



**FCC 47 CFR PART 15 SUBPART E  
ISED CANADA RSS 247 ISSUE 2  
ISED CANADA RSS GEN ISSUE 5**

**CERTIFICATION TEST REPORT**

**FOR**

**MAGIC LEAP ONE – LIGHTPACK LIGHTWEAR**

**MODEL NUMBER: M1001/M1002**

**FCC ID: 2AM5NM1000  
IC: 23045-M1000**

**REPORT NUMBER: R11694639-E6**

**ISSUE DATE: 2018-07-10**

**Prepared for  
MAGIC LEAP, INC.  
7500 WEST SUNRISE BOULEVARD  
PLANTATION, FL 33322, USA**

**Prepared by  
UL LLC  
12 LABORATORY DR.  
RESEARCH TRIANGLE PARK, NC 27709 USA  
TEL: (919) 549-1400**

### Revision History

Ver.	Issue Date	Revisions	Revised By
1	2018-06-26	Initial Issue	Brian T. Kiewra
2	2018-06-27	Revised simultaneous transmission statement in Section 5.5	Brian T. Kiewra
3	2018-06-29	Revised serial numbers in Section 1. Removed reference to module 2 in Section 5.1 Revised test frequencies in Section 9.16.8 Revised PSD results in Sections 9.9.3 and 9.10.3 <u>Revised antenna gain in Sections 9.11.5 and 9.12.5</u>	Brian T. Kiewra
4	2018-07-02	Added calibration interval note to Section 6. <u>Revised PSD data in Section 9.9.3.</u>	Brian T. Kiewra
5	2018-07-10	Modified some conducted power entries throughout the report. Revised antenna gain table in Section 5.3	Brian T. Kiewra

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS.....</b>	<b>7</b>
<b>2. TEST METHODOLOGY .....</b>	<b>9</b>
<b>3. FACILITIES AND ACCREDITATION.....</b>	<b>9</b>
<b>4. CALIBRATION AND UNCERTAINTY.....</b>	<b>10</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION.....</i>	10
4.2. <i>SAMPLE CALCULATION.....</i>	10
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	10
<b>5. EQUIPMENT UNDER TEST.....</b>	<b>11</b>
5.1. <i>DESCRIPTION OF EUT.....</i>	11
5.2. <i>MAXIMUM OUTPUT POWER .....</i>	11
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS.....</i>	13
5.4. <i>SOFTWARE AND FIRMWARE.....</i>	13
5.5. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	13
5.6. <i>DESCRIPTION OF TEST SETUP.....</i>	15
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>16</b>
<b>7. MEASUREMENT METHODS.....</b>	<b>19</b>
<b>8. ON TIME AND DUTY CYCLE.....</b>	<b>20</b>
<b>9. ANTENNA PORT TEST RESULTS – MODULE 1.....</b>	<b>25</b>
9.1. <i>802.11a MODE IN THE 5.2 GHz BAND .....</i>	26
9.1.1. 26 dB BANDWIDTH.....	26
9.1.2. 99% BANDWIDTH.....	30
9.1.3. OUTPUT POWER AND PSD .....	34
9.2. <i>802.11n HT20 MODE IN THE 5.2 GHz BAND.....</i>	44
9.2.1. 26 dB BANDWIDTH.....	44
9.2.2. 99% BANDWIDTH.....	48
9.2.3. OUTPUT POWER AND PSD .....	52
9.3. <i>802.11n HT40 MODE IN THE 5.2 GHz BAND.....</i>	62
9.3.1. 26 dB BANDWIDTH - MIMO .....	62
9.3.2. 26 dB BANDWIDTH - SISO.....	65
9.3.3. 99% BANDWIDTH - MIMO.....	68
9.3.4. 99% BANDWIDTH - SISO.....	71
9.3.5. OUTPUT POWER AND PSD - MIMO .....	74
9.3.6. OUTPUT POWER AND PSD - SISO .....	80
9.4. <i>802.11ac VHT80 MODE IN THE 5.2 GHz BAND .....</i>	88
9.4.1. 26 dB BANDWIDTH – MIMO .....	88
9.4.2. 26 dB BANDWIDTH - SISO.....	90
9.4.3. 99% BANDWIDTH - MIMO.....	92
9.4.4. 99% BANDWIDTH - SISO.....	94
9.4.5. OUTPUT POWER AND PSD - MIMO .....	96
9.4.6. OUTPUT POWER AND PSD - SISO .....	101
9.5. <i>802.11a MODE IN THE 5.3 GHz BAND .....</i>	108

9.5.1.	26 dB BANDWIDTH.....	108
9.5.2.	99% BANDWIDTH.....	112
9.5.3.	OUTPUT POWER AND PSD .....	116
9.6.	<i>802.11n HT20 MODE IN THE 5.3 GHz BAND</i> .....	123
9.6.1.	26 dB BANDWIDTH.....	123
9.6.2.	99% BANDWIDTH.....	127
9.6.3.	OUTPUT POWER AND PSD .....	131
9.7.	<i>802.11n HT40 MODE IN THE 5.3 GHz BAND</i> .....	138
9.7.1.	26 dB BANDWIDTH – MIMO.....	138
9.7.2.	26 dB BANDWIDTH - SISO.....	141
9.7.3.	99% BANDWIDTH - MIMO.....	144
9.7.4.	99% BANDWIDTH - SISO.....	147
9.7.5.	OUTPUT POWER AND PSD - MIMO .....	150
9.7.6.	OUTPUT POWER AND PSD – SISO .....	156
9.8.	<i>802.11ac VHT80 MODE IN THE 5.3 GHz BAND</i> .....	164
9.8.1.	26 dB BANDWIDTH - MIMO .....	164
9.8.2.	26 dB BANDWIDTH - SISO.....	166
9.8.3.	99% BANDWIDTH - MIMO.....	168
9.8.4.	99% BANDWIDTH - SISO.....	170
9.8.5.	OUTPUT POWER AND PSD - MIMO .....	172
9.8.6.	OUTPUT POWER AND PSD - SISO .....	176
9.9.	<i>802.11a MODE IN THE 5.6 GHz BAND</i> .....	183
9.9.1.	26 dB BANDWIDTH.....	183
9.9.2.	99% BANDWIDTH.....	188
9.9.3.	OUTPUT POWER AND PSD .....	193
9.10.	<i>802.11n HT20 MODE IN THE 5.6 GHz BAND</i> .....	206
9.10.1.	26 dB BANDWIDTH.....	206
9.10.2.	99% BANDWIDTH.....	211
9.10.3.	OUTPUT POWER AND PSD .....	216
9.11.	<i>802.11n HT40 MODE IN THE 5.6 GHz BAND</i> .....	229
9.11.1.	26 dB BANDWIDTH - MIMO .....	229
9.11.2.	26 dB BANDWIDTH - SISO .....	234
9.11.3.	99% BANDWIDTH – MIMO.....	239
9.11.4.	99% BANDWIDTH - SISO.....	244
9.11.5.	OUTPUT POWER AND PSD - MIMO .....	249
9.11.6.	OUTPUT POWER AND PSD - SISO .....	261
9.12.	<i>802.11ac VHT80 MODE IN THE 5.6 GHz BAND</i> .....	279
9.12.1.	26 dB BANDWIDTH - MIMO .....	279
9.12.2.	26 dB BANDWIDTH - SISO .....	283
9.12.3.	99% BANDWIDTH - MIMO .....	287
9.12.4.	99% BANDWIDTH - SISO .....	291
9.12.5.	OUTPUT POWER AND PSD - MIMO .....	295
9.12.6.	OUTPUT POWER AND PSD - SISO .....	305
9.13.	<i>802.11a MODE IN THE 5.8 GHz BAND</i> .....	322
9.13.1.	6 dB BANDWIDTH .....	322
9.13.2.	99% BANDWIDTH.....	326
9.13.3.	OUTPUT POWER .....	330
9.13.4.	MAXIMUM POWER SPECTRAL DENSITY (PSD) .....	332
9.14.	<i>802.11n HT20 MODE IN THE 5.8 GHz BAND</i> .....	337
9.14.1.	6 dB BANDWIDTH .....	337
9.14.2.	99% BANDWIDTH.....	341
9.14.3.	OUTPUT POWER .....	345
9.14.4.	MAXIMUM POWER SPECTRAL DENSITY .....	346
9.15.	<i>802.11n HT40 MODE IN THE 5.8 GHz BAND</i> .....	350
9.15.1.	6 dB BANDWIDTH - MIMO .....	350

9.15.2.	6 dB BANDWIDTH - SISO .....	353
9.15.3.	99% BANDWIDTH - MIMO .....	356
9.15.4.	99% BANDWIDTH - SISO .....	359
9.15.5.	OUTPUT POWER - MIMO .....	362
9.15.6.	OUTPUT POWER - SISO .....	363
9.15.7.	MAXIMUM POWER SPECTRAL DENSITY (PSD) - MIMO .....	365
9.15.8.	MAXIMUM POWER SPECTRAL DENSITY (PSD) - SISO .....	368
9.16.	<b>802.11ac VHT80 MODE IN THE 5.8 GHz BAND</b> .....	<b>372</b>
9.16.1.	6 dB BANDWIDTH - MIMO .....	372
9.16.2.	6 dB BANDWIDTH - SISO .....	374
9.16.3.	99% BANDWIDTH - MIMO .....	376
9.16.4.	99% BANDWIDTH - SISO .....	378
9.16.5.	OUTPUT POWER - MIMO .....	380
9.16.6.	OUTPUT POWER - SISO .....	381
9.16.7.	MAXIMUM POWER SPECTRAL DENSITY (PSD) - MIMO .....	383
9.16.8.	MAXIMUM POWER SPECTRAL DENSITY (PSD) - SISO .....	385
<b>10.</b>	<b>RADIATED TEST RESULTS</b> .....	<b>388</b>
10.1.	<i>LIMITS AND PROCEDURE</i> .....	388
10.2.	<i>TRANSMITTER ABOVE 1 GHz – MODULE 1</i> .....	390
10.2.1.	TX ABOVE 1 GHz 802.11a MODE, 5.2 GHz BAND – MODULE 1, MIMO (CDD) .....	390
10.2.2.	TX ABOVE 1 GHz 802.11a MODE, 5.3 GHz BAND – MODULE 1, MIMO (CDD) .....	395
10.2.3.	TX ABOVE 1 GHz 802.11a MODE, 5.6 GHz BAND – MODULE 1, MIMO (CDD) .....	400
10.2.4.	TX ABOVE 1 GHz 802.11a MODE, 5.8 GHz BAND – MODULE 1, MIMO (CDD) .....	407
10.2.5.	TX ABOVE 1 GHz 802.11n HT20 MODE, 5.2 GHz BAND – MODULE 1, MIMO SDM .....	414
10.2.6.	TX ABOVE 1 GHz 802.11ac VHT20 MODE, 5.2 GHz BAND – MODULE 1, MIMO TxBF .....	419
10.2.7.	TX ABOVE 1 GHz 802.11n HT20 MODE, 5.3 GHz BAND – MODULE 1, MIMO SDM .....	421
10.2.8.	TX ABOVE 1 GHz 802.11ac VHT20 MODE, 5.3 GHz BAND – MODULE 1, MIMO TxBF .....	426
10.2.9.	TX ABOVE 1 GHz 802.11n HT20 MODE, 5.6 GHz BAND – MODULE 1, MIMO SDM .....	428
10.2.10.	TX ABOVE 1 GHz 802.11ac VHT20 MODE, 5.6 GHz BAND – MODULE 1, MIMO TxBF .....	435
10.2.11.	TX ABOVE 1 GHz 802.11n HT20 MODE, 5.8 GHz BAND – MODULE 1, MIMO SDM .....	439
10.2.12.	TX ABOVE 1 GHz 802.11ac VHT20 MODE, 5.8 GHz BAND – MODULE 1, MIMO TxBF .....	446
10.2.13.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.2 GHz BAND – MODULE 1, SISO ANT0 .....	450
10.2.14.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.2 GHz BAND – MODULE 1, SISO ANT1 .....	454
10.2.15.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.2 GHz BAND – MODULE 1, MIMO SDM .....	458
10.2.16.	TX ABOVE 1 GHz 802.11ac VHT40 MODE, 5.2 GHz BAND – MODULE 1, MIMO TxBF .....	462
10.2.17.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.3 GHz BAND – MODULE 1, SISO ANT0 .....	464
10.2.18.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.3 GHz BAND – MODULE 1, SISO ANT1 .....	468
10.2.19.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.3 GHz BAND – MODULE 1, MIMO SDM .....	472
10.2.20.	TX ABOVE 1 GHz 802.11ac VHT40 MODE, 5.3 GHz BAND – MODULE 1, MIMO TxBF .....	476
10.2.21.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.6 GHz BAND – MODULE 1, SISO ANT0 .....	478
10.2.22.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.6 GHz BAND – MODULE 1, SISO ANT1 .....	486
10.2.23.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.6 GHz BAND – MODULE 1, MIMO SDM .....	494
10.2.24.	TX ABOVE 1 GHz 802.11ac VHT40 MODE, 5.6 GHz BAND – MODULE 1, MIMO TxBF .....	501
10.2.25.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.8 GHz BAND – MODULE 1, SISO ANT0 .....	505
10.2.26.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.8 GHz BAND – MODULE 1, SISO ANT1 .....	511
10.2.27.	TX ABOVE 1 GHz 802.11n HT40 MODE, 5.8 GHz BAND – MODULE 1, MIMO SDM .....	517
10.2.28.	TX ABOVE 1 GHz 802.11ac VHT40 MODE, 5.8 GHz BAND – MODULE 1, MIMO TxBF .....	523
10.2.29.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.2 GHz BAND – MODULE 1, SISO ANT0 .....	527
10.2.30.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.2 GHz BAND – MODULE 1, SISO ANT1 .....	530
10.2.31.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.2 GHz BAND – MODULE 1, MIMO SDM .....	533
10.2.32.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.2 GHz BAND – MODULE 1, MIMO TxBF .....	536
10.2.33.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.3 GHz BAND – MODULE 1, SISO ANT0 .....	538
10.2.34.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.3 GHz BAND – MODULE 1, SISO ANT1 .....	541
10.2.35.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.3 GHz BAND – MODULE 1, MIMO SDM .....	544
10.2.36.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.3 GHz BAND – MODULE 1, MIMO TxBF .....	547
10.2.37.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.6 GHz BAND – MODULE 1, SISO ANT0 .....	549
10.2.38.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.6 GHz BAND – MODULE 1, SISO ANT1 .....	556
10.2.39.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.6 GHz BAND – MODULE 1, MIMO SDM .....	563

---

10.2.40.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.6 GHz BAND – MODULE 1, MIMO TxBF .....	570
10.2.41.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.8 GHz BAND – MODULE 1, SISO ANT0 .....	574
10.2.42.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.8 GHz BAND – MODULE 1, SISO ANT1 .....	579
10.2.43.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.8 GHz BAND – MODULE 1, MIMO SDM .....	584
10.2.44.	TX ABOVE 1 GHz 802.11ac VHT80 MODE, 5.8 GHz BAND – MODULE 1, MIMO TxBF .....	589
10.3.	<b>RADIATED Tx WORST-CASE .....</b>	<b>593</b>
11.	<b>AC POWER LINE CONDUCTED EMISSIONS.....</b>	<b>597</b>
12.	<b>SETUP PHOTOS.....</b>	<b>600</b>
	<b>END OF REPORT .....</b>	<b>600</b>

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Magic Leap, Inc.  
7500 West Sunrise Boulevard  
Plantation, FL 33322, USA

**EUT DESCRIPTION:** Magic Leap One – Lightpack Lightwear

**MODEL:** M1001/M1002

**SERIAL NUMBER:** G321F9N03434, PB1067B00000, PB1067B00001,  
PB1067B00002

**DATE TESTED:** 2018-01-03 to 2018-06-22

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Compliant
ISED CANADA RSS 247 ISSUE 2	Compliant
ISED CANADA RSS GEN ISSUE 4	Compliant

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

Approved & Released  
For UL LLC By:



Jeffrey Moser  
Operations Leader  
UL – Consumer Technology Division

Prepared By:



Brian T. Kiewra  
Project Engineer  
UL – Consumer Technology Division

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 789033 D02 v02r01, KDB662911 D01 v02r01, RSS-GEN Issue 4, RSS-247 Issue 2.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA.

12 Laboratory Dr., RTP, NC 27709
<input type="checkbox"/> Chamber A
<input type="checkbox"/> Chamber C

2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560
<input checked="" type="checkbox"/> Chamber NORTH
<input checked="" type="checkbox"/> Chamber SOUTH

The onsite chambers are covered under Industry Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ \text{Cable Loss (dB)} - \text{Preamp Gain (dB)} & \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	Required by standard
Occupied Channel Bandwidth	2.00%	±5 %
RF output power, conducted	1.3 dB	±1,5 dB
Power Spectral Density, conducted	2.47 dB	±3 dB
Unwanted Emissions, conducted	2.94 dB	±3 dB
All emissions, radiated	5.36 dB	±6 dB
Temperature	2.26 °C	±3 °C
Supply voltages	2.40%	±3 %
Time	3.39%	±5 %

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

Magic Leap One - Lightpack Lightwear with BT/BLE/802.11a/b/g/n/ac (20/40/80 MHz). This test report covers the M1001 and M1002. The only difference between the two models is the size of the headband on the Lightwear.

### 5.2. MAXIMUM OUTPUT POWER

The Module 1 has a maximum conducted output power as follows:

MIMO (FCC 5.2GHz, FCC/ISED all other bands)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	16.78	47.64
5180 - 5240	802.11n HT20	16.71	46.88
5190 - 5230	802.11n HT40	13.49	22.34
5210	802.11ac VHT80	12.25	16.79
5260 - 5320	802.11a	16.78	47.64
5260 - 5320	802.11n HT20	16.62	45.92
5270 - 5310	802.11n HT40	13.81	24.04
5290	802.11ac VHT80	12.86	19.32
5500 - 5700	802.11a	16.78	47.64
5500 - 5700	802.11n HT20	16.62	45.92
5510 - 5670	802.11n HT40	13.62	23.01
5530-5690	802.11ac VHT80	12.73	18.75
5745-5825	802.11a	16.51	44.77
5745-5825	802.11n HT20	16.32	42.85
5755-5795	802.11n HT40	13.98	25.00
5775	802.11ac VHT80	12.89	19.45

Note: MIMO power represents MIMO modes and transmit beamforming power.

**MIMO (ISED)**

Frequency Range (MHz)	Mode	EIRP (dBm)	EIRP (mW)
5180 - 5240	802.11a	16.75	47.32
5180 - 5240	802.11n HT20	17.24	52.97
5190 - 5230	802.11n HT40	17.49	56.10
5210	802.11ac VHT80	16.25	42.17

Note: MIMO power represents MIMO modes and transmit beamforming power.

**SISO (FCC)**

Frequency Range (MHz)	Mode	ANT0 Output Power (dBm)	Output Power (mW)	ANT1 Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	13.16	20.70	14.30	26.92
5180 - 5240	802.11n HT20	13.13	20.56	14.24	26.55
5190 - 5230	802.11n HT40	13.09	20.37	13.98	25.00
5210	802.11ac VHT80	12.60	18.20	13.24	21.09
5260 - 5320	802.11a	13.09	20.37	14.39	27.48
5260 - 5320	802.11n HT20	12.94	19.68	14.19	26.24
5270 - 5310	802.11n HT40	13.06	20.23	13.92	24.66
5290	802.11ac VHT80	12.64	18.37	13.06	20.23
5500 - 5700	802.11a	13.26	21.18	14.30	26.92
5500 - 5700	802.11n HT20	13.04	20.14	14.12	25.82
5510 - 5670	802.11n HT40	13.10	20.42	13.93	24.72
5530-5690	802.11ac VHT80	12.51	17.82	13.55	22.65
5745-5825	802.11a	13.01	20.00	13.94	24.77
5745-5825	802.11n HT20	12.86	19.32	13.78	23.88
5755-5795	802.11n HT40	12.91	19.54	13.80	23.99
5775	802.11ac VHT80	12.60	18.20	13.33	21.53

**SISO (ISED)**

Frequency Range (MHz)	Mode	ANT0 EIRP (dBm)	ANT0 EIRP (mW)	ANT1 EIRP (dBm)	ANT1 EIRP (mW)
5180 - 5240	802.11a	12.52	17.86	14.81	30.27
5180 - 5240	802.11n HT20	13.08	20.32	15.27	33.65
5190 - 5230	802.11n HT40	16.48	44.46	18.67	73.62
5210	802.11ac VHT80	16.11	40.83	18.03	63.53

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes antennas with the following maximum gains:

Band Of Operation (MHz)	Ant0 gain (dBi)	Ant1 Gain (dBi)	Ant2 gain (dBi)
2401 - 2480	1.54	0.4	-0.8
5150-5250	3.3	4.6	NA
5250-5350	3.2	4.5	NA
5500-5725	2.5	3.7	NA
5745-5850	0.6	4.5	NA

UNII WiFi transmits on Ant0 and Ant 1.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was PEQ5.

### 5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission (<1GHz and >18GHz) and power line conducted emissions were performed with the EUT set to transmit at the channel with highest output power and PSD as worst-case scenario. 1-18GHz radiated emissions were performed with the EUT set to transmit at low, a middle, and high channels.

The fundamental of both module1 and module 2 was investigated in three orthogonal orientations, X,Y, and Z, in both SISO and MIMO modes. It was determined that X orientation was worst-case orientation in SISO mode for both modules. Worst-case orientation in MIMO mode for module 1 was Z and for module 2 was Y. Therefore all final radiated testing was performed with the EUT in X orientation for SISO mode and Z orientation for Module 1 MIMO and Y orientation for module 2 MIMO.

All testing done, based on the baseline scan, at worst-case data rates of:

802.11a: 6 Mbps  
802.11n20: MCS8  
802.11n40 SISO: MCS0  
802.11n40 MIMO: MCS8  
802.11ac80 SISO: MCS0 (Nss=1)  
802.11ac80: MCS0 (Nss = 2)

Please note, 802.11a was considered correlated. The manufacturer states they do not support 2 chain correlated modes in 802.11n HT20/HT40 (MCS0-MCS7) and 802.11ac VHT80 (MCS0- MCS9 , Nss =1) modes (same data transmitted on both chains at the same time). Therefore, only 11n HT20/HT40, MCS8-MCS15, and 11ac VHT80, MCS0 – MCS9 Nss =2, were considered for testing.

Additionally, for 802.11a and 802.11n HT20, the power setting and measured power per chain was the same for SISO and MIMO modes allowing the MIMO summed power to be worst-case. Therefore, all MIMO mode data represents SISO mode data for 20 MHz channel bandwidth modes.

Transmit beamforming only supported by 802.11n and 802.11ac modes.

For Transmit Beamforming (TxBF) Radiated Bandedge testing, a companion router was placed on the turn table to lock the beam and radiated bandedge testing was performed.

For TxBF Radiated Spurious Emissions testing, the router was placed on the turn table and spurious emissions was investigated at different  $\theta$ s around the EUT. It was determined that there was <3dB delta in each position. The router was then placed behind the receiving antenna. Transmit beamforming spot check scans were taken and this showed little to no variation from 802.11n/ac MIMO SDM spurious scans. Therefore, 802.11n/ac MIMO SDM spurious data is used to represent 802.11nHT20/nHT40 and 802.11ac VHT80 transmit beamforming. Note - For transmit beamforming testing 802.11ac VHT20 and VHT40 were tested to cover 802.11n HT20 and HT40.

Simultaneous transmission of the following was investigated:

- Proprietary BLE and 2.4 GHz WiFi
- Proprietary BLE and BLE
- Proprietary BLE and Bluetooth
- Proprietary BLE and 5 GHz WiFi
- 2.4GHz and 5GHz (11a)
- 2.4GHz and 5GHz (11a) and Proprietary BLE
- 2.4GHz and Bluetooth and Proprietary BLE
- 5GHz and Bluetooth
- 5GHz and Bluetooth and Proprietary BLE

The following does not simultaneously transmit and thus was not considered:

- BLE and Bluetooth

Device was found to still be compliant.

Refer to UL Document R11694639-ST1 for simultaneous transmission data.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply	Salcomp	M3002	Non-Serialized	NA

### I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB-C	1	USB-C	DC/Data	<3m	None
2	Hardwired	1	Hardwired	Data	<3m	Connects Lightwear to Lightpack

### TEST SETUP

The EUT is setup as standalone equipment.

### SETUP DIAGRAM FOR TESTS

Refer to UL document R11694639-EP6 for diagram.

## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Note: All equipment was within calibration interval at time of use.

### Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
T177	Spectrum Analyzer	Agilent Technologies	E4446A	2017-03-30, 2018-04-12	2018-03-30, 2019-04-12
72822 (SA0019)	Spectrum Analyzer	Agilent Technologies	E4446A	2017-08-21	2018-09-21
SA0020	Spectrum Analyzer	Agilent Technologies	E4446A	2017-11-06	2018-11-06
SN 161024885	Environmental Meter	Fisher Scientific	15-077-963	2016-12-23	2018-12-23
PWM001	RF Power Meter	Keysight Technologies	N1912A	2017-05-23, 2018-05-30	2018-05-23, 2019-05-30
PWS006	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2017-05-18, 2018-05-30	2018-05-18, 2019-05-31
PWM003	RF Power Meter	Keysight Technologies	N1911A	2017-07-14	2018-07-14
PWS001	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2017-05-18, 2018-05-30	2018-05-18, 2019-05-30
PWS003	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2017-12-18	2018-12-18
MM0168	True RMS Multimeter	Agilent	U1232A	2017-10-25	2018-10-30

### Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL076	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3476-240	2017-06-12	2018-06-12
s/n 160938893	Environmental Meter	Fisher Scientific	14-650-118	2016-11-02	2018-11-02
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2017-08-22	2018-08-22
PRE0101521 (75141)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2017-08-23	2018-08-23
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2017-06-12	2018-06-12
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	<b>0.009-30MHz</b>	(Loop Ant.)			
AT0059	Active Loop Antenna	ETS-Lindgren	6502	2017-06-05	2018-06-30
	<b>30-1000 MHz</b>				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2017-06-15	2018-06-30
	<b>1-18 GHz</b>				
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2017-04-05, 2018-04-30	2018-04-05, 2019-04-30
AT0078	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2017-09-26	2018-09-26
	<b>18-40 GHz</b>				
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2017-10-10	2018-10-10
AT0077	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2017-10-10	2018-10-10
	<b>Gain-Loss Chains</b>				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2017-09-15	2018-09-15
S-SAC02	Gain-loss string: 30-1000MHz	Various	Various	2017-06-11	2018-06-11
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2017-12-31	2018-12-31
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2017-03-03, 2018-04-02	2018-03-31, 2019-04-02
	<b>Receiver &amp; Software</b>				
SA0025	Spectrum Analyzer	Agilent	N9030A	2017-04-10, 2018-04-30	2018-04-10, 2019-04-30
SA0026	Spectrum Analyzer	Agilent	N9030A	2017-02-17, 2018-03-20	2018-02-28, 2019-03-20
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	<b>Additional Equipment used</b>				
s/n 161024887	Environmental Meter	Fisher Scientific	15-077-963	2016-12-23	2018-12-23

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	<b>1-18 GHz</b>				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2017-04-05, 2018-04-30	2018-04-30, 2019-04-30
	<b>Gain-Loss Chains</b>				
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2017-08-18, 2018-03-23	2018-08-18, 2019-03-23
	<b>Receiver &amp; Software</b>				
SA0027	Spectrum Analyzer	Agilent	N9030A	2017-03-16, 2018-04-04	2018-03-31, 2019-04-04
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	<b>Additional Equipment used</b>				
s/n 161024690	Environmental Meter	Fisher Scientific	15-077-963	2016-12-21	2018-12-21

## 7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

26 dB Emission BW: KDB 789033 D02 v02r01 Section C.

99% Occupied BW: KDB 789033 D02 v02r01, Section D .

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G).

Power Spectral Density: KDB 789033 D02 v02r01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.1, G .3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.1, G.3, G.4, and G.5.

Use of IEEE 802.11 channels that straddle the UNII-2C and UNII-3 bands at 5725 MHz: KDB 789033 D02 v02r01, Section III

AC Mains: ANSI C63.10:2013 Section 6.2

## 8. ON TIME AND DUTY CYCLE

### LIMITS

None; for reporting purposes only.

### PROCEDURE

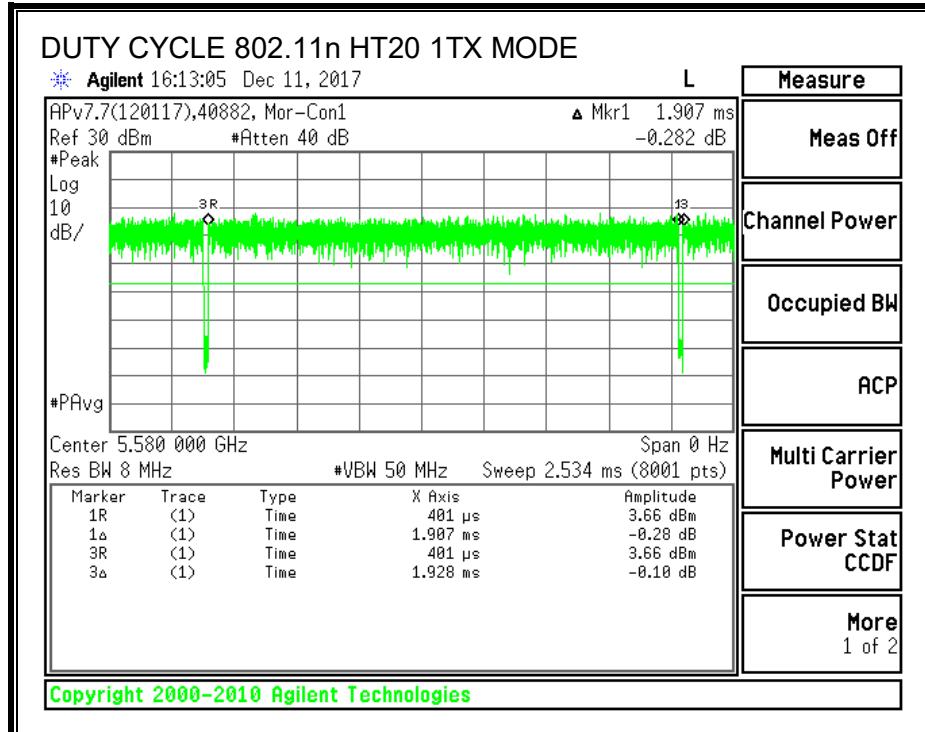
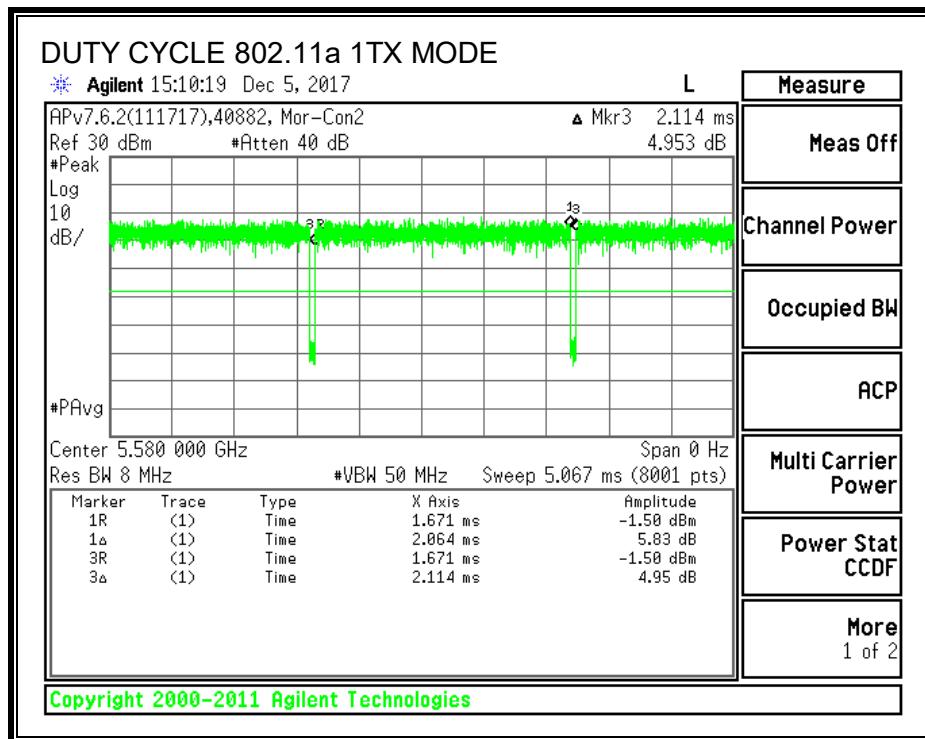
KDB 789033 Zero-Span Spectrum Analyzer Method.

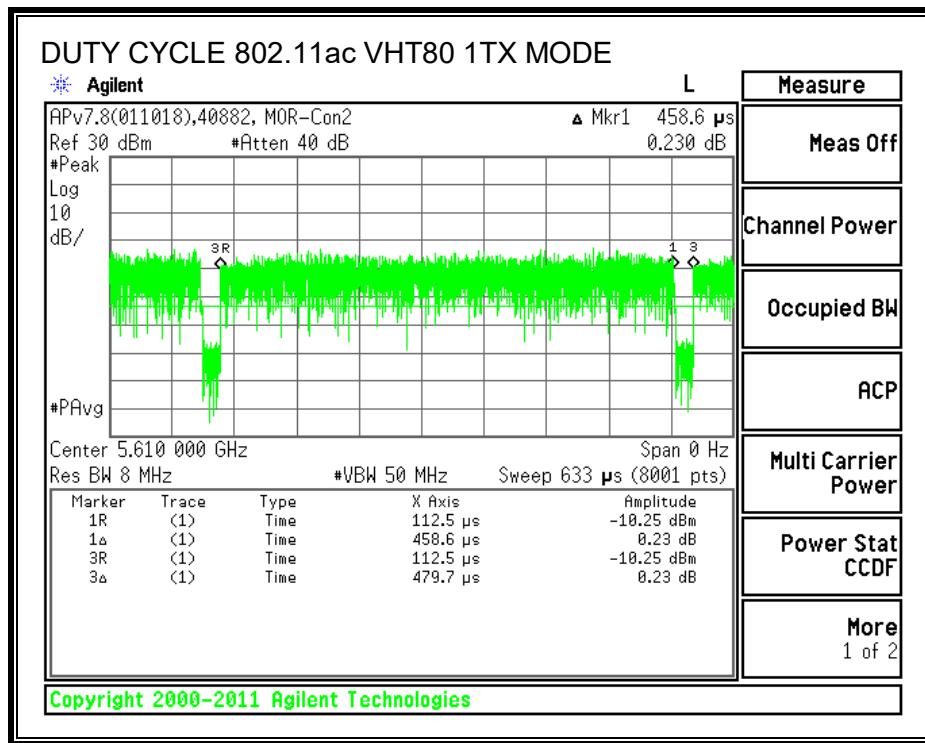
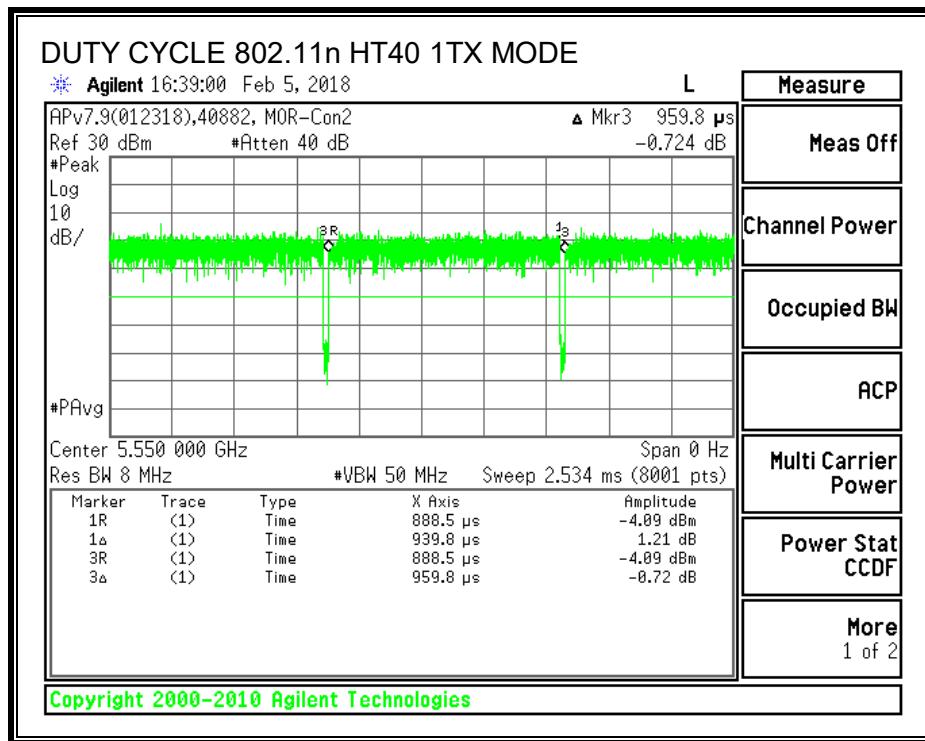
### ON TIME AND DUTY CYCLE RESULTS – MODULE 1

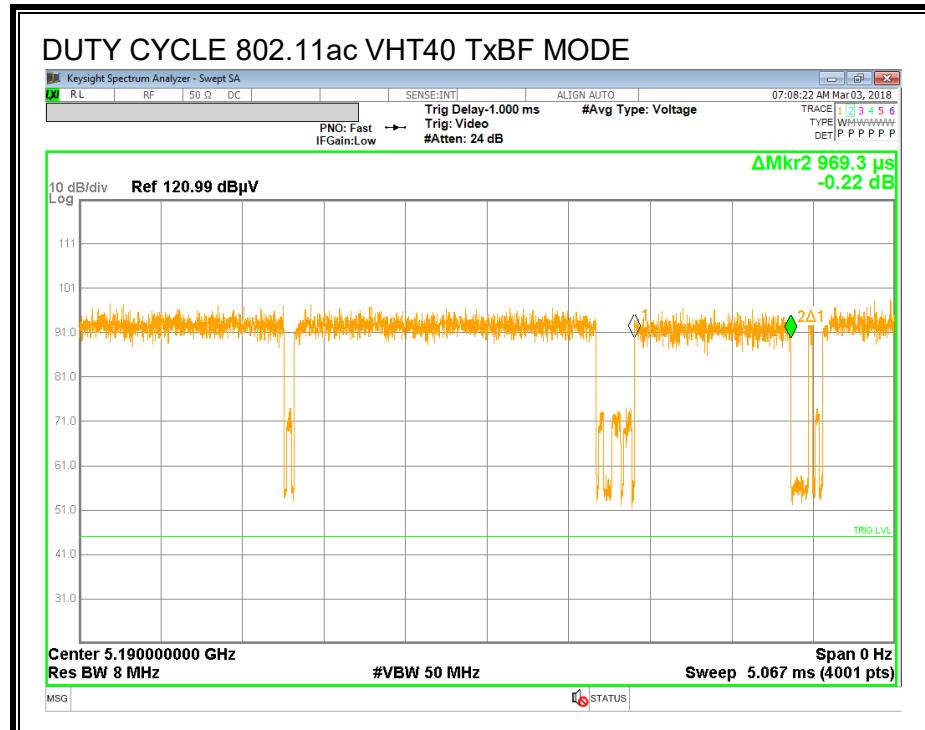
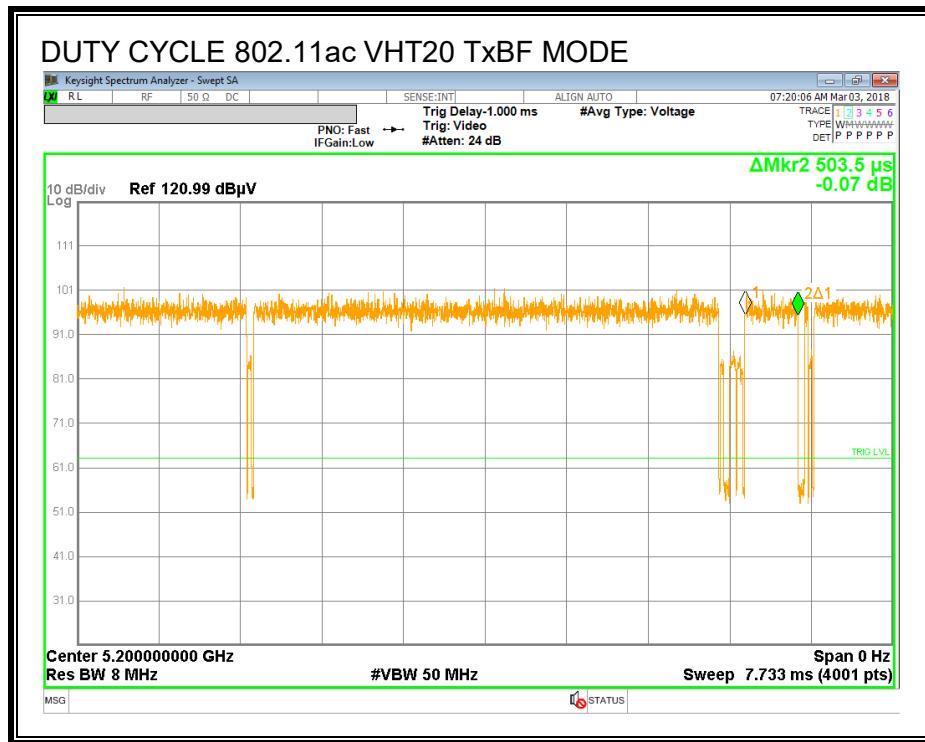
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a 1TX	2.064	2.114	0.976	97.63%	0.10	0.484
802.11n HT20 1TX	1.907	1.928	0.989	98.91%	0.00	0.010
802.11n HT40 1TX	0.9398	0.9598	0.979	97.92%	0.09	1.064
802.11ac VHT80 1TX	0.4586	0.4797	0.956	95.60%	0.19	2.181
802.11ac VHT20 TxBF	0.504					1.986
802.11ac VHT40 TxBF	0.9693					1.032
802.11ac VHT80 TxBF	0.5600					1.786

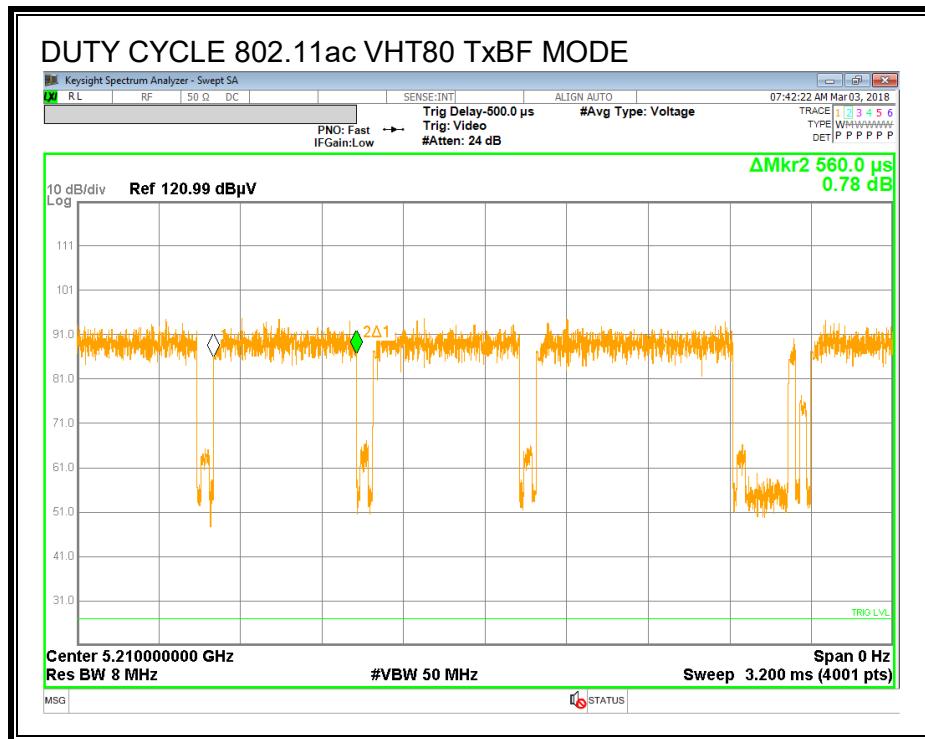
Note 1: TxBF duty cycle was not constant, requiring the use of the worst-case on time for Ton. Therefore, the 1/Ton method was used to make average Radiated measurements with a minimum VBW of what is listed in the results table above.

## DUTY CYCLE PLOTS – MODULE 1









## 9. ANTENNA PORT TEST RESULTS – MODULE 1

Note: MIMO conducted data and power represents both SDM modes and transmit beamforming modes for all applicable modulations.

## 9.1.802.11a MODE IN THE 5.2 GHz BAND

### 9.1.1. 26 dB BANDWIDTH

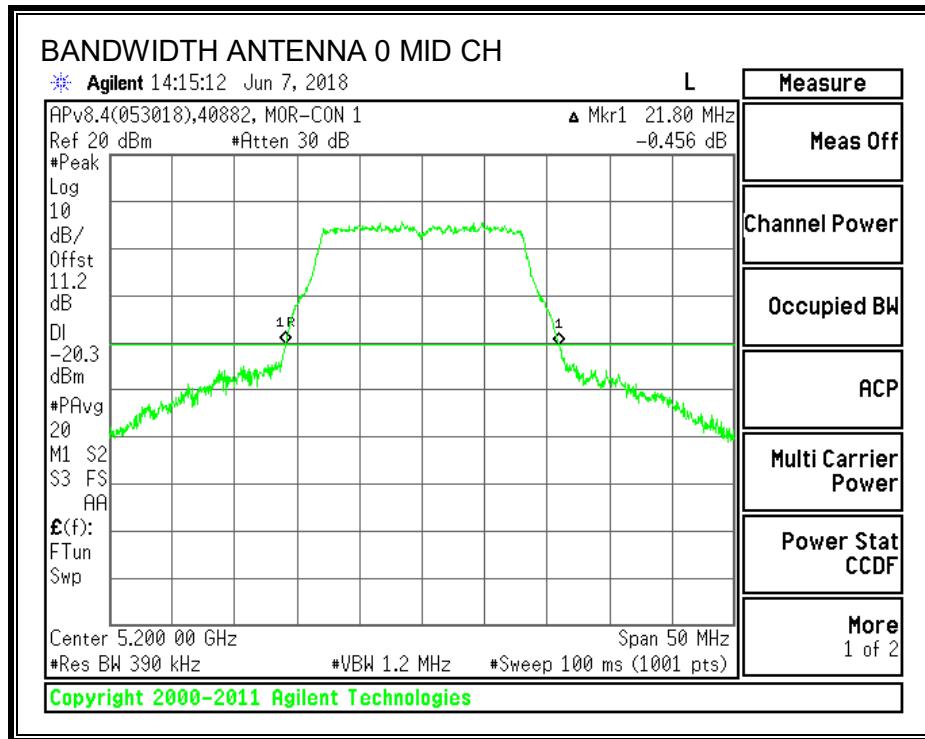
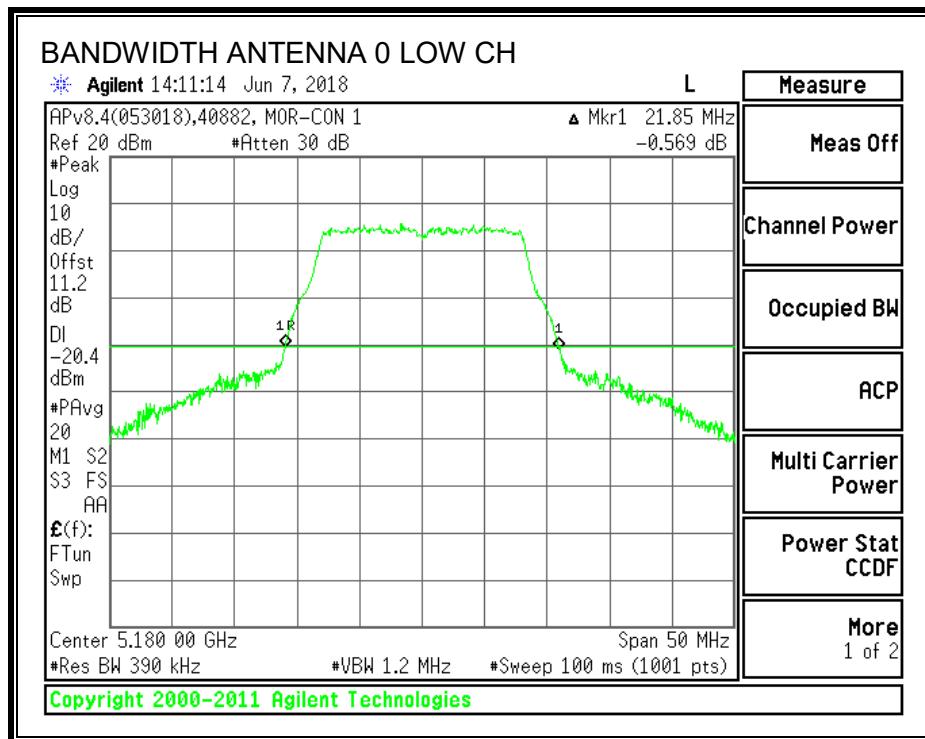
#### LIMITS

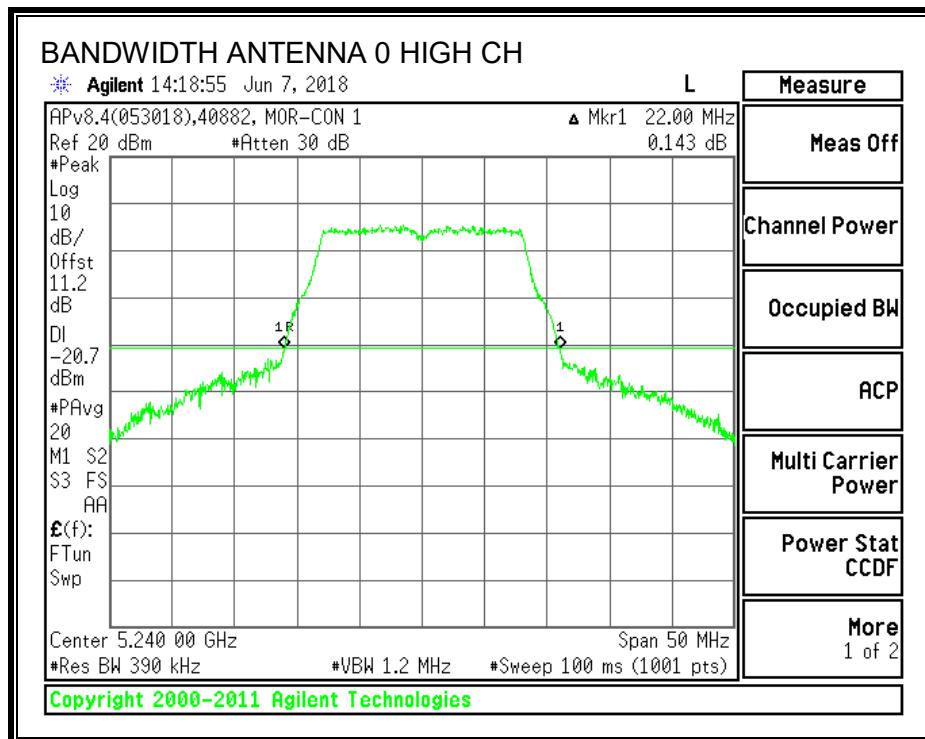
None; for reporting purposes only.

#### RESULTS

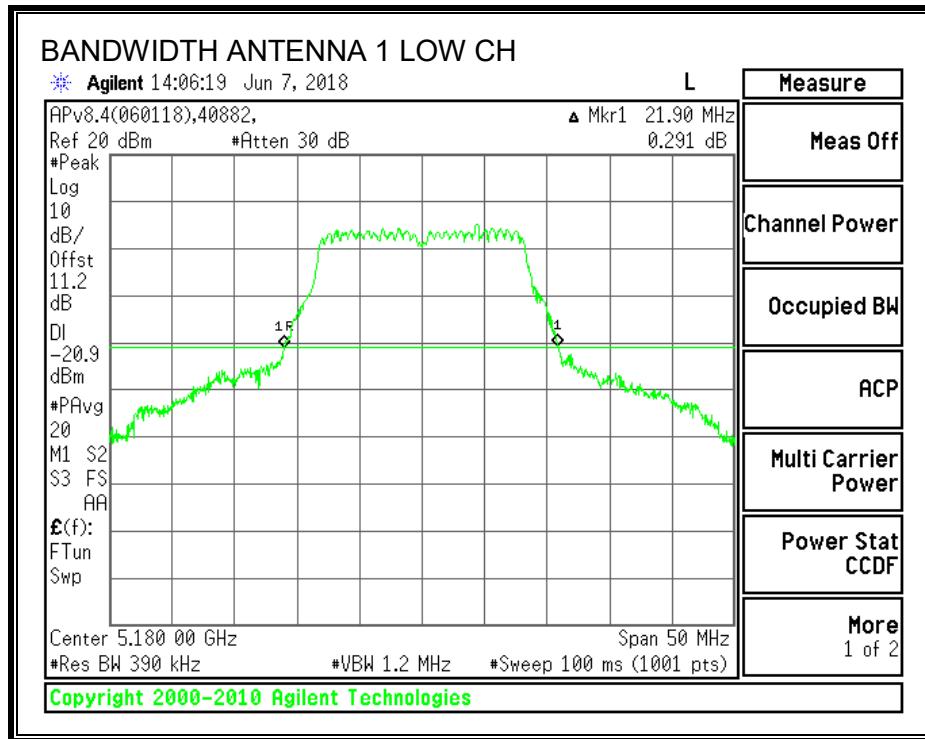
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	21.85	21.90
Mid	5200	21.80	21.90
High	5240	22.00	22.85

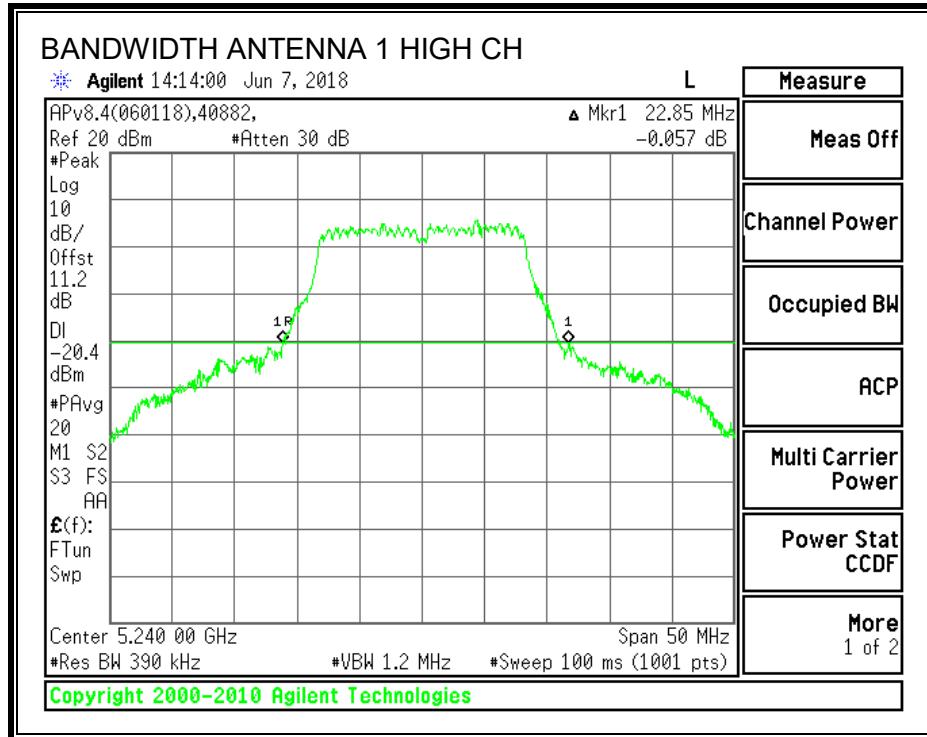
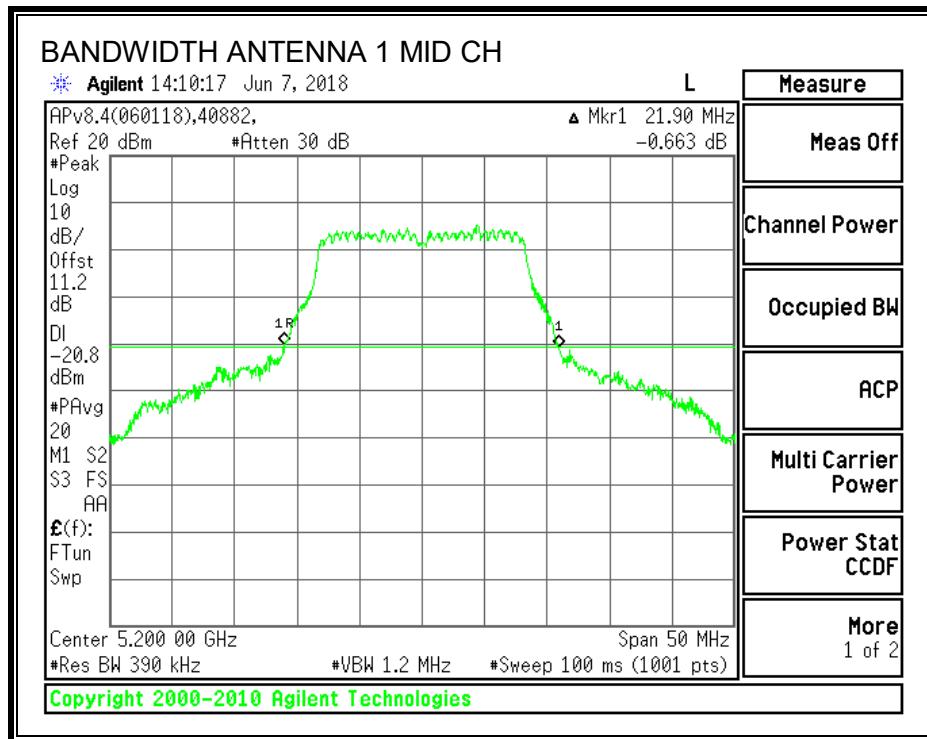
## 26 dB BANDWIDTH, MODULE 1 ANTENNA 0





## 26 dB BANDWIDTH, MODULE 1 ANTENNA 1





### 9.1.2. 99% BANDWIDTH

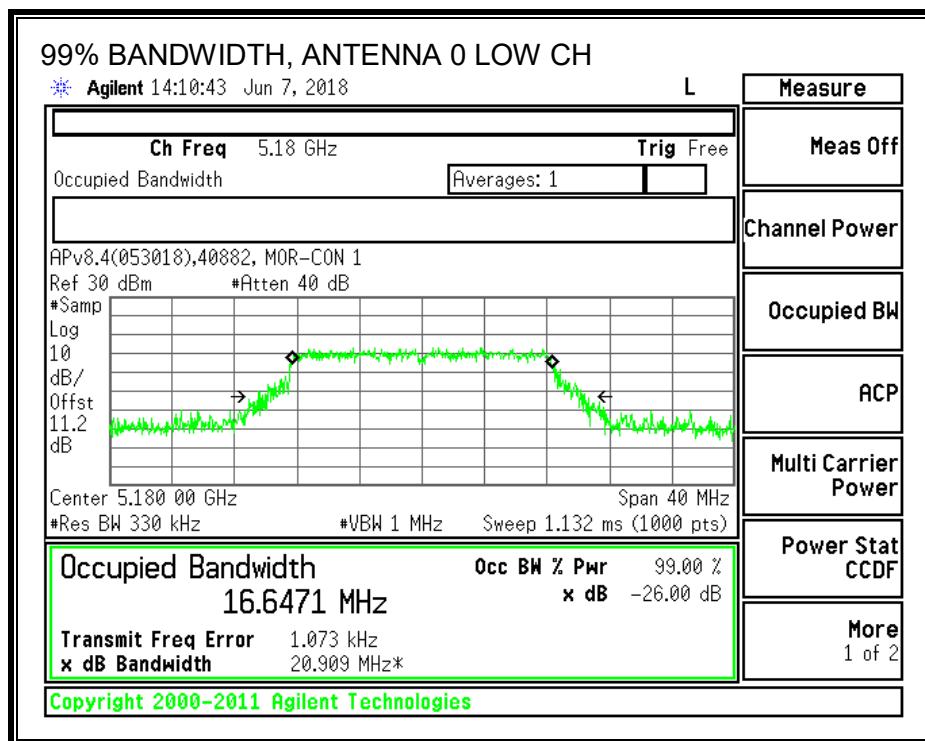
#### LIMITS

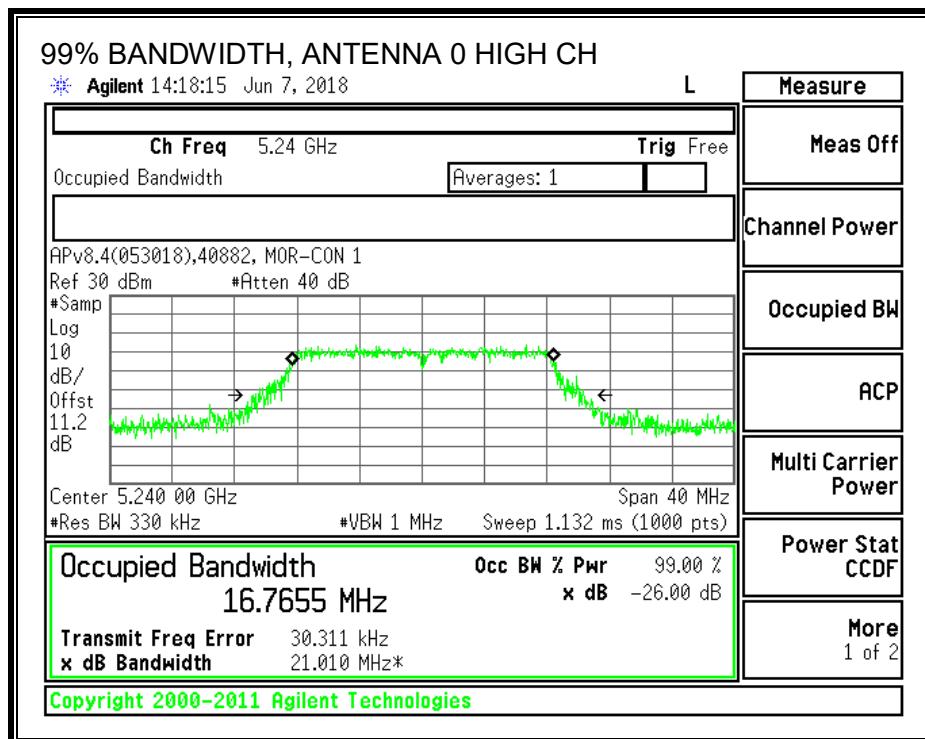
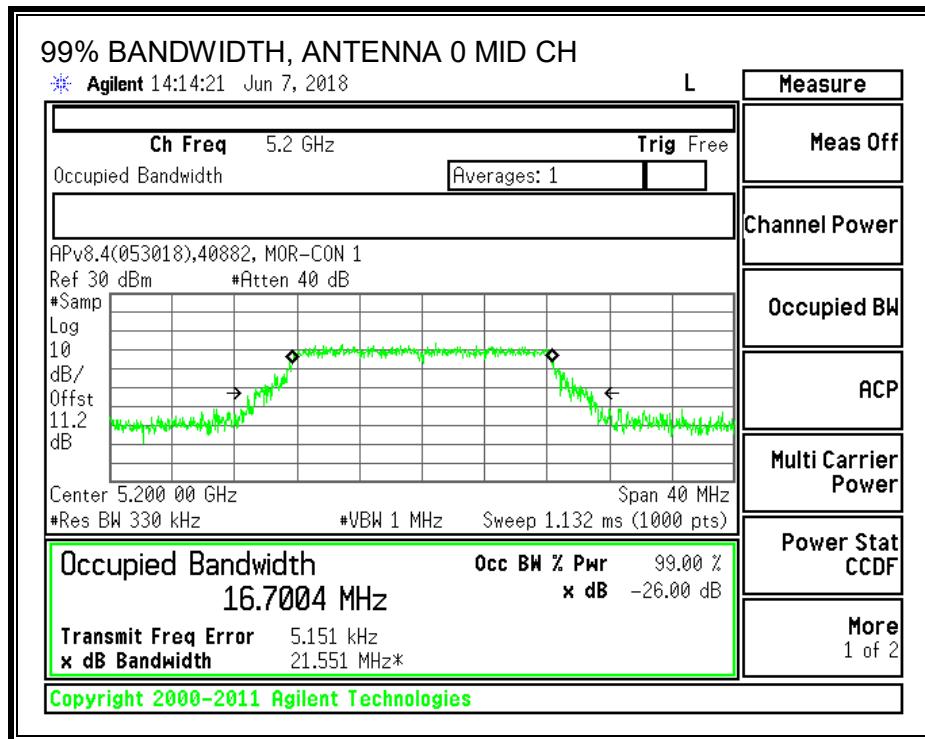
None; for reporting purposes only.

#### RESULTS

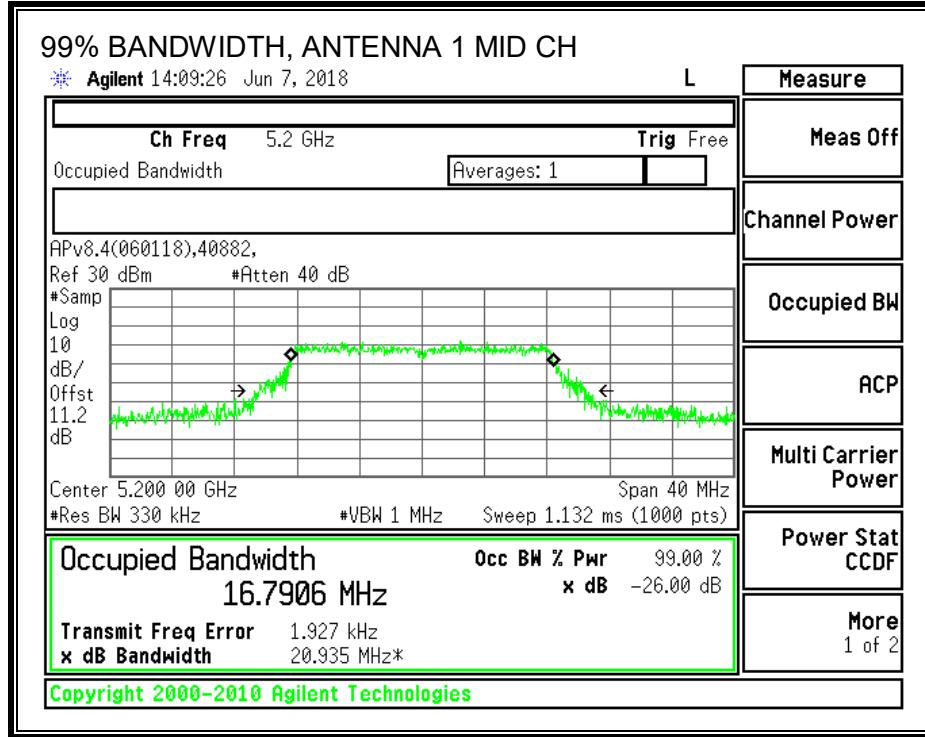
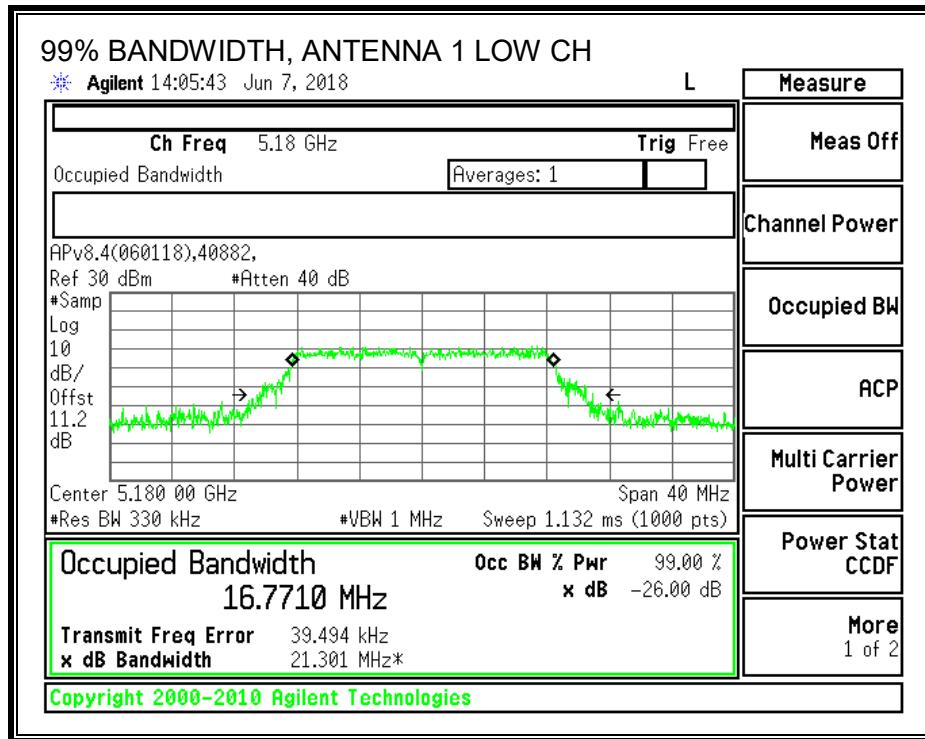
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	16.6471	16.7710
Mid	5200	16.7004	16.7906
High	5240	16.7655	16.6984

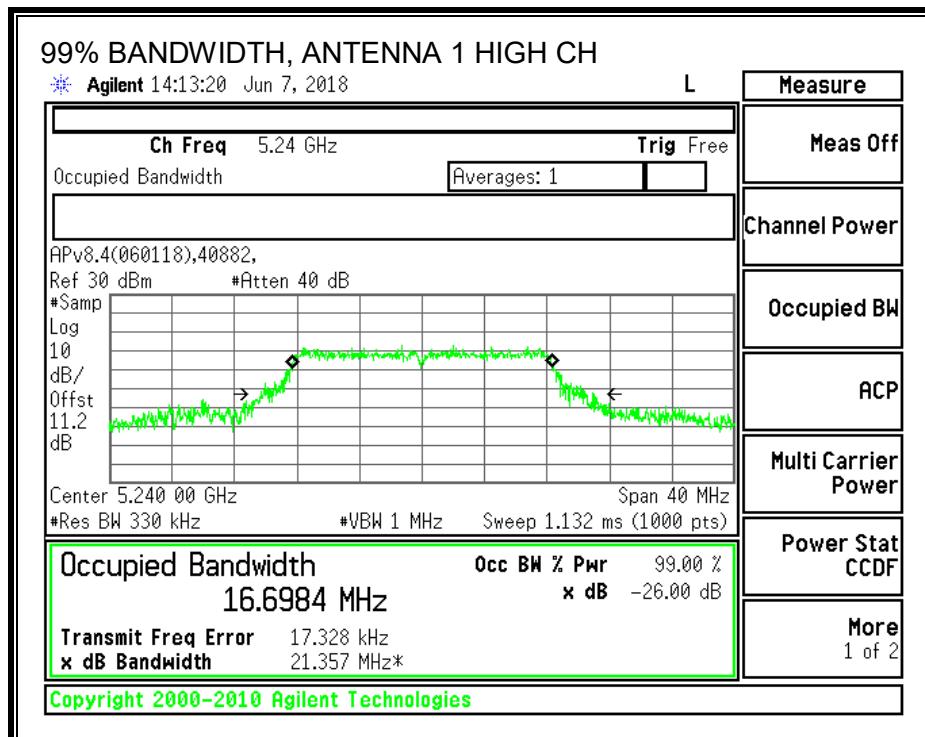
#### 99% BANDWIDTH MODULE 1, ANTENNA 0





## 99% BANDWIDTH, MODULE 1 ANTENNA 1





### 9.1.3. OUTPUT POWER AND PSD

#### LIMITS

##### FCC §15.407 (a) (1)

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS 247 Issue 2, Clause 6.2.1.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10}B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

**DIRECTIONAL ANTENNA GAIN**

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.30	4.60	4.00

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.30	4.60	6.98

## **RESULTS (FCC)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	4.00	6.98	24.00	10.02
Mid	5200	4.00	6.98	24.00	10.02
High	5240	4.00	6.98	24.00	10.02

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.94	14.22	16.64	24.00	-7.36
Mid	5200	12.96	14.30	16.69	24.00	-7.31
High	5240	13.16	14.30	16.78	24.00	-7.22

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	3.53	1.92	5.91	10.02	-4.11
Mid	5200	3.16	2.27	5.85	10.02	-4.17
High	5240	3.49	2.85	6.29	10.02	-3.73

Note – These power measurements were gated.

## **RESULTS (ISED)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Low	5180	4	6.98	16.65	22.21	10.00
Mid	5200	4	6.98	16.70	22.23	10.00
High	5240	4	6.98	16.70	22.23	10.00

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

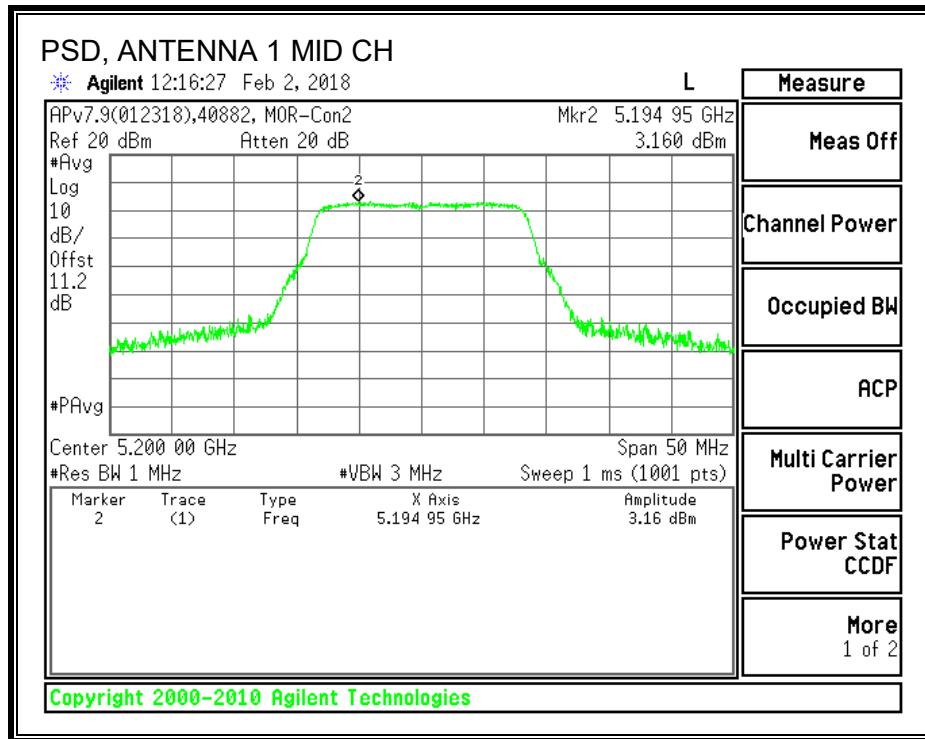
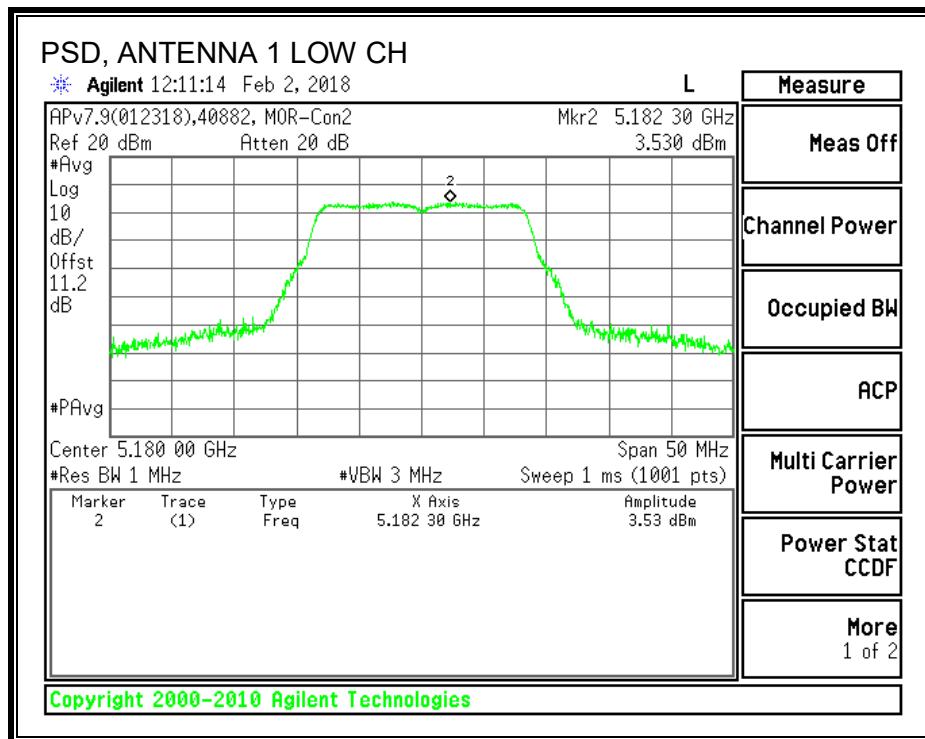
### **Output Power Results**

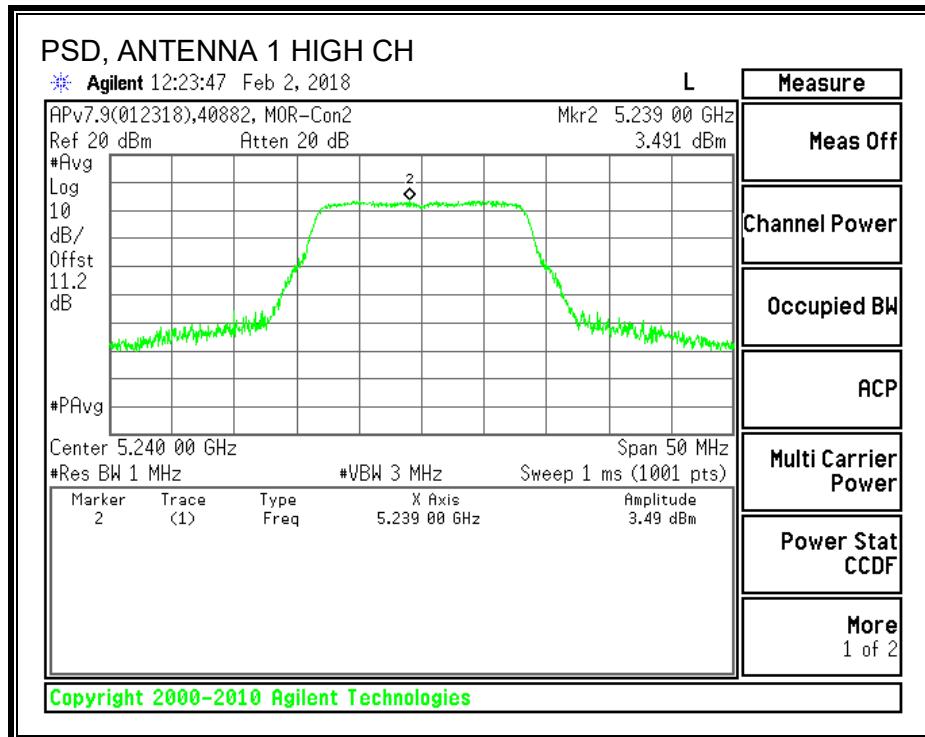
Channel	Frequency (MHz)	ANT 0 Meas Cond Power (dBm)	ANT 1 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5180	8.72	9.86	16.44	22.21	-5.78
Mid	5200	9.00	9.90	16.58	22.23	-5.64
High	5240	9.12	10.11	16.75	22.23	-5.47

### **PSD Results**

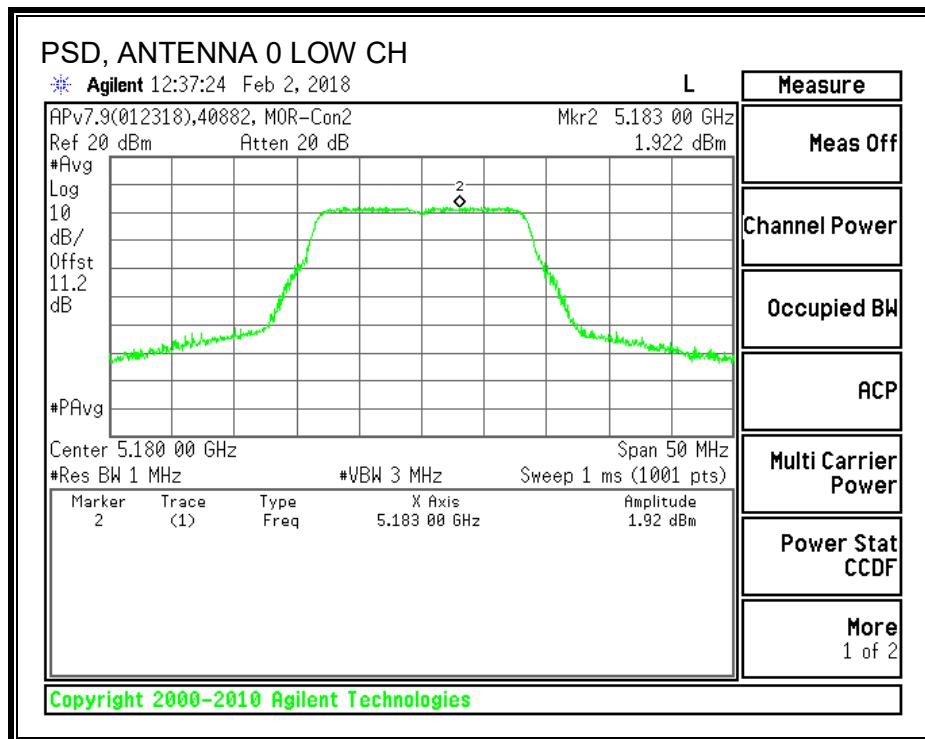
Channel	Frequency (MHz)	ANT 0 Meas Cond PSD (dBm)	ANT 1 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Low	5180	-3.50	-2.37	7.19	10.00	-2.81
Mid	5200	-3.52	-2.61	7.05	10.00	-2.95
High	5240	-3.21	-2.42	7.30	10.00	-2.70

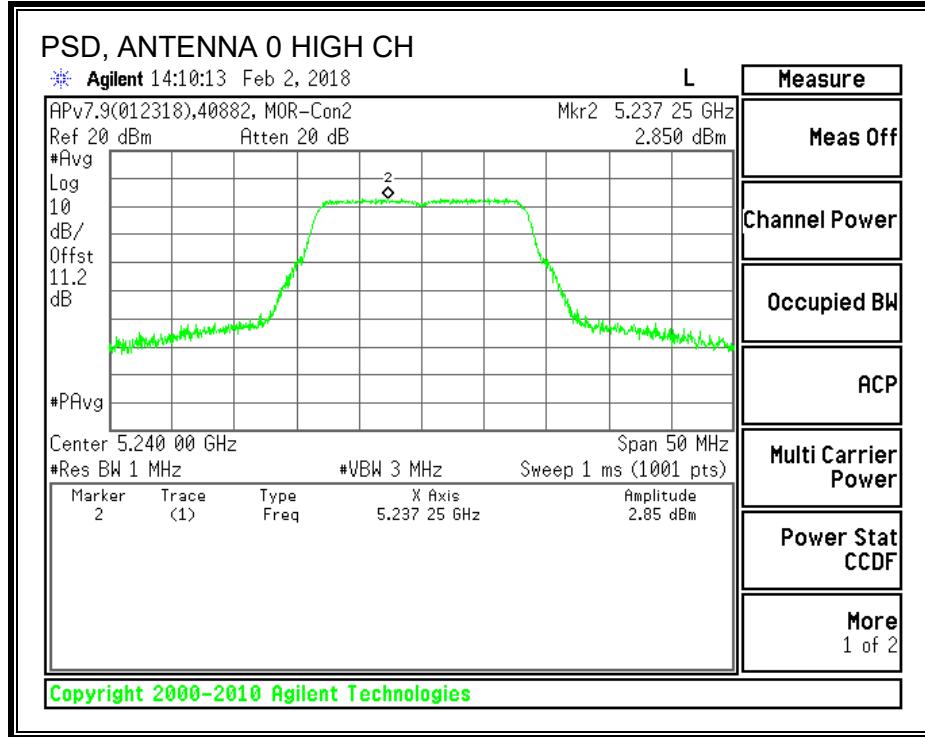
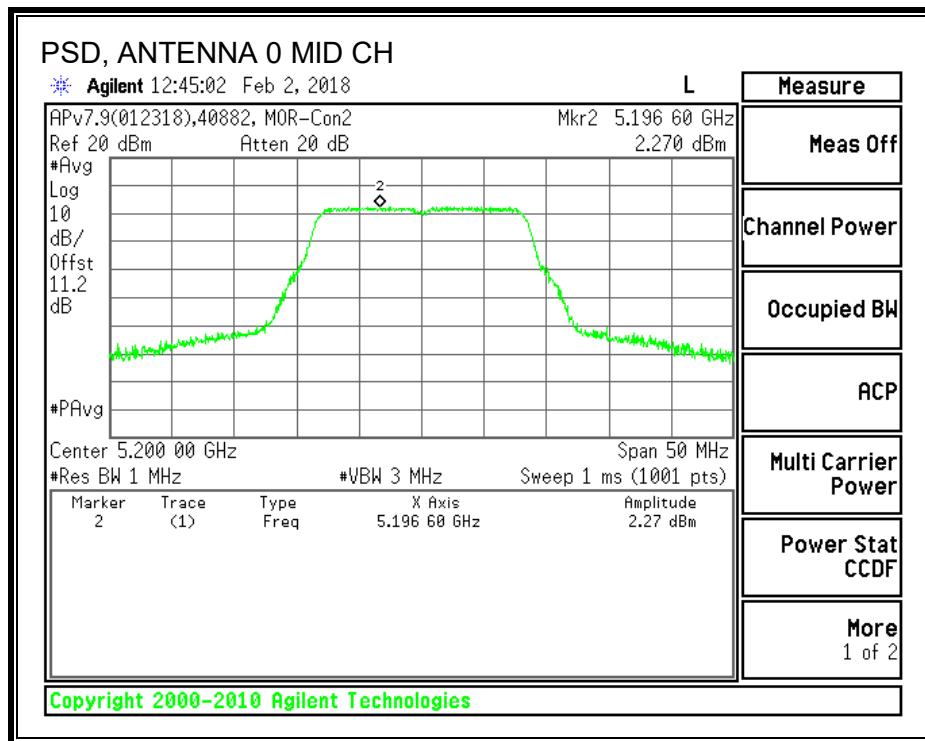
**FCC PSD, MODULE 1 ANTENNA 1**



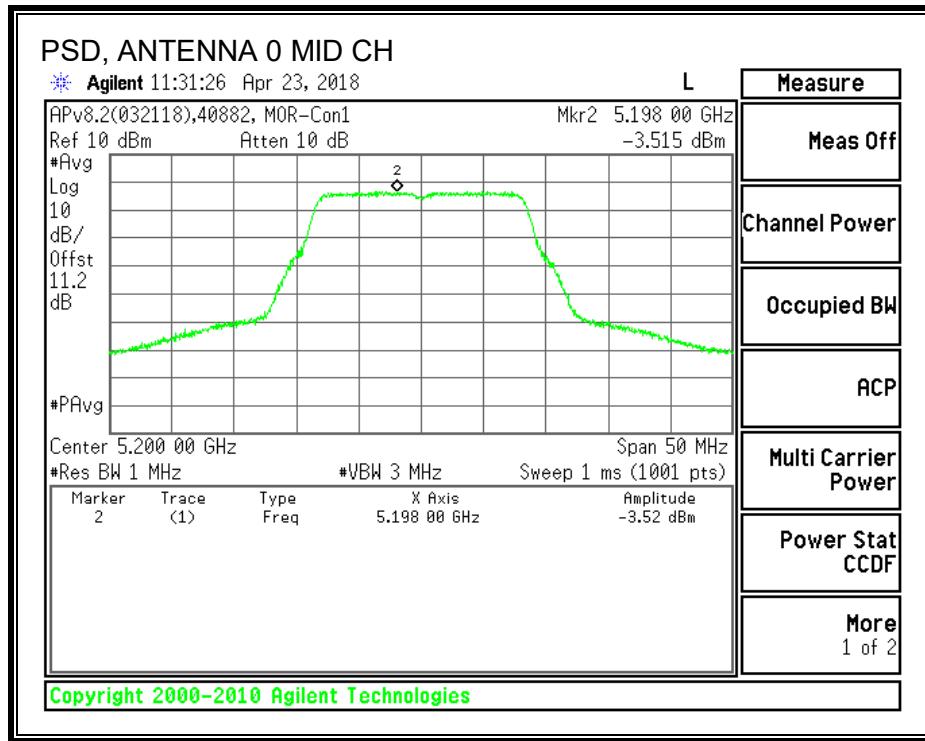
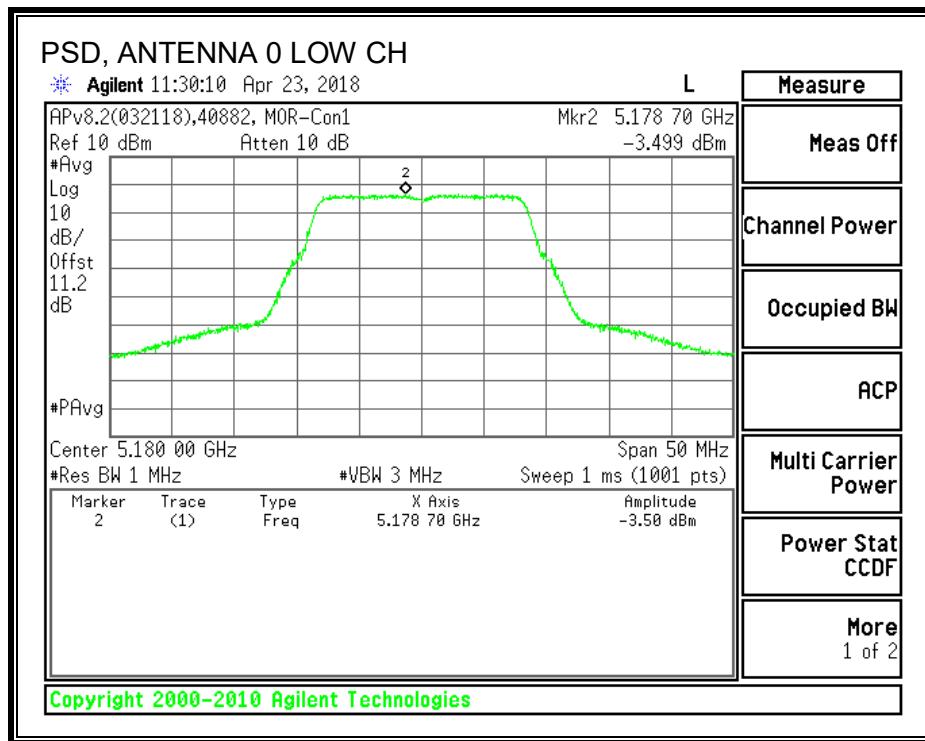


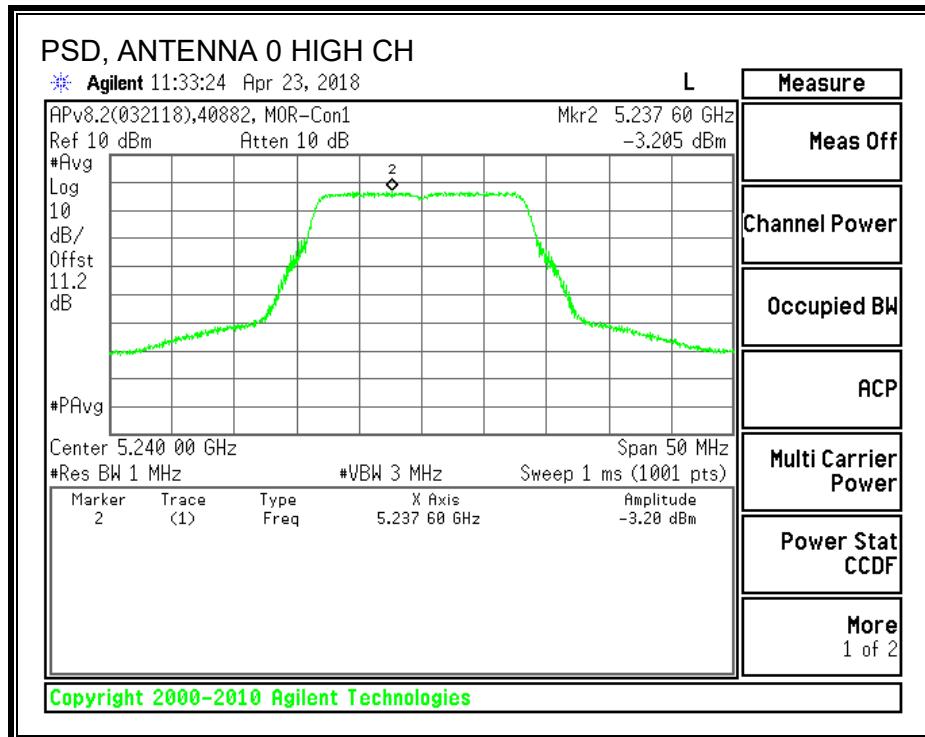
### FCC PSD, MODULE 1 ANTENNA 0



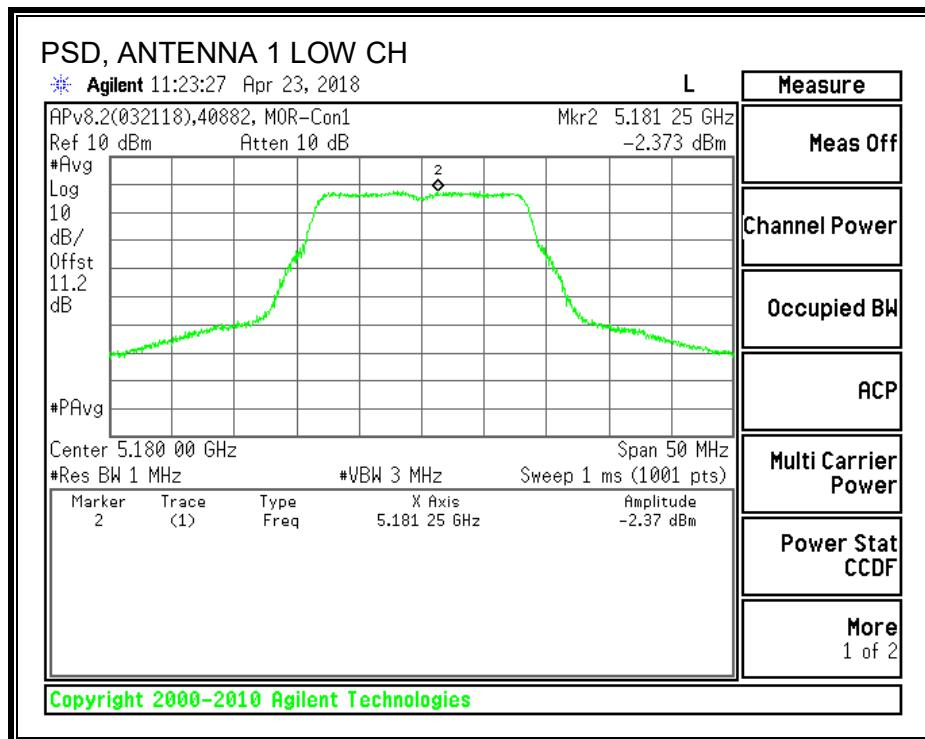


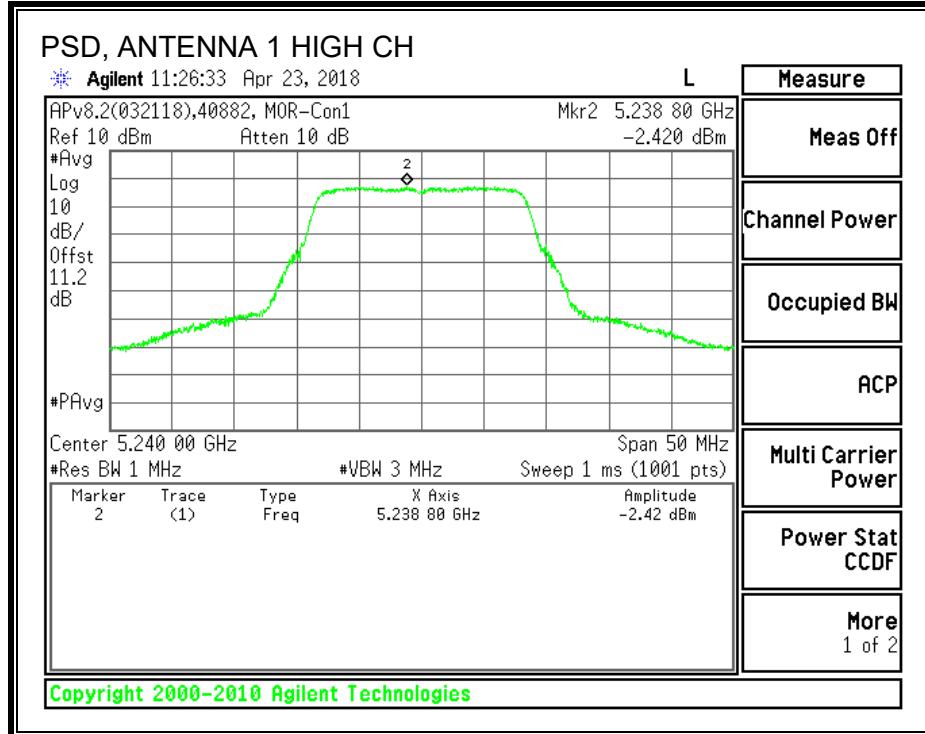
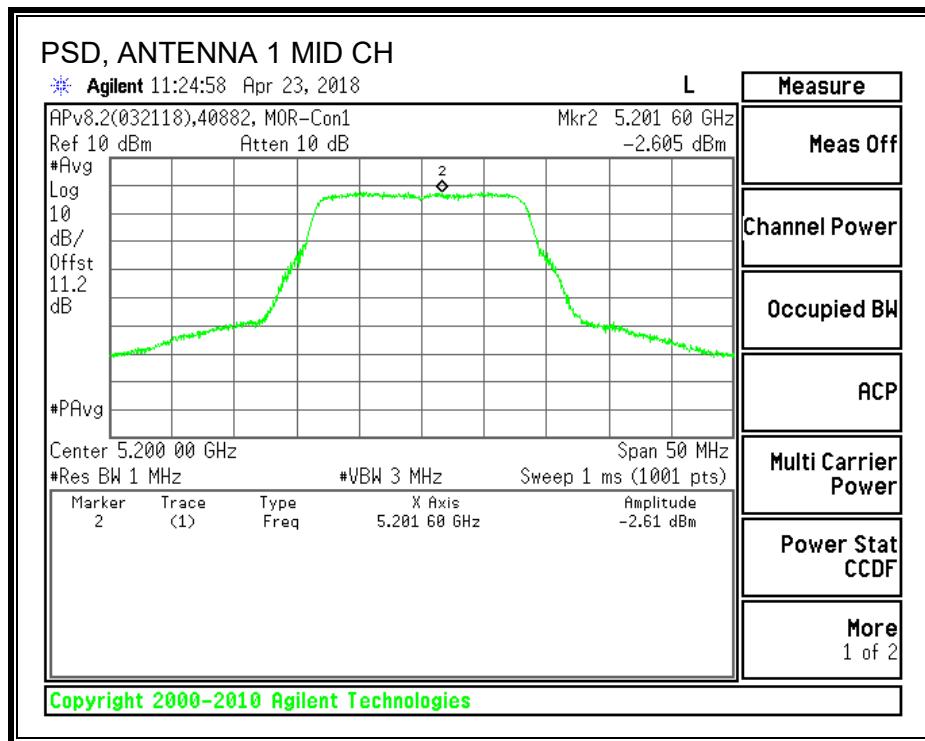
**ISED PSD, MODULE 1 ANTENNA 0**





### ISED PSD, MODULE 1 ANTENNA 1





## 9.2.802.11n HT20 MODE IN THE 5.2 GHz BAND

### 9.2.1. 26 dB BANDWIDTH

#### LIMITS

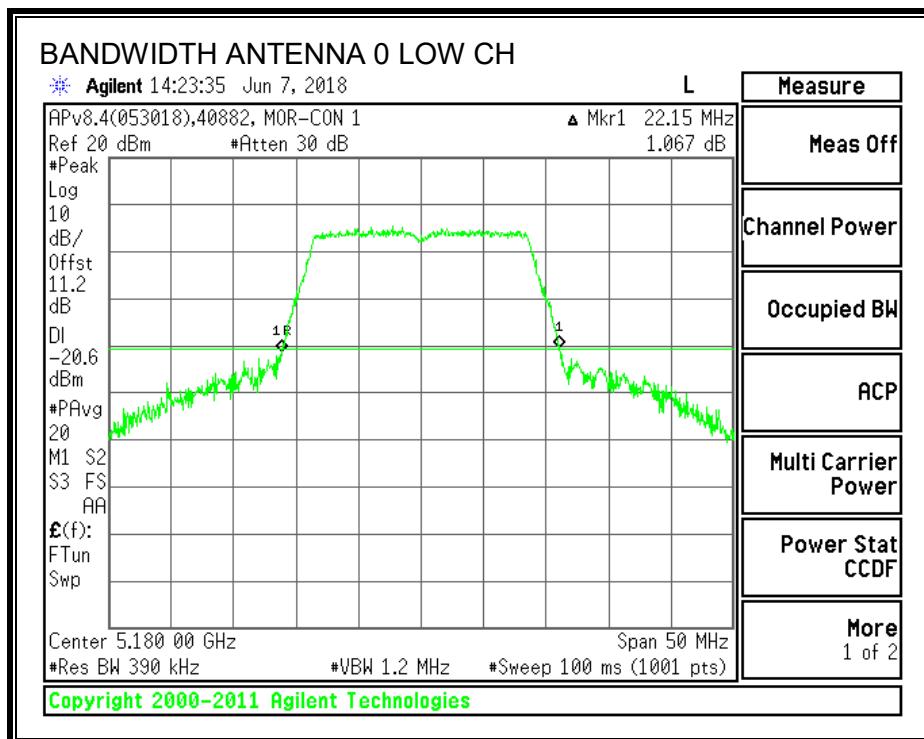
None; for reporting purposes only.

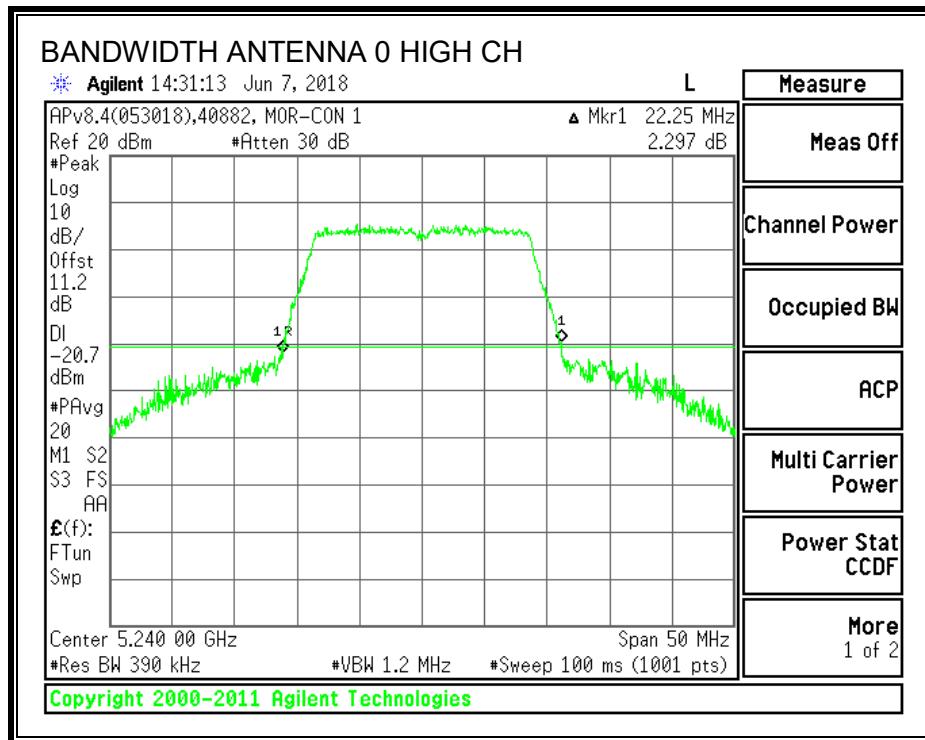
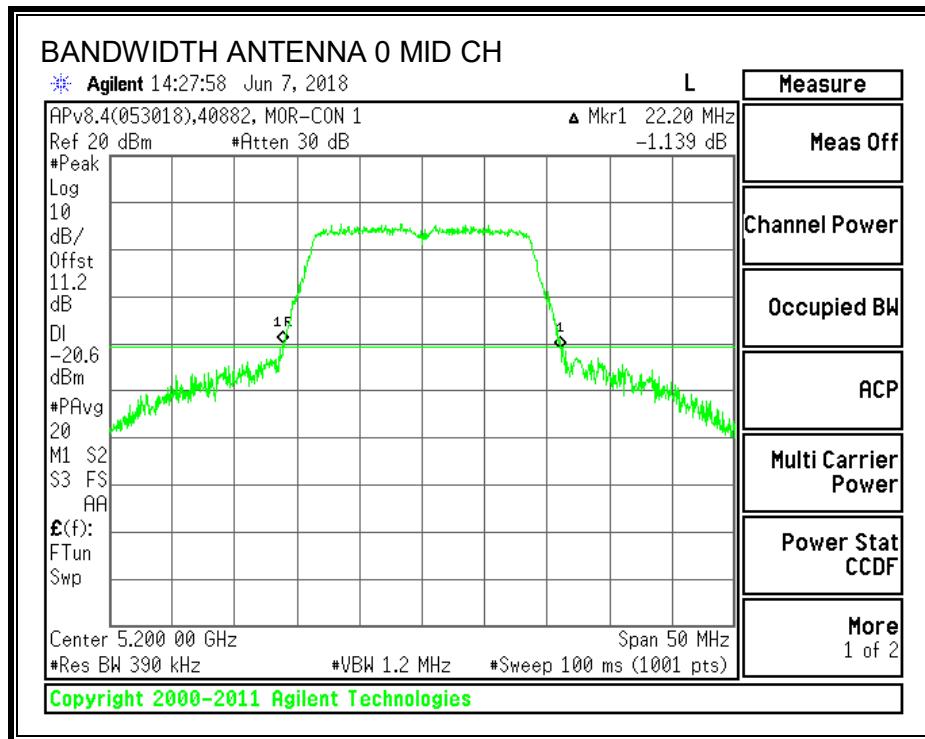
#### RESULTS

##### MODULE 1

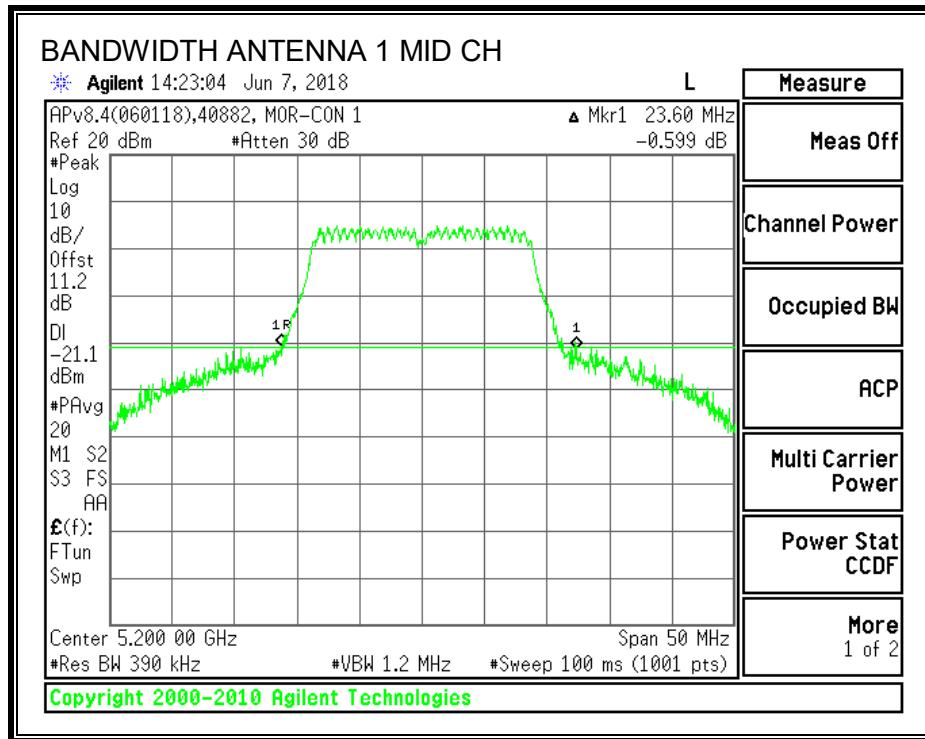
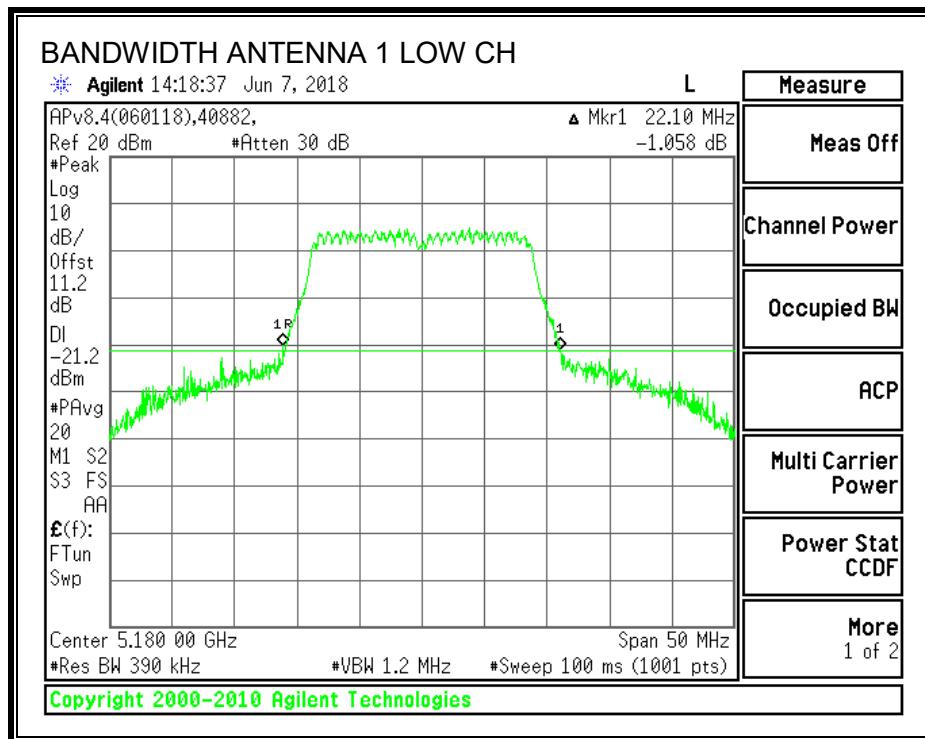
Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5180	22.15	22.10
Mid	5200	22.20	23.60
High	5240	22.25	28.45

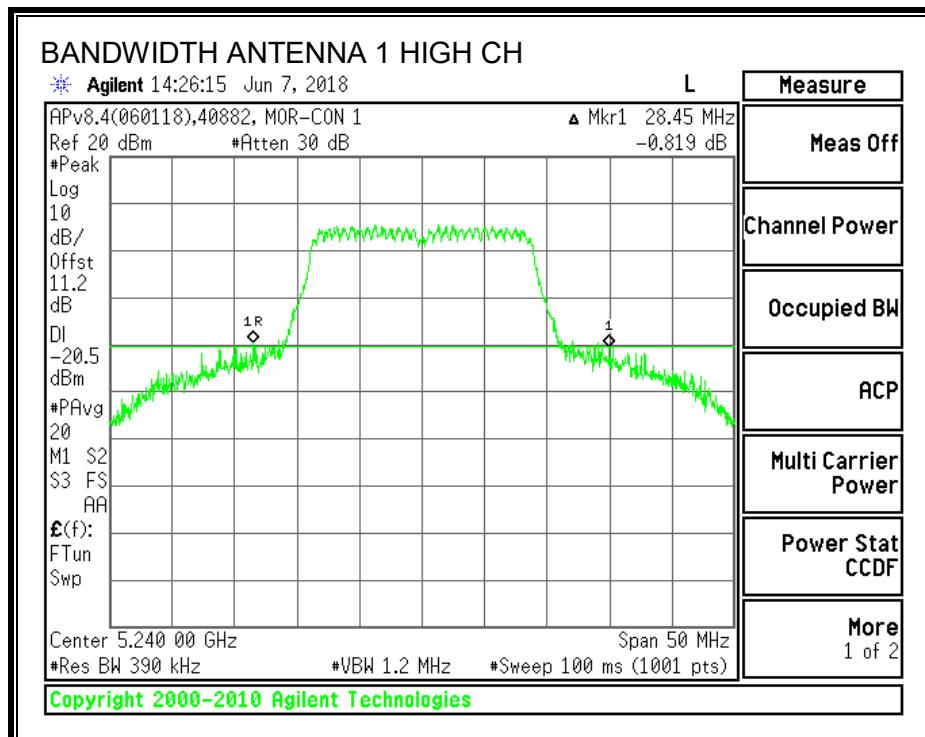
#### 26 dB BANDWIDTH, MODULE 1 ANTENNA 0





## 26 dB BANDWIDTH, MODULE 1 ANTENNA 1





### 9.2.2. 99% BANDWIDTH

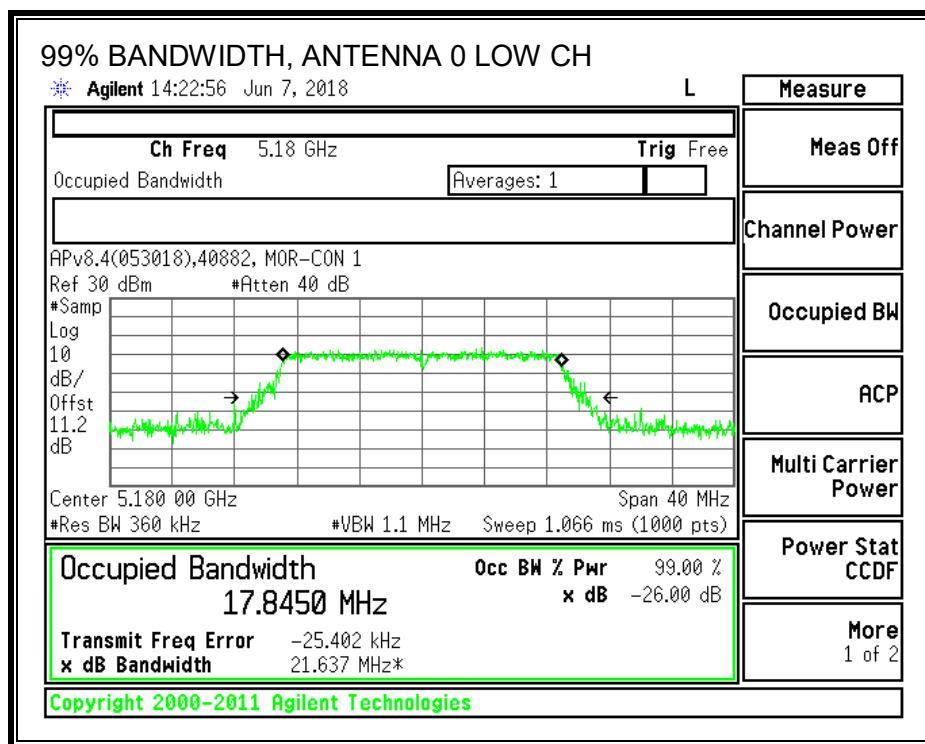
#### LIMITS

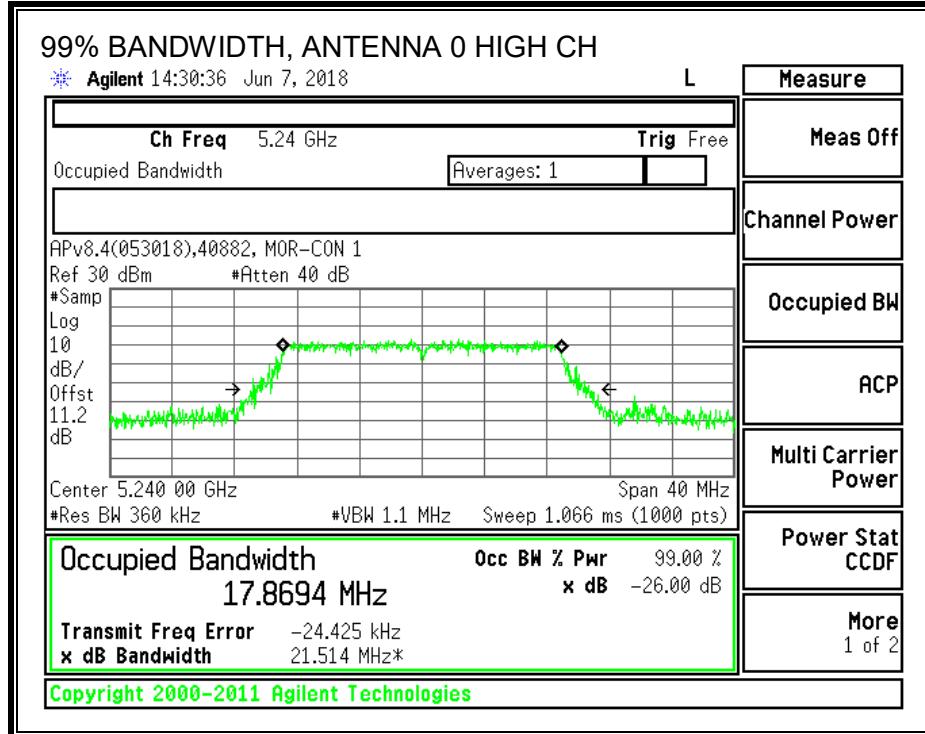
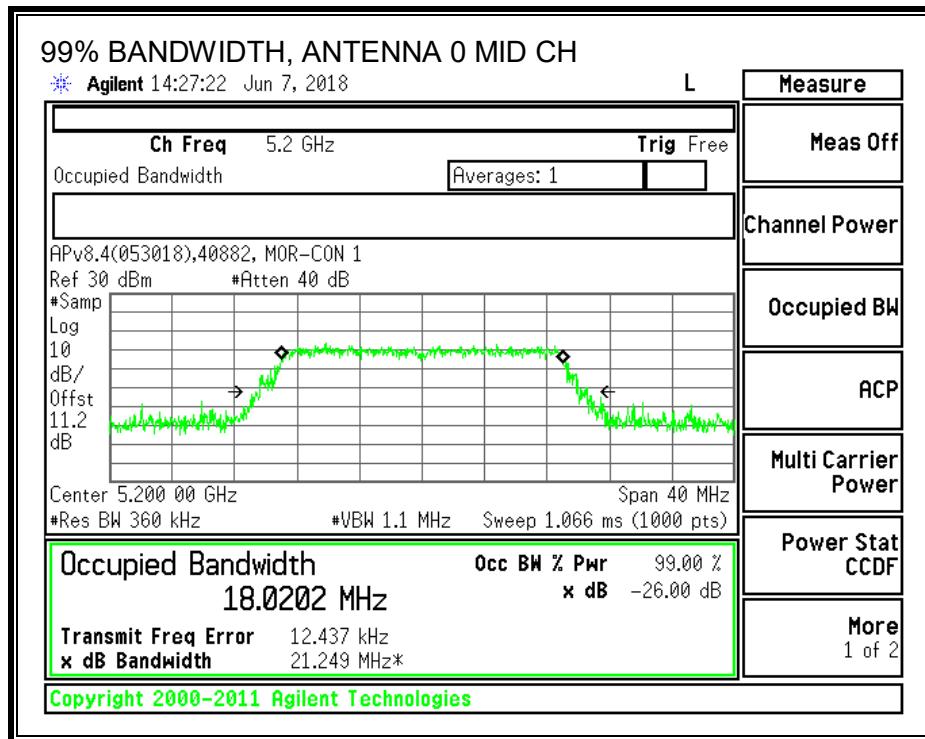
None; for reporting purposes only.

