



FCC Test Report

Report No: FCS202112033W02

Issued for

Applicant:	Shenzhen juchuangsheng Technology Co., Ltd
Address:	401, building C, No.3, Ertian 2nd Road, Pinghu community, Pinghu street, Longgang District, Shenzhen
Product Name:	Notebook
Brand Name:	N/A
Model Name:	WS05-4500
Series Model:	N/A
FCC ID:	2A38L-WS054500
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.fcs-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name: Shenzhen juchuangsheng Technology Co., Ltd

Address.....: 401, building C, No.3, Ertian 2nd Road, Pinghu community, Pinghu street, Longgang District, Shenzhen

Manufacture's Name: Shenzhen juchuangsheng Technology Co., Ltd

Address.....: 401, building C, No.3, Ertian 2nd Road, Pinghu community, Pinghu street, Longgang District, Shenzhen

Product Description

Product Name: Notebook

Model Name.....: WS05-4500

Series Model: NA

Test Standards: CFR 47 FCC Part15E section 15.407
ANSI C63.10-2013

Test Procedure.....: KDB 789033 D02 General UNII Test procedures New Rules 02
KDB558074 D01 Meas Guidance v05

This device described above has been tested by Flux Compliance Service Laboratory, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests : 14 Dec, 2021 ~ 23 Dec, 2021

Date of Issue.....: 23 Dec, 2021

Test Result: Pass

Tested by

:

Scott Shen

(Scott Shen)

Reviewed by

:

Duke Qian

(Duke Qian)

Approved by

:

Jack Wang

(Jack Wang)



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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	23 Dec, 2021	FCS202112033W02	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Standard Section	Test Item	Judgment	Remark
FCC 15.407 (e)	6/26db Bandwidth and 99% Bandwidth	PASS	--
FCC 15.407 (a)	Maximum Conducted Output Power	PASS	--
FCC 15.407 (a)	Power Spectral Density	PASS	--
FCC 15.407 (g)	Frequency Stability Measurement	PASS	
FCC 15.407 (a) FCC 15.209 FCC 15.205	Emissions in restricted frequency bands	PASS	
FCC 15.407 (a) FCC 15.209 FCC 15.205	Band Edge Compliance	PASS	
FCC 15.207	Power Line Conducted Emission	PASS	
FCC 15.203	Antenna requirement	PASS	--

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.71 \text{ dB}$
2	Unwanted Emissions, conducted	$\pm 2.988 \text{ dB}$
3	Conducted Emission (9KHz-150KHz)	$\pm 4.13 \text{ dB}$
4	Conducted Emission (150KHz-30MHz)	$\pm 4.74 \text{ dB}$
5	All emissions, radiated (<1G) 30MHz-1000MHz	$\pm 5.2 \text{ dB}$
6	All emissions, radiated 1GHz -18GHz	$\pm 4.66 \text{ dB}$
7	All emissions, radiated 18GHz -40GHz	$\pm 4.31 \text{ dB}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Notebook
Trade Name	N/A
Model Name	WS05-4500
Series Model	N/A
Model Difference	NA
Channel List	Please refer to the Note 2.2.
Operation frequency	IEEE 802.11a/n/ac(HT20): U-NII-1 5150MHz ~5250MHZ U-NII-3 5725MHZ-5850 MHz
Number of channel	5150MHz ~5250MHZ (7CH) 5725MHZ-5850 MHz (8CH)
Modulation:	OFDM
Power supply	DC 12V by adapter
Battery	DC 11.4V/4000mAh
Hardware version number	V1.0
Software version number	V1.0
Sample type	Portable equipment
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

U-NII-1 (5.15-5.25GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	38	5190
40	5200	42	5210
44	5220	46	5230
48	5240		

U-NII-3 (5.725-5.85GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
149	5745	151	5755
153	5765	155	5775
157	5785	159	5795
161	5805	165	5825

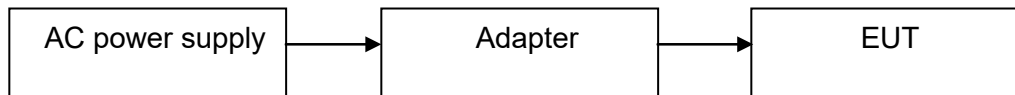
3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	KCC	KCC	integral antenna	N/A	1.0	WIFI Antenna 1

2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Block diagram of EUT configuration for test



Test software: the QA tool

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

For 802.11a/n/ac(HT20)

U-NII-1

channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	40	5200
48	5240		

U-NII-3

channel	Frequency(MHz)	channel	Frequency(MHz)
149	5745	157	5785
165	5825		

For 802.11n/ac(HT40)

U-NII-1

channel	Frequency(MHz)	channel	Frequency(MHz)
38	5190	46	5230

U-NII-3

channel	Frequency(MHz)	channel	Frequency(MHz)
151	5755	159	5795

For 802.11ac(HT80)

U-NII-1

channel	Frequency(MHz)	channel	Frequency(MHz)
42	5210		

U-NII-3

channel	Frequency(MHz)	channel	Frequency(MHz)
155	5775		

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2021.05.26	2022.05.25
Signal Analyzer	R&S	FSV40-N	FCS-E012	2021.05.26	2022.05.25
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2021.07.08	2022.07.07
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2021.08.26	2022.08.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2021.08.26	2022.08.25
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2021.05.26	2022.05.25
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2021.05.26	2022.05.25
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2021.05.26	2022.05.25
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2021.07.08	2022.07.07
Temperature & Humidity	HTC-1	victor	FCS-E005	2021.08.26	2022.08.25

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESCI	FCS-E020	2021.07.08	2022.07.07
LISN	R&S	ENV216	FCS-E007	2021.07.08	2022.07.07
LISN	ETS	3810/2NM	FCS-E009	2021.05.26	2022.05.25
Temperature & Humidity	HTC-1	victor	FCS-E008	2021.07.08	2022.07.07

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2021.05.26	2022.05.25
Spectrum Analyzer	Agilent	E4447A	MY50180039	2021.07.08	2022.07.07
Spectrum Analyzer	R&S	FSV-40	101499	2021.08.26	2022.08.25

3. 26dB Bandwidth, 6dB Bandwidth and 99% Bandwidth

3.1 Limit

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	For FCC:5470-5725 For IC:5470-5600 5650-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

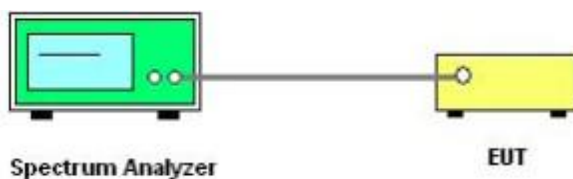
3.2 Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth: RBW=100kHz For 26dB Bandwidth: approximately 1% of the emission bandwidth.
VBW	For 6dB Bandwidth: VBW=300kHz For 26dB Bandwidth: >3RBW
Trace	Max hold
Sweep	Auto couple

(2) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26dB and 6dB relative to the maximum level measured in the fundamental emission.

3.3 Test setup



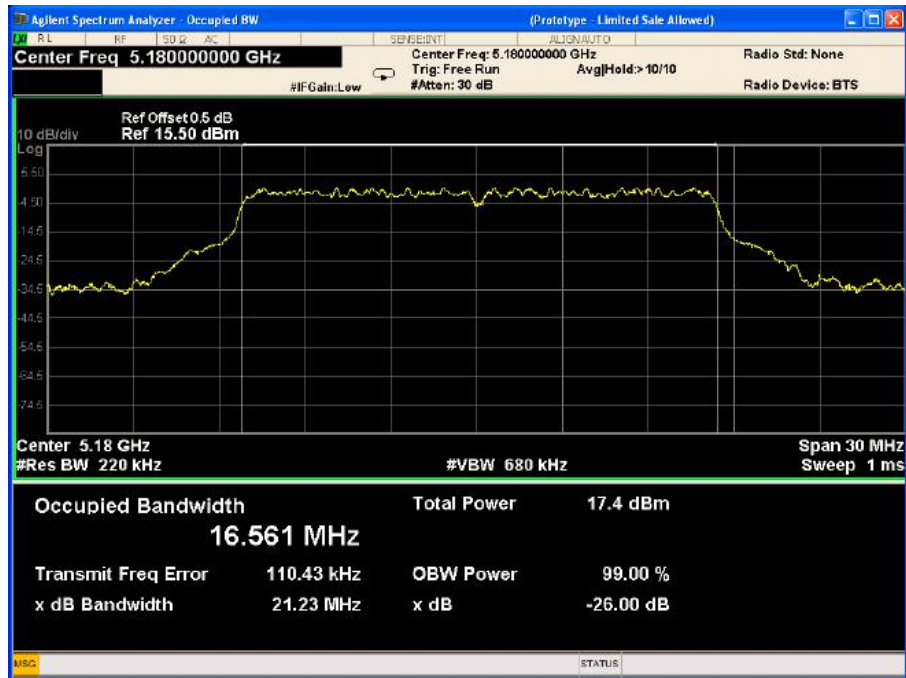
3.4 Test results

Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	21.23	21.08	21.08	16.561	16.557	16.559
	802.11n(HT20)	21.30	21.55	21.38	17.813	17.817	17.758
	802.11n(HT40)	39.55	/	39.36	36.336	/	36.366
	802.11ac(HT20)	21.37	21.40	21.39	17.835	17.812	17.831
	802.11ac(HT40)	40.34	/	39.49	36.521	/	36.507
	802.11ac(HT80)	80.98	/	/	75.731	/	/

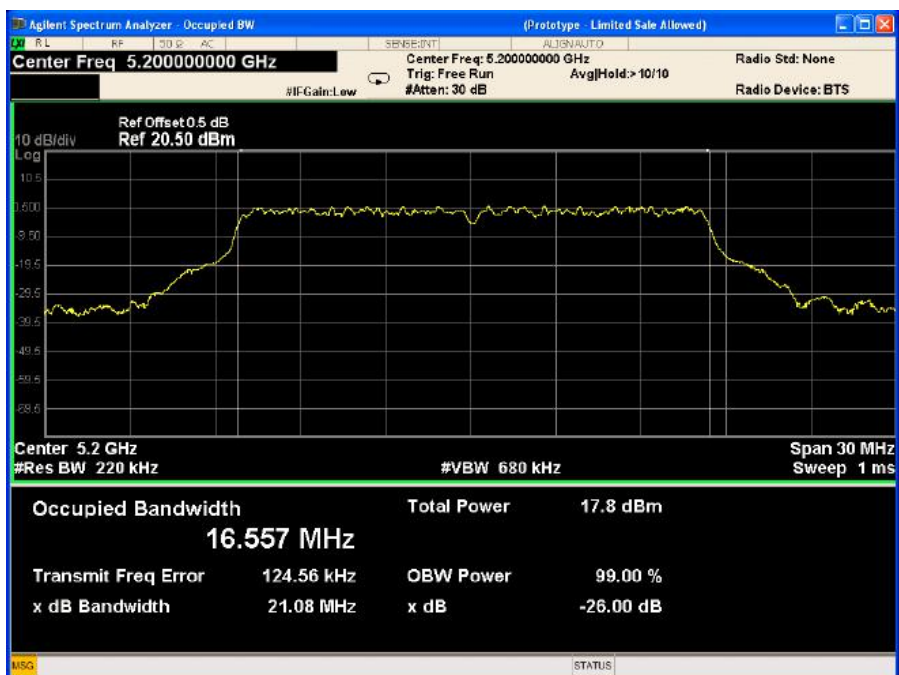
Band	Operation mode	6 dB Bandwidth (MHz)		
		Low	Middle	High
U-NII-3	802.11a	16.47	16.50	16.49
	802.11n(HT20)	16.30	15.89	15.09
	802.11n(HT40)	36.01	/	35.70
	802.11ac(HT20)	16.30	16.90	15.30
	802.11ac(HT40)	36.29	/	35.72
	802.11ac(HT80)	75.04	/	/

