

# **FCC REPORT**

## **(UNII)**

**Applicant:** HUNG WAI PRODUCTS LIMITED

**Address of Applicant:** Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong

**Equipment Under Test (EUT)**

Product Name: Android player Main board with wireless module

Model No.: ASSY-1859ATMBA-V2

**FCC ID:** 2AB6Z-1859ATMBA-V2

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

**Date of sample receipt:** 29 Mar., 2016

**Date of Test:** 2 Apr to 10 May 2016

**Date of report issued:** 11 May, 2016

**Test Result:** PASS\*

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

Authorized Signature:



Bruce Zhang  
Laboratory Manager

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

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

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## 2 Version

Version No.	Date	Description
00	11 May, 2016	Original

Tested by:

  
Test Engineer

Date:

11 May, 2016

Reviewed by:

  
Project Engineer

Date:

11 May, 2016

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## 4 Test Summary

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

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

*Remark: Test according to ANSI C63.4:2009 and ANSI C63.10: 2009*

### 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 General Information

### 5.1 Client Information

Applicant:	HUNG WAI PRODUCTS LIMITED
Address of Applicant:	Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong
Manufacturer/Factory:	HUNG WAI ELECTRONICS (HUIZHOU) LTD
Address of Manufacturer/Factory:	3rd floor, NO. 3, Minfeng Road, Huinan High and New Technology Industry Park, Huiao Avenue, Huizhou City, Guangdong

### 5.2 General Description of E.U.T.

Product Name:	Android player Main board with wireless module
Model No.:	ASSY-1859ATMBA-V2
Operation Frequency:	Band 1: 5180MHz-5240MHz Band 4: 5745MHz-5825MHz
Channel numbers:	Band 1: 802.11a/802.11n20: 4,802.11n40: 2,802.11ac:1 Band 4: 802.11a/802.11n20: 5,802.11n40: 2,802.11ac:1
Channel separation:	802.11a/802.11n20:20MHz, 802.11n40:40MHz, 802.11ac : 80MHz
Modulation technology: (IEEE 802.11a)	BPSK, QPSK, 16-QAM, 64-QAM
Modulation technology: (IEEE 802.11n)	BPSK, QPSK, 16-QAM, 64-QAM
Modulation technology: (IEEE 802.11ac)	BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Data speed(IEEE 802.11a)	6Mbps, 9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps,MCS1:13Mbps,MCS2:19.5Mbps,MCS3:26Mbps, MCS4:39Mbps,MCS5:52Mbps,MCS6:58.5Mbps,MCS7:65Mbps
Data speed (IEEE 802.11n40):	MCS0:15Mbps,MCS1:30Mbps,MCS2:45Mbps,MCS3:60Mbps, MCS4:90Mbps,MCS5:120Mbps,MCS6:135Mbps,MCS7:150Mbps
Data speed (IEEE 802.11ac):	Up to 433.3Mbps
Antenna Type:	External Antenna
Antenna gain:	2 dBi
Power supply:	DC 12V

## Operation Frequency each of channel

Band 1					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	38	5190MHz	42	5210MHz
40	5200MHz	46	5230MHz		
44	5220MHz				
48	5240MHz				
Band 4					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	155	5775MHz
153	5765MHz	159	5795MHz		
157	5785MHz				
161	5805MHz				
165	5825MHz				

### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Band 1					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest channel	5180MHz	Lowest channel	5190MHz	Middle channel	5210MHz
Middle channel	5200MHz	Highest channel	5230MHz		
Highest channel	5240MHz				
Band 4					
802.11a/802.11n20		802.11n40		802.11ac	
Channel	Frequency	Channel	Frequency	Channel	Frequency
Lowest channel	5745MHz	Lowest channel	5755MHz	Middle channel	5775MHz
Middle channel	5785MHz	Highest channel	5795MHz		
Highest channel	5825MHz				

### 5.3 Test environment and mode

<b>Operating Environment:</b>	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
<b>Test mode:</b>	
Continuously transmitting mode	Keep the EUT in 100% duty cycle transmitting with modulation.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

**Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.**

Mode	Data rate
802.11a	6 Mbps
802.11n20	6.5 Mbps
802.11n40	13 Mbps
802.11ac	23.9 Mbps

#### Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 6 Mbps for 802.11a, 6.5 Mbps for 802.11n20, 13 Mbps for 802.11n40 and 29.3Mbps for 802.11ac. All test items for 802.11a, 802.11ac and 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
FLY POWER	Switching Adapter	PS24A120K2000UD	N/A	VoC

### 5.5 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 and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our 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.

## 5.6 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

## 5.7 Test Instruments list

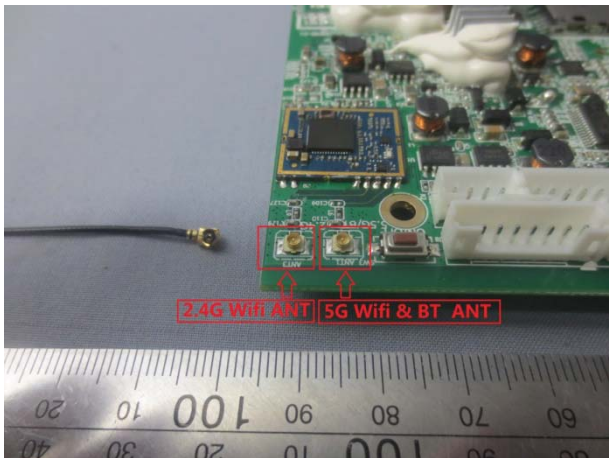

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	03-25-2016	03-25-2017
3	Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	03-25-2016	03-25-2017
4	Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2016	03-31-2017
5	Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2016	03-31-2017
6	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2016	03-31-2017
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2016	03-31-2017
8	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	03-28-2016	03-28-2017
9	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-28-2016	03-28-2017
10	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2016	03-31-2017
11	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	08-23-2014	08-22-2017
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-24-2016	03-24-2017
3	LISN	CHASE	MN2050D	CCIS0074	03-26-2016	03-26-2017
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2016	03-31-2017
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

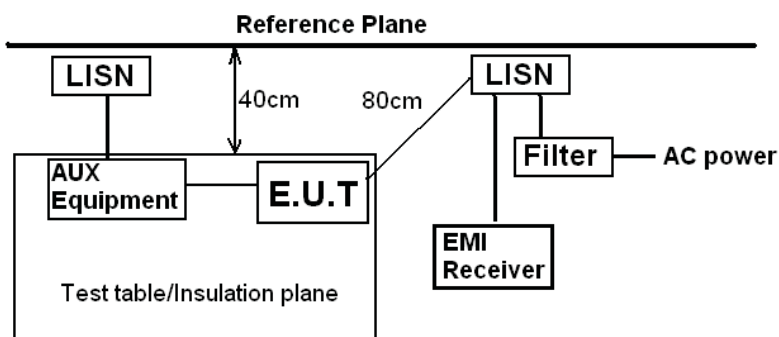


## 6 Test results and Measurement Data

### 6.1 Antenna requirement

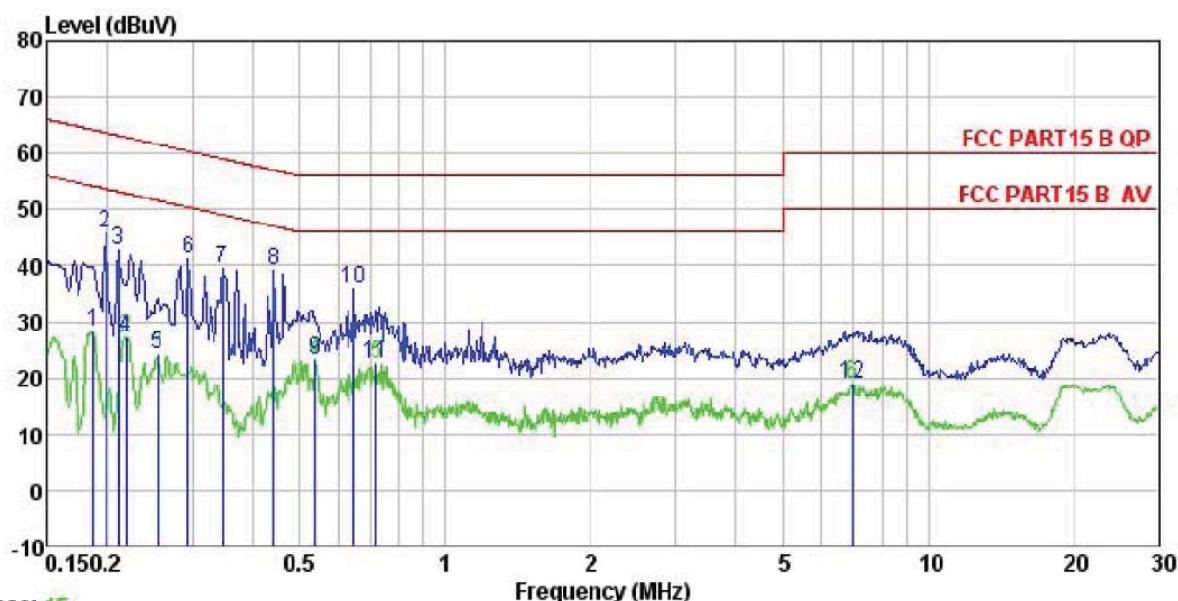
<b>Standard requirement:</b>	FCC Part15 E Section 15.203 /407(a)
<p><b>15.203 requirement:</b></p> <p><i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of 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.</i></p> <p><i>This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</i></p>	
<b>E.U.T Antenna:</b>	
<p><i>The antenna of EUT use reversed polarity non standards antenna port which cannot be replaced by end-user. And the antenna gain is 2 dBi.</i></p>	
<div style="display: flex; justify-content: space-around;">   </div>	

## 6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.10: 2009		
TestFrequencyRange:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	
	0.15-0.5	66 to 56*	0.15-0.5
	0.5-5	56	0.5-5
	5-30	60	5-30
* Decreases with the logarithm of the frequency.			
Test procedure	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>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).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.</li> </ol>		
Test setup:	 <p>Remark:  E.U.T: Equipment Under Test  LISN: Line Impedance Stabilization Network  Test table height=0.8m</p>		
Test Uncertainty:	See Page 4		
Test Instruments:	Refer to section 5.6 for details		
Test mode:	Refer to section 5.3 for details.		
Test results:	Passed		

## Measurement Data:

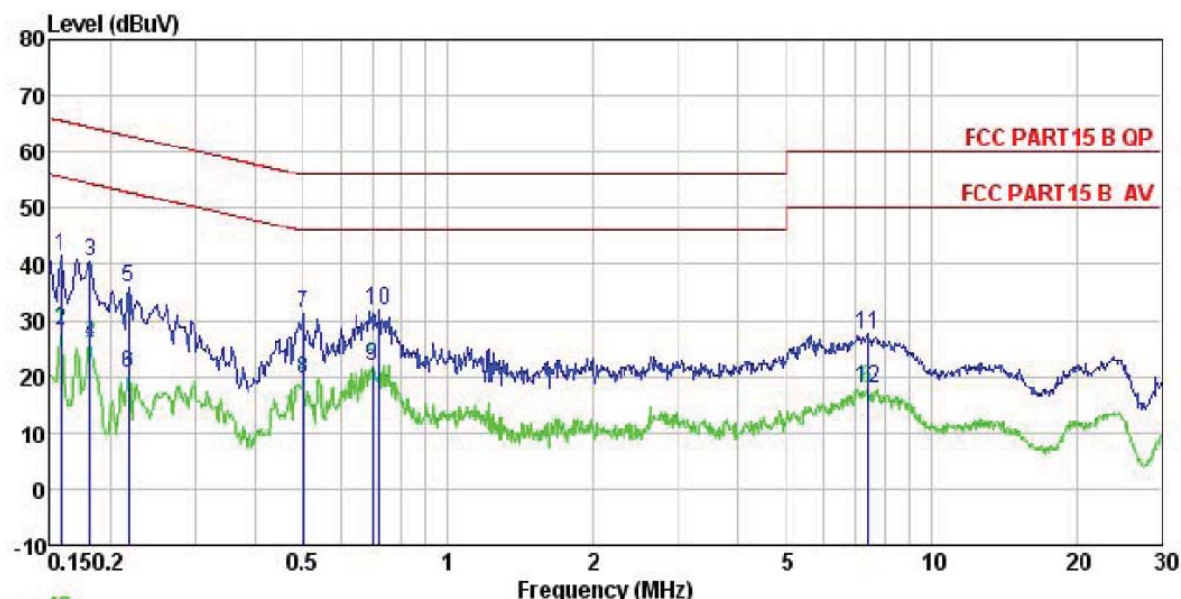
Line:



Site : CCIS Shielding Room  
 Condition : FCC PART15 B QP LISN LINE  
 EUT : Android player Main board with wireless  
 Model : ASSY-1859ATMBA-V2  
 Test Mode : 5G Wifi mode  
 Power Rating : AC 120/60Hz  
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa  
 Test Engineer: MT  
 Remark :

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.186	17.35	0.15	10.76	28.26	54.20	-25.94	Average
2	0.198	35.00	0.15	10.76	45.91	63.71	-17.80	QP
3	0.211	32.05	0.15	10.76	42.96	63.18	-20.22	QP
4	0.219	16.34	0.15	10.76	27.25	52.88	-25.63	Average
5	0.253	13.18	0.16	10.75	24.09	51.64	-27.55	Average
6	0.294	30.41	0.16	10.74	41.31	60.41	-19.10	QP
7	0.346	28.69	0.20	10.73	39.62	59.05	-19.43	QP
8	0.442	28.33	0.24	10.74	39.31	57.02	-17.71	QP
9	0.538	12.07	0.26	10.76	23.09	46.00	-22.91	Average
10	0.647	24.63	0.30	10.77	35.70	56.00	-20.30	QP
11	0.720	11.57	0.32	10.78	22.67	46.00	-23.33	Average
12	6.951	7.81	0.36	10.80	18.97	50.00	-31.03	Average

Neutral:



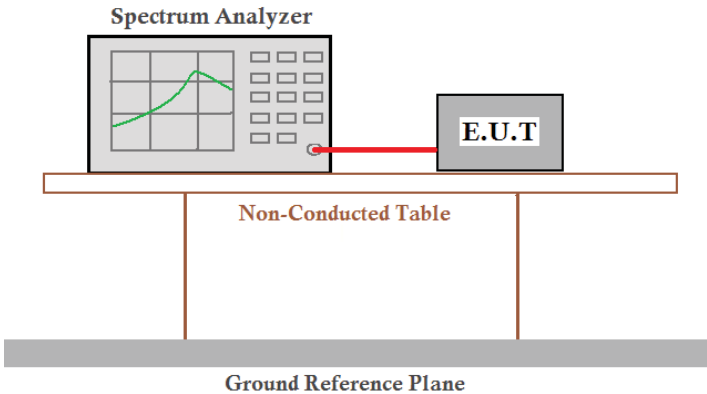
Trace: 13  
 Site : CCIS Shielding Room  
 Condition : FCC PART15 B QP LISN NEUTRAL  
 EUT : Android player Main board with wireless  
 Model : ASSY-1859ATMBA-V2  
 Test Mode : 5G Wifi mode  
 Power Rating : AC 120/60Hz  
 Environment : Temp: 23 °C Humi:56% Atmos:101KPa  
 Test Engineer: MT  
 Remark :

	Read	LISN	Cable	Limit	Over	
Freq	Level	Factor	Loss	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dB	
1	0.158	30.68	0.13	10.78	41.59	65.56 -23.97 QP
2	0.158	17.13	0.13	10.78	28.04	55.56 -27.52 Average
3	0.182	29.56	0.14	10.77	40.47	64.42 -23.95 QP
4	0.182	15.10	0.14	10.77	26.01	54.42 -28.41 Average
5	0.219	24.78	0.16	10.76	35.70	62.88 -27.18 QP
6	0.219	9.74	0.16	10.76	20.66	52.88 -32.22 Average
7	0.502	20.04	0.24	10.76	31.04	56.00 -24.96 QP
8	0.502	8.71	0.24	10.76	19.71	46.00 -26.29 Average
9	0.697	10.79	0.33	10.77	21.89	46.00 -24.11 Average
10	0.720	20.79	0.33	10.78	31.90	56.00 -24.10 QP
11	7.407	16.27	0.31	10.82	27.40	60.00 -32.60 QP
12	7.407	6.70	0.31	10.82	17.83	50.00 -32.17 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

## 6.3 Conducted Output Power

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) & (a) (3)
Test Method:	ANSI C63.10: 2009, KDB789033
Limit:	Band 1: 24dBm Band 4: 30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a green trace on its screen, is connected to an E.U.T. (Equipment Under Test) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a 'Non-Conducted Table'. This table is supported by two vertical legs and rests on a 'Ground Reference Plane', which is represented by a thick grey horizontal bar at the bottom of the setup.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data:**

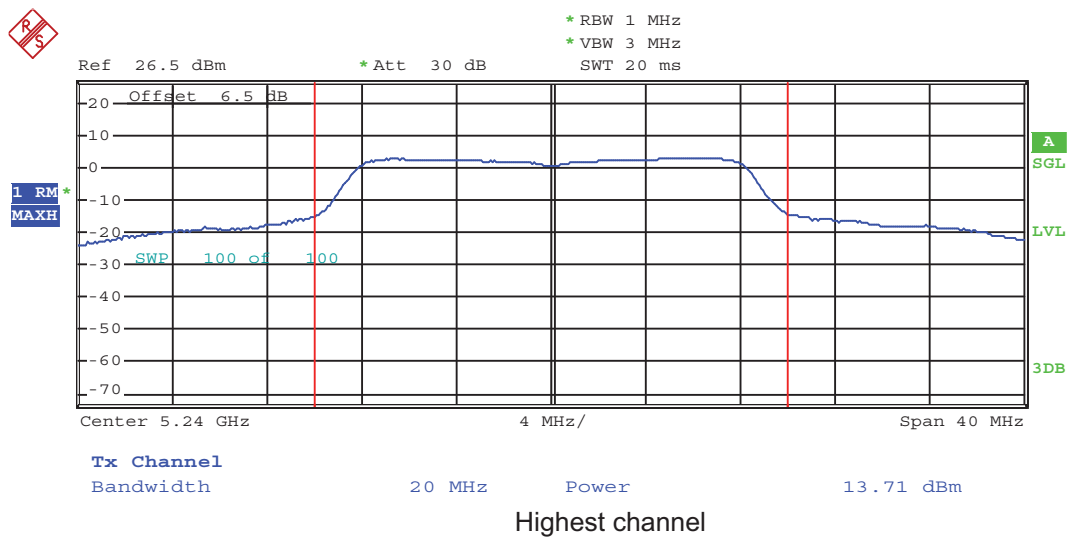
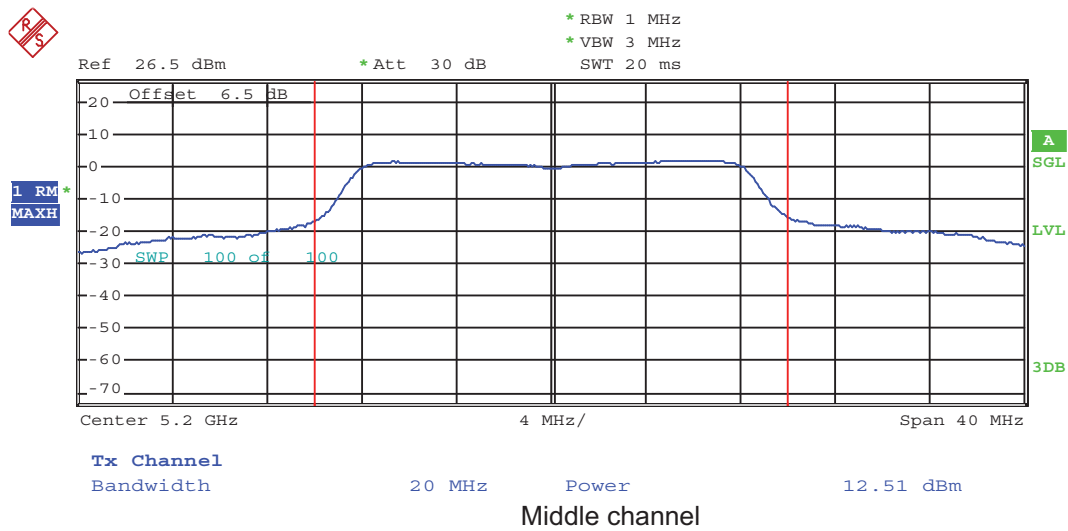
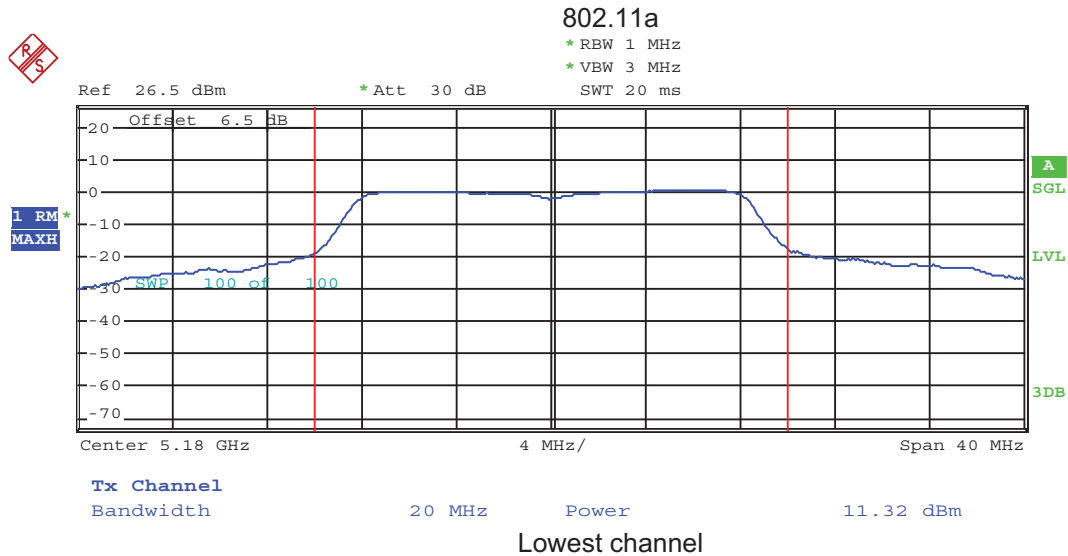
Band 1				
Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	11.32	24.00	Pass
	Middle	12.51	24.00	Pass
	Highest	13.71	24.00	Pass
802.11n20	Lowest	11.01	24.00	Pass
	Middle	11.94	24.00	Pass
	Highest	12.61	24.00	Pass
802.11n40	Lowest	11.27	24.00	Pass
	Highest	12.32	24.00	Pass
802.11ac	Middle	11.28	24.00	Pass

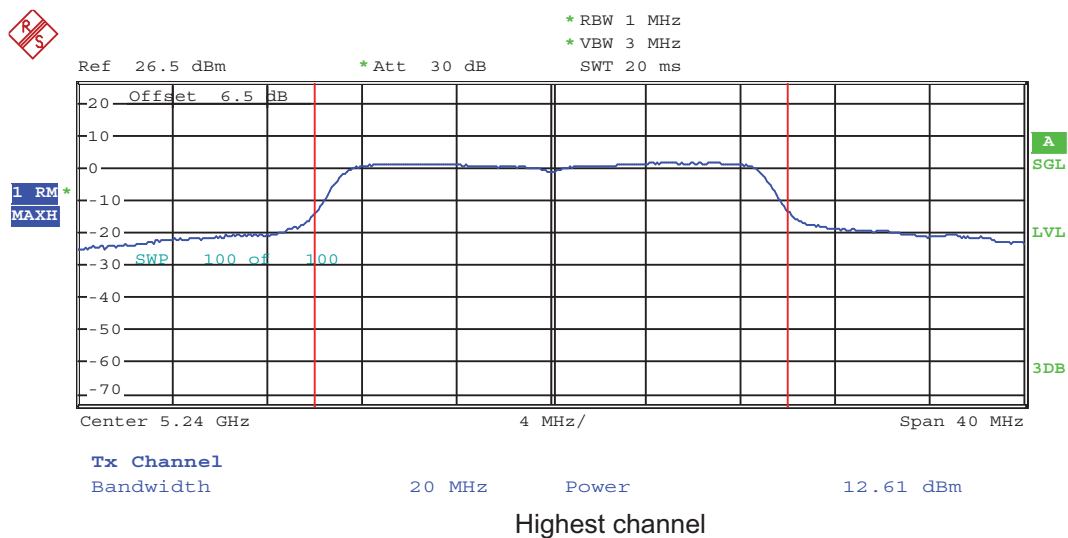
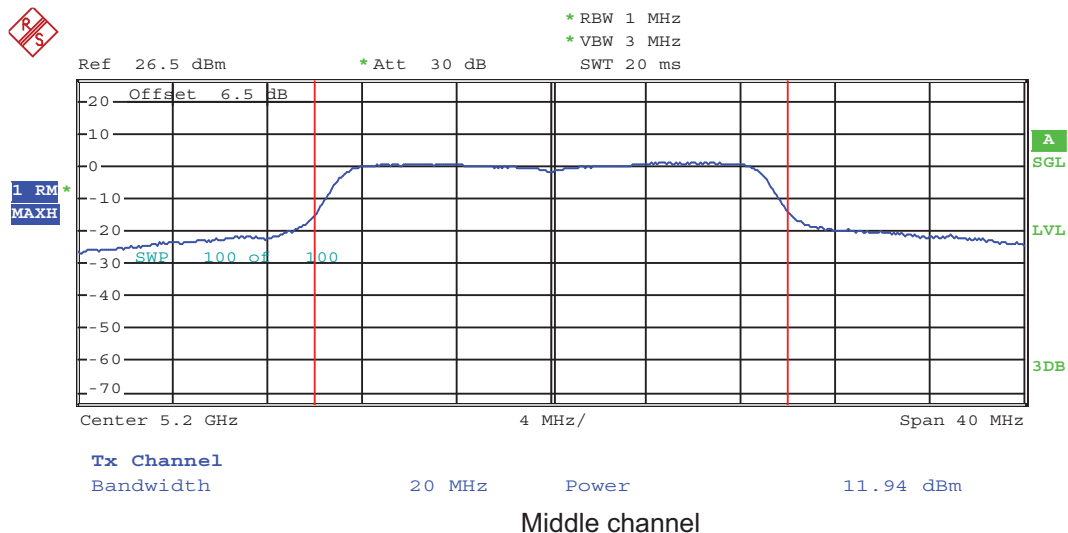
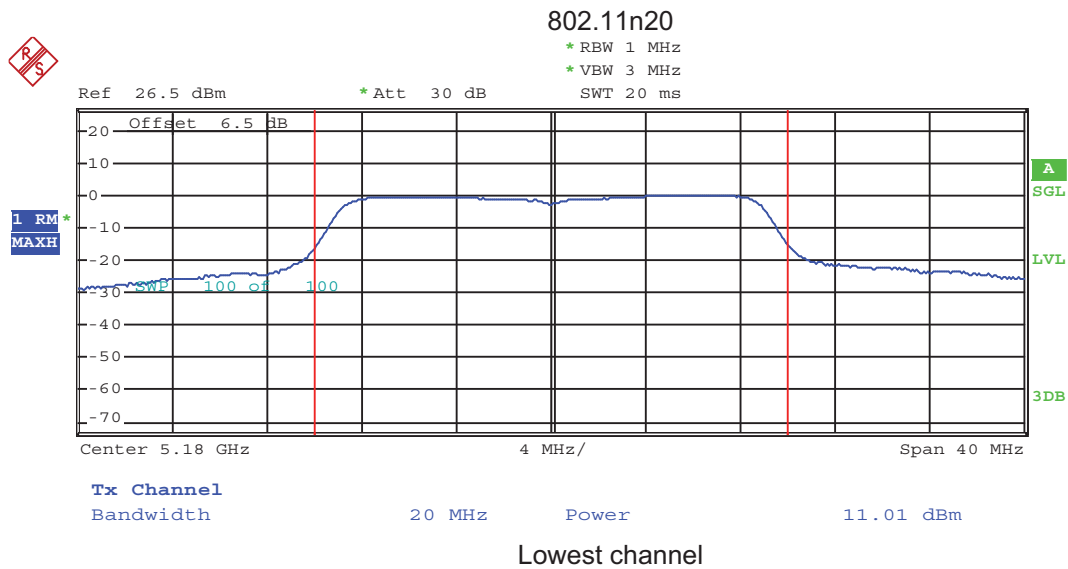
Band 4				
Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	12.30	30.00	Pass
	Middle	13.00	30.00	Pass
	Highest	14.00	30.00	Pass
802.11n20	Lowest	11.34	30.00	Pass
	Middle	12.85	30.00	Pass
	Highest	13.16	30.00	Pass
802.11n40	Lowest	11.54	30.00	Pass
	Highest	12.13	30.00	Pass
802.11ac	Middle	12.03	30.00	Pass



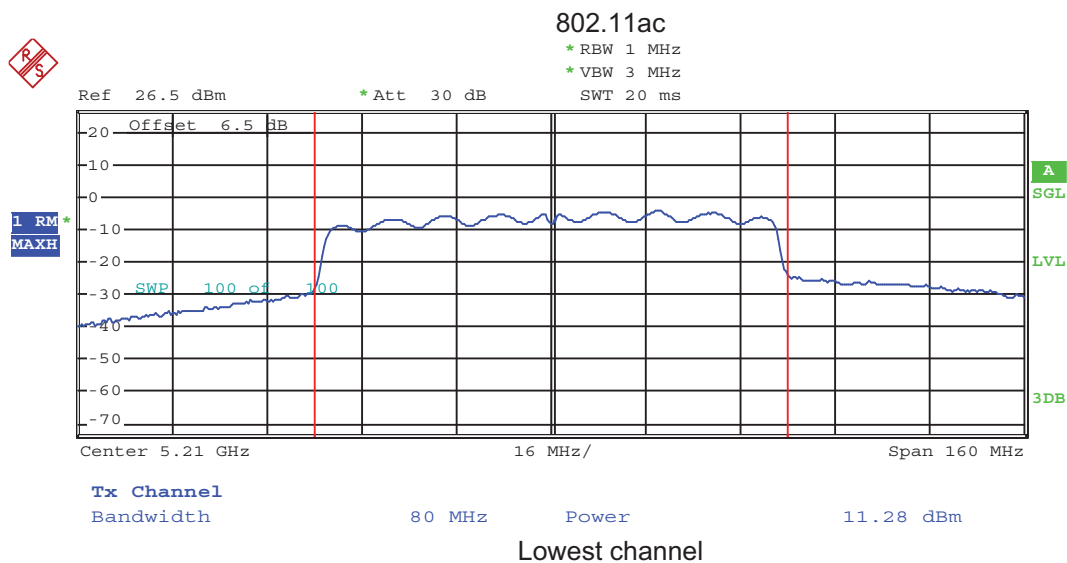
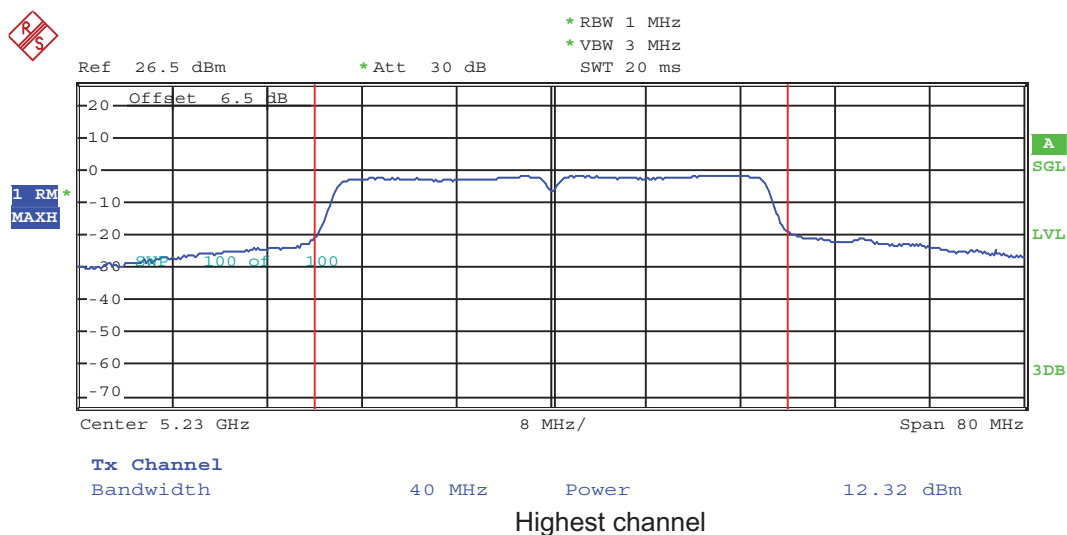
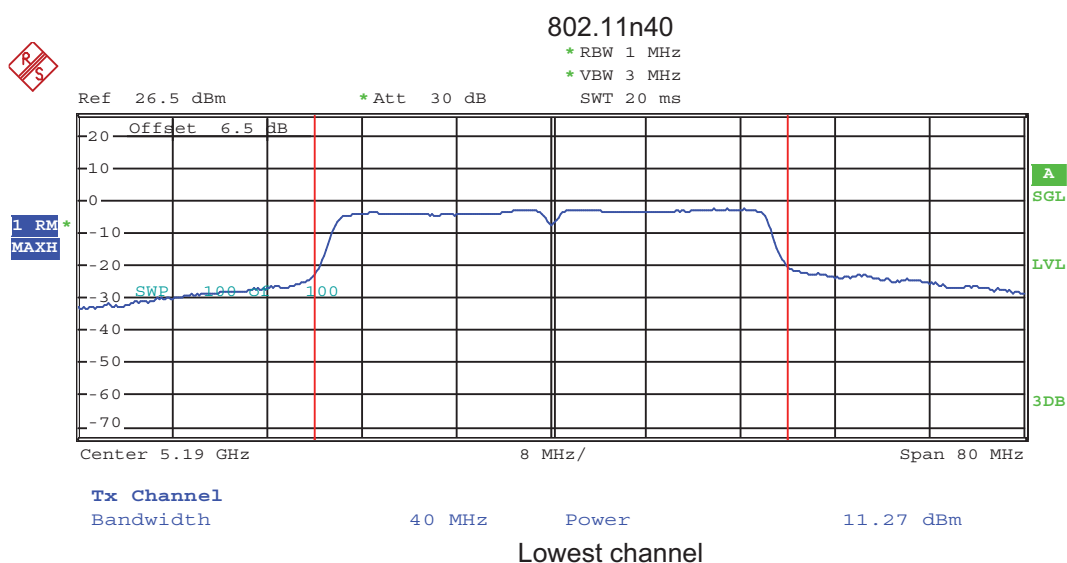
Test plot as follows:

Band 1

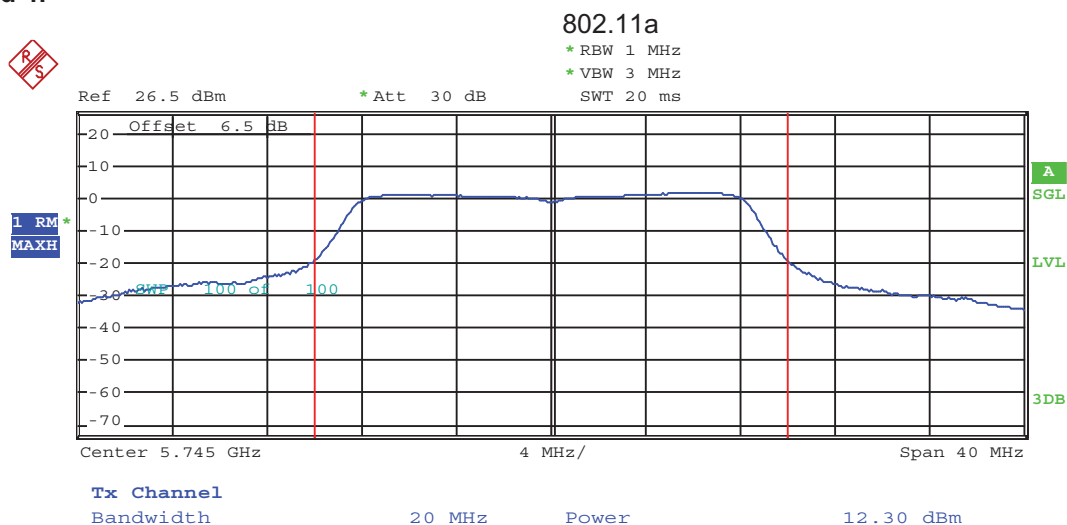




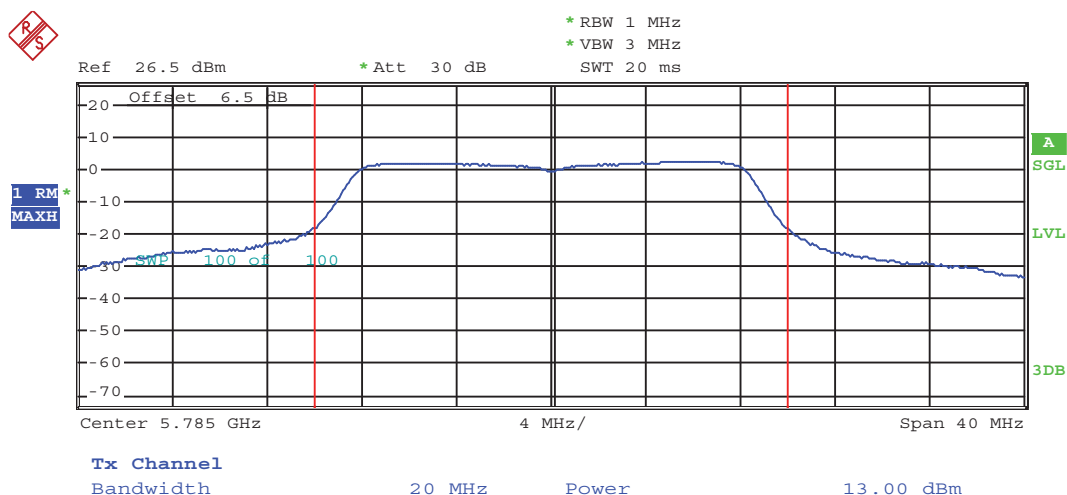




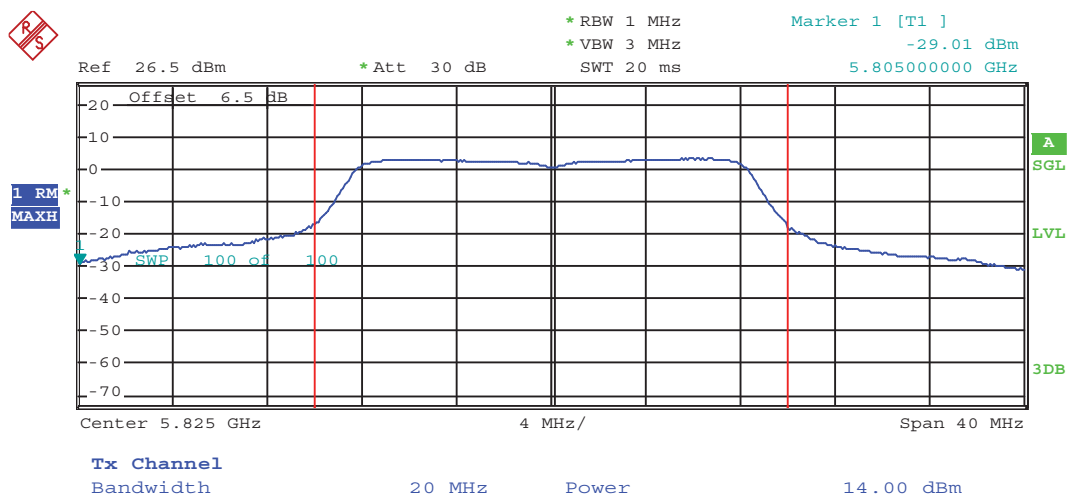
## Band 4:



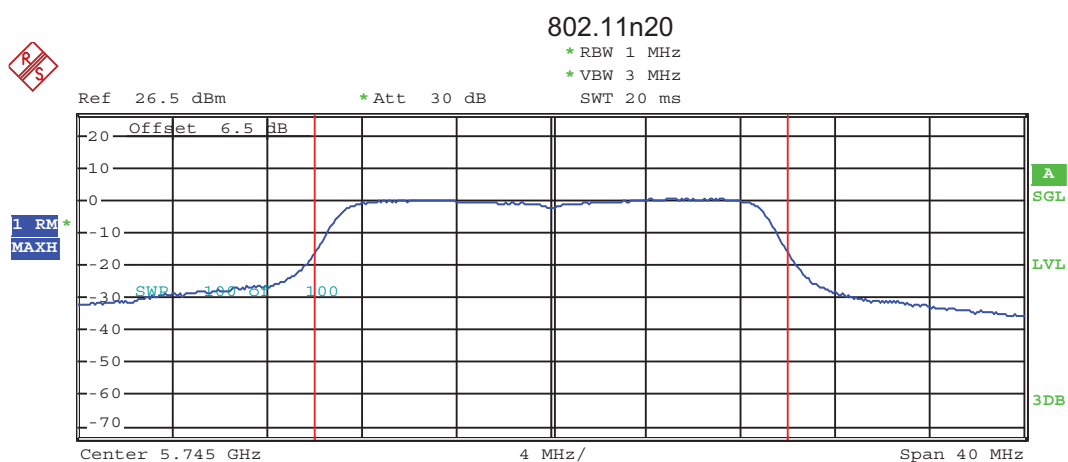
### Lowest channel



### Middle channel

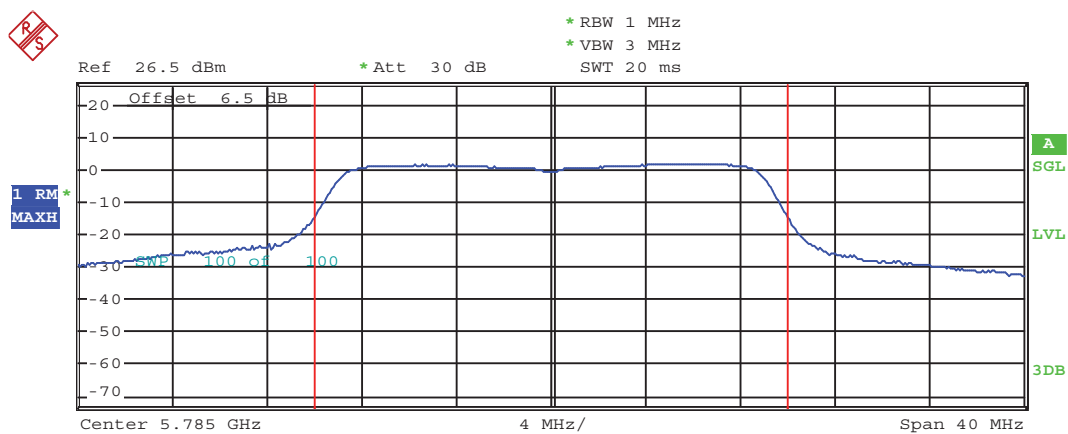


### Highest channel



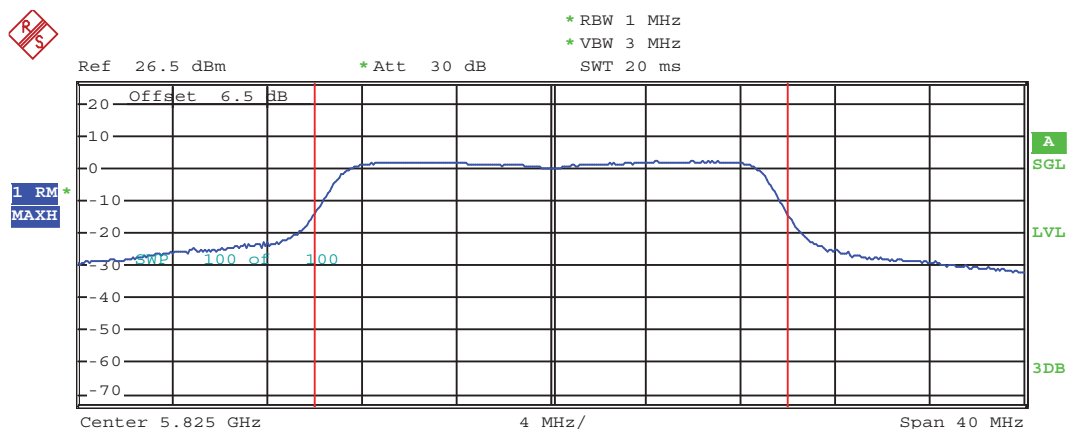
**Tx Channel**  
Bandwidth 20 MHz Power 11.34 dBm

Lowest channel



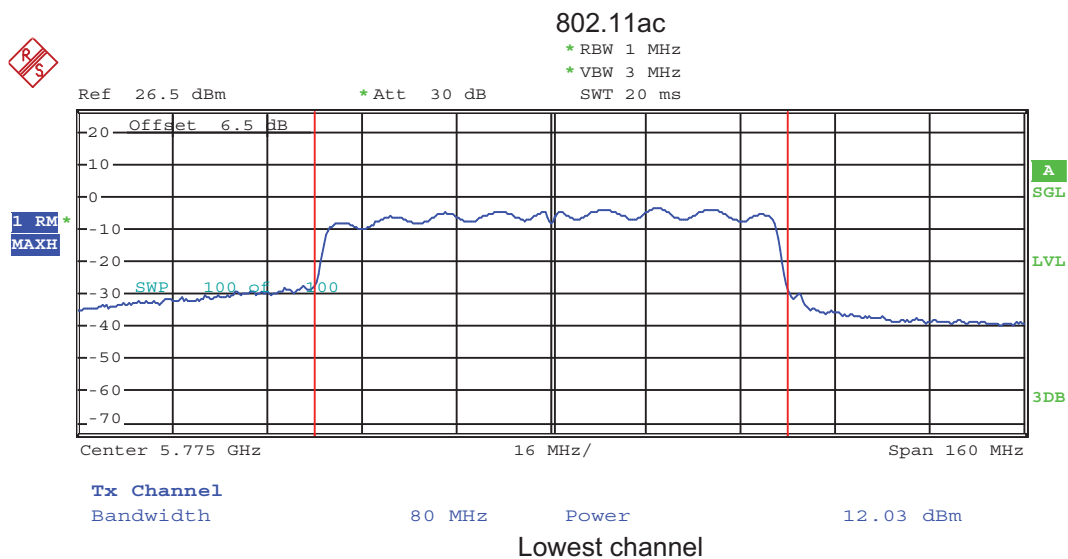
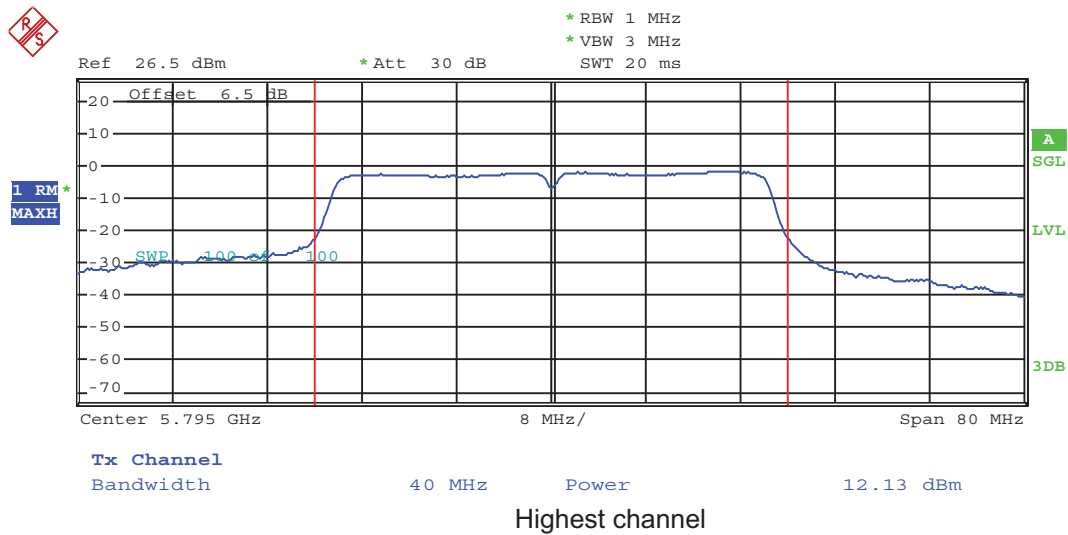
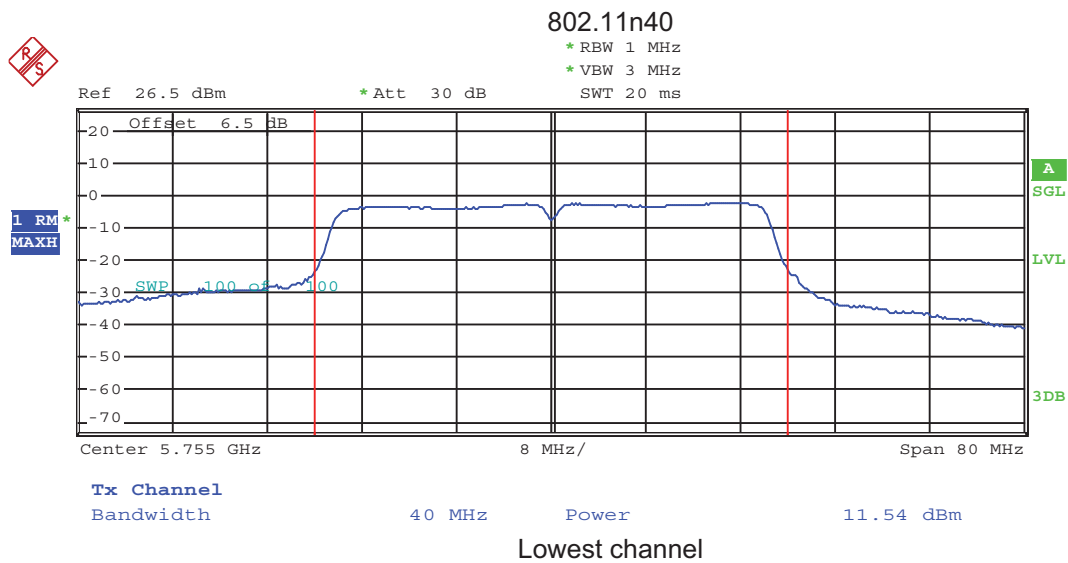
**Tx Channel**  
Bandwidth 20 MHz Power 12.85 dBm

Middle channel

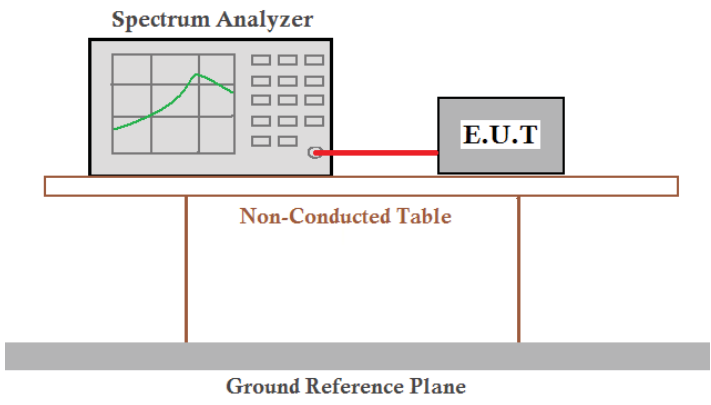


**Tx Channel**  
Bandwidth 20 MHz Power 13.16 dBm

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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

### Measurement Data:

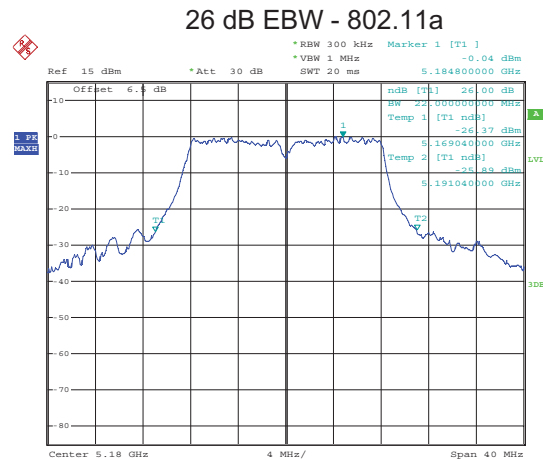
#### Band 1:

Test Channel	26dB Emission Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	22.00	22.40	44.00	---	N/A	N/A
Middle	21.84	22.32	---	80.96		
Highest	21.68	22.32	43.84	---		
Test Channel	99% Occupy Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	17.12	18.08	36.48	---	N/A	N/A
Middle	17.12	18.08	---	75.52		
Highest	16.96	18.00	36.48	---		

**Band 4:**

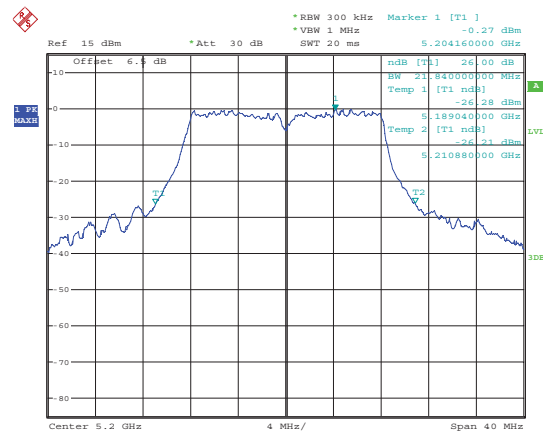
Test Channel	26dB Emission Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	22.00	22.48	44.00	83.84	N/A	N/A
Middle	22.08	22.88	---	---		
Highest	22.16	22.64	44.80	---		
Test Channel	99% Occupy Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	17.04	18.00	36.64	75.84	N/A	N/A
Middle	17.04	18.08	---	---		
Highest	17.12	18.08	36.80	---		
Test Channel	6dB Emission Bandwidth (MHz)				Limit	Result
	802.11a	802.11n20	802.11n40	802.11ac		
Lowest	16.80	17.84	36.80	76.16	>500kHz	N/A
Middle	16.72	17.84	---	---		
Highest	16.72	17.92	36.80	---		

Test plot as follows:  
Band 1:



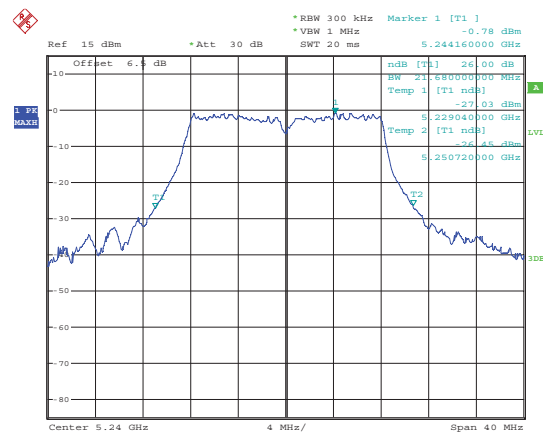
Date: 18.APR.2016 11:21:13

Lowest channel



Date: 18.APR.2016 11:20:41

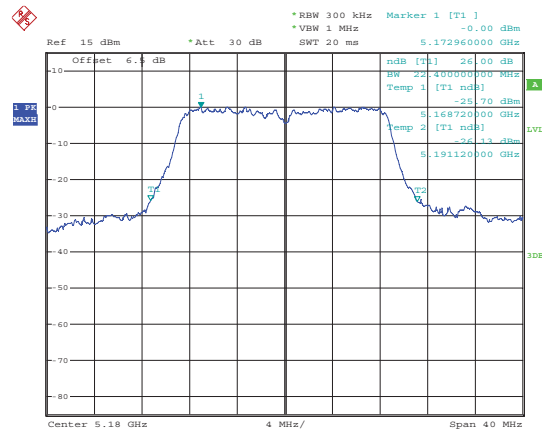
Middle channel



Date: 18.APR.2016 11:22:08

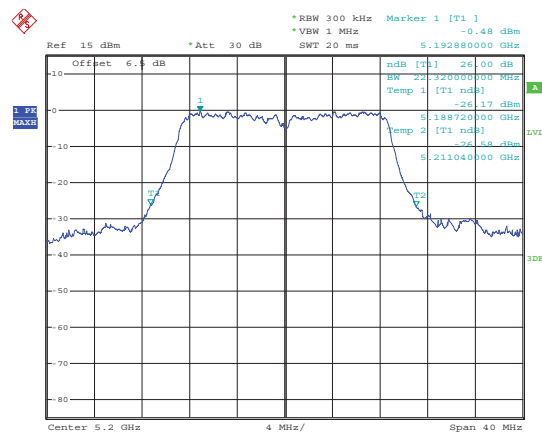
Highest channel

## 802.11n20



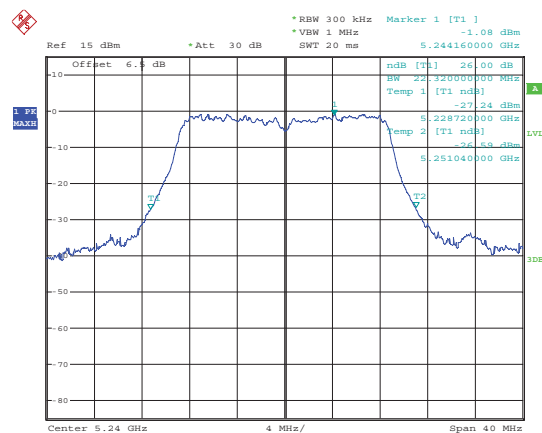
Date: 18.APR.2016 11:25:58

## Lowest channel



Date: 18.APR.2016 11:26:52

## Middle channel

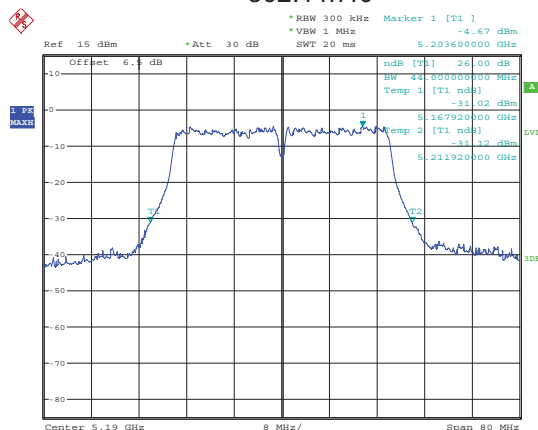


Date: 18.APR.2016 11:28:05

## Highest channel

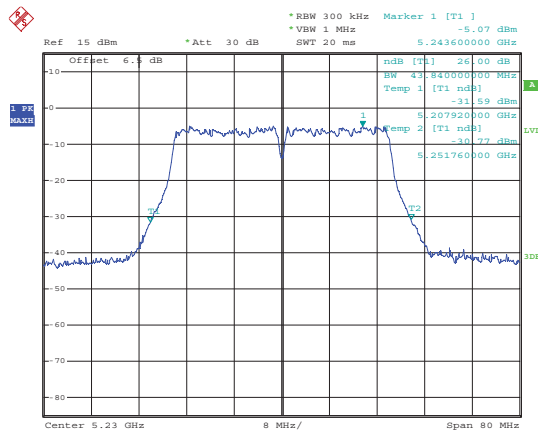


## 802.11n40



Date: 18.APR.2016 11:28:47

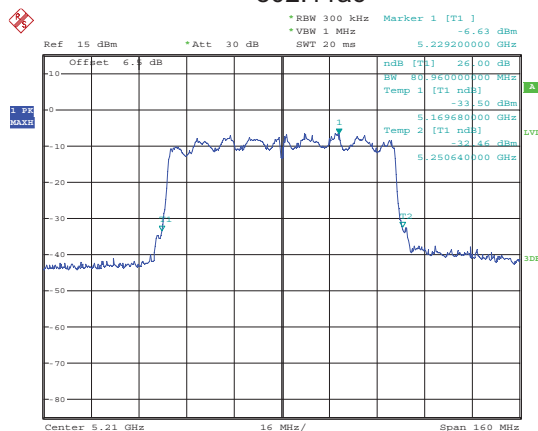
## Lowest channel



Date: 18.APR.2016 11:32:37

## Highest channel

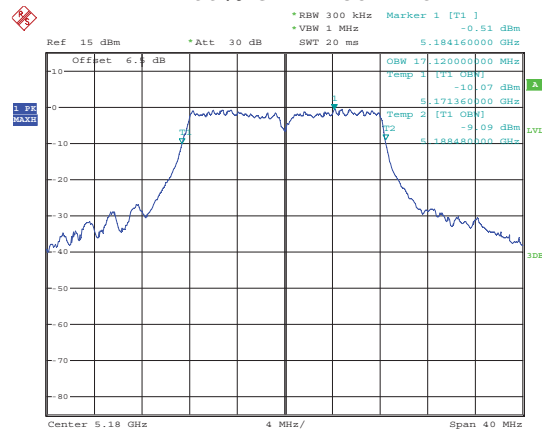
## 802.11ac



Date: 18.APR.2016 11:36:54

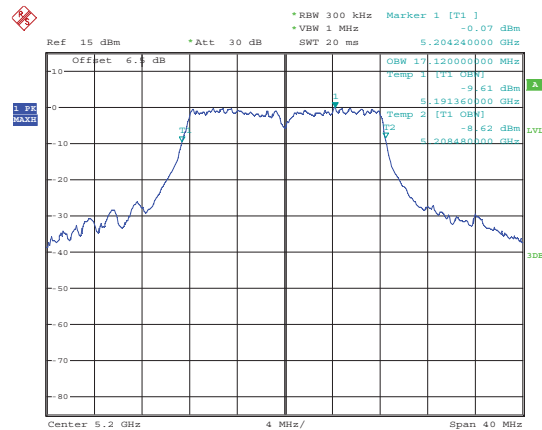
## Middle channel

## 99% OBW - 802.11a



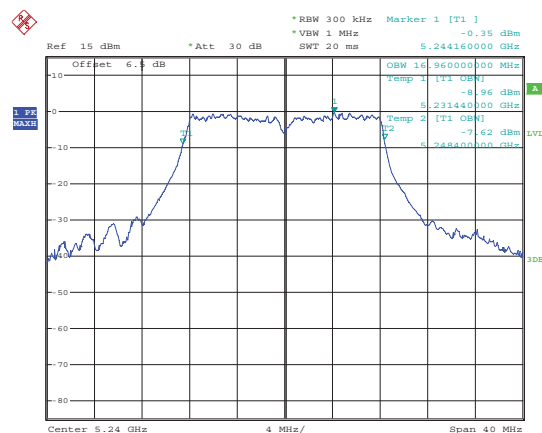
Date: 18.APR.2016 11:21:25

## Lowest channel



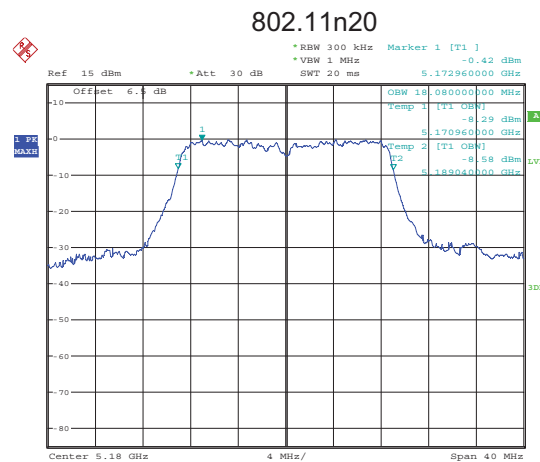
Date: 18.APR.2016 11:20:26

## Middle channel



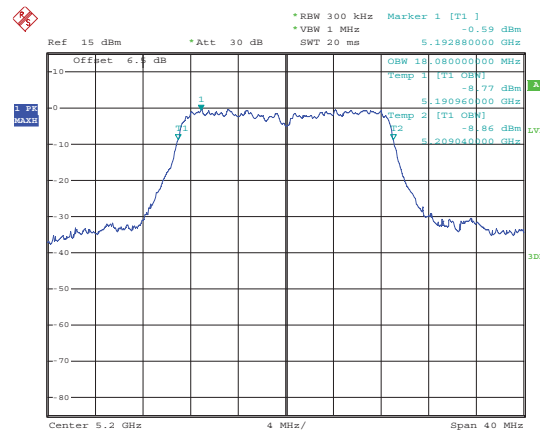
Date: 18.APR.2016 11:21:55

## Highest channel



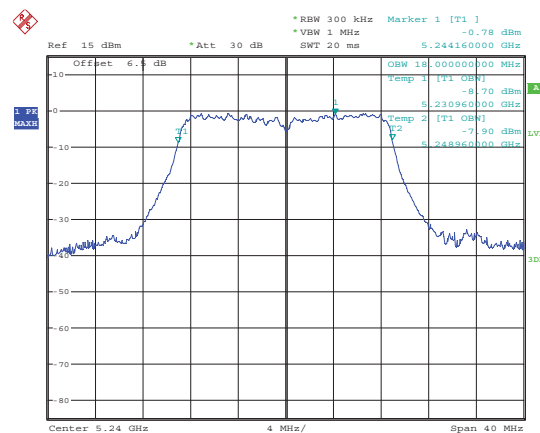
Date: 18.APR.2016 11:26:16

## Lowest channel



Date: 18.APR.2016 11:27:30

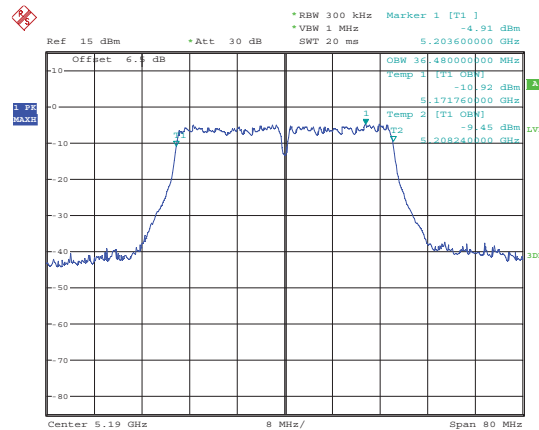
## Middle channel



Date: 18.APR.2016 11:27:54

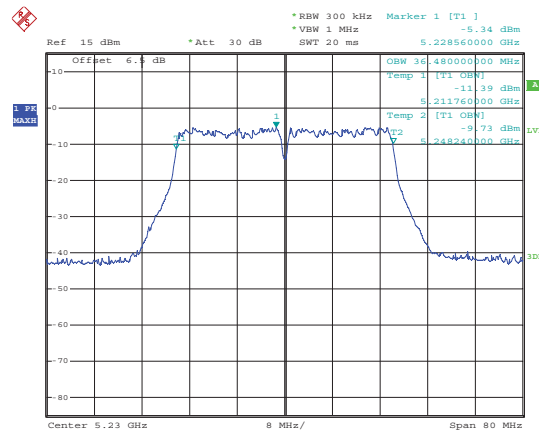
## Highest channel

## 802.11n40



Date: 18.APR.2016 11:28:58

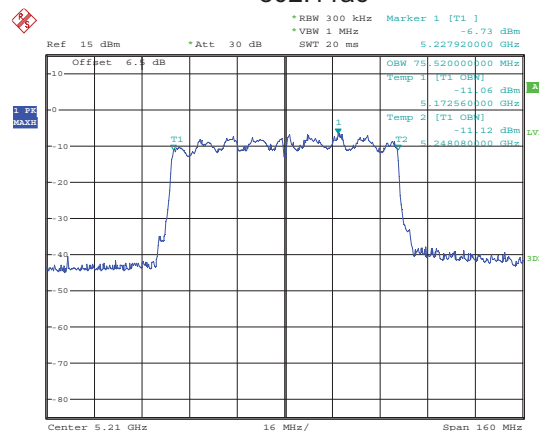
## Lowest channel



Date: 18.APR.2016 11:30:14

## Highest channel

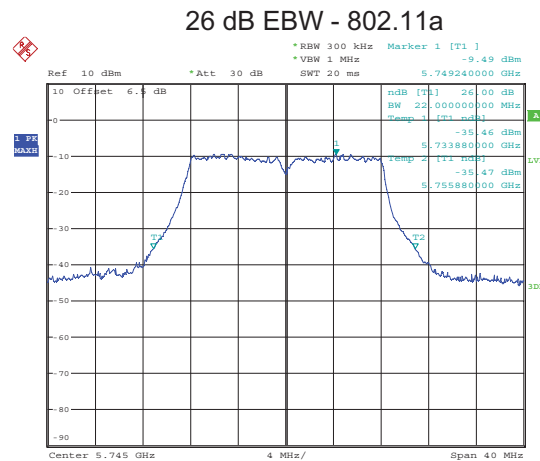
## 802.11ac



Date: 18.APR.2016 11:37:06

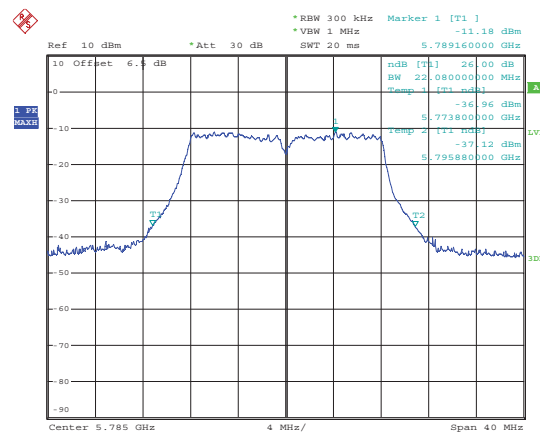
## Middle channel

## Band 4:



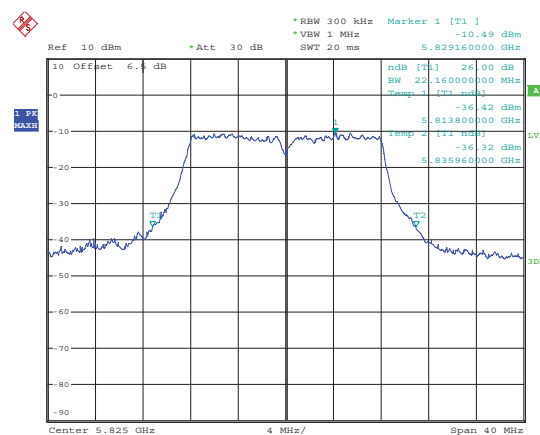
Date: 18.APR.2016 11:49:44

## Lowest channel



Date: 18.APR.2016 11:49:04

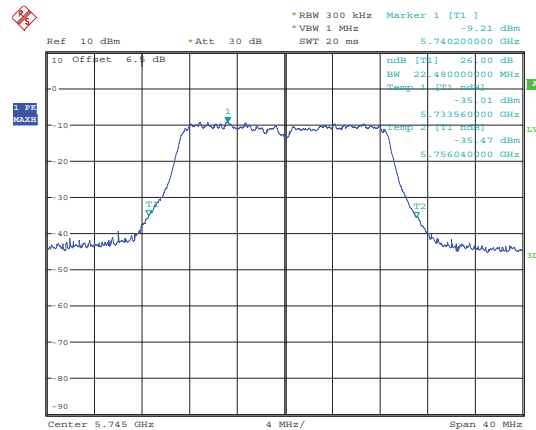
## Middle channel



Date: 18.APR.2016 11:48:08

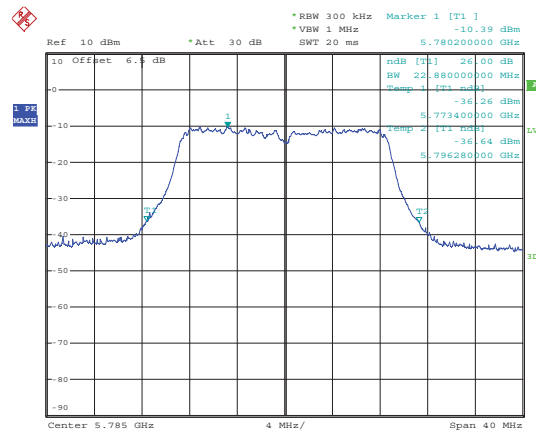
## Highest channel

## 802.11n20



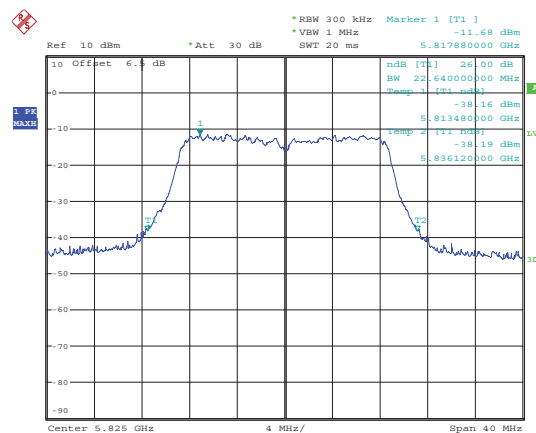
Date: 18.APR.2016 11:44:17

## Lowest channel



Date: 18.APR.2016 11:46:09

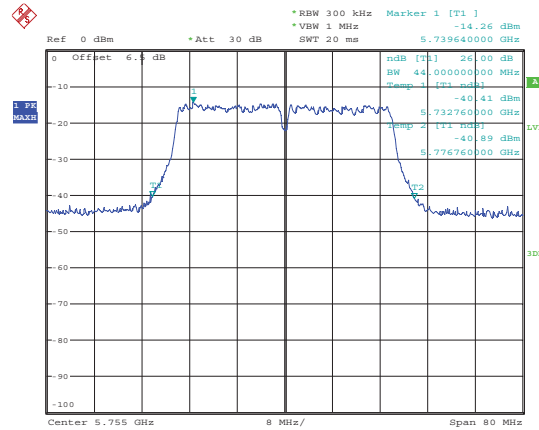
## Middle channel



Date: 18.APR.2016 11:47:08

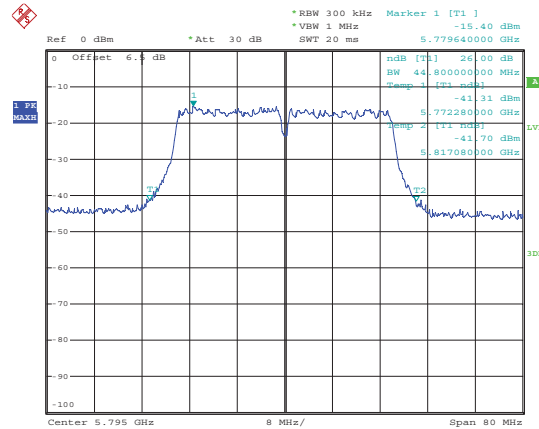
## Highest channel

## 802.11n40



Date: 18.APR.2016 11:41:40

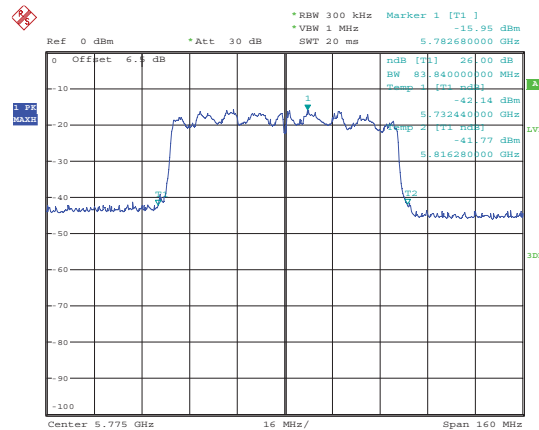
## Lowest channel



Date: 18.APR.2016 11:42:19

## Highest channel

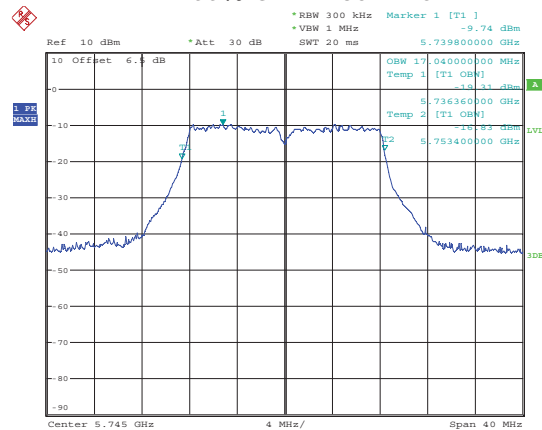
## 802.11ac



Date: 18.APR.2016 11:39:55

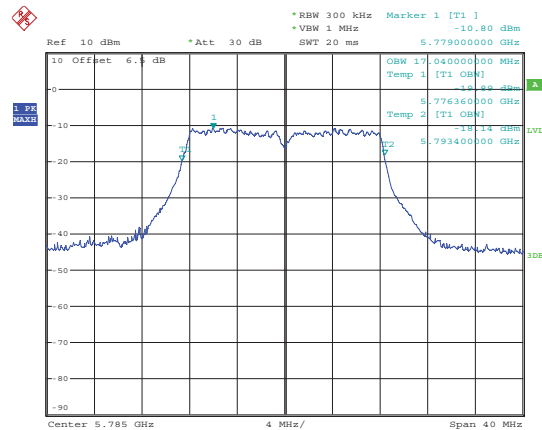
## Lowest channel

## 99% OBW - 802.11a



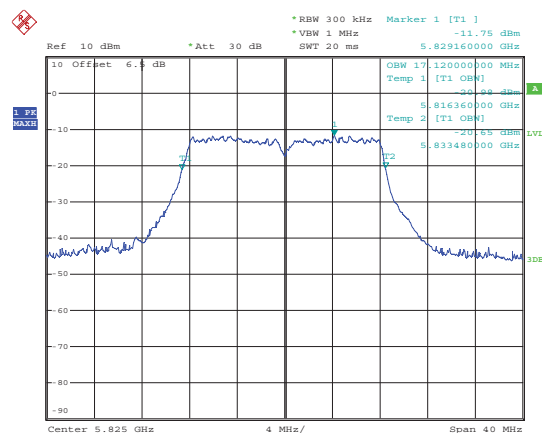
Date: 18.APR.2016 11:49:55

## Lowest channel



Date: 18.APR.2016 11:48:51

## Middle channel

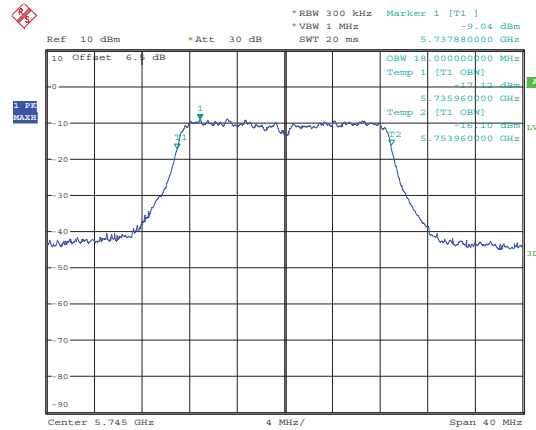


Date: 18.APR.2016 11:48:21

## Highest channel

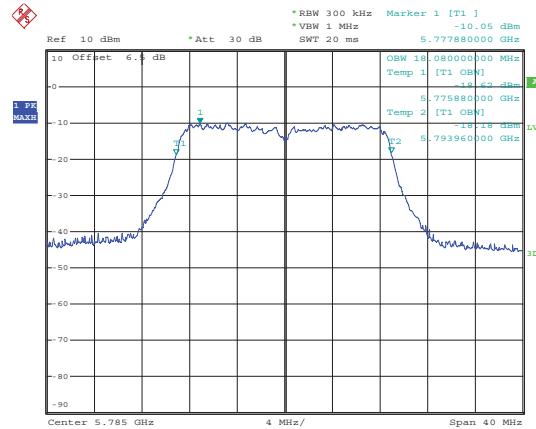


## 802.11n20



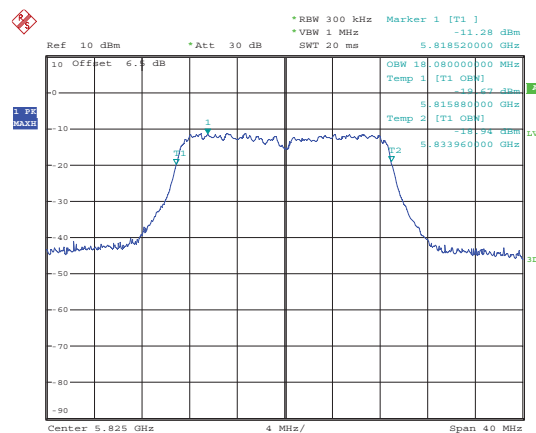
Date: 18.APR.2016 11:44:07

## Lowest channel



Date: 18.APR.2016 11:46:29

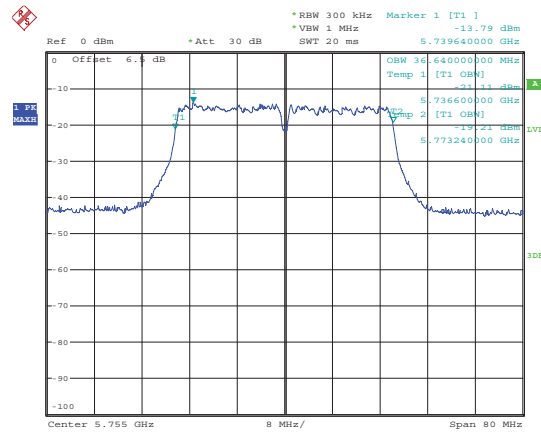
## Middle channel



Date: 18.APR.2016 11:46:57

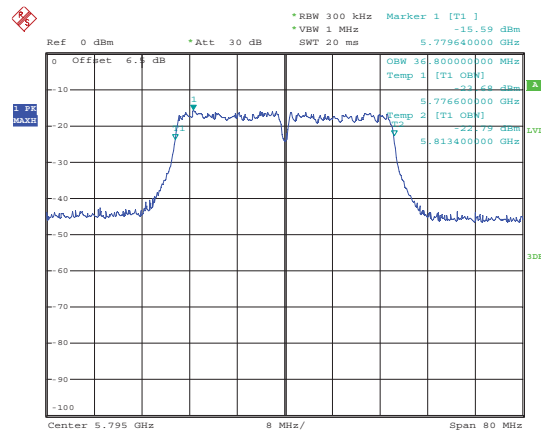
## Highest channel

## 802.11n40



Date: 18.APR.2016 11:41:27

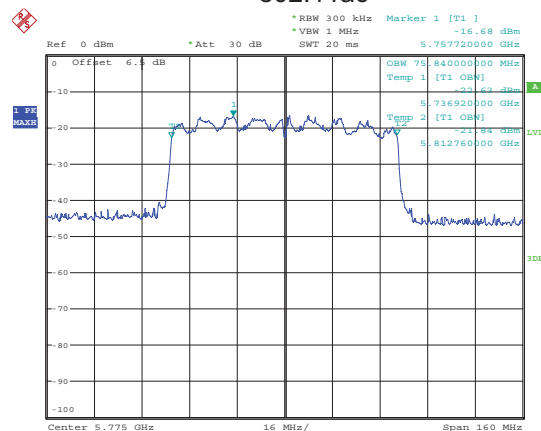
## Lowest channel



Date: 18.APR.2016 11:42:36

## Highest channel

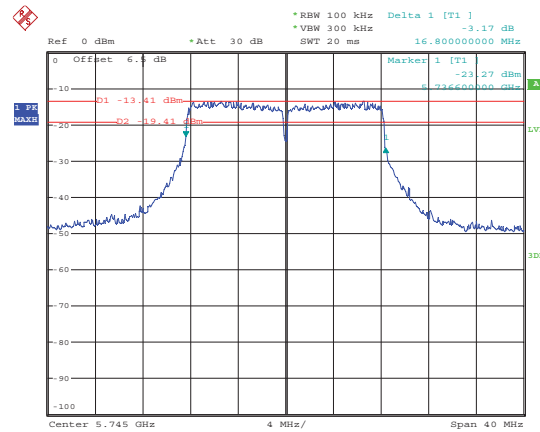
## 802.11ac



Date: 18.APR.2016 11:40:08

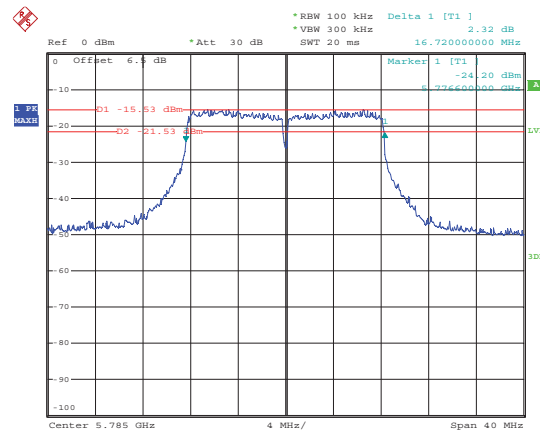
## Lowest channel

## 6 dB BW - 802.11a



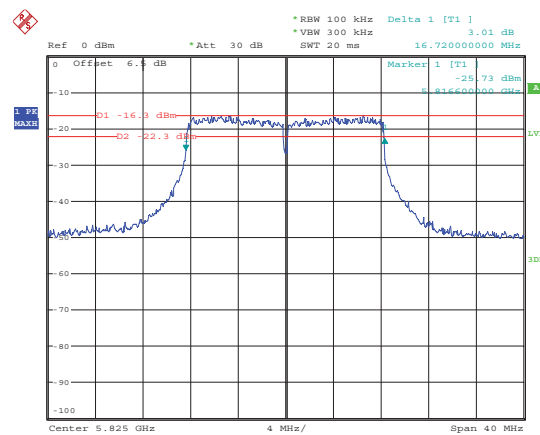
Date: 18.APR.2016 11:58:33

## Lowest channel



Date: 18.APR.2016 12:00:19

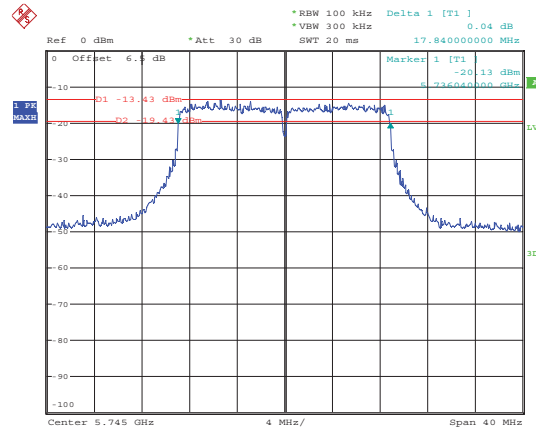
## Middle channel



Date: 18.APR.2016 12:02:19

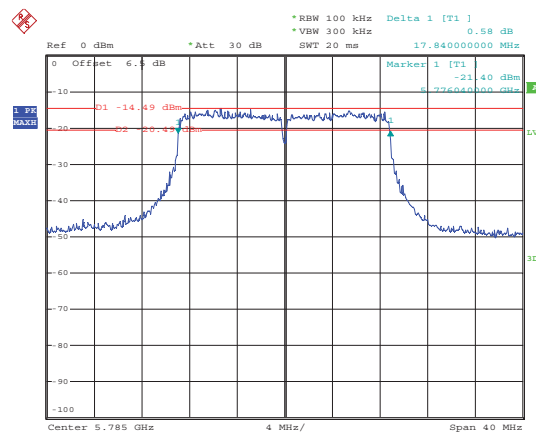
## Highest channel

## 802.11n20



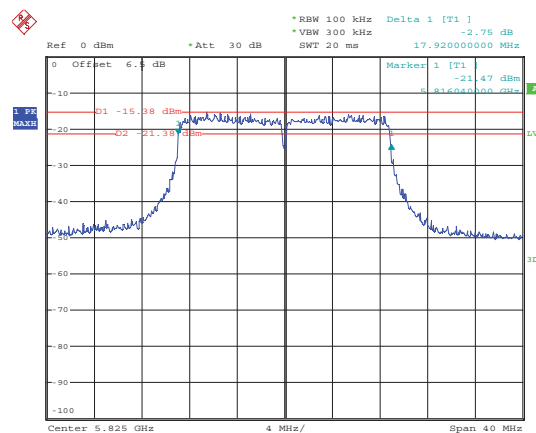
Date: 18.APR.2016 12:07:46

## Lowest channel



Date: 18.APR.2016 12:06:28

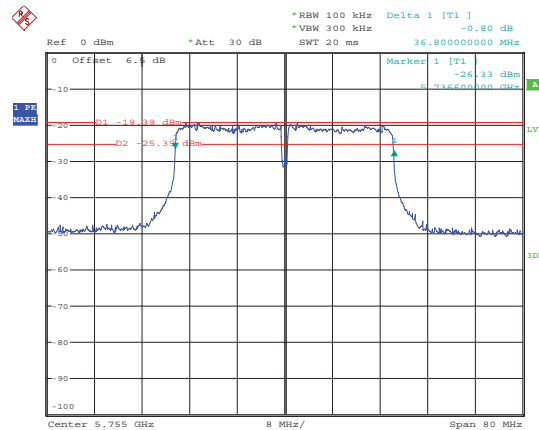
## Middle channel



Date: 18.APR.2016 12:03:27

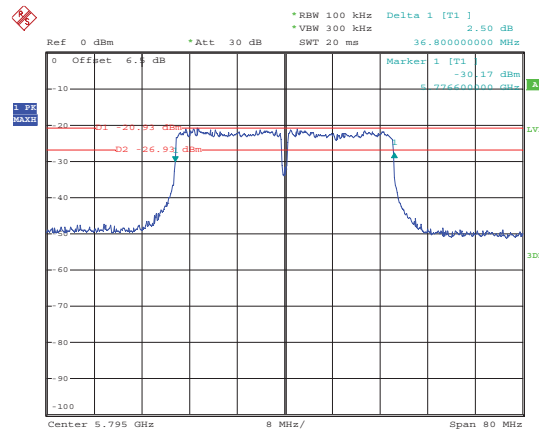
## Highest channel

## 802.11n40



Date: 18.APR.2016 12:08:56

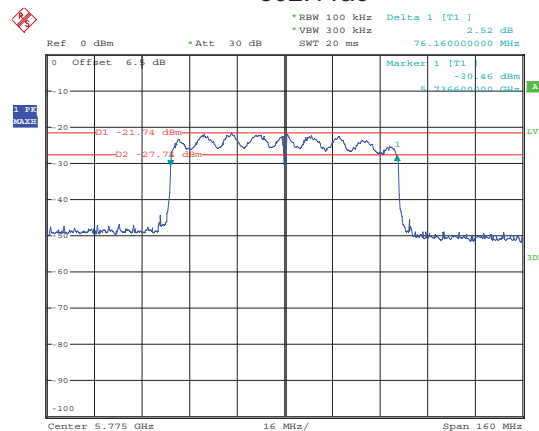
## Lowest channel



Date: 18.APR.2016 12:10:24

## Highest channel

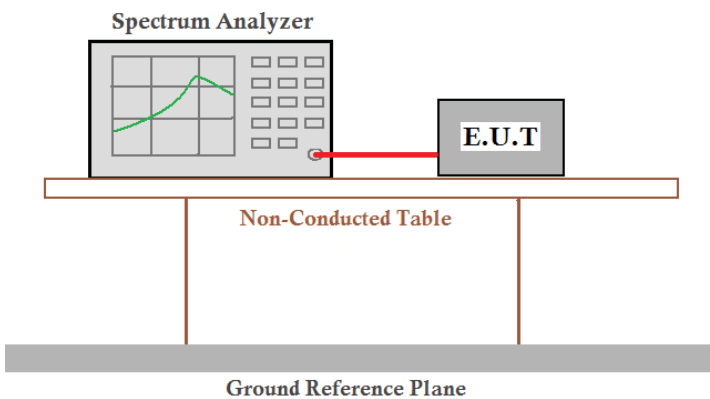
## 802.11ac



Date: 18.APR.2016 12:14:05

## Middle channel

## 6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) &(a) (3)
Test Method:	ANSI C63.10:2009, KDB 789033
Limit:	Band 1: 11 dBm/MHz Band 4: 30 dBm/500kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve on its screen, is connected to an E.U.T (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T are positioned on a white rectangular table labeled 'Non-Conducted Table'. This table is supported by two vertical legs. Below the table, a thick grey horizontal bar represents the 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data:**

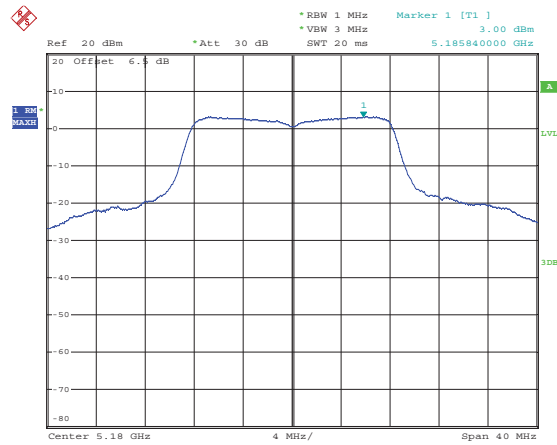
Band 1				
Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	3.00	11.00	Pass
	Middle	3.73	11.00	Pass
	Highest	3.96	11.00	Pass
802.11n20	Lowest	3.34	11.00	Pass
	Middle	3.60	11.00	Pass
	Highest	3.59	11.00	Pass
802.11n40	Lowest	-1.06	11.00	Pass
	Highest	0.14	11.00	Pass
802.11ac	Middle	-2.69	11.00	Pass

Band 4				
Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	-7.56	30.00	Pass
	Middle	0.61	30.00	Pass
	Highest	-0.50	30.00	Pass
802.11n20	Lowest	0.94	30.00	Pass
	Middle	0.27	30.00	Pass
	Highest	-0.30	30.00	Pass
802.11n40	Lowest	-2.85	30.00	Pass
	Highest	-2.94	30.00	Pass
802.11ac	Middle	-4.78	30.00	Pass

Test plot as follows:

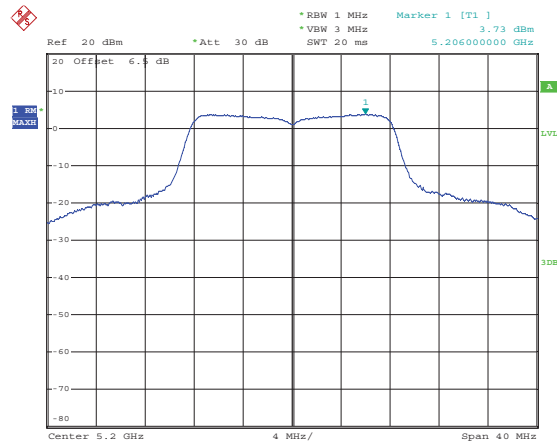
Band 1:

Test mode:802.11a



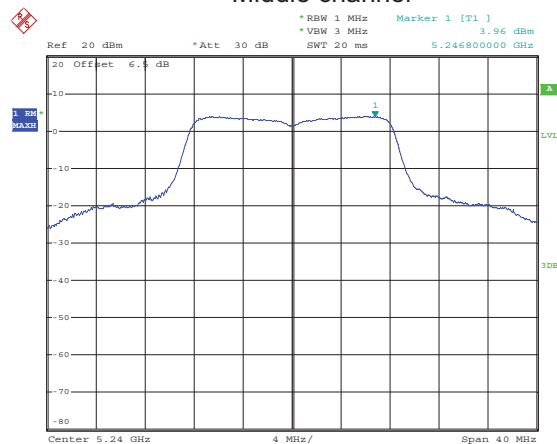
Date: 18.APR.2016 12:16:29

Lowest channel



Date: 18.APR.2016 12:17:12

Middle channel

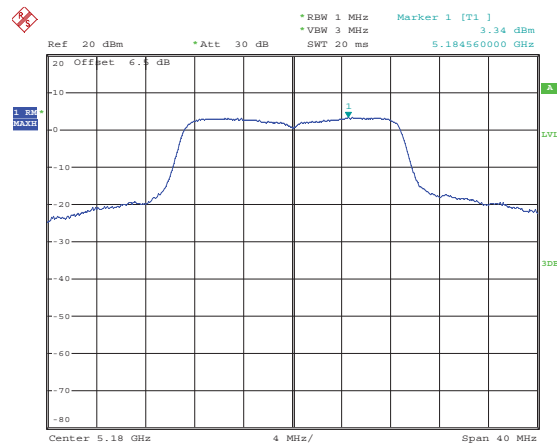


Date: 18.APR.2016 12:17:42

Highest channel

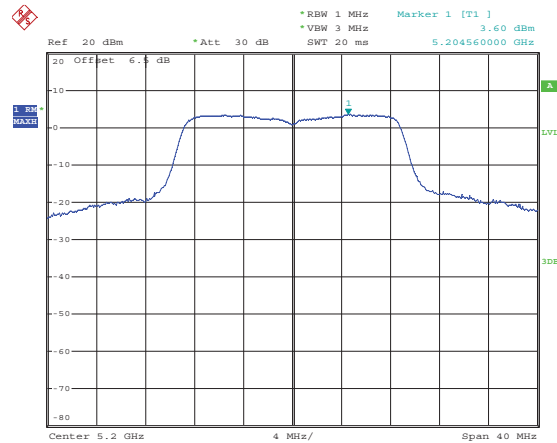


## Test mode:802.11n20



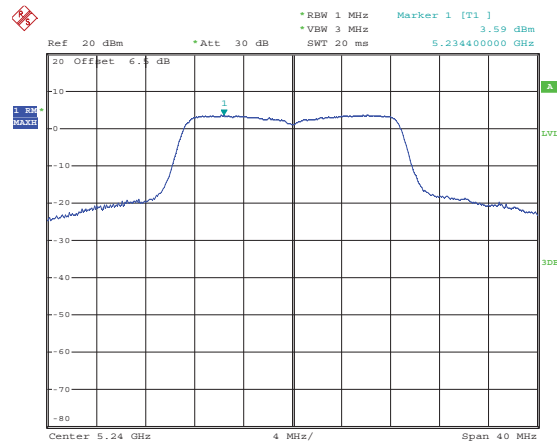
Date: 18.APR.2016 12:19:33

## Lowest channel



Date: 18.APR.2016 12:18:44

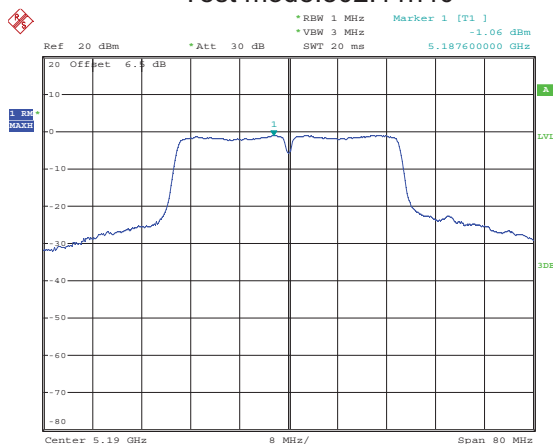
## Middle channel



Date: 18.APR.2016 12:18:13

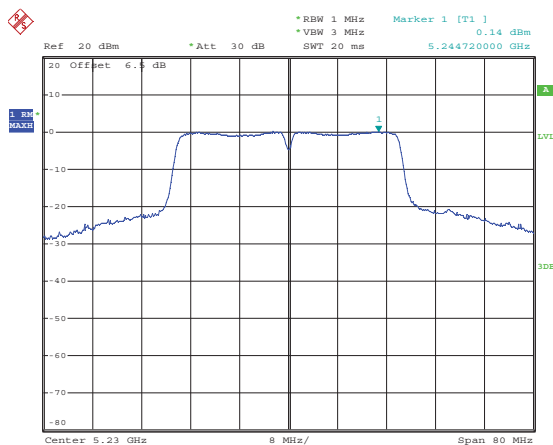
## Highest channel

## Test mode:802.11n40



Date: 18.APR.2016 12:20:43

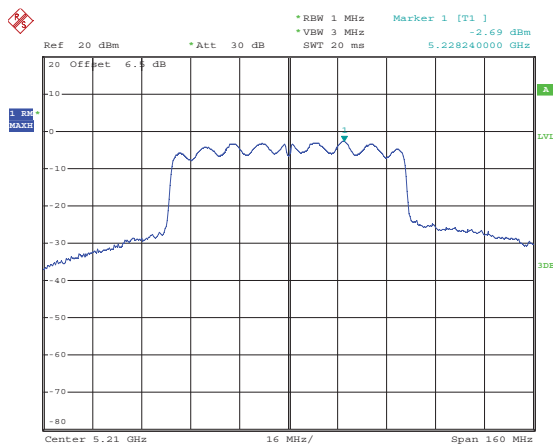
## Lowest channel



Date: 18.APR.2016 12:21:26

## Highest channel

## Test mode:802.11ac

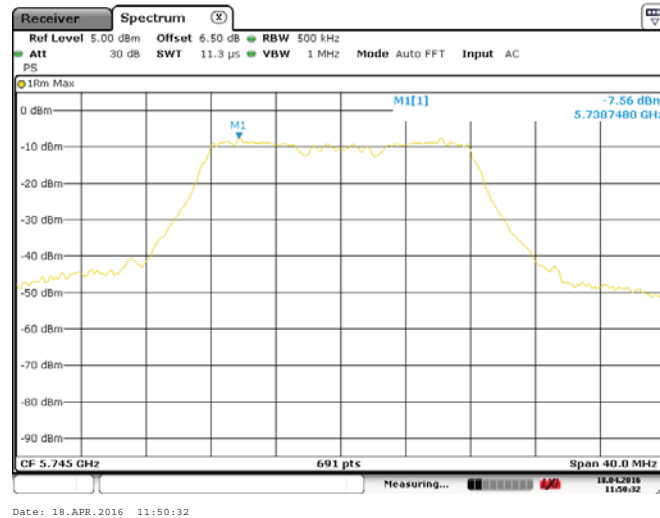


Date: 18.APR.2016 12:22:21

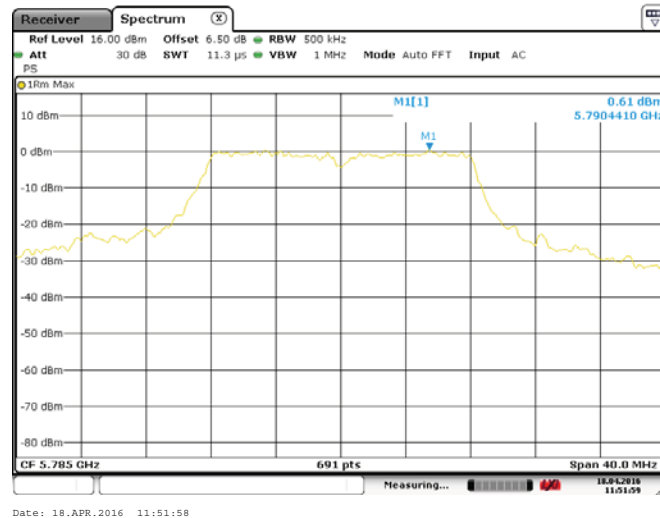
Middle channel

## Band 4:

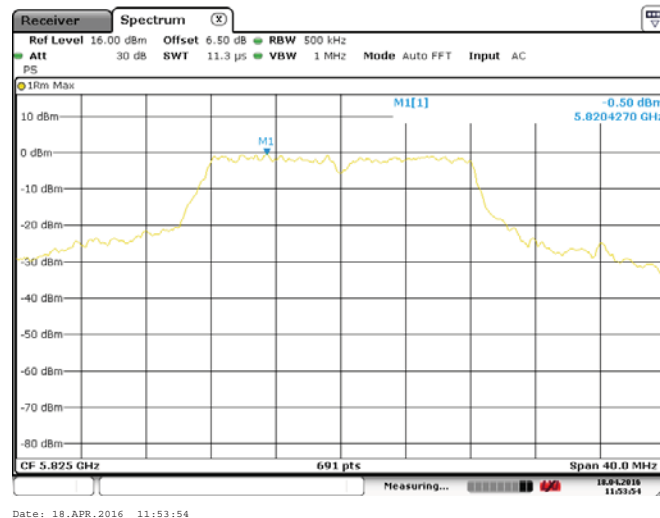
Test mode:802.11a



Lowest channel

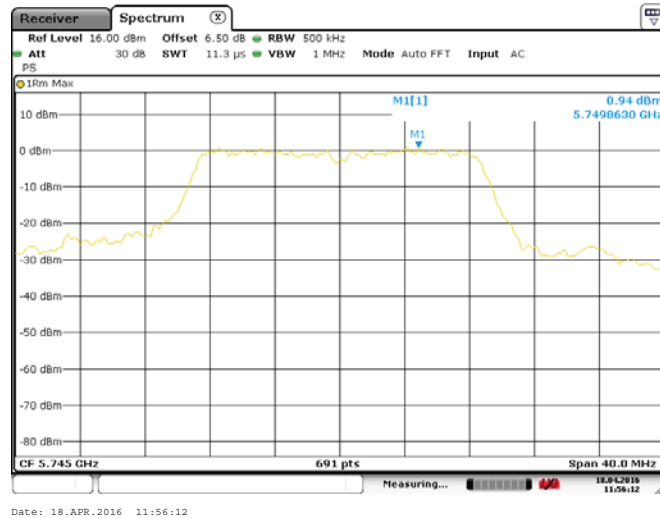


Middle channel

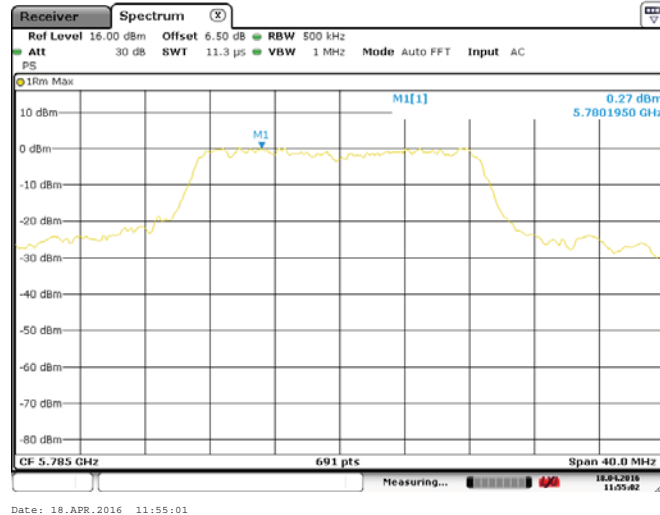


Highest channel

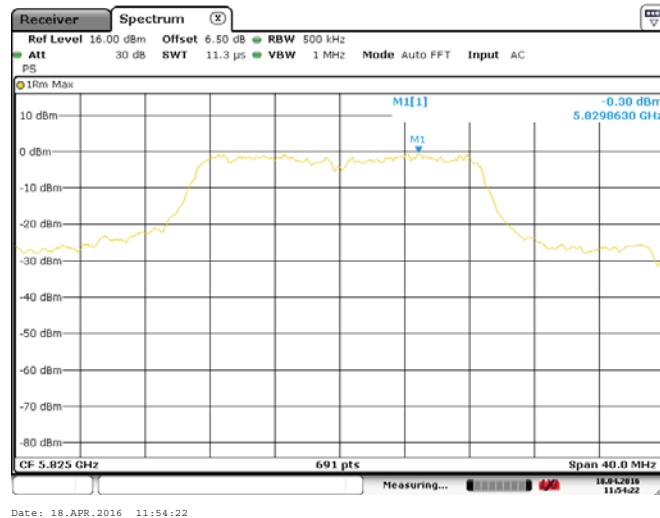
Test mode:802.11n20



Lowest channel

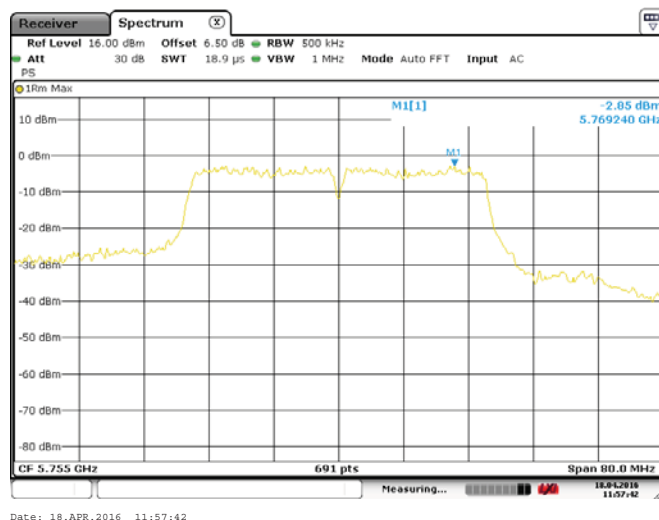


Middle channel

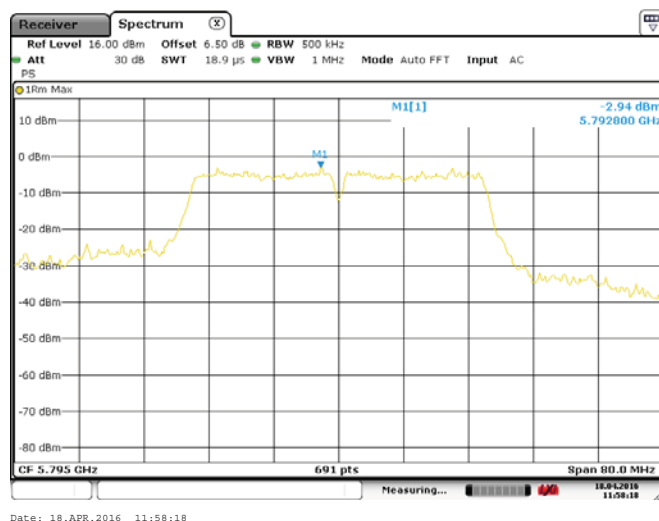


Highest channel

Test mode:802.11n40

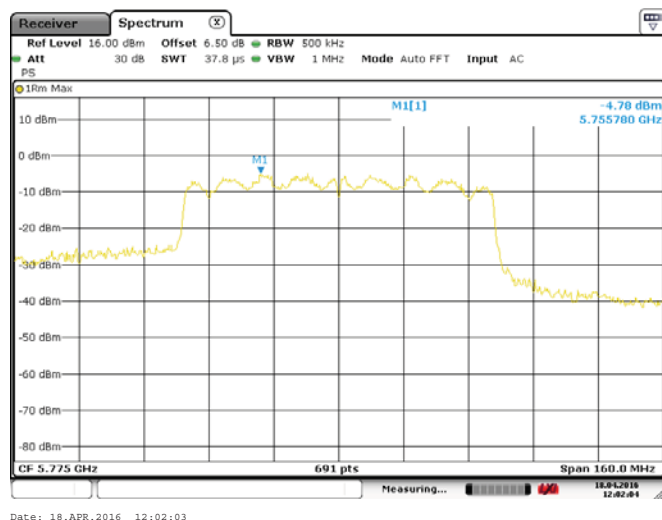


Lowest channel



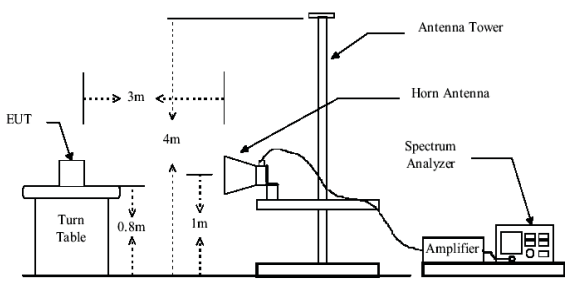
Highest channel

Test mode:802.11ac



Middel channel

## 6.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 (b)													
Test Method:	ANSI C63.10:2009 , KDB 789033													
Receiver setup:	<table><tr><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><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></table>	Detector	RBW	VBW	Remark	Peak	1MHz	3MHz	Peak Value	RMS	1MHz	3MHz	Average Value	
Detector	RBW	VBW	Remark											
Peak	1MHz	3MHz	Peak Value											
RMS	1MHz	3MHz	Average Value											
Limit:	<table><tr><td>Band</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td rowspan="2">Band 1 &amp; 4</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> <p>Remark:</p> <p>1. Band 1 limit: E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m,for EIPR[dBm]=-27dBm.</p> <p>2. Band 4 limit: E[dBμV/m] = EIRP[dBm] + 95.2=78.2 dBuV/m,for EIPR[dBm]=-17dBm.</p>	Band	Limit (dBuV/m @3m)	Remark	Band 1 & 4	68.20	Peak Value	54.00	Average Value	Band 4	78.20	Peak Value	54.00	Average Value
Band	Limit (dBuV/m @3m)	Remark												
Band 1 & 4	68.20	Peak Value												
	54.00	Average Value												
Band 4	78.20	Peak Value												
	54.00	Average Value												
Test Procedure:	<p>1. The EUT was placed on the top of a rotating table 0.8 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.</p> <p>2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.</p> <p>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.</p> <p>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.</p> <p>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.</p>													
Test setup:														
Test Instruments:	Refer to section 5.6 for details													
Test mode:	Refer to section 5.3 for details													
Test results:	Passed													



**Band 1:**

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	42.12	36.23	10.96	40.06	49.25	68.20	-18.95	Horizontal
5150.00	41.86	36.23	10.96	40.06	48.99	68.20	-19.21	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.62	36.23	10.96	40.06	39.75	54.00	-14.25	Horizontal
5150.00	31.46	36.23	10.96	40.06	38.59	54.00	-15.41	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	41.79	35.37	11.19	40.18	48.17	68.20	-20.03	Horizontal
5350.00	42.53	35.37	11.19	40.18	48.91	68.20	-19.29	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	31.75	35.37	11.19	40.18	38.13	54.00	-15.87	Horizontal
5350.00	32.48	35.37	11.19	40.18	38.86	54.00	-15.14	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-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	42.09	36.23	10.96	40.06	49.22	68.20	-18.98	Horizontal
5150.00	41.29	36.23	10.96	40.06	48.42	68.20	-19.78	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.69	36.23	10.96	40.06	39.82	54.00	-14.18	Horizontal
5150.00	31.57	36.23	10.96	40.06	38.70	54.00	-15.30	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.26	35.37	11.19	40.18	48.64	68.20	-19.56	Horizontal
5350.00	41.87	35.37	11.19	40.18	48.25	68.20	-19.95	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.63	35.37	11.19	40.18	39.01	54.00	-14.99	Horizontal
5350.00	31.46	35.37	11.19	40.18	37.84	54.00	-16.16	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	42.26	36.23	10.96	40.06	49.39	68.20	-18.81	Horizontal
5150.00	43.59	36.23	10.96	40.06	50.72	68.20	-17.48	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	32.63	36.23	10.96	40.06	39.76	54.00	-14.24	Horizontal
5150.00	33.14	36.23	10.96	40.06	40.27	54.00	-13.73	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.65	35.37	11.19	40.18	49.03	68.20	-19.17	Horizontal
5350.00	42.78	35.37	11.19	40.18	49.16	68.20	-19.04	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.43	35.37	11.19	40.18	38.81	54.00	-15.19	Horizontal
5350.00	32.01	35.37	11.19	40.18	38.39	54.00	-15.61	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.

802.11ac-HT80								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	41.17	36.23	10.96	40.06	48.30	68.20	-19.90	Horizontal
5150.00	42.36	36.23	10.96	40.06	49.49	68.20	-18.71	Vertical
802.11ac-HT80								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	31.24	36.23	10.96	40.06	38.37	54.00	-15.63	Horizontal
5150.00	31.56	36.23	10.96	40.06	38.69	54.00	-15.31	Vertical
802.11ac-HT80								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.69	35.37	11.19	40.18	49.07	68.20	-19.13	Horizontal
5350.00	41.23	35.37	11.19	40.18	47.61	68.20	-20.59	Vertical
802.11ac-HT80								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	31.29	35.37	11.19	40.18	37.67	54.00	-16.33	Horizontal
5350.00	32.87	35.37	11.19	40.18	39.25	54.00	-14.75	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	41.56	34.65	11.62	40.54	47.29	78.20	-30.91	Horizontal
5725.00	42.62	34.65	11.62	40.54	48.35	78.20	-29.85	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	31.48	34.65	11.62	40.54	37.21	54.00	-16.79	Horizontal
5725.00	32.64	34.65	11.62	40.54	38.37	54.00	-15.63	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	41.59	34.63	11.75	40.69	47.28	78.20	-30.92	Horizontal
5850.00	40.63	34.63	11.75	40.69	46.32	78.20	-31.88	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	31.42	34.63	11.75	40.69	37.11	54.00	-16.89	Horizontal
5850.00	30.95	34.63	11.75	40.69	36.64	54.00	-17.36	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-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	42.48	34.65	11.62	40.54	48.21	78.20	-29.99	Horizontal
5725.00	41.56	34.65	11.62	40.54	47.29	78.20	-30.91	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.56	34.65	11.62	40.54	38.29	54.00	-15.71	Horizontal
5725.00	31.63	34.65	11.62	40.54	37.36	54.00	-16.64	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	42.16	34.63	11.75	40.69	47.85	78.20	-30.35	Horizontal
5850.00	41.29	34.63	11.75	40.69	46.98	78.20	-31.22	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.36	34.63	11.75	40.69	38.05	54.00	-15.95	Horizontal
5850.00	31.48	34.63	11.75	40.69	37.17	54.00	-16.83	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	41.56	34.65	11.62	40.54	47.29	78.20	-30.91	Horizontal
5725.00	42.75	34.65	11.62	40.54	48.48	78.20	-29.72	Vertical
802.11n-HT40								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.98	34.65	11.62	40.54	38.71	54.00	-15.29	Horizontal
5725.00	31.76	34.65	11.62	40.54	37.49	54.00	-16.51	Vertical
802.11n-HT40								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	41.59	34.63	11.75	40.69	47.28	78.20	-30.92	Horizontal
5850.00	40.56	34.63	11.75	40.69	46.25	78.20	-31.95	Vertical
802.11n-HT40								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	31.46	34.63	11.75	40.69	37.15	54.00	-16.85	Horizontal
5850.00	30.18	34.63	11.75	40.69	35.87	54.00	-18.13	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.

802.11ac-HT80								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	41.52	34.65	11.62	40.54	47.25	78.20	-30.95	Horizontal
5725.00	42.32	34.65	11.62	40.54	48.05	78.20	-30.15	Vertical
802.11ac-HT80								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	32.56	34.65	11.62	40.54	38.29	54.00	-15.71	Horizontal
5725.00	31.76	34.65	11.62	40.54	37.49	54.00	-16.51	Vertical
802.11ac-HT80								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	41.56	34.63	11.75	40.69	47.25	78.20	-30.95	Horizontal
5850.00	40.53	34.63	11.75	40.69	46.22	78.20	-31.98	Vertical
802.11ac-HT80								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	31.26	34.63	11.75	40.69	36.95	54.00	-17.05	Horizontal
5850.00	30.15	34.63	11.75	40.69	35.84	54.00	-18.16	Vertical

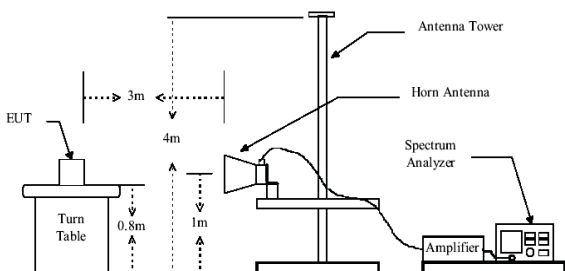
*Remark:*

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

Test Requirement:	FCC Part15 E Section 15.407(b)				
Test Method:	ANSI C63.10: 2009				
TestFrequencyRange:	Band 1: 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz Band 4: 5.35 GHz to 5.46 GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	Above 1GHz		68.2		Peak Value
			54.00		Average Value
Test Procedure:	<div>1. The EUT was placed on the top of a rotating table 0.8 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation.</div> <div>2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower.</div> <div>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.</div> <div>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading.</div> <div>5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode.</div> <div>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.</div>				
Test setup:	<div></div>				
Test Instruments:	Refer to section 5.6 for details				
Test mode:	Refer to section 5.3 for details				
Test results:	Passed				

**Band 1:**

**802.11a**

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	43.26	34.50	10.22	40.67	47.31	74.00	-26.69	Horizontal
4500.00	42.09	34.50	10.22	40.67	46.14	74.00	-27.86	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	32.98	34.50	10.22	40.67	37.03	54.00	-16.97	Horizontal
4500.00	31.06	34.50	10.22	40.67	35.11	54.00	-18.89	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	41.54	34.90	11.32	40.23	47.53	74.00	-26.47	Horizontal
5460.00	42.97	34.90	11.32	40.23	48.96	74.00	-25.04	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	31.45	34.90	11.32	40.23	37.44	54.00	-16.56	Horizontal
5460.00	32.63	34.90	11.32	40.23	38.62	54.00	-15.38	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-HT20

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	41.51	34.50	10.22	40.67	45.56	74.00	-28.44	Horizontal
4500.00	42.33	34.50	10.22	40.67	46.38	74.00	-27.62	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	31.08	34.50	10.22	40.67	35.13	54.00	-18.87	Horizontal
4500.00	32.64	34.50	10.22	40.67	36.69	54.00	-17.31	Vertical
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	42.98	34.90	11.32	40.23	48.97	74.00	-25.03	Horizontal
5460.00	42.05	34.90	11.32	40.23	48.04	74.00	-25.96	Vertical
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	31.19	34.90	11.32	40.23	37.18	54.00	-16.82	Horizontal
5460.00	32.75	34.90	11.32	40.23	38.74	54.00	-15.26	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	42.14	34.50	10.22	40.67	46.19	74.00	-27.81	Horizontal
4500.00	41.52	34.50	10.22	40.67	45.57	74.00	-28.43	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	32.68	34.50	10.22	40.67	36.73	54.00	-17.27	Horizontal
4500.00	31.43	34.50	10.22	40.67	35.48	54.00	-18.52	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	41.62	34.90	11.32	40.23	47.61	74.00	-26.39	Horizontal
5460.00	42.37	34.90	11.32	40.23	48.36	74.00	-25.64	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	31.29	34.90	11.32	40.23	37.28	54.00	-16.72	Horizontal
5460.00	33.62	34.90	11.32	40.23	39.61	54.00	-14.39	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.

## 802.11ac-HT80

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	41.84	34.50	10.22	40.67	45.89	74.00	-28.11	Horizontal
4500.00	41.62	34.50	10.22	40.67	45.67	74.00	-28.33	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	31.38	34.50	10.22	40.67	35.43	54.00	-18.57	Horizontal
4500.00	31.39	34.50	10.22	40.67	35.44	54.00	-18.56	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	41.68	34.90	11.32	40.23	47.67	74.00	-26.33	Horizontal
5460.00	41.79	34.90	11.32	40.23	47.78	74.00	-26.22	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	31.87	34.90	11.32	40.23	37.86	54.00	-16.14	Horizontal
5460.00	31.96	34.90	11.32	40.23	37.95	54.00	-16.05	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.36	35.37	11.19	40.18	48.74	74.00	-25.26	Horizontal
5350.00	41.65	35.37	11.19	40.18	48.03	74.00	-25.97	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	32.09	35.37	11.19	40.18	38.47	54.00	-15.53	Horizontal
5350.00	31.98	35.37	11.19	40.18	38.36	54.00	-15.64	Vertical
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	42.16	34.90	11.32	40.23	48.15	74.00	-25.85	Horizontal
5460.00	41.38	34.90	11.32	40.23	47.37	74.00	-26.63	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5460.00	33.29	34.90	11.32	40.23	39.28	54.00	-14.72	Horizontal
5460.00	32.04	34.90	11.32	40.23	38.03	54.00	-15.97	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-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	42.31	35.37	11.19	40.18	48.69	74.00	-25.31	Horizontal
5350.00	41.29	35.37	11.19	40.18	47.67	74.00	-26.33	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	32.64	35.37	11.19	40.18	39.02	54.00	-14.98	Horizontal
5350.00	31.26	35.37	11.19	40.18	37.64	54.00	-16.36	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	42.53	34.90	11.32	40.23	48.52	74.00	-25.48	Horizontal
5460.00	43.49	34.90	11.32	40.23	49.48	74.00	-24.52	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
5460.00	32.54	34.90	11.32	40.23	38.53	54.00	-15.47	Horizontal
5460.00	32.63	34.90	11.32	40.23	38.62	54.00	-15.38	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	42.16	35.37	11.19	40.18	48.54	74.00	-25.46	Horizontal
5350.00	43.62	35.37	11.19	40.18	50.00	74.00	-24.00	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	32.58	35.37	11.19	40.18	38.96	54.00	-15.04	Horizontal
5350.00	33.24	35.37	11.19	40.18	39.62	54.00	-14.38	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	42.23	34.90	11.32	40.23	48.22	74.00	-25.78	Horizontal
5460.00	42.01	34.90	11.32	40.23	48.00	74.00	-26.00	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	32.53	34.90	11.32	40.23	38.52	54.00	-15.48	Horizontal
5460.00	31.68	34.90	11.32	40.23	37.67	54.00	-16.33	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.



## 802.11ac-HT80

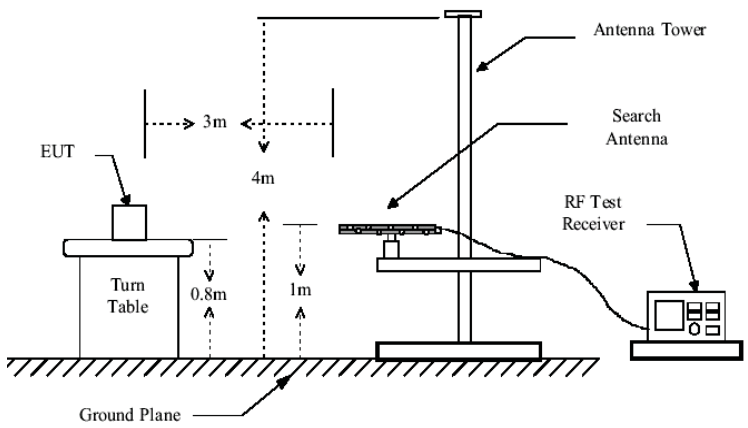
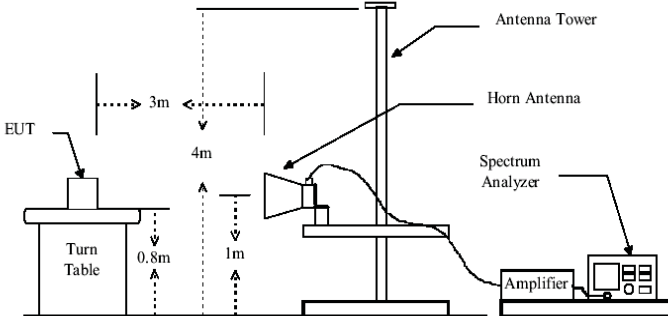
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	41.26	35.37	11.19	40.18	47.64	74.00	-26.36	Horizontal
5350.00	41.63	35.37	11.19	40.18	48.01	74.00	-25.99	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	31.84	35.37	11.19	40.18	38.22	54.00	-15.78	Horizontal
5350.00	31.23	35.37	11.19	40.18	37.61	54.00	-16.39	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	41.59	34.90	11.32	40.23	47.58	74.00	-26.42	Horizontal
5460.00	41.65	34.90	11.32	40.23	47.64	74.00	-26.36	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	31.02	34.90	11.32	40.23	37.01	54.00	-16.99	Horizontal
5460.00	31.82	34.90	11.32	40.23	37.81	54.00	-16.19	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.

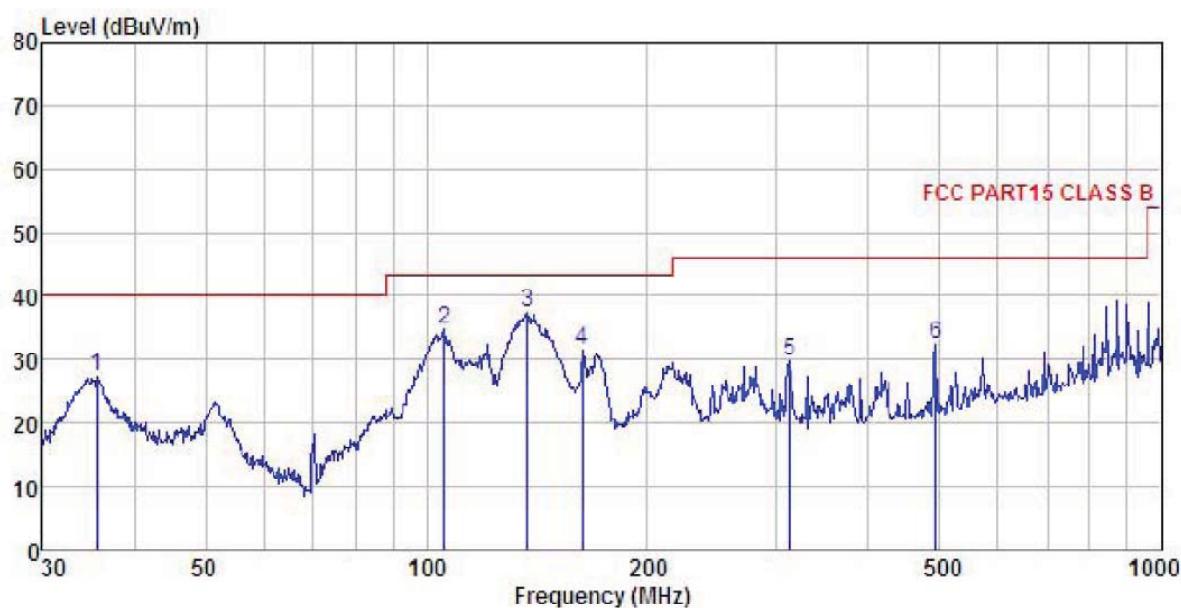
## 6.7.2 Unwanted Emissions out of the Restricted Bands

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2009				
TestFrequencyRange:	30MHz to 40GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Frequency		Limit (dBm/MHz)		Remark
	Above 1GHz		68.20		Peak Value
			54.00		Average Value
	Remark:				
	1. Above 1GHz limit: $E[dB\mu V/m] = EIRP[dBm] + 95.2=68.2 \text{ dBuV/m,for } EIPR[dBm]=-27dBm.$				
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 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 then the 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.				

Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test Uncertainty:	See page 4
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

## Below 1GHz

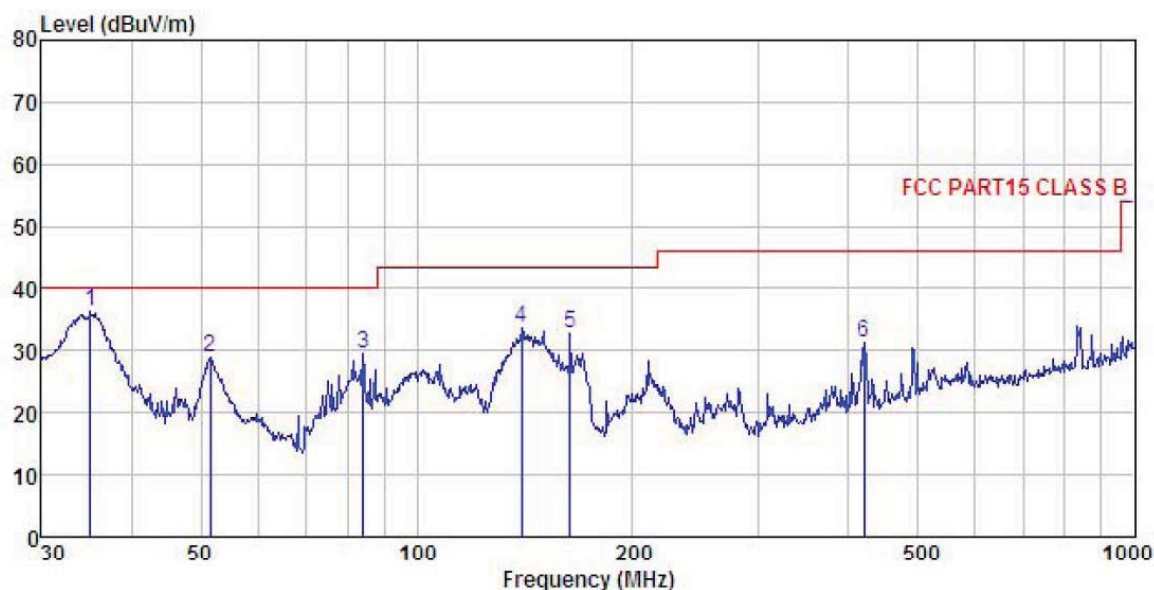
Horizontal:



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) HORIZONTAL  
 EUT : Android player Main board with wireless  
 Model : ASSY-1859ATMBA-V2  
 Test mode : 5G-Wifi Mode  
 Power Rating : AC120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: MT  
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dE/m	dB	dB	dBuV/m	dBuV/m	dB	
1	35.624	41.23	15.05	1.07	29.94	27.41	40.00	-12.59	QP
2	106.013	51.72	10.62	2.01	29.48	34.87	43.50	-8.63	QP
3	136.939	52.45	11.88	2.36	29.29	37.40	43.50	-6.10	QP
4	163.182	48.28	9.86	2.61	29.11	31.64	43.50	-11.86	QP
5	312.179	42.29	13.08	2.98	28.48	29.87	46.00	-16.13	QP
6	494.199	41.20	16.72	3.57	28.94	32.55	46.00	-13.45	QP

Vertical:



Site : 3m chamber  
 Condition : FCC PART15 CLASS B 3m VULB9163(30M3G) VERTICAL  
 EUT : Android player Main board with wireless  
 Model : ASSY-1859ATMBA-V2  
 Test mode : 5G-Wifi Mode  
 Power Rating : AC120V/60Hz  
 Environment : Temp:25.5°C Humi:55%  
 Test Engineer: MT  
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB/m		dB	dBuV/m	dBuV/m	dB	
1	35.128	50.46	14.79	1.04	29.95	36.34	40.00	-3.66	QP
2	51.481	43.51	13.85	1.27	29.81	28.82	40.00	-11.18	QP
3	84.110	49.86	7.35	1.79	29.61	29.39	40.00	-10.61	QP
4	139.851	48.93	11.74	2.39	29.27	33.79	43.50	-9.71	QP
5	163.755	49.25	9.86	2.62	29.10	32.63	43.50	-10.87	QP
6	420.580	40.89	16.03	3.13	28.82	31.23	46.00	-14.77	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	41.23	40.10	15.37	41.34	55.36	68.20	-12.84	Vertical
10360.00	42.14	40.10	15.37	41.34	56.27	68.20	-11.93	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	31.32	40.10	15.37	41.34	45.45	54.00	-8.55	Vertical
10360.00	32.64	40.10	15.37	41.34	46.77	54.00	-7.23	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	41.28	40.00	15.42	41.27	55.43	68.20	-12.77	Vertical
10400.00	41.12	40.00	15.42	41.27	55.27	68.20	-12.93	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	31.87	40.00	15.42	41.27	46.02	54.00	-7.98	Vertical
10400.00	31.32	40.00	15.42	41.27	45.47	54.00	-8.53	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	40.24	39.70	15.55	41.10	54.39	68.20	-13.81	Vertical
10480.00	40.32	39.70	15.55	41.10	54.47	68.20	-13.73	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	30.45	39.70	15.55	41.10	44.60	54.00	-9.40	Vertical
10480.00	30.08	39.70	15.55	41.10	44.23	54.00	-9.77	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	41.36	40.10	15.37	41.34	55.49	68.20	-12.71	Vertical
10360.00	40.56	40.10	15.37	41.34	54.69	68.20	-13.51	Horizontal
802.11n20 mode Lowest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	31.39	40.10	15.37	41.34	45.52	54.00	-8.48	Vertical
10360.00	30.42	40.10	15.37	41.34	44.55	54.00	-9.45	Horizontal

802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	42.48	40.00	15.42	41.27	56.63	68.20	-11.57	Vertical
10400.00	40.52	40.00	15.42	41.27	54.67	68.20	-13.53	Horizontal
802.11n20 mode Middle channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	32.48	40.00	15.42	41.27	46.63	54.00	-7.37	Vertical
10400.00	30.21	40.00	15.42	41.27	44.36	54.00	-9.64	Horizontal

802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	41.08	39.70	15.55	41.10	55.23	68.20	-12.97	Vertical
10480.00	42.51	39.70	15.55	41.10	56.66	68.20	-11.54	Horizontal
802.11n20 mode Highest channel (AverageValue)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	31.49	39.70	15.55	41.10	45.64	54.00	-8.36	Vertical
10480.00	32.63	39.70	15.55	41.10	46.78	54.00	-7.22	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	41.06	40.00	15.42	41.31	55.17	68.20	-13.03	Vertical
10380.00	40.42	40.00	15.42	41.31	54.53	68.20	-13.67	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	31.24	40.00	15.42	41.31	45.35	54.00	-8.65	Vertical
10380.00	30.16	40.00	15.42	41.31	44.27	54.00	-9.73	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	40.12	39.80	15.51	41.17	54.26	68.20	-13.94	Vertical
10460.00	41.23	39.80	15.51	41.17	55.37	68.20	-12.83	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	30.06	39.80	15.51	41.17	44.20	54.00	-9.80	Vertical
10460.00	31.51	39.80	15.51	41.17	45.65	54.00	-8.35	Horizontal

802.11ac-HT80MHz 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
10420.00	42.26	39.90	15.46	41.24	56.38	68.20	-11.82	Vertical
10420.00	41.21	39.90	15.46	41.24	55.33	68.20	-12.87	Horizontal
802.11ac-HT80MHz 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
10420.00	32.48	39.90	15.46	41.24	46.60	54.00	-7.40	Vertical
10420.00	30.14	39.90	15.46	41.24	44.26	54.00	-9.74	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	41.24	41.50	16.83	40.75	58.82	74.00	-15.18	Vertical
11490.00	41.82	41.50	16.83	40.75	59.40	74.00	-14.60	Horizontal
802.11a mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	31.28	41.50	16.83	40.75	48.86	54.00	-5.14	Vertical
11490.00	32.98	41.50	16.83	40.75	50.56	54.00	-3.44	Horizontal

802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	40.42	41.38	16.90	40.91	57.79	74.00	-16.21	Vertical
11570.00	40.62	41.38	16.90	40.91	57.99	74.00	-16.01	Horizontal
802.11a mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	31.54	41.38	16.90	40.91	48.91	54.00	-5.09	Vertical
11570.00	31.24	41.38	16.90	40.91	48.61	54.00	-5.39	Horizontal

802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	40.79	41.26	16.97	41.06	57.96	74.00	-16.04	Vertical
11650.00	40.17	41.26	16.97	41.06	57.34	74.00	-16.66	Horizontal
802.11a mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	31.12	41.26	16.97	41.06	48.29	54.00	-5.71	Vertical
11650.00	30.24	41.26	16.97	41.06	47.41	54.00	-6.59	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	40.23	41.50	16.83	40.75	57.81	74.00	-16.19	Vertical
11490.00	39.54	41.50	16.83	40.75	57.12	74.00	-16.88	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	30.25	41.50	16.83	40.75	47.83	54.00	-6.17	Vertical
11490.00	29.75	41.50	16.83	40.75	47.33	54.00	-6.67	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	41.98	41.38	16.90	40.91	59.35	74.00	-14.65	Vertical
11570.00	42.03	41.38	16.90	40.91	59.40	74.00	-14.60	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	31.67	41.38	16.90	40.91	49.04	54.00	-4.96	Vertical
11570.00	32.62	41.38	16.90	40.91	49.99	54.00	-4.01	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	40.59	41.26	16.97	41.06	57.76	74.00	-16.24	Vertical
11650.00	41.18	41.26	16.97	41.06	58.35	74.00	-15.65	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	30.54	41.26	16.97	41.06	47.71	54.00	-6.29	Vertical
11650.00	31.48	41.26	16.97	41.06	48.65	54.00	-5.35	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)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	40.09	41.50	16.83	40.77	57.65	74.00	-16.35	Vertical
11510.00	39.52	41.50	16.83	40.77	57.08	74.00	-16.92	Horizontal
802.11n40 mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	30.62	41.50	16.83	40.77	48.18	54.00	-5.82	Vertical
11510.00	29.57	41.50	16.83	40.77	47.13	54.00	-6.87	Horizontal

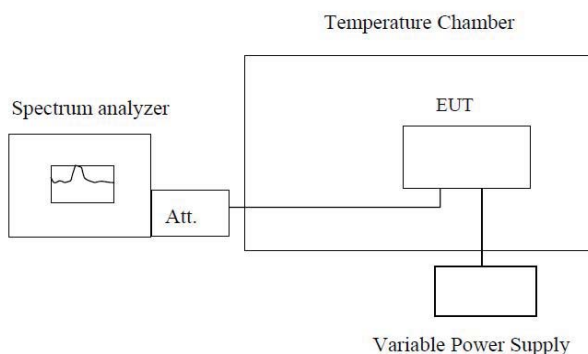
802.11n40 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	41.01	41.32	16.93	40.95	58.31	74.00	-15.69	Vertical
11590.00	40.16	41.32	16.93	40.95	57.46	74.00	-16.54	Horizontal
802.11n40 mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	31.54	41.32	16.93	40.95	48.84	54.00	-5.16	Vertical
11590.00	30.26	41.32	16.93	40.95	47.56	54.00	-6.44	Horizontal

802.11ac-HT80 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.00	42.36	41.44	16.86	40.88	59.78	74.00	-14.22	Vertical
11550.00	41.79	41.44	16.86	40.88	59.21	74.00	-14.79	Horizontal
802.11ac-HT80 mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.00	31.59	41.44	16.86	40.88	49.01	54.00	-4.99	Vertical
11550.00	31.69	41.44	16.86	40.88	49.11	54.00	-4.89	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 ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
Test setup:	 <p>Note : Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> <li>1. The EUT is installed in an environment test chamber with external power source.</li> <li>2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.</li> <li>3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.</li> <li>4. When temperature is stabled, measure the frequency stability.</li> <li>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.</li> </ol>
Test Instruments:	Refer to section 5.6 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(ac)		
20	102V	5179.997632	0.46
	120V	5179.974748	4.87
	138V	5179.963920	6.97

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

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(ac)	Temp(℃)		
120V	-20	5179.987041	2.50
	-10	5179.995369	0.89
	0	5179.968418	6.10
	10	5179.987569	2.40
	20	5179.996638	0.65
	30	5179.974248	4.97
	40	5179.963784	6.99
	50	5179.974963	4.83

## Band 4:

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

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(ac)		
20	102V	5744.974745	4.40
	120V	5744.993362	1.16
	138V	5744.998526	0.26

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

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(ac)	Temp(℃)		
120V	-20	5744.994745	0.91
	-10	5744.993639	1.11
	0	5744.994785	0.91
	10	5744.985369	2.55
	20	5744.993852	1.07
	30	5744.994478	0.96
	40	5744.999369	0.11
	50	5744.992452	1.31