#### RESULTS

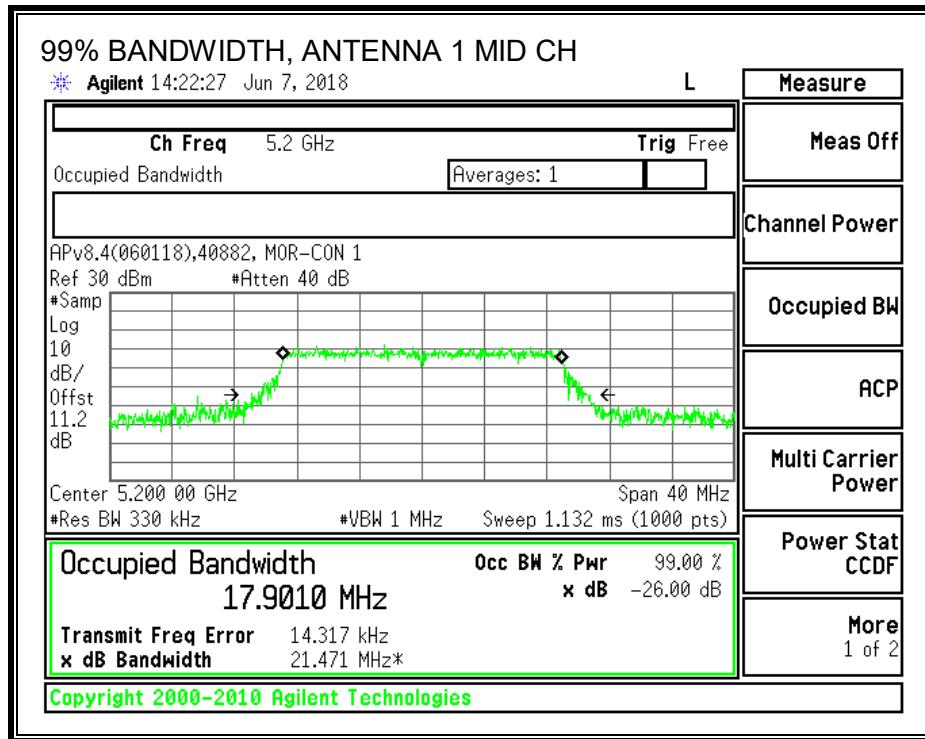
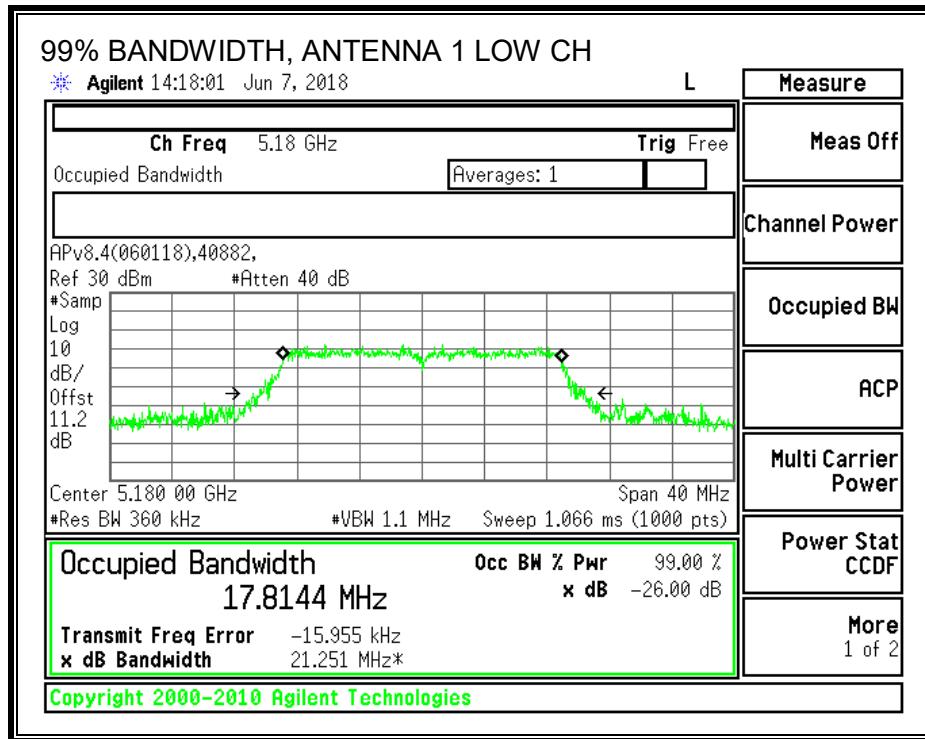
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5180	17.8450	17.8144
Mid	5200	18.0202	17.9010
High	5240	17.8694	17.8649

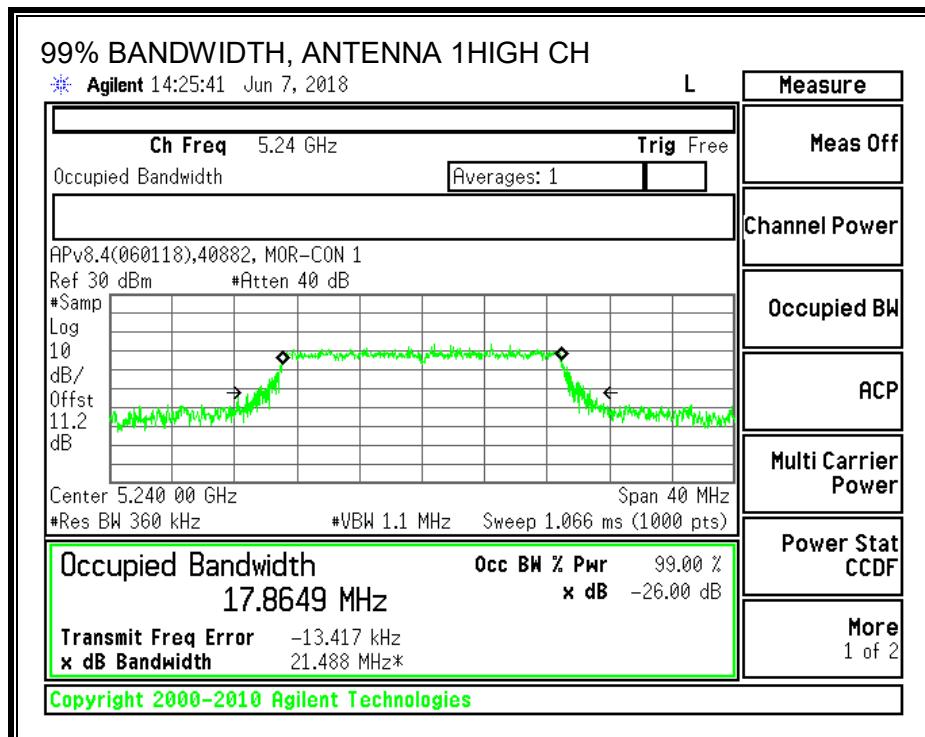
#### 99% BANDWIDTH, MODULE 1 ANTENNA 0





## 99% BANDWIDTH, MODULE 1 ANTENNA 1





### 9.2.3. OUTPUT POWER AND PSD

#### LIMITS

##### FCC §15.407 (a) (1)

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS 247 Issue 2, Clause 6.2.1.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10}B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

**DIRECTIONAL ANTENNA GAIN**

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.30	4.60	4.00

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.30	4.60	6.98

## **MODULE 1 RESULTS (FCC)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	4.00	6.98	24.00	10.02
Mid	5200	4.00	6.98	24.00	10.02
High	5240	4.00	6.98	24.00	10.02

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.06	14.05	16.59	24.00	-7.41
Mid	5200	13.08	14.24	16.71	24.00	-7.29
High	5240	13.13	13.80	16.49	24.00	-7.51

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	0.50	-0.51	3.03	10.02	-6.99
Mid	5200	0.56	-0.56	3.05	10.02	-6.97
High	5240	0.96	-0.43	3.33	10.02	-6.69

## **MODULE 1 RESULTS (ISED)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Low	5180	4.00	6.98	17.81	22.51	10.00
Mid	5200	4.00	6.98	17.90	22.53	10.00
High	5240	4.00	6.98	17.86	22.52	10.00

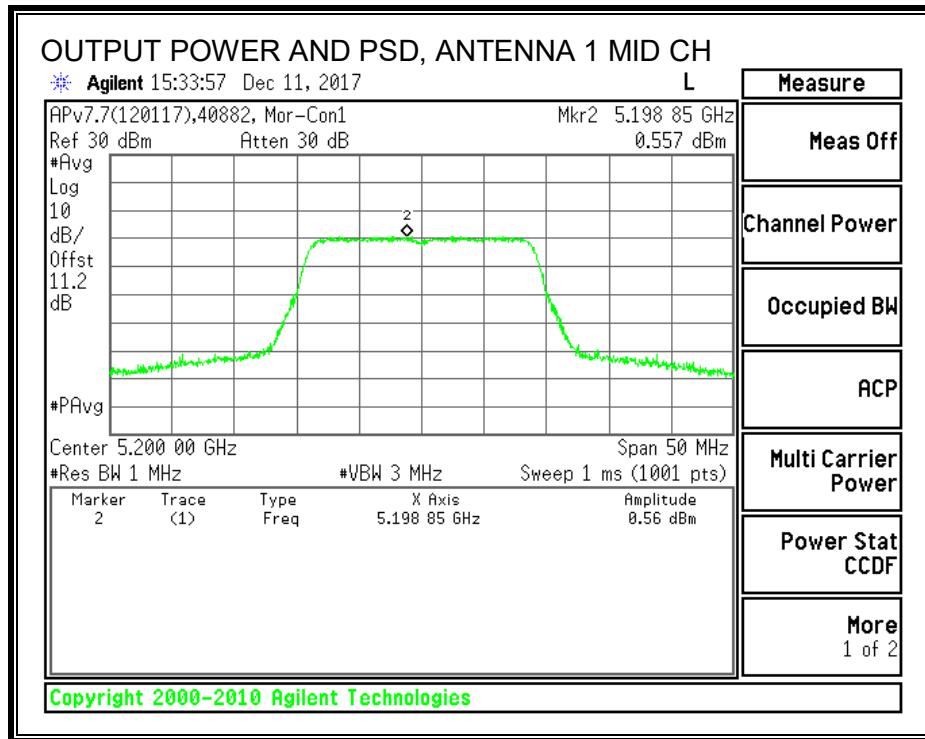
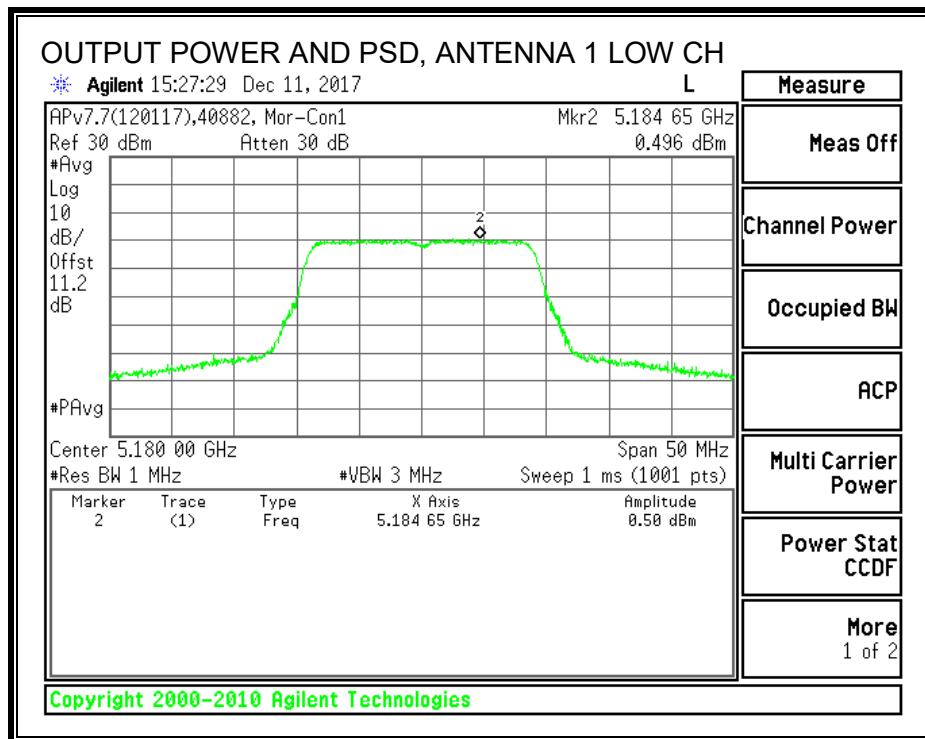
### **Output Power Results**

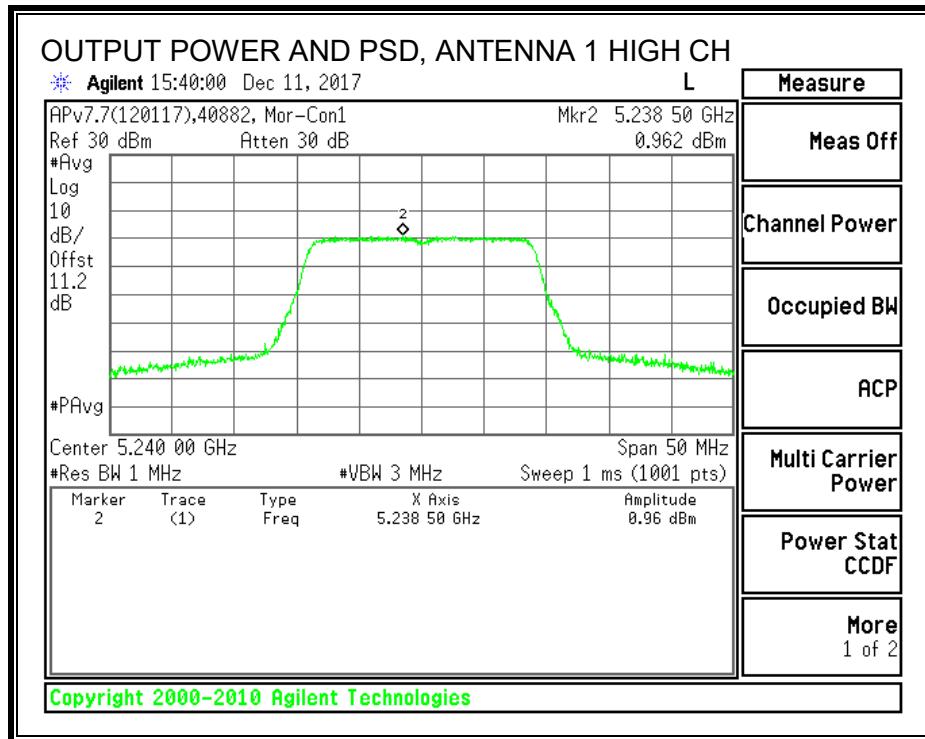
Channel	Frequency (MHz)	ANT 0 Meas Cond Power (dBm)	ANT 1 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5180	9.65	10.35	17.02	22.51	-5.48
Mid	5200	9.63	10.67	17.19	22.53	-5.34
High	5240	9.78	10.64	17.24	22.52	-5.28

### **PSD Results**

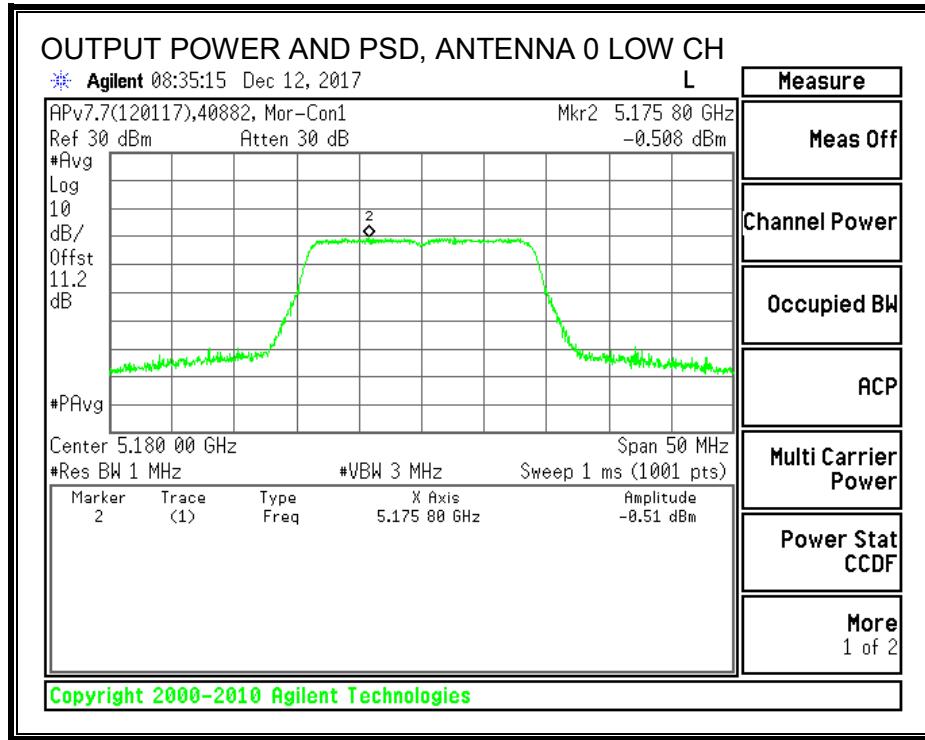
Channel	Frequency (MHz)	ANT 0 Meas Cond PSD (dBm)	ANT 1 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Low	5180	-3.31	-2.51	7.10	10.00	-2.90
Mid	5200	-3.35	-2.48	7.10	10.00	-2.90
High	5240	-2.72	-2.55	7.36	10.00	-2.64

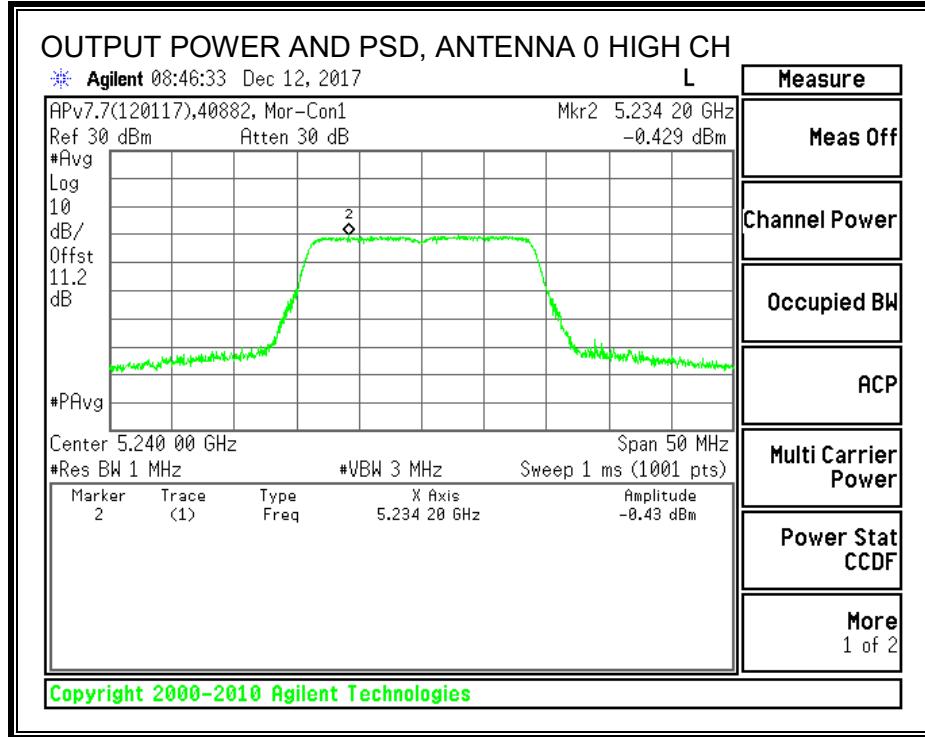
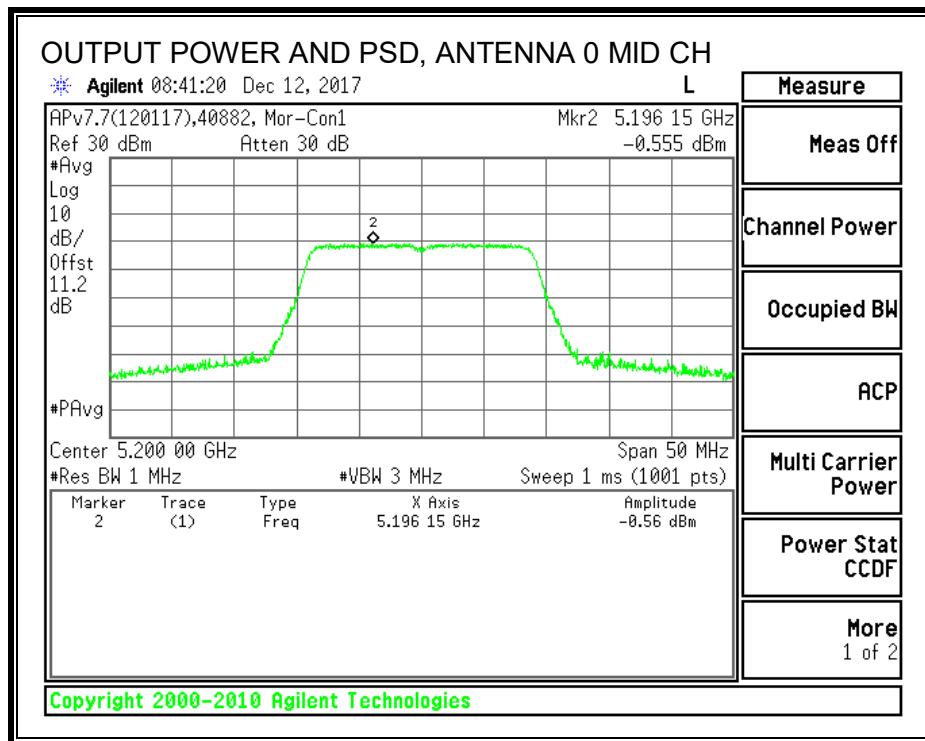
**FCC PSD, MODULE 1 ANTENNA 1**



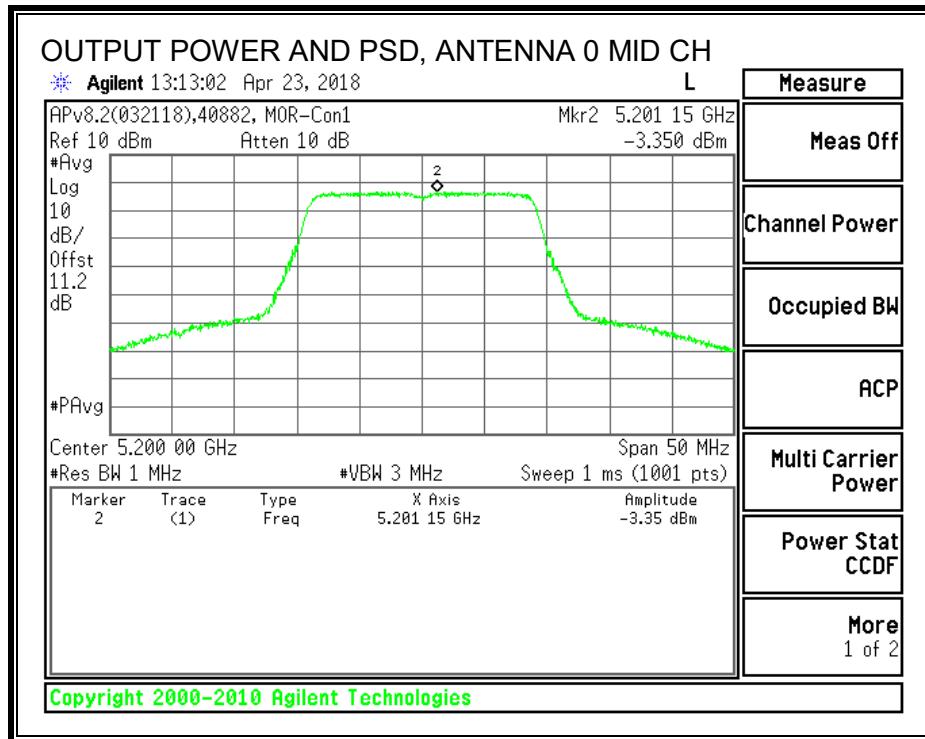
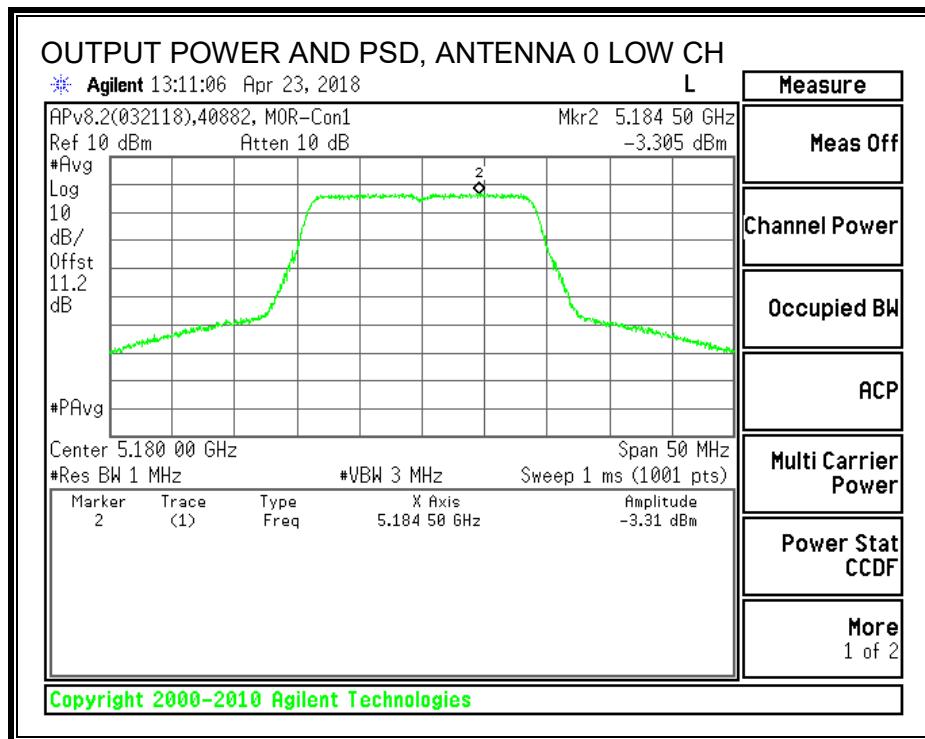


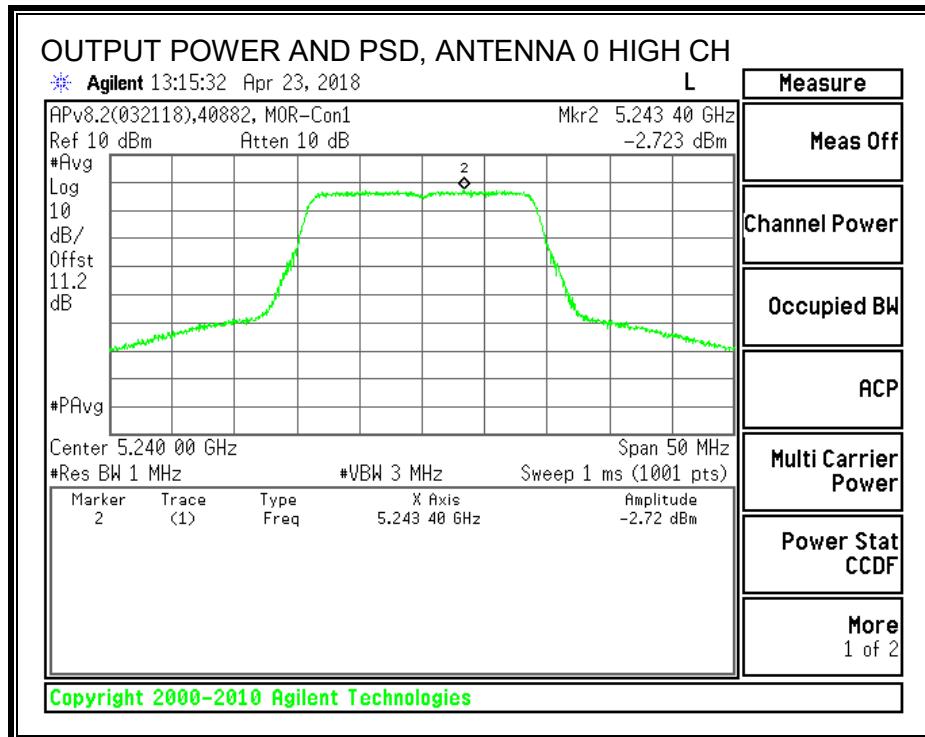
## FCC PSD, MODULE 1 ANTENNA 0



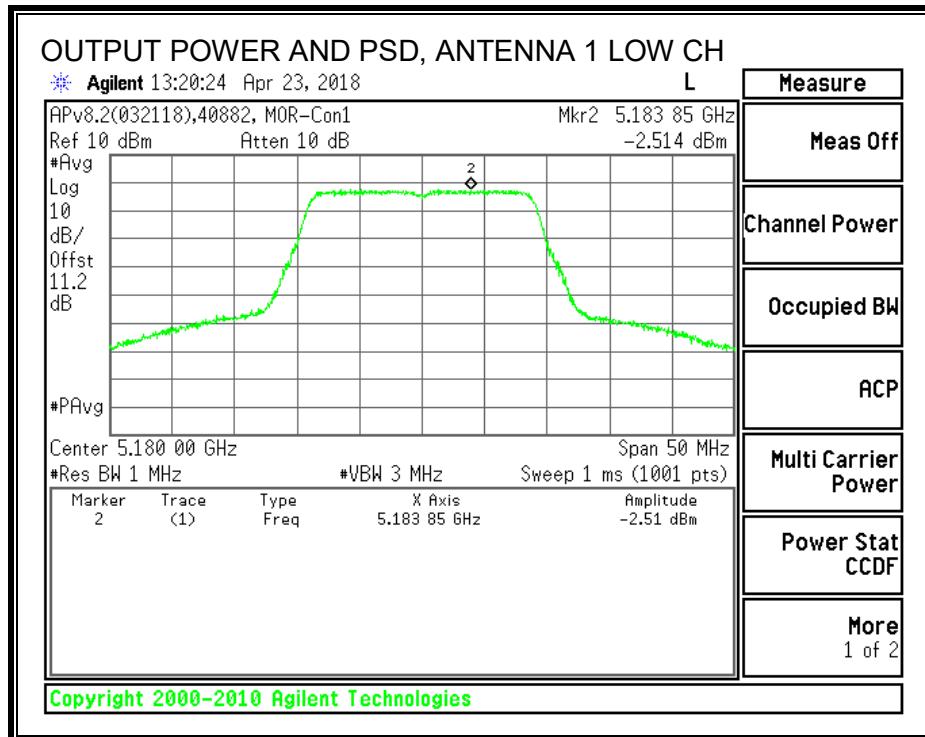


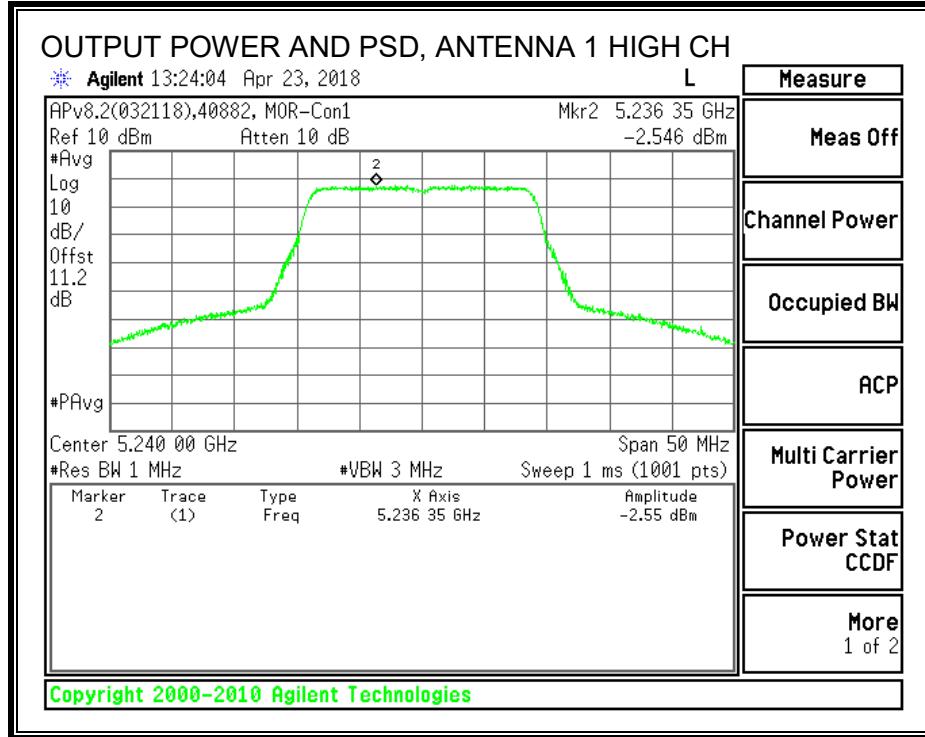
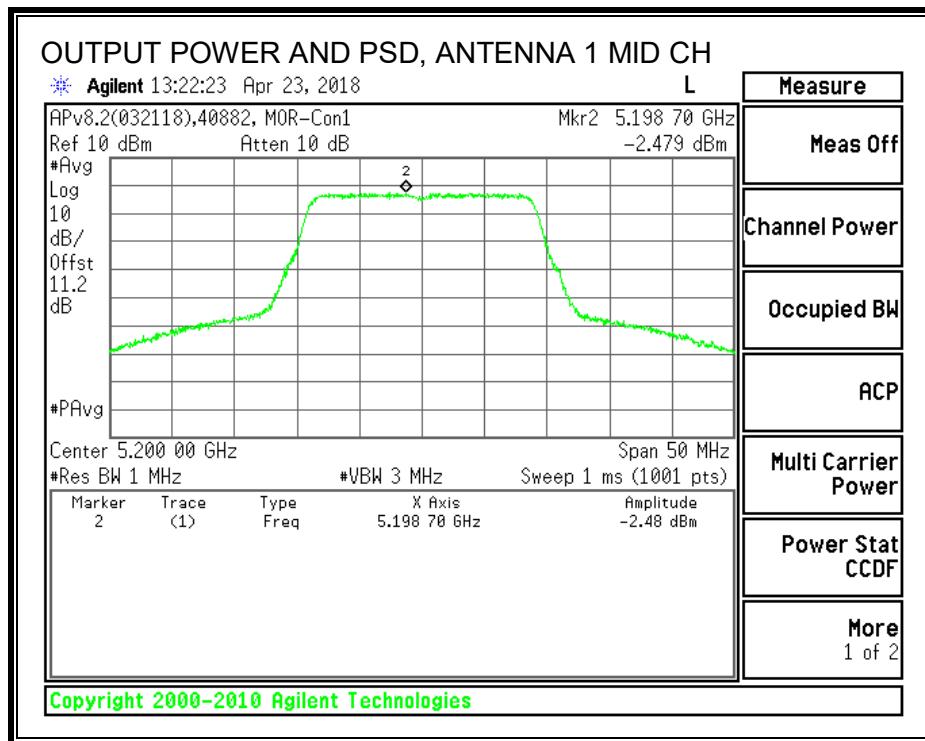
**ISED PSD, MODULE 1 ANTENNA 0**





### ISED PSD, MODULE 1 ANTENNA 1





### 9.3.802.11n HT40 MODE IN THE 5.2 GHz BAND

#### 9.3.1. 26 dB BANDWIDTH - MIMO

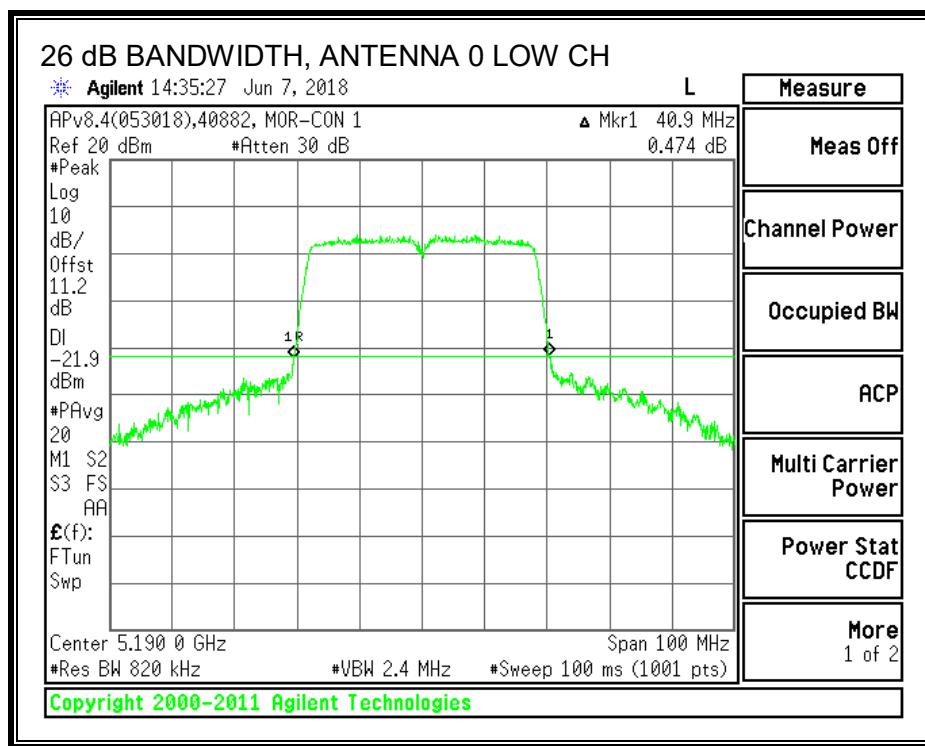
#### LIMITS

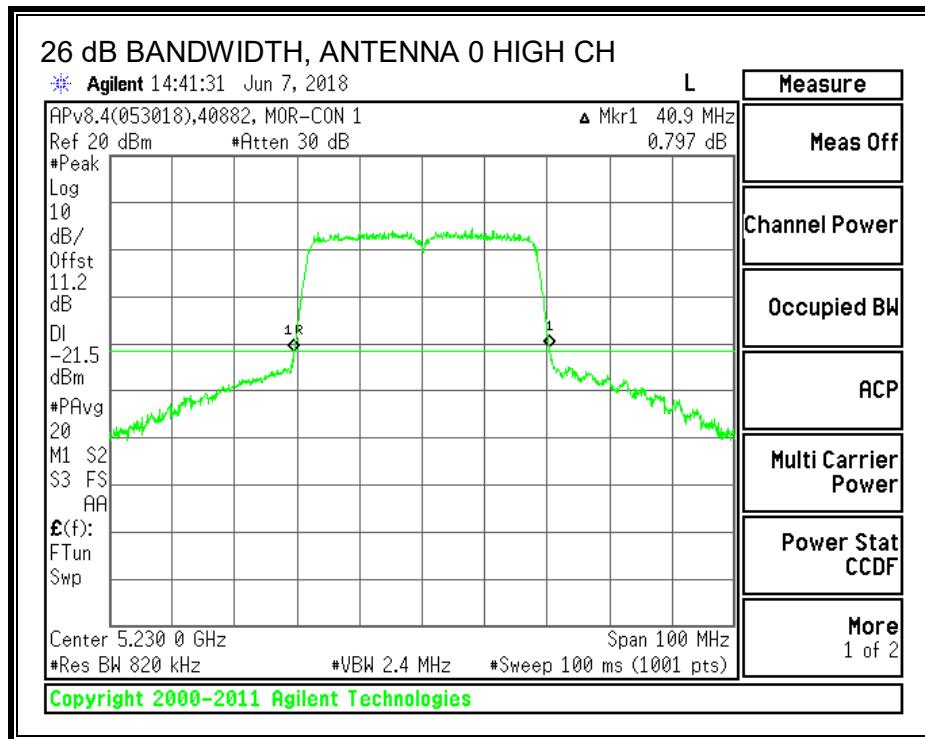
None; for reporting purposes only.

#### RESULTS

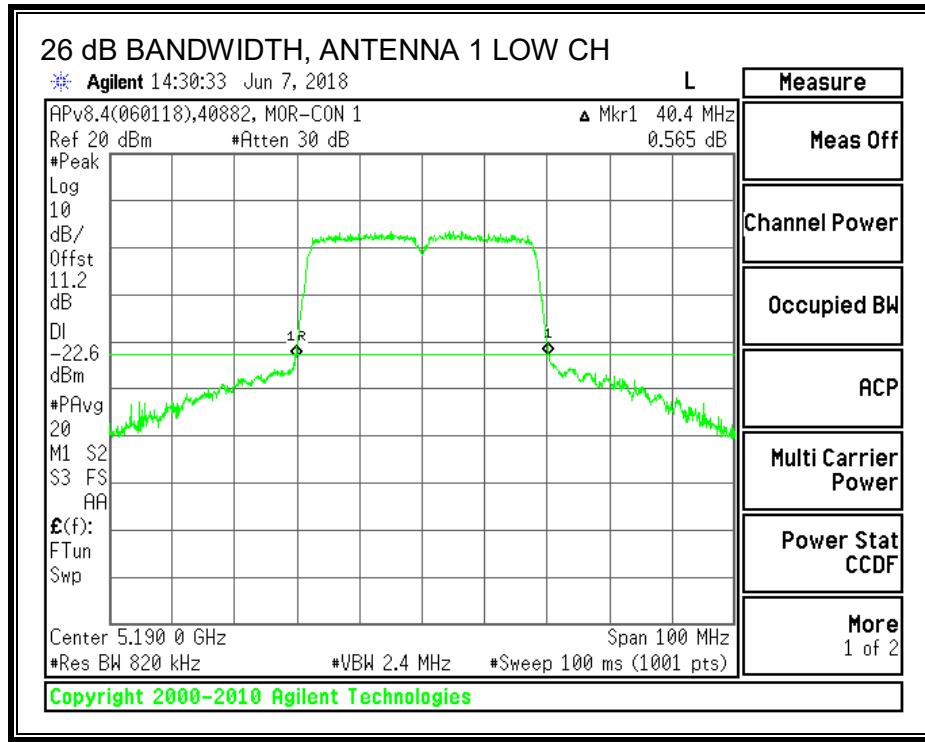
Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5190	40.90	40.40
High	5230	40.90	40.60

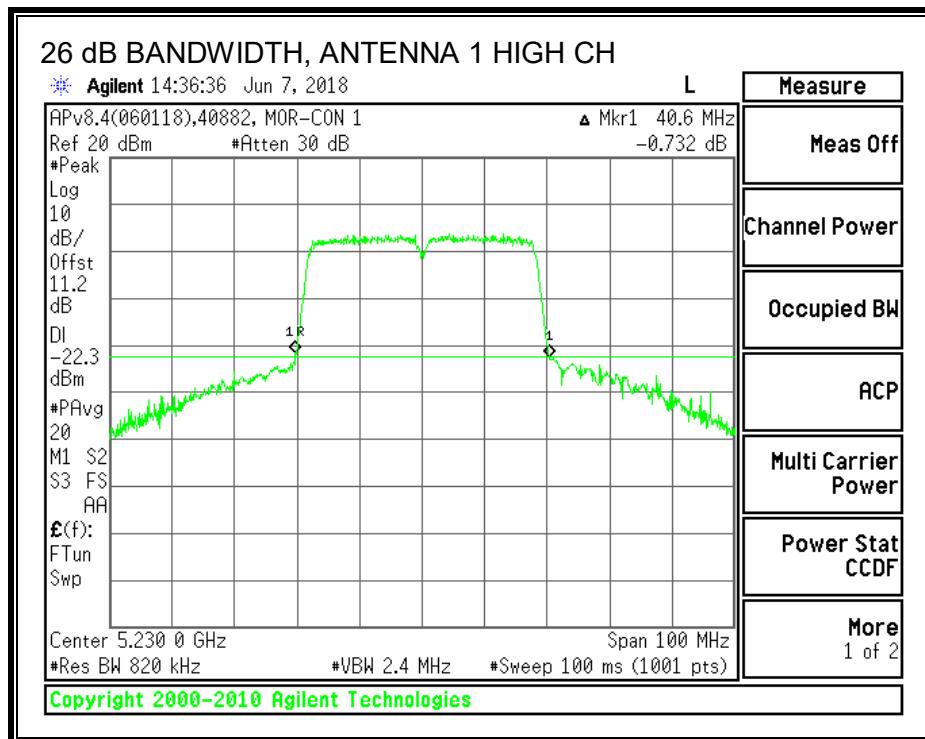
#### 26 dB BANDWIDTH, MODULE 1 ANTENNA 0





## **26 dB BANDWIDTH, MODULE 1 ANTENNA 1**





### 9.3.2. 26 dB BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

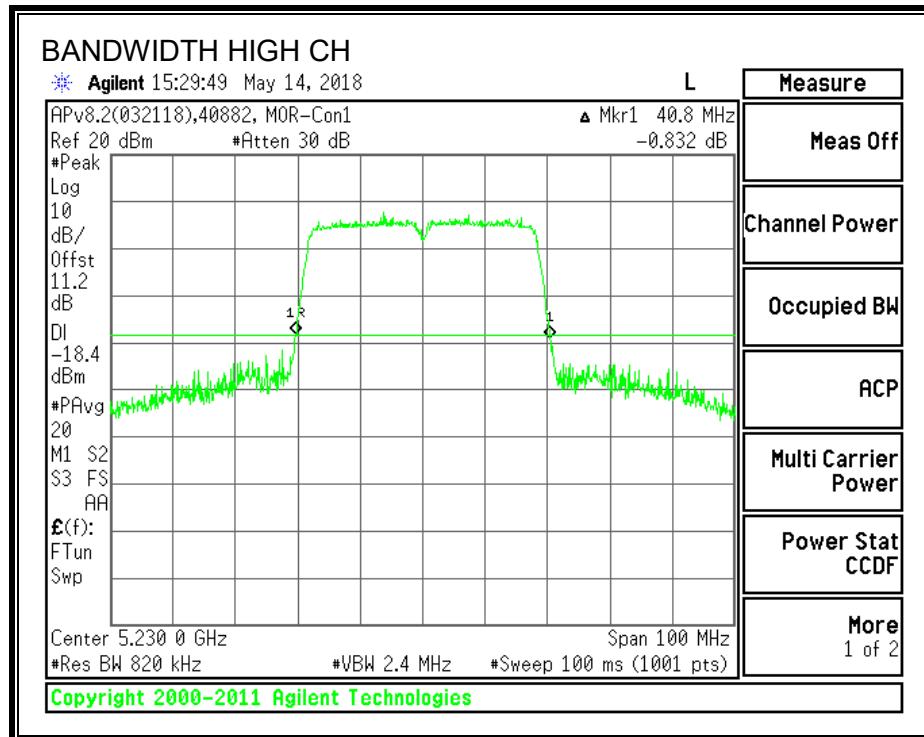
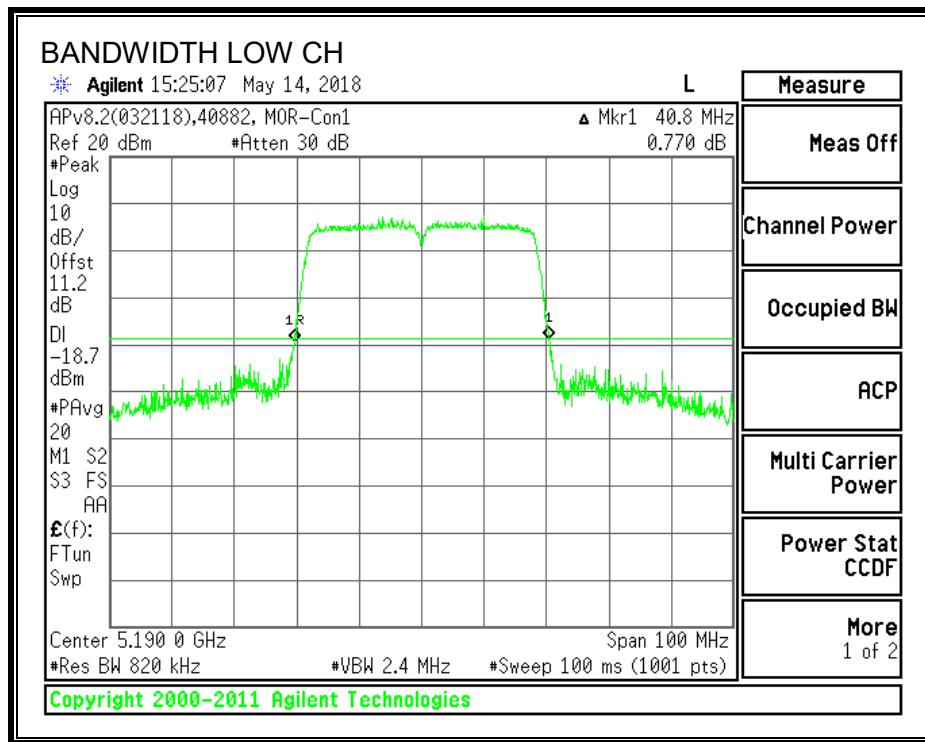
##### ANTENNA 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	40.80
High	5230	40.80

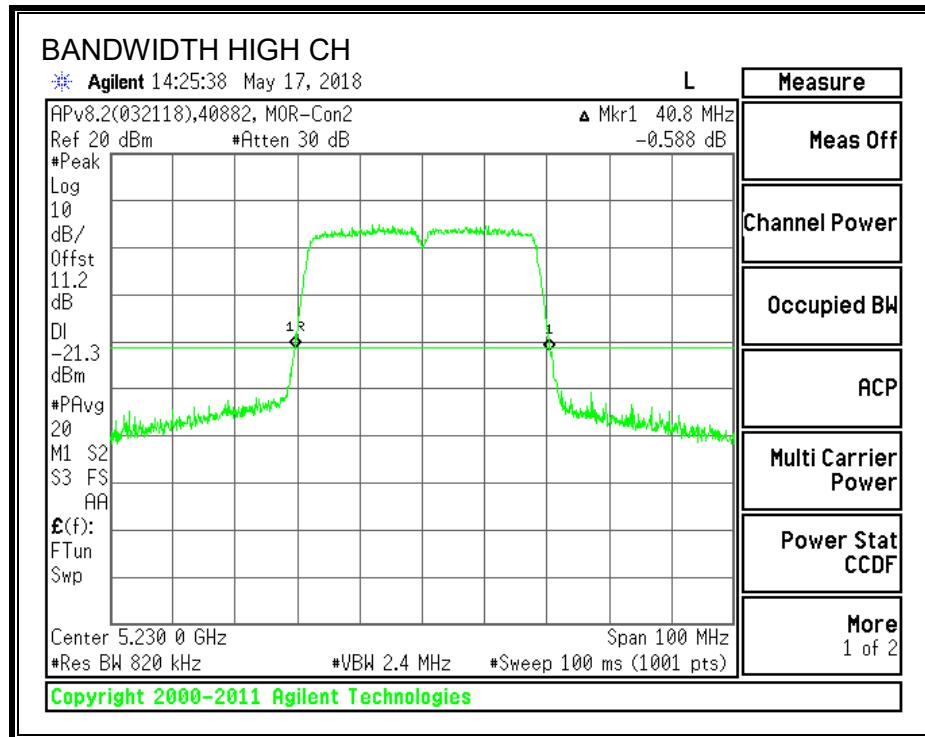
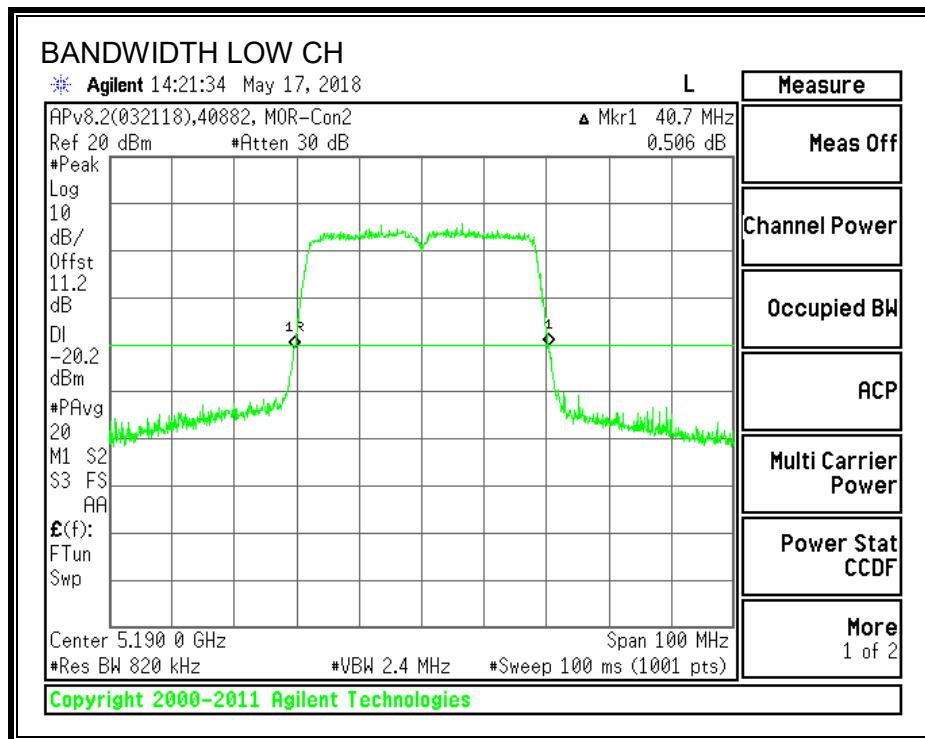
##### ANTENNA 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	40.70
High	5230	40.80

## 26 dB BANDWIDTH – MODULE 1 ANTENNA 0



## 26 dB BANDWIDTH – MODULE 1 ANTENNA 1



### 9.3.3. 99% BANDWIDTH - MIMO

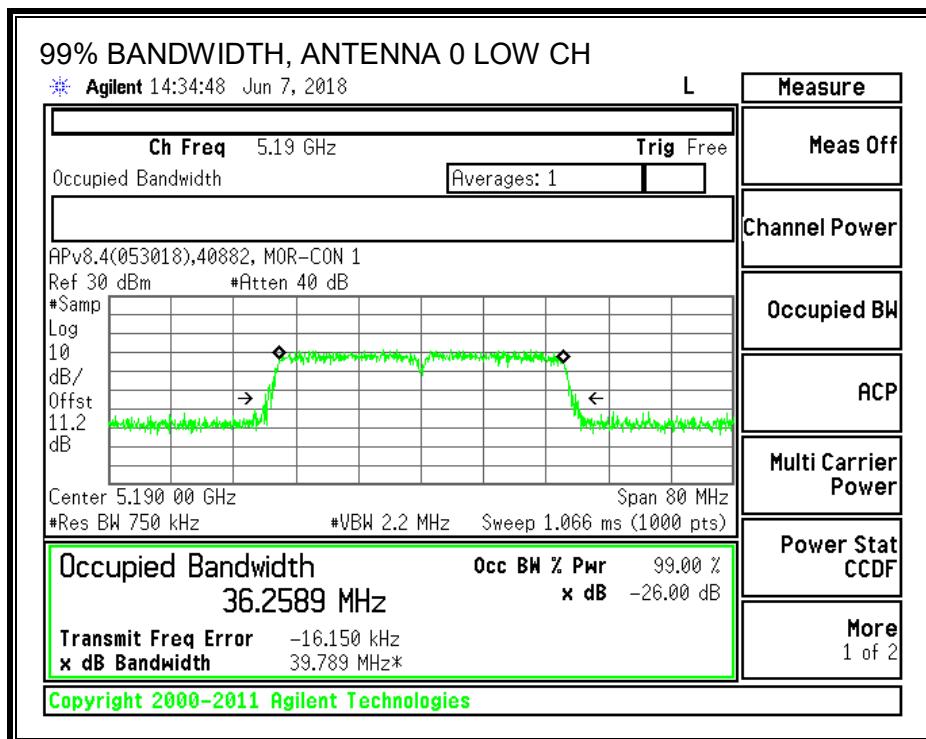
#### LIMITS

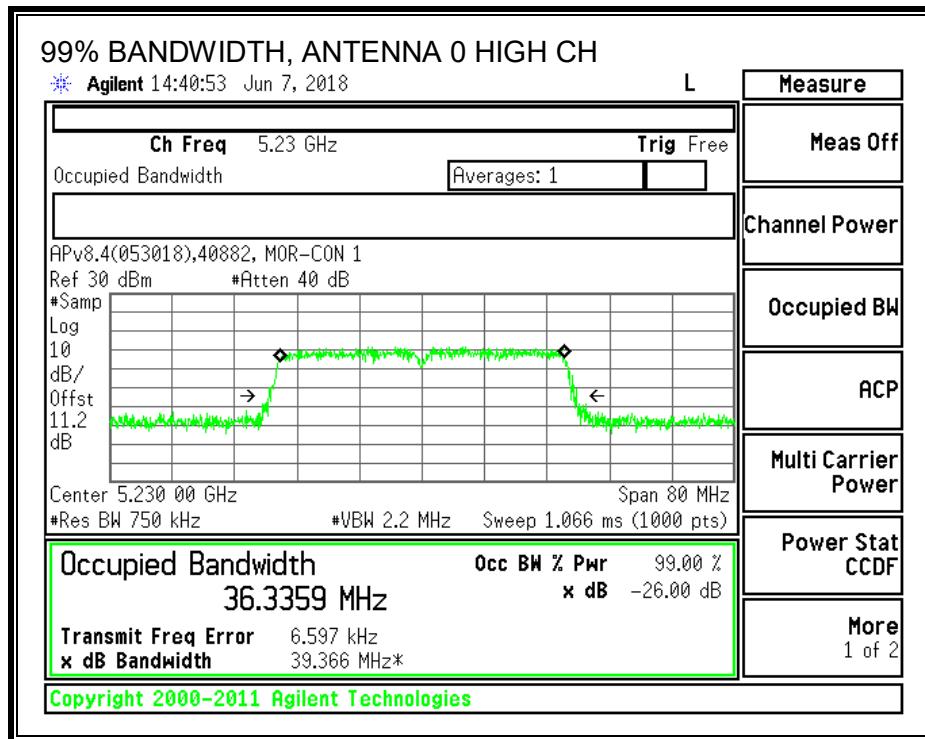
None; for reporting purposes only.

#### RESULTS

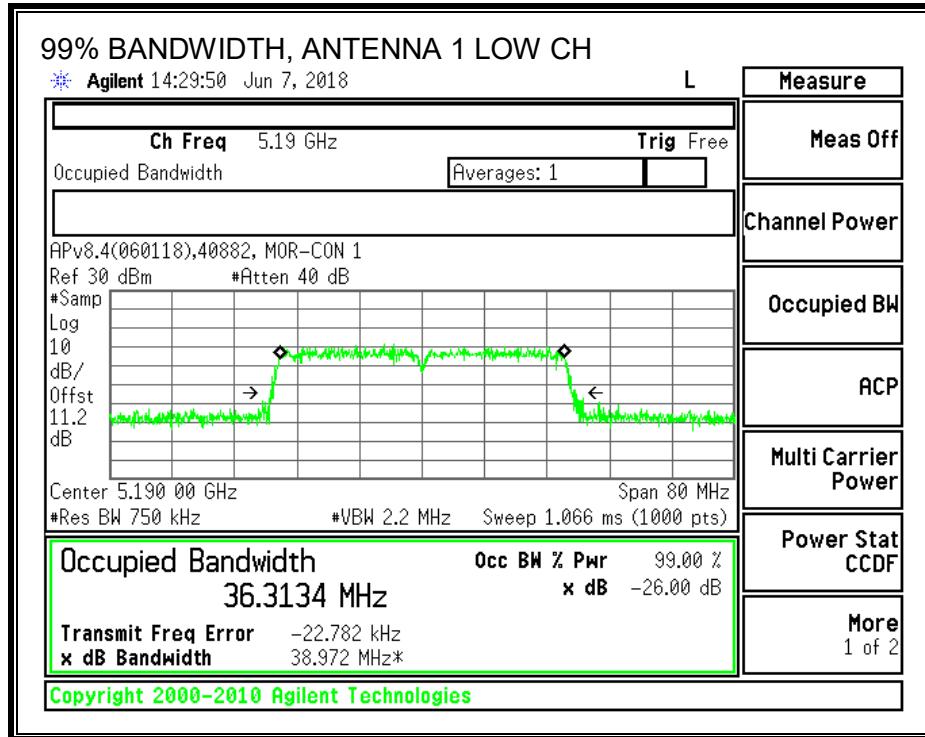
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5190	36.2589	36.3134
High	5230	36.3359	36.3046

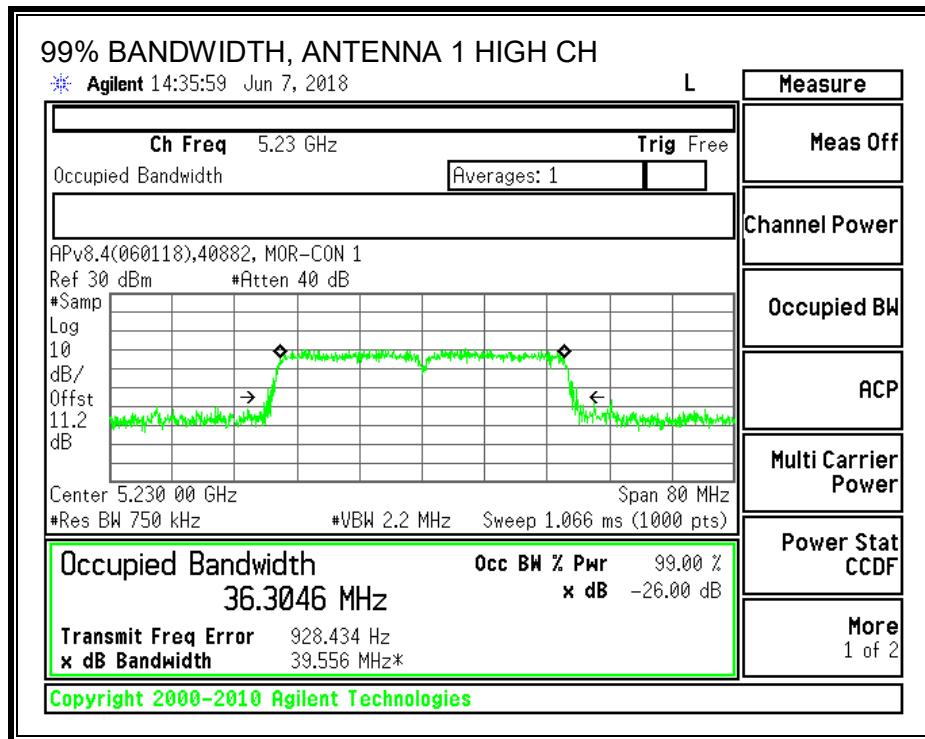
#### 99% BANDWIDTH, MODULE 1 ANTENNA 0





### 99% BANDWIDTH, MODULE 1 ANTENNA 1





### 9.3.4. 99% BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

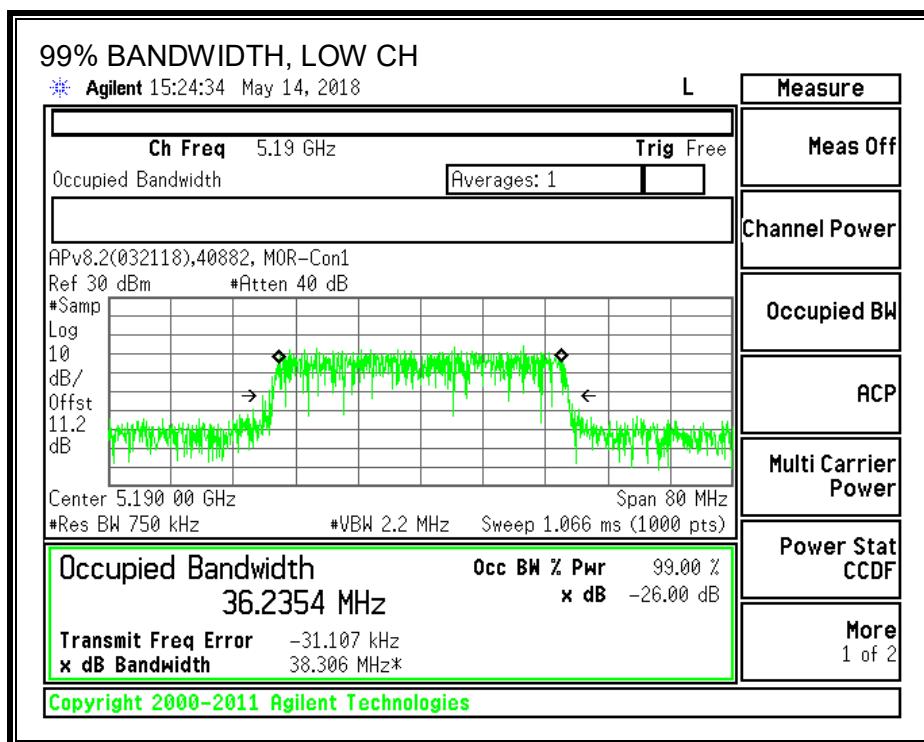
##### ANTENNA 0

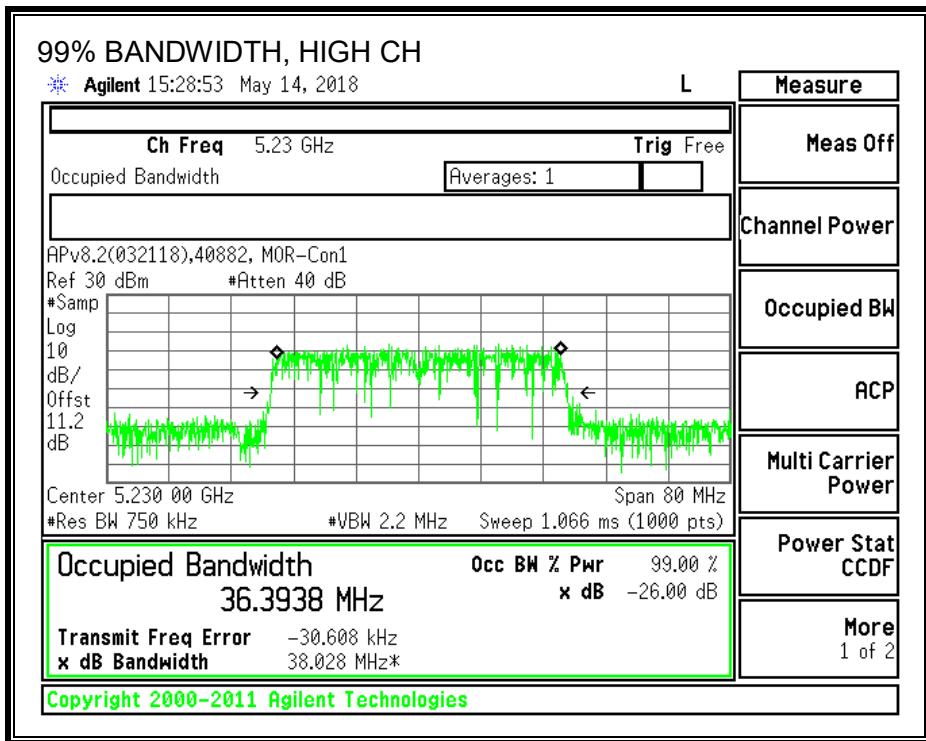
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.2354
High	5230	36.3938

##### ANTENNA 1

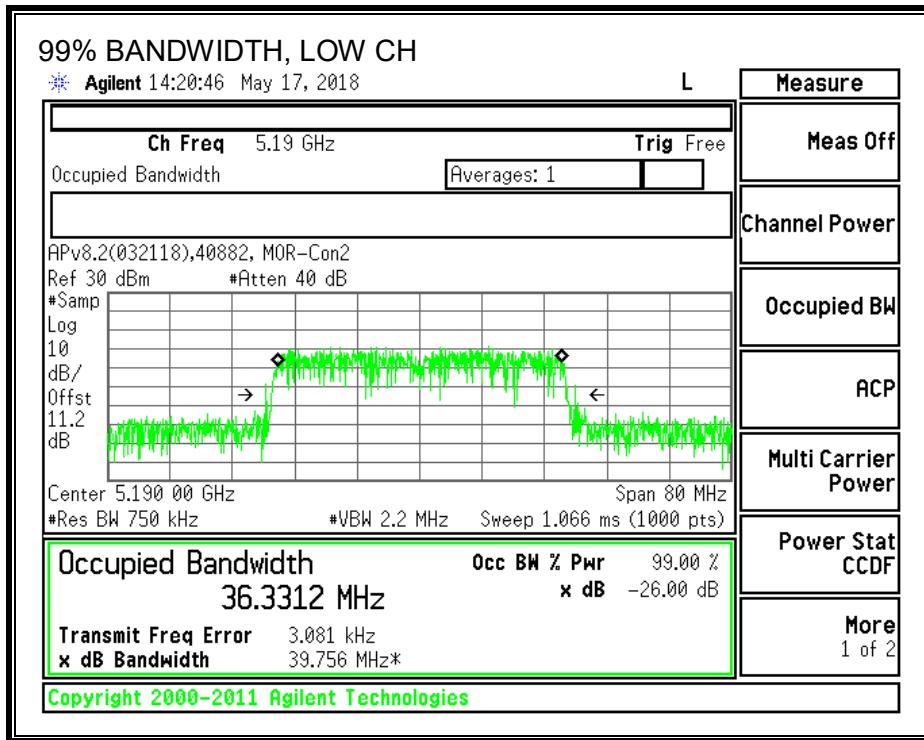
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.3312
High	5230	36.2662

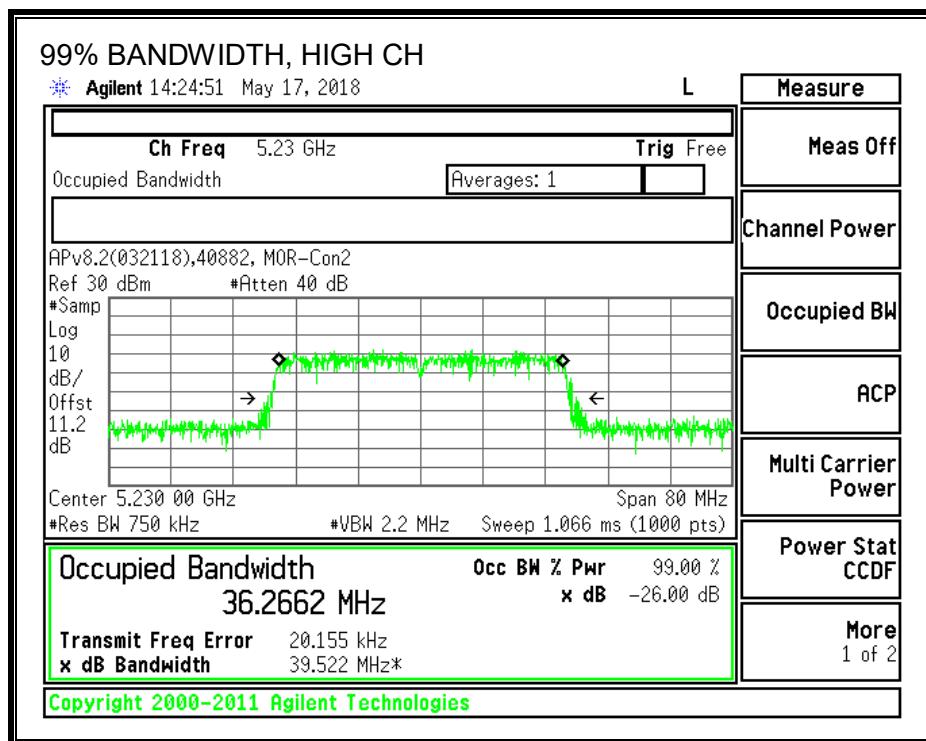
#### 99% BANDWIDTH – MODULE 1 ANTENNA 0





### **99% BANDWIDTH – MODULE 1 ANTENNA 1**





### 9.3.5. OUTPUT POWER AND PSD - MIMO

#### LIMITS

##### FCC §15.407 (a) (1)

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS 247 Issue 2, Clause 6.2.1.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10}B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

**DIRECTIONAL ANTENNA GAIN**

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.30	4.60	4.00

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.30	4.60	6.98

## **RESULTS (FCC)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	4.00	6.98	24.00	10.02
High	5230	4.00	6.98	24.00	10.02

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	9.64	10.66	13.28	24.00	-10.72
High	5230	9.93	10.80	13.49	24.00	-10.51

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-2.49	-3.62	0.08	10.02	-9.94
High	5230	-2.19	-3.72	0.21	10.02	-9.81

## **RESULTS (ISED)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Low	5190	4.00	6.98	36.26	23.00	10.00
High	5230	4.00	6.98	36.30	23.00	10.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

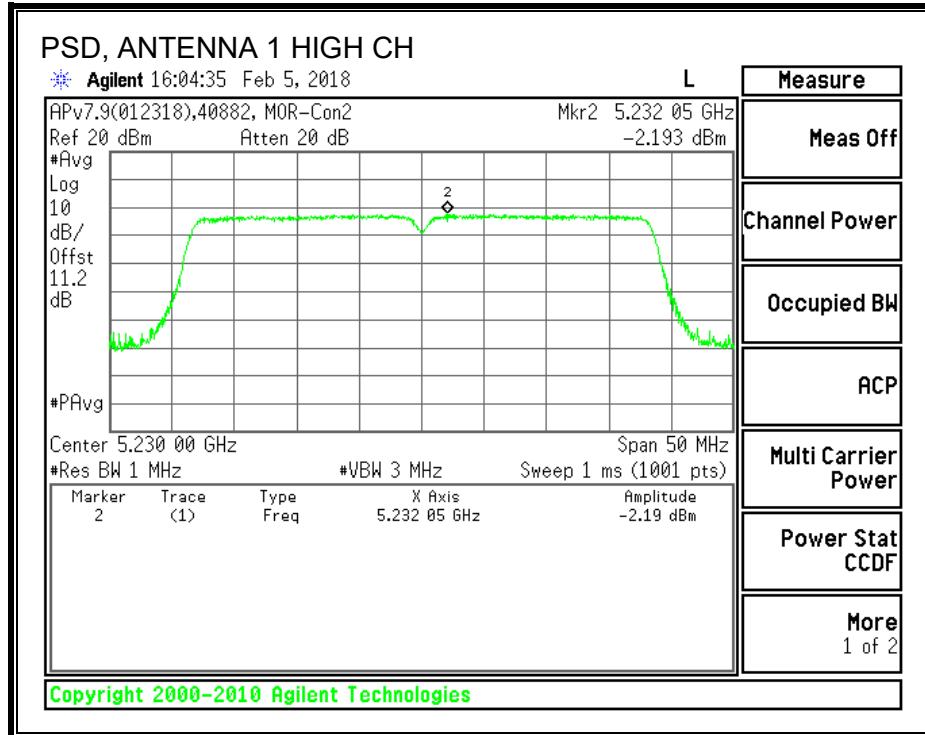
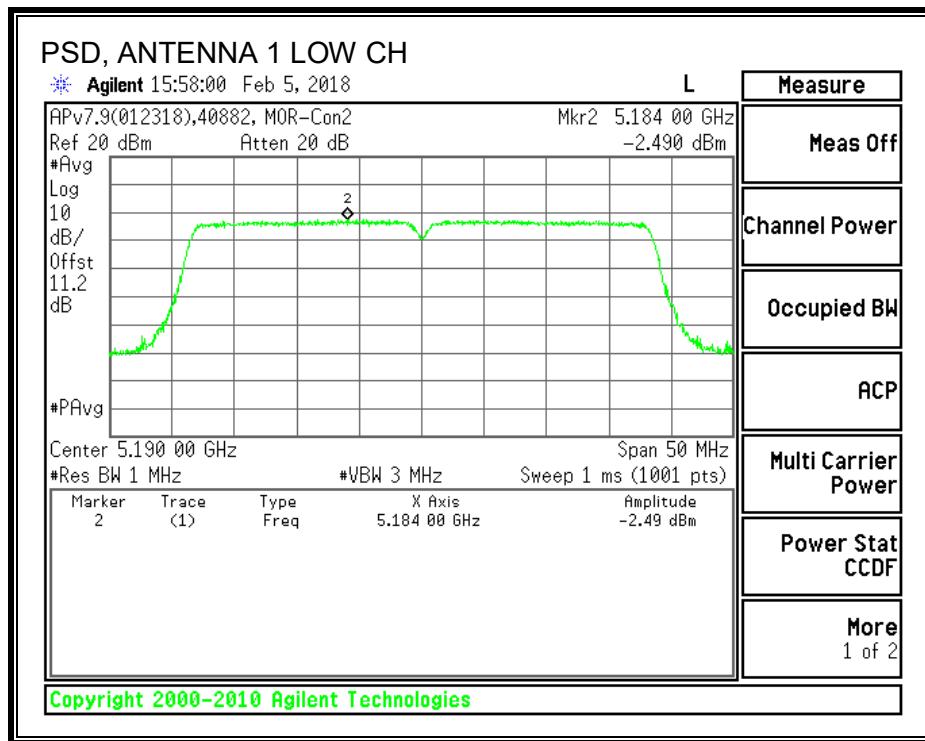
### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Cond Power (dBm)	ANT 1 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5190	9.64	10.66	17.28	23.00	-5.72
High	5230	9.93	10.80	17.49	23.00	-5.51

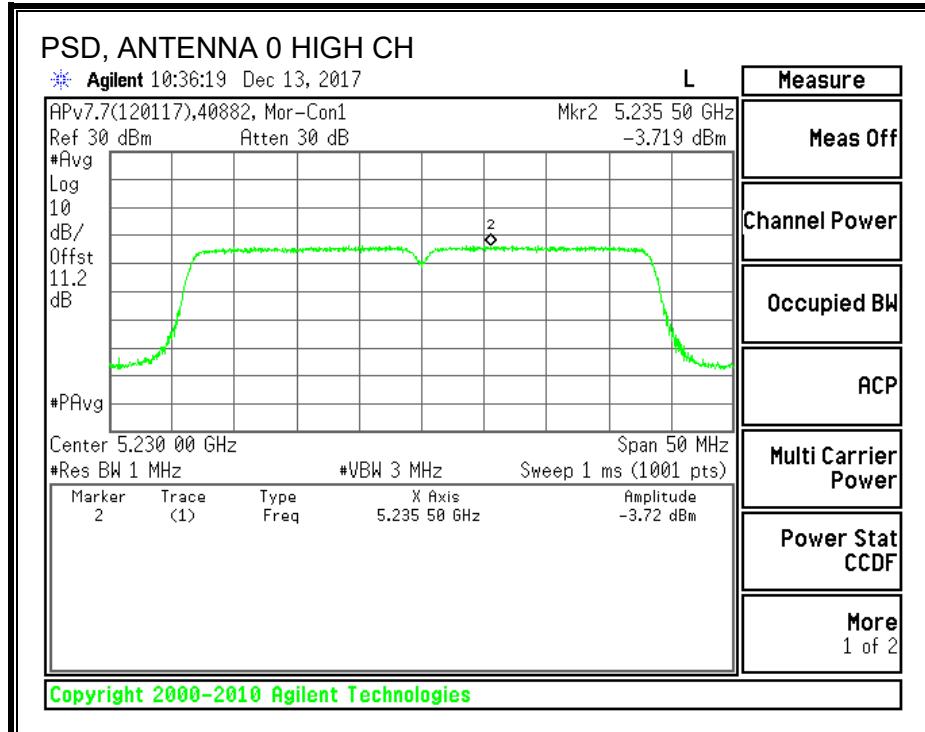
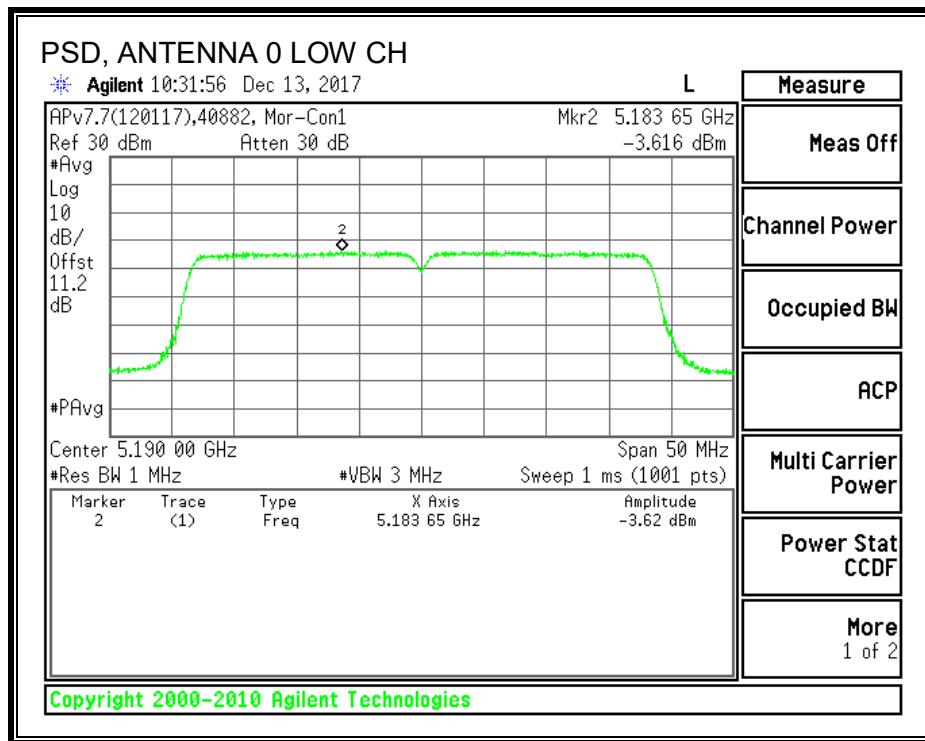
### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas Cond PSD (dBm)	ANT 0 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Low	5190	-2.49	-3.62	7.06	10.00	-2.94
High	5230	-2.19	-3.72	7.19	10.00	-2.81

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



### 9.3.6. OUTPUT POWER AND PSD - SISO

#### LIMITS

FCC §15.407 (a) (1)

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS 247 Issue 2, Clause 6.2.1.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10}B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## RESULTS (FCC) – ANTENNA 0

### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	3.30	3.30	24.00	11.00
High	5230	3.30	3.30	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	13.09	13.09	24.00	-10.91
High	5230	13.09	13.09	24.00	-10.91

### PSD Results

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-2.86	-2.77	11.00	-13.77
High	5230	-2.54	-2.45	11.00	-13.45

Note – This measured power was a gated measurement.

## RESULTS (FCC) – ANTENNA 1

### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	4.60	4.60	24.00	11.00
High	5230	4.60	4.60	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	13.93	13.93	24.00	-10.07
High	5230	13.98	13.98	24.00	-10.02

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	-0.83	-0.74	11.00	-11.74
High	5230	-0.66	-0.57	11.00	-11.57

Note – Measured power was a gated measurement.

## RESULTS (ISED) – ANTENNA 0

### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Ant Gain (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Low	5190	3.30	36.24	23.00	10.00
High	5230	3.30	36.39	23.00	10.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5190	13.09	16.48	23.00	-6.52
High	5230	13.09	16.48	23.00	-6.52

### PSD Results

Channel	Frequency (MHz)	ANT 0 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Low	5190	-2.86	0.53	10.00	-9.47
High	5230	-2.54	0.85	10.00	-9.15

## RESULTS (ISED) – ANTENNA 1

### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Ant Gain (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Low	5190	4.60	36.33	23.00	10.00
High	5230	4.60	36.27	23.00	10.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

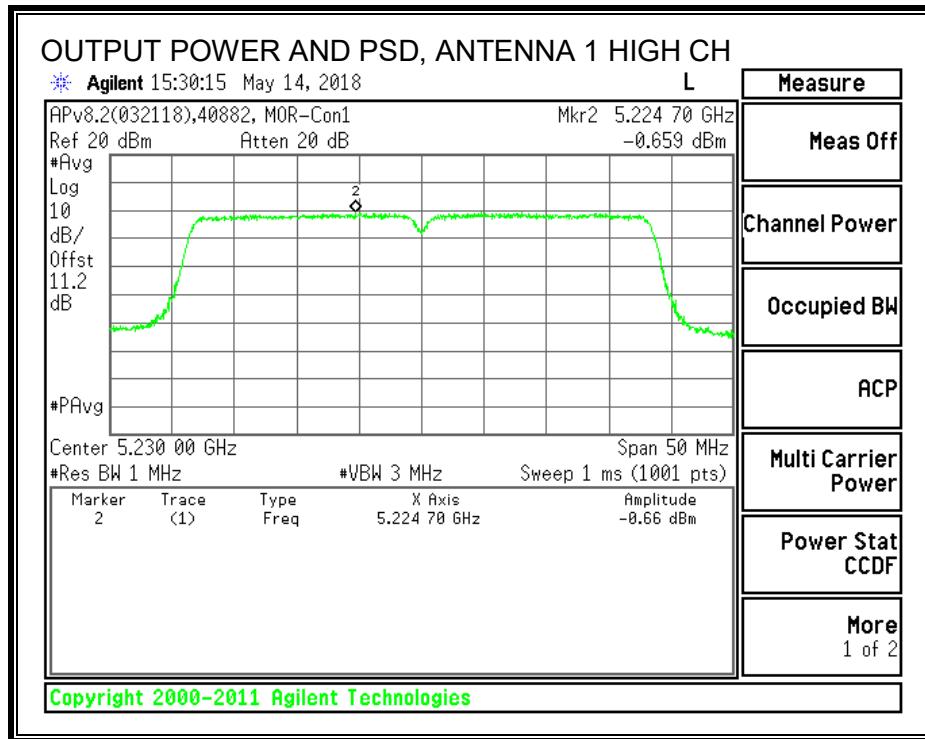
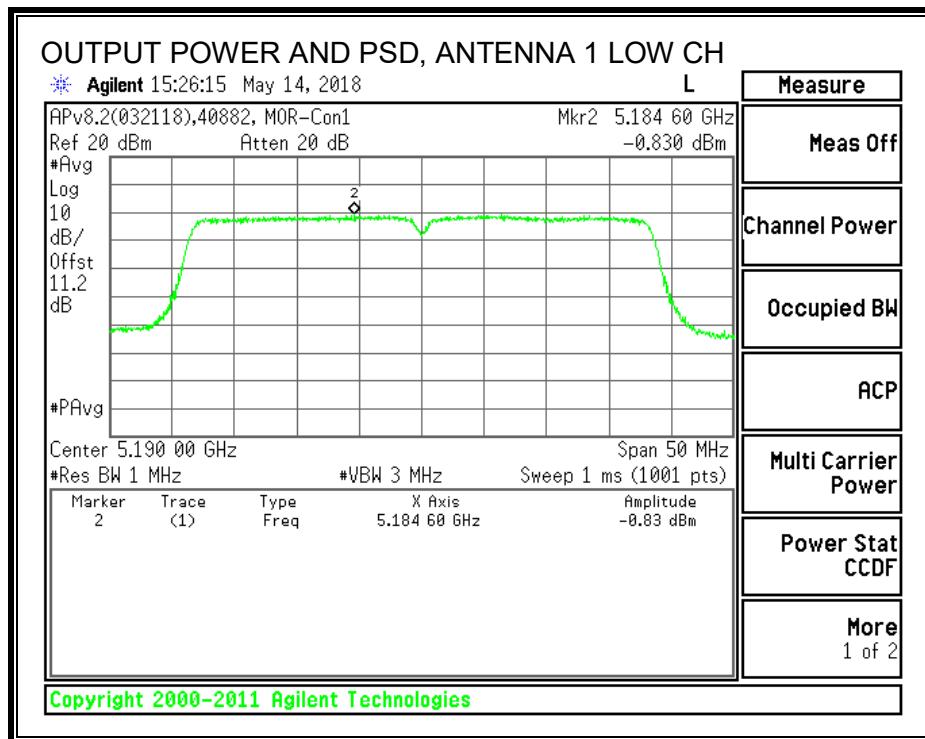
### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5190	13.93	18.62	23.00	-4.38
High	5230	13.98	18.67	23.00	-4.33

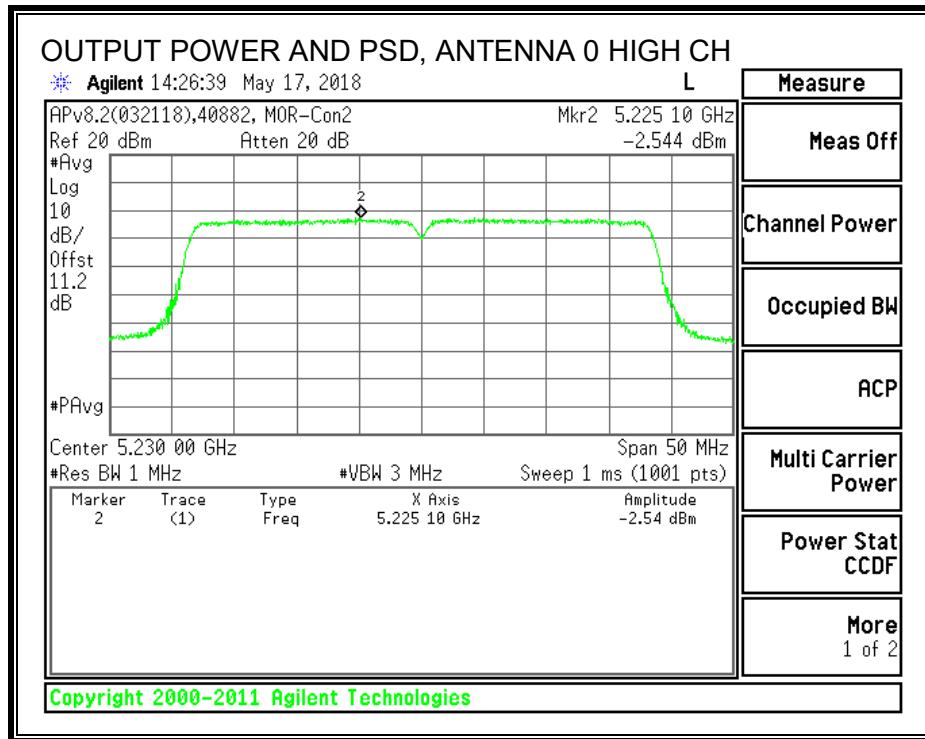
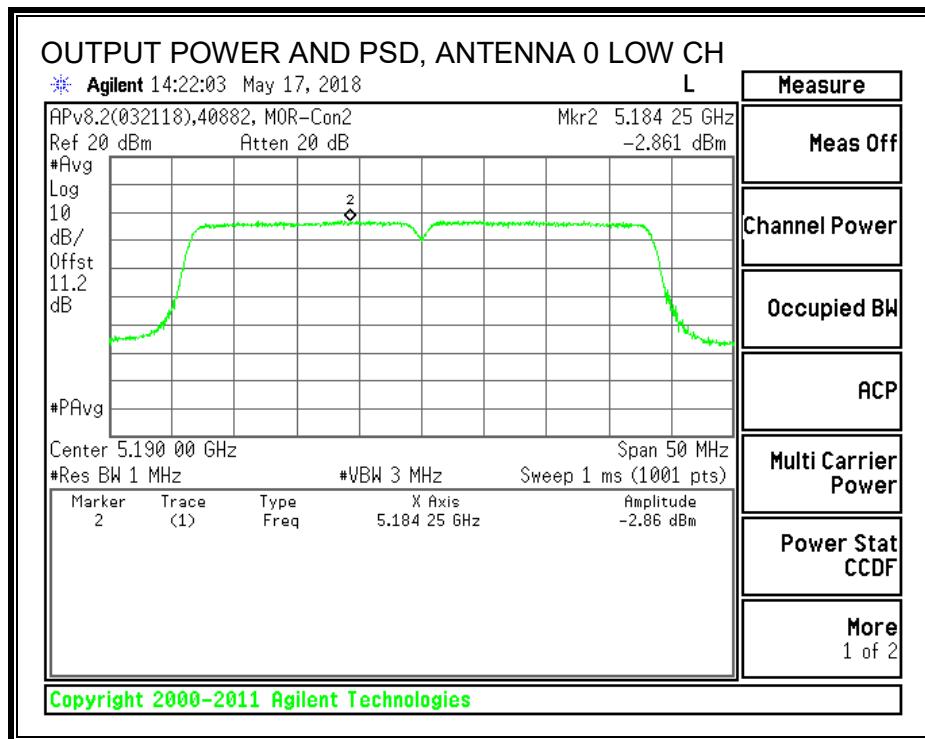
### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Low	5190	-0.83	3.86	10.00	-6.14
High	5230	-0.66	4.03	10.00	-5.97

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



## 9.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

### 9.4.1. 26 dB BANDWIDTH – MIMO

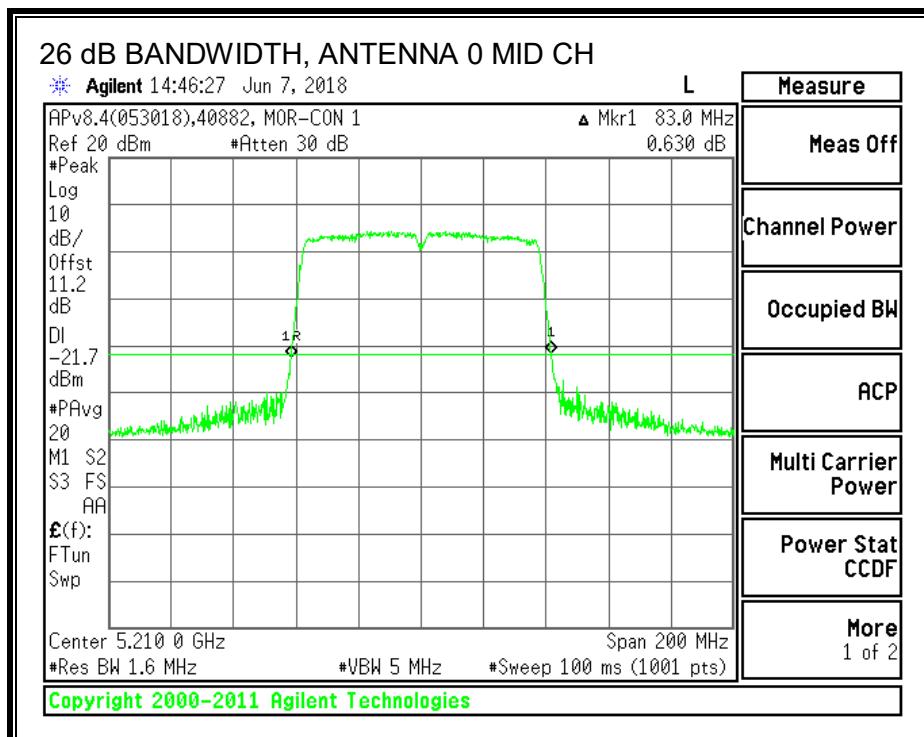
#### LIMITS

None; for reporting purposes only.

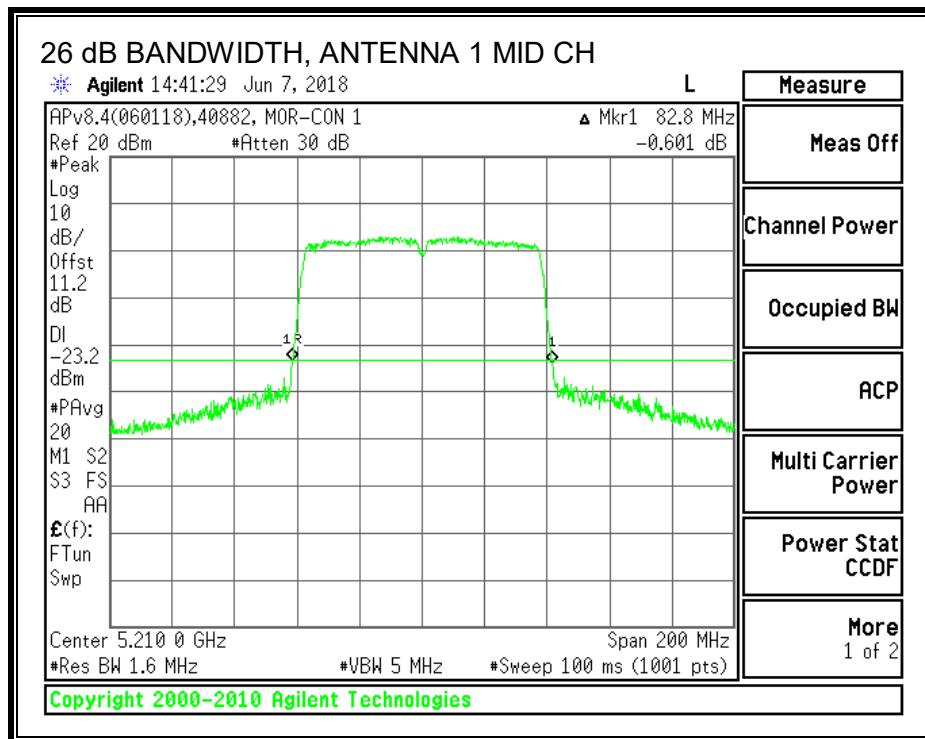
#### RESULTS

Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Mid	5210	83.00	82.80

#### 26 dB BANDWIDTH, ANTENNA 0



## 26 dB BANDWIDTH, ANTENNA 1



#### 9.4.2. 26 dB BANDWIDTH - SISO

##### LIMITS

None; for reporting purposes only.

##### RESULTS

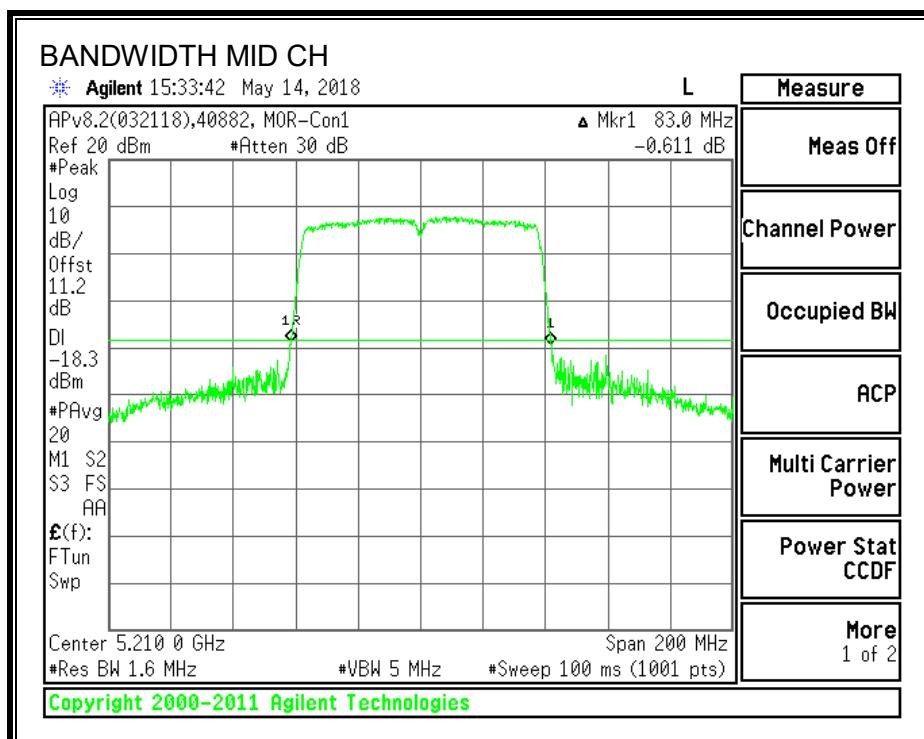
###### ANTENNA 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5210	83.00

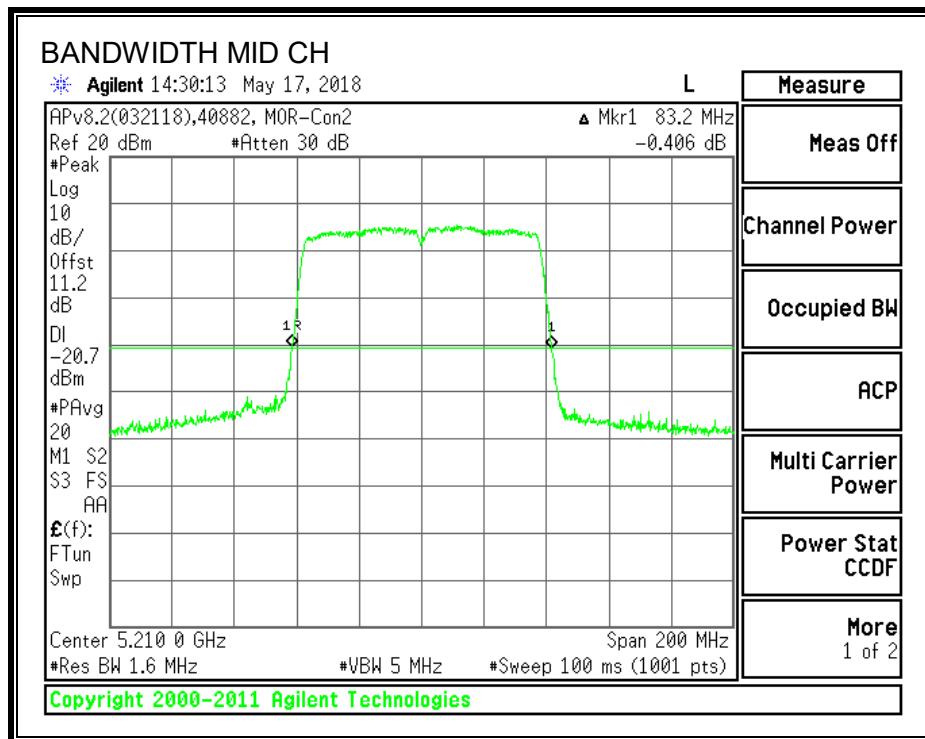
###### ANTENNA 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5210	83.20

#### 26 dB BANDWIDTH – ANTENNA 0



## 26 dB BANDWIDTH – ANTENNA 1



### 9.4.3. 99% BANDWIDTH - MIMO

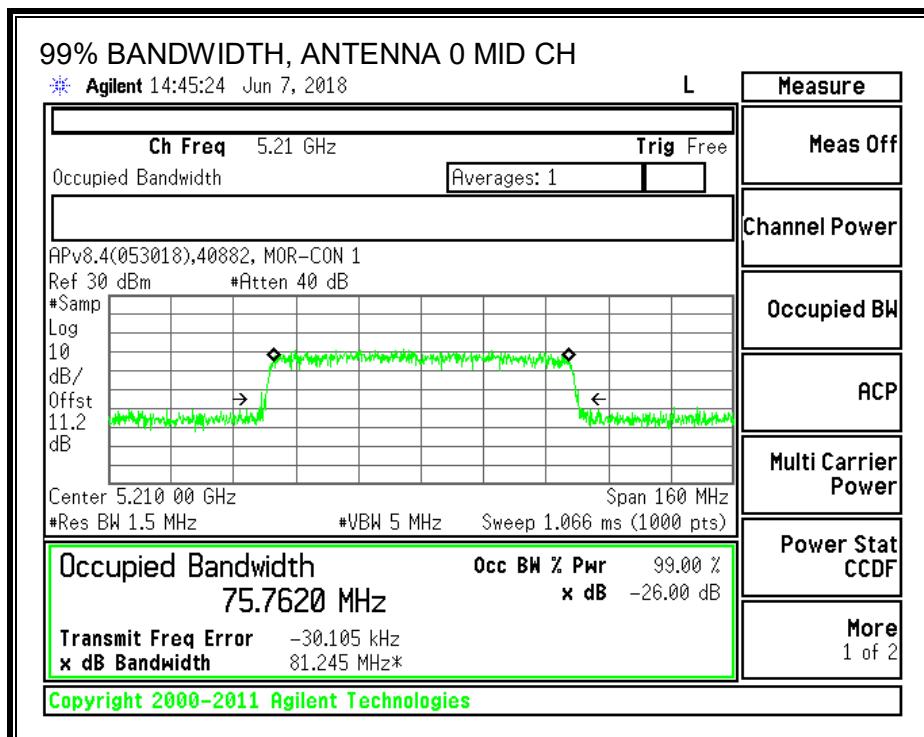
#### LIMITS

None; for reporting purposes only.

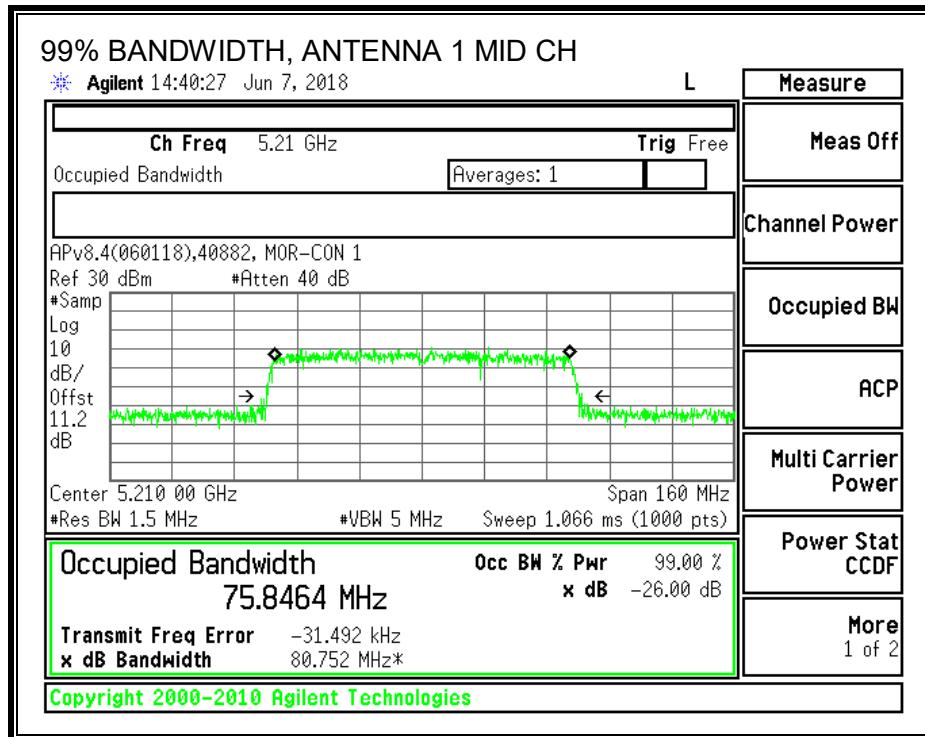
#### RESULTS

Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Mid	5210	75.7620	75.8464

#### 99% BANDWIDTH, ANTENNA 0



## 99% BANDWIDTH, ANTENNA 1



#### 9.4.4. 99% BANDWIDTH - SISO

##### LIMITS

None; for reporting purposes only.

##### RESULTS

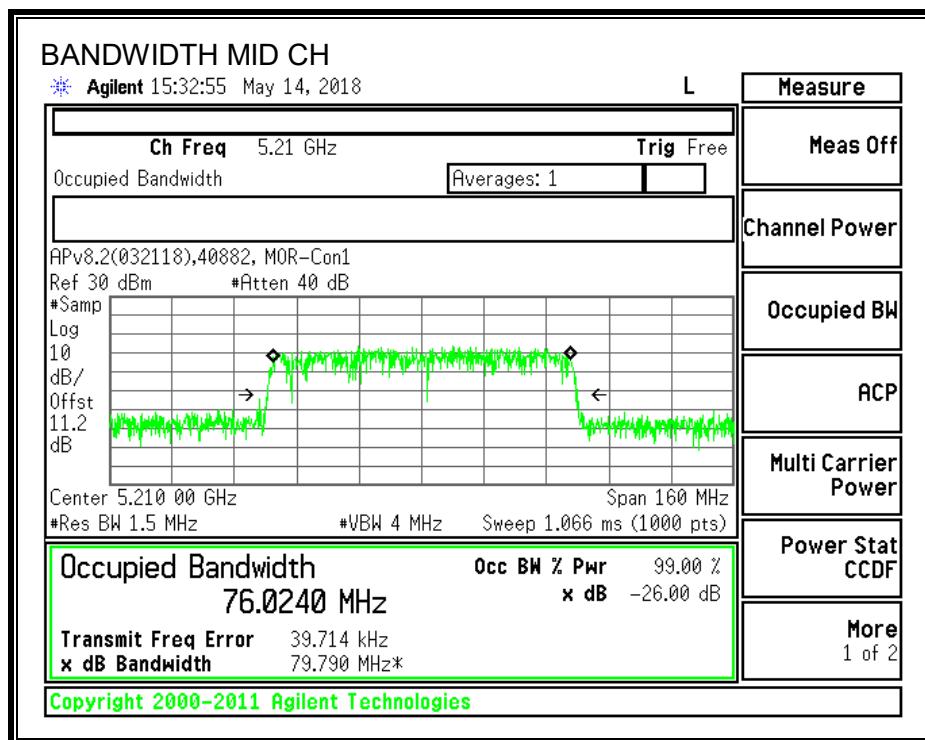
###### ANTENNA 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	76.0240

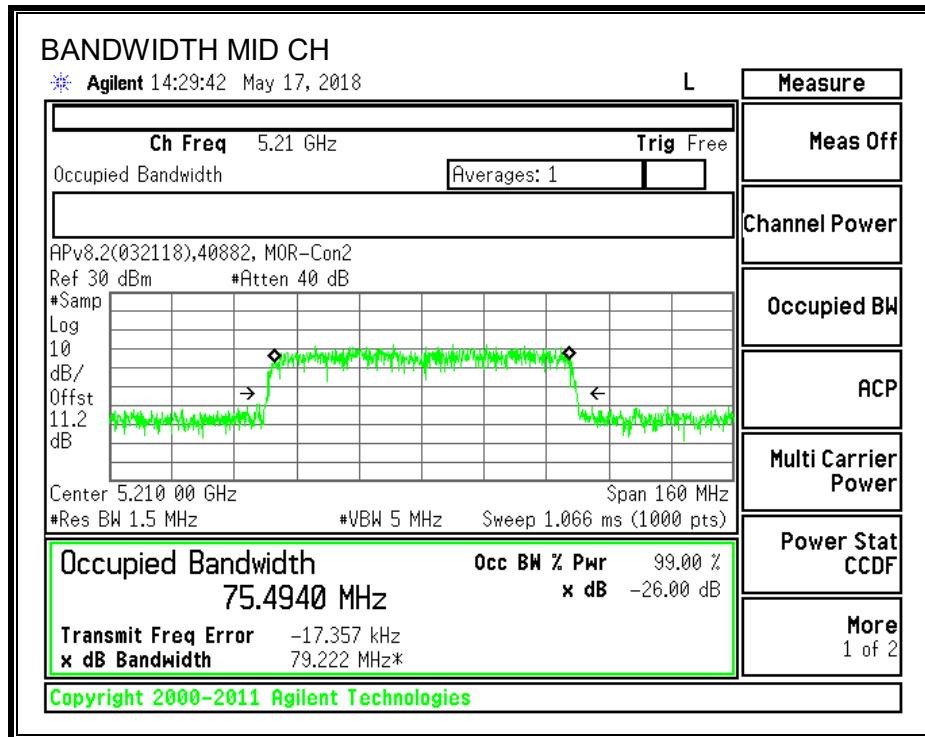
###### ANTENNA 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	75.4940

##### 99% BANDWIDTH – ANTENNA 0



**99% BANDWIDTH – ANTENNA 1**



#### 9.4.5. OUTPUT POWER AND PSD - MIMO

##### LIMITS

###### FCC §15.407 (a) (1)

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS 247 Issue 2, Clause 6.2.1.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10}B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

**DIRECTIONAL ANTENNA GAIN**

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.30	4.60	4.00

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.30	4.60	6.98

## **RESULTS (FCC)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5210	4.00	6.98	24.00	10.02

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	8.53	9.52	12.25	24.00	-11.75

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-5.81	-7.54	-3.39	10.02	-13.41

## **RESULTS (ISED)**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Mid	5210	4.00	6.98	75.76	23.00	10.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

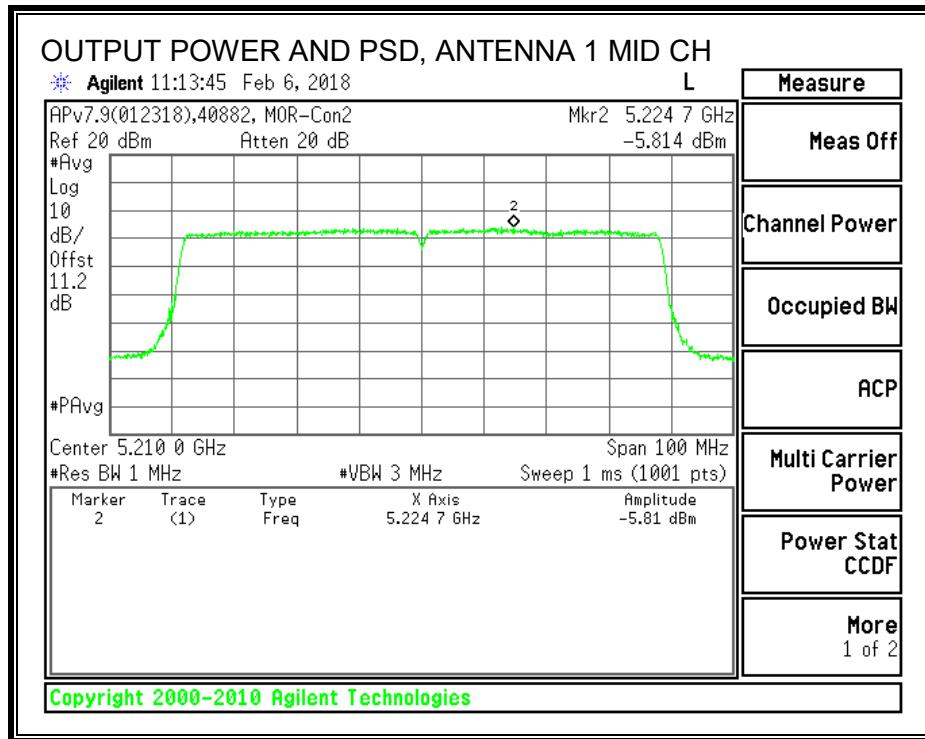
### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Cond Power (dBm)	ANT 1 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Mid	5210	8.53	9.52	16.25	23.00	-6.75

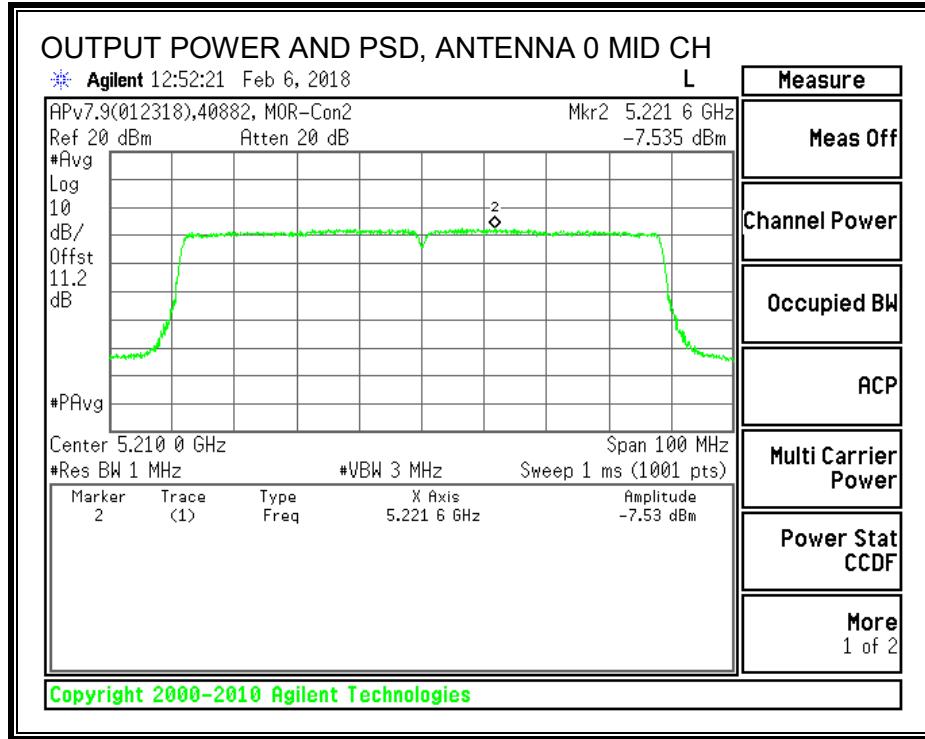
### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas Cond PSD (dBm)	ANT 0 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Mid	5210	-5.81	-7.54	3.59	10.00	-6.41

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



#### 9.4.6. OUTPUT POWER AND PSD - SISO

##### LIMITS

###### FCC §15.407 (a) (1)

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS 247 Issue 2, Clause 6.2.1.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10}B$ , dBm, whichever is less stringent. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10}B$ , dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

**DIRECTIONAL ANTENNA GAIN**

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## **RESULTS (FCC) – ANTENNA 0**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5210	3.30	3.30	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	12.60	12.60	24.00	-11.40

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-6.82	-6.63	11.00	-17.63

Note – This power measurement was gated.