3.5 Original Test Data

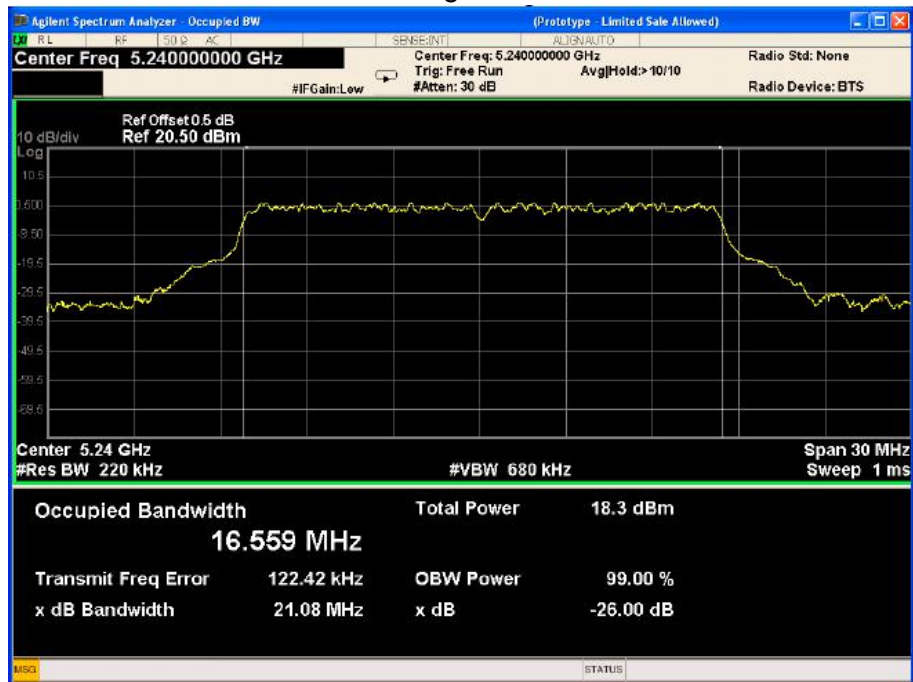
U-NII-1 11a Low CH 5180MHz



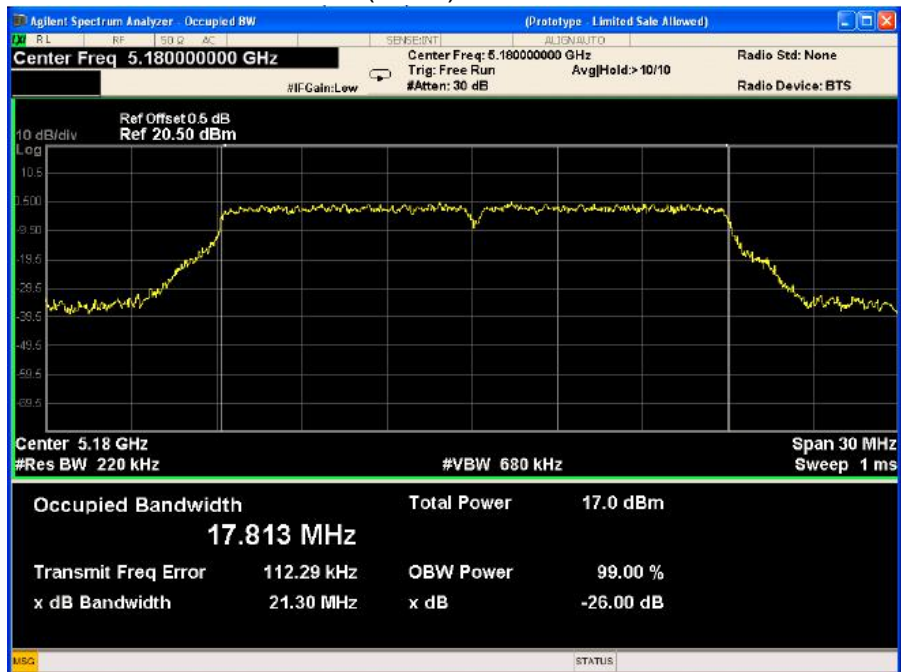
U-NII-1 11a Middle CH 5200MHz



U-NII-1 11a High CH 5240MHz



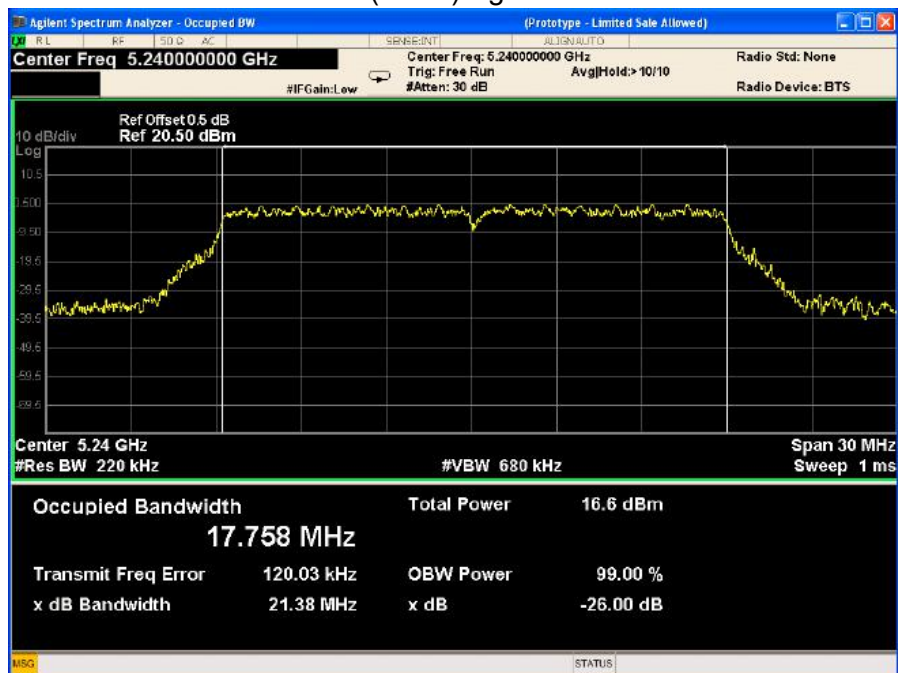
U-NII-1 11n(HT20) Low CH 5180MHz



U-NII-1 11n(HT20) Middle CH 5200MHZ



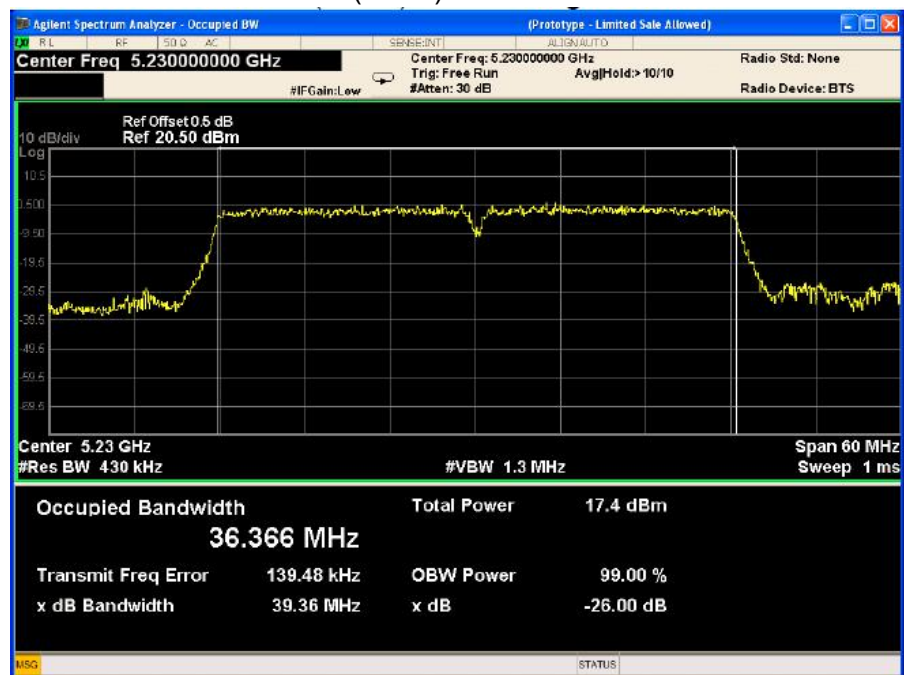
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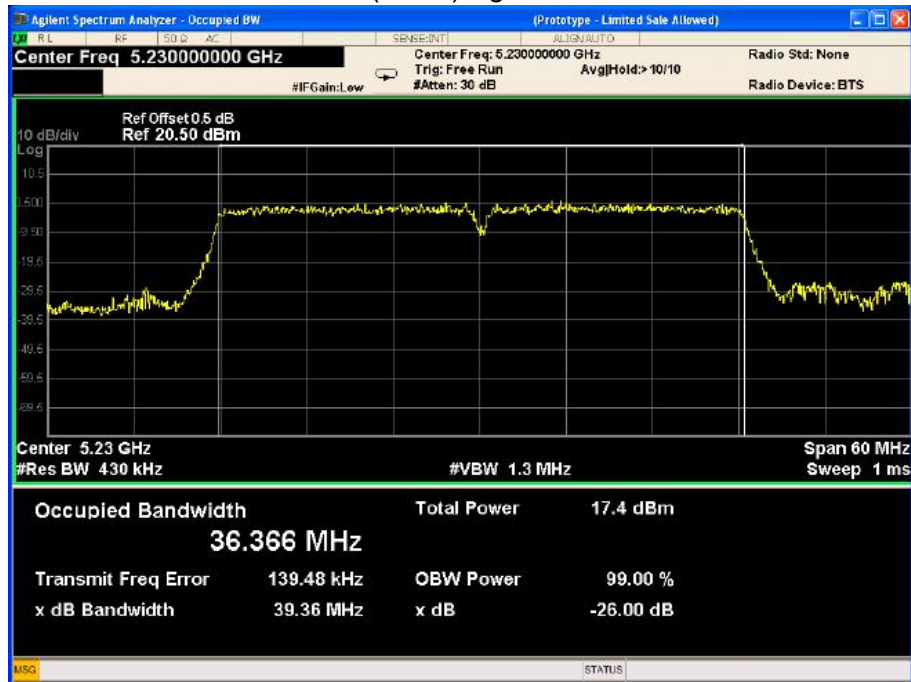
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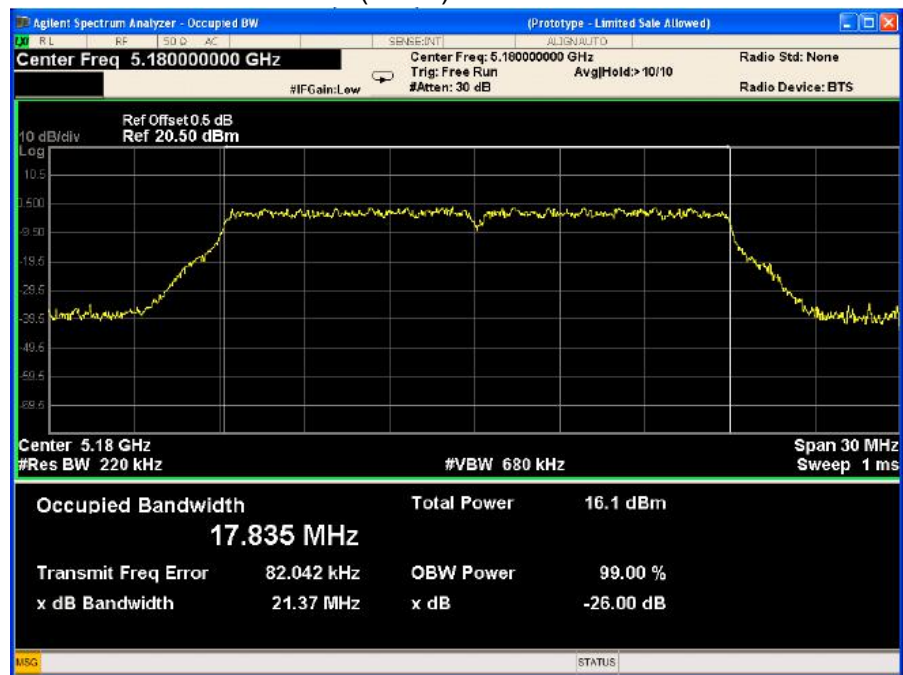
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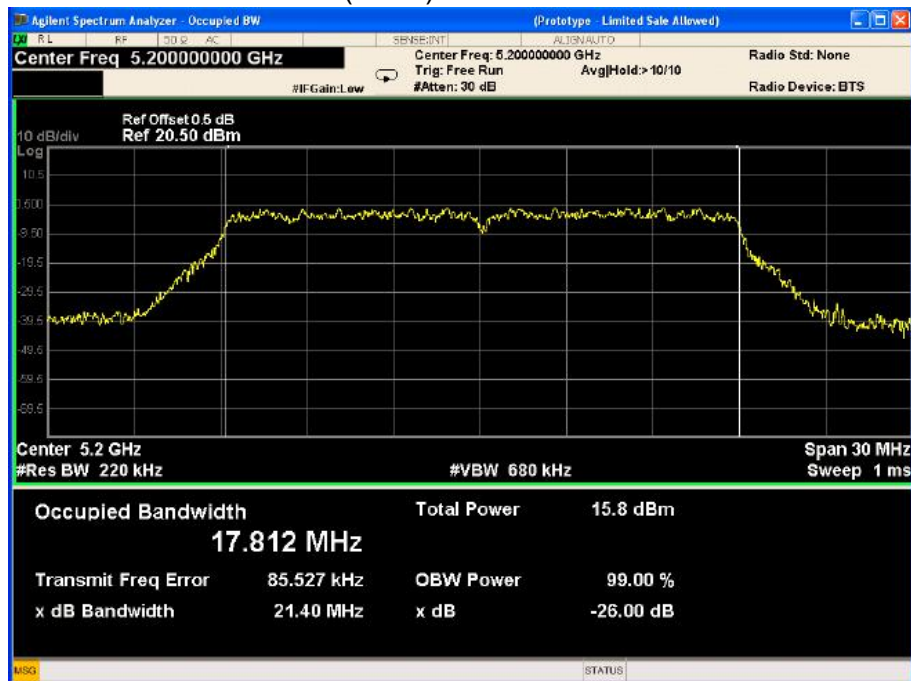
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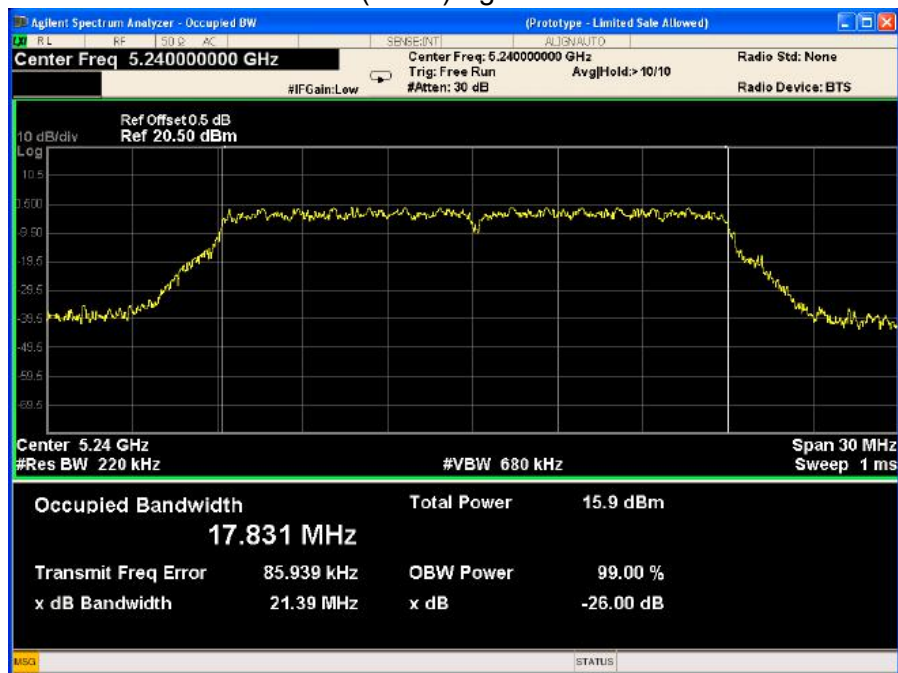
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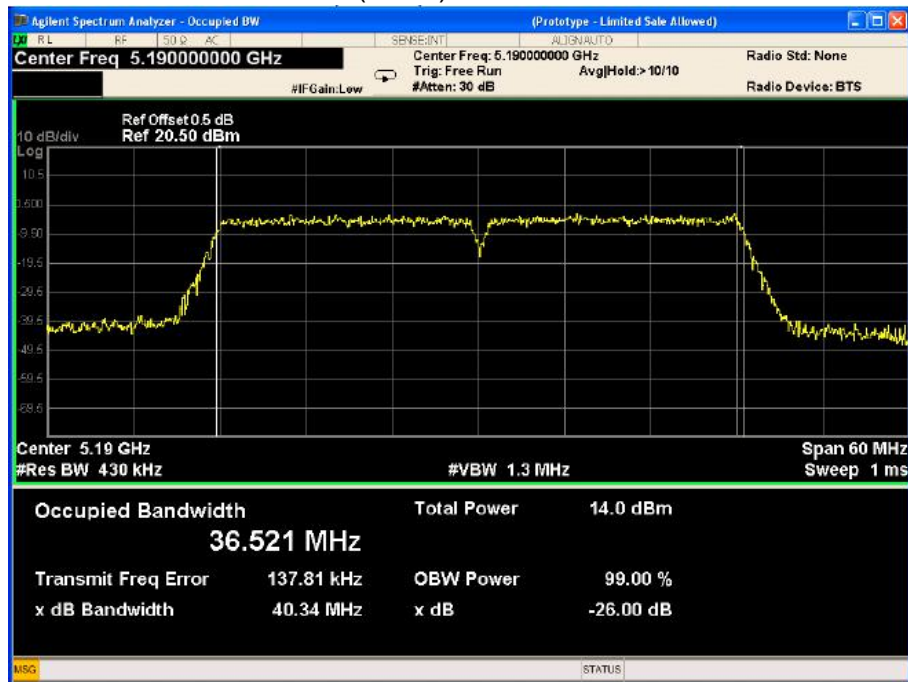
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U-NII-1 ac(HT20)High CH 5240MHZ



