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FCC RADIO TEST REPORT

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Applicant Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
FCC ID	MSQ-RT0M00
Manufacturer's company (1)	ASKEY TECHNOLOGH(JIANGSU)LTD.
Manufacturer Address (1)	N0.1388, JiaoTong Road, WuKiang Economic-Technological Development Area, Jangus Province, P.R.C
Manufacturer's company (2)	Compal Networking (KunShan) Co., LTD.
Manufacturer Address (2)	No. 520, Nabbang Rd., Economic & Technical Development Zone Kunshan, Jiangsu Province China

Product Name	Wireless-AC3200 Tri-band Gigabit Router
Brand Name	ASUS
Model No.	RT-AC3200, RT-AC3200R, RT-AC3200W
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jul. 17, 2014
Final Test Date	May 11, 2016
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11 a/ac of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013, 47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r02, KDB662911 D01 v02r01, KDB644545 D03 v01, ET Docket No. 13-49; FCC 16-24.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR471703-01	Rev. 01	Initial issue of report	May 23, 2016



1. VERIFICATION OF COMPLIANCE

Product Name : Wireless-AC3200 Tri-band Gigabit Router
Brand Name : ASUS
Model No. : RT-AC3200, RT-AC3200R, RT-AC3200W
Applicant : ASUSTeK COMPUTER INC.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jul. 17, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

A handwritten signature in blue ink that reads 'Sam Chen'. The signature is written in a cursive style and is positioned above a horizontal line.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.2	15.407(a)	Maximum Conducted Output Power	Complies	2.74 dB
4.3	15.407(a)	Power Spectral Density	Complies	1.43 dB
4.4	15.407(b)	Radiated Emissions	Complies	7.21 dB
4.5	15.407(b)	Band Edge Emissions	Complies	1.01 dB
4.6	15.407(g)	Frequency Stability	Complies	-
4.7	15.203	Antenna Requirements	Complies	-

Note: This device supports Bridge Mode in Band 1 and Band 4.

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	9 for 20MHz bandwidth ; 4 for 40MHz bandwidth 2 for 80MHz bandwidth
Channel Band Width (99%)	<p><For Non-Beamforming Mode></p> <p>Band 1: IEEE 802.11a: 16.59 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.04 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz</p> <p>Band 4: IEEE 802.11a: 24.75 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 25.62 MHz ; IEEE 802.11ac MCS0/Nss1 (VHT40): 47.90 MHz ; IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz</p> <p><For Beamforming Mode></p> <p>Band 1: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.97 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.76 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz</p> <p>Band 4: IEEE 802.11ac MCS0/Nss1 (VHT20): 17.97 MHz ; IEEE 802.11ac MCS0/Nss1 (VHT40): 37.19 MHz ; IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz</p>

Maximum Conducted Output Power	<p><For Non-Beamforming Mode></p> <p>Band 1:</p> <p>IEEE 802.11a: 26.04 dBm</p> <p>IEEE 802.11ac MCS0/Nss1 (VHT20): 26.00 dBm</p> <p>IEEE 802.11ac MCS0/Nss1 (VHT40): 26.07 dBm</p> <p>IEEE 802.11ac MCS0/Nss1 (VHT80): 16.05 dBm</p> <p><For Beamforming Mode></p> <p>Band 1:</p> <p>IEEE 802.11ac MCS0/Nss1 (VHT20): 25.12 dBm</p> <p>IEEE 802.11ac MCS0/Nss1 (VHT40): 23.50 dBm</p> <p>IEEE 802.11ac MCS0/Nss1 (VHT80): 16.25 dBm</p>
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	<input checked="" type="checkbox"/> IP Based (Load Based)	<input type="checkbox"/> Frame Based
Beamforming Function	<input checked="" type="checkbox"/> With beamforming for 802.11n/ac in 2.4GHz/5GHz.	<input type="checkbox"/> Without beamforming
Operate Condition	<input checked="" type="checkbox"/> Indoor	<input type="checkbox"/> Outdoor

Antenna and Band width

Antenna	Three (TX)		
	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).

Then EUT supports HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80.

Note 3: Modulation modes consist of below configuration:

HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

Power	Brand	Model No.	Rating
Adapter 1 (Fixed plug)	PI	AD883J20	Input: 100-240V~50/60Hz 1.0A Output: 19V, 2.37A
Adapter 2 (Fixed plug)	Delta	ADP-45BW B	Input: 100-240V~50-60Hz 1.2A Output: 19V, 2.37A
Others			
RJ-45 Cable*1: Shielded, 1.5m			

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)			Remark
					2.4GHz	5GHz (Band 1)	5GHz (Band 4)	
1	M.gear	C660-510331-A	Dipole Ant.	Reversed-SMA	-	-	3.47	support single band
2	M.gear	C660-510331-A	Dipole Ant.	Reversed-SMA	-	-	3.47	support single band
3	PSA	RFDPA181300SBLB805	Dipole Ant.	Reversed-SMA	2.6	3.37	2.89	support dual band
4	M.gear	C660-510331-A	Dipole Ant.	Reversed-SMA	-	-	3.47	support single band
5	M.gear	C660-510324-A	Dipole Ant.	Reversed-SMA	1.87	3.23	3.33	support dual band

Note 1: Above antennas are the same type antenna, thus only the highest antenna gain Ant. 3 for 2.4GHz/5GHz band1 and Ant. 1, 2, 4 for 5GHz band 4 tested and recorded in the report.

Note 2: <For 2.4GHz and 5GHz Band 1>

For IEEE 802.11b/g/a/n/ac mode (3TX/3RX)

Chain 3, Chain 5 and Chain 6 can be used as transmitting/receiving antenna.

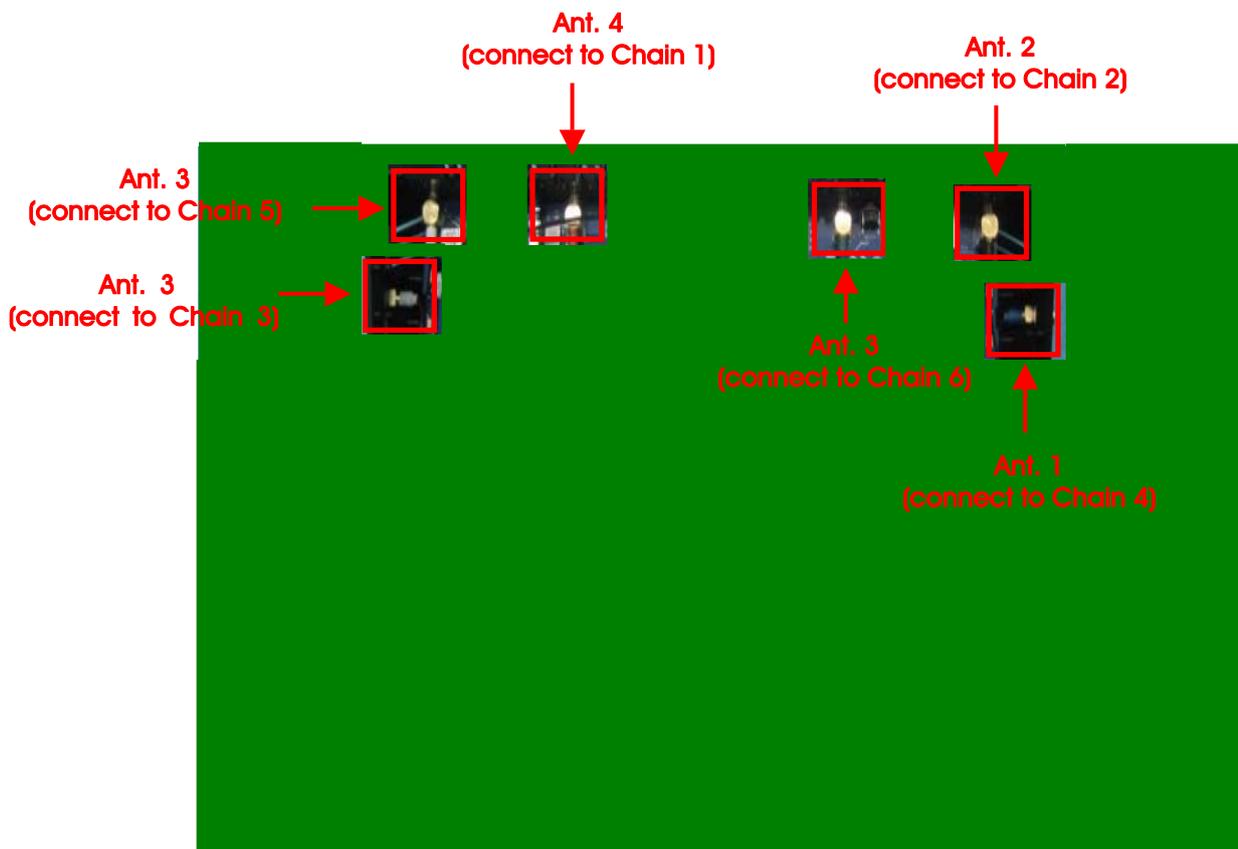
Chain 3, Chain 5 and Chain 6 could transmit/receive simultaneously.

<For 5GHz Band 4>

For IEEE 802.11a/n/ac mode (3TX/3RX):

Chain 1, Chain 2 and Chain 4 can be used as transmitting/receiving antenna.

Chain 1, Chain 2 and Chain 4 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 151, 159.

For 80MHz bandwidth systems, use Channel 42, 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz	-	-
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

For Band 1:

Test Items	Mode	Data Rate	Channel	Chain	
Max. Conducted Output Power	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1	6Mbps	36/40/48	3+5+6
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	3+5+6
	11ac VHT40	Band 1	MCS0/Nss1	38/46	3+5+6
	11ac VHT80	Band 1	MCS0/Nss1	42	3+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 1	MCS0/Nss1	36/40	3+5+6
	11ac VHT40	Band 1	MCS0/Nss1	38/46	3+5+6
	11ac VHT80	Band 1	MCS0/Nss1	42	3+5+6
	Power Spectral Density	<For Non-Beamforming Mode>			
11a/BPSK		Band 1	6Mbps	36/40/48	3+5+6
11ac VHT20		Band 1	MCS0/Nss1	36/40/48	3+5+6
11ac VHT40		Band 1	MCS0/Nss1	38/46	3+5+6
11ac VHT80		Band 1	MCS0/Nss1	42	3+5+6
<For Beamforming Mode>					
11ac VHT20		Band 1	MCS0/Nss1	36/40	3+5+6
11ac VHT40		Band 1	MCS0/Nss1	38/46	3+5+6
11ac VHT80		Band 1	MCS0/Nss1	42	3+5+6
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement		<For Non-Beamforming Mode>			
	11a/BPSK	Band 1	6Mbps	36/40/48	3+5+6
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	3+5+6
	11ac VHT40	Band 1	MCS0/Nss1	38/46	3+5+6
	11ac VHT80	Band 1	MCS0/Nss1	42	3+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 1	MCS0/Nss1	36/40	3+5+6
	11ac VHT40	Band 1	MCS0/Nss1	38/46	3+5+6
	11ac VHT80	Band 1	MCS0/Nss1	42	3+5+6

Radiated Emission Above 1GHz	<For Non-Beamforming Mode>				
	11a/BPSK	Band 1	6Mbps	36/40/48	3+5+6
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	3+5+6
	11ac VHT40	Band 1	MCS0/Nss1	38/46	3+5+6
	11ac VHT80	Band 1	MCS0/Nss1	42	3+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 1	MCS0/Nss1	36/40	3+5+6
	11ac VHT40	Band 1	MCS0/Nss1	38/46	3+5+6
	11ac VHT80	Band 1	MCS0/Nss1	42	3+5+6
	Band Edge Emission	<For Non-Beamforming Mode>			
11a/BPSK		Band 1	6Mbps	36/40/48	3+5+6
11ac VHT20		Band 1	MCS0/Nss1	36/40/48	3+5+6
11ac VHT40		Band 1	MCS0/Nss1	38/46	3+5+6
11ac VHT80		Band 1	MCS0/Nss1	42	3+5+6
<For Beamforming Mode>					
11ac VHT20		Band 1	MCS0/Nss1	36/40	3+5+6
11ac VHT40		Band 1	MCS0/Nss1	38/46	3+5+6
11ac VHT80		Band 1	MCS0/Nss1	42	3+5+6
Frequency Stability		20 MHz	Band 1	-	40
	40 MHz	Band 1	-	38	3
	80 MHz	Band 1	-	42	3

For Band 4:

Test Items	Mode	Data Rate	Channel	Chain	
Power Spectral Density	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+4
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+4
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+4
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+4
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+4
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+4
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+4
	26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	<For Non-Beamforming Mode>			
11a/BPSK		Band 4	6Mbps	149/157/165	1+2+4
11ac VHT20		Band 4	MCS0/Nss1	149/157/165	1+2+4
11ac VHT40		Band 4	MCS0/Nss1	151/159	1+2+4
11ac VHT80		Band 4	MCS0/Nss1	155	1+2+4
<For Beamforming Mode>					
11ac VHT20		Band 4	MCS0/Nss1	149/157/165	1+2+4
11ac VHT40		Band 4	MCS0/Nss1	151/159	1+2+4
11ac VHT80		Band 4	MCS0/Nss1	155	1+2+4
Frequency Stability		20 MHz	Band 4	-	157
	40 MHz	Band 4	-	151	2
	80 MHz	Band 4	-	155	2

Note 1: VHT20/VHT40 covers HT20/HT40, due to same modulation.

Note 2: There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802 11n/ac in 2.4GHz / 5GHz. Beamforming mode and non-beamforming mode has been test and record in this test report.

The following test modes were performed for all tests:

For Radiated Emission test:

Mode 1. CTX - EUT

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	Site Category	Location	FCC Designation No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

3.7. Table for Multiple Listing

The EUT has three model names which are identical to each other in all aspects except for the following table:

Brand Name	Model Name	Description
ASUS	RT-AC3200	All the models are identical, the difference model for difference brand served as marketing strategy.
	RT-AC3200R	
	RT-AC3200W	

From the above models, model: RT-AC3200 was selected as representative model for the test and its data was recorded in this report.

3.8. Table for SKU List

The EUT has two SKU which are identical to each other in all aspects except for the following table:

SKU	Description
1	The difference between SKU 1 and SKU 2 is LAN transformer
2	

3.9. Table for Housing List

The EUT has two housing and which are identical to each other in all aspects except for the following table:

Housing	With Hole	Without Hole
1	V	X
2	X	V

From the above models, model: housing 2 was selected as representative model for the test and its data was recorded in this report.

3.10. Table for Class II Change

This product is an extension of original report under Sporton project number: FR471703AA and FR471703AB.

