



FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

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

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FCC ID: A3LSMG903F

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Prepared for

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC
MODEL NUMBER: SM-G903F
SERIAL NUMBER: R38G60CA7KK (RADIATED); R38G60C9R5L(CONDUCTED)
DATE TESTED: JUN 15 - JUL 01, 2015

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 v01, 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:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, ANT+ and NFC.
This test report addresses the NII (UNII) operational mode.

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	Antenna1
5180 - 5240	802.11a	12.18	16.52
	802.11n HT20	11.87	15.38
5190 - 5230	802.11n HT40	11.58	14.39
5210	802.11ac VHT80	11.62	14.52
5260 - 5320	802.11a	12.09	16.18
	802.11n HT20	11.65	14.62
5270 - 5310	802.11n HT40	11.54	14.26
5290	802.11ac VHT80	11.64	14.59
5500 - 5720	802.11a	12.37	17.26
	802.11n HT20	12.37	17.26
5510 - 5710	802.11n HT40	12.10	16.22
5530 - 5690	802.11ac VHT80	12.30	16.98
5745 - 5825	802.11a	12.34	17.14
	802.11n HT20	11.64	14.59
5755 - 5795	802.11n HT40	11.45	13.96
5775	802.11ac VHT80	11.44	13.93

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency Range [MHz]	Antenna Gain [dBi]
UNII 1 5150 – 5250	0.47
UNII 2A 5250 – 5350	0.47
UNII 2C 5470 – 5725	2.81
UNII 3 5725 – 5825	0.16

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA20EWE	N/A	N/A
Data Cable	SAMSUNG	EP-DN915UWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

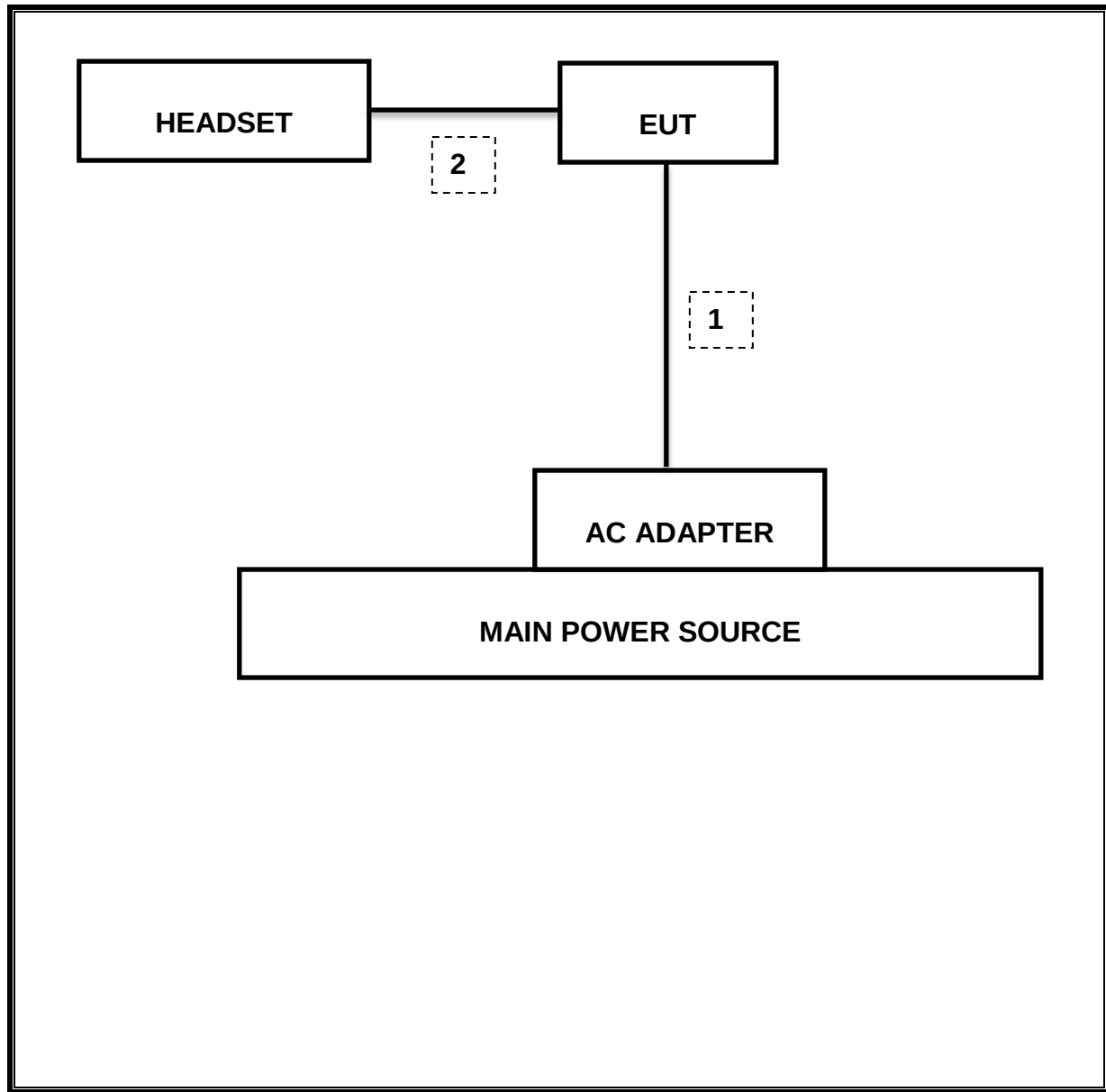
I/O CABLES

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 exercised the radio card.

SETUP DIAGRAM FOR TESTS



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	950	11-17-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	11-17-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15
LISN	R&S	ENV-216	101836	04-09-16
LISN	R&S	ENV-216	101837	04-09-16

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	84.30 MHz
15.407	6dB Band width (5.8Ghz)	500KHz		Pass	3.000 MHz (Straddle)
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	12.37 dBm
15.407 (a)(3)	TX Cond. Power 5.725-5.825	< 30dBm or 17+10Log(OBW)		Pass	12.34 dBm
15.407 (a)(5)	PSD (5.2,5.3,5.5GHz)	<11dBm		Pass	2.323 dBm
15.407 (a)(5)	PSD (5.8GHz)	30dBm per 500kHz		Pass	2.250 dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Radiated	Pass	48.08 dBuV (QP)
15.407 (b) & 15.209	Radiated Spurious Emission	< 54dBuV/m		Pass	52.16dBuV/m (AV)
15.407 (h)(2)	Dynamic Frequency Selection	N/A	Radiated / Conducted	Pass	N/A

8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

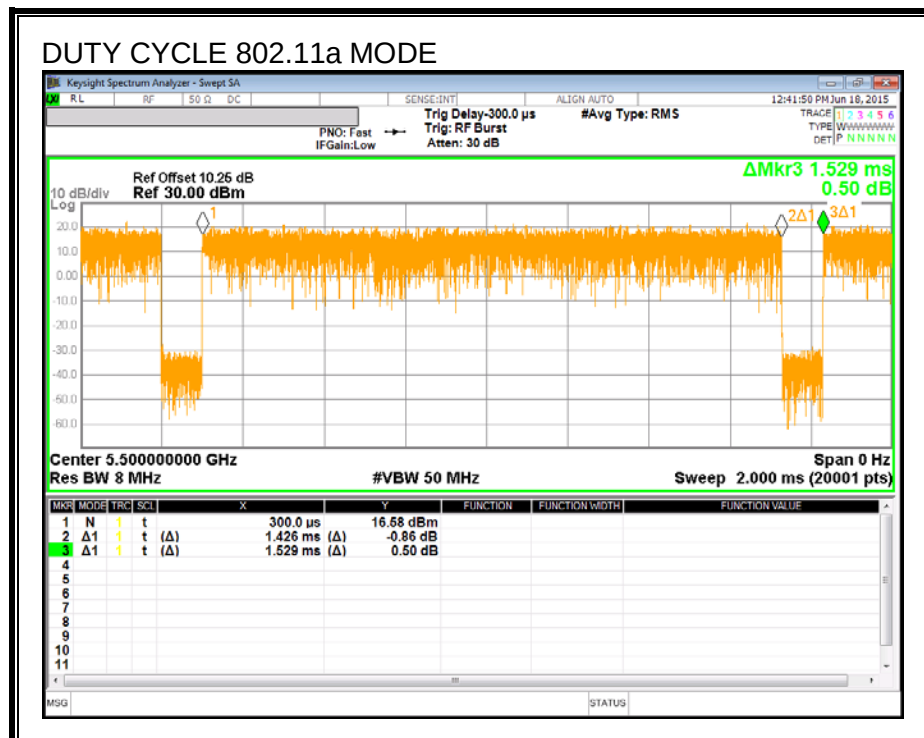
PROCEDURE

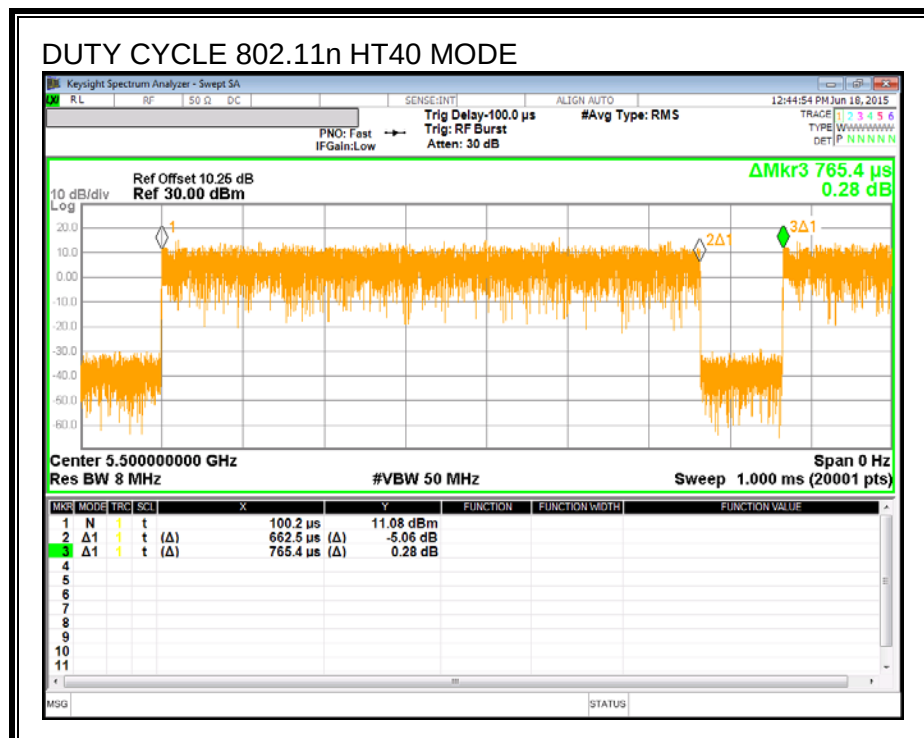
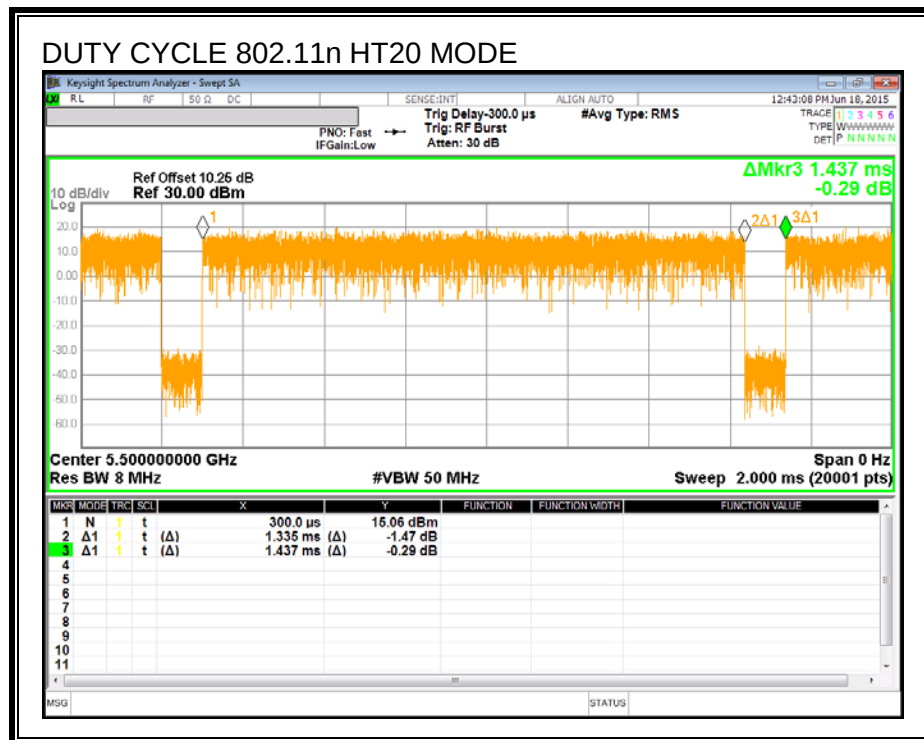
KDB 789033 Zero-Span Spectrum Analyzer Method.

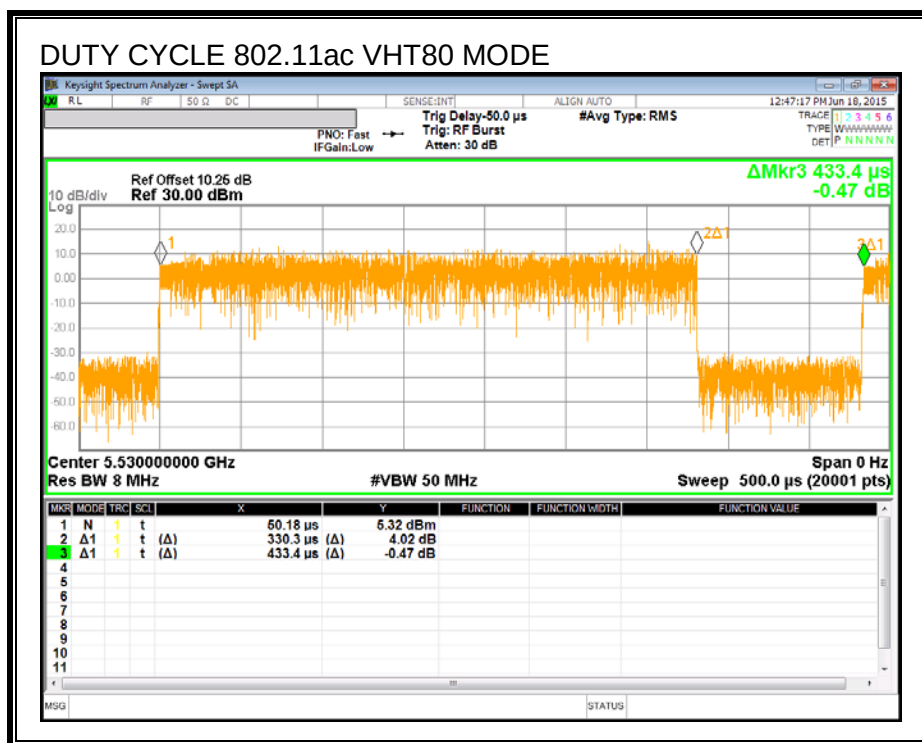
8.1. ON TIME AND DUTY CYCLE RESULTS

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	1.426	1.529	0.933	93.3%	0.30	0.701
802.11n HT20	1.335	1.437	0.929	92.9%	0.32	0.749
802.11n HT40	0.663	0.765	0.866	86.6%	0.63	1.509
802.11ac VHT80	0.330	0.433	0.762	76.2%	1.18	3.028

8.2. DUTY CYCLE PLOTS







9. MEASUREMENT METHOD

KDB 789033 D02 General UNII Test Procedures New Rules v01
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

Straddle Channels: KDB 644545 D03 v01

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 v01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

RESULTS

10.1.1. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5720	3.163	0.5
Low	5745	16.000	0.5
Mid	5785	16.200	0.5
High	5825	16.200	0.5
Worst		3.163	

10.1.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5720	3.788	0.5
Low	5745	17.575	0.5
Mid	5785	17.550	0.5
High	5825	17.650	0.5
Worst		3.788	

10.1.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5710	3.075	0.5
Low	5765	36.250	0.5
High	5795	36.100	0.5
Worst		3.075	

10.1.4. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

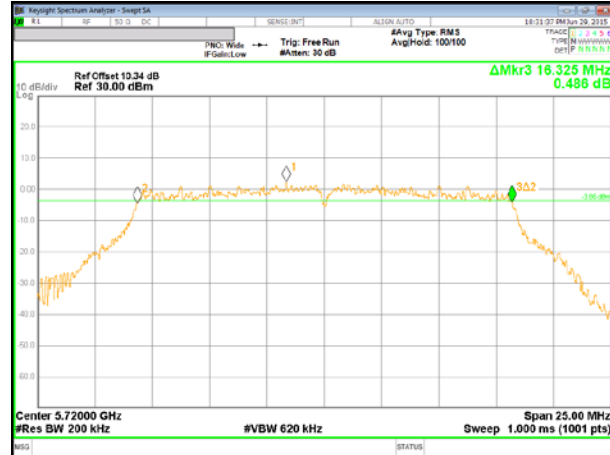
Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5690	3.000	0.5
Middle	5775	76.000	0.5
Worst		3.000	

- **Straddle Channel**
: the 6dB minimum bandwidth for the portion falling in the UNII-3 band.

