

# **CERTIFICATION TEST REPORT**

# **Report Number. :** 11600175-E4V3

- Applicant : MICROSOFT CORP ONE MICROSOFT WAY REDMOND, WA 98052, U.S.A.
  - **Model :** 1796
  - FCC ID : C3K1796
    - **IC** : 3048A-1796
- **EUT Description** : PORTABLE COMPUTING DEVICE
- Test Standard(s) : FCC 47 CFR PART 15 SUBPART E INDUSTRY CANADA RSS - 247 ISSUE 2

Date Of Issue: May 05, 2017

Prepared by:

UL Verification Services Inc. 47173 Benicia Street Fremont, CA 94538, U.S.A. TEL: (510) 771-1000 FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

### **Revision History**

Rev.	Issue Date	Revisions	Revised By
V1	3/14/17	Initial Issue	
V2	5/02/17	<ul> <li>Updated KDB revisions in section 2</li> <li>Updated IC Site code in section 3</li> <li>Updated power in sections 9.9.3 and 9.10.3</li> <li>Updated power/psd in section 9.12.3 for CH 122</li> <li>Updated radiated harmonics in section 10.1.12 for high channel</li> </ul>	C. Susa
V3	5/05/17	<ul> <li>Updated sections 9.13.4, 9.14.4, 9.15.4, 9.16.4 to show straddle channel</li> <li>Updated section 10.1 test procedure description</li> </ul>	C. Susa

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### **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME:	MICROSOFT CORP ONE MICROSOFT WAY REDMOND, WA 98052, U.S.A.
EUT DESCRIPTION:	PORTABLE COMPUTING DEVICE
MODEL:	1796
SERIAL NUMBER:	035885670353 (Conducted); 035828270353 (Radiated)
DATE TESTED:	March 2 <sup>nd</sup> 2017 – May 2 <sup>nd</sup> 2017

APPLICABLE STANDARDS		
STANDARD	TEST RESULTS	
CFR 47 Part 15 Subpart E	Pass	
INDUSTRY CANADA RSS-247 Issue 2	Pass	
INDUSTRY CANADA RSS-GEN Issue 4	Pass	

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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, any agency of the Federal Government, or any agency of the U.S. government.

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 14-30, FCC KDB 662911 D01 v02r01, FCC KDB 905462 D02 v02/D03 v01r02/D06 v02, FCC KDB 789033 D02 v01r03, FCC KDB 644545 D03 v01, ANSI C63.10-2013, RSS-GEN Issue 4, and RSS-247 Issue 2.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	
🛛 Chamber A	Chamber D	
Chamber B	Chamber E	
Chamber C	Chamber F	
	Chamber G	
	Chamber H	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under Industry Canada company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://ts.nist.gov/standards/scopes/2000650.htm</u>.

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# 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB - 26.9 dB = 28.9 dBuV/m

# 4.3. MEASUREMENT UNCERTAINTY

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

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

Parameter	Uncertainty
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

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

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# 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a handheld computing device with 802.11 2x2, a/b/g/n/ac WLAN, Bluetooth, Bluetooth LE.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

### 5.2 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)	
2TX				
5180 - 5240	802.11a	13.23	21.04	
5180 - 5240	802.11n HT20	13.21	20.94	
5190 - 5230	802.11n HT40	12.52	17.86	
5210	802.11ac VHT80	9.43	8.77	

### 5.3 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)	
2ТХ				
5260 - 5320	802.11a	16.74	47.21	
5260 - 5320	802.11n HT20	16.76	47.42	
5270 - 5310	802.11n HT40	13.66	23.23	
5290	802.11ac VHT80	9.78	9.51	

### 5.6 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)	
2TX				
5500 - 5700	802.11a	16.84	48.31	
5500 - 5700	802.11n HT20	17.02	50.35	
5510 - 5670	802.11n HT40	15.97	39.54	
5530 - 5610	802.11ac VHT80	13.03	20.09	

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### 5.8 GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2TX			
5745 - 5825	802.11a	16.91	49.09
5745 - 5825	802.11n HT20	17.01	50.23
5755 - 5795	802.11n HT40	13.86	24.32
5775	802.11ac VHT80	10.21	10.50

### STRADDLE CHANNELS

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)					
2TX (Channels overlapping UNII-2C and UNII-3)								
5720 (Whole Fundamental)	802.11a	14.28	26.79					
5720 (Whole Fundamental)	802.11n HT20	14.45	27.86					
5710 (Whole Fundamental)	802.11n HT40	14.02	25.23					
5690 (Whole Fundamental)	802.11ac VHT80	10.56	11.38					

### List of test reduction

Antenna Port Testing							
Band	Mode	Covered by					
5 GHz band	802.11a 1TX	802.11a 2TX					
5 GHz band	802.11n HT20 1TX	802.11n HT20 2TX					
5 GHz band	802.11n HT40 1TX	802.11n HT40 2TX					
5 GHz band	802.11ac VHT 80 1TX	802.11ac VHT 80 2TX					

Note: 802.11n VHT20 and VHT40 modes are leveraged from 802.11n HT20 and HT40.

# 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integrated antenna, with a maximum gain as follows:

Frequency Band	Antenna Gain (dBi)			
(GHz)	Chain 0 (A)	Chain 1 (B)		
5.2	2.10	3.00		
5.3	1.20	2.80		
5.5	0.90	3.60		
5.8	1.30	3.60		

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### 5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 14.2.201.157

The test utility software used during testing was WiFi tool v2.7.6.

### 5.5. WORST-CASE CONFIGURATION AND MODE

For below 1GHz radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X/Y/Z, it was determined that Y orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Y orientation.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps 802.11n HT20 mode: MCS0 802.11n HT40 mode: MCS0 802.11ac VHT80 mode: MCS0

802.11ac VHT20 and VHT40 mode are different from 802.11nHT20 and HT40 only in control messages and have the same power settings.

For MIMO modes, the 2TX emission testing was considered as a worst case scenario and was performed at power levels, per transmit chain, greater than or equal to the maximum power in any 1TX mode.

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# 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List							
Description Manufacturer Model Serial Number FCC ID							
Laptop AC/DC adapter	Lenovo	ADLX45NCC2A	11S36200281ZZ20059W0H5	NA			
Laptop	Lenovo	11e	LR-04N7BL	NA			
USB-Internet Adapter	linksys	USB3GIGV1	15710S08406242	NA			

### I/O CABLES

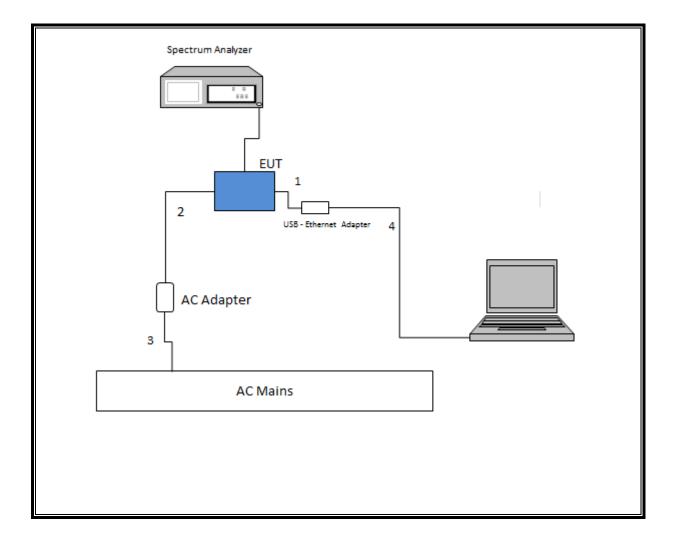
	I/O Cable List								
Cable	Port	# of identical	Connector	Cable Type	Cable	Remarks			
No		ports	Туре		Length (m)				
1	USB	1	USB	Un-Shielded	0.17				
2	DC	1	Proprietary	Un-Shielded	1.75				
3	AC	1	2-prong	Un-Shielded	0.5				
4	Ethernet	1	RJ45	Un-Shielded	2				

### TEST SETUP

The EUT was tested connected to a host Laptop via RJ45/USB cable for antenna port and AC tests. Radiated tests were performed with EUT connected to AC adapter and remote laptop. Test software exercised the radio card.

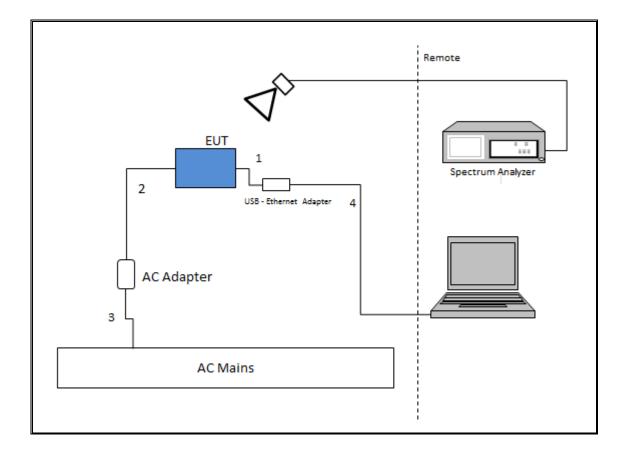
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### SETUP DIAGRAM FOR ANTENNA PORT CONDUCTED TESTS



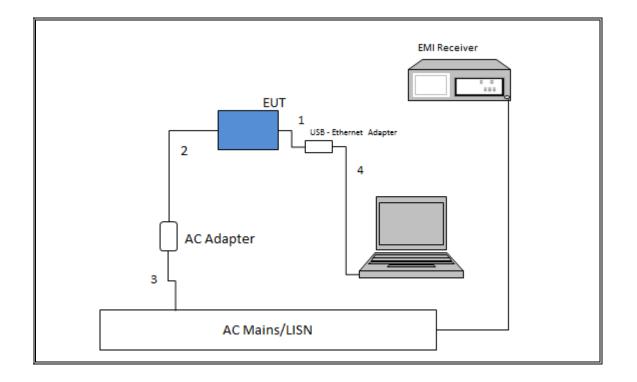
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### SETUP DIAGRAM FOR RADIATED TESTS



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### SETUP DIAGRAM FOR ACLINE CONDUCTED TESTS



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# 6. TEST AND MEASUREMENT EQUIPMENT

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

	TEST EQUIPMENT LIST									
Description	Manufacturer	Model	Asset	Cal Due						
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences Corp.	JB3	T408	11/10/17						
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T345	03/30/17						
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T711	01/30/18						
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	T482	2/15/2018						
High Pass Filter 6GHz	Micro-Tronics	HPS17542	T483	2/15/2018						
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	T481	8/1/2017						
High Pass Filter 6GHz	Micro-Tronics	HPS17542	T484	8/1/2017						
RF Preamplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S- 42	T493	02/15/18						
RF Preamplifier, 1 - 8GHz	Miteq	AMF-4D-01000800-30- 29P	T1156	02/15/18						
RF Preamplifier, 1 - 18GHz	Miteq	AFS42-00101800-25-S- 42	T1165	08/01/17						
RF Preamplifier, 1 - 7GHz	Amplical	AMP1G6-10-27	T1370	04/15/17						
RF Preamplifier, 10kHz - 1GHz	Sonoma	310N	T15	08/26/17						
Spectrum Analyzer	Agilent (Keysight) Technologies	E4440A	T199	7/22/17						
Spectrum Analyzer	Keysight	N9030A	T905	01/11/18						
Spectrum Analyzer	Keysight	N9030A	T908	04/13/17						
Spectrum Analyzer	Keysight	N9030A	T907	01/23/18						
LISN	Fischer Custom Communications	FCC-LISN-50/250-25-2- 01	T1310	6/8/2017						
EMI Receiver	Rohde & Schwarz	ESR	T1436	1/6/2018						
Antenna, Horn, 18-26 GHz	ARA	MWH-1826/B	T449	05/26/17						
RF Preamplifier, 1 - 26GHz	Agilent	8449B	T404	07/05/17						
Spectrum Analyzer	HP	8564E	T106	09/07/17						
RF Preamplifier, 26 - 40GHz	Miteq	NSP4000-SP2	T88	04/07/17						
Antenna, Horn, 26-40 GHz	ARA	MWH-2640/B	T446	05/26/17						
Power Meter	Keysight	N1911A	T229	7/28/17						
Power Sensor	Keysight	N1921A	T413	6/20/17						

Test Software List						
Description Manufacturer Model Version						
Radiated Software	UL	UL EMC	9.5, 4/26/16			
Antenna Port Software	UL	UL RF	6.1, 3/1/17			
Conducted Emissions Software	UL	UL EMC	9.5, 5/26/15			

# 7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v01r03, Section B.

26 dB Emission BW: KDB 789033 D02 v01r03, Section C.

99% Occupied BW: KDB 789033 D02 v01r03, Section D.

<u>Conducted Output Power</u>: KDB 789033 D02 v01r03, Section E.3.b (Method PM-G) and KDB 789033 D02 v01r03, Section E.2.b (Method SA-1)

Power Spectral Density: KDB 789033 D02 v01r03, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v01r03, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r03, Sections G.3, G.4, and G.5.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

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# 8. ON TIME, DUTY CYCLE

### LIMITS

None; for reporting purposes only.

### PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

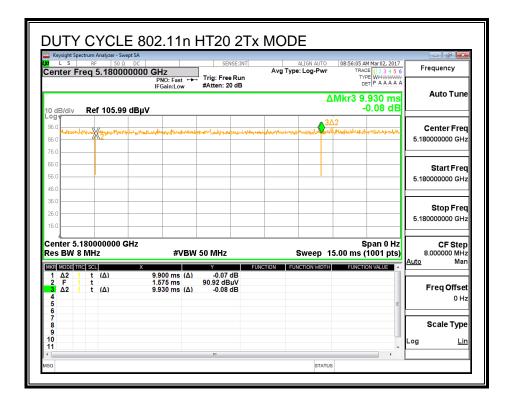
#### **RESULTS**

Mode	<b>ON</b> Time	Period Duty Cycle		Duty	Duty Cycle	1/T	
	В		x	Cycle	<b>Correction Factor</b>	Minimum VBW	
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)	
802.11a 2Tx	3.150	3.170	0.994	99.4%	0.00	0.010	
802.11n HT20 2Tx	9.900	9.930	0.997	99.7%	0.00	0.010	
802.11n HT40 2Tx	4.770	4.810	0.992	99.2%	0.00	0.010	
802.11ac HT80 2Tx	2.238	2.259	0.991	99.1%	0.00	0.010	

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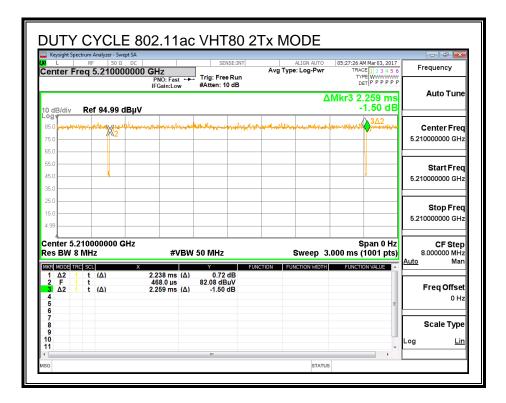
### **DUTY CYCLE PLOTS**

Keysight Spectr	rum Analyzer - Swept SA					- đ <del>- X</del>
enter Fre	RF 50 Ω DC		SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	06:08:49 AM Mar 02, 2017 TRACE 1 2 3 4 5 6	Frequency
ontoi i i o	9 5. 1000000	PNO: Fast +	Trig: Free Run #Atten: 10 dB		DET P P P P P	
		IFGam:Low	#Atten: 10 db		Mkr3 3.170 ms	Auto Tune
0 dB/div	Ref 106.99 dB	λuV		-	-1.14 dB	
			an in smaller descellant and	Helmanned al mark that we		<u> </u>
97.0	2	And international Institution	No. of Concession, State State State of State	Stor Magness in our Alexandria to all Name	M. I. South and the state of the second s	Center Freq
87.0				+ + +	I	5.18000000 GHz
77.0					I	
57.0						Start Freq
57.0					I'	5.180000000 GHz
47.0	<b>_</b>				I	
37.0				_	I'	Stop From
27.0						Stop Freq 5,18000000 GHz
17.0					I'	5.18000000 GH2
antor 5 19	30000000 GHz	-			Span 0 Hz	05.04+*
enter 5.1a			W 50 MHz	Sweep 5	5,000 ms (1001 pts)	CF Step 8.000000 MHz
KR MODE TRC	SCI	x	Y F	UNCTION FUNCTION WIDTH	· · · ·	<u>Auto</u> Man
1 Δ2 1	t (Δ)	3.150 ms (Δ)	-0.11 dB	Henon - Honorion - Honorion		
2 F 1 3 Δ2 1	t t (Δ)	740.0 μs 3.170 ms (Δ)	98.45 dBµV -1.14 dB			Freq Offset
4 5					=	0 Hz
6						
8						Scale Type
9						
						Log <u>Lin</u>
7 8						Scale



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LS	Im Analyzer - Swept SA RF 50 Ω DC <b>q 5.1900000</b>	с		SENSE:INT	Avg	ALIGN AUTO Type: Log-Pwr	TRAC	Mar02, 2017 E 1 2 3 4 5 6 E W	Fre	quency
		IFGain:Lov		#Atten: 20 dB		Δ	Mkr3 4	810 ms	4	Auto Tune
og	Ref -11.00 dBi		helmen	dynyldhannad diwystadaya	riensethelmhylyrae	ntodayayathattaan	/▲ 3∆2		Ce	enter Freq 000000 GHz
i1.0 i1.0 i1.0										Start Fred
11.0 11.0 101										Stop Fred
enter 5.19 es BW 8 M			/BW	50 MHz	FUNCTION	Sweep 1	0.00 ms (	pan 0 Hz 1001 pts) NVALUE		CF Step 000000 MHz Mar
2 F 1 3 Δ2 1 4 5	t (Δ) t t (Δ)	4.770 ms 3.360 ms 4.810 ms		-1.52 dB -23.37 dBm -1.62 dB				E	F	req Offsei 0 Hz
6 7 8 9									s	cale Type
10									Log	Lin



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# 9. ANTENNA PORT TEST RESULTS

# 9.1. 11a 2TX MODE IN THE 5.2GHz BAND

### 9.1.1. 26 dB BANDWIDTH

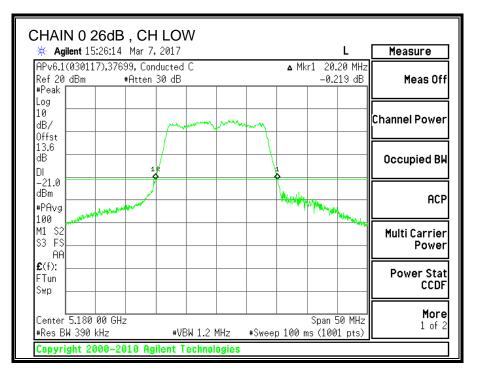
### LIMITS

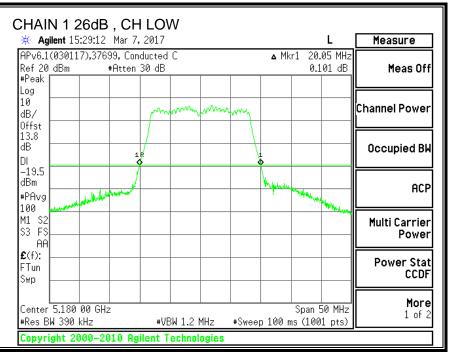
None; for reporting purposes only.

### **RESULTS**

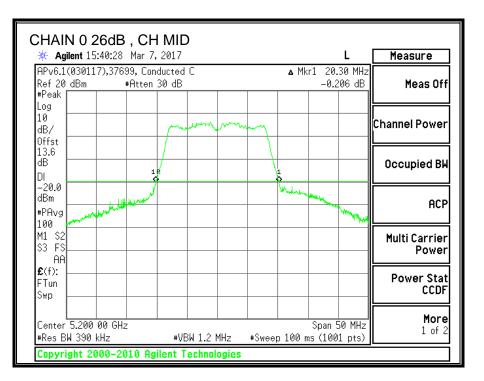
Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)	
Low	5180	20.2	20.05	
Mid	5200	20.3	20.05	
High	5240	20.4	20	

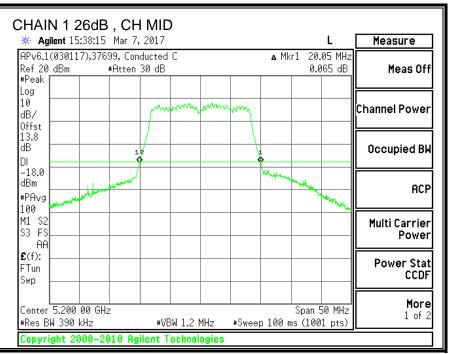
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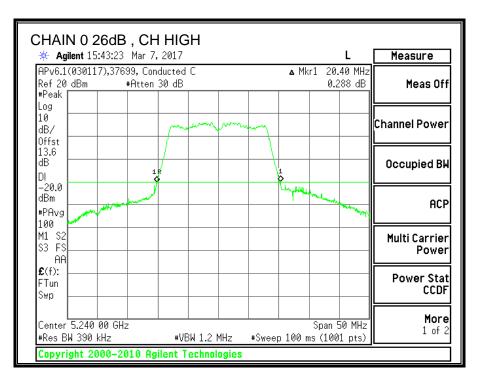
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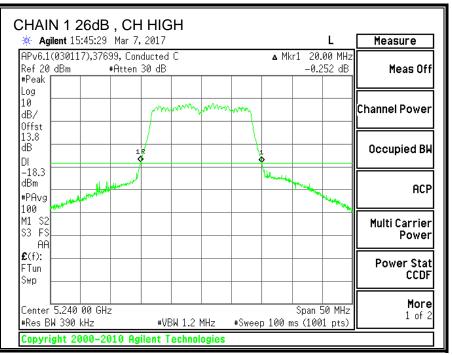




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### 9.1.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

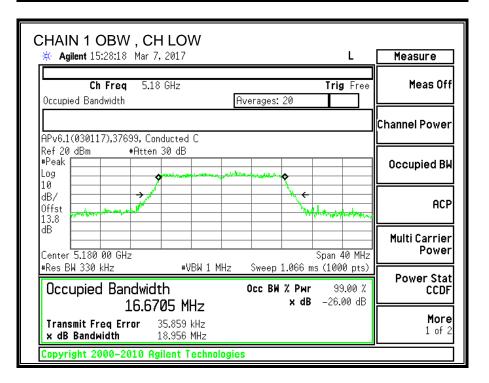
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5180	16.72	16.671
Mid	5200	16.618	16.576
High	5240	16.697	16.572

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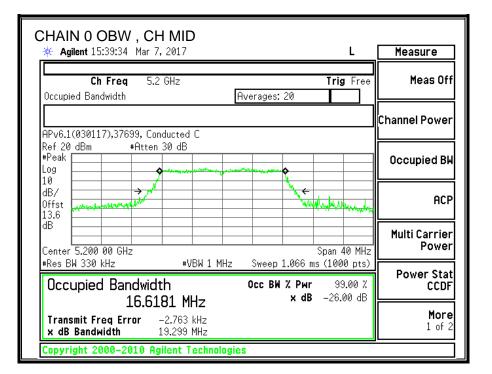
CHAIN 0 OBW , CH LOW	L Measure					
Ch Freq 5.18 GHz Occupied Bandwidth Averages: 20	Trig Free Meas Off					
APv6.1(030117),37699, Conducted C	Channel Power					
Ref 20 dBm #Atten 30 dB #Peak Log	Occupied BW					
10 dB/ 0ffst 13.6	ACP					
dB	Span 40 MHz					
*Res BW 330 kHz         *VBW 1 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Осс ВИ % Рыг         99.00 %         CCDF           16.7200 MHz         × dB         -26.00 dB						
ITransmit Freq Error     4.964 kHz       x dB Bandwidth     19.628 MHz	More 1 of 2					
Copyright 2000–2010 Agilent Technologies						

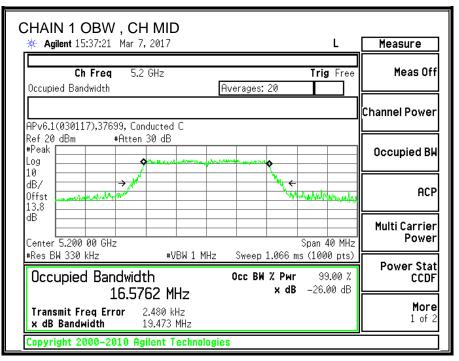


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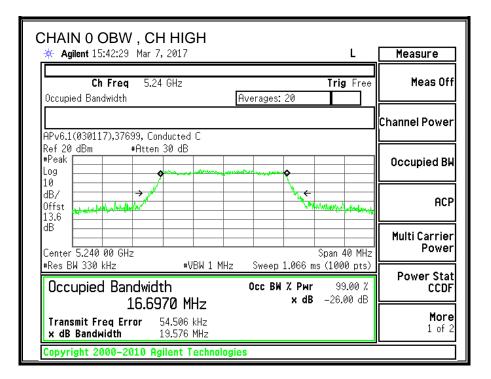
DATE: May 05, 2017

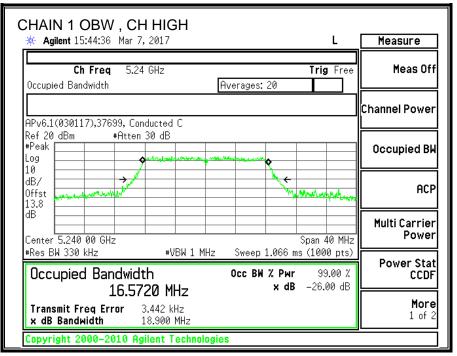
IC: 3048A-1796





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### 9.1.3. OUTPUT POWER AND PPSD

### LIMITS

FCC §15.407 (a) (1)

(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.

IC RSS-247 6.2.1(1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
2.10	3.00	2.57	5.57

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### **RESULTS**

ID: 50818 JQ Date: 3/9/1
--------------------------

### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	<b>99%</b>	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5180	20.05	16.67	2.57	5.57
Mid	5200	20.05	16.58	2.57	5.57
High	5240	20.00	16.57	2.57	5.57

#### Limits

Channel	Frequency	FCC	IC	Max	Power	FCC	IC	PPSD
		Power	EIRP	IC	Limit	PPSD	eirp	Limit
		Limit	Limit	Power		Limit	PSD	
							Limit	
	(MHz)	(dBm)						
Low	5180	24.00	22.22	19.65	19.65	11.00	10.00	4.43
Mid	5200	24.00	22.19	19.62	19.62	11.00	10.00	4.43
High	5240	24.00	22.19	19.62	19.62	11.00	10.00	4.43

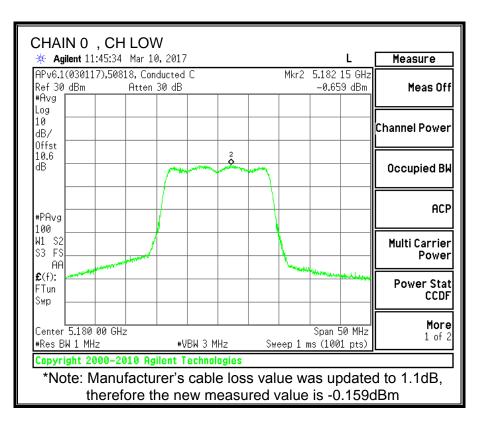
#### **Output Power Results**

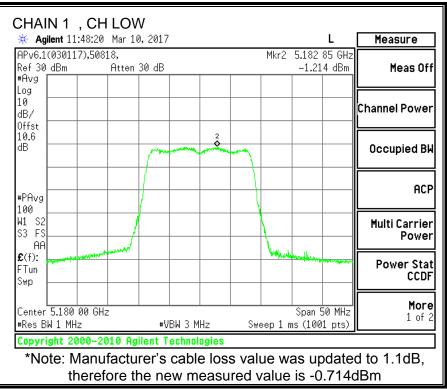
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	10.33	9.91	13.14	19.65	-6.51
Mid	5200	10.06	9.87	12.98	19.62	-6.65
High	5240	10.62	9.78	13.23	19.62	-6.39

#### **PPSD** Results

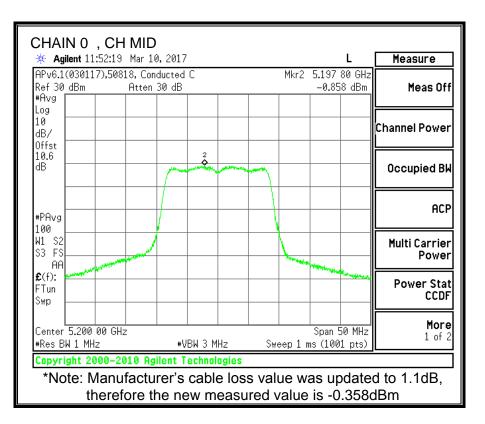
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	-0.16	-0.71	2.58	4.43	-1.85
Mid	5200	-0.36	-0.95	2.37	4.43	-2.06
High	5240	-0.55	-0.74	2.37	4.43	-2.06

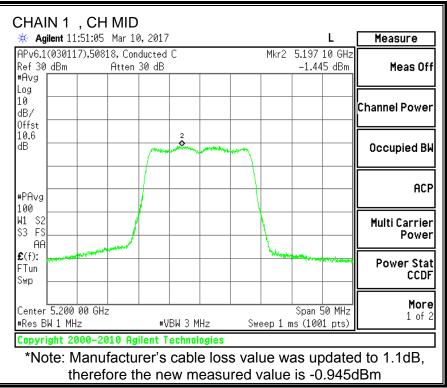
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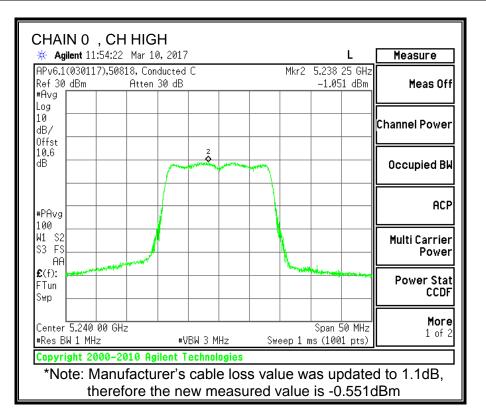


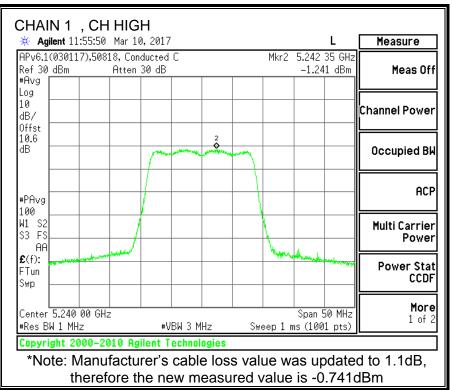
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# 9.2. 11n HT20 2TX MODE IN THE 5.2GHz BAND

### 9.2.1. 26 dB BANDWIDTH

### LIMITS

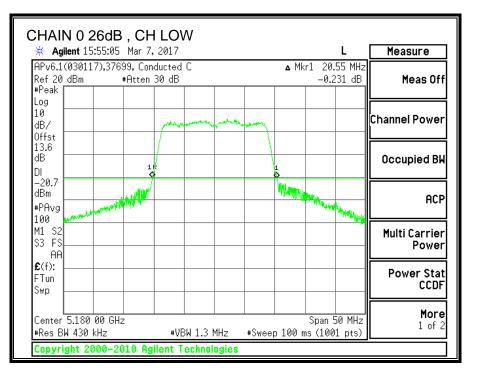
None; for reporting purposes only.