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
<p>For Band 1: Consider the component with precision and make sure each device in mass production to comply with regulation rule. Test it by mass product, not golden sample.</p>	<p>After evaluating, retesting all channels except 802.11ac MCS0/Nss1 VHT20 CH48 (For Beamforming Mode).</p> <ol style="list-style-type: none"> 26dB Bandwidth and 99% Occupied Bandwidth Maximum Conducted Output Power Power Spectral Density Radiated Emissions above 1GHz Band Edge Emissions Frequency Stability
<p>For Band 4: Updating test rule of 5GHz band 4 to "15.407 (b)(4)(ii) of New Rules (ET Docket No. 13-49; FCC 16-24)" from "Old Rules".</p>	<ol style="list-style-type: none"> 26dB Spectrum Bandwidth and 99% Occupied Power Spectral Density. Frequency Stability. <p>Note: The above test items will be based on original output power to re-test.</p>

3.11. Table for Supporting Units

<For Non-Beamforming Mode>

For Test Site No: 03CH01-CB <Above 1GHz>

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

<For Beamforming Mode>

For Test Site No: 03CH01-CB <Above 1GHz>

Support Unit	Brand	Model	FCC ID
NB*2	DELL	E4300	DoC
WLAN Dongle	Netgear	A6200	PY31220200

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.12. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

<For Non-Beamforming Mode>

Test Software Version	Mtool_2.0.1.8					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	74	73	85	102	99	99
802.11ac MCS0/Nss1 VHT20	72	71	84	102	99	99
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	
	52		83		97	
802.11ac MCS0/Nss1 VHT80	5210 MHz			5775 MHz		
	43			89		

<For Beamforming Mode>

Test Software Version	Mtool_2.0.1.8				
Mode	Test Frequency (MHz)				
	NCB: 20MHz				
	5180 MHz	5200 MHz	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	75	80	91	89	89
Mode	NCB: 40MHz				
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz
	55		78		92
802.11ac MCS0/Nss1 VHT80	5210 MHz			5775 MHz	
	46			88	

3.13. EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN XP were executed.

The program was executed as follows:

1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe " to link with the remote workstation to receive and transmit packet by WLAN Dongle and transmit duty cycle no less 98%

3.14. Duty Cycle

For non-beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.040	2.090	97.61	0.11	0.49
802.11ac MCS0/Nss1 VHT20	1.907	1.952	97.70	0.10	0.52
802.11ac MCS0/Nss1 VHT40	0.932	0.984	94.72	0.24	1.07
802.11ac MCS0/Nss1 VHT80	0.440	0.488	90.16	0.45	2.27

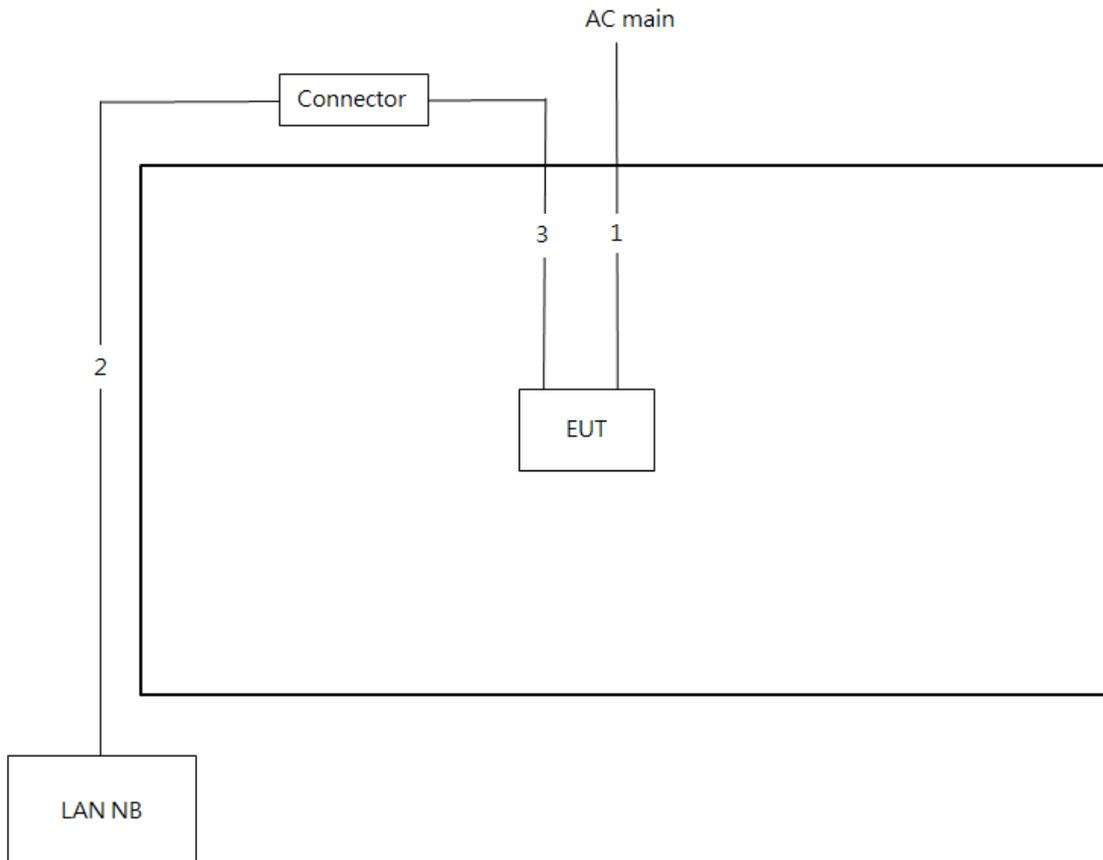
For beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	3.810	3.940	96.70	0.15	0.26
802.11ac MCS0/Nss1 VHT40	3.650	3.790	96.31	0.16	0.27
802.11ac MCS0/Nss1 VHT80	4.663	4.775	97.65	0.10	0.21

3.15. Test Configurations

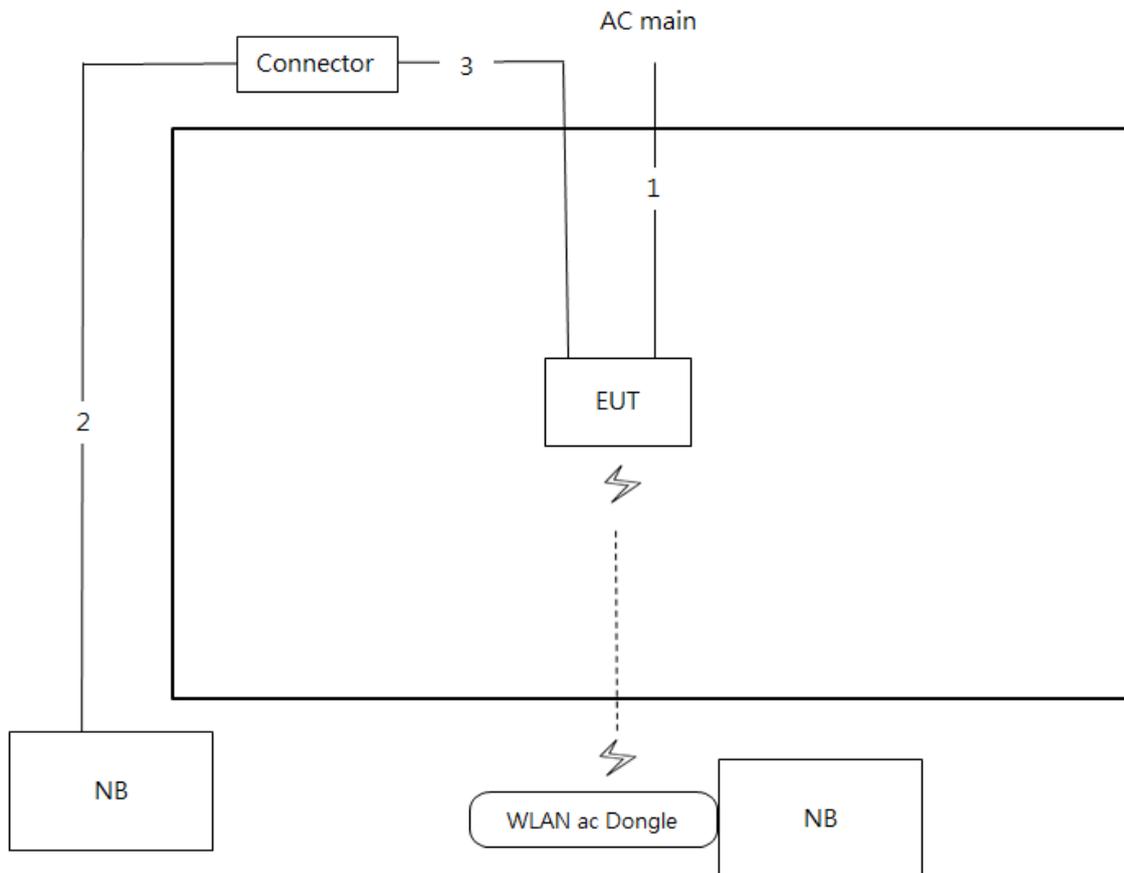
3.15.1. Radiation Emissions Test Configuration

<For Non-Beamforming Mode>



Item	Connection	Shielded	Length
1	Power cable	No	2.2m
2	RJ-45 cable	Yes	10m
3	RJ-45 cable	Yes	1.5m

<For Beamforming Mode>



Item	Connection	Shielded	Length
1	Power cable	No	2.2m
2	RJ-45 cable	Yes	10m
3	RJ-45 cable	Yes	1.5m

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

4.1.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

26dB Bandwidth	
Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth	
Spectrum Parameters	Setting
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold

4.1.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.1.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.4.4.

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	26°C	Humidity	63%
Test Engineer	Gary Chu		

For Band 1:

<For Non-Beamforming Mode>

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	20.52	16.59
	5200 MHz	20.70	16.59
	5240 MHz	20.78	16.59
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.35	17.71
	5200 MHz	20.26	17.80
	5240 MHz	20.52	17.80
802.11ac MCS0/Nss1 VHT40	5190 MHz	39.86	35.89
	5230 MHz	40.29	36.04
802.11ac MCS0/Nss1 VHT80	5210 MHz	81.16	75.54

<For Beamforming Mode>

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.96	17.97
	5200 MHz	21.22	17.97
802.11ac MCS0/Nss1 VHT40	5190 MHz	41.01	36.76
	5230 MHz	40.73	36.61
802.11ac MCS0/Nss1 VHT80	5210 MHz	81.16	75.83

Temperature	24°C	Humidity	62%
Test Engineer	Eddie Weng		

For Band 4:

<For Non-Beamforming Mode>

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	37.30	24.75
	5785 MHz	37.39	20.75
	5825 MHz	40.00	23.53
802.11ac MCS0/Nss1 VHT20	5745 MHz	41.83	25.62
	5785 MHz	36.70	20.67
	5825 MHz	36.44	23.53
802.11ac MCS0/Nss1 VHT40	5755 MHz	80.44	38.35
	5795 MHz	85.51	47.90
802.11ac MCS0/Nss1 VHT80	5775 MHz	104.35	76.12

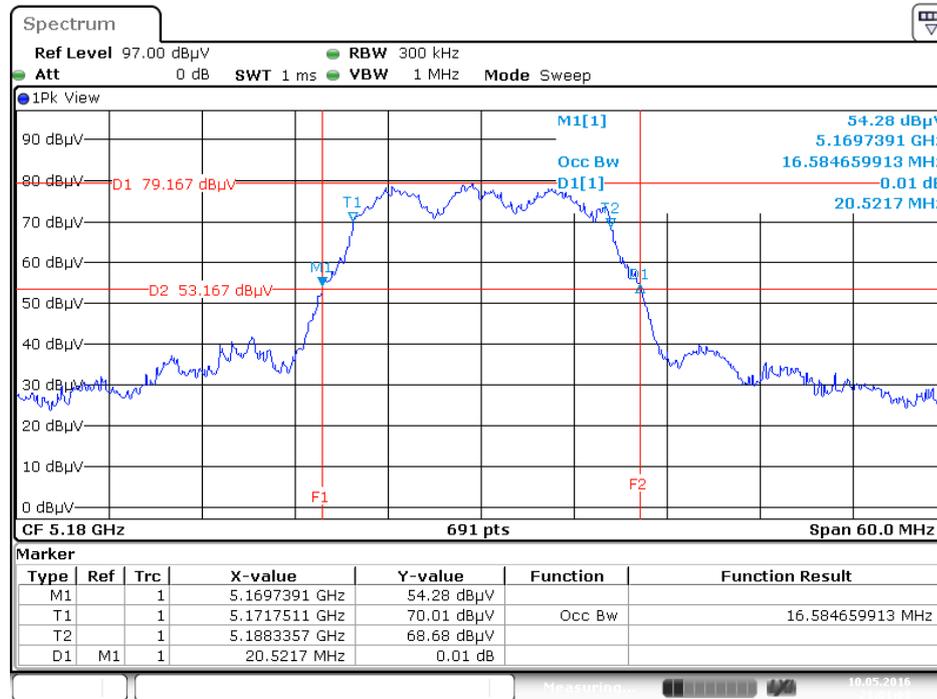
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Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT20	5745 MHz	21.91	17.97
	5785 MHz	21.73	17.97
	5825 MHz	21.47	17.97
802.11ac MCS0/Nss1 VHT40	5755 MHz	56.81	37.19
	5795 MHz	56.66	36.90
802.11ac MCS0/Nss1 VHT80	5775 MHz	112.17	76.12

For Band 1:

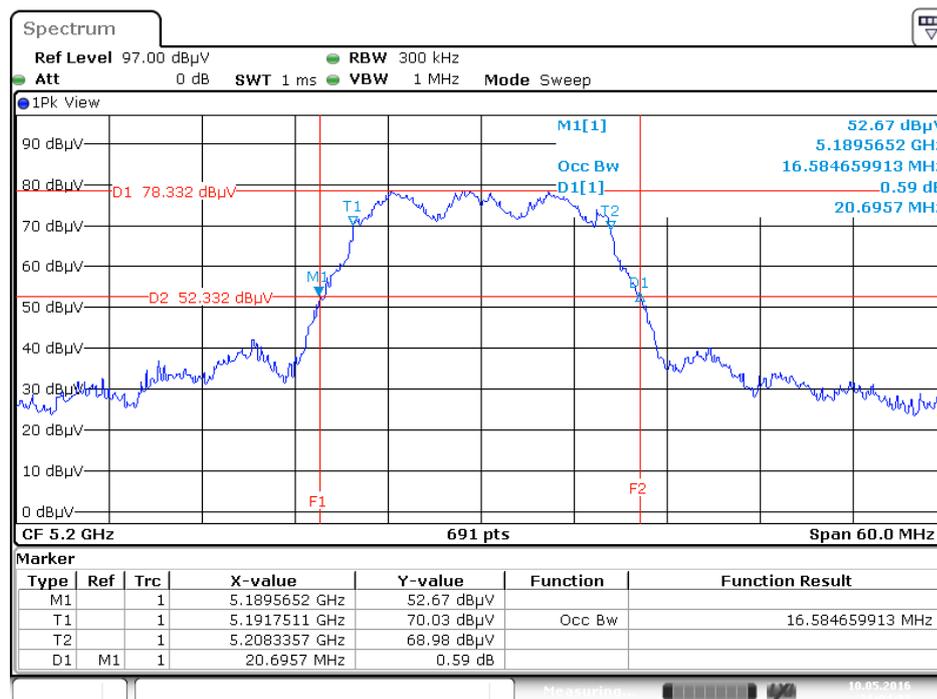
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 5 + Chain 6 / 5180 MHz



