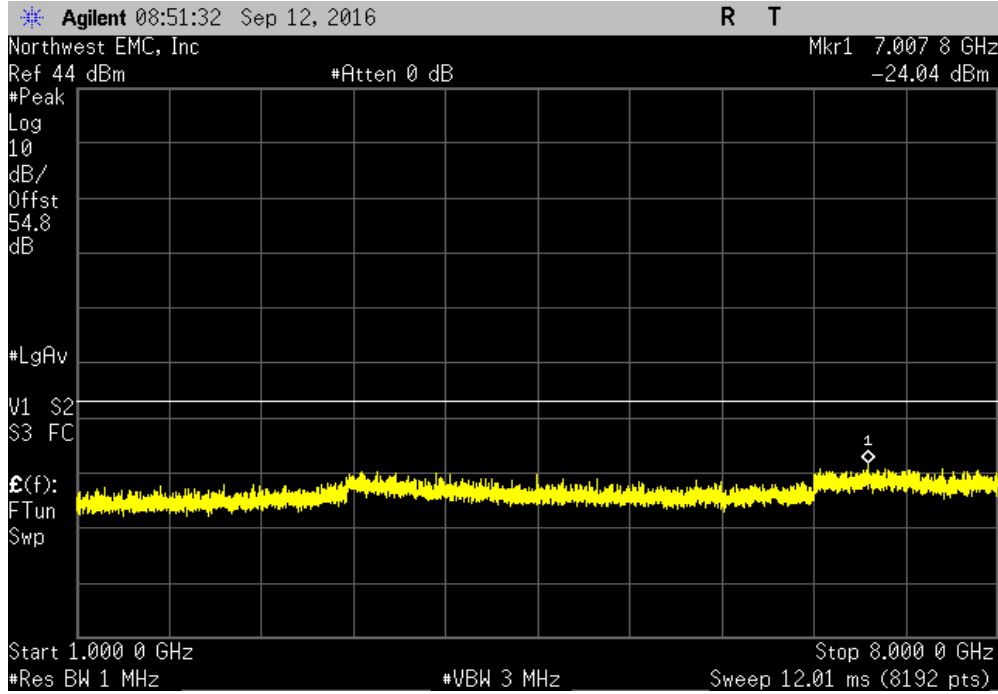


Antenna Port 2, LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-16.45	-13	Pass	

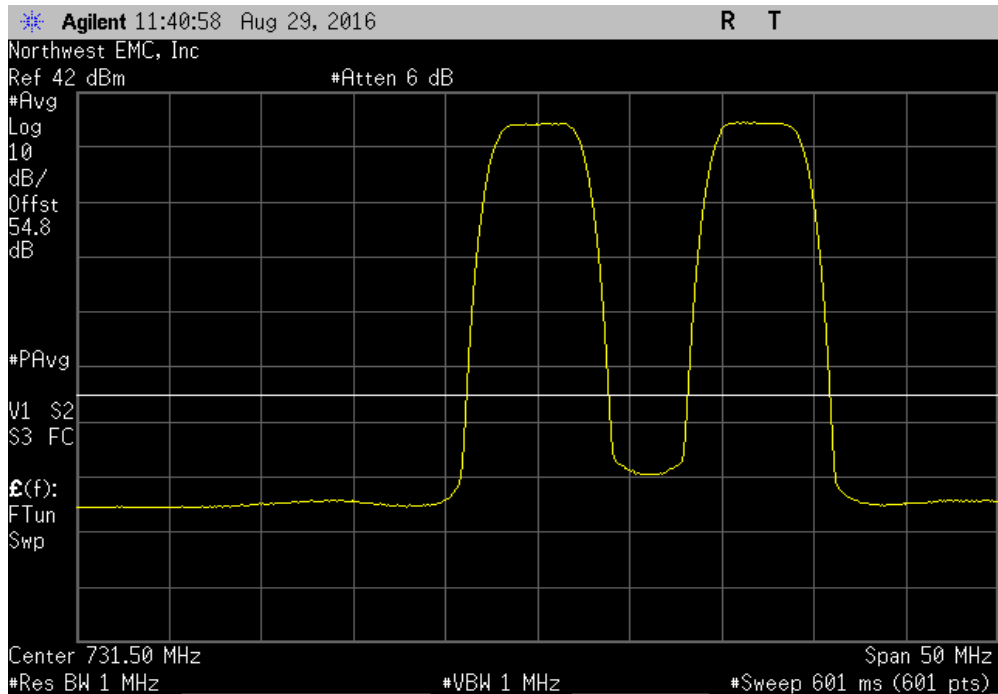


# INTERMODULATION - BAND 12

Antenna Port 2, LTE5, 731.5 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-24.04	-13	Pass		



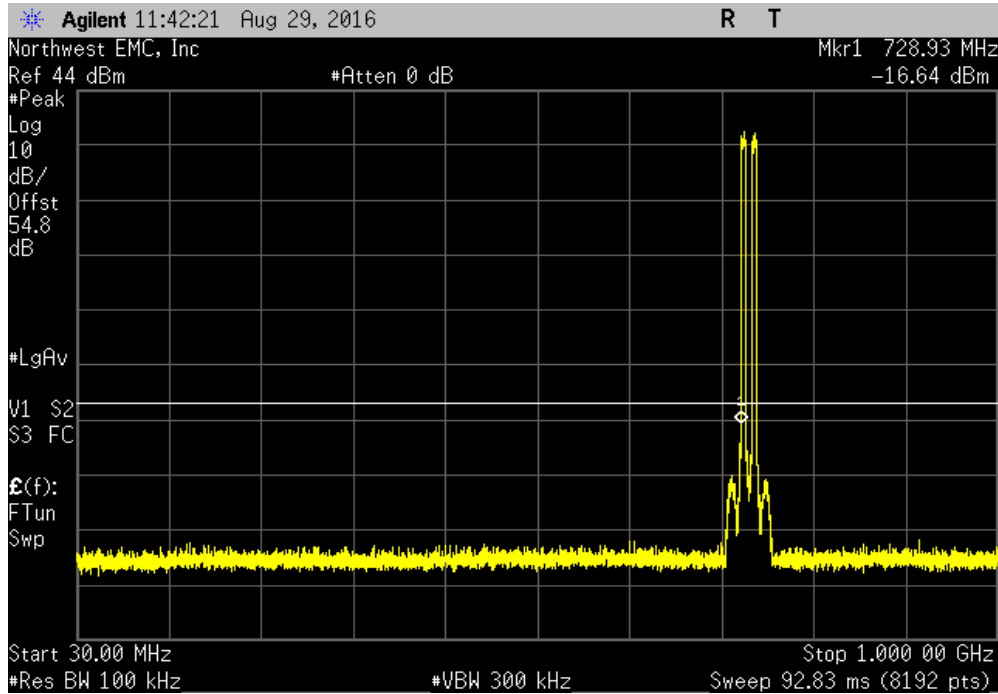
Antenna Port 2, LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		



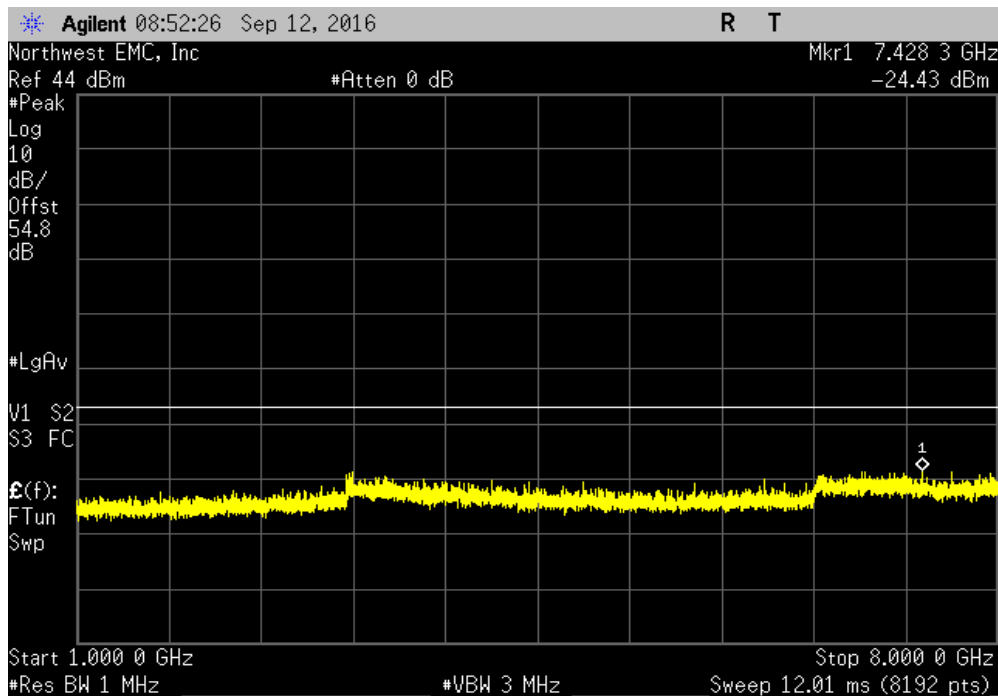


# INTERMODULATION - BAND 12

Antenna Port 2, LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-16.64	-13	Pass	