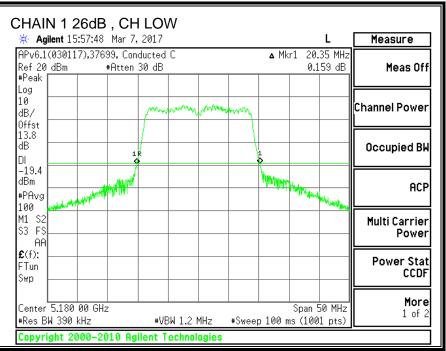
### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5180	20.55	20.35
Mid	5200	20.4	20.3
High	5240	20.6	20.35

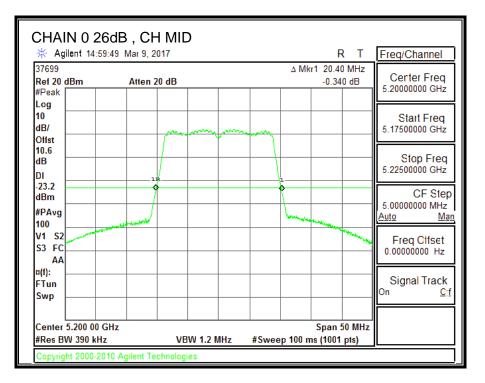
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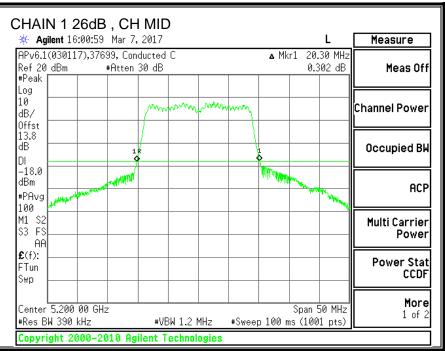
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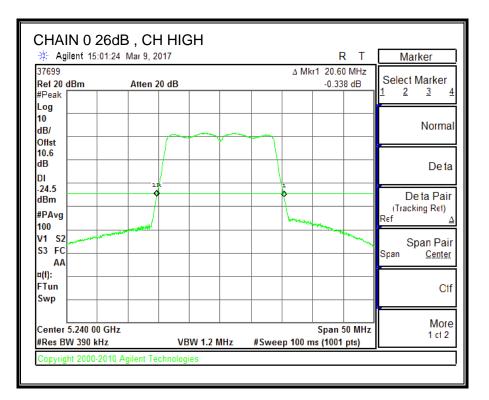


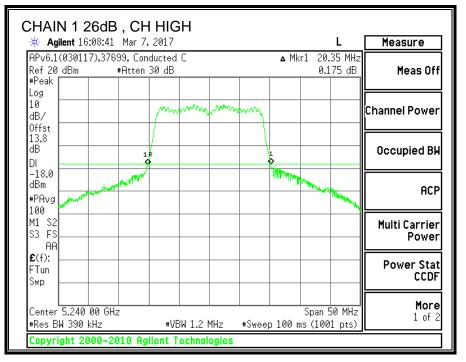
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# 9.2.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

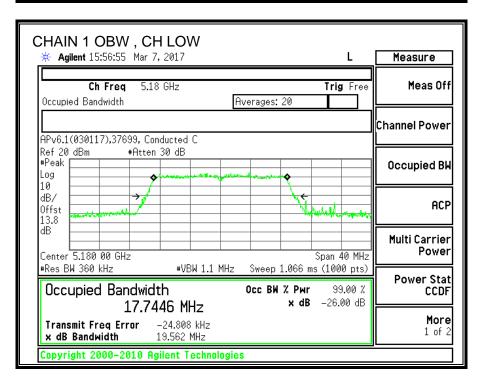
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5180	17.696	17.745
Mid	5200	17.65	17.655
High	5240	17.651	17.695

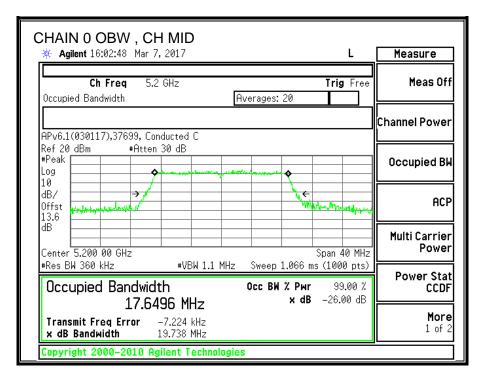
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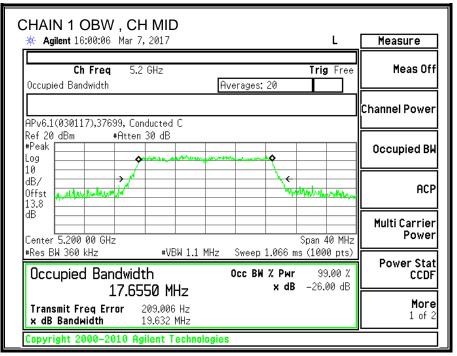
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CHAIN 0 OBW , CH LOW * Agilent 15:53:52 Mar 7, 2017		L	Measure
<b>Ch Freq</b> 5.18 GHz Occupied Bandwidth	Averages: 20	Trig Free	Meas Off
APv6.1(030117),37699, Conducted C			Channel Power
Ref 20 dBm #Atten 30 dB #Peak Log			Occupied BW
10 dB/ 0ffst 13.6		WWW.phinghout	ACP
dB Center 5.180 00 GHz		òpan 40 MHz	Multi Carrier Power
*Res BW 360 kHz *VBW 1. Occupied Bandwidth 17.6959 MHz	Occ BW % Pwr		Power Stat CCDF
Transmit Freq Error         25.600 kHz           x dB Bandwidth         19.967 MHz			<b>More</b> 1 of 2
Copyright 2000–2010 Agilent Techr	ologies		



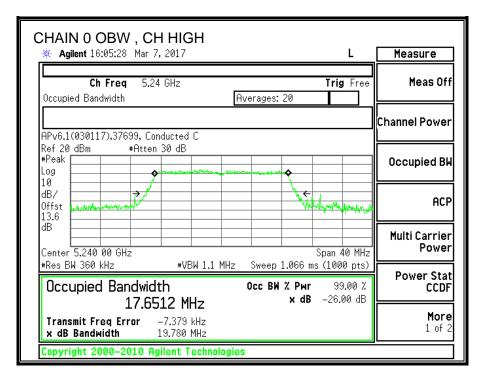
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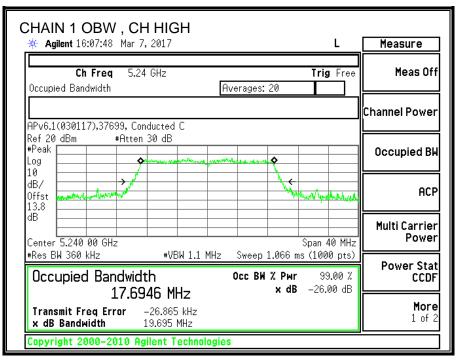




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# 9.2.3. OUTPUT POWER AND PPSD

### LIMITS

FCC §15.407 (a) (1)

(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.

IC RSS-247 6.2.1(1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
2.10	3.00	2.57	5.57

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#### **RESULTS**

<b>ID:</b> 50818 JQ	Date:	3/9/17
---------------------	-------	--------

### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5180	20.35	17.70	2.57	5.57
Mid	5200	20.30	17.65	2.57	5.57
High	5240	20.35	17.65	2.57	5.57

#### Limits

Channel	Frequency	FCC	IC	Max	Power	FCC	IC	PPSD
		Power	EIRP	IC	Limit	PPSD	eirp	Limit
		Limit	Limit	Power		Limit	PSD	
							Limit	
	(MHz)	(dBm)						
Low	5180	24.00	22.48	19.91	19.91	11.00	10.00	4.43
Mid	5200	24.00	22.47	19.90	19.90	11.00	10.00	4.43
High	5240	24.00	22.47	19.90	19.90	11.00	10.00	4.43

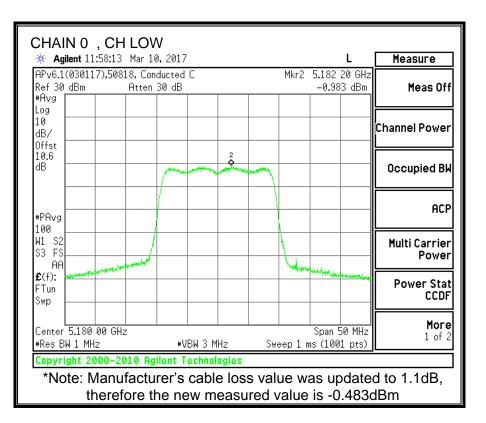
#### **Output Power Results**

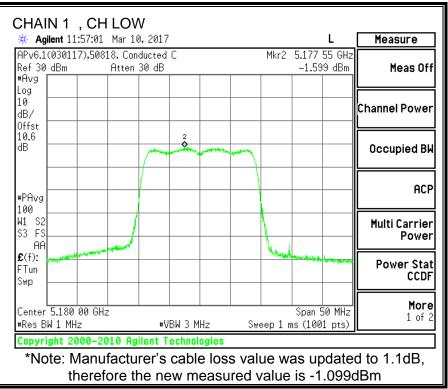
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	10.41	9.67	13.07	19.91	-6.84
Mid	5200	10.43	9.96	13.21	19.90	-6.69
High	5240	10.75	9.51	13.18	19.90	-6.71

#### **PPSD Results**

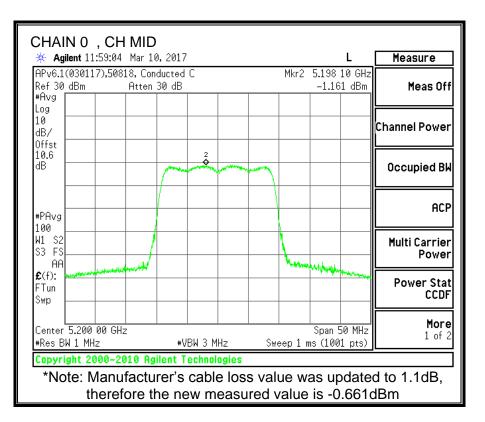
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	-0.48	-1.10	2.23	4.43	-2.20
Mid	5200	-0.66	-0.80	2.28	4.43	-2.15
High	5240	-0.53	-1.39	2.07	4.43	-2.36

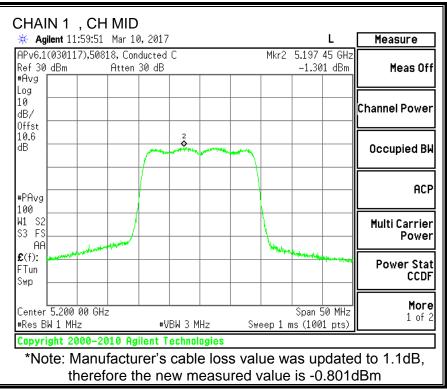
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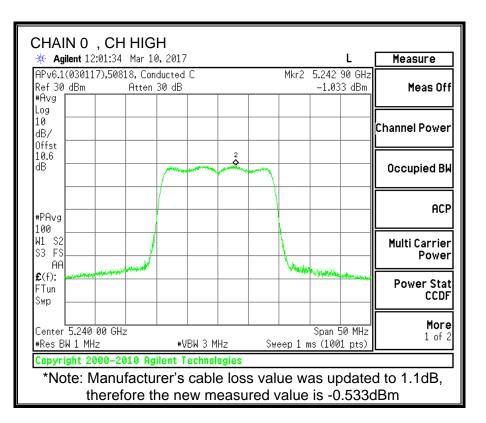


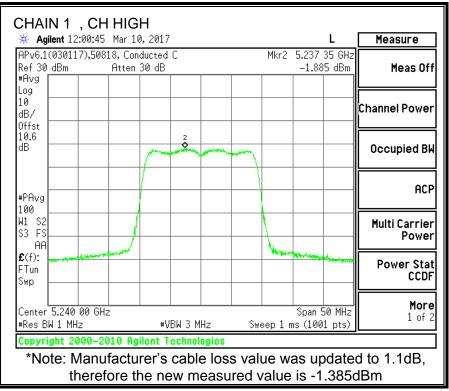
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# 9.3. 11n HT40 2TX MODE IN THE 5.2GHz BAND

# 9.3.1. 26 dB BANDWIDTH

### LIMITS

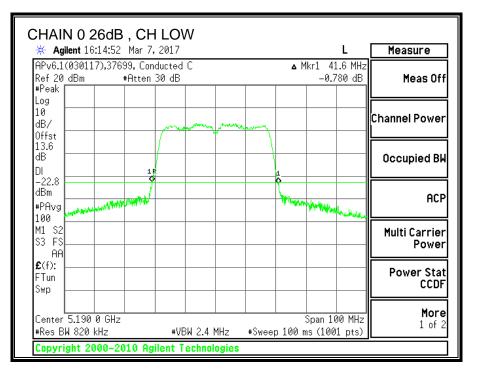
None; for reporting purposes only.

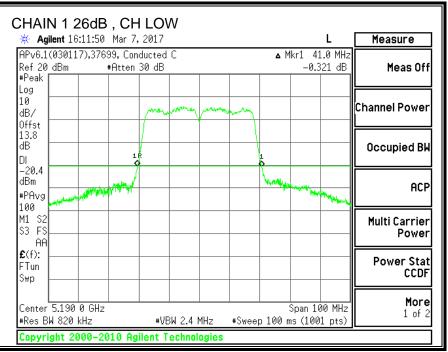
### **RESULTS**

Channel	Frequency		26 dB BW CHAIN 1 (MHz)
Low	5190	41.6	41
High	5230	41.7	40.7

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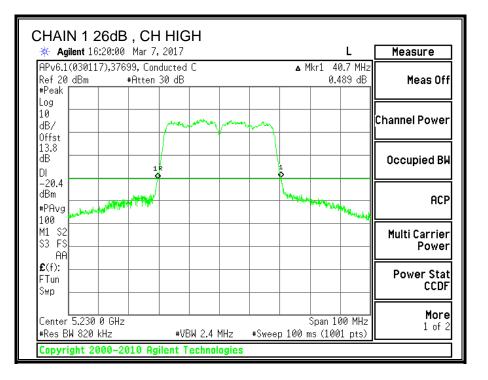
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CHAIN 0 26dB, CH			L	Measure
APv6.1(030117),37699, Cond Ref 20 dBm #Atten 3 #Peak	ducted C	▲ Mkr1 4 0.	41.7 MHz 522 dB	Meas Off
Log 10 dB/ 0ffst	mmm	anno -		Channel Power
13.6 dB DI 1Ŕ		1		Occupied BW
-22.4 dBm #PAvg 100		harrighter whereas	Happingen	ACP
M1 S2 S3 FS AA				Multi Carrier Power
£(f): FTun Swp				Power Stat CCDF
Center 5.230 0 GHz #Res BW 820 kHz	#VBW 2.4 MHz	Span 1 #Sweep 100 ms (10	.00 MHz 01 pts)	More 1 of 2



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# 9.3.2. 99% BANDWIDTH

#### LIMITS

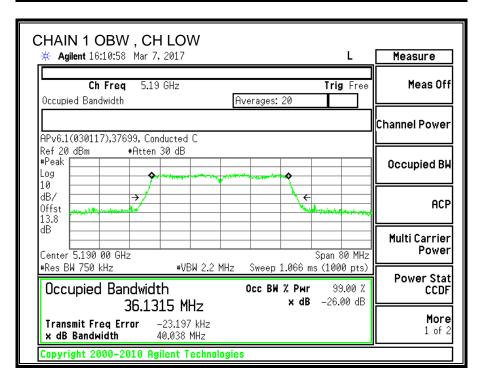
None; for reporting purposes only.

#### **RESULTS**

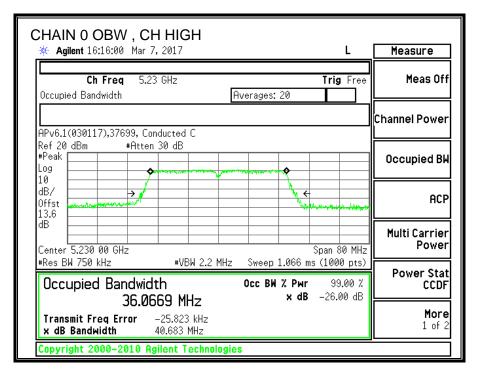
Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5190	36.132	36.132
High	5230	36.067	36.082

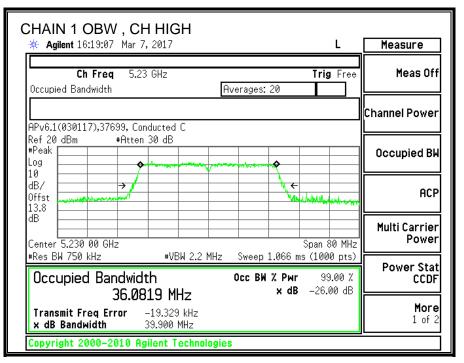
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CHAIN 0 OBW , CH LOW * Agilent 16:13:54 Mar 7, 2017 L	Measure
Ch Freq 5.19 GHz Trig Free Occupied Bandwidth Averages: 20	Meas Off
APv6.1(030117),37699, Conducted C	Channel Power
Ref 20 dBm #Atten 30 dB #Peak Log	Occupied BW
10 dB/ 0ffst 13.6	ACP
dB Center 5.190 00 GHz Span 80 MHz	Multi Carrier Power
*Res BW 750 kHz         #VBW 2.2 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         осс BW % Рыг         99.00 %           36.1318 MHz         × dB         -26.00 dB	Power Stat CCDF
ЗО.ISIO МП2 Transmit Freq Error 21.861 kHz х dB Bandwidth 40.454 MHz	More 1 of 2
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# 9.3.3. OUTPUT POWER AND PPSD

### LIMITS

FCC §15.407 (a) (1)

(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.

IC RSS-247 6.2.1(1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
2.10	3.00	2.57	5.57

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### **RESULTS**

ID: 45258 JL	Date:	3/3/17
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### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	<b>99%</b>	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5190	41.00	36.13	2.57	5.57
High	5230	40.70	36.07	2.57	5.57

#### Limits

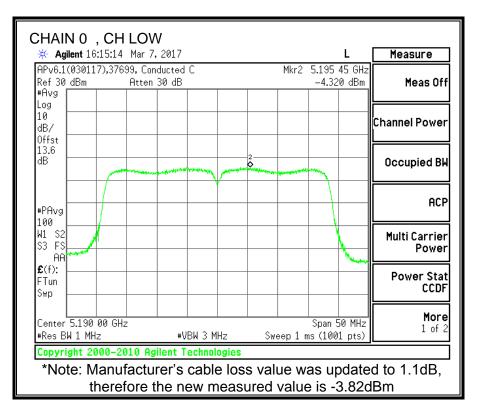
Channel	Frequency	FCC	IC	Max	Power	FCC	IC	PPSD
		Power	EIRP	IC	Limit	PPSD	eirp	Limit
		Limit	Limit	Power		Limit	PSD	
							Limit	
	(MHz)	(dBm)						
Low	5190	24.00	23.00	20.43	20.43	11.00	10.00	4.43
High	5230	24.00	23.00	20.43	20.43	11.00	10.00	4.43

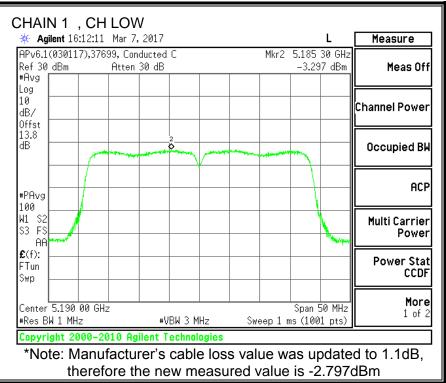
### **Output Power Results**

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	9.69	9.33	12.52	20.43	-7.91
High	5230	10.00	8.95	12.52	20.43	-7.91

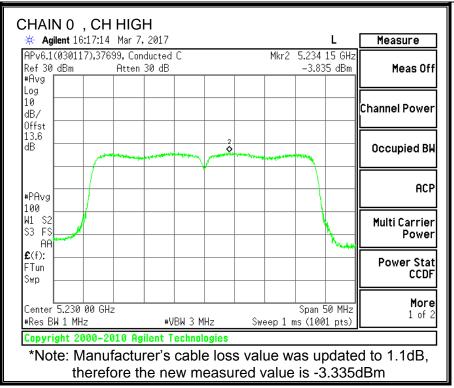
#### **PPSD** Results

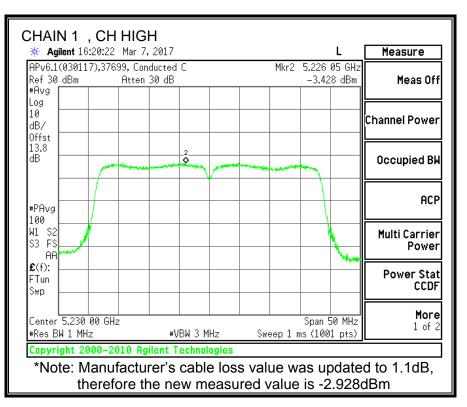
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	-3.82	-2.80	-0.27	4.43	-4.70
High	5230	-3.34	-2.93	-0.12	4.43	-4.55





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# 9.4. 11ac VHT80 2TX MODE IN THE 5.2GHz BAND

# 9.4.1. 26 dB BANDWIDTH

### <u>LIMITS</u>

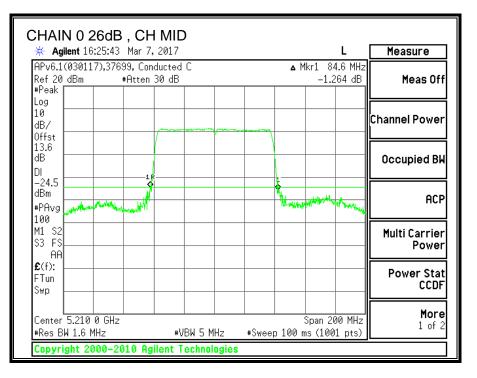
None; for reporting purposes only.

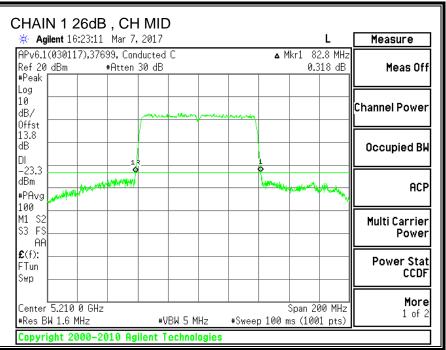
### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Mid	5210	84.6	82.8

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# 9.4.2. 99% BANDWIDTH

#### LIMITS

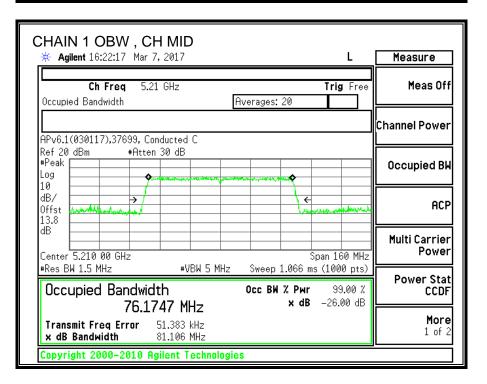
None; for reporting purposes only.

#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Mid	5210	76.029	76.175

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CHAIN 0 OBW , CH MID           ** Agilent 16:24:50 Mar 7, 2017         L	Measure			
Ch Freq 5.21 GHz Trig Free Occupied Bandwidth Averages: 20	Meas Off			
APv6.1(030117),37699, Conducted C	Channel Power			
Ref 20 dBm         #Atten 30 dB           #Peak	Occupied BW			
10 dB/ → 0ffst 13.6	ACP			
dB	Multi Carrier Power			
IRes BW 1.5 MHz         *VBW 5 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Occ BW % Pwr         99.00 %         CCDF           76.0290 MHz         × dB         -26.00 dB				
Transmit Freq Error 2.774 kHz x dB Bandwidth 81.392 MHz Copyright 2000-2010 Agilent Technologies	<b>More</b> 1 of 2			



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# 9.4.3. OUTPUT POWER AND PPSD

### LIMITS

FCC §15.407 (a) (1)

(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.

IC RSS-247 6.2.1(1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

#### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
2.10	3.00	2.57	5.57

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### **RESULTS**

ID:	45258 JL	Date:	3/3/17

### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5210	82.80	76.03	2.57	5.57

#### Limits

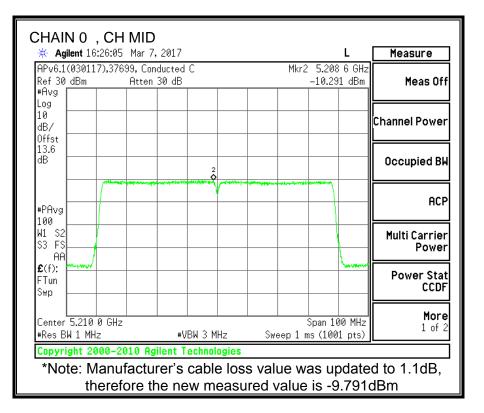
Channel	Frequency	FCC	IC	Max	Power	FCC	IC	PPSD
		Power	EIRP	IC	Limit	PPSD	eirp	Limit
		Limit	Limit	Power		Limit	PSD	
							Limit	
	(MHz)	(dBm)						
Low	5210	24.00	23.00	20.43	20.43	11.00	10.00	4.43

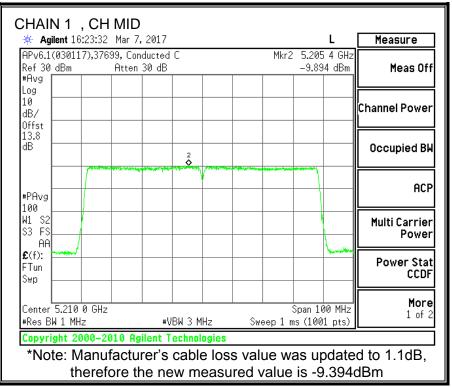
#### **Output Power Results**

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5210	6.72	6.10	9.43	20.43	-11.00

#### **PPSD** Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5210	-9.79	-9.39	-6.58	4.43	-11.01





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# 9.5. 11a 2TX MODE IN THE 5.3GHz BAND

# 9.5.1. 26 dB BANDWIDTH

### LIMITS

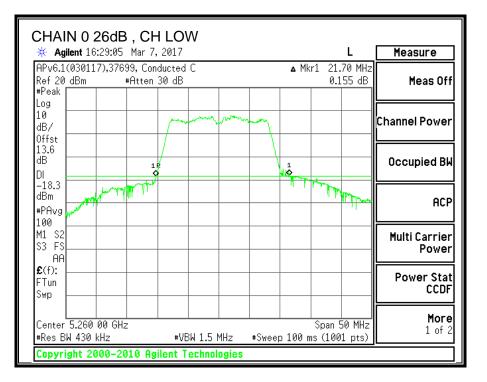
None; for reporting purposes only.

