FCC 47 CFR PART 15 SUBPART E

UNII

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n/ac and ANT+

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n/ac and ANT+
MODEL NUMBER:	SM-T719
SERIAL NUMBER:	R32H2000PJA (RADIATED); R32H20000WM (CONDUCTED)
DATE TESTED:	FEB 15, 2016 - MAR 15, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Pass

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any 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 06-96, FCC KDB 789033 D02 v01r01, ANSI C63.10-2009.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro
☒ Chamber 1
☐ Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at http://www.iasonline.org/PDF/TL/TL-637.pdf.

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

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4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 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 GSM/WCDMA/LTE Tablet + BT/BLE, DTS/UNII a/b/g/n/ac and ANT+.
This test report addresses the NII (UNII) operational mode.

WiFi MIMO Condition

Frequency	Mode	Antenna 1	Antenna 2
2.4 GHz	802.11b	TX / RX	TX / RX
	802.11g	TX / RX	TX / RX
	802.11n	TX / RX	TX / RX
	802.11n MIMO	TX / RX	TX / RX
5 GHz	802.11a	TX / RX	TX / RX
	802.11n	TX / RX	TX / RX
	802.11ac	TX / RX	TX / RX
	802.11n/ac MIMO	TX / RX	TX / RX

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5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

Frequency Range [MHz]	Mode	Output Power [dBm]		Output Power [mW]	
		Antenna1	Antenna2	Antenna1	Antenna2
5180 - 5240	802.11a SISO	15.14	14.88	32.65	30.79
	802.11a MIMO	18.01		63.21	
	802.11n HT20 SISO	15.36	14.67	34.38	29.33
	802.11n HT20 MIMO	17.98		62.85	
5190 - 5230	802.11n HT40 SISO	14.37	14.46	27.36	27.94
	802.11n HT40 MIMO	17.43		55.30	
5210	802.11ac VHT80 SISO	12.89	12.78	19.45	18.96
	802.11ac VHT80 MIMO	15.84		38.41	
5260 - 5320	802.11a SISO	14.71	14.87	29.59	30.67
	802.11a MIMO	17.80		60.26	
	802.11n HT20 SISO	15.45	14.69	35.04	29.42
	802.11n HT20 MIMO	18.01		63.23	
5270 - 5310	802.11n HT40 SISO	14.47	14.42	28.00	27.67
	802.11n HT40 MIMO	17.43		55.38	
5290	802.11ac VHT80 SISO	12.85	12.81	19.28	19.08
	802.11ac VHT80 MIMO	15.84		38.36	
5500 - 5700	802.11a SISO	14.94	14.90	31.18	30.89
	802.11a MIMO	17.82		60.50	
	802.11n HT20 SISO	14.69	14.66	29.43	29.22
	802.11n HT20 MIMO	17.59		57.37	
5510 - 5670	802.11n HT40 SISO	14.44	14.30	27.77	26.90
	802.11n HT40 MIMO	17.38		54.67	
5530 - 5610	802.11ac VHT80 SISO	12.88	12.81	19.39	19.10
	802.11ac VHT80 MIMO	15.85		38.49	
5745 - 5825	802.11a SISO	15.22	14.70	33.28	29.48
	802.11a MIMO	17.98		62.76	
	802.11n HT20 SISO	14.88	15.29	30.78	33.80
	802.11n HT20 MIMO	18.10		64.58	
5755 - 5795	802.11n HT40 SISO	14.42	14.39	27.65	27.49
	802.11n HT40 MIMO	17.41		55.14	
5775	802.11ac VHT80 SISO	12.79	12.79	19.03	19.02
	802.11ac VHT80 MIMO	15.80		38.05	

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of:

Frequency Range [MHz]	Antenna Gain [dBi]	
	Antenna 1	Antenna 2
UNII 1 5150 – 5250	-0.66	-2.69
UNII 2A 5250 – 5350	-1.70	-2.49
UNII 2C 5470 – 5725	-0.57	-1.93
UNII 3 5725 – 5850	-1.23	-1.93

5.4. List of test reduction and modes covering other modes:

The output power on covered modes is equal to or less than one referenced.

UNII 1

5150 - 5250 MHz Authorized Frequency Band (Antenna port & Radiated Testing)		
Frequency Range [MHz]	**Mode**	**Covered by**
5180 - 5240	802.11a legacy 1TX/STBC 2TX	802.11a 2TX CDD
5180 - 5240	802.11HT20 1TX	802.11n HT20 2TX CDD
5180 - 5240	802.11HT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5180 - 5240	802.11ac VHT20 1TX	802.11n HT20 2TX CDD
5180 - 5240	802.11ac VHT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5180 - 5240	802.11ac VHT20 2TX CDD/Tx BF	802.11n HT20 2TX CDD
5190 - 5230	802.11n HT40 1TX	802.11n HT40 2TX CDD
5190 - 5230	802.11n HT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5190 - 5230	802.11ac VHT40 1TX	802.11n HT40 2TX CDD
5190 - 5230	802.11ac VHT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5190 - 5230	802.11ac VHT40 2TX CDD/Tx BF	802.11n HT40 2TX CDD
5210	802.11ac VHT80 1TX	802.11ac VHT80 2TX CDD
5210	802.11ac VHT80 2TX STBC/SDM/Tx BF	802.11ac VHT80 2TX CDD

UNII 2A

5250 - 5350 MHz Authorized Frequency Band (Antenna port & Radiated Testing)		
Frequency Range [MHz]	Mode	Covered by
5260 - 5320	802.11a legacy 1TX/STBC 2TX	802.11a 2TX CDD
5260 - 5320	802.11HT20 1TX	802.11n HT20 2TX CDD
5260 - 5320	802.11HT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5260 - 5320	802.11ac VHT20 1TX	802.11n HT20 2TX CDD
5260 - 5320	802.11ac VHT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5260 - 5320	802.11ac VHT20 2TX CDD/Tx BF	802.11n HT20 2TX CDD
5270 - 5310	802.11n HT40 1TX	802.11n HT40 2TX CDD
5270 - 5310	802.11n HT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5270 - 5310	802.11ac VHT40 1TX	802.11n HT40 2TX CDD
5270 - 5310	802.11ac VHT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5270 - 5310	802.11ac VHT40 2TX CDD/Tx BF	802.11n HT40 2TX CDD
5290	802.11ac VHT80 1TX	802.11ac VHT80 2TX CDD
5290	802.11ac VHT80 2TX STBC/SDM/Tx BF	802.11ac VHT80 2TX CDD

UNII 2C

5470 - 5725 MHz Authorized Frequency Band (Antenna port & Radiated Testing)		
Frequency Range [MHz]	Mode	Covered by
5500 - 5700	802.11a legacy 1TX/STBC 2TX	802.11a 2TX CDD
5500 - 5700	802.11HT20 1TX	802.11n HT20 2TX CDD
5500 - 5700	802.11HT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5500 - 5700	802.11ac VHT20 1TX	802.11n HT20 2TX CDD
5500 - 5700	802.11ac VHT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5500 - 5700	802.11ac VHT20 2TX CDD/Tx BF	802.11n HT20 2TX CDD
5510 - 5690	802.11n HT40 1TX	802.11n HT40 2TX CDD
5510 - 5690	802.11n HT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5510 - 5690	802.11ac VHT40 1TX	802.11n HT40 2TX CDD
5510 - 5690	802.11ac VHT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5510 - 5690	802.11ac VHT40 2TX CDD/Tx BF	802.11n HT40 2TX CDD
5530 - 5610	802.11ac VHT80 1TX	802.11ac VHT80 2TX CDD
5530 - 5610	802.11ac VHT80 2TX STBC/SDM/Tx BF	802.11ac VHT80 2TX CDD

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5725 - 5850 MHz Authorized Frequency Band (Antenna port & Radiated Testing)		
Frequency Range [MHz]	**Mode**	**Covered by**
5745 - 5825	802.11a legacy 1TX/STBC 2TX	802.11a 2TX CDD
5745 - 5825	802.11HT20 1TX	802.11n HT20 2TX CDD
5745 - 5825	802.11HT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5745 - 5825	802.11ac VHT20 1TX	802.11n HT20 2TX CDD
5745 - 5825	802.11ac VHT20 2TX STBC/SDM	802.11n HT20 2TX CDD
5745 - 5825	802.11ac VHT20 2TX CDD/Tx BF	802.11n HT20 2TX CDD
5755 - 5795	802.11n HT40 1TX	802.11n HT40 2TX CDD
5755 - 5795	802.11n HT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5755 - 5795	802.11ac VHT40 1TX	802.11n HT40 2TX CDD
5755 - 5795	802.11ac VHT40 2TX STBC/SDM	802.11n HT40 2TX CDD
5755 - 5795	802.11ac VHT40 2TX CDD/Tx BF	802.11n HT40 2TX CDD
5775	802.11ac VHT80 1TX	802.11ac VHT80 2TX CDD
5775	802.11ac VHT80 2TX STBC/SDM/Tx BF	802.11ac VHT80 2TX CDD

5.5. WORST-CASE CONFIGURATION AND MODE

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 the X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in the X orientation.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11ac VHT80mode: MCS0

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA20EWE	R37G4AH1402DK3	N/A
Data Cable	SAMSUNG	EP-DG925UWE	N/A	N/A
Earphone	SAMSUNG	EO-EG900BW	N/A	N/A

I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

TEST SETUP

The EUT is a stand-alone unit during the tests.
Test software in hidden menu exercised the EUT to enable NII mode.

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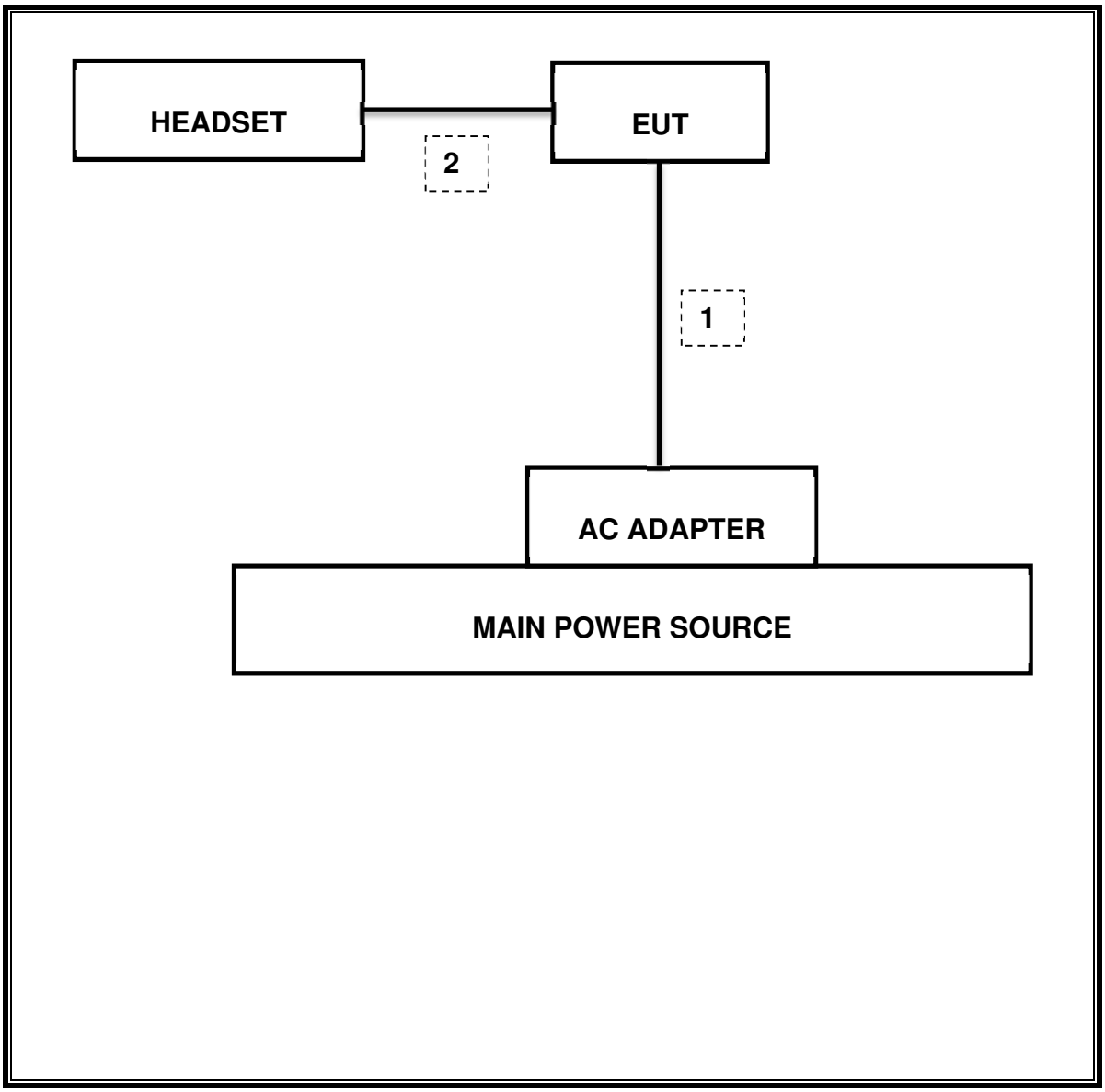
SETUP DIAGRAM FOR TESTS



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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**	**S/N**	**Cal Due**
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	11-17-16
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-25-17
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-16
Antenna, Horn, 18 GHz	ETS	3115	00161451	05-17-17
Antenna, Horn, 18 GHz	ETS	3117	00168724	06-17-17
Antenna, Horn, 18 GHz	ETS	3117	00168717	06-17-17
Antenna, Horn, 40 GHz	ETS	3116C	00166155	09-23-16
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	08-24-17
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-18-16
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-18-16
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-18-16
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-18-16
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-19-16
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-19-16
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	08-18-16
Average Power Sensor	R&S	NRZ-Z91	102681	08-18-16
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-18-16
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-19-16
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-19-16
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-19-16
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	08-18-16
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	015	08-18-16
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	08-18-16
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	08-18-16
High Pass Filter 5GHz	Micro-Tronics	HPS17542	016	08-18-16
High Pass Filter 6GHz	Micro-Tronics	HPM17543	015	08-18-16
LISN	R&S	ENV-216	101836	08-19-16
LISN	R&S	ENV-216	101837	08-19-16

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.407 (a)	Occupied Band width (26dB)	N/A	Conducted	Pass	83.62 MHz
15.407	6dB Band width (5.8Ghz)	500KHz		Pass	15.078 MHz
15.407 (a)(2)	TX Cond. Power 5.15-2.25, 5.25-5.35 & 5.47-5.725	<24dBm or 11+10Log(OBW)		Pass	18.01 dBm
15.407 (a)(3)	TX Cond. Power 5.725-5.825	< 30dBm or 17+10Log(OBW)		Pass	18.01 dBm
15.407 (a)(5)	PSD (5.2,5.3,5.5GHz)	<11dBm		Pass	8.15 dBm
15.407 (a)(5)	PSD (5.8GHz)	30dBm per 500kHz		Pass	4.93 dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Radiated	Pass	46.68 dBuV (QP)
15.407 (b) & 15.209	Radiated Spurious Emission	< 68.2dBuV/m		Pass	63.31 dBuV/m (PK)
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Radiated / Condcuted	Pass	N/A

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8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 D02 v01r01 Zero-Span Spectrum Analyzer Method.

8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B [msec)	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
802.11a	1.432	1.530	0.936	93.6%	0.29	0.698
802.11n HT20	1.340	1.438	0.932	93.2%	0.31	0.746
802.11n HT40	0.664	0.761	0.872	87.2%	0.59	1.506
802.11ac VHT80	0.332	0.429	0.774	77.4%	1.11	3.012

8.2. DUTY CYCLE PLOTS

DUTY CYCLE 802.11a MODE

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DUTY CYCLE 802.11n HT20 MODE

DUTY CYCLE 802.11n HT40 MODE

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DUTY CYCLE 802.11ac VHT80 MODE

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9. MEASUREMENT METHOD

KDB 789033 D02 General UNII Test Procedures New Rules v01r01
KDB 905462 D03 Clients Without Radar Detection New Rules v01r01

The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-2 is used for power and PPSD

The Duty Cycle is less than 98% and consistent, KDB 789033 Method AD with Power RMS Averaging and duty cycle correction is used.