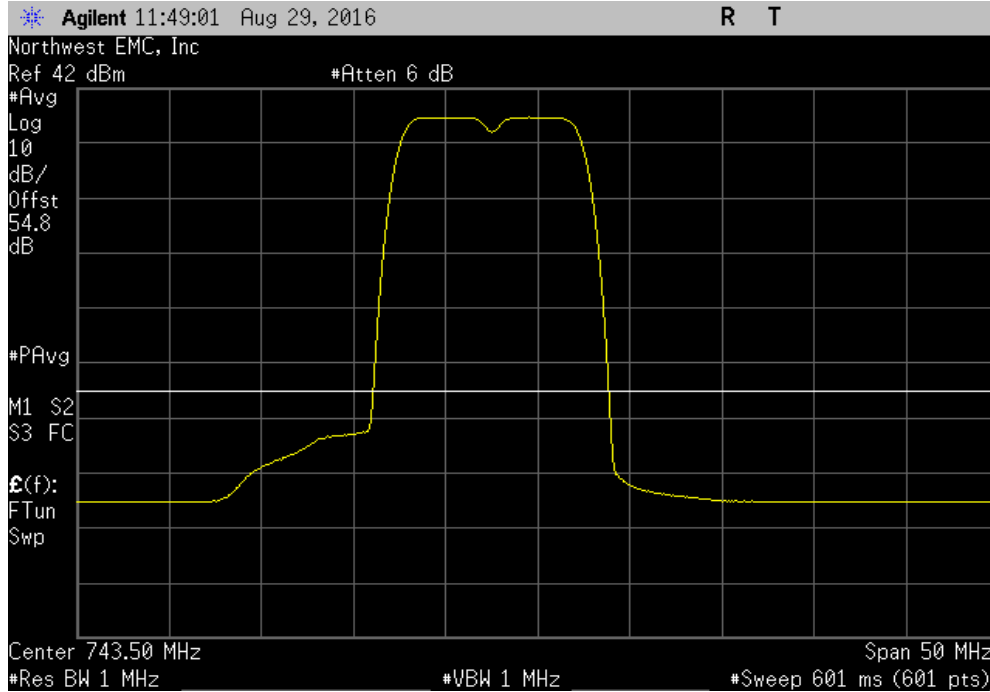


Antenna Port 2, LTE5, 731.5 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.43	-13	Pass	

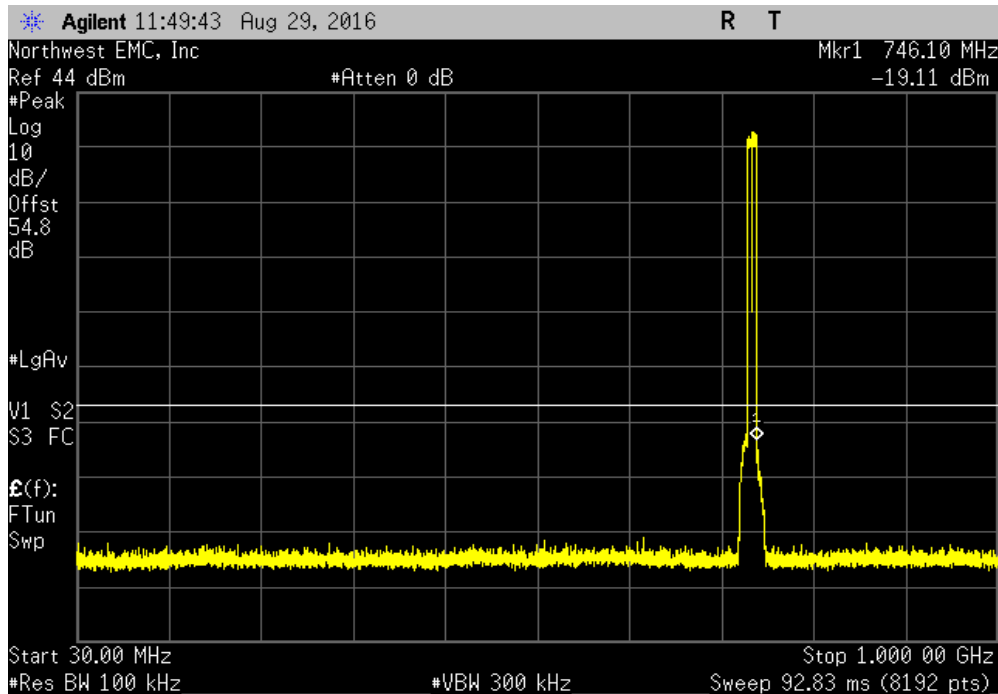


# INTERMODULATION - BAND 12

Antenna Port 2, LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

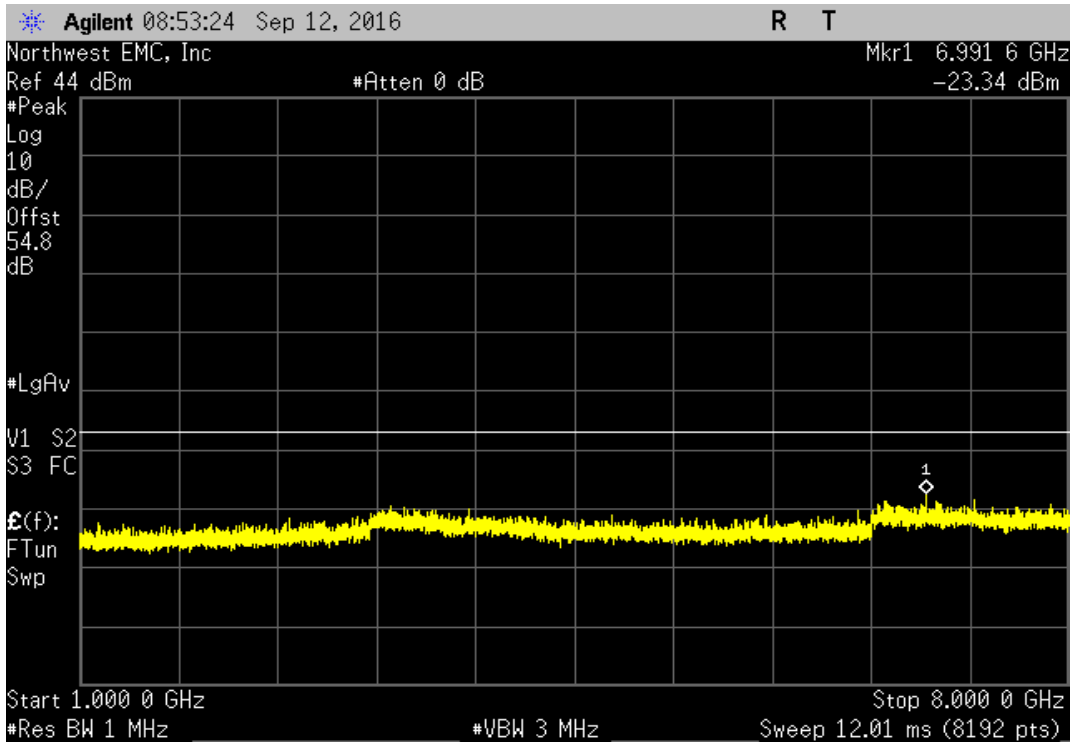


Antenna Port 2, LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-19.11	-13	Pass	



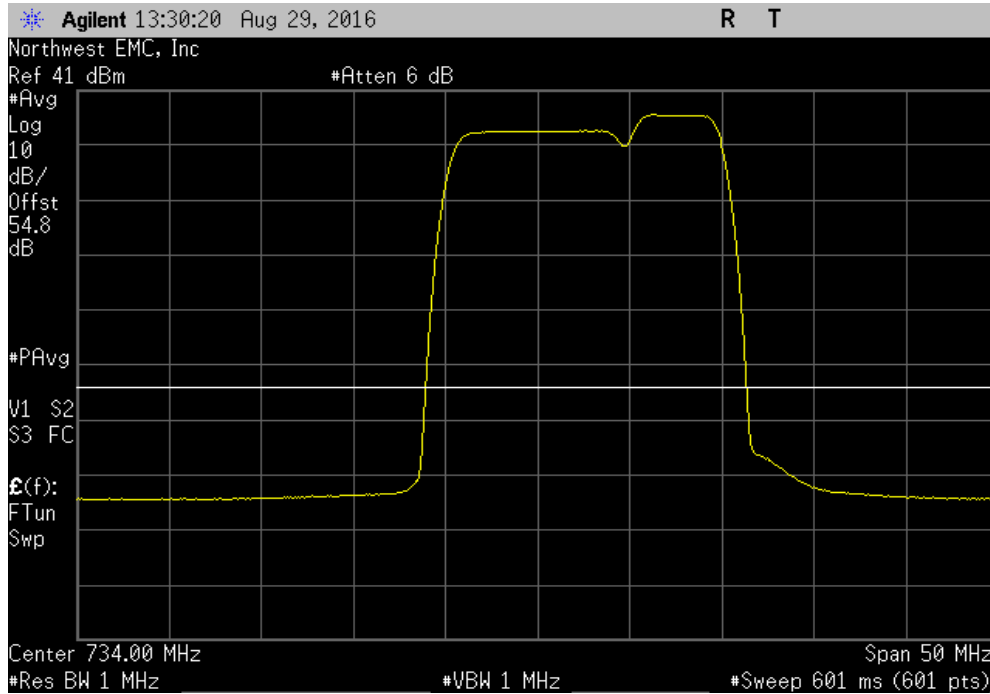
# INTERMODULATION - BAND 12

Antenna Port 2, LTE5, 743.5 MHz, High Band Edge, adjacent secondary channel						
Frequency		Max Value		Limit		Result
Range		(dBm)		≤ (dBm)		
1 GHz - 8 GHz		-23.34		-13		Pass