10.1.5. 6 dB BANDWIDTH PLOTS

IEEE 802.11a mode

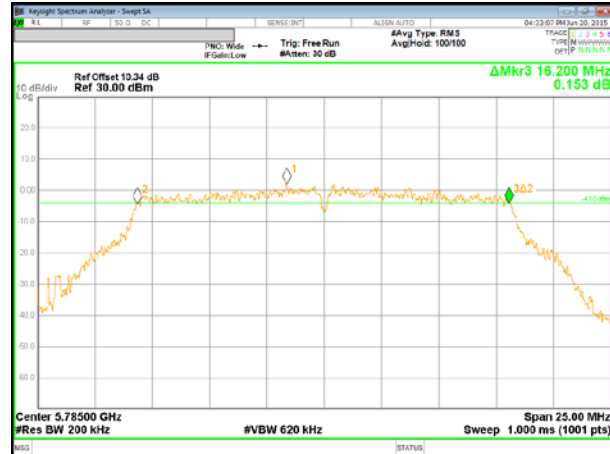
11a Mode Straddle Channel



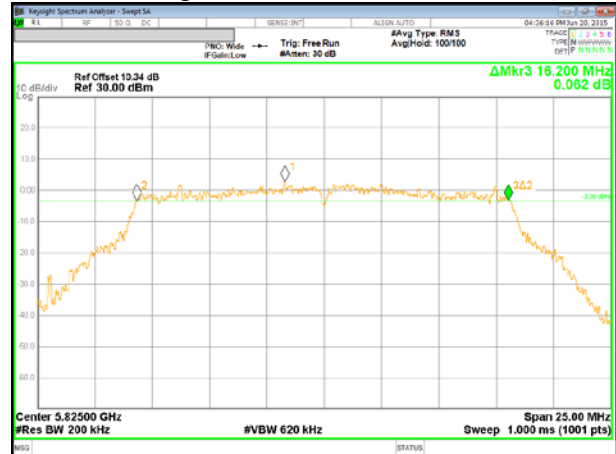
11a Mode Low Channel



11a Mode Middle Channel

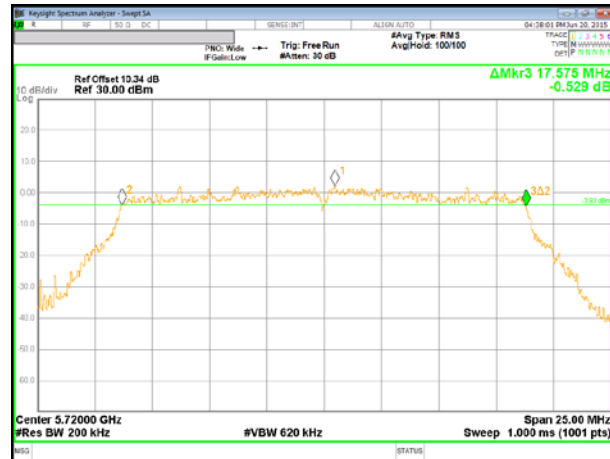


11a Mode High Channel

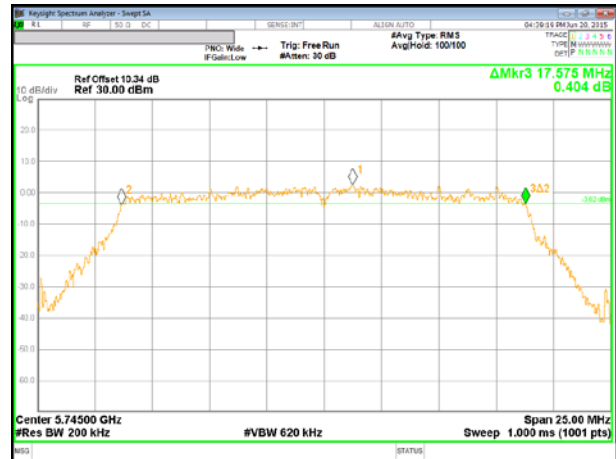


IEEE 802.11n HT20 mode

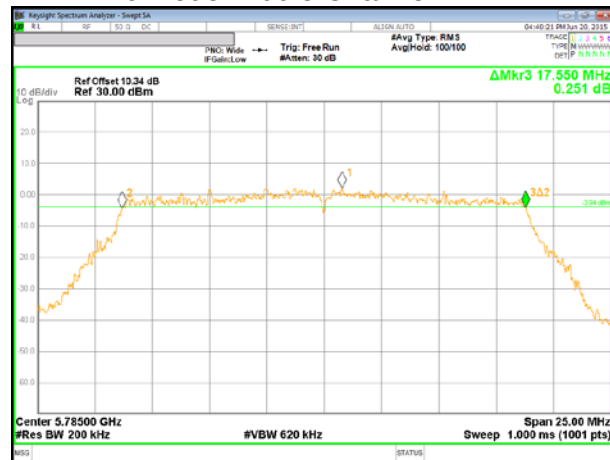
11n HT20 Mode Straddle Channel



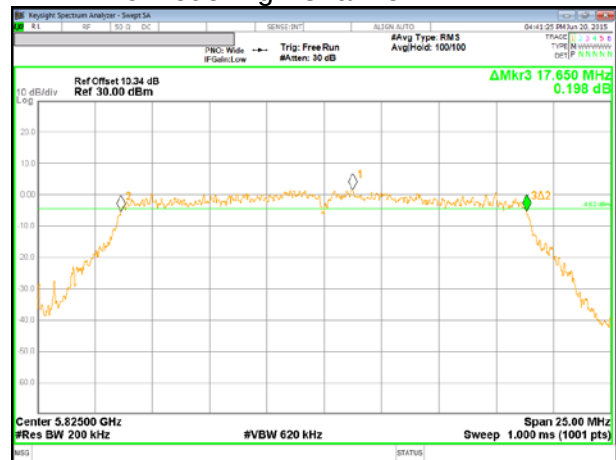
11n HT20 Mode Low Channel



11n HT20 Mode Middle Channel

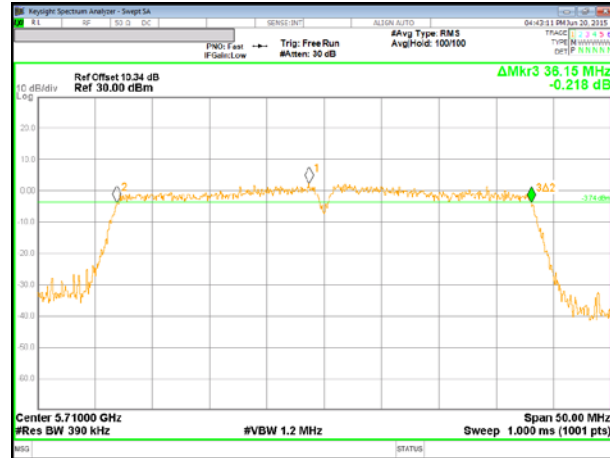


11n HT20 Mode High Channel

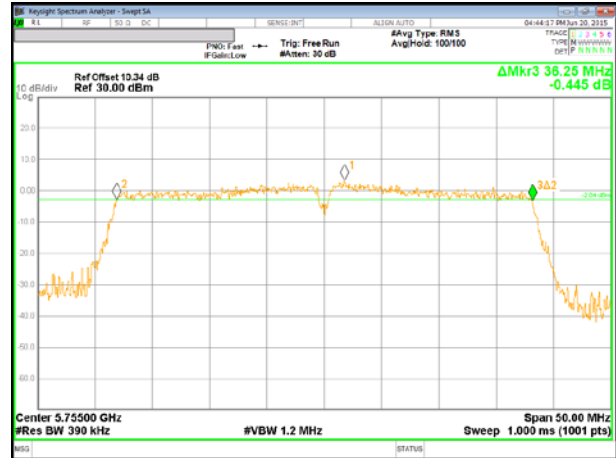


IEEE 802.11n HT40 mode

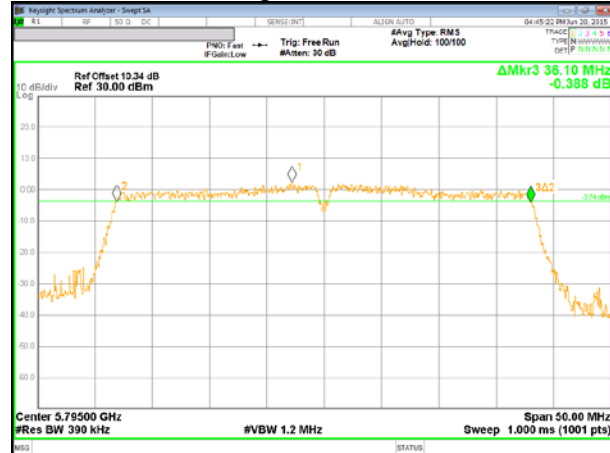
11n HT40 Mode Straddle Channel



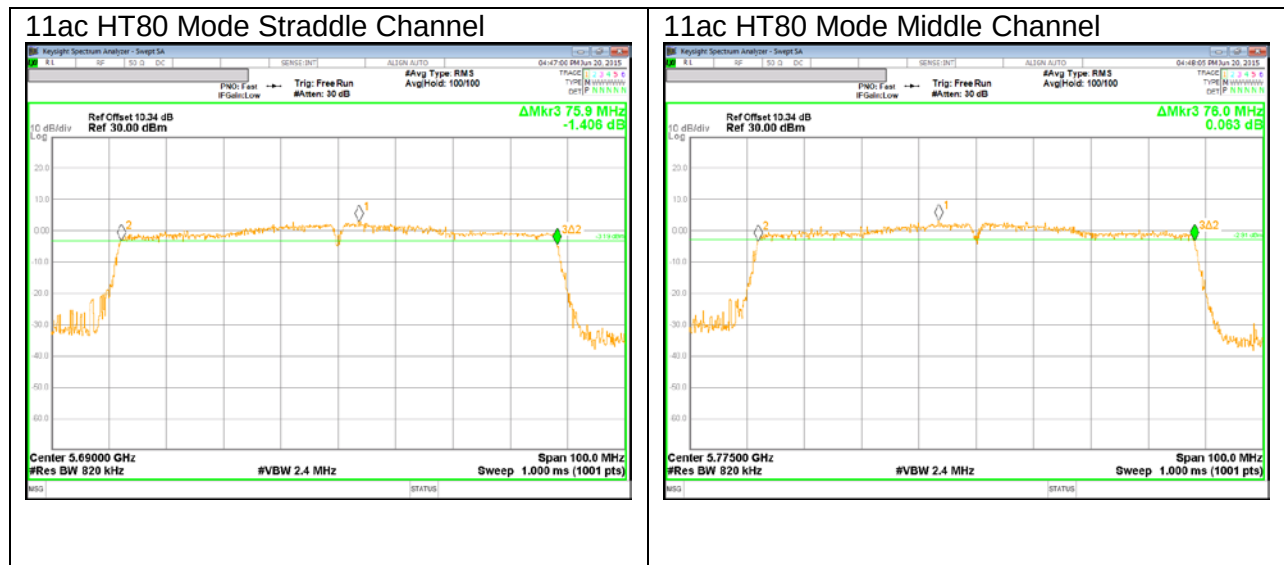
11n HT40 Mode Low Channel



11n HT40 Mode High Channel



IEEE 802.11ac VHT80 mode



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]
Low	5180	21.160
Mid	5200	21.080
High	5240	21.120
Worst		21.160

10.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5180	21.560
Mid	5200	21.480
High	5240	21.560
Worst		21.560

10.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5190	40.020
High	5230	39.720
Worst		21.240

10.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Middle	5210	81.500
Worst		81.500

10.2.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5260	21.120
Mid	5300	21.240
High	5320	21.160
Worst		21.240

10.2.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5260	21.600
Mid	5300	21.560
High	5320	21.640
Worst		21.640

10.2.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5270	39.480
High	5310	39.540
Worst		39.540

10.2.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Middle	5290	82.600
Worst		82.600

10.2.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5500	21.200
Mid	5580	21.200
High	5700	21.240
Straddle	5720	21.240
Worst		21.240

10.2.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5500	21.640
Mid	5580	21.640
High	5700	21.640
Straddle	5720	21.560
Worst		21.640

10.2.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5510	39.480
Mid	5550	39.660
High	5670	39.180
Straddle	5710	39.600
Worst		39.660

10.2.12. 802.11ac VHT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5530	83.600
High	5610	83.900
Straddle	5690	83.200
Worst		83.900

10.2.13. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5745	21.280
Mid	5785	21.240
High	5825	21.240
Worst		21.280

10.2.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5745	21.600
Mid	5785	21.600
High	5825	21.720
Worst		21.720

10.2.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Low	5755	39.960
High	5795	40.560
Worst		40.560

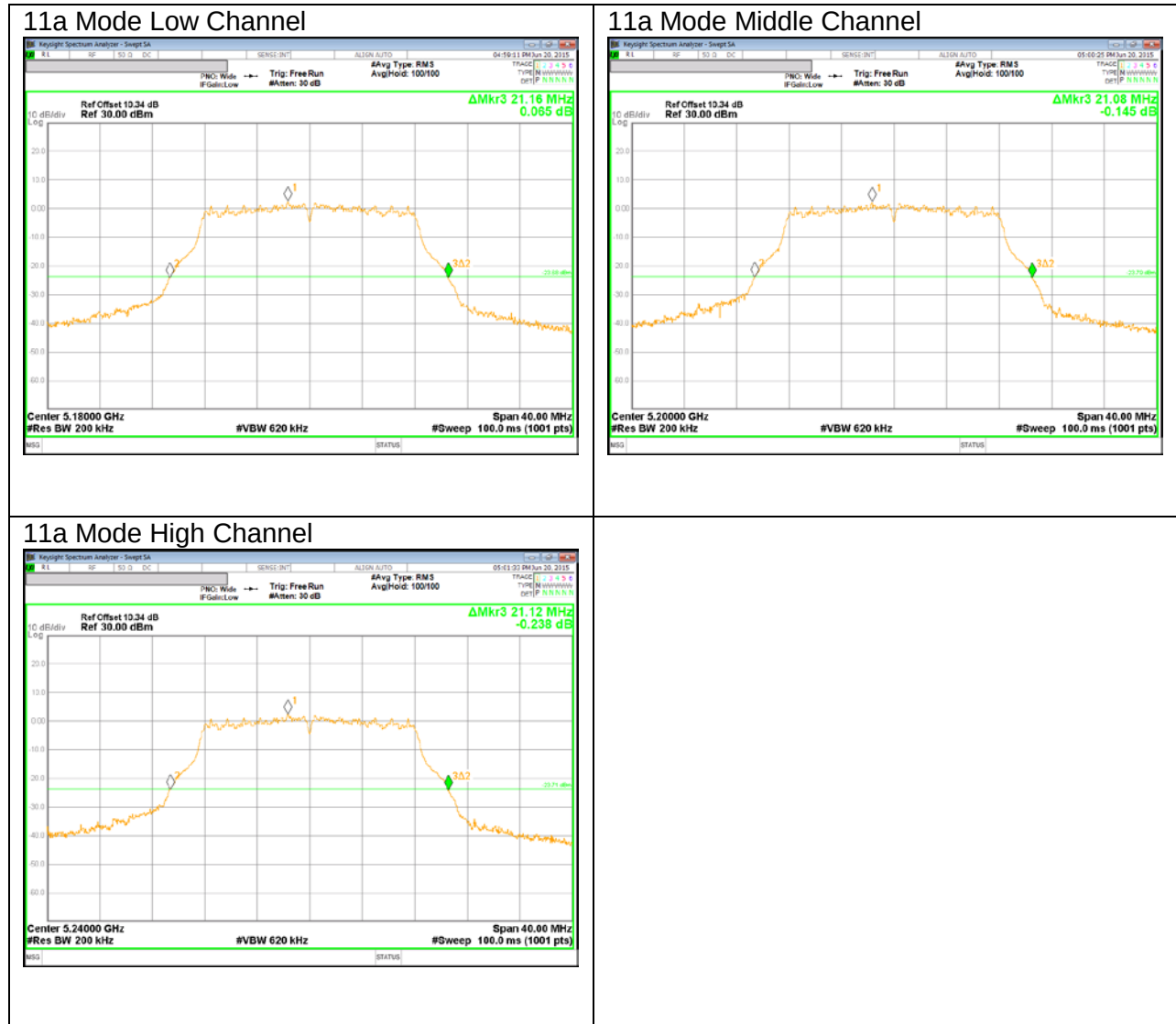
10.2.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	26 dB Bandwidth [MHz]
Middle	5775	84.300
Worst		84.300