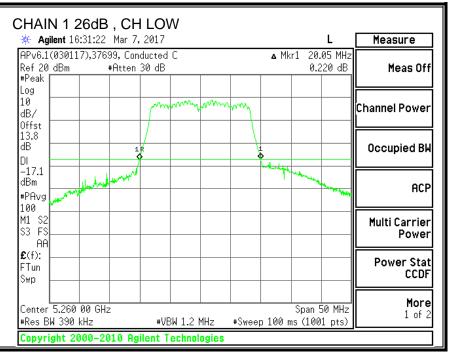
### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5260	21.7	20.05
Mid	5300	20.3	20.05
High	5320	21.55	20.05

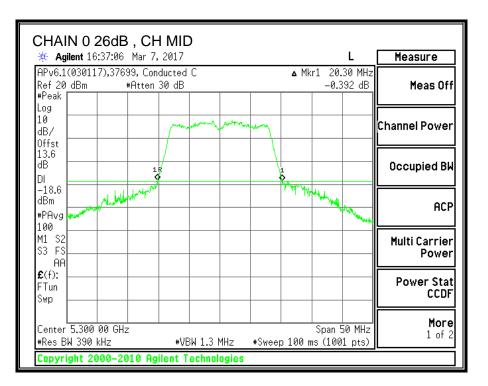
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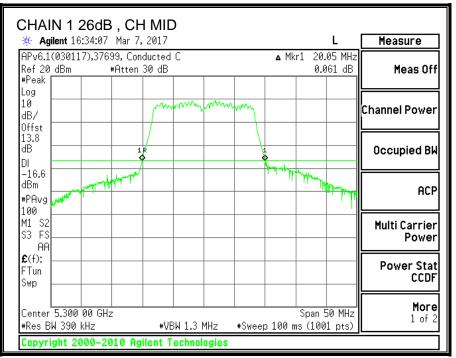
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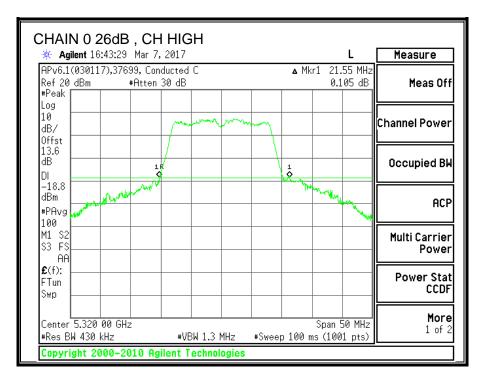


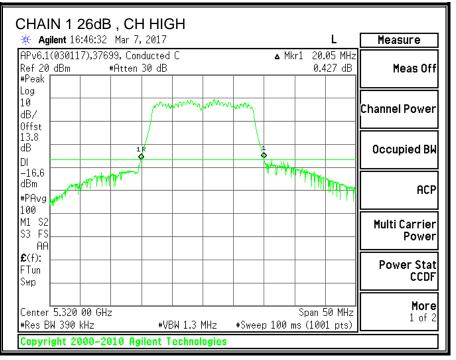
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# 9.5.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

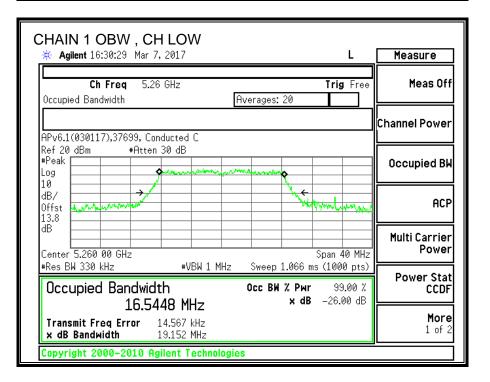
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5260	16.593	16.545
Mid	5300	16.681	16.584
High	5320	16.602	16.58

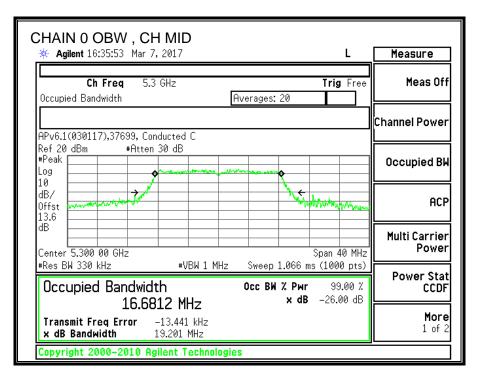
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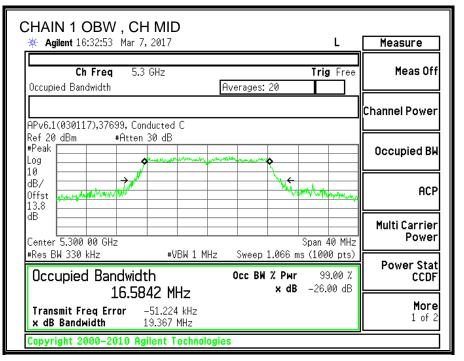
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Occupied Bandwidth Averages: 20 Channel APv6.1(030117),37699, Conducted C Ref 20 dBm *Atten 30 dB *Peak Log 10 dB/ Offst 13.6 dB Center 5.260 00 GHz *Res BW 330 kHz *VBW 1 MHz Sweep 1.066 ms (1000 pts)	ure
APv6.1(030117),37699, Conducted C         Channel           APv6.1(030117),37699, Conducted C         Channel           ePeak         ••••••••••••••••••••••••••••••••••••	eas Off
Ref 20 dBm         #Atten 30 dB           #Peak         Occup           10         0           18/         0           0ffst         0           13.6         0           dB         0           0dB         0           0dF         0           13.6         0           0dB         0	Power
dB/ Offst 13.6 dB         max         max <thmax< th="">         max         <thmax< th=""></thmax<></thmax<>	oied BW
dB         Span 40 MHz           Center 5.260 00 GHz         Span 40 MHz           *Res BW 330 kHz         *VBW 1 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Occ BW % Pwr         99.00 %	ACP
Occupied Bandwidth Occ BM Z Pwr 99.00 Z	arrier Power
16.5931 MHz	er Stat CCDF
Transmit Freq Error     14.407 kHz       × dB Bandwidth     19.477 MHz	More 1 of 2

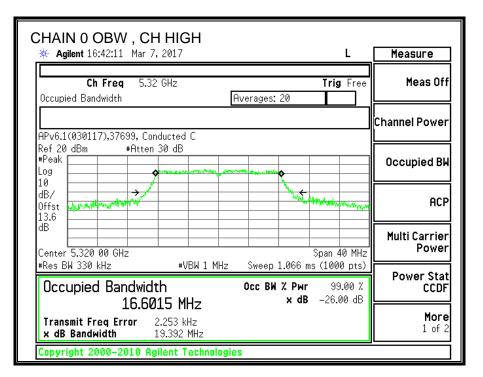


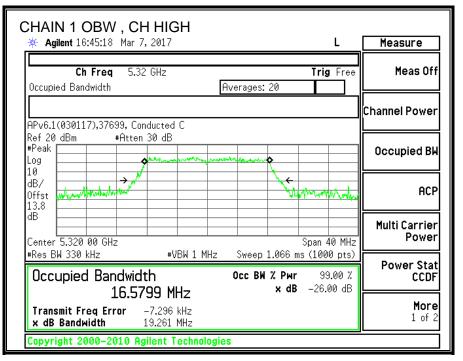
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# 9.5.3. OUTPUT POWER AND PPSD

## 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 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.

IC RSS-247 (6.2.2) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

## TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### **DIRECTIONAL ANTENNA GAIN**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.20	2.80	2.07	5.05

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### **RESULTS**

ID: 45258 JL Date: 3/3/17

## Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5260	20.05	16.55	2.07	5.05
Mid	5300	20.05	16.58	2.07	5.05
High	5320	20.05	16.58	2.07	5.05

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5260	24.00	23.19	27.00	23.19	11.00	11.00	11.00
Mid	5300	24.00	23.20	27.00	23.20	11.00	11.00	11.00
High	5320	24.00	23.20	27.00	23.20	11.00	11.00	11.00

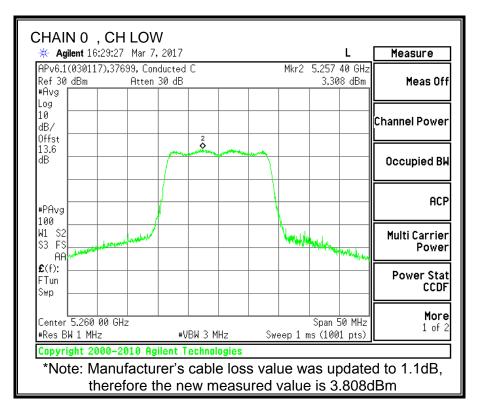
### **Output Power Results**

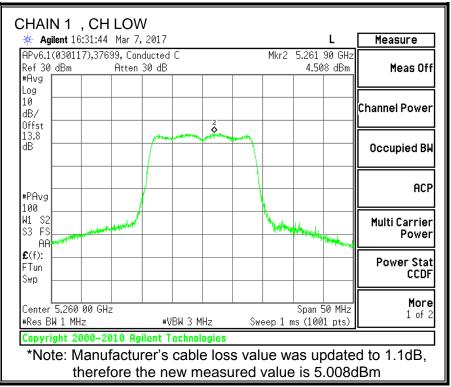
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	13.55	13.44	16.51	23.19	-6.68
Mid	5300	13.40	13.80	16.61	23.20	-6.58
High	5320	13.59	13.86	16.74	23.20	-6.46

#### **PPSD** Results

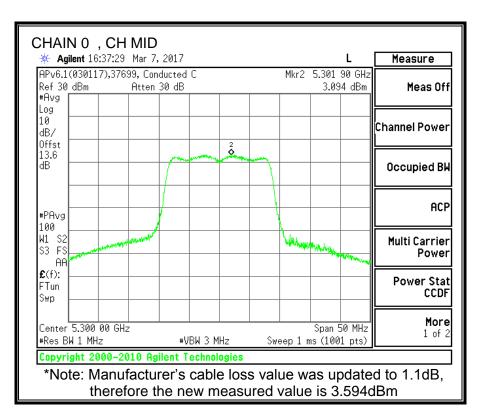
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	3.81	5.01	7.46	11.00	-3.54
Mid	5300	3.59	4.66	7.17	11.00	-3.83
High	5320	3.45	4.85	7.22	11.00	-3.78

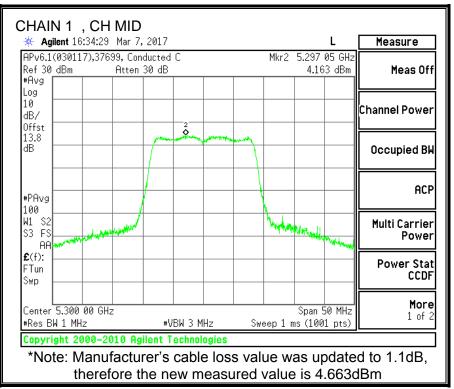
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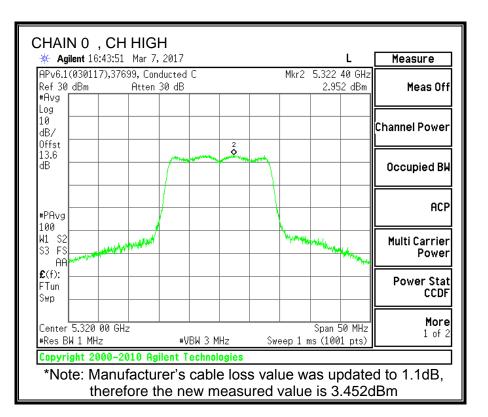


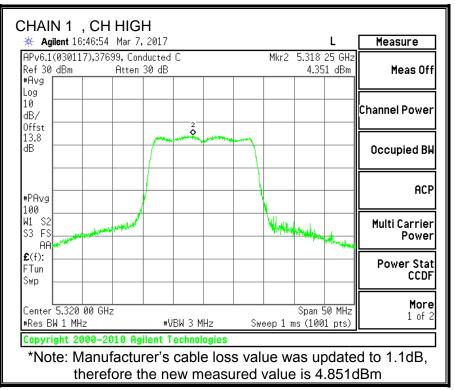
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# 9.6. 11n HT20 2TX MODE IN THE 5.3GHz BAND

# 9.6.1. 26 dB BANDWIDTH

### LIMITS

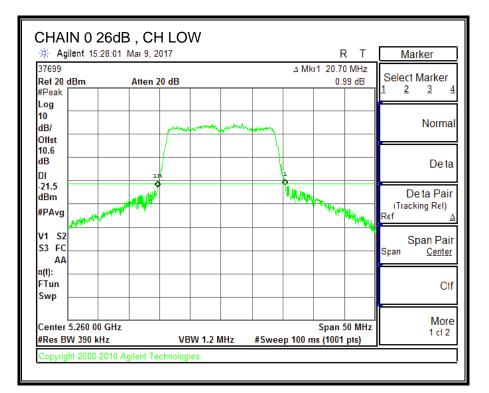
None; for reporting purposes only.

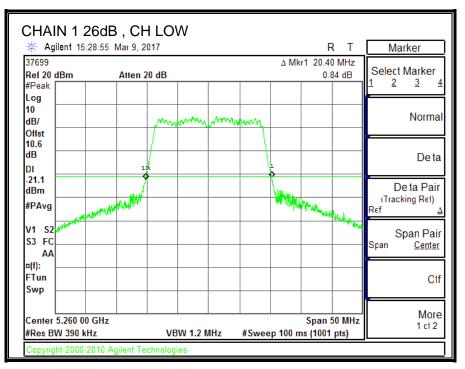
### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5260	20.7	20.4
Mid	5300	20.5	20.5
High	5320	20.55	20.4

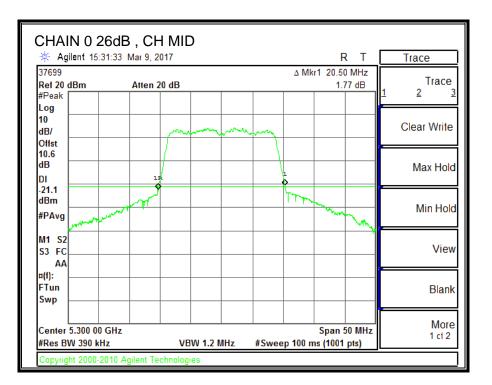
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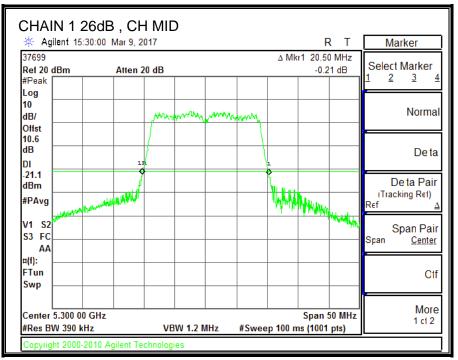
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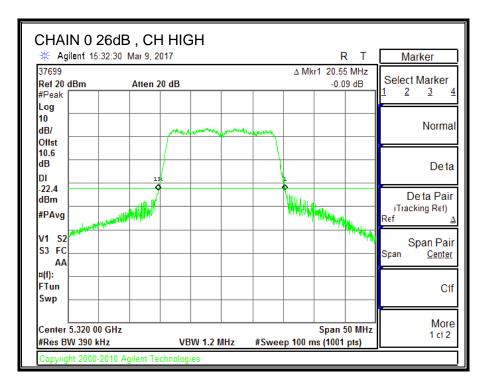


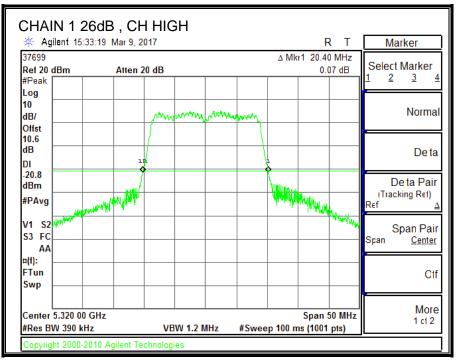
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# 9.6.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

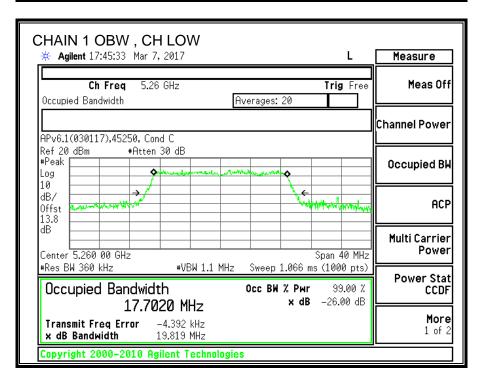
### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5260	17.803	17.702
Mid	5300	17.694	17.704
High	5320	17.664	17.738

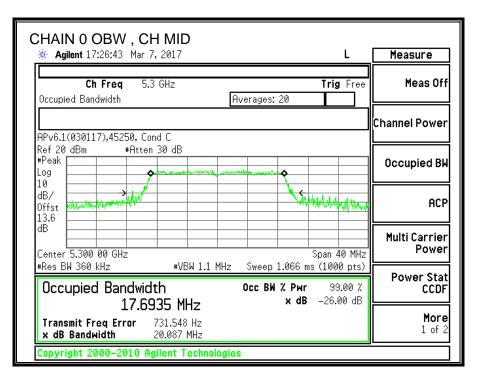
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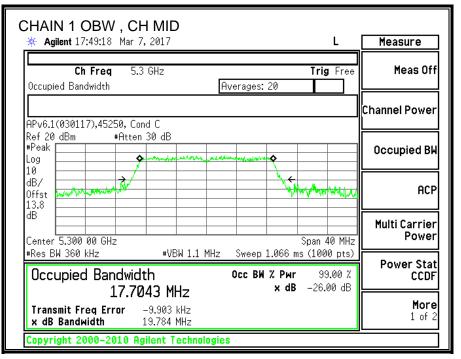
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CHAIN 0 OBW , CH LOW <b>* Agilent</b> 17:20:37 Mar 7, 2017		Macaura
** Agient 17.20.57 Mar 7, 2017		Measure
Ch Freq 5.26 GHz Tr Occupied Bandwidth Averages: 20	ig Free	Meas Off
		Channel Power
APv6.1(030117),45250, Cond C		
Ref 20 dBm #Atten 30 dB #Peak Log		Occupied BW
dB/ Offst annhumber ann	whether w	ACP
13.6		
dB		Multi Carrier
	40.1411	Power
	1 40 MHz	
#Res BW 360 kHz	000 pts)	Power Stat
Occupied Bandwidth Occ BW % Pwr	99.00 %	CCDF
17.8026 MHz × dB -2	6.00 dB	
		More
Transmit Freq Error     3.425 kHz       x dB Bandwidth     20.655 MHz		1 of 2
Copyright 2000–2010 Agilent Technologies		

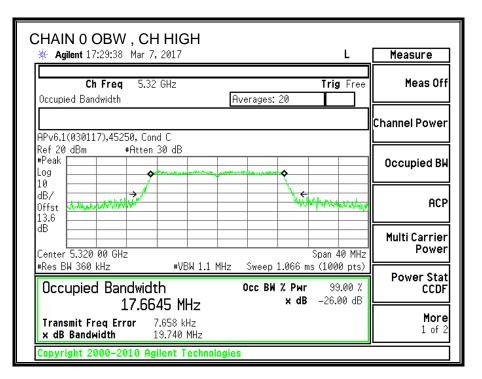


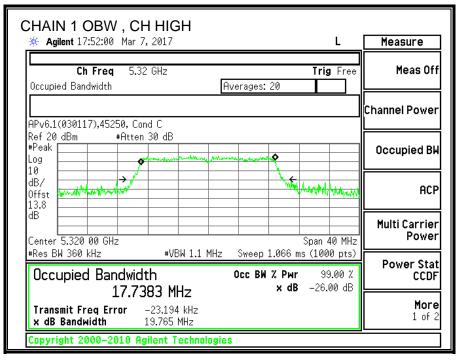
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# 9.6.3. OUTPUT POWER AND PPSD

## 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 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.

IC RSS-247 (6.2.2) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

# TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### **DIRECTIONAL ANTENNA GAIN**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.20	2.80	2.07	5.05

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### **RESULTS**

ID: 45258 JL Date: 3/3/17

### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	26 dB 99%		Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5260	20.40	17.70	2.07	5.05
Mid	5300	20.50	17.69	2.07	5.05
High	5320	20.40	17.66	2.07	5.05

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5260	24.00	23.48	27.00	23.48	11.00	11.00	11.00
Mid	5300	24.00	23.48	27.00	23.48	11.00	11.00	11.00
High	5320	24.00	23.47	27.00	23.47	11.00	11.00	11.00

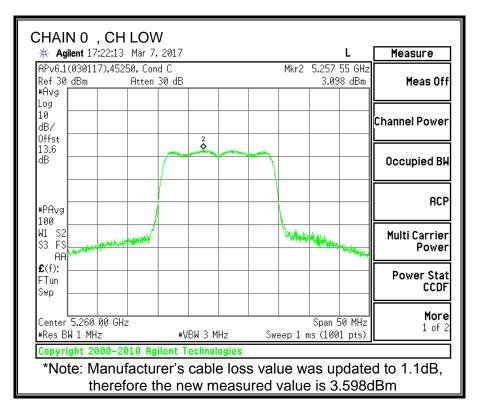
### **Output Power Results**

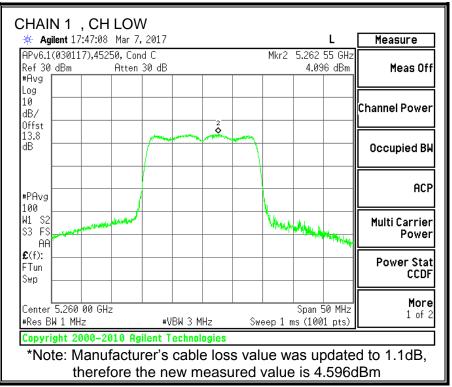
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	13.75	13.65	16.71	23.48	-6.77
Mid	5300	13.61	13.89	16.76	23.48	-6.72
High	5320	13.38	13.65	16.53	23.47	-6.94

#### **PPSD** Results

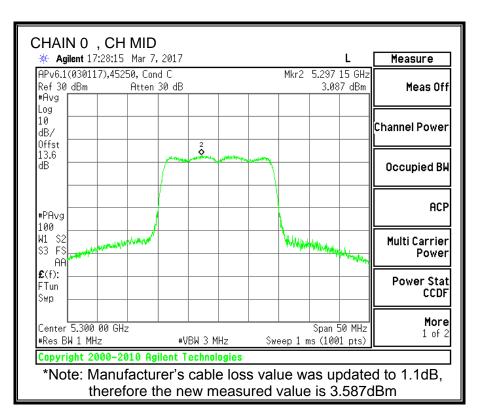
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	3.60	4.60	7.14	11.00	-3.86
Mid	5300	3.59	4.80	7.25	11.00	-3.75
High	5320	3.34	4.50	6.97	11.00	-4.03

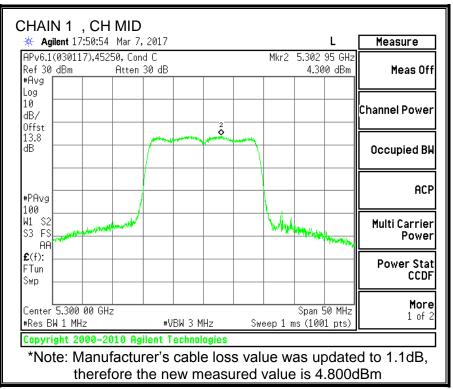
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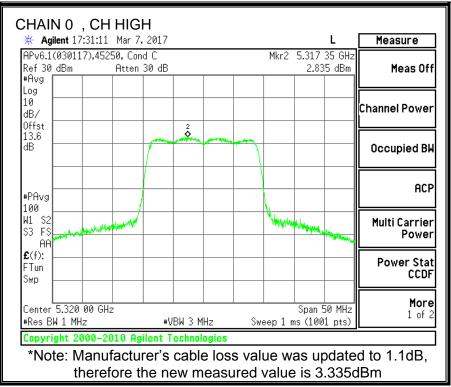


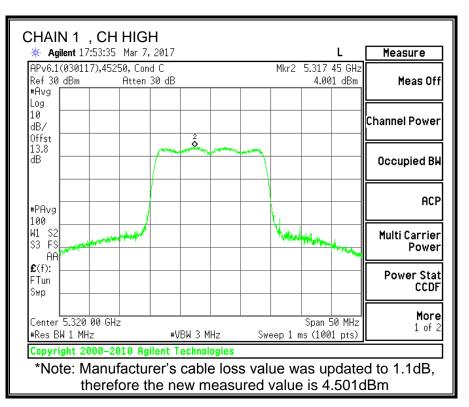
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# 9.7. 11n HT40 2TX MODE IN THE 5.3GHz BAND

# 9.7.1. 26 dB BANDWIDTH

## LIMITS

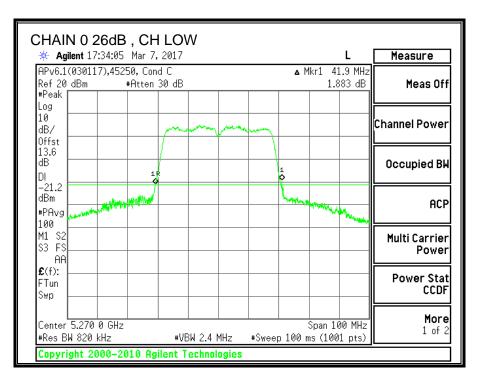
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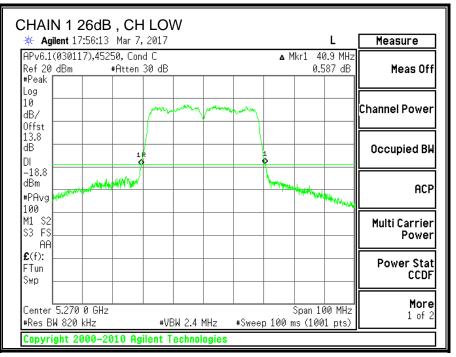
### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5270	41.9	40.9
High	5310	42.6	40.8

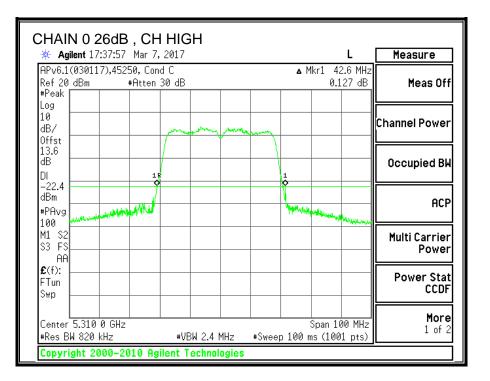
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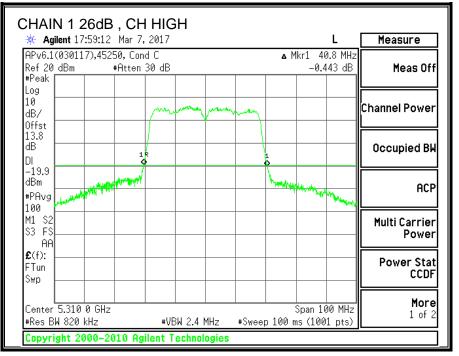
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# 9.7.2. 99% BANDWIDTH

### LIMITS

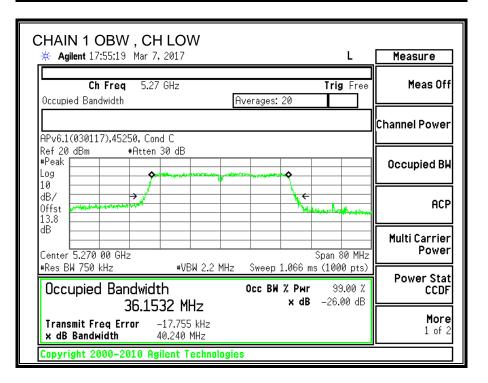
None; for reporting purposes only.