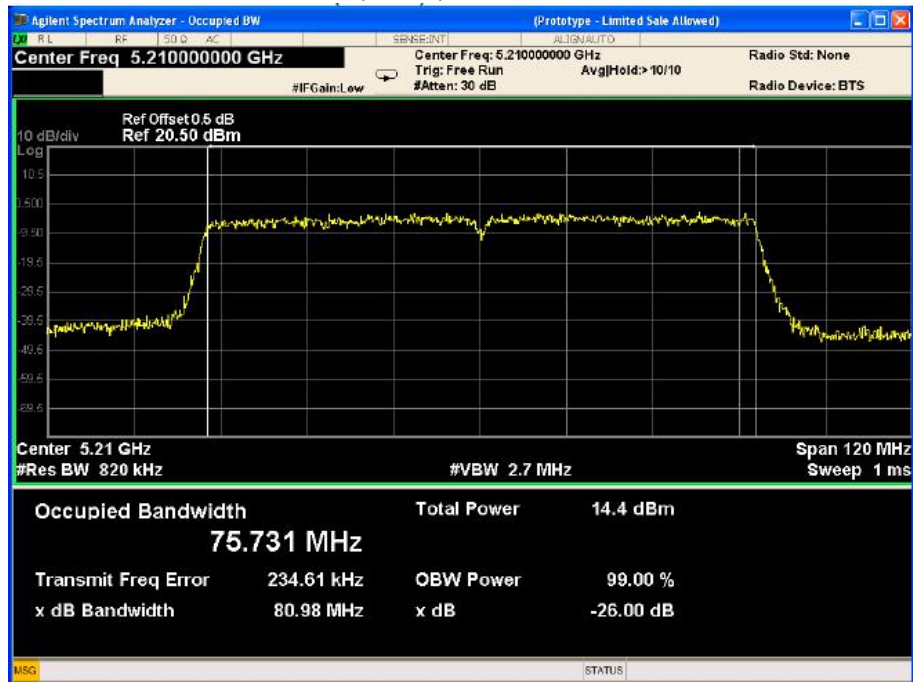
U-NII-1 ac(HT40) Low CH 5190MHZ



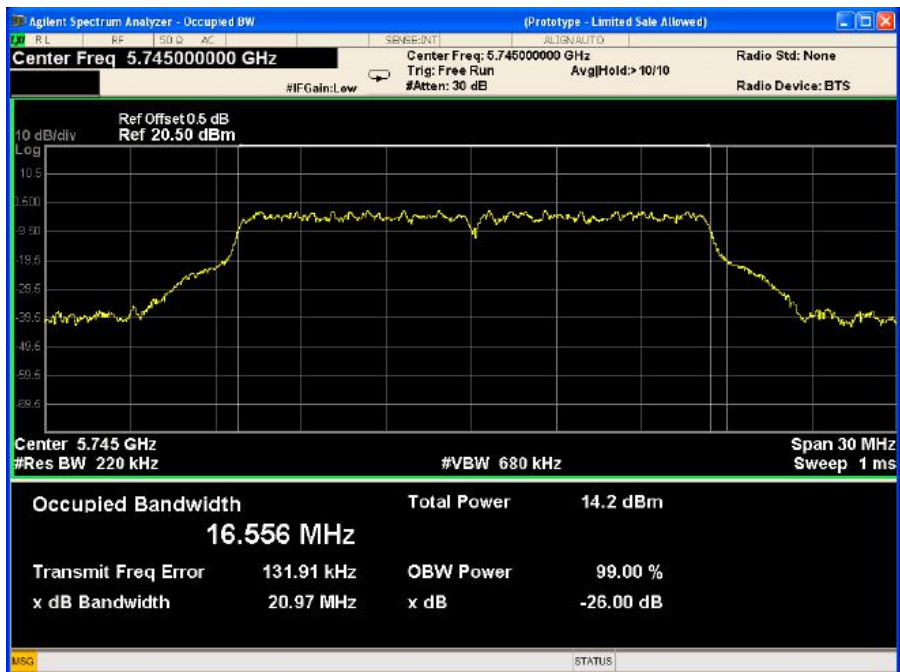
U-NII-1 ac(HT40) High CH 5230MHZ



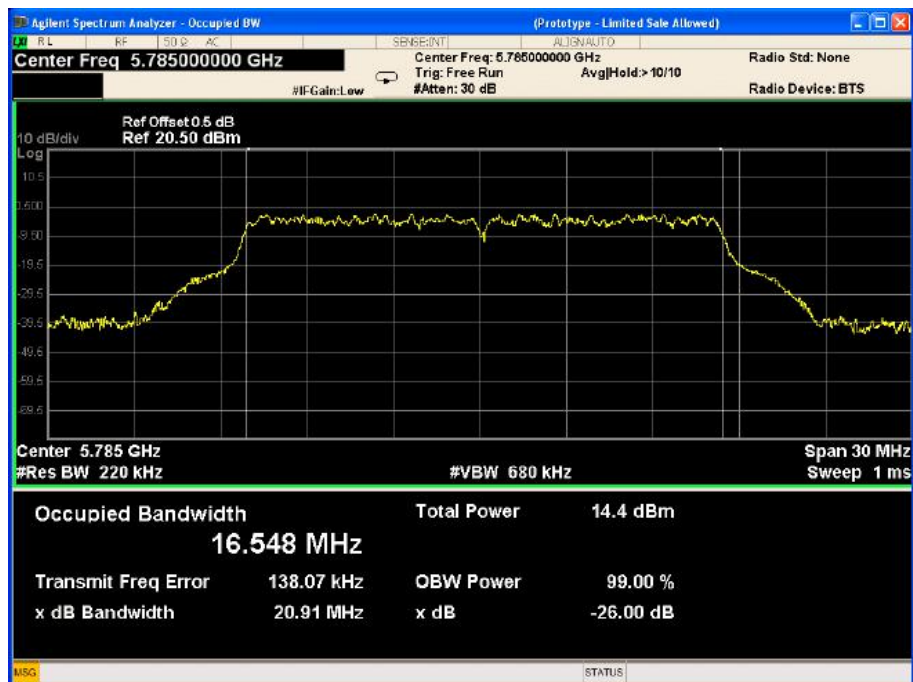
U-NII-1 ac(HT80) Low CH 5210MHZ



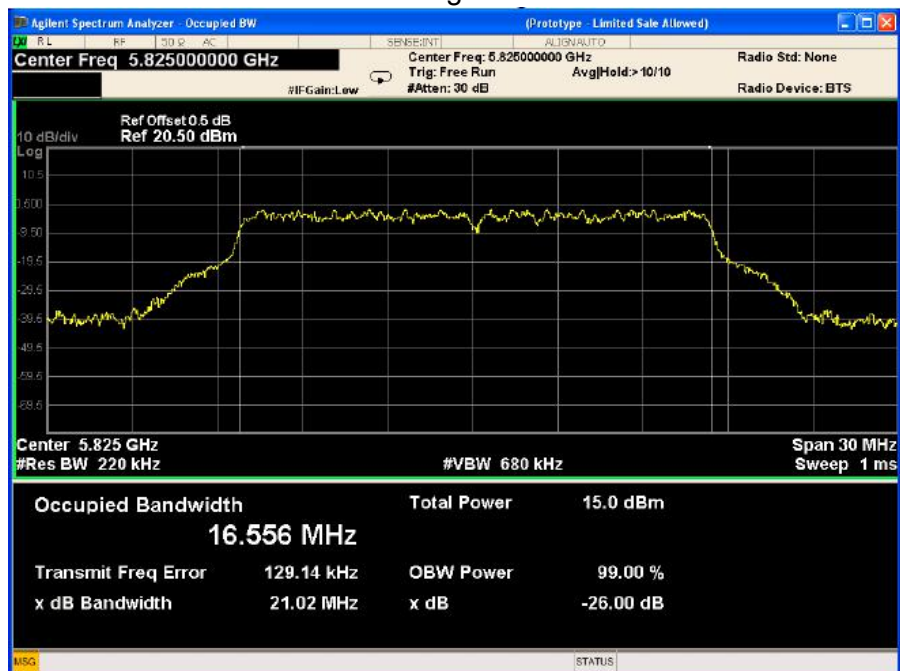
U-NII-3 11a Low CH 5745MHZ



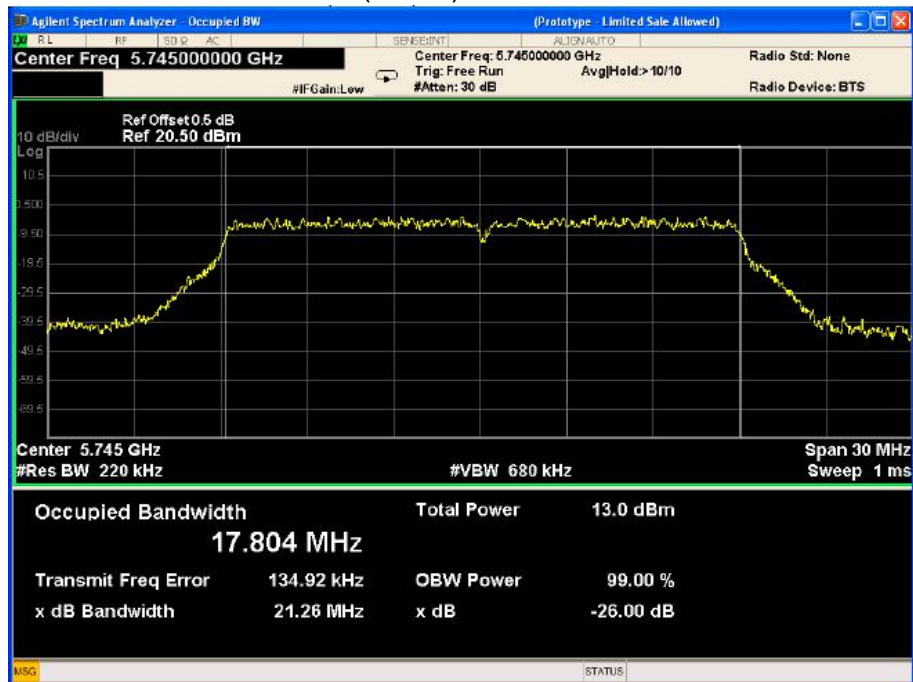
U-NII-3 11a Middle CH 5785MHZ



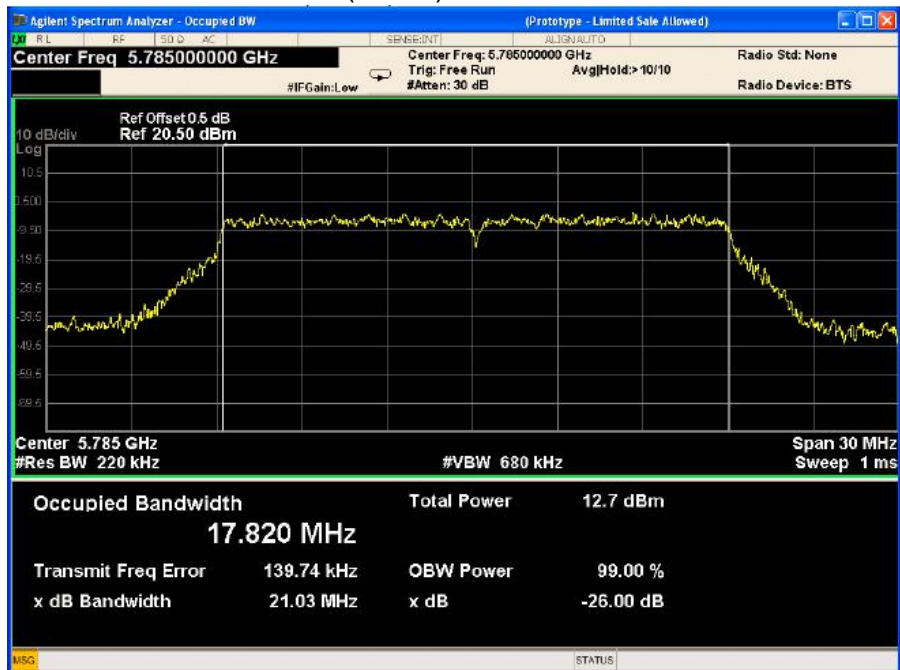
U-NII-3 11a High CH 5825MHZ



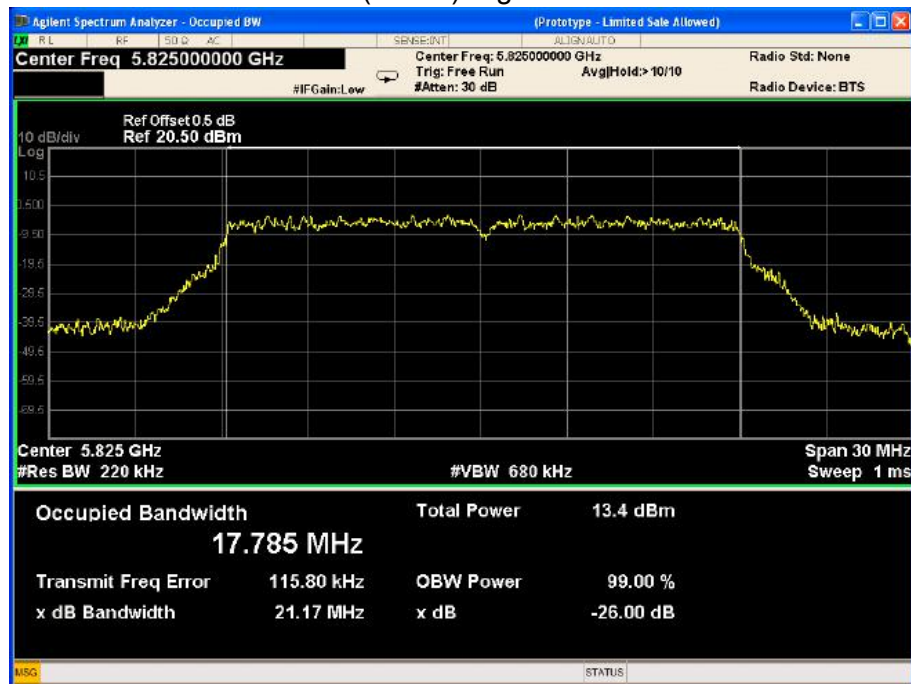
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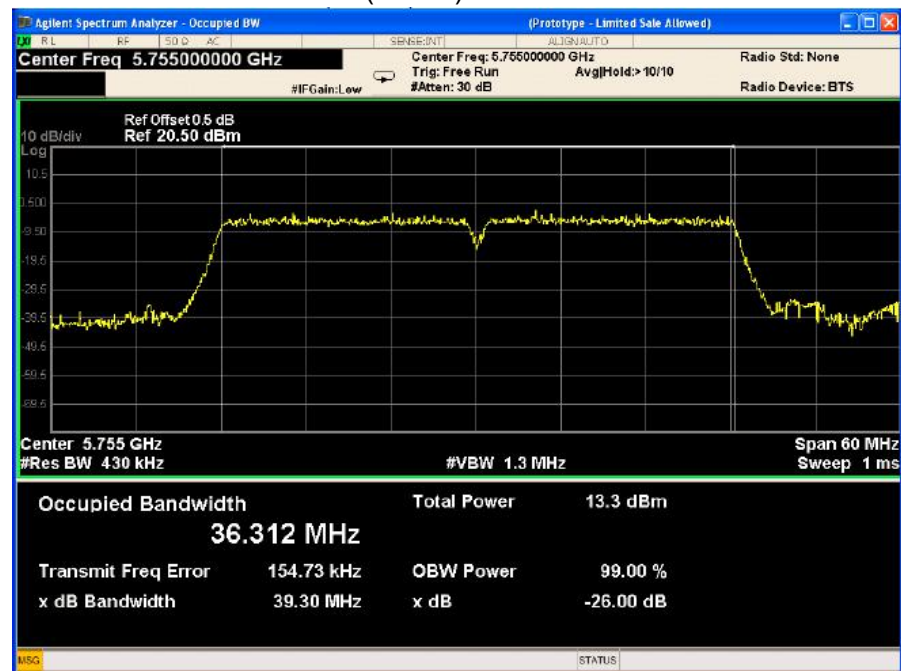
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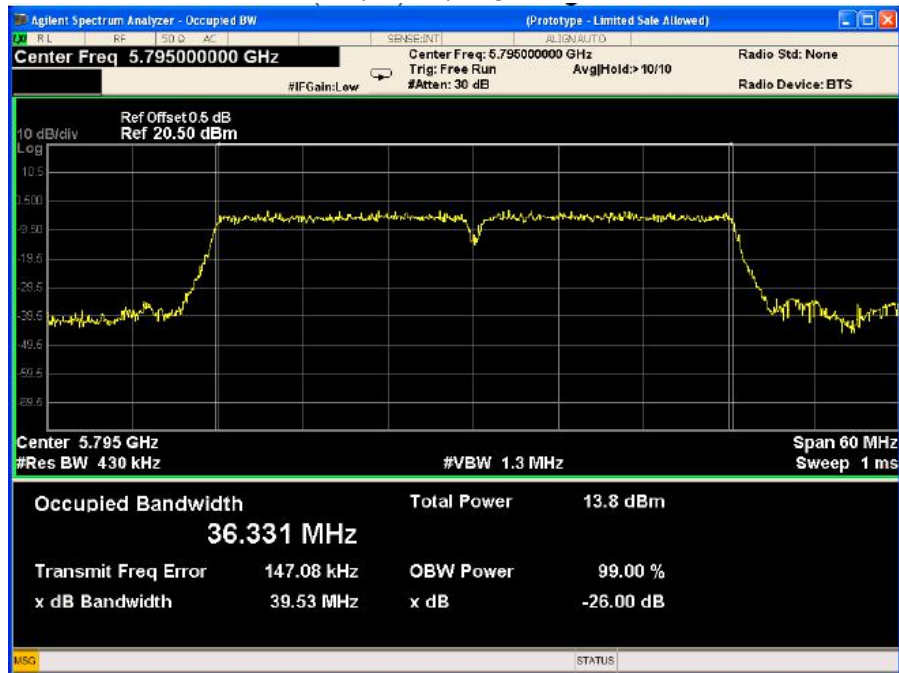
U-NII-3 11n(HT 20) High CH 5825MHZ