## RESULTS (FCC) – ANTENNA 1

### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5210	4.60	4.60	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	13.24	13.24	24.00	-10.76

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5210	-4.35	-4.16	11.00	-15.16

Note – This power measurement was gated.

## **RESULTS (ISED) – ANTENNA 0**

### **Antenna Gain and Limits**

Channel	Frequency (MHz)	Directional Ant Gain (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Mid	5210	3.30	76.02	23.00	10.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Mid	5210	12.62	16.11	23.00	-6.89

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Mid	5210	-6.82	-3.33	10.00	-13.33

## RESULTS (ISED) – ANTENNA 1

### Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Ant Gain (dBi)	Occupied 99% BW (MHz)	EIRP Limit (dBm)	EIRP PSD Limit (dBm)
Mid	5210	4.60	75.49	23.00	10.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

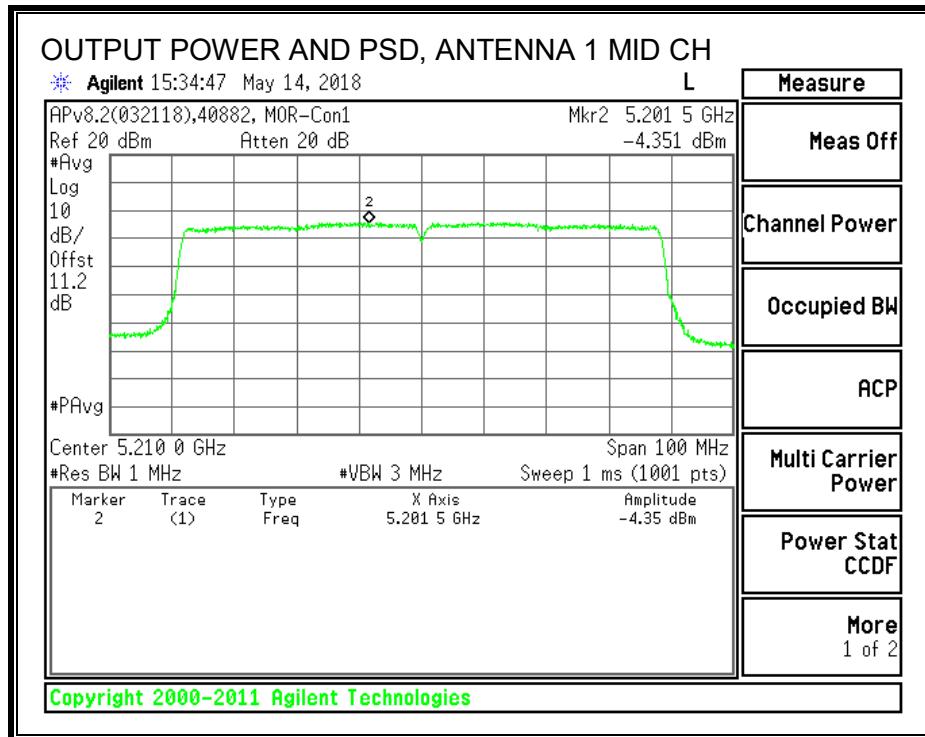
### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Cond Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Mid	5210	13.24	18.03	23.00	-4.97

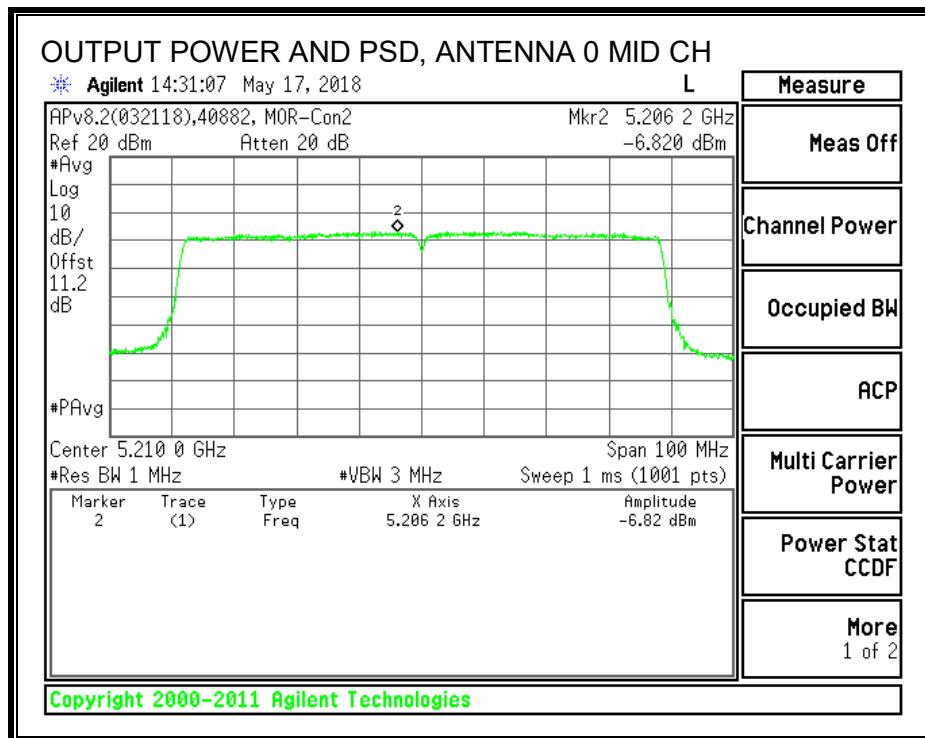
### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas Cond PSD (dBm)	Total Corr'd EIRP PSD (dBm)	EIRP PSD Limit (dBm)	EIRP PSD Margin (dB)
Mid	5210	-4.35	0.44	10.00	-9.56

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



## 9.5.802.11a MODE IN THE 5.3 GHz BAND

### 9.5.1. 26 dB BANDWIDTH

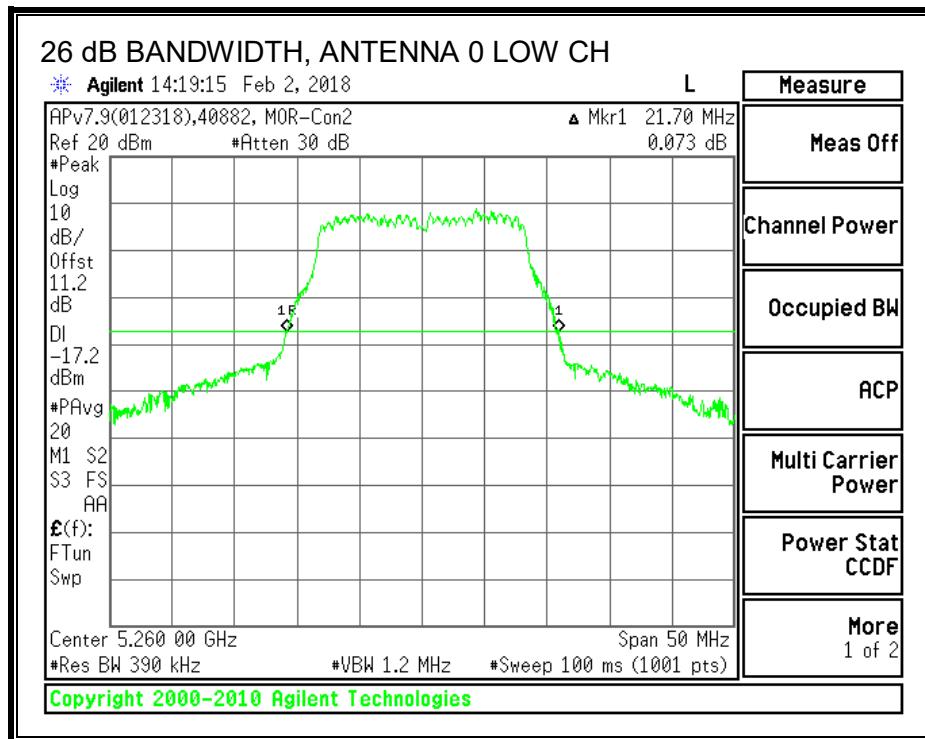
#### LIMITS

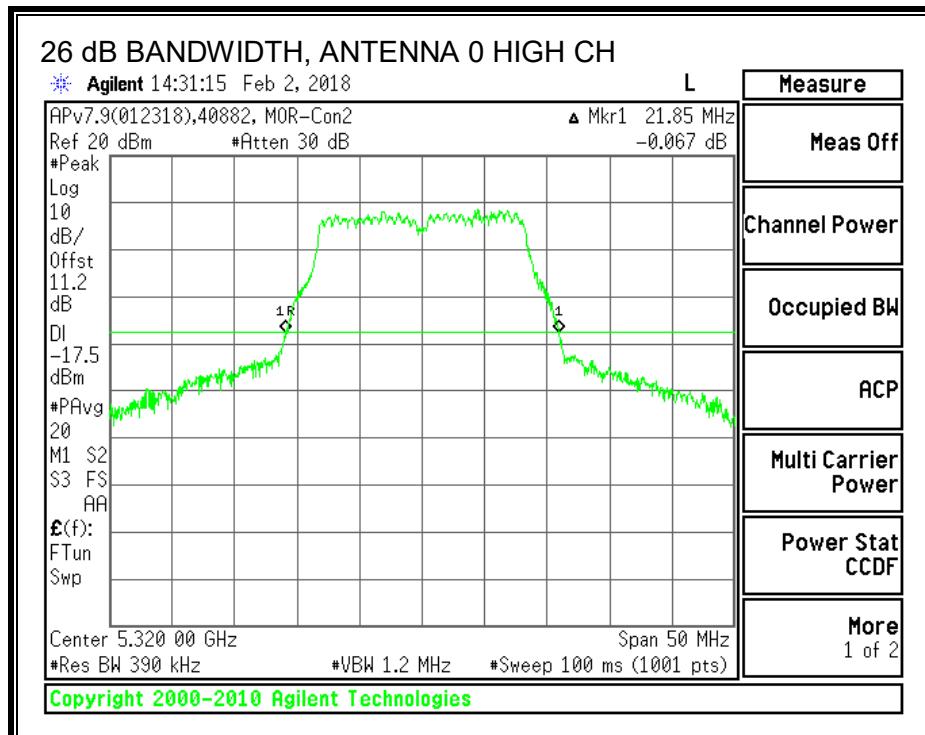
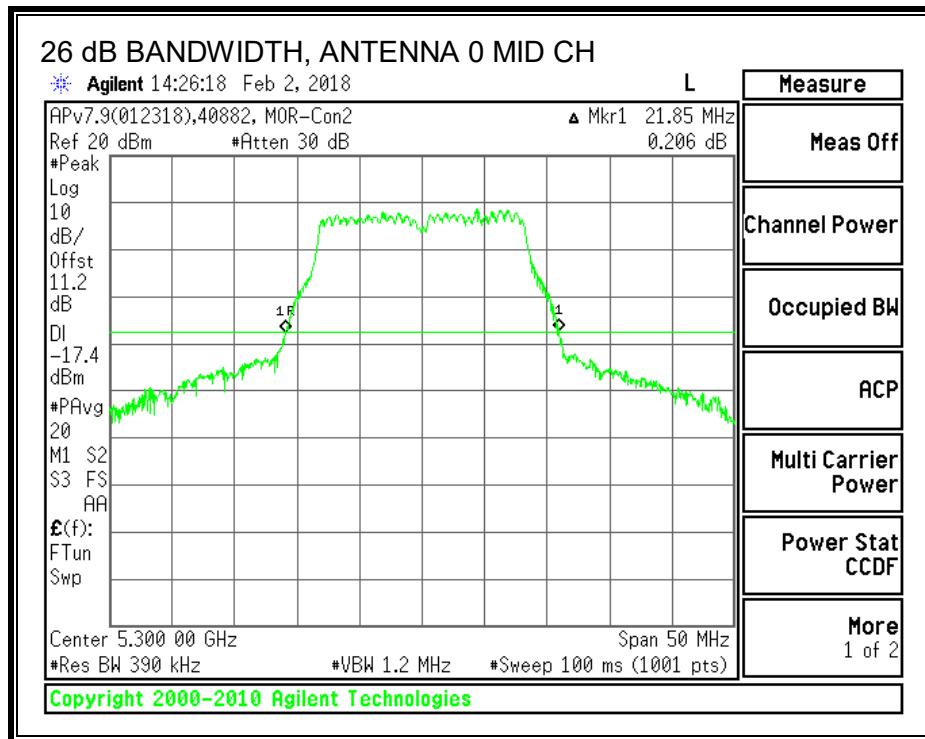
None; for reporting purposes only.

#### RESULTS

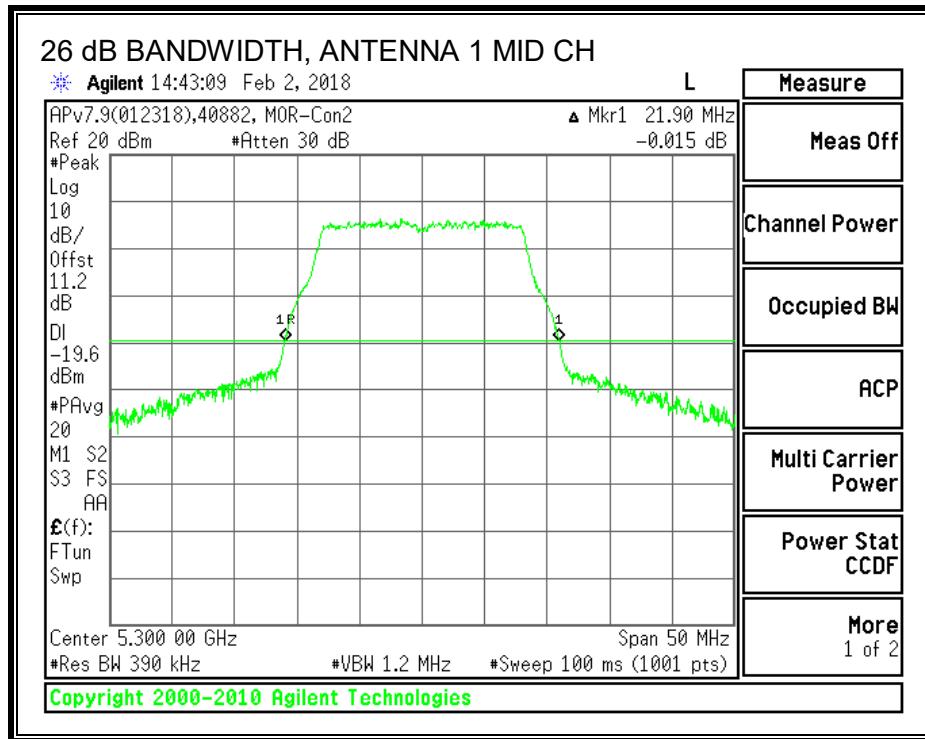
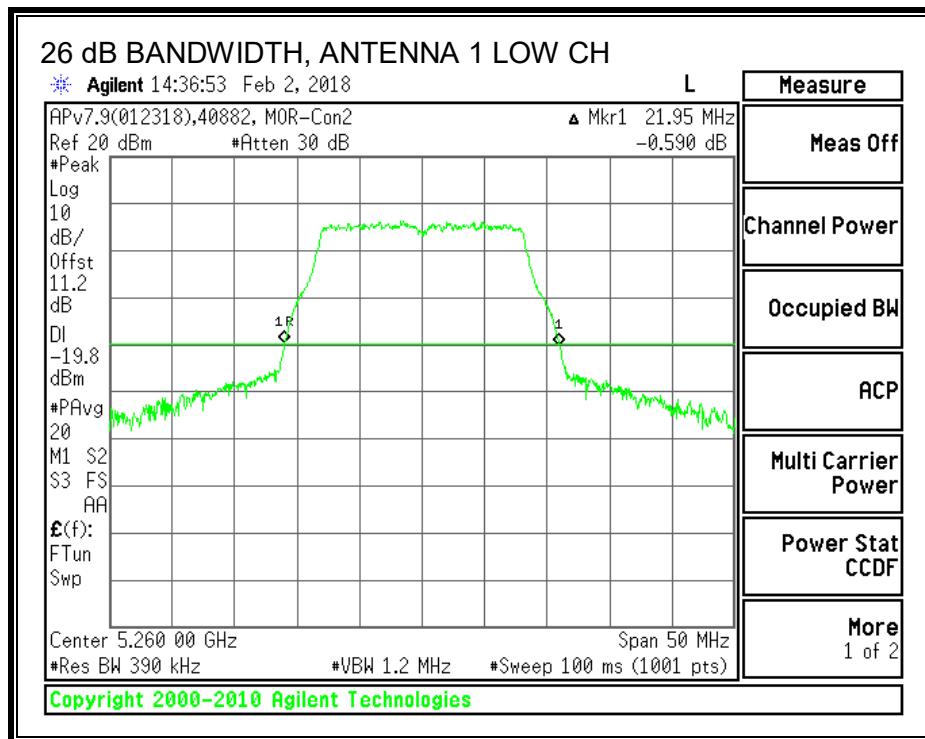
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5260	21.70	21.95
Mid	5300	21.85	21.90
High	5320	21.85	21.90

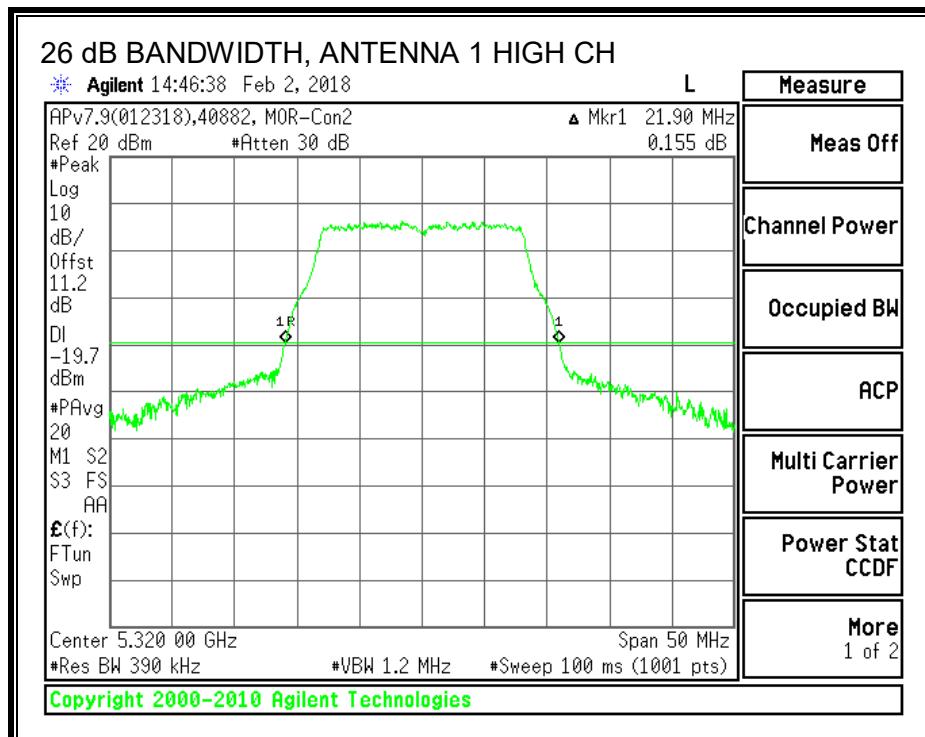
#### 26 dB BANDWIDTH, ANTENNA 0





## 26 dB BANDWIDTH, ANTENNA 1





### 9.5.2. 99% BANDWIDTH

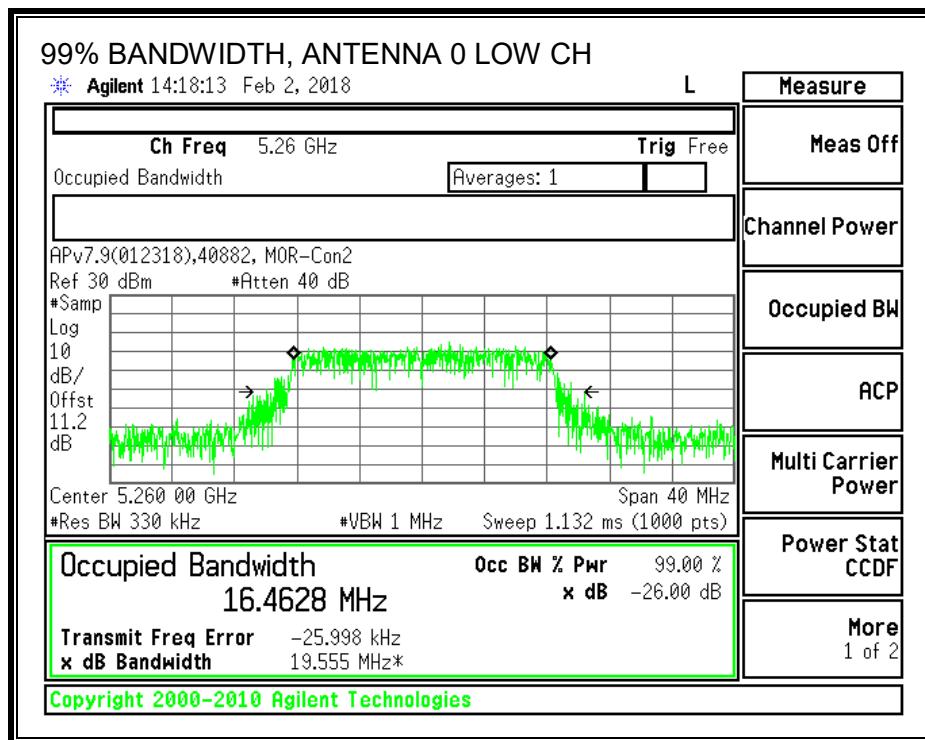
#### LIMITS

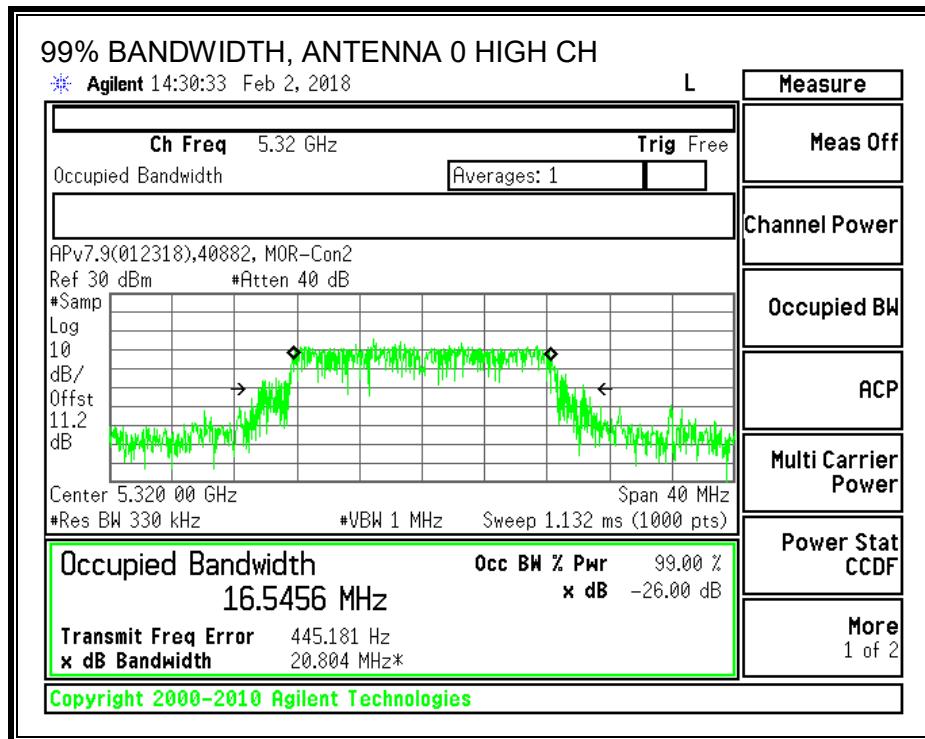
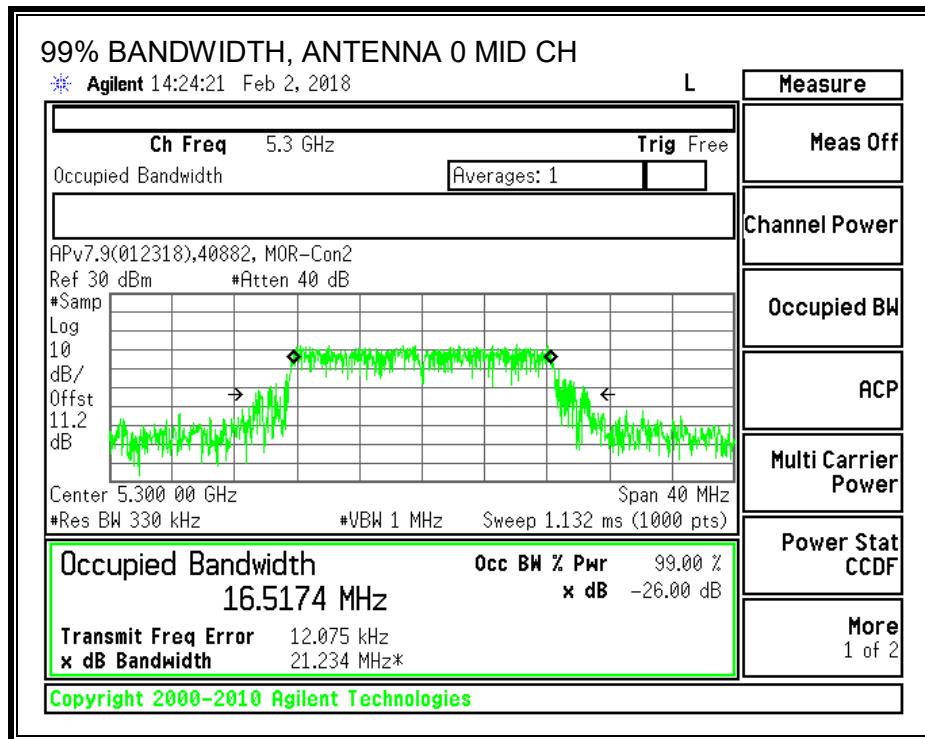
None; for reporting purposes only.

#### RESULTS

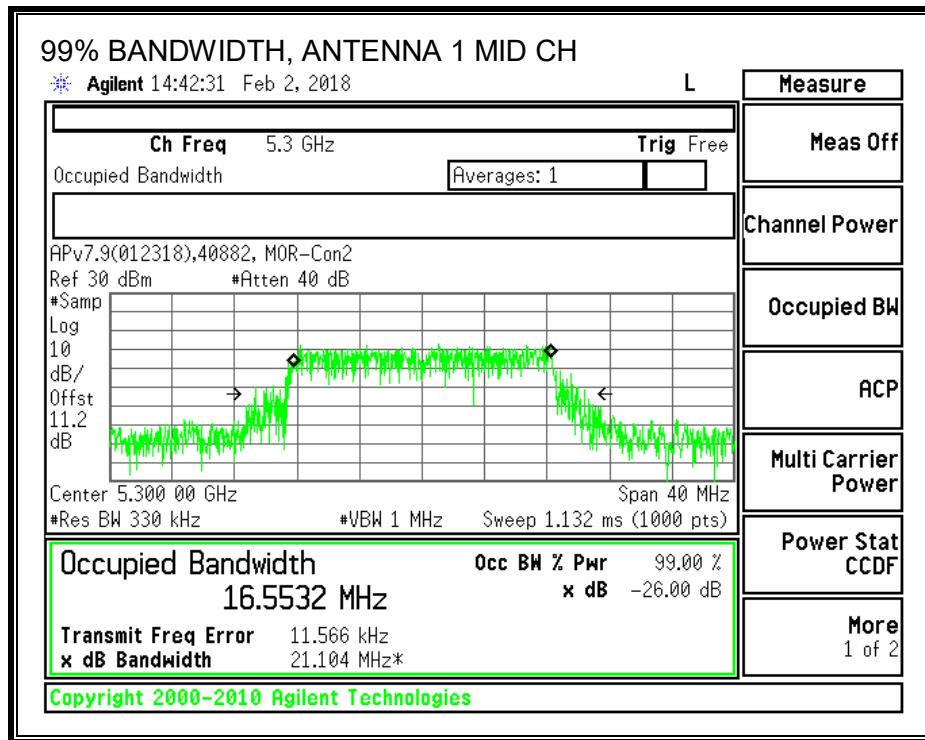
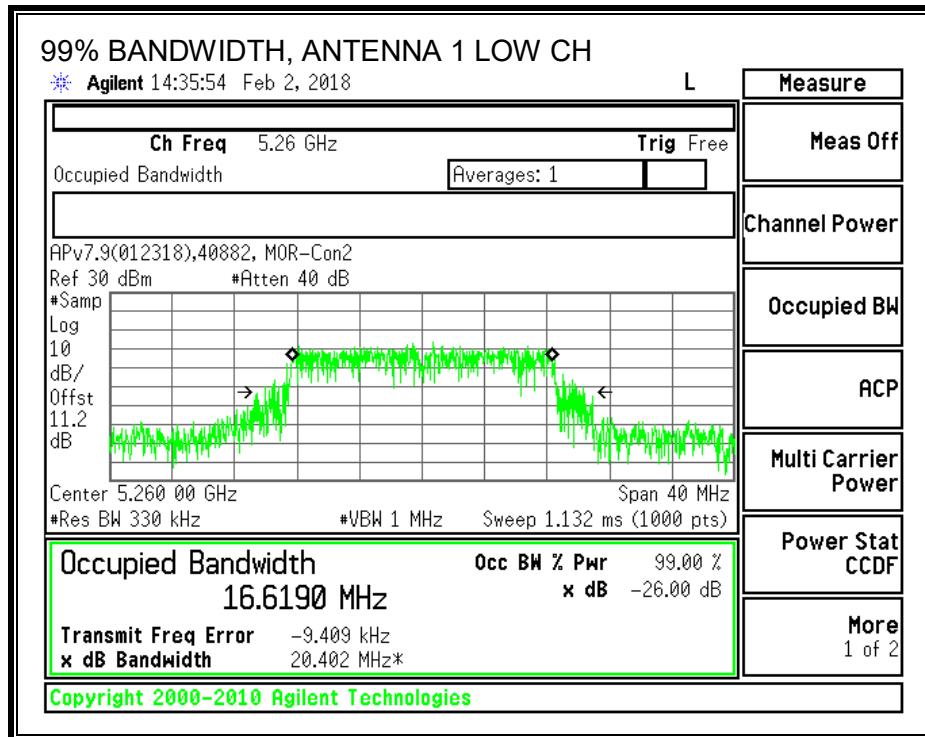
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5260	16.4628	16.6190
Mid	5300	16.5174	16.5532
High	5320	16.5456	16.7079

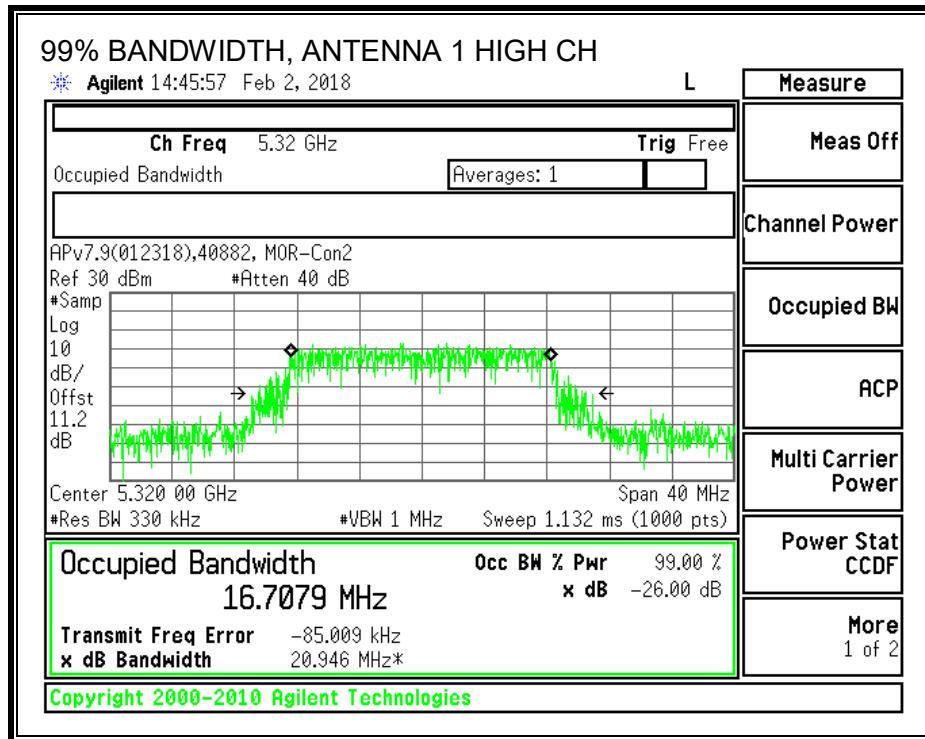
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





### 9.5.3. OUTPUT POWER AND PSD

#### LIMITS

##### FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### ISED RSS-247 Issue 2 Section 6.2.2.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for Power (dBi)
3.20	4.50	3.90

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for PSD (dBi)
3.20	4.50	6.88

## RESULTS (FCC)

### Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	21.70	3.90	6.88	24.00	10.12
Mid	5300	21.85	3.90	6.88	24.00	10.12
High	5320	21.85	3.90	6.88	24.00	10.12

Duty Cycle CF (dB)	0.10	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.95	14.29	16.78	24.00	-7.22
Mid	5300	12.99	14.00	16.63	24.00	-7.37
High	5320	12.94	14.24	16.75	24.00	-7.25

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	3.76	2.49	6.28	10.12	-3.84
Mid	5300	3.93	2.38	6.33	10.12	-3.79
High	5320	3.73	2.79	6.39	10.12	-3.73

## **RESULTS (ISED CONDUCTED POWER AND PSD)**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	16.46	23.17	11.00
Mid	5300	16.52	23.18	11.00
High	5320	16.55	23.19	11.00

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.95	14.29	16.78	23.17	-6.38
Mid	5300	12.99	14.00	16.63	23.18	-6.54
High	5320	12.94	14.24	16.75	23.19	-6.44

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	3.76	2.49	6.28	11.00	-4.72
Mid	5300	3.93	2.38	6.33	11.00	-4.67
High	5320	3.73	2.79	6.39	11.00	-4.61

## **RESULTS (ISED EIRP)**

### **Bandwidth, Antenna Gain and Limits**

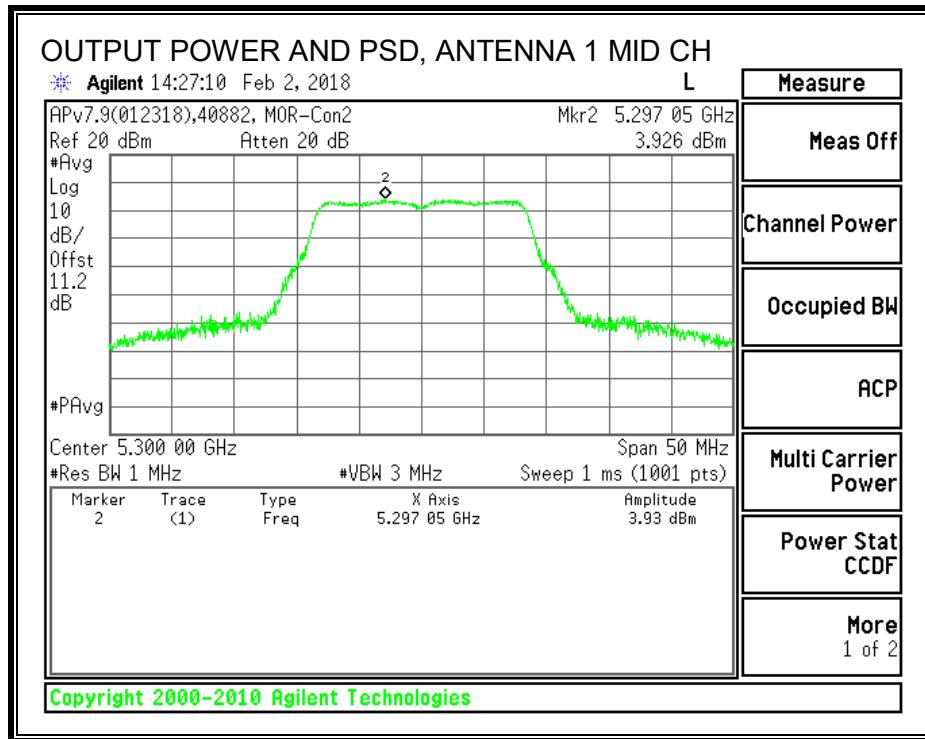
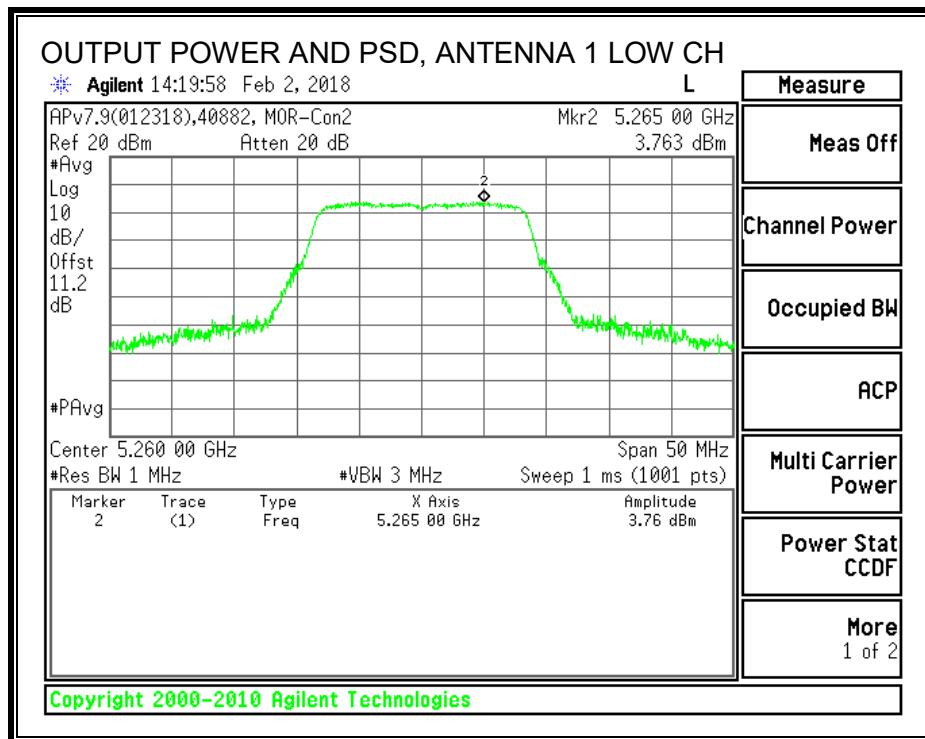
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Low	5260	16.46	3.90	29.17
Mid	5300	16.52	3.90	29.18
High	5320	16.55	3.90	29.19

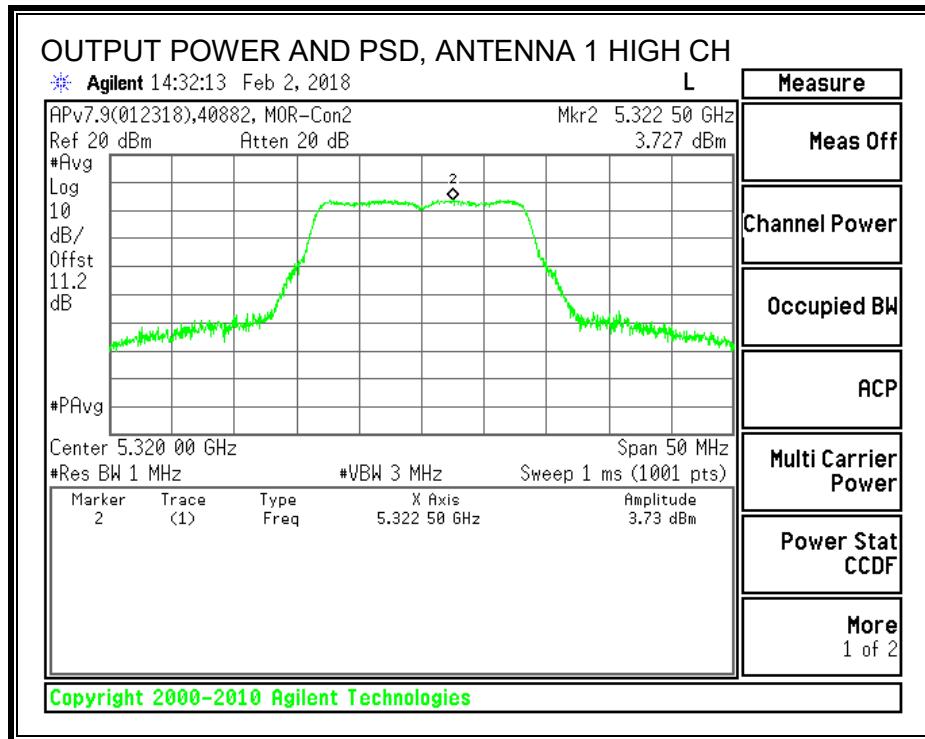
<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

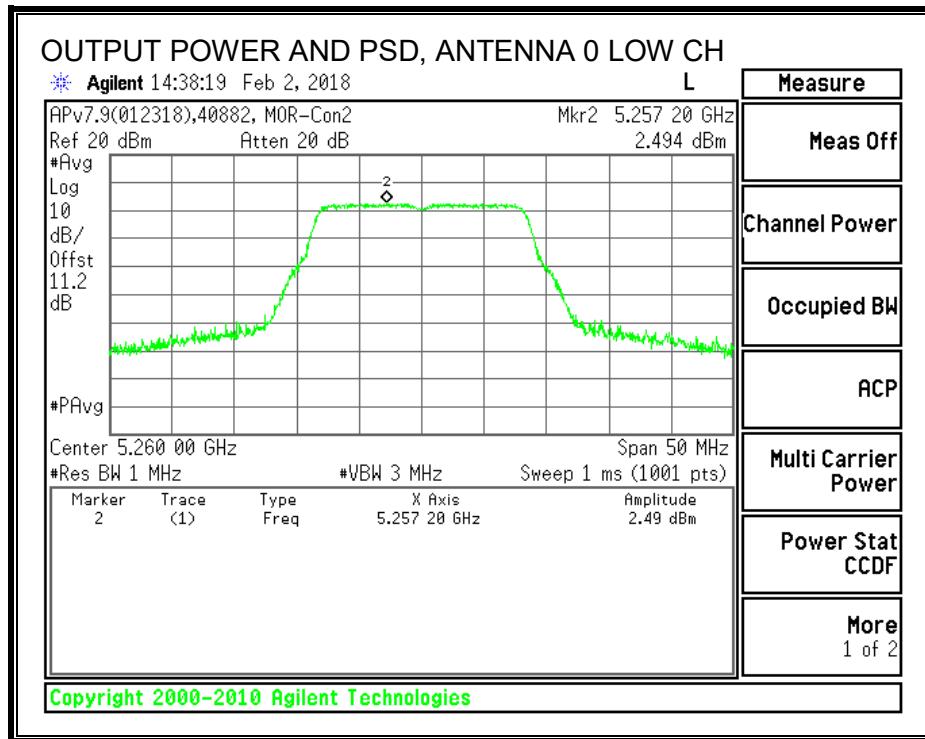
Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5260	12.95	14.29	20.68	29.17	-8.48
Mid	5300	12.99	14.00	20.53	29.18	-8.64
High	5320	12.94	14.24	20.65	29.19	-8.54

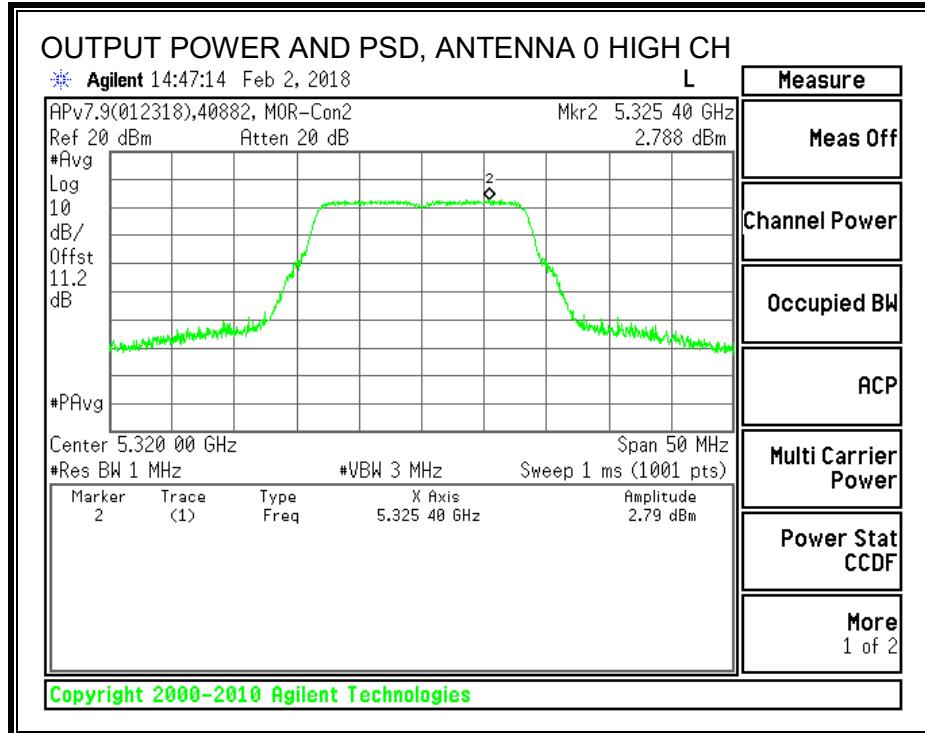
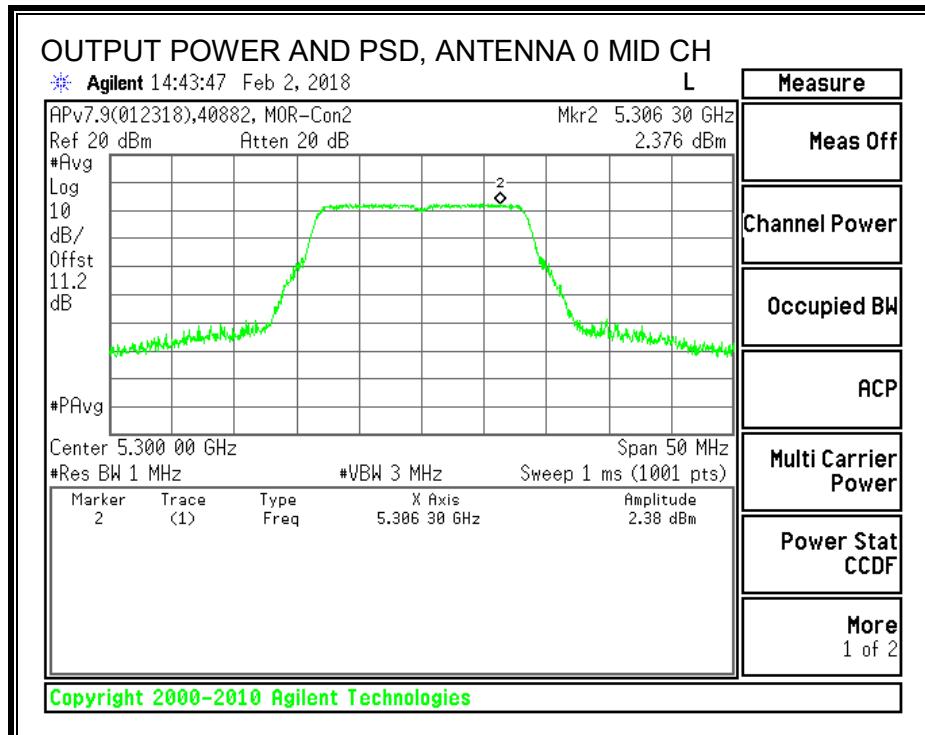
## OUTPUT POWER AND PSD, ANTENNA 1





## OUTPUT POWER AND PSD, ANTENNA 0





## 9.6.802.11n HT20 MODE IN THE 5.3 GHz BAND

### 9.6.1. 26 dB BANDWIDTH

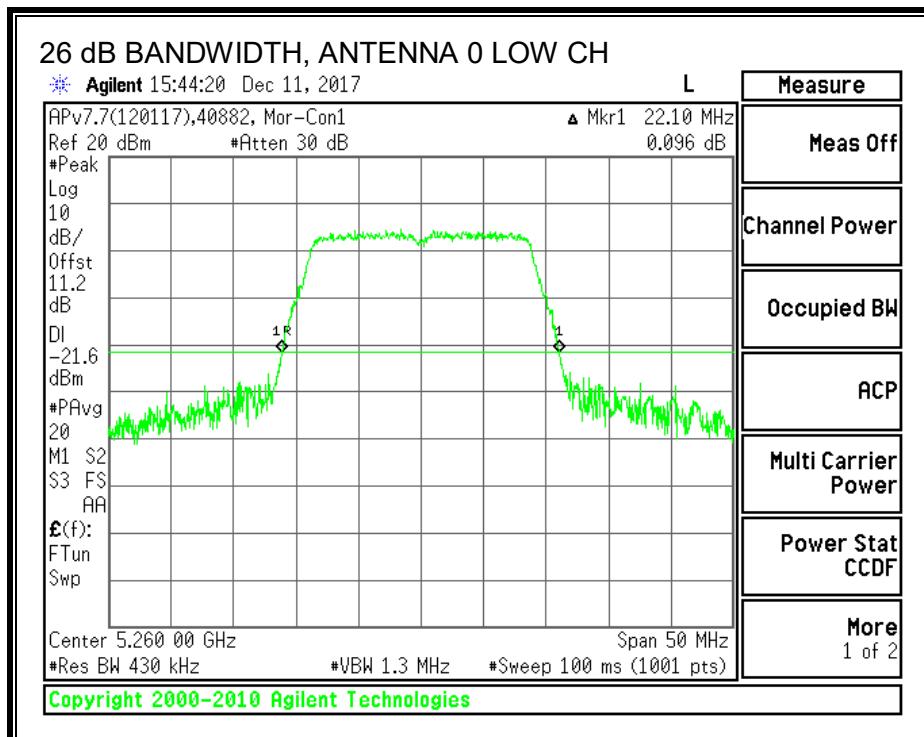
#### LIMITS

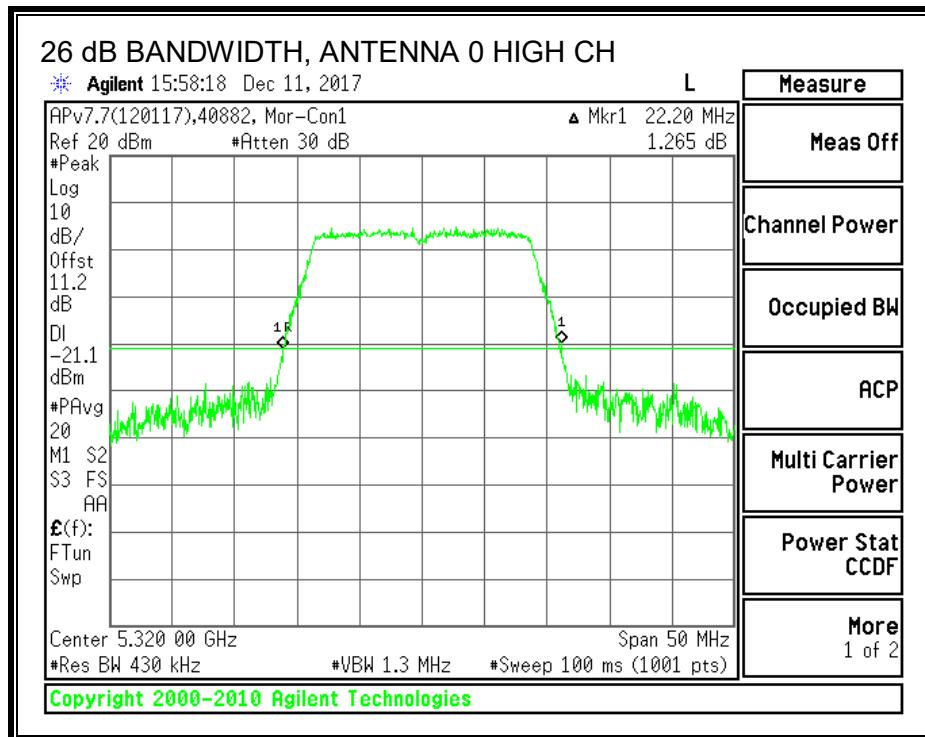
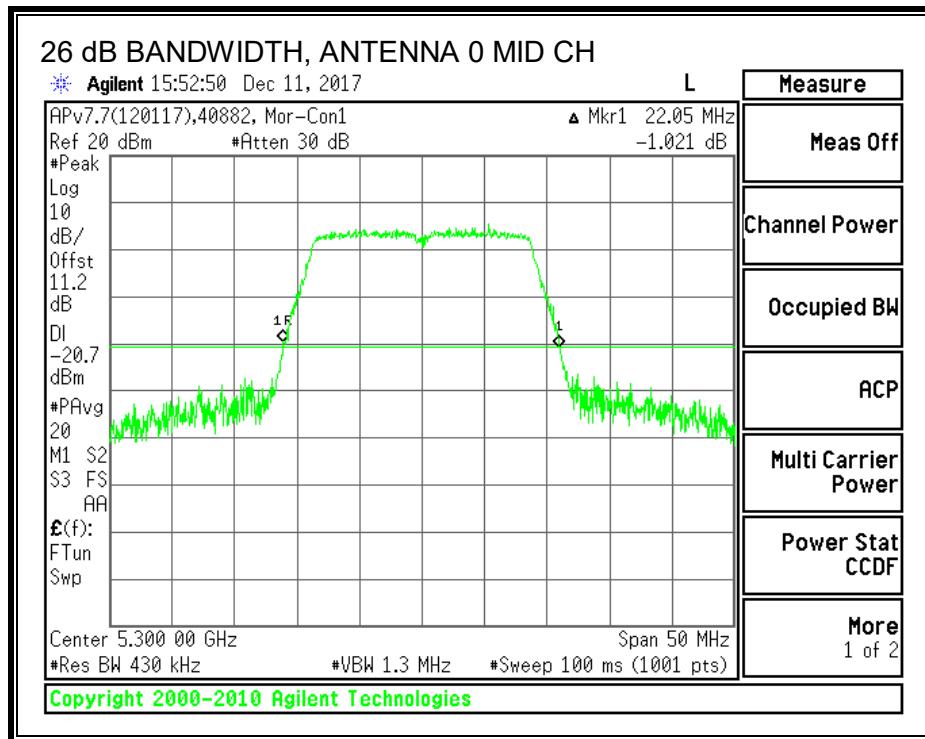
None; for reporting purposes only.

#### RESULTS

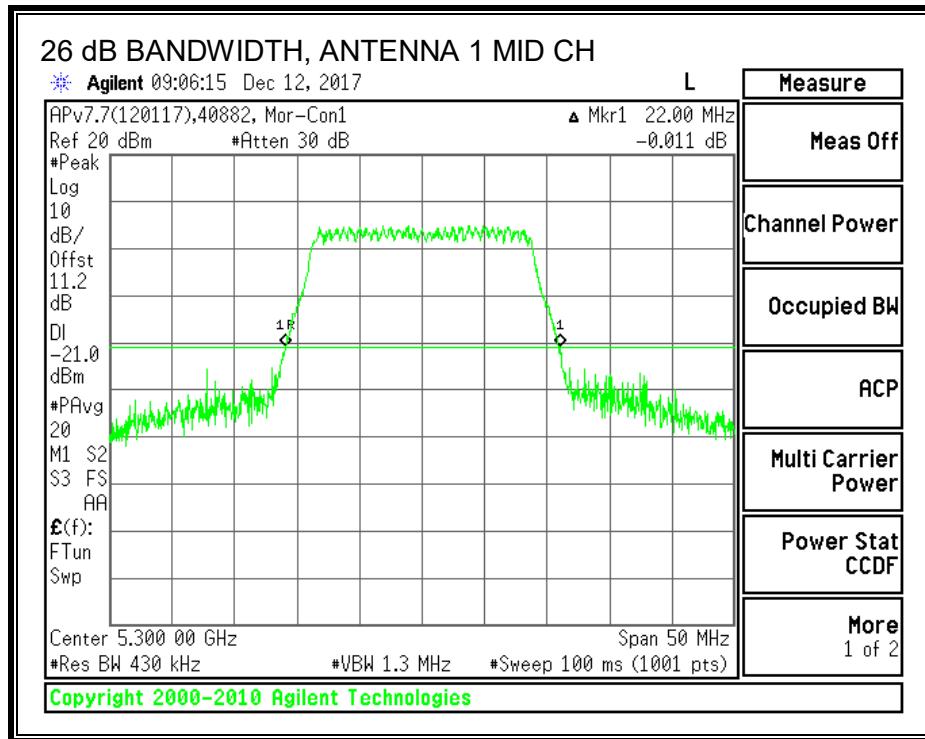
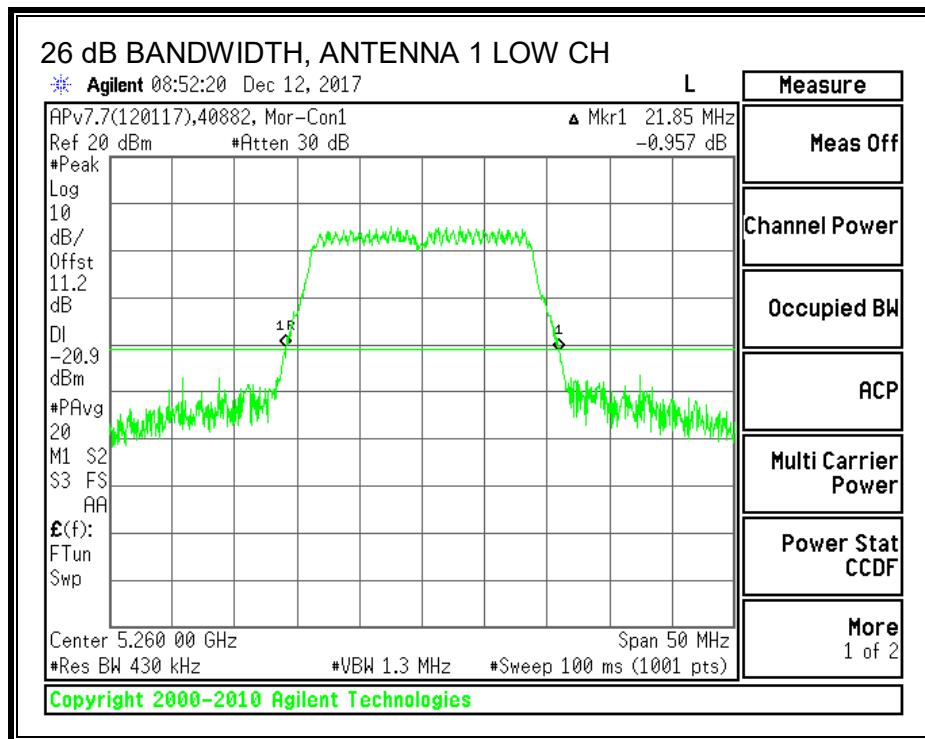
Channel	Frequency	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5260	22.10	21.85
Mid	5300	22.05	22.00
High	5320	22.20	22.00

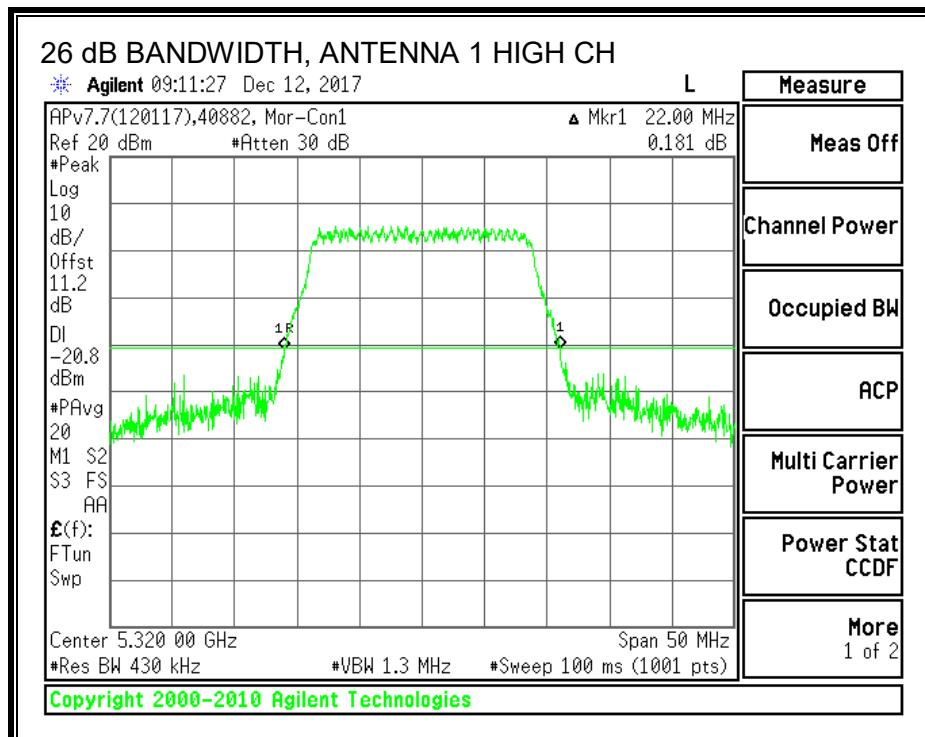
#### 26 dB BANDWIDTH, ANTENNA 0





## 26 dB BANDWIDTH, ANTENNA 1





### 9.6.2. 99% BANDWIDTH

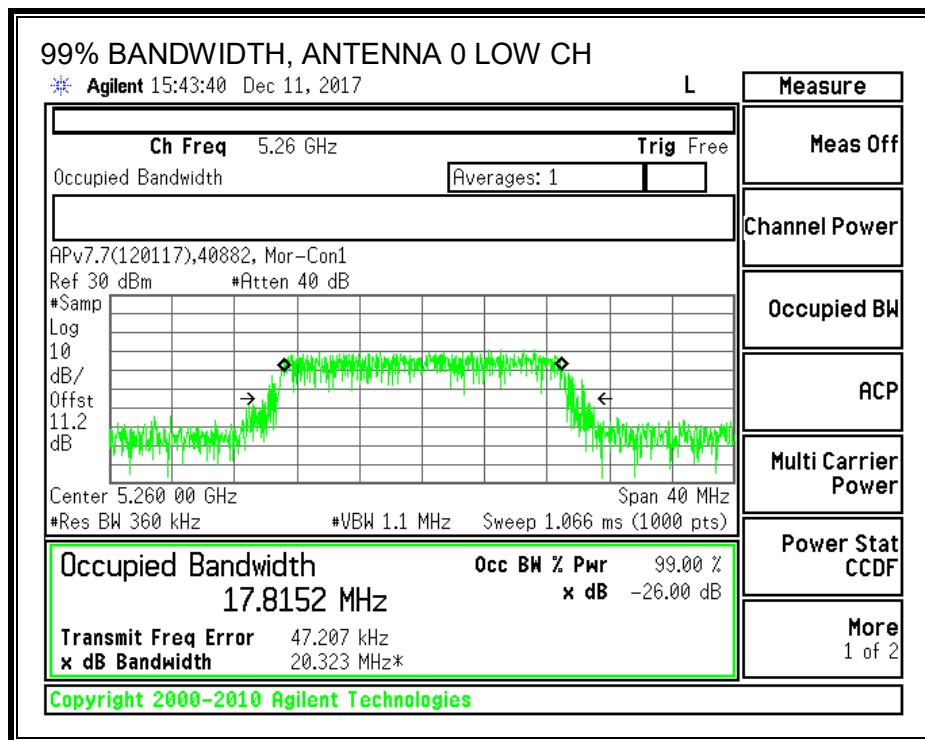
#### LIMITS

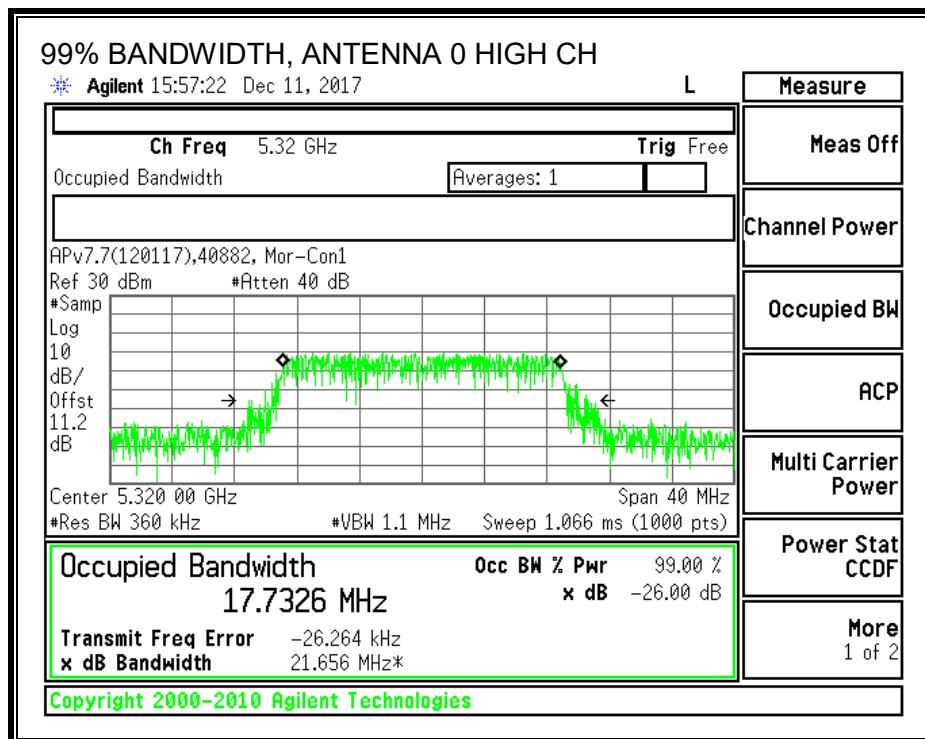
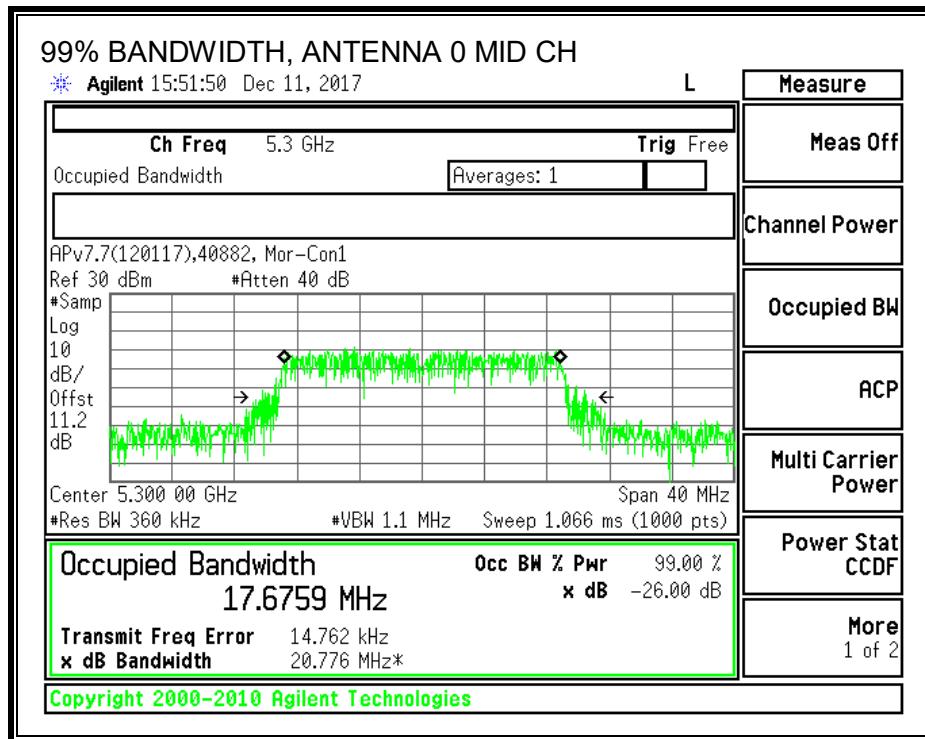
None; for reporting purposes only.

#### RESULTS

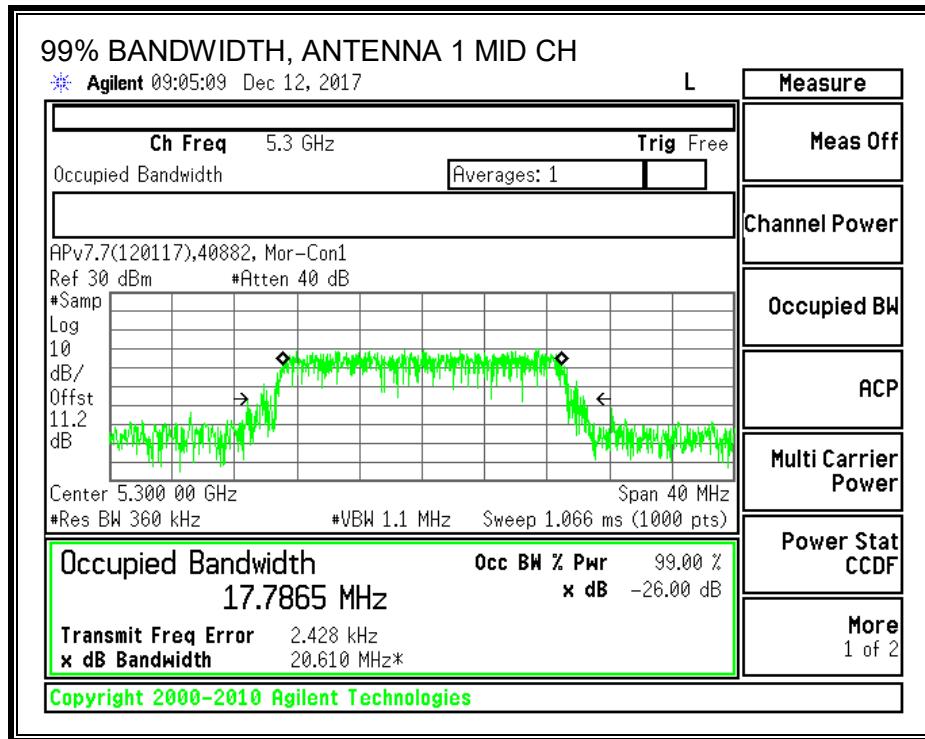
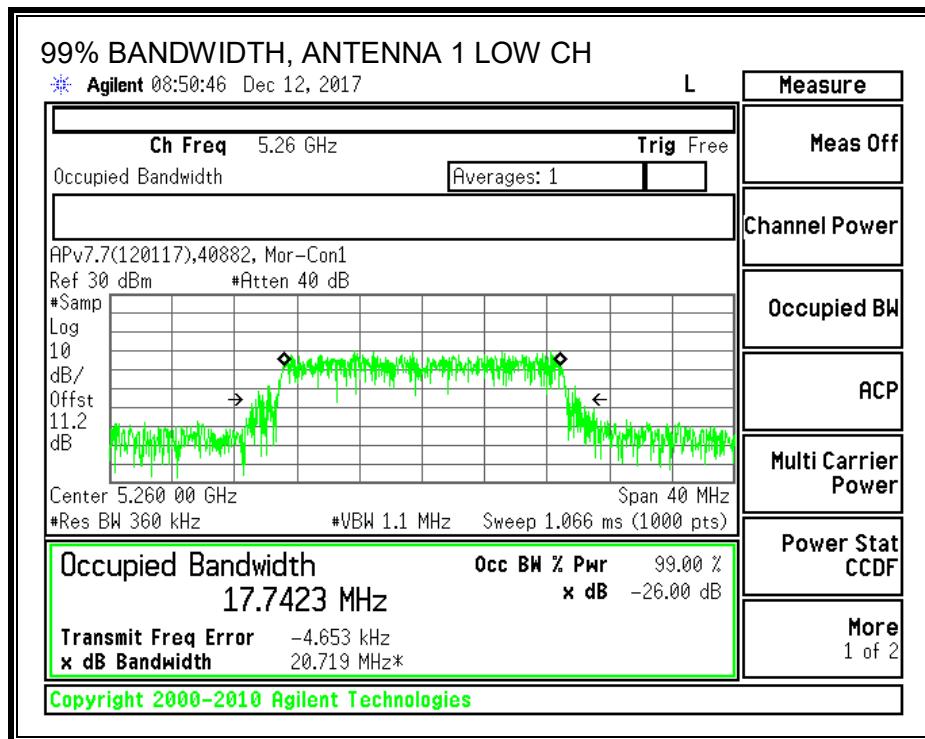
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5260	17.8152	17.7423
Mid	5300	17.6759	17.7865
High	5320	17.7326	17.8208

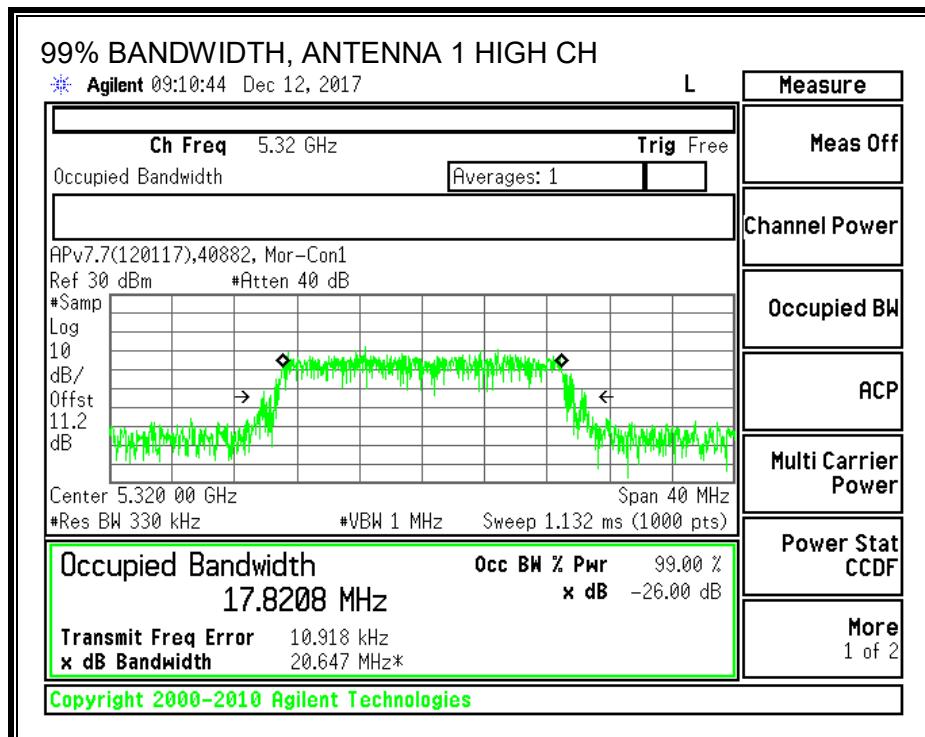
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





### 9.6.3. OUTPUT POWER AND PSD

#### LIMITS

##### FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### ISED RSS-247 Issue 2 Section 6.2.2.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

#### DIRECTIONAL ANTENNA GAIN

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.20	4.50	3.90

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.20	4.50	6.88

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	22.10	3.90	6.88	24.00	10.12
Mid	5300	22.05	3.90	6.88	24.00	10.12
High	5320	22.00	3.90	6.88	24.00	10.12

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.94	14.19	16.62	24.00	-7.38
Mid	5300	12.92	13.97	16.49	24.00	-7.51
High	5320	12.83	14.16	16.56	24.00	-7.44

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	0.37	-0.82	2.82	10.12	-7.30
Mid	5300	0.33	-0.39	3.00	10.12	-7.12
High	5320	0.44	-0.07	3.20	10.12	-6.92

## **RESULTS (ISED CONDUCTED POWER AND PSD)**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	17.74	23.49	11.00
Mid	5300	17.49	23.43	11.00
High	5320	17.73	23.49	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.94	14.19	16.62	23.49	-6.87
Mid	5300	12.92	13.97	16.49	23.43	-6.94
High	5320	12.83	14.16	16.56	23.49	-6.93

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	0.37	-0.82	2.83	11.00	-8.17
Mid	5300	0.33	-0.39	3.00	11.00	-8.00
High	5320	0.44	-0.07	3.20	11.00	-7.80

## **RESULTS (ISED EIRP)**

### **Bandwidth, Antenna Gain and Limits**

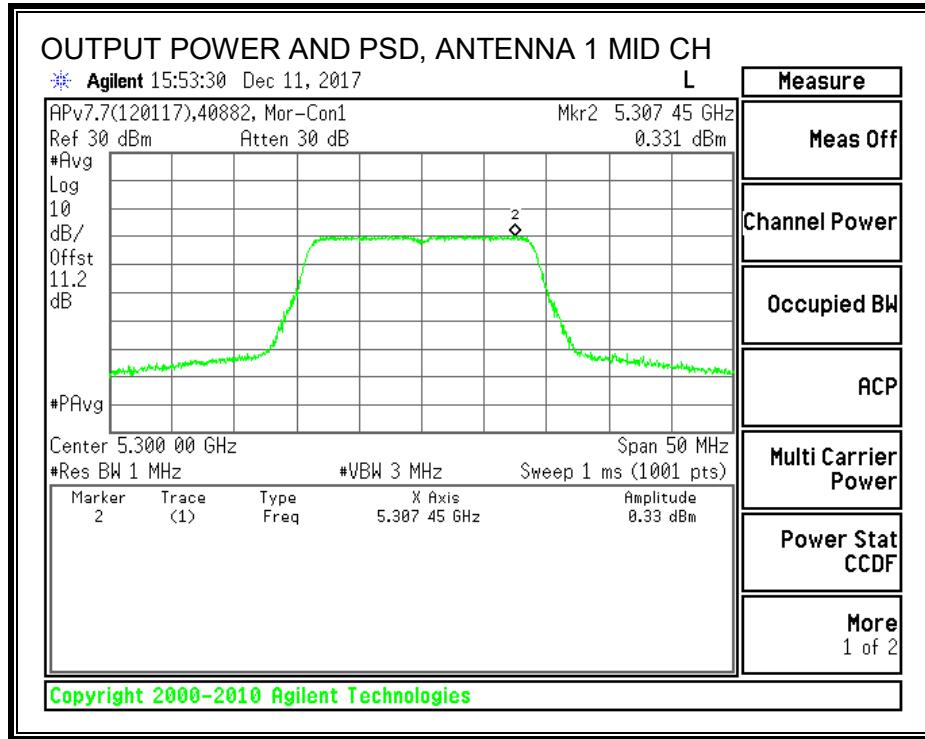
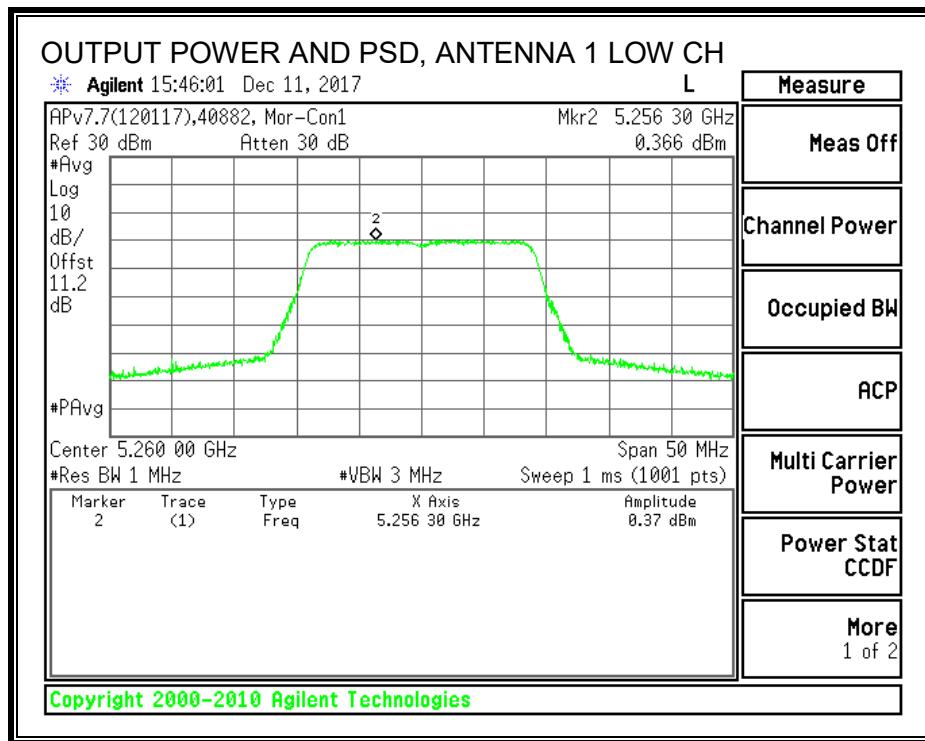
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Low	5260	17.74	3.90	29.49
Mid	5300	17.49	3.90	29.43
High	5320	17.73	3.90	29.49

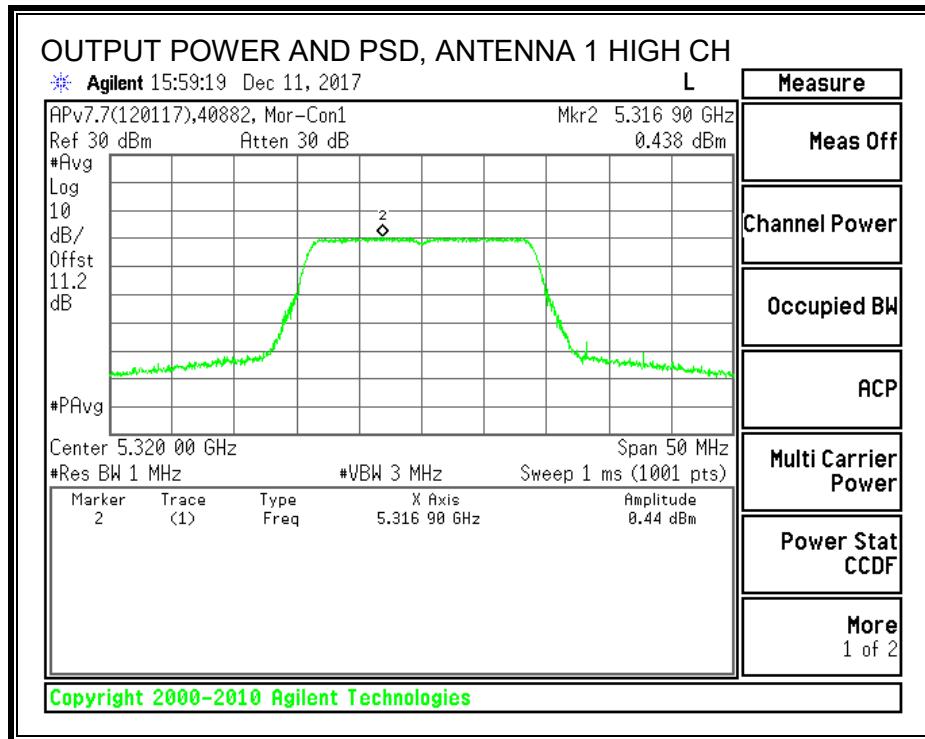
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

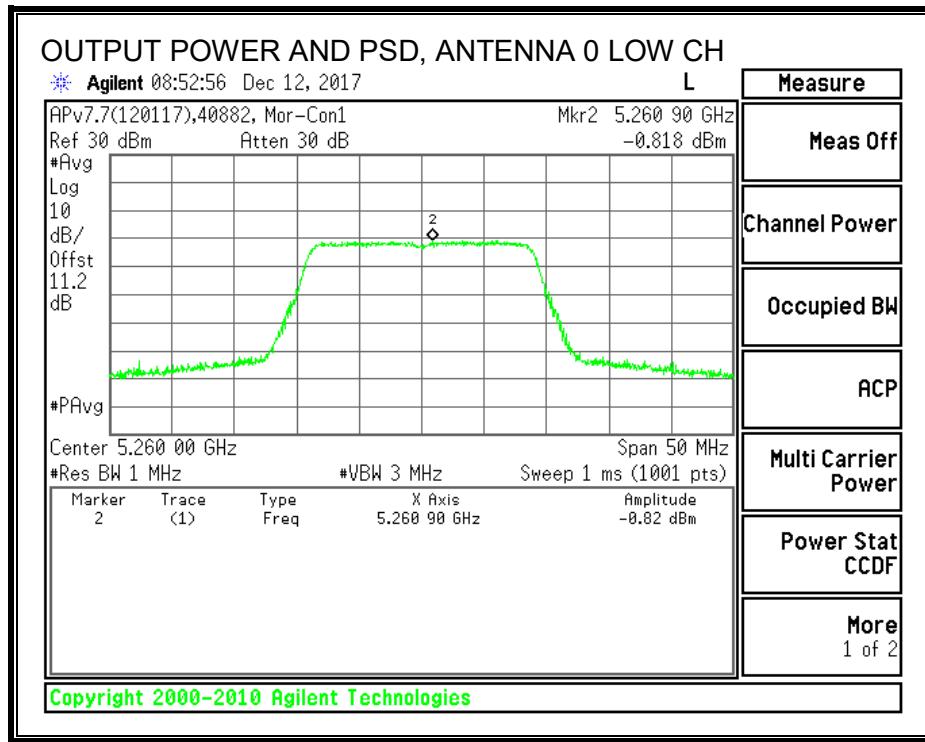
Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5260	12.94	14.19	20.52	29.49	-8.97
Mid	5300	12.92	13.97	20.39	29.43	-9.04
High	5320	12.83	14.16	20.46	29.49	-9.03

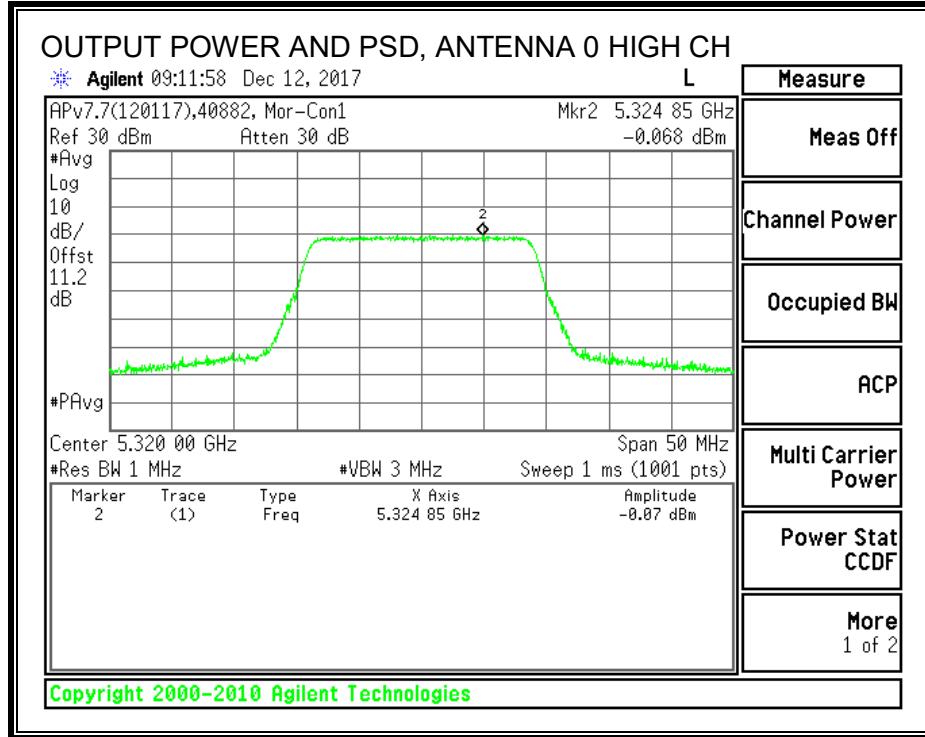
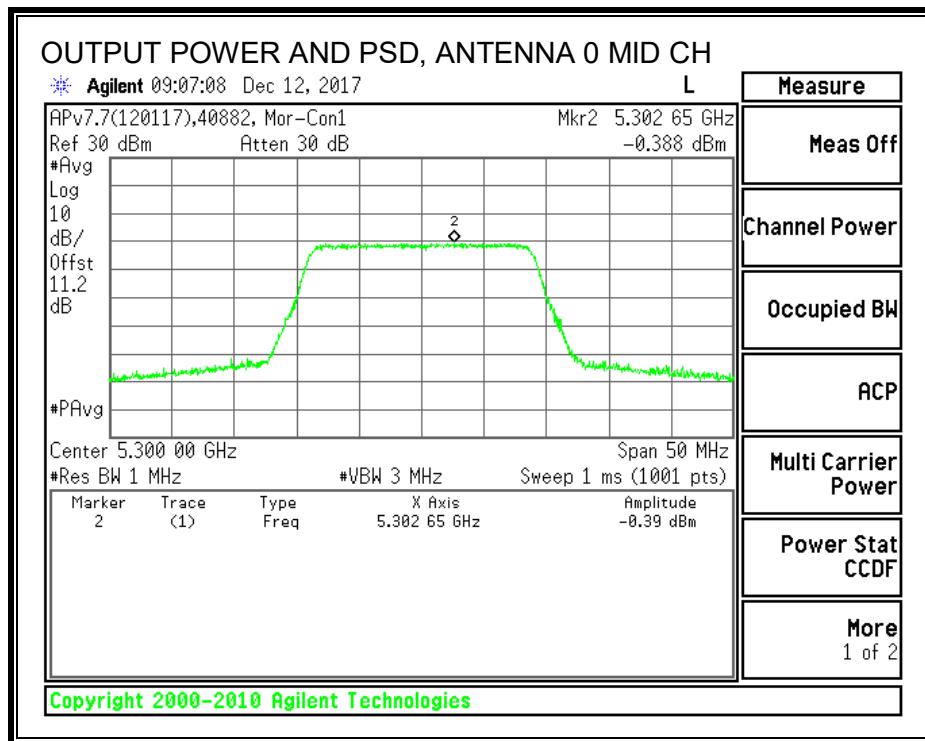
## OUTPUT POWER AND PSD, ANTENNA 1





## OUTPUT POWER AND PSD, ANTENNA 0





## 9.7.802.11n HT40 MODE IN THE 5.3 GHz BAND

### 9.7.1. 26 dB BANDWIDTH – MIMO

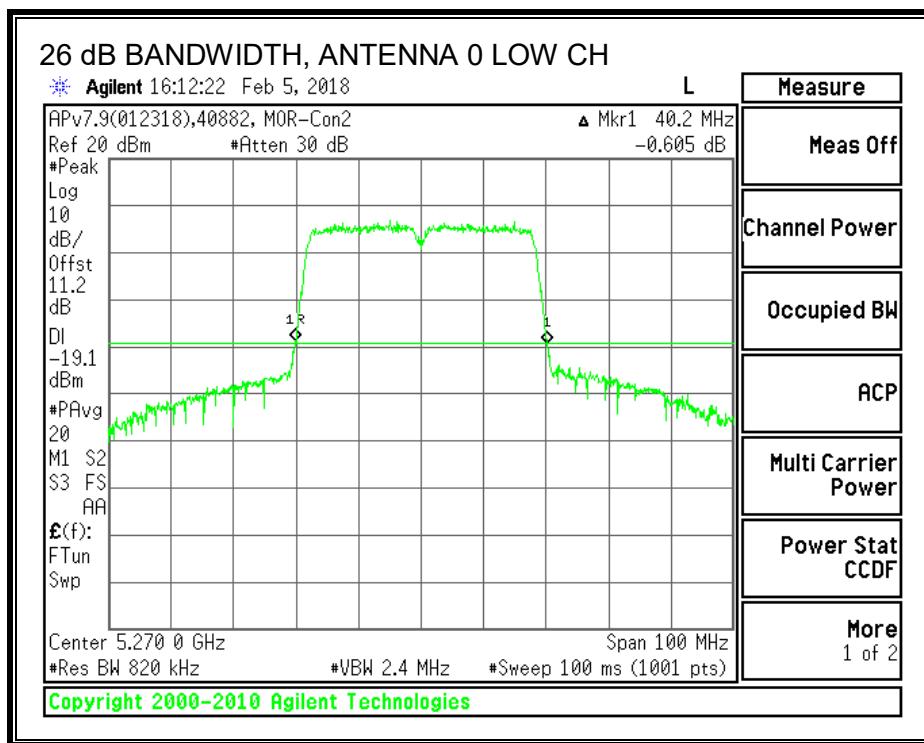
#### LIMITS

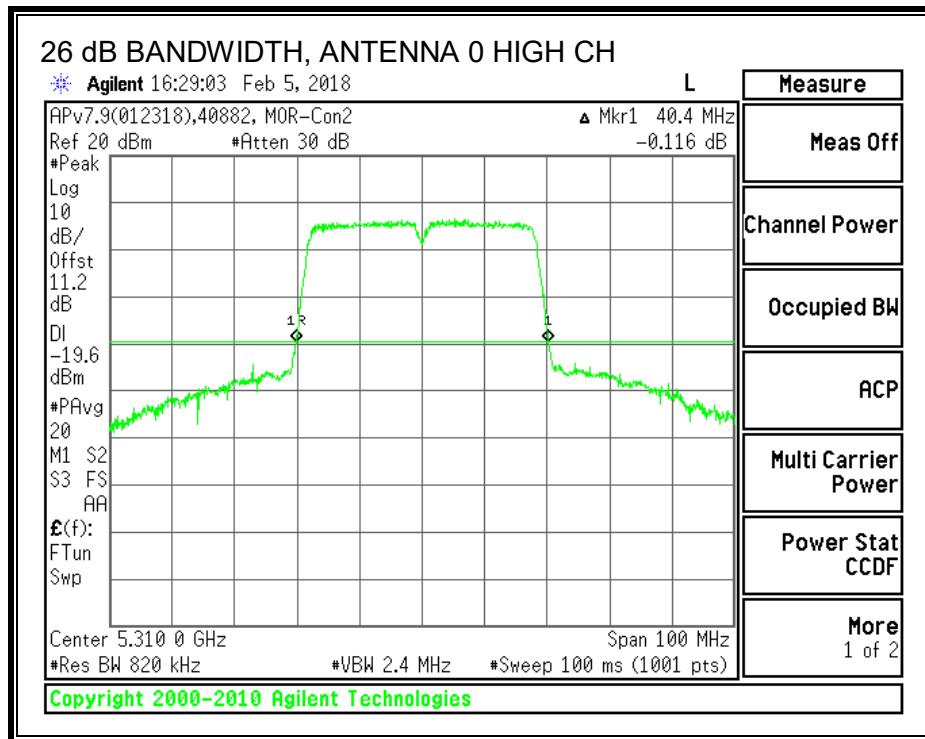
None; for reporting purposes only.

#### RESULTS

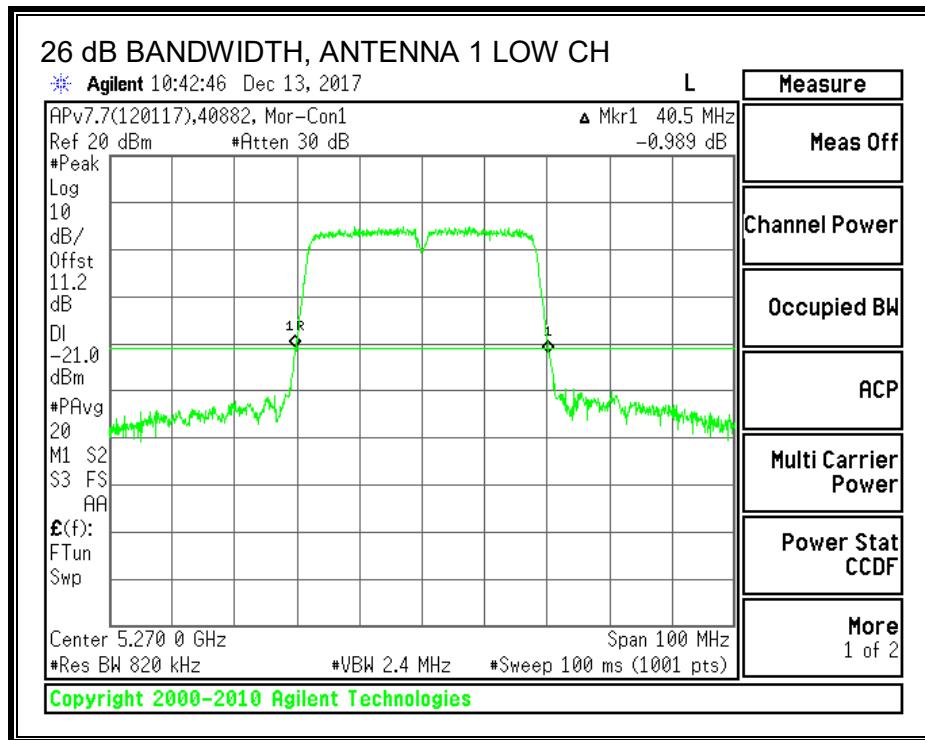
Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5270	40.20	40.50
High	5310	40.40	40.40

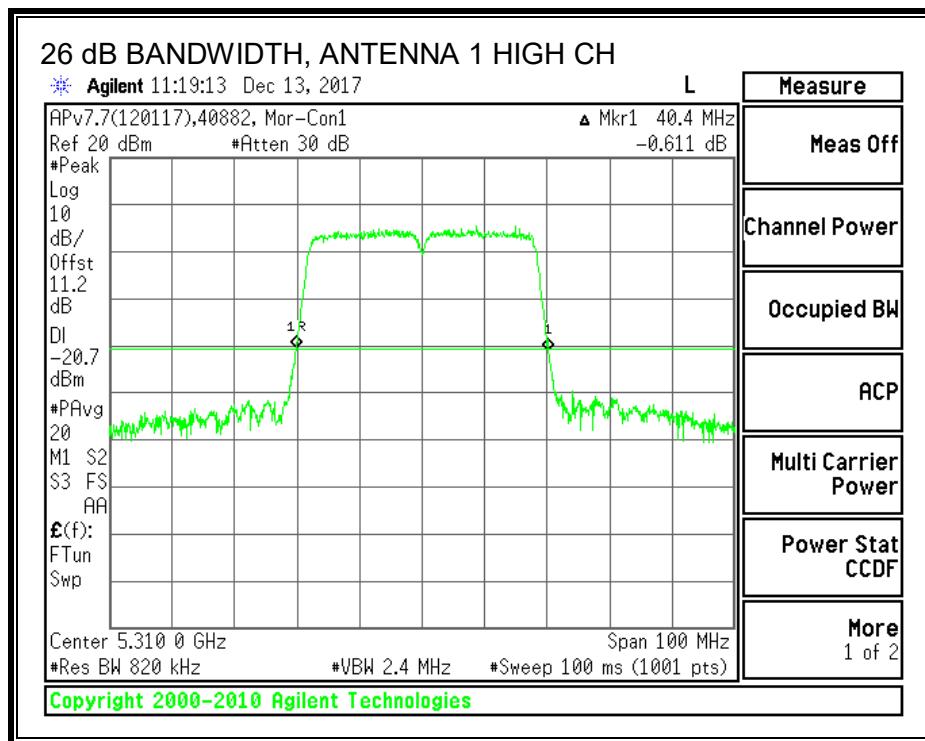
#### 26 dB BANDWIDTH, ANTENNA 0





## 26 dB BANDWIDTH, ANTENNA 1





### 9.7.2. 26 dB BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

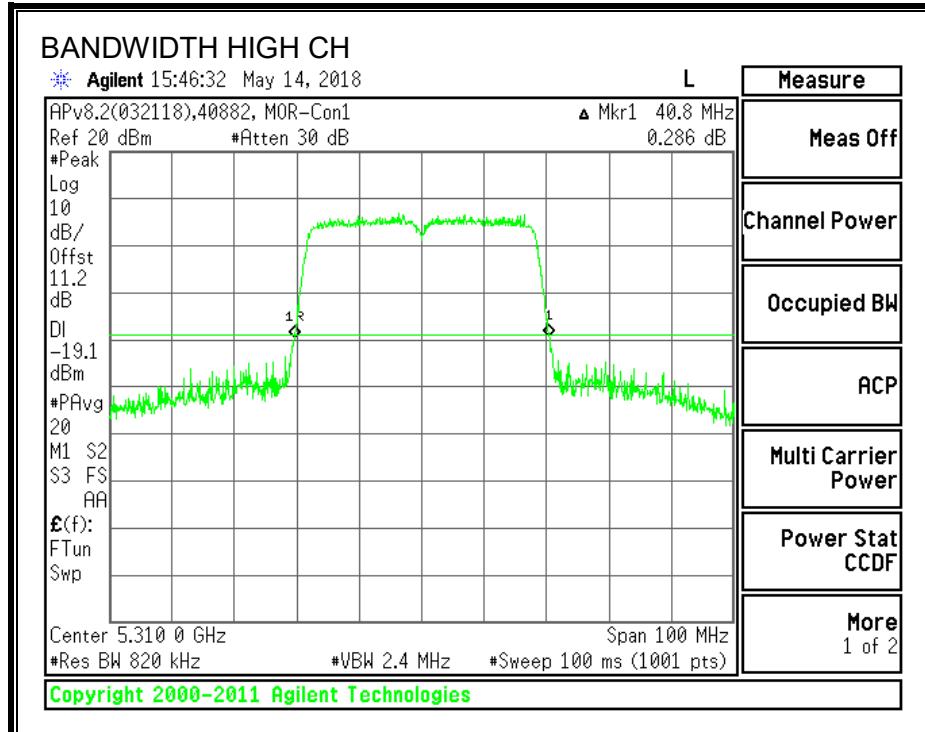
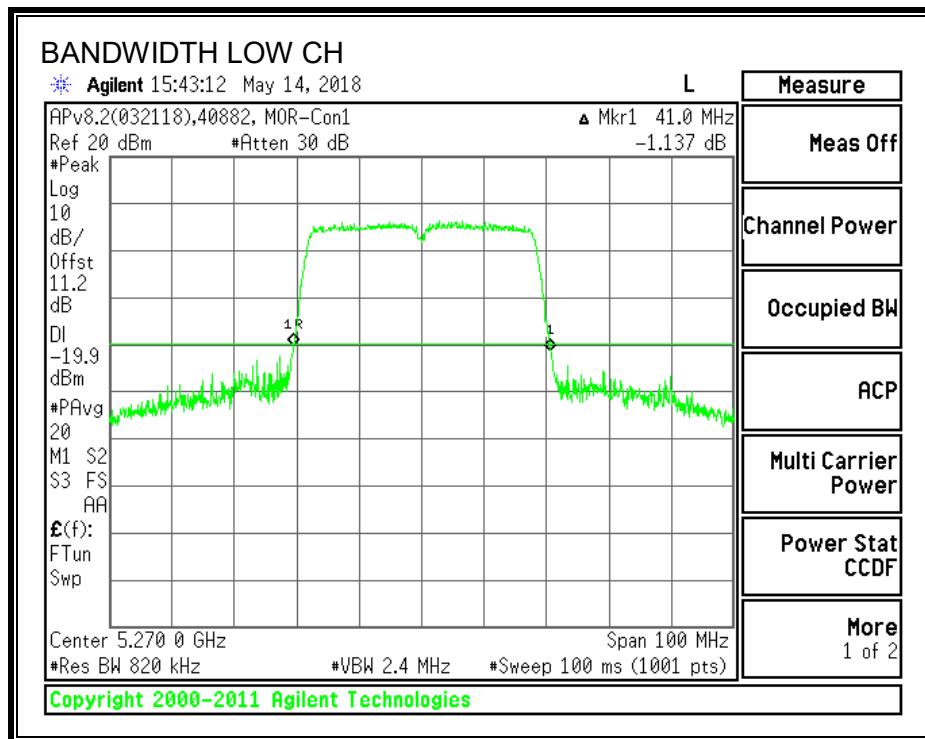
##### ANTENNA 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	41.00
High	5310	40.80

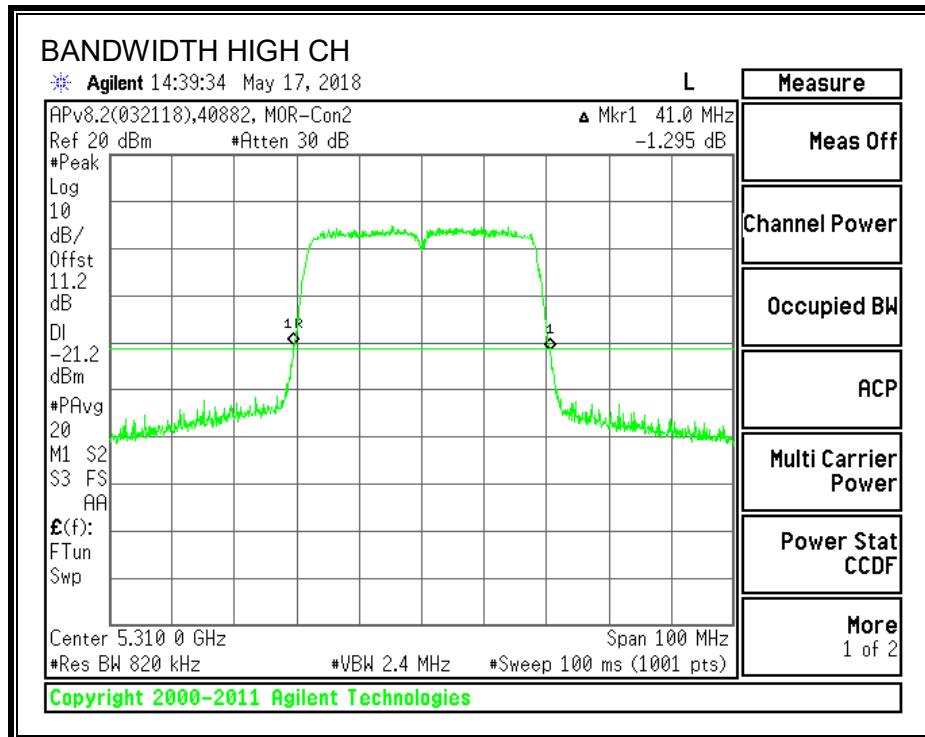
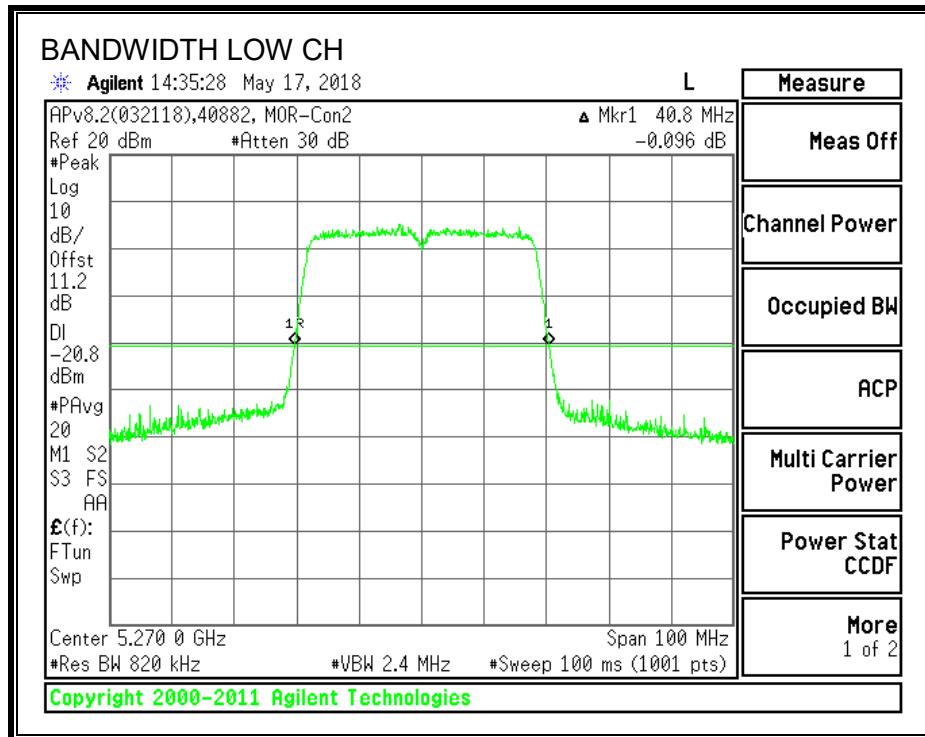
##### ANTENNA 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	40.80
High	5310	41.00

## 26 dB BANDWIDTH - ANTENNA 0



## 26 dB BANDWIDTH - ANTENNA 1



### 9.7.3. 99% BANDWIDTH - MIMO

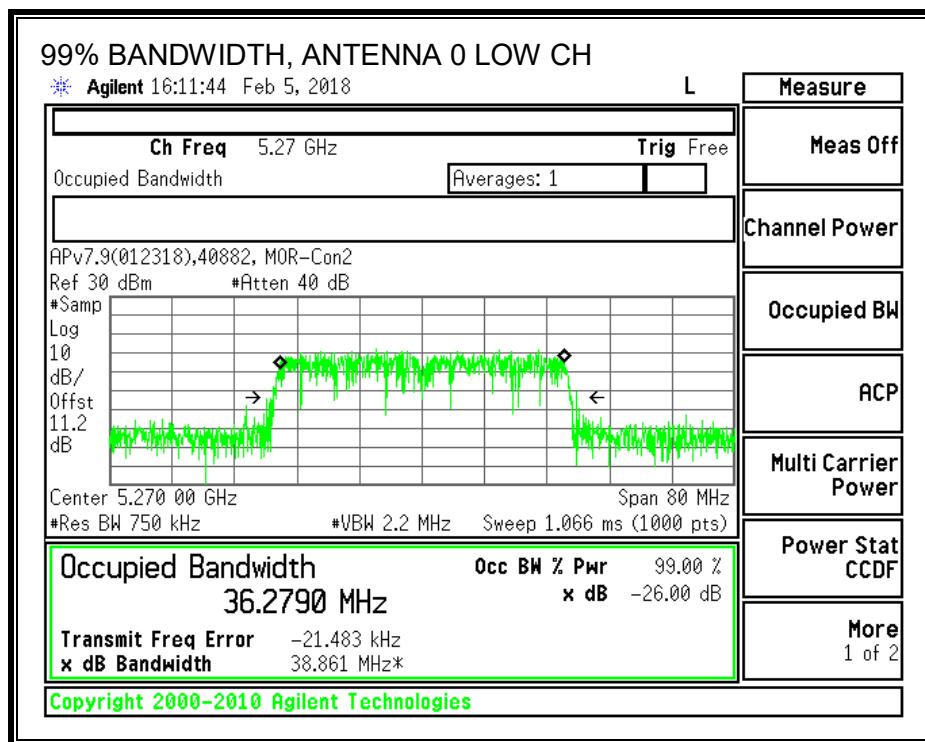
#### LIMITS

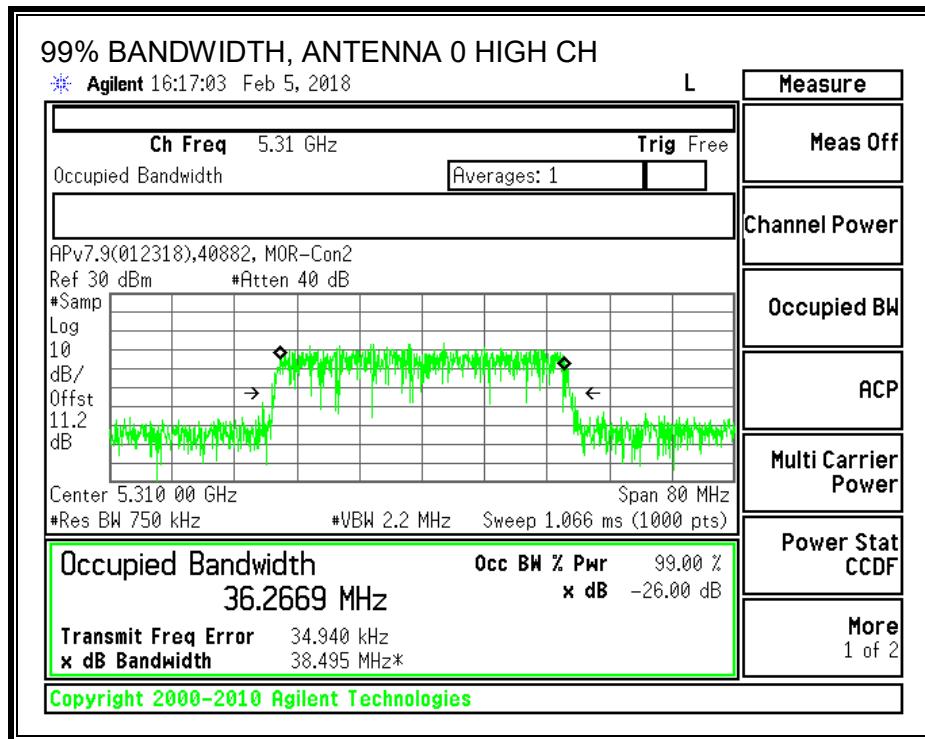
None; for reporting purposes only.