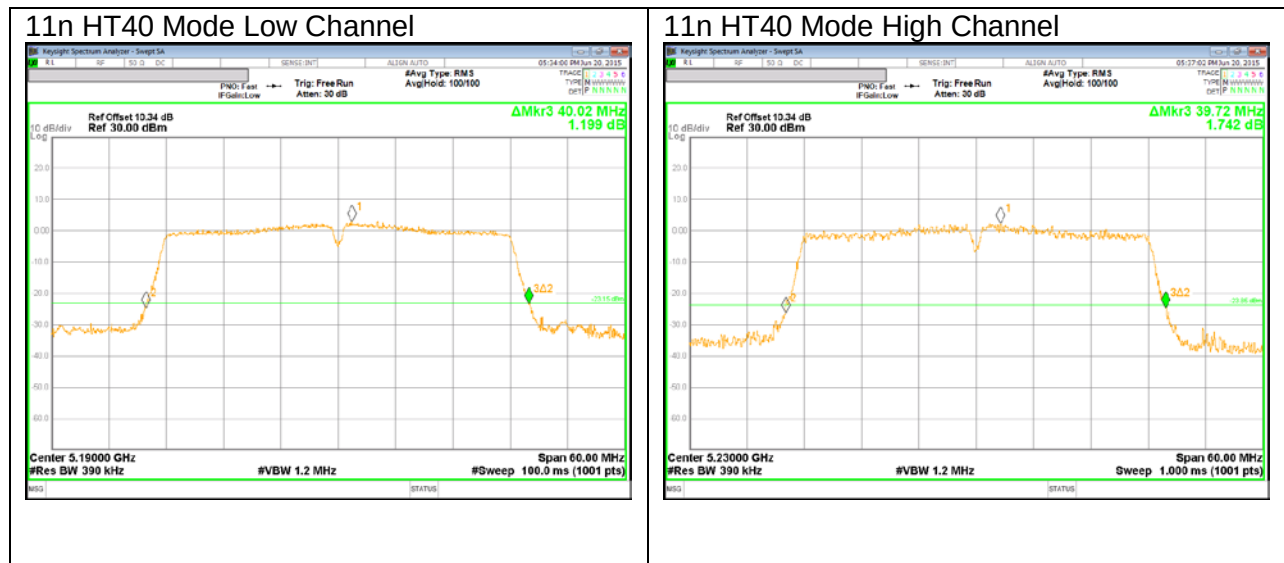
10.2.17. 26 dB BANDWIDTH PLOTS

UNII 5.2 GHz

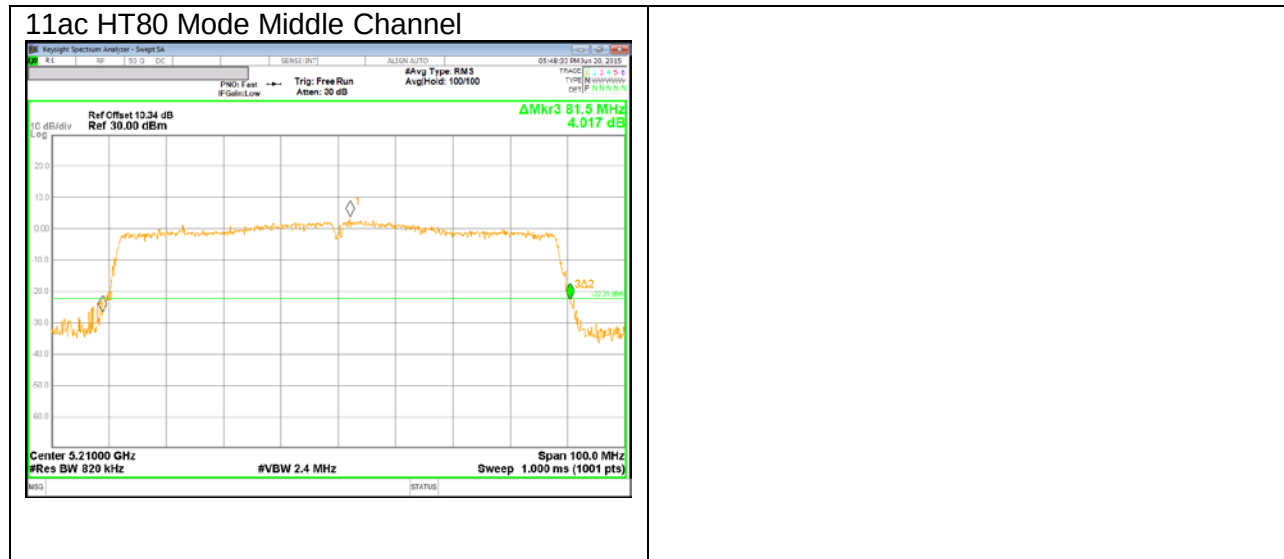
IEEE 802.11a mode



IEEE 802.11n HT40 mode

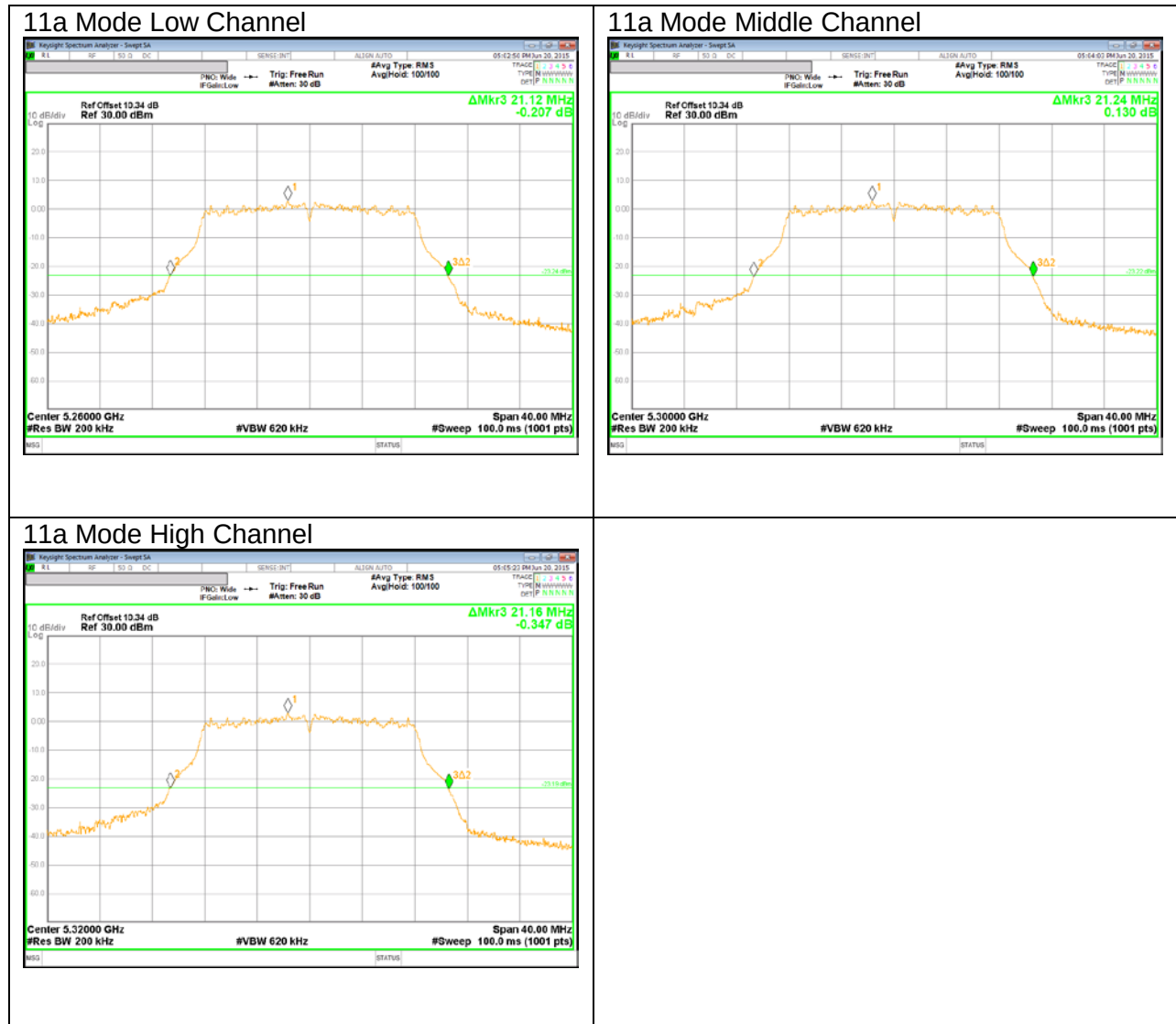


IEEE 802.11ac VHT80 mode



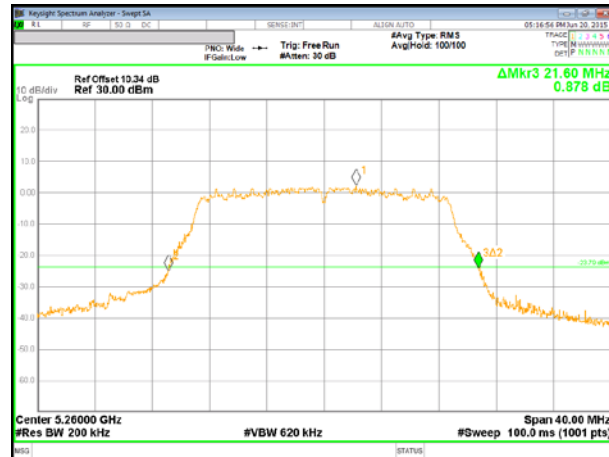
UNII 5.3 GHz

IEEE 802.11a mode

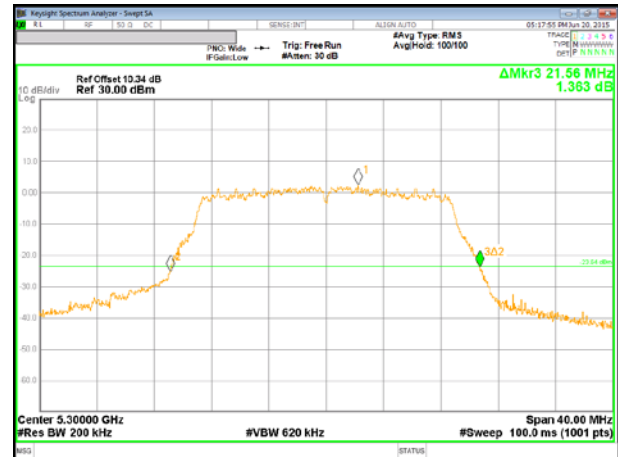


IEEE 802.11n HT20 mode

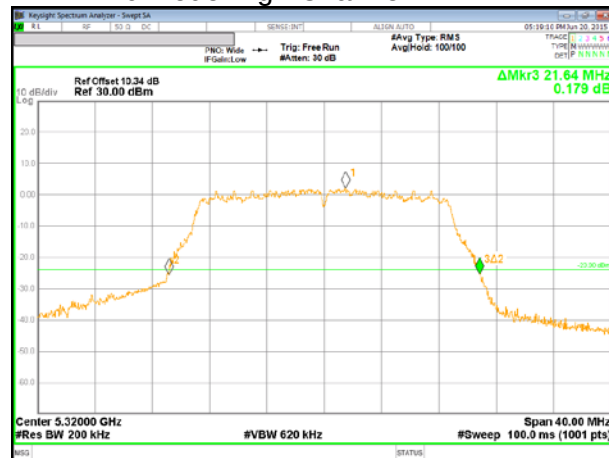
11n HT20 Mode Low Channel



11n HT20 Mode Middle Channel

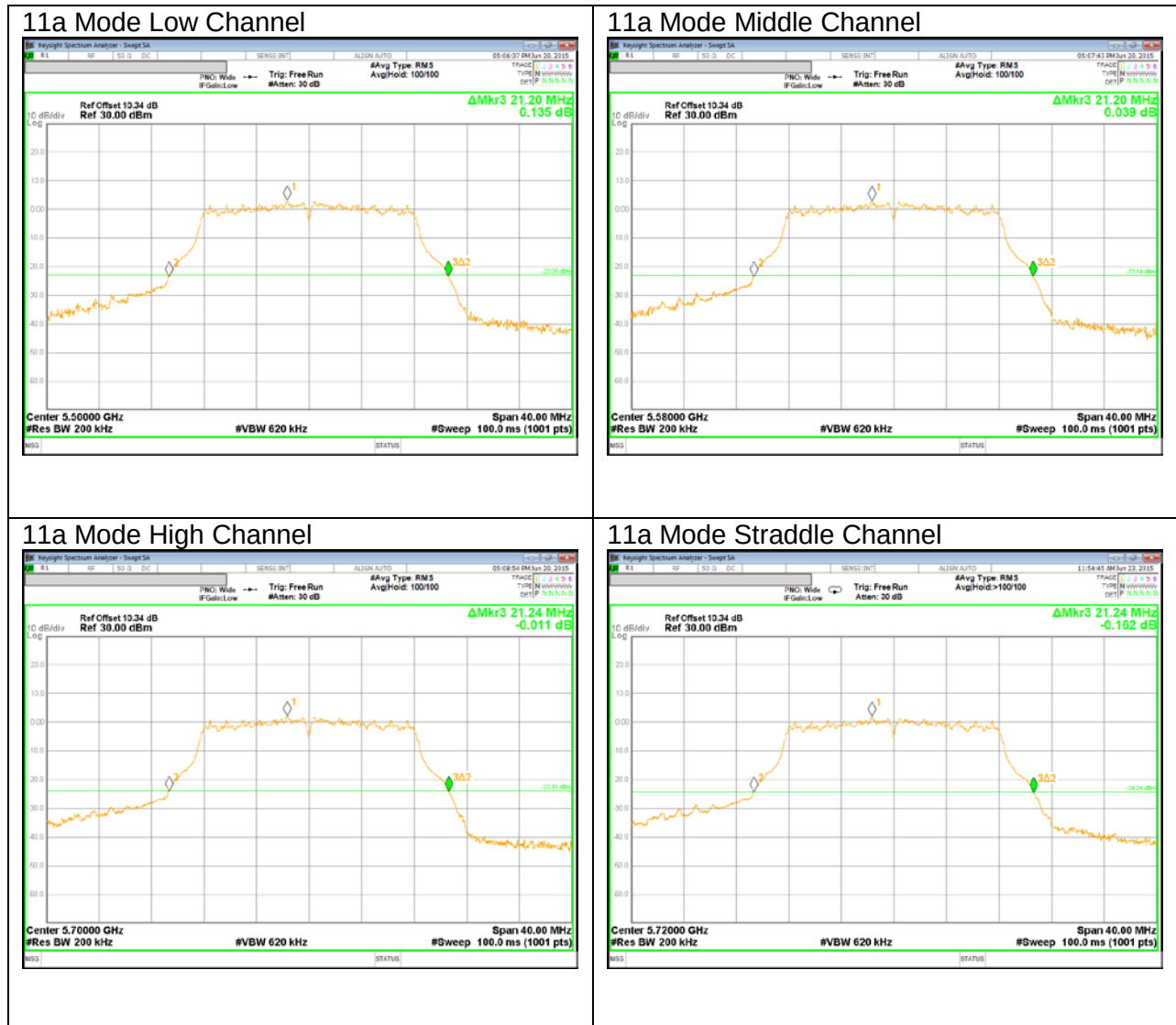


11n HT20 Mode High Channel



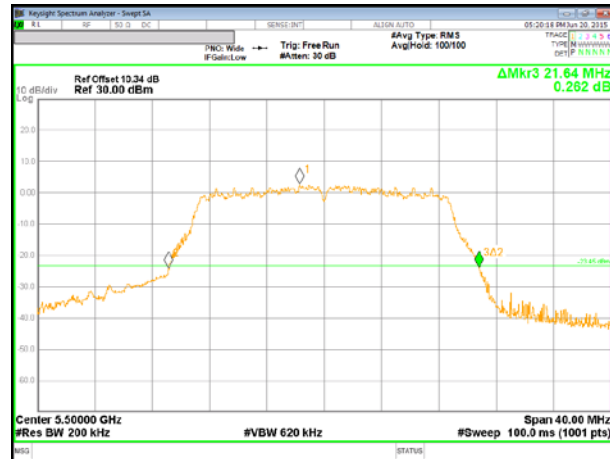
UNII 5.5 GHz

IEEE 802.11a mode

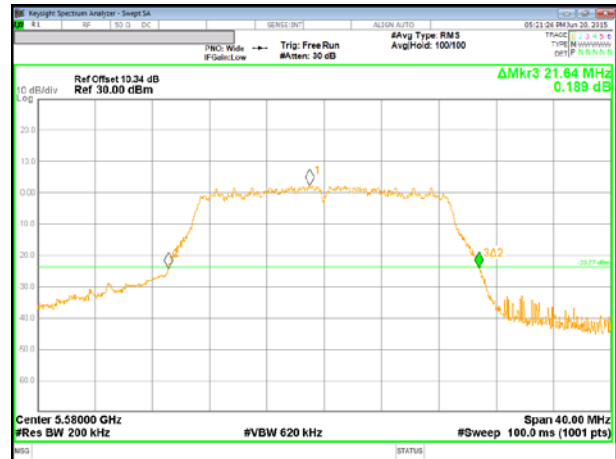


IEEE 802.11n HT20 mode

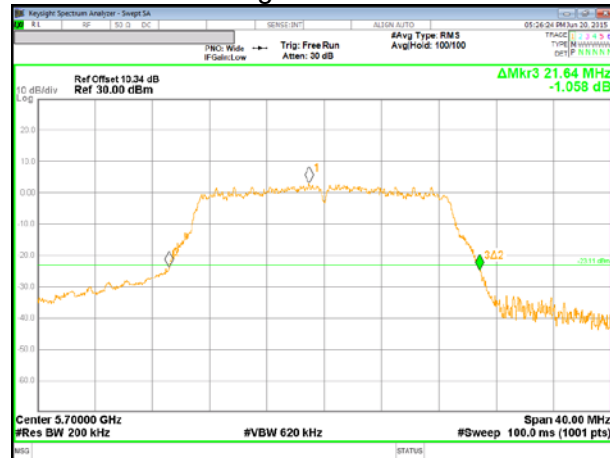
11n HT20 Mode Low Channel



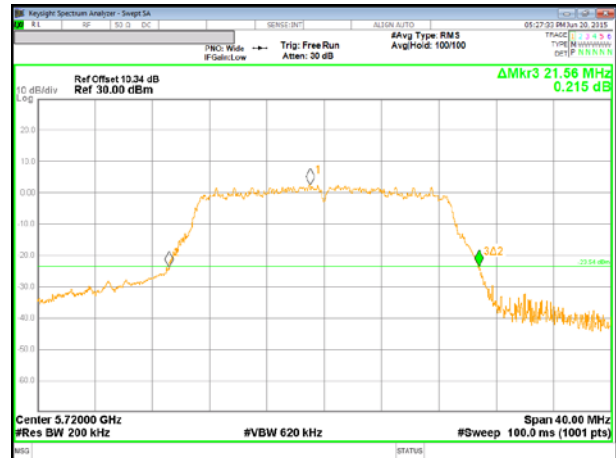
11n HT20 Mode Middle Channel



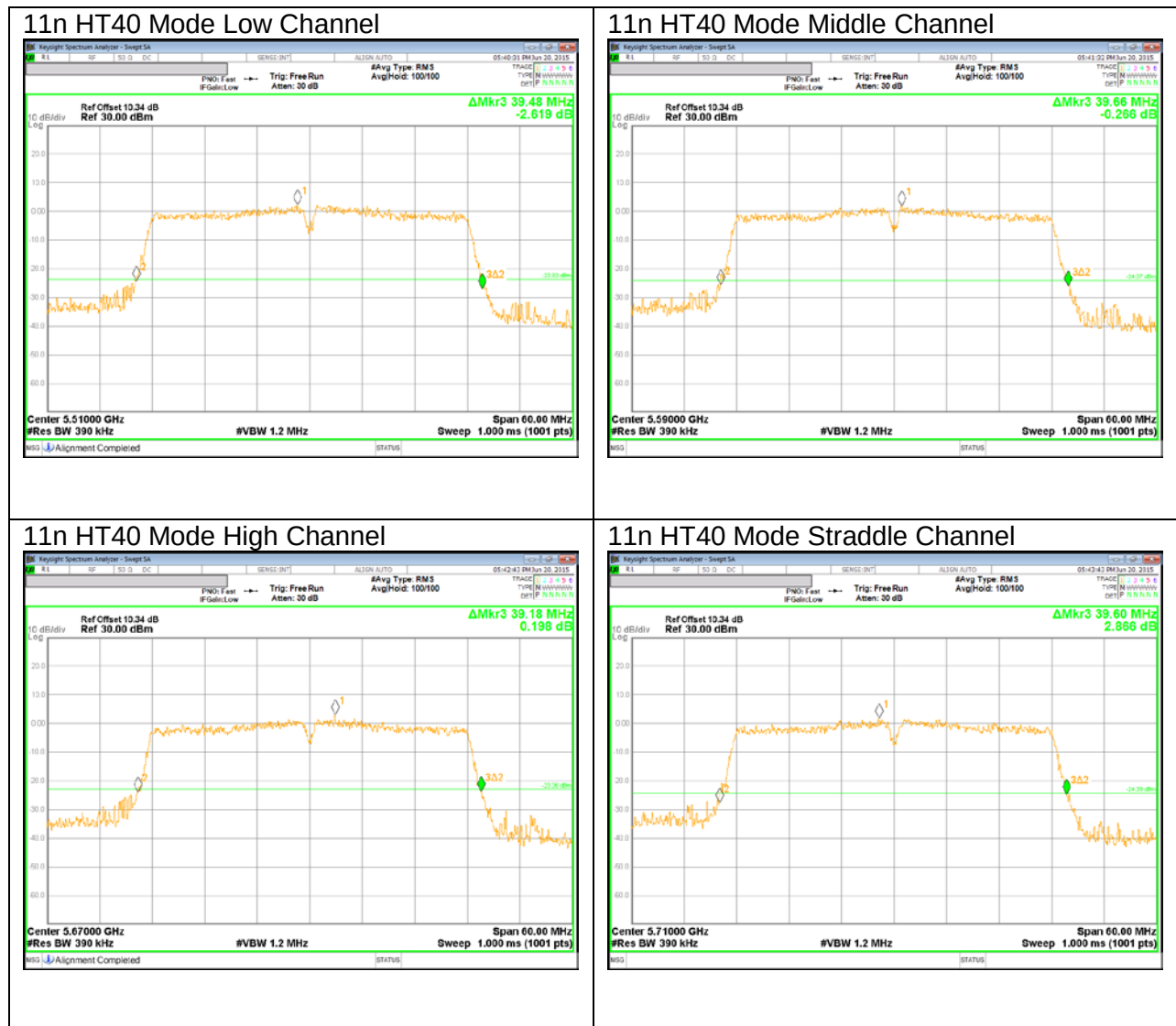
11n HT20 Mode High Channel



11n Mode Straddle Channel

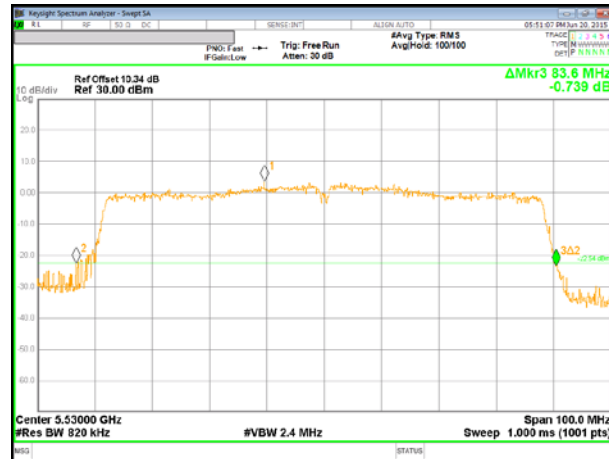


IEEE 802.11n HT40 mode

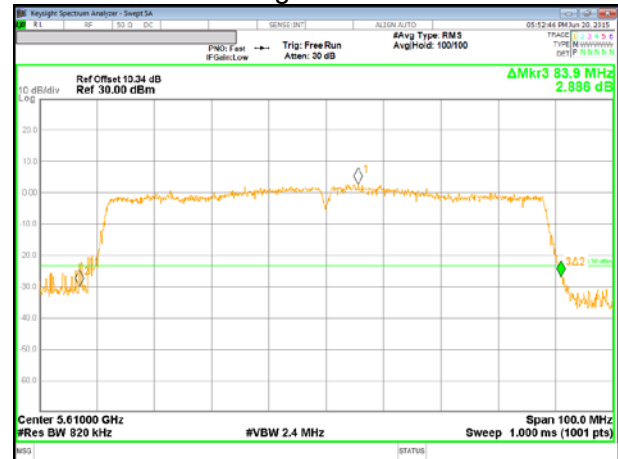


IEEE 802.11ac VHT80 mode

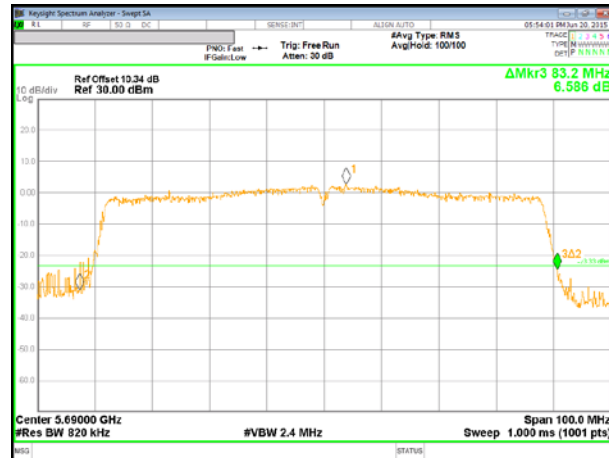
11ac HT80 Mode Low Channel



11ac HT80 Mode High Channel

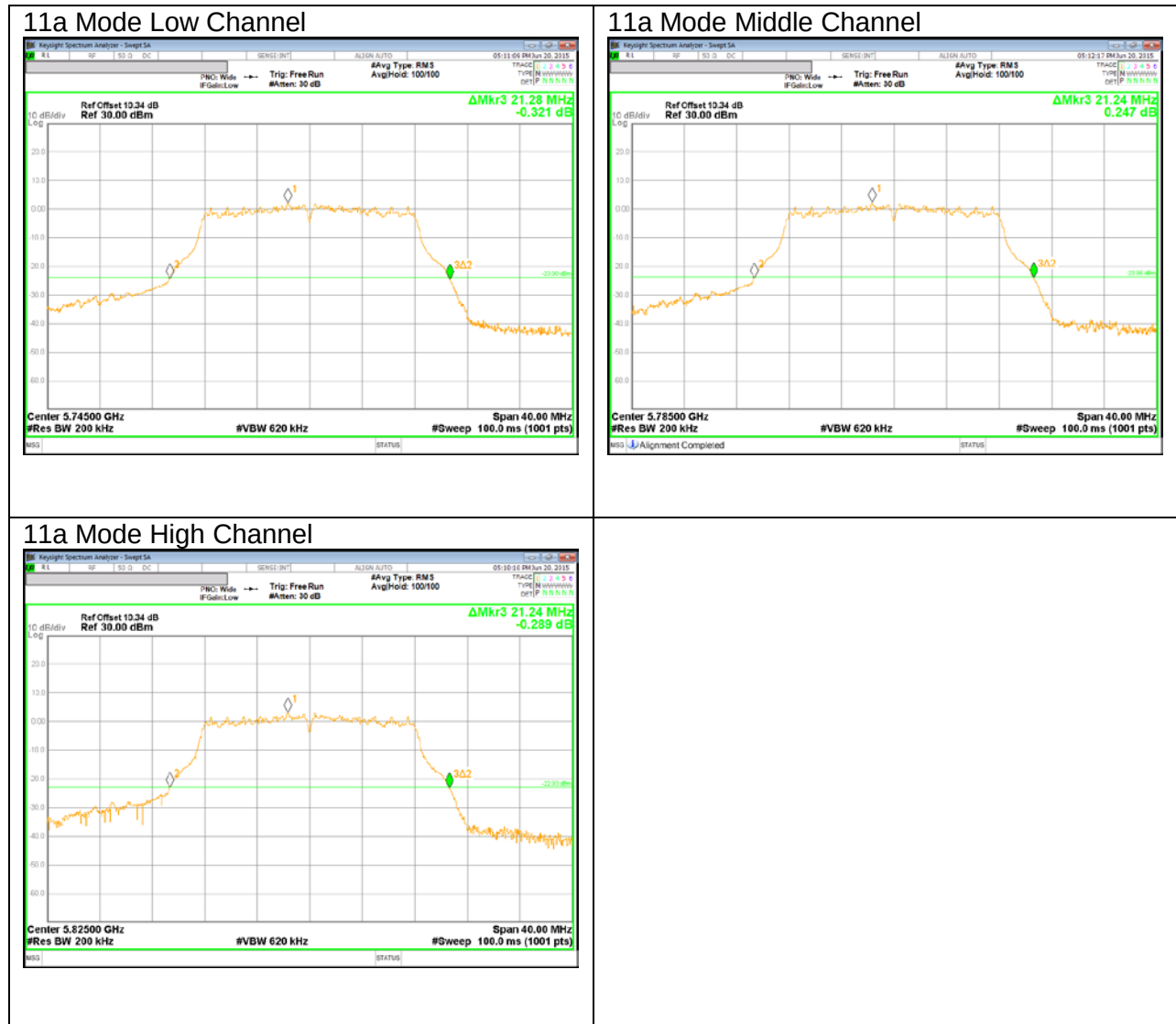


11ac HT80 Mode Straddle Channel

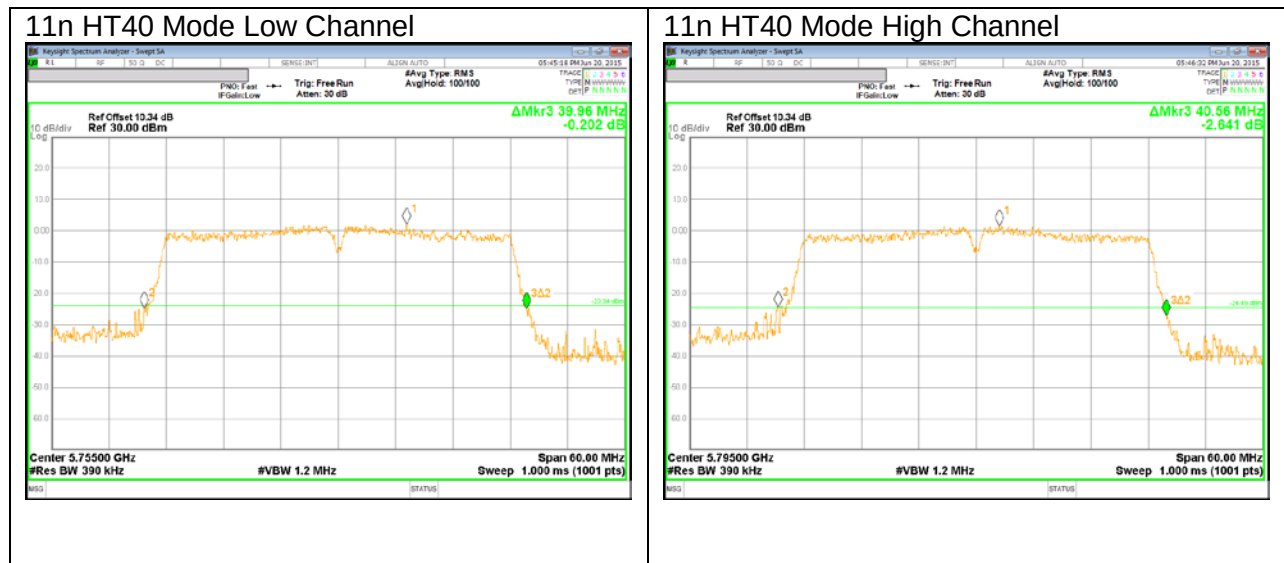


UNII 5.8 GHz

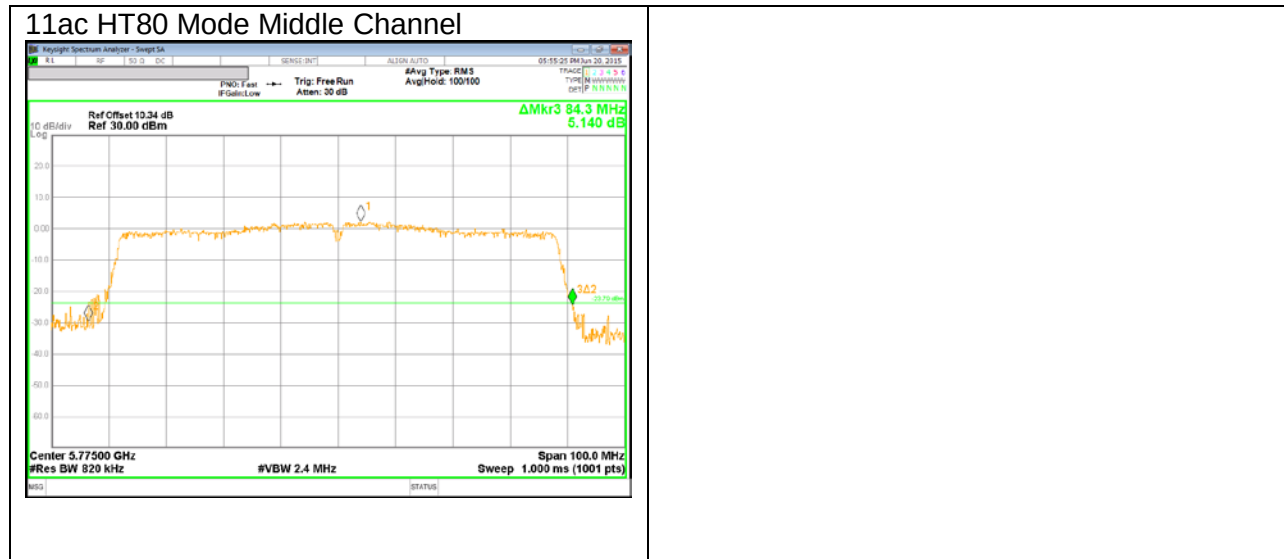
IEEE 802.11a mode



IEEE 802.11n HT40 mode



IEEE 802.11ac VHT80 mode



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]
Low	5180	16.616
Mid	5200	16.485
High	5240	16.559
Worst		16.616

10.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5180	17.730
Mid	5200	17.759
High	5240	17.740
Worst		17.759