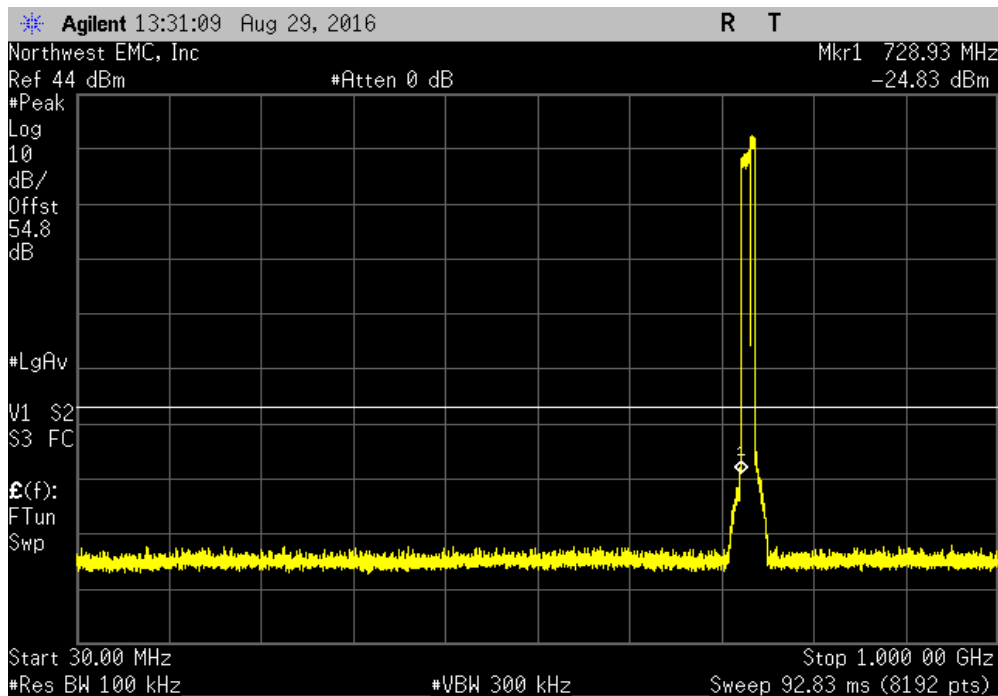


# INTERMODULATION - BAND 12

Antenna Port 2, LTE10, 734 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

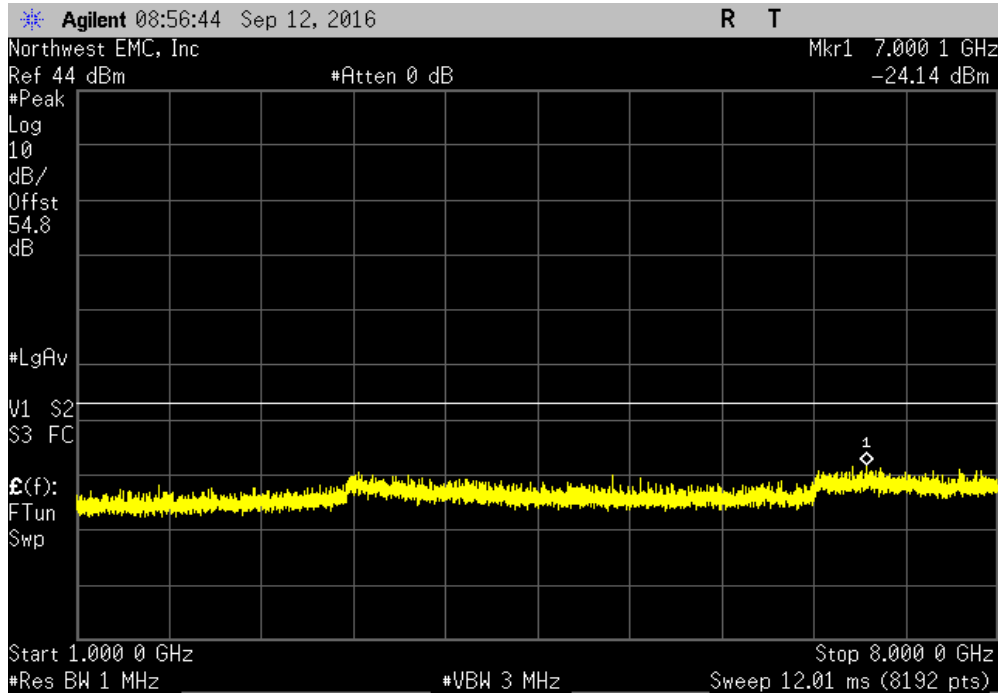


Antenna Port 2, LTE10, 734 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-24.83	-13	Pass	

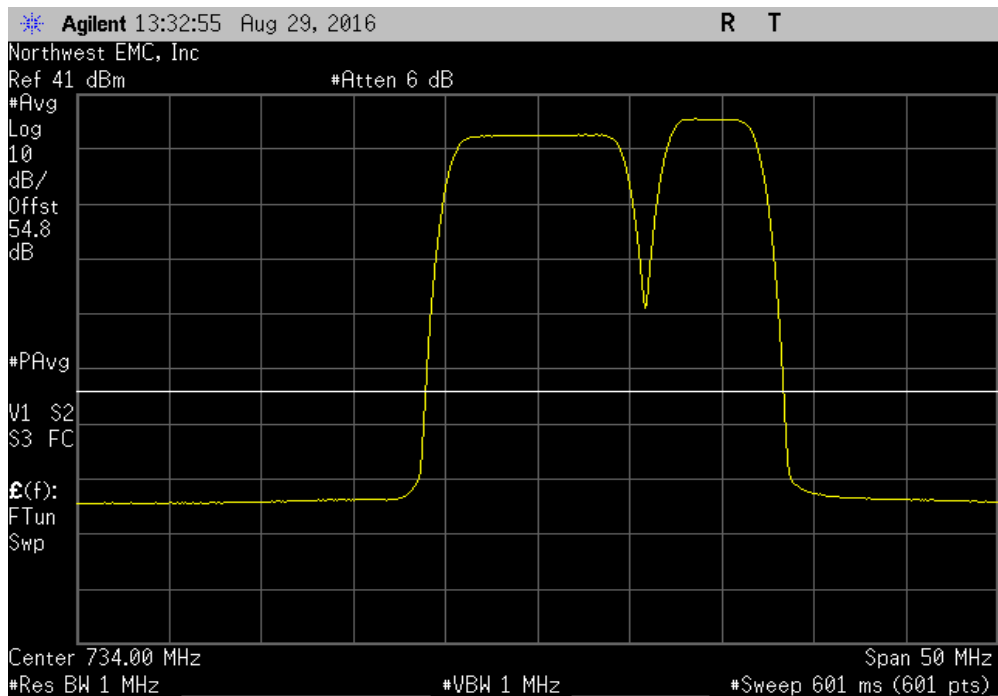


# INTERMODULATION - BAND 12

Antenna Port 2, LTE10, 734 MHz, Low Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-24.14	-13	Pass		

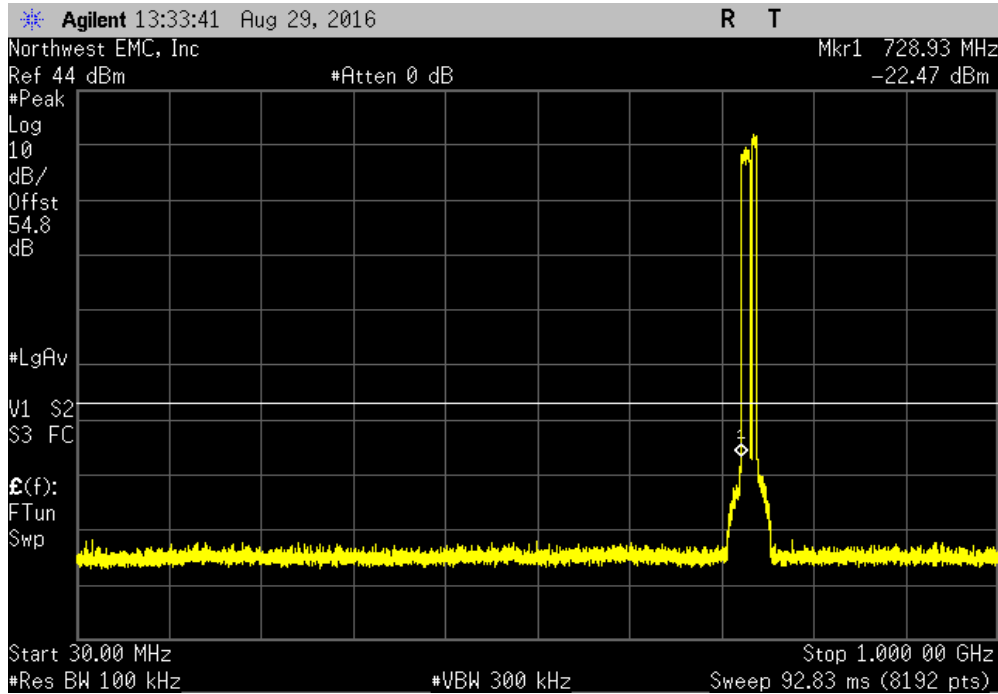


Antenna Port 2, LTE10, 734 MHz, Low Band Edge, max offset secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		