### **RESULTS**

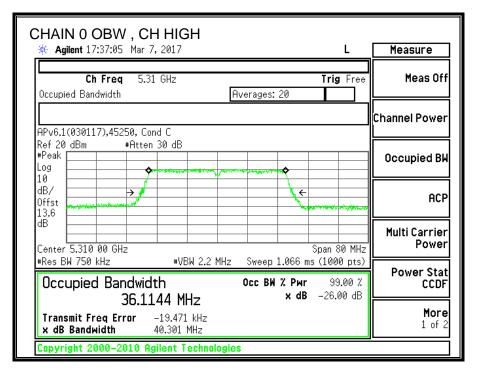
Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5270	36.109	36.153
High	5310	36.114	36.256

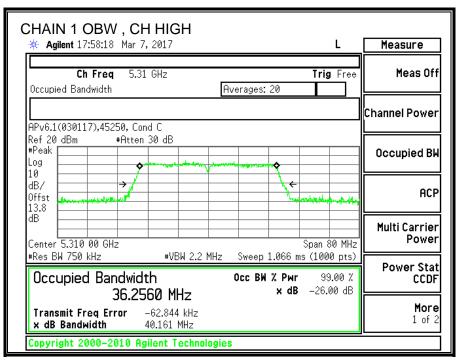
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CHAIN 0 OBW , CH LOW	Measure
Ch Freq 5.27 GHz Trig Free Occupied Bandwidth Averages: 20	Meas Off
APv6.1(030117),45250, Cond C	Channel Power
Ref 20 dBm *Atten 30 dB *Peak Log	Occupied BW
10 dB/ offst 13.6	ACP
dBCenter 5.270 00 GHz Span 80 MHz	Multi Carrier Power
*Res BW 750 kHz         *VBW 2.2 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Occ BW % Pwr         99.00 %           36.1090 MHz         × dB         -26.00 dB	Power Stat CCDF
Transmit Freq Error     -18.203 kHz       × dB Bandwidth     40.366 MHz       Copyright 2000-2010 Agilent Technologies	<b>More</b> 1 of 2



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# 9.7.3. OUTPUT POWER AND PPSD

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 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.

IC RSS-247 (6.2.2) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### **DIRECTIONAL ANTENNA GAIN**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.20	2.80	2.07	5.05

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### **RESULTS**

ID: 45258 JL	Date:	3/3/17
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### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5270	40.90	36.11	2.07	5.05
High	5310	40.80	36.11	2.07	5.05

#### Limits

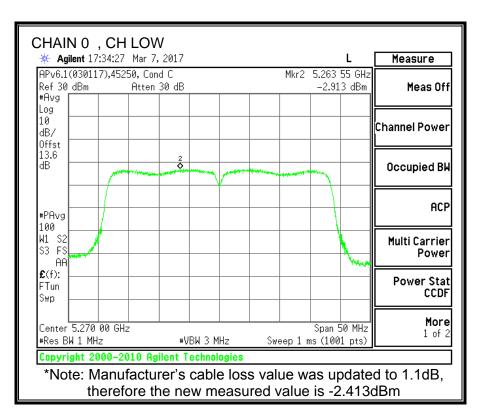
Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
1	5070	04.00	04.00	00.00	04.00	44.00	44.00	44.00
Low	5270	24.00	24.00	30.00	24.00	11.00	11.00	11.00

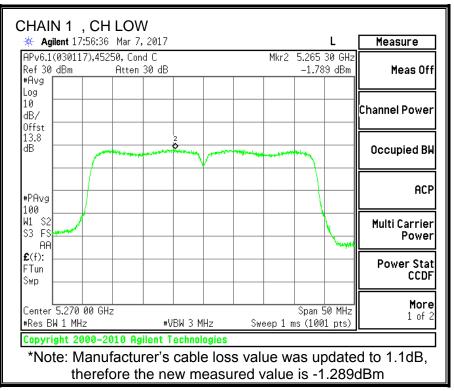
## **Output Power Results**

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	10.62	10.68	13.66	24.00	-10.34
High	5310	9.73	9.49	12.62	24.00	-11.38

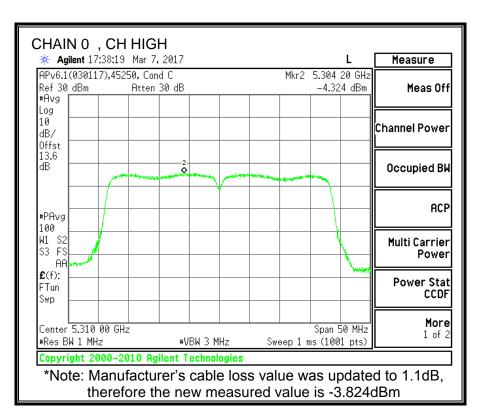
### **PPSD** Results

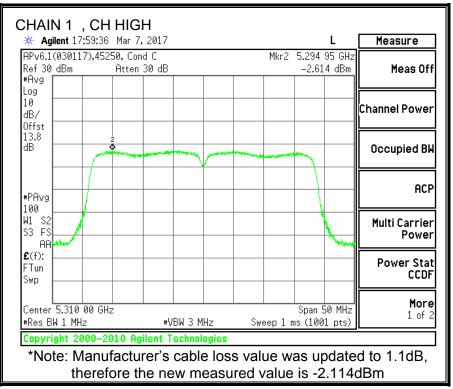
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
	(1411 12)	(ubiii)	(ubiii)	(ubiii)	(ubiii)	(ub)
Low	5270	-2.41	-1.29	1.20	11.00	-9.80





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# 9.8. 11ac VHT80 2TX MODE IN THE 5.3GHz BAND

# 9.8.1. 26 dB BANDWIDTH

### LIMITS

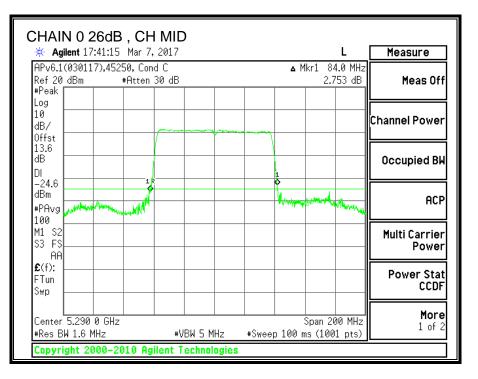
None; for reporting purposes only.

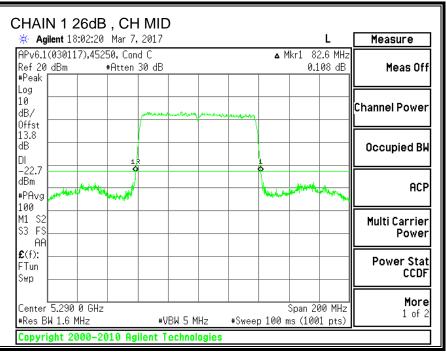
### **RESULTS**

Channel		26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Mid	5290	84	82.6

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# 9.8.2. 99% BANDWIDTH

### LIMITS

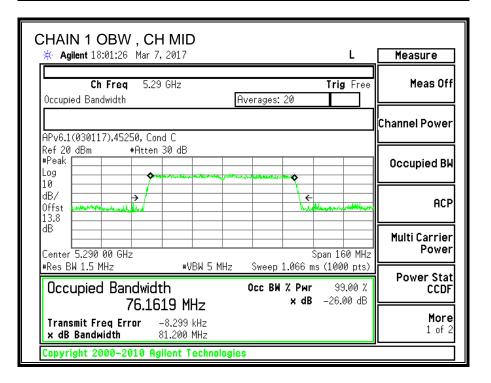
None; for reporting purposes only.

### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Mid	5290	76.082	76.162

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CHAIN 0 OBW , CH MID                ※ Agilent 17:40:23 Mar 7, 2017	Measure
Ch Freq 5.29 GHz Trig Free Occupied Bandwidth Averages: 20	Meas Off
APv6.1(030117).45250, Cond C	Channel Power
Ref 20 dBm #Atten 30 dB #Peak Log	Occupied BW
10 dB/ Offst 13.6	ACP
dB	Multi Carrier Power
*Res BW 1.5 MHz         *VBW 5 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Occ BH % Pmr         99.00 %	Power Stat CCDF
76.0824         MHz         × dB         -26.00 dB           Transmit Freq Error         -37.449 kHz         -37.449 kHz         -26.00 dB         -26.0	More 1 of 2
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# 9.8.3. OUTPUT POWER AND PPSD

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 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.

IC RSS-247 (6.2.2) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

### TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### **DIRECTIONAL ANTENNA GAIN**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.20	2.80	2.07	5.05

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### **RESULTS**

ID: 45258 JL	Date:	3/3/17
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#### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	<b>99%</b>	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5530	82.60	76.08	2.07	5.05

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5530	24.00	24.00	30.00	24.00	11.00	11.00	11.00

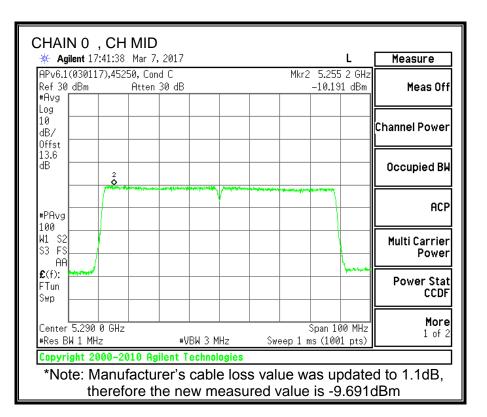
### **Output Power Results**

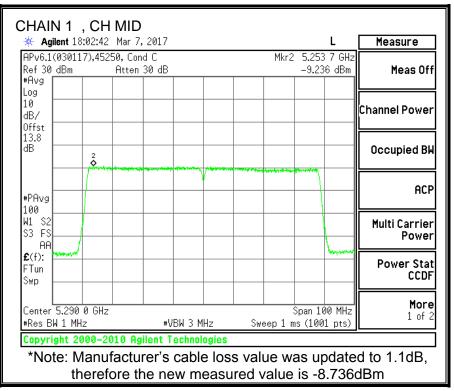
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5530	7.21	6.29	9.78	24.00	-14.22

### **PPSD** Results

Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5530	-9.691	-8.736	-6.18	11.00	-17.18

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# 9.9. 11a 2TX MODE IN THE 5.6GHz BAND

# 9.9.1. 26 dB BANDWIDTH

### LIMITS

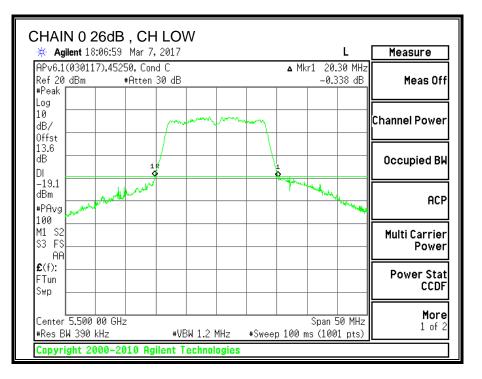
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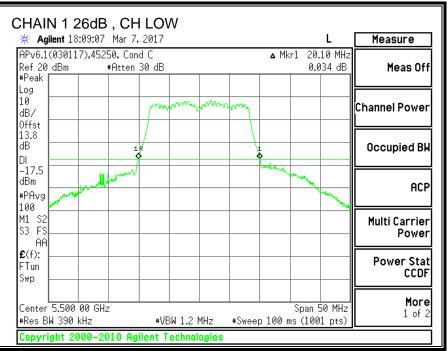
### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5500	20.3	20.1
Mid	5580	20.1	20.9
High	5700	20.3	20
144	5720	20.30	19.95

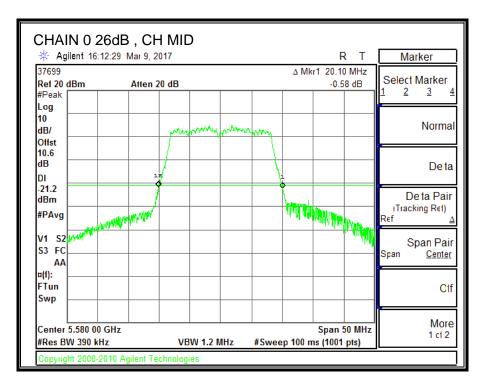
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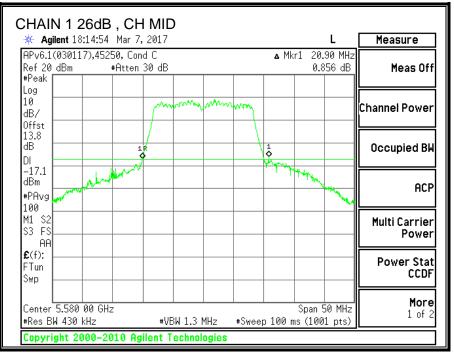
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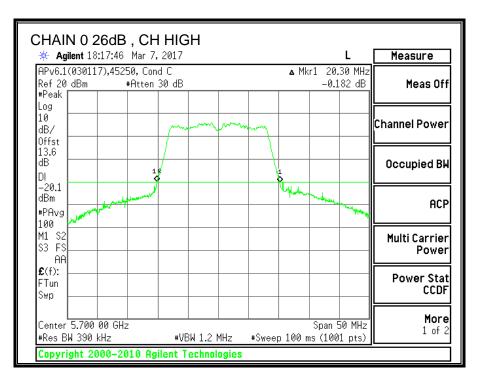


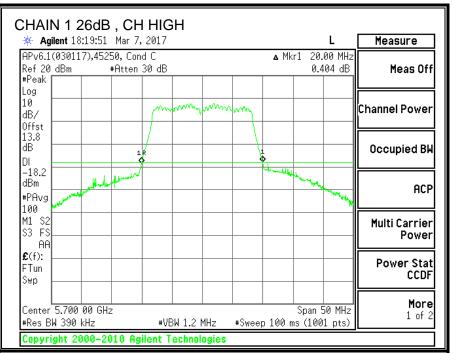
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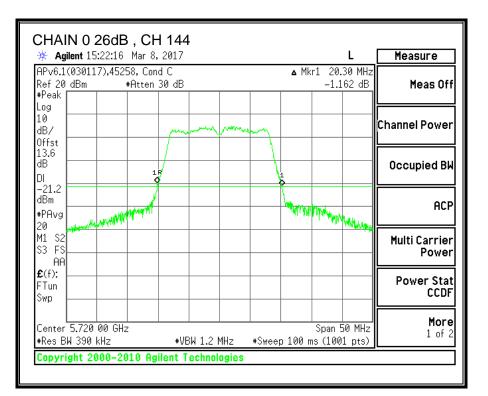


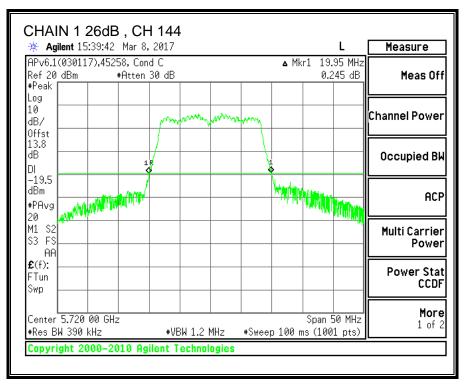
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## 9.9.2. 99% BANDWIDTH

#### LIMITS

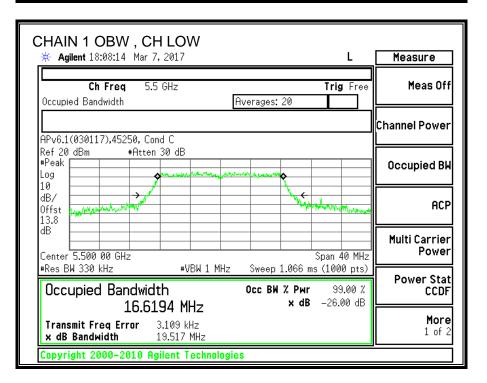
None; for reporting purposes only.

#### **RESULTS**

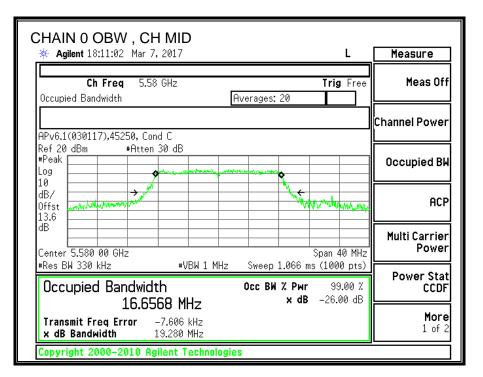
Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5500	16.586	16.619
Mid	5580	16.657	16.572
High	5700	16.553	16.589
144	5720	16.509	16.515

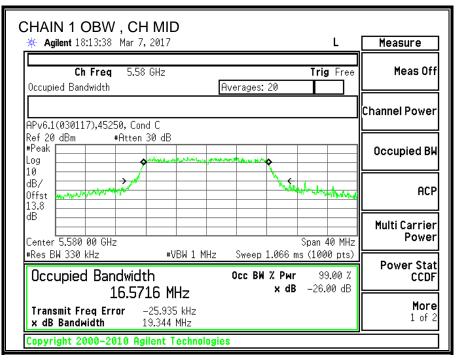
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CHAIN 0 OBW , CH			L	Measure
Ch Freq 5.5 G	-	Averages: 20	Trig Free	Meas Off
APv6.1(030117),45250, Cond		110610963. 20		Channel Power
Ref 20 dBm #Atten 30 #Peak Log				Occupied BW
10 dB/ Offst 13.6			water data and a set	ACP
dB			Span 40 MHz	Multi Carrier Power
*Res BW 330 kHz Occupied Bandwidth 16,585		Sweep 1.066 m Occ BW % Pwr x dB		Power Stat CCDF
Transmit Freq Error 25				More 1 of 2
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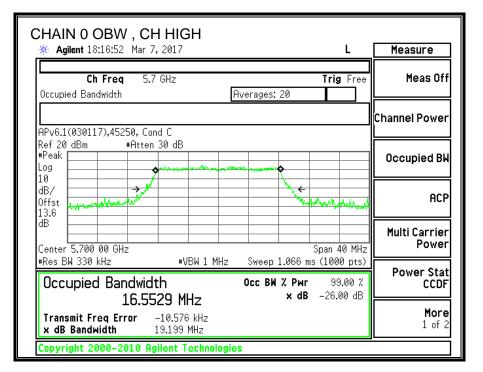


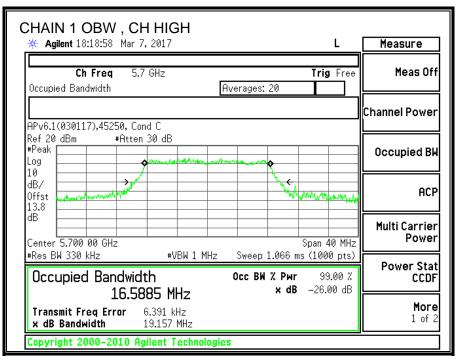
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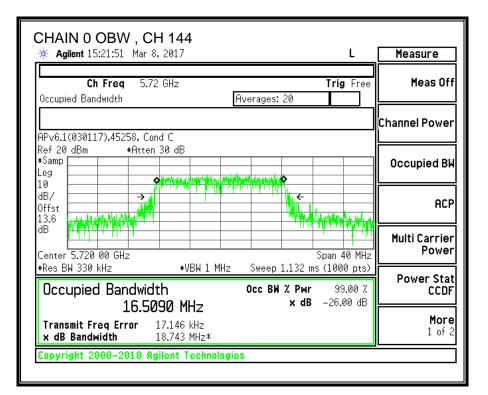


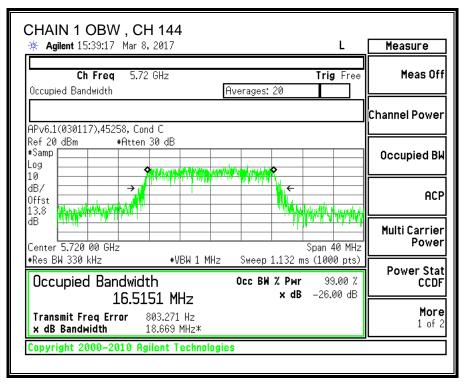
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## 9.9.3. OUTPUT POWER AND PPSD

## 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 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.

IC RSS-247 (6.2.3) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

## TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.Straddle channel power is measured using PXA spectrum analyzer, duty cycle correction factor is required.

#### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
0.90	3.60	2.46	5.36

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## **RESULTS**

ID:	45258 JL	Date:	3/3/17
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#### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5500	20.10	16.59	2.46	5.36
Mid	5580	20.10	16.57	2.46	5.36
High	5700	20.00	16.55	2.46	5.36
144	5720	19.95	16.51	2.46	5.36

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5500	24.00	23.20	27.00	23.20	11.00	11.00	11.00
Mid	5580	24.00	23.19	27.00	23.19	11.00	11.00	11.00
High	5700	24.00	23.19	27.00	23.19	11.00	11.00	11.00
144	5720	24.00	23.18	27.00	23.18	11.00	11.00	11.00

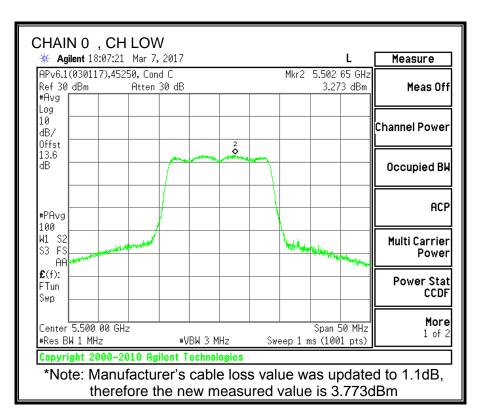
## **Output Power Results**

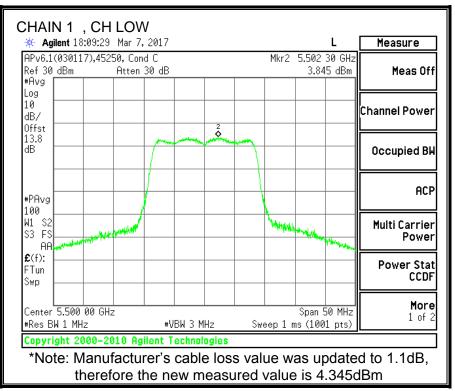
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	13.16	14.11	16.67	23.20	-6.53
Mid	5580	13.53	14.11	16.84	23.19	-6.35
High	5700	12.85	13.21	16.04	23.19	-7.14
144	5720	10.96	11.56	14.28	23.18	-8.90

## **PPSD** Results

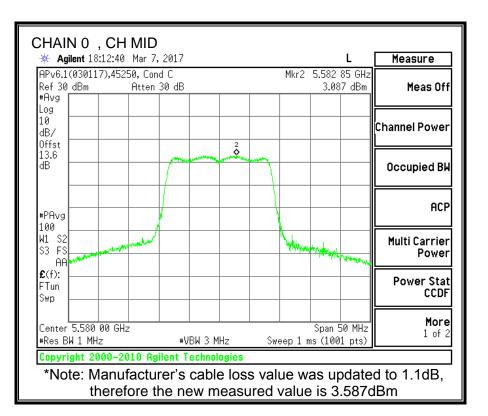
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	3.77	4.35	7.08	11.00	-3.92
Mid	5580	3.59	4.57	7.12	11.00	-3.88
High	5700	2.54	3.46	6.03	11.00	-4.97
144	5720	1.42	2.13	4.80	11.00	-6.20

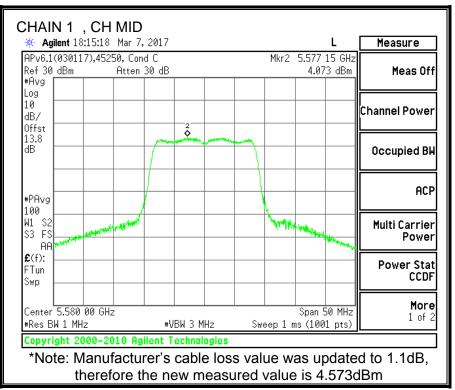
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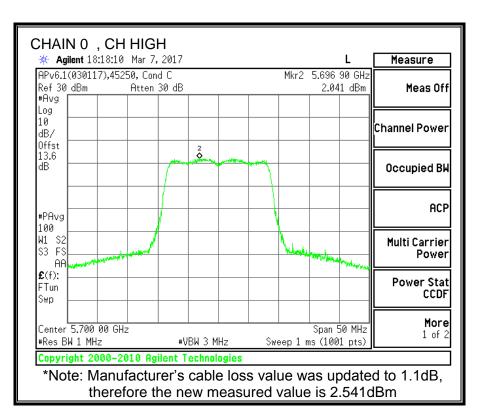


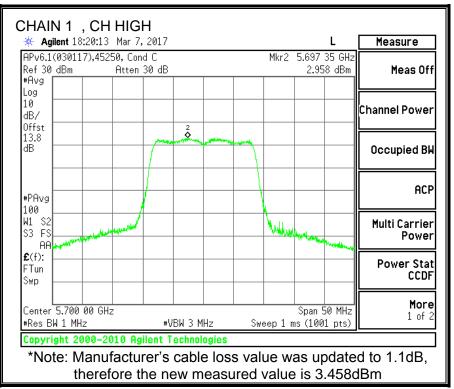
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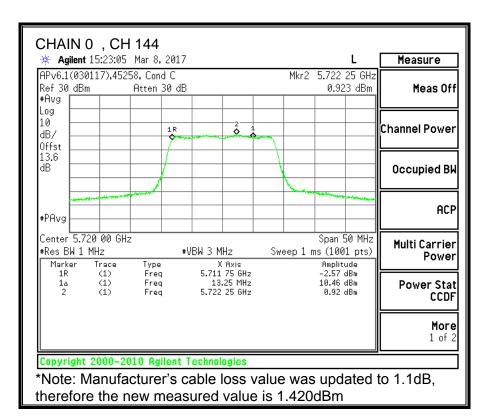


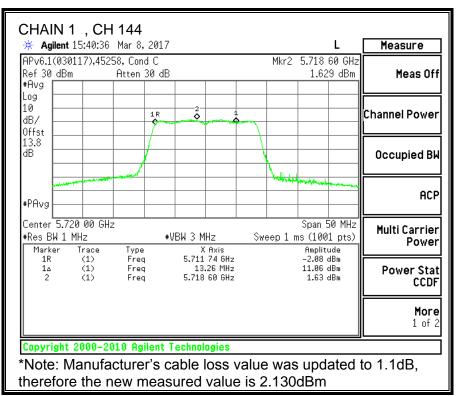
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# 9.10. 11n HT20 2TX MODE IN THE 5.6GHz BAND

## 9.10.1. 26 dB BANDWIDTH

## <u>LIMITS</u>

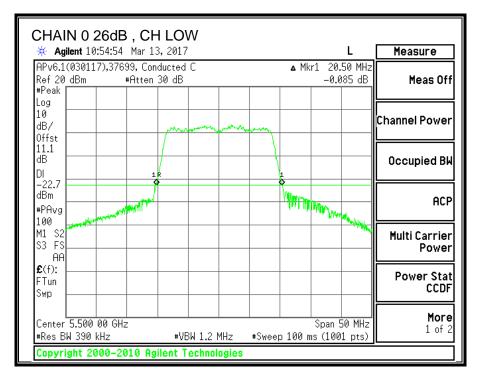
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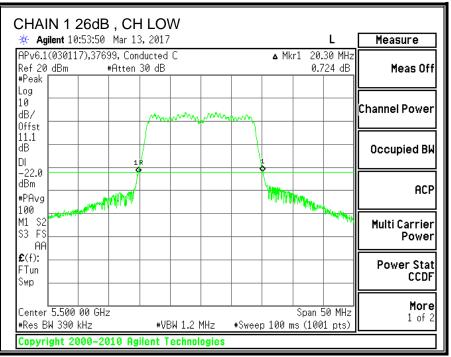
## **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5500	20.5	20.3
Mid	5580	20.5	20.25
High	5700	20.55	20.35
144	5720	20.45	20.35

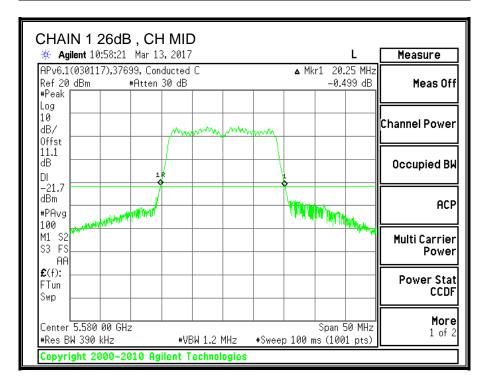
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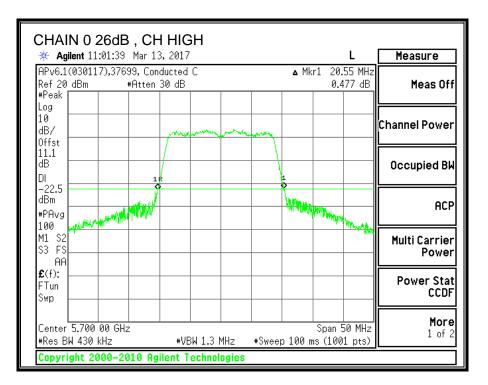


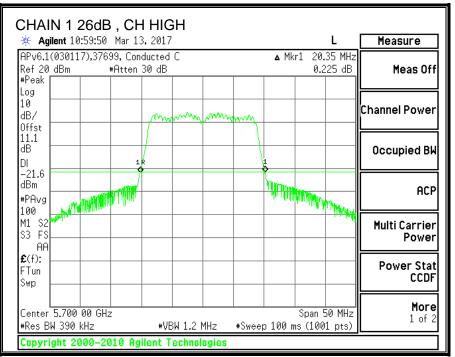


CHAIN 0 26dB , CH MID	L	Measure
APv6.1(030117),37699, Conducted C Ref 20 dBm #Atten 30 dB #Peak	▲ Mkr1 20.50 MHz -0.076 dB	Meas Off
Log 10 dB/ Offst		Channel Power
11.1 dB DI 19	4	Occupied BW
-22.7 9		ACP
S3 FS	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Multi Carrier Power
£(f): FTun Swp		Power Stat CCDF
Center 5.580 00 GHz #Res BW 390 kHz #VBW 1.3 MHz	Span 50 MHz #Sweep 100 ms (1001 pts)	<b>More</b> 1 of 2

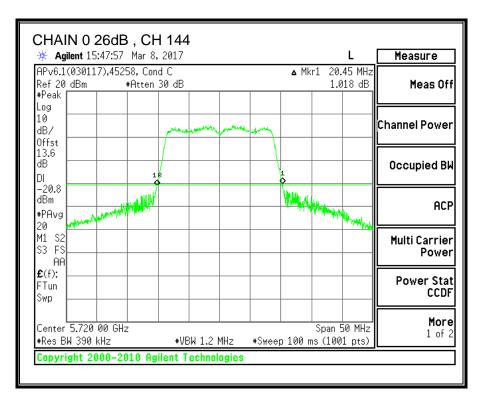


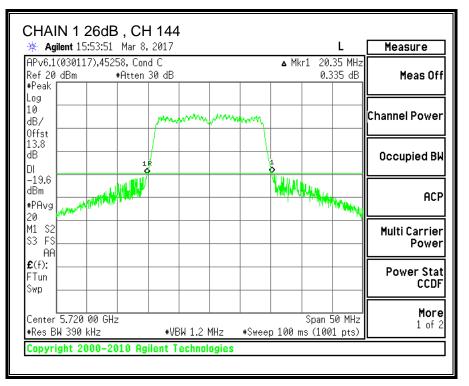
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## 9.10.2. 99% BANDWIDTH

#### **LIMITS**

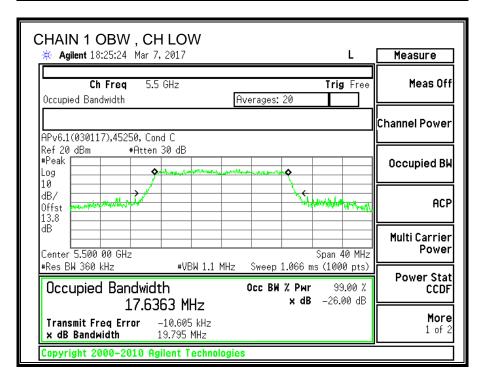
None; for reporting purposes only.

