



TEST REPORT

Reference No. : WTS18S08120400W
FCC ID..... : 2AQP2-LIBA00
Applicant..... : Field and Company, LLC.
Address : 1997 S 1100 E., Suite 202, Salt Lake City, Utah, 84106, United States
Manufacturer : DAMAI ELECTRONICS (HK) LIMITED
Address : RM 2201, 22-F PARK-IN COMM CTR, 56 DUNDAS ST MONGKOK, KL, HONG KONG
Product Name : Leef iBridge Air
Model No. : LIBA00
Brand..... : N/A
Standards..... : FCC CFR47 Part 15 C Section 15.407:2017
Date of Receipt sample..... : 2018-08-07
Date of Test..... : 2018-08-08 to 2018-08-18
Date of Issue : 2018-08-20
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:

Waltek Services (Shenzhen) Co., Ltd.

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Compiled by:

Ford Wang

Ford Wang / Project Engineer

Approved by:



Philo Zhong

Philo Zhong / Manager



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



3 Contents

	Page
1 COVER PAGE.....	1
2 LABORATORIES INTRODUCTION.....	2
3 CONTENTS	4
4 REVISION HISTORY	6
5 GENERAL INFORMATION.....	7
5.1 GENERAL DESCRIPTION OF E.U.T.	7
5.2 DETAILS OF E.U.T.	7
5.3 CHANNEL LIST.....	7
6 TEST SUMMARY	12
7 EQUIPMENT USED DURING TEST	13
7.1 EQUIPMENTS LIST	13
7.2 DESCRIPTION OF SUPPORT UNITS	14
7.3 MEASUREMENT UNCERTAINTY	14
7.4 TEST EQUIPMENT CALIBRATION	14
8 CONDUCTED EMISSION	15
8.1 E.U.T. OPERATION	15
8.2 EUT SETUP.....	15
8.3 MEASUREMENT DESCRIPTION	15
8.4 CONDUCTED EMISSION TEST RESULT	16
9 RADIATED EMISSIONS.....	18
9.1 EUT OPERATION.....	18
9.2 TEST SETUP	19
9.3 SPECTRUM ANALYZER SETUP	20
9.4 TEST PROCEDURE	21
9.5 CORRECTED AMPLITUDE & MARGIN CALCULATION	21
9.6 SUMMARY OF TEST RESULTS	22
10 DUTY CYCLE.....	23
10.1 SUMMARY OF TEST RESULTS	23
11 BAND EDGE	36
11.1 TEST PRODUCE	36
11.2 TEST RESULT	37
12 6 DB BANDWIDTH.....	51
12.1 TEST PROCEDURE:.....	51
12.2 TEST RESULT:	51
13 26 DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH	59
13.1 TEST PROCEDURE:.....	59
13.2 TEST RESULT:	60
14 CONDUCTED OUTPUT POWER	75
14.1 TEST PROCEDURE:.....	75
14.2 TEST RESULT :	76
15 POWER SPECTRAL DENSITY	92
15.1 TEST PROCEDURE:.....	92
15.2 TEST RESULT:	93
16 FREQUENCY STABILITY.....	109
16.1 TEST PROCEDURE:.....	109



16.2	TEST RESULT:	110
17	ANTENNA REQUIREMENT	111



WALTEK



4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S08120 400W	2018-08-07	2018-08-08 to 2018-08-18	2018-08-20	original	-	Valid



WALTEK



5 General Information

5.1 General Description of E.U.T.

Product Name:	Leef iBridge Air
Model No.:	LIBA00
Model Description:	N/A
Operation Frequency:	IEEE 802.11a/ n(HT20/40)/ac(HT20/40/80): 5150MHz to 5250MHz IEEE 802.11a/ n(HT20/40)/ac(HT20/40/80): 5725MHz to 5850MHz
Type of modulation:	IEEE for 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE for 802.11n : OFDM(BPSK/QPSK/16QAM/64QAM) IEEE for 802.11ac : OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)
The Lowest Oscillator:	32.768KHz
Antenna installation:	PCB printed antenna
Antenna Gain:	1.5dBi

5.2 Details of E.U.T.

Technical Data:	DC 3.7V From Li-ion battery
Note:	This product do not support the Wi-Fi function when it was charging

5.3 Channel List

U-NII-1 (5.15-5.25GHz)		U-NII-3 (5.725-5.85GHz)	
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	149	5745
38	5190	151	5755
40	5200	153	5765
42	5210	155	5785
44	5220	157	5785
46	5230	159	5795
48	5240	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 the selected channel see below:



For 802.11a/n(HT20)/ac(HT20):

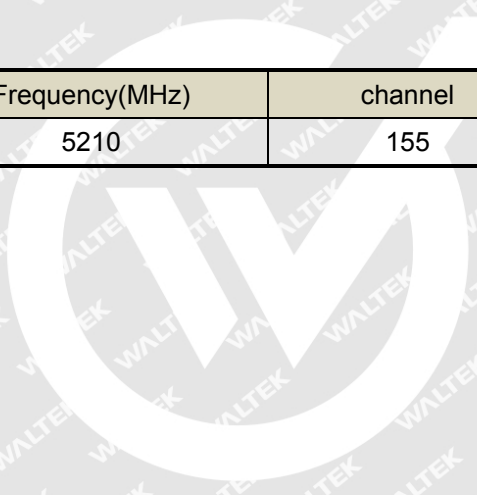
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	149	5745
40	5200	157	5785
48	5240	165	5825

For 802.11 n(HT40)/ac(HT40):

channel	Frequency(MHz)	channel	Frequency(MHz)
38	5190	151	5755
46	5230	159	5795

For 802.11 ac(HT80):

channel	Frequency(MHz)	channel	Frequency(MHz)
42	5210	155	5775


WALTEK



Test Mode Description:

During testing, Channel and 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.

Transmitting duty cycle is no less 98%.

The software is installed in operation system, named "RFTestTool.apk", Version 1, date 20160518.

Test Items	Mode	Data Rate	Channel	TX/RX
Radiated Emissions	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Duty Cycle	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Band Edge	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX



6dB Bandwidth	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
26dB Bandwidth and 99% Occupied Bandwidth	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Conducted Output Power	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Power Spectral Density	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX



	802.11ac(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(HT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Frequency Stability	Un-modulation	/	U-NII-1 36/40/48 U-NII-3 149/155/165	TX



WALTEK



6 Test Summary

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



WALTEK



Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2017-09-14	2018-09-13
2.	Spectrum Analyzer (9k~6GHz)	R&S	FSL6	100959	2017-09-14	2018-09-13
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-14	2018-09-13

7.2 Description of Support Units

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

7.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

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.

WALTEK



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:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

8.1 E.U.T. Operation

Operating Environment :

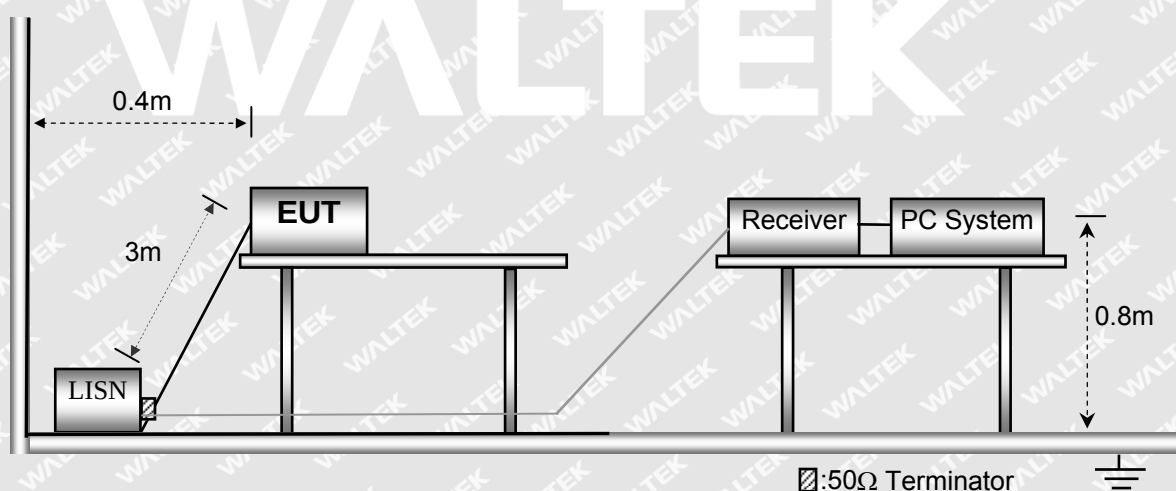
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation :

The test was performed in 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 C63.10:2013.



8.3 Measurement Description

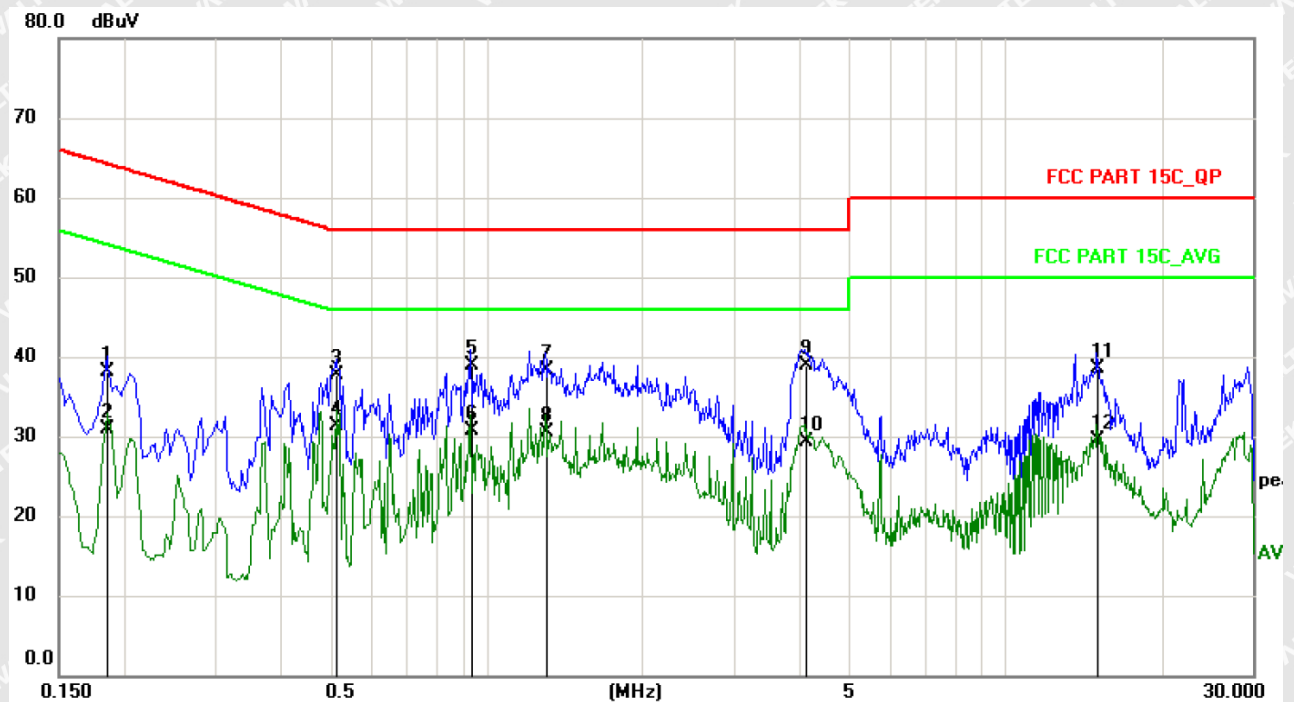
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.



8.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines.

Live line:



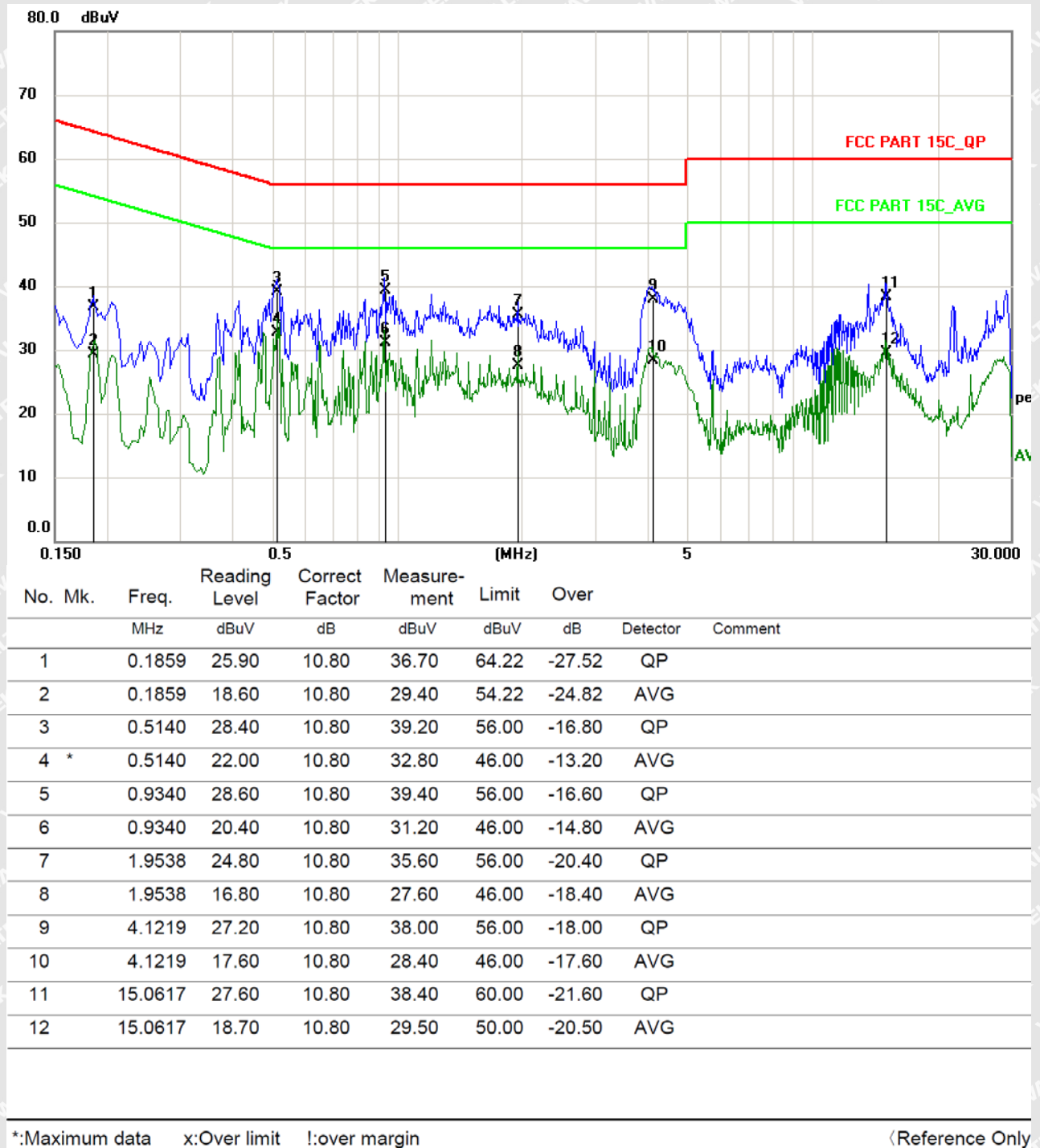
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1859	27.30	10.80	38.10	64.22	-26.12	QP	
2		0.1859	20.10	10.80	30.90	54.22	-23.32	AVG	
3		0.5140	27.00	10.80	37.80	56.00	-18.20	QP	
4	*	0.5140	20.50	10.80	31.30	46.00	-14.70	AVG	
5		0.9340	28.10	10.80	38.90	56.00	-17.10	QP	
6		0.9340	19.90	10.80	30.70	46.00	-15.30	AVG	
7		1.3020	27.60	10.80	38.40	56.00	-17.60	QP	
8		1.3020	19.80	10.80	30.60	46.00	-15.40	AVG	
9		4.1219	28.20	10.80	39.00	56.00	-17.00	QP	
10		4.1219	18.60	10.80	29.40	46.00	-16.60	AVG	
11		15.0617	27.80	10.80	38.60	60.00	-21.40	QP	
12		15.0617	18.70	10.80	29.50	50.00	-20.50	AVG	

*:Maximum data x:Over limit !:over margin

(Reference Only)



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 Distance	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
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 :

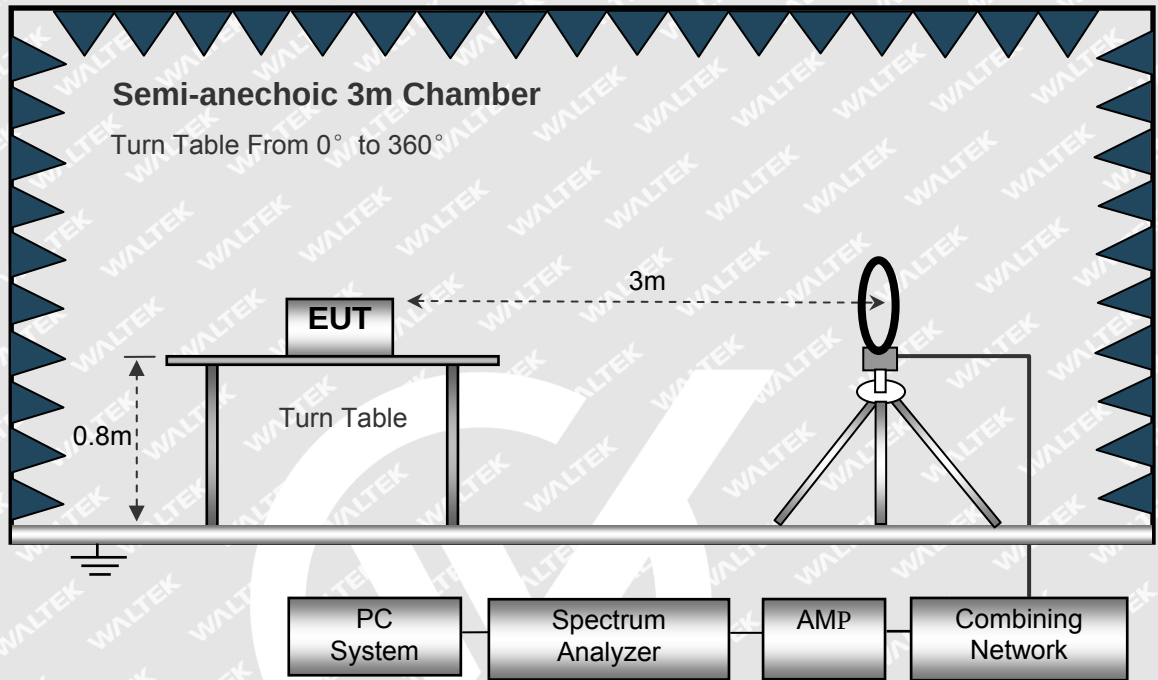
The test was performed in transmitting mode, the test data were shown in the report.



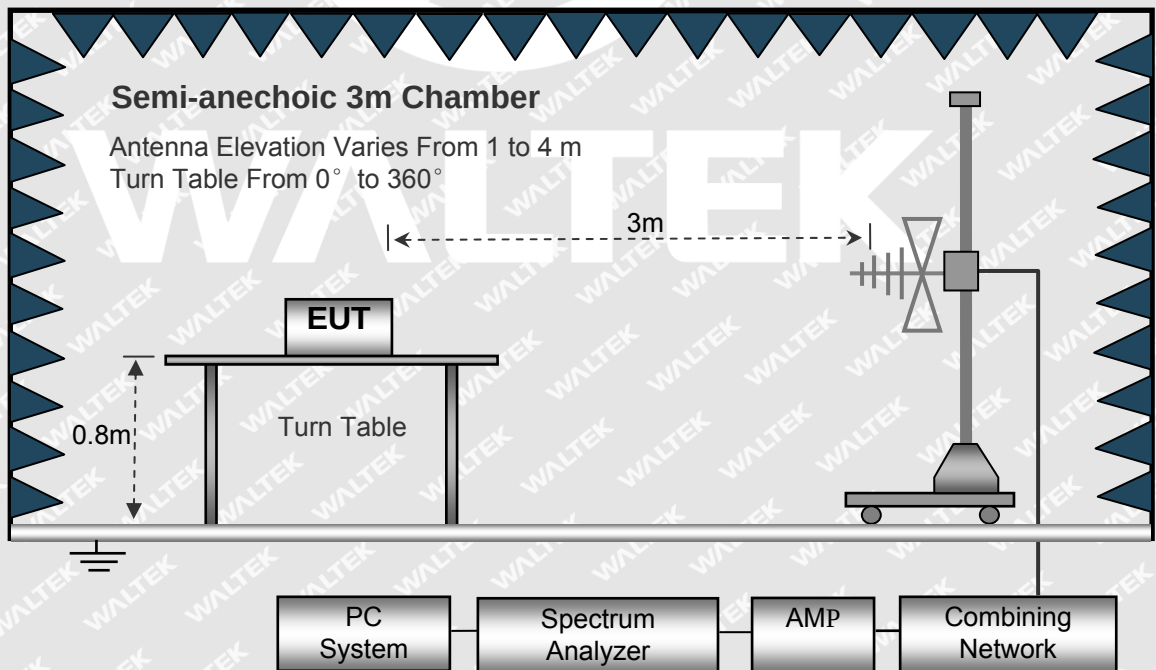
9.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

The test setup for emission measurement below 30MHz.

