FCC REPORT
(UNII)

Applicant:	Autel Intelligent Technology Corp., Ltd.
Address of Applicant:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	ADVANCED DIAGNOSTIC & MEASUREMENT SYSTEM
Model No.:	MaxiSys Ultra
Trade mark:	AUTEL
FCC ID:	WQ8MAXISYSULTRA
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	23 May, 2019
Date of Test:	24 May, to 23 Sep., 2019
Date of report issued:	15 Oct., 2019
Test Result:	PASS*

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*24 Sep., 2019*	*Original*
01	*15 Oct. 2019*	*Delete page 7 channel 140 information*

Tested by: YT Yang ***Date:*** *15 Oct., 2019*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *15 Oct., 2019*

Project Engineer

3 Contents

Page

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) (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) (3)	Pass
Band Edge	15.407(b)	Pass
Spurious Emission	15.407 (b) & 15.205 & 15.209	Pass
Frequency Stability	15.407(g)	Pass
Pass: The EUT complies with the essential requirements in the standard. *N/A: Not Applicable.*		

5 General Information

5.1 Client Information

Applicant:	Autel Intelligent Technology Corp., Ltd.
Address:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan, Shenzhen, China
Manufacturer:	Autel Intelligent Technology Corp., Ltd.
Address:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan, Shenzhen, China
Factory1:	Autel Intelligent Technology Corp., Ltd.
Address:	6th Floor, Building 1,Yanxiang Zhigu, NO.11 Gaoxin West Rd, Guangming New District, Shenzhen City, Guangdong Province, China.
Factory2:	AUTEL VIETNAM COMPANY LIMITED
Address:	4th Floor, Factory#6, Land#CN1, An Duong Industrial Zone, Hong Phong Township, An Duong County, Hai Phong, VietNam

5.2 General Description of E.U.T.

Product Name:	ADVANCED DIAGNOSTIC & MEASUREMENT SYSTEM
Model No.:	MaxiSys Ultra
Operation Frequency:	Band 1: 5150MHz-5250MHz, Band 4: 5725MHz-5825MHz
Channel numbers:	Band 1: 802.11a/802.11n20/802.11ac20: 4, 802.11n40/802.11ac40: 2, 802.11ac80: 1 Band 4: 802.11a/802.11n20/802.11ac20: 4, 802.11n40/802.11ac40: 2, 802.11ac80: 1
Channel separation:	802.11a/802.11n20/802.11ac20: 20MHz, 802.11n40/802.11ac40: 40MHz, 802.11ac80: 80MHz
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 866.6Mbps
Antenna Type:	Internal Antenna
Antenna gain:	Left module： ANT 1: 5.2G Wi-Fi: 3.3 dBi, 5.8G Wi-F：3.4 dBi ANT 2: 5.2G Wi-Fi: 2.6 dBi, 5.8G Wi-F：5.2 dBi Right module： ANT 3: 5.2G Wi-Fi: 2.4 dBi, 5.8G Wi-F：4.8 dBi ANT 4: 5.2G Wi-Fi: 2.5 dBi, 5.8G Wi-F：3.3 dBi

Power supply:	Rechargeable Li-ion Battery DC3.8V, 18000mAh
AC adapter:	Adapter 1: Model.: GME36A-120300FDS Input: 100-240V, 50/60Hz, 1.2A Output: 12V, 3A Adapter 2: Model.: A361-1203000DI Input: 100-240V, 50/60Hz, 1.5A Output:12V,3000mA Adapter 3: Model.: j361-1203000DI Input: 100-240V, 50/60Hz, 1.5A Output:12V,3000mA
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/ac20		802.11n/ac40		802.11ac80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	42	5210MHz
40	5200MHz	46	5230MHz		
44	5220MHz				
48	5240MHz				
Band 4					
802.11a/802.11n/ac20		802.11n/ac40		802.11ac80	
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/ac20		802.11n/ac40		802.11ac80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5180MHz	Lowest	5190MHz	Middle	5210MHz
Middle	5200MHz	Highest	5230MHz		
Highest	5240MHz				
Band 4					
802.11a/802.11n/ac20		802.11n/ac40		802.11ac80	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest	5745MHz	Lowest	5755MHz	Middle	5775MHz
Middle	5785MHz	Highest	5795MHz		
Highest	5825MHz				

5.3 Test environment and test mode

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
802.11n20	6.5 Mbps
802.11n40	13 Mbps
802.11ac80	29.3 Mbps
Remark: 802.11a support SISO, 802.11n20/n40/ac20/ac40/ac80 support MIMO	

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)	±5.38 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.36 dB (k=2)

5.6 Related Submittal(s) / Grant (s)

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

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.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **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. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, 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

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
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Biconical Antenna	SCHWARZBECK	VUBA9117	359	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-10-2018	11-09-2019
Signal Generator	Rohde & Schwarz	SMX	835454/016	03-18-2019	03-17-2020
Signal Generator	R&S	SMR20	1008100050	03-18-2019	03-17-2020
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	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
DC Power Supply	XinNuoEr	WYK-10020K	1409050110020	10-31-2018	10-30-2019
Temperature Humidity Chamber	HengPu	HPGDS-500	20140828008	09-24-2018	09-23-2019
Simulated Station	Rohde & Schwarz	CMW500	140493	07-16-2018	07-15-2019

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	03-18-2019	03-17-2020
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2019	03-17-2020
LISN	CHASE	MN2050D	1447	03-18-2019	03-17-2020
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2019	07-20-2020
Cable	HP	10503A	N/A	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		

6 Test results and Measurement Data

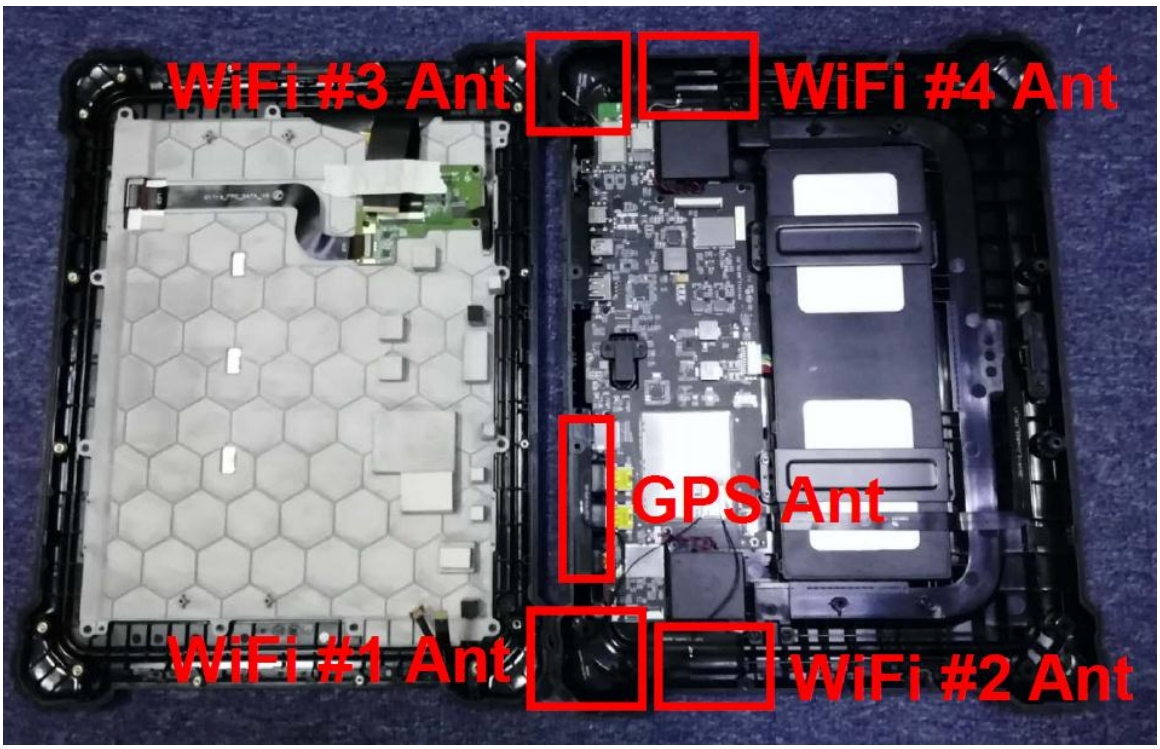
6.1 Antenna requirement

Standard requirement:	FCC Part15 E Section 15.203 /407(a)

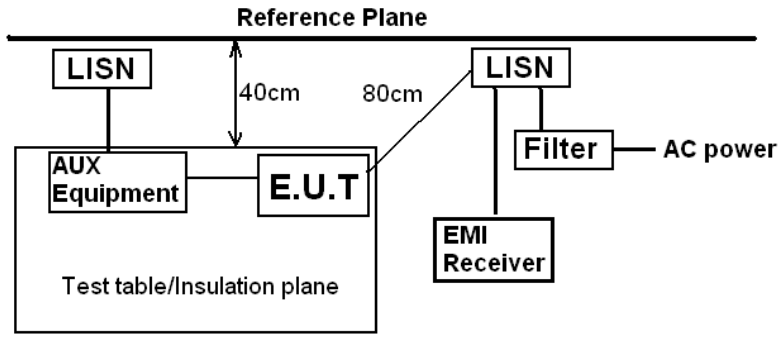
15.203 requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer 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 Internal antenna which cannot replace by end-user, the best case gain of the antenna is 5.2 dBi.

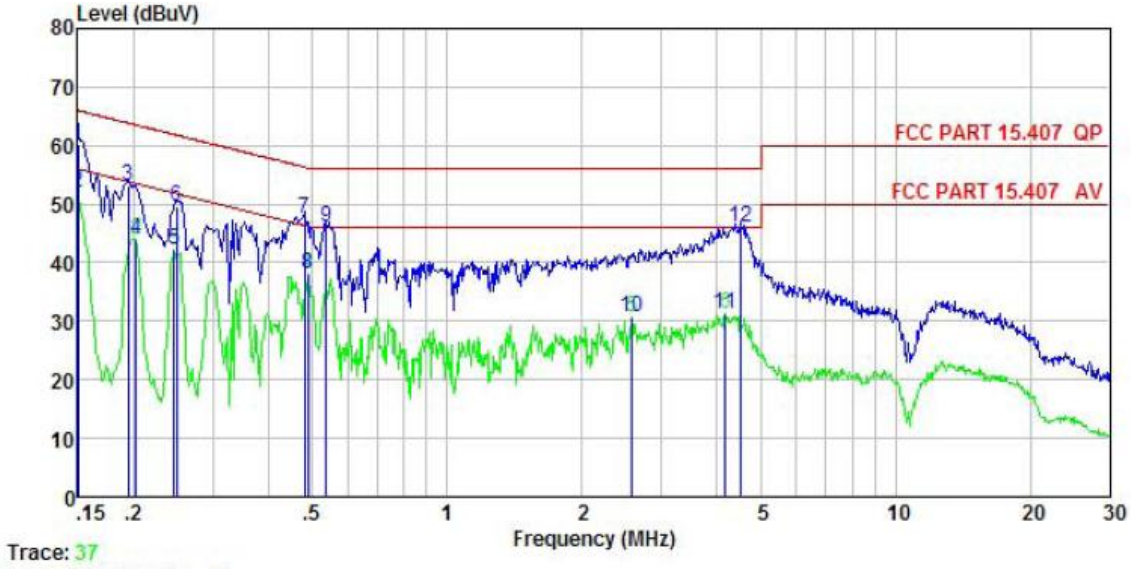


6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.10: 2013		
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: 2013 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:	ADVANCED DIAGNOSTIC & MEASUREMENT SYSTEM	Product model:	MAXISYS ULTRA
Test by:	YT	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%

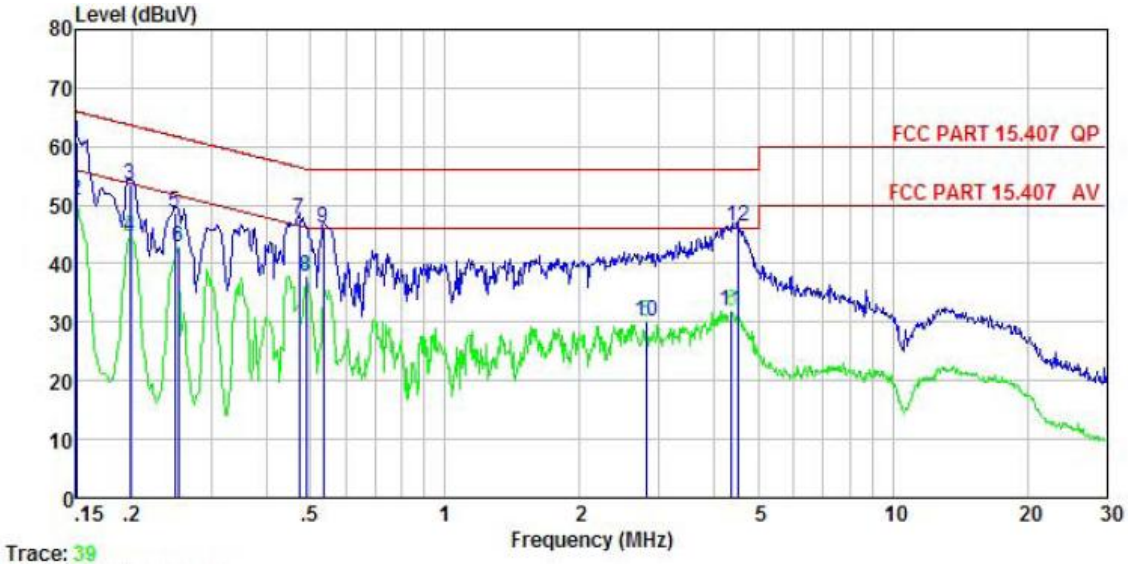


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	50.00	-0.45	10.78	60.33	66.00	-5.67	QP
2	0.150	41.57	-0.45	10.78	51.90	56.00	-4.10	Average
3	0.194	42.85	-0.41	10.76	53.20	63.84	-10.64	QP
4	0.202	33.62	-0.41	10.76	43.97	53.54	-9.57	Average
5	0.246	31.86	-0.40	10.75	42.21	51.91	-9.70	Average
6	0.249	39.28	-0.40	10.75	49.63	61.78	-12.15	QP
7	0.481	37.27	-0.39	10.75	47.63	56.32	-8.69	QP
8	0.489	27.83	-0.39	10.76	38.20	46.19	-7.99	Average
9	0.538	35.70	-0.39	10.76	46.07	56.00	-9.93	QP
10	2.581	20.07	-0.43	10.93	30.57	46.00	-15.43	Average
11	4.180	20.83	-0.47	10.88	31.24	46.00	-14.76	Average
12	4.525	35.64	-0.47	10.87	46.04	56.00	-9.96	QP

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 + Cable Loss.*
4. *Test all adapters and modes to reflect only the worst mode*

Product name:	ADVANCED DIAGNOSTIC & MEASUREMENT SYSTEM	Product model:	MAXISYS ULTRA
Test by:	YT	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%

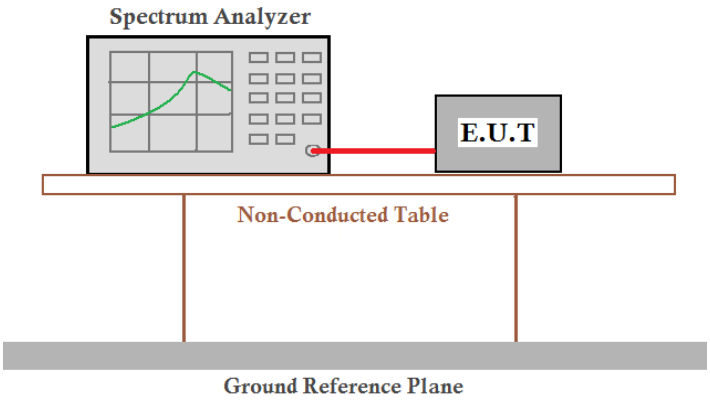


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.150	50.85	-0.68	10.78	60.95	66.00	-5.05	QP
2	0.150	40.67	-0.68	10.78	50.77	56.00	-5.23	Average
3	0.198	43.45	-0.69	10.76	53.52	63.71	-10.19	QP
4	0.198	34.56	-0.69	10.76	44.63	53.71	-9.08	Average
5	0.249	38.75	-0.66	10.75	48.84	61.78	-12.94	QP
6	0.253	32.79	-0.65	10.75	42.89	51.64	-8.75	Average
7	0.471	37.54	-0.65	10.75	47.64	56.49	-8.85	QP
8	0.489	27.72	-0.65	10.76	37.83	46.19	-8.36	Average
9	0.535	36.09	-0.65	10.76	46.20	56.00	-9.80	QP
10	2.809	19.97	-0.67	10.93	30.23	46.00	-15.77	Average
11	4.361	21.76	-0.71	10.88	31.93	46.00	-14.07	Average
12	4.501	36.08	-0.71	10.87	46.24	56.00	-9.76	QP

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 + Cable Loss.*
4. *Test all adapters and modes to reflect only the worst mode*

6.3 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv) & (a) (3)
Test Method:	ANSI C63.10: 2013, KDB789033
Limit:	Band 1: 24dBm Band 4: 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:

Left module:

Band 1						
Mode	Test CH	Ant. Port	Conducted Output power(dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX1	11.03	/	24.0	Pass
		TX2	11.51	/		
	Middle	TX1	11.06	/	24.0	Pass
		TX2	11.55	/		
	Highest	TX1	11.26	/	24.0	Pass
		TX2	11.67	/		
802.11n20	Lowest	TX1	9.92	13.76	24.0	Pass
		TX2	11.44			
	Middle	TX1	9.78	13.74	24.0	Pass
		TX2	11.51			
	Highest	TX1	10.17	13.95	24.0	Pass
		TX2	11.60			
802.11n40	Lowest	TX1	4.97	8.53	24.0	Pass
		TX2	6.01			
	Highest	TX1	4.87	8.54	24.0	Pass
		TX2	6.10			
802.11ac20	Lowest	TX1	9.90	13.84	24.0	Pass
		TX2	11.60			
	Middle	TX1	9.91	13.75	24.0	Pass
		TX2	11.43			
	Highest	TX1	10.04	13.86	24.0	Pass
		TX2	11.54			
802.11ac40	Lowest	TX1	4.87	8.47	24.0	Pass
		TX2	5.97			
	Highest	TX1	4.87	8.56	24.0	Pass
		TX2	6.13			
802.11ac80	Middle	TX1	4.67	8.26	24.0	Pass
		TX2	5.76			

Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{GN/20})^2/N_{ANT}]$ *,So the Directional gain=10* log[(10^(3.3/20) + 10^(2.6/20))^2/2]=*5.97dBi*
2. *The directional Gain of antenna is not* greater *than 6 dBi, so the limit of power is 24 dBm.*

Band 4						
Mode	Test CH	Ant. Port	Conducted Output power(dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX1	8.54	/	28.65	Pass
		TX2	9.33	/		
	Middle	TX1	8.31	/	28.65	Pass
		TX2	9.26	/		
	Highest	TX1	8.29	/	28.65	Pass
		TX2	8.29	/		
802.11n20	Lowest	TX1	8.39	11.90	28.65	Pass
		TX2	9.34			
	Middle	TX1	8.32	11.75	28.65	Pass
		TX2	9.13			
	Highest	TX1	8.26	11.84	28.65	Pass
		TX2	9.34			
802.11n40	Lowest	TX1	9.07	12.61	28.65	Pass
		TX2	10.07			
	Highest	TX1	8.82	12.40	28.65	Pass
		TX2	9.89			
802.11ac20	Lowest	TX1	8.50	12.48	28.65	Pass
		TX2	10.26			
	Middle	TX1	8.40	12.64	28.65	Pass
		TX2	10.59			
	Highest	TX1	8.24	12.60	28.65	Pass
		TX2	10.62			
802.11ac40	Lowest	TX1	9.09	12.44	28.65	Pass
		TX2	9.74			
	Highest	TX1	8.80	12.31	28.65	Pass
		TX2	9.75			
802.11ac80	Middle	TX1	8.58	12.04	28.65	Pass
		TX2	9.43			

Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* $\log[(10^{(3.4/20)}+10^{(5.2/20)})^2/2]$*=7.35dBi*
2. *The directional Gain of antenna is* greater *than 6 dBi, so the limit of power is 28.65 dBm.*

Right module:

Band 1						
Mode	Test CH	Ant. Port	Conducted Output power(dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX3	12.01	/	24.0	Pass
		TX4	11.63	/		
	Middle	TX3	12.12	/	24.0	Pass
		TX4	11.76	/		
	Highest	TX3	12.30	/	24.0	Pass
		TX4	12.07	/		
802.11n20	Lowest	TX3	11.81	14.70	24.0	Pass
		TX4	11.56			
	Middle	TX3	11.89	14.84	24.0	Pass
		TX4	11.77			
	Highest	TX3	12.17	15.06	24.0	Pass
		TX4	11.92			
802.11n40	Lowest	TX3	6.73	9.70	24.0	Pass
		TX4	6.65			
	Highest	TX3	6.93	9.94	24.0	Pass
		TX4	6.93			
802.11ac20	Lowest	TX3	11.79	14.64	24.0	Pass
		TX4	11.47			
	Middle	TX3	11.89	14.80	24.0	Pass
		TX4	11.68			
	Highest	TX3	12.23	15.14	24.0	Pass
		TX4	12.03			
802.11ac40	Lowest	TX3	6.72	9.70	24.0	Pass
		TX4	6.62			
	Highest	TX3	6.93	9.91	24.0	Pass
		TX4	6.87			
802.11ac80	Middle	TX3	6.42	9.46	24.0	Pass
		TX4	6.48			

Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* $\log[(10^{(2.4/20)}+10^{(2.5/20)})^2/2]$*=5.46dBi*
2. *The directional Gain of antenna is not* greater *than 6 dBi, so the limit of power is 24 dBm.*

Band 4						
Mode	Test CH	Ant. Port	Conducted Output power(dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX3	9.90	/	28.91	Pass
		TX4	10.27	/		
	Middle	TX3	10.09	/	28.91	Pass
		TX4	10.16	/		
	Highest	TX3	10.28	/	28.91	Pass
		TX4	10.17	/		
802.11n20	Lowest	TX3	9.92	13.02	28.91	Pass
		TX4	10.09			
	Middle	TX3	10.17	13.16	28.91	Pass
		TX4	10.13			
	Highest	TX3	10.29	13.22	28.91	Pass
		TX4	10.13			
802.11n40	Lowest	TX3	10.67	13.70	28.91	Pass
		TX4	10.71			
	Highest	TX3	10.72	13.67	28.91	Pass
		TX4	10.59			
802.11ac20	Lowest	TX3	10.03	13.06	28.91	Pass
		TX4	10.06			
	Middle	TX3	10.16	13.22	28.91	Pass
		TX4	10.26			
	Highest	TX3	10.26	13.22	28.91	Pass
		TX4	10.16			
802.11ac40	Lowest	TX3	10.52	13.62	28.91	Pass
		TX4	10.70			
	Highest	TX3	10.75	13.74	28.91	Pass
		TX4	10.70			
802.11ac80	Middle	TX3	10.20	13.26	28.91	Pass
		TX4	10.30			

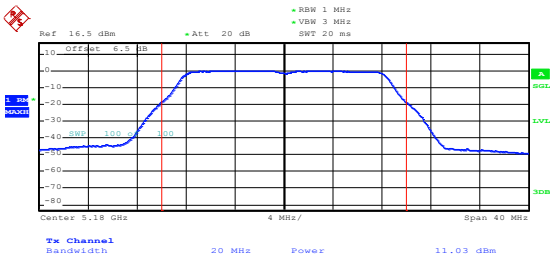
Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* $\log[(10^{(4.3/20)}+10^{(3.3/20)})^2/2]$*=7.09dBi*
2. *The directional Gain of antenna is* greater *than 6 dBi, so the limit of power is 28.91 dBm.*

Test plot as follows:
Left module:

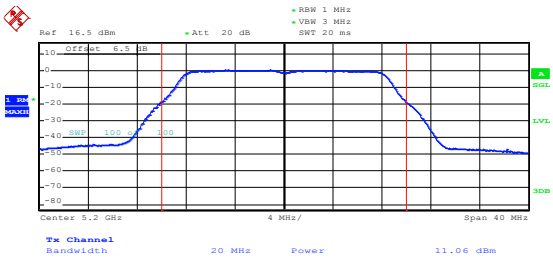
802.11a

ANT 1



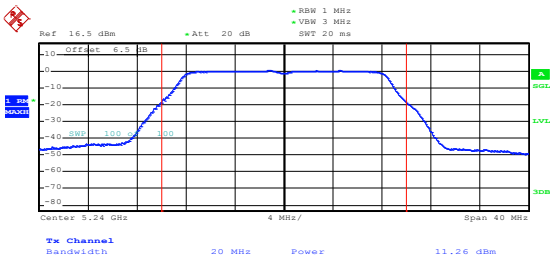
Date: 23.JUN.2019 14:42:24

Lowest channel



Date: 23.JUN.2019 14:42:40

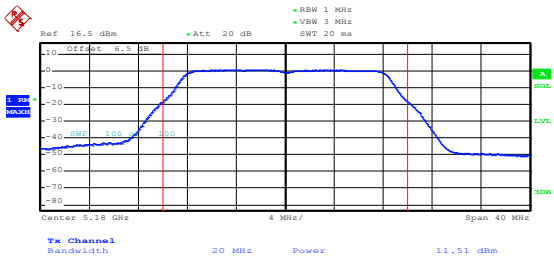
Middle channel



Date: 23.JUN.2019 14:42:55

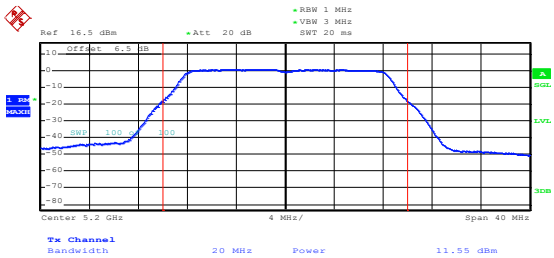
Highest channel

ANT 2



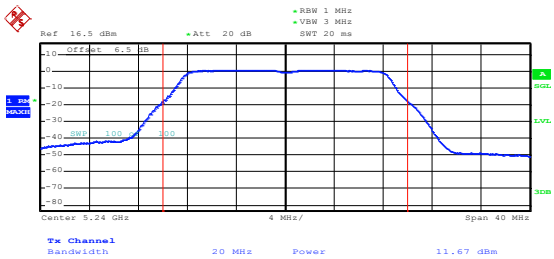
Date: 23.JUN.2019 17:26:18

Lowest channel



Date: 23.JUN.2019 17:26:41

Middle channel

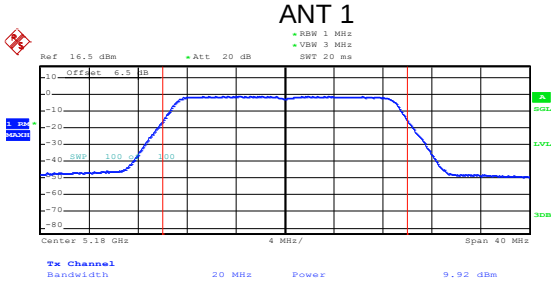


Date: 23.JUN.2019 17:27:06

Highest channel

802.11n-HT20

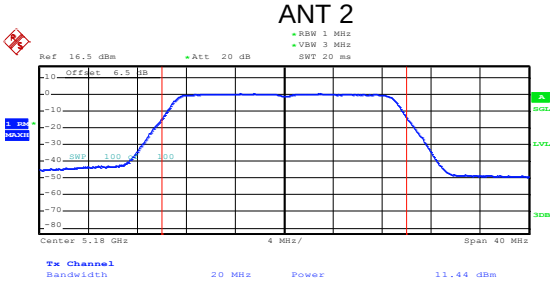
ANT 1



Date: 23.JUN.2019 14:43:25

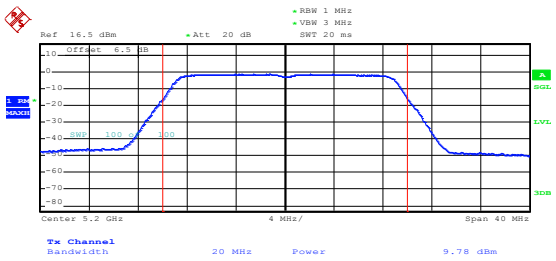
Lowest channel

ANT 2



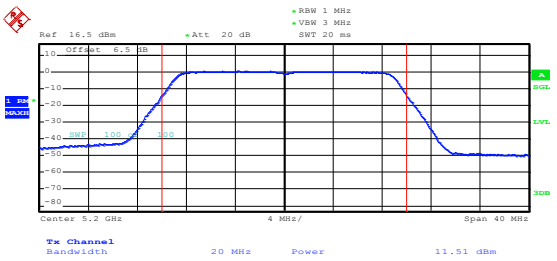
Date: 23.JUN.2019 17:27:40

Lowest channel



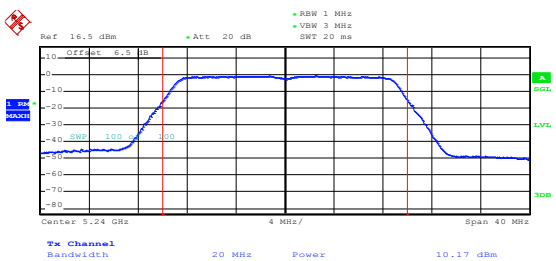
Date: 23.JUN.2019 14:43:42

Middle channel



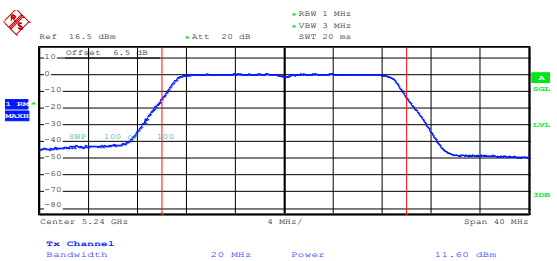
Date: 23.JUN.2019 17:28:05

Middle channel



Date: 23.JUN.2019 14:43:57

Highest channel

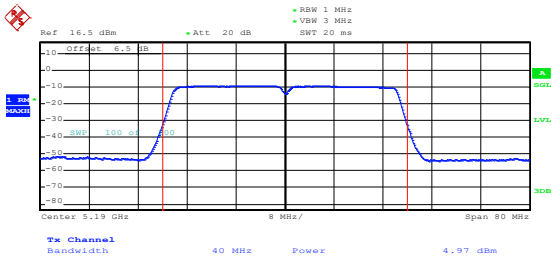


Date: 23.JUN.2019 17:28:29

Highest channel

802.11n-HT40

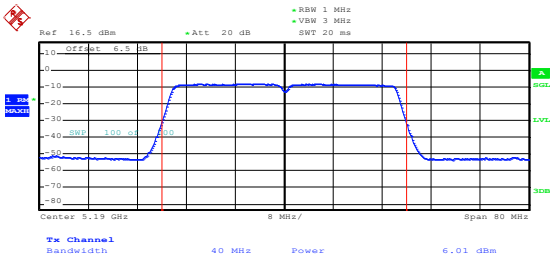
ANT 1



Date: 23.JUN.2019 14:46:38

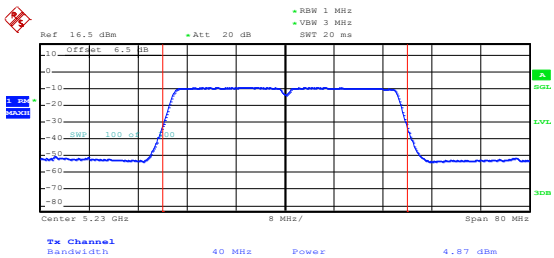
Lowest channel

ANT 2



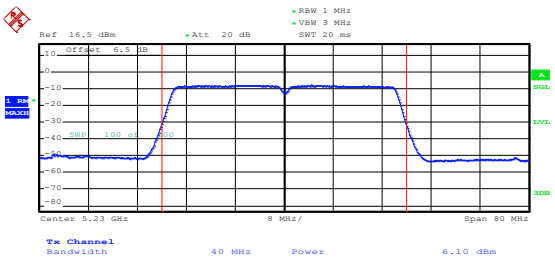
Date: 23.JUN.2019 17:34:00

Lowest channel



Date: 23.JUN.2019 14:47:18

Highest channel

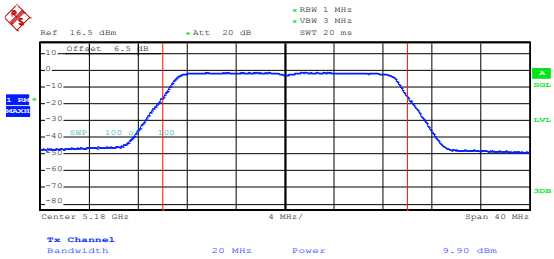


Date: 23.JUN.2019 17:34:17

Highest channel

802.11ac-HT20

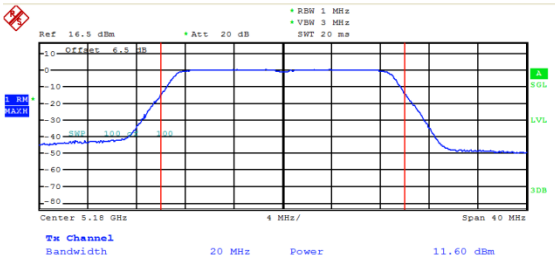
ANT 1



Date: 23.JUN.2019 14:44:33

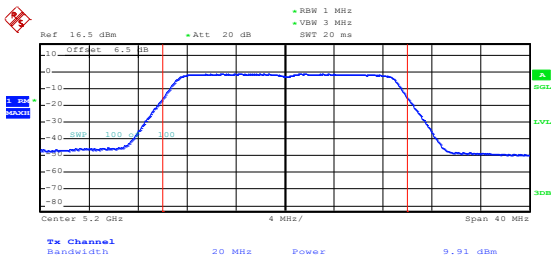
Lowest channel

ANT 2



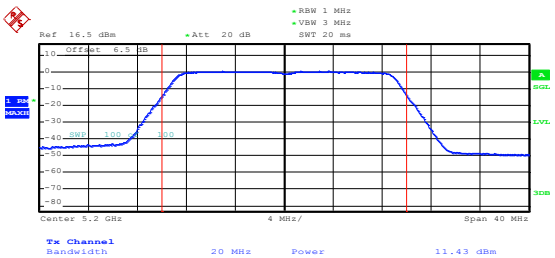
Date: 23.JUN.2019 17:29:56

Lowest channel



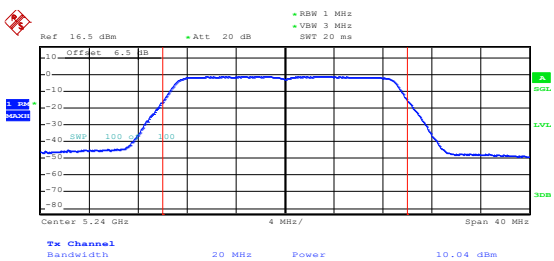
Date: 23.JUN.2019 14:45:01

Middle channel



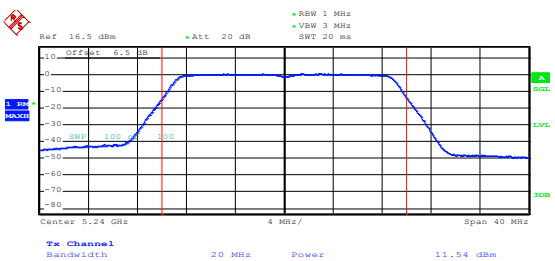
Date: 23.JUN.2019 17:31:23

Middle channel



Date: 23.JUN.2019 14:45:22

Highest channel

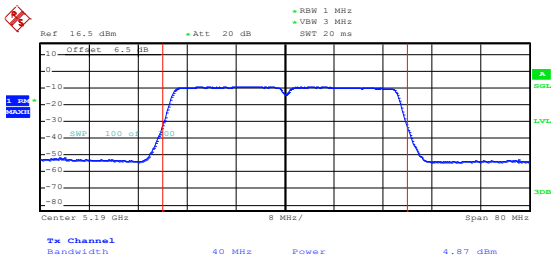


Date: 23.JUN.2019 17:31:41

Highest channel

802.11ac-HT40

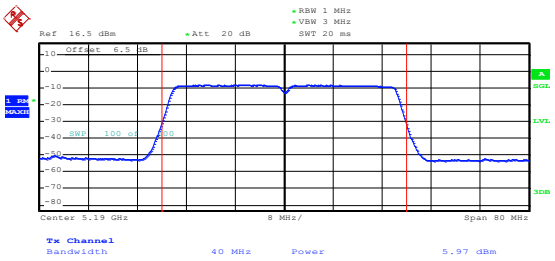
ANT 1



Date: 23.JUN.2019 14:48:00

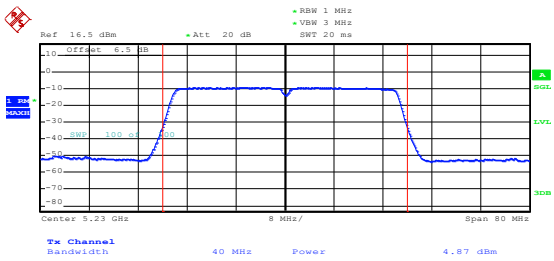
Lowest channel

ANT 2



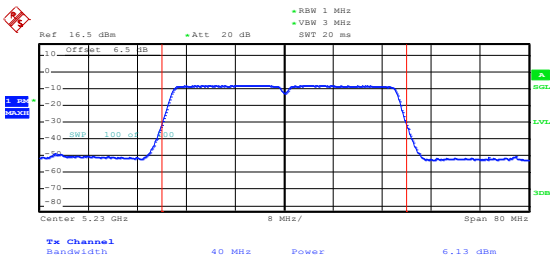
Date: 23.JUN.2019 17:34:51

Lowest channel



Date: 23.JUN.2019 14:48:16

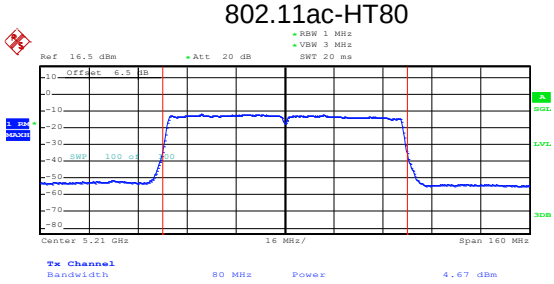
Highest channel



Date: 23.JUN.2019 17:35:10

Highest channel

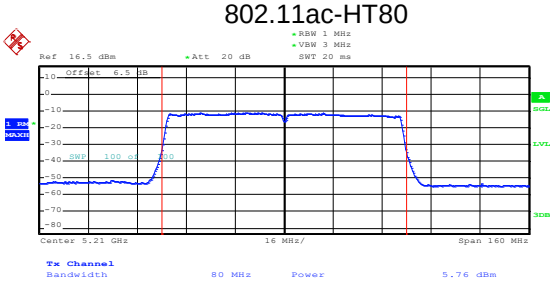
802.11ac-HT80



Date: 23.JUN.2019 14:49:04

Middle channel

802.11ac-HT80



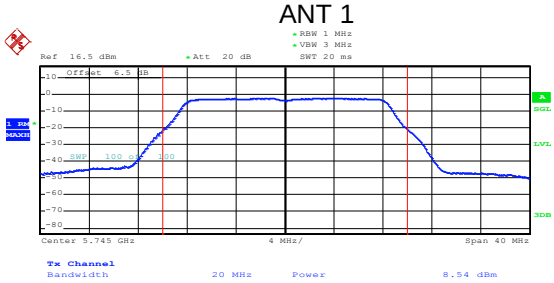
Date: 23.JUN.2019 17:37:03

Middle channel

Band 4:

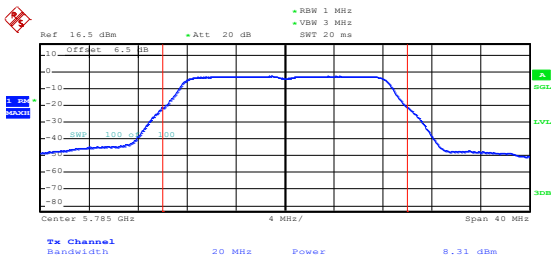
802.11a

ANT 1



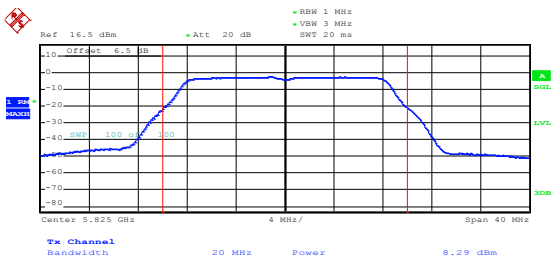
Date: 23.JUN.2019 15:18:38

Lowest channel



Date: 23.JUN.2019 15:18:57

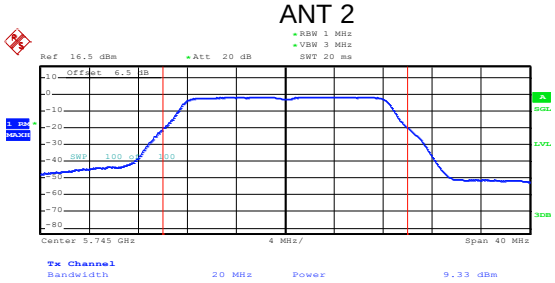
Middle channel



Date: 23.JUN.2019 15:19:12

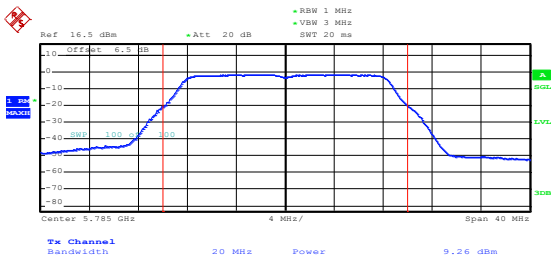
Highest channel

ANT 2



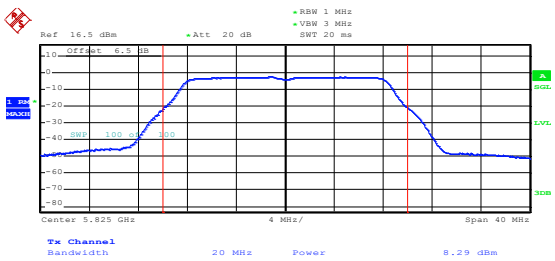
Date: 23.JUN.2019 17:18:11

Lowest channel



Date: 23.JUN.2019 17:18:33

Middle channel

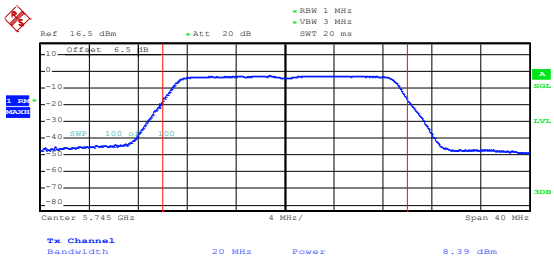


Date: 23.JUN.2019 15:19:12

Highest channel

802.11n-HT20

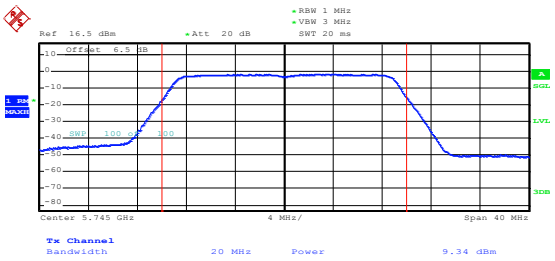
ANT 1



Date: 23.JUN.2019 15:19:55

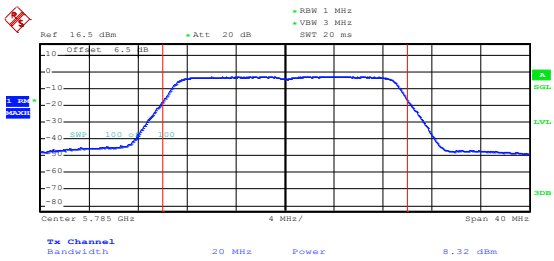
Lowest channel

ANT 2



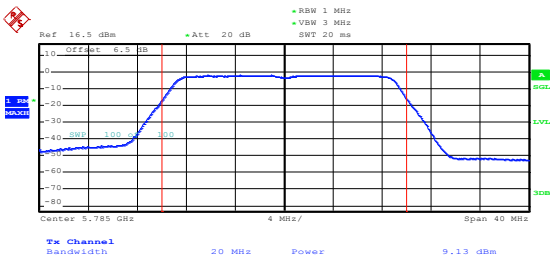
Date: 23.JUN.2019 17:19:36

Lowest channel



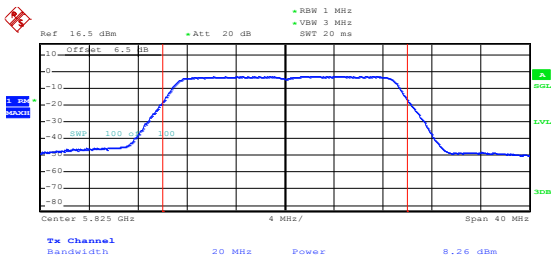
Date: 23.JUN.2019 15:20:11

Middle channel



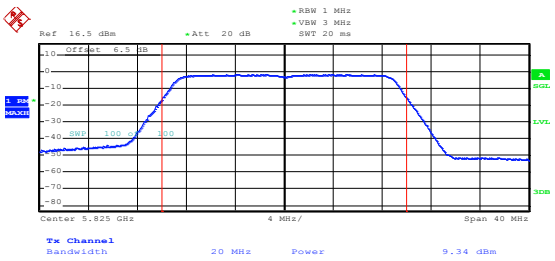
Date: 23.JUN.2019 17:19:51

Middle channel



Date: 23.JUN.2019 15:20:34

Highest channel

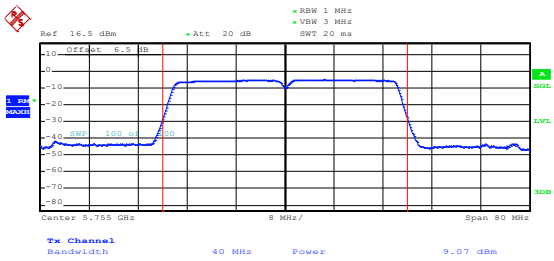


Date: 23.JUN.2019 17:20:11

Highest channel

802.11n-HT40

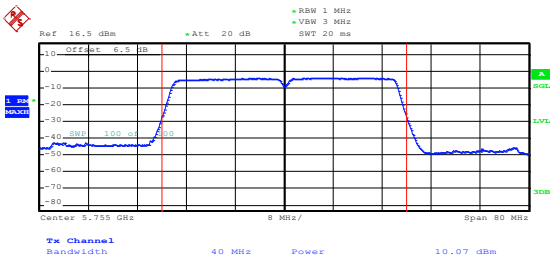
ANT 1



Date: 23.JUN.2019 15:24:41

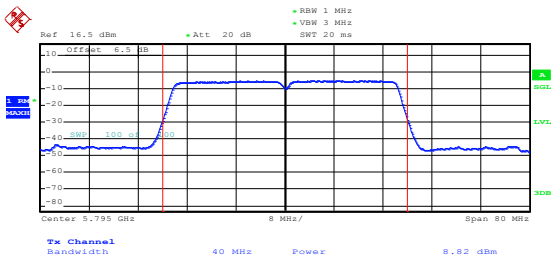
Lowest channel

ANT 2



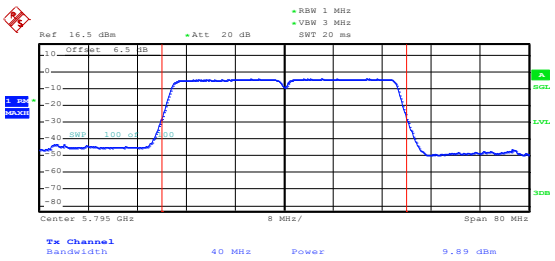
Date: 23.JUN.2019 17:21:18

Lowest channel



Date: 23.JUN.2019 15:24:58

Highest channel

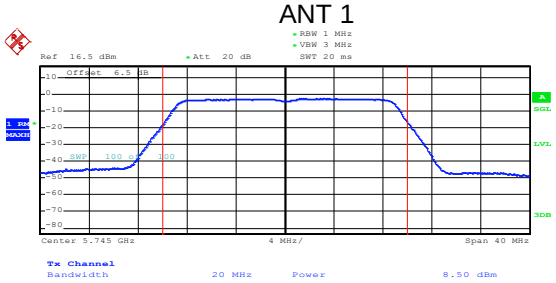


Date: 23.JUN.2019 17:21:43

Highest channel

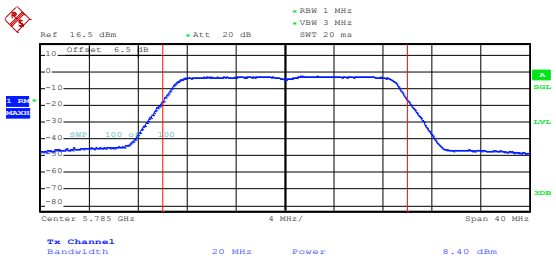
802.11ac-HT20

ANT 1



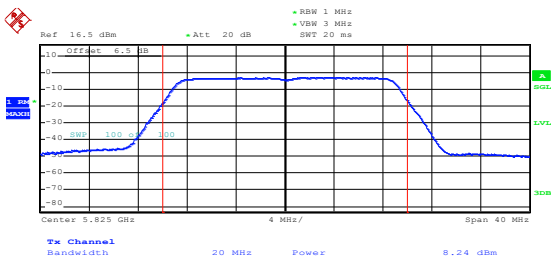
Date: 23.JUN.2019 15:21:43

Lowest channel



Date: 23.JUN.2019 15:22:02

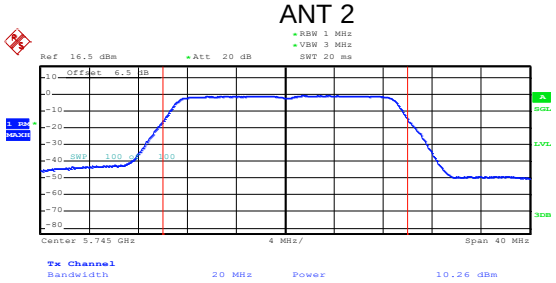
Middle channel



Date: 23.JUN.2019 15:22:22

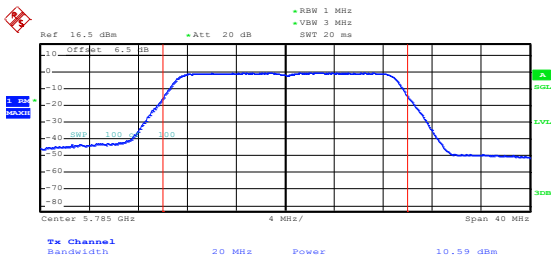
Highest channel

ANT 2



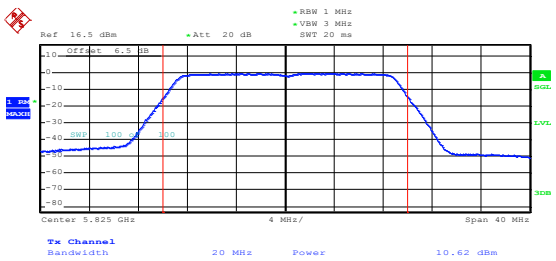
Date: 15.AUG.2019 15:01:08

Lowest channel



Date: 15.AUG.2019 15:01:49

Middle channel

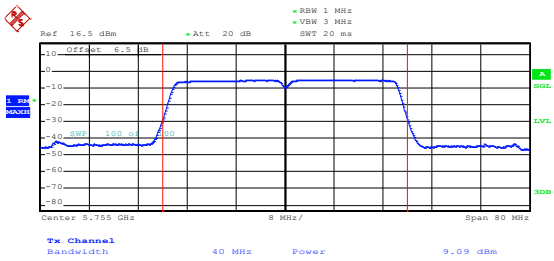


Date: 15.AUG.2019 15:02:12

Highest channel

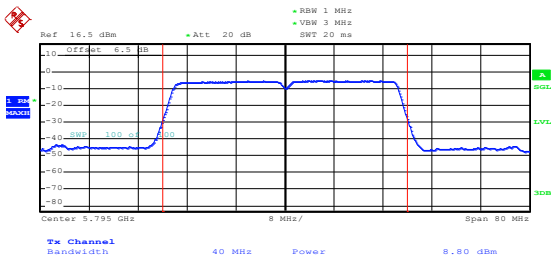
802.11ac-HT40

ANT 1



Date: 23.JUN.2019 15:27:46

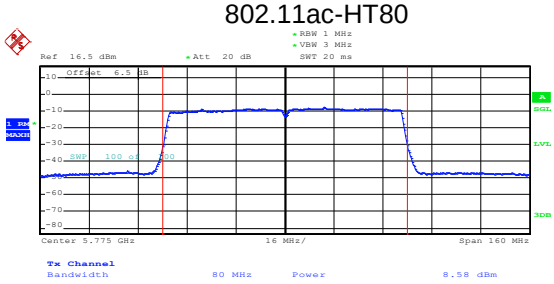
Lowest channel



Date: 23.JUN.2019 15:28:10

Highest channel

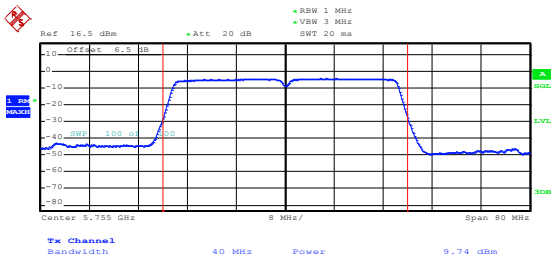
802.11ac-HT80



Date: 23.JUN.2019 15:30:42

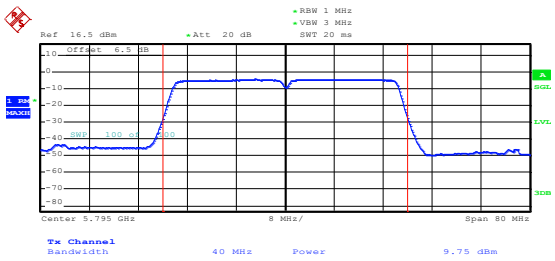
Middle channel

ANT 2



Date: 23.JUN.2019 17:22:13

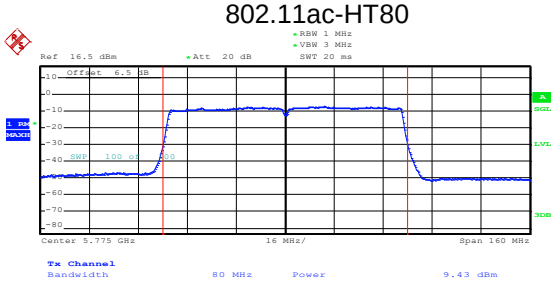
Lowest channel



Date: 23.JUN.2019 17:22:40

Highest channel

802.11ac-HT80



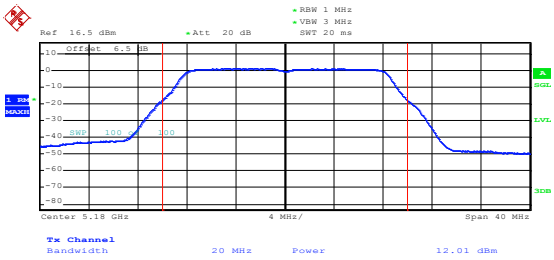
Date: 23.JUN.2019 17:24:07

Middle channel

Right module:

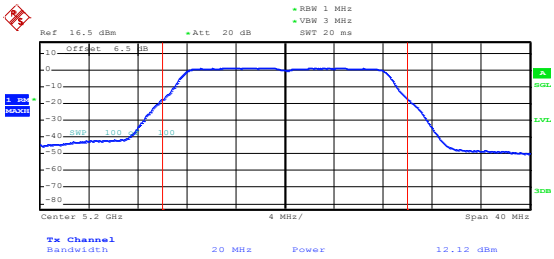
802.11a

ANT 3



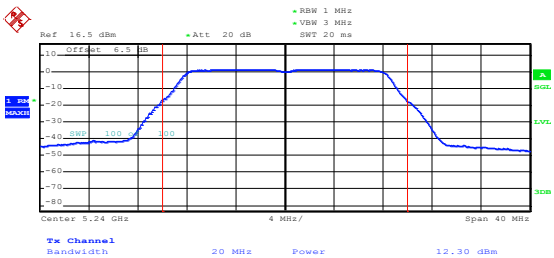
Date: 23.JUN.2019 10:51:40

Lowest channel



Date: 23.JUN.2019 10:51:57

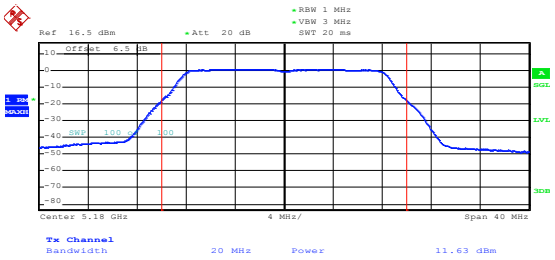
Middle channel



Date: 23.JUN.2019 10:52:15

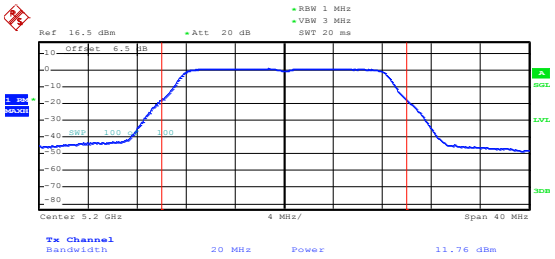
Highest channel

ANT 4



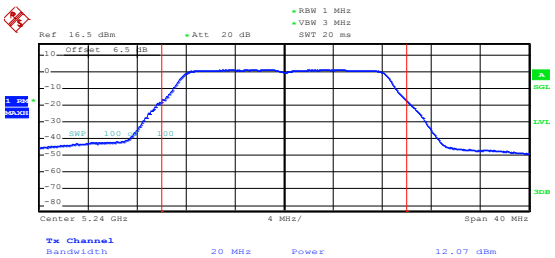
Date: 23.JUN.2019 10:01:40

Lowest channel



Date: 23.JUN.2019 10:01:58

Middle channel

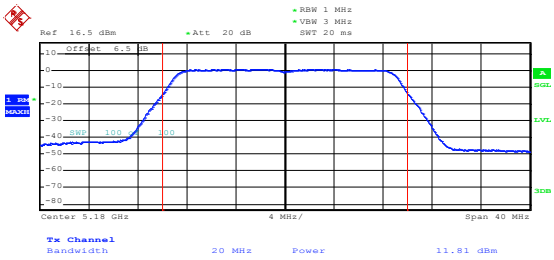


Date: 23.JUN.2019 10:02:13

Highest channel

802.11n-HT20

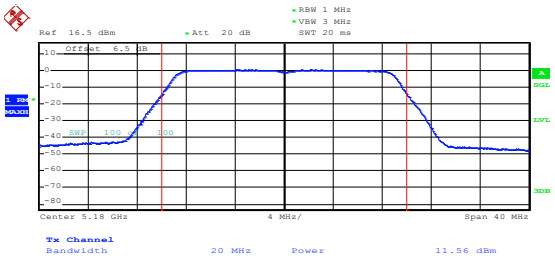
ANT 1



Date: 23.JUN.2019 10:52:44

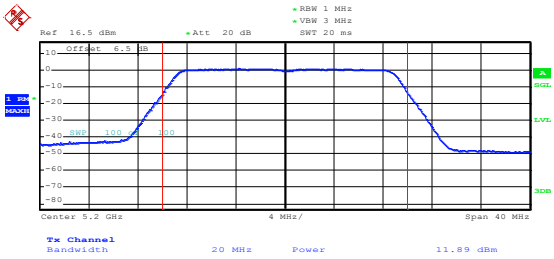
Lowest channel

ANT 2



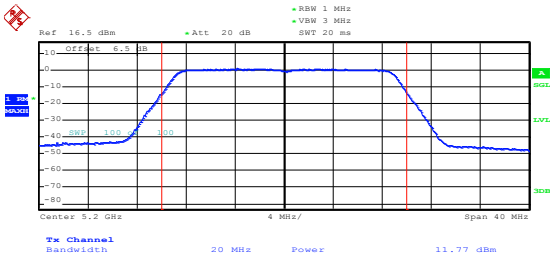
Date: 23.JUN.2019 10:02:43

Lowest channel



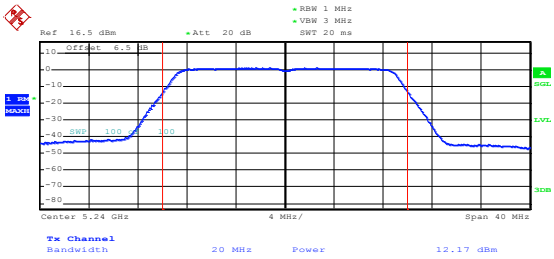
Date: 23.JUN.2019 10:53:10

Middle channel



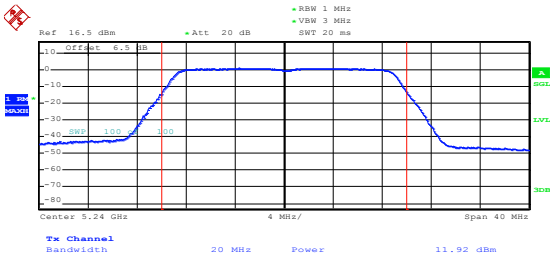
Date: 23.JUN.2019 10:03:32

Middle channel



Date: 23.JUN.2019 10:53:26

Highest channel

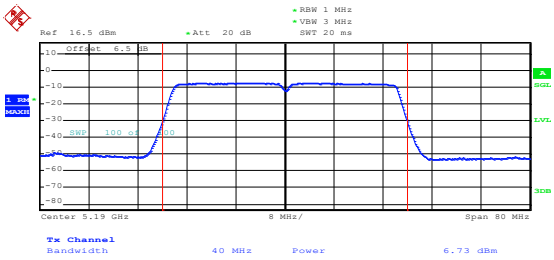


Date: 23.JUN.2019 10:03:49

Highest channel

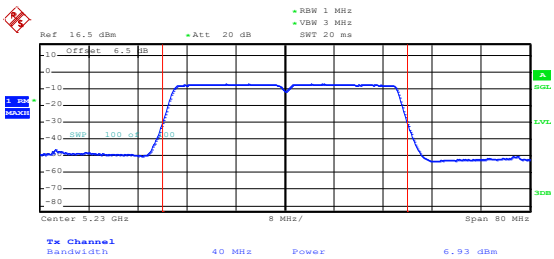
802.11n-HT40

ANT 1



Date: 23.JUN.2019 10:54:04

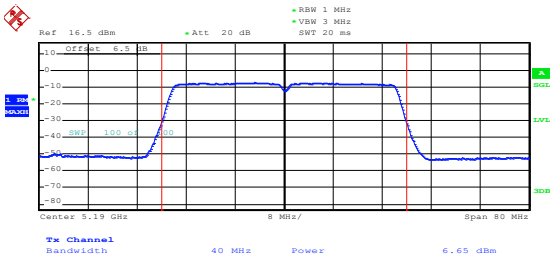
Lowest channel



Date: 23.JUN.2019 10:54:22

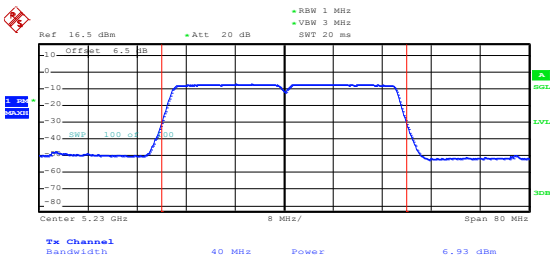
Highest channel

ANT 2



Date: 23.JUN.2019 10:05:21

Lowest channel

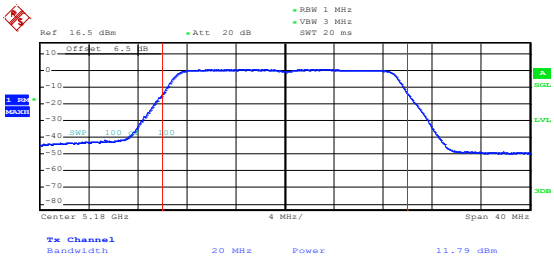


Date: 23.JUN.2019 10:05:37

Highest channel

802.11ac-HT20

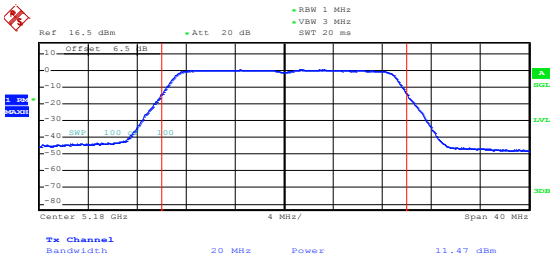
ANT 1



Date: 23.JUN.2019 10:56:35

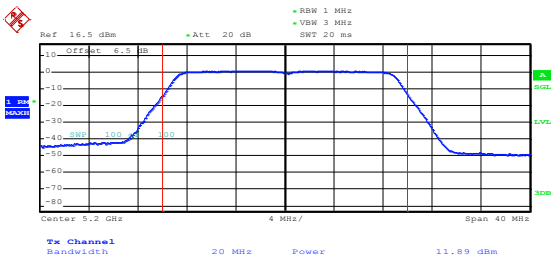
Lowest channel

ANT 2



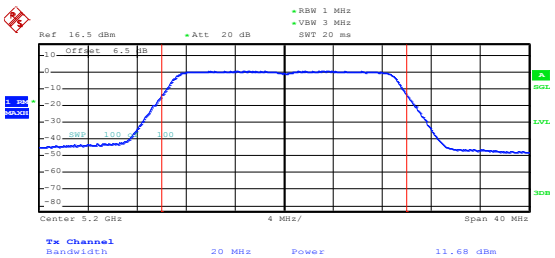
Date: 23.JUN.2019 10:10:41

Lowest channel



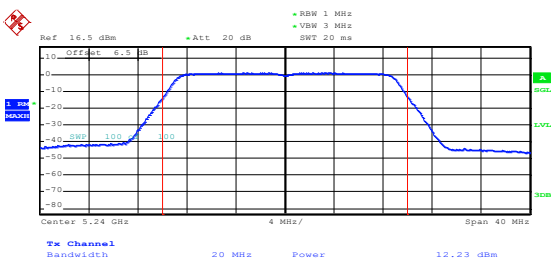
Date: 23.JUN.2019 10:56:53

Middle channel



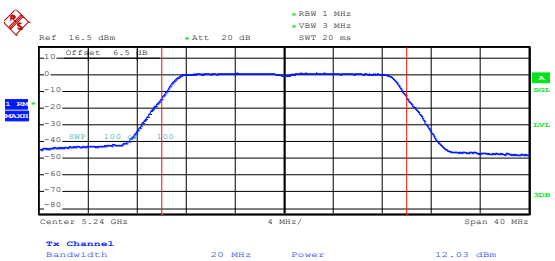
Date: 23.JUN.2019 10:11:09

Middle channel



Date: 23.JUN.2019 10:57:07

Highest channel

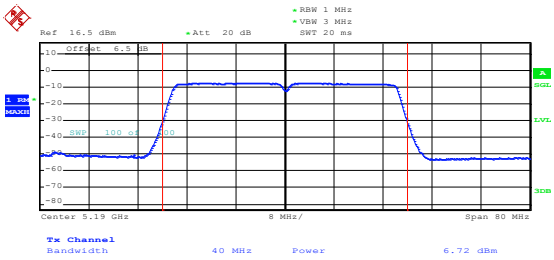


Date: 23.JUN.2019 10:11:27

Highest channel

802.11ac-HT40

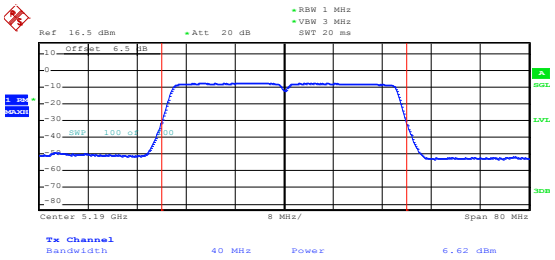
ANT 1



Date: 23.JUN.2019 10:54:51

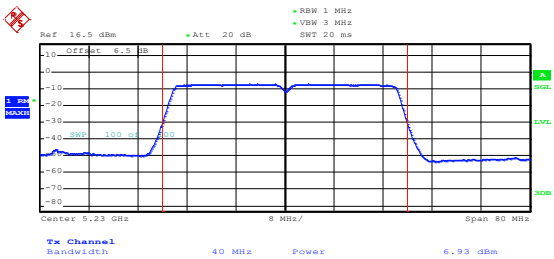
Lowest channel

ANT 2



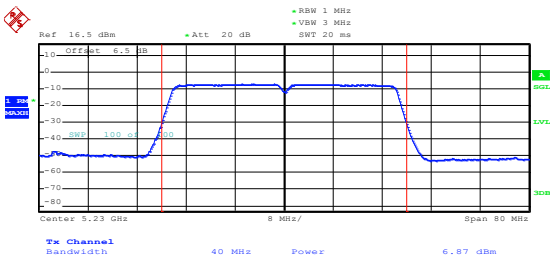
Date: 23.JUN.2019 10:08:23

Lowest channel



Date: 23.JUN.2019 10:55:06

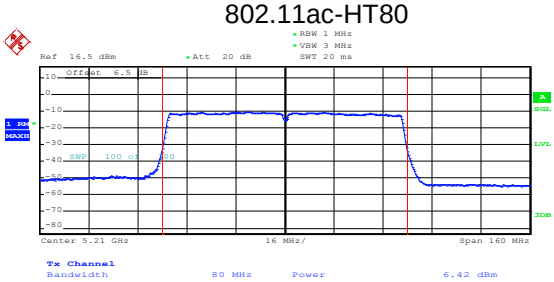
Highest channel



Date: 23.JUN.2019 10:08:40

Highest channel

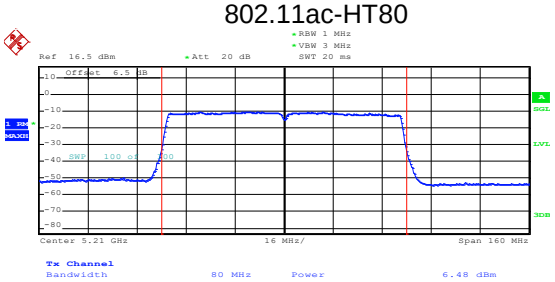
802.11ac-HT80



Date: 23.JUN.2019 10:58:09

Middle channel

802.11ac-HT80



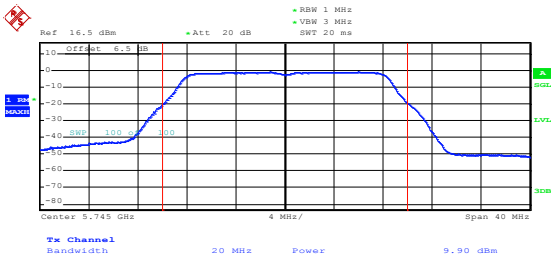
Date: 23.JUN.2019 10:07:31

Middle channel

Band 4:

802.11a

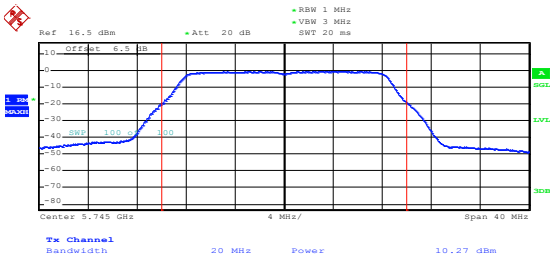
ANT 1



Date: 23.JUN.2019 11:24:28

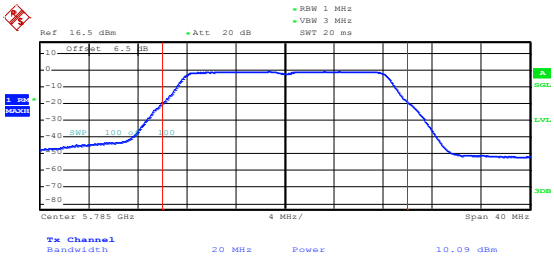
Lowest channel

ANT 2



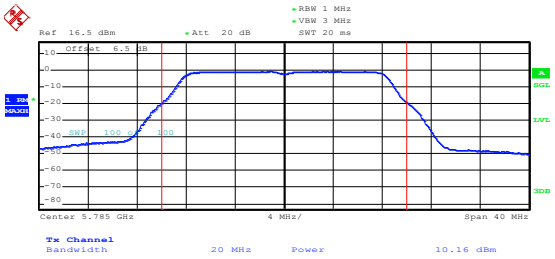
Date: 23.JUN.2019 12:37:40

Lowest channel



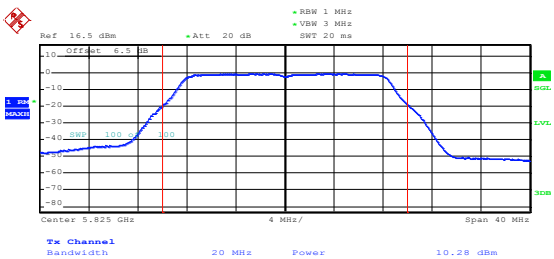
Date: 23.JUN.2019 11:24:49

Middle channel



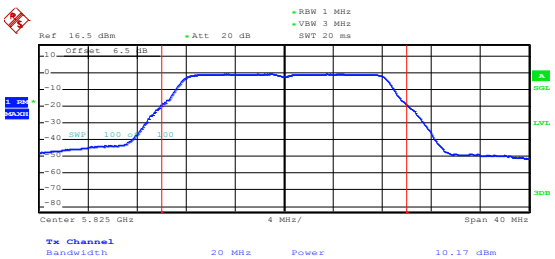
Date: 23.JUN.2019 12:38:37

Middle channel



Date: 23.JUN.2019 11:25:13

Highest channel

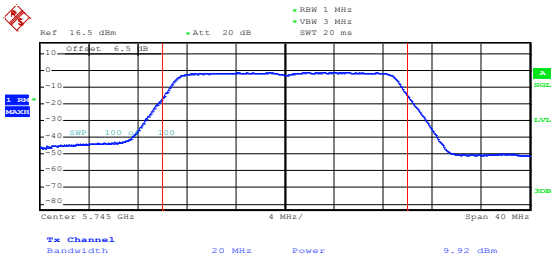


Date: 23.JUN.2019 12:38:57

Highest channel

802.11n-HT20

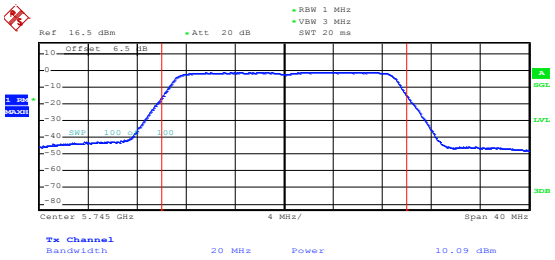
ANT 1



Date: 23.JUN.2019 11:26:53

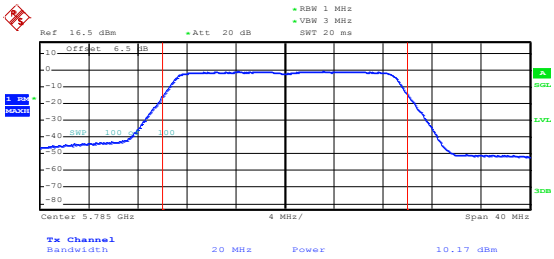
Lowest channel

ANT 2



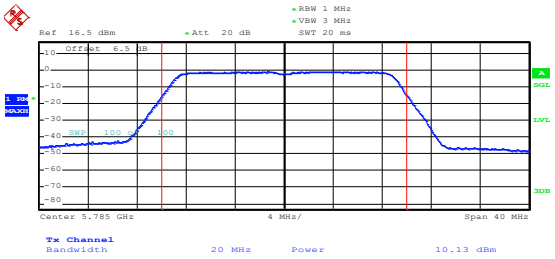
Date: 23.JUN.2019 12:39:41

Lowest channel



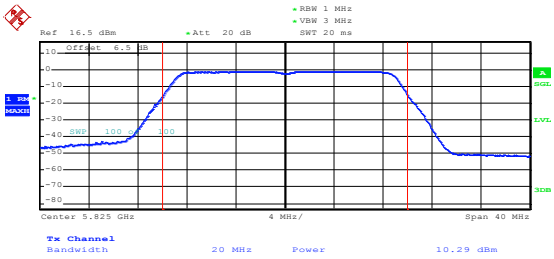
Date: 23.JUN.2019 11:27:27

Middle channel



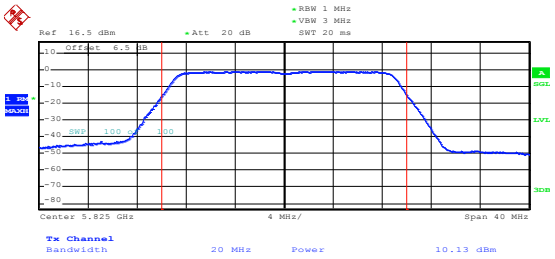
Date: 23.JUN.2019 12:39:59

Middle channel



Date: 23.JUN.2019 11:27:45

Highest channel

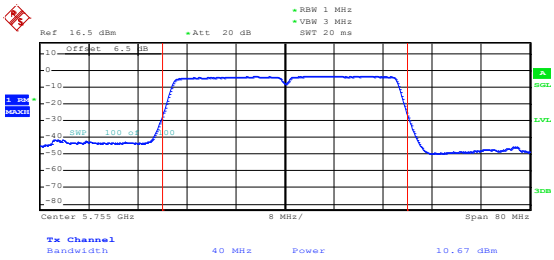


Date: 23.JUN.2019 12:40:13

Highest channel

802.11n-HT40

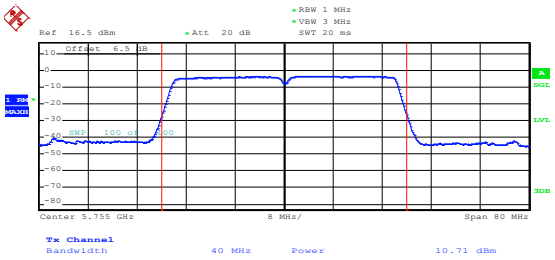
ANT 1



Date: 23.JUN.2019 11:28:39

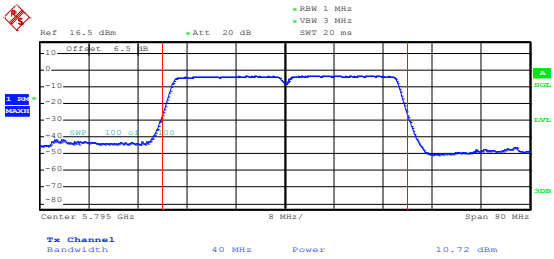
Lowest channel

ANT 2



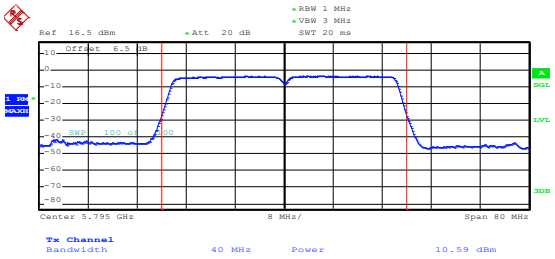
Date: 23.JUN.2019 12:42:10

Lowest channel



Date: 23.JUN.2019 11:28:59

Highest channel

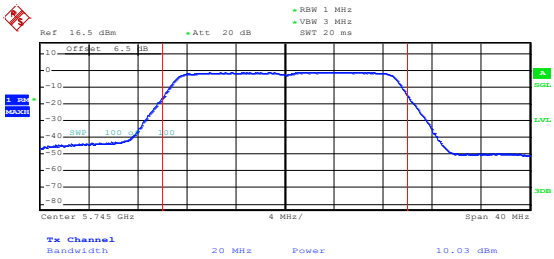


Date: 23.JUN.2019 12:42:43

Highest channel

802.11ac-HT20

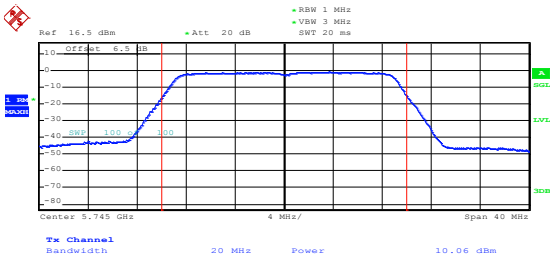
ANT 1



Date: 23.JUN.2019 11:25:42

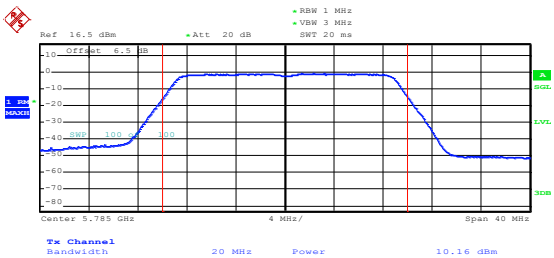
Lowest channel

ANT 2



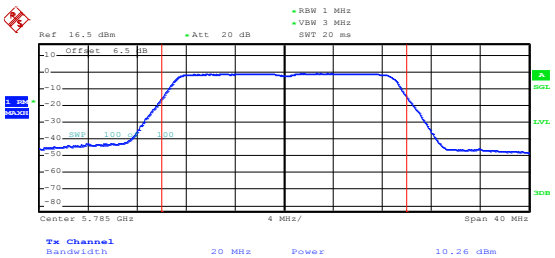
Date: 23.JUN.2019 12:40:44

Lowest channel



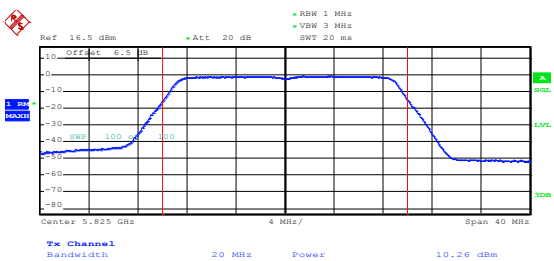
Date: 23.JUN.2019 11:26:03

Middle channel



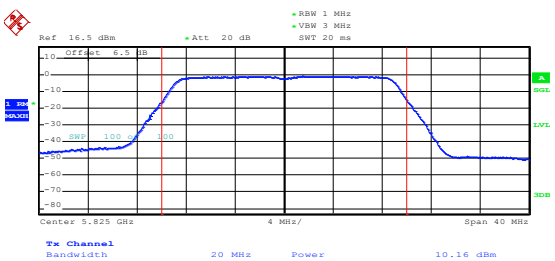
Date: 23.JUN.2019 12:41:00

Middle channel



Date: 23.JUN.2019 11:26:25

Highest channel

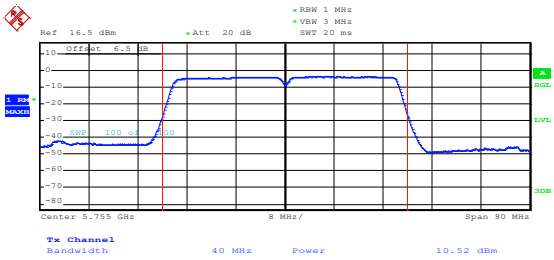


Date: 23.JUN.2019 12:41:16

Highest channel

802.11ac-HT40

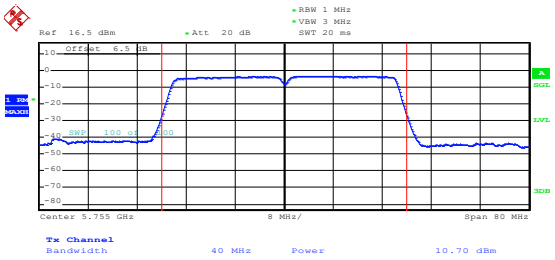
ANT 1



Date: 23.JUN.2019 11:29:27

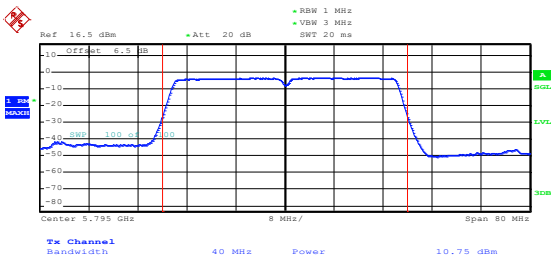
Lowest channel

ANT 2



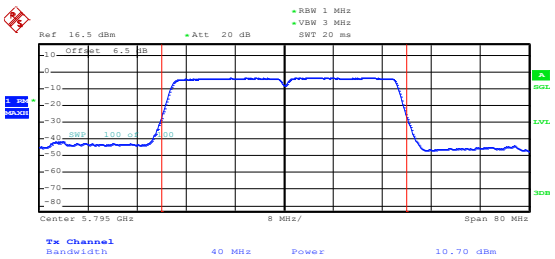
Date: 23.JUN.2019 12:43:49

Lowest channel



Date: 23.JUN.2019 11:29:46

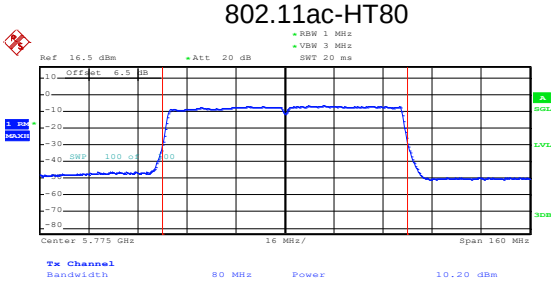
Highest channel



Date: 23.JUN.2019 12:44:13

Highest channel

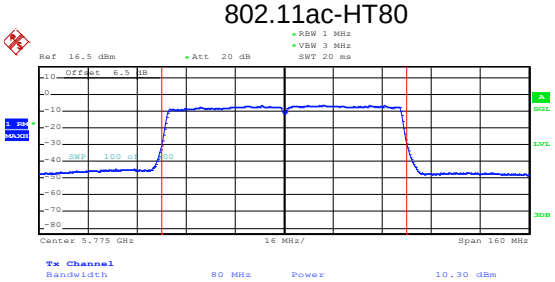
802.11ac-HT80



Date: 23.JUN.2019 11:33:31

Middle channel

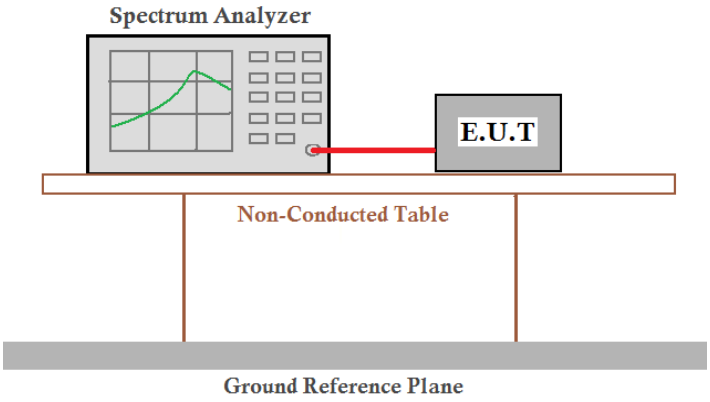
802.11ac-HT80



Date: 23.JUN.2019 12:45:36

Middle channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407 (a) (5) and Section 15.407 (e)
Test Method:	ANSI C63.10:2013 and KDB 789033
Limit:	Band 1/4: N/A (26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: >500kHz (6dB Bandwidth)
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:

Left module:

Band 1: ANT 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	20.08	20.32	40.00	20.24	40.00	---	N/A	PASS
Middle	20.16	20.40	---	20.08	---	79.72		
Highest	19.68	19.76	39.36	19.84	39.68	---		
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	17.36	18.40	37.12	18.32	37.12	---	N/A	PASS
Middle	17.36	18.40	---	18.40	---	76.48		
Highest	17.28	18.32	36.96	18.32	36.96	---		

Remark: The ANT 1 and ANT 2 are the same chip control，pre-scan ANT 1 and ANT 2, found ANT 1 was worse case mode. The report only reflects the worst mode.

Band 4:ANT 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	22.00	22.16	40.32	22.00	40.32	---	N/A	PASS
Middle	22.00	22.32	---	21.92	---	81.28		
Highest	21.92	22.16	40.00	22.16	40.48	---		
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	17.36	18.40	37.12	18.40	36.96	---	N/A	PASS
Middle	17.36	18.40	---	18.40	---	76.16		
Highest	17.36	18.40	37.12	18.40	37.12	---		
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	16.56	17.76	36.64	17.76	36.64	---	>500kHz	PASS
Middle	16.56	17.76	---	17.76	---	76.80		
Highest	16.56	17.76	36.64	17.76	36.64	---		

Remark: The ANT 1 and ANT 2 are the same chip control，pre-scan ANT 1 and ANT 2, found ANT 1 was worse case mode. The report only reflects the worst mode.

Right module:
Band 1: ANT 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	20.16	20.48	40.16	20.08	40.00	---	N/A	PASS
Middle	20.08	20.40	---	20.16	---	79.46		
Highest	19.68	19.92	39.84	19.84	39.84	---		
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	17.36	18.40	36.96	18.32	37.12	---	N/A	PASS
Middle	17.28	18.40	---	18.32	---	76.48		
Highest	17.28	18.40	36.96	18.32	36.96	---		

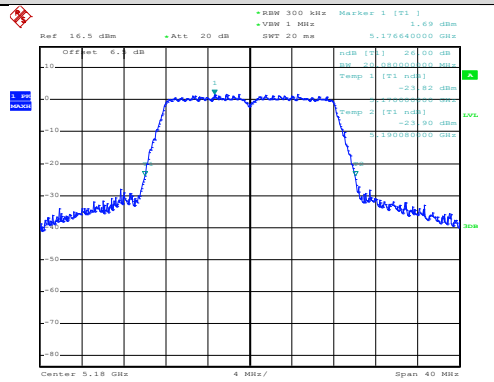
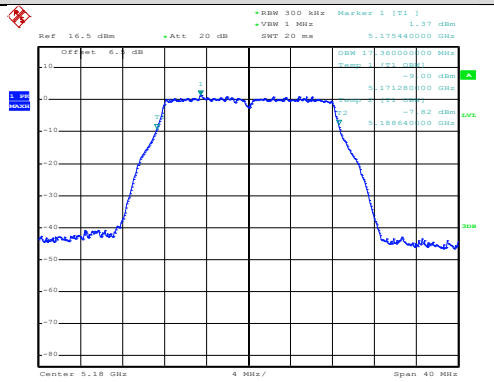
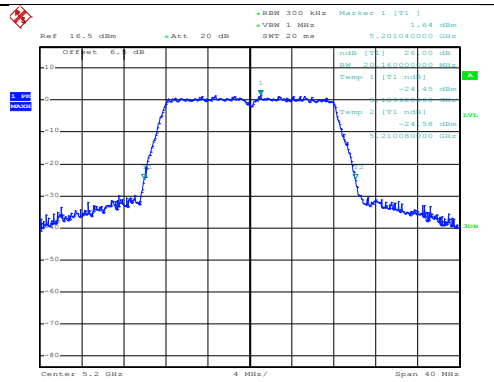
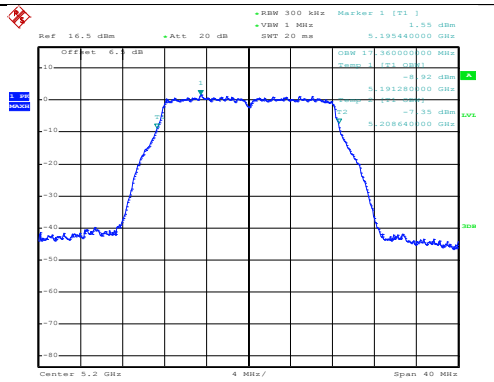
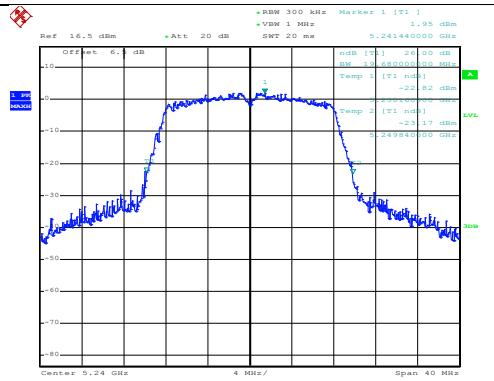
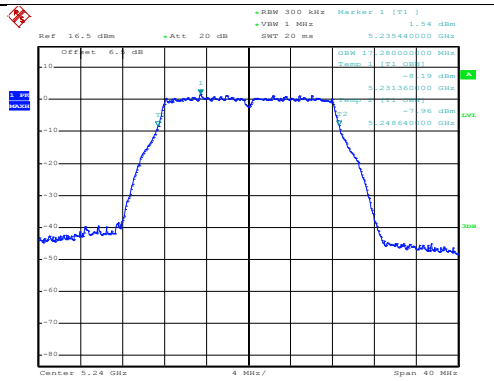
Remark: The ANT 3 and ANT 4 are the same chip control，pre-scan ANT 3 and ANT 4, found ANT 3 was worse case mode. The report only reflects the worst mode.

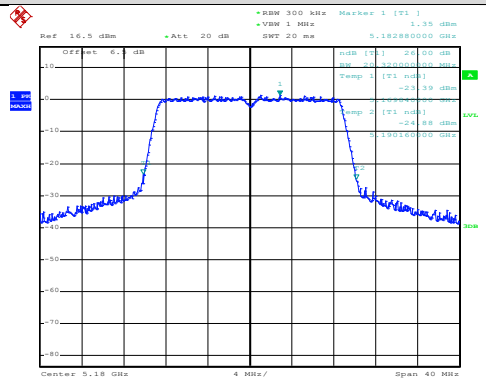
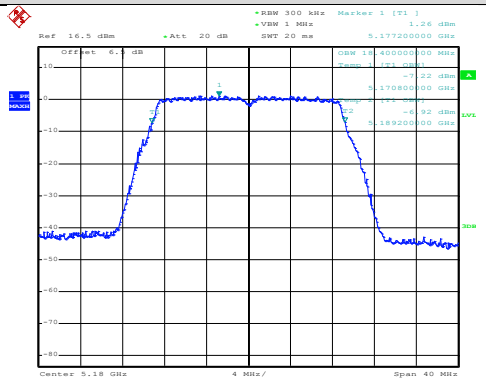
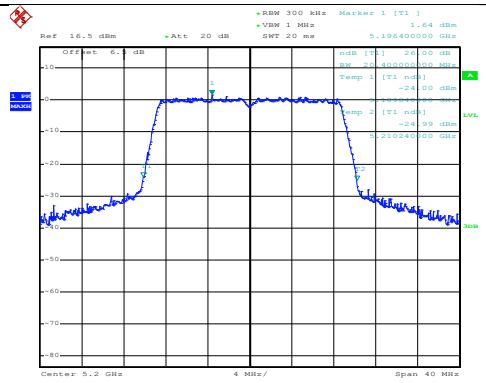
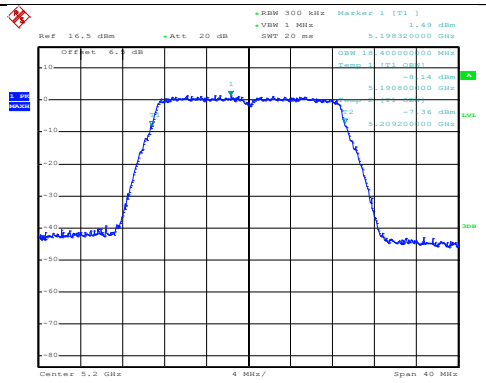
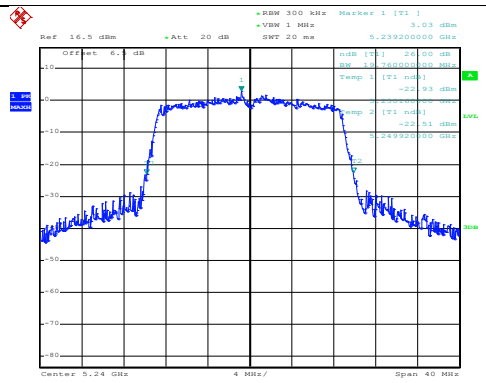
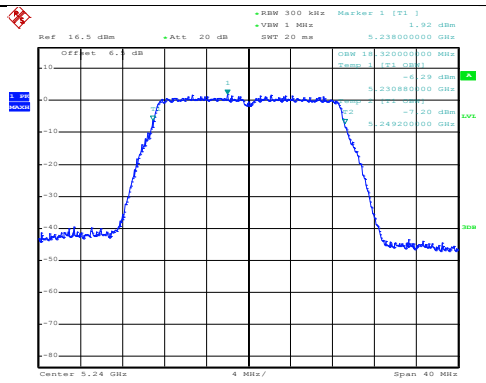
Band 4: ANT 3

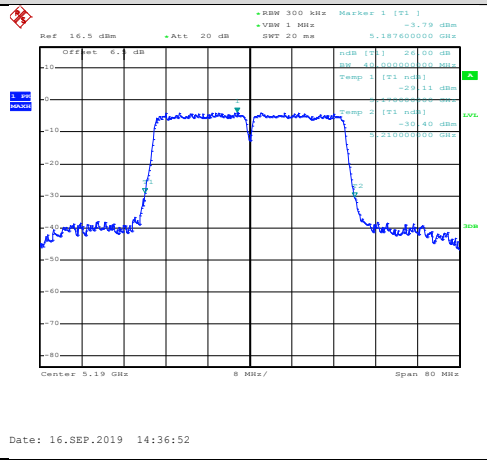
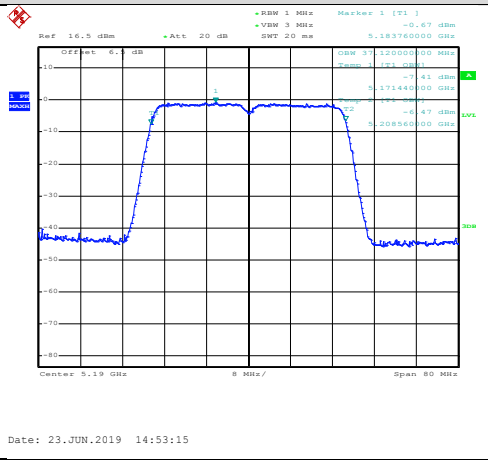
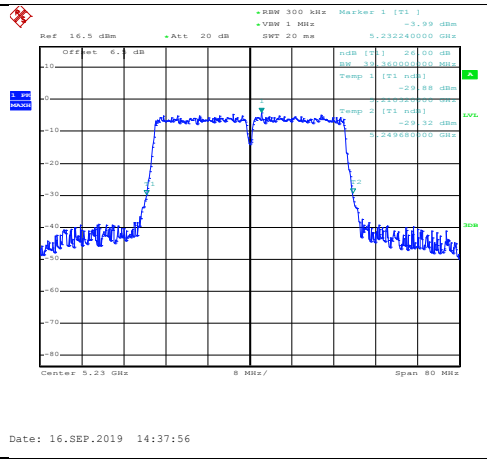
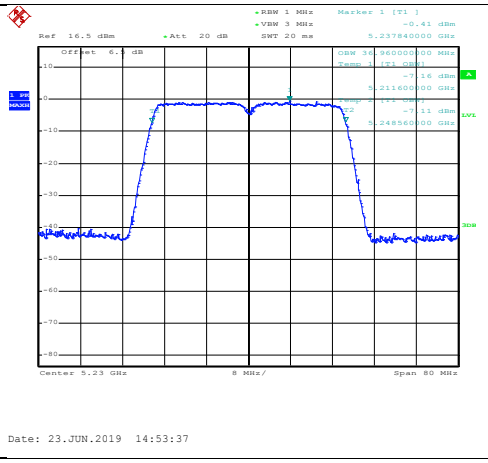
Test Channel	26dB Emission Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	17.36	17.36	36.32	17.36	36.32	---	N/A	PASS
Middle	17.44	17.36	---	17.36	---	75.84		
Highest	17.36	17.36	36.48	17.36	36.32	---		
Test Channel	99% Occupy Bandwidth (MHz)						Limit	Result
	802.11a	802.11n (HT20)	802.11n (HT40)	802.11ac (HT20)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	17.36	18.40	37.12	18.40	37.12	---	N/A	PASS
Middle	17.36	18.40	---	18.40	---	76.16		
Highest	17.36	18.40	37.12	18.32	36.96	---		
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	16.56	17.76	36.64	17.76	36.64	---	>500kHz	PASS
Middle	16.56	17.84	---	17.76	---	76.80		
Highest	16.56	17.76	36.64	17.76	36.64	---		

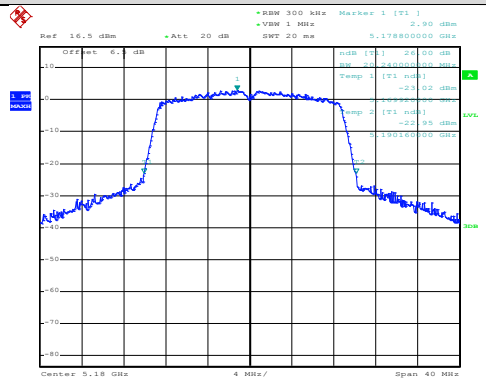
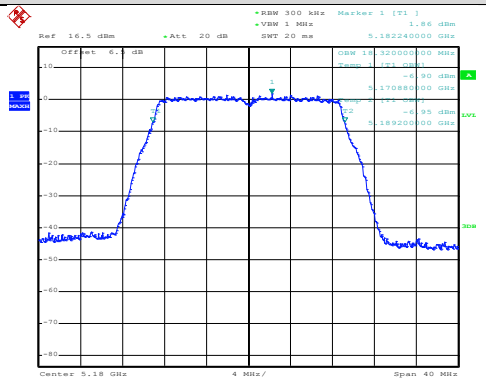
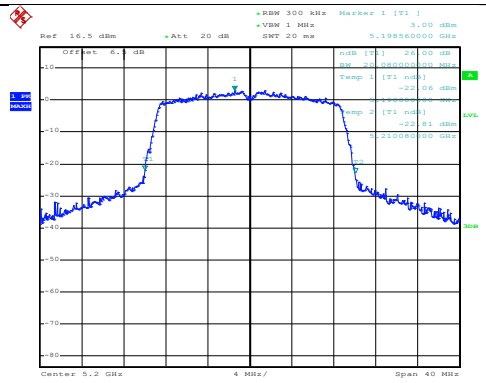
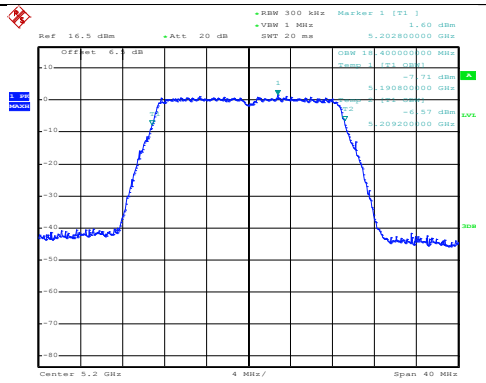
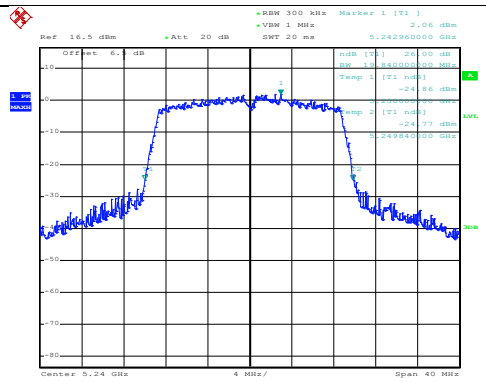
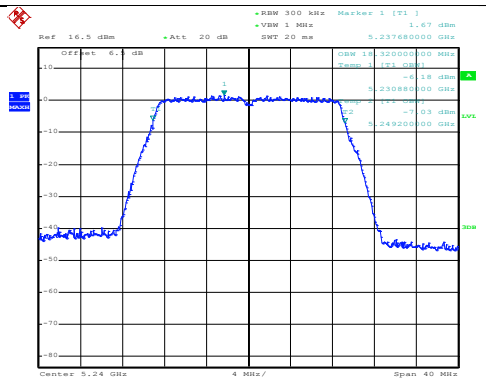
Remark: The ANT 3 and ANT 4 are the same chip control，pre-scan ANT 3 and ANT 4, found ANT 3 was worse case mode. The report only reflects the worst mode.

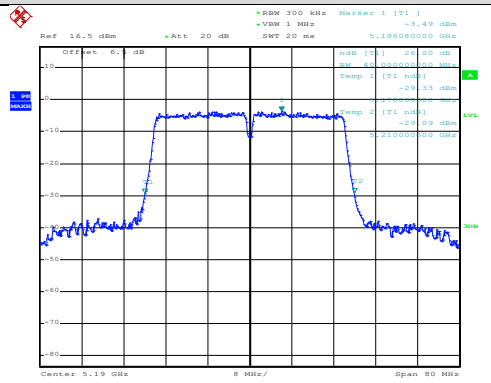
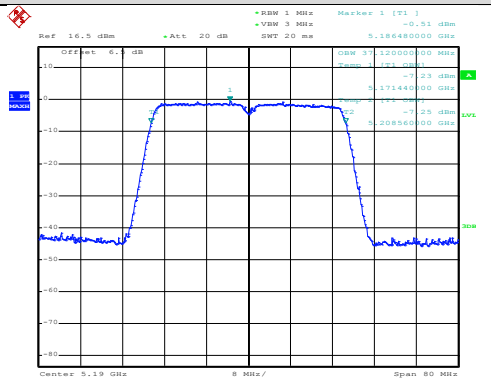
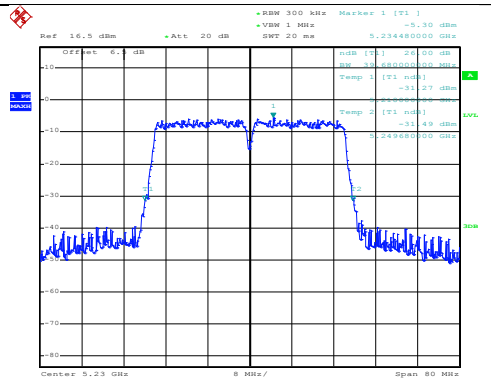
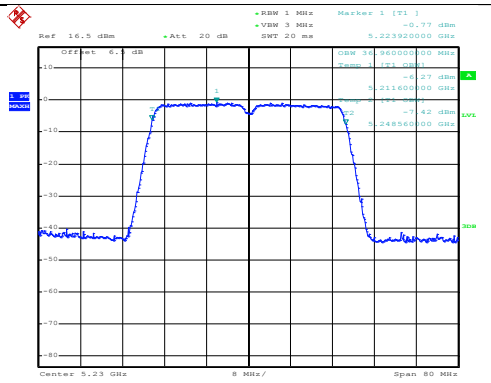
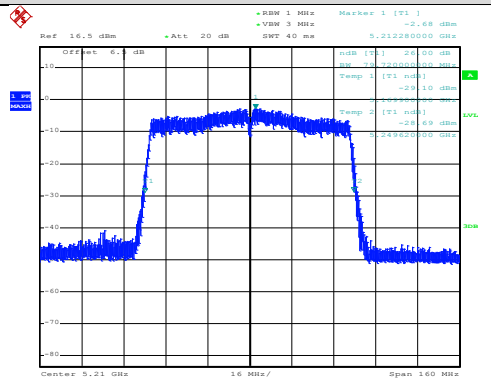
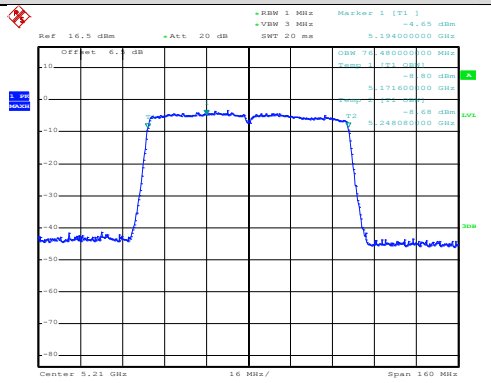
Measurement Data:
Left module:
Band 1: TX1

802.11a	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:22:11	Date: 23.JUN.2019 14:55:02
Lowest channel	
	
Date: 16.SEP.2019 14:22:54	Date: 23.JUN.2019 14:55:15
Middle channel	
	
Date: 16.SEP.2019 14:24:12	Date: 23.JUN.2019 14:55:26
Highest channel	

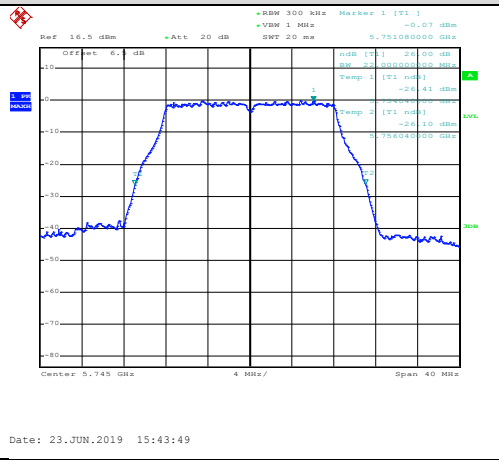
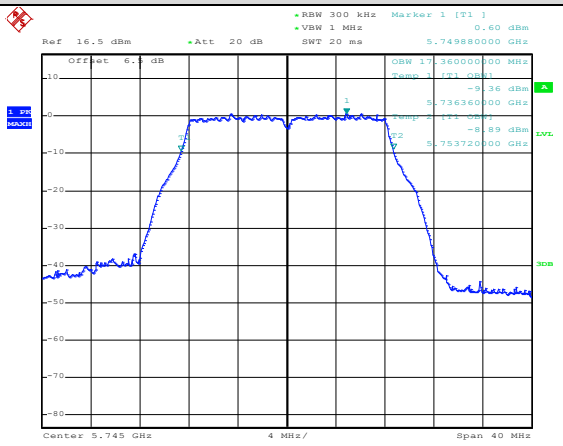
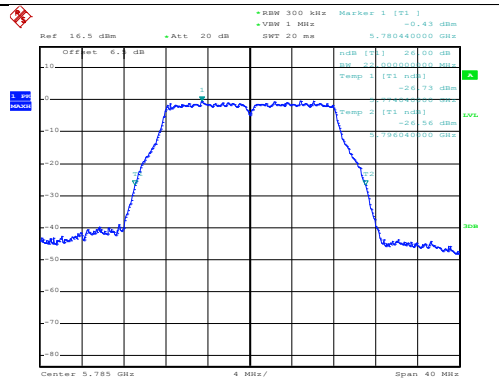
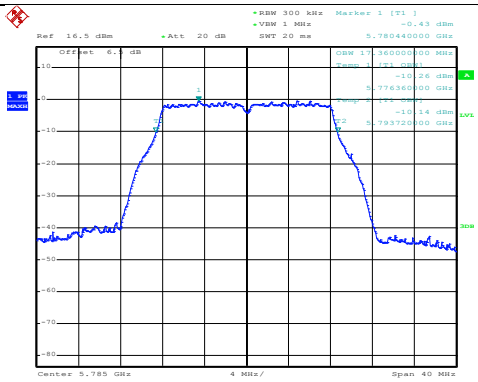
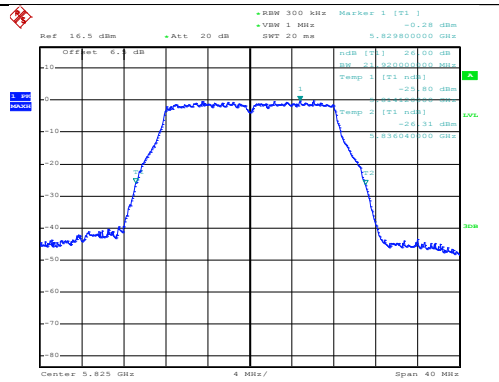
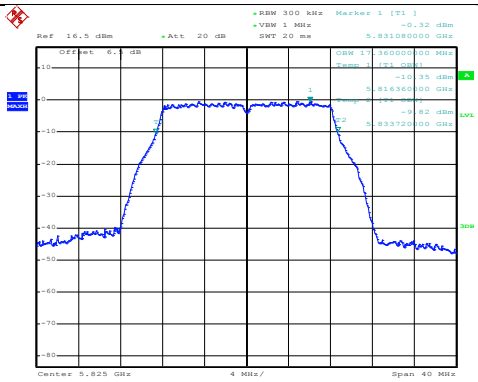
802.11n(HT20)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:26:01	Date: 23.JUN.2019 14:55:51
Lowest channel	
	
Date: 16.SEP.2019 14:26:57	Date: 23.JUN.2019 14:56:04
Middle channel	
	
Date: 16.SEP.2019 14:28:42	Date: 23.JUN.2019 14:56:17
Highest channel	

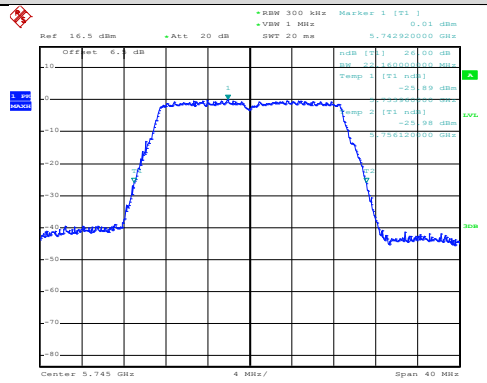
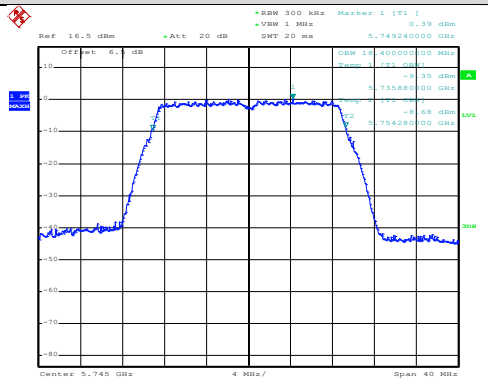
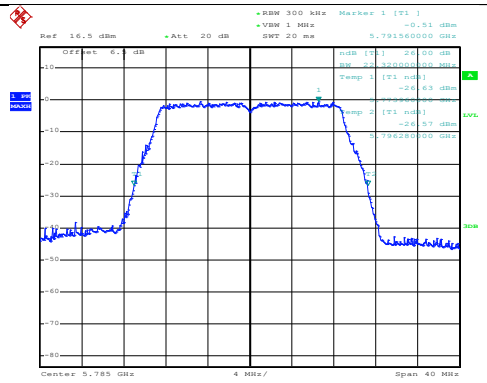
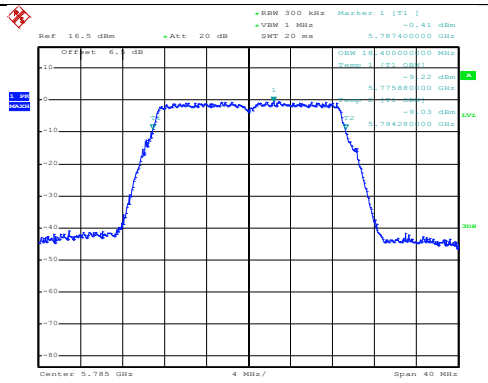
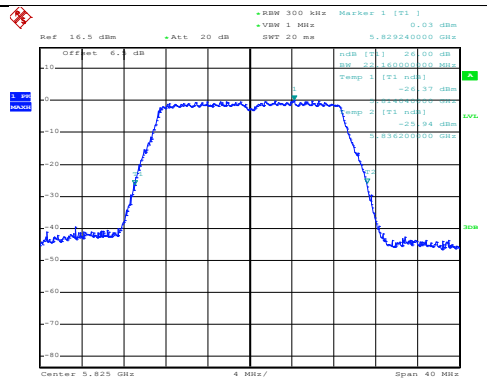
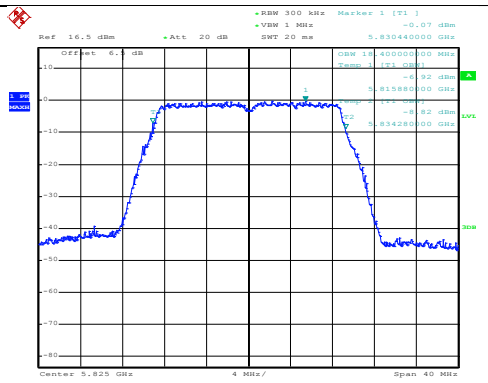
802.11n(HT40)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:36:52	Date: 23.JUN.2019 14:53:15
Lowest channel	
	
Date: 16.SEP.2019 14:37:56	Date: 23.JUN.2019 14:53:37
Highest channel	

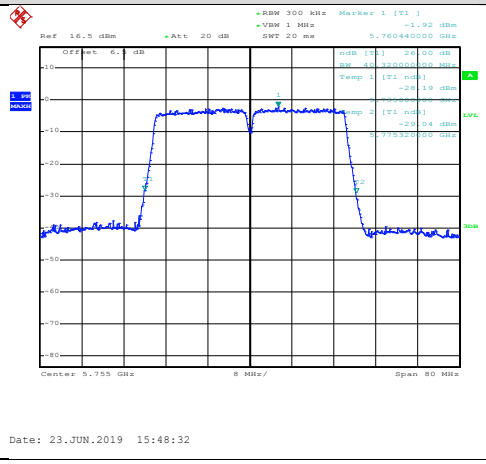
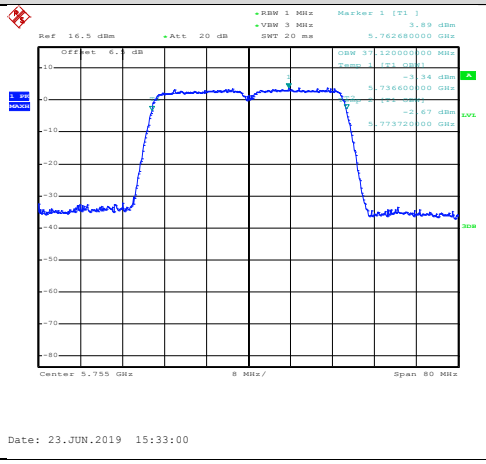
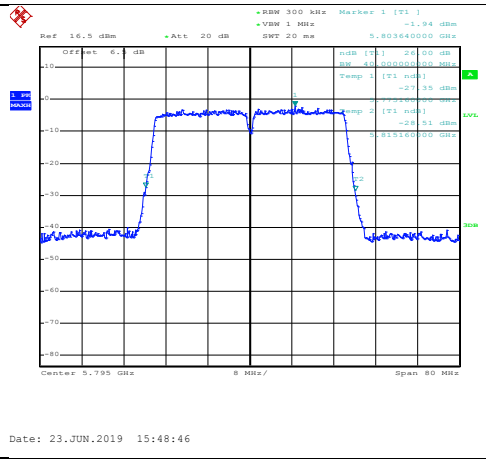
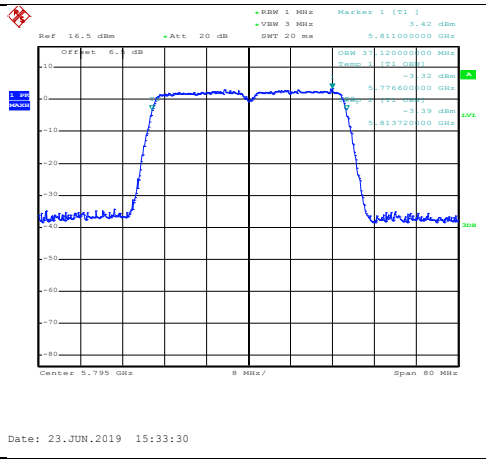
802.11ac(HT20)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:29:42	Date: 23.JUN.2019 14:56:37
Lowest channel	
	
Date: 16.SEP.2019 14:30:30	Date: 23.JUN.2019 14:56:50
Middle channel	
	
Date: 16.SEP.2019 14:31:38	Date: 23.JUN.2019 14:57:02
Highest channel	

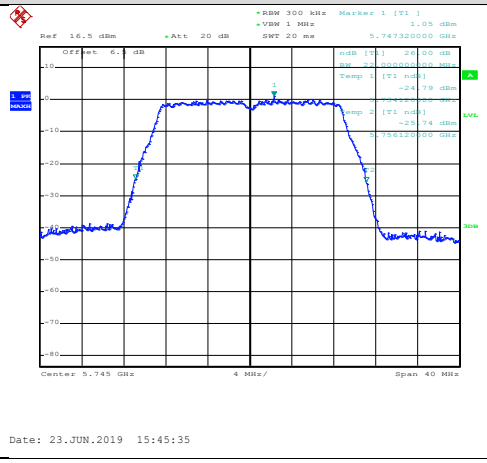
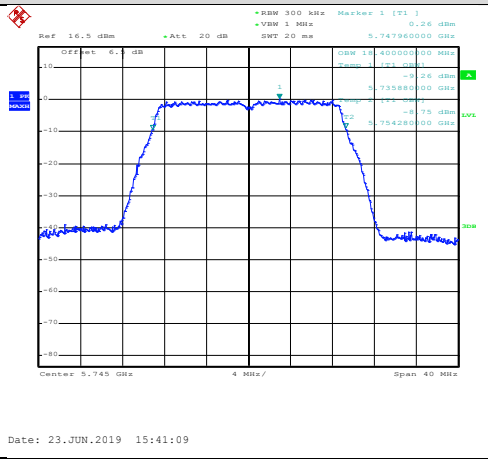
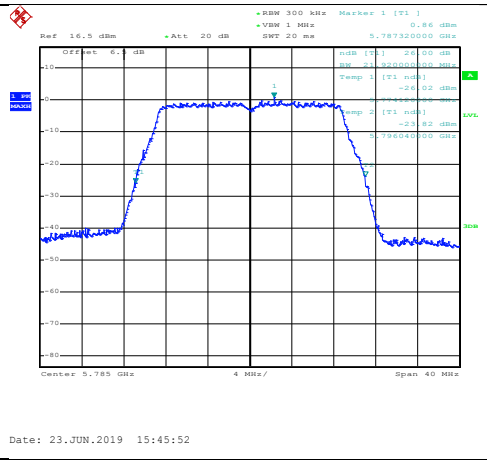
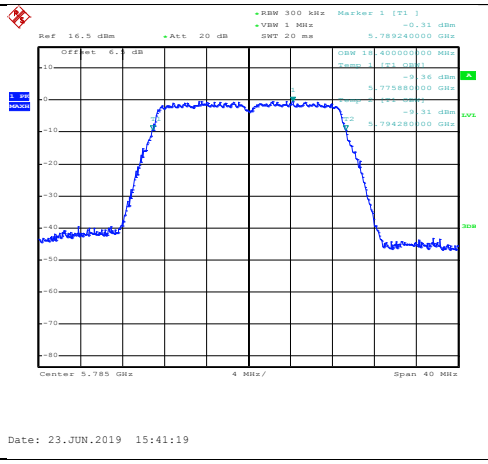
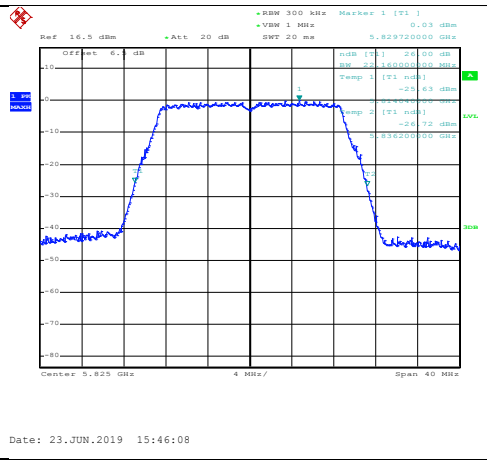
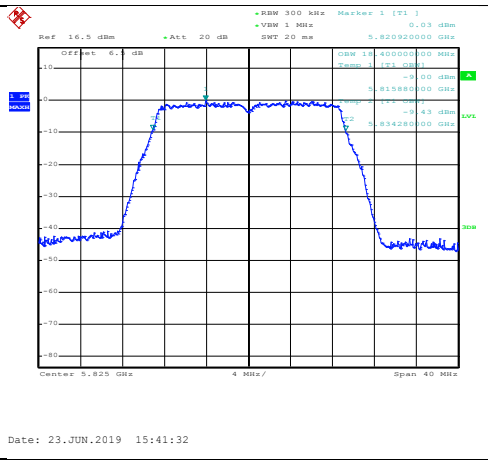
802.11ac(HT40)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:42:41	Date: 23.JUN.2019 14:54:03
Lowest channel	
	
Date: 16.SEP.2019 14:47:53	Date: 23.JUN.2019 14:54:16
Highest channel	
802.11ac(HT80)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 15:49:24	Date: 23.JUN.2019 14:52:41
Middleest channel	

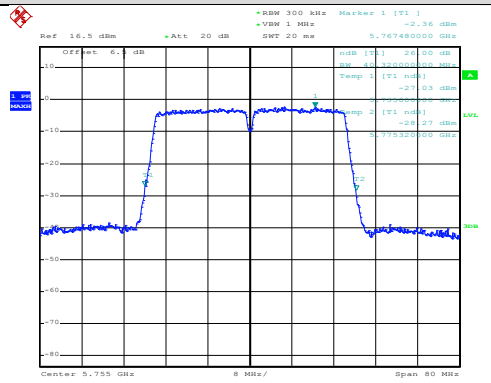
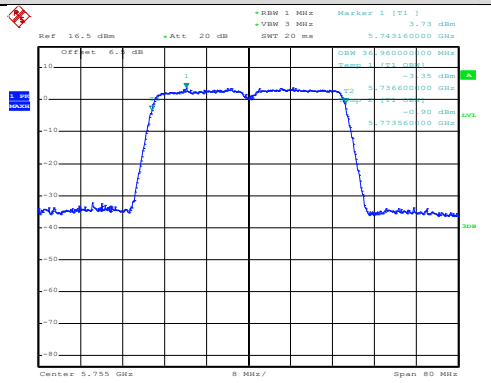
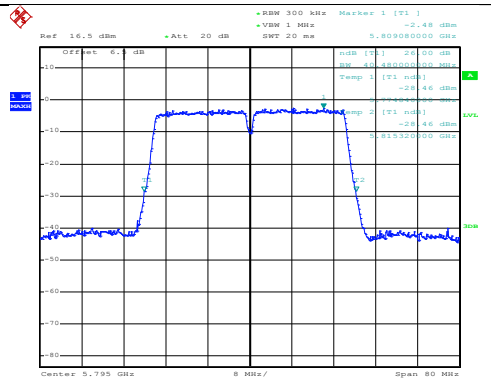
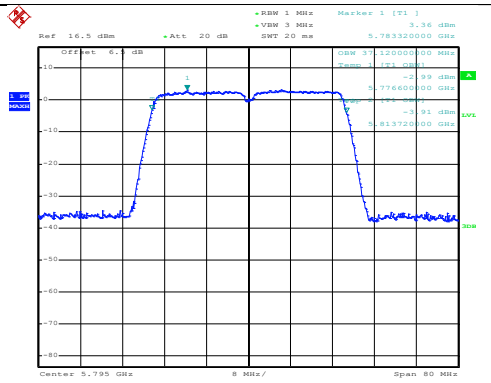
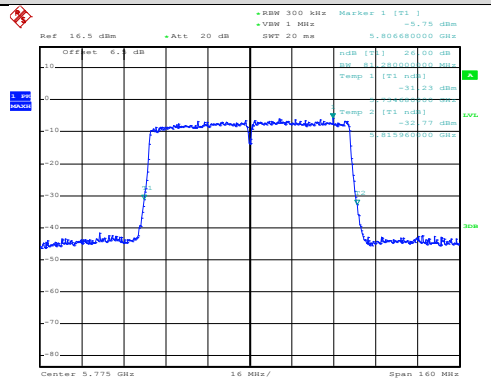
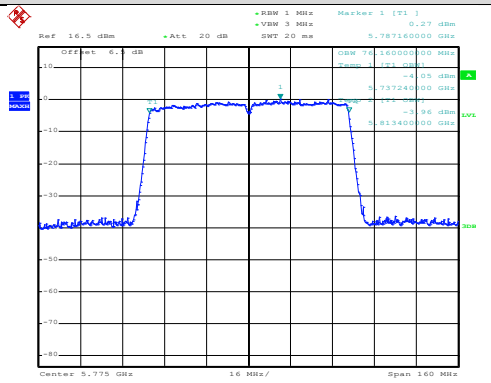
Band 4: TX1

802.11a	
26 dB EBW	99% OBW
	
Lowest channel	
	
Middle channel	
	
Highest channel	

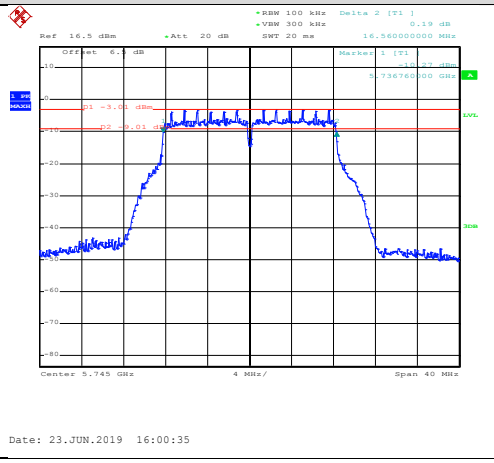
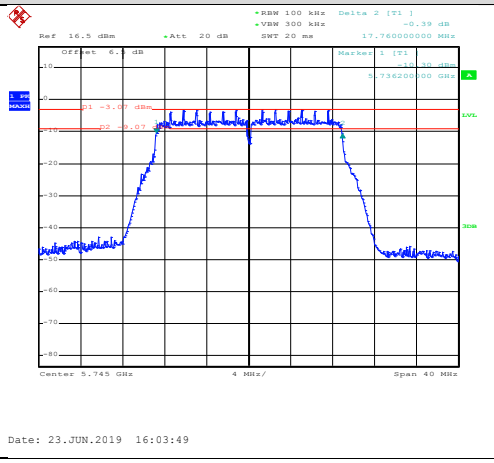
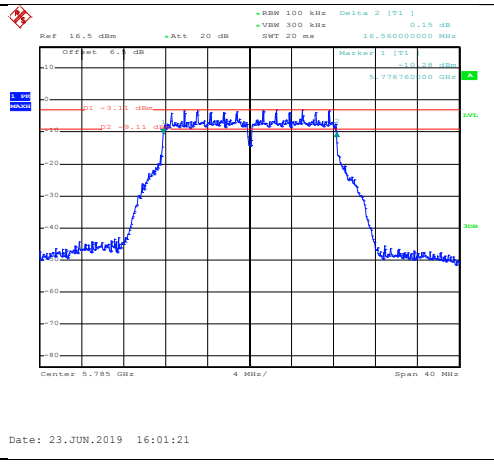
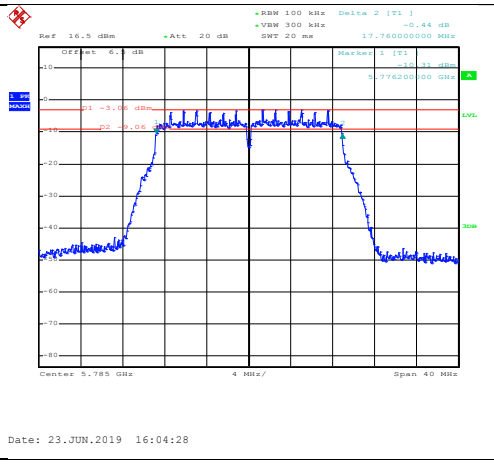
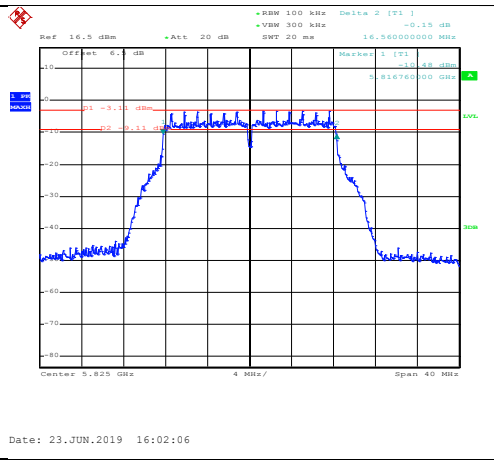
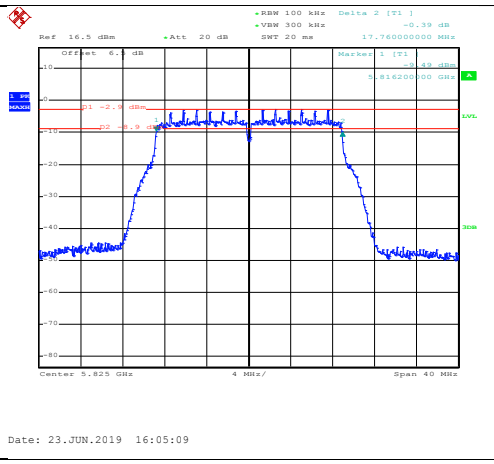
802.11n(HT20)	
26 dB EBW	99% OBW
	
Date: 23.JUN.2019 15:44:37	Date: 23.JUN.2019 15:39:00
Lowest channel	
	
Date: 23.JUN.2019 15:44:49	Date: 23.JUN.2019 15:39:17
Middle channel	
	
Date: 23.JUN.2019 15:45:04	Date: 23.JUN.2019 15:39:33
Highest channel	

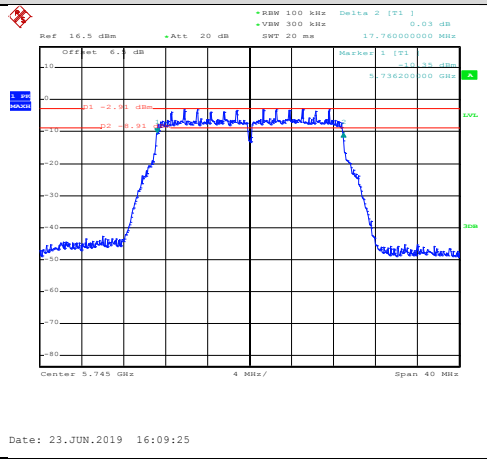
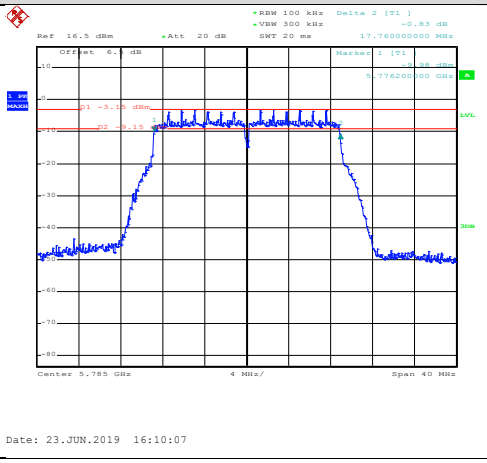
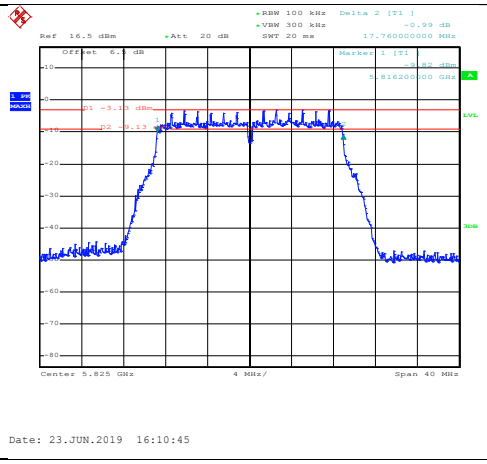
802.11n(HT40)	
26 dB EBW	99% OBW
	
Date: 23.JUN.2019 15:48:32	Date: 23.JUN.2019 15:33:00
Lowest channel	
	
Date: 23.JUN.2019 15:48:46	Date: 23.JUN.2019 15:33:30
Highest channel	

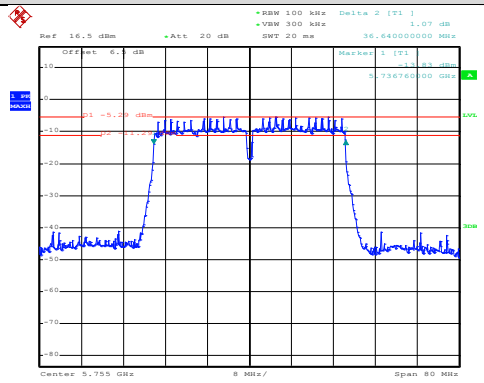
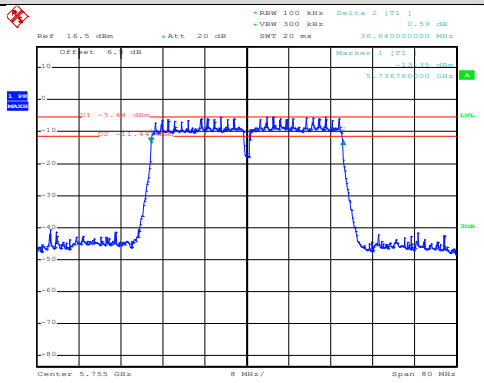
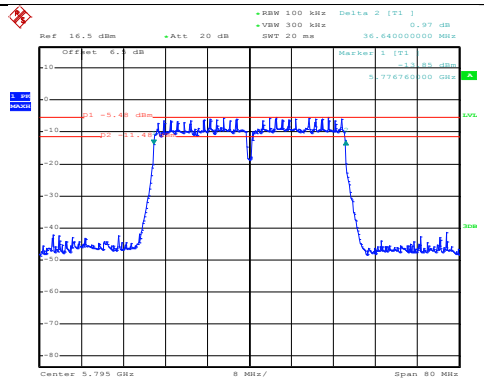
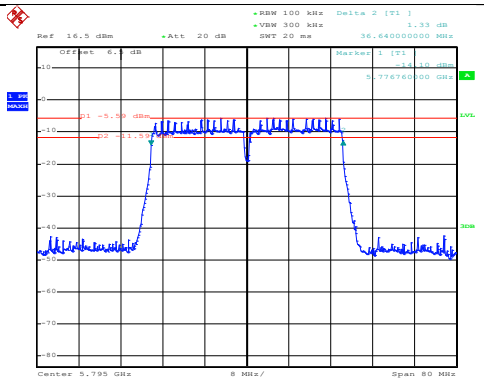
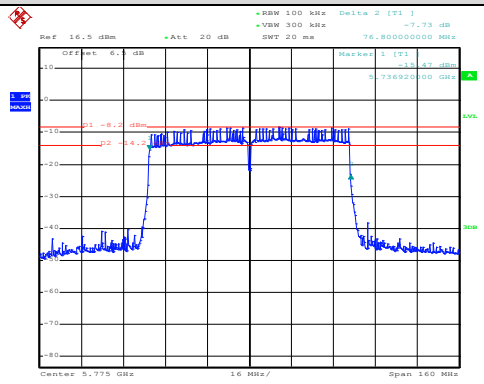
802.11ac(HT20)	
26 dB EBW	99% OBW
	
Date: 23.JUN.2019 15:45:35	Date: 23.JUN.2019 15:41:09
Lowest channel	
	
Date: 23.JUN.2019 15:45:52	Date: 23.JUN.2019 15:41:19
Middle channel	
	
Date: 23.JUN.2019 15:46:08	Date: 23.JUN.2019 15:41:32
Highest channel	

802.11ac(HT40)	
26 dB EBW	99% OBW
	
Date: 23.JUN.2019 15:49:39	Date: 23.JUN.2019 15:34:08
Lowest channel	
	
Date: 23.JUN.2019 15:50:01	Date: 23.JUN.2019 15:34:38
Highest channel	
802.11ac(HT80)	
26 dB EBW	99% OBW
	
Date: 23.JUN.2019 15:50:50	Date: 23.JUN.2019 15:32:02
Middleest channel	

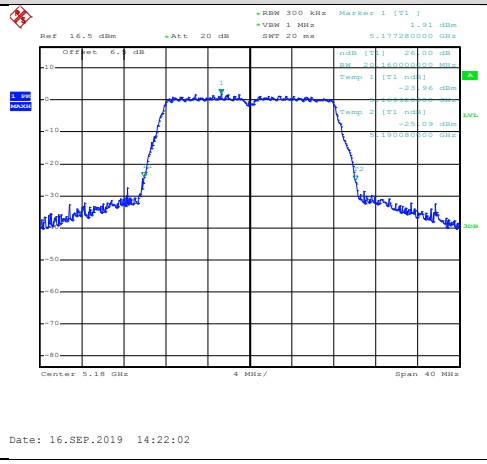
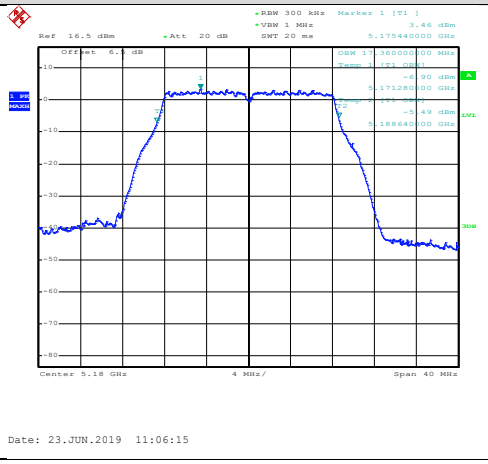
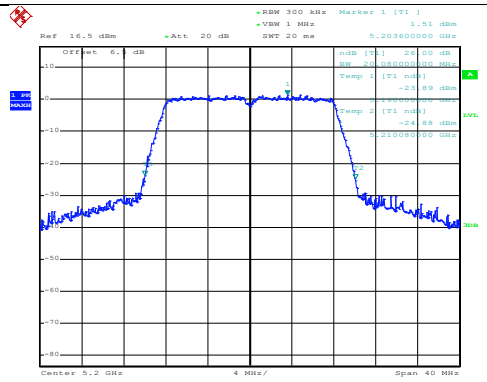
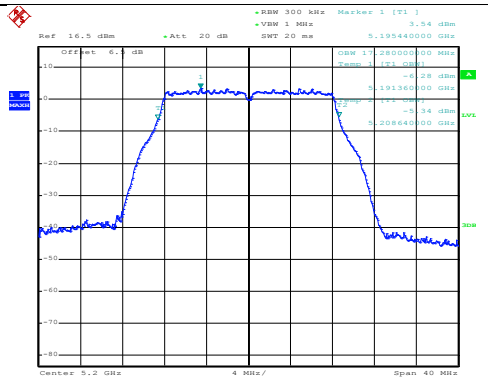
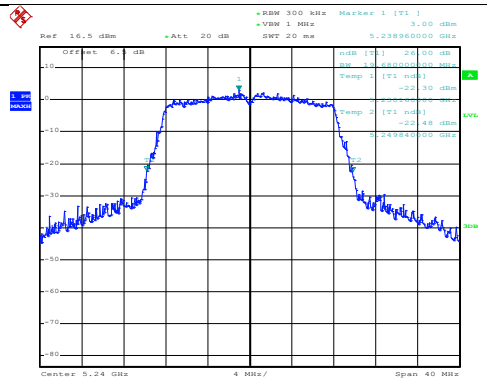
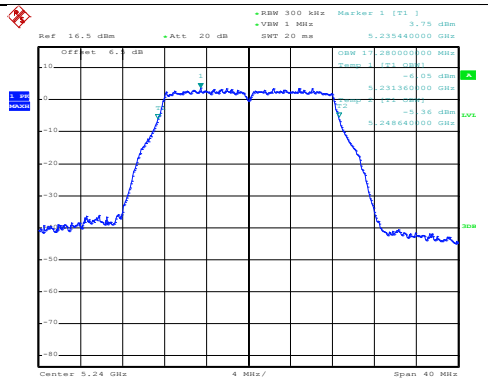
Band 4: 6 dB EBW

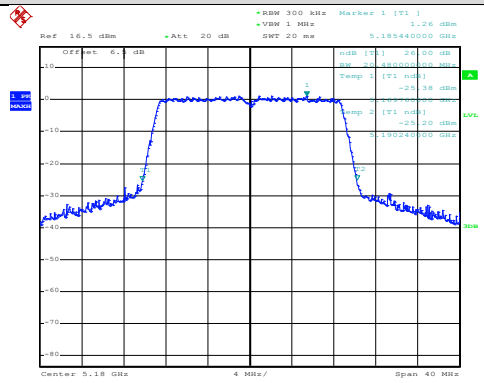
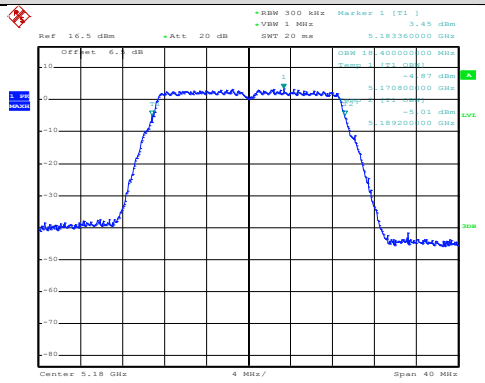
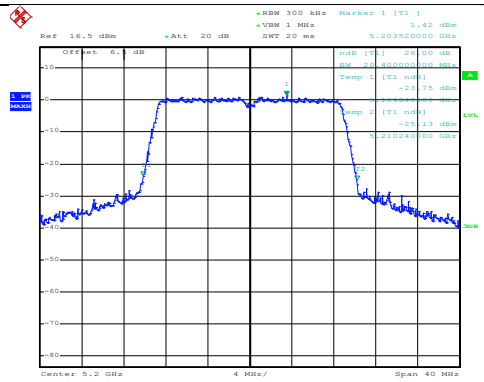
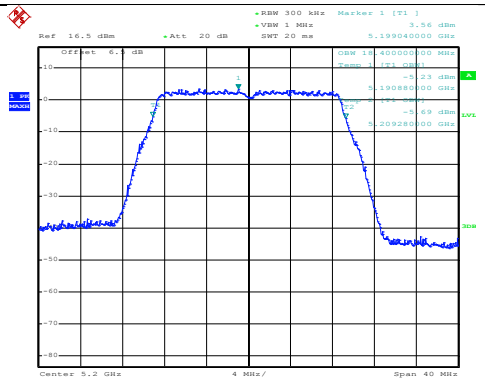
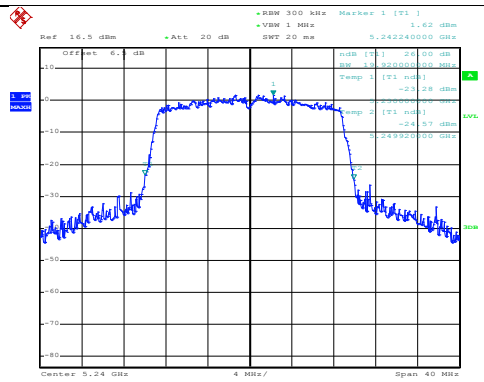
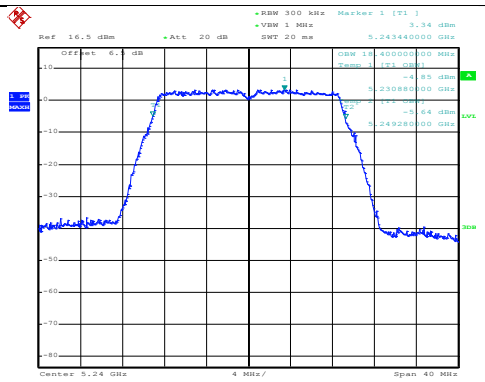
ANT 1	
802.11a	802.11n-HT20
6 dB EBW	6 dB EBW
	
Lowest channel	Lowest channel
	
Middle channel	Middle channel
	
highest channel	highest channel

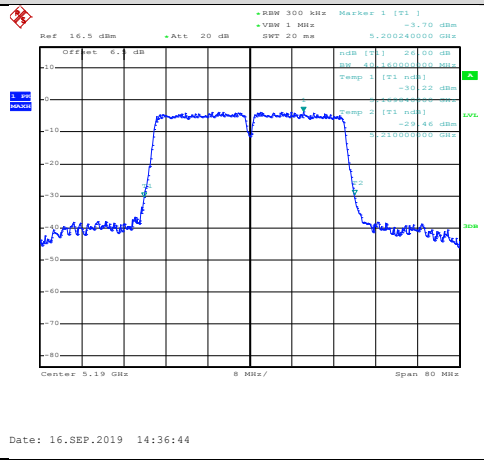
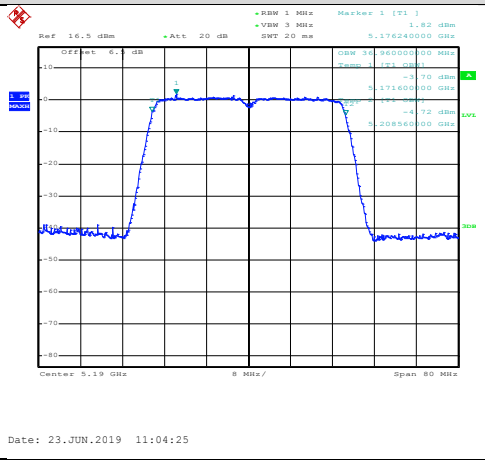
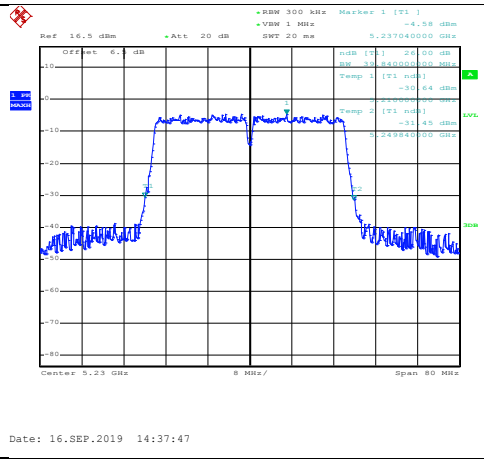
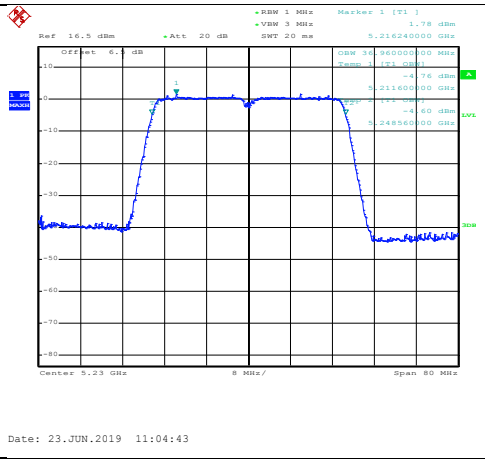
ANT 1	
802.11ac-HT20	
6 dB EBW	
	
Lowest channel	Middle channel
	
highest channel	

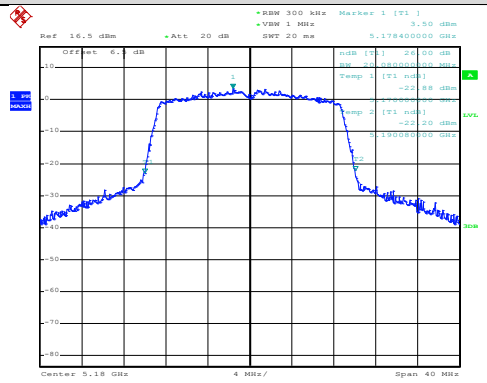
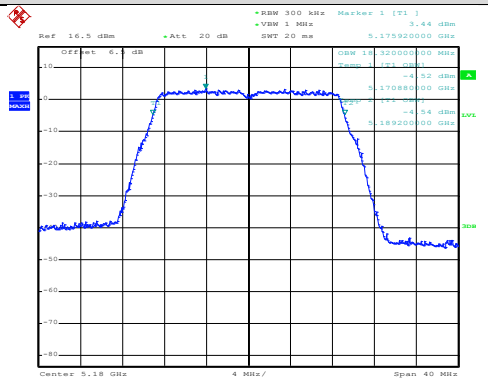
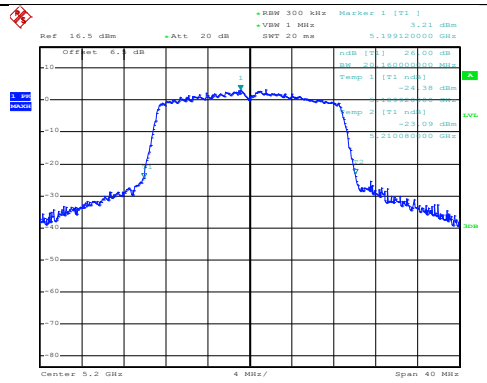
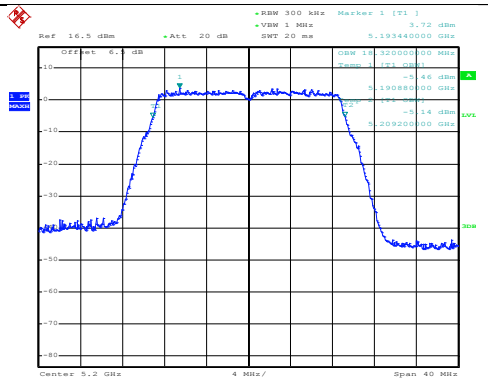
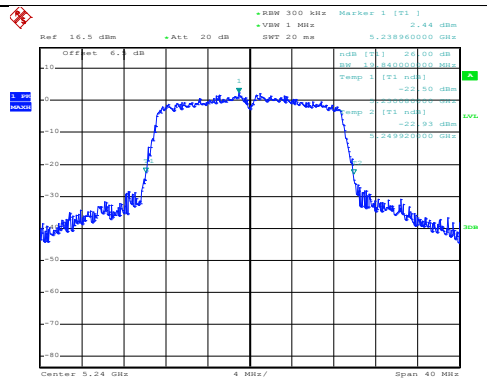
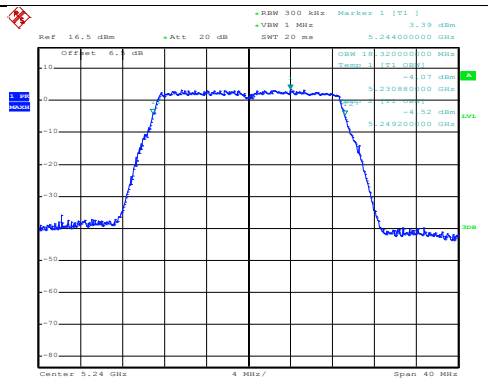
ANT 1	
802.11n-HT40	802.11ac-HT40
6 dB EBW	6 dB EBW
	
Lowest channel	Lowest channel
	
Highest channel	Highest channel
802.11ac-HT80	
6 dB EBW	
	
Highest channel	

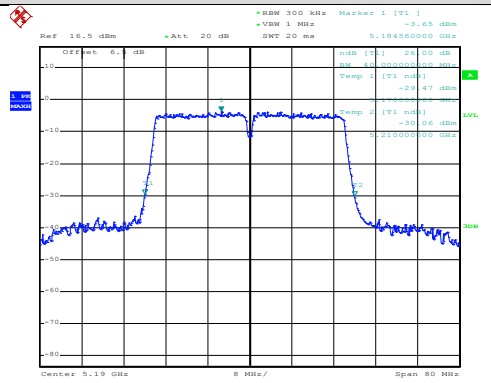
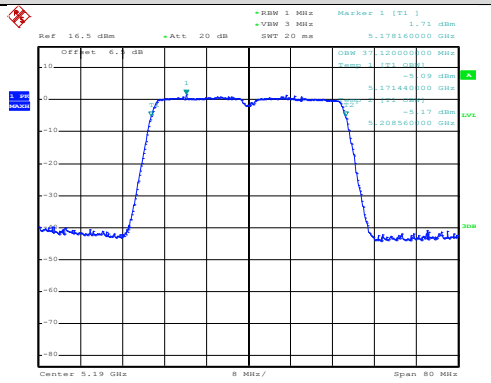
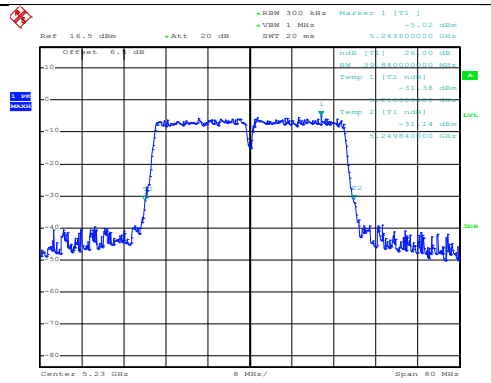
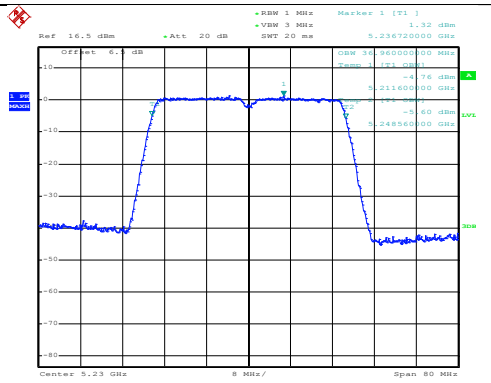
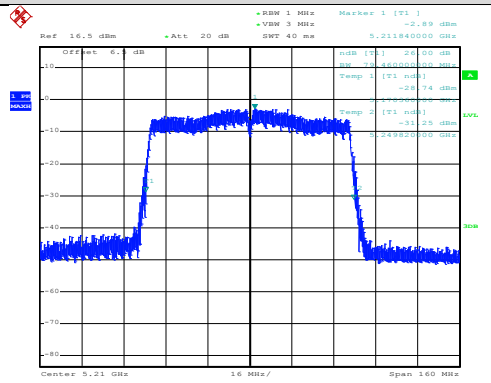
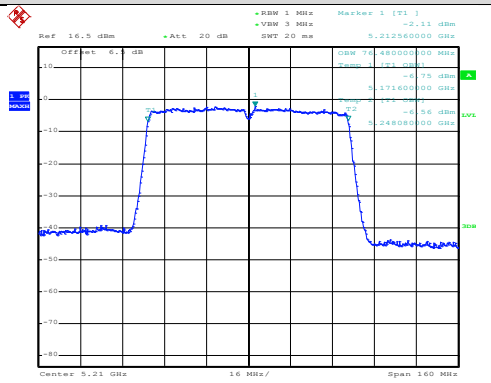
Right module:
Band 1:TX3

802.11a	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:22:02	Date: 23.JUN.2019 11:06:15
Lowest channel	
	
Date: 16.SEP.2019 14:23:02	Date: 23.JUN.2019 11:06:28
Middle channel	
	
Date: 16.SEP.2019 14:24:01	Date: 23.JUN.2019 11:06:41
Highest channel	

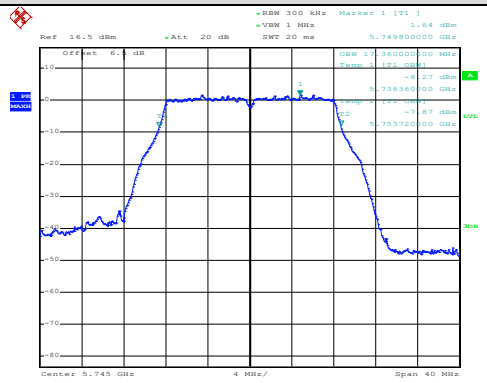
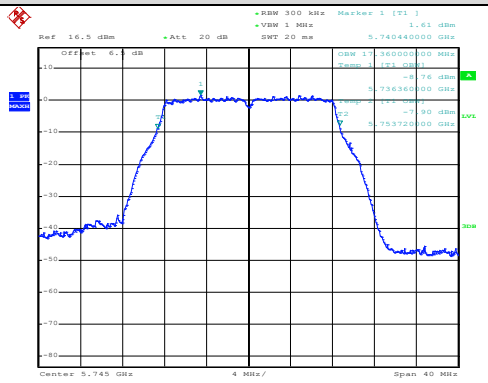
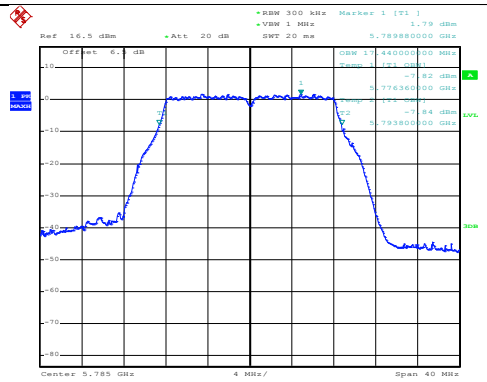
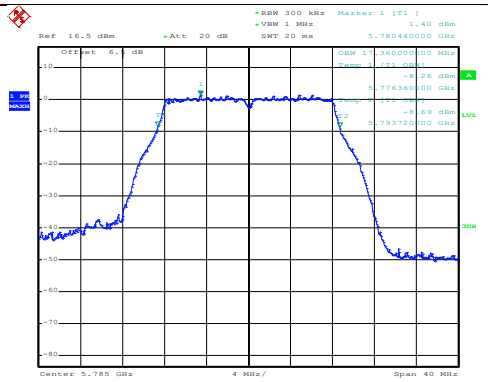
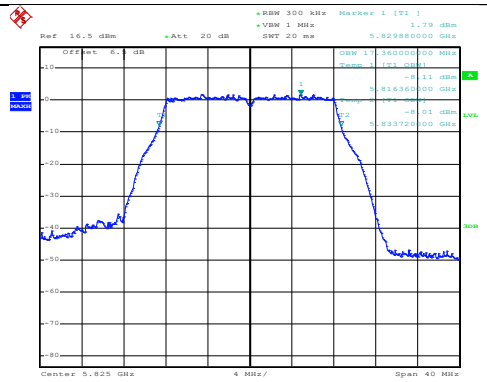
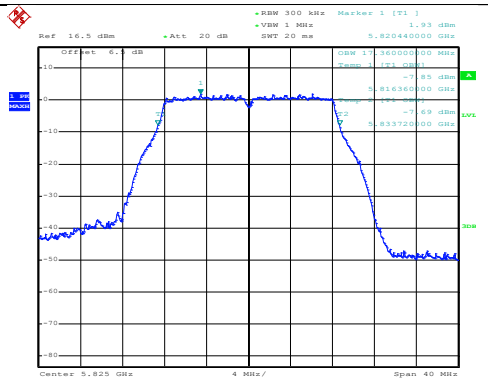
802.11n(HT20)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:25:52	Date: 23.JUN.2019 11:08:18
Lowest channel	
	
Date: 16.SEP.2019 14:26:49	Date: 23.JUN.2019 11:08:31
Middle channel	
	
Date: 16.SEP.2019 14:28:17	Date: 23.JUN.2019 11:08:44
Highest channel	

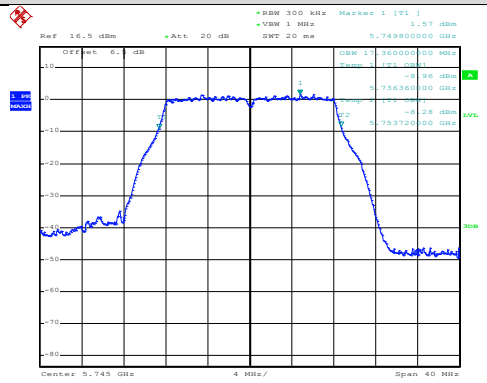
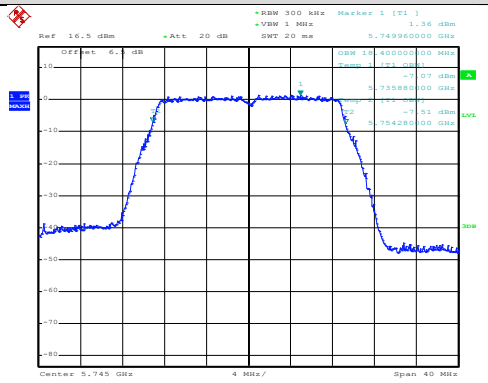
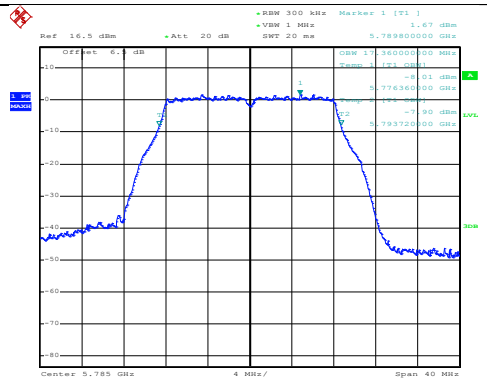
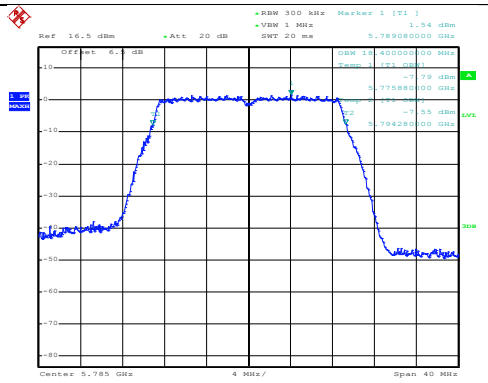
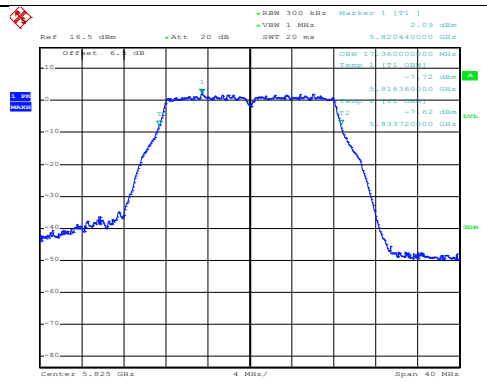
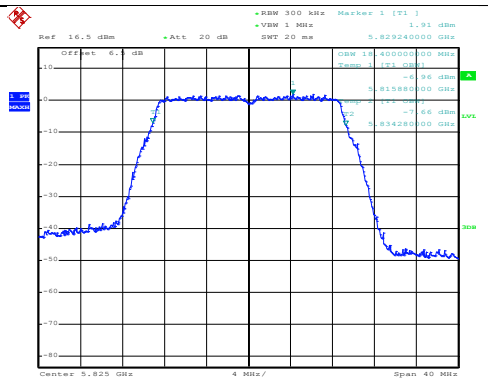
802.11n(HT40)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:36:44	Date: 23.JUN.2019 11:04:25
Lowest channel	
	
Date: 16.SEP.2019 14:37:47	Date: 23.JUN.2019 11:04:43
Highest channel	

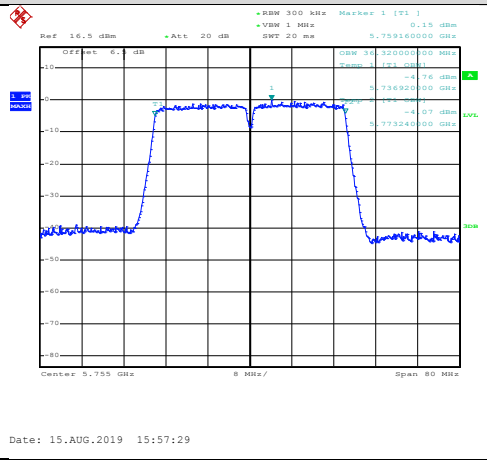
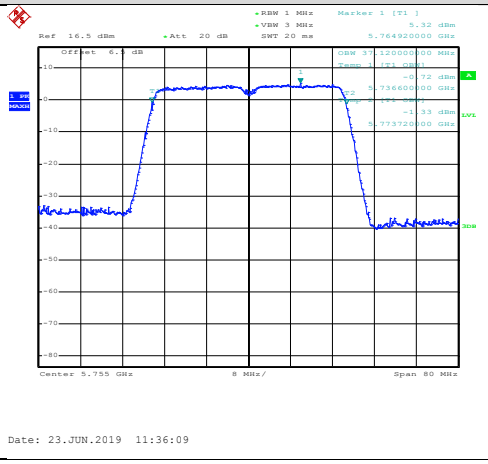
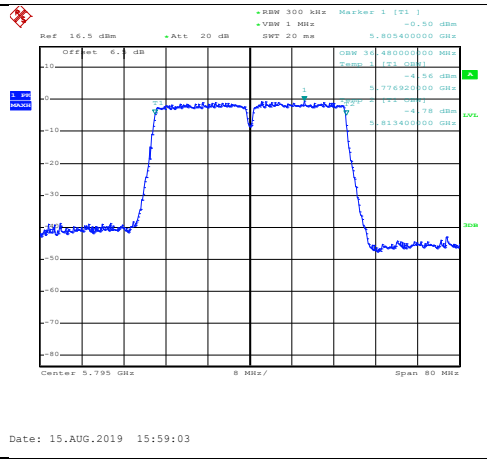
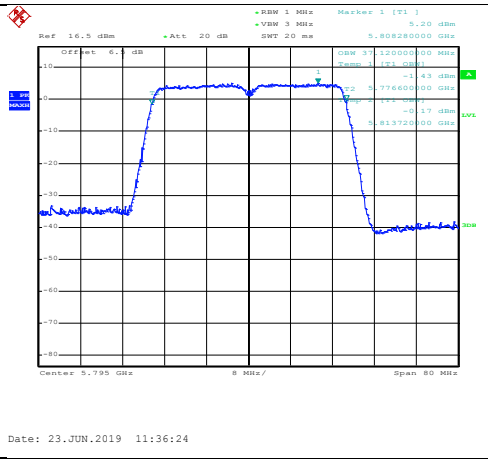
802.11ac(HT20)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:29:34	Date: 23.JUN.2019 11:07:09
Lowest channel	
	
Date: 16.SEP.2019 14:30:23	Date: 23.JUN.2019 11:07:21
Middle channel	
	
Date: 16.SEP.2019 14:31:24	Date: 23.JUN.2019 11:07:31
Highest channel	

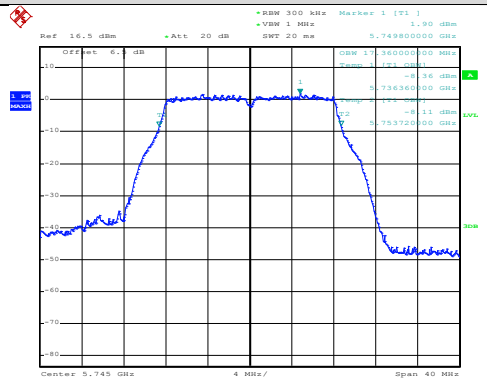
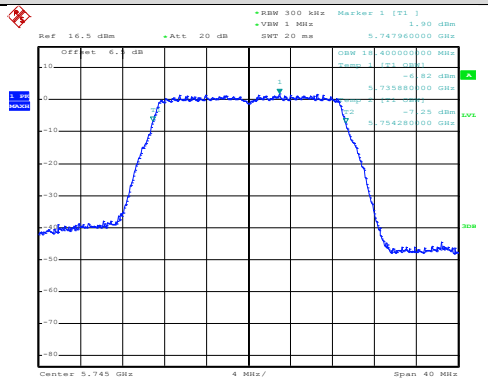
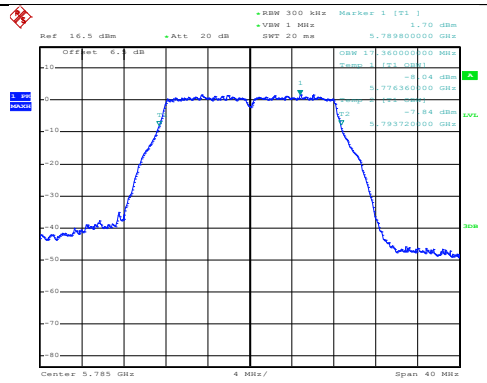
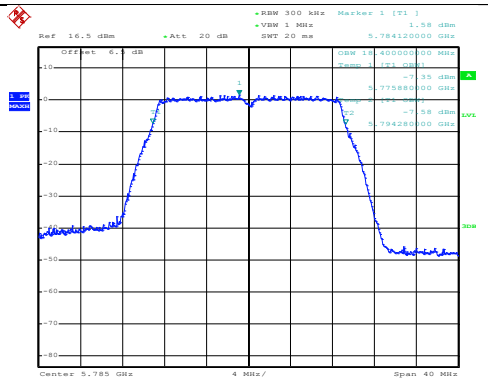
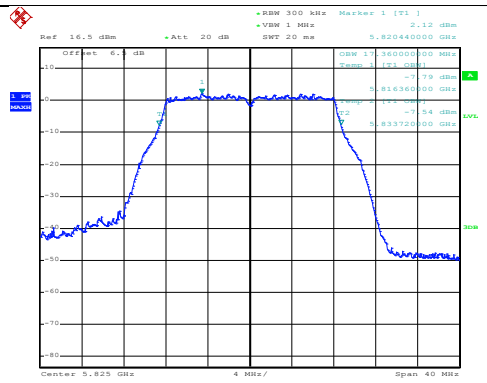
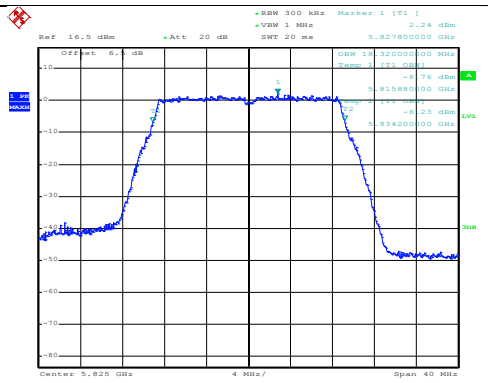
802.11ac(HT40)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 14:42:32	Date: 23.JUN.2019 11:03:36
Lowest channel	
	
Date: 16.SEP.2019 14:47:42	Date: 23.JUN.2019 11:03:57
Highest channel	
802.11ac(HT80)	
26 dB EBW	99% OBW
	
Date: 16.SEP.2019 15:48:56	Date: 23.JUN.2019 11:00:24
Middleest channel	

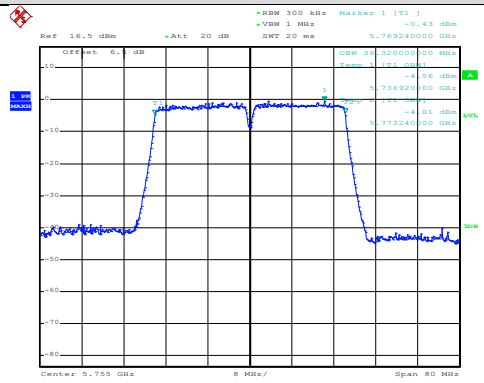
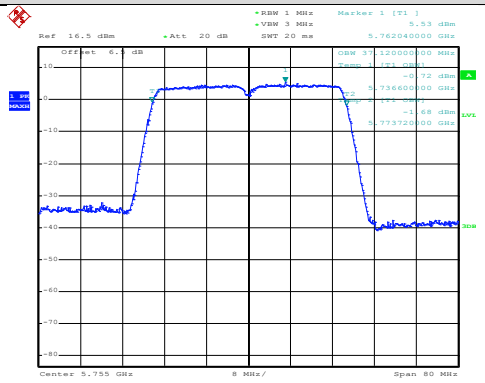
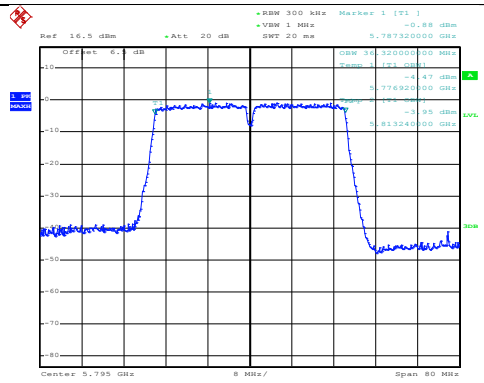
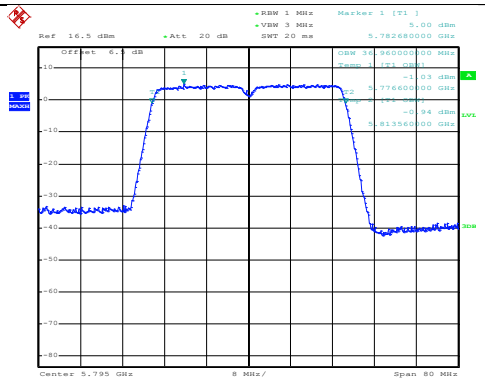
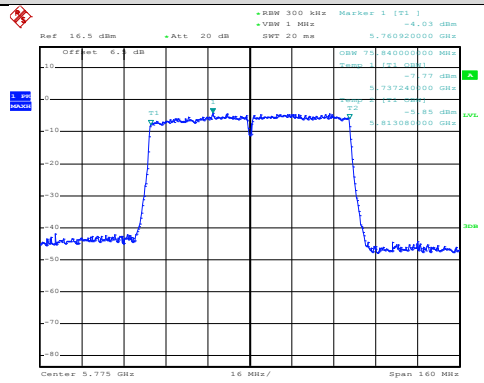
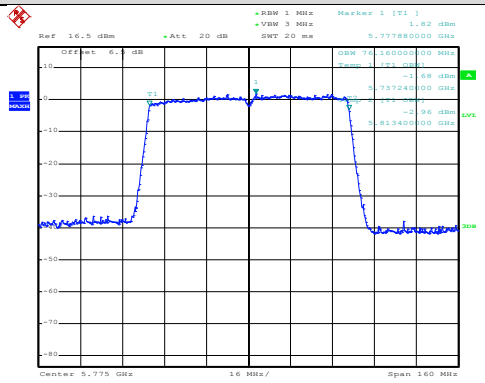
Band 4:TX3

802.11a	
26 dB EBW	99% OBW
	
Date: 15.AUG.2019 15:43:15	Date: 23.JUN.2019 11:37:33
Lowest channel	
	
Date: 15.AUG.2019 15:51:33	Date: 23.JUN.2019 11:37:53
Middle channel	
	
Date: 15.AUG.2019 15:52:27	Date: 23.JUN.2019 11:38:08
Highest channel	

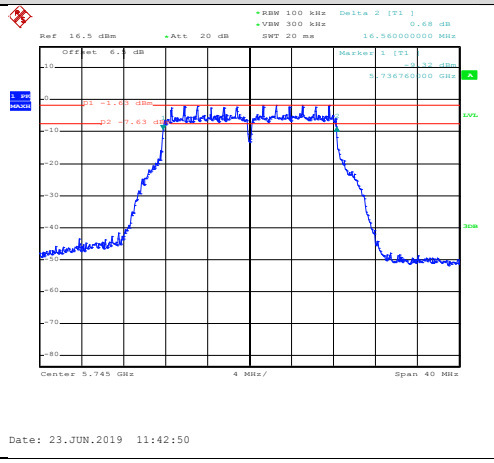
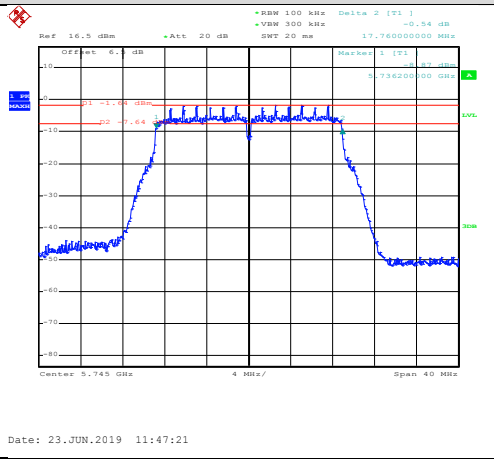
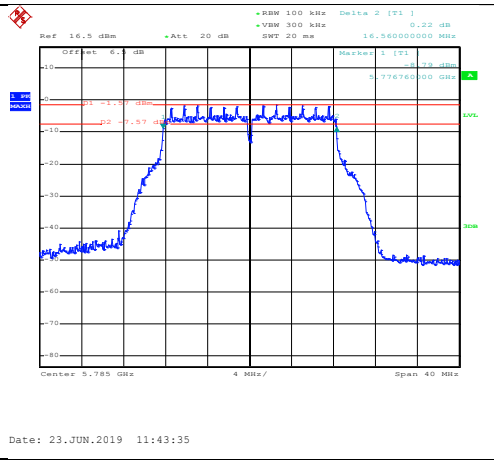
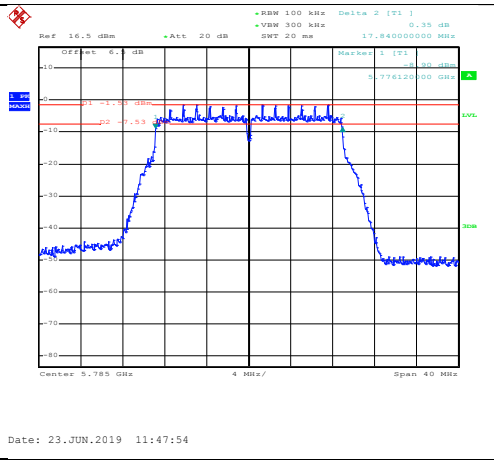
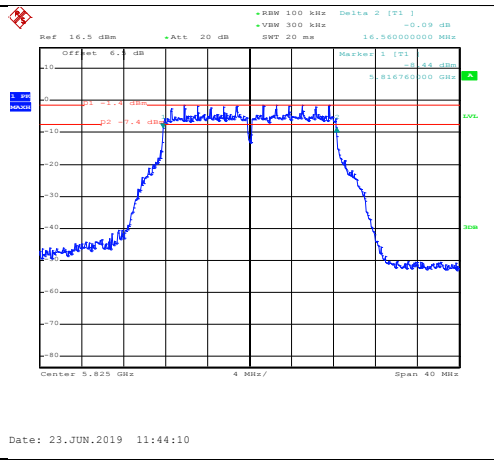
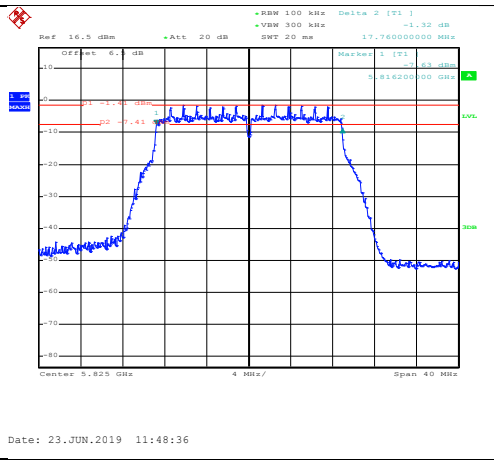
802.11n(HT20)	
26 dB EBW	99% OBW
	
Date: 15.AUG.2019 15:43:29	Date: 23.JUN.2019 11:38:40
Lowest channel	
	
Date: 15.AUG.2019 15:44:35	Date: 23.JUN.2019 11:38:57
Middle channel	
	
Date: 15.AUG.2019 15:53:08	Date: 23.JUN.2019 11:39:10
Highest channel	

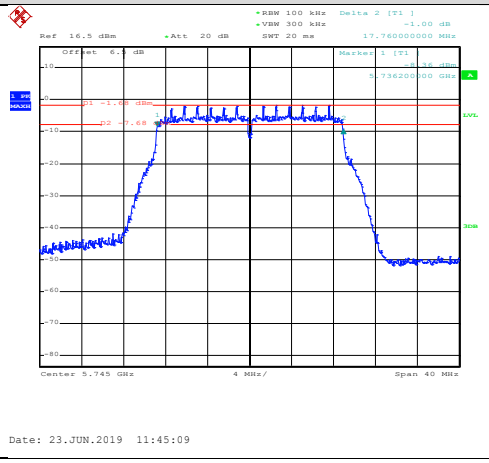
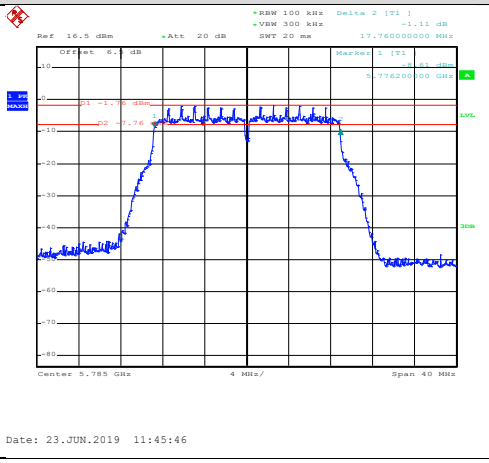
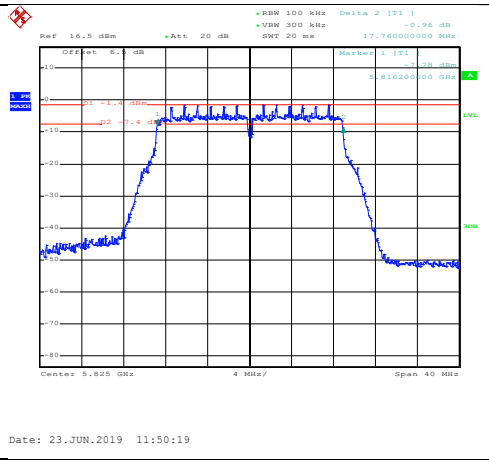
802.11n(HT40)	
26 dB EBW	99% OBW
	
Date: 15.AUG.2019 15:57:29	Date: 23.JUN.2019 11:36:09
Lowest channel	
	
Date: 15.AUG.2019 15:59:03	Date: 23.JUN.2019 11:36:24
Highest channel	

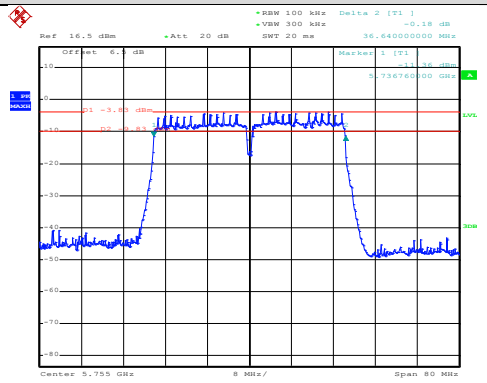
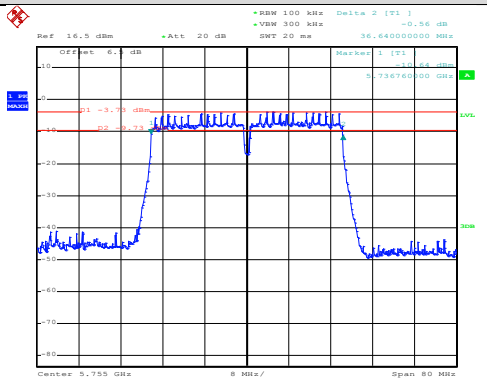
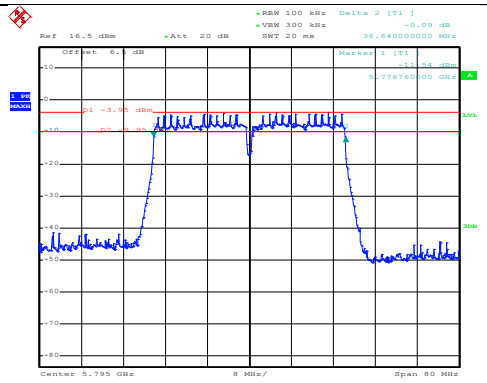
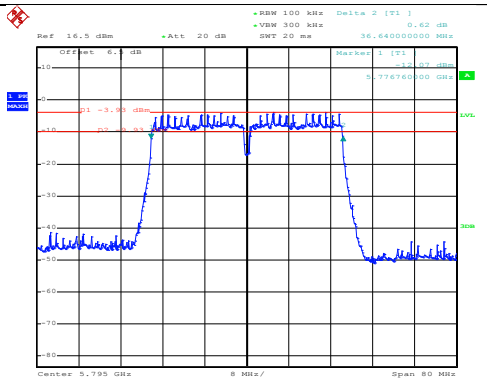
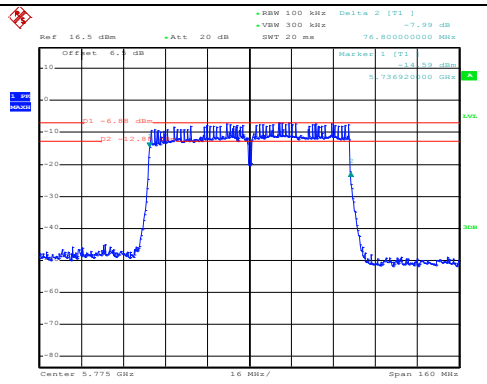
802.11ac(HT20)	
26 dB EBW	99% OBW
	
Date: 15.AUG.2019 15:44:02	Date: 23.JUN.2019 11:39:39
Lowest channel	
	
Date: 15.AUG.2019 15:44:25	Date: 23.JUN.2019 11:39:52
Middle channel	
	
Date: 15.AUG.2019 15:52:53	Date: 23.JUN.2019 11:40:03
Highest channel	

802.11ac(HT40)	
26 dB EBW	99% OBW
	
Date: 15.AUG.2019 15:57:36	Date: 23.JUN.2019 11:35:31
Lowest channel	
	
Date: 15.AUG.2019 15:59:29	Date: 23.JUN.2019 11:35:45
Highest channel	
802.11ac(HT80)	
26 dB EBW	99% OBW
	
Date: 15.AUG.2019 16:00:30	Date: 23.JUN.2019 11:34:40
Middleest channel	

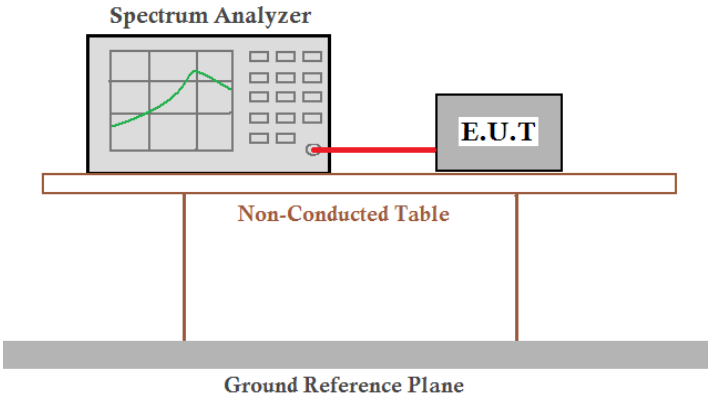
Band 4: 6 dB EBW

ANT 3	
802.11a	802.11n-HT20
6 dB EBW	6 dB EBW
	
Lowest channel	Lowest channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

ANT 3	
802.11ac-HT20	
6 dB EBW	
	
Lowest channel	Middle channel
	
Highest channel	

ANT 3	
802.11n-HT40	802.11ac-HT40
6 dB EBW	6 dB EBW
	
Lowest channel	Lowest channel
	
Highest channel	Highest channel
802.11ac-HT80	
6 dB EBW	
	
Middle channel	

6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (iv) & (a)(3)
Test Method:	ANSI C63.10:2013, KDB 789033
Limit:	Band 1: 11 dBm/MHz Band 4: 30 dBm/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:

Left module:

Band 1						
Mode	Test CH	Ant. Port	Conducted PSD(dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX1	-0.94	/	11.00	Pass
		TX2	0.59	/		
	Middle	TX1	-0.85	/	11.00	Pass
		TX2	0.81	/		
	Highest	TX1	-0.71	/	11.00	Pass
		TX2	0.60	/		
802.11n20	Lowest	TX1	-1.14	2.60	11.00	Pass
		TX2	0.22			
	Middle	TX1	-0.97	2.76	11.00	Pass
		TX2	0.37			
	Highest	TX1	-0.90	2.77	11.00	Pass
		TX2	0.34			
802.11n40	Lowest	TX1	-9.21	-5.48	11.00	Pass
		TX2	-7.87			
	Highest	TX1	-9.01	-5.45	11.00	Pass
		TX2	-7.97			
802.11ac20	Lowest	TX1	-1.24	2.61	11.00	Pass
		TX2	0.30			
	Middle	TX1	-1.24	2.70	11.00	Pass
		TX2	0.44			
	Highest	TX1	-0.88	2.83	11.00	Pass
		TX2	0.42			
802.11ac40	Lowest	TX1	-9.21	-5.50	11.00	Pass
		TX2	-7.91			
	Highest	TX1	-8.87	-5.25	11.00	Pass
		TX2	-7.73			
802.11ac80	Middle	TX1	-11.89	-8.50	11.00	Pass
		TX2	-11.17			

Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* $\log[(10^{(3.3/20)}+10^{(2.6/20)})^2/2]$*=5.97dBi*
2. *The directional Gain of antenna is not* greater *than 6 dBi, so the limit of PSD is 11 dBm.*

Band 4						
Mode	Test CH	Ant. Port	Conducted PSD(dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX1	1.96	/	28.65	Pass
		TX2	1.64	/		
	Middle	TX1	1.37	/	28.65	Pass
		TX2	0.89	/		
	Highest	TX1	1.70	/	28.65	Pass
		TX2	1.27	/		
802.11n20	Lowest	TX1	1.42	4.81	28.65	Pass
		TX2	2.14			
	Middle	TX1	1.58	4.54	28.65	Pass
		TX2	1.48			
	Highest	TX1	1.02	3.94	28.65	Pass
		TX2	0.83			
802.11n40	Lowest	TX1	-0.34	2.69	28.65	Pass
		TX2	-0.30			
	Highest	TX1	-0.02	2.65	28.65	Pass
		TX2	-0.74			
802.11ac20	Lowest	TX1	1.32	4.38	28.65	Pass
		TX2	1.41			
	Middle	TX1	1.36	4.35	28.65	Pass
		TX2	1.32			
	Highest	TX1	2.03	4.75	28.65	Pass
		TX2	1.42			
802.11ac40	Lowest	TX1	0.04	2.59	28.65	Pass
		TX2	-0.94			
	Highest	TX1	-0.76	2.22	28.65	Pass
		TX2	-0.82			
802.11ac80	Middle	TX1	-3.87	-1.11	28.65	Pass
		TX2	-4.38			

Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* log[(10^(3.4/20) + 10^(5.2/20))^2/2]=*7.35dBi*
2. *The directional Gain of antenna is* greater *than 6 dBi, so the limit of PSD is 28.65 dBm.*

Right module:

Band 1						
Mode	Test CH	Ant. Port	Conducted PSD(dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX3	0.88	/	11.00	Pass
		TX4	0.72	/		
	Middle	TX3	1.26	/	11.00	Pass
		TX4	0.88	/		
	Highest	TX3	1.19	/	11.00	Pass
		TX4	0.89	/		
802.11n20	Lowest	TX3	0.76	3.64	11.00	Pass
		TX4	0.49			
	Middle	TX3	0.91	3.80	11.00	Pass
		TX4	0.67			
	Highest	TX3	0.88	3.86	11.00	Pass
		TX4	0.81			
802.11n40	Lowest	TX3	-7.45	-4.52	11.00	Pass
		TX4	-7.61			
	Highest	TX3	-7.35	-4.20	11.00	Pass
		TX4	-7.07			
802.11ac20	Lowest	TX3	0.79	3.67	11.00	Pass
		TX4	0.52			
	Middle	TX3	0.70	3.56	11.00	Pass
		TX4	0.40			
	Highest	TX3	0.99	3.95	11.00	Pass
		TX4	0.89			
802.11ac40	Lowest	TX3	-7.44	-4.51	11.00	Pass
		TX4	-7.60			
	Highest	TX3	-7.33	-4.19	11.00	Pass
		TX4	-7.07			
802.11ac80	Middle	TX3	-10.58	-7.50	11.00	Pass
		TX4	-10.45			

Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* $\log[(10^{(2.4/20)}+10^{(2.5/20)})^2/2]$*=5.46dBi*
2. *The directional Gain of antenna is not* greater *than 6 dBi, so the limit of PSD is 11 dBm.*

Band 4						
Mode	Test CH	Ant. Port	Conducted PSD(dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX3	2.93	/	28.91	Pass
		TX4	1.92	/		
	Middle	TX3	2.20	/	28.91	Pass
		TX4	1.77	/		
	Highest	TX3	2.51	/	28.91	Pass
		TX4	1.79	/		
802.11n20	Lowest	TX3	2.50	4.95	28.91	Pass
		TX4	1.30			
	Middle	TX3	2.03	4.81	28.91	Pass
		TX4	1.55			
	Highest	TX3	2.83	5.18	28.91	Pass
		TX4	1.39			
802.11n40	Lowest	TX3	-0.02	2.68	28.91	Pass
		TX4	-0.67			
	Highest	TX3	-0.50	2.63	28.91	Pass
		TX4	-0.27			
802.11ac20	Lowest	TX3	1.92	4.59	28.91	Pass
		TX4	1.20			
	Middle	TX3	2.47	4.94	28.91	Pass
		TX4	1.32			
	Highest	TX3	2.66	5.26	28.91	Pass
		TX4	1.80			
802.11ac40	Lowest	TX3	-0.71	2.37	28.91	Pass
		TX4	-0.57			
	Highest	TX3	-0.22	2.33	28.91	Pass
		TX4	-1.20			
802.11ac80	Middle	TX3	-2.86	-0.77	28.91	Pass
		TX4	-4.96			

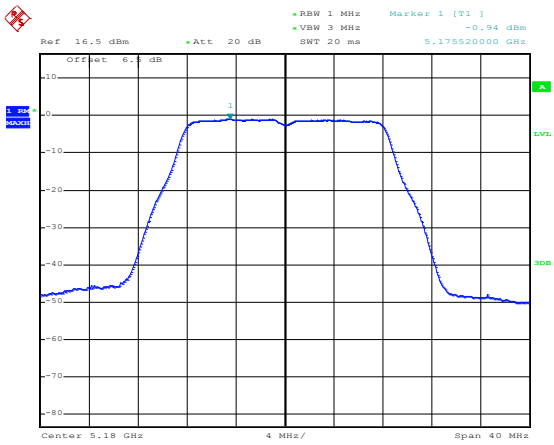
Remark:

1. *Because transmit signals are correlated,* Directional gain = $10\log[(10^{(G1/20)}+10^{(G2/20)}+\ldots+10^{(GN/20)})^2/N_{ANT}]$ *,So the Directional gain=10* $\log[(10^{(4.3/20)}+10^{(3.3/20)})^2/2]$*=7.09 dBi*
2. *The directional Gain of antenna is* greater *than 6 dBi, so the limit of PSD is 28.91 dBm.*

Test plot as follows:
Left module:

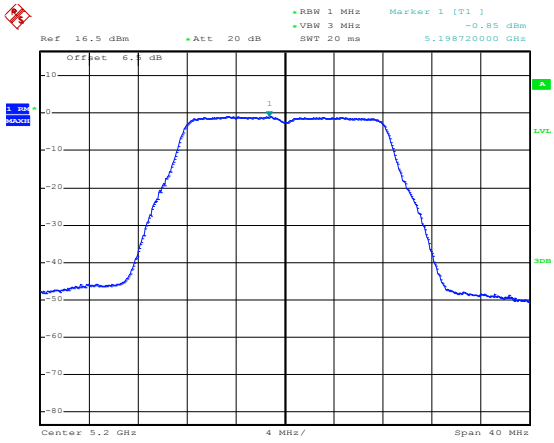
802.11a

ANT 1



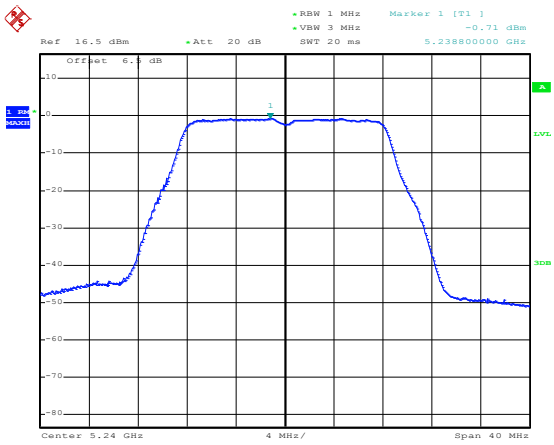
Date: 23.JUN.2019 14:58:31

Lowest channel



Date: 23.JUN.2019 14:58:44

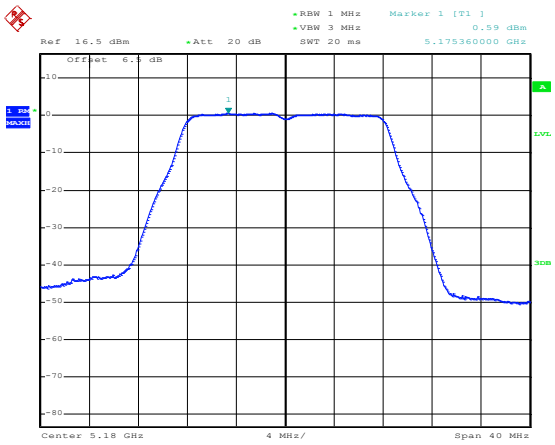
Middle channel



Date: 23.JUN.2019 14:58:55

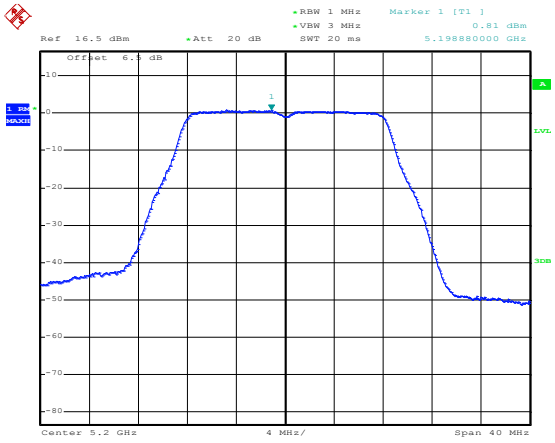
Highest channel

ANT 2



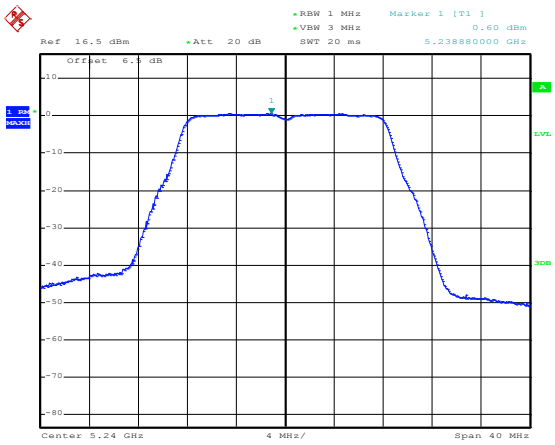
Date: 23.JUN.2019 17:49:19

Lowest channel



Date: 23.JUN.2019 17:49:36

Middle channel

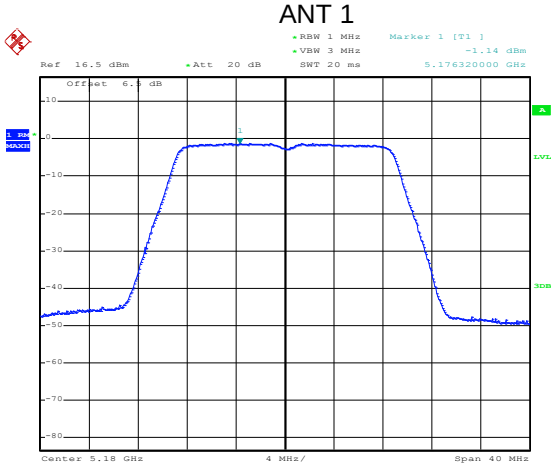


Date: 23.JUN.2019 17:49:47

Highest channel

802.11n-HT20

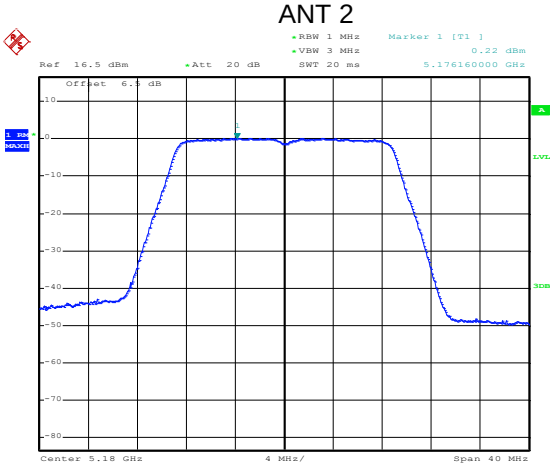
ANT 1



Date: 23.JUN.2019 14:59:17

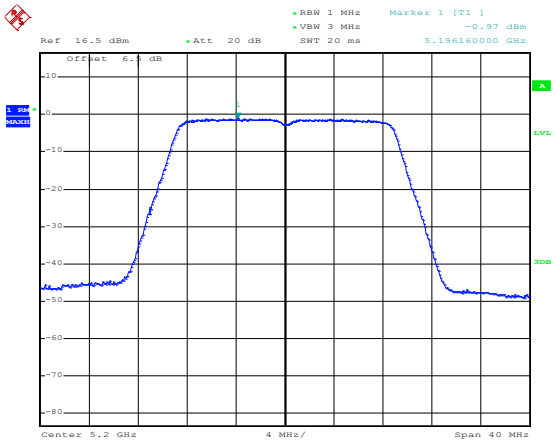
Lowest channel

ANT 2



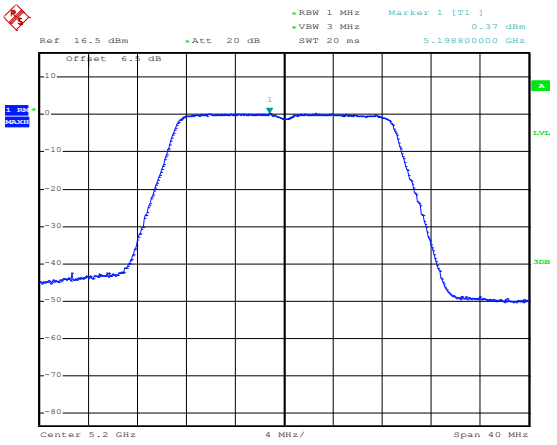
Date: 23.JUN.2019 17:50:11

Lowest channel



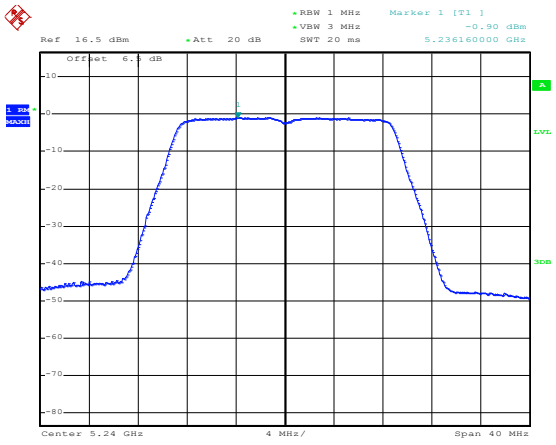
Date: 23.JUN.2019 14:59:27

Middle channel



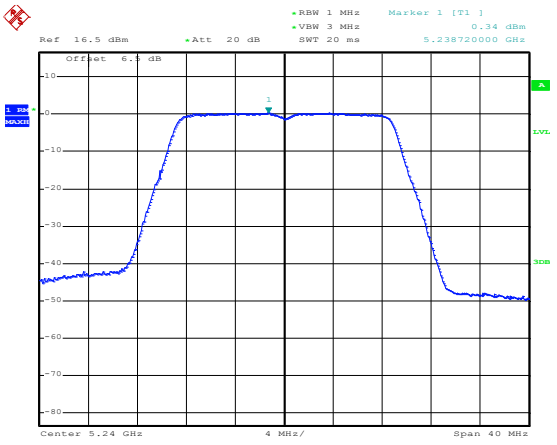
Date: 23.JUN.2019 17:50:23

Middle channel



Date: 23.JUN.2019 14:59:57

Highest channel

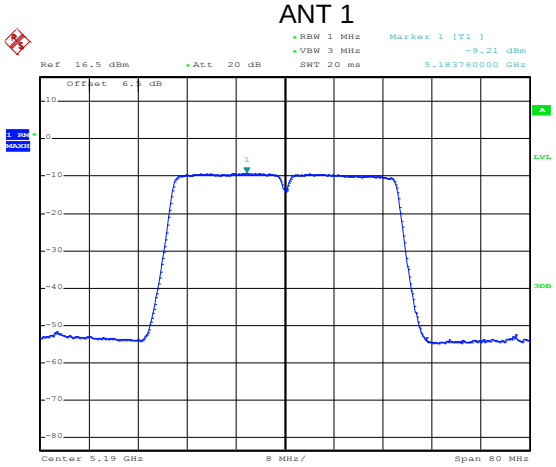


Date: 23.JUN.2019 17:50:39

Highest channel

802.11n-HT40

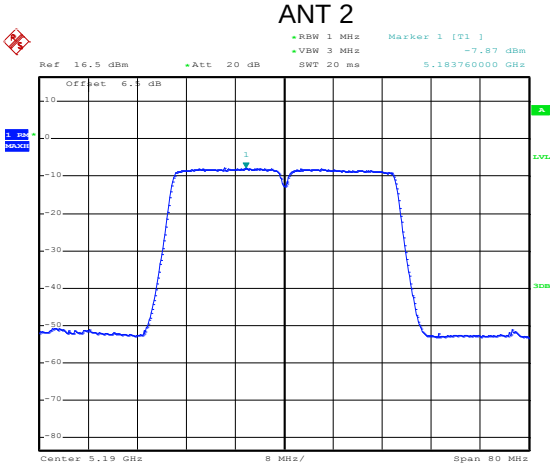
ANT 1



Date: 23.JUN.2019 15:01:33

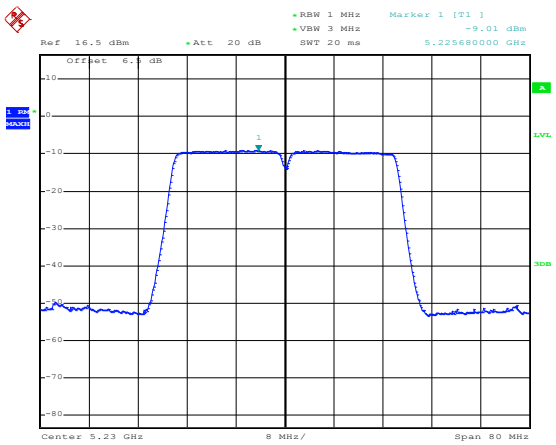
Lowest channel

ANT 2



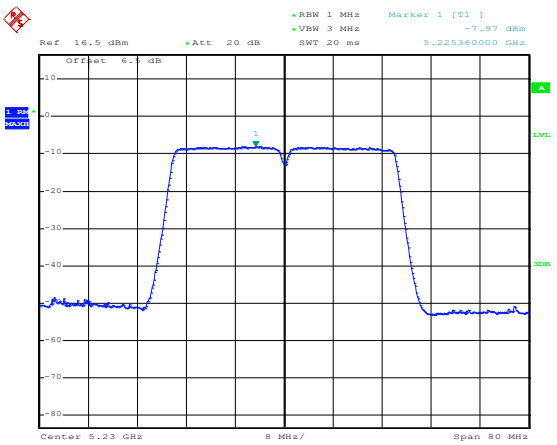
Date: 23.JUN.2019 17:52:03

Lowest channel



Date: 23.JUN.2019 15:01:50

Highest channel

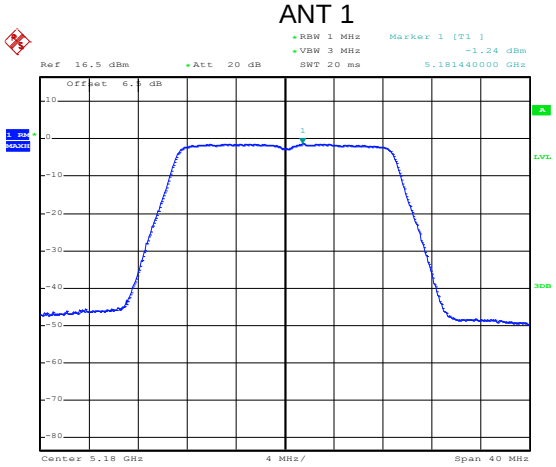


Date: 23.JUN.2019 17:52:13

Highest channel

802.11ac-HT20

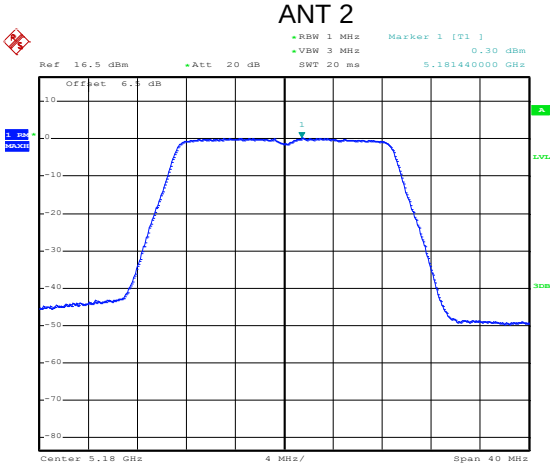
ANT 1



Date: 23.JUN.2019 15:00:34

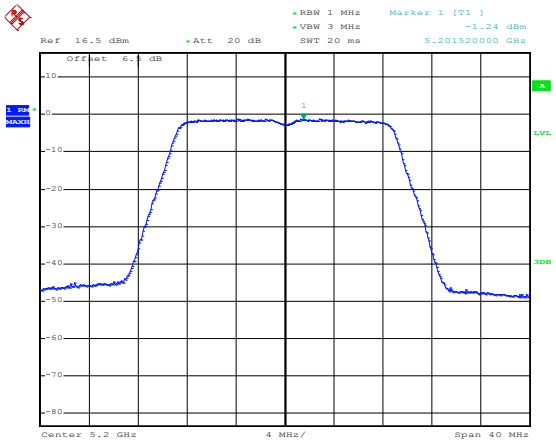
Lowest channel

ANT 2



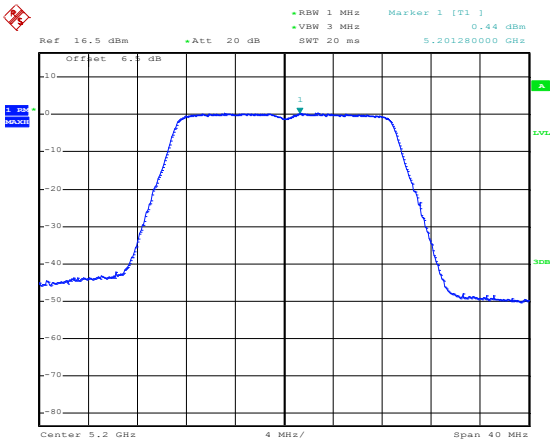
Date: 23.JUN.2019 17:51:00

Lowest channel



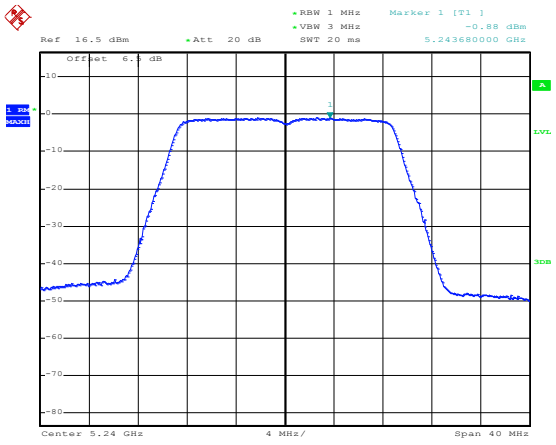
Date: 23.JUN.2019 15:00:45

Middle channel



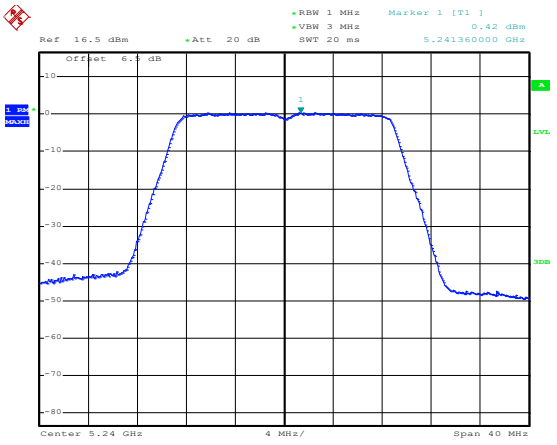
Date: 23.JUN.2019 17:51:11

Middle channel



Date: 23.JUN.2019 15:00:57

Highest channel

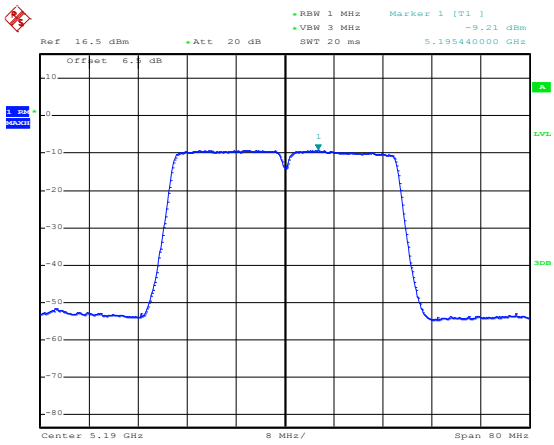


Date: 23.JUN.2019 17:51:25

Highest channel

802.11ac-HT40

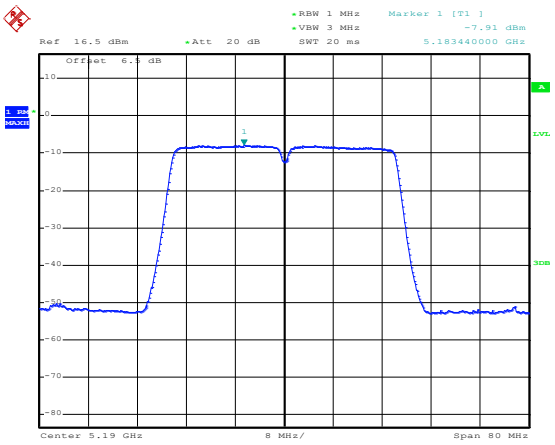
ANT 1



Date: 23.JUN.2019 15:02:12

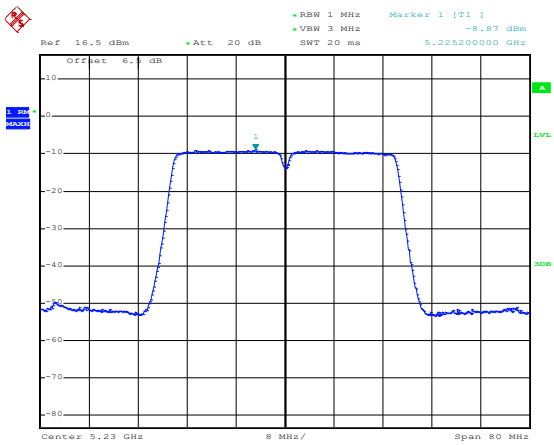
Lowest channel

ANT 2



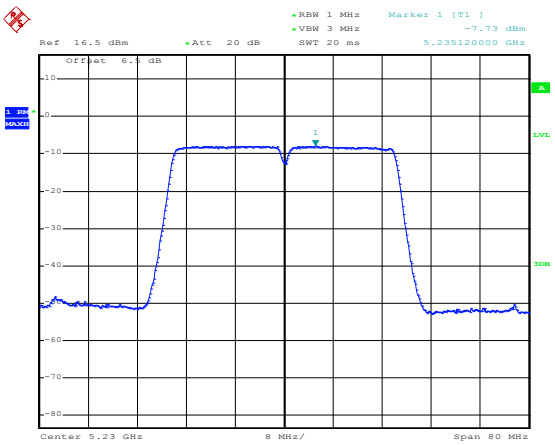
Date: 23.JUN.2019 17:52:35

Lowest channel



Date: 23.JUN.2019 15:02:24

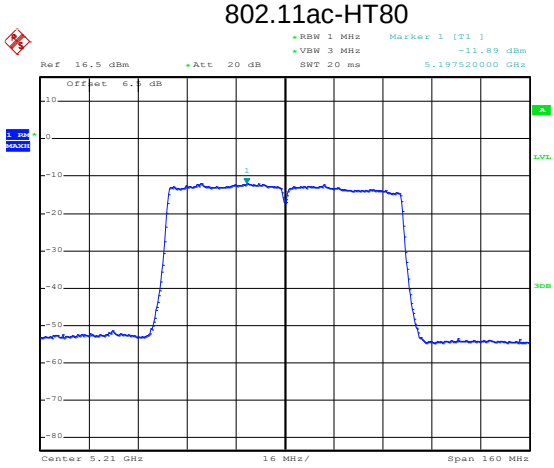
Highest channel



Date: 23.JUN.2019 17:52:53

Highest channel

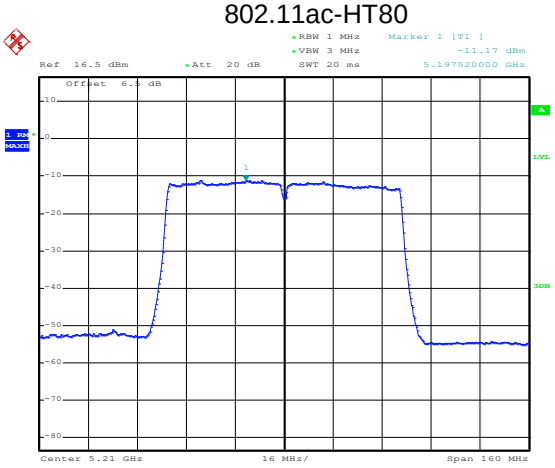
802.11ac-HT80



Date: 23.JUN.2019 15:04:22

Middle channel

802.11ac-HT80



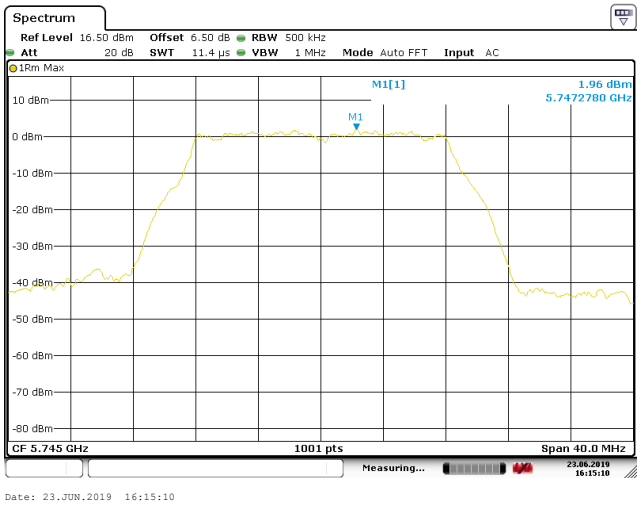
Date: 23.JUN.2019 17:53:30

Middle channel

Band 4:

802.11a

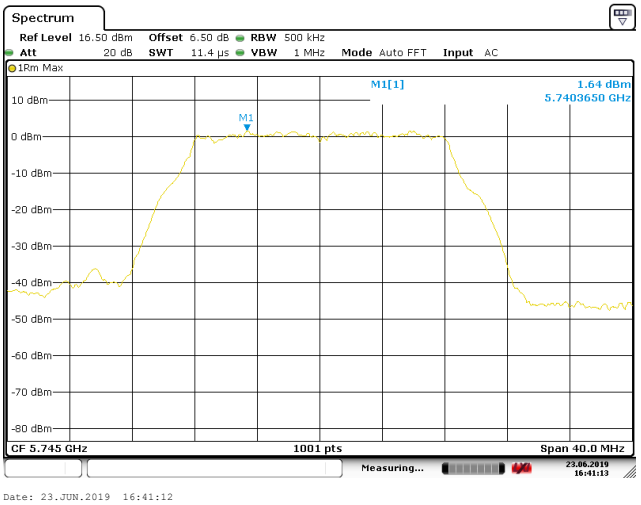
ANT 1



Date: 23.JUN.2019 16:15:10

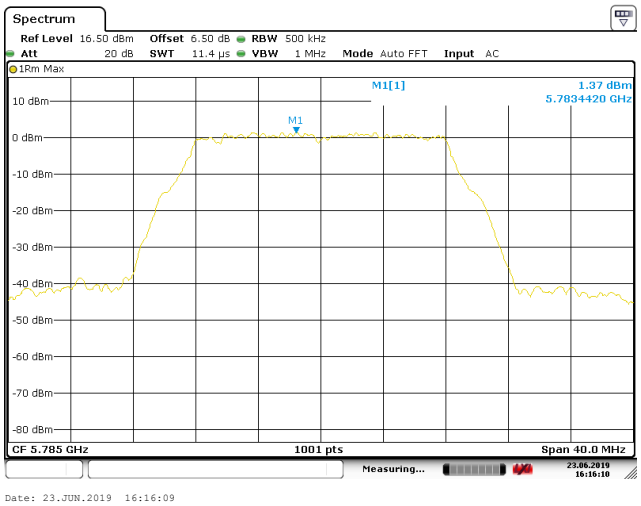
Lowest channel

ANT 2



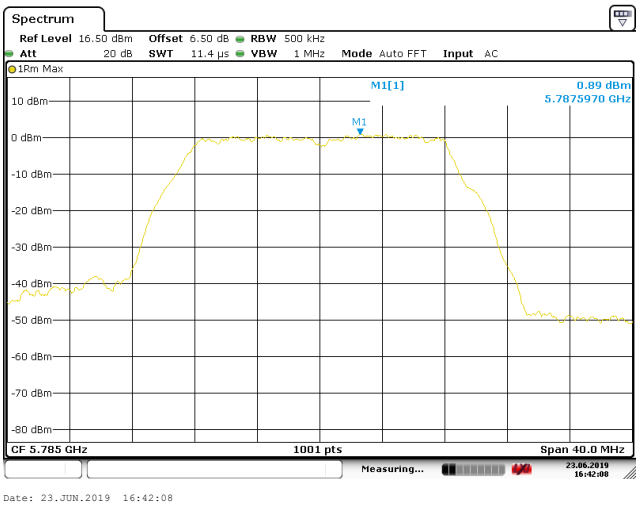
Date: 23.JUN.2019 16:41:12

Lowest channel



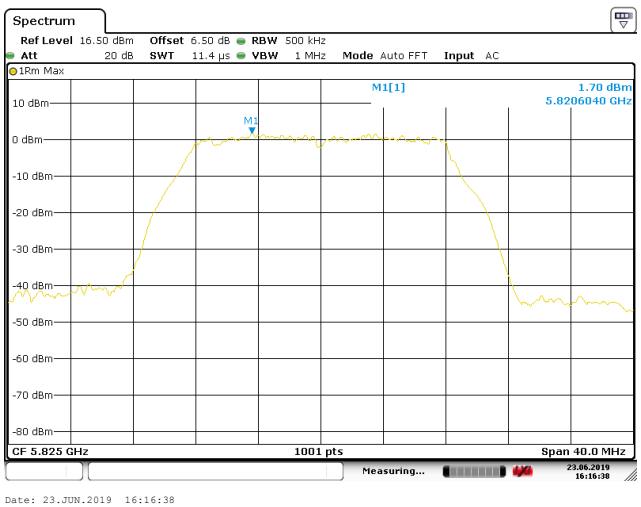
Date: 23.JUN.2019 16:16:09

Middle channel



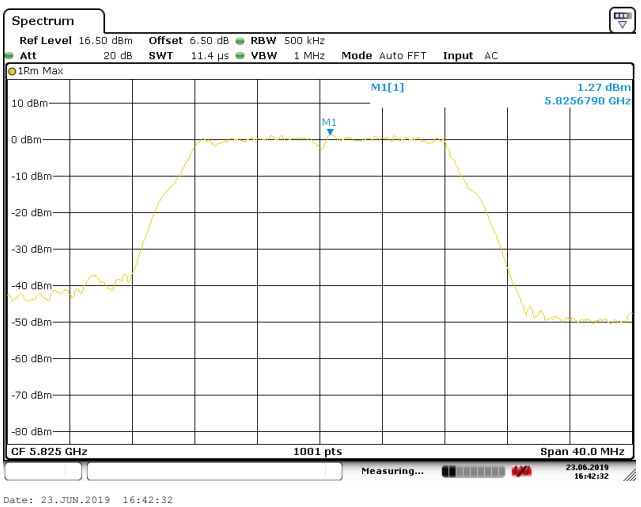
Date: 23.JUN.2019 16:42:08

Middle channel



Date: 23.JUN.2019 16:16:38

Highest channel



Date: 23.JUN.2019 16:42:32

Highest channel