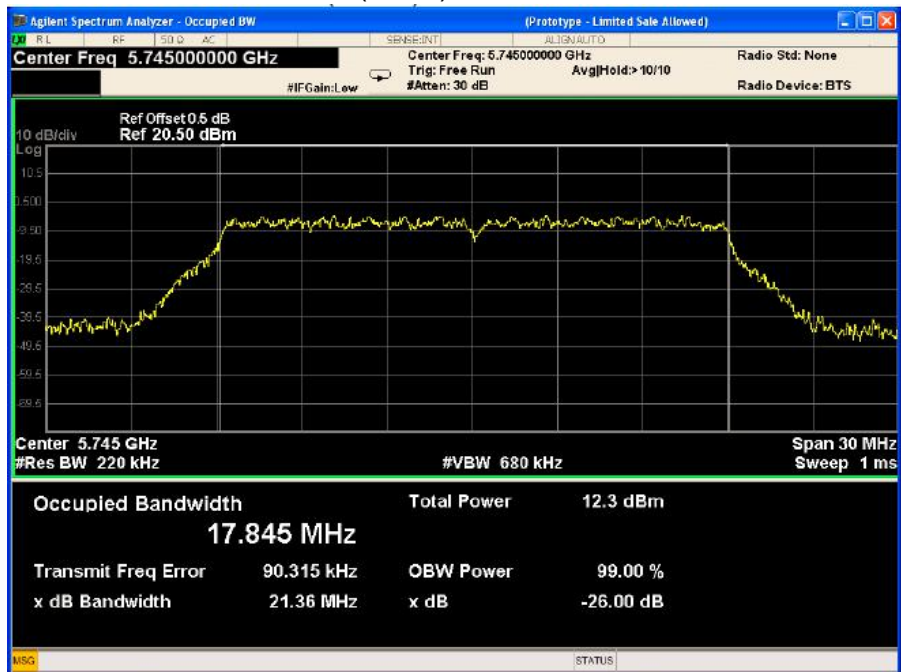
U-NII-3 11n(HT 40) Low CH 5755MHZ



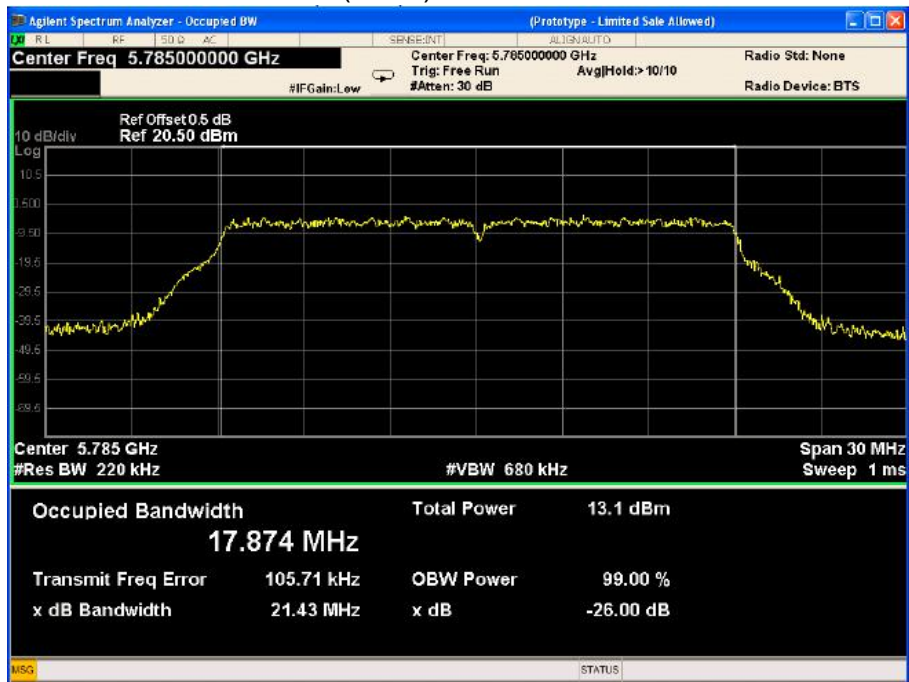
U-NII-3 11n(HT 40) High CH 5795MHZ



U-NII-3 ac(HT20) Low CH 5745MHZ



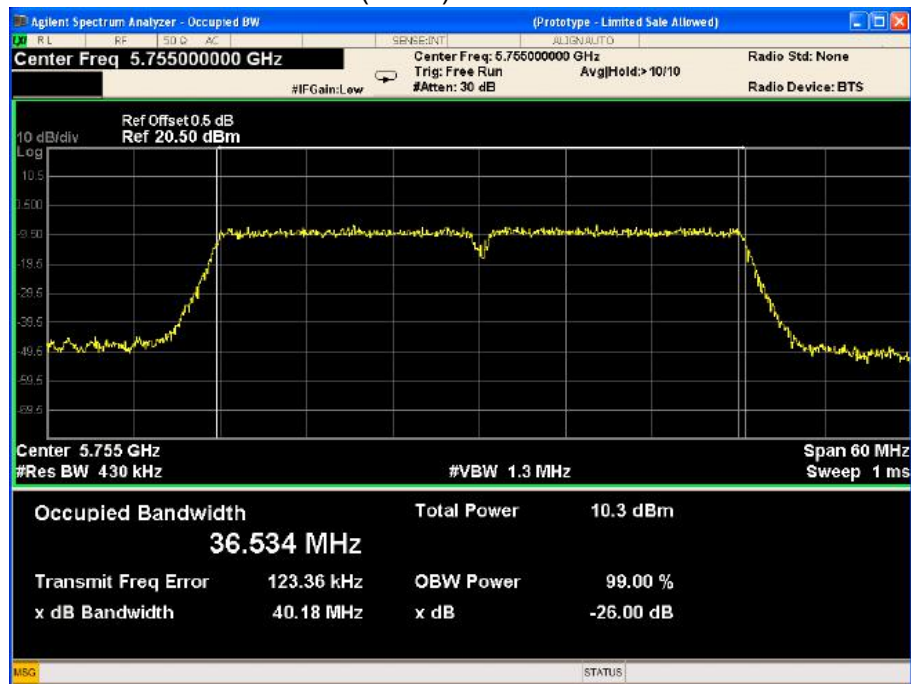
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U-NII-3 ac(HT20) High CH 5825MHZ



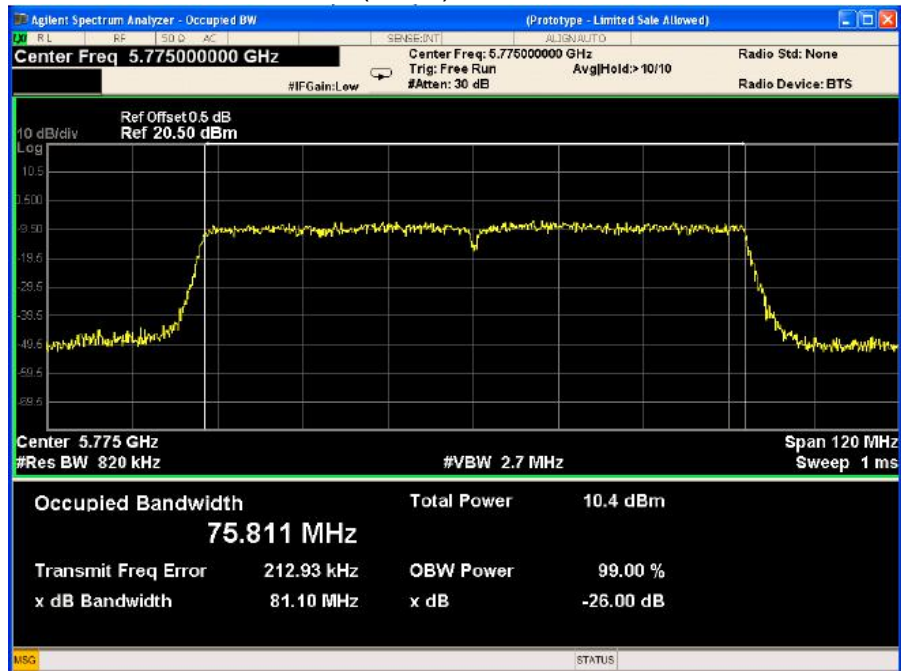
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U-NII-3 ac(HT40) High CH 5795MHZ