#### RESULTS

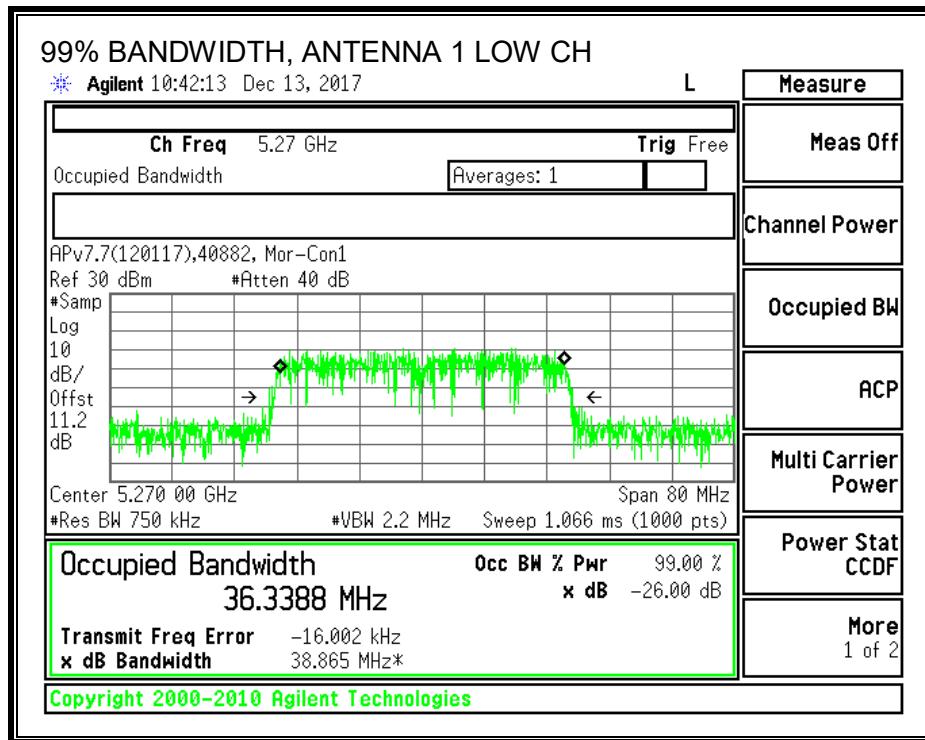
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5270	36.2790	36.3388
High	5310	36.2669	36.3279

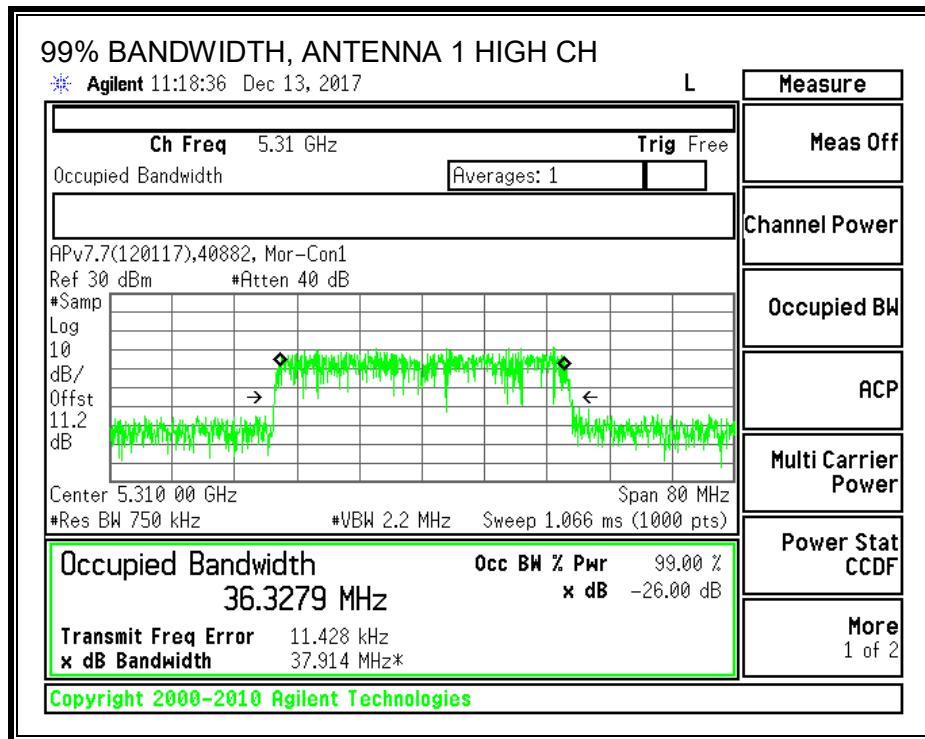
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





#### 9.7.4. 99% BANDWIDTH - SISO

##### LIMITS

None; for reporting purposes only.

##### RESULTS

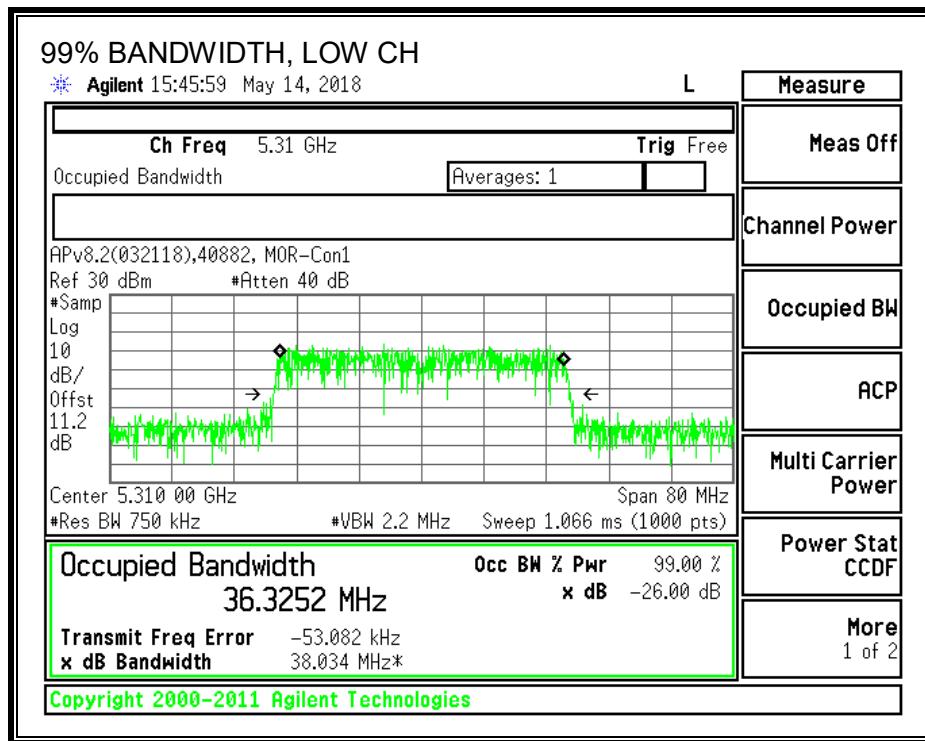
###### ANTENNA 0

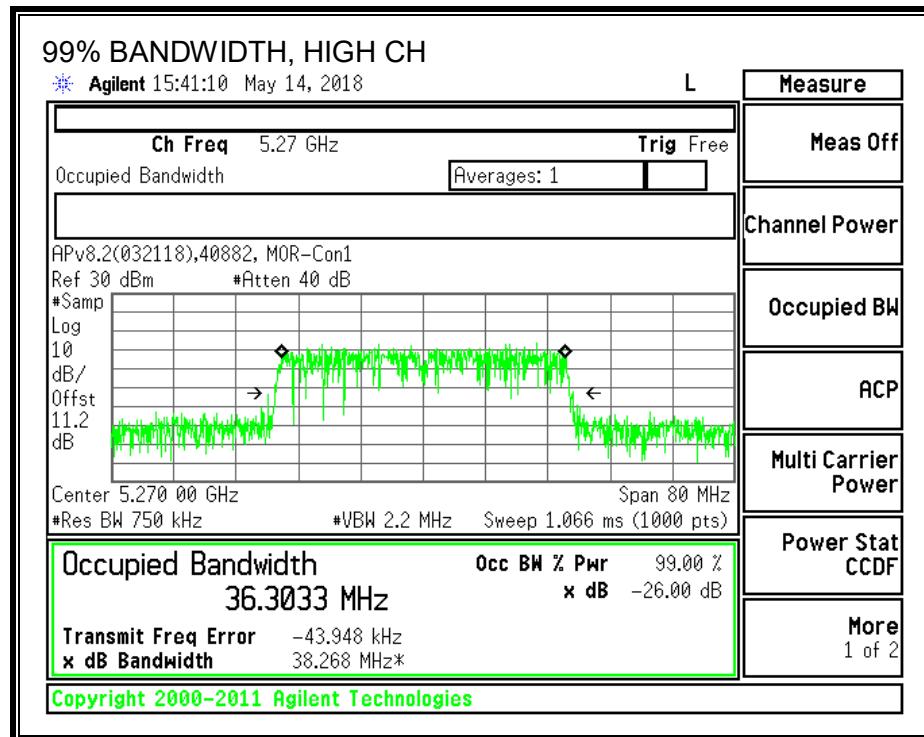
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	36.3252
High	5310	36.3033

###### ANTENNA 1

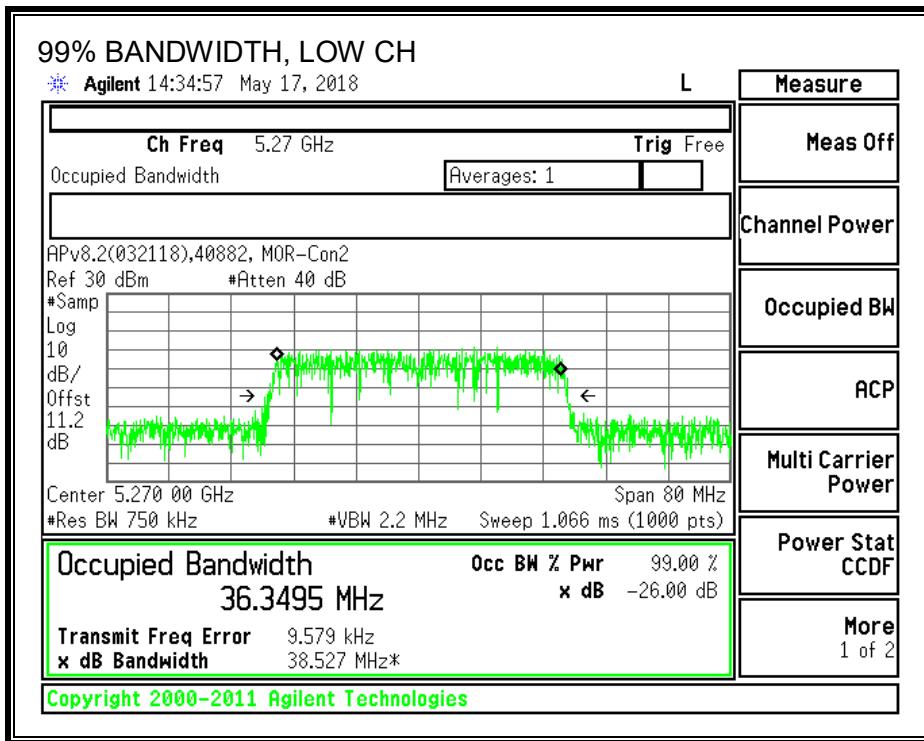
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	36.3495
High	5310	36.3860

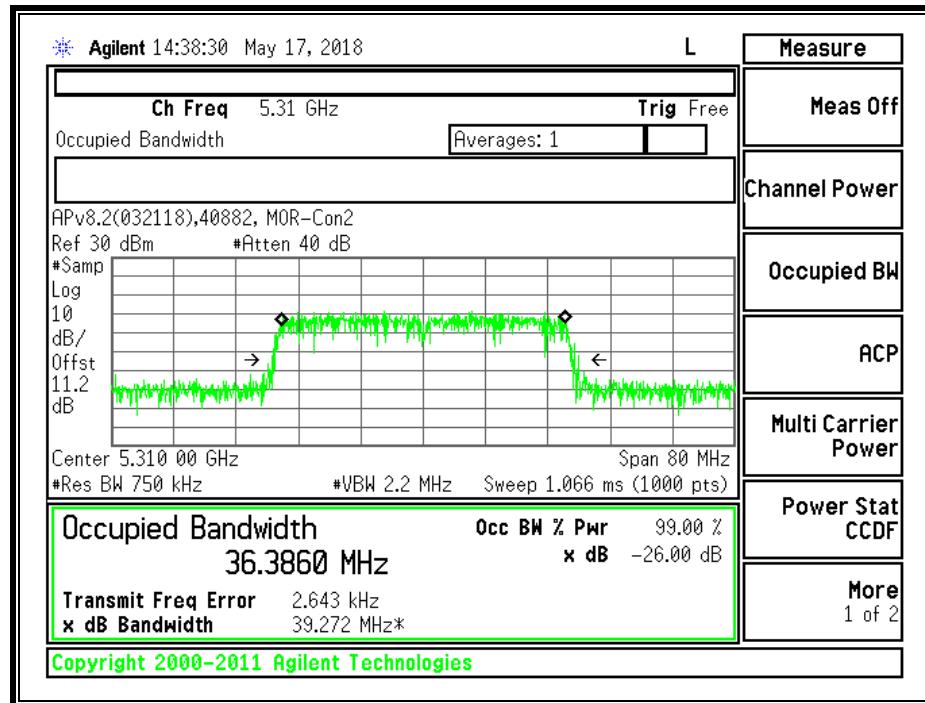
##### 99% BANDWIDTH – ANTENNA 0





### 99% BANDWIDTH – ANTENNA 1





### 9.7.5. OUTPUT POWER AND PSD - MIMO

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ISED RSS-247 Issue 2 Section 6.2.2.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

#### DIRECTIONAL ANTENNA GAIN

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.20	4.50	3.90

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.20	4.50	6.88

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	40.20	3.90	6.88	24.00	10.12
High	5310	40.40	3.90	6.88	24.00	10.12

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	10.10	11.11	13.73	24.00	-10.27
High	5310	10.14	11.22	13.81	24.00	-10.19

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	-1.90	-3.59	0.44	10.12	-9.68
High	5310	-1.80	-2.98	0.75	10.12	-9.37

## **RESULTS (ISED CONDUCTED POWER AND PSD)**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	36.28	24.00	11.00
High	5320	36.27	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	10.10	11.11	13.73	24.00	-10.27
High	5320	10.14	11.22	13.81	24.00	-10.19

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	-1.90	-3.59	0.44	11.00	-10.56
High	5320	-1.80	-2.98	0.75	11.00	-10.25

## **RESULTS (ISED EIRP)**

### **Bandwidth, Antenna Gain and Limits**

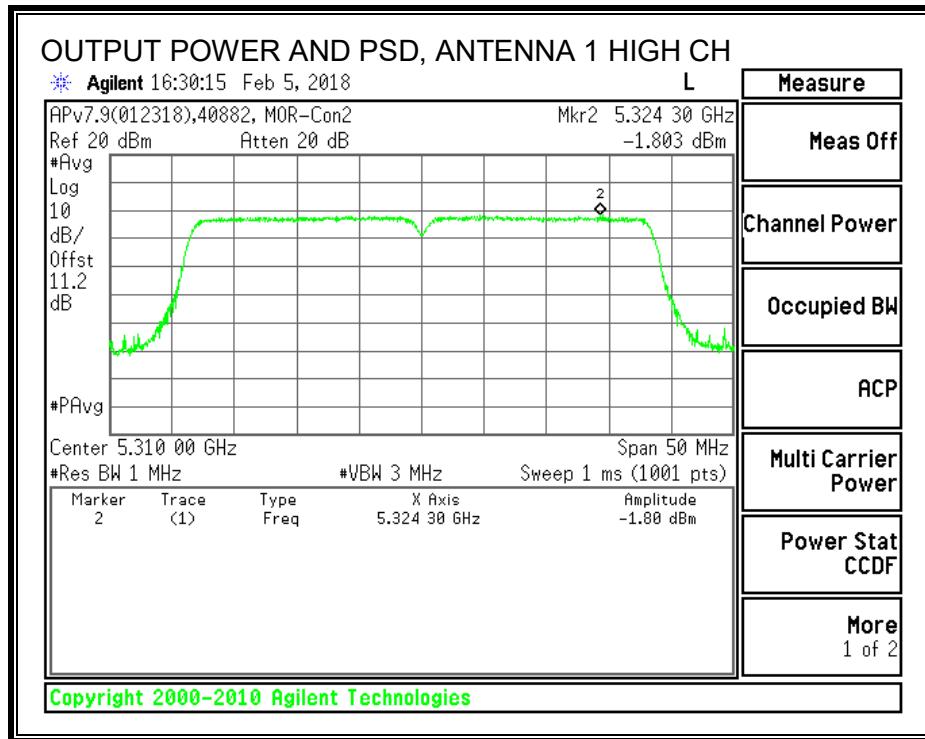
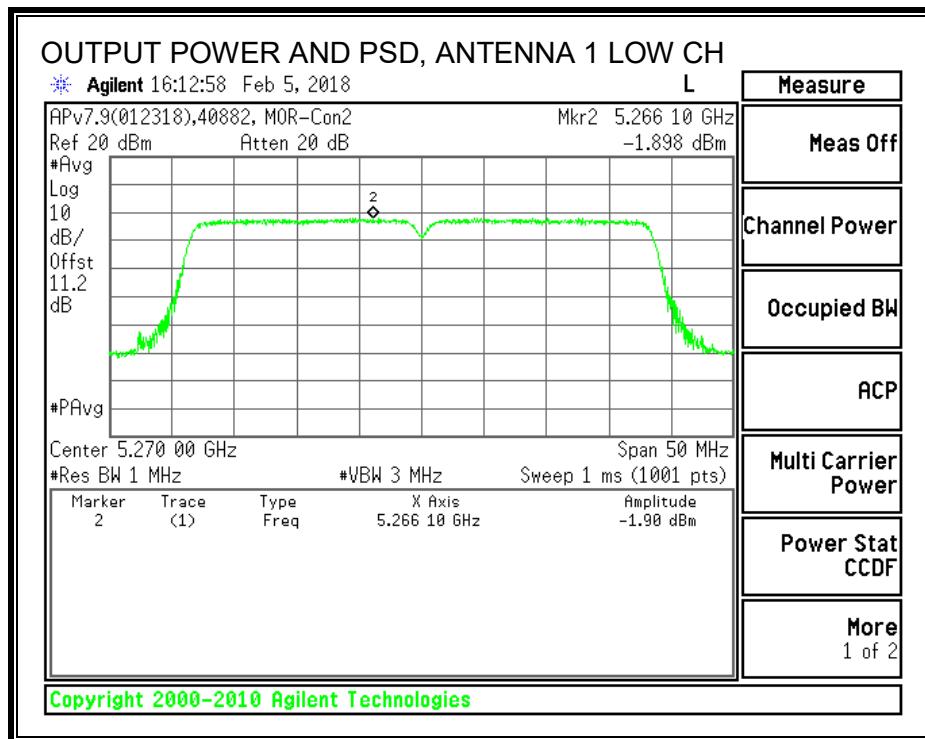
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Low	5270	36.28	3.90	30.00
High	5310	36.27	3.90	30.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

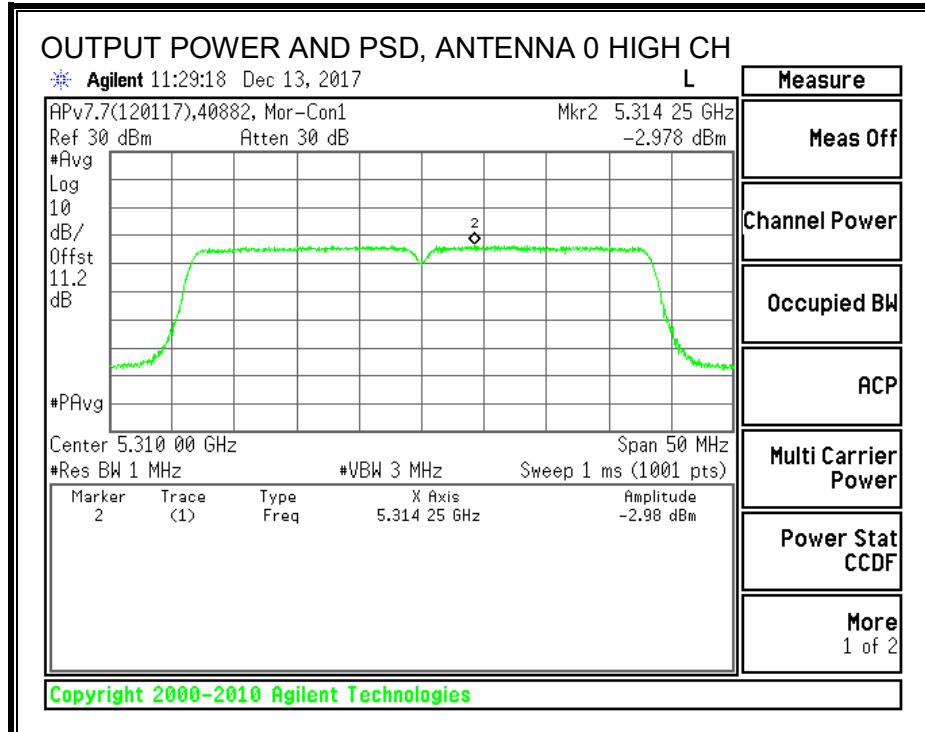
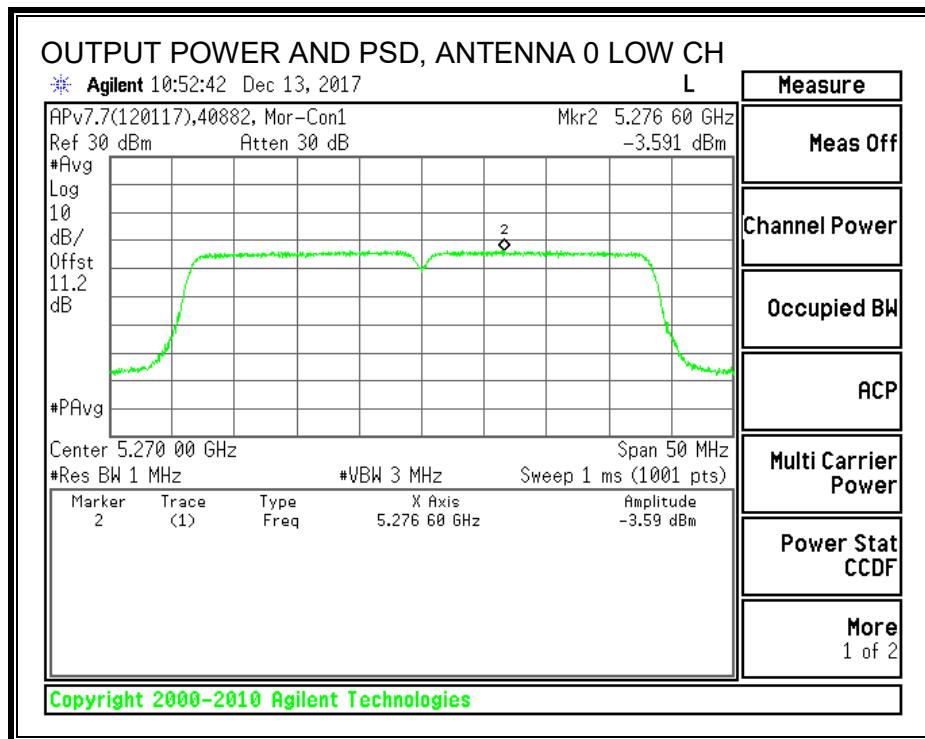
### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5270	10.10	11.11	17.63	30.00	-12.37
High	5310	10.14	11.22	17.71	30.00	-12.29

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



## 9.7.6. OUTPUT POWER AND PSD – SISO

### LIMITS

#### FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### ISED RSS-247 Issue 2 Section 6.2.2.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## **RESULTS (FCC) – ANTENNA 0**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	41.00	3.20	24.00	11.00
High	5310	40.80	3.20	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	12.80	12.89	24.00	-11.11
High	5310	12.97	13.06	24.00	-10.94

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	-3.00	-2.91	11.00	-13.91
High	5310	-2.73	-2.64	11.00	-13.64

## **RESULTS (FCC) – ANTENNA 1**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	40.80	4.50	24.00	11.00
High	5310	41.00	4.50	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	13.83	13.92	24.00	-10.08
High	5310	13.83	13.92	24.00	-10.08

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	-1.12	-1.03	11.00	-12.03
High	5310	-1.12	-1.03	11.00	-12.03

## **RESULTS (ISED CONDUCTED POWER AND PSD – ANTENNA 0**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	36.33	24.00	11.00
High	5310	36.30	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	12.80	12.89	24.00	-11.11
High	5310	12.97	13.06	24.00	-10.94

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	-3.00	-2.91	11.00	-13.91
High	5310	-2.73	-2.64	11.00	-13.64

## RESULTS (ISED CONDUCTED POWER AND PSD – ANTENNA 1

### Bandwidth and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	36.35	24.00	11.00
High	5310	36.39	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	13.83	13.92	24.00	-10.08
High	5310	13.83	13.92	24.00	-10.08

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	-1.12	-1.03	11.00	-12.03
High	5310	-1.12	-1.03	11.00	-12.03

## RESULTS (ISED EIRP) – ANTENNA 0

### Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Low	5270	36.33	3.20	30.00
High	5310	36.30	3.20	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5270	12.80	16.09	30.00	-13.91
High	5310	12.97	16.26	30.00	-13.74

## RESULTS (ISED EIRP) – ANTENNA 1

### Bandwidth, Antenna Gain and Limits

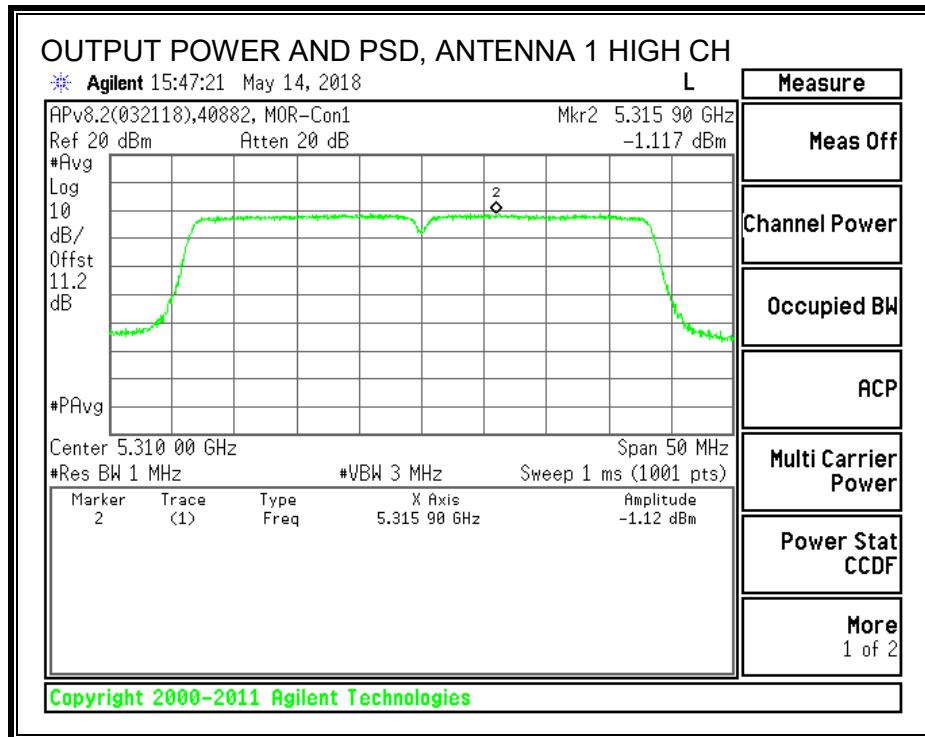
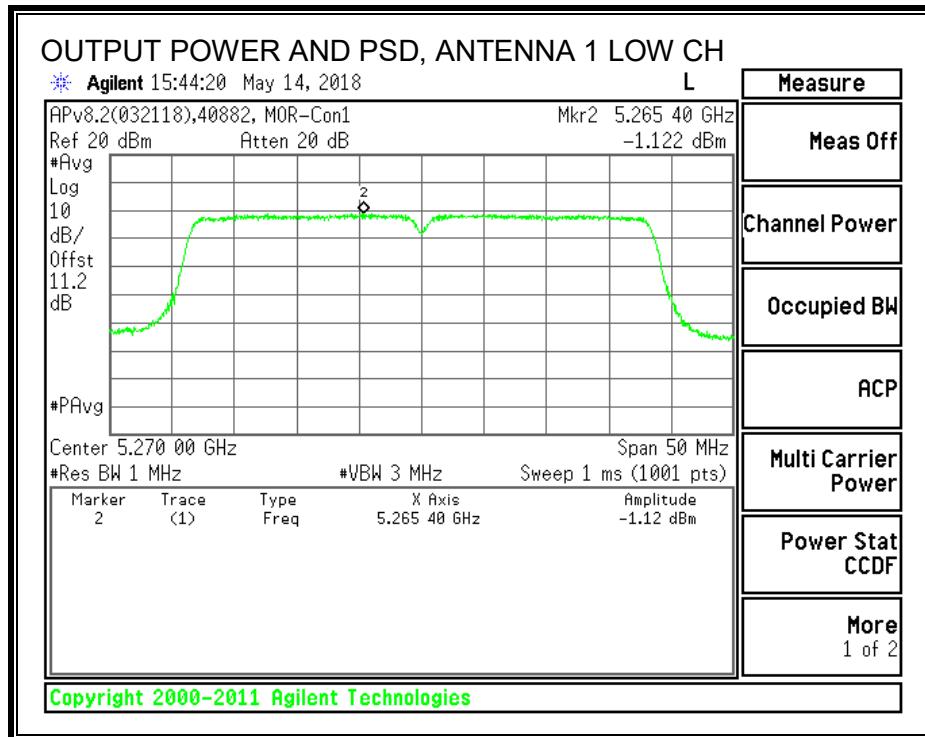
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Low	5270	36.35	4.50	30.00
High	5310	36.39	4.50	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

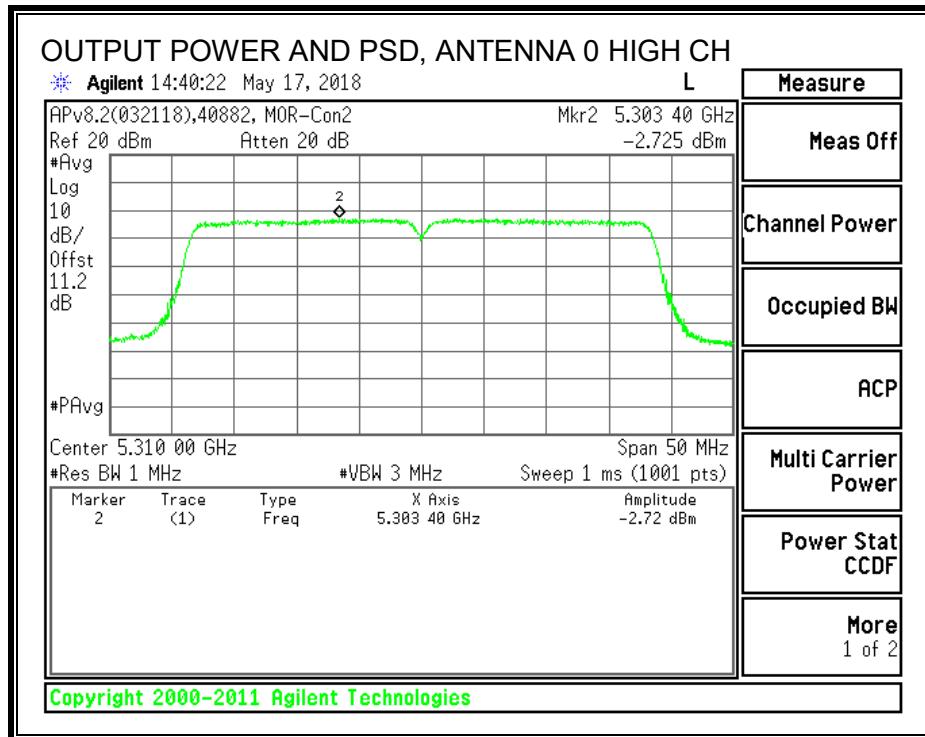
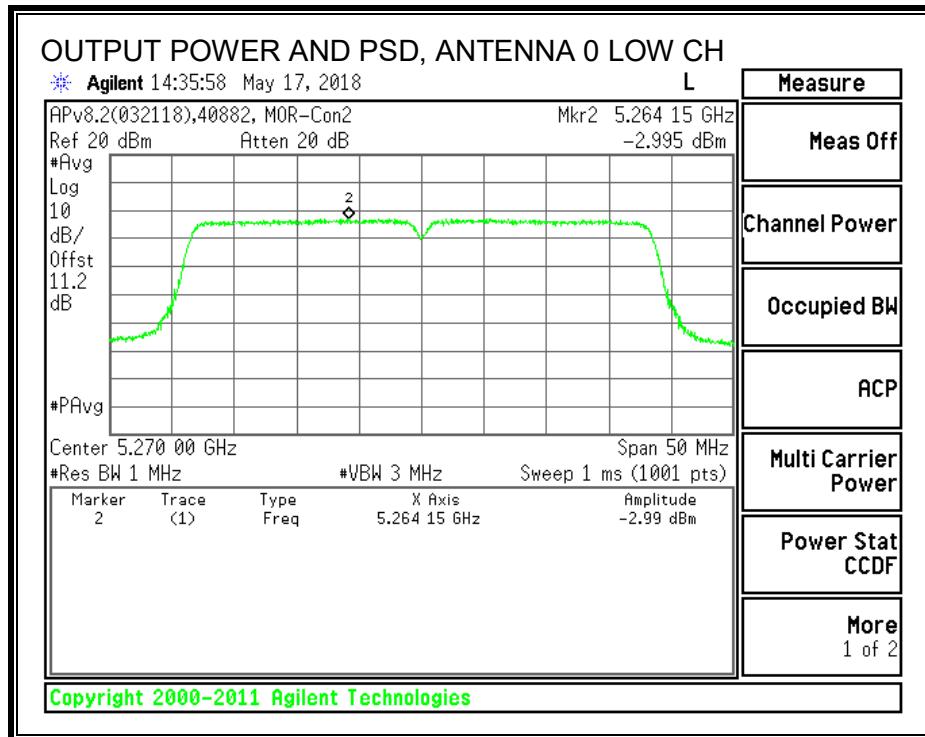
### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5270	13.83	18.42	30.00	-11.58
High	5310	13.83	18.42	30.00	-11.58

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



## 9.8.802.11ac VHT80 MODE IN THE 5.3 GHz BAND

### 9.8.1. 26 dB BANDWIDTH - MIMO

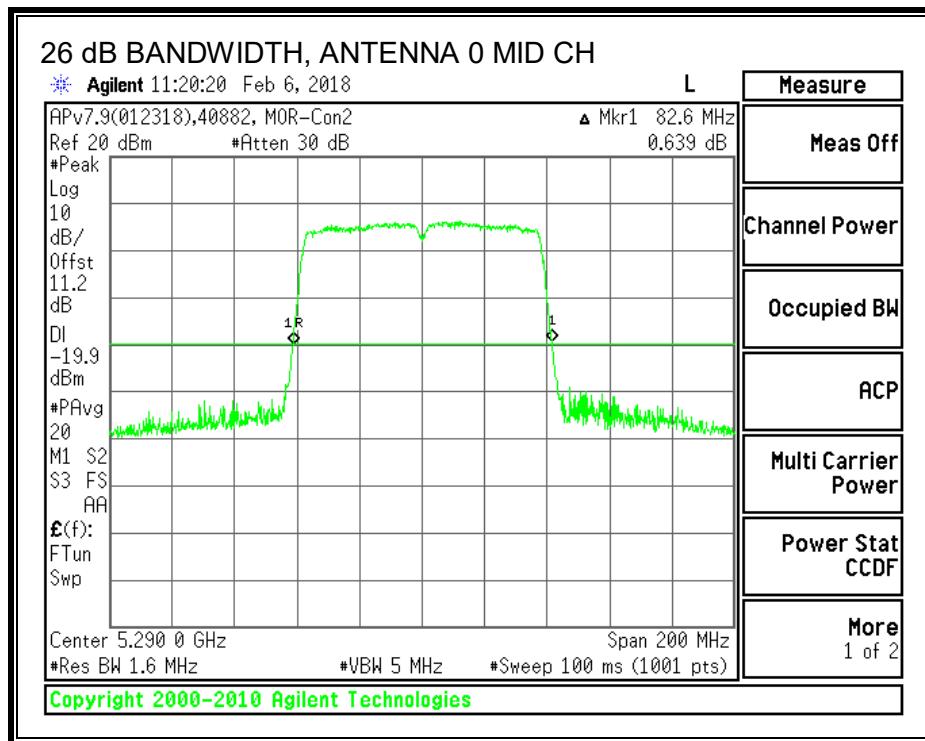
#### LIMITS

None; for reporting purposes only.

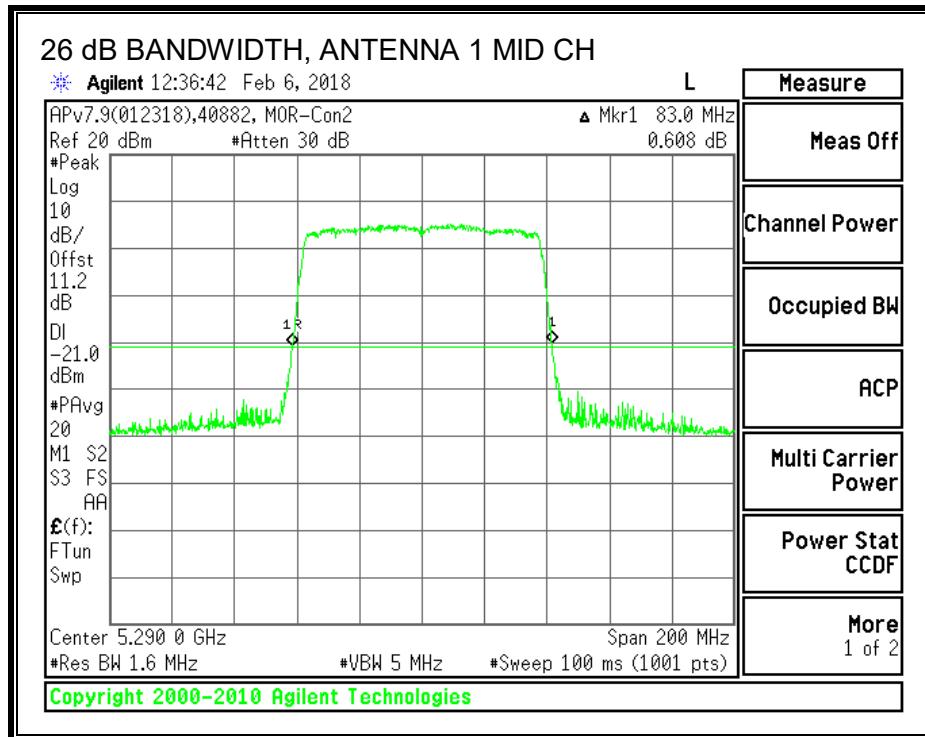
#### RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Mid	5290	82.60	83.00

#### 26 dB BANDWIDTH, ANTENNA 0



## 26 dB BANDWIDTH, ANTENNA 1



### 9.8.2. 26 dB BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

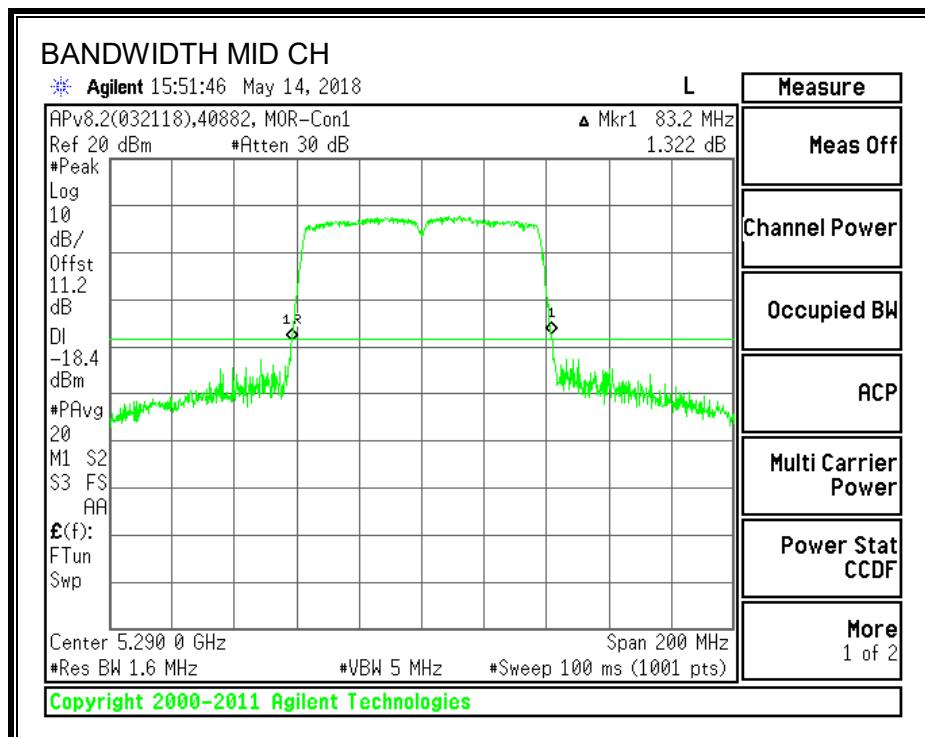
##### ANTENNA 0

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5290	83.20

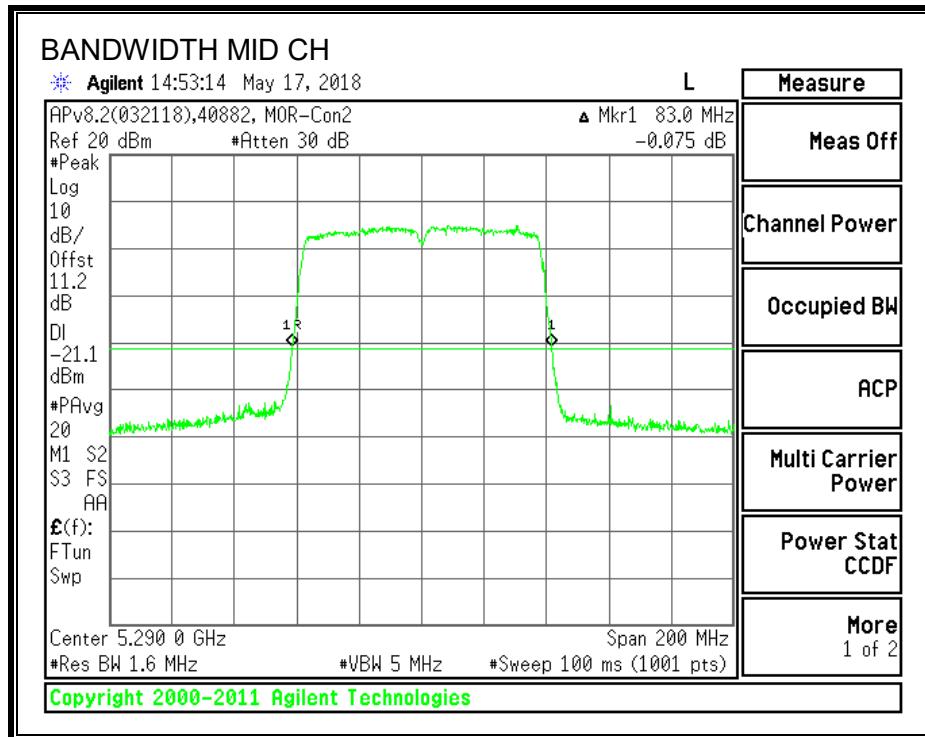
##### ANTENNA 1

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5290	83.00

#### 26 dB BANDWIDTH – ANTENNA 0



## 26 dB BANDWIDTH – ANTENNA 1



### 9.8.3. 99% BANDWIDTH - MIMO

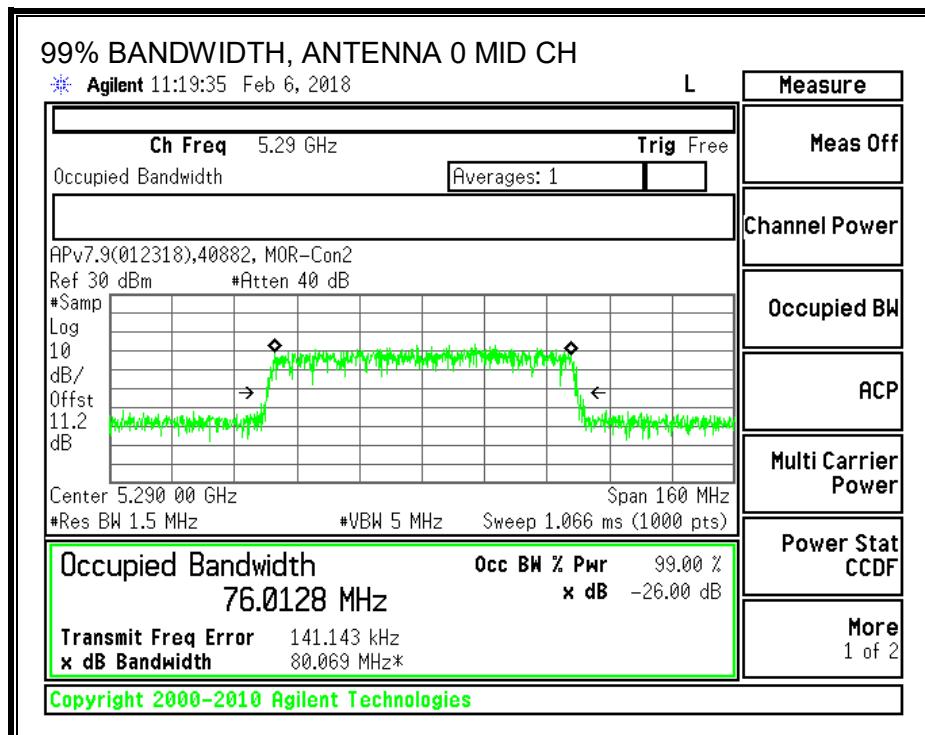
#### LIMITS

None; for reporting purposes only.

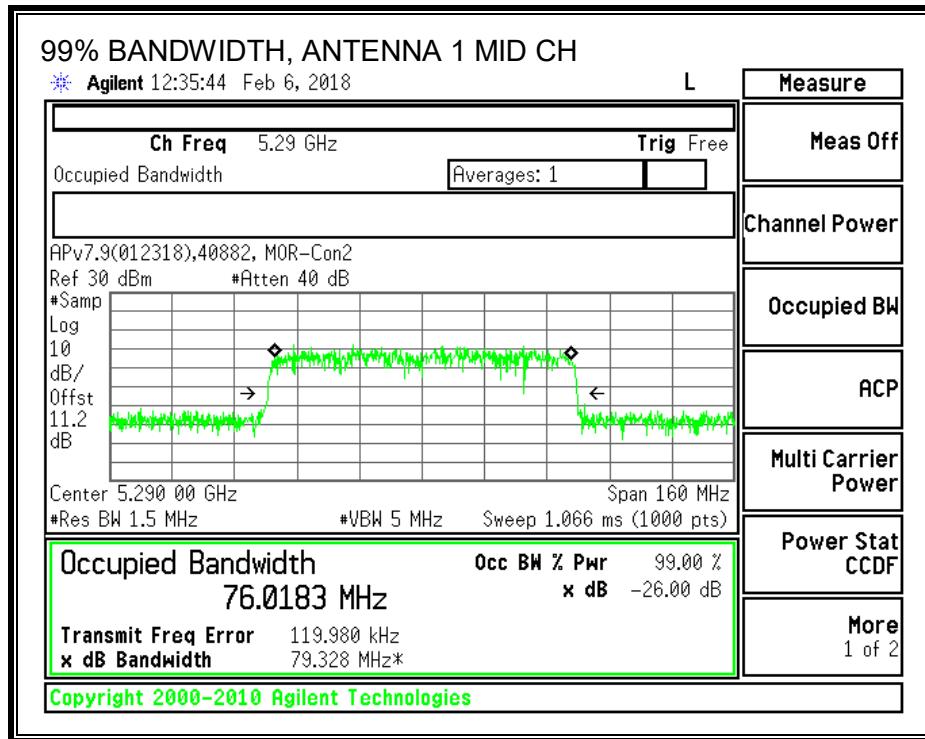
#### RESULTS

Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Mid	5290	76.0128	76.0183

#### 99% BANDWIDTH, ANTENNA 0



## 99% BANDWIDTH, ANTENNA 1



#### 9.8.4. 99% BANDWIDTH - SISO

##### LIMITS

None; for reporting purposes only.

##### RESULTS

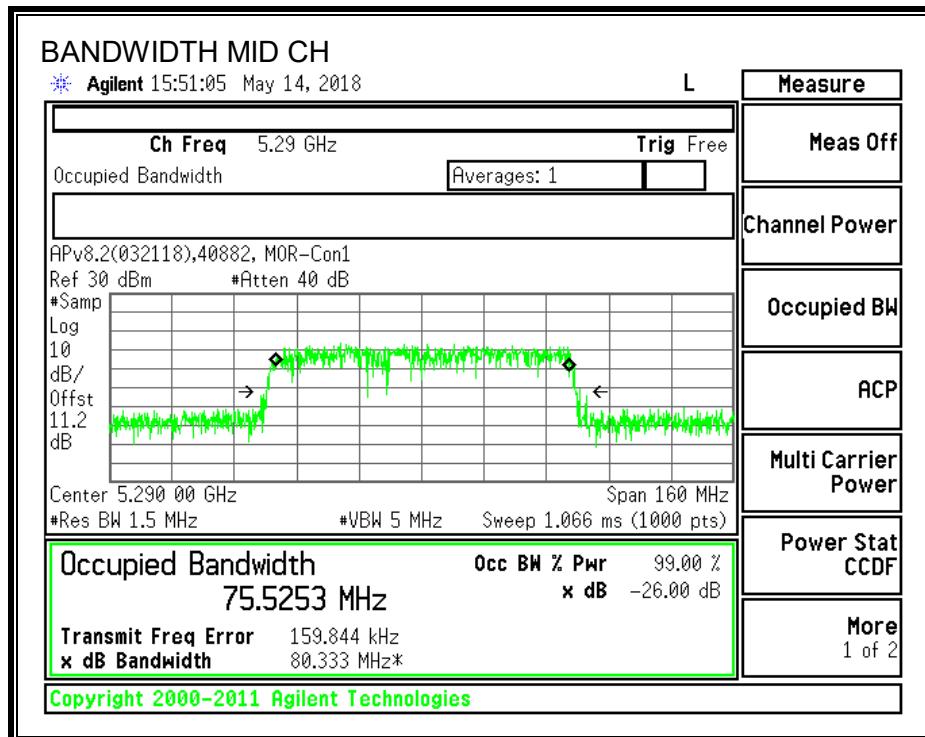
###### ANTENNA 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5290	75.5253

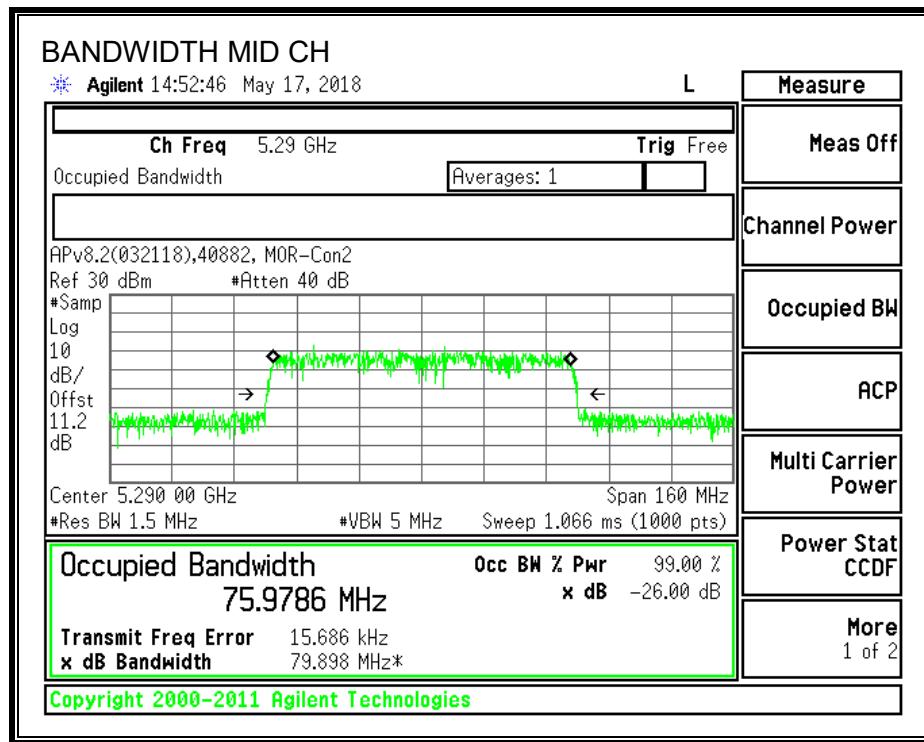
###### ANTENNA 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5290	75.9786

##### 99% BANDWIDTH – ANTENNA 0



**99% BANDWIDTH – ANTENNA 1**



### 9.8.5. OUTPUT POWER AND PSD - MIMO

#### LIMITS

##### FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### ISED RSS-247 Issue 2 Section 6.2.2.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

#### DIRECTIONAL ANTENNA GAIN

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
3.20	4.50	3.90

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
3.20	4.50	6.88

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5290	82.60	3.90	6.88	24.00	10.12

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	9.14	10.12	12.86	24.00	-11.14

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5290	-5.52	-6.54	-2.80	10.12	-12.92

### RESULTS (ISED CONDUCTED POWER AND PSD)

#### Bandwidth and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5290	76.01	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	9.14	10.12	12.86	24.00	-11.14

#### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5290	-5.52	-6.54	-2.80	11.00	-13.80

### RESULTS (ISED EIRP)

#### Bandwidth, Antenna Gain and Limits

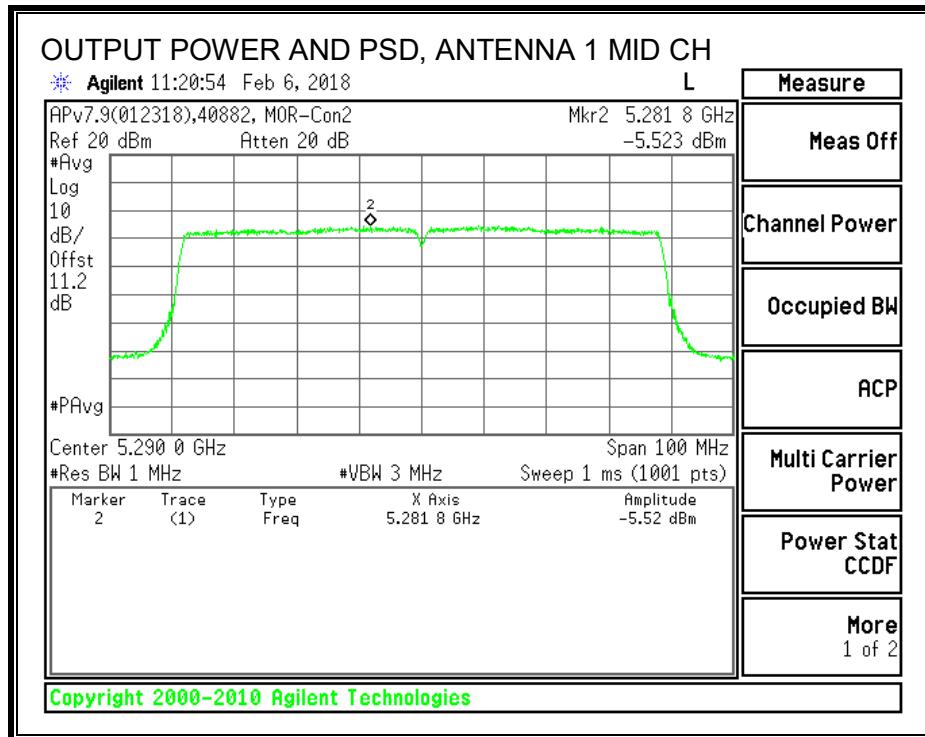
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Mid	5290	76.01	3.90	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

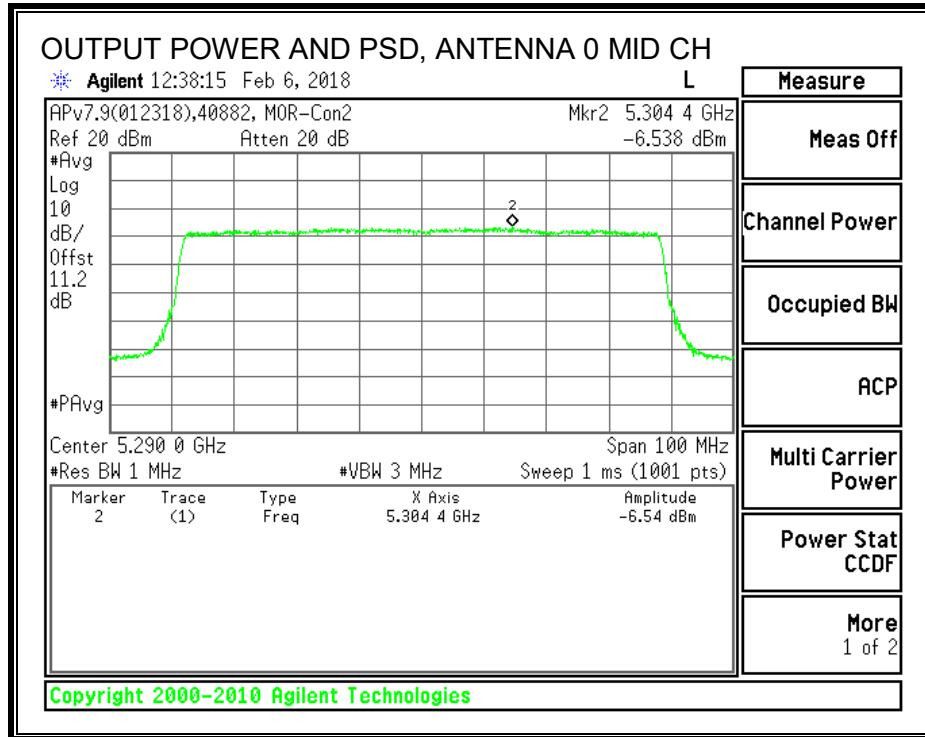
#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Mid	5290	9.14	10.12	16.76	30.00	-13.24

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



### 9.8.6. OUTPUT POWER AND PSD - SISO

#### LIMITS

##### FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### ISED RSS-247 Issue 2 Section 6.2.2.1

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or  $1.76 + 10 \log_{10} B$ , dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

- a) The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
- b) The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

#### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## RESULTS (FCC) – ANTENNA 0

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5290	83.20	3.20	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	12.45	12.64	24.00	-11.36

### PPSD Results

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5290	-7.06	-6.87	11.00	-17.87

## RESULTS (FCC) – ANTENNA 1

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5290	83.00	4.50	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	12.87	13.06	24.00	-10.94

### PPSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5290	-4.27	-4.08	11.00	-15.08

## **RESULTS (ISED CONDUCTED POWER AND PSD – ANTENNA 0**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5290	75.53	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	12.45	12.64	24.00	-11.36

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5290	-7.06	-6.87	11.00	-17.87

## **RESULTS (ISED CONDUCTED POWER AND PSD – ANTENNA 1**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Mid	5290	75.98	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	12.87	13.06	24.00	-10.94

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5290	-4.27	-4.08	11.00	-15.08

## RESULTS (ISED EIRP) – ANTENNA 0

### Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Mid	5290	75.53	3.20	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Mid	5290	12.45	15.84	30.00	-14.16

## RESULTS (ISED EIRP) – ANTENNA 1

### Bandwidth, Antenna Gain and Limits

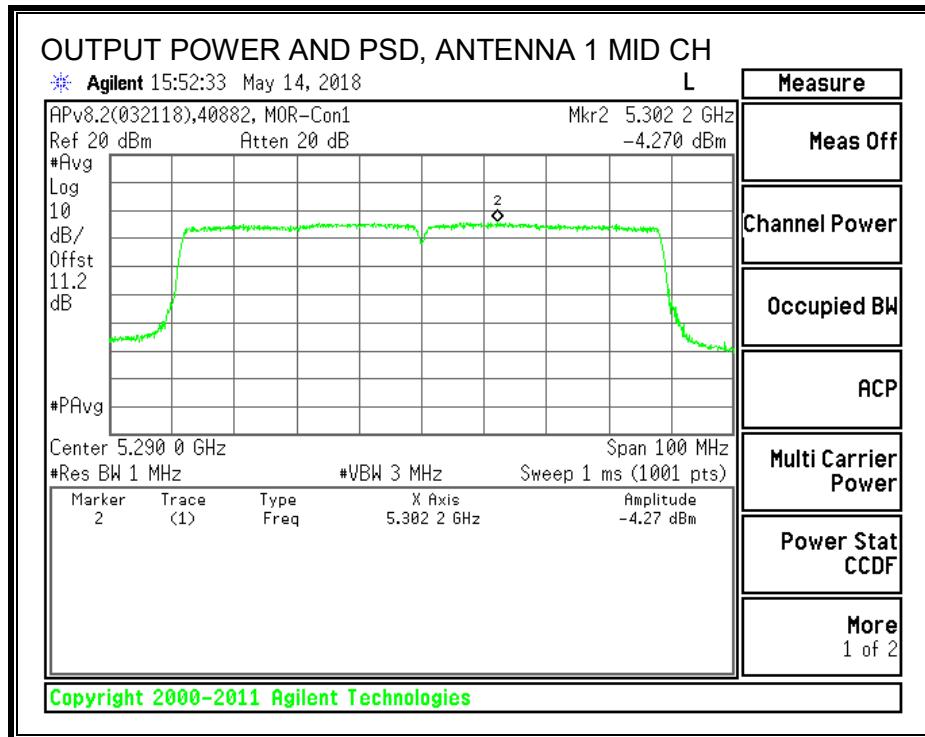
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant Gain (dBi)	EIRP Limit (dBm)
Mid	5290	75.98	4.50	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

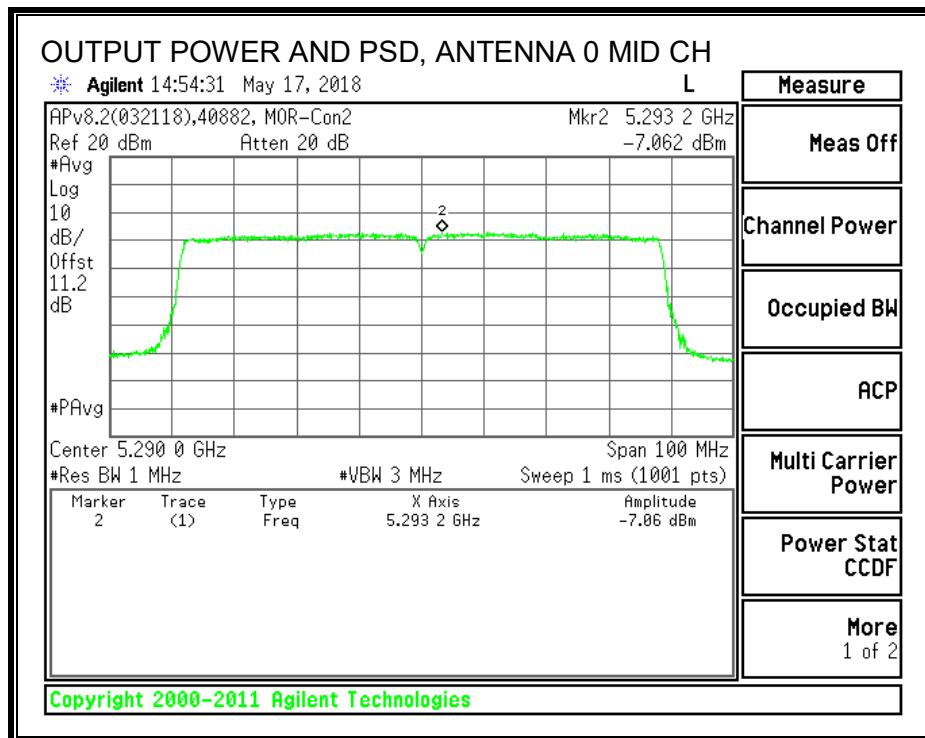
### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Mid	5290	12.87	17.56	30.00	-12.44

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



## 9.9.802.11a MODE IN THE 5.6 GHz BAND

### 9.9.1. 26 dB BANDWIDTH

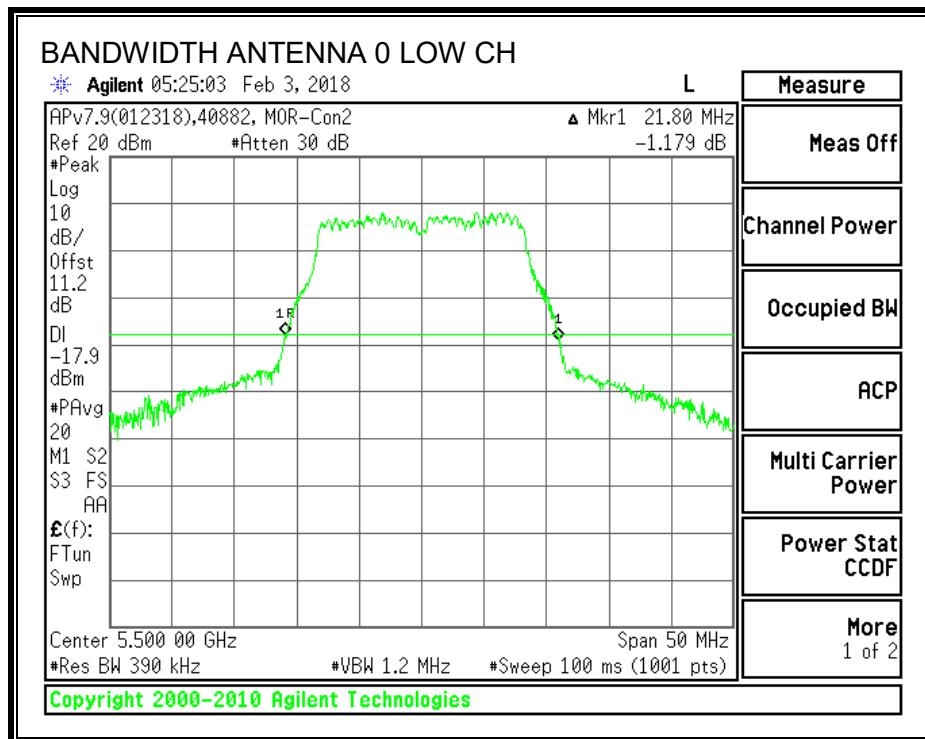
#### LIMITS

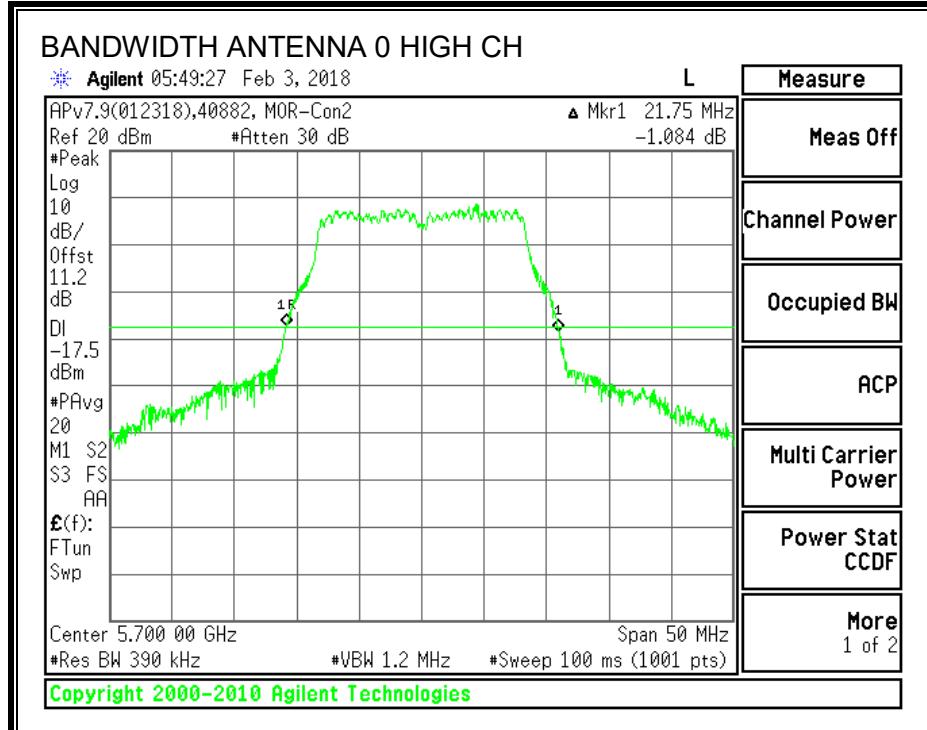
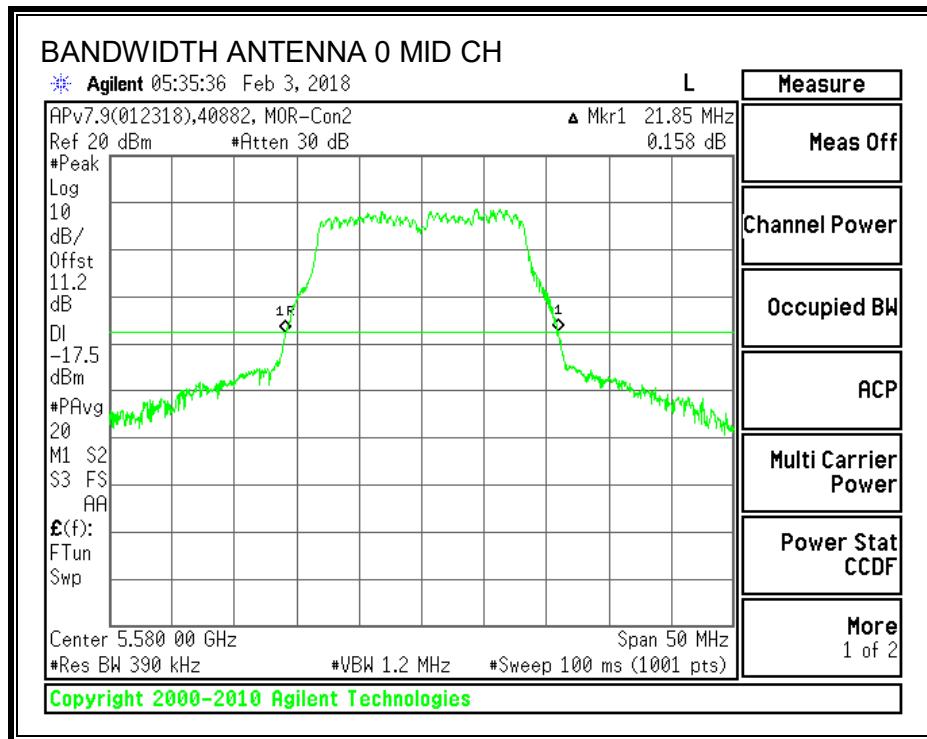
None; for reporting purposes only.

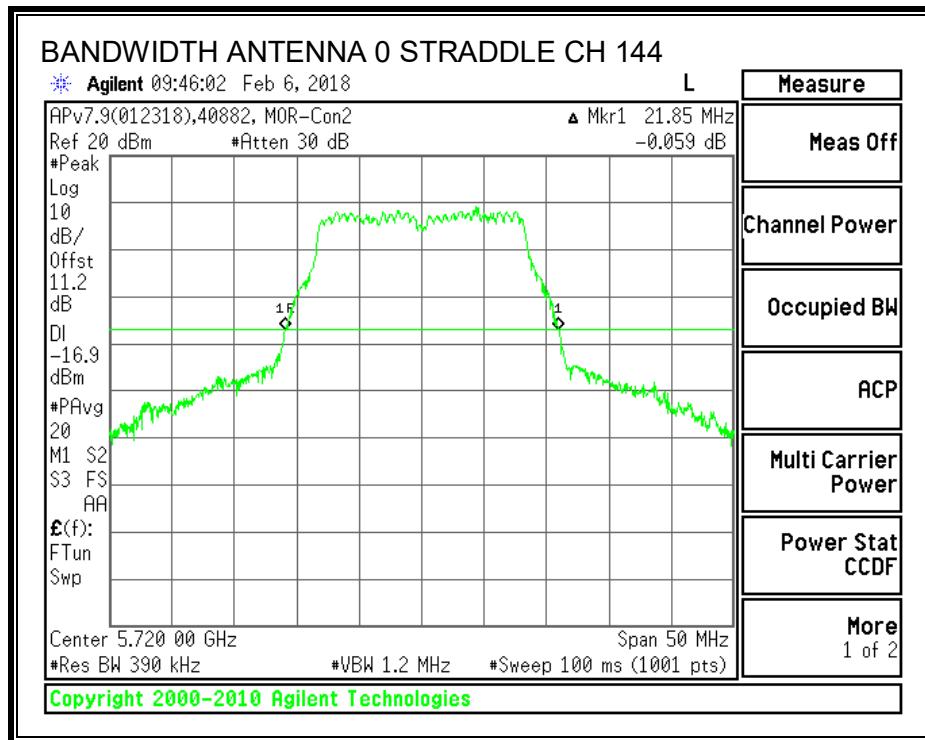
#### RESULTS

Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5500	21.80	21.95
Mid	5580	21.85	21.95
High	5700	21.75	21.90
144	5720	21.85	22.15

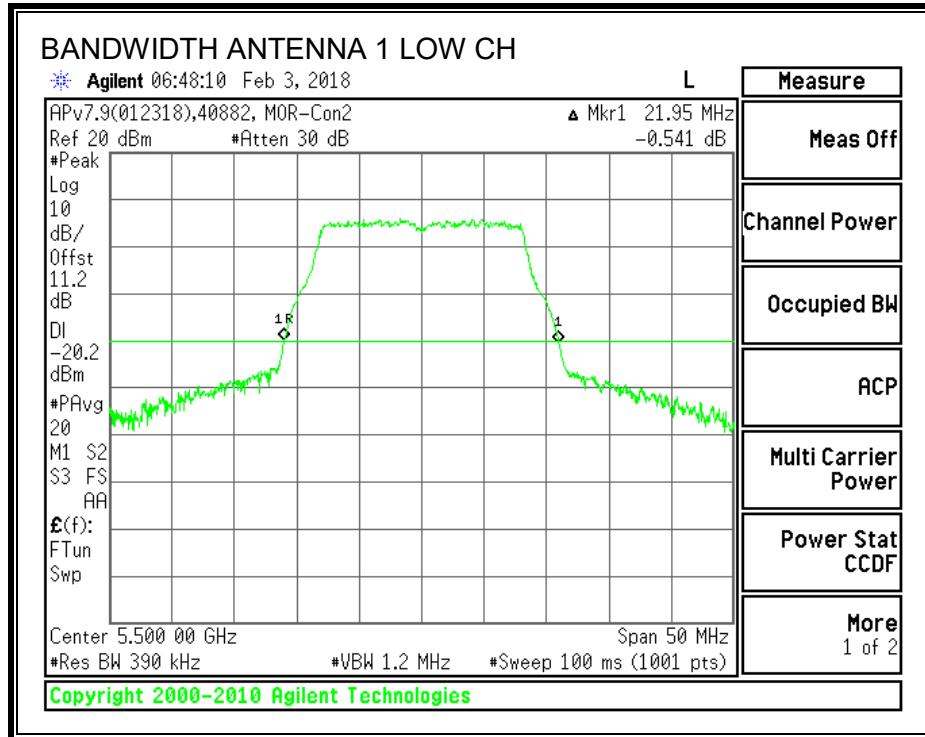
#### 26 dB BANDWIDTH, ANTENNA 0

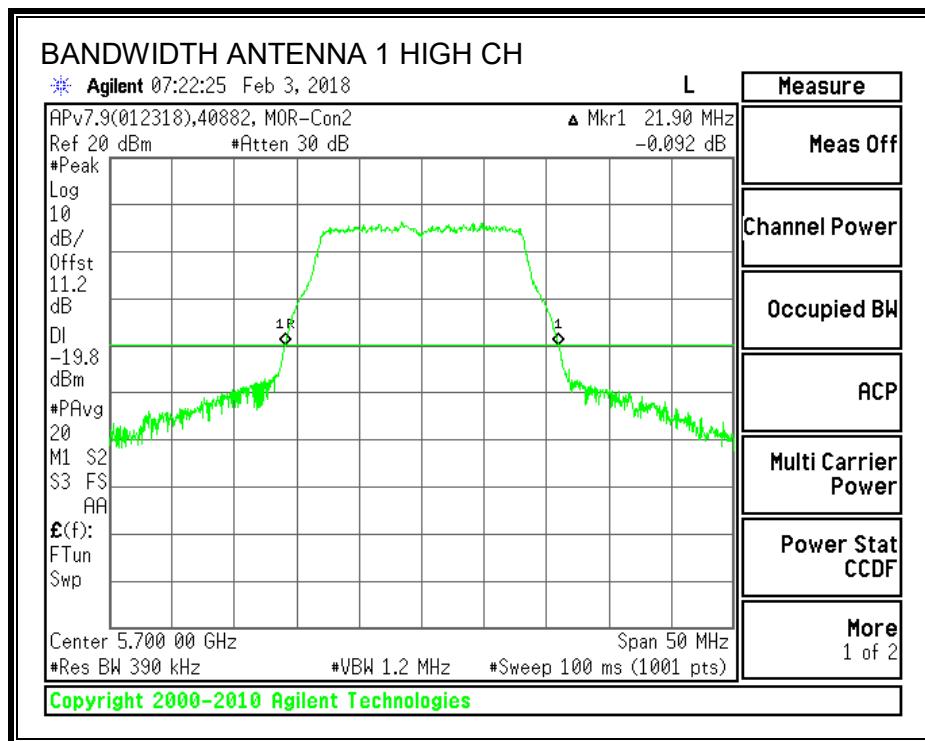
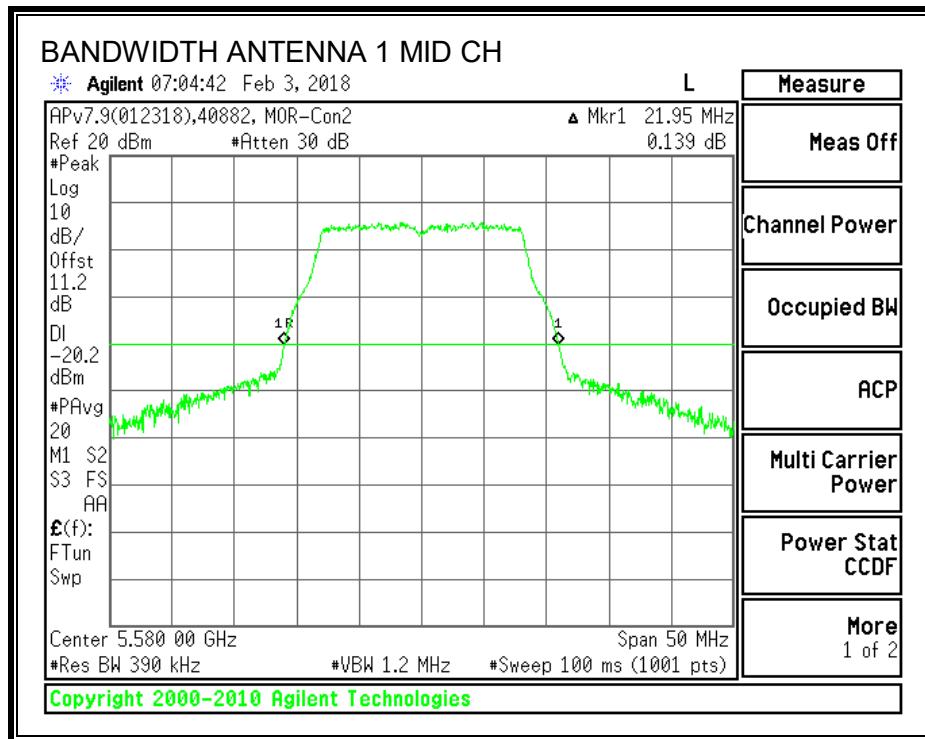


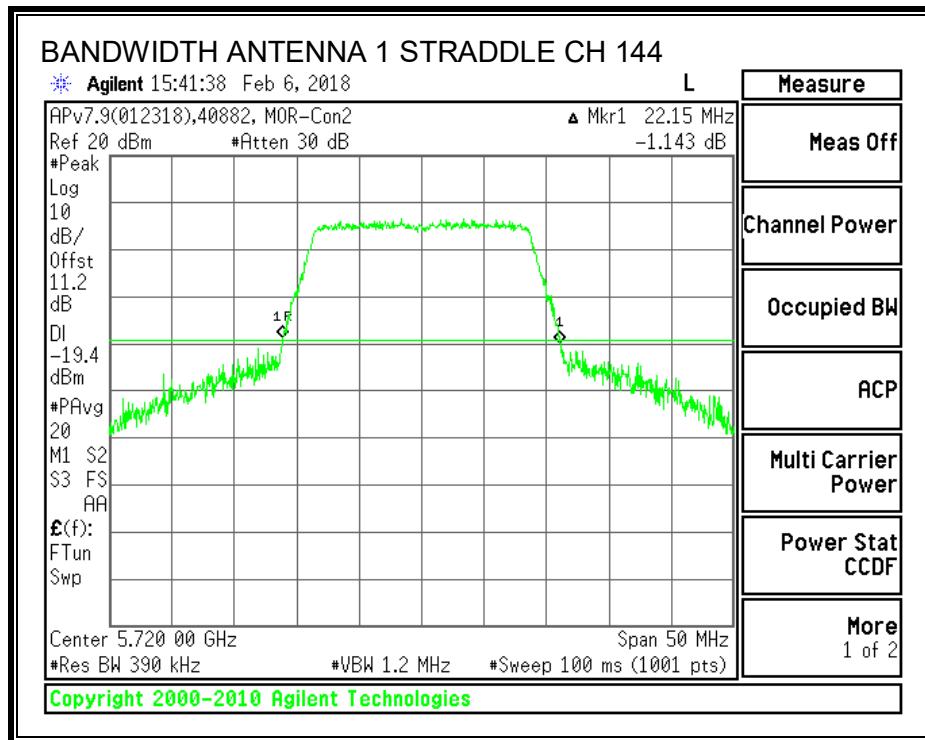




## 26 dB BANDWIDTH, ANTENNA 1







### 9.9.2. 99% BANDWIDTH

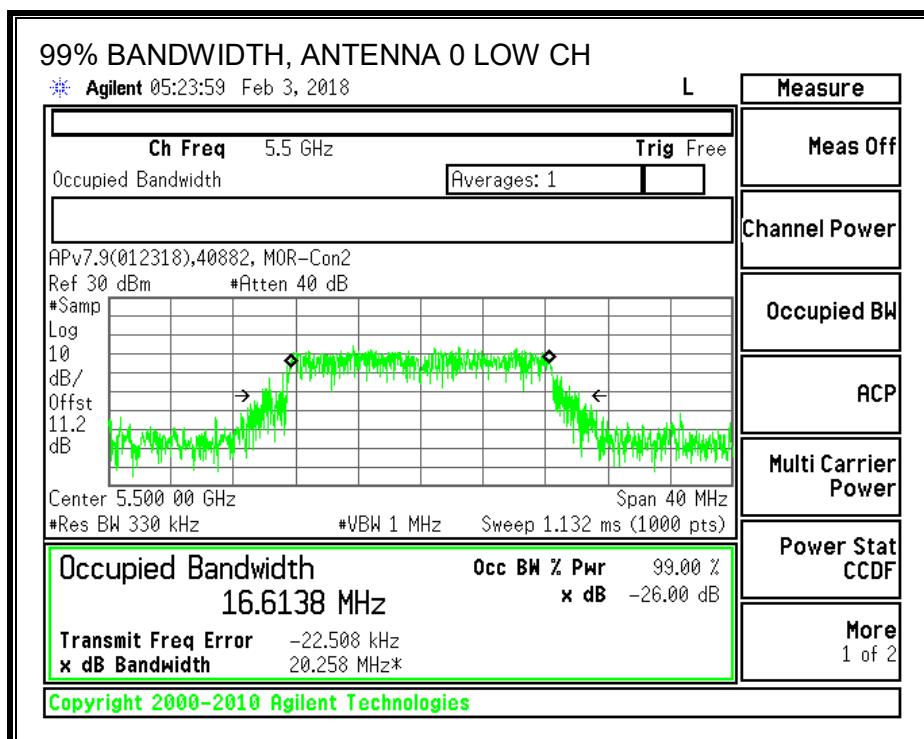
#### LIMITS

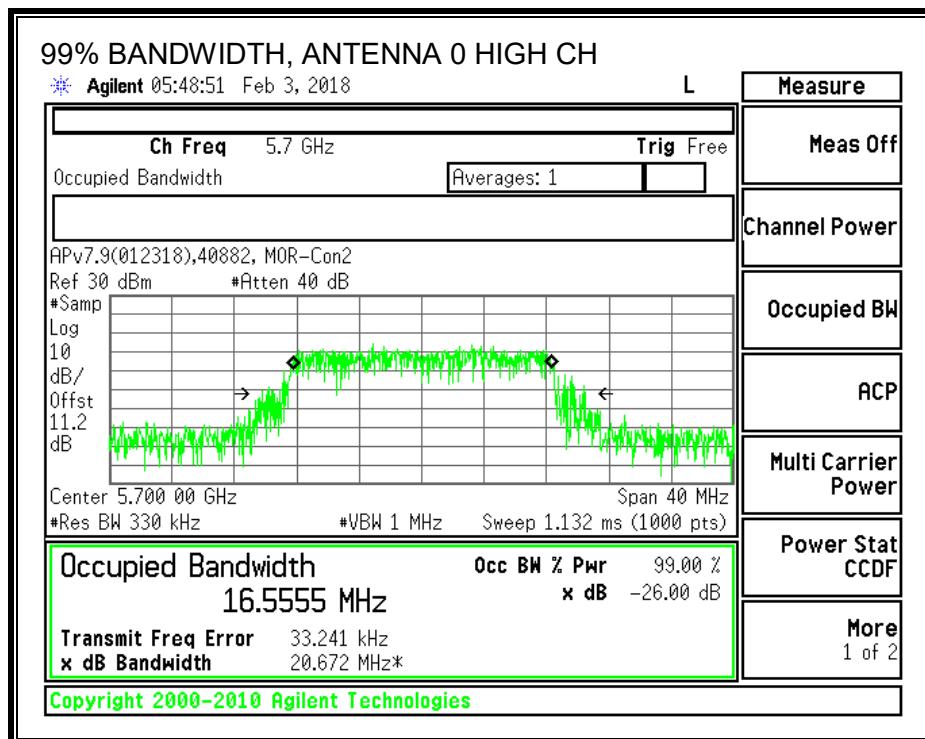
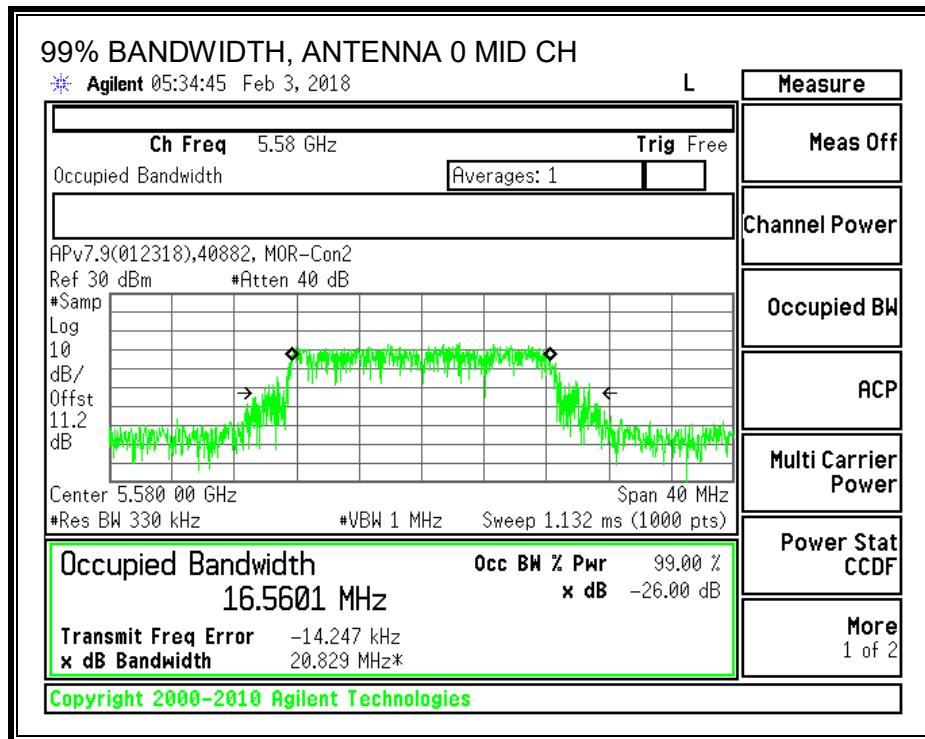
None; for reporting purposes only.

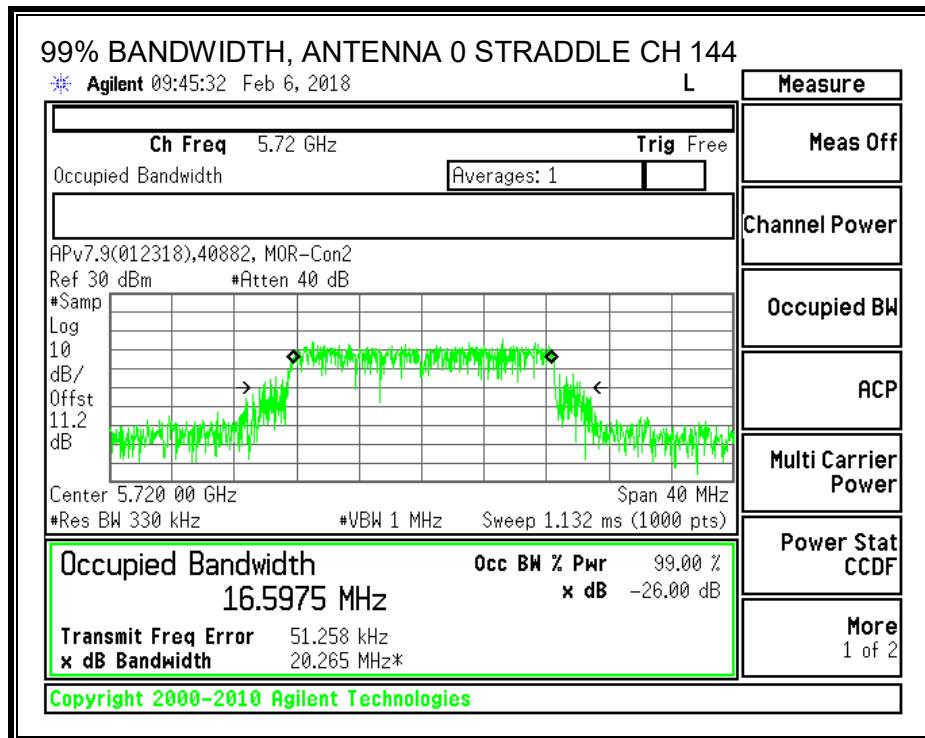
#### RESULTS

Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5500	16.6138	16.6861
Mid	5580	16.5601	16.5631
High	5700	16.5555	16.5713
144	5720	16.5975	17.8383

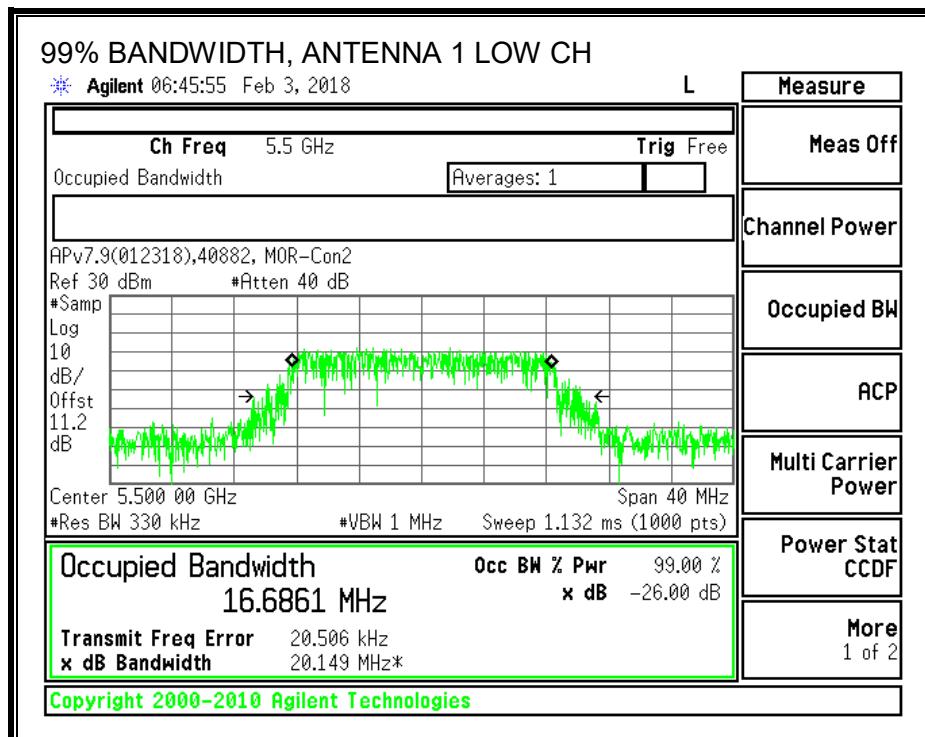
#### 99% BANDWIDTH, ANTENNA 0

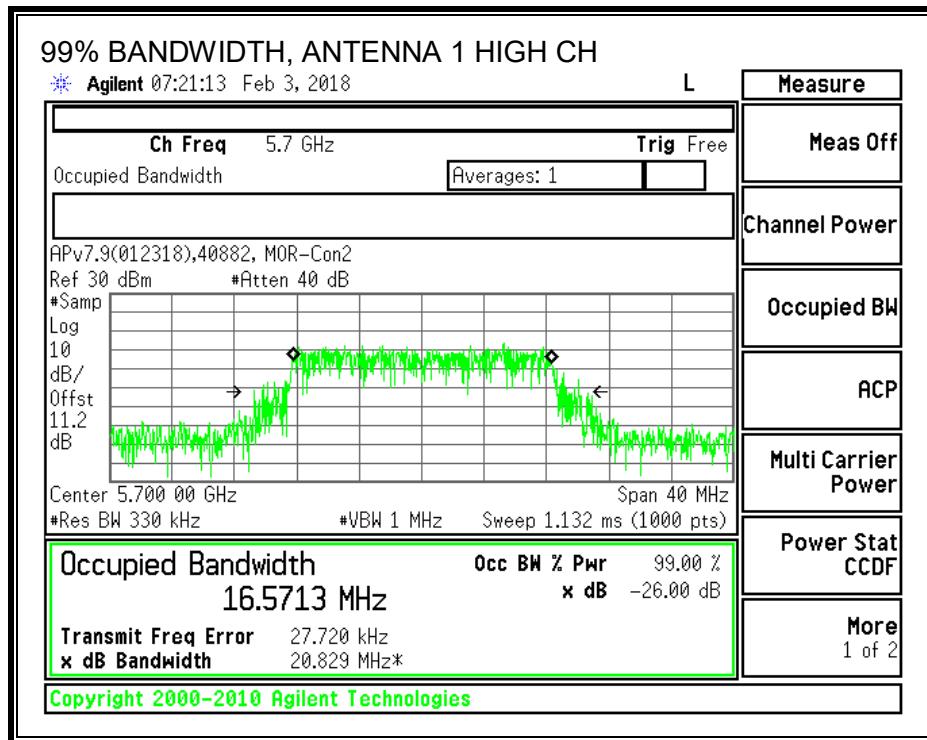
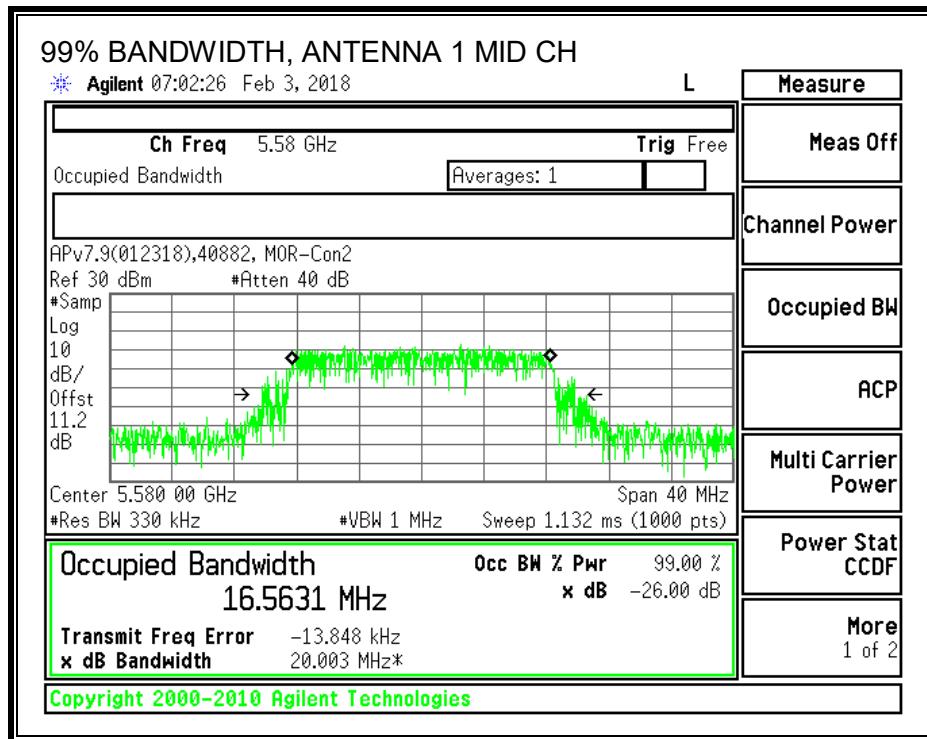


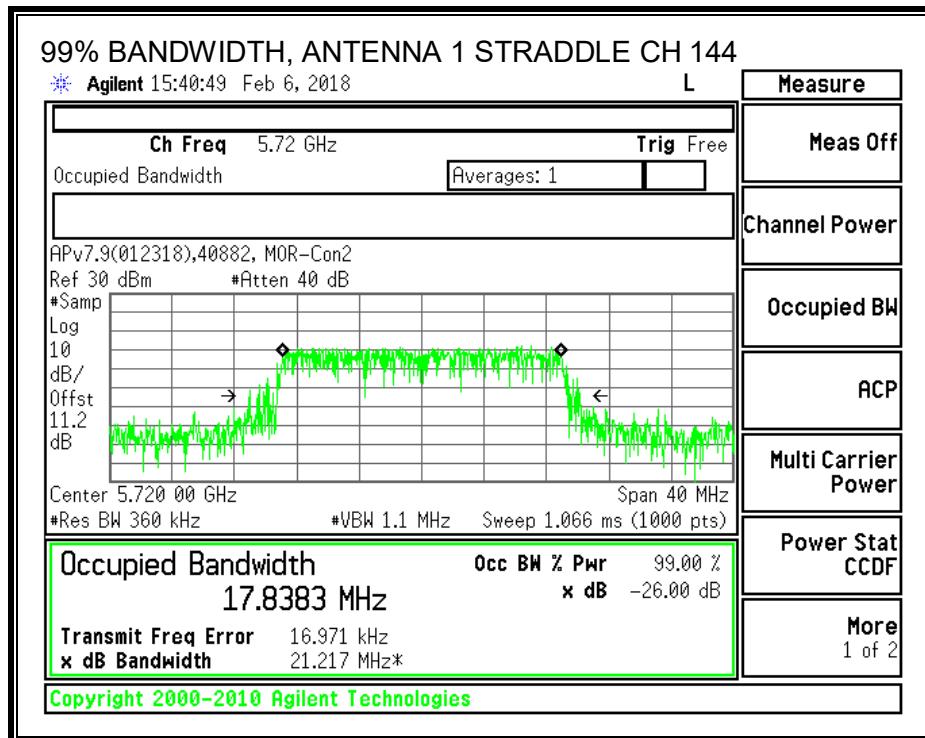




## 99% BANDWIDTH, ANTENNA 1







### 9.9.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### RSS-247 ISSUE 2 SECTION 6.2.3.1

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for Power (dBi)
2.50	3.70	3.14

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for PSD (dBi)
2.50	3.70	6.13

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5500	21.80	3.14	6.13	24.00	10.87
Mid	5580	21.85	3.14	6.13	24.00	10.87
High	5700	21.75	3.14	6.13	24.00	10.87

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.16	14.06	16.74	24.00	-7.26
Mid	5580	12.95	14.13	16.69	24.00	-7.31
High	5700	13.06	14.20	16.78	24.00	-7.22

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5500	3.120	1.461	5.48	10.87	-5.39
Mid	5580	2.967	1.773	5.52	10.87	-5.35
High	5700	3.260	1.796	5.70	10.87	-5.17

## **RESULTS (ISED Conducted Power and PSD)**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5500	16.61	23.20	11.00
Mid	5580	16.56	23.19	11.00
High	5700	16.56	23.19	11.00

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.16	14.06	16.74	23.20	-6.46
Mid	5580	12.95	14.13	16.69	23.19	-6.50
High	5700	13.06	14.20	16.78	23.19	-6.41

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5500	3.120	1.461	5.48	11.00	-5.52
Mid	5580	2.967	1.773	5.52	11.00	-5.48
High	5700	3.260	1.796	5.70	11.00	-5.30

## **RESULTS (ISED EIRP)**

### **Bandwidth, Antenna Gain, and Limits**

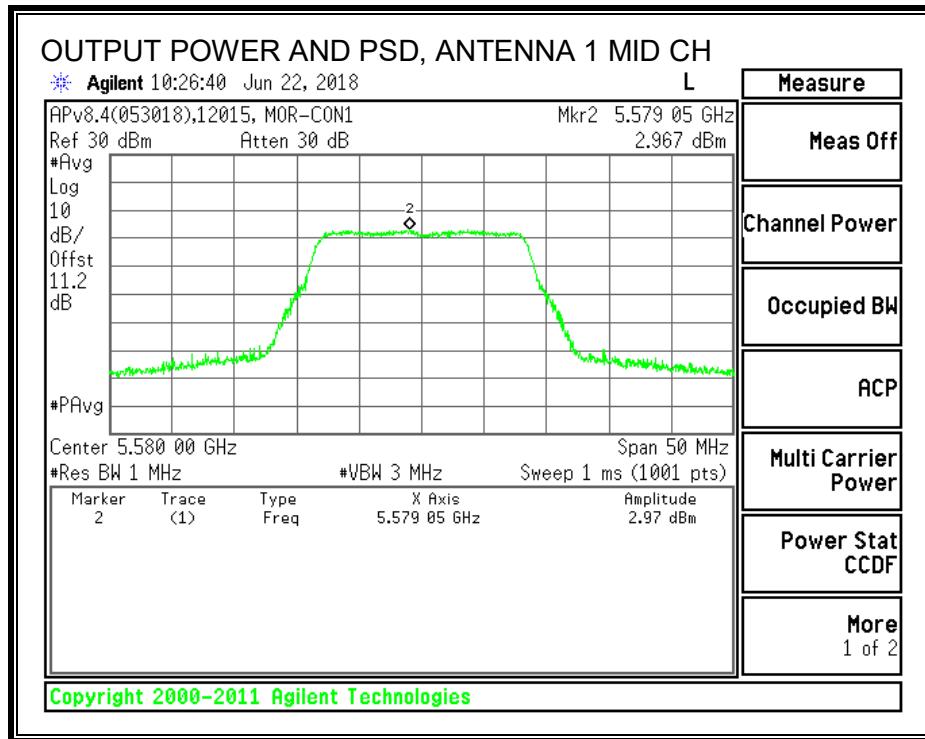
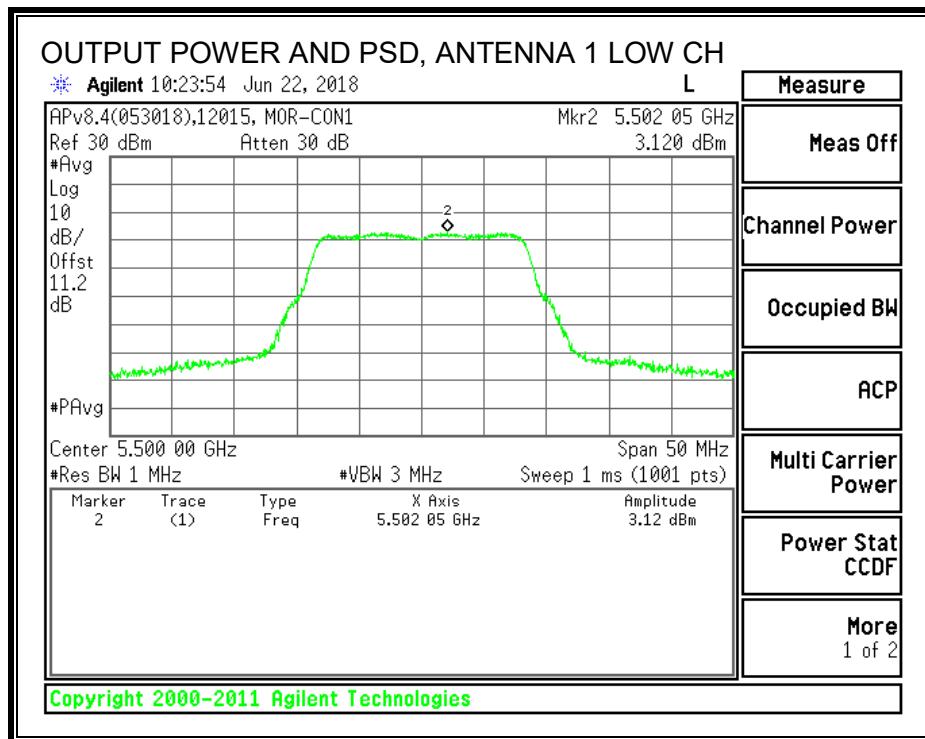
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5500	16.61	3.14	29.20
Mid	5580	16.56	3.14	29.19
High	5700	16.56	3.14	29.19

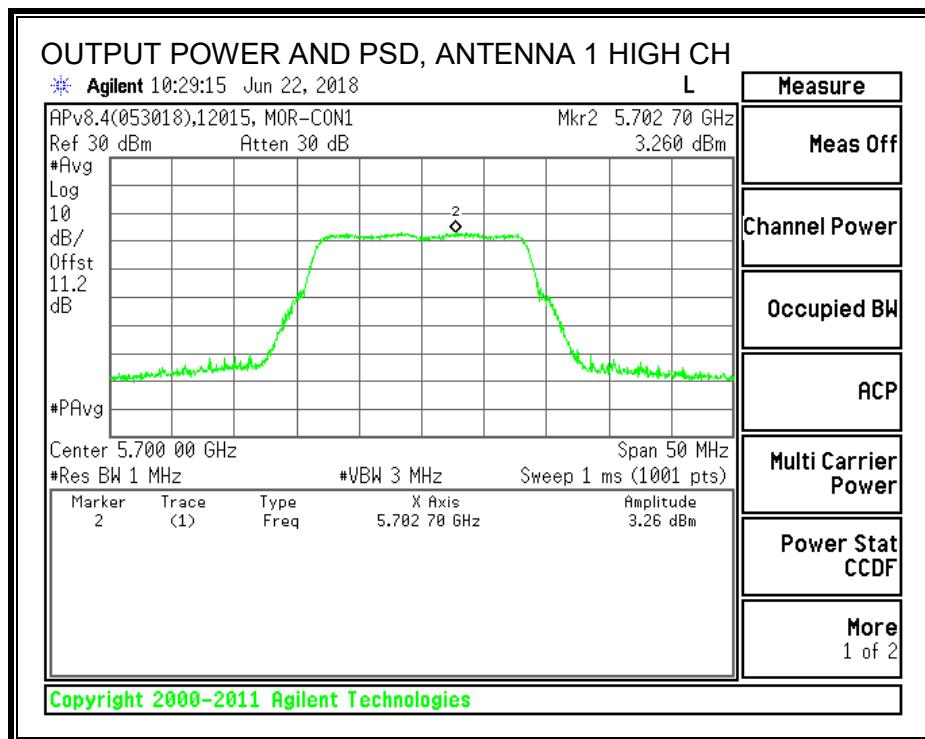
Duty Cycle CF (dB)	0.10	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

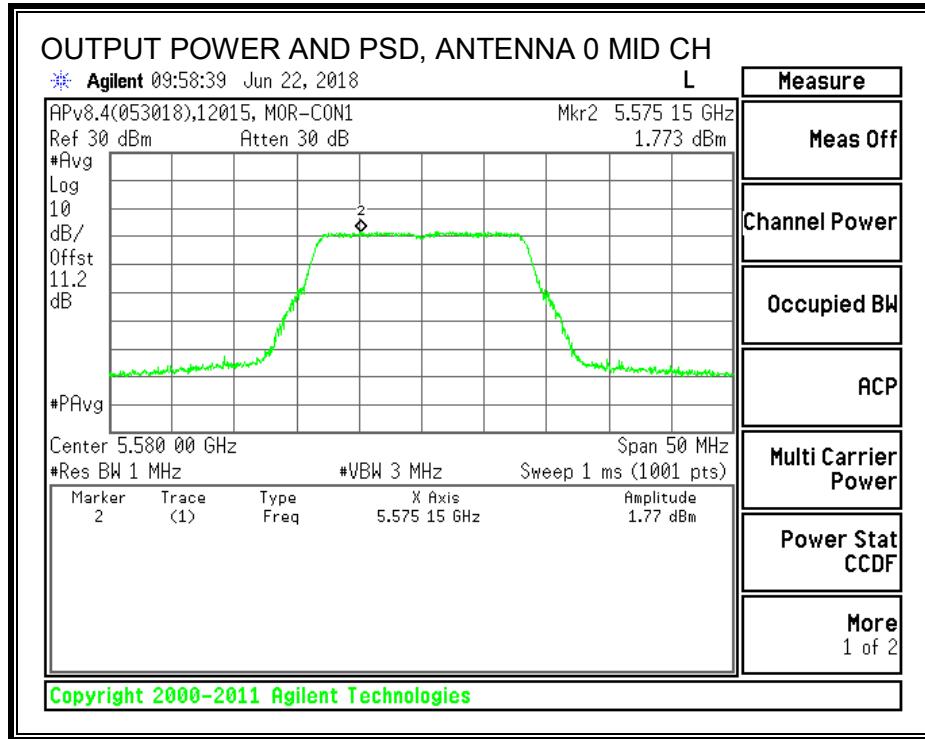
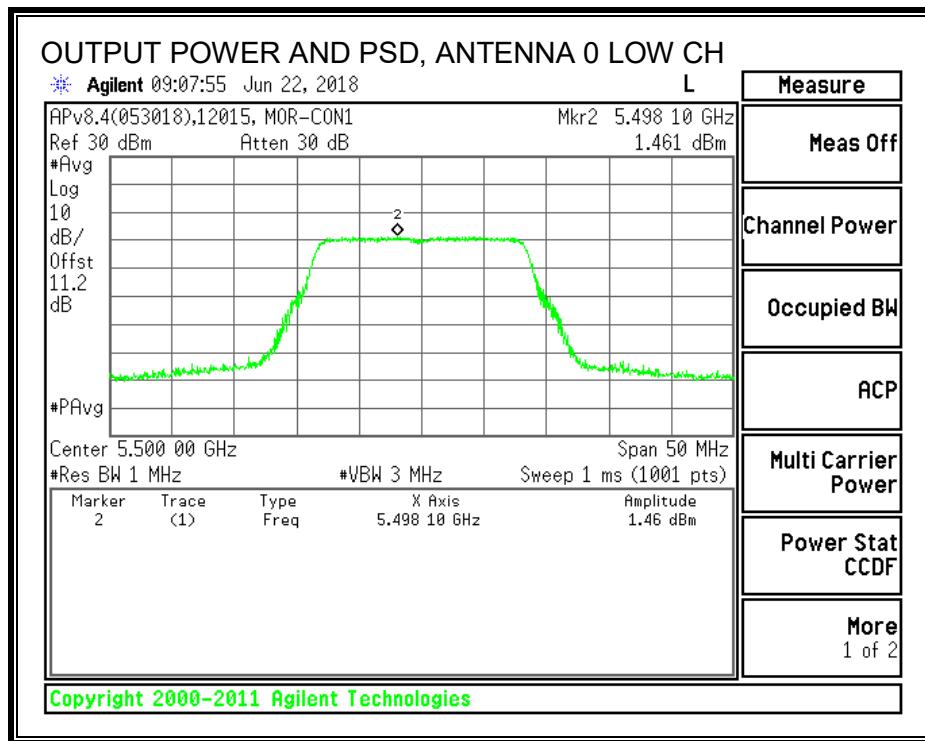
Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5500	13.16	14.06	19.88	29.20	-9.32
Mid	5580	12.95	14.13	19.83	29.19	-9.36
High	5700	13.06	14.20	19.92	29.19	-9.27

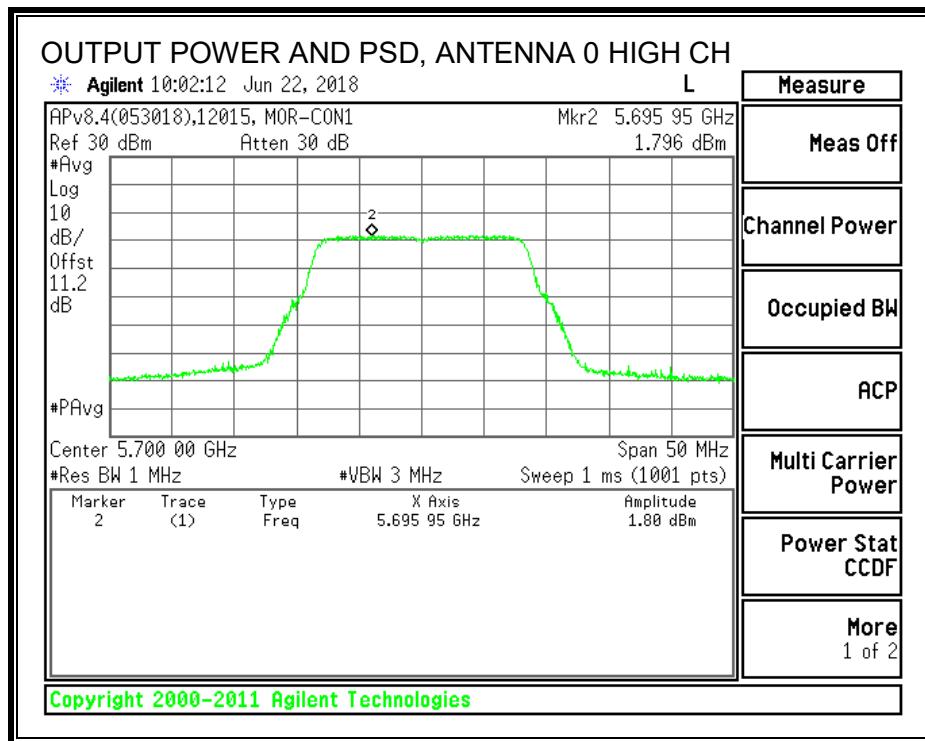
## OUTPUT POWER AND PSD, ANTENNA 1





## OUTPUT POWER AND PSD, ANTENNA 0





**STRADDLE CHANNEL 144 RESULTS (FCC)UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
144	5720	21.85	3.14	6.13	24.00	10.87

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
144	5720	13.09	14.16	16.77	24.00	-7.23

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
144	5720	4.28	2.36	6.53	10.87	-4.34

**STRADDLE CHANNEL 144 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
144	5720	16.60	23.20	11.00

Duty Cycle CF (dB)	0.10	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
144	5720	13.09	14.16	16.77	23.20	-6.43

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
144	5720	4.28	2.36	6.53	11.00	-4.47

**STRADDLE CHANNEL 144 RESULTS (ISED EIRP) UNII-2C BAND**

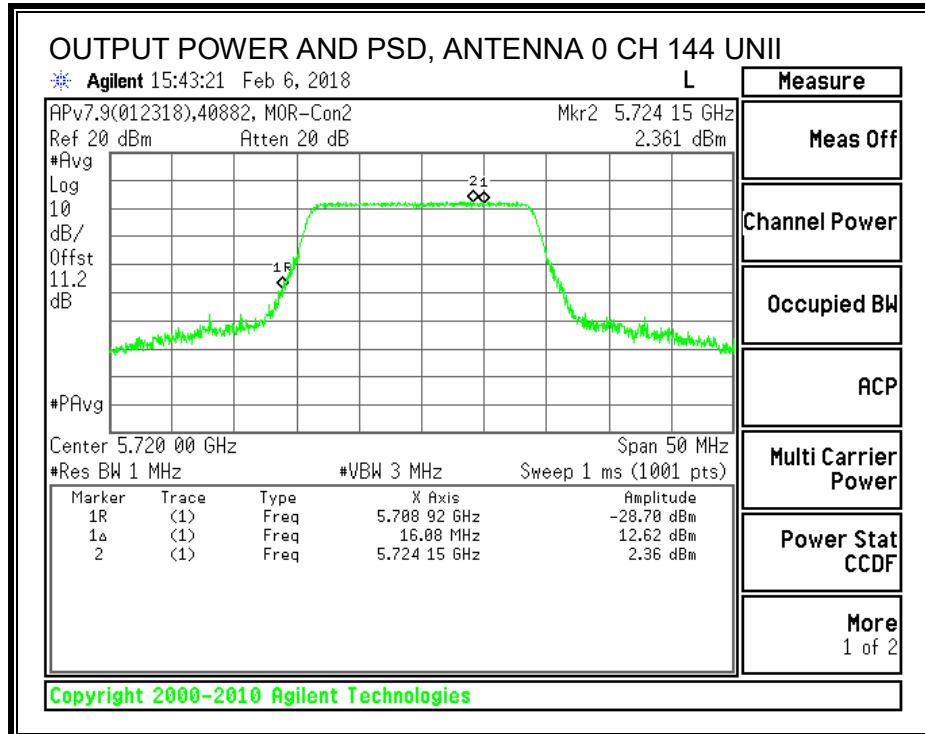
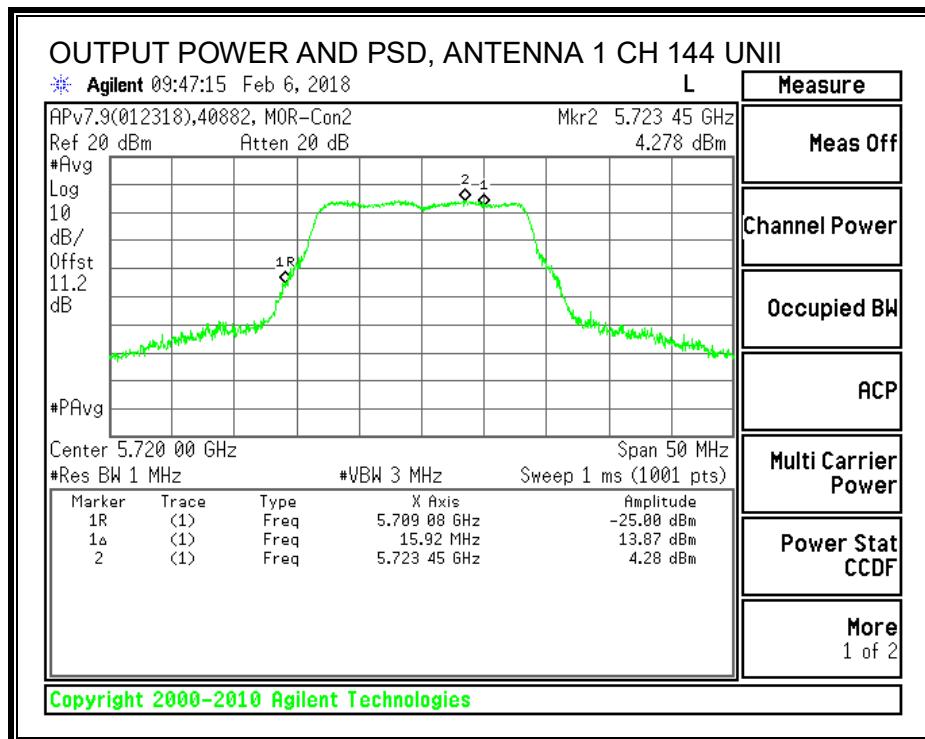
**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
144	5720	16.60	3.14	29.20

Duty Cycle CF (dB)	0.10	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
144	5720	13.09	14.16	19.91	29.20	-9.29



**STRADDLE CHANNEL 144 RESULTS (FCC and ISED)UNII-3 BAND**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
144	5720	3.14	6.13	30.00	29.87

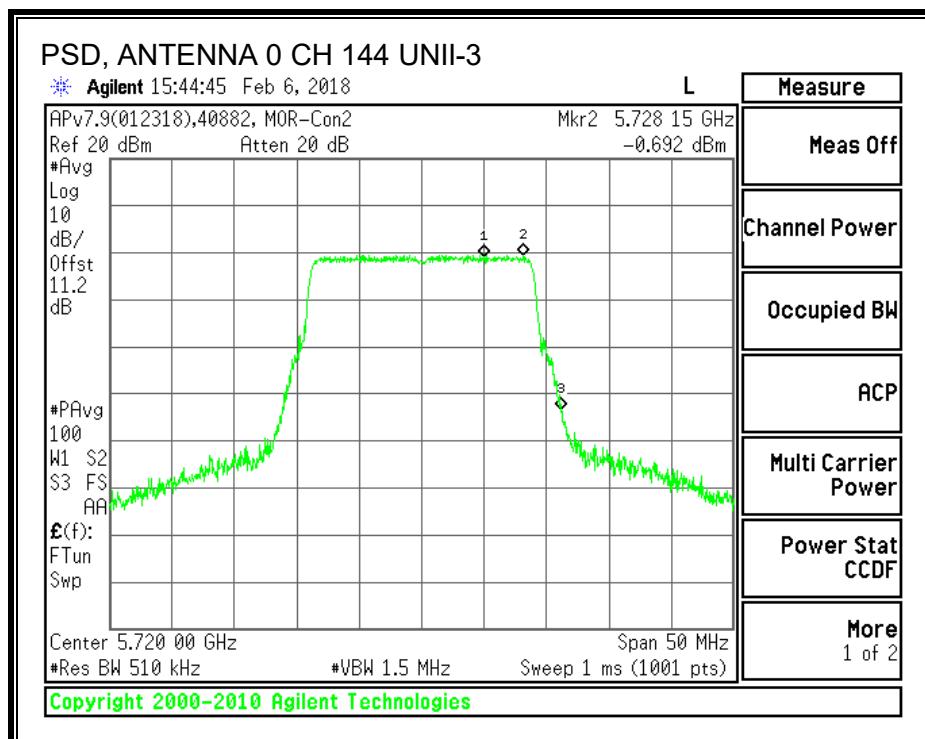
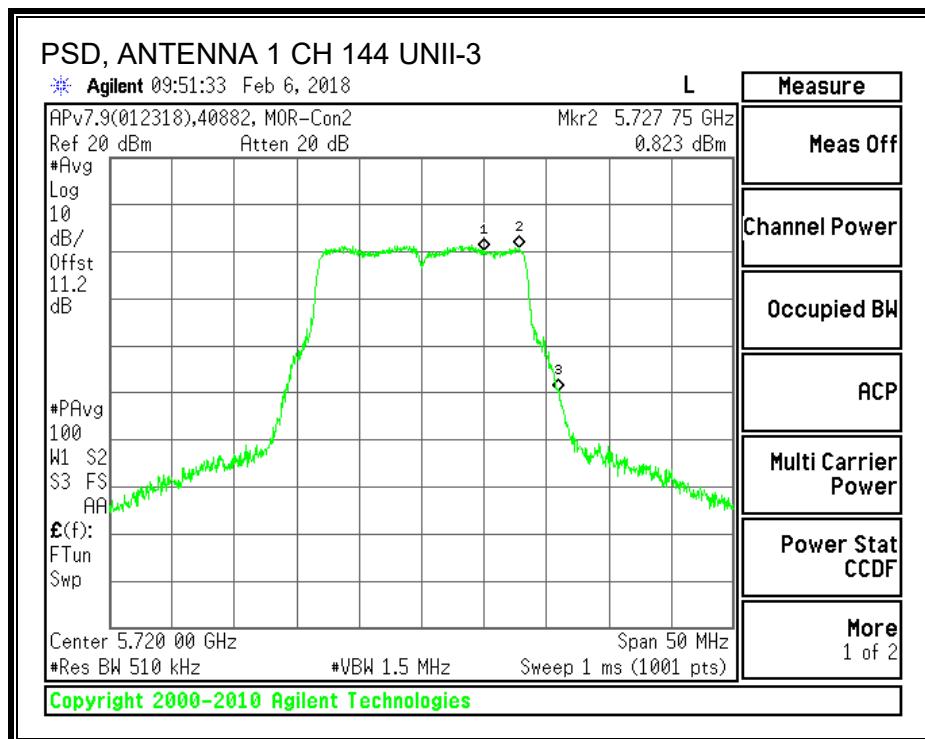
<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
144	5720	13.09	14.16	16.77	30.00	-13.23

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
144	5720	0.82	-0.69	3.24	29.87	-26.63



## 9.10. 802.11n HT20 MODE IN THE 5.6 GHz BAND

### 9.10.1. 26 dB BANDWIDTH

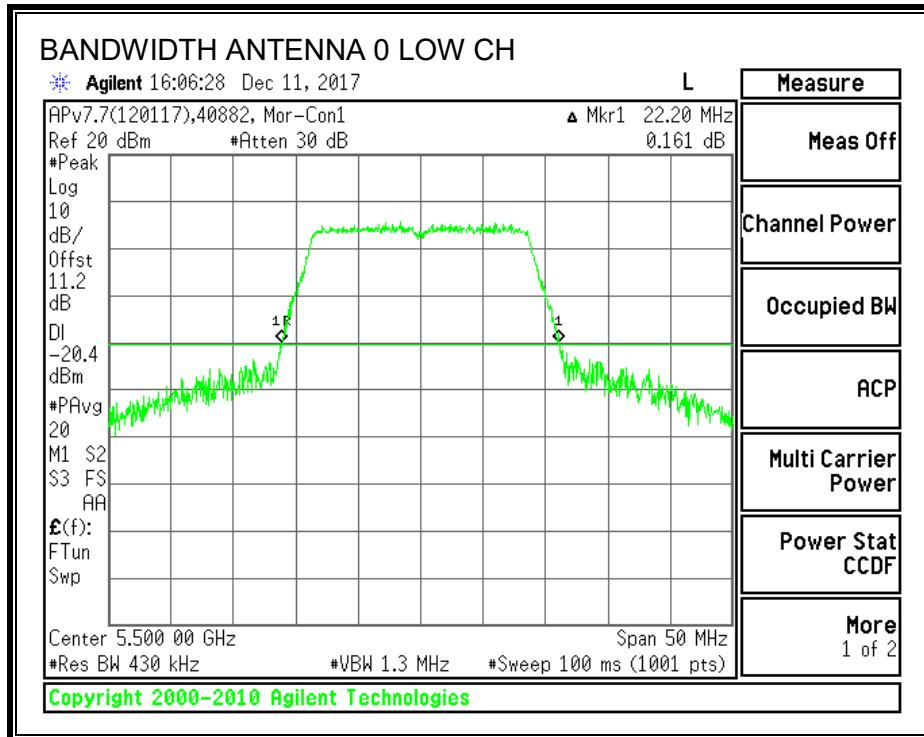
#### LIMITS

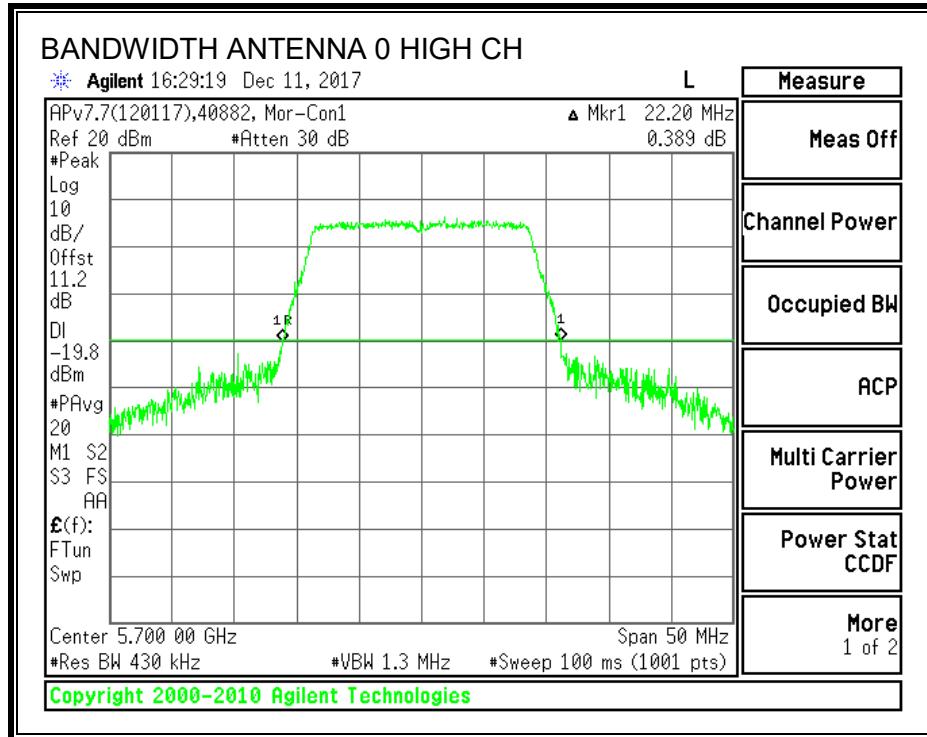
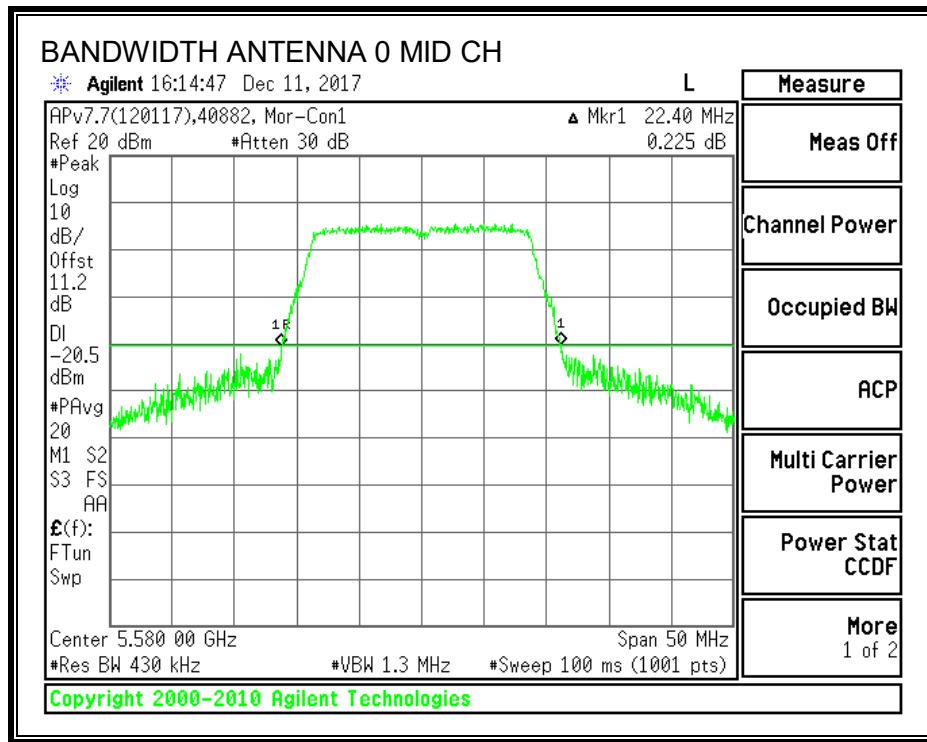
None; for reporting purposes only.