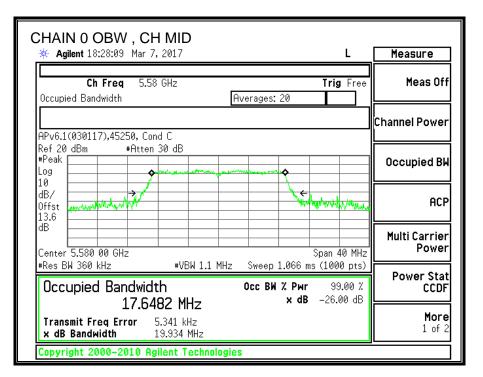
#### **RESULTS**

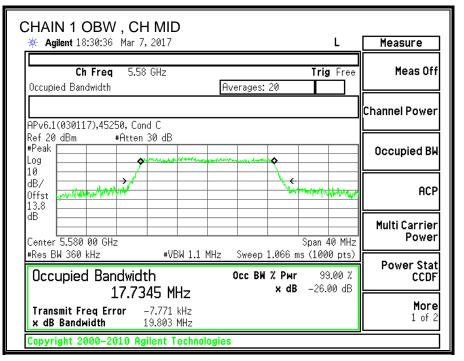
Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5500	17.677	17.636
Mid	5580	17.648	17.734
High	5700	17.651	17.709
144	5720	17.657	17.671

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CHAIN 0 OBW , CH LOW		L	Measure
Ch Freq 5.5 GHz	0	Trig Free	Meas Off
Occupied Bandwidth	Averages: 20		Channel Power
APv6.1(030117),45250, Cond C Ref 20 dBm #Atten 30 dB #Peak Log	43		Occupied BW
10 dB/ 0ffst 13.6	× + + + + + + + + + + + + + + + + + + +	nother y lyternelse	ACP
Genter 5.500 00 GHz		Span 40 MHz	Multi Carrier Power
*Res BW 360 kHz         *VBW 3           Occupied Bandwidth	.1 MHz Sweep 1.066 m Occ BW % Pwr	s (1000 pts)	Power Stat CCDF
<b>17.6773 MHz</b> Transmit Freg Error 34.336 kHz × dB Bandwidth 19.825 MHz		20.00 UD	More 1 of 2
Copyright 2000–2010 Agilent Tecl	nologies		

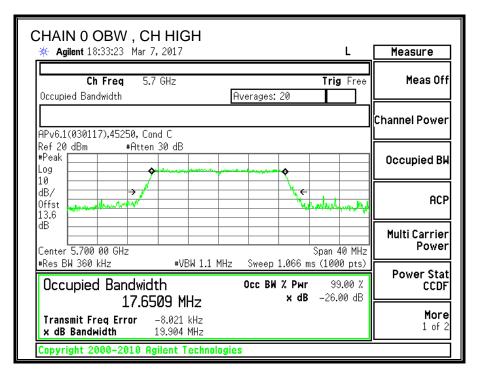


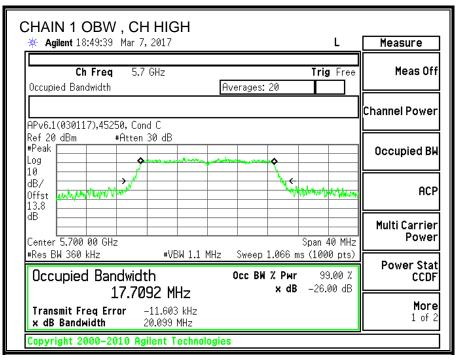




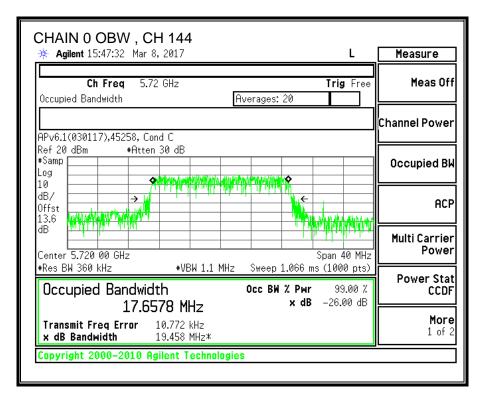
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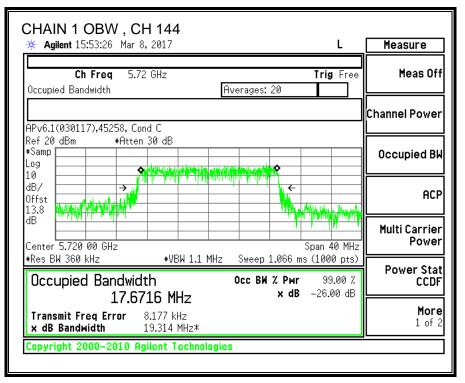
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## 9.10.3. OUTPUT POWER AND PPSD

## 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 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.

IC RSS-247 (6.2.3) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

## TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.Straddle channel power is measured using PXA spectrum analyzer, duty cycle correction factor is required.

#### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
0.90	3.60	2.46	5.36

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## **RESULTS**

ID: 45258 JL	Date:	3/3/17
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#### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5500	20.30	17.64	2.46	5.36
Mid	5580	20.25	17.65	2.46	5.36
High	5700	20.35	17.65	2.46	5.36
144	5720	20.35	17.66	2.46	5.36

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5500	24.00	23.46	27.00	23.46	11.00	11.00	11.00
Mid	5580	24.00	23.47	27.00	23.47	11.00	11.00	11.00
High	5700	24.00	23.47	27.00	23.47	11.00	11.00	11.00
144	5720	24.00	23.47	27.00	23.47	11.00	11.00	11.00

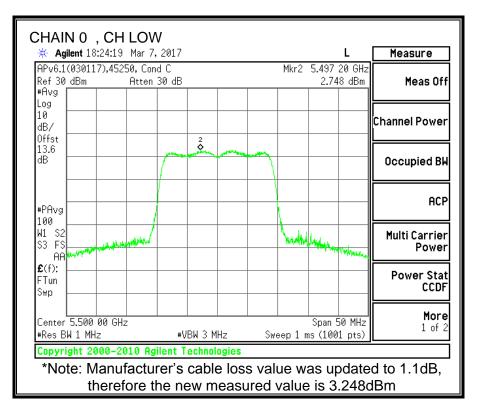
## **Output Power Results**

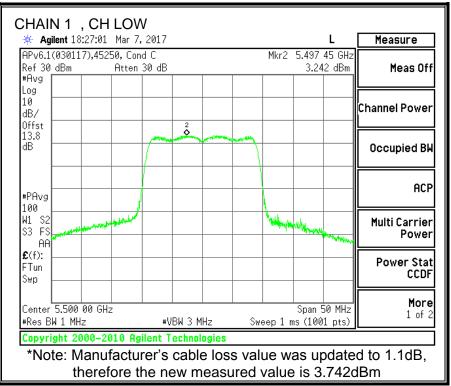
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	13.00	13.85	16.46	23.46	-7.01
Mid	5580	13.70	14.30	17.02	23.47	-6.45
High	5700	13.01	13.33	16.18	23.47	-7.28
144	5720	11.23	11.64	14.45	23.47	-9.02

#### **PPSD Results**

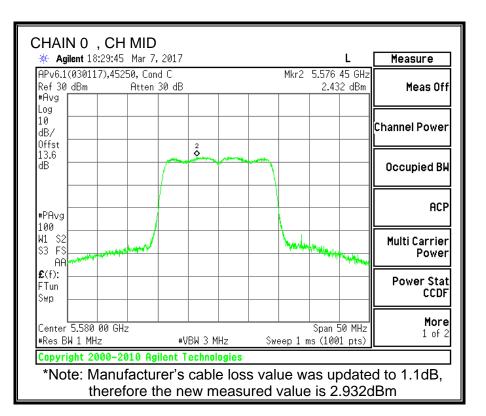
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	3.25	3.74	6.51	11.00	-4.49
Mid	5580	2.93	3.79	6.39	11.00	-4.61
High	5700	1.94	2.66	5.32	11.00	-5.68
144	5720	1.68	2.19	4.95	11.00	-6.05

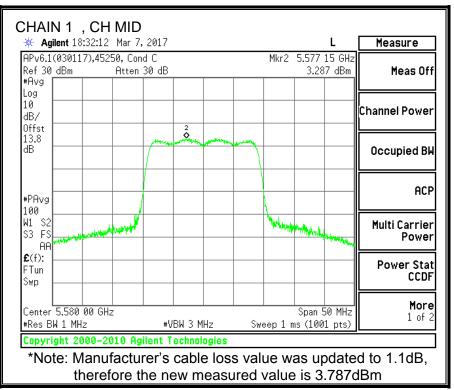
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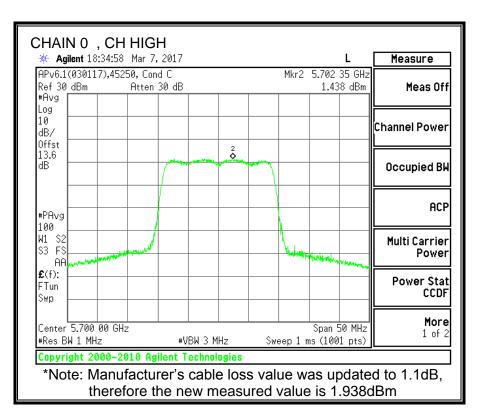


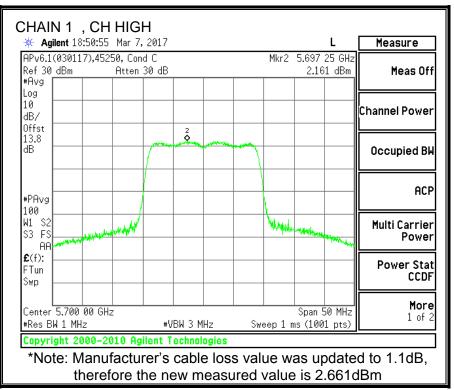
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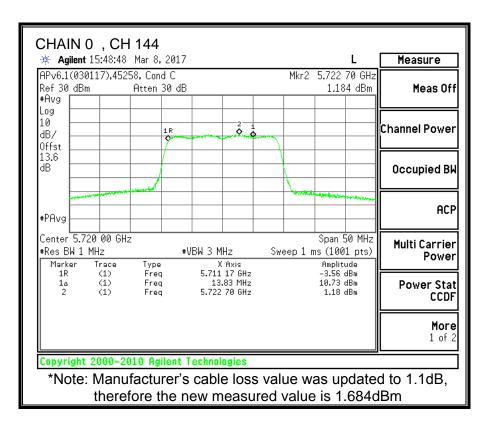


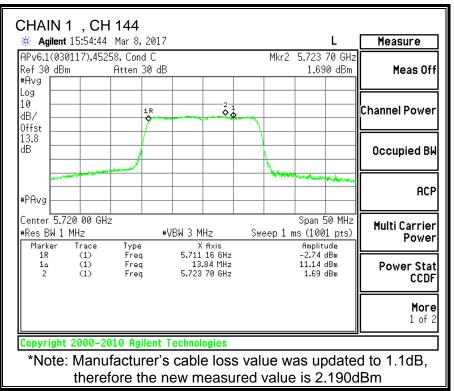
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# 9.11. 11n HT40 2TX MODE IN THE 5.6GHz BAND

## 9.11.1. 26 dB BANDWIDTH

## LIMITS

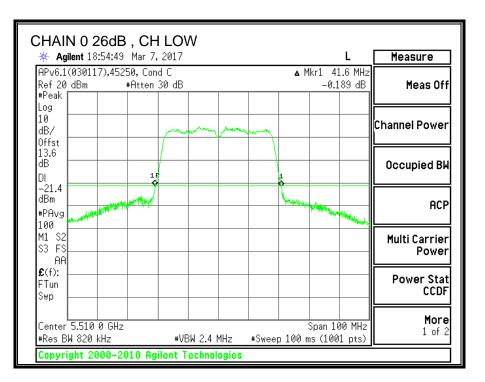
None; for reporting purposes only.

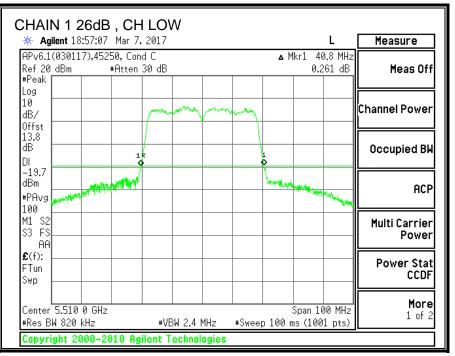
## **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5510	41.6	40.8
Mid	5550	41.6	41
High	5670	41.7	41.2
142	5710	41.4	40.7

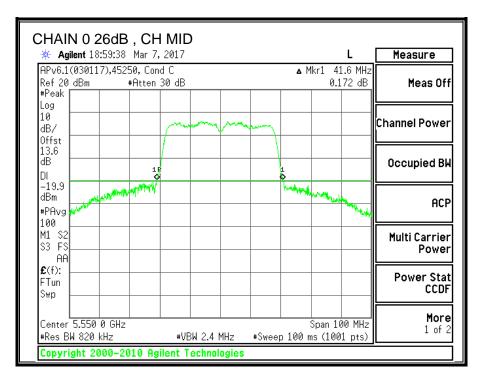
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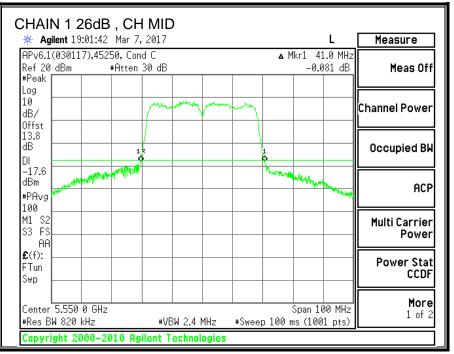
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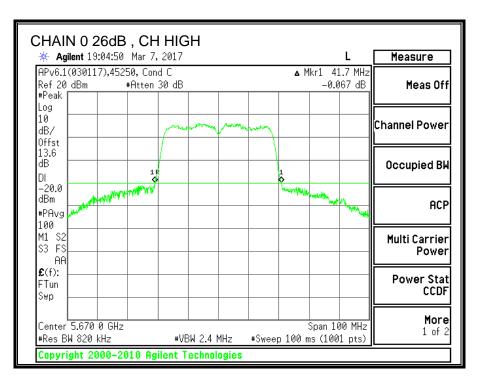
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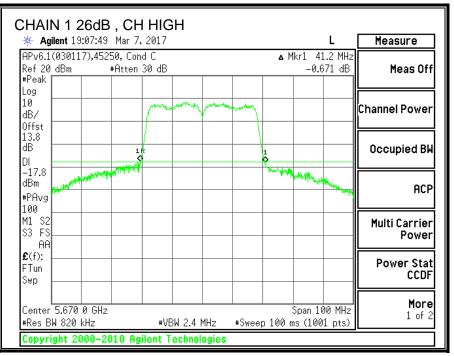




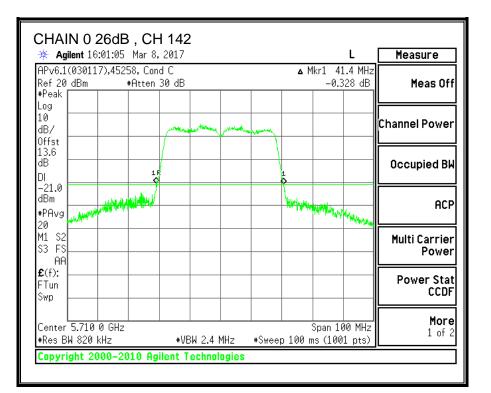
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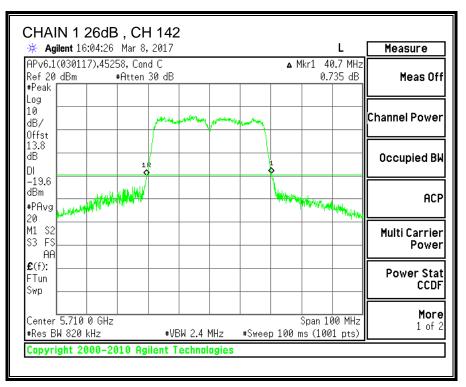
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# 9.11.2. 99% BANDWIDTH

#### **LIMITS**

None; for reporting purposes only.

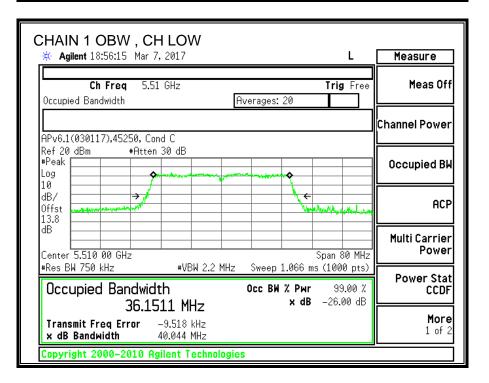
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5510	36.096	36.151
Mid	5550	36.186	36.089
High	5670	36.079	36.148
142	5710	36.192	36.160

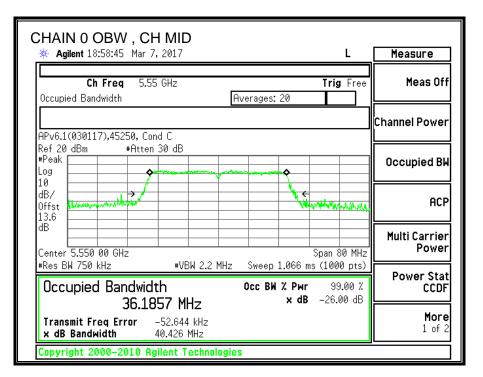
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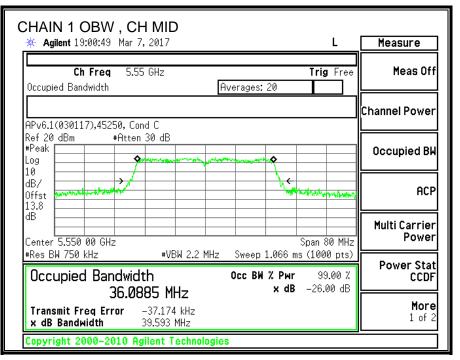
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CHAIN 0 OBW , CH LOW                ※ Agilent 18:53:57 Mar 7, 2017	Measure
Ch Freq 5.51 GHz Trig Free Occupied Bandwidth Averages: 20	Meas Off
	Channel Power
Ref 20 dBm #Atten 30 dB #Peak	Occupied BW
10 dB/ Offst 13.6 → → → → → → → → → → → → →	ACP
dB	Multi Carrier Power
*Res BW 750 kHz         *VBW 2.2 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Occ BW % Pwr         99.00 %           36.0956 MHz         × dB         -26.00 dB	Power Stat CCDF
Transmit Freq Error     7.195 kHz       x dB Bandwidth     40.145 MHz	<b>More</b> 1 of 2

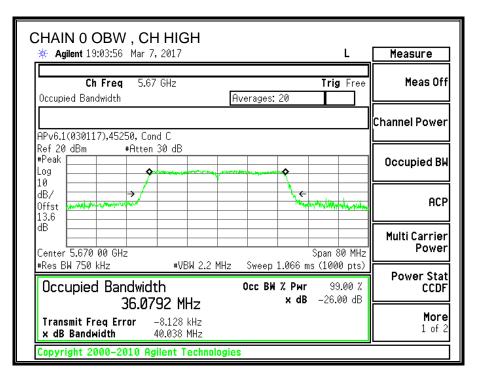


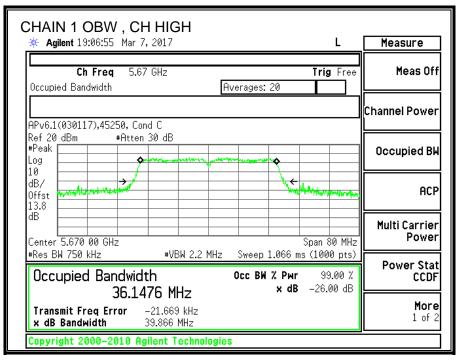
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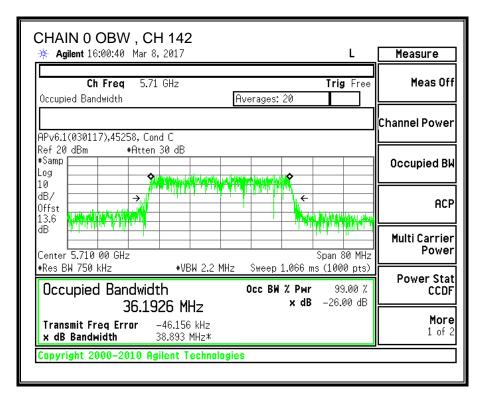


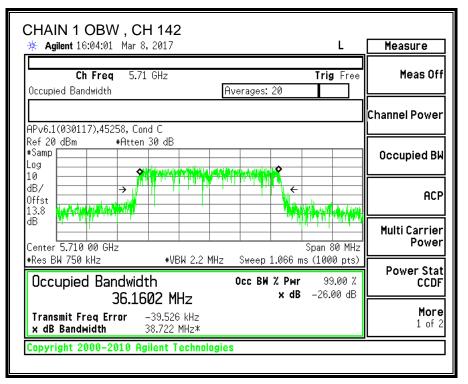
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# 9.11.3. OUTPUT POWER AND PPSD

# 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 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.

IC RSS-247 (6.2.3) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

# TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.Straddle channel power is measured using PXA spectrum analyzer, duty cycle correction factor is required.

### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
0.90	3.60	2.46	5.36

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# **RESULTS**

ID:	45258 JL	Date:	3/3/17
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#### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5510	40.80	36.10	2.46	5.36
Mid	5550	41.00	36.09	2.46	5.36
High	5670	41.20	36.08	2.46	5.36
142	5710	40.70	36.16	2.46	5.36

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5510	24.00	24.00	30.00	24.00	11.00	11.00	11.00
Mid	5550	24.00	24.00	30.00	24.00	11.00	11.00	11.00
High	5670	24.00	24.00	30.00	24.00	11.00	11.00	11.00
142	5710	24.00	24.00	30.00	24.00	11.00	11.00	11.00

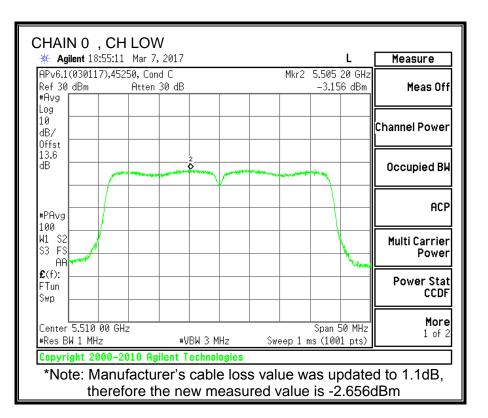
# **Output Power Results**

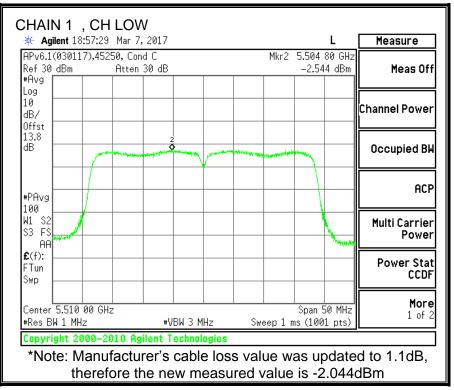
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	10.28	10.71	13.51	24.00	-10.49
Mid	5550	12.30	12.73	15.53	24.00	-8.47
High	5670	12.74	13.17	15.97	24.00	-8.03
142	5710	10.93	11.09	14.02	24.00	-9.98

## **PPSD Results**

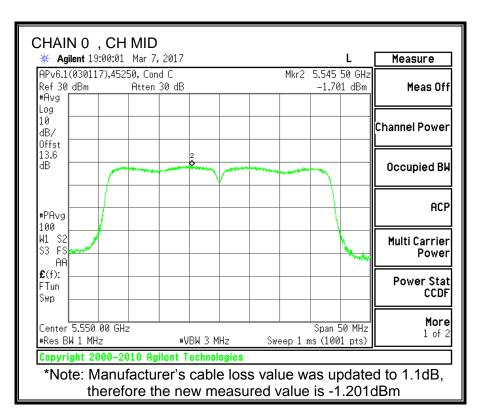
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	-2.66	-2.04	0.67	11.00	-10.33
Mid	5550	-1.20	0.06	2.48	11.00	-8.52
High	5670	-1.06	-0.002	2.51	11.00	-8.49
142	5710	-2.33	-1.88	0.91	11.00	-10.09

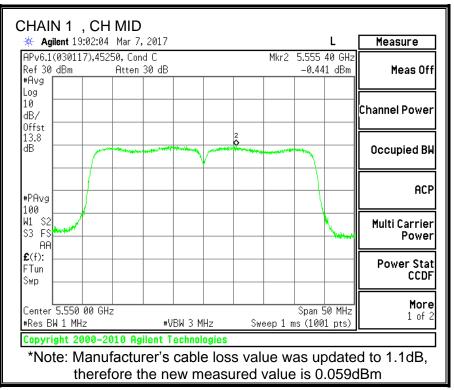
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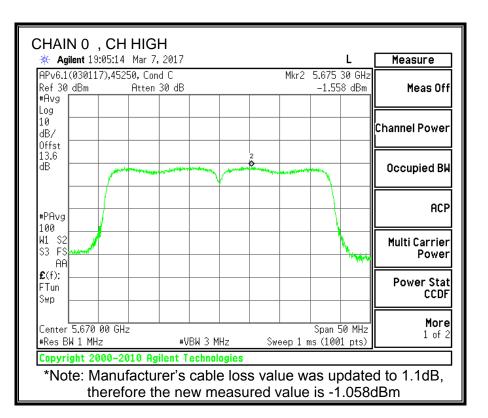


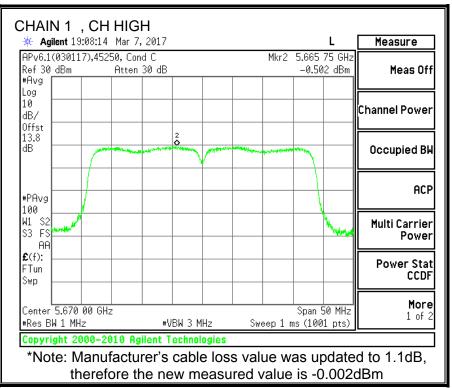
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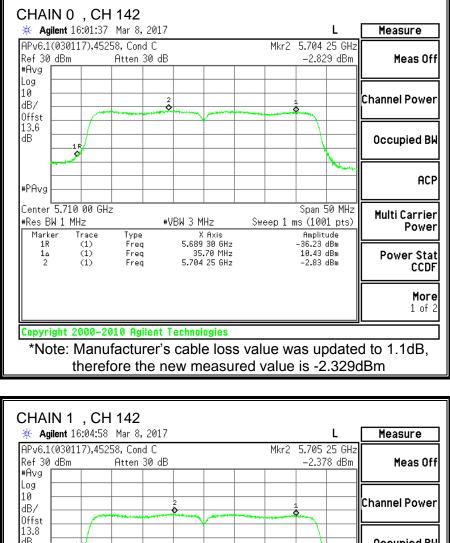


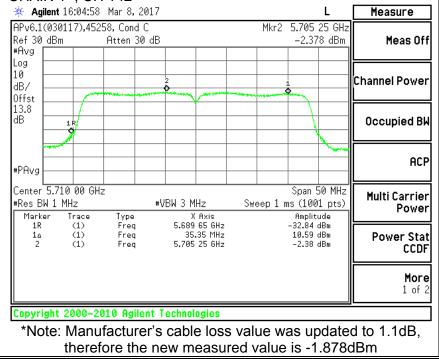
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# 9.12. 11ac VHT80 2TX MODE IN THE 5.6GHz BAND

# 9.12.1. 26 dB BANDWIDTH

# <u>LIMITS</u>

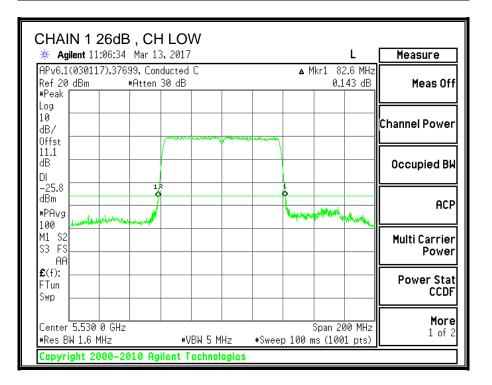
None; for reporting purposes only.