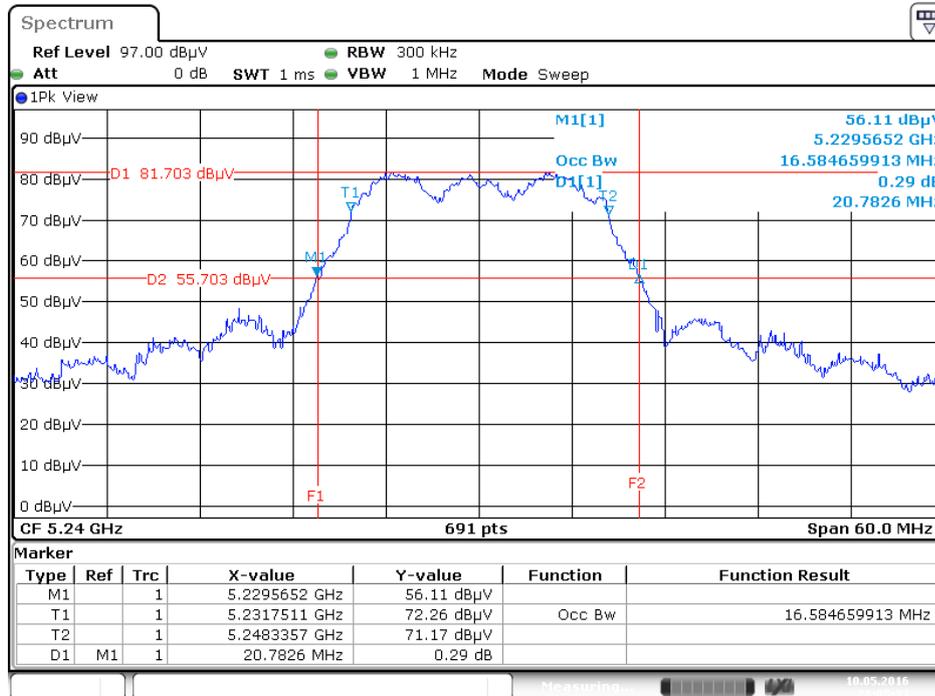
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 5 + Chain 6 / 5200 MHz



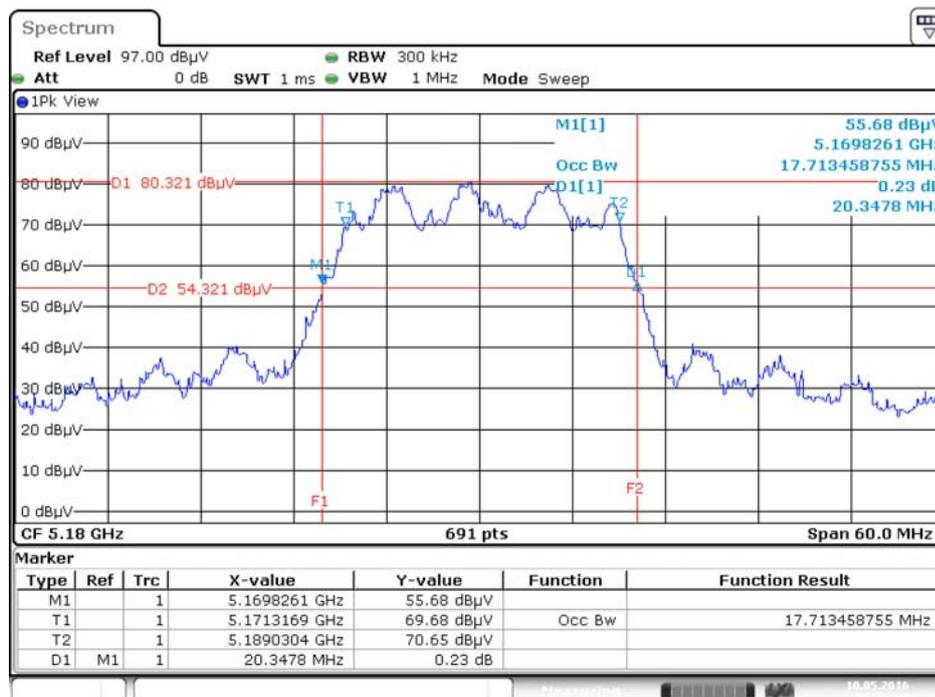
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 5 + Chain 6 / 5240 MHz



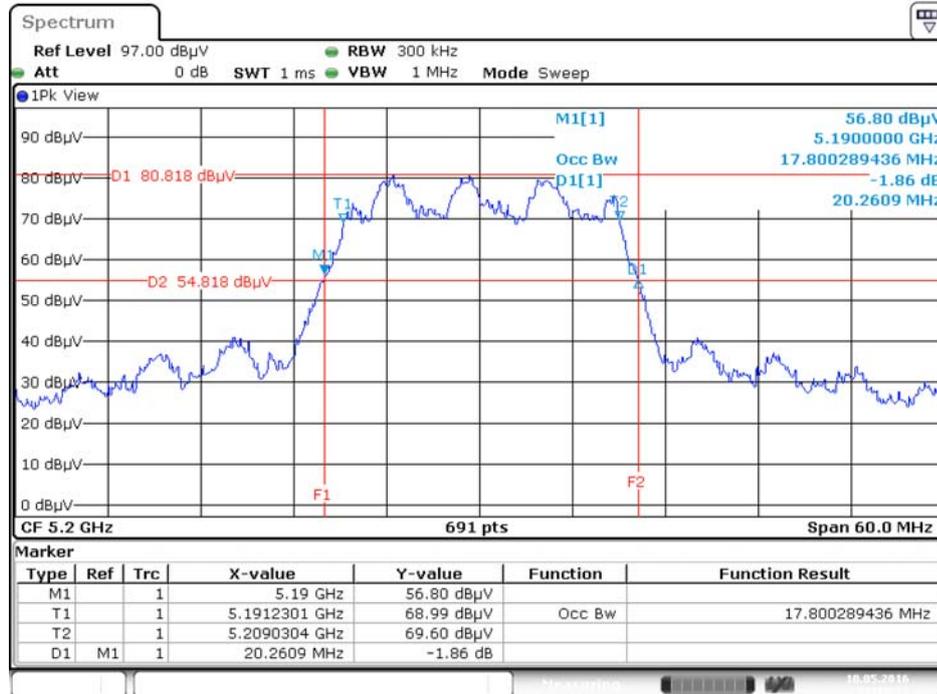
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5180 MHz



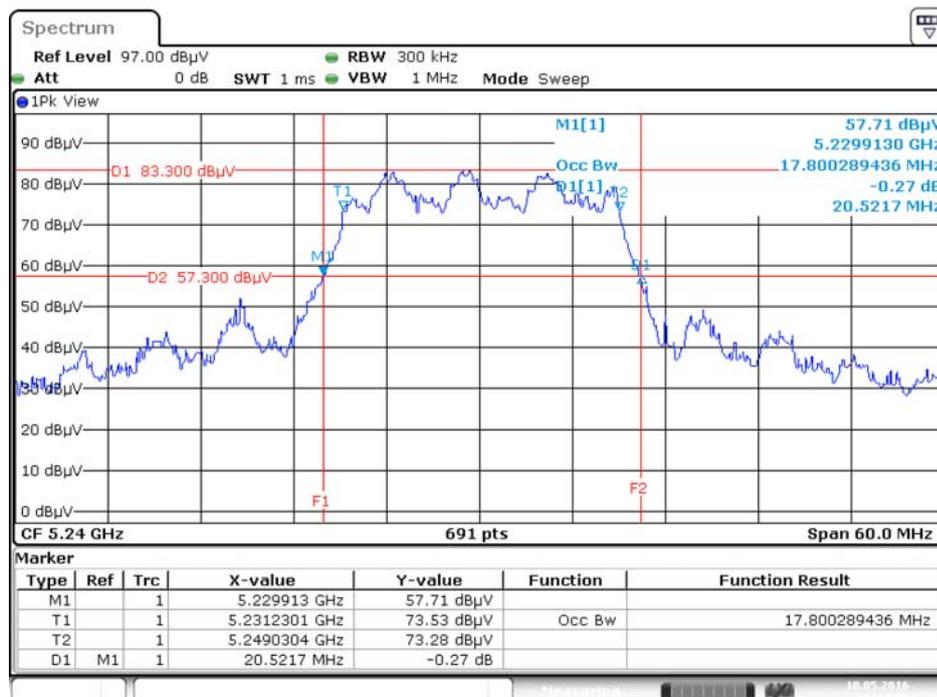
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5200 MHz



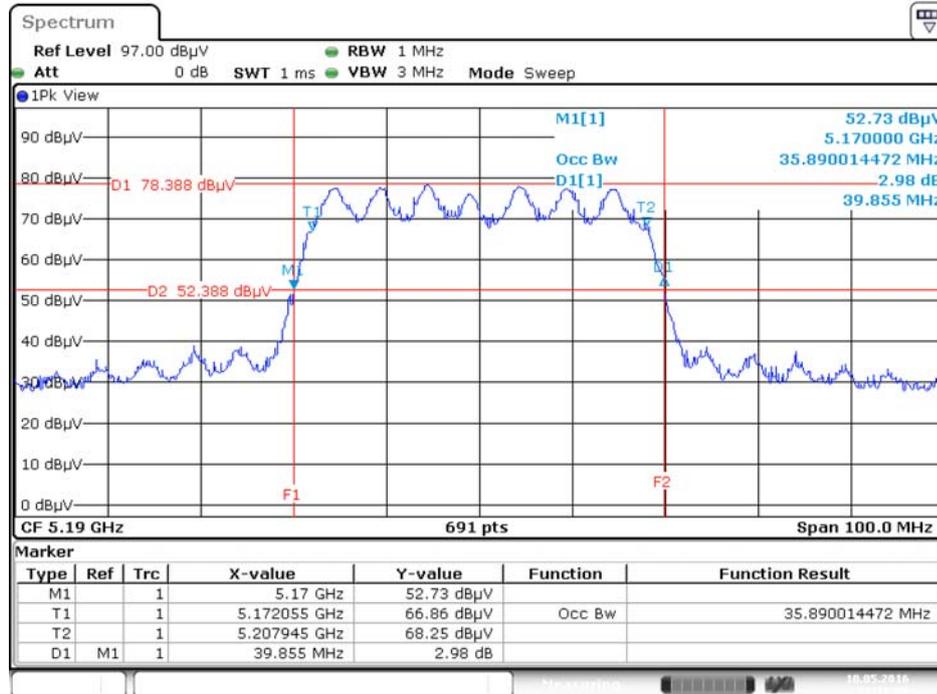
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5240 MHz



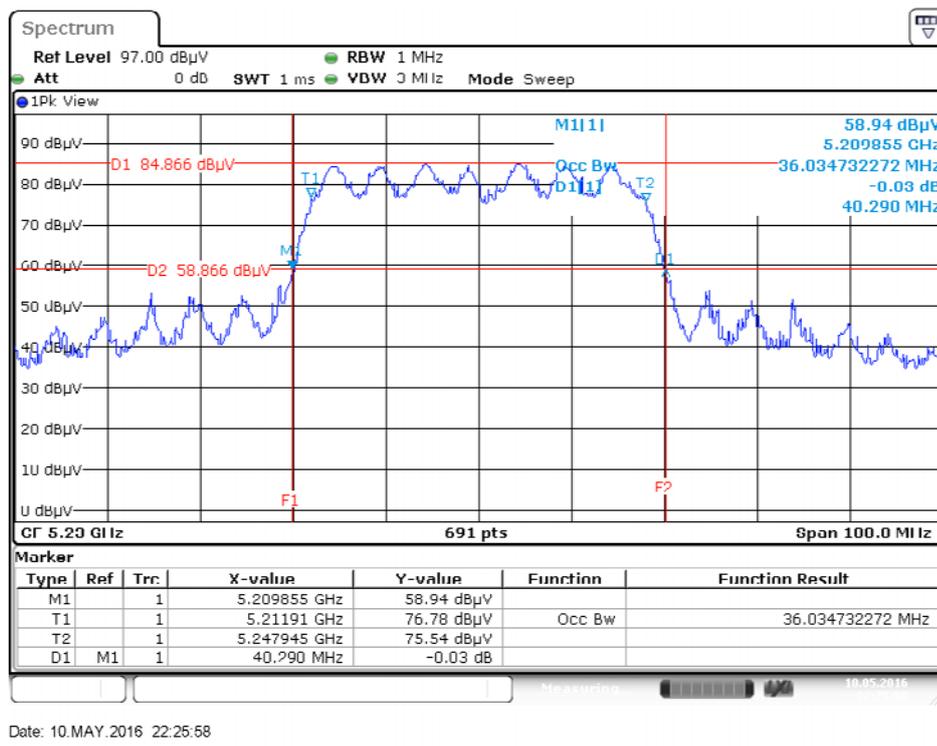
Date: 10.MAY.2016 21:10:58

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6 / 5190 MHz



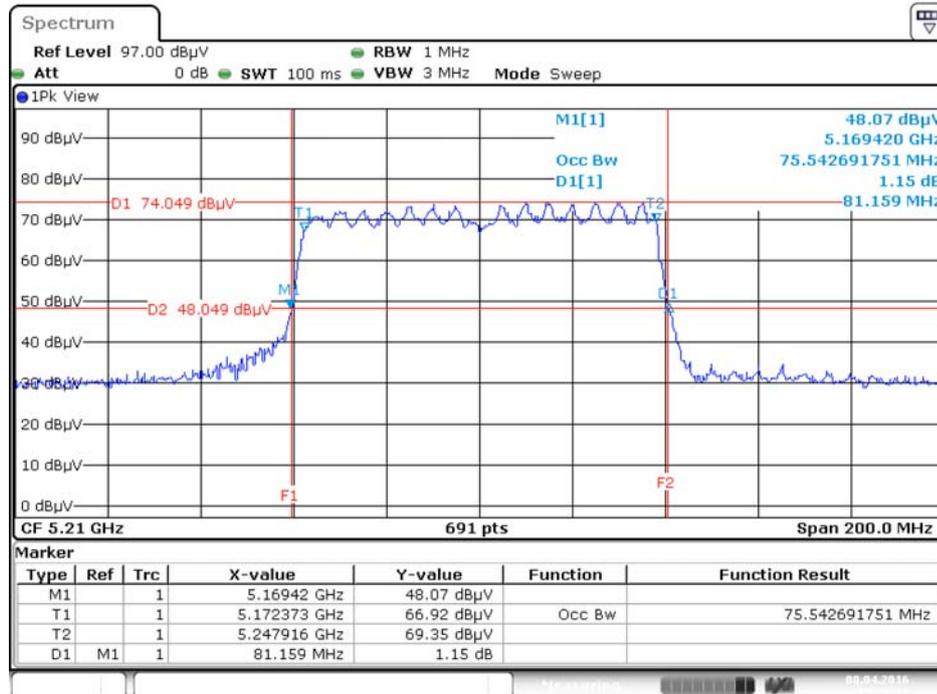
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6 / 5230 MHz