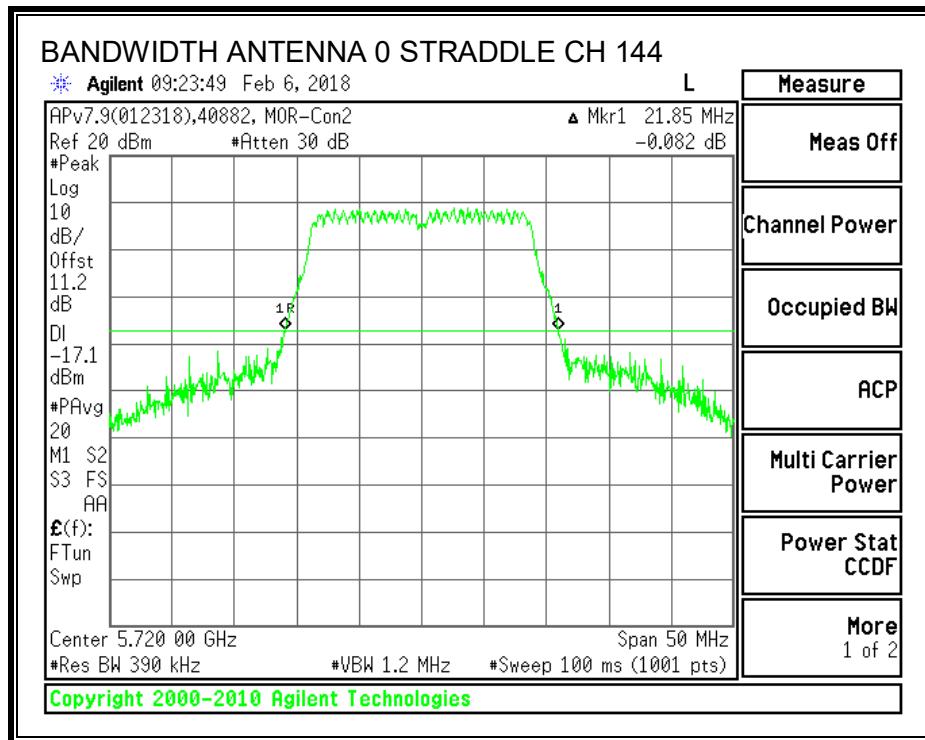
#### RESULTS

Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5500	22.20	21.95
Mid	5580	22.40	21.90
High	5700	22.20	21.90
144	5720	21.85	22.20

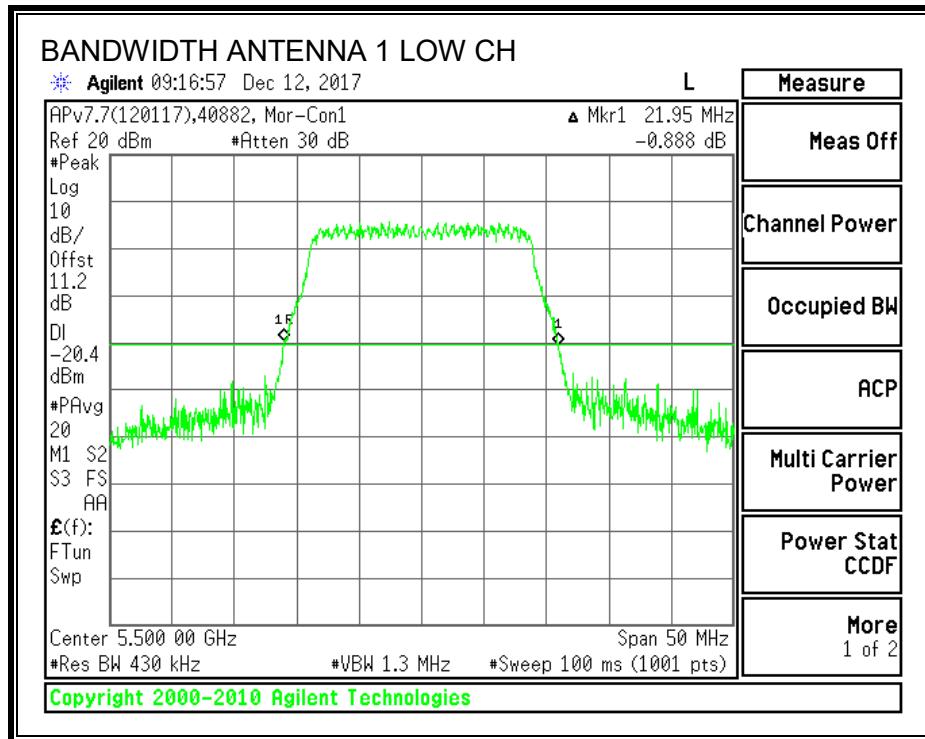
#### 26 dB BANDWIDTH, ANTENNA 0

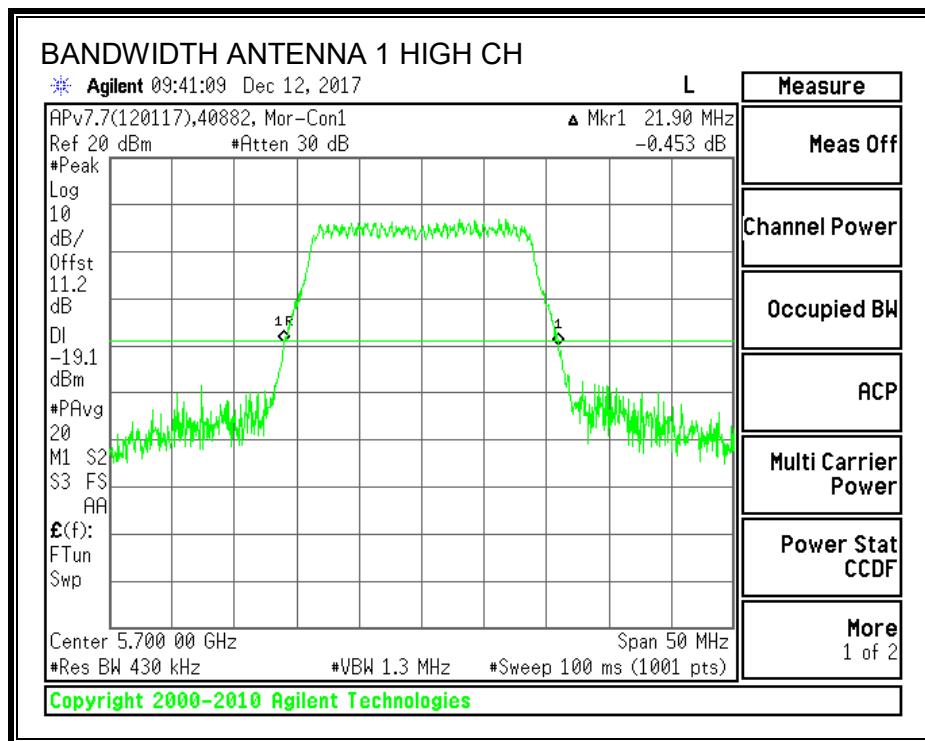
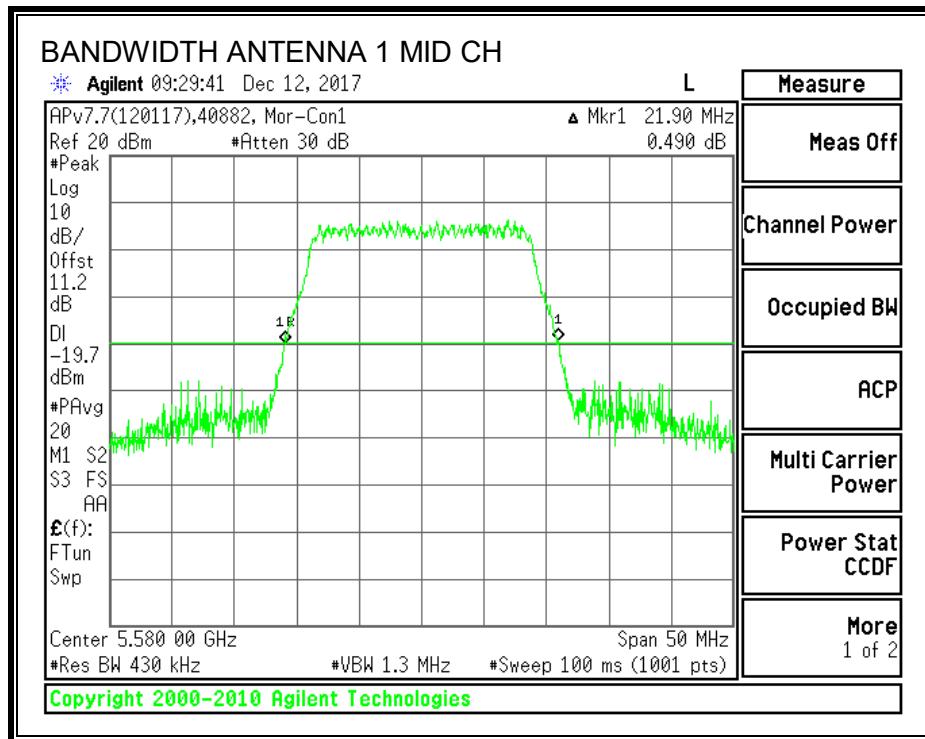


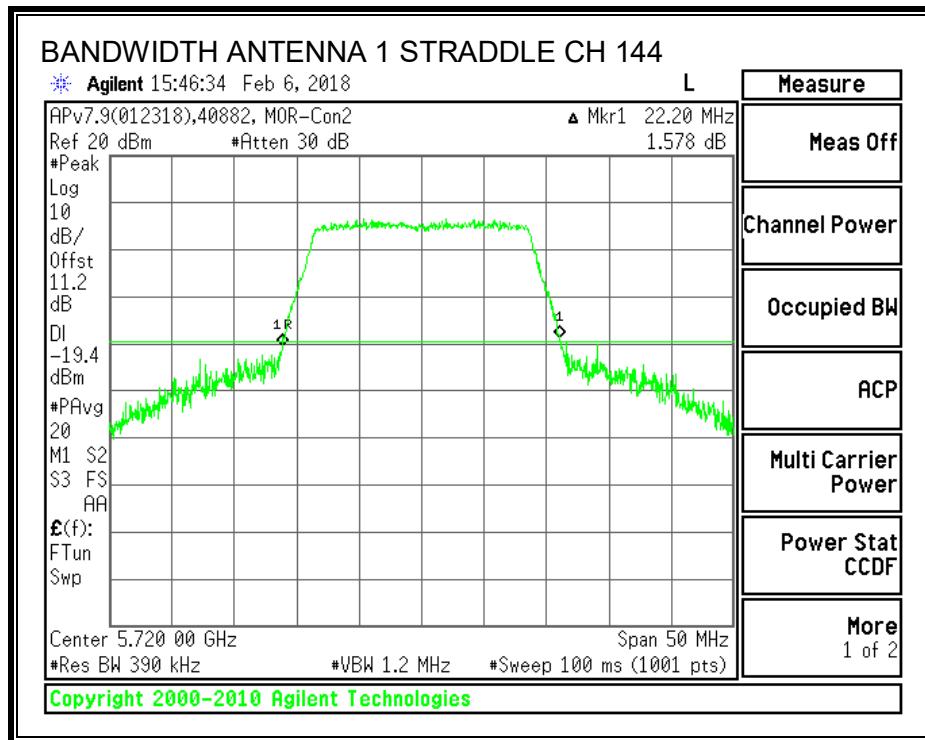




## 26 dB BANDWIDTH, ANTENNA 1







### 9.10.2. 99% BANDWIDTH

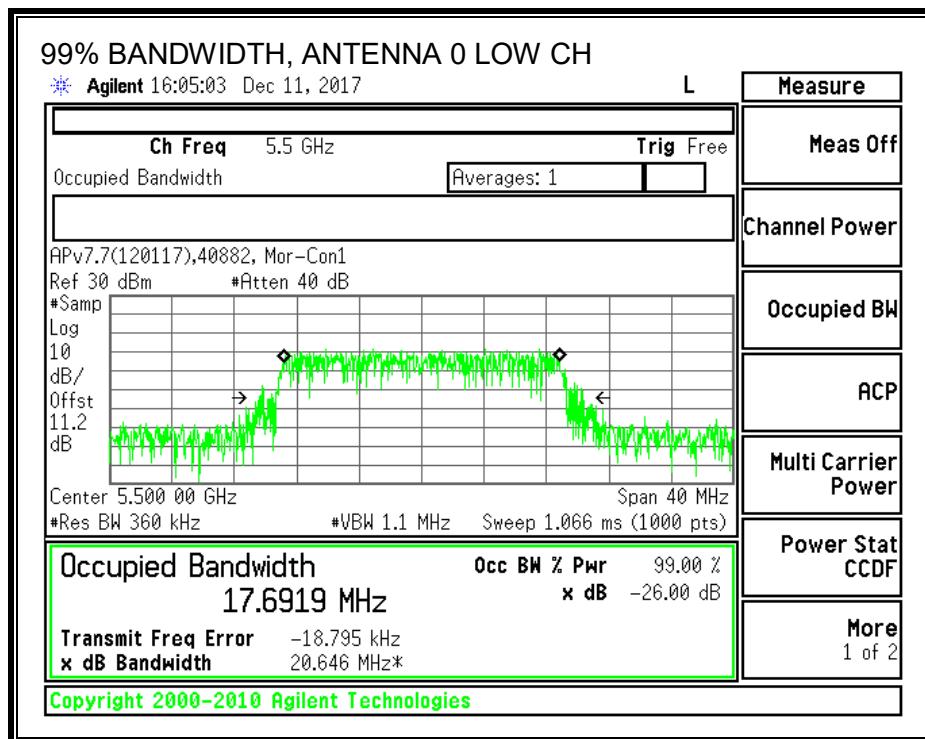
#### LIMITS

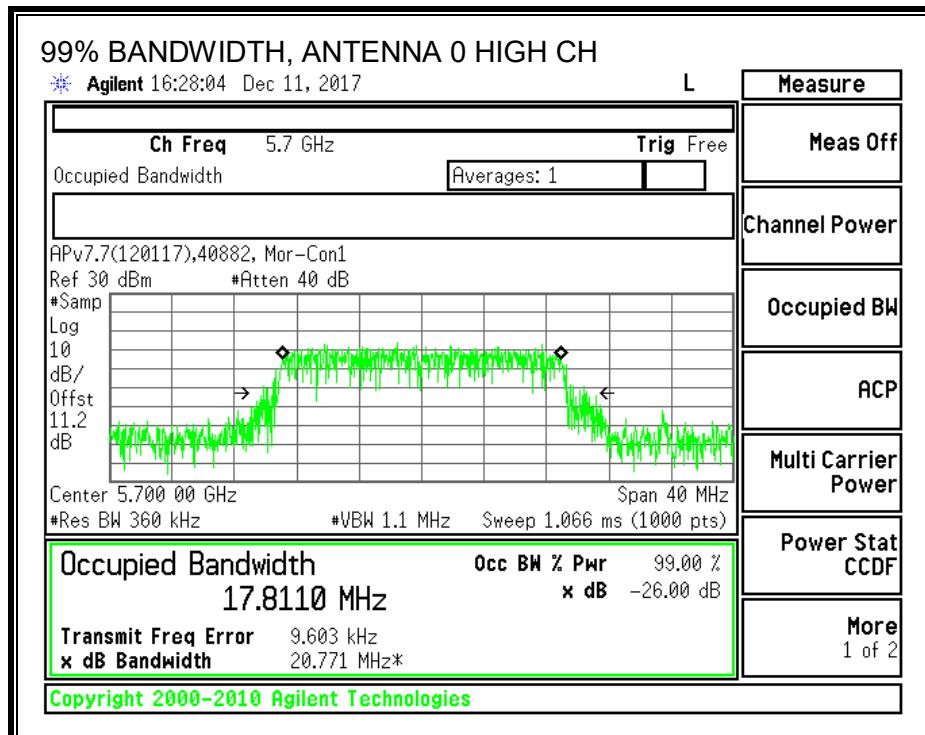
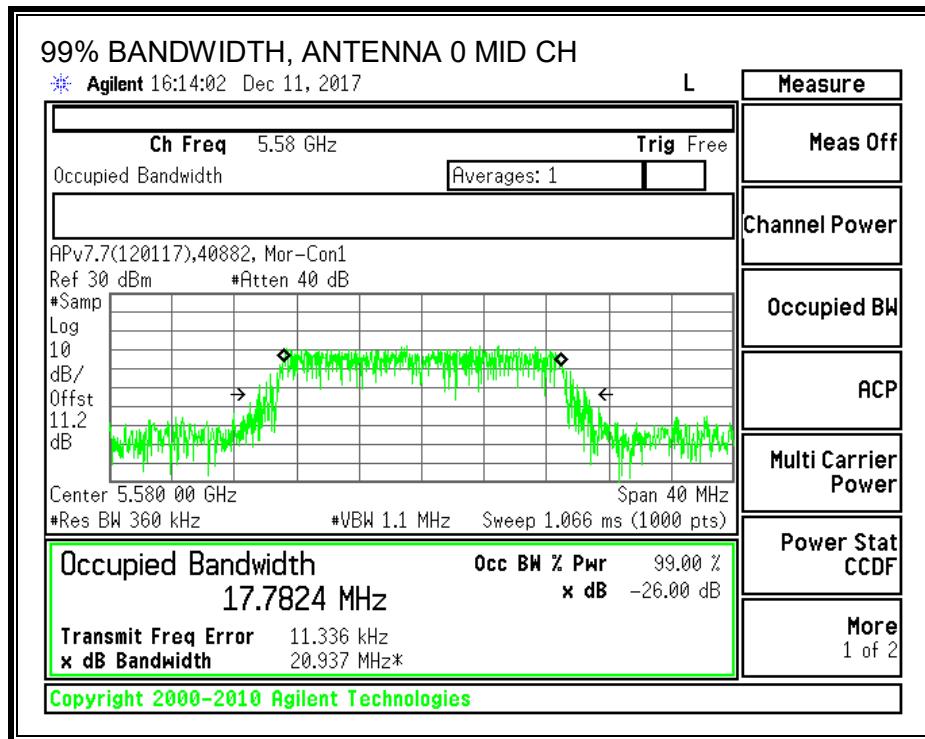
None; for reporting purposes only.

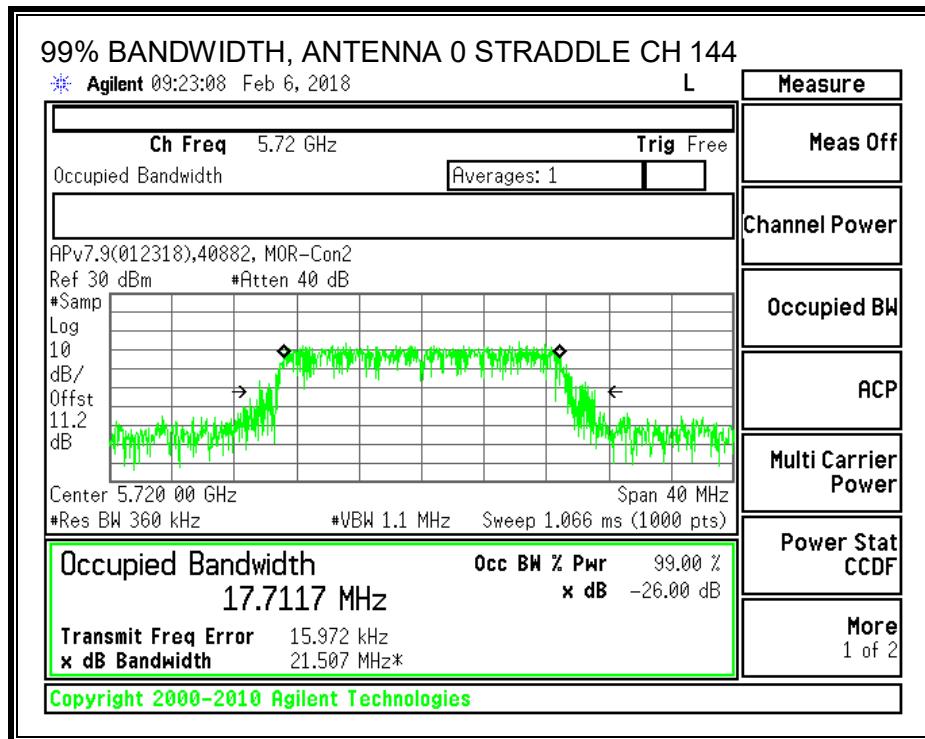
#### RESULTS

Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5500	17.6919	17.8201
Mid	5580	17.7824	17.8322
High	5700	17.8110	17.8175
144	5720	17.7117	17.8488

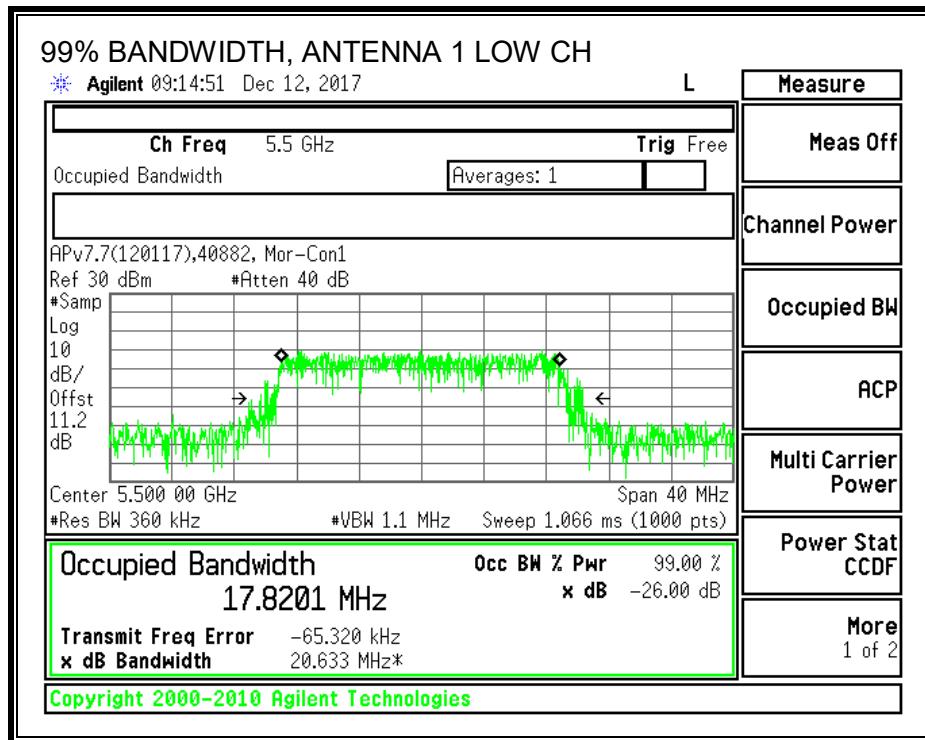
#### 99% BANDWIDTH, ANTENNA 0

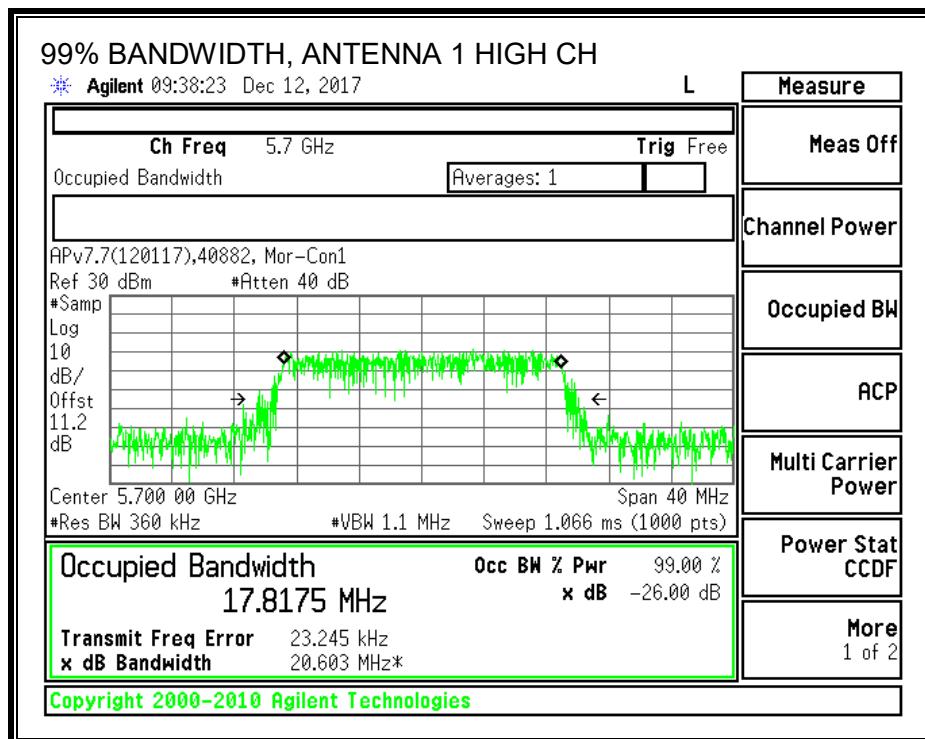
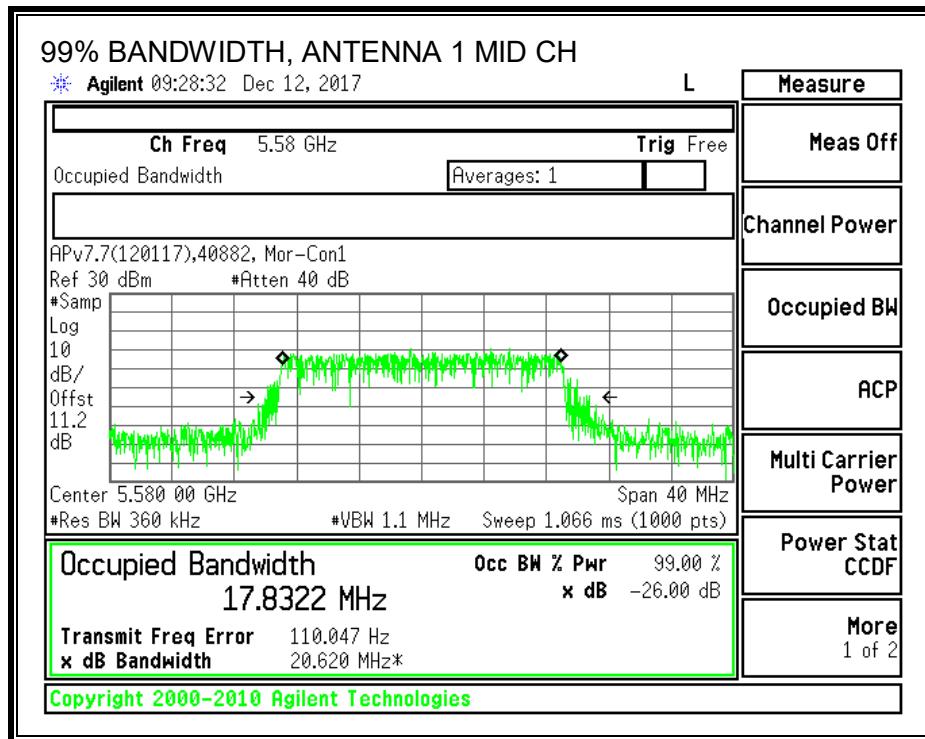


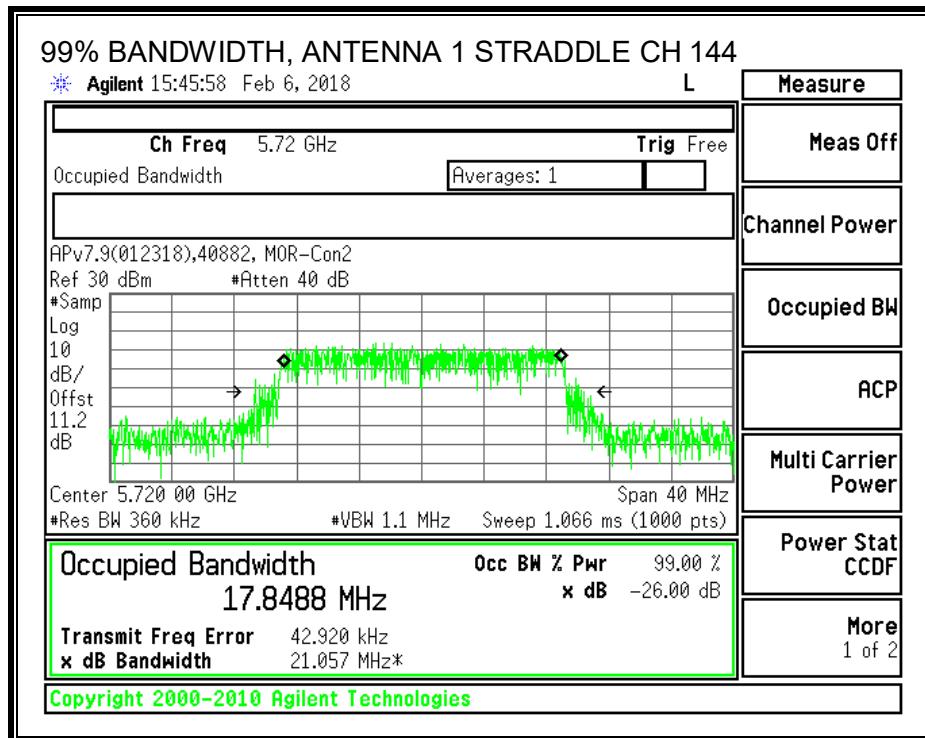




## 99% BANDWIDTH, ANTENNA 1







### 9.10.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### RSS-247 ISSUE 2 SECTION 6.2.3.1

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for Power (dBi)
2.50	3.70	3.14

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for PSD (dBi)
2.50	3.70	6.13

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5500	21.95	3.14	6.13	24.00	10.87
Mid	5580	21.90	3.14	6.13	24.00	10.87
High	5700	21.90	3.14	6.13	24.00	10.87

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.04	14.06	16.59	24.00	-7.41
Mid	5580	13.02	14.12	16.62	24.00	-7.38
High	5700	12.99	14.07	16.57	24.00	-7.43

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5500	2.029	1.095	4.60	10.87	-6.27
Mid	5580	2.755	1.586	5.22	10.87	-5.65
High	5700	2.935	1.580	5.32	10.87	-5.55

## **RESULTS (ISED Conducted Power and PSD)**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5500	17.69	23.48	11.00
Mid	5580	17.78	23.50	11.00
High	5700	17.81	23.51	11.00

<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.04	14.06	16.59	23.48	-6.89
Mid	5580	13.02	14.12	16.62	23.50	-6.88
High	5700	12.99	14.07	16.57	23.51	-6.93

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5500	2.029	1.095	4.60	11.00	-6.40
Mid	5580	2.755	1.586	5.22	11.00	-5.78
High	5700	2.935	1.580	5.32	11.00	-5.68

## RESULTS (ISED EIRP)

### Bandwidth, Antenna Gain, and Limits

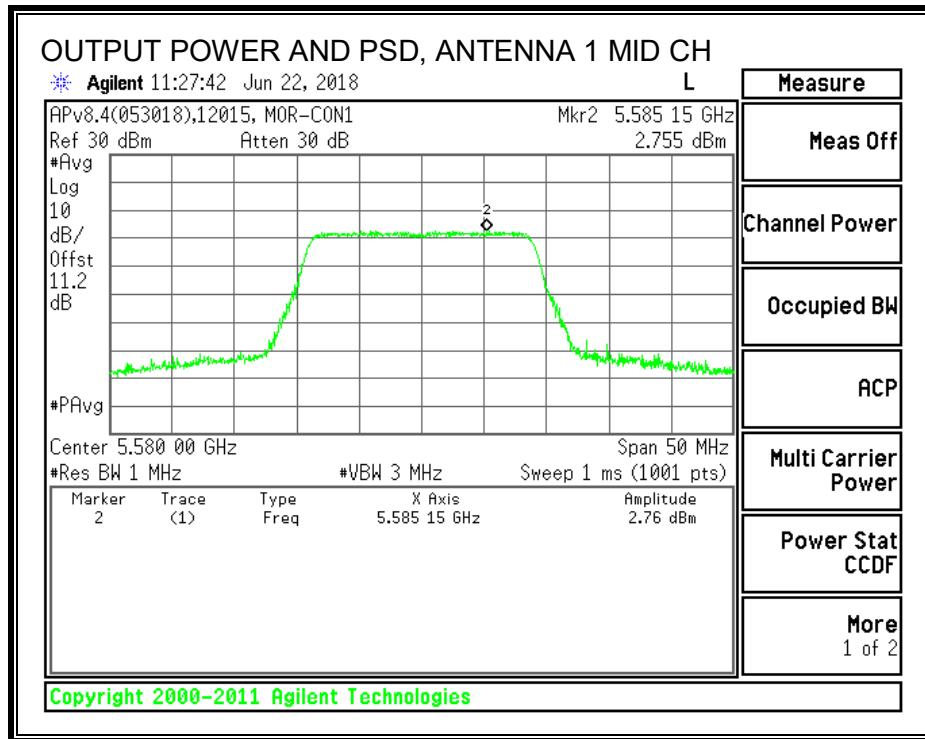
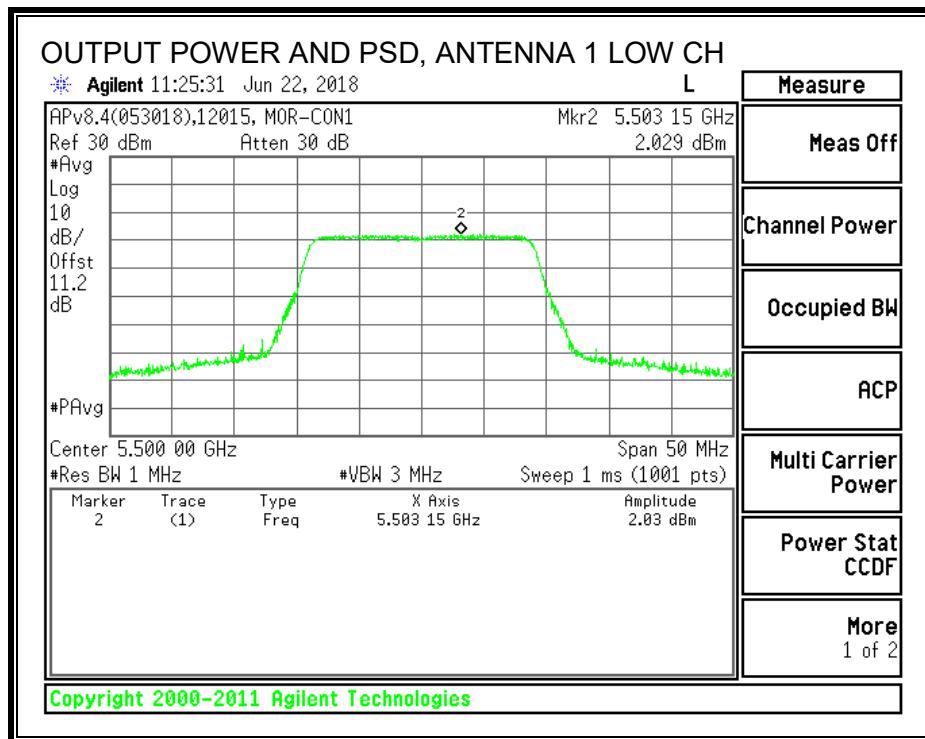
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5500	17.69	3.14	29.48
Mid	5580	17.78	3.14	29.50
High	5700	17.81	3.14	29.51

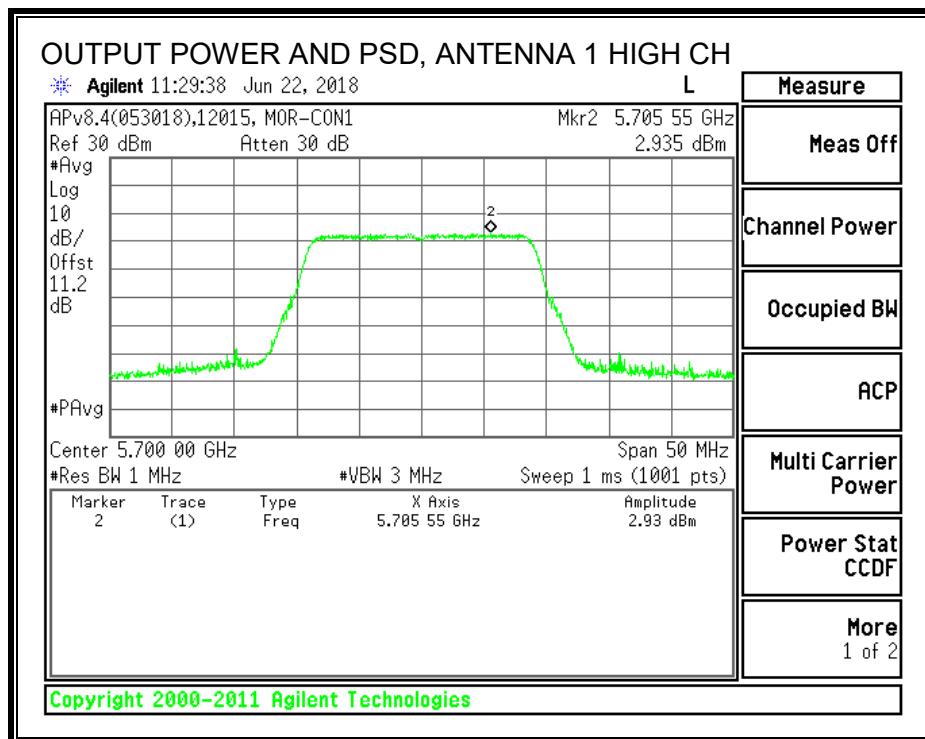
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

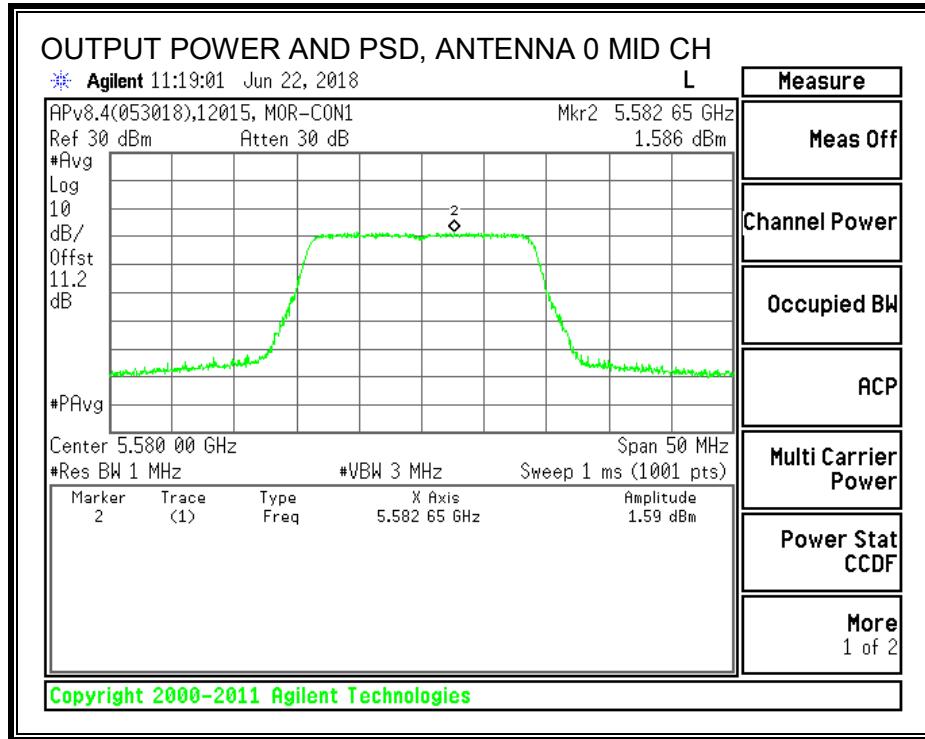
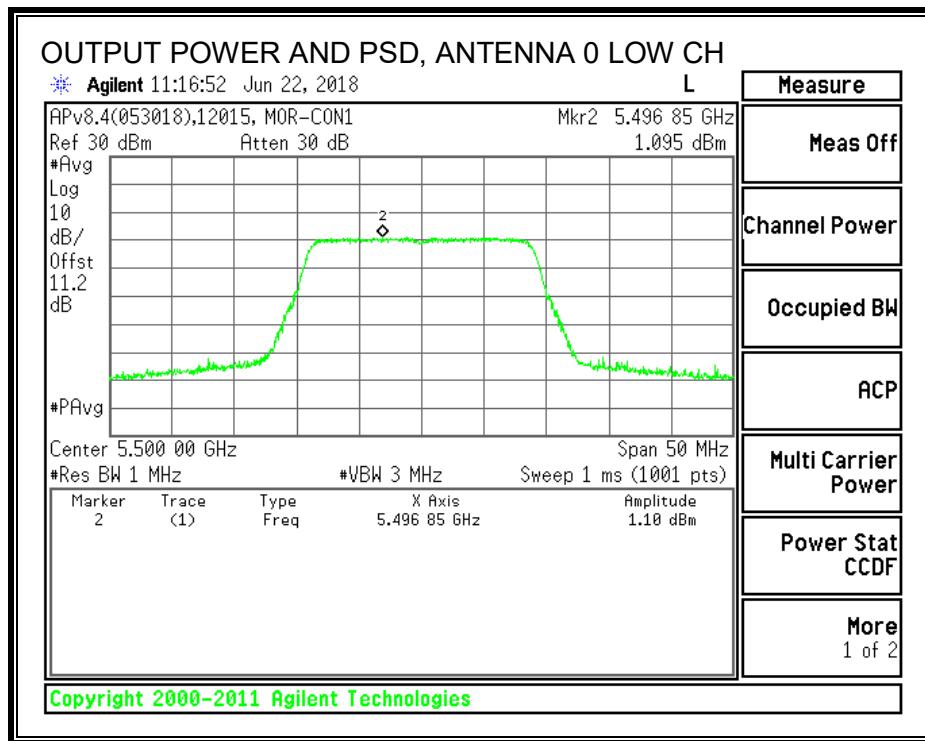
Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5500	13.04	14.06	19.73	29.48	-9.75
Mid	5580	13.02	14.12	19.76	29.50	-9.74
High	5700	12.99	14.07	19.71	29.51	-9.79

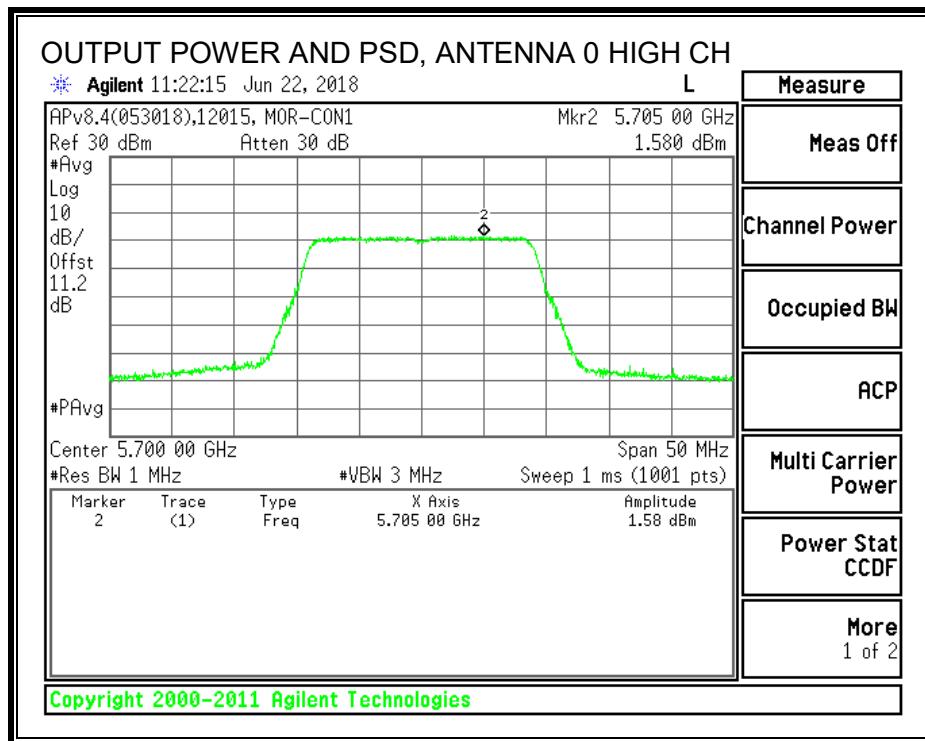
## OUTPUT POWER AND PSD, ANTENNA 1





## OUTPUT POWER AND PSD, ANTENNA 0





**STRADDLE CHANNEL 144 RESULTS (FCC) UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
144	5720	21.85	3.14	6.13	24.00	10.87

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
144	5720	12.47	14.14	16.40	24.00	-7.60

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
144	5720	3.60	2.56	6.12	10.87	-4.75

**STRADDLE CHANNEL 144 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
144	5720	17.71	23.48	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
144	5720	12.47	14.14	16.40	23.48	-7.09

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
144	5720	3.60	2.56	6.12	11.00	-4.88

**STRADDLE CHANNEL 144 RESULTS (ISED EIRP) UNII-2C BAND**

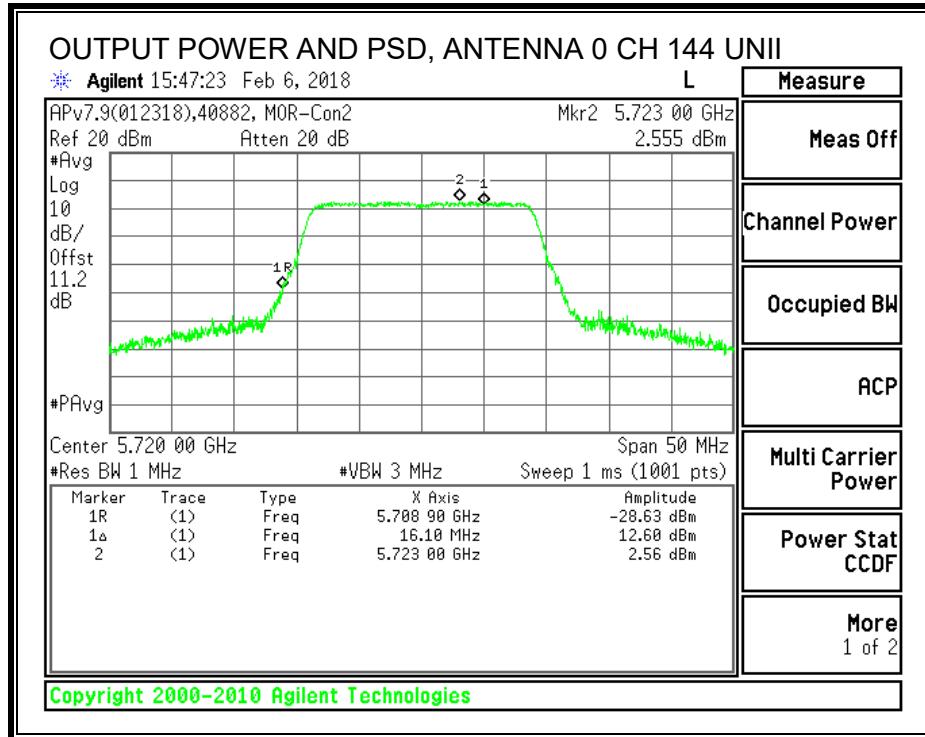
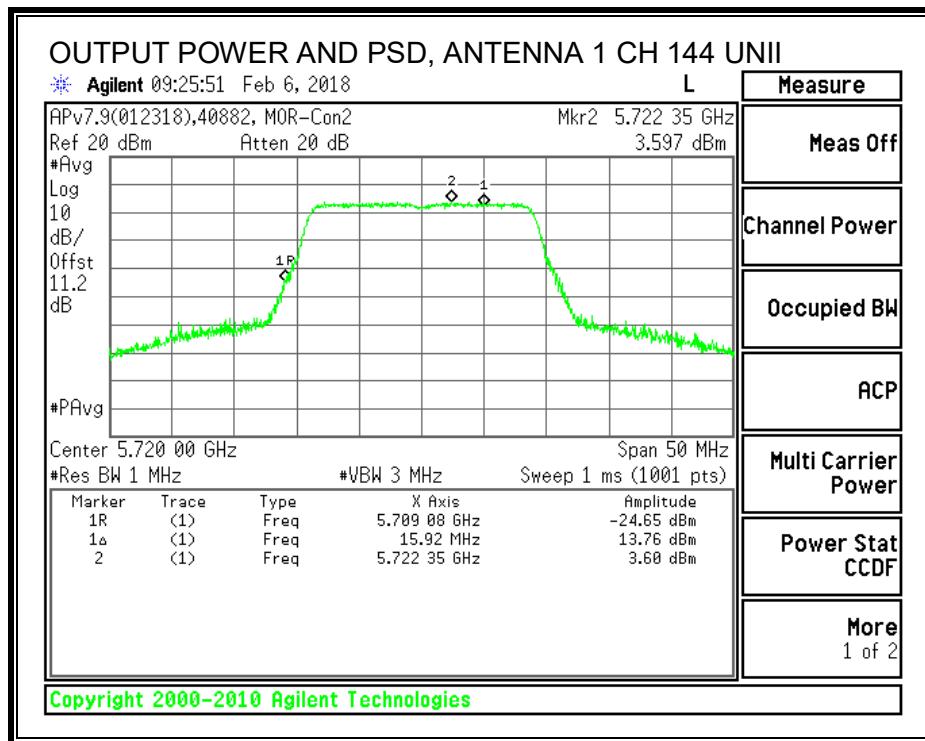
**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
144	5720	17.71	3.14	29.48

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
144	5720	12.47	14.14	19.54	29.48	-9.95



**STRADDLE CHANNEL 144 RESULTS (FCC and ISED) UNII-3 BAND**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
144	5720	3.14	6.13	30.00	29.87

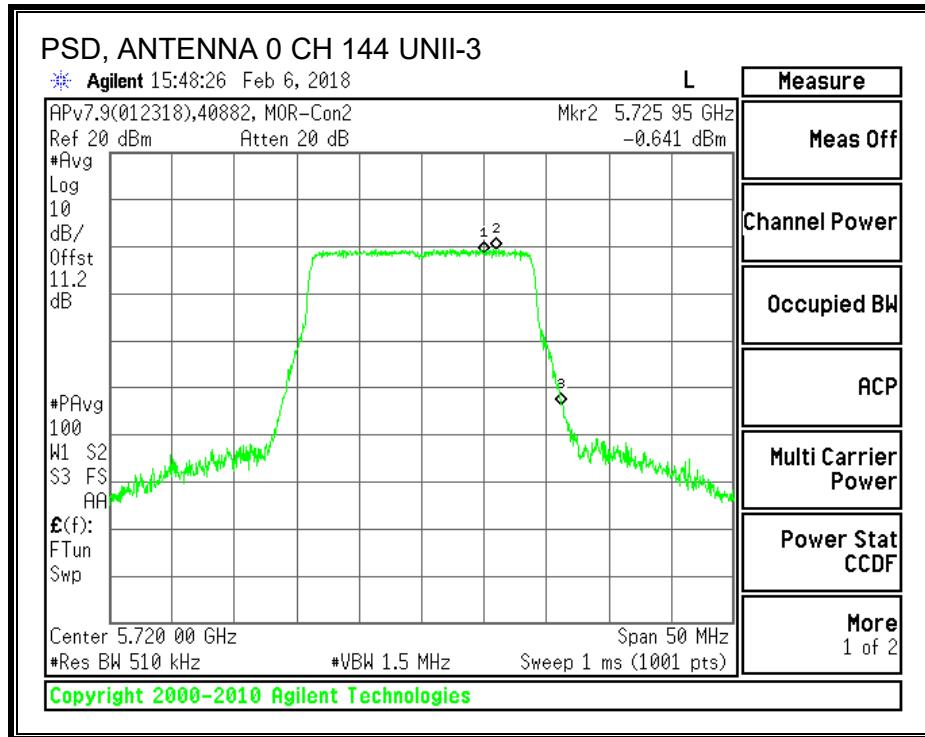
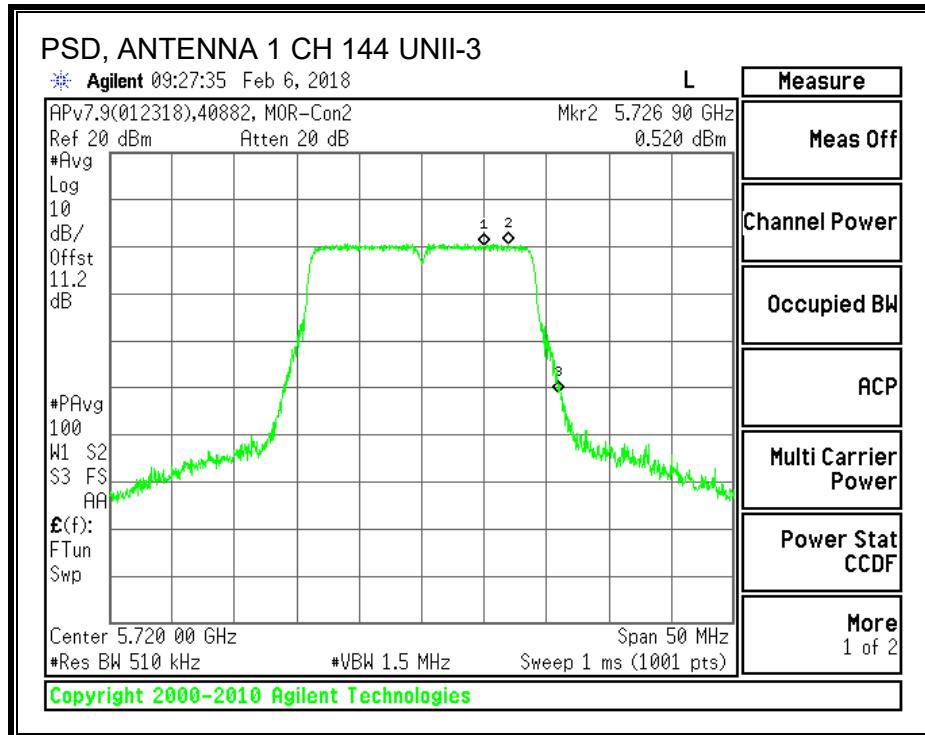
<b>Duty Cycle CF (dB)</b>	0.00	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
144	5720	12.47	14.14	16.40	30.00	-13.60

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
144	5720	0.52	-0.64	2.99	29.87	-26.88



## 9.11. 802.11n HT40 MODE IN THE 5.6 GHz BAND

### 9.11.1. 26 dB BANDWIDTH - MIMO

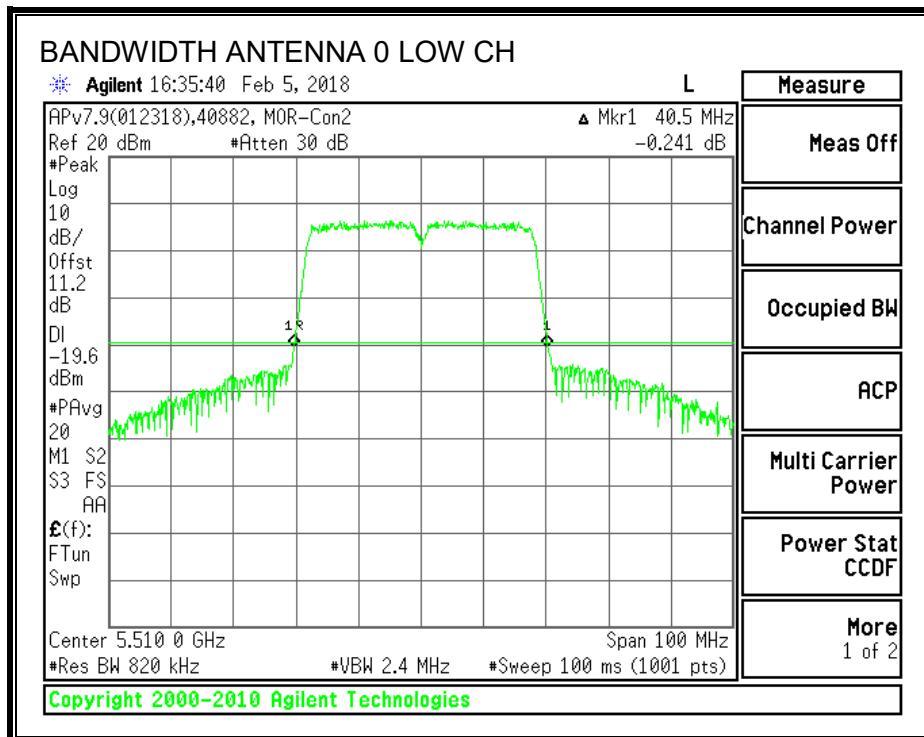
#### LIMITS

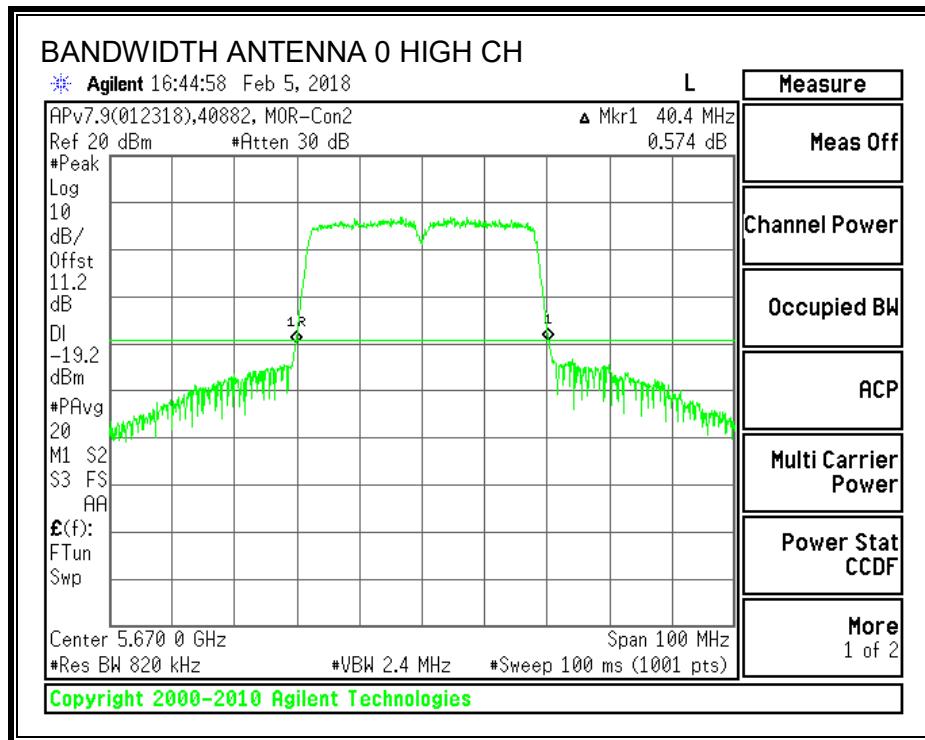
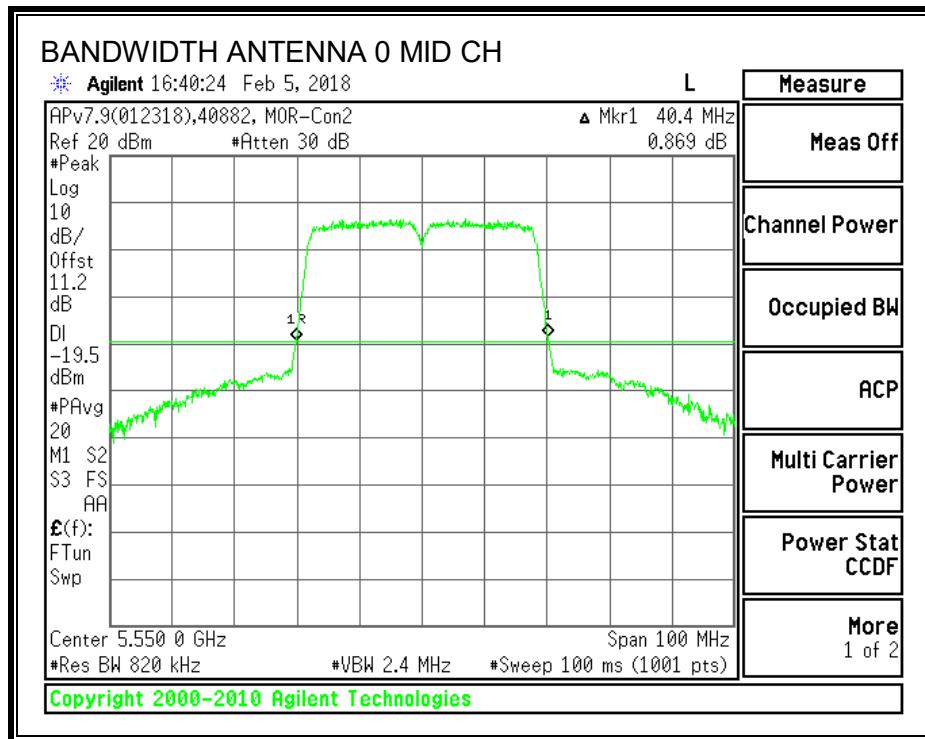
None; for reporting purposes only.

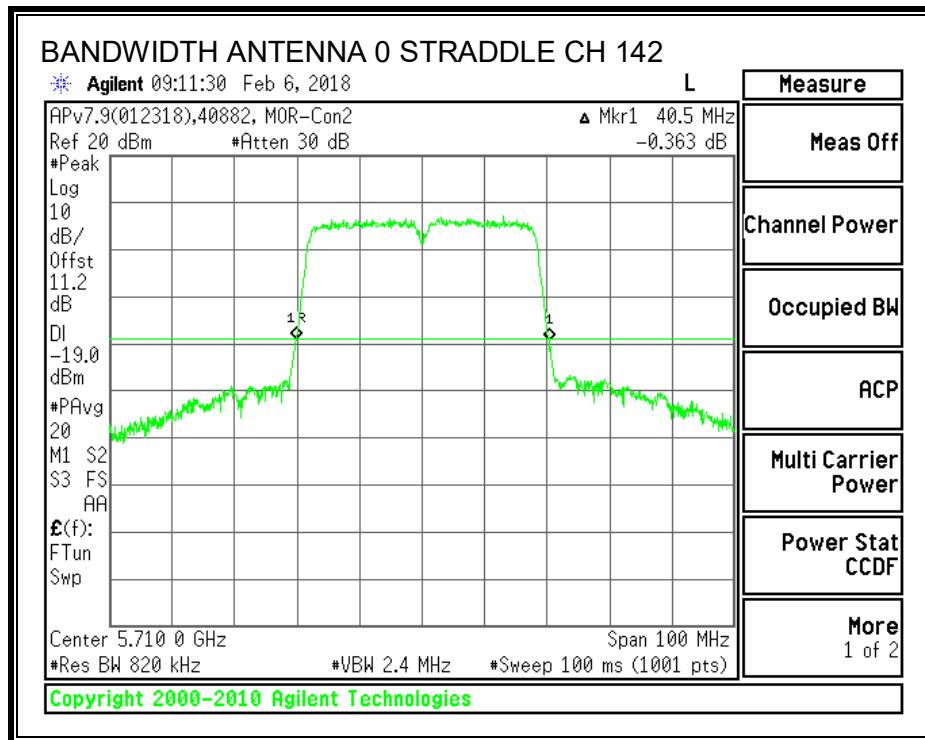
#### RESULTS

Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5510	40.50	40.30
Mid	5550	40.40	40.30
High	5670	40.40	40.60
142	5710	40.50	40.90

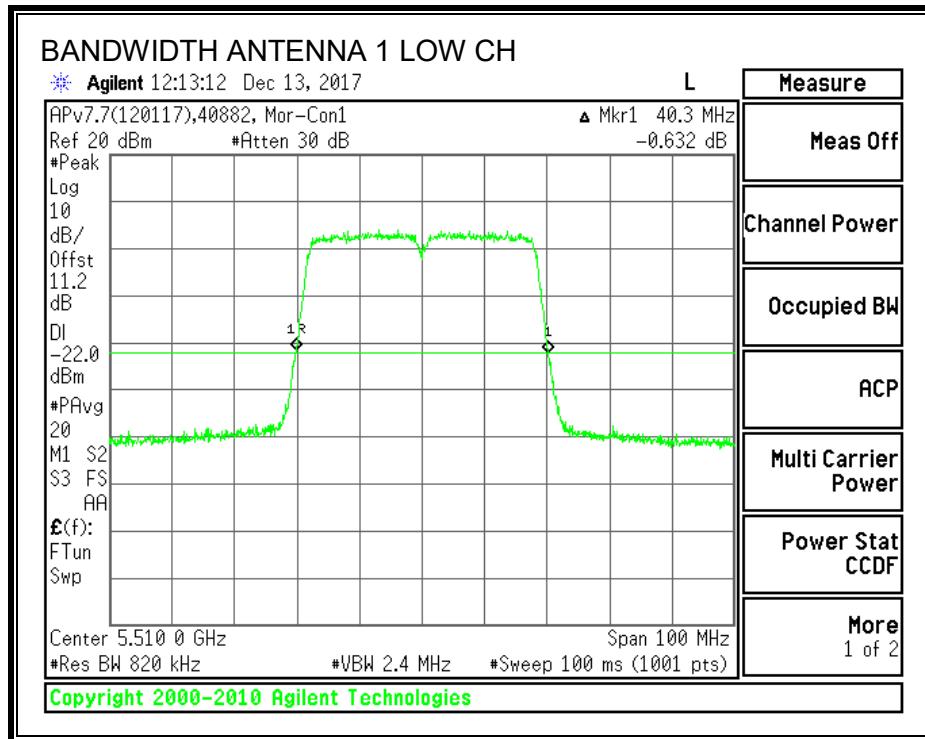
#### 26 dB BANDWIDTH, ANTENNA 0

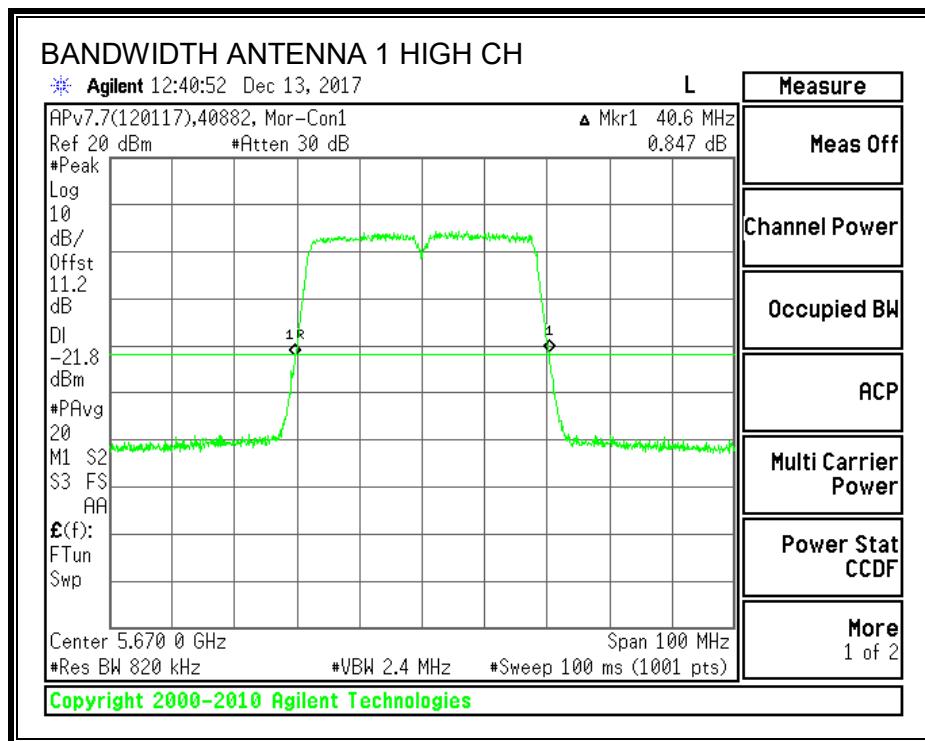
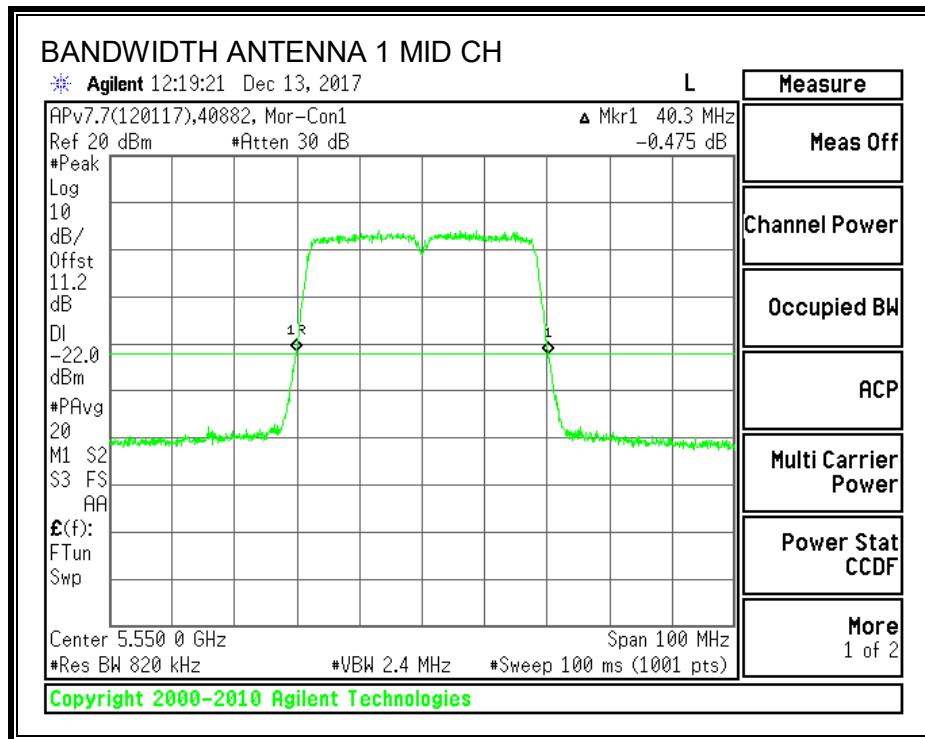


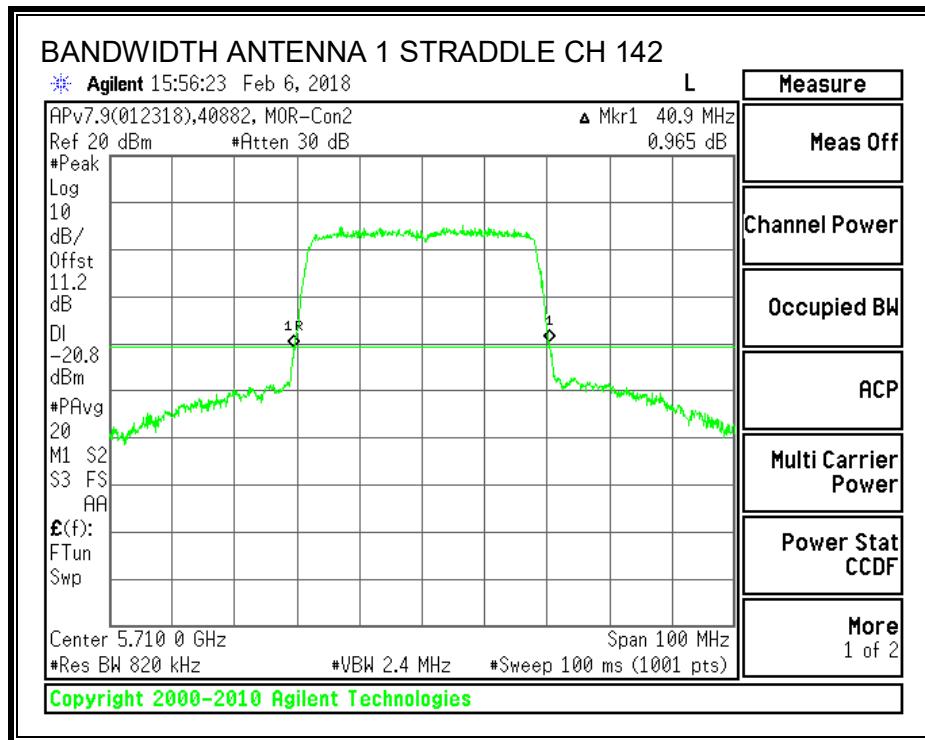




## 26 dB BANDWIDTH, ANTENNA 1







### 9.11.2. 26 dB BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

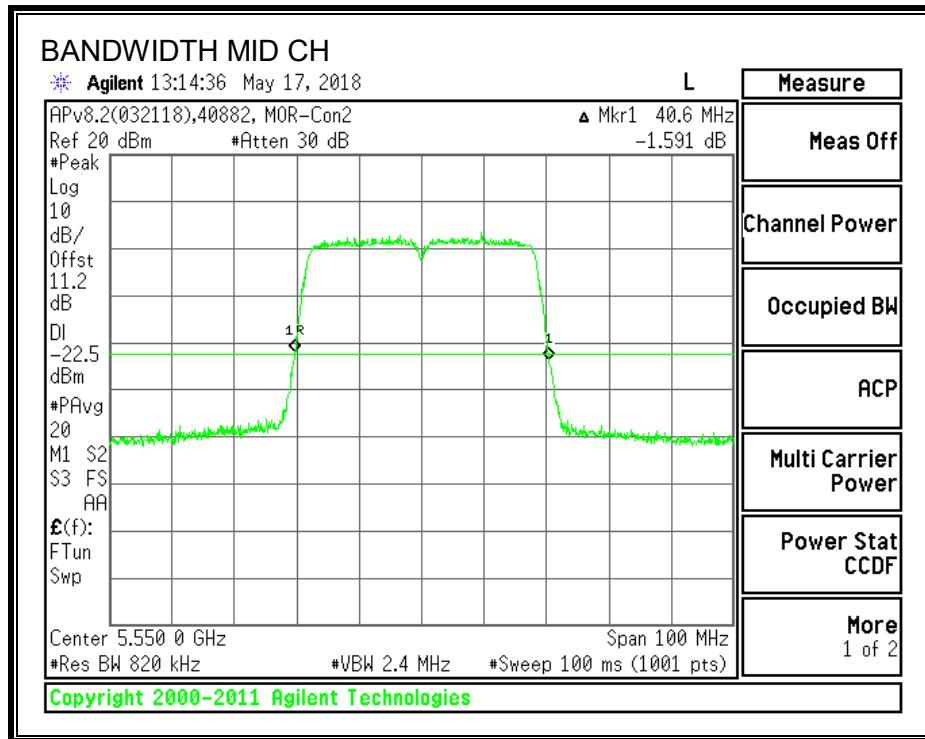
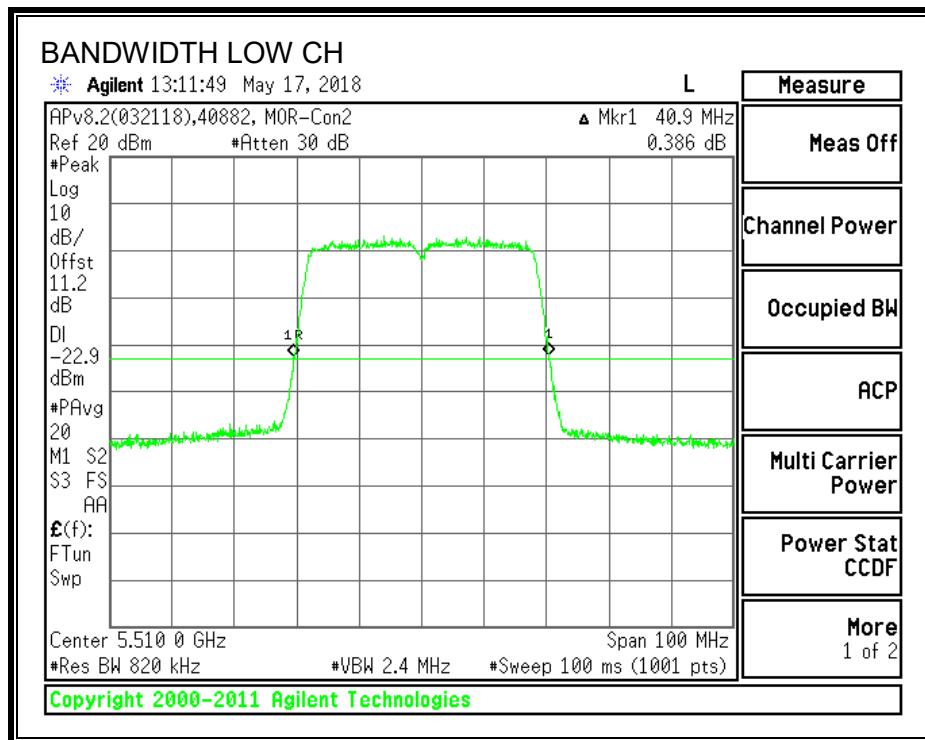
##### ANTENNA 0

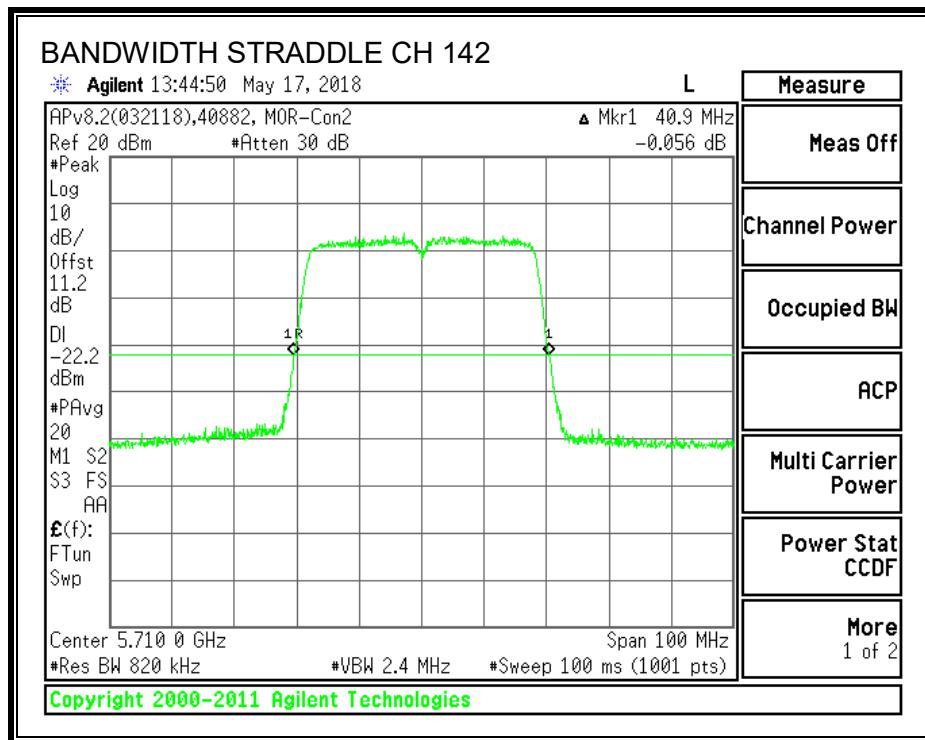
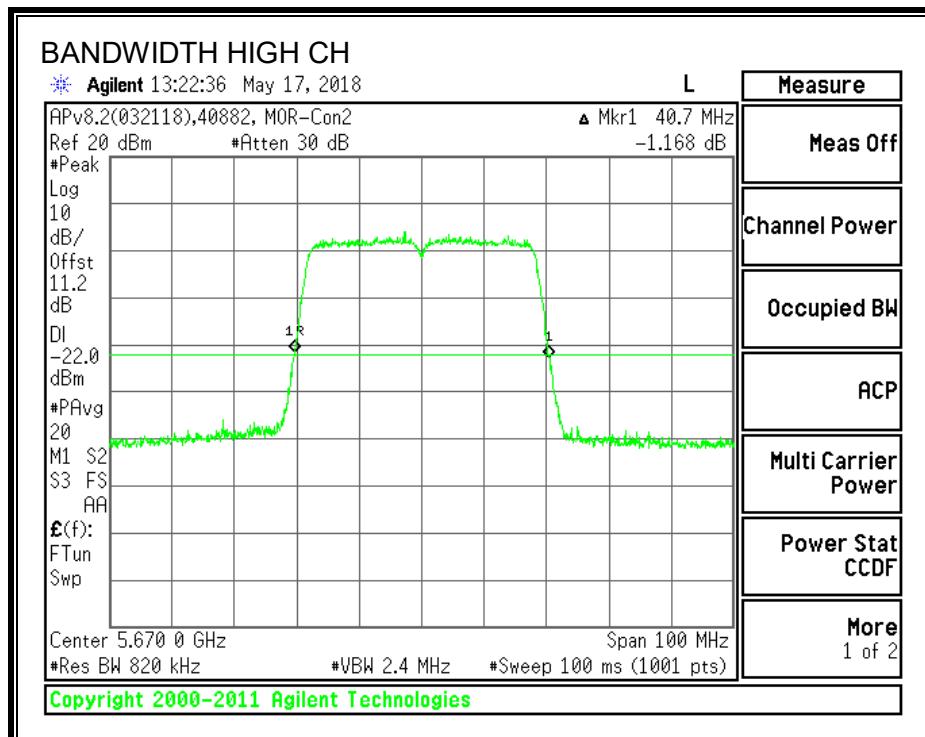
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	40.90
Mid	5550	40.60
High	5670	40.70
142	5710	40.90

##### ANTENNA 1

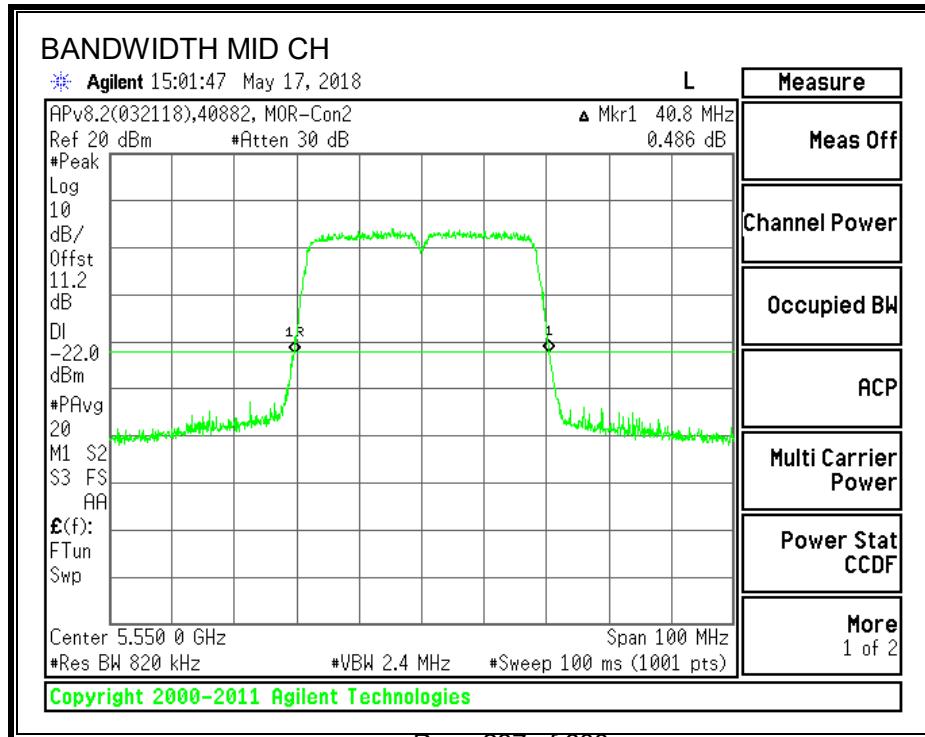
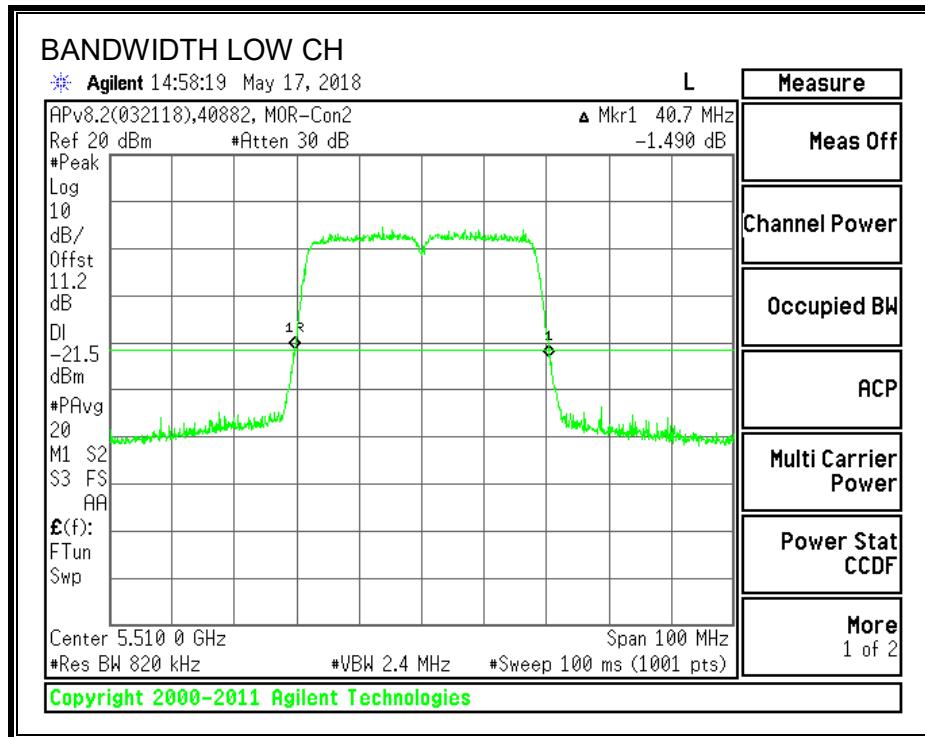
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	40.70
Mid	5550	40.80
High	5670	40.70
142	5710	40.90

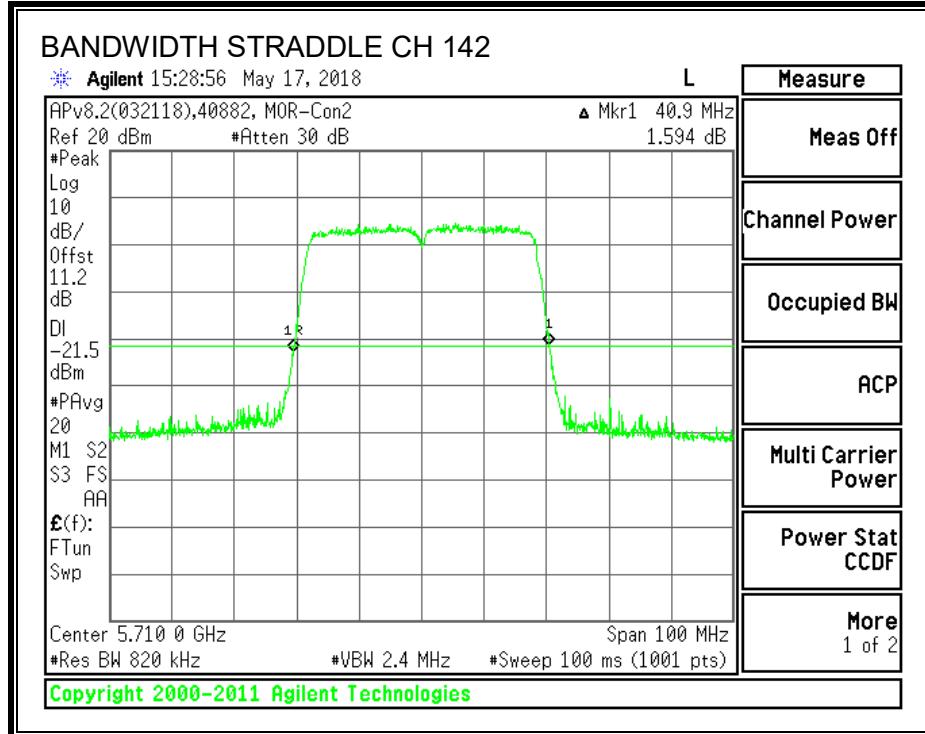
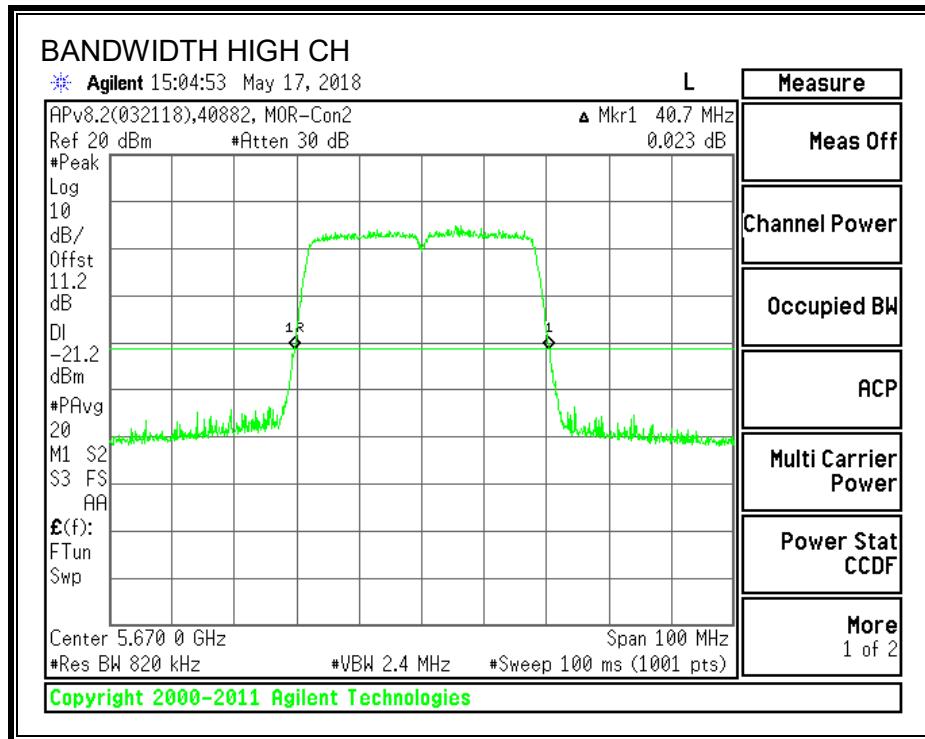
## 26 dB BANDWIDTH – ANTENNA 0





## 26 dB BANDWIDTH – ANTENNA 1





### 9.11.3. 99% BANDWIDTH – MIMO

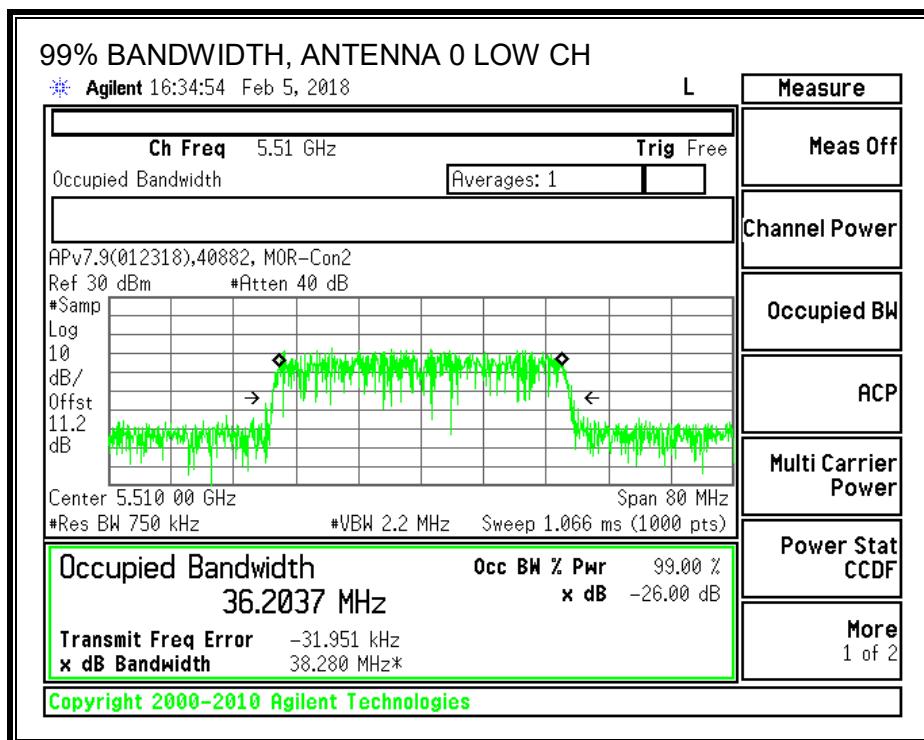
#### LIMITS

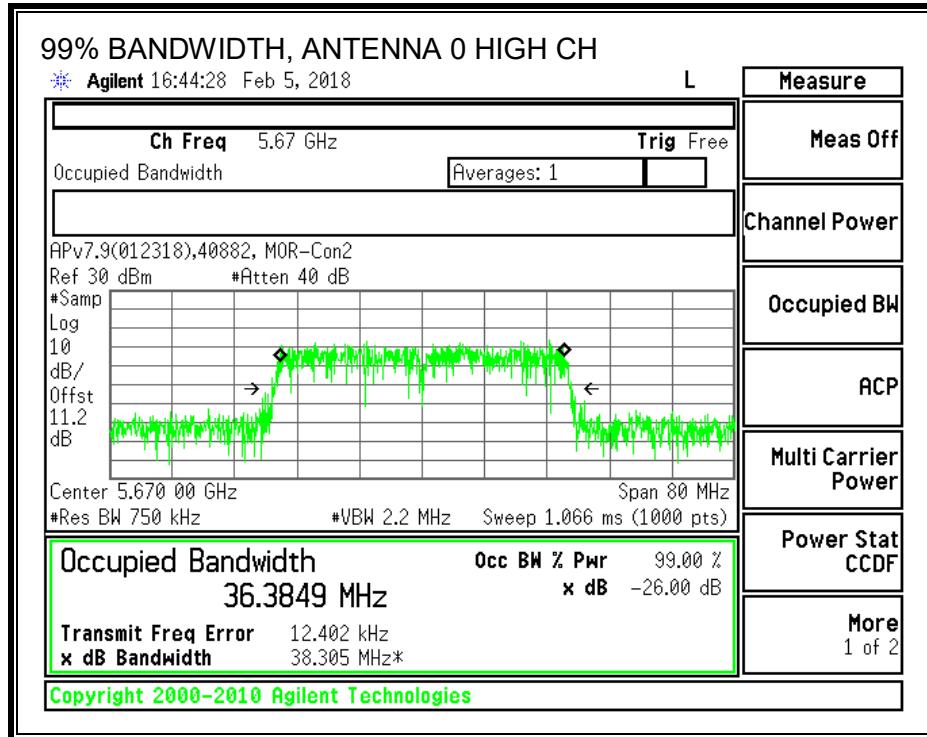
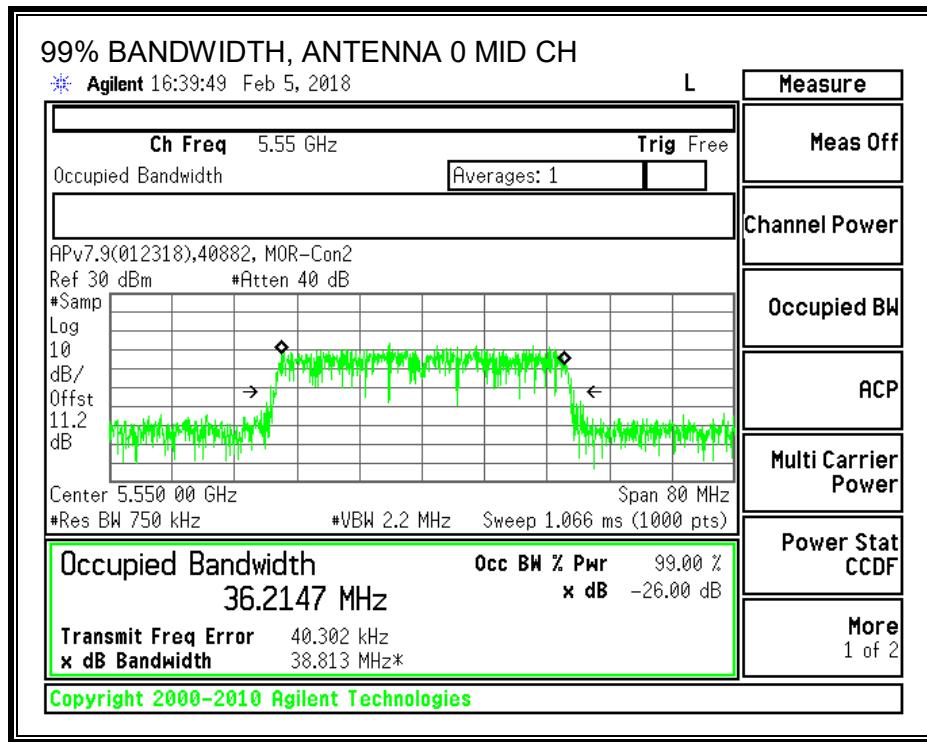
None; for reporting purposes only.