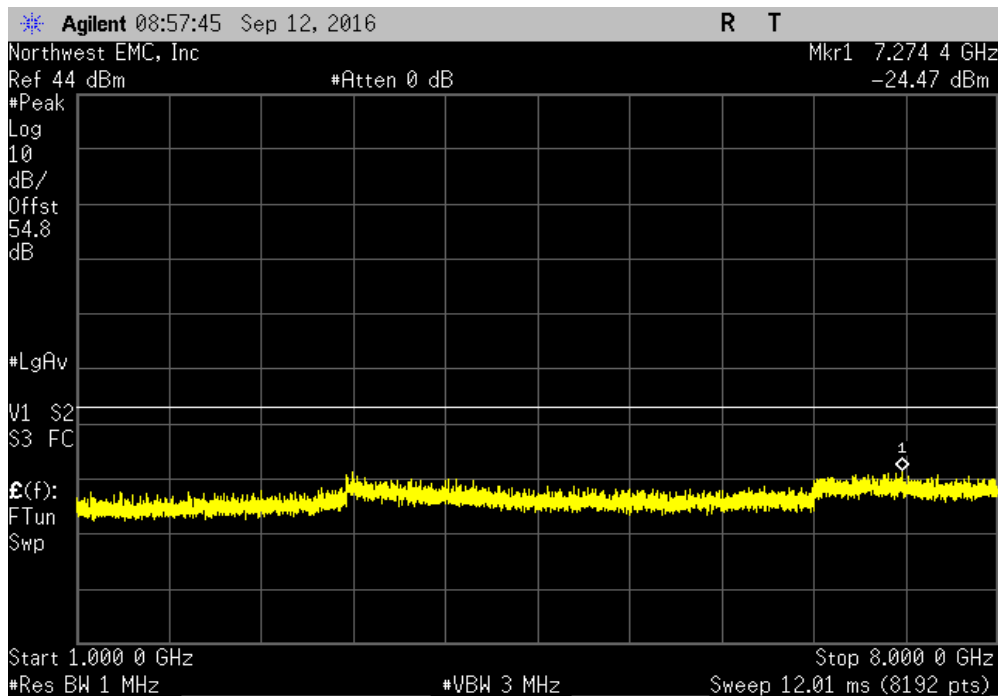


# INTERMODULATION - BAND 12

Antenna Port 2, LTE10, 734 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-22.47	-13	Pass	

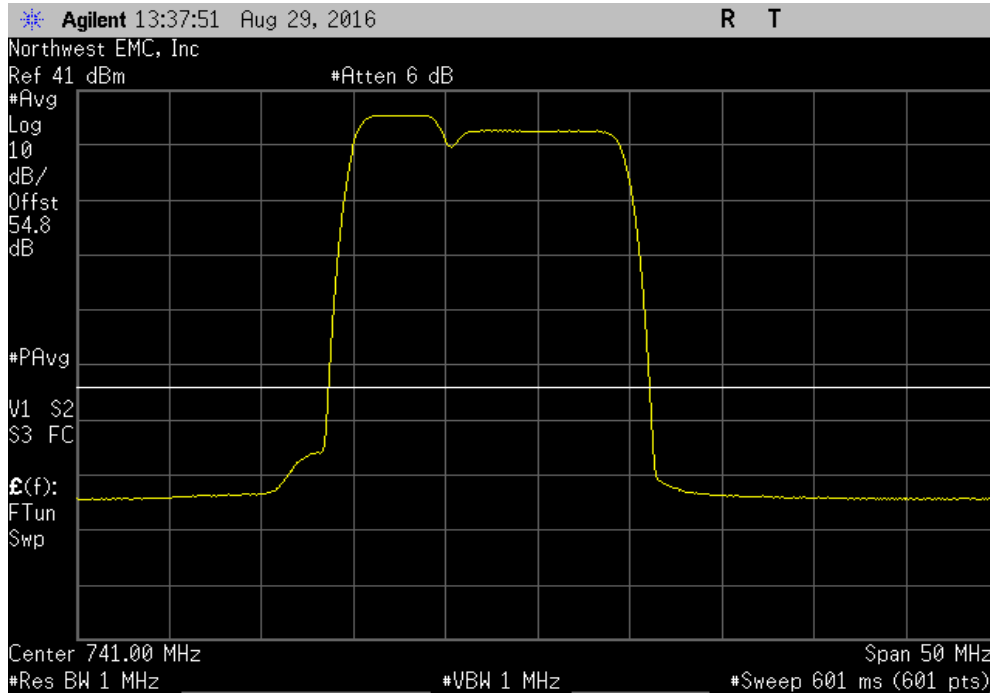


Antenna Port 2, LTE10, 734 MHz, Low Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.47	-13	Pass	

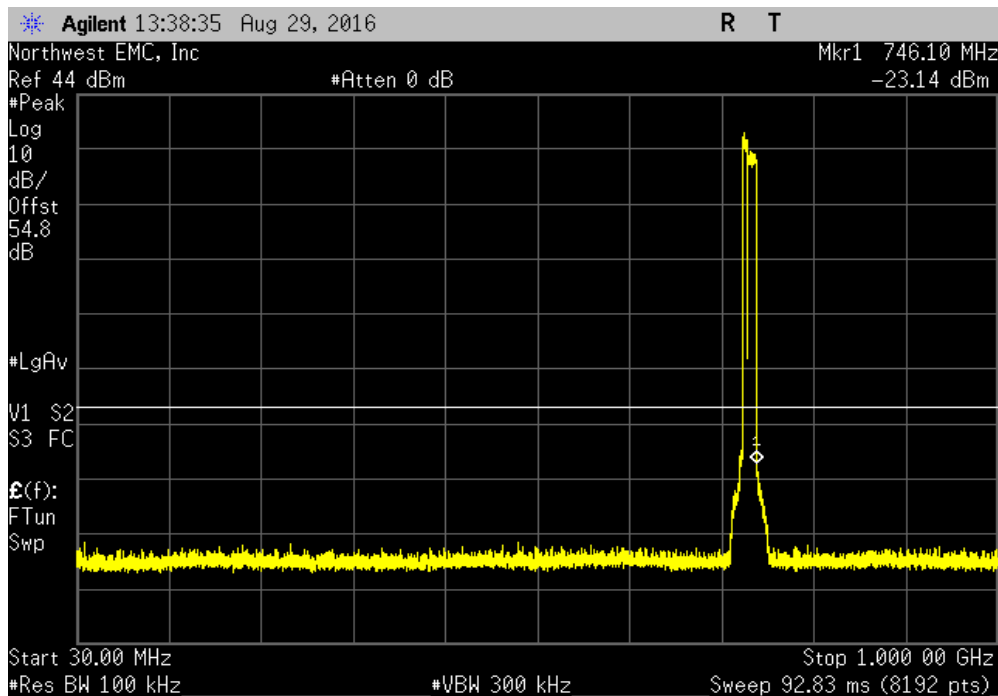


# INTERMODULATION - BAND 12

Antenna Port 2, LTE10, 741 MHz, High Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		

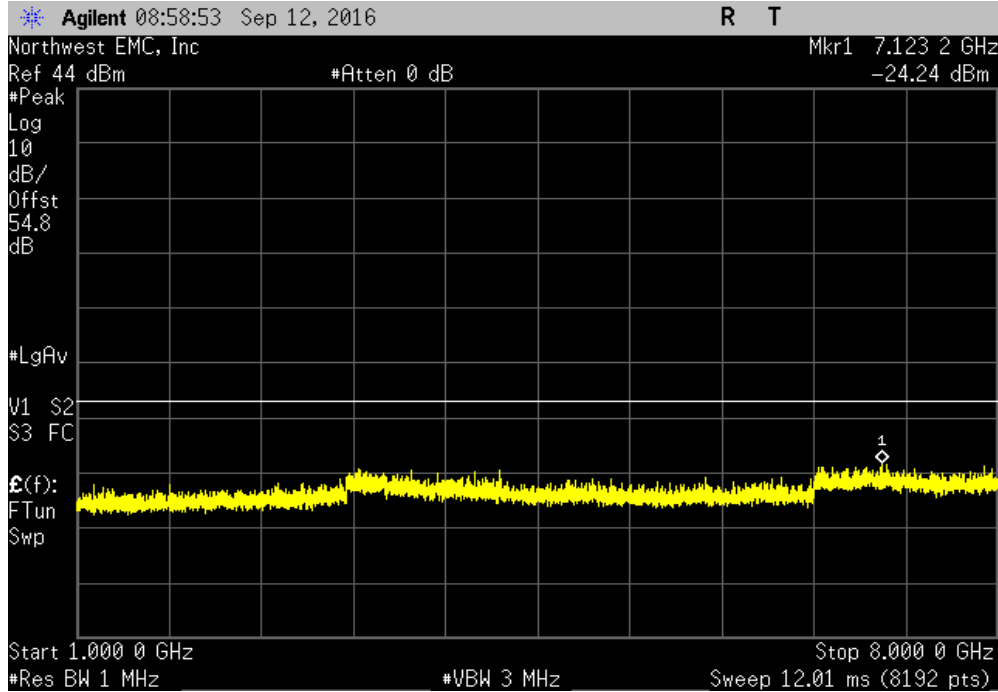


Antenna Port 2, LTE10, 741 MHz, High Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
30 MHz - 1 GHz	-23.14	-13	Pass		