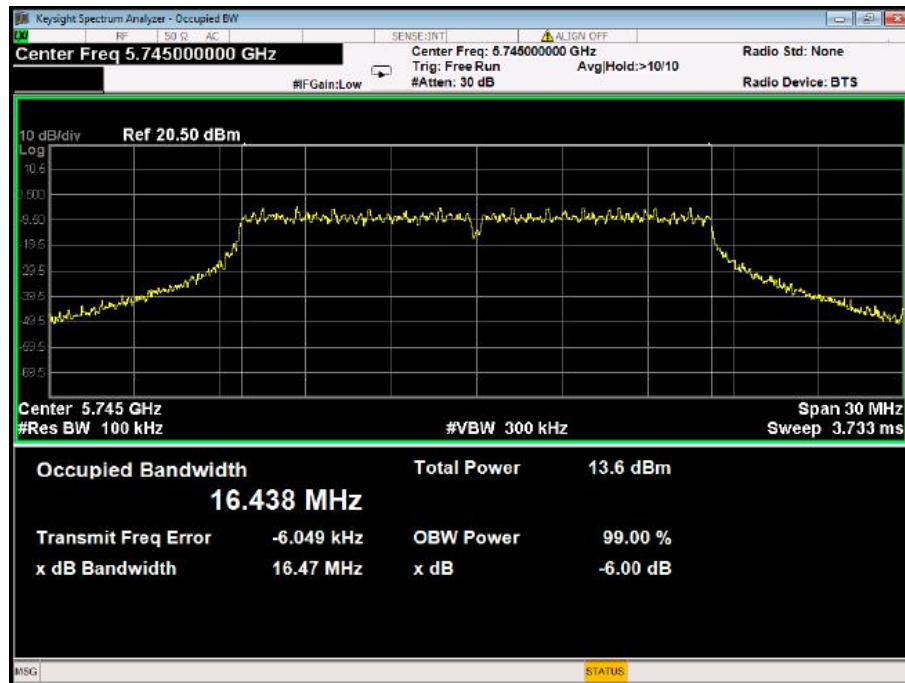


U-NII-3 ac(HT80) Low CH 5775MHZ

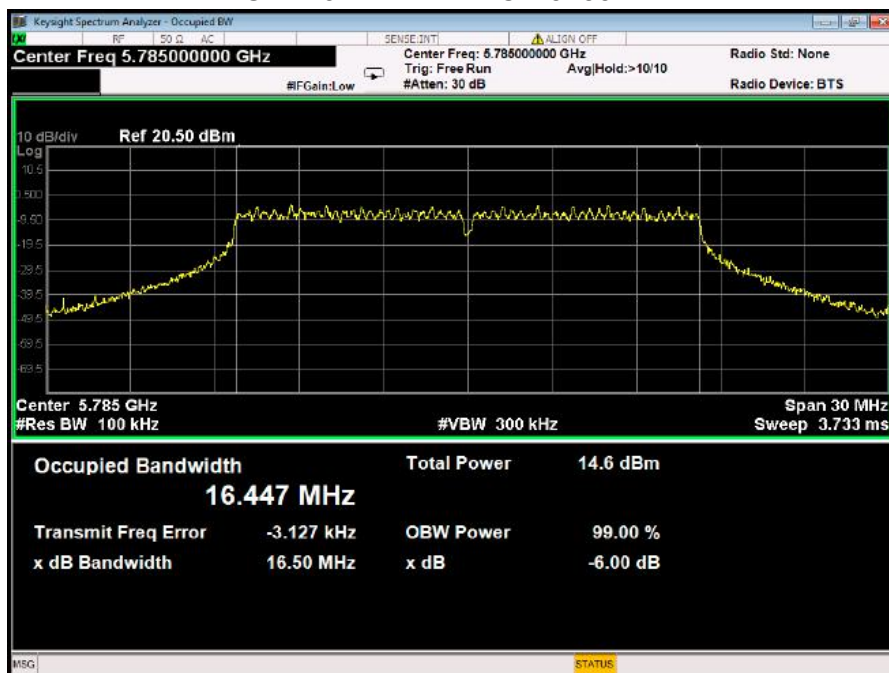


6dB Bandwidth test result

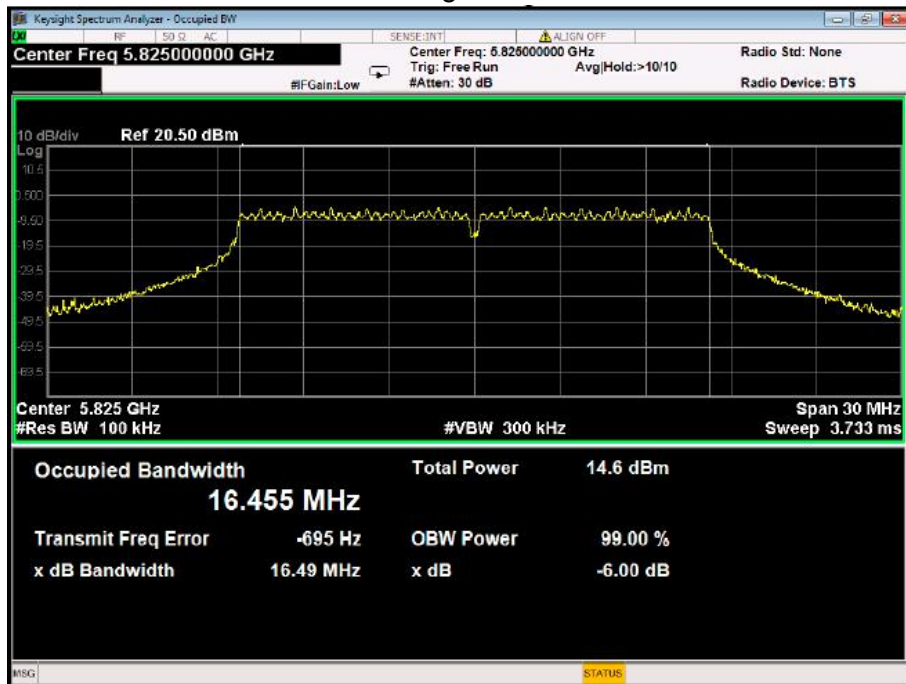
U-NII-3 11a Low CH 5745MHZ



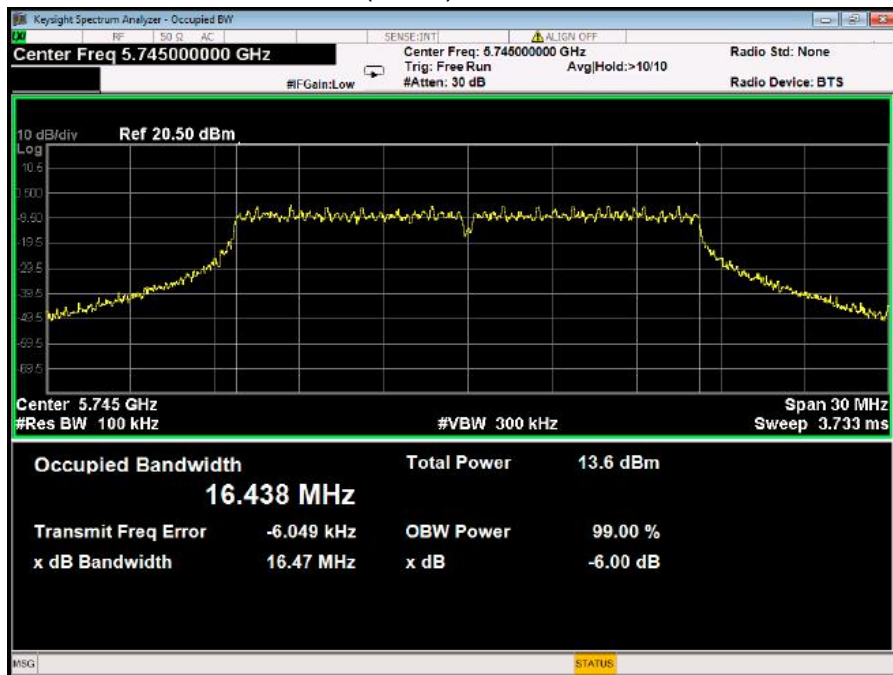
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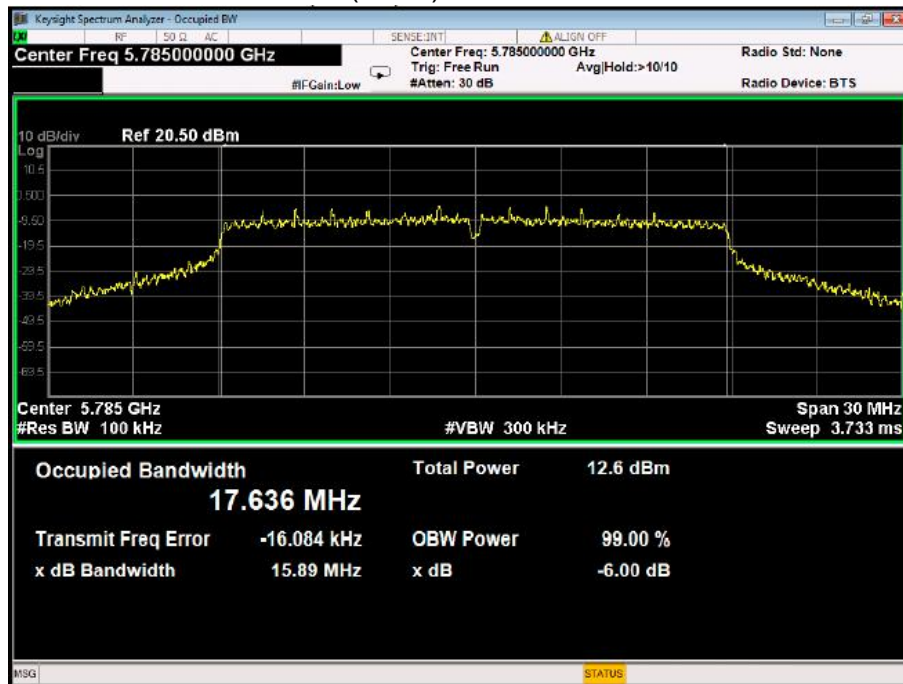
U-NII-3 11a High CH 5825MHZ



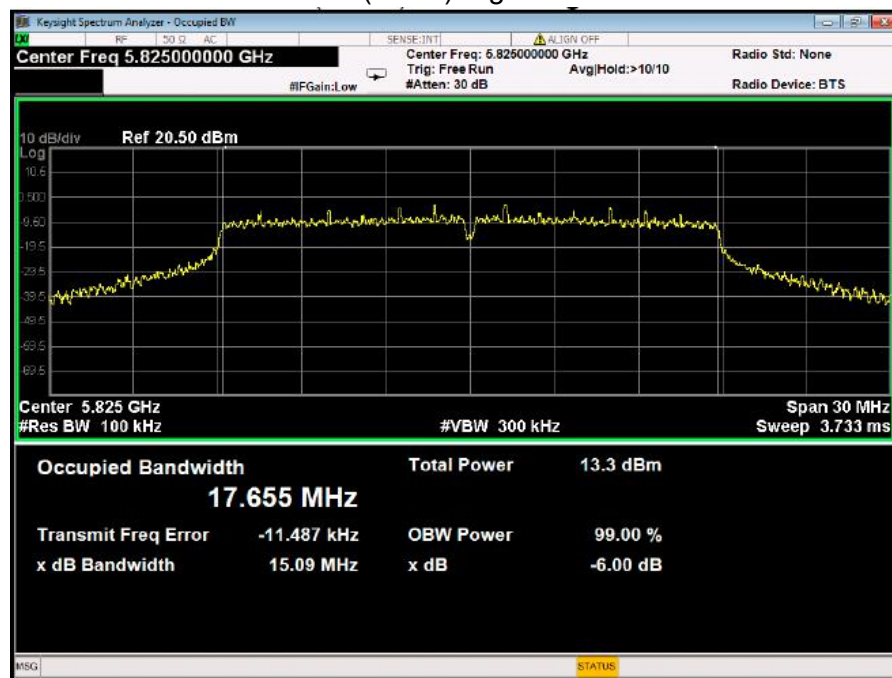