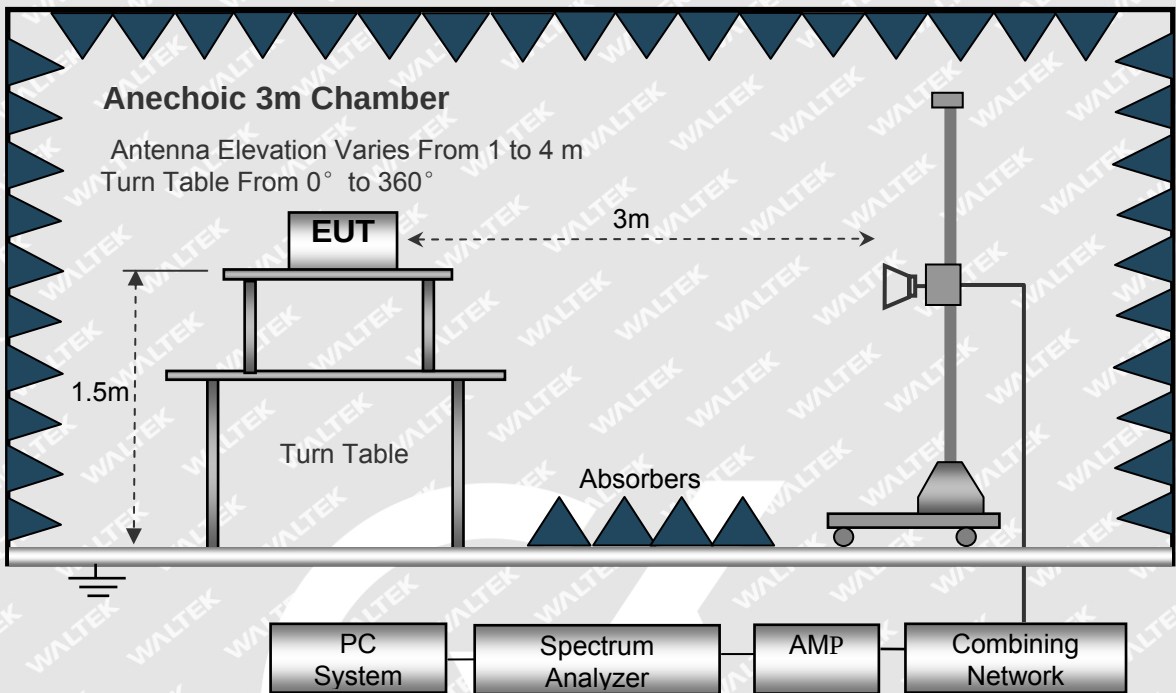


The test setup for emission measurement from 30 MHz to 1 GHz.





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 X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used during radiated emissions above 1GHz measurement.

9.5 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:

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



9.6 Summary of Test Results

The worst case 802.11n(HT20) Low Channel for U-NII-1 802.11a Low Channel for U-NII-3

Frequency	Receiver Reading	Detector	Turntable Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/207/205	
				Height	Polar			Limit	Margin
802.11n(HT20) U-NII-1 Low Channel 5180MHz									
(MHz)	(dBuV)	(PK/QP/AVE)	Degree	(m)	(H/V)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
600.360	46.80	QP	325	1.8	H	-5.00	41.80	46.00	-4.20
600.360	38.50	QP	320	1.0	V	-7.00	31.50	46.00	-14.50
5150.000	53.21	PK	275	1.3	H	6.91	60.12	74.00	-13.88
5150.000	40.42	AVE	135	1.3	H	6.91	47.33	54.00	-6.67
10360.000	46.37	PK	263	1.2	H	14.04	60.41	74.00	-13.59
10360.000	32.06	AVE	250	1.1	H	14.04	46.10	54.00	-7.90

Frequency	Receiver Reading	Detector	Turntable Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/207/205	
				Height	Polar			Limit	Margin
802.11a U-NII-3 Low Channel 5725MHz									
(MHz)	(dBuV)	(PK/QP/AVE)	Degree	(m)	(H/V)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
600.360	45.30	QP	298	1.7	H	-5.00	40.30	46.00	-5.70
600.360	37.30	QP	313	1.1	V	-7.00	30.30	46.00	-15.70
5150.000	46.76	PK	259	1.5	H	6.91	53.67	74.00	-20.33
5150.000	28.78	AVE	163	1.4	H	6.91	35.69	54.00	-18.31
11490.000	44.80	PK	175	1.4	H	16.86	61.66	74.00	-12.34
11490.000	29.97	AVE	260	1.3	H	16.86	46.83	54.00	-7.17

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 and 789033 D02 General UNII Test Procedures New Rules v01, Section (B)

Test Method:

ANSI C63.10: 2013

Test Limit:

N/A

Test Result:

PASS

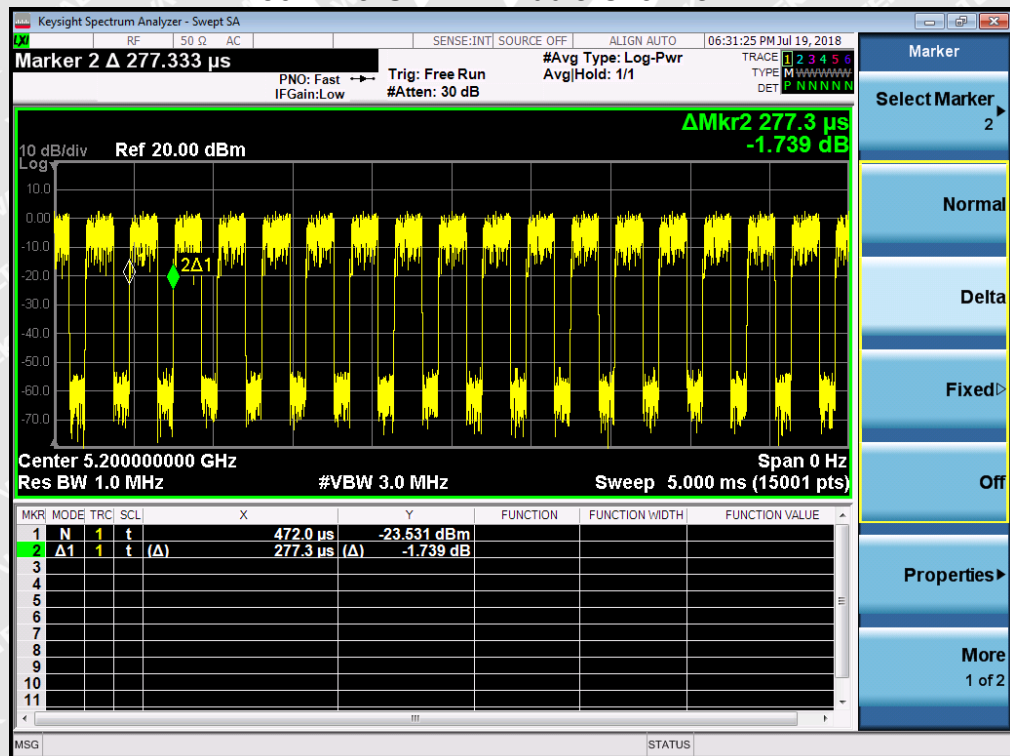
Remark:

Through Pre-scan, and found 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.

10.1 Summary of Test Results

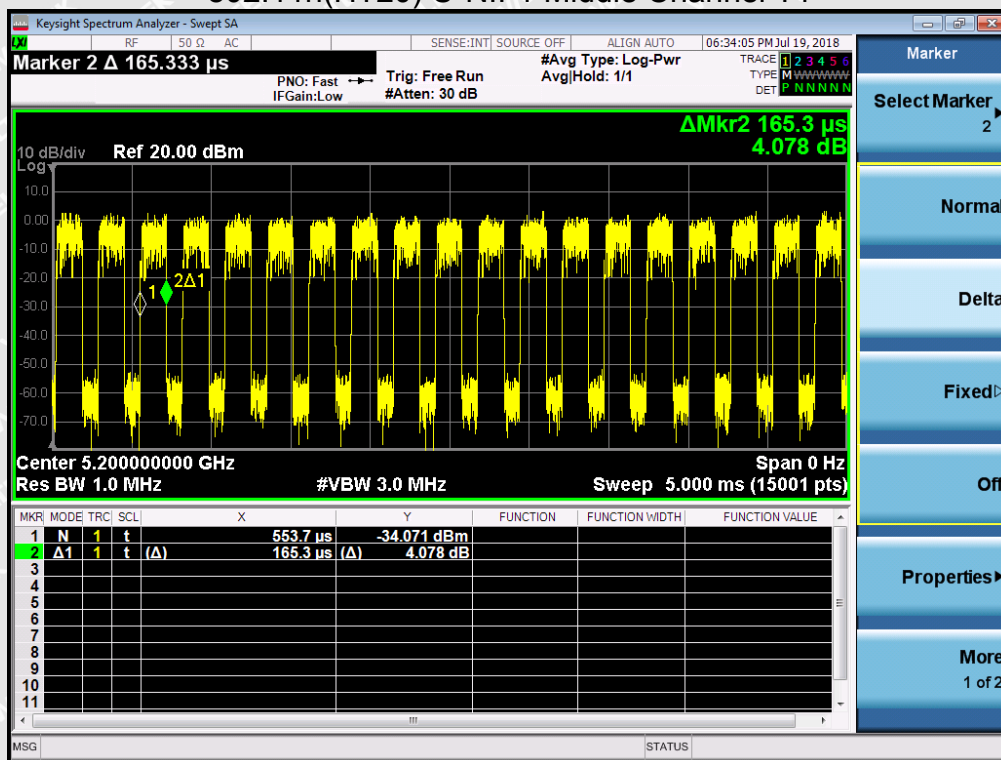
802.11a mode			
Channel	On time(ms)	Period(ms)	Duty Cycle(%)
CH40	0.1773	0.2773	63.94%
Ch157	0.1735	0.2751	63.07%
802.11n(HT20)			
Channel	On time(ms)	Period(ms)	Duty Cycle(%)
CH40	0.1653	0.2653	62.31%
Ch157	0.1615	0.2618	61.69%
802.11n(HT40)			
Channel	On time(ms)	Period(ms)	Duty Cycle(%)
CH38	0.1028	0.2008	51.20%
CH151	0.1030	0.2026	50.84%
802.11ac(HT20)			
Channel	On time(ms)	Period(ms)	Duty Cycle(%)
CH40	0.1690	0.2767	61.08%
Ch157	0.1698	0.2761	61.50%
802.11ac(HT40)			
Channel	On time(ms)	Period(ms)	Duty Cycle(%)
CH38	0.1003	0.1935	51.83%
CH151	0.09893	0.1940	50.99%
802.11ac(HT80)			
Channel	On time(ms)	Period(ms)	Duty Cycle(%)
42	0.06627	0.1721	38.51%
155	0.06740	0.1643	41.02%

802.11a U-NII-1 Middle Channel T1

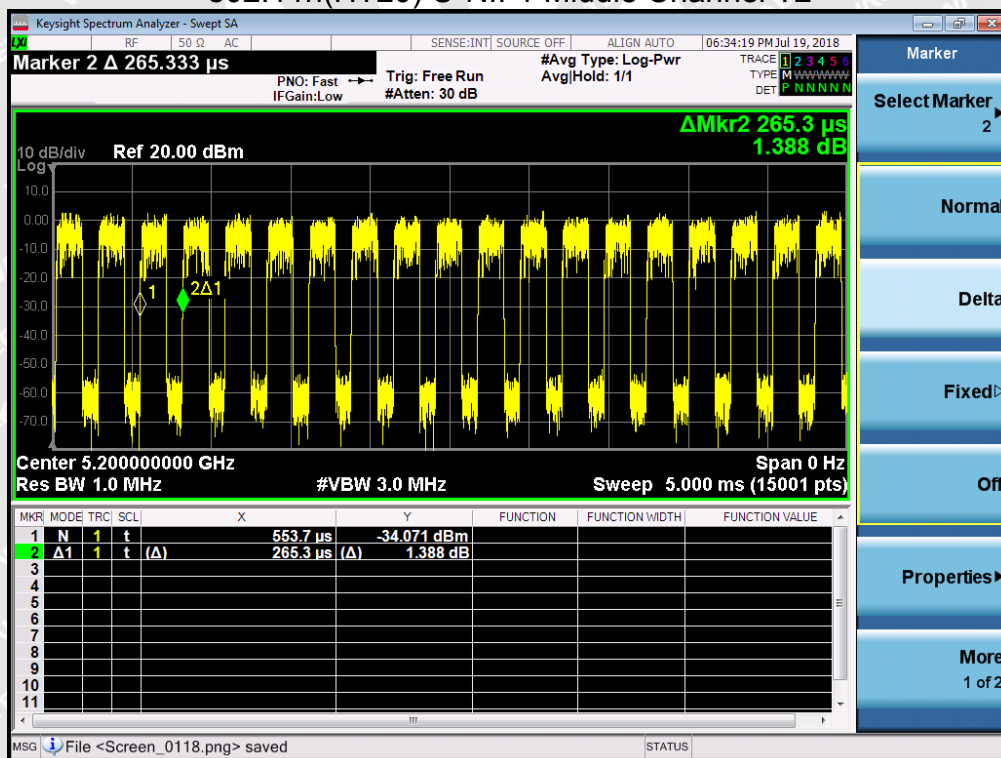




802.11n(HT20) U-NII-1 Middle Channel T1

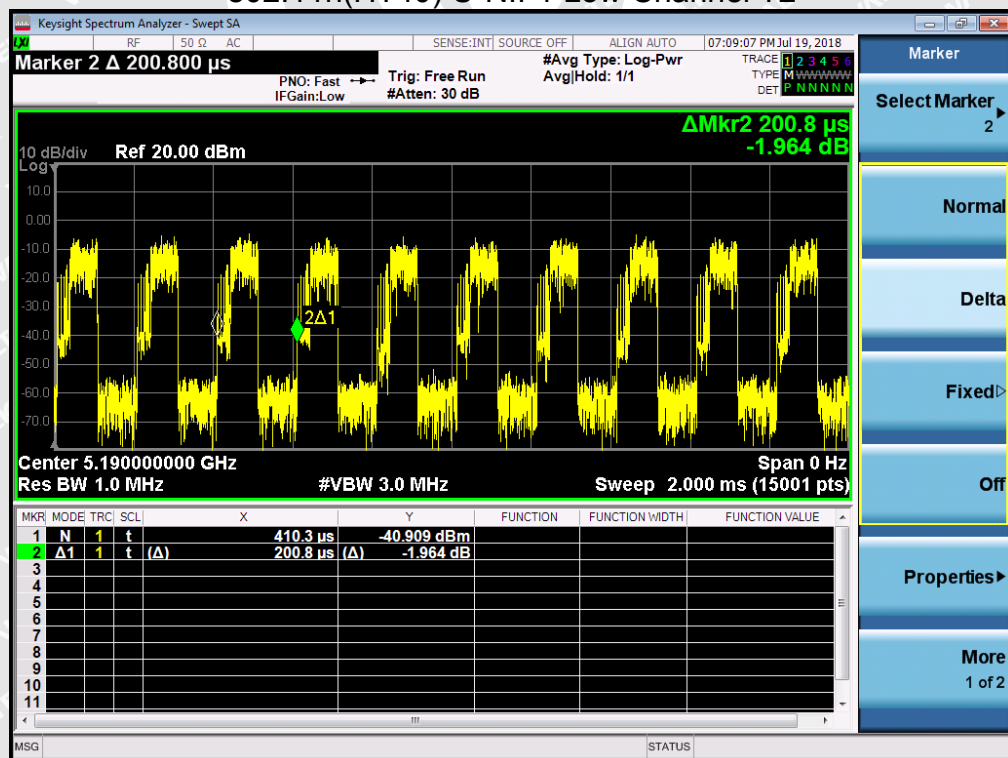


802.11n(HT20) U-NII-1 Middle Channel T2

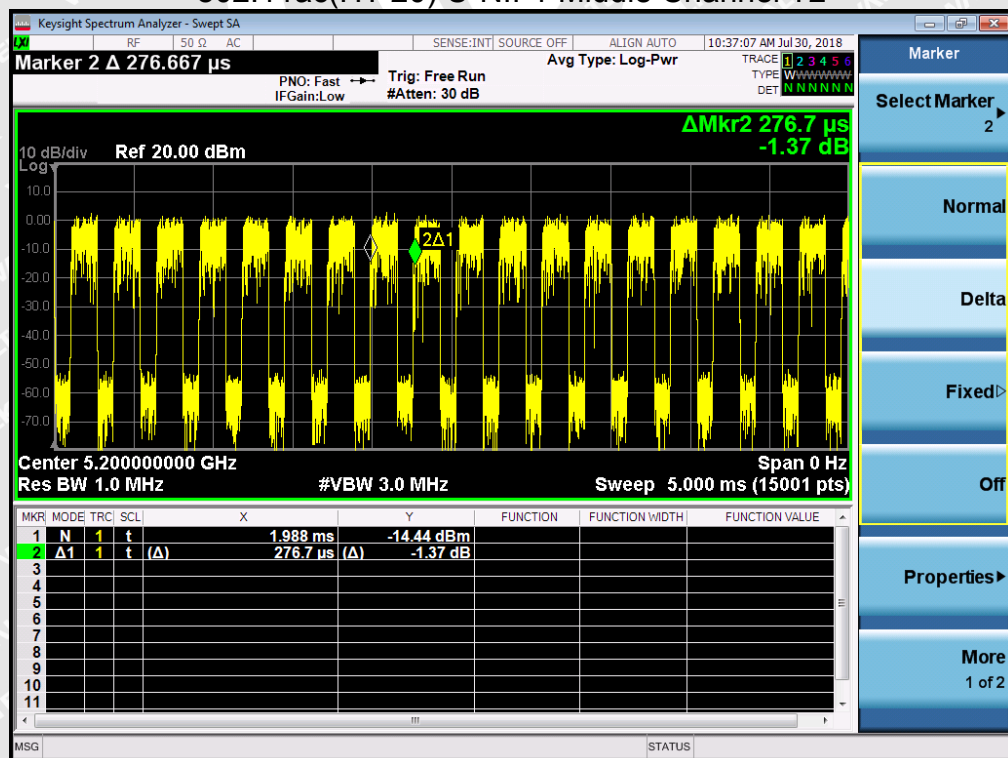




802.11n(HT40) U-NII-1 Low Channel T2

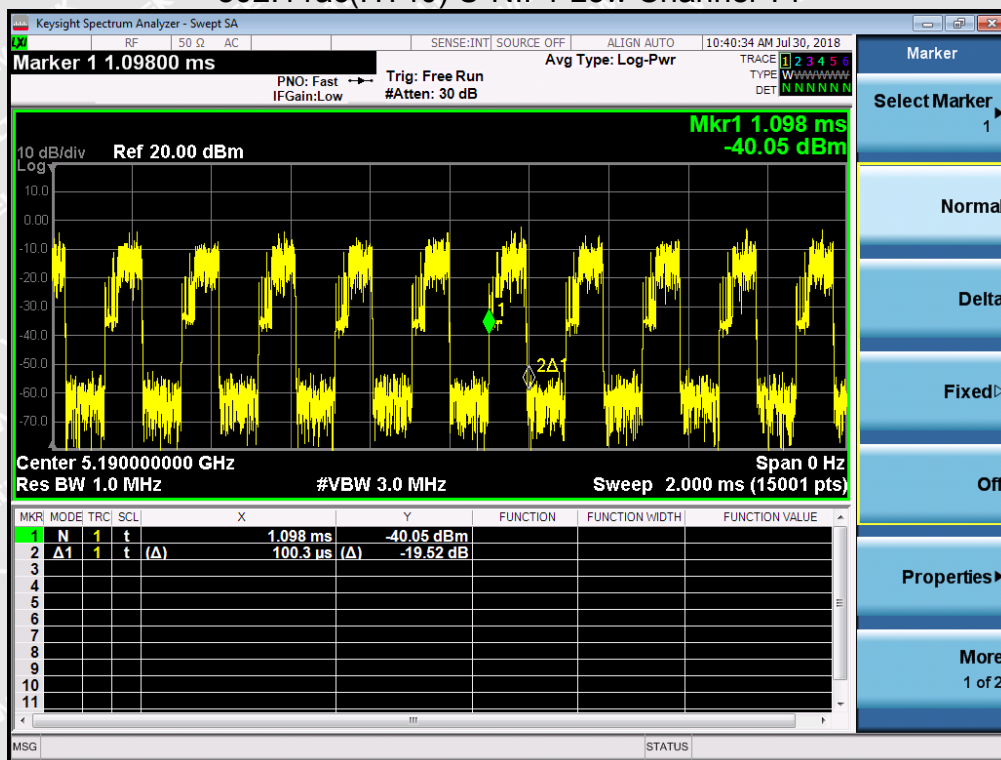


802.11ac(HT 20) U-NII-1 Middle Channel T2

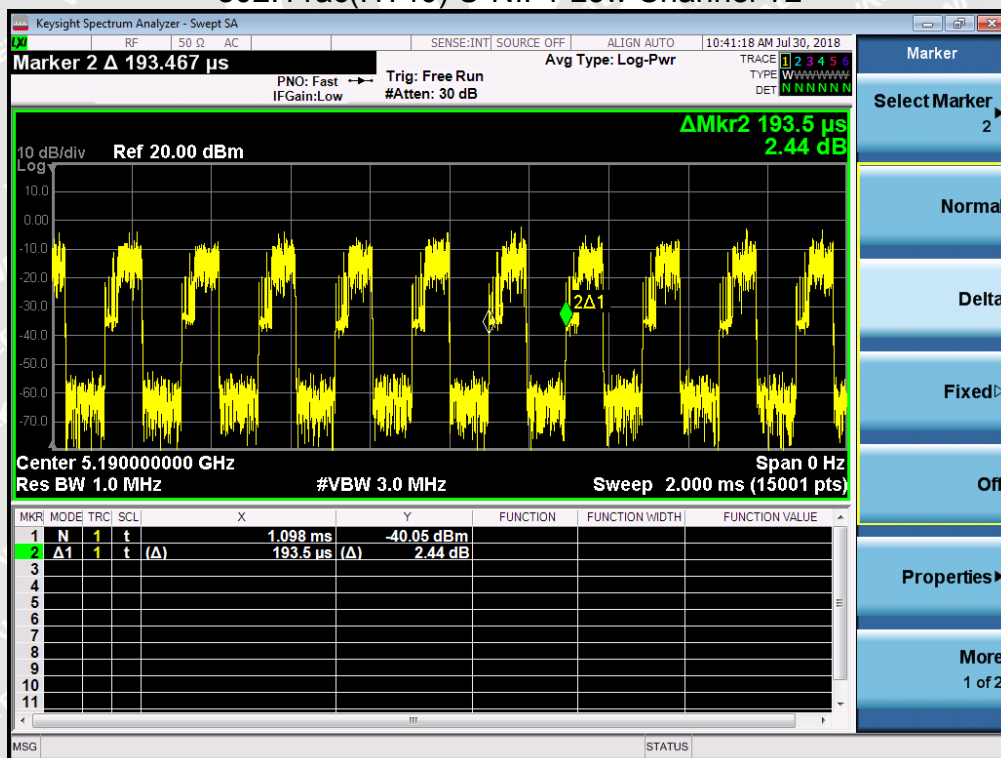




802.11ac(HT40) U-NII-1 Low Channel T1

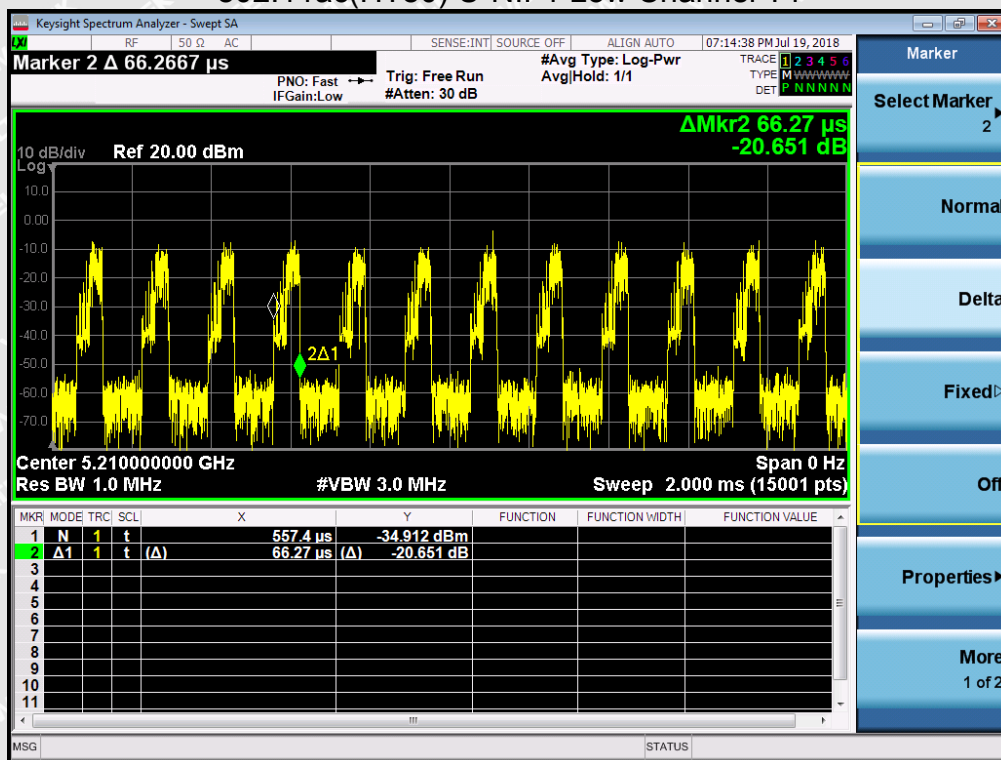


802.11ac(HT40) U-NII-1 Low Channel T2

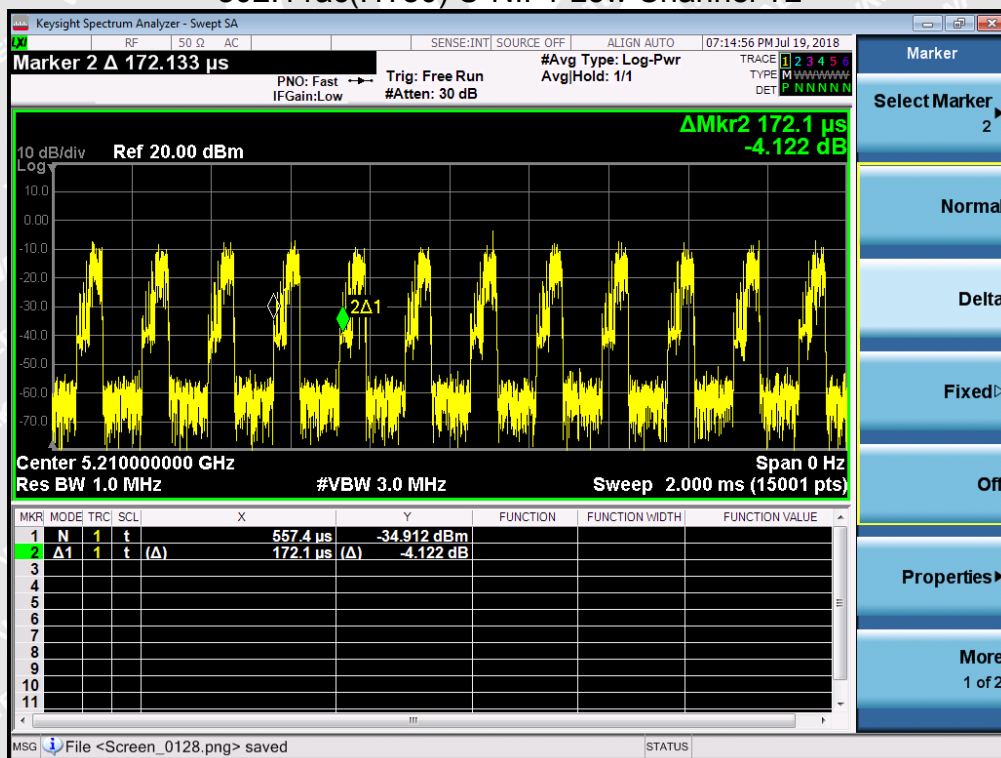




802.11ac(HT80) U-NII-1 Low Channel T1

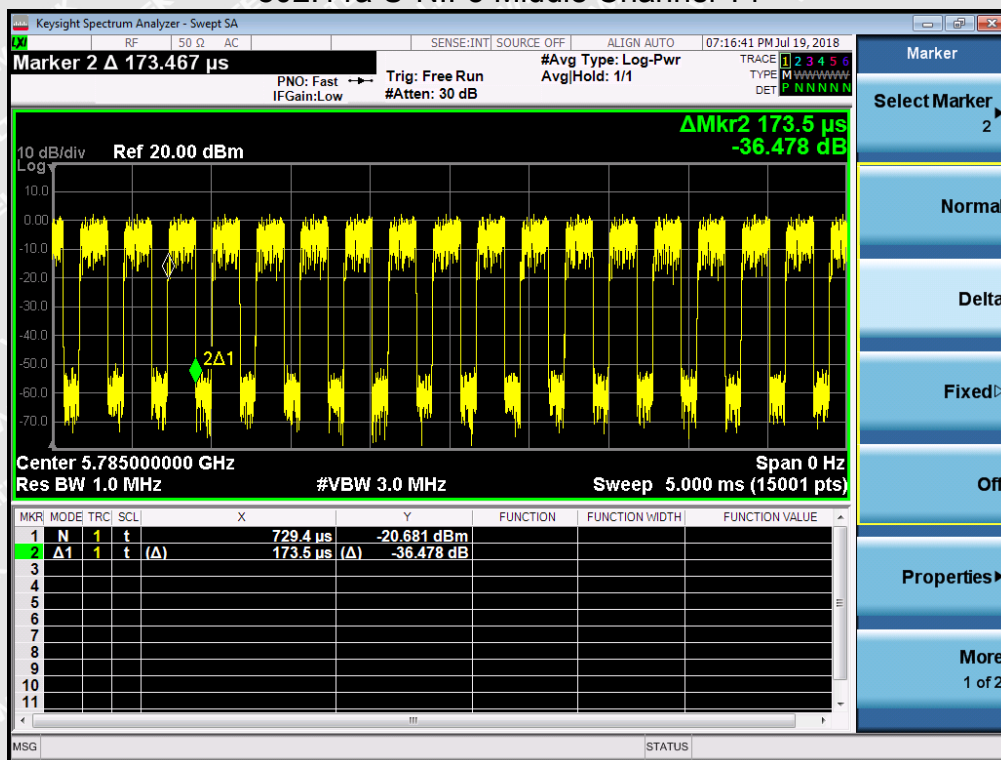


802.11ac(HT80) U-NII-1 Low Channel T2

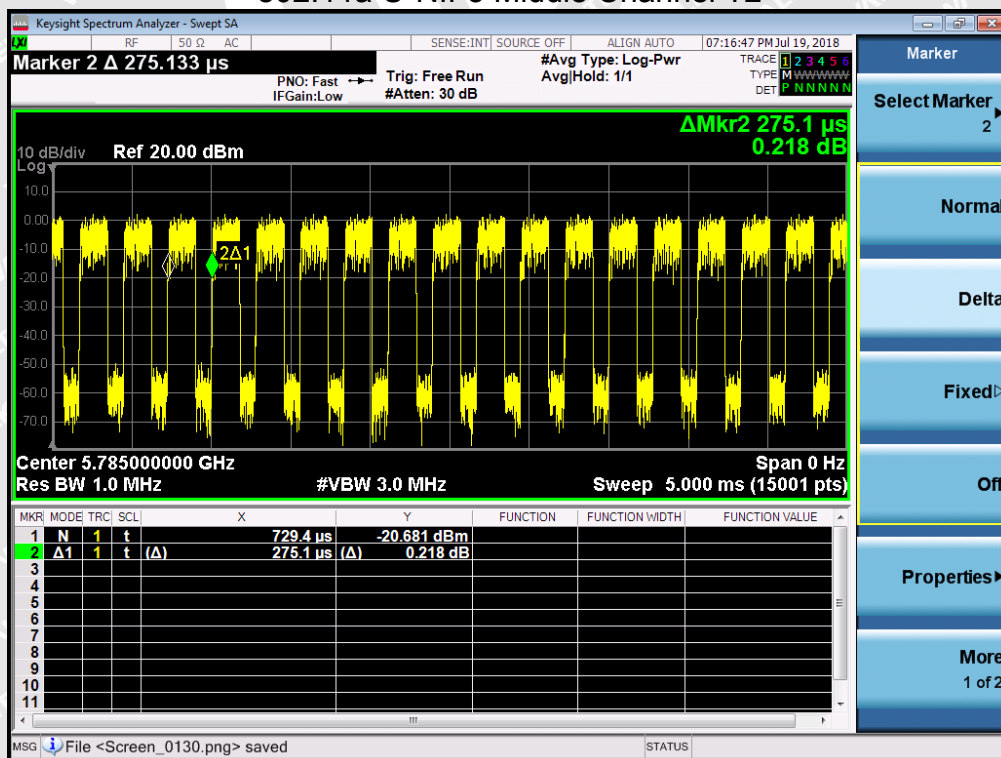




802.11a U-NII-3 Middle Channel T1

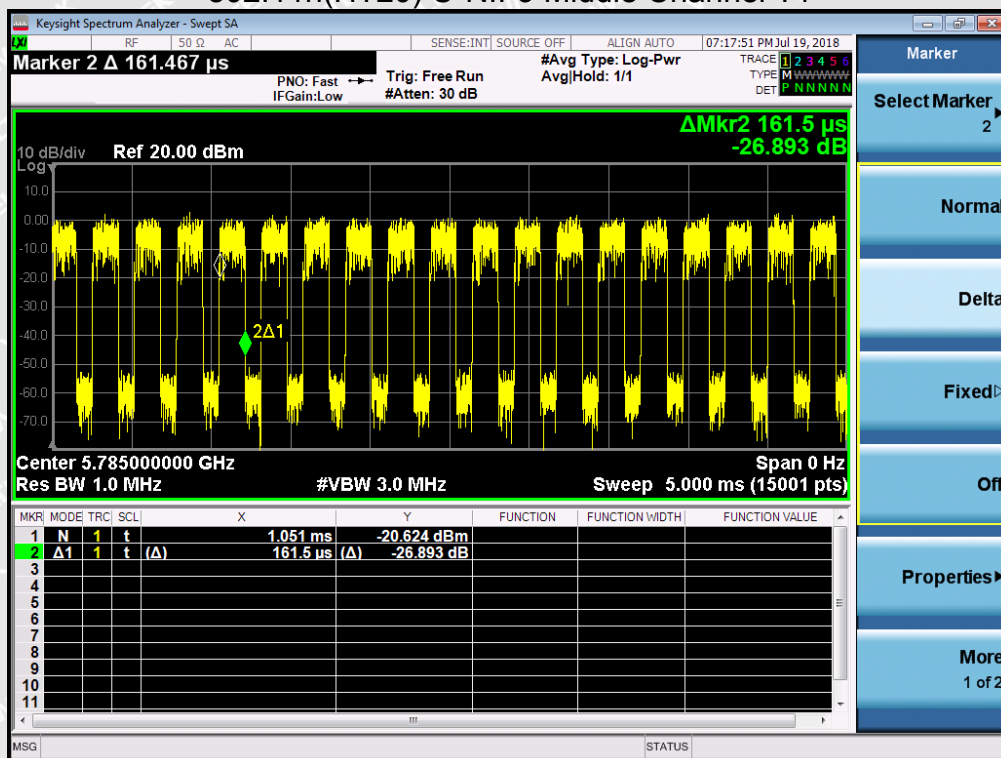


802.11a U-NII-3 Middle Channel T2

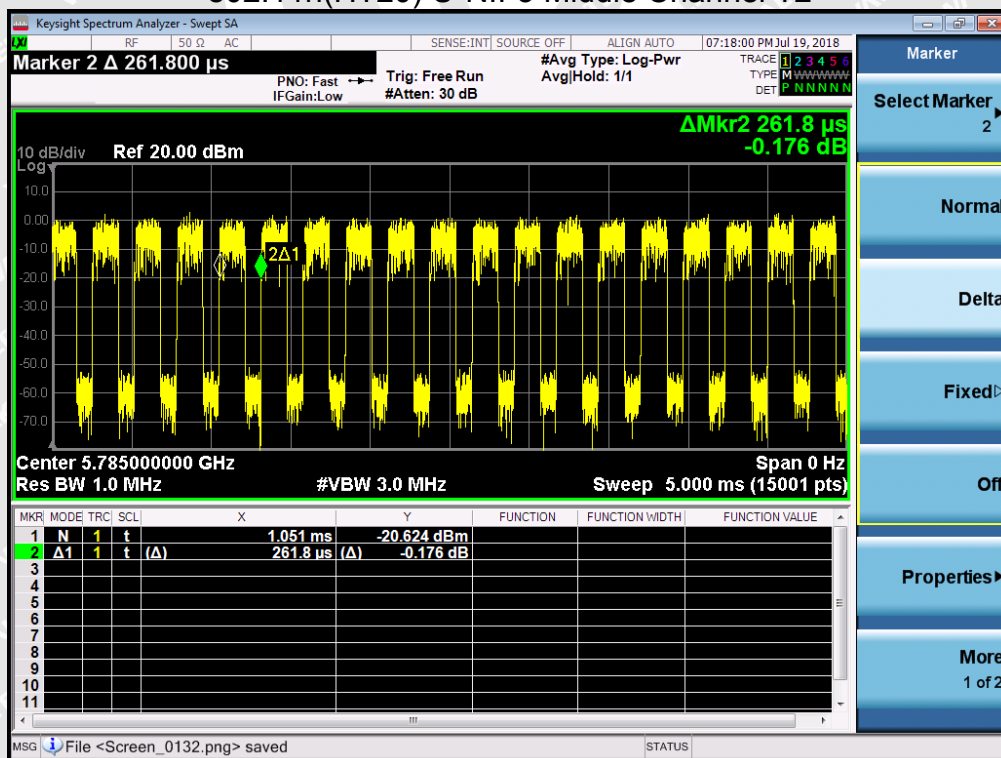




802.11n(HT20) U-NII-3 Middle Channel T1

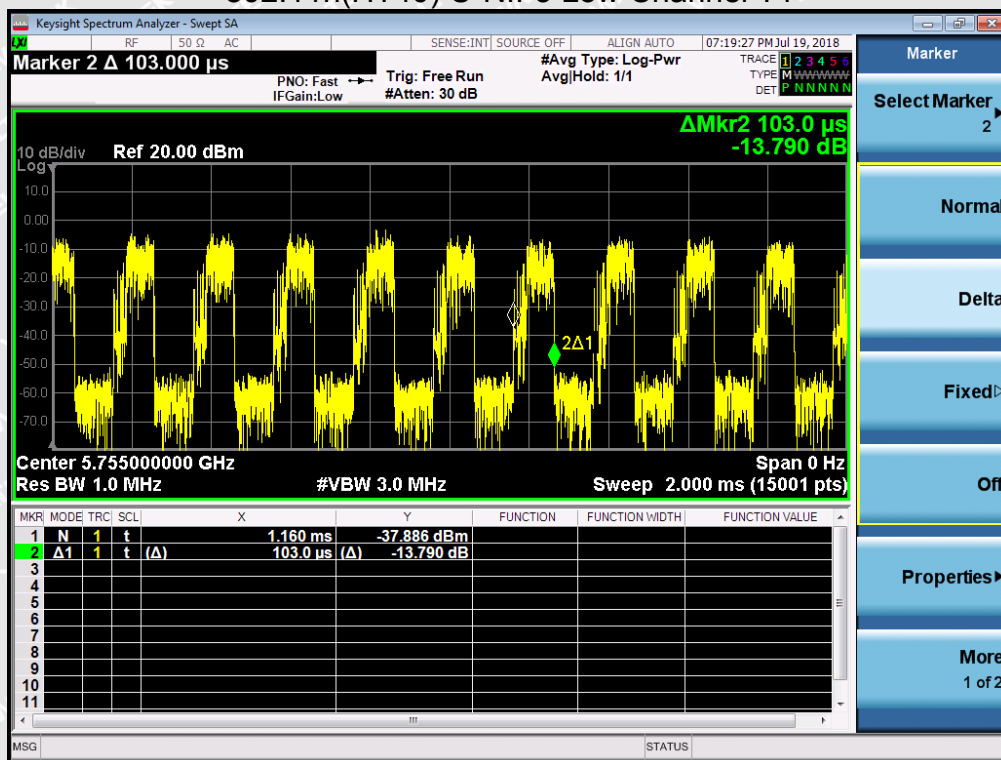


802.11n(HT20) U-NII-3 Middle Channel T2

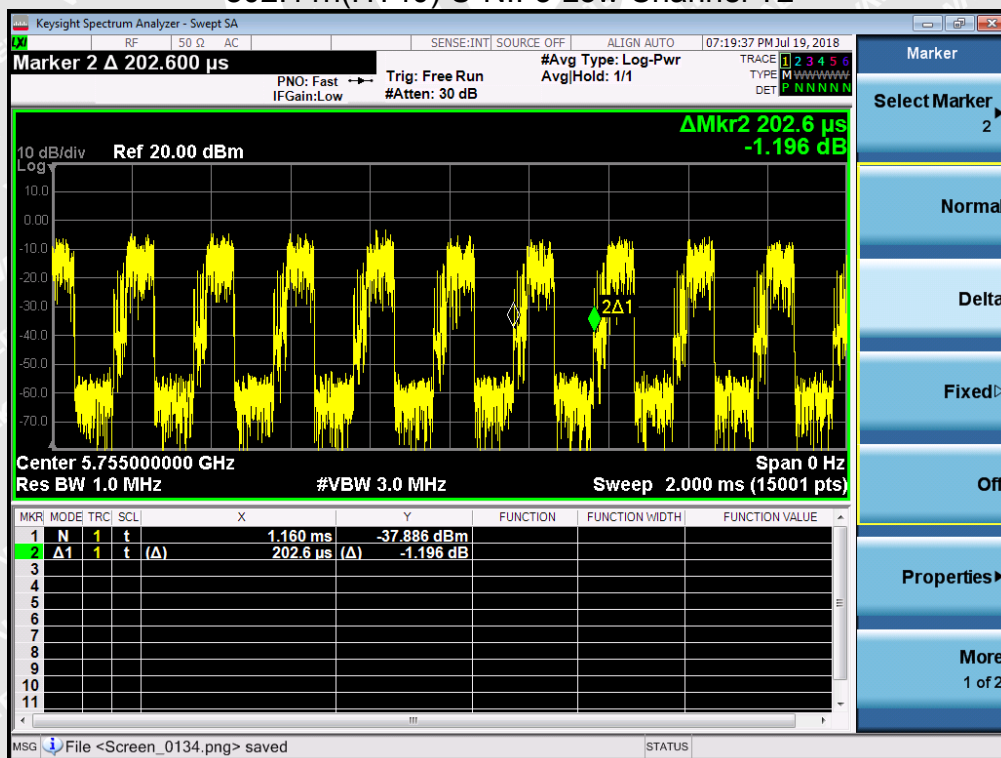




802.11n(HT40) U-NII-3 Low Channel T1

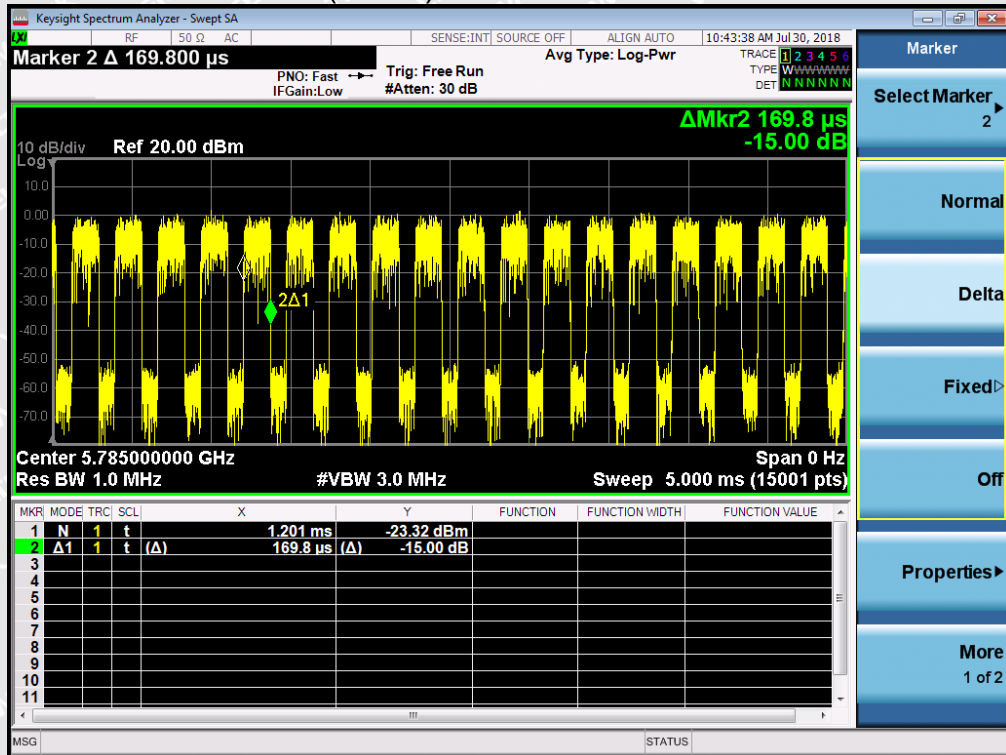


802.11n(HT40) U-NII-3 Low Channel T2

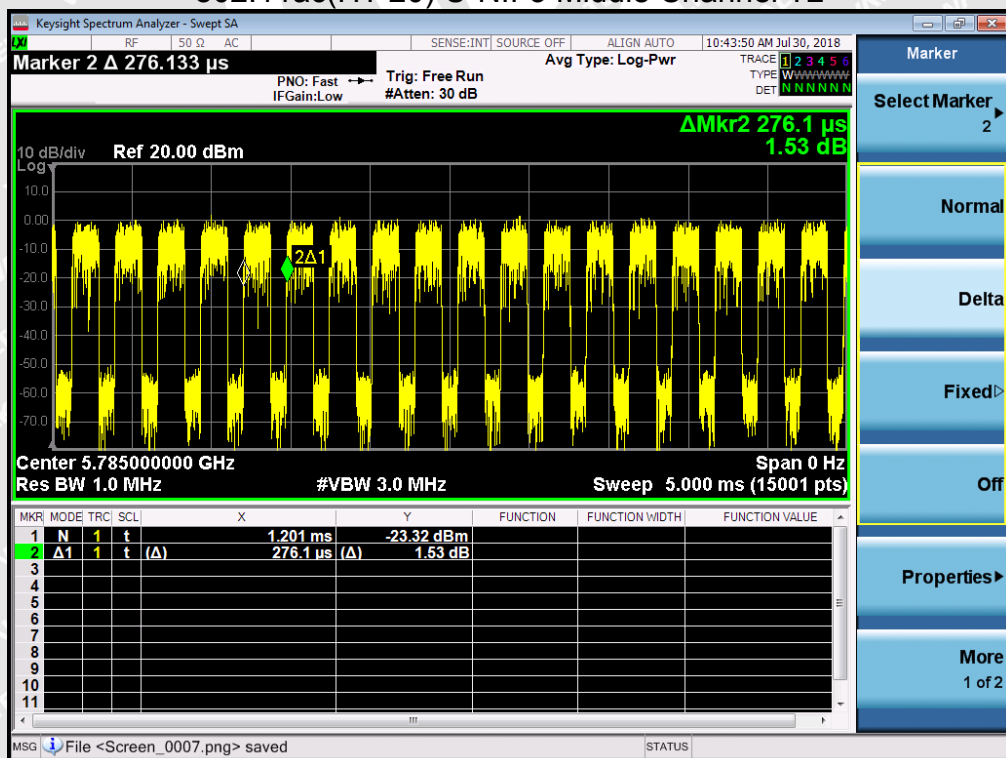




802.11ac(HT 20) U-NII-3 Middle Channel T1

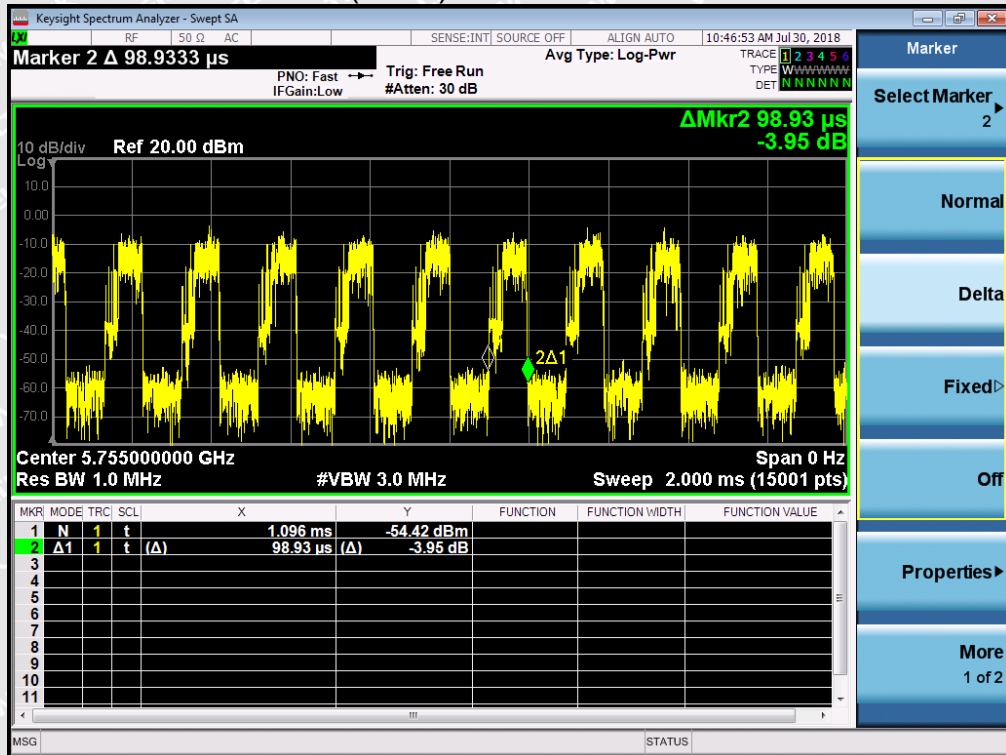


802.11ac(HT 20) U-NII-3 Middle Channel T2

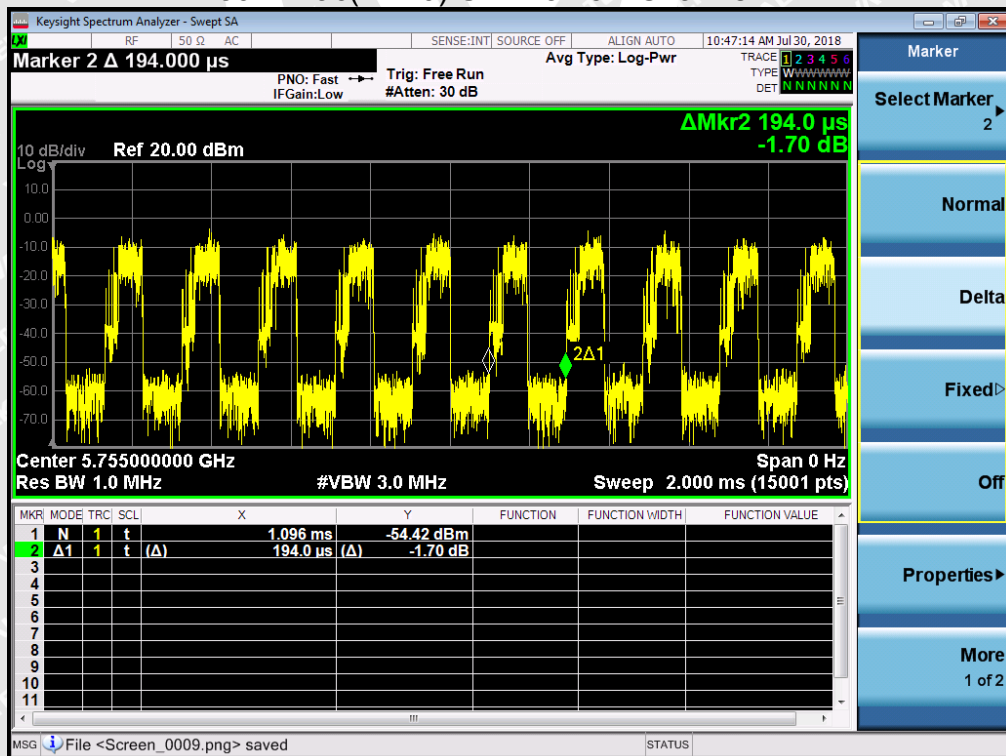




802.11ac(HT40) U-NII-3 Low Channel T1

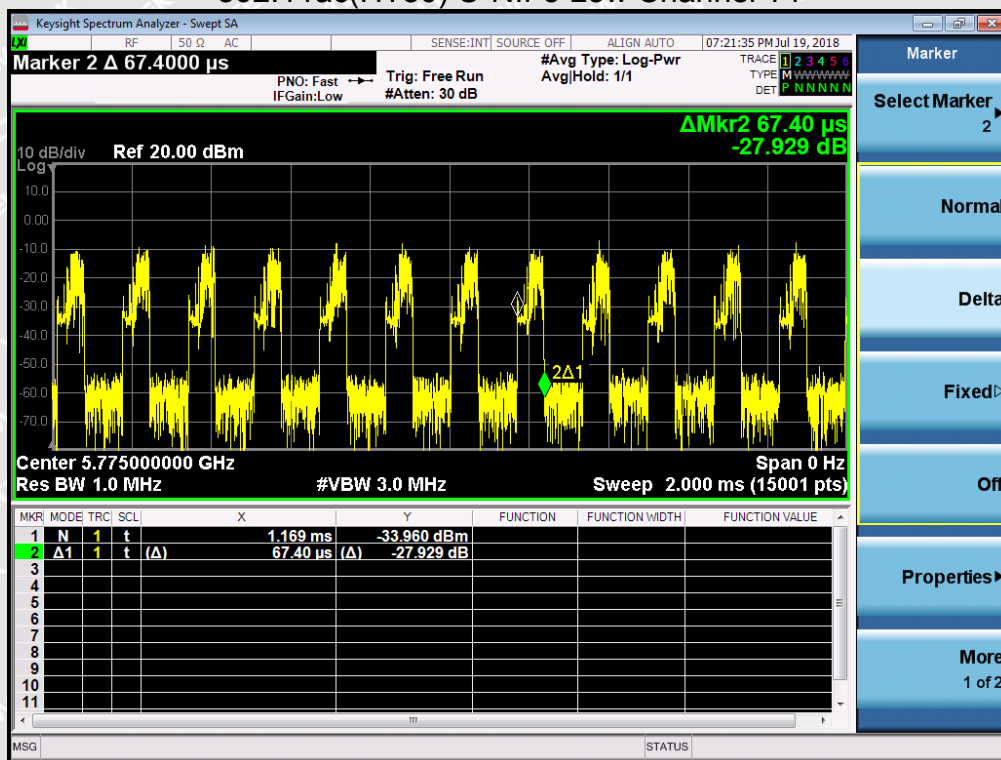


802.11ac(HT40) U-NII-3 Low Channel T2

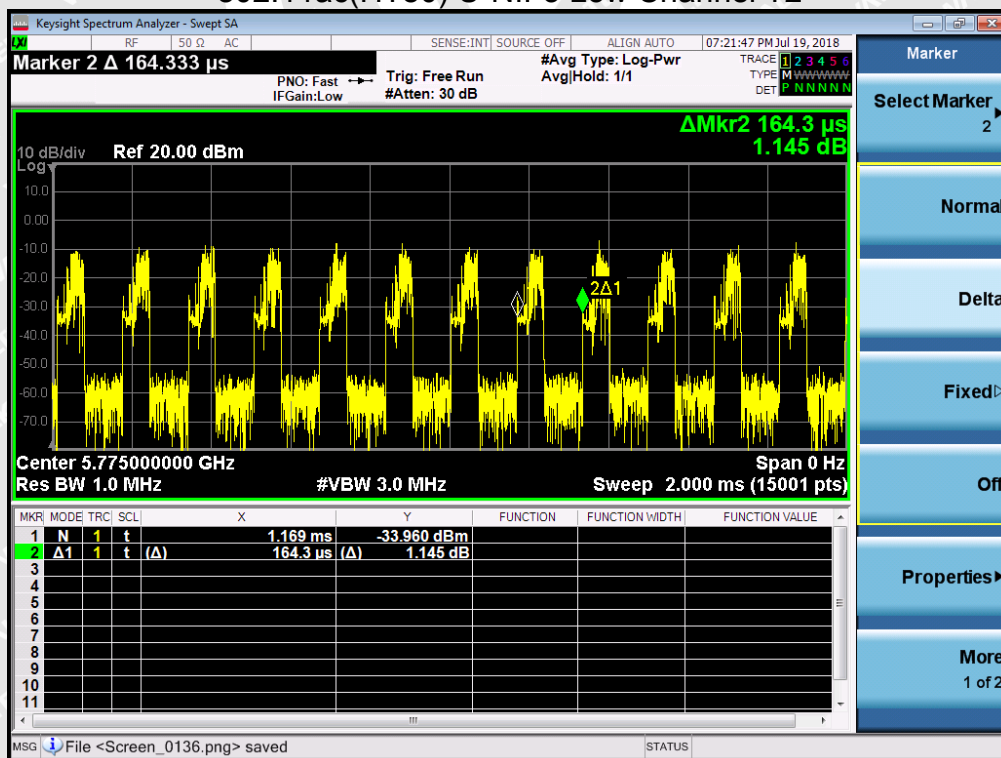




802.11ac(HT80) U-NII-3 Low Channel T1



802.11ac(HT80) U-NII-3 Low Channel T2





11 Band Edge

Test Requirement: FCC CFR47 Part 15 Section 15.407

Test Method: ANSI C63.10 2013

Test Limit:

(1) 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 .

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17dBm/MHz ; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27dBm/MHz .

Test Result: PASS

11.1 Test Produce

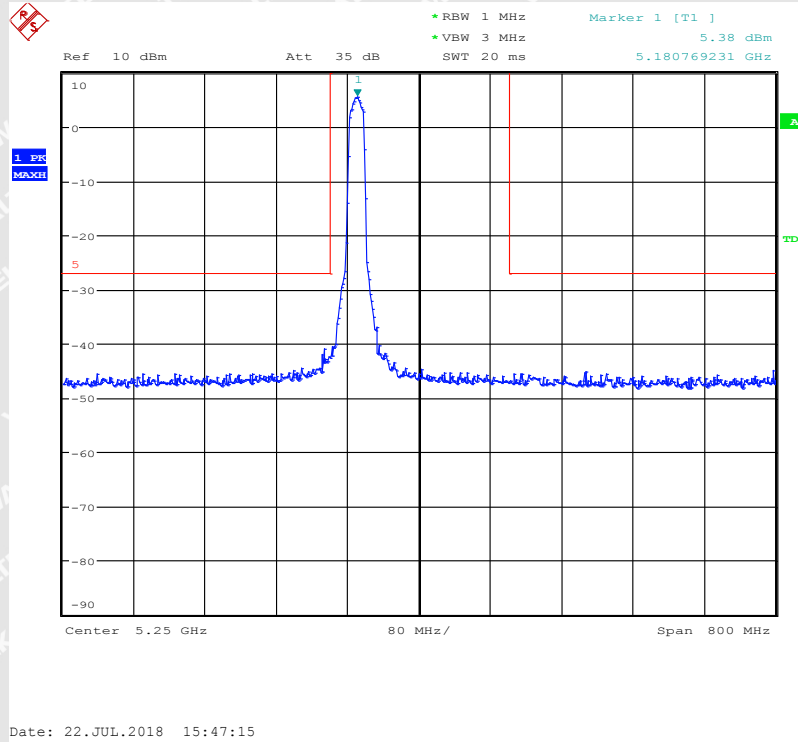
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.



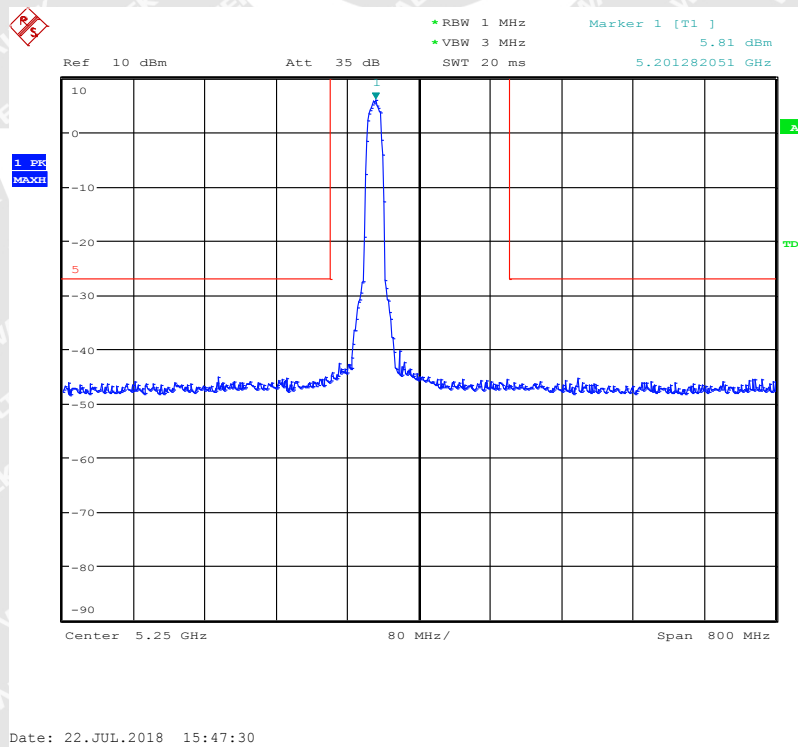
11.2 Test Result

Test result plots shown as follows:

802.11a U-NII-1 Low Channel

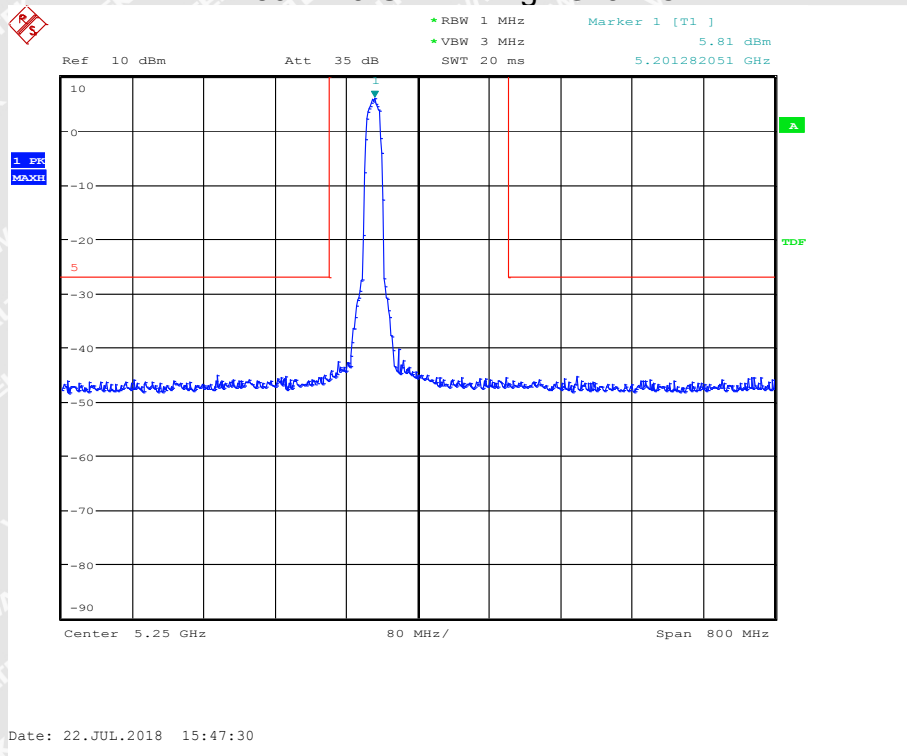


802.11a U-NII-1 Middle Channel

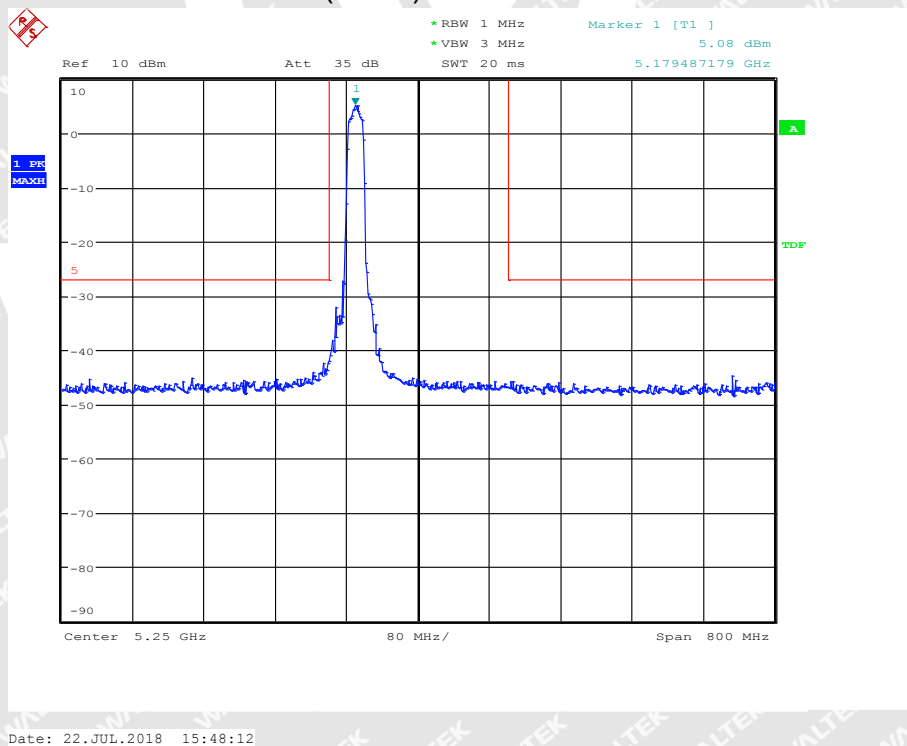




802.11a U-NII-1 High Channel

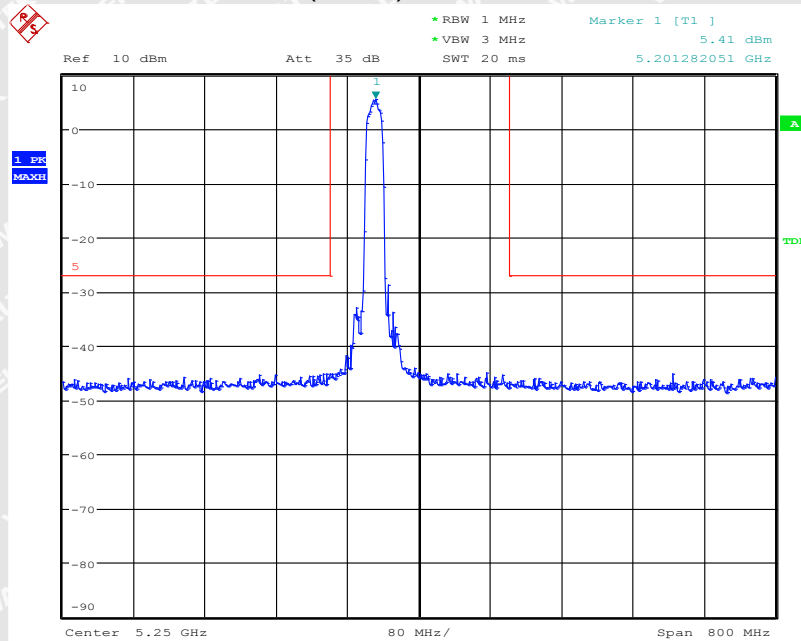


802.11n(HT20) U-NII-1 Low Channel



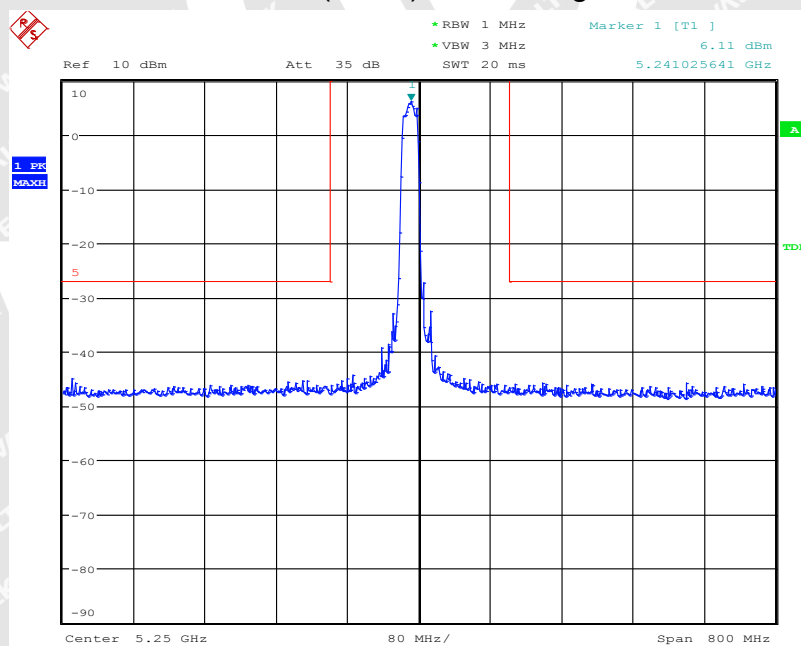


802.11n(HT20) U-NII-1 Middle Channel



Date: 22.JUL.2018 15:48:24

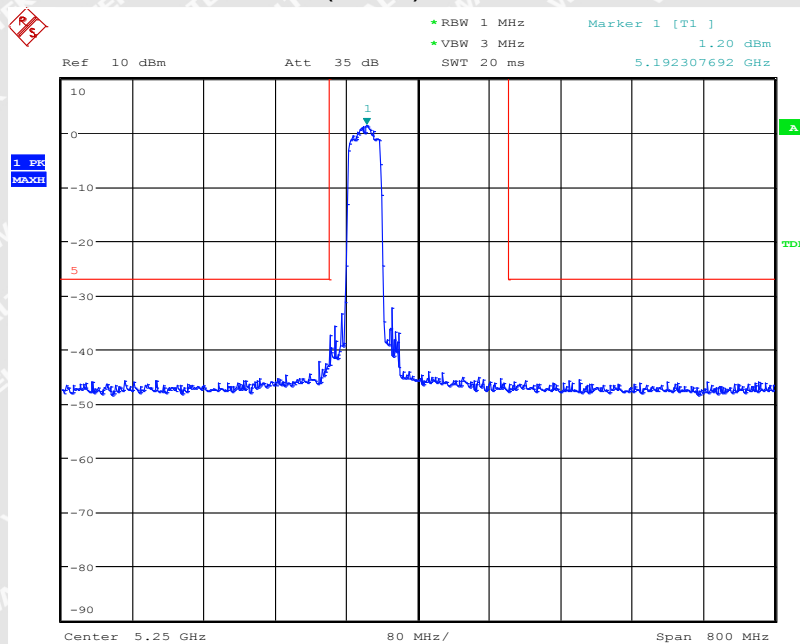
802.11n(HT20) U-NII-1 High Channel



Date: 22.JUL.2018 15:48:36

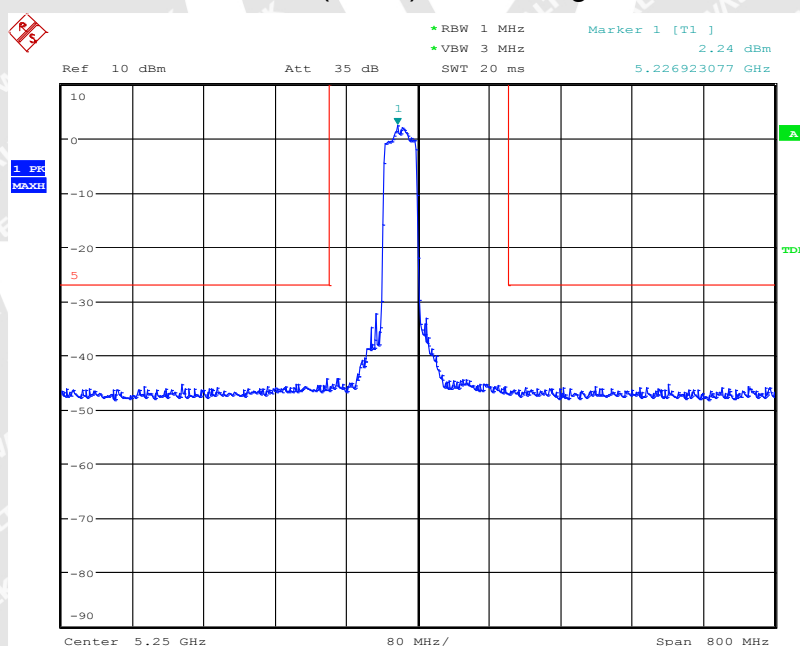


802.11n(HT40) U-NII-1 Low Channel



Date: 22.JUL.2018 15:50:14

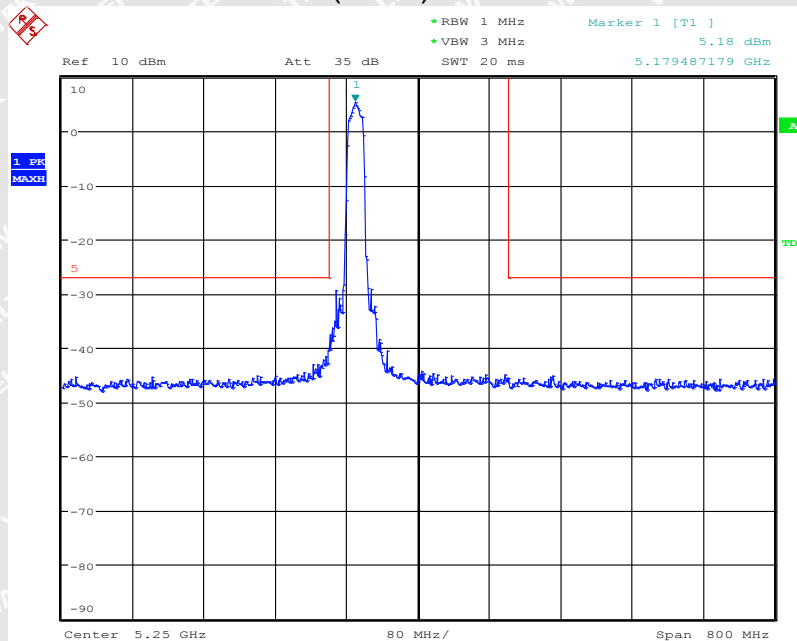
802.11n(HT40) U-NII-1 High Channel



Date: 22.JUL.2018 15:50:30

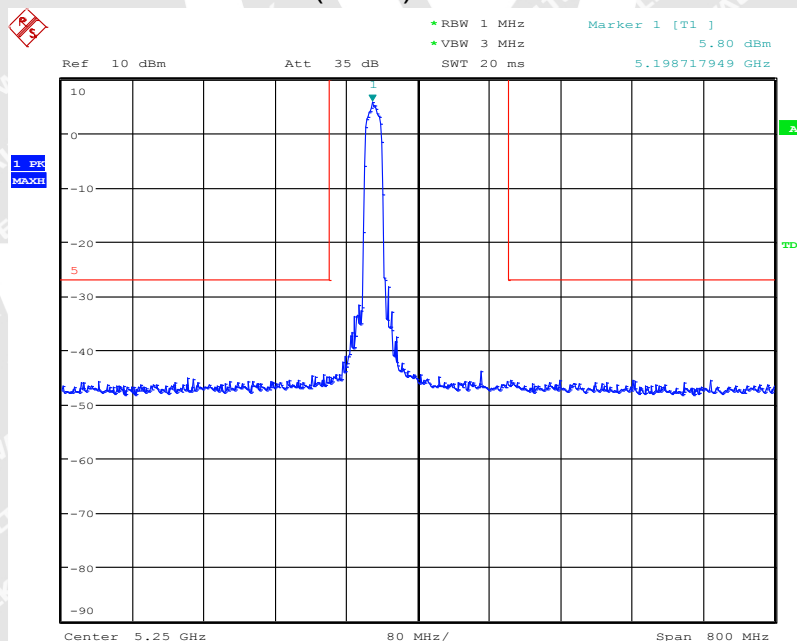


802.11ac(HT20) U-NII-1 Low Channel



Date: 22.JUL.2018 15:49:14

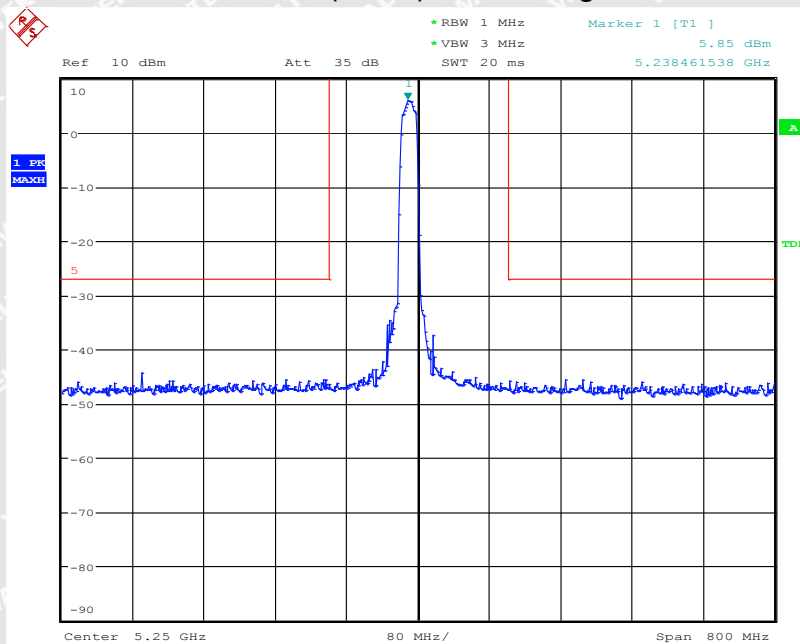
802.11ac(HT20) U-NII-1 Middle Channel



Date: 22.JUL.2018 15:49:30

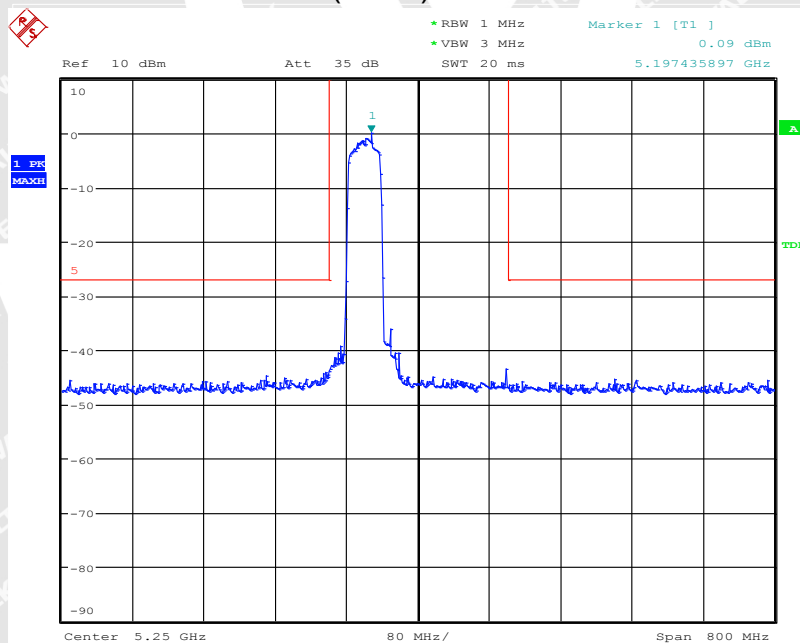


802.11ac(HT20) U-NII-1 High Channel



Date: 22.JUL.2018 15:49:48

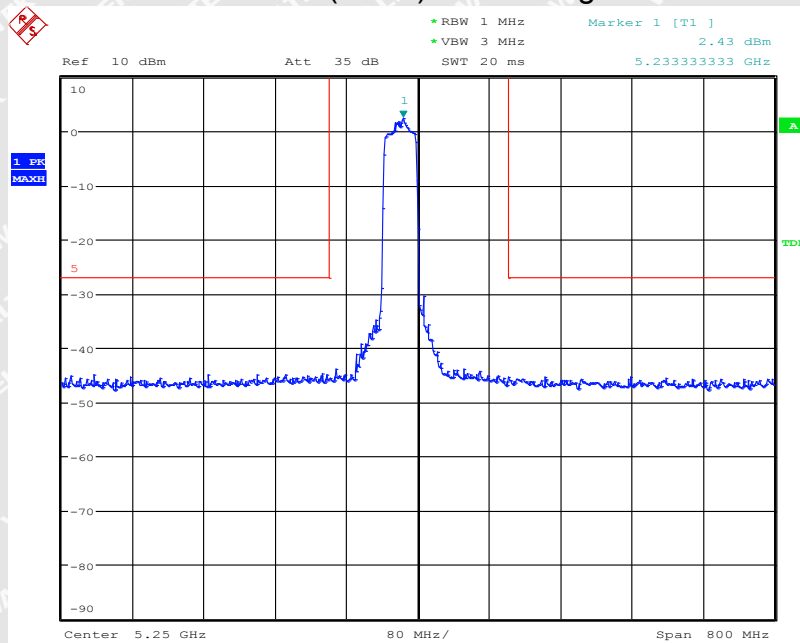
802.11ac(HT40) U-NII-1 Low Channel



Date: 22.JUL.2018 15:50:51

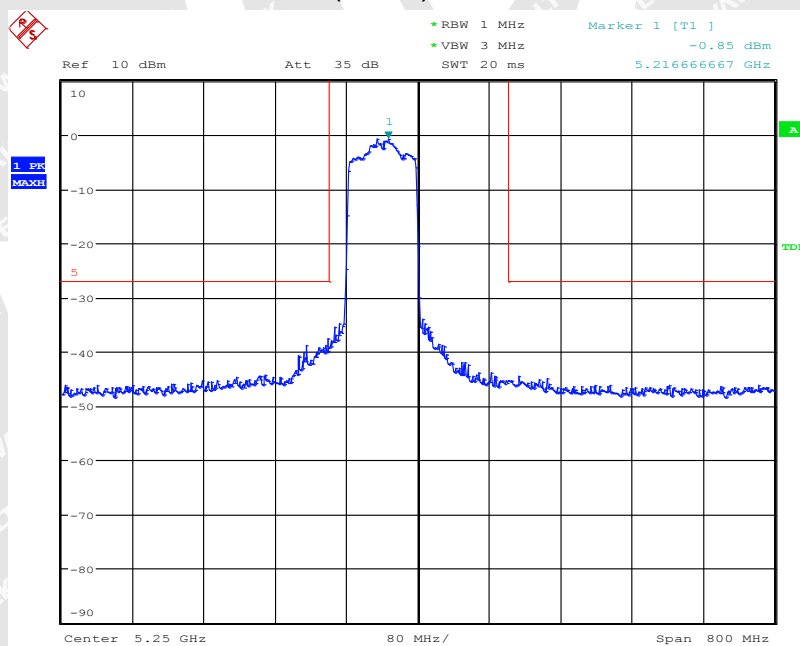


802.11ac(HT40) U-NII-1 High Channel



Date: 22.JUL.2018 15:51:37

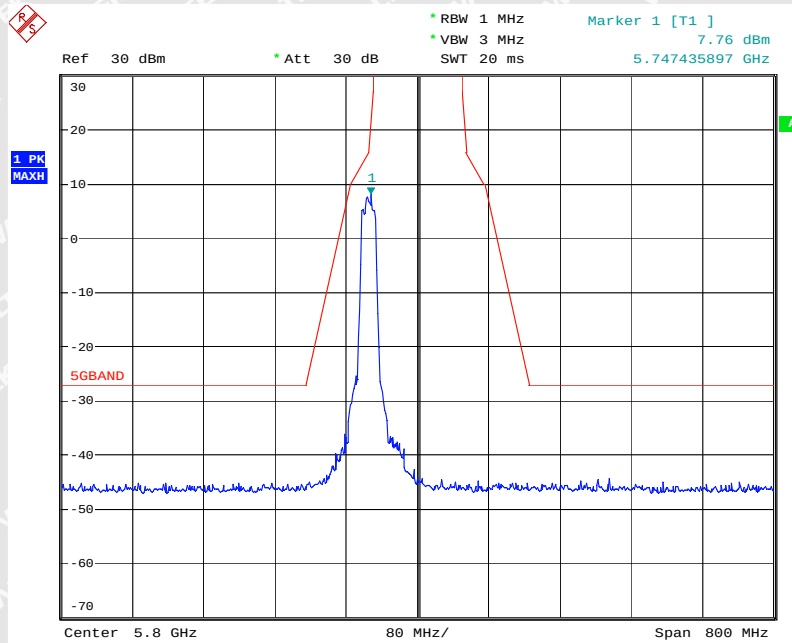
802.11ac(HT80) U-NII-1 Low Channel



Date: 22.JUL.2018 15:52:09

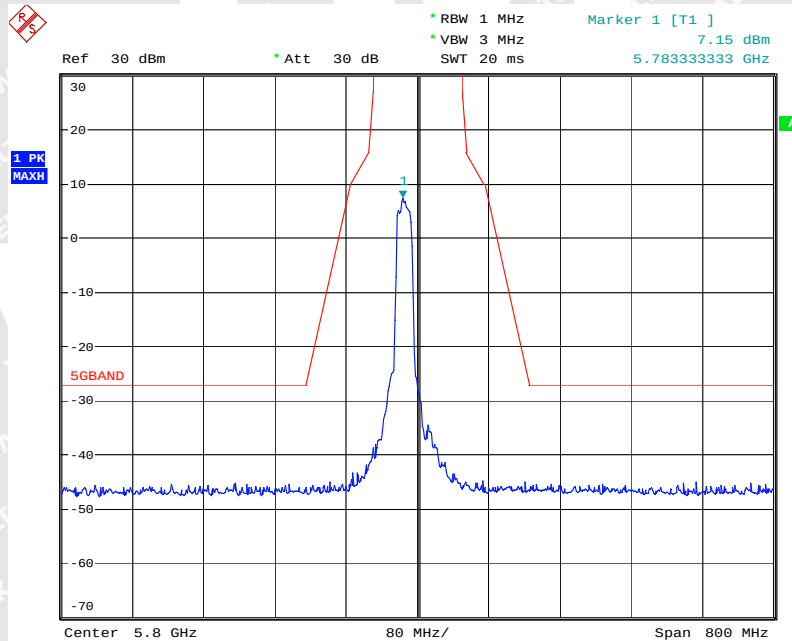


802.11a U-NII-3 Low Channel



Date: 20.JUL.2018 10:07:32

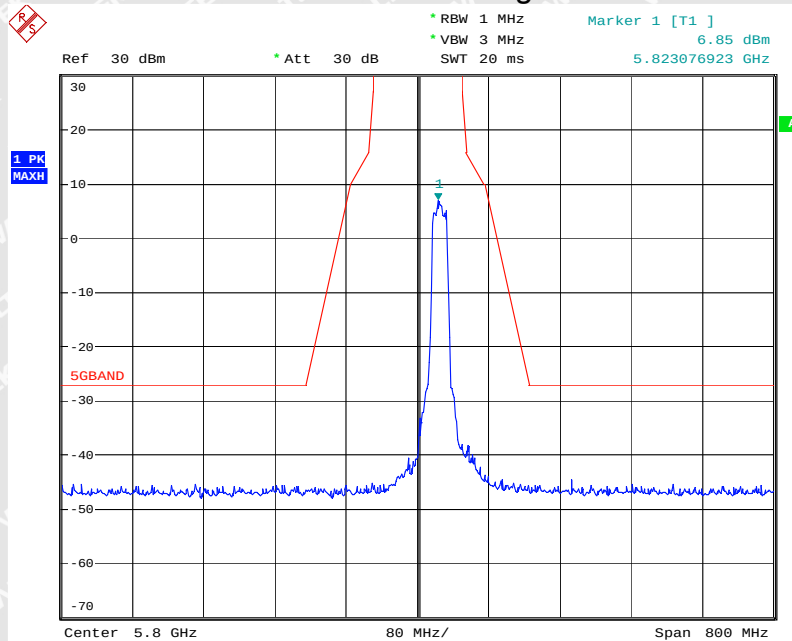
802.11a U-NII-3 Middle Channel



Date: 20.JUL.2018 10:08:15

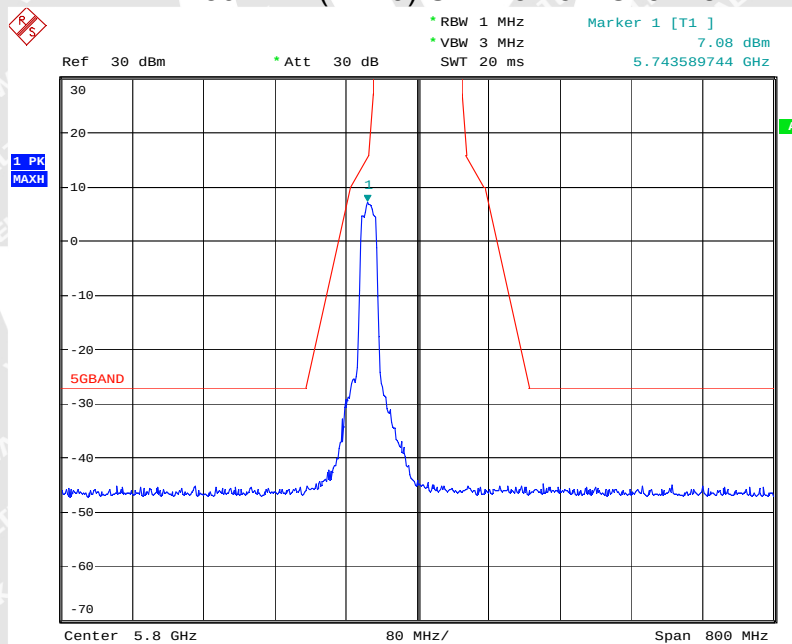


802.11a U-NII-3 High Channel



Date: 20.JUL.2018 10:08:45

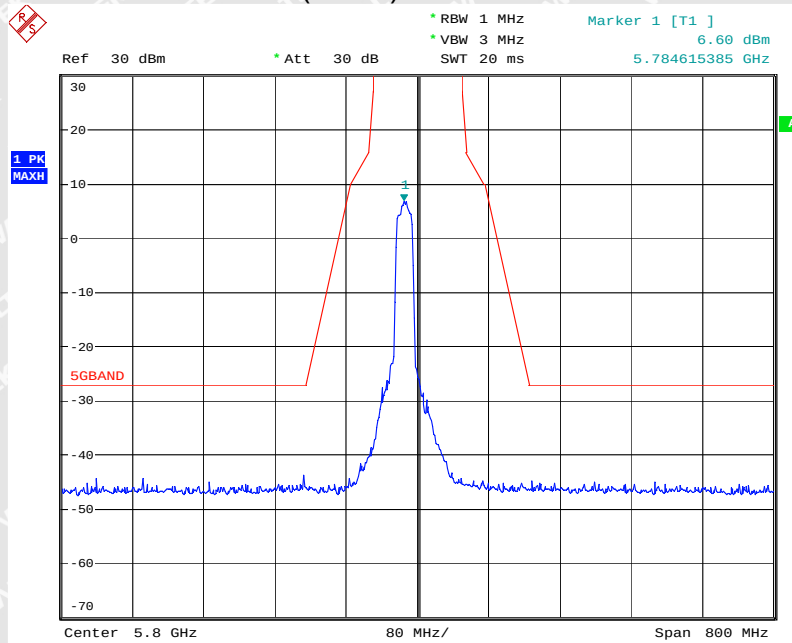
802.11n(HT20) U-NII-3 Low Channel



Date: 20.JUL.2018 10:09:54

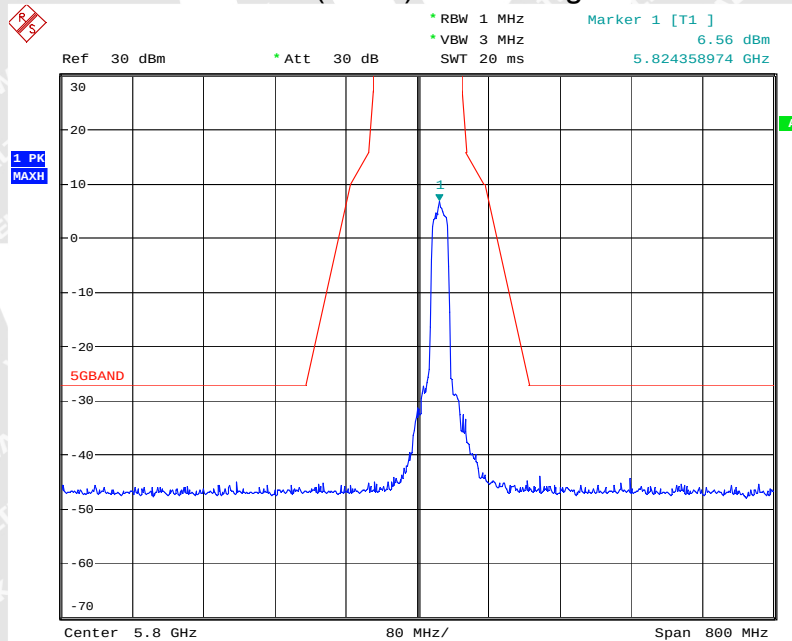


802.11n(HT20) U-NII-3 Middle Channel



Date: 20.JUL.2018 10:10:50

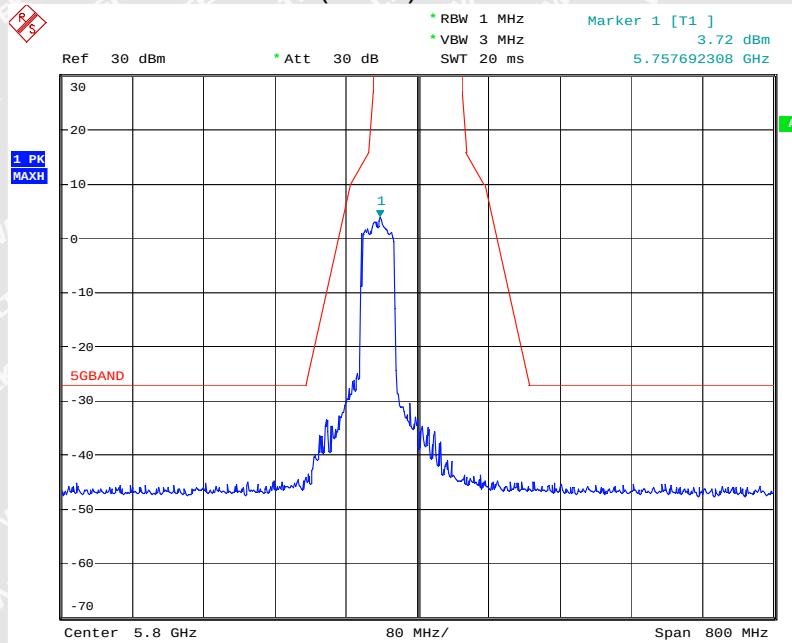
802.11n(HT20) U-NII-3 High Channel



Date: 20.JUL.2018 10:11:19

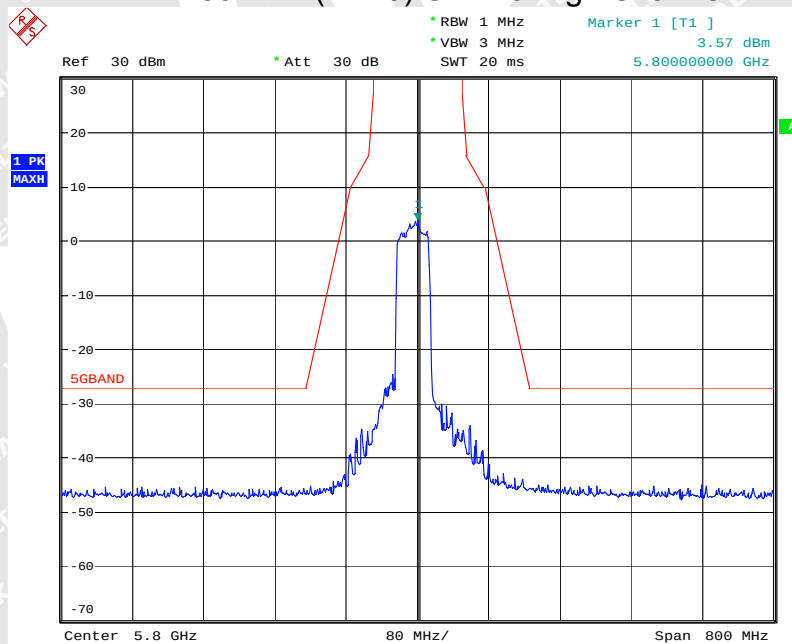


802.11n(HT40) U-NII-3 Low Channel



Date: 20.JUL.2018 10:13:27

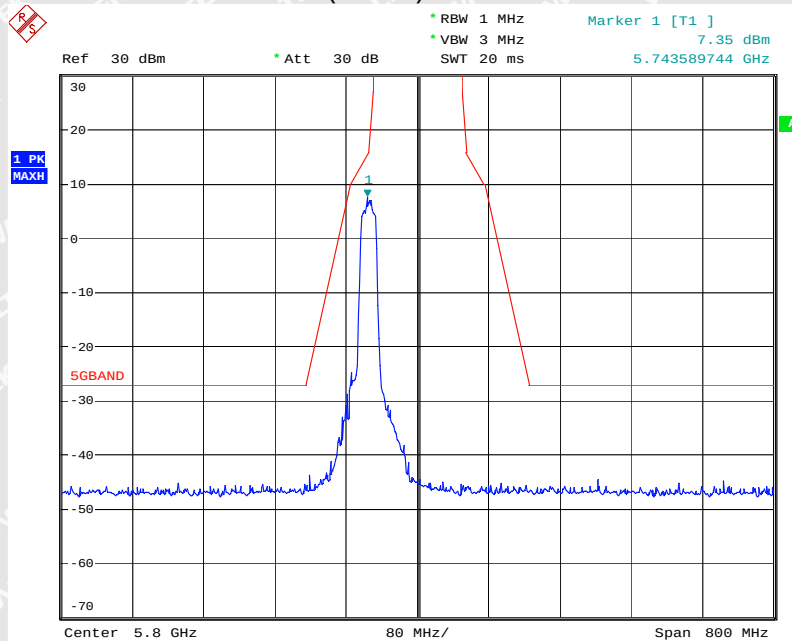
802.11n(HT40) U-NII-3 High Channel



Date: 20.JUL.2018 10:14:06

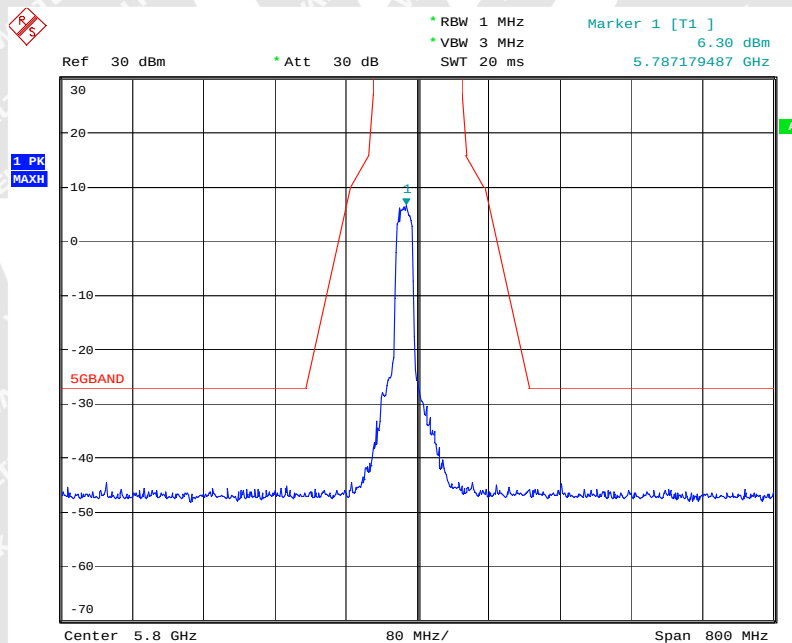


802.11ac(HT20) U-NII-3 Low Channel



Date: 20.JUL.2018 10:11:52

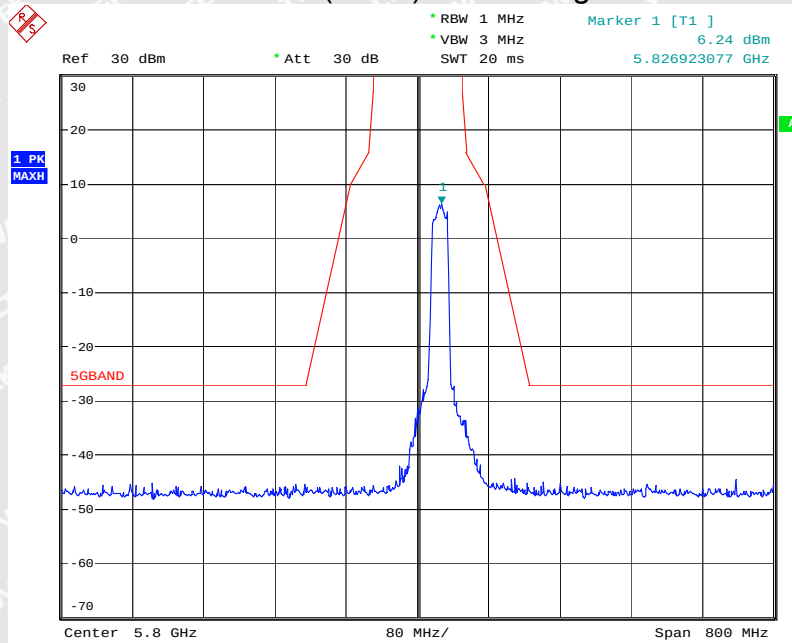
802.11ac(HT20) U-NII-3 Middle Channel



Date: 20.JUL.2018 10:12:18

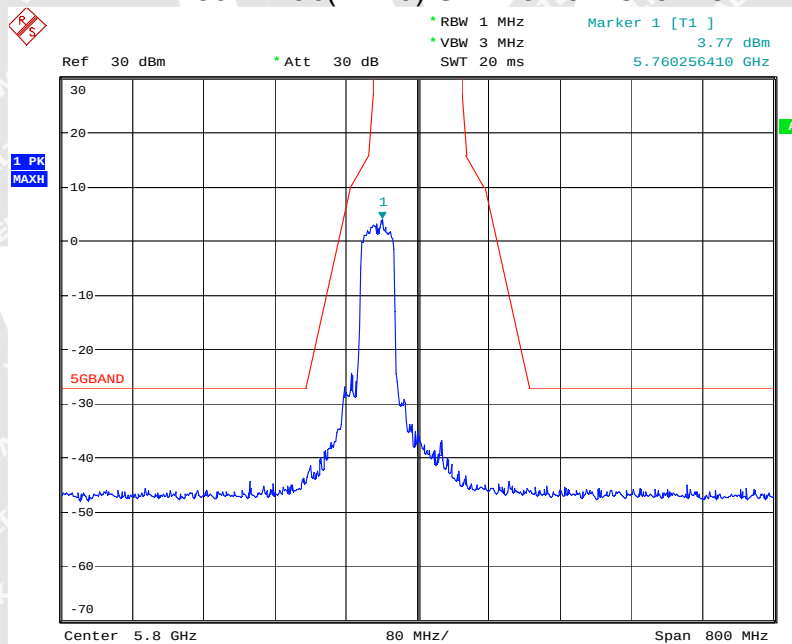


802.11ac(HT20) U-NII-3 High Channel



Date: 20.JUL.2018 10:12:41

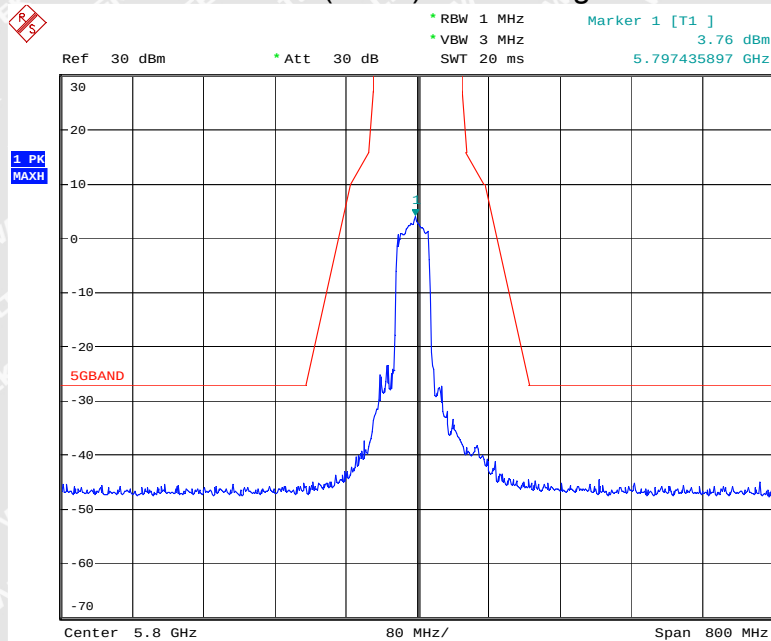
802.11ac(HT40) U-NII-3 Low Channel



Date: 20.JUL.2018 10:14:44

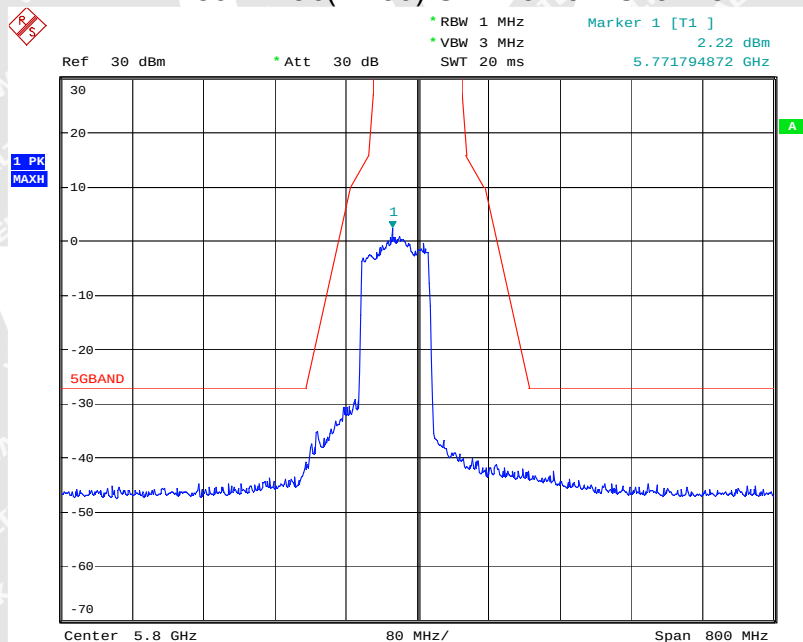


802.11ac(HT40) U-NII-3 High Channel



Date: 20.JUL.2018 10:15:18

802.11ac(HT80) U-NII-3 Low Channel



Date: 20.JUL.2018 10:16:53



12 6 dB Bandwidth

Test Requirement: FCC CFR47 Part 15 Section 15.407(e)
KDB662911 D01 Multiple Transmitter Output v02r01
Test Method: KDB789033 D02 General UNII Test Procedures New Rules v01
Section C
Test Limit: ≥ 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:

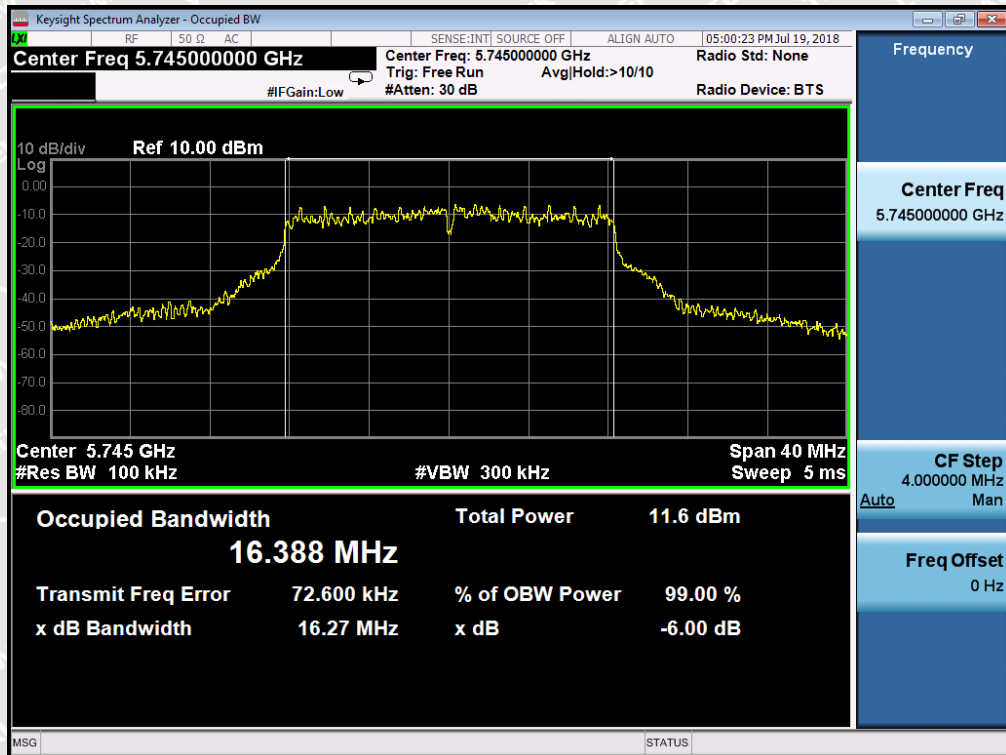
Band	Operation Mode	6 dB Bandwidth (MHz)		
		Low	Middle	High
U-NII-3	802.11a	16.27	16.32	16.31
	802.11n(HT20)	17.69	17.70	17.62
	802.11n(HT40)	36.39	/	36.39
	802.11ac(HT20)	17.69	17.71	17.71
	802.11ac(HT40)	36.40	/	36.39
	802.11ac(HT80)	76.16	/	/

WALTEK

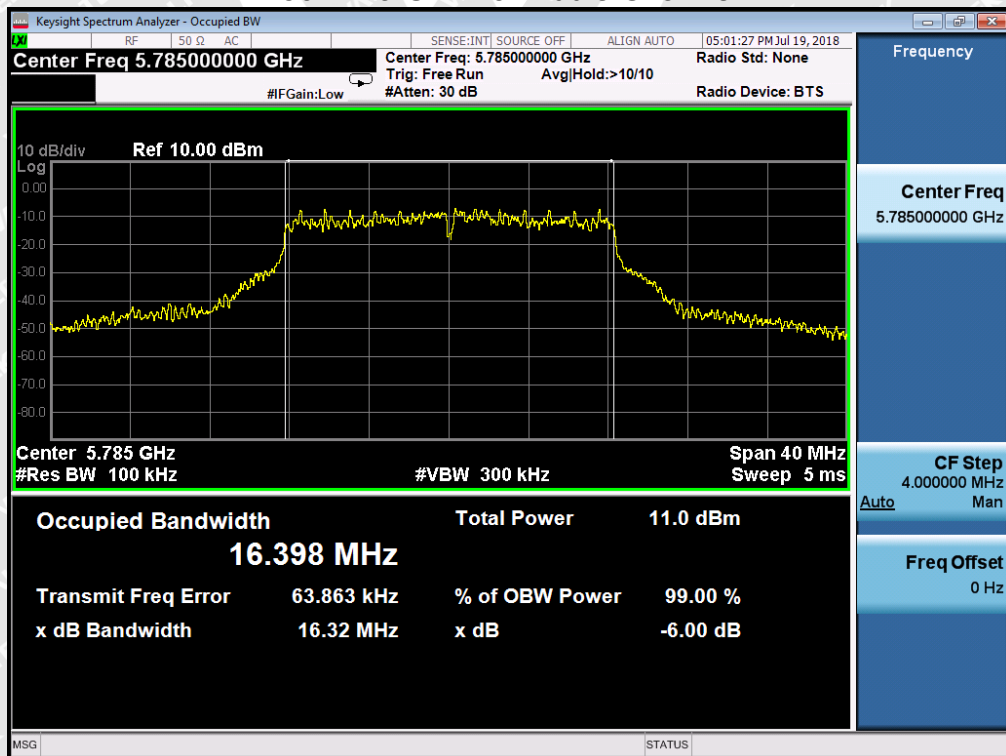


Test result plots shown as follows:

802.11a U-NII-3 Low Channel

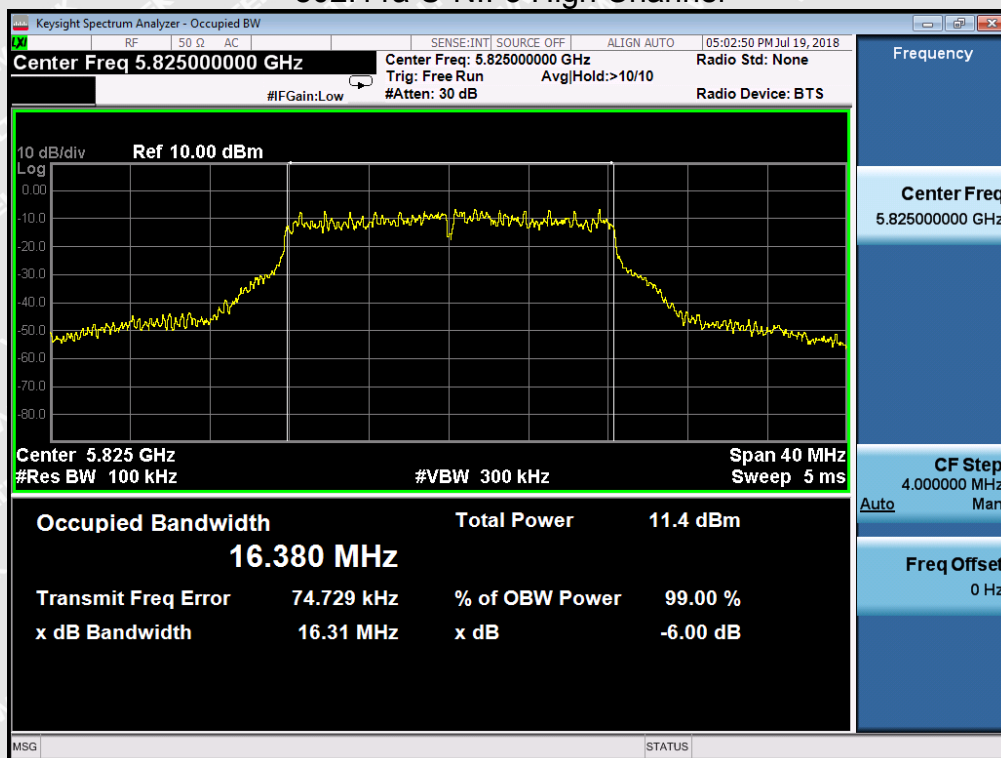


802.11a U-NII-3 Middle Channel

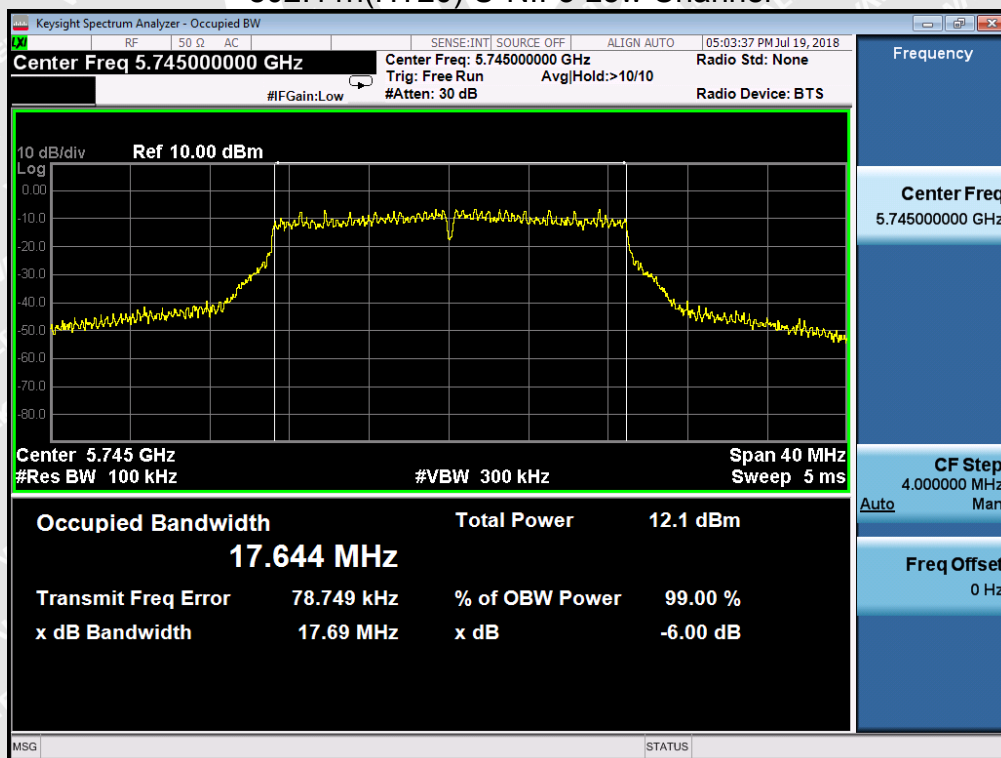




802.11a U-NII-3 High Channel

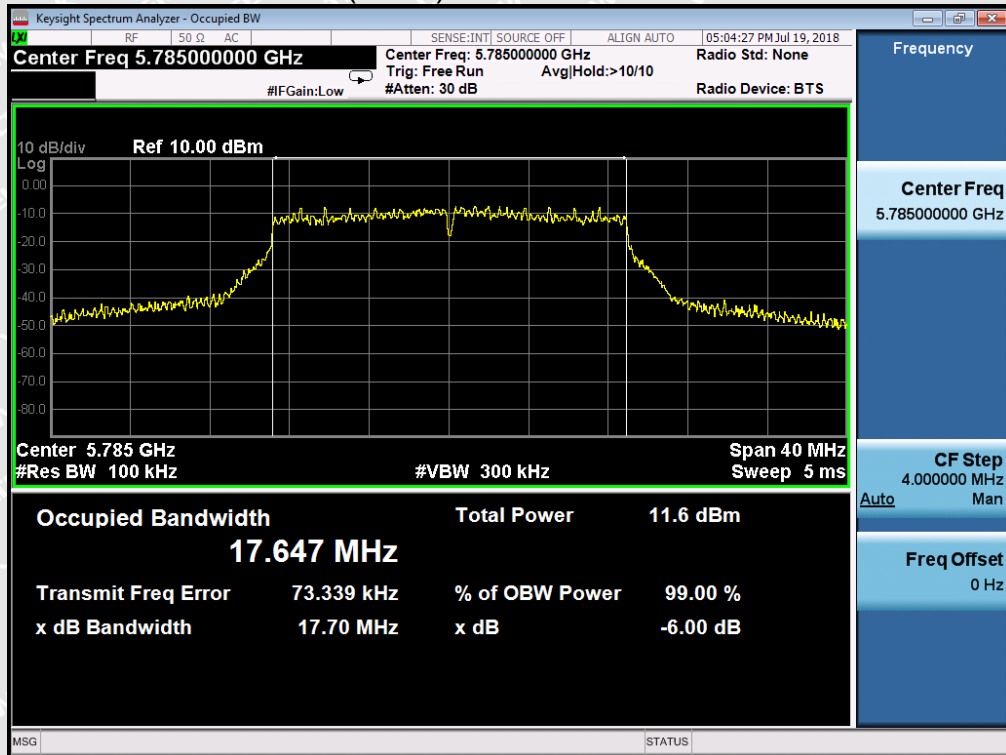


802.11n(HT20) U-NII-3 Low Channel

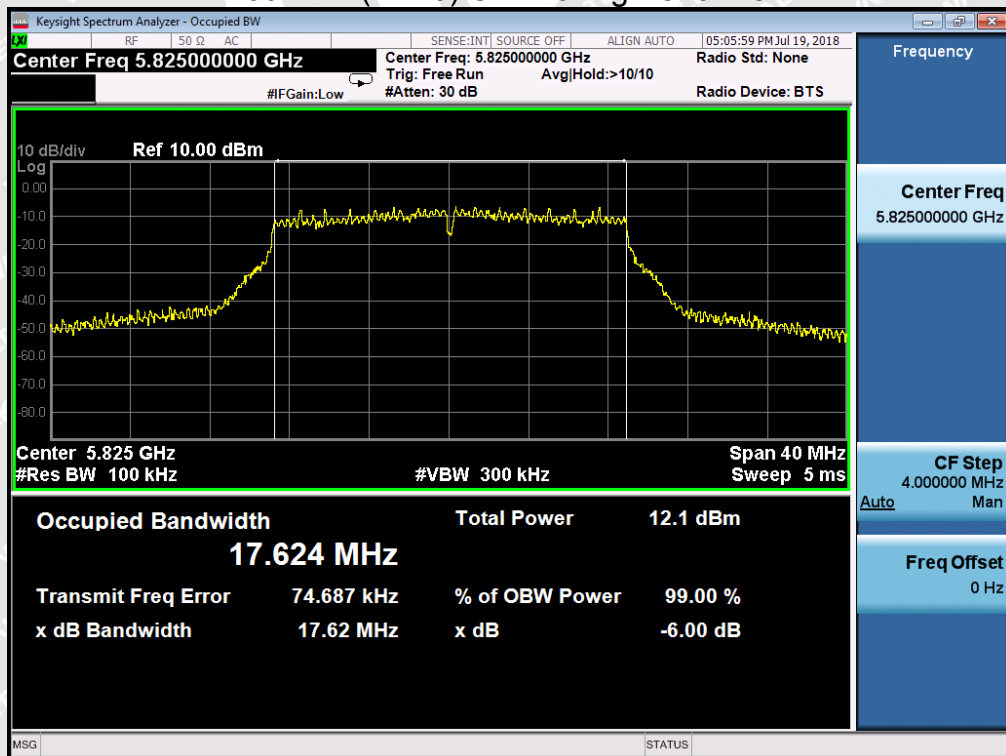




802.11n(HT20) U-NII-3 Middle Channel

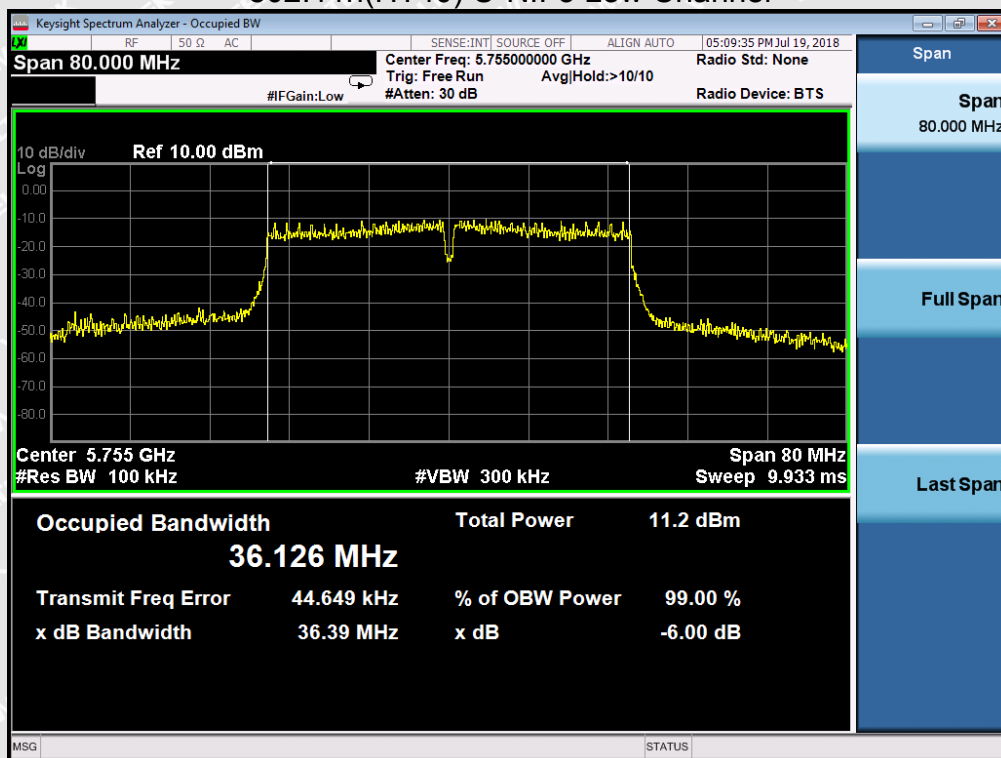


802.11n(HT20) U-NII-3 High Channel

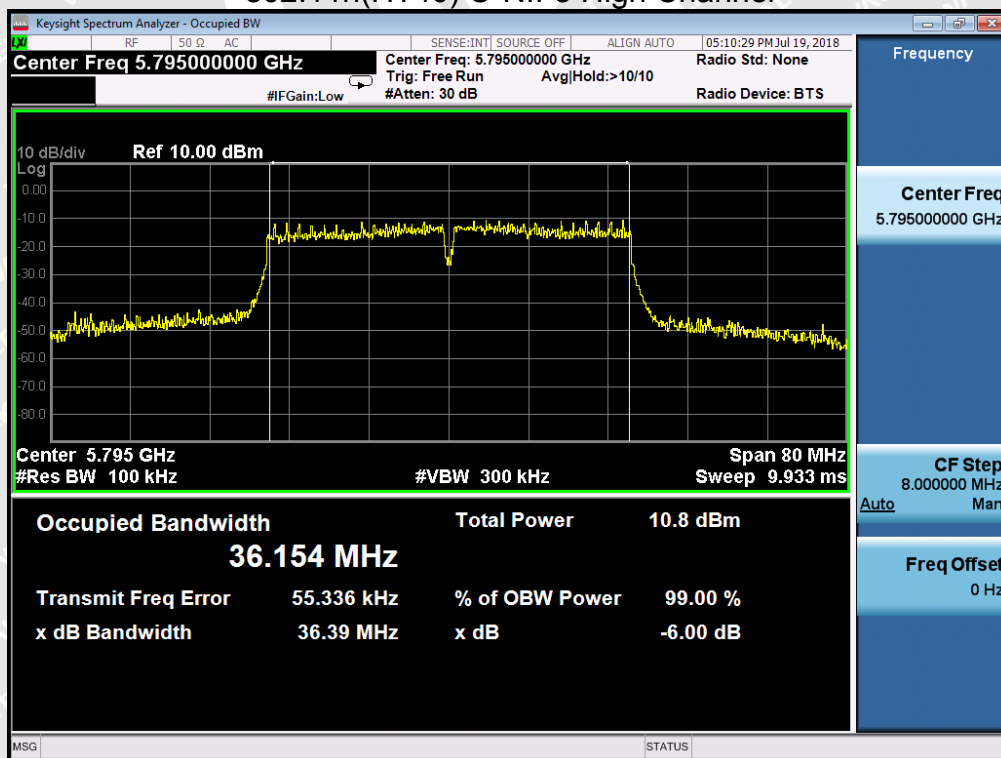




802.11n(HT40) U-NII-3 Low Channel

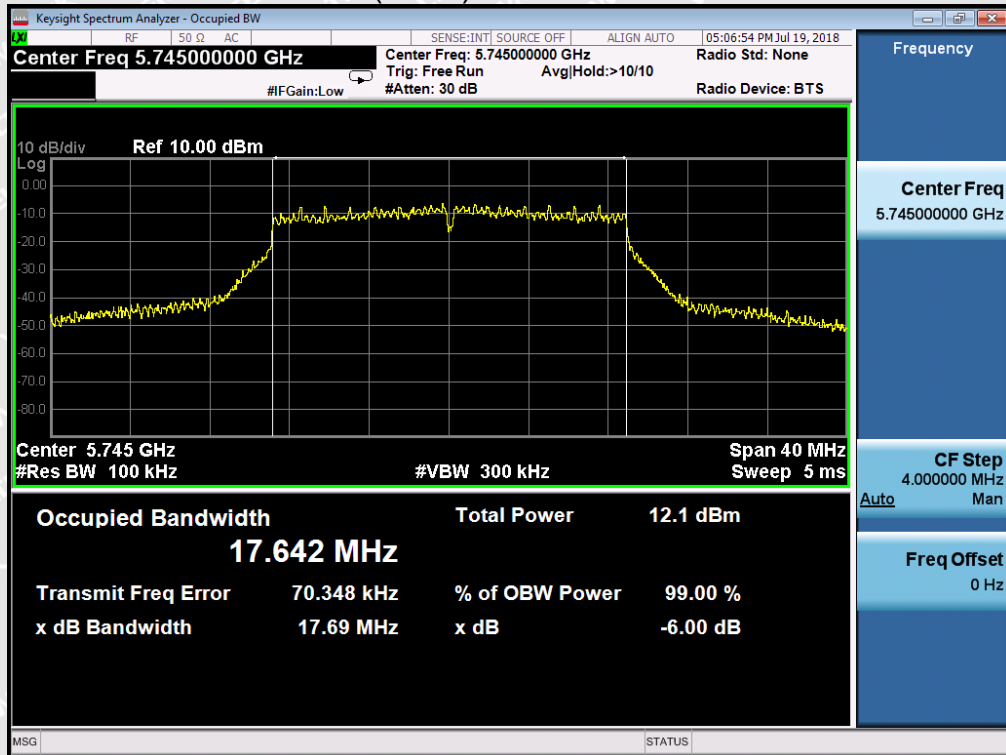


802.11n(HT40) U-NII-3 High Channel

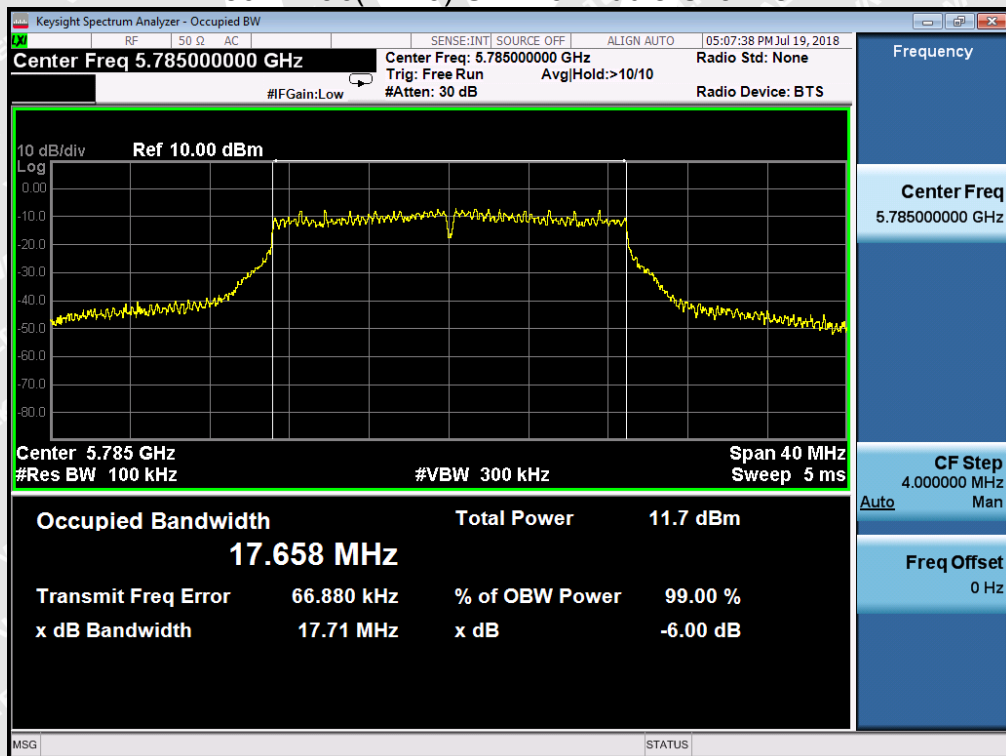




802.11ac(HT20) U-NII-3 Low Channel

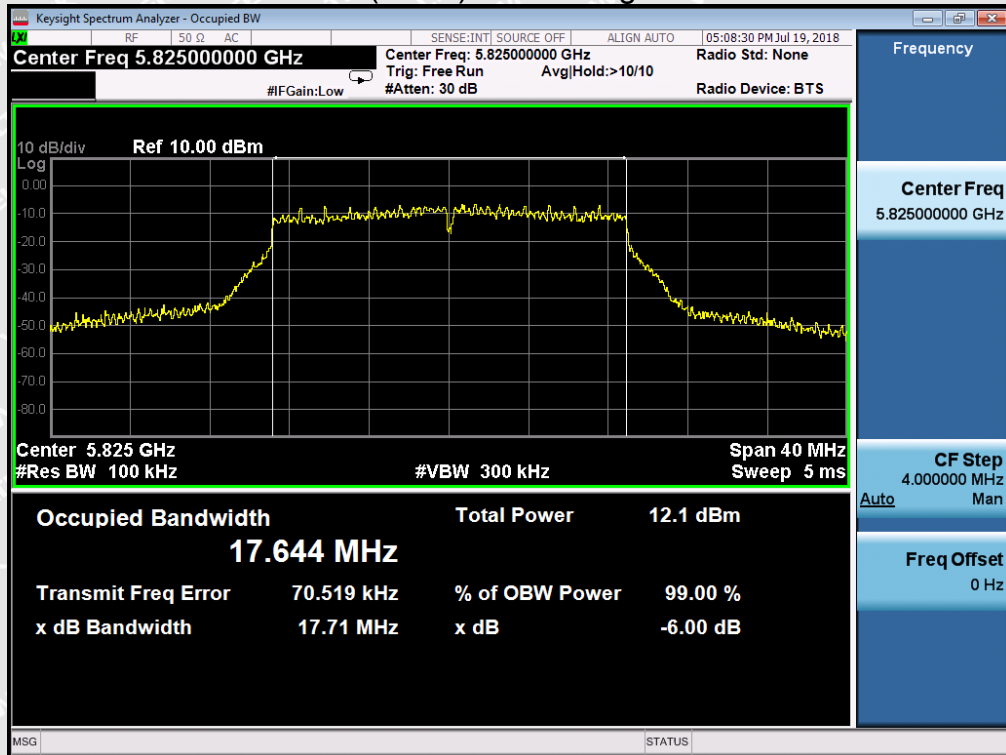


802.11ac(HT20) U-NII-3 Middle Channel

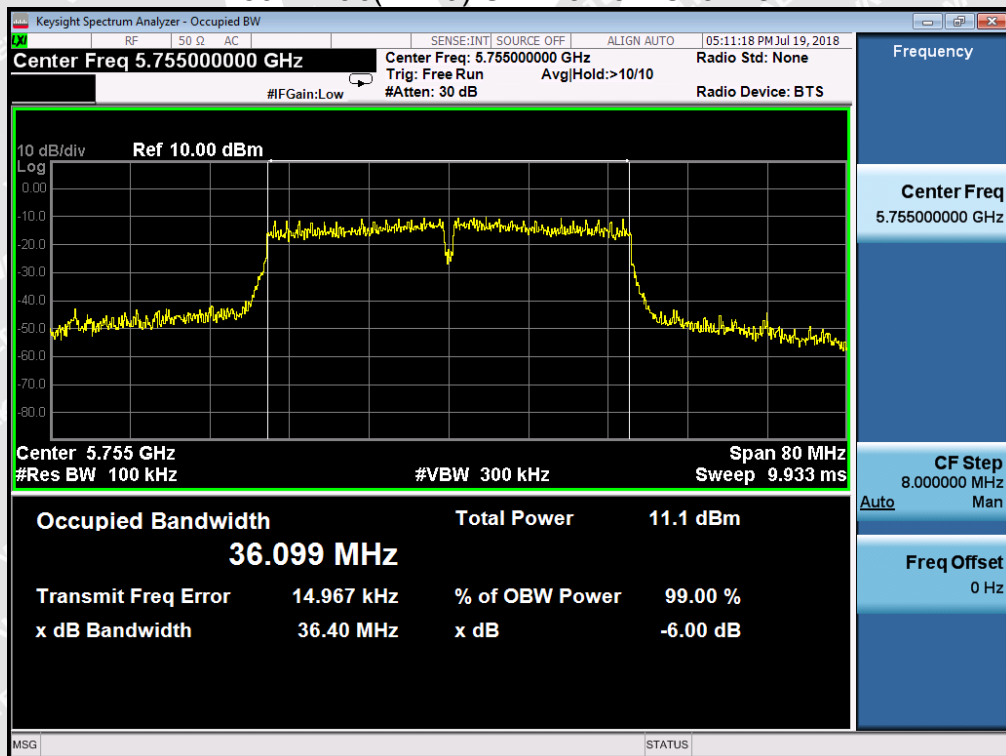




802.11ac(HT20) U-NII-3 High Channel

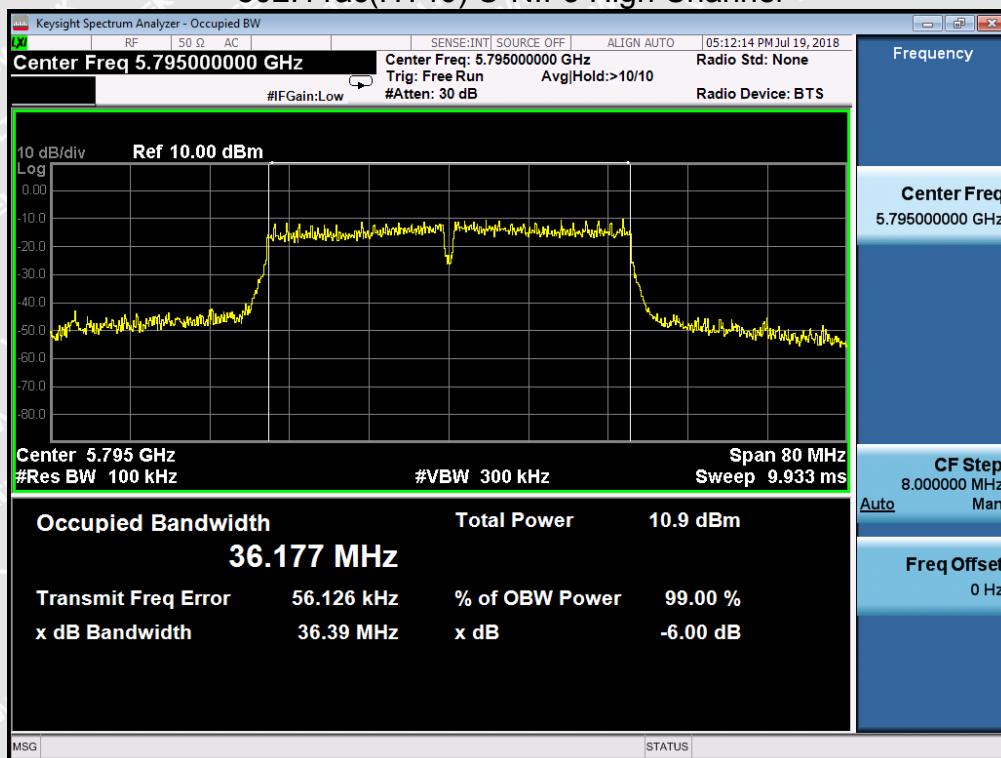


802.11ac(HT40) U-NII-3 Low Channel

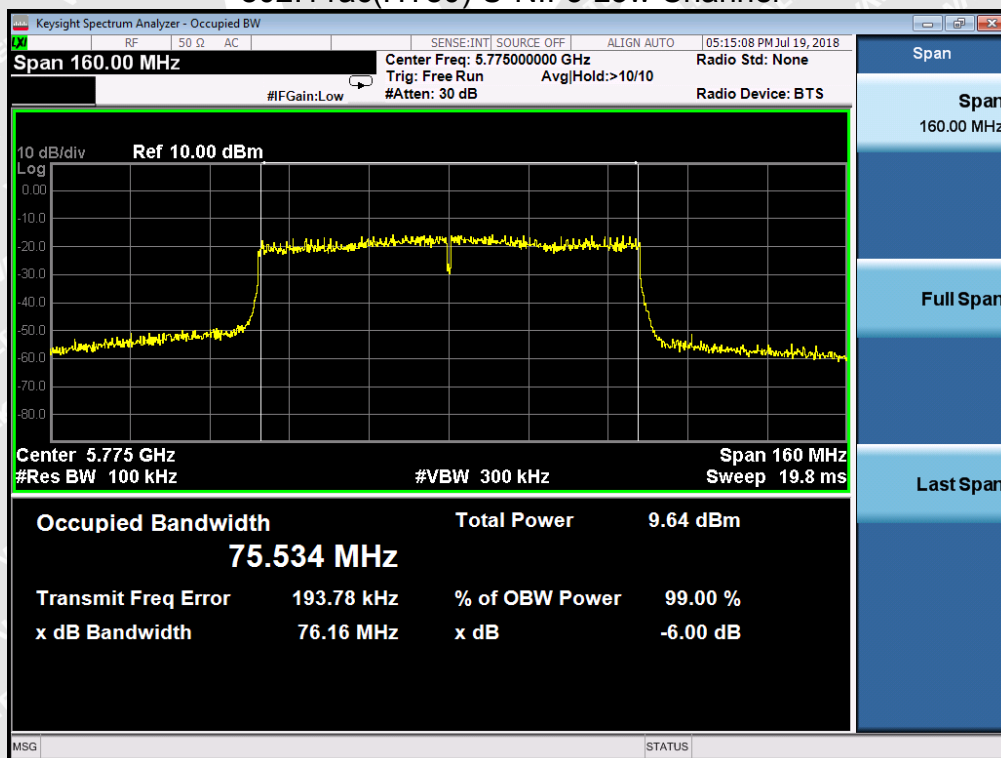




802.11ac(HT40) U-NII-3 High Channel



802.11ac(HT80) U-NII-3 Low Channel





13 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.407 (a)
KDB662911 D01 Multiple Transmitter Output v02r01
Test Method: KDB789033 D02 General UNII Test Procedures New Rules v01
Section D
Test Limit: No restriction limits
Test Result: PASS

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 = 100kHz, VBW = 300kHz



WALTEK



13.2 Test Result:

Band	Operation Mode	26 dB Bandwidth (MHz)			99% Occupied Bandwidth(MHz)		
		Low	Middle	High	Low	Middle	High
U-NII-1	802.11a	20.81	20.80	20.82	16.515	16.518	16.519
	802.11n(HT20)	21.32	21.23	21.37	17.810	17.807	17.832
	802.11n(HT40)	40.25	/	40.09	36.535	/	36.539
	802.11ac(HT20)	21.32	21.23	21.37	17.810	17.807	17.832
	802.11ac(HT40)	40.73	/	40.80	36.837	/	36.794
	802.11ac(HT80)	80.59	/	/	75.550	/	/
U-NII-3	802.11a	20.90	21.05	20.83	16.576	16.608	16.546
	802.11n(HT20)	21.32	21.41	21.40	17.839	17.856	17.875
	802.11n(HT40)	40.13	/	40.03	36.540	/	36.610
	802.11ac(HT20)	21.52	21.29	21.16	17.918	17.978	17.894
	802.11ac(HT40)	41.09	/	41.00	36.965	/	37.017
	802.11ac(HT80)	80.30	/	/	75.679	/	/

WALTEK