Date: 10.MAY.2016 22:25:58

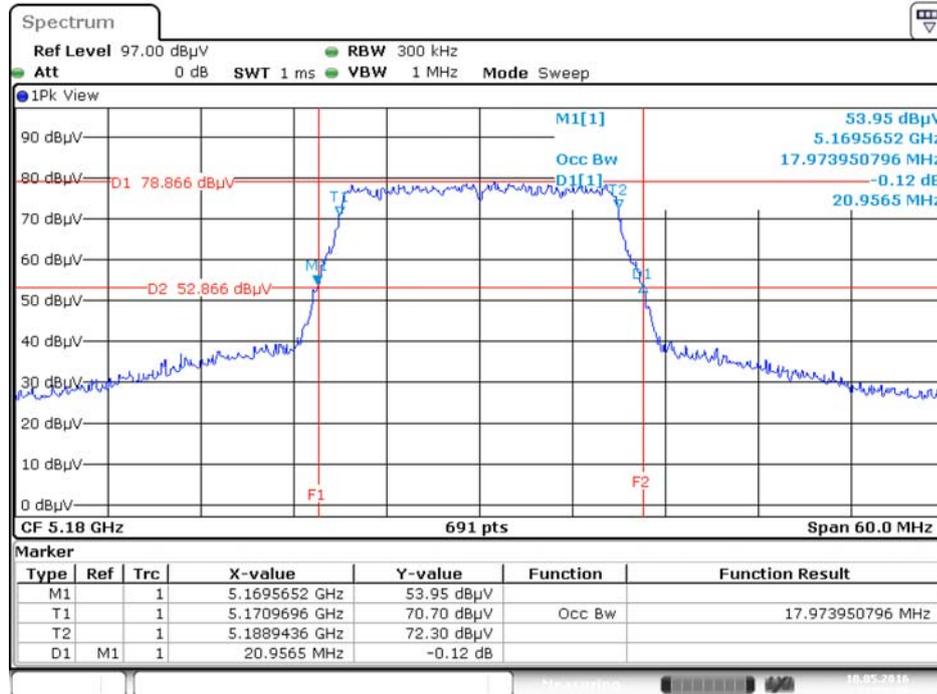
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 5 + Chain 6 / 5210 MHz



Date: 8.APR.2016 15:36:22

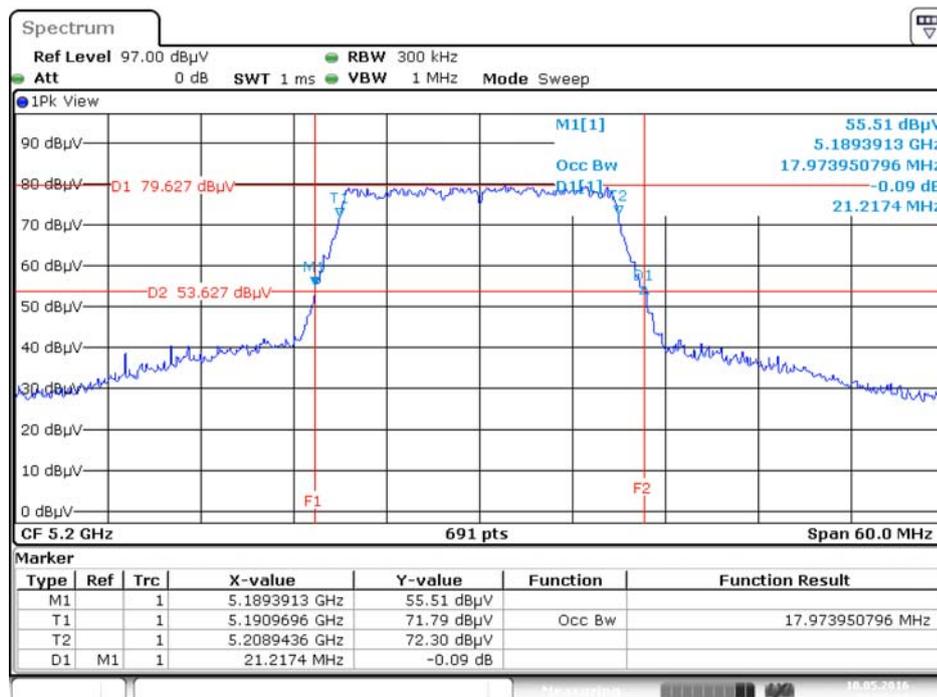
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5180 MHz



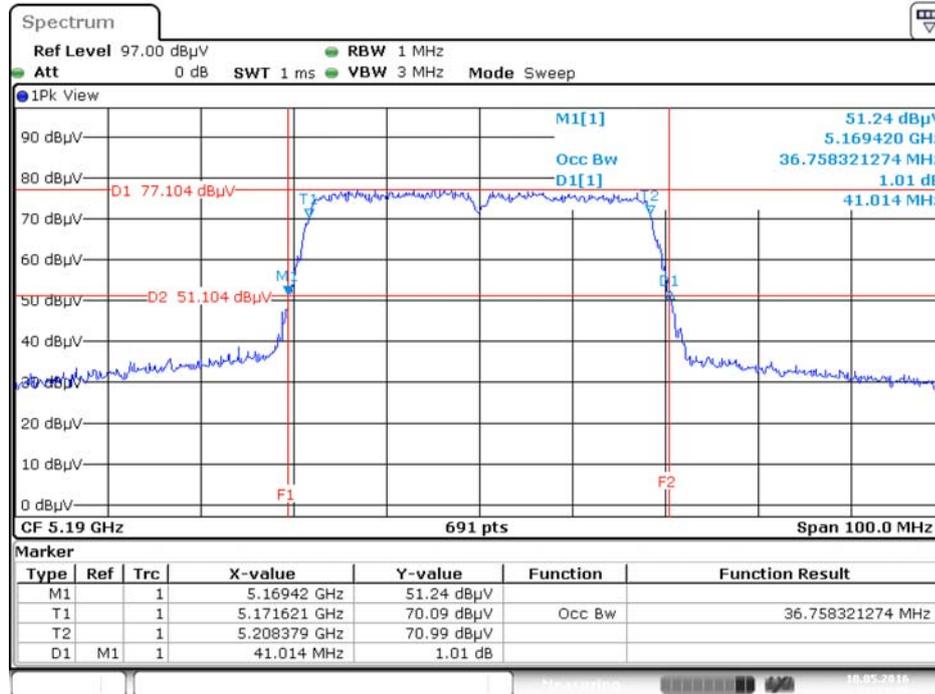
Date: 10.MAY.2016 21:25:30

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5200 MHz



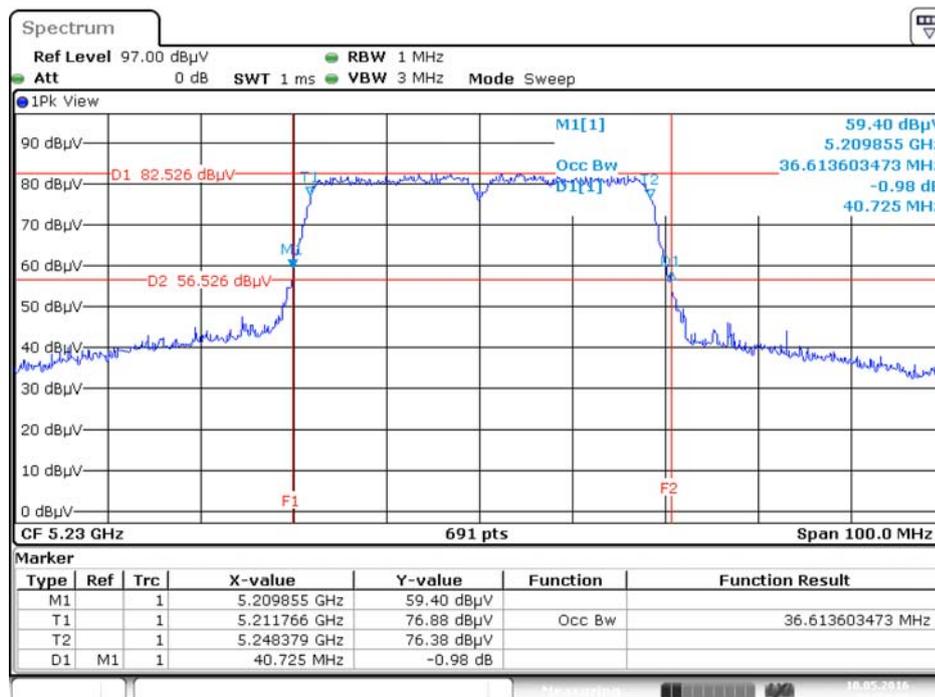
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6 / 5190 MHz



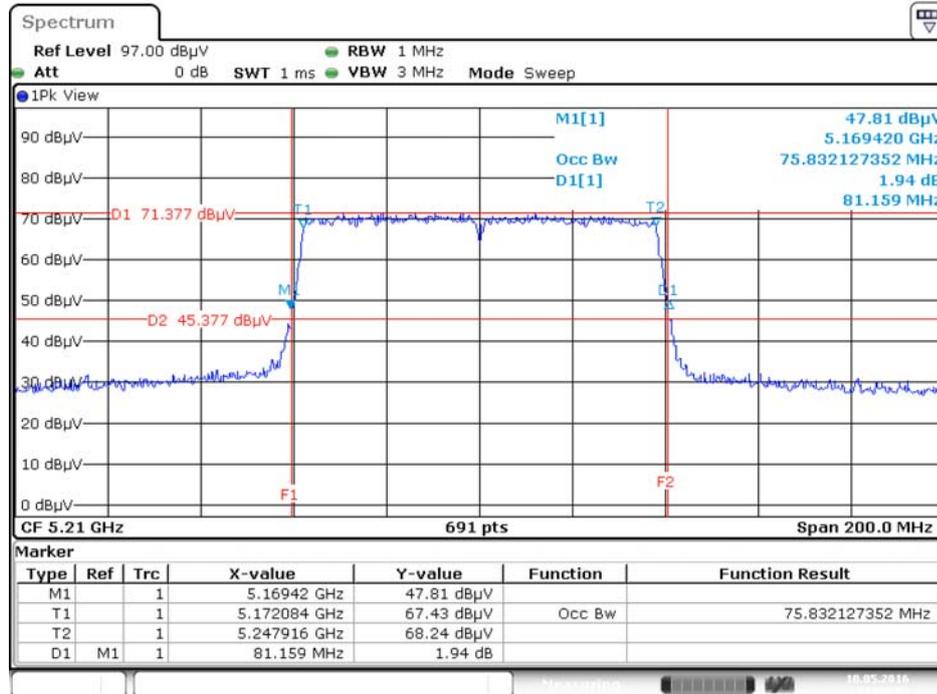
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6 / 5230 MHz



Date: 10.MAY.2016 21:23:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 5 + Chain 6 / 5210 MHz

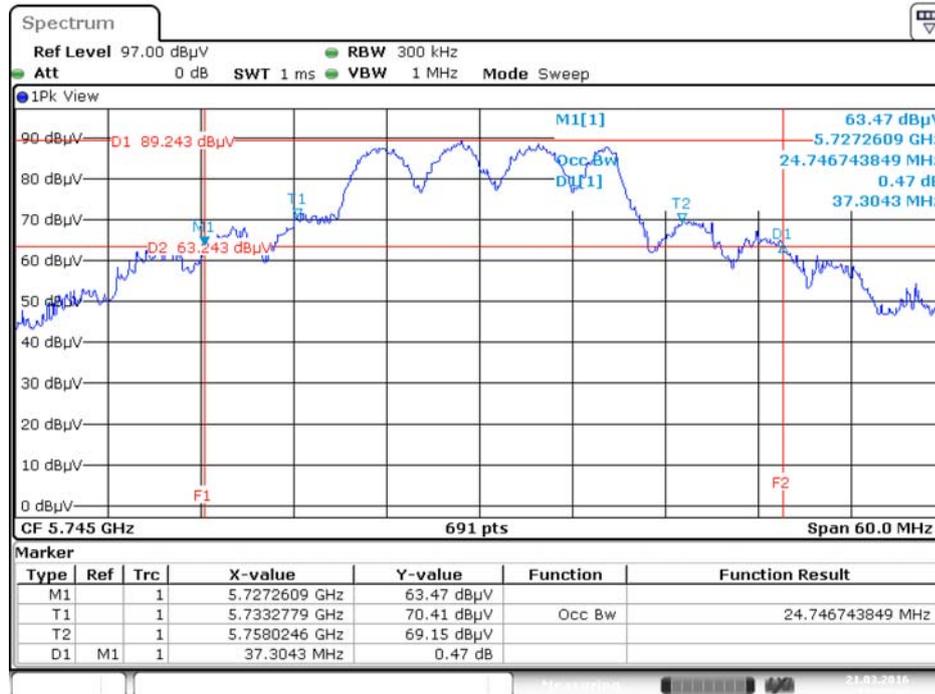


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For Band 4:

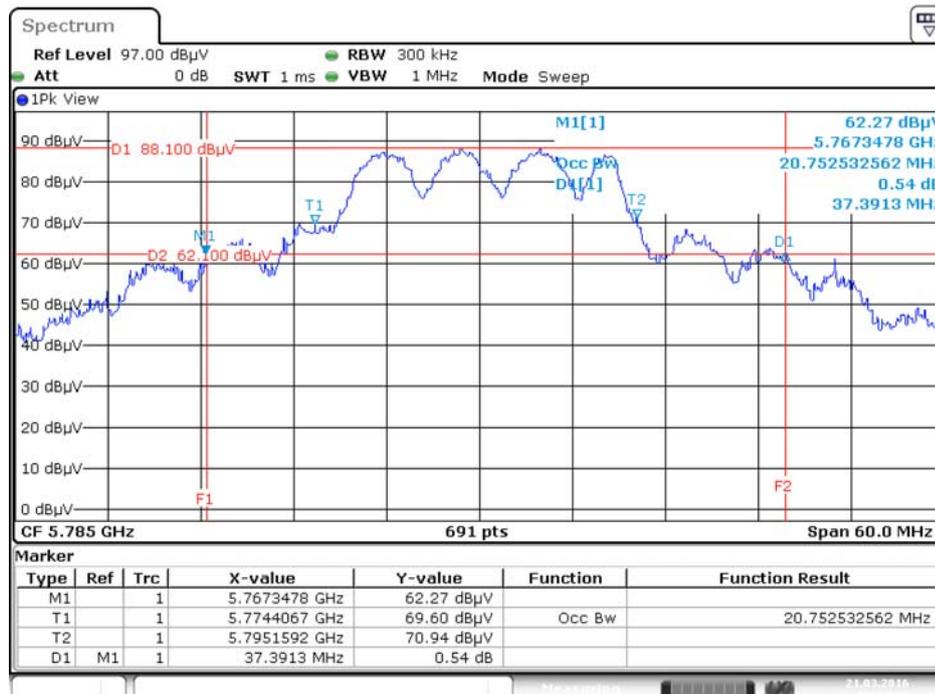
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 4 / 5745 MHz



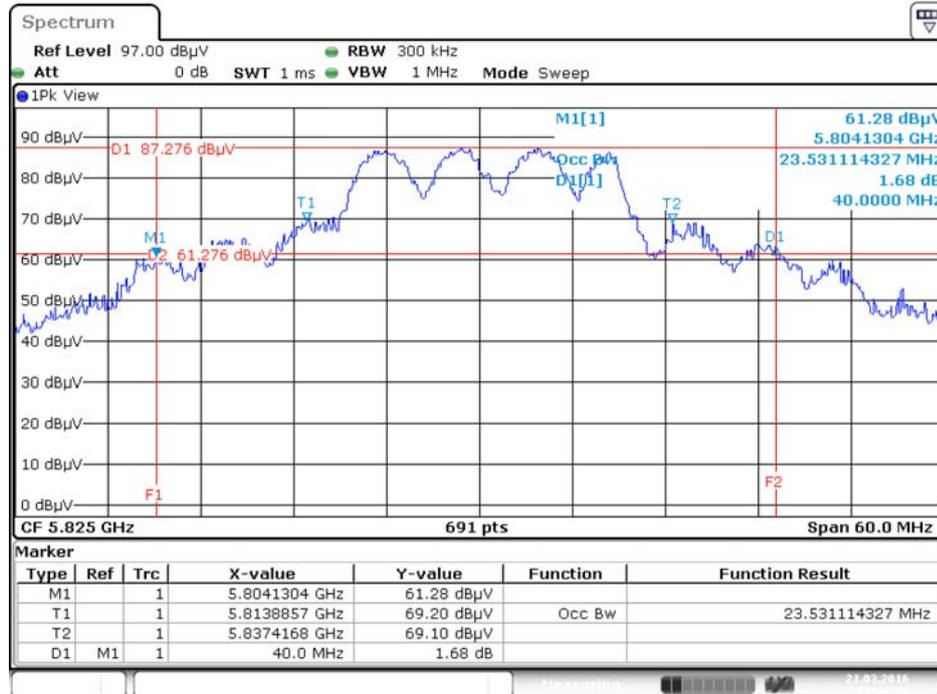
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 4 / 5785 MHz



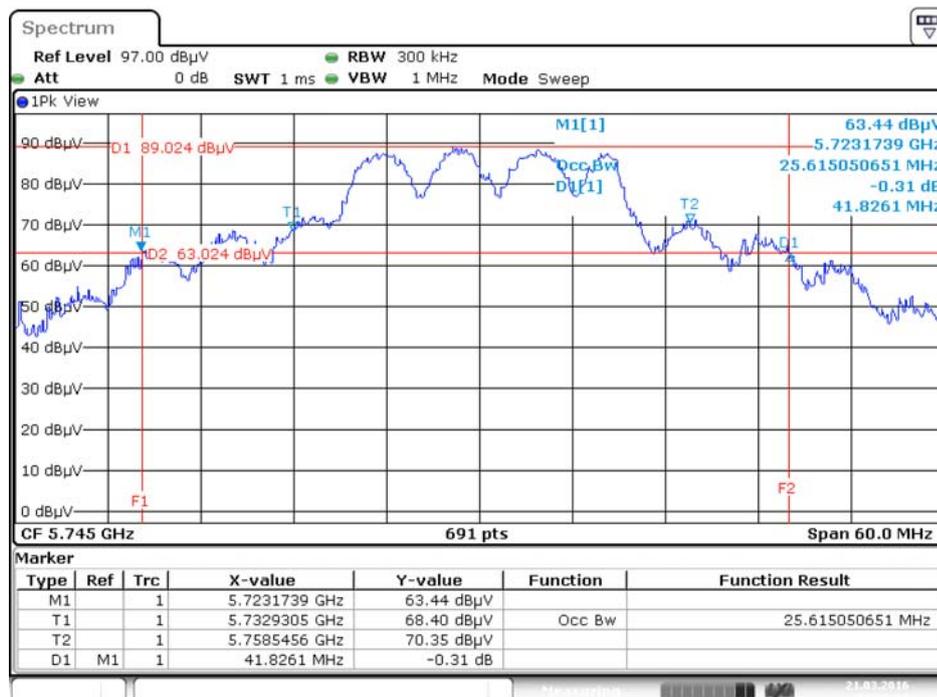
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 4 / 5825 MHz



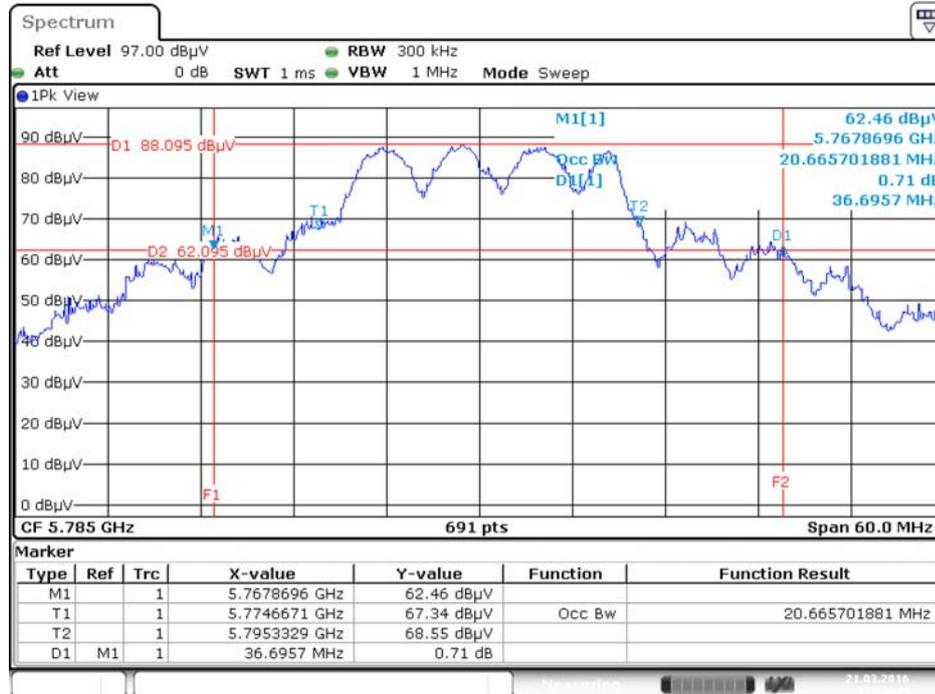
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 4 / 5745 MHz



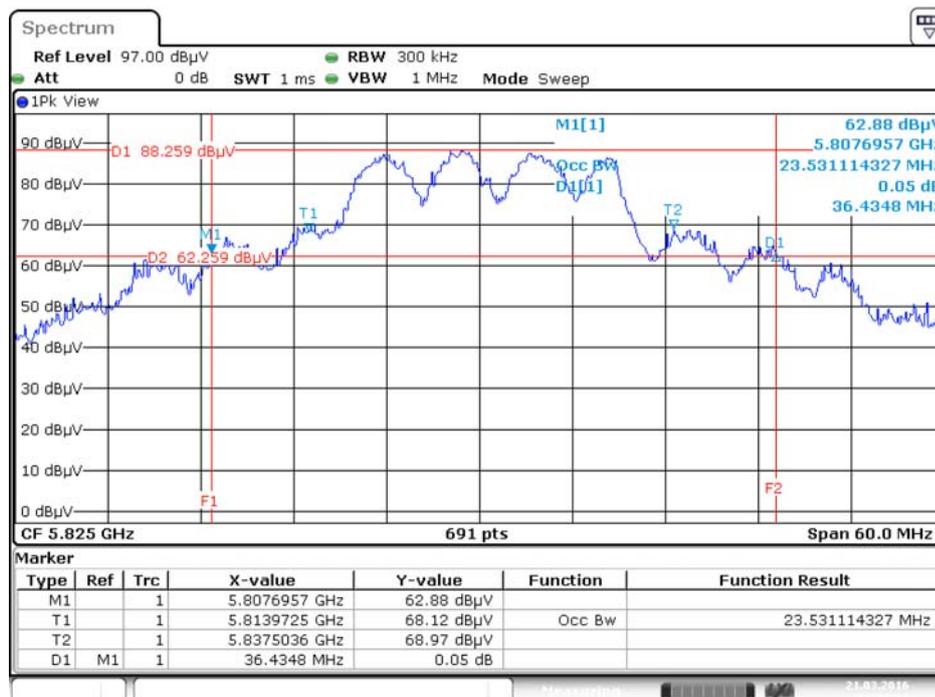
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 4 / 5785 MHz



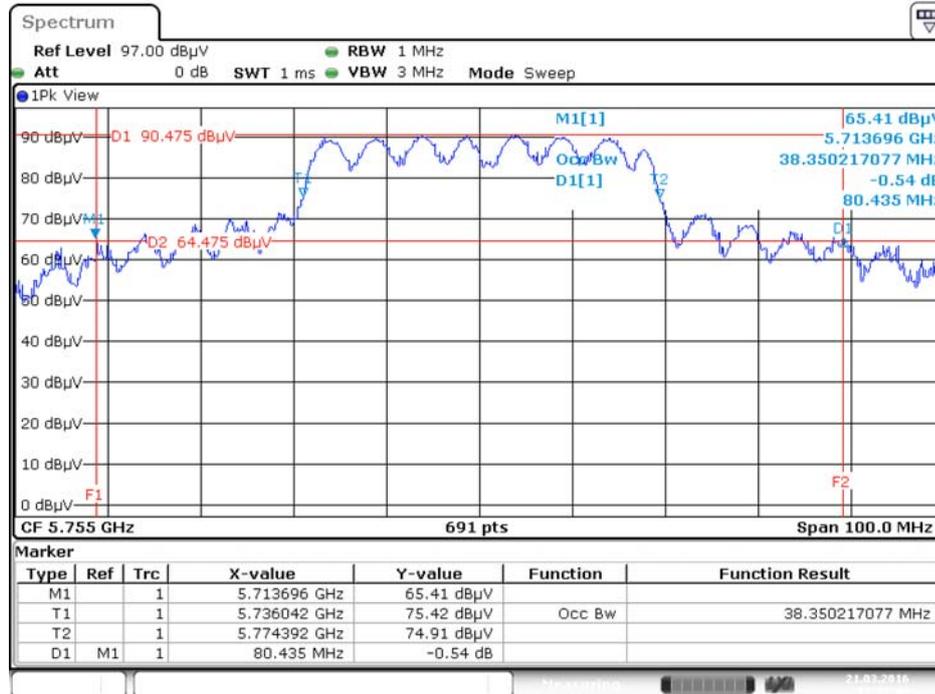
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 4 / 5825 MHz



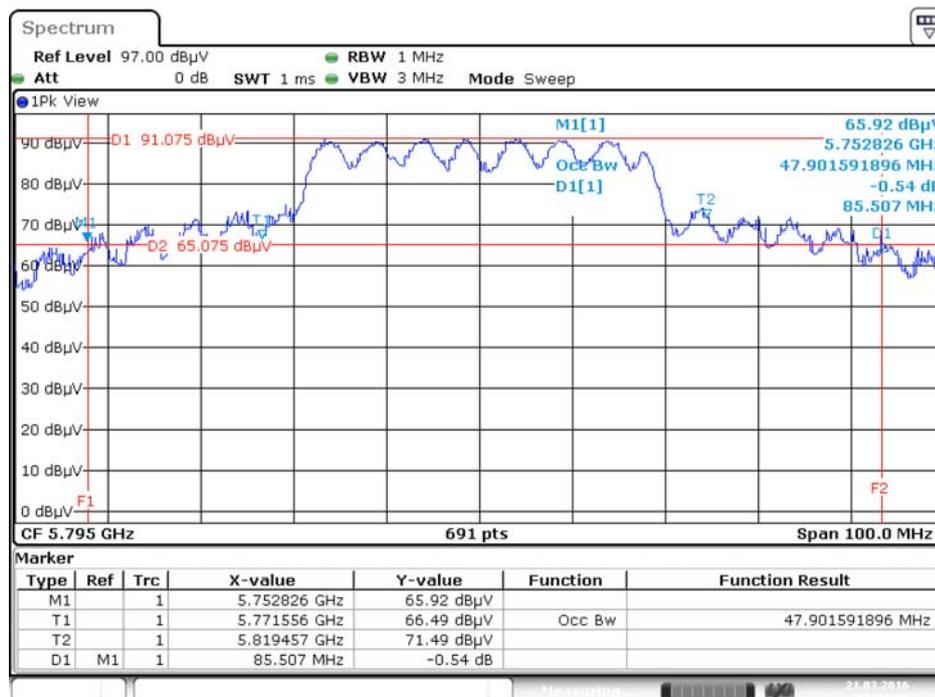
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 4 / 5755 MHz