# **RESULTS**

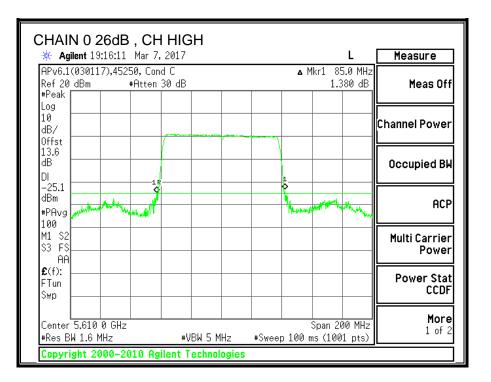
Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5530	84.4	82.6
High	5610	85	82.4
138	5690	84	83.8

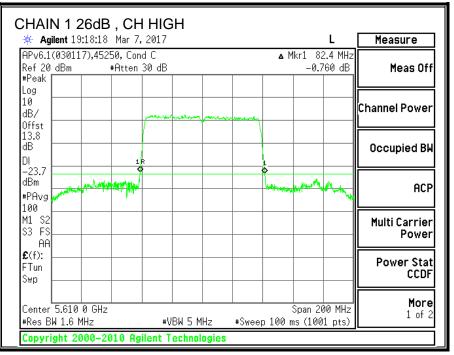
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CHAIN 0 26dB , CH LOW	
※ Agilent 11:05:12 Mar 13, 2017	L Measure
APv6.1(030117),37699, Conducted C Ref 20 dBm #Atten 30 dB #Peak	▲ Mkr1 84.4 MHz -0.367 dB Meas Off
Log 10 dB/ 0ffst	Channel Power
11.1 / / / / / / / / / / / / / / / / / /	Occupied BW
dBm	ACP
M1 S2 S3 FS AA	Multi Carrier Power
£(f): FTun Swp	Power Stat CCDF
Center 5.530 0 GHz #Res BW 1.6 MHz #Sweep	Span 200 MHz         More           100 ms (1001 pts)         1 of 2
Copyright 2000–2010 Agilent Technologies	



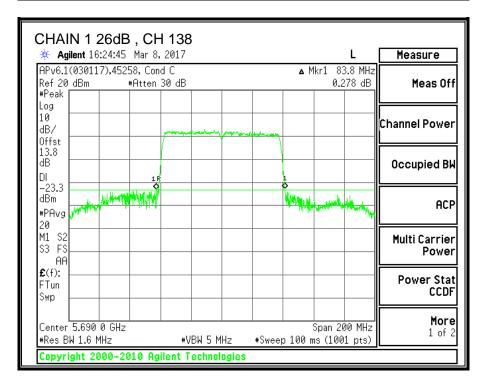
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CHAIN 0 26dB, CH			L	Measure
APv6.1(030117),45258, Cond Ref 20 dBm #Atten 3 #Peak	С	▲ Mkr1 8	527 dB	Meas Off
Log 10 dB/ 0ffst				Channel Power
13.6 dB DI -24.5		a		Occupied BW
-24.3 dBm #PAvg 20			week and a	АСР
M1 S2 S3 FS AA				Multi Carrier Power
£(f): FTun Swp				Power Stat CCDF
Center 5.690 0 GHz #Res BW 1.6 MHz	#VBW 5 MHz		200 MHz 01 pts)	<b>More</b> 1 of 2



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# 9.12.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

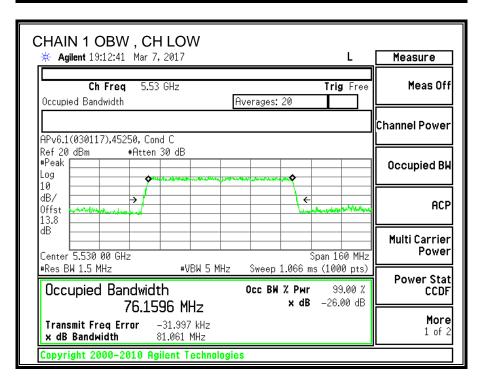
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5530	76.05	76.16
High	5610	76.033	75.912
138	5690	76.149	76.096

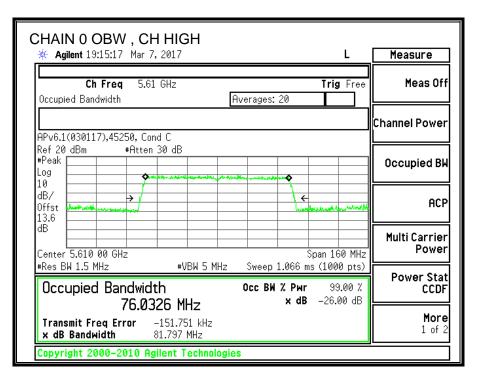
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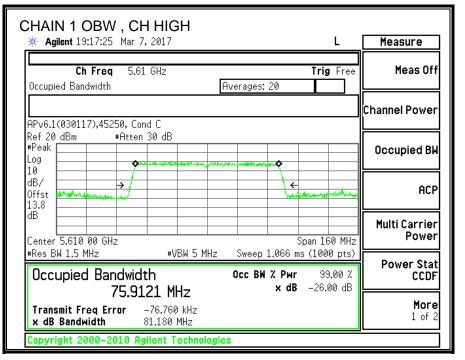
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APv6.1(030117),45250, Cond C Ref 20 dBm #Atten 30 dB *Peak Log 10	Meas Off Channel Power
APv6.1(030117),45250, Cond C Ref 20 dBm #Atten 30 dB *Peak Log 10	Channel Power
*Peak Log 10 10	
	Occupied BW
0ffst mittanianing for the standard stand Standard standard stan	ACP
dBCenter 5.530 00 GHz \$pan 160 MHz	Multi Carrier Power
*Res BW 1.5 MHz         #VBW 5 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Осс ВМ % Рыг         99.00 %           76.0498 MHz         × dB         -26.00 dB	Power Stat CCDF
Transmit Freq Error       13.811 kHz         x dB Bandwidth       81.349 MHz	<b>More</b> 1 of 2



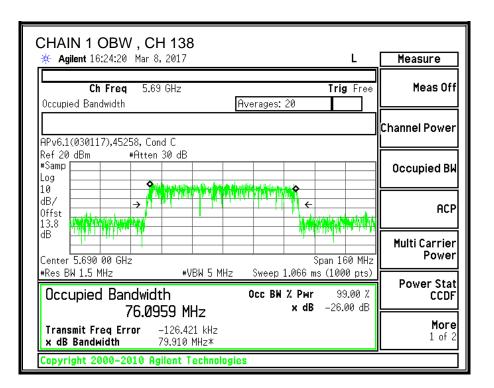
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CHAIN 0 OBW , CH 138	Measure
Ch Freq 5.69 GHz Trig Free Occupied Bandwidth Averages: 20	Meas Off
	Channel Power
Ref 20 dBm #Atten 30 dB #Samp	Occupied BW
10 dB/ offst 13.6 dB/ dB/ dB/ dB/ dB/ dB/ dB/ dB/	ACP
dB	Multi Carrier Power
#Res BW 1.5 MHz         #VBW 5 MHz         Sweep 1.066 ms (1000 pts)           Occupied Bandwidth         Осс ВМ % Рыг         99.00 %           76.1487 MHz         × dB         -26.00 dB	Power Stat CCDF
Transmit Freq Error     -66.078 kHz       x dB Bandwidth     79.866 MHz*	<b>More</b> 1 of 2
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# 9.12.3. OUTPUT POWER AND PPSD

## 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 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.

IC RSS-247 (6.2.3) (1)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, 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 log10B, 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.

# TEST PROCEDURE

Measurements perform using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.Straddle channel power is measured using PXA spectrum analyzer, duty cycle correction factor is required.

### DIRECTIONAL ANTENNA GAIN

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
0.90	3.60	2.46	5.36

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## **RESULTS**

ID:	45258 JL 37699 CS	Date:	3/3/17 5/2/17
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## Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5530	82.60	76.05	2.46	5.36
High	5610	82.40	75.91	2.46	5.36
138	5690	83.80	76.10	2.46	5.36

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5530	24.00	24.00	30.00	24.00	11.00	11.00	11.00
High	5610	24.00	24.00	30.00	24.00	11.00	11.00	11.00
138	5690	24.00	24.00	30.00	24.00	11.00	11.00	11.00

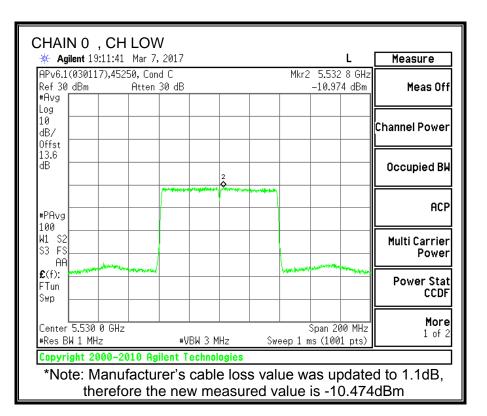
## **Output Power Results**

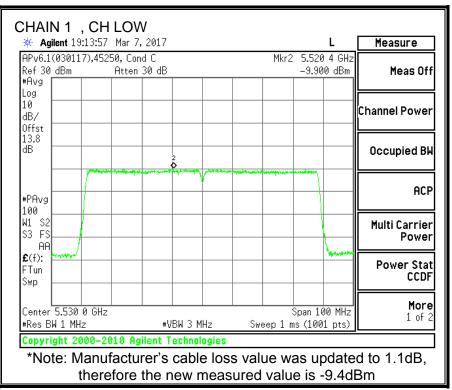
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5530	6.22	6.89	9.58	24.00	-14.42
High	5610	9.88	10.16	13.03	24.00	-10.97
138	5690	7.39	7.70	10.56	24.00	-13.44

#### **PPSD** Results

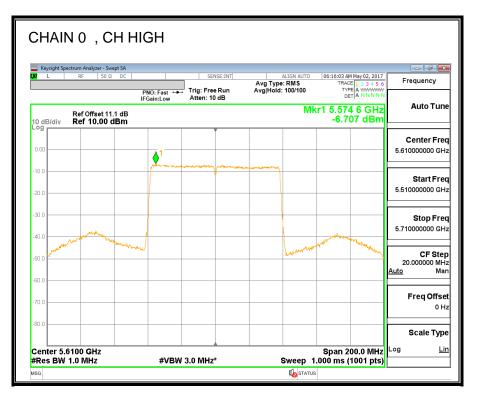
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5530	-10.47	-9.40	-6.89	11.00	-17.89
High	5610	-6.71	-6.81	-3.75	11.00	-14.75
138	5690	-9.52	-9.11	-6.30	11.00	-17.30

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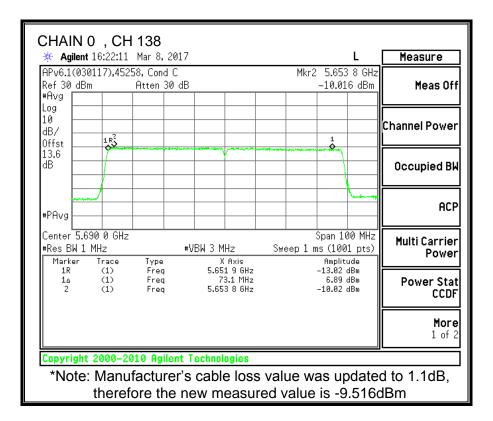


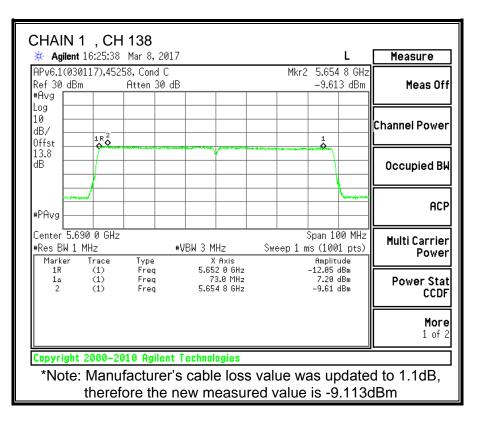


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# 9.13. 11a 2TX MODE IN THE 5.8GHz BAND

# 9.13.1. 6 dB BANDWIDTH

## <u>LIMITS</u>

FCC §15.407 (e)

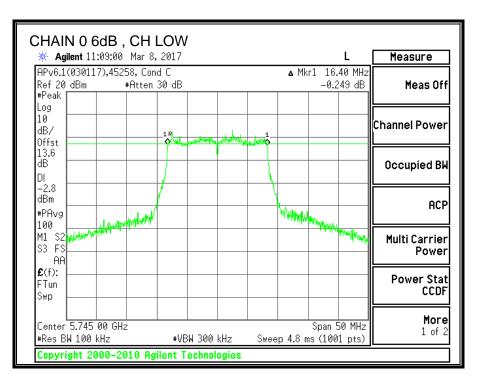
IC RSS-247 (6.2.4) (1)

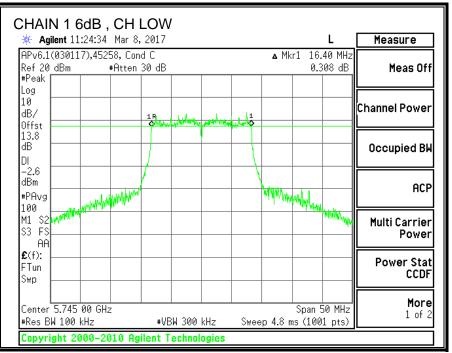
The minimum 6 dB bandwidth shall be at least 500 kHz.

### **RESULTS**

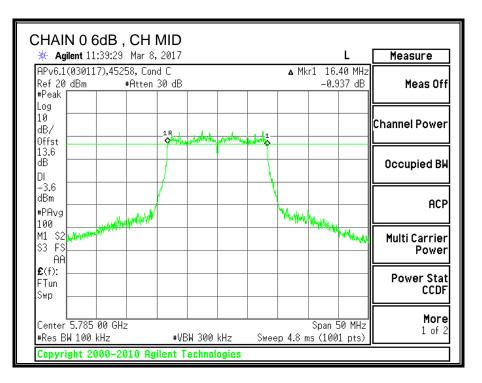
Channel	Frequency	6 dB BW CHAIN 0 (MHz)	6 dB BW CHAIN 1 (MHz)	Minimum Limit (MHz)
Low	5745	16.40	16.40	0.5
Mid	5785	16.40	16.40	0.5
High	5825	16.40	16.40	0.5
144	5720	3.3	3.3	0.5

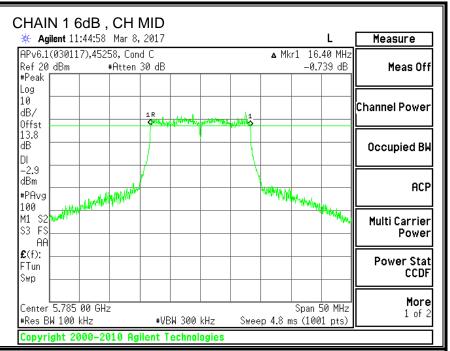
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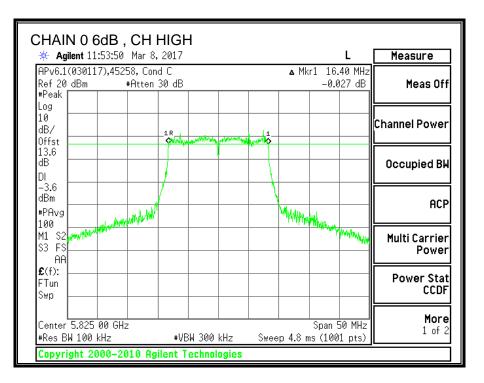


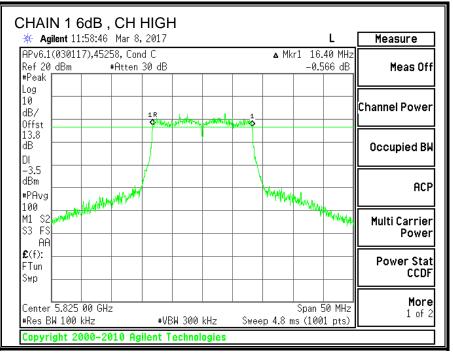
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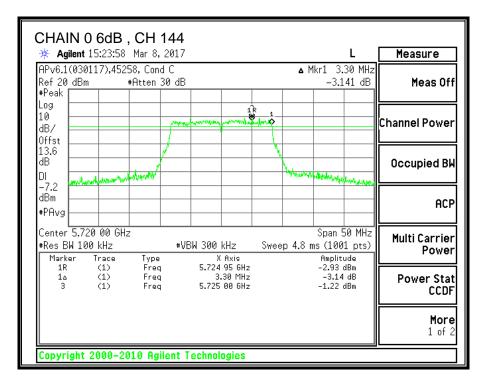
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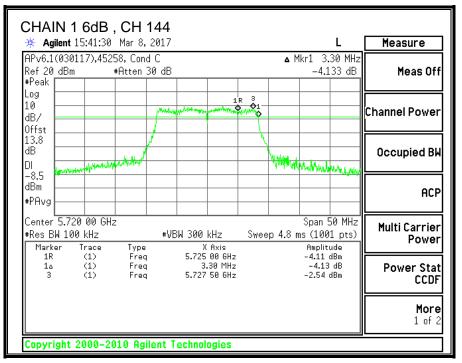




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# 9.13.2. 26 dB BANDWIDTH

#### LIMITS

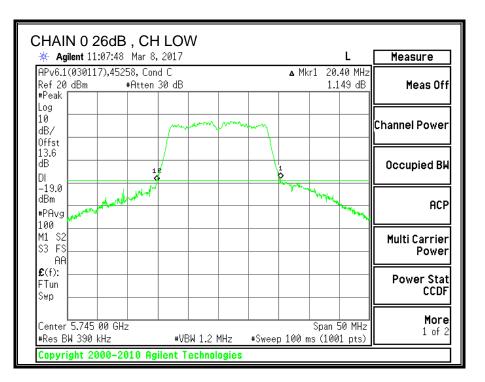
None; for reporting purposes only.

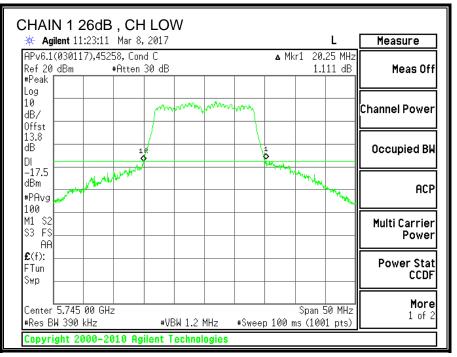
#### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5745	20.40	20.25
Mid	5785	20.65	21.35
High	5825	21.45	20.15

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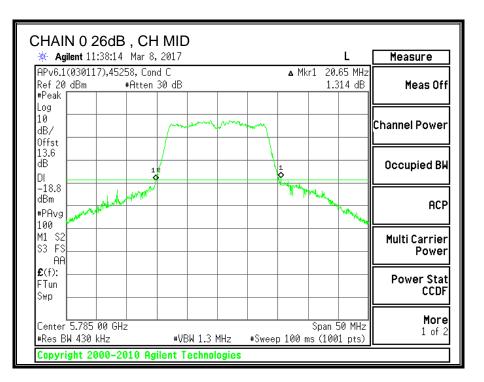
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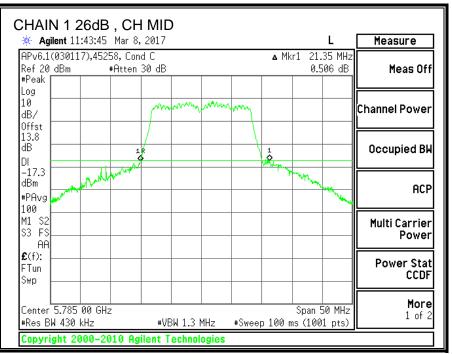




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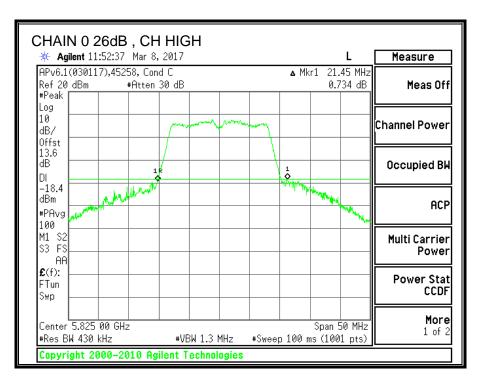
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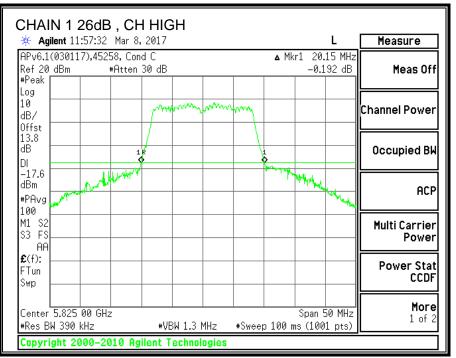




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# 9.13.3. 99% BANDWIDTH

#### **LIMITS**

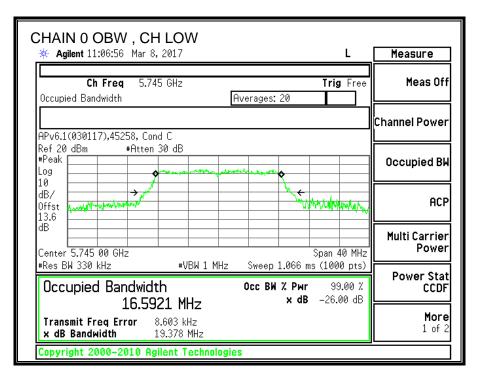
None; for reporting purposes only.

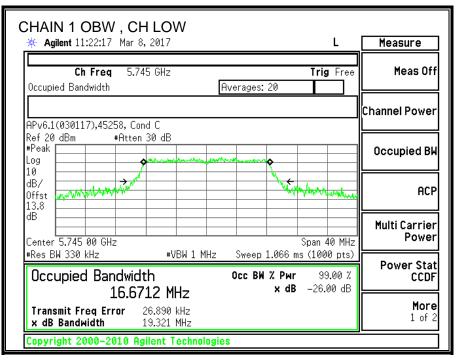
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5745	16.592	16.671
Mid	5785	16.638	16.631
High	5825	16.622	16.552

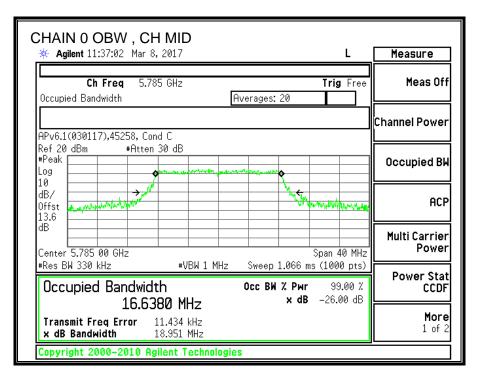
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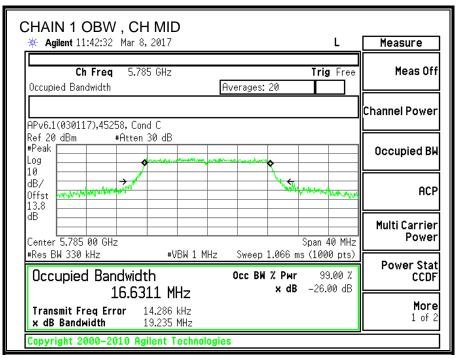
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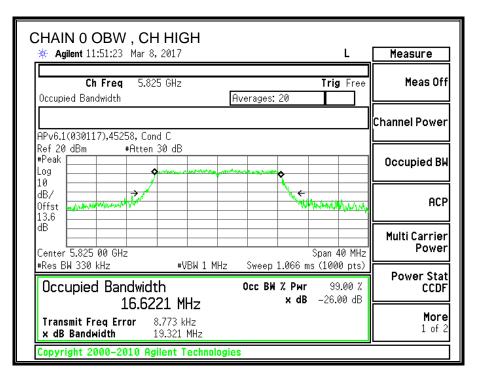
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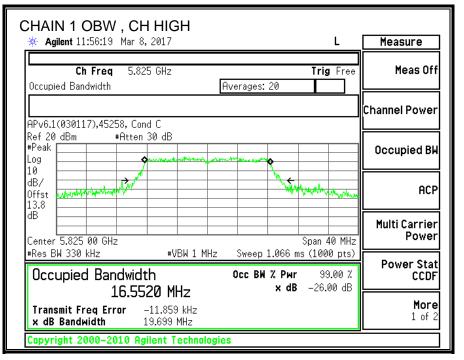




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# 9.13.4. OUTPUT POWER AND PSD

# LIMITS

FCC §15.407 (a) (3)

IC RSS-247 (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**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.30	3.60	2.60	5.54

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# **RESULTS**

ID:	45258 JL	Date:	3/3/17
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## Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5745	20.25	16.59	2.60	5.54
Mid	5785	20.65	16.63	2.60	5.54
High	5805	20.15	16.55	2.60	5.54
144	5720	19.95	16.51	2.60	5.54

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5745	30.00	29.20	35.20	29.20	30.00	30.00	30.00
Mid	5785	30.00	29.21	35.21	29.21	30.00	30.00	30.00
High	5805	30.00	29.19	35.19	29.19	30.00	30.00	30.00
144	5720	30.00	29.18	35.18	29.18	30.00	30.00	30.00

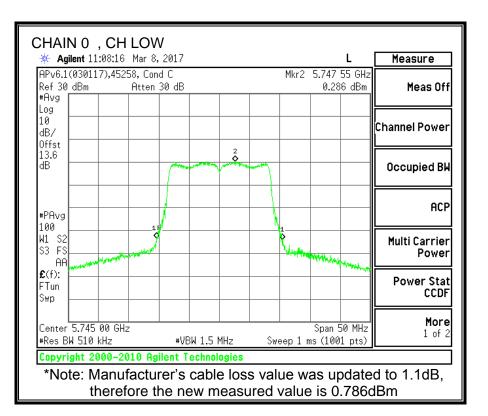
## **Output Power Results**

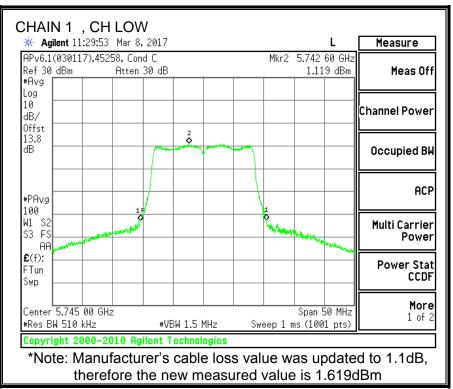
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	14.08	13.71	16.91	29.20	-12.29
Mid	5785	13.80	13.52	16.67	29.21	-12.54
High	5805	13.62	13.19	16.42	29.19	-12.77
144	5720	4.80	5.27	8.05	29.18	-21.13