U-NII-3 11n(HT20) Low CH 5745MHZ



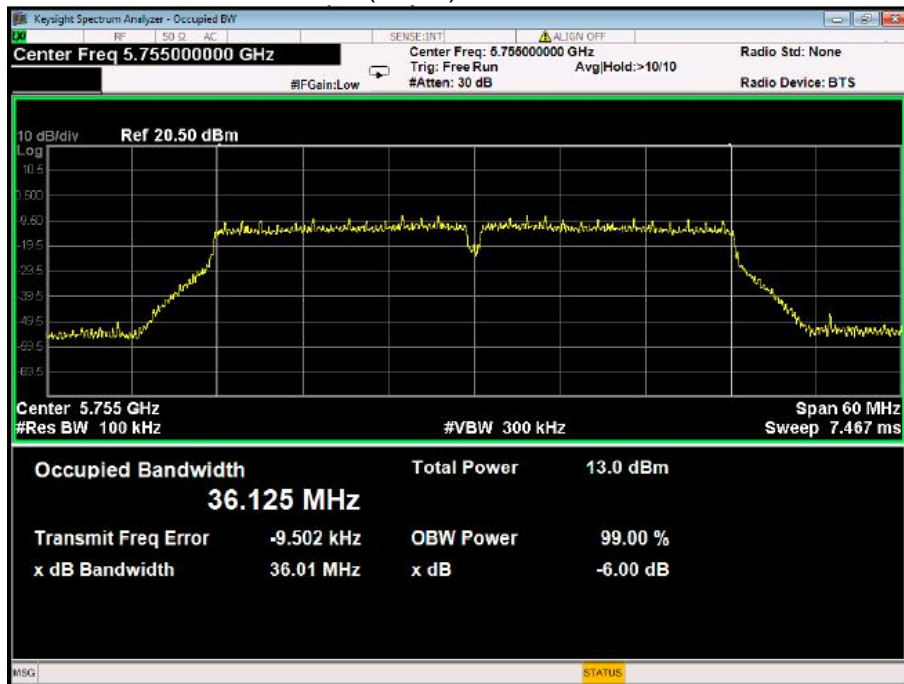
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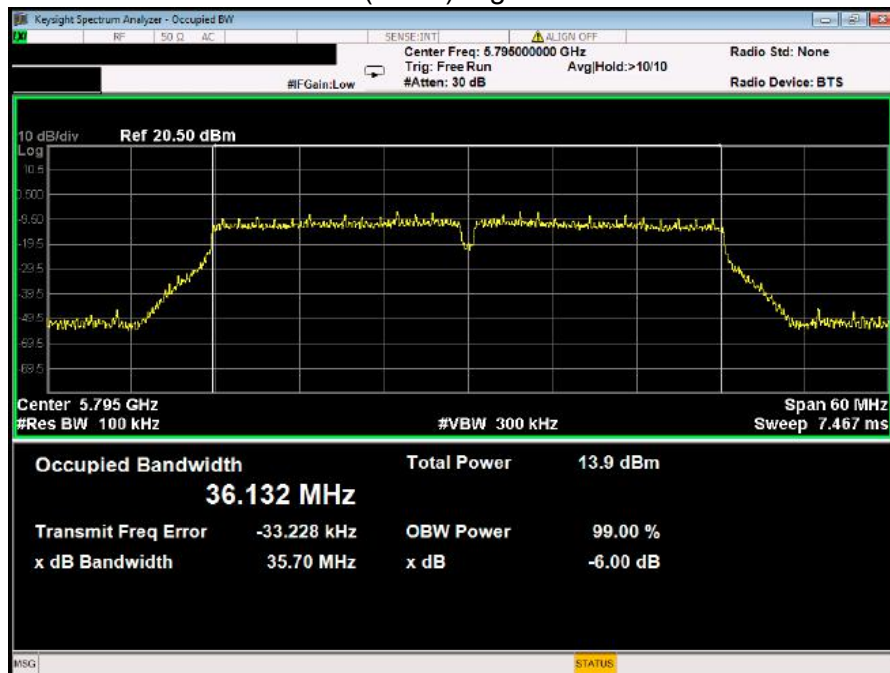
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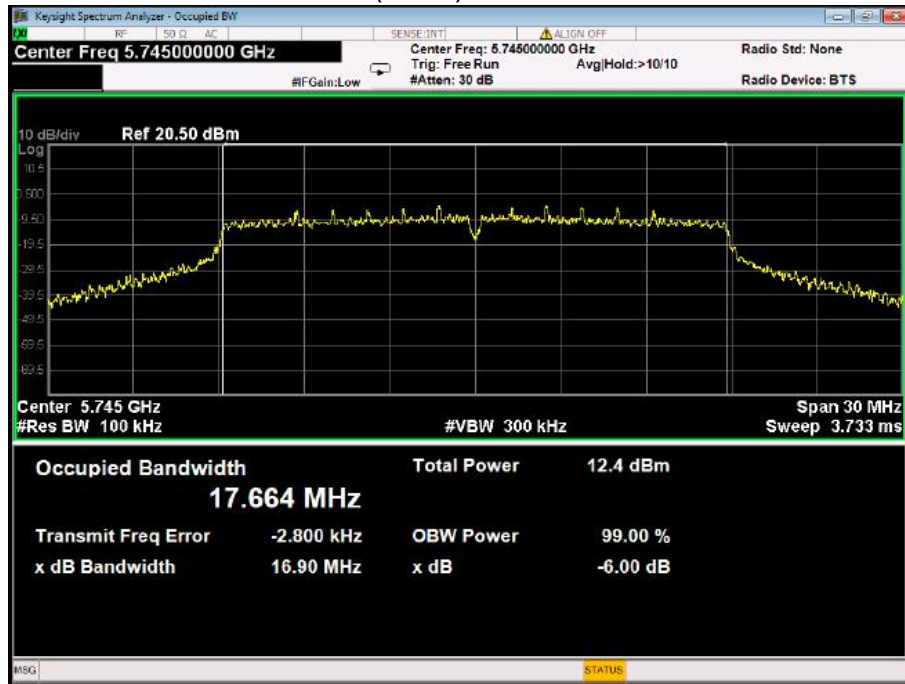
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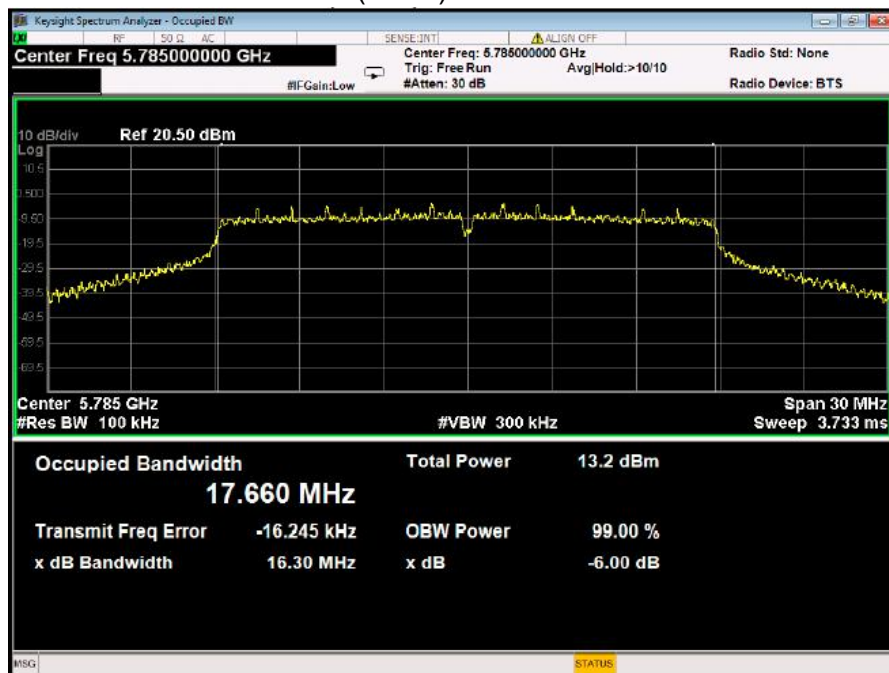
U-NII-3 11n(HT40) High CH 5795MHZ



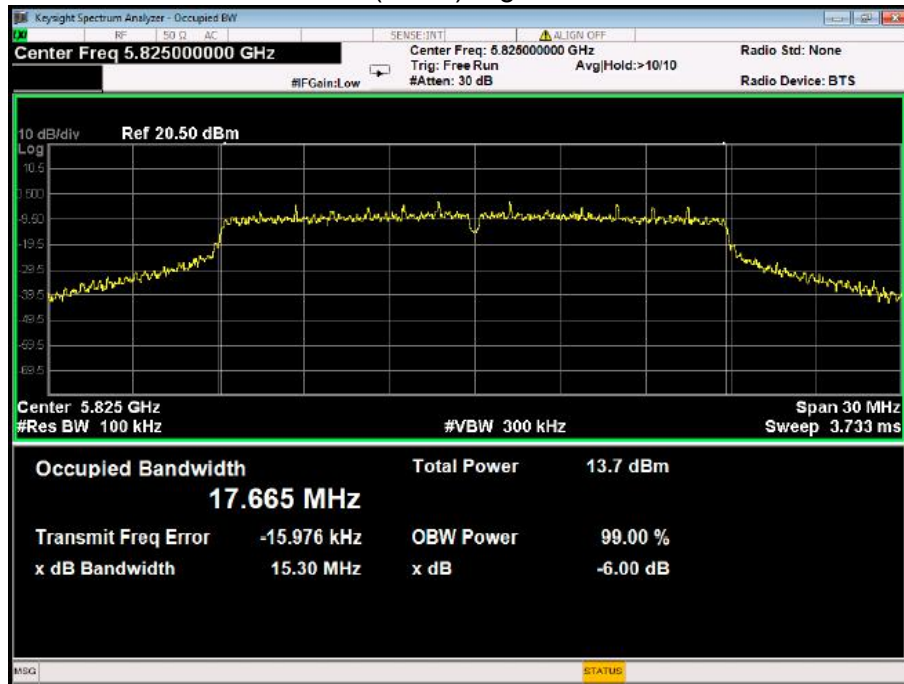
U-NII-3 11ac(HT20) Low CH 5745MHZ



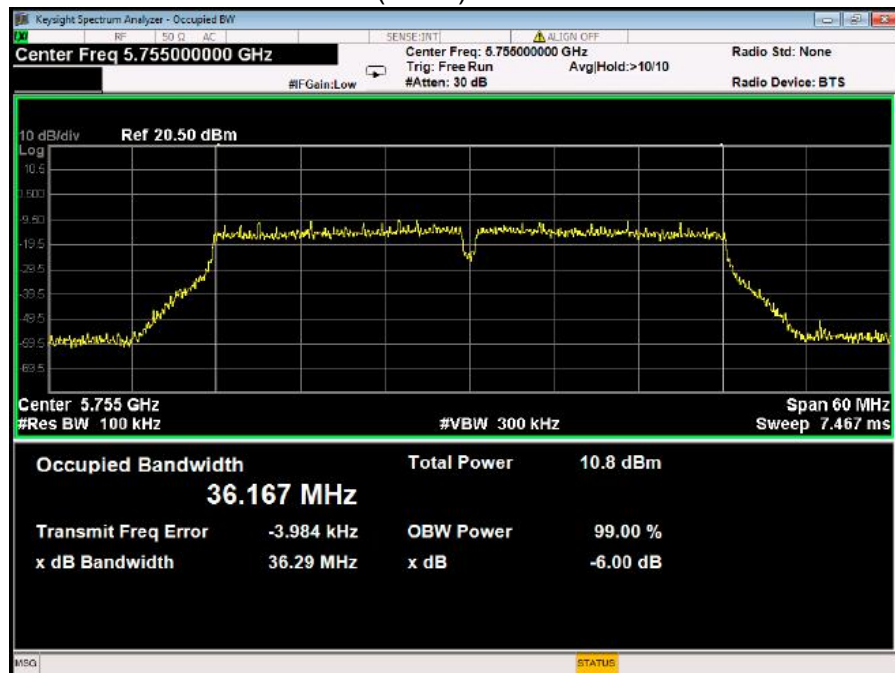
U-NII-3 11ac(HT20) Middle CH 5785MHZ



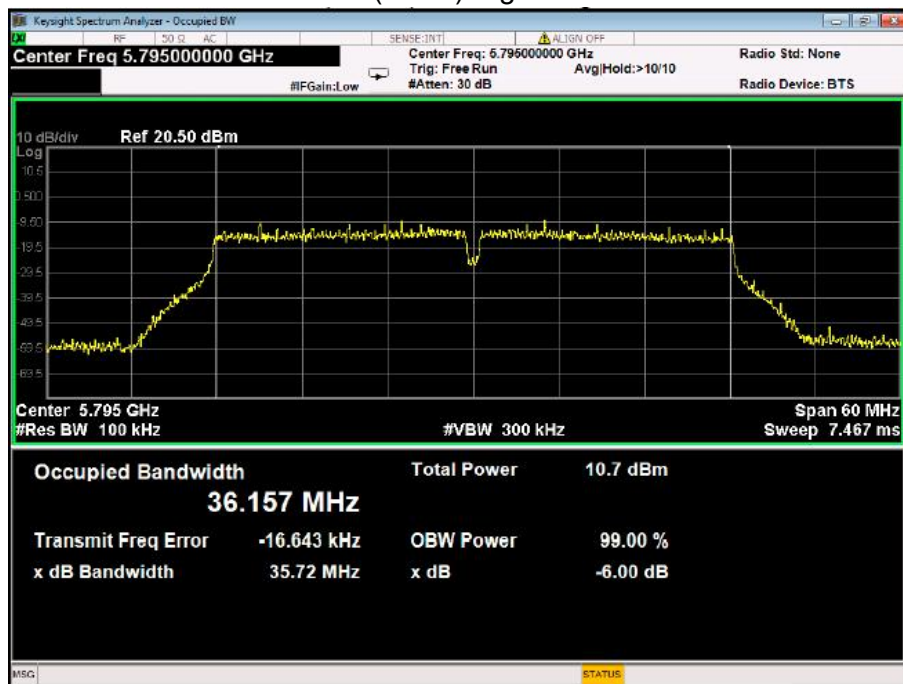
U-NII-3 11ac(HT20) High CH 5825MHZ



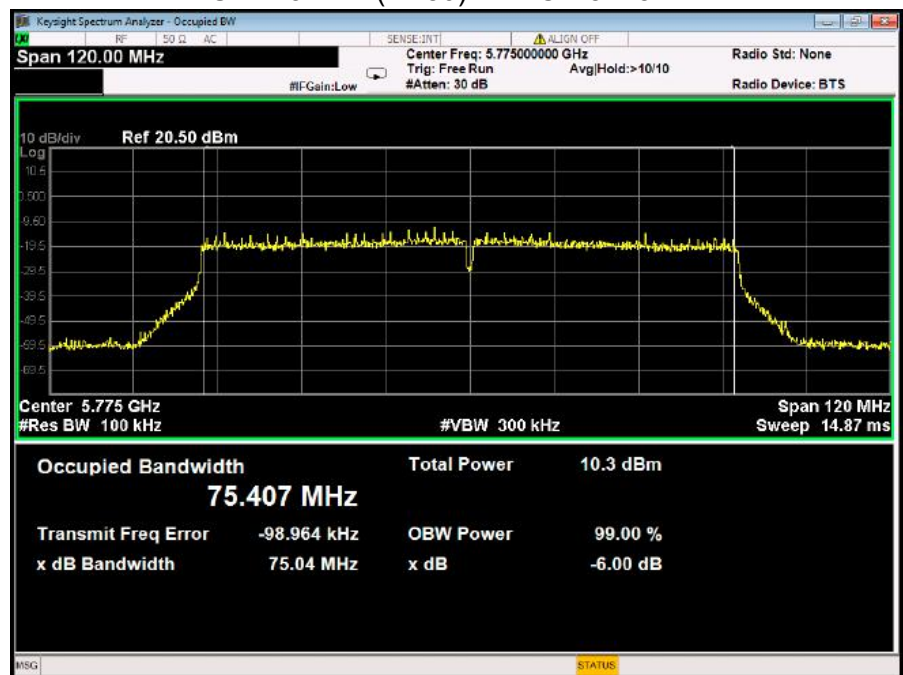
U-NII-3 11ac(HT40) Low CH 5755MHZ



U-NII-3 11ac(HT40) High CH 5795MHZ



U-NII-3 11ac(HT80) Low CH 5775MHZ



4 CONDUCTED OUTPUT POWER

4.1 limit

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices: 250mW (24dBm)	5150-5250
	For RSS: e.i.r.p. power: not exceed 200 mW(23dBm) or $10 + 10 \log_{10} B$	
	250mW (24dBm) or $11 + 10 \log_{10} B$	5250-5350
	250mW (24dBm) or $11 + 10 \log_{10} B$	For FCC:5470-5725 For IC:5470-5600 5650-5725
	1 Watt (30dBm)	5725-5850
Note: For ISDE: B=99% bandwidth.		

