

TEST REPORT

Reference No. : WTS17S1194413-3E V2
FCC ID..... : XUJHTT
Applicant..... : Launch Tech Co., Ltd.
Address : Launch Industrial Park, North of Wuhe Rd. Banxuegang, Longgang, Shenzhen, China
Manufacturer : The same as above
Address : The same as above
Product..... : Vehicle VIN Checking Terminal, Professional full vehicle model handheld diagnostic tool
Model(s)..... : HTT
Brand Name : LAUNCH
Standards..... : FCC CFR47 Part 15 C Section 15.407: 2017
Date of Receipt sample..... : 2017-11-03
Date of Test..... : 2017-11-04 to 2017-12-11
Date of Issue : 2018-03-16
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Test Facility:**A. Accreditations for Conformity Assessment (International)**

Country/Region	Accreditation Body	Scope	Note
USA	A2LA (Certificate No.: 4243.01)	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		International Services	WPC
Thailand	NTC		-
Singapore	IDA		-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. IC Canada Registration No.: 7760A			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS17S11944 13-3E	2017-11-03	2017-11-04 to 2017-12-11	2018-03-14	original	-	Replaced
WTS17S11944 13-3E V1	2017-11-03	2017-11-04 to 2017-12-11	2018-03-15	Version 1	Updated	Replaced
WTS17S11944 13-3E V2	2017-11-03	2017-11-04 to 2017-12-11	2018-03-16	Version 2	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product:	Vehicle VIN Checking Terminal, Professional full vehicle model handheld diagnostic tool
Model(s):	HTT
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40 5G-802.11a/n/ac HT20/n HT40
Bluetooth Version:	Bluetooth v4.1 with BLE
GPS:	Support
NFC:	Support
Hardware Version:	YZG40050H-MAINBOARD-V3.0.0
Software Version:	NRD90M test-keys
Highest frequency (Exclude Radio):	1.25GHz
Storage Location:	Internal Storage

5.2 Details of E.U.T.

Operation Frequency:	2.4G WiFi: 802.11b/g/n HT20: 2412~2462MHz 802.11n HT40: 2422~2452MHz 5G WiFi: 802.11a/n/ac (HT20): U-NII-1: 5150-5250MHz, U-NII-2A: 5250-5350MHz(DFS), U-NII-2C: 5470-5725MHz(DFS), U-NII-3: 5725-5850MHz 802.11n/ac (HT40): U-NII-1: 5190-5230MHz, U-NII-2A: 5270-5310MHz(DFS), U-NII-2C: 5510-5670MHz(DFS), U-NII-3: 5755-5795MHz Bluetooth: 2402~2480MHz NFC: 13.56MHz
Max. RF output power:	WiFi (2.4G): 18.67dBm WiFi (5G): 6.0dBm Bluetooth: 5.44dBm
Type of Modulation:	WiFi: CCK, OFDM Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK NFC: ASK, 2ASK
Antenna installation:	WiFi/Bluetooth: internal permanent antenna NFC: loop antenna
Antenna Gain:	WiFi (2.4G): 0.7dBi WiFi (5G): 0.7dBi Bluetooth: 0.7dBi

Ratings:	Battery DC 3.8V, 4680mAh DC 5V, 3.0A; 9V, 2.7A; 12V, 2.0A charging from adapter (Adapter Input: AC100-240V, 50/60Hz 0.7A)
Adapter:	Manufacturer: Dongguan Guangshu Electrical Technology Co., Ltd Model No.: GS-QC24W

5.3 Channel List

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

U-NII-2A (5.25-5.35GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
52	5260	54	5270
56	5280	60	5300
62	5310	64	5320

U-NII-2C (5.47-5.725GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
100	5500	102	5510
104	5520	108	5540
110	5550	112	5560
116	5580	118	5590
120	5600	124	5620
126	5630	128	5640
132	5660	134	5670
136	5680	140	5700

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

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and only the lowest frequency was shown in report and the selected channel see below:

For 802.11a/n/ac(HT20):

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

48	5240		
----	------	--	--

channel	Frequency(MHz)	channel	Frequency(MHz)
52	5260	56	5280
64	5320		

channel	Frequency(MHz)	channel	Frequency(MHz)
100	5500	120	5600
140	5700		

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

For 802.11n/ac(HT40):

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

channel	Frequency(MHz)	channel	Frequency(MHz)
54	5270	62	5310

channel	Frequency(MHz)	channel	Frequency(MHz)
102	5510	110	5550
134	5670		

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

6 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.407 15.205(a) 15.209(a)	PASS
Duty Cycle	KDB 789033	PASS
6dB Bandwidth	15.407	PASS
26 dB Emission Bandwidth & 99% Occupied Bandwidth	15.407	PASS
Maximum Conducted Output Power	15.407	PASS
Power Spectral Density	15.407	PASS
Restricted bands around fundamental frequency	15.407	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2017-04-29	2018-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2017-04-09	2018-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2017-04-09	2018-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2017-04-09	2018-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-04-09	2018-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2017-04-13	2018-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2017-04-13	2018-04-12
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2017-04-13	2018-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-04-09	2018-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2017-04-13	2018-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2017-04-13	2018-04-12

RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2017-09-12	2018-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-12	2018-09-11
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-12	2018-09-11

7.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

7.3 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10 ⁻⁷ Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval : 95%. Confidence factor:k=2	

7.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207

Test Method: ANSI C63.10:2013

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

8.1 E.U.T. Operation

Operating Environment :

Temperature: 21.5 °C

Humidity: 51.9 % RH

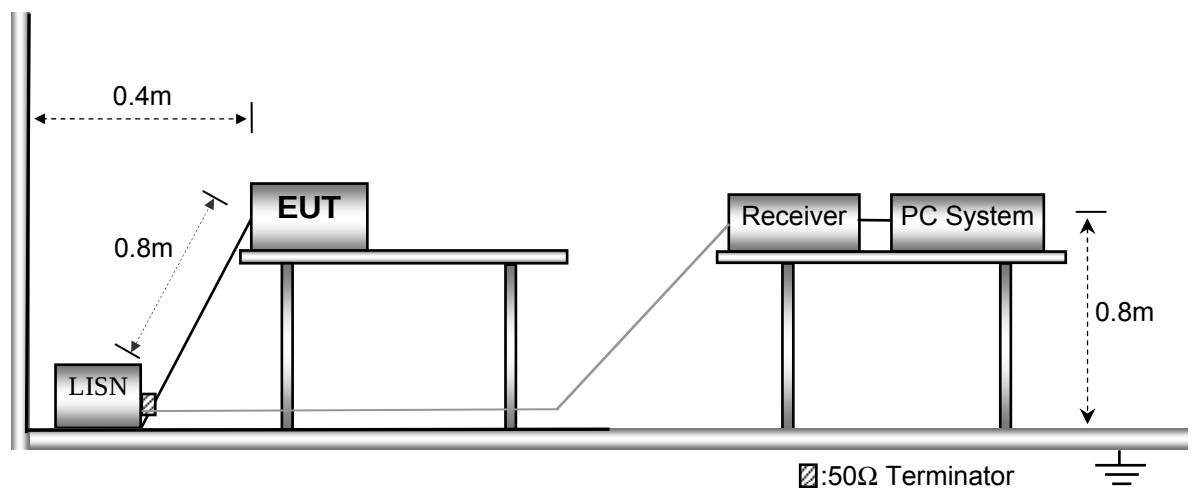
Atmospheric Pressure: 101.2kPa

EUT Operation :

The test was performed in TX transmitting mode, the test data were shown in the report.

8.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4.



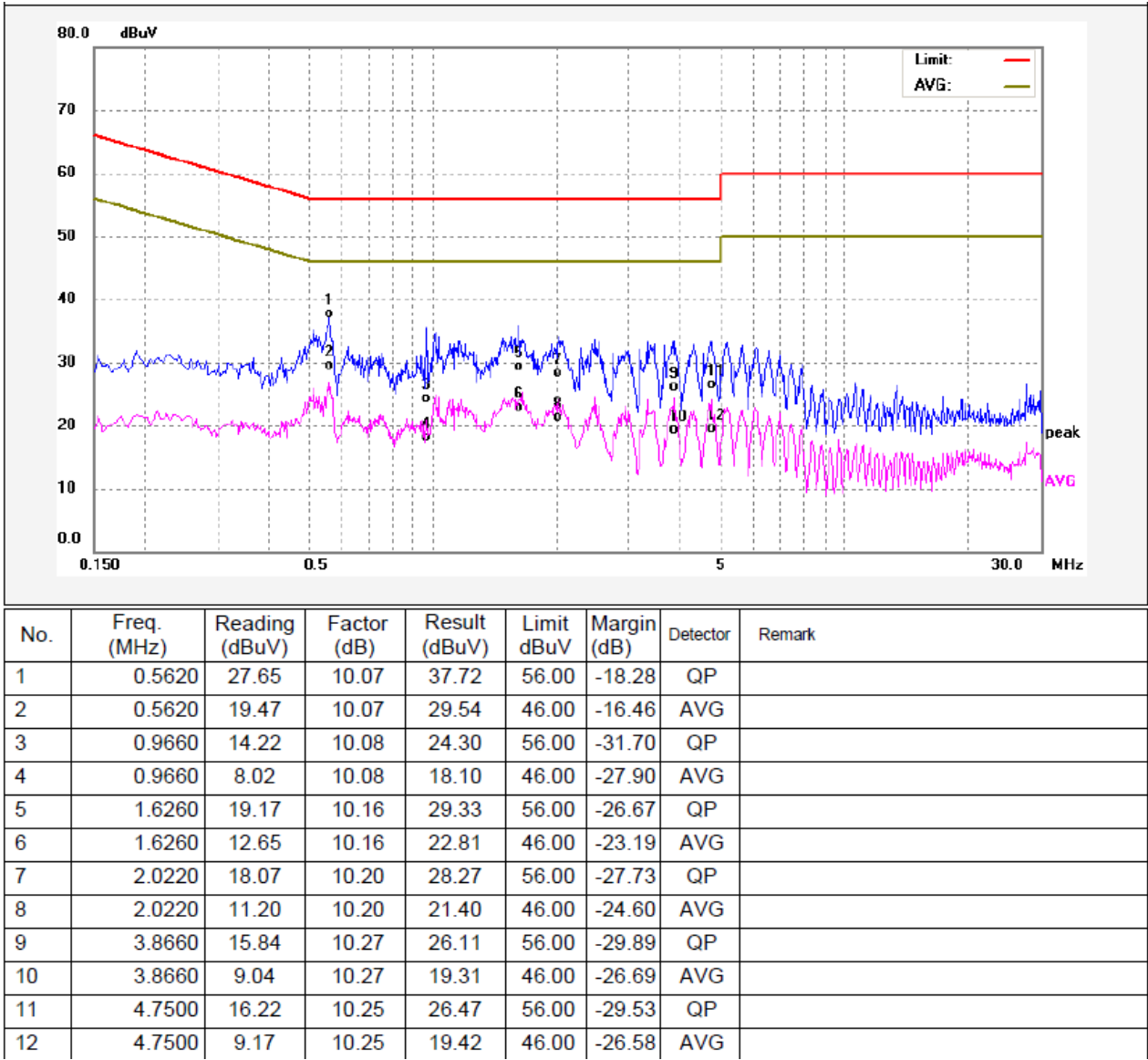
8.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

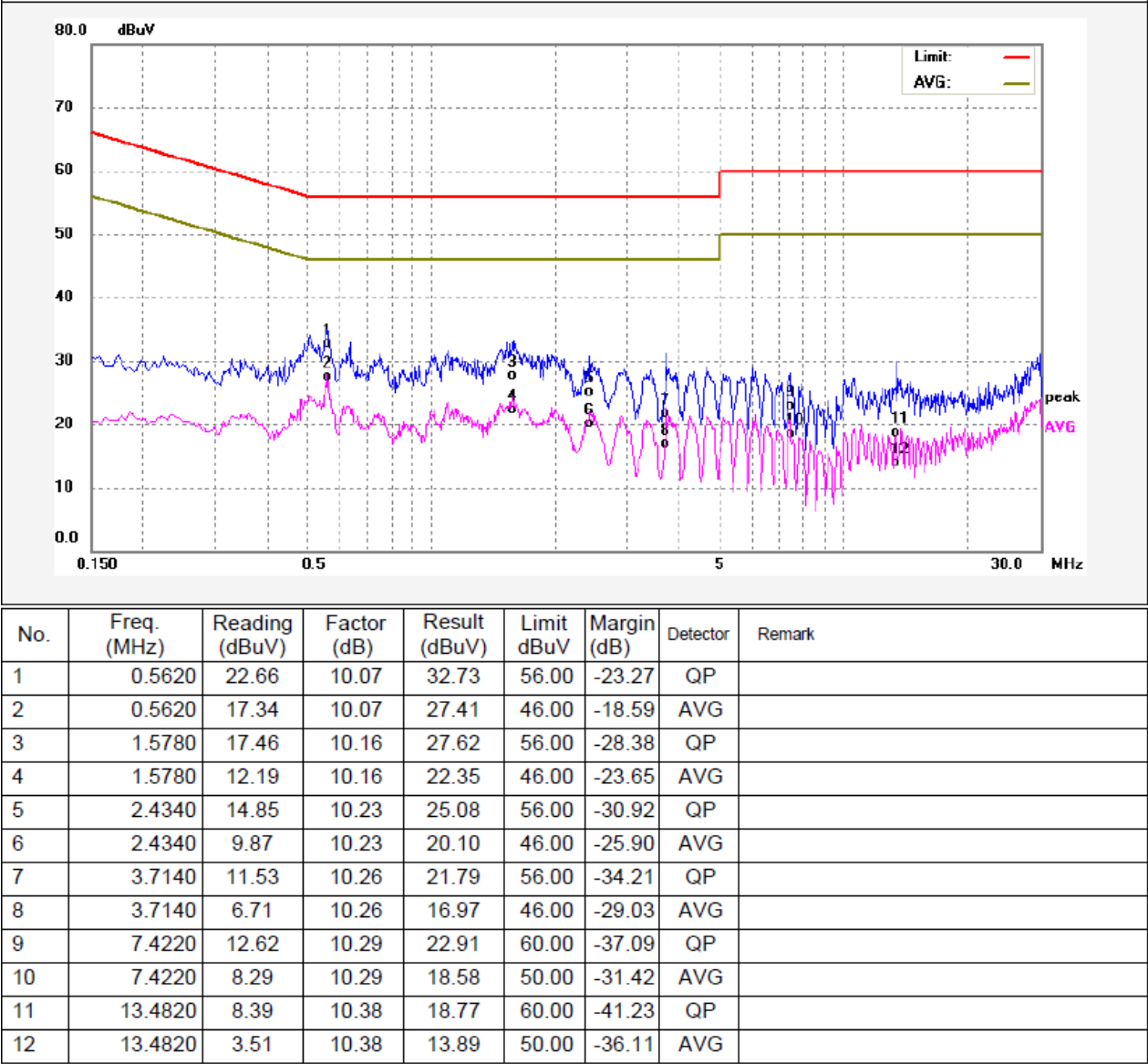
8.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines. only the worst data (802.11n20 mode low channel) were reported.

Live line:



Neutral line:



9 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.407

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

9.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

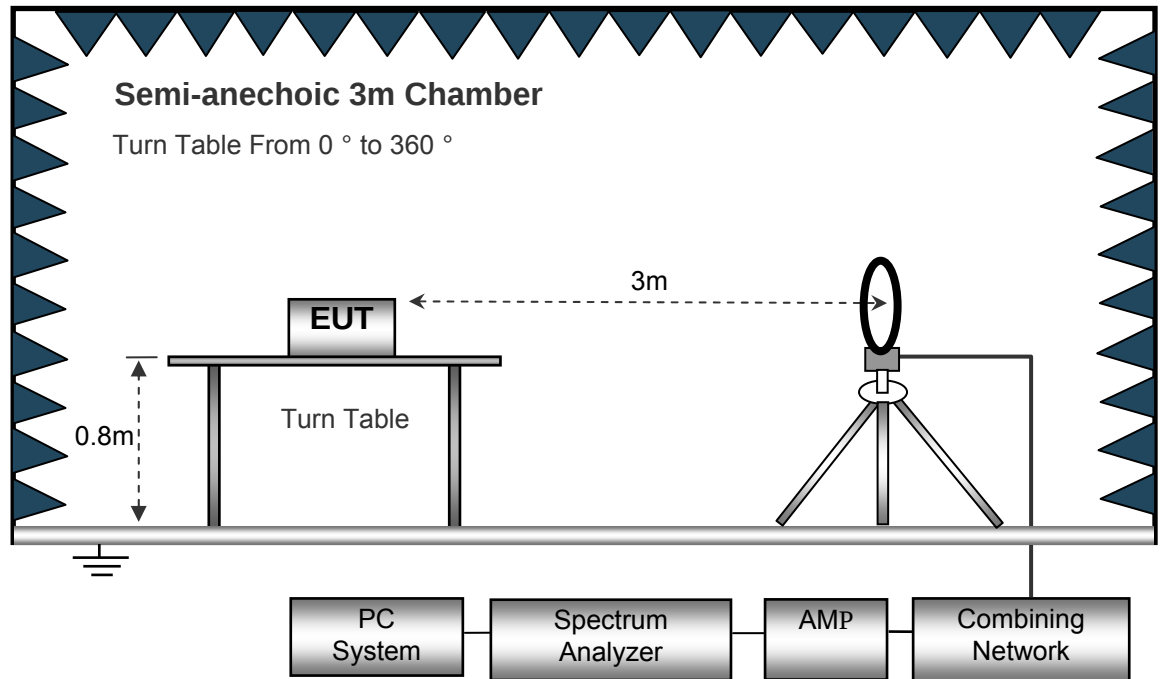
EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

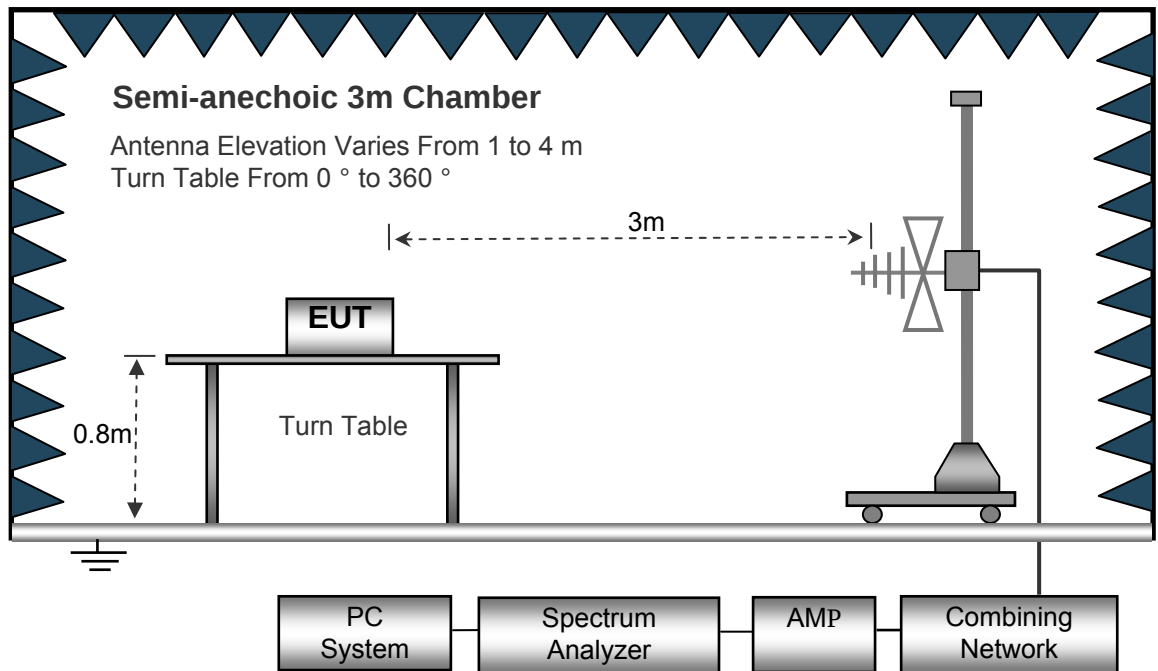
9.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

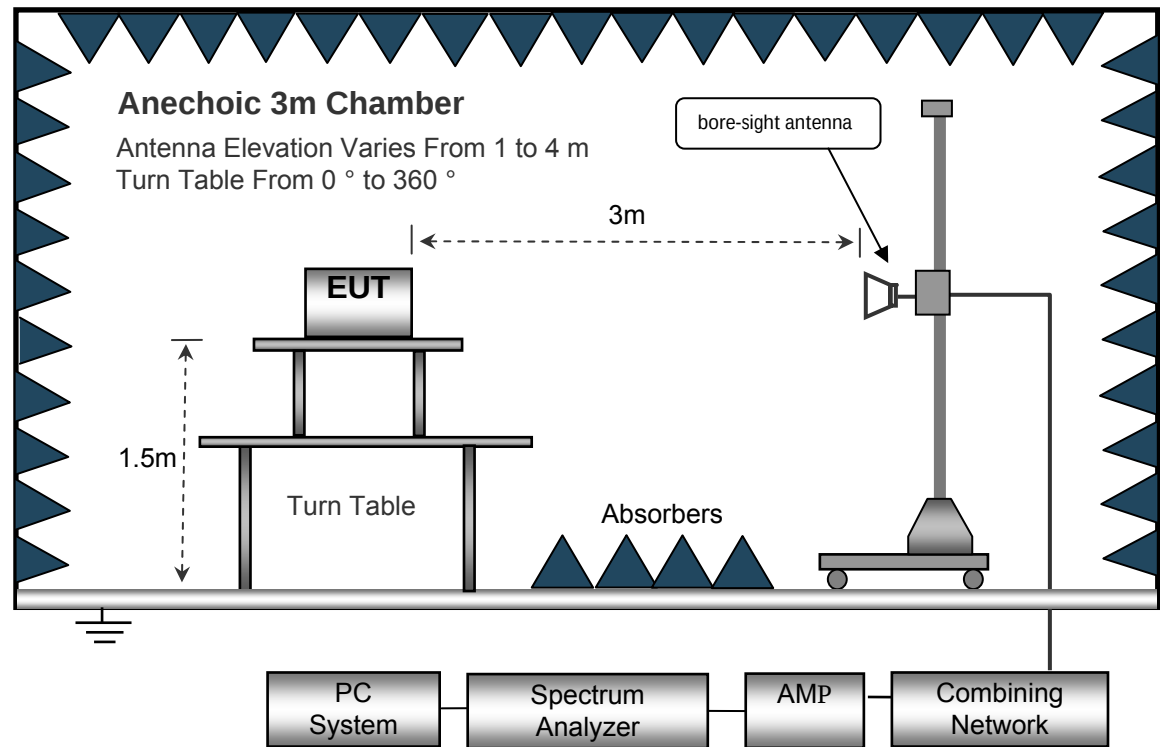
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



9.3 Spectrum Analyzer Setup

Below 30MHz	
Sweep Speed	Auto
IF Bandwidth.....	10kHz
Video Bandwidth.....	10kHz
Resolution Bandwidth.....	10kHz
30MHz ~ 1GHz	
Sweep Speed	Auto
Detector	PK
Resolution Bandwidth.....	100kHz
Video Bandwidth.....	300kHz
Above 1GHz	
Sweep Speed	Auto
Detector	PK
Resolution Bandwidth.....	1MHz
Video Bandwidth.....	3MHz
Detector	Ave.
Resolution Bandwidth.....	1MHz
Video Bandwidth.....	10Hz

9.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

9.5 Summary of Test Results

Test Frequency: 9KHz~30MHz

Remark :All band measurement for low/middle/high/channel, only the worst case (low channel for each band) were shown follow:

Frequency	Measurement results dBμV @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dBμV/m @30m	Limits dBμV/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
U-NII-1:802.11a 5180MHz							
6.021	26.82	QP	21.84	40.00	8.66	29.54	-20.88
8.304	25.64	QP	21.02	40.00	6.66	29.54	-22.88
26.127	26.52	QP	20.55	40.00	7.07	29.54	-22.47
U-NII-1:802.11n20 5180MHz							
6.021	26.96	QP	21.84	40.00	8.80	29.54	-20.74
8.304	25.52	QP	21.02	40.00	6.54	29.54	-23.00
26.127	25.11	QP	20.55	40.00	5.66	29.54	-23.88
U-NII-1:802.11ac 5180MHz							
6.021	26.59	QP	21.84	40.00	8.43	29.54	-21.11
8.304	25.32	QP	21.02	40.00	6.34	29.54	-23.20
26.127	25.12	QP	20.55	40.00	5.67	29.54	-23.87
U-NII-1:802.11n40 5190MHz							
6.021	27.93	QP	21.84	40.00	9.77	29.54	-19.77
8.304	25.11	QP	21.02	40.00	6.13	29.54	-23.41
26.127	24.57	QP	20.55	40.00	5.12	29.54	-24.42
U-NII-1:802.11ac40 5190MHz							
6.021	27.42	QP	21.84	40.00	9.26	29.54	-20.28
8.304	25.28	QP	21.02	40.00	6.30	29.54	-23.24
26.127	26.05	QP	20.55	40.00	6.60	29.54	-22.94

Frequency	Measurement results dB μ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB μ V/m @30m	Limits dB μ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
U-NII-2A:802.11a 5260MHz							
6.021	27.01	QP	21.84	40.00	8.85	29.54	-20.69
8.304	25.80	QP	21.02	40.00	6.82	29.54	-22.72
26.127	23.88	QP	20.55	40.00	4.43	29.54	-25.11
U-NII-2A:802.11n20 5260MHz							
6.021	25.58	QP	21.84	40.00	7.42	29.54	-22.12
8.304	27.05	QP	21.02	40.00	8.07	29.54	-21.47
26.127	26.27	QP	20.55	40.00	6.82	29.54	-22.72
U-NII-2A:802.11ac 5260MHz							
6.021	27.25	QP	21.84	40.00	9.09	29.54	-20.45
8.304	26.69	QP	21.02	40.00	7.71	29.54	-21.83
26.127	26.47	QP	20.55	40.00	7.02	29.54	-22.52
U-NII-2A:802.11n40 5270MHz							
6.021	27.48	QP	21.84	40.00	9.32	29.54	-20.22
8.304	27.98	QP	21.02	40.00	9.00	29.54	-20.54
26.127	27.00	QP	20.55	40.00	7.55	29.54	-21.99
U-NII-2A:802.11ac40 5270MHz							
6.021	28.39	QP	21.84	40.00	10.23	29.54	-19.31
8.304	29.23	QP	21.02	40.00	10.25	29.54	-19.29
26.127	26.35	QP	20.55	40.00	6.90	29.54	-22.64

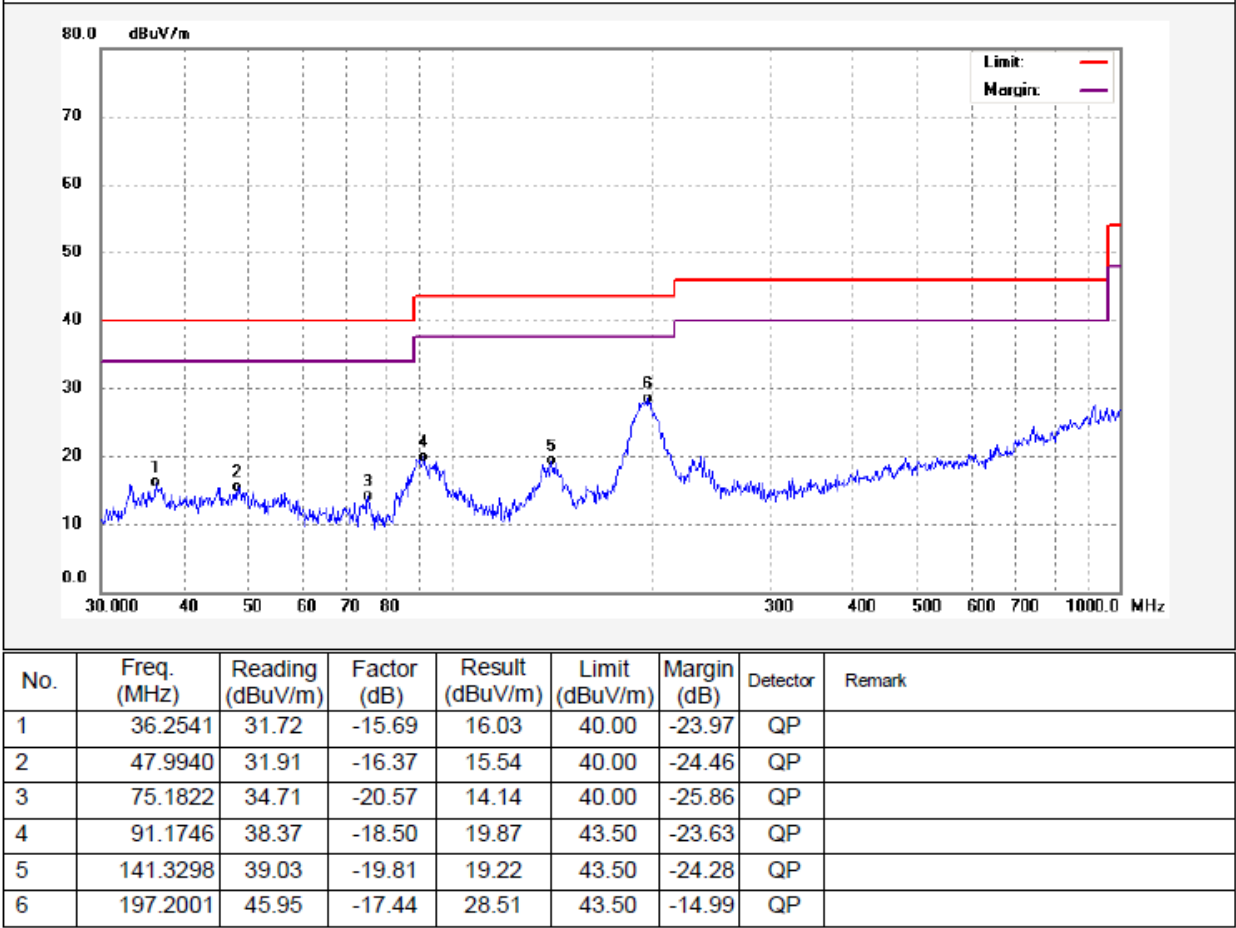
Frequency	Measurement results dB μ V @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dB μ V/m @30m	Limits dB μ V/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
U-NII-2C:802.11a 5500MHz							
6.021	25.72	QP	21.84	40.00	7.56	29.54	-21.98
8.304	27.55	QP	21.02	40.00	8.57	29.54	-20.97
26.127	27.34	QP	20.55	40.00	7.89	29.54	-21.65
U-NII-2C:802.11n20 5500MHz							
6.021	26.58	QP	21.84	40.00	8.42	29.54	-21.12
8.304	26.57	QP	21.02	40.00	7.59	29.54	-21.95
26.127	26.19	QP	20.55	40.00	6.74	29.54	-22.80
U-NII-2C:802.11ac20 5500MHz							
6.021	27.45	QP	21.84	40.00	9.29	29.54	-20.25
8.304	25.40	QP	21.02	40.00	6.42	29.54	-23.12
26.127	25.92	QP	20.55	40.00	6.47	29.54	-23.07
U-NII-2C:802.11n40 5510MHz							
6.021	28.59	QP	21.84	40.00	10.43	29.54	-19.11
8.304	26.52	QP	21.02	40.00	7.54	29.54	-22.00
26.127	27.33	QP	20.55	40.00	7.88	29.54	-21.66
U-NII-2C:802.11ac40 5510MHz							
6.021	30.04	QP	21.84	40.00	11.88	29.54	-17.66
8.304	25.22	QP	21.02	40.00	6.24	29.54	-23.30
26.127	26.89	QP	20.55	40.00	7.44	29.54	-22.10

Frequency	Measurement results dBμV @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dBμV/m @30m	Limits dBμV/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
802.11a 5745MHz							
6.021	24.96	QP	21.84	40.00	6.80	29.54	-22.74
8.304	27.78	QP	21.02	40.00	8.80	29.54	-20.74
26.127	27.01	QP	20.55	40.00	7.56	29.54	-21.98
802.11n20 5745MHz							
6.021	23.49	QP	21.84	40.00	5.33	29.54	-24.21
8.304	26.96	QP	21.02	40.00	7.98	29.54	-21.56
26.127	26.95	QP	20.55	40.00	7.50	29.54	-22.04
802.11ac 5745MHz							
6.021	26.54	QP	21.84	40.00	8.38	29.54	-21.16
8.304	25.48	QP	21.02	40.00	6.50	29.54	-23.04
26.127	26.59	QP	20.55	40.00	7.14	29.54	-22.40
802.11n40 5755MHz							
6.021	27.50	QP	21.84	40.00	9.34	29.54	-20.20
8.304	25.36	QP	21.02	40.00	6.38	29.54	-23.16
26.127	26.96	QP	20.55	40.00	7.51	29.54	-22.03
802.11ac40 5755MHz							
6.021	27.33	QP	21.84	40.00	9.17	29.54	-20.37
8.304	23.97	QP	21.02	40.00	4.99	29.54	-24.55
26.127	27.27	QP	20.55	40.00	7.82	29.54	-21.72

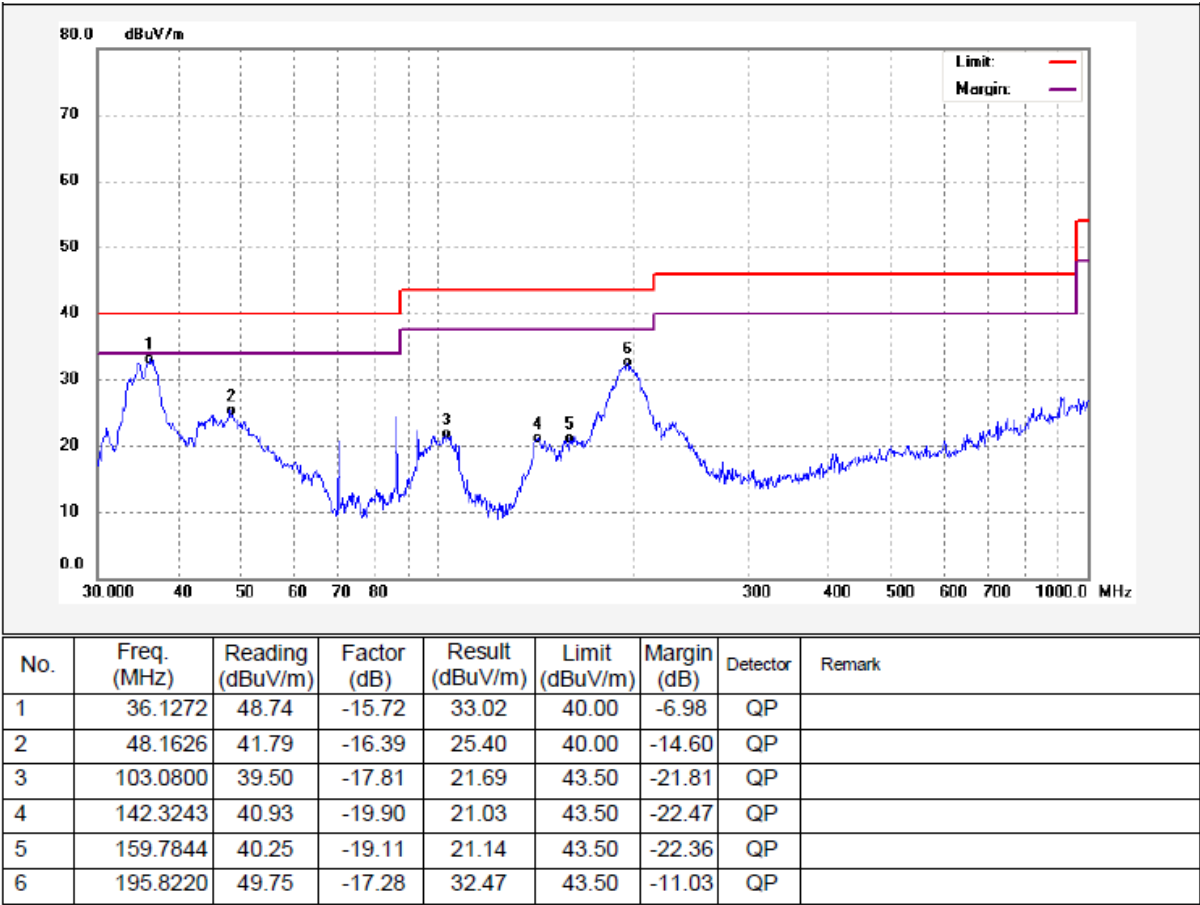
Test Frequency: 30MHz ~ 1GHz

Remark: only the worst data (802.11a HT20 Low Channel mode) were reported.

Horizontal



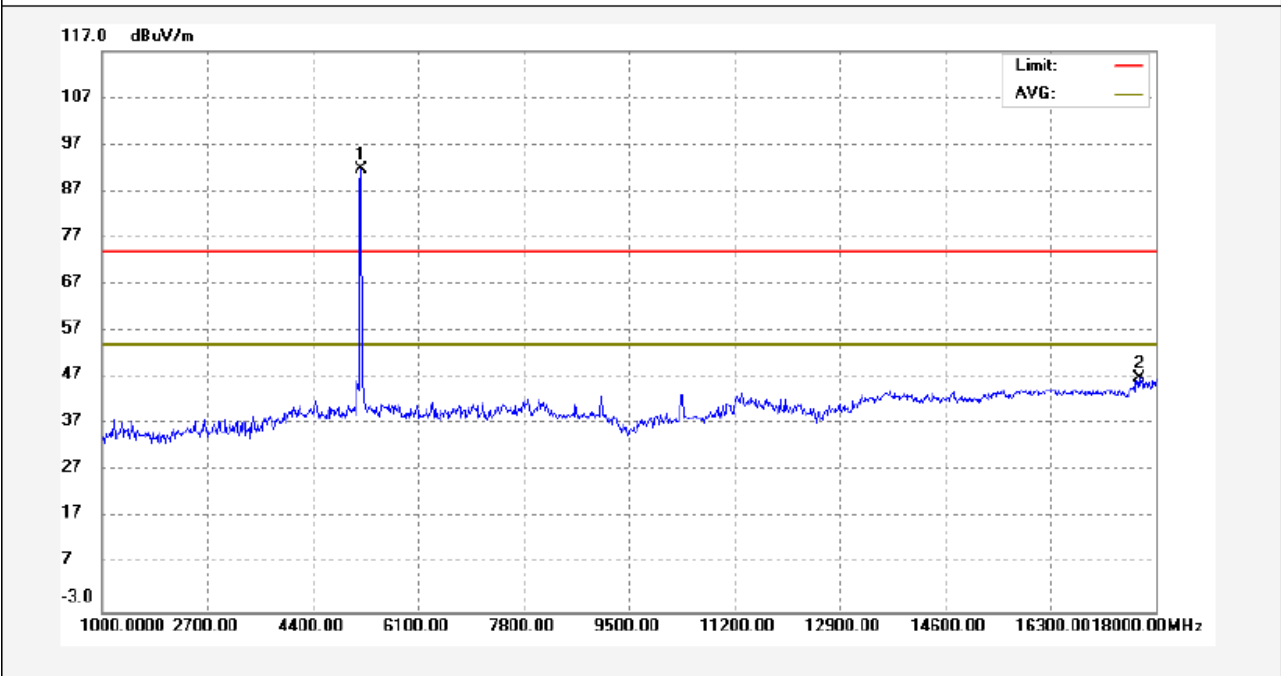
Vertical



Test Frequency: Above 1GHz

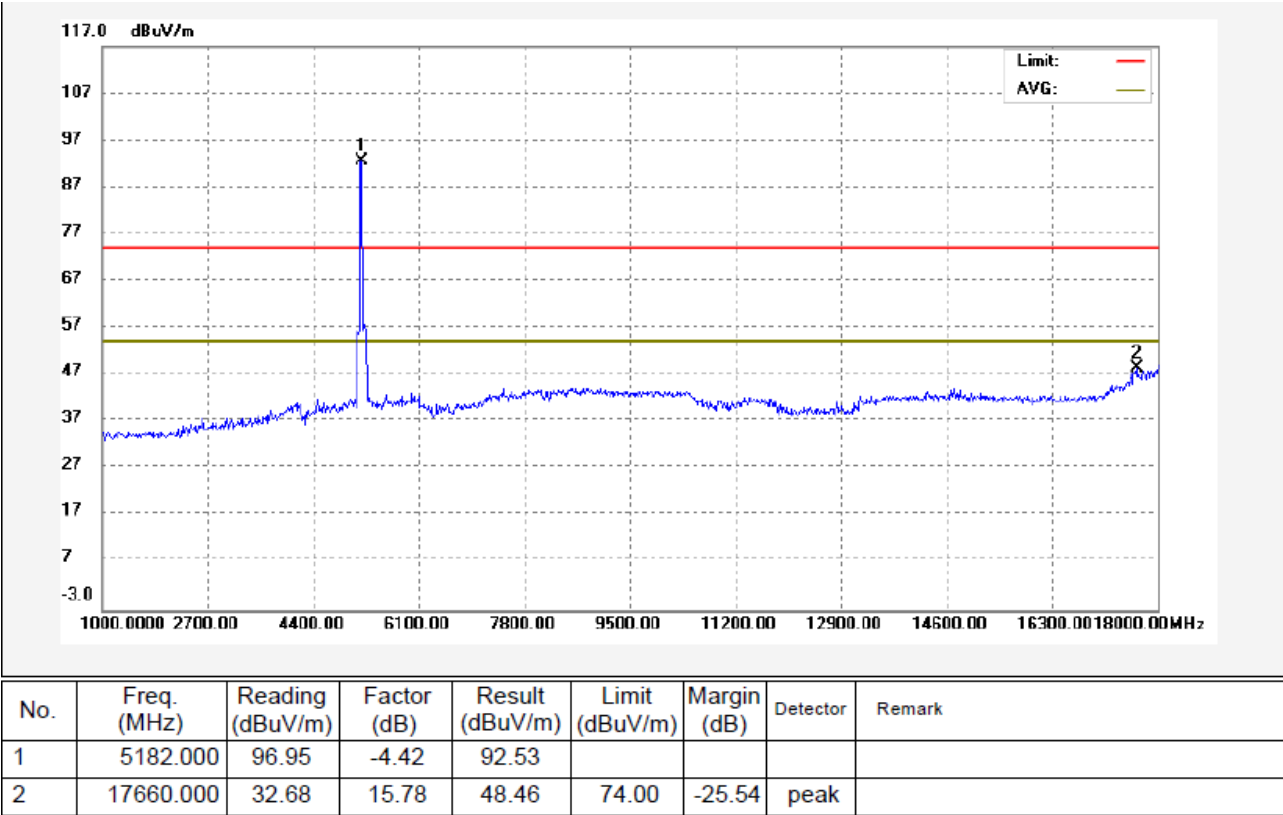
Remark: only the worst data (802.11a HT20 Low Channel mode) were reported

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5182.000	95.99	-4.42	91.57	74.00	-27.06	peak	
2	17728.000	30.81	16.13	46.94	74.00	-27.06	peak	

Vertical



Test Frequency: 18GHz~40GHz

The measurements were more than 20 dB below the limit and not reported.

10 Duty cycle

Test Requirement: 47 CFR Part 15C 15.407
 Test Method: ANSI C63.10: 2013
 Test Limit: N/A
 Test Result: PASS
 Remark: N/A

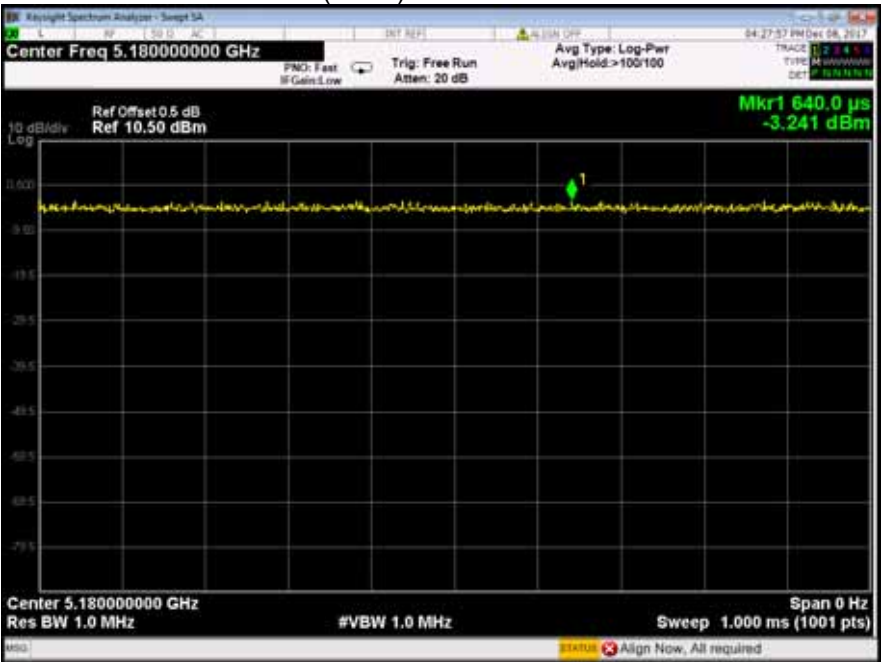
10.1 Summary of Test Results

802.11a(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
52	100	100	100
100	100	100	100
149	100	100	100
802.11n(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
52	100	100	100
100	100	100	100
149	100	100	100
802.11ac(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
52	100	100	100
100	100	100	100
149	100	100	100
802.11n(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
54	100	100	100
102	100	100	100
151	100	100	100

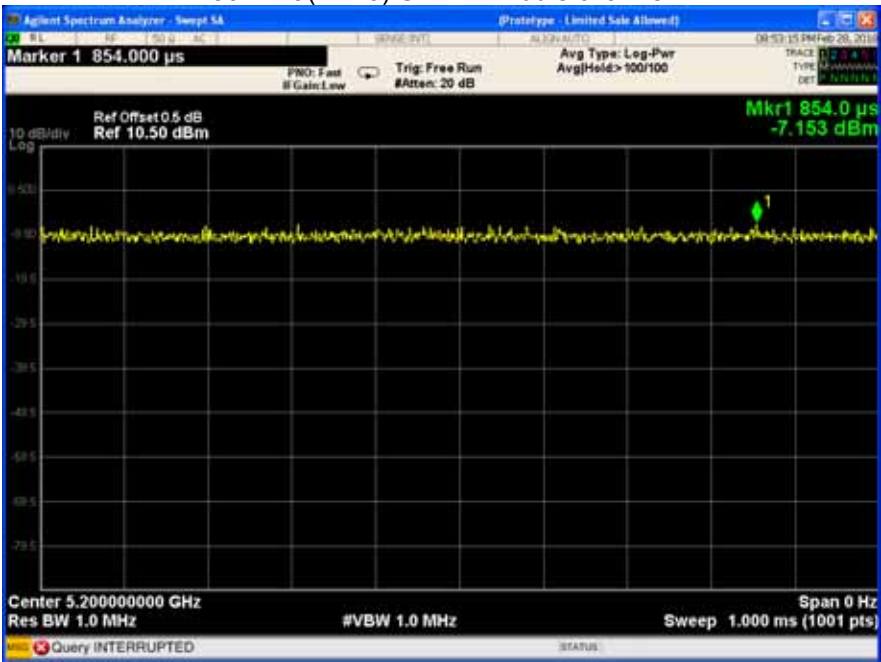
802.11ac(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
54	100	100	100
102	100	100	100
151	100	100	100

Test result plots shown as follows:

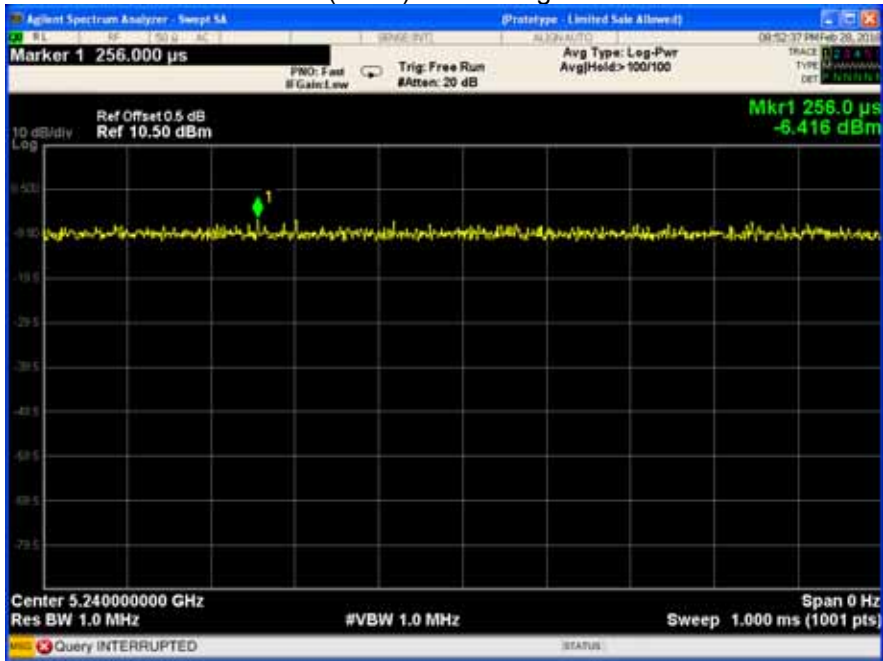
802.11a(HT20) U-NII-1 Low channel



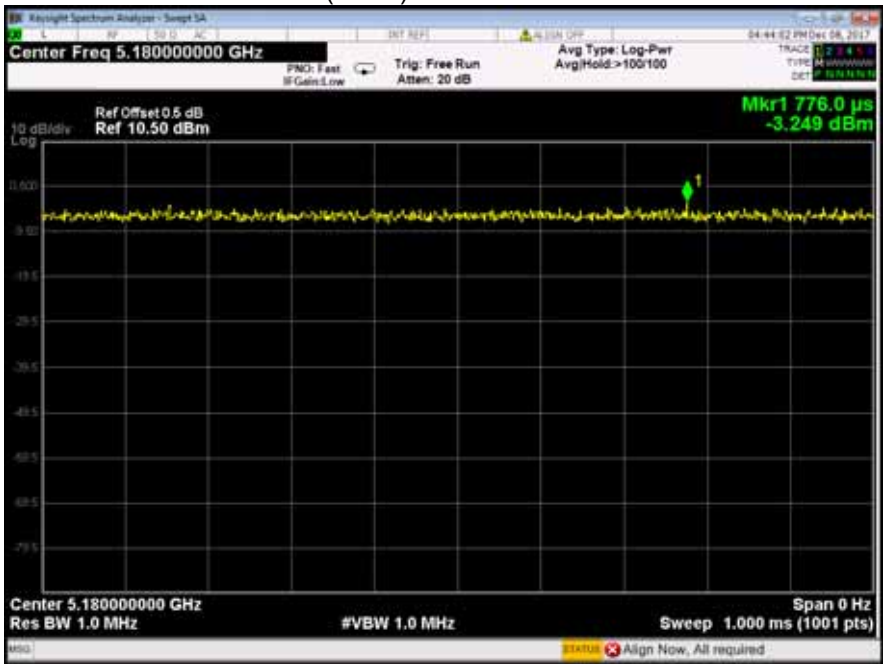
802.11a(HT20) U-NII-1 Middle channel



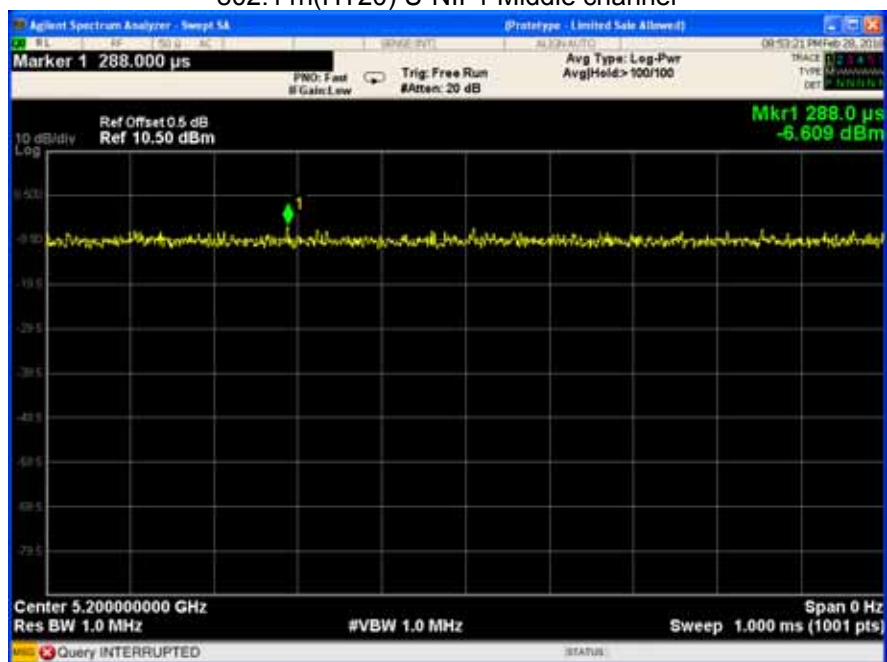
802.11a(HT20) U-NII-1 High channel



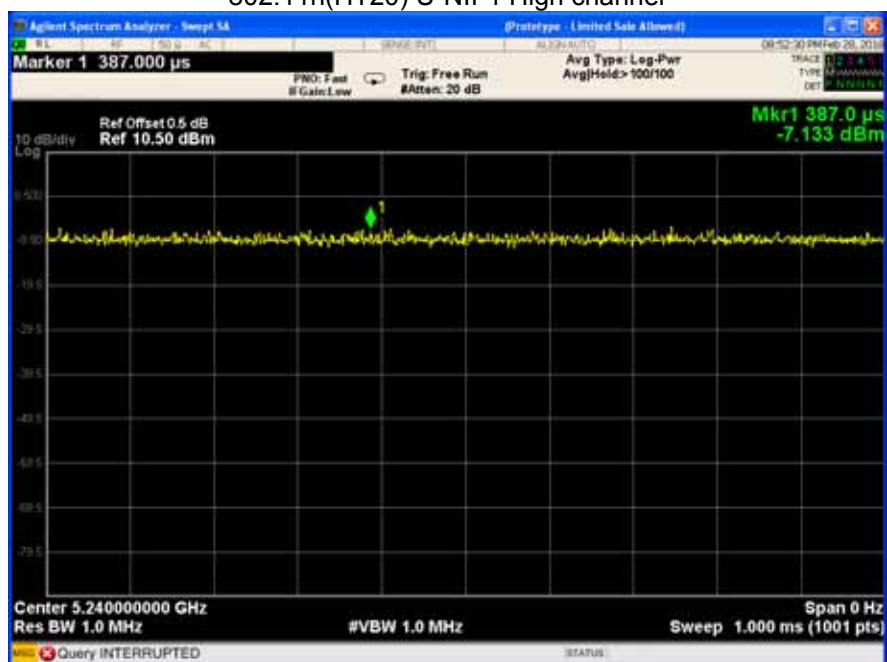
802.11n(HT20) U-NII-1 Low channel



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



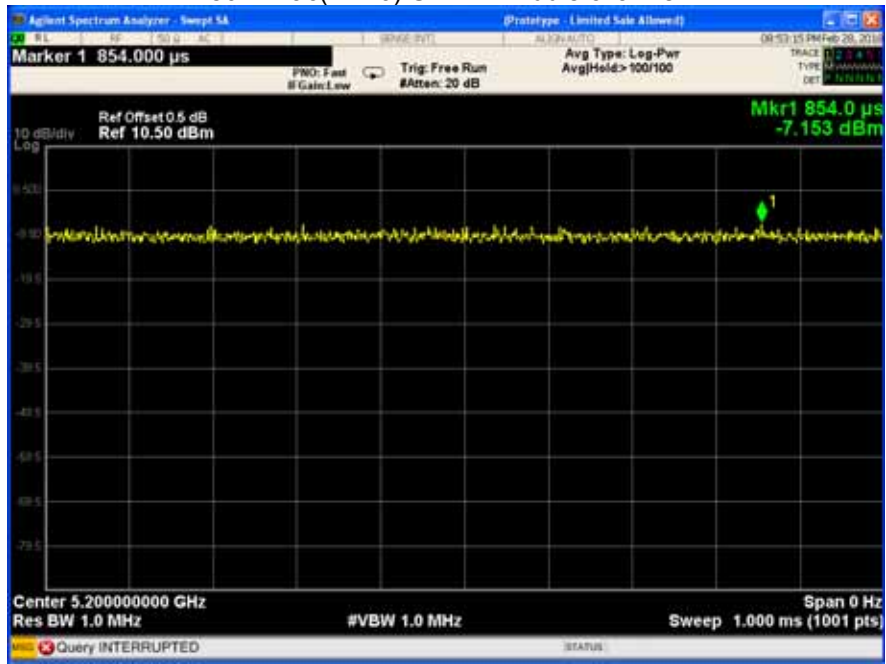
802.11n(HT20) U-NII-1 High channel



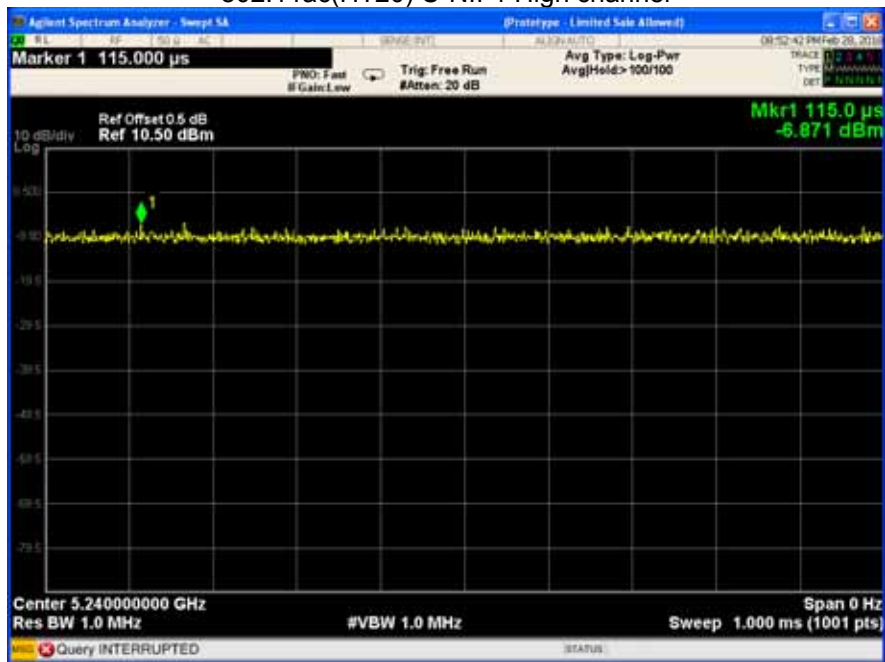
802.11ac(HT20) U-NII-1 Low channel



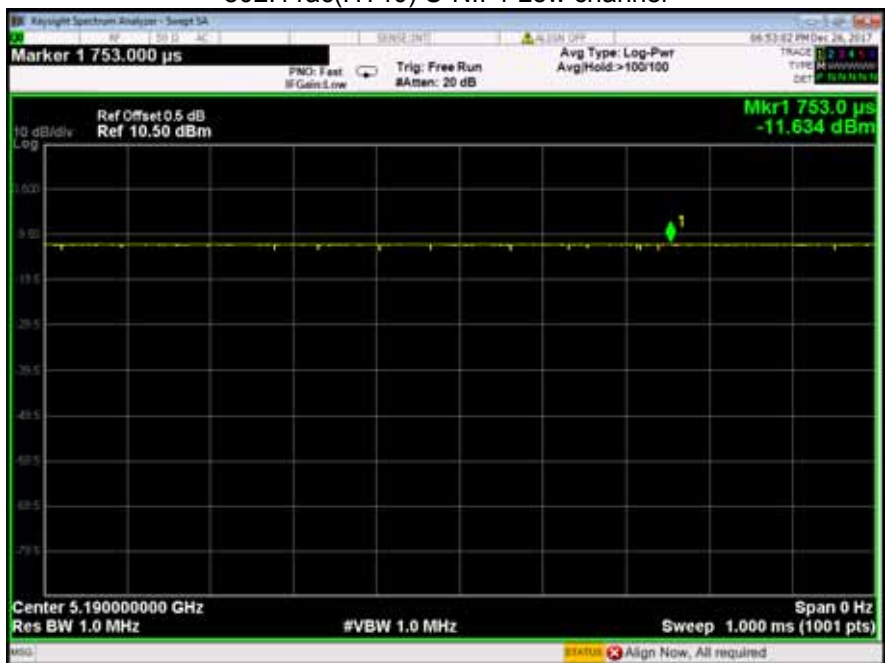
802.11ac(HT20) U-NII-1 Middle channel



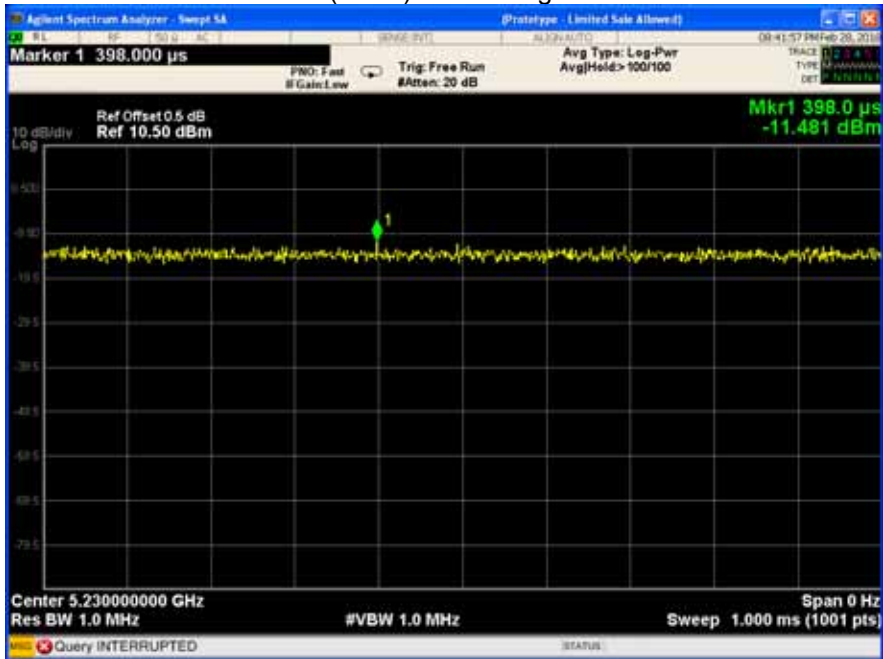
802.11ac(HT20) U-NII-1 High channel



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



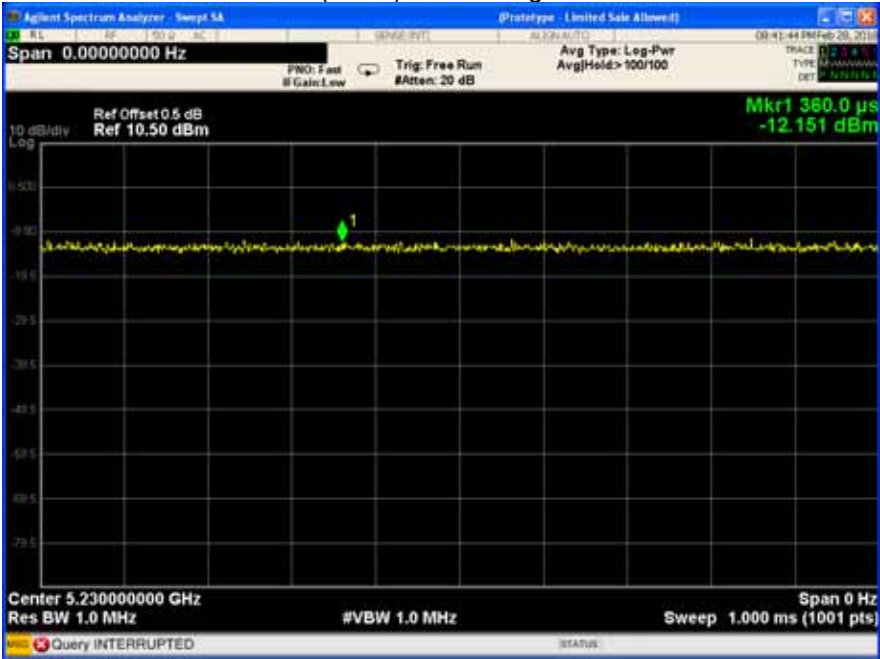
802.11ac(HT40) U-NII-1 High channel



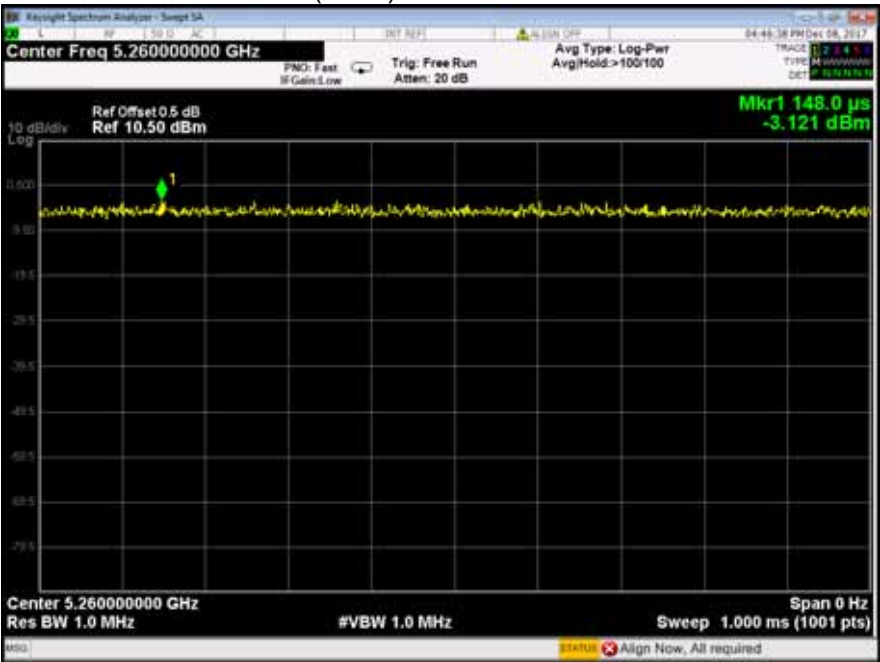
802.11n(HT40) U-NII-1 Low channel



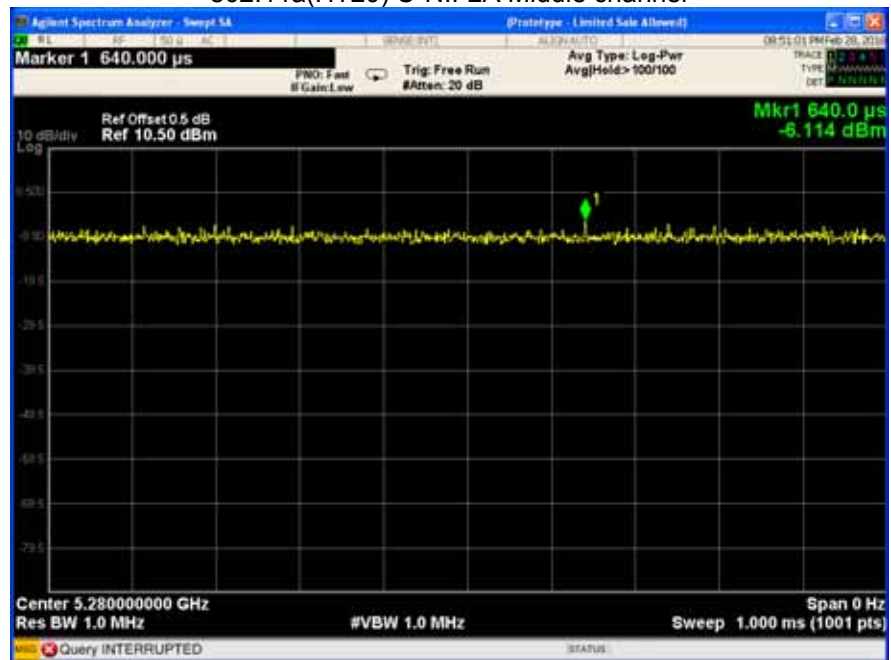
802.11n(HT40) U-NII-1 High channel



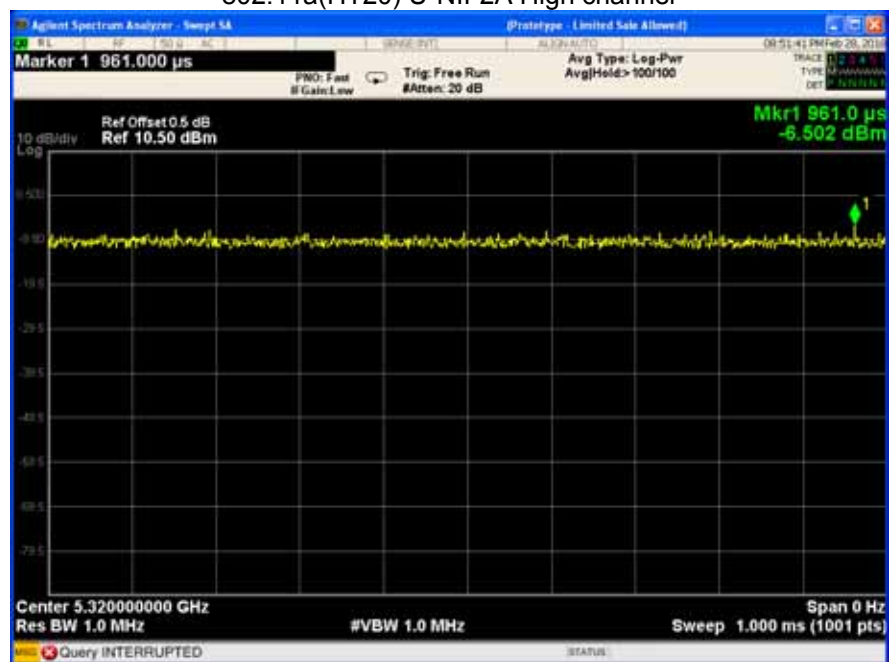
802.11a(HT20) U-NII-2A Low channel



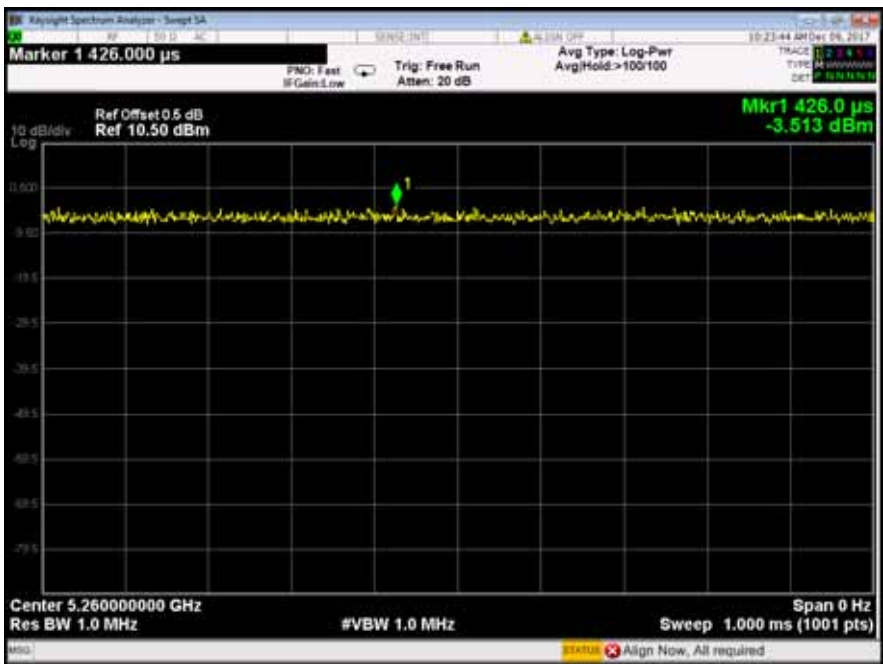
802.11a(HT20) U-NII-2A Middle channel



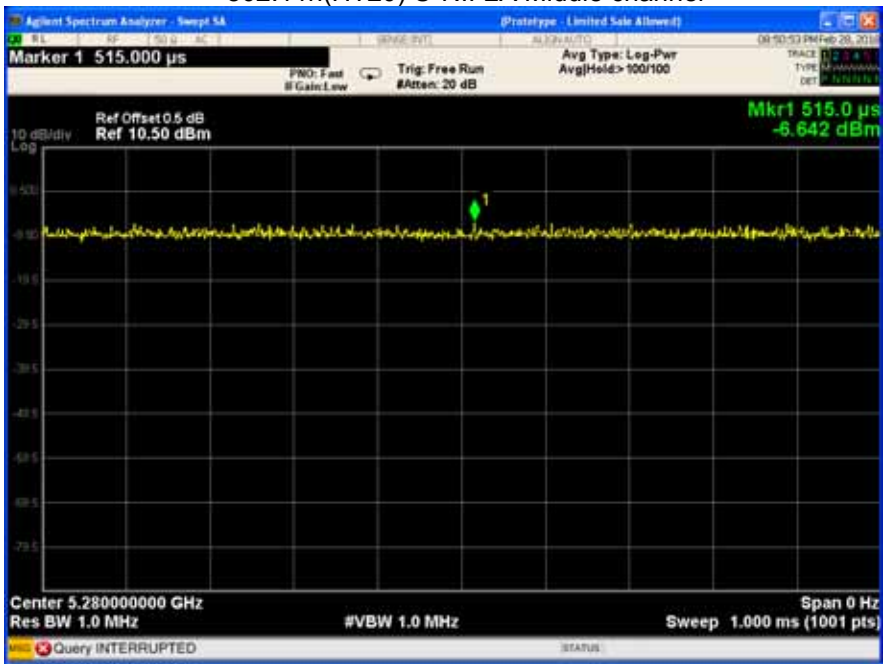
802.11a(HT20) U-NII-2A High channel



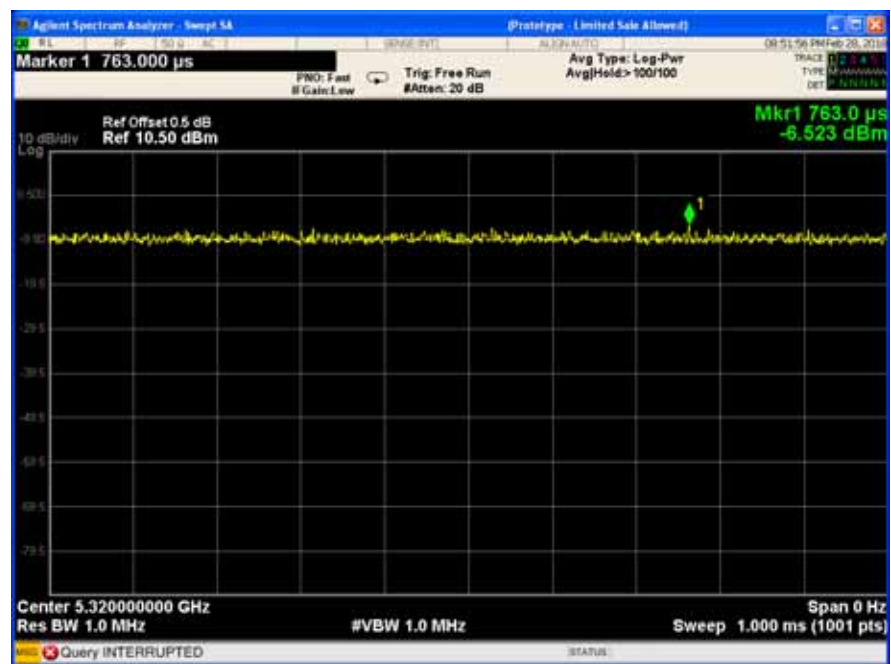
802.11n(HT20) U-NII-2A Low channel



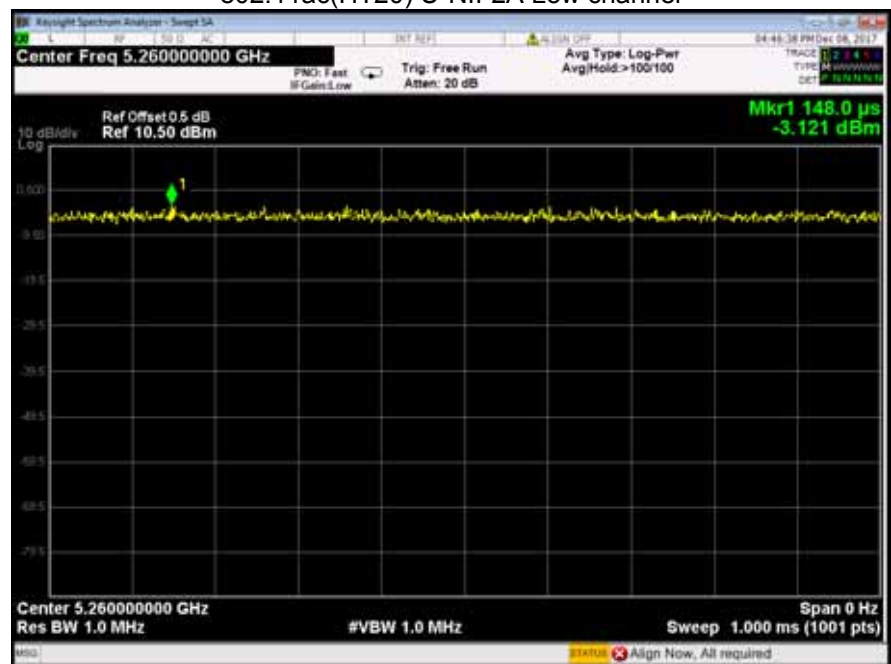
802.11n(HT20) U-NII-2A Middle channel



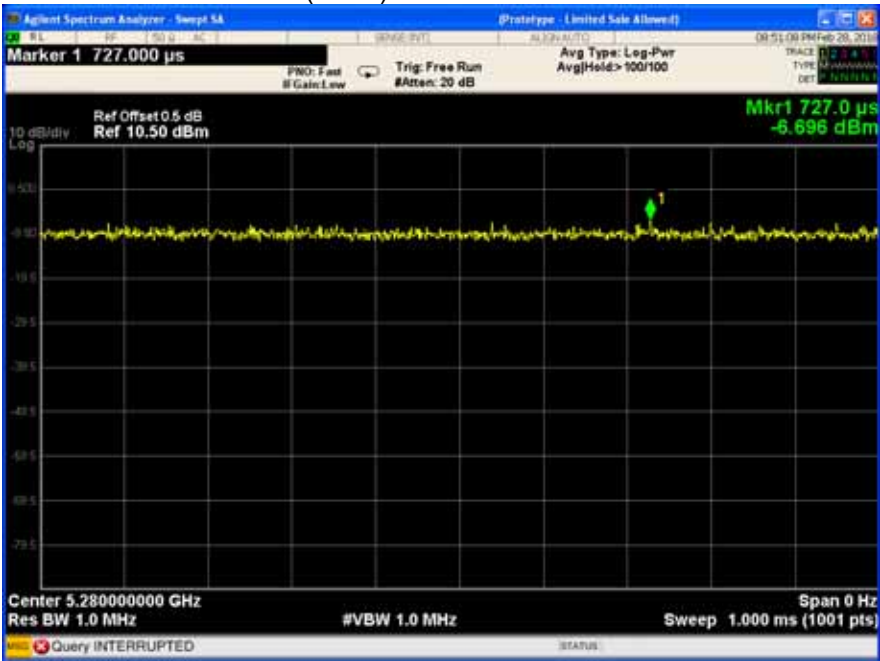
802.11n(HT20) U-NII-2A High channel



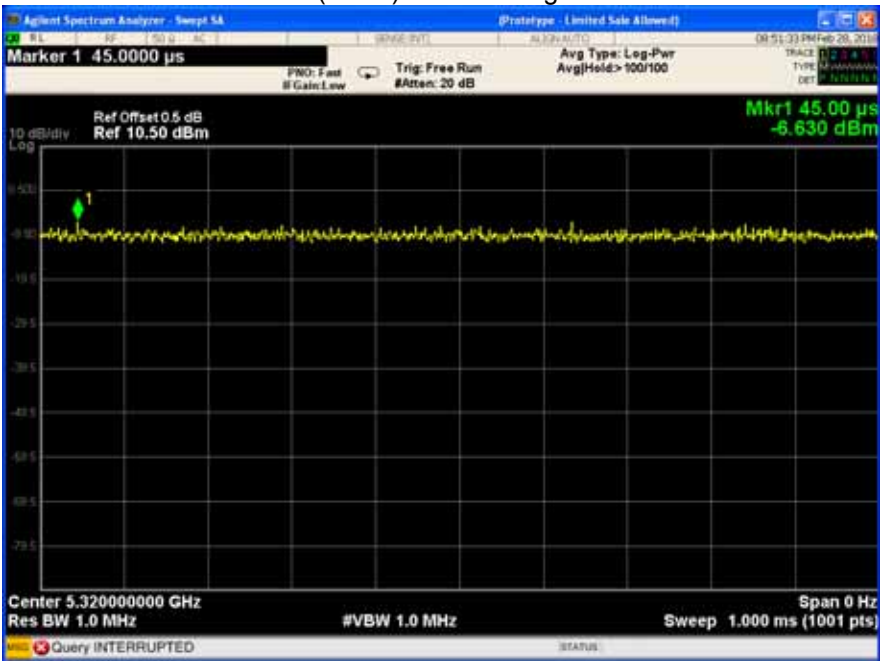
802.11ac(HT20) U-NII-2A Low channel



802.11ac(HT20) U-NII-2A Middle channel



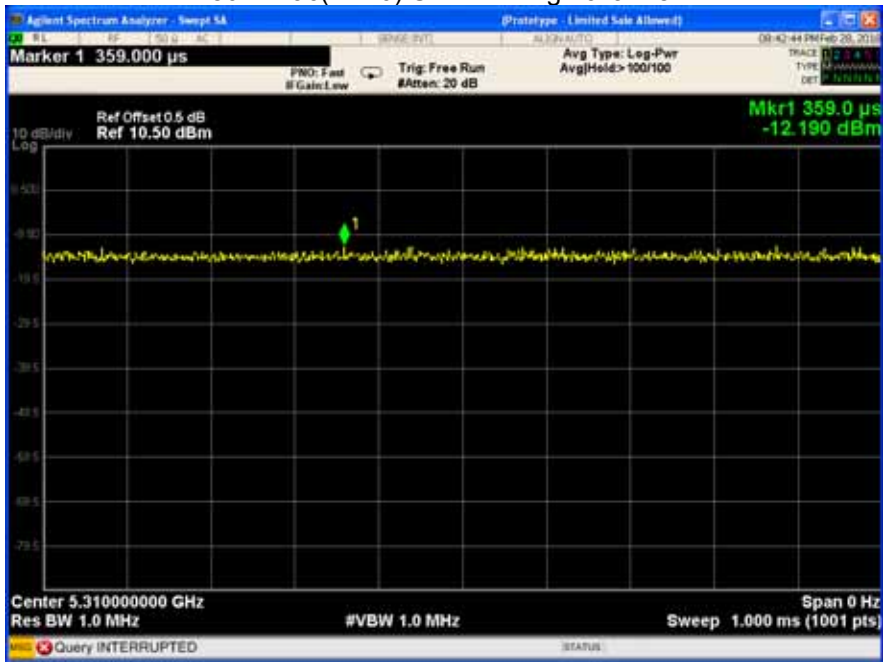
802.11ac(HT20) U-NII-2A High channel



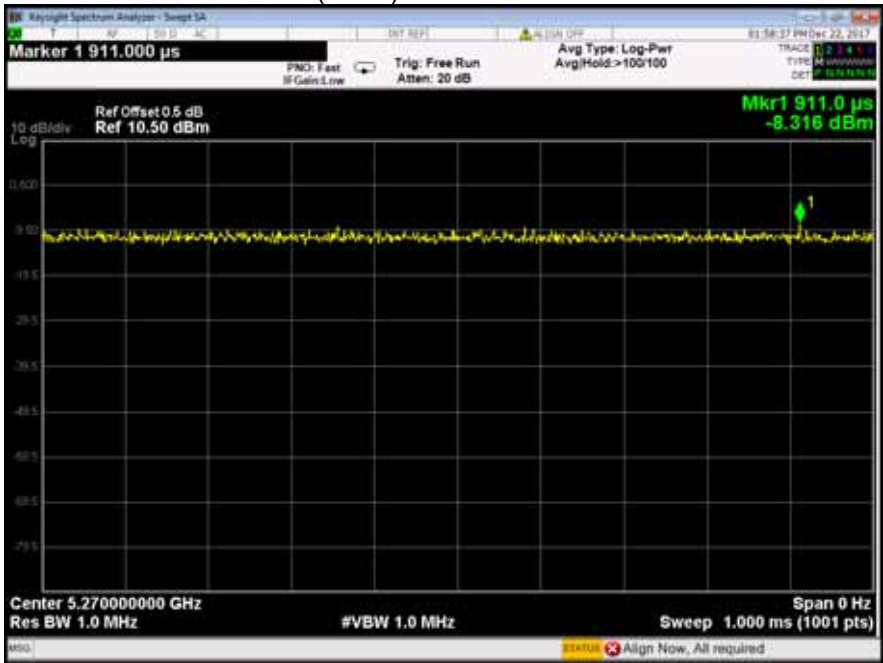
802.11ac(HT40) U-NII-2A Low channel



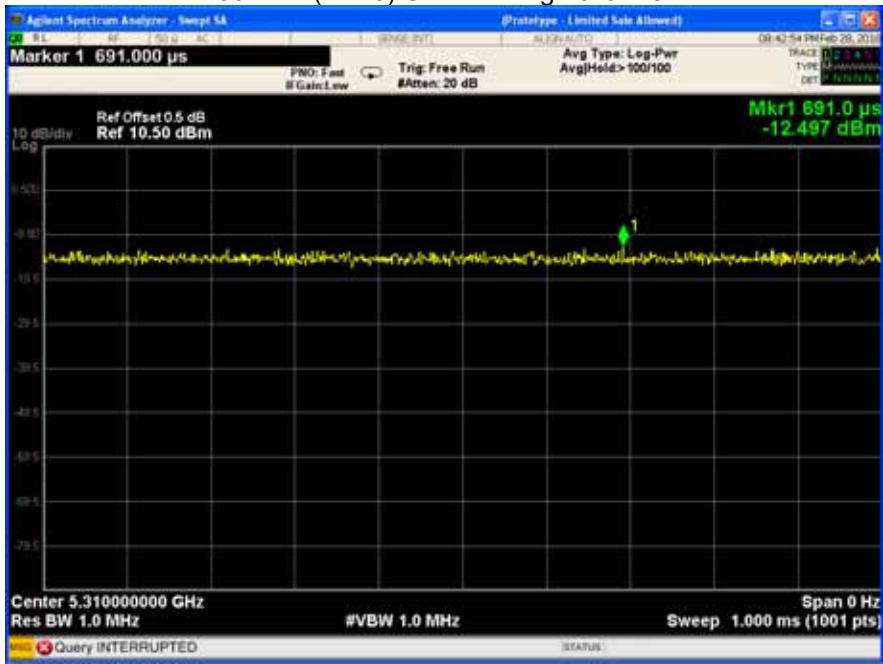
802.11ac(HT40) U-NII-2A High channel



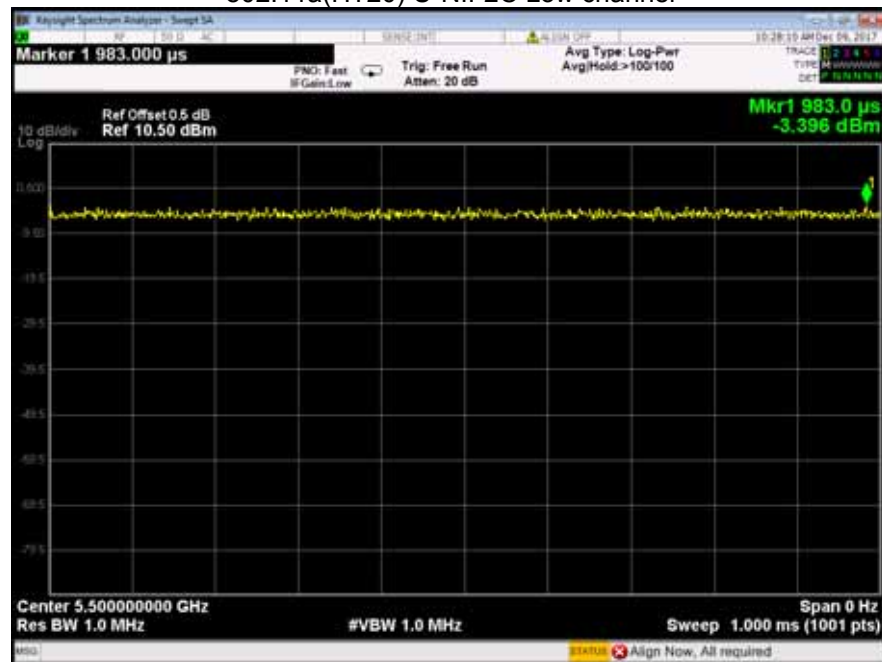
802.11n(HT40) U-NII-2A Low channel



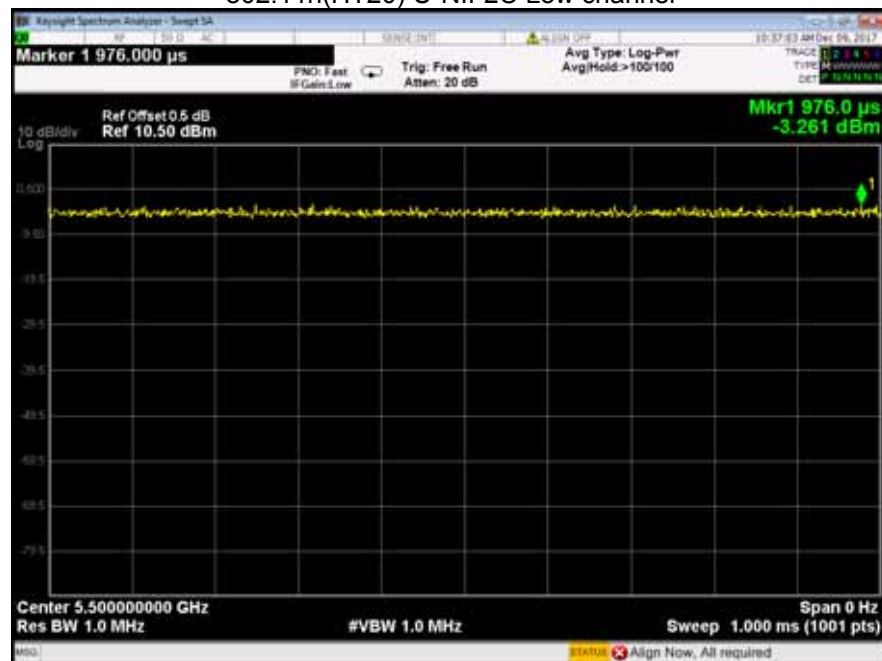
802.11n(HT40) U-NII-2A High channel



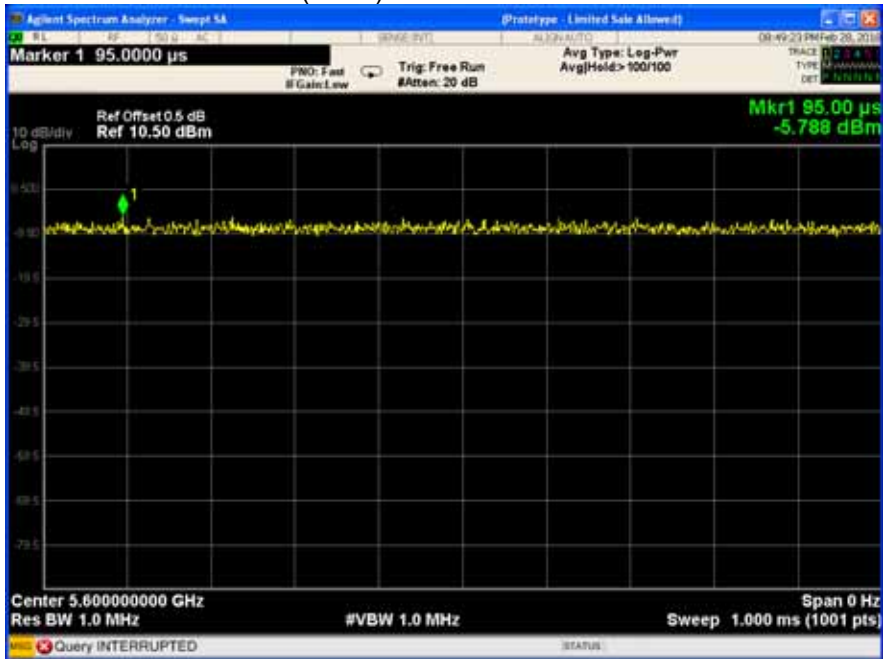
802.11a(HT20) U-NII-2C Low channel



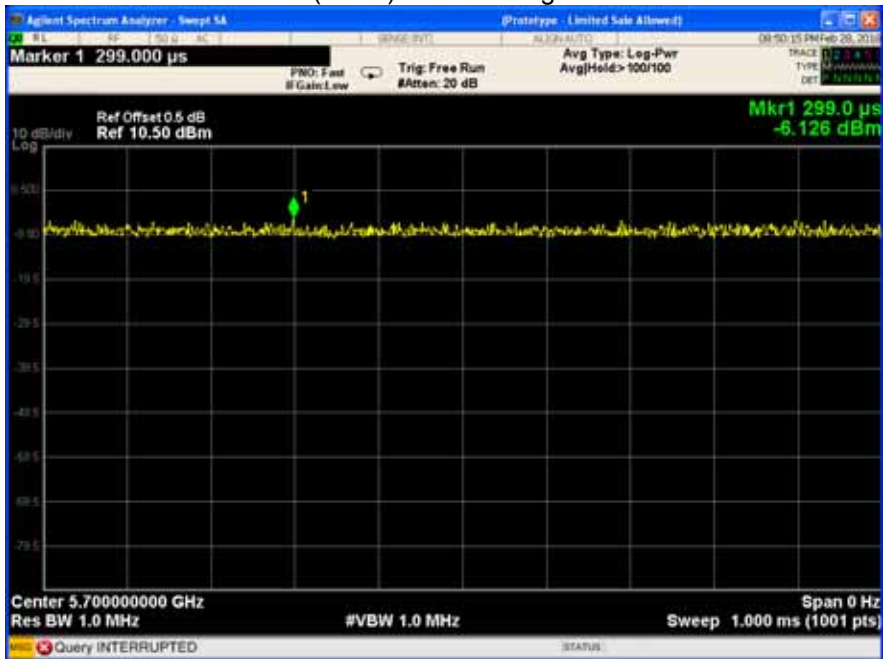
802.11n(HT20) U-NII-2C Low channel



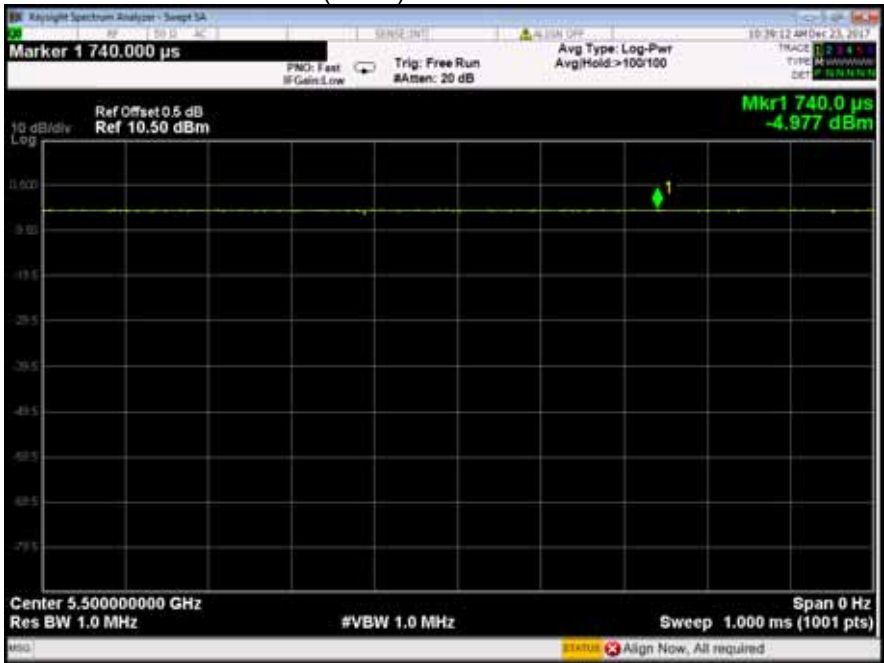
802.11n(HT20) U-NII-2C Middle channel



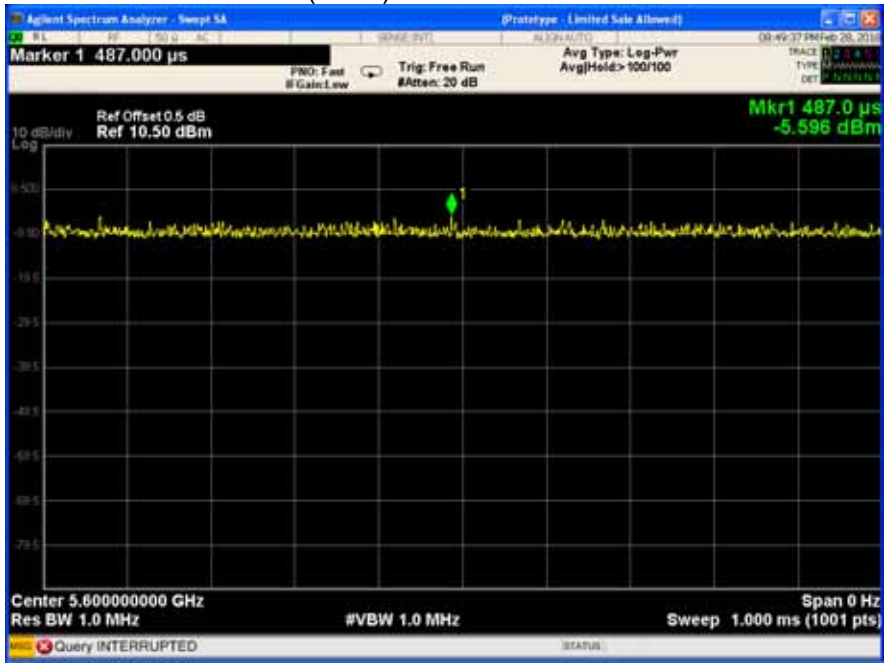
802.11n(HT20) U-NII-2C High channel



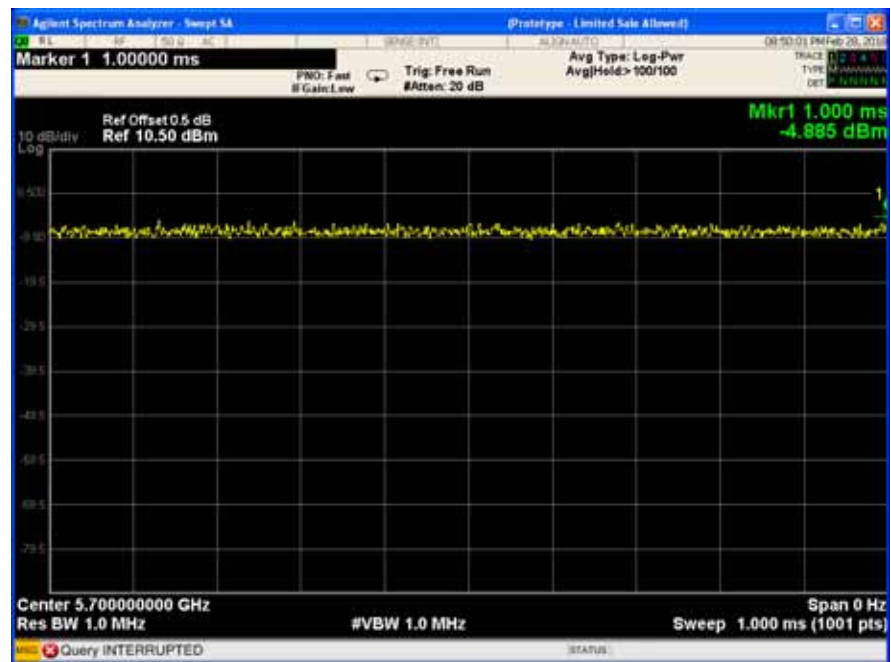
802.11ac(HT20) U-NII-2C Low channel



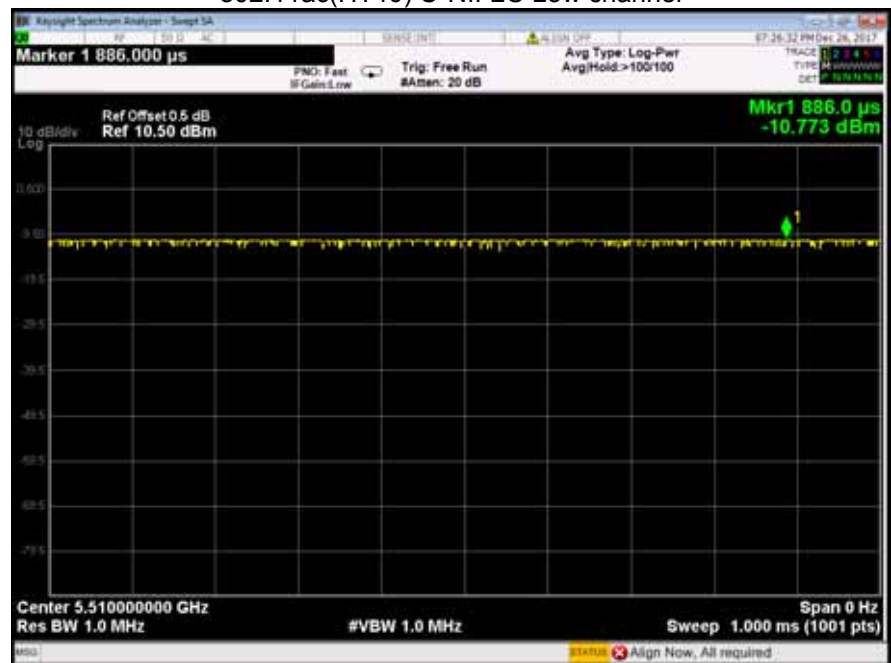
802.11ac(HT20) U-NII-2C Middle channel



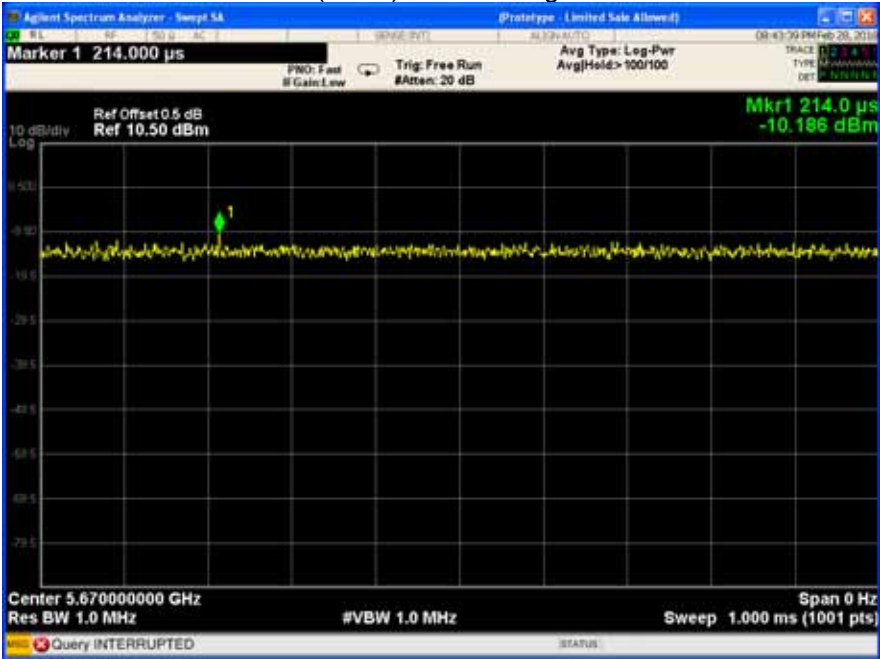
802.11ac(HT20) U-NII-2C High channel



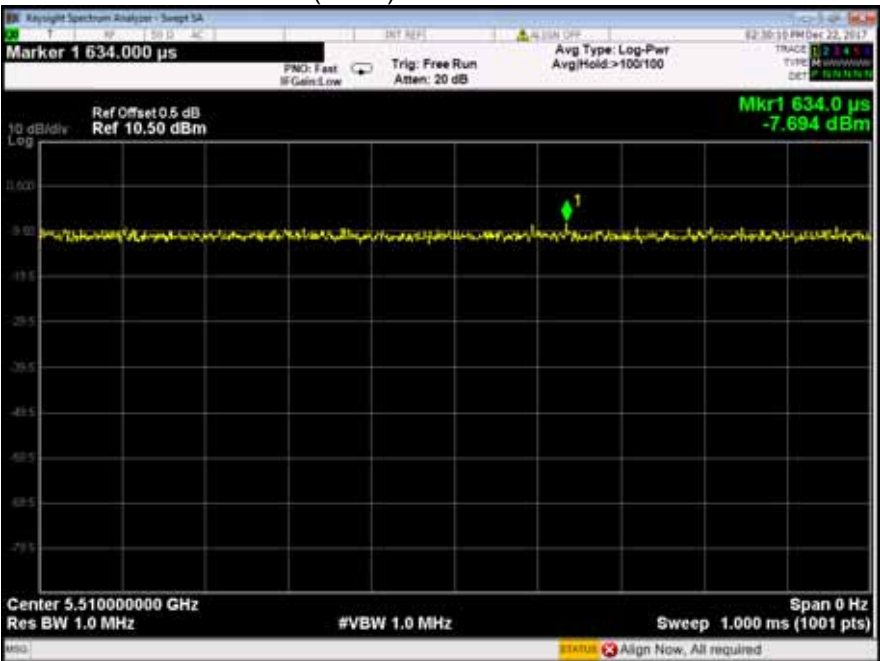
802.11ac(HT40) U-NII-2C Low channel



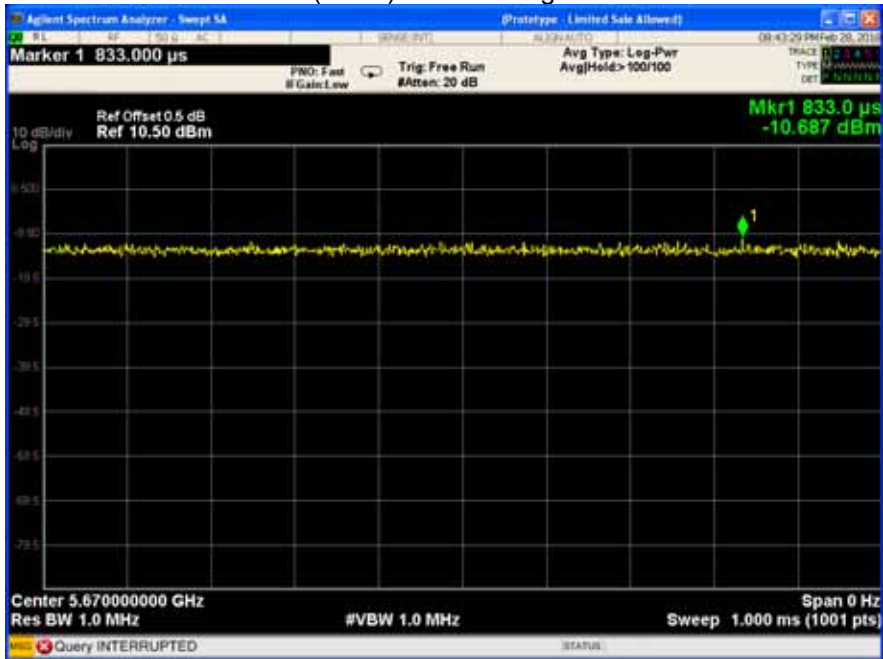
802.11ac(HT40) U-NII-2C High channel



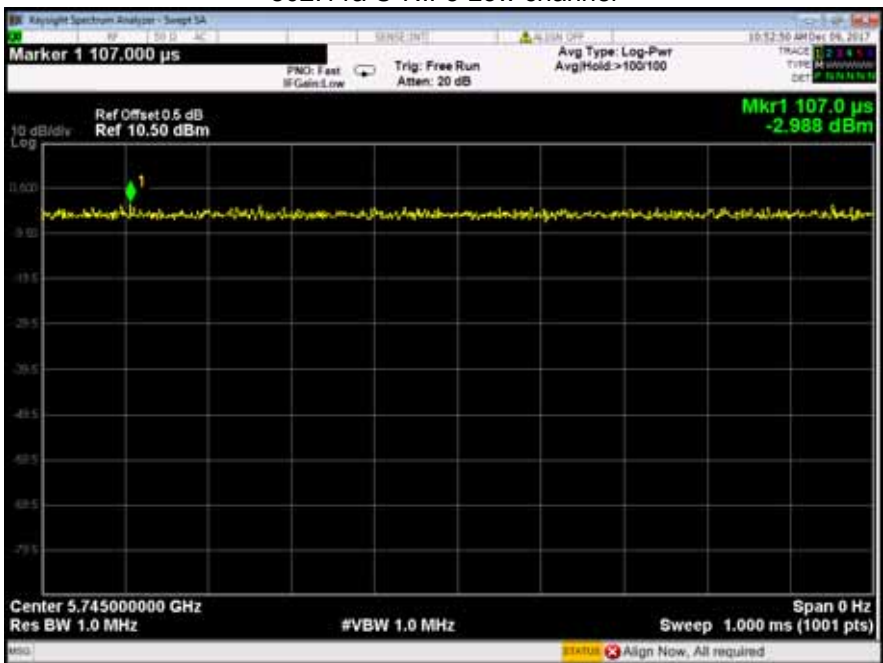
802.11n(HT40) U-NII-2C Low channel



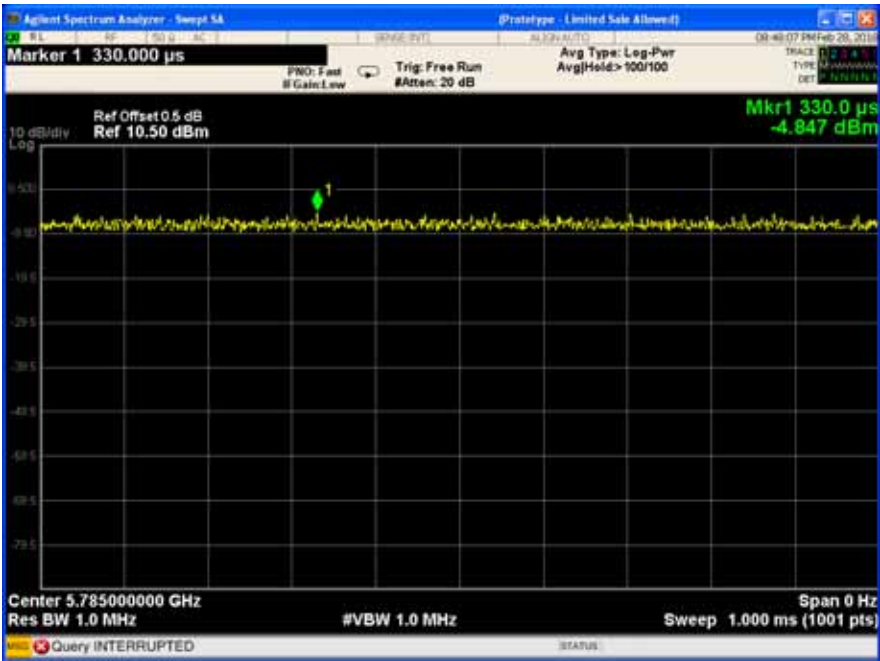
802.11n(HT40) U-NII-2C High channel



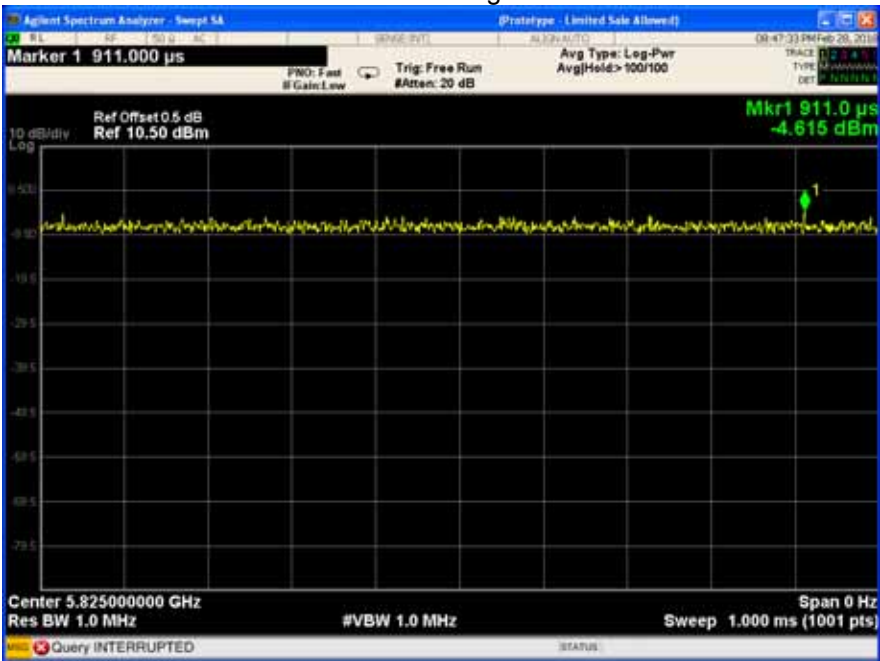
802.11a U-NII-3 Low channel



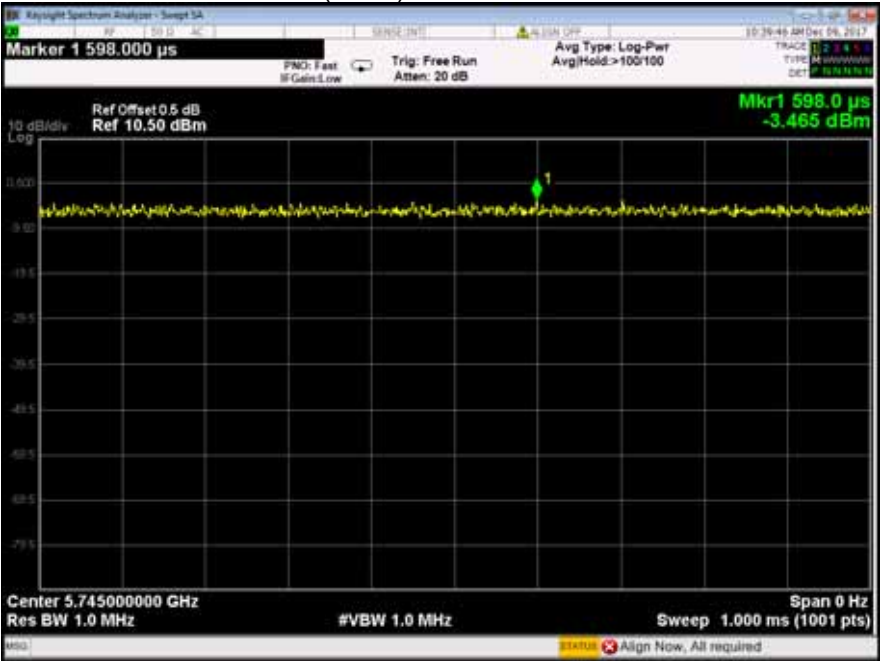
802.11a U-NII-3 Middle channel



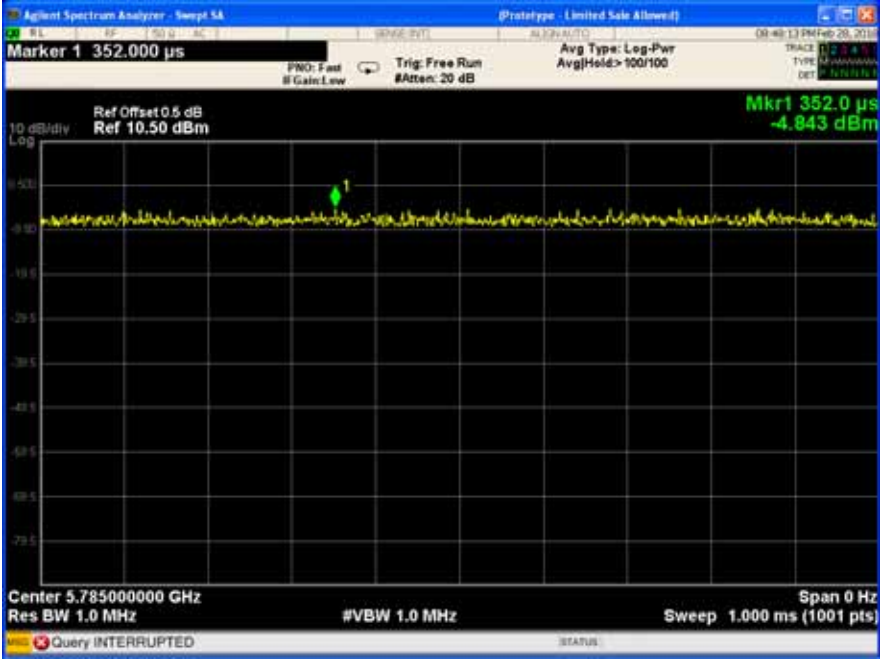
802.11a U-NII-3 High channel



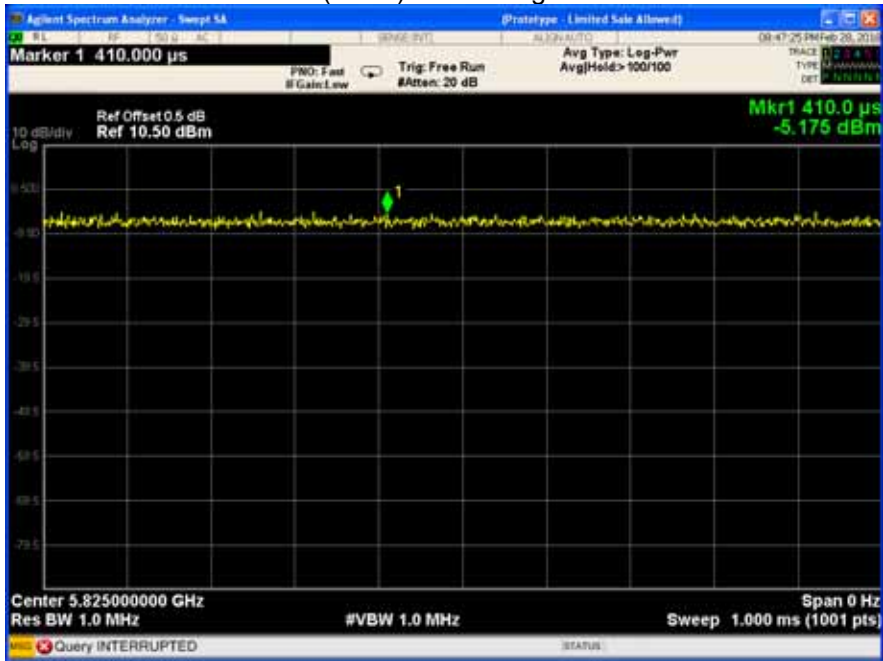
802.11n(HT20) U-NII-3 Low channel



802.11n(HT20) U-NII-3 Middle channel



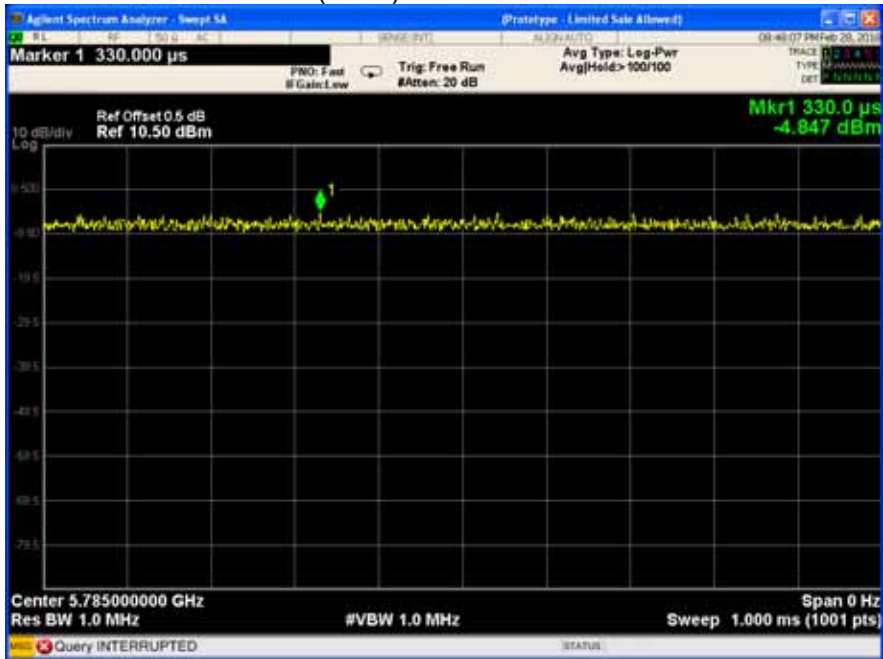
802.11n(HT20) U-NII-3 High channel



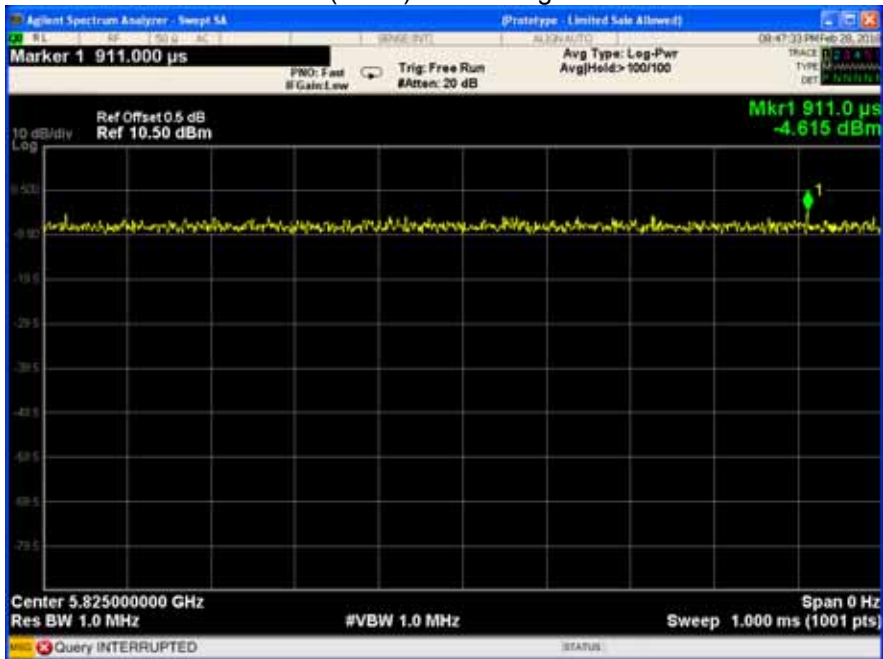
802.11ac(HT20) U-NII-3 Low channel



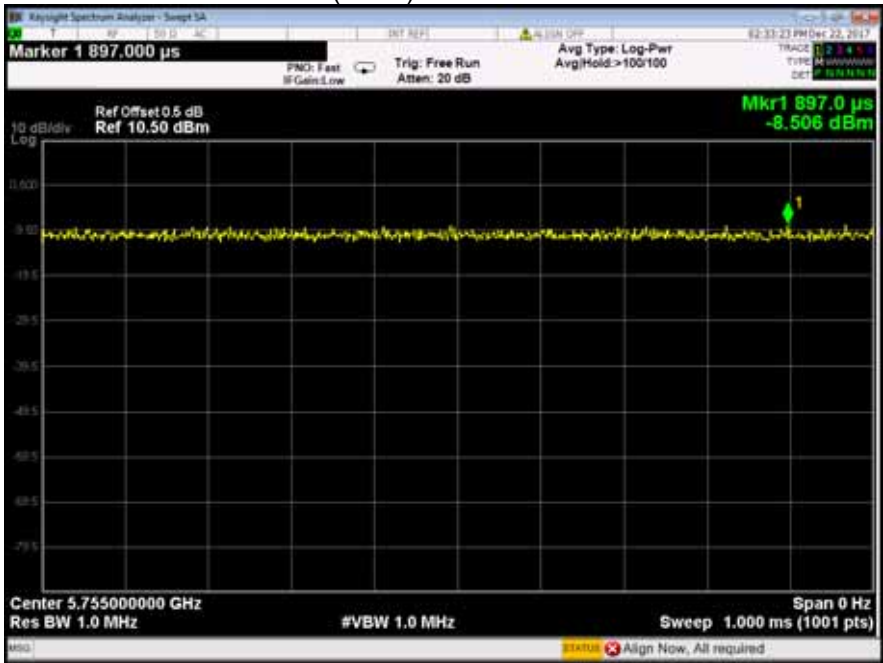
802.11ac(HT20) U-NII-3 Middle channel



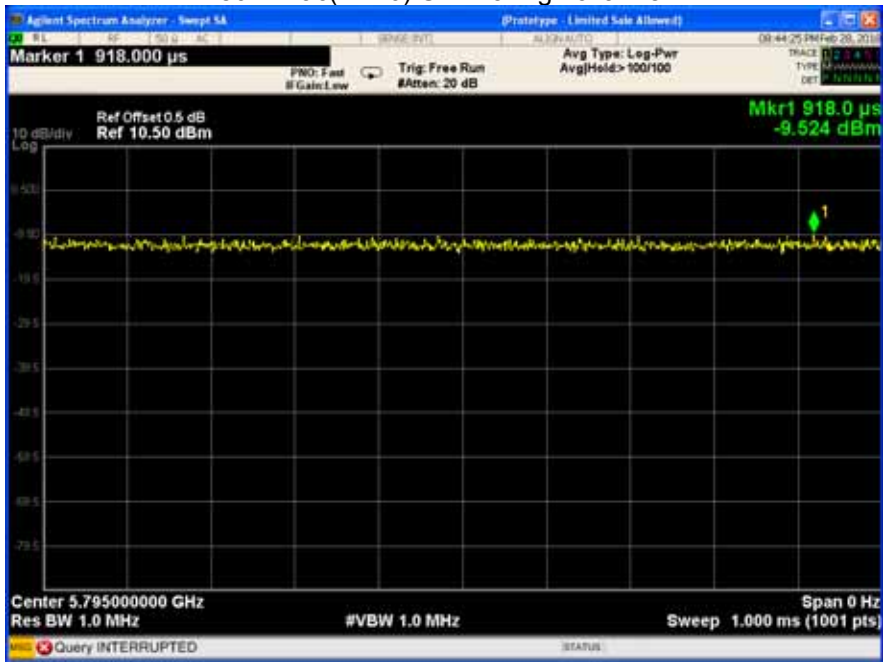
802.11ac(HT20) U-NII-3 High channel



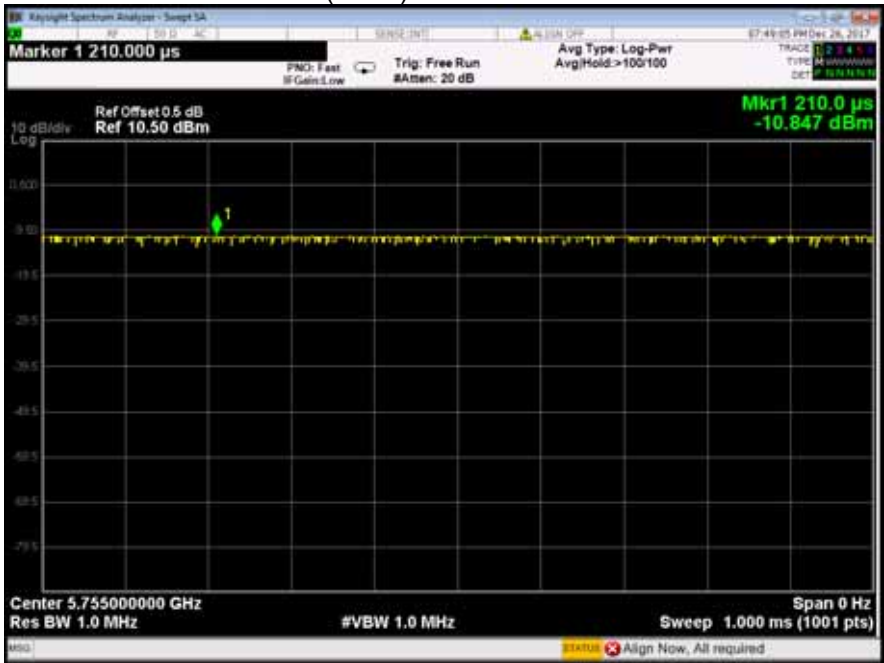
802.11ac(HT40) U-NII-3 Low channel



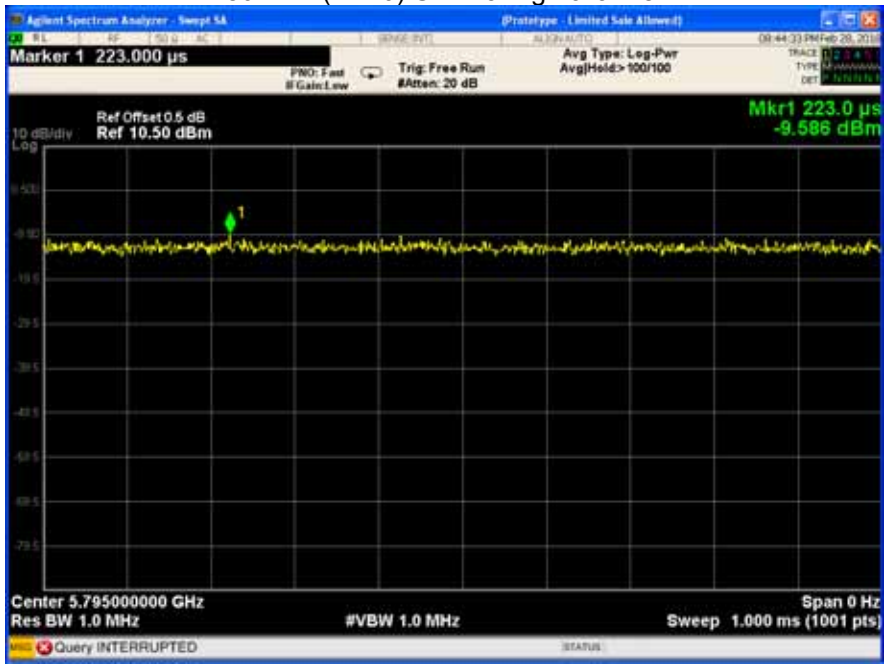
802.11ac(HT40) U-NII-3 High channel



802.11n(HT40) U-NII-3 Low channel



802.11n(HT40) U-NII-3 High channel



11 Band Edge

Test Requirement:	FCC CFR47 Part 15 Section 15.407
Test Method:	ANSI C63.10 2013
Test Limit:	For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz. For transmitters operating in the 5.725-5.85 GHz band: (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. (ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
Test Result:	PASS

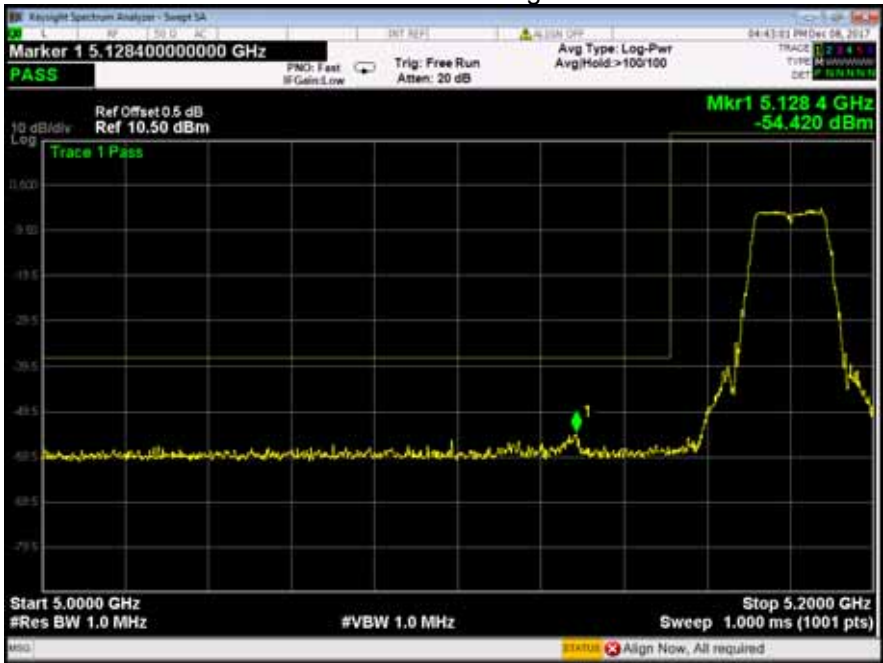
11.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

11.2 Test Result

Test result plots shown as follows:

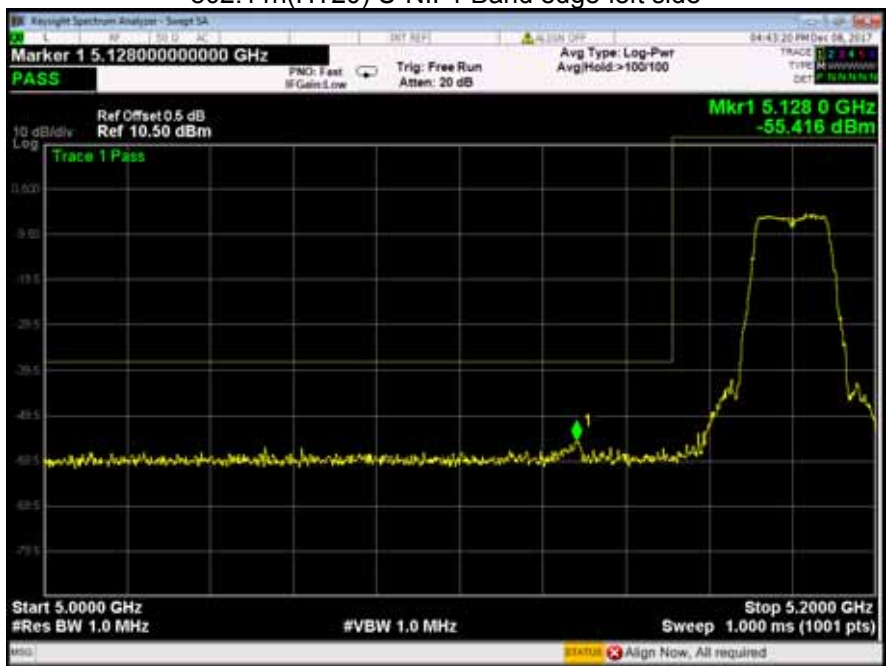
802.11a U-NII-1 Band edge-left side



802.11a U-NII-1 Band edge-right side



802.11n(HT20) U-NII-1 Band edge-left side



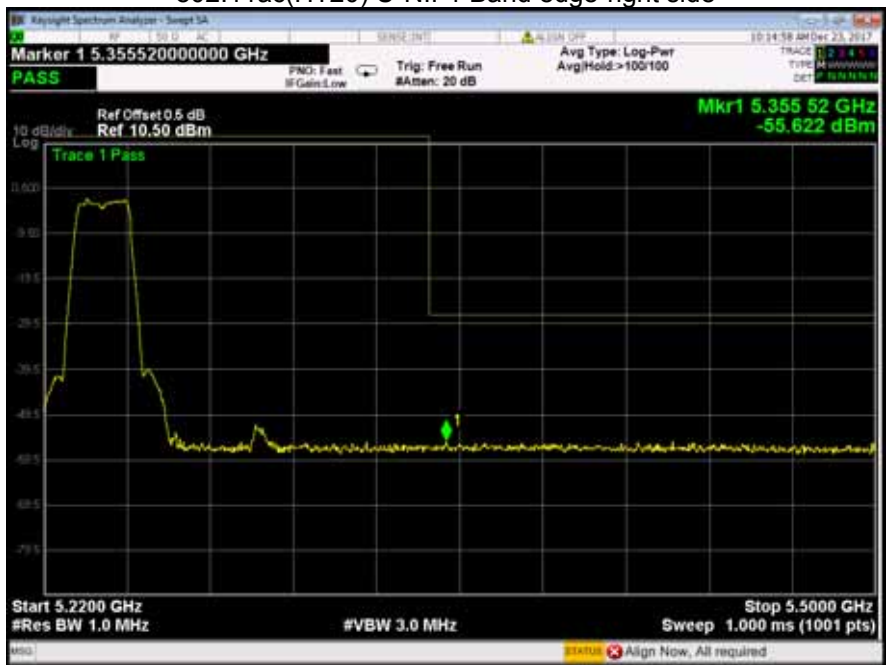
802.11n(HT20) U-NII-1 Band edge-right side



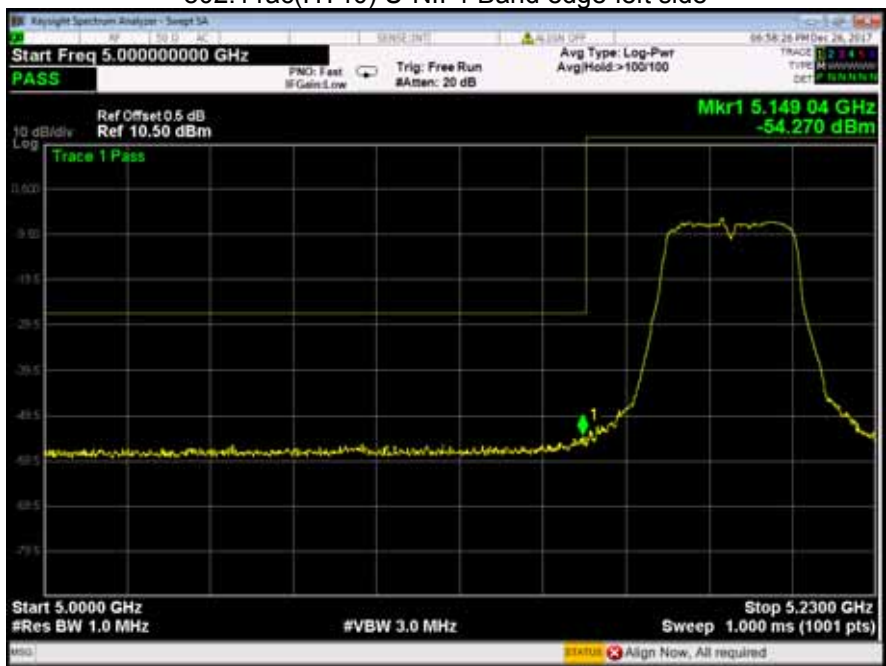
802.11ac(HT20) U-NII-1 Band edge-left side



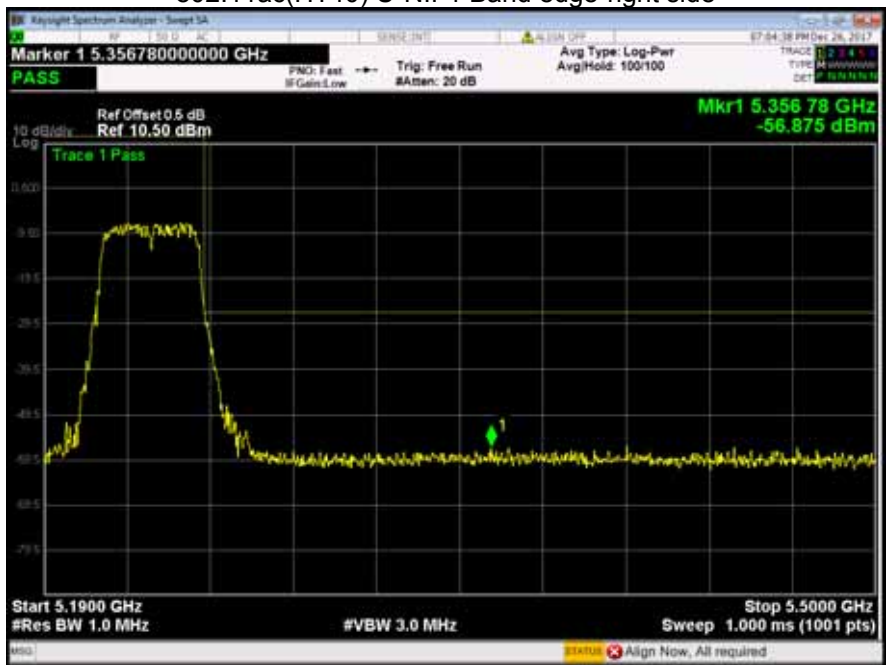
802.11ac(HT20) U-NII-1 Band edge-right side



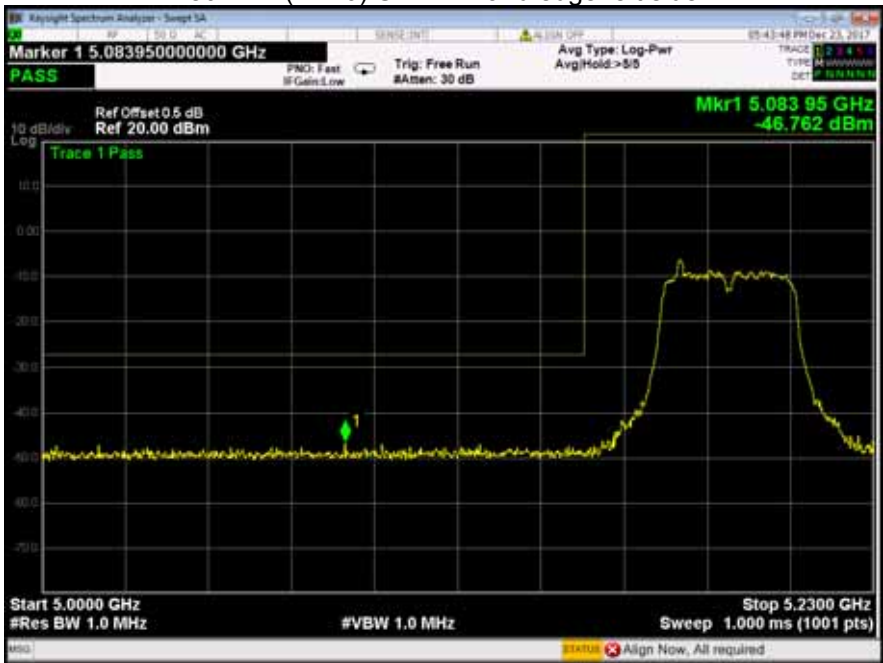
802.11ac(HT40) U-NII-1 Band edge-left side



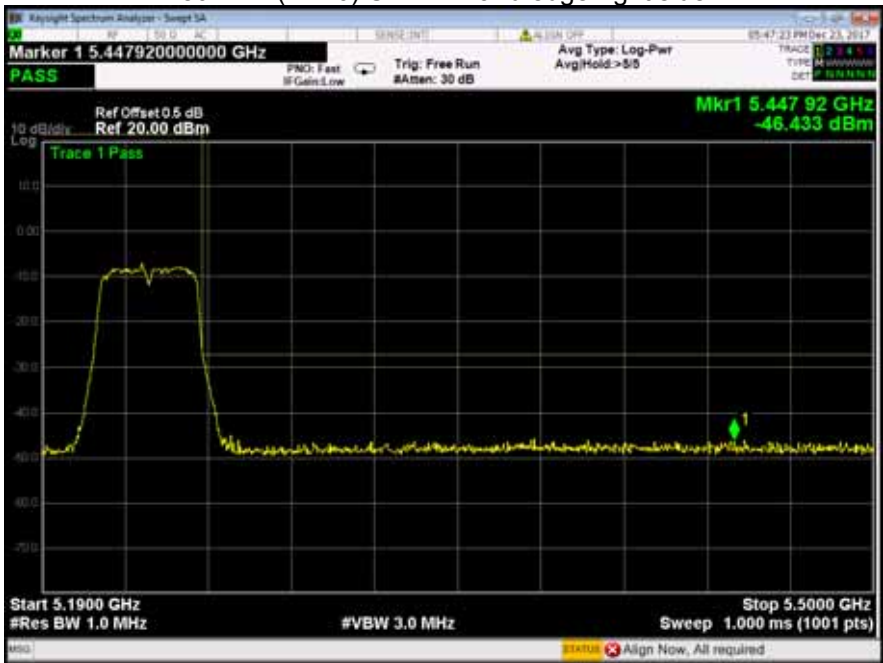
802.11ac(HT40) U-NII-1 Band edge-right side



802.11n(HT40) U-NII-1 Band edge-left side



802.11n(HT40) U-NII-1 Band edge-right side



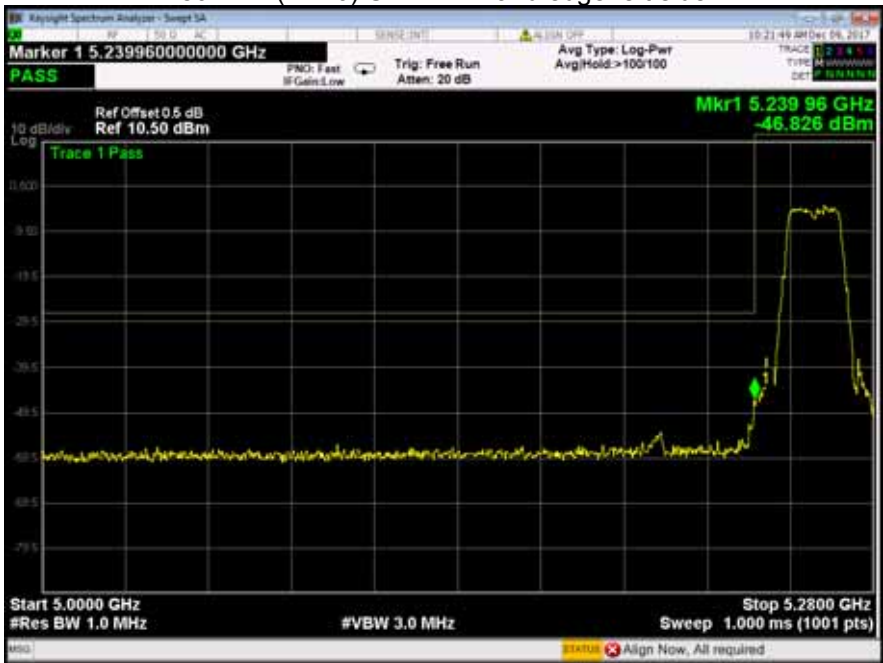
802.11a U-NII-2A Band edge-left side



802.11a U-NII-2A Band edge-right side



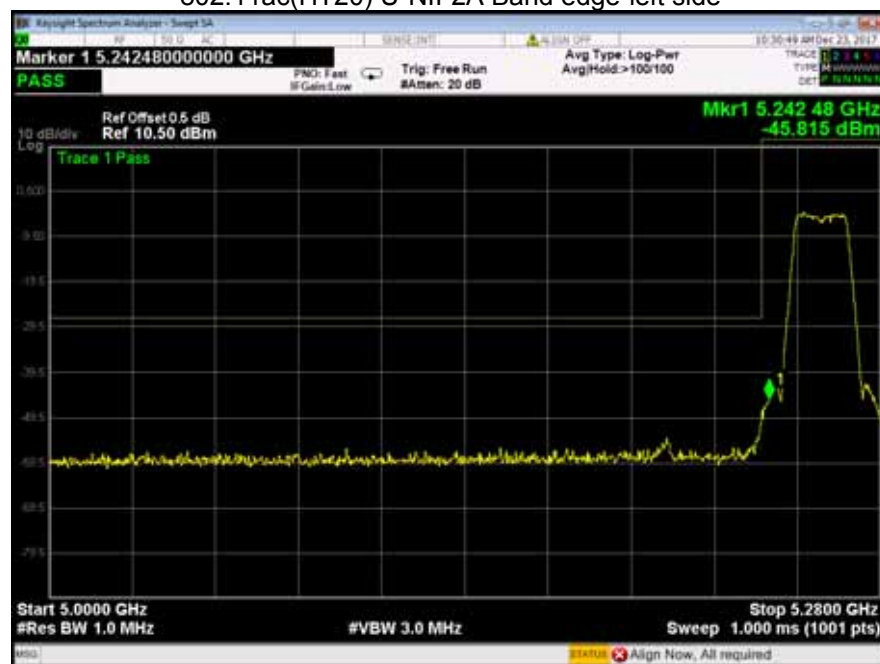
802.11n(HT20) U-NII-2A Band edge-left side



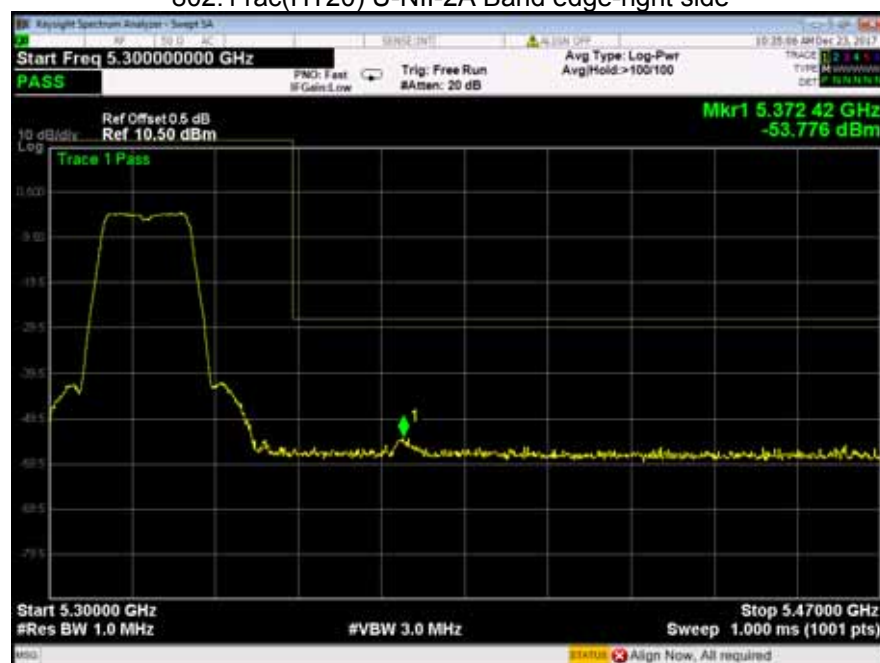
802.11n(HT20) U-NII-2A Band edge-right side



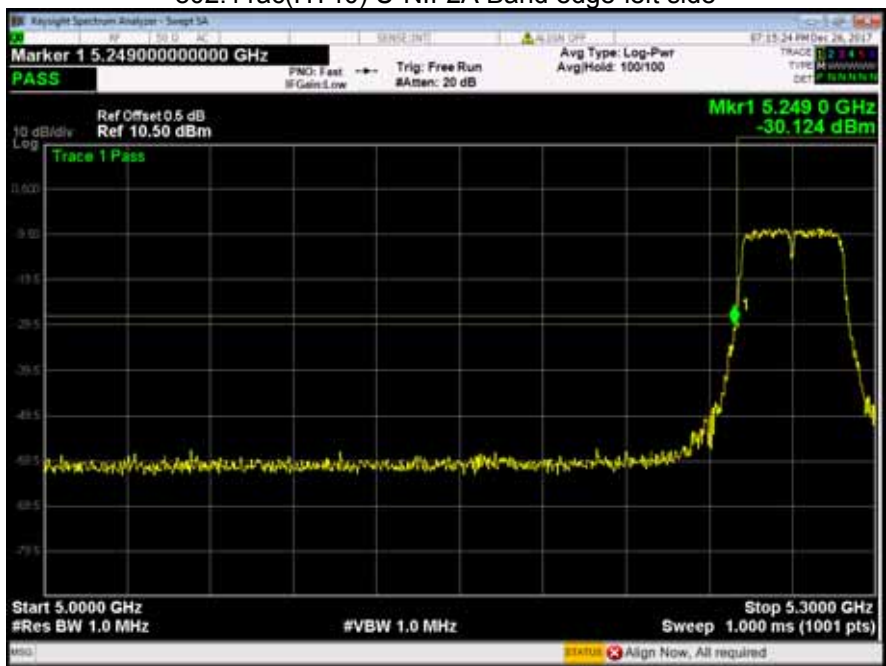
802.11ac(HT20) U-NII-2A Band edge-left side



802.11ac(HT20) U-NII-2A Band edge-right side



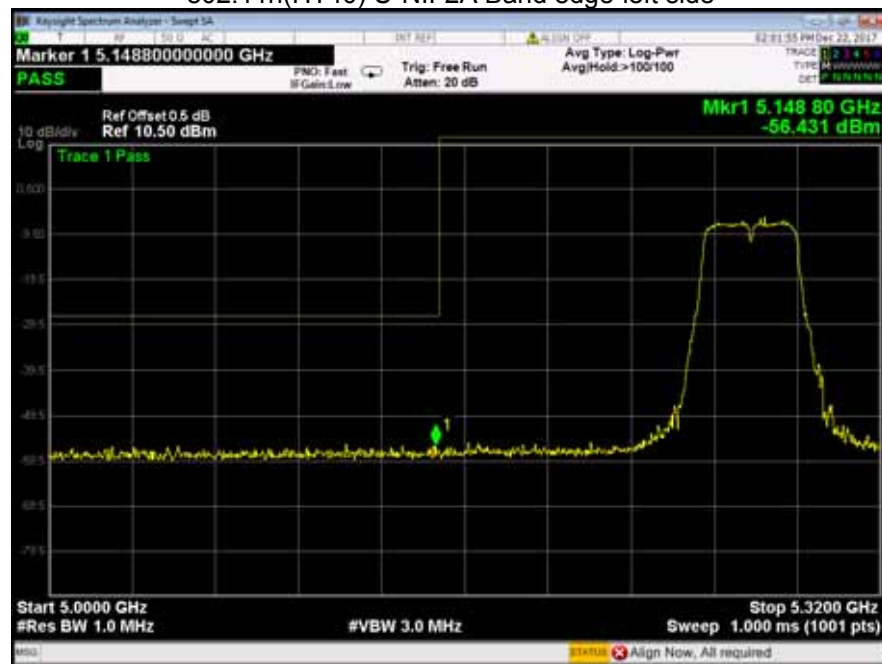
802.11ac(HT40) U-NII-2A Band edge-left side



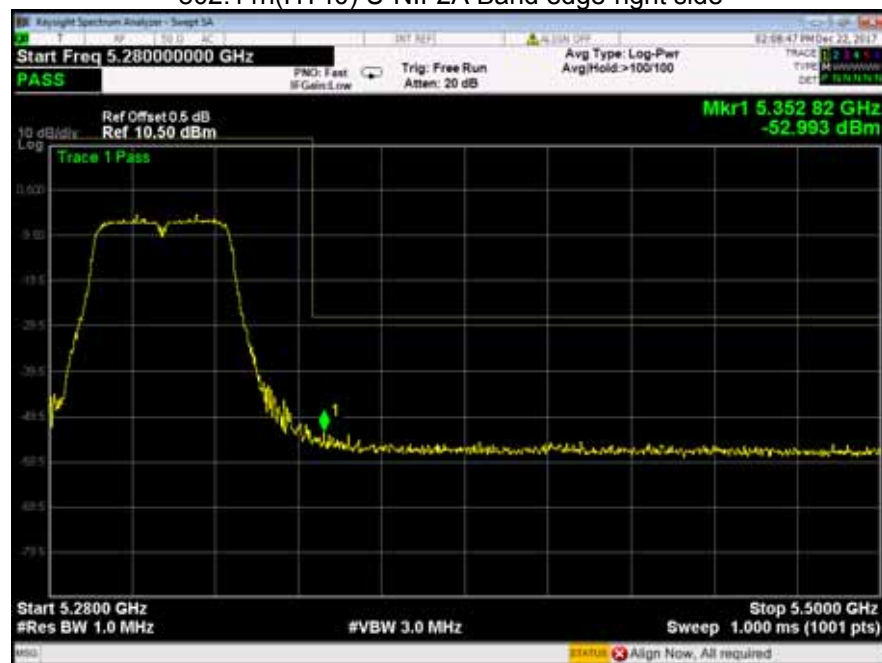
802.11ac(HT40) U-NII-2A Band edge-right side



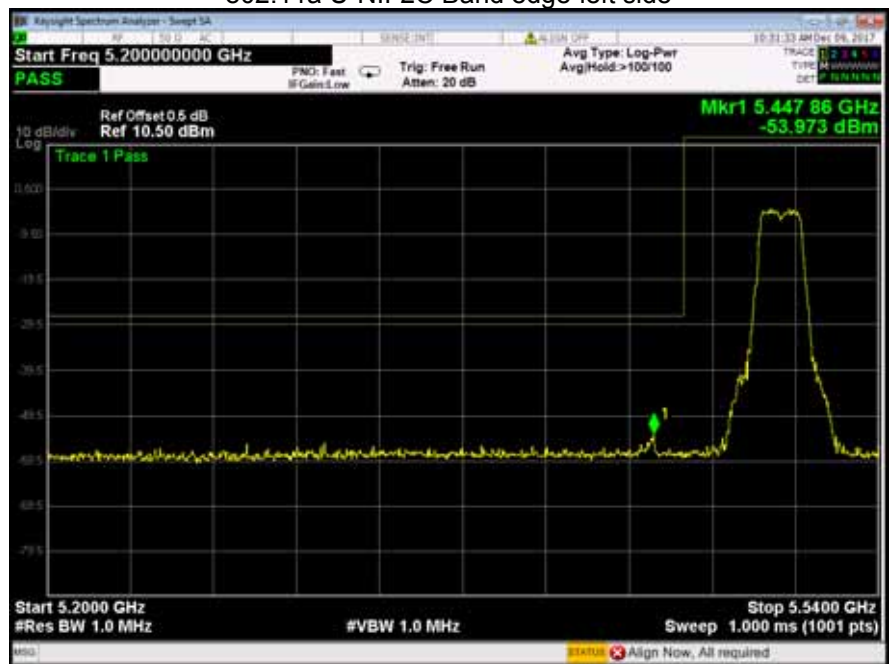
802.11n(HT40) U-NII-2A Band edge-left side



802.11n(HT40) U-NII-2A Band edge-right side



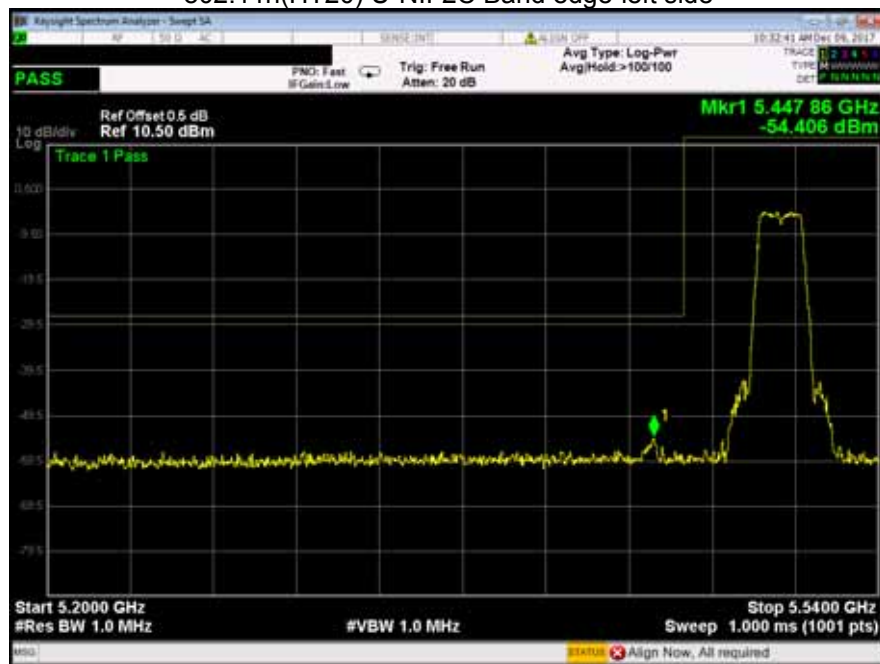
802.11a U-NII-2C Band edge-left side



802.11a U-NII-2C Band edge-right side



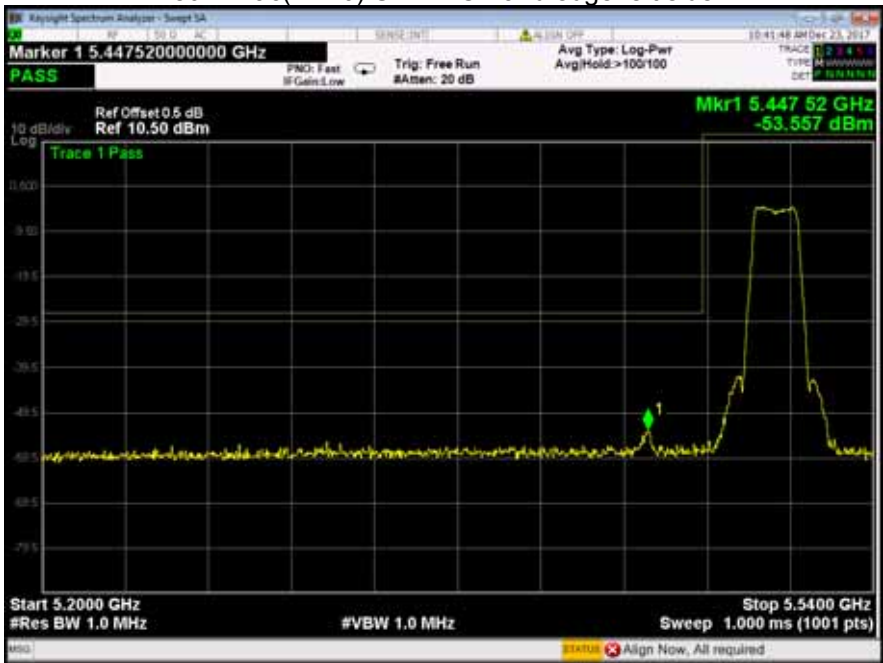
802.11n(HT20) U-NII-2C Band edge-left side



802.11n(HT20) U-NII-2C Band edge-right side



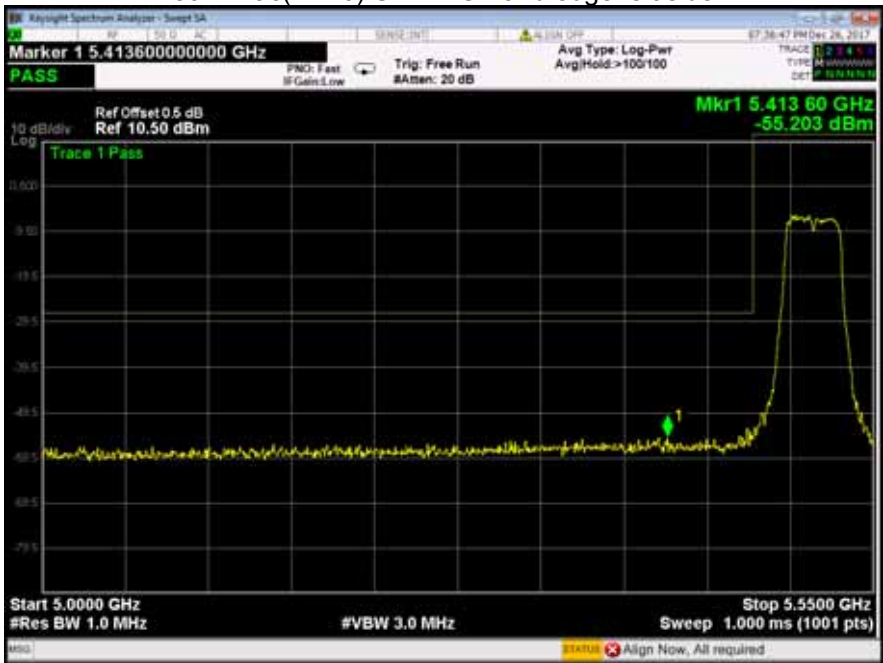
802.11ac(HT20) U-NII-2C Band edge-left side



802.11ac(HT20) U-NII-2C Band edge-right side



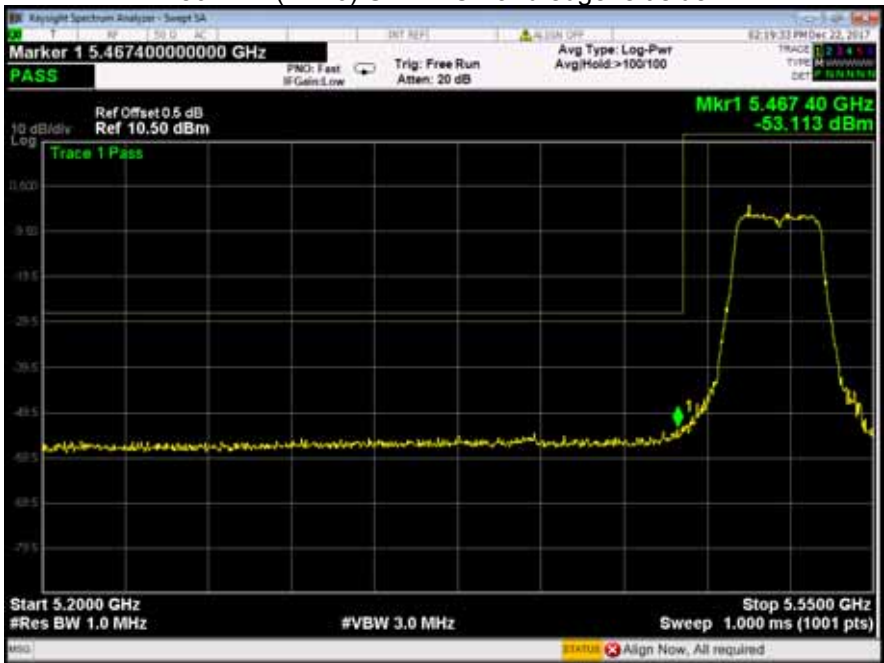
802.11ac(HT40) U-NII-2C Band edge-left side



802.11ac(HT40) U-NII-2C Band edge-right side



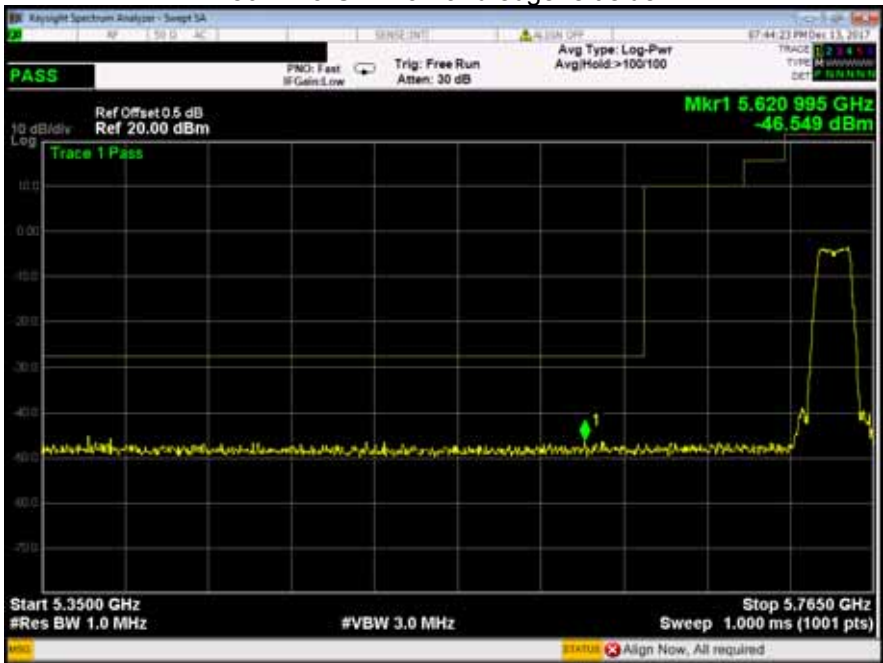
802.11n(HT40) U-NII-2C Band edge-left side



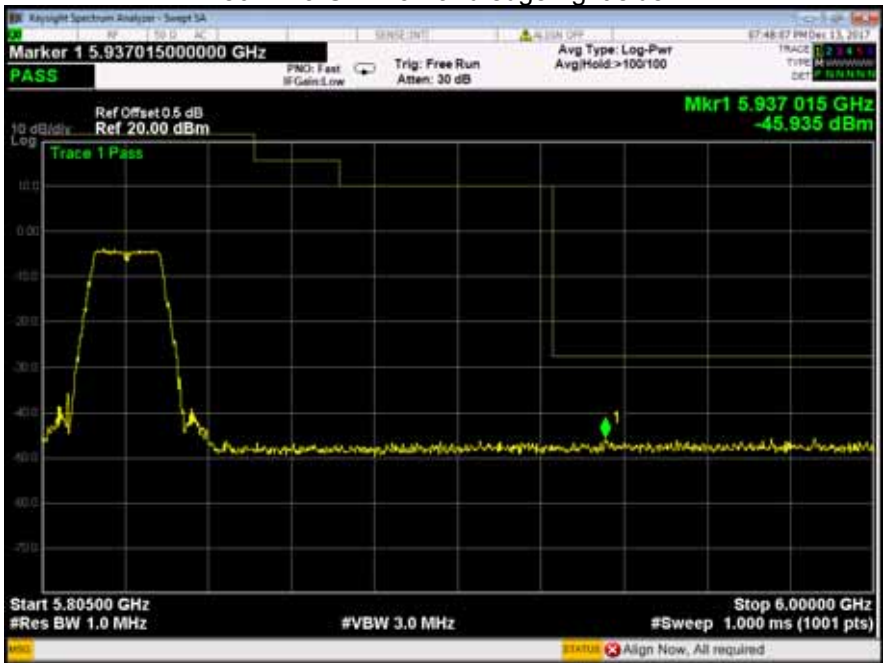
802.11n(HT40) U-NII-2C Band edge-right side



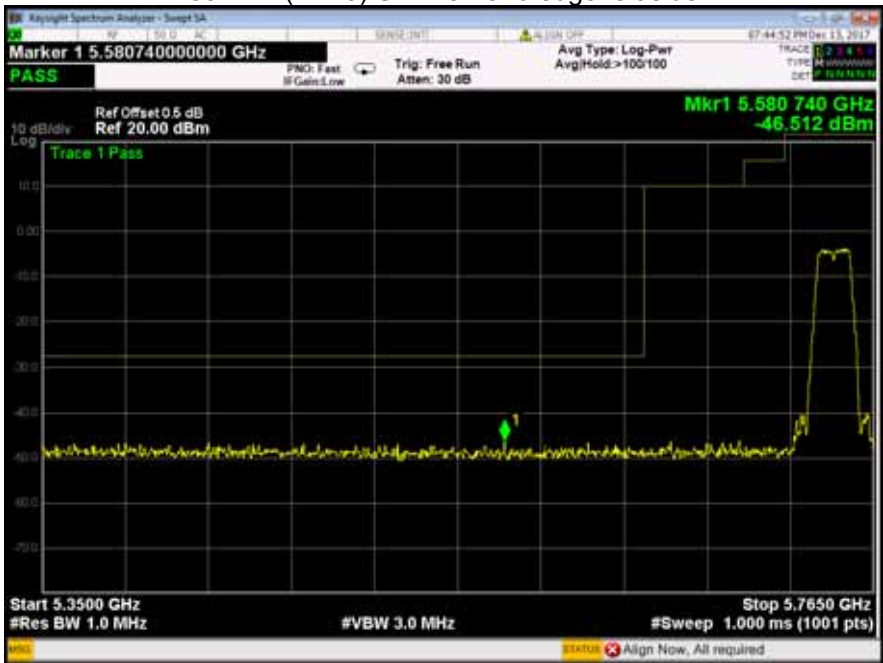
802.11a U-NII-3 Band edge-left side



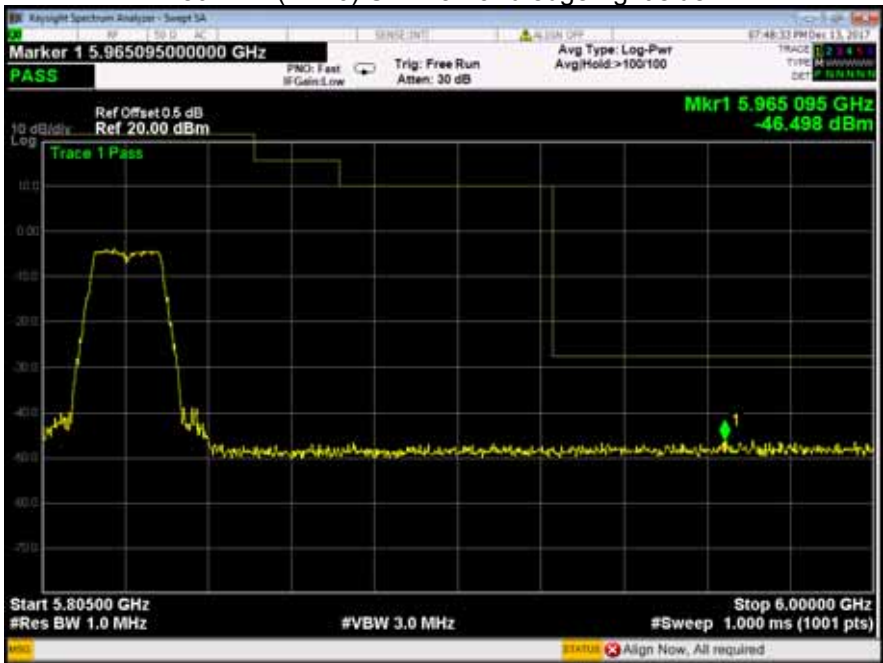
802.11a U-NII-3 Band edge-right side



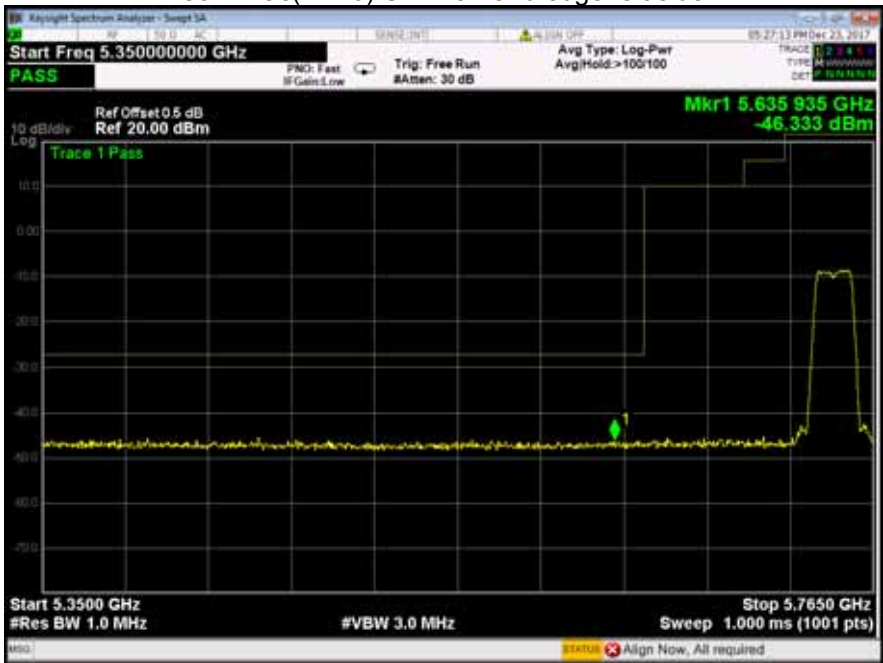
802.11n(HT20) U-NII-3 Band edge-left side



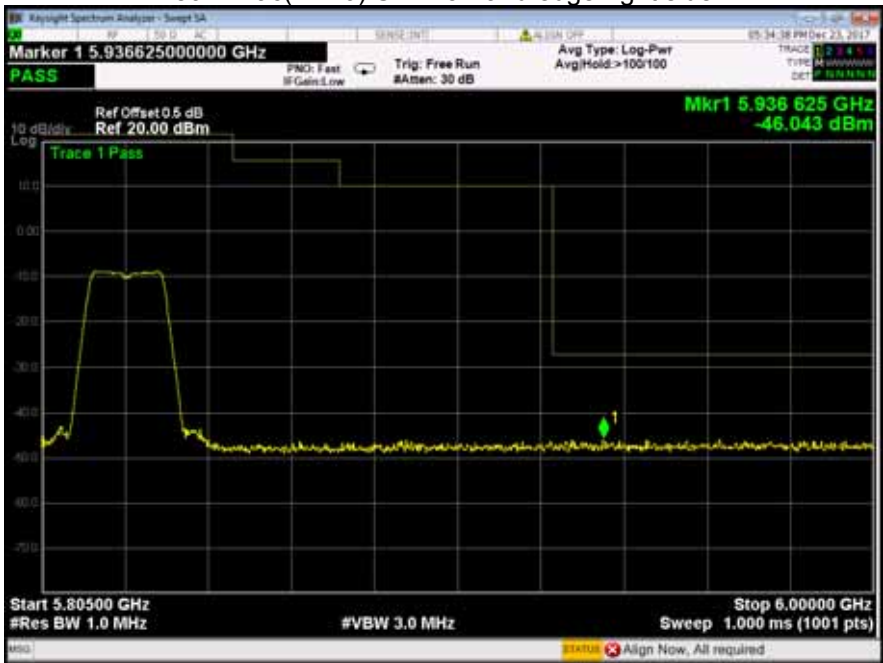
802.11n(HT20) U-NII-3 Band edge-right side



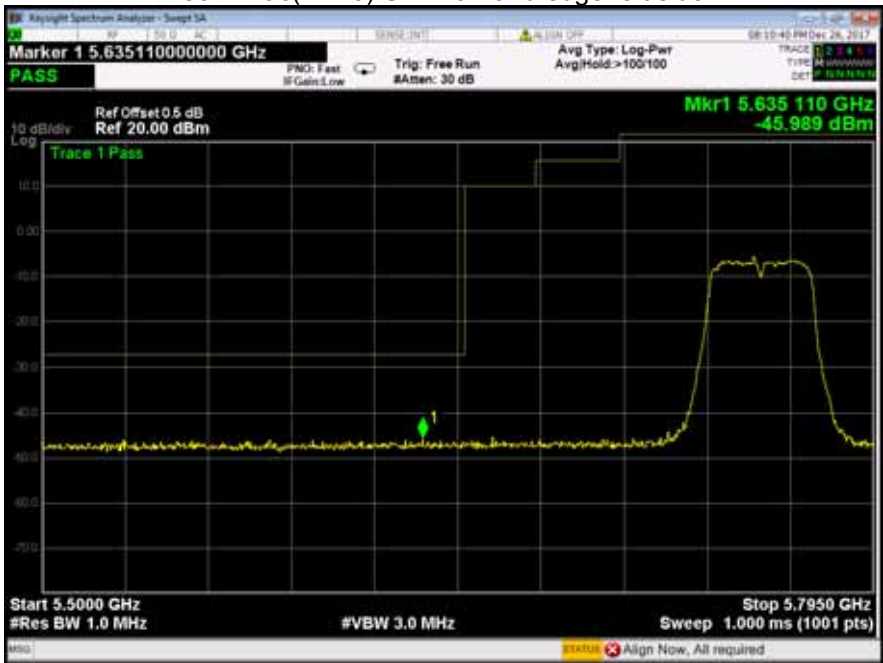
802.11ac(HT20) U-NII-3 Band edge-left side



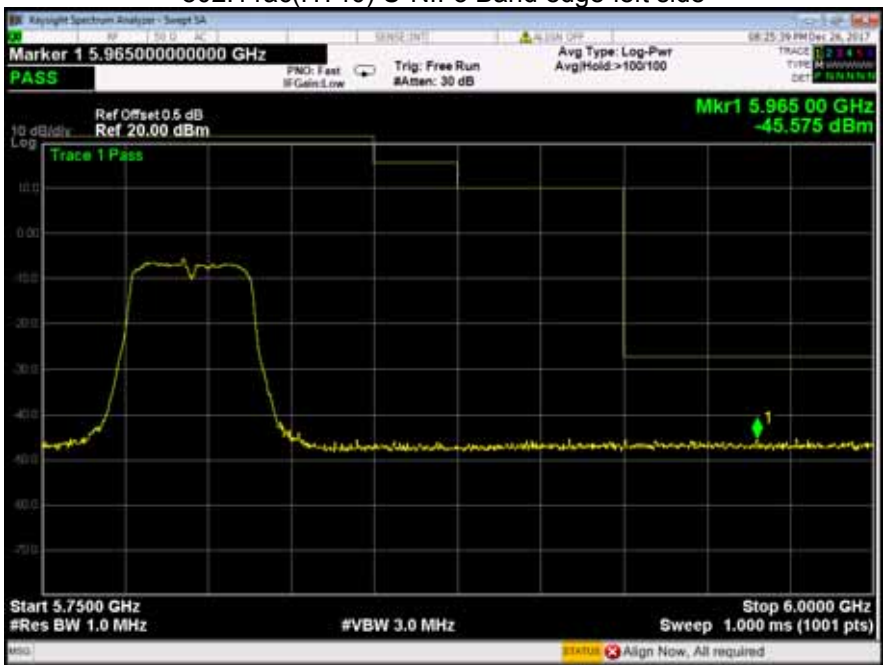
802.11ac(HT20) U-NII-3 Band edge-right side



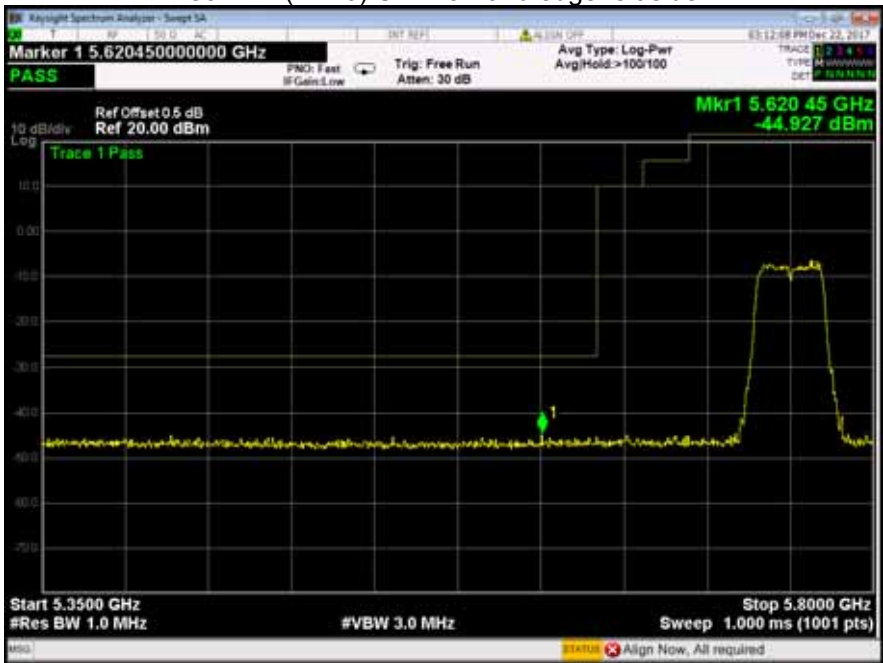
802.11ac(HT40) U-NII-3 Band edge-left side



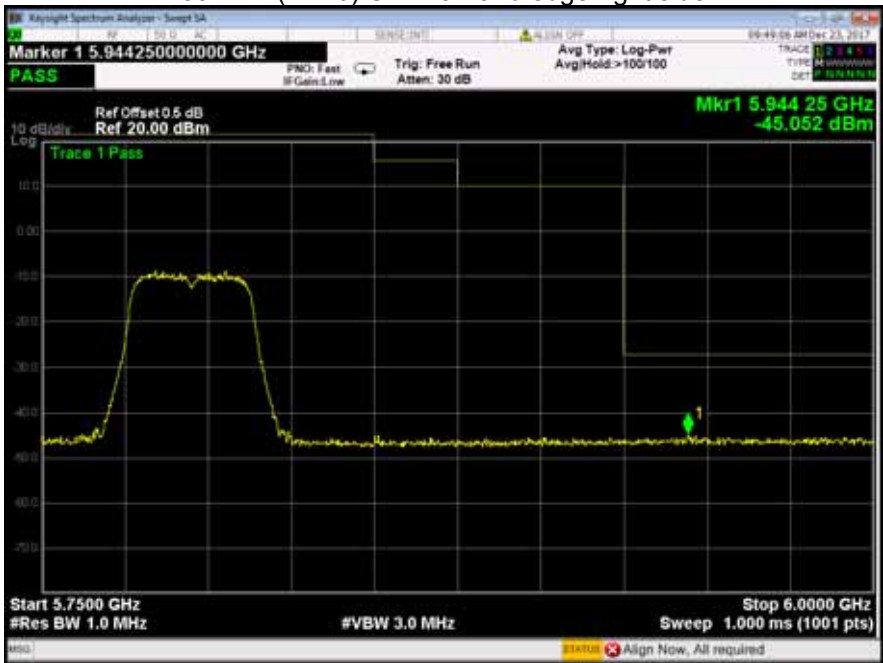
802.11ac(HT40) U-NII-3 Band edge-left side



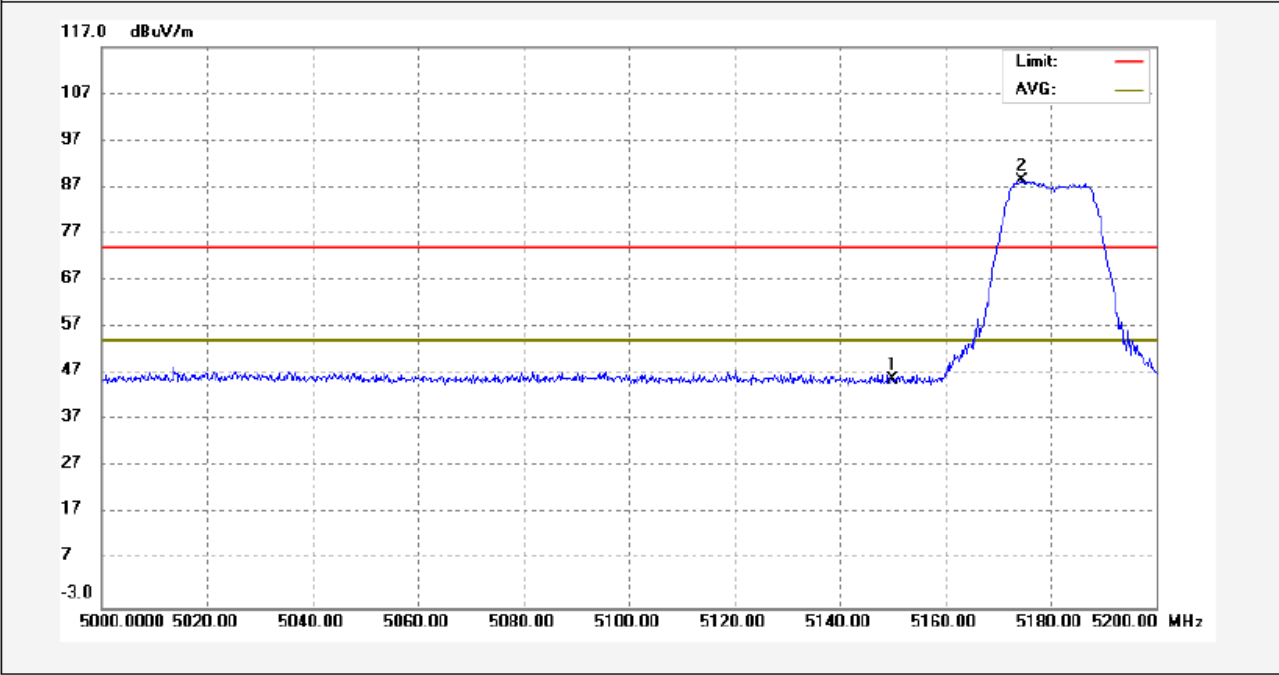
802.11n(HT40) U-NII-3 Band edge-left side



802.11n(HT40) U-NII-3 Band edge-right side

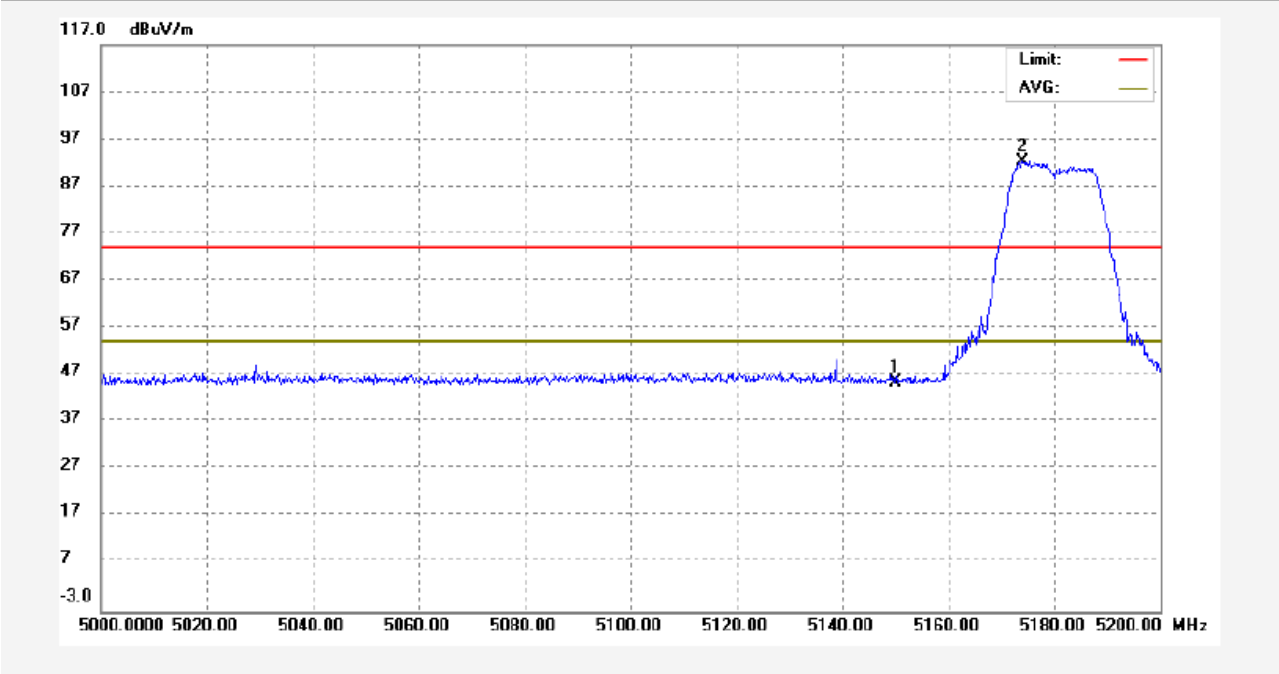


802.11a(HT20) U-NII-1 Transmitting Band edge-left side Horizontal



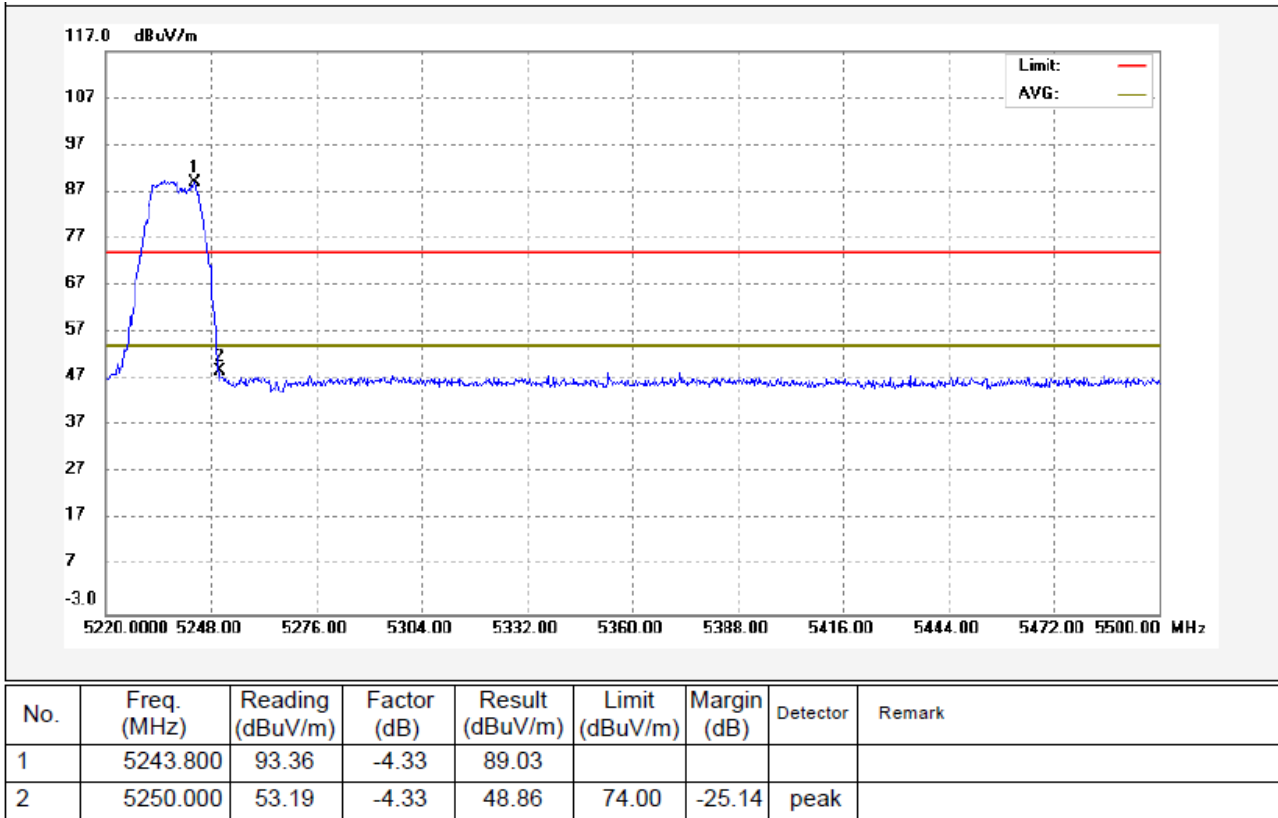
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5150.000	50.22	-4.47	45.75	74.00	-28.25	peak	
2	5174.400	92.89	-4.44	88.45				

802.11a(HT20) U-NII-1 Transmitting Band edge-left side Vertical

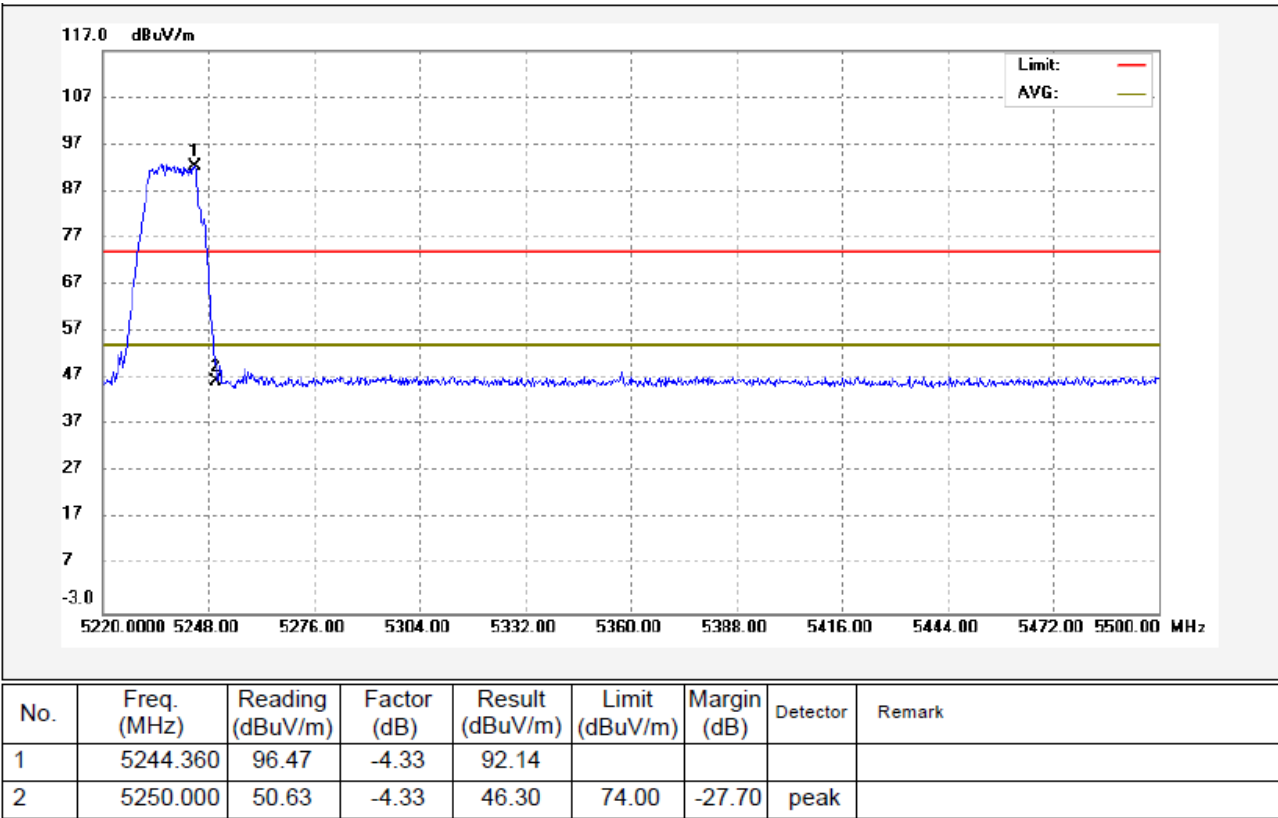


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5150.000	49.88	-4.47	45.41	74.00	-28.59	peak	
2	5174.000	96.65	-4.44	92.21				

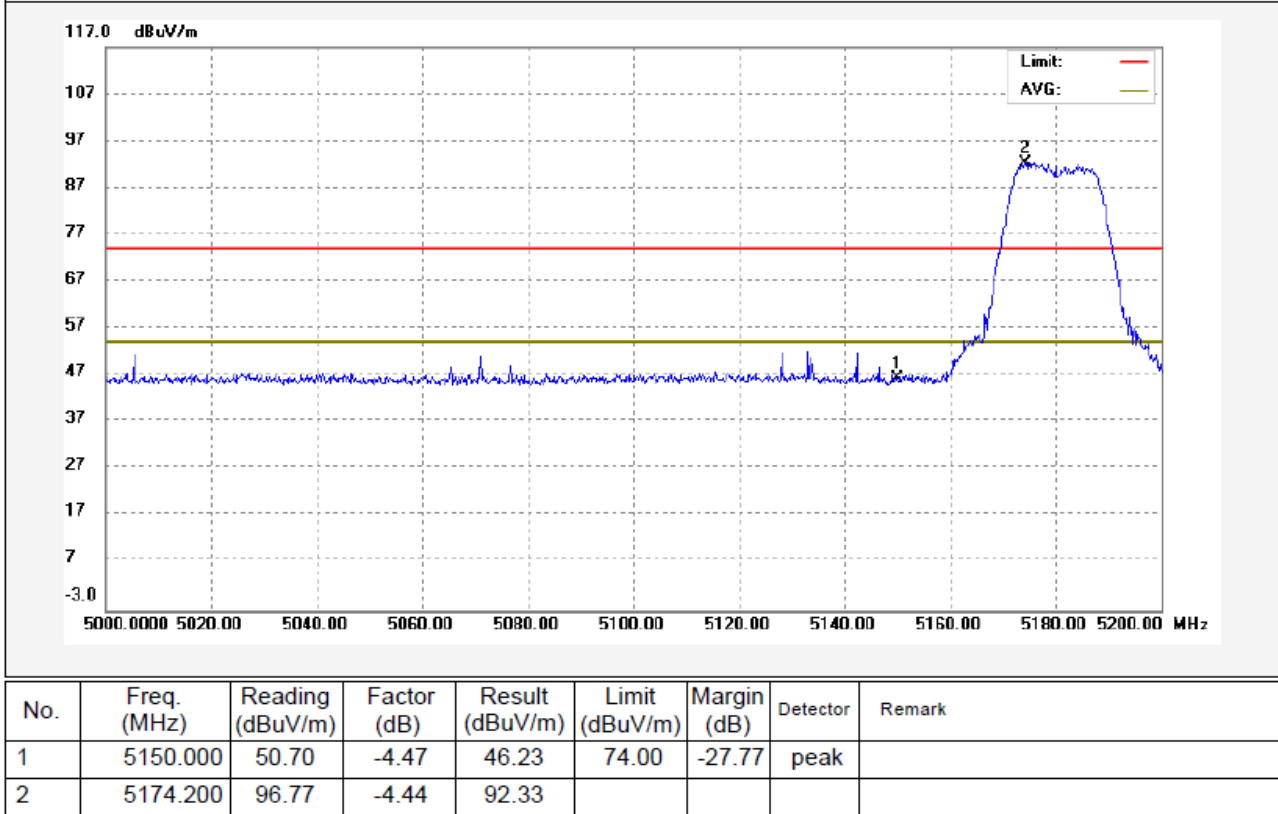
802.11a(HT20) U-NII-1 Transmitting Band edge-right side Vertical



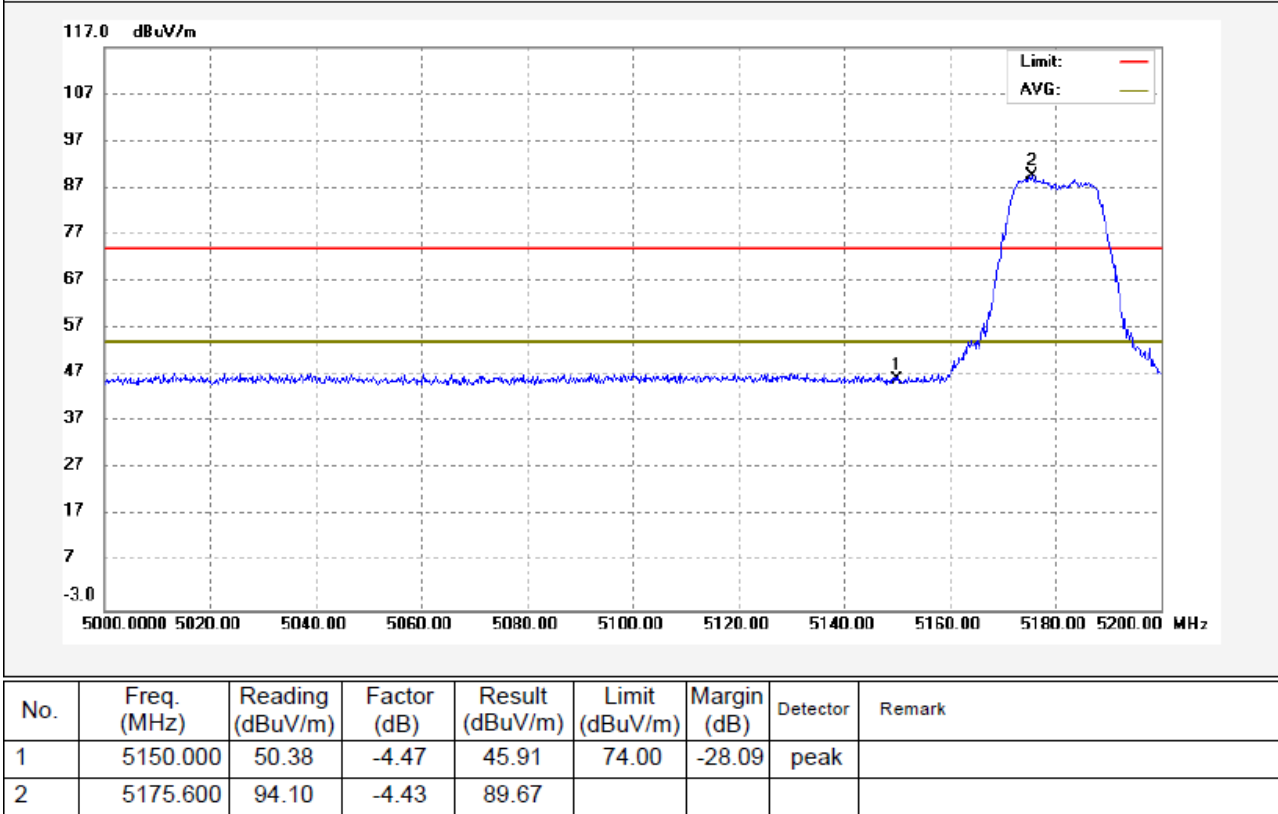
802.11a(HT20) U-NII-1 Transmitting Band edge-right side Horizontal



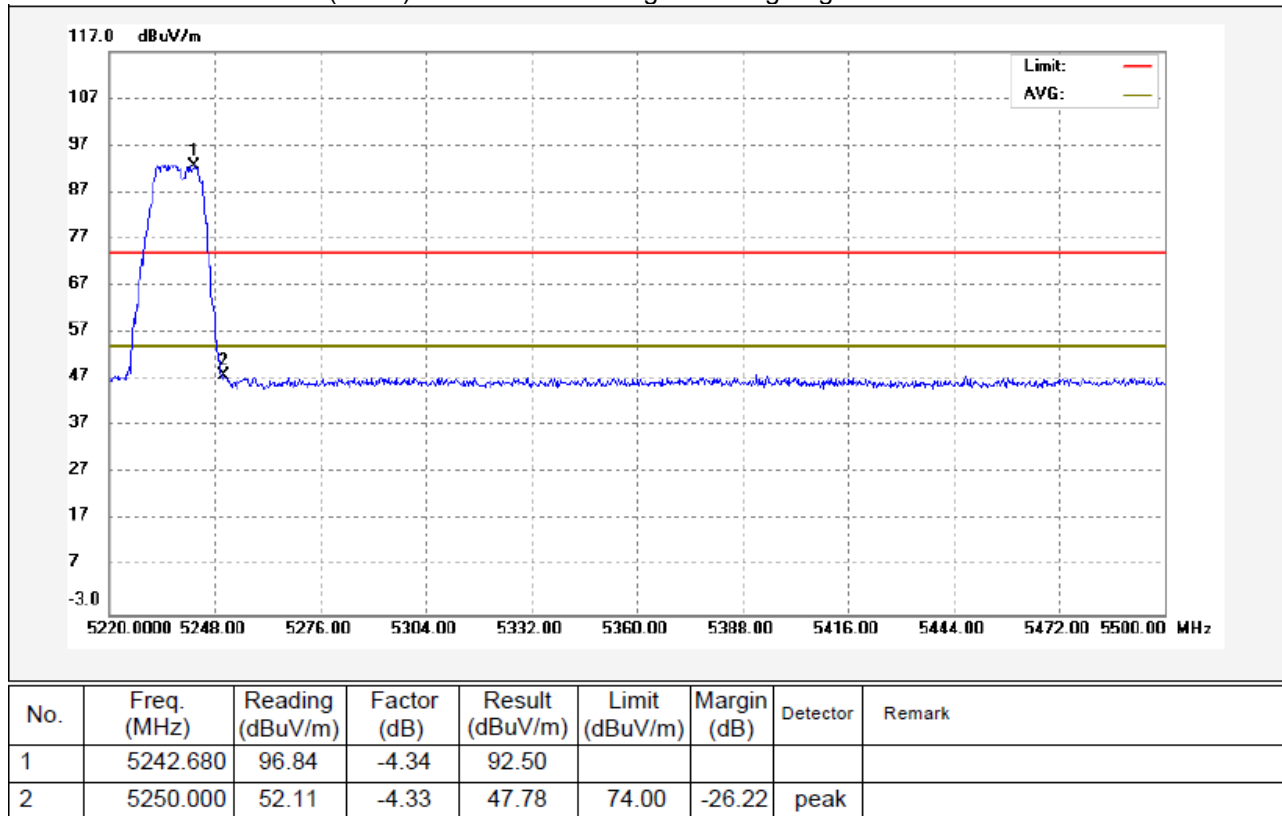
802.11ac(HT20) U-NII-1 Transmitting Band edge-left side Horizontal



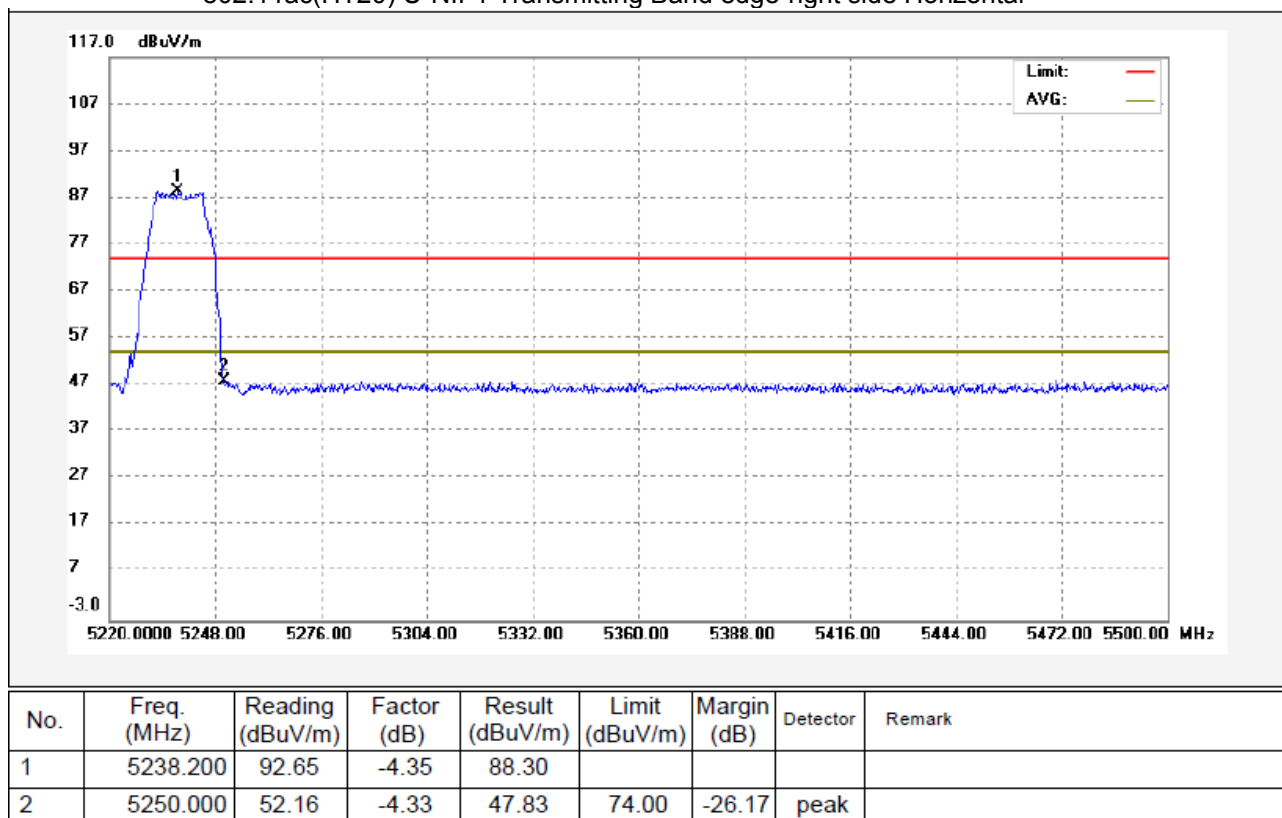
802.11ac(HT20) U-NII-1 Transmitting Band edge-left side Vertical



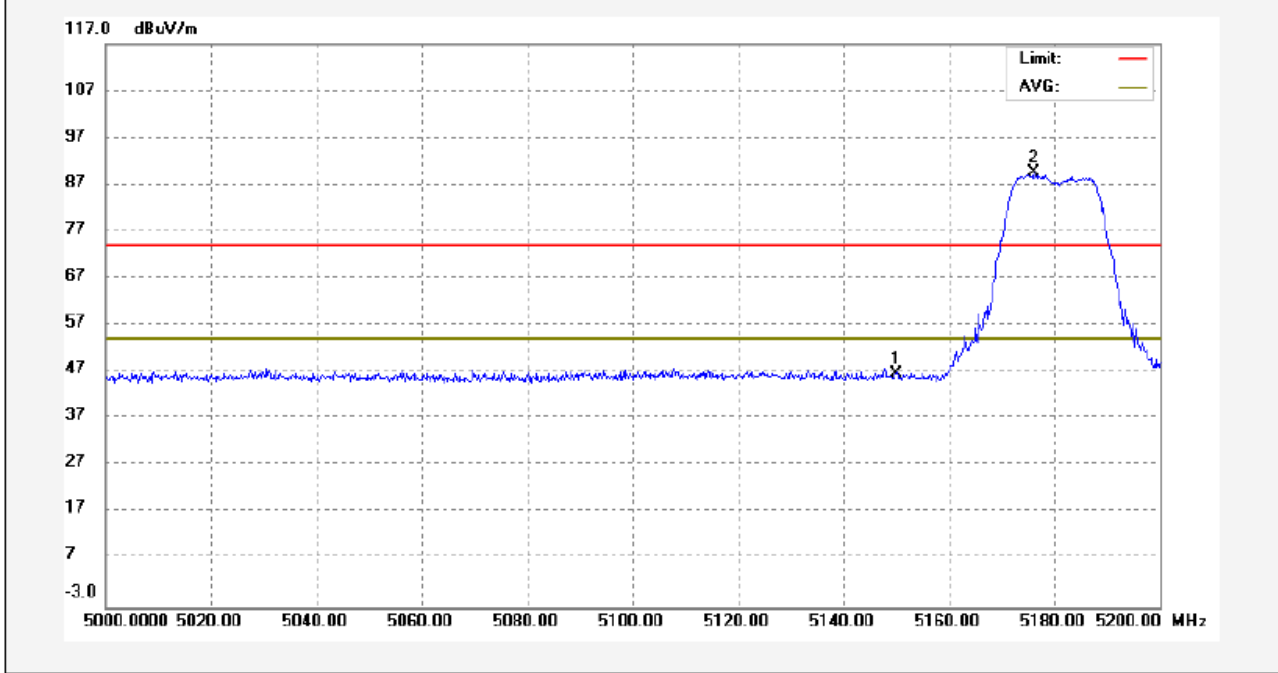
802.11ac(HT20) U-NII-1 Transmitting Band edge-right side Vertical



802.11ac(HT20) U-NII-1 Transmitting Band edge-right side Horizontal

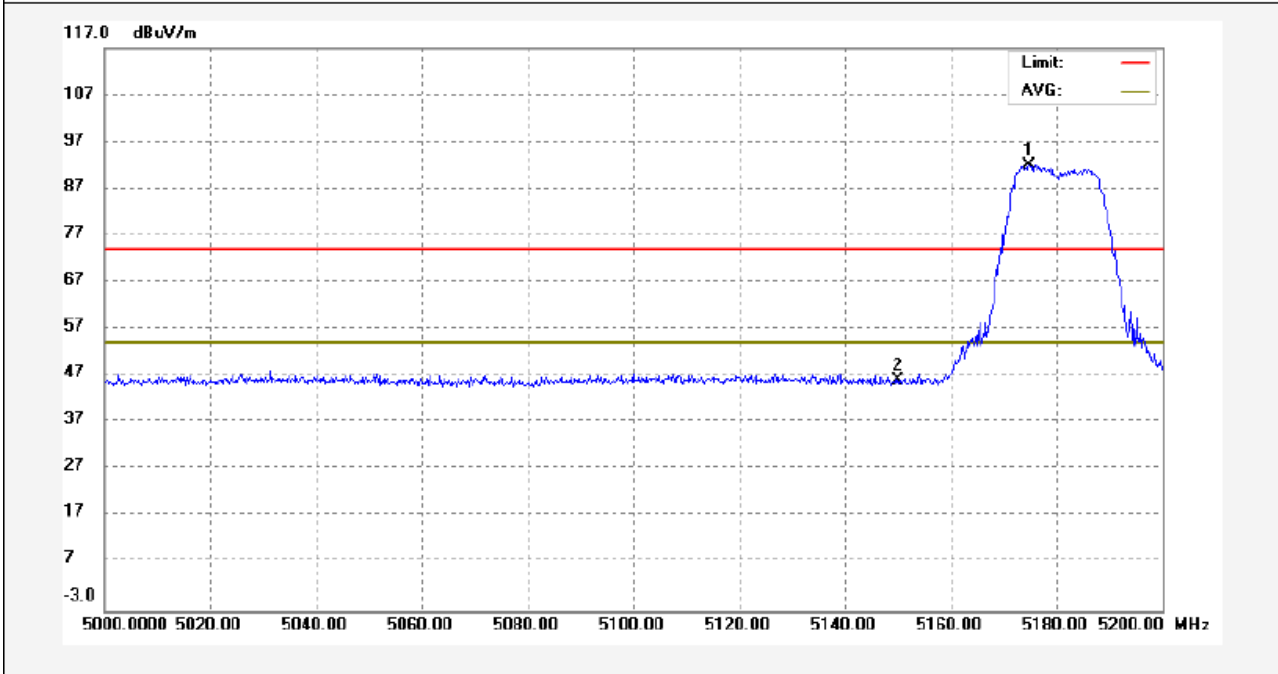


802.11n(HT20) U-NII-1 Transmitting Band edge-left side Horizontal



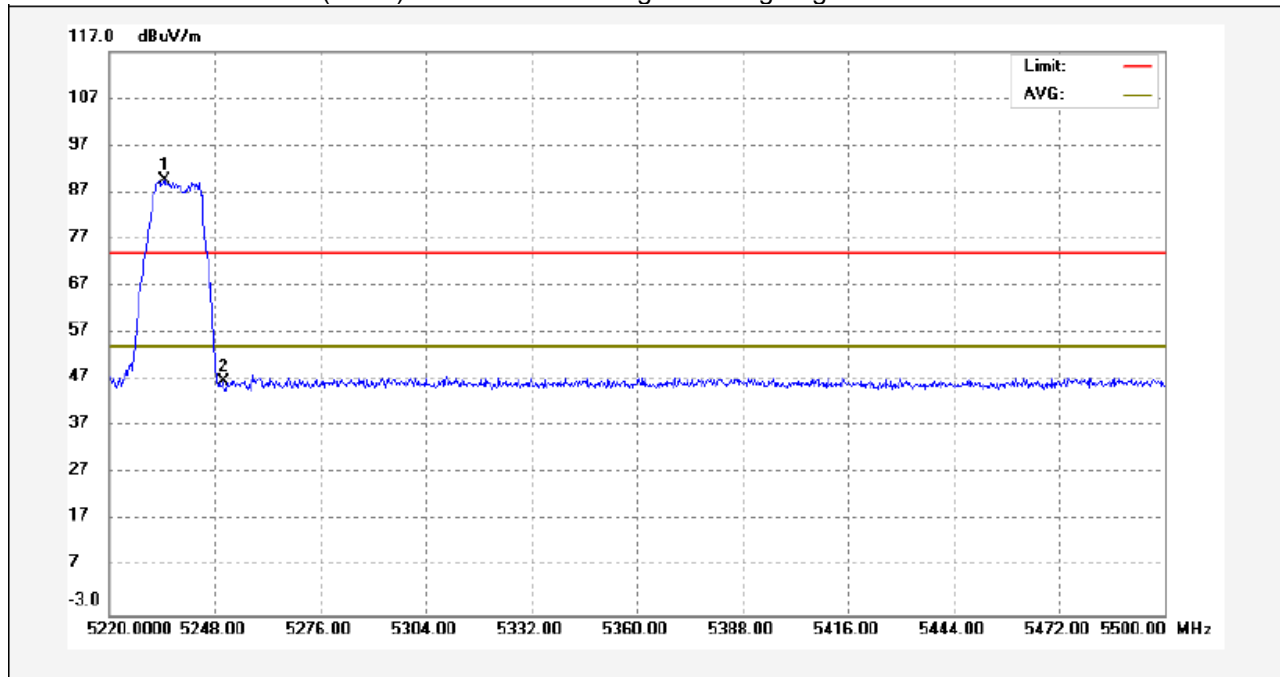
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5150.000	51.08	-4.47	46.61	74.00	-27.39	peak	
2	5176.000	93.99	-4.43	89.56				

802.11n(HT20) U-NII-1 Transmitting Band edge-left side Vertical

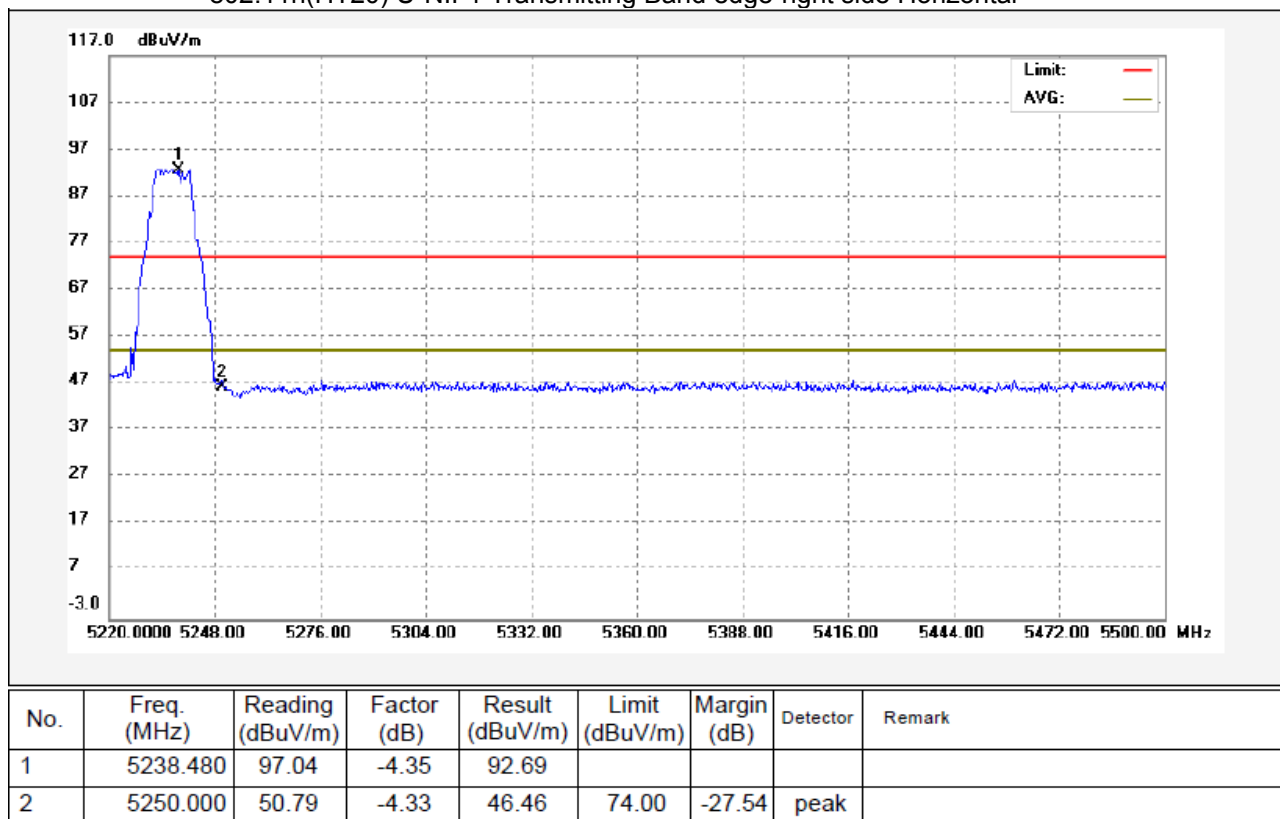


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5174.800	96.47	-4.44	92.03				
2	5150.000	50.54	-4.47	46.07	74.00	-27.93	peak	

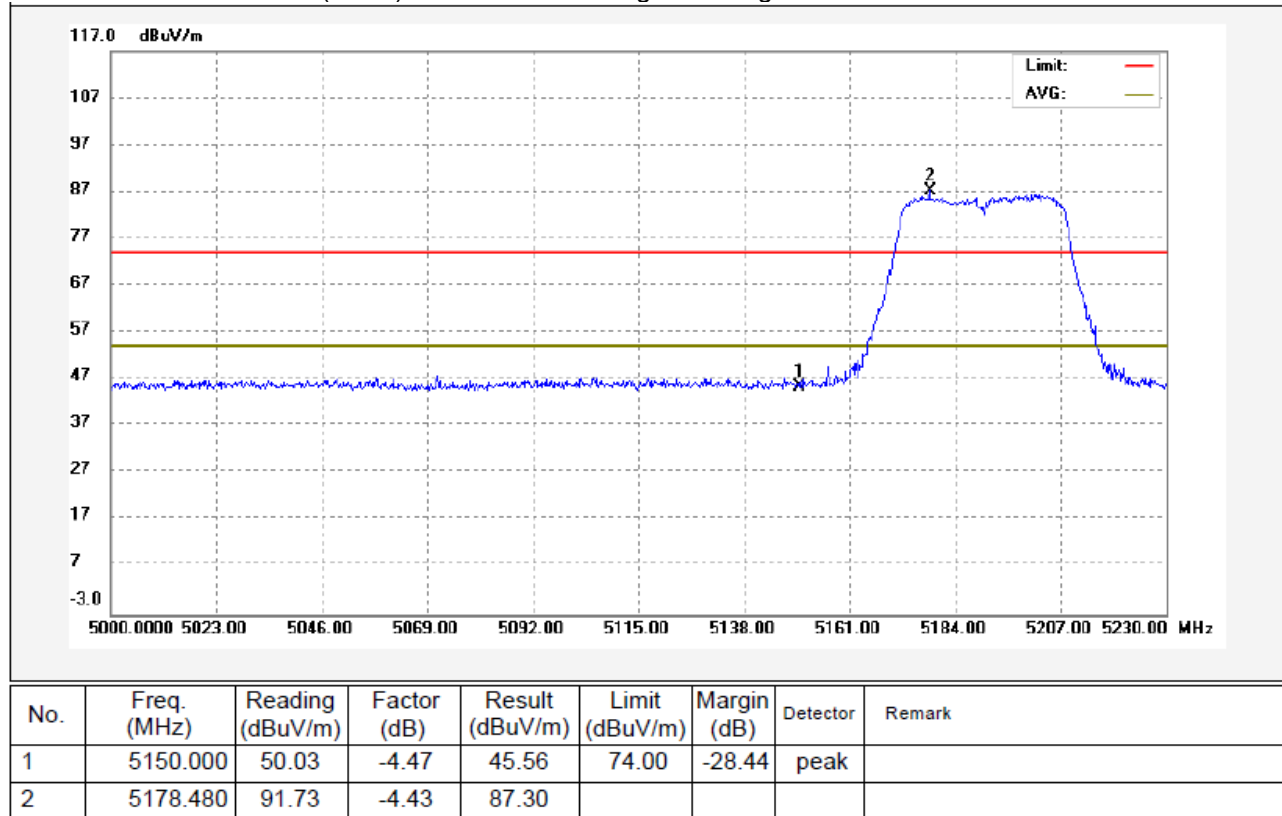
802.11n(HT20) U-NII-1 Transmitting Band edge-right side Vertical



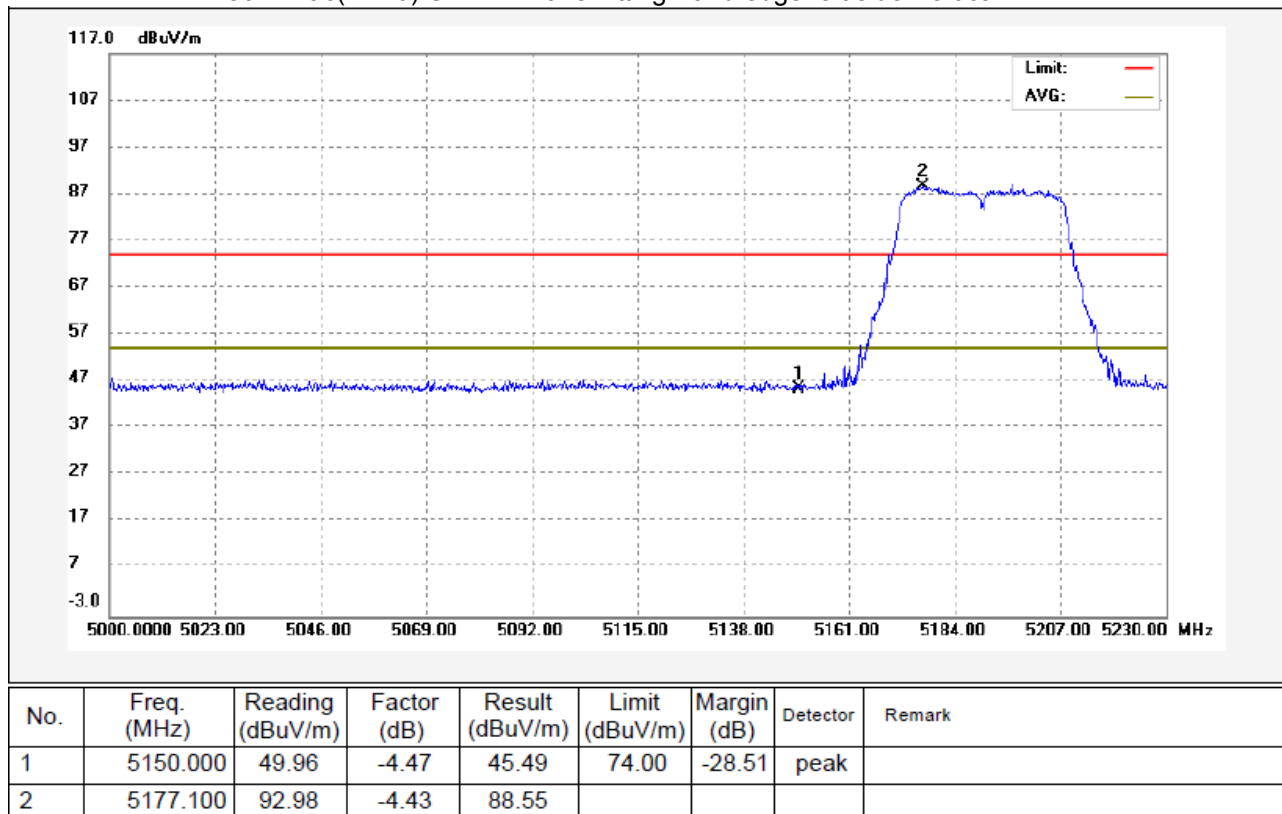
802.11n(HT20) U-NII-1 Transmitting Band edge-right side Horizontal



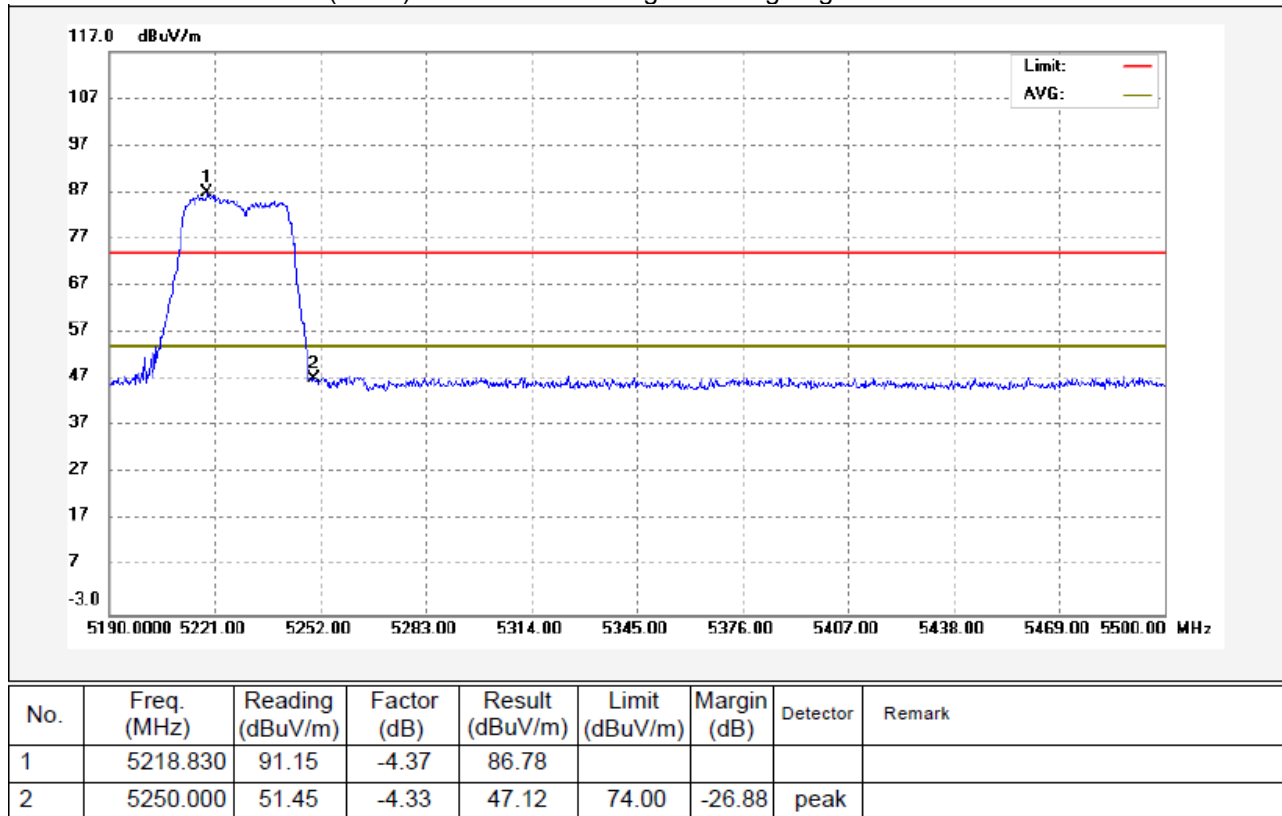
802.11ac(HT40) U-NII-1 Transmitting Band edge-left side Horizontal



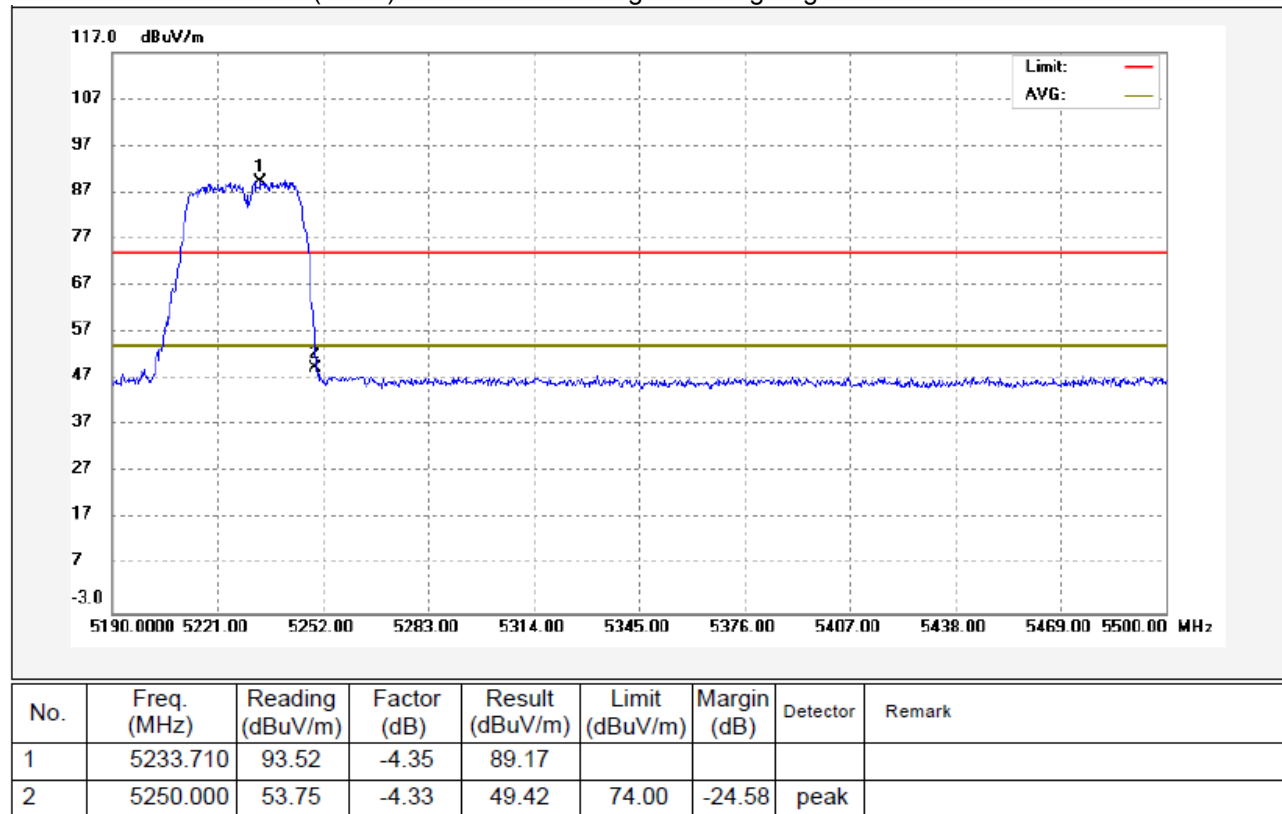
802.11ac(HT40) U-NII-1 Transmitting Band edge-left side Vertical



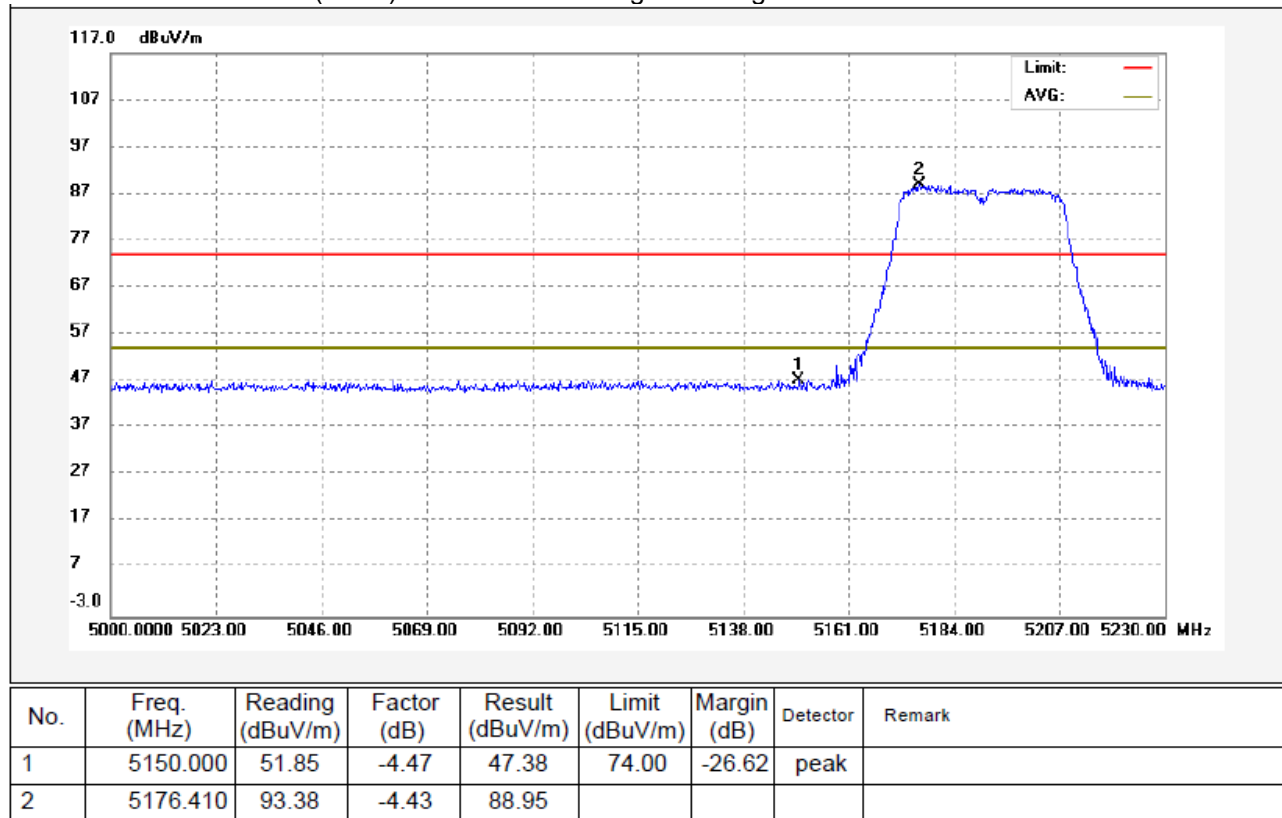
802.11ac(HT40) U-NII-1 Transmitting Band edge-right side Vertical



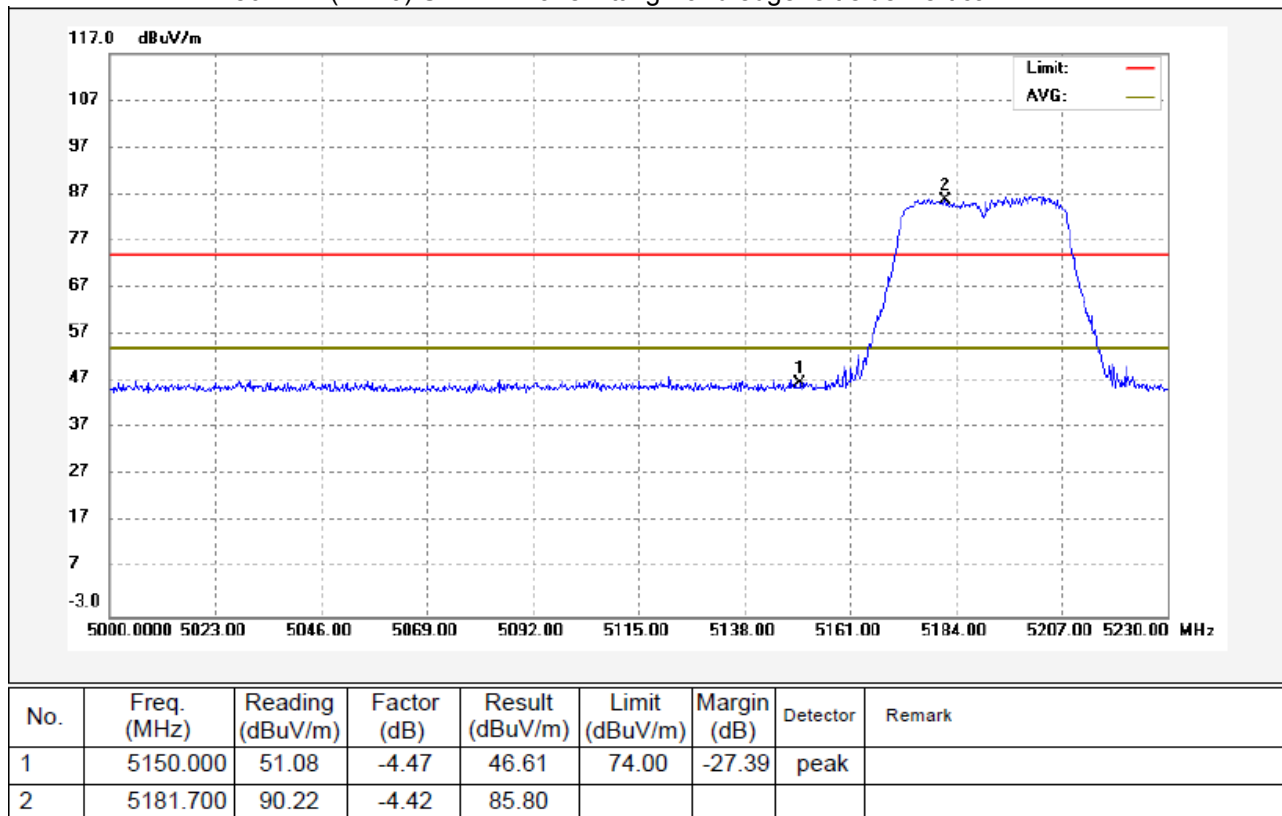
802.11ac(HT40) U-NII-1 Transmitting Band edge-right side Horizontal



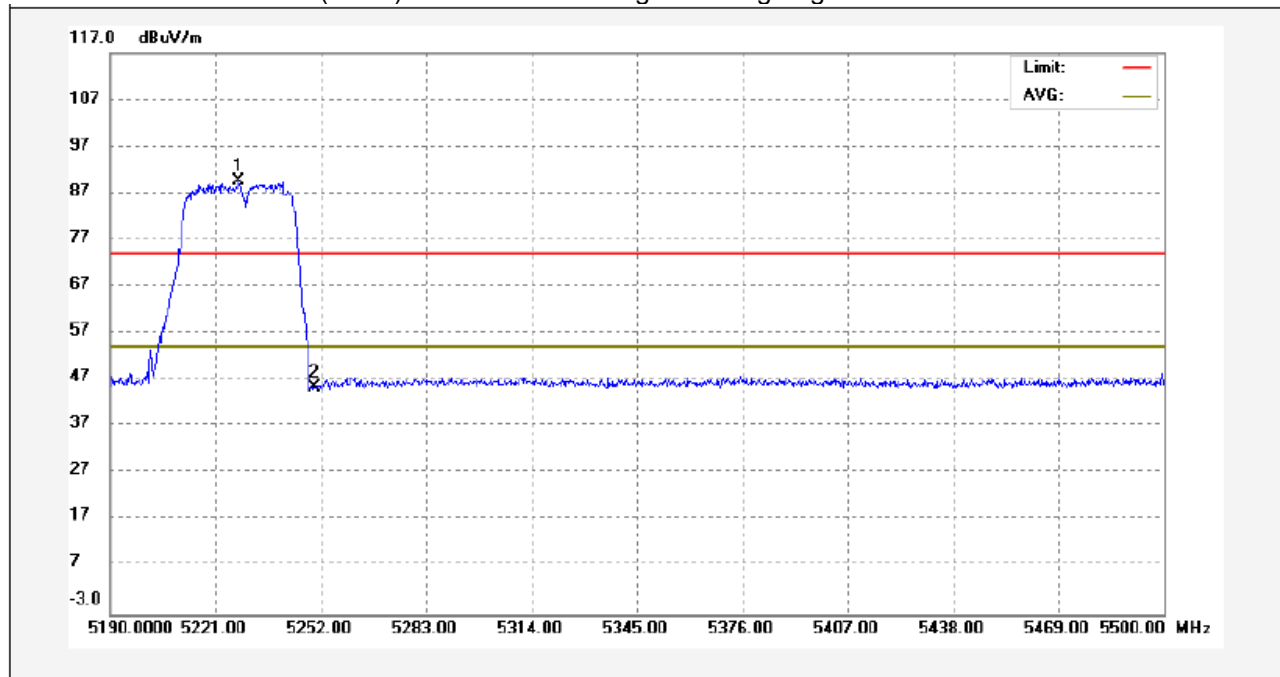
802.11n(HT40) U-NII-1 Transmitting Band edge-left side Horizontal



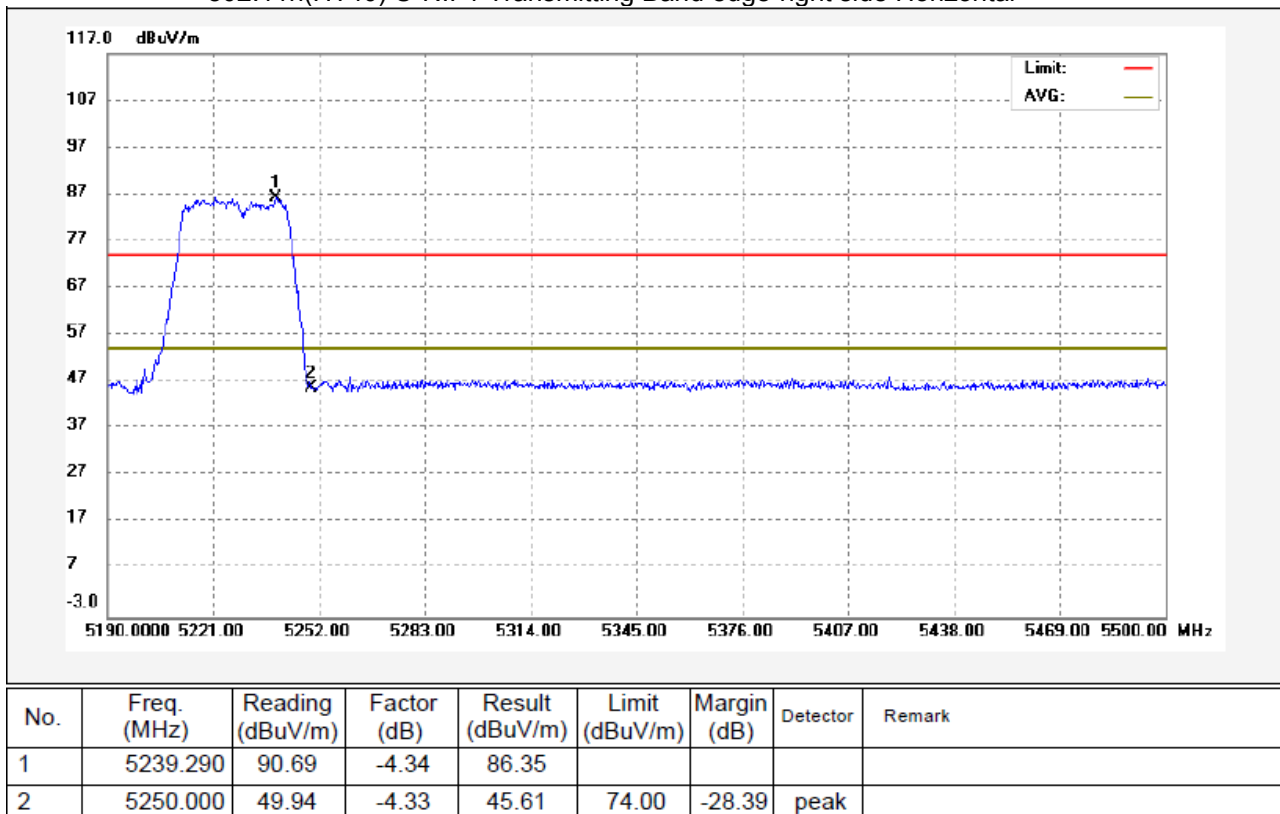
802.11n(HT40) U-NII-1 Transmitting Band edge-left side Vertical



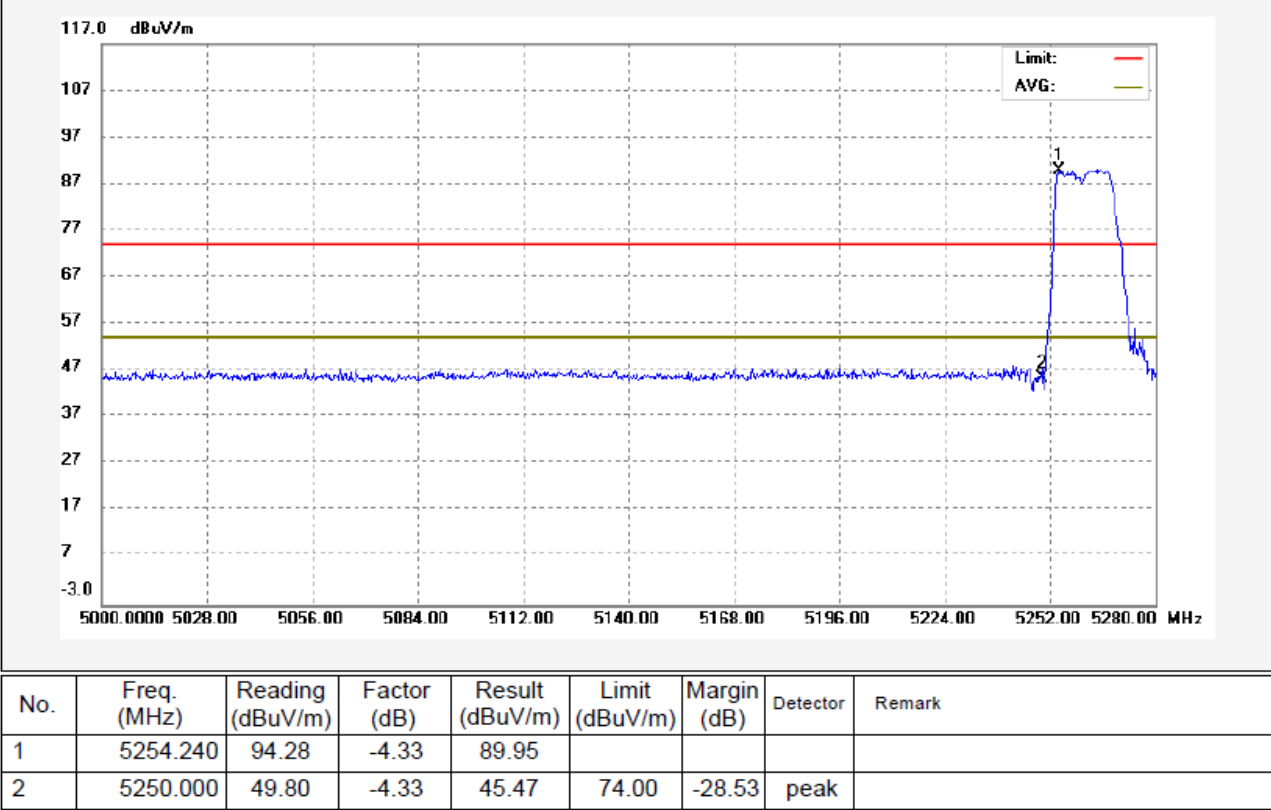
802.11n(HT40) U-NII-1 Transmitting Band edge-right side Vertical



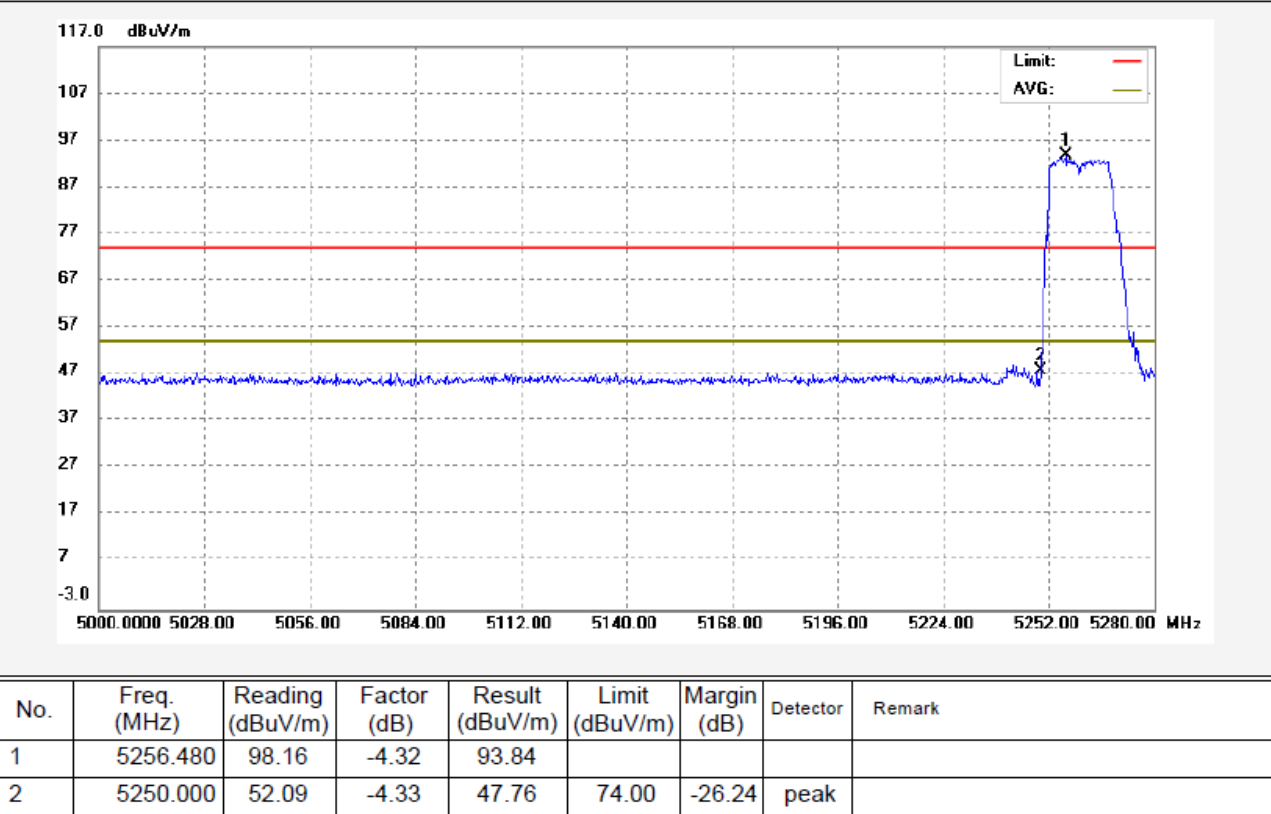
802.11n(HT40) U-NII-1 Transmitting Band edge-right side Horizontal



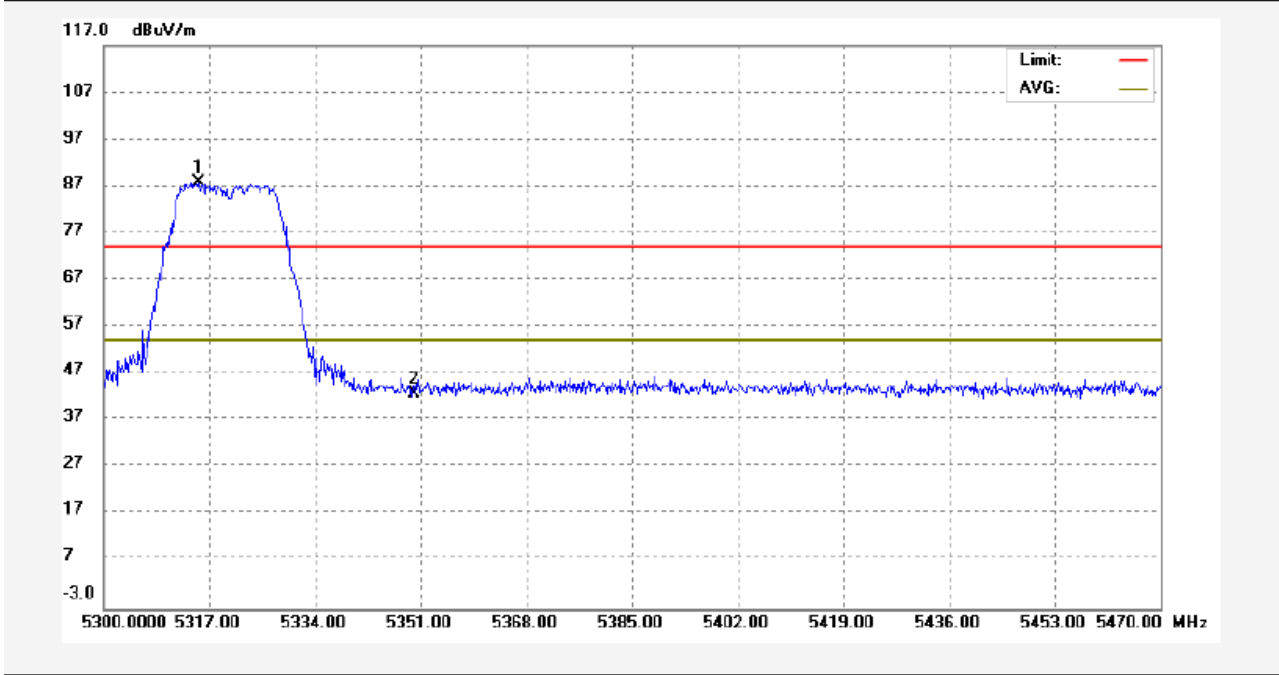
802.11a(HT20) U-NII-2A Transmitting Band edge-left side Horizontal



802.11a(HT20) U-NII-2A Transmitting Band edge-left side Vertical

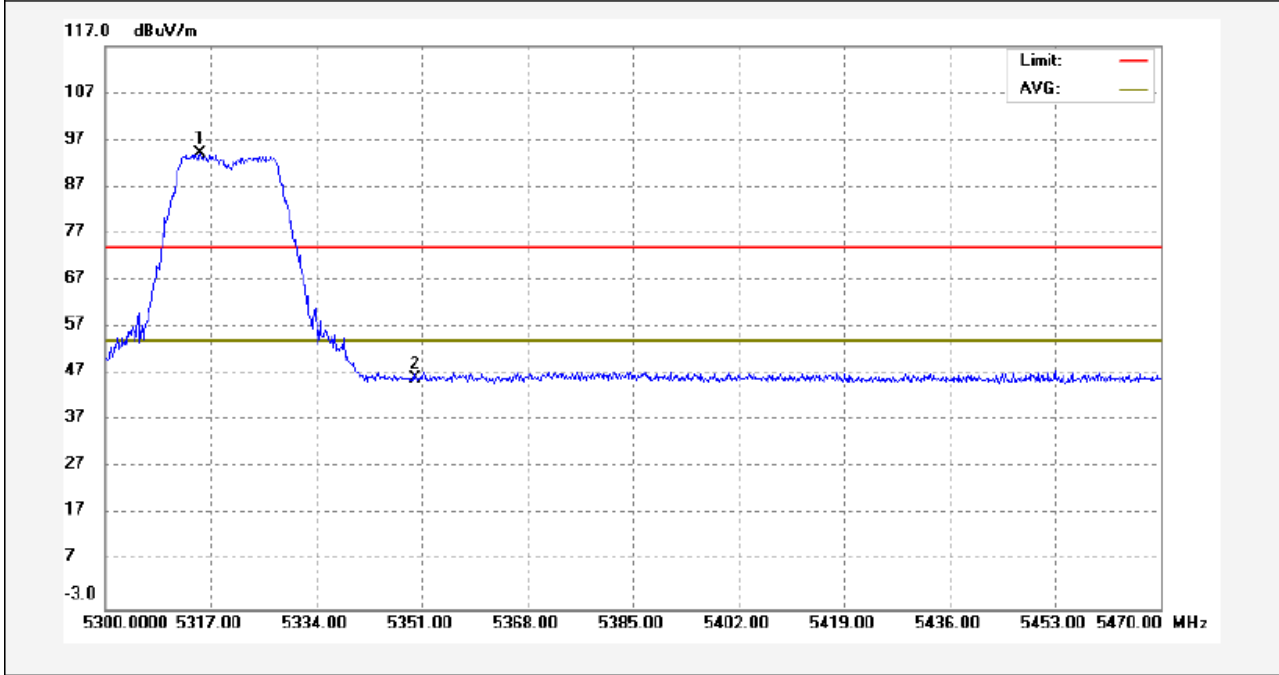


802.11a(HT20) U-NII-2A Transmitting Band edge-right side Vertical



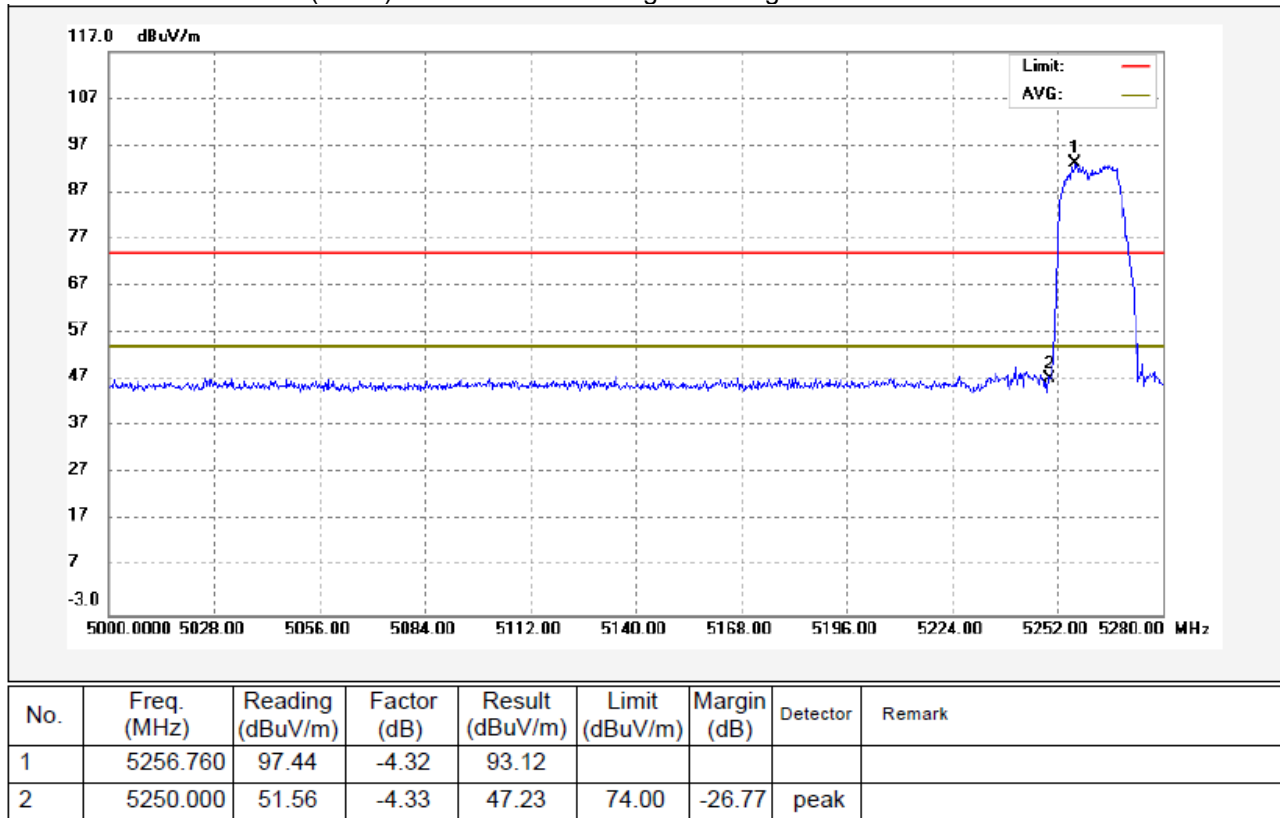
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5315.300	92.09	-4.24	87.85	74.00	-13.85		
2	5350.000	46.93	-4.19	42.74	74.00	-31.26	peak	

802.11a(HT20) U-NII-2A Transmitting Band edge-right side Horizontal

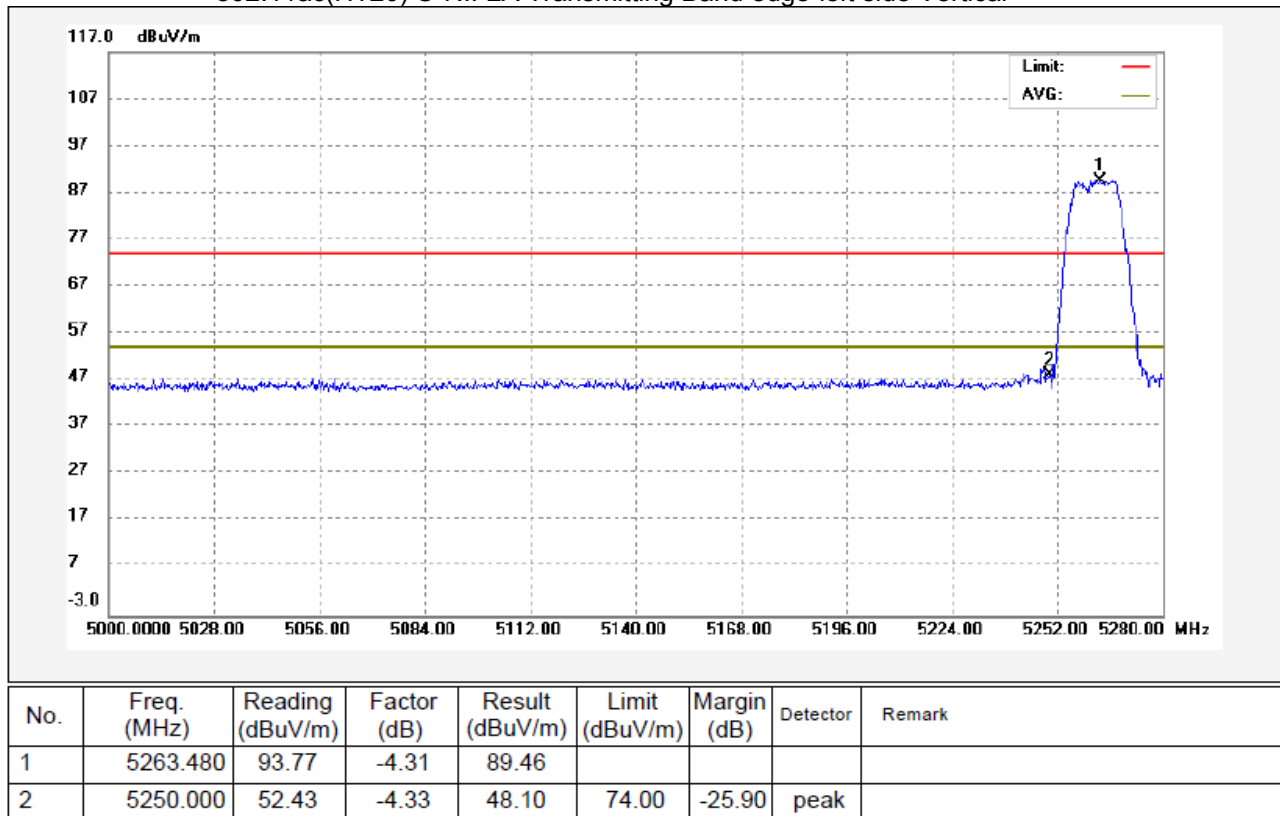


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5315.300	98.21	-4.24	93.97	74.00	-19.97		
2	5350.000	50.25	-4.19	46.06	74.00	-27.94	peak	

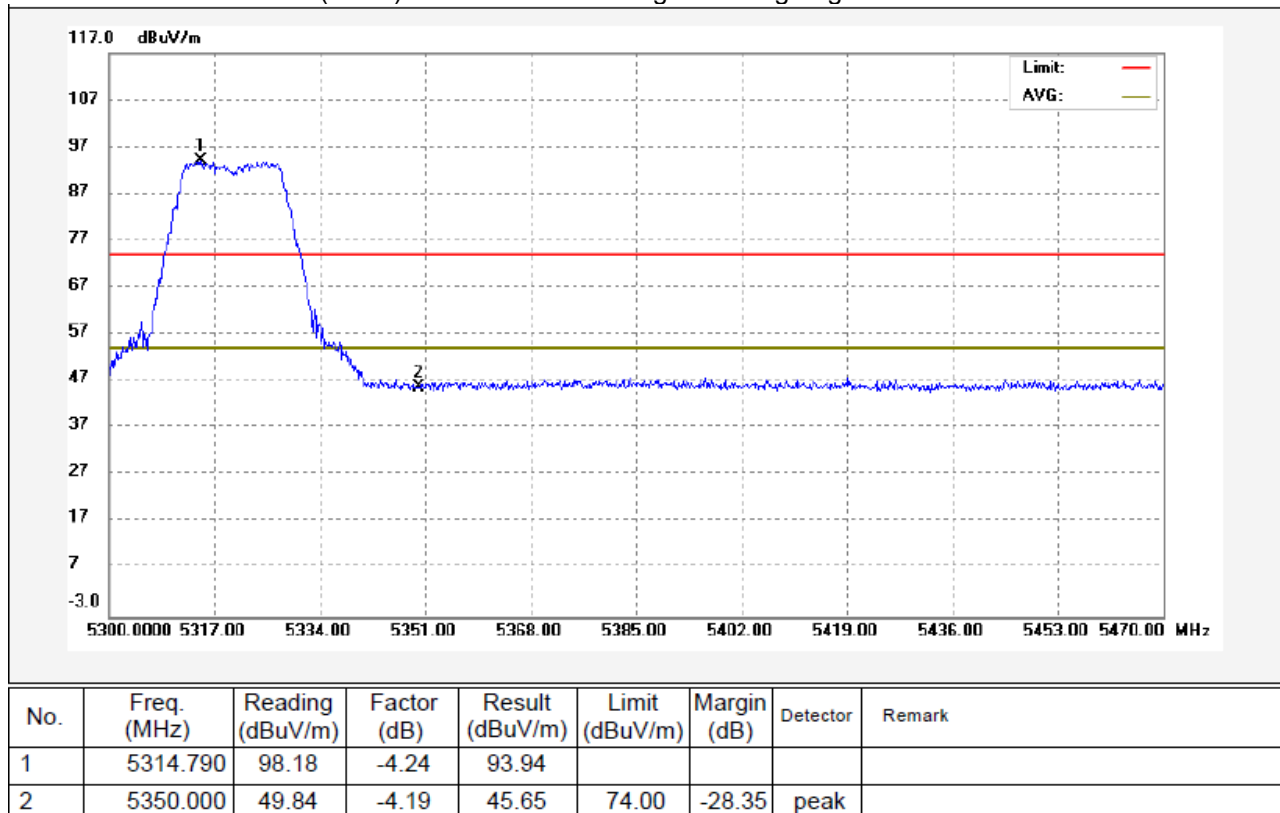
802.11ac(HT20) U-NII-2A Transmitting Band edge-left side Horizontal



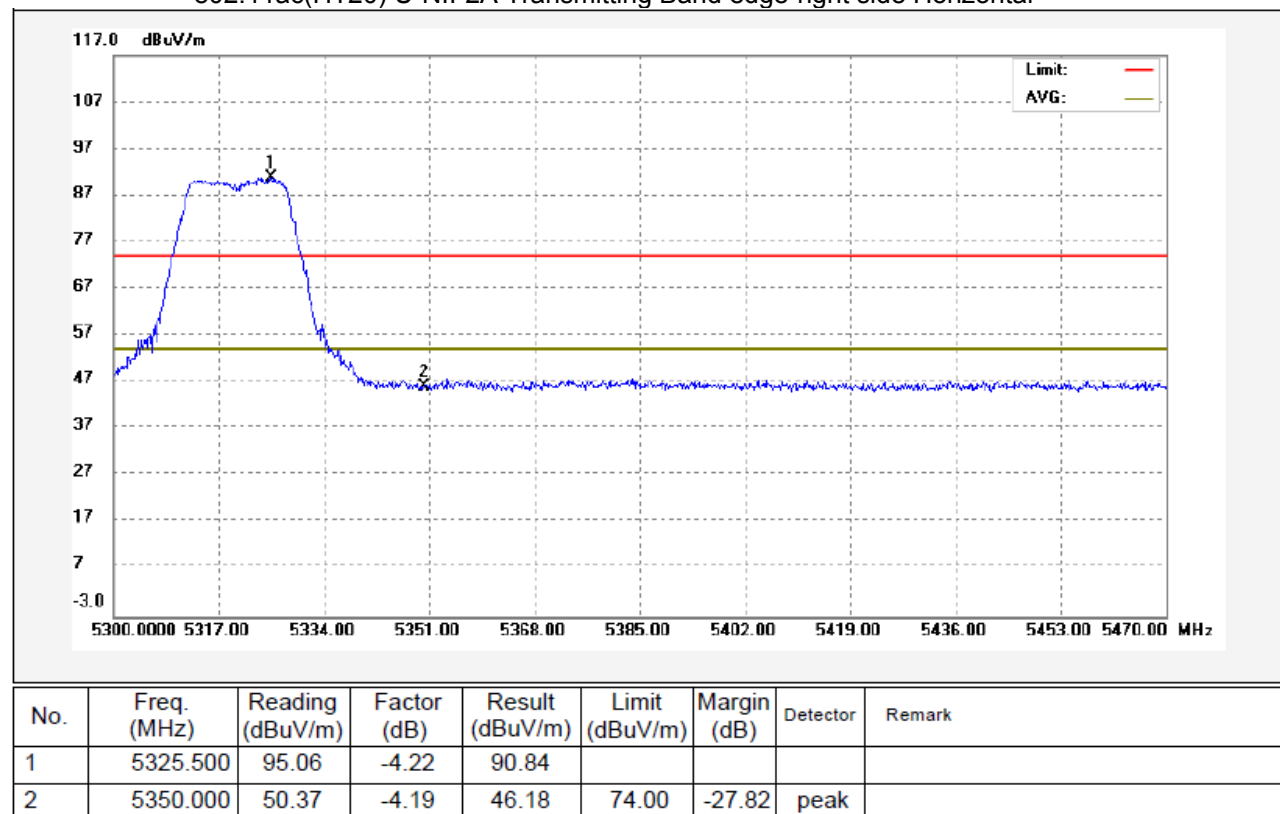
802.11ac(HT20) U-NII-2A Transmitting Band edge-left side Vertical



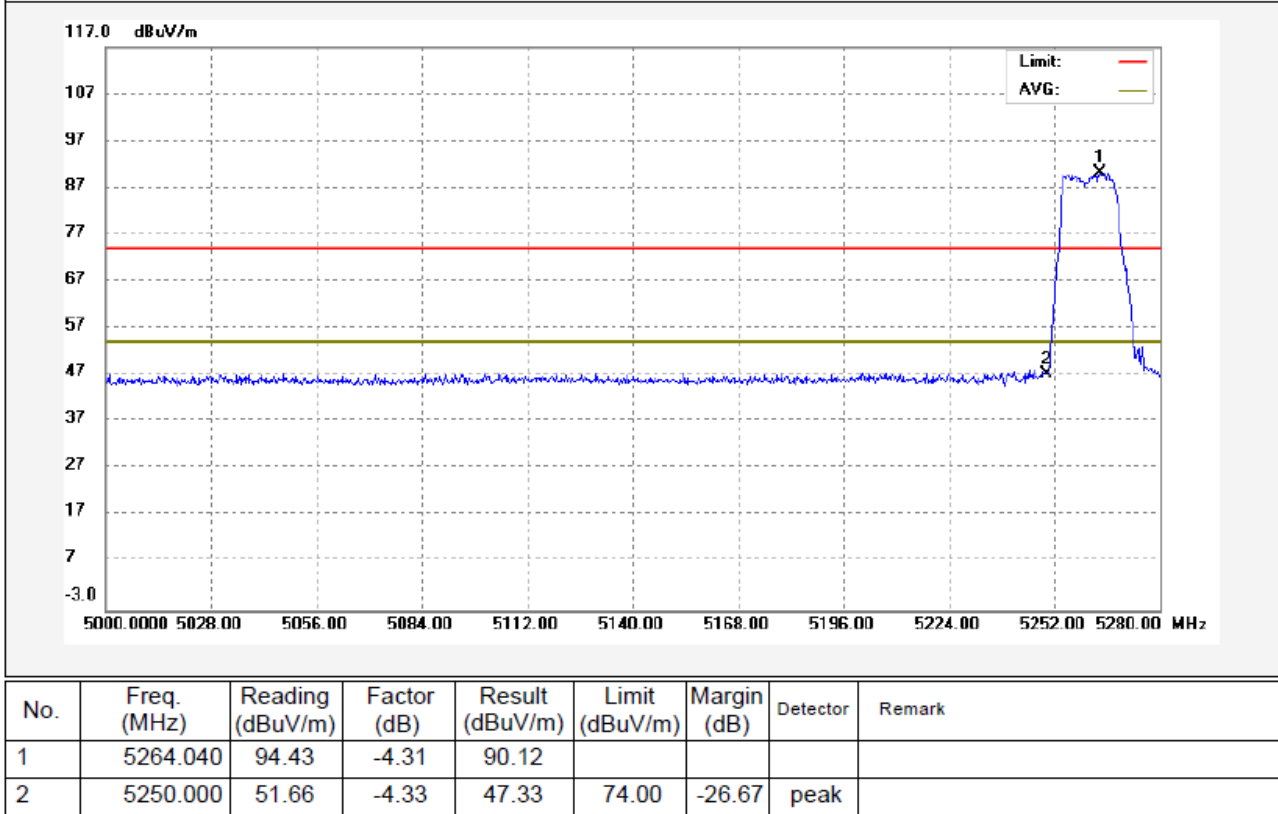
802.11ac(HT20) U-NII-2A Transmitting Band edge-right side Vertical



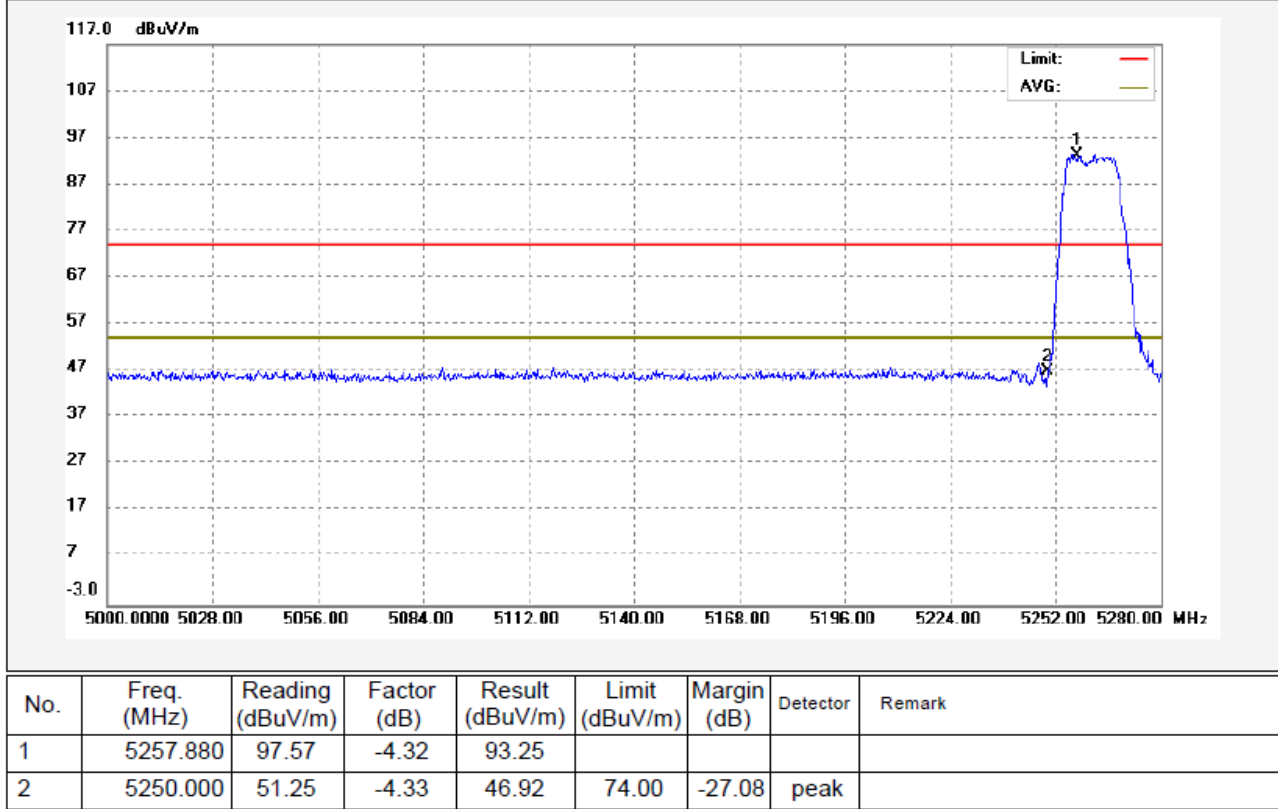
802.11ac(HT20) U-NII-2A Transmitting Band edge-right side Horizontal



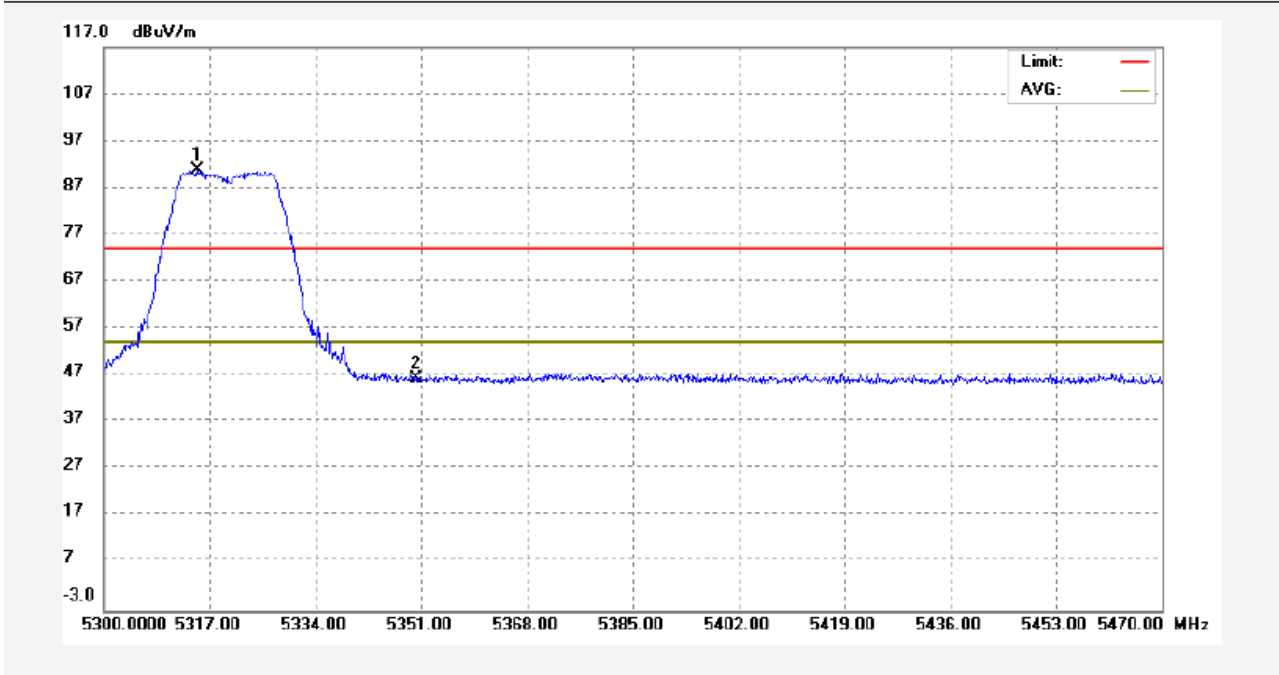
802.11n(HT20) U-NII-2A Transmitting Band edge-left side Horizontal



802.11n(HT20) U-NII-2A Transmitting Band edge-left side Vertical

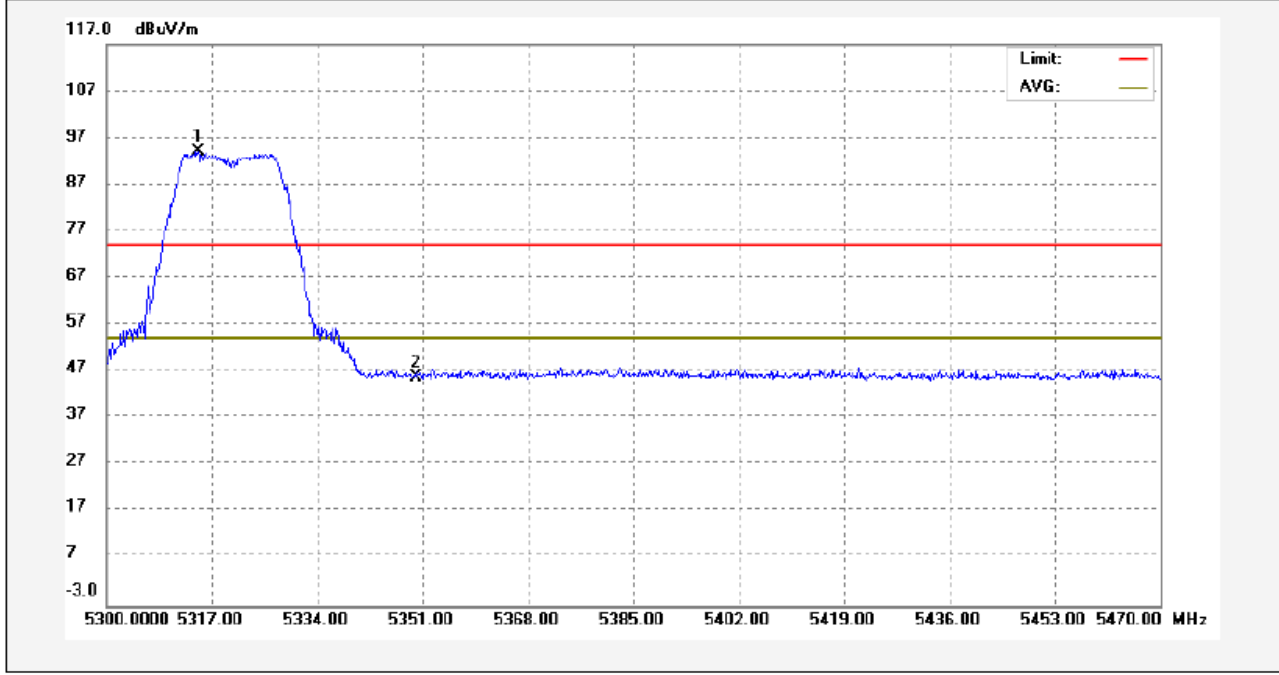


802.11n(HT20) U-NII-2A Transmitting Band edge-right side Vertical



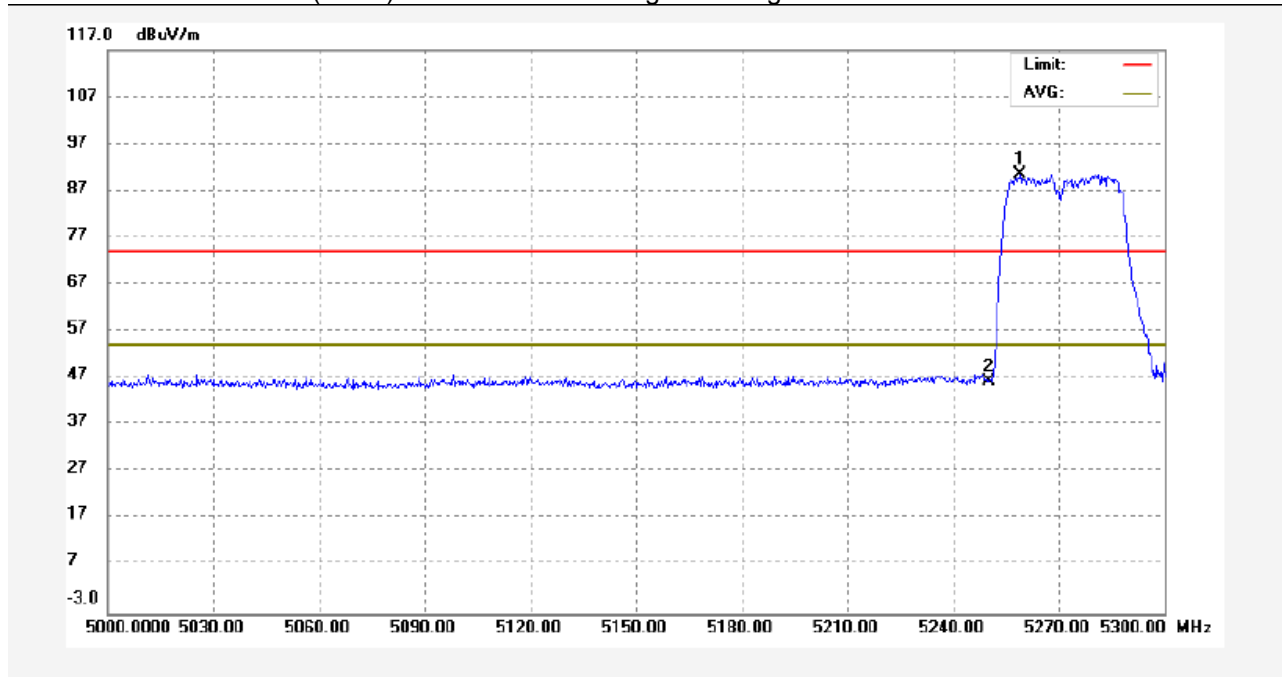
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5314.960	95.02	-4.24	90.78	74.00	-27.60	peak	
2	5350.000	50.59	-4.19	46.40	74.00	-27.60	peak	

802.11n (HT20) U-NII-2A Transmitting Band edge-right side Horizontal



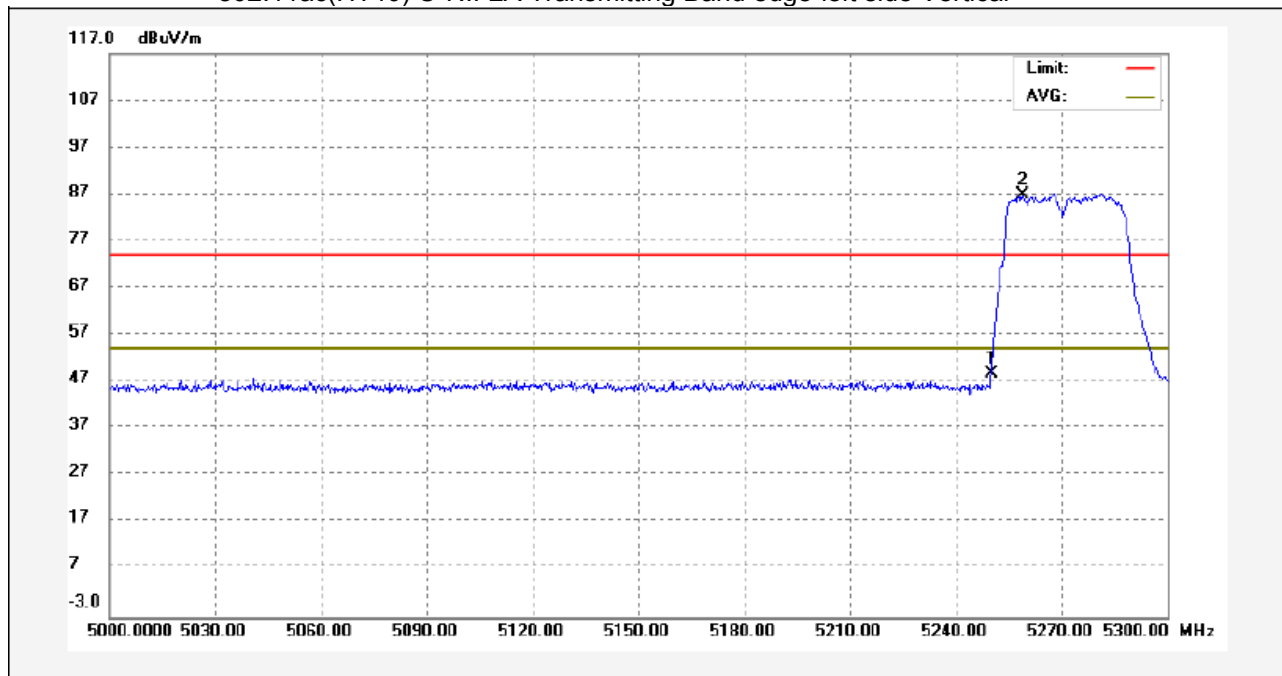
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5314.790	98.21	-4.24	93.97	74.00	-28.19	peak	
2	5350.000	50.00	-4.19	45.81	74.00	-28.19	peak	

802.11ac(HT40) U-NII-2A Transmitting Band edge-left side Horizontal



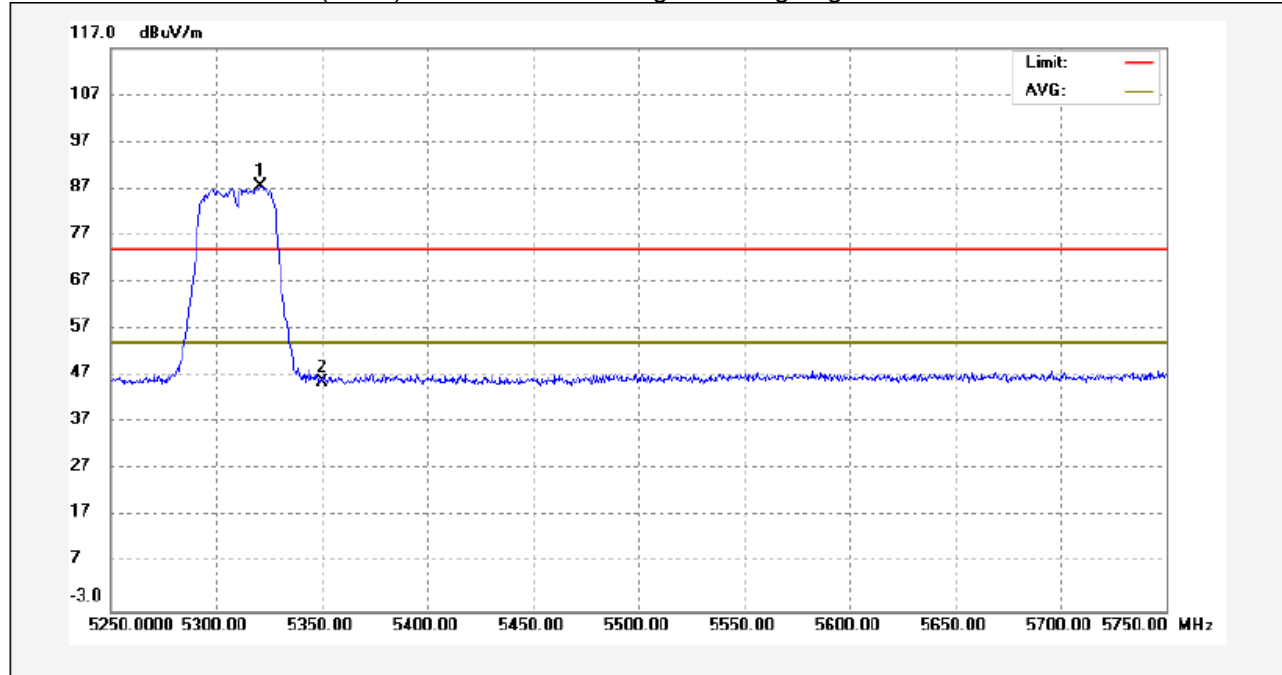
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5258.900	94.78	-4.32	90.46				
2	5250.000	50.70	-4.33	46.37	74.00	-27.63	peak	

802.11ac(HT40) U-NII-2A Transmitting Band edge-left side Vertical



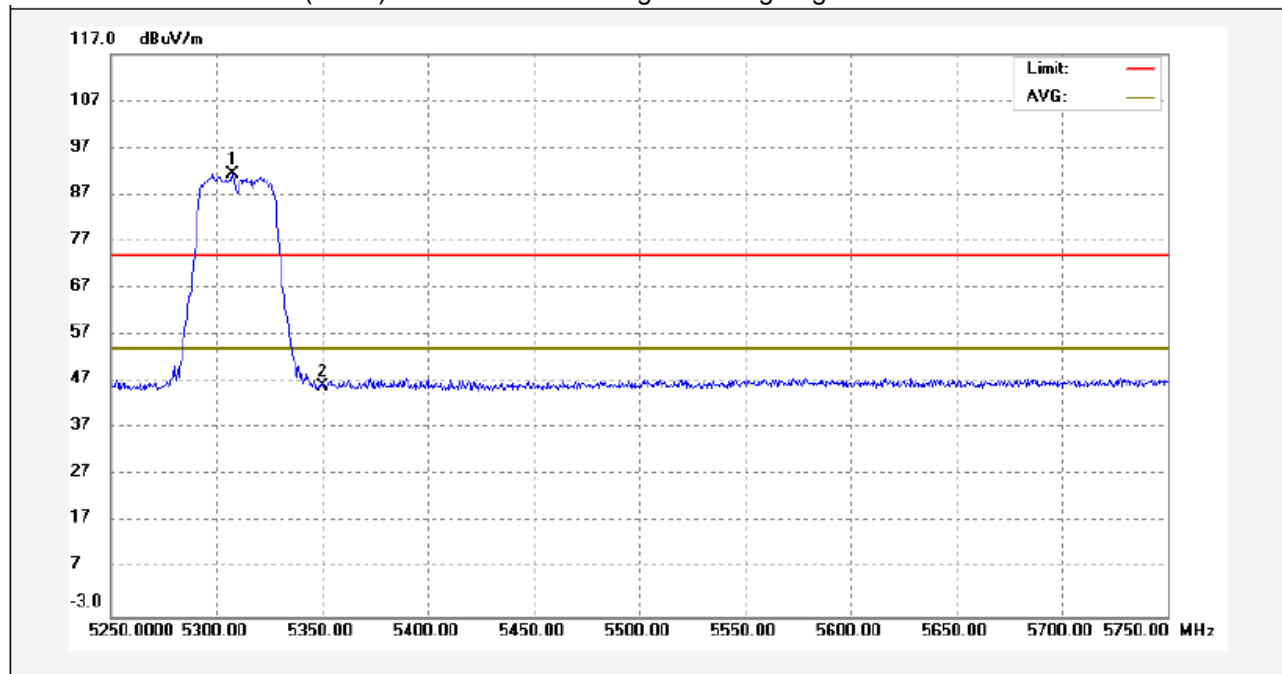
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5250.000	53.19	-4.33	48.86	74.00	-25.14	peak	
2	5258.900	91.15	-4.32	86.83				

802.11ac(HT40) U-NII-2A Transmitting Band edge-right side Vertical



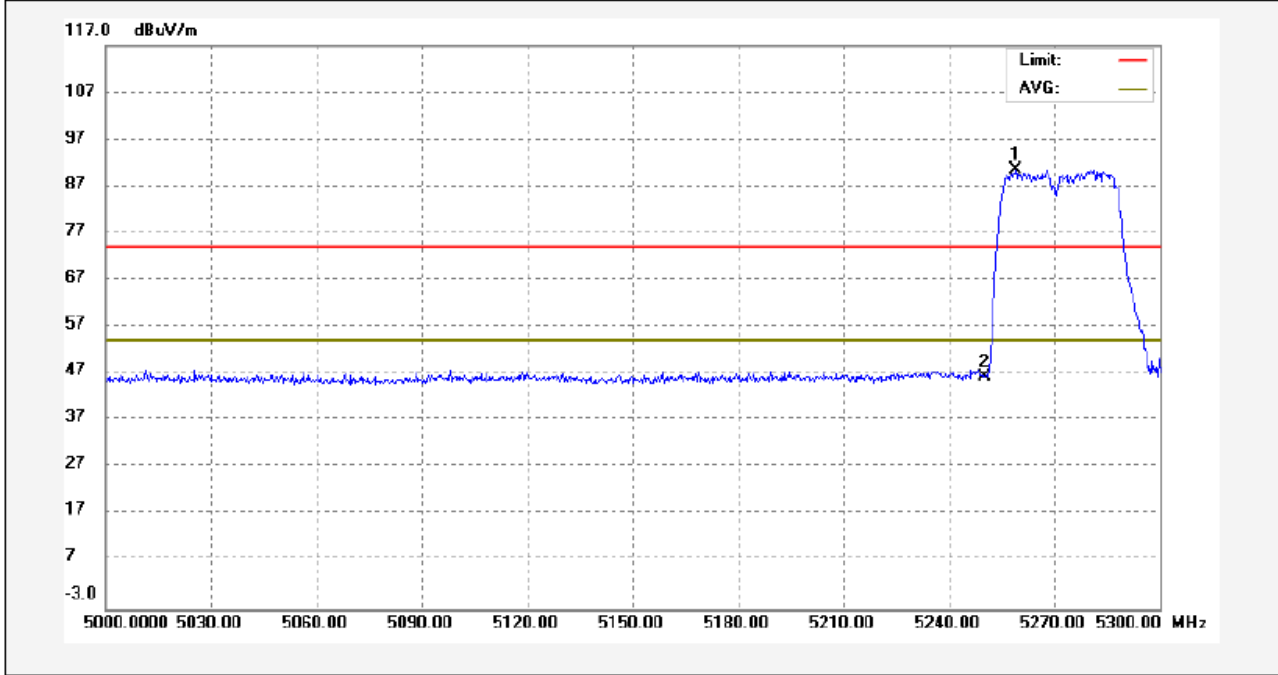
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5321.000	91.73	-4.23	87.50				
2	5350.000	50.03	-4.19	45.84	74.00	-28.16	peak	

802.11ac(HT40) U-NII-2A Transmitting Band edge-right side Horizontal



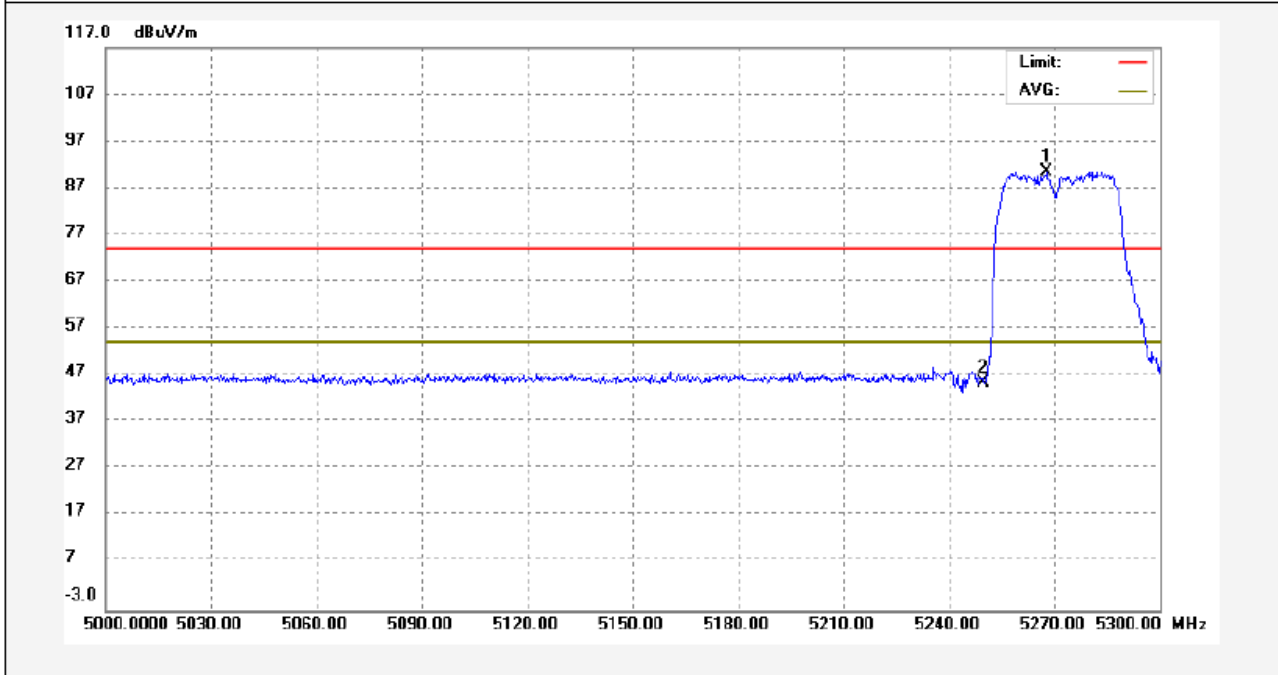
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5307.500	95.68	-4.24	91.44				
2	5350.000	50.15	-4.19	45.96	74.00	-28.04	peak	

802.11n(HT40) U-NII-2A Transmitting Band edge-left side Horizontal



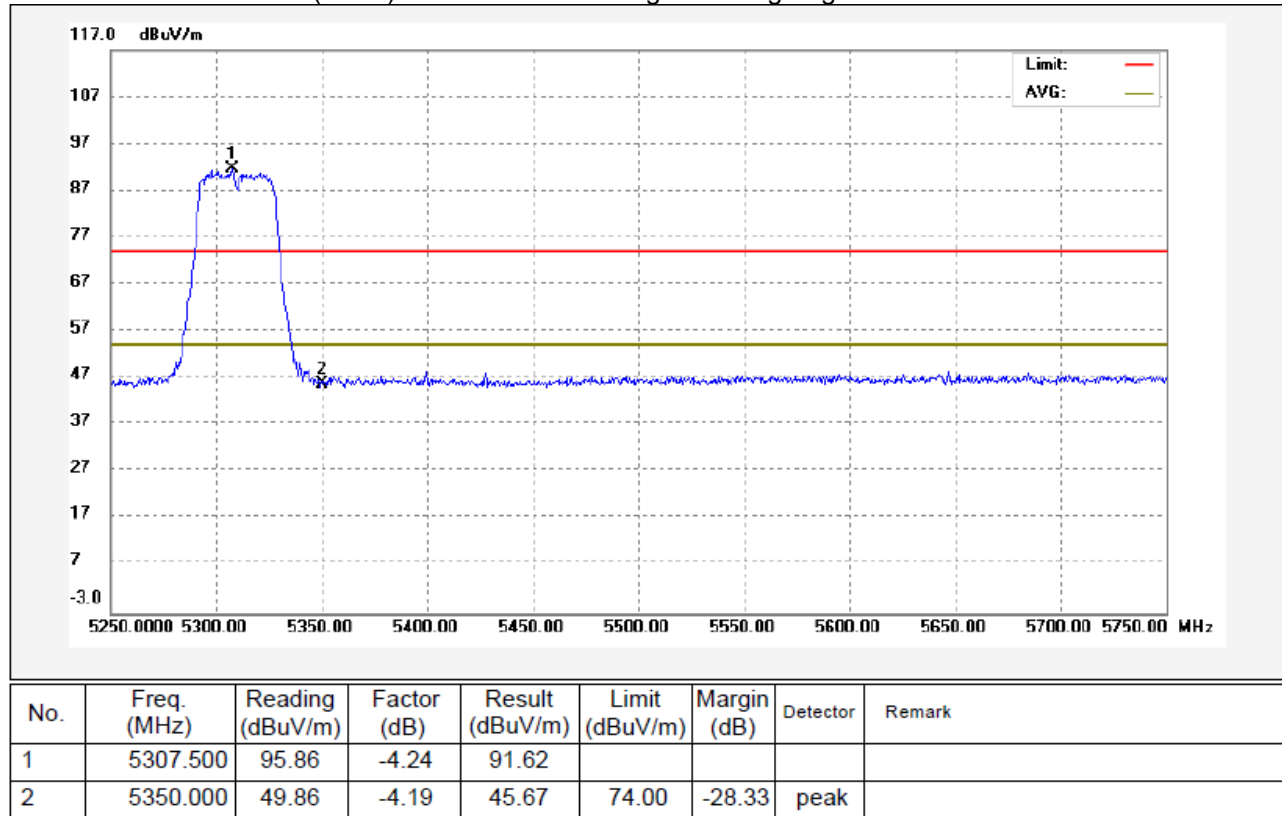
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5258.900	94.78	-4.32	90.46				
2	5250.000	50.70	-4.33	46.37	74.00	-27.63	peak	

802.11n(HT40) U-NII-2A Transmitting Band edge-left side Vertical

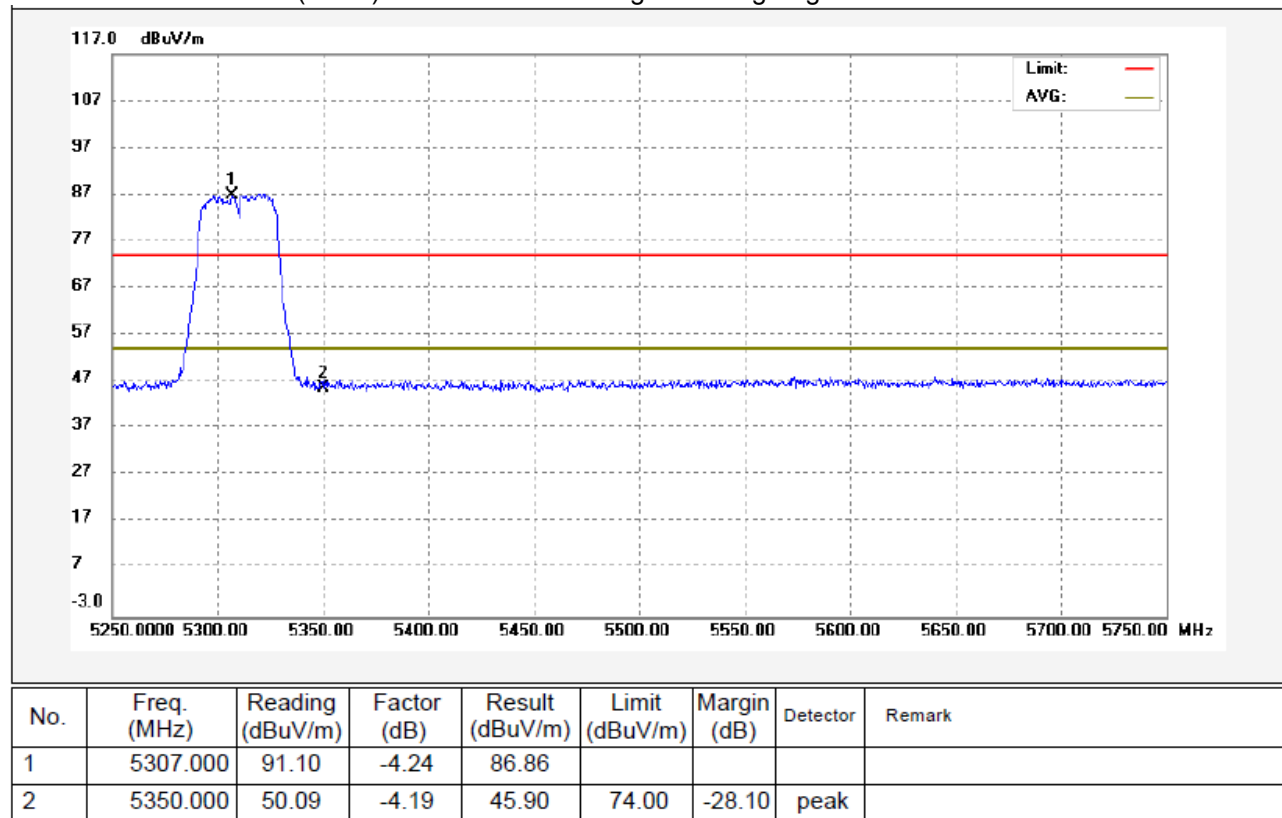


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5267.600	94.65	-4.31	90.34				
2	5250.000	49.67	-4.33	45.34	74.00	-28.66	peak	

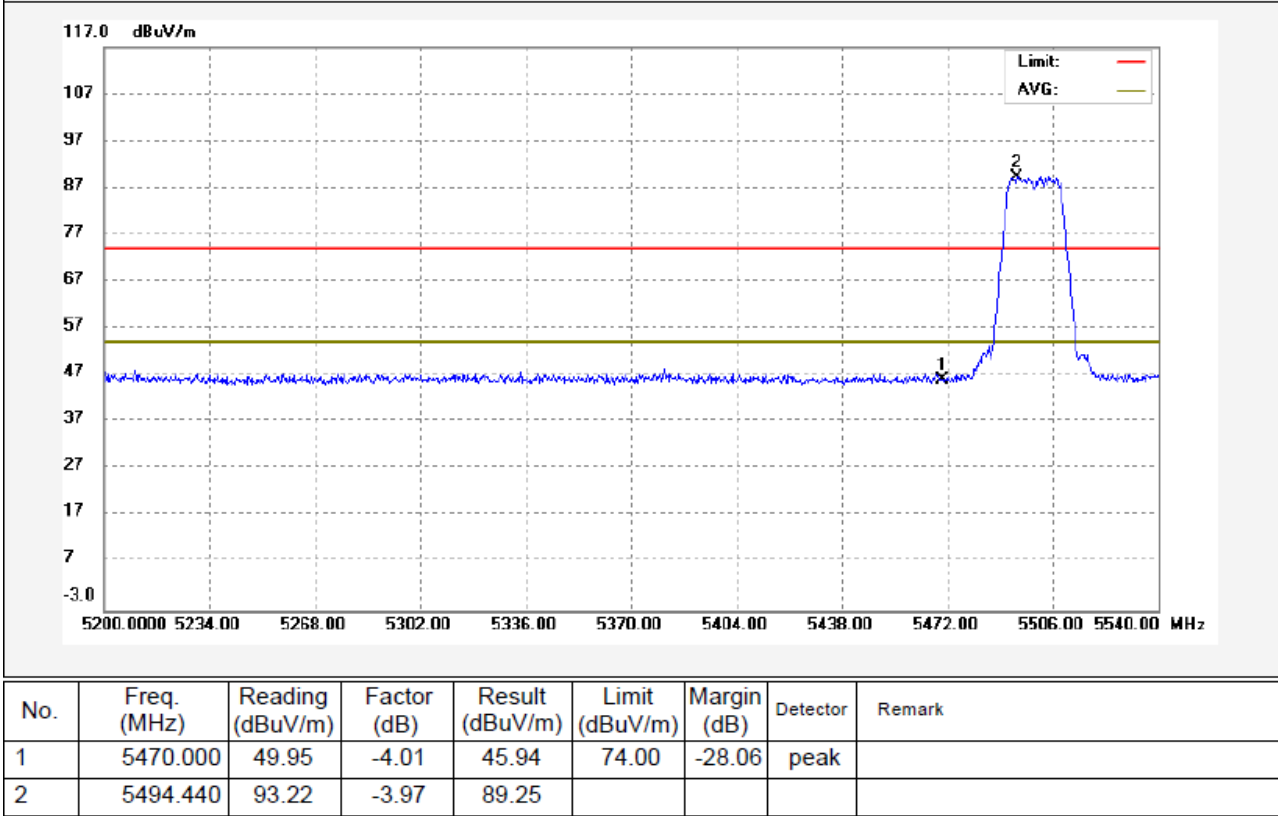
802.11n(HT40) U-NII-2A Transmitting Band edge-right side Vertical



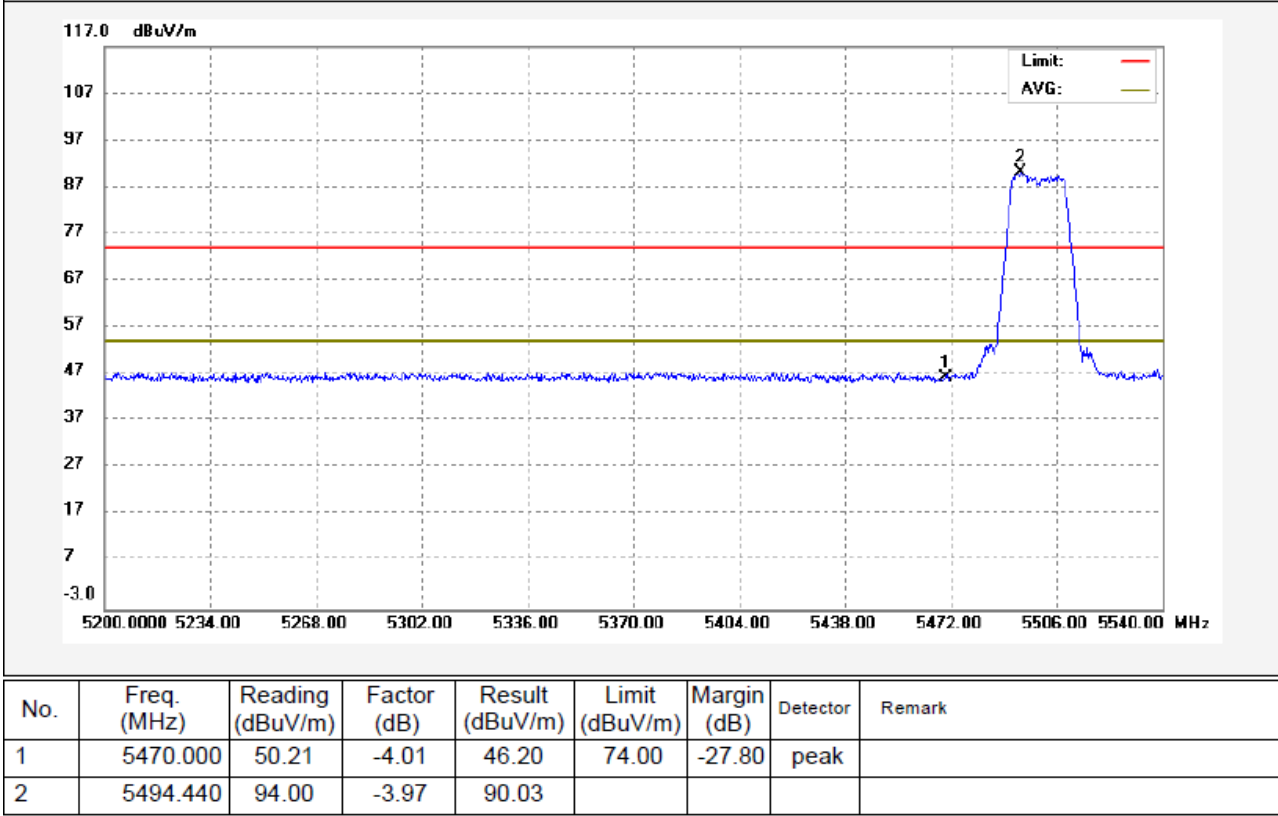
802.11n(HT40) U-NII-2A Transmitting Band edge-right side Horizontal



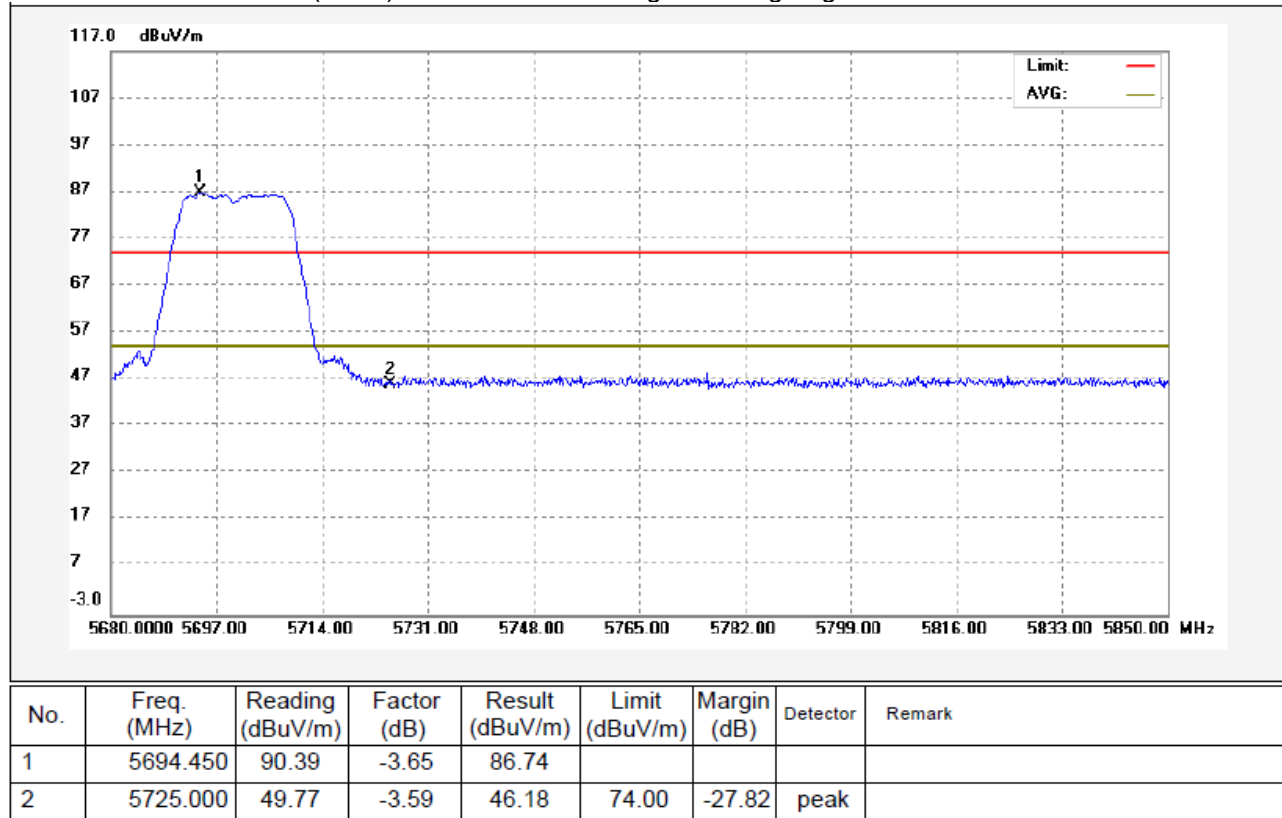
802.11a(HT20) U-NII-2C Transmitting Band edge-left side Horizontal



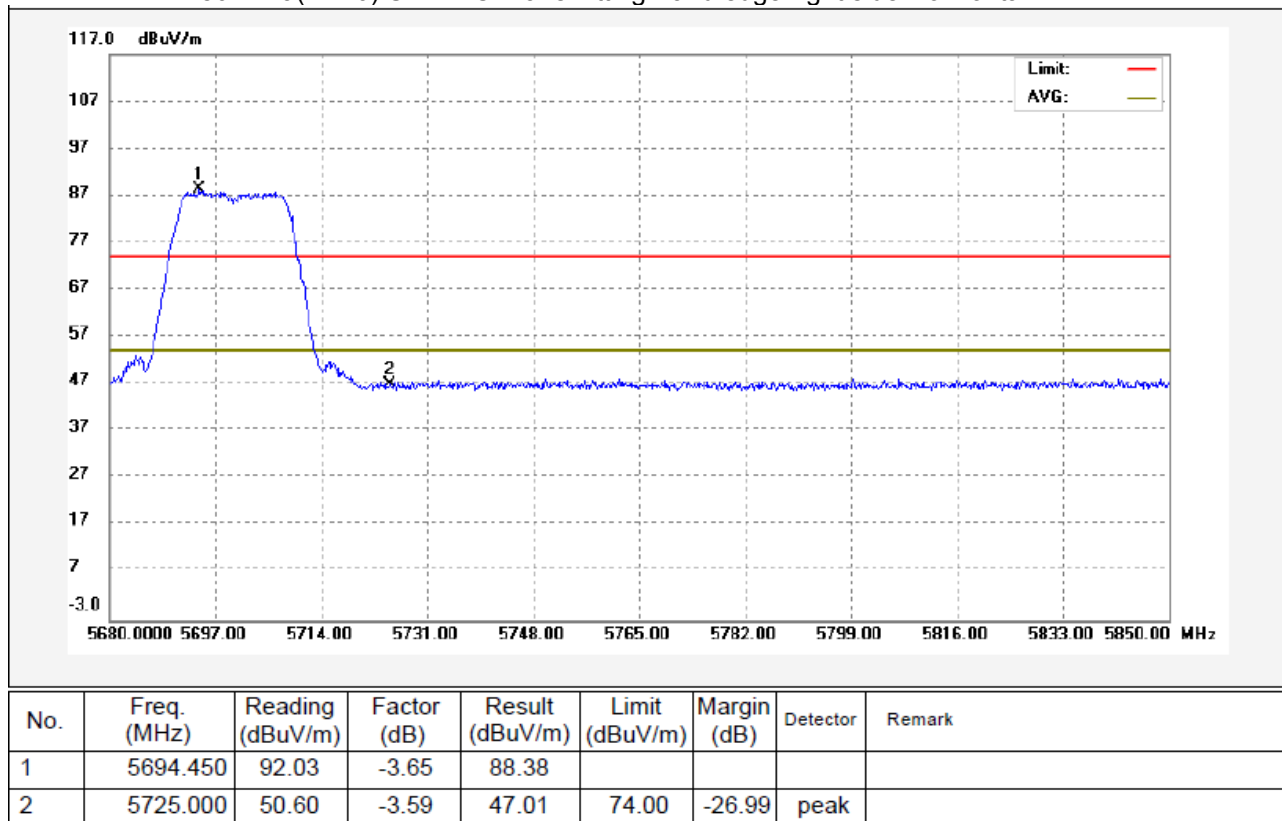
802.11a(HT20) U-NII-2C Transmitting Band edge-left side Vertical



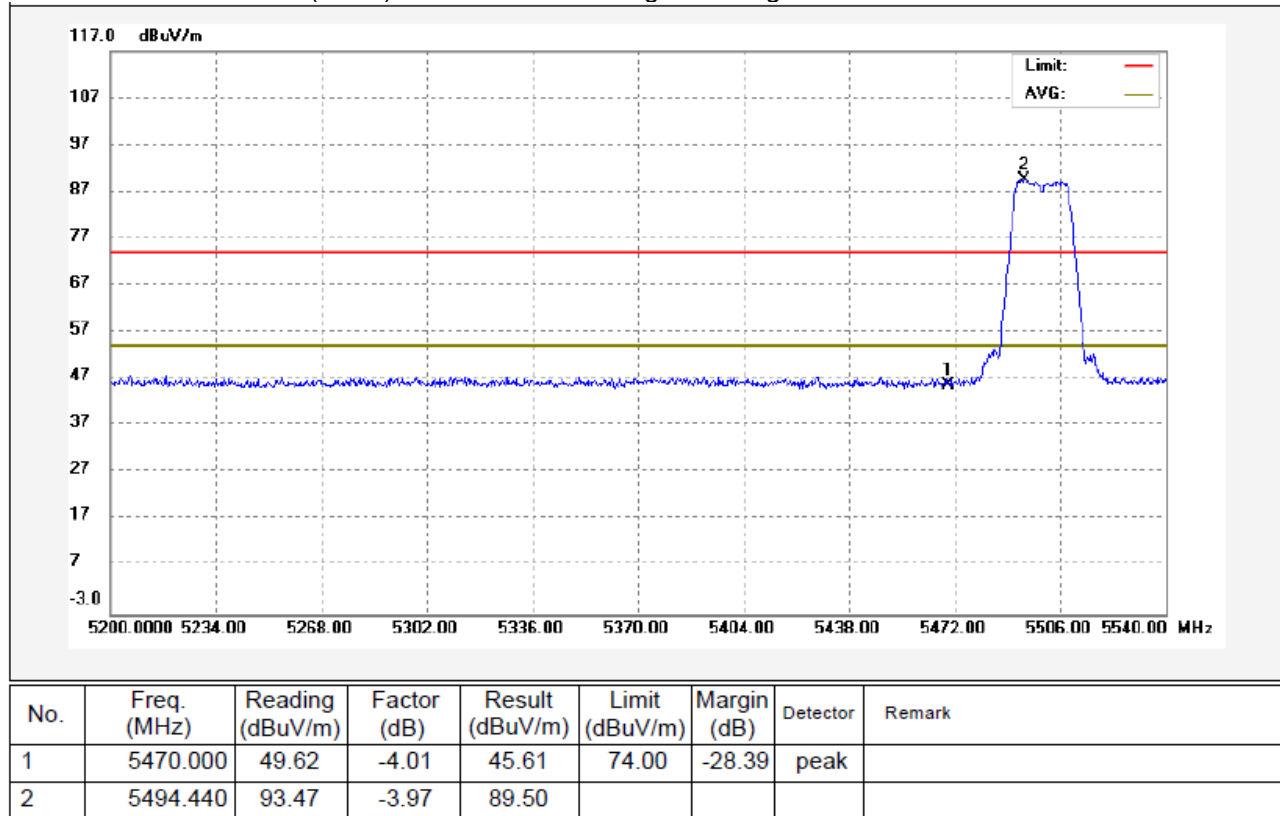
802.11a(HT20) U-NII-2C Transmitting Band edge-right side Vertical



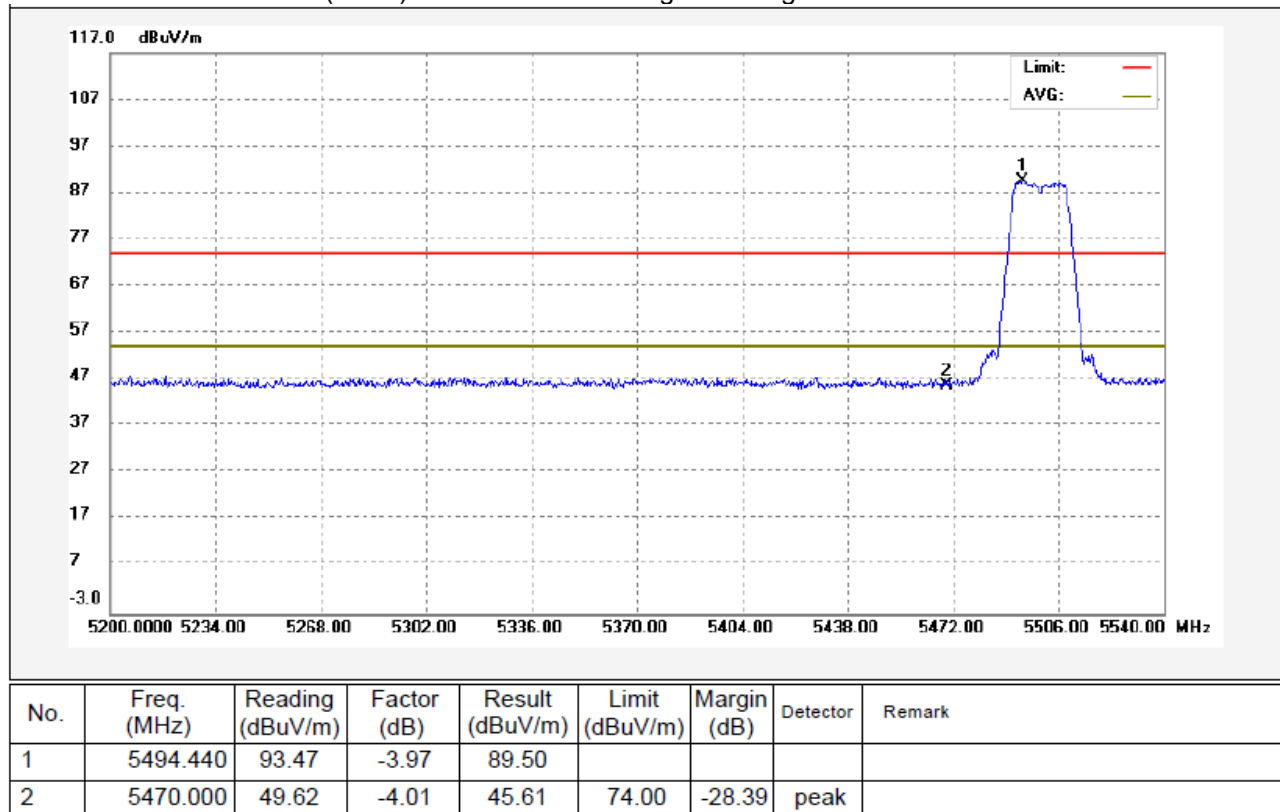
802.11a(HT20) U-NII-2C Transmitting Band edge-right side Horizontal



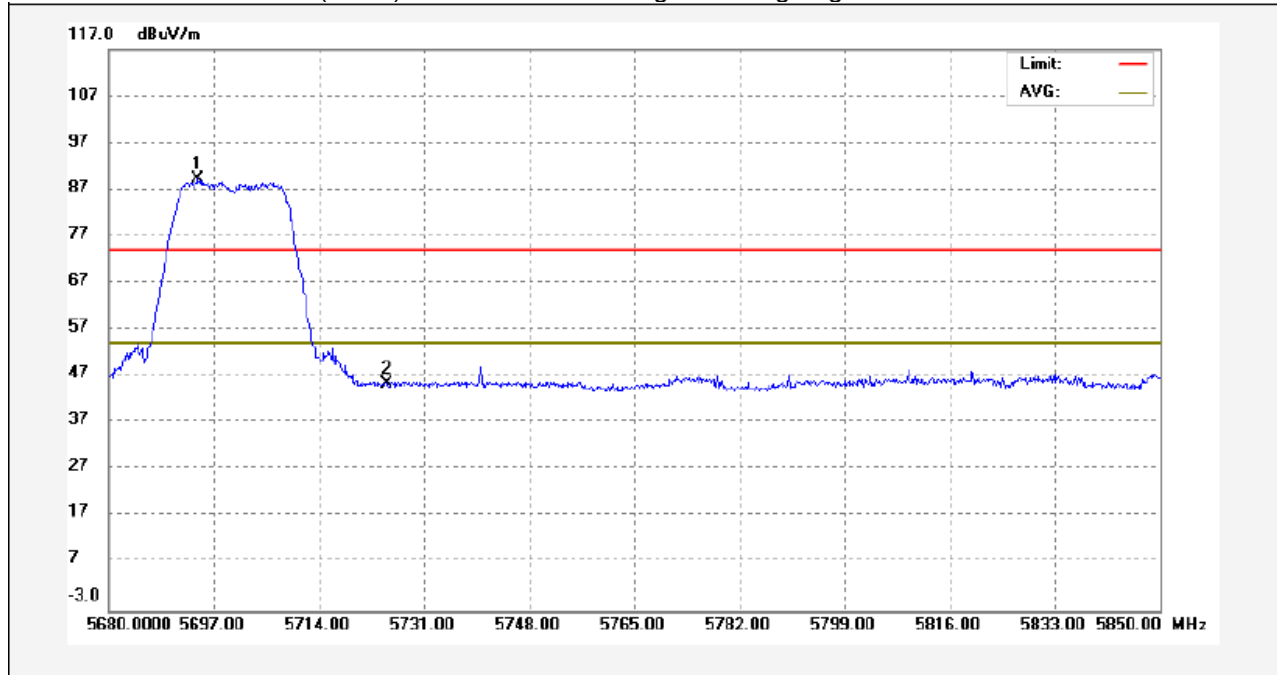
802.11ac(HT20) U-NII-2C Transmitting Band edge-left side Horizontal



802.11ac(HT20) U-NII-2C Transmitting Band edge-left side Vertical



802.11ac(HT20) U-NII-2C Transmitting Band edge-right side Vertical



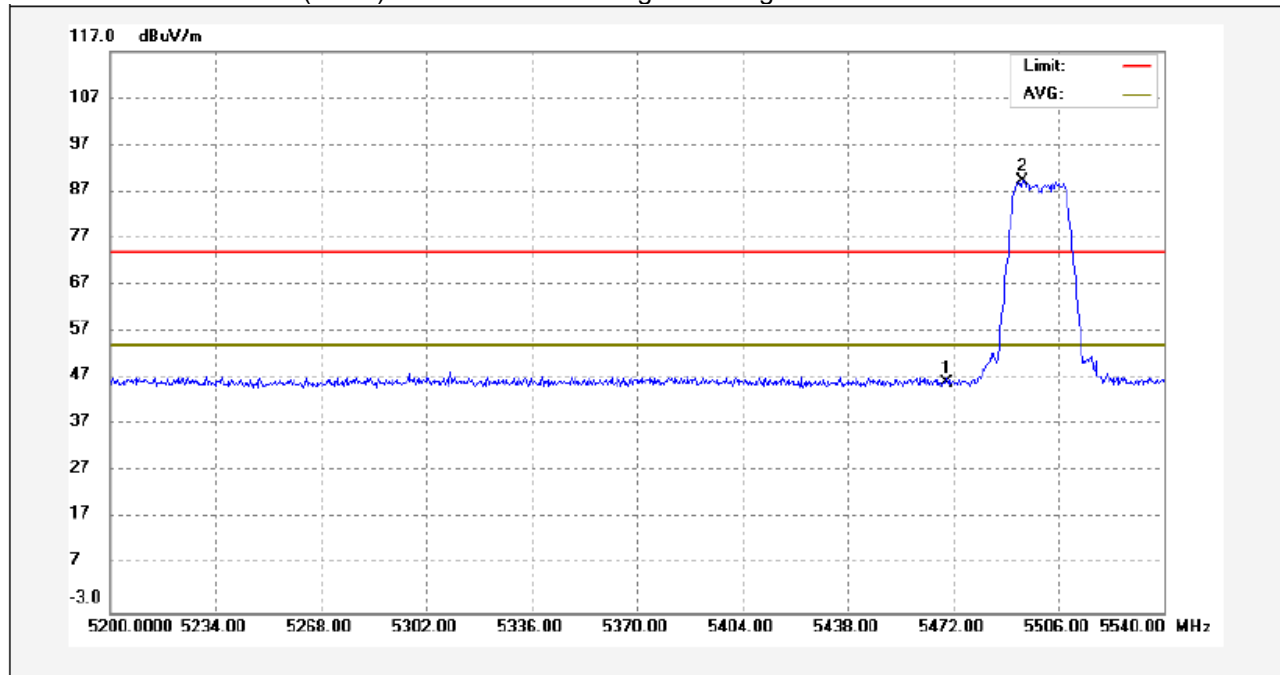
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5694.450	92.79	-3.65	89.14				
2	5725.000	49.03	-3.59	45.44	74.00	-28.56	peak	

802.11ac(HT20) U-NII-2C Transmitting Band edge-right side Horizontal



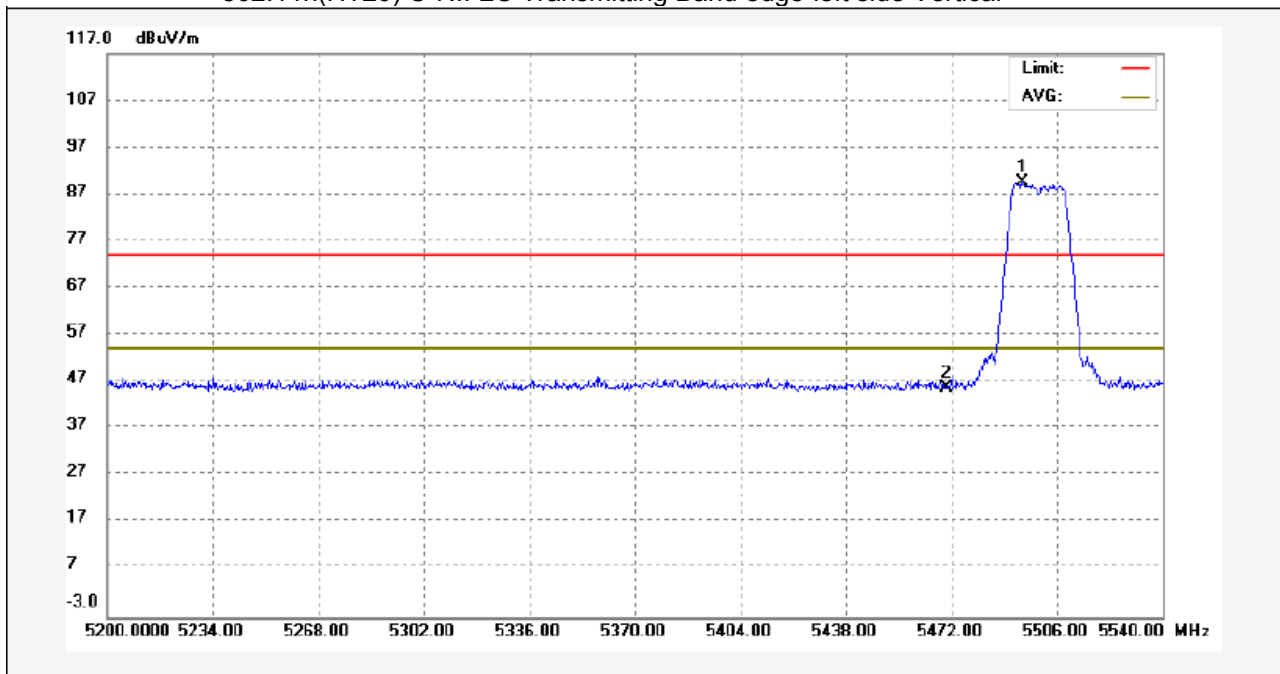
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5694.620	91.19	-3.65	87.54				
2	5725.000	50.12	-3.59	46.53	74.00	-27.47	peak	

802.11n(HT20) U-NII-2C Transmitting Band edge-left side Horizontal



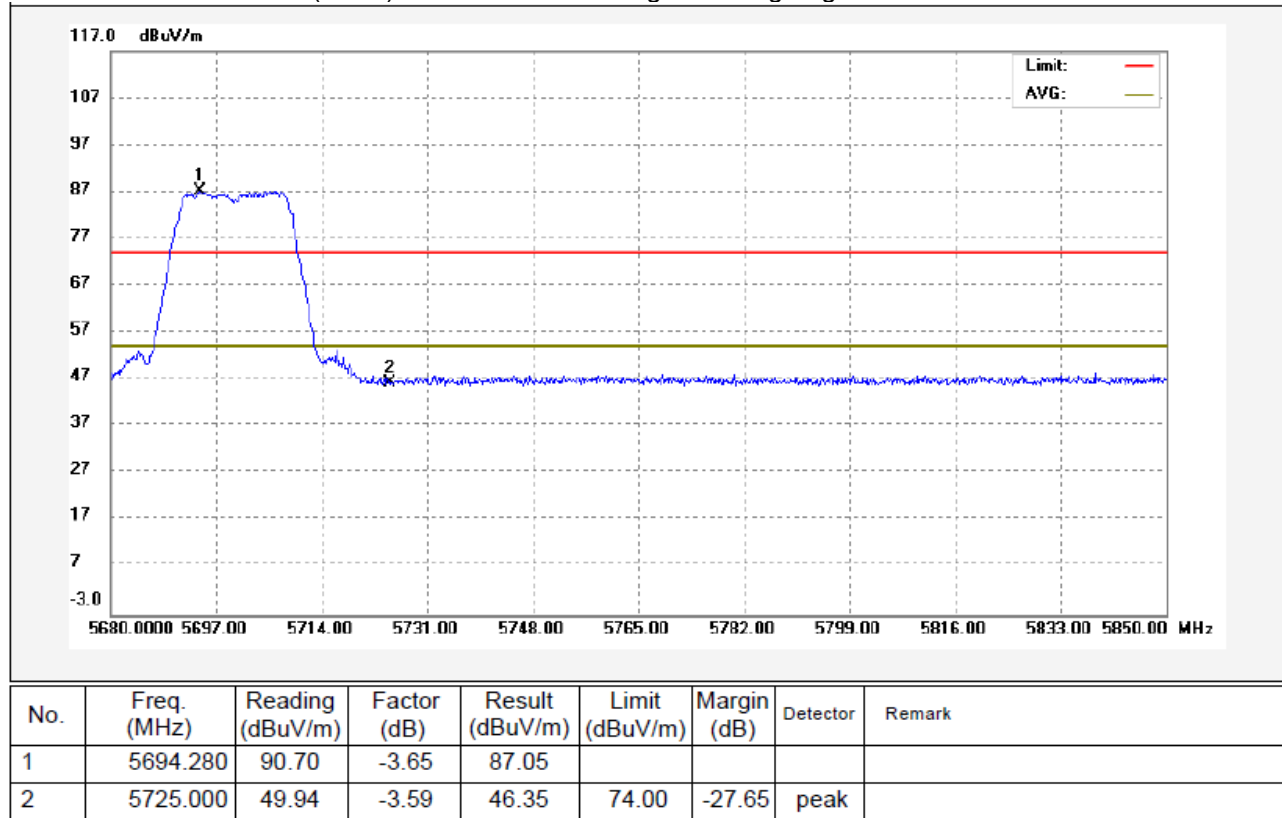
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5470.000	50.08	-4.01	46.07	74.00	-27.93	peak	
2	5494.440	93.25	-3.97	89.28				

802.11n(HT20) U-NII-2C Transmitting Band edge-left side Vertical

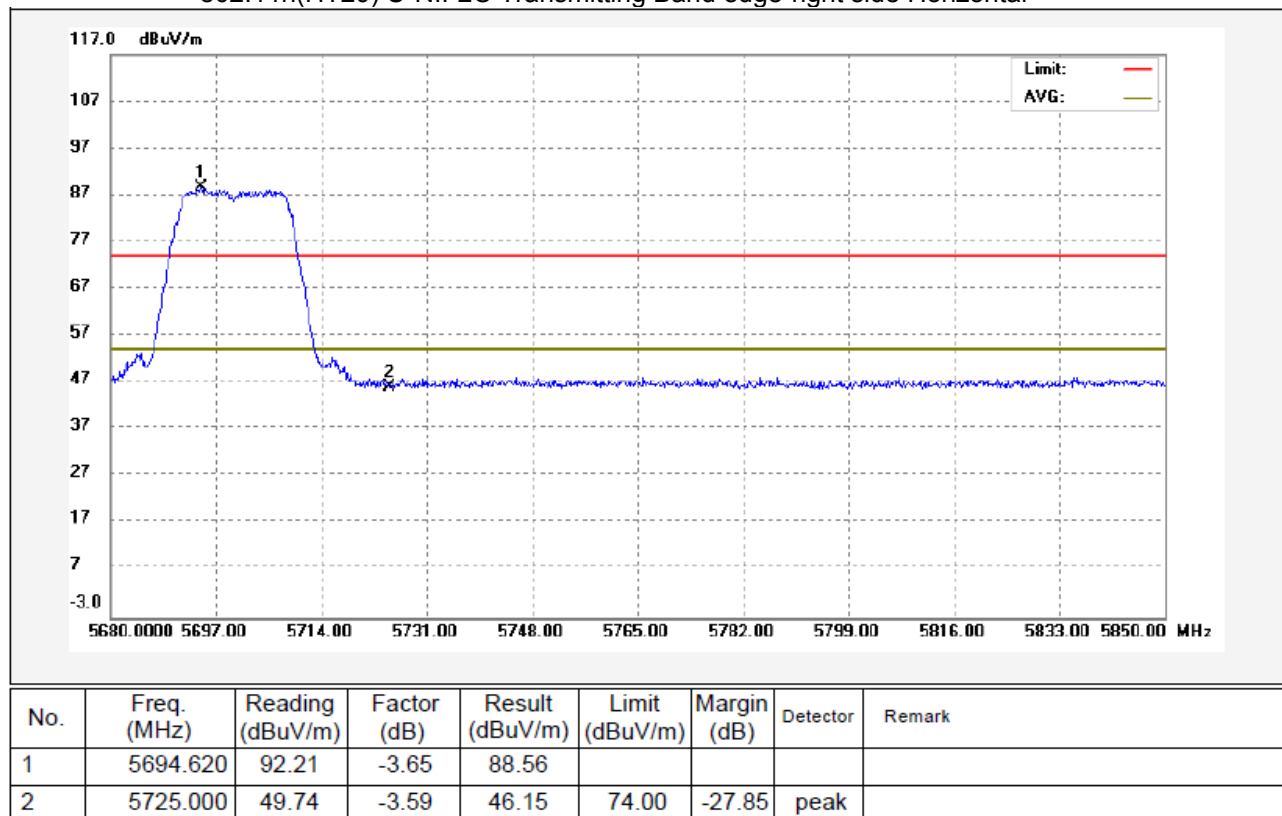


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5494.780	93.46	-3.97	89.49				
2	5470.000	49.70	-4.01	45.69	74.00	-28.31	peak	

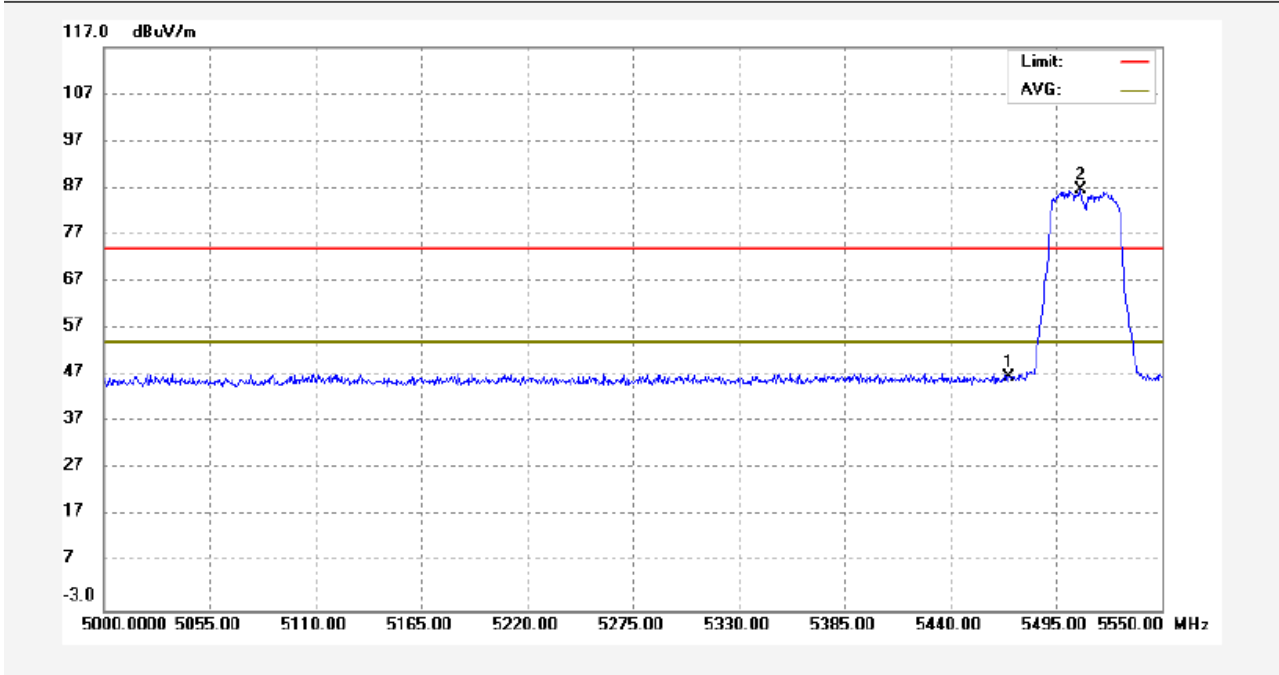
802.11n(HT20) U-NII-2C Transmitting Band edge-right side Vertical



802.11n(HT20) U-NII-2C Transmitting Band edge-right side Horizontal

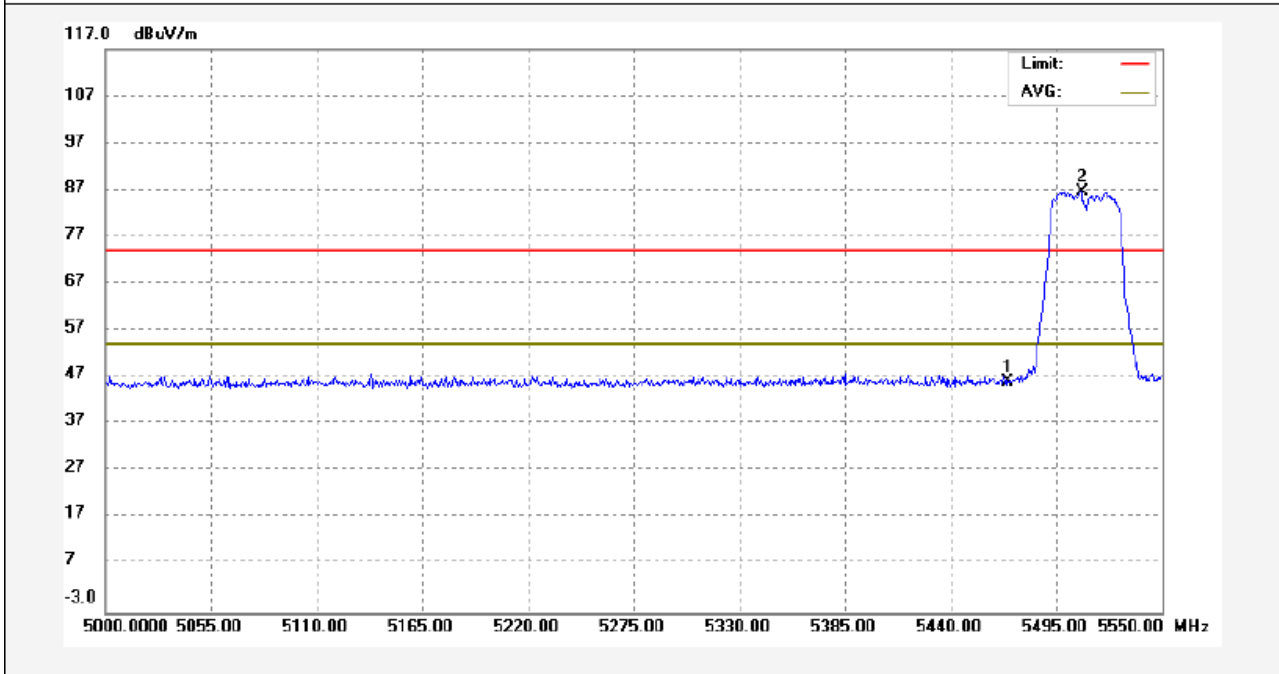


802.11ac(HT40) U-NII-2C Transmitting Band edge-left side Horizontal



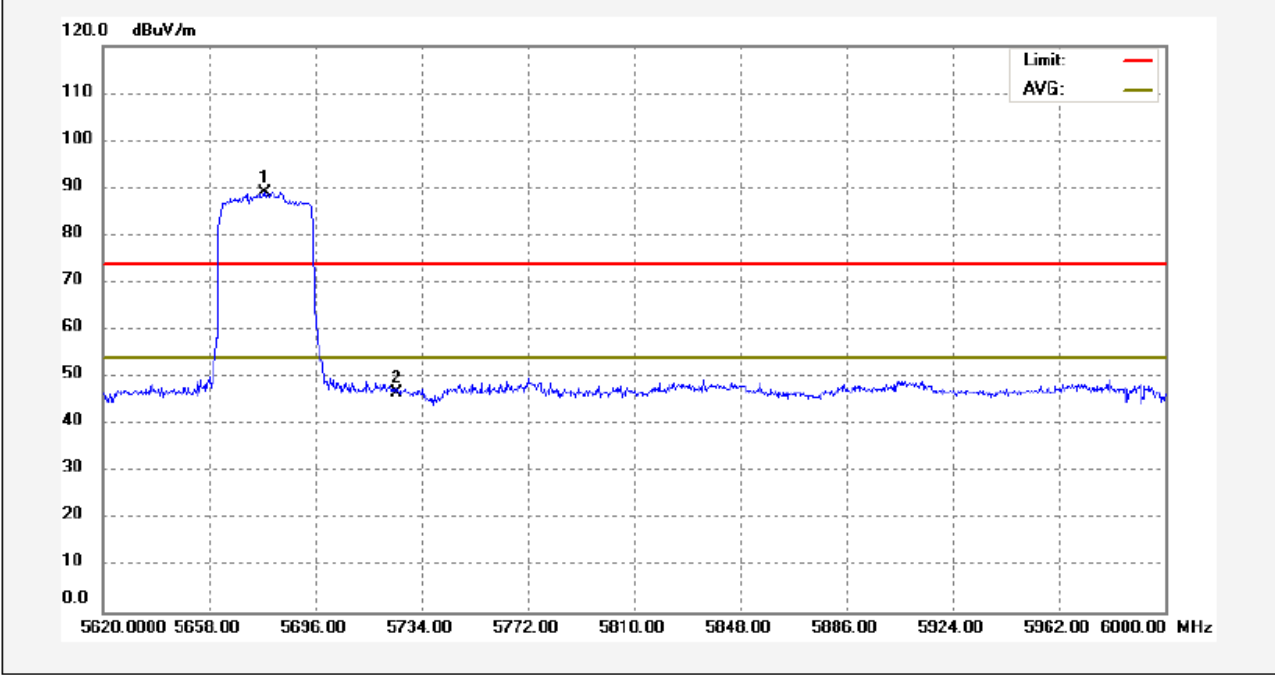
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5470.000	50.56	-4.01	46.55	74.00	-27.45	peak	
2	5507.650	90.60	-3.96	86.64				

802.11ac(HT40) U-NII-2C Transmitting Band edge-left side Vertical



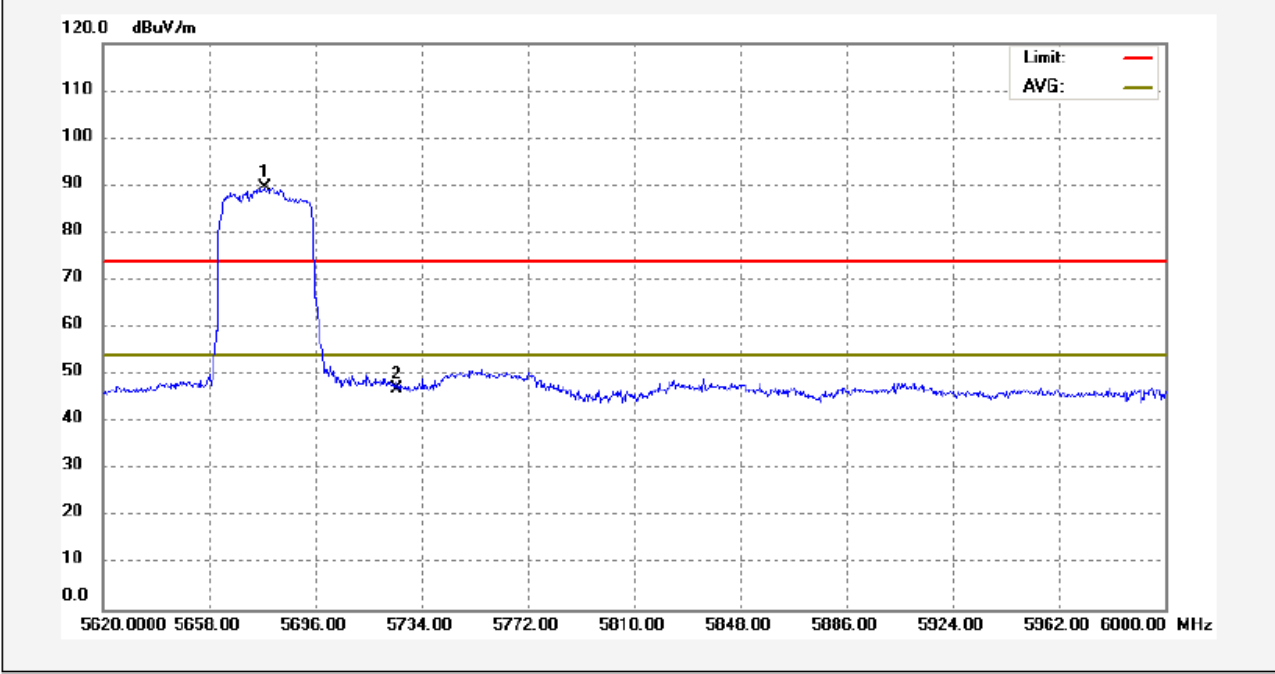
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5470.000	49.92	-4.01	45.91	74.00	-28.09	peak	
2	5508.200	90.54	-3.96	86.58				

802.11ac(HT40) U-NII-2C Transmitting Band edge-right side Vertical



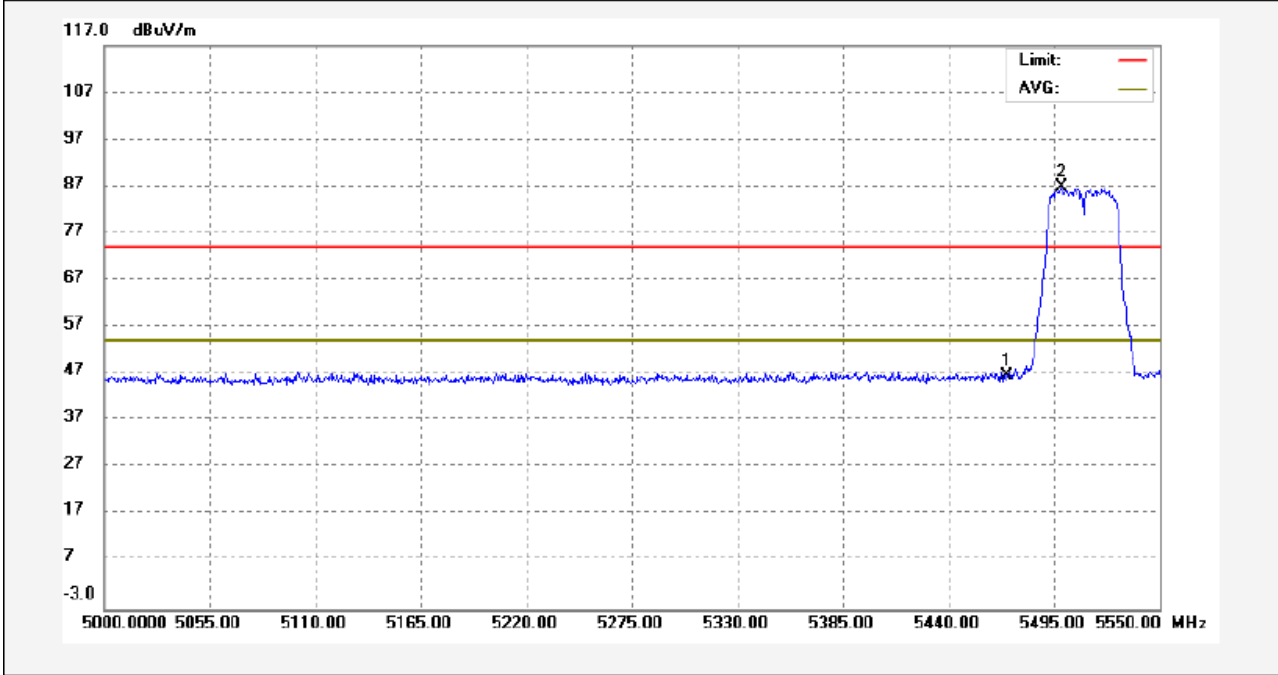
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5677.760	91.27	-2.37	88.90				
2	5725.000	48.79	-2.28	46.51	74.00	-27.49	peak	

802.11ac(HT40) U-NII-2C Transmitting Band edge-right side Horizontal



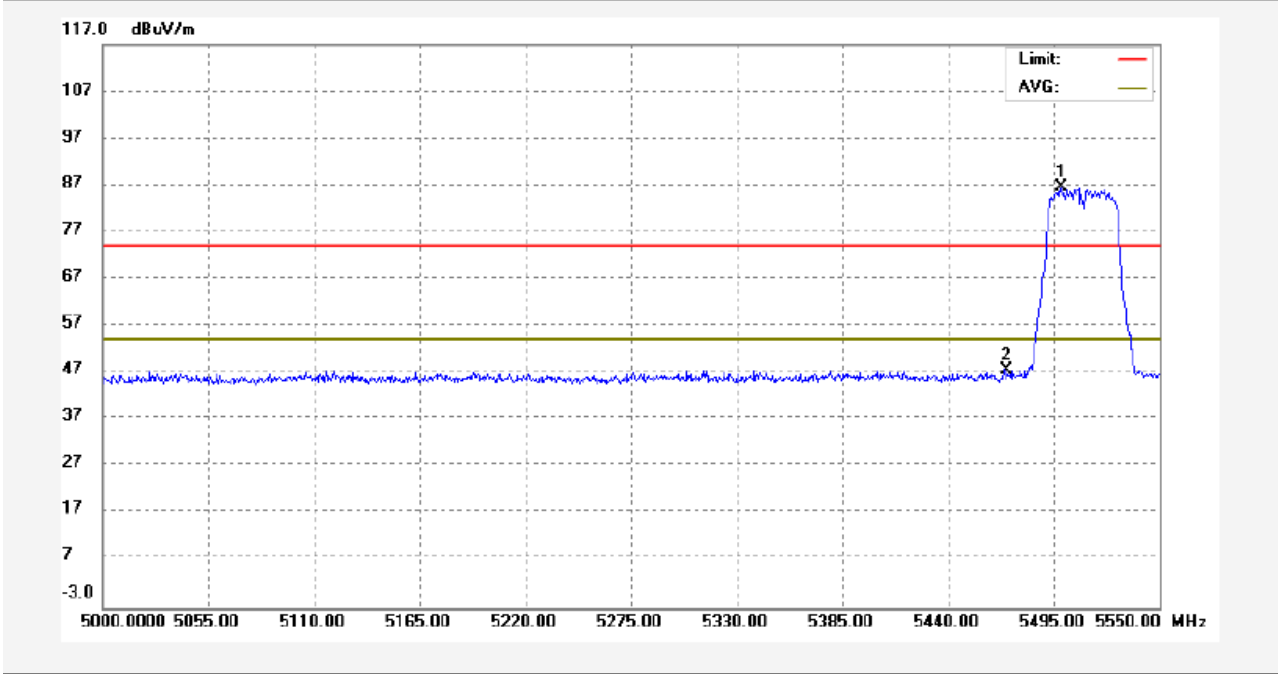
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5677.760	91.77	-2.37	89.40				
2	5725.000	49.29	-2.28	47.01	74.00	-26.99	peak	

802.11n(HT40) U-NII-2C Transmitting Band edge-left side Horizontal



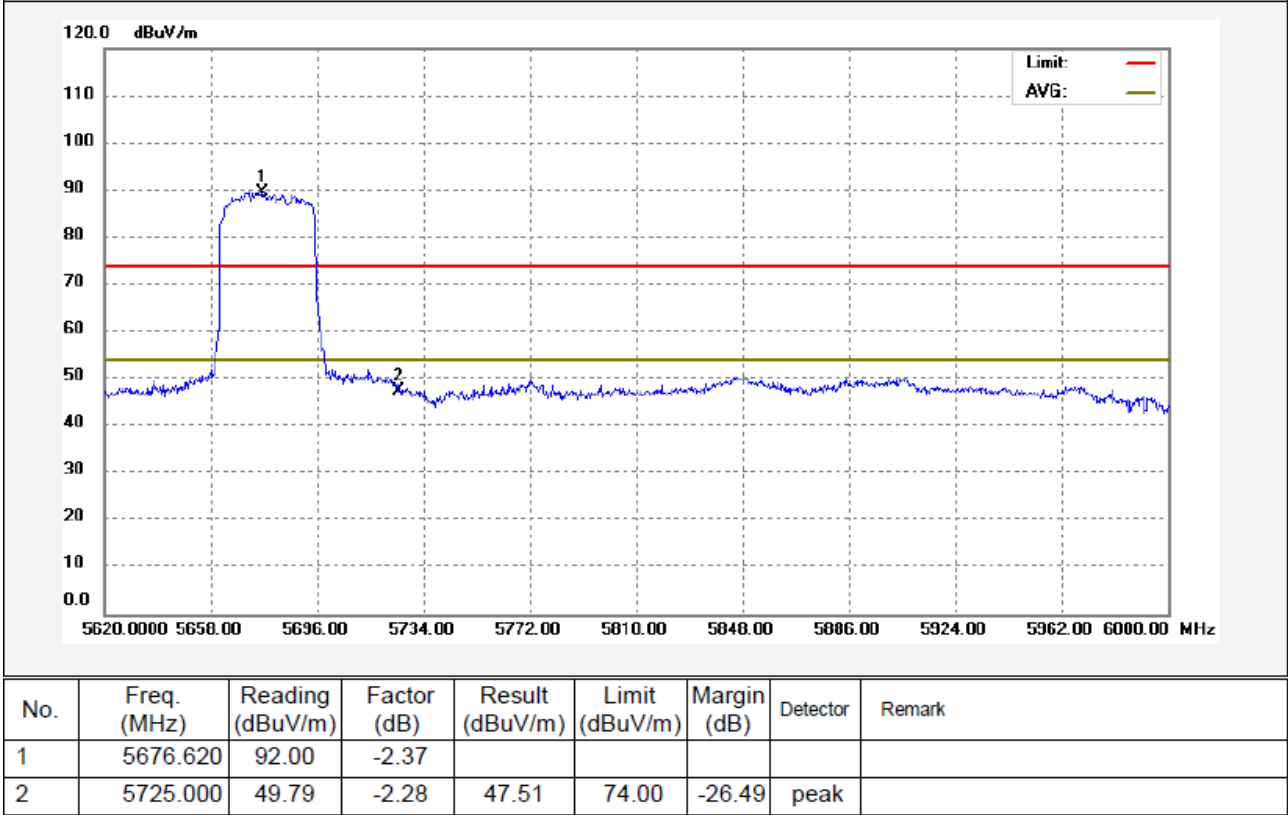
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5470.000	50.59	-4.01	46.58	74.00	-27.42	peak	
2	5498.850	90.78	-3.97	86.81				

802.11n(HT40) U-NII-2C Transmitting Band edge-left side Vertical

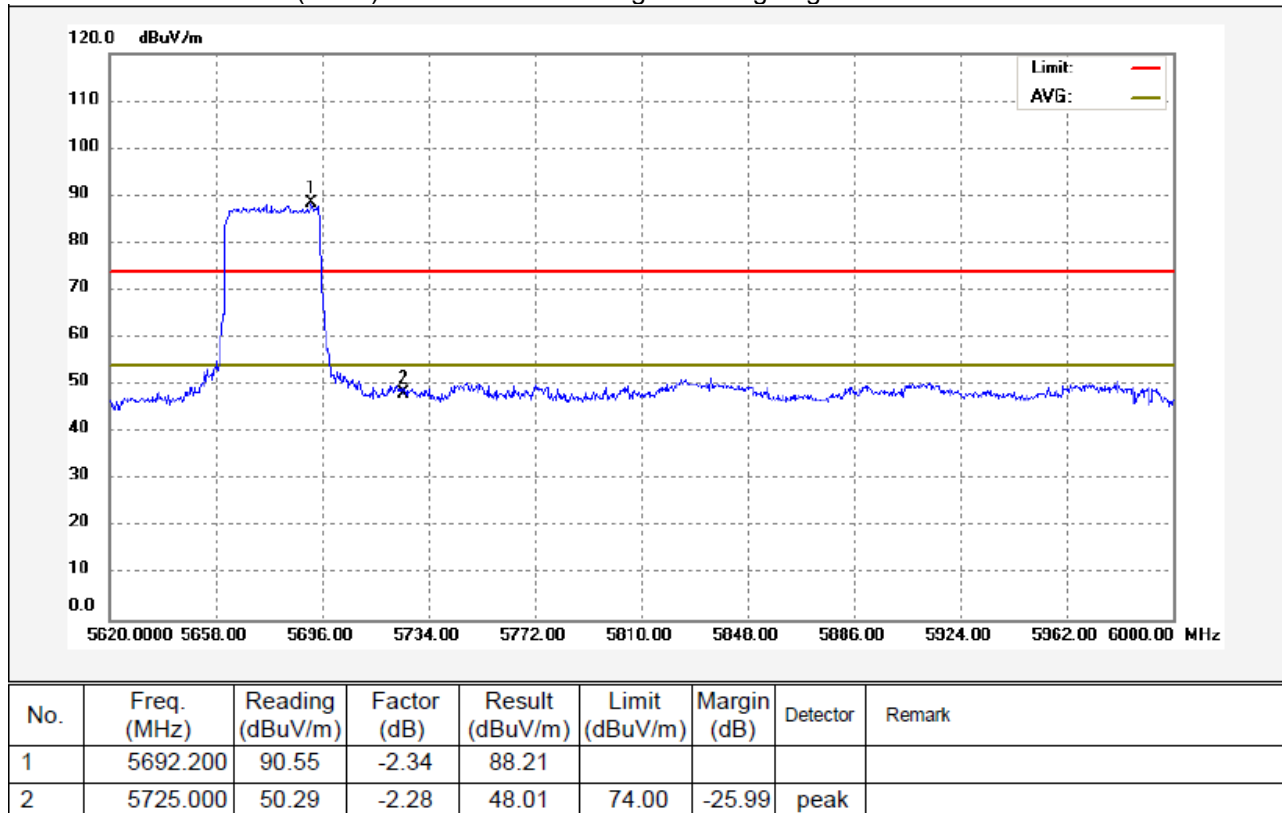


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5498.850	90.40	-3.97	86.43				
2	5470.000	51.42	-4.01	47.41	74.00	-26.59	peak	

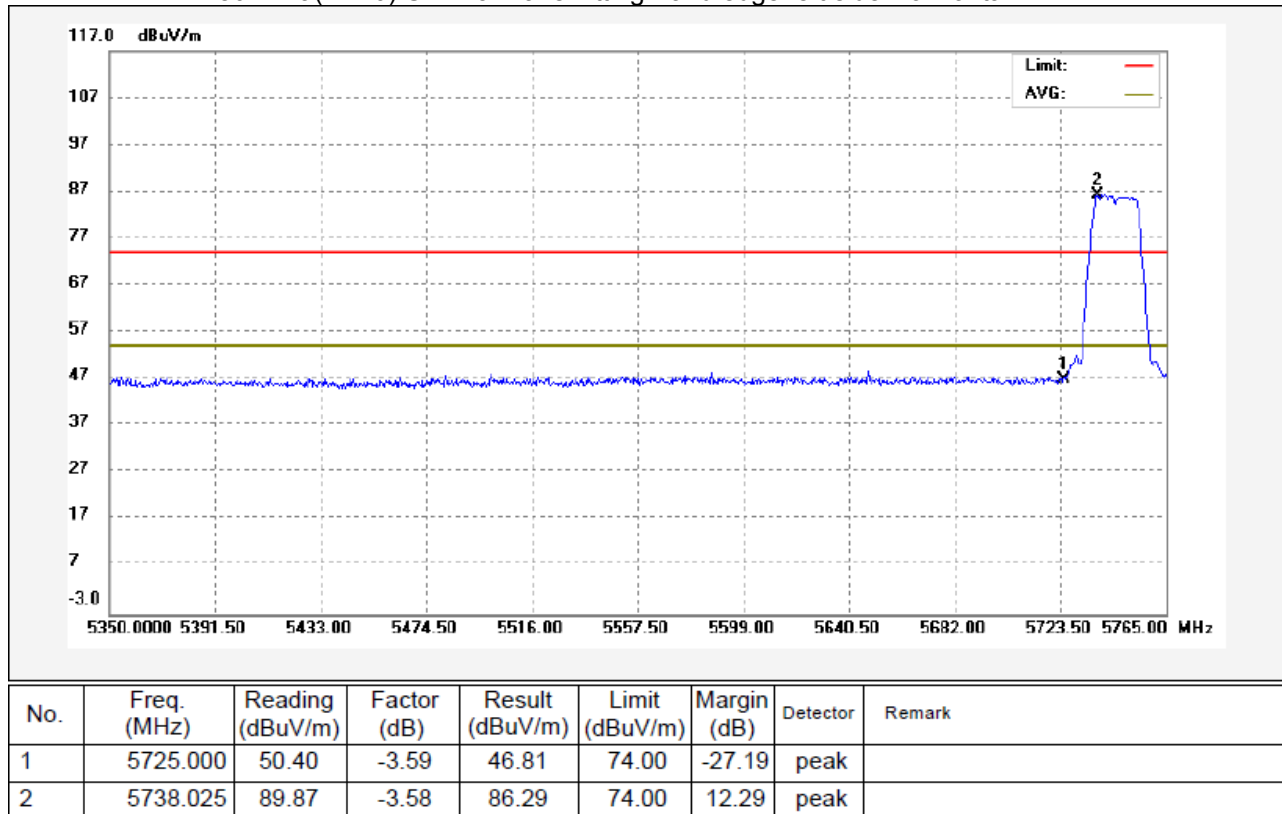
802.11n(HT40) U-NII-2C Transmitting Band edge-right side Vertical



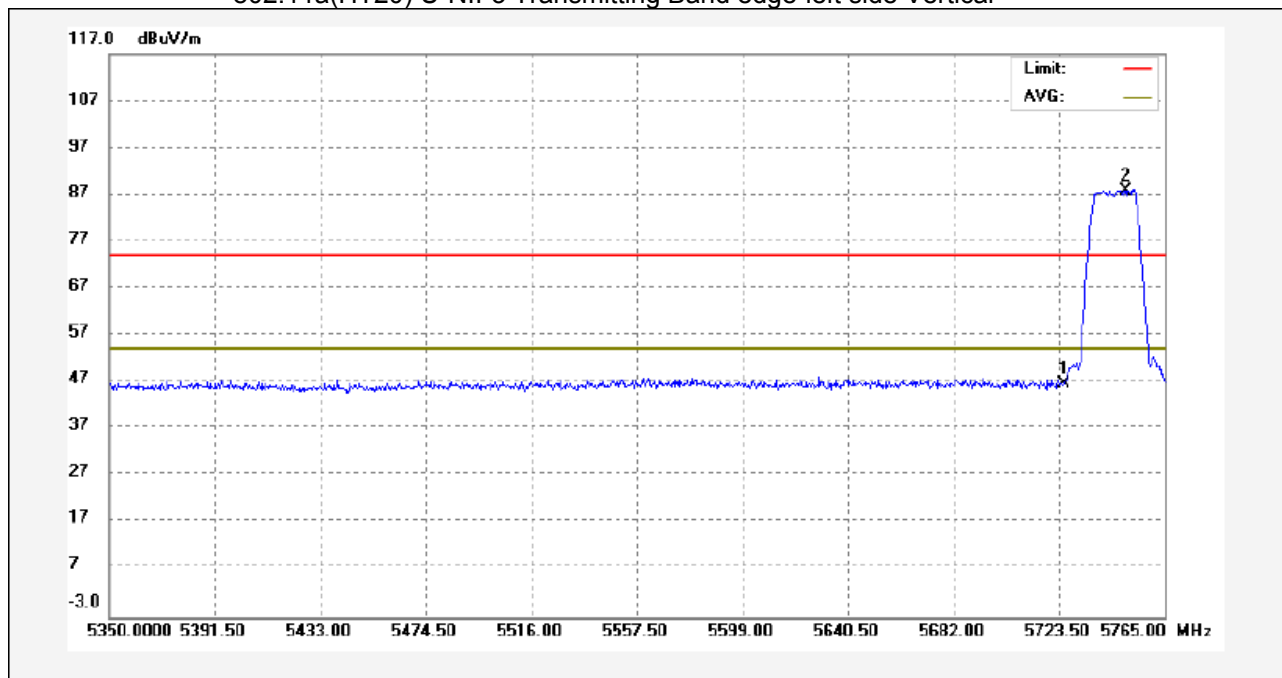
802.11n(HT40) U-NII-2C Transmitting Band edge-right side Horizontal



802.11a(HT20) U-NII-3 Transmitting Band edge-left side Horizontal

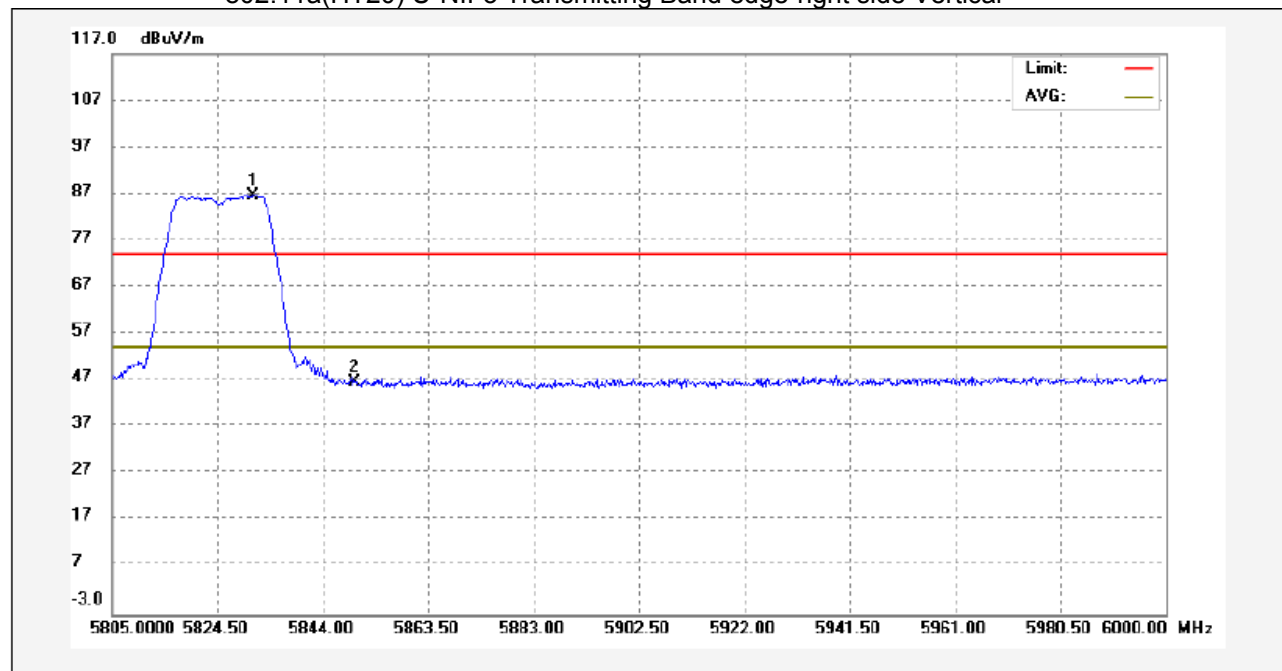


802.11a(HT20) U-NII-3 Transmitting Band edge-left side Vertical



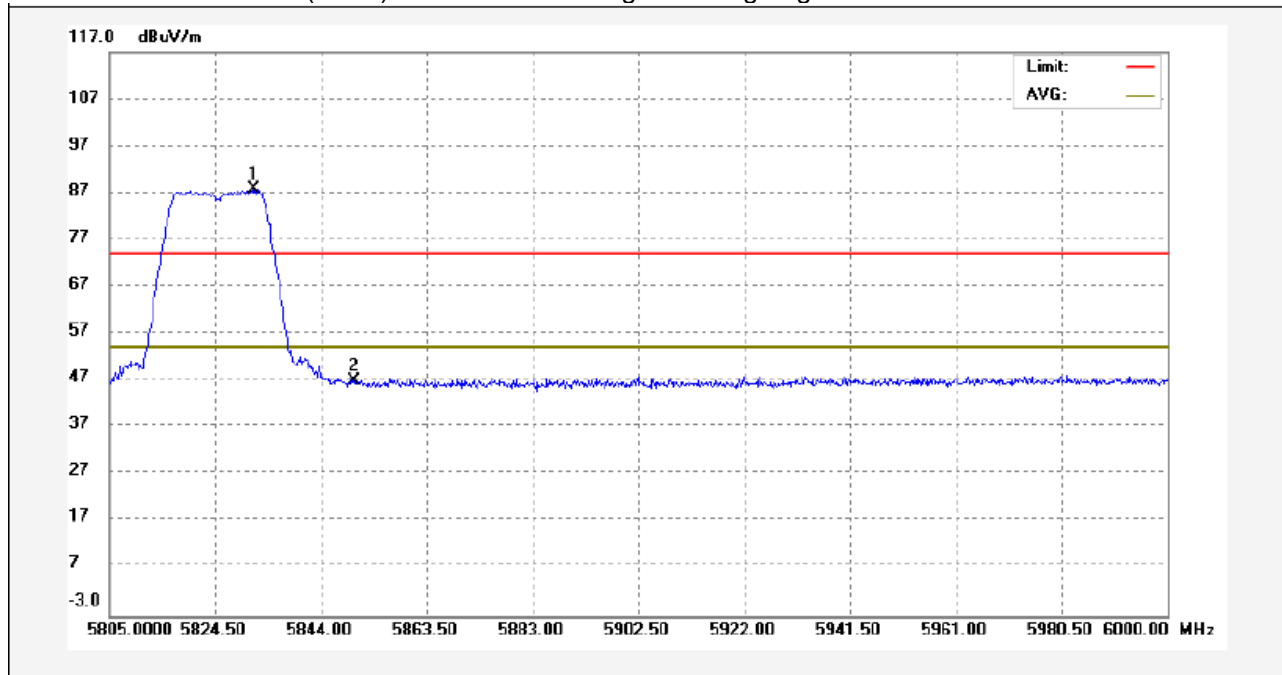
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5725.000	50.14	-3.59	46.55	74.00	-27.45	peak	
2	5749.645	91.43	-3.56	87.87	74.00	13.87	peak	

802.11a(HT20) U-NII-3 Transmitting Band edge-right side Vertical



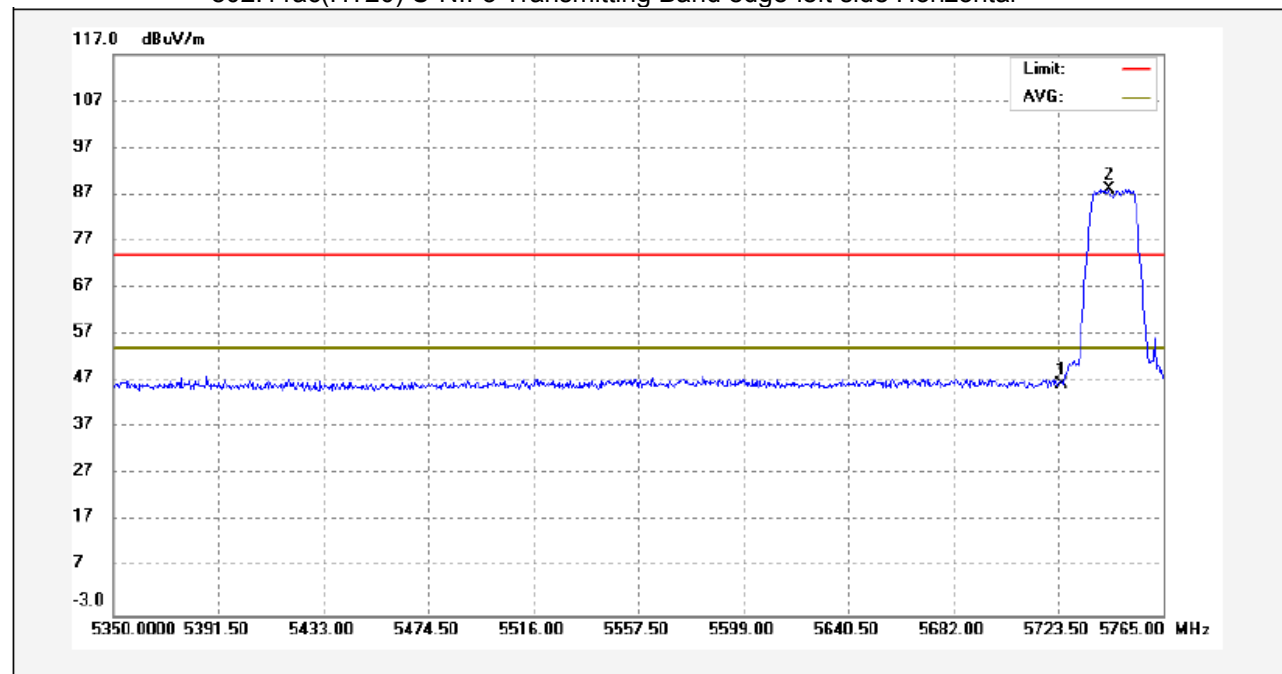
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5831.130	90.11	-3.42	86.69	74.00	12.69	peak	
2	5850.000	50.15	-3.40	46.75	74.00	-27.25	peak	

802.11a(HT20) U-NII-3 Transmitting Band edge-right side Horizontal



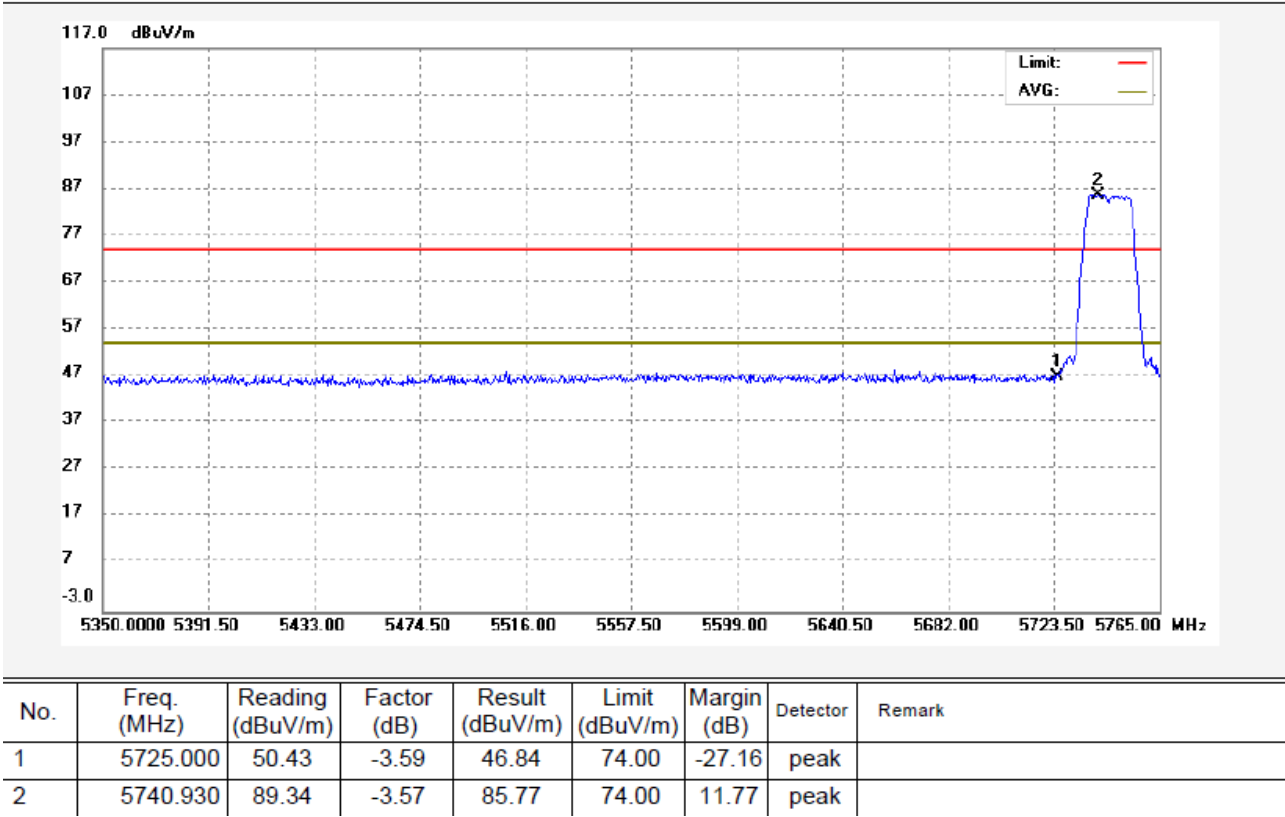
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5831.520	91.19	-3.42	87.77	74.00	13.77	peak	
2	5850.000	50.34	-3.40	46.94	74.00	-27.06	peak	

802.11ac(HT20) U-NII-3 Transmitting Band edge-left side Horizontal

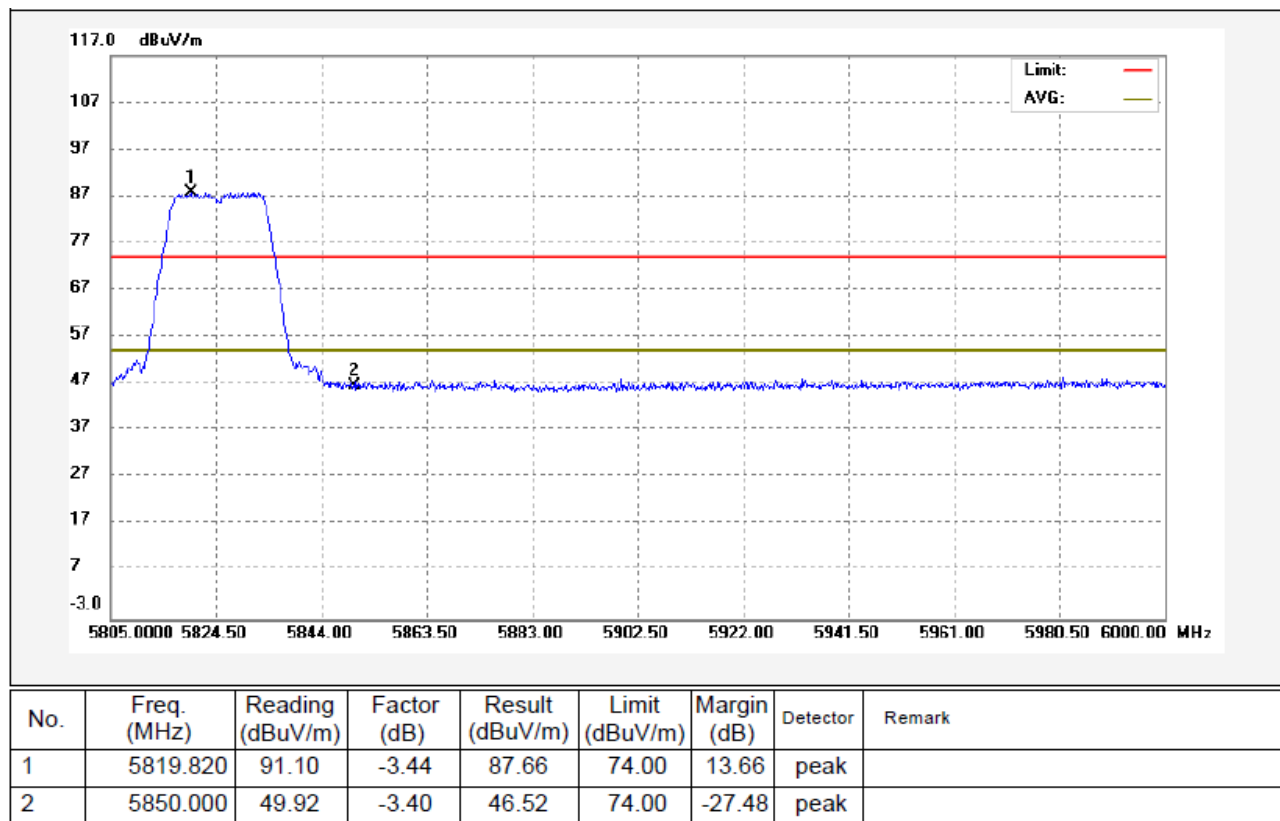


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	5725.000	49.88	-3.59	46.29	74.00	-27.71	peak	
2	5743.420	91.57	-3.57	88.00	74.00	14.00	peak	

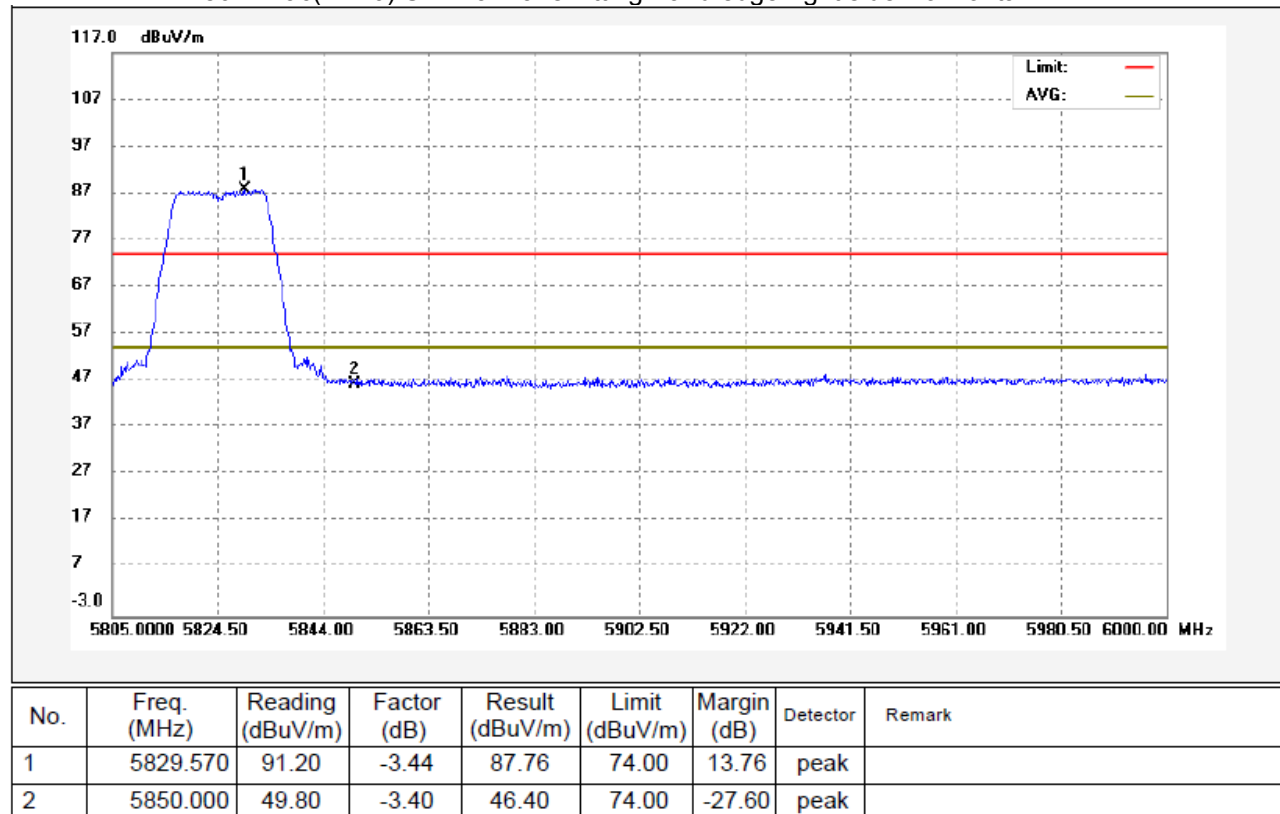
802.11ac(HT20) U-NII-3 Transmitting Band edge-left side Vertical



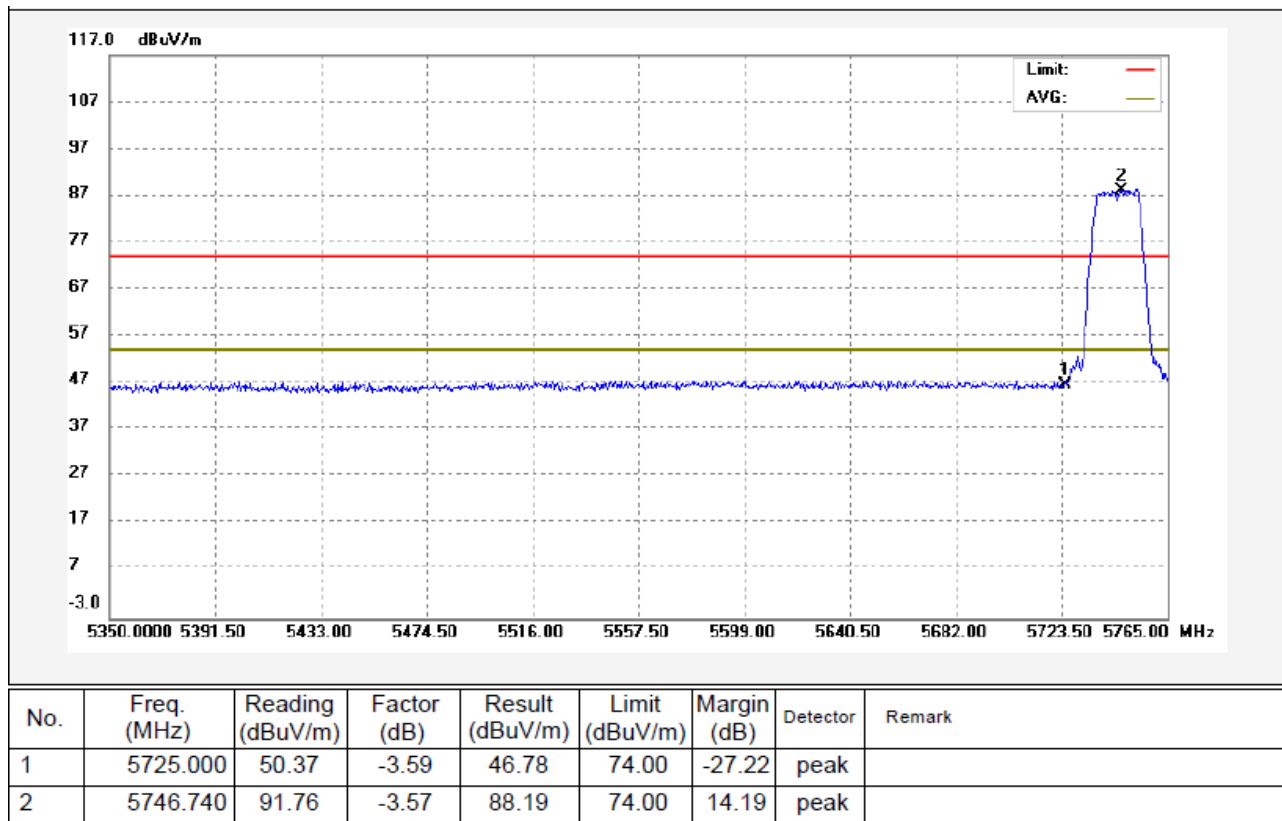
802.11ac(HT20) U-NII-3 Transmitting Band edge-right side Vertical



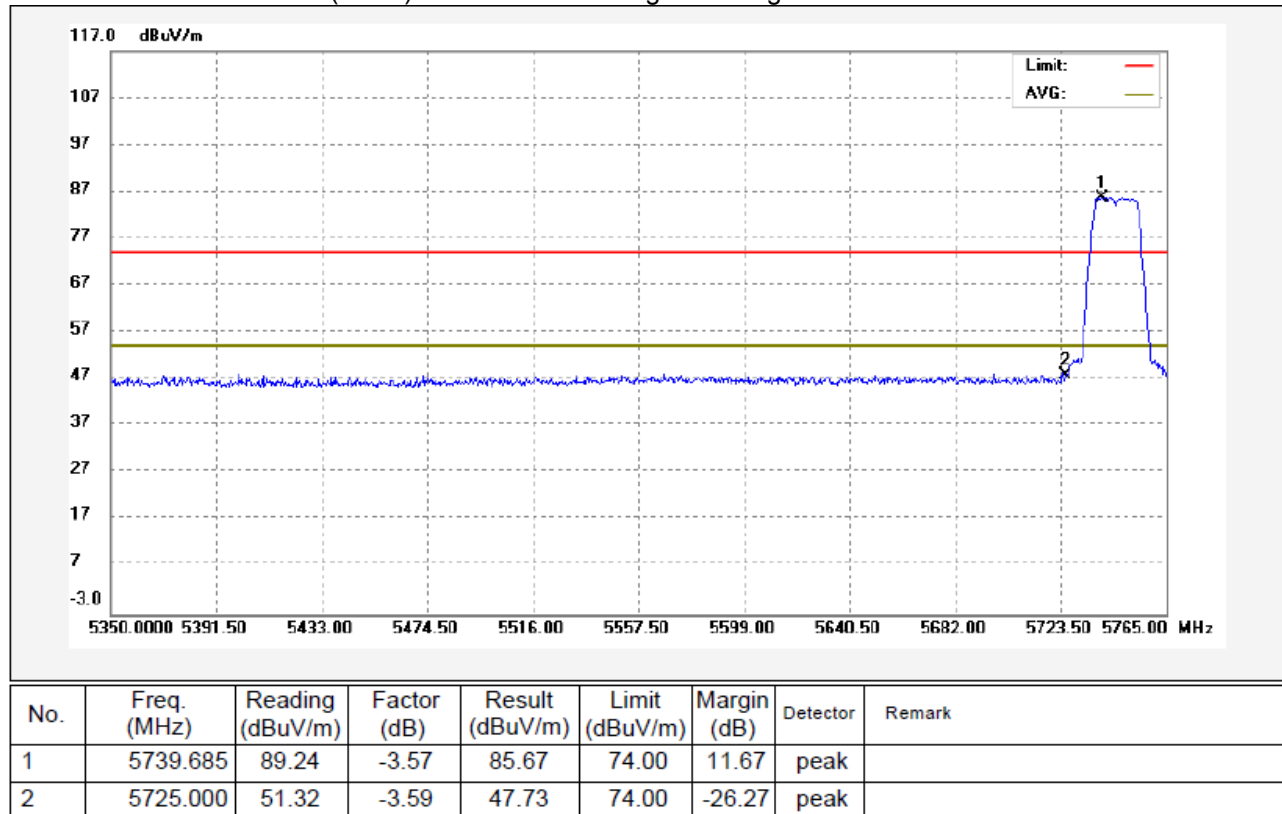
802.11ac(HT20) U-NII-3 Transmitting Band edge-right side Horizontal



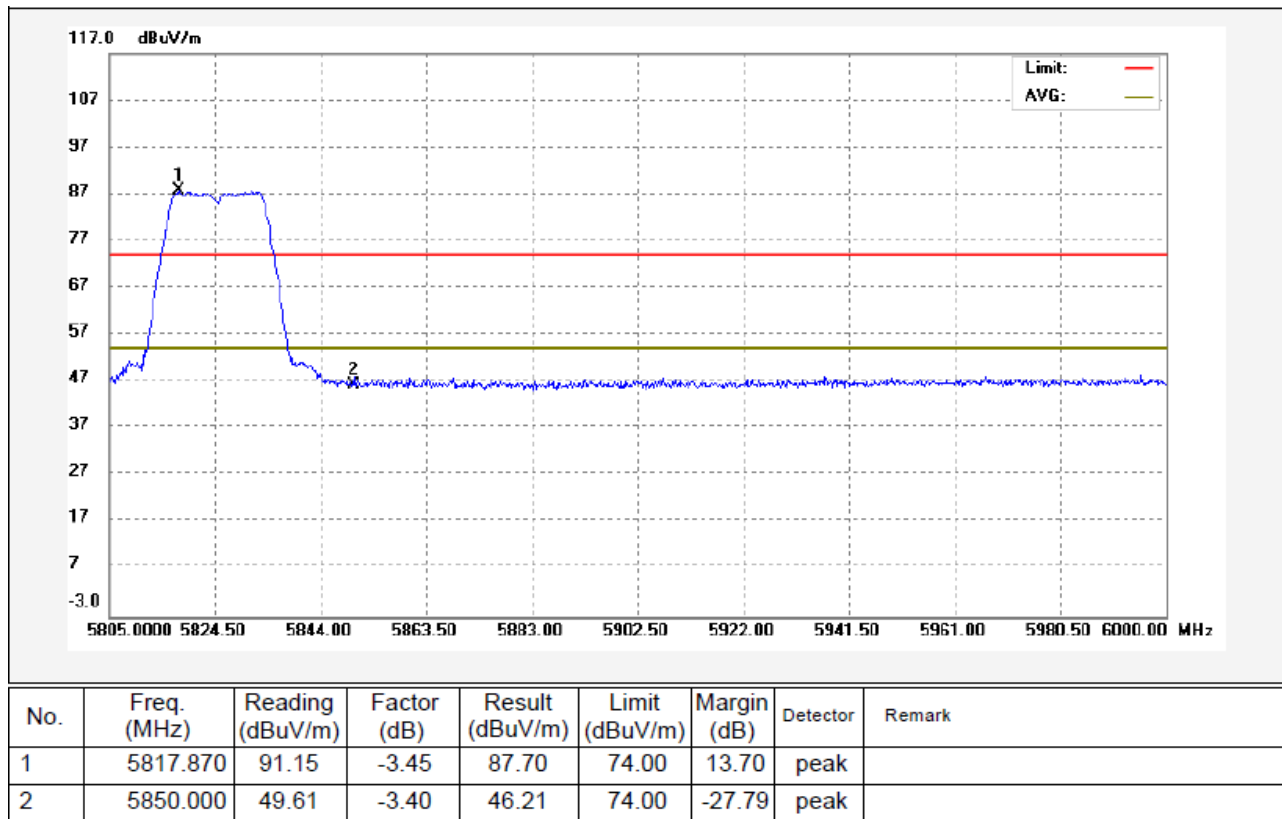
802.11n(HT20) U-NII-3 Transmitting Band edge-left side Horizontal



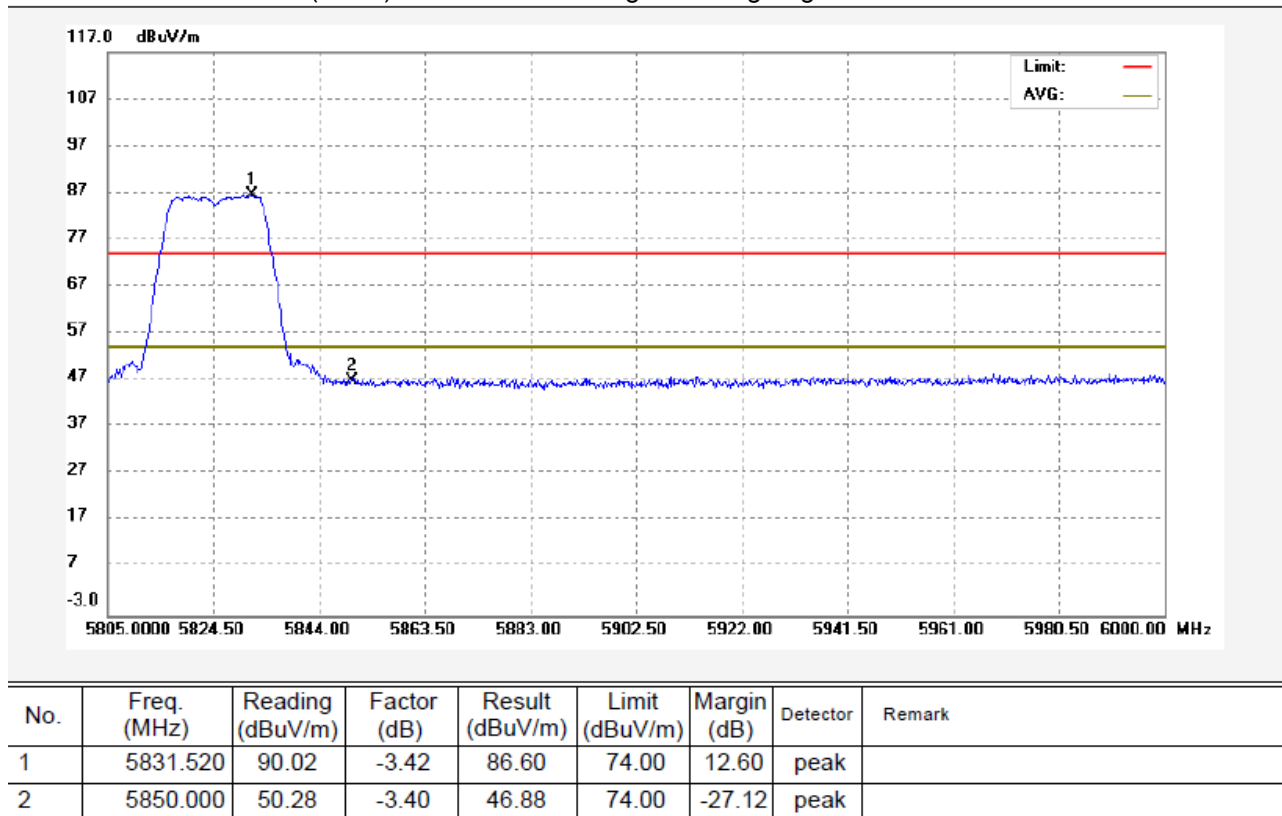
802.11n(HT20) U-NII-3 Transmitting Band edge-left side Vertical



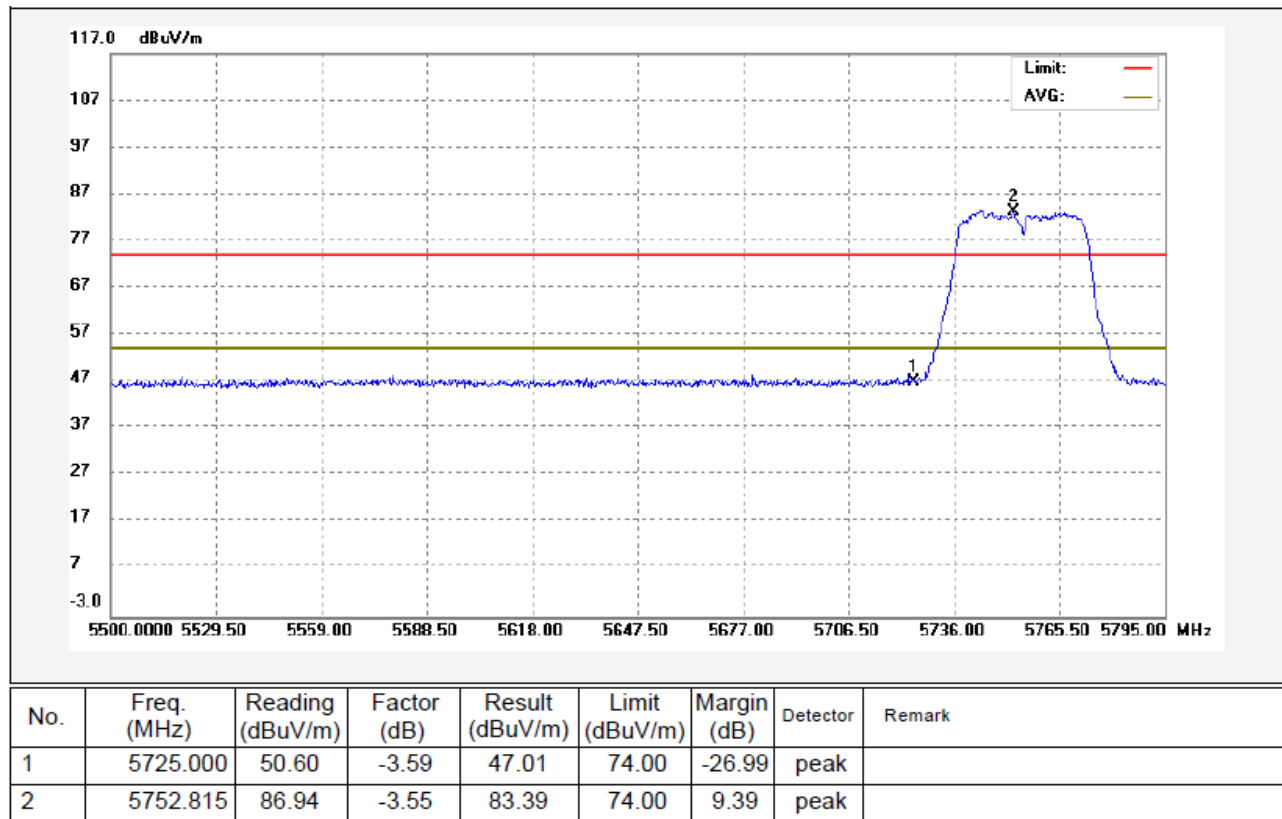
802.11n(HT20) U-NII-3 Transmitting Band edge-right side Vertical



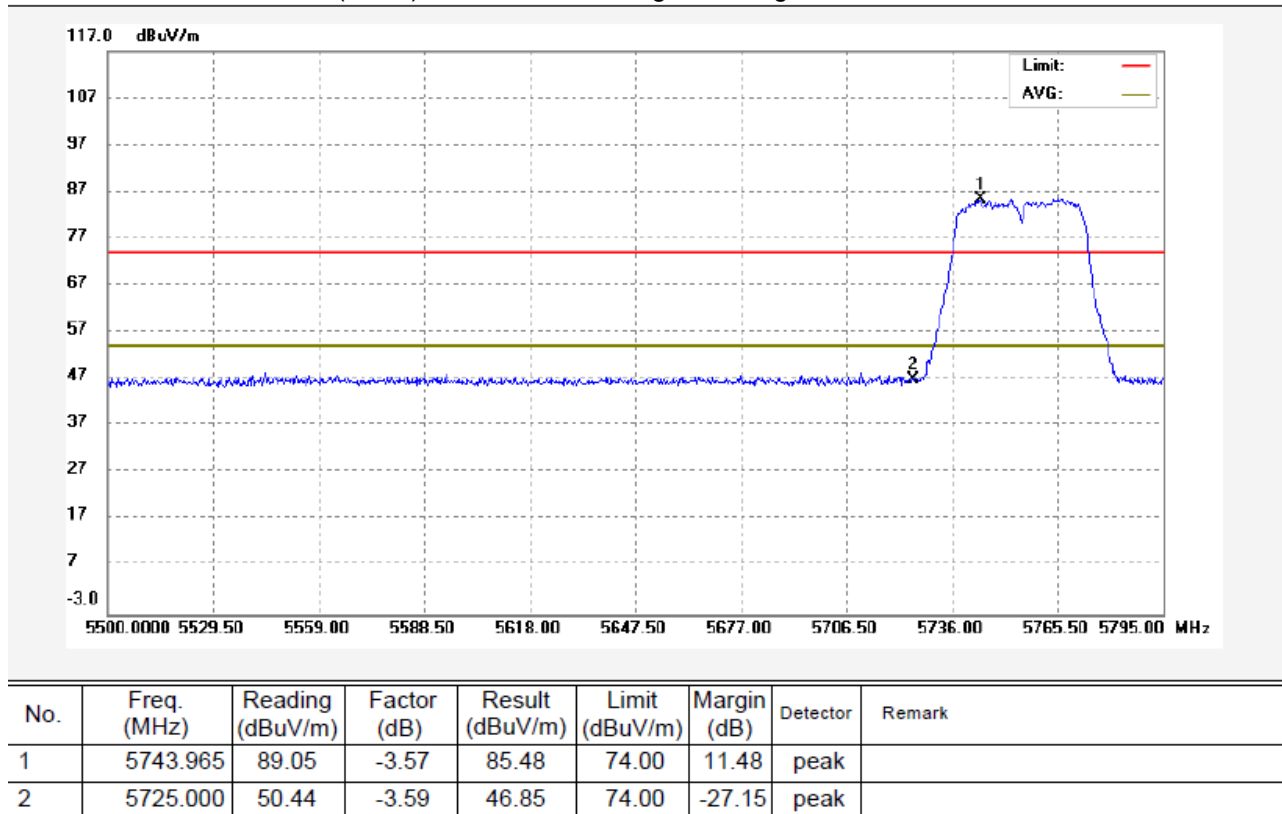
802.11n (HT20) U-NII-3 Transmitting Band edge-right side Horizontal



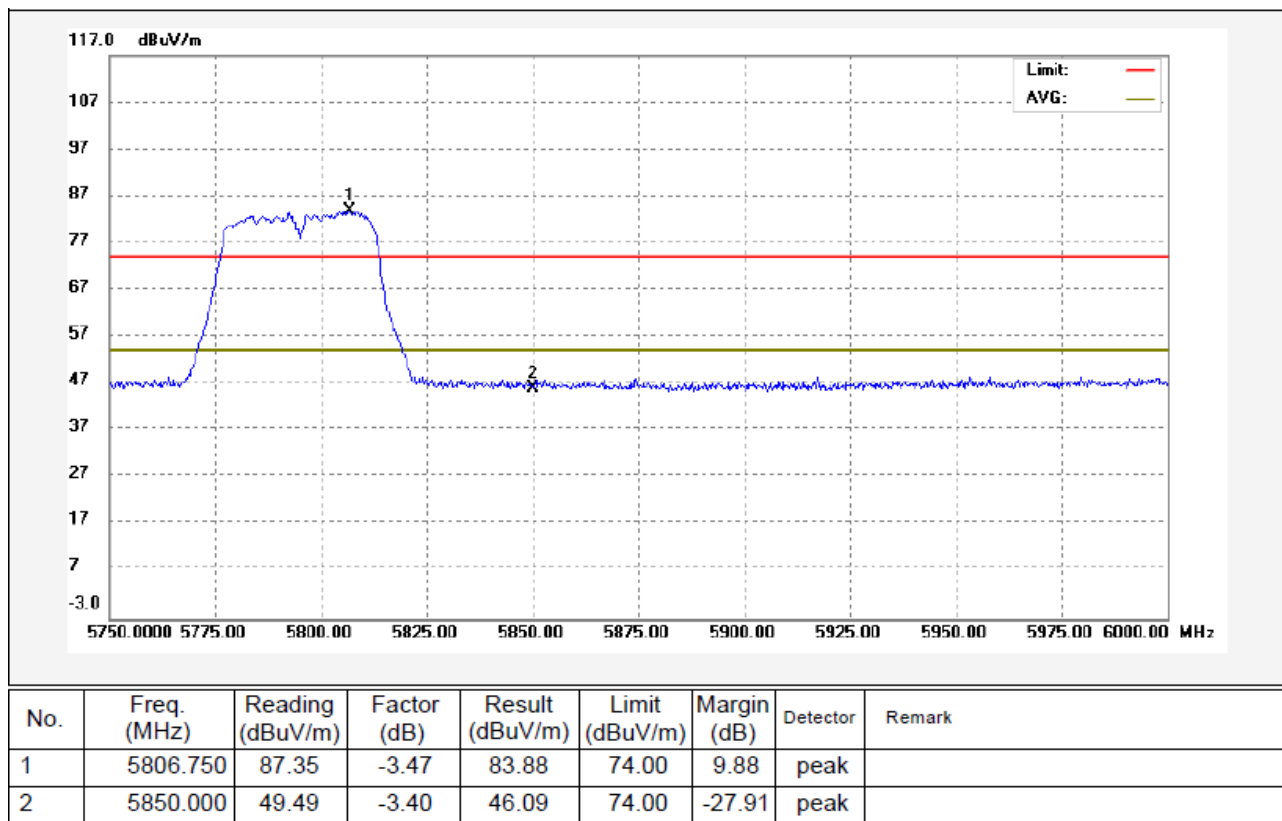
802.11ac(HT40) U-NII-3 Transmitting Band edge-left side Horizontal



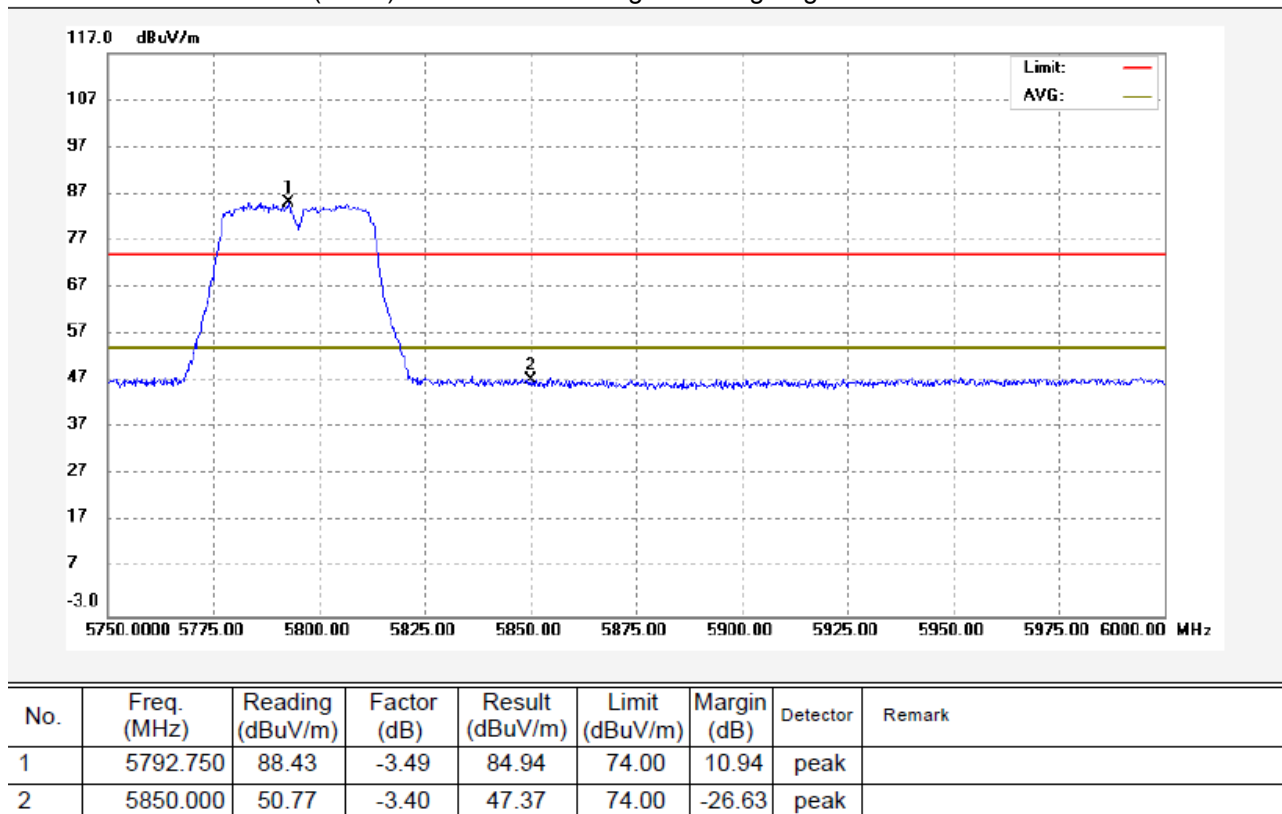
802.11ac(HT40) U-NII-3 Transmitting Band edge-left side Vertical



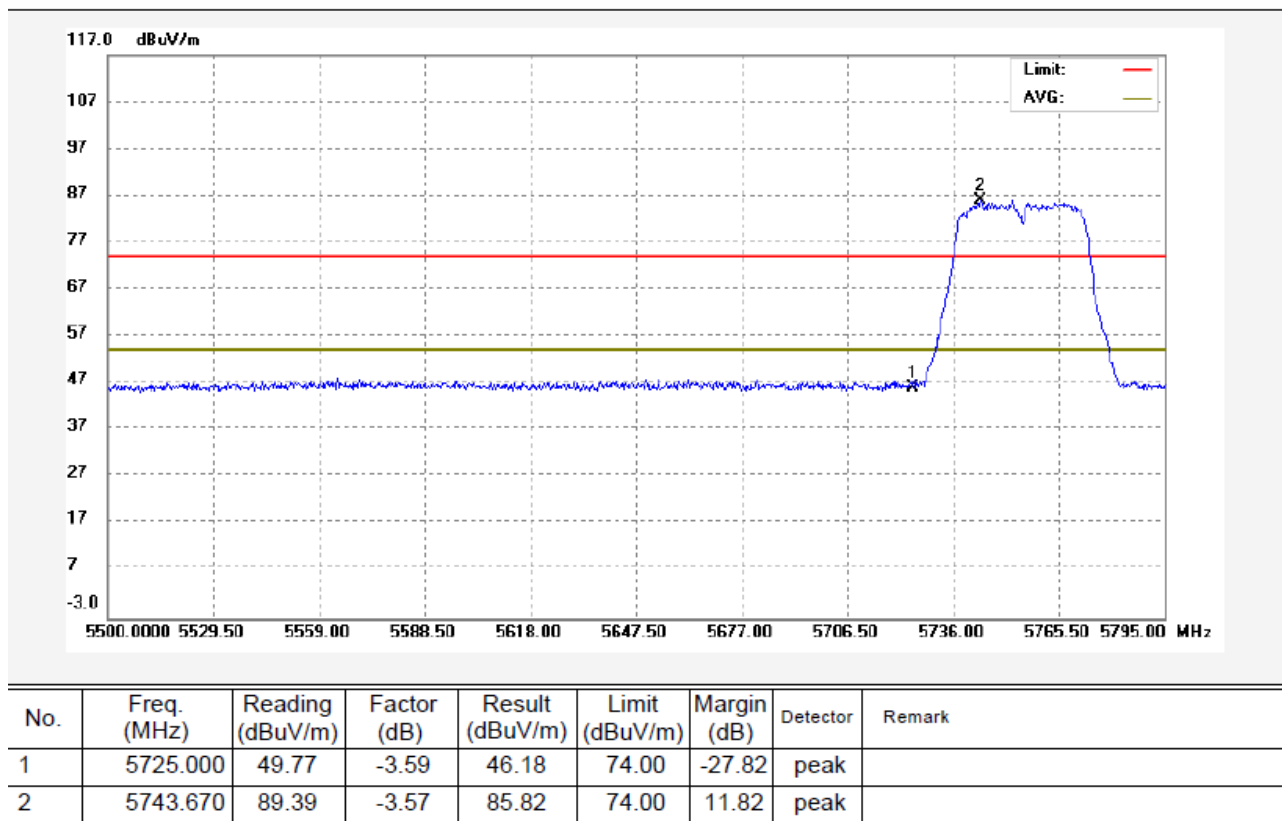
802.11ac(HT40) U-NII-3 Transmitting Band edge-right side Vertical



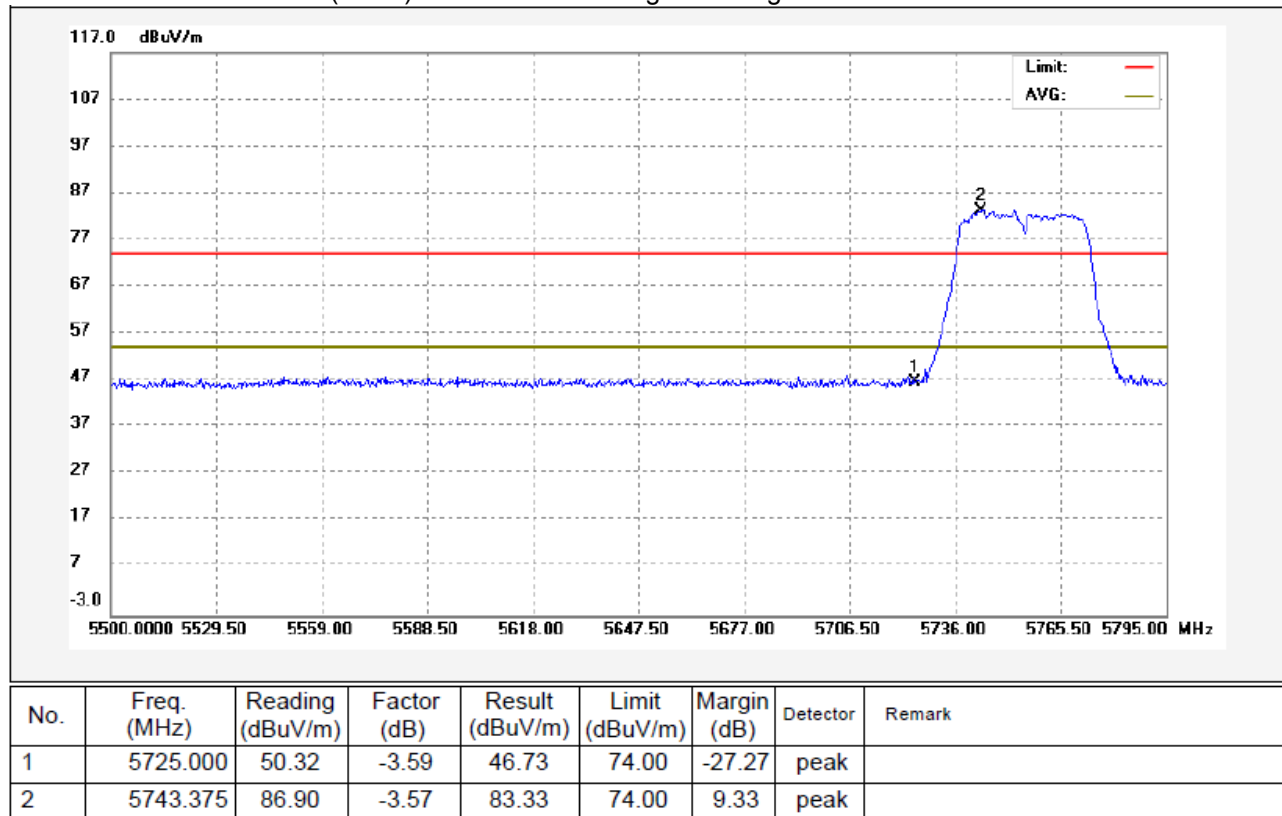
802.11ac(HT40) U-NII-3 Transmitting Band edge-right side Horizontal



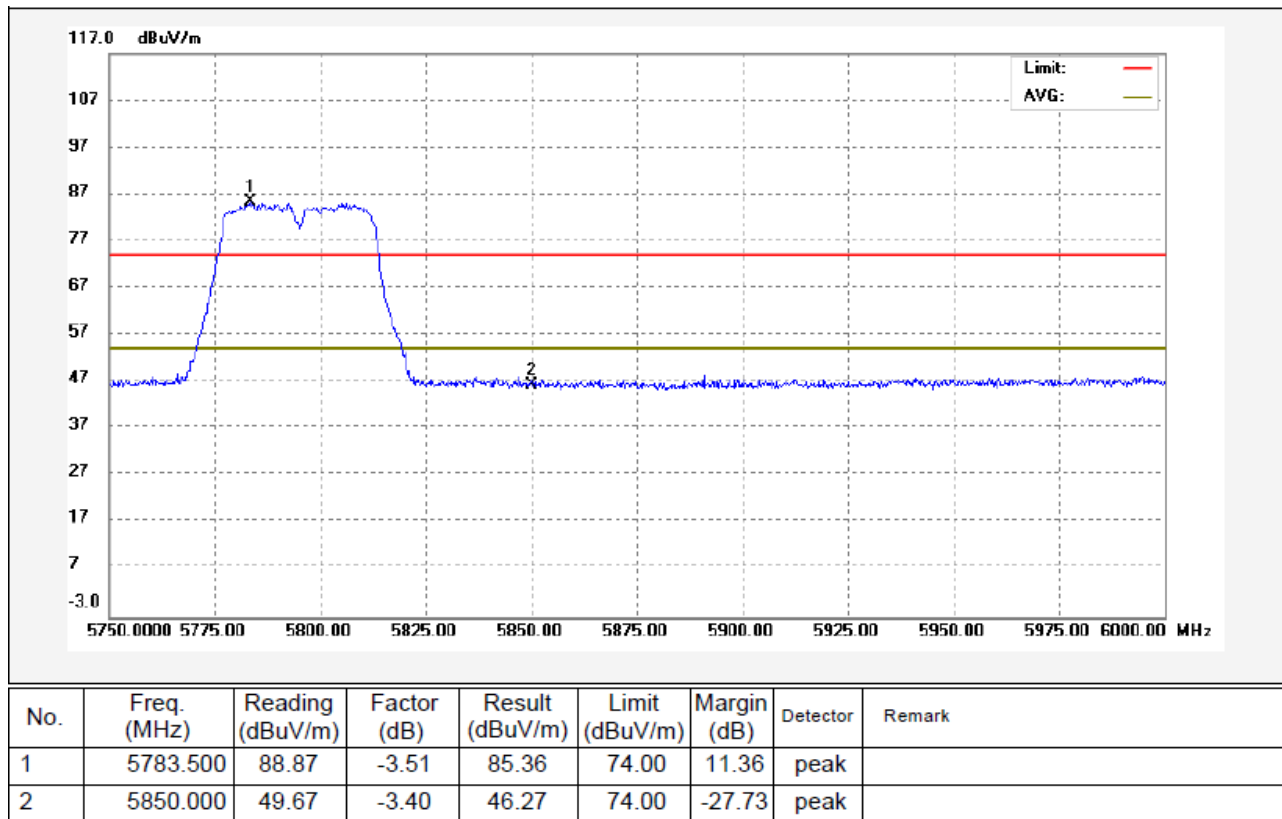
802.11n(HT40) U-NII-3 Transmitting Band edge-left side Horizontal



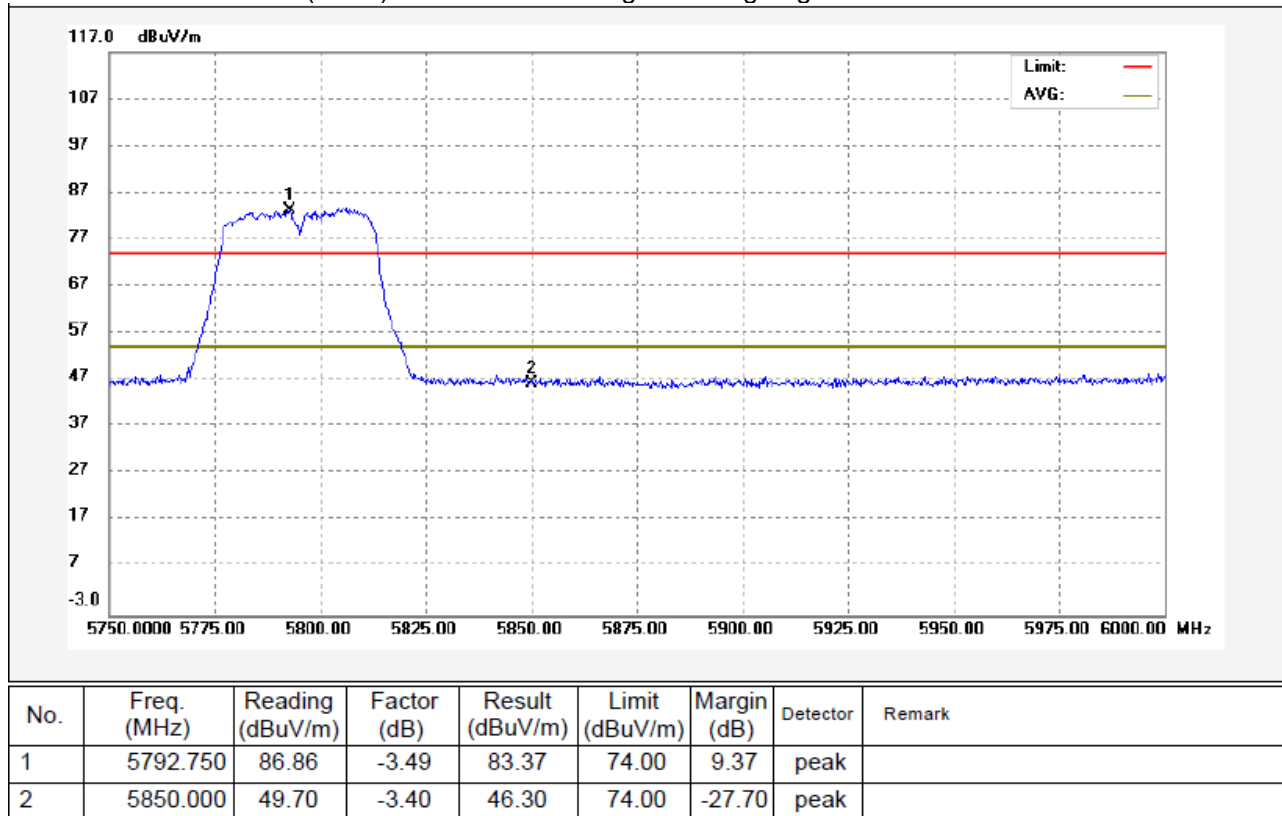
802.11n(HT40) U-NII-3 Transmitting Band edge-left side Vertical



802.11n(HT40) U-NII-3 Transmitting Band edge-right side Vertical



802.11n(HT40) U-NII-3 Transmitting Band edge-right side Horizontal



12 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.407

Test Method: KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

Test Limit: No restriction limits for U-NII-1/II/III. Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Result: PASS

12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

12.2 Test Result:

Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	21.66	21.74	21.47	16.74	16.78	17.85
	802.11n(HT20)	21.73	22.33	21.94	16.75	16.92	17.77
	802.11ac(HT20)	21.92	21.61	21.14	17.84	16.77	17.81
	802.11n(HT40)	42.53	/	42.63	36.32	/	36.06
	802.11ac(HT40)	41.90	/	42.11	36.12	/	36.07

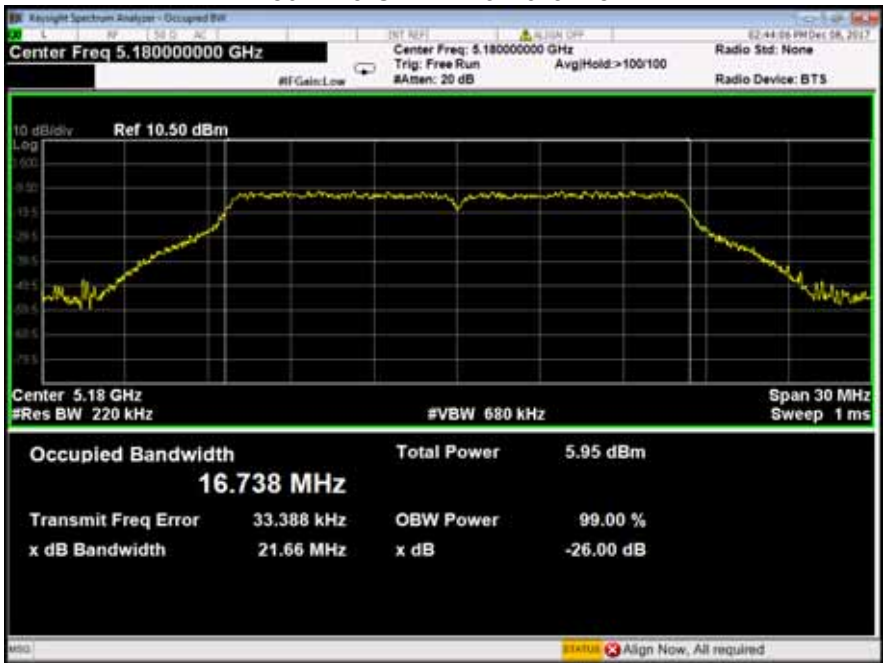
Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-2A	802.11a	21.50	21.50	22.05	16.74	16.76	17.81
	802.11n(HT20)	21.92	21.97	21.97	17.85	16.73	17.82
	802.11ac(HT20)	21.68	21.88	21.04	17.83	16.77	17.81
	802.11n(HT40)	42.98	/	42.69	36.16	/	36.07
	802.11ac(HT40)	42.11	/	42.45	36.12	/	36.04

Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-2C	802.11a	21.89	21.86	21.87	16.83	16.77	17.90
	802.11n(HT20)	22.06	21.92	21.06	17.83	16.75	17.85
	802.11ac(HT20)	21.76	21.58	22.19	17.84	16.73	17.85
	802.11n(HT40)	42.54	/	42.27	36.14	/	36.15
	802.11ac(HT40)	41.72	/	41.65	36.31	/	36.10

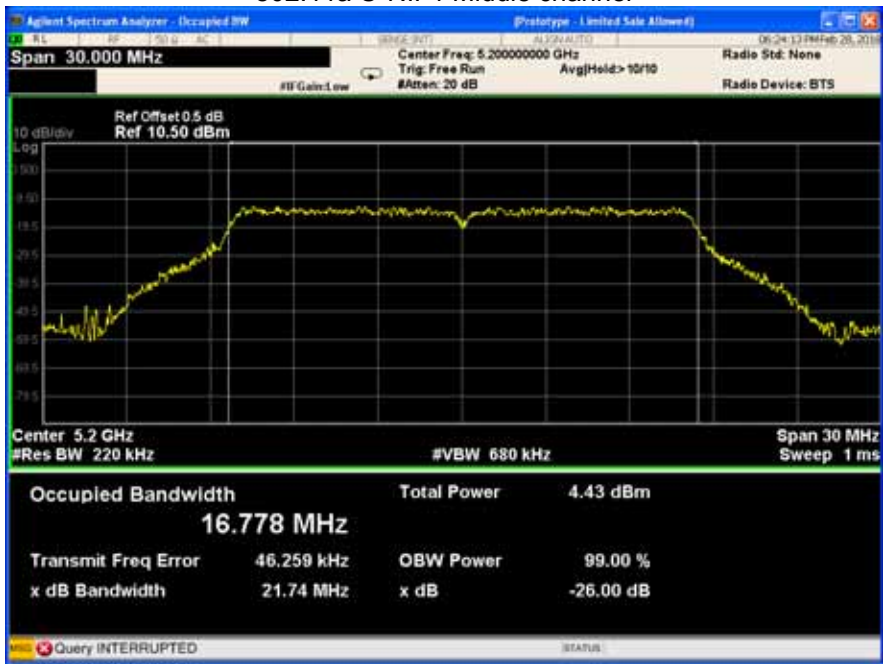
Band	Operation mode	26 dB Bandwidth (MHz)			6 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High	Low	Middle	High
U-NII-3	802.11a	21.81	21.78	22.30	16.38	16.40	17.59	16.81	16.71	17.82
	802.11n(HT20)	22.07	21.45	21.97	16.35	16.41	17.59	17.83	16.74	17.83
	802.11ac(HT20)	21.56	21.52	22.14	16.36	16.37	17.58	16.52	16.76	17.87
	802.11n(HT40)	42.92	/	42.70	35.14	/	35.34	35.92	/	36.13
	802.11ac(HT40)	41.88	/	42.05	35.17	/	35.09	35.90	/	36.06

Test result plots shown as follows:

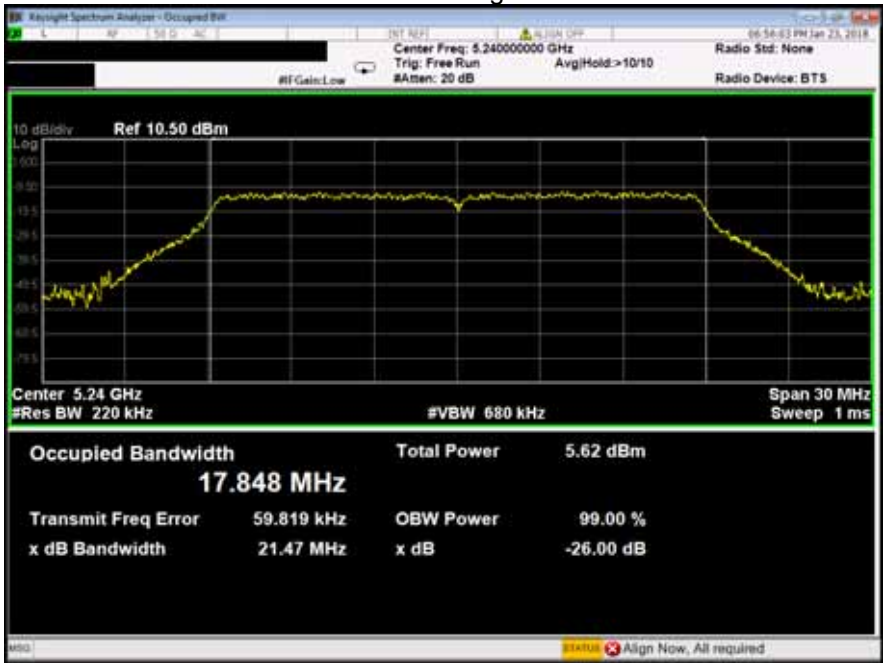
802.11a U-NII-1 Low channel



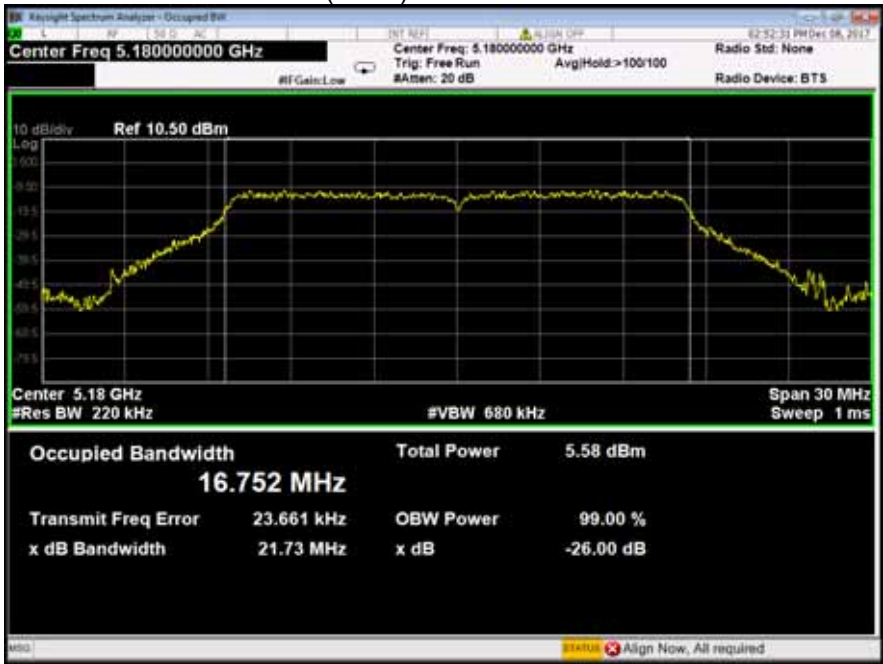
802.11a U-NII-1 Middle channel



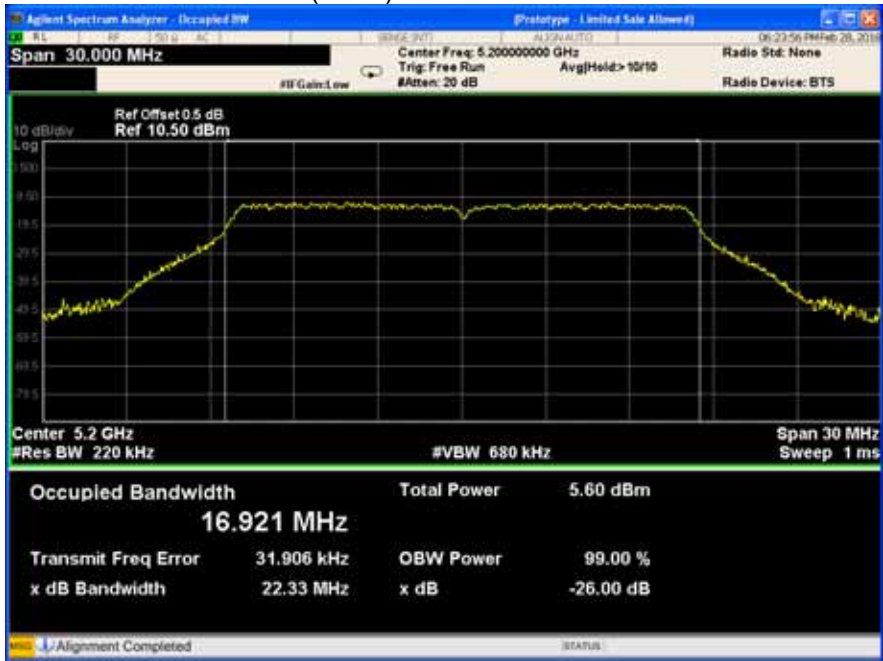
802.11a U-NII-1 High channel



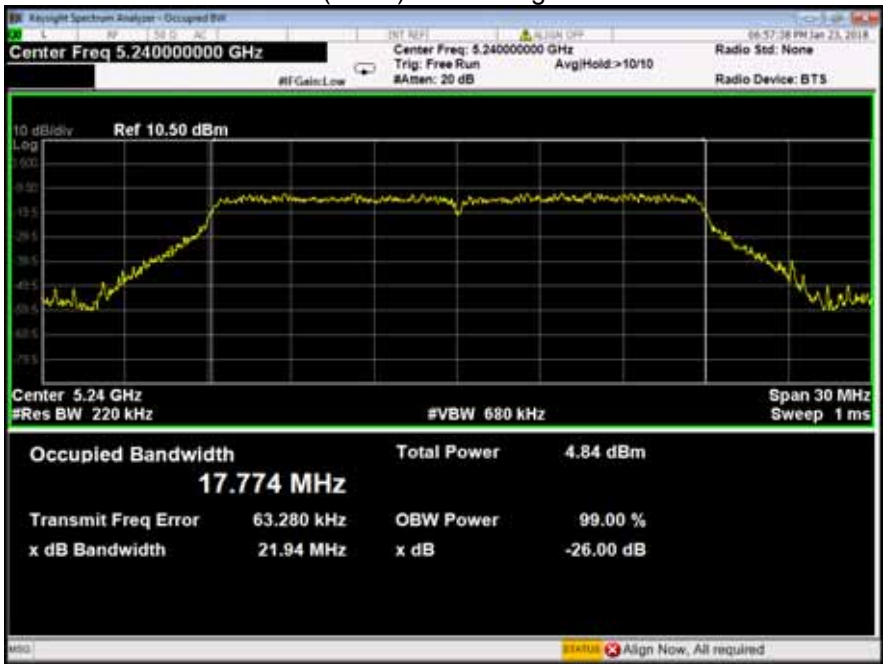
802.11n(HT20) U-NII-1 Low channel



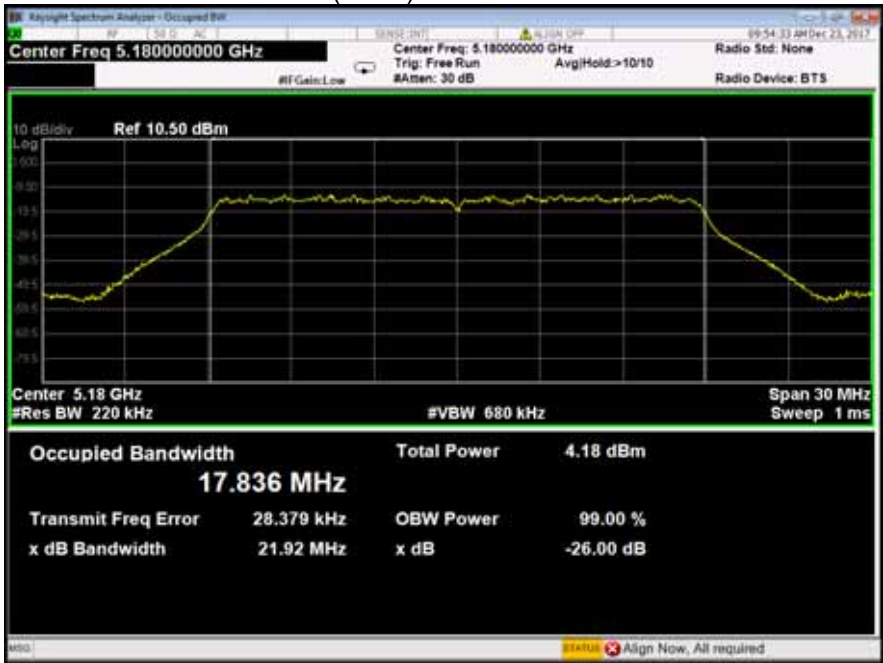
802.11n(HT20) U-NII-1 Middle channel



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



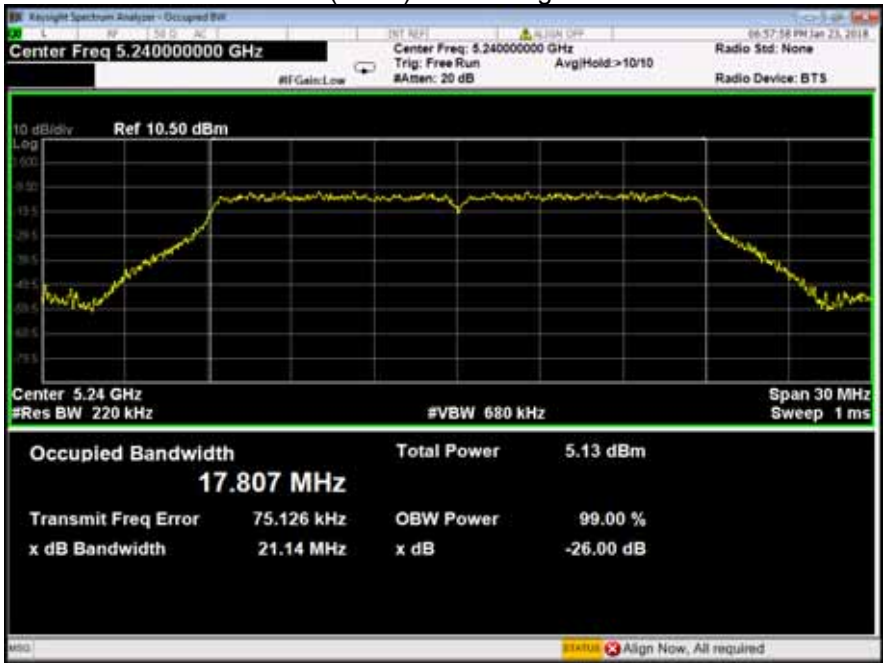
802.11ac(HT20) U-NII-1 Low channel



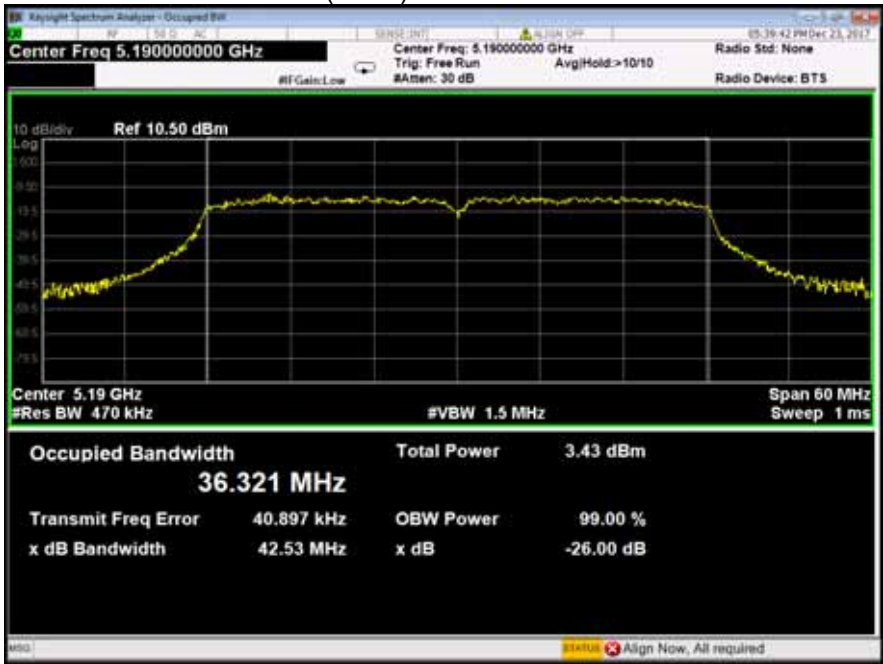
802.11ac(HT20) U-NII-1 Middle channel



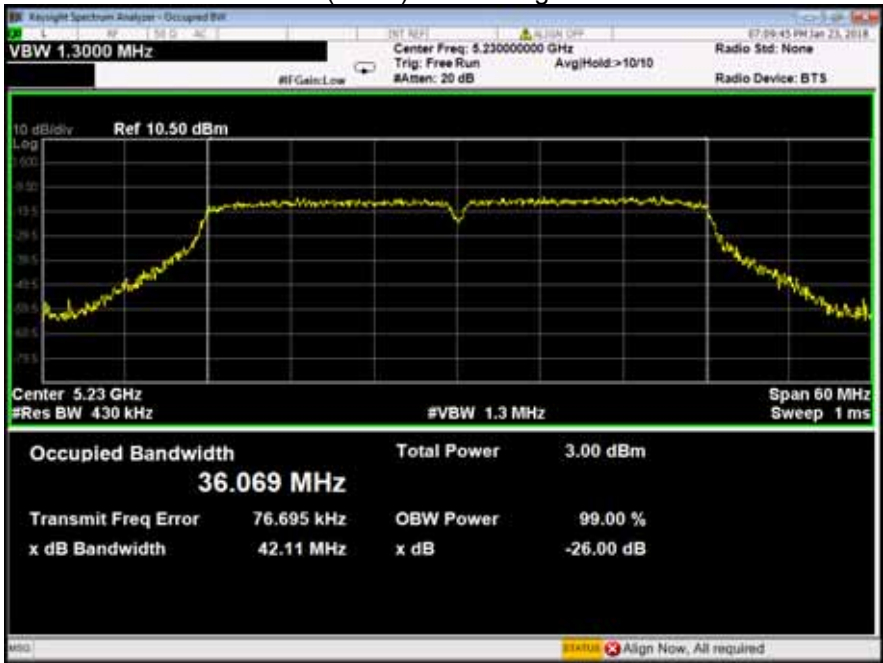
802.11ac(HT20) U-NII-1 High channel



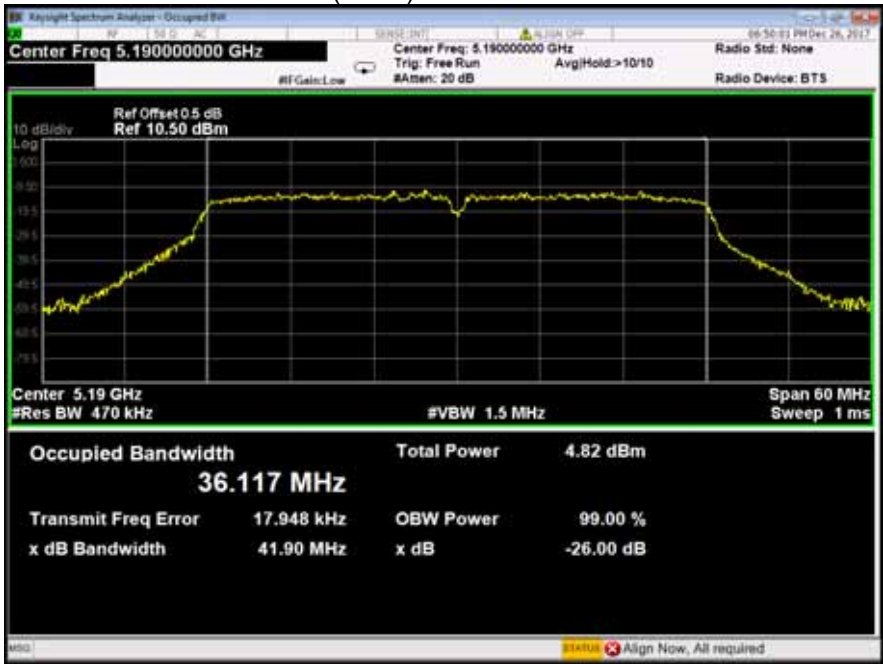
802.11n(HT40) U-NII-1 Low channel



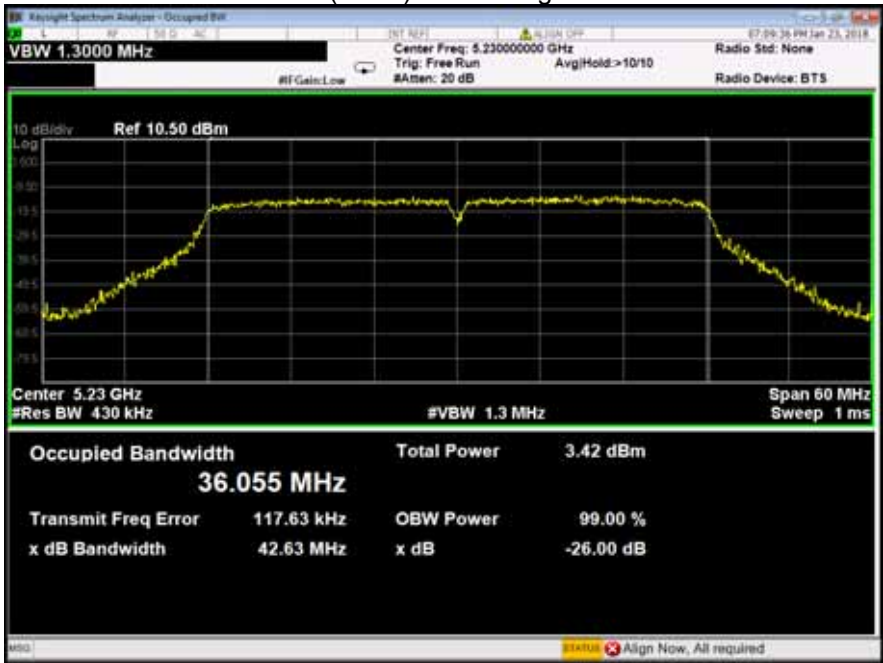
802.11n(HT40) U-NII-1 Highchannel



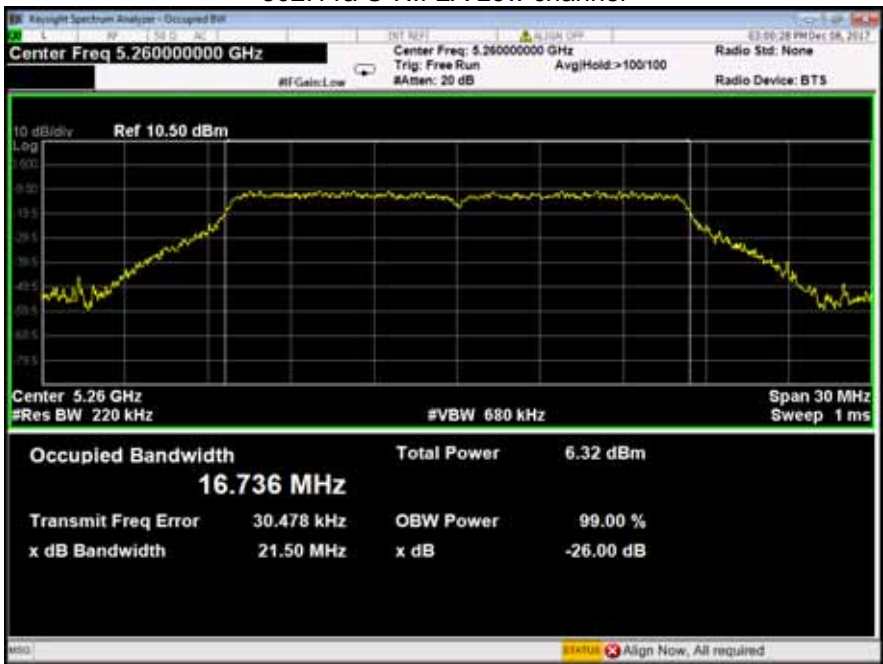
802.11ac(HT40) U-NII-1 Low channel



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



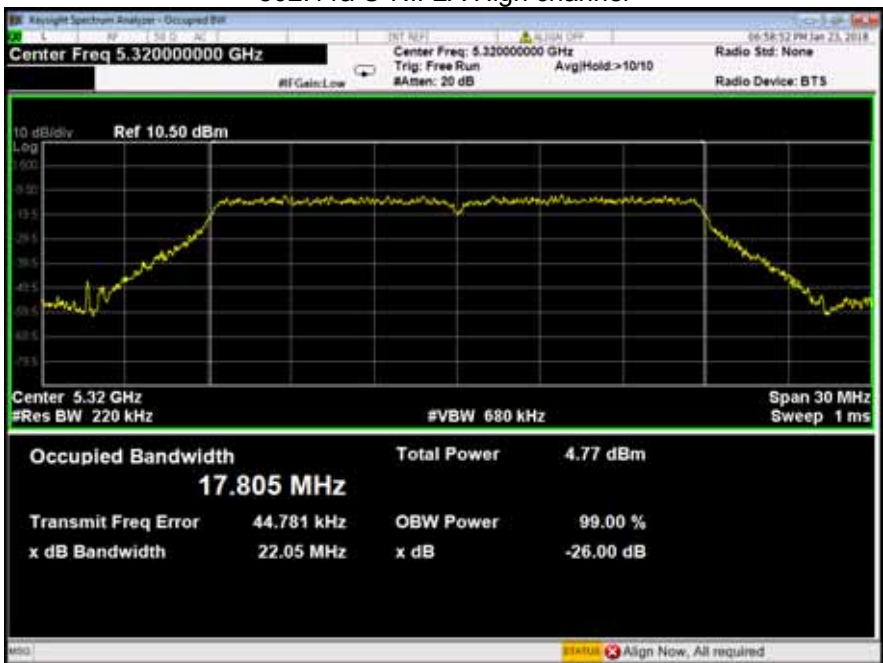
802.11a U-NII-2A Low channel



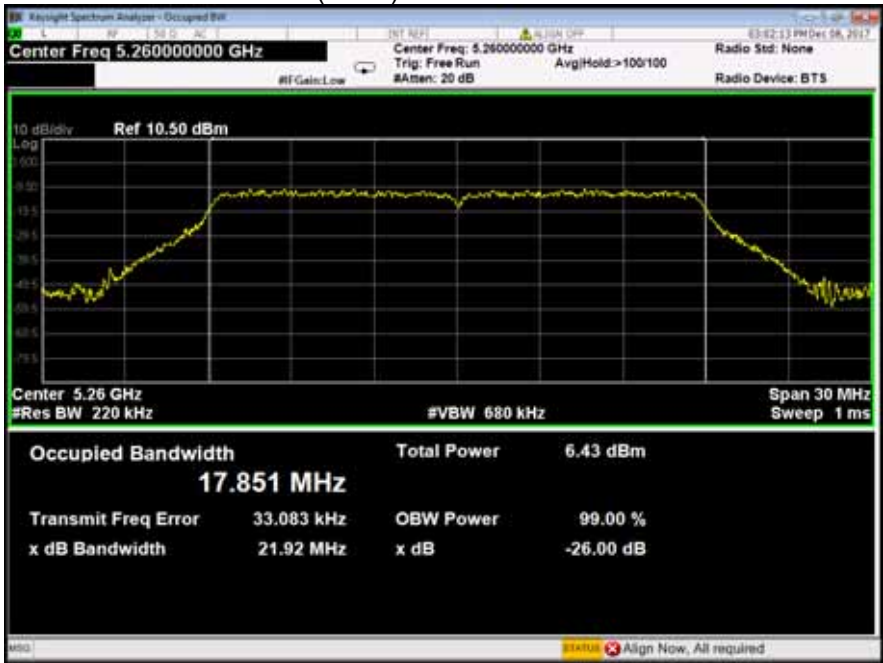
802.11a U-NII-2A Middle channel



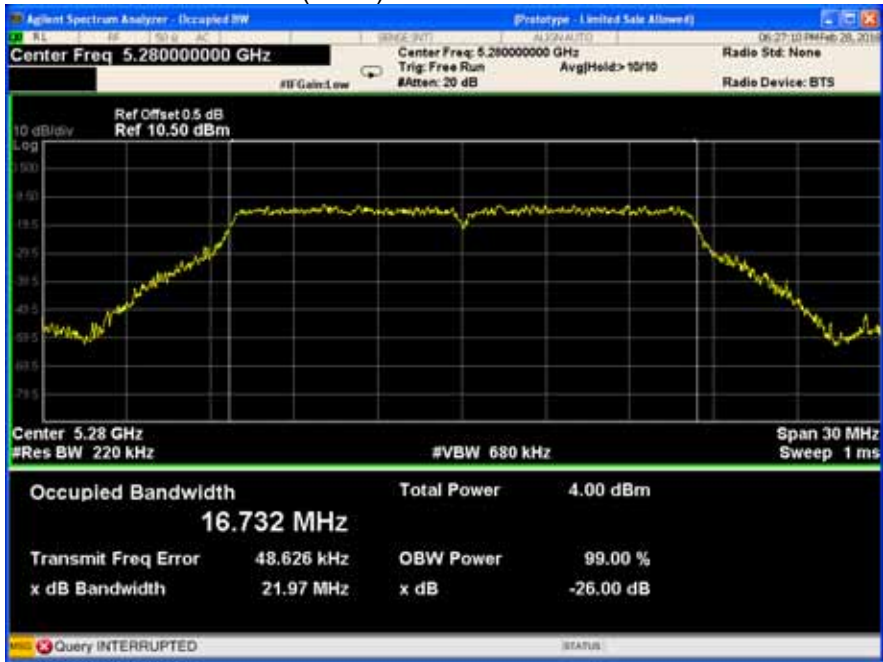
802.11a U-NII-2A High channel



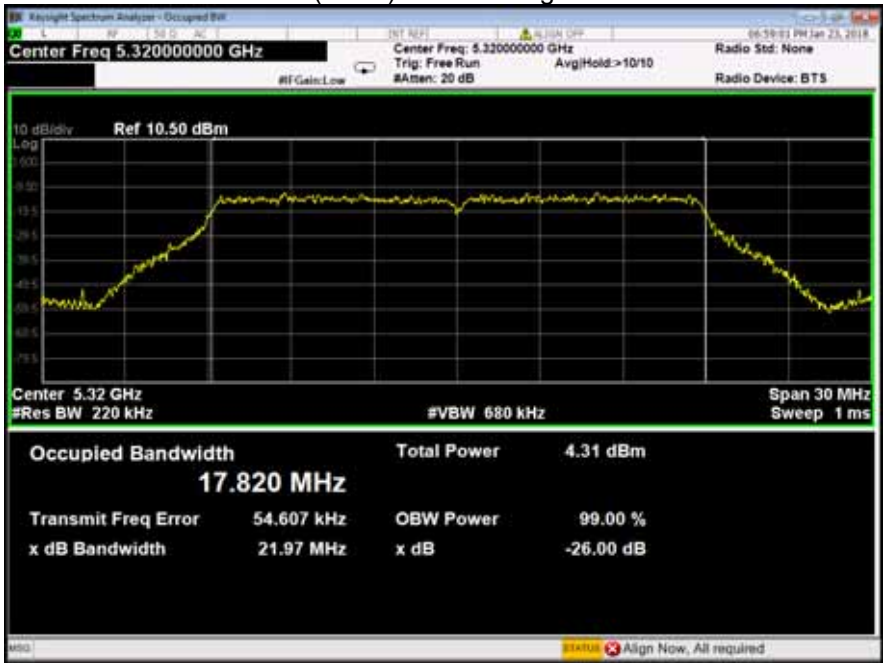
802.11n(HT20) U-NII-2A Low channel



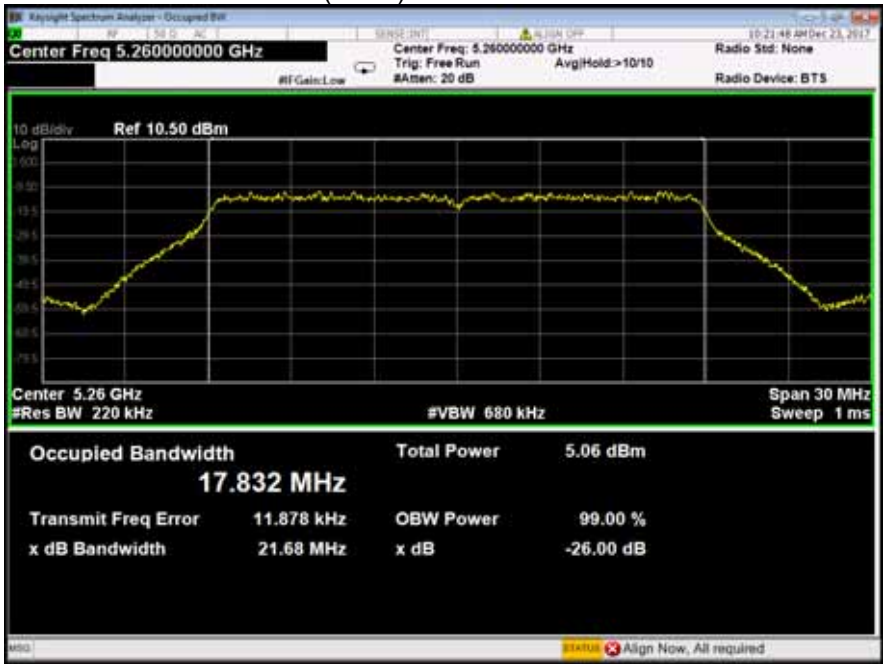
802.11n(HT20) U-NII-2A Middle channel



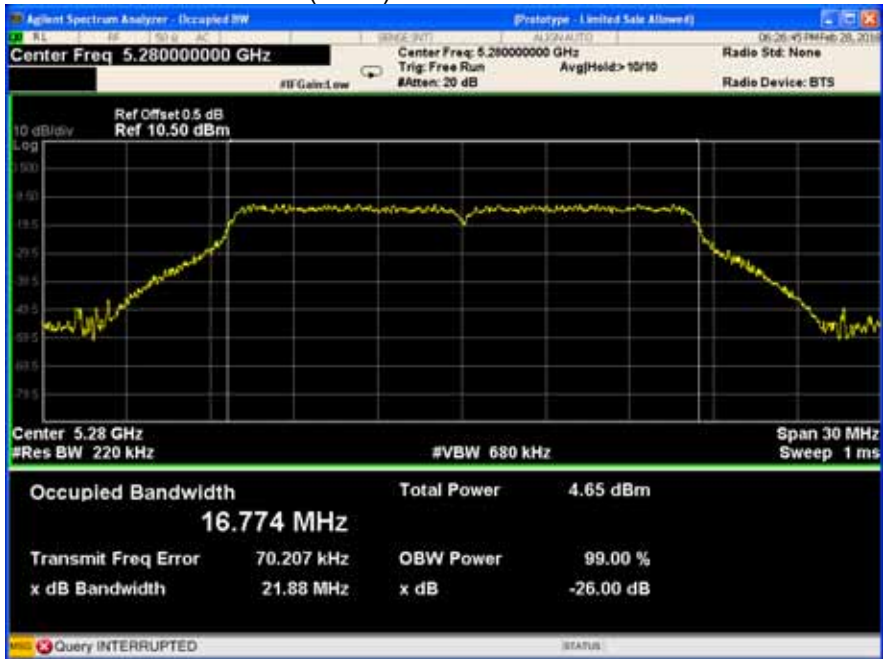
802.11n(HT20) U-NII-2A High channel



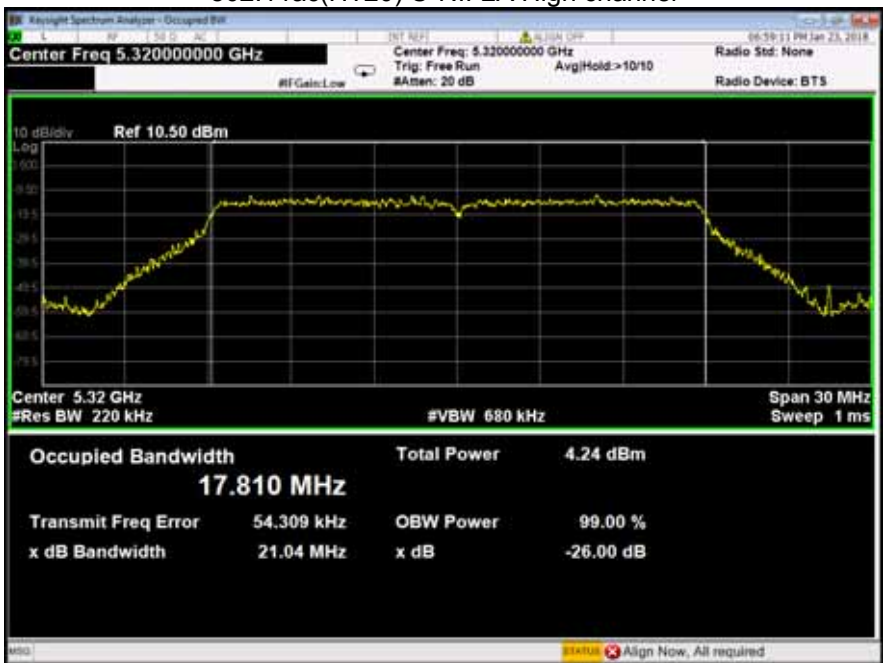
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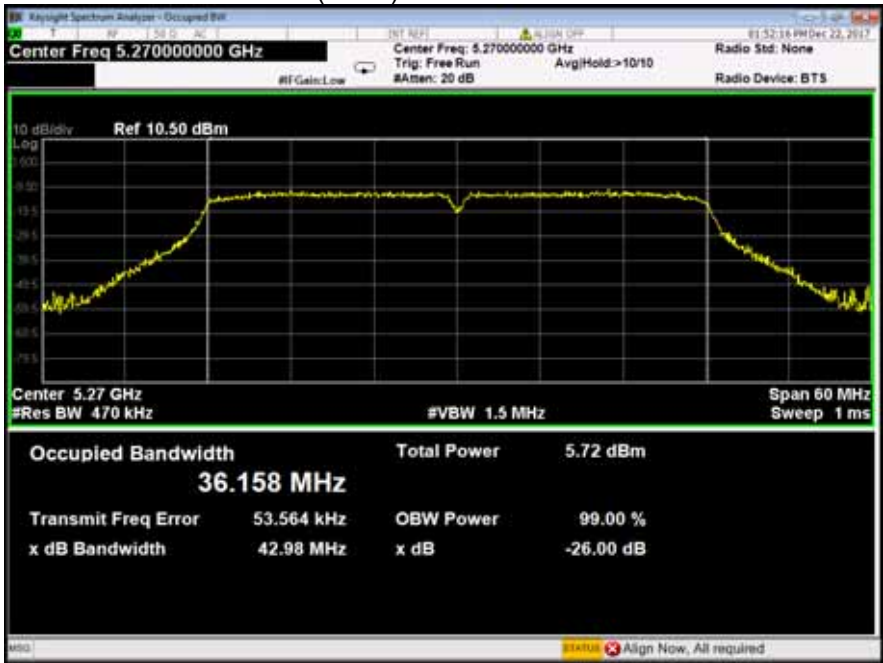
802.11ac(HT20) U-NII-2A Middle channel



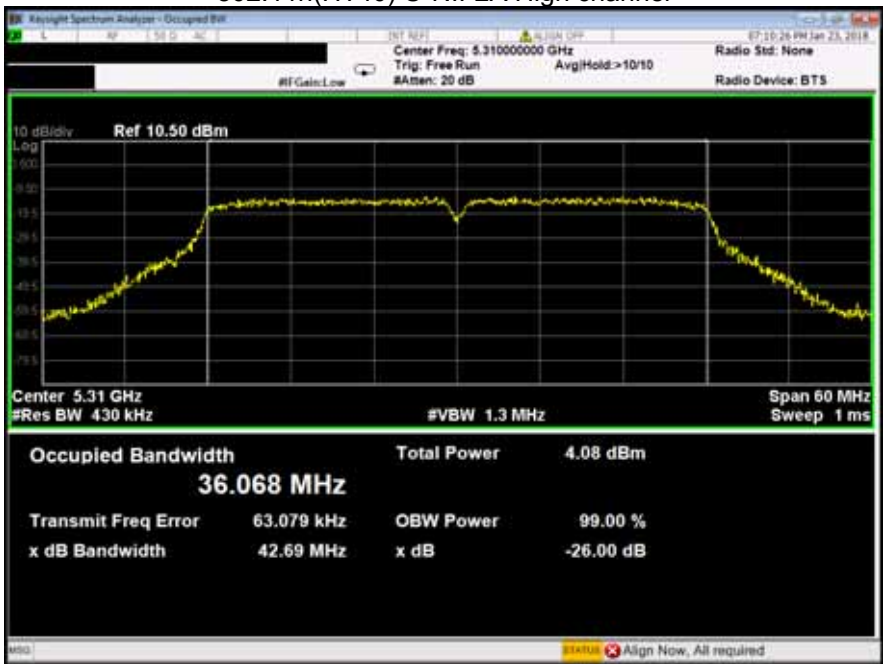
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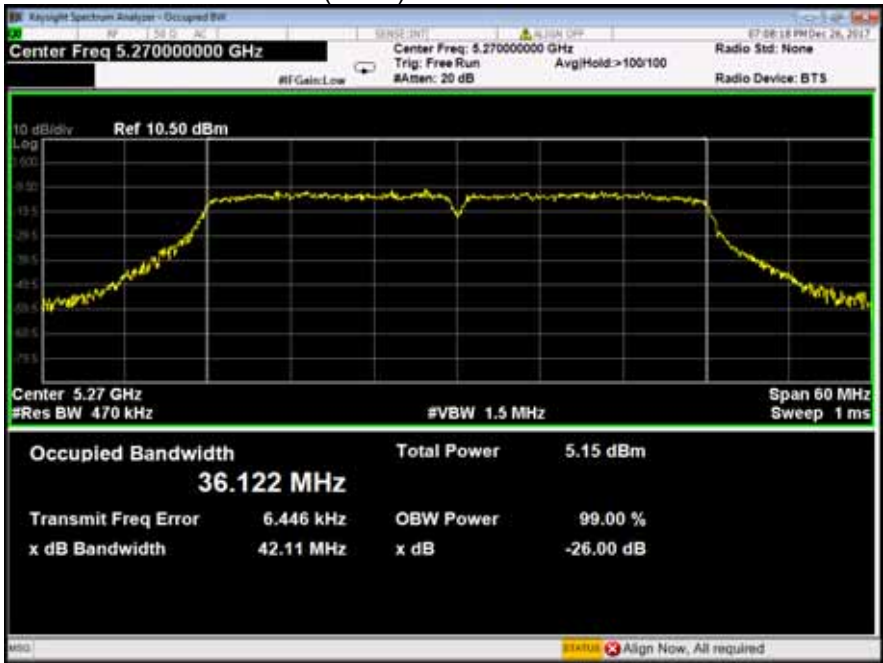
802.11n(HT40) U-NII-2A Low channel



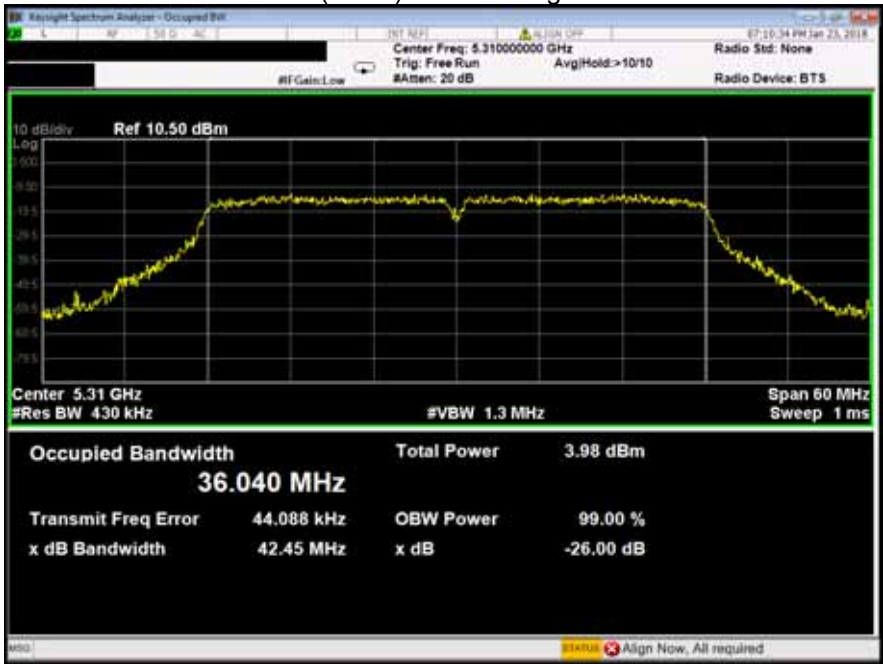
802.11n(HT40) U-NII-2A High channel



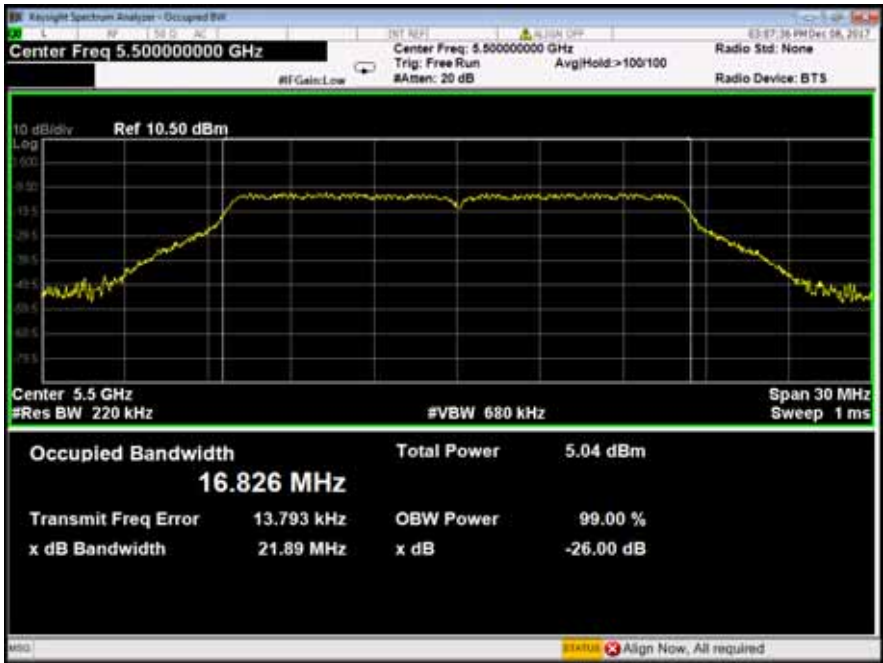
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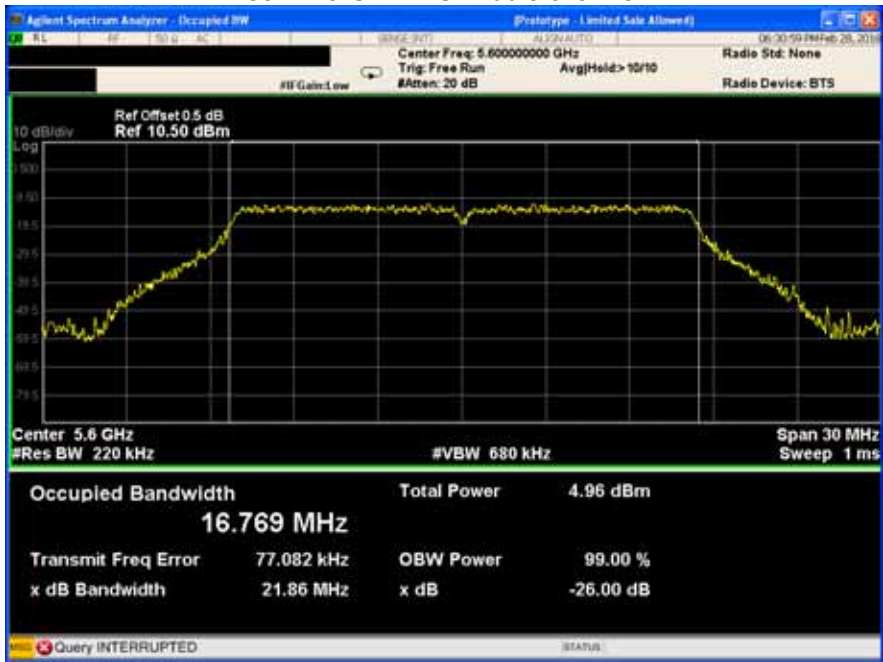
802.11ac(HT40) U-NII-2A High channel



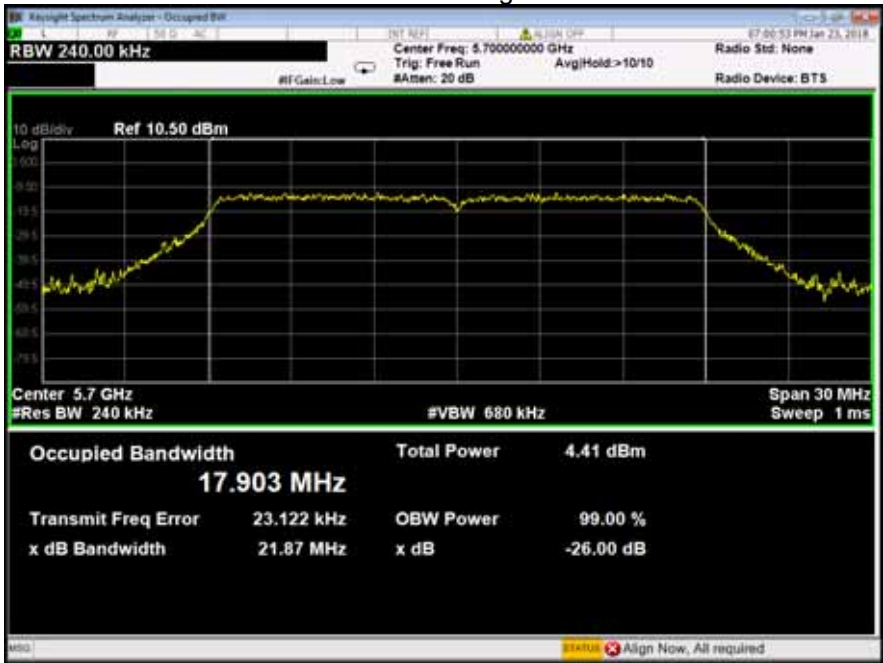
802.11a U-NII-2C Low channel



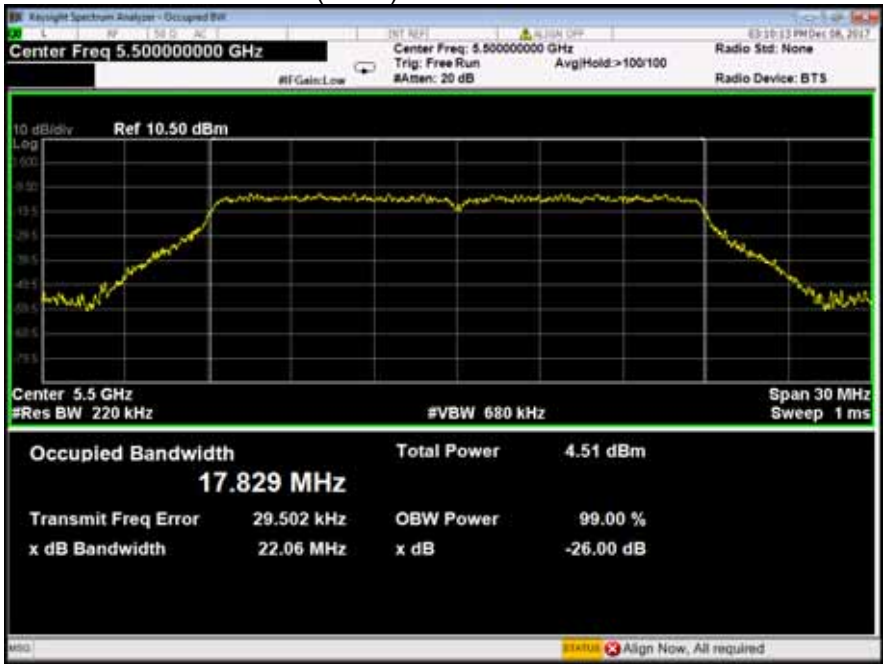
802.11a U-NII-2C Middle channel



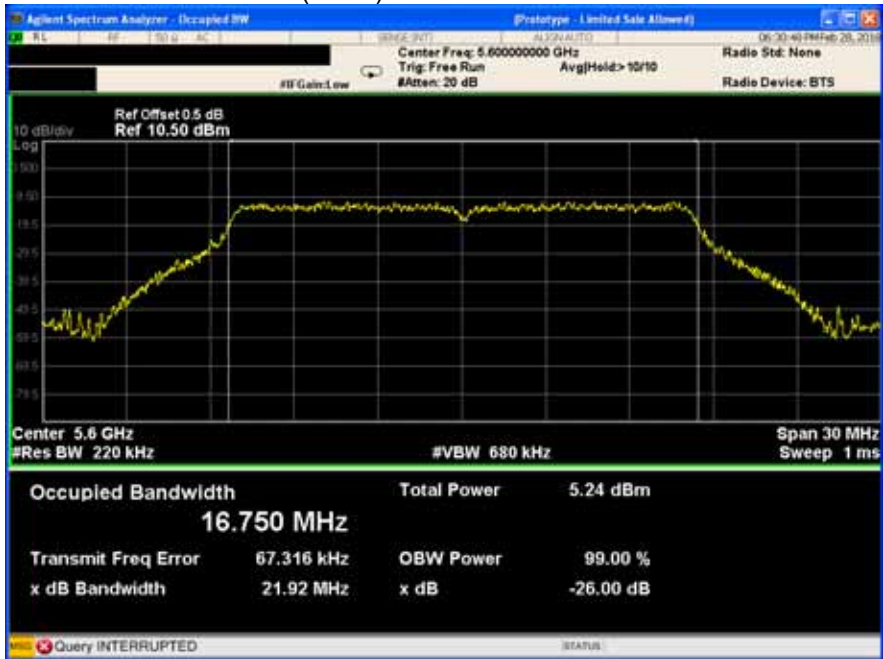
802.11a U-NII-2C High channel



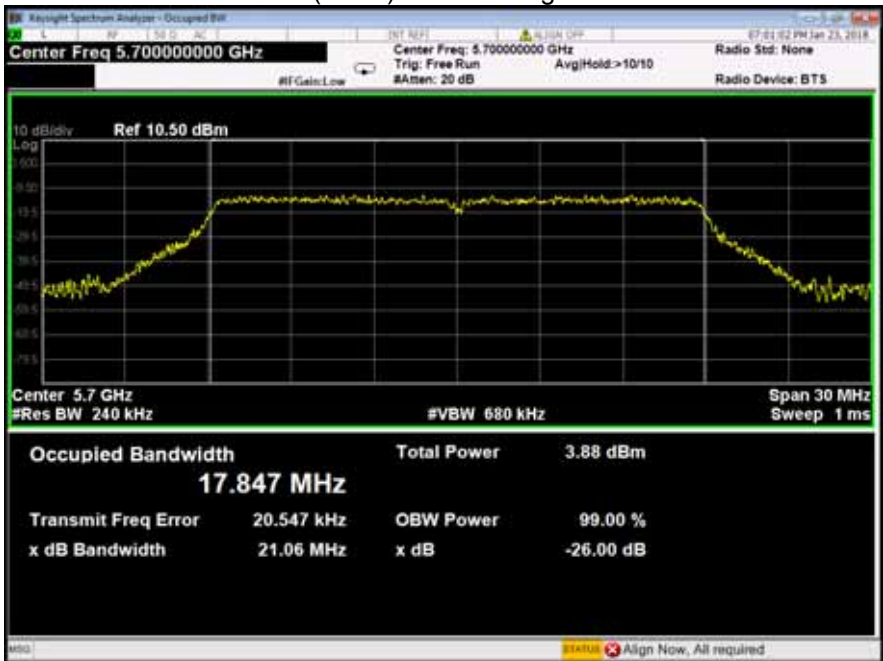
802.11n(HT20) U-NII-2C Low channel



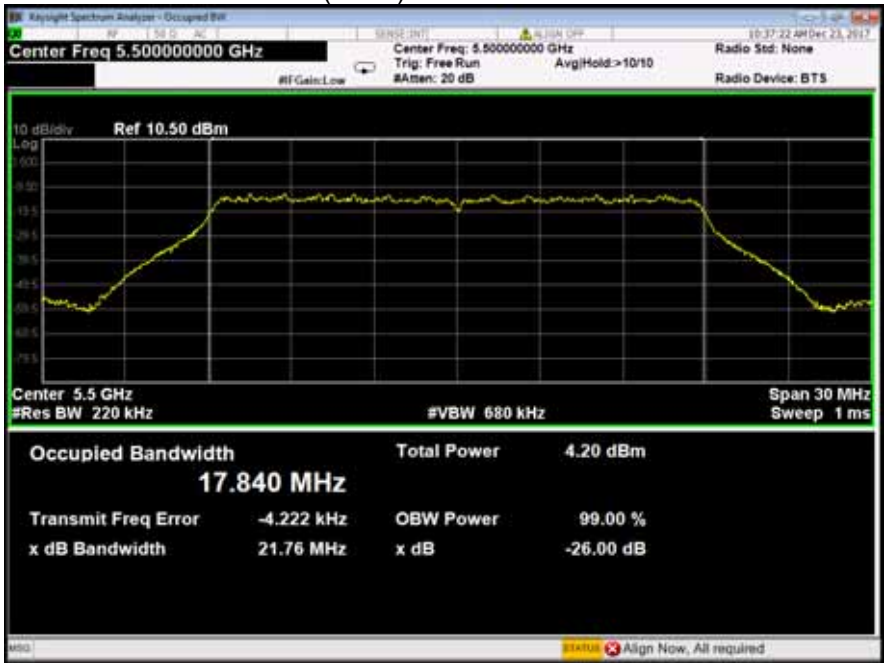
802.11n(HT20) U-NII-2C Middle channel



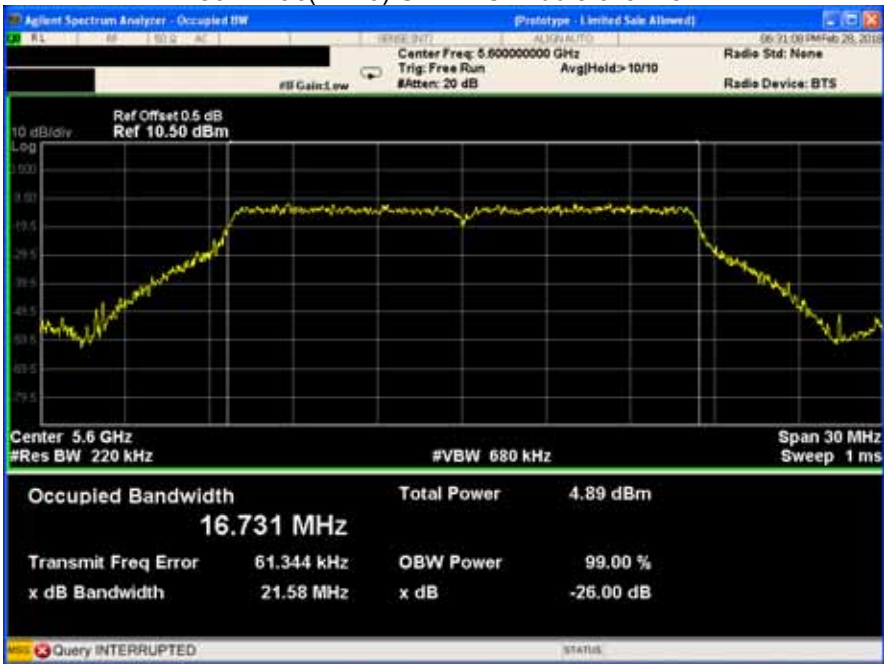
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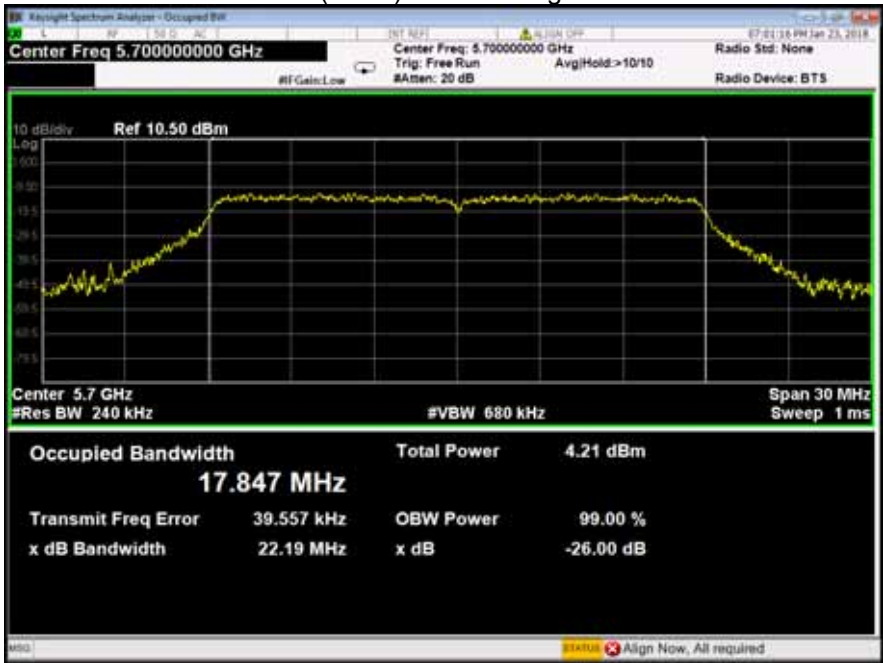
802.11ac(HT20) U-NII-2C Low channel



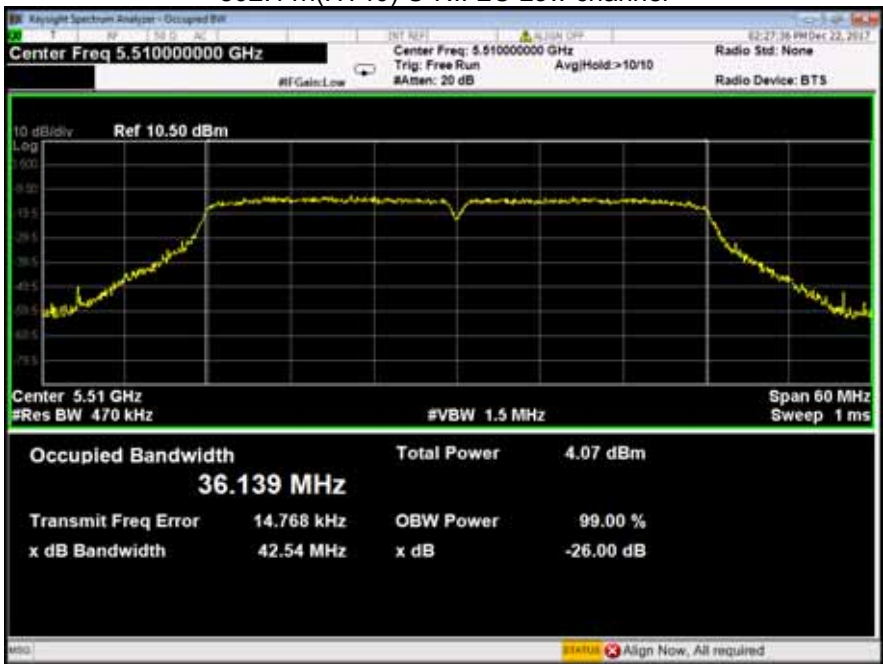
802.11ac(HT20) U-NII-2C Middle channel



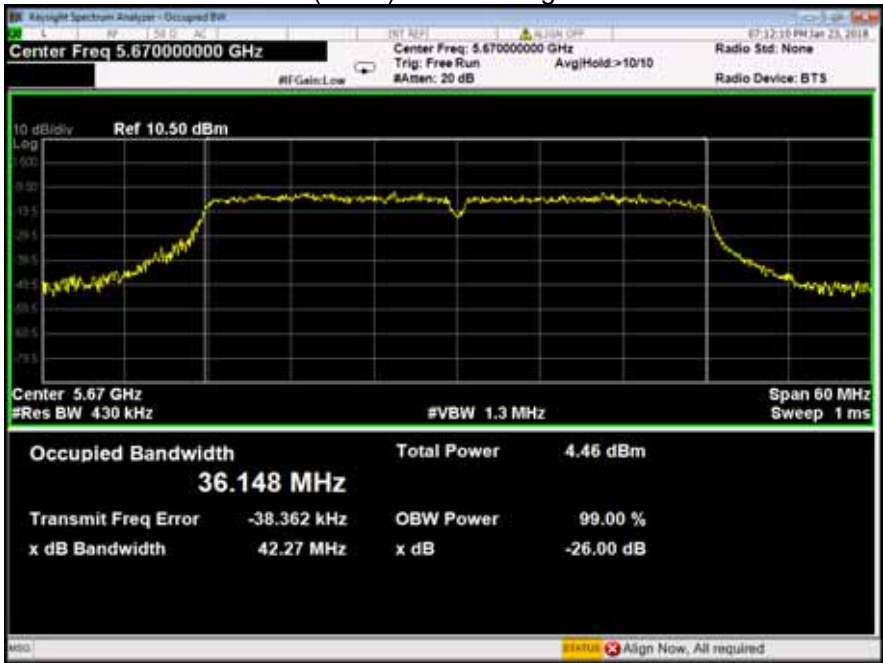
802.11ac(HT20) U-NII-2C High channel



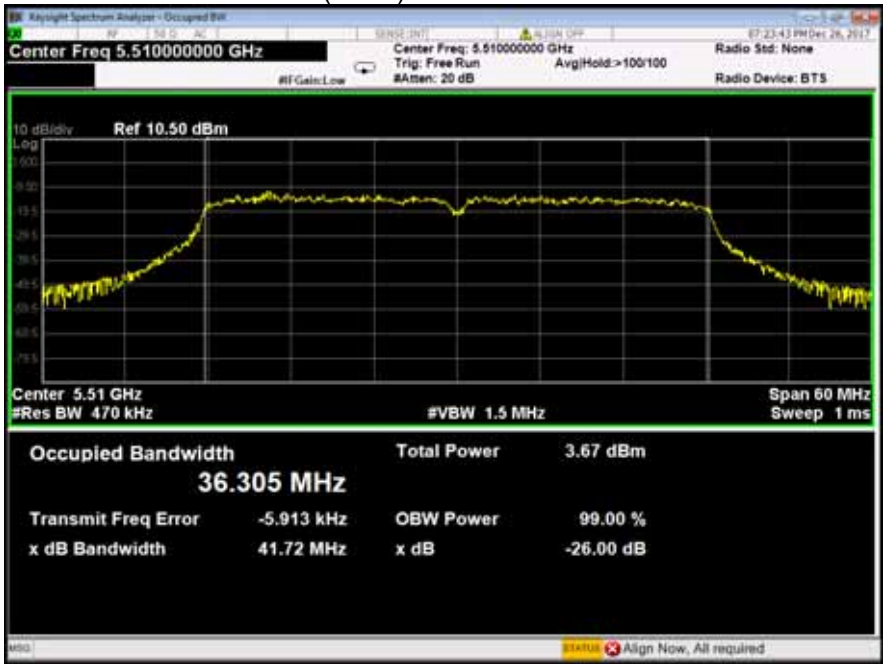
802.11n(HT40) U-NII-2C Low channel



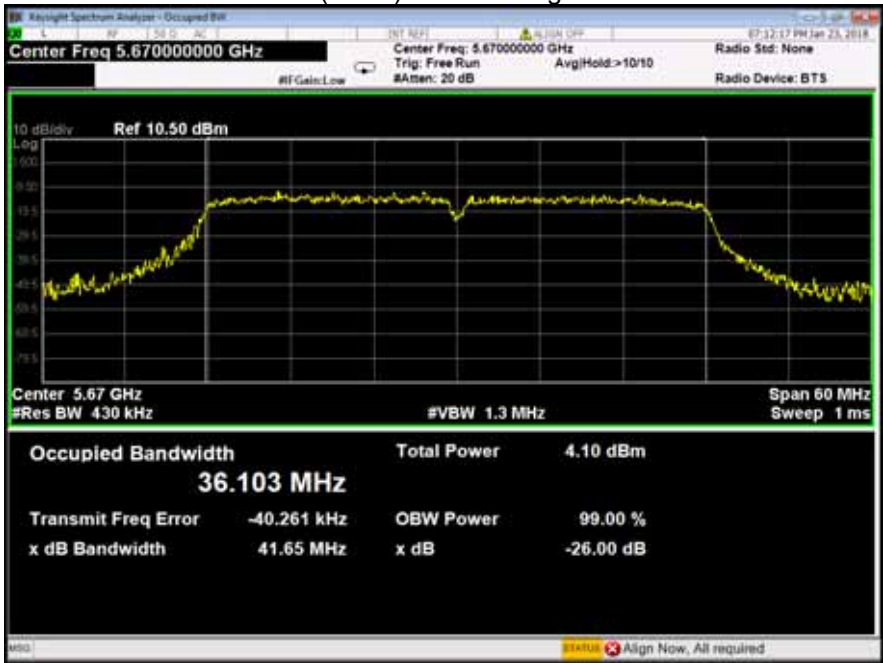
802.11n(HT40) U-NII-2C High channel



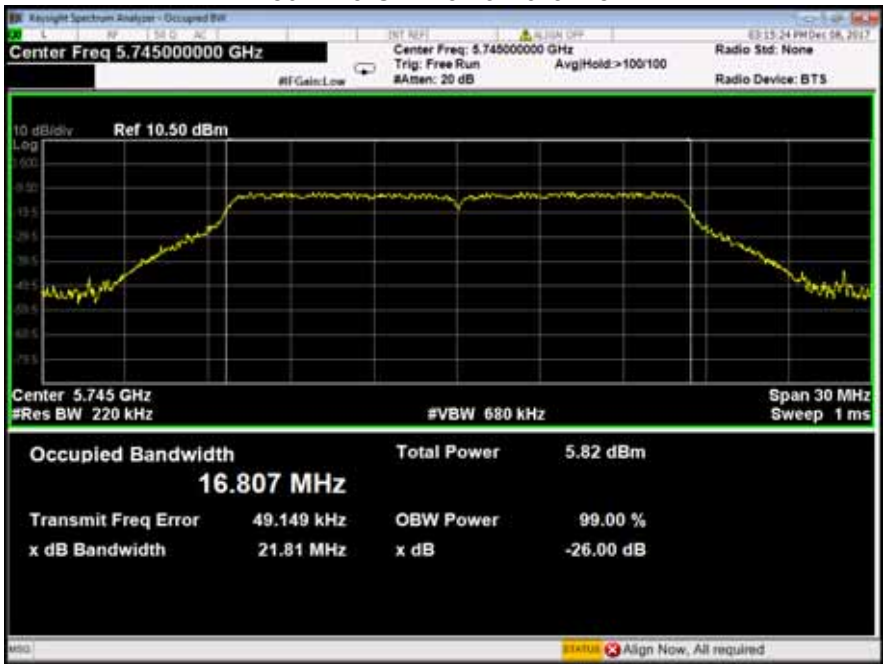
802.11ac(HT40) U-NII-2C Low channel

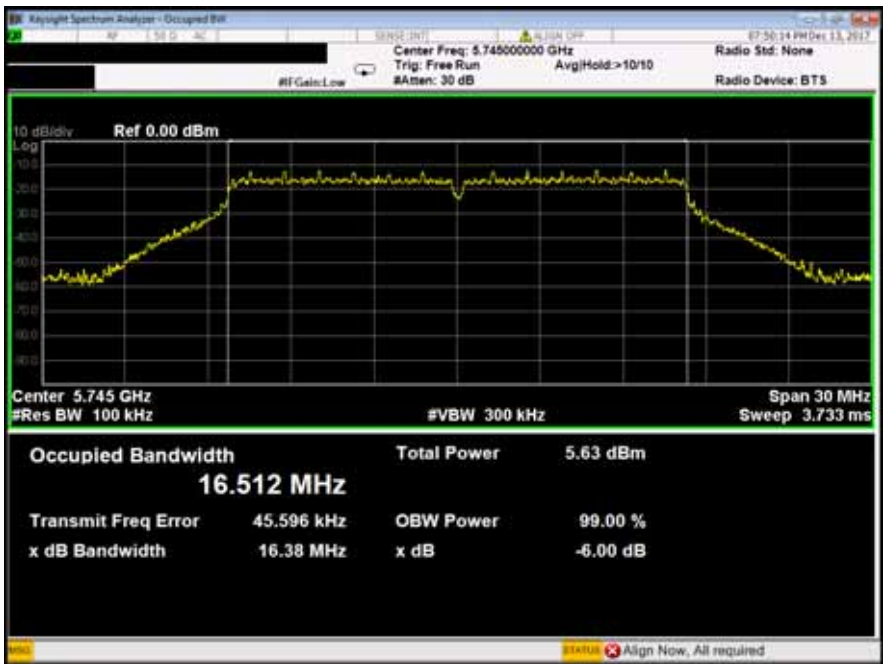


802.11ac(HT40) U-NII-2C High channel

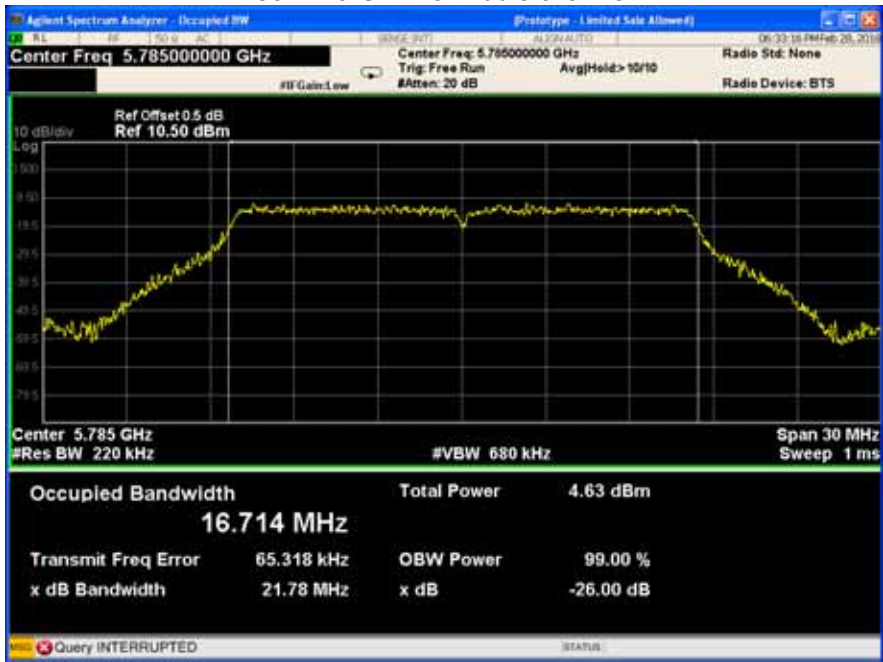


802.11a U-NII-3 Low channel



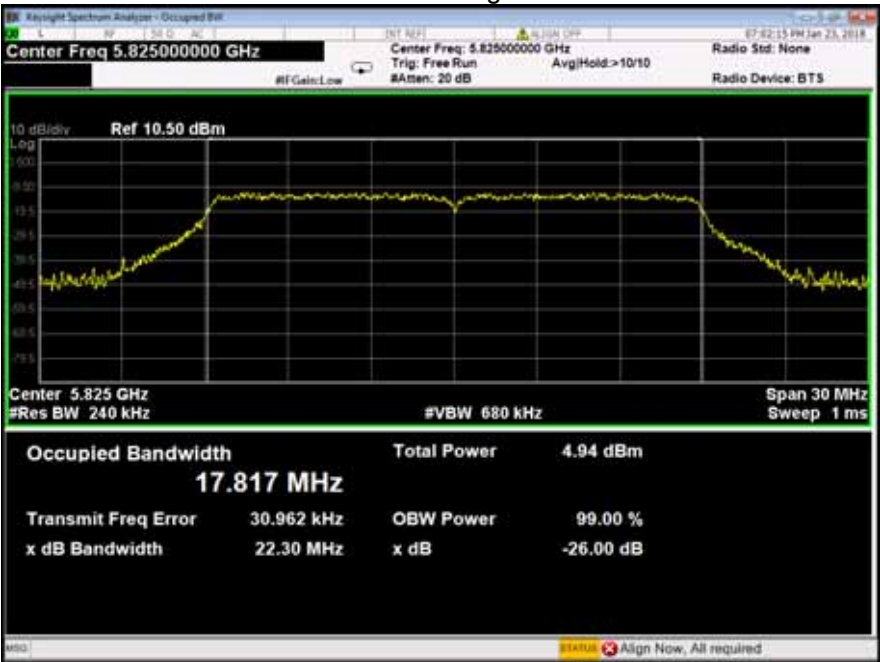


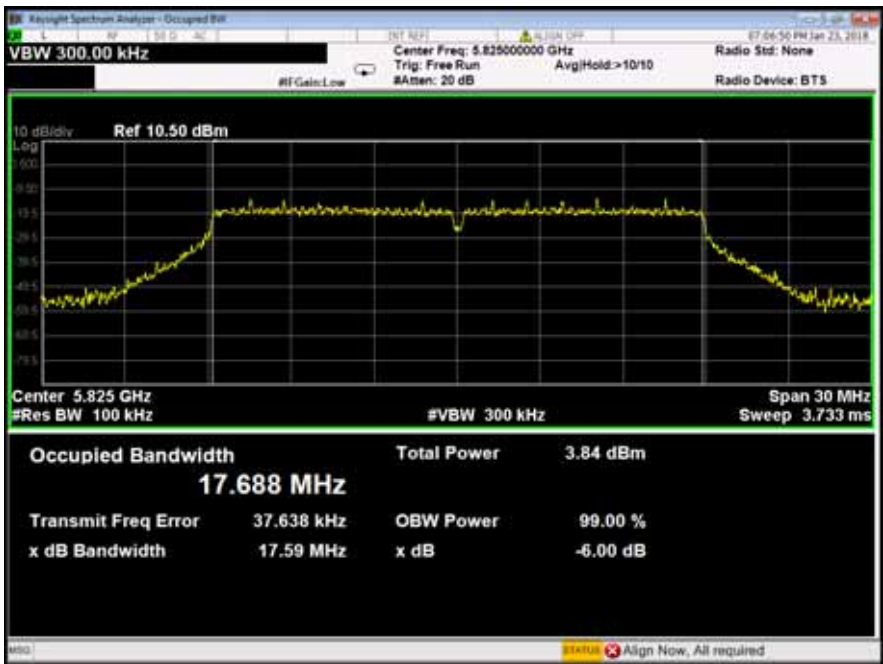
802.11a U-NII-3 Middle channel



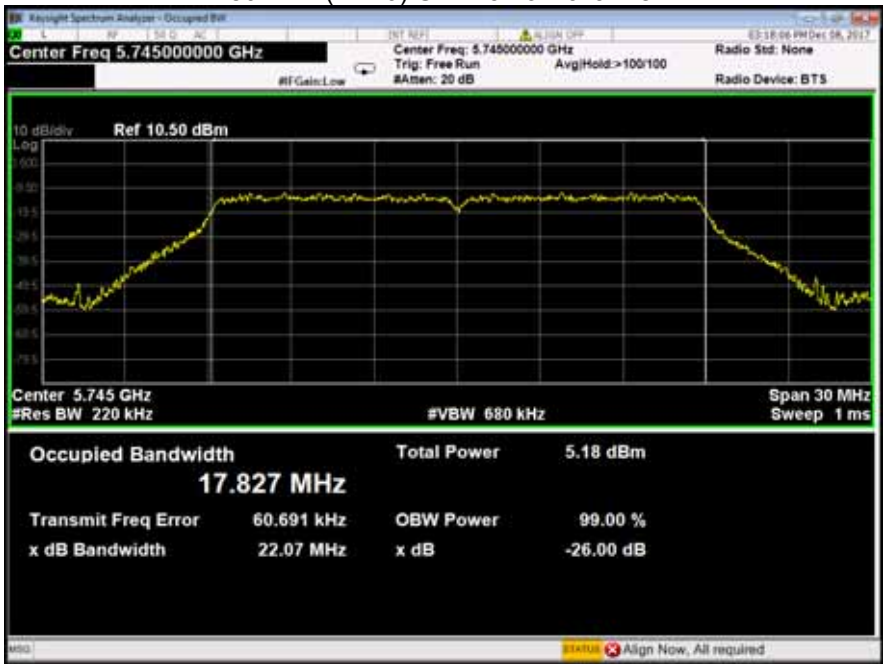


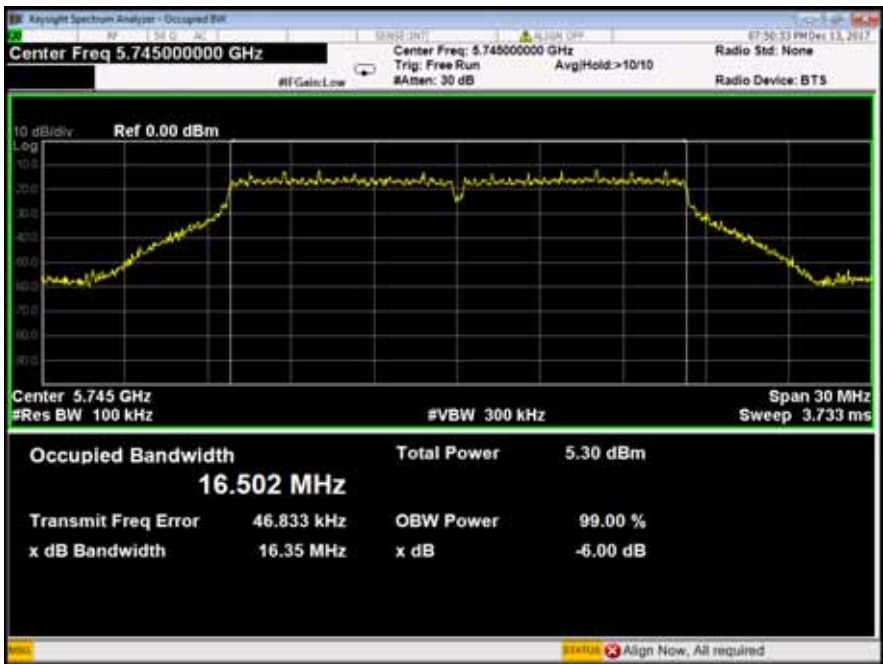
802.11a U-NII-3 High channel



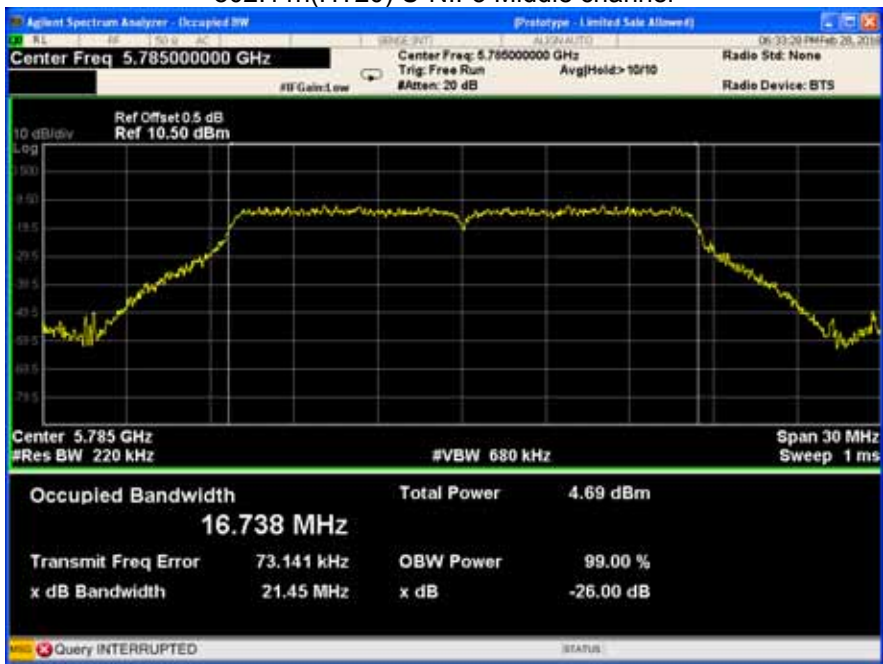


802.11n(HT20) U-NII-3 Low channel



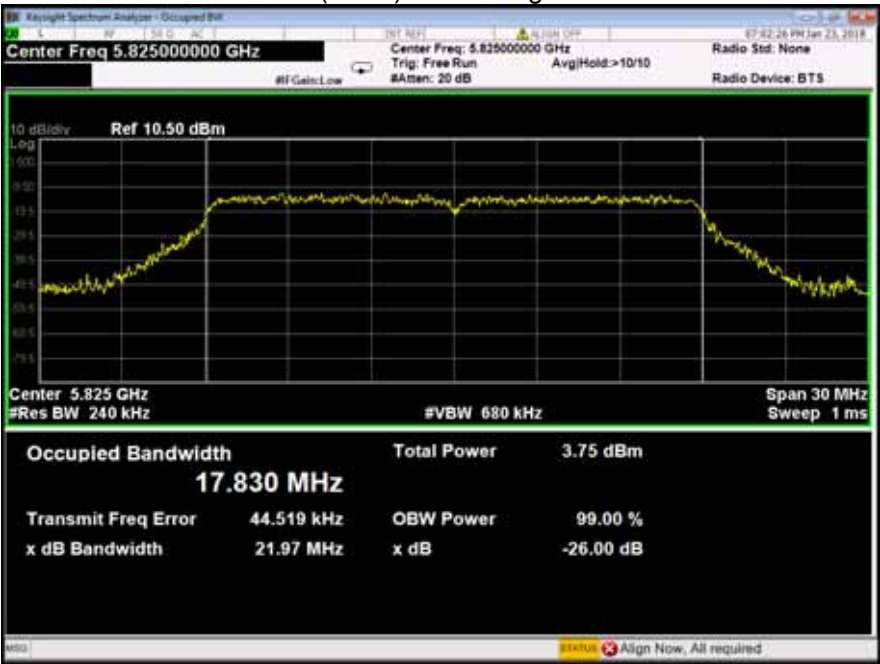


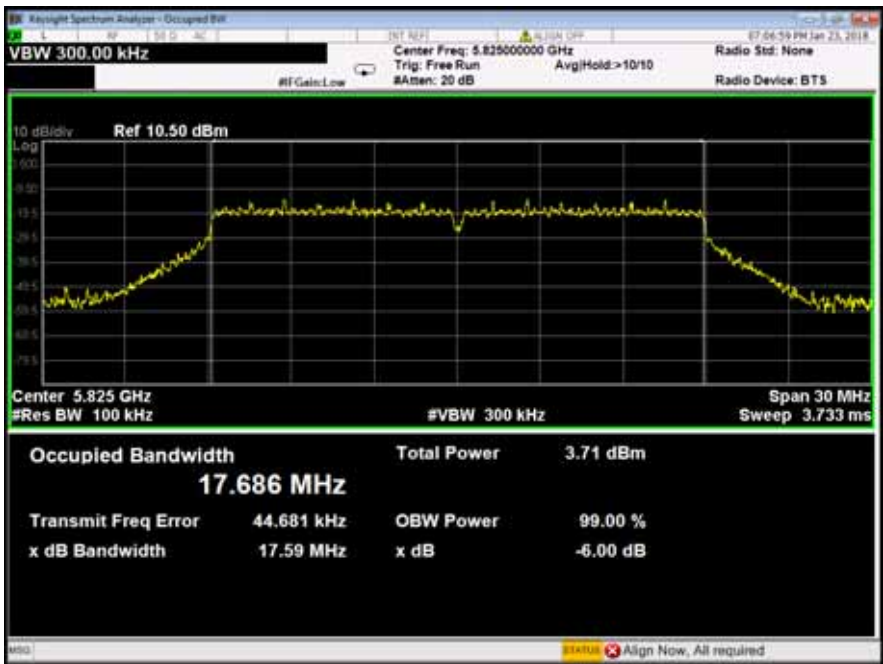
802.11n(HT20) U-NII-3 Middle channel



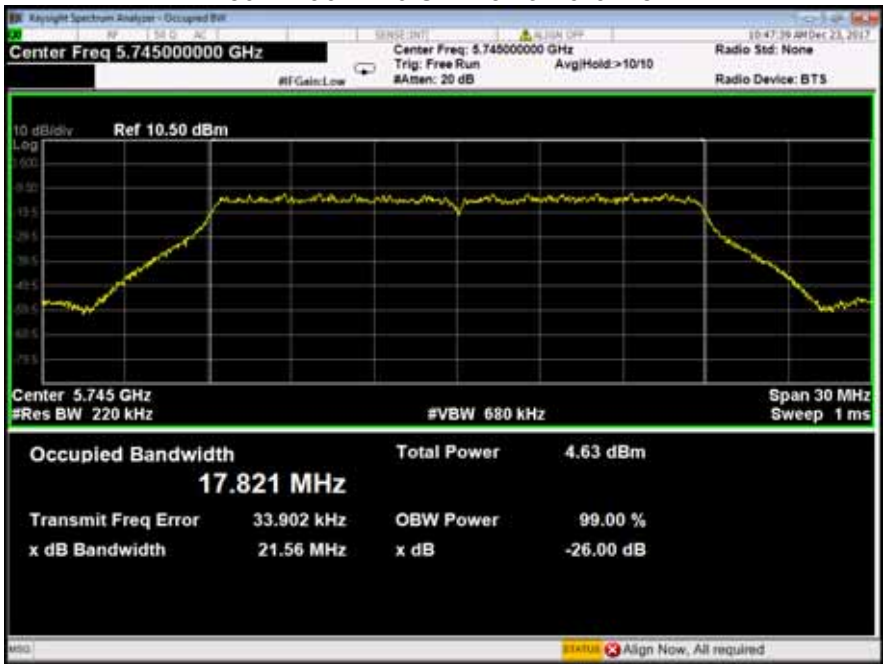


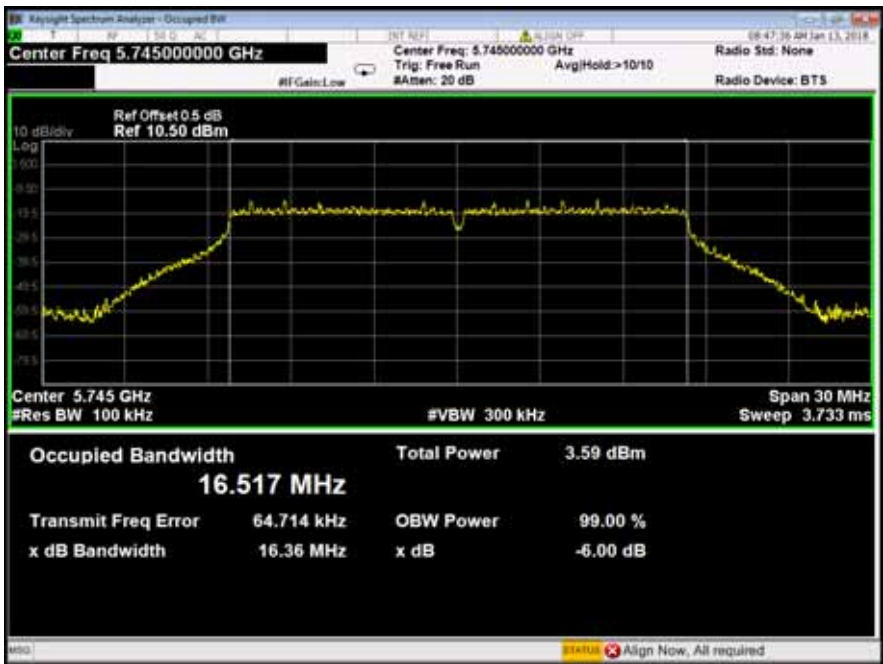
802.11n(HT20) U-NII-3 High channel



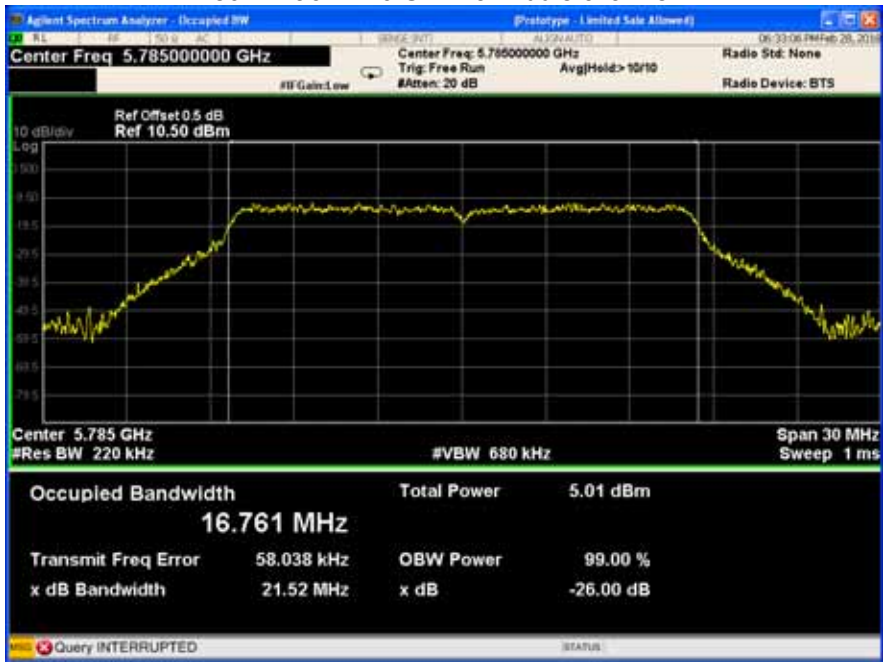


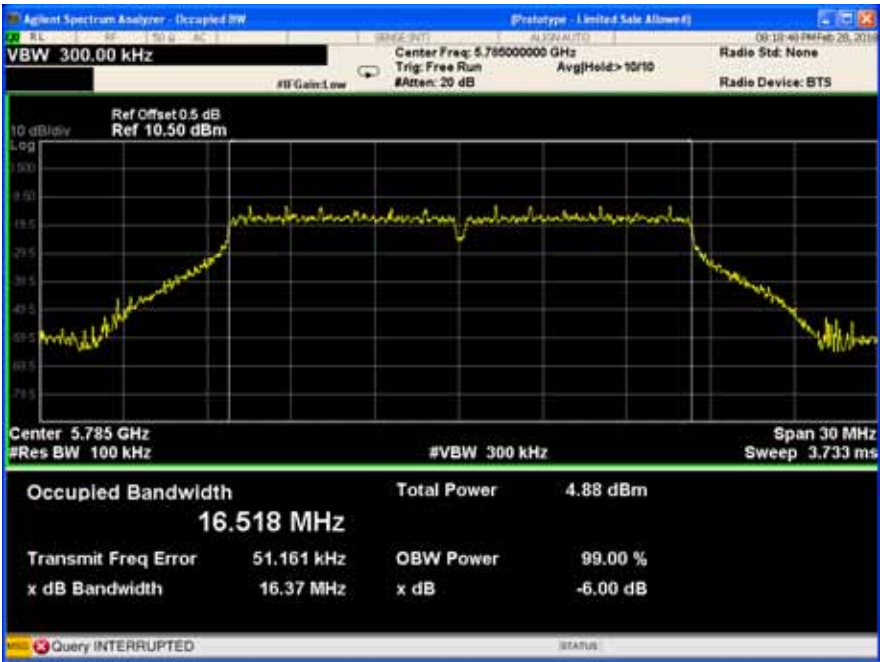
802.11ac HT20 U-NII-3 Low channel



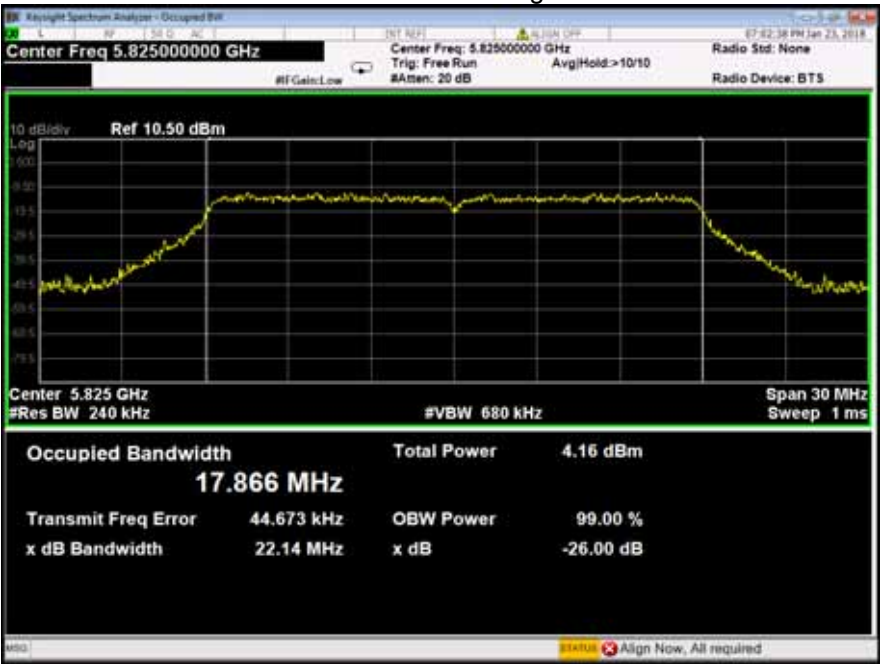


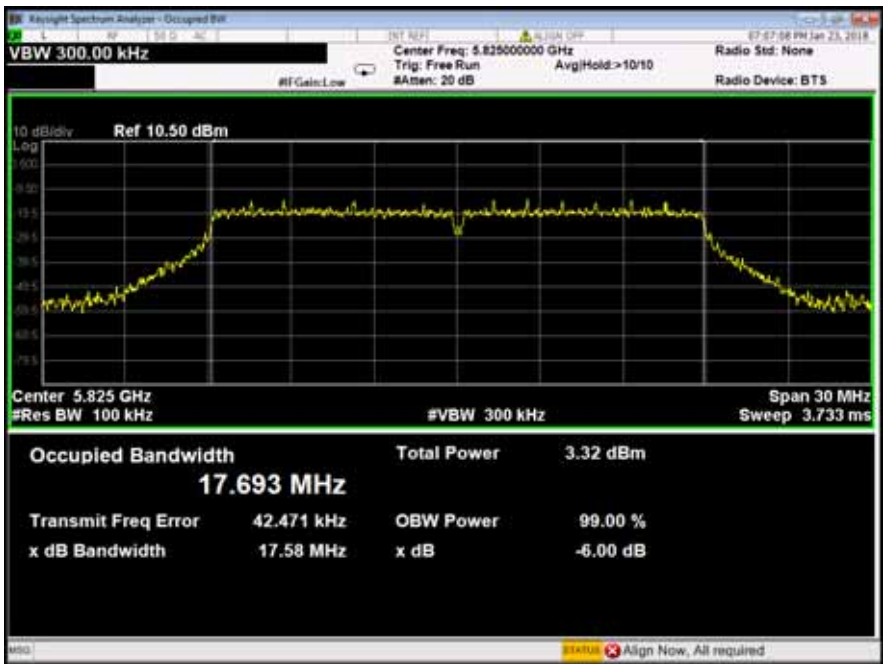
802.11ac HT20 U-NII-3 Middle channel



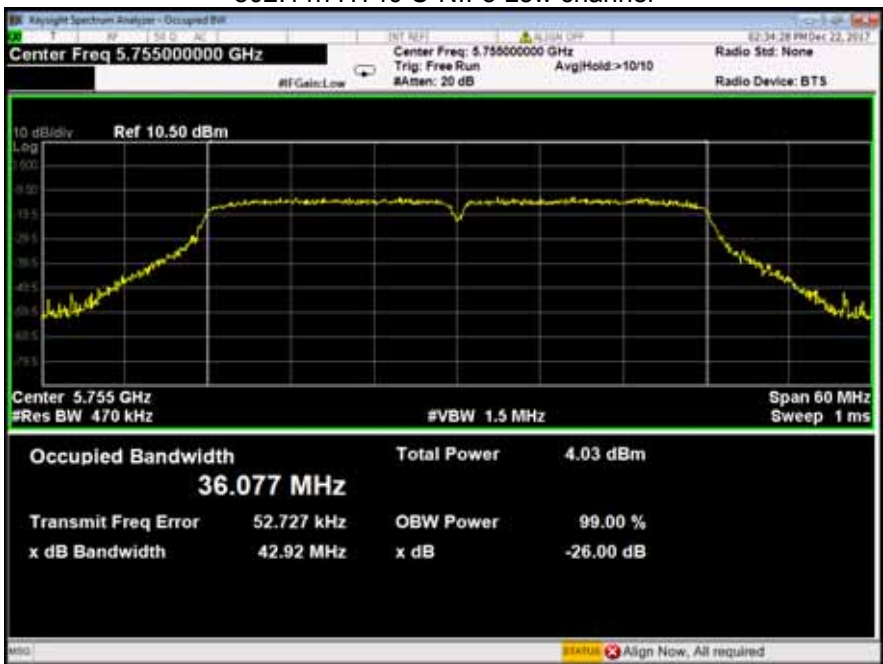


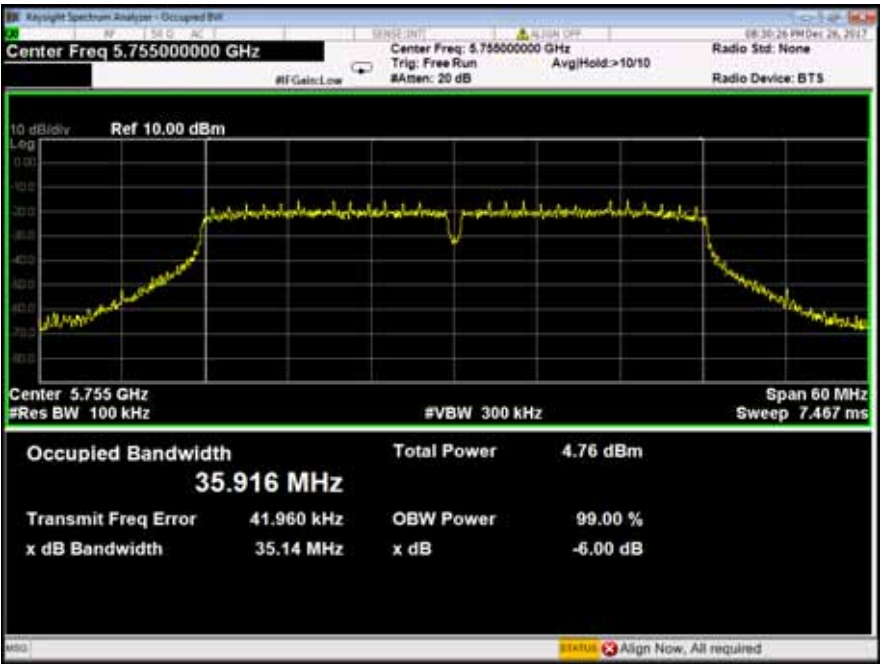
802.11ac HT20 U-NII-3 High channel



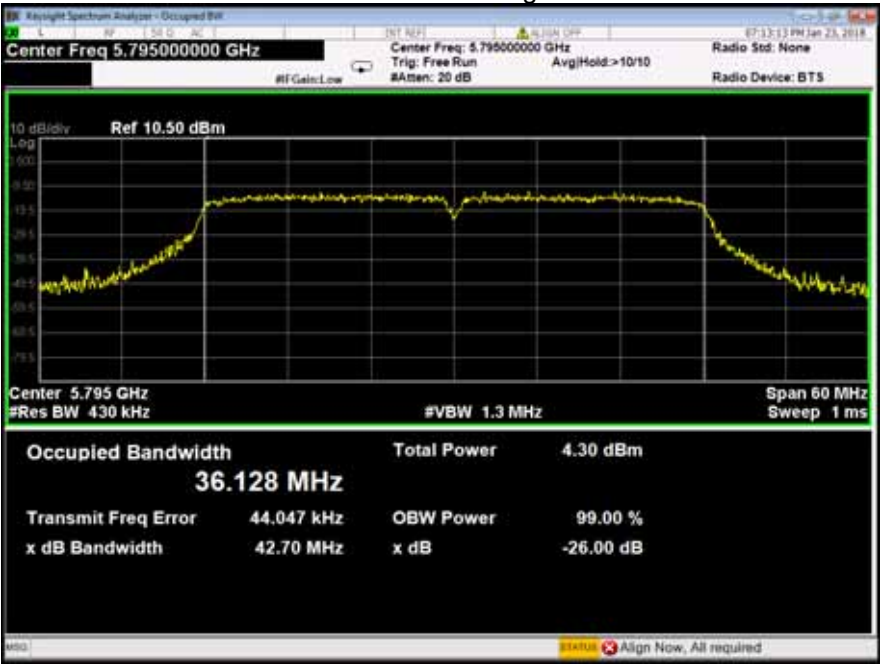


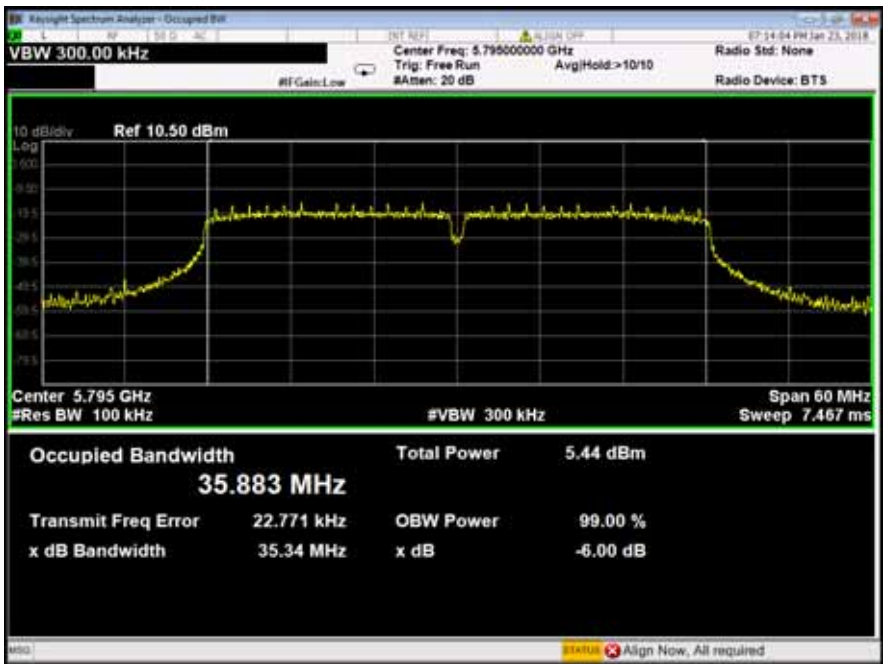
802.11n HT40 U-NII-3 Low channel



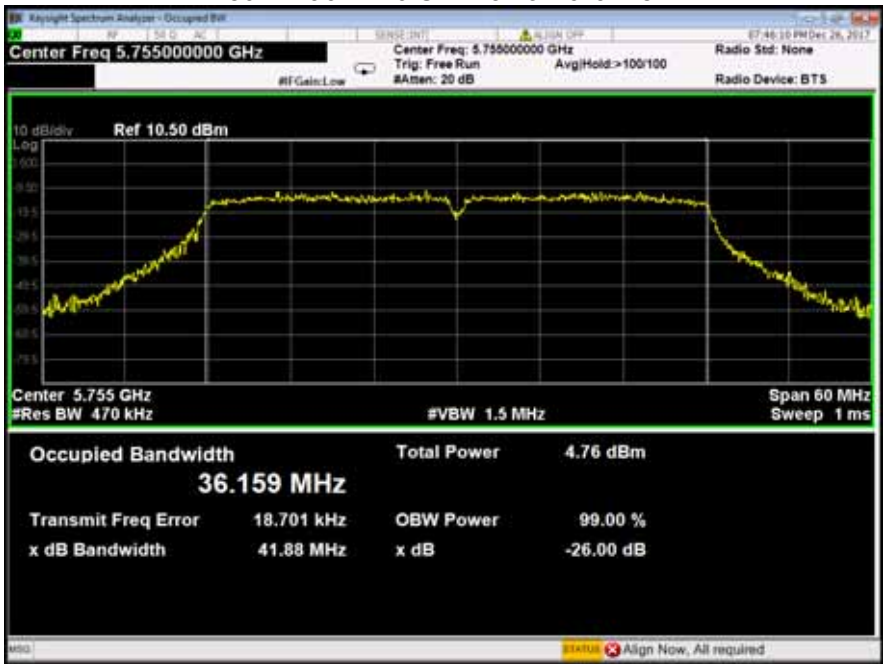


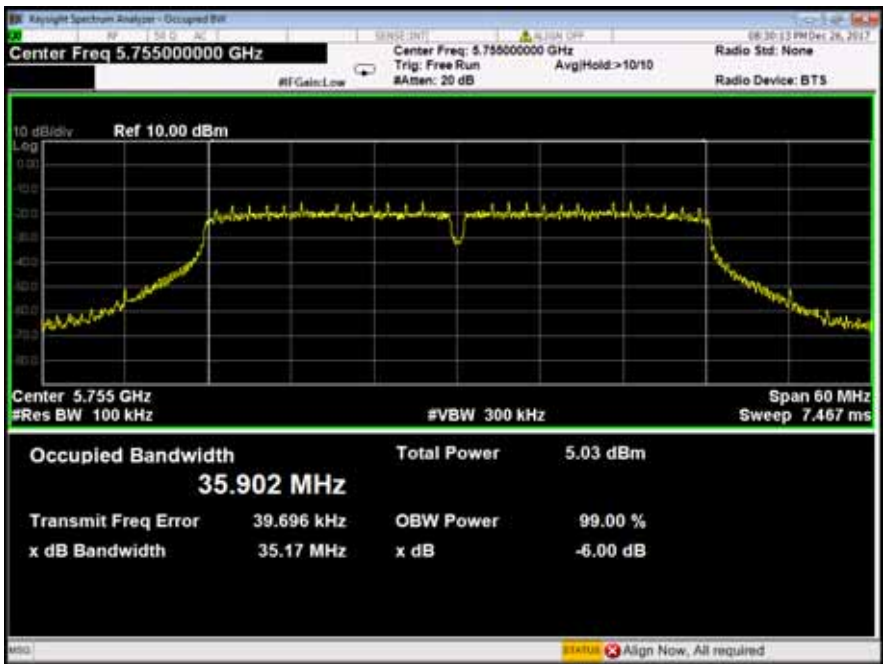
802.11n HT40 U-NII-3 High channel



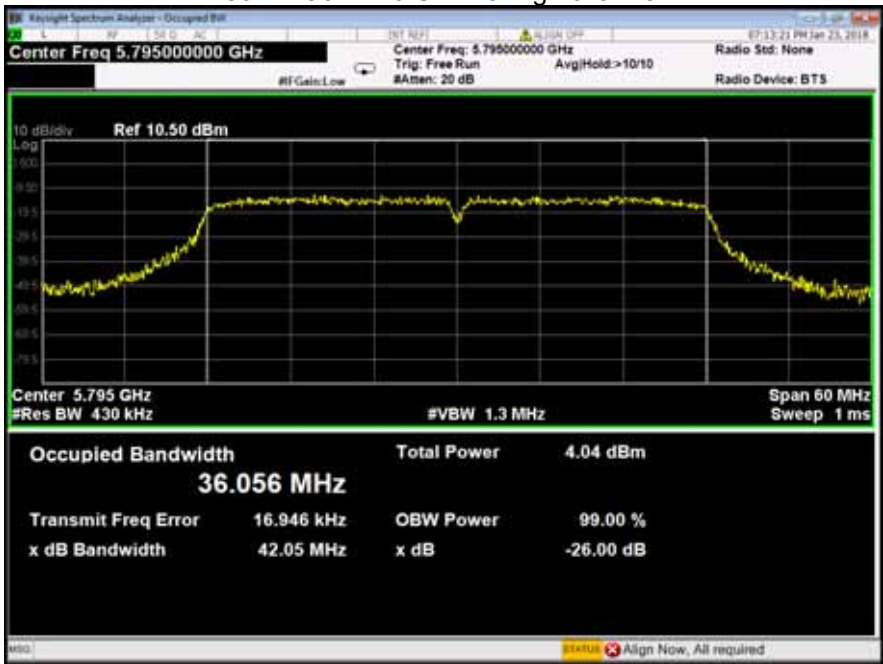


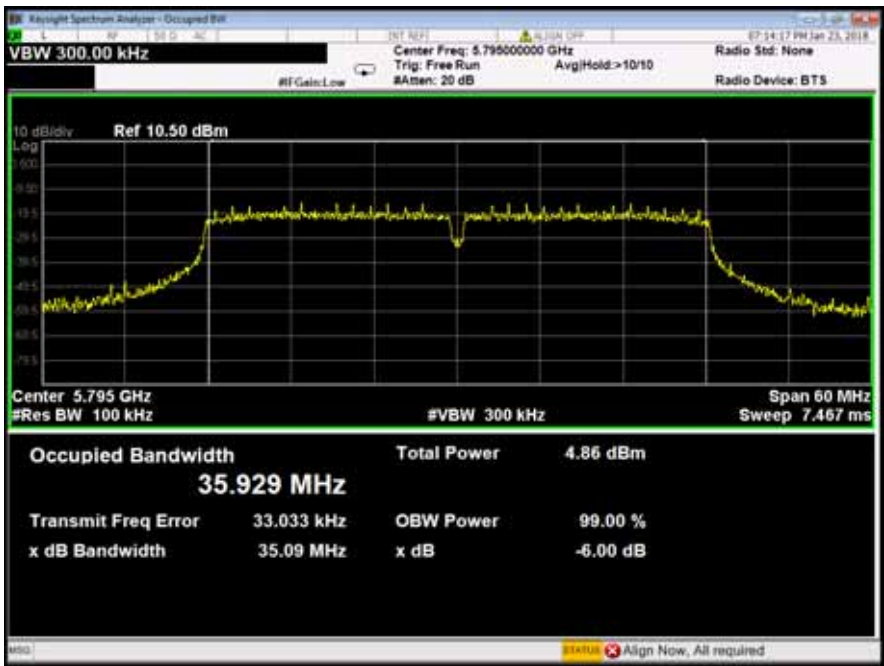
802.11ac HT40 U-NII-3 Low channel





802.11ac HT40 U-NII-3 High channel





13 Conducted Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Test Limit:	24dBm for 5150-5250MHz, 5250-5350MHz and 5470-5725MHz; 30 dBm for 5725-5850MHz
Test Result:	PASS Conducted output power= measurement power+10log(1/x)
Remark:	X is duty cycle=1, so 10log(1/1)=0 Conducted output power= measurement power

13.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

13.2 Test Result:

Band	Operation mode	Conducted Output Power (dBm)		
		Low channel	Middle channel	High channel
U-NII-1	802.11a	4.66	3.26	3.97
	802.11n(HT20)	4.74	3.10	4.02
	802.11ac(HT20)	4.79	3.08	3.72
	802.11ac(HT40)	4.47	/	2.98
	802.11n(HT40)	3.41	/	2.64

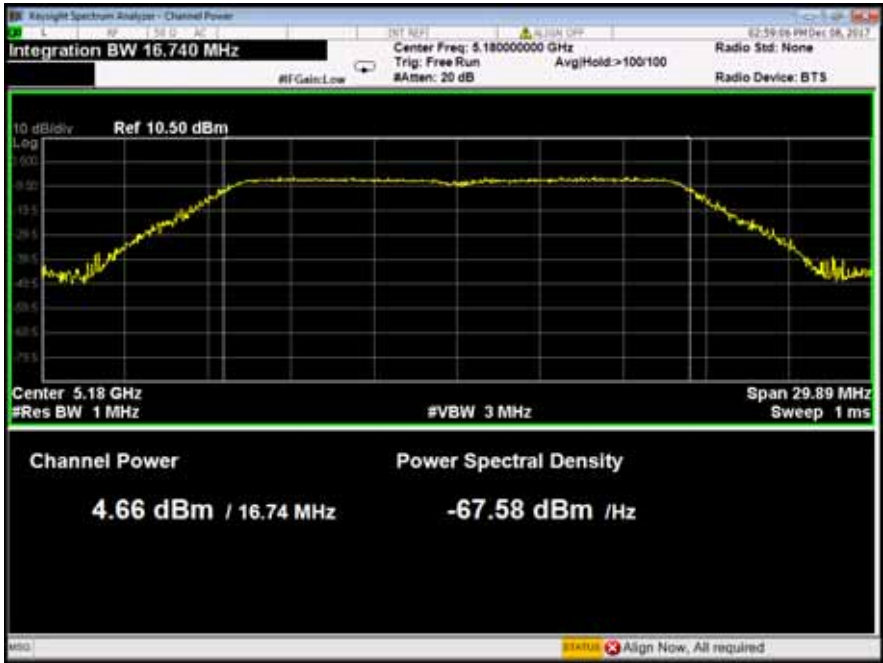
Band	Operation mode	Conducted Output Power (dBm)		
		Low channel	Middle channel	High channel
U-NII-2A	802.11a	5.09	3.27	3.87
	802.11n(HT20)	5.16	3.15	3.18
	802.11ac(HT20)	4.57	3.55	3.38
	802.11ac(HT40)	4.92	/	3.78
	802.11n(HT40)	4.71	/	3.88

Band	Operation mode	Conducted Output Power (dBm)		
		Low channel	Middle channel	High channel
U-NII-2C	802.11a	5.16	4.10	5.11
	802.11n(HT20)	5.47	4.05	4.60
	802.11ac(HT20)	5.06	4.05	4.23
	802.11ac(HT40)	5.18	/	4.73
	802.11n(HT40)	5.42	/	4.83

Band	Operation mode	Conducted Output Power (dBm)		
		Low channel	Middle channel	High channel
U-NII-3	802.11a	6.00	3.19	3.44
	802.11n(HT20)	5.70	3.58	3.14
	802.11ac(HT20)	3.86	3.30	3.02
	802.11ac(HT40)	4.58	/	3.66
	802.11n(HT40)	3.99	/	3.63

Test result plots shown as follows:

802.11a U-NII-1 Low channel



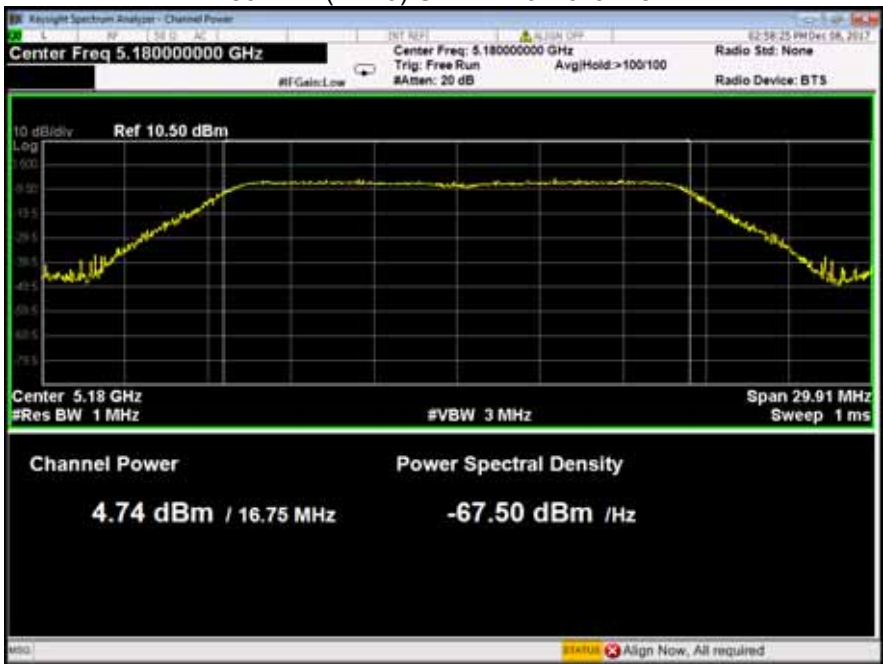
802.11a U-NII-1 Middle channel



802.11a U-NII-1 High channel



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



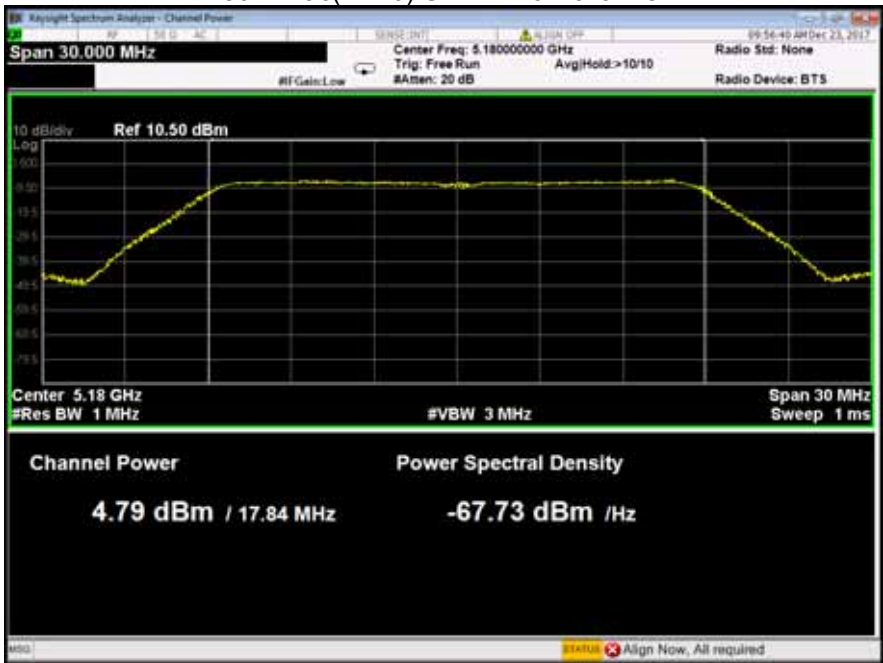
802.11n(HT20) U-NII-1 Middle channel



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



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



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



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



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