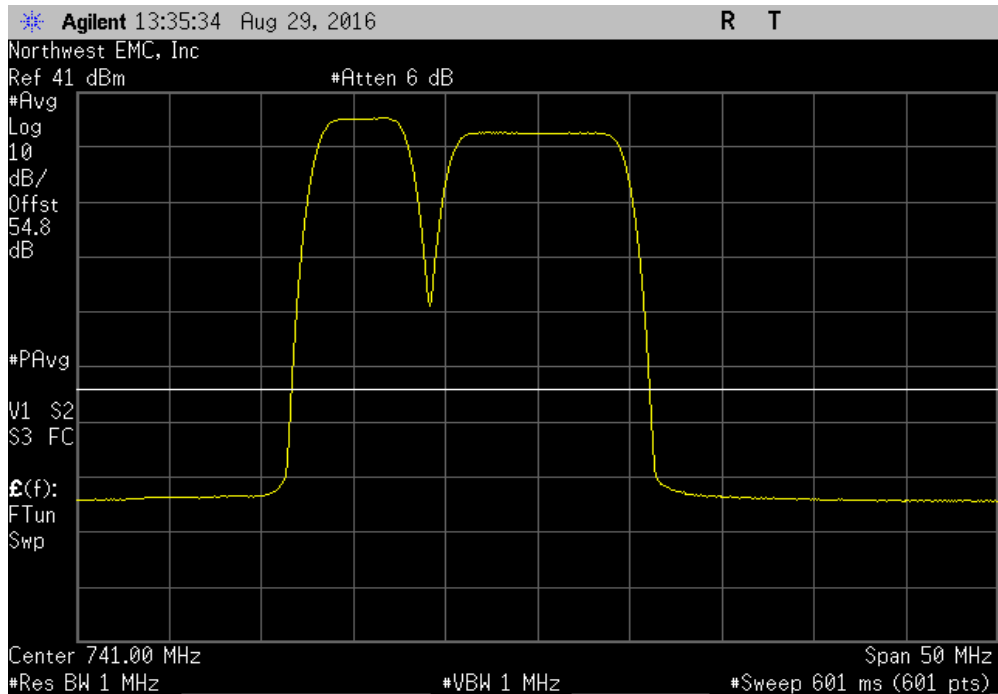


# INTERMODULATION - BAND 12

Antenna Port 2, LTE10, 741 MHz, High Band Edge, adjacent secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-24.24	-13	Pass		



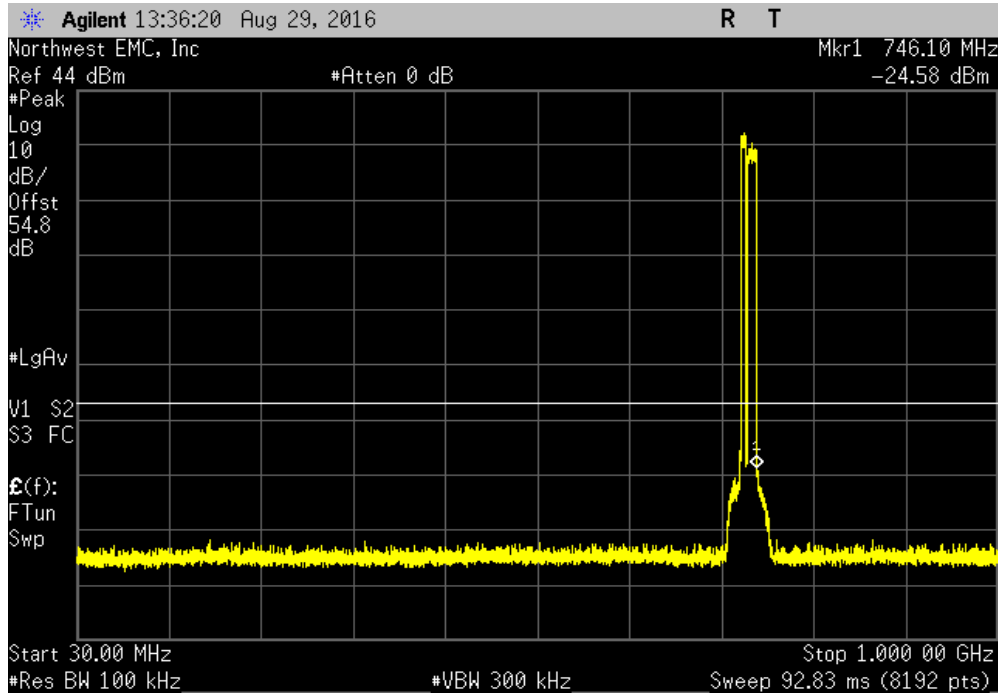
Antenna Port 2, LTE10, 741 MHz, High Band Edge, max offset secondary channel					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		



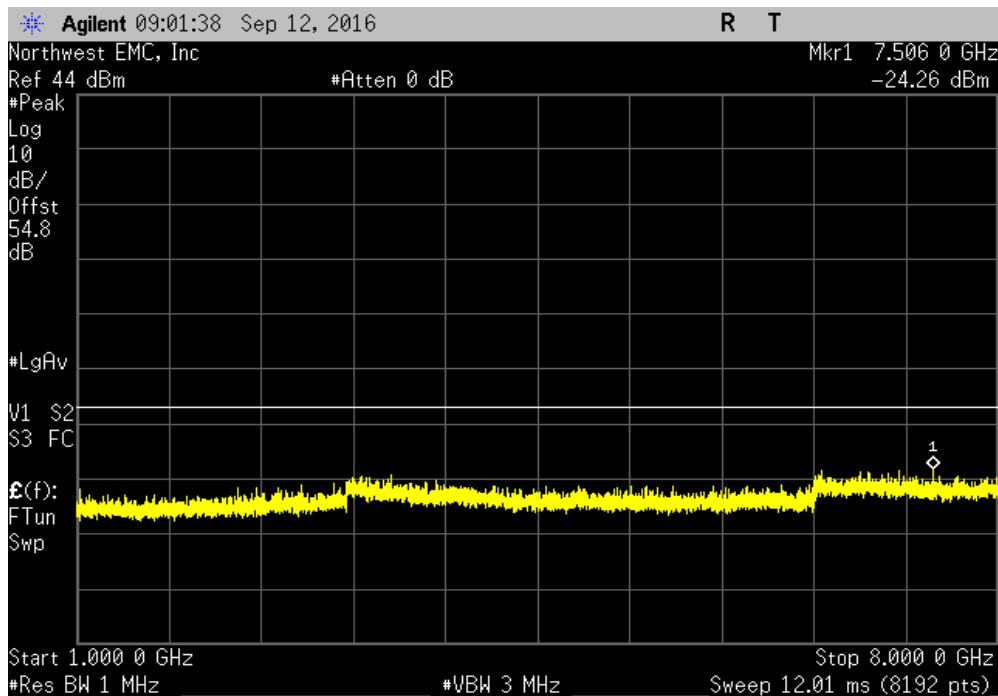


# INTERMODULATION - BAND 12

Antenna Port 2, LTE10, 741 MHz, High Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-24.58	-13	Pass	



Antenna Port 2, LTE10, 741 MHz, High Band Edge, max offset secondary channel				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-24.26	-13	Pass	



# INTERMODULATION - BAND 17

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	Keysight	N5182B	TFX	4/16/2015	4/16/2018
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	AFD	7/29/2016	7/29/2017

## 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 appropriate resolution bandwidth and no video filtering were made for each modulation type.

Since the EUT does not have an RF Input, the EUT was configured with two modulated carriers, 1 at the edge of the band and the 2nd either adjacent or at max separation possible. The purpose of the test is to insure that no additional signals are created by having multiple carriers in the passband of the EUT.


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 spurious conducted emissions limits. Measurements close to the limit were re-measured using a RMS average detector.

Only the Low Channel for LTE5 channel bandwidth was tested. The High Channel was previously tested in this band. Also no LTE10 was tested since band is only 12MHz wide cannot fit more than 1(ea) 10MHz channel at a time.