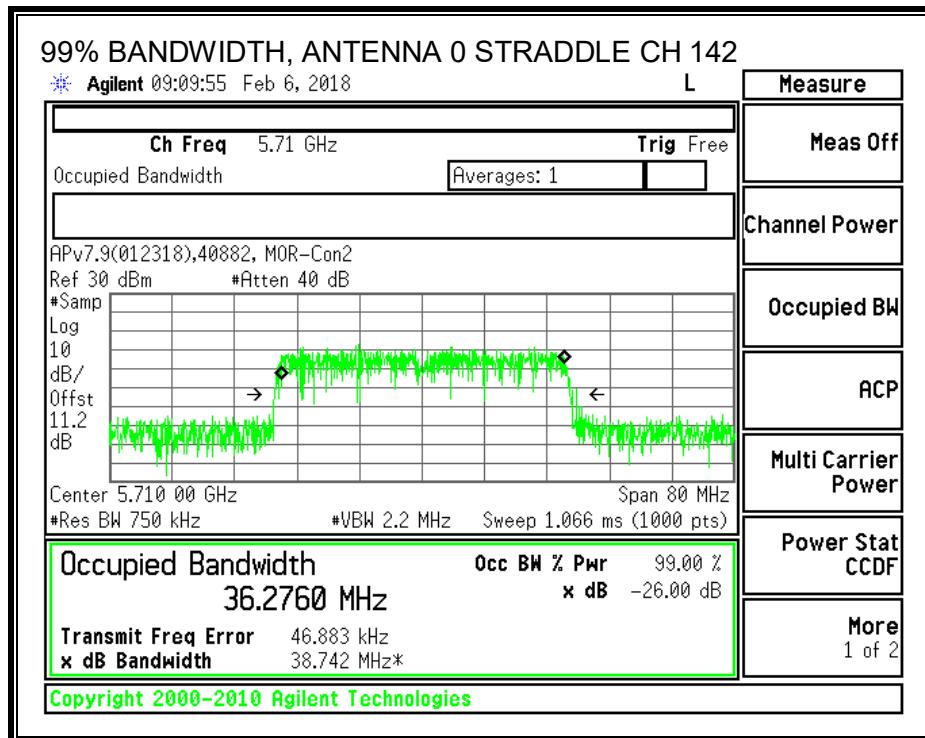
#### RESULTS

Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5510	36.2037	36.2486
Mid	5550	36.2147	36.3404
High	5670	36.3849	36.3155
142	5710	36.2760	36.2452

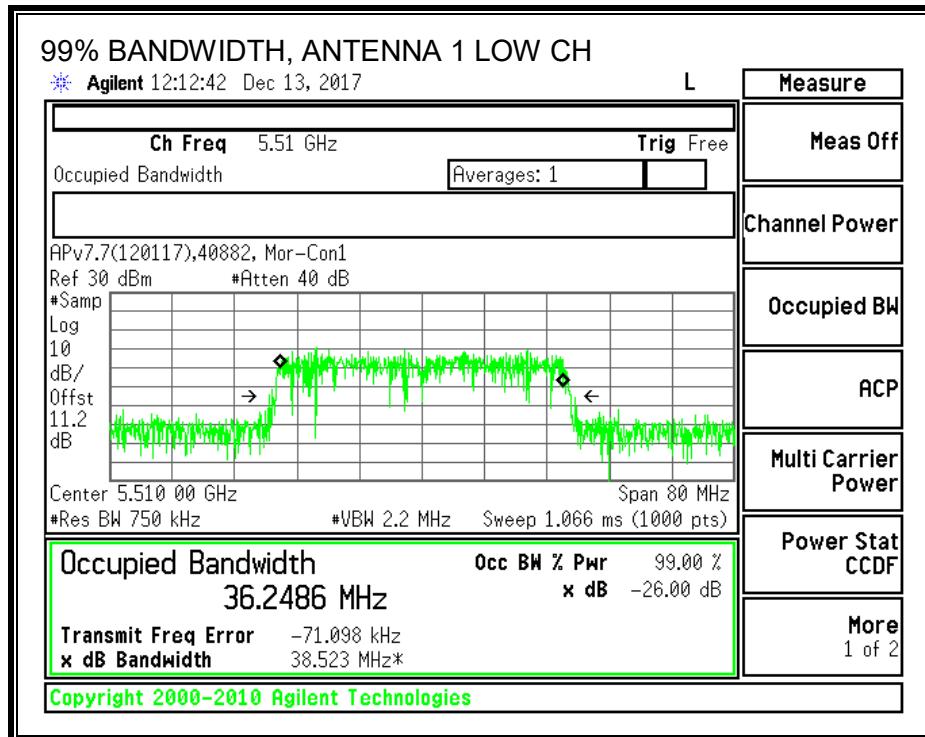
#### 99% BANDWIDTH, ANTENNA 0

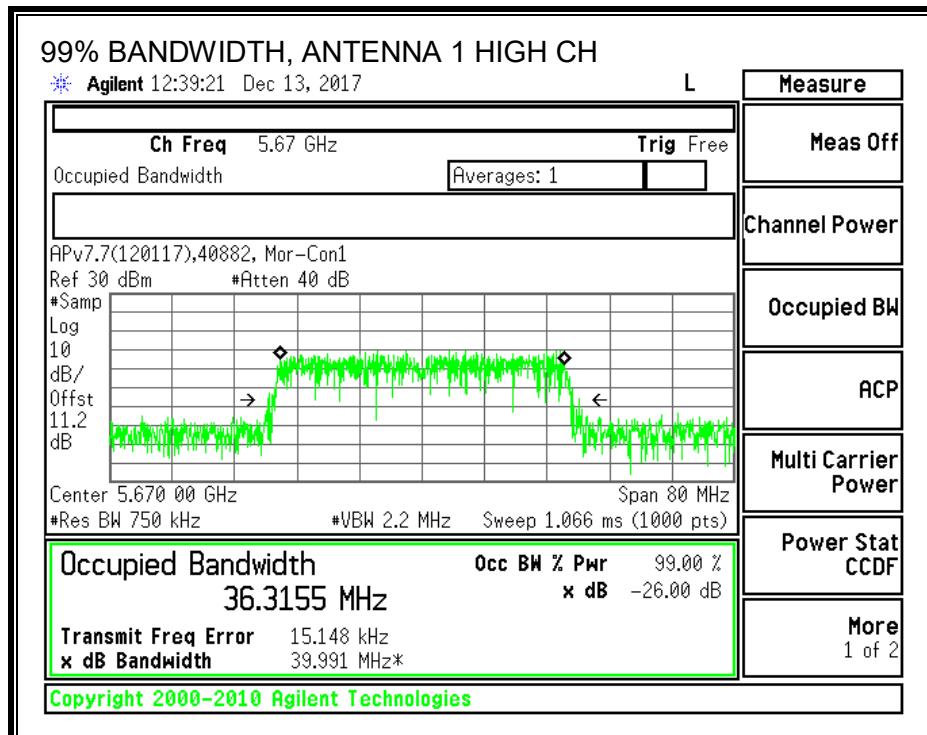
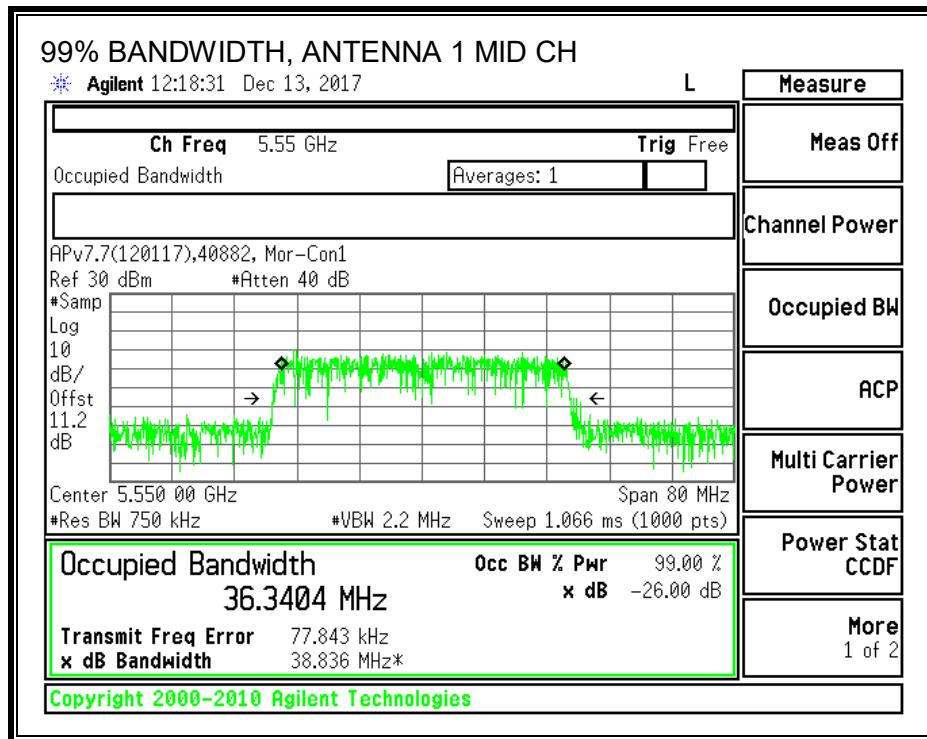


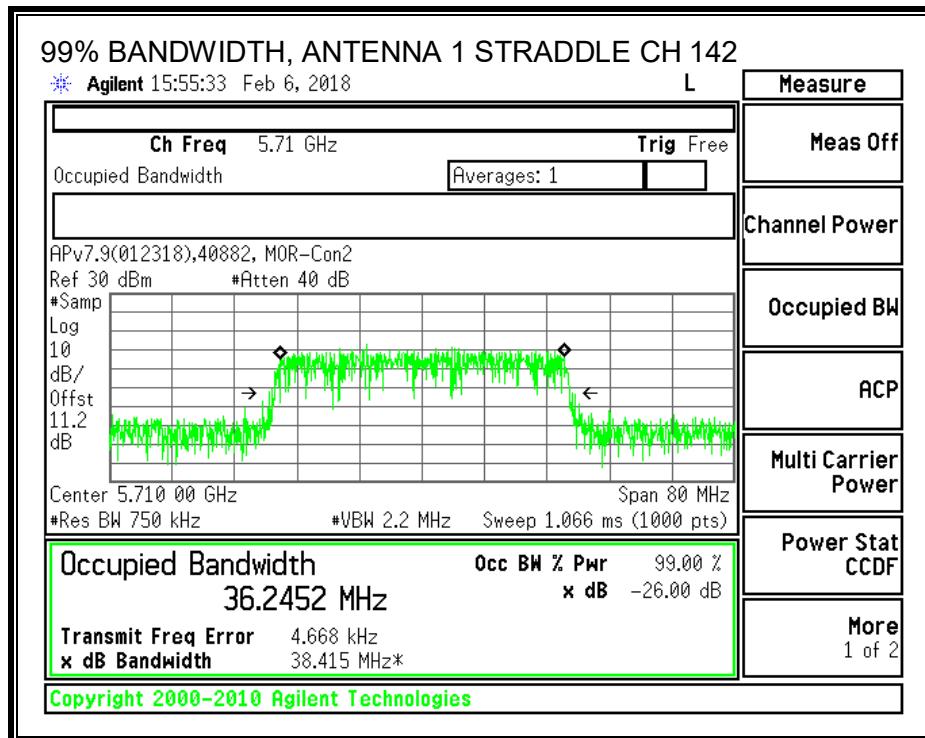




## 99% BANDWIDTH, ANTENNA 1







#### 9.11.4. 99% BANDWIDTH - SISO

##### LIMITS

None; for reporting purposes only.

##### RESULTS

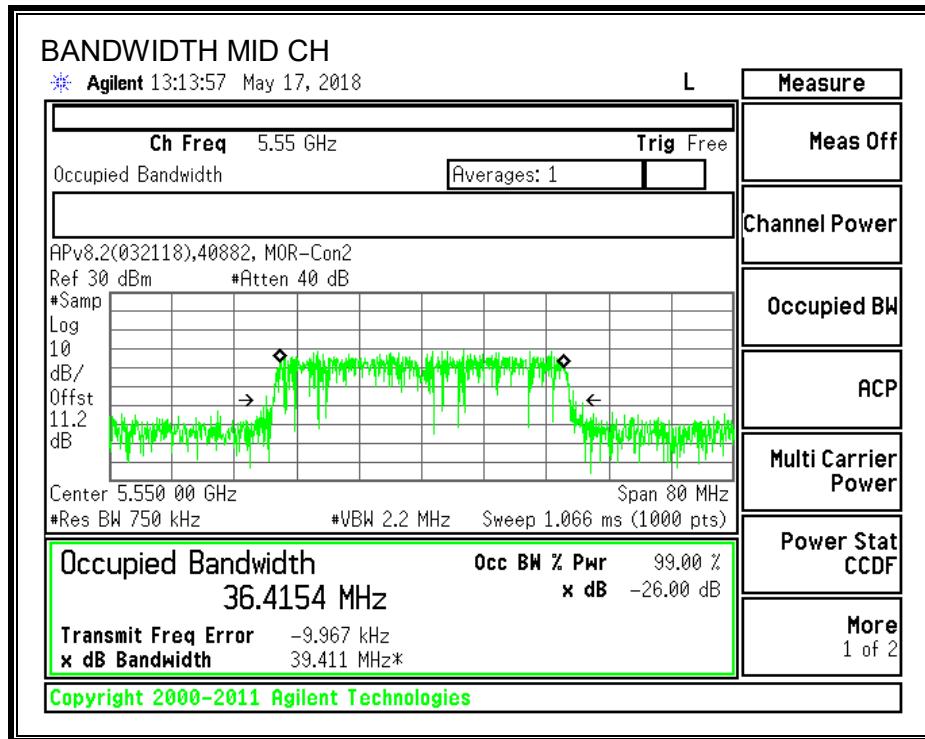
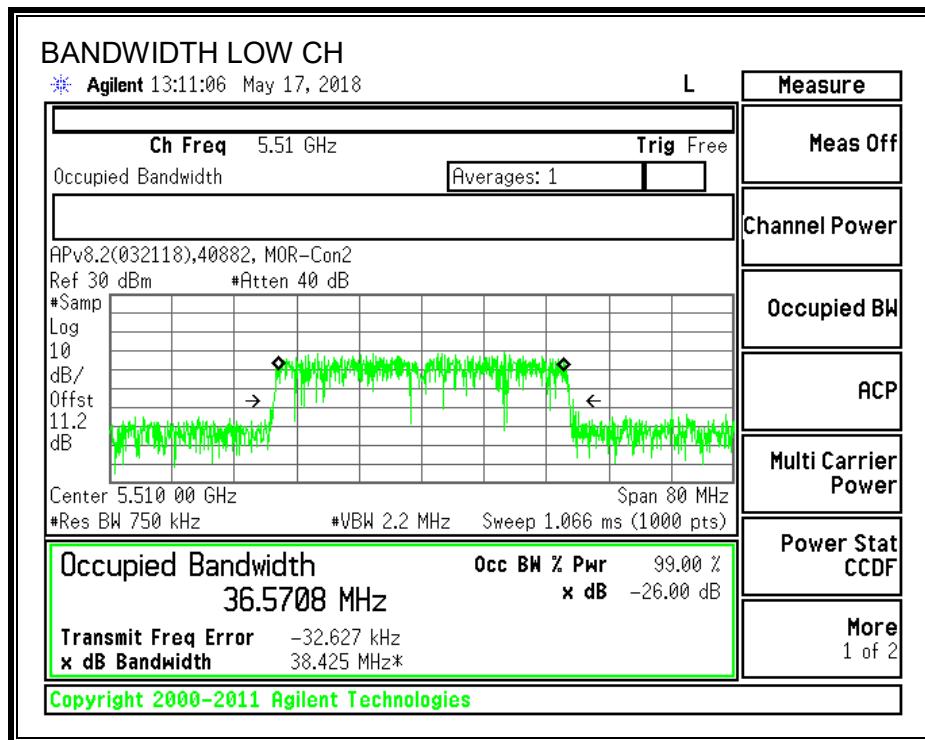
###### ANTENNA 0

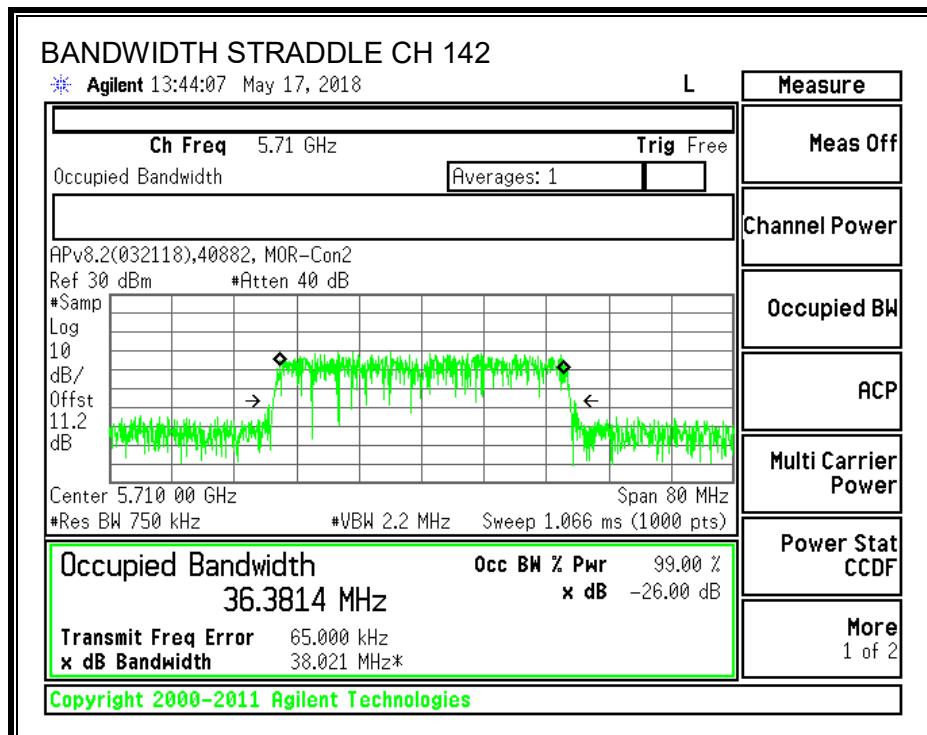
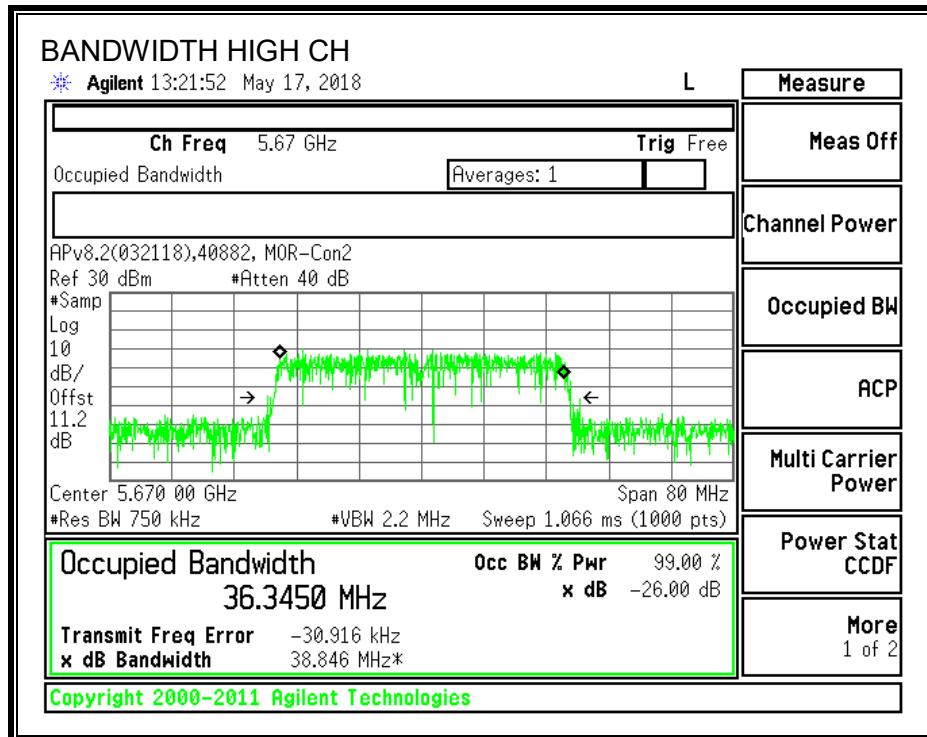
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.5708
Mid	5550	36.4154
High	5670	36.3450
142	5710	36.3814

###### ANTENNA 1

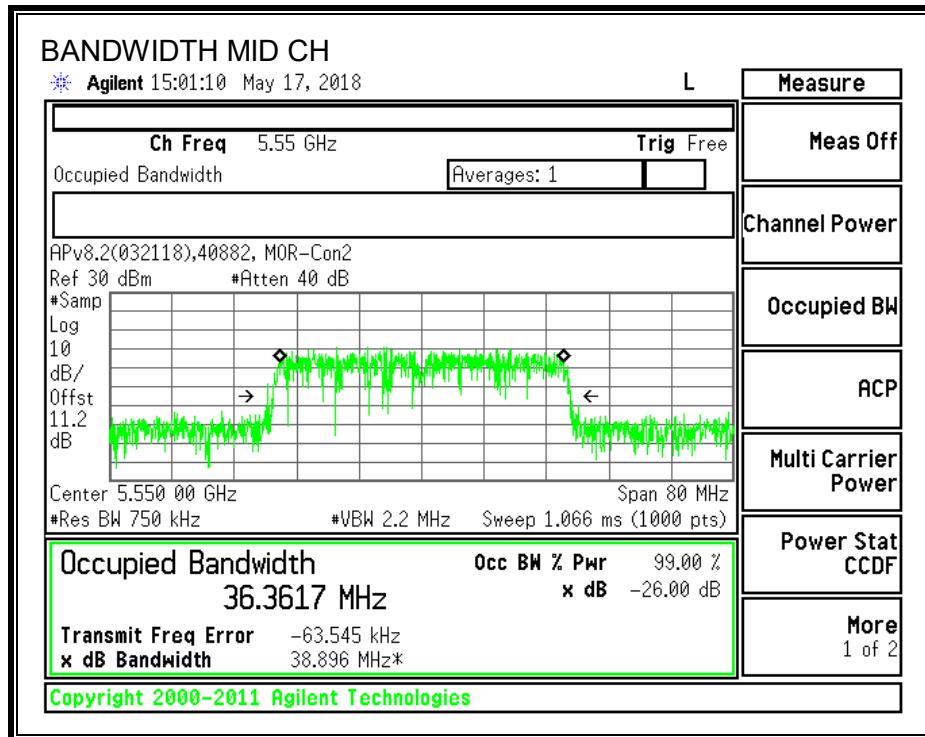
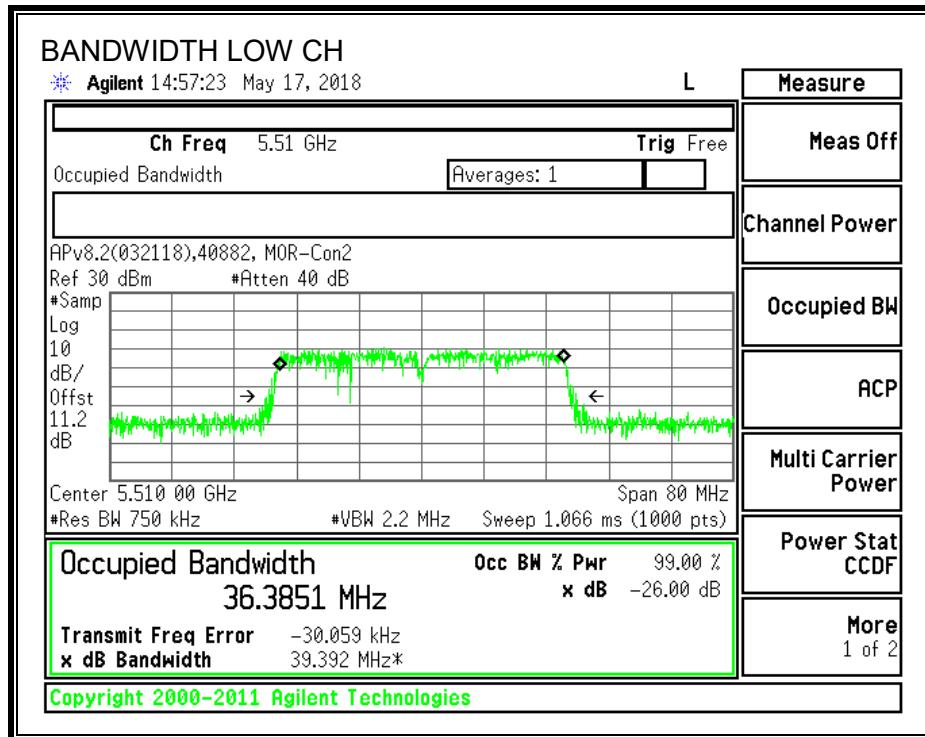
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.3851
Mid	5550	36.3617
High	5670	36.2636
142	5710	36.2770

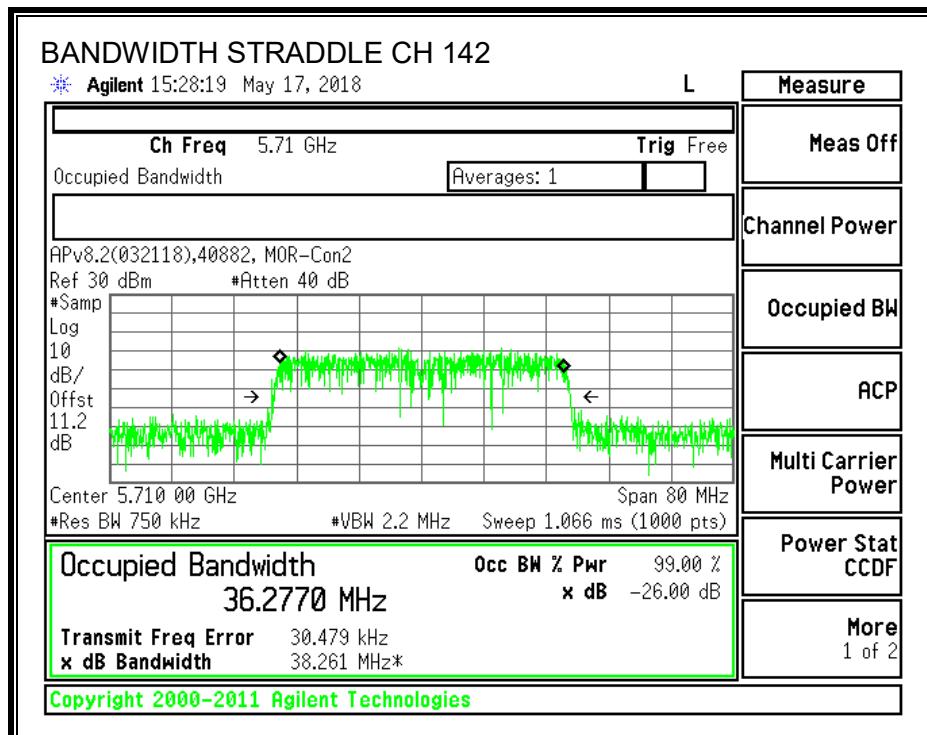
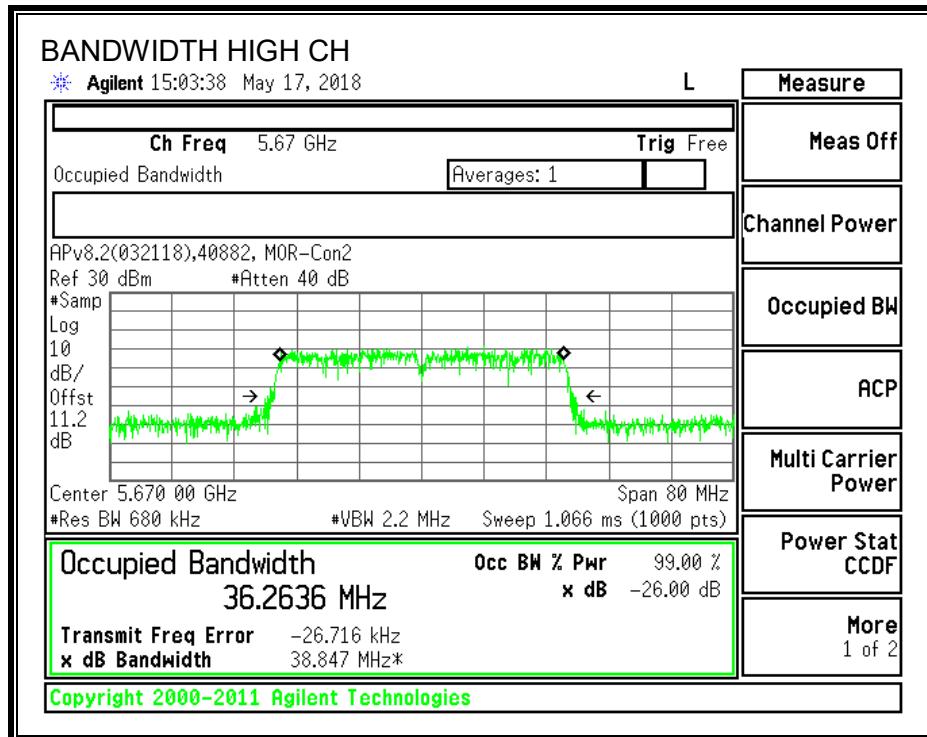
## 99% BANDWIDTH – ANTENNA 0





## 99% BANDWIDTH – ANTENNA 1





### 9.11.5. OUTPUT POWER AND PSD - MIMO

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### RSS-247 ISSUE 2 SECTION 6.2.3.1

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

#### DIRECTIONAL ANTENNA GAIN

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
2.50	3.70	3.14

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
2.50	3.70	6.13

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	40.30	3.14	6.13	24.00	10.87
Mid	5550	40.30	3.14	6.13	24.00	10.87
High	5670	40.40	3.14	6.13	24.00	10.87

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	10.07	10.73	13.51	24.00	-10.49
Mid	5550	10.08	10.83	13.57	24.00	-10.43
High	5670	10.15	10.86	13.62	24.00	-10.38

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	-1.83	-4.57	0.11	10.87	-10.76
Mid	5550	-1.90	-4.59	0.06	10.87	-10.81
High	5670	-1.54	-3.91	0.54	10.87	-10.33

## **RESULTS (ISED Conducted Power and PSD)**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	36.20	24.00	11.00
Mid	5550	36.21	24.00	11.00
High	5670	36.32	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	10.07	10.73	13.51	24.00	-10.49
Mid	5550	10.08	10.83	13.57	24.00	-10.43
High	5670	10.15	10.86	13.62	24.00	-10.38

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	-1.83	-4.57	0.11	11.00	-10.89
Mid	5550	-1.90	-4.59	0.06	11.00	-10.94
High	5670	-1.54	-3.91	0.54	11.00	-10.46

## RESULTS (ISED EIRP)

### Bandwidth, Antenna Gain, and Limits

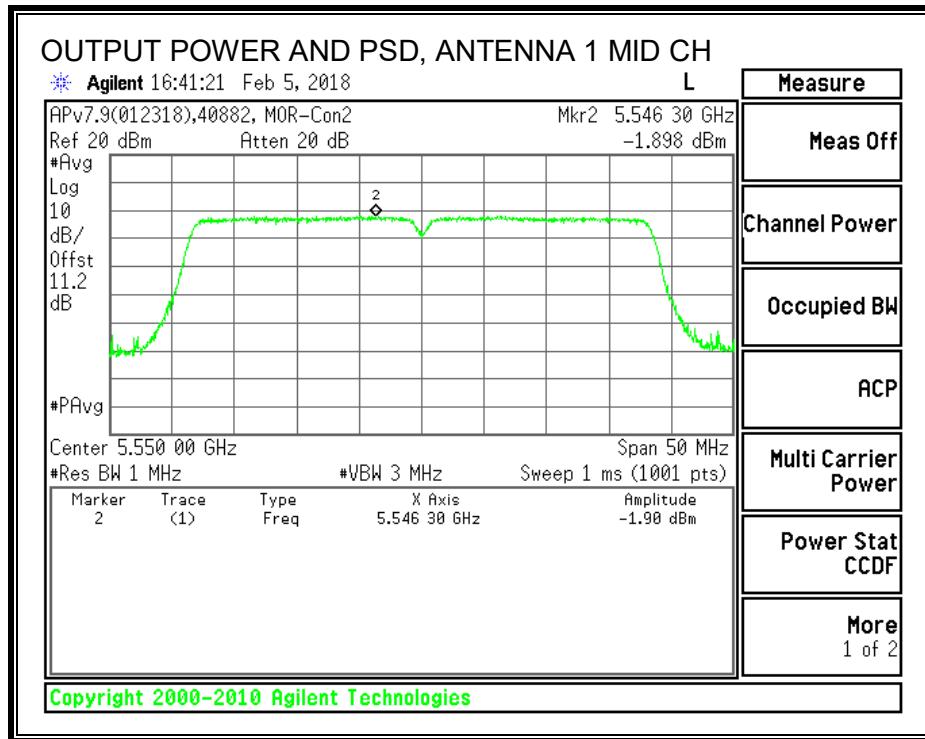
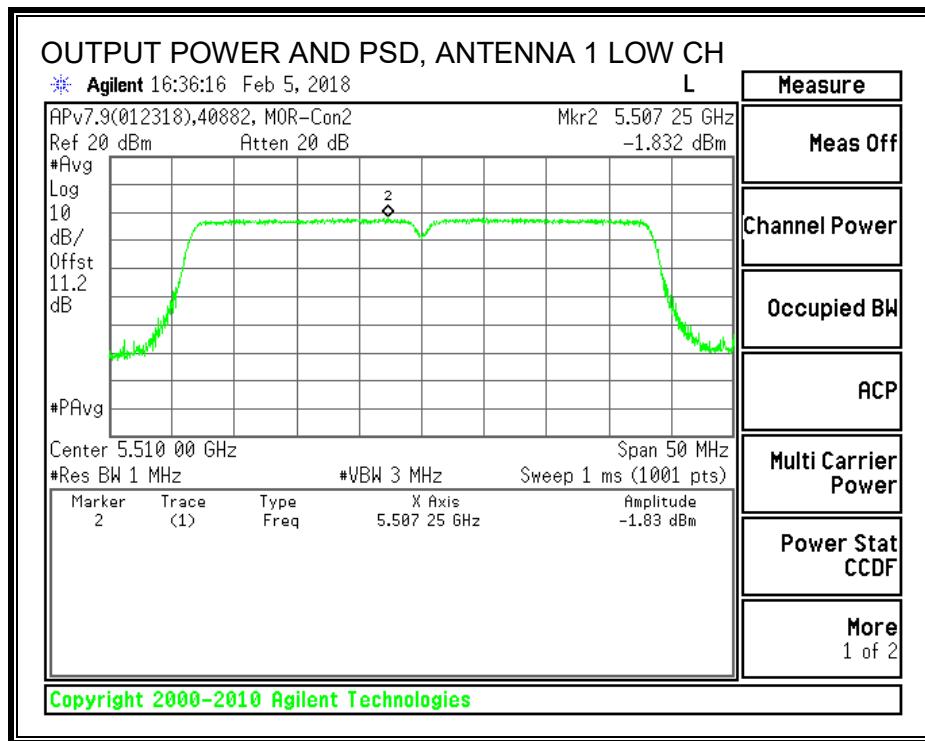
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5510	36.20	3.14	30.00
Mid	5550	36.21	3.14	30.00
High	5670	36.32	3.14	30.00

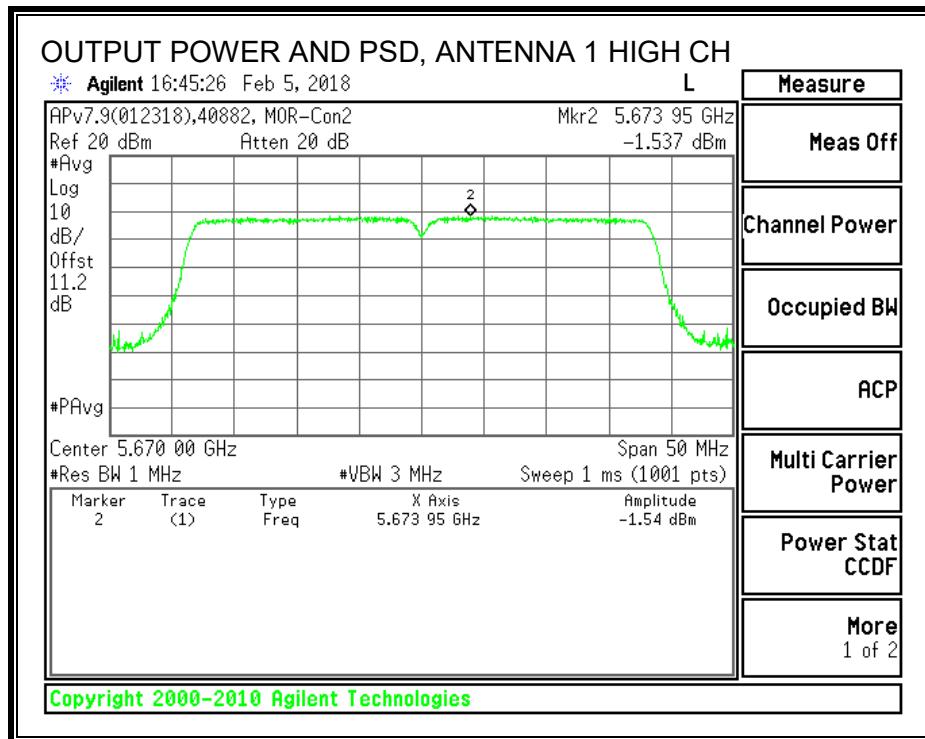
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

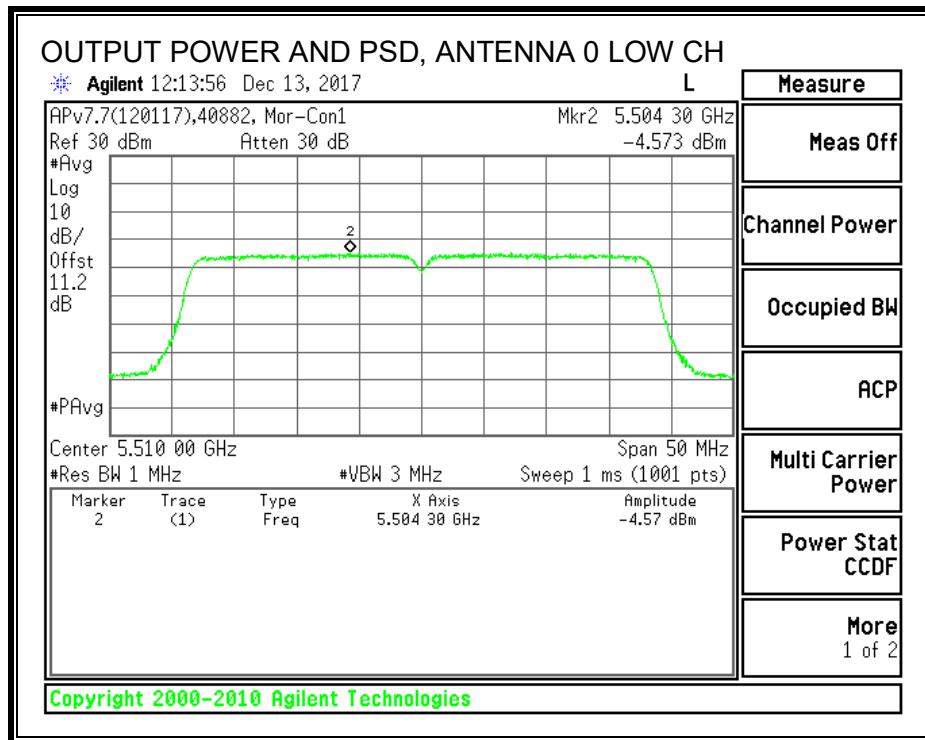
Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5510	10.07	10.73	16.65	30.00	-13.35
Mid	5550	10.08	10.83	16.71	30.00	-13.29
High	5670	10.15	10.86	16.76	30.00	-13.24

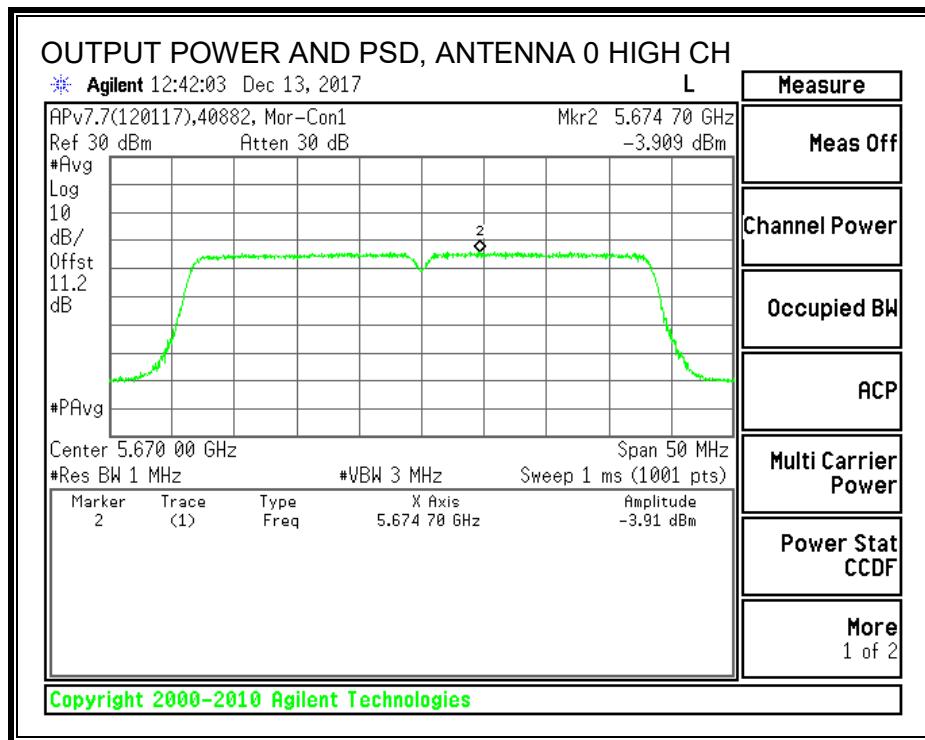
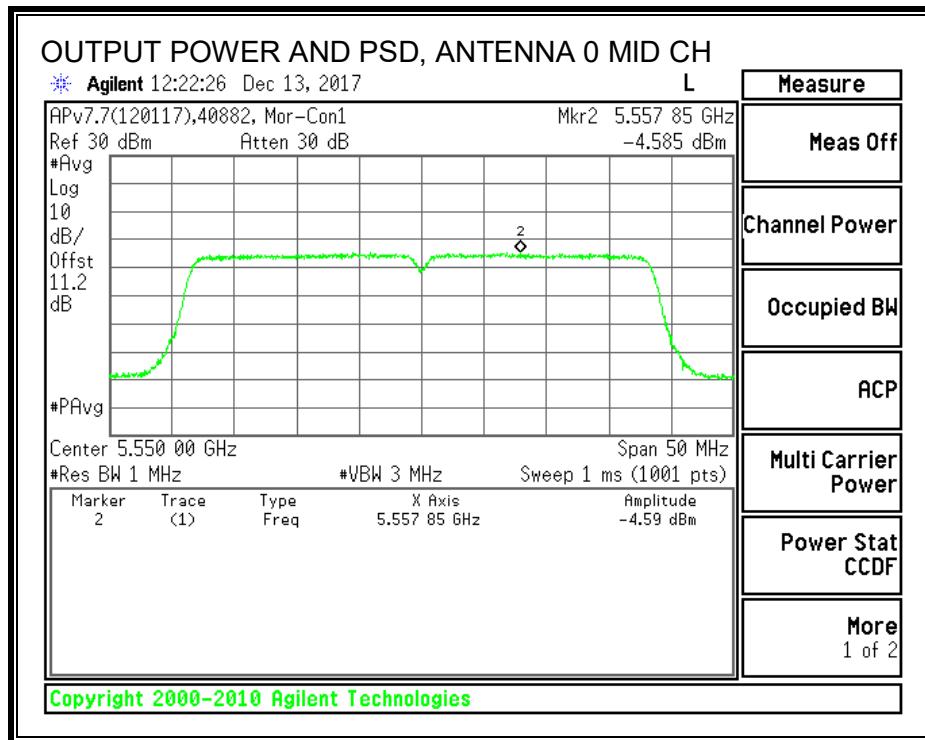
## OUTPUT POWER AND PSD, ANTENNA 1





## OUTPUT POWER AND PSD, ANTENNA 0





**STRADDLE CHANNEL 142 RESULTS (FCC) UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	40.50	3.14	6.13	24.00	10.87

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	10.11	11.01	13.68	24.00	-10.32

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-1.61	-2.58	1.03	10.87	-9.84

**STRADDLE CHANNEL 142 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	36.25	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	10.11	11.01	13.68	24.00	-10.32

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-1.61	-2.58	1.03	11.00	-9.97

**STRADDLE CHANNEL 142 RESULTS (ISED EIRP) UNII-2C BAND**

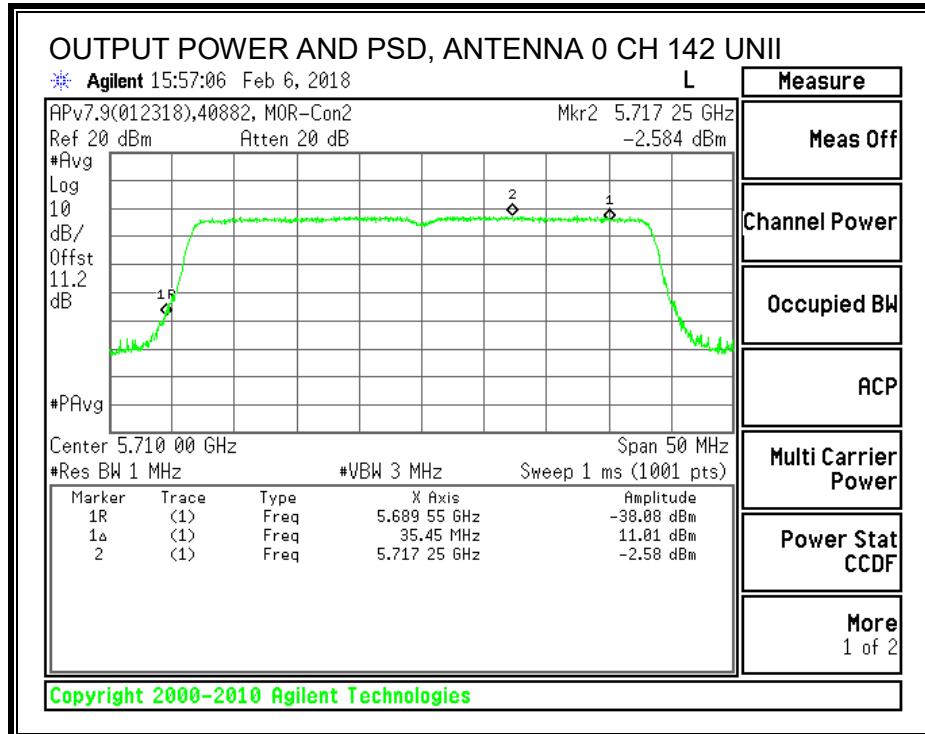
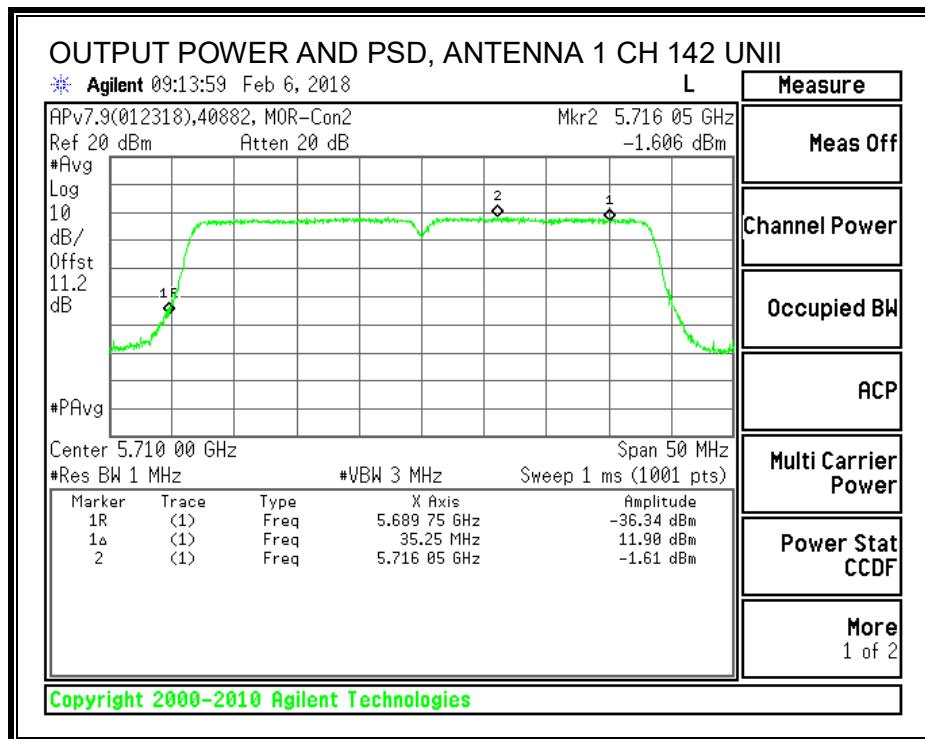
**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
142	5710	36.25	3.14	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
142	5710	10.11	11.01	16.82	30.00	-13.18



**STRADDLE CHANNEL 142 RESULTS (FCC and ISED) UNII-3 BAND**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	3.14	6.13	30.00	29.87

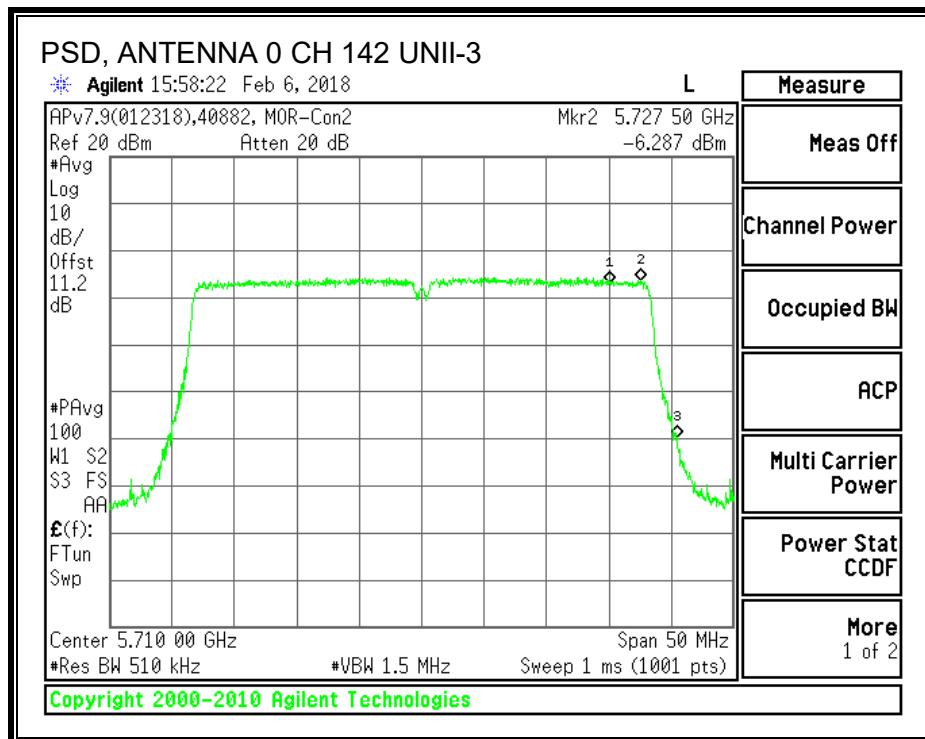
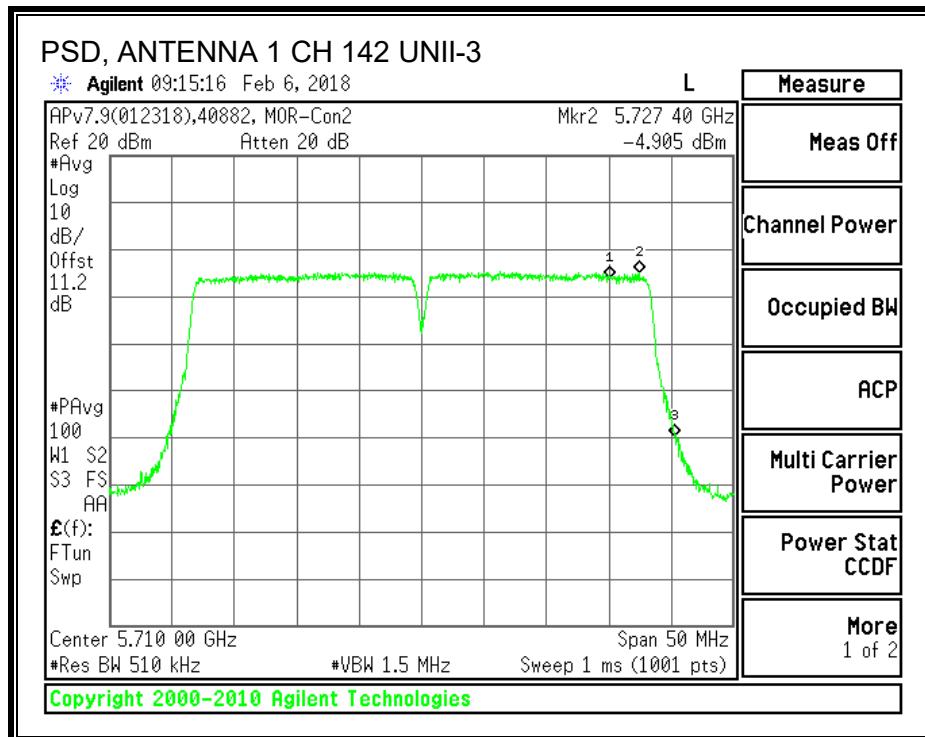
<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	10.11	11.01	13.68	30.00	-16.32

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-4.91	-6.29	-2.44	29.87	-32.31



## 9.11.6. OUTPUT POWER AND PSD - SISO

### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### RSS-247 ISSUE 2 SECTION 6.2.3.1

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## **RESULTS (FCC) – ANTENNA 0**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	40.90	2.50	24.00	11.00
Mid	5550	40.60	2.50	24.00	11.00
High	5670	40.70	2.50	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	12.05	12.05	24.00	-11.95
Mid	5550	13.02	13.02	24.00	-10.98
High	5670	13.10	13.10	24.00	-10.90

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	-4.94	-4.85	11.00	-15.85
Mid	5550	-4.96	-4.87	11.00	-15.87
High	5670	-4.31	-4.22	11.00	-15.22

Note – Measured power was a gated measurement.

## RESULTS (FCC) – ANTENNA 1

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	40.70	3.70	24.00	11.00
Mid	5550	40.80	3.70	24.00	11.00
High	5670	40.70	3.70	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	13.11	13.11	24.00	-10.89
Mid	5550	13.93	13.93	24.00	-10.07
High	5670	13.89	13.89	24.00	-10.11

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	-3.74	-3.65	11.00	-14.65
Mid	5550	-3.90	-3.81	11.00	-14.81
High	5670	-3.37	-3.28	11.00	-14.28

Note – Measured power was a gated measurement.

## **RESULTS (ISED Conducted Power and PSD) – ANTENNA 0**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	36.57	24.00	11.00
Mid	5550	36.42	24.00	11.00
High	5670	36.35	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	12.05	12.05	24.00	-11.95
Mid	5550	13.02	13.02	24.00	-10.98
High	5670	13.10	13.10	24.00	-10.90

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	-4.94	-4.85	11.00	-15.85
Mid	5550	-4.96	-4.87	11.00	-15.87
High	5670	-4.31	-4.22	11.00	-15.22

Note – Measured power was a gated measurement.

## RESULTS (ISED Conducted Power and PSD) – ANTENNA 1

### Bandwidth and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	36.39	24.00	11.00
Mid	5550	36.36	24.00	11.00
High	5670	36.26	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	13.11	13.11	24.00	-10.89
Mid	5550	13.93	13.93	24.00	-10.07
High	5670	13.89	13.89	24.00	-10.11

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	-3.74	-3.65	11.00	-14.65
Mid	5550	-3.90	-3.81	11.00	-14.81
High	5670	-3.37	-3.28	11.00	-14.28

Note – Measured power was a gated measurement.

## RESULTS (ISED EIRP) – ANTENNA 0

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5510	36.57	2.50	30.00
Mid	5550	36.42	2.50	30.00
High	5670	36.35	2.50	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5510	12.05	14.55	30.00	-15.45
Mid	5550	13.02	15.52	30.00	-14.48
High	5670	13.10	15.60	30.00	-14.40

## RESULTS (ISED EIRP) – ANTENNA 1

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5510	36.39	3.70	30.00
Mid	5550	36.36	3.70	30.00
High	5670	36.26	3.70	30.00

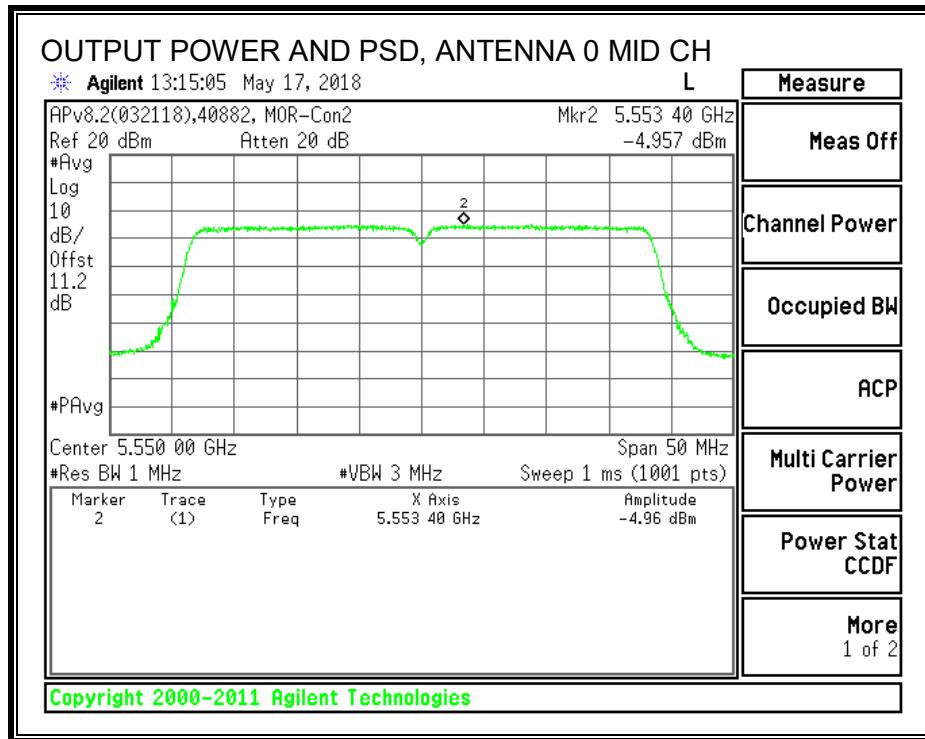
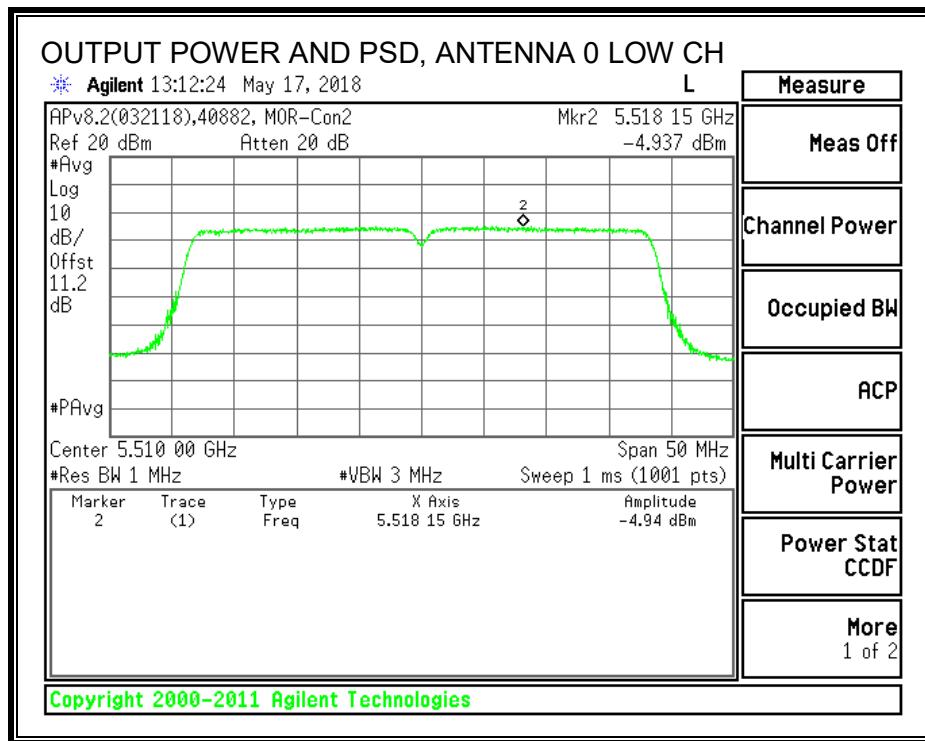
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

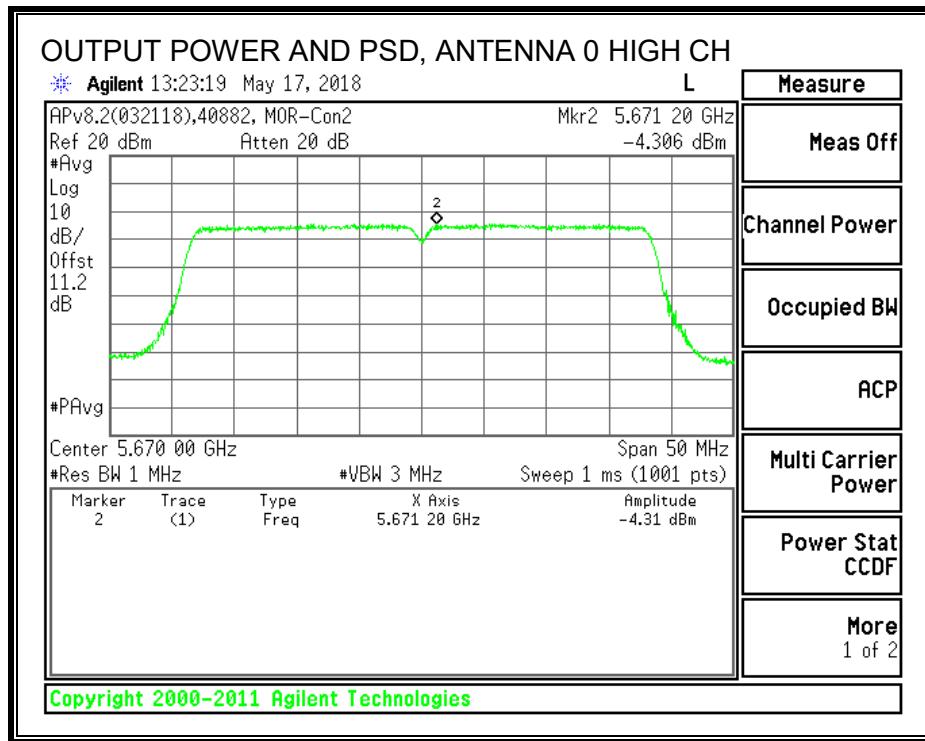
### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5510	13.11	16.81	30.00	-13.19
Mid	5550	13.93	17.63	30.00	-12.37
High	5670	13.89	17.59	30.00	-12.41

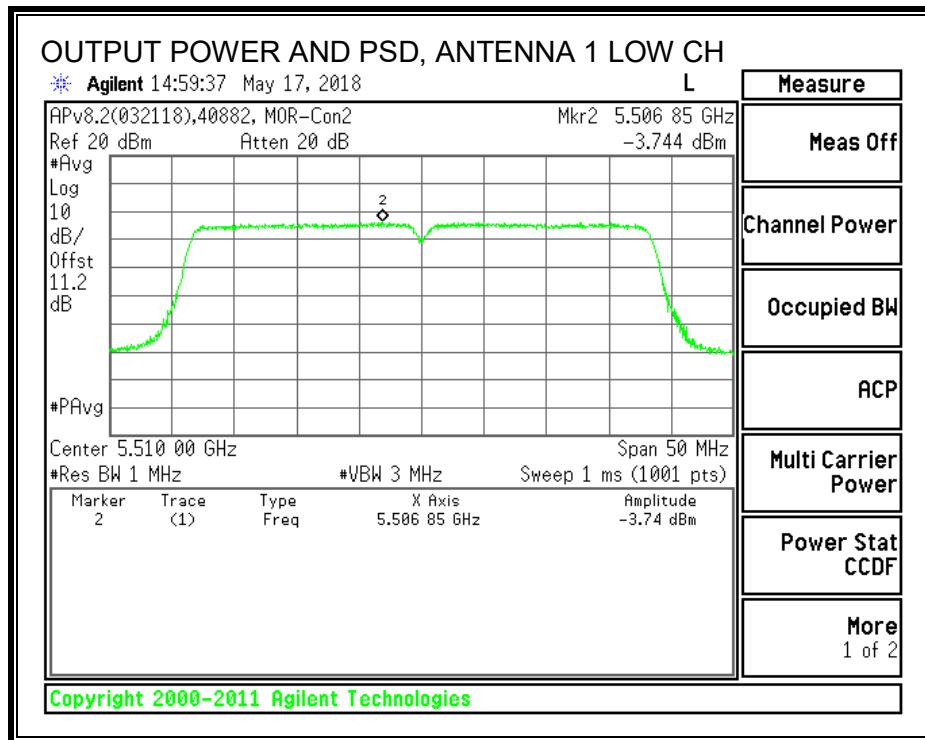
Note – Measured power was a gated measurement.

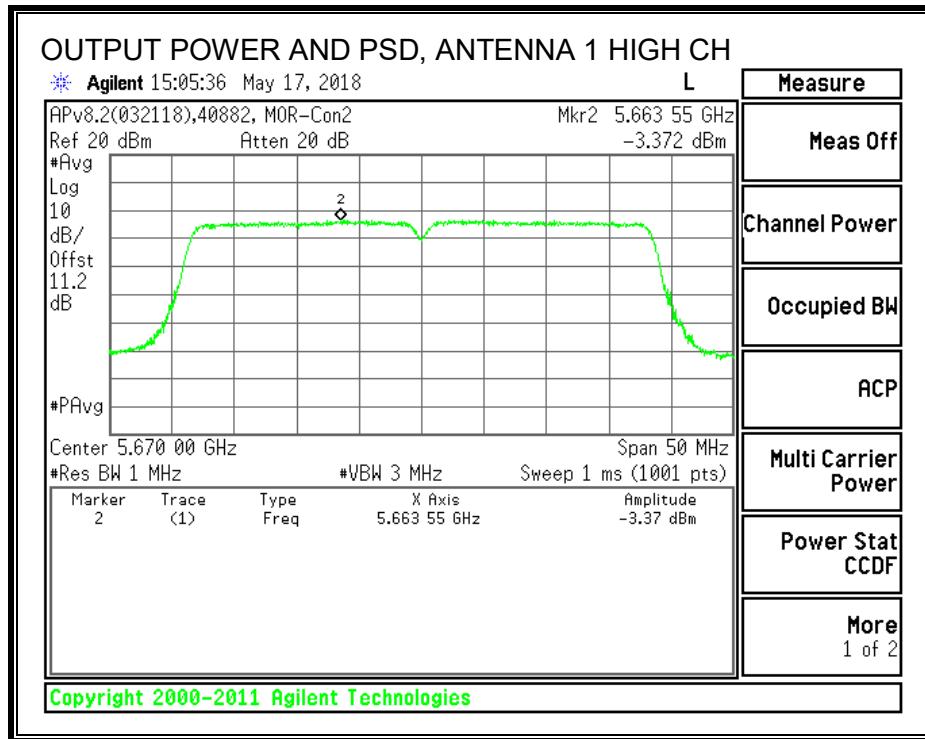
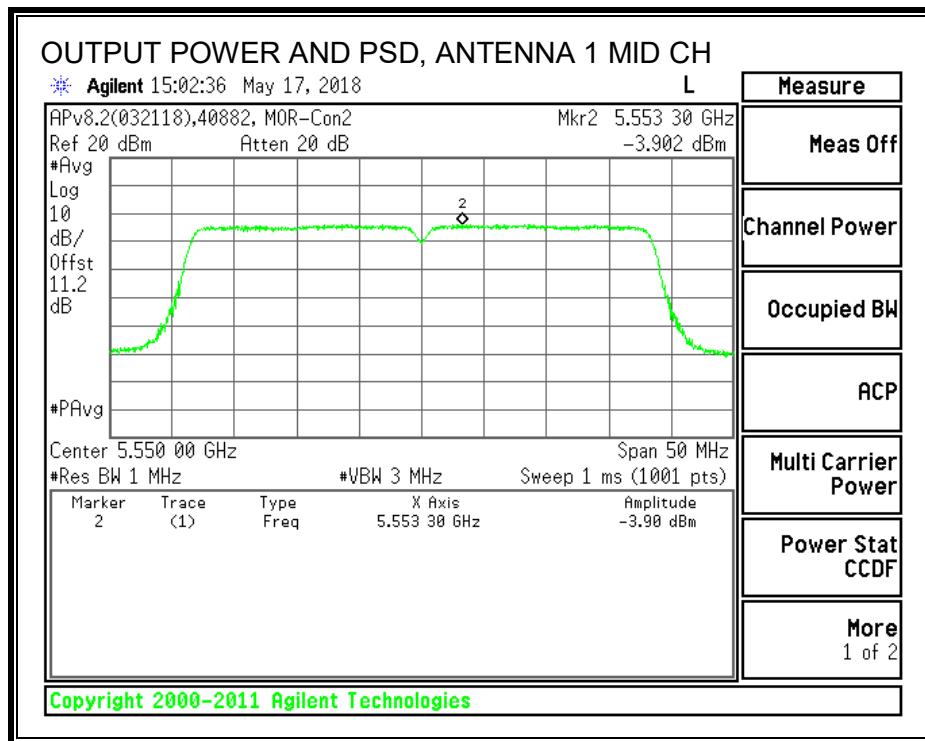
## OUTPUT POWER AND PSD, ANTENNA 0





### OUTPUT POWER AND PSD, ANTENNA 1





### STRADDLE CHANNEL 142 RESULTS (FCC) UNII-2C BAND – ANTENNA 0

#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	40.90	2.50	2.50	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	13.02	13.11	24.00	-10.89

#### PSD Results

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-4.26	-4.17	11.00	-15.17

### STRADDLE CHANNEL 142 RESULTS (FCC) UNII-2C BAND – ANTENNA 1

#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	40.90	3.70	3.70	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	13.91	14.00	24.00	-10.00

#### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-3.07	-2.98	11.00	-13.98

**STRADDLE CHANNEL 142 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND – ANTENNA 0**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	36.38	24.00	11.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	13.02	13.11	24.00	-10.89

**PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-4.26	-4.17	11.00	-15.17

**STRADDLE CHANNEL 142 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND – ANTENNA 1**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	36.28	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	13.91	14.00	24.00	-10.00

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-3.07	-2.98	11.00	-13.98

### STRADDLE CHANNEL 144 RESULTS (ISED EIRP) UNII-2C BAND – ANTENNA 0

#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
142	5710	36.38	2.50	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
142	5710	13.02	15.61	30.00	-14.39

### STRADDLE CHANNEL 144 RESULTS (ISED EIRP) UNII-2C BAND – ANTENNA 1

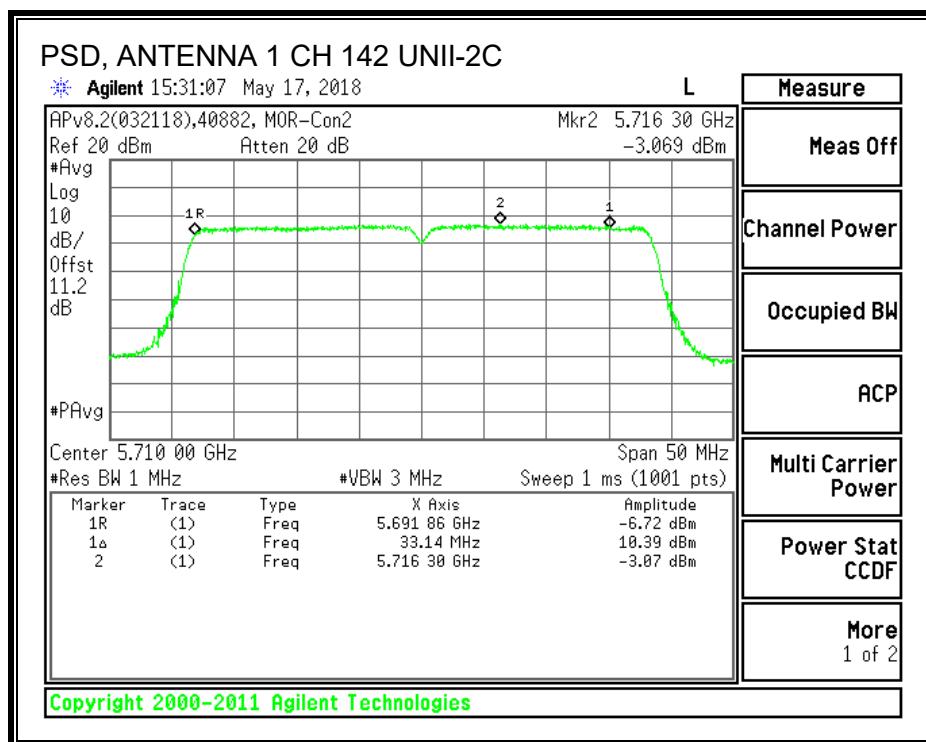
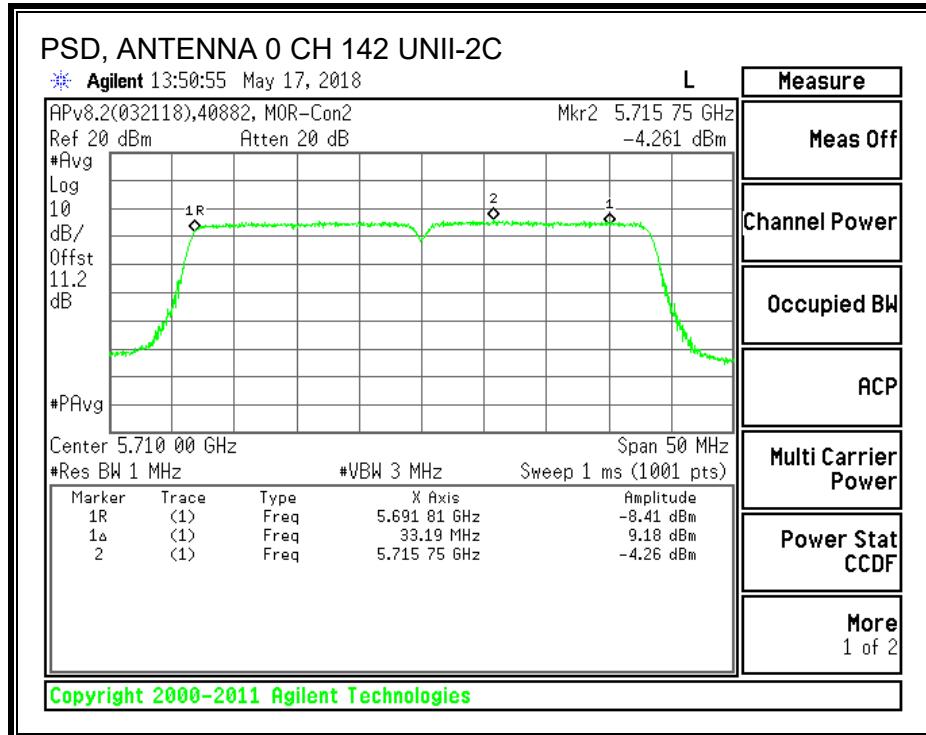
#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
142	5710	36.28	3.70	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
142	5710	13.91	17.70	30.00	-12.30



**UNII-3 BAND (FCC and ISED) – ANTENNA 0**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	2.50	30.00	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	13.02	13.11	30.00	-16.89

**PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-7.95	-7.86	30.00	-37.86

**UNII-3 BAND (FCC and ISED) – ANTENNA 1**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
142	5710	3.70	30.00	30.00

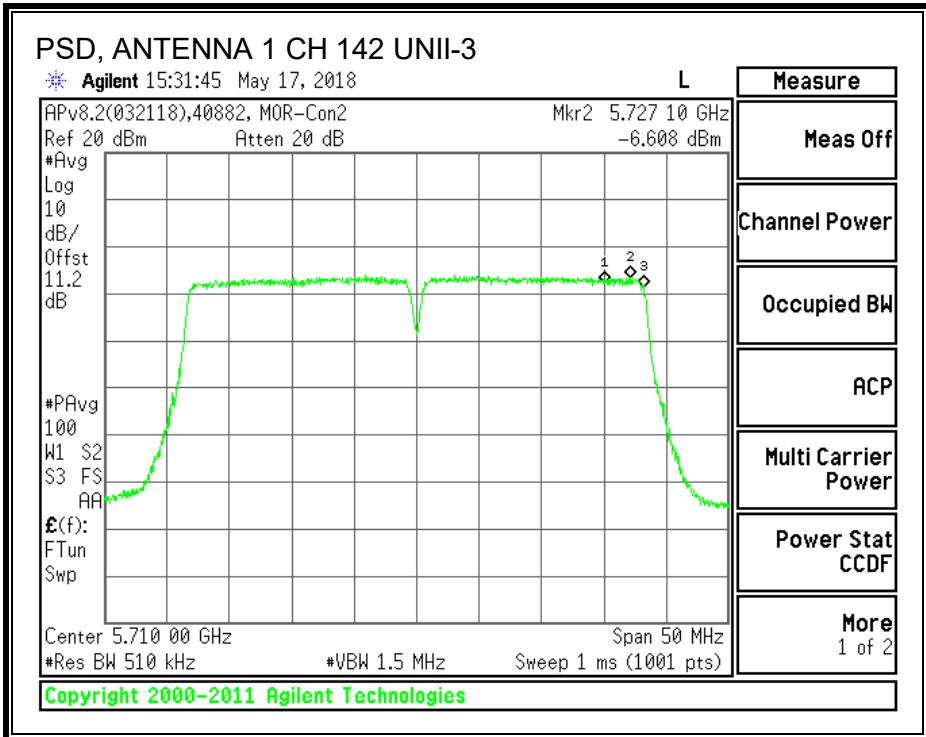
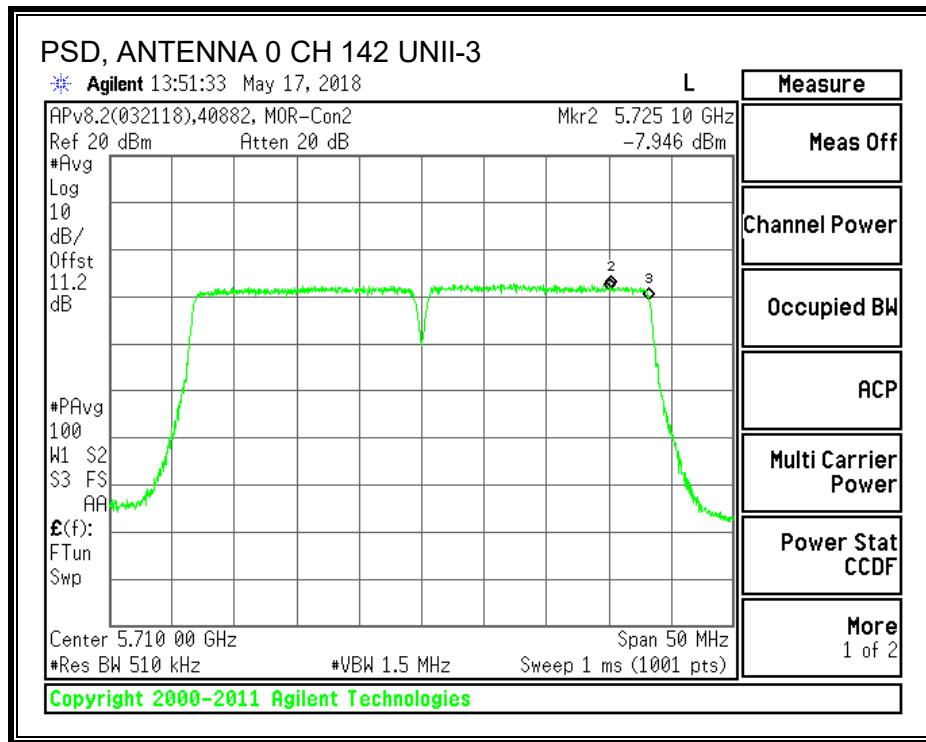
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
142	5710	13.91	14.00	30.00	-16.00

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
142	5710	-6.61	-6.52	30.00	-36.52



## 9.12. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

### 9.12.1. 26 dB BANDWIDTH - MIMO

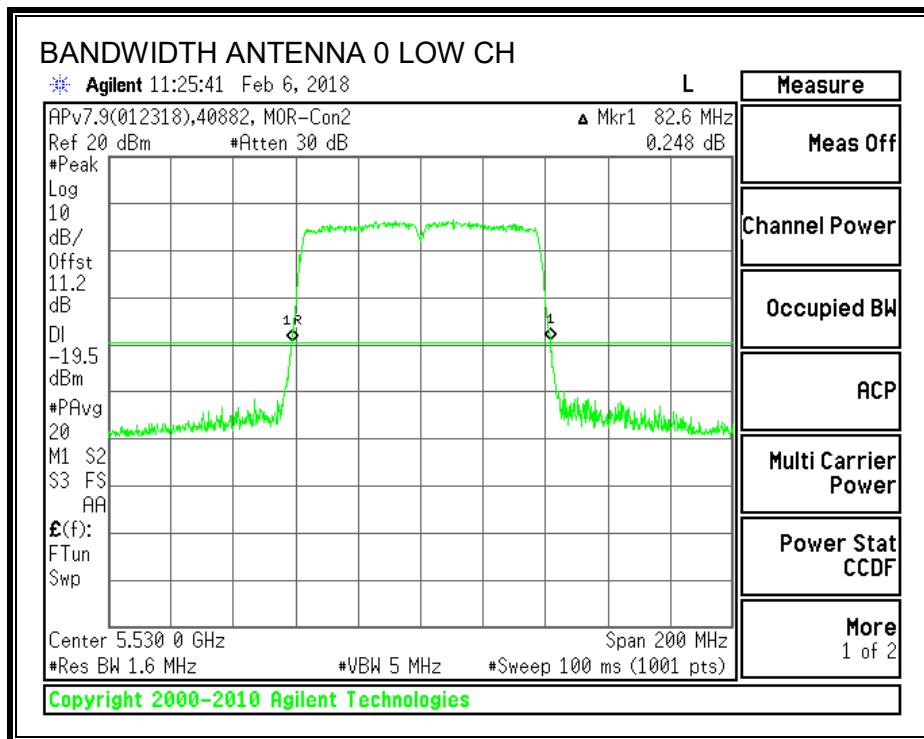
#### LIMITS

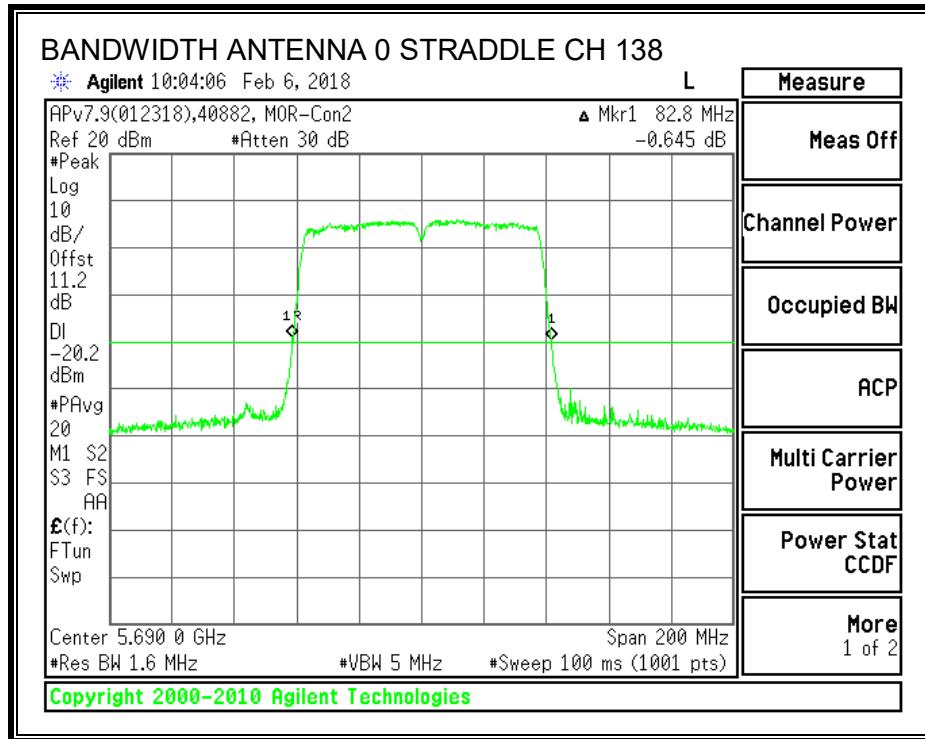
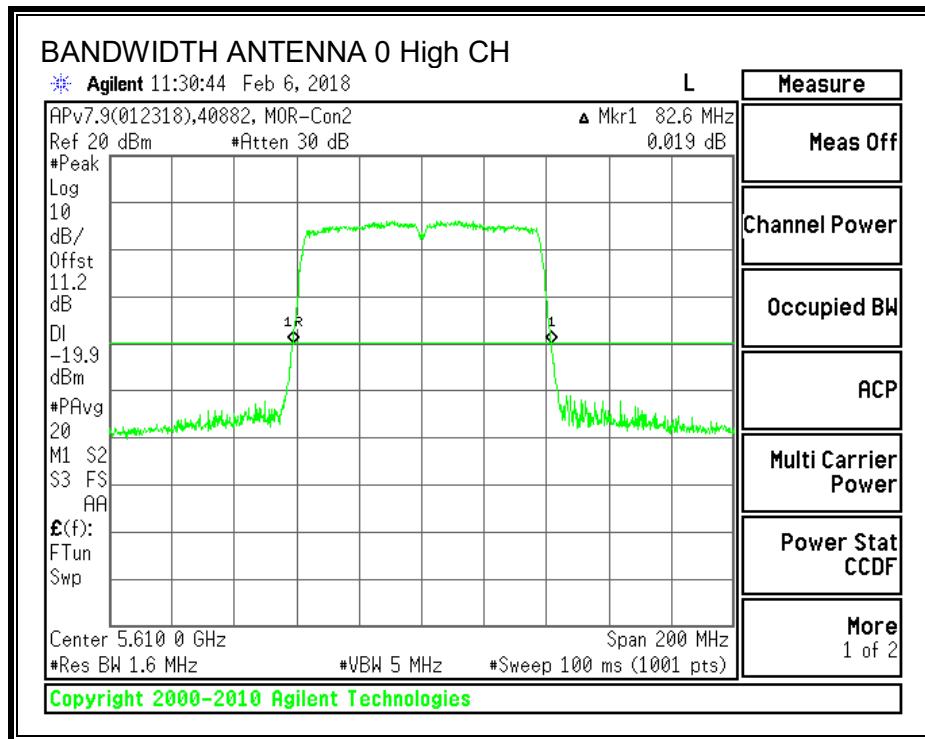
None; for reporting purposes only.

#### RESULTS

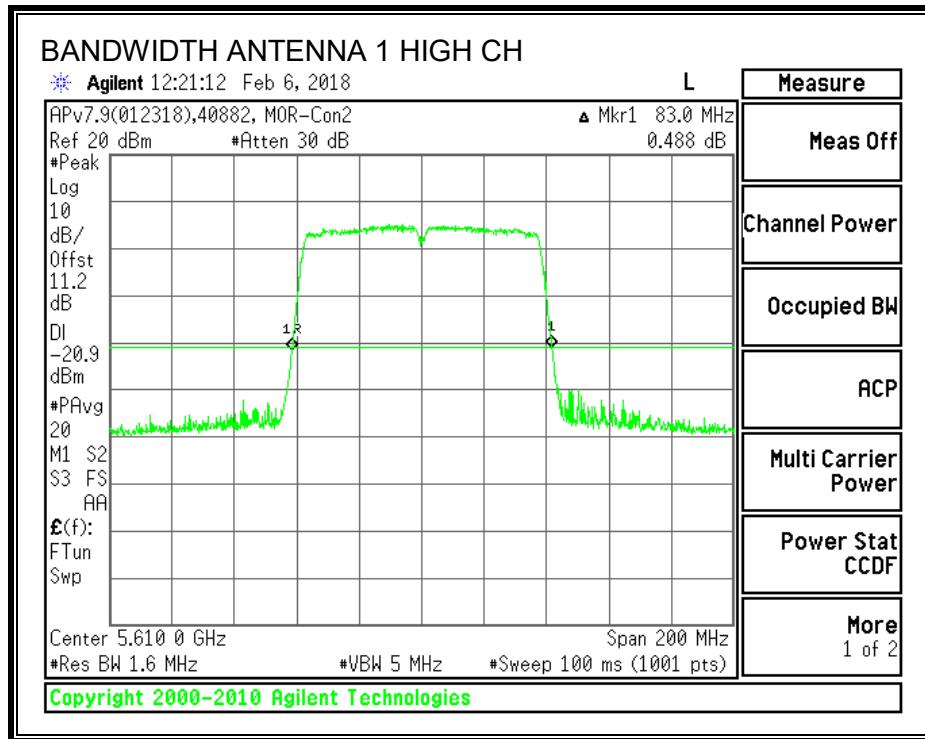
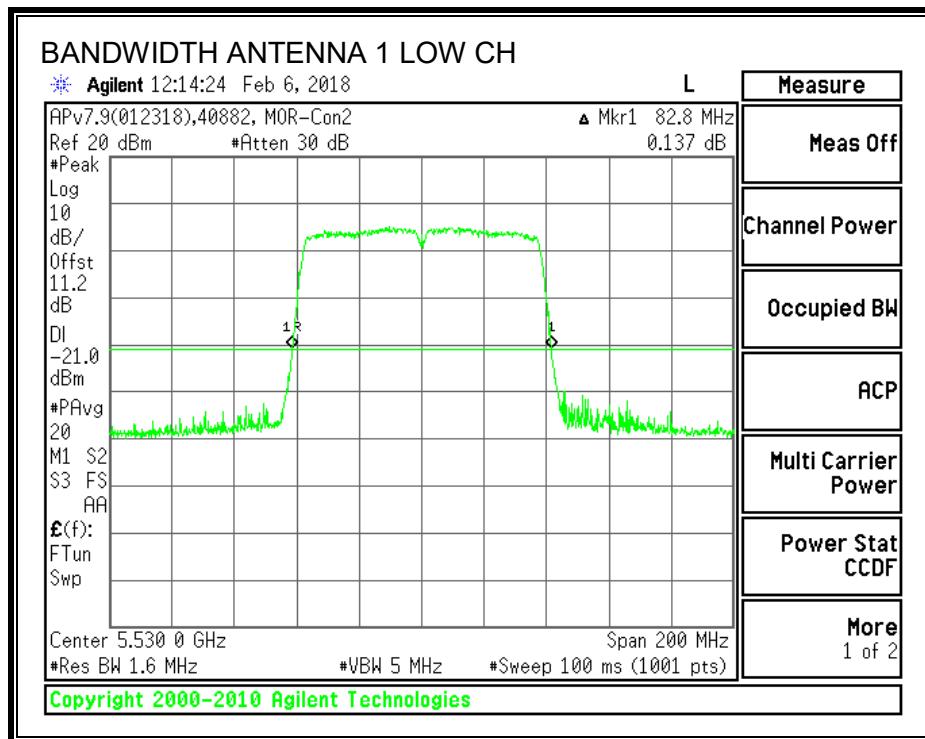
Channel	Frequency (MHz)	26 dB BW ANT 0 (MHz)	26 dB BW ANT 1 (MHz)
Low	5530	83.40	82.80
High	5610	83.40	82.80
138	5690	82.60	83.20

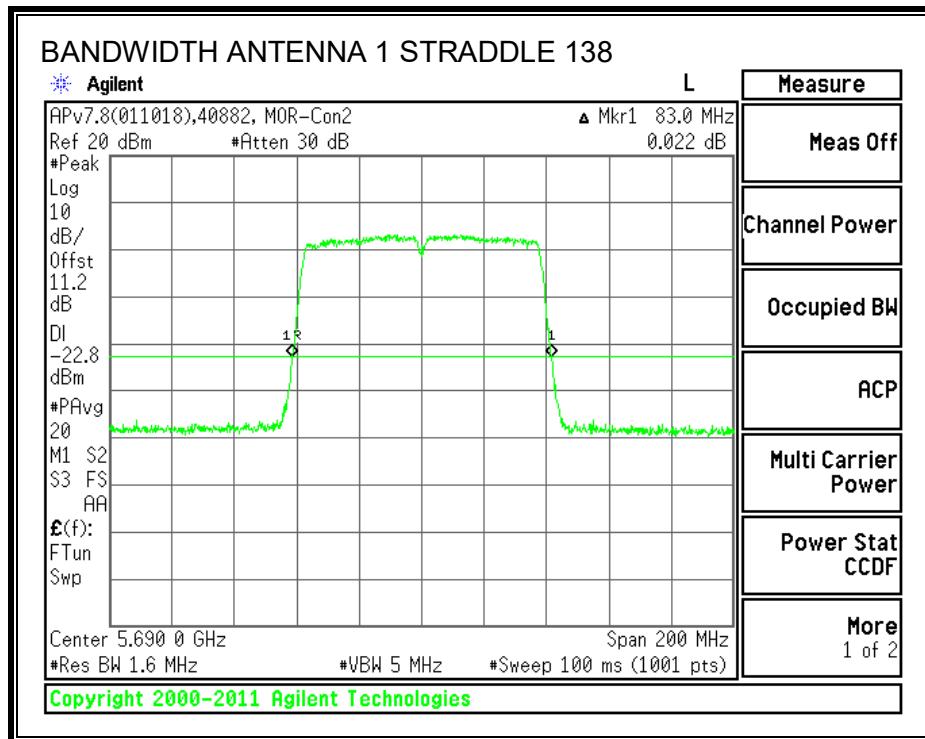
#### 26 dB BANDWIDTH, ANTENNA 0





## 26 dB BANDWIDTH, ANTENNA 1





### 9.12.2. 26 dB BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

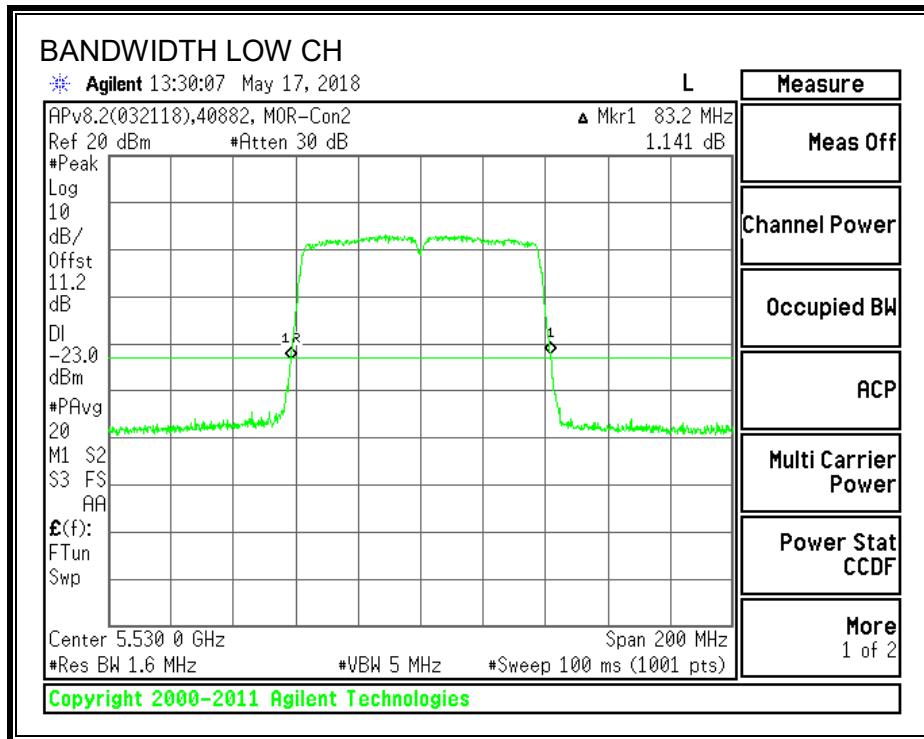
##### ANTENNA 0

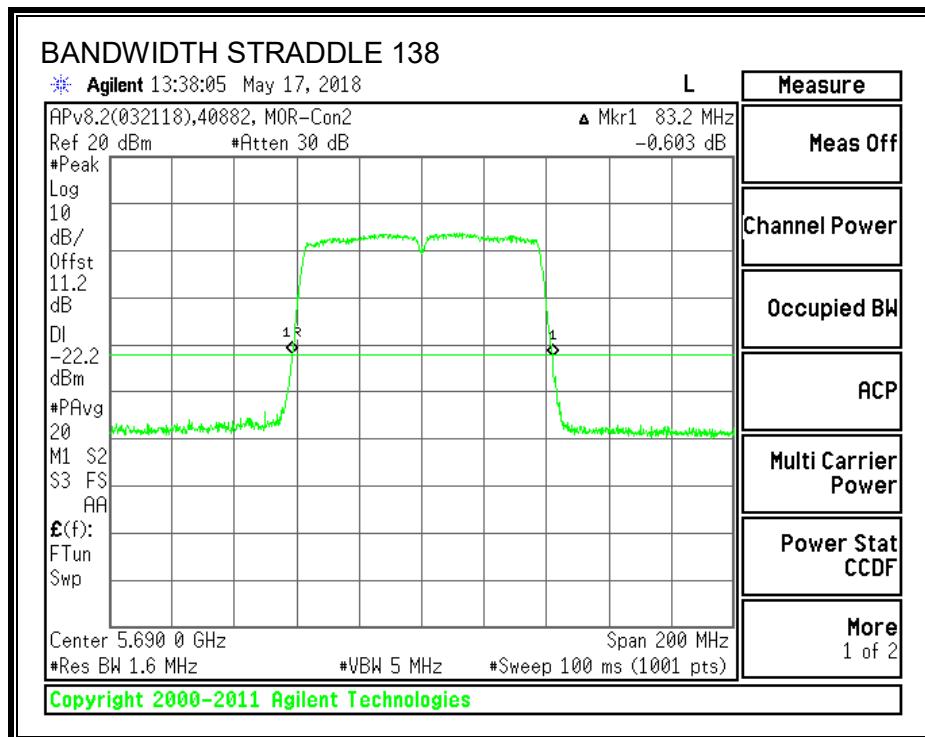
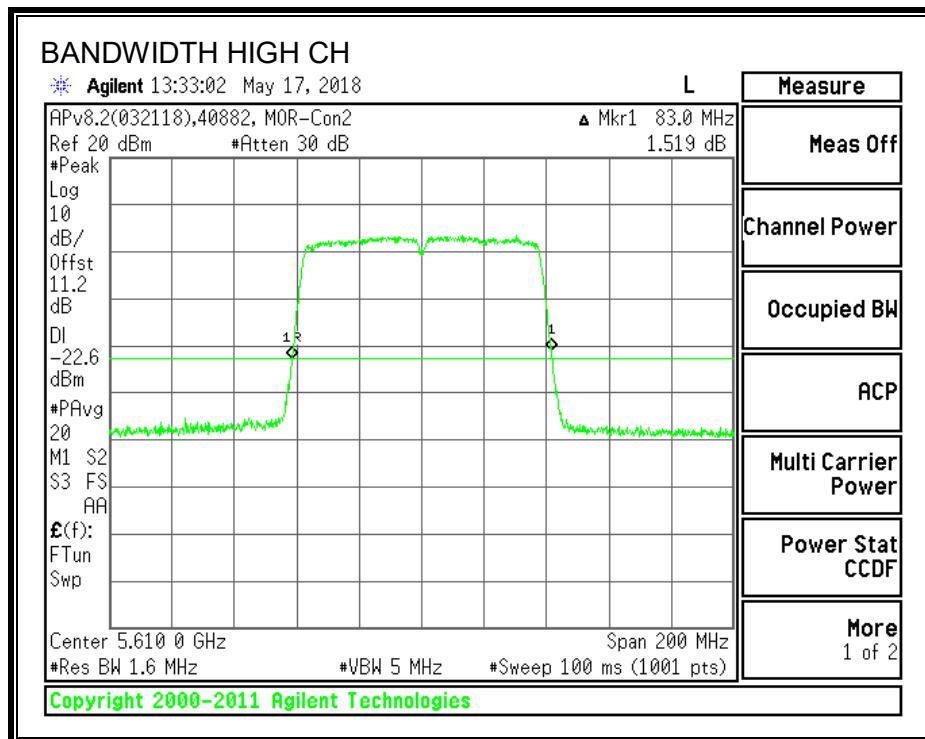
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5530	83.20
High	5610	83.00
138	5690	83.20

##### ANTENNA 1

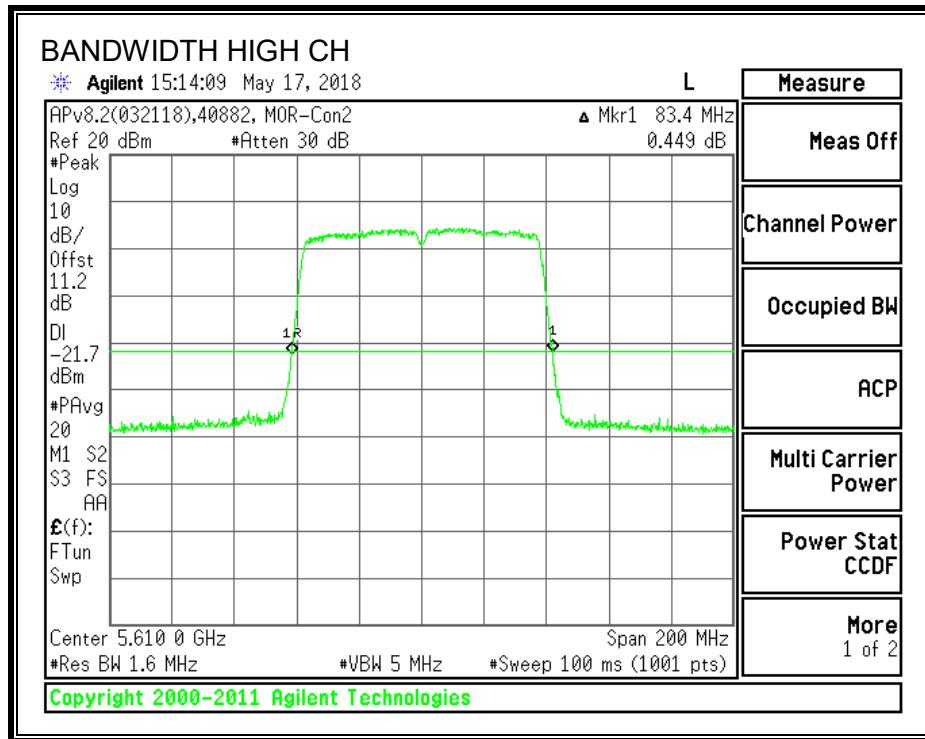
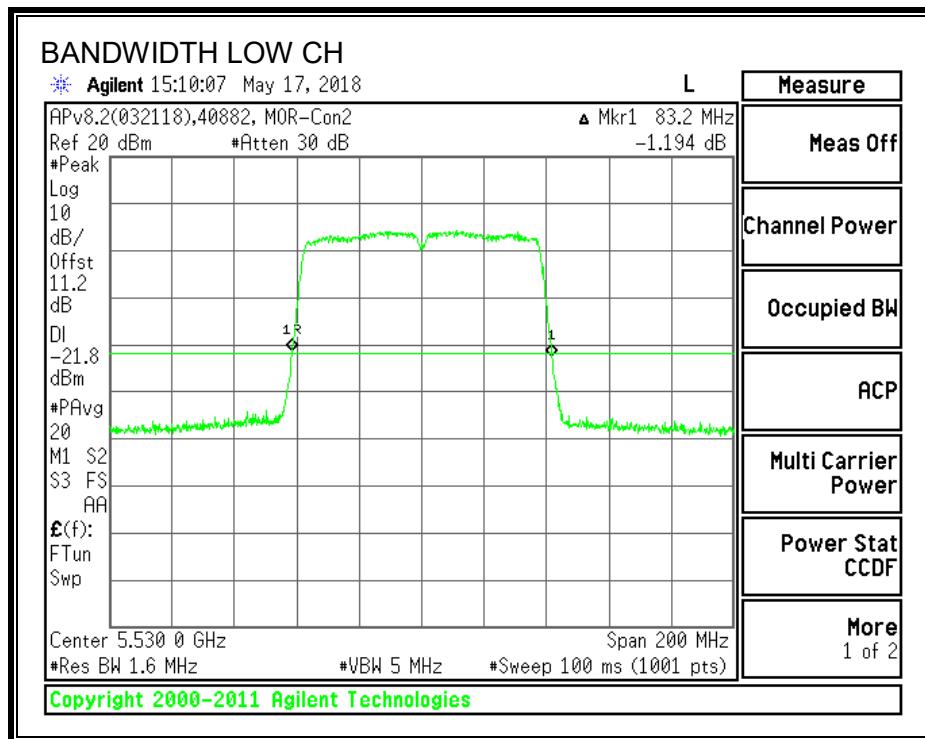
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5530	83.20
High	5610	83.40
138	5690	83.20

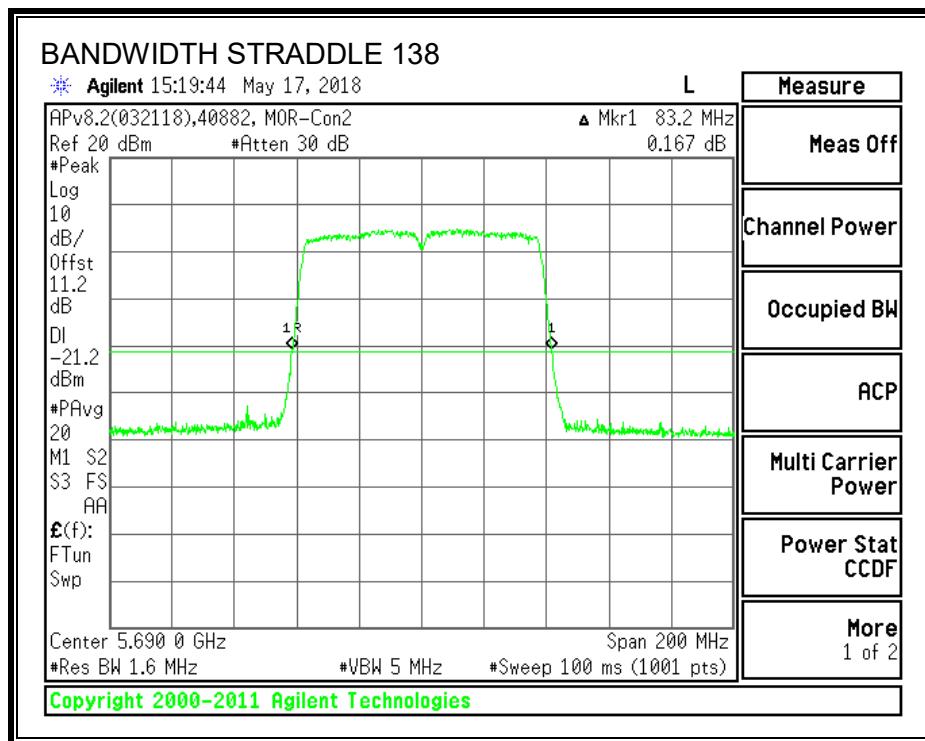
#### 26 dB BANDWIDTH – ANTENNA 0





## 26 dB BANDWIDTH – ANTENNA 1





### 9.12.3. 99% BANDWIDTH - MIMO

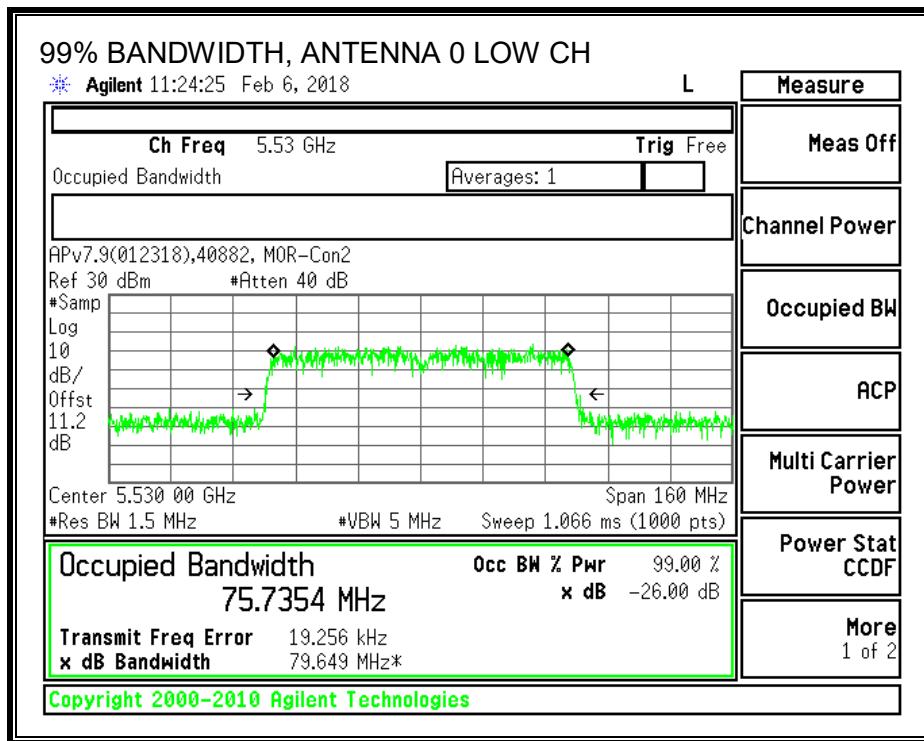
#### LIMITS

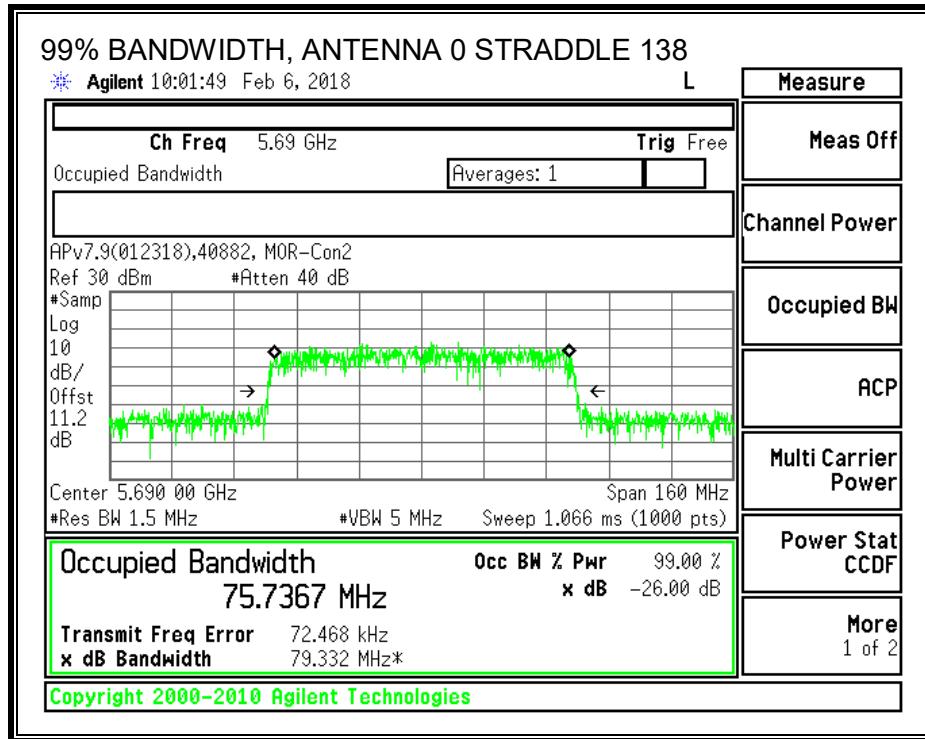
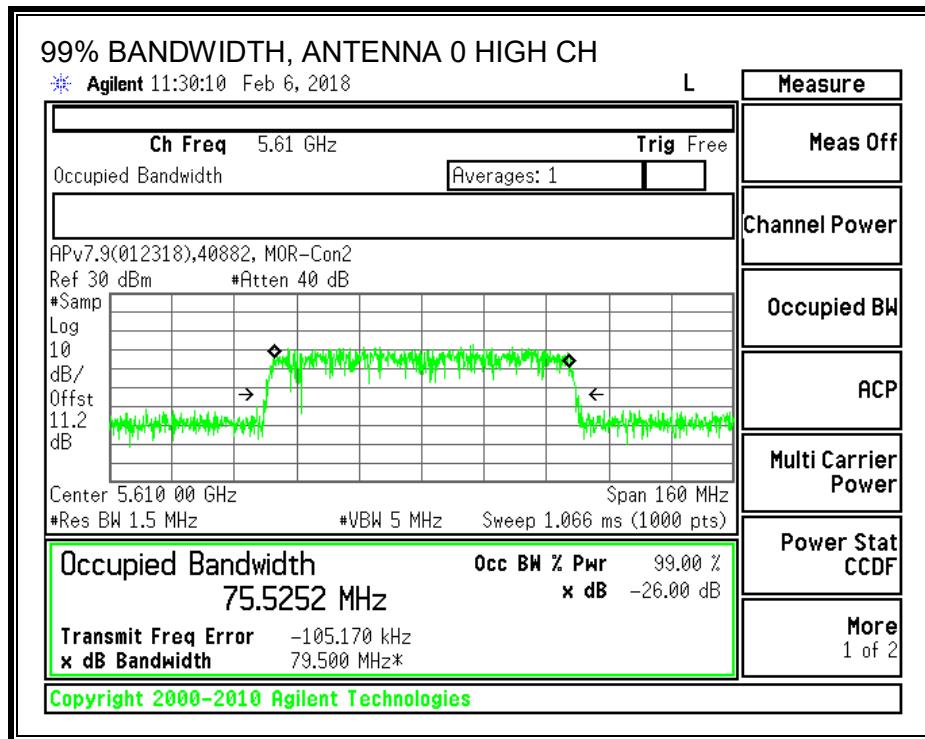
None; for reporting purposes only.

#### RESULTS

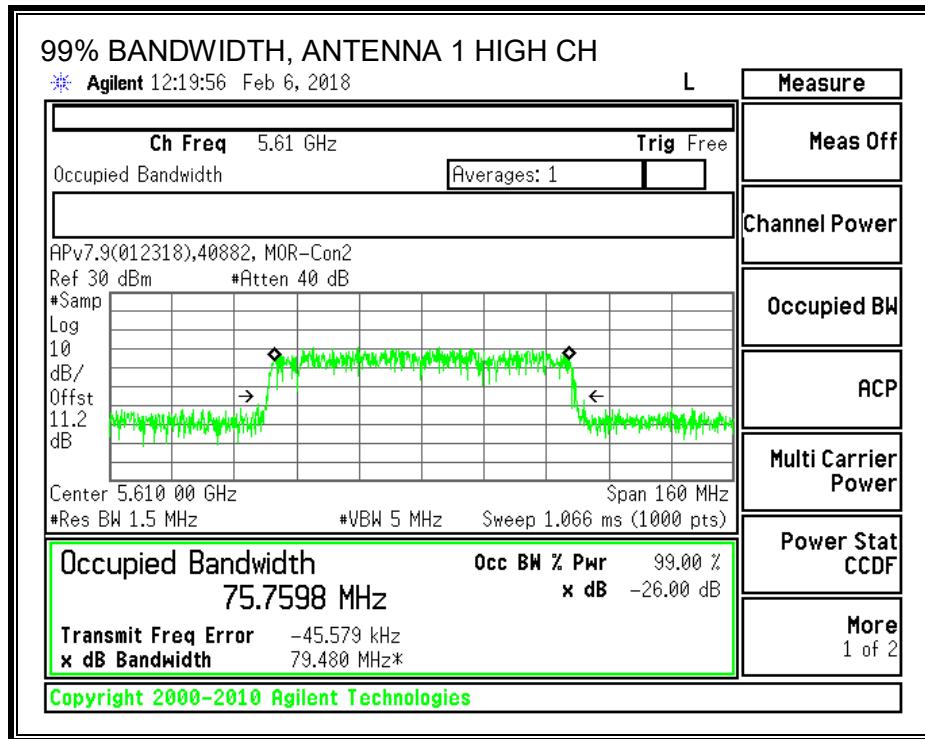
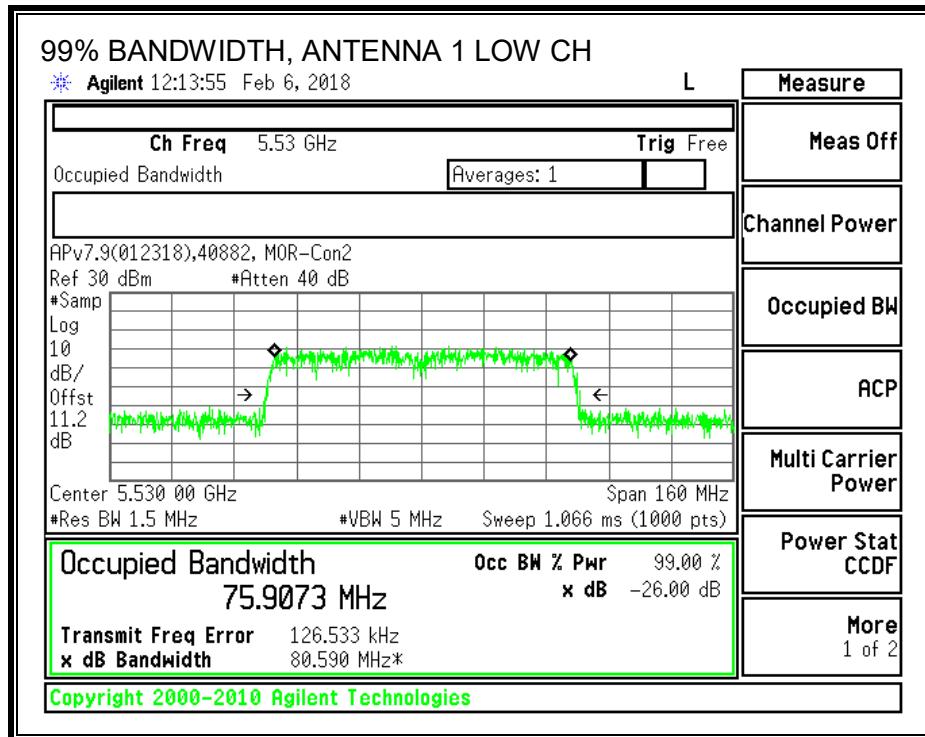
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5530	75.7354	75.9073
High	5610	75.5252	75.7598
138	5690	75.7367	75.9553

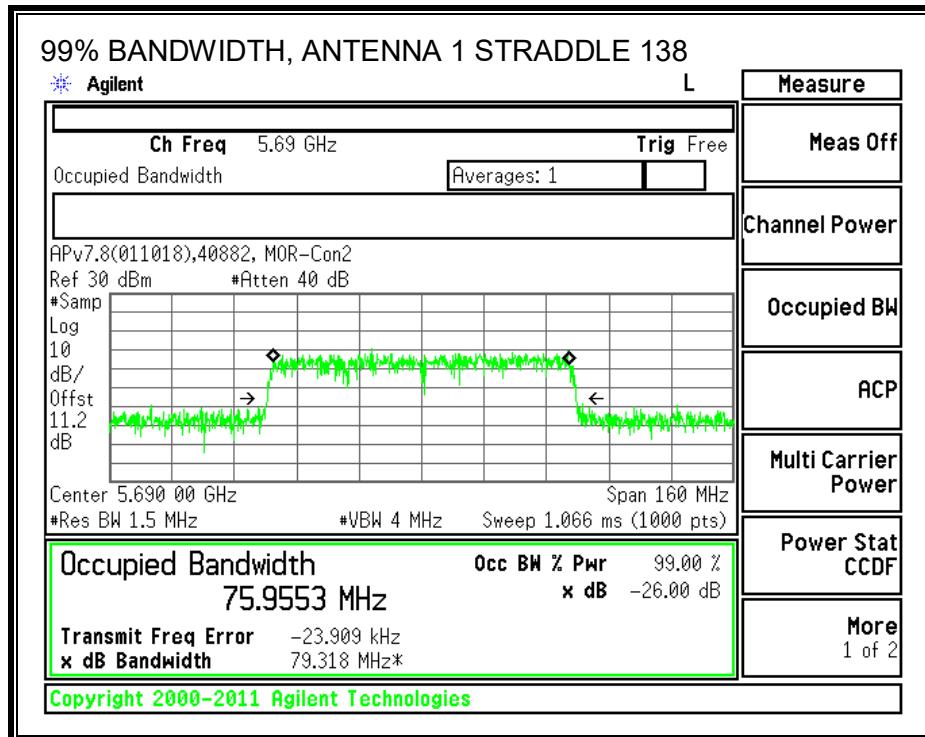
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





#### 9.12.4. 99% BANDWIDTH - SISO

#### LIMITS

None; for reporting purposes only.

