FCC REPORT

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:	4K Media Player
Model No.:	InVision 4K Media Player, 503-HD4KRK328
FCC ID:	2AB6Z-INVISION4K
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	02 Jul., 2015
Date of Test:	02 Jul., to 10 Aug., 2015
Date of report issued:	10 Aug., 2015
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	*10 Aug., 2015*	*Original*

Prepared by: Sera Xiang ***Date:*** *10 Aug., 2015*

Report Clerk

Reviewed by: Vimer Zhang ***Date:*** *10 Aug., 2015*

Project Engineer

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4 Test Summary

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

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

Remark: Test according to ANSI C63.4:2009.

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:	HUNG WAI ELECTRONICS (HUIZHOU) LTD.
Address of Manufacturer:	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:	4K Media Player
Model No.:	InVision 4K Media Player, 503-HD4KRK328
Operation Frequency:	Band 1: 5180MHz-5240MHz Band 4: 5745MHz-5825MHz
Operation mode:	Indoor used
Channel numbers:	Band 1: 802.11a/802.11n20: 4, Band 4: 802.11a/802.11n20: 5,
Channel separation:	802.11a/802.11n20: 20MHz
Modulation technology: (IEEE 802.11a)	BPSK, QPSK,16-QAM, 64-QAM
Modulation technology: (IEEE 802.11n)	BPSK, QPSK, 16-QAM, 64-QAM
Data speed(IEEE 802.11a)	6Mbps, 9Mbps,12Mbps,18Mbps, 24Mbps,36Mbps,48Mbps, 54Mbps
Data speed (IEEE 802.11n20):	MCS0: 6.5Mbps, MCS1:13Mbps, MCS2:19.5Mbps, MCS3:26Mbps, MCS4:39Mbps, MCS5:52Mbps, MCS6:58.5Mbps, MCS7:65Mbps
Antenna Type:	External Antenna
Antenna gain:	2 dBi
AC adapter :	Model No.: PS18C120K1500UD Input:100-240V AC,50/60Hz 0.5A Output:12.0V DC MAX 1500mA
Remark:	Model No.: InVision 4K Media Player, 503-HD4KRK328 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being different Model Number for customer and for HUNG WAI.

Operation Frequency each of channel

Band 1			
802.11a/802.11n20			
Channel	Frequency		
36	5180MHz		
40	5200MHz		
44	5220MHz		
48	5240MHz		
Band 4			
802.11a/802.11n20			
Channel	Frequency		
149	5745MHz		
153	5765MHz		
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			
Channel	Frequency		
The lowest channel	5180MHz		
The middle channel	5200MHz		
The highest channel	5240MHz		
Band 4			
802.11a/802.11n20			
Channel	Frequency		
The lowest channel	5745MHz		
The middle channel	5785MHz		
The highest channel	5825MHz		

5.3 Test environment and mode

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

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

Per-scan all kind of data rate 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

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. All test items for 802.11a and 802.11n were performed with duty cycle above 98%, meet the requirements of KDB789033.

5.4 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 out files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

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

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

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

5.5 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

5.6 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 Semi - Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2014	08-22-2017
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	03-28-2015	03-28-2016
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	03-28-2015	03-28-2016
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	04-01-2015	03-31-2016
6	Amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	04-01-2015	03-31-2016
7	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	04-01-2015	03-31-2016
8	Horn Antenna	ETS-LINDGREN	3160	GTS217	04-01-2015	03-31-2016
9	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
10	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
11	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	03-28-2015	03-28-2016
12	EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	03-28-2015	03-28-2016
13	Loop antenna	Laplace instrument	RF300	EMC0701	04-01-2015	03-31-2016
14	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	03-28-2015	03-28-2016
15	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	04-08-2015	04-08-2016

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	11-10-2012	11-09-2015
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	03-28-2015	03-28-2016
3	LISN	CHASE	MN2050D	CCIS0074	03-28-2015	03-28-2016
4	Coaxial Cable	CCIS	N/A	CCIS0086	04-01-2015	03-31-2016
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement

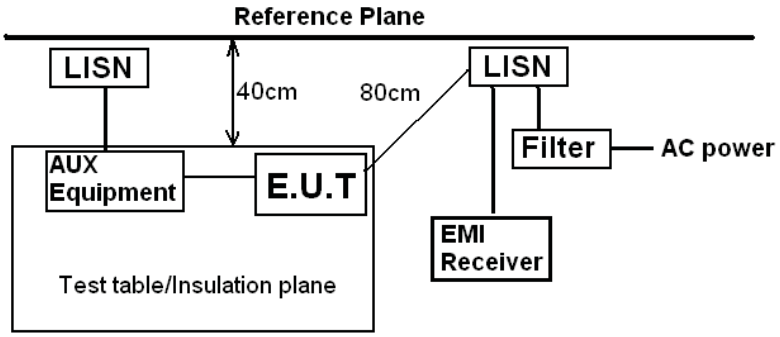
Standard requirement:	FCC Part15 E Section 15.203 /407(a)

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

E.U.T Antenna:	

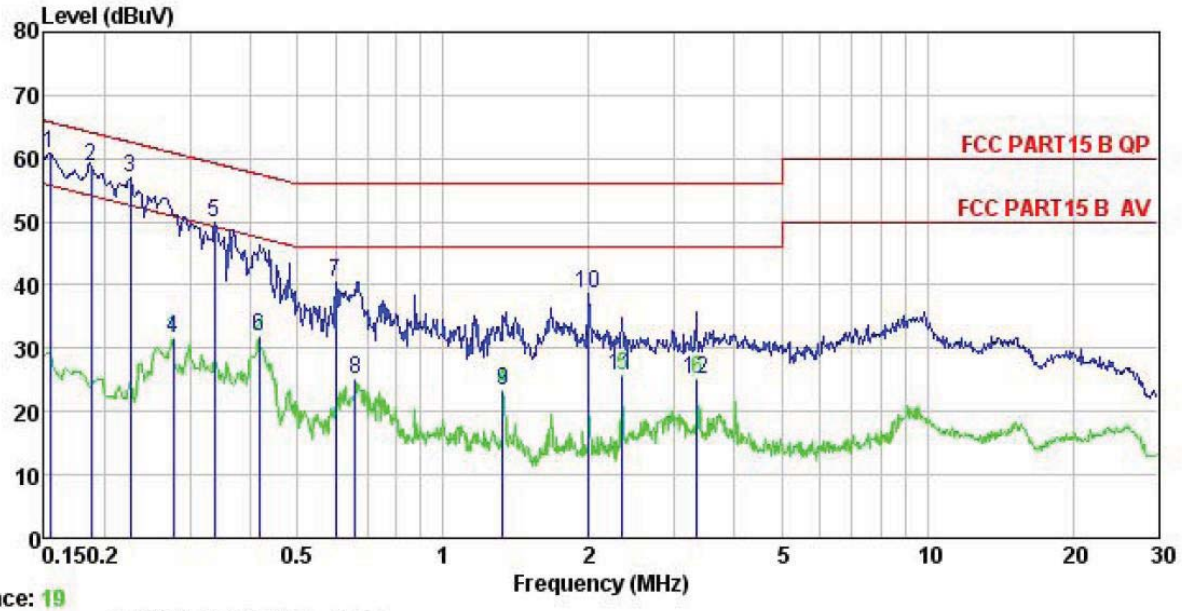
The antenna of EUT is a Reverse-SMA Antenna, which cannot be replaced by end-user. And the antenna gain is 2 dBi.

6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4: 2009
Test Frequency Range:	150 kHz to 30 MHz
Class / Severity:	Class B
Receiver setup:	RBW=9 kHz, VBW=30 kHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). It provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data

Line:

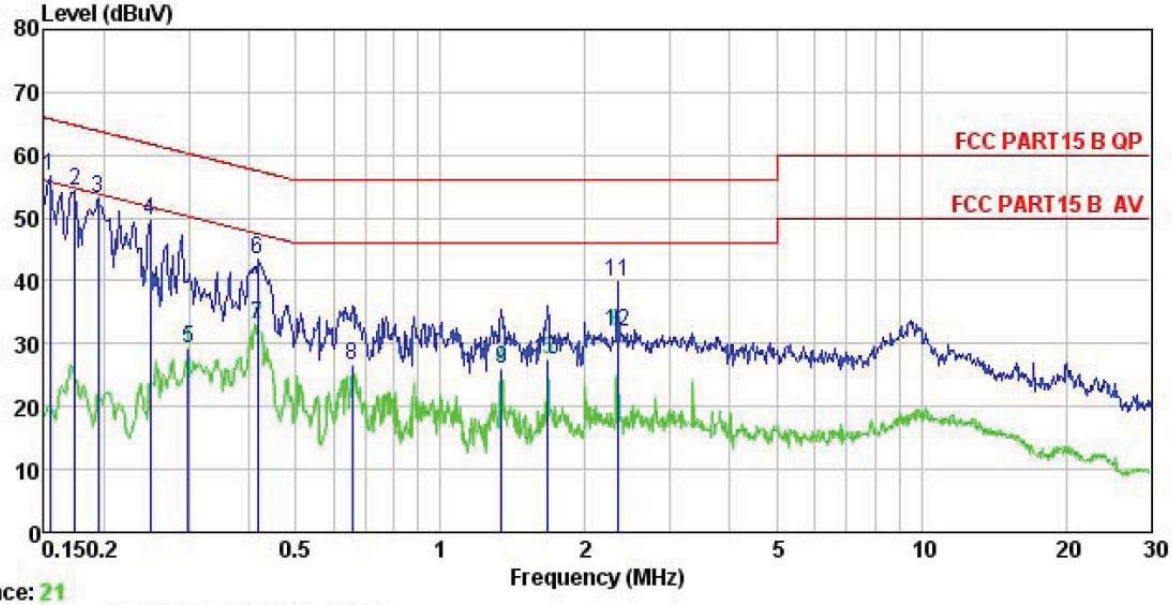


Trace: 19

Site : CCIS Shielding Room
Condition : FCC PART15 B QP LISN LINE
Job No. : 533RF
EUT : 4K Media Player
Model : InVision 4K Media Player, 503-HD4KRK328
Test Mode : 5GWifi mode
Power Rating : AC120V/60Hz
Environment : Temp: 23 'C Huni: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	0.154	49.83	0.27	10.78	60.88	65.78	-4.90	QP
2	0.187	47.80	0.28	10.76	58.84	64.15	-5.31	QP
3	0.226	46.04	0.27	10.75	57.06	62.61	-5.55	QP
4	0.277	20.54	0.26	10.74	31.54	50.90	-19.36	Average
5	0.337	38.94	0.27	10.73	49.94	59.27	-9.33	QP
6	0.417	20.98	0.28	10.73	31.99	47.51	-15.52	Average
7	0.601	29.42	0.25	10.77	40.44	56.00	-15.56	QP
8	0.658	14.03	0.23	10.77	25.03	46.00	-20.97	Average
9	1.331	12.07	0.25	10.91	23.23	46.00	-22.77	Average
10	2.001	27.42	0.26	10.96	38.64	56.00	-17.36	QP
11	2.346	14.61	0.26	10.94	25.81	46.00	-20.19	Average
12	3.346	13.80	0.27	10.91	24.98	46.00	-21.02	Average

Neutral:



Trace: 21

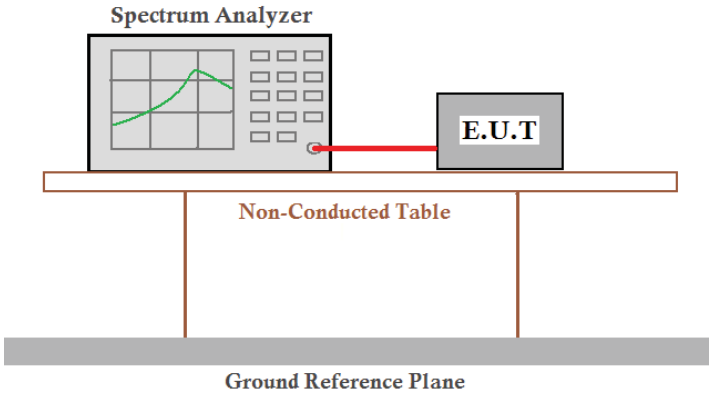
```
Site          : CCIS Shielding Room
Condition     : FCC PART15 B QP LISN NEUTRAL
Job No.       : 533RF
EUT           : 4K Media Player
Model         : InVision 4K Media Player, 503-HD4KRK328
Test Mode     : 5GWifi mode
Power Rating  : AC120V/60Hz
Environment   : Temp: 23 'C Huni:56%  Atmos:101KPa
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	0.154	45.74	0.25	10.78	56.77	65.78	-9.01	QP
2	0.174	43.30	0.25	10.77	54.32	64.77	-10.45	QP
3	0.194	42.23	0.25	10.76	53.24	63.84	-10.60	QP
4	0.249	38.69	0.26	10.75	49.70	61.78	-12.08	QP
5	0.299	18.19	0.26	10.74	29.19	50.28	-21.09	Average
6	0.417	32.33	0.26	10.73	43.32	57.51	-14.19	QP
7	0.417	22.19	0.26	10.73	33.18	47.51	-14.33	Average
8	0.654	15.45	0.20	10.77	26.42	46.00	-19.58	Average
9	1.338	14.74	0.25	10.91	25.90	46.00	-20.10	Average
10	1.671	16.17	0.27	10.94	27.38	46.00	-18.62	Average
11	2.334	28.55	0.29	10.94	39.78	56.00	-16.22	QP
12	2.334	20.73	0.29	10.94	31.96	46.00	-14.04	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 C63.4: 2009, KDB 789033
Limit:	**Band 1:** 1 W (For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.); **Band 4:** 1W.
Test setup:	
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	15.88	30.00	Pass
	Middle	15.56	30.00	Pass
	Highest	15.52	30.00	Pass
802.11n20	Lowest	14.23	30.00	Pass
	Middle	14.18	30.00	Pass
	Highest	13.91	30.00	Pass

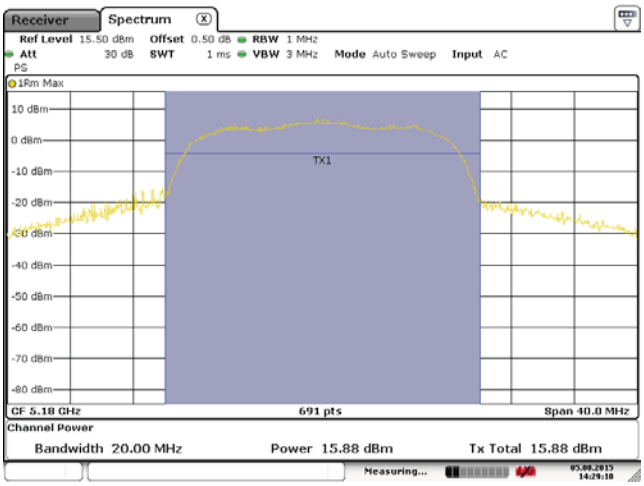
Band 4

Mode	Test CH	Conducted Output power (dBm)	Limit (dBm)	Result
802.11a	Lowest	13.48	30.00	Pass
	Middle	13.43	30.00	Pass
	Highest	13.34	30.00	Pass
802.11n20	Lowest	12.57	30.00	Pass
	Middle	12.52	30.00	Pass
	Highest	12.53	30.00	Pass

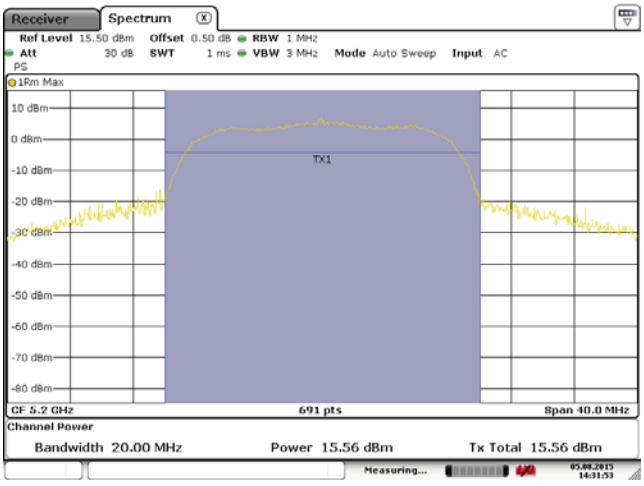
Test plot as follows:

Band 1

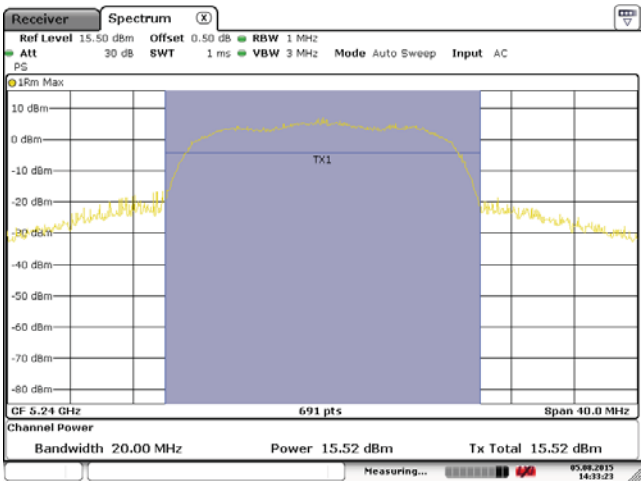
802.11a



Lowest channel

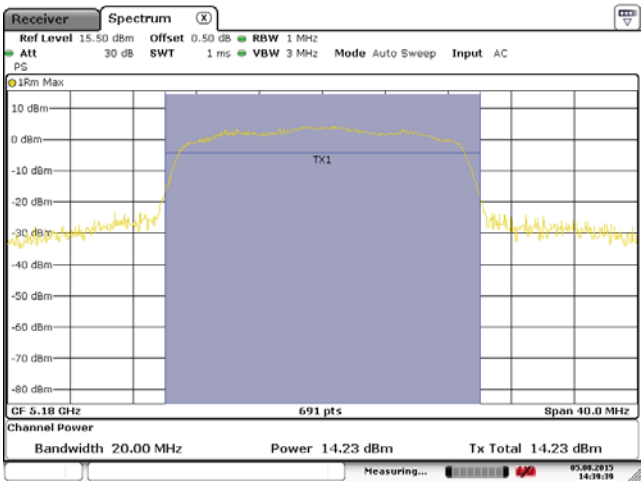


Middle channel

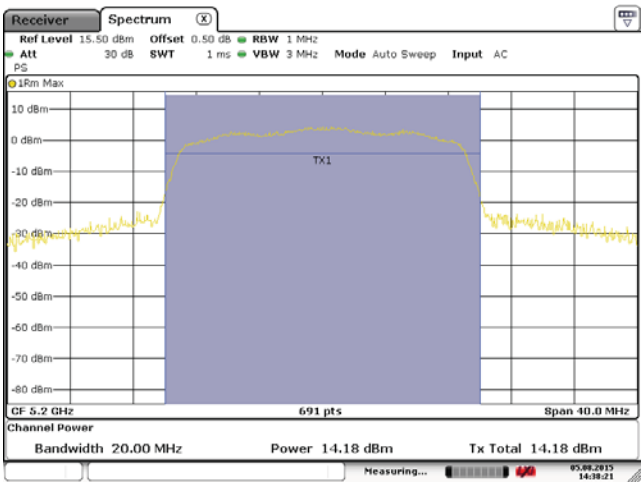


Highest channel

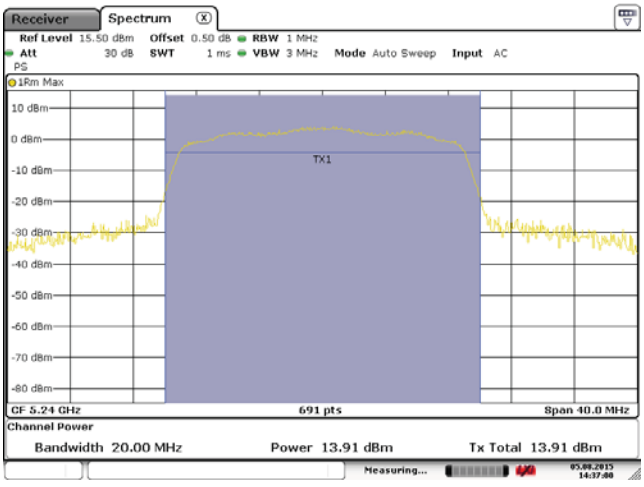
802.11n20



Lowest channel



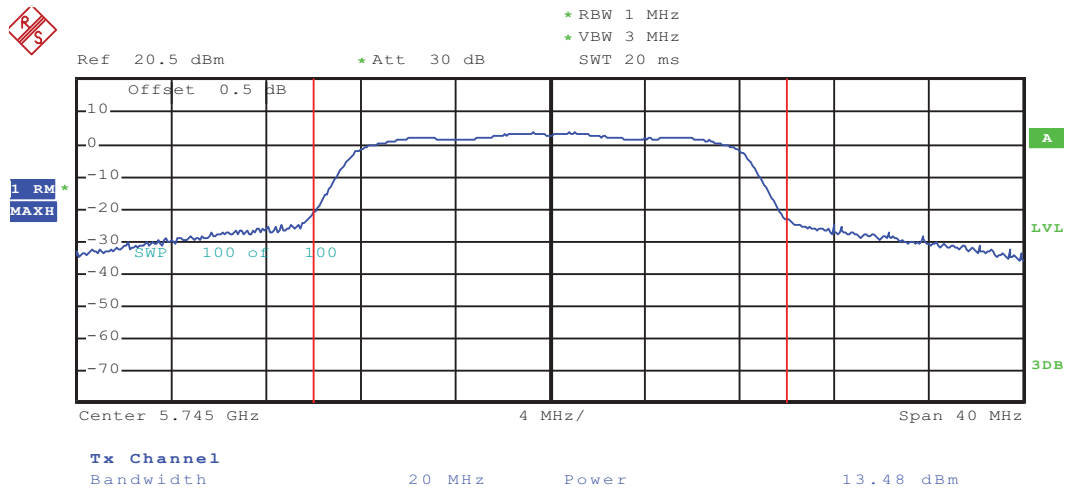
Middle channel



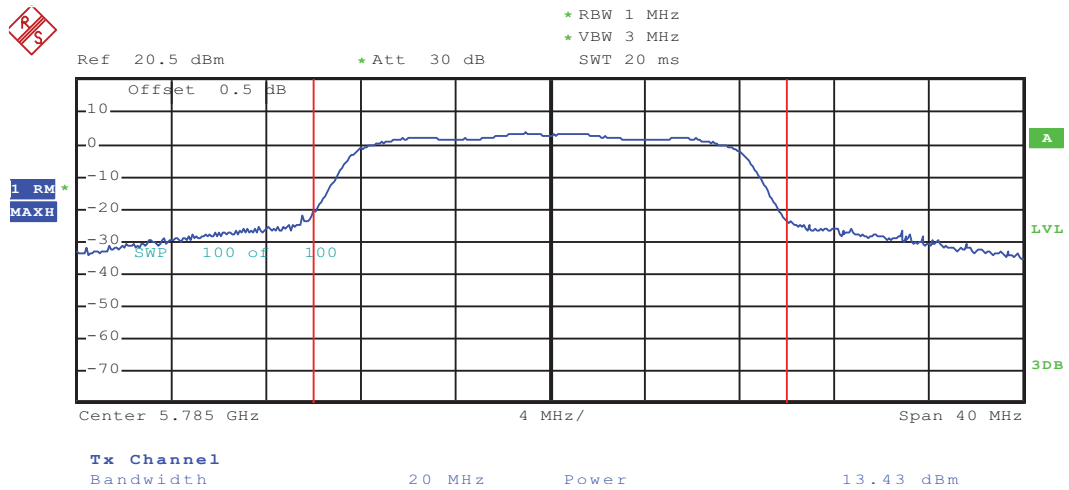
Highest channel

Band 4:

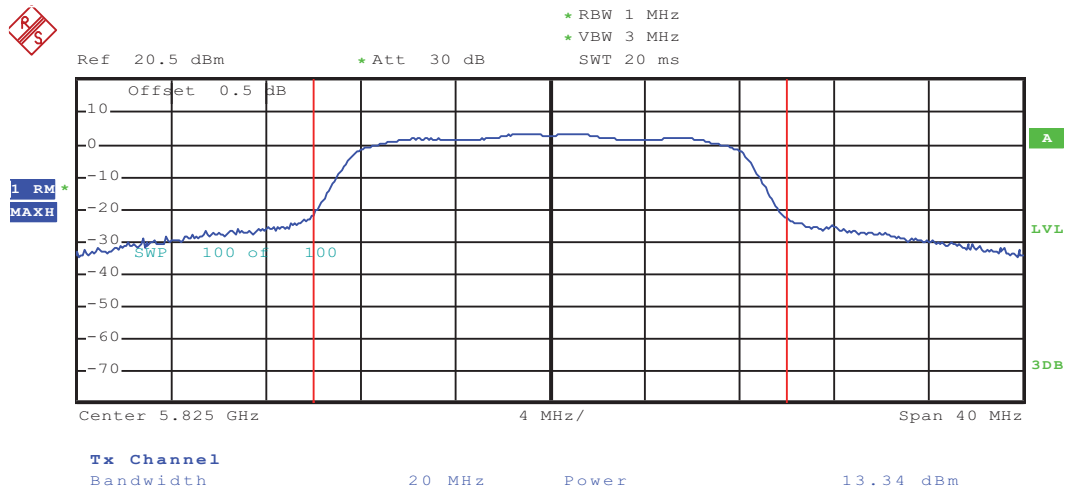
802.11a



Lowest channel

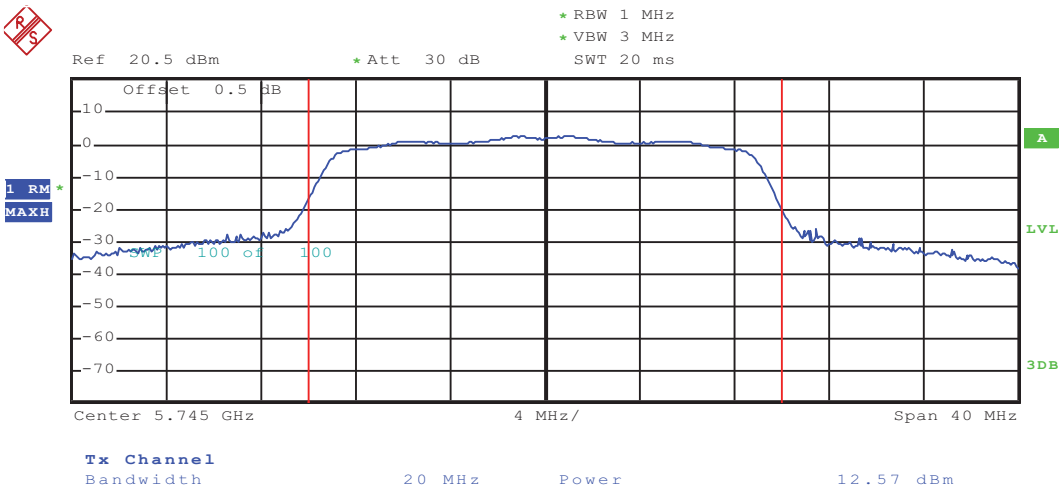


Middle channel

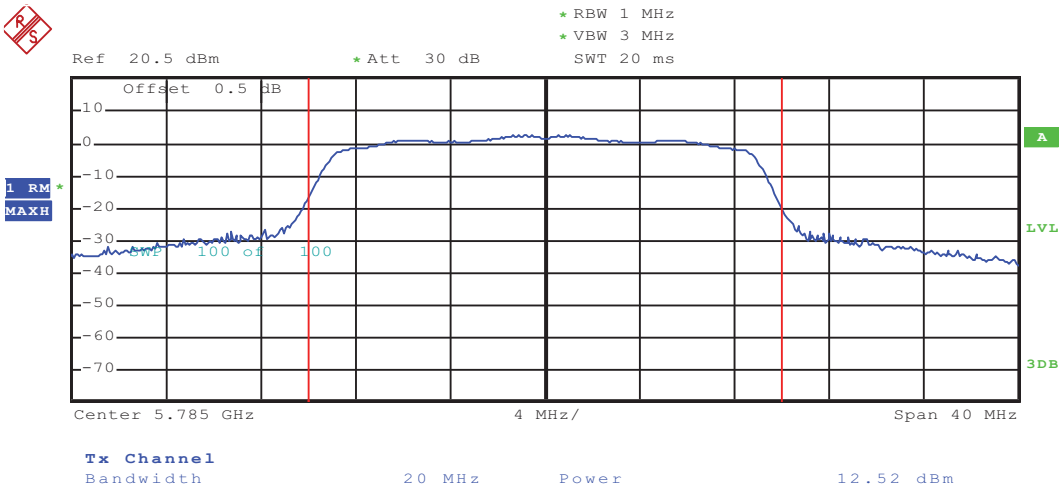


Highest channel

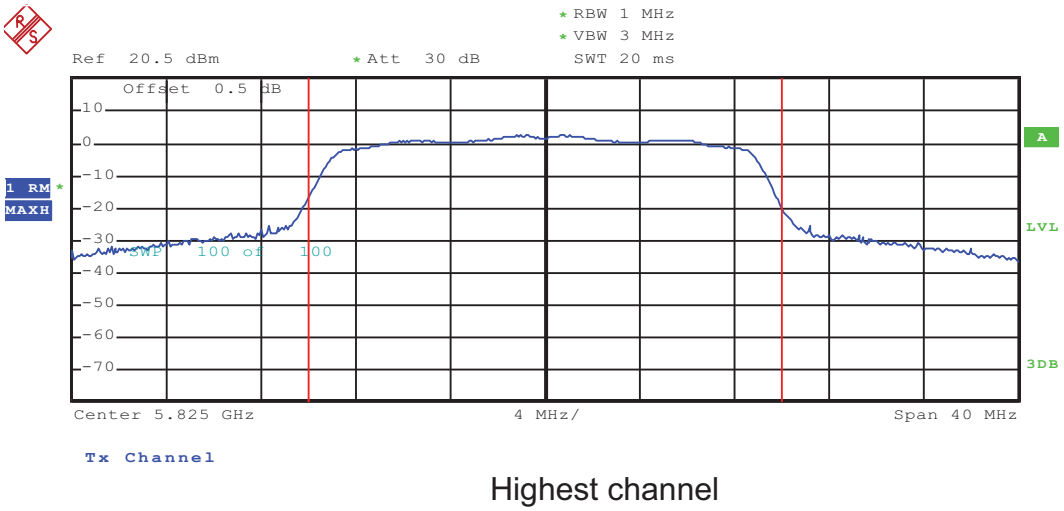
802.11n20



Lowest channel

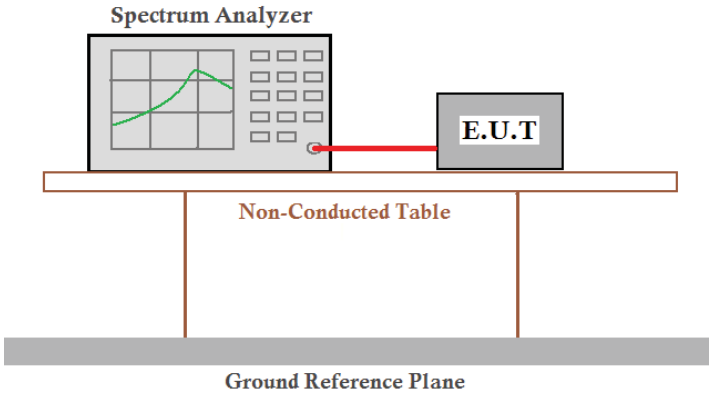


Middle channel



Highest channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 E Section 15.407 (a) (5) and Section 15.407 (e)
Test Method:	ANSI C63.4:2009 and KDB 789033
Limit:	Band 1: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: N/A(26dB Emission Bandwidth and 99% Occupy Bandwidth) Band 4: >500kHz(6dB Bandwidth)
Test setup:	
Test Instruments:	Refer to section 5.6 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		
Lowest	18.93	19.39	N/A	N/A
Middle	18.87	19.33		
Highest	18.99	19.28		

Test Channel	99% Occupy Bandwidth (MHz)		Limit	Result
	802.11a	802.11n20		
Lowest	16.67	17.54	N/A	N/A
Middle	16.61	17.54		
Highest	16.61	17.48		

Band 4:

Test Channel	26dB Emission Bandwidth (MHz)		Limit	Result