# INTERMODULATION - BAND 17

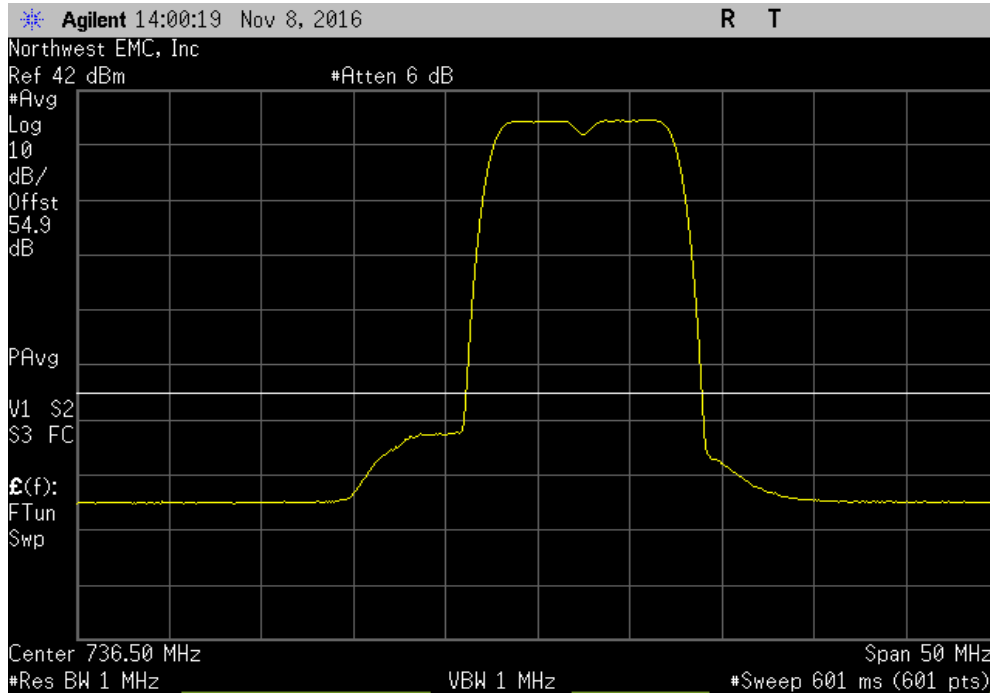


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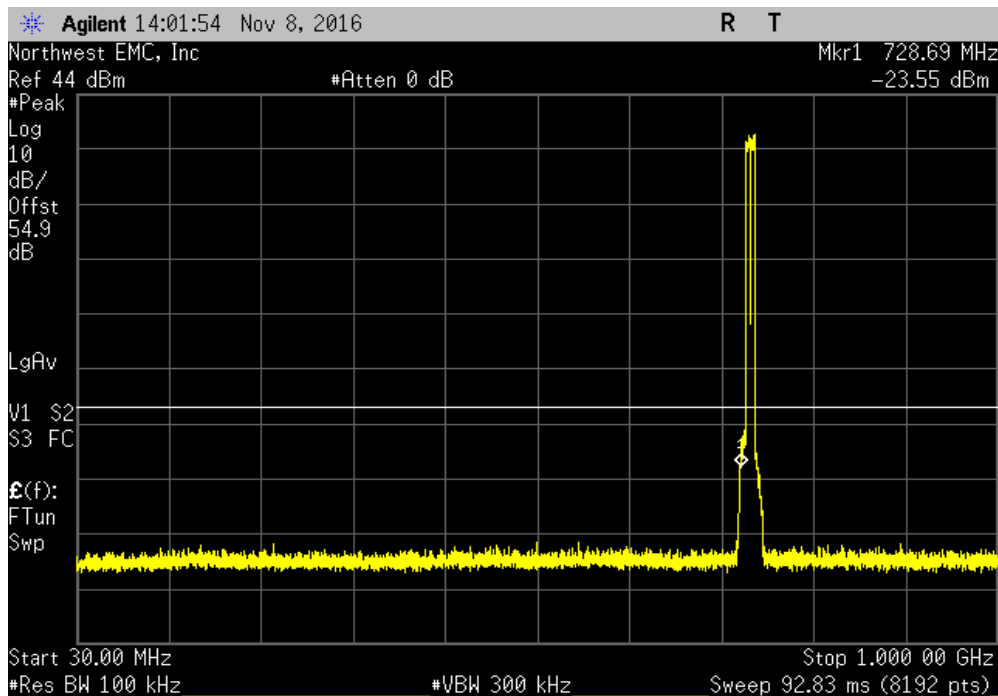
EUT: CWS-3050-12		Work Order: KMWC0077				
Serial Number: K163300001		Date: 11/08/16				
Customer: Parallel Wireless Inc.		Temperature: 20.8 °C				
Attendees: Edward Lee		Humidity: 49% RH				
Project: None		Barometric Pres.: 1018 mbar				
Tested by: Johnny Candelas		Power: 48 VDC				
Job Site: OC13		Test Method				
FCC 27:2016		ANSI/TIA/EIA-603-D-2010				
<b>COMMENTS</b>						
Power Level Setting 40W. Reference Level Offset: DC Block + 30dB Attenuator + 20dB Attenuator + Power Divider + Cable Loss = 54.9dB total.						
<b>DEVIATIONS FROM TEST STANDARD</b>						
None						
Configuration #	1	Signature 				
		Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
<b>Antenna Port 1</b>						
		LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz	Fundamental	N/A	N/A	N/A
		LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz	30 MHz - 1 GHz	-23.55	-13	Pass
		LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz	1 GHz - 8 GHz	-22.42	-13	Pass
		LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz	Fundamental	N/A	N/A	N/A
		LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz	30 MHz - 1 GHz	-21.07	-13	Pass
		LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz	1 GHz - 8 GHz	-23.12	-13	Pass
<b>Antenna Port 2</b>						
		LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz	Fundamental	N/A	N/A	N/A
		LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz	30 MHz - 1 GHz	-21.54	-13	Pass
		LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz	1 GHz - 8 GHz	-23.34	-13	Pass
		LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz	Fundamental	N/A	N/A	N/A
		LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz	30 MHz - 1 GHz	-22.41	-13	Pass
		LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz	1 GHz - 8 GHz	-23.5	-13	Pass

# INTERMODULATION - BAND 17

Antenna Port 1, LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

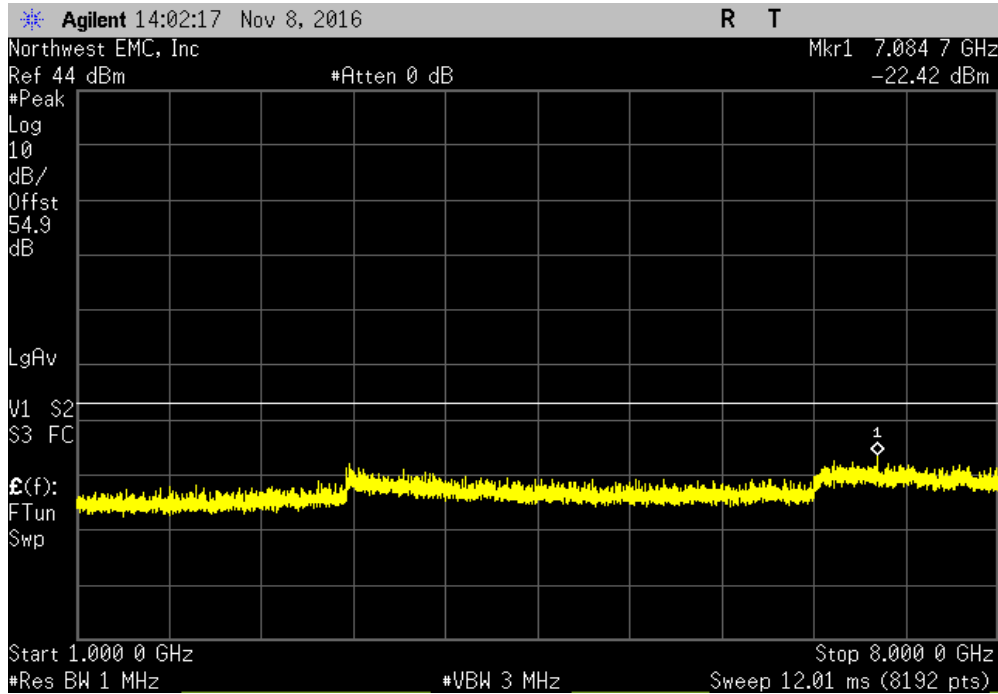


Antenna Port 1, LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-23.55	-13	Pass	