10.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5190	36.245
High	5230	36.115
Worst		36.245

10.3.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Middle	5210	75.508
Worst		75.508

10.3.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5260	16.528
Mid	5300	16.565
High	5320	16.521
Worst		16.565

10.3.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5260	17.641
Mid	5300	17.695
High	5320	17.694
Worst		17.695

10.3.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5270	36.291
High	5310	36.242
Worst		36.291

10.3.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Middle	5290	75.663
Worst		75.663

10.3.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5500	16.561
Mid	5580	16.556
High	5700	16.574
Straddle	5720	16.558
Worst		16.574

10.3.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5500	17.744
Mid	5580	17.726
High	5700	17.704
Straddle	5720	17.745
Worst		17.745

10.3.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5510	36.202
Mid	5550	36.247
High	5670	36.246
Straddle	5710	36.161
Worst		36.247

10.3.12. 802.11ac VHT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5530	75.196
High	5610	75.404
Straddle	5690	75.531
Worst		75.531

10.3.13. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5745	16.548
Mid	5785	16.522
High	5825	16.578
Worst		16.578

10.3.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5745	17.713
Mid	5785	17.776
High	5825	17.759
Worst		17.776

10.3.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	5755	36.154
High	5795	36.151
Worst		36.154

10.3.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

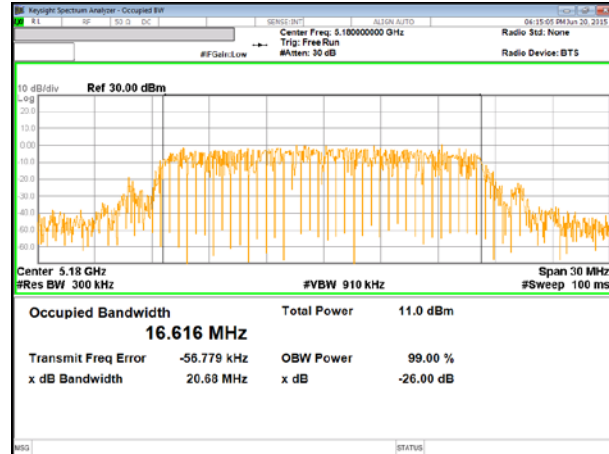
Channel	Frequency [MHz]	99% Bandwidth [MHz]
Middle	5775	75.835
Worst		75.835

