FCC REPORT
(WIFI)

Applicant:	Hangzhou ALL IN E-Commerce Co., Ltd.
Address of Applicant:	Room 1602, Building1, The Star City, 2028 Jiangling Road, Binjiang District, Hangzhou City, Zhejiang Province
Equipment Under Test (EUT)	
Product Name:	broage NBOOK
Model No.:	ACH-I515-01
FCC ID:	2AWGQI515
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	08 Jun., 2020
Date of Test:	09 Jun., to 17 Sep., 2020
Date of report issued:	17 Sep., 2020
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 CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	*01 Sep., 2020*	*Original*
01	*14 Sep., 2020*	*1. Updated description of EUT Antenna on page 8.* *2. Added test data of duty cycle on page 18/19.* *3. Updated test data of radiated emission below 1GHz on page 78/79.*
02	*16 Sep., 2020*	*1. Updated test data of duty cycle on page 18/19.*
03	*17 Sep., 2020*	*1. Updated band edge of n20/n40 data on page 57 to page 64.* 2. Updated radiated emission on page 78/79.

Tested by: Janet Wei ***Date:*** *17 Sep., 2020*

Test Engineer

Reviewed by: Winner zhang ***Date:*** *17 Sep., 2020*

Project Engineer

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4 Test Summary

Test Items	Section in CFR 47	Result
Antenna requirement	15.203 & 15.247 (b)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247 (d)	Pass
Spurious Emission	15.205 & 15.209	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 C63.4-2014* *ANSI C63.10-2013* *KDB 558074 D01 15.247 Meas Guidance v05r02*

5 General Information

5.1 Client Information

Applicant:	Hangzhou ALL IN E-Commerce Co., Ltd.
Address:	Room 1602, Building1, The Star City, 2028 Jiangling Road, Binjiang District, Hangzhou City, Zhejiang Province

5.2 General Description of E.U.T.

Product Name:	broage NBOOK
Model No.:	ACH-I515-01
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(HT20)) 2422MHz~2452MHz (802.11n(HT40))
Channel numbers:	11 for 802.11b/802.11g/802.11(HT20) 7 for 802.11n(HT40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Internal Antenna
Antenna gain:	2.2dBi
Power supply:	Rechargeable Li-polymer Battery DC7.6V-6000mAh
AC adapter:	Model: GEO651DA-190300 Input: AC100-240V, 50/60Hz, 1.5A Output: DC 19.0V, 3.0A
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel for 802.11b/g/n(HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

1. *For 802.11n-HT40 mode, the channel number is from 3 to 9;*
2. *Channel 1, 6 & 11 selected for 802.11b/g/n-HT20 as Lowest, Middle and Highest channel. Channel 3, 6 & 9 selected for 802.11n-HT40 as Lowest, Middle and Highest Channel.*

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation

Radiated Emission: The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.
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, the follow list were the worst case.

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(HT20)	6.5Mbps
802.11n(HT40)	13.5Mbps

5.4 Description of Support Units

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 Laboratory Facility

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

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

Shenzhen Zhongjian Nanfang Testing 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 Shenzhen Zhongjian Nanfang Testing 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

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing 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

5.9 Test Instruments list

Radiated Emission:

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	07-22-2017	07-21-2020
				07-22-2020	07-21-2021
Loop Antenna	SCHWARZBECK	FMZB1519B	044	03-07-2020	03-06-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
				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
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
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200	Version: 2.0.0.0		

Conducted Emission:

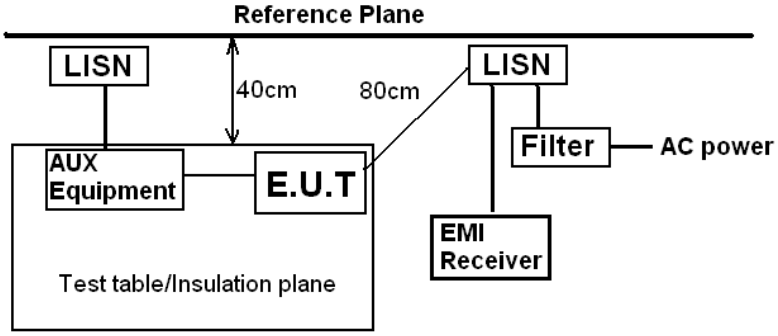
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-05-2020	03-04-2021
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-05-2020	03-04-2021
LISN	CHASE	MN2050D	1447	03-05-2020	03-04-2021
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2017	07-20-2020
				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

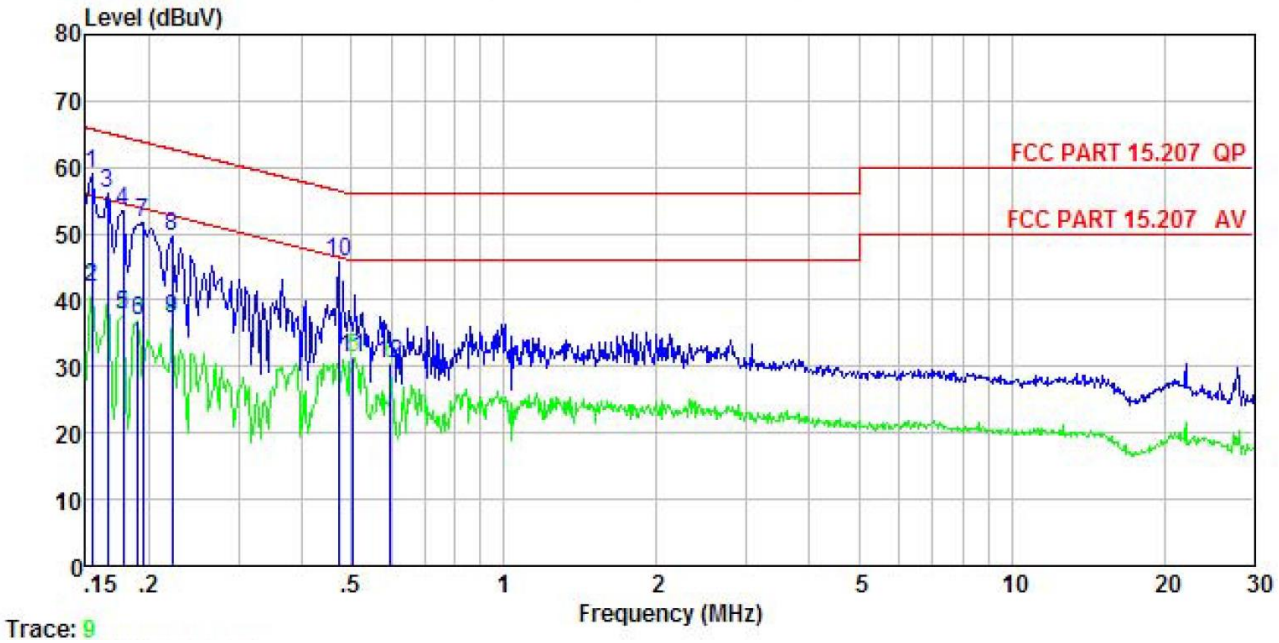
Standard requirement:	FCC Part 15 C Section 15.203 /247(b)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique 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. 15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The Wi-Fi antenna are an Internal antenna which cannot replace by end-user, the best case gain of the antenna is 2.2 dBi. For detailed antenna information, please refer to the internal photos.	

6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.207		
Test Frequency Range:	150 kHz to 30 MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9 kHz, VBW=30 kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* 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.), which 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 5.9 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Passed		

Measurement Data:

Product name:	broage NBOOK	**Product model:**	ACH-I515-01
Test by:	Janet	**Test mode:**	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%

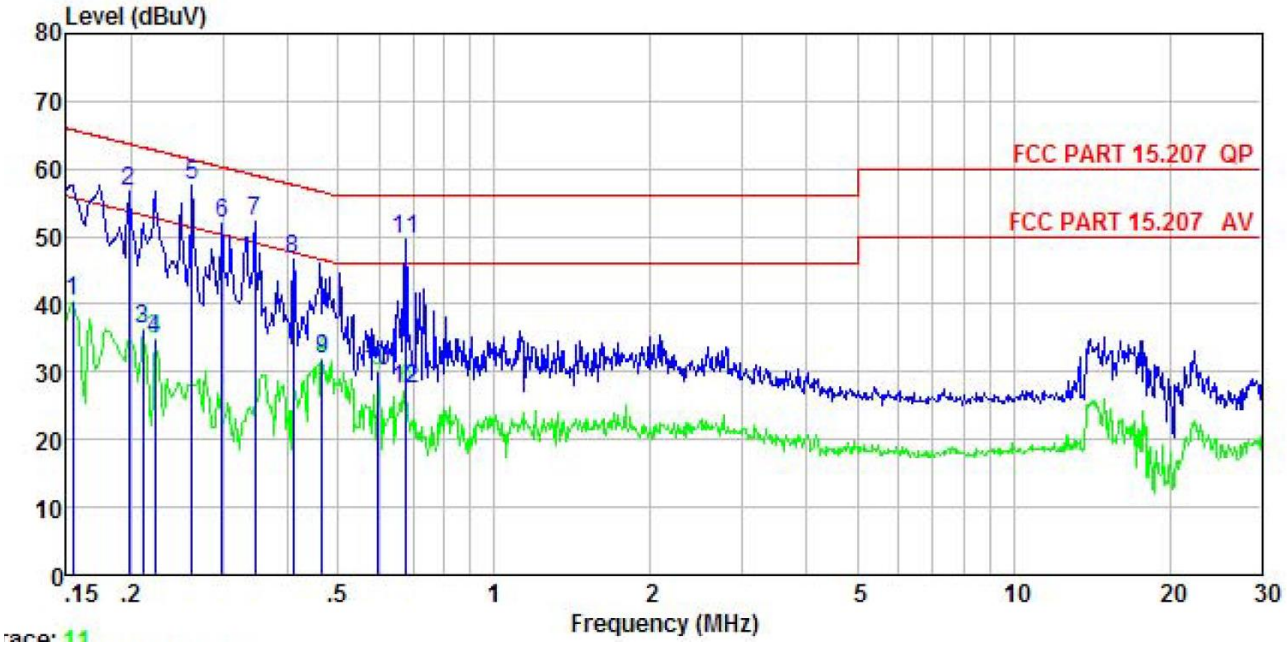


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	48.81	-0.57	10.78	58.96	65.78	-6.82	QP
2	0.154	31.91	-0.57	10.78	42.06	55.78	-13.72	Average
3	0.166	45.96	-0.58	10.77	56.06	65.16	-9.10	QP
4	0.178	43.50	-0.58	10.77	53.57	64.59	-11.02	QP
5	0.178	27.79	-0.58	10.77	37.86	54.59	-16.73	Average
6	0.190	26.78	-0.59	10.76	36.81	54.02	-17.21	Average
7	0.194	41.56	-0.59	10.76	51.58	63.84	-12.26	QP
8	0.222	39.63	-0.58	10.76	49.62	62.74	-13.12	QP
9	0.222	27.06	-0.58	10.76	37.05	52.74	-15.69	Average
10	0.471	35.59	-0.44	10.75	45.75	56.49	-10.74	QP
11	0.505	21.40	-0.43	10.76	31.38	46.00	-14.62	Average
12	0.598	20.54	-0.48	10.77	30.45	46.00	-15.55	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:	broage NBOOK	**Product model:**	ACH-I515-01
Test by:	Janet	**Test mode:**	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%

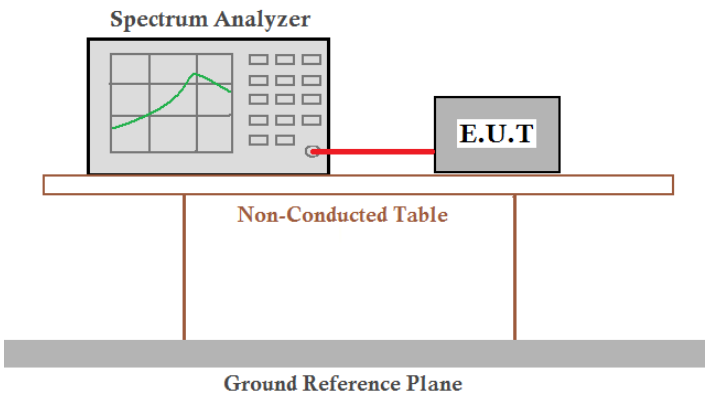


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.154	30.42	-0.69	10.78	40.52	55.78	-15.26	Average
2	0.198	46.68	-0.67	10.76	56.77	63.71	-6.94	QP
3	0.211	26.21	-0.67	10.76	36.30	53.18	-16.88	Average
4	0.222	24.80	-0.67	10.76	34.89	52.74	-17.85	Average
5	0.262	47.49	-0.67	10.75	57.58	61.38	-3.80	QP
6	0.299	42.02	-0.67	10.74	52.10	60.28	-8.18	QP
7	0.346	42.17	-0.65	10.73	52.22	59.05	-6.83	QP
8	0.410	36.54	-0.63	10.72	46.58	57.64	-11.06	QP
9	0.466	21.83	-0.64	10.75	31.94	46.58	-14.64	Average
10	0.598	20.02	-0.64	10.77	30.19	46.00	-15.81	Average
11	0.675	39.45	-0.64	10.77	49.62	56.00	-6.38	QP
12	0.675	17.26	-0.64	10.77	27.43	46.00	-18.57	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 Part 15 C Section 15.247 (b)(3)
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

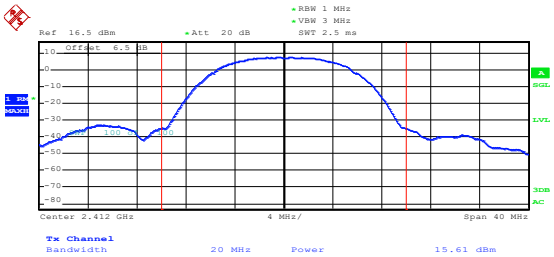
Measurement Data:

Mode	Test CH	Ant. Port	Conducted Output power(dBm)	Total power (dBm)	Limit (dBm)	Result
802.11b (SISO)	Lowest	TX1	15.61	/	30.00	Pass
		TX2	15.35			
	Middle	TX1	15.32			
		TX2	15.61			
	Highest	TX1	15.47			
		TX2	15.79			
802.11g (SISO)	Lowest	TX1	14.02	/	30.00	Pass
		TX2	14.01			
	Middle	TX1	14.01			
		TX2	14.49			
	Highest	TX1	14.18			
		TX2	14.84			
802.11n(HT20) (MIMO)	Lowest	TX1	13.02	16.02	30.00	Pass
		TX2	13.00			
	Middle	TX1	13.09	16.26		
		TX2	13.41			
	Highest	TX1	13.27	16.56		
		TX2	13.81			
802.11n(HT40) (MIMO)	Lowest	TX1	12.50	15.44	30.00	Pass
		TX2	12.35			
	Middle	TX1	12.49	15.57		
		TX2	12.62			
	Highest	TX1	12.62	15.77		
		TX2	12.90			

Test plot as follows:

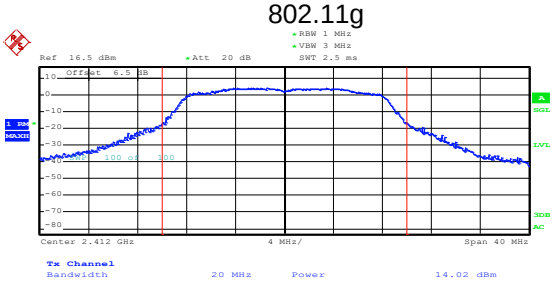
ANT1

802.11b



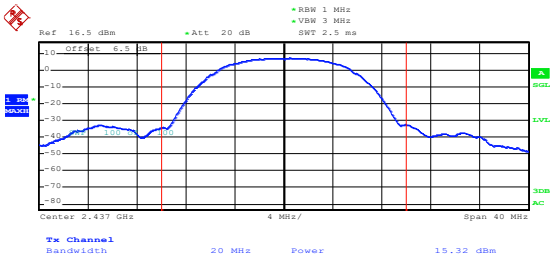
Date: 18.JUN.2020 11:54:41

802.11g



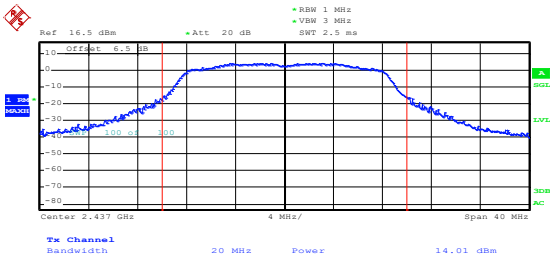
Date: 18.JUN.2020 11:57:32

Lowest channel



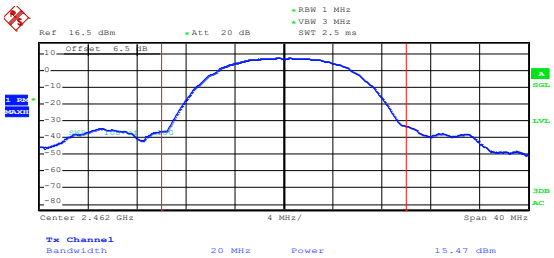
Date: 18.JUN.2020 11:54:59

Lowest channel



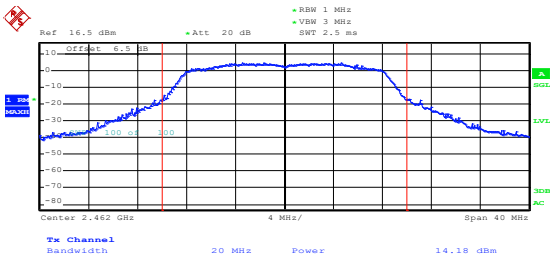
Date: 18.JUN.2020 11:56:41

Middle channel



Date: 18.JUN.2020 11:55:12

Middle channel

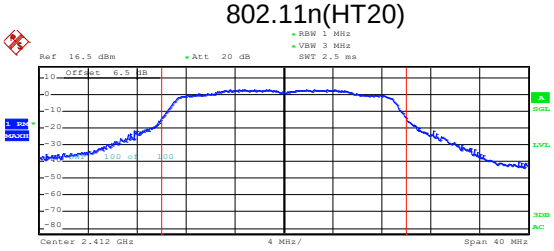


Date: 18.JUN.2020 11:55:58

Highest channel

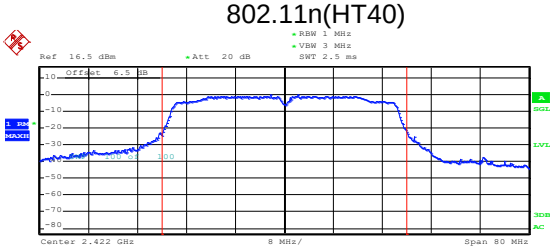
Highest channel

802.11n(HT20)



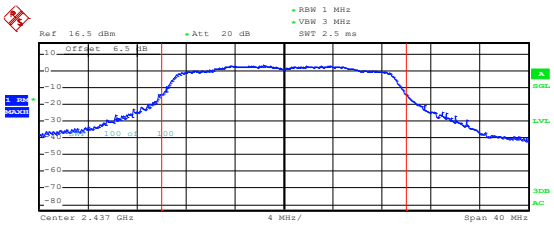
Date: 18.JUN.2020 11:58:21

802.11n(HT40)



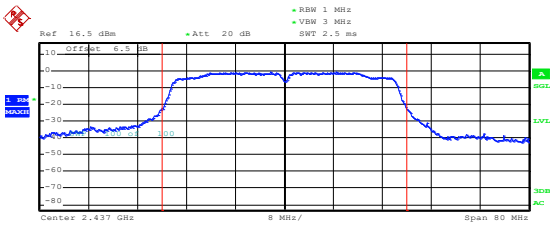
Date: 18.JUN.2020 11:59:19

Lowest channel



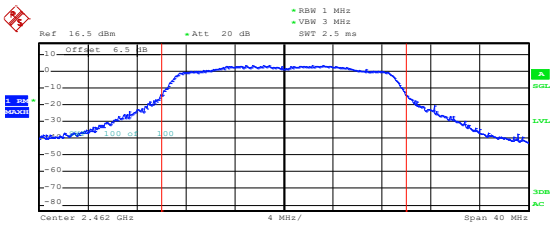
Date: 18.JUN.2020 11:58:40

Lowest channel



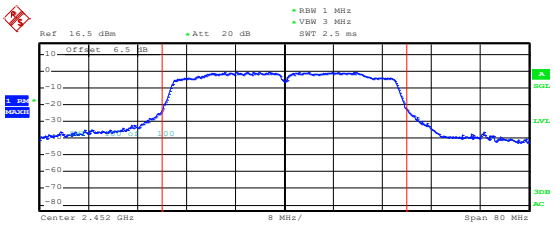
Date: 18.JUN.2020 11:59:31

Middle channel



Date: 18.JUN.2020 11:58:52

Middle channel

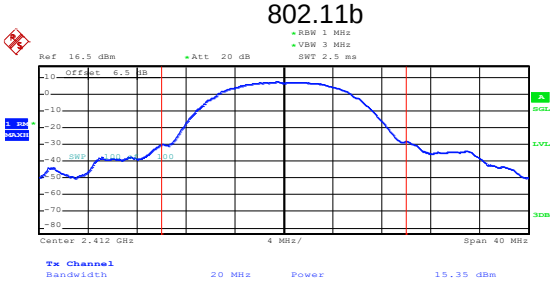


Date: 18.JUN.2020 11:59:46

Highest channel

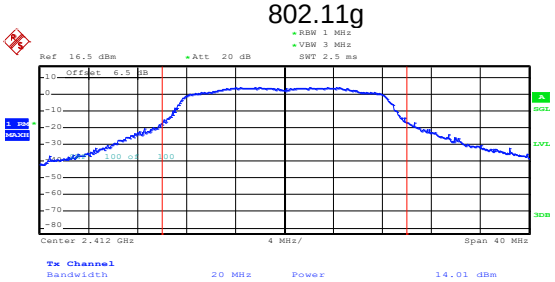
ANT2

802.11b



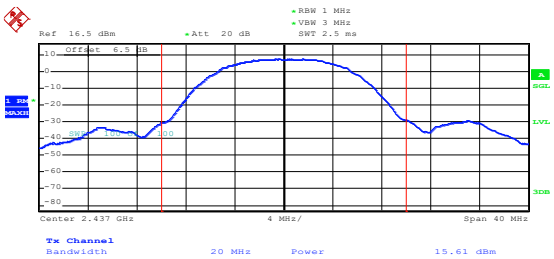
Date: 18.JUN.2020 16:37:05

802.11g



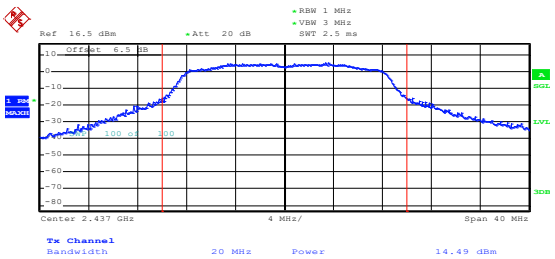
Date: 18.JUN.2020 16:38:20

Lowest channel



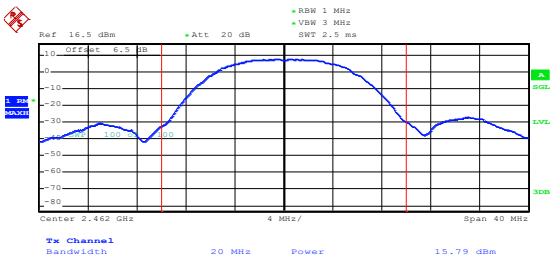
Date: 18.JUN.2020 16:37:19

Lowest channel



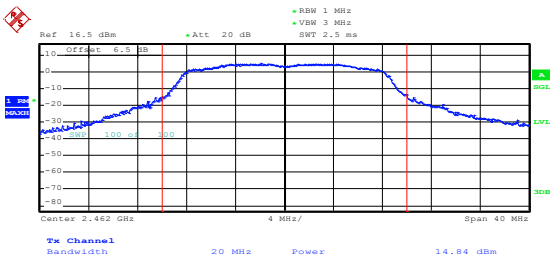
Date: 18.JUN.2020 16:38:08

Middle channel



Date: 18.JUN.2020 16:37:33

Middle channel

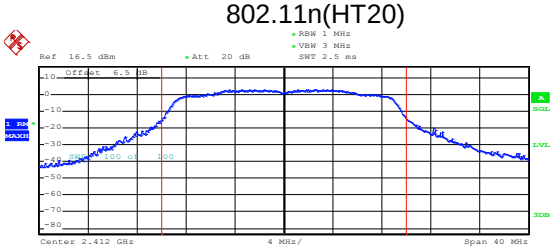


Date: 18.JUN.2020 16:37:55

Highest channel

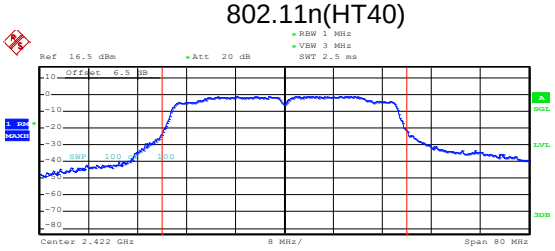
Highest channel

802.11n(HT20)



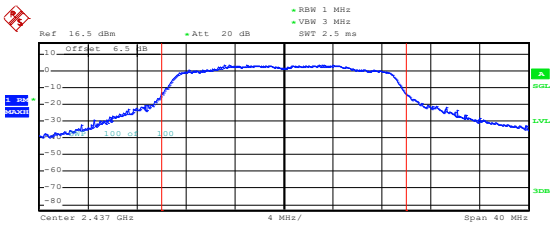
Date: 18.JUN.2020 16:38:52

802.11n(HT40)



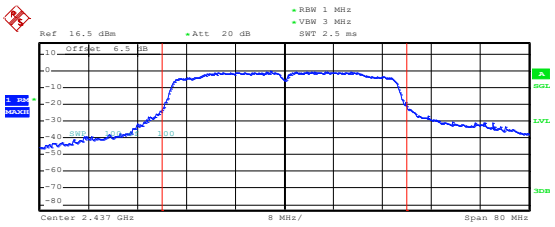
Date: 18.JUN.2020 16:39:41

Lowest channel



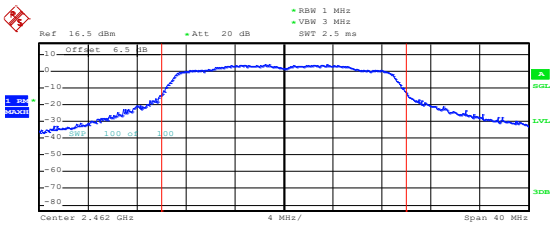
Date: 18.JUN.2020 16:39:05

Lowest channel



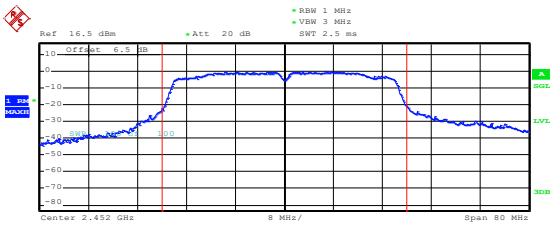
Date: 18.JUN.2020 16:39:53

Middle channel



Date: 18.JUN.2020 16:39:17

Middle channel

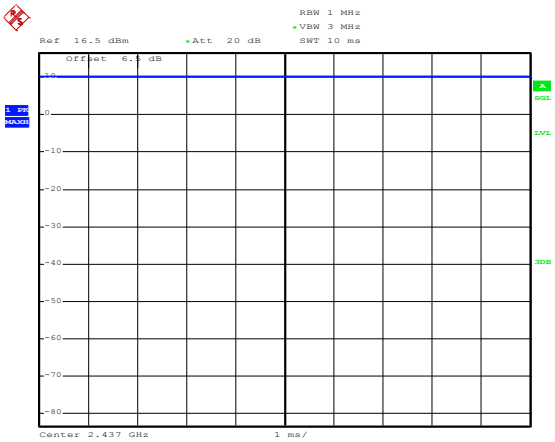


Date: 18.JUN.2020 16:40:05

Highest channel

Duty cycle

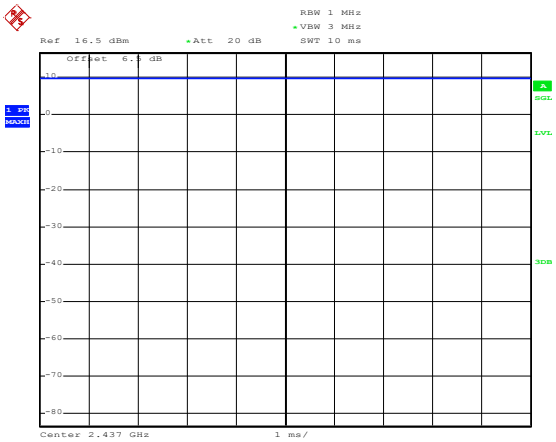
ANT 1



Date: 14.SEP.2020 04:38:10

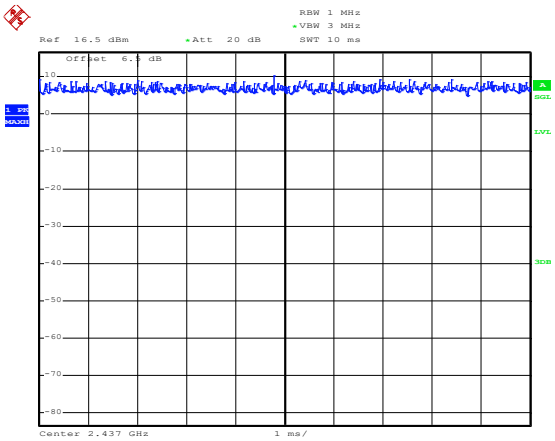
802.11b

ANT 2



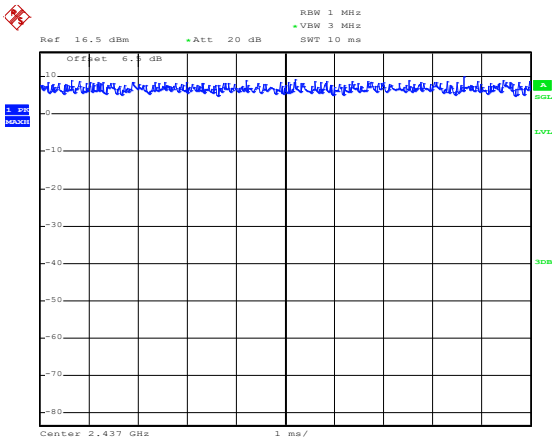
Date: 14.SEP.2020 04:49:34

802.11b



Date: 14.SEP.2020 04:37:01

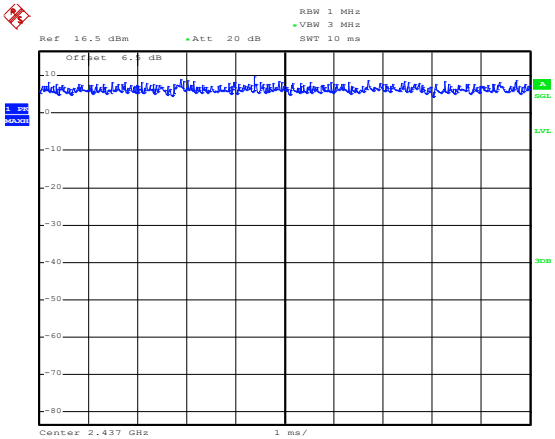
802.11g



Date: 14.SEP.2020 04:48:36

802.11g

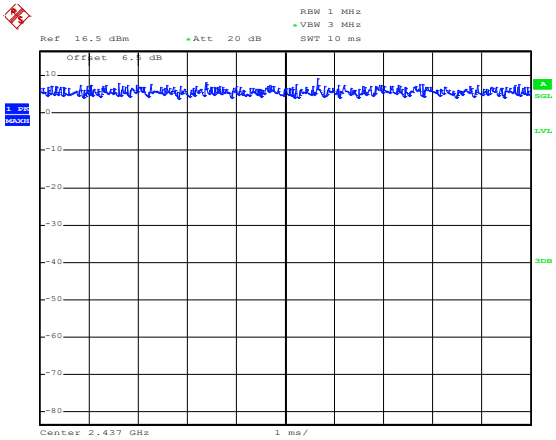
ANT 1



Date: 14.SEP.2020 04:37:15

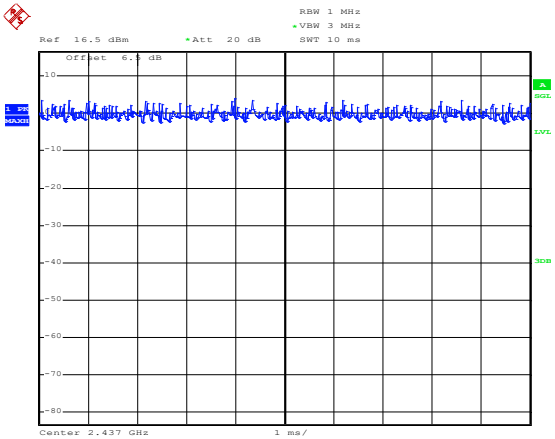
802.11n20

ANT 2



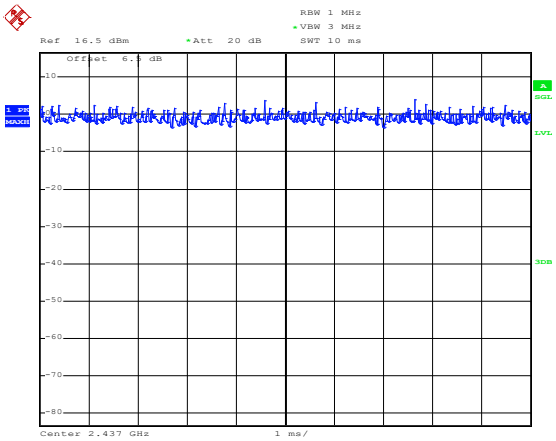
Date: 14.SEP.2020 04:48:52

802.11n20



Date: 14.SEP.2020 04:37:38

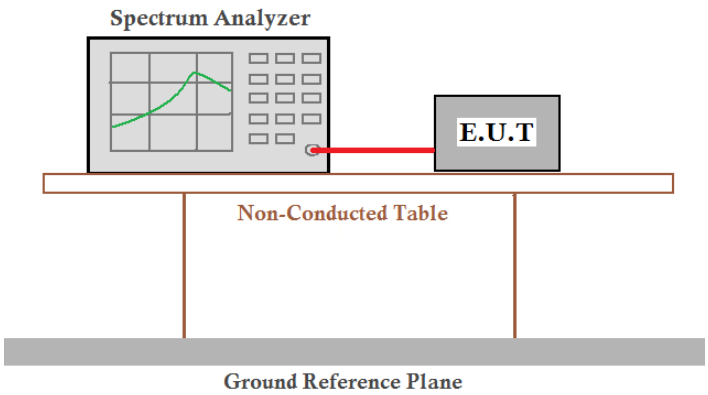
802.11n40



Date: 14.SEP.2020 04:49:07

802.11n40

6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

ANT1

Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	9.36	15.28	15.52	35.52	>500	Pass
Middle	9.36	15.28	15.28	35.52		
Highest	9.28	15.28	15.28	35.52		
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	12.48	16.72	17.92	36.32	N/A	N/A
Middle	12.48	16.72	17.92	36.32		
Highest	12.56	16.72	17.92	36.48		

ANT2

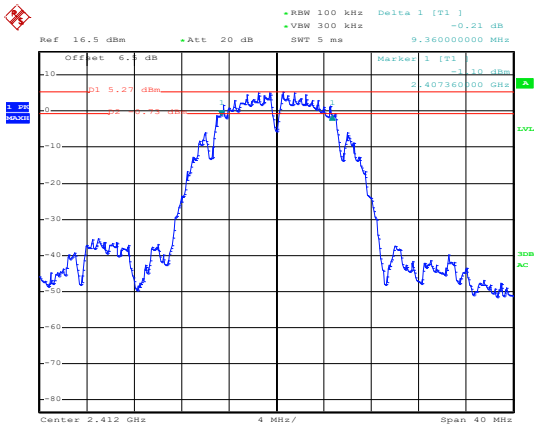
Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	9.28	15.36	15.28	35.52	>500	Pass
Middle	9.28	15.28	15.28	35.52		
Highest	9.28	15.28	15.20	35.52		
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	12.56	16.72	17.84	36.48	N/A	N/A
Middle	12.88	16.80	17.92	36.48		
Highest	12.96	16.88	18.00	36.48		

Test plot as follows:

ANT1

802.11b

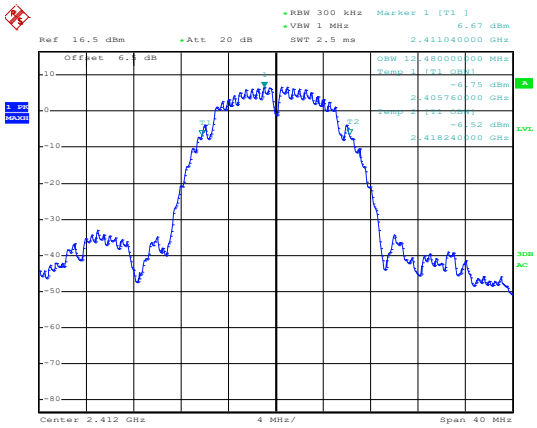
6dB EBW



Date: 18.JUN.2020 14:02:55

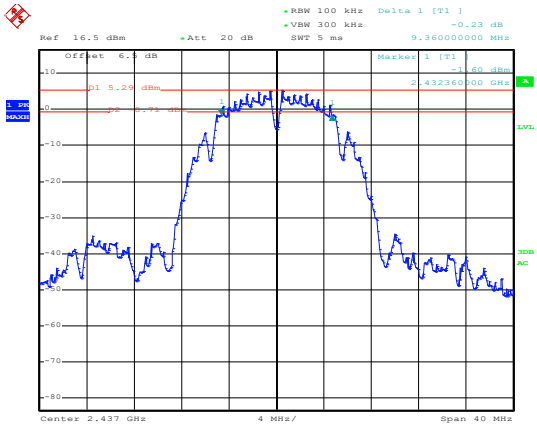
Lowest channel

99% OBW



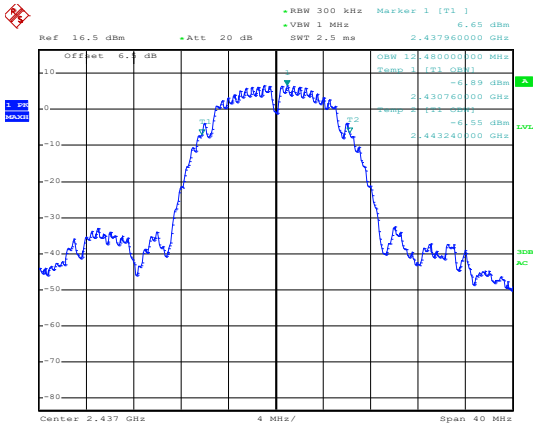
Date: 18.JUN.2020 12:02:45

Lowest channel



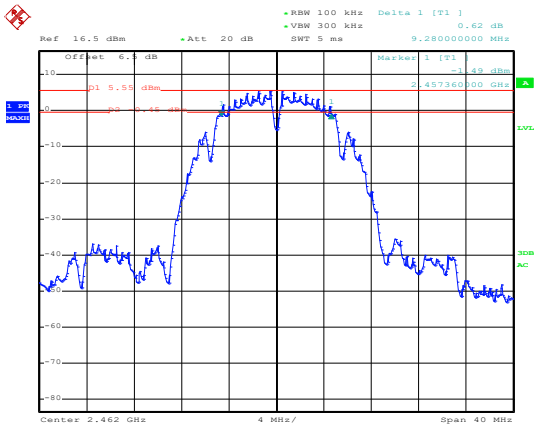
Date: 18.JUN.2020 14:03:30

Middle channel



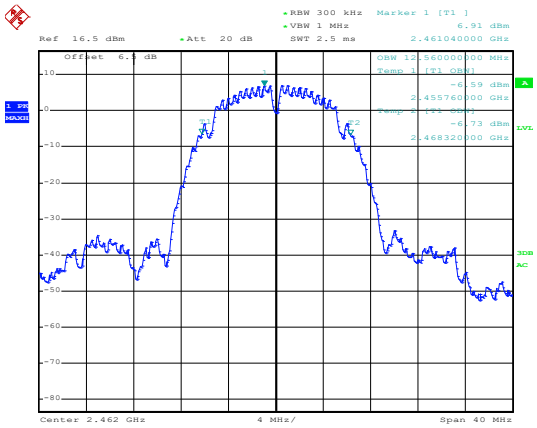
Date: 18.JUN.2020 12:02:57

Middle channel



Date: 18.JUN.2020 14:04:06

Highest channel

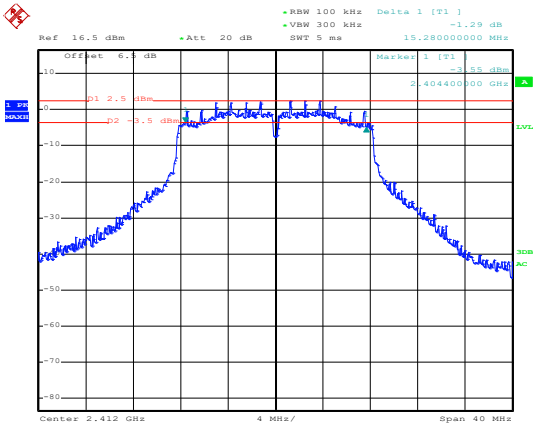


Date: 18.JUN.2020 12:03:11

Highest channel

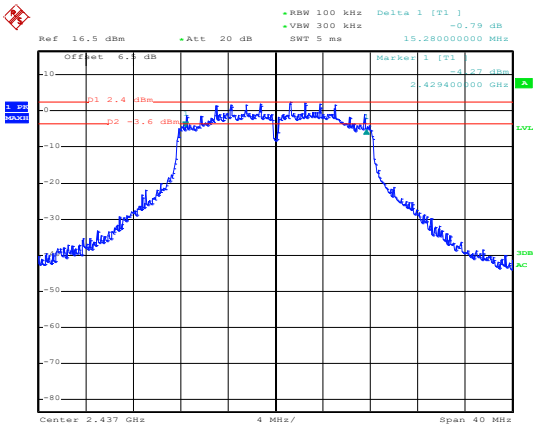
802.11g

6dB EBW



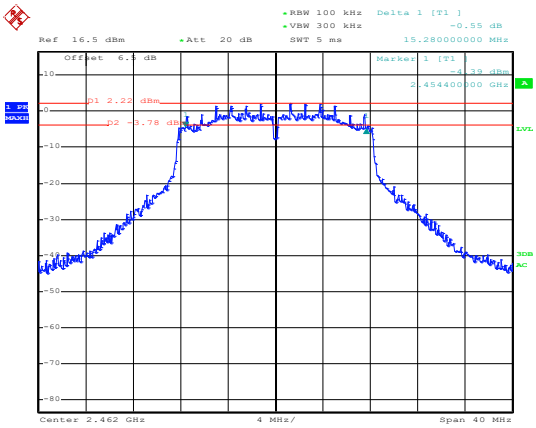
Date: 18.JUN.2020 14:01:59

Lowest channel



Date: 18.JUN.2020 14:00:36

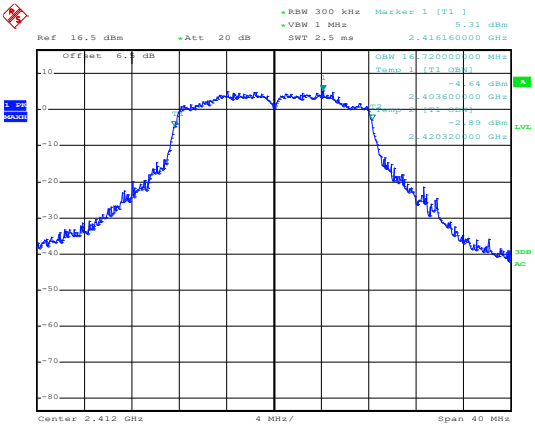
Middle channel



Date: 18.JUN.2020 13:59:04

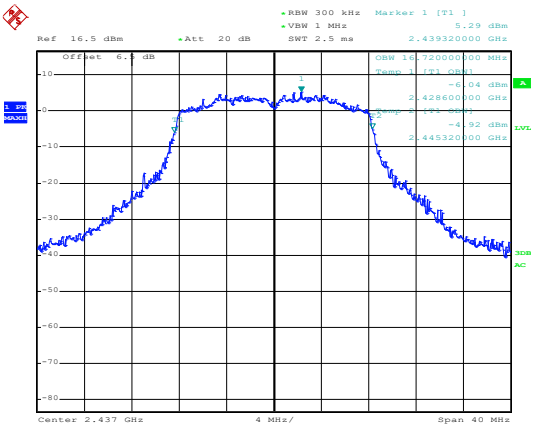
Highest channel

99% OBW



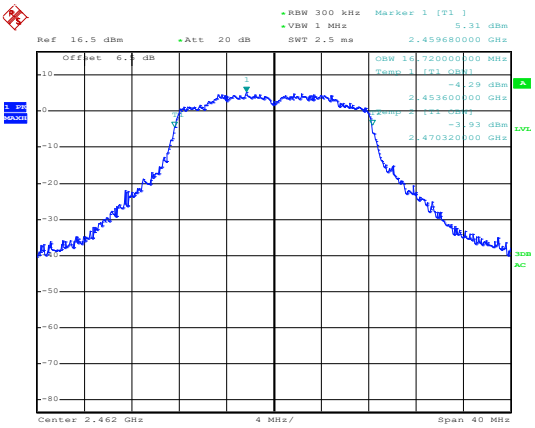
Date: 18.JUN.2020 12:02:26

Lowest channel



Date: 18.JUN.2020 12:02:16

Middle channel

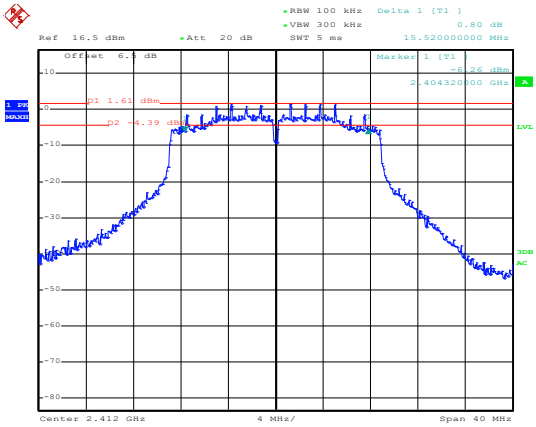


Date: 18.JUN.2020 12:02:06

Highest channel

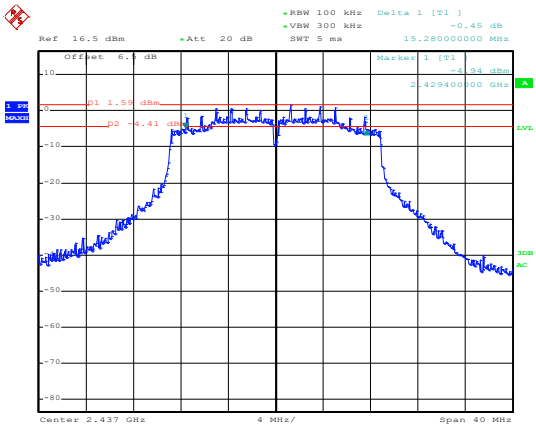
802.11n(HT20)

6dB EBW



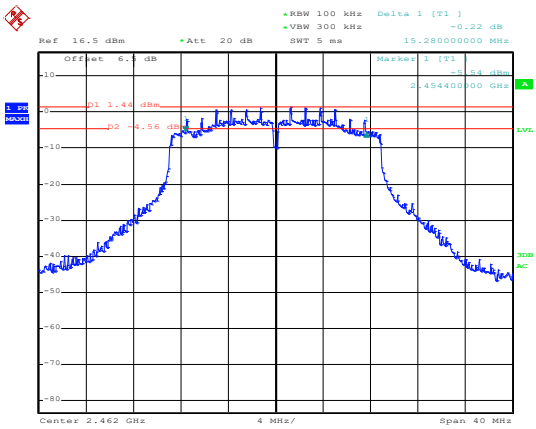
Date: 18.JUN.2020 13:55:20

Lowest channel



Date: 18.JUN.2020 13:56:50

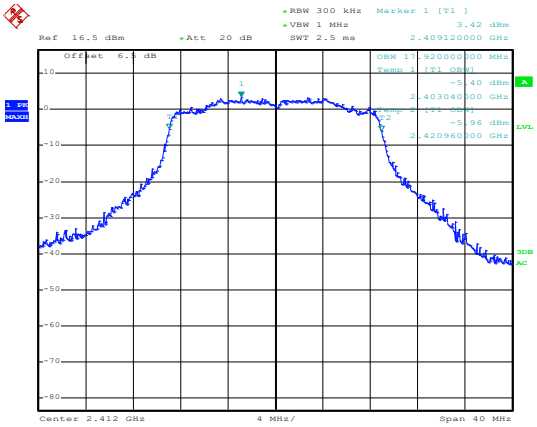
Middle channel



Date: 18.JUN.2020 13:57:36

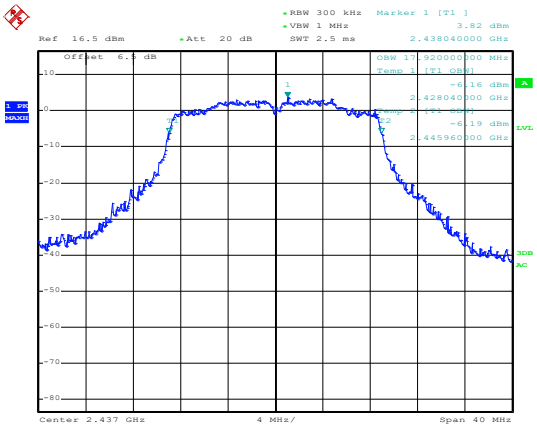
Highest channel

99% OBW



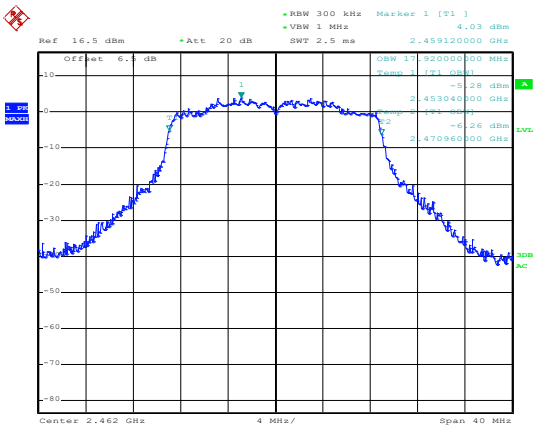
Date: 18.JUN.2020 12:01:25

Lowest channel



Date: 18.JUN.2020 12:01:37

Middle channel

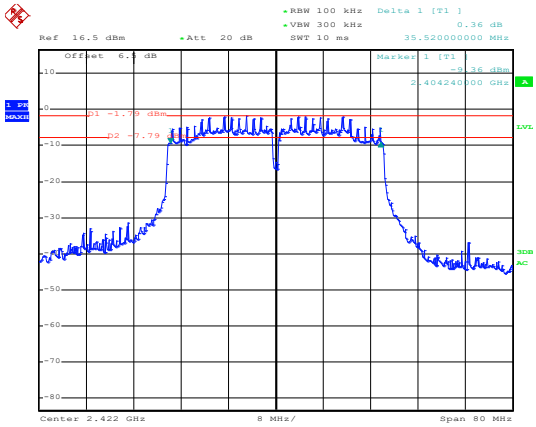


Date: 18.JUN.2020 12:01:49

Highest channel

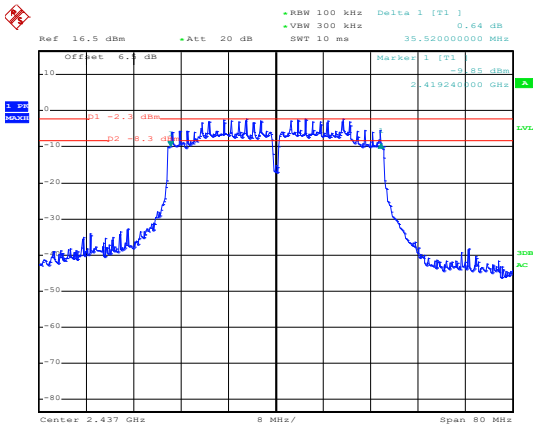
802.11n(HT40)

6dB EBW



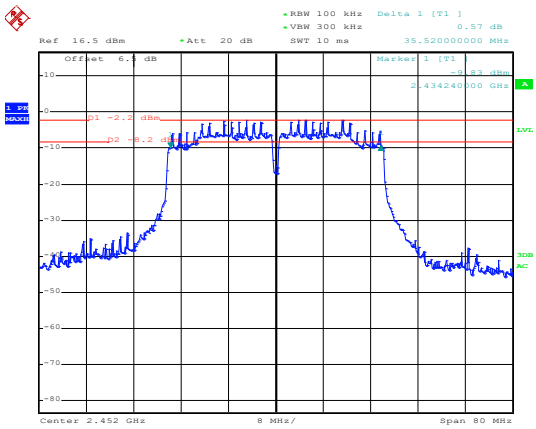
Date: 18.JUN.2020 13:50:18

Lowest channel



Date: 18.JUN.2020 13:52:02

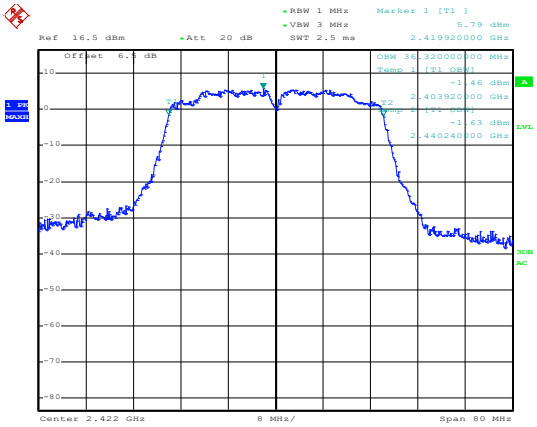
Middle channel



Date: 18.JUN.2020 13:53:38

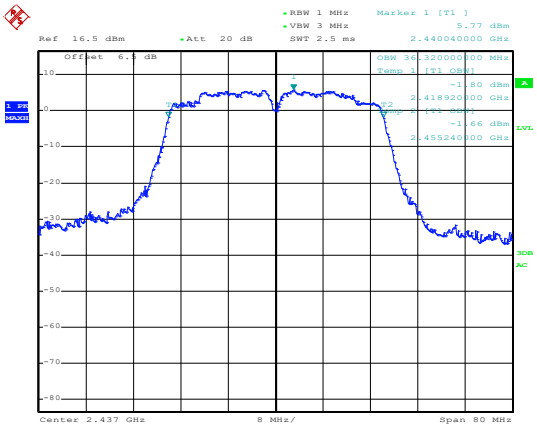
Highest channel

99% OBW



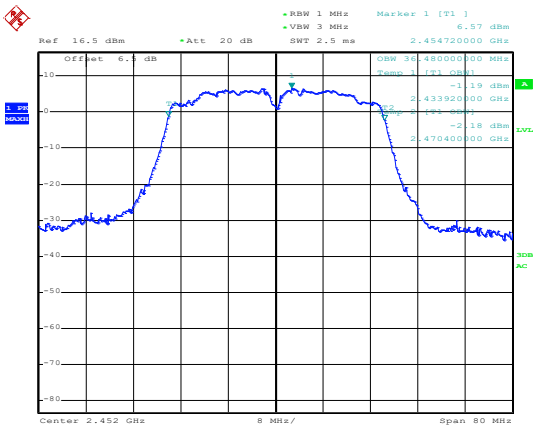
Date: 18.JUN.2020 12:00:59

Lowest channel



Date: 18.JUN.2020 12:00:47

Middle channel



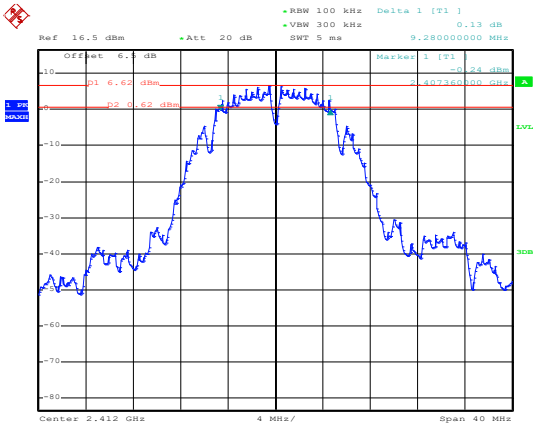
Date: 18.JUN.2020 12:00:37

Highest channel

ANT2

802.11b

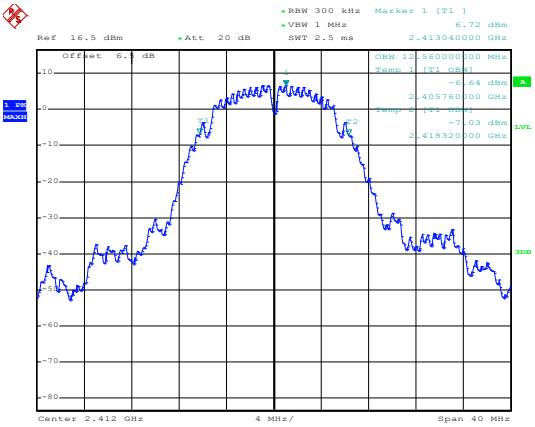
6dB EBW



Date: 18.JUN.2020 16:59:49

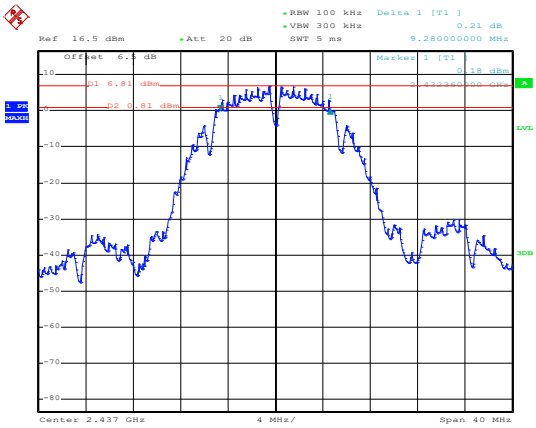
Lowest channel

99% OBW



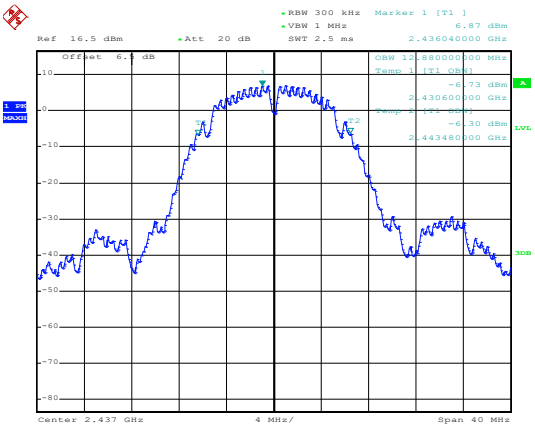
Date: 18.JUN.2020 16:42:35

Lowest channel



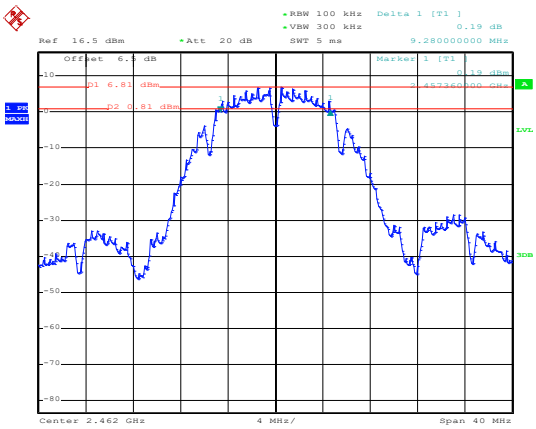
Date: 18.JUN.2020 17:01:19

Middle channel



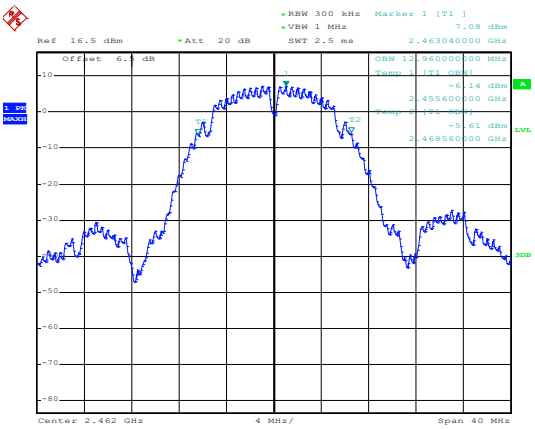
Date: 18.JUN.2020 16:42:45

Middle channel



Date: 18.JUN.2020 17:02:17

Highest channel

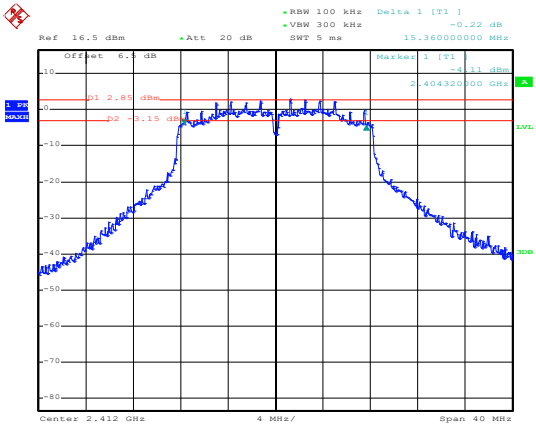


Date: 18.JUN.2020 16:42:58

Highest channel

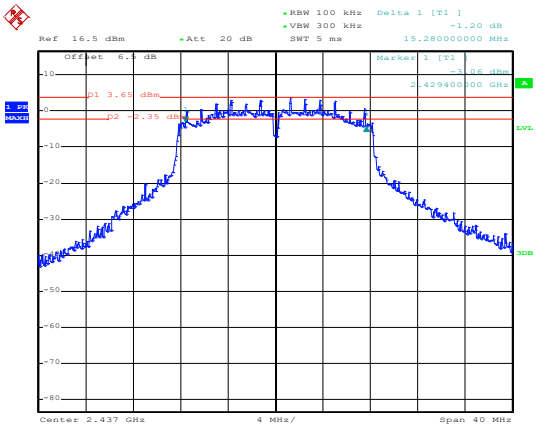
802.11g

6dB EBW



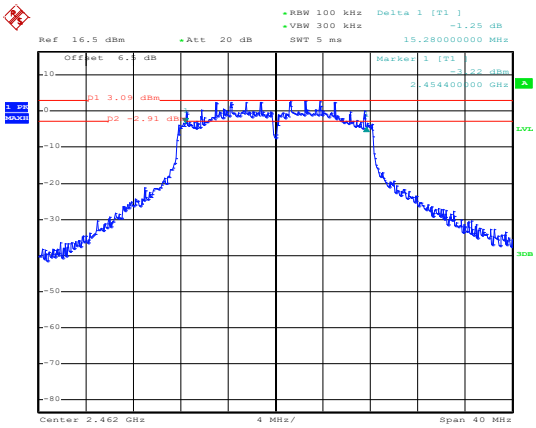
Date: 18.JUN.2020 16:58:44

Lowest channel



Date: 18.JUN.2020 16:56:50

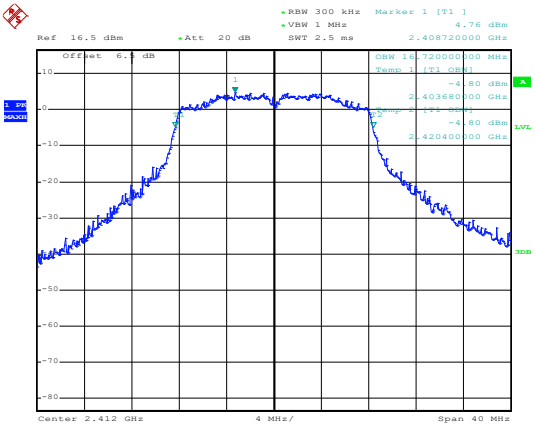
Middle channel



Date: 18.JUN.2020 16:55:57

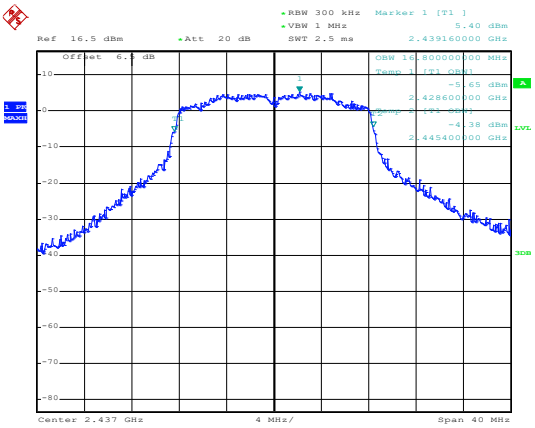
Highest channel

99% OBW



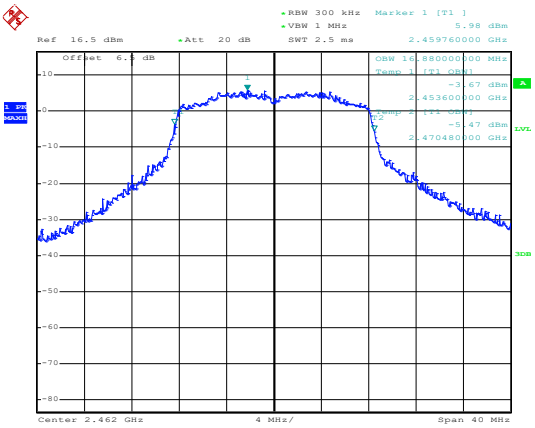
Date: 18.JUN.2020 16:42:21

Lowest channel



Date: 18.JUN.2020 16:42:11

Middle channel

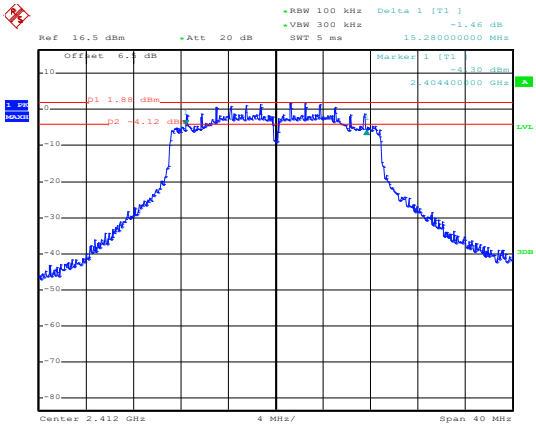


Date: 18.JUN.2020 16:42:00

Highest channel

802.11n(HT20)

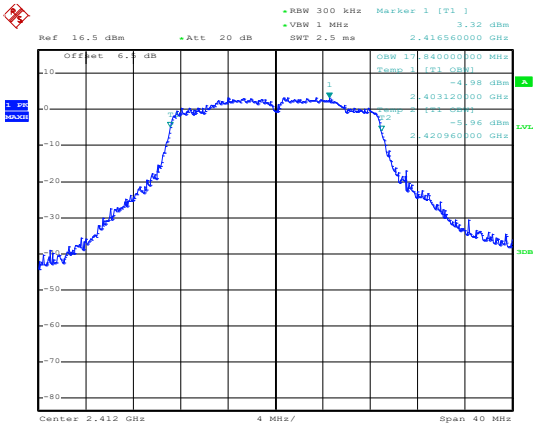
6dB EBW



Date: 18.JUN.2020 16:51:20

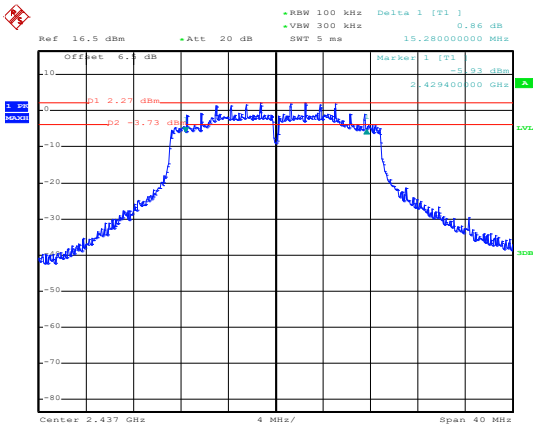
Lowest channel

99% OBW



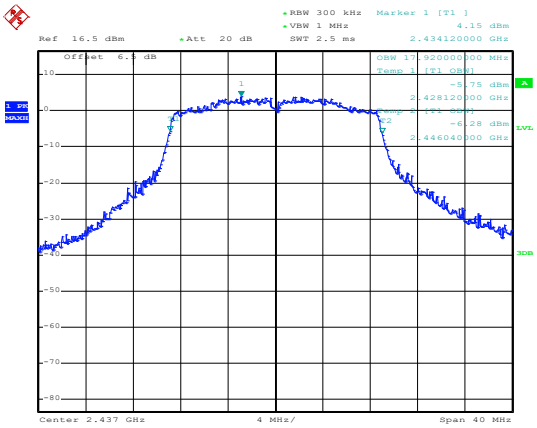
Date: 18.JUN.2020 16:41:23

Lowest channel



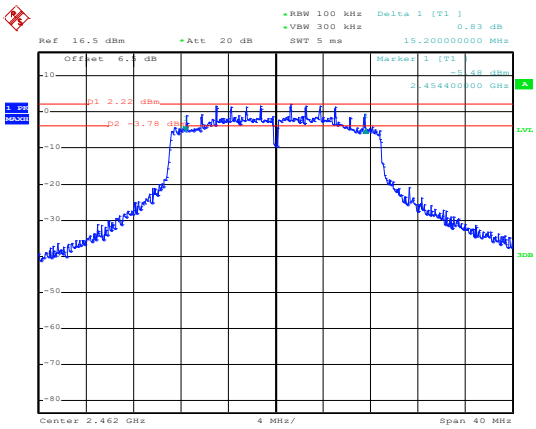
Date: 18.JUN.2020 17:58:37

Middle channel



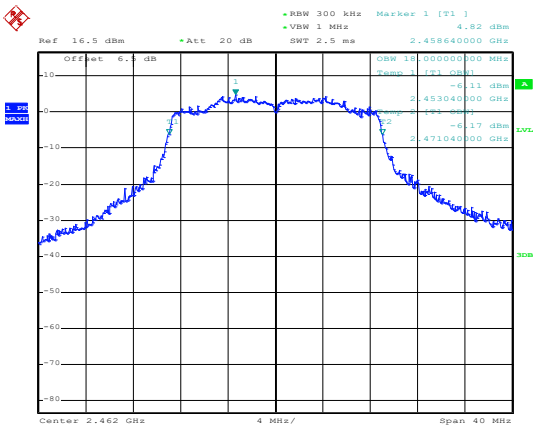
Date: 18.JUN.2020 16:41:33

Middle channel



Date: 18.JUN.2020 16:55:13

Highest channel

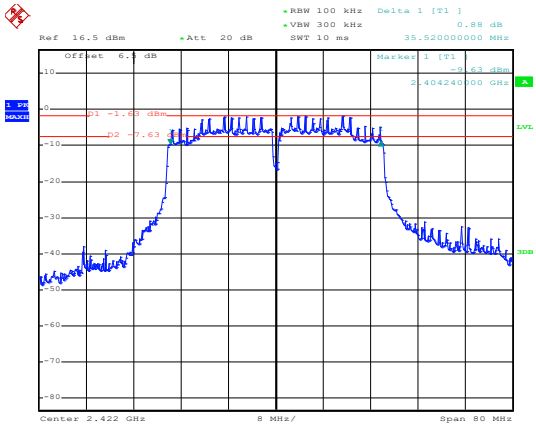


Date: 18.JUN.2020 16:41:45

Highest channel

802.11n(HT40)

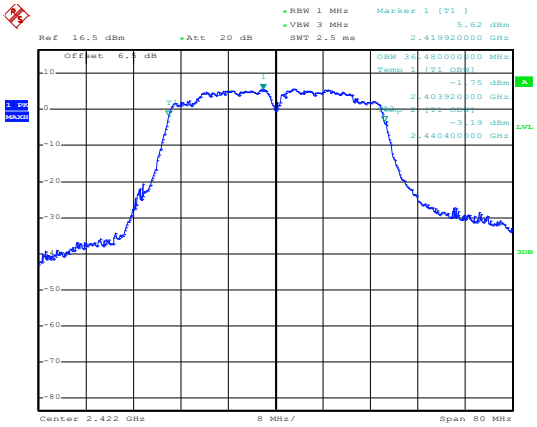
6dB EBW



Date: 18.JUN.2020 16:50:11

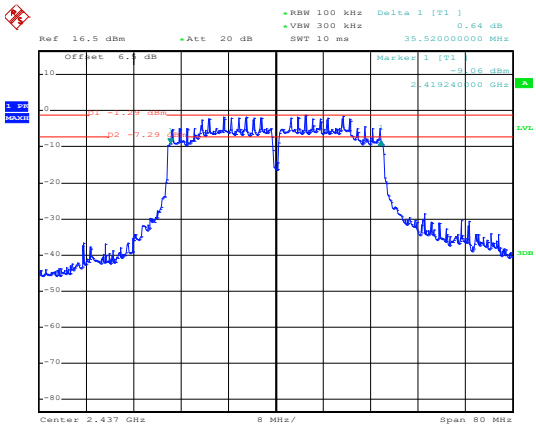
Lowest channel

99% OBW



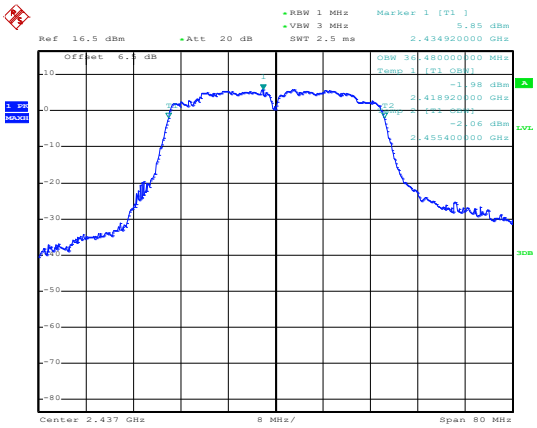
Date: 18.JUN.2020 16:41:02

Lowest channel



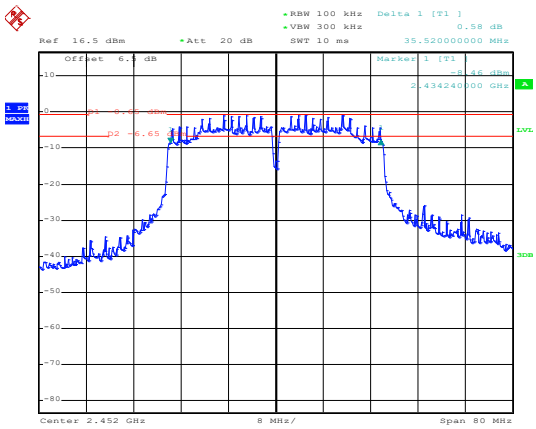
Date: 18.JUN.2020 16:48:44

Middle channel



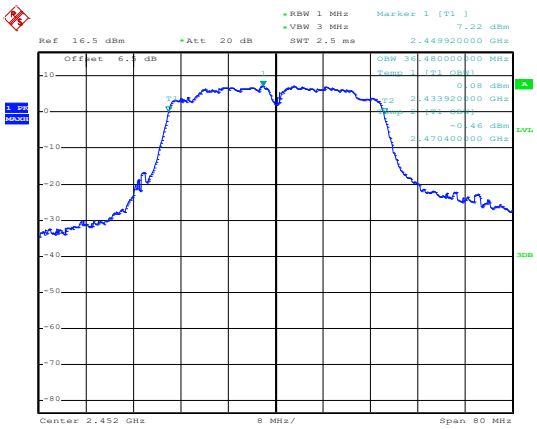
Date: 18.JUN.2020 16:40:50

Middle channel



Date: 18.JUN.2020 16:47:09

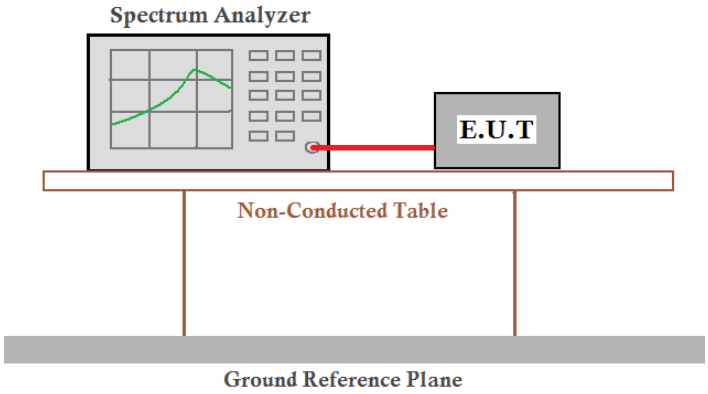
Highest channel



Date: 18.JUN.2020 16:40:35

Highest channel

6.5 Power Spectral Density

Test Requirement:	FCC Part 15 C Section 15.247 (e)
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

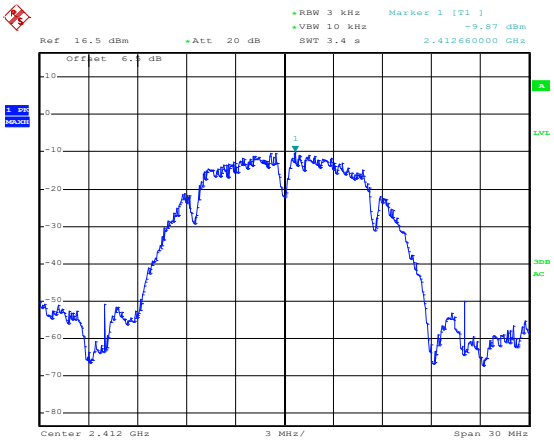
Measurement Data:

Mode	Test CH	Ant. Port	Conducted P.S.D(dBm/3KHz)	Total P.S.D (dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b (SISO)	Lowest	TX1	-9.87	/	8.0	Pass
		TX2	-8.87			
	Middle	TX1	-9.53			
		TX2	-9.55			
	Highest	TX1	-9.70			
		TX2	-8.63			
802.11g (SISO)	Lowest	TX1	-13.70	/	8.0	Pass
		TX2	-12.49			
	Middle	TX1	-13.47			
		TX2	-11.99			
	Highest	TX1	-13.29			
		TX2	-11.77			
802.11n(HT20) (MIMO)	Lowest	TX1	-12.68	-10.11	8.0	Pass
		TX2	-13.62			
	Middle	TX1	-13.50	-10.37		
		TX2	-13.26			
	Highest	TX1	-13.68	-9.65		
		TX2	-11.84			
802.11n(HT40) (MIMO)	Lowest	TX1	-16.27	-13.65	8.0	Pass
		TX2	-17.09			
	Middle	TX1	-17.37	-14.56		
		TX2	-17.77			
	Highest	TX1	-16.74	-14.07		Pass
		TX2	-17.44			

Test plot as follows:

ANT1

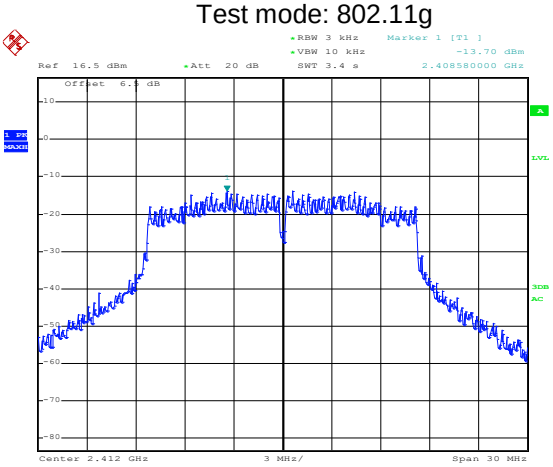
Test mode: 802.11b



Date: 18.JUN.2020 12:03:55

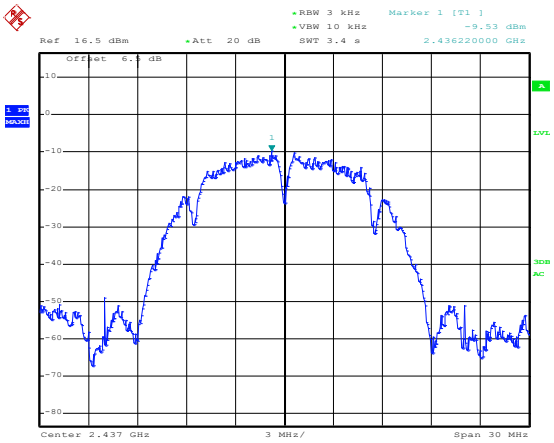
Lowest channel

Test mode: 802.11g



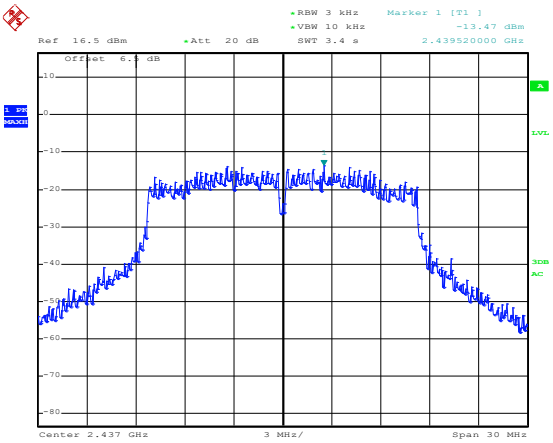
Date: 18.JUN.2020 12:04:13

Lowest channel



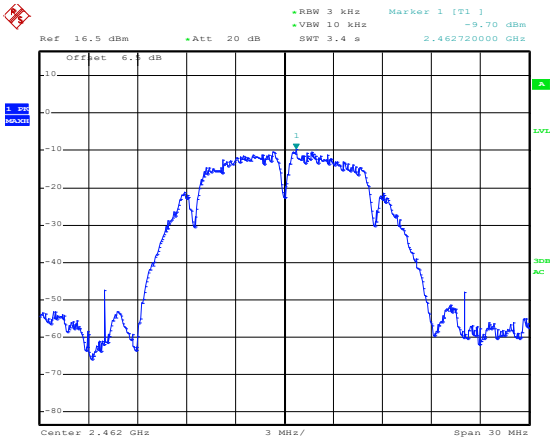
Date: 18.JUN.2020 12:03:44

Middle channel



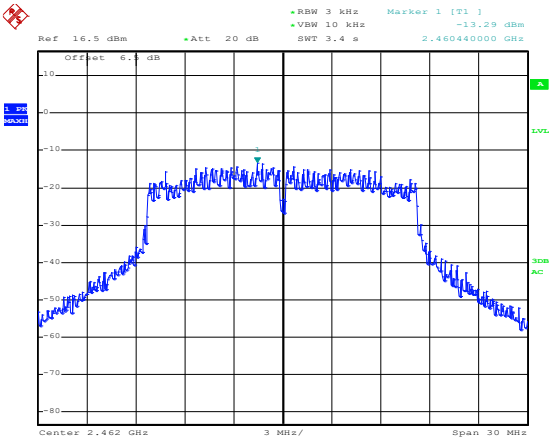
Date: 18.JUN.2020 12:04:29

Middle channel



Date: 18.JUN.2020 12:03:29

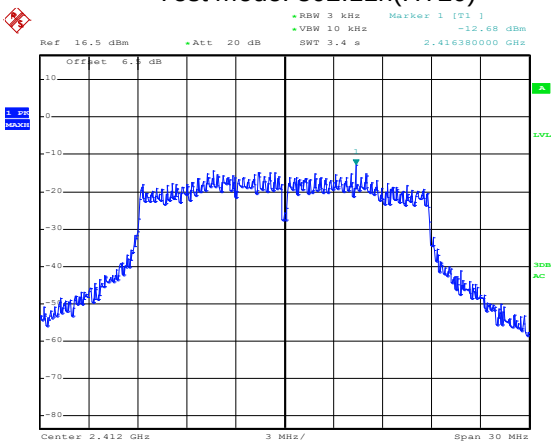
Highest channel



Date: 18.JUN.2020 12:04:42

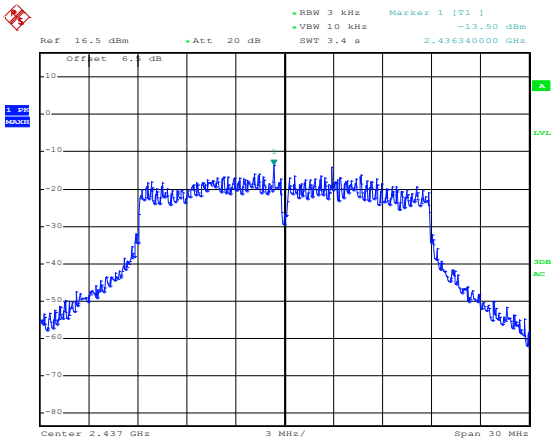
Highest channel

Test mode: 802.11n(HT20)



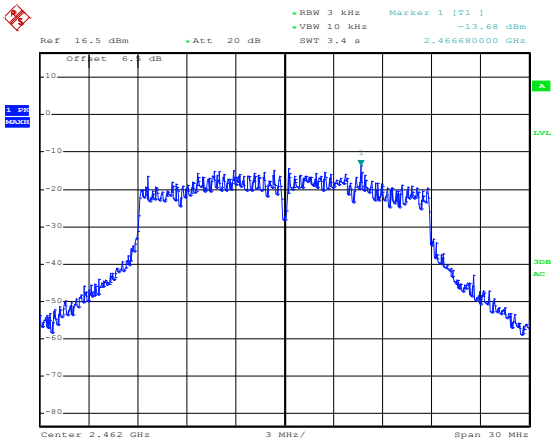
Date: 18.JUN.2020 12:05:27

Lowest channel



Date: 18.JUN.2020 12:05:14

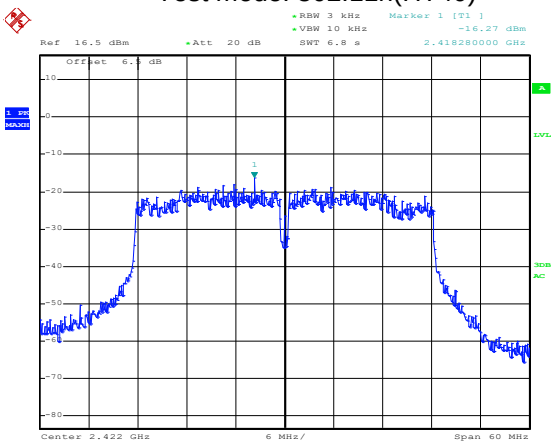
Middle channel



Date: 18.JUN.2020 12:05:00

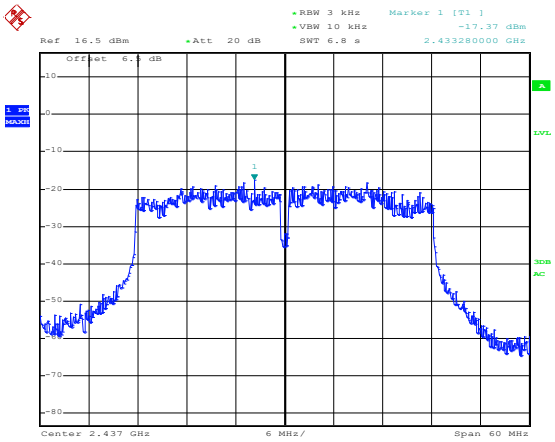
Highest channel

Test mode: 802.11n(HT40)



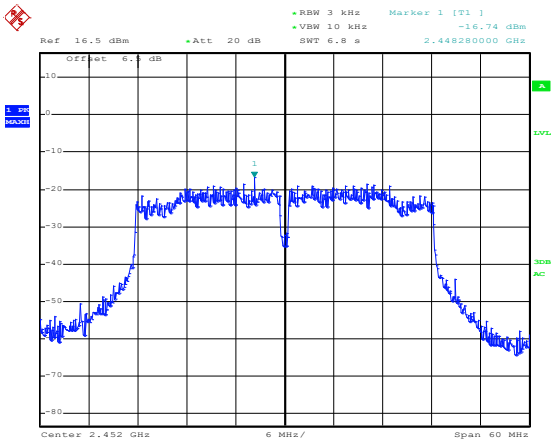
Date: 18.JUN.2020 12:05:47

Lowest channel



Date: 18.JUN.2020 12:06:03

Middle channel

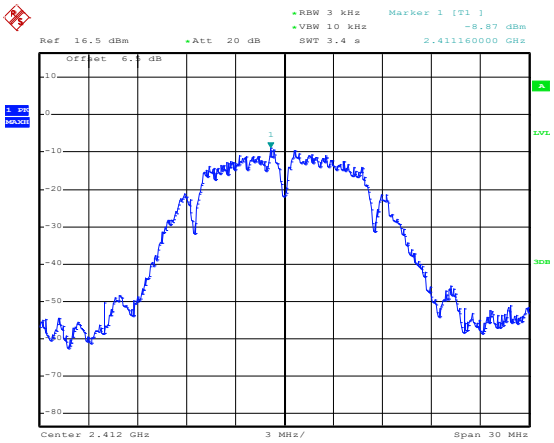


Date: 18.JUN.2020 12:06:18

Highest channel

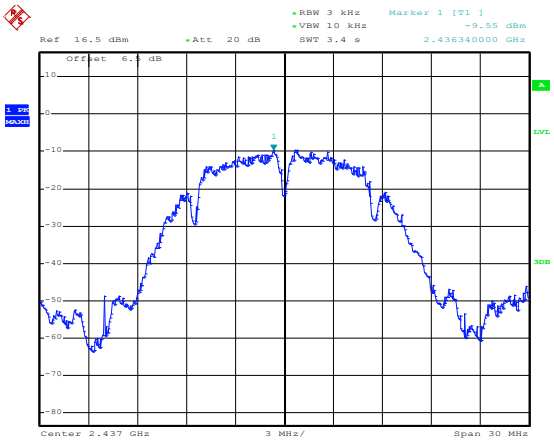
ANT2

Test mode: 802.11b



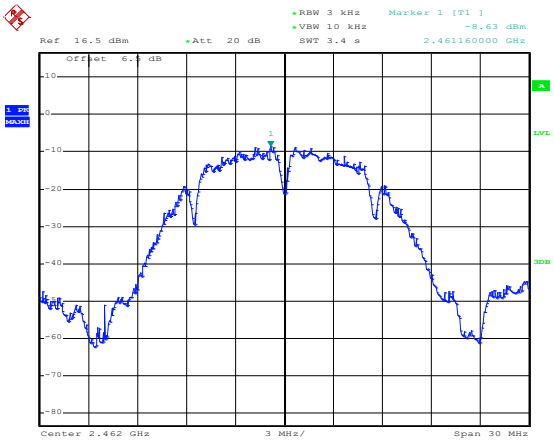
Date: 18.JUN.2020 16:43:47

Lowest channel



Date: 18.JUN.2020 16:43:35

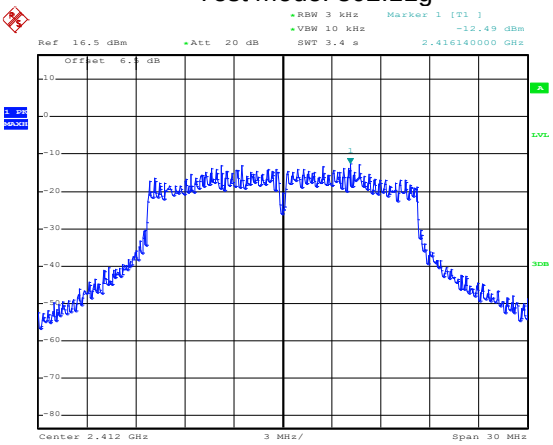
Middle channel



Date: 18.JUN.2020 16:43:17

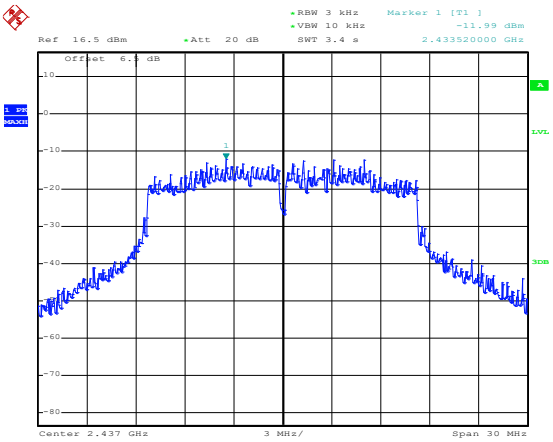
Highest channel

Test mode: 802.11g



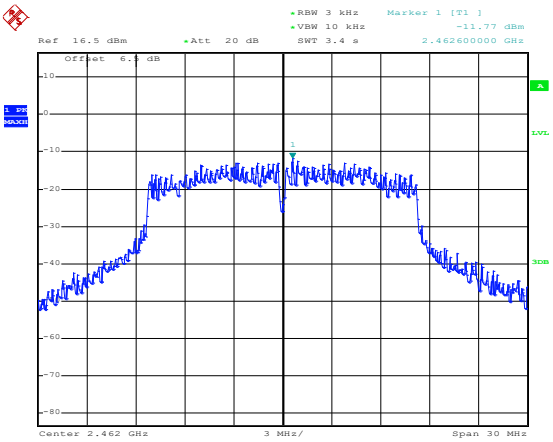
Date: 18.JUN.2020 16:44:02

Lowest channel



Date: 18.JUN.2020 16:44:14

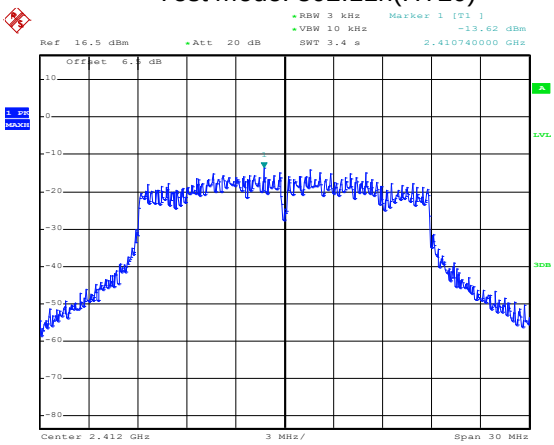
Middle channel



Date: 18.JUN.2020 16:44:28

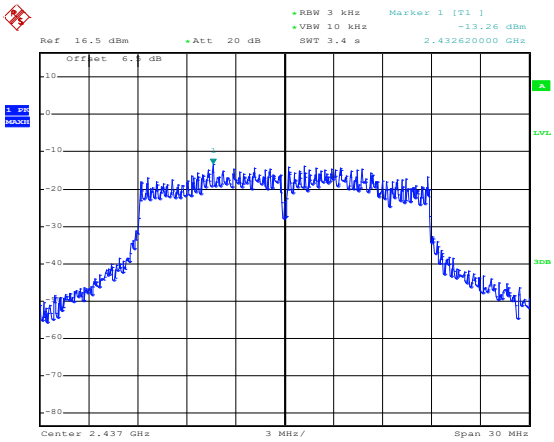
Highest channel

Test mode: 802.11n(HT20)



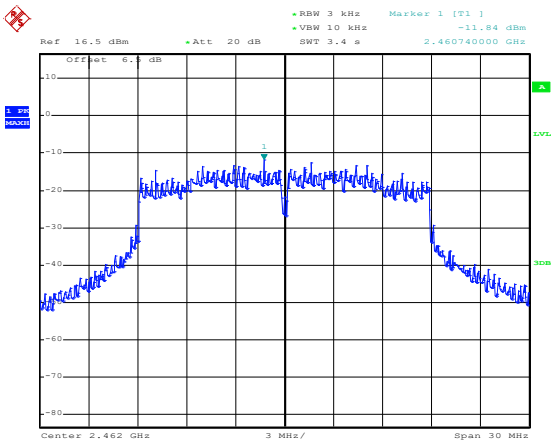
Date: 18.JUN.2020 16:45:14

Lowest channel



Date: 18.JUN.2020 16:44:59

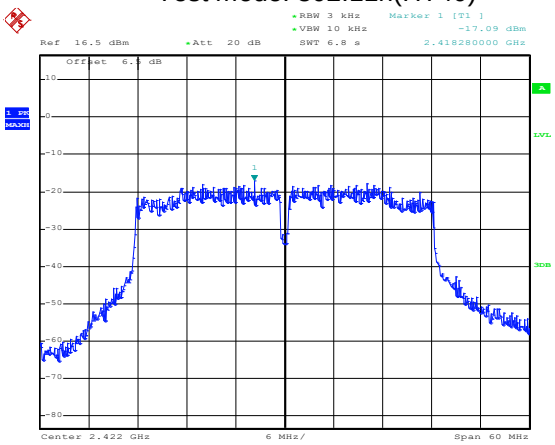
Middle channel



Date: 18.JUN.2020 16:44:46

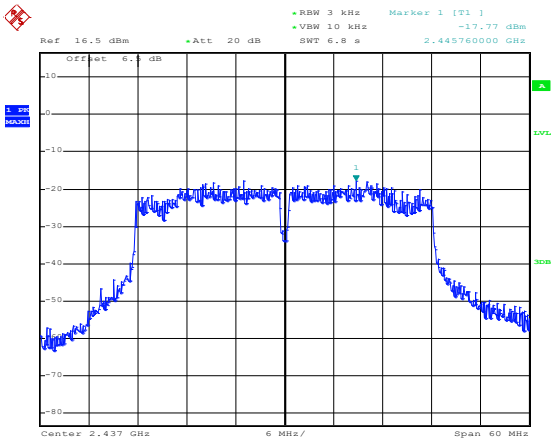
Highest channel

Test mode: 802.11n(HT40)



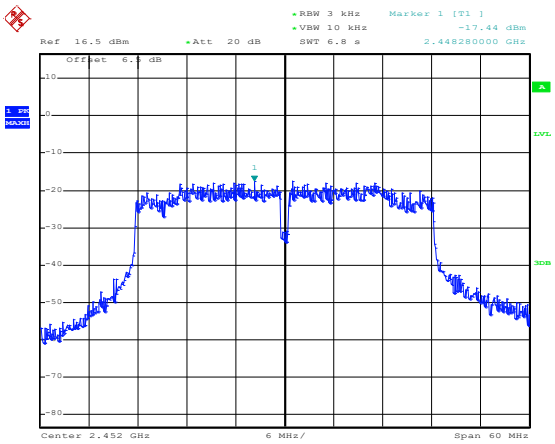
Date: 18.JUN.2020 16:45:44

Lowest channel



Date: 18.JUN.2020 16:45:59

Middle channel

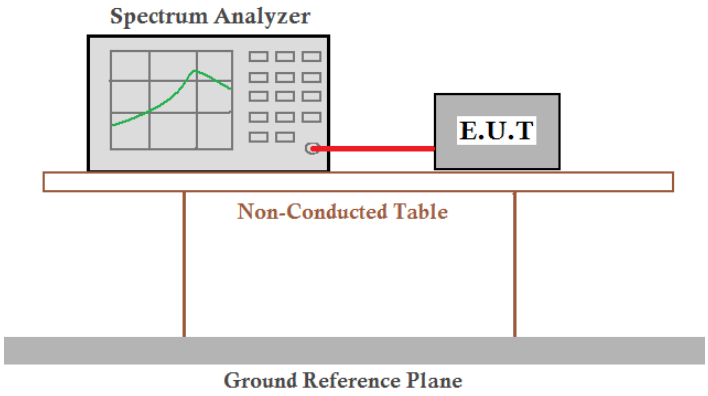


Date: 18.JUN.2020 16:46:27

Highest channel

6.6 Band Edge

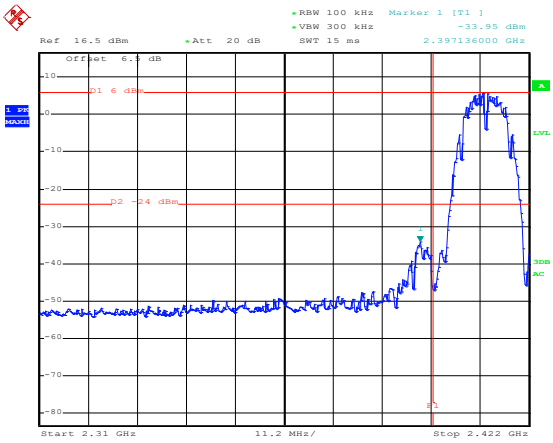
6.6.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

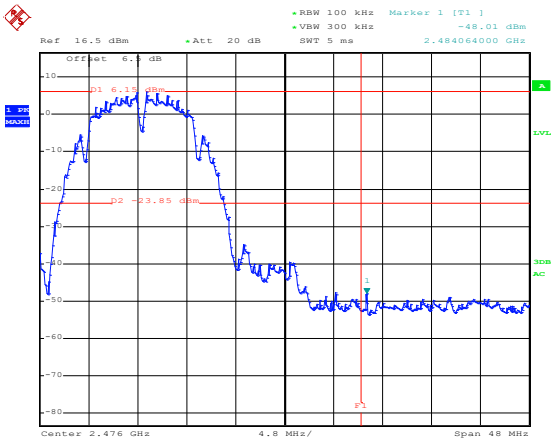
ANT1

802.11b



Date: 18.JUN.2020 13:43:01

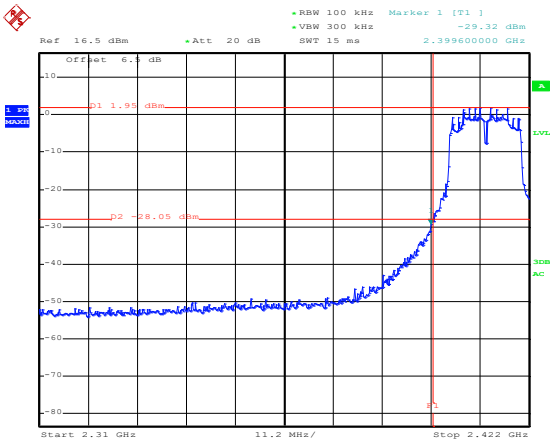
Lowest channel



Date: 18.JUN.2020 13:42:22

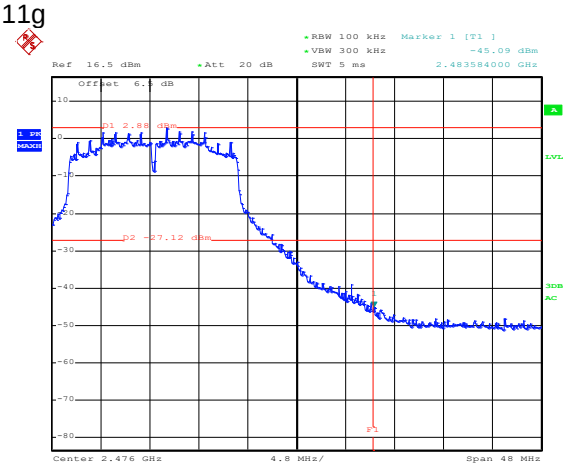
Highest channel

802.11g



Date: 18.JUN.2020 13:44:11

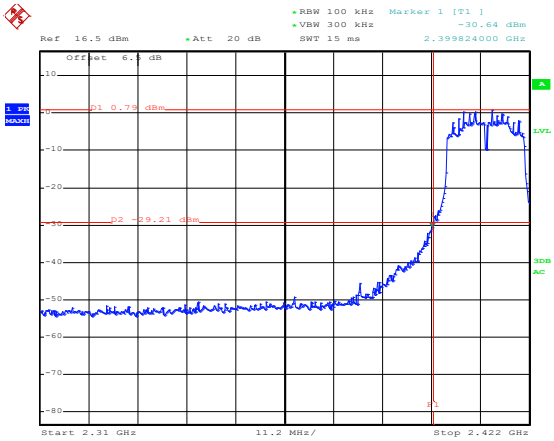
Lowest channel



Date: 18.JUN.2020 13:41:44

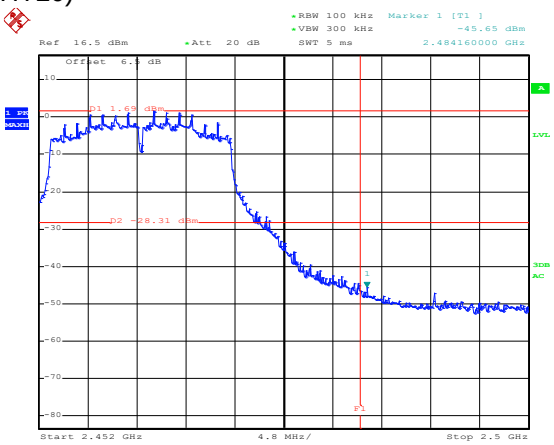
Highest channel

802.11n(HT20)



Date: 18.JUN.2020 13:44:59

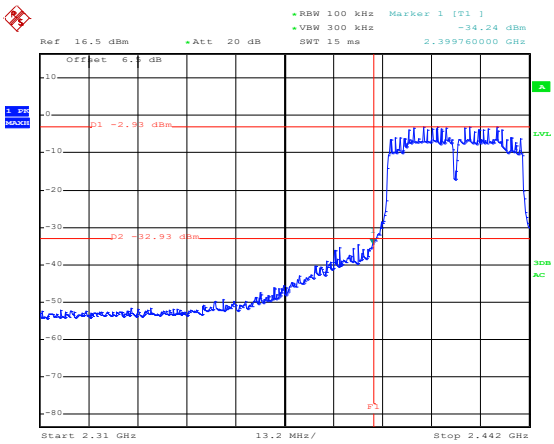
Lowest channel



Date: 18.JUN.2020 13:40:22

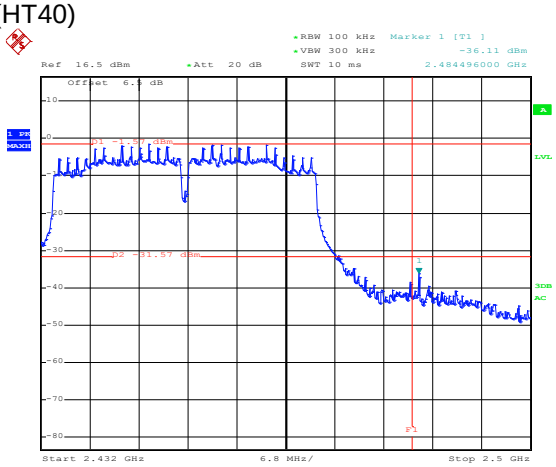
Highest channel

802.11n(HT40)



Date: 18.JUN.2020 13:48:10

Lowest channel

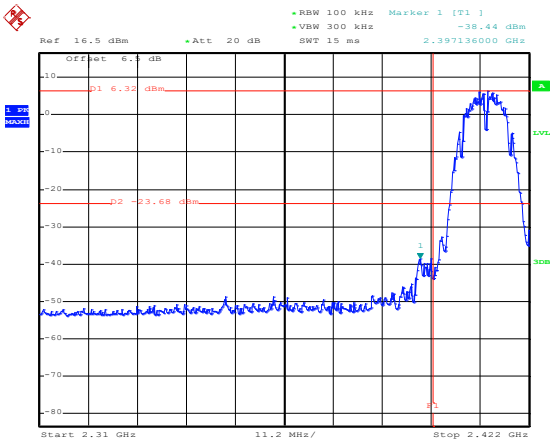


Date: 18.JUN.2020 13:39:33

Highest channel

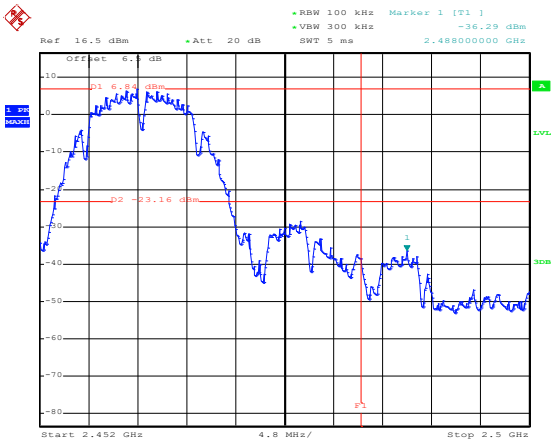
ANT2

802.11b



Date: 18.JUN.2020 17:14:35

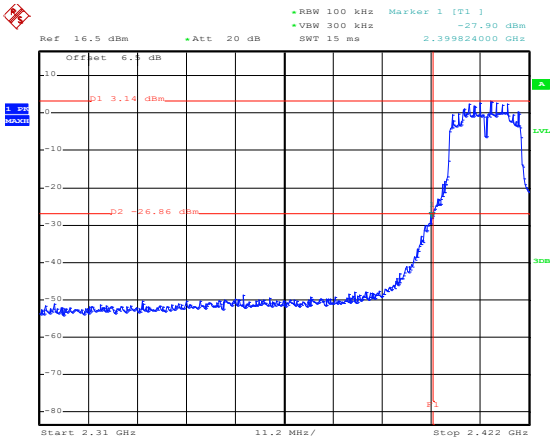
Lowest channel



Date: 18.JUN.2020 17:03:24

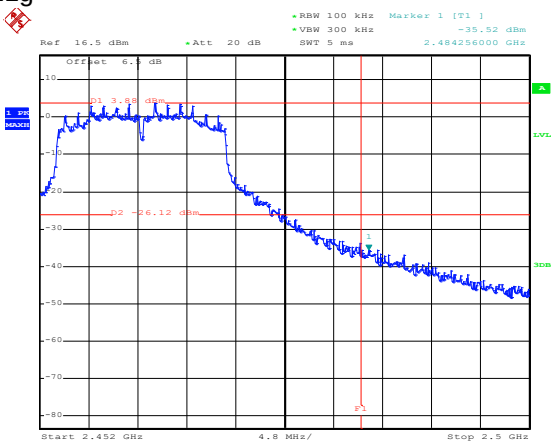
Highest channel

802.11g



Date: 18.JUN.2020 17:13:41

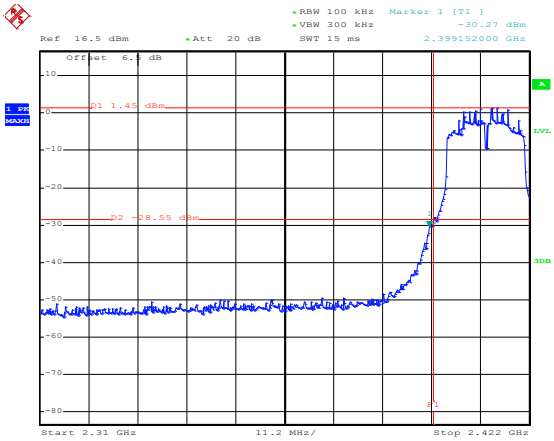
Lowest channel



Date: 18.JUN.2020 17:04:32

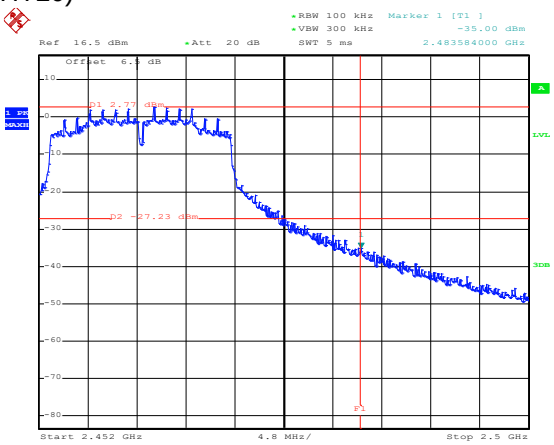
Highest channel

802.11n(HT20)



Date: 18.JUN.2020 17:10:46

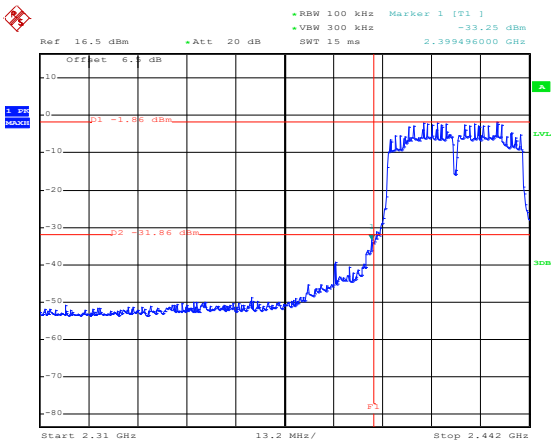
Lowest channel



Date: 18.JUN.2020 17:05:54

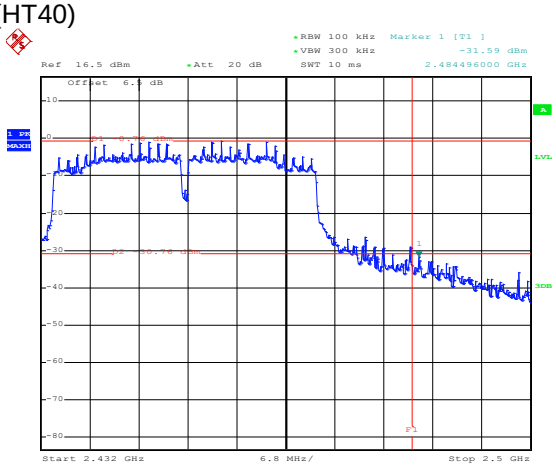
Highest channel

802.11n(HT40)



Date: 18.JUN.2020 17:10:12

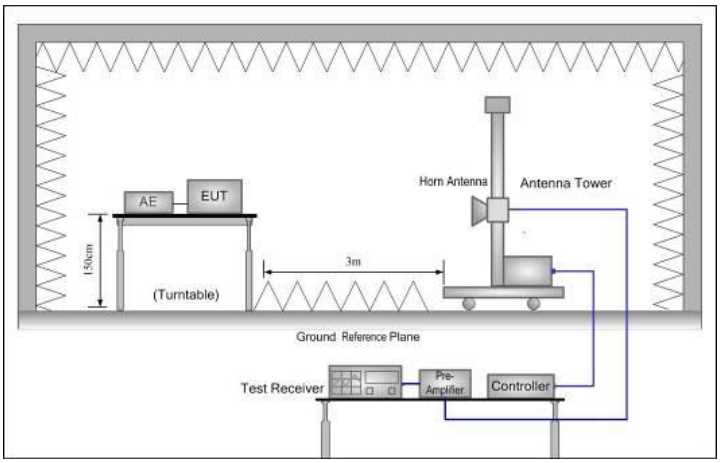
Lowest channel



Date: 18.JUN.2020 17:09:11

Highest channel

6.6.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209 and 15.205				
Test Frequency Range:	2310 MHz to 2390 MHz and 2483.5 MHz to 2500 MHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency	Limit (dBuV/m @3m)	Remark		
	Above 1GHz	54.00	Average Value		
		74.00	Peak Value		
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.				
Test setup:					
Test Instruments:	Refer to section 5.9 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				