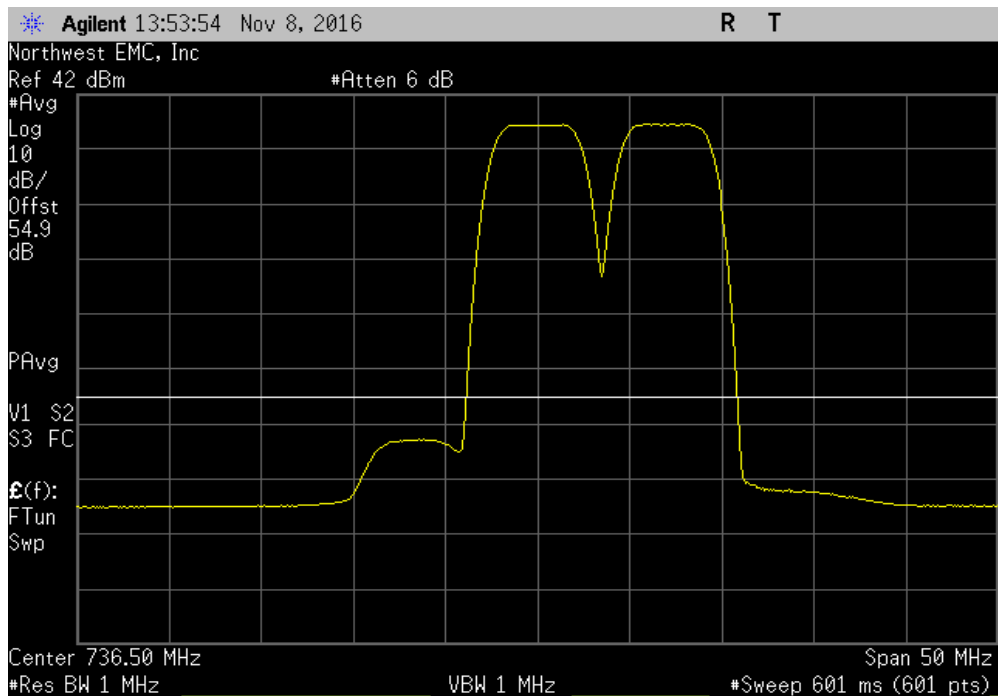


# INTERMODULATION - BAND 17

Antenna Port 1, LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-22.42	-13	Pass		

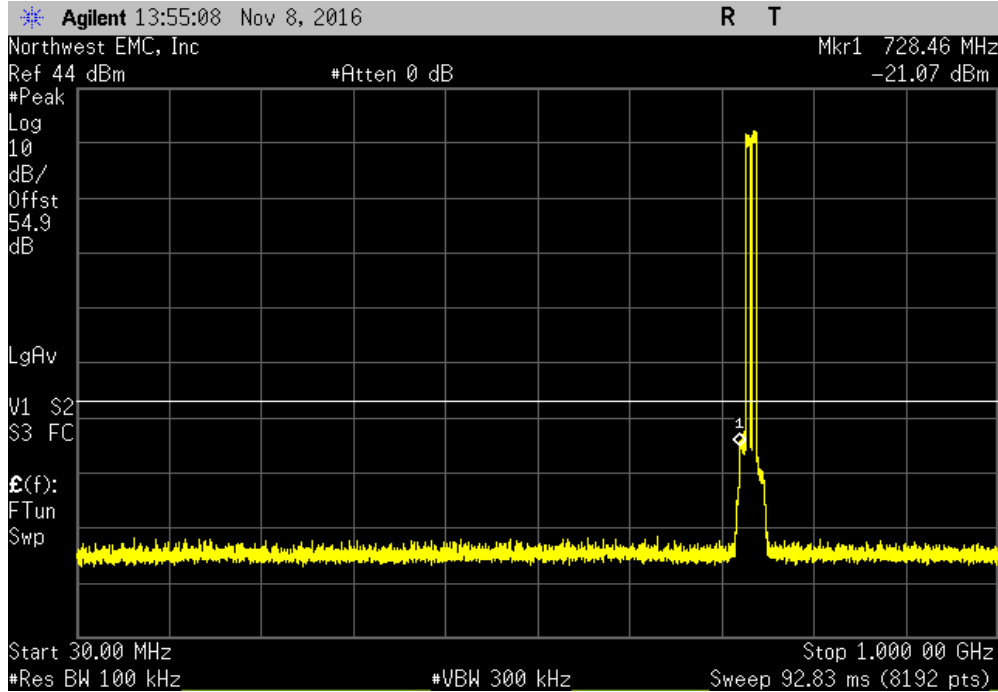


Antenna Port 1, LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		

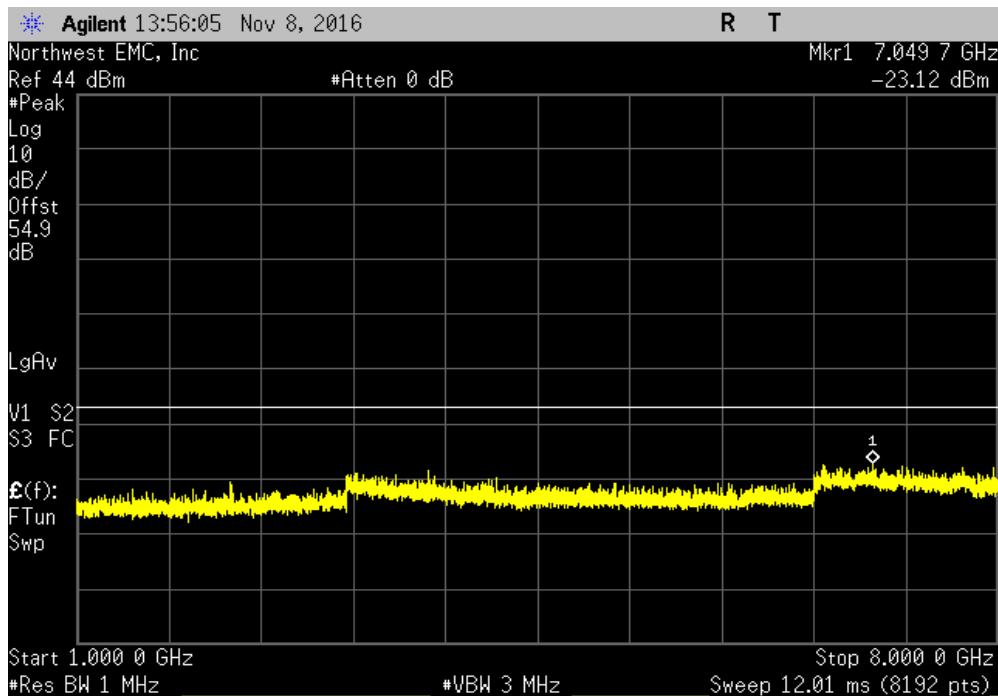


# INTERMODULATION - BAND 17

Antenna Port 1, LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-21.07	-13	Pass	

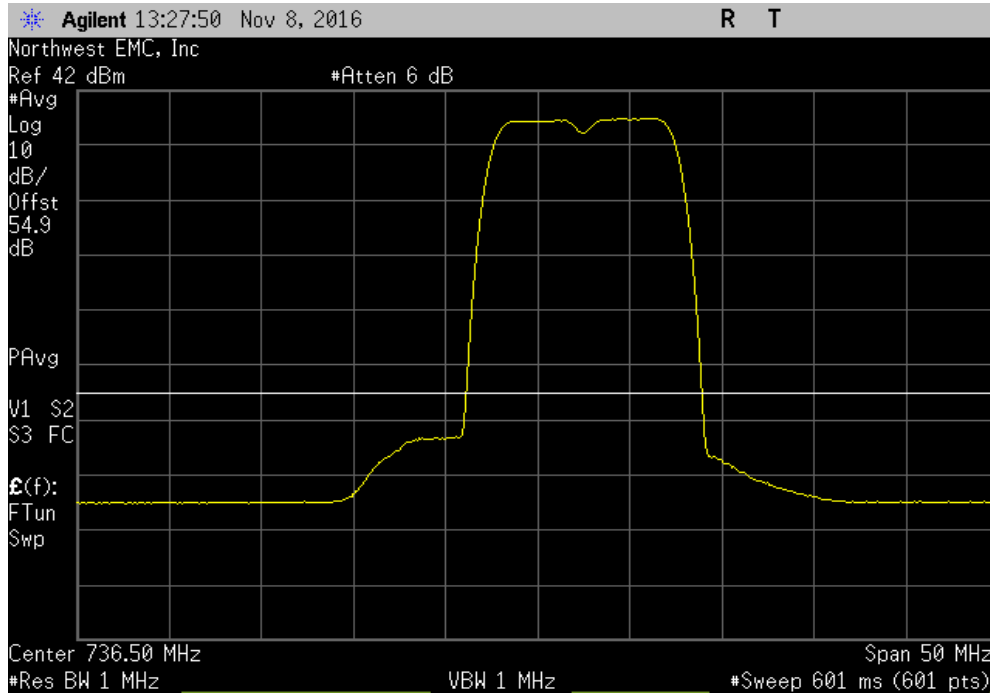


Antenna Port 1, LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.12	-13	Pass	