10.3.17. 99% BANDWIDTH PLOTS

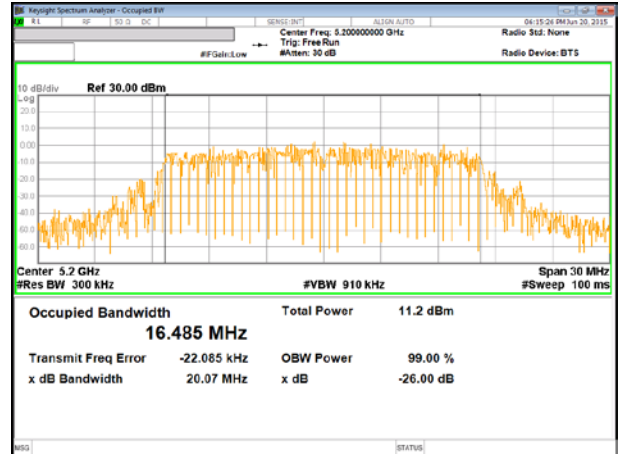
UNII 5.2 GHz

IEEE 802.11a mode

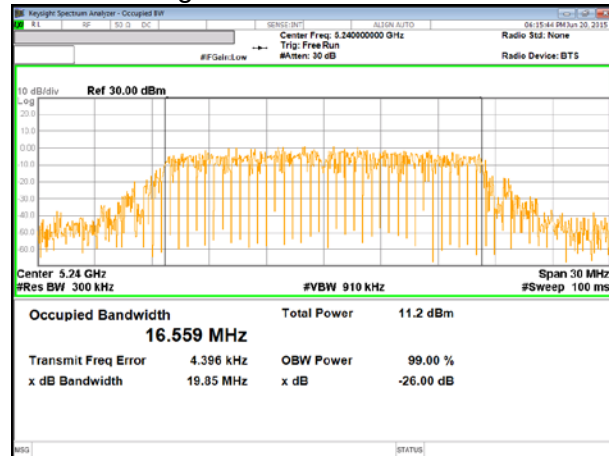
11a Mode Low Channel



11a Mode Middle Channel

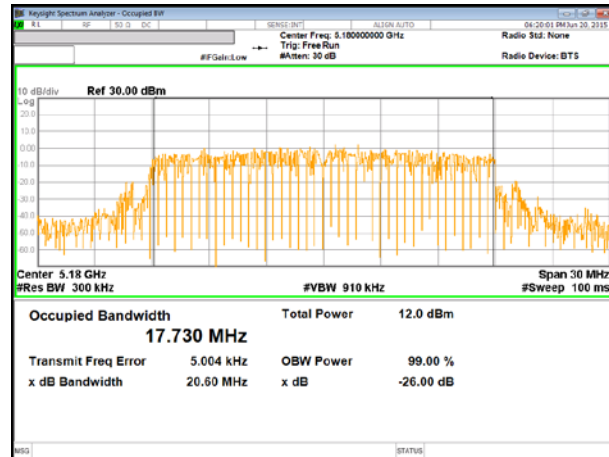


11a Mode High Channel

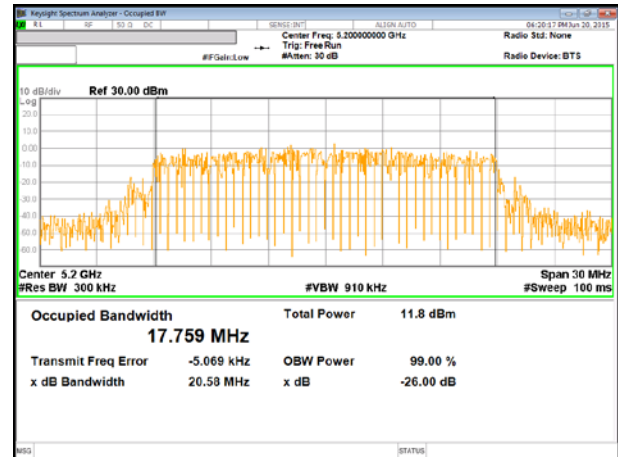


IEEE 802.11n HT20 mode

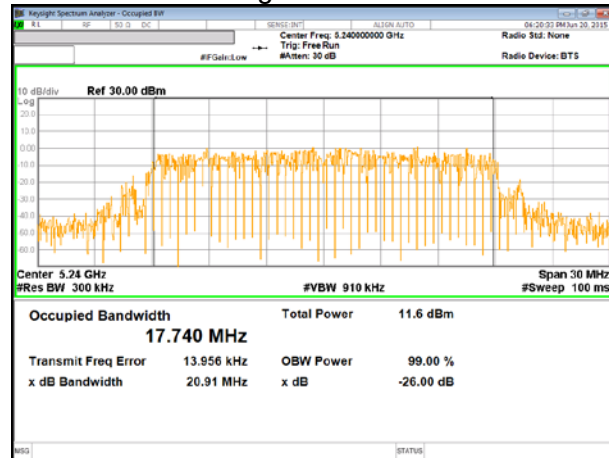
11n HT20 Mode Low Channel



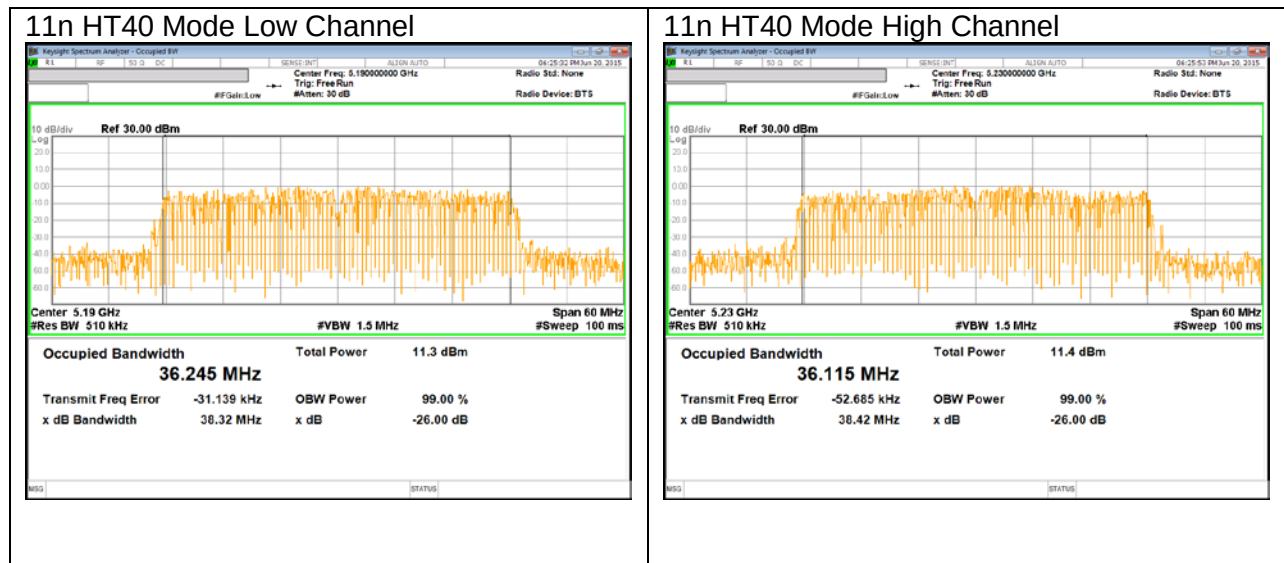
11n HT20 Mode Middle Channel



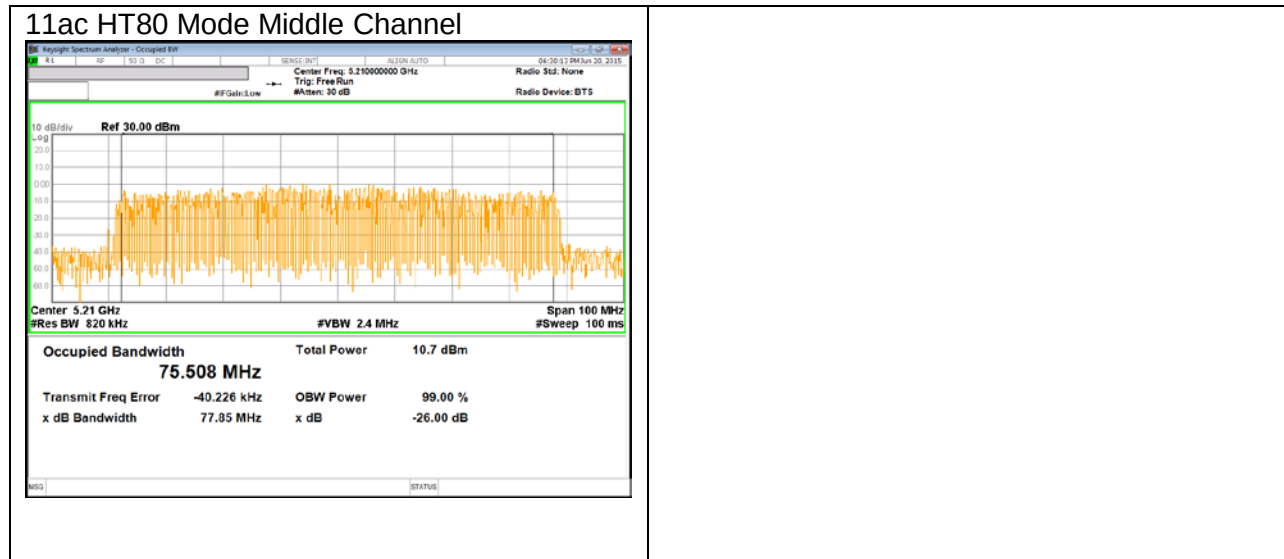
11n HT20 Mode High Channel



IEEE 802.11n HT40 mode



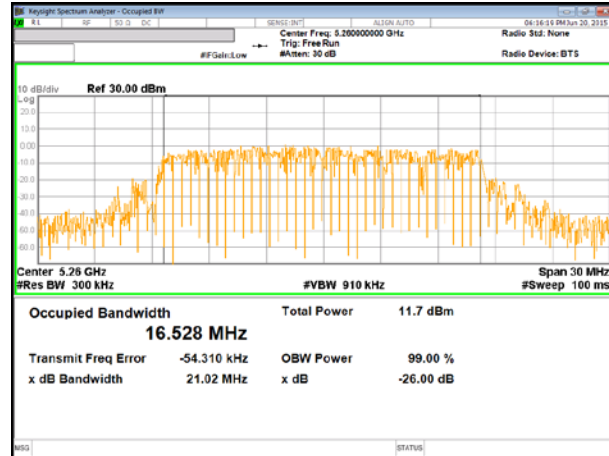
IEEE 802.11ac VHT80 mode



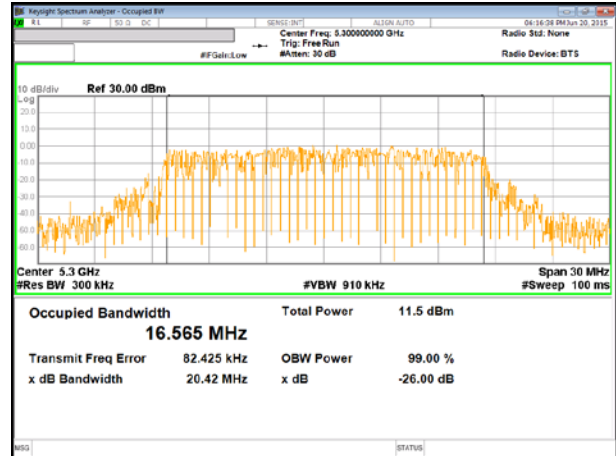
UNII 5.3 GHz

IEEE 802.11a mode

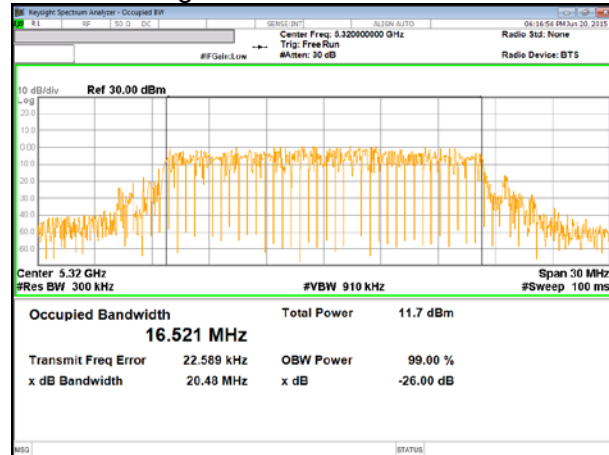
11a Mode Low Channel



11a Mode Middle Channel

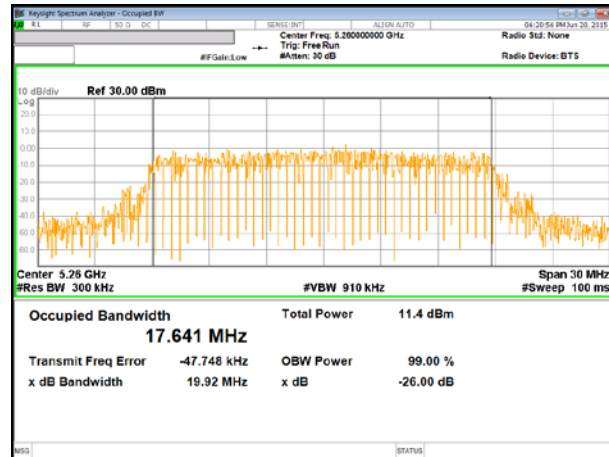


11a Mode High Channel

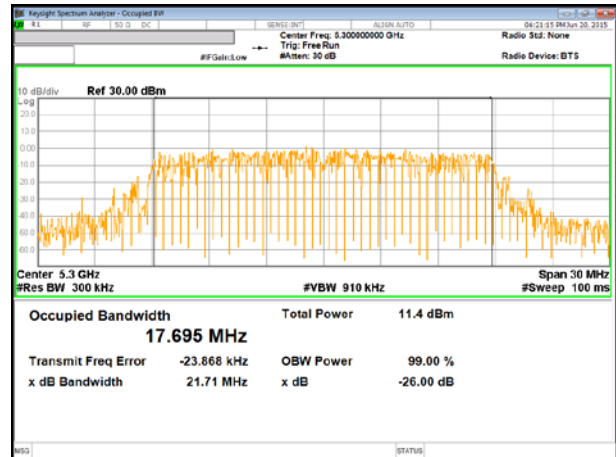


IEEE 802.11n HT20 mode

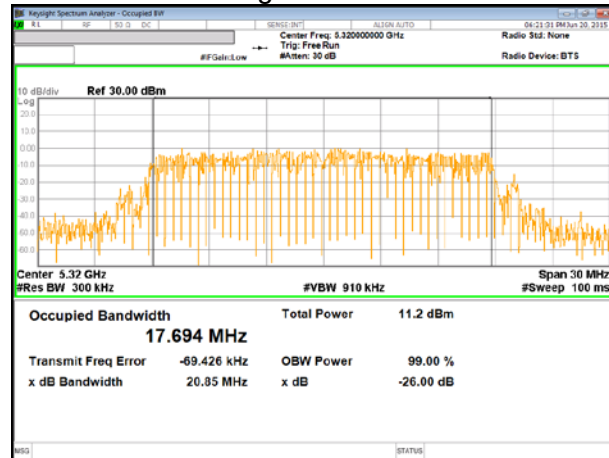
11n HT20 Mode Low Channel



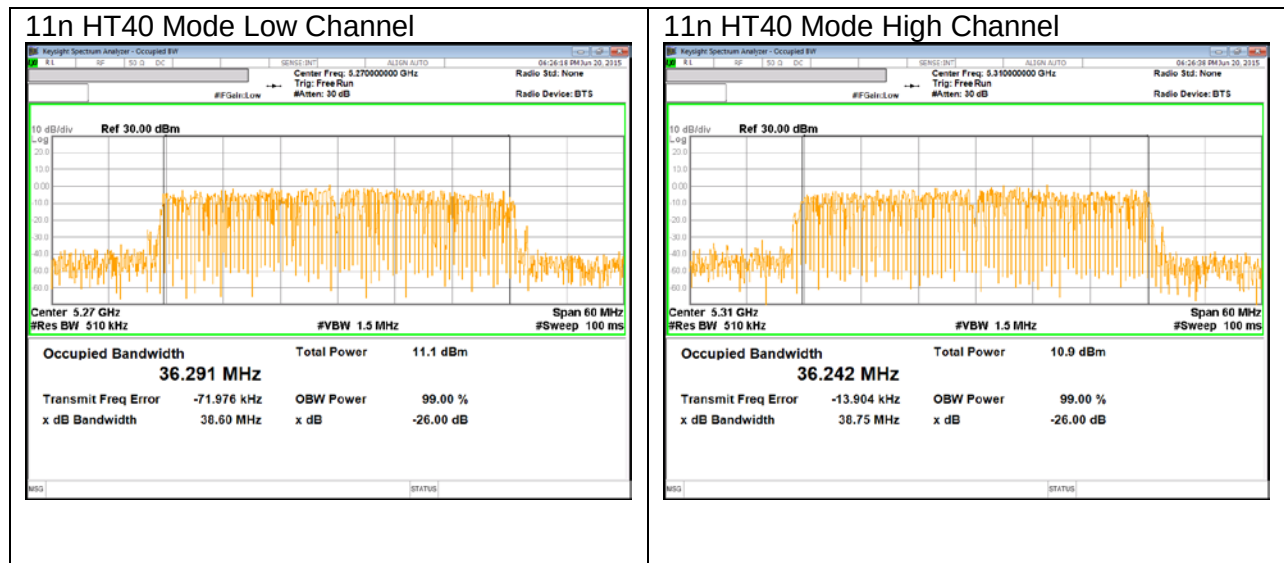
11n HT20 Mode Middle Channel



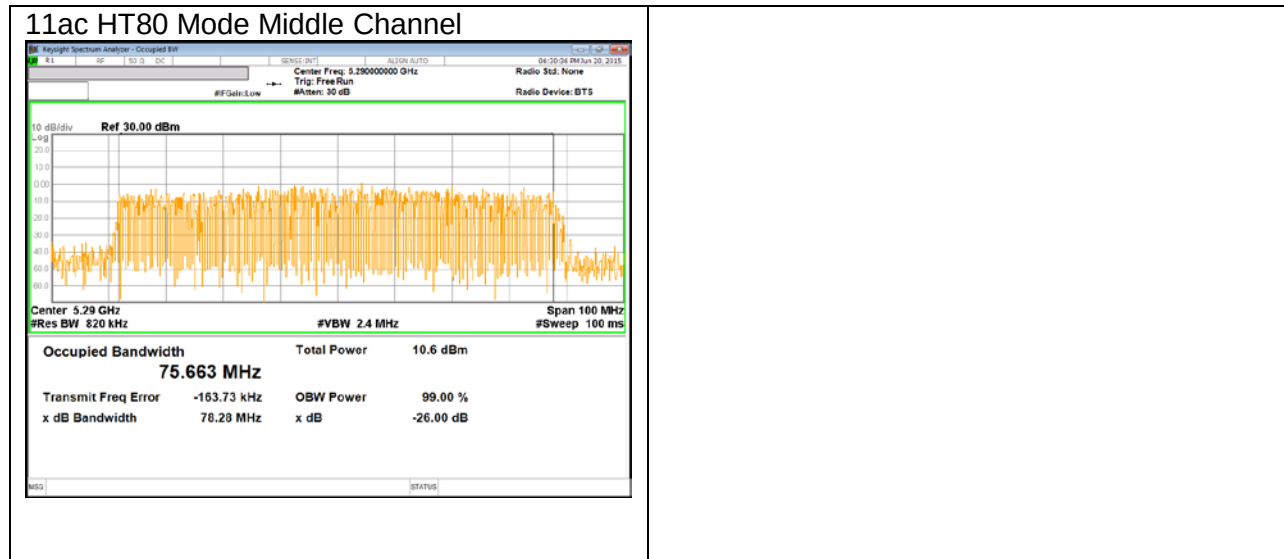
11n HT20 Mode High Channel



IEEE 802.11n HT40 mode



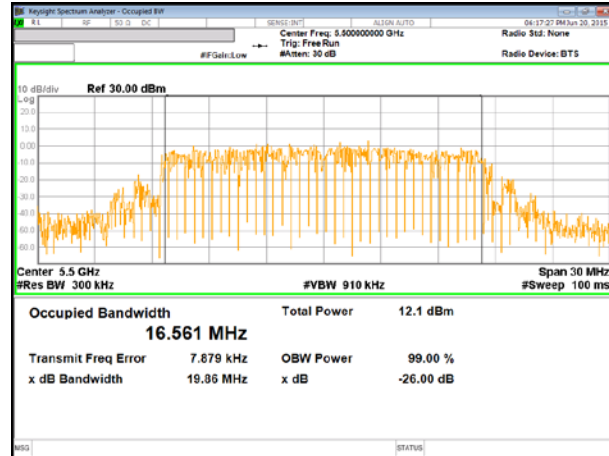
IEEE 802.11ac VHT80 mode



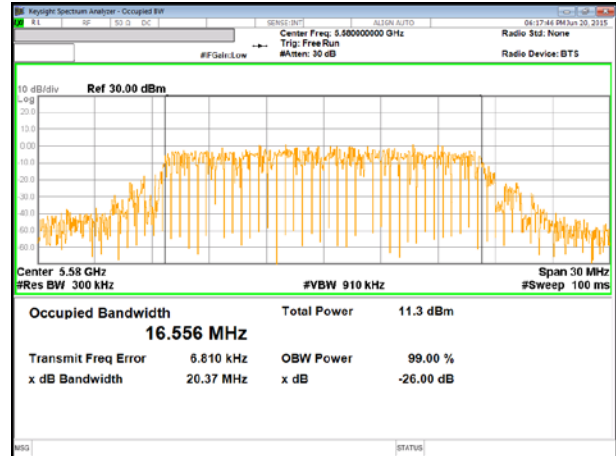
UNII 5.5 GHz

IEEE 802.11a mode

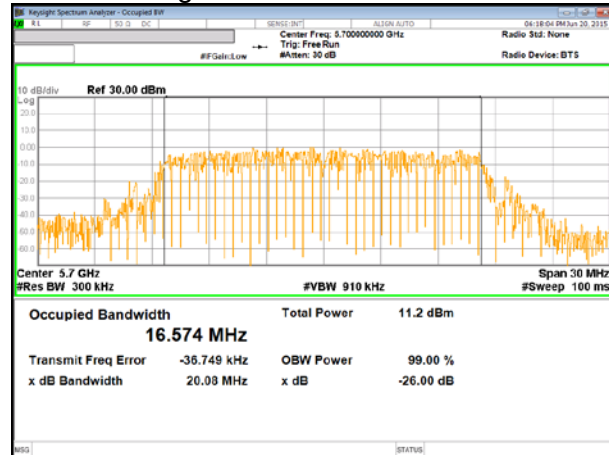
11a Mode Low Channel



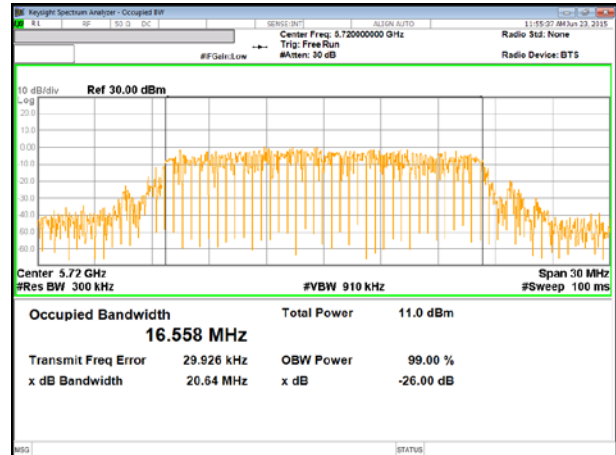
11a Mode Middle Channel



11a Mode High Channel

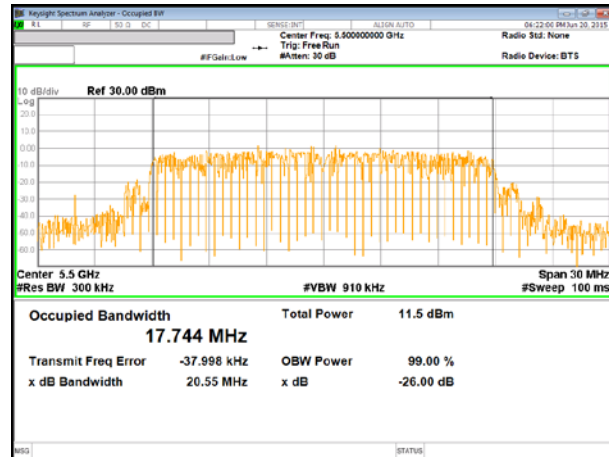


11a Mode Straddle Channel

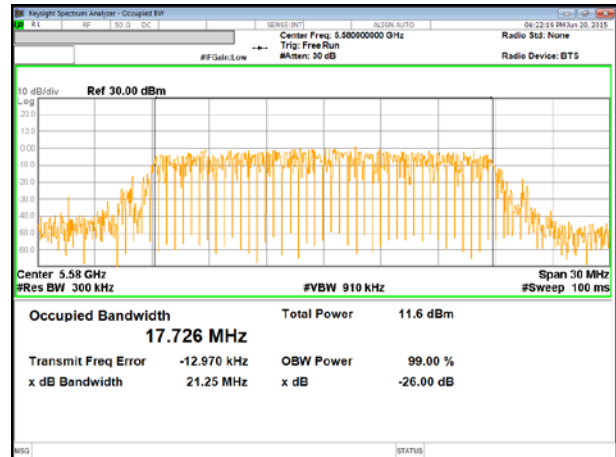


IEEE 802.11n HT20 mode

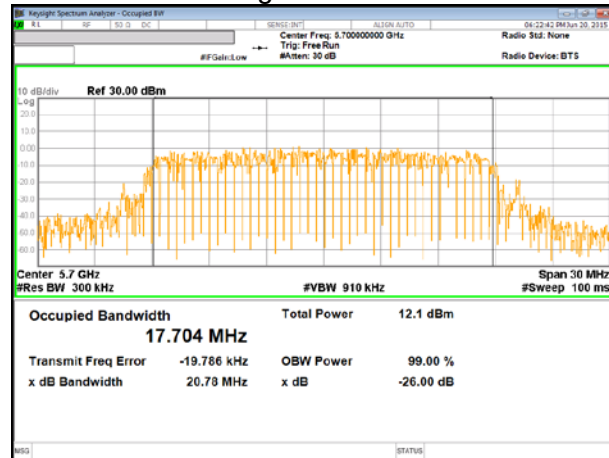
11n HT20 Mode Low Channel



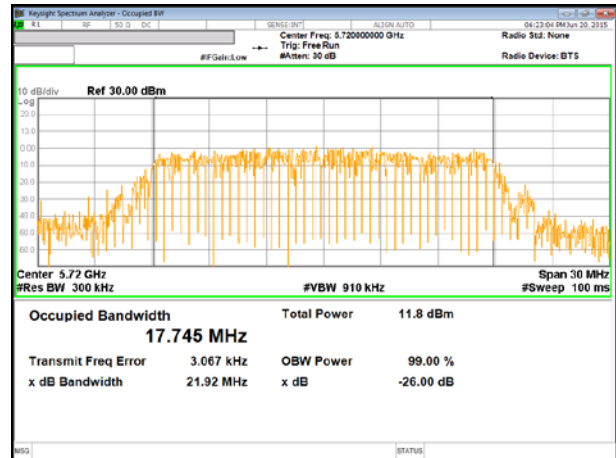
11n HT20 Mode Middle Channel



11n HT20 Mode High Channel

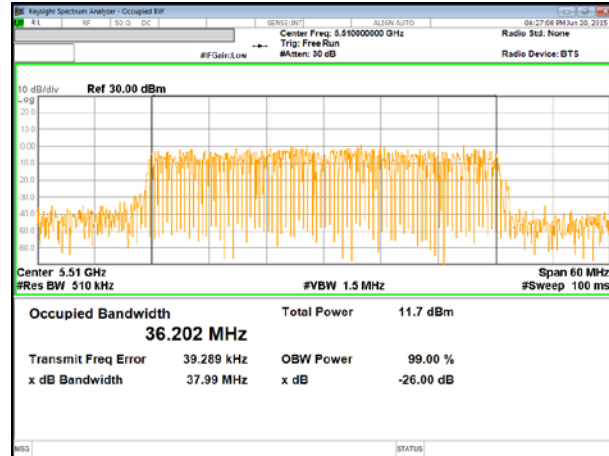


11n Mode Straddle Channel

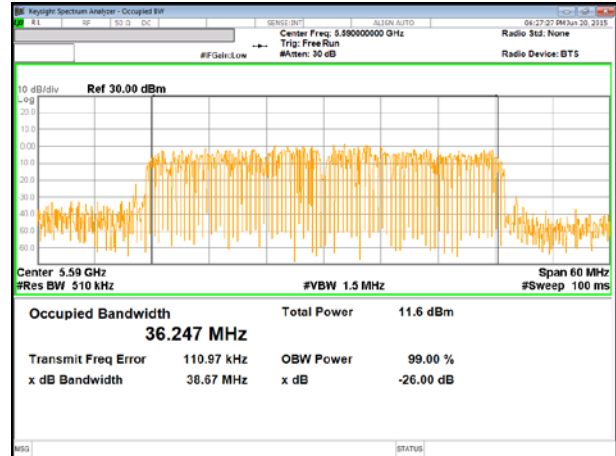


IEEE 802.11n HT40 mode

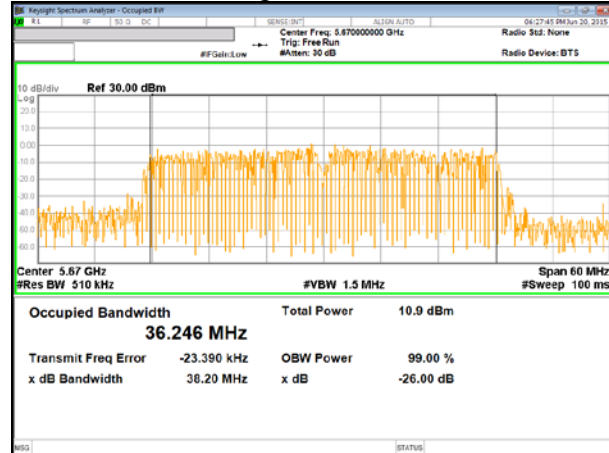
11n HT40 Mode Low Channel



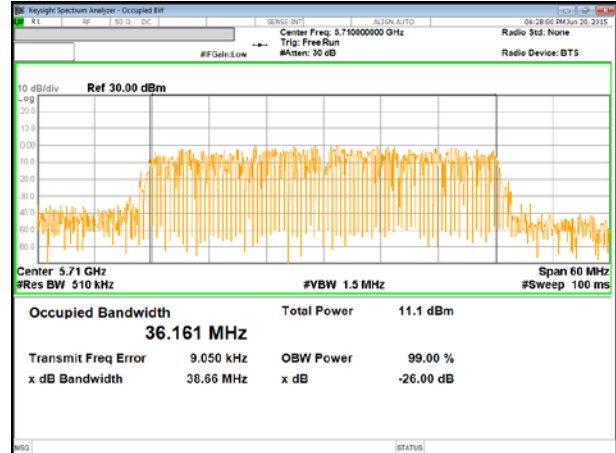
11n HT40 Mode Middle Channel



11n HT40 Mode High Channel

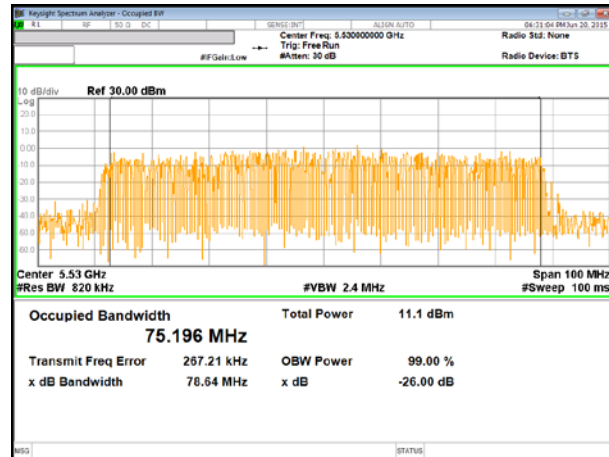


11n HT40 Mode Straddle Channel



IEEE 802.11ac VHT80 mode

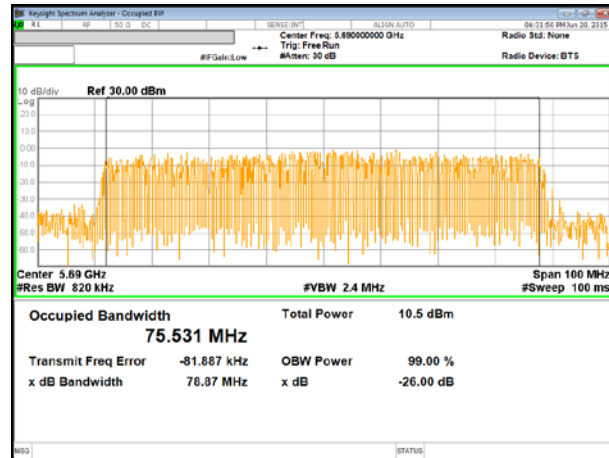
11ac HT80 Mode Low Channel



11ac HT80 Mode High Channel



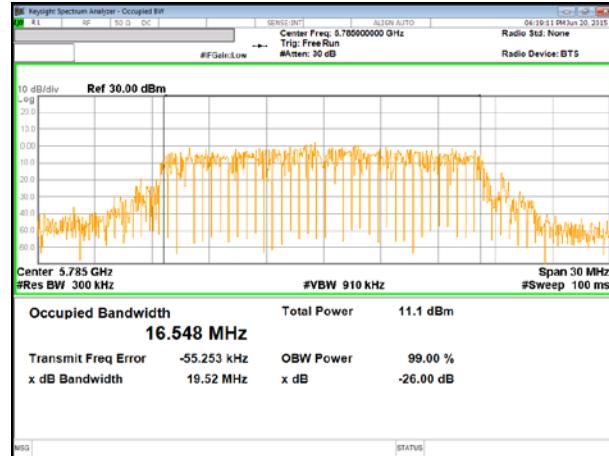
11ac HT80 Mode Straddle Channel



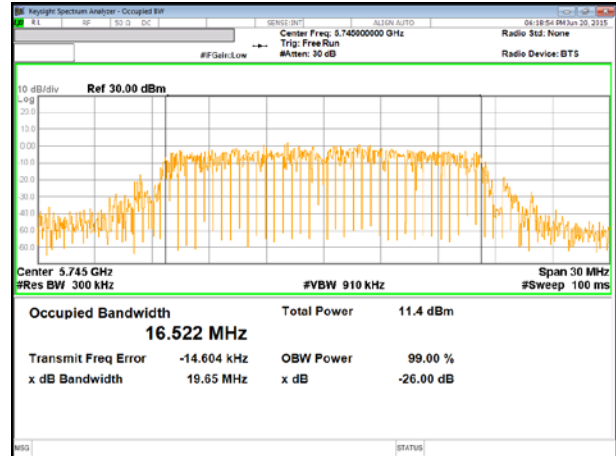
UNII 5.8 GHz

IEEE 802.11a mode

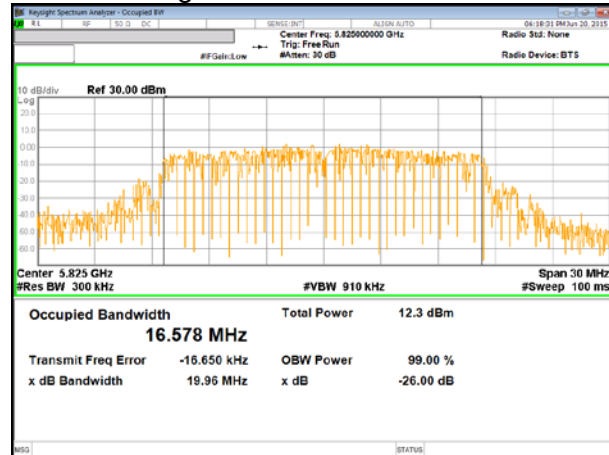
11a Mode Low Channel



11a Mode Middle Channel

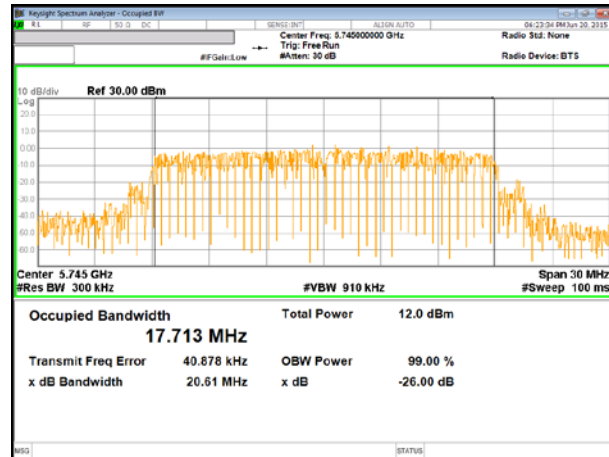


11a Mode High Channel

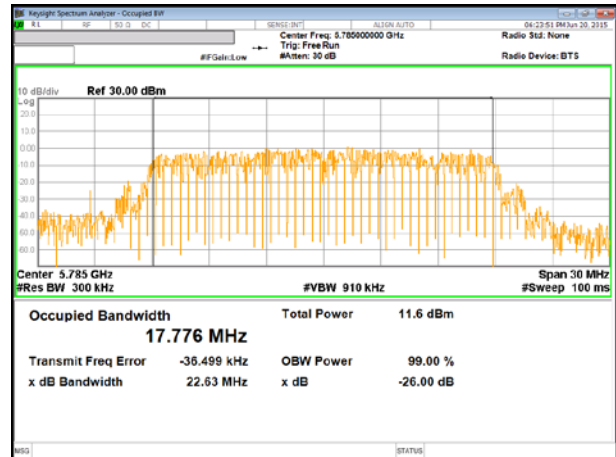


IEEE 802.11n HT20 mode

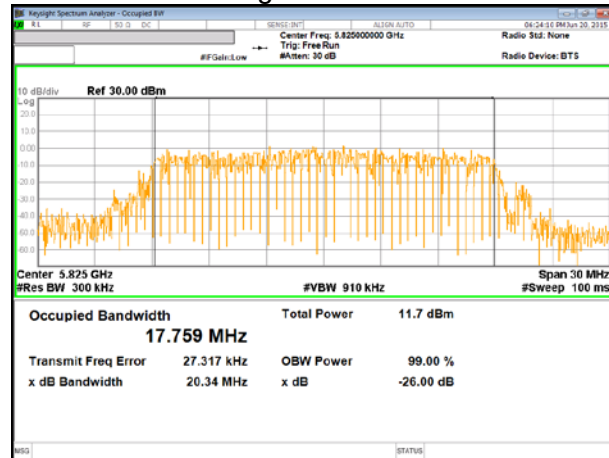
11n HT20 Mode Low Channel



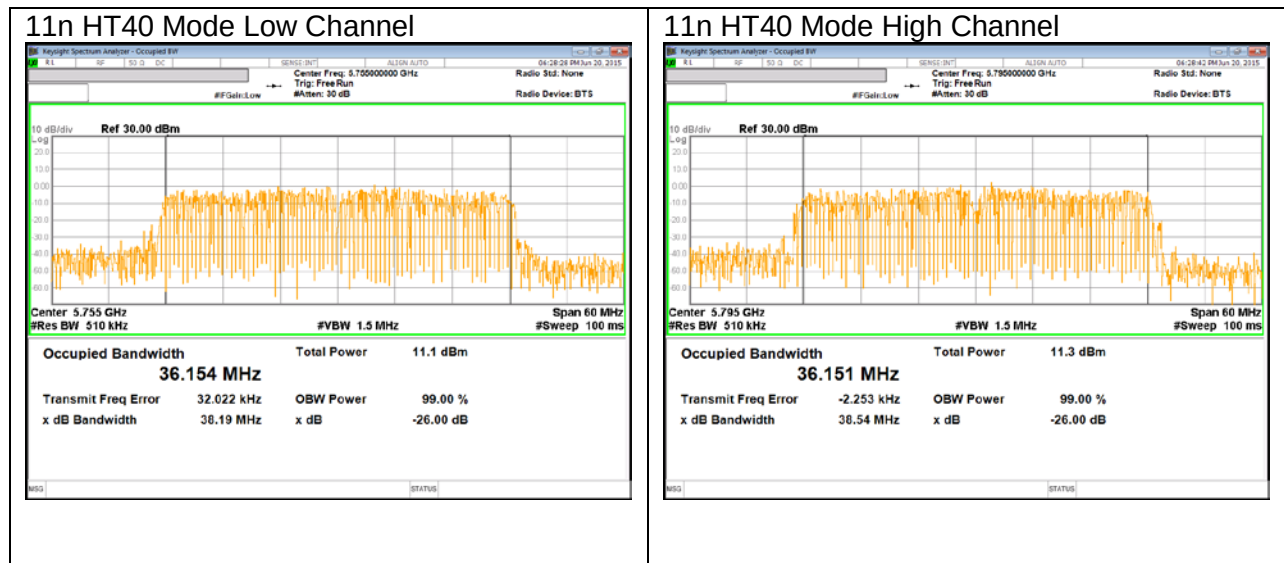
11n HT20 Mode Middle Channel



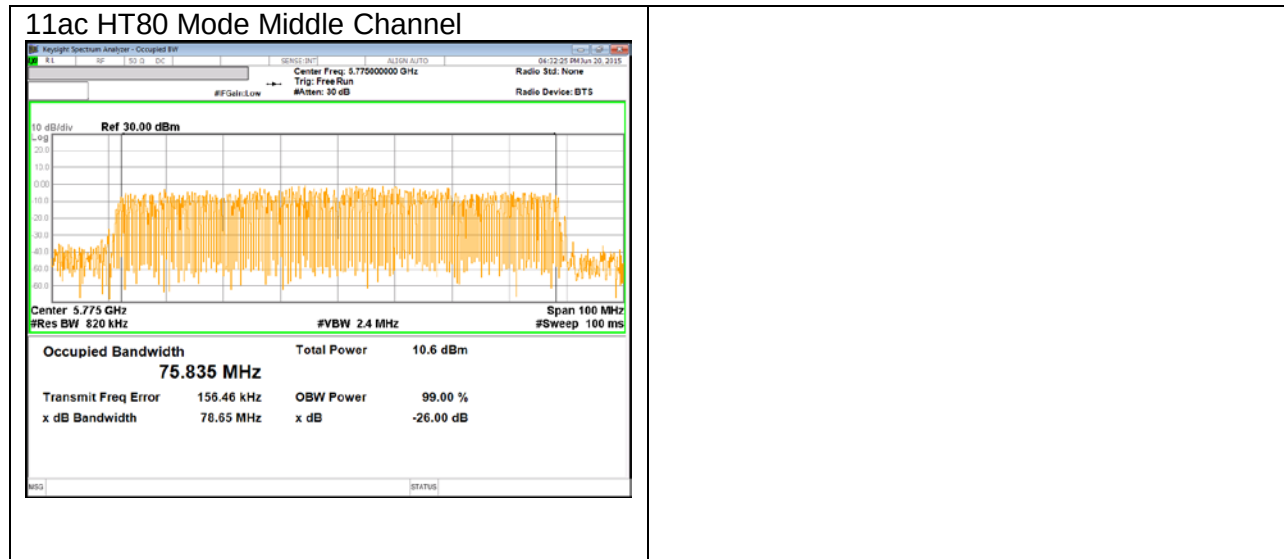
11n HT20 Mode High Channel



IEEE 802.11n HT40 mode



IEEE 802.11ac VHT80 mode



10.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.29 dB (including 10 dB pad and 0.29 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