	802.11a	802.11n20		
Lowest	20.64	19.84	N/A	N/A
Middle	20.80	20.80		
Highest	22.72	20.48		

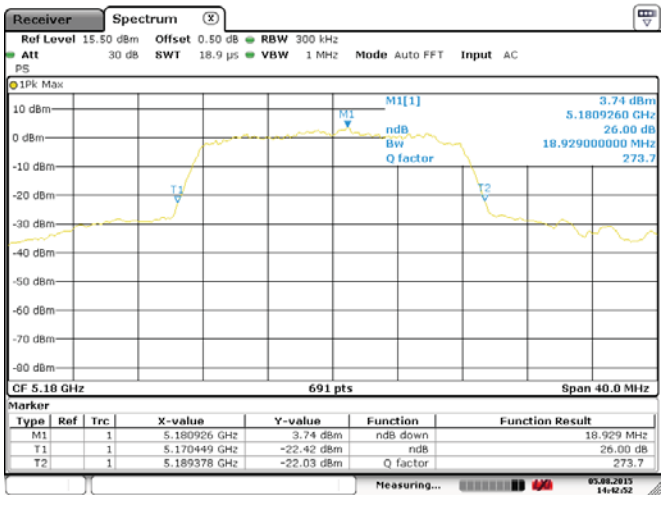
Test Channel	99% Occupy Bandwidth (MHz)		Limit	Result
	802.11a	802.11n20		
Lowest	16.88	17.76	N/A	N/A
Middle	16.88	17.76		
Highest	16.88	17.68		

Test Channel	6dB Emission Bandwidth (MHz)		Limit	Result
	802.11a	802.11n20		
Lowest	15.76	16.16	>500kHz	N/A
Middle	15.52	16.24		
Highest	15.68	16.24		

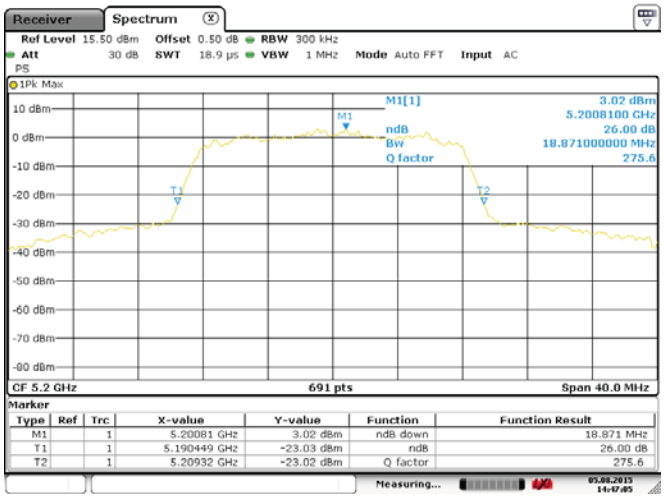
Test plot as follows:

Band 1:

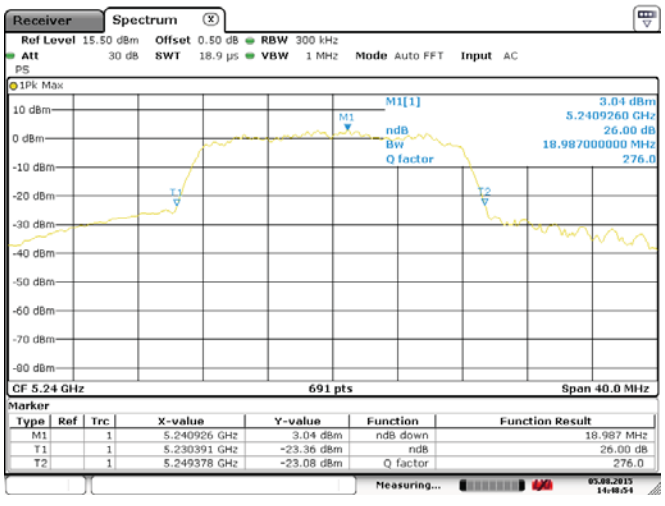
26 dB EBW - 802.11a



Lowest channel

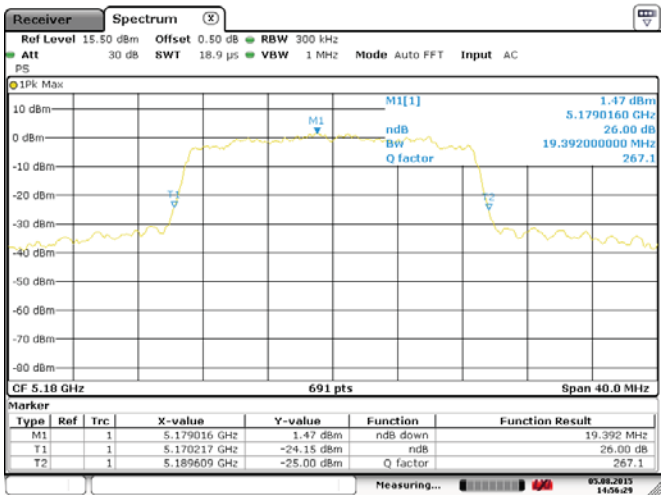


Middle channel

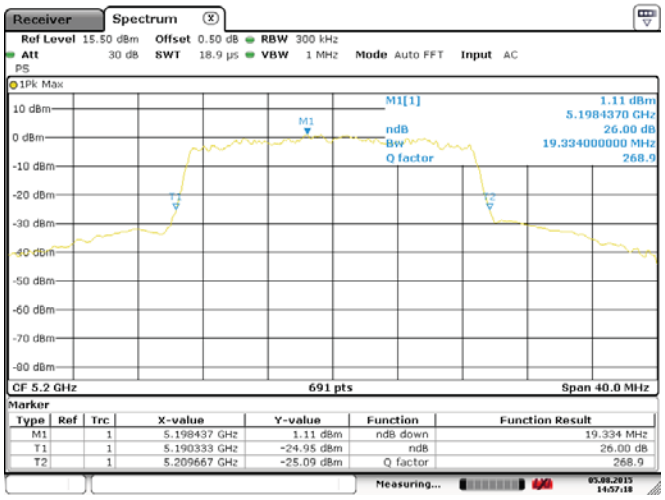


Highest channel

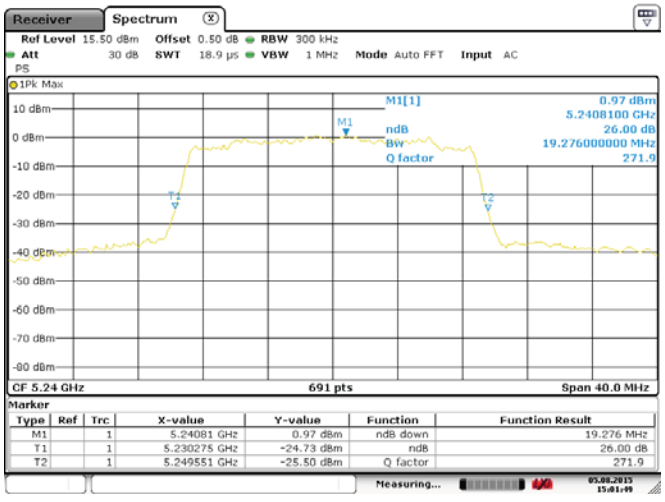
802.11n20



Lowest channel

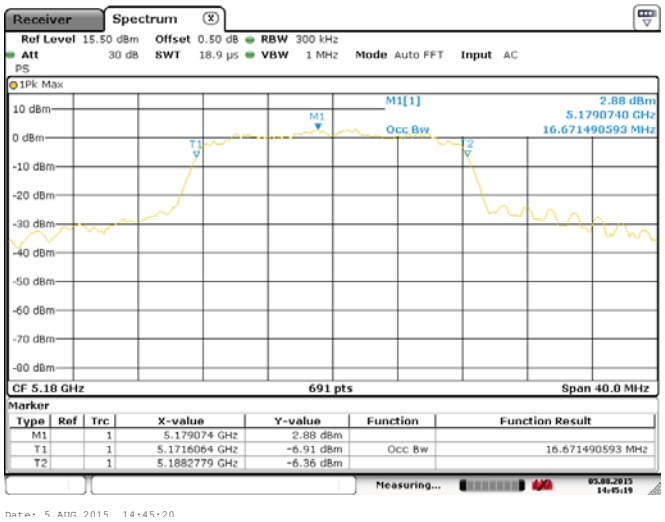


Middle channel

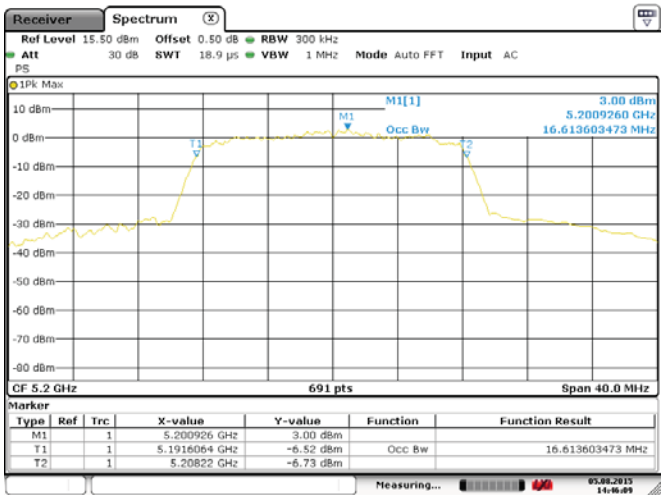


Highest channel

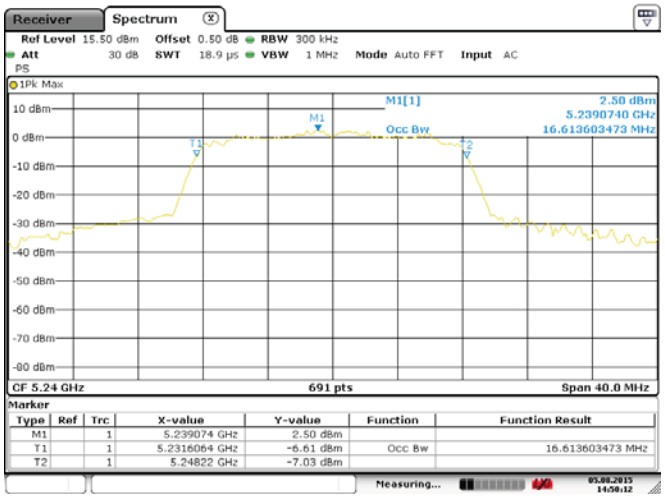
99% OBW - 802.11a



Lowest channel

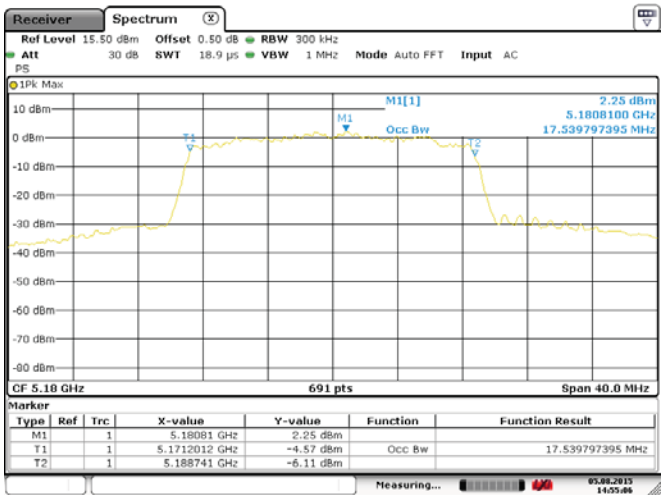


Middle channel

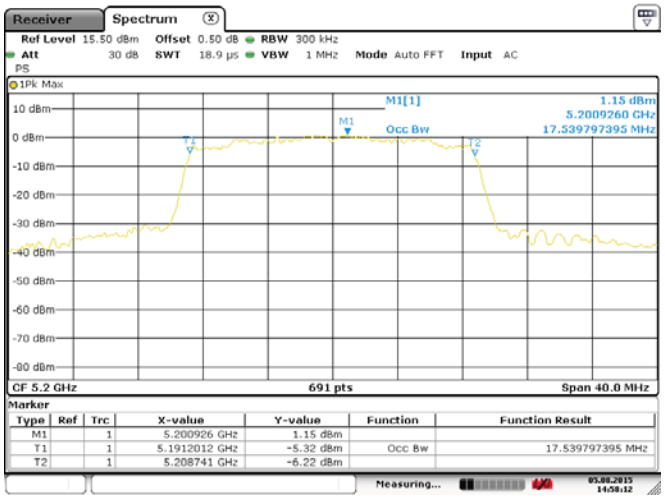


Highest channel

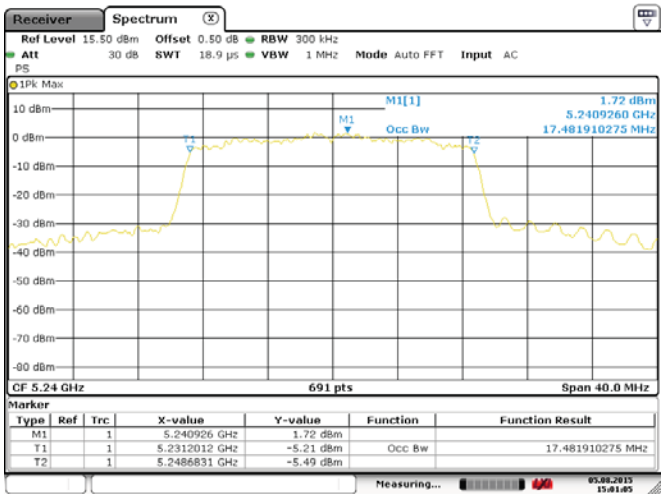
802.11n20



Lowest channel



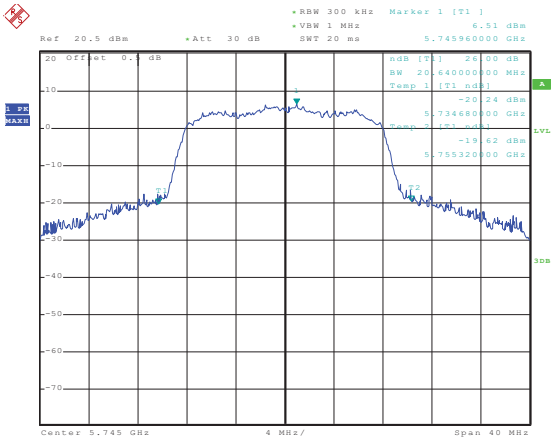
Middle channel



Highest channel

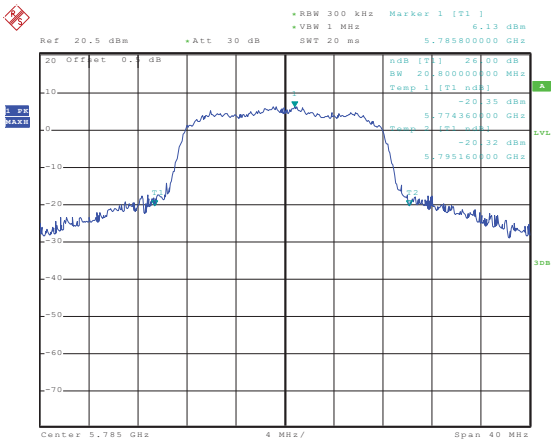
Band 4:

26 dB EBW - 802.11a



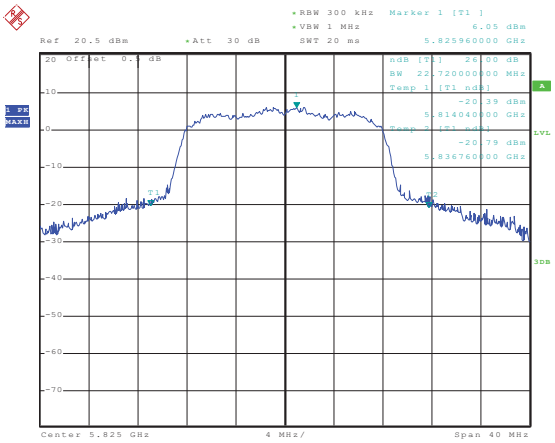
Date: 1.AUG.2015 11:42:49

Lowest channel



Date: 1.AUG.2015 11:43:28

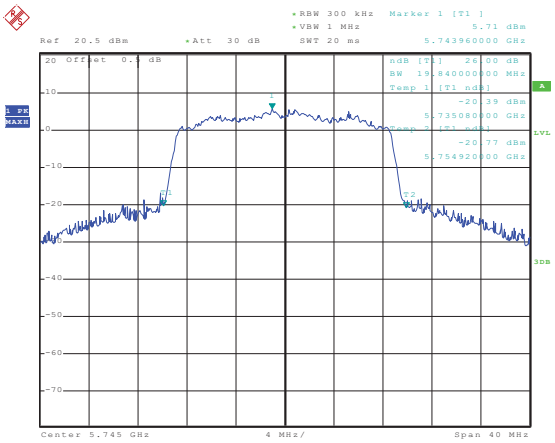
Middle channel



Date: 1.AUG.2015 11:44:31

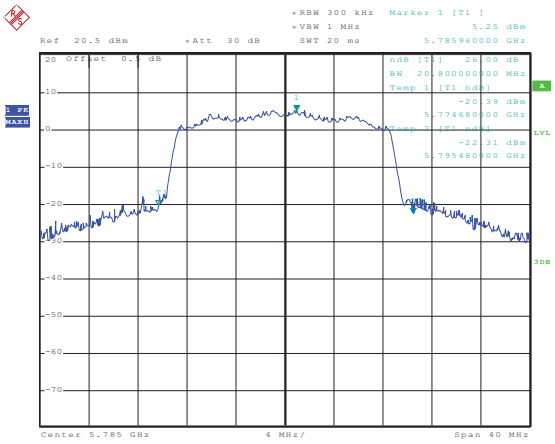
Highest channel

802.11n20



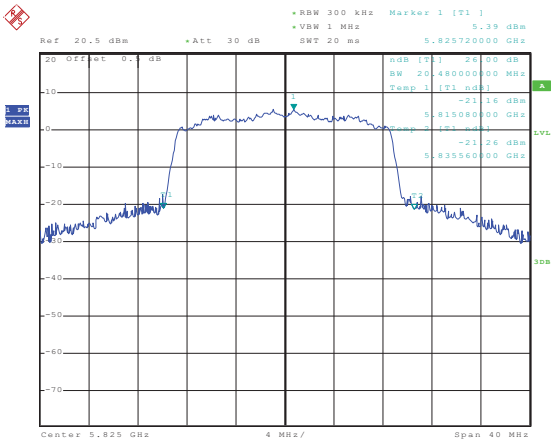
Date: 1.AUG.2015 11:45:13

Lowest channel



Date: 1.AUG.2015 11:59:18

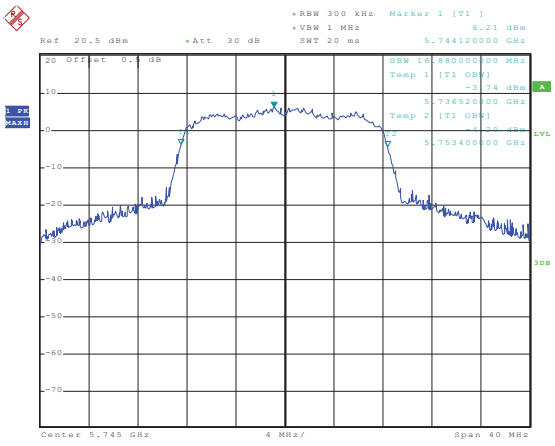
Middle channel



Date: 1.AUG.2015 11:59:54

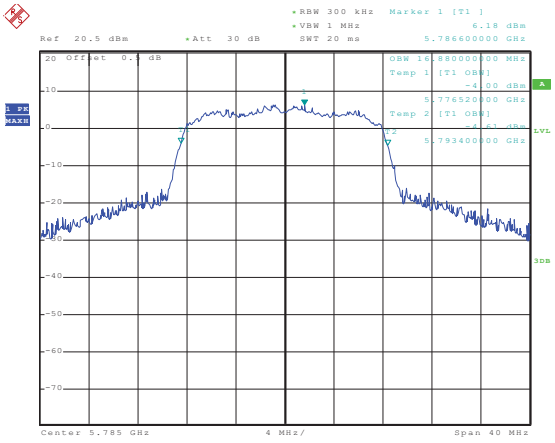
Highest channel

99% OBW - 802.11a



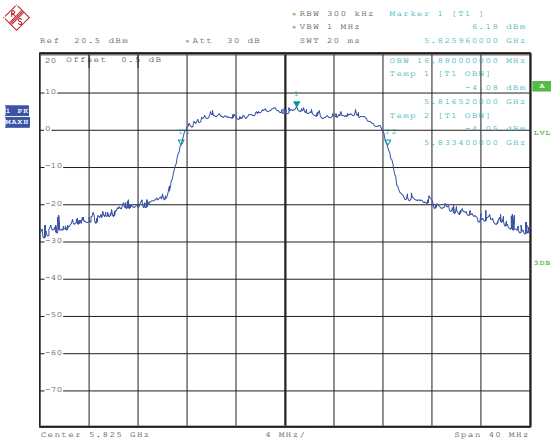
Date: 1.AUG.2015 11:42:30

Lowest channel



Date: 1.AUG.2015 11:43:41

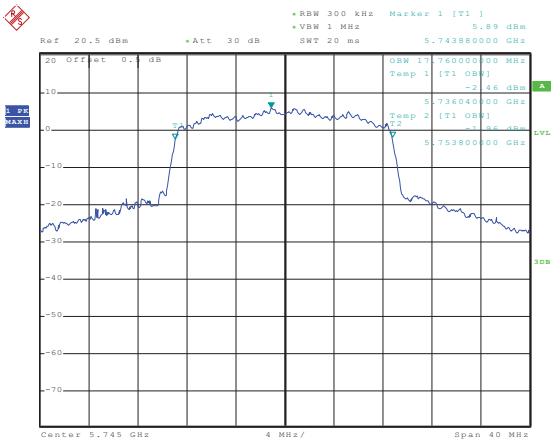
Middle channel



Date: 1.AUG.2015 11:44:12

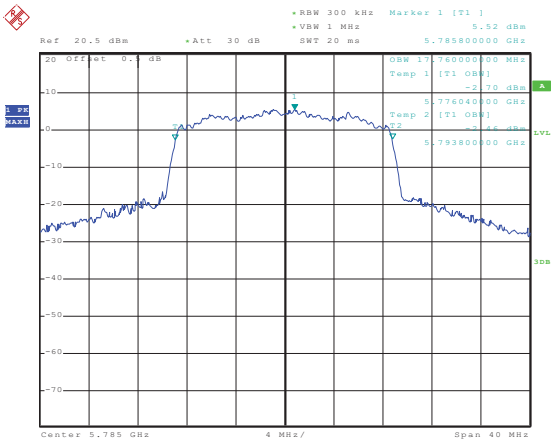
Highest channel

802.11n20



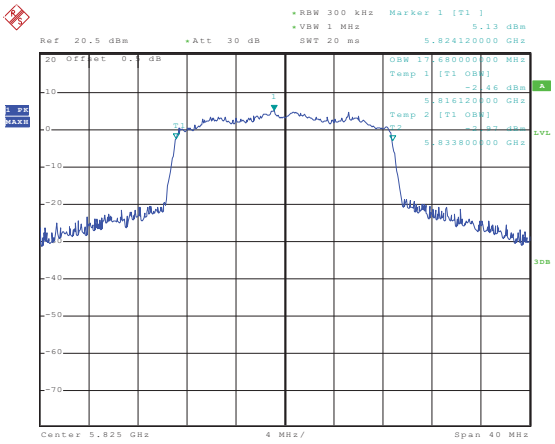
Date: 1.AUG.2015 11:54:48

Lowest channel



Date: 1.AUG.2015 11:58:32

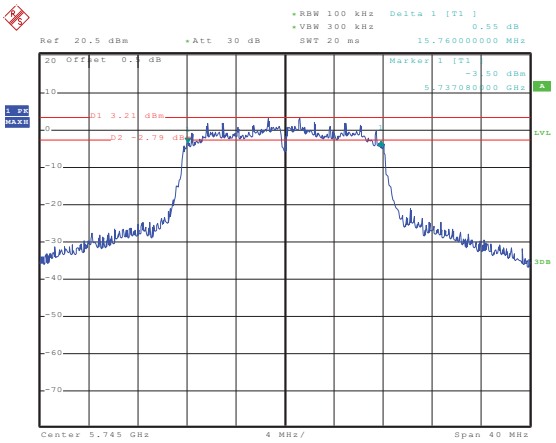
Middle channel



Date: 1.AUG.2015 12:00:08

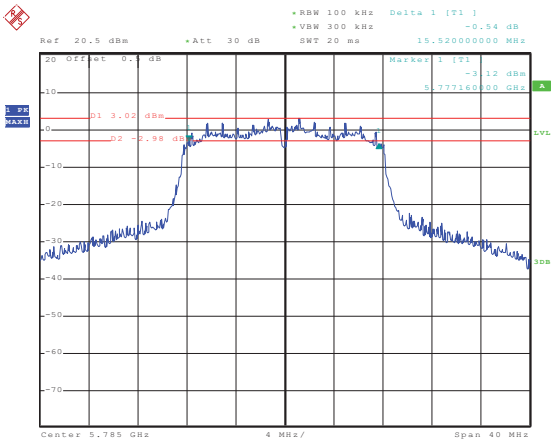
Highest channel

6 dB BW - 802.11a



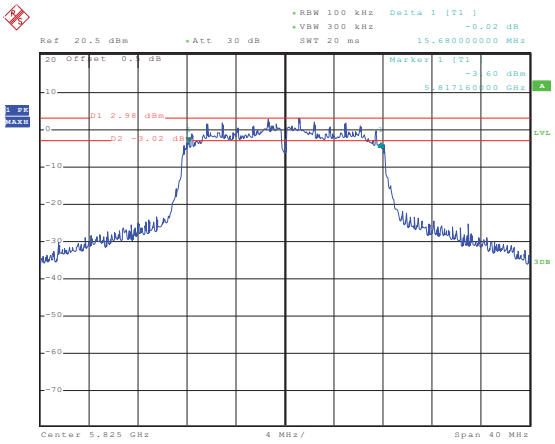
Date: 1.AUG.2015 12:06:28

Lowest channel



Date: 1.AUG.2015 12:07:56

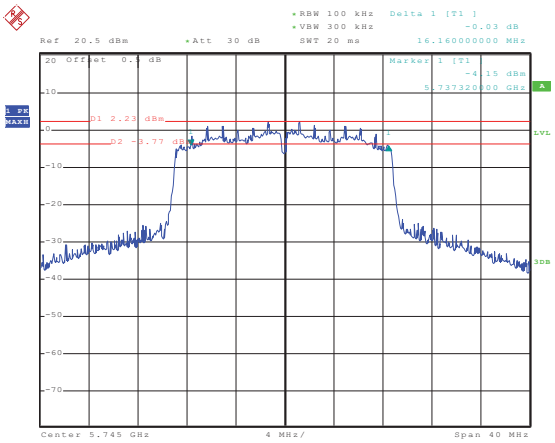
Middle channel



Date: 1.AUG.2015 12:08:49

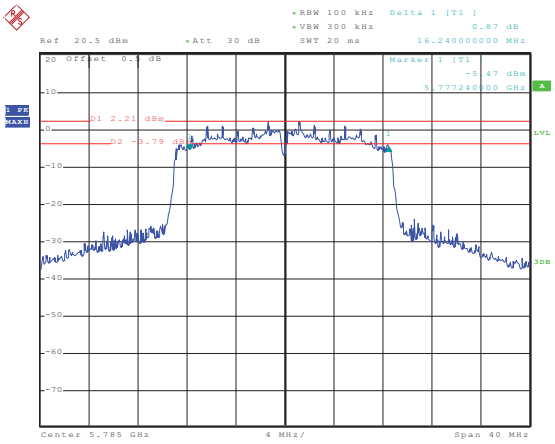
Highest channel

802.11n20



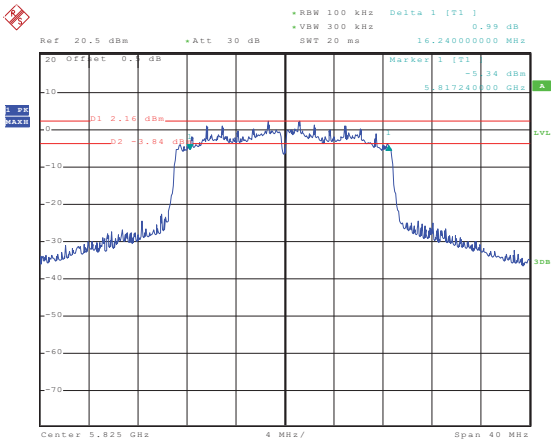
Date: 1.AUG.2015 12:05:08

Lowest channel



Date: 1.AUG.2015 12:04:00

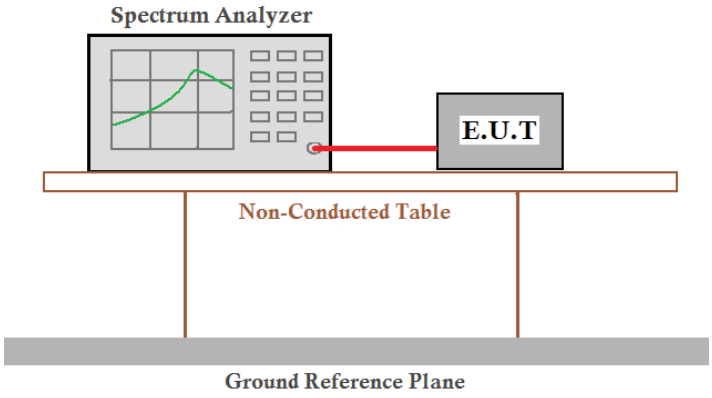
Middle channel



Date: 1.AUG.2015 12:02:48

Highest channel

6.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407 (a) (1) (ii) & (a) (3)
Test Method:	ANSI C63.4:2009, KDB 789033
Limit:	**Band 1: 17 dBm/MHz** (The maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.); **Band 4: 30dBm/500kHz**
Test setup:	