#### RESULTS

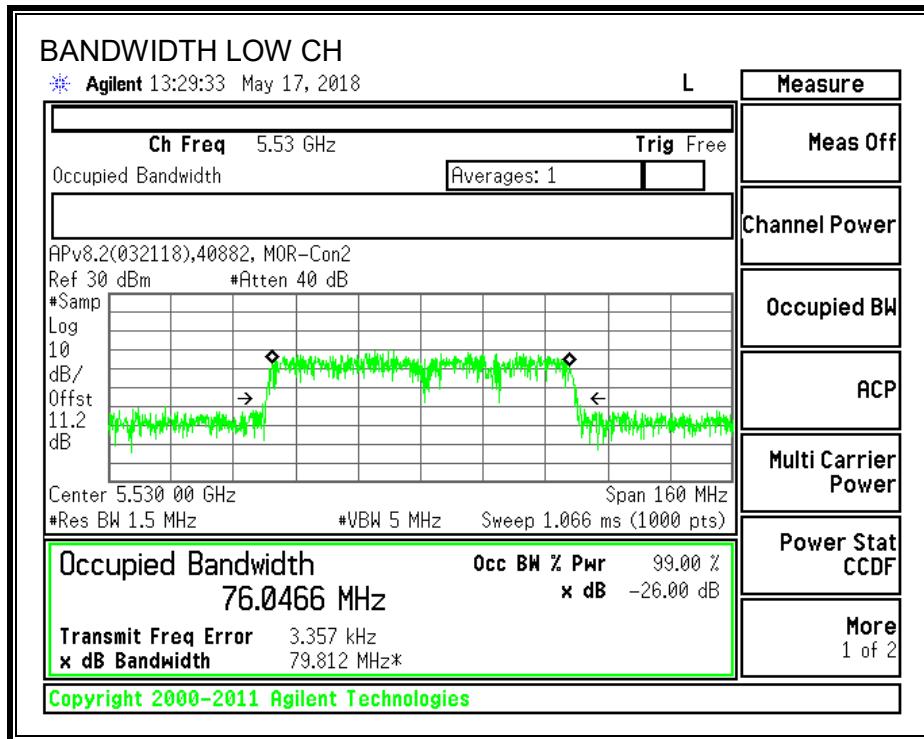
##### ANTENNA 0

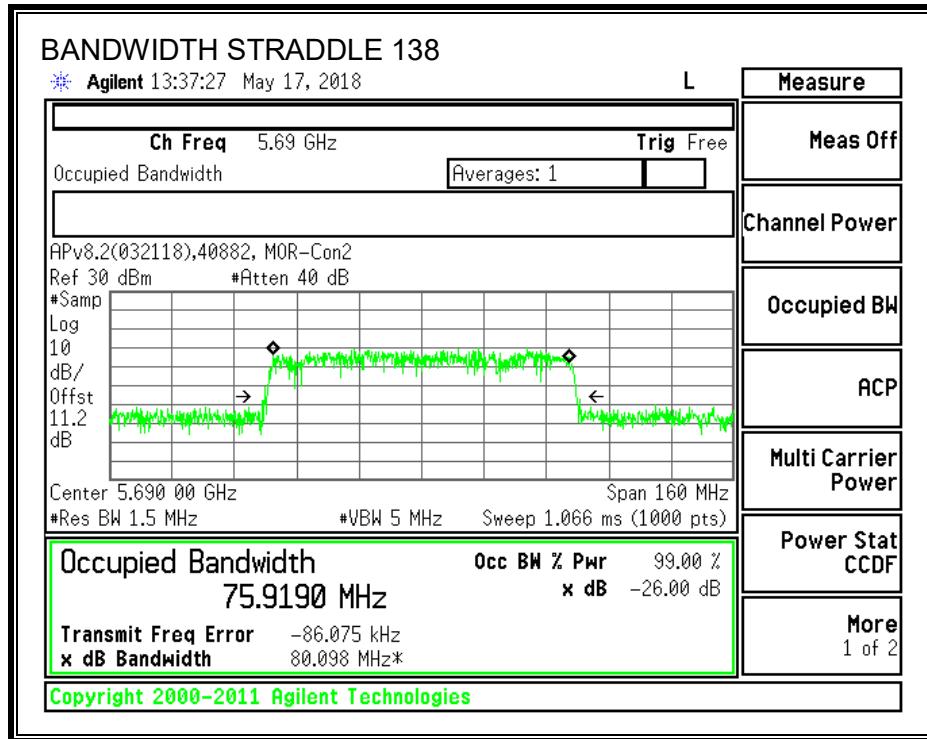
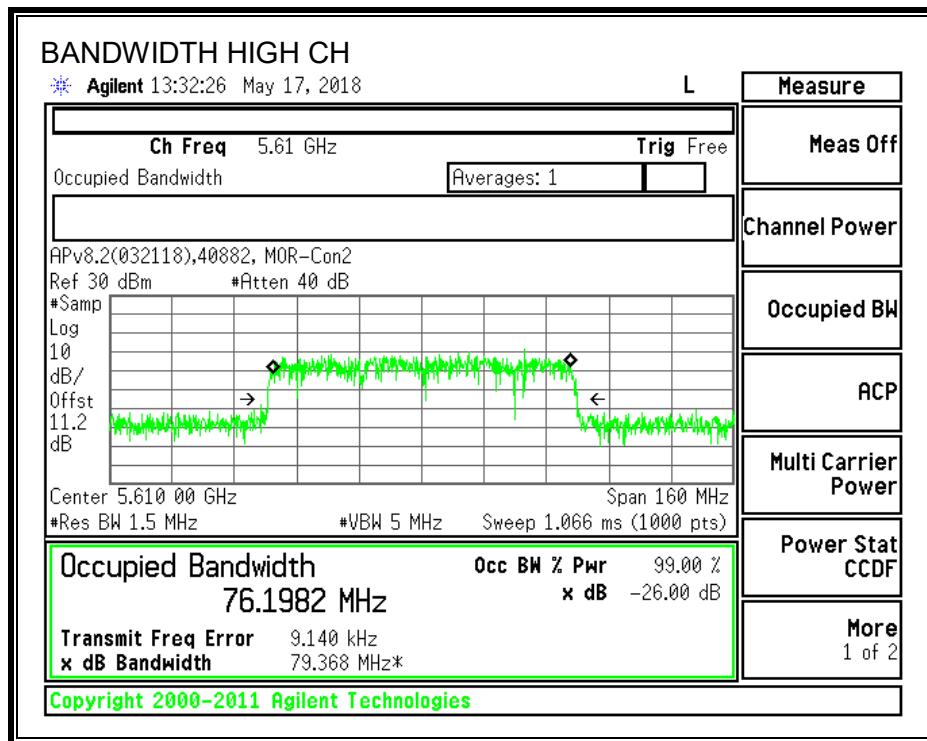
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5530	76.0466
High	5610	76.1982
138	5690	75.9190

##### ANTENNA 1

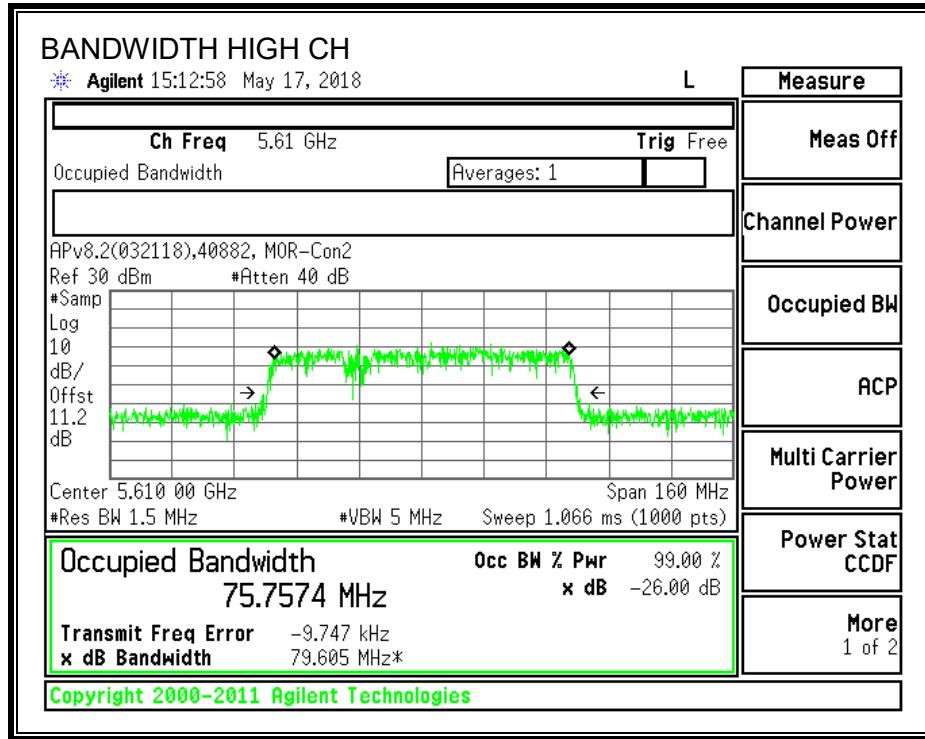
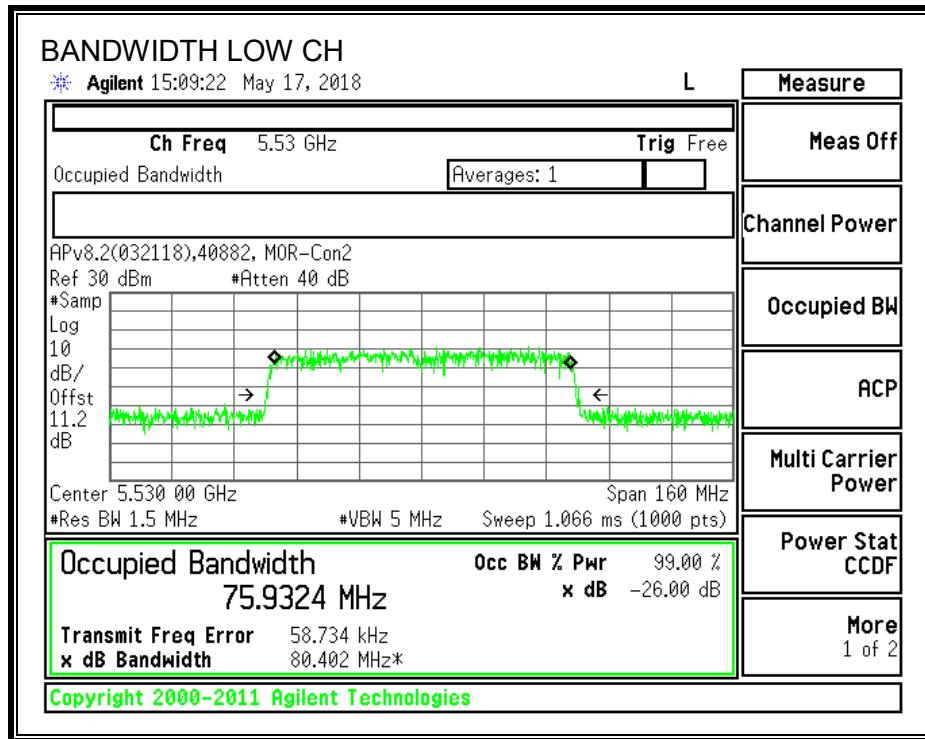
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5530	75.9324
High	5610	75.7574
138	5690	75.6701

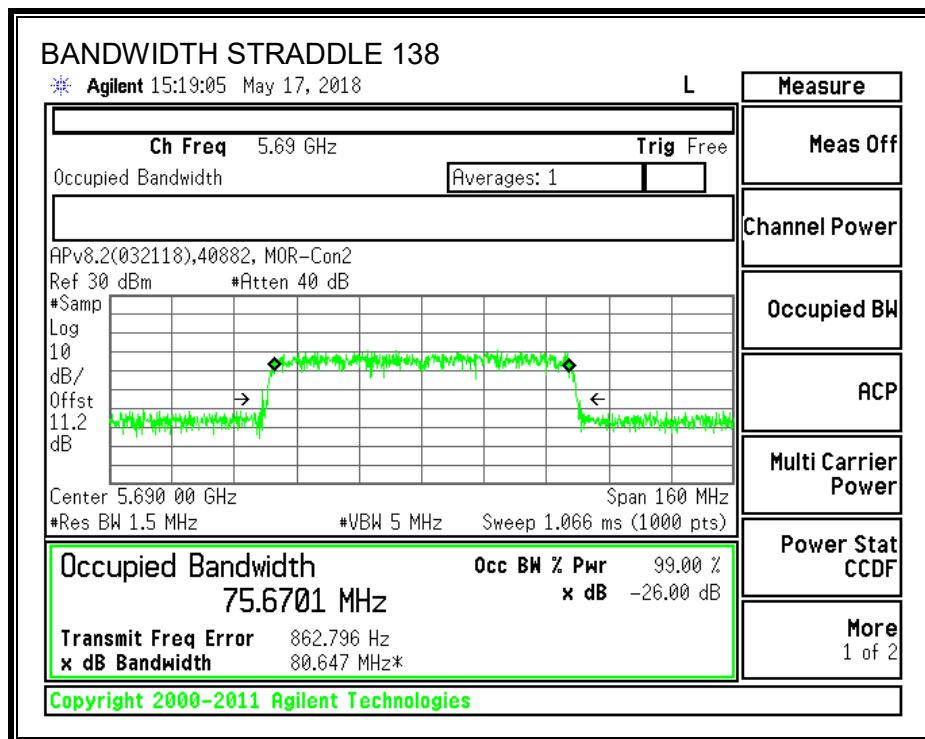
#### 99% BANDWIDTH – ANTENNA 0





## 99% BANDWIDTH – ANTENNA 1





### 9.12.5. OUTPUT POWER AND PSD - MIMO

#### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### RSS-247 ISSUE 2 SECTION 6.2.3.1

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

#### DIRECTIONAL ANTENNA GAIN

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
2.50	3.70	3.14

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for PSD (dBi)</b>
2.50	3.70	6.13

## **RESULTS (FCC)**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5530	82.60	3.14	6.13	24.00	10.87
High	5610	82.60	3.14	6.13	24.00	10.87

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	9.20	9.83	12.73	24.00	-11.27
High	5610	9.02	9.78	12.62	24.00	-11.38

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5530	-4.96	-6.83	-2.60	10.87	-13.47
High	5610	-5.91	-6.72	-3.09	10.87	-13.96

### RESULTS (ISED Conducted Power and PSD)

#### Bandwidth and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5530	75.74	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	9.20	9.83	12.73	24.00	-11.27

#### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5530	-4.96	-6.83	-2.60	11.00	-13.60

### RESULTS (ISED EIRP)

#### Bandwidth, Antenna Gain, and Limits

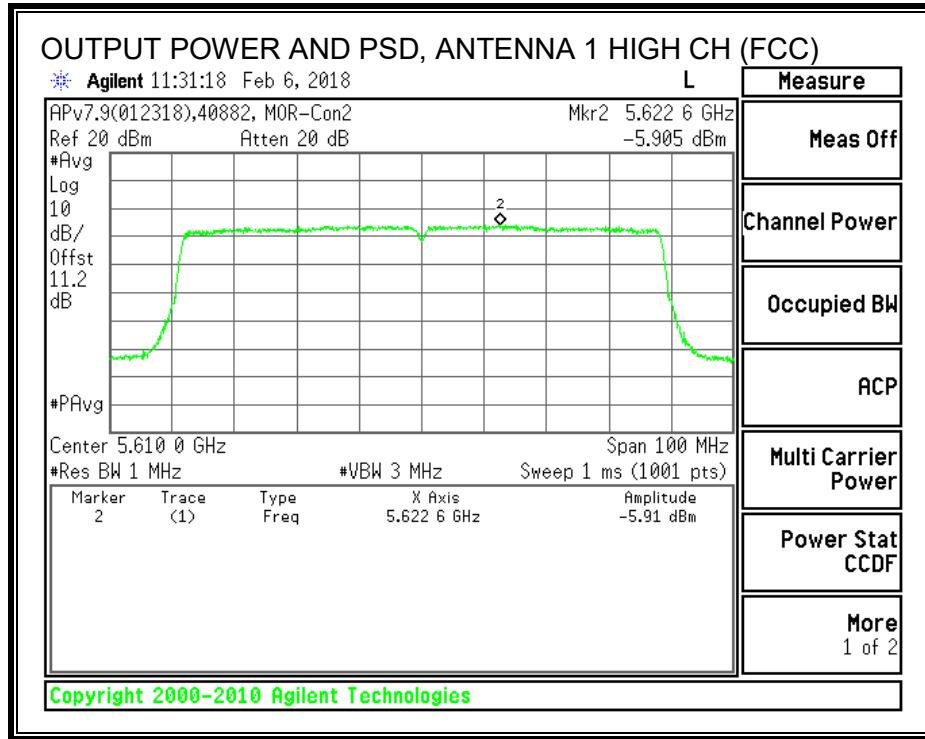
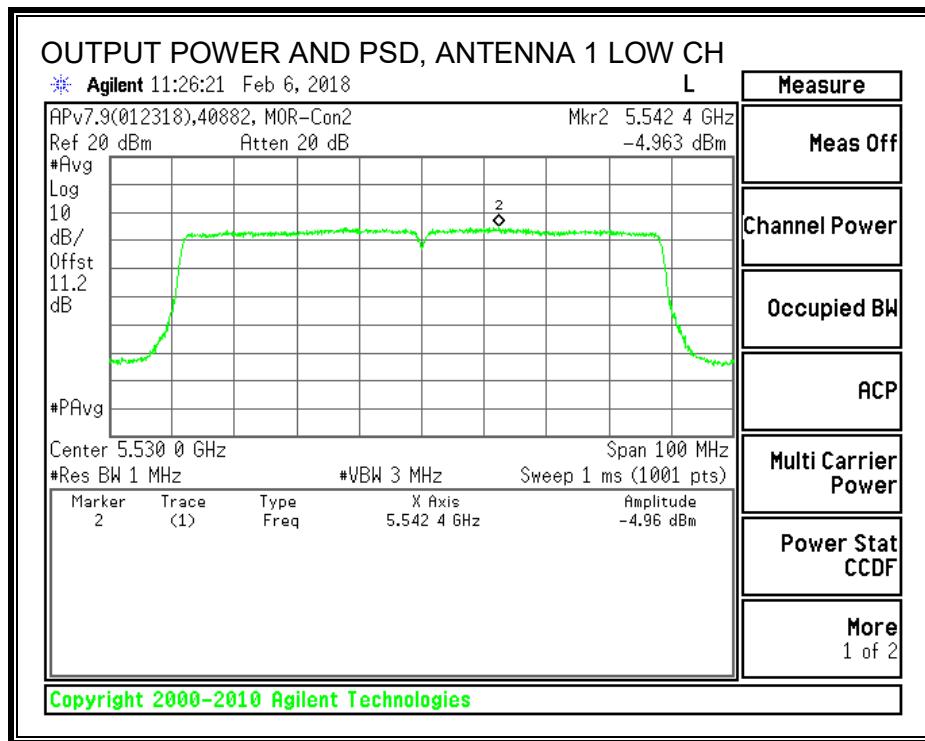
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5530	75.74	3.14	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

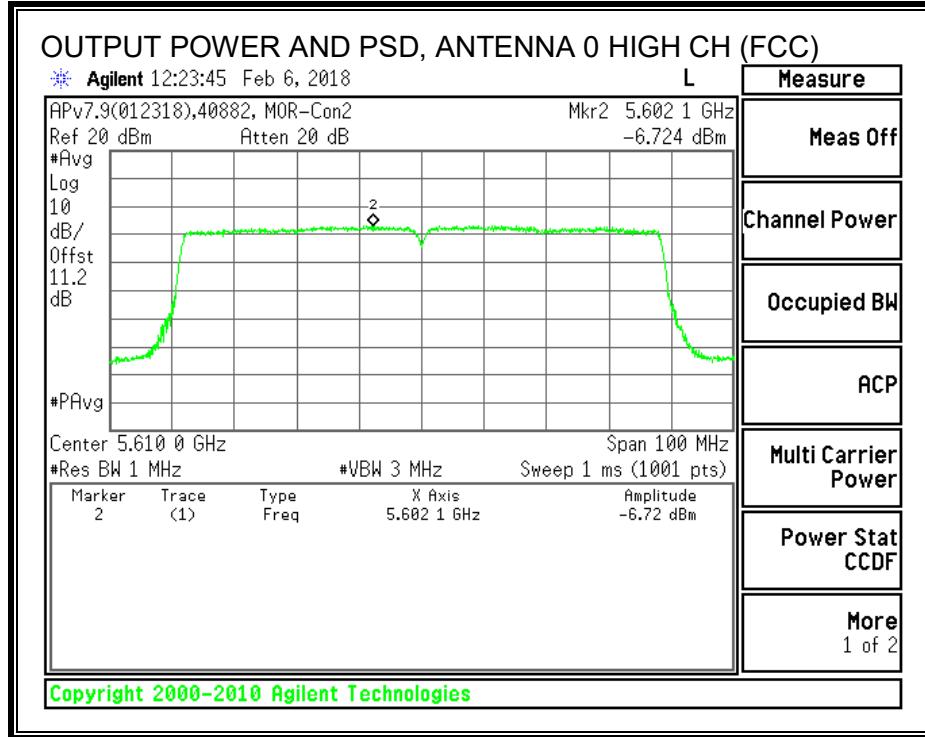
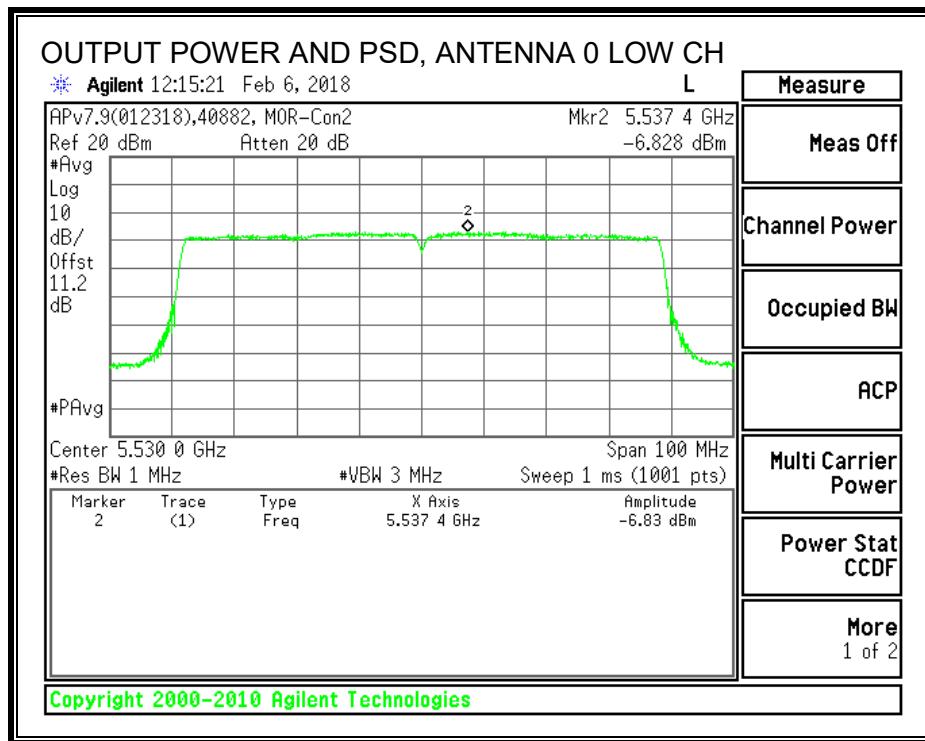
#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5530	9.20	9.83	15.87	30.00	-14.13

## OUTPUT POWER AND PSD, ANTENNA 1



## OUTPUT POWER AND PSD, ANTENNA 0



**STRADDLE CHANNEL 138 RESULTS (FCC)UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	82.80	3.14	6.13	24.00	10.87

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	9.12	9.79	12.67	24.00	-11.33

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-5.93	-8.32	-3.76	10.87	-14.63

**STRADDLE CHANNEL 138 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	75.74	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	9.12	9.79	12.67	24.00	-11.33

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-5.93	-8.32	-3.76	11.00	-14.76

**STRADDLE CHANNEL 138 RESULTS (ISED EIRP) UNII-2C BAND**

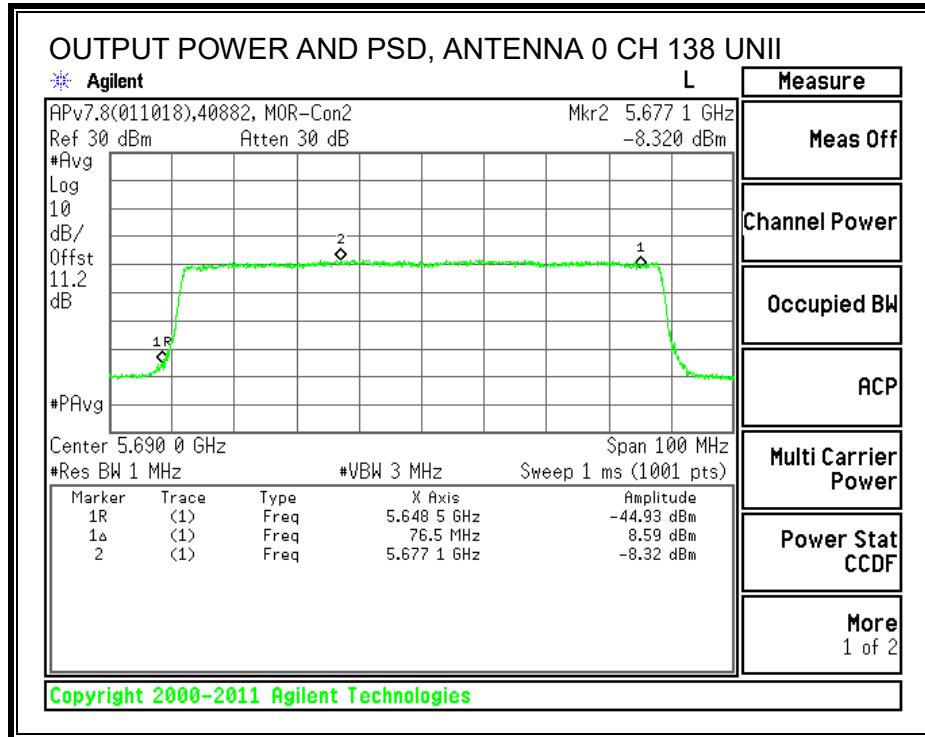
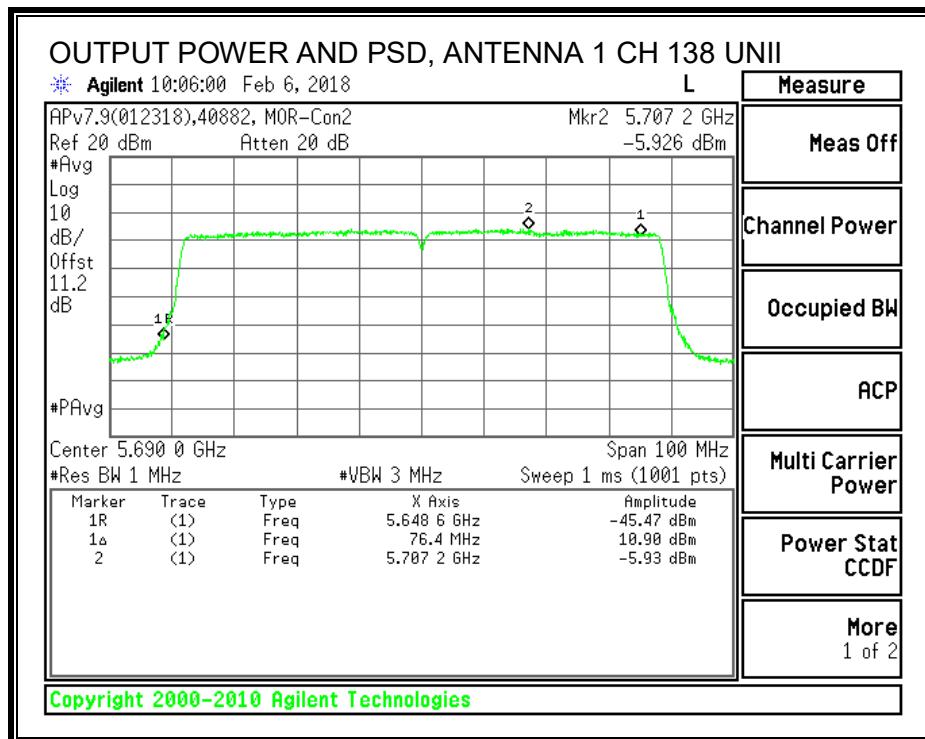
**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
138	5690	75.74	3.14	30.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
138	5690	9.12	9.79	15.81	30.00	-14.19



**UNII-3 BAND (FCC and ISED)**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	3.14	6.13	30.00	29.87

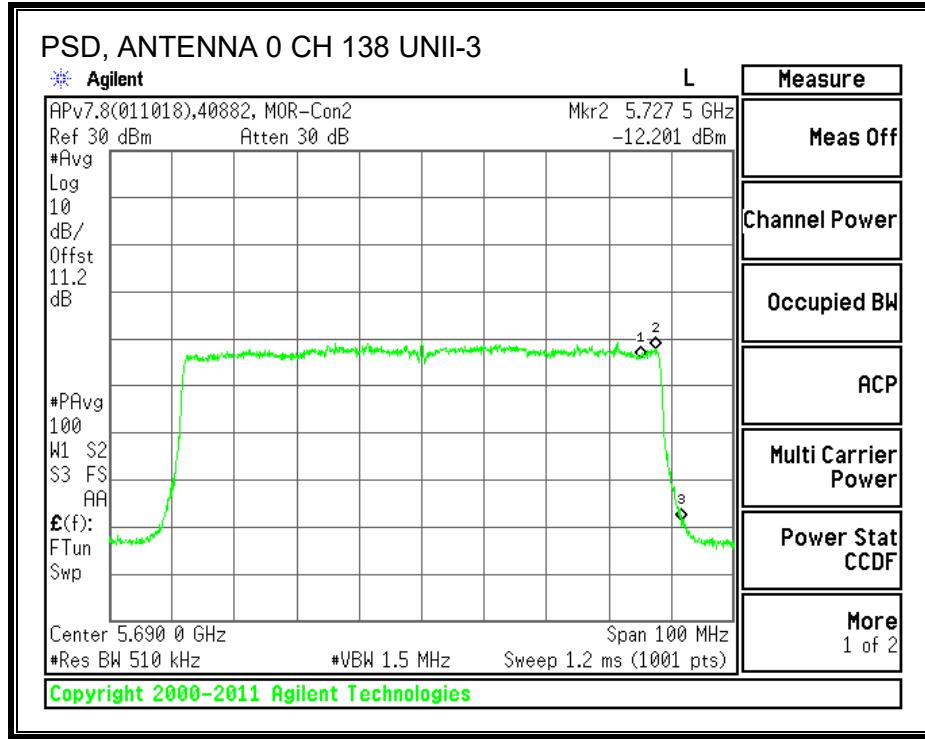
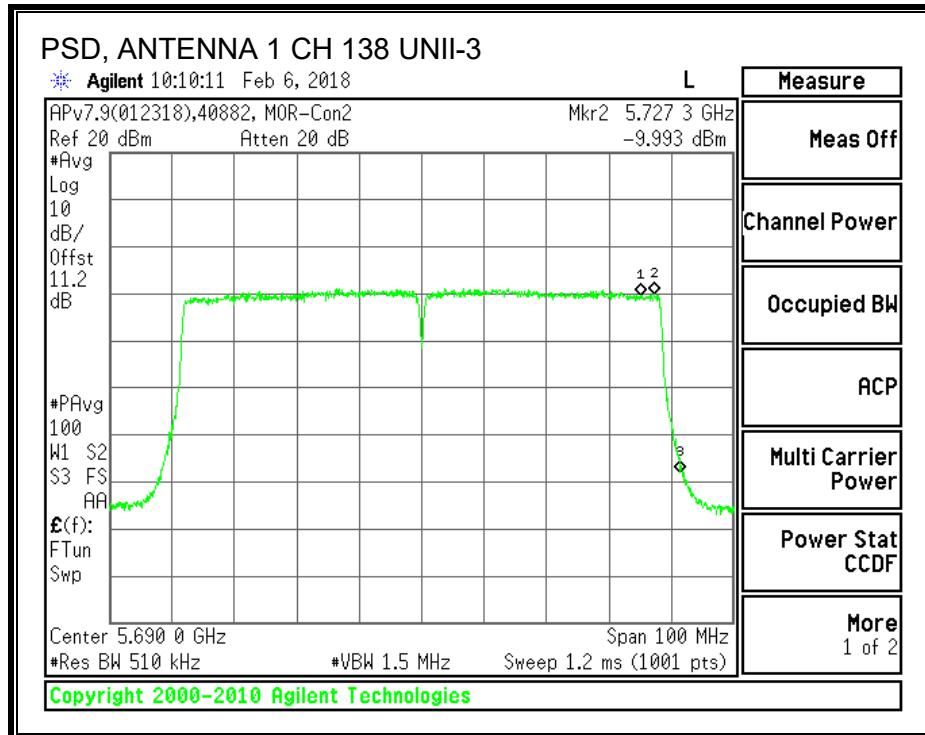
<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	9.12	9.79	12.67	30.00	-17.33

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-9.99	-12.20	-7.76	29.87	-37.63



## 9.12.6. OUTPUT POWER AND PSD - SISO

### LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### RSS-247 ISSUE 2 SECTION 6.2.3.1

The maximum conducted output power shall not exceed 250 mW or  $11 + 10 \log_{10} B$ , dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band. The maximum e.i.r.p. shall not exceed 1.0 W or  $17 + 10 \log_{10} B$ , dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## **RESULTS (FCC) – ANTENNA 0**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5530	83.20	2.50	24.00	11.00
High	5610	83.00	2.50	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	12.59	12.59	24.00	-11.41
High	5610	12.51	12.51	24.00	-11.49

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5530	-9.15	-8.96	11.00	-19.96
High	5610	-8.68	-8.49	11.00	-19.49

Note – Measured power was a gated measurement.

## **RESULTS (FCC) – ANTENNA 1**

### **Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5530	83.20	3.70	24.00	11.00
Mid	5610	83.40	3.70	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	13.44	13.44	24.00	-10.56
Mid	5610	13.55	13.55	24.00	-10.45

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5530	-8.01	-7.82	11.00	-18.82
Mid	5610	-7.44	-7.25	11.00	-18.25

Note – Measured power was a gated measurement.

## **RESULTS (ISED Conducted Power and PSD) – ANTENNA 0**

### **Bandwidth and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5530	76.05	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	12.59	12.59	24.00	-11.41

### **PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5530	-9.15	-8.96	11.00	-19.96

Note – Measured power was a gated measurement.

## RESULTS (ISED Conducted Power and PSD) – ANTENNA 1

### Bandwidth and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
Low	5530	75.93	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	13.44	13.44	24.00	-10.56

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5530	-8.01	-7.82	11.00	-18.82

Note – Measured power was a gated measurement.

## RESULTS (ISED EIRP) – ANTENNA 0

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5530	76.05	2.50	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5530	12.59	15.09	30.00	-14.91

## RESULTS (ISED EIRP) – ANTENNA 1

### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
Low	5530	75.93	3.70	30.00

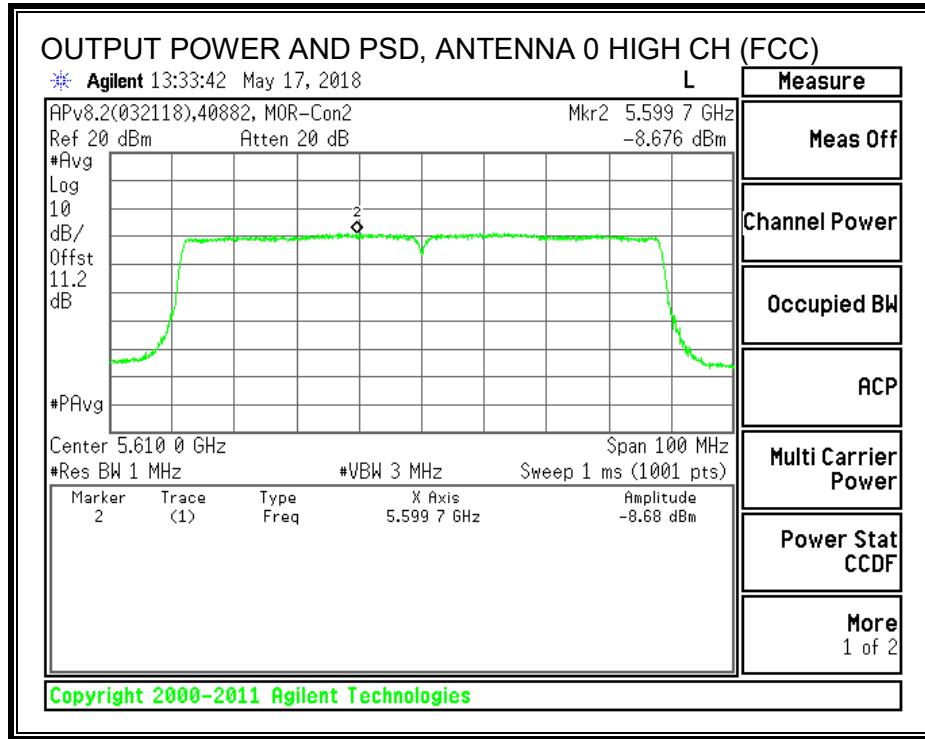
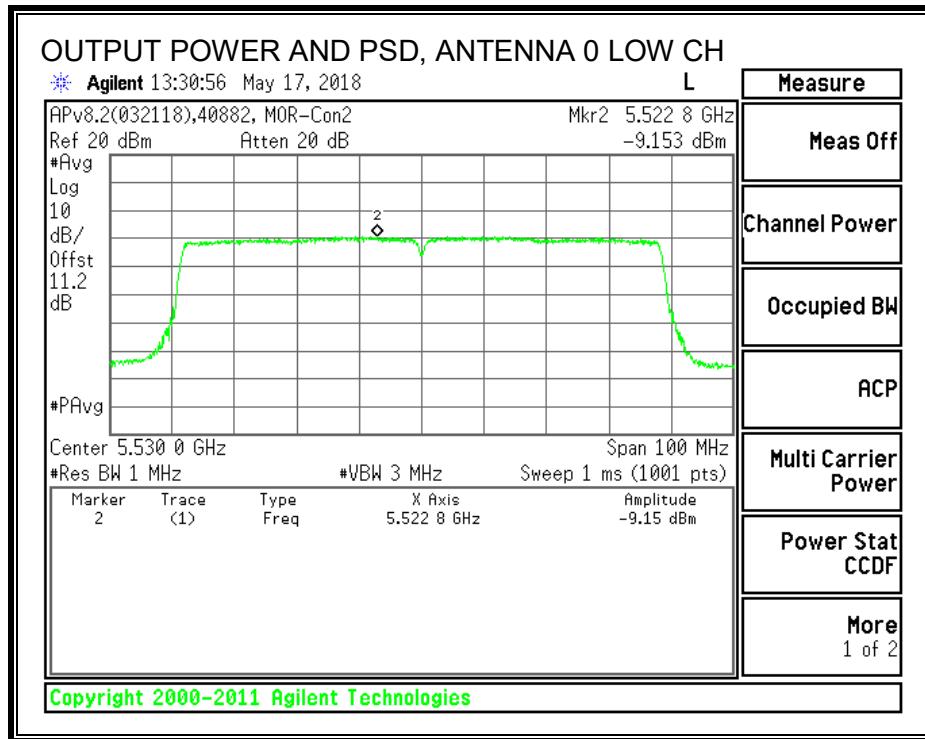
Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

### Output Power Results

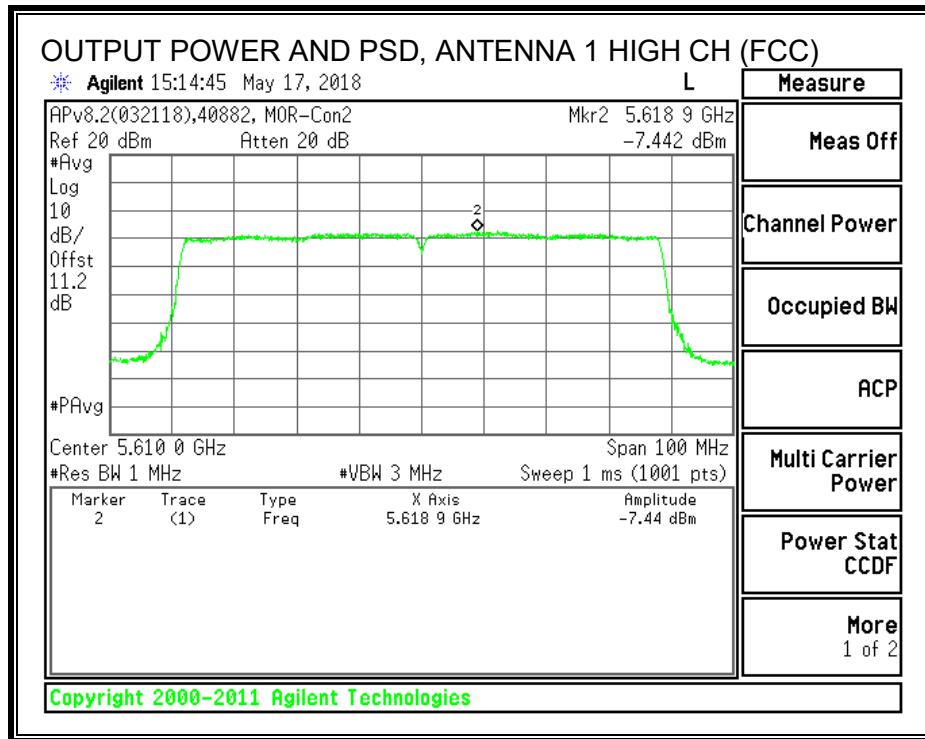
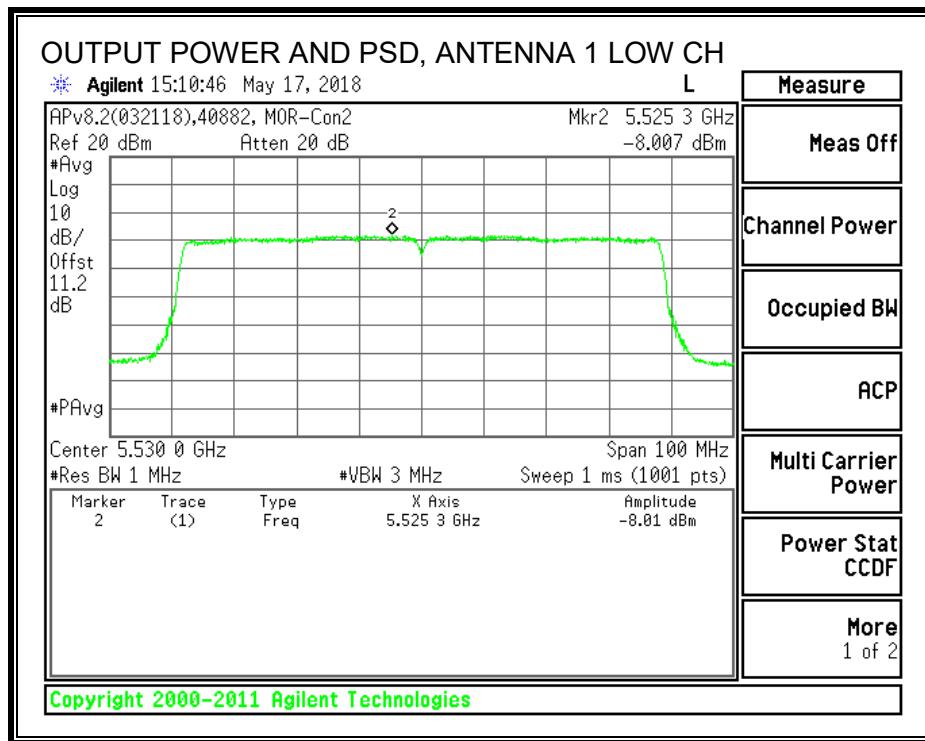
Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
Low	5530	13.44	17.14	30.00	-12.86

Note – Measured power was a gated measurement.

## OUTPUT POWER AND PSD, ANTENNA 0



## OUTPUT POWER AND PSD, ANTENNA 1



### STRADDLE CHANNEL 138 RESULTS (FCC) UNII-2C BAND – ANTENNA 0

#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	83.20	2.50	2.50	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	12.61	12.61	24.00	-11.39

#### PSD Results

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-8.25	-8.06	11.00	-19.06

Note – Measured power was a gated measurement.

### STRADDLE CHANNEL 138 RESULTS (FCC) UNII-2C BAND – ANTENNA 1

#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	83.20	3.70	3.70	24.00	11.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	13.56	13.56	24.00	-10.44

#### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-7.09	-6.90	11.00	-17.90

Note – Measured power was a gated measurement.

**STRADDLE CHANNEL 138 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND – ANTENNA 0**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	75.92	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	12.61	12.61	24.00	-11.39

**PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-8.25	-8.06	11.00	-19.06

Note – Measured power was a gated measurement.

**STRADDLE CHANNEL 138 RESULTS (ISED Conducted Power and PSD) UNII-2C BAND – ANTENNA 1**

**Bandwidth, Antenna Gain, and Limits**

Channel	Frequency (MHz)	Min 99% BW (MHz)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	75.67	24.00	11.00

<b>Duty Cycle CF (dB)</b>	0.19	<b>Included in Calculations of Corr'd Power &amp; PSD</b>
---------------------------	------	---

**Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	13.56	13.56	24.00	-10.44

**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-7.09	-6.90	11.00	-17.90

Note – Measured power was a gated measurement.

### STRADDLE CHANNEL 138 RESULTS (ISED EIRP) UNII-2C BAND – ANTENNA 0

#### Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
138	5690	75.92	2.50	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
138	5690	12.61	15.11	30.00	-14.89

### STRADDLE CHANNEL 138 RESULTS (ISED EIRP) UNII-2C BAND – ANTENNA 1

#### Bandwidth, Antenna Gain, and Limits

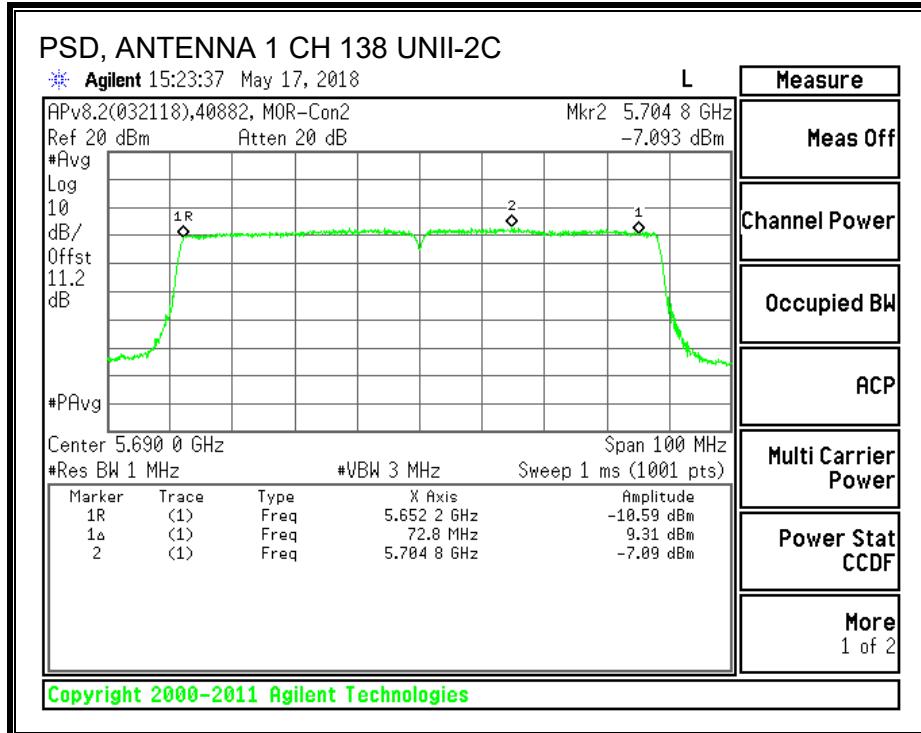
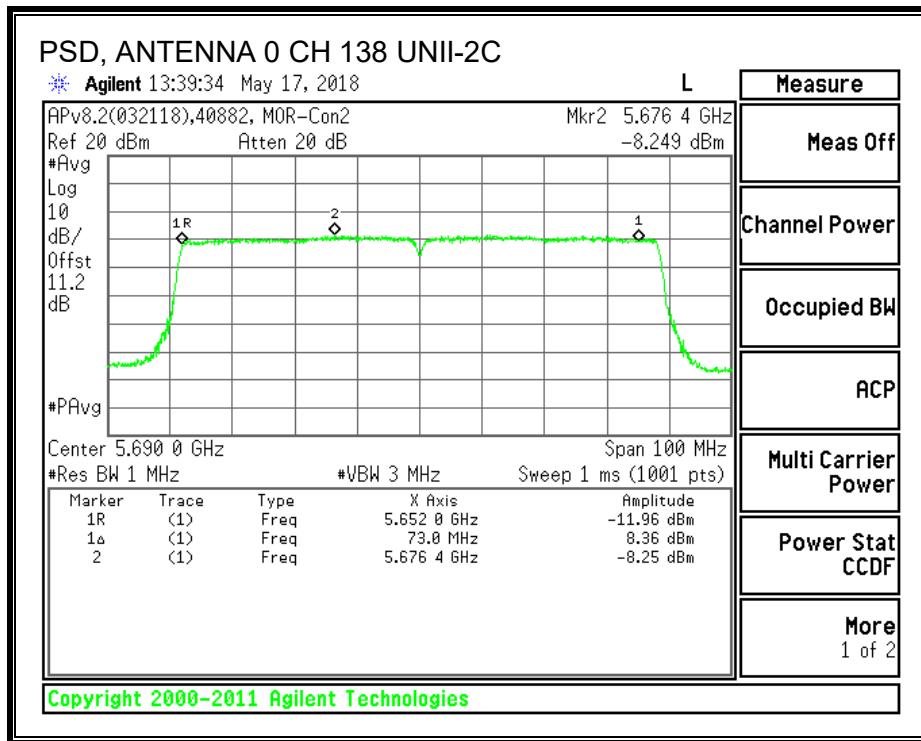
Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Ant. Gain (dBi)	EIRP Limit (dBm)
138	5690	75.67	3.70	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd EIRP (dBm)	EIRP Limit (dBm)	EIRP Margin (dB)
138	5690	13.56	17.26	30.00	-12.74

Note – Measured power was a gated measurement.



**UNII-3 BAND (FCC and ISED) – ANTENNA 0**

**Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	2.50	30.00	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

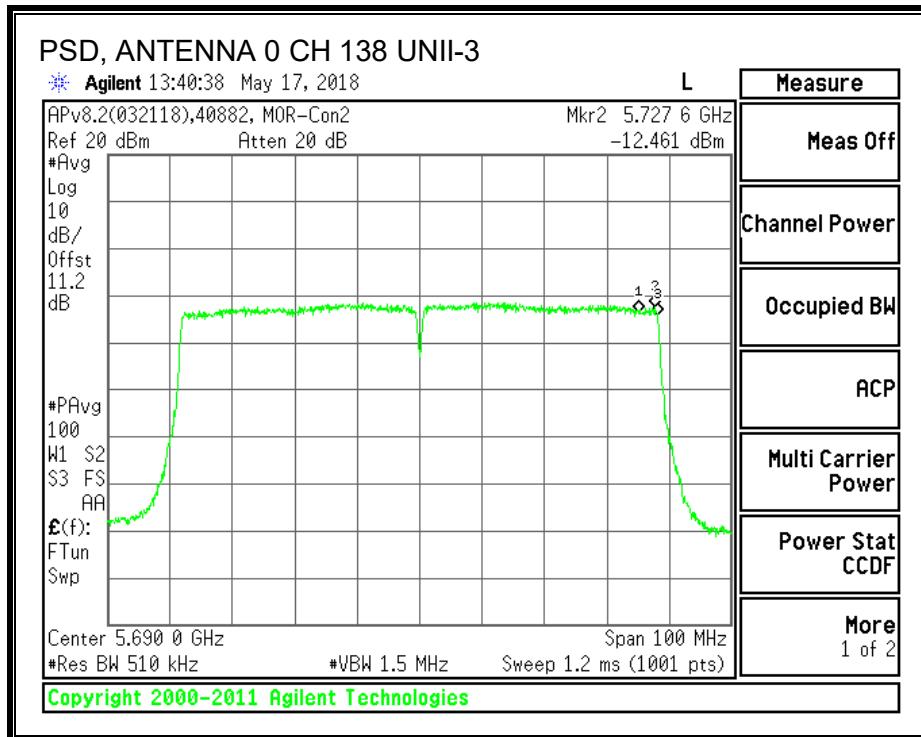
**Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	12.61	12.61	30.00	-17.39

**PSD Results**

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-12.46	-12.27	30.00	-42.27

Note – Measured power was a gated measurement.



### UNII-3 BAND (FCC and ISED) – ANTENNA 1

#### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
138	5690	3.70	30.00	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power & PSD
--------------------	------	--

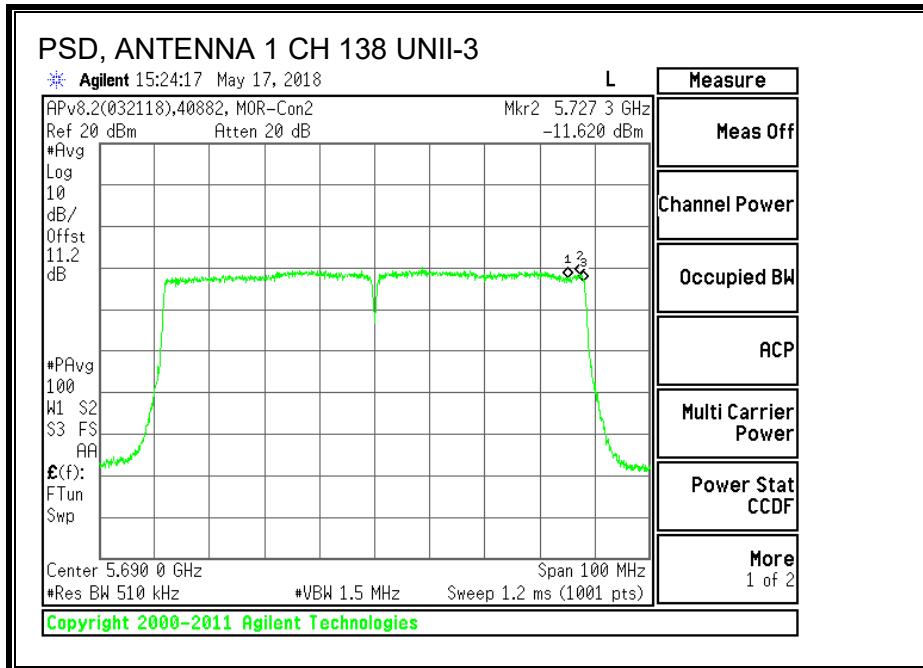
#### Output Power Results

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
138	5690	13.56	13.56	30.00	-16.44

#### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
138	5690	-11.62	-11.43	30.00	-41.43

Note – Measured power was a gated measurement.



## 9.13. 802.11a MODE IN THE 5.8 GHz BAND

### 9.13.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.407 (e)

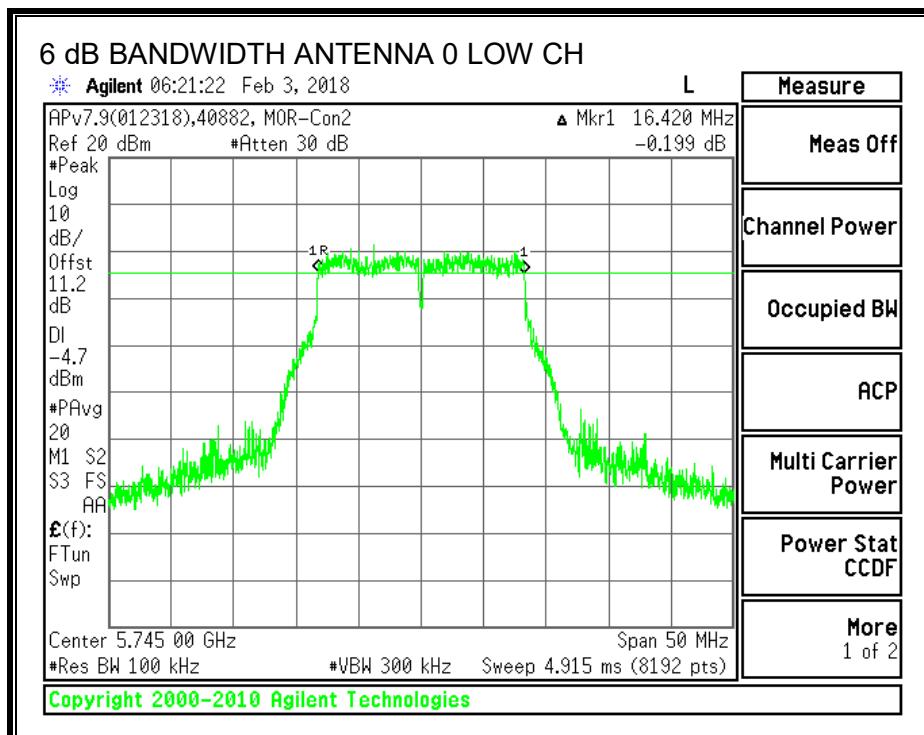
RSS-247 Issue 2 Section 6.2.4.1

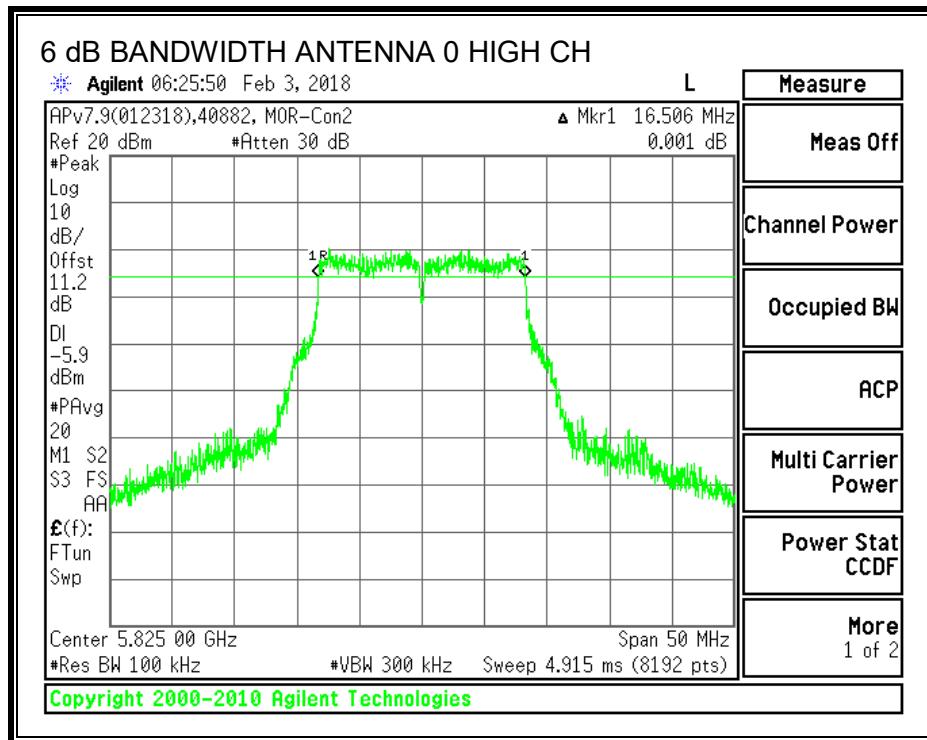
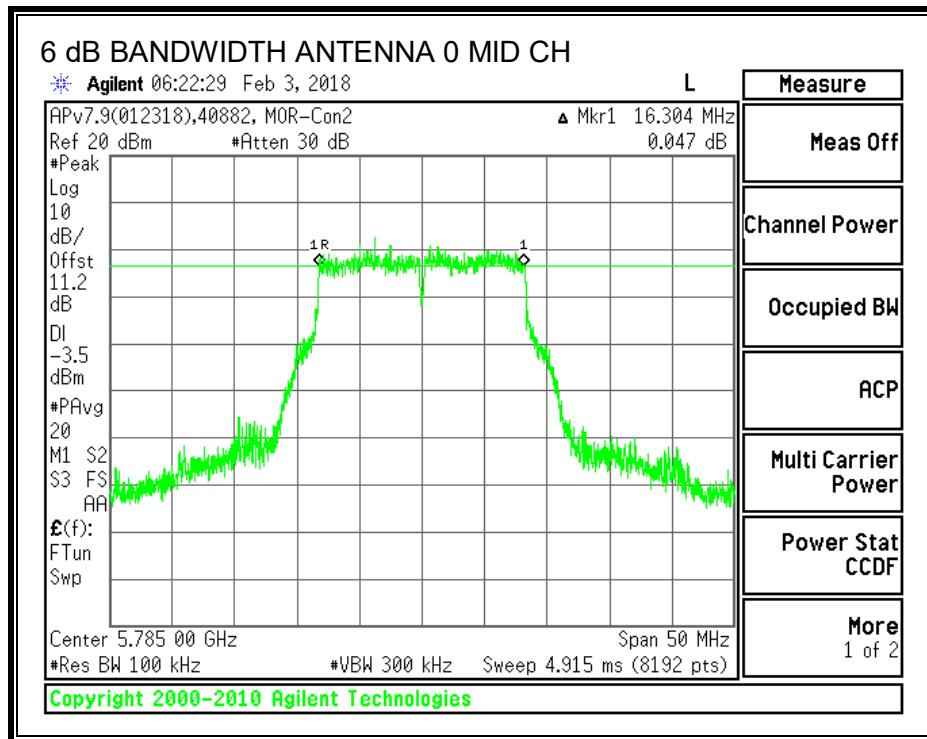
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

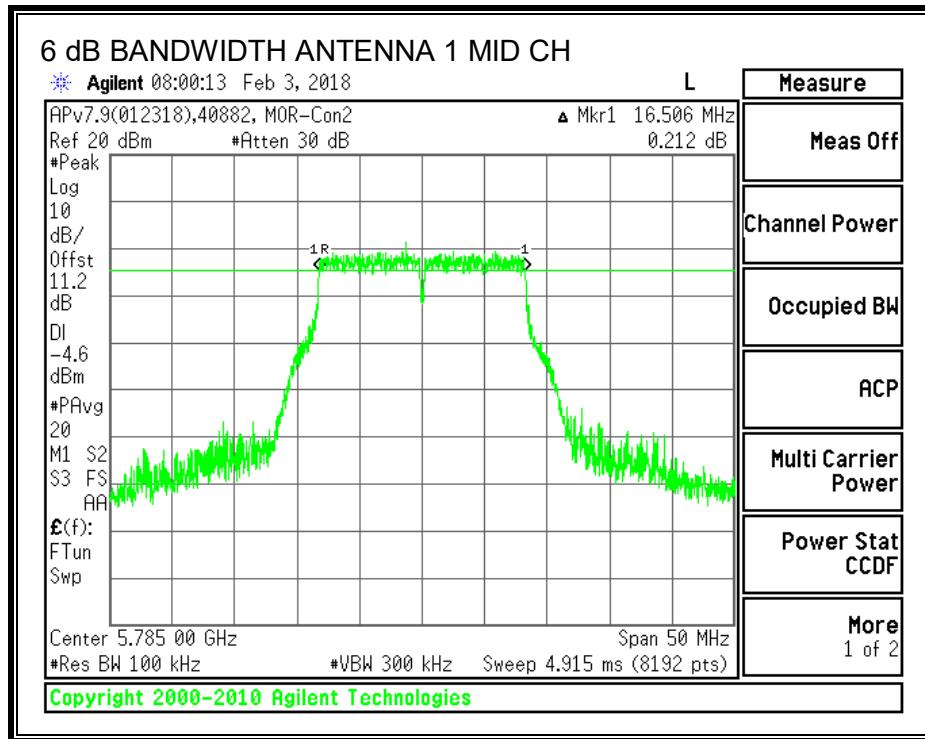
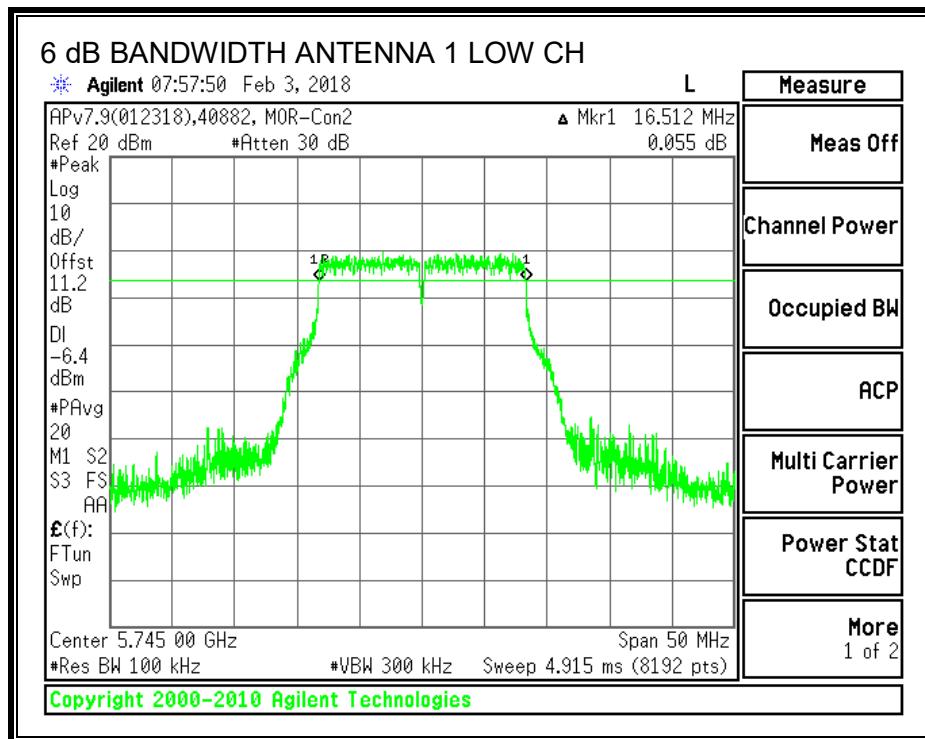
Channel	Frequency (MHz)	6 dB BW ANT 0 (MHz)	6 dB BW ANT 1 (MHz)	Minimum Limit (MHz)
Low	5745	16.4200	16.5120	0.5
Mid	5785	16.3040	16.5060	0.5
High	5825	16.5060	16.3720	0.5

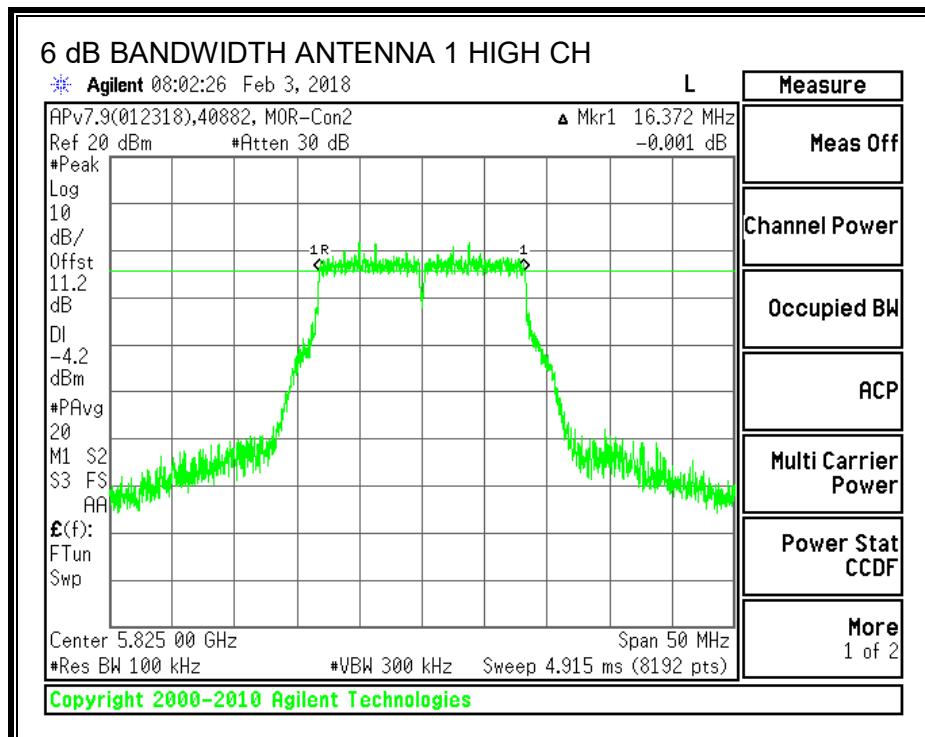
#### 6 dB BANDWIDTH, ANTENNA 0





## 6 dB BANDWIDTH, ANTENNA 1





### 9.13.2. 99% BANDWIDTH

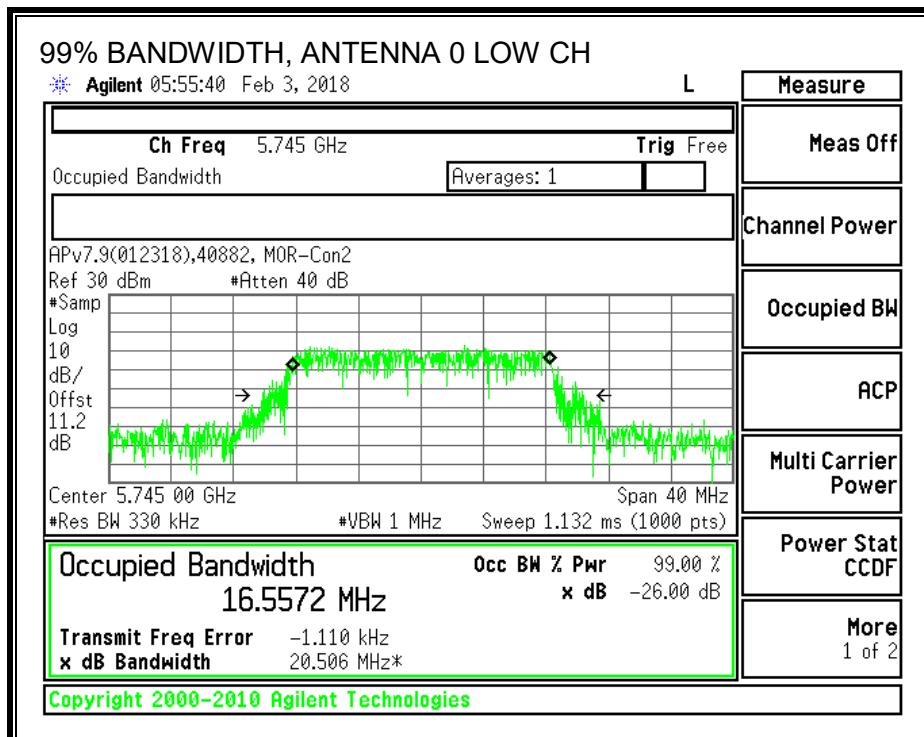
#### LIMITS

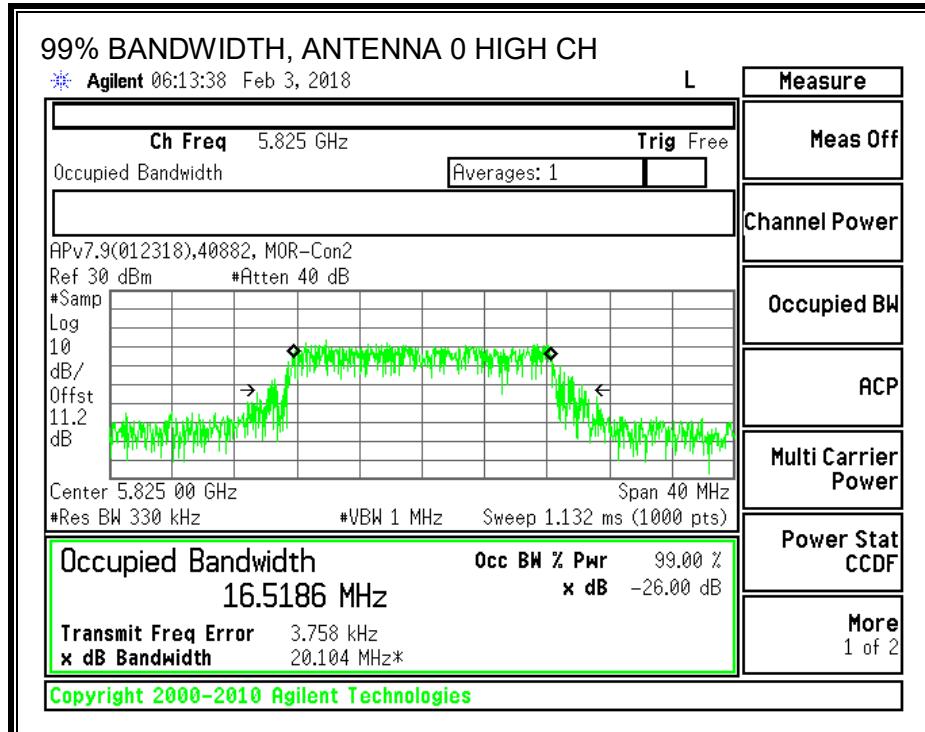
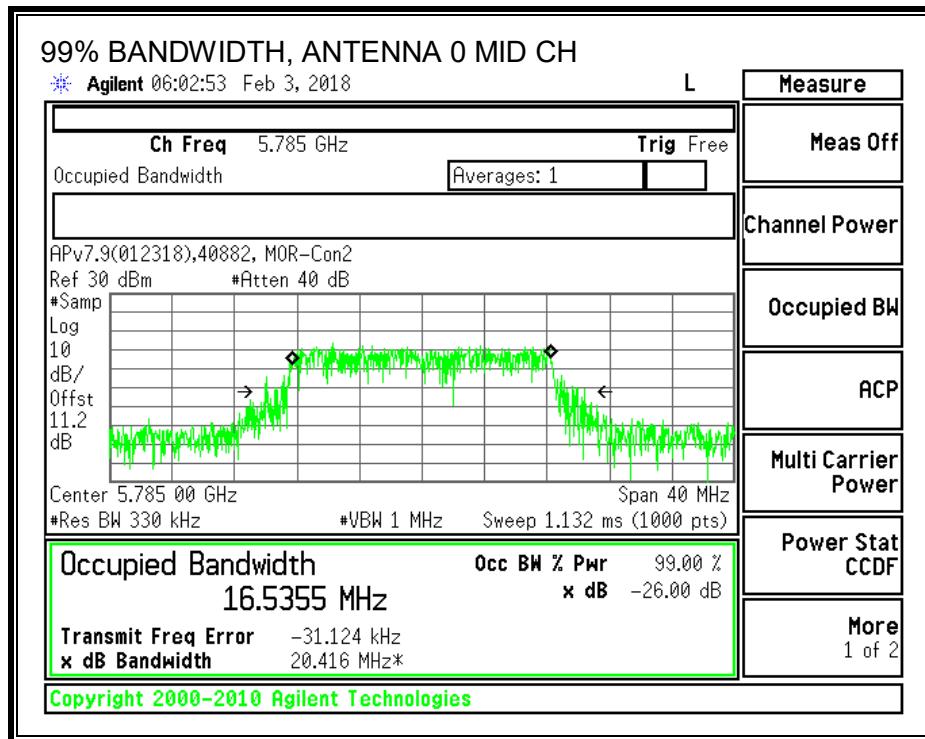
None; for reporting purposes only.

#### RESULTS

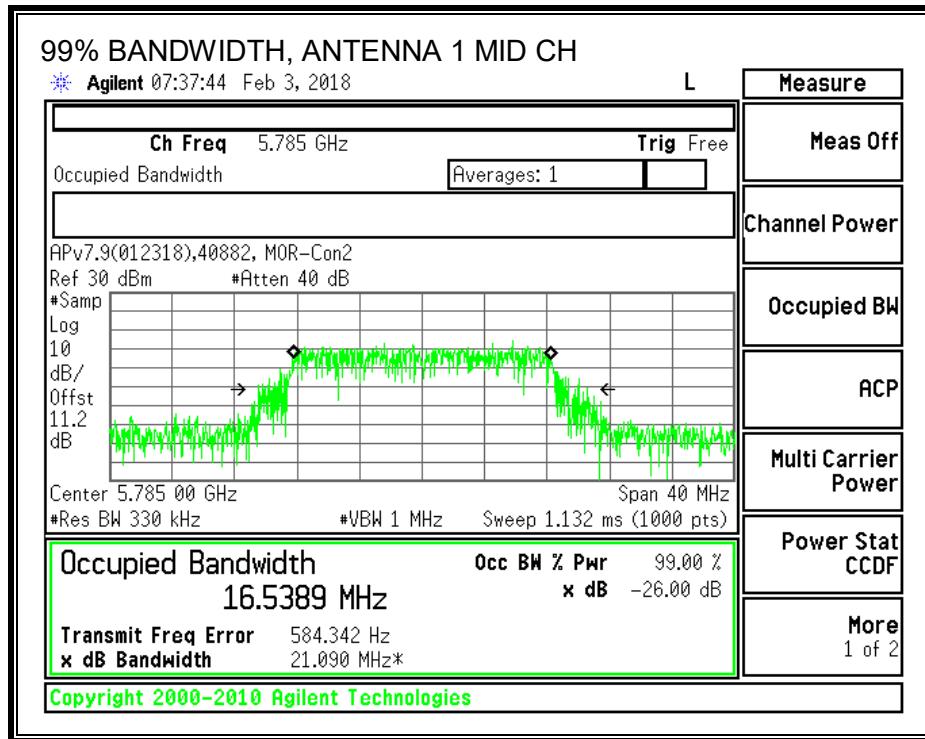
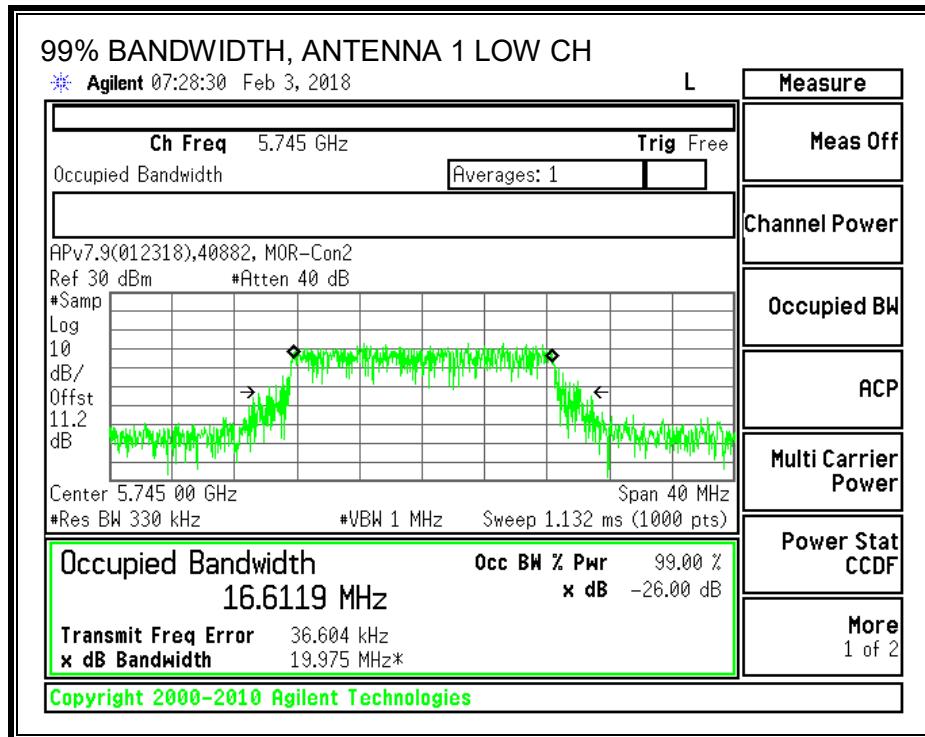
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5745	16.5572	16.6119
Mid	5785	16.5355	16.5389
High	5825	16.5186	16.5572

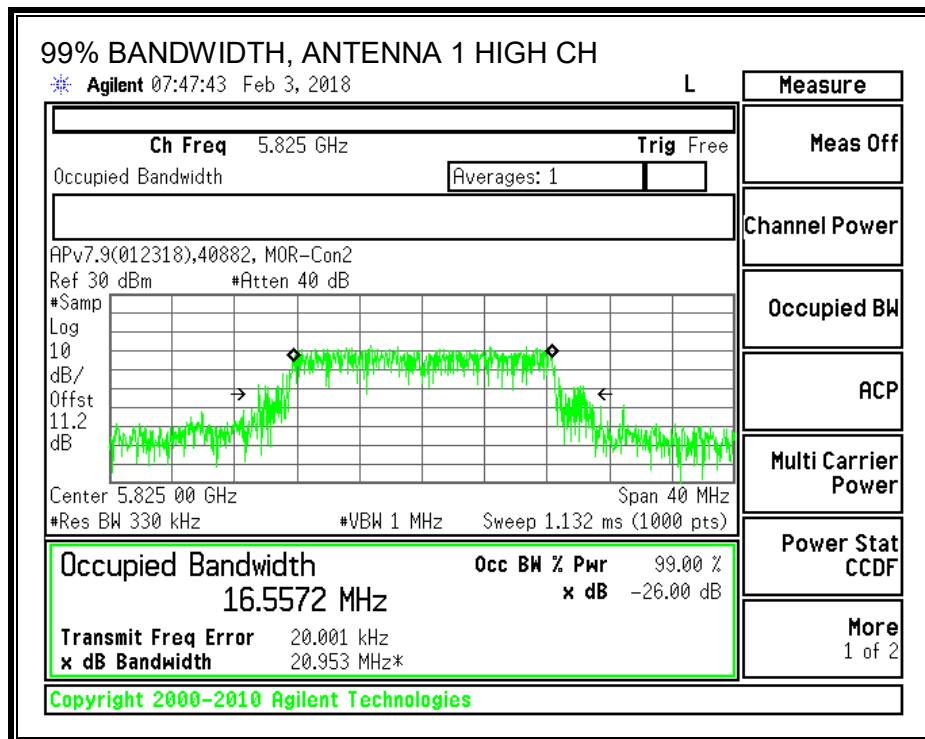
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





### 9.13.3. OUTPUT POWER

#### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### DIRECTIONAL ANTENNA GAIN

<b>ANT 0 Antenna Gain (dBi)</b>	<b>ANT 1 Antenna Gain (dBi)</b>	<b>Directional Gain for Power (dBi)</b>
0.60	4.50	2.97

## **RESULTS**

### **Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	2.97	30.00
Mid	5785	2.97	30.00
High	5825	2.97	30.00

<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd Power</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	12.91	13.84	16.51	30.00	-13.49
Mid	5785	12.83	13.80	16.45	30.00	-13.55
High	5825	12.72	13.75	16.38	30.00	-13.62

## **TEST INFORMATION**

Date: 2018-04-25

Tester: 46722

#### 9.13.4. MAXIMUM POWER SPECTRAL DENSITY (PSD)

##### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna	ANT 1 Antenna	Correlated Chains Directional Gain (dBi)
Gain (dBi)	Gain (dBi)	Gain (dBi)
0.60	4.50	5.78

##### RESULTS

**Antenna Gain and Limits**

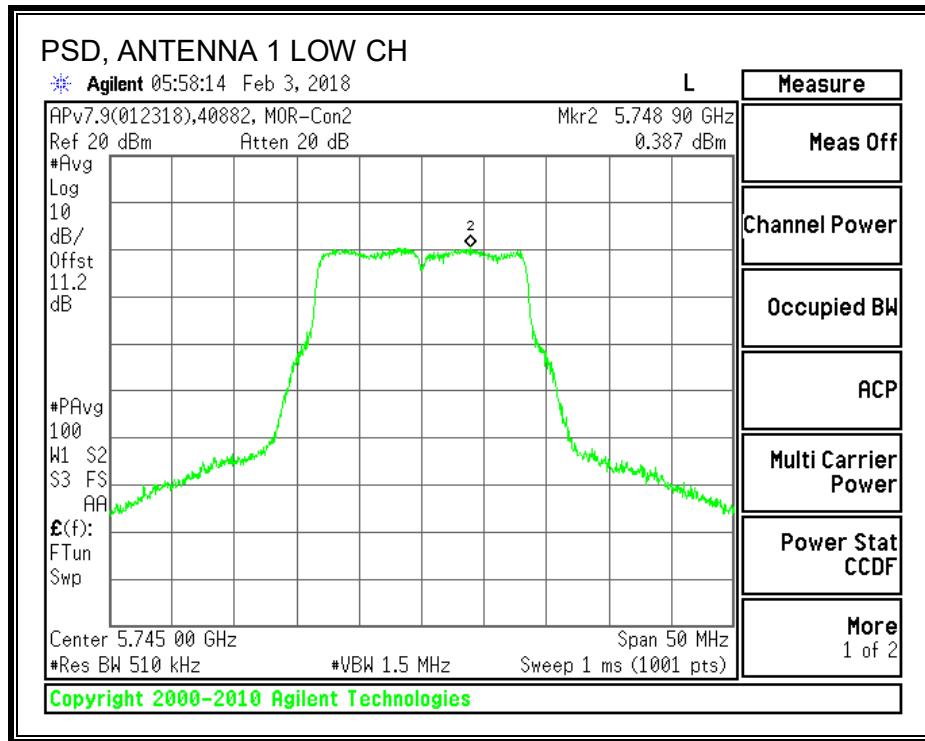
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	5.78	30.00
Mid	5785	5.78	30.00
High	5825	5.78	30.00

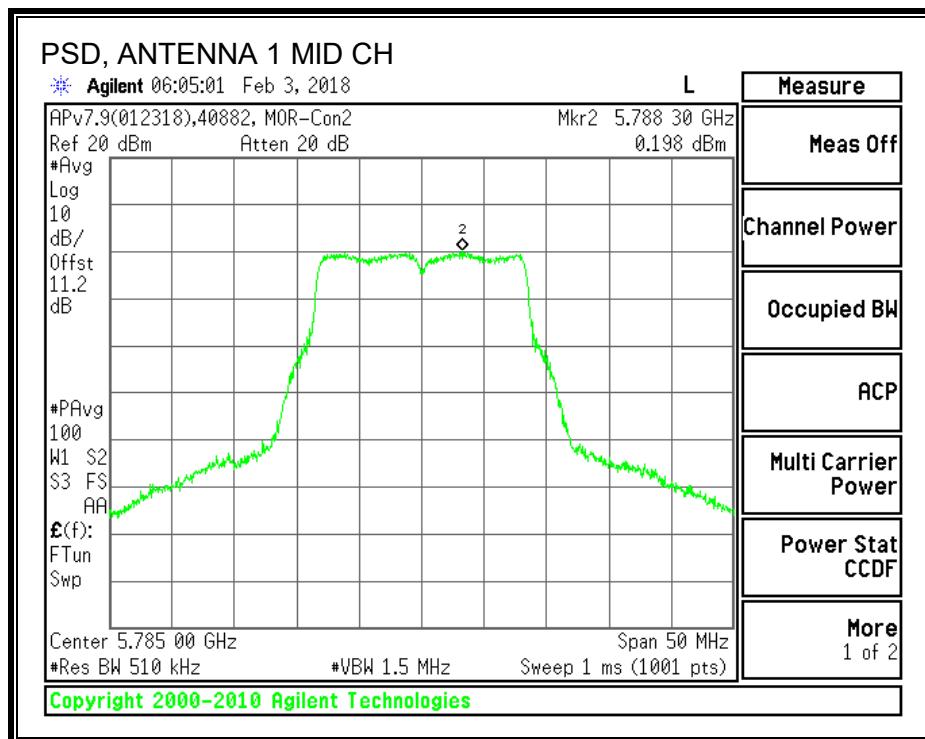
<b>Duty Cycle CF (dB)</b>	0.10	<b>Included in Calculations of Corr'd PSD</b>
---------------------------	------	---

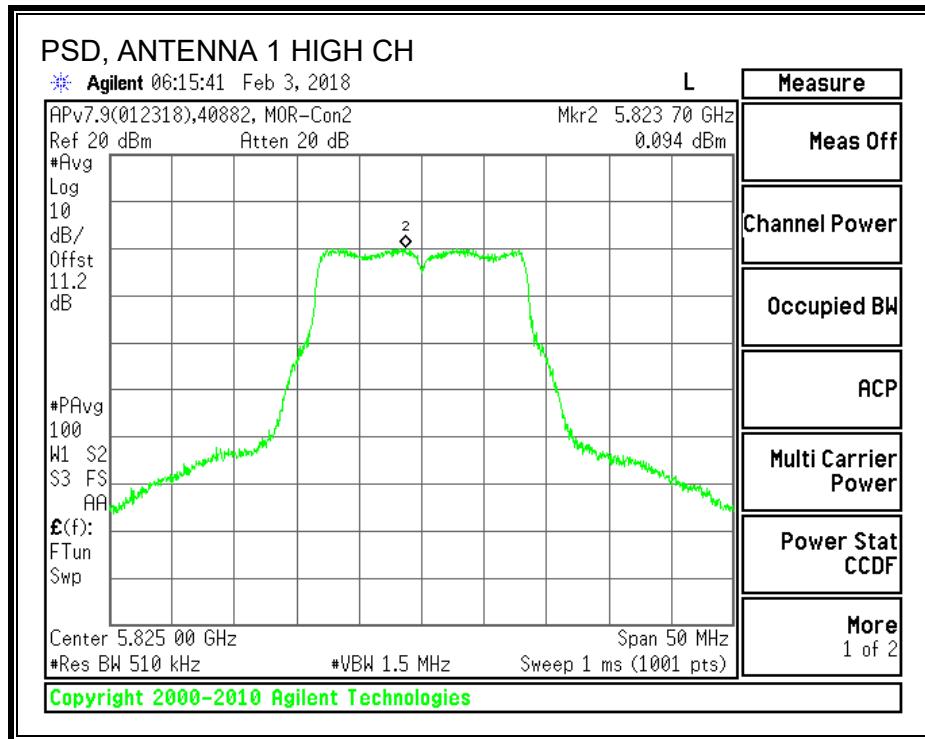
**PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	0.39	-0.13	3.25	30.00	-26.75
Mid	5785	0.20	-0.10	3.16	30.00	-26.84
High	5825	0.09	-0.11	3.10	30.00	-26.90

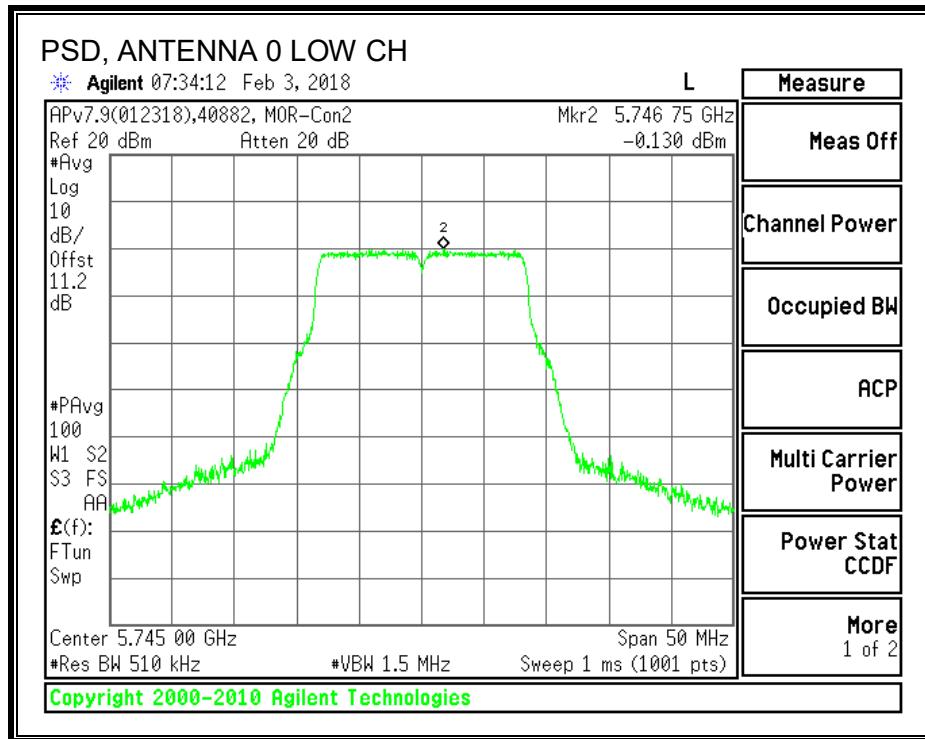
**PSD, ANTENNA 1**

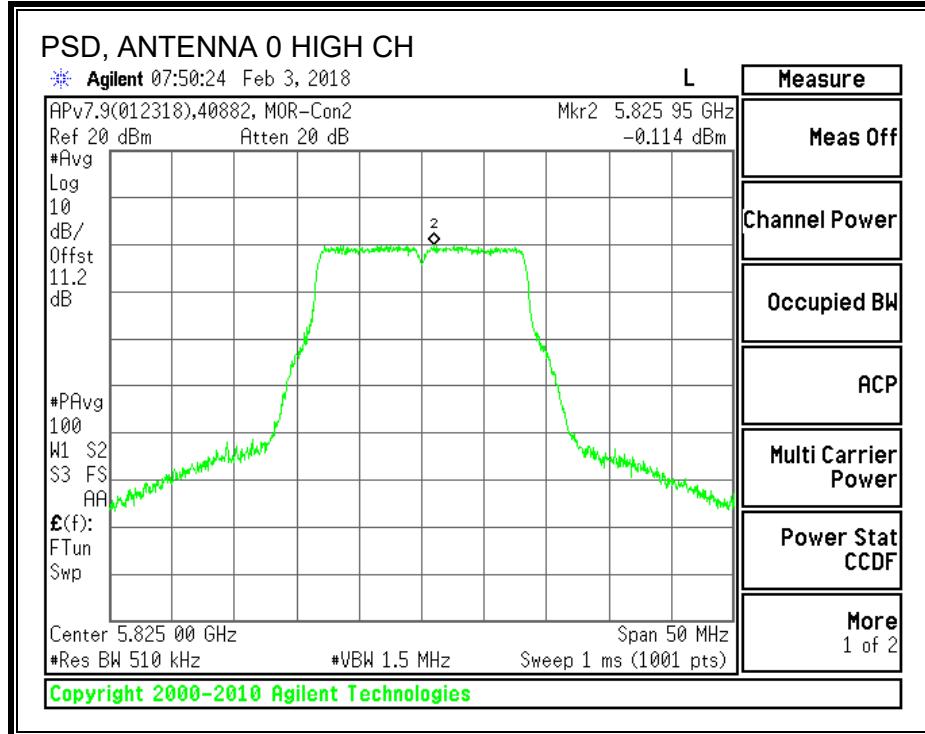
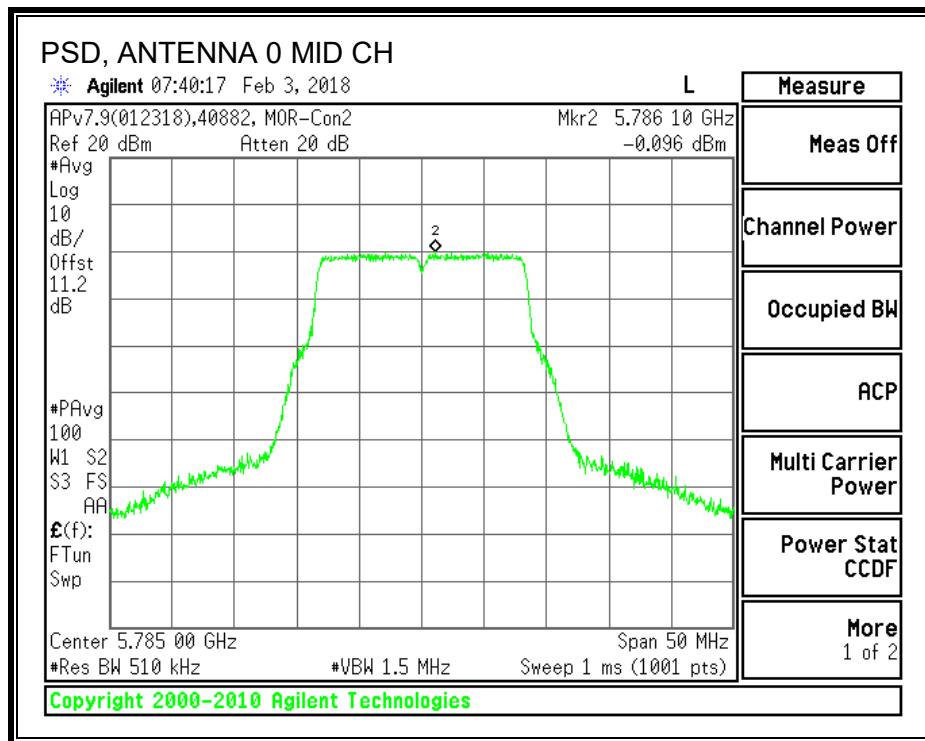






## PSD, ANTENNA 0





## 9.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

### 9.14.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.407 (e)

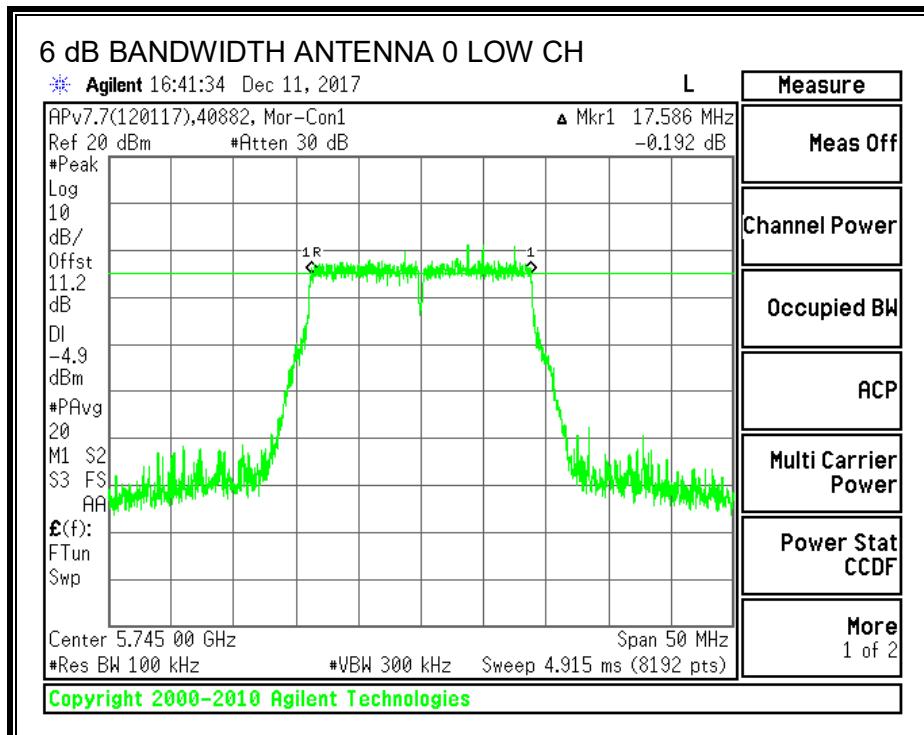
RSS-247 Issue 2 Section 6.2.4.1

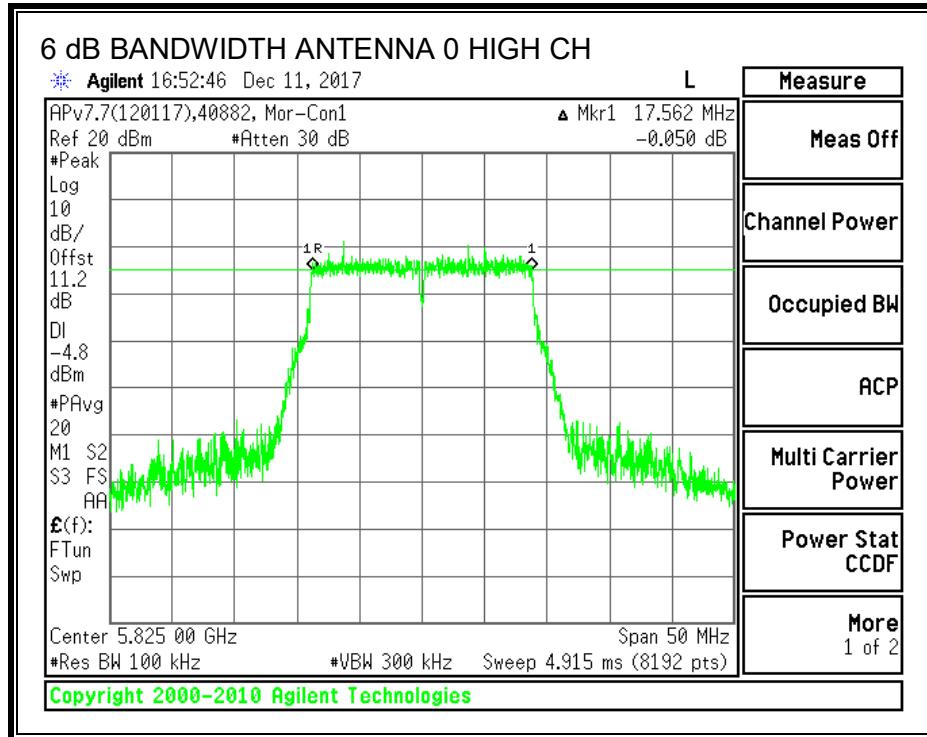
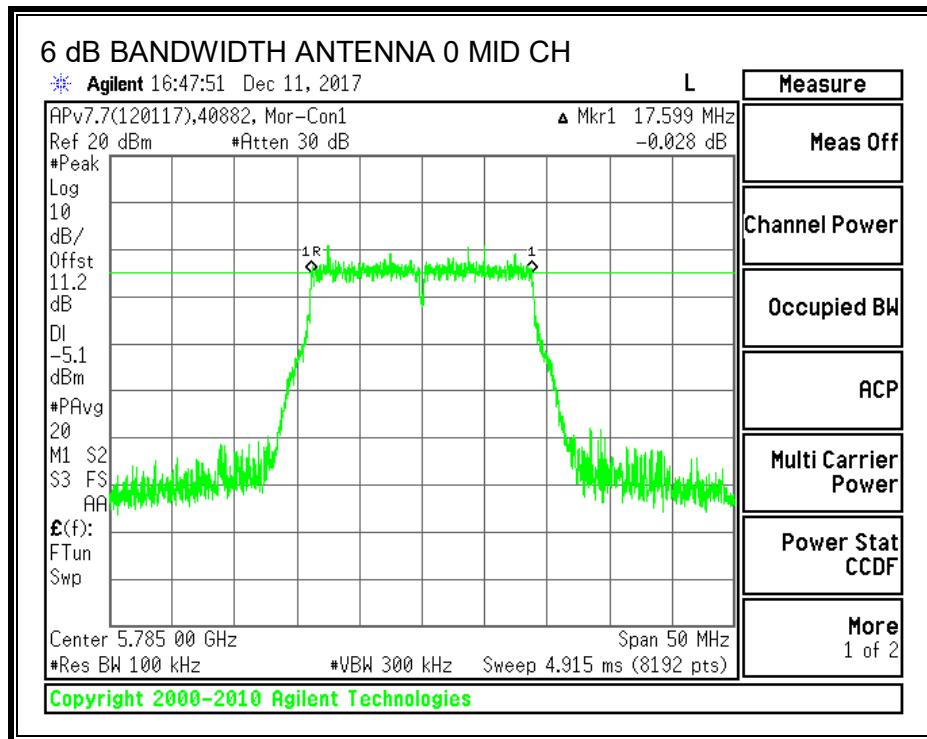
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

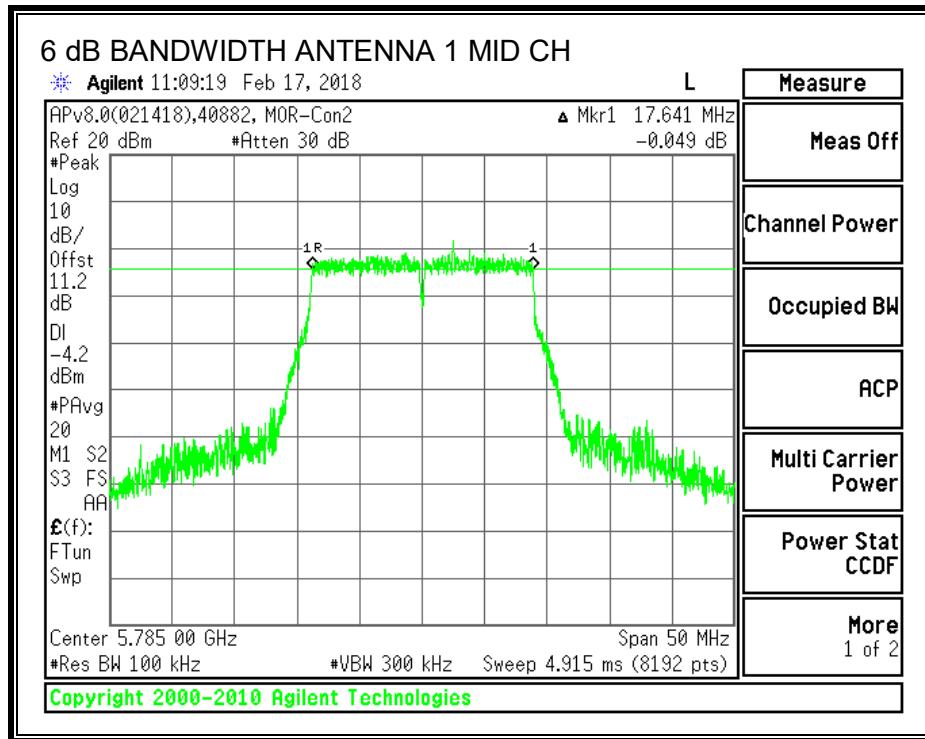
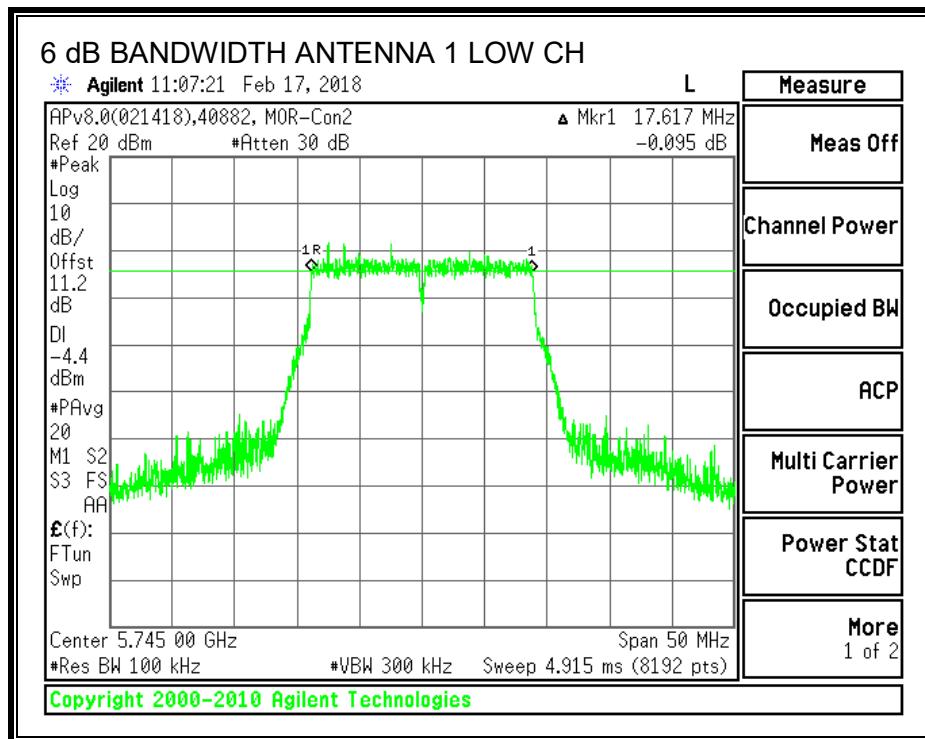
Channel	Frequency (MHz)	6 dB BW ANT 0 (MHz)	6 dB BW ANT 1 (MHz)	Minimum Limit (MHz)
Low	5745	17.5860	17.6170	0.5
Mid	5785	17.5990	17.6410	0.5
High	5825	17.5620	17.6110	0.5

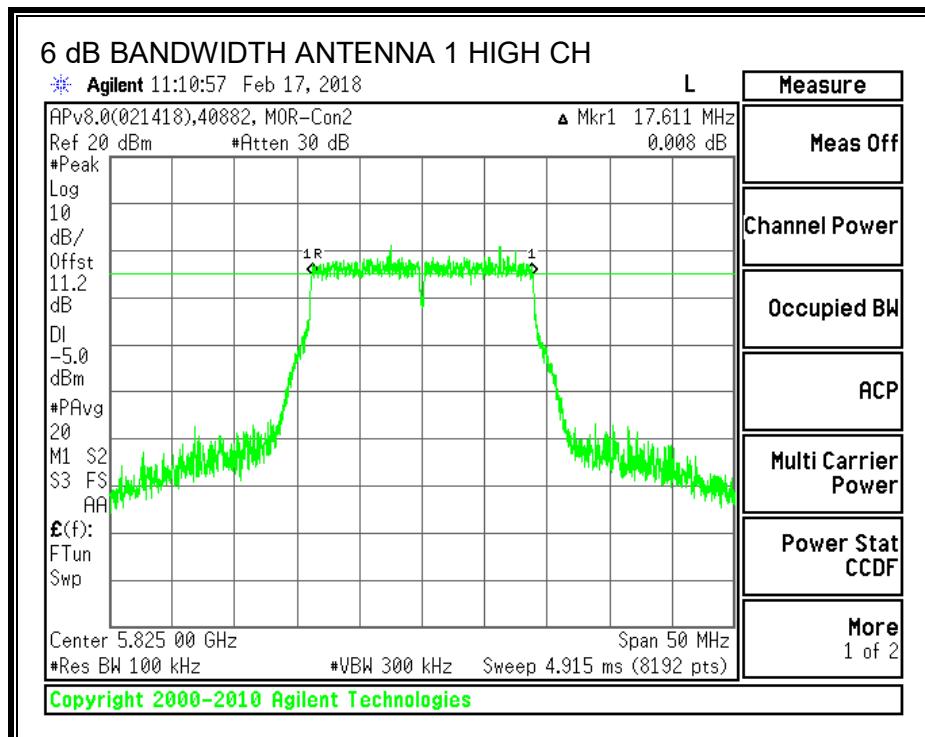
#### 6 dB BANDWIDTH, ANTENNA 0





## 6 dB BANDWIDTH, ANTENNA 1





### 9.14.2. 99% BANDWIDTH

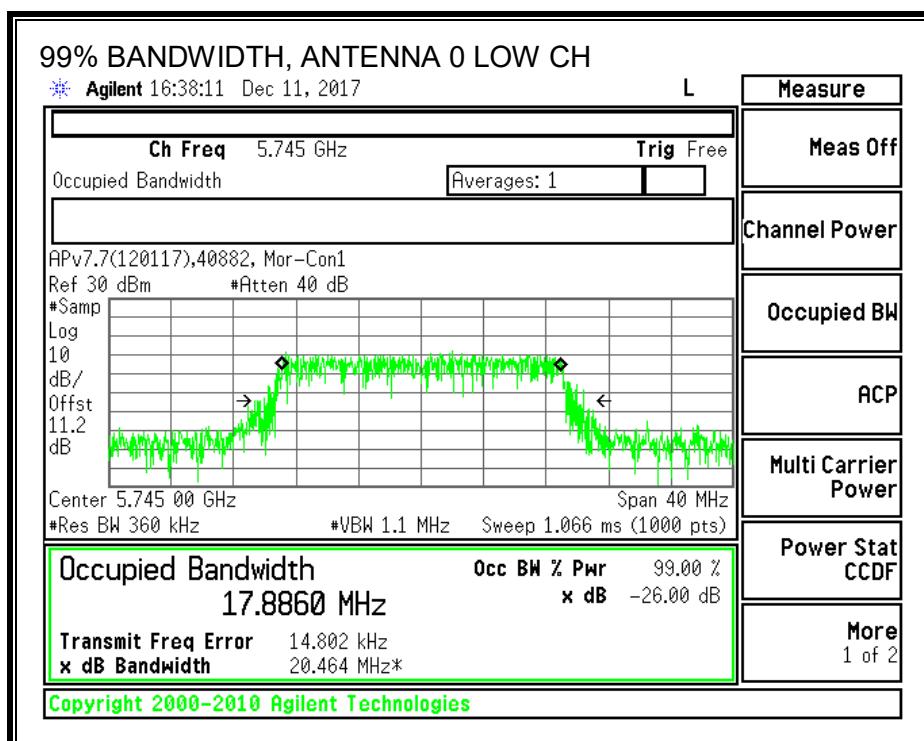
#### LIMITS

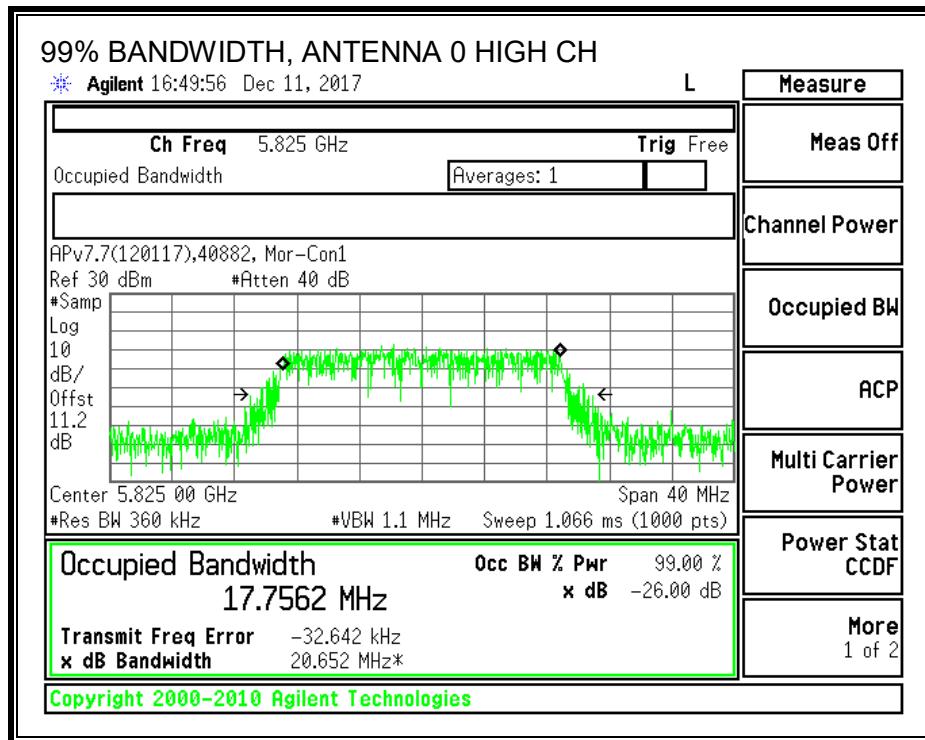
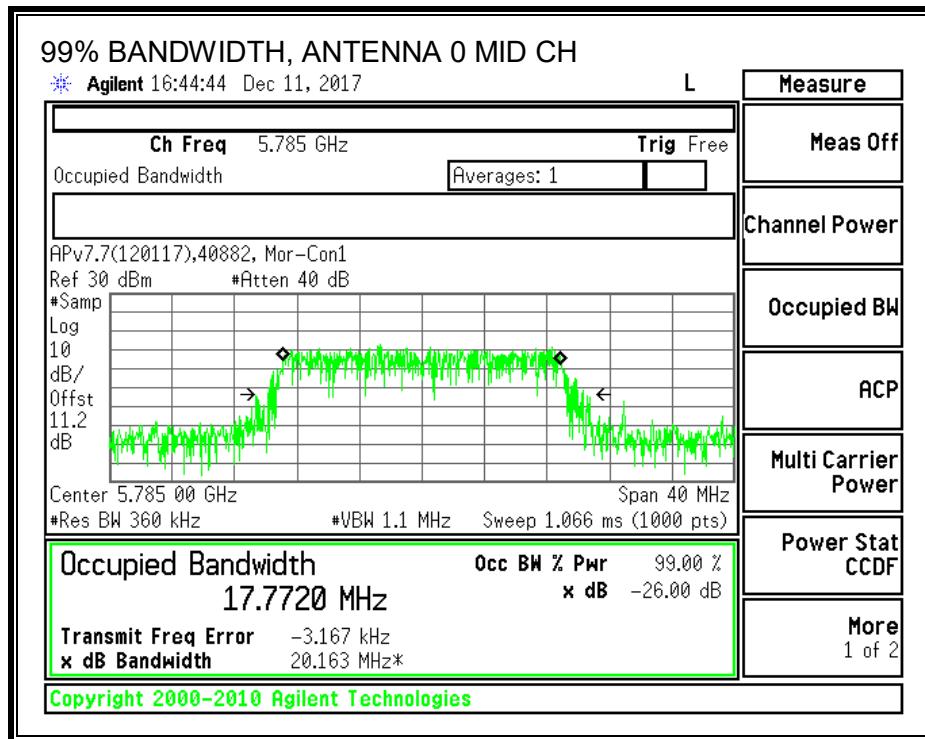
None; for reporting purposes only.