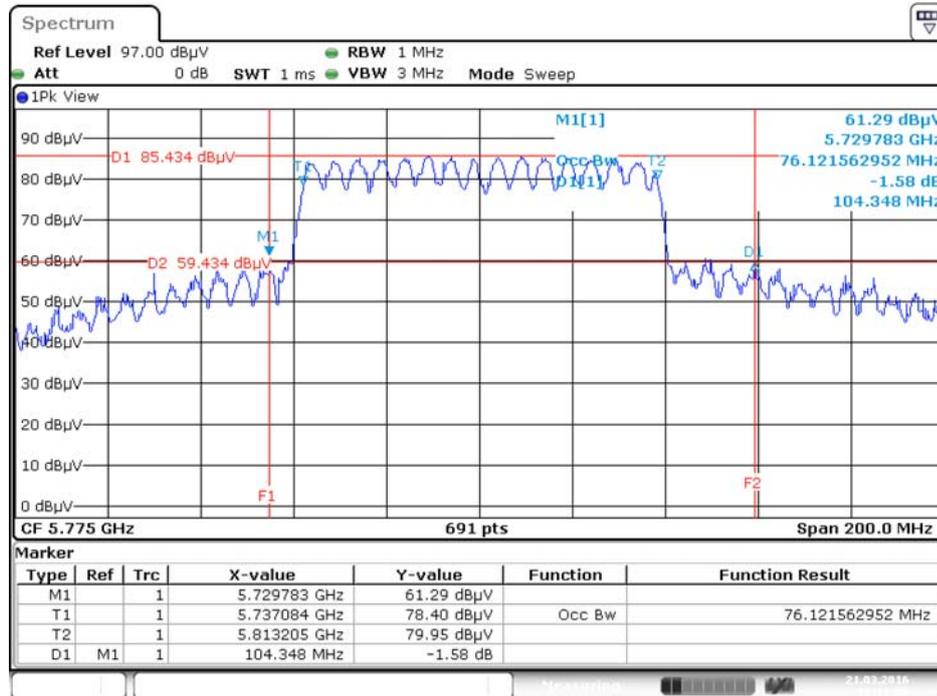
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 4 / 5795 MHz



Date: 21.MAR.2016 18:00:28

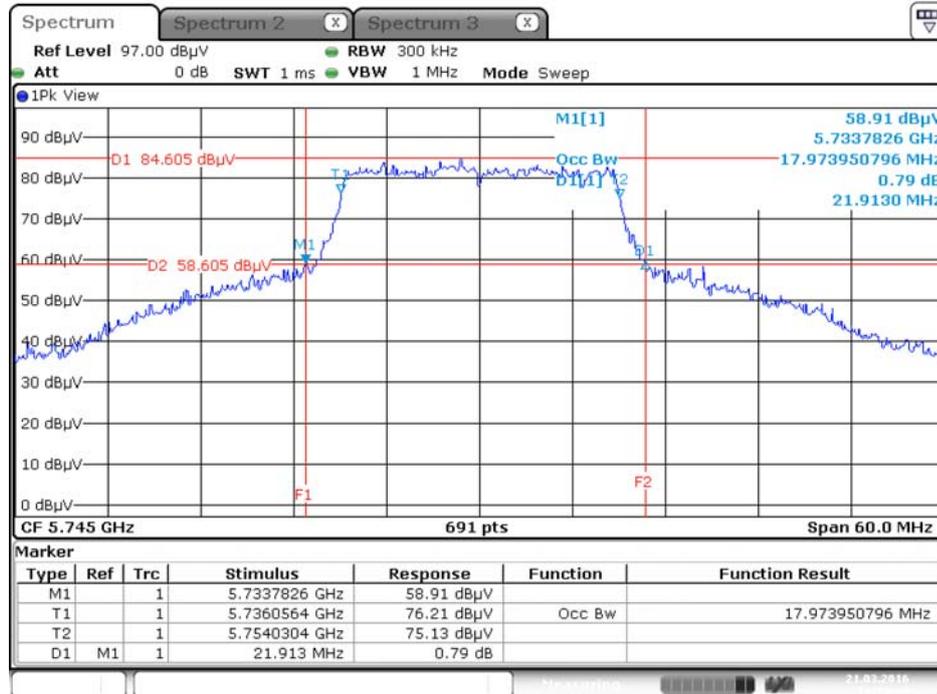
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 4 / 5775 MHz



Date: 21.MAR.2016 18:18:50

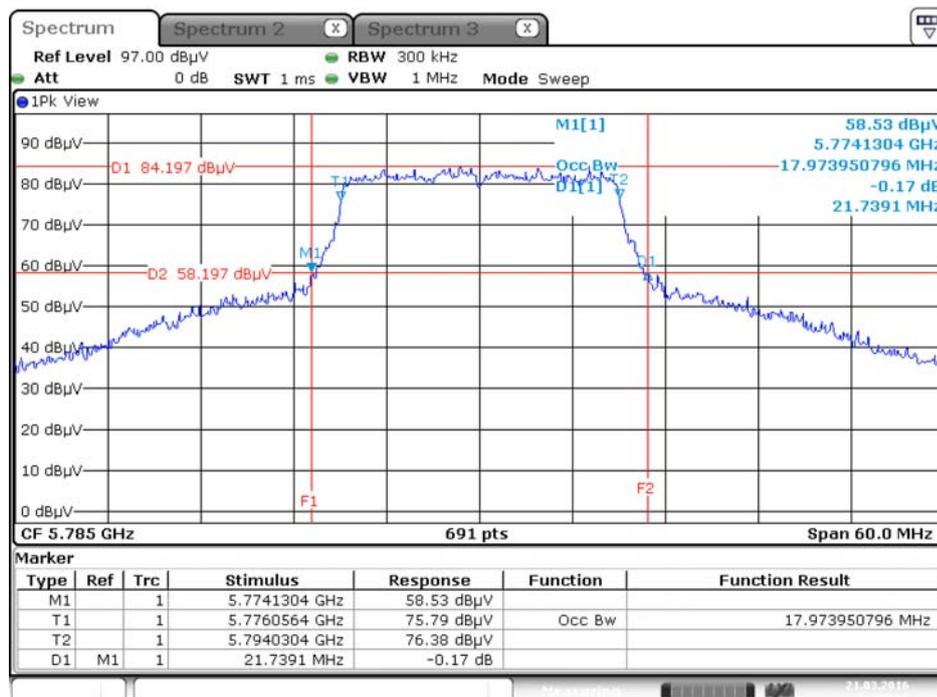
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 4 / 5745 MHz



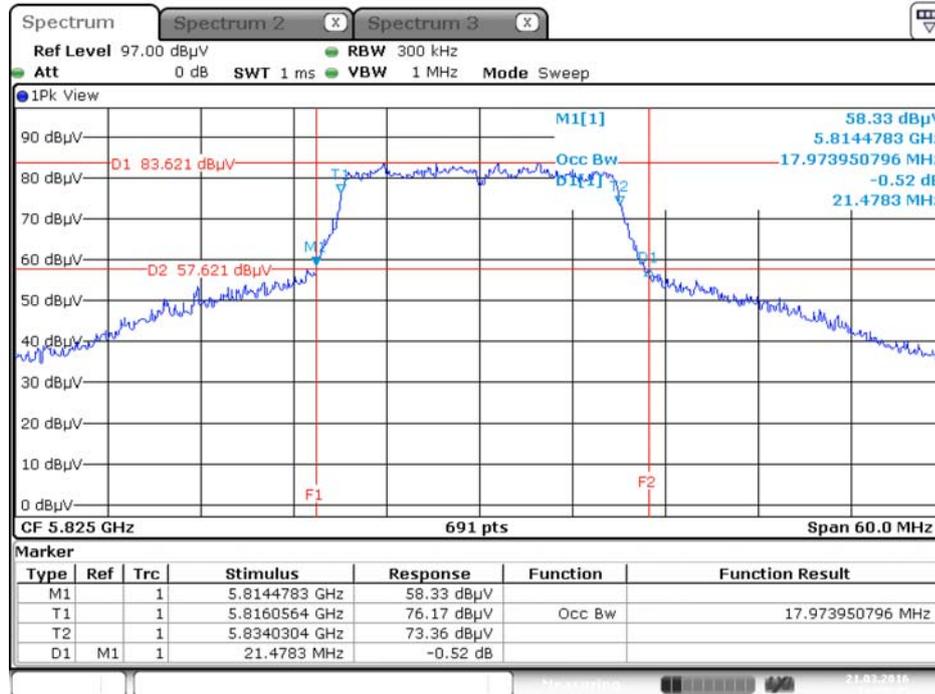
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 4 / 5785 MHz



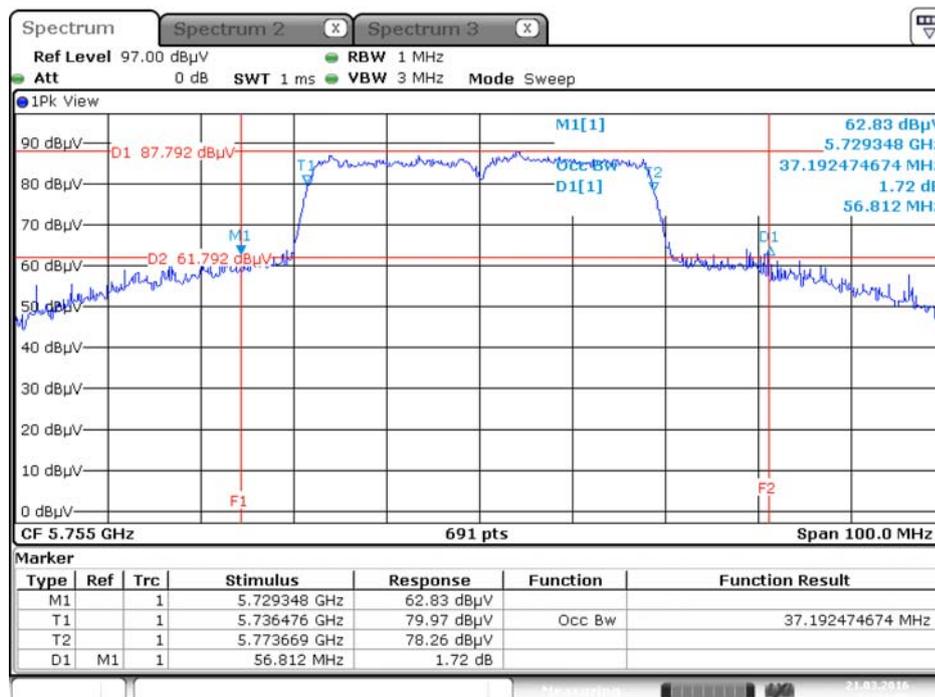
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 4 / 5825 MHz



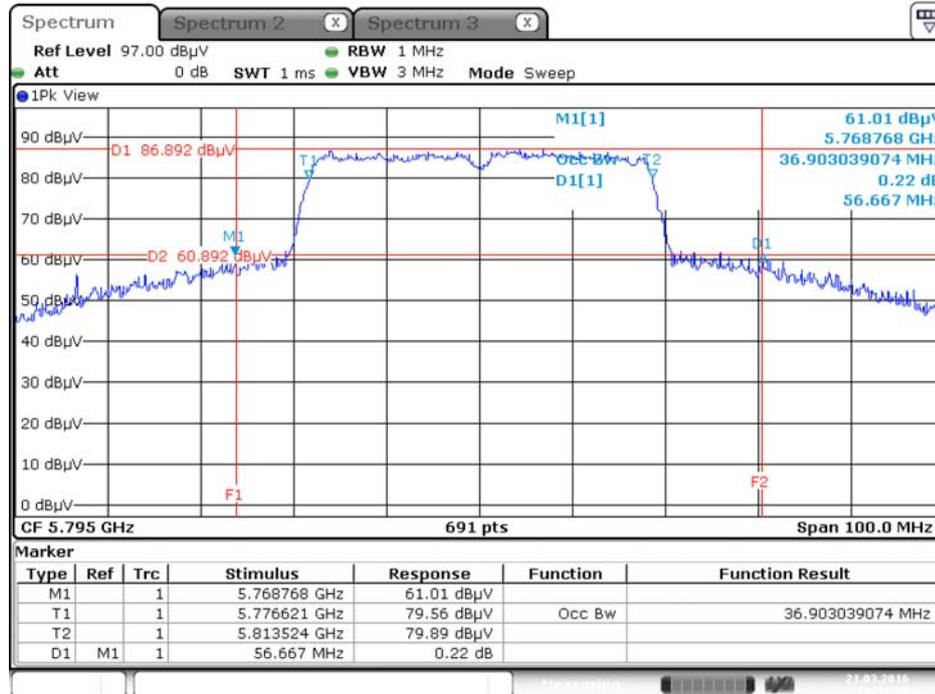
Date: 21.MAR.2016 19:25:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 4 / 5755 MHz



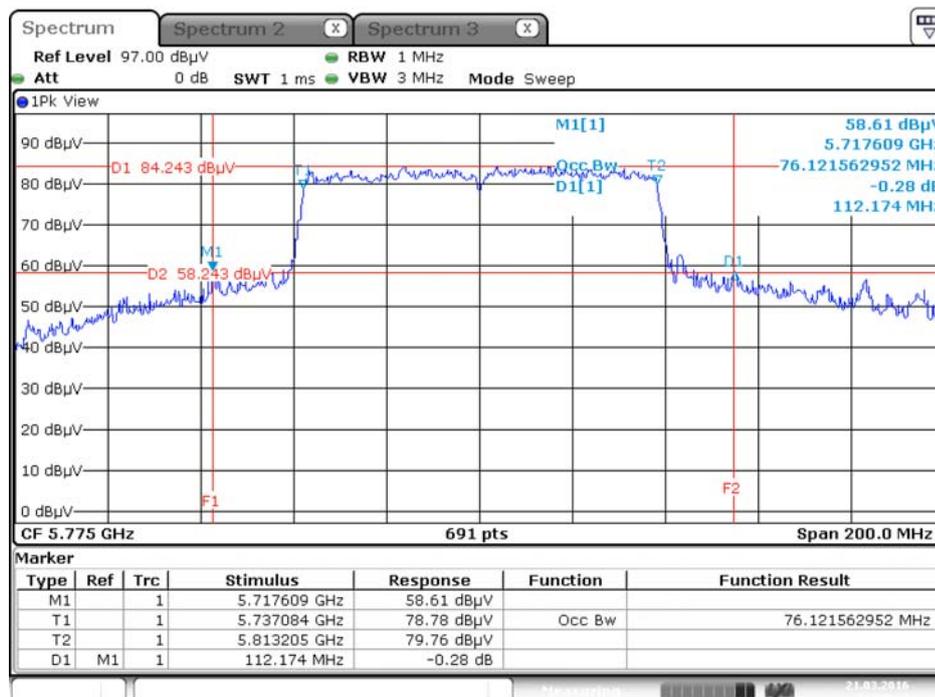
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26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 4 / 5795 MHz



Date: 21.MAR.2016 19:23:29

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 4 / 5775 MHz



Date: 21.MAR.2016 19:20:34

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

Frequency Band		Limit
<input checked="" type="checkbox"/>	5.15~5.25 GHz	
Operating Mode		
<input type="checkbox"/>	Outdoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
<input checked="" type="checkbox"/>	Indoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. 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.
<input type="checkbox"/>	Fixed point-to-point access points	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
<input type="checkbox"/>	Client devices	The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. 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.

☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.
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4.2.2. Measuring Instruments and Setting

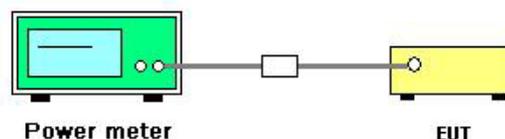
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	26°C	Humidity	63%
Test Engineer	Gary Chu	Test Date	May 10, 2016

<For Non-Beamforming Mode>

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 3	Chain 5	Chain 6	Total		
802.11a	5180 MHz	18.15	18.35	19.05	23.31	30.00	Complies
	5200 MHz	17.86	17.78	18.07	22.68	30.00	Complies
	5240 MHz	21.05	21.32	21.43	26.04	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	18.01	18.12	18.35	22.93	30.00	Complies
	5200 MHz	18.01	18.11	18.39	22.94	30.00	Complies
	5240 MHz	21.05	21.15	21.48	26.00	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	13.15	13.25	13.58	18.10	30.00	Complies
	5230 MHz	21.05	21.25	21.59	26.07	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	11.05	11.19	11.59	16.05	30.00	Complies

<For Beamforming Mode>

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 3	Chain 5	Chain 6	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	19.34	19.51	19.79	24.32	27.86	Complies
	5200 MHz	20.12	20.33	20.59	25.12	27.86	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	13.66	13.82	14.08	18.63	27.86	Complies
	5230 MHz	18.32	18.76	19.07	23.50	27.86	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	11.26	11.31	11.84	16.25	27.86	Complies

Note: $Directional\ Gain = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{K=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 8.14 \text{ dBi} > 6 \text{ dBi}$, so Limit = $30 - (8.14 - 6) = 27.86 \text{ dBm}$.

4.3. Power Spectral Density Measurement

4.3.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.2.1.

Frequency Band		Limit
<input checked="" type="checkbox"/>	5.15~5.25 GHz	
	Operating Mode	
<input type="checkbox"/>	Outdoor access point	17 dBm/MHz
<input checked="" type="checkbox"/>	Indoor access point	17 dBm/MHz
<input type="checkbox"/>	Fixed point-to-point access points	17 dBm/MHz
<input type="checkbox"/>	Client devices	11 dBm/MHz
<input checked="" type="checkbox"/>	5.725~5.85 GHz	30 dBm/500kHz

4.3.2. Measuring Instruments and Setting

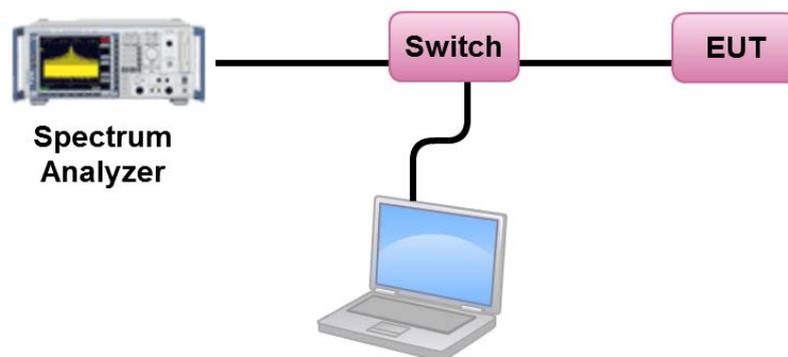
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements and sum the spectra across the outputs.
4. For 5.725~5.85 GHz, the measured result of PSD level must add $10\log(500\text{kHz}/\text{RBW})$ and the final result should ≤ 30 dBm.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	26°C	Humidity	63%
Test Engineer	Gary Chu		

For Band 1:

<For Non-Beamforming Mode>

Configuration IEEE 802.11a / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	10.16	14.86	Complies
40	5200 MHz	9.50	14.86	Complies
48	5240 MHz	12.80	14.86	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	9.87	14.86	Complies
40	5200 MHz	9.94	14.86	Complies
48	5240 MHz	12.76	14.86	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	2.01	14.86	Complies
46	5230 MHz	9.78	14.86	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.23	14.86	Complies

Note: $Directional\ Gain = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{K=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 8.14 \text{ dBi} > 6 \text{ dBi}$, so Limit = $17 - (8.14 - 6) = 14.86 \text{ dBm/MHz}$.

<For Beamforming Mode>

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	11.13	14.86	Complies
40	5200 MHz	12.02	14.86	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	2.40	14.86	Complies
46	5230 MHz	7.31	14.86	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 5 + Chain 6

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.48	14.86	Complies

Note: $Directional\ Gain = 10 \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{K=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 8.14 \text{ dBi} > 6 \text{ dBi}$, so Limit = $17 - (8.14 - 6) = 14.86 \text{ dBm/MHz}$.

Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

Temperature	24°C	Humidity	62%
Test Engineer	Eddie Weng		

For Band 4:

<For Non-Beamforming Mode>

Mode	Frequency	Power Density (dBm/3kHz)				10log(500k Hz/RBW) Factor (dB)	Total Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
		Chain 1	Chain 2	Chain 4	Total				
802.11a	5745 MHz	-0.85	-0.70	-0.43	4.11	22.22	26.33	27.76	Complies
	5785 MHz	-0.67	-1.42	-0.28	4.01	22.22	26.23	27.76	Complies
	5825 MHz	-0.97	-0.62	-0.49	4.08	22.22	26.30	27.76	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	-1.38	-1.14	-0.93	3.63	22.22	25.84	27.76	Complies
	5785 MHz	-1.30	-1.11	-1.02	3.63	22.22	25.85	27.76	Complies
	5825 MHz	-1.35	-1.18	-1.13	3.55	22.22	25.77	27.76	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	-4.84	-5.25	-4.45	-0.06	22.22	22.16	27.76	Complies
	5795 MHz	-3.44	-4.71	-4.28	0.66	22.22	22.88	27.76	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	-9.30	-9.45	-8.77	-4.39	22.22	17.83	27.76	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{K=1}^{N_{ANT}}g_{j,k}\right\}^2}{N_{ANT}}\right] = 8.24\text{dBi} > 6\text{dBi}$, so Limit = $30 - (8.24 - 6) = 27.76\text{dBm}/500\text{kHz}$.

<For Beamforming Mode>

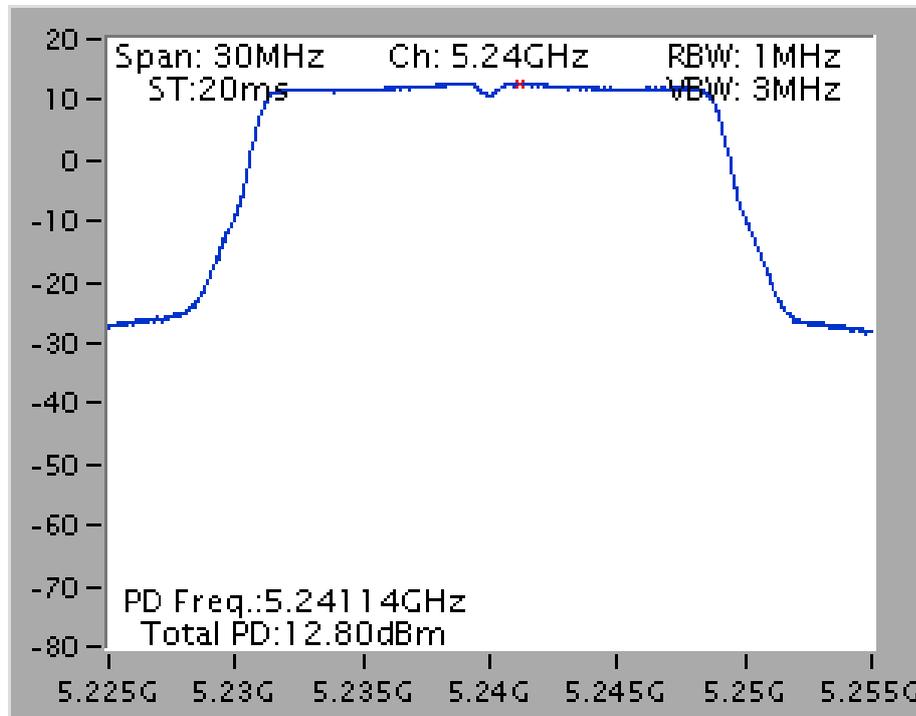
Mode	Frequency	Power Density (dBm/3kHz)				10log(500k Hz/RBW) Factor (dB)	Total Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
		Chain 1	Chain 2	Chain 4	Total				
802.11ac MCS0/Nss1 VHT20	5745 MHz	-3.78	-3.68	-3.14	1.25	22.22	23.47	27.76	Complies
	5785 MHz	-3.81	-3.42	-3.01	1.37	22.22	23.59	27.76	Complies
	5825 MHz	-3.29	-3.13	-2.59	1.78	22.22	24.00	27.76	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	-6.80	-6.20	-6.65	-1.77	22.22	20.45	27.76	Complies
	5795 MHz	-6.82	-6.35	-6.58	-1.81	22.22	20.41	27.76	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	-10.16	-10.65	-9.80	-5.42	22.22	16.80	27.76	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{K=1}^{N_{ANT}}g_{j,k}\right\}^2}{N_{ANT}}\right] = 8.24\text{dBi} > 6\text{dBi}$, so Limit = $30 - (8.24 - 6) = 27.76\text{dBm}/500\text{kHz}$.

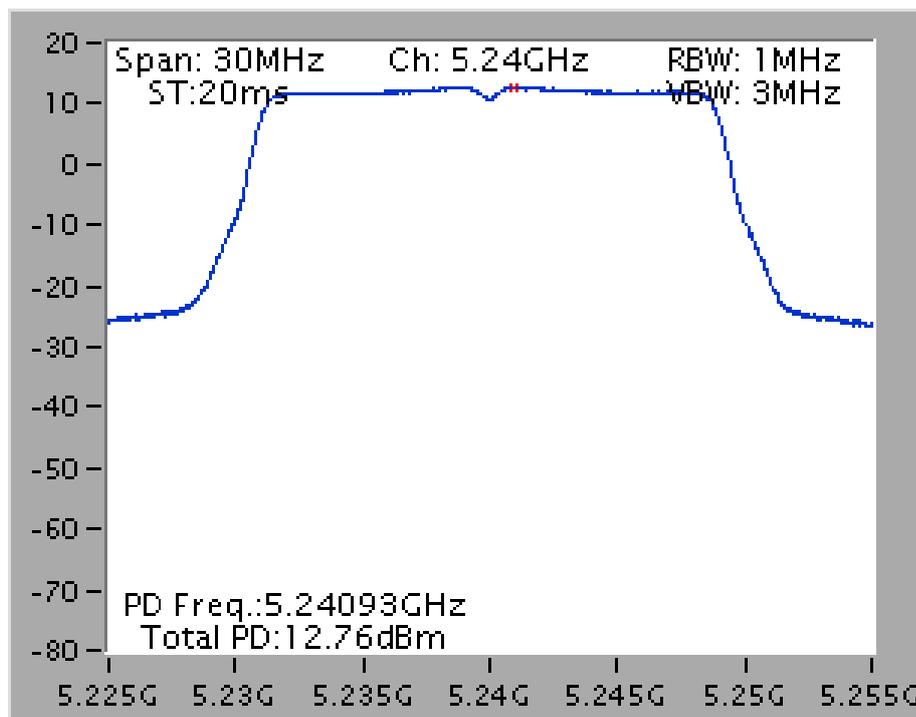
For Band 1:

<For Non-Beamforming Mode>

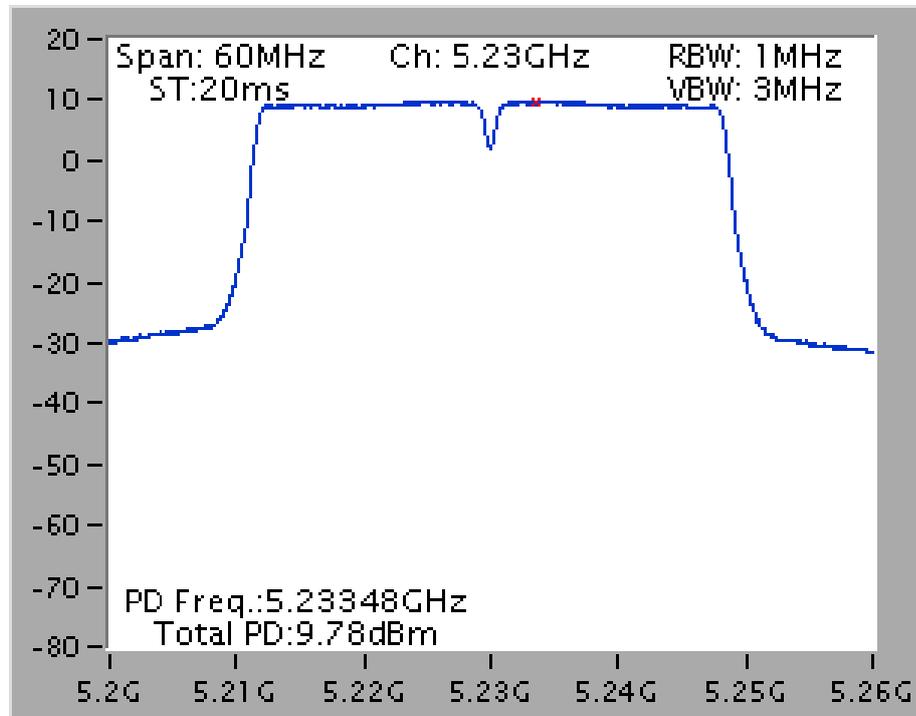
Power Density Plot on Configuration IEEE 802.11a / Chain 3 + Chain 5 + Chain 6 / 5240 MHz