MIMO Device: KDB 662911 v02r01

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10. ANTENNA PORT TEST RESULTS

10.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407

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

TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v01r01: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

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10.1.1. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		Primary	Secondary	
Low	5745	15.333	15.105	0.5
Mid	5785	15.288	15.285	0.5
High	5825	15.080	15.128	0.5
Worst		15.080		

10.1.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		Chain 0	Chain 1	
Low	5745	15.078	15.113	0.5
Mid	5785	15.095	15.140	0.5
High	5825	15.085	15.138	0.5
Worst		15.078		

10.1.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		Chain 0	Chain 1	
Low	5755	35.055	35.090	0.5
High	5795	35.085	35.105	0.5
Worst		35.055		

10.1.4. 802.11n VHT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]		Minimum Limit [MHz]
		Chain 0	Chain 1	
Middle	5775	75.070	75.100	0.5
Worst		75.070		

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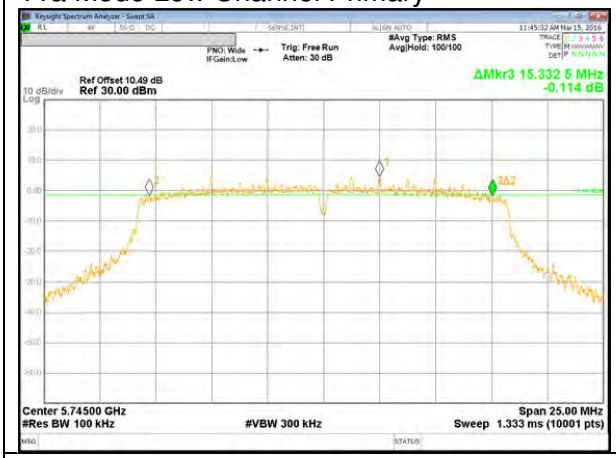
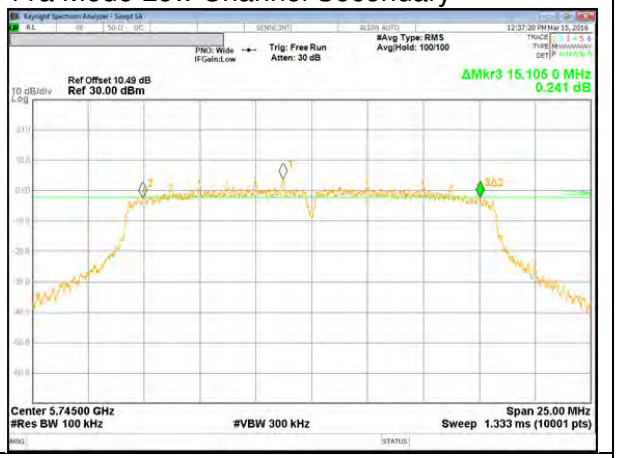
10.1.5. 6 dB BANDWIDTH PLOTS

IEEE 802.11a mode

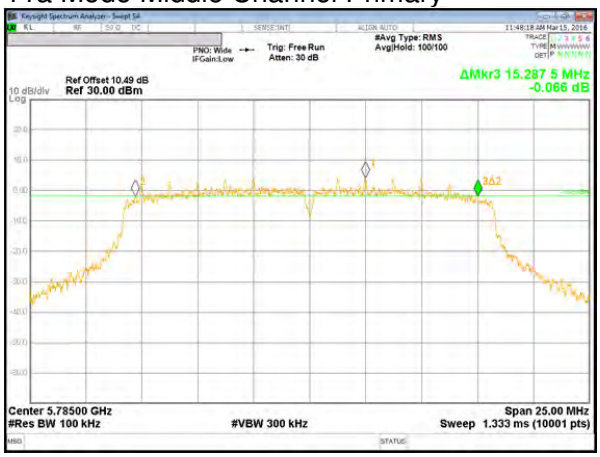
11a Mode Low Channel Primary



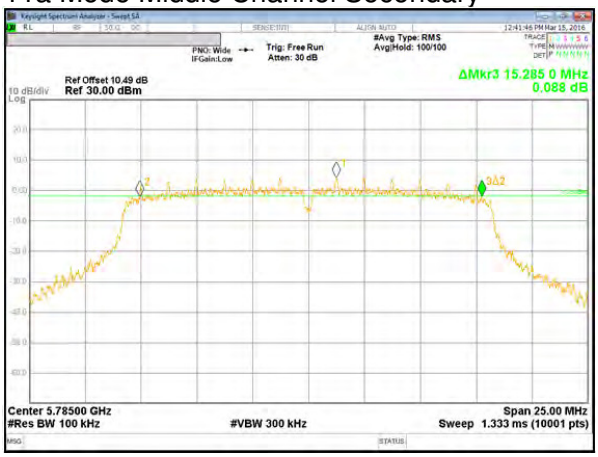
11a Mode Low Channel Secondary



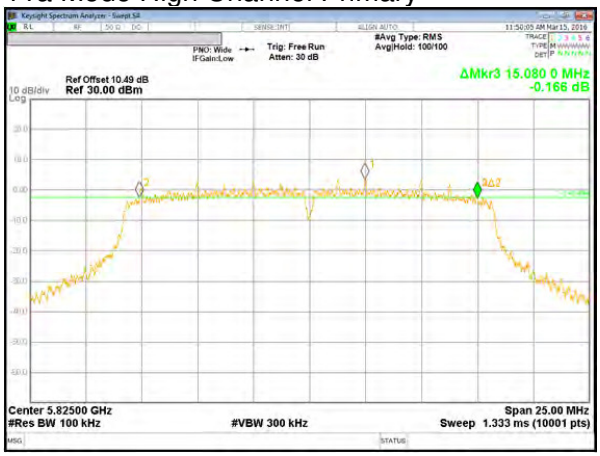
11a Mode Middle Channel Primary



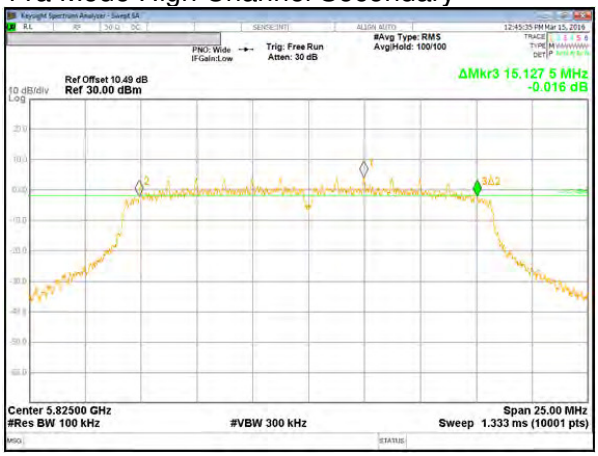
11a Mode Middle Channel Secondary



11a Mode High Channel Primary



11a Mode High Channel Secondary



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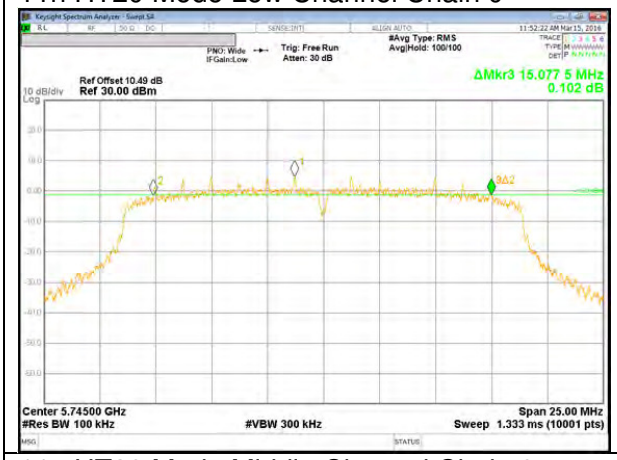
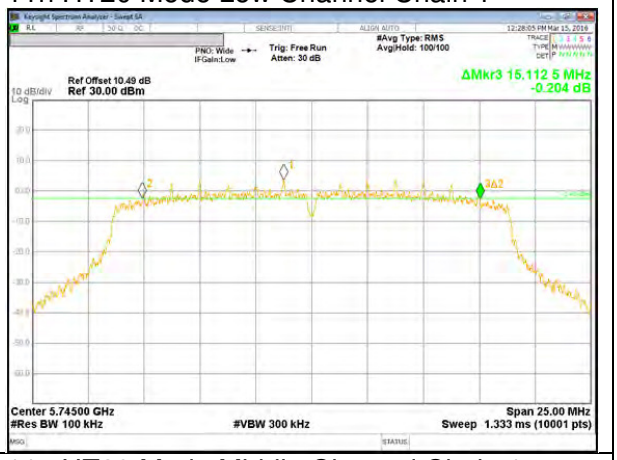
IEEE 802.11n HT20 mode

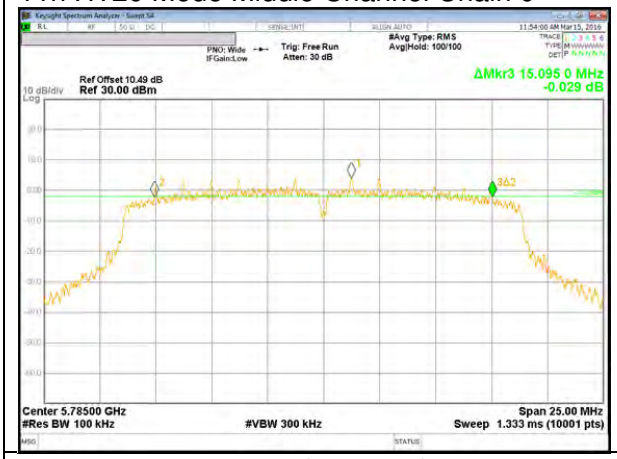
11n HT20 Mode Low Channel Chain 0



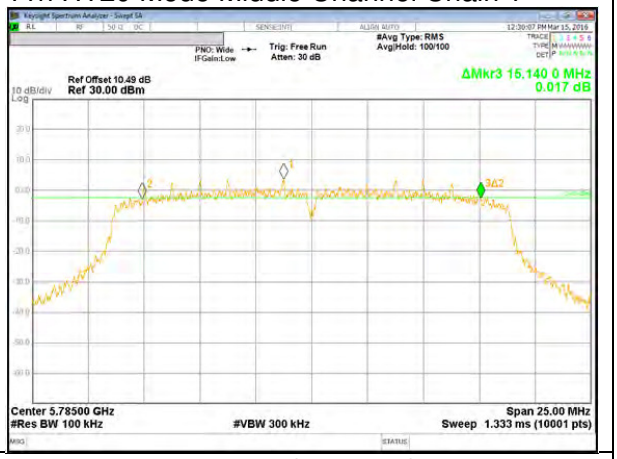
11n HT20 Mode Low Channel Chain 1



11n HT20 Mode Middle Channel Chain 0

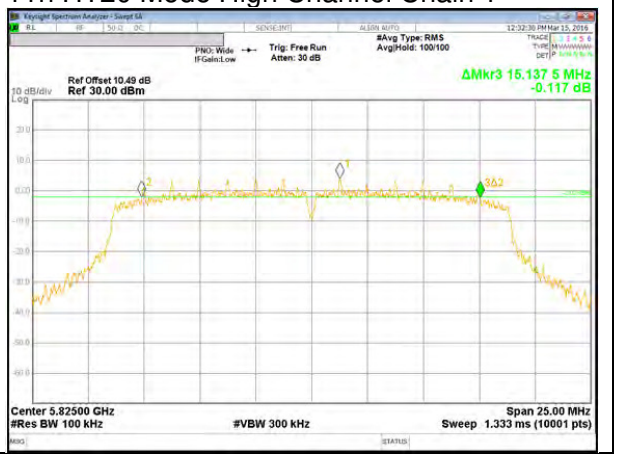


11n HT20 Mode Middle Channel Chain 1



11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1



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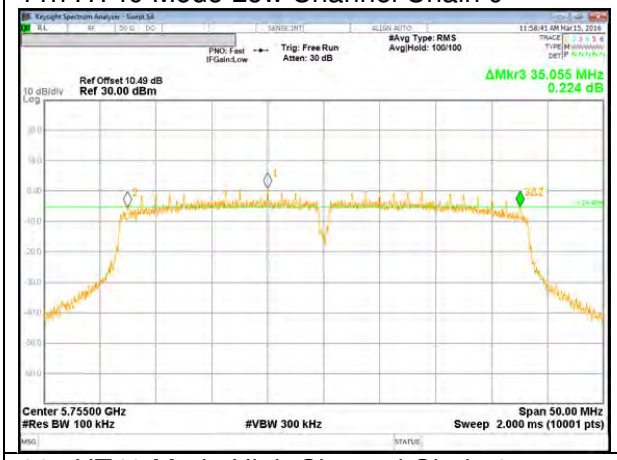
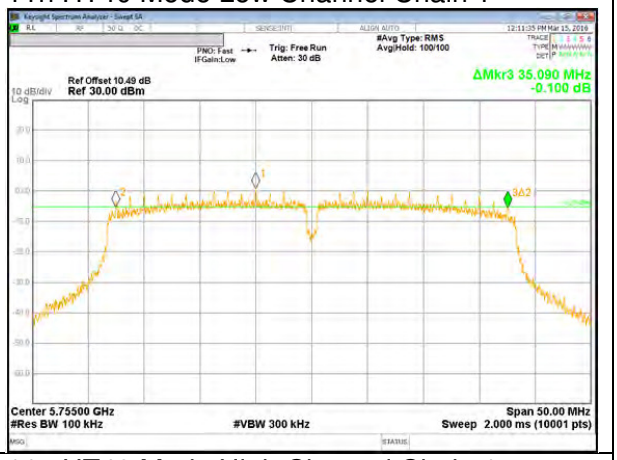
IEEE 802.11n HT40 mode

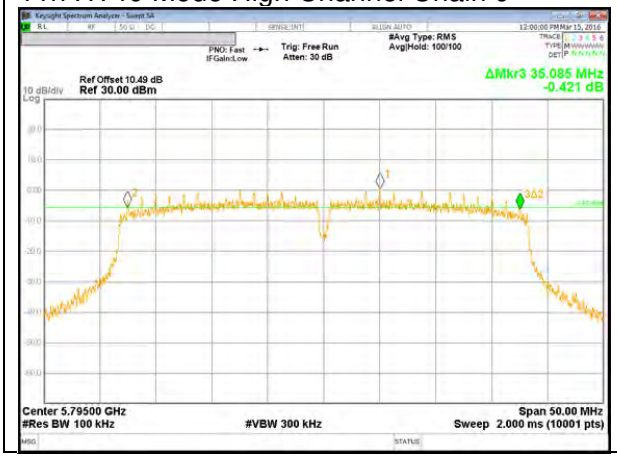
11n HT40 Mode Low Channel Chain 0



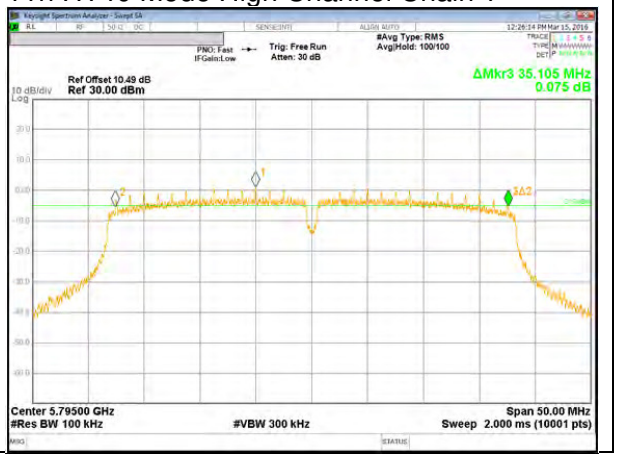
11n HT40 Mode Low Channel Chain 1



11n HT40 Mode High Channel Chain 0



11n HT40 Mode High Channel Chain 1



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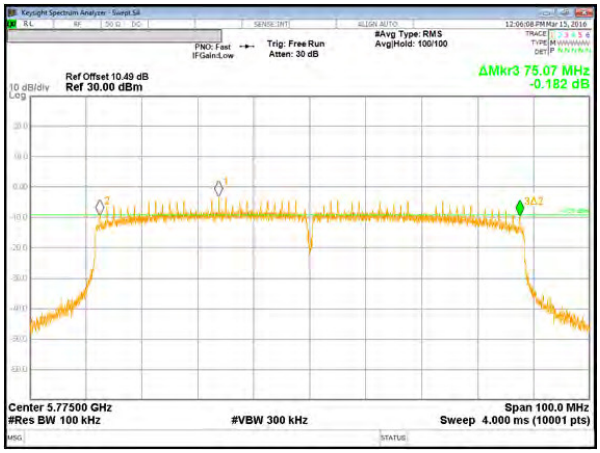
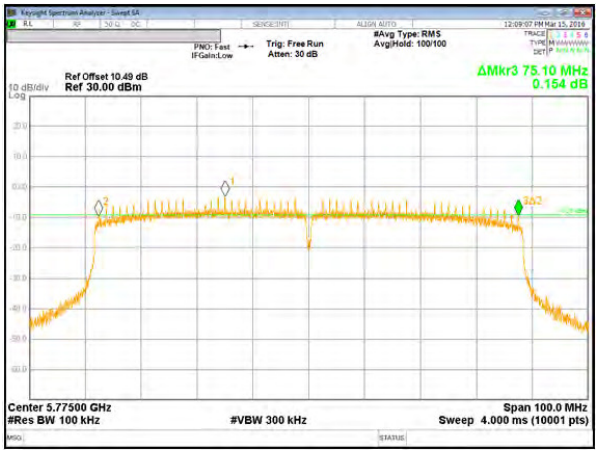
IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0	11ac HT80 Mode Middle Channel Chain 1
	

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10.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

10.2.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Primary	Secondary
Low	5180	19.52	18.65
Mid	5200	18.96	19.53
High	5240	18.82	18.86
Worst		19.53	

10.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5180	19.73	19.46
Mid	5200	19.50	19.66
High	5240	19.81	19.55
Worst		19.81	

10.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5190	39.62	40.06
High	5230	40.30	40.04
Worst		40.30	

10.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Middle	5210	83.12	81.76
Worst		83.12	

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10.2.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Primary	Secondary
Low	5260	18.83	18.87
Mid	5300	18.83	19.20
High	5320	18.39	19.42
Worst		19.42	

10.2.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5260	19.72	19.52
Mid	5300	19.72	19.35
High	5320	19.86	19.40
Worst		19.86	

10.2.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5270	39.85	39.55
High	5310	39.77	39.86
Worst		39.86	

10.2.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Middle	5290	83.62	82.37
Worst		83.62	

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10.2.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Primary	Secondary
Low	5500	18.58	18.85
Mid	5580	18.80	18.64
High	5700	18.66	18.84
Worst		18.85	

10.2.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5500	19.82	19.63
Mid	5580	19.75	19.68
High	5700	19.79	19.98
Worst		19.98	

10.2.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5510	40.27	39.88
Mid	5550	40.57	39.96
High	5670	40.46	39.56
Worst		40.57	

10.2.12. 802.11ac VHT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5530	81.69	82.19
High	5610	83.29	81.89
Worst		83.29	

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10.2.13. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Primary	Secondary
Low	5745	19.21	18.66
Mid	5785	18.69	18.96
High	5825	19.10	18.88
Worst		19.21	

10.2.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5745	19.36	19.67
Mid	5785	19.62	19.72
High	5825	19.46	19.54
Worst		19.72	