#### RESULTS

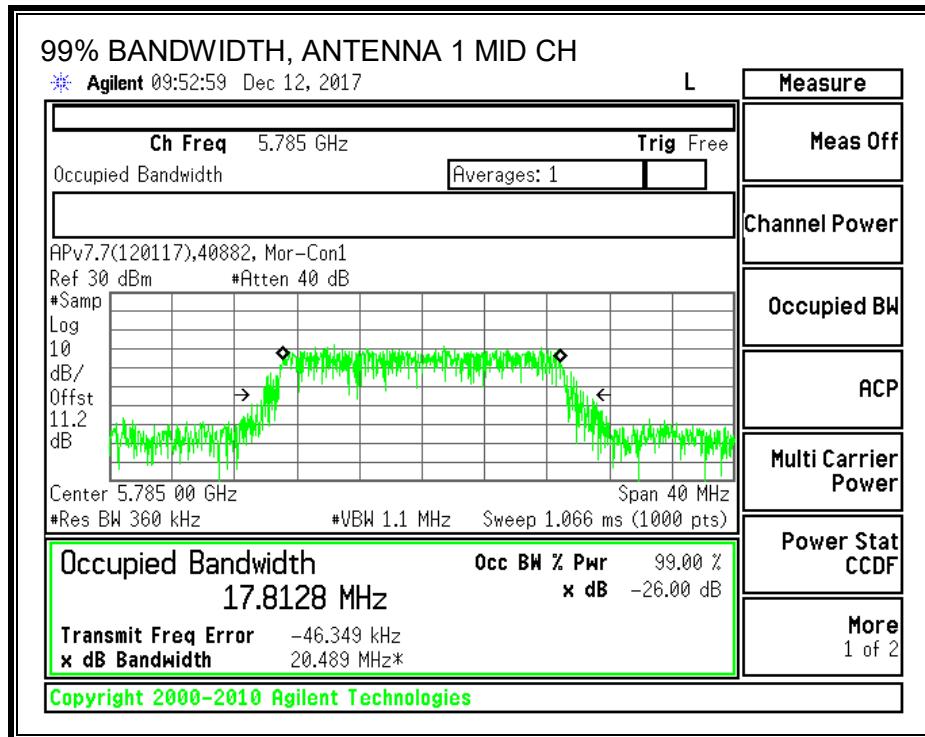
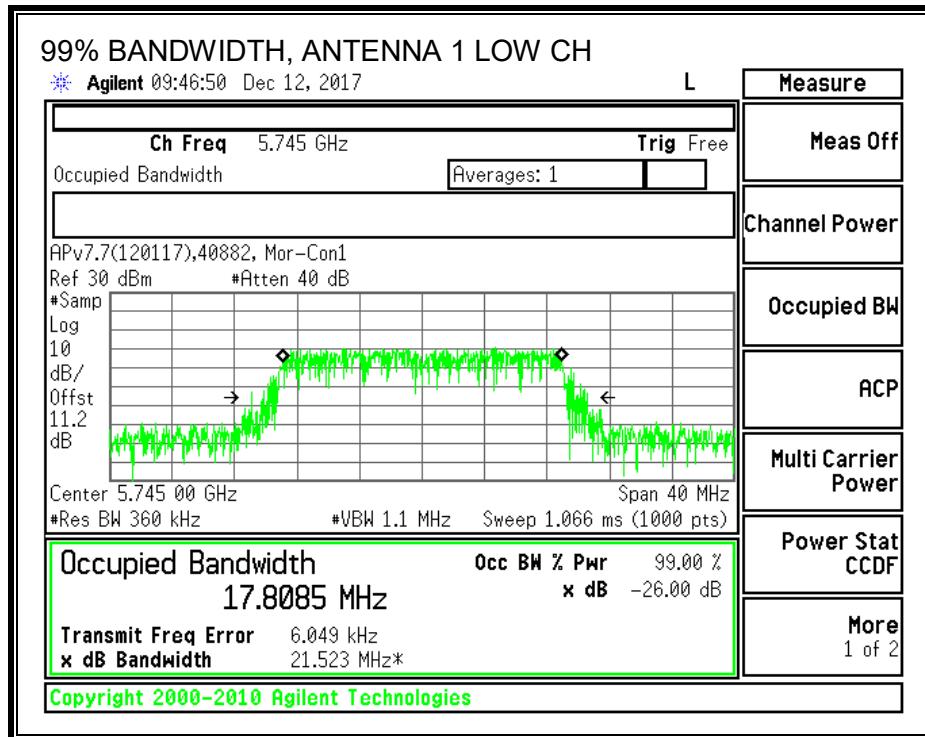
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5745	17.8860	17.8085
Mid	5785	17.7720	17.8128
High	5825	17.7562	17.7635

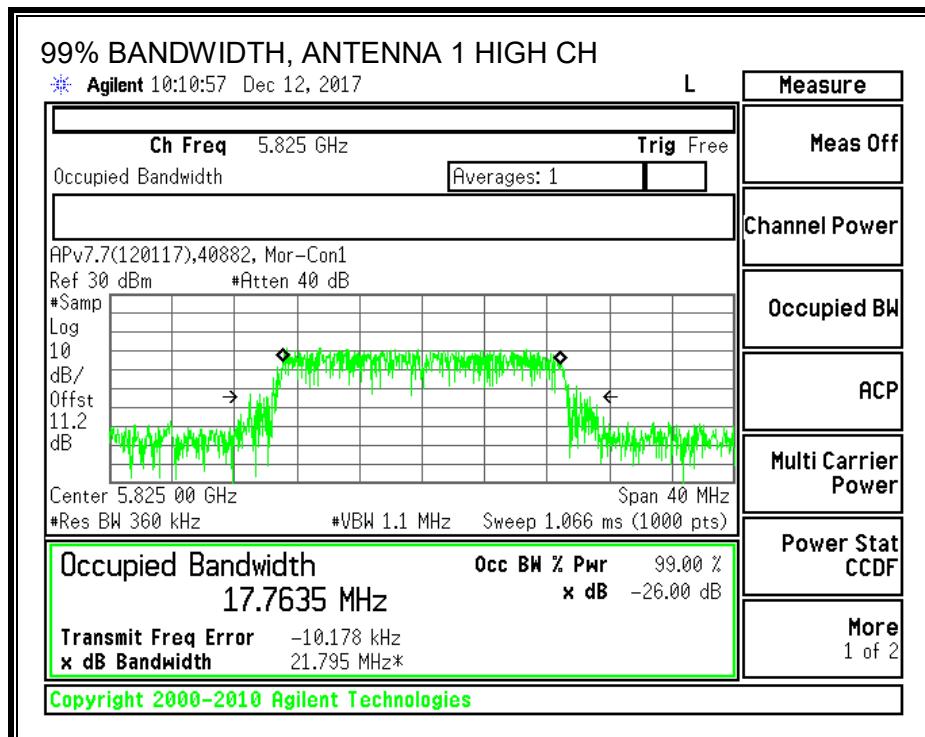
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





### 9.14.3. OUTPUT POWER

#### LIMITS

FCC §15.407 (a) (3)  
RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for Power (dBi)
0.60	4.50	2.97

#### RESULTS

##### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	2.97	30.00
Mid	5785	2.97	30.00
High	5825	2.97	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
--------------------	------	--

##### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	12.78	13.78	16.32	30.00	-13.68
Mid	5785	12.86	13.62	16.27	30.00	-13.73
High	5825	12.74	13.75	16.28	30.00	-13.72

#### TEST INFORMATION

Date: 2018-04-25

Tester: 46722

#### 9.14.4. MAXIMUM POWER SPECTRAL DENSITY

##### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna	ANT 1 Antenna	Correlated Chains Directional Gain (dBi)
Gain (dBi)	Gain (dBi)	Gain (dBi)
0.60	4.50	5.78

##### RESULTS\

###### Antenna Gain and Limits

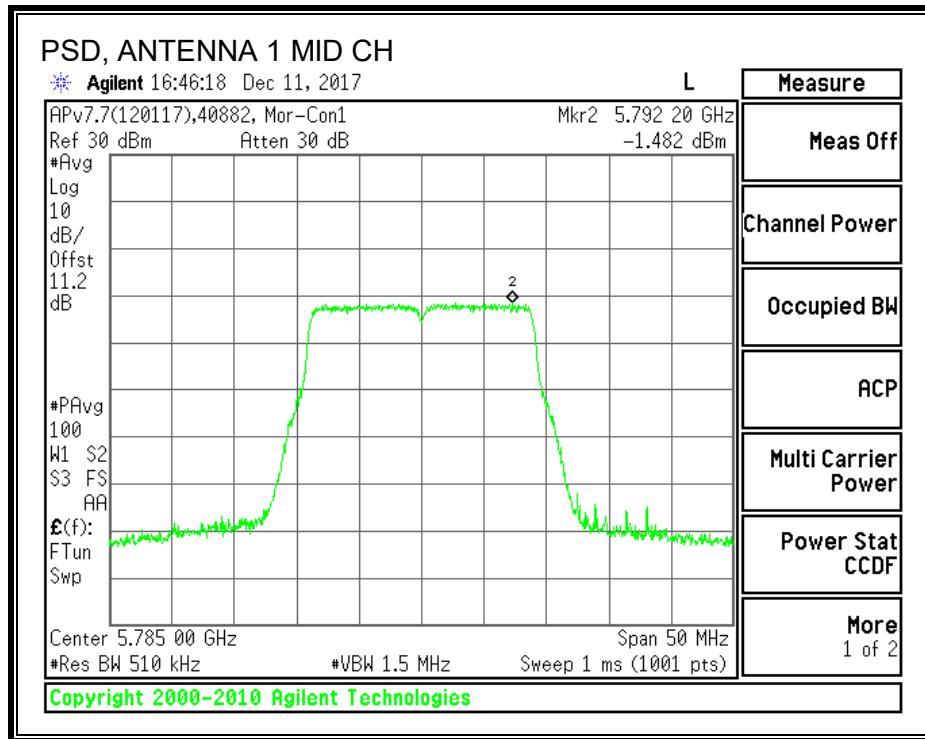
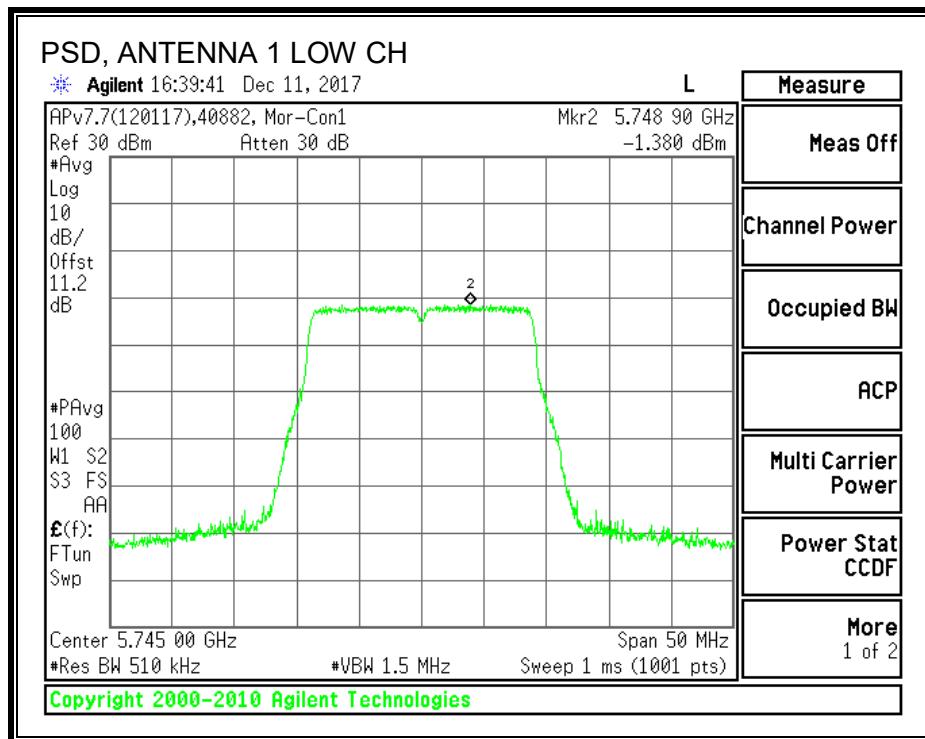
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	5.78	30.00
Mid	5785	5.78	30.00
High	5825	5.78	30.00

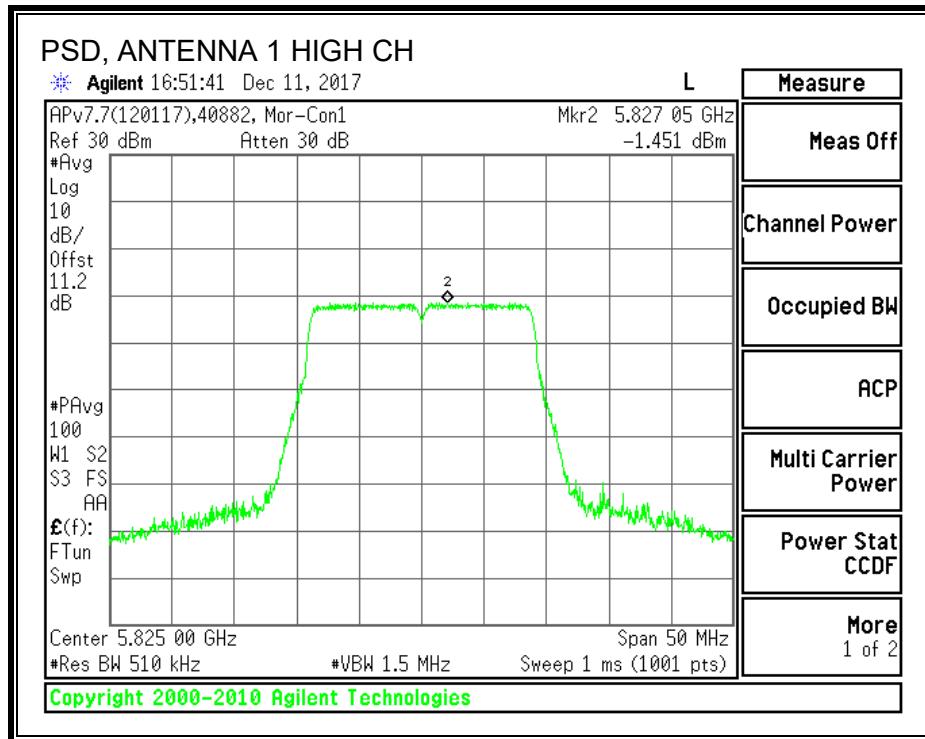
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
--------------------	------	--

###### PSD Results

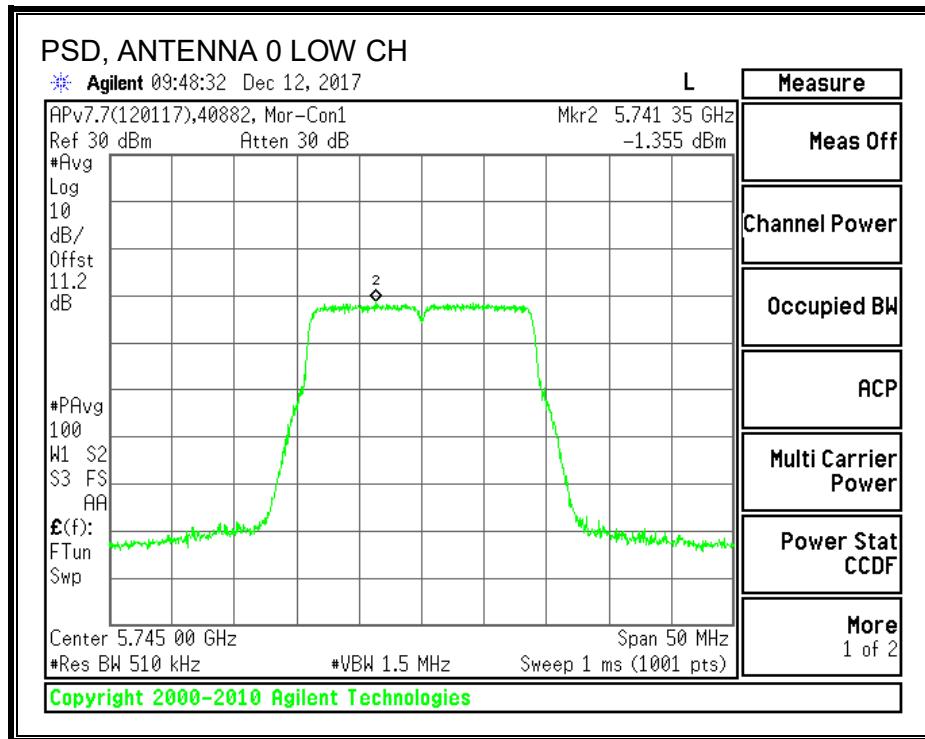
Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	-1.38	-1.36	1.64	30.00	-28.36
Mid	5785	-1.48	-1.71	1.42	30.00	-28.58
High	5825	-1.45	-1.44	1.57	30.00	-28.43

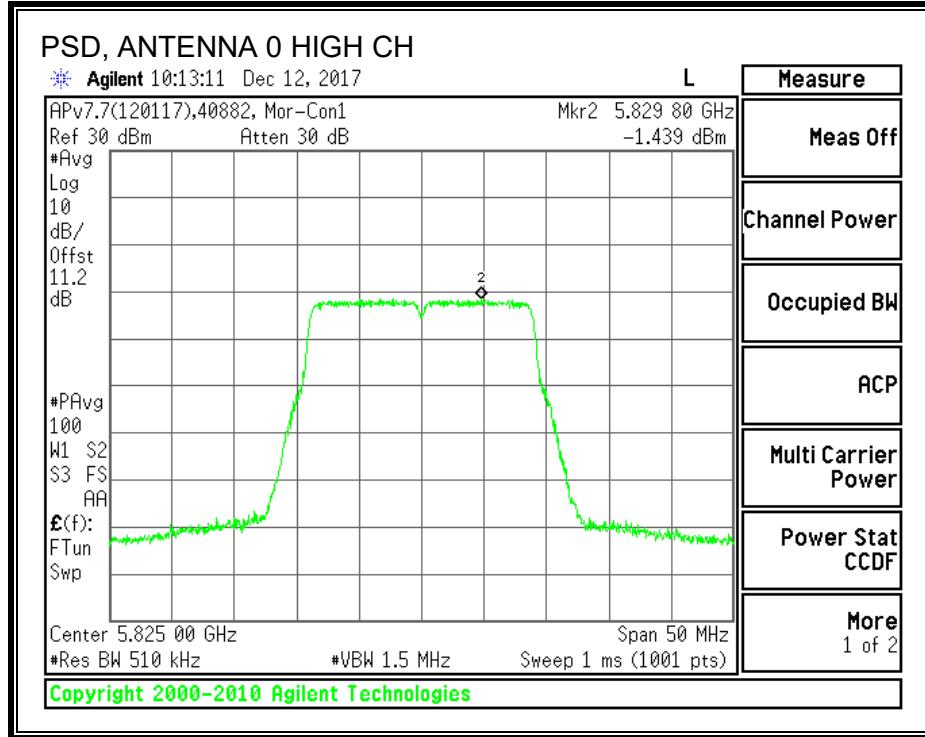
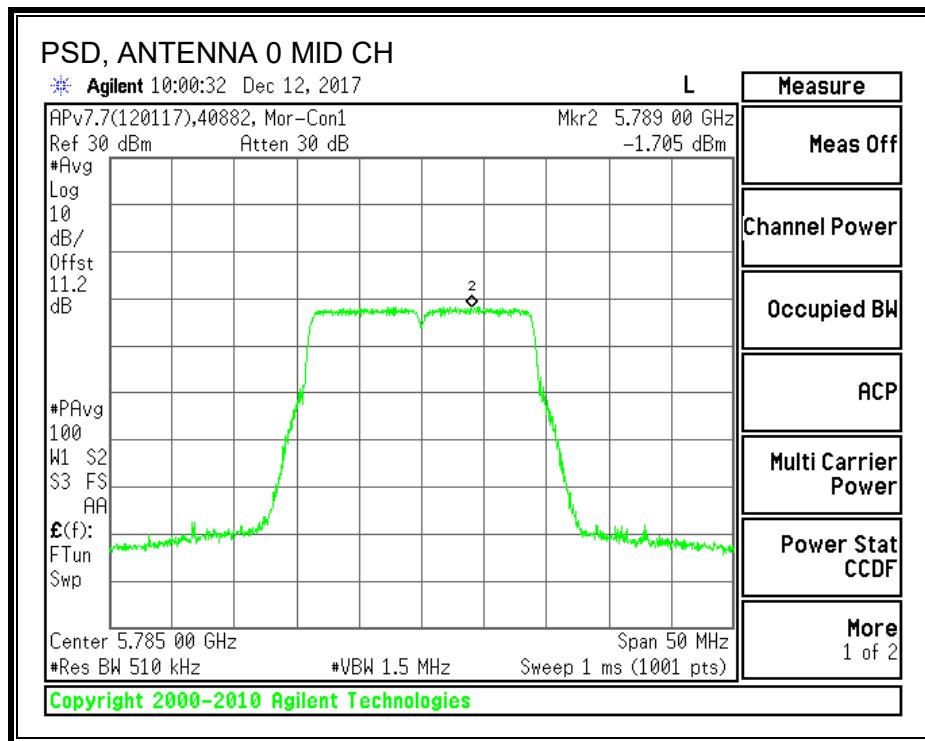
## PSD, ANTENNA 1





## PSD, ANTENNA 0





## 9.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

### 9.15.1. 6 dB BANDWIDTH - MIMO

#### LIMITS

FCC §15.407 (e)

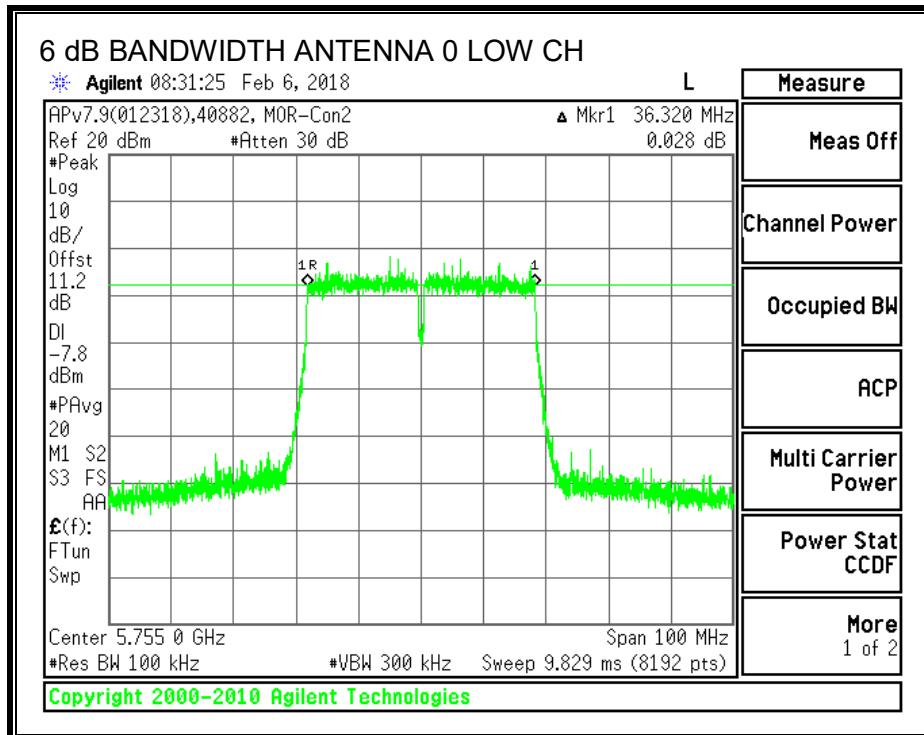
RSS-247 Issue 2 Section 6.2.4.1

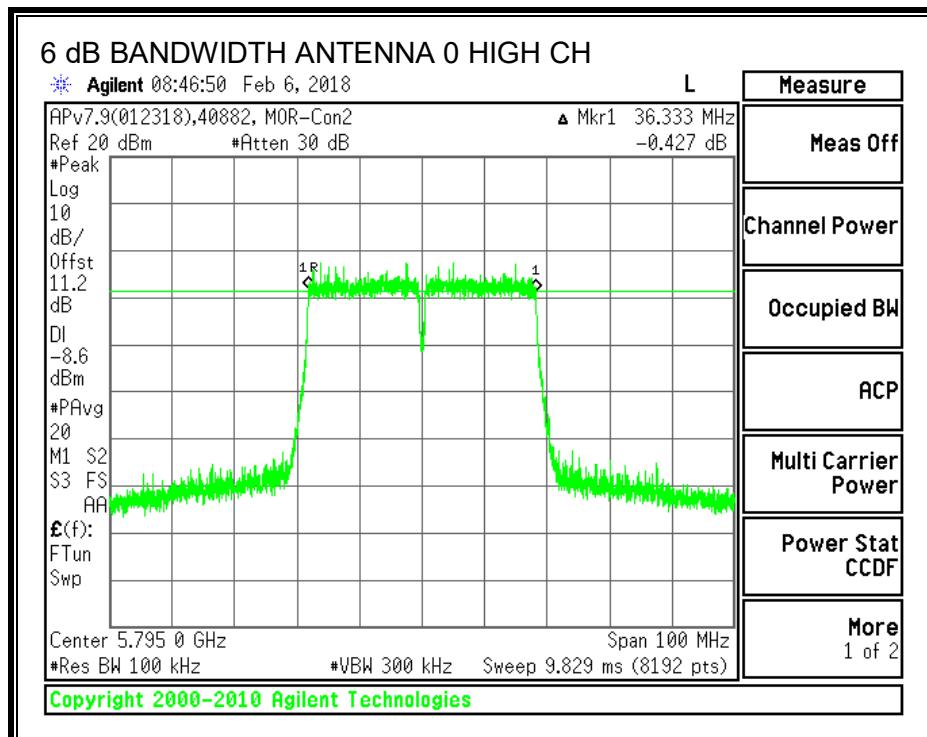
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

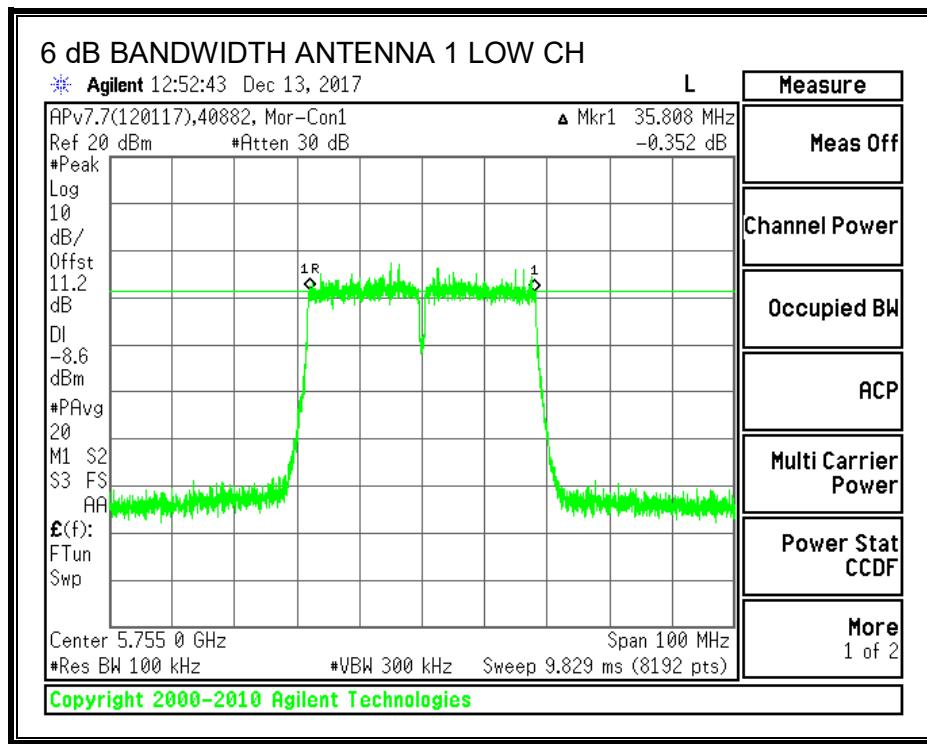
Channel	Frequency (MHz)	6 dB BW ANT 0 (MHz)	6 dB BW ANT 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.3200	35.8080	0.5
High	5795	36.3330	36.3330	0.5

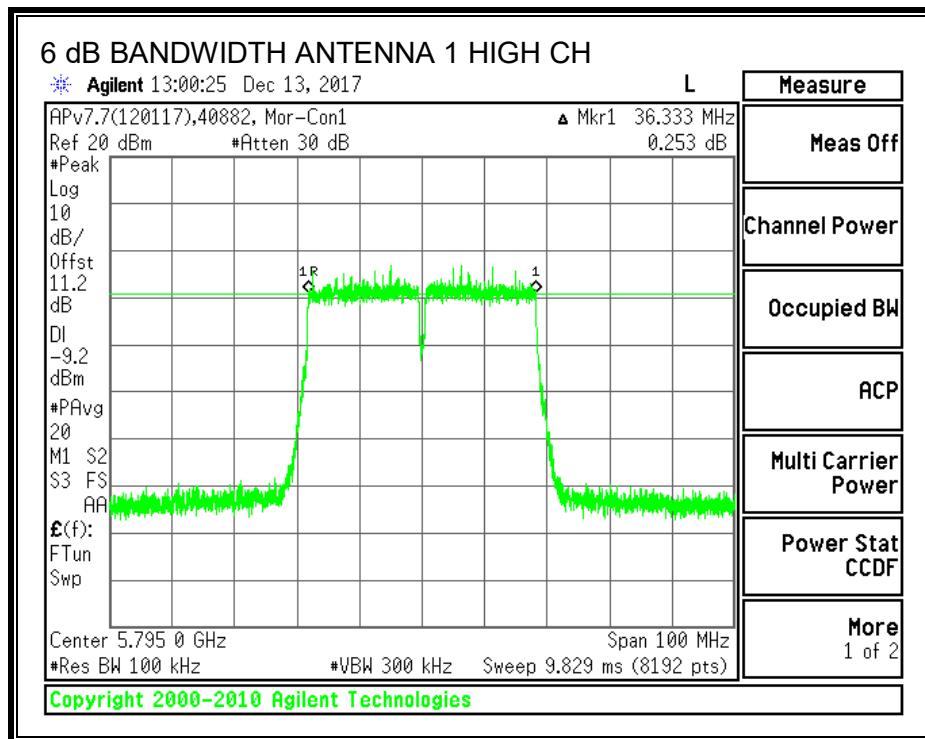
#### 6 dB BANDWIDTH, ANTENNA 0





## 6 dB BANDWIDTH, ANTENNA 1





### 9.15.2. 6 dB BANDWIDTH - SISO

#### LIMITS

FCC §15.407 (e)

RSS-247 Issue 2 Section 6.2.4.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

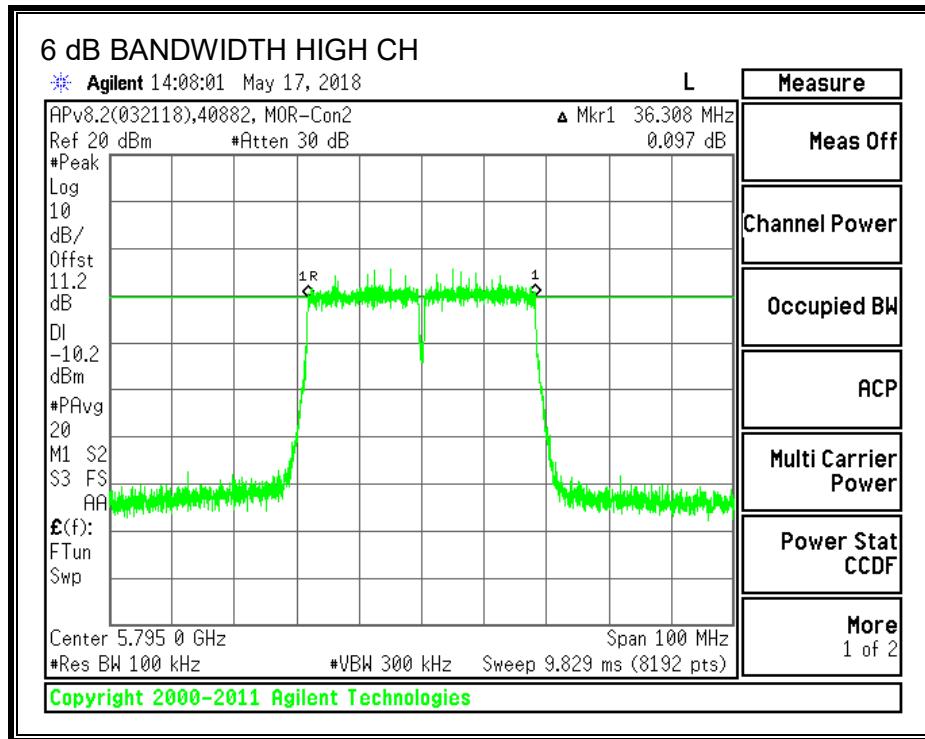
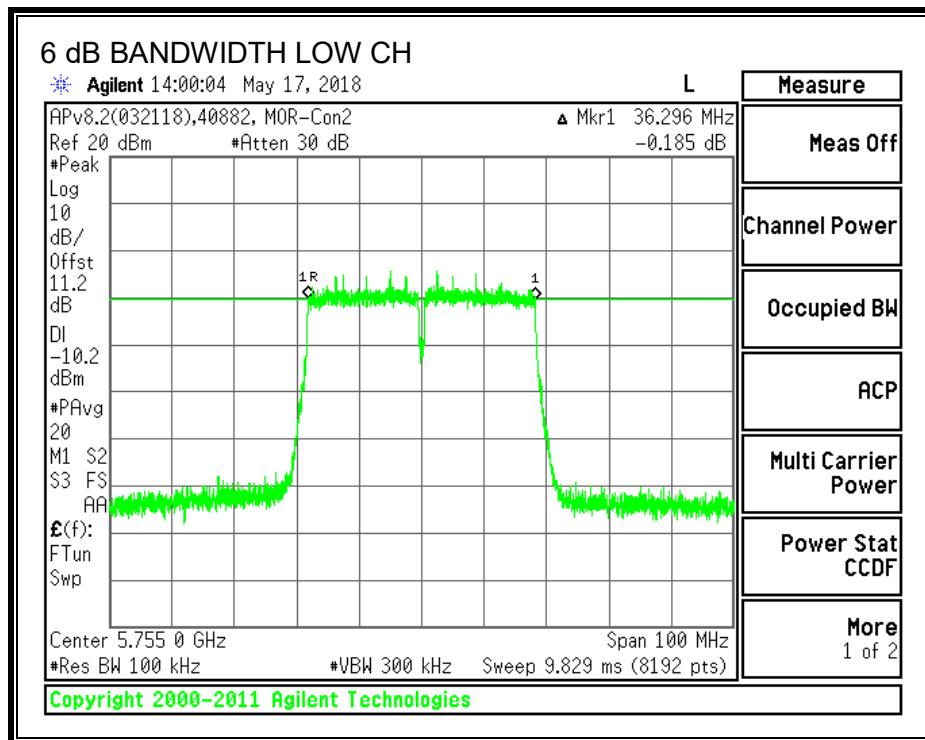
##### ANTENNA 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	36.2960	0.5
High	5795	36.3080	0.5

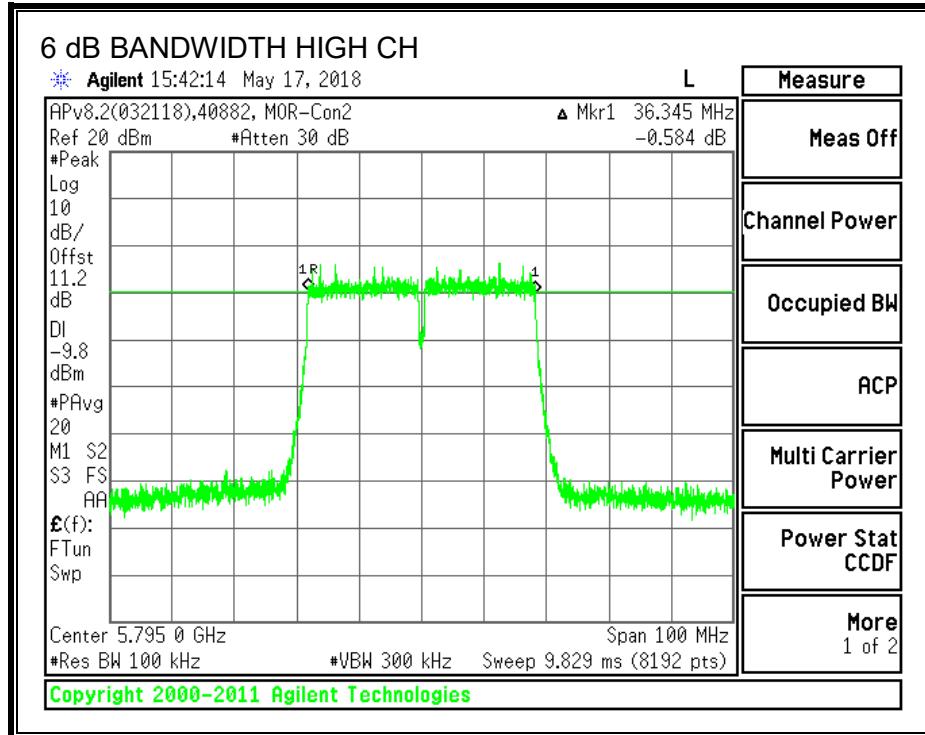
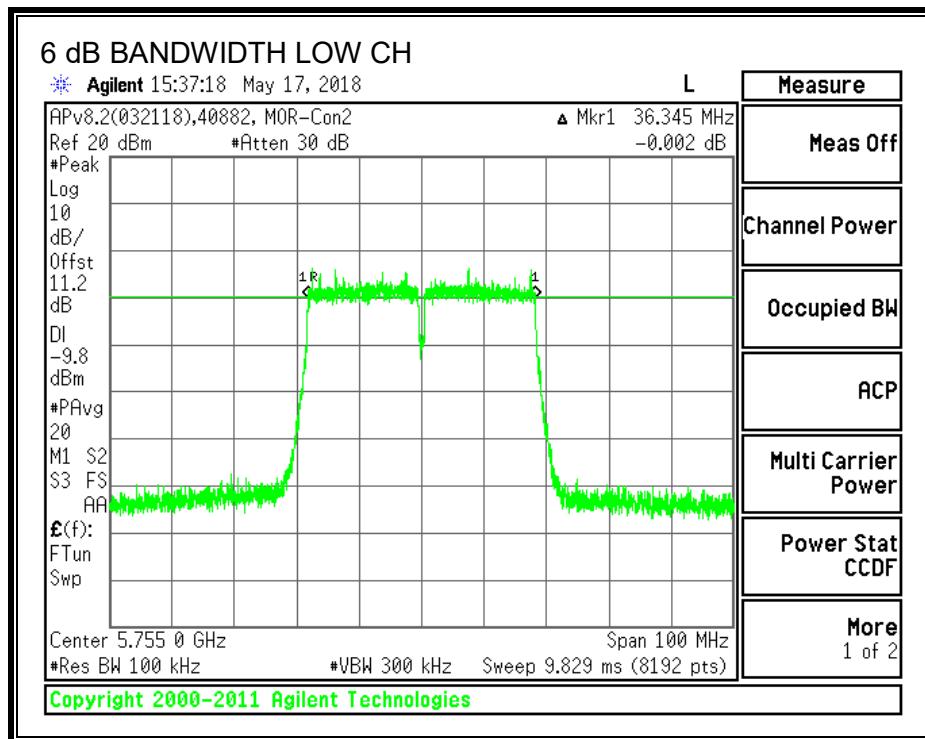
##### ANTENNA 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	36.3450	0.5
High	5795	36.3450	0.5

## 6 dB BANDWIDTH – ANTENNA 0



## 6 dB BANDWIDTH – ANTENNA 1



### 9.15.3. 99% BANDWIDTH - MIMO

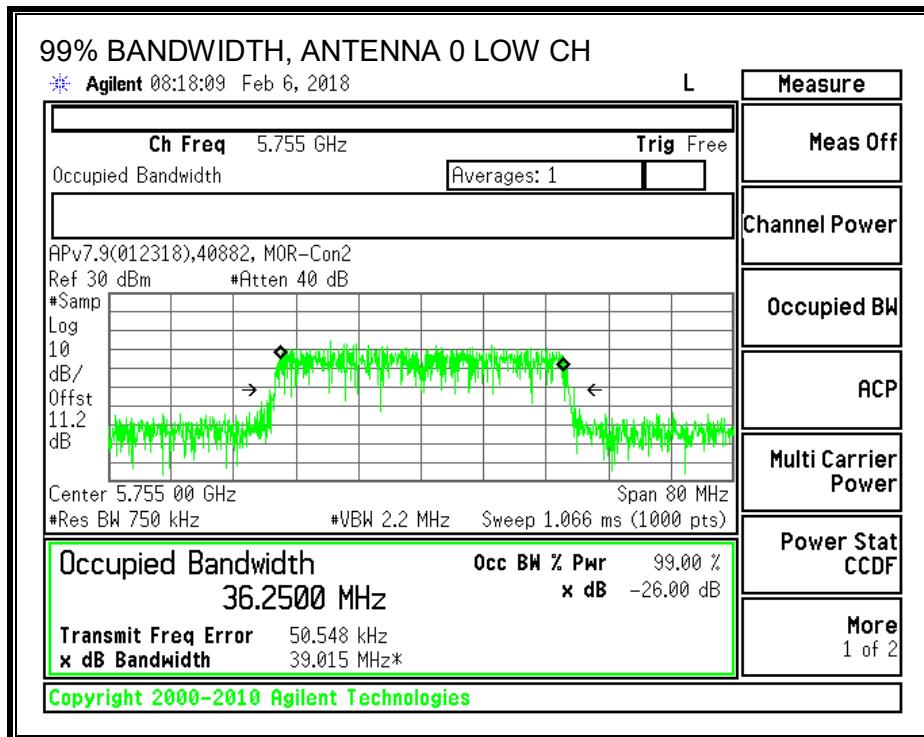
#### LIMITS

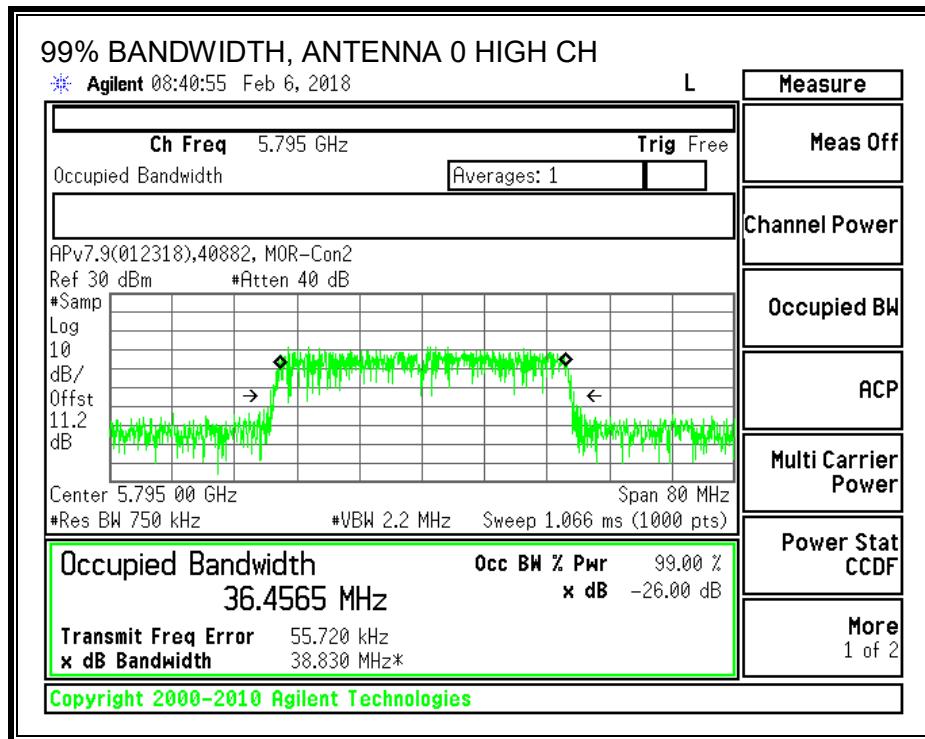
None; for reporting purposes only.

#### RESULTS

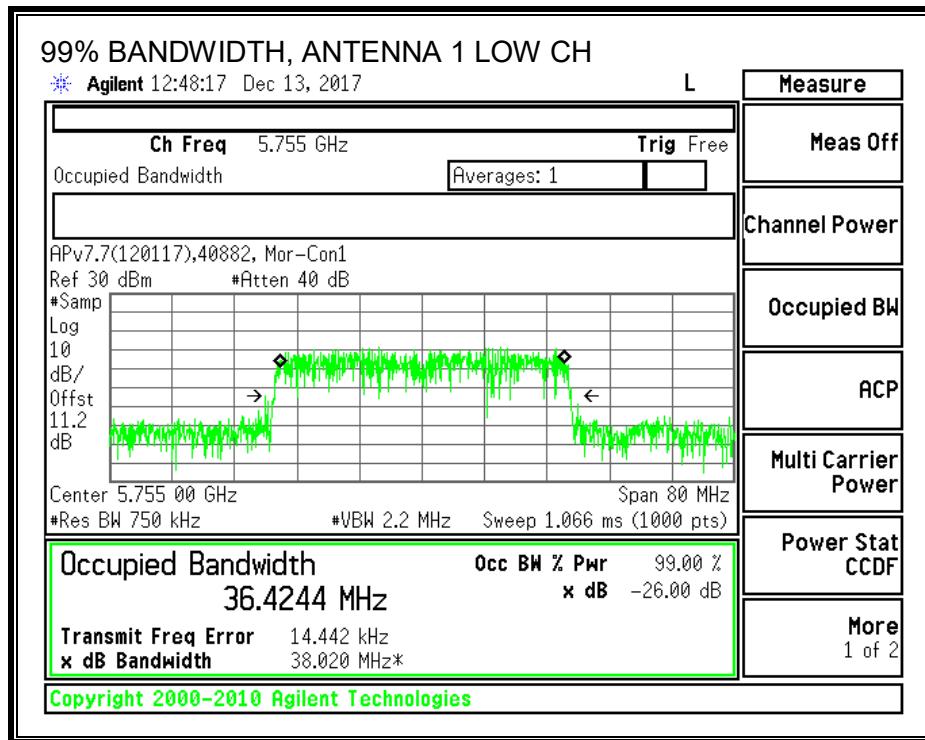
Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Low	5755	36.2500	36.4244
High	5795	36.4565	36.2612

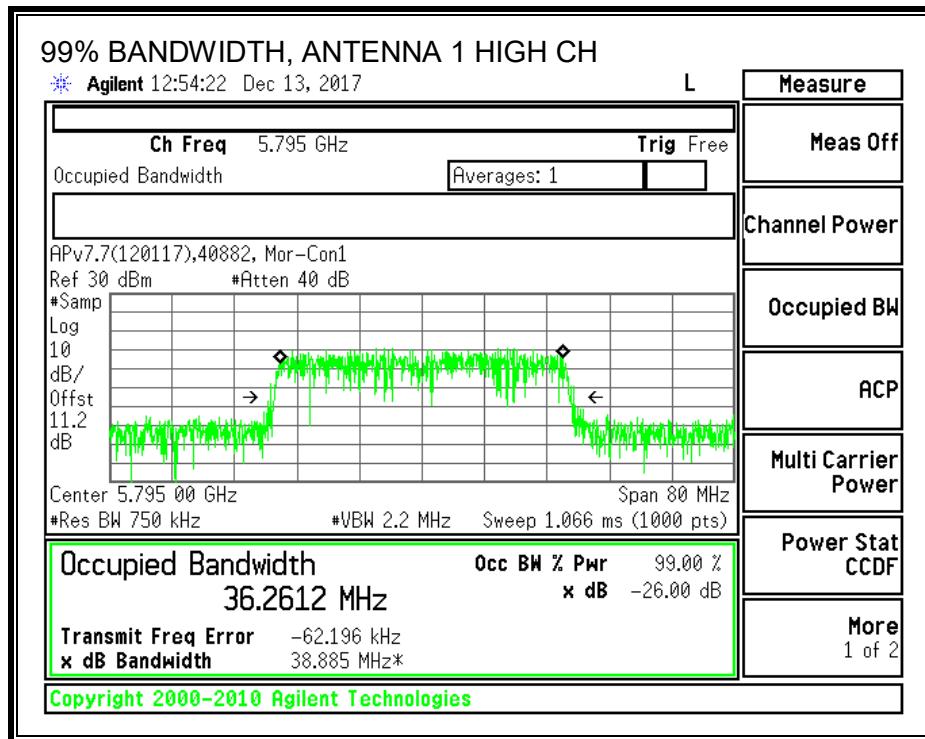
#### 99% BANDWIDTH, ANTENNA 0





## 99% BANDWIDTH, ANTENNA 1





#### 9.15.4. 99% BANDWIDTH - SISO

## LIMITS

None; for reporting purposes only.

## RESULTS

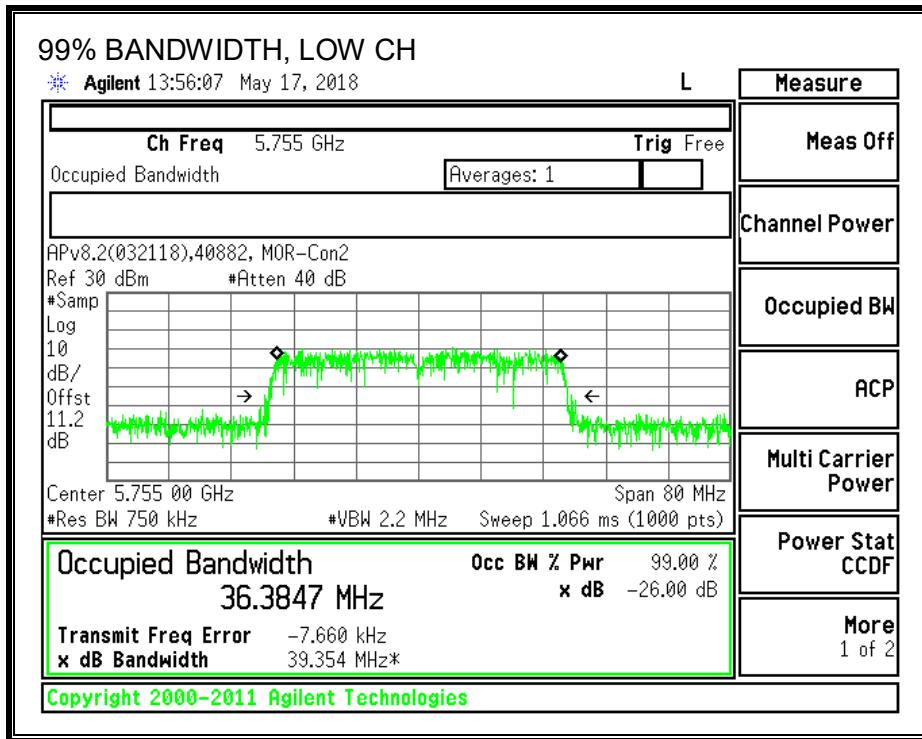
## ANTENNA 0

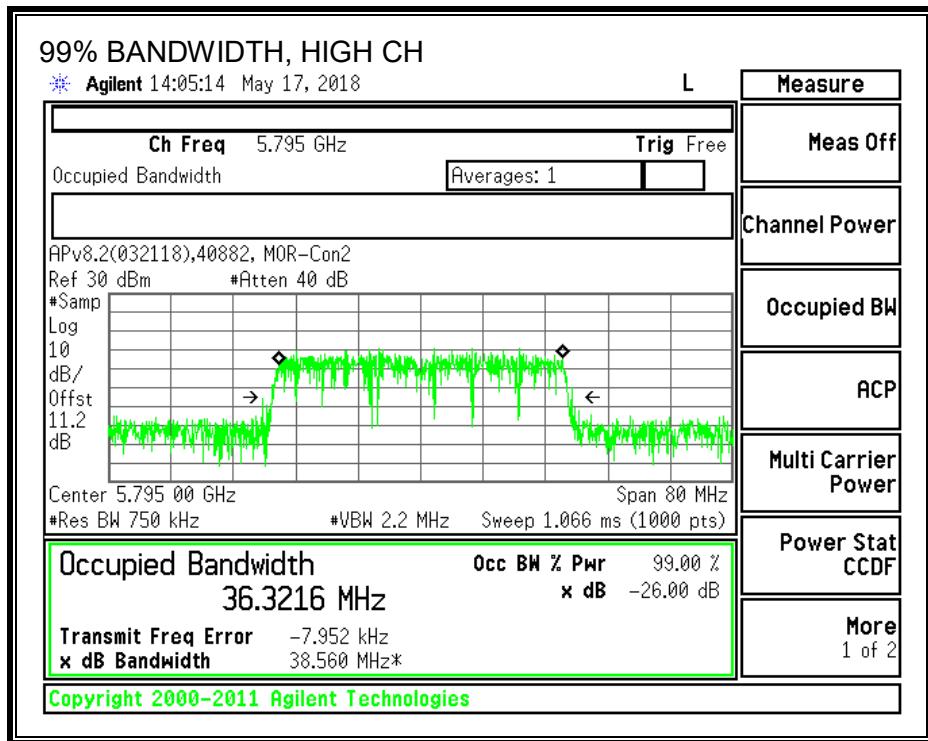
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.3847
High	5795	36.3216

## ANTENNA 1

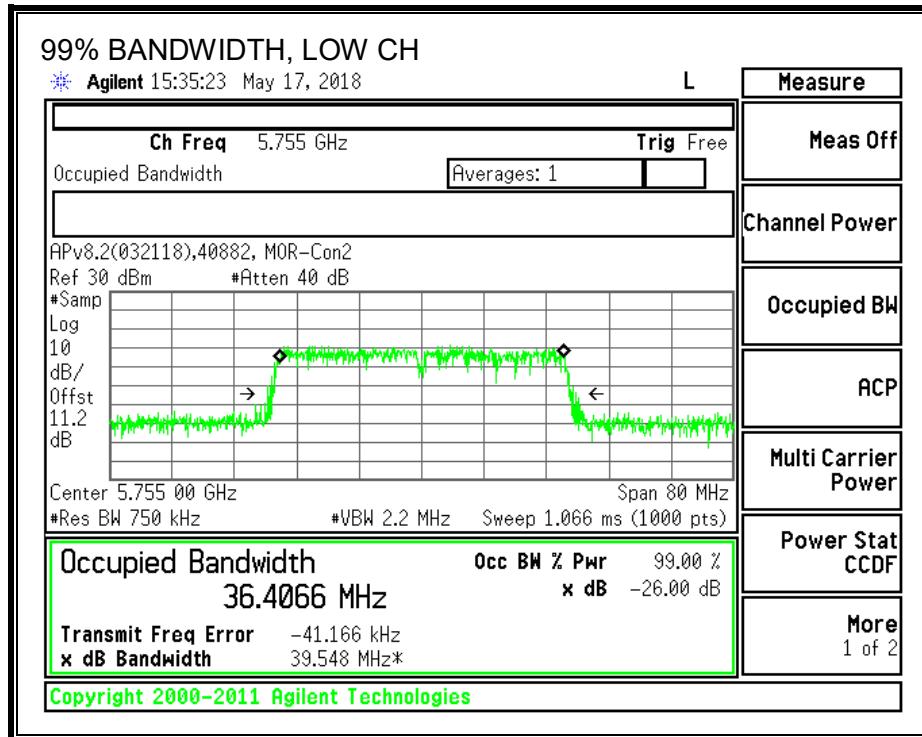
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.4066
High	5795	36.2349

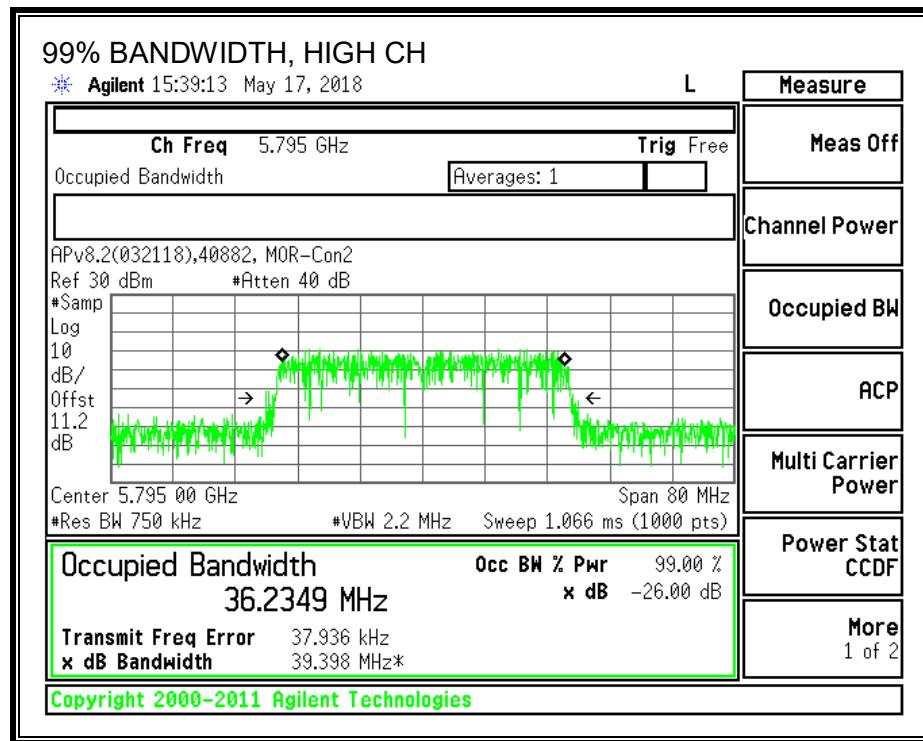
## **99% BANDWIDTH – ANTENNA 0**





### 99% BANDWIDTH – ANTENNA 1





### 9.15.5. OUTPUT POWER - MIMO

#### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 Bi.

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for Power (dBi)
0.60	4.50	2.97

#### RESULTS

##### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	2.97	30.00
High	5795	2.97	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power
--------------------	------	--

##### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	10.41	11.31	13.98	30.00	-16.02
High	5795	10.33	11.29	13.94	30.00	-16.06

## 9.15.6. OUTPUT POWER - SISO

### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

### RESULTS – ANTENNA 0

#### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	0.60	30.00
High	5795	0.60	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	12.91	12.91	30.00	-17.09
High	5795	12.85	12.85	30.00	-17.15

Note – This was a gated measurement.

## **RESULTS – ANTENNA 1**

### **Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	4.50	30.00
High	5795	4.50	30.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd Power</b>
---------------------------	------	---

### **Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	13.80	13.80	30.00	-16.20
High	5795	13.80	13.80	30.00	-16.20

Note – This is a gated measurement.

### 9.15.7. MAXIMUM POWER SPECTRAL DENSITY (PSD) - MIMO

#### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
0.60	4.50	5.78

#### RESULTS

##### Antenna Gain and Limit

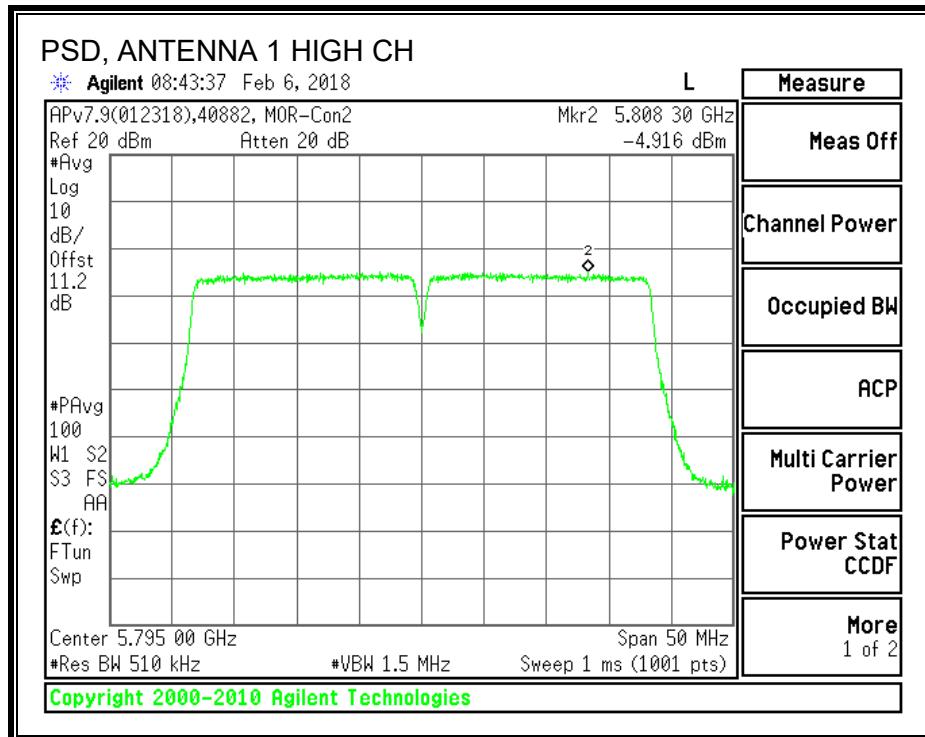
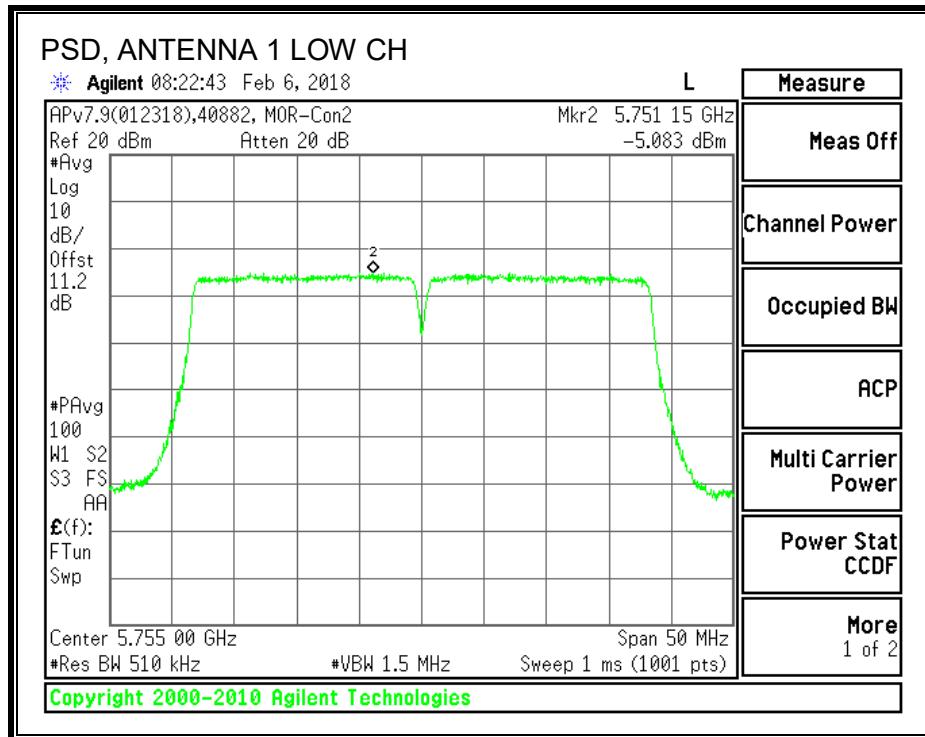
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	5.78	30.00
High	5795	5.78	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD
--------------------	------	--

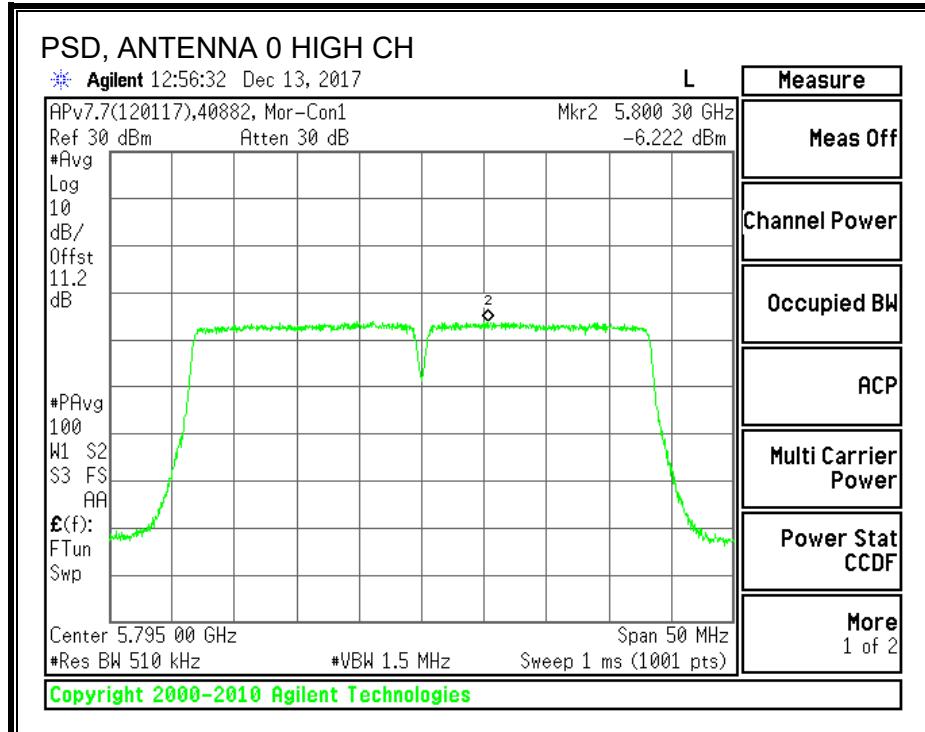
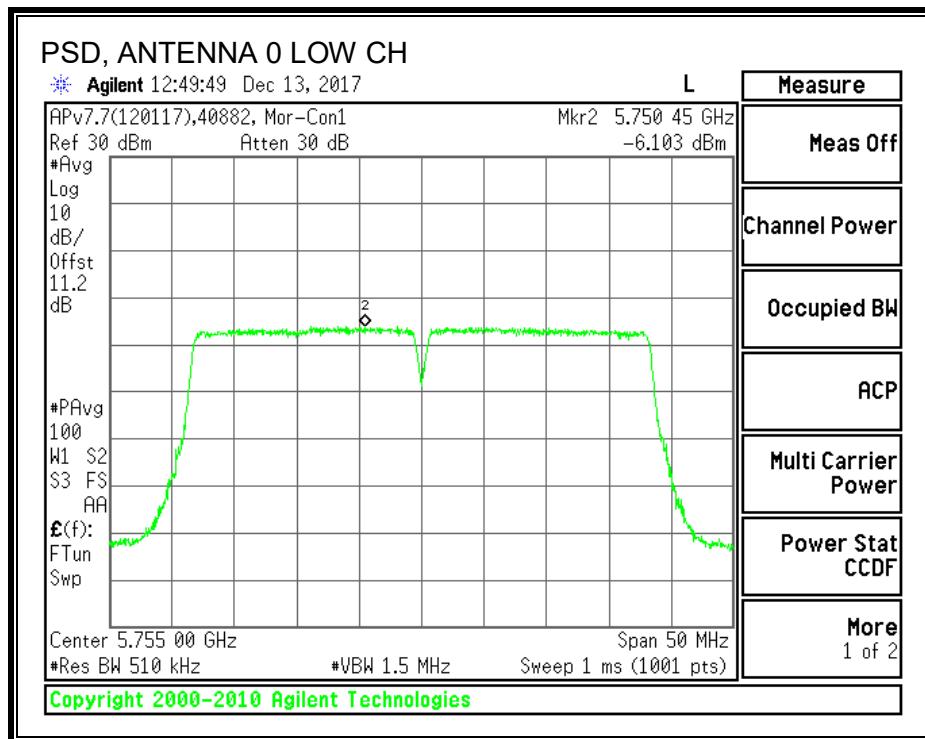
##### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-5.08	-6.10	-2.46	30.00	-32.46
High	5795	-4.92	-6.22	-2.42	30.00	-32.42

## PSD, ANTENNA 1



## PSD, ANTENNA 0



### 9.15.8. MAXIMUM POWER SPECTRAL DENSITY (PSD) - SISO

#### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

#### RESULTS – ANTENNA 0

##### Antenna Gain and Limits

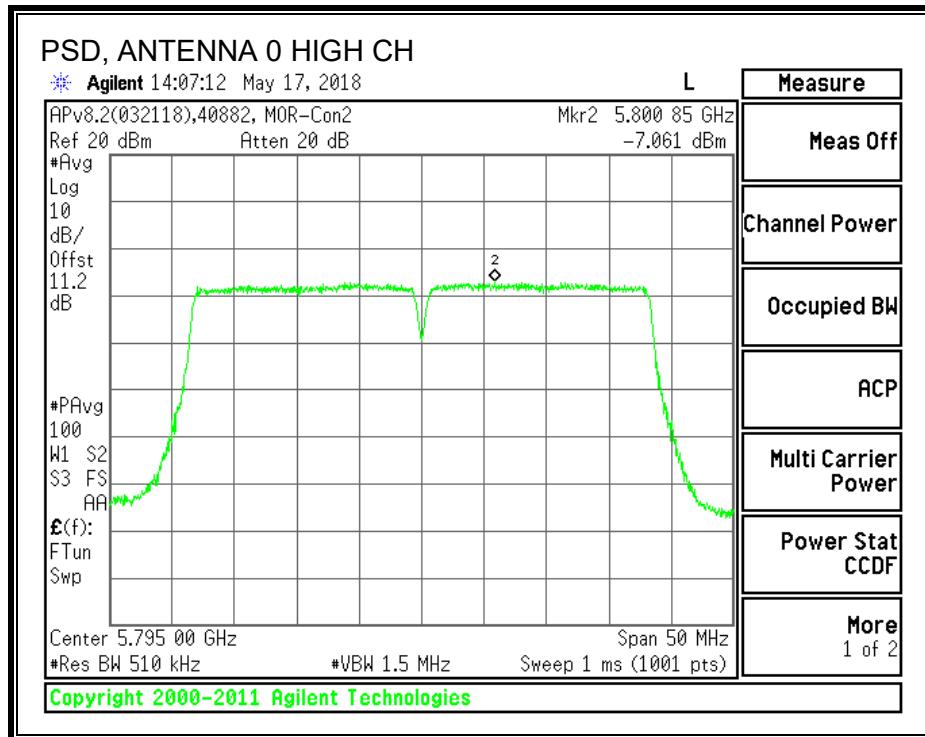
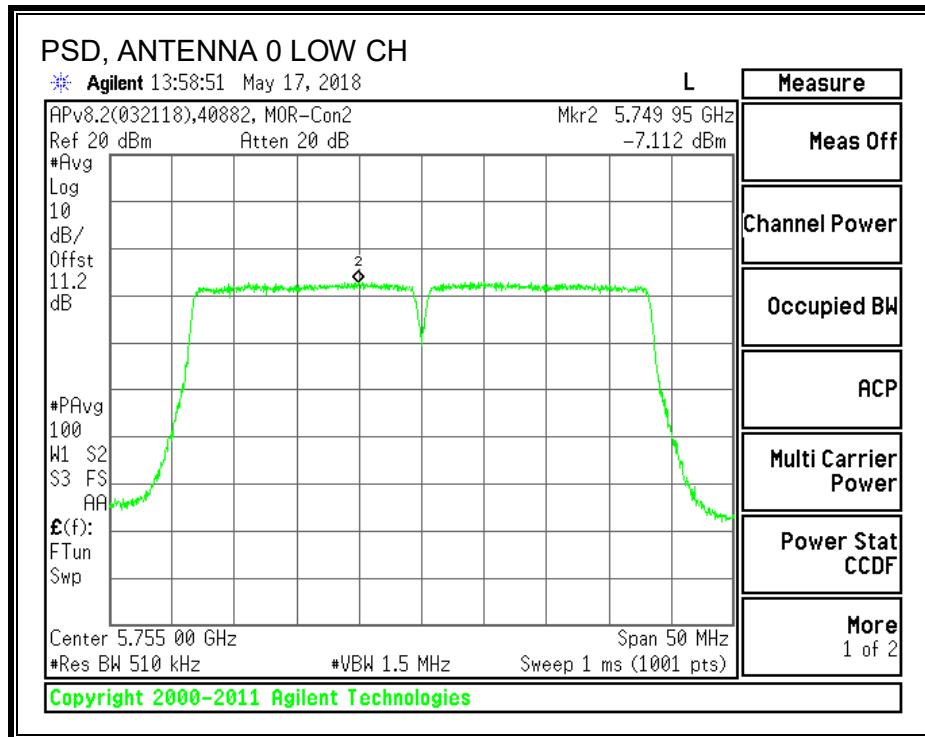
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	0.60	30.00
High	5795	0.60	30.00

Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD
--------------------	------	--

##### PSD Results

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-7.11	-7.02	30.00	-37.02
High	5795	-7.06	-6.97	30.00	-36.97

## PSD, ANTENNA 0



## **RESULTS – ANTENNA 1**

### **Antenna Gain and Limits**

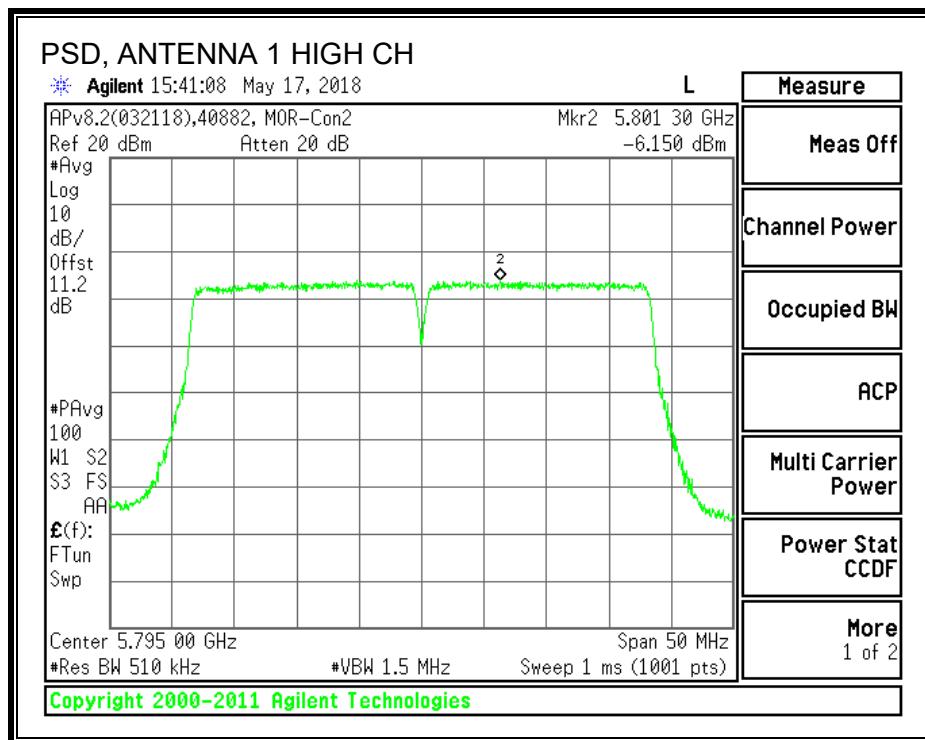
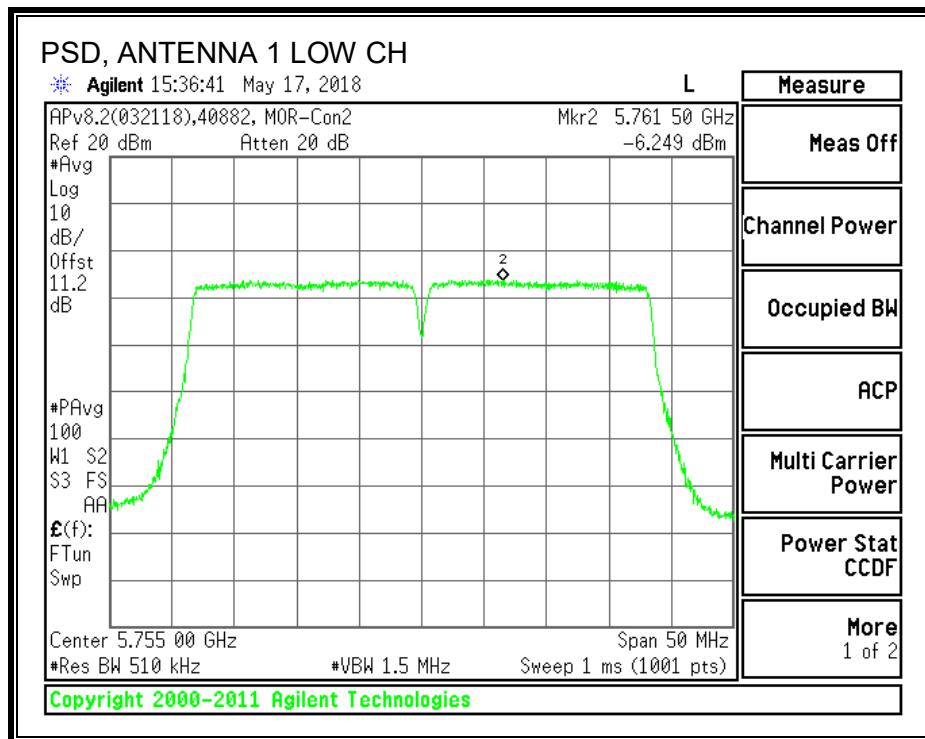
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	4.50	30.00
High	5795	4.50	30.00

<b>Duty Cycle CF (dB)</b>	0.09	<b>Included in Calculations of Corr'd PSD</b>
---------------------------	------	---

### **PSD Results**

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	-6.25	-6.16	30.00	-36.16
High	5795	-6.15	-6.06	30.00	-36.06

## PSD, ANTENNA 1



## 9.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

### 9.16.1. 6 dB BANDWIDTH - MIMO

#### LIMITS

FCC §15.407 (e)

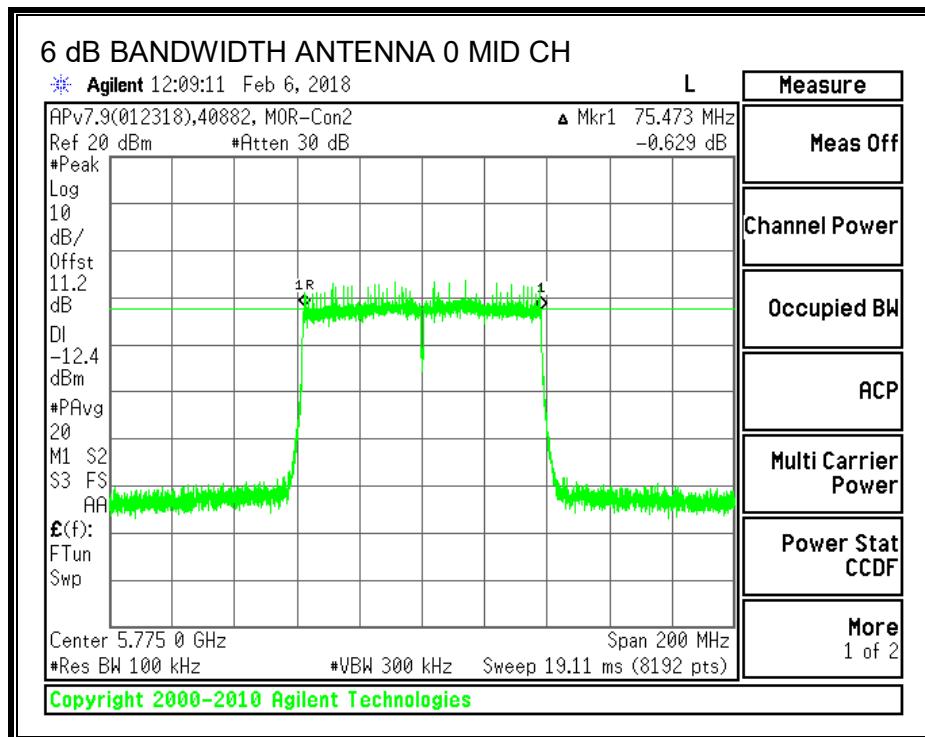
RSS-247 Issue 2 Section 6.2.4.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

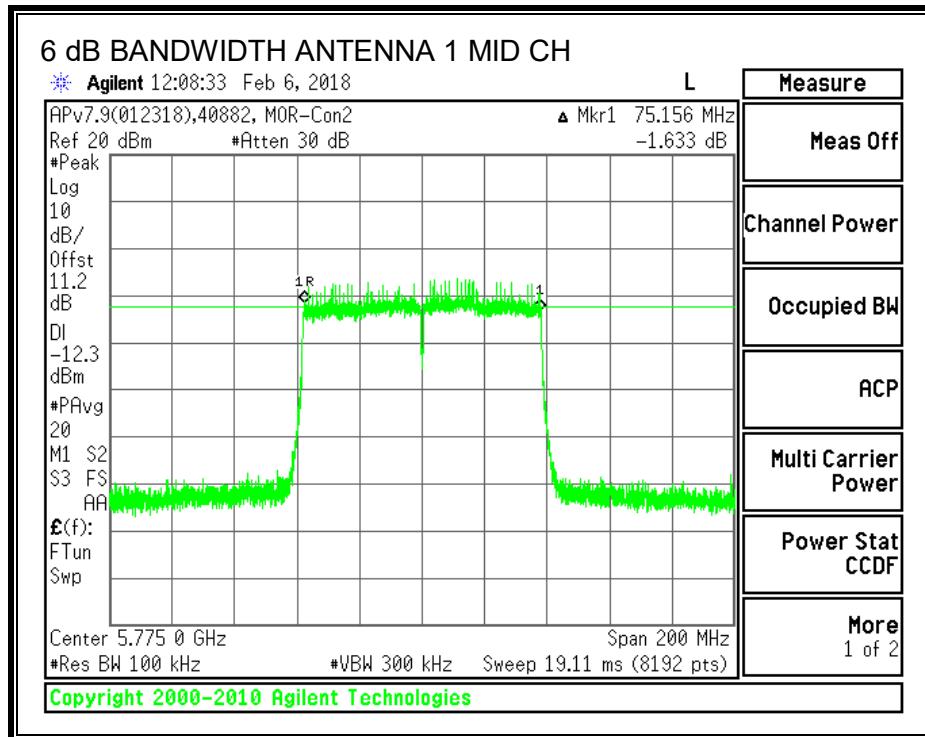
#### RESULTS

Channel	Frequency (MHz)	6 dB BW ANT 0 (MHz)	6 dB BW ANT 1 (MHz)	Minimum Limit (MHz)
Mid	5775	75.4730	75.1560	0.5

#### 6 dB BANDWIDTH, ANTENNA 0



## 6 dB BANDWIDTH, ANTENNA 1



### 9.16.2. 6 dB BANDWIDTH - SISO

#### LIMITS

FCC §15.407 (e)

RSS-247 Issue 2 Section 6.2.4.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RESULTS

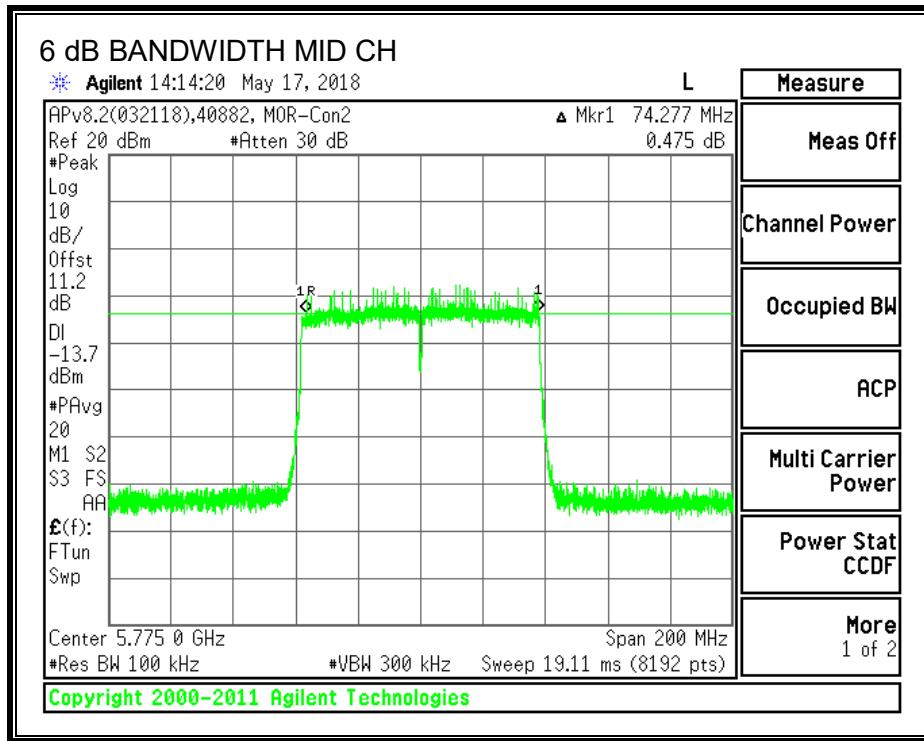
##### ANTENNA 0

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Mid	5775	74.2770	0.5

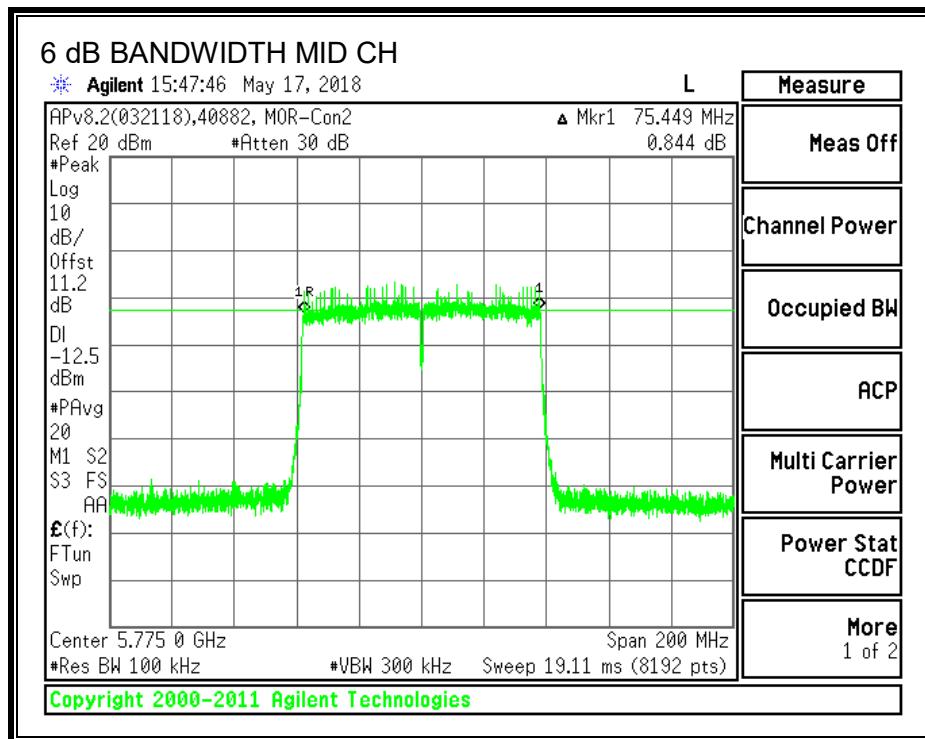
##### ANTENNA 1

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Mid	5775	75.4490	0.5

#### 6 dB BANDWIDTH – ANTENNA 0



## 6 dB BANDWIDTH – ANTENNA 1



### 9.16.3. 99% BANDWIDTH - MIMO

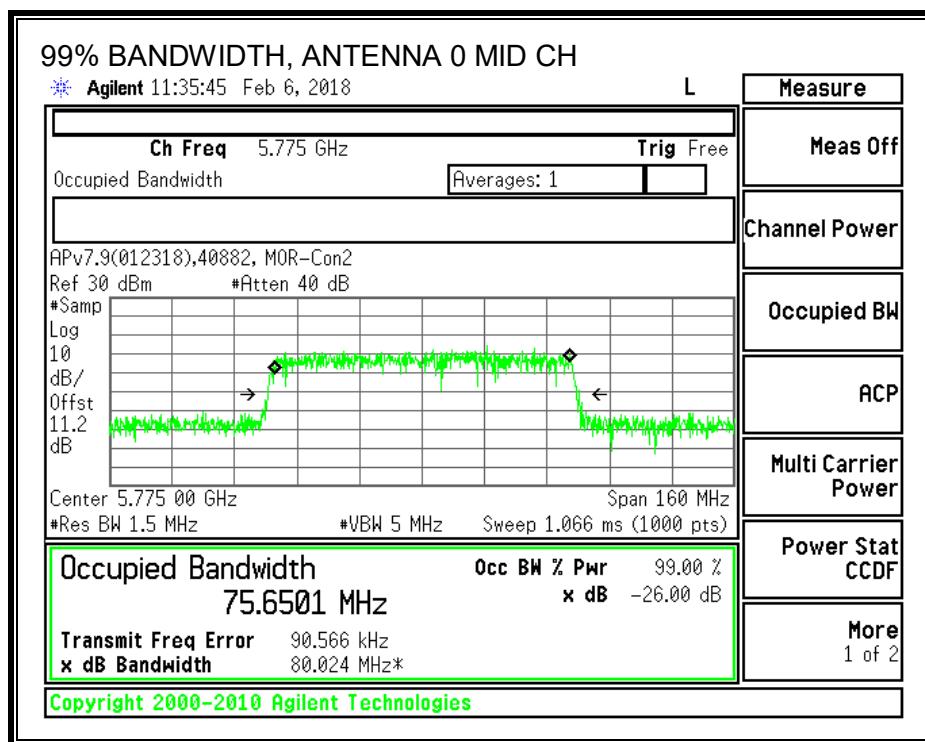
#### LIMITS

None; for reporting purposes only.

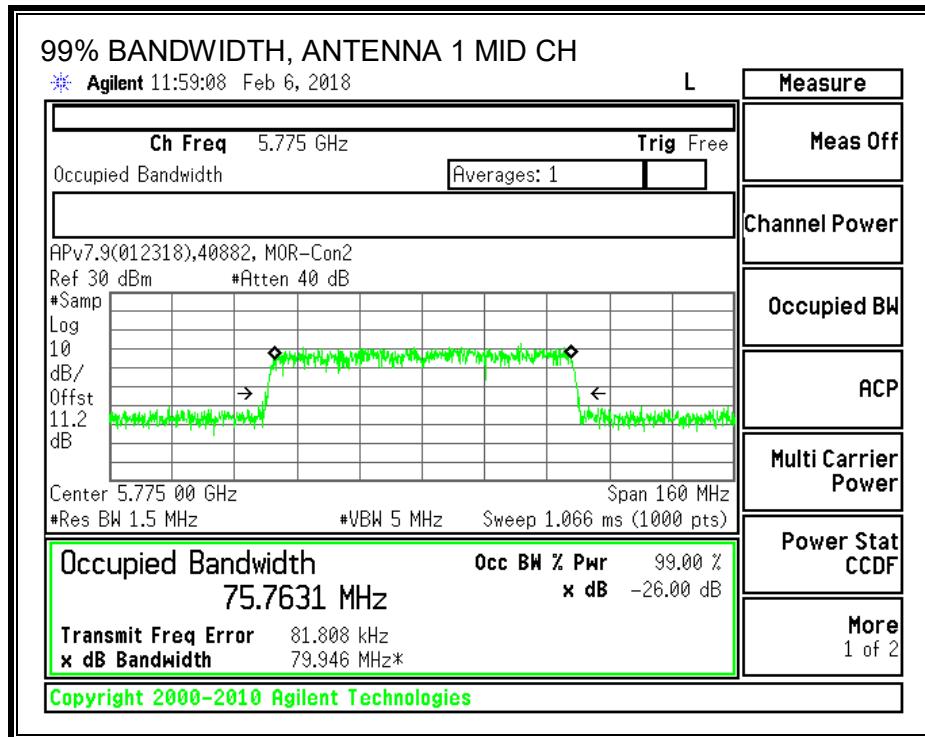
#### RESULTS

Channel	Frequency (MHz)	99% BW ANT 0 (MHz)	99% BW ANT 1 (MHz)
Mid	5775	75.6501	75.7631

#### 99% BANDWIDTH, ANTENNA 0



**99% BANDWIDTH, ANTENNA 1**



#### 9.16.4. 99% BANDWIDTH - SISO

##### LIMITS

None; for reporting purposes only.

##### RESULTS

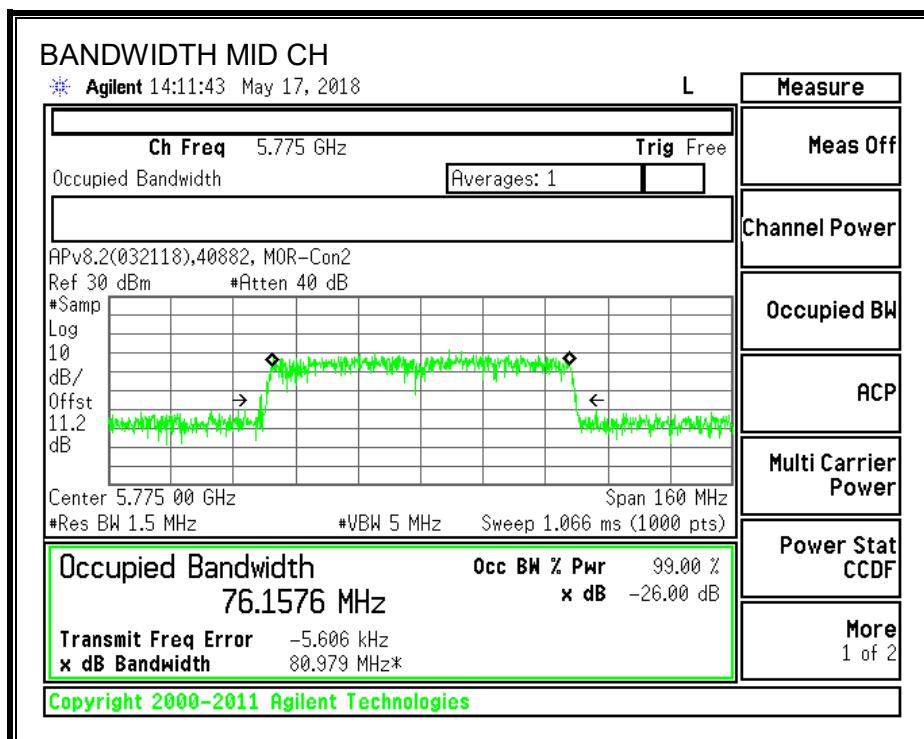
###### ANTENNA 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5775	76.1576

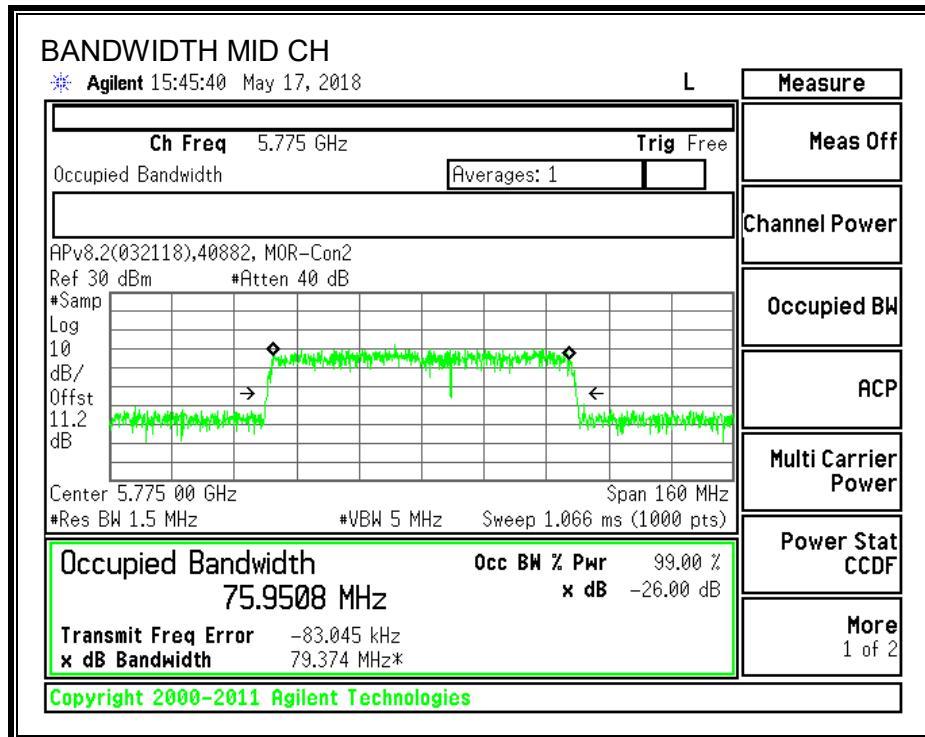
###### ANTENNA 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5775	75.9508

##### 99% BANDWIDTH – ANTENNA 0



## 99% BANDWIDTH – ANTENNA 1



### 9.16.5. OUTPUT POWER - MIMO

#### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Directional Gain for Power (dBi)
0.60	4.50	2.97

#### RESULTS

##### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Mid	5775	2.97	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power
--------------------	------	--

##### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	9.24	10.10	12.89	30.00	-17.11

#### TEST INFORMATION

Date: 2018-04-25

Tester: 46722

## 9.16.6. OUTPUT POWER - SISO

### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

### RESULTS – ANTENNA 0

#### Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Mid	5775	0.60	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power
--------------------	------	--

#### Output Power Results

Channel	Frequency (MHz)	ANT 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	12.60	12.60	30.00	-17.40

Note – This was a gated measurement.

## **RESULTS – ANTENNA 1**

### **Antenna Gain and Limit**

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Mid	5775	4.50	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd Power
--------------------	------	--

### **Output Power Results**

Channel	Frequency (MHz)	ANT 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	13.33	13.33	30.00	-16.67

Note – This was a gated measurement.

### 9.16.7. MAXIMUM POWER SPECTRAL DENSITY (PSD) - MIMO

#### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### DIRECTIONAL ANTENNA GAIN

ANT 0 Antenna Gain (dBi)	ANT 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
0.60	4.50	5.78

#### RESULTS

##### Antenna Gain and Limit

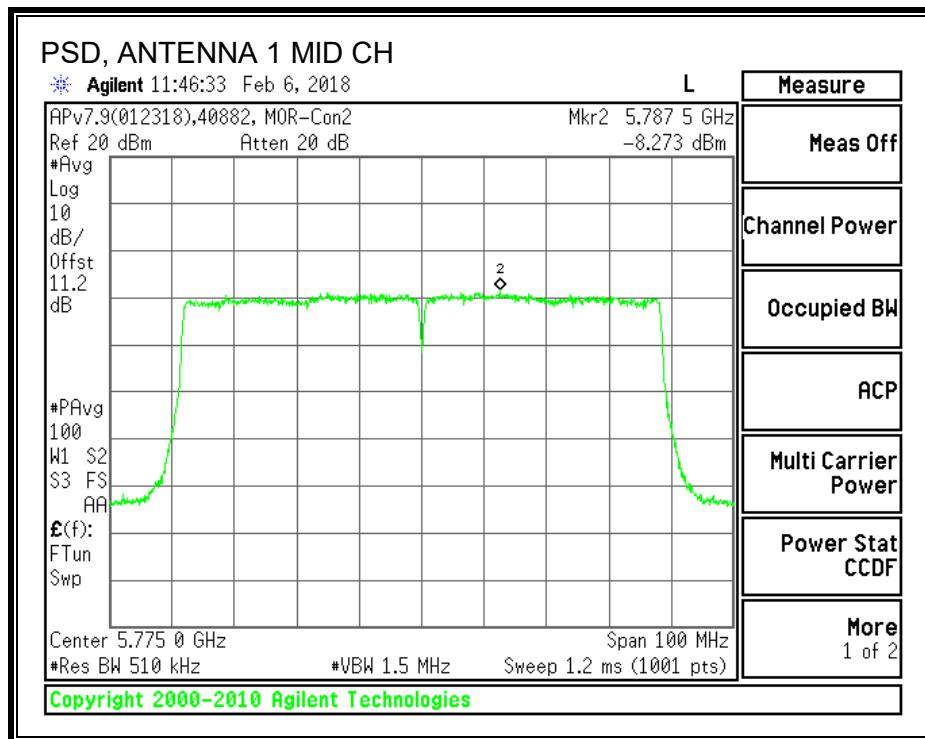
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Mid	5775	5.78	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd PSD
--------------------	------	--

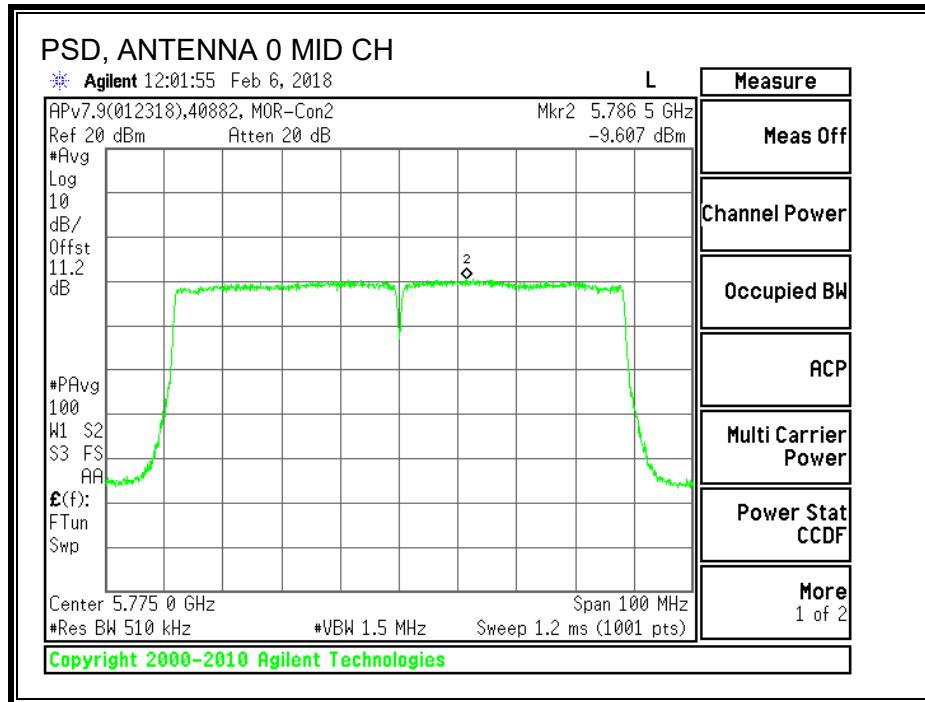
##### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5775	-8.27	-9.61	-5.69	30.00	-35.69

## PSD, ANTENNA 1



## PSD, ANTENNA 0



## 9.16.8. MAXIMUM POWER SPECTRAL DENSITY (PSD) - SISO

### LIMITS

FCC §15.407 (a) (3)

RSS-247 Issue 2 Section 6.2.4.1

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

### RESULTS – ANTENNA 0

#### Antenna Gain and Limits

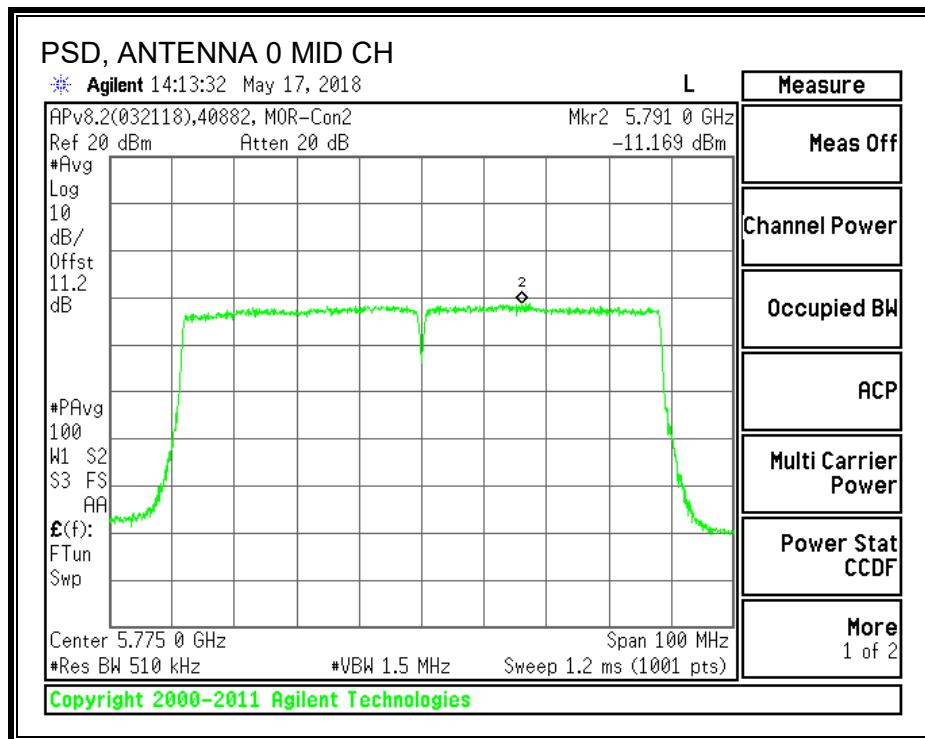
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Mid	5775	0.60	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd PSD
--------------------	------	--

#### PSD Results

Channel	Frequency (MHz)	ANT 0 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5775	-11.17	-10.98	30.00	-40.98

## PSD, ANTENNA 0



## RESULTS – ANTENNA 1

### Antenna Gain and Limits

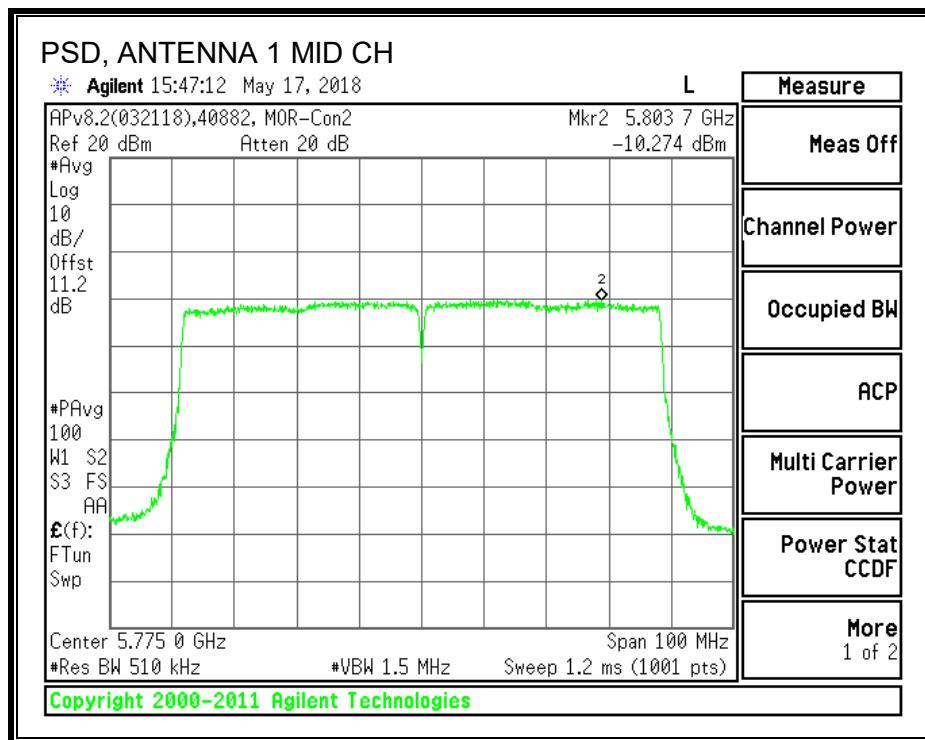
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Mid	5775	4.50	30.00

Duty Cycle CF (dB)	0.19	Included in Calculations of Corr'd PSD
--------------------	------	--

### PSD Results

Channel	Frequency (MHz)	ANT 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Mid	5775	-10.27	-10.08	30.00	-40.08

## PSD, ANTENNA 1



## 10. RADIATED TEST RESULTS

### 10.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

RSS 247 Issue 2 Sections 6.2.1.2(for 5150-5250 MHz band), 6.2.2.2(for 5250-5350 MHz band) 6.2.3.2 (for 5470-5600 MHz and 5650-5725 MHz bands), and 6.2.4.2 (for 5725-5850 MHz band)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For peak measurements above 1 GHz, the resolution bandwidth is set to 1 MHz and the video bandwidth is set to 3 MHz. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was reduced  $VBW = 1/Ton$  for TxBF mode, for all other modes, RMS.

The spectrum from 1 to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. For 9kHz to 1000 MHz and 18 to 26 GHz investigation, the worst-case channel was selected.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Transmit beamforming only supported by 802.11n and 802.11ac modes.

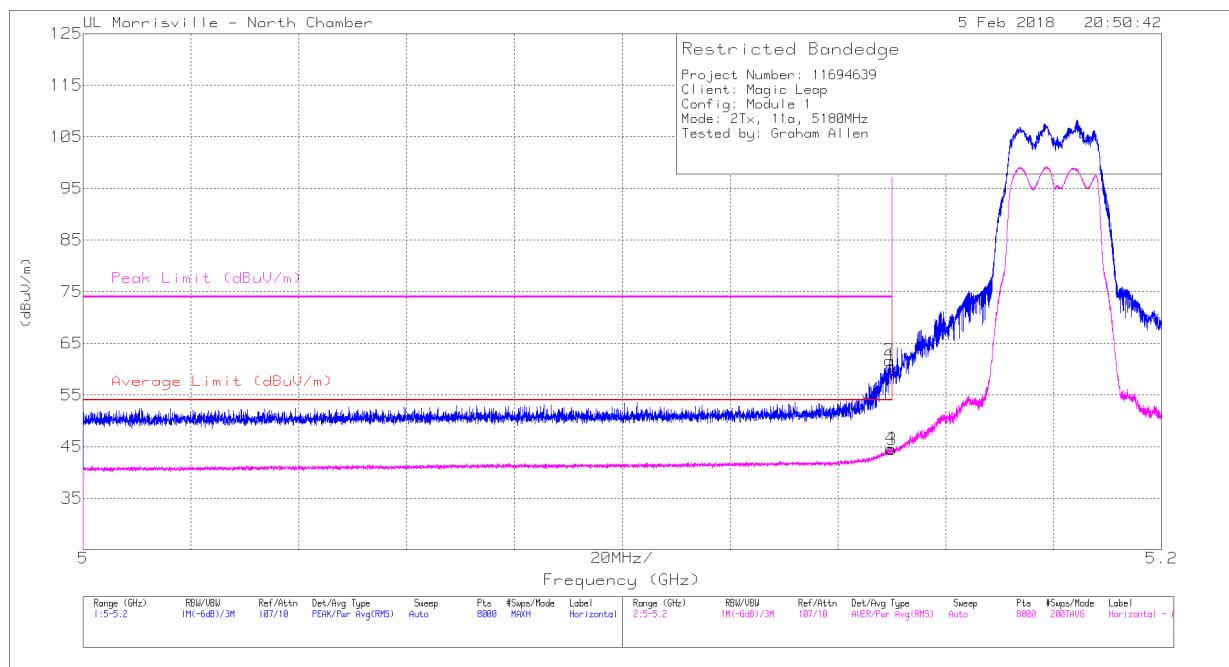
For Transmit Beamforming (TxBF) Radiated Bandedge testing, a companion router was placed on the turn table to lock the beam and radiated bandedge testing was performed.

For TxBF Radiated Spurious Emissions testing, the router was placed on the turn table and spurious emissions was investigated at different  $\theta$ s around the EUT. It was determined that there was  $<3$ dB delta in each position. The router was then placed behind the receiving antenna. Transmit beamforming spot check scans were taken and this showed little to no variation from 802.11n/ac MIMO SDM spurious scans. Therefore, 802.11n/ac MIMO SDM spurious data is used to represent 802.11nHT20/nHT40 and 802.11ac VHT80 transmit beamforming. Note - For transmit beamforming testing 802.11ac VHT20 and VHT40 were tested to cover 802.11n HT20 and HT40.

## 10.2. TRANSMITTER ABOVE 1 GHz – MODULE 1

### 10.2.1. TX ABOVE 1 GHz 802.11a MODE, 5.2 GHz BAND – MODULE 1, MIMO (CDD)

#### RESTRICTED BANDEDGE (LOW CHANNEL) HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 AF (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	48.53	Pk	34.3	-22.3	0	60.53	-	-	74	-13.47	99	107	H
2	* 5.15	49.71	Pk	34.3	-22.3	0	61.71	-	-	74	-12.29	99	107	H
3	* 5.15	32.42	RMS	34.3	-22.3	0.1	44.52	54	-9.48	-	-	99	107	H
4	* 5.15	32.63	RMS	34.3	-22.3	0.1	44.73	54	-9.27	-	-	99	107	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection