FCC REPORT
(UNII)

Applicant: 8devices

Address of Applicant: Gedimino 47, Kaunas, LT-44242, Lithuania

Equipment Under Test (EUT)

Product Name: Broadband Digital Transmission System

Model No.: Rambutan

FCC ID: Z9W-RMB

Applicable standards: FCC CFR Title 47 Part 15 Subpart E Section 15.407

Date of sample receipt: 10 May, 2016

Date of Test: 10 May, to 15 Jul., 2016

Date of report issued: 21 Jul., 2016

Test Result: PASS*

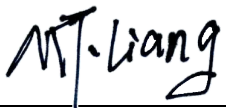
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*21 Jul., 2016*	*Original*

Tested by:  ***Date:*** *21 Jul., 2016*

Test Engineer

Reviewed by:  ***Date:*** *21 Jul., 2016*

Project Engineer

3 Contents

4 Test Summary

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

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	8devices
Address of Applicant:	Gedimino 47, Kaunas, LT-44242, Lithuania
Manufacturer/ Factory:	8devices
Address of Manufacture/Factory:	Gedimino 47, Kaunas, LT-44242, Lithuania

5.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	Rambutan
Operation Frequency:	Band 1: 5150MHz-5250MHz Band 4: 5725MHz-5850MHz
Channel numbers:	Band 1: 802.11a/802.11n20: 4,802.11n40: 2 Band 4: 802.11a/802.11n20: 5,802.11n40: 2
Channel separation:	802.11a/802.11n20: 20MHz, 802.11n40: 40MHz
Modulation technology: (IEEE 802.11a)	BPSK,QPSK,16-QAM,64-QAM
Modulation technology: (IEEE 802.11n)	BPSK,QPSK,16-QAM,64-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
Antenna Type:	Antenna 0: Ceramic Antenna (Indoor used only) Antenna 1: Rod Antenna (Used for 5725MHz~5850MHz only)
Antenna gain:	Antenna 0: 5 dBi (5150~5250MHz indoor, 5725~5850MHz) Antenna 1:10 dBi (5725~5850MHz)
Power supply:	DC 5V
Remark:	802.11b/g/n all support 2×2 MIMO

Operation Frequency each of channel

Band 1			
802.11a/802.11n20		802.11n40	
Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz
40	5200MHz	46	5230MHz
44	5220MHz		
48	5240MHz		
Band 4			
802.11a/802.11n20		802.11n40	
Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz
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/802.11n20		802.11n40	
Channel	Frequency	Channel	Frequency
The lowest channel	5180MHz	The lowest channel	5190MHz
The middle channel	5200MHz	The highest channel	5230MHz
The highest channel	5240MHz		
Band 4			
802.11a/802.11n20		802.11n40	
Channel	Frequency	Channel	Frequency
The lowest channel	5745MHz	The lowest channel	5755MHz
The middle channel	5785MHz	The highest channel	5795MHz
The highest channel	5825MHz		

5.3 Test environment andmode

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.
Remark	During the test, pre-scan the Antenna 0 and Antenna 1, and found the Antenna 1 is the worst case, so only shows the data of Antenna 1 in this report.

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 in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11a	6Mbps
802.11n20	6.5Mbps
802.11n40	13Mbps
Final Test Mode:	
According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 6Mbps for 802.11a, 6.5 Mbps for 802.11n20, 13 Mbps for 802.11n40. All test items for 802.11a, 802.11n were performed with duty cycle above 98%, meet the requirements of KDB789033.	

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC

5.5 Measurement Uncertainty

Items	Expanded Uncertainty (Confidence of 95%)
Conducted Emission (9kHz ~ 30MHz)	2.14 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	4.24 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	4.35 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	4.44 dB (k=2)
Radiated Emission (18GHz ~ 26.5GHz)	4.56 dB (k=2)

5.6 Laboratory Facility

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

●FCC- Registration No.: 817957

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered andfully describedin a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

●IC - Registration No.: 10106A-1

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.

5.7 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

5.8 Test Instruments list

Radiated Emission

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-25-2016	03-25-2017
Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-25-2016	03-25-2017
Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	03-25-2016	03-25-2017
Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	03-25-2016	03-25-2017
Pre-amplifier (18-40GHz)	A.H System	PAM-1840	GTS219	04-01-2016	03-31-2017
Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2016	03-31-2017
Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-28-2016	03-28-2017
EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	04-01-2016	03-31-2017
Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2016	03-31-2017
Spectrum Analyzer	HP	8564E	CCIS0150	05-24-2016	05-23-2017
EMI Test Software	AUDIX	E3	N/A	N/A	N/A

Conducted Emission

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	11-10-2013	11-09-2016
EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-24-2016	03-24-2017
LISN	CHASE	MN2050D	CCIS0074	03-26-2016	03-26-2017
Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2016	03-31-2017
EMI Test Software	AUDIX	E3	N/A	N/A	N/A

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 requirementdoes not apply to carrier currentdevices or to devices operated underthe provisions of §15.211, § 15.213,§ 15.217, § 15.219, or § 15.221. Further, thisrequirement does not apply to intentionalradiators that must be professionallyinstalled, such as perimeterprotection systems and some field disturbance sensors, or to other intentionalradiators which, in accordancewith § 15.31(d), must be measured at theinstallation site. However, the installershall be responsible for ensuring thatthe proper antenna is employed so thatthe limits in this part are not exceeded.

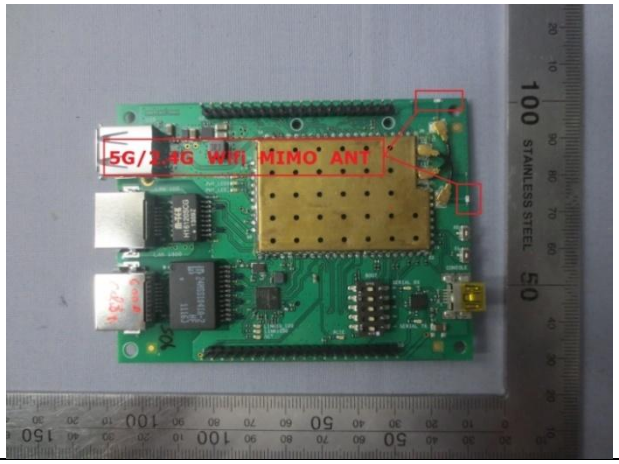
E.U.T Antenna:

The product is a professionally installed device which has two types of antennas for the application. The antennas information as below table:

Antenna No.	Antenna Type	Antenna Gain (dBi)	Remark
Antenna 0	Ceramic Antenna	5	Indoor use only
Antenna 1	Rod Antenna	10	5725MHz~5850MHz use only

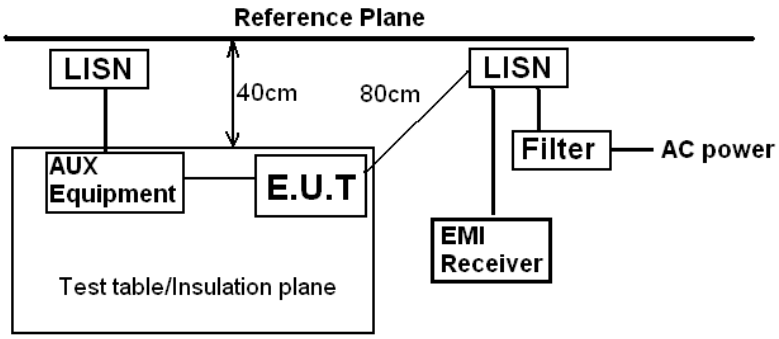
According to above information, the antennas meet the requirements of this section

Antenna 0:



Antenna 1:

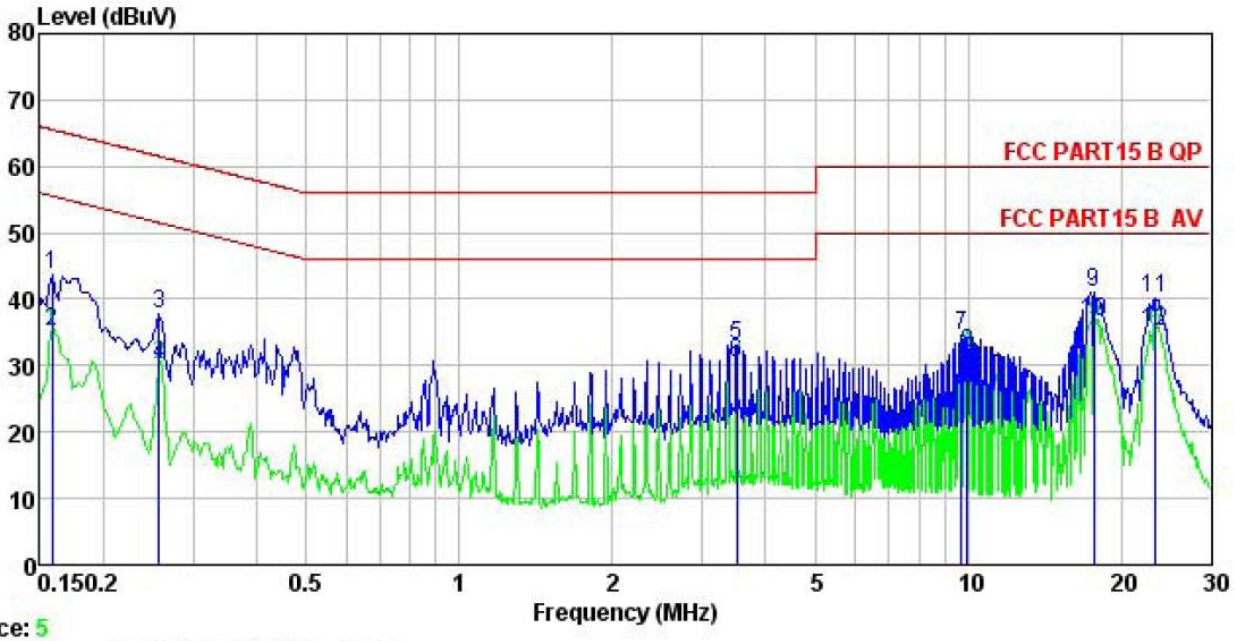
6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.4: 2014		
TestFrequencyRange:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). Itprovides 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 C63.4: 2014 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 5.8 for details		
Test mode:	Refer to section 5.3 for details.		
Test results:	Passed		

Remark:

1. *During the test, pre-scan the Antenna 0 and Antenna 1, and found the Antenna 0 is the worst case, so only shows the data of Antenna 0 in this report.*

Measurement Data:
MIMO TX mode
Line:



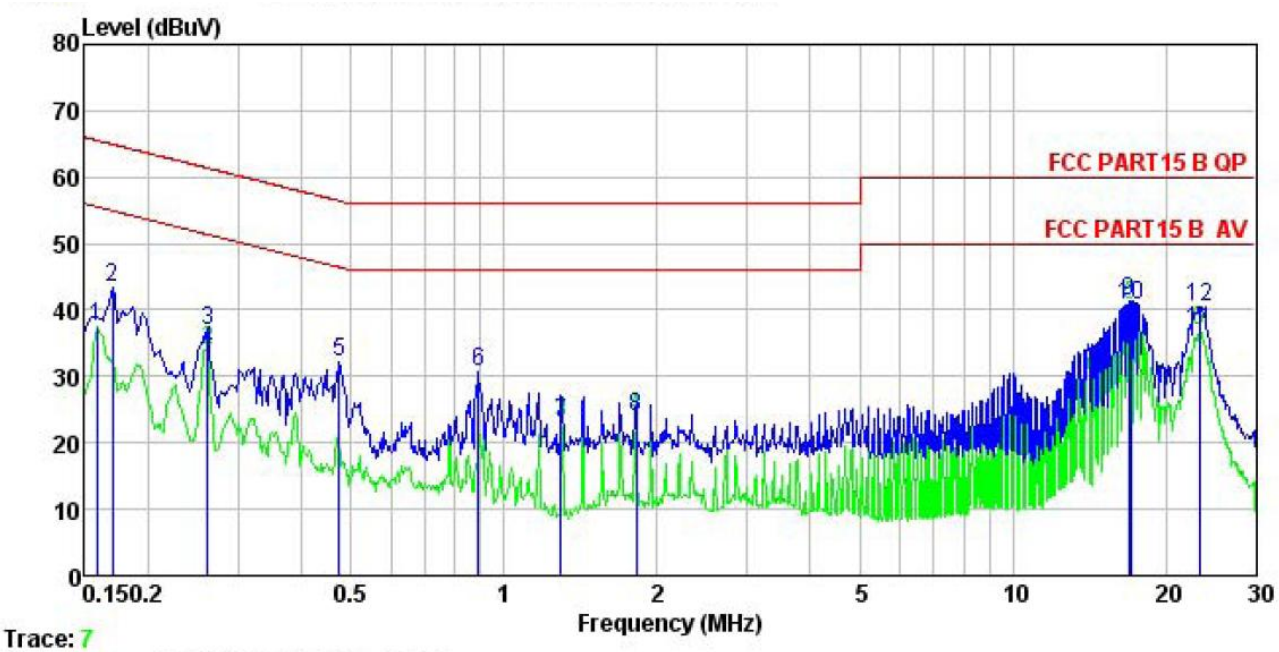
Trace: 5

Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN LINE
EUT : Broadband Digital Transmission System
Model : Rambutan
Test Mode : TX mode
Power Rating : AC 120/60Hz
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: MT
Remark : 5G WiFi

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	32.81	0.14	10.78	43.73	65.56	-21.83	QP
2	0.158	24.12	0.14	10.78	35.04	55.56	-20.52	Average
3	0.258	26.97	0.16	10.75	37.88	61.51	-23.63	QP
4	0.258	19.24	0.16	10.75	30.15	51.51	-21.36	Average
5	3.509	21.91	0.34	10.90	33.15	56.00	-22.85	QP
6	3.509	19.02	0.34	10.90	30.26	46.00	-15.74	Average
7	9.705	23.43	0.31	10.93	34.67	60.00	-25.33	QP
8	9.966	20.70	0.30	10.94	31.94	50.00	-18.06	Average
9	17.661	29.93	0.30	10.90	41.13	60.00	-18.87	QP
10	17.755	25.52	0.30	10.90	36.72	50.00	-13.28	Average
11	23.263	28.90	0.35	10.89	40.14	60.00	-19.86	QP
12	23.387	24.02	0.35	10.89	35.26	50.00	-14.74	Average

Notes:
1. *An initial pre-scan was performed on the live 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.*

Neutral:



Trace: 7

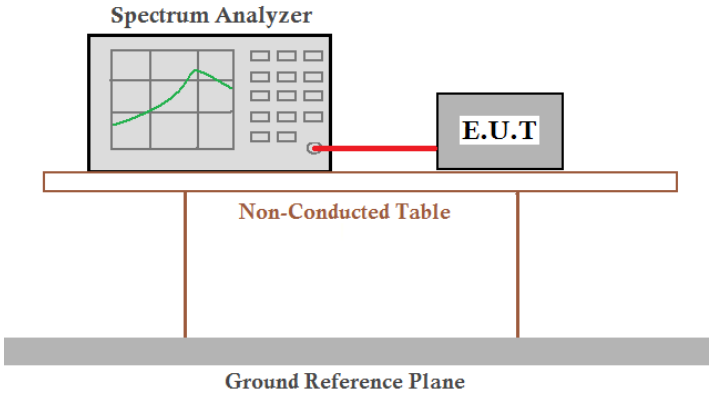
```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN NEUTRAL
EUT           : Broadband Digital Transmission System
Model         : Rambutan
Test Mode     : TX mode
Power Rating  : AC 120/60Hz
Environment   : Temp: 23 'C Huni:56%  Atmos:101KPa
Test Engineer: MT
Remark        : 5G WiFi
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.158	26.58	0.13	10.78	37.49	55.56	-18.07	Average
2	0.170	32.35	0.13	10.77	43.25	64.94	-21.69	QP
3	0.262	26.07	0.18	10.75	37.00	61.38	-24.38	QP
4	0.262	23.16	0.18	10.75	34.09	51.38	-17.29	Average
5	0.474	21.11	0.24	10.75	32.10	56.45	-24.35	QP
6	0.890	19.68	0.28	10.84	30.80	56.00	-25.20	QP
7	1.296	11.75	0.26	10.90	22.91	46.00	-23.09	Average
8	1.819	12.58	0.26	10.95	23.79	46.00	-22.21	Average
9	16.928	30.14	0.27	10.91	41.32	60.00	-18.68	QP
10	17.018	29.65	0.27	10.91	40.83	50.00	-9.17	Average
11	23.263	25.63	0.25	10.89	36.77	50.00	-13.23	Average
12	23.387	29.32	0.25	10.89	40.46	60.00	-19.54	QP

Notes:

1. *An initial pre-scan was performed on the live 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.*

6.3 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) & (a) (3)
Test Method:	ANSI C63.10: 2013, KDB789033
Limit:	**Band 1:** 1W (For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.) **Band 4:** 1W (If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.).
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1:

Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	22.06	25.06	30.00	Pass
		TX1	22.03			
	Middle	TX0	21.73	24.13	30.00	Pass
		TX1	20.42			
	Highest	TX0	21.13	23.56	30.00	Pass
		TX1	19.87			
802.11n20	Lowest	TX0	21.30	24.42	30.00	Pass
		TX1	21.52			
	Middle	TX0	21.20	23.70	30.00	Pass
		TX1	20.10			
	Highest	TX0	21.53	23.88	30.00	Pass
		TX1	20.10			
802.11n40	Lowest	TX0	21.78	24.89	30.00	Pass
		TX1	21.98			
	Highest	TX0	21.48	24.52	30.00	Pass
		TX1	21.54			

Remark:
1. Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.
2. Only 5 dBi antenna used for 5150MHz~5250MHz.
3. The maximum directional Gain of antenna is 5 dBi, so the limit of power is 30 dBm.

Band 4:

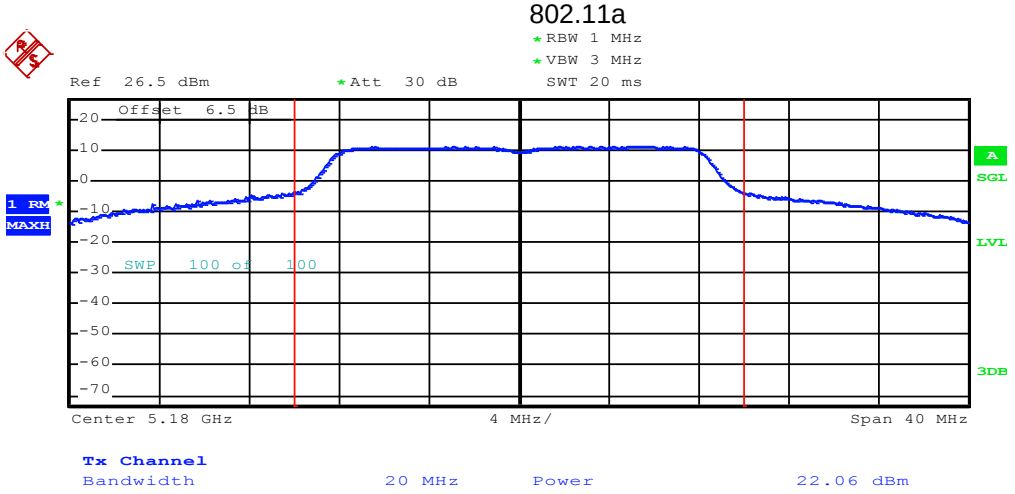
Mode	Test CH	Ant. Port	Conducted Output power (dBm)	Total power (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	22.02	25.28	26.00	Pass
		TX1	22.51			
	Middle	TX0	21.60	25.03	26.00	Pass
		TX1	22.40			
	Highest	TX0	21.64	24.96	26.00	Pass
		TX1	22.23			
802.11n20	Lowest	TX0	21.75	25.08	26.00	Pass
		TX1	22.36			
	Middle	TX0	21.58	24.95	26.00	Pass
		TX1	22.27			
	Highest	TX0	21.90	25.14	26.00	Pass
		TX1	22.34			
802.11n40	Lowest	TX0	21.59	24.92	26.00	Pass
		TX1	22.21			
	Highest	TX0	21.20	24.80	26.00	Pass
		TX1	22.31			

Remark:
1. Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.
2. The maximum directional Gain of antennas is10 dBi, so the limit of power is 26 dBm.

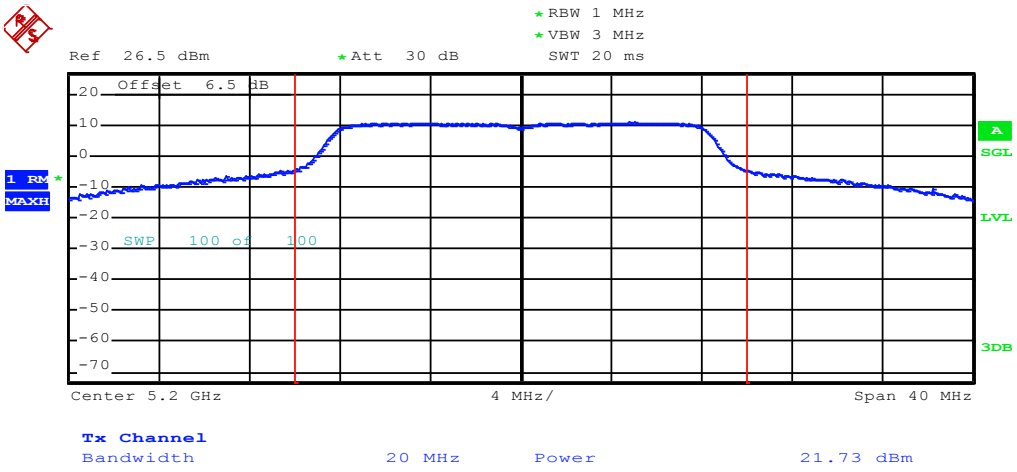
Test plot as follows:

Band 1: TX0

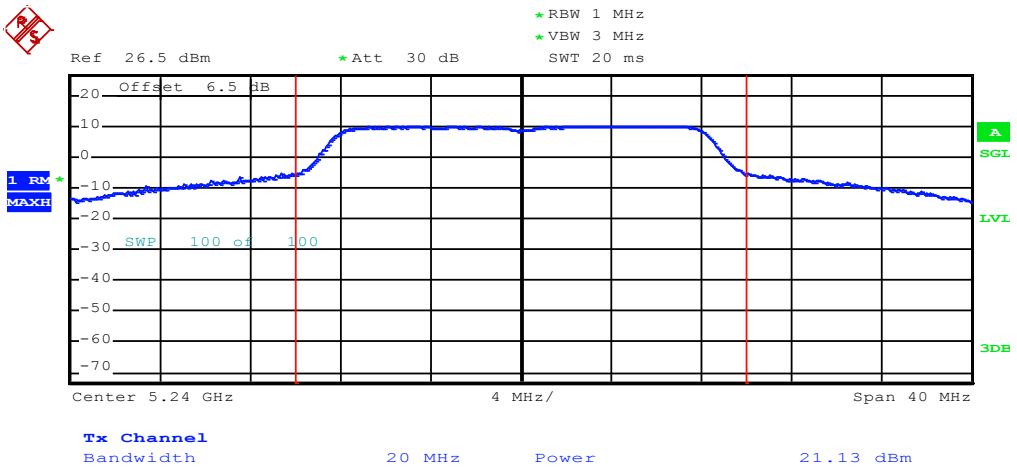
802.11a



Lowest channel

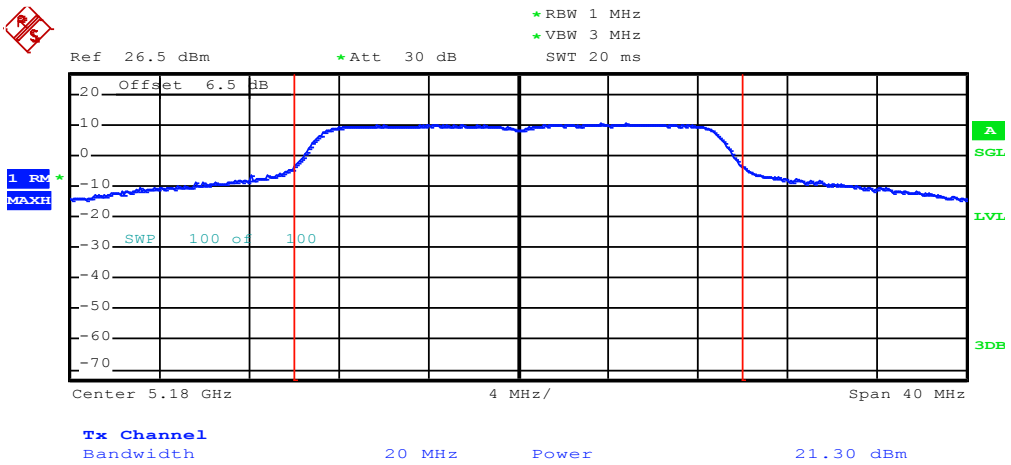


Middle channel

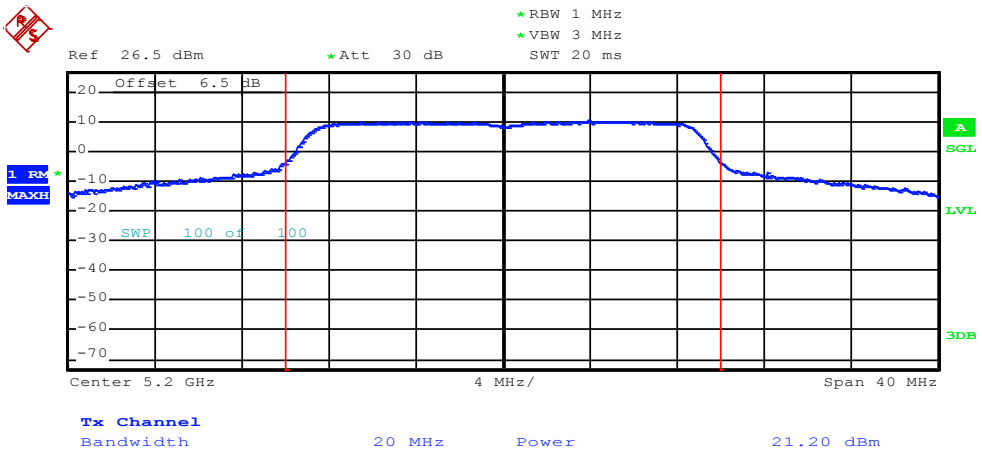


Highest channel

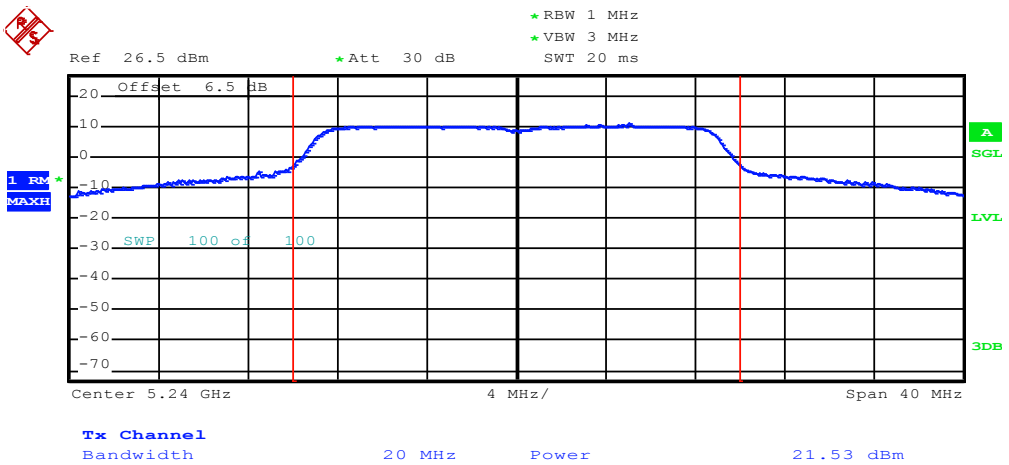
802.11n20



Lowest channel

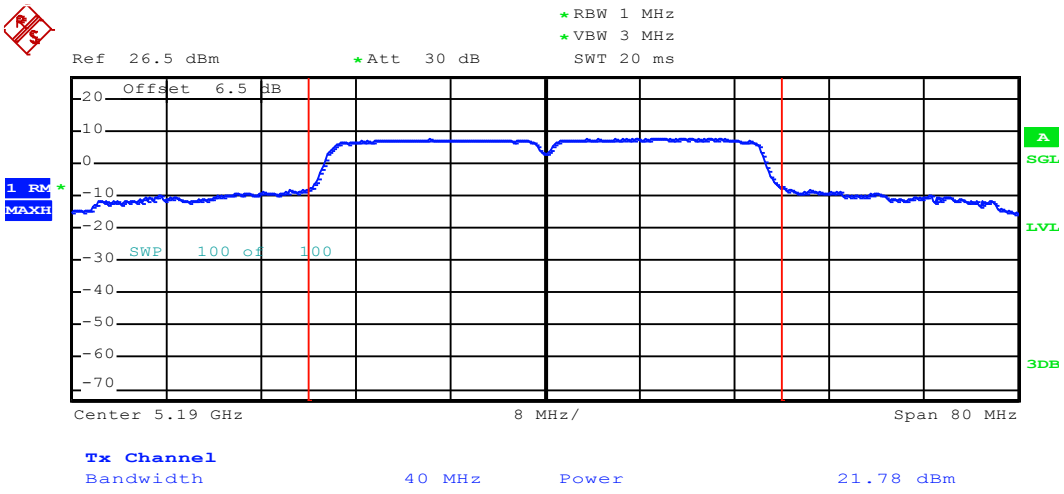


Middle channel

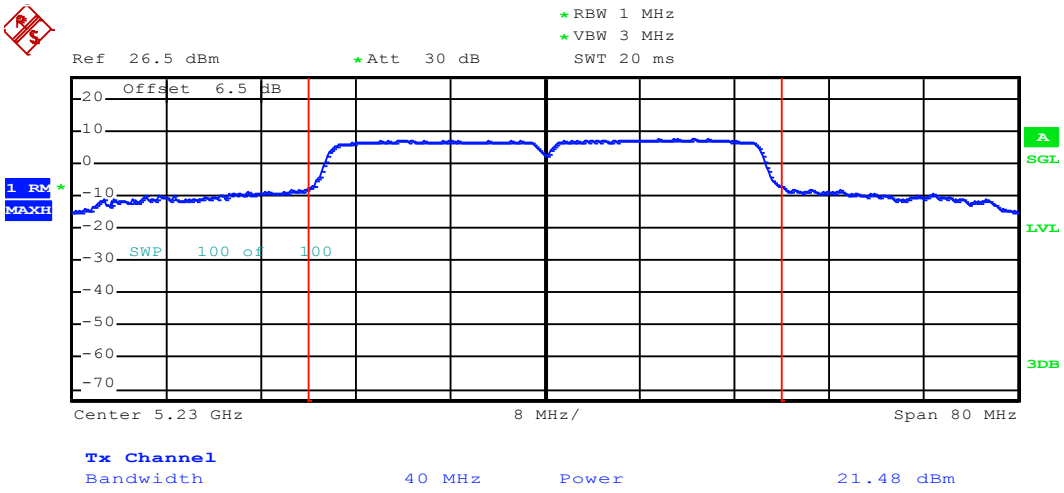


Highest channel

802.11n40



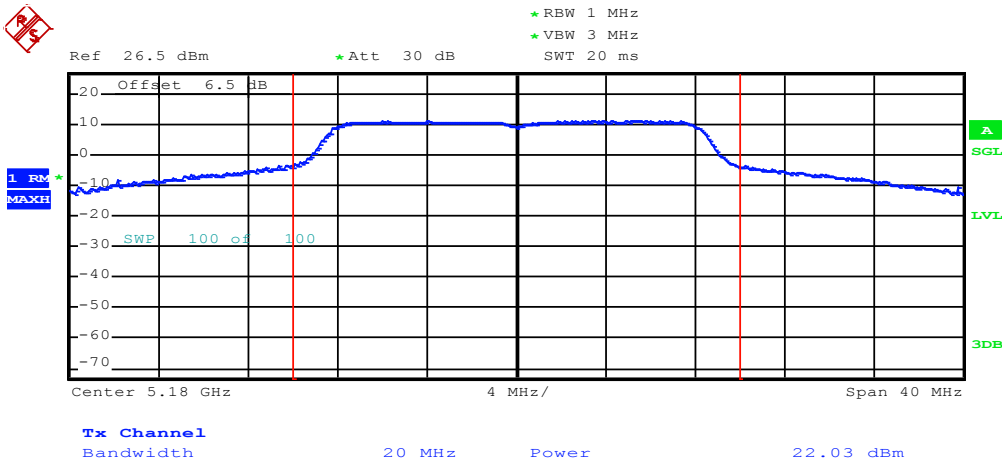
Lowest channel



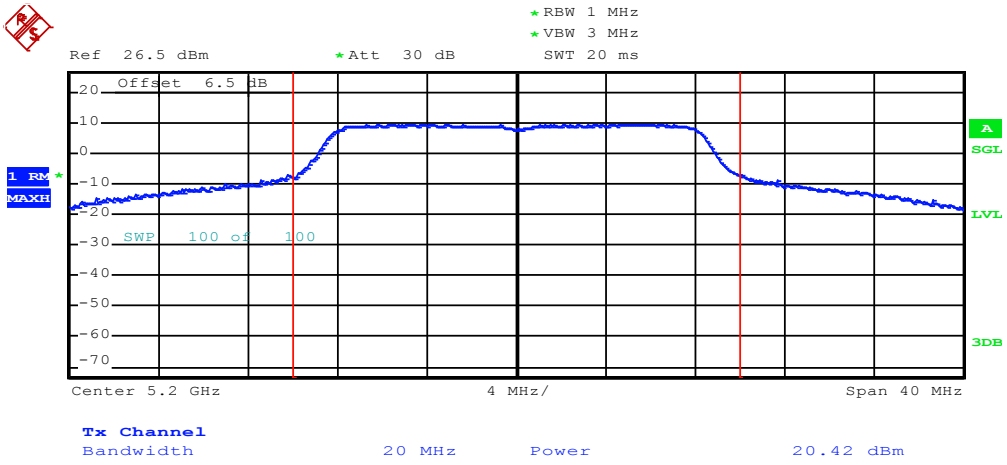
Highest channel

TX1

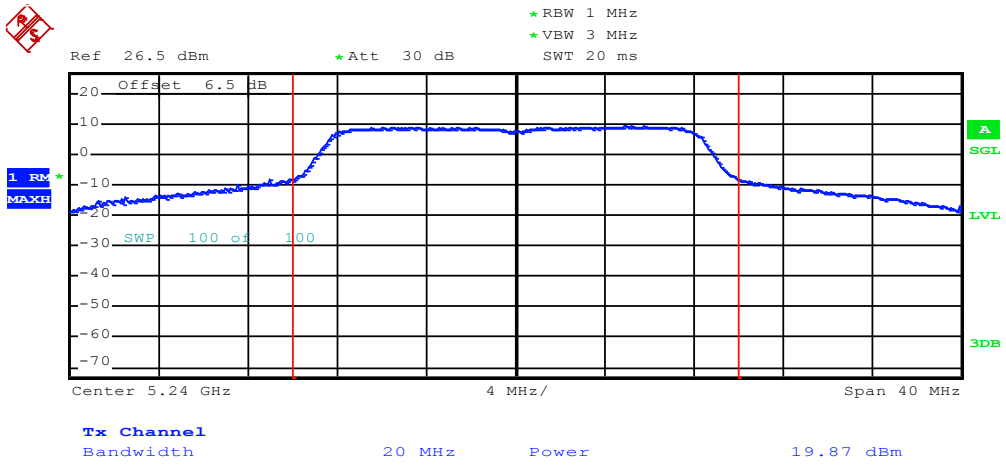
802.11a



Lowest channel

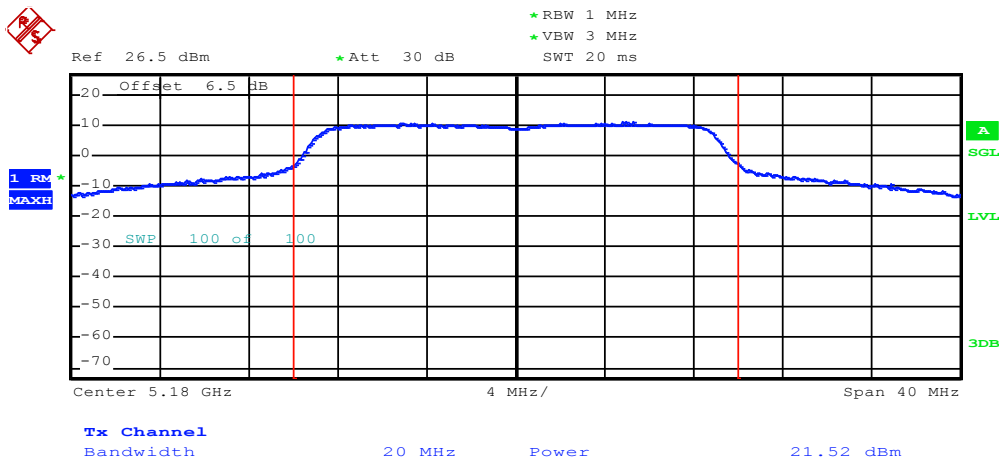


Middle channel

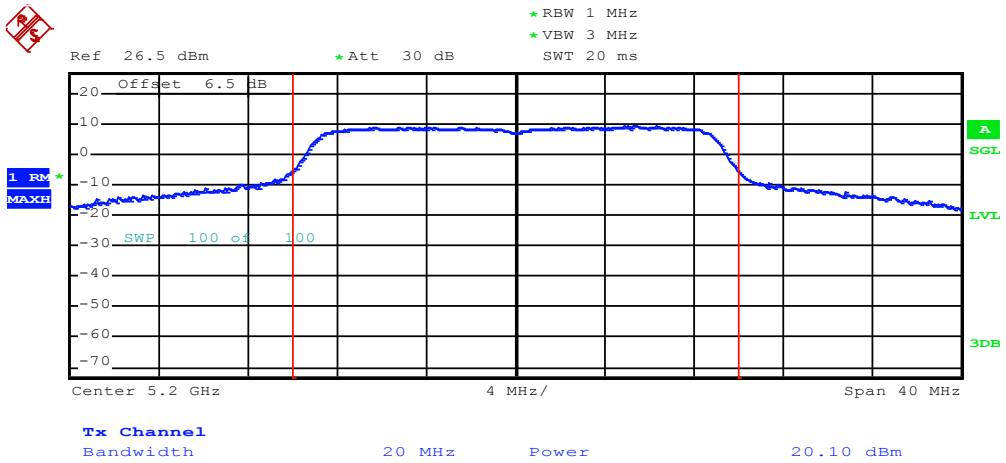


Highest channel

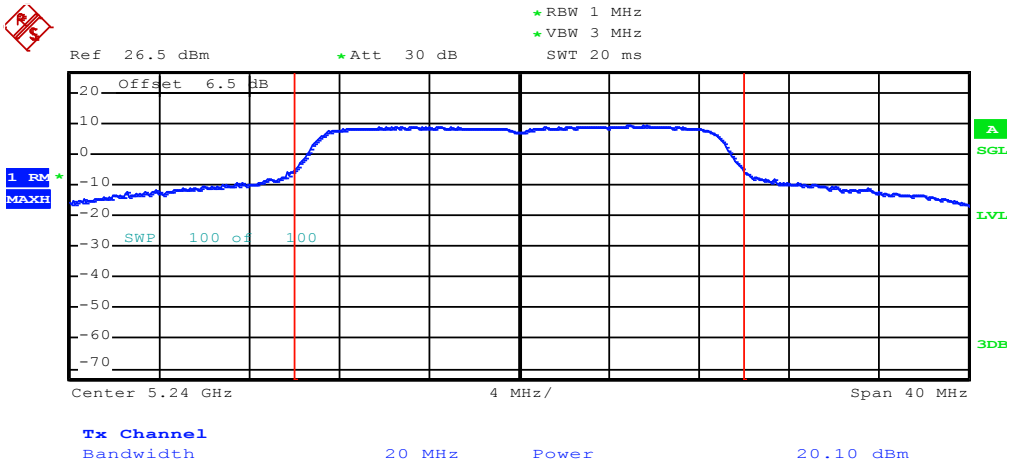
802.11n20



Lowest channel

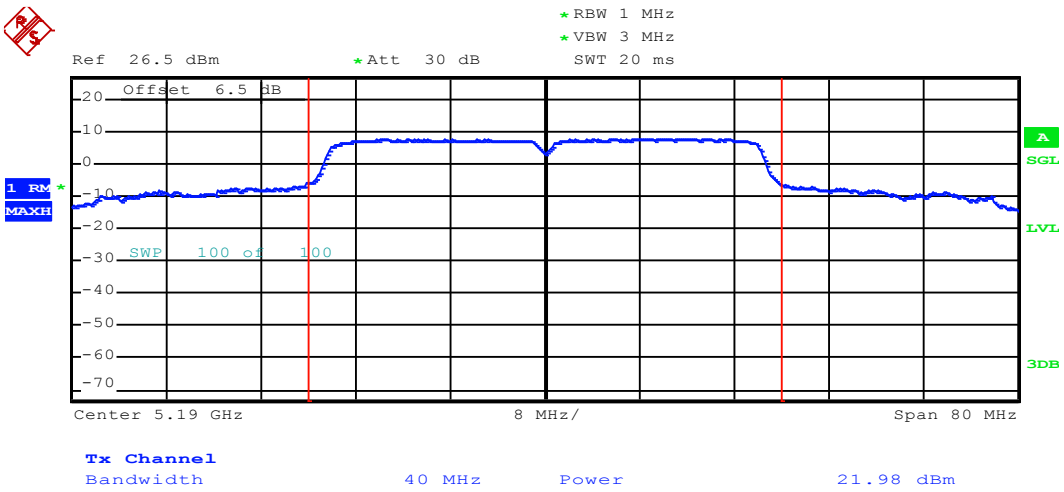


Middle channel

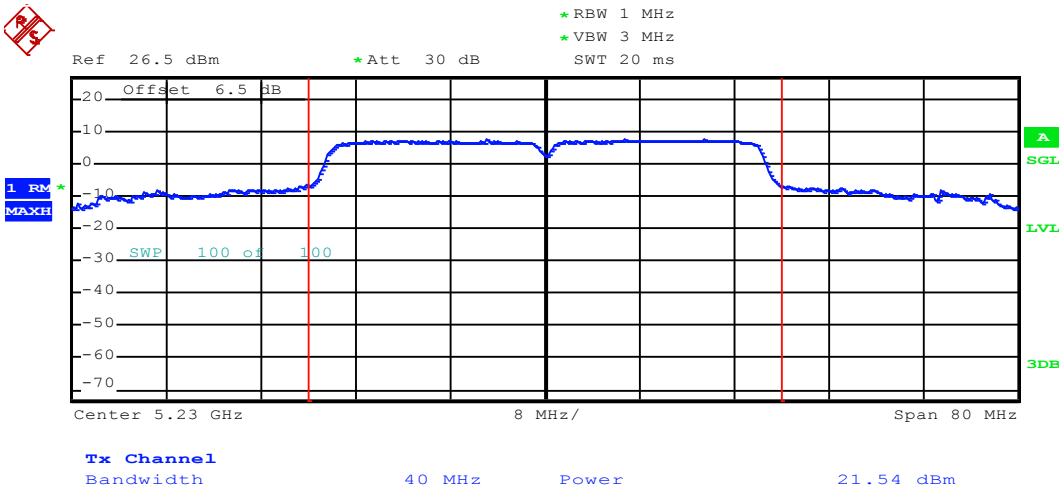


Highest channel

802.11n40



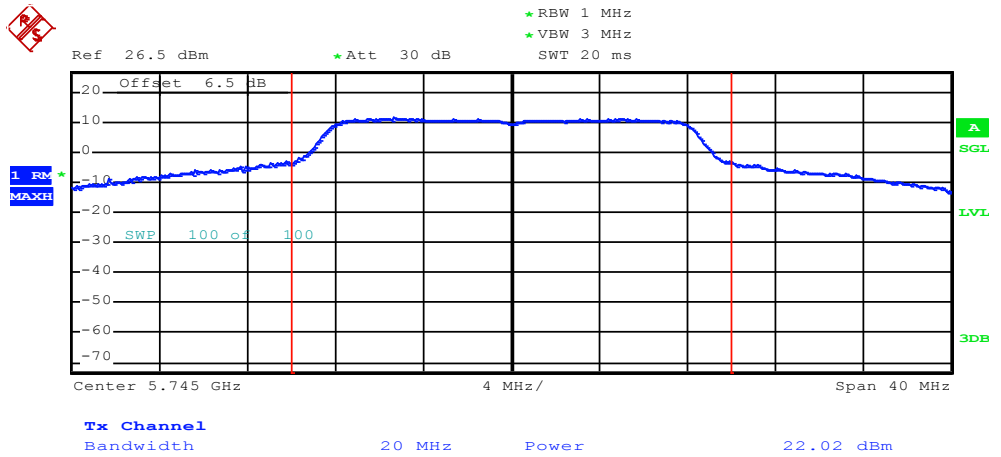
Lowest channel



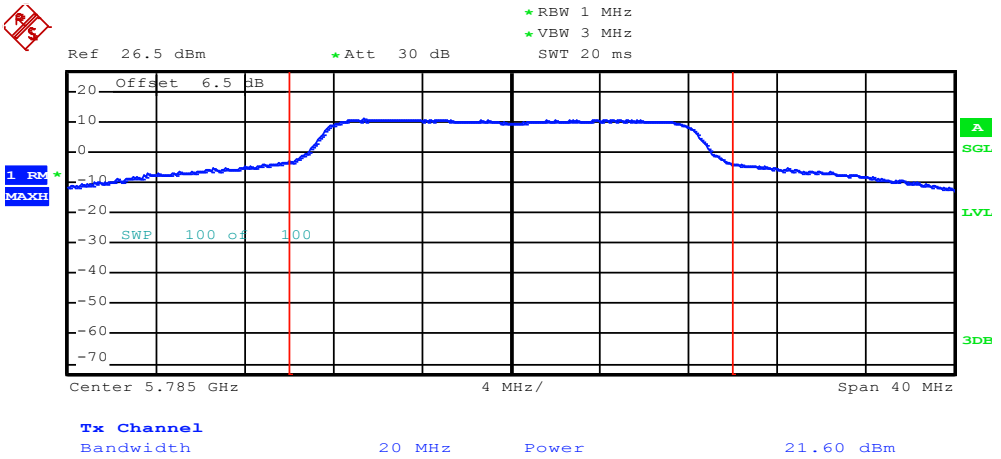
Highest channel

Band 4: TX0

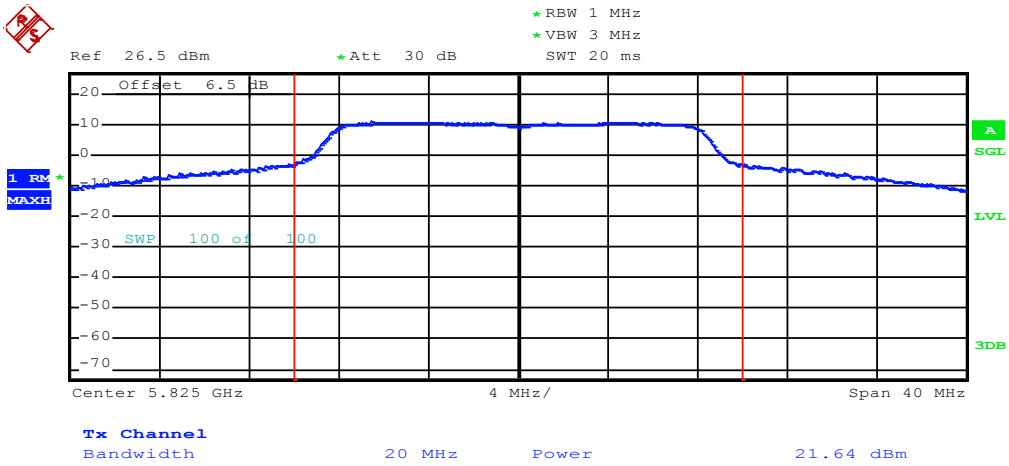
802.11a



Lowest channel

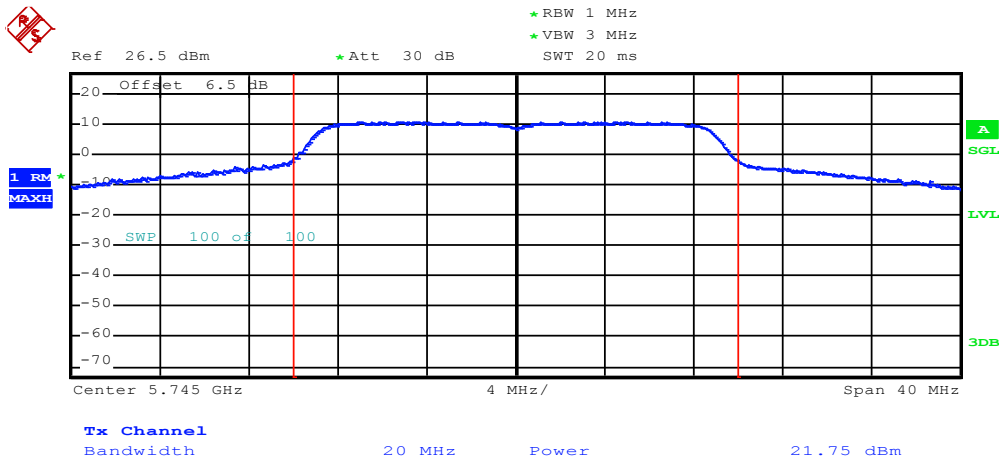


Middle channel

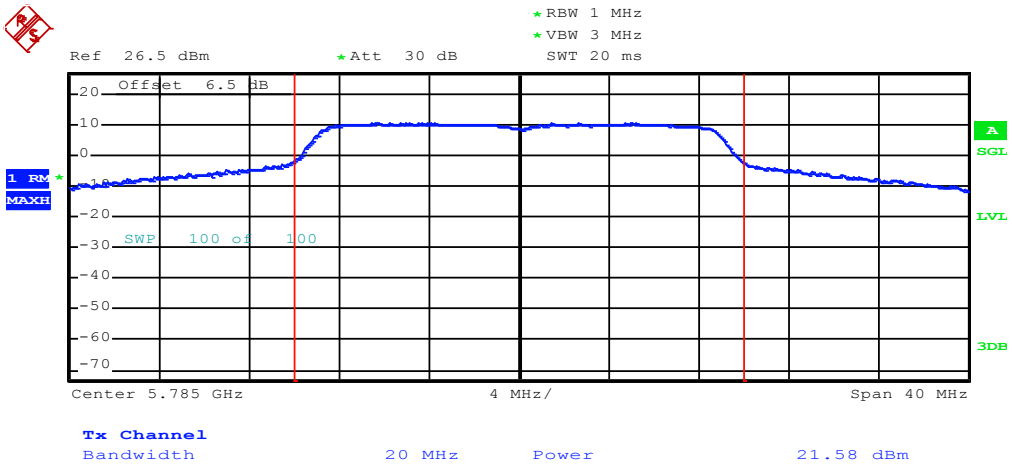


Highest channel

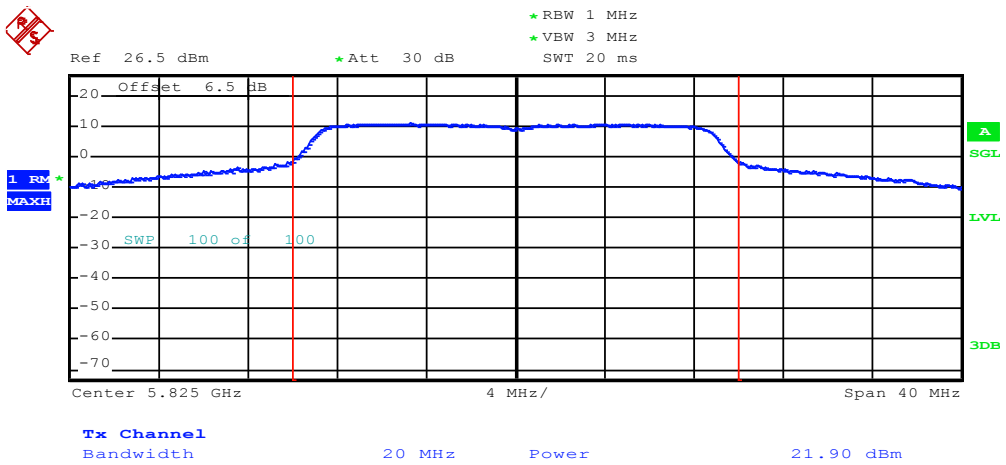
802.11n20



Lowest channel

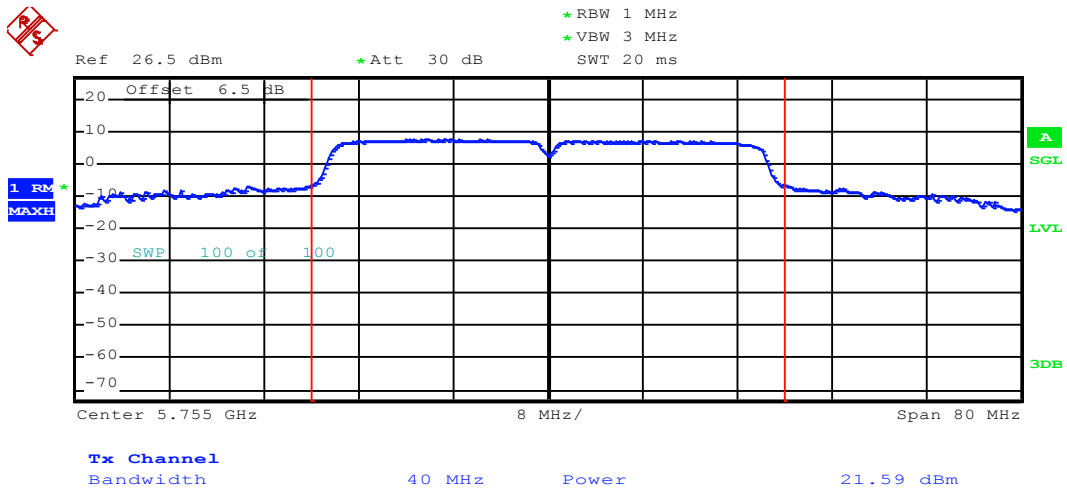


Middle channel

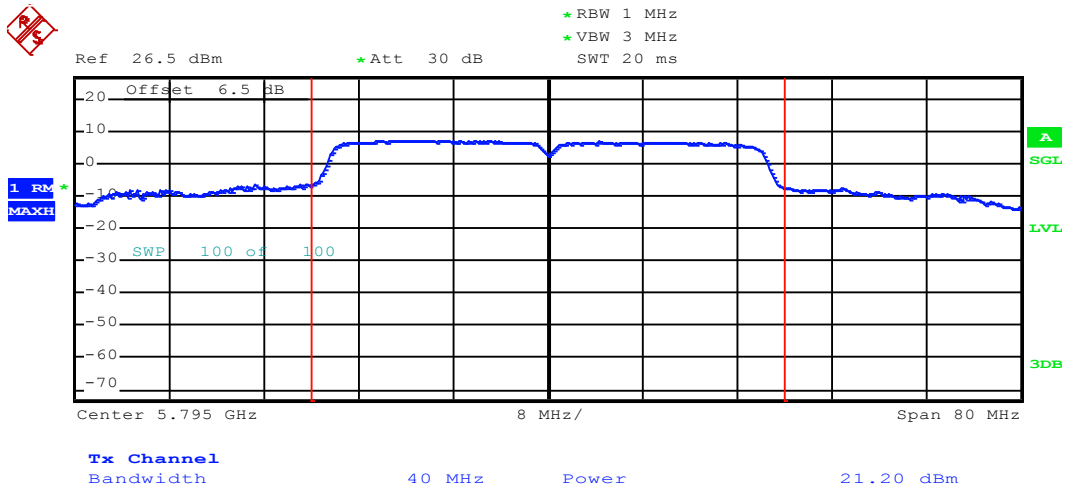


Highest channel

802.11n40



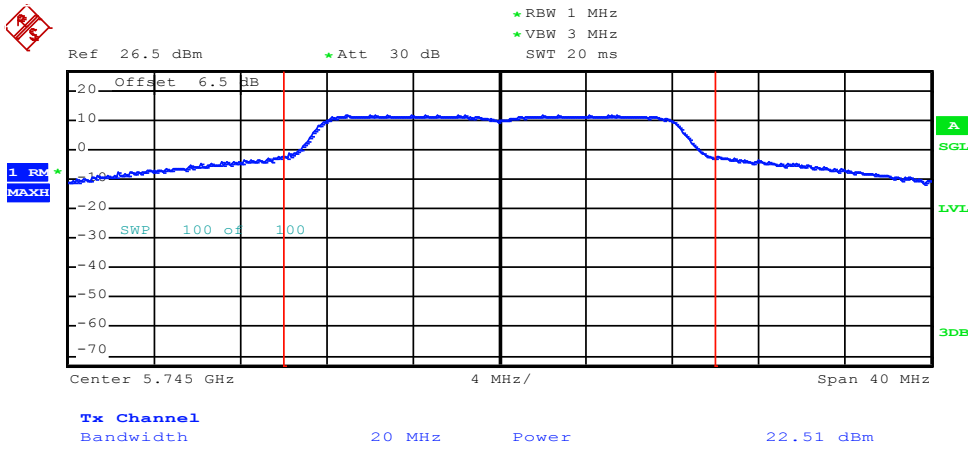
Lowest channel



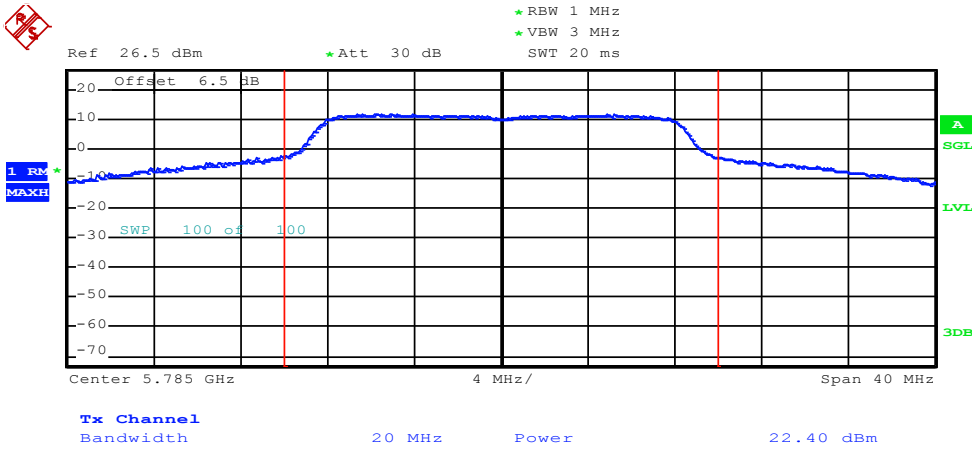
Highest channel

TX1

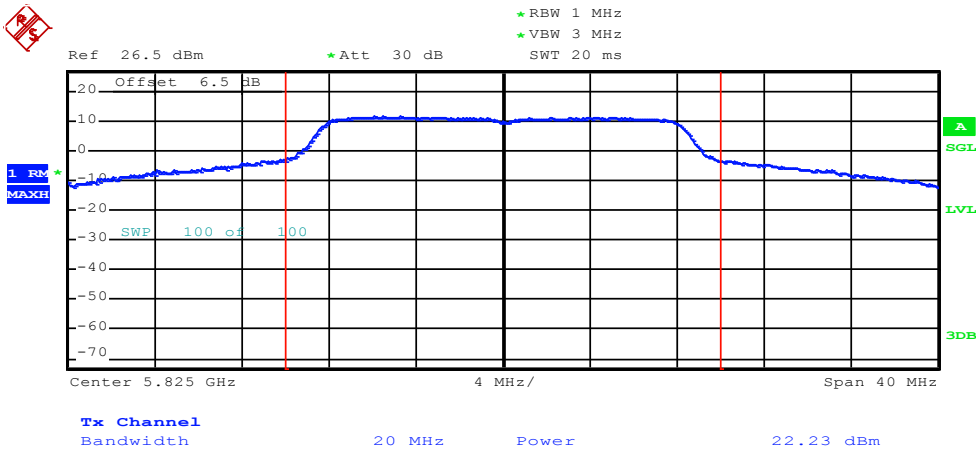
802.11a



Lowest channel

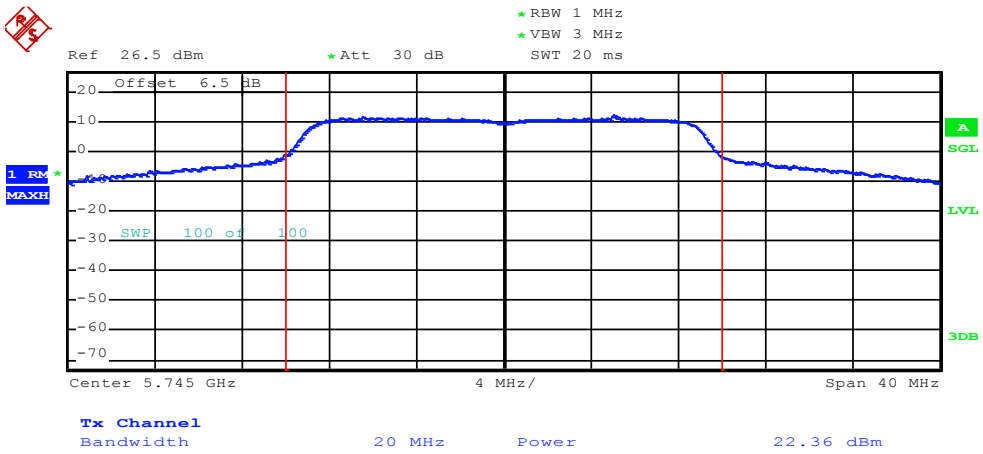


Middle channel

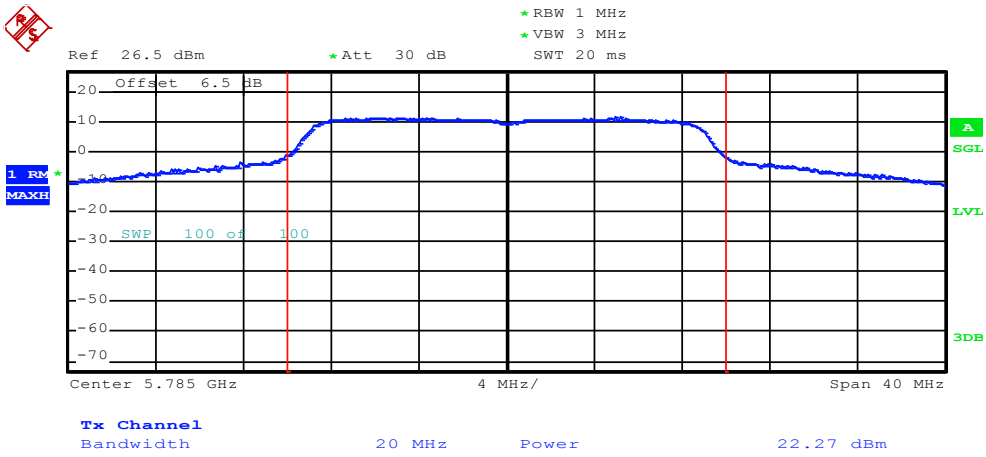


Highest channel

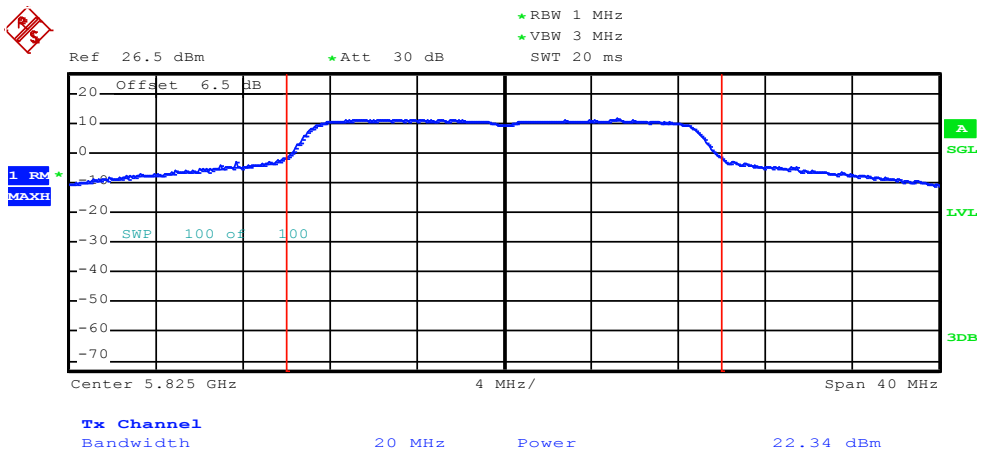
802.11n20



Lowest channel

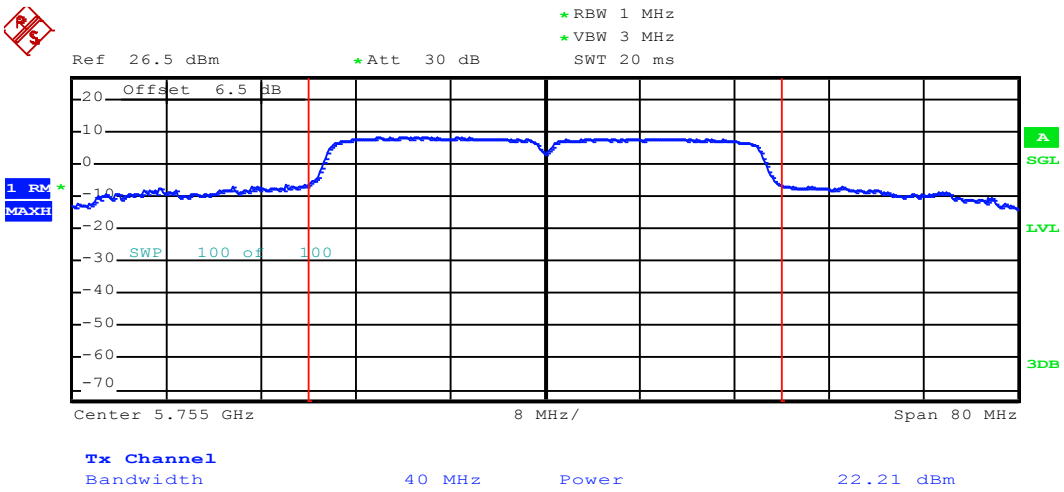


Middle channel

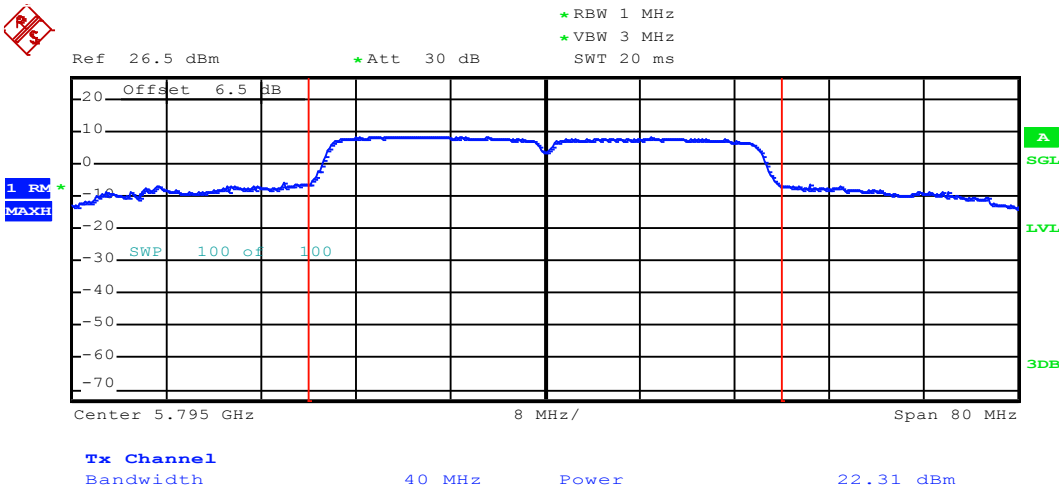


Highest channel

802.11n40

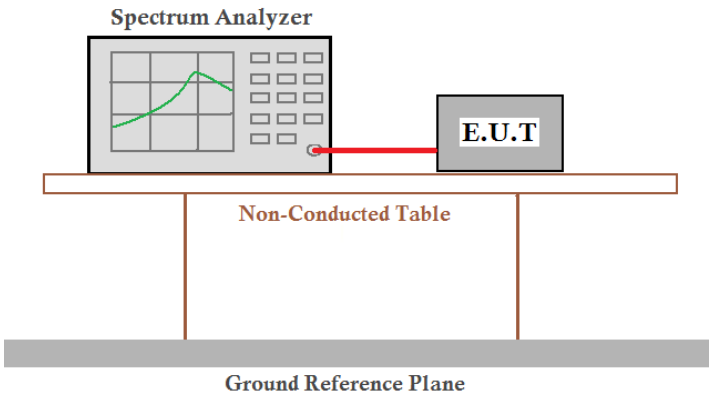


Lowest channel



Highest 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: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: >500kHz(6dB Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1:

TX0

Test Channel	26dB Emission Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	24.96	26.16	47.84	N/A	N/A
Middle	25.60	26.56	---		
Highest	25.04	27.76	48.48		
Test Channel	99% Occupy Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.52	18.72	36.64	N/A	N/A
Middle	17.84	18.72	---		
Highest	17.68	18.64	36.96		

TX1

Test Channel	26dB Emission Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	24.88	26.40	49.76	N/A	N/A
Middle	25.52	27.44	---		
Highest	23.60	27.44	48.00		
Test Channel	99% Occupy Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	18.16	18.56	36.96	N/A	N/A
Middle	17.44	18.48	---		
Highest	17.36	18.48	36.64		

Band 4:

TX0

Test Channel	26dB Emission Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	25.84	26.64	49.60	N/A	N/A
Middle	24.56	26.08	---		
Highest	25.04	25.84	47.68		
Test Channel	99% Occupy Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.68	18.80	36.80	N/A	N/A
Middle	17.60	18.64	---		
Highest	17.60	18.64	36.80		
Test Channel	6dB Emission Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	16.64	17.76	36.64	>500kHz	N/A
Middle	16.56	17.76	---		
Highest	16.56	17.76	36.64		

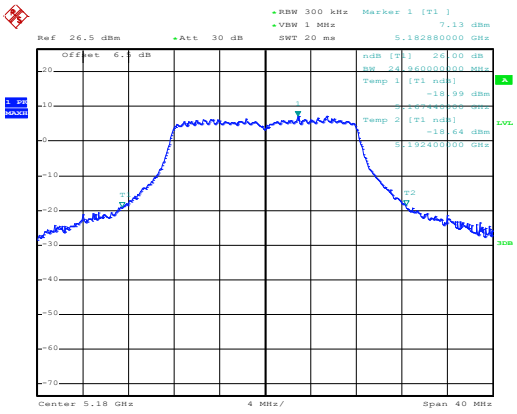
TX1

Test Channel	26dB Emission Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	27.44	29.52	61.12	N/A	N/A
Middle	27.60	29.84	---		
Highest	30.64	28.80	54.24		
Test Channel	99% Occupy Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	17.68	18.80	37.28	N/A	N/A
Middle	17.84	18.88	---		
Highest	18.48	18.88	37.60		
Test Channel	6dB Emission Bandwidth (MHz)			Limit	Result
	802.11a	802.11n20	802.11n40		
Lowest	16.72	17.76	36.64	>500kHz	N/A
Middle	16.56	17.68	---		
Highest	16.56	17.52	36.64		

Test plot as follows:

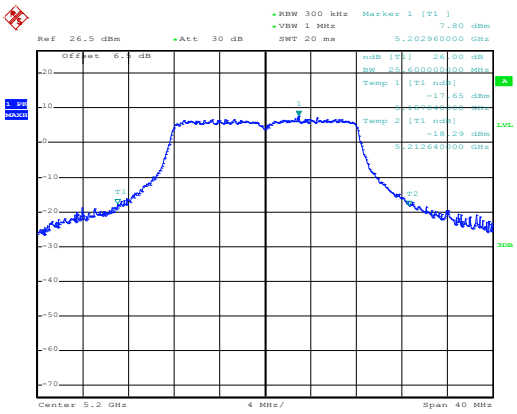
Band 1: TX0

26 dB EBW - 802.11a



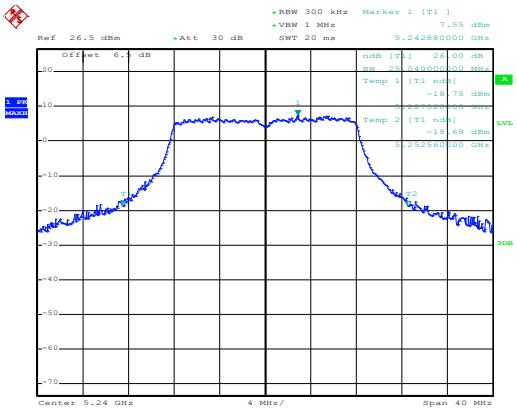
Date: 16.MAY.2016 14:22:10

Lowest channel



Date: 16.MAY.2016 14:23:43

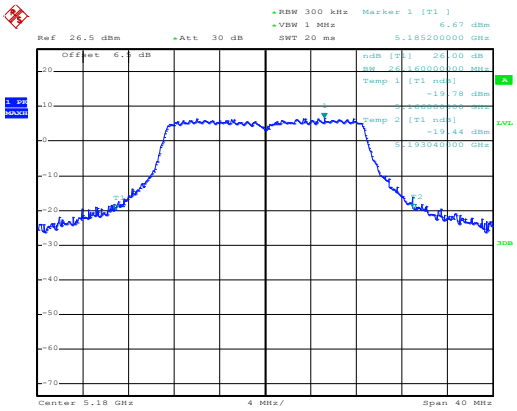
Middle channel



Date: 16.MAY.2016 14:24:41

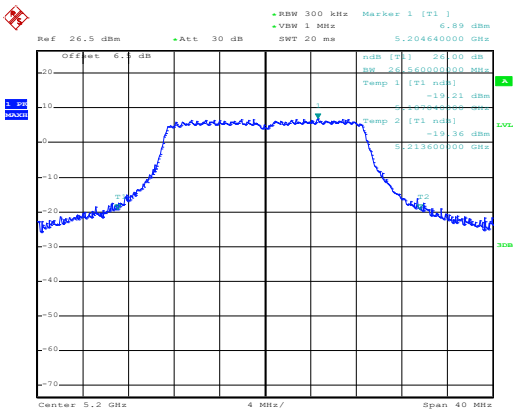
Highest channel

802.11n20



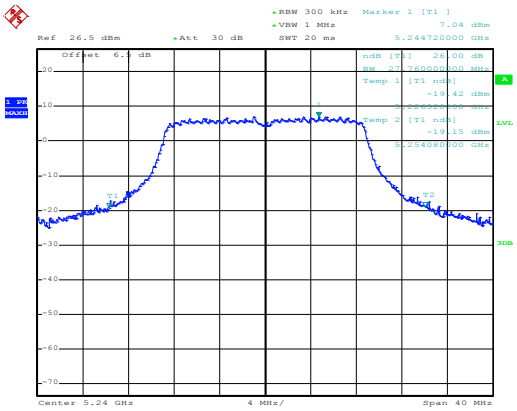
Date: 16.MAY.2016 14:26:21

Lowest channel



Date: 16.MAY.2016 14:27:06

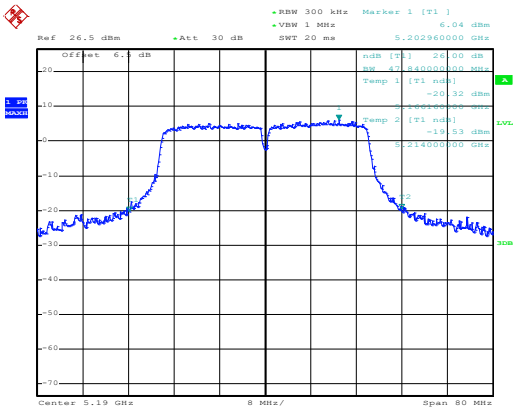
Middle channel



Date: 16.MAY.2016 14:29:05

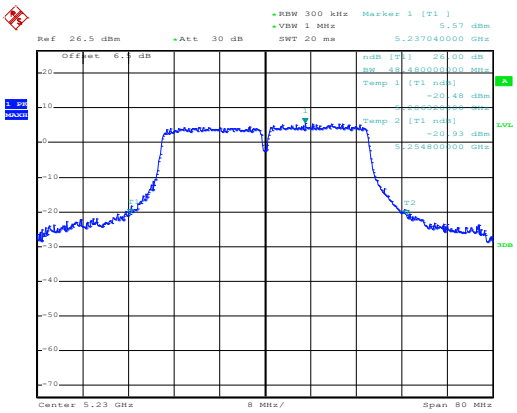
Highest channel

802.11n40



Date: 16.MAY.2016 15:15:42

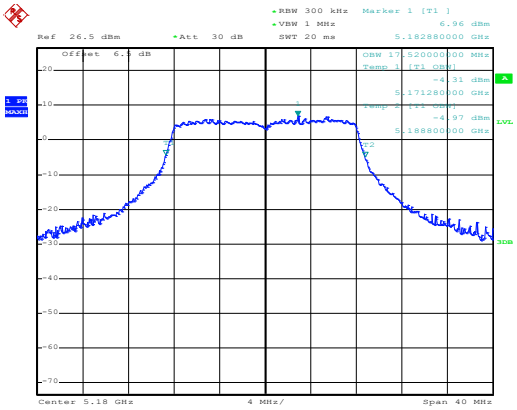
Lowest channel



Date: 16.MAY.2016 15:14:56

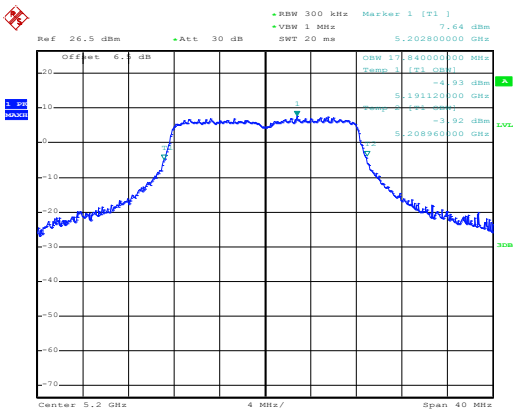
Highest channel

99% OBW - 802.11a



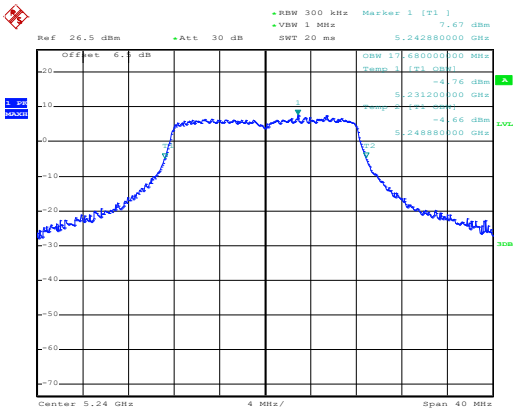
Date: 16.MAY.2016 14:22:32

Lowest channel



Date: 16.MAY.2016 14:23:17

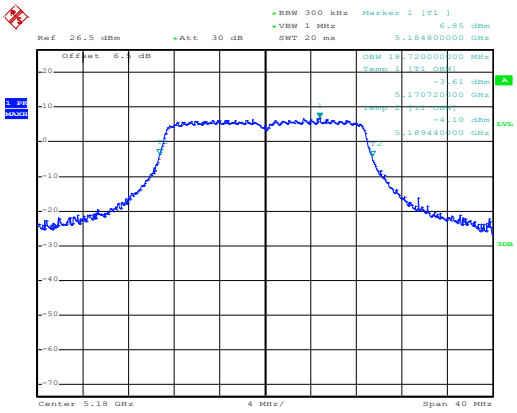
Middle channel



Date: 16.MAY.2016 14:25:01

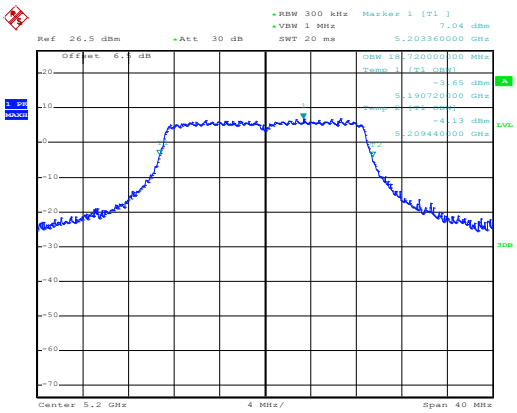
Highest channel

802.11n20



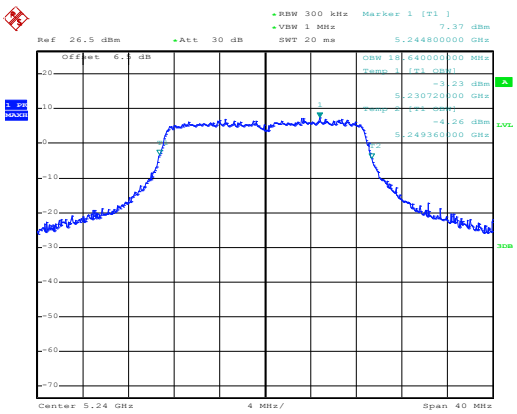
Date: 16.MAY.2016 14:25:50

Lowest channel



Date: 16.MAY.2016 14:27:35

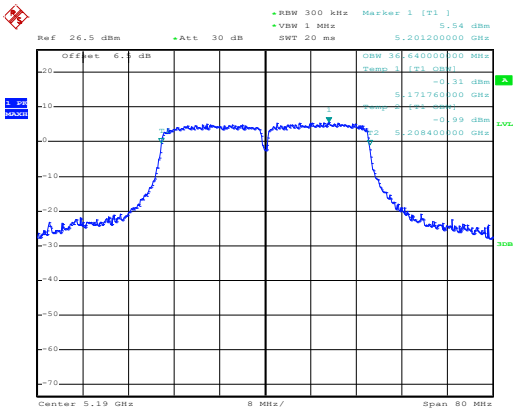
Middle channel



Date: 16.MAY.2016 14:28:08

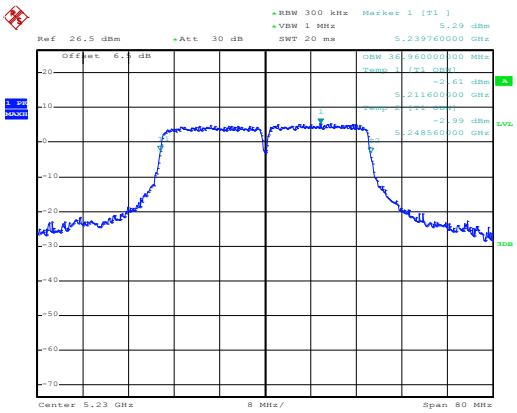
Highest channel

802.11n40



Date: 16.MAY.2016 15:16:00

Lowest channel

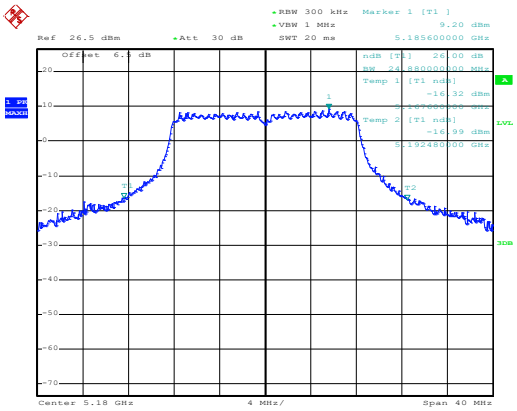


Date: 16.MAY.2016 15:14:28

Highest channel

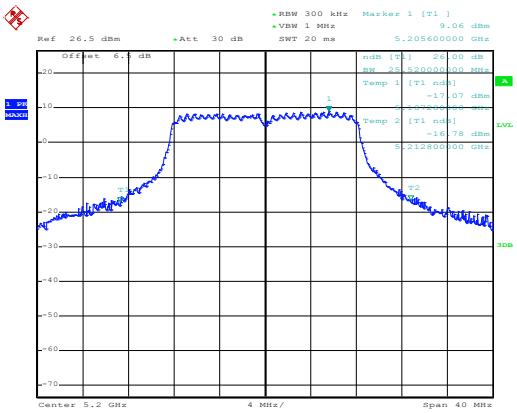
TX1

26 dB EBW - 802.11a



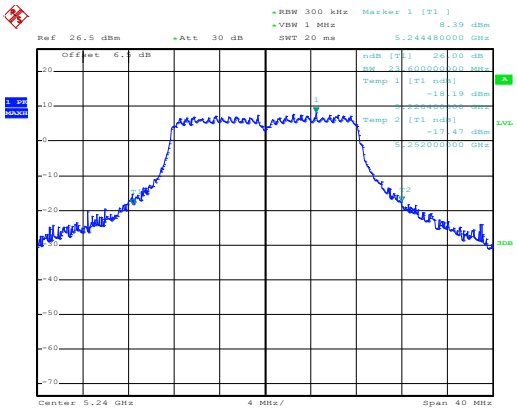
Date: 16.MAY.2016 10:11:33

Lowest channel



Date: 16.MAY.2016 10:12:39

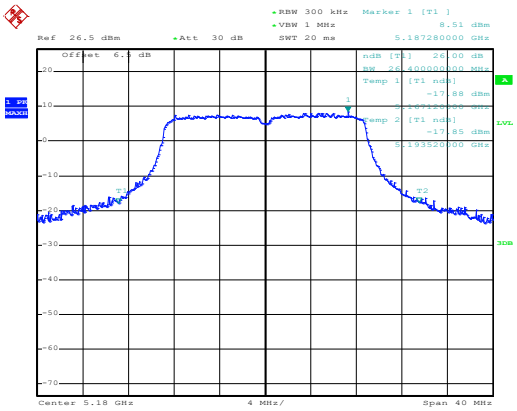
Middle channel



Date: 16.MAY.2016 10:21:09

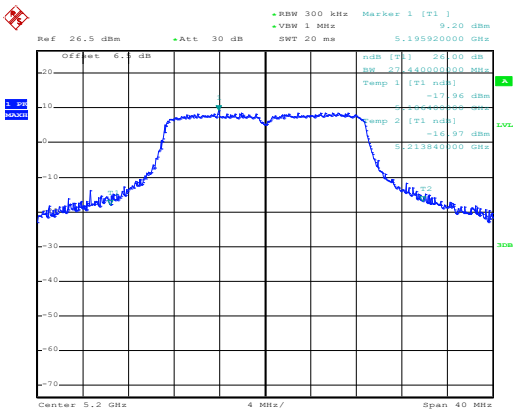
Highest channel

802.11n20



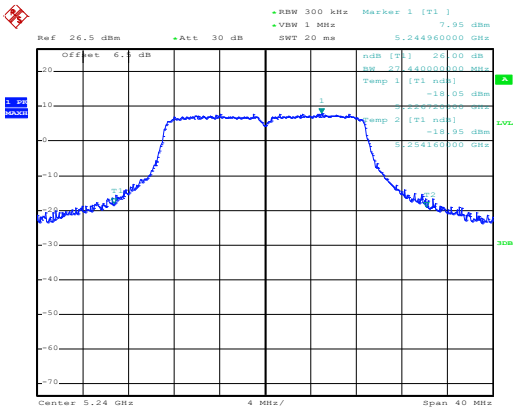
Date: 16.MAY.2016 10:29:55

Lowest channel



Date: 16.MAY.2016 10:36:01

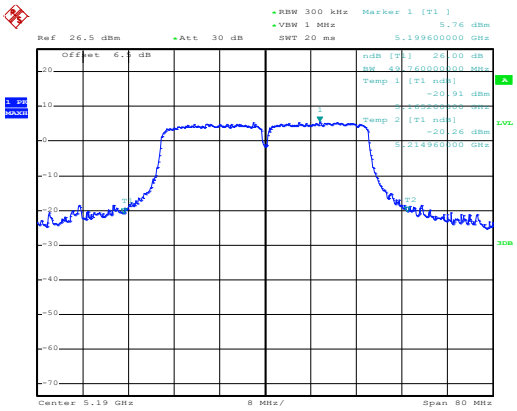
Middle channel



Date: 16.MAY.2016 10:38:03

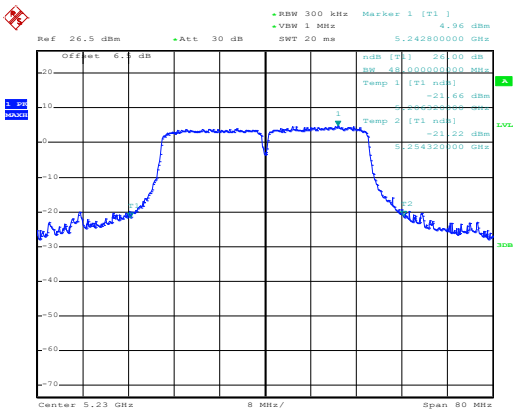
Highest channel

802.11n40



Date: 16.MAY.2016 10:39:23

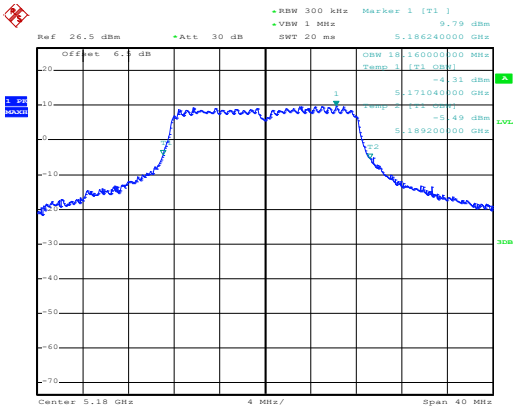
Lowest channel



Date: 16.MAY.2016 10:40:51

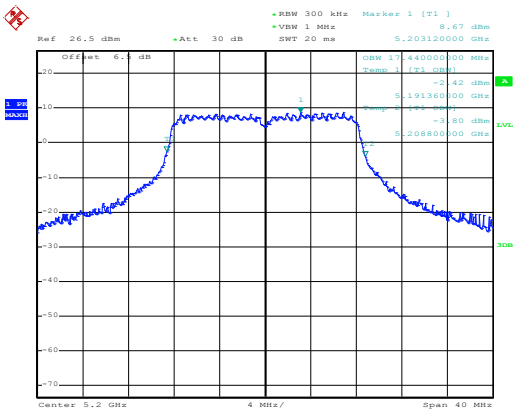
Highest channel

99% OBW - 802.11a



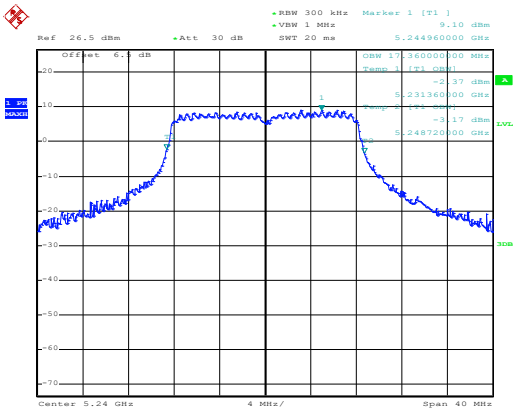
Date: 16.MAY.2016 10:04:29

Lowest channel



Date: 16.MAY.2016 10:13:12

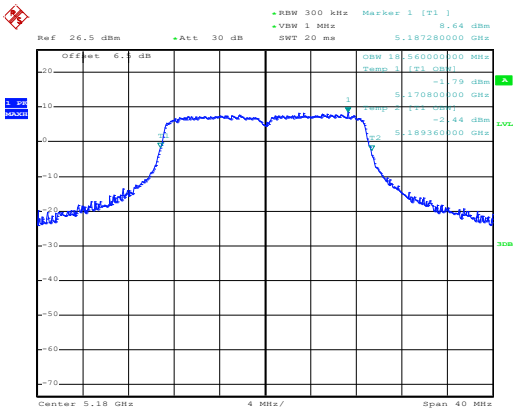
Middle channel



Date: 16.MAY.2016 10:14:03

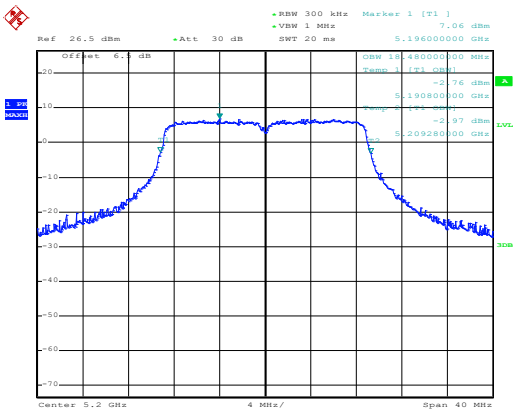
Highest channel

802.11n20



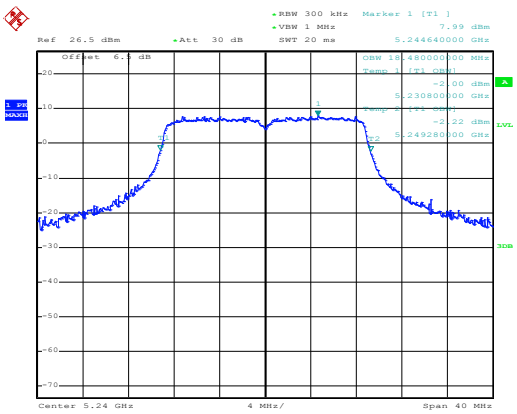
Date: 16.MAY.2016 10:29:31

Lowest channel



Date: 16.MAY.2016 10:36:54

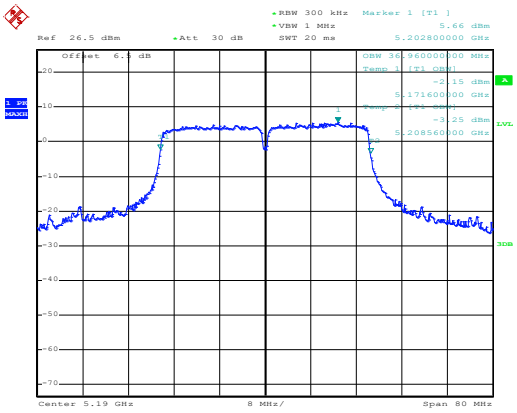
Middle channel



Date: 16.MAY.2016 10:37:40

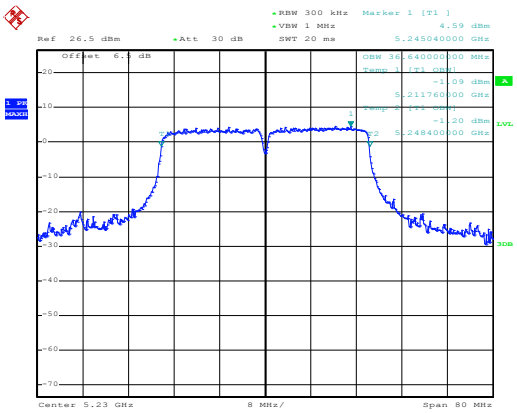
Highest channel

802.11n40



Date: 16.MAY.2016 10:39:42

Lowest channel

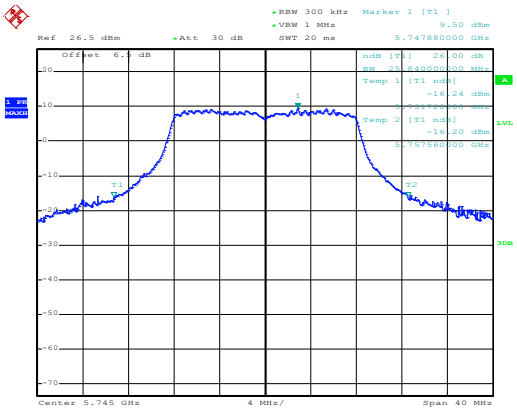


Date: 16.MAY.2016 10:40:26

Highest channel

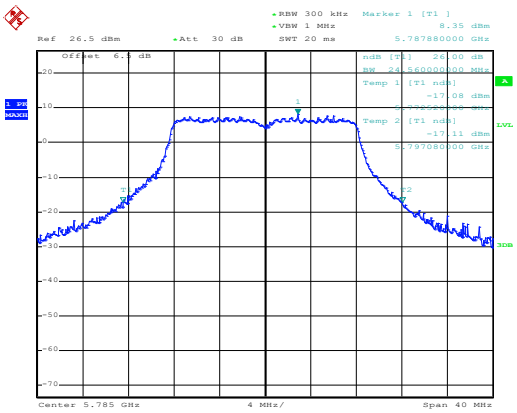
Band 4: TX0

26 dB EBW - 802.11a



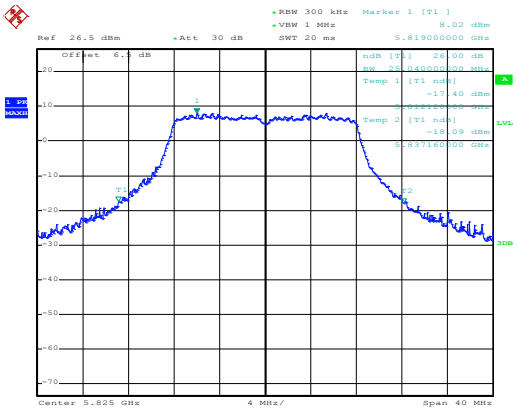
Date: 16.MAY.2016 15:22:04

Lowest channel



Date: 16.MAY.2016 15:23:26

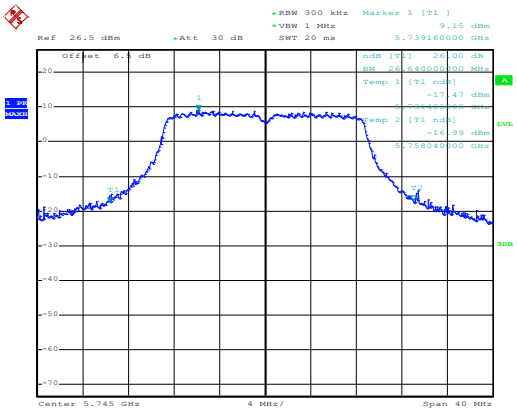
Middle channel



Date: 16.MAY.2016 15:24:27

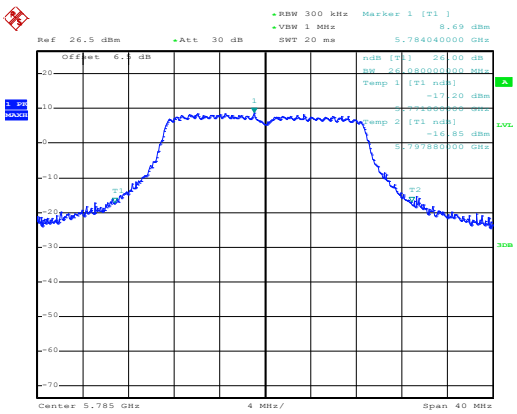
Highest channel

802.11n20



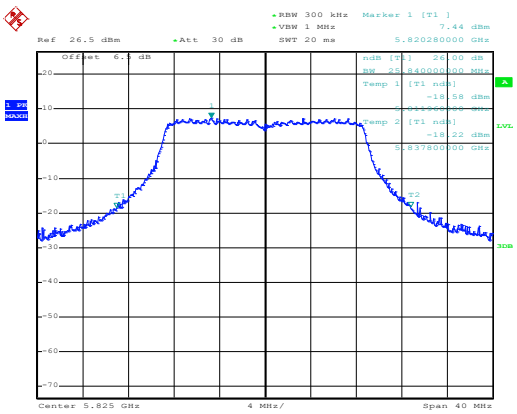
Date: 16.MAY.2016 15:26:17

Lowest channel



Date: 16.MAY.2016 15:27:32

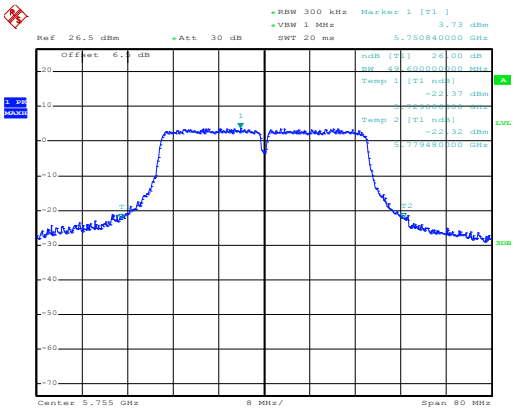
Middle channel



Date: 16.MAY.2016 15:29:30

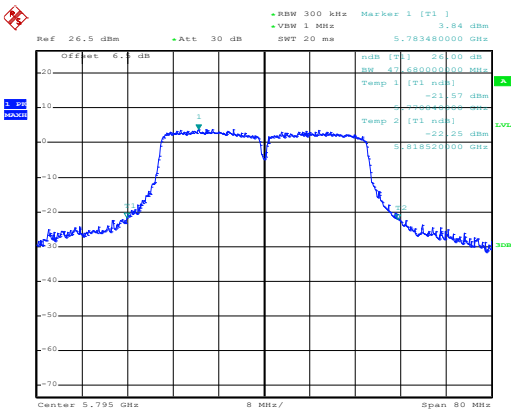
Highest channel

802.11n40



Date: 16.MAY.2016 14:30:21

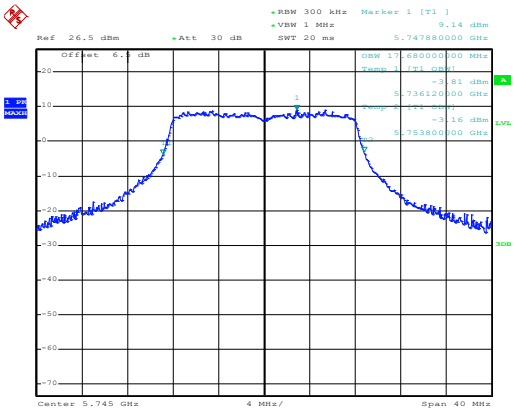
Lowest channel



Date: 16.MAY.2016 14:31:48

Highest channel

99% OBW - 802.11a



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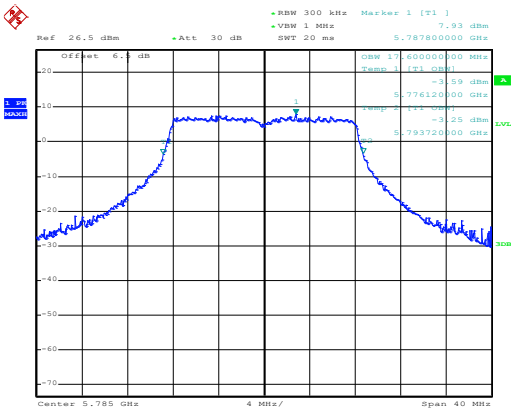
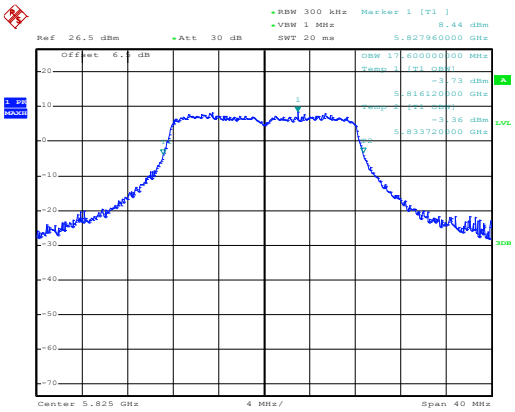
Lowest channel



Date: 16.MAY.2016 15:23:08

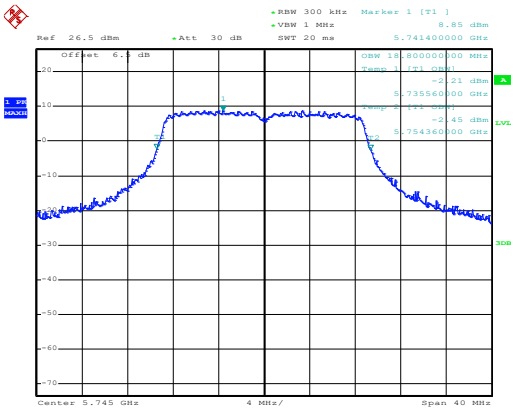
Middle channel



Date: 16.MAY.2016 15:24:42

Highest channel

802.11n20



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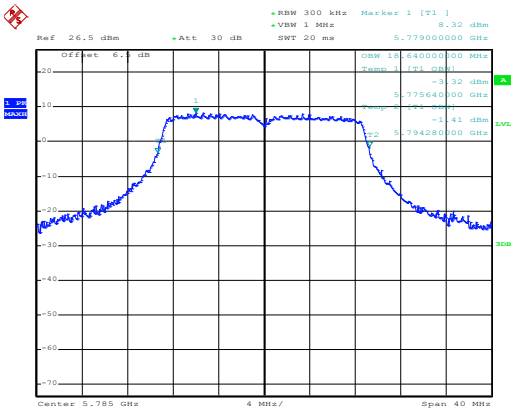
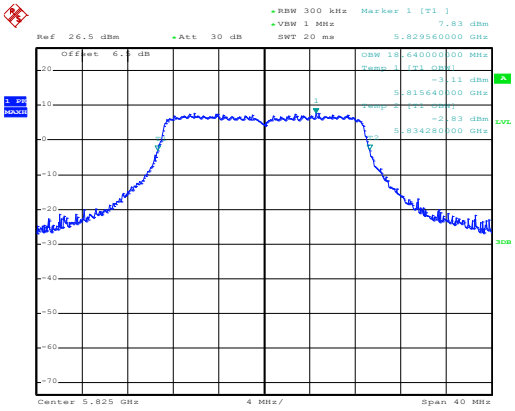
Lowest channel



Date: 16.MAY.2016 15:27:49

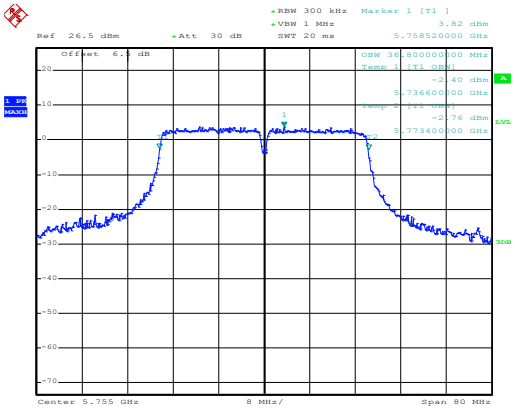
Middle channel



Date: 16.MAY.2016 15:29:02

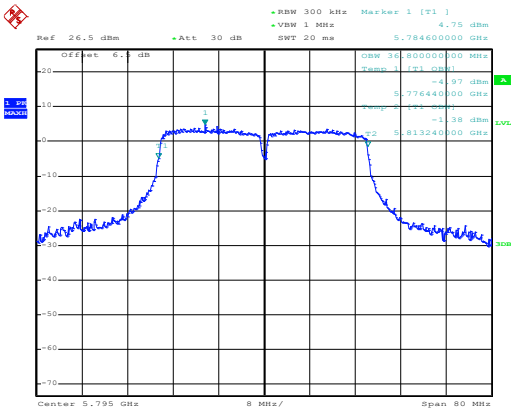
Highest channel

802.11n40



Date: 16.MAY.2016 14:30:47

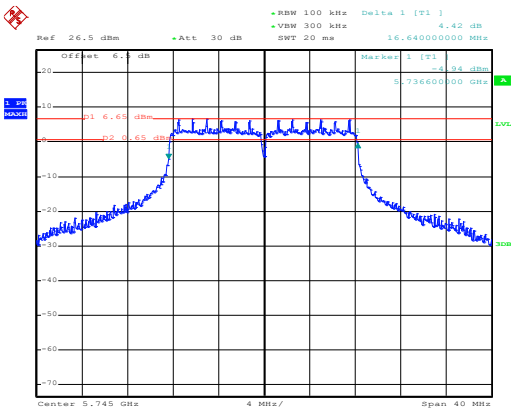
Lowest channel



Date: 16.MAY.2016 14:31:24

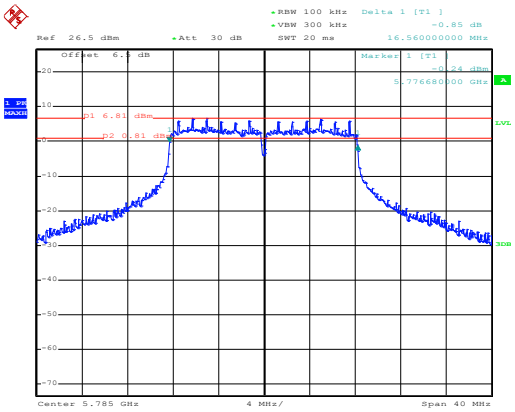
Highest channel

6 dB BW - 802.11a



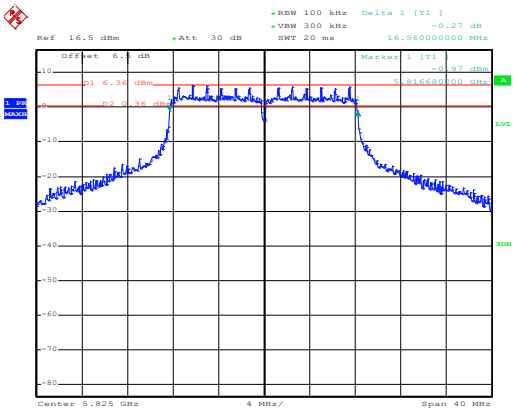
Date: 16.MAY.2016 15:31:59

Lowest channel



Date: 16.MAY.2016 15:34:37

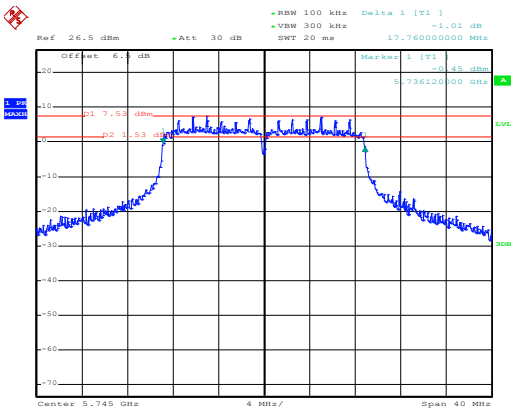
Middle channel



Date: 17.MAY.2016 08:32:10

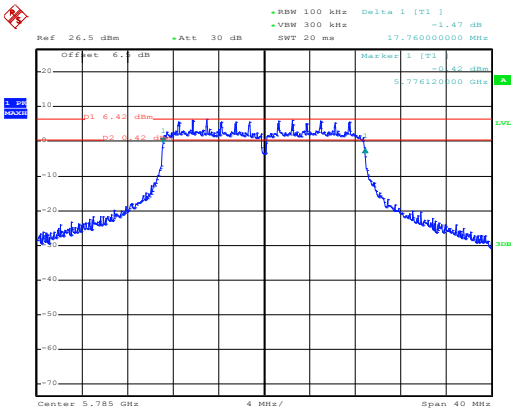
Highest channel

802.11n20



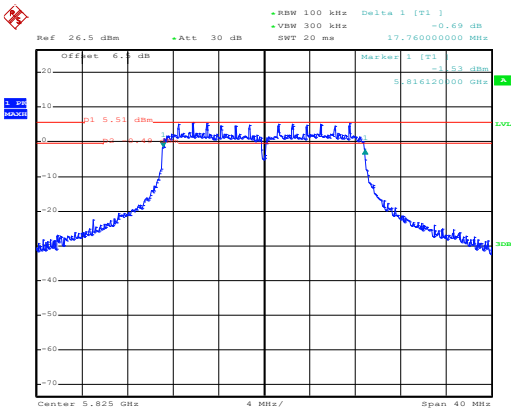
Date: 16.MAY.2016 15:38:50

Lowest channel



Date: 16.MAY.2016 15:40:42

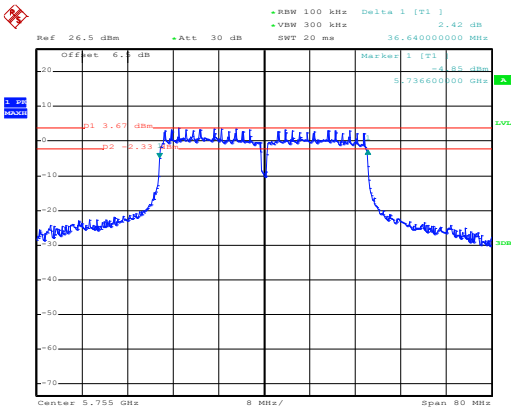
Middle channel



Date: 16.MAY.2016 15:42:18

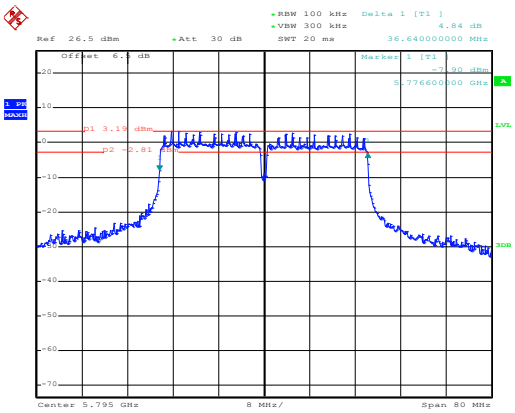
Highest channel

802.11n40



Date: 16.MAY.2016 15:45:01

Lowest channel

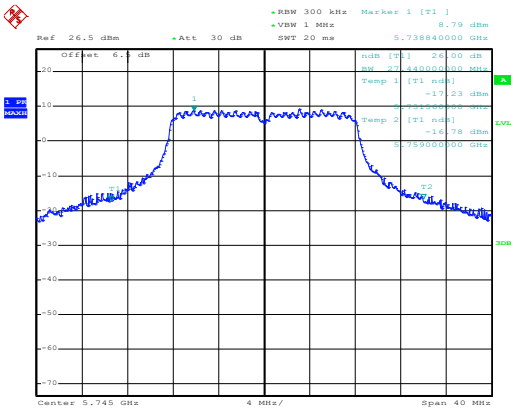


Date: 16.MAY.2016 15:46:32

Highest channel

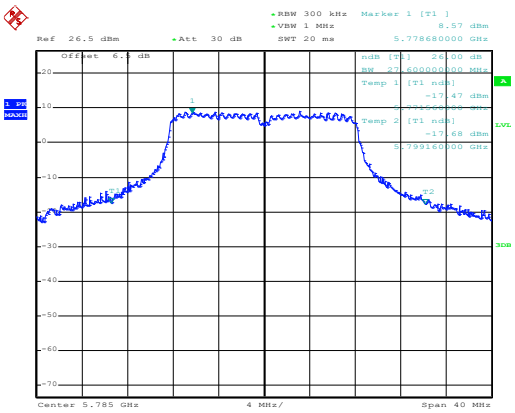
TX1

26 dB EBW - 802.11a



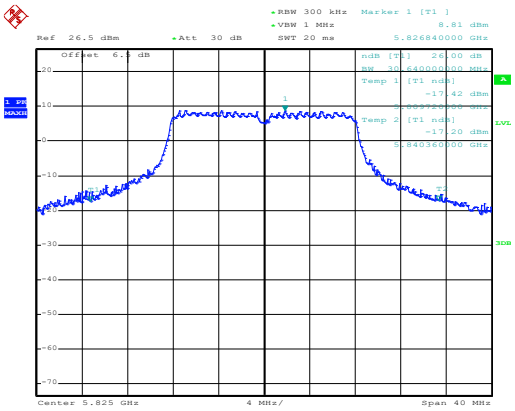
Date: 16.MAY.2016 11:29:35

Lowest channel



Date: 16.MAY.2016 11:28:18

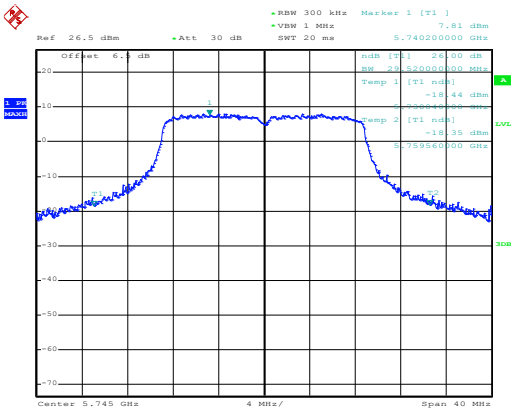
Middle channel



Date: 16.MAY.2016 11:15:33

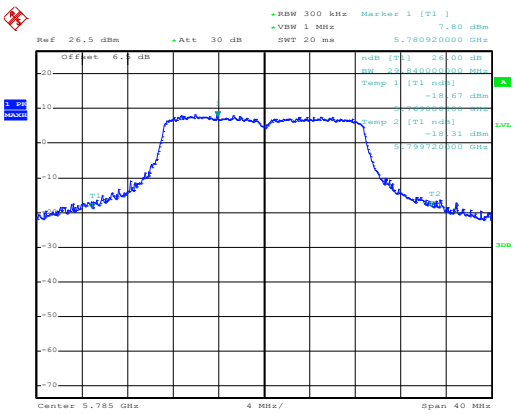
Highest channel

802.11n20



Date: 16.MAY.2016 11:54:04

Lowest channel



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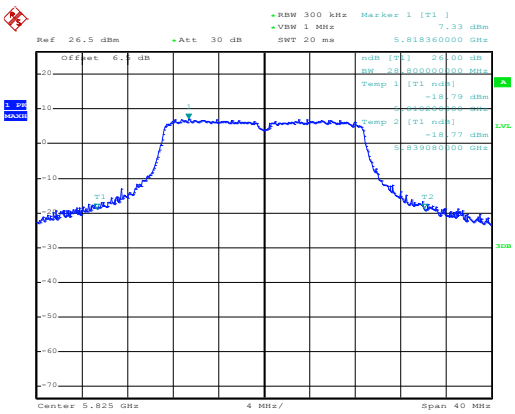
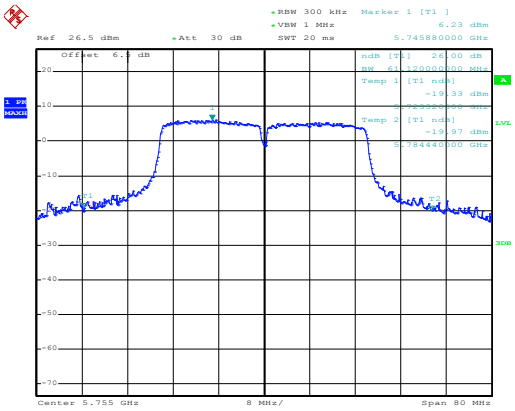
Middle channel



Date: 16.MAY.2016 11:56:26

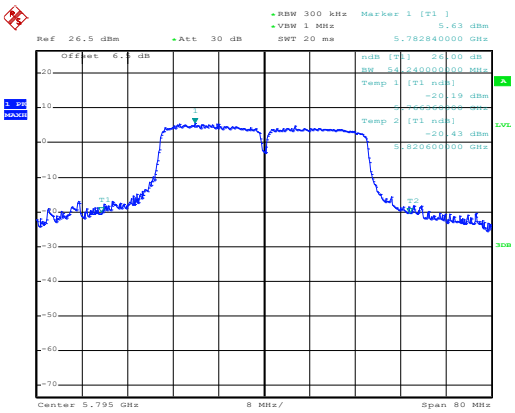
Highest channel

802.11n40



Date: 16.MAY.2016 11:58:48

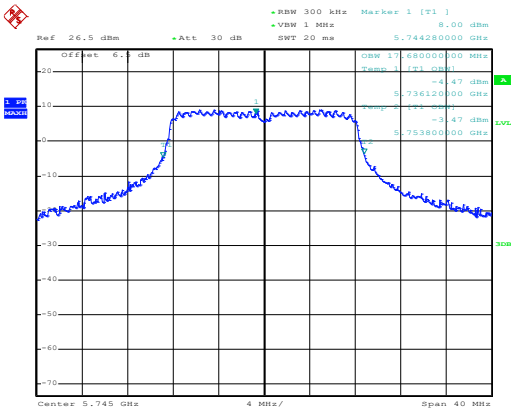
Lowest channel



Date: 16.MAY.2016 11:59:54

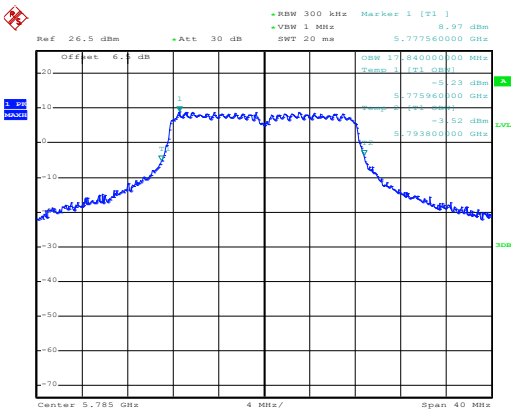
Highest channel

99% OBW - 802.11a



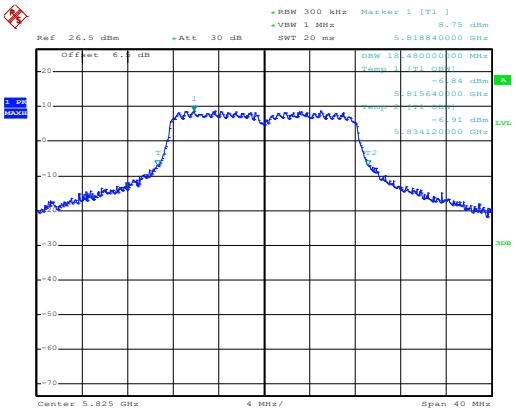
Date: 16.MAY.2016 11:11:18

Lowest channel



Date: 16.MAY.2016 11:13:50

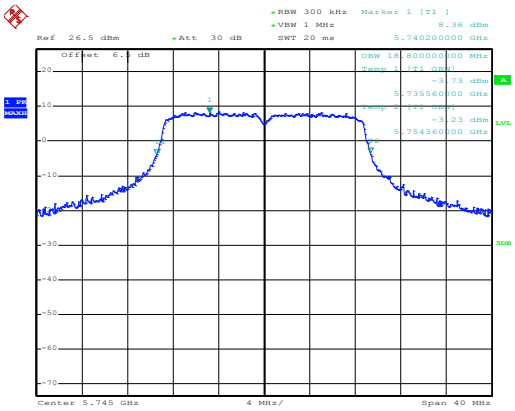
Middle channel



Date: 16.MAY.2016 11:15:56

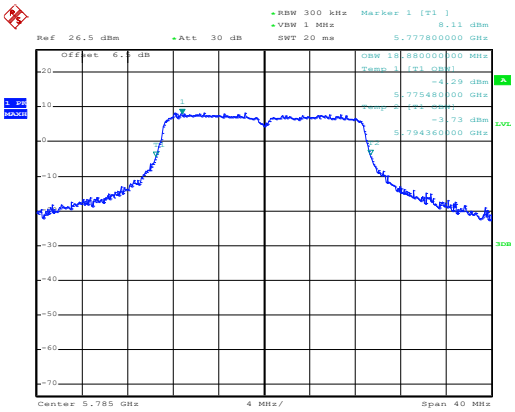
Highest channel

802.11n20



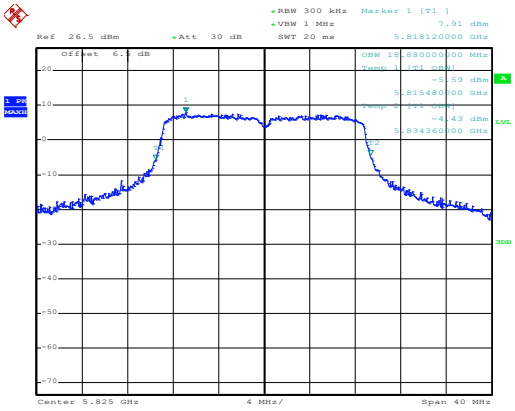
Date: 16.MAY.2016 11:53:35

Lowest channel



Date: 16.MAY.2016 11:55:21

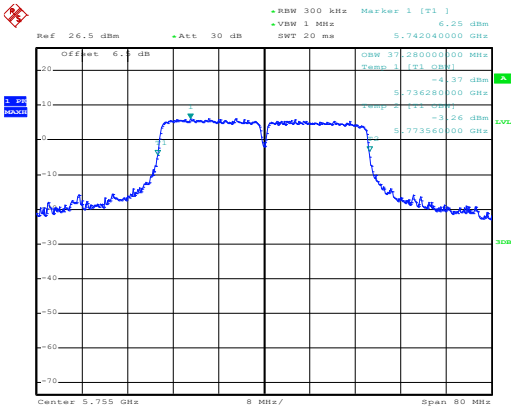
Middle channel



Date: 16.MAY.2016 11:56:45

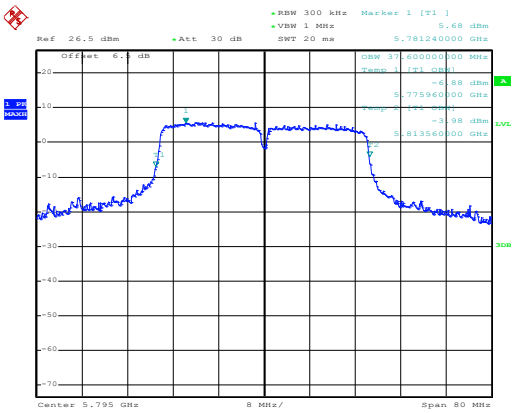
Highest channel

802.11n40



Date: 16.MAY.2016 11:57:52

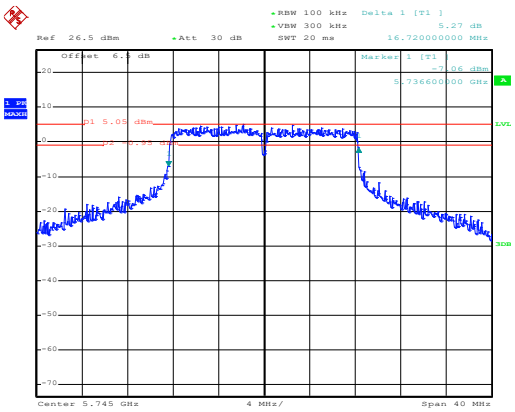
Lowest channel



Date: 16.MAY.2016 12:00:33

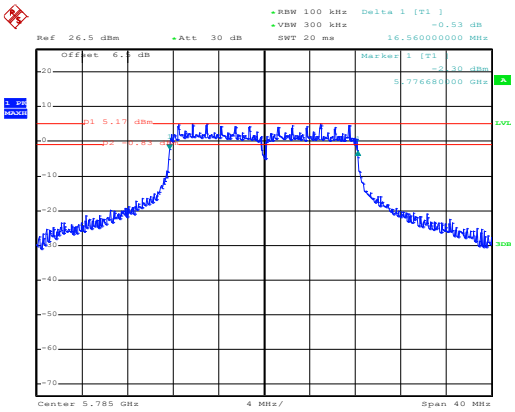
Highest channel

6 dB BW - 802.11a



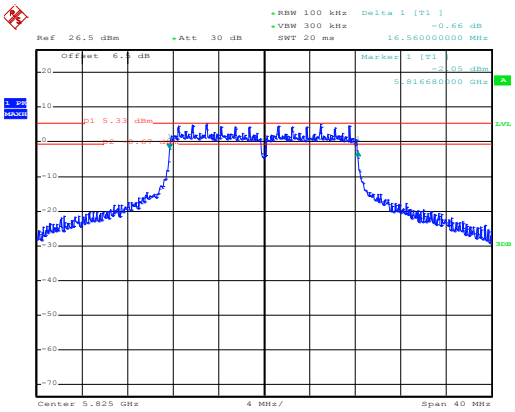
Date: 16.MAY.2016 11:35:15

Lowest channel



Date: 16.MAY.2016 11:37:27

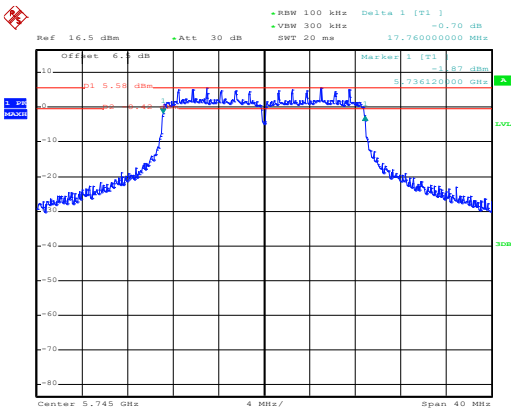
Middle channel



Date: 16.MAY.2016 11:39:12

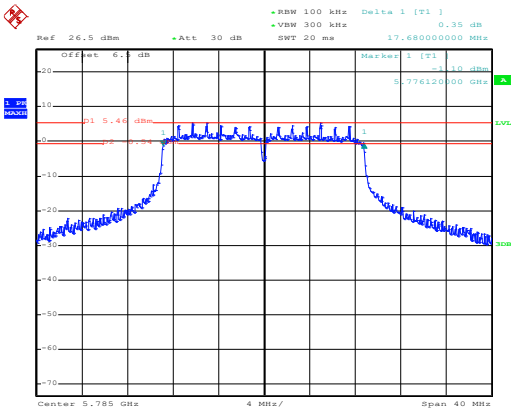
Highest channel

802.11n20



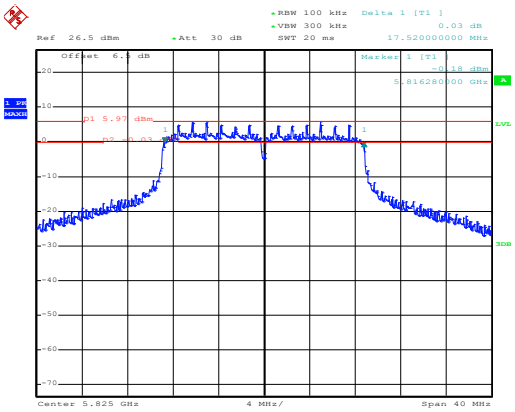
Date: 17.MAY.2016 08:24:58

Lowest channel



Date: 16.MAY.2016 11:43:41

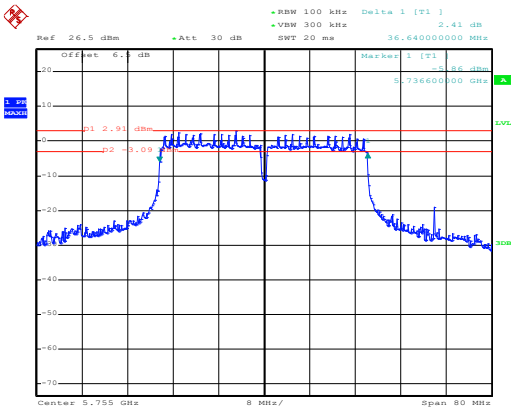
Middle channel



Date: 16.MAY.2016 11:45:54

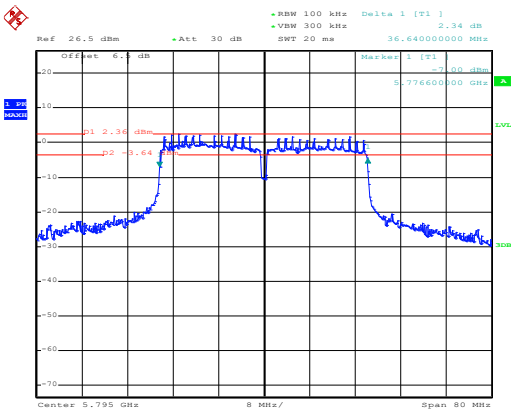
Highest channel

802.11n40



Date: 16.MAY.2016 11:47:57

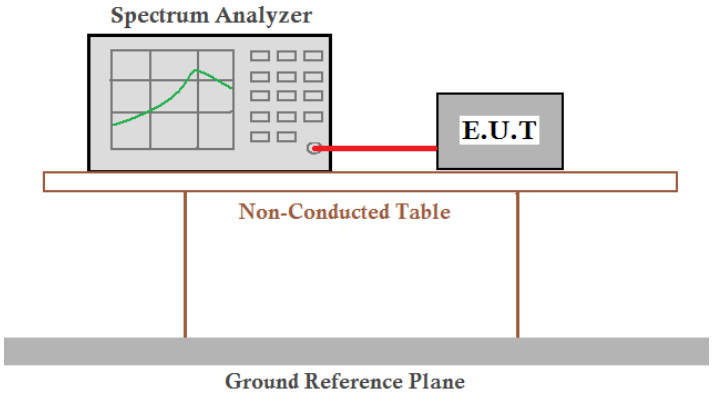
Lowest channel



Date: 16.MAY.2016 11:50:04

Highest channel

6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) &(a) (3)
Test Method:	ANSI C63.10:2013, KDB 789033
Limit:	**Band 1:** 17 dBm/MHz (The maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.); **Band 4:** 30dBm/500kHz (The maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.)
Test setup:	
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Band 1:

Mode	Test Channel	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	9.80	12.63	17.00	Pass
		TX1	9.43			
	Middle	TX0	9.75	12.38	17.00	Pass
		TX1	8.96			
	Highest	TX0	9.58	12.04	17.00	Pass
		TX1	8.39			
802.11n 20	Lowest	TX0	9.84	12.48	17.00	Pass
		TX1	9.07			
	Middle	TX0	9.71	12.28	17.00	Pass
		TX1	8.78			
	Highest	TX0	9.55	12.32	17.00	Pass
		TX1	9.05			
802.11n 40	Lowest	TX0	7.79	10.88	17.00	Pass
		TX1	7.94			
	Highest	TX0	7.03	10.33	17.00	Pass
		TX1	7.60			

Remark:
1. Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.
2. Only 5 dBi antenna used for 5150MHz~5250MHz.
3. The maximum directional Gain of antenna is 5 dBi, so the limit of power spectral density is 17 dBm.

Band 4:

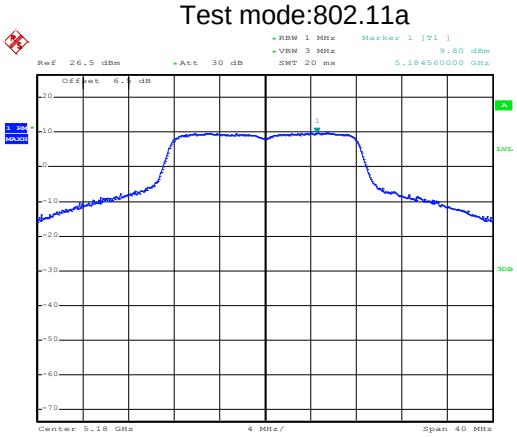
Mode	Test Channel	Ant. Port	PSD (dBm)	Total PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	TX0	14.12	18.26	26.00	Pass
		TX1	16.14			
	Middle	TX0	14.48	15.94	26.00	Pass
		TX1	10.51			
	Highest	TX0	14.42	15.76	26.00	Pass
		TX1	10.01			
802.11n 20	Lowest	TX0	13.84	15.37	26.00	Pass
		TX1	10.10			
	Middle	TX0	13.10	14.61	26.00	Pass
		TX1	9.30			
	Highest	TX0	14.26	15.40	26.00	Pass
		TX1	9.04			
802.11n 40	Lowest	TX0	11.29	12.47	26.00	Pass
		TX1	6.24			
	Highest	TX0	10.87	13.78	26.00	Pass
		TX1	10.67			

Remark:
1. Because the transmit signals are completely uncorrelated, so the Directional gain = G_{ANT}.
2. The maximum directional Gain of antennas is 10 dBi, so the limit of power spectral density is 26 dBm.

Test plot as follows:

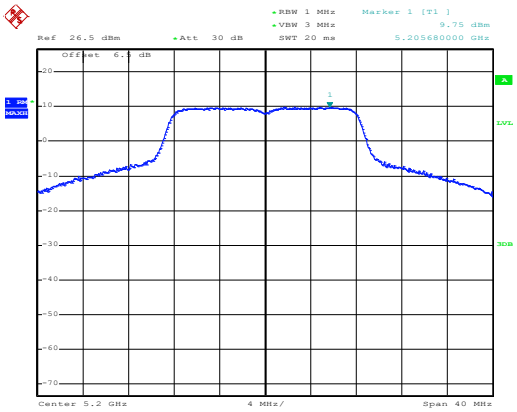
Band 1: TX0

Test mode:802.11a



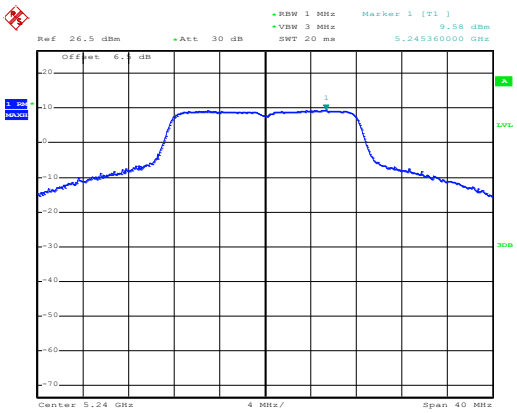
Date: 14.JUL.2016 16:08:16

Lowest channel



Date: 14.JUL.2016 16:10:24

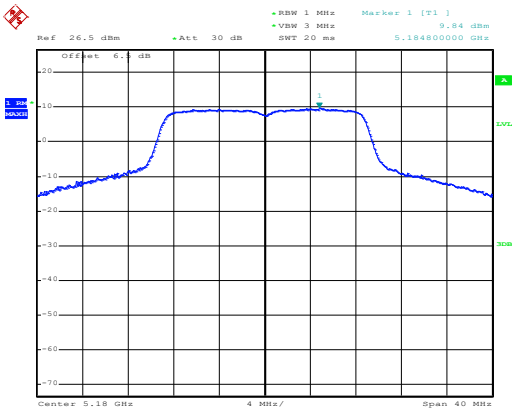
Middle channel



Date: 14.JUL.2016 16:10:50

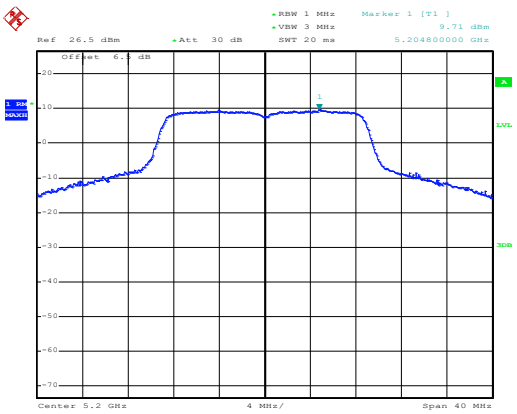
Highest channel

Test mode:802.11n20



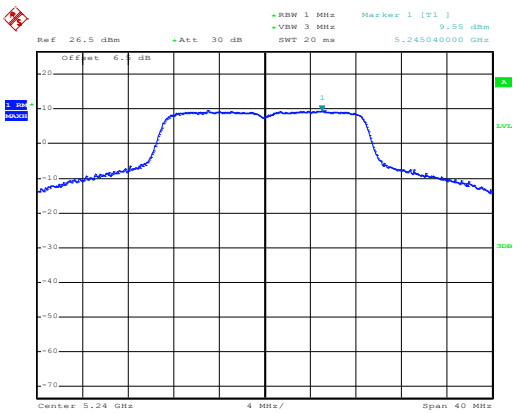
Date: 14.JUL.2016 16:14:24

Lowest channel



Date: 14.JUL.2016 16:13:48

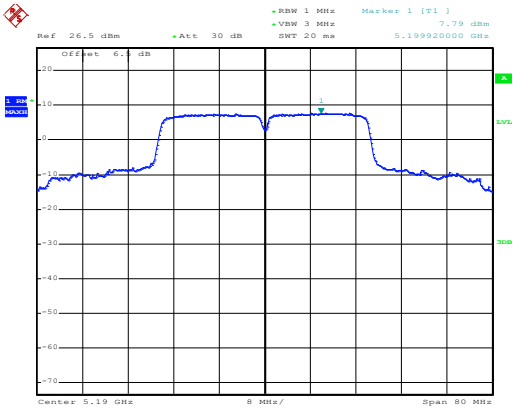
Middle channel



Date: 14.JUL.2016 16:12:49

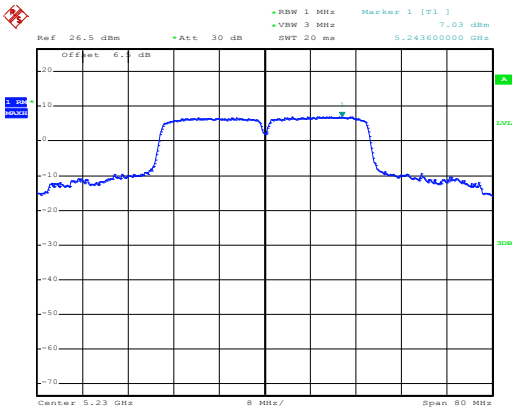
Highest channel

Test mode:802.11n40



Date: 14.JUL.2016 16:17:31

Lowest channel

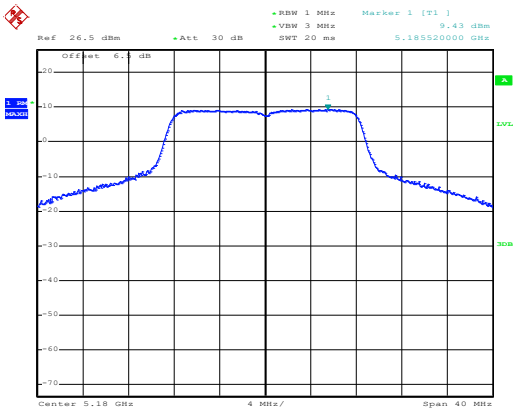


Date: 14.JUL.2016 16:19:07

Highest channel

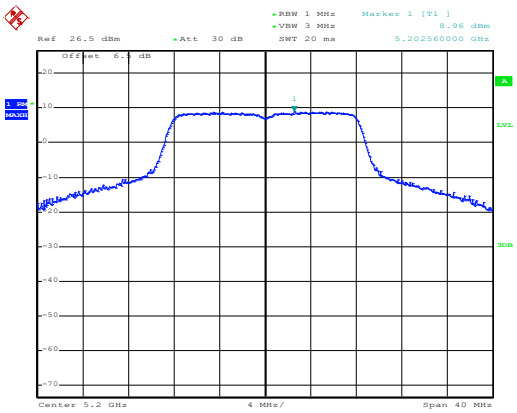
TX1

Test mode:802.11a



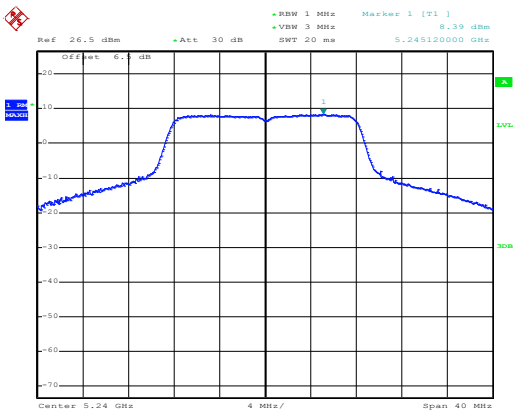
Date: 14.JUL.2016 16:21:17

Lowest channel



Date: 14.JUL.2016 16:23:29

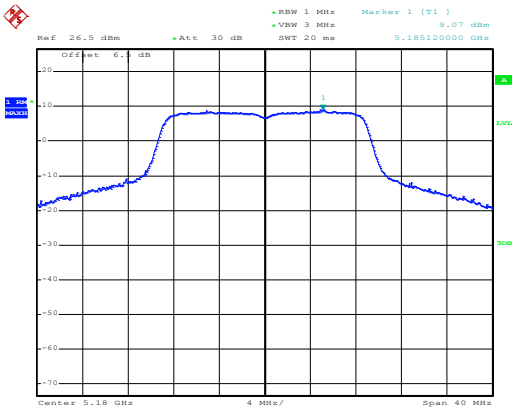
Middle channel



Date: 14.JUL.2016 16:24:40

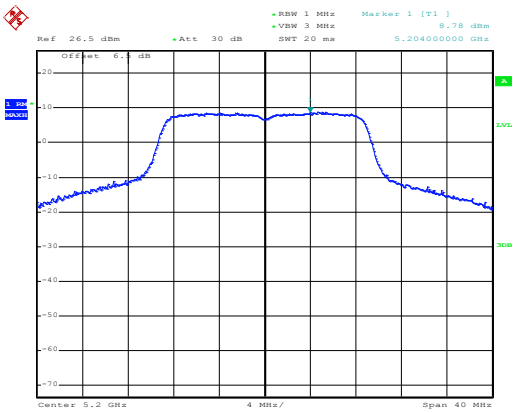
Highest channel

Test mode:802.11n20



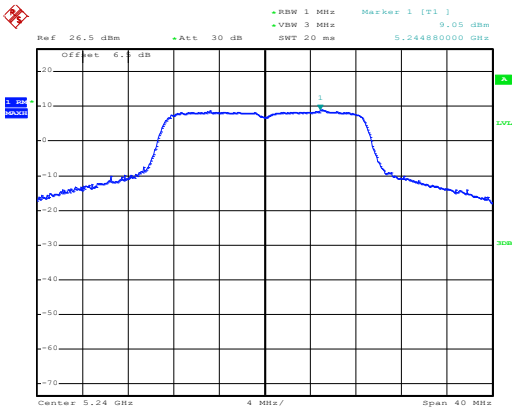
Date: 14.JUL.2016 16:29:32

Lowest channel



Date: 14.JUL.2016 16:28:13

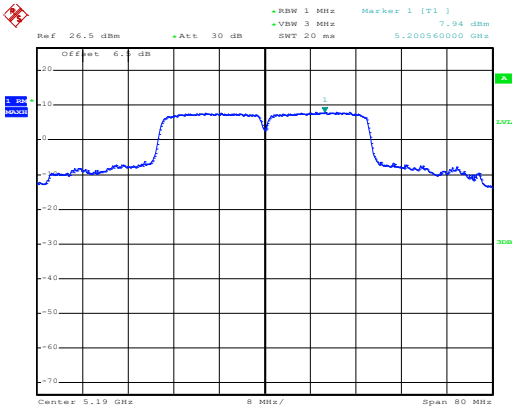
Middle channel



Date: 14.JUL.2016 16:26:50

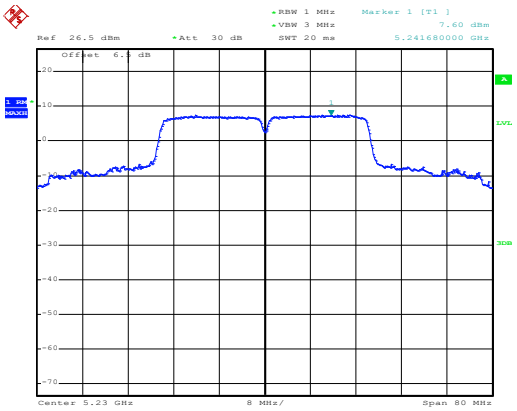
Highest channel

Test mode:802.11n40



Date: 14.JUL.2016 16:32:59

Lowest channel

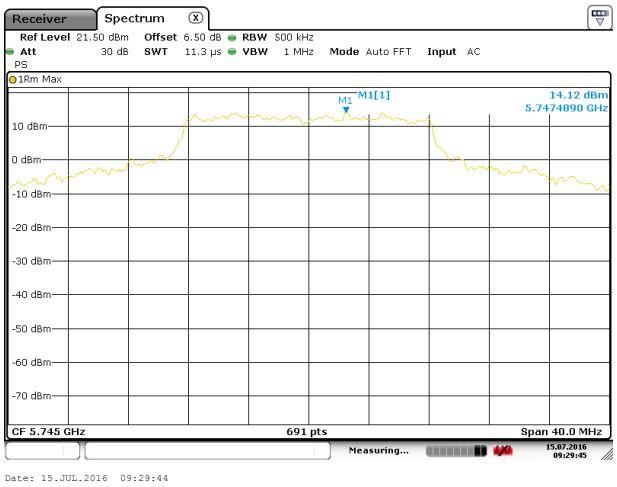


Date: 14.JUL.2016 16:32:30

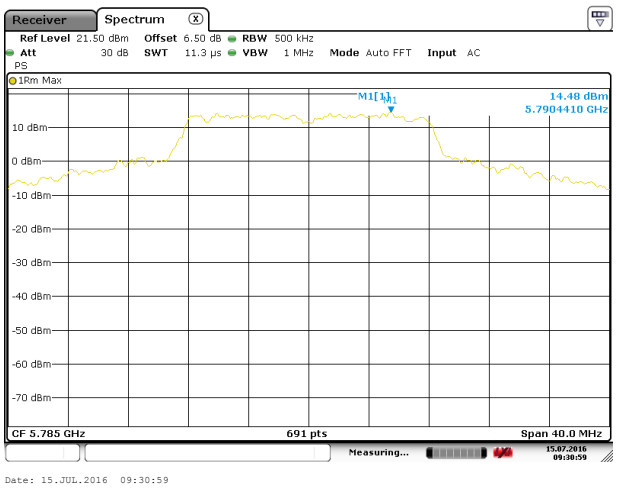
Highest channel

Band 4: TX0

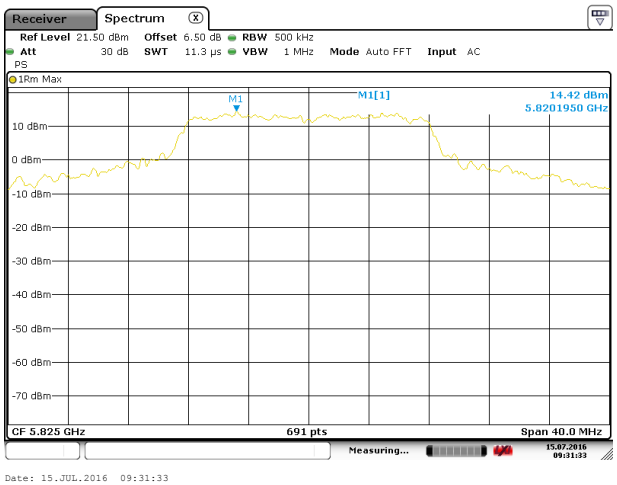
Test mode:802.11a



Lowest channel

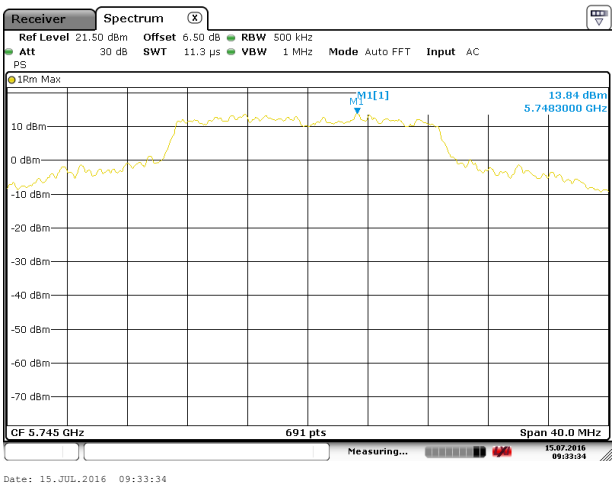


Middle channel

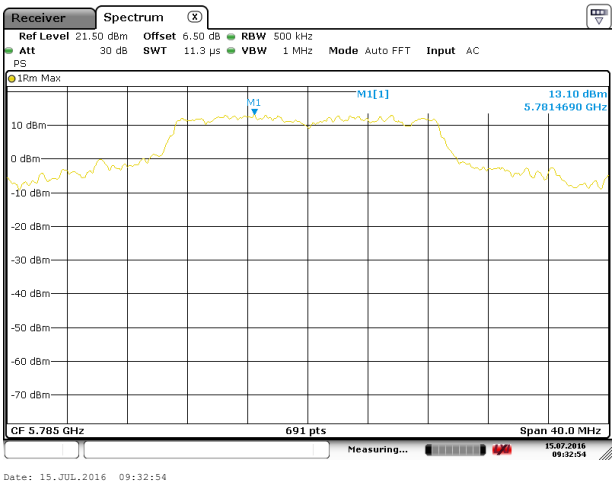


Highest channel

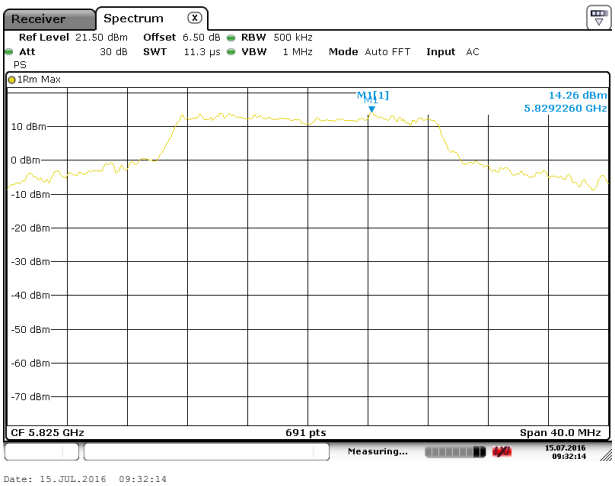
Test mode:802.11n20



Lowest channel

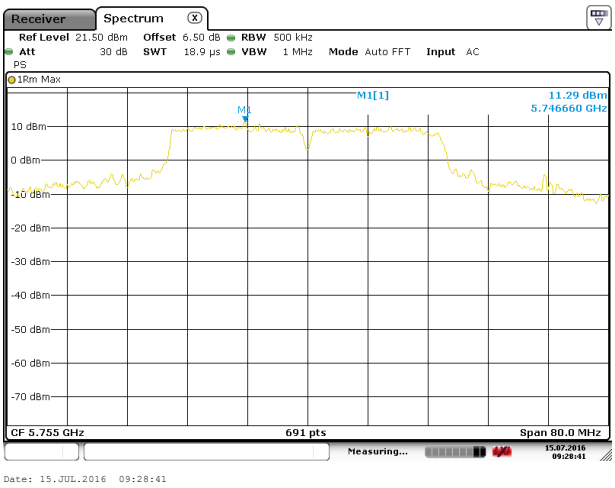


Middle channel

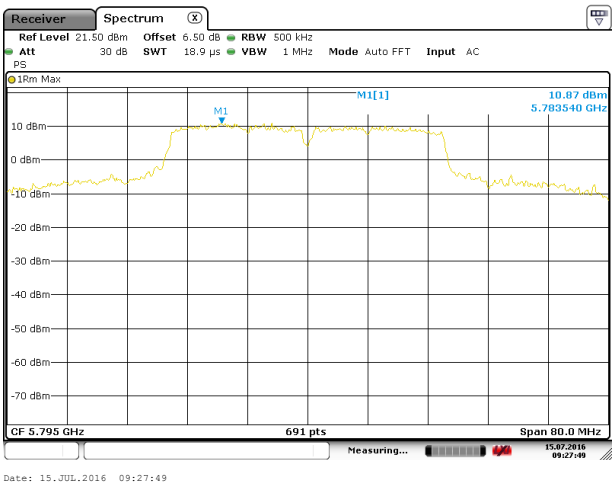


Highest channel

Test mode:802.11n40



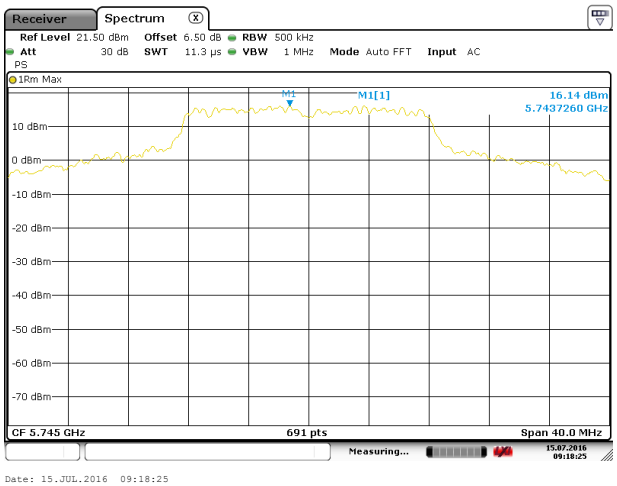
Lowest channel



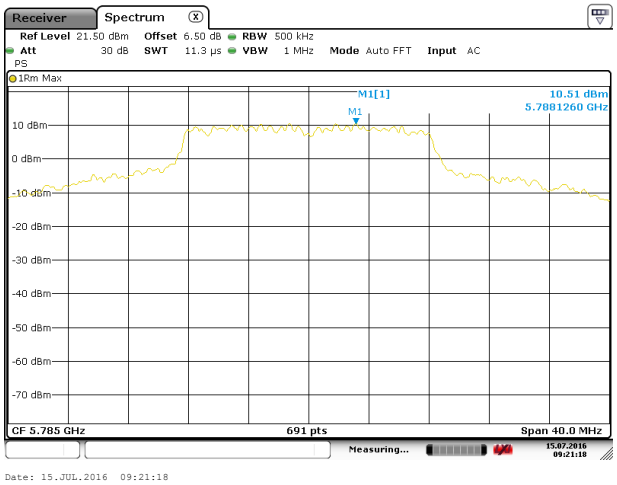
Highest channel

TX1

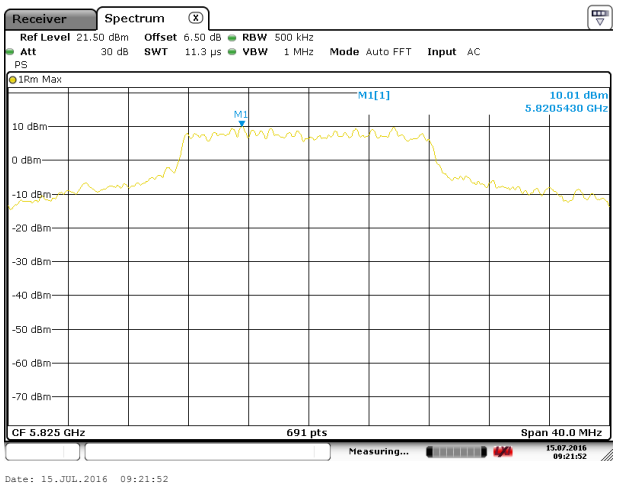
Test mode:802.11a



Lowest channel

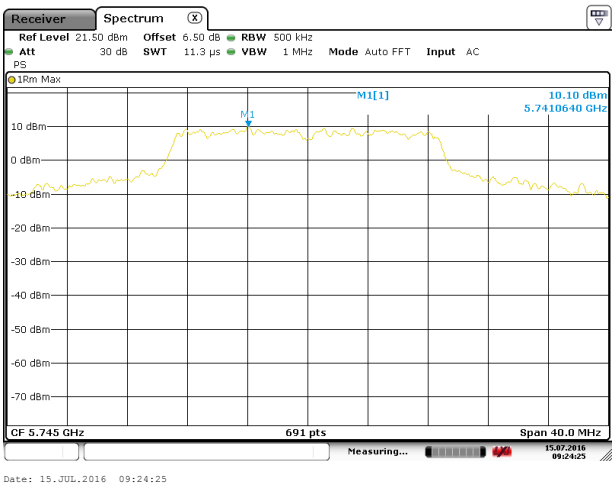


Middle channel

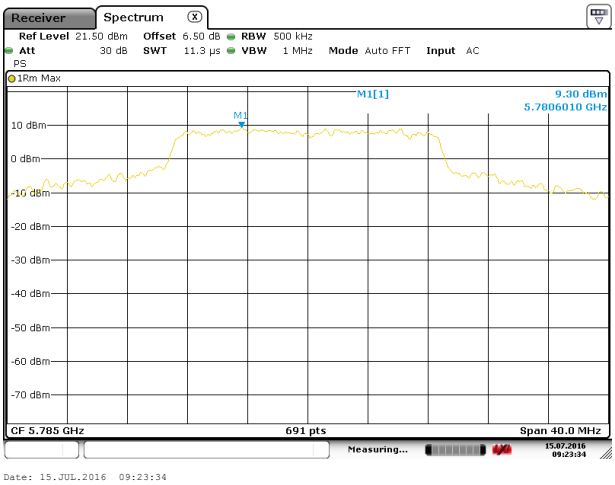


Highest channel

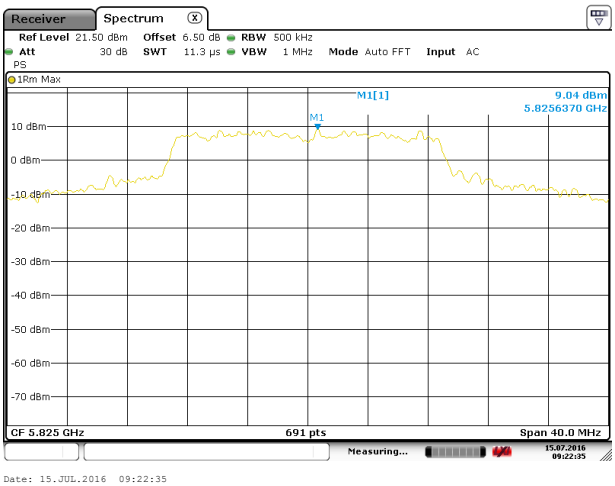
Test mode:802.11n20



Lowest channel

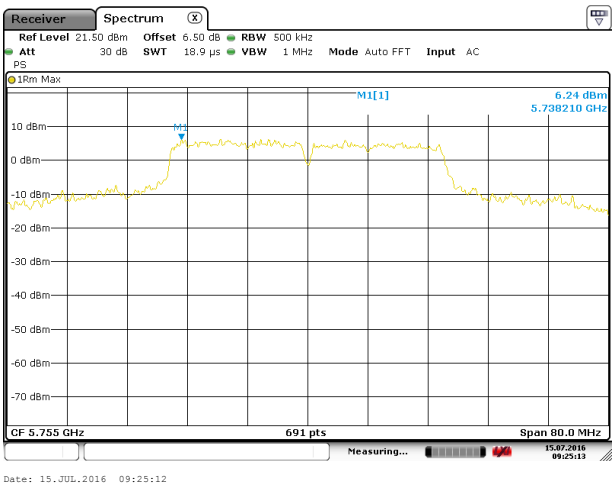


Middle channel

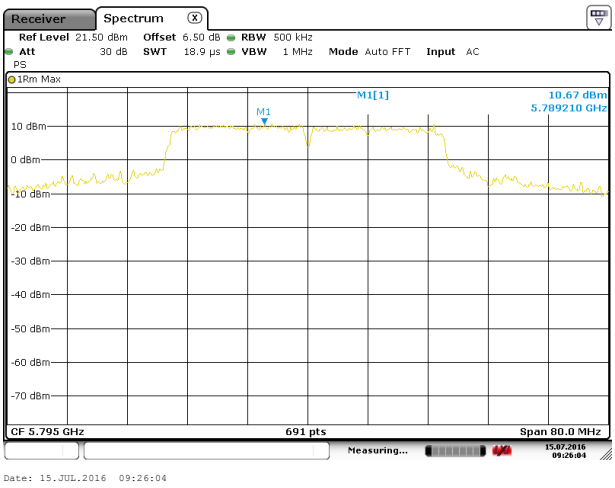


Highest channel

Test mode:802.11n40

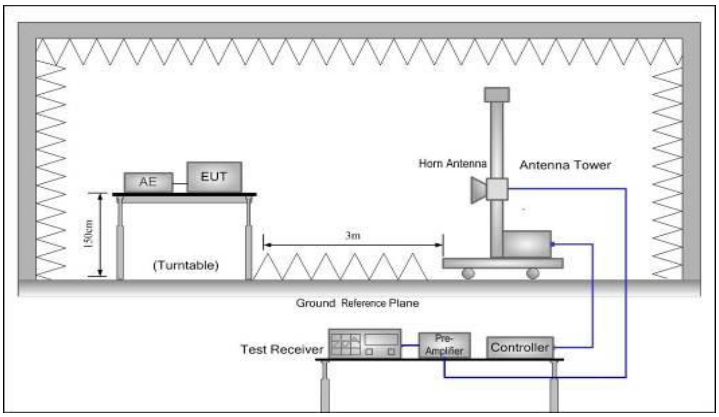


Lowest channel



Highest channel

6.6 Band Edge

<table>
<tr><td>Test Requirement:</td><td colspan="4">FCC Part15 E Section 15.407 (b)</td></tr>
<tr><td>Test Method:</td><td colspan="4">ANSI C63.10:2013 , KDB 789033</td></tr>
<tr><td>Receiver setup:</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td></td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td></td><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td>Limit:</td><td colspan="4"><table>
<tr><td>Band</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td rowspan="2">Band 1</td><td>68.20</td><td>Peak Value</td></tr>
<tr><td>54.00</td><td>Average Value</td></tr>
<tr><td rowspan="2">Band 4</td><td>78.20</td><td>Peak Value</td></tr>
<tr><td>54.00</td><td>Average Value</td></tr>
</table></td></tr>
<tr><td></td><td colspan="4">Remark:
1. Band 1 limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.
2. Band 4 limit:
E[dBμV/m] = EIRP[dBm] + 95.2=78.2 dBuV/m, for EIPR[dBm]=-17dBm.</td></tr>
<tr><td>Test Procedure:</td><td colspan="4">1. The EUT was placed on the top of a rotating table 1.5 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td colspan="4"> 
</td></tr>
<tr><td>Test Instruments:</td><td colspan="4">Refer to section 5.8 for details</td></tr>
<tr><td>Test mode:</td><td colspan="4">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="4">Passed</td></tr>
</table>

MIMO TX mode

Band 1:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	43.58	36.23	10.96	40.06	50.71	68.20	-17.49	Horizontal
5150.00	43.67	36.23	10.96	40.06	50.80	68.20	-17.40	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	35.14	36.23	10.96	40.06	42.27	54.00	-11.73	Horizontal
5150.00	34.75	36.23	10.96	40.06	41.88	54.00	-12.12	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	43.66	35.37	11.19	40.18	50.04	68.20	-18.16	Horizontal
5350.00	44.13	35.37	11.19	40.18	50.51	68.20	-17.69	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	33.67	35.37	11.19	40.18	40.05	54.00	-13.95	Horizontal
5350.00	35.68	35.37	11.19	40.18	42.06	54.00	-11.94	Vertical

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	44.37	36.23	10.96	40.06	51.50	68.20	-16.70	Horizontal
5150.00	43.24	36.23	10.96	40.06	50.37	68.20	-17.83	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	35.71	36.23	10.96	40.06	42.84	54.00	-11.16	Horizontal
5150.00	35.03	36.23	10.96	40.06	42.16	54.00	-11.84	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	45.63	35.37	11.19	40.18	52.01	68.20	-16.19	Horizontal
5350.00	44.17	35.37	11.19	40.18	50.55	68.20	-17.65	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.22	35.37	11.19	40.18	41.60	54.00	-12.40	Horizontal
5350.00	35.12	35.37	11.19	40.18	41.50	54.00	-12.50	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	44.33	36.23	10.96	40.06	51.46	68.20	-16.74	Horizontal
5150.00	45.21	36.23	10.96	40.06	52.34	68.20	-15.86	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	35.71	36.23	10.96	40.06	42.84	54.00	-11.16	Horizontal
5150.00	35.04	36.23	10.96	40.06	42.17	54.00	-11.83	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	45.21	35.37	11.19	40.18	51.59	68.20	-16.61	Horizontal
5350.00	45.06	35.37	11.19	40.18	51.44	68.20	-16.76	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.21	35.37	11.19	40.18	41.59	54.00	-12.41	Horizontal
5350.00	33.91	35.37	11.19	40.18	40.29	54.00	-13.71	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Band 4:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	44.63	34.65	11.62	40.54	50.36	78.20	-27.84	Horizontal
5725.00	45.22	34.65	11.62	40.54	50.95	78.20	-27.25	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	35.26	34.65	11.62	40.54	40.99	54.00	-13.01	Horizontal
5725.00	34.21	34.65	11.62	40.54	39.94	54.00	-14.06	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	44.84	34.63	11.75	40.69	50.53	78.20	-27.67	Horizontal
5850.00	44.36	34.63	11.75	40.69	50.05	78.20	-28.15	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	35.08	34.63	11.75	40.69	40.77	54.00	-13.23	Horizontal
5850.00	35.21	34.63	11.75	40.69	40.90	54.00	-13.10	Vertical

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.15	34.65	11.62	40.54	50.88	78.20	-27.32	Horizontal
5725.00	44.67	34.65	11.62	40.54	50.40	78.20	-27.80	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	35.29	34.65	11.62	40.54	41.02	54.00	-12.98	Horizontal
5725.00	34.42	34.65	11.62	40.54	40.15	54.00	-13.85	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	45.71	34.63	11.75	40.69	51.40	78.20	-26.80	Horizontal
5850.00	44.26	34.63	11.75	40.69	49.95	78.20	-28.25	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	35.31	34.63	11.75	40.69	41.00	54.00	-13.00	Horizontal
5850.00	34.79	34.63	11.75	40.69	40.48	54.00	-13.52	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

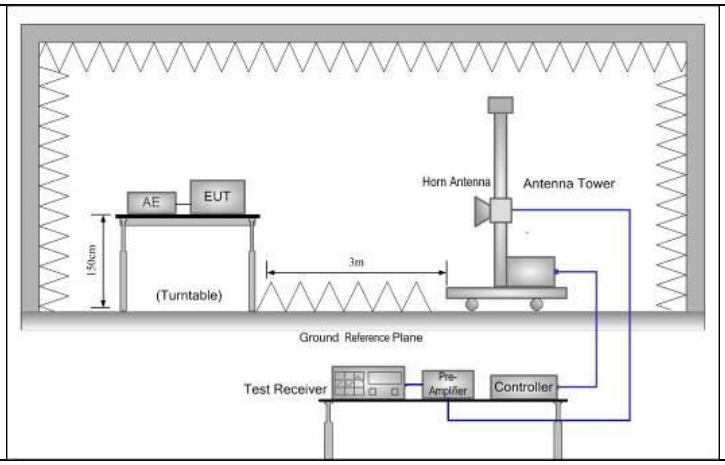
802.11n-HT40								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	45.22	34.65	11.62	40.54	50.95	78.20	-27.25	Horizontal
5725.00	44.27	34.65	11.62	40.54	50.00	78.20	-28.20	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	35.91	34.65	11.62	40.54	41.64	54.00	-12.36	Horizontal
5725.00	35.16	34.65	11.62	40.54	40.89	54.00	-13.11	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	45.21	34.63	11.75	40.69	50.90	78.20	-27.30	Horizontal
5850.00	45.09	34.63	11.75	40.69	50.78	78.20	-27.42	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	35.59	34.63	11.75	40.69	41.28	54.00	-12.72	Horizontal
5850.00	34.21	34.63	11.75	40.69	39.90	54.00	-14.10	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.7 Spurious Emission

6.7.1 Restricted Band

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 E Section 15.407(b)</td></tr>
<tr><td>Test Method:</td><td colspan="5">ANSI C63.10: 2013</td></tr>
<tr><td>TestFrequencyRange:</td><td colspan="5">Band 1: 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz
Band 4: 5.35 GHz to 5.46 GHz</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td>Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">68.20</td><td>Peak Value</td></tr>
<tr><td colspan="2">54.00</td><td>Average Value</td></tr>
<tr><td></td><td colspan="5">Remark:
1. Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m,for EIPR[dBm]=-27dBm</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 1.5 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.</td></tr>
<tr><td>Test setup:</td><td colspan="5"> 
</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 5.8 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Refer to section 5.3 for details</td></tr>
<tr><td>Test results:</td><td colspan="5">Passed</td></tr>
</table>

MIMO TX mode

Band 1:

802.11a

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	45.79	34.50	10.22	40.67	49.84	68.20	-18.36	Horizontal
4500.00	45.63	34.50	10.22	40.67	49.68	68.20	-18.52	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	34.27	34.50	10.22	40.67	38.32	54.00	-15.68	Horizontal
4500.00	34.42	34.50	10.22	40.67	38.47	54.00	-15.53	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	44.62	34.90	11.32	40.23	50.61	68.20	-17.59	Horizontal
5460.00	45.51	34.90	11.32	40.23	51.50	68.20	-16.70	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	34.71	34.90	11.32	40.23	40.70	54.00	-13.30	Horizontal
5460.00	34.26	34.90	11.32	40.23	40.25	54.00	-13.75	Vertical

802.11n-HT20

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	45.21	34.50	10.22	40.67	49.26	68.20	-18.94	Horizontal
4500.00	44.74	34.50	10.22	40.67	48.79	68.20	-19.41	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	34.91	34.50	10.22	40.67	38.96	54.00	-15.04	Horizontal
4500.00	35.56	34.50	10.22	40.67	39.61	54.00	-14.39	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	44.71	34.90	11.32	40.23	50.70	68.20	-17.50	Horizontal
5460.00	45.62	34.90	11.32	40.23	51.61	68.20	-16.59	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	35.21	34.90	11.32	40.23	41.20	54.00	-12.80	Horizontal
5460.00	35.79	34.90	11.32	40.23	41.78	54.00	-12.22	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	45.33	34.50	10.22	40.67	49.38	68.20	-18.82	Horizontal
4500.00	44.21	34.50	10.22	40.67	48.26	68.20	-19.94	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	34.91	34.50	10.22	40.67	38.96	54.00	-15.04	Horizontal
4500.00	35.08	34.50	10.22	40.67	39.13	54.00	-14.87	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	44.61	34.90	11.32	40.23	50.60	68.20	-17.60	Horizontal
5460.00	45.21	34.90	11.32	40.23	51.20	68.20	-17.00	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	35.73	34.90	11.32	40.23	41.72	54.00	-12.28	Horizontal
5460.00	34.32	34.90	11.32	40.23	40.31	54.00	-13.69	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Band 4:

802.11a

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	45.82	35.37	11.19	40.18	52.20	68.20	-16.00	Horizontal
5350.00	44.53	35.37	11.19	40.18	50.91	68.20	-17.29	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.22	35.37	11.19	40.18	41.60	54.00	-12.40	Horizontal
5350.00	34.61	35.37	11.19	40.18	40.99	54.00	-13.01	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	45.76	34.90	11.32	40.23	51.75	68.20	-16.45	Horizontal
5460.00	44.37	34.90	11.32	40.23	50.36	68.20	-17.84	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	35.22	34.90	11.32	40.23	41.21	54.00	-12.79	Horizontal
5460.00	35.71	34.90	11.32	40.23	41.70	54.00	-12.30	Vertical

802.11n-HT20

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	45.81	35.37	11.19	40.18	52.19	68.20	-16.01	Horizontal
5350.00	45.23	35.37	11.19	40.18	51.61	68.20	-16.59	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.62	35.37	11.19	40.18	42.00	54.00	-12.00	Horizontal
5350.00	35.14	35.37	11.19	40.18	41.52	54.00	-12.48	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	45.32	34.90	11.32	40.23	51.31	68.20	-16.89	Horizontal
5460.00	46.11	34.90	11.32	40.23	52.10	68.20	-16.10	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	35.42	34.90	11.32	40.23	41.41	54.00	-12.59	Horizontal
5460.00	34.71	34.90	11.32	40.23	40.70	54.00	-13.30	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n-HT40

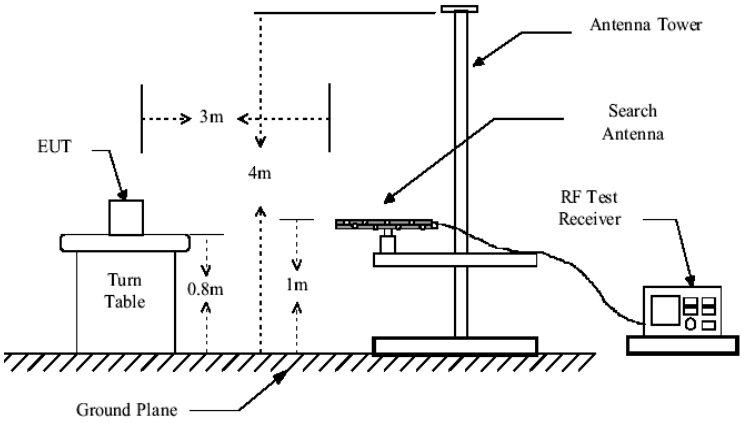
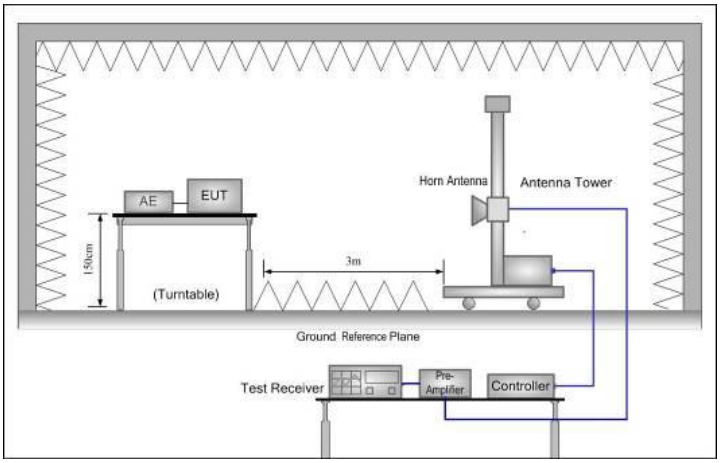
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	45.88	35.37	11.19	40.18	52.26	68.20	-15.94	Horizontal
5350.00	45.62	35.37	11.19	40.18	52.00	68.20	-16.20	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	35.71	35.37	11.19	40.18	42.09	54.00	-11.91	Horizontal
5350.00	34.62	35.37	11.19	40.18	41.00	54.00	-13.00	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	45.12	34.90	11.32	40.23	51.11	68.20	-17.09	Horizontal
5460.00	44.76	34.90	11.32	40.23	50.75	68.20	-17.45	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	35.42	34.90	11.32	40.23	41.41	54.00	-12.59	Horizontal
5460.00	35.24	34.90	11.32	40.23	41.23	54.00	-12.77	Vertical

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.7.2 Unwanted Emissions out of the Restricted Bands

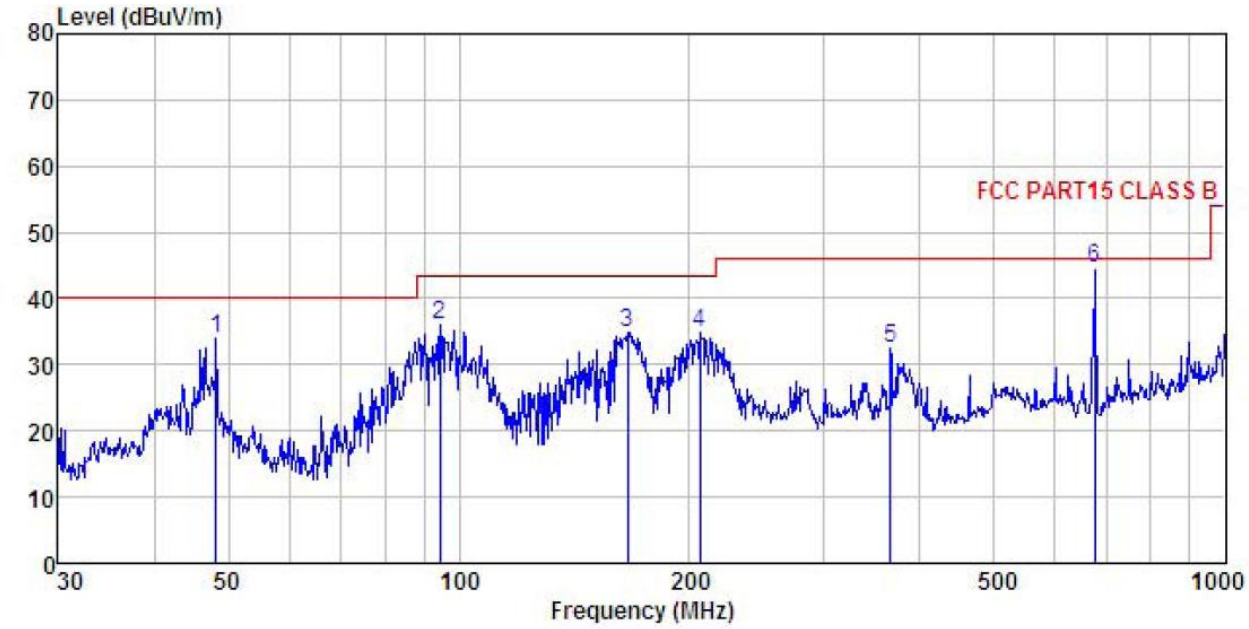
<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td colspan="5">ANSI C63.10:2013</td></tr>
<tr><td>TestFrequencyRange:</td><td colspan="5">30MHz to 40GHz</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m</td></tr>
<tr><td rowspan="4">Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td rowspan="11">Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2">30MHz-88MHz</td><td colspan="2">40.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">88MHz-216MHz</td><td colspan="2">43.5</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">216MHz-960MHz</td><td colspan="2">46.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">960MHz-1GHz</td><td colspan="2">54.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">Frequency</td><td colspan="2">Limit (dBm/MHz)</td><td>Remark</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">68.20</td><td>Peak Value</td></tr>
<tr><td colspan="2">54.00</td><td>Average Value</td></tr>
<tr><td colspan="5">Remark:
1. Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m,for EIPR[dBm]=-27dBm.</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

MIMO TX mode

Below 1GHz

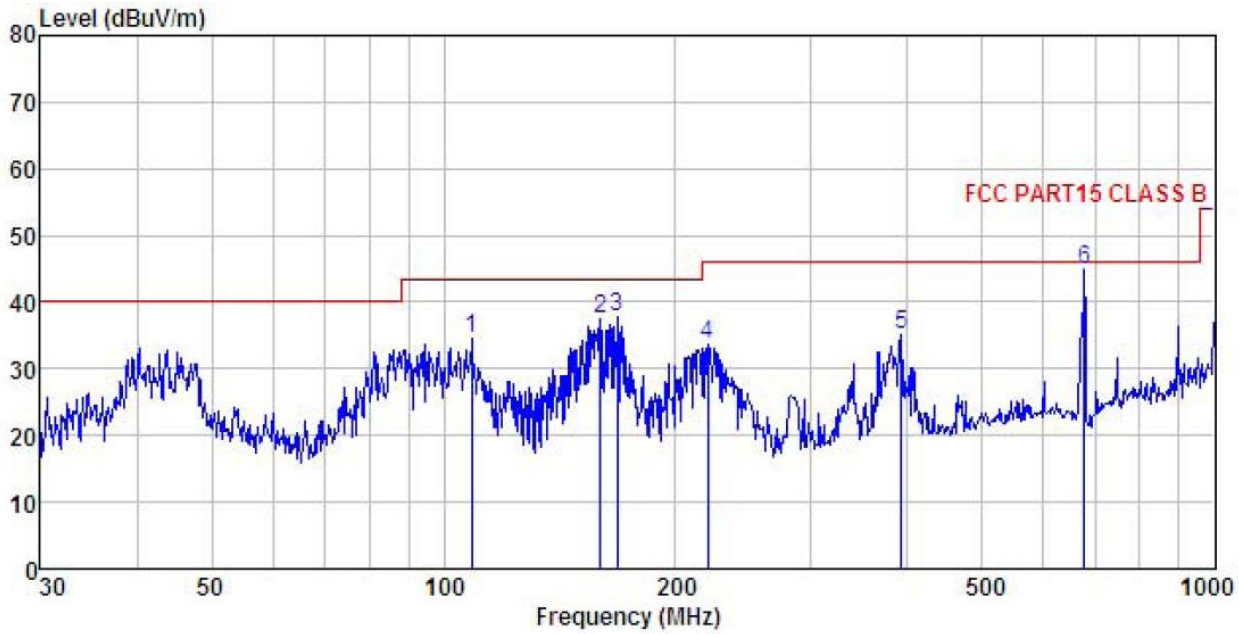
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL
Pro : 5011
EUT : Broadband Digital Transmission System
Model : Rambutan
Test mode : TX mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5'C Huni:55%
Test Engineer: MT
REMARK : 5G WiFi(10dBi ant)

	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	48.163	46.53	16.00	1.27	29.83	33.97	40.00	-6.03	QP
2	94.428	55.04	8.56	2.01	29.55	36.06	43.50	-7.44	QP
3	166.068	51.40	9.84	2.63	29.08	34.79	43.50	-8.71	QP
4	206.398	50.23	10.52	2.86	28.79	34.82	43.50	-8.68	QP
5	365.539	43.30	14.72	3.09	28.63	32.48	46.00	-13.52	QP
6	675.208	50.24	19.00	4.02	28.72	44.54	46.00	-1.46	QP

Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL
Pro : 5011
EUT : Broadband Digital Transmission System
Model : Rambutan
Test mode : TX mode
Power Rating : AC120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: MT
REMARK : 5G WiFi(10dBi ant)

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	108.647	51.56	10.42	2.03	29.47	34.54	43.50	-8.96	QP
2	159.784	54.20	9.90	2.59	29.13	37.56	43.50	-5.94	QP
3	167.824	54.51	9.82	2.64	29.07	37.90	43.50	-5.60	QP
4	219.845	48.14	11.42	2.85	28.71	33.70	46.00	-12.30	QP
5	392.095	45.08	15.65	3.08	28.75	35.06	46.00	-10.94	QP
6	677.580	50.47	19.02	4.04	28.72	44.81	46.00	-1.19	QP

Above 1GHz

Band 1:

802.11a mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	41.34	40.10	15.37	41.34	55.47	68.20	-12.73	Vertical
10360.00	42.05	40.10	15.37	41.34	56.18	68.20	-12.02	Horizontal
802.11a mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	31.89	40.10	15.37	41.34	46.02	54.00	-7.98	Vertical
10360.00	32.47	40.10	15.37	41.34	46.60	54.00	-7.40	Horizontal
802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	41.58	40.00	15.42	41.27	55.73	68.20	-12.47	Vertical
10400.00	41.66	40.00	15.42	41.27	55.81	68.20	-12.39	Horizontal
802.11a mode Middle channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.25	40.00	15.42	41.27	46.40	54.00	-7.60	Vertical
10400.00	31.74	40.00	15.42	41.27	45.89	54.00	-8.11	Horizontal
802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	40.86	39.70	15.55	41.10	55.01	68.20	-13.19	Vertical
10480.00	40.72	39.70	15.55	41.10	54.87	68.20	-13.33	Horizontal
802.11a mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	30.69	39.70	15.55	41.10	44.84	54.00	-9.16	Vertical
10480.00	31.03	39.70	15.55	41.10	45.18	54.00	-8.82	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	41.68	40.10	15.37	41.34	55.81	68.20	-12.39	Vertical
10360.00	40.73	40.10	15.37	41.34	54.86	68.20	-13.34	Horizontal
802.11n20 mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	32.01	40.10	15.37	41.34	46.14	54.00	-7.86	Vertical
10360.00	31.87	40.10	15.37	41.34	46.00	54.00	-8.00	Horizontal
802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	42.28	40.00	15.42	41.27	56.43	68.20	-11.77	Vertical
10400.00	40.58	40.00	15.42	41.27	54.73	68.20	-13.47	Horizontal
802.11n20 mode Middle channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.37	40.00	15.42	41.27	46.52	54.00	-7.48	Vertical
10400.00	30.18	40.00	15.42	41.27	44.33	54.00	-9.67	Horizontal
802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	41.89	39.70	15.55	41.10	56.04	68.20	-12.16	Vertical
10480.00	42.33	39.70	15.55	41.10	56.48	68.20	-11.72	Horizontal
802.11n20 mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.87	39.70	15.55	41.10	46.02	54.00	-7.98	Vertical
10480.00	32.89	39.70	15.55	41.10	47.04	54.00	-6.96	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n40 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	41.05	40.00	15.42	41.31	55.16	68.20	-13.04	Vertical
10380.00	40.63	40.00	15.42	41.31	54.74	68.20	-13.46	Horizontal
802.11n40 mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380.00	32.56	40.00	15.42	41.31	46.67	54.00	-7.33	Vertical
10380.00	31.18	40.00	15.42	41.31	45.29	54.00	-8.71	Horizontal
802.11n40 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	41.26	39.80	15.51	41.17	55.40	68.20	-12.80	Vertical
10460.00	41.53	39.80	15.51	41.17	55.67	68.20	-12.53	Horizontal
802.11n40 mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460.00	31.27	39.80	15.51	41.17	45.41	54.00	-8.59	Vertical
10460.00	31.71	39.80	15.51	41.17	45.85	54.00	-8.15	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Band 4:

802.11a mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	41.72	41.50	16.83	40.75	59.30	68.20	-8.90	Vertical
11490.00	42.03	41.50	16.83	40.75	59.61	68.20	-8.59	Horizontal
802.11a mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	31.86	41.50	16.83	40.75	49.44	54.00	-4.56	Vertical
11490.00	32.41	41.50	16.83	40.75	49.99	54.00	-4.01	Horizontal
802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	41.28	41.38	16.90	40.91	58.65	68.20	-9.55	Vertical
11570.00	40.69	41.38	16.90	40.91	58.06	68.20	-10.14	Horizontal
802.11a mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	32.54	41.38	16.90	40.91	49.91	54.00	-4.09	Vertical
11570.00	31.09	41.38	16.90	40.91	48.46	54.00	-5.54	Horizontal
802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	41.25	41.26	16.97	41.06	58.42	68.20	-9.78	Vertical
11650.00	41.73	41.26	16.97	41.06	58.90	68.20	-9.30	Horizontal
802.11a mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	31.59	41.26	16.97	41.06	48.76	54.00	-5.24	Vertical
11650.00	30.42	41.26	16.97	41.06	47.59	54.00	-6.41	Horizontal

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	41.13	41.50	16.83	40.75	58.71	68.20	-9.49	Vertical
11490.00	40.08	41.50	16.83	40.75	57.66	68.20	-10.54	Horizontal
802.11n20 mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	31.27	41.50	16.83	40.75	48.85	54.00	-5.15	Vertical
11490.00	30.64	41.50	16.83	40.75	48.22	54.00	-5.78	Horizontal
802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	41.92	41.38	16.90	40.91	59.29	68.20	-8.91	Vertical
11570.00	42.11	41.38	16.90	40.91	59.48	68.20	-8.72	Horizontal
802.11n20 mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	31.84	41.38	16.90	40.91	49.21	54.00	-4.79	Vertical
11570.00	32.69	41.38	16.90	40.91	50.06	54.00	-3.94	Horizontal
802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	41.17	41.26	16.97	41.06	58.34	68.20	-9.86	Vertical
11650.00	42.02	41.26	16.97	41.06	59.19	68.20	-9.01	Horizontal
802.11n20 mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	31.06	41.26	16.97	41.06	48.23	54.00	-5.77	Vertical
11650.00	31.28	41.26	16.97	41.06	48.45	54.00	-5.55	Horizontal

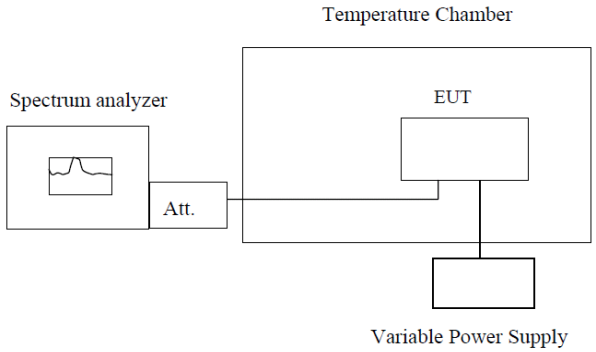
Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

802.11n40 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	41.28	41.50	16.83	40.77	58.84	68.20	-9.36	Vertical
11510.00	40.03	41.50	16.83	40.77	57.59	68.20	-10.61	Horizontal
802.11n40 mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	31.51	41.50	16.83	40.77	49.07	54.00	-4.93	Vertical
11510.00	30.07	41.50	16.83	40.77	47.63	54.00	-6.37	Horizontal
802.11n40 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	41.18	41.32	16.93	40.95	58.48	68.20	-9.72	Vertical
11590.00	40.69	41.32	16.93	40.95	57.99	68.20	-10.21	Horizontal
802.11n40 mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	32.07	41.32	16.93	40.95	49.37	54.00	-4.63	Vertical
11590.00	30.85	41.32	16.93	40.95	48.15	54.00	-5.85	Horizontal

Remark:
1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.8 Frequency stability

Test Requirement:	FCC Part15 E Section 15.407 (g)
Limit:	Manufacturers of U-NII devices are responsible for ensuringfrequency stability such that anemission is maintained within the band of operation under all conditions of normal operation asspecified in the user's manual.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage ofEUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage.Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.
Test results:	Passed

Measurement Data (the worst channel):

Band 1:

Voltage vs. Frequency Stability (Lowest channel=5180MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(dc)		
20	5.75V	5179.989641	2.00
	5.00V	5179.983256	3.23
	4.25V	5179.984712	2.95

Temperature vs. Frequency Stability (Lowest channel=5180MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(dc)	Temp(℃)		
5V	-20	5179.989321	2.06
	-10	5179.984715	2.95
	0	5179.986923	2.52
	10	5179.988794	2.16
	20	5179.981245	3.62
	30	5179.986230	2.66
	40	5179.985490	2.80
	50	5179.983479	3.19

Band 4:

Voltage vs. Frequency Stability (Lowest channel=5745MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(AC /60Hz)		
20	5.75V	5744.987412	2.19
	5.00V	5744.983621	2.85
	4.25V	5744.984197	2.75

Temperature vs. Frequency Stability (Lowest channel=5745MHz)

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(AC /60Hz)	Temp(℃)		
5V	-20	5744.981420	3.23
	-10	5744.983265	2.91
	0	5744.987489	2.18
	10	5744.986521	2.35
	20	5744.986321	2.38
	30	5744.984519	2.69
	40	5744.989546	1.82
	50	5744.984128	2.76