10.2.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5755	40.16	40.54
High	5795	40.13	39.58
Worst		40.54	

10.2.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]	
		Chain 0	Chain 1
Middle	5775	81.97	81.93
Worst		81.97	

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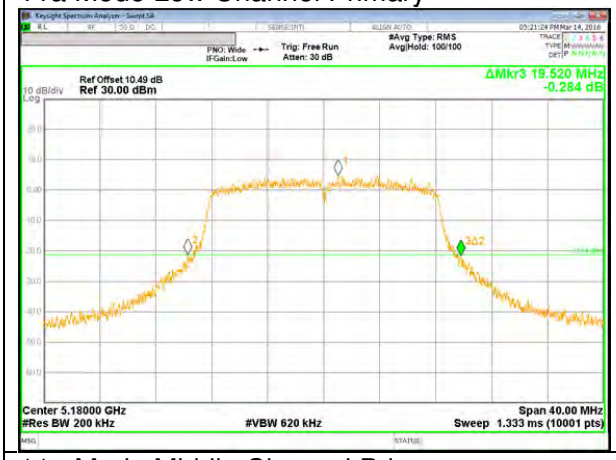
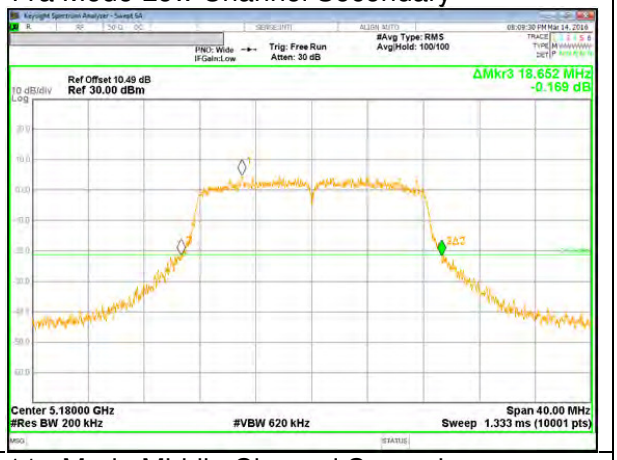
10.2.17. 26 dB BANDWIDTH PLOTS

UNII 5.2 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

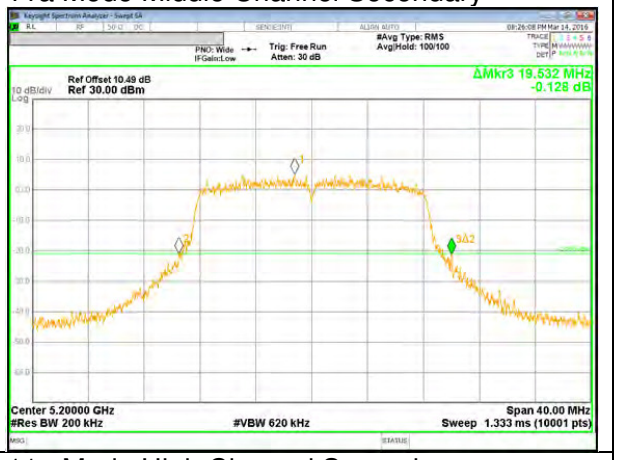


11a Mode Low Channel Secondary



11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary



11a Mode High Channel Primary

11a Mode High Channel Secondary

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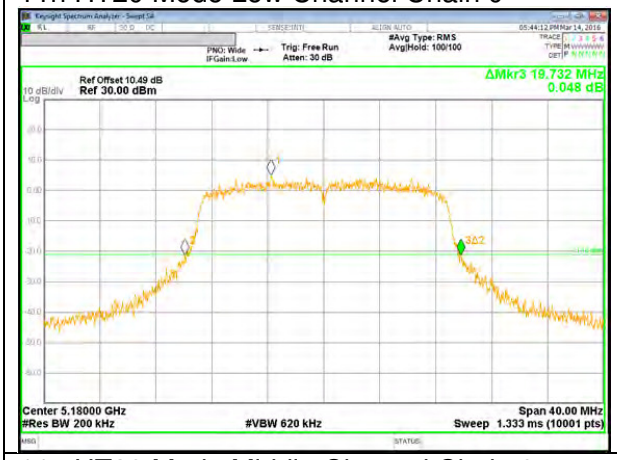
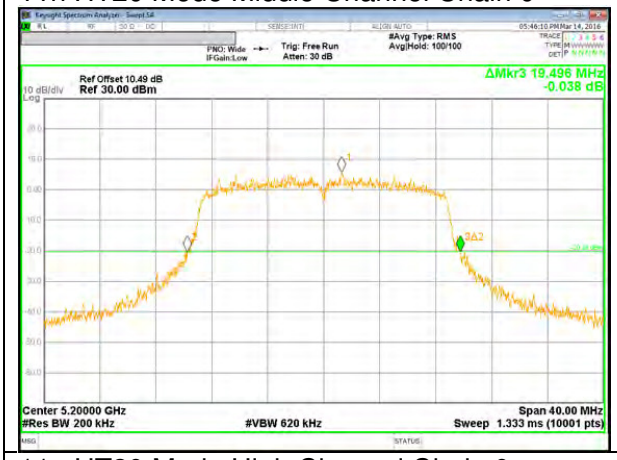
UNII 5.2 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

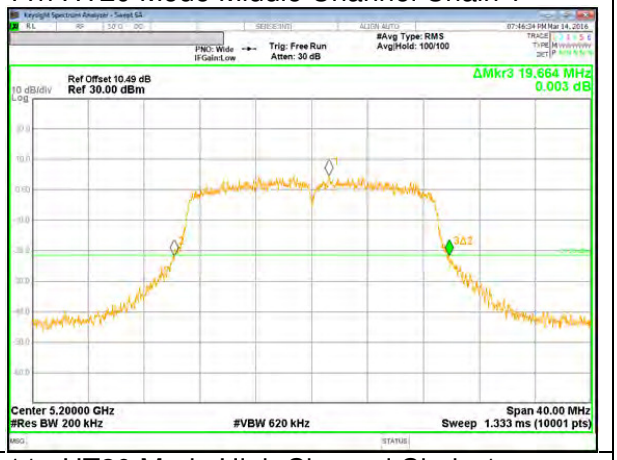


11n HT20 Mode Low Channel Chain 1

11n HT20 Mode Middle Channel Chain 0

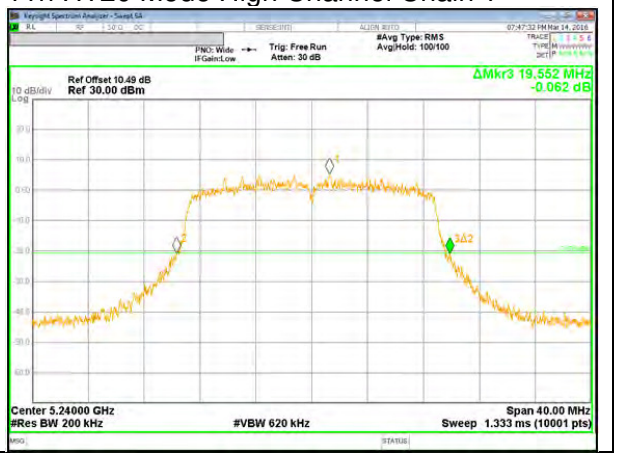


11n HT20 Mode Middle Channel Chain 1



11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1



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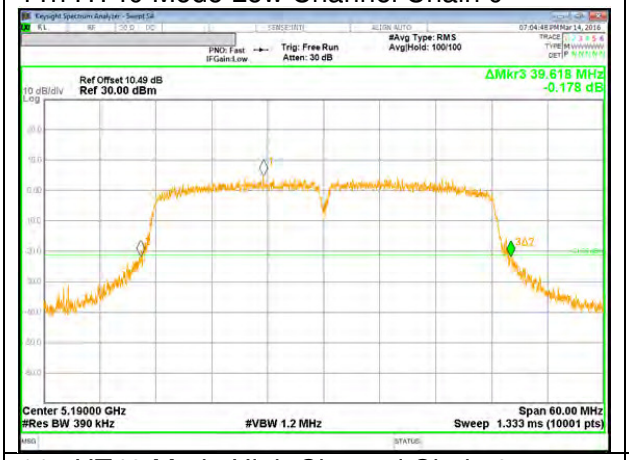
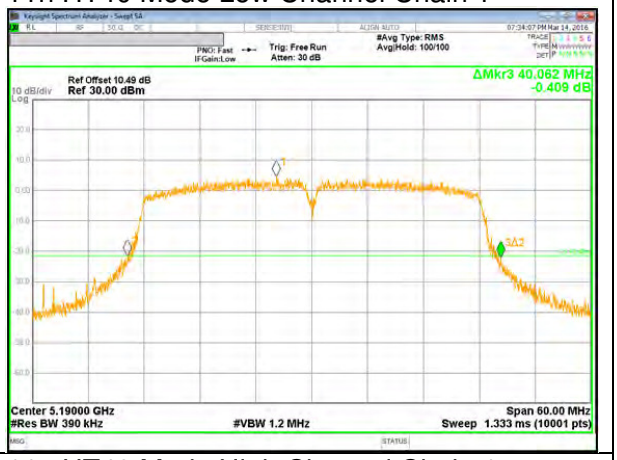
UNII 5.2 GHz IEEE 802.11n HT40 mode

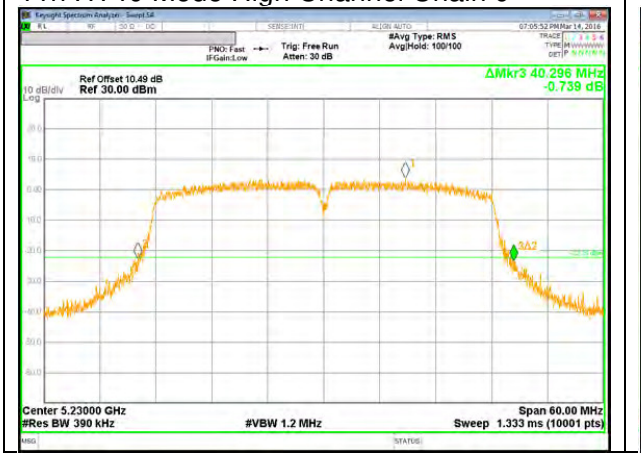
11n HT40 Mode Low Channel Chain 0



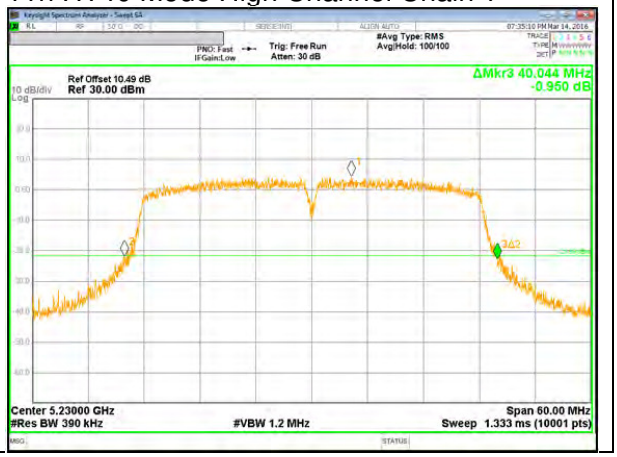
11n HT40 Mode Low Channel Chain 1



11n HT40 Mode High Channel Chain 0

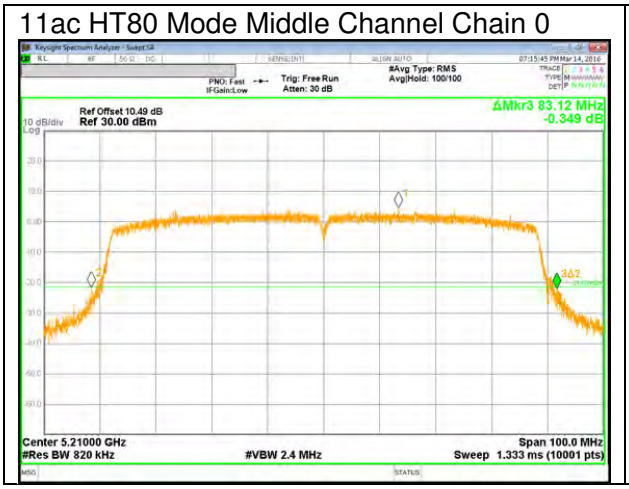


11n HT40 Mode High Channel Chain 1

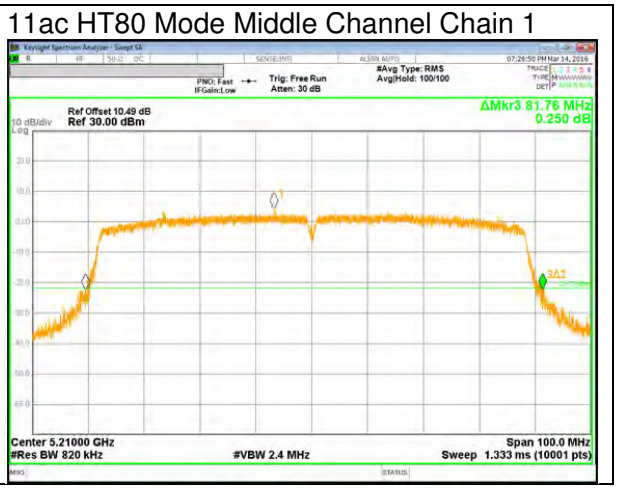


UNII 5.2 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0



11ac HT80 Mode Middle Channel Chain 1



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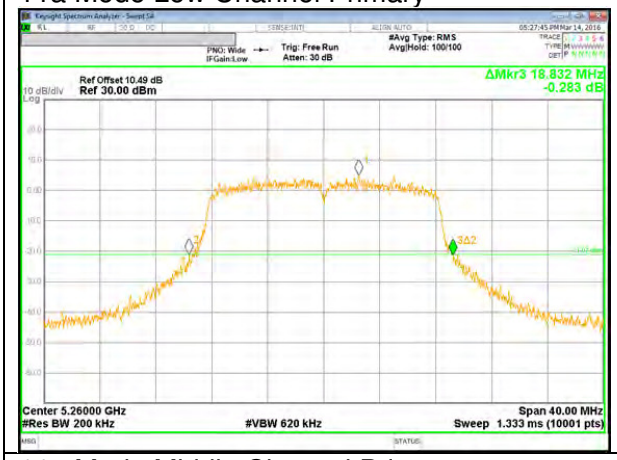
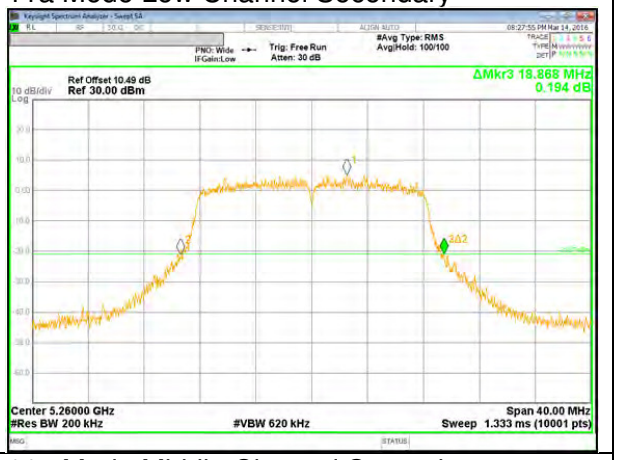
UNII 5.3 GHz IEEE 802.11a mode

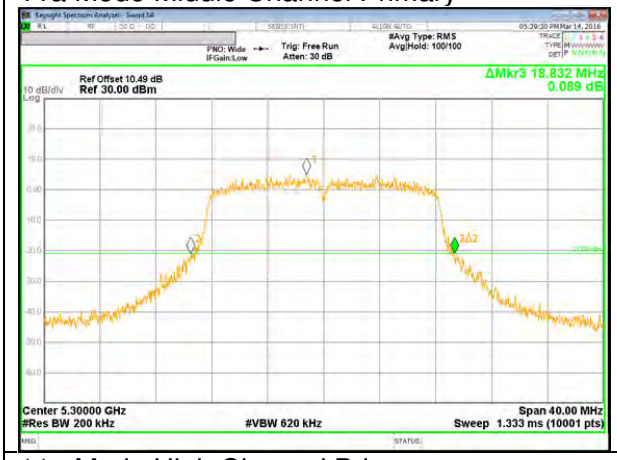
11a Mode Low Channel Primary



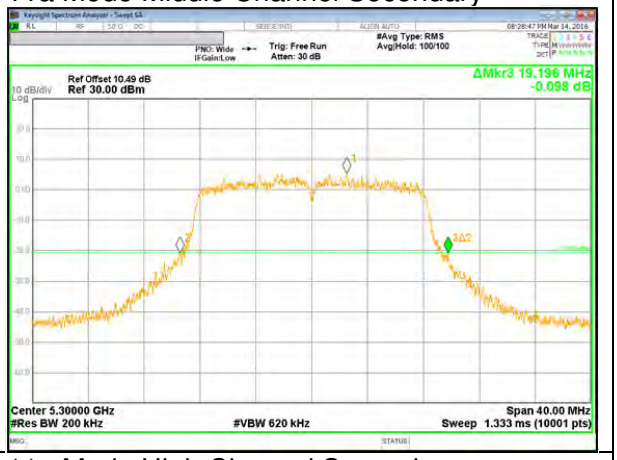
11a Mode Low Channel Secondary



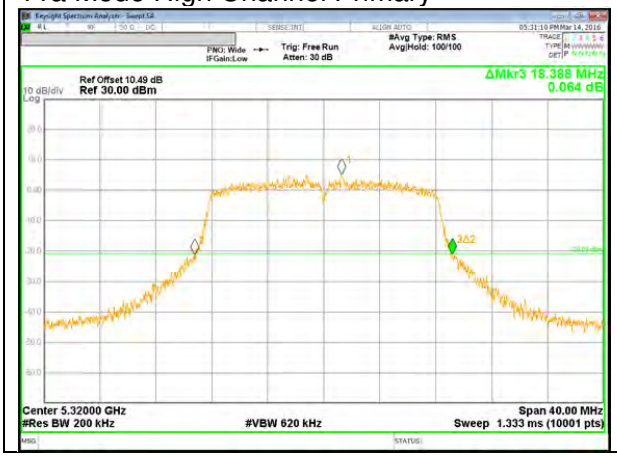
11a Mode Middle Channel Primary



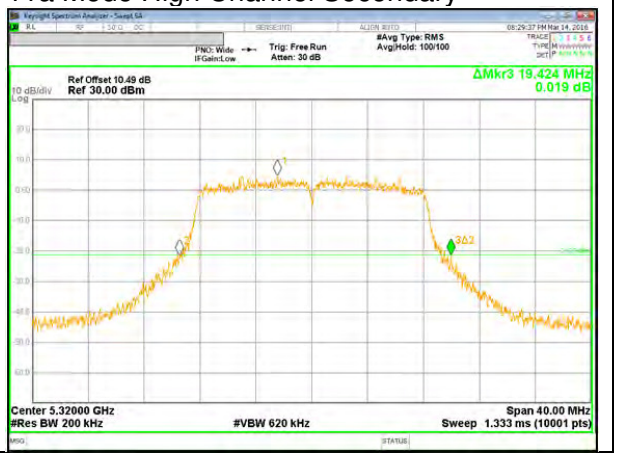
11a Mode Middle Channel Secondary



11a Mode High Channel Primary



11a Mode High Channel Secondary



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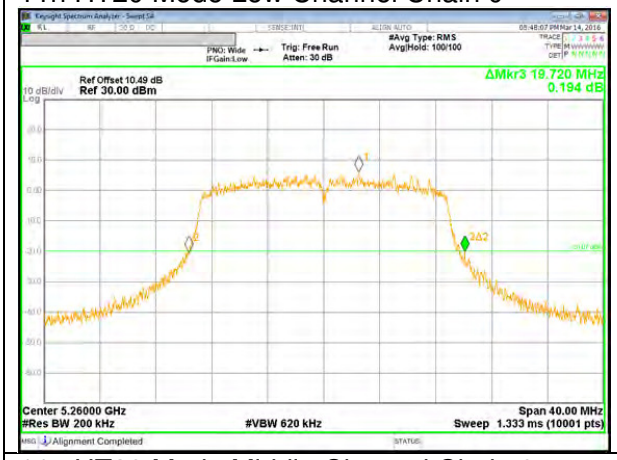
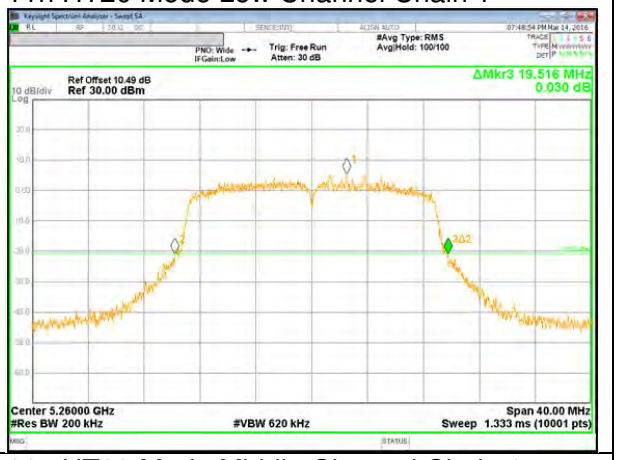
UNII 5.3 GHz IEEE 802.11n HT20 mode

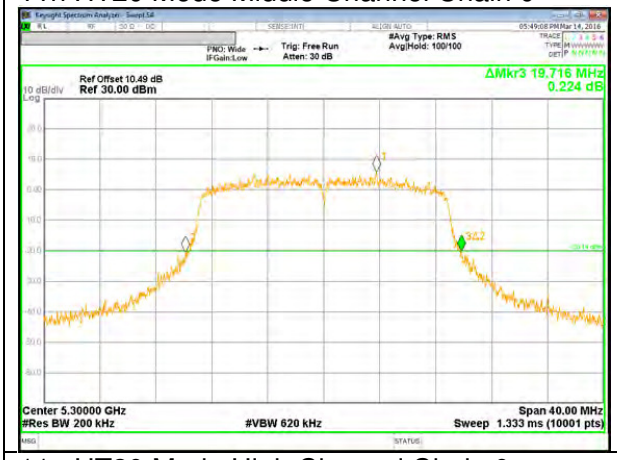
11n HT20 Mode Low Channel Chain 0



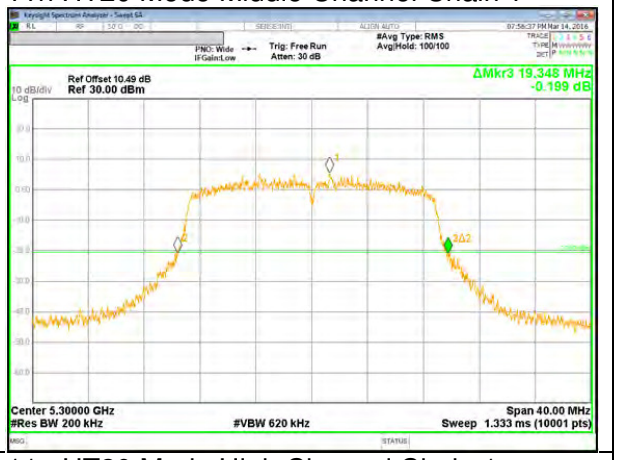
11n HT20 Mode Low Channel Chain 1



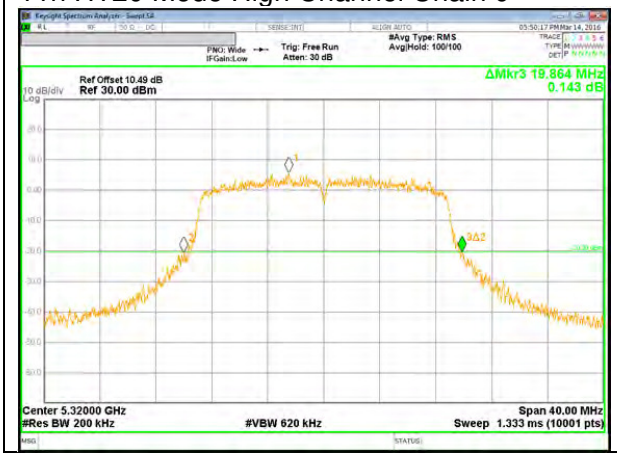
11n HT20 Mode Middle Channel Chain 0



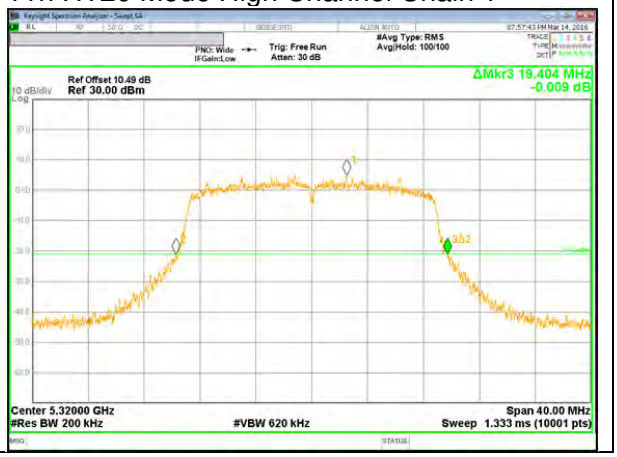
11n HT20 Mode Middle Channel Chain 1



11n HT20 Mode High Channel Chain 0



11n HT20 Mode High Channel Chain 1



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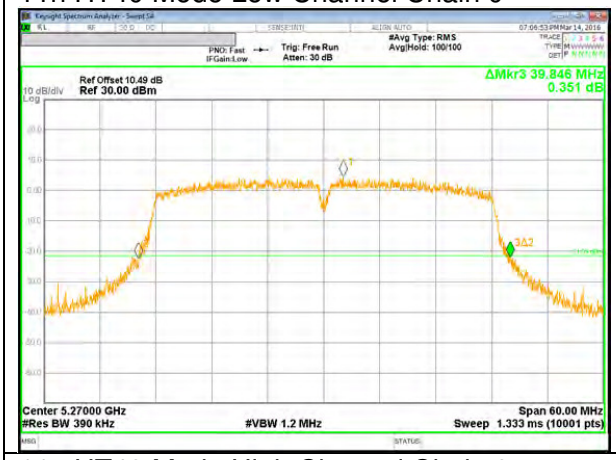
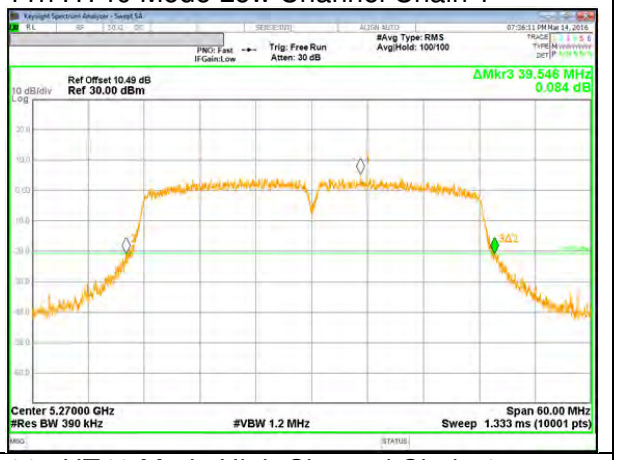
UNII 5.3 GHz IEEE 802.11n HT40 mode

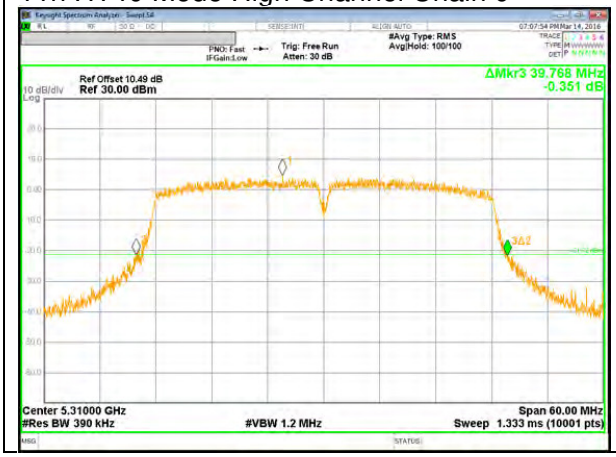
11n HT40 Mode Low Channel Chain 0



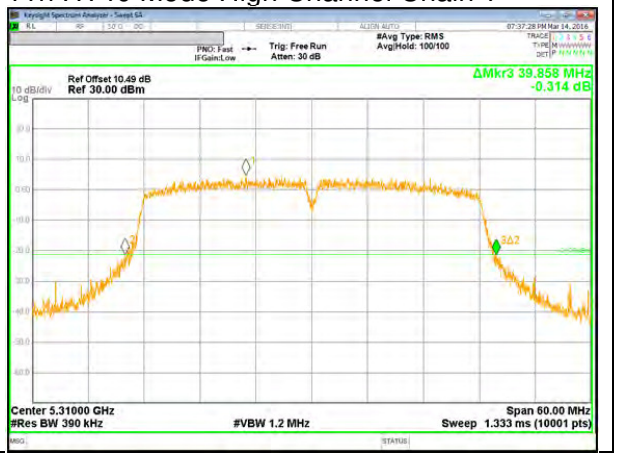
11n HT40 Mode Low Channel Chain 1



11n HT40 Mode High Channel Chain 0

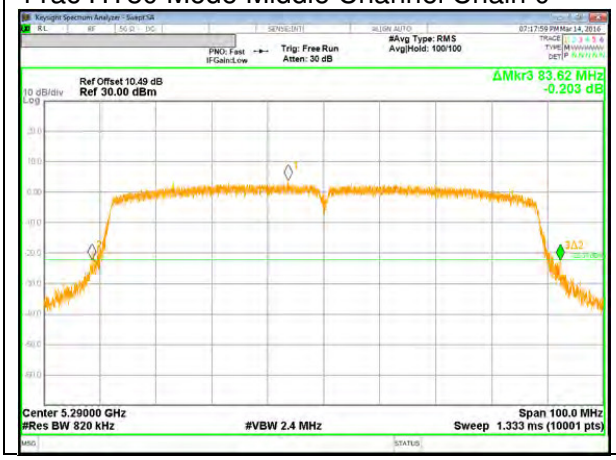


11n HT40 Mode High Channel Chain 1



UNII 5.3 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0



11ac HT80 Mode Middle Channel Chain 1

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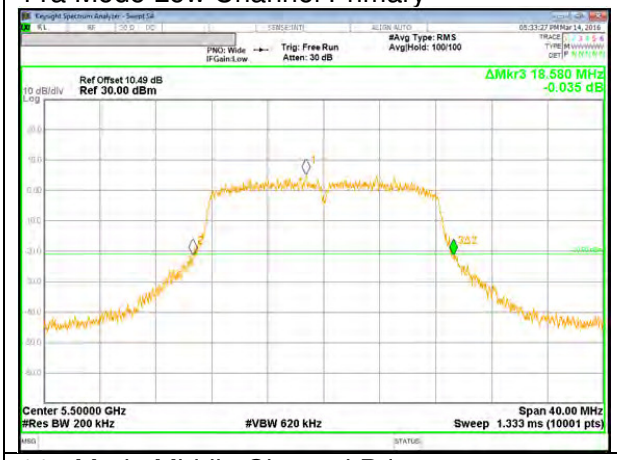
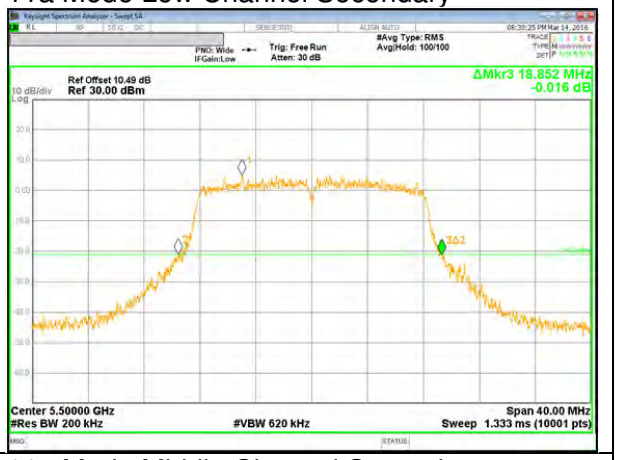
UNII 5.5 GHz IEEE 802.11a mode

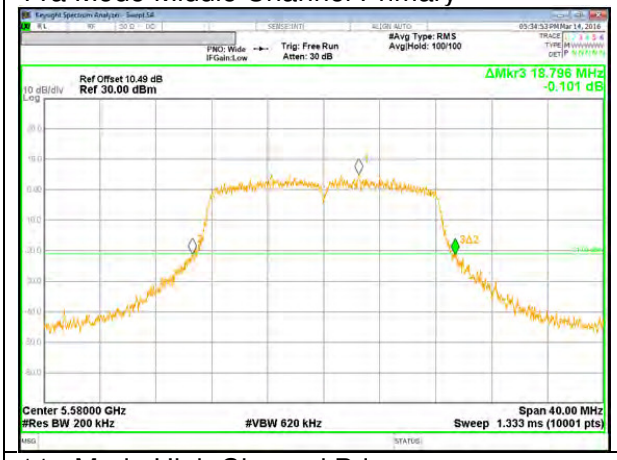
11a Mode Low Channel Primary



11a Mode Low Channel Secondary



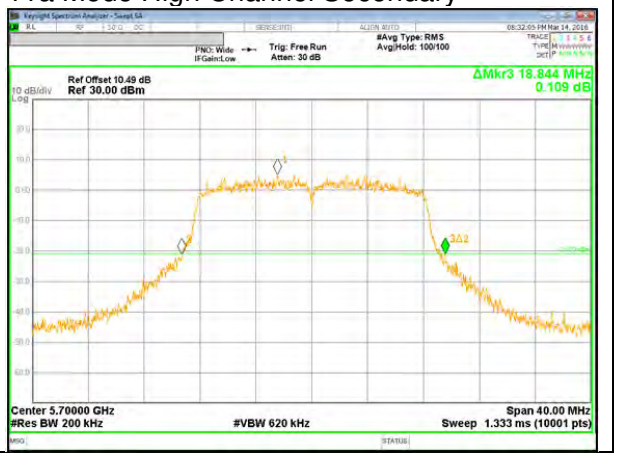
11a Mode Middle Channel Primary



11a Mode Middle Channel Secondary

11a Mode High Channel Primary

11a Mode High Channel Secondary



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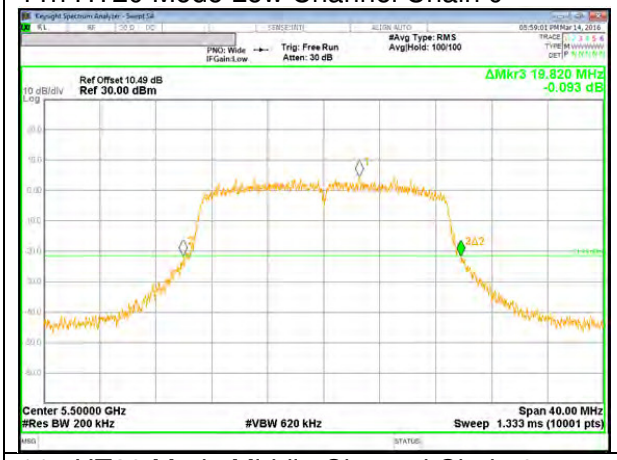
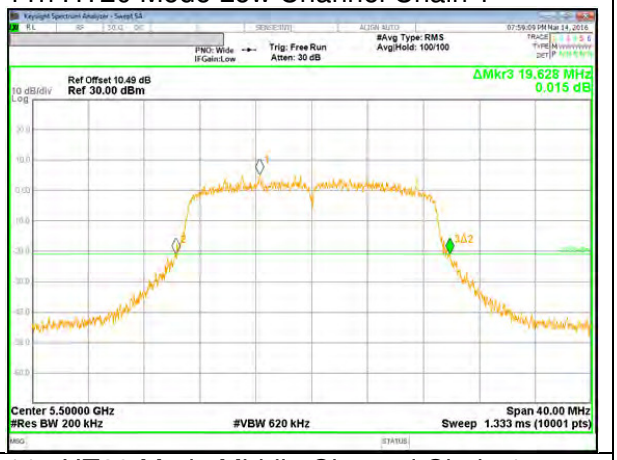
UNII 5.5 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

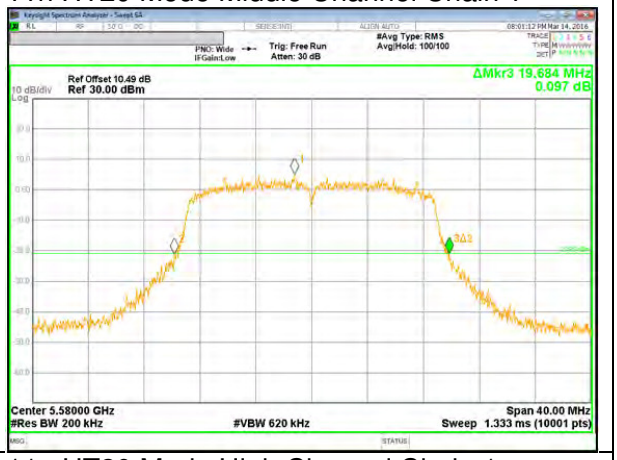


11n HT20 Mode Low Channel Chain 1



11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1



11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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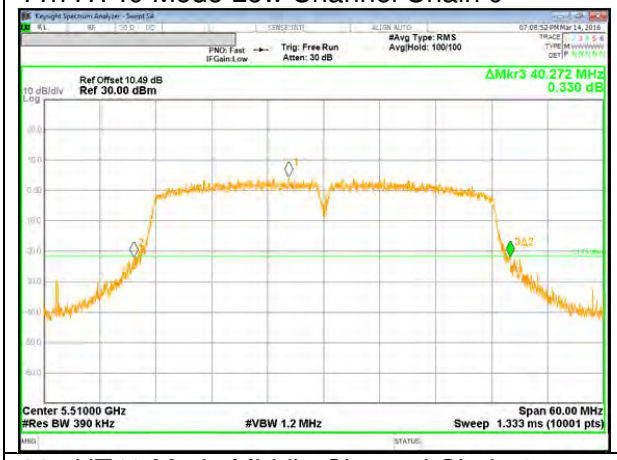
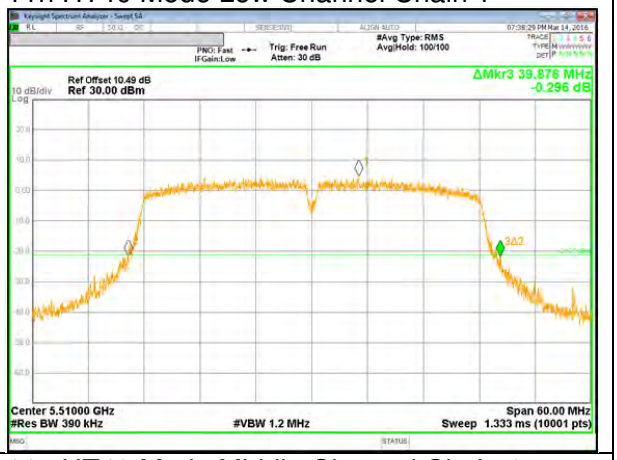
UNII 5.5 GHz IEEE 802.11n HT40 mode

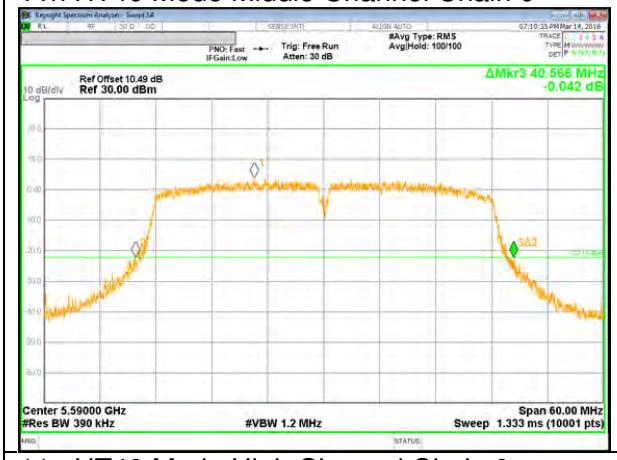
11n HT40 Mode Low Channel Chain 0



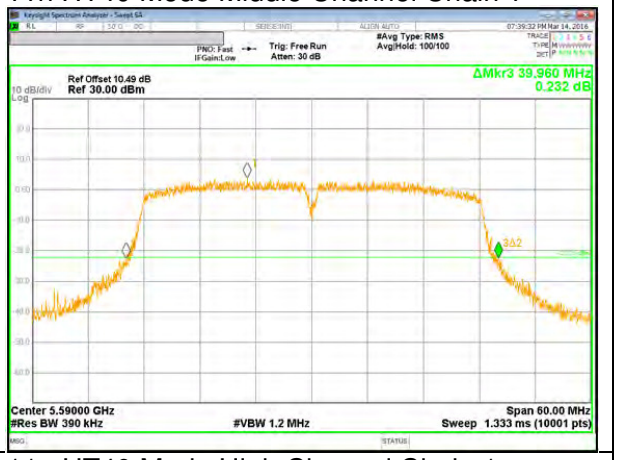
11n HT40 Mode Low Channel Chain 1



11n HT40 Mode Middle Channel Chain 0

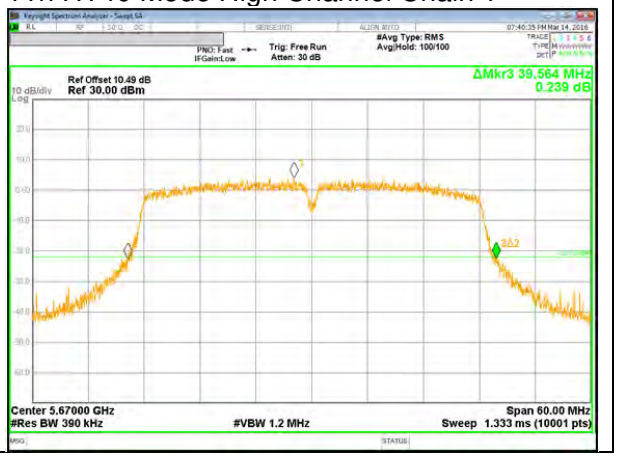


11n HT40 Mode Middle Channel Chain 1



11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1



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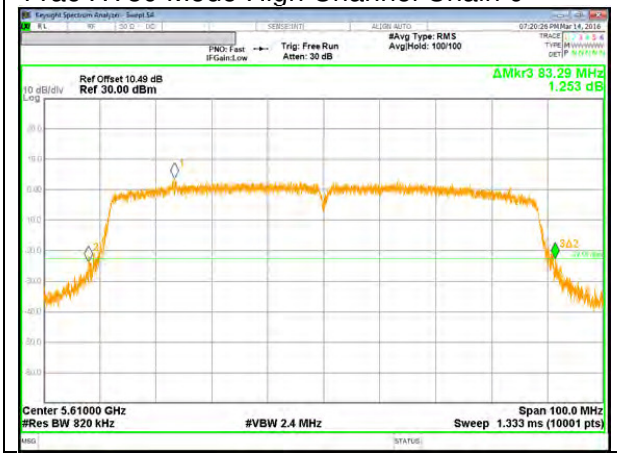
UNII 5.5 GHz IEEE 802.11ac VHT80 mode

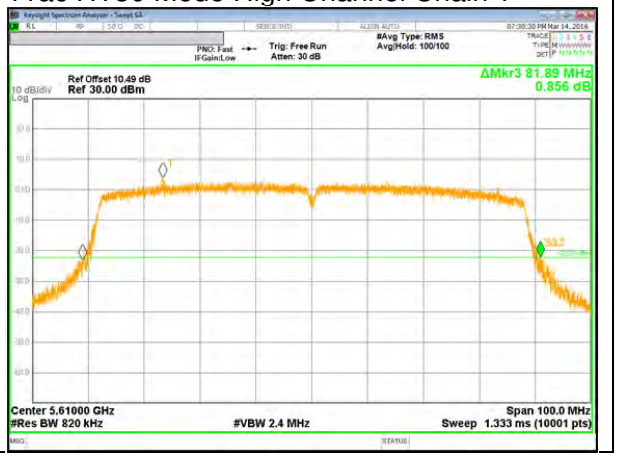
11ac HT80 Mode Low Channel Chain 0

11ac HT80 Mode Low Channel Chain 1

11ac HT80 Mode High Channel Chain 0



11ac HT80 Mode High Channel Chain 1



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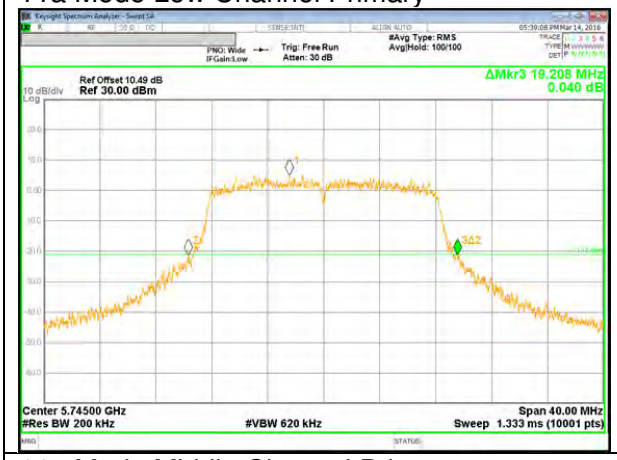
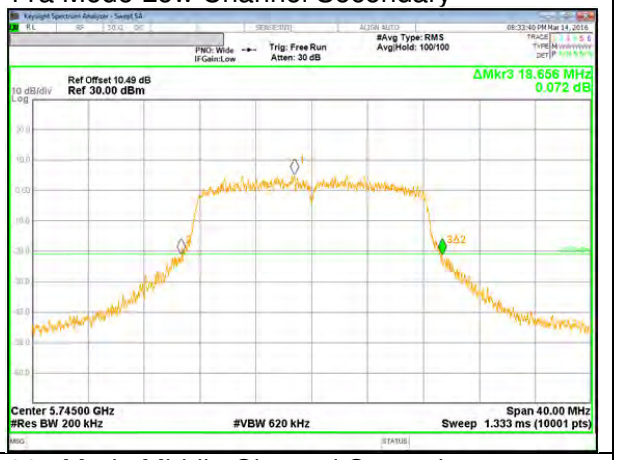
UNII 5.8 GHz IEEE 802.11a mode

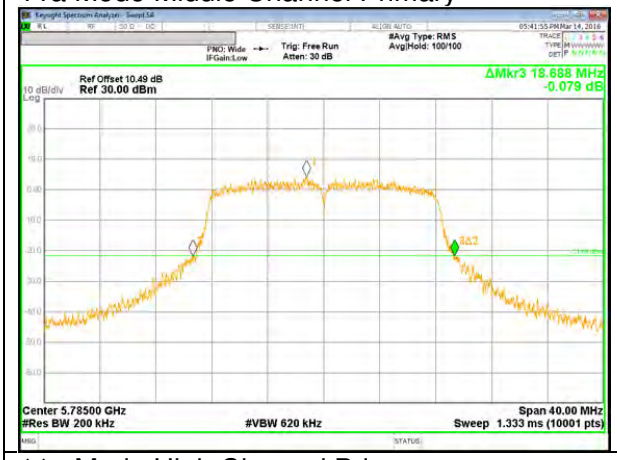
11a Mode Low Channel Primary



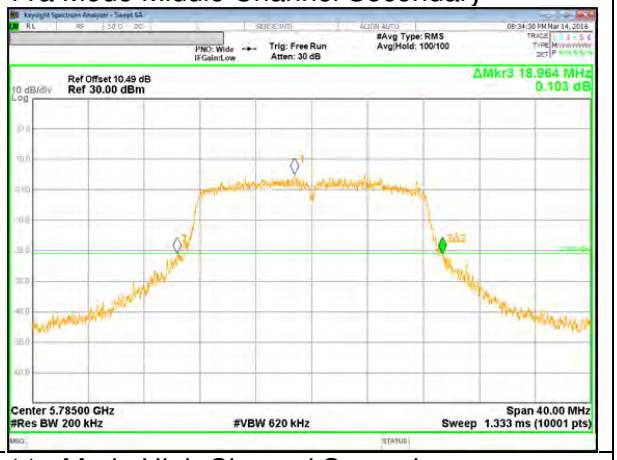
11a Mode Low Channel Secondary



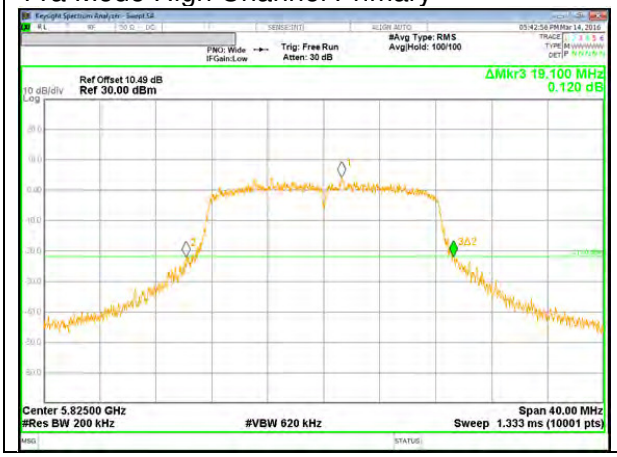
11a Mode Middle Channel Primary



11a Mode Middle Channel Secondary



11a Mode High Channel Primary



11a Mode High Channel Secondary

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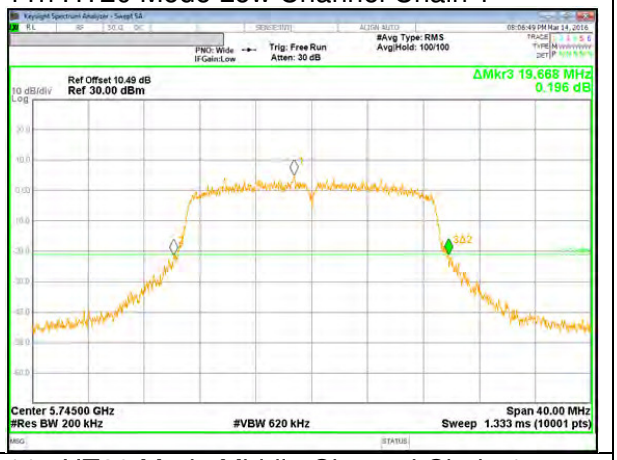
UNII 5.8 GHz IEEE 802.11n HT20 mode

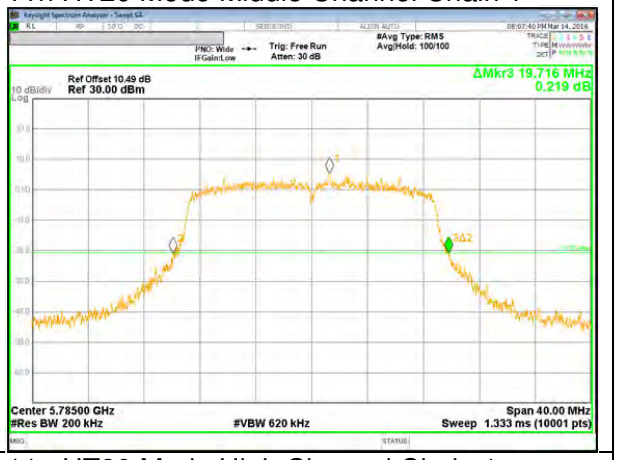
11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1

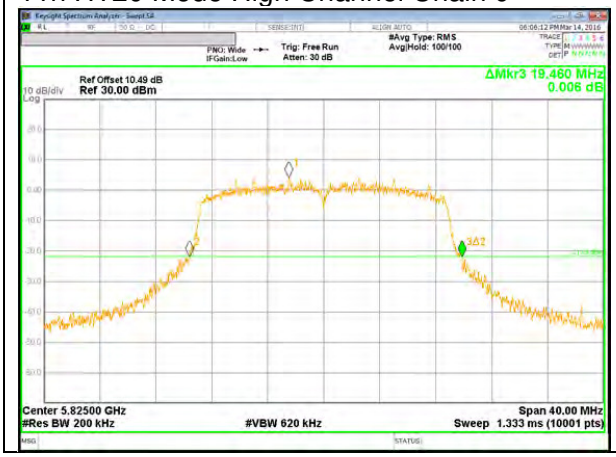


11n HT20 Mode Middle Channel Chain 0

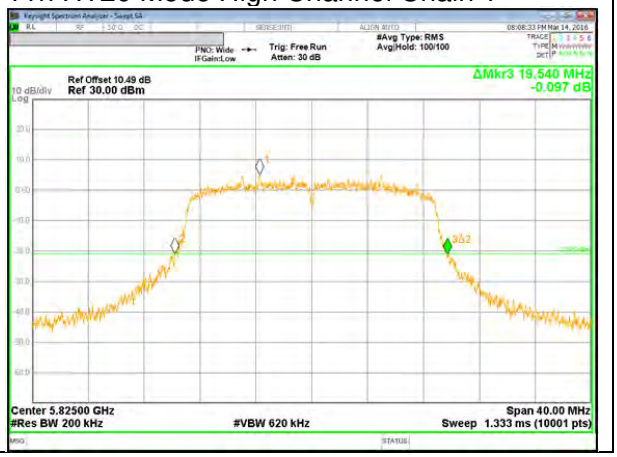
11n HT20 Mode Middle Channel Chain 1



11n HT20 Mode High Channel Chain 0



11n HT20 Mode High Channel Chain 1



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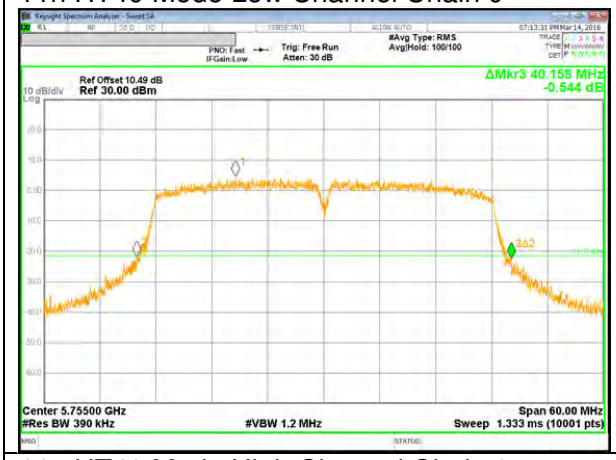
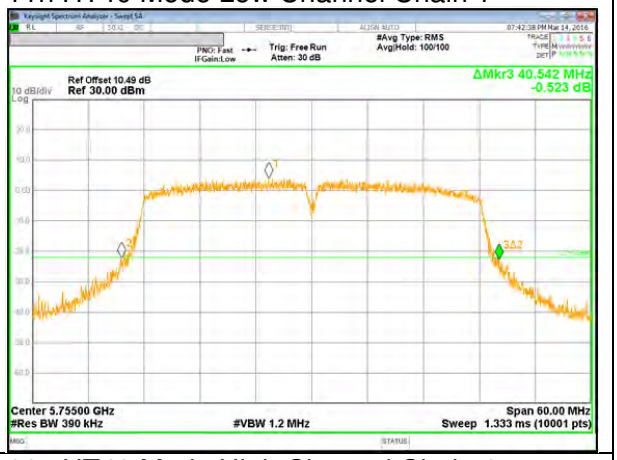
UNII 5.8 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0

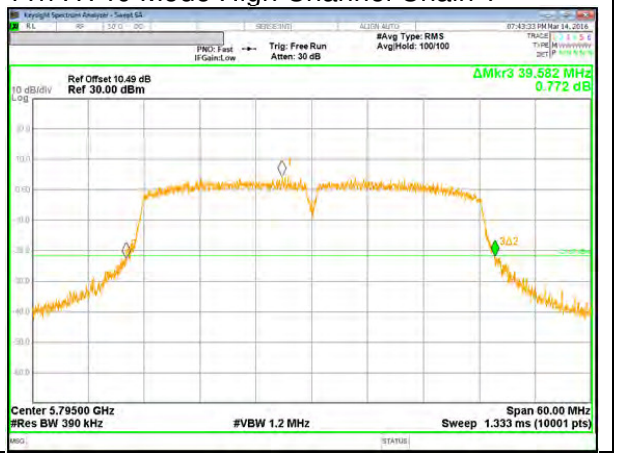


11n HT40 Mode Low Channel Chain 1



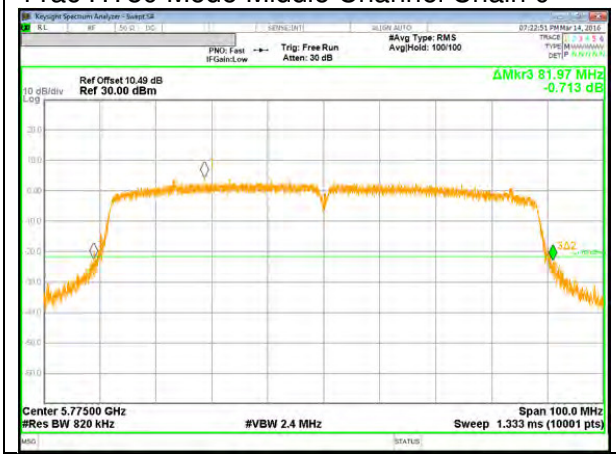
11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

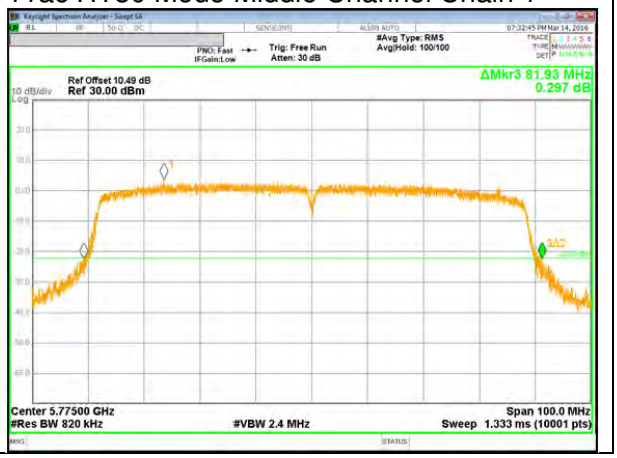


UNII 5.8 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0



11ac HT80 Mode Middle Channel Chain 1



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10.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

10.3.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Primary	Secondary
Low	5180	16.278	16.313
Mid	5200	16.352	16.339
High	5240	16.269	16.324
Worst		16.352	

10.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5180	17.483	17.516
Mid	5200	17.442	17.449
High	5240	17.506	17.434
Worst		17.516	

10.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5190	35.867	35.875
High	5230	35.911	35.823
Worst		35.911	

10.3.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Middle	5210	75.042	75.029
Worst		75.042	

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10.3.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Primary	Secondary
Low	5260	16.340	16.297
Mid	5300	16.322	16.348
High	5320	16.290	16.338
Worst		16.348	

10.3.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5260	17.433	17.438
Mid	5300	17.473	17.440
High	5320	17.420	17.504
Worst		17.504	

10.3.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5270	35.756	35.787
High	5310	35.907	35.931
Worst		35.931	

10.3.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Middle	5290	75.128	75.047
Worst		75.128	

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10.3.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Primary	Secondary
Low	5500	16.286	16.312
Mid	5580	16.315	16.273
High	5700	16.348	16.304
Worst		16.348	

10.3.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5500	17.436	17.457
Mid	5580	17.494	17.508
High	5700	17.399	17.480
Worst		17.508	

10.3.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5510	35.825	35.780
Mid	5550	35.840	35.927
High	5670	35.912	35.832
Worst		35.927	

10.3.12. 802.11ac VHT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5530	74.932	74.929
High	5610	74.953	74.998
Worst		74.998	

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10.3.13. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Primary	Secondary
Low	5745	16.351	16.351
Mid	5785	16.308	16.327
High	5825	16.275	16.345
Worst		16.351	

10.3.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5745	17.516	17.426
Mid	5785	17.487	17.427
High	5825	17.484	17.506
Worst		17.516	

10.3.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Low	5755	35.834	35.768
High	5795	35.882	35.909
Worst		35.909	

10.3.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]	
		Chain 0	Chain 1
Middle	5775	74.984	75.157
Worst		75.157	

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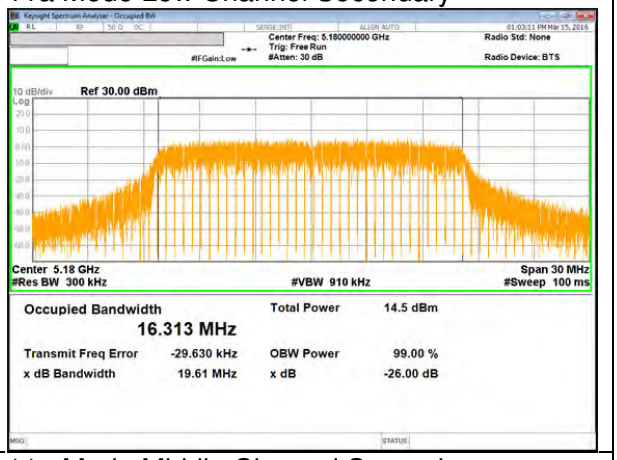
10.3.17. 99% BANDWIDTH PLOTS

UNII 5.2 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

11a Mode Low Channel Secondary



11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary

11a Mode High Channel Primary

11a Mode High Channel Secondary

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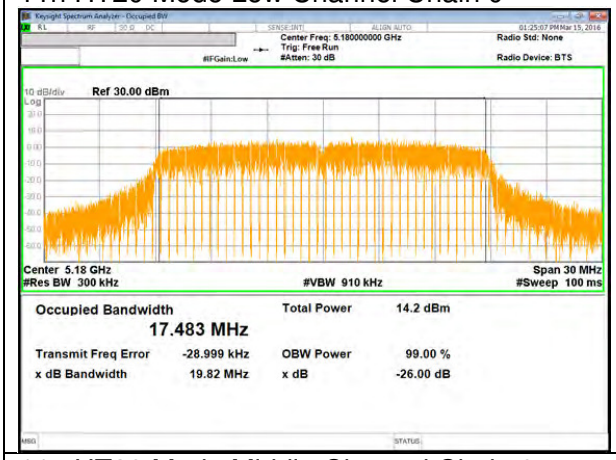
UNII 5.2 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0



11n HT20 Mode Low Channel Chain 1

11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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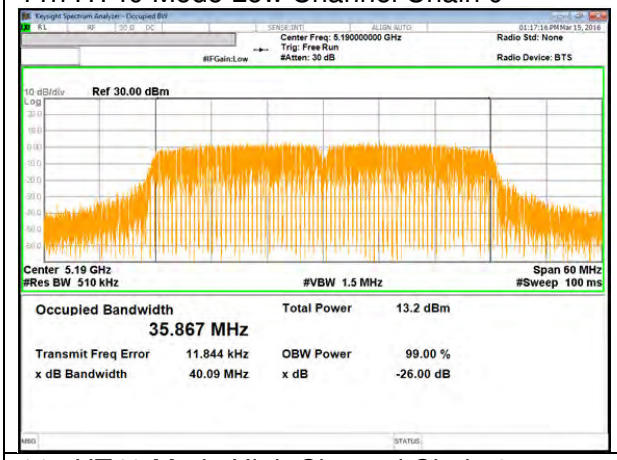
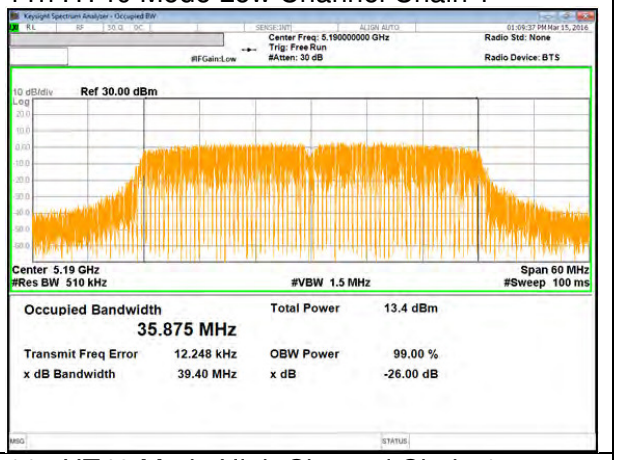
UNII 5.2 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0



11n HT40 Mode Low Channel Chain 1



11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

UNII 5.2 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0

11ac HT80 Mode Middle Channel Chain 1

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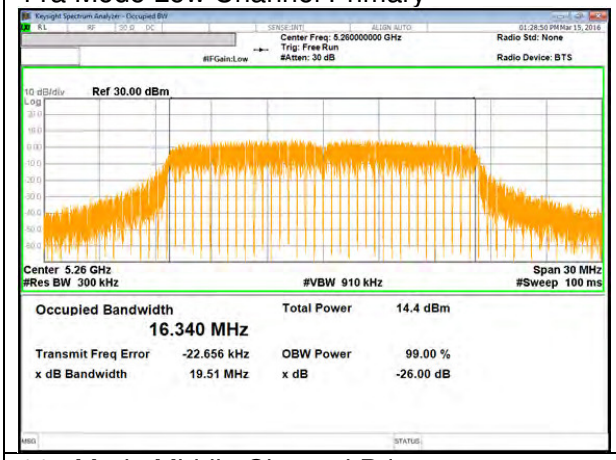
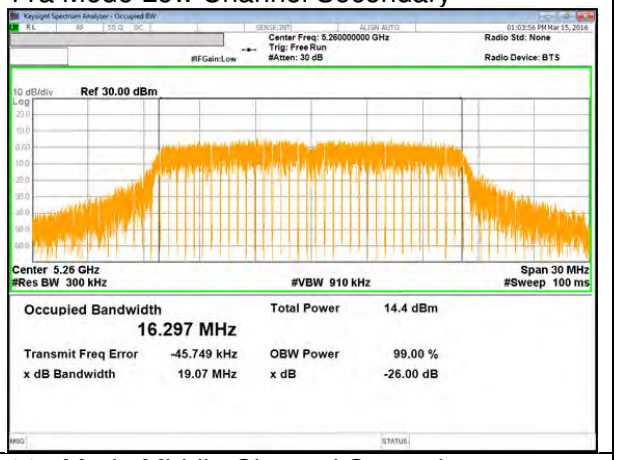
UNII 5.3 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

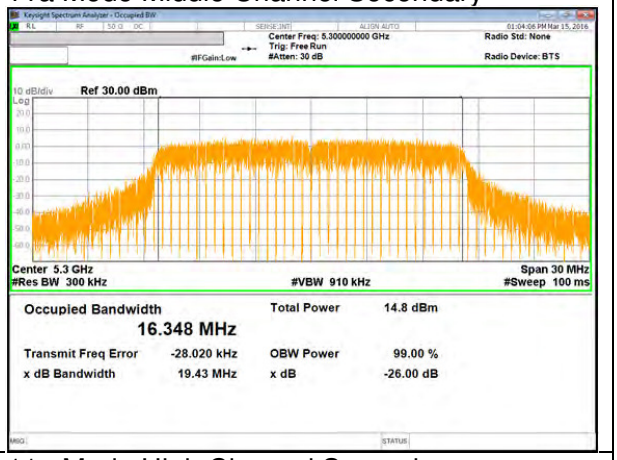


11a Mode Low Channel Secondary



11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary



11a Mode High Channel Primary

11a Mode High Channel Secondary

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UNII 5.3 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1

11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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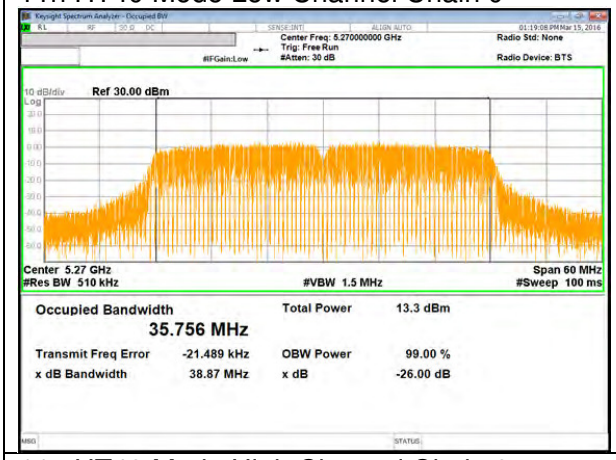
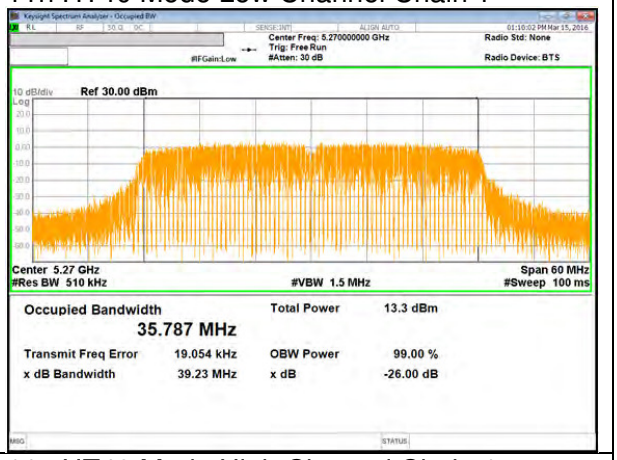
UNII 5.3 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0



11n HT40 Mode Low Channel Chain 1

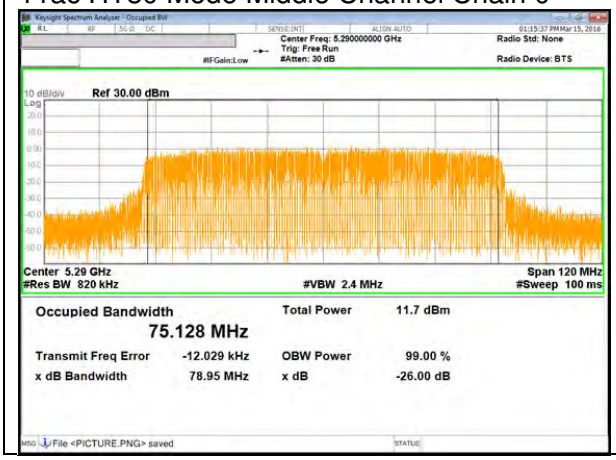


11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

UNII 5.3 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0



11ac HT80 Mode Middle Channel Chain 1

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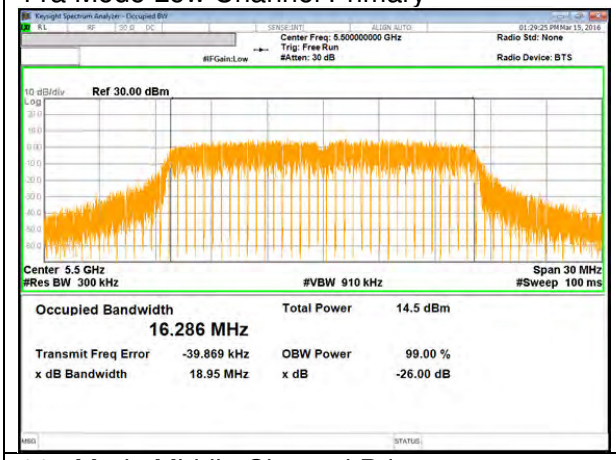
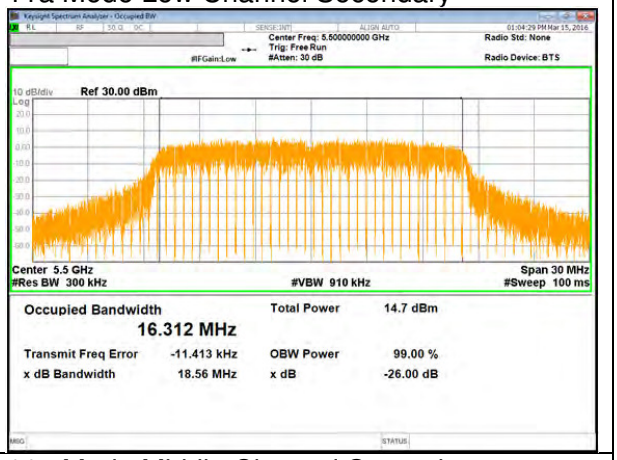
UNII 5.5 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

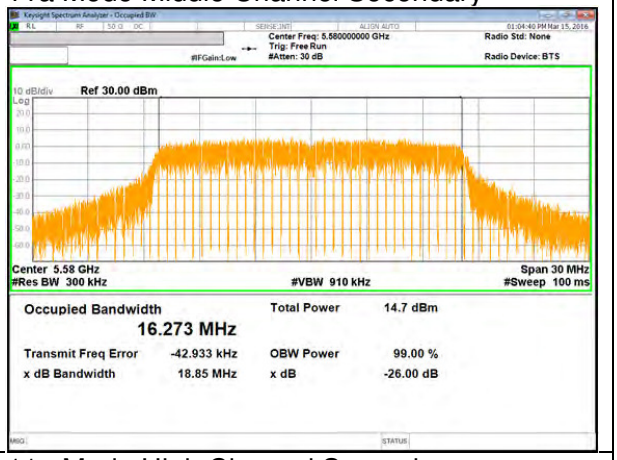


11a Mode Low Channel Secondary

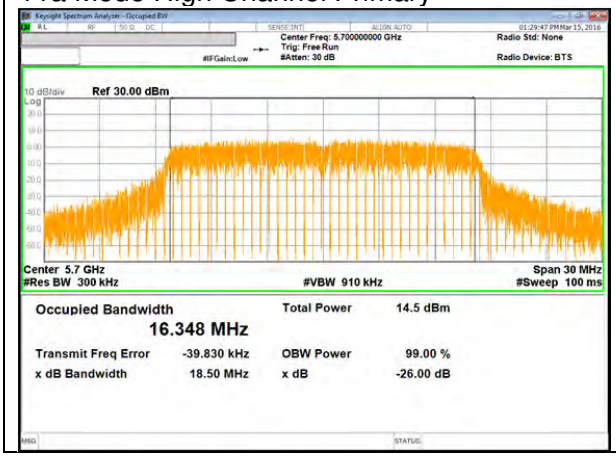


11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary



11a Mode High Channel Primary



11a Mode High Channel Secondary

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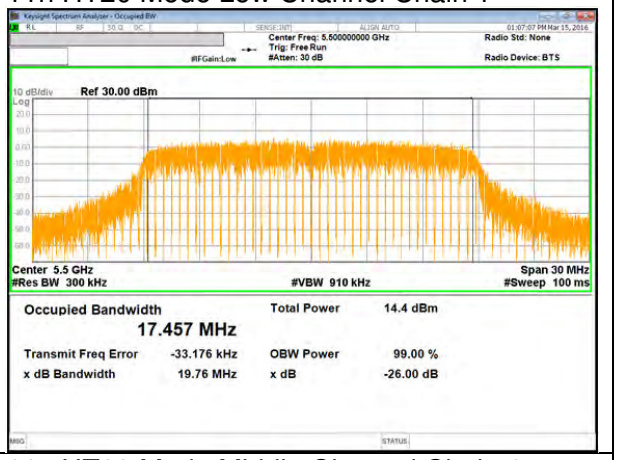
UNII 5.5 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1



11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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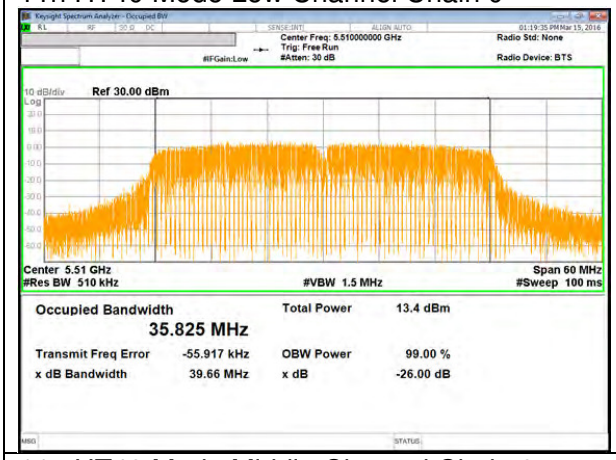
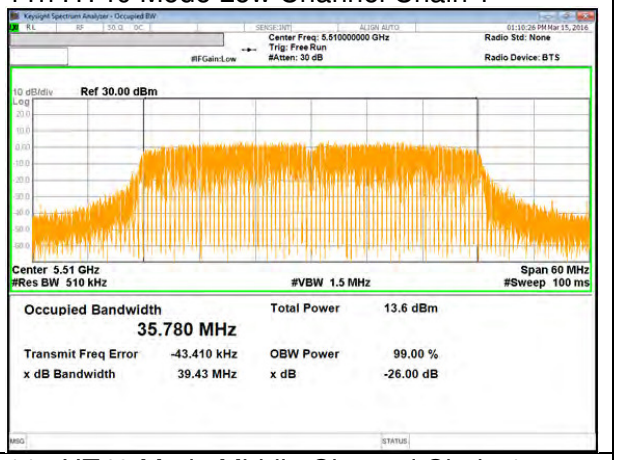
UNII 5.5 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0

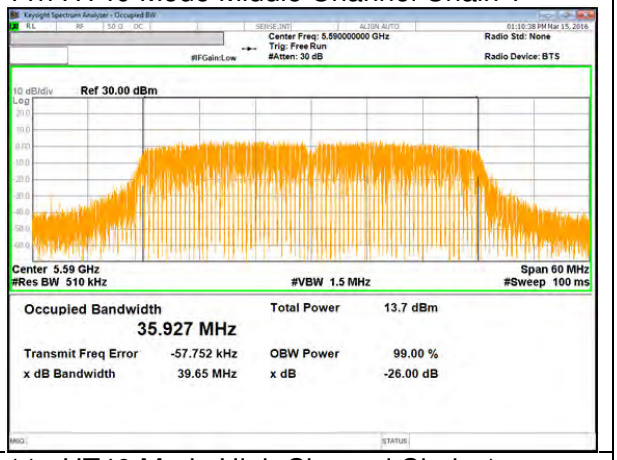


11n HT40 Mode Low Channel Chain 1



11n HT40 Mode Middle Channel Chain 0

11n HT40 Mode Middle Channel Chain 1



11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

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UNII 5.5 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Low Channel Chain 0

11ac HT80 Mode Low Channel Chain 1

11ac HT80 Mode High Channel Chain 0

11ac HT80 Mode High Channel Chain 1

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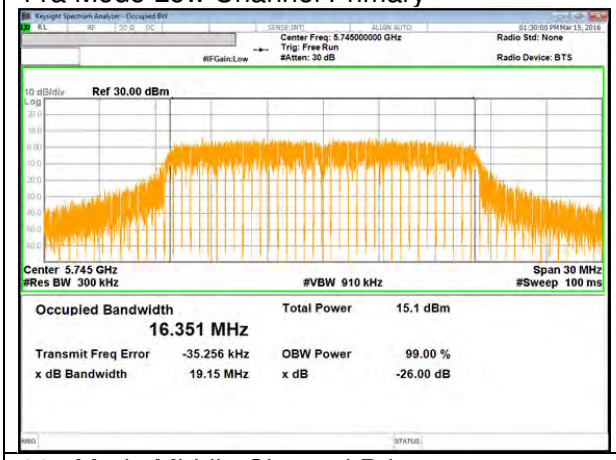
UNII 5.8 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

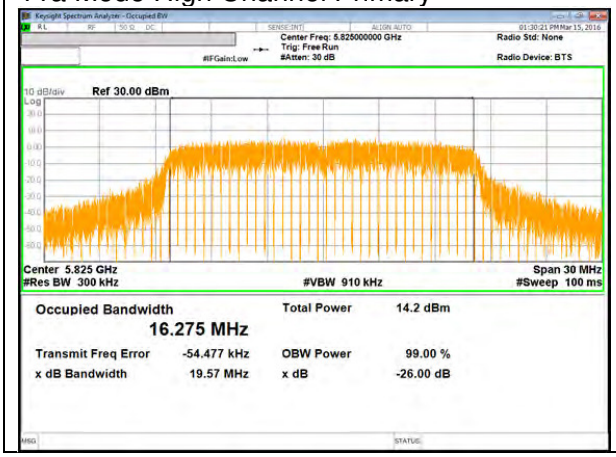


11a Mode Low Channel Secondary

11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary

11a Mode High Channel Primary



11a Mode High Channel Secondary

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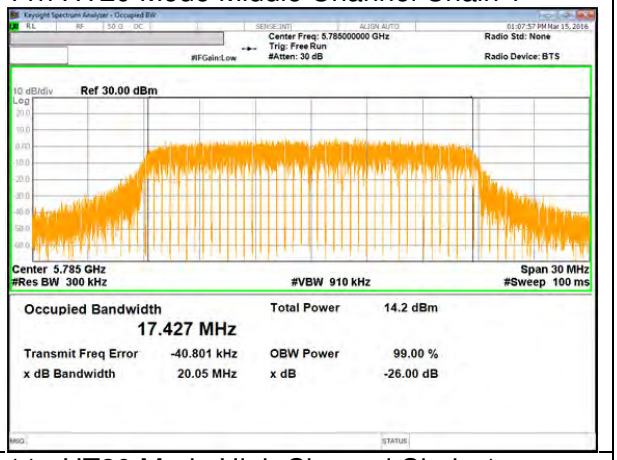
UNII 5.8 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1

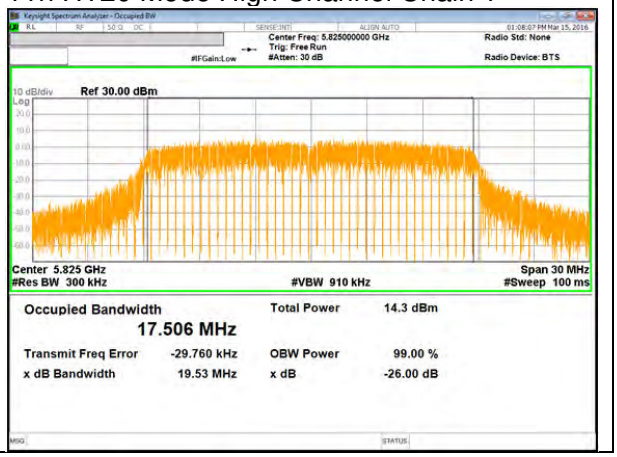
11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1



11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1



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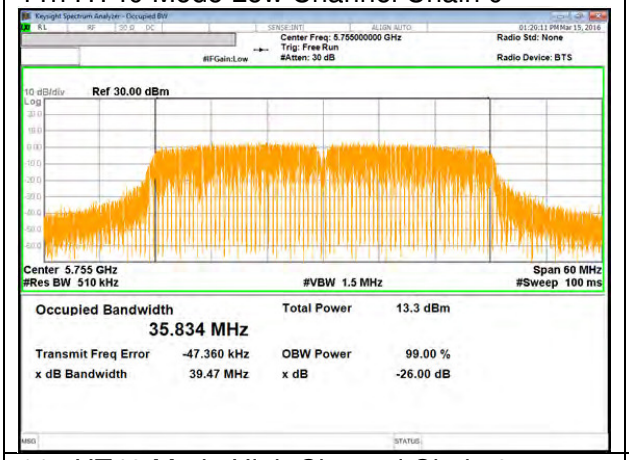
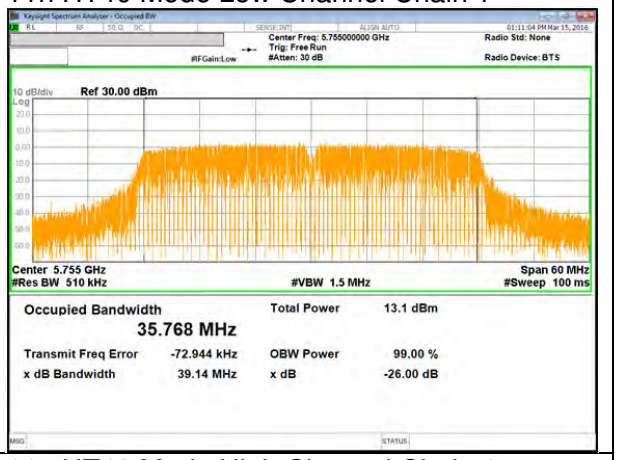
UNII 5.8 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0



11n HT40 Mode Low Channel Chain 1



11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

UNII 5.8 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0

11ac HT80 Mode Middle Channel Chain 1

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10.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1) (2) (3)

For the band 5.15–5.25 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 peak power spectraensity 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.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. 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.

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.

DIRECTIONAL ANTENNA GAIN

For Power: The TX chains are uncorrelated and the antenna gains are unequal among the chains. The directional gain is:

For PSD: The TX chains are correlated and the antenna gains are unequal among the chains. The directional gain is:

5 GHz

Frequency Band [MHz]	Chain 0 Antenna Gain [dBi]	Chain 1 Antenna Gain [dBi]	Uncorrelated Chains Directional Gain [dBi]	Correlated Chains Directional Gain [dBi]
5150 - 5250	-0.66	-2.69	-1.56	1.39
5250 - 5350	-1.70	-2.49	-2.08	0.92
5470 - 5725	-0.57	-1.93	-1.20	1.79
5725 - 5850	-1.23	-1.93	-1.57	1.44

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RESULTS

10.4.1. 802.11a MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5180	19.52	16.31	-1.56	1.39
Mid	5200	19.53	16.35	-1.56	1.39
High	5240	18.86	16.32	-1.56	1.39

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5180	23.90	11.00
Mid	5200	23.91	11.00
High	5240	23.76	11.00

Duty Cycle CF [dB]	0.29	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Primary Antenna 1 Power [dBm]	Secendary Antenna 2 Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5180	14.72	14.60	17.96	23.90	-5.95
Mid	5200	14.85	14.56	18.01	23.91	-5.90
High	5240	14.26	14.35	17.60	23.76	-6.15

PPSD Results

Channel	Frequency [MHz]	Primary Antenna 1 PPSD [dBm]	Secondary Antenna 2 PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5180	4.49	4.52	7.80	11.00	-3.20
Mid	5200	4.93	4.55	8.04	11.00	-2.96
High	5240	4.66	4.67	7.96	11.00	-3.04

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10.4.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5180	19.73	17.52	-1.56	1.39
Mid	5200	19.66	17.45	-1.56	1.39
High	5240	19.81	17.51	-1.56	1.39

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5180	23.95	11.00
Mid	5200	23.94	11.00
High	5240	23.97	11.00

Duty Cycle CF [dB]	0.31	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5180	14.34	14.11	17.54	23.95	-6.41
Mid	5200	14.64	14.37	17.82	23.94	-6.11
High	5240	15.06	14.24	17.98	23.97	-5.99

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5180	4.02	3.98	7.32	11.00	-3.68
Mid	5200	4.50	3.98	7.56	11.00	-3.44
High	5240	5.13	4.14	7.98	11.00	-3.02

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10.4.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5190	40.06	35.88	-1.56	1.39
High	5230	40.30	35.91	-1.56	1.39

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5190	24.00	11.00
High	5230	24.00	11.00

Duty Cycle CF [dB]	0.59	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5190	13.78	13.87	17.43	24.00	-6.57
High	5230	13.56	13.82	17.30	24.00	-6.70

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5190	0.54	0.71	4.23	11.00	-6.77
High	5230	0.41	0.66	4.14	11.00	-6.86

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10.4.4. 802.11ac HT80 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Middle	5210	83.12	75.04	-1.56	1.39

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Middle	5210	24.00	11.00

Duty Cycle CF [dB]	1.11	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Middle	5210	11.78	11.67	15.84	24.00	-8.16

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Middle	5210	-4.79	-4.28	-0.40	11.00	-11.40

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10.4.5. 802.11a MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5260	18.87	16.34	-2.08	0.92
Mid	5300	19.20	16.35	-2.08	0.92
High	5320	19.42	16.34	-2.08	0.92

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5260	23.76	11.00
Mid	5300	23.83	11.00
High	5320	23.88	11.00

Duty Cycle CF [dB]	0.29	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Primary Antenna 1 Power [dBm]	Secendary Antenna 2 Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5260	14.40	14.39	17.70	23.76	-6.06
Mid	5300	14.42	14.58	17.80	23.83	-6.03
High	5320	14.35	14.31	17.63	23.88	-6.26

PPSD Results

Channel	Frequency [MHz]	Primary Antenna 1 PPSD [dBm]	Secendary Antenna 2 PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5260	4.58	4.29	7.74	11.00	-3.26
Mid	5300	4.20	4.47	7.64	11.00	-3.36
High	5320	4.32	4.33	7.62	11.00	-3.38

