FCC REPORT
(UNII)

Applicant:	Lenbrook Industries Limited.
Address of Applicant:	633 Granite Court, Pickering, Ontario, L1W 3K1 Canada
Equipment Under Test (EUT)	
Product Name:	BLOUS STREAMING DAC AMPLIFIER
Model No.:	M33
Trade mark:	NAD
FCC ID:	SVC-M33
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	30 Mar., 2020
Date of Test:	31 Mar., to 10 Nov., 2020
Date of report issued:	12 Nov., 202
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	*12 Nov., 202*	*Original*

Tested by: Yaro Wu ***Date:*** *12 Nov., 202*

Test Engineer

Reviewed by: Winner zhang ***Date:*** *12 Nov., 202*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Test Result
Antenna requirement	15.203 & 15.407 (a)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.407 (a) (1) (iv) & (a) (2) & (a) (3)	Pass
26dB Occupied Bandwidth	15.407 (a) (5)	Pass
6dB Emission Bandwidth	15.407(e)	Pass
Power Spectral Density	15.407 (a) (1) (iv) & (a) (2) & (a) (3)	Pass
Band Edge	15.407(b)	Pass
Spurious Emission	15.407 (b) & 15.205 & 15.209	Pass
Frequency Stability	15.407(g)	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI C63.10-2013* *KDB 789033 D02 General UNII Test Procedures New Rules v02r01*

5 General Information

5.1 Client Information

Applicant:	Lenbrook Industries Limited.
Address:	633 Granite Court, Pickering, Ontario, L1W 3K1 Canada
Manufacturer:	Lenbrook Industries Limited.
Address:	633 Granite Court, Pickering, Ontario, L1W 3K1 Canada
Factory:	Hansong (Nanjing) Technology Ltd.
Address:	8th Kangping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China

5.2 General Description of E.U.T.

Product Name:	BLOUS STREAMING DAC AMPLIFIER			
Model No.:	M33			
Operation Frequency:	Band 1: 5150MHz-5250MHz		Band 2: 5250MHz-5350MHz	
	Band 3: 5470MHz-5725MHz		Band 4: 5725MHz-5825MHz	
Channel numbers:	Band 1:	802.11a/802.11n20: 4	802.11n40: 2	802.11ac: 1
	Band 2:	802.11a/802.11n20: 4	802.11n40: 2	802.11ac: 1
	Band 3:	802.11a/802.11n20: 11	802.11n40: 5	802.11ac: 2
	Band 4:	802.11a/802.11n20: 5	802.11n40: 2	802.11ac: 1
Channel separation:	20MHz:	802.11a/802.11n-HT20/802.11ac-HT20		
	40MHz:	802.11n-HT40/802.11ac-HT40		
	80MHz:	802.11ac-HT80		
Modulation technology (IEEE 802.11a):	BPSK, QPSK, 16-QAM, 64-QAM			
Modulation technology (IEEE 802.11n):	BPSK, QPSK, 16-QAM, 64-QAM			
Modulation technology (IEEE 802.11ac):	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM			
Data speed (IEEE 802.11a):	6Mbps, 9Mbps,12Mbps,18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps			
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps, MCS1:13Mbps,MCS2:19.5Mbps, MCS3:26Mbps, MCS4:39Mbps, MCS5:52Mbps, MCS6:58.5Mbps, MCS7:65Mbps			
Data speed (IEEE 802.11n40):	MCS0:15Mbps, MCS1:30Mbps, MCS2:45Mbps, MCS3:60Mbps, MCS4:90Mbps, MCS5:120Mbps, MCS6:135Mbps, MCS7:150Mbps			
Data speed (IEEE 802.11ac):	Up to 433.3Mbps			
Antenna Type:	External Antenna			
Antenna gain:	2.0 dBi			
Power supply:	AC 100V~240V, 50/60Hz			
Test Sample Condition:	The test samples were provided in good working order with no visible defects.			

Operation Frequency each of channel					
Band 1					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	42	5210MHz
40	5200MHz	46	5230MHz		
44	5220MHz				
48	5240MHz				
Band 2					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260MHz	54	5270MHz	58	5290MHz
56	5280MHz	62	5310MHz		
60	5300MHz				
64	5320MHz				
Band 3					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
100	5500MHz	102	5510MHz	106	5530MHz
104	5520MHz	110	5550MHz	122	5610MHz
108	5540MHz	118	5590MHz		
112	5560MHz	126	5630MHz		
116	5580MHz	134	5670MHz		
120	5600MHz				
124	5620MHz				
128	5640MHz				
132	5660MHz				
136	5680MHz				
140	5700MHz				
Band 4					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	155	5775MHz
153	5765MHz	159	5795MHz		
157	5785MHz				
161	5805MHz				
165	5825MHz				

Note:
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:

Band 1					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5180MHz	Lowest	5190MHz	Middle	5210MHz
Middle	5200MHz	Highest	5230MHz		
Highest	5240MHz				
Band 2					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5260MHz	Lowest	5270MHz	Middle	5290MHz
Middle	5280MHz	Highest	5310MHz		
Highest	5320MHz				
Band 3					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5500MHz	Lowest	5510MHz	Lowest	5530MHz
Middle	5600MHz	Middle	5590MHz	Highest	5610MHz
Highest	5700MHz	Highest	5670MHz		
Band 4					
802.11a/802.11n/ac-HT20		802.11n/ac-HT40		802.11ac-HT80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5745MHz	Lowest	5755MHz	Middle	5775MHz
Middle	5785MHz	Highest	5795MHz		
Highest	5825MHz				

5.3 Test environment and mode, and test samples plans

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate, and found the follow list were the worst case.	
Mode	Data rate
802.11a	6 Mbps
802.11n/ac20	6.5 Mbps
802.11n/ac40	13.5 Mbps
802.11ac80	29.3 Mbps

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
The EUT has been tested as an independent unit.				

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.8 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.10 Test Instruments list

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2020	07-21-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-07-2020	03-06-2021
Biconical Antenna	SCHWARZBECK	VUBA9117	359	06-22-2020	06-21-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2020	06-21-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2019	11-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-07-2020	03-06-2021
Pre-amplifier	CD	PAP-1G18	11804	03-07-2020	03-06-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-05-2020	03-04-2021
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-05-2020	03-04-2021
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-18-2019	11-17-2020
Signal Generator	Rohde & Schwarz	SMX	835454/016	03-05-2020	03-04-2021
Signal Generator	R&S	SMR20	1008100050	03-05-2020	03-04-2021
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2020	03-06-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2020	03-06-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2020	03-06-2021
DC Power Supply	XinNuoEr	WYK-10020K	1409050110020	09-25-2019	09-24-2020
				09-25-2020	09-24-2021
Temperature Humidity Chamber	HengPu	HPGDS-500	20140828008	11-01-2019	10-31-2020
				11-01-2020	10-31-2021
Simulated Station	Rohde & Schwarz	CMW500	140493	07-22-2020	07-21-2021

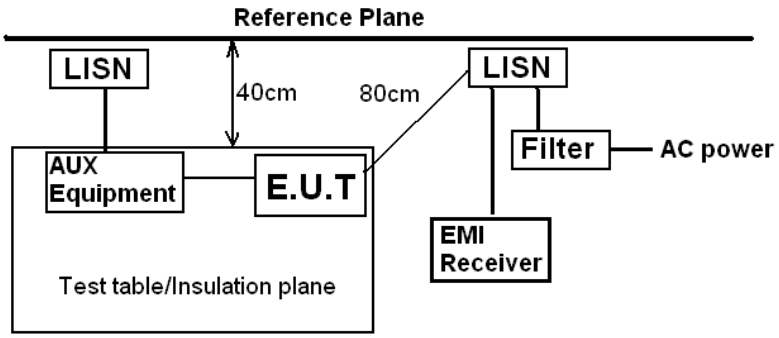
Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-05-2020	03-04-2021
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-05-2020	03-04-2021
LISN	CHASE	MN2050D	1447	03-05-2020	03-04-2021
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2020	07-20-2021
Cable	HP	10503A	N/A	03-05-2020	03-04-2021
EMI Test Software	AUDIX	E3	Version: 6.110919b		

6 Test results and Measurement Data

6.1 Antenna requirement

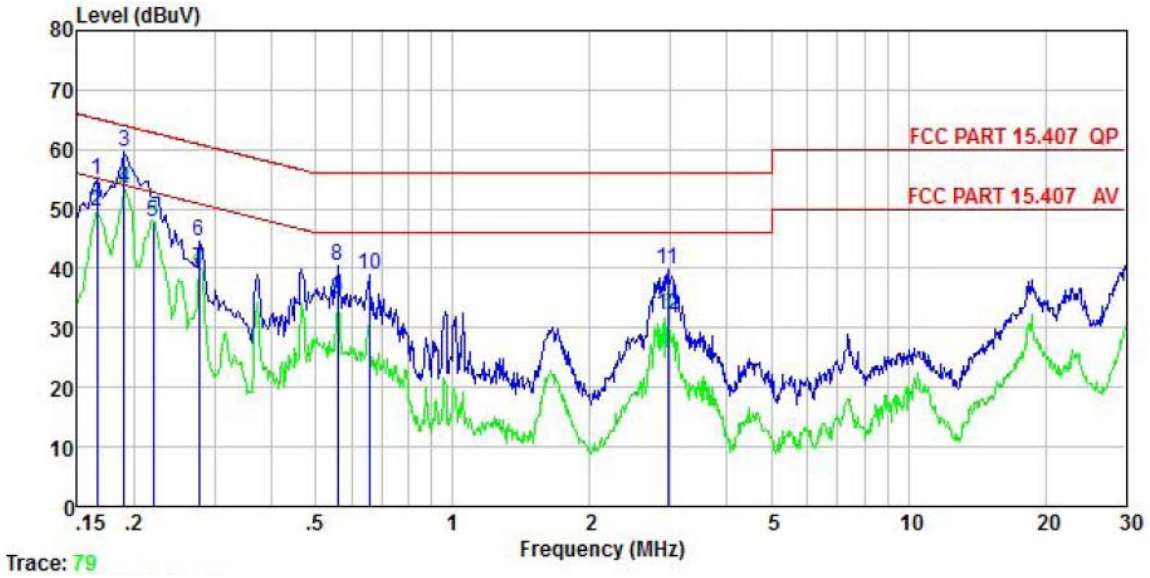
Standard requirement:	FCC Part15 E Section 15.203 /407(a)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.	
E.U.T Antenna:	
The Wi-Fi antenna is an External antenna which cannot replace by end-user, the best case gain of the antenna is 2.0 dBi.	

6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	
	0.15-0.5	66 to 56*	0.15-0.5
	0.5-5	56	0.5-5
	5-30	60	5-30
	* Decreases with the logarithm of the frequency.		
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10(latest version) on conducted measurement.		
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test Instruments:	Refer to section 5.10 for details		
Test mode:	Refer to section 5.3 for details.		
Test results:	Passed		

Measurement Data:

Product name:	BLOUS STREAMING DAC AMPLIFIER	**Product model:**	M33
Test by:	Mike	**Test mode:**	5G Wi-Fi Tx mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

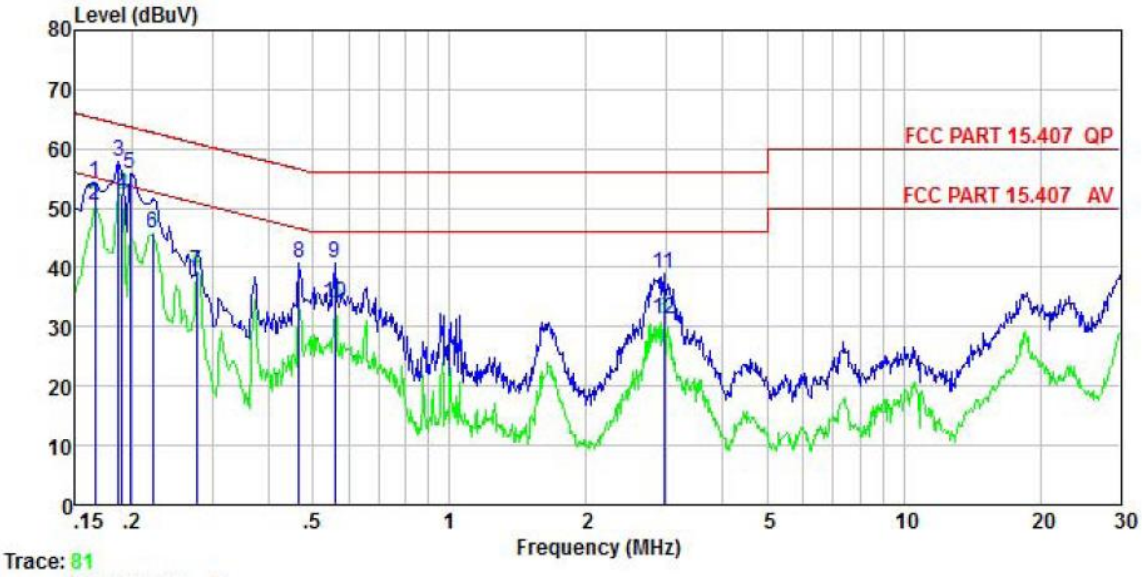


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.166	44.61	-0.58	0.00	10.77	54.80	65.16	-10.36	QP
2	0.166	39.34	-0.58	0.00	10.77	49.53	55.16	-5.63	Average
3	0.190	49.34	-0.59	0.00	10.76	59.51	64.02	-4.51	QP
4	0.190	43.34	-0.59	0.00	10.76	53.51	54.02	-0.51	Average
5	0.220	37.77	-0.58	0.00	10.76	47.95	52.83	-4.88	Average
6	0.277	34.33	-0.56	0.00	10.74	44.51	60.90	-16.39	QP
7	0.277	29.82	-0.56	0.00	10.74	40.00	50.90	-10.90	Average
8	0.558	30.04	-0.46	0.00	10.76	40.34	56.00	-15.66	QP
9	0.558	24.42	-0.46	0.00	10.76	34.72	46.00	-11.28	Average
10	0.654	28.63	-0.51	0.00	10.77	38.89	56.00	-17.11	QP
11	2.962	29.28	-0.43	0.00	10.92	39.77	56.00	-16.23	QP
12	2.962	21.80	-0.43	0.00	10.92	32.29	46.00	-13.71	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Aux Factor + Cable Loss.*

Product name:	BLOUS STREAMING DAC AMPLIFIER	Product model:	M33
Test by:	Mike	Test mode:	5G Wi-Fi Tx mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120 V/60 Hz	Environment:	Temp: 22.5℃ Huni: 55%

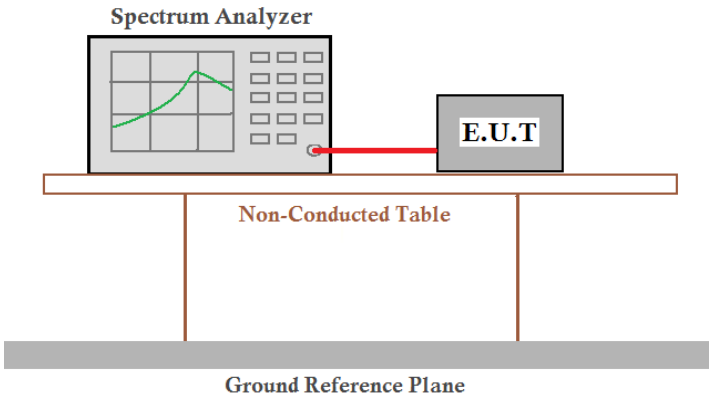


	Freq	Read Level	LISN Factor	Aux Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dB	
1	0.166	44.24	-0.68	0.00	10.77	54.33	65.16	-10.83	QP
2	0.166	40.29	-0.68	0.00	10.77	50.38	55.16	-4.78	Average
3	0.186	47.70	-0.67	0.00	10.76	57.79	64.20	-6.41	QP
4	0.190	42.26	-0.67	0.00	10.76	52.35	54.02	-1.67	Average
5	0.198	45.85	-0.67	0.00	10.76	55.94	63.71	-7.77	QP
6	0.222	35.55	-0.67	0.00	10.76	45.64	52.74	-7.10	Average
7	0.277	29.15	-0.67	0.00	10.74	39.22	50.90	-11.68	Average
8	0.466	30.52	-0.64	0.00	10.75	40.63	56.58	-15.95	QP
9	0.558	30.60	-0.65	0.00	10.76	40.71	56.00	-15.29	QP
10	0.561	23.88	-0.65	0.00	10.76	33.99	46.00	-12.01	Average
11	2.962	28.67	-0.65	0.00	10.92	38.94	56.00	-17.06	QP
12	2.962	21.03	-0.65	0.00	10.92	31.30	46.00	-14.70	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Aux Factor + Cable Loss.*

6.3 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv) & (a)(2) & (a) (3)
Limit:	Band 1: 24dBm Band 2: 24dBm or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. Band 3: 24dBm or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. Band 4: 30dBm
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1				
Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	17.13	24.00	Pass
	Middle	17.15		
	Highest	17.05		
802.11n20	Lowest	17.15	24.00	Pass
	Middle	17.36		
	Highest	17.22		
802.11n40	Lowest	17.50	24.00	Pass
	Highest	17.42		
802.11ac20	Lowest	17.22	24.00	Pass
	Middle	17.44		
	Highest	17.39		
802.11ac40	Lowest	17.41	24.00	Pass
	Highest	17.42		
802.11ac80	Lowest	17.25	24.00	Pass

Band 2				
Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	17.22	24.00	Pass
	Middle	17.22		
	Highest	17.13		
802.11n20	Lowest	17.40	24.00	Pass
	Middle	17.23		
	Highest	17.48		
802.11n40	Lowest	17.43	24.00	Pass
	Highest	17.50		
802.11ac20	Lowest	17.33	24.00	Pass
	Middle	17.20		
	Highest	17.54		
802.11ac40	Lowest	17.45	24.00	Pass
	Highest	17.53		
802.11ac80	Lowest	17.51	24.00	Pass

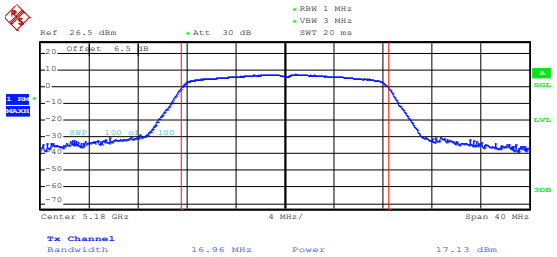
Band 3				
Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	17.47	24.00	Pass
	Middle	17.36		
	Highest	17.24		
802.11n20	Lowest	17.52	24.00	Pass
	Middle	17.53		
	Highest	17.35		
802.11n40	Lowest	17.45	24.00	Pass
	Middle	17.30		
	Highest	17.33		
802.11ac20	Lowest	17.51	24.00	Pass
	Middle	17.61		
	Highest	17.33		
802.11ac40	Lowest	17.32	24.00	Pass
	Middle	17.49		
	Highest	17.28		
802.11ac80	Lowest	17.46	24.00	Pass
	Highest	17.21		

Band 4				
Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	17.46	30.00	Pass
	Middle	17.44		
	Highest	17.23		
802.11n20	Lowest	17.31	30.00	Pass
	Middle	17.29		
	Highest	17.28		
802.11n40	Lowest	17.38	30.00	Pass
	Highest	17.07		
802.11ac20	Lowest	17.42	30.00	Pass
	Middle	17.36		
	Highest	17.24		
802.11ac40	Lowest	17.19	30.00	Pass
	Highest	17.25		
802.11ac80	Lowest	17.17	30.00	Pass

Test plot as follows:

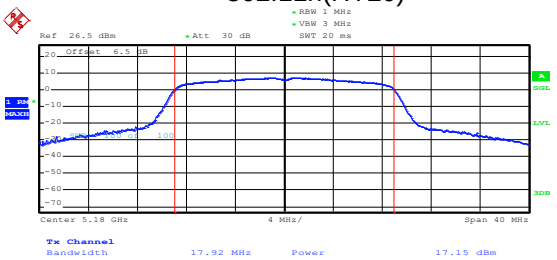
Band 1:

802.11a



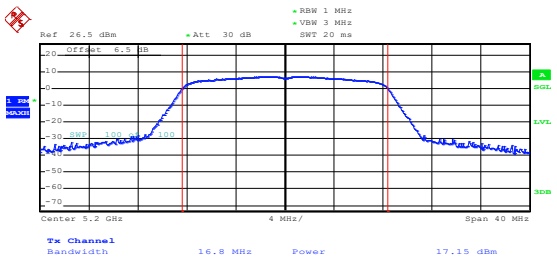
Date: 2.SEP.2020 16:42:32

802.11n(HT20)



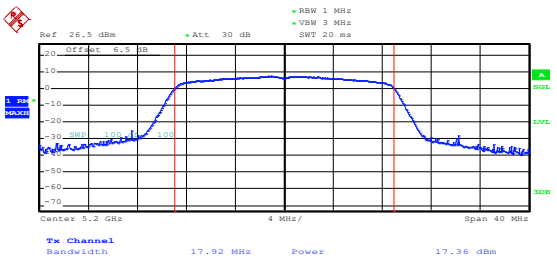
Date: 2.SEP.2020 16:44:55

Lowest channel



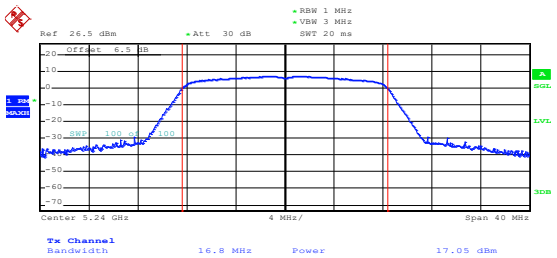
Date: 2.SEP.2020 16:42:50

Lowest channel



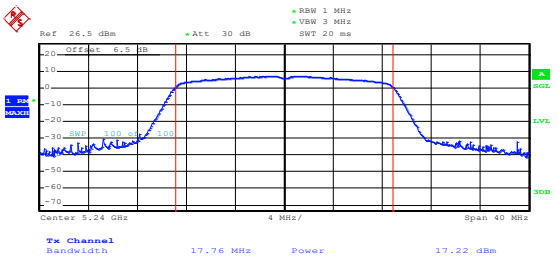
Date: 2.SEP.2020 16:44:30

Middle channel



Date: 2.SEP.2020 16:43:18

Middle channel

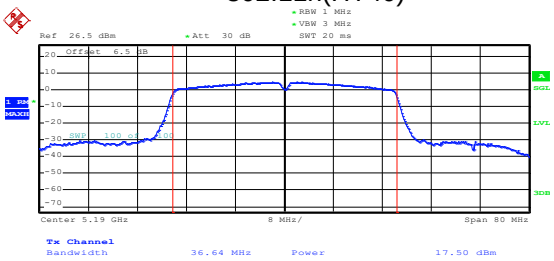


Date: 2.SEP.2020 16:43:43

Highest channel

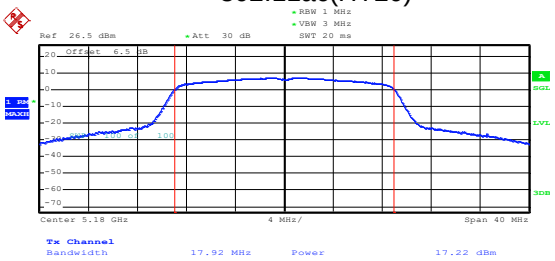
Highest channel

802.11n(HT40)



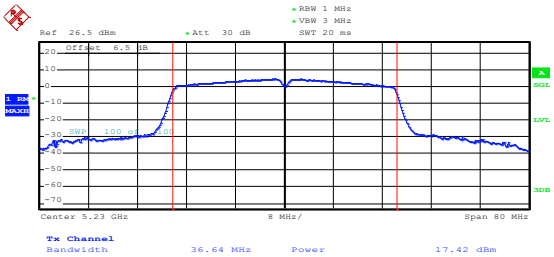
Date: 2.SEP.2020 16:19:41

802.11ac(HT20)



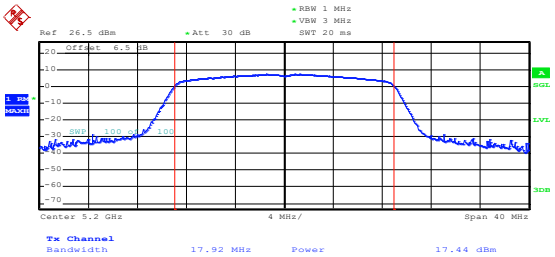
Date: 2.SEP.2020 16:45:11

Lowest channel



Date: 2.SEP.2020 16:19:15

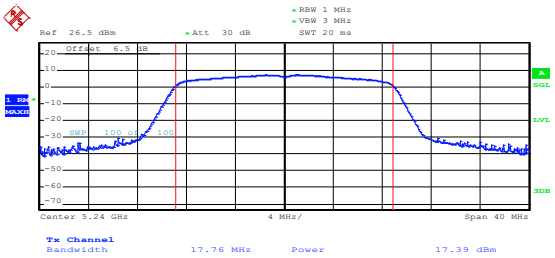
Lowest channel



Date: 2.SEP.2020 16:45:28

Highest channel

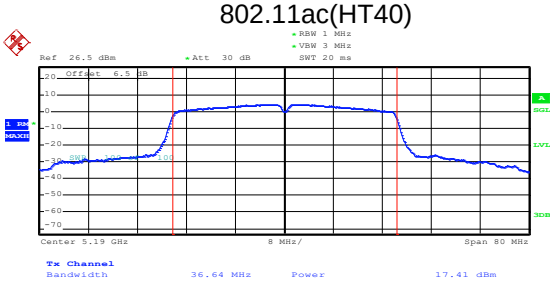
Middle channel



Date: 2.SEP.2020 16:45:54

Highest channel

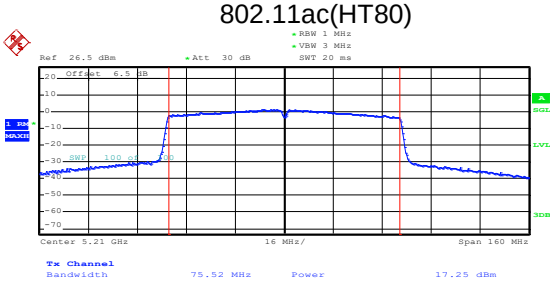
802.11ac(HT40)



Date: 2.SEP.2020 16:18:38

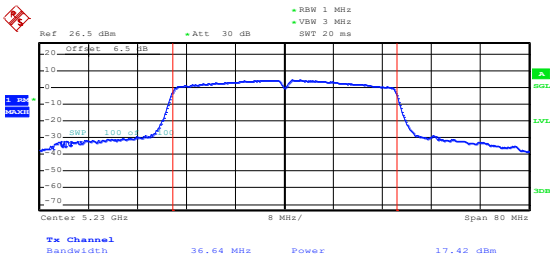
Lowest channel

802.11ac(HT80)



Date: 2.SEP.2020 16:17:44

Middle channel

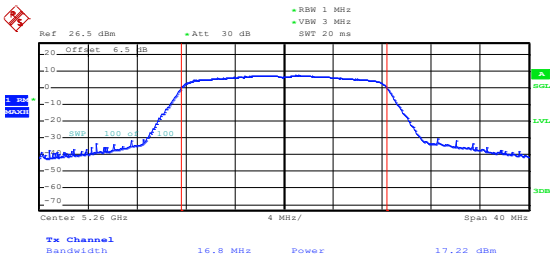


Date: 2.SEP.2020 16:18:59

Highest channel

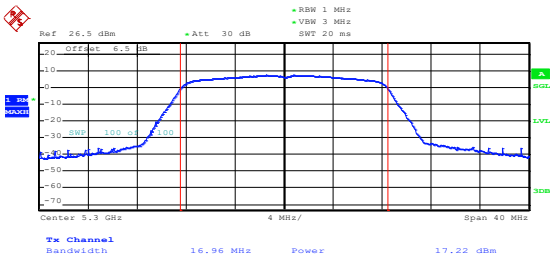
Band 2:

802.11a



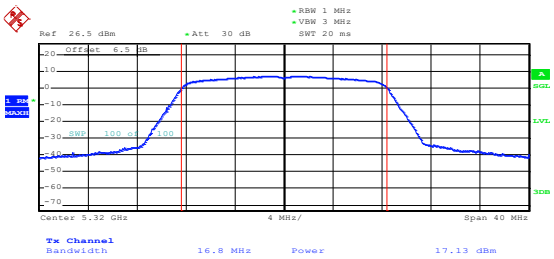
Date: 2.SEP.2020 16:41:40

Lowest channel



Date: 2.SEP.2020 16:42:01

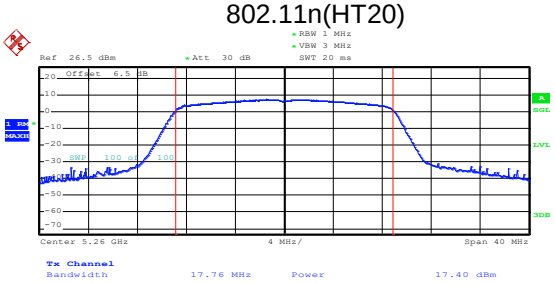
Middle channel



Date: 2.SEP.2020 16:41:18

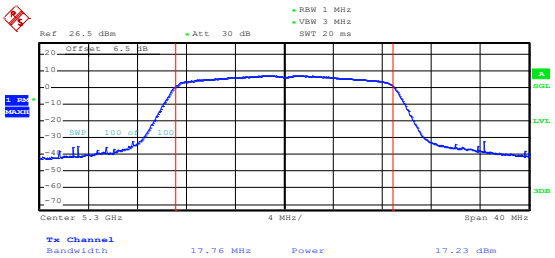
Highest channel

802.11n(HT20)



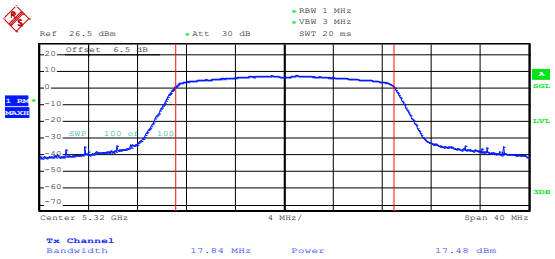
Date: 2.SEP.2020 16:38:44

Lowest channel



Date: 2.SEP.2020 16:39:10

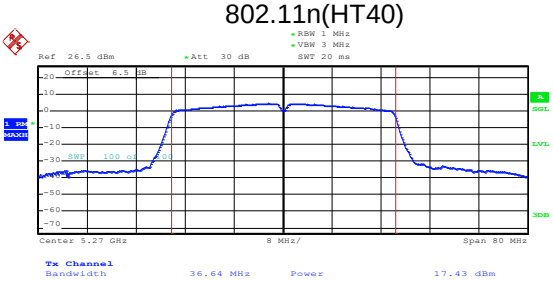
Middle channel



Date: 2.SEP.2020 16:40:48

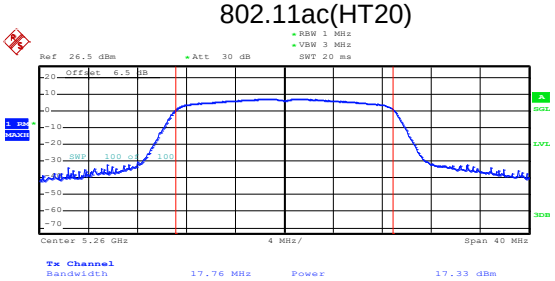
Highest channel

802.11n(HT40)



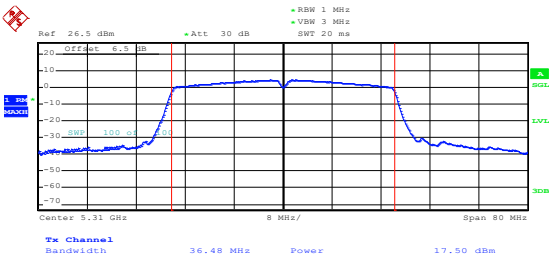
Date: 2.SEP.2020 16:20:22

802.11ac(HT20)



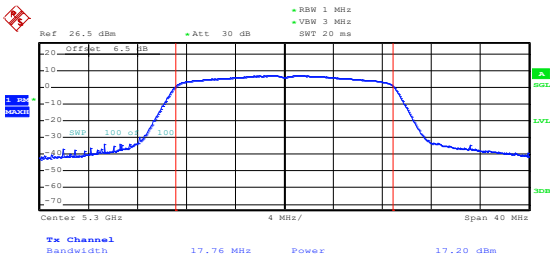
Date: 2.SEP.2020 16:39:57

Lowest channel



Date: 2.SEP.2020 16:24:30

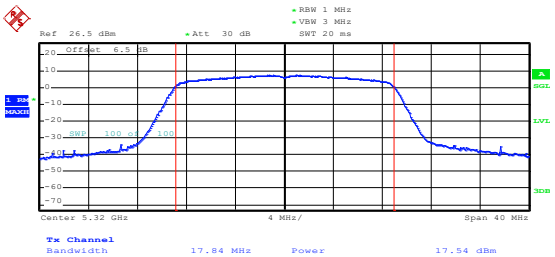
Lowest channel



Date: 2.SEP.2020 16:39:28

Highest channel

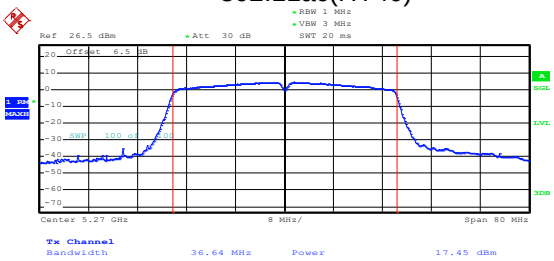
Middle channel



Date: 2.SEP.2020 16:40:33

Highest channel

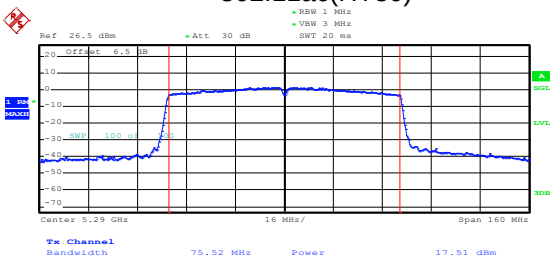
802.11ac(HT40)



Date: 2.SEP.2020 16:23:57

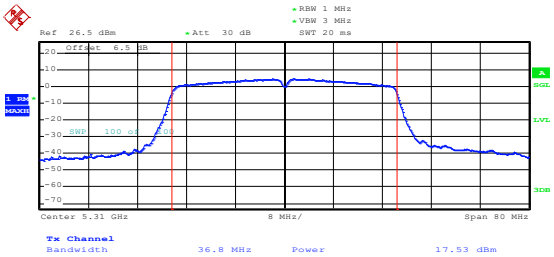
Lowest channel

802.11ac(HT80)



Date: 2.SEP.2020 16:17:15

Middle channel

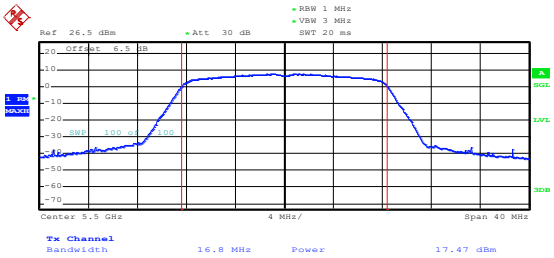


Date: 2.SEP.2020 16:23:21

Highest channel

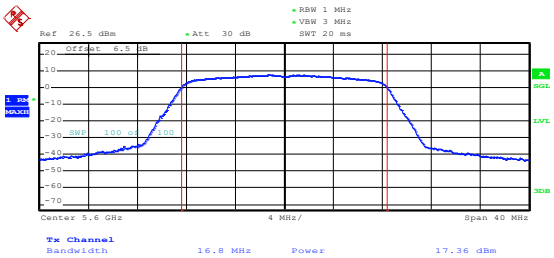
Band 3:

802.11a



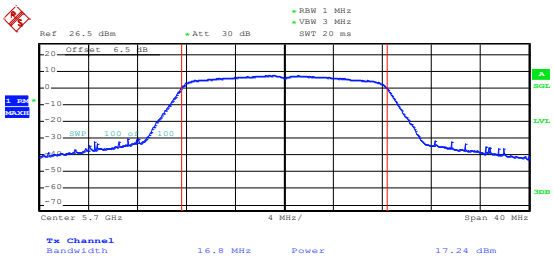
Date: 2.SEP.2020 16:34:35

Lowest channel



Date: 2.SEP.2020 16:34:07

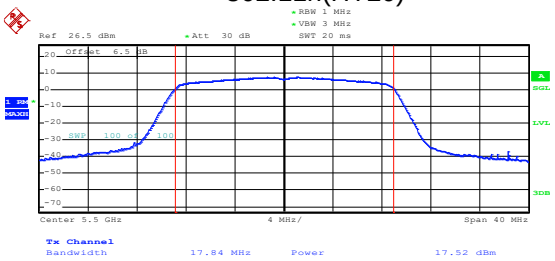
Middle channel



Date: 2.SEP.2020 16:33:33

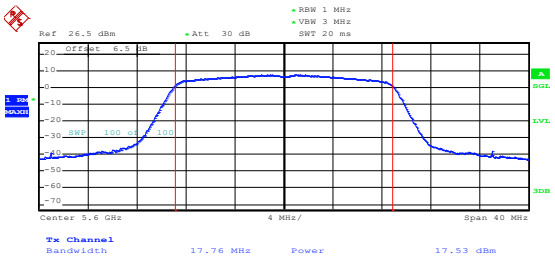
Highest channel

802.11n(HT20)



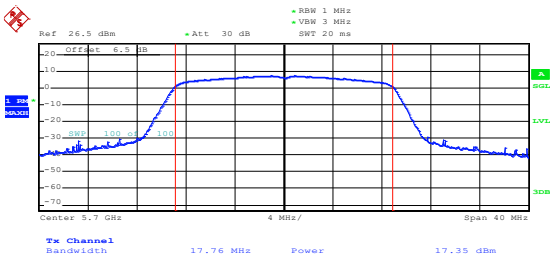
Date: 2.SEP.2020 16:38:04

Lowest channel



Date: 2.SEP.2020 16:37:27

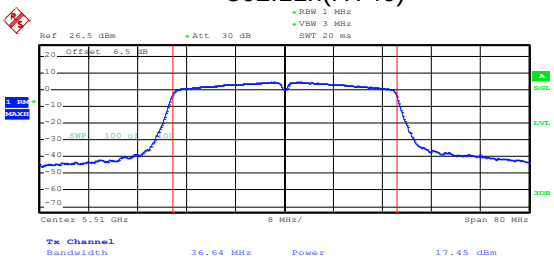
Middle channel



Date: 2.SEP.2020 16:36:46

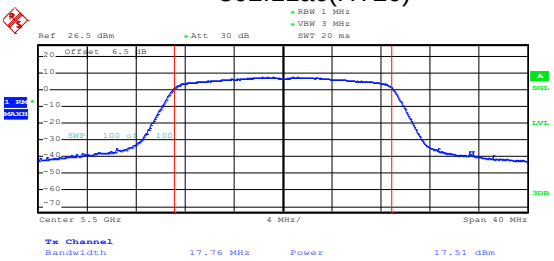
Highest channel

802.11n(HT40)



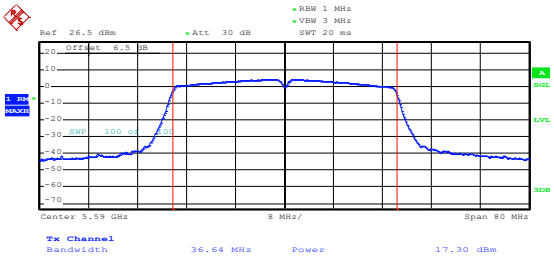
Date: 2.SEP.2020 16:25:18

802.11ac(HT20)



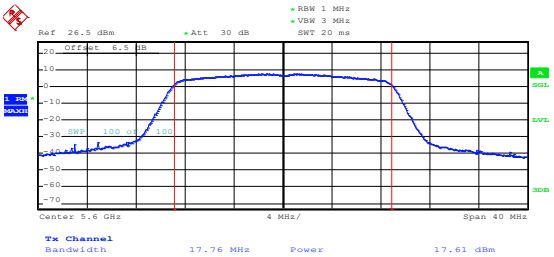
Date: 2.SEP.2020 16:35:26

Lowest channel



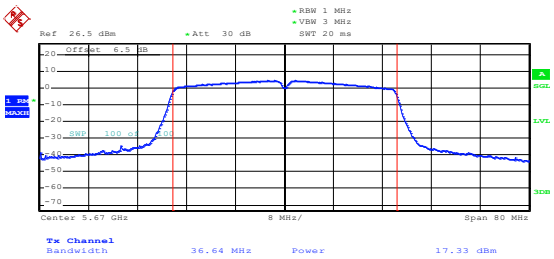
Date: 2.SEP.2020 16:25:35

Lowest channel



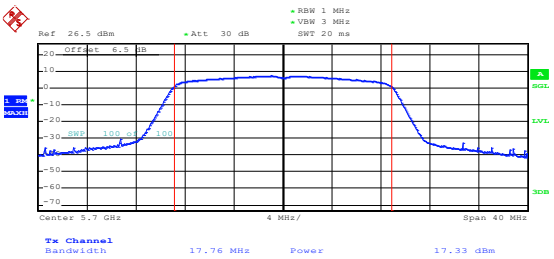
Date: 2.SEP.2020 17:11:55

Middle channel



Date: 2.SEP.2020 16:26:04

Middle channel

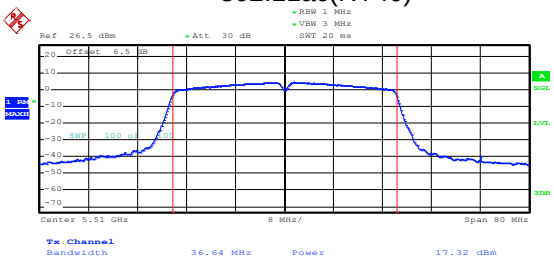


Date: 2.SEP.2020 16:36:18

Highest channel

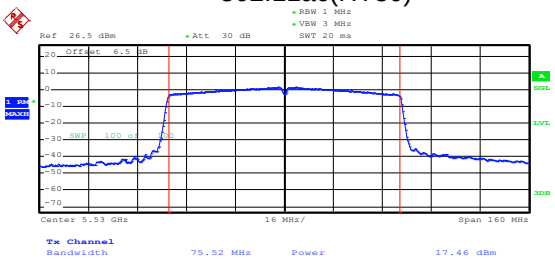
Highest channel

802.11ac(HT40)



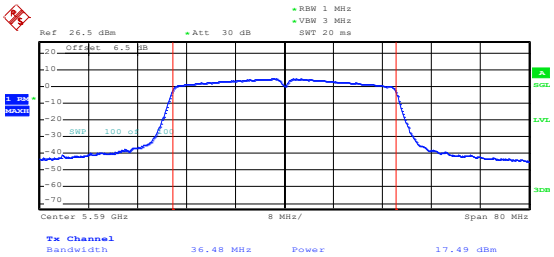
Date: 2.SEP.2020 16:26:53

802.11ac(HT80)



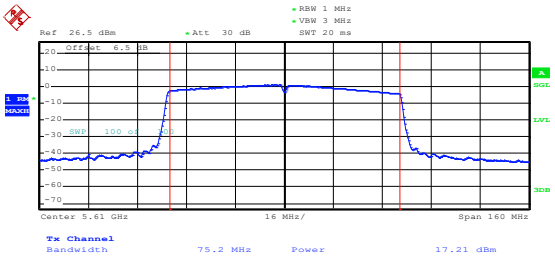
Date: 2.SEP.2020 16:16:35

Lowest channel



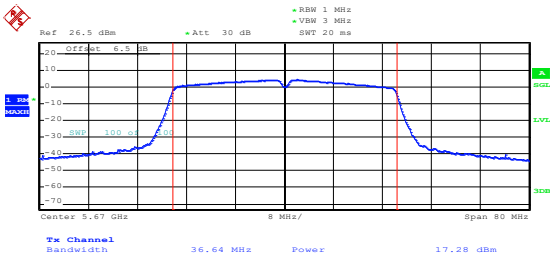
Date: 2.SEP.2020 16:27:18

Lowest channel



Date: 2.SEP.2020 16:15:47

Middle channel

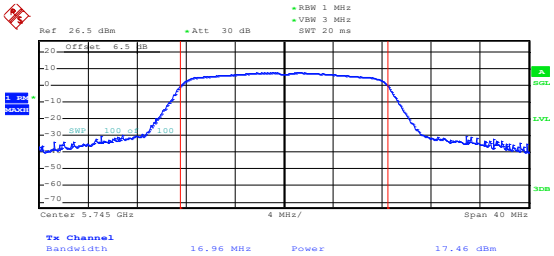


Date: 2.SEP.2020 16:26:25

Highest channel

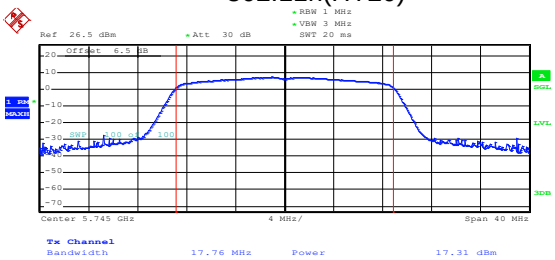
Band 4:

802.11a



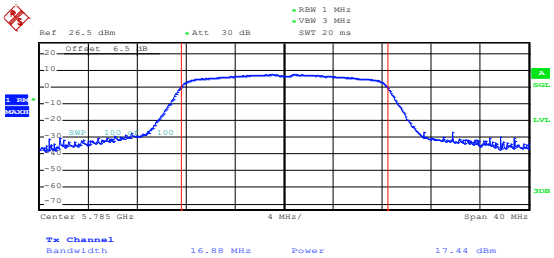
Date: 2.SEP.2020 16:32:06

802.11n(HT20)



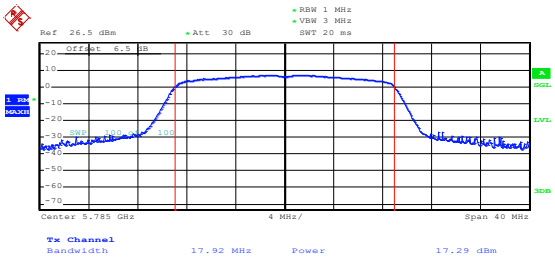
Date: 2.SEP.2020 16:29:32

Lowest channel



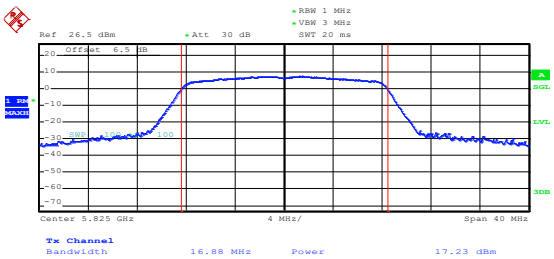
Date: 2.SEP.2020 16:32:31

Lowest channel



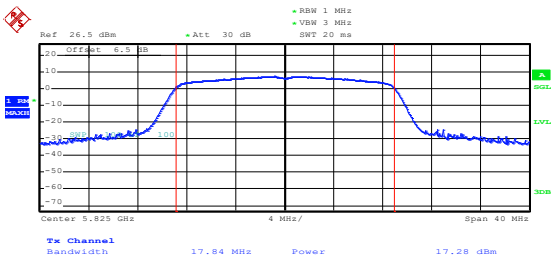
Date: 2.SEP.2020 16:29:58

Middle channel



Date: 2.SEP.2020 16:32:49

Middle channel

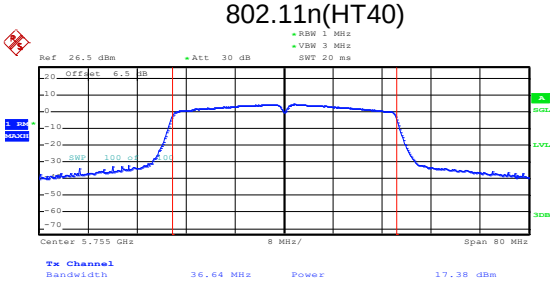


Date: 2.SEP.2020 16:30:25

Highest channel

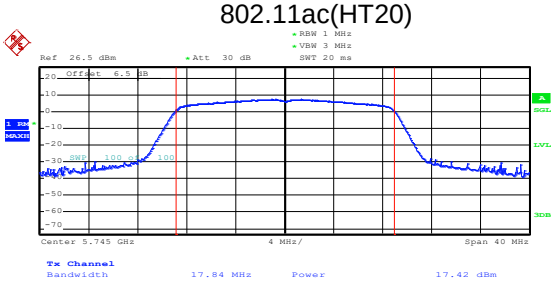
Highest channel

802.11n(HT40)



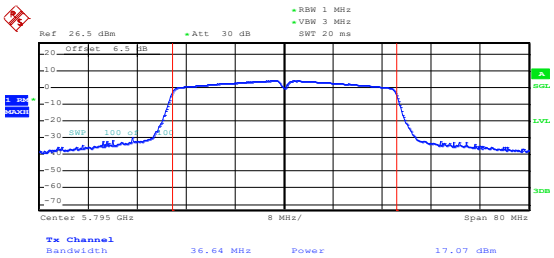
Date: 2.SEP.2020 16:28:39

802.11ac(HT20)



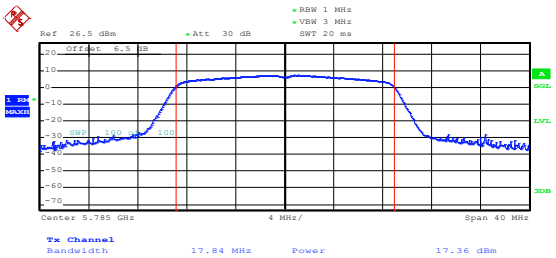
Date: 2.SEP.2020 16:31:37

Lowest channel



Date: 2.SEP.2020 16:28:27

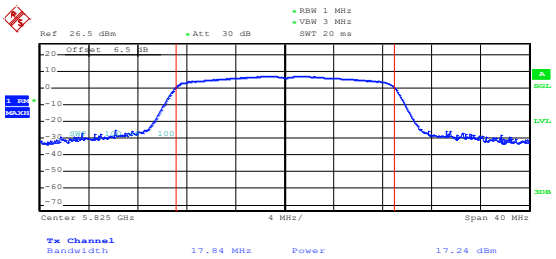
Lowest channel



Date: 2.SEP.2020 16:31:18

Highest channel

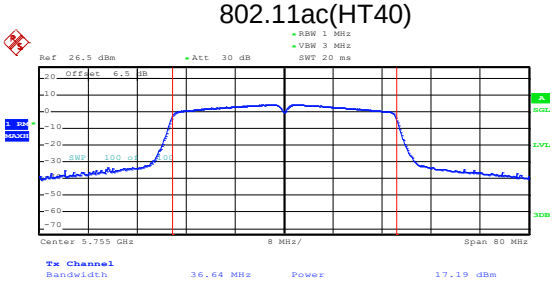
Middle channel



Date: 2.SEP.2020 16:30:55

Highest channel

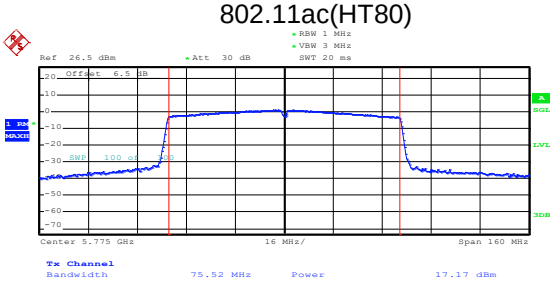
802.11ac(HT40)



Date: 2.SEP.2020 16:27:41

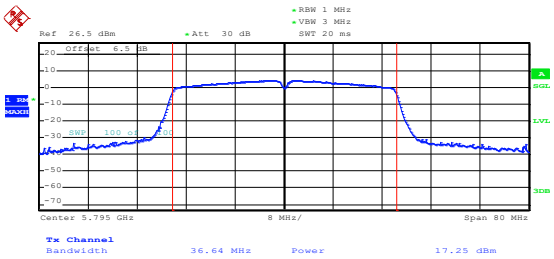
Lowest channel

802.11ac(HT80)



Date: 2.SEP.2020 16:15:15

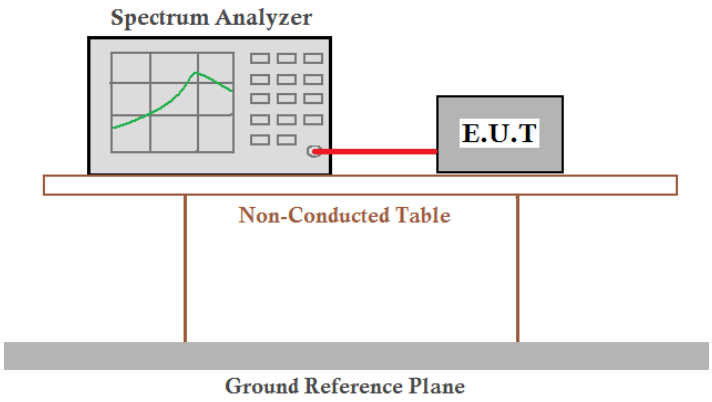
Middle channel



Date: 2.SEP.2020 16:28:10

Highest channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407 (a) (5) and Section 15.407 (e)
Limit:	Band 1/2/3/4: N/A (26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: >500kHz (6dB Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1:

Test Channel	26dB Emission Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	20.48	20.80	42.08	20.08	41.92	---	N/A	PASS
Middle	20.32	20.64	---	20.72	---	81.92		
Highest	20.16	20.72	41.92	20.64	42.08	---		
Test Channel	99% Occupy Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.96	17.92	36.64	17.92	36.64	---	N/A	PASS
Middle	16.80	17.92	---	17.92	---	75.52		
Highest	16.80	17.76	36.64	17.76	36.64	---		

Band 2:

Test Channel	26dB Emission Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	20.40	20.64	41.92	20.64	41.92	---	N/A	PASS
Middle	20.40	20.56	---	20.56	---	81.60		
Highest	20.32	20.64	42.24	20.56	41.92	---		
Test Channel	99% Occupy Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.80	17.76	36.64	17.76	36.64	---	N/A	PASS
Middle	16.96	17.76	---	17.76	---	75.52		
Highest	16.80	17.84	36.48	17.84	36.80	---		

Band 3:

Test Channel	26dB Emission Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	20.24	20.64	41.92	20.64	41.92	81.60	N/A	PASS
Middle	20.32	20.56	41.92	20.56	41.92	---		
Highest	20.32	20.72	41.76	20.56	42.08	81.60		
Test Channel	99% Occupy Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.80	17.84	36.64	17.76	36.64	75.52	N/A	PASS
Middle	16.80	17.76	36.64	17.76	36.48	---		
Highest	16.80	17.76	36.64	17.76	36.64	75.20		

Band 4:

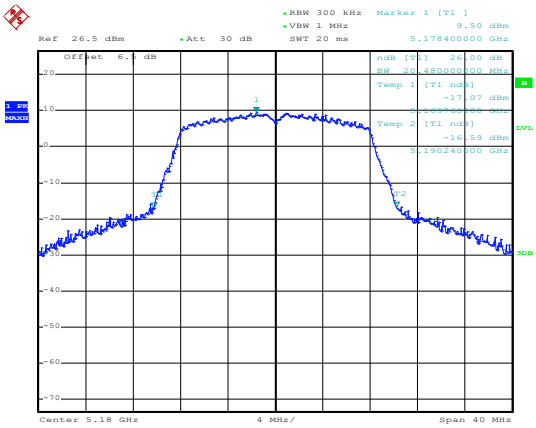
Test Channel	26dB Emission Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	20.40	20.64	42.08	20.72	41.92	---	N/A	PASS
Middle	20.40	20.64	---	20.56	---	81.28		
Highest	20.40	20.56	42.08	20.64	41.92	---		
Test Channel	99% Occupy Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.96	17.76	36.64	17.84	36.64	---	N/A	PASS
Middle	16.88	17.92	---	17.84	---	75.52		
Highest	16.88	17.84	36.64	17.84	36.64	---		
Test Channel	6dB Emission Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	15.52	15.52	35.52	15.52	35.52	---	>500kHz	PASS
Middle	15.44	15.60	---	15.44	---	76.16		
Highest	15.52	15.44	35.52	15.52	35.52	---		

Test plot as follows:

Band 1:

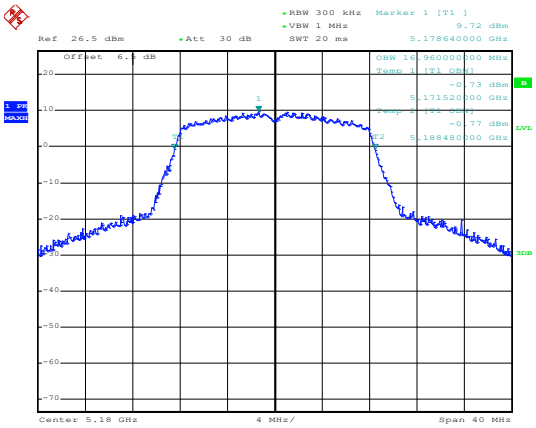
802.11a

26 dB EBW



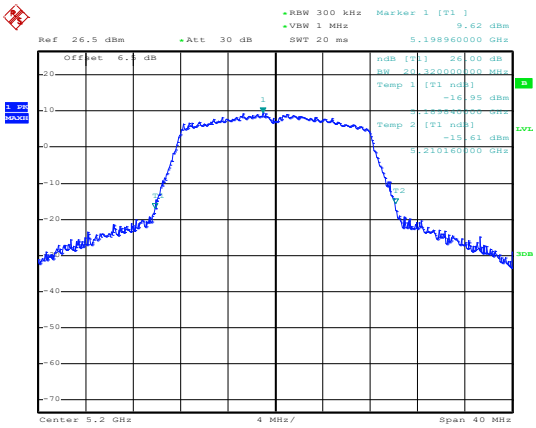
Date: 2.SEP.2020 15:37:46

99% OBW

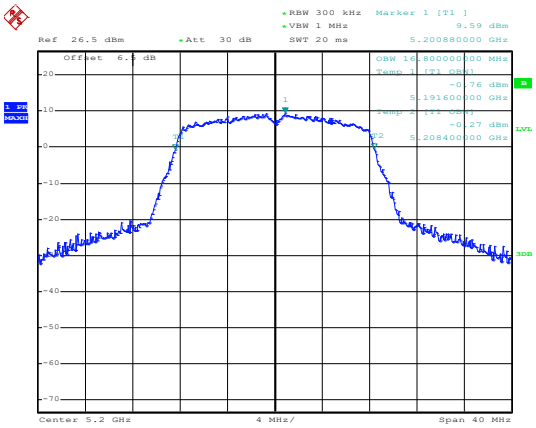


Date: 2.SEP.2020 15:38:00

Lowest channel

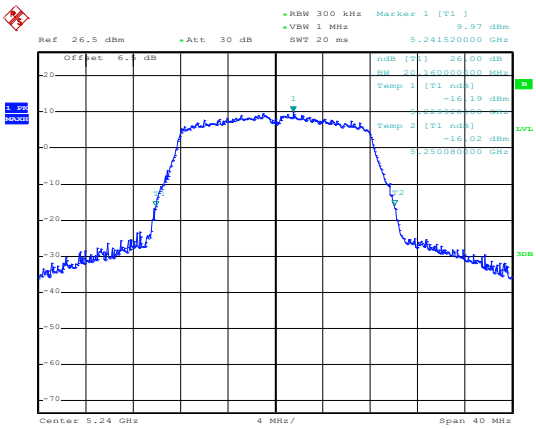


Date: 2.SEP.2020 15:38:24

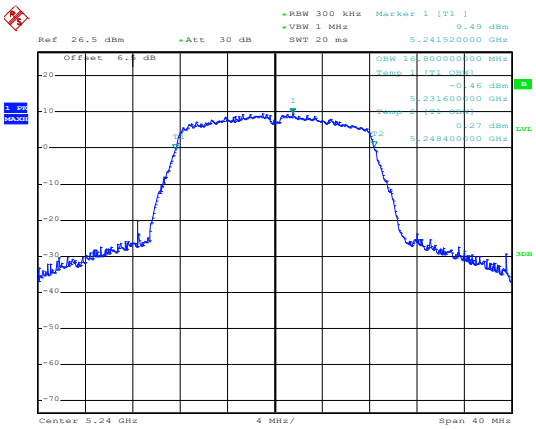


Date: 2.SEP.2020 15:38:17

Middle channel



Date: 2.SEP.2020 15:38:37

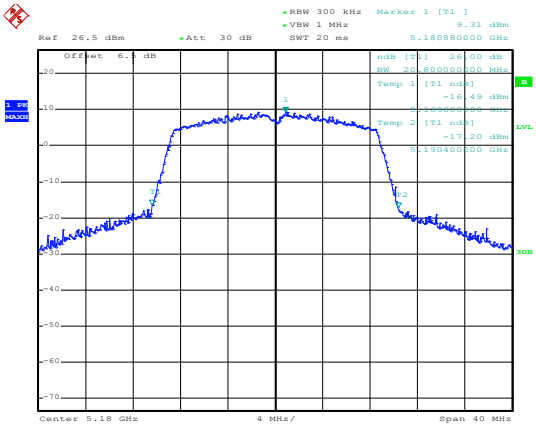


Date: 2.SEP.2020 15:38:44

Highest channel

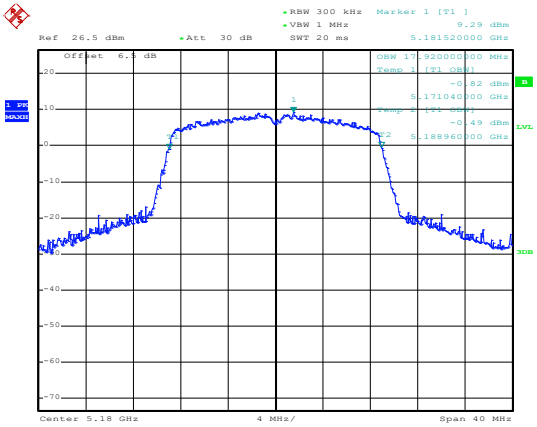
802.11n(HT20)

26 dB EBW



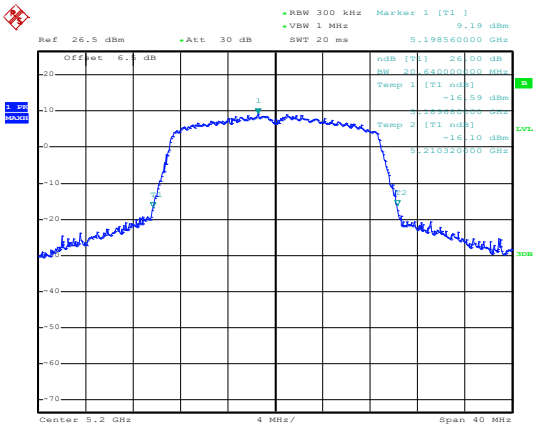
Date: 2.SEP.2020 15:39:57

99% OBW

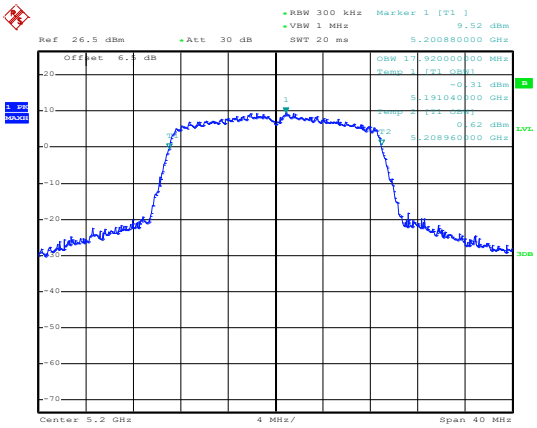


Date: 2.SEP.2020 15:39:50

Lowest channel

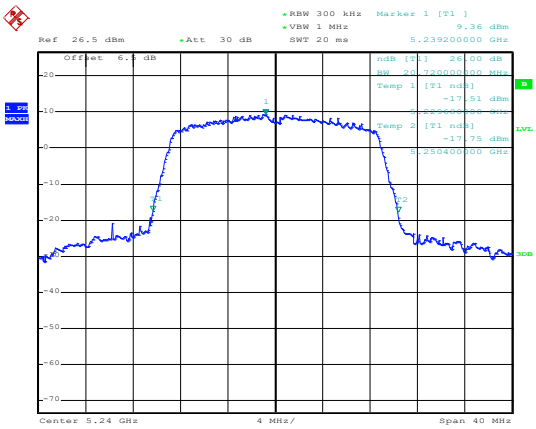


Date: 2.SEP.2020 15:39:28

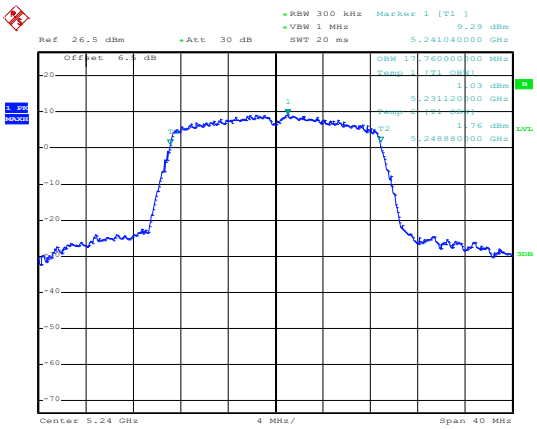


Date: 2.SEP.2020 15:39:36

Middle channel



Date: 2.SEP.2020 15:39:13

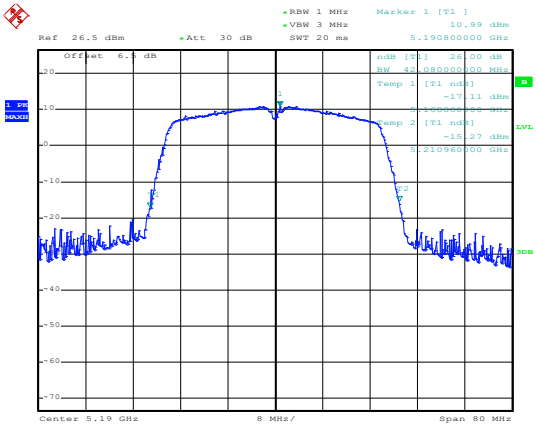


Date: 2.SEP.2020 15:39:04

Highest channel

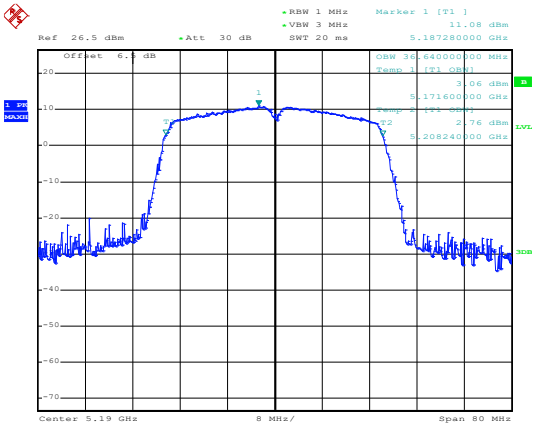
802.11n(HT40)

26 dB EBW



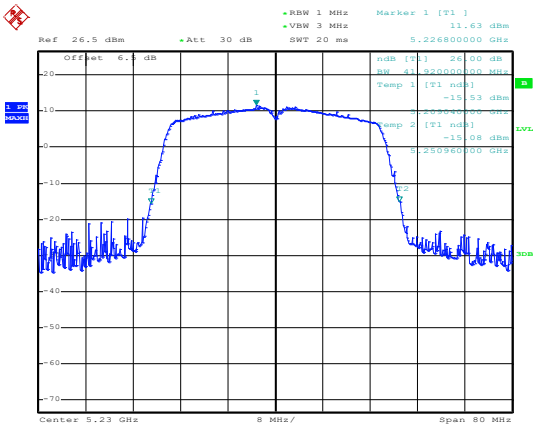
Date: 2.SEP.2020 15:59:38

99% OBW

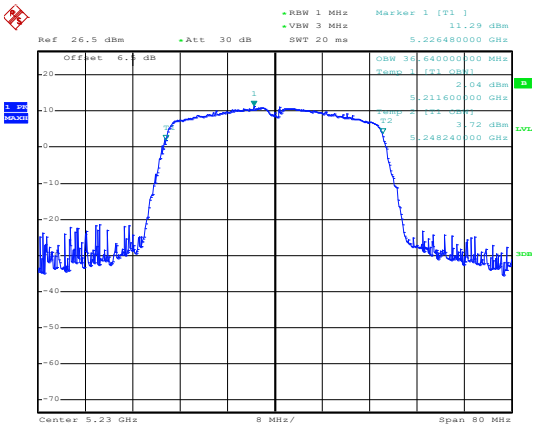


Date: 2.SEP.2020 15:59:30

Lowest channel



Date: 2.SEP.2020 15:59:11

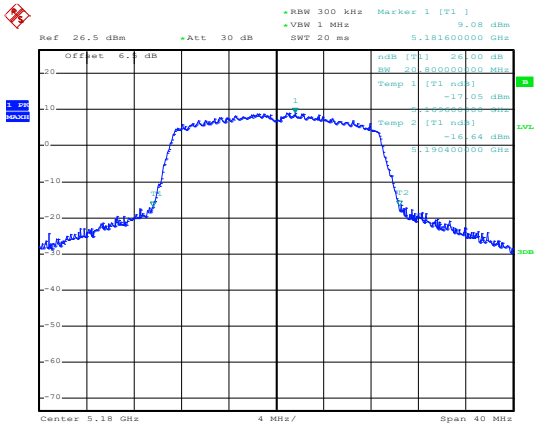


Date: 2.SEP.2020 15:59:19

Highest channel

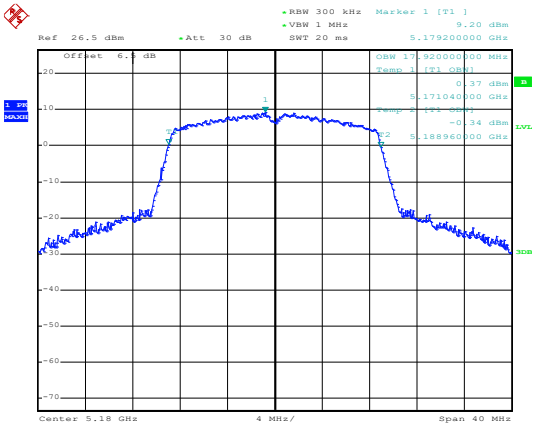
802.11ac(HT20)

26 dB EBW



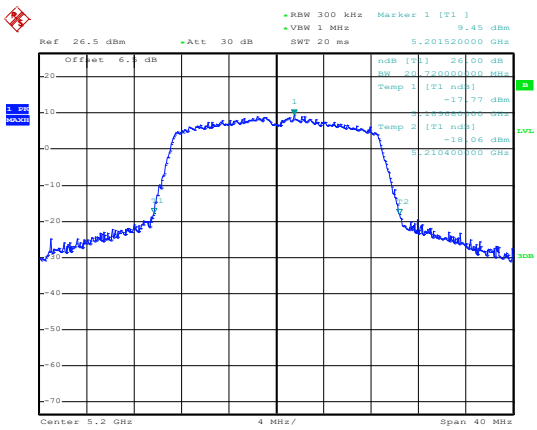
Date: 2.SEP.2020 15:40:18

99% OBW

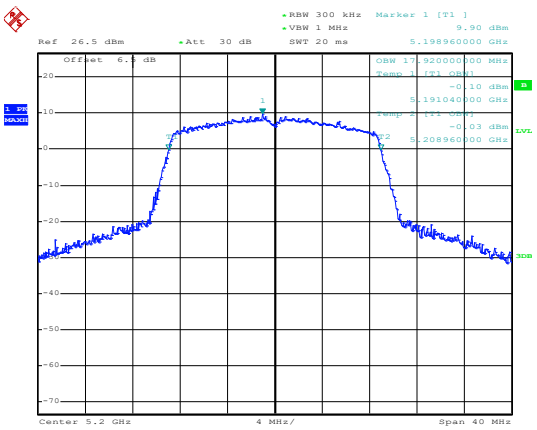


Date: 2.SEP.2020 15:40:24

Lowest channel

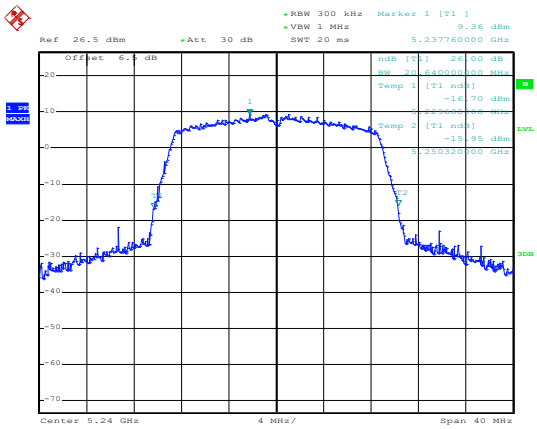


Date: 2.SEP.2020 15:40:56

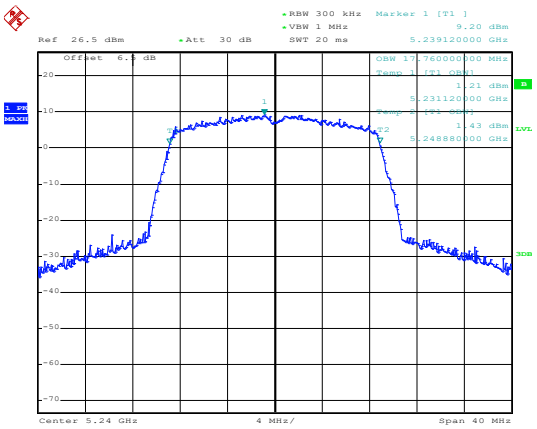


Date: 2.SEP.2020 15:40:50

Middle channel



Date: 2.SEP.2020 15:41:11

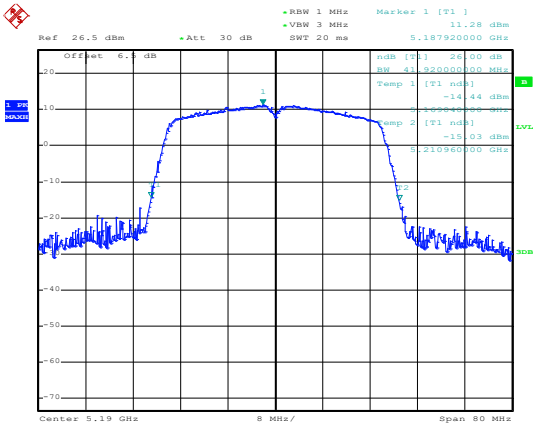


Date: 2.SEP.2020 15:41:20

Highest channel

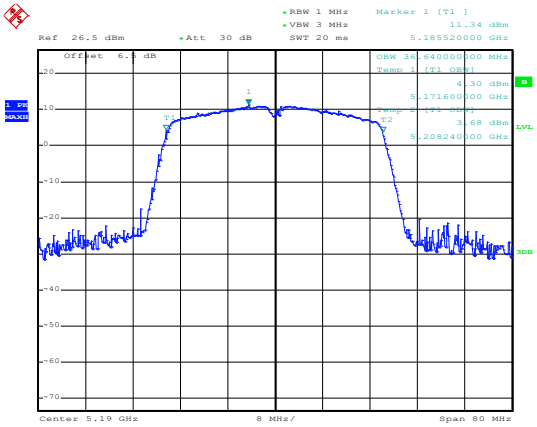
802.11ac(HT40)

26 dB EBW



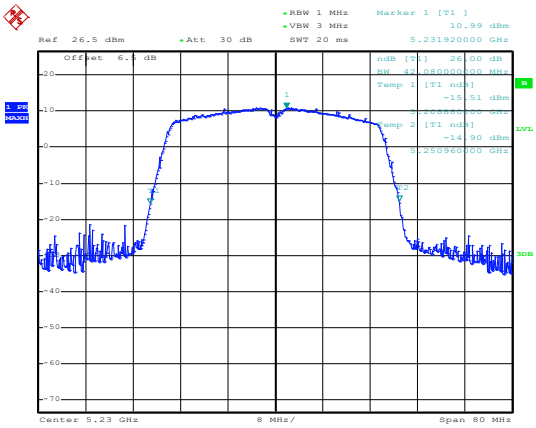
Date: 2.SEP.2020 15:58:28

99% OBW

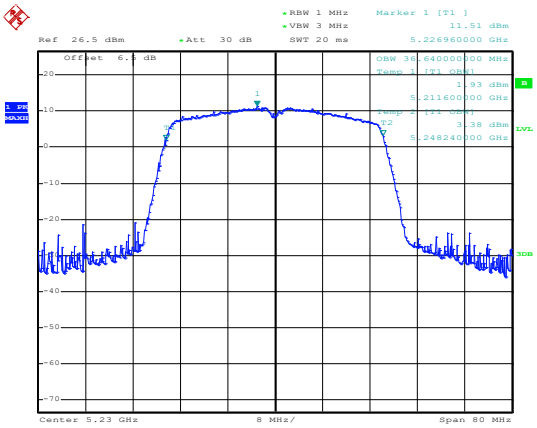


Date: 2.SEP.2020 15:58:36

Lowest channel



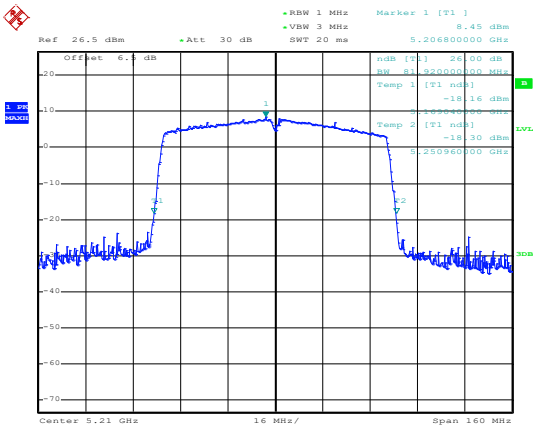
Date: 2.SEP.2020 15:58:57



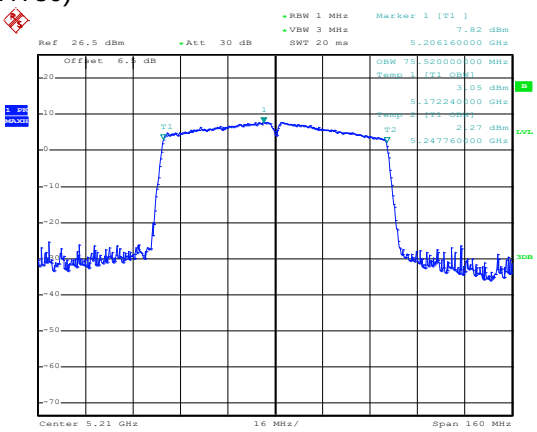
Date: 2.SEP.2020 15:58:48

Highest channel

802.11ac(HT80)



Date: 2.SEP.2020 16:00:00



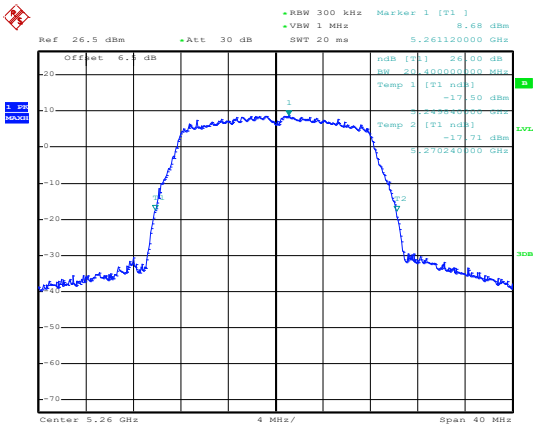
Date: 2.SEP.2020 16:00:09

Middle channel

Band 2:

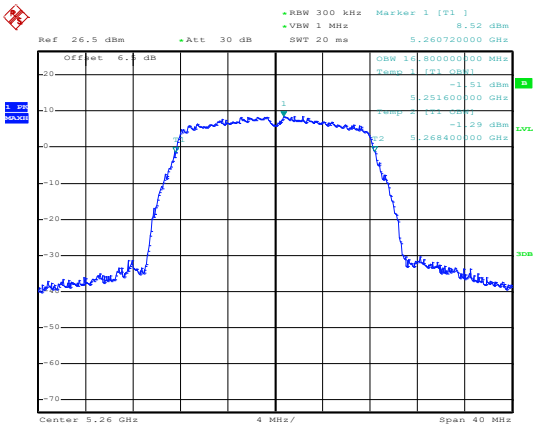
802.11a

26 dB EBW



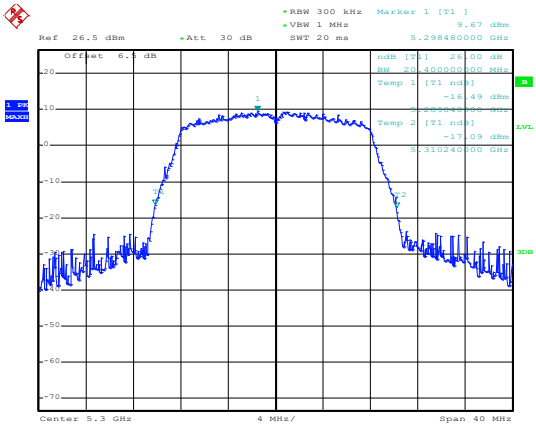
Date: 2.SEP.2020 15:44:39

99% OBW

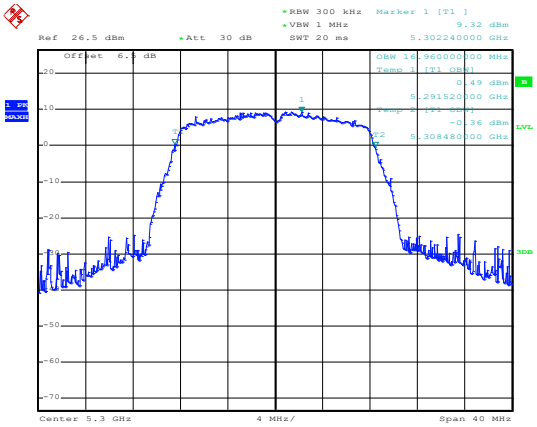


Date: 2.SEP.2020 15:44:44

Lowest channel

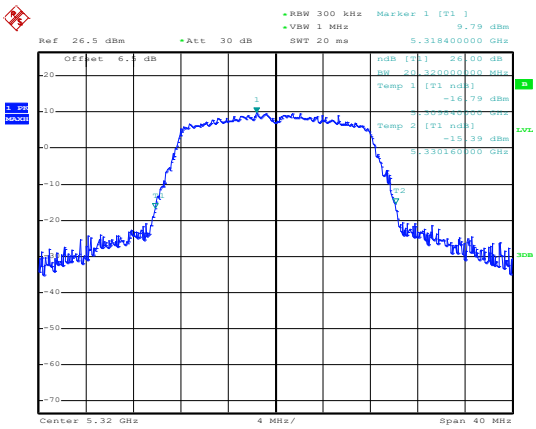


Date: 2.SEP.2020 15:45:04

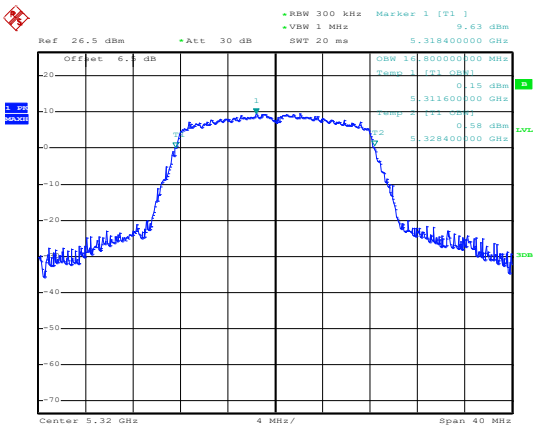


Date: 2.SEP.2020 15:44:56

Middle channel



Date: 2.SEP.2020 15:45:16

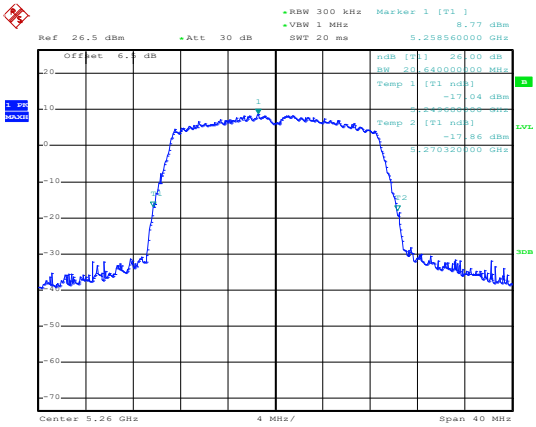


Date: 2.SEP.2020 15:45:22

Highest channel

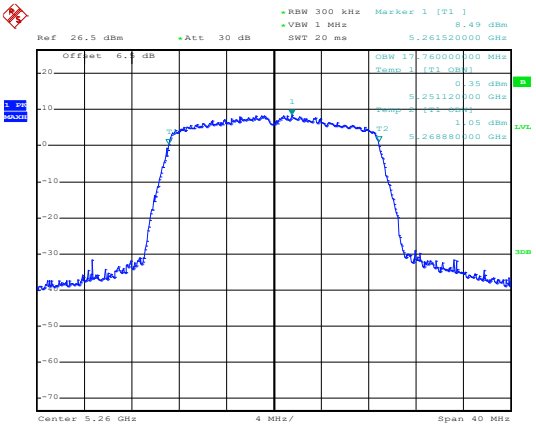
802.11n(HT20)

26 dB EBW



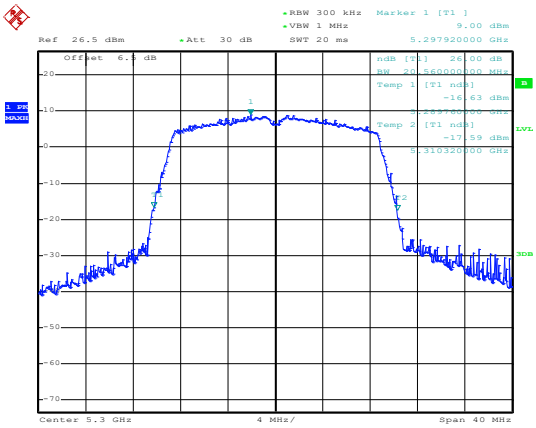
Date: 2.SEP.2020 15:44:17

99% OBW

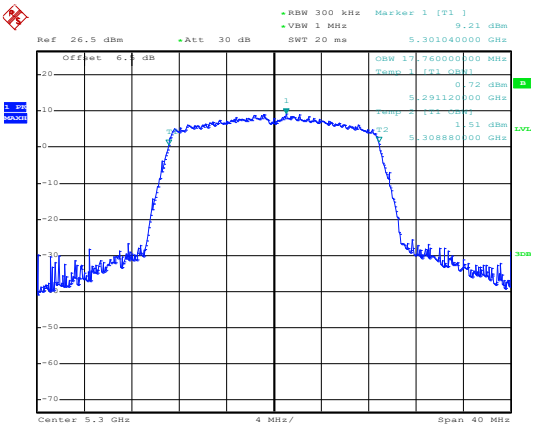


Date: 2.SEP.2020 15:44:08

Lowest channel

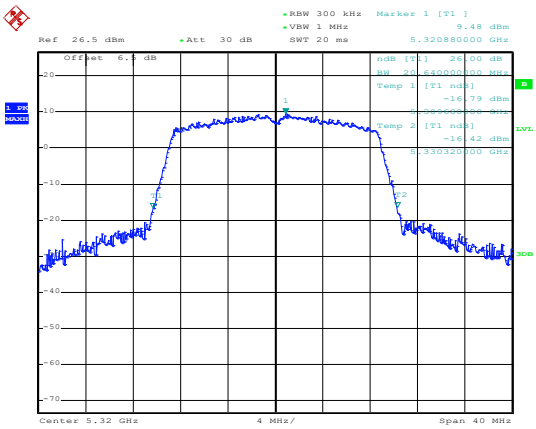


Date: 2.SEP.2020 15:43:51



Date: 2.SEP.2020 15:43:57

Middle channel



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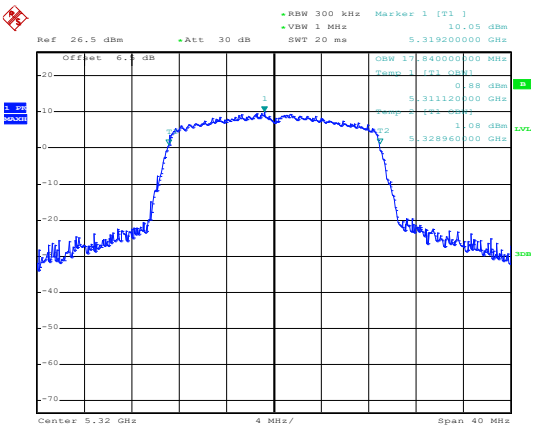
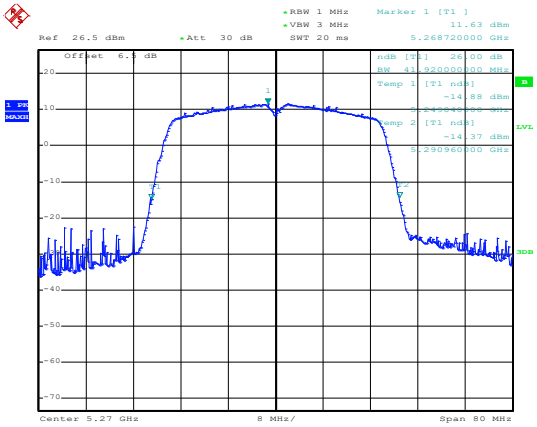


Date: 2.SEP.2020 15:43:24

Highest channel

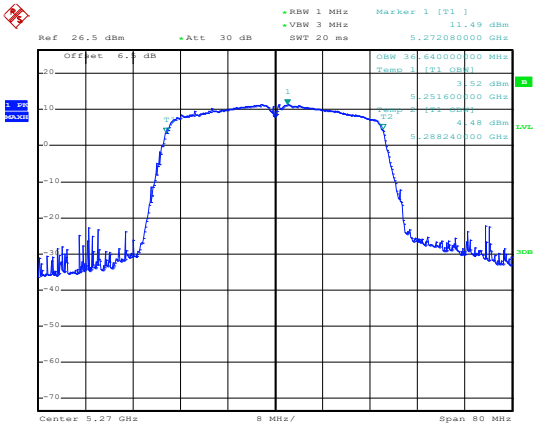
802.11n(HT40)

26 dB EBW



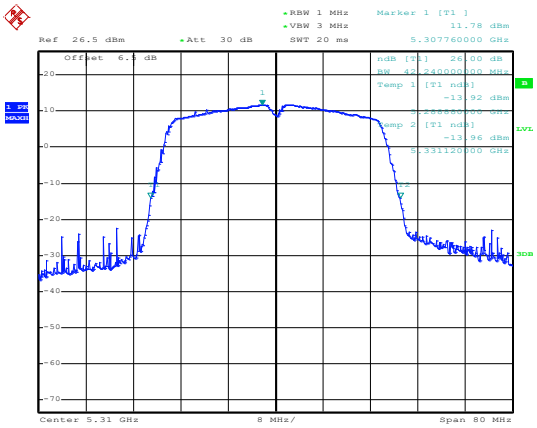
Date: 2.SEP.2020 15:57:00

99% OBW



Date: 2.SEP.2020 15:57:07

Lowest channel



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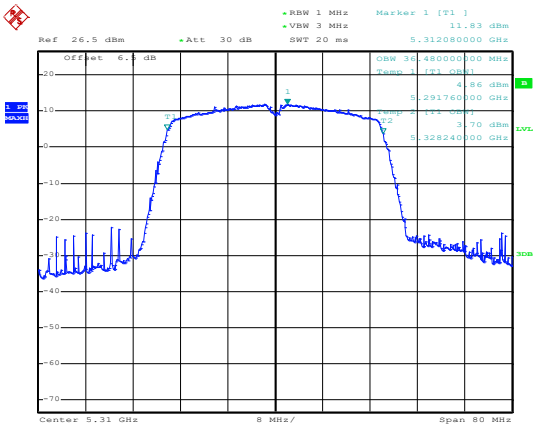
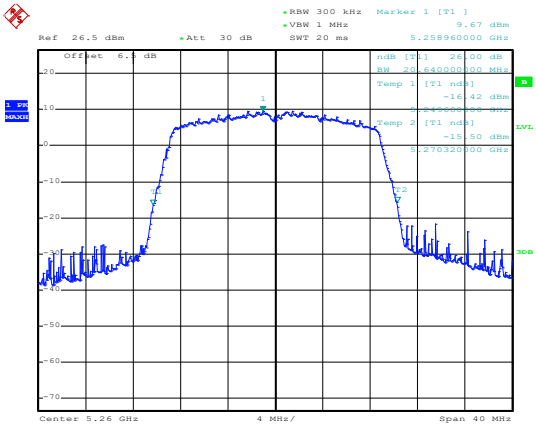


Date: 2.SEP.2020 15:57:19

Highest channel

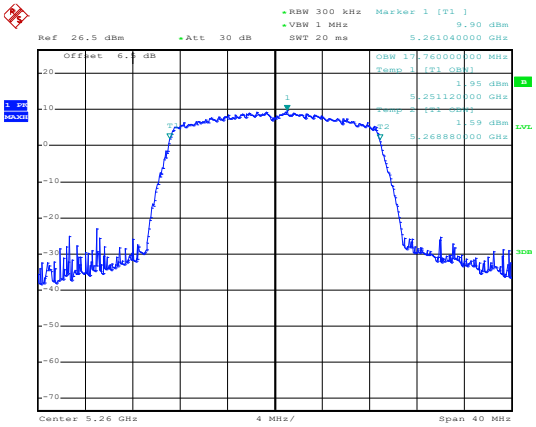
802.11ac(HT20)

26 dB EBW



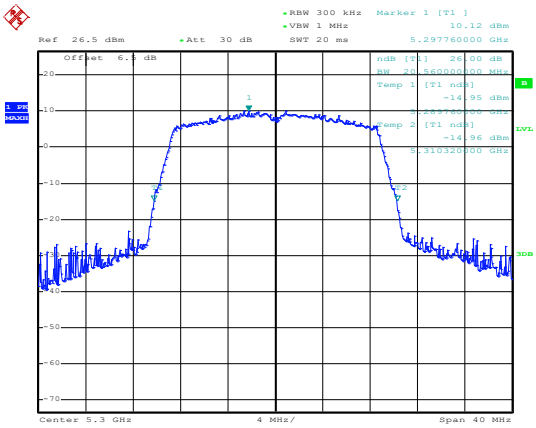
Date: 2.SEP.2020 15:41:47

99% OBW

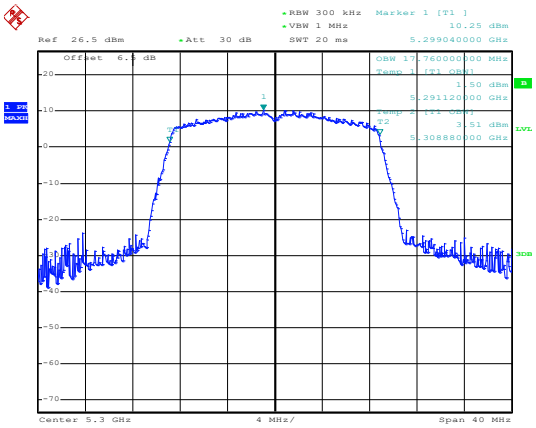


Date: 2.SEP.2020 15:41:36

Lowest channel

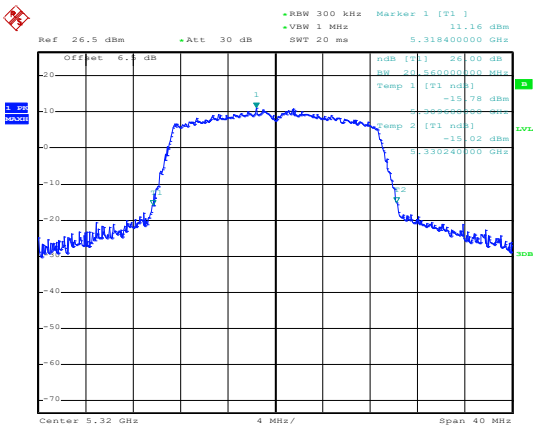


Date: 2.SEP.2020 15:42:06



Date: 2.SEP.2020 15:42:12

Middle channel



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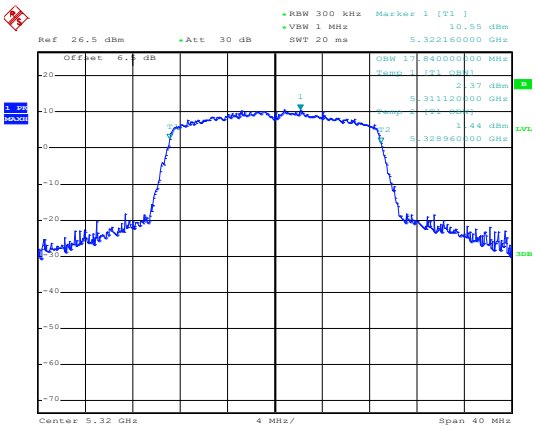
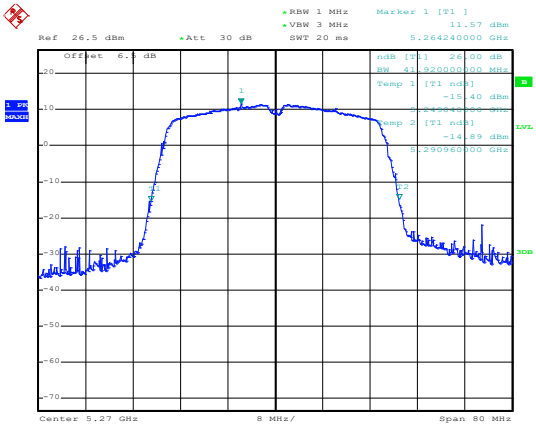


Date: 2.SEP.2020 15:42:31

Highest channel

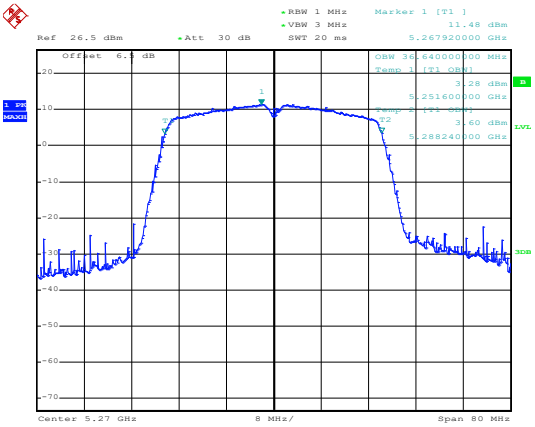
802.11ac(HT40)

26 dB EBW



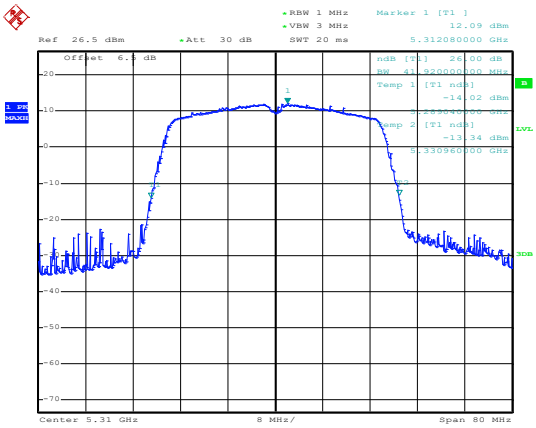
Date: 2.SEP.2020 15:58:12

99% OBW



Date: 2.SEP.2020 15:58:05

Lowest channel



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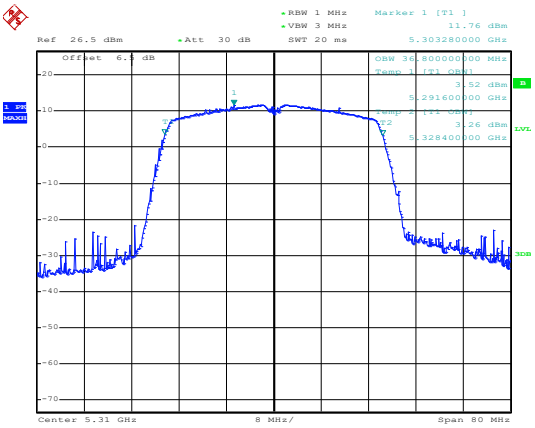
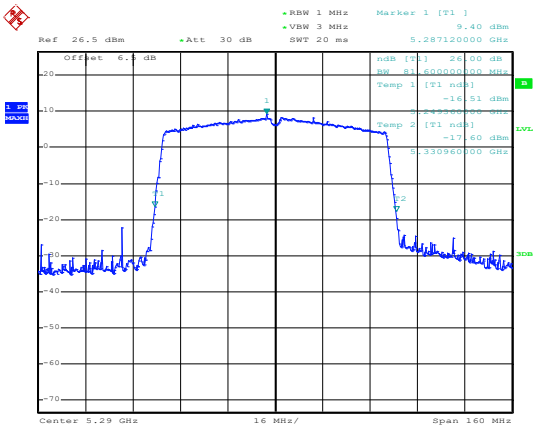


Date: 2.SEP.2020 15:57:53

Highest channel

802.11ac(HT80)



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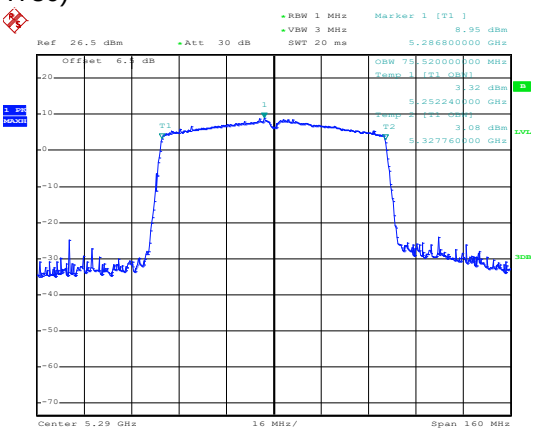


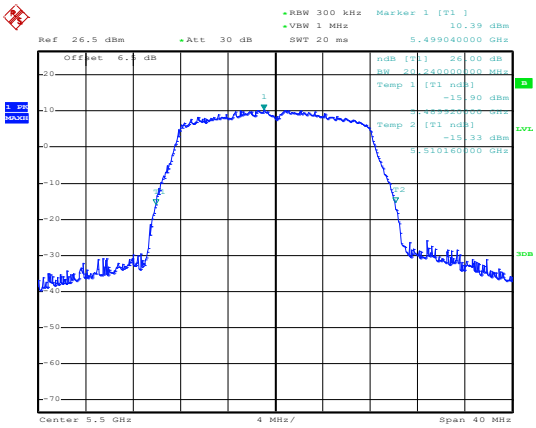
Date: 2.SEP.2020 16:00:22

Middle channel

Band 3:

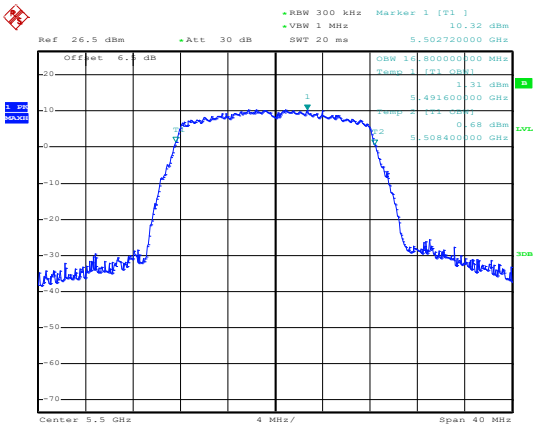
802.11a

26 dB EBW



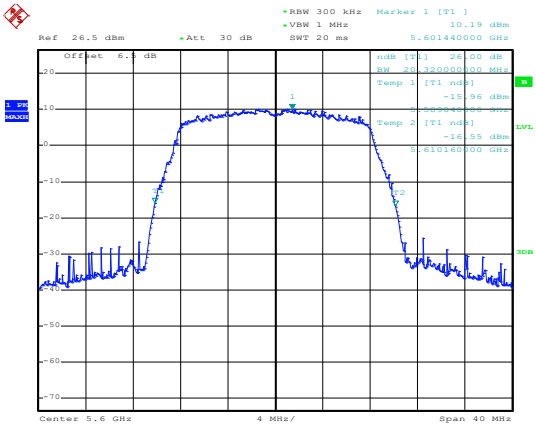
Date: 2.SEP.2020 15:45:49

99% OBW

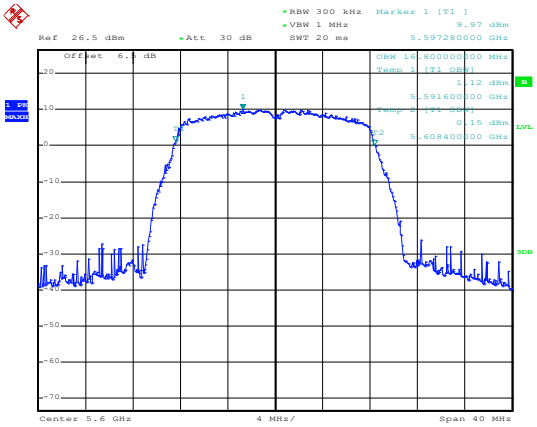


Date: 2.SEP.2020 15:45:43

Lowest channel

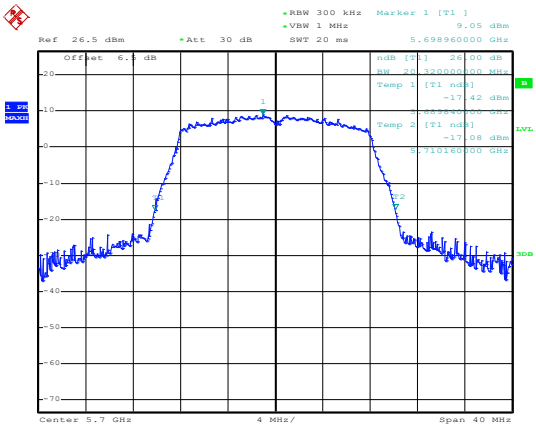


Date: 2.SEP.2020 15:46:09



Date: 2.SEP.2020 15:46:15

Middle channel



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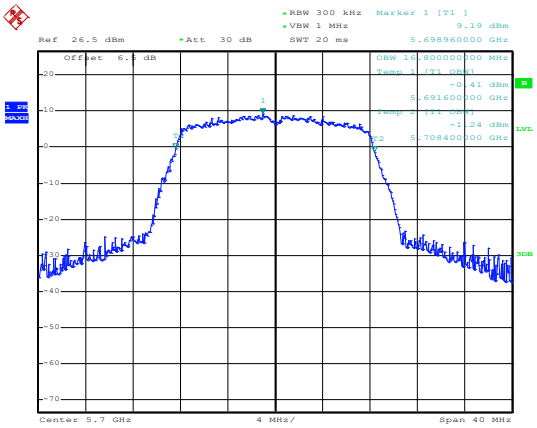
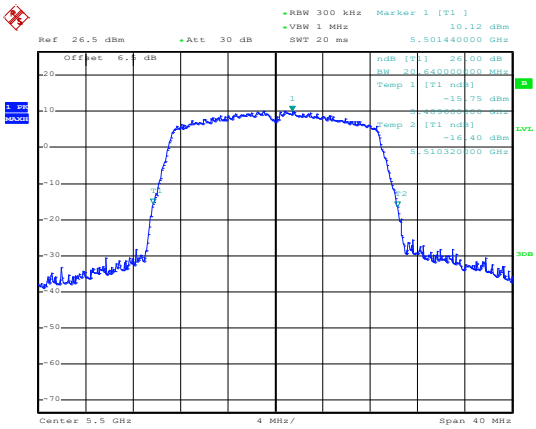


Date: 2.SEP.2020 15:46:33

Highest channel

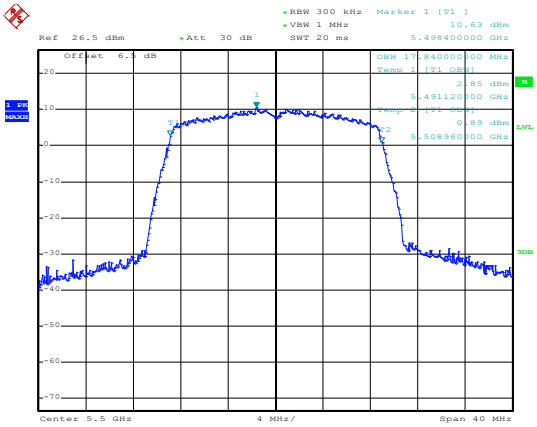
802.11n(HT20)

26 dB EBW



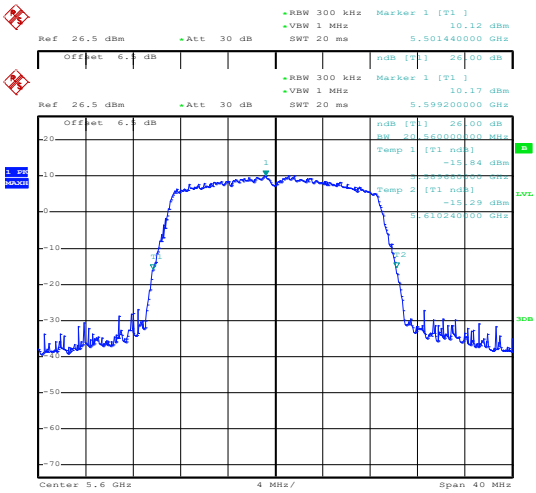
Date: 2.SEP.2020 15:47:41

99% OBW

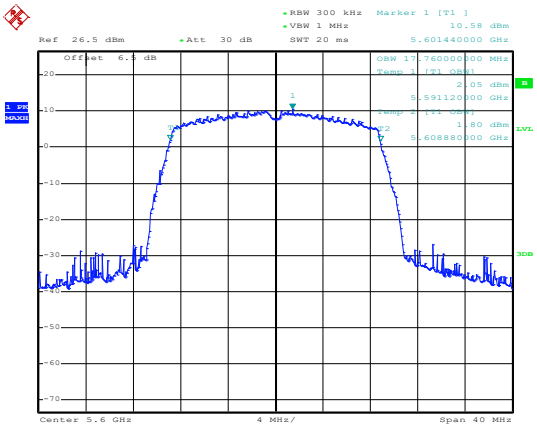


Date: 2.SEP.2020 15:47:51

Lowest channel

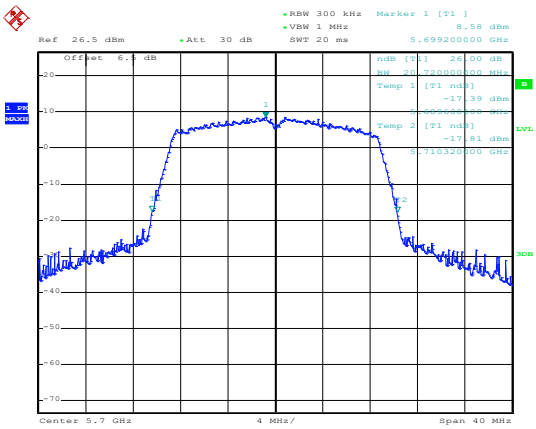


Date: 2.SEP.2020 15:47:23



Date: 2.SEP.2020 15:47:17

Middle channel



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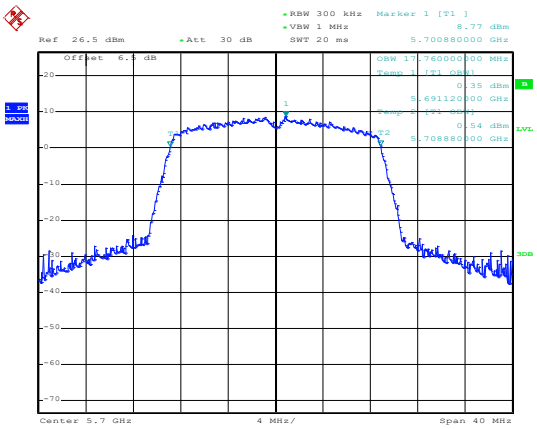
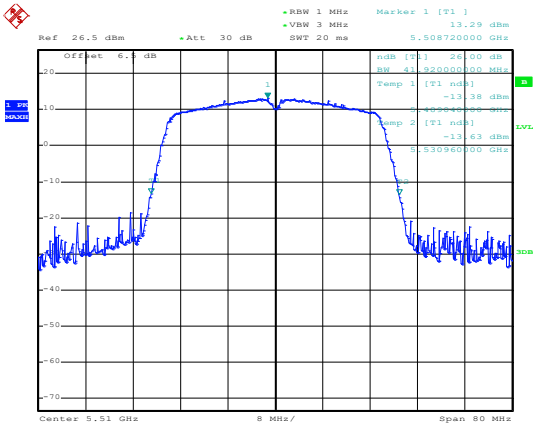


Date: 2.SEP.2020 15:47:05

Highest channel

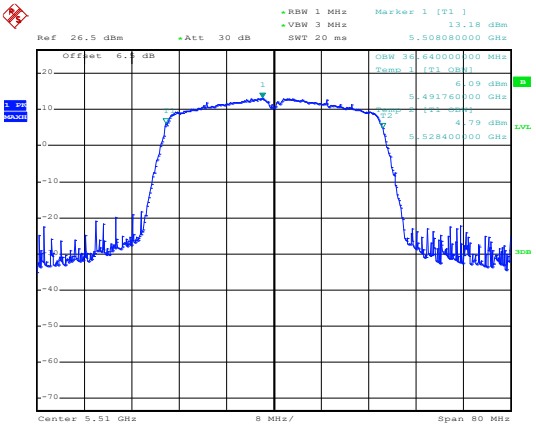
802.11n(HT40)

26 dB EBW



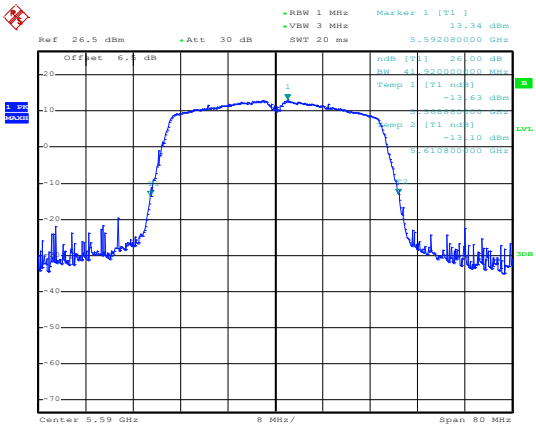
Date: 2.SEP.2020 15:56:37

99% OBW

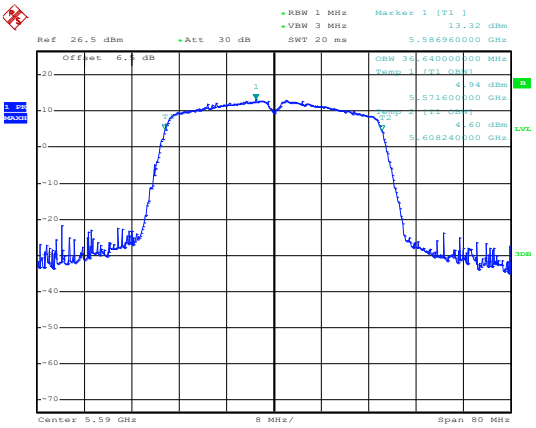


Date: 2.SEP.2020 15:56:29

Lowest channel

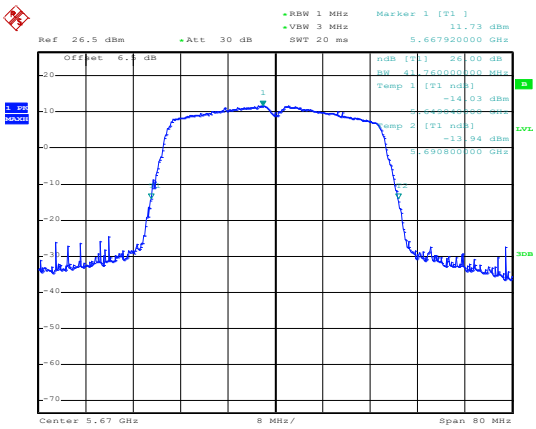


Date: 2.SEP.2020 15:56:02

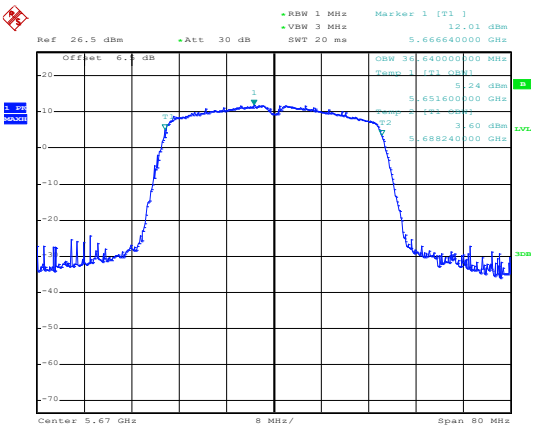


Date: 2.SEP.2020 15:56:07

Middle channel



Date: 2.SEP.2020 15:55:50

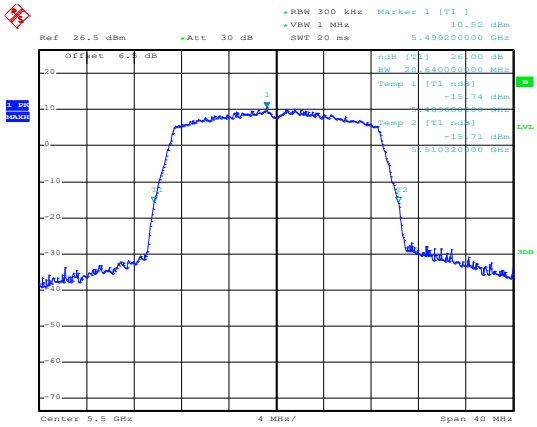


Date: 2.SEP.2020 15:55:43

Highest channel

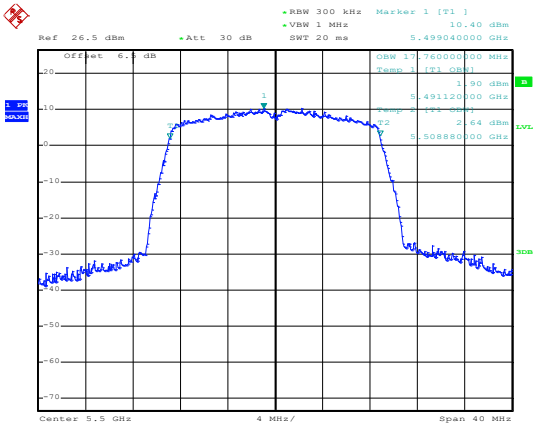
802.11ac(HT20)

26 dB EBW



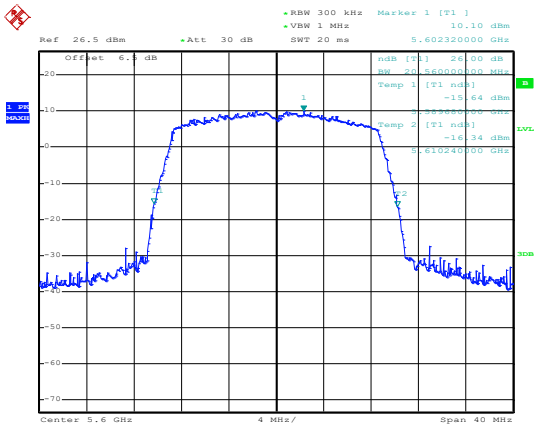
Date: 2.SEP.2020 15:48:10

99% OBW

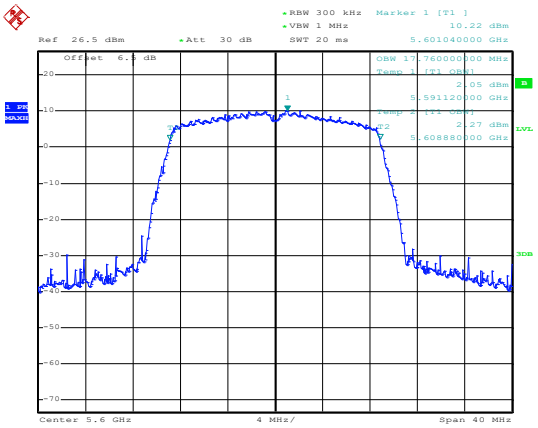


Date: 2.SEP.2020 15:48:04

Lowest channel

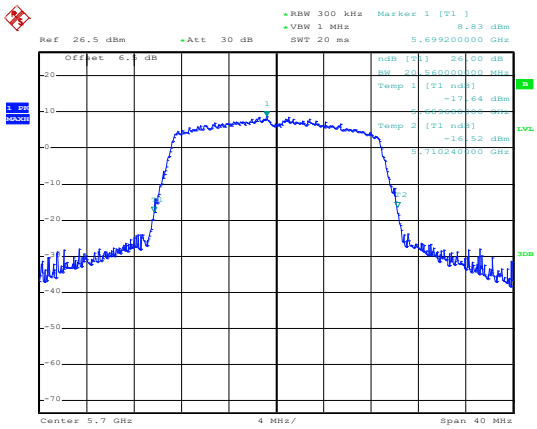


Date: 2.SEP.2020 15:48:25

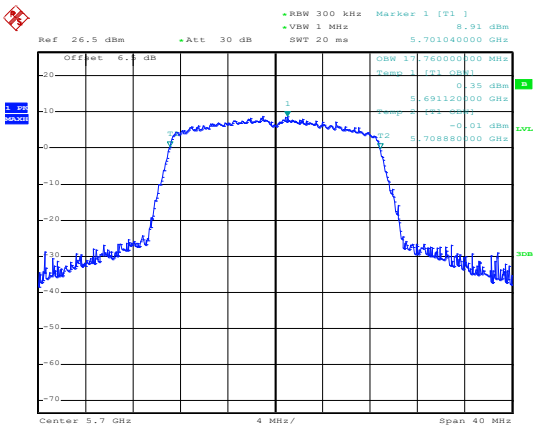


Date: 2.SEP.2020 15:48:32

Middle channel



Date: 2.SEP.2020 15:48:52

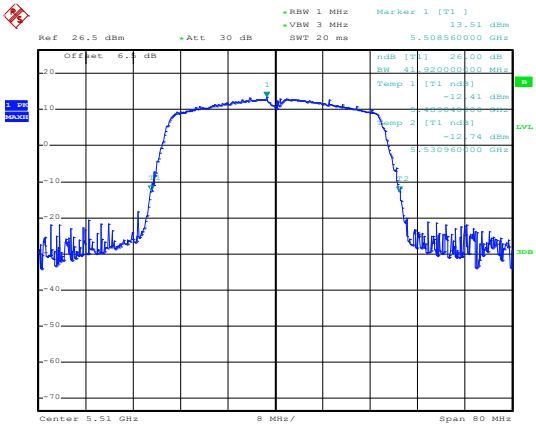


Date: 2.SEP.2020 15:48:45

Highest channel

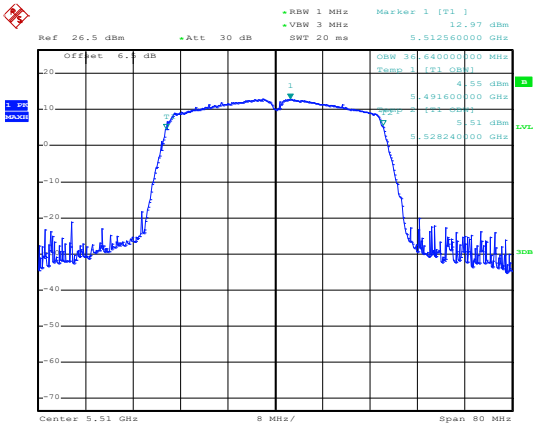
802.11ac(HT40)

26 dB EBW



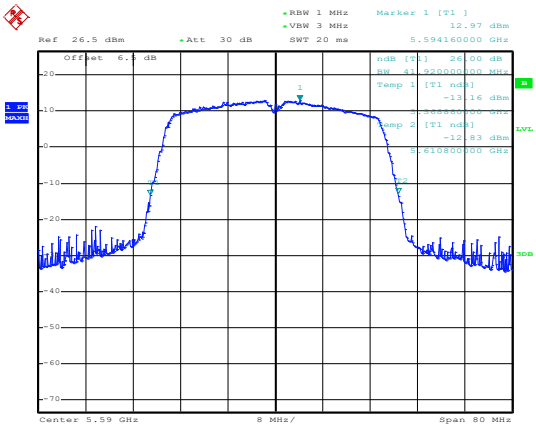
Date: 2.SEP.2020 15:54:30

99% OBW



Date: 2.SEP.2020 15:54:36

Lowest channel



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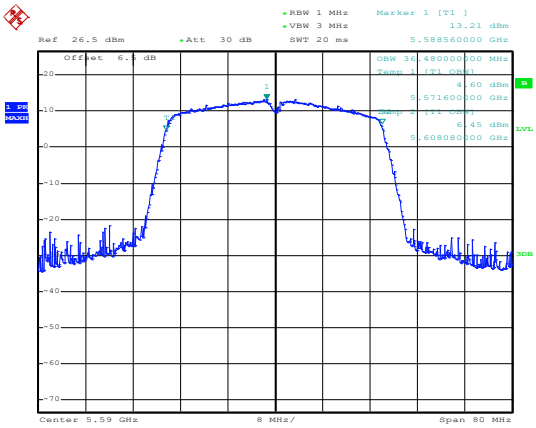
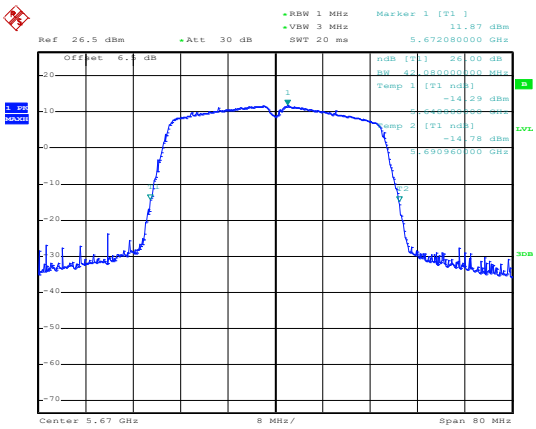
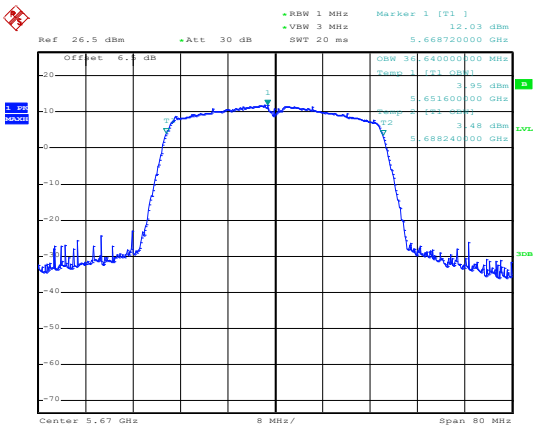


Date: 2.SEP.2020 15:54:58

Middle channel



Date: 2.SEP.2020 15:55:18

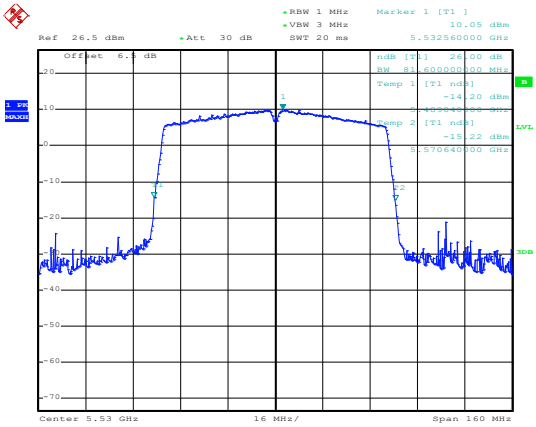


Date: 2.SEP.2020 15:55:26

Highest channel

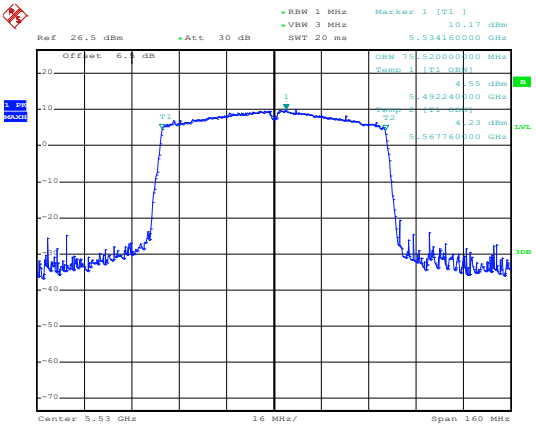
802.11ac(HT80)

26 dB EBW



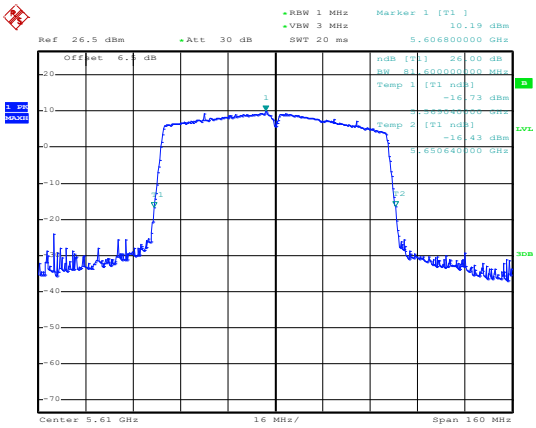
Date: 2.SEP.2020 16:00:46

99% OBW

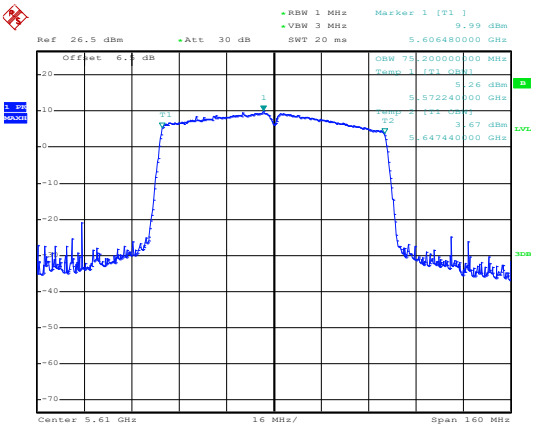


Date: 2.SEP.2020 16:00:52

Lowest channel



Date: 2.SEP.2020 16:01:18



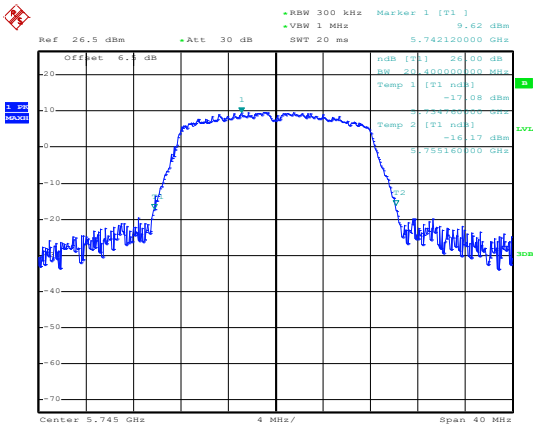
Date: 2.SEP.2020 16:01:11

Highest channel

Band 4:

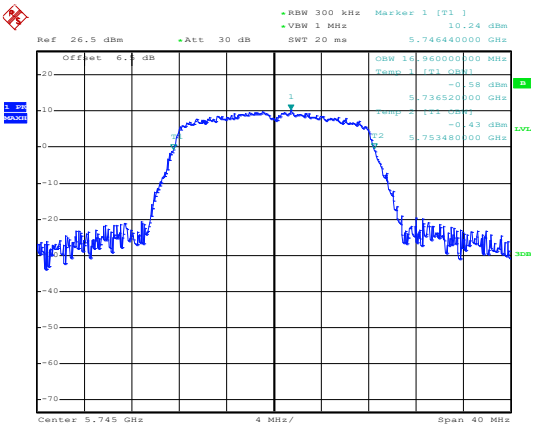
802.11a

26 dB EBW



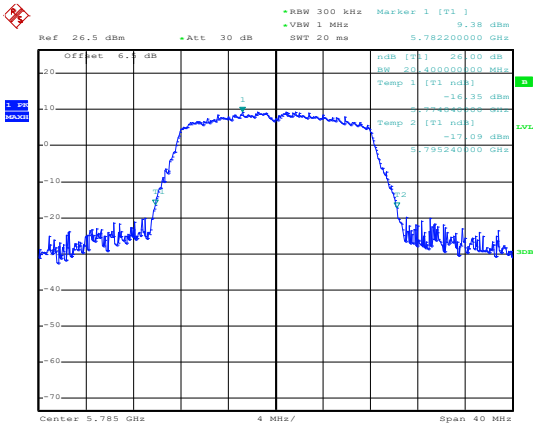
Date: 2.SEP.2020 15:51:44

99% OBW



Date: 2.SEP.2020 15:51:37

Lowest channel



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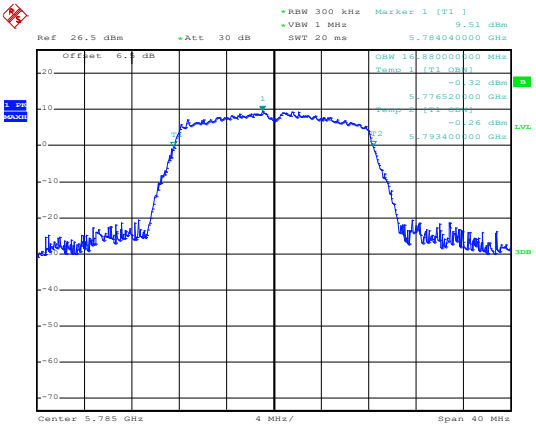
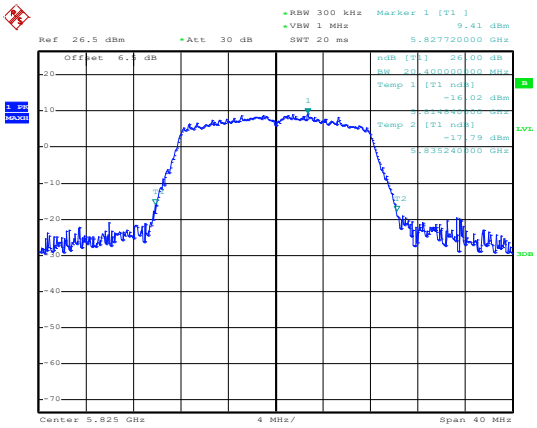
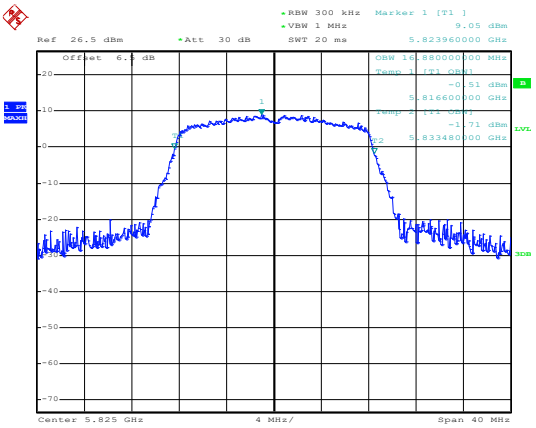


Date: 2.SEP.2020 15:52:08

Middle channel



Date: 2.SEP.2020 15:52:25

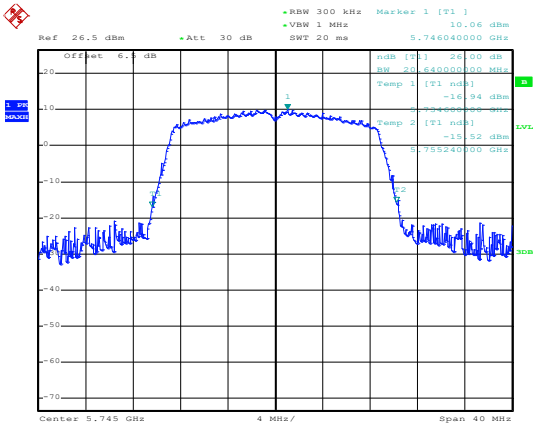


Date: 2.SEP.2020 15:52:17

Highest channel

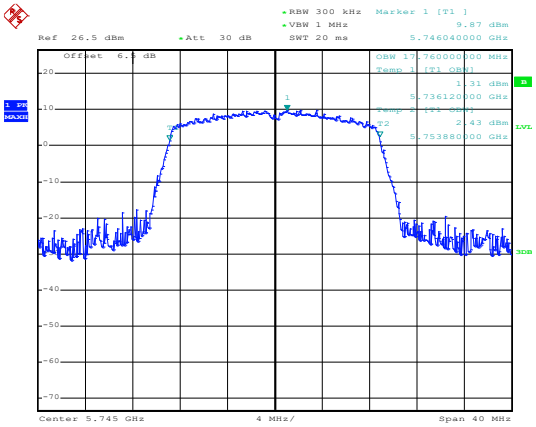
802.11n(HT20)

26 dB EBW



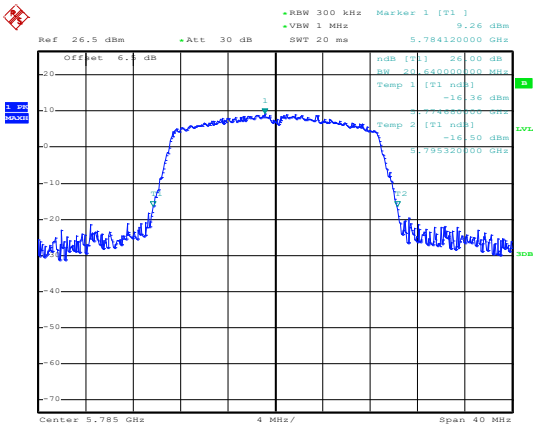
Date: 2.SEP.2020 15:51:16

99% OBW



Date: 2.SEP.2020 15:51:23

Lowest channel



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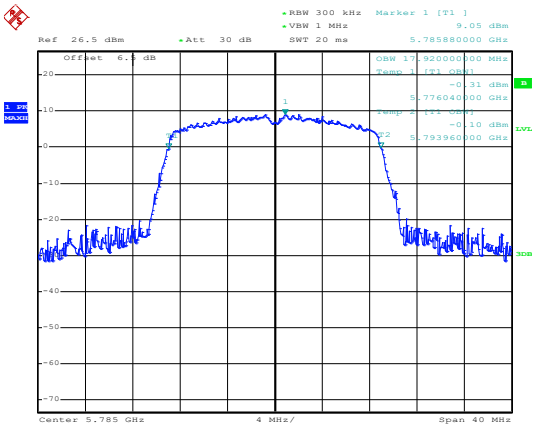
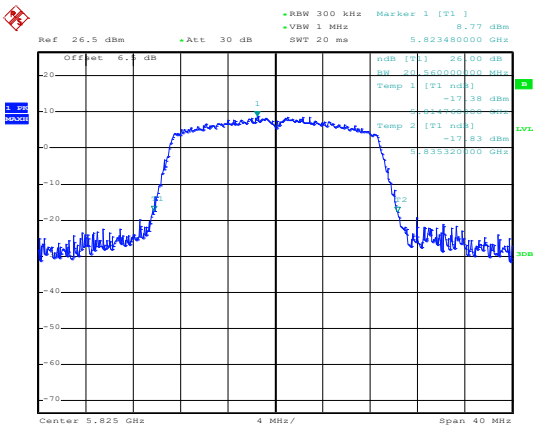
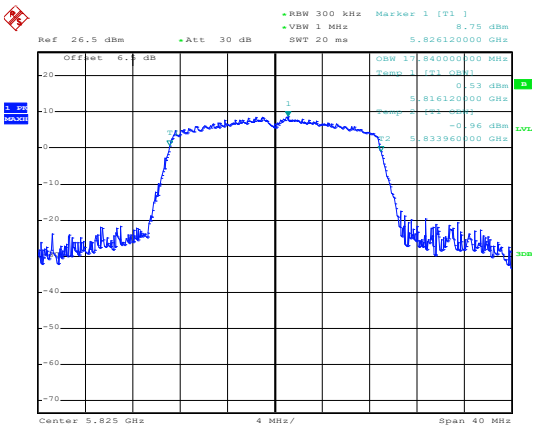


Date: 2.SEP.2020 15:51:00

Middle channel



Date: 2.SEP.2020 15:50:44

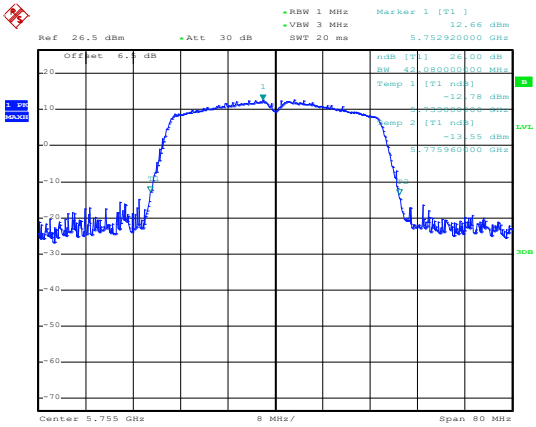


Date: 2.SEP.2020 15:50:51

Highest channel

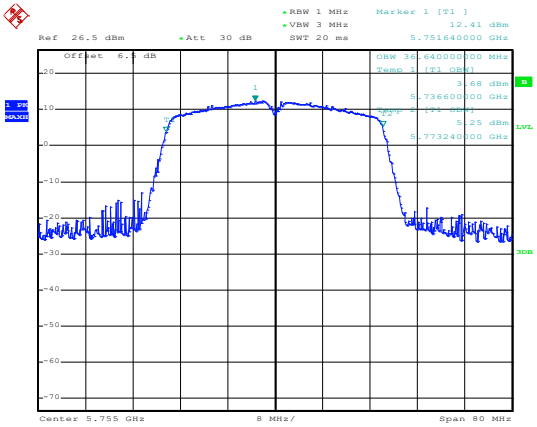
802.11n(HT40)

26 dB EBW



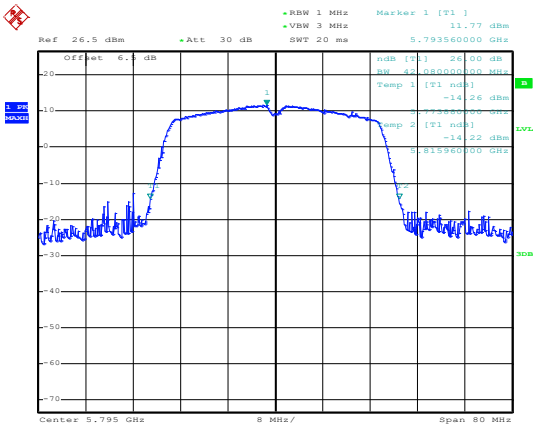
Date: 2.SEP.2020 15:53:13

99% OBW

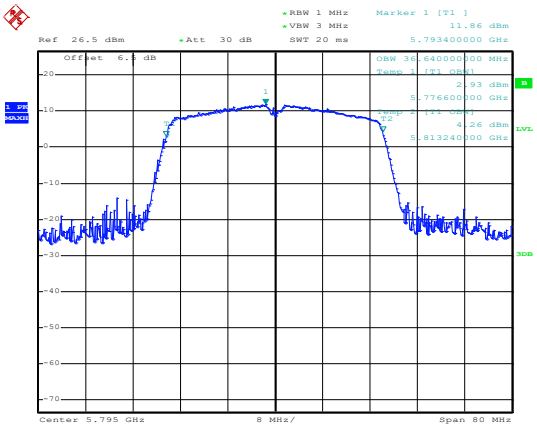


Date: 2.SEP.2020 15:53:21

Lowest channel



Date: 2.SEP.2020 15:53:37

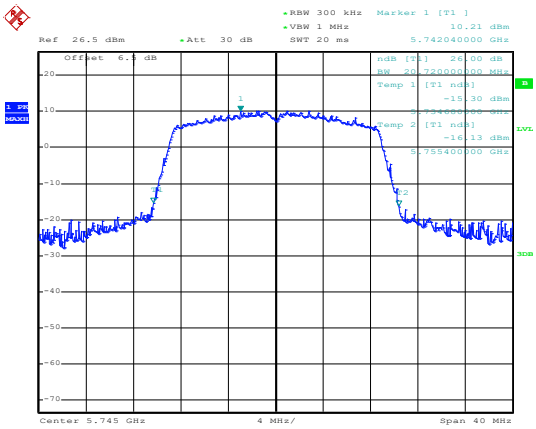


Date: 2.SEP.2020 15:53:31

Highest channel

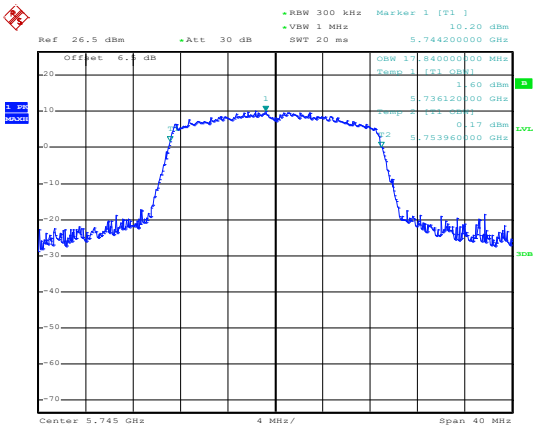
802.11ac(HT20)

26 dB EBW



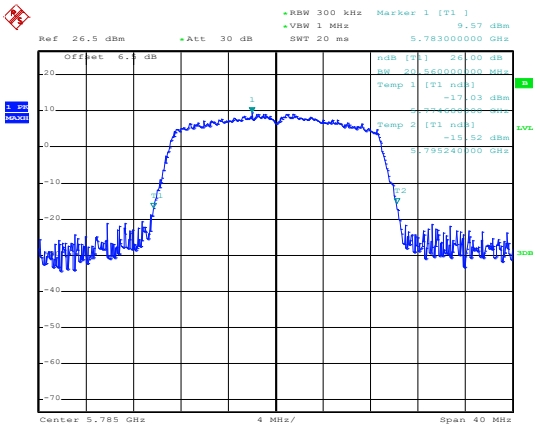
Date: 2.SEP.2020 15:49:55

99% OBW



Date: 2.SEP.2020 15:49:47

Lowest channel



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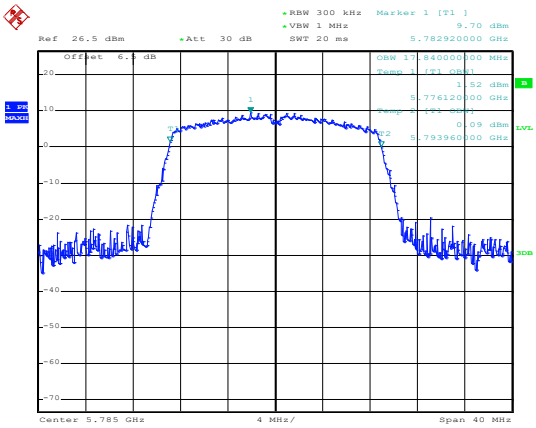
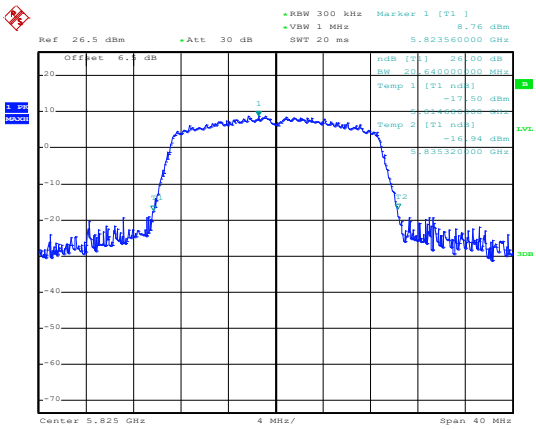


Date: 2.SEP.2020 15:50:14

Middle channel



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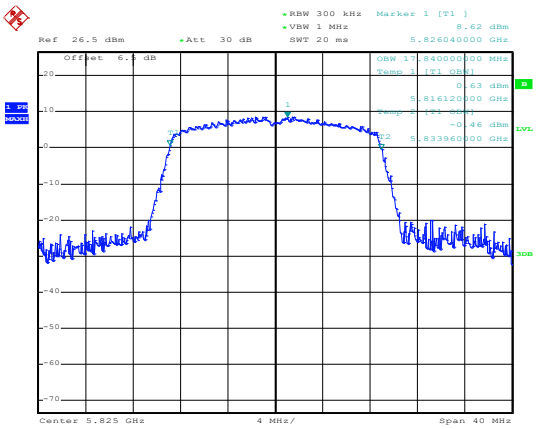
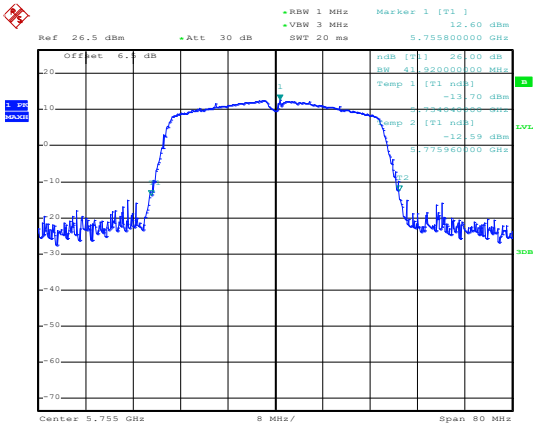


Date: 2.SEP.2020 15:50:26

Highest channel

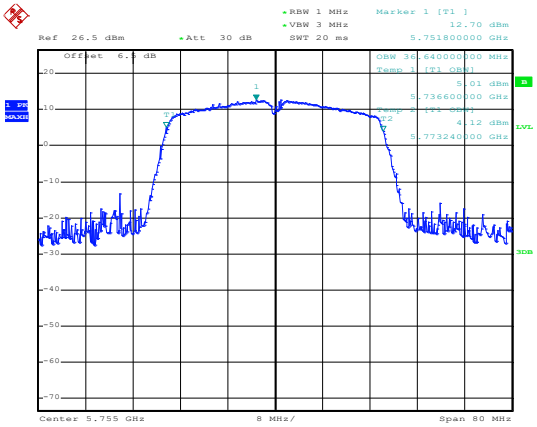
802.11ac(HT40)

26 dB EBW



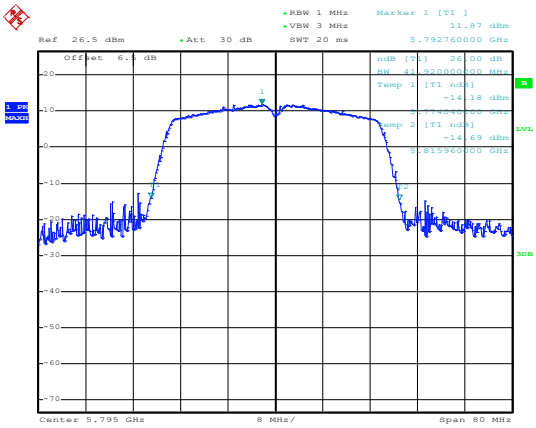
Date: 2.SEP.2020 15:54:10

99% OBW

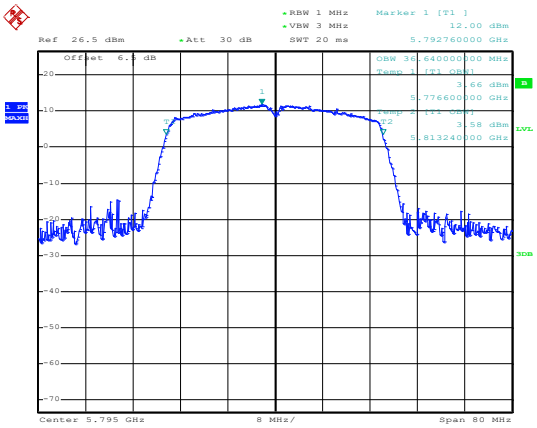


Date: 2.SEP.2020 15:54:04

Lowest channel



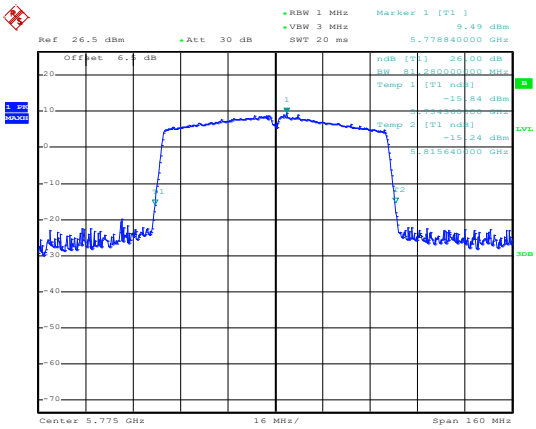
Date: 2.SEP.2020 15:53:48



Date: 2.SEP.2020 15:53:55

Highest channel

802.11ac(HT80)



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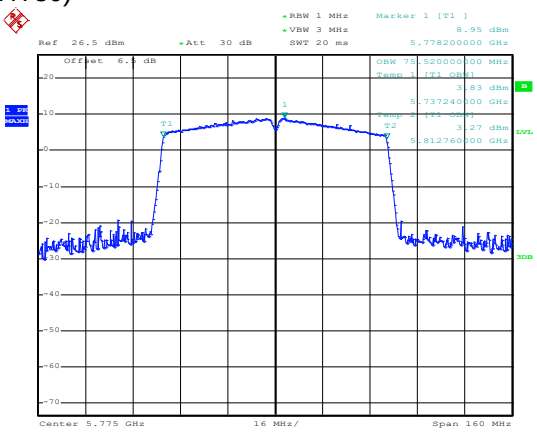
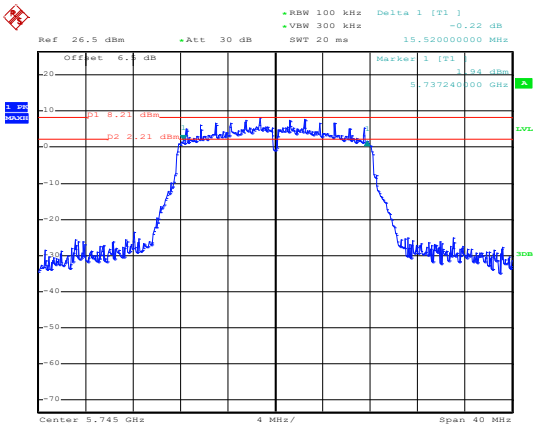


Date: 2.SEP.2020 16:01:43

Middle channel

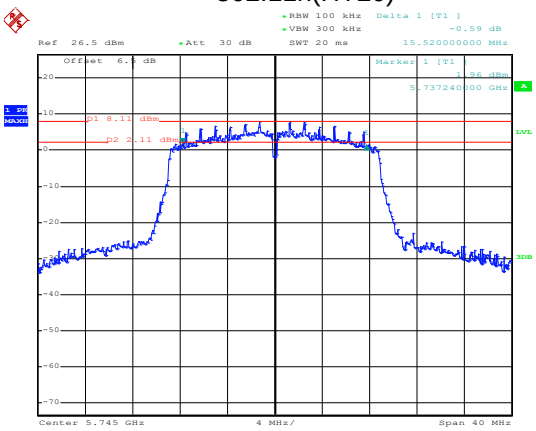
6dB BW

802.11a



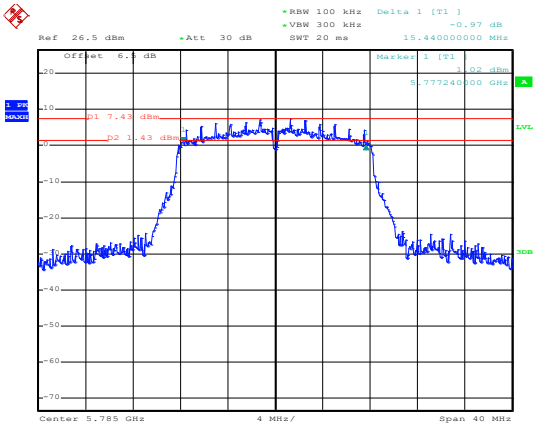
Date: 2.SEP.2020 17:07:48

802.11n(HT20)



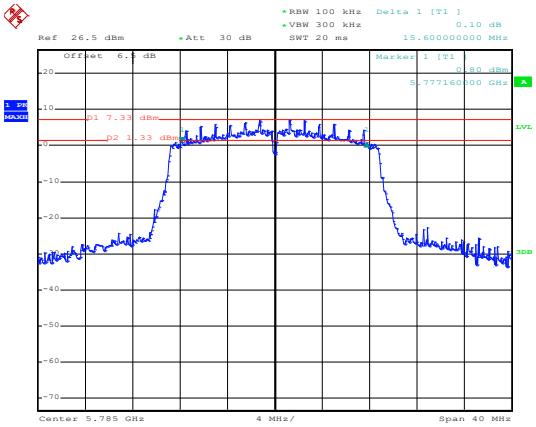
Date: 2.SEP.2020 17:04:37

Lowest channel



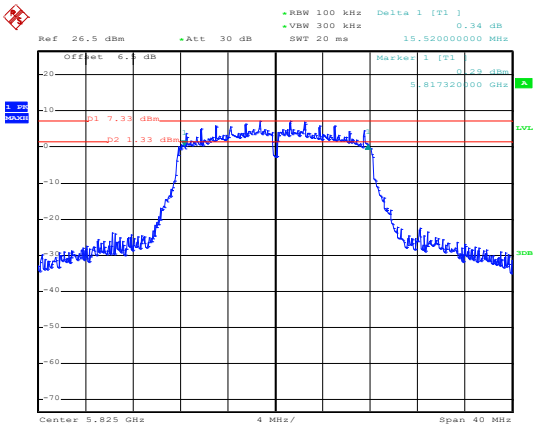
Date: 2.SEP.2020 17:08:15

Lowest channel



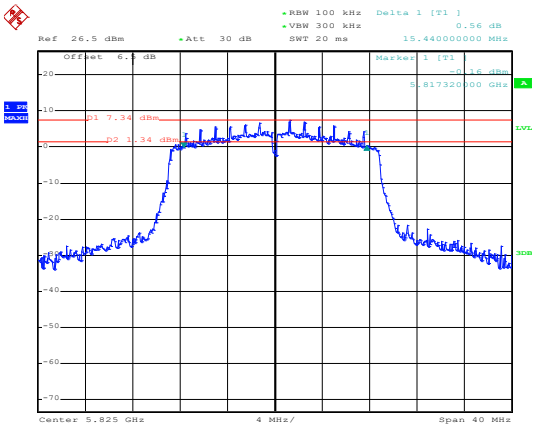
Date: 2.SEP.2020 17:05:15

Middle channel



Date: 2.SEP.2020 17:08:46

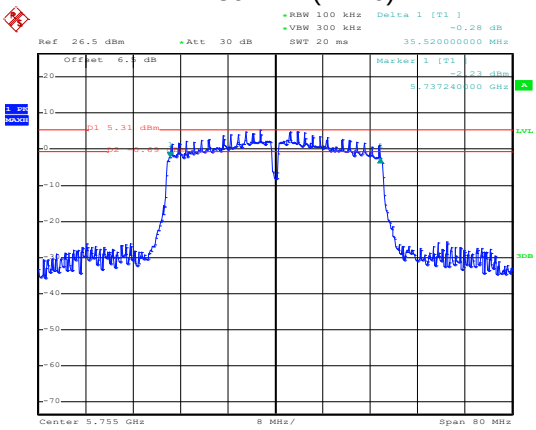
Middle channel



Date: 2.SEP.2020 17:05:52

Highest channel

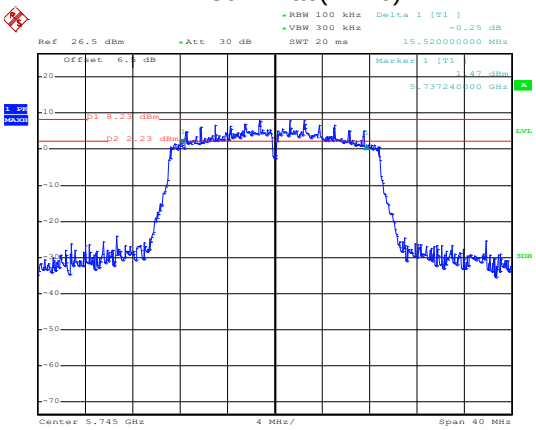
802.11n(HT40)



Date: 2.SEP.2020 17:03:43

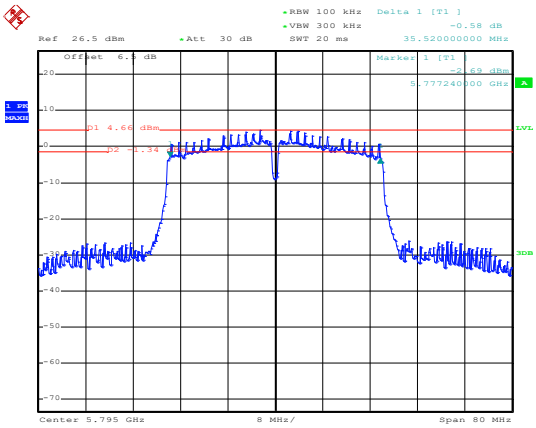
Lowest channel

802.11ac(HT20)



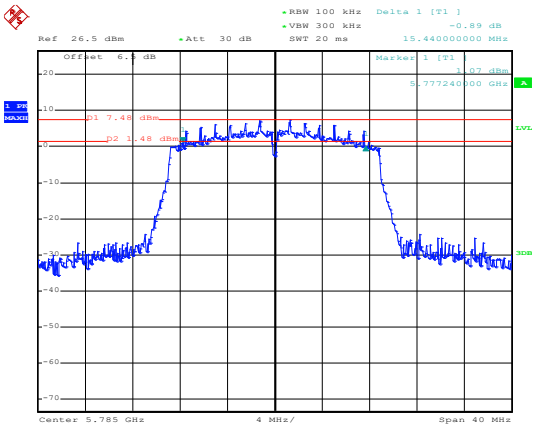
Date: 2.SEP.2020 17:07:15

Lowest channel



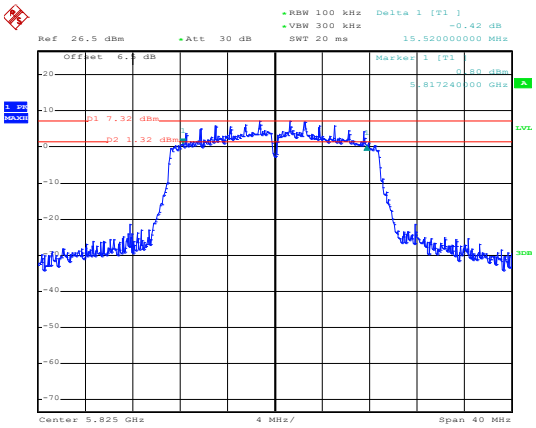
Date: 2.SEP.2020 17:02:51

Highest channel



Date: 2.SEP.2020 17:06:51

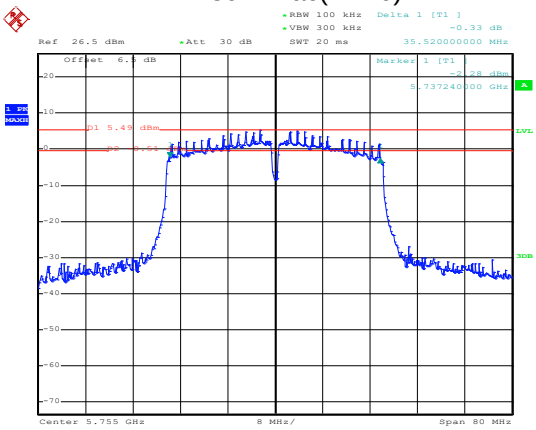
Middle channel



Date: 2.SEP.2020 17:06:24

Highest channel

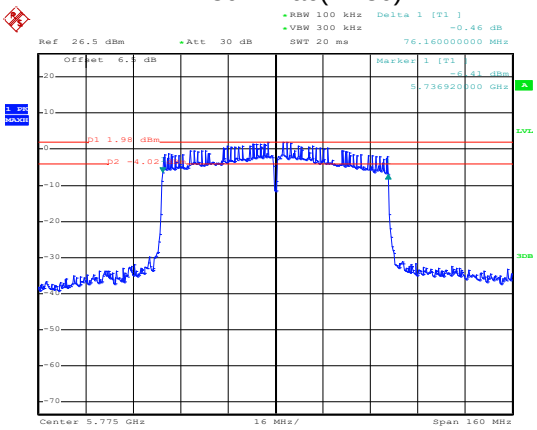
802.11ac(HT40)



Date: 2.SEP.2020 17:01:19

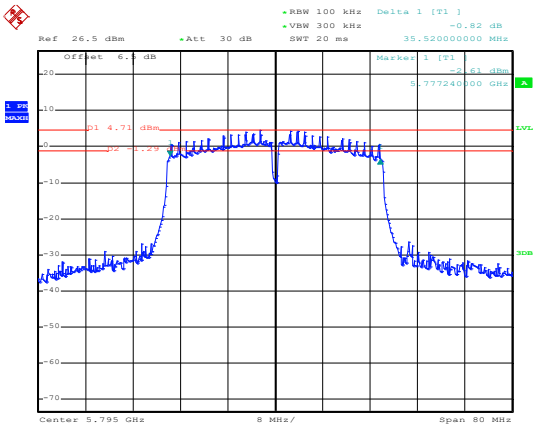
Lowest channel

802.11ac(HT80)



Date: 2.SEP.2020 17:00:37

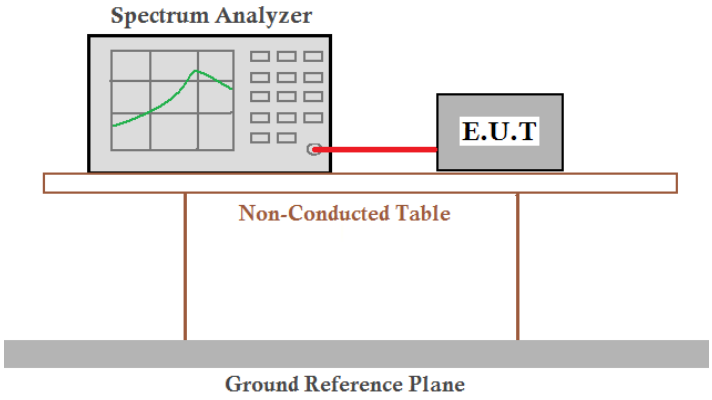
Middle channel



Date: 2.SEP.2020 17:01:53

Highest channel

6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv) & (a) (2) & (a)(3)
Limit:	Band 1: 11 dBm/MHz Band 2: 11 dBm/MHz Band 3: 11 dBm/MHz Band 4: 30 dBm/500kHz
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1				
Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	6.90	11.00	Pass
	Middle	6.86		
	Highest	7.25		
802.11n(HT20)	Lowest	6.75	11.00	Pass
	Middle	6.60		
	Highest	6.75		
802.11n(HT40)	Lowest	3.54	11.00	Pass
	Highest	3.32		
802.11ac(HT20)	Lowest	6.75	11.00	Pass
	Middle	6.72		
	Highest	7.16		
802.11ac(HT40)	Lowest	3.64	11.00	Pass
	Highest	3.30		
802.11ac(HT80)	Middle	0.21	11.00	Pass

Band 2				
Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	6.32	11.00	Pass
	Middle	6.59		
	Highest	6.70		
802.11n(HT20)	Lowest	6.88	11.00	Pass
	Middle	6.21		
	Highest	6.46		
802.11n(HT40)	Lowest	3.12	11.00	Pass
	Highest	3.89		
802.11ac(HT20)	Lowest	6.48	11.00	Pass
	Middle	6.71		
	Highest	6.79		
802.11ac(HT40)	Lowest	3.42	11.00	Pass
	Highest	3.96		
802.11ac(HT80)	Middle	0.31	11.00	Pass

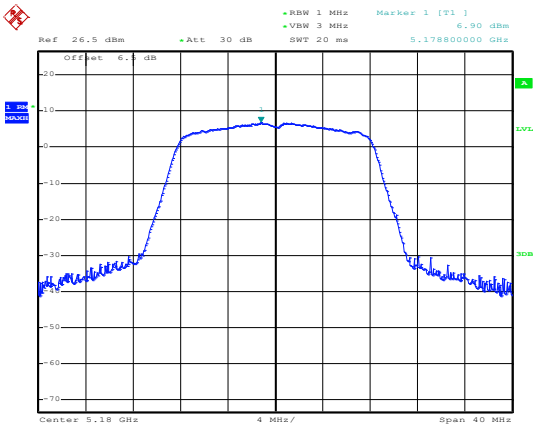
Band 3				
Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	6.87	11.00	Pass
	Middle	6.44		
	Highest	6.49		
802.11n20	Lowest	6.92	11.00	Pass
	Middle	6.77		
	Highest	6.13		
802.11n40	Lowest	3.99	11.00	Pass
	Middle	3.93		
	Highest	3.44		
802.11ac20	Lowest	6.97	11.00	Pass
	Middle	6.62		
	Highest	6.23		
802.11ac40	Lowest	3.98	11.00	Pass
	Middle	3.89		
	Highest	3.41		
802.11ac80	Lowest	0.83	11.00	Pass
	Highest	0.37		

Band 4				
Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	11.92	30.00	Pass
	Middle	11.27		
	Highest	10.83		
802.11n20	Lowest	12.62	30.00	Pass
	Middle	11.88		
	Highest	10.69		
802.11n40	Lowest	8.39	30.00	Pass
	Highest	8.09		
802.11ac20	Lowest	11.79	30.00	Pass
	Middle	10.94		
	Highest	10.44		
802.11ac40	Lowest	8.14	30.00	Pass
	Highest	7.84		
802.11ac80	Middle	4.54	30.00	Pass

Test plot as follows:

Band 1

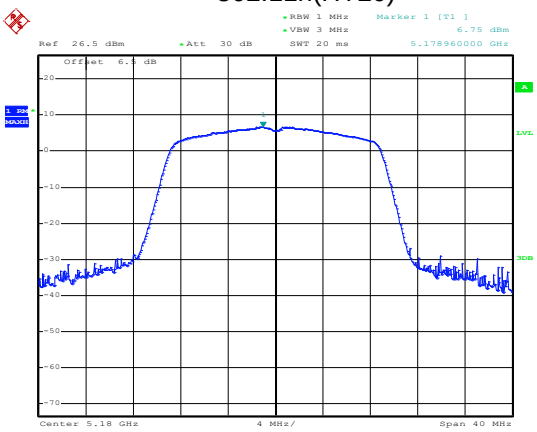
802.11a



Date: 2.SEP.2020 16:48:43

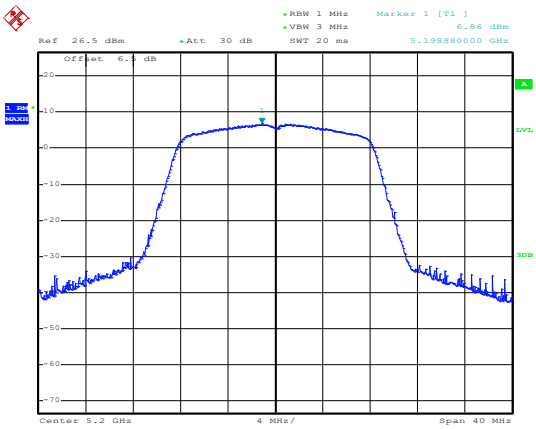
Lowest channel

802.11n(HT20)



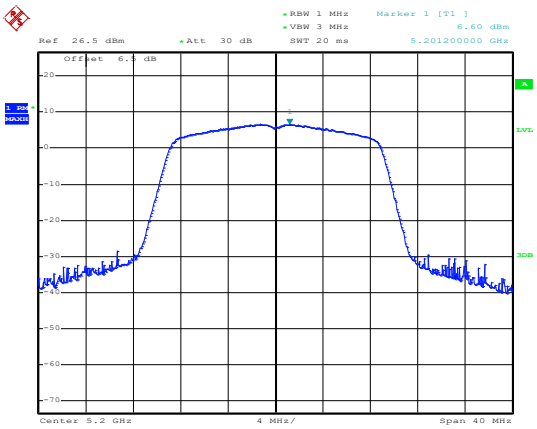
Date: 2.SEP.2020 16:47:15

Middle channel



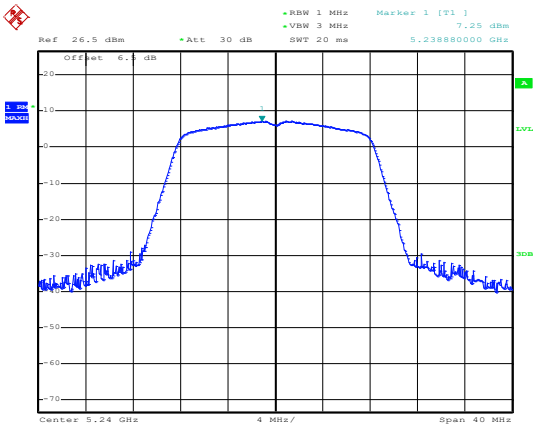
Date: 2.SEP.2020 16:48:13

Middle channel



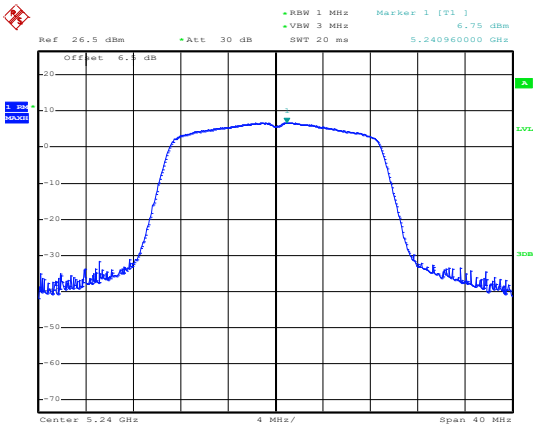
Date: 2.SEP.2020 16:47:27

Middle channel



Date: 2.SEP.2020 16:47:54

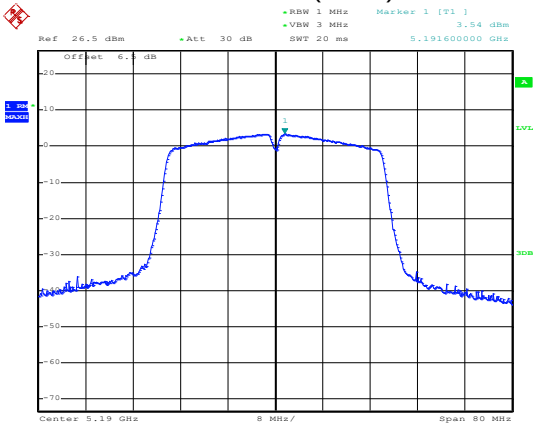
Highest channel



Date: 2.SEP.2020 16:47:38

Highest channel

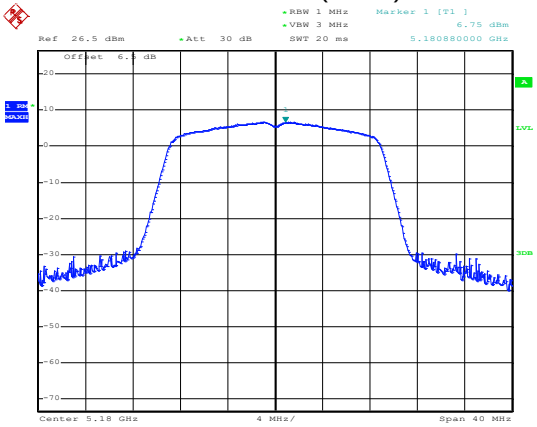
802.11n(HT40)



Date: 2.SEP.2020 16:57:39

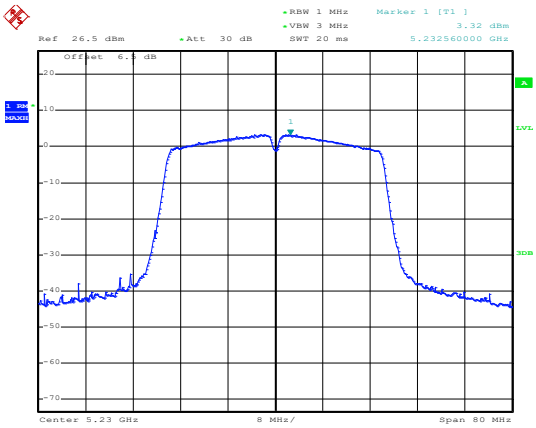
Lowest channel

802.11ac(HT20)



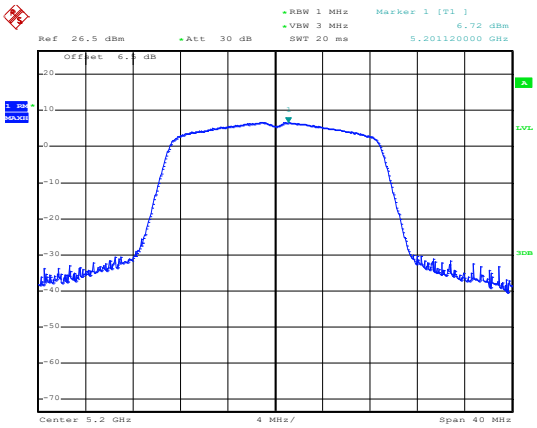
Date: 2.SEP.2020 16:47:03

Middle channel



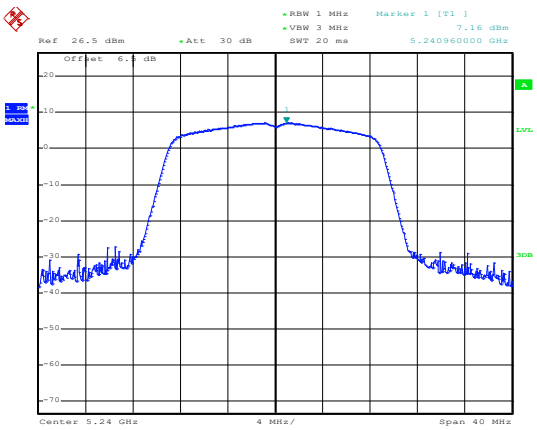
Date: 2.SEP.2020 16:57:24

Highest channel



Date: 2.SEP.2020 16:46:47

Middle channel



Date: 2.SEP.2020 16:46:33

Highest channel