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	9.90	17.00	Pass
	Middle	8.61	17.00	Pass
	Highest	9.20	17.00	Pass
802.11n20	Lowest	7.19	17.00	Pass
	Middle	6.70	17.00	Pass
	Highest	6.66	17.00	Pass

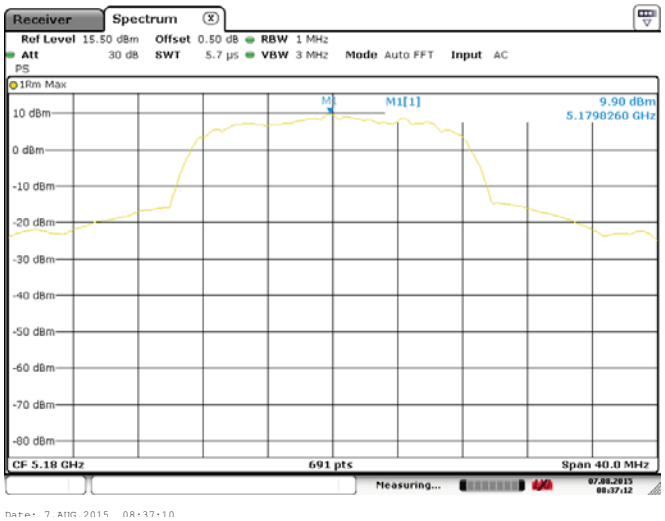
Band 4

Mode	Test CH	PSD (dBm)	Limit (dBm)	Result
802.11a	Lowest	6.43	30.00	Pass
	Middle	5.24	30.00	Pass
	Highest	4.10	30.00	Pass
802.11n20	Lowest	5.24	30.00	Pass
	Middle	4.91	30.00	Pass
	Highest	3.80	30.00	Pass

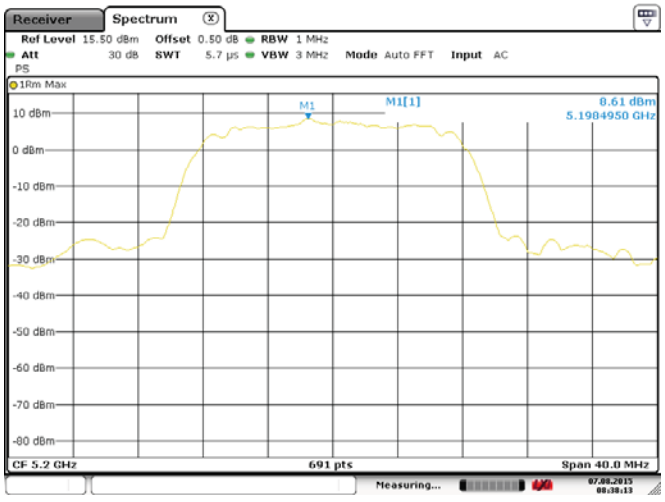
Test plot as follows:

Band 1:

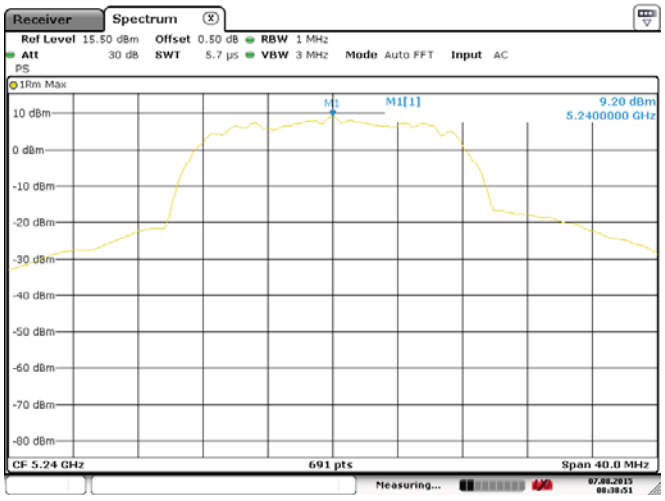
Test mode: 802.11a



Lowest channel

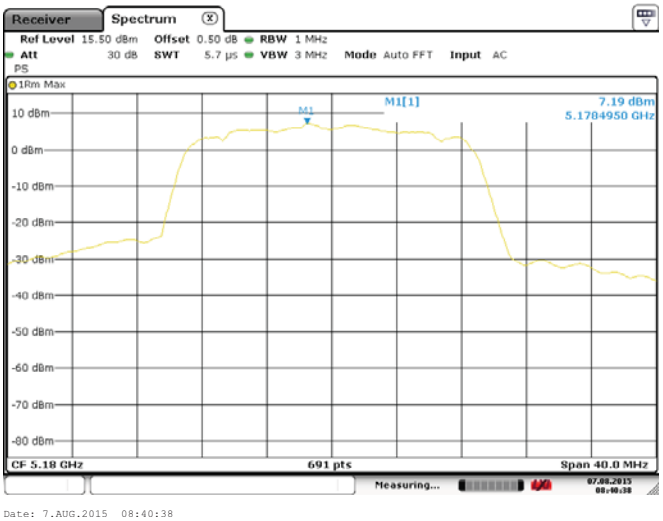


Middle channel

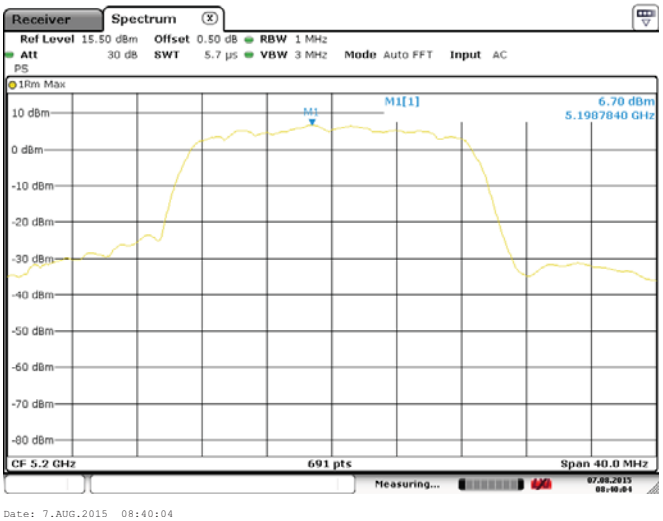


Highest channel

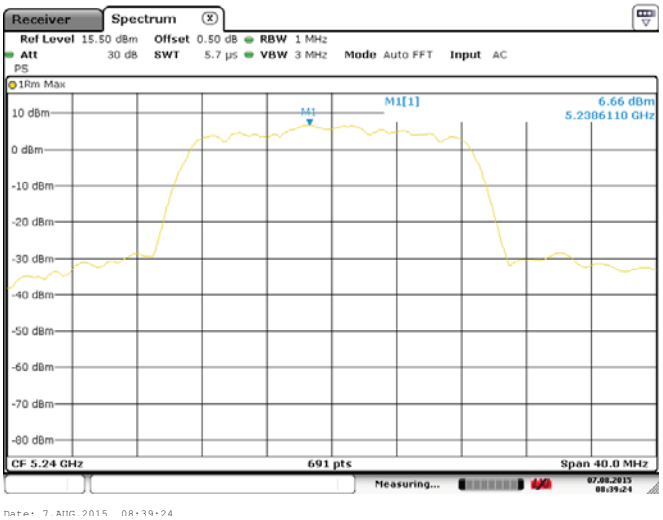
Test mode: 802.11n20



Lowest channel



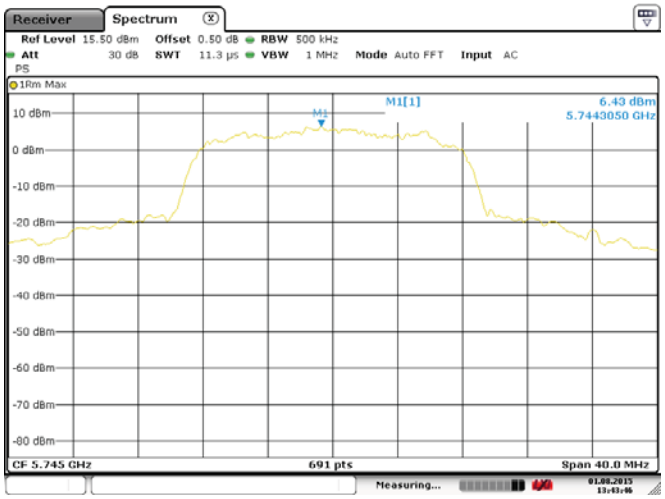
Middle channel



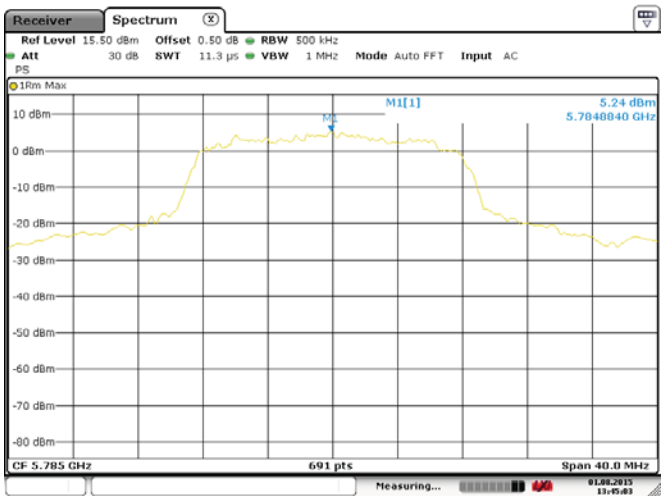
Highest channel

Band 4:

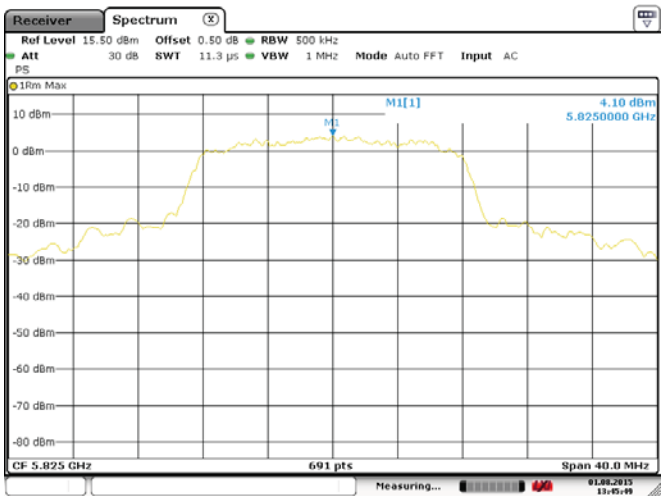
Test mode: 802.11a



Lowest channel

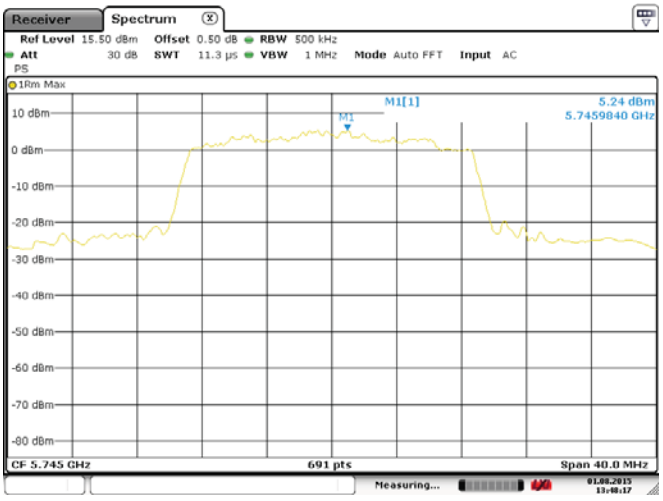


Middle channel



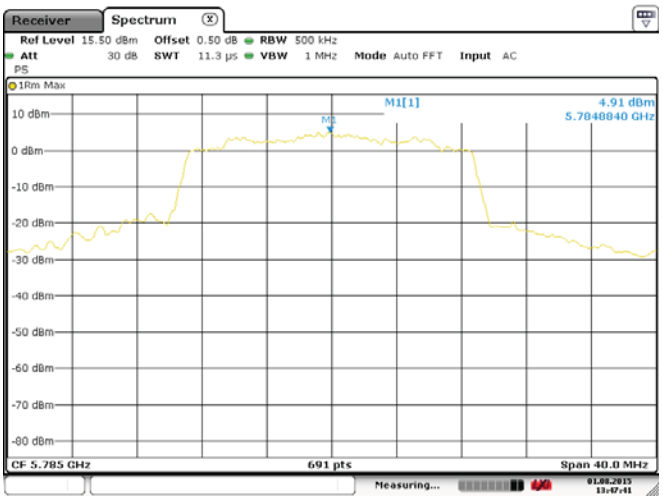
Highest channel

Test mode: 802.11n20



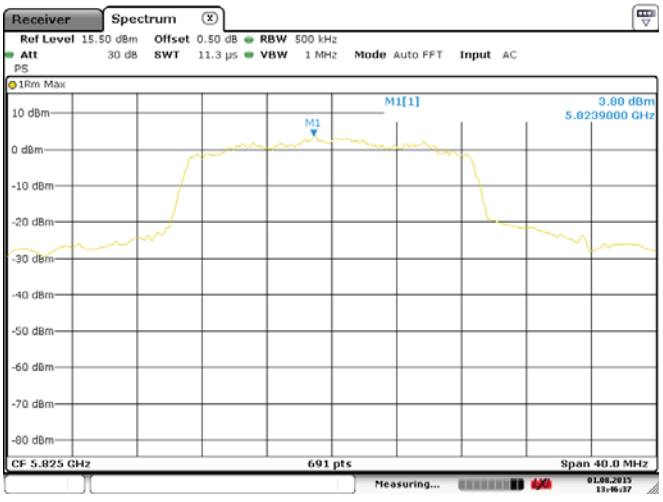
Date: 1.AUG.2015 13:48:17

Lowest channel



Date: 1.AUG.2015 13:47:40

Middle channel



Date: 1.AUG.2015 13:46:37

Highest channel

6.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 (b)
Test Method:	ANSI C63.4:2009 , KDB 789033
Receiver setup:	

Detector	RBW	VBW	Remark
Quasi-peak	120kHz	300kHz	Quasi-peak Value
RMS	1MHz	3MHz	Average Value

Limit:

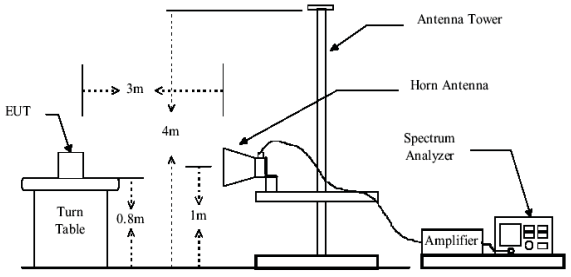
	Limit (dBuV/m @3m)	Remark
Band 1	68.20	Peak Value
	54.00	Average Value
Band 4	78.20	Peak Value
	54.00	Average Value

Remark:
1. Band 1 limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]= -27dBm.
2. Band 4 limit:
E[dBμV/m] = EIRP[dBm] + 95.2=78.2 dBuV/m, for EIPR[dBm]= -17dBm.

Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test setup:



Test Instruments:	Refer to section 5.6 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	38.52	32.07	9.13	40.06	39.66	68.20	-28.54	Horizontal
5150.00	37.64	32.07	9.13	40.06	38.78	68.20	-29.42	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	29.02	32.07	9.13	40.06	30.16	54.00	-23.84	Horizontal
5150.00	27.42	32.07	9.13	40.06	28.56	54.00	-25.44	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	37.76	31.78	9.15	40.18	38.51	68.20	-29.69	Horizontal
5350.00	37.64	31.78	9.15	40.18	38.39	68.20	-29.81	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	27.59	31.78	9.15	40.18	28.34	54.00	-25.66	Horizontal
5350.00	27.43	31.78	9.15	40.18	28.18	54.00	-25.82	Vertical

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	38.01	32.07	9.13	40.06	39.15	68.20	-29.05	Horizontal
5150.00	37.12	32.07	9.13	40.06	38.26	68.20	-29.94	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5150.00	27.58	32.07	9.13	40.06	28.72	54.00	-25.28	Horizontal
5150.00	27.63	32.07	9.13	40.06	28.77	54.00	-25.23	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	37.02	31.78	9.15	40.18	37.77	68.20	-30.43	Horizontal
5350.00	36.86	31.78	9.15	40.18	37.61	68.20	-30.59	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	27.23	31.78	9.15	40.18	27.98	54.00	-26.02	Horizontal
5350.00	26.15	31.78	9.15	40.18	26.90	54.00	-27.10	Vertical

Remark:

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

Band 4:

802.11a								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	40.25	32.27	9.30	40.54	41.28	78.20	-36.92	Horizontal
5725.00	40.11	32.27	9.30	40.54	41.14	78.20	-37.06	Vertical
802.11a								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	30.47	32.27	9.30	40.54	31.50	54.00	-22.50	Horizontal
5725.00	30.62	32.27	9.30	40.54	31.65	54.00	-22.35	Vertical
802.11a								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	40.35	32.71	9.37	40.69	41.74	78.20	-36.46	Horizontal
5850.00	39.55	32.71	9.37	40.69	40.94	78.20	-37.26	Vertical
802.11a								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	29.65	32.71	9.37	40.69	31.04	54.00	-22.96	Horizontal
5850.00	30.21	32.71	9.37	40.69	31.60	54.00	-22.40	Vertical

802.11n-HT20								
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	40.12	32.27	9.30	40.54	41.15	78.20	-37.05	Horizontal
5725.00	40.14	32.27	9.30	40.54	41.17	78.20	-37.03	Vertical
802.11n-HT20								
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	30.85	32.27	9.30	40.54	31.88	54.00	-22.12	Horizontal
5725.00	30.24	32.27	9.30	40.54	31.27	54.00	-22.73	Vertical
802.11n-HT20								
Test channel		Highest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	40.12	32.71	9.37	40.69	41.51	78.20	-36.69	Horizontal
5850.00	39.66	32.71	9.37	40.69	41.05	78.20	-37.15	Vertical
802.11n-HT20								
Test channel		Highest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	30.21	32.71	9.37	40.69	31.60	54.00	-22.40	Horizontal
5850.00	29.87	32.71	9.37	40.69	31.26	54.00	-22.74	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 C63.4: 2009
Test Frequency Range:	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

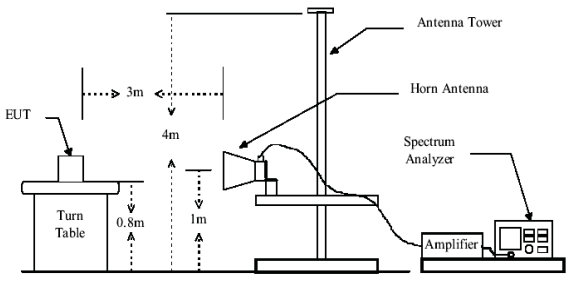
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
Above 1GHz	74.00	Peak Value
	54.00	Average Value

Test Procedure:

7. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
8. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
9. 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.
10. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
11. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
12. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test setup:



Test Instruments:	Refer to section 5.6 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)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	37.15	30.72	8.54	40.67	35.74	74.00	-38.26	Horizontal
4500.00	37.62	30.72	8.54	40.67	36.21	74.00	-37.79	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	27.41	30.72	8.54	40.67	26.00	54.00	-28.00	Horizontal
4500.00	26.86	30.72	8.54	40.67	25.45	54.00	-28.55	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	37.14	31.99	9.16	40.23	38.06	74.00	-35.94	Horizontal
5460.00	37.41	31.99	9.16	40.23	38.33	74.00	-35.67	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	27.42	31.99	9.16	40.23	28.34	54.00	-25.66	Horizontal
5460.00	27.32	31.99	9.16	40.23	28.24	54.00	-25.76	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
4500.00	37.12	30.72	8.54	40.67	35.71	74.00	-38.29	Horizontal
4500.00	37.31	30.72	8.54	40.67	35.90	74.00	-38.10	Vertical
Test channel		Lowest			Level		Average	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4500.00	27.14	30.72	8.54	40.67	25.73	54.00	-28.27	Horizontal
4500.00	26.68	30.72	8.54	40.67	25.27	54.00	-28.73	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	37.25	31.99	9.16	40.23	38.17	74.00	-35.83	Horizontal
5460.00	37.89	31.99	9.16	40.23	38.81	74.00	-35.20	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	27.00	31.99	9.16	40.23	27.92	54.00	-26.08	Horizontal
5460.00	27.41	31.99	9.16	40.23	28.33	54.00	-25.67	Vertical

Remark:

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

Band 4:

802.11a

Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.58	31.78	9.15	40.18	43.33	74.00	-30.67	Horizontal
5460.00	43.36	31.99	9.16	40.23	44.28	74.00	-29.72	Horizontal
5350.00	43.23	31.78	9.15	40.18	43.98	74.00	-30.02	Vertical
5460.00	42.85	31.99	9.16	40.23	43.77	74.00	-30.23	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	33.32	31.78	9.15	40.18	34.07	54.00	-19.93	Horizontal
5460.00	32.54	31.99	9.16	40.23	33.46	54.00	-20.54	Horizontal
5350.00	32.45	31.78	9.15	40.18	33.20	54.00	-20.80	Vertical
5460.00	32.63	31.99	9.16	40.23	33.55	54.00	-20.45	Vertical

802.11n-HT20

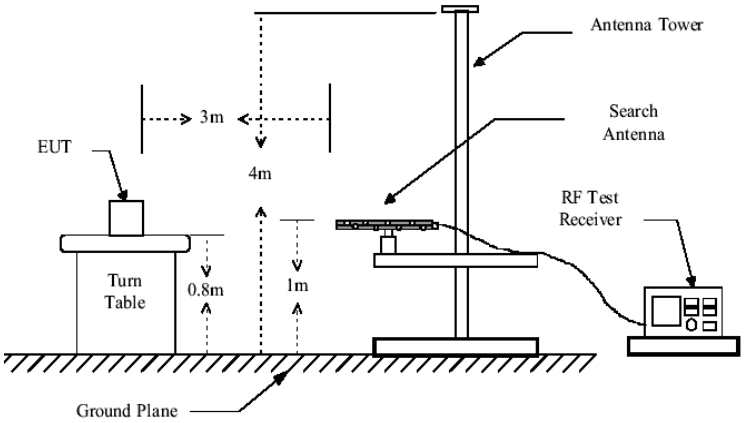
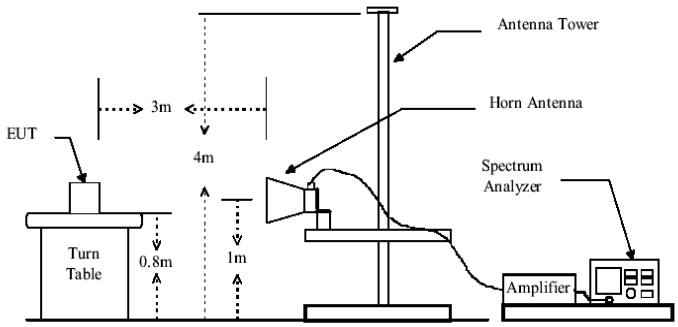
Test channel		Lowest			Level		Peak	
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5350.00	42.36	31.78	9.15	40.18	43.11	74.00	-30.89	Horizontal
5460.00	42.15	31.99	9.16	40.23	43.07	74.00	-30.93	Horizontal
5350.00	43.62	31.78	9.15	40.18	44.37	74.00	-29.63	Vertical
5460.00	42.15	31.99	9.16	40.23	43.07	74.00	-30.93	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	32.54	31.78	9.15	40.18	33.29	54.00	-20.71	Horizontal
5460.00	31.52	31.99	9.16	40.23	32.44	54.00	-21.56	Horizontal
5350.00	32.23	31.78	9.15	40.18	32.98	54.00	-21.02	Vertical
5460.00	32.74	31.99	9.16	40.23	33.66	54.00	-20.34	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.*

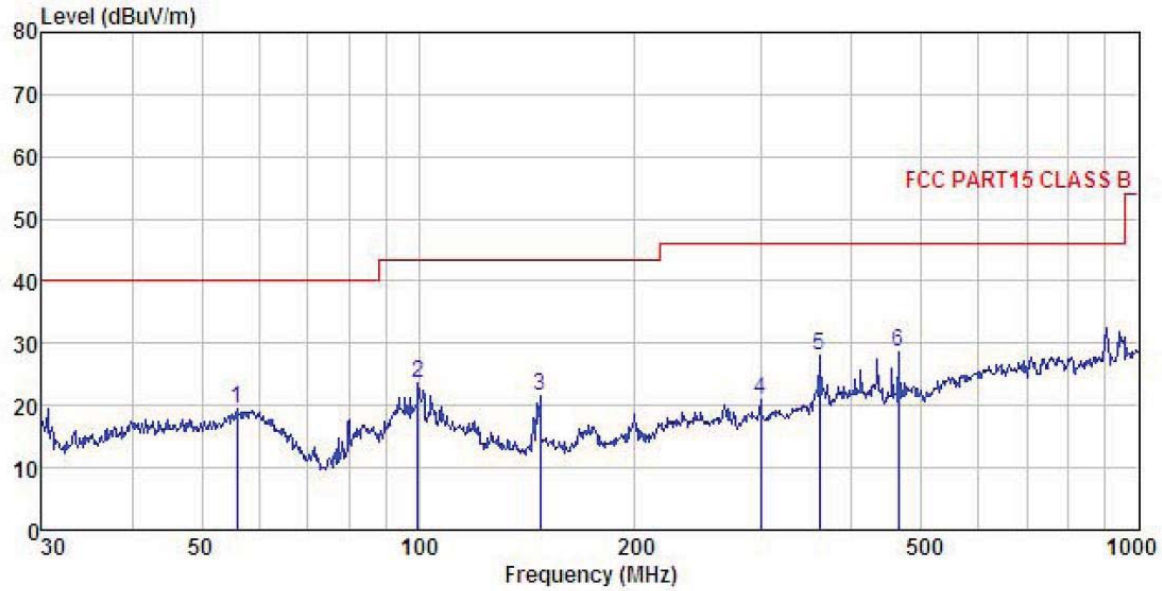
6.7.2 Unwanted Emissions in the Restricted Bands

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4:2009</td></tr>
<tr><td>Test Frequency Range:</td><td>30MHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
</table>
<table>
<tr><th>Frequency</th><th>Limit (dBm/MHz)</th><th>Remark</th></tr>
<tr><td rowspan="2">Above 1GHz</td><td>68.20</td><td>Peak Value</td></tr>
<tr><td>54.00</td><td>Average Value</td></tr>
<tr><td colspan="3">Remark:
1. Above 1GHz limit:
E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.</td></tr>
</table>
</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Below 1GHz

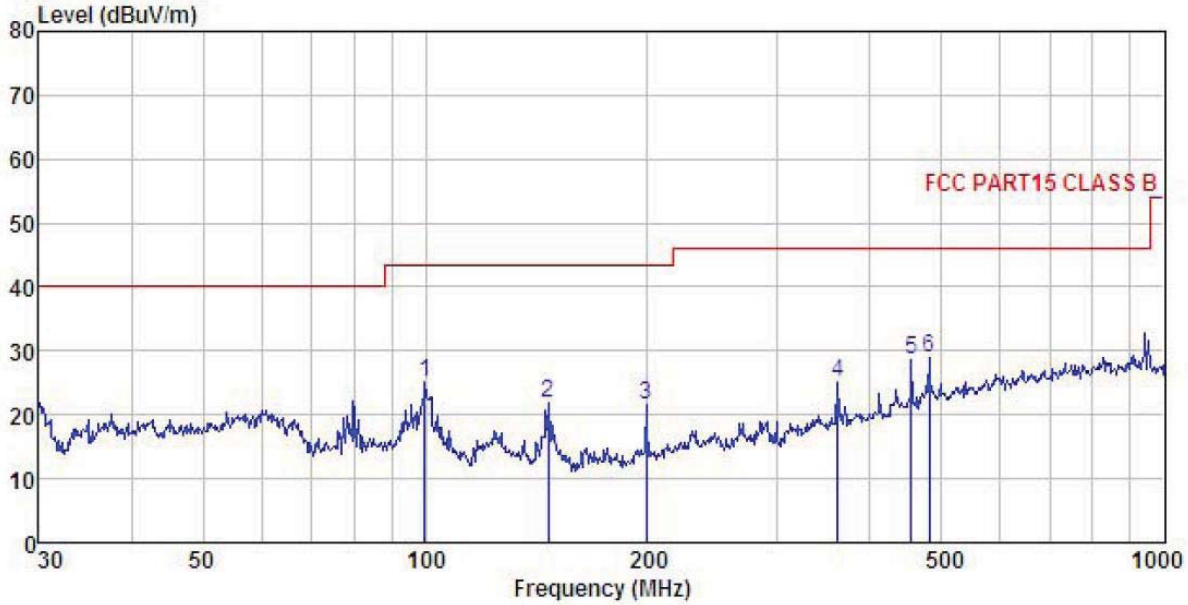
Horizontal:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) HORIZONTAL
Job No. : 533RF
EUT : 4K Media Player
Model : InVision 4K Media Player, 503-HD4KRK328
Test mode : 5GWifi Mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5℃ Huni:55%
Test Engineer: MT
REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	56.001	35.62	12.97	0.66	29.79	19.46	40.00	-20.54	
2	99.878	39.17	13.16	0.96	29.53	23.76	43.50	-19.74	
3	147.404	41.12	8.24	1.30	29.23	21.43	43.50	-22.07	
4	298.268	34.58	13.00	1.76	28.45	20.89	46.00	-25.11	
5	360.448	40.12	14.43	1.98	28.61	27.92	46.00	-18.08	
6	463.970	39.60	15.71	2.30	28.89	28.72	46.00	-17.28	

Vertical:



Site : 3m chamber
Condition : FCC PART15 CLASS B 3m VULB9163(30M1G) VERTICAL
Job No. : 533RF
EUT : 4K Media Player
Model : InVision 4K Media Player, 503-HD4KRK328
Test mode : 5GWifi Mode
Power Rating : AC 120V/60Hz
Environment : Temp:25.5'C Huni:55%
Test Engineer: MT
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	99.878	40.50	13.16	0.96	29.53	25.09	43.50	-18.41	QP
2	146.888	41.60	8.24	1.30	29.24	21.90	43.50	-21.60	QP
3	199.286	38.48	10.57	1.38	28.83	21.60	43.50	-21.90	QP
4	361.714	37.34	14.43	1.98	28.61	25.14	46.00	-20.86	QP
5	454.310	39.62	15.58	2.27	28.88	28.59	46.00	-17.41	QP
6	480.528	39.51	16.07	2.35	28.92	29.01	46.00	-16.99	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	46.23	39.23	13.84	41.34	57.96	68.20	-10.24	Vertical
10360.00	45.12	39.23	13.84	41.34	56.85	68.20	-11.35	Horizontal
802.11a 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
10360.00	35.27	39.23	13.84	41.34	47.00	54.00	-7.00	Vertical
10360.00	35.62	39.23	13.84	41.34	47.35	54.00	-6.65	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	44.27	39.36	13.85	41.27	56.21	68.20	-11.99	Vertical
10400.00	44.17	39.36	13.85	41.27	56.11	68.20	-12.09	Horizontal
802.11a mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	34.52	39.36	13.85	41.27	46.46	54.00	-7.54	Vertical
10400.00	35.68	39.36	13.85	41.27	47.62	54.00	-6.38	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	44.68	39.56	13.90	41.06	57.08	68.20	-11.12	Vertical
10480.00	43.25	39.56	13.90	41.06	55.65	68.20	-12.55	Horizontal
802.11a mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	34.58	39.56	13.90	41.06	46.98	54.00	-7.02	Vertical
10480.00	33.67	39.56	13.90	41.06	46.07	54.00	-7.93	Horizontal

Remark:

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

802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.00	45.36	39.23	13.84	41.34	57.09	68.20	-11.11	Vertical
10360.00	44.17	39.23	13.84	41.34	55.90	68.20	-12.30	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
10360.00	35.62	39.23	13.84	41.34	47.35	54.00	-6.65	Vertical
10360.00	34.85	39.23	13.84	41.34	46.58	54.00	-7.42	Horizontal

802.11n20 mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400.00	45.62	39.36	13.85	41.27	57.56	68.20	-10.64	Vertical
10400.00	44.23	39.36	13.85	41.27	56.17	68.20	-12.03	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
10400.00	35.62	39.36	13.85	41.27	47.56	54.00	-6.44	Vertical
10400.00	34.85	39.36	13.85	41.27	46.79	54.00	-7.21	Horizontal

802.11n20 mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480.00	43.35	39.56	13.90	41.06	55.75	68.20	-12.45	Vertical
10480.00	44.01	39.56	13.90	41.06	56.41	68.20	-11.79	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
10480.00	33.85	39.56	13.90	41.06	46.25	54.00	-7.75	Vertical
10480.00	35.26	39.56	13.90	41.06	47.66	54.00	-6.34	Horizontal

Remark:

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

Band 4:

802.11a mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	42.23	40.25	13.82	40.75	55.55	68.20	-12.65	Vertical
11490.00	41.28	40.25	13.82	40.75	54.60	68.20	-13.60	Horizontal
802.11a mode Lowest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	31.14	40.25	13.82	40.75	44.46	54.00	-9.54	Vertical
11490.00	30.25	40.25	13.82	40.75	43.57	54.00	-10.43	Horizontal

802.11a mode Middle channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	41.11	40.17	13.78	40.91	54.15	68.20	-14.05	Vertical
11570.00	42.03	40.17	13.78	40.91	55.07	68.20	-13.13	Horizontal
802.11a mode Middle channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	30.45	40.17	13.78	40.91	43.49	54.00	-10.51	Vertical
11570.00	30.11	40.17	13.78	40.91	43.15	54.00	-10.85	Horizontal

802.11a mode Highest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	40.23	39.89	13.74	41.06	52.80	68.20	-15.40	Vertical
11650.00	41.11	39.89	13.74	41.06	53.68	68.20	-14.52	Horizontal
802.11a mode Highest channel (Average Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	31.12	39.89	13.74	41.06	43.69	54.00	-10.31	Vertical
11650.00	31.25	39.89	13.74	41.06	43.82	54.00	-10.18	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.*

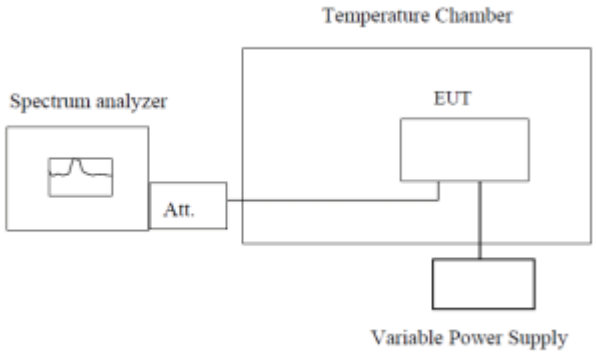
802.11n20 mode Lowest channel (Peak Value)								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	40.23	40.25	13.82	40.75	53.55	68.20	-14.65	Vertical
11490.00	41.12	40.25	13.82	40.75	54.44	68.20	-13.76	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	30.42	40.25	13.82	40.75	43.74	54.00	-10.26	Vertical
11490.00	30.56	40.25	13.82	40.75	43.88	54.00	-10.12	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	41.11	40.17	13.78	40.91	54.15	68.20	-14.05	Vertical
11570.00	40.05	40.17	13.78	40.91	53.09	68.20	-15.11	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	30.47	40.17	13.78	40.91	43.51	54.00	-10.49	Vertical
11570.00	30.35	40.17	13.78	40.91	43.39	54.00	-10.61	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	40.23	39.89	13.74	41.06	52.80	68.20	-15.40	Vertical
11650.00	41.02	39.89	13.74	41.06	53.59	68.20	-14.61	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	30.23	39.89	13.74	41.06	42.80	54.00	-11.20	Vertical
11650.00	30.17	39.89	13.74	41.06	42.74	54.00	-11.26	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:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.6 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 /60Hz)		
20	138	5179.985700	2.76
	120	5179.986300	2.64
	102	5179.984600	2.97

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

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(AC /60Hz)	Temp(℃)		
120	-20	5179.986800	2.55
	-10	5179.985200	2.86
	0	5179.983700	3.15
	10	5179.986200	2.66
	20	5179.989600	2.01
	30	5179.982800	3.32
	40	5179.983200	3.24
	50	5179.984700	2.95

Band 4:

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

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Temp(℃)	Voltage(AC /60Hz)		
20	138	5744.986557	2.34
	120	5744.988763	1.96
	102	5744.987596	2.16

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

Test conditions		Frequency(MHz)	Max. Deviation (ppm)
Voltage(AC /60Hz)	Temp(℃)		
120	-20	5744.993574	1.12
	-10	5744.998452	0.27
	0	5744.989833	1.77
	10	5744.997862	0.37
	20	5744.988874	1.94
	30	5744.998508	0.26
	40	5744.986795	2.30
	50	5744.990285	1.69