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10.4.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5260	19.72	17.44	-2.08	0.92
Mid	5300	19.72	17.47	-2.08	0.92
High	5320	19.86	17.50	-2.08	0.92

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5260	23.95	11.00
Mid	5300	23.95	11.00
High	5320	23.98	11.00

Duty Cycle CF [dB]	0.31	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5260	15.09	14.25	18.01	23.95	-5.94
Mid	5300	15.14	14.16	17.99	23.95	-5.95
High	5320	14.98	14.38	18.01	23.98	-5.97

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5260	4.93	4.06	7.84	11.00	-3.16
Mid	5300	4.99	4.41	8.03	11.00	-2.97
High	5320	4.80	4.09	7.78	11.00	-3.22

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10.4.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5270	39.85	35.79	-2.08	0.92
High	5310	39.86	35.93	-2.08	0.92

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5270	24.00	11.00
High	5310	24.00	11.00

Duty Cycle CF [dB]	0.59	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5270	13.88	13.78	17.43	24.00	-6.57
High	5310	13.71	13.83	17.37	24.00	-6.63

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5270	0.78	0.72	4.35	11.00	-6.65
High	5310	0.54	0.77	4.26	11.00	-6.74

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10.4.8. 802.11ac HT80 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Middle	5290	83.62	75.13	-2.08	0.92

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Middle	5290	24.00	11.00

Duty Cycle CF [dB]	1.11	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Middle	5290	11.74	11.69	15.84	24.00	-8.16

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Middle	5290	-4.54	-4.44	-0.37	11.00	-11.37

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10.4.9. 802.11a MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5500	18.85	16.31	-1.20	1.79
Mid	5580	18.80	16.32	-1.20	1.79
High	5700	18.84	16.35	-1.20	1.79

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5500	23.75	11.00
Mid	5580	23.74	11.00
High	5700	23.75	11.00

Duty Cycle CF [dB]	0.29	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Primary Antenna 1 Power [dBm]	Secendary Antenna 2 Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5500	14.43	14.61	17.82	23.75	-5.94
Mid	5580	14.44	14.36	17.70	23.74	-6.04
High	5700	14.65	14.27	17.76	23.75	-5.99

PPSD Results

Channel	Frequency [MHz]	Primary Antenna 1 PPSD [dBm]	Secendary Antenna 2 PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5500	4.53	4.64	7.88	11.00	-3.12
Mid	5580	4.47	4.53	7.79	11.00	-3.21
High	5700	4.95	4.26	7.92	11.00	-3.08

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10.4.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5500	19.82	17.46	-1.20	1.79
Mid	5580	19.75	17.51	-1.20	1.79
High	5700	19.98	17.48	-1.20	1.79

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5500	23.97	11.00
Mid	5580	23.96	11.00
High	5700	24.00	11.00

Duty Cycle CF [dB]	0.31	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5500	14.05	14.18	17.43	23.97	-6.54
Mid	5580	14.19	14.35	17.59	23.96	-6.37
High	5700	14.38	14.14	17.58	24.00	-6.42

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5500	4.07	4.19	7.44	11.00	-3.56
Mid	5580	3.92	4.28	7.42	11.00	-3.58
High	5700	4.40	5.22	8.15	11.00	-2.85

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10.4.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5510	40.27	35.83	-1.20	1.79
Mid	5550	40.57	35.93	-1.20	1.79
High	5670	40.46	35.91	-1.20	1.79

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5510	24.00	11.00
Mid	5550	24.00	11.00
High	5670	24.00	11.00

Duty Cycle CF [dB]	0.59	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5510	13.84	13.70	17.38	24.00	-6.62
Mid	5550	13.63	13.60	17.22	24.00	-6.78
High	5670	13.47	13.59	17.14	24.00	-6.86

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5510	1.28	0.67	4.59	11.00	-6.41
Mid	5550	0.51	-0.11	3.81	11.00	-7.19
High	5670	0.36	0.65	4.11	11.00	-6.89

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10.4.12. 802.11ac HT80 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5530	82.19	74.93	-1.20	1.79
High	5610	83.29	75.00	-1.20	1.79

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5530	24.00	11.00
High	5610	24.00	11.00

Duty Cycle CF [dB]	1.11	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5530	11.76	11.70	15.85	24.00	-8.15
High	5610	11.67	11.60	15.76	24.00	-8.24

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5530	-4.14	-4.30	-0.10	11.00	-11.10
High	5610	-4.53	-4.41	-0.34	11.00	-11.34

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10.4.13. 802.11a MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5745	19.21	16.35	-1.57	1.44
Mid	5785	18.96	16.33	-1.57	1.44
High	5825	19.10	16.35	-1.57	1.44

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5745	30.00	30.00
Mid	5785	30.00	30.00
High	5825	30.00	30.00

Duty Cycle CF [dB]	0.29	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Primary Antenna 1 Power [dBm]	Secendary Antenna 2 Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5745	14.93	14.41	17.98	30.00	-12.02
Mid	5785	14.02	14.27	17.44	30.00	-12.56
High	5825	13.74	14.28	17.32	30.00	-12.68

PPSD Results

Channel	Frequency [MHz]	Primary Antenna 1 PPSD [dBm]	Secendary Antenna 2 PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5745	1.85	1.42	4.93	30.00	-25.07
Mid	5785	0.86	1.15	4.30	30.00	-25.70
High	5825	1.02	1.22	4.42	30.00	-25.58

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10.4.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5745	19.67	17.52	-1.57	1.44
Mid	5785	19.72	17.49	-1.57	1.44
High	5825	19.54	17.51	-1.57	1.44

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5745	30.00	30.00
Mid	5785	30.00	30.00
High	5825	30.00	30.00

Duty Cycle CF [dB]	0.31	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5745	14.58	14.98	18.10	30.00	-11.90
Mid	5785	13.98	14.04	17.33	30.00	-12.67
High	5825	13.53	14.02	17.09	30.00	-12.91

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5745	1.38	0.80	4.41	30.00	-25.59
Mid	5785	1.04	0.83	4.25	30.00	-25.75
High	5825	0.31	0.95	3.96	30.00	-26.04

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10.4.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5755	40.54	35.83	-1.57	1.44
High	5795	40.13	35.91	-1.57	1.44

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5755	30.00	30.00
High	5795	30.00	30.00

Duty Cycle CF [dB]	0.59	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5755	13.80	13.76	17.38	30.00	-12.62
High	5795	13.82	13.80	17.41	30.00	-12.59

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5755	-2.43	-2.43	1.18	30.00	-28.82
High	5795	-2.03	-2.35	1.41	30.00	-28.59

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10.4.16. 802.11ac HT80 MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Middle	5775	81.97	75.16	-1.57	1.44

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	FCC PPSD Limit [dBm]
Middle	5775	30.00	30.00

Duty Cycle CF [dB]	1.11	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Chain 0 Meas Power [dBm]	Chain 1 Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Middle	5775	11.68	11.68	15.80	30.00	-14.20

PPSD Results

Channel	Frequency [MHz]	Chain 0 Meas PPSD [dBm]	Chain 1 Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Middle	5775	-7.40	-7.62	-3.39	30.00	-33.39

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10.4.17. OUTPUT POWER AND PPSD PLOTS

UNII 5.2 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

11a Mode Low Channel Secondary

11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary

11a Mode High Channel Primary

11a Mode High Channel Secondary

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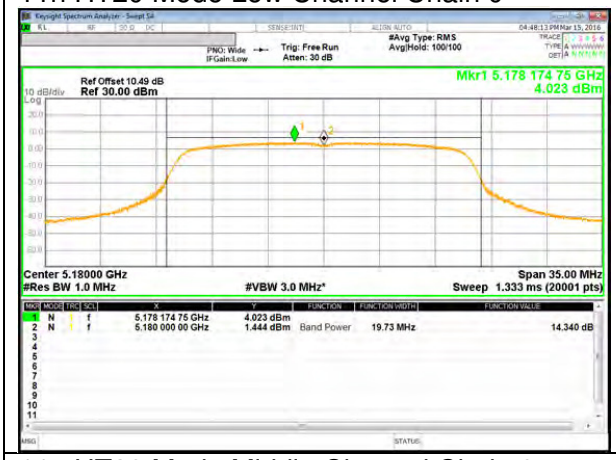
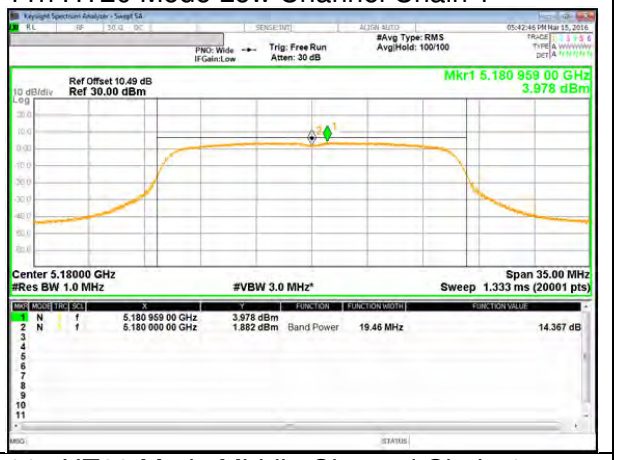
UNII 5.2 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0



11n HT20 Mode Low Channel Chain 1



11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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UNII 5.2 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0

11n HT40 Mode Low Channel Chain 1

11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

UNII 5.2 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0

11ac HT80 Mode Middle Channel Chain 1

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UNII 5.3 GHz IEEE 802.11a mode

11a Mode Low Channel Primary

11a Mode Low Channel Secondary

11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary

11a Mode High Channel Primary

11a Mode High Channel Secondary

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UNII 5.3 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1

11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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UNII 5.3 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0

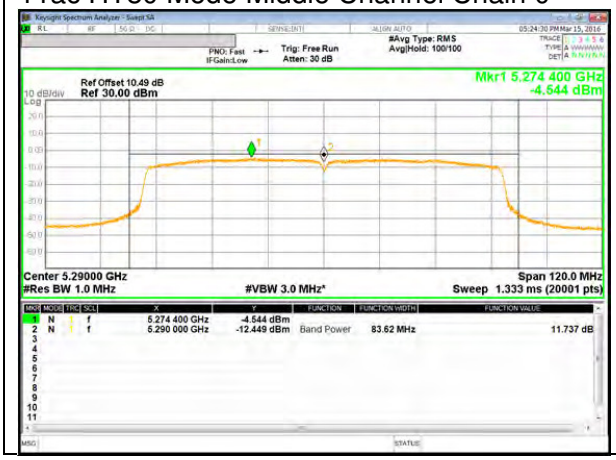
11n HT40 Mode Low Channel Chain 1

11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

UNII 5.3 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Middle Channel Chain 0



11ac HT80 Mode Middle Channel Chain 1

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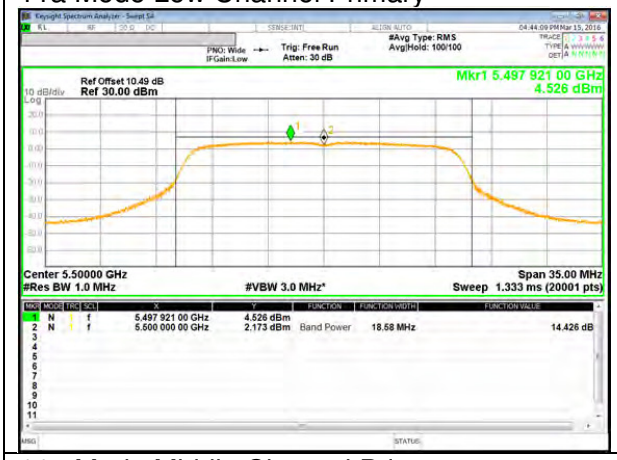
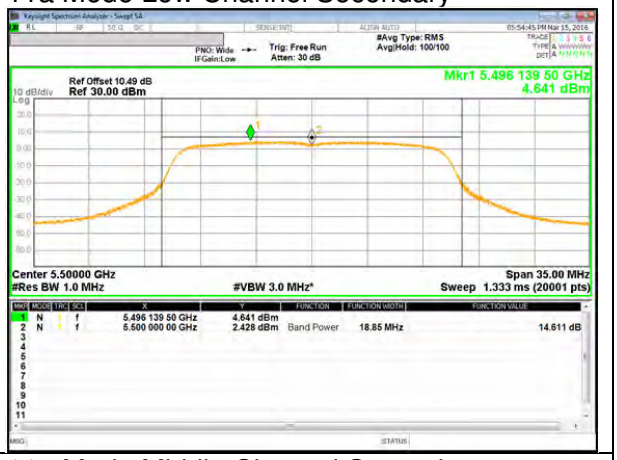
UNII 5.5 GHz IEEE 802.11a mode

11a Mode Low Channel Primary



11a Mode Low Channel Secondary



11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary

11a Mode High Channel Primary

11a Mode High Channel Secondary

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UNII 5.5 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1

11n HT20 Mode Middle Channel Chain 0

11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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UNII 5.5 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel Chain 0

11n HT40 Mode Low Channel Chain 1

11n HT40 Mode Middle Channel Chain 0

11n HT40 Mode Middle Channel Chain 1

11n HT40 Mode High Channel Chain 0

11n HT40 Mode High Channel Chain 1

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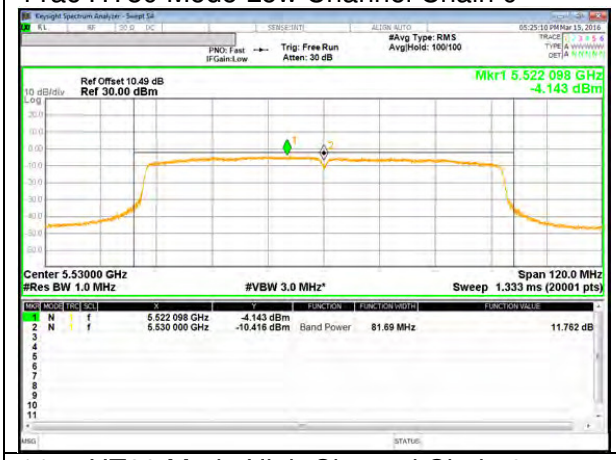
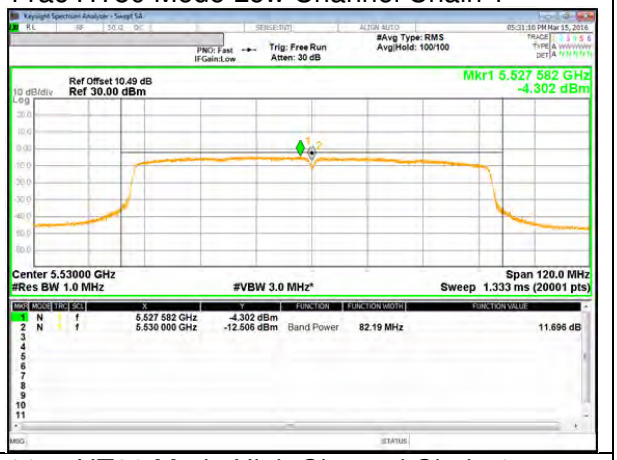
UNII 5.5 GHz IEEE 802.11ac VHT80 mode

11ac HT80 Mode Low Channel Chain 0



11ac HT80 Mode Low Channel Chain 1



11ac HT80 Mode High Channel Chain 0

11ac HT80 Mode High Channel Chain 1

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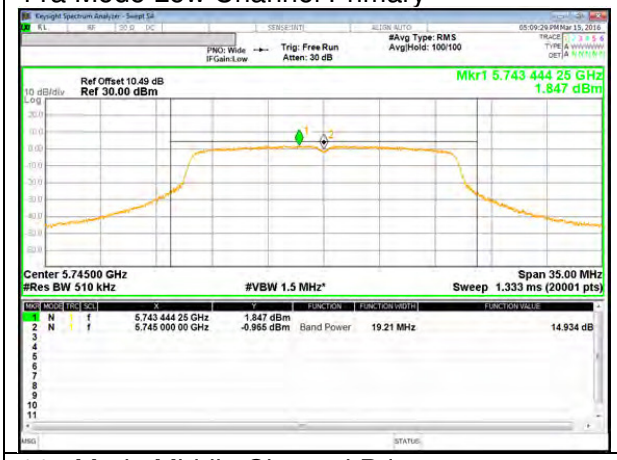
UNII 5.8 GHz IEEE 802.11a mode

11a Mode Low Channel Primary



11a Mode Low Channel Secondary

11a Mode Middle Channel Primary

11a Mode Middle Channel Secondary

11a Mode High Channel Primary

11a Mode High Channel Secondary

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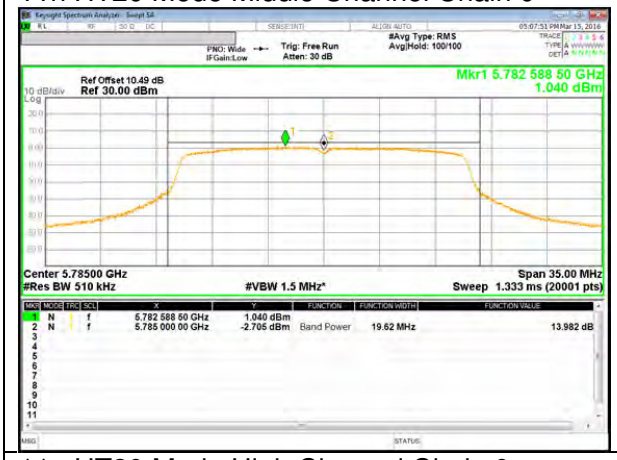
UNII 5.8 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel Chain 0

11n HT20 Mode Low Channel Chain 1

11n HT20 Mode Middle Channel Chain 0



11n HT20 Mode Middle Channel Chain 1

11n HT20 Mode High Channel Chain 0

11n HT20 Mode High Channel Chain 1

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