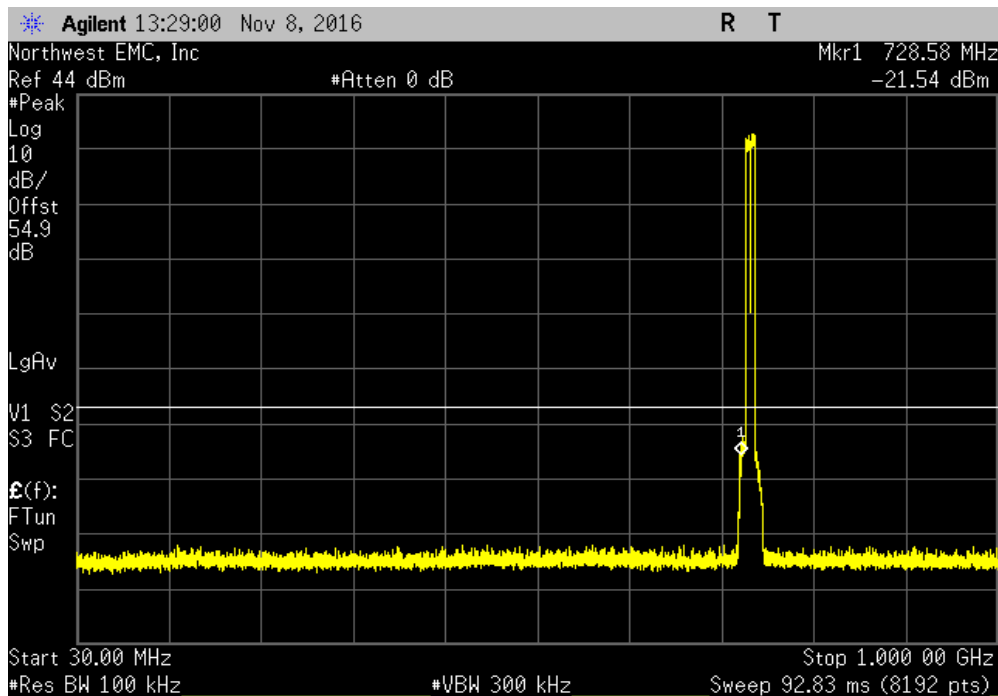


# INTERMODULATION - BAND 17

Antenna Port 2, LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
Fundamental		N/A	N/A	N/A	

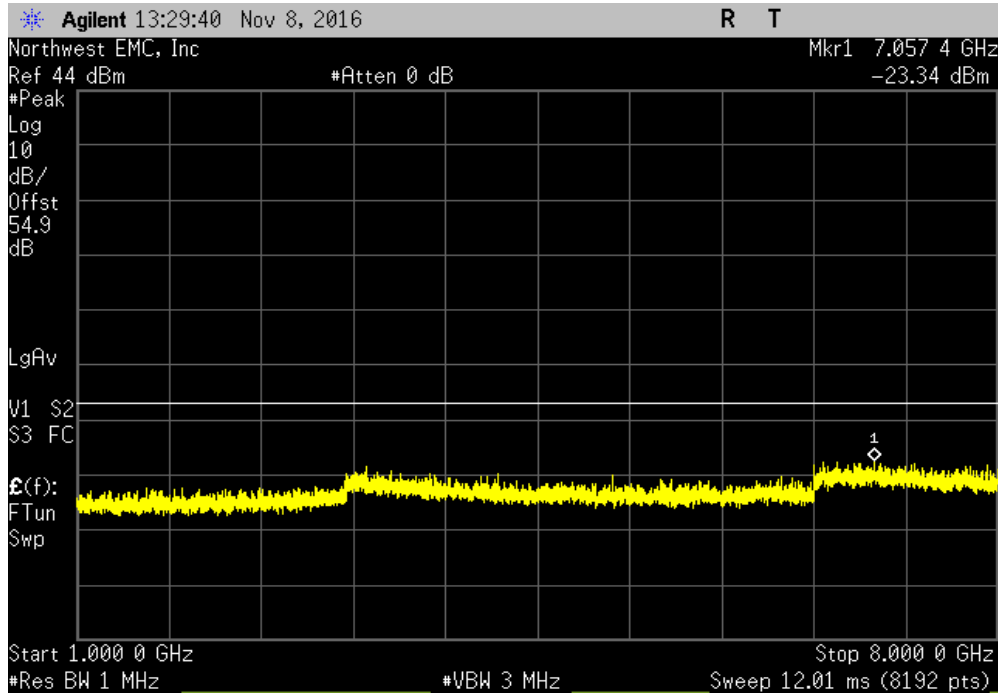


Antenna Port 2, LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz					
Frequency Range		Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz		-21.54	-13	Pass	

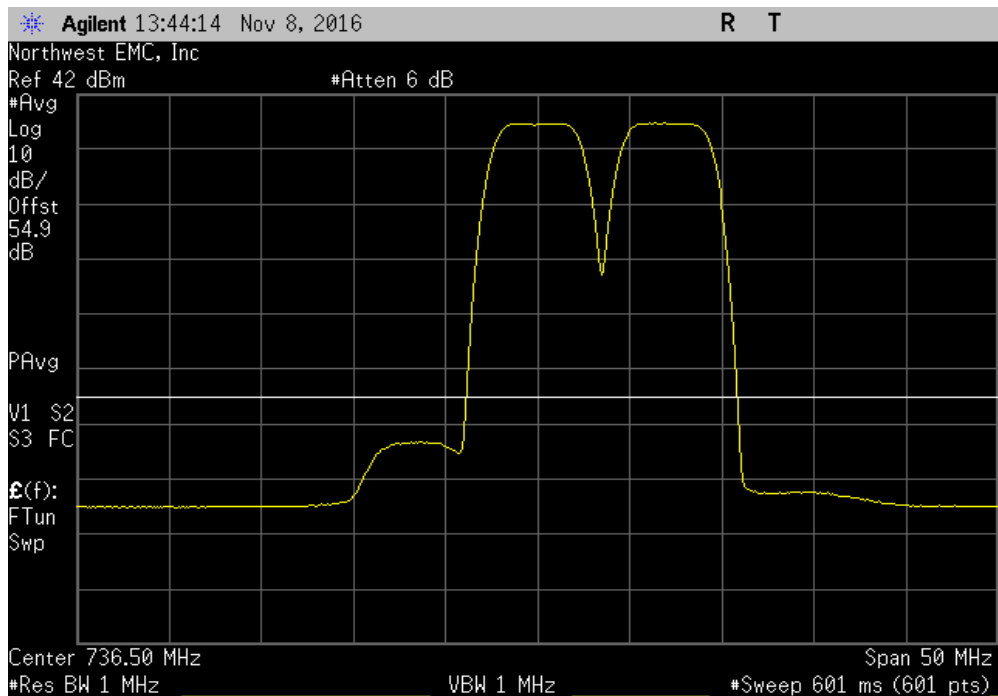


# INTERMODULATION - BAND 17

Antenna Port 2, LTE5, 736.5 MHz, Low Band Edge, adjacent secondary channel at 741.5 MHz					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
1 GHz - 8 GHz	-23.34	-13	Pass		



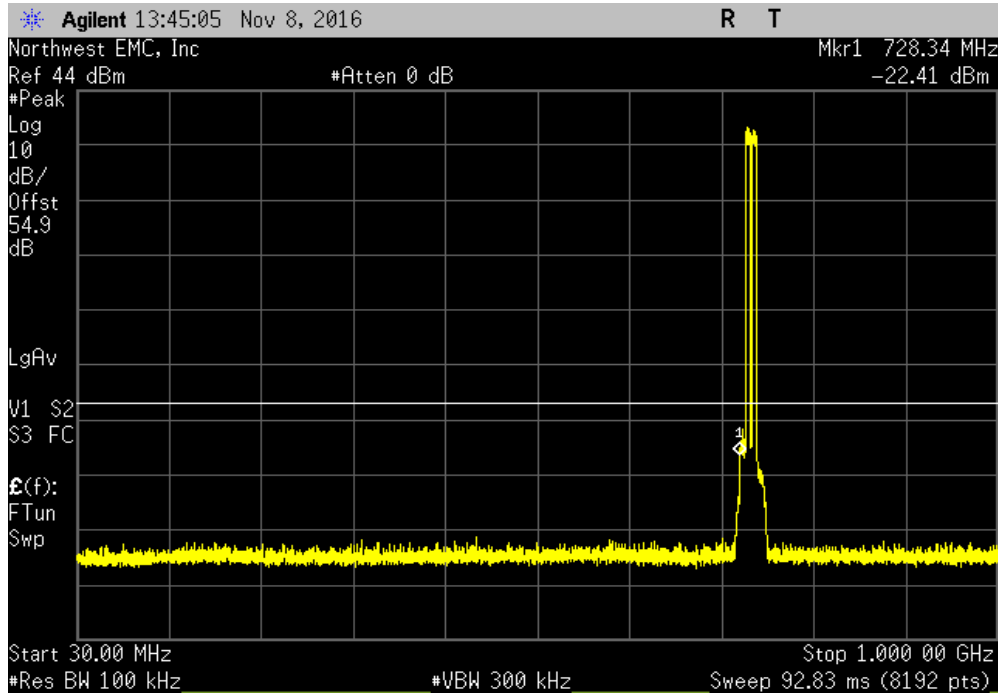
Antenna Port 2, LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz					
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result		
Fundamental	N/A	N/A	N/A		





# INTERMODULATION - BAND 17

Antenna Port 2, LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
30 MHz - 1 GHz	-22.41	-13	Pass	



Antenna Port 2, LTE5, 736.5 MHz, Low Band Edge, max offset secondary channel at 743.5 MHz				
Frequency Range	Max Value (dBm)	Limit ≤ (dBm)	Result	
1 GHz - 8 GHz	-23.5	-13	Pass	