4.2 test procedure

- Connect each EUT's antenna output to power meter by RF cable and attenuator
- Get each antenna port's output power of EUT.

4.3 TEST SETUP



4.4 test results

Band	Operation mode	Conducted Output Power (dBm)		
		Low	Middle	High
U-NII-1	802.11a	7.75	8.11	7.51
	802.11n(HT20)	6.31	6.99	6.81
	802.11n(HT40)	6.65	/	7.18
	802.11ac(HT20)	5.95	6.17	5.85
	802.11ac(HT40)	4.69	/	3.97
	802.11ac(HT80)	4.30	/	/
U-NII-3	802.11a	5.59	4.51	5.94
	802.11n(HT20)	3.57	2.73	3.57
	802.11n(HT40)	3.17	/	3.86
	802.11ac(HT20)	2.46	3.37	3.59
	802.11ac(HT40)	0.32	/	0.94
	802.11ac(HT80)	0.50	/	/

5. POWER SPECTRAL DENSITY

5.1 LIMIT

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	For FCC: Other than Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250
	For RSS eirp:10dBm/MHz	
	11dBm/MHz	5250-5350
	11dBm/MHz	For FCC:5470-5725 For IC:5470-5600 5650-5725
	30dBm/500kHz	5725-5850

5.2 TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

Connect the UUT to the spectrum analyser and use the following settings:

5725MHz-5850MHz

Note:

1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v01, section II.F.5., it is acceptable to set RBW at 1MHz and VBW at 3MHz if the spectrum analyzer does not have 500kHz RBW.

2. The value measured with RBW=1MHz is to be added with $10\log(500\text{kHz}/1\text{MHz})$ which is - 3dB. For example, if the measured value is +10dBm using RBW=1MHz (that is +10dBm/MHz), then the converted value will be +7dBm/500kHz.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

5.3 TEST SETUP



5.4 TEST RESULTS

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
U-NII-1	802.11a	8.352	8.970	9.449
	802.11n(HT20)	7.247	8.185	7.687
	802.11n(HT40)	5.212	/	5.673
	802.11ac(HT20)	6.814	7.083	7.317
	802.11ac(HT40)	2.960	/	2.590
	802.11ac(HT80)	-0.037	/	/
	Limit	≤11.00dBm/MHz		

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
U-NII-3	802.11a	5.476	5.550	6.217
	802.11n(HT20)	4.276	4.111	4.670
	802.11n(HT40)	2.555	/	2.129
	802.11ac(HT20)	3.929	3.574	4.600
	802.11ac(HT40)	-1.742	/	-0.663
	802.11ac(HT80)	-4.221	/	/
	Limit	≤30.00dBm/500kHz		

5.5 original test data

U-NII-1 802.11a Low CH



U-NII-1 802.11a Middle CH



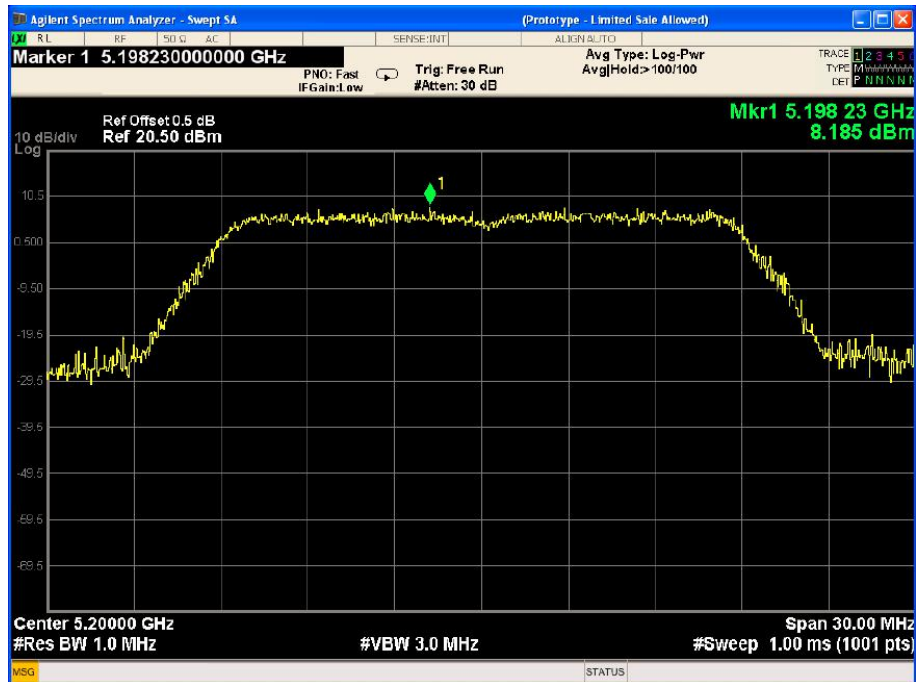
U-NII-1 802.11a High CH



U-NII-1 802.11n(HT20) Low CH



U-NII-1 802.11n(HT20) Middle CH



U-NII-1 802.11n(HT20) High CH



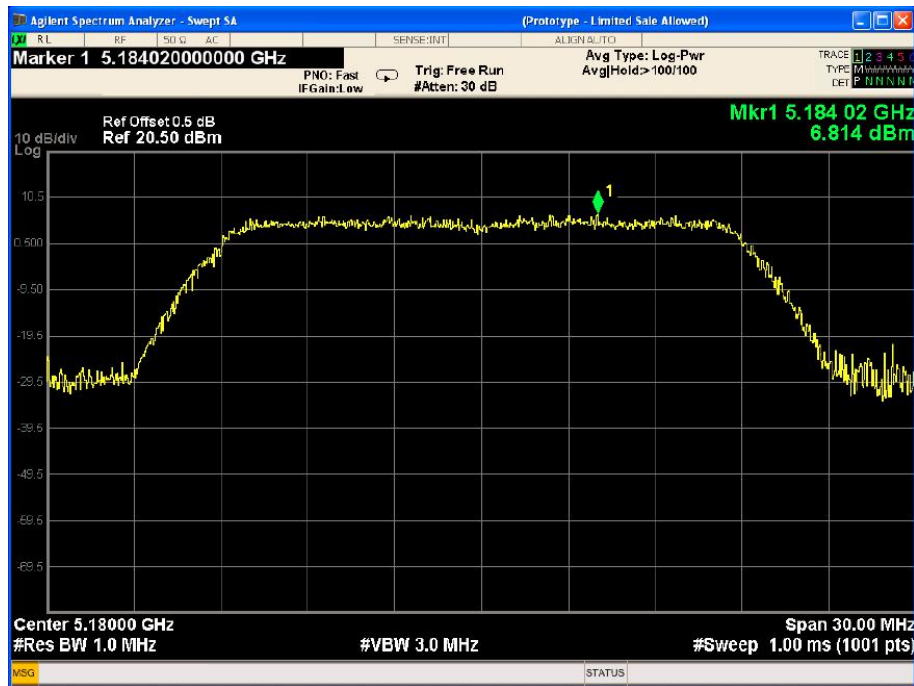
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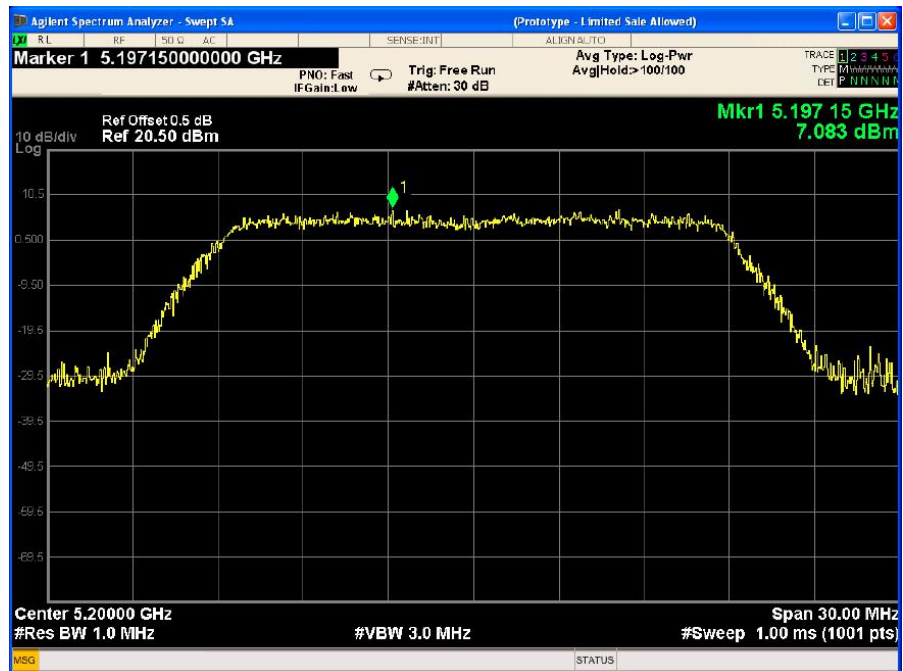
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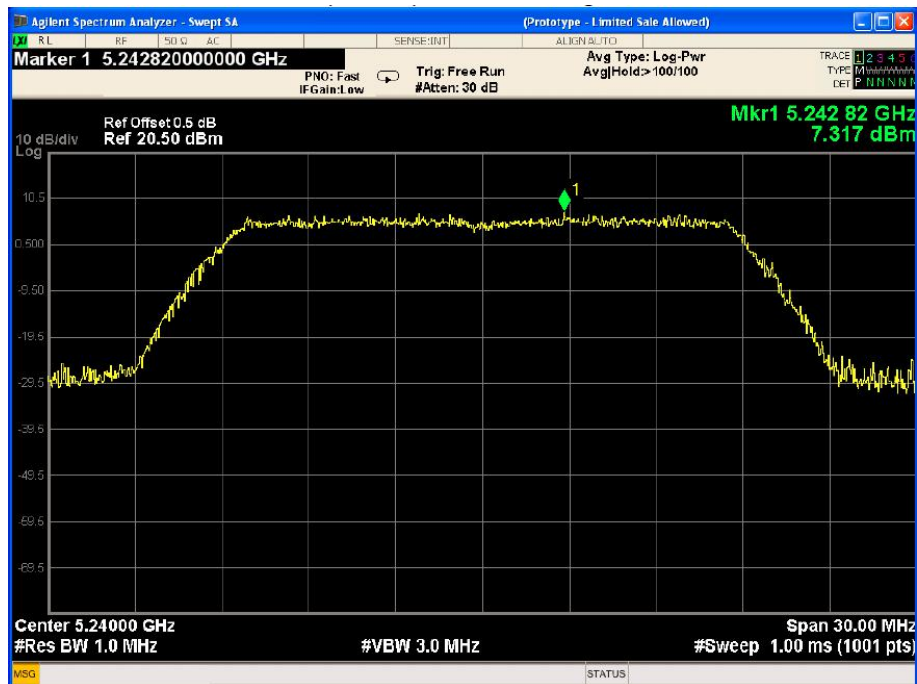
U-NII-1 802.11ac(HT20) Low CH



U-NII-1 802.11ac(HT20) Middle CH



U-NII-1 802.11ac(HT20) High CH



U-NII-1 802.11ac(HT40) Low CH



U-NII-1 802.11ac(HT40) High CH



U-NII-1 802.11ac(HT80) Low CH



U-NII-3 802.11a Low CH



U-NII-3 802.11a Middle CH



U-NII-3 802.11a High CH



U-NII-3 802.11n(HT20) Low CH