## **PPSD Results**

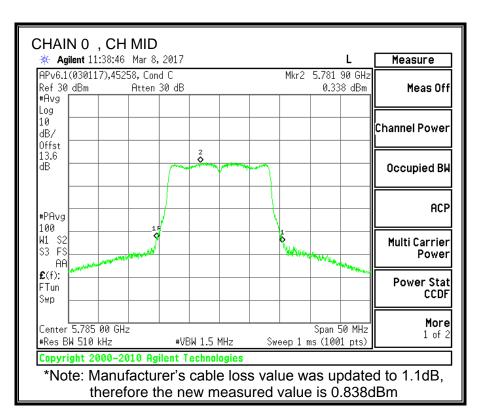
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	0.79	1.62	4.23	30.00	-25.77
Mid	5785	0.84	1.26	4.06	30.00	-25.94
High	5805	0.73	0.92	3.84	30.00	-26.16
144	5720	-1.91	-1.12	1.51	30.00	-28.49

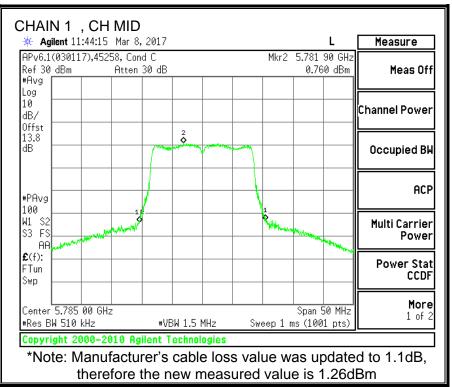
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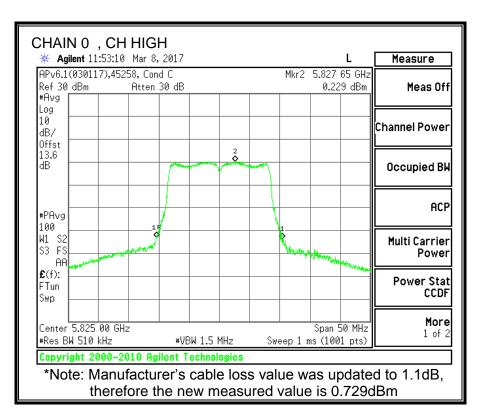


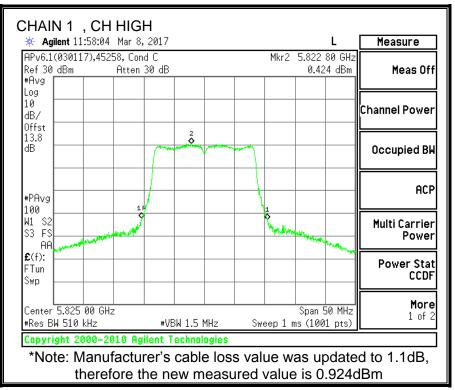
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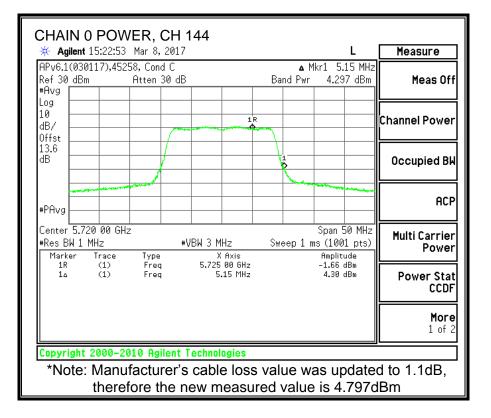


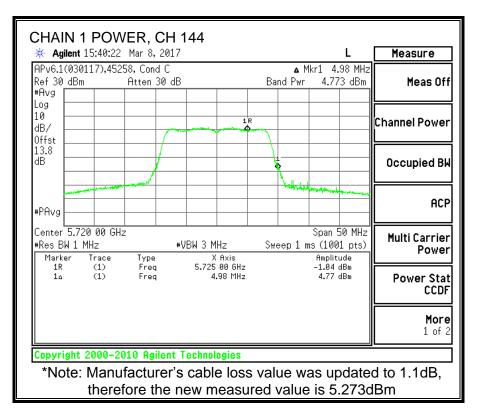
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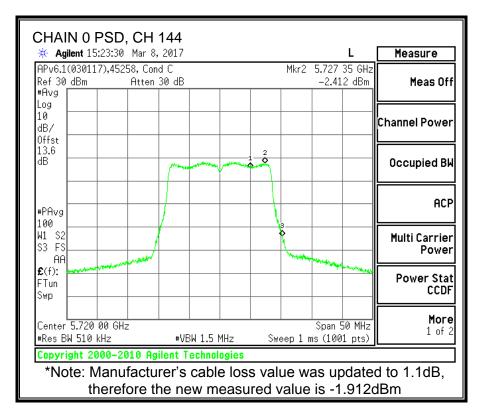


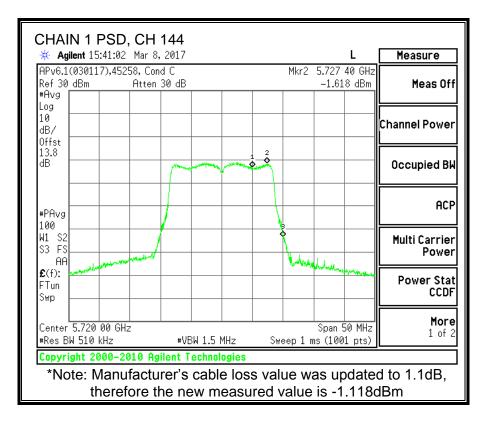
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# 9.14. 11n HT20 2TX MODE IN THE 5.8GHz BAND

# 9.14.1. 6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.407 (e)

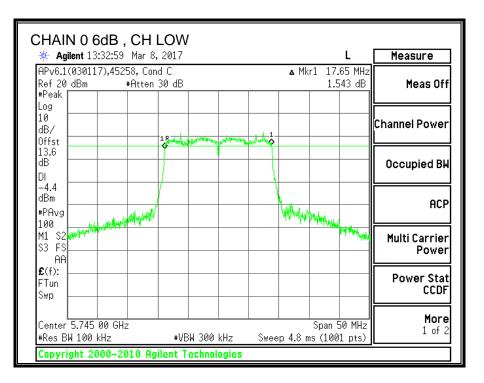
IC RSS-247 (6.2.4) (1)

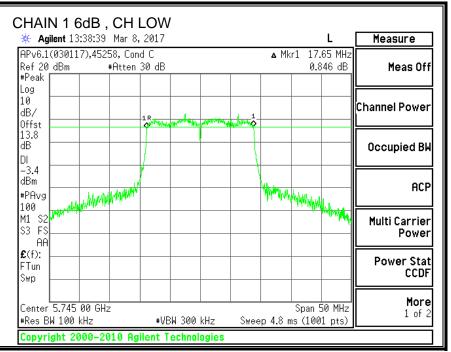
The minimum 6 dB bandwidth shall be at least 500 kHz.

## **RESULTS**

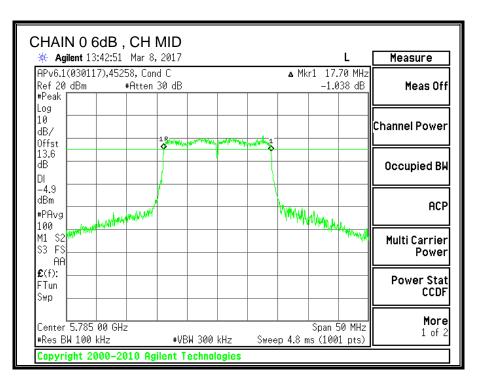
Channel	Frequency	6 dB BW CHAIN 0 (MHz)	6 dB BW CHAIN 1 (MHz)	Minimum Limit (MHz)
Low	5745	17.65	17.65	0.5
Mid	5785	17.70	17.60	0.5
High	5825	17.60	17.60	0.5
144	5720	3.9	3.9	0.5

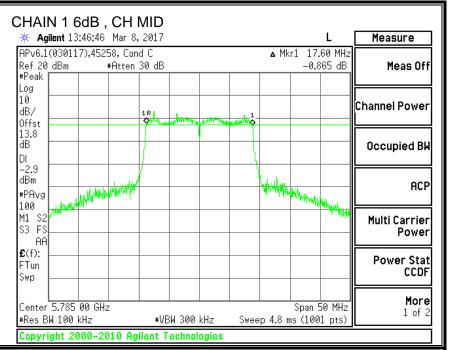
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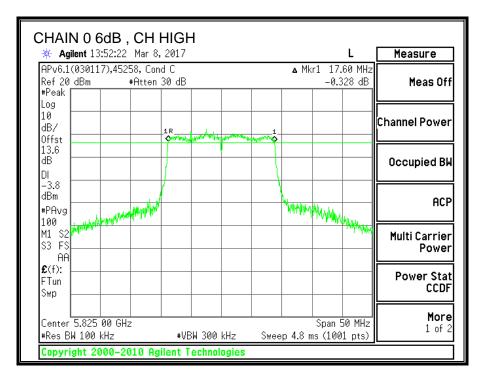


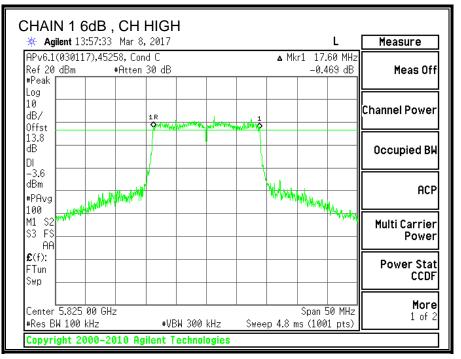
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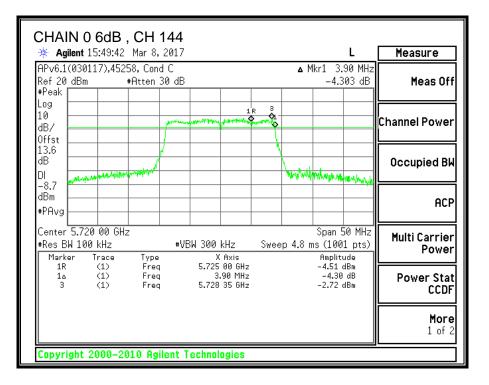


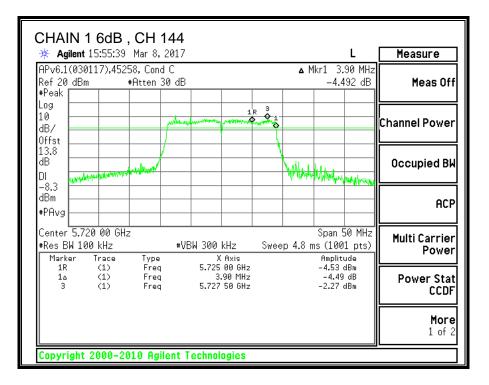
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# 9.14.2. 26 dB BANDWIDTH

## LIMITS

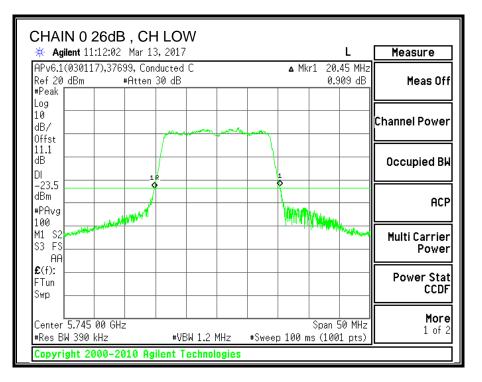
None; for reporting purposes only.

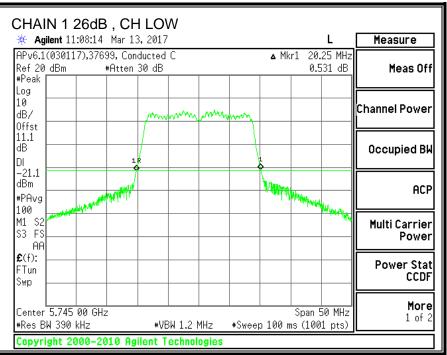
## **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5745	20.45	20.25
Mid	5785	20.45	20.35
High	5825	20.65	20.3

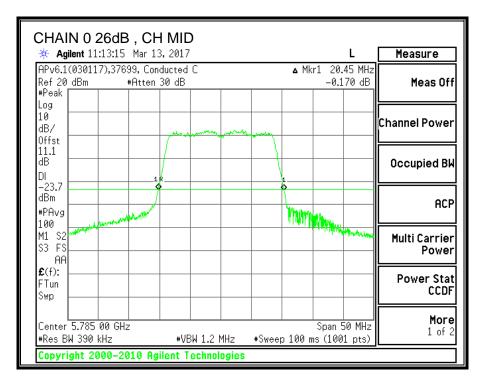
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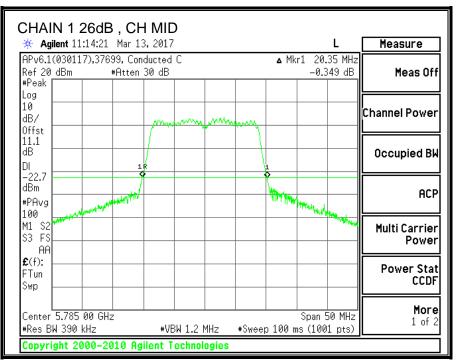
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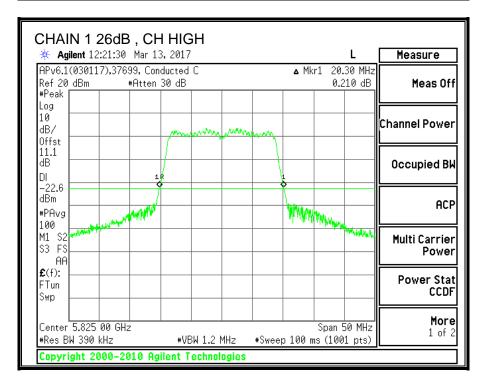
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CHAIN 0 26dB , CH F			_	
🛛 🔆 Agilent 12:23:12 Mar 13, 2	2017		L	Measure
APv6.1(030117),37699, Conduc Ref 20 dBm #Atten 30 #Peak			0.65 MHz .521 dB	Meas Off
Log 10 dB/ Offst /	-	•••••		Channel Power
11.1 // dB // 18		<u></u>		Occupied BW
-23.5 dBm #PAvg 100 M1 S2		Maria Maria	helium .	ACP
M1 S2 S3 FS AA				Multi Carrier Power
£(f): FTun Swp				Power Stat CCDF
Center 5.825 00 GHz #Res BW 430 kHz	#VBW 1.3 MHz		50 MHz 01 pts)	<b>More</b> 1 of 2
Copyright 2000–2010 Agiler	nt Technologies			



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# 9.14.3. 99% BANDWIDTH

## LIMITS

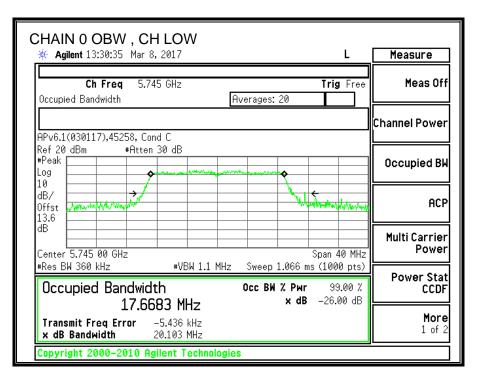
None; for reporting purposes only.

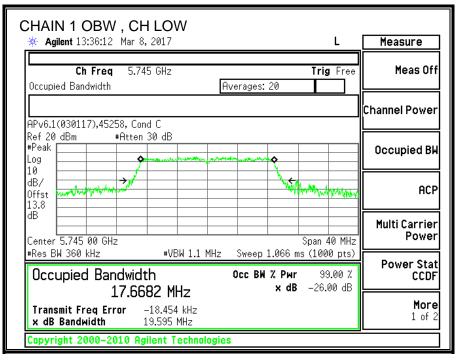
## **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5745	17.668	17.668
Mid	5785	17.704	17.656
High	5825	17.662	17.667

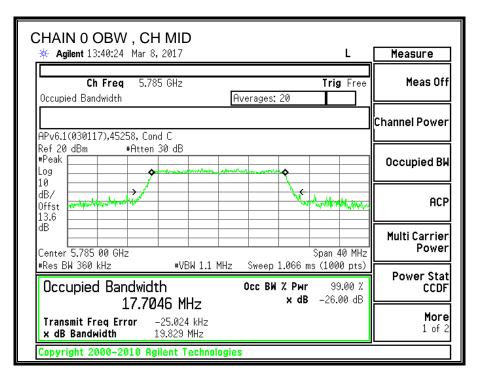
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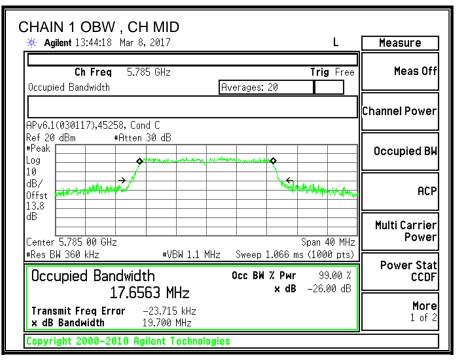
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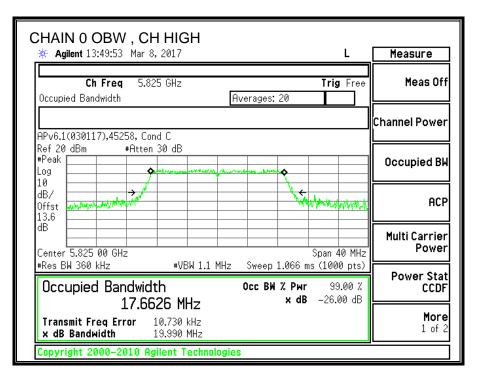


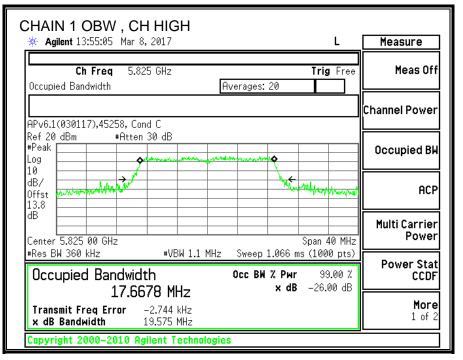
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# 9.14.4. OUTPUT POWER AND PSD

# LIMITS

FCC §15.407 (a) (3)

IC RSS-247 (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**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.30	3.60	2.60	5.54

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# **RESULTS**

## Bandwidth and Antenna Gain

Danawia	Danowidin and Antenna Gam							
Channel	Frequency	Min	Min Directional		Directional			
		26 dB	99%	Gain	Gain			
		BW	BW	for Power	for PPSD			
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)			
Low	5745	20.25	17.67	2.60	5.54			
Mid	5785	20.35	17.66	2.60	5.54			
High	5805	20.30	17.66	2.60	5.54			
144	5720	20.35	17.66	2.60	5.54			

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5745	30.00	29.47	35.47	29.47	30.00	30.00	30.00
Mid	5785	30.00	29.47	35.47	29.47	30.00	30.00	30.00
High	5805	30.00	29.47	35.47	29.47	30.00	30.00	30.00
144	5720	30.00	29.47	35.47	29.47	30.00	30.00	30.00

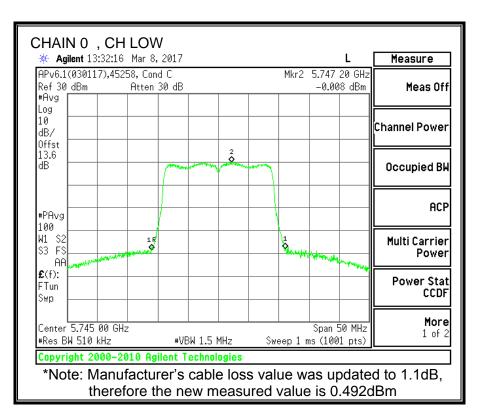
# **Output Power Results**

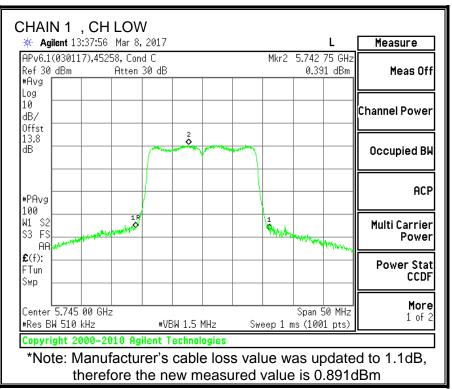
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas	Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	14.16	13.83	17.01	29.47	-12.46
Mid	5785	13.84	13.55	16.71	29.47	-12.76
High	5805	13.95	13.31	16.65	29.47	-12.82
144	5720	5.61	5.87	8.75	29.47	-20.72

# **PPSD** Results

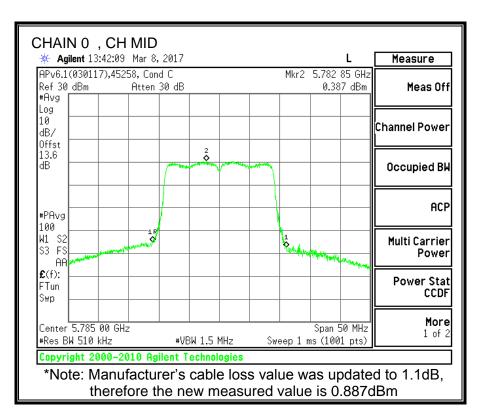
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	0.49	0.89	3.71	30.00	-26.29
Mid	5785	0.89	1.44	4.18	30.00	-25.82
High	5805	0.90	0.73	3.83	30.00	-26.17
144	5720	-1.62	-1.20	1.61	30.00	-28.39

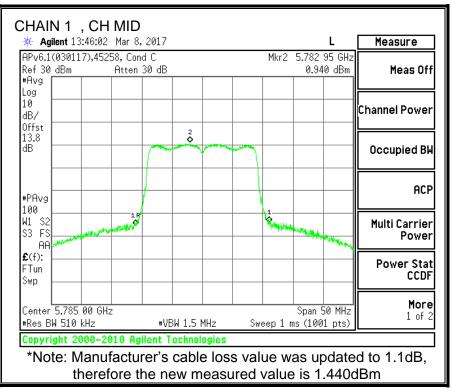
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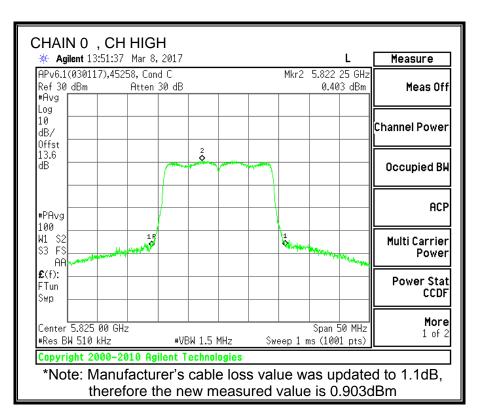


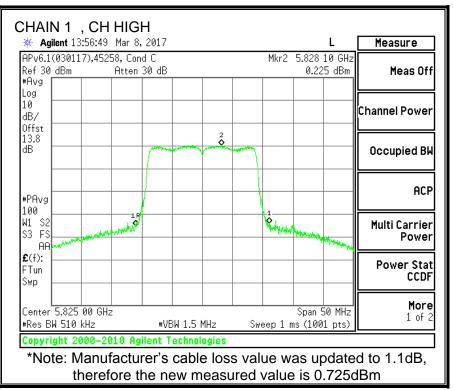
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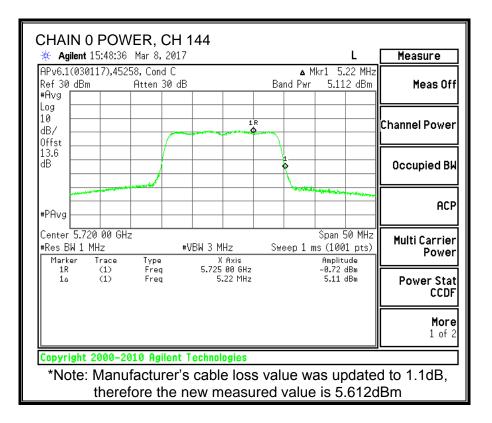


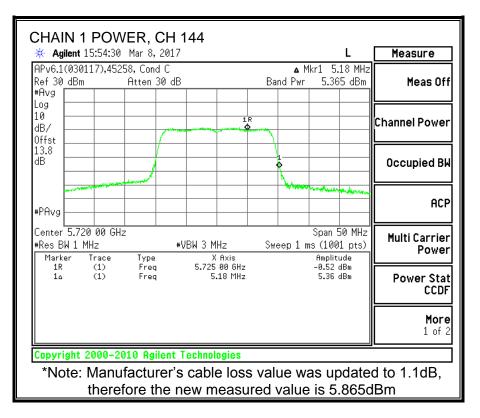
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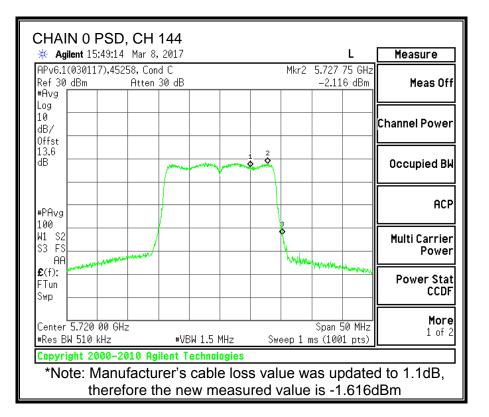


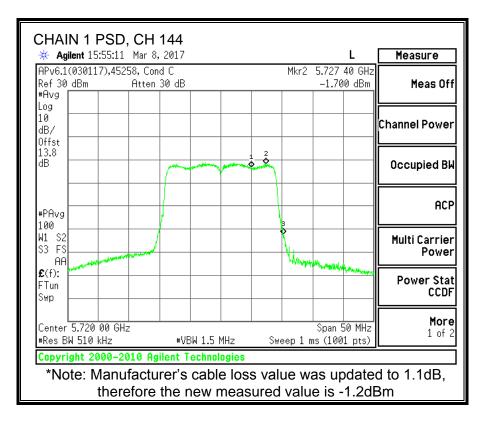
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# 9.15. 11n HT40 2TX MODE IN THE 5.8GHz BAND

# 9.15.1. 6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.407 (e)

IC RSS-247 (6.2.4) (1)

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

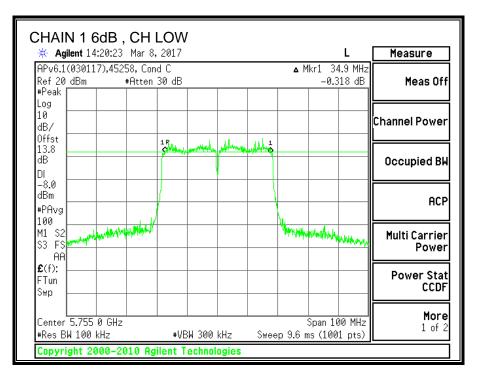
# **RESULTS**

Channel	Frequency	6 dB BW CHAIN 0 (MHz)	6 dB BW CHAIN 1 (MHz)	Minimum Limit (MHz)
Low	5755	35.7	34.9	0.5
High	5795	36.4	35.8	0.5
142	5710	3.4	3.4	0.5

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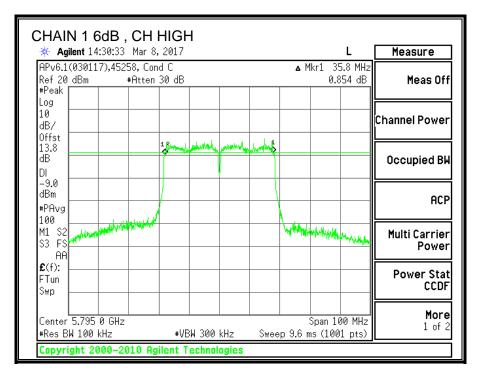
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											HAI
Measure	L						2017	Mar 8,	:16:49	lent 14	🔆 Ag
Meas Off	i.7 MHz 44 dB		۸ ۵					58, Con #Atten			APv6.1 Ref 20 #Peak
Channel Power											Log 10 dB/ Offst
Occupied BW				Jan 1	and the second		1R Commune				13.6 dB DI
ACP								. (			-8.9 dBm #PAvg
Multi Carrier Power	Alterates	ally the No.	<b>Markin</b>					adad for the second	vn.lpilipaj	underforder	100 M1 S2 S3 FS AA
Power Stat CCDF											€(f): FTun Swp
More 1 of 2		Span 10 ns (100		Swee	kHz	W 300	+VE				Center #Res B
					ogies	echnol	ilent T	10 Ag	00-20	ght 20	Copyri



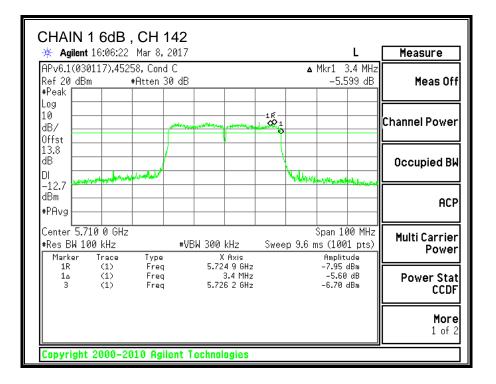
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CHAIN 0 6dB , CH		L	Measure
APv6.1(030117),45258, Con Ref 20 dBm #Atten #Peak		▲ Mkr1 36.4 MH: -0.578 dB	
Log 10 dB/ Offst			Channel Power
13.6 dB DI	British dishter provently		Occupied BW
-9.7 dBm #PAvg 100			ACP
100 M1 S2 S3 FS harden the Ministration of the Ministratio of the Ministration of the		When when a start and a start	Multi Carrier Power
£(f): FTun Swp			Power Stat CCDF
Center 5.795 0 GHz #Res BW 100 kHz	#VBW 300 kHz	Span 100 MHz Sweep 9.6 ms (1001 pts)	



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CHAIN 0 6dB , CH				
🔆 🔆 Agilent 16:02:49 Mar 8,	2017		L	Measure
APv6.1(030117),45258, Con Ref 20 dBm #Atten #Peak		▲ Mk	<r1 3.4="" mhz<br="">-4.492 dB</r1>	Meas Off
Log 10 dB/ 0ffst	permission antipoper president,			Channel Power
13.6 dB DI			the free the same to use	Occupied BW
-13.4 dBm #PAvg				ACP
Center 5.710 0 GHz #Res BW 100 kHz Marker Trace Type	#VBW 300 kHz X Axis	Sweep 9.6 ms	an 100 MHz (1001 pts) Amplitude	Multi Carrier Power
1R (1) Freq 1△ (1) Freq 3 (1) Freq	3.4 MHz		-8.09 dBm -4.49 dB -7.37 dBm	Power Stat CCDF
				<b>More</b> 1 of 2
Copyright 2000-2010 Agi	ilent Technologies			



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# 9.15.2. 26 dB BANDWIDTH

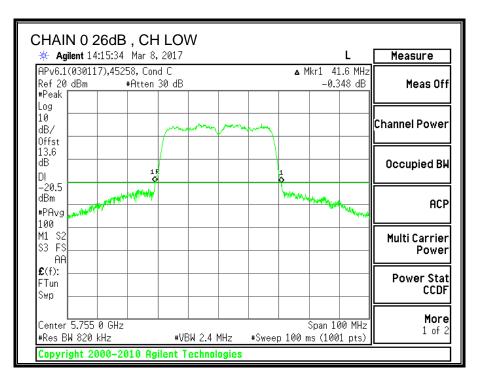
## LIMITS

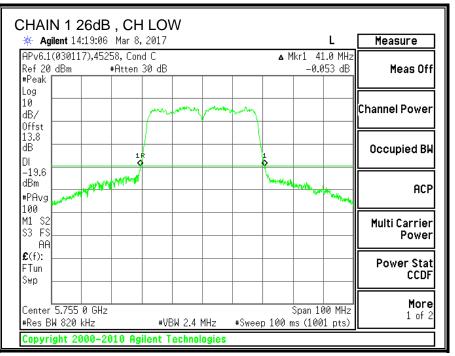
None; for reporting purposes only.

## **RESULTS**

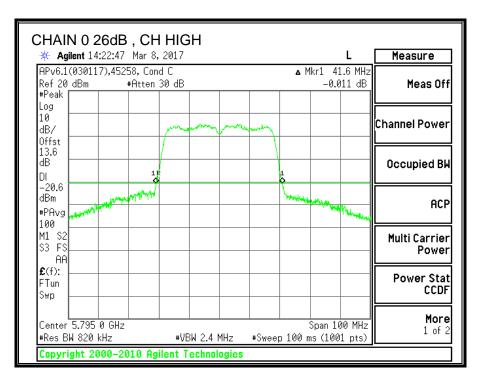
Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
Low	5755	41.6	41.0
High	5795	41.6	40.8

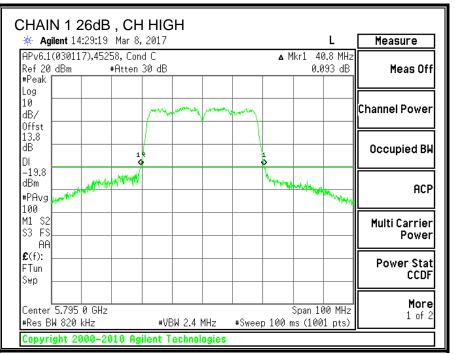
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# 9.15.3. 99% BANDWIDTH

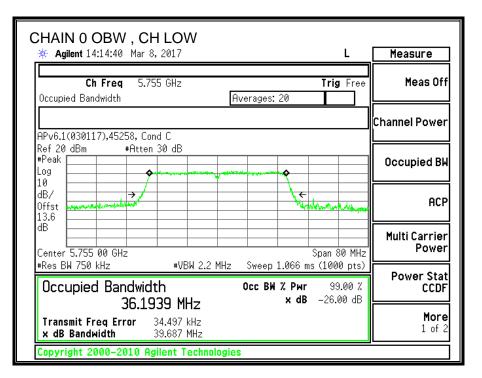
#### **LIMITS**

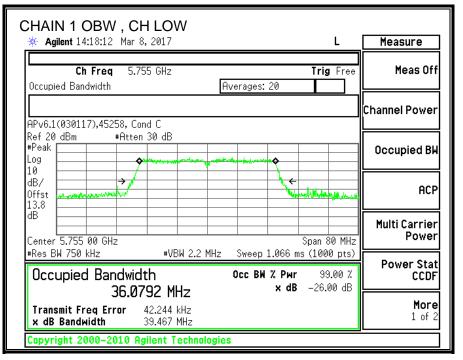
None; for reporting purposes only.

## **RESULTS**

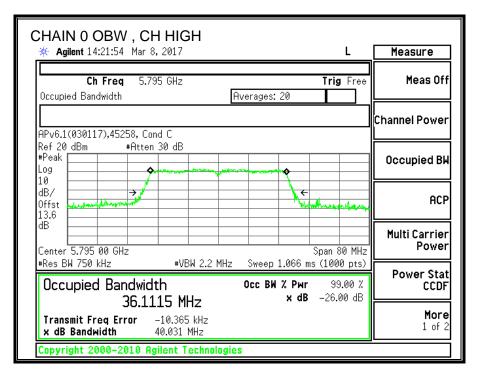
Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
Low	5755	36.193	36.079
High	5795	36.115	36.141

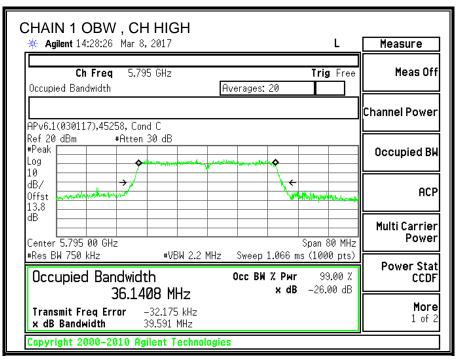
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# 9.15.4. OUTPUT POWER AND PSD

## LIMITS

FCC §15.407 (a) (3)

IC RSS-247 (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**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.30	3.60	2.60	5.54

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## **RESULTS**

<b>ID:</b> 45258 J	L Date:	3/3/17
--------------------	---------	--------

## Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
Low	5755	41	36.08	2.60	5.54
High	5795	40.8	36.12	2.60	5.54
142	5710	40.7	36.16	2.60	5.54

#### Limits

Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
Low	5755	30.00	30.00	36.00	30.00	30.00	17.00	17.00
High	5795	30.00	30.00	36.00	30.00	30.00	17.00	17.00
142	5710	30.00	30.00	36.00	30.00	30.00	17.00	17.00

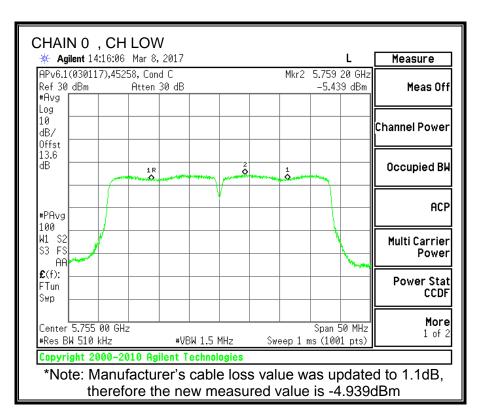
## **Output Power Results**

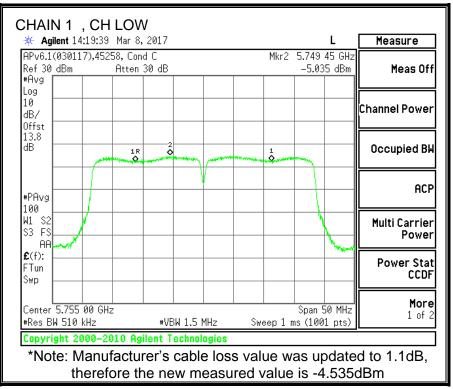
Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
		Meas Meas		Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5755	11.15	10.53	13.86	30.00	-16.14
High	5795	10.95	10.41	13.70	30.00	-16.30
142	5710	0.48	0.48	3.49	30.00	-26.51

# **PPSD** Results

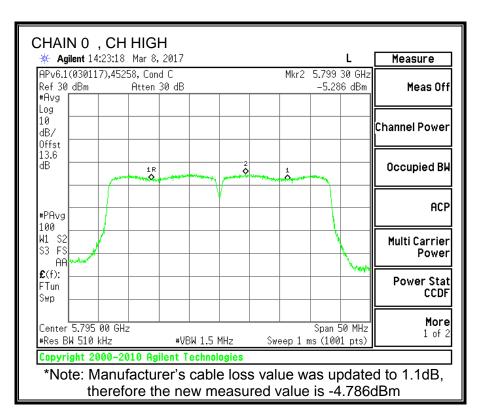
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD
		Meas	Meas	Corr'd	Limit	Margin
		PPSD	PPSD	PPSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5755	-4.94	-4.54	-1.72	17.00	-18.72
High	5795	-4.79	-4.91	-1.84	17.00	-18.84
142	5710	-6.08	-6.04	-3.05	17.00	-20.05

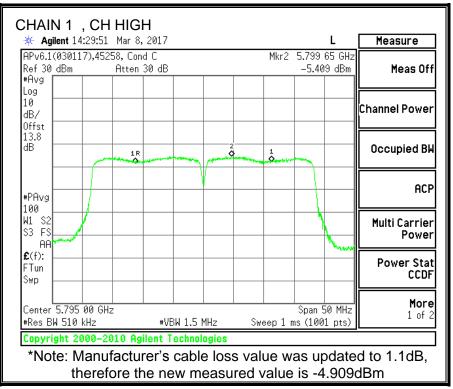
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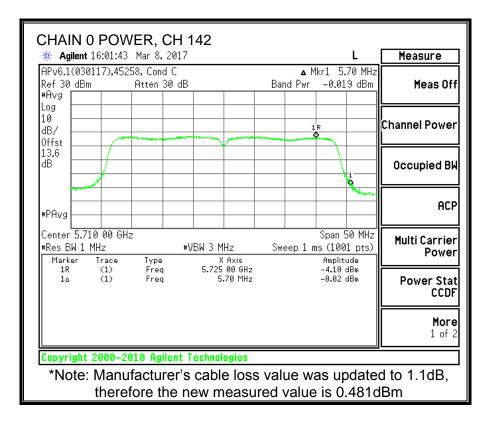


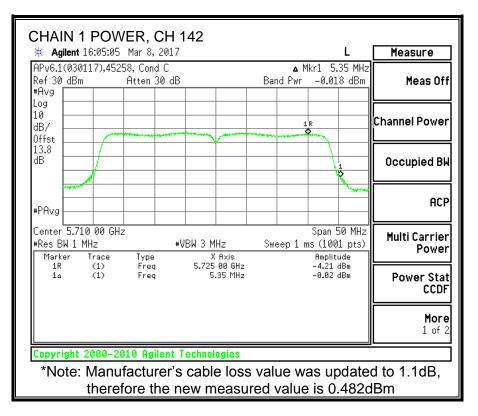
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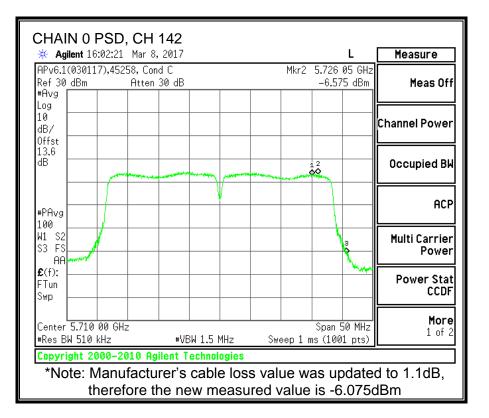


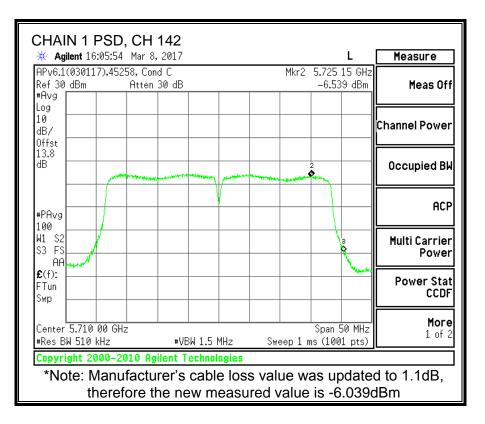
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# 9.16. 11ac HT80 2TX MODE IN THE 5.8GHz BAND

# 9.16.1. 6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.407 (e)

IC RSS-247 (6.2.4) (1)

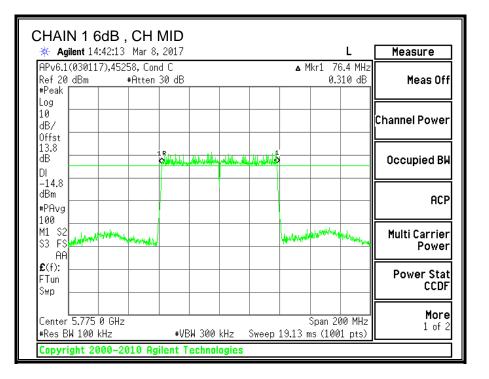
The minimum 6 dB bandwidth shall be at least 500 kHz.

## **RESULTS**

Channel	Frequency	6 dB BW CHAIN 0 (MHz)	6 dB BW CHAIN 1 (MHz)	Minimum Limit (MHz)
155	5775	76.4	76.4	0.5
138	5690	3.2	3.4	0.5

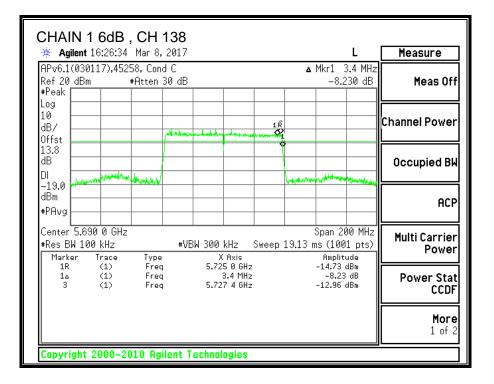
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CHAIN 0 6dB,	CH MID				
🔆 🔆 🔆 🔆 🔆 🔆	Mar 8, 2017			L	Measure
#Peak	3, Cond C Atten 30 dB			76.4 MHz 0.382 dB	Meas Off
Log 10 dB/ 0ffst					Channel Power
13.6 dB DI	1R Aladalah	hit Mhonshal ashiel Mile	 		Occupied BW
-15.5 dBm #PAvg 100					ACP
M1 S2 S3 FS			worktheather	and the state of the	Multi Carrier Power
£(f): FTun Swp					Power Stat CCDF
Center 5.775 0 GHz #Res BW 100 kHz	#VBW 30	0 kHz Sweep		200 MHz 001 pts)	More 1 of 2
Copyright 2000-201	.0 Agilent Techn	ologies			



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CHA			, CH Mar 8,							1	Measure
										L	rieasul e
Ref 20	(03011 dBm		58, Con #Atten					Δ	. Mkr1 ( 3.0	3.2 MHz 081 dB	Meas Off
#Peak											
Log 10											
dB/							1 Ř				Channel Power
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DI	<u> </u>										
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dBm	<u> </u>										ACP
#PAvg											
	L	0.011									
	5.690								Span 2		Multi Carrier
	W 100						Sweep	19.13	ms (100		Power
Mark 1R		race (1)	Type Freg			Axis 50GH	-		Amplit -12,72		
10			Freq			3.2 MH			-3.08		Power Stat
3		(1)	Freq		5.72	7 4 GH	z		-10.50	dBm	CCDF
											0001
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											1 UT 2
Copyri	ight 20	000-20	)10 Agi	lent T	echnol	ogies					



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# 9.16.2. 26 dB BANDWIDTH

#### LIMITS

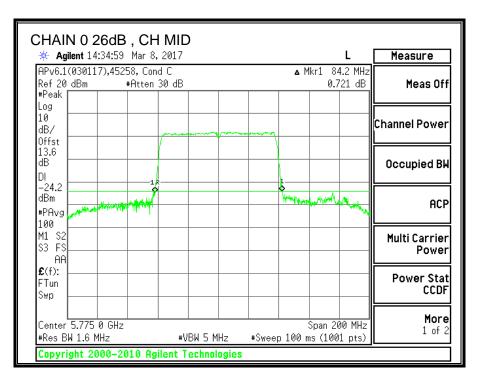
None; for reporting purposes only.

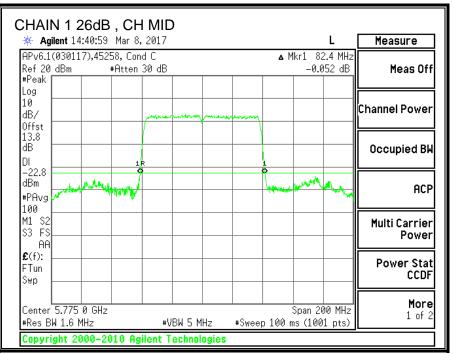
#### **RESULTS**

Channel	Frequency	26 dB BW CHAIN 0 (MHz)	26 dB BW CHAIN 1 (MHz)
155	5775	84.2	82.4

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# 9.16.3. 99% BANDWIDTH

#### **LIMITS**

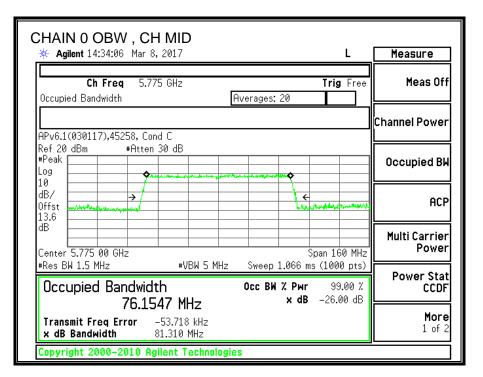
None; for reporting purposes only.

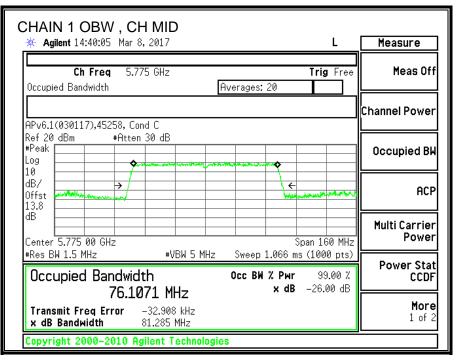
#### **RESULTS**

Channel	Frequency	99% BW CHAIN 0 (MHz)	99% BW CHAIN 1 (MHz)
155	5775	76.155	76.107

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# 9.16.4. OUTPUT POWER AND PSD

#### **LIMITS**

FCC §15.407 (a) (3)

IC RSS-247 (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**

Chain 0	Chain 1	<b>Uncorrelated Chains</b>	<b>Correlated Chains</b>
Antenna	Antenna	Directional	Directional
Gain	Gain	Gain	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.30	3.60	2.60	5.54

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## **RESULTS**

ID: 45258 JL	Date:	3/3/17
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#### Bandwidth and Antenna Gain

Channel	Frequency	Min	Min	Directional	Directional
		26 dB	99%	Gain	Gain
		BW	BW	for Power	for PPSD
	(MHz)	(MHz)	(MHz)	(dBi)	(dBi)
155	5775	82.40	76.11	2.60	5.54
138	5690	83.80	76.10	2.60	5.54

#### Limits

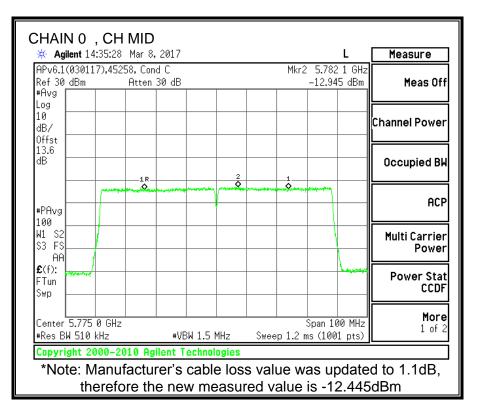
Channel	Frequency	FCC	IC	IC	Power	FCC	IC	PPSD
		Power	Power	EIRP	Limit	PPSD	PSD	Limit
		Limit	Limit	Limit		Limit	Limit	
	(MHz)	(dBm)						
155	5775	30.00	30.00	36.00	30.00	30.00	17.00	17.00
138	5690	30.00	30.00	36.00	30.00	30.00	17.00	17.00

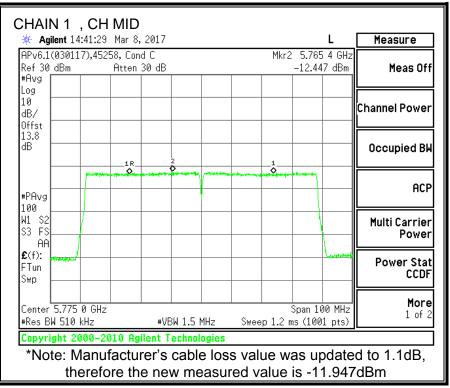
#### **Output Power Results**

Channel	Frequency	Chain 0	Chain 1	Total	Power	Power
	Meas		Meas	Corr'd	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
155	5775	7.56	6.81	10.21	30.00	-19.79
138	5690	-6.58	-6.25	-3.40	30.00	-33.40

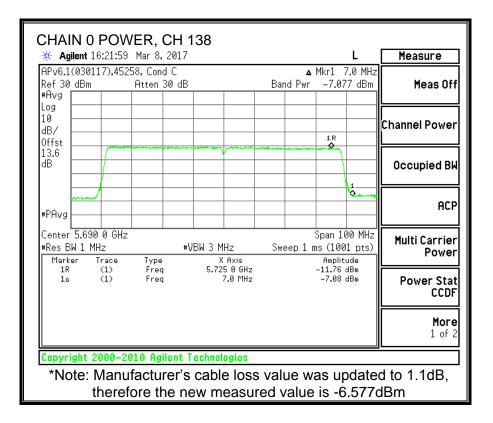
#### **PPSD** Results

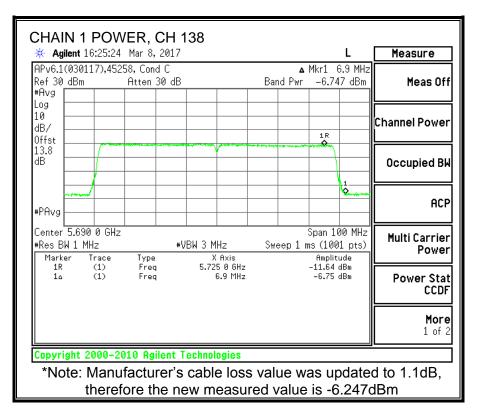
Channel	Frequency	Chain 0	Chain 1	Total	PPSD	PPSD	
		Meas	Meas	Corr'd	Limit	Margin	
		PPSD	PPSD	PPSD			
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	
155	<b>(MHz)</b> 5775	(dBm) -12.45	(dBm) -11.95	<b>(dBm)</b> -9.18	(dBm) 17.00	(dB) -26.18	



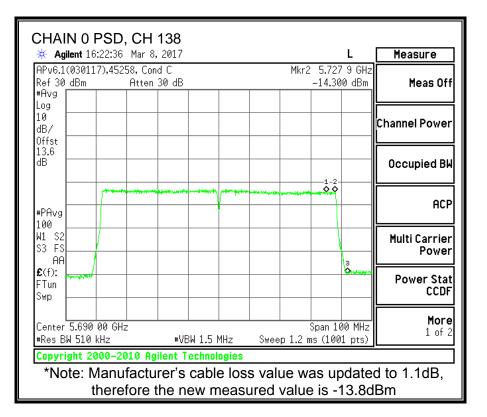


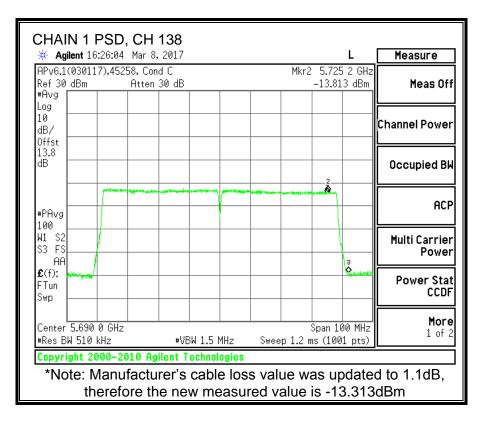
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# **10. RADIATED TEST RESULTS**

# 10.1. LIMITS AND PROCEDURE

# <u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
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 measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

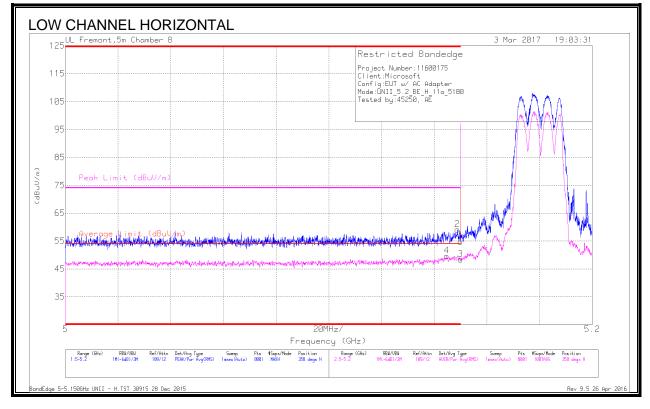
The spectrum from 30 MHz to 1GHz and 18GHz to 40 GHz is investigated with the transmitter set to transmit at the channel with highest output power as worst-case scenario. 1GHz to 18GHz was set to the lowest, middle, and highest channels in the 5 GHz bands.

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.

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# 10.1.1. 11a 2TX MODE IN THE 5.2GHz BAND

## **RESTRICTED BANDEDGE (LOW CHANNEL)**

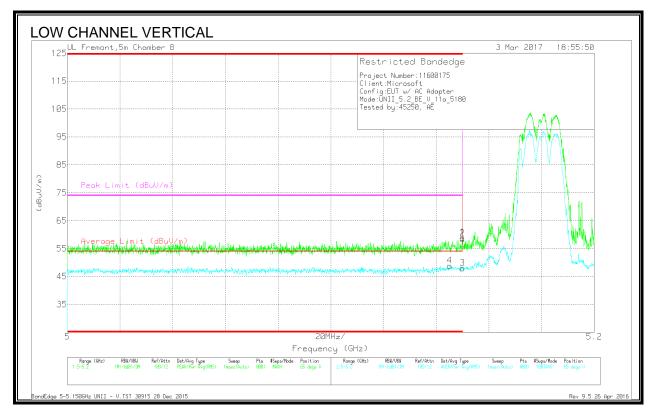


Marke r	Frequency (GHz)	Meter Readin g (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimut h (Degs)	Heigh t (cm)	Polarit y
2	* 5.149	43.02	Pk	34.2	-18.1	59.12	-	-	74	-14.88	358	284	н
4	* 5.145	33.29	RMS	34.2	-17.8	49.69	54	-4.31	-	-	358	284	н
1	5.15	38.63	Pk	34.2	-18.1	54.73	-	-	74	-19.27	358	284	н
3	5.15	32.31	RMS	34.2	-18.1	48.41	54	-5.59	-	-	358	284	Н

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

RMS - RMS detection

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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 5.15	42.39	Pk	34.2	-18.1	58.49	-	-	74	-15.51	65	352	V
4	* 5.145	32.39	RMS	34.2	-17.8	48.79	54	-5.21	-	-	65	352	V
1	5.15	42.79	Pk	34.2	-18.1	58.89	-	-	74	-15.11	65	352	V
3	5.15	31.81	RMS	34.2	-18.1	47.91	54	-6.09	-	-	65	352	V

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

**RMS - RMS detection** 

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