10.4.1. 802.11a MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5180	12.09
Mid	5200	12.08
High	5240	12.02
Worst		12.09

10.4.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5180	11.87
Mid	5200	11.56
High	5240	11.69
Worst		11.87

10.4.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5190	11.58
High	5230	11.57
Worst		11.58

10.4.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Middle	5210	11.62
Worst		11.62

10.4.5. 802.11a MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5260	12.09
Mid	5300	11.82
High	5320	11.75
Worst		12.09

10.4.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5260	11.65
Mid	5300	11.49
High	5320	11.35
Worst		11.65

10.4.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5270	11.54
High	5310	11.51
Worst		11.54

10.4.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Middle	5290	11.64
Worst		11.64

10.4.9. 802.11a MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5500	11.74
Mid	5580	11.35
High	5700	12.04
Straddle	5720	12.01
Worst		12.04

10.4.10. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5500	12.37
Mid	5580	12.10
High	5700	11.62
Straddle	5720	11.48
Worst		12.37

10.4.11. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5510	11.52
Mid	5550	11.40
High	5670	12.07
Straddle	5710	12.10
Worst		12.10

10.4.12. 802.11ac VHT80 MODE IN THE 5.5 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5530	11.74
High	5610	11.48
Straddle	5690	12.30
Worst		12.30

10.4.13. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5745	12.34
Mid	5785	12.02
High	5825	11.70
Worst		12.34

10.4.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5745	11.64
Mid	5785	11.35
High	5825	11.07
Worst		11.64

10.4.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Low	5755	11.45
High	5795	11.19
Worst		11.45

10.4.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	Average Power [dBm]
Mid	5775	11.44
Worst		11.44

10.5. 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 $11 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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 $11 \text{ dBm} + 10 \log B$, 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

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

Frequency Range [MHz]	Antenna Gain [dBi]
UNII 1 5150 – 5250	0.47
UNII 2A 5250 – 5350	0.47
UNII 2C 5470 – 5725	2.81
UNII 3 5725 – 5825	0.16

RESULTS

10.5.1. 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	21.16	16.62	0.47	0.47
Mid	5200	21.08	16.49	0.47	0.47
High	5240	21.12	16.56	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5180	24.00	22.21	23.53	23.53	11.00	10.00	10.00
Mid	5200	24.00	22.17	23.53	23.53	11.00	10.00	10.00
High	5240	24.00	22.19	23.53	23.53	11.00	10.00	10.00

Duty Cycle CF [dB]	0.30	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5180	11.37	11.67	23.53	-11.86
Mid	5200	11.36	11.67	23.53	-11.86
High	5240	11.29	11.59	23.53	-11.94

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5180	1.45	1.76	10.00	-8.24
Mid	5200	1.54	1.84	10.00	-8.16
High	5240	1.56	1.86	10.00	-8.14

10.5.2. 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 PPSP [dBi]
Low	5180	21.56	17.73	0.47	0.47
Mid	5200	21.48	17.76	0.47	0.47
High	5240	21.56	17.74	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSP Limit [dBm]	IC eirp PSD Limit [dBm]	PPSP Limit [dBm]
Low	5180	24.00	22.49	23.53	23.53	11.00	10.00	10.00
Mid	5200	24.00	22.49	23.53	23.53	11.00	10.00	10.00
High	5240	24.00	22.49	23.53	23.53	11.00	10.00	10.00

Duty Cycle CF [dB]	0.32	Included in Calculations of Corr'd Power & PPSP
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Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5180	12.10	12.42	23.53	-11.11
Mid	5200	12.06	12.37	23.53	-11.16
High	5240	12.03	12.35	23.53	-11.18

PPSP Results

Channel	Frequency [MHz]	Meas PPSP [dBm]	Total Corr'd PPSP [dBm]	PPSP Limit [dBm]	PPSP Margin [dB]
Low	5180	2.05	2.37	10.00	-7.63
Mid	5200	2.17	2.49	10.00	-7.51
High	5240	1.97	2.29	10.00	-7.71

10.5.3. 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	40.02	36.25	0.47	0.47
High	5230	39.72	36.12	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5190	24.00	23.00	23.53	23.53	11.00	10.00	10.00
High	5230	24.00	23.00	23.53	23.53	11.00	10.00	10.00

Duty Cycle CF [dB]	0.63	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5190	11.87	12.50	23.53	-11.03
High	5230	11.84	12.46	23.53	-11.07

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5190	-1.54	-0.91	10.00	-10.91
High	5230	-1.32	-0.69	10.00	-10.69

10.5.4. 802.11ac VHT80 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	81.50	75.51	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Middle	5210	24.00	23.00	23.53	23.53	11.00	10.00	10.00

Duty Cycle CF [dB]	1.18	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Middle	5210	11.22	12.40	23.53	-11.13

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Middle	5210	-4.49	-3.31	10.00	-13.31

10.5.5. 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	21.12	16.53	0.47	0.47
Mid	5300	21.24	16.57	0.47	0.47
High	5320	21.16	16.52	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5260	24.00	22.18	23.53	23.53	11.00	11.00	11.00
Mid	5300	24.00	22.19	23.53	23.53	11.00	11.00	11.00
High	5320	24.00	22.18	23.53	23.53	11.00	11.00	11.00

Duty Cycle CF [dB]	0.30	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5260	11.84	12.15	23.53	-11.38
Mid	5300	11.64	11.94	23.53	-11.59
High	5320	11.69	11.99	23.53	-11.54

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5260	2.15	2.45	11.00	-8.55
Mid	5300	1.98	2.29	11.00	-8.71
High	5320	1.57	1.87	11.00	-9.13

10.5.6. 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	21.60	17.64	0.47	0.47
Mid	5300	21.56	17.70	0.47	0.47
High	5320	21.64	17.69	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5260	24.00	22.47	23.53	23.53	11.00	11.00	11.00
Mid	5300	24.00	22.48	23.53	23.53	11.00	11.00	11.00
High	5320	24.00	22.48	23.53	23.53	11.00	11.00	11.00

Duty Cycle CF [dB]	0.32	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5260	11.60	11.92	23.53	-11.61
Mid	5300	11.32	11.63	23.53	-11.90
High	5320	11.32	11.64	23.53	-11.89

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5260	1.44	1.76	11.00	-9.24
Mid	5300	1.41	1.73	11.00	-9.27
High	5320	1.56	1.88	11.00	-9.12

10.5.7. 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 PPSP [dBi]
Low	5270	39.48	36.29	0.47	0.47
High	5310	39.54	36.24	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSP Limit [dBm]	IC eirp PPSP Limit [dBm]	PPSP Limit [dBm]
Low	5270	24.00	23.00	23.53	23.53	11.00	11.00	11.00
High	5310	24.00	23.00	23.53	23.53	11.00	11.00	11.00

Duty Cycle CF [dB]	0.63	Included in Calculations of Corr'd Power & PPSP
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5270	11.60	12.23	23.53	-11.30
High	5310	11.39	12.01	23.53	-11.52

PPSP Results

Channel	Frequency [MHz]	Meas PPSP [dBm]	Total Corr'd PPSP [dBm]	PPSP Limit [dBm]	PPSP Margin [dB]
Low	5270	-1.34	-0.71	11.00	-11.71
High	5310	-1.57	-0.94	11.00	-11.94

10.5.8. 802.11ac VHT80 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	82.60	75.66	0.47	0.47

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Middle	5290	24.00	23.00	23.53	23.53	11.00	11.00	11.00

Duty Cycle CF [dB]	1.18	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Limit [dBm]	Power Margin [dB]
Middle	5290	11.02	12.20	23.53	-11.33

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Middle	5290	-4.67	-3.49	11.00	-14.49

10.5.9. 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	21.20	16.56	2.81	2.81
Mid	5580	21.20	16.56	2.81	2.81
High	5700	21.24	16.57	2.81	2.81

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5500	24.00	22.19	21.19	21.19	11.00	11.00	11.00
Mid	5580	24.00	22.19	21.19	21.19	11.00	11.00	11.00
High	5700	24.00	22.19	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	0.30	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5500	12.15	12.45	21.19	-8.74
Mid	5580	11.56	11.86	21.19	-9.33
High	5700	11.23	11.53	21.19	-9.66

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5500	2.32	2.63	11.00	-8.37
Mid	5580	1.73	2.03	11.00	-8.97
High	5700	1.56	1.86	11.00	-9.14

10.5.10. 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	21.64	17.74	2.81	2.81
Mid	5580	21.64	17.73	2.81	2.81
High	5700	21.64	17.70	2.81	2.81

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5500	24.00	22.49	21.19	21.19	11.00	11.00	11.00
Mid	5580	24.00	22.49	21.19	21.19	11.00	11.00	11.00
High	5700	24.00	22.48	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	0.32	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5500	11.71	12.03	21.19	-9.16
Mid	5580	11.20	11.52	21.19	-9.67
High	5700	12.16	12.48	21.19	-8.71

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5500	1.65	1.96	11.00	-9.04
Mid	5580	1.19	1.51	11.00	-9.49
High	5700	1.92	2.24	11.00	-8.76

10.5.11. 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	39.48	36.20	2.81	2.81
Mid	5550	39.66	36.25	2.81	2.81
High	5670	39.18	36.25	2.81	2.81

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5510	24.00	23.00	21.19	21.19	11.00	11.00	11.00
Mid	5550	24.00	23.00	21.19	21.19	11.00	11.00	11.00
High	5670	24.00	23.00	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	0.63	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5510	11.83	12.45	21.19	-8.74
Mid	5550	11.65	12.27	21.19	-8.92
High	5670	11.42	12.05	21.19	-9.14

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5510	-0.54	0.09	11.00	-10.91
Mid	5550	-1.37	-0.74	11.00	-11.74
High	5670	-1.90	-1.27	11.00	-12.27

10.5.12. 802.11ac VHT80 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	83.60	75.20	2.81	2.81
High	5610	83.90	75.40	2.81	2.81

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5530	24.00	23.00	21.19	21.19	11.00	11.00	11.00
High	5610	24.00	23.00	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	1.18	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5530	11.27	12.45	21.19	-8.74
High	5610	11.13	12.31	21.19	-8.88

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5530	-4.30	-3.12	11.00	-14.12
High	5610	-4.75	-3.57	11.00	-14.57

10.5.13. 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	21.28	16.55	0.16	0.16
Mid	5785	21.24	16.52	0.16	0.16
High	5825	21.24	16.58	0.16	0.16

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5745	24.00	22.19	23.84	23.84	11.00	11.00	11.00
Mid	5785	24.00	22.18	23.84	23.84	11.00	11.00	11.00
High	5825	24.00	22.20	23.84	23.84	11.00	11.00	11.00

Duty Cycle CF [dB]	0.30	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5745	11.51	11.82	23.84	-12.02
Mid	5785	11.09	11.39	23.84	-12.45
High	5825	12.10	12.41	23.84	-11.43

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5745	1.84	2.14	11.00	-8.86
Mid	5785	1.31	1.62	11.00	-9.38
High	5825	2.25	2.55	11.00	-8.45

10.5.14. 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	21.60	17.71	0.16	0.16
Mid	5785	21.60	17.78	0.16	0.16
High	5825	21.72	17.76	0.16	0.16

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5745	24.00	22.48	23.84	23.84	11.00	11.00	11.00
Mid	5785	24.00	22.50	23.84	23.84	11.00	11.00	11.00
High	5825	24.00	22.49	23.84	23.84	11.00	11.00	11.00

Duty Cycle CF [dB]	0.32	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
Low	5745	11.25	11.57	23.84	-12.27
Mid	5785	10.38	10.70	23.84	-13.14
High	5825	11.53	11.85	23.84	-11.99

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5745	2.10	2.42	11.00	-8.58
Mid	5785	1.53	1.85	11.00	-9.15
High	5825	1.55	1.87	11.00	-9.13

10.5.15. 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	39.96	36.15	0.16	0.16
High	5795	40.56	36.15	0.16	0.16

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Low	5755	24.00	23.00	23.84	23.84	11.00	11.00	11.00
High	5795	24.00	23.00	23.84	23.84	11.00	11.00	11.00

Duty Cycle CF [dB]	0.63	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5755	11.83	12.46	23.84	-11.38
High	5795	11.70	12.33	23.84	-11.51

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5755	-1.54	-0.91	11.00	-11.91
High	5795	-1.50	-0.87	11.00	-11.87

10.5.16. 802.11ac VHT80 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	83.20	75.53	0.16	0.16

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
Middle	5775	24.00	23.00	23.84	23.84	11.00	11.00	11.00

Duty Cycle CF [dB]	1.18	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Channel	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Limit [dBm]	Power Margin [dB]
Middle	5775	11.27	12.45	23.84	-11.39

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Middle	5775	-4.97	-3.79	11.00	-14.79

10.5.17. 802.11a MODE IN STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5720	15.62	13.28	2.81	2.81
UNII-3	5720	5.62	3.28	2.81	2.81
Whole	5720	21.24	16.56	2.81	2.81

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
UNII-2C	5720	22.94	21.23	20.13	20.13	11.00	11.00	11.00
UNII-3	5720	18.50	15.16	15.69	15.69	11.00	11.00	11.00
Whole	5720	24.00	22.19	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	0.30	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Portion	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
UNII-2C	5720	10.91	11.21	20.13	-8.92
UNII-3	5720	3.50	3.80	15.69	-11.89
Whole	5720	11.63	11.93	21.19	-9.26

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
144	5720	1.52	1.82	11.00	-9.18

10.5.18. 802.11n HT20 MODE IN STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5720	15.78	13.87	2.81	2.81
UNII-3	5720	5.78	3.87	2.81	2.81
Whole	5720	21.56	17.75	2.81	2.81

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
UNII-2C	5720	22.98	21.42	20.17	20.17	11.00	11.00	11.00
UNII-3	5720	18.62	15.88	15.81	15.81	11.00	11.00	11.00
Whole	5720	24.00	22.49	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	0.32	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Portion	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
UNII-2C	5720	10.38	10.70	20.17	-9.47
UNII-3	5720	3.86	4.18	15.81	-11.63
Whole	5720	11.25	11.57	21.19	-9.62

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
144	5720	0.53	0.85	11.00	-10.15

10.5.19. 802.11n HT40 MODE IN STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5710	34.80	33.08	2.81	2.81
UNII-3	5710	4.80	3.08	2.81	2.81
Whole	5710	39.60	36.16	2.81	2.81

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
UNII-2C	5710	24.00	23.00	21.19	21.19	11.00	11.00	11.00
UNII-3	5710	17.81	14.89	15.00	15.00	11.00	11.00	11.00
Whole	5710	24.00	23.00	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	0.63	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Portion	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
UNII-2C	5710	11.66	12.29	21.19	-8.90
UNII-3	5710	0.51	1.13	15.00	-13.87
Whole	5710	11.98	12.61	21.19	-8.58

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
142	5710	-1.55	-0.92	11.00	-11.92

10.5.20. 802.11ac VHT80 MODE IN STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Min 99% BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5690	76.60	72.77	2.81	2.81
UNII-3	5690	6.60	2.77	2.81	2.81
Whole	5690	83.20	75.53	2.81	2.81

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	IC EIRP Limit [dBm]	Max IC Power [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]	IC eirp PSD Limit [dBm]	PPSD Limit [dBm]
UNII-2C	5690	24.00	23.00	21.19	21.19	11.00	11.00	11.00
UNII-3	5690	19.20	14.42	16.39	16.39	11.00	11.00	11.00
Whole	5690	24.00	23.00	21.19	21.19	11.00	11.00	11.00

Duty Cycle CF [dB]	1.18	Included in Calculations of Corr'd Power & PPSD
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Output Power Results

Portion	Frequency [MHz]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]	Power Margin [dB]
UNII-2C	5690	11.18	12.36	21.19	-8.83
UNII-3	5690	-3.32	-2.14	16.39	-18.53
Whole	5690	11.34	12.51	21.19	-8.68

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
138	5690	-4.39	-3.21	11.00	-14.21