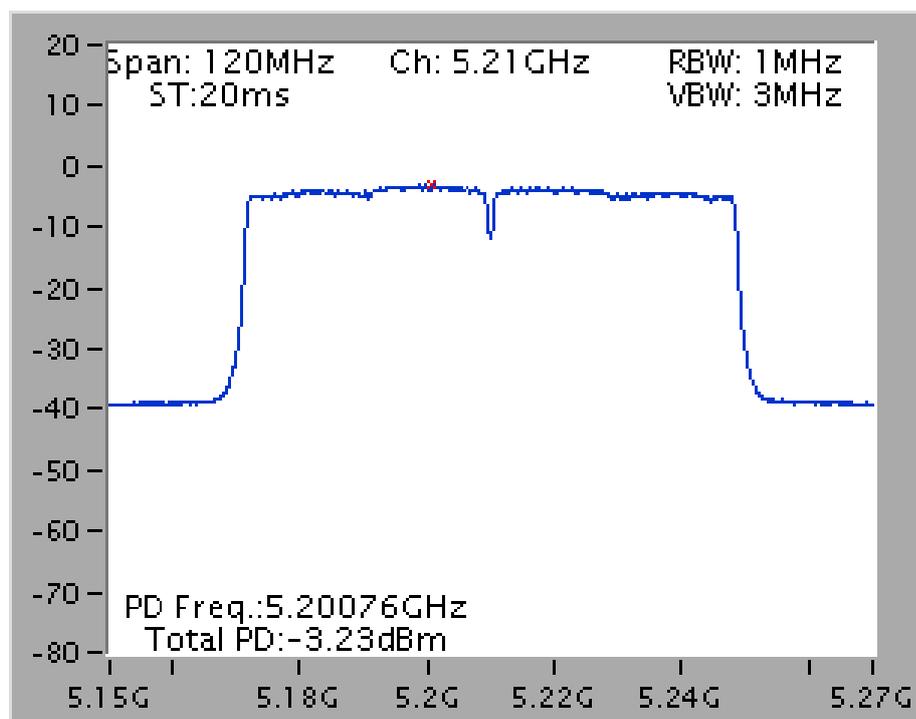
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5240 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6 /
5230 MHz

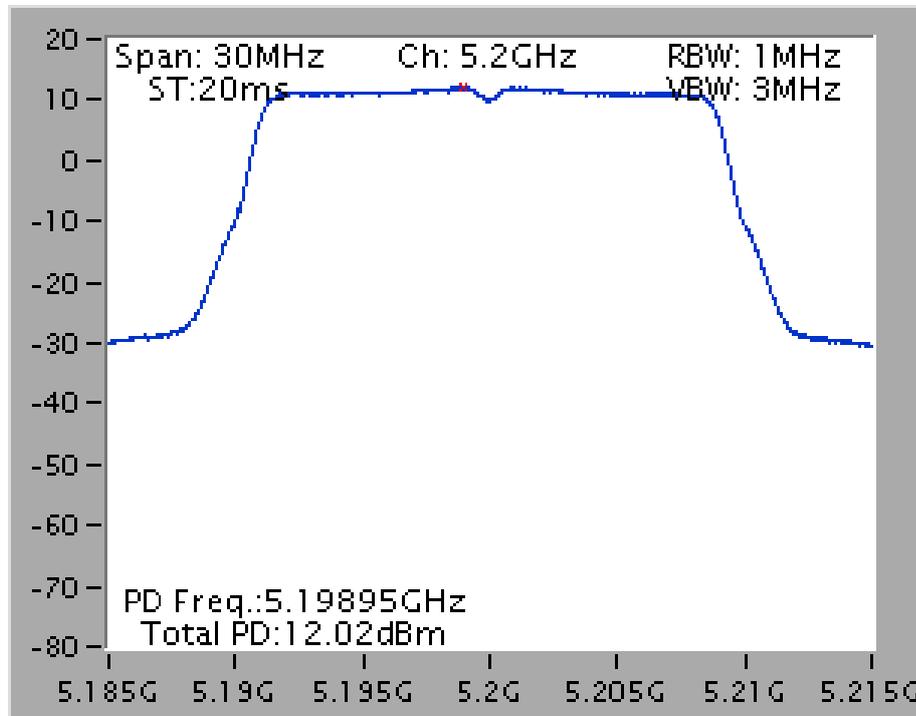


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 5 + Chain 6 /
5210 MHz

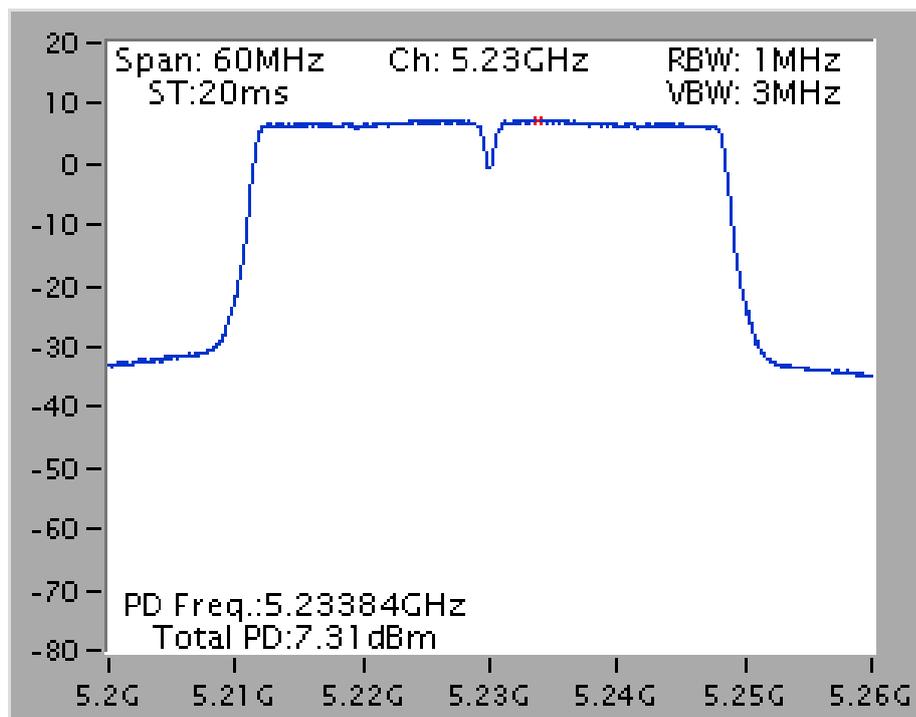


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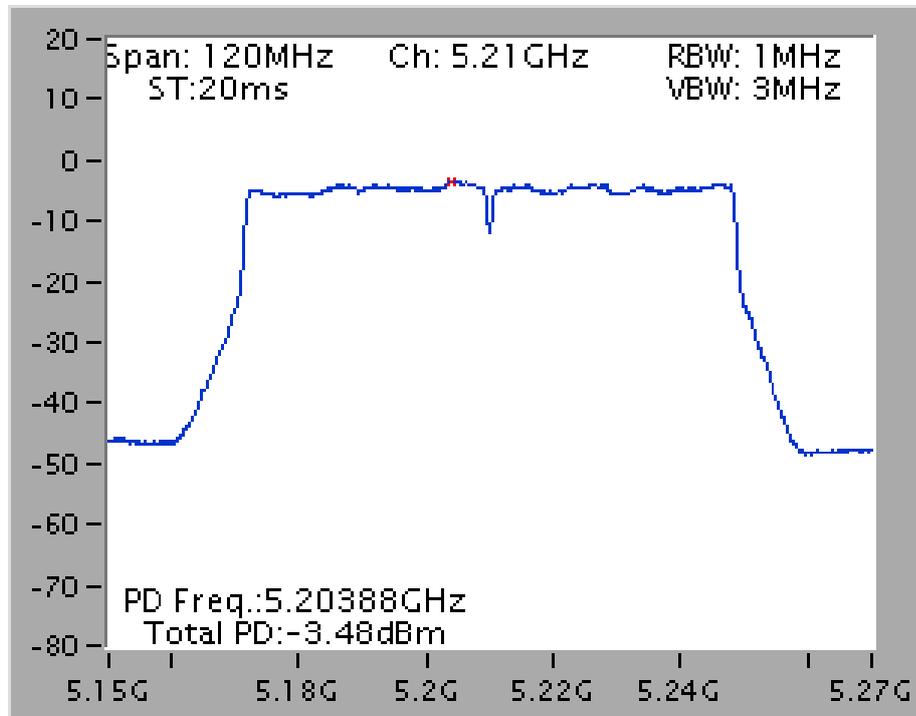
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 5 + Chain 6 / 5200 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 5 + Chain 6 / 5230 MHz



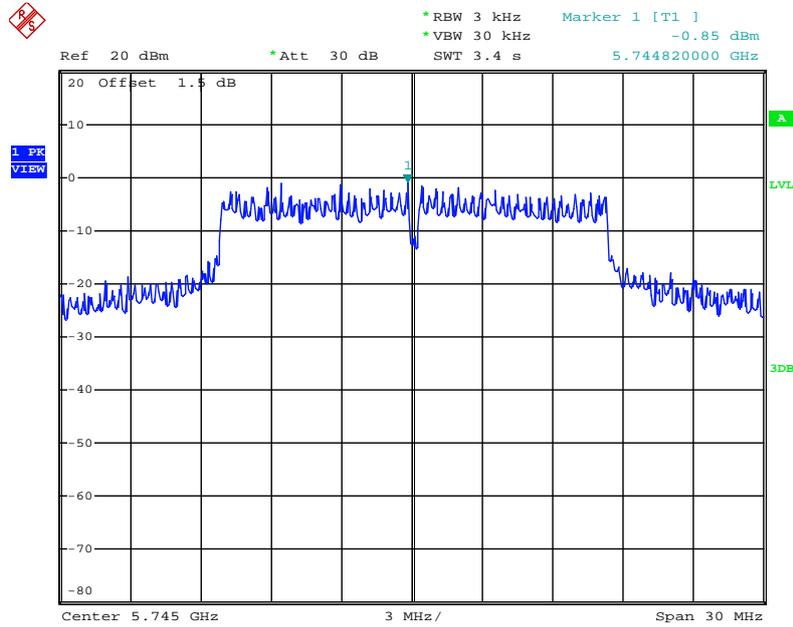
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 5 + Chain 6 /
5210 MHz



For Band 4:

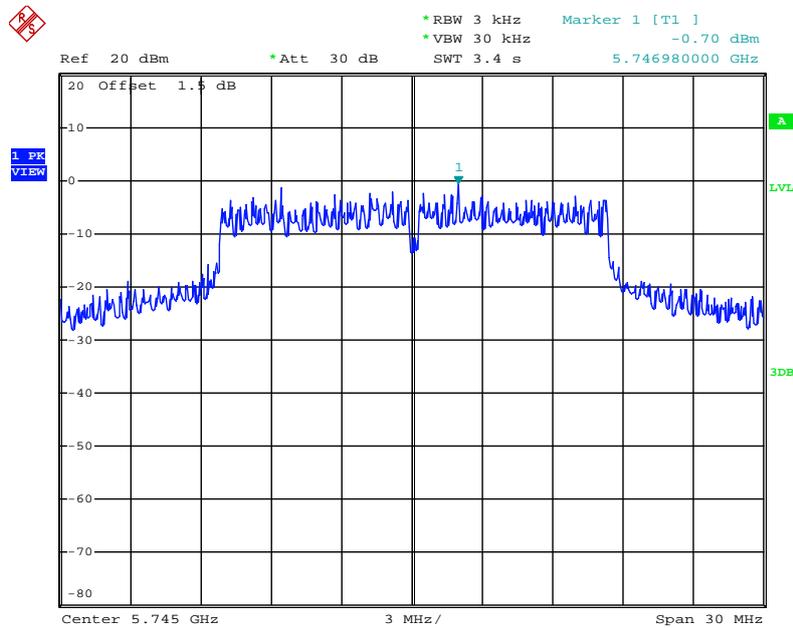
<For Non-Beamforming Mode>

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz / Chain 1



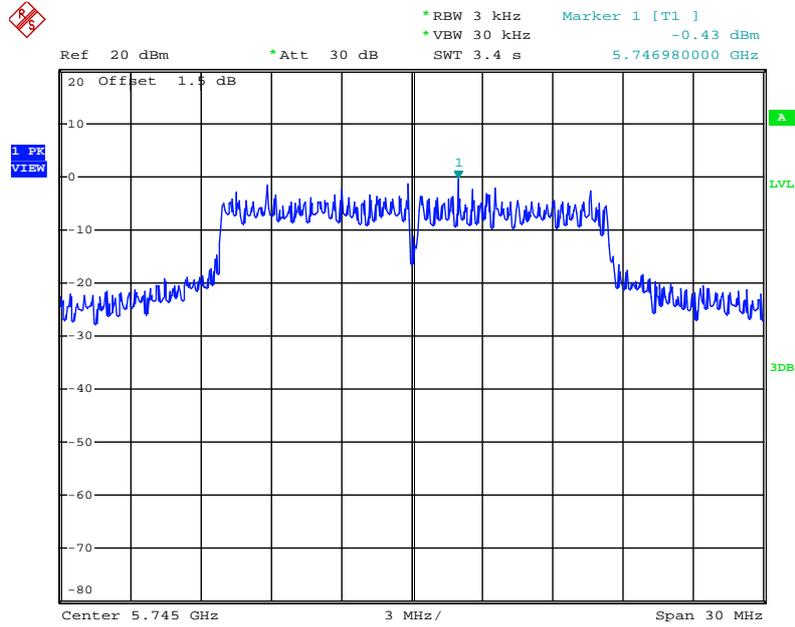
Date: 7.NOV.2014 23:21:12

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz / Chain 2



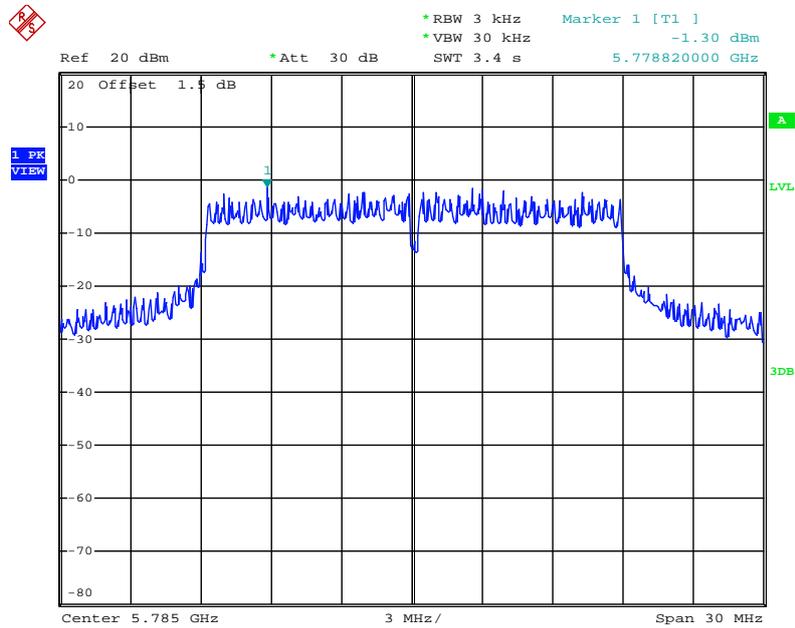
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Power Density Plot on Configuration IEEE 802.11a / 5745 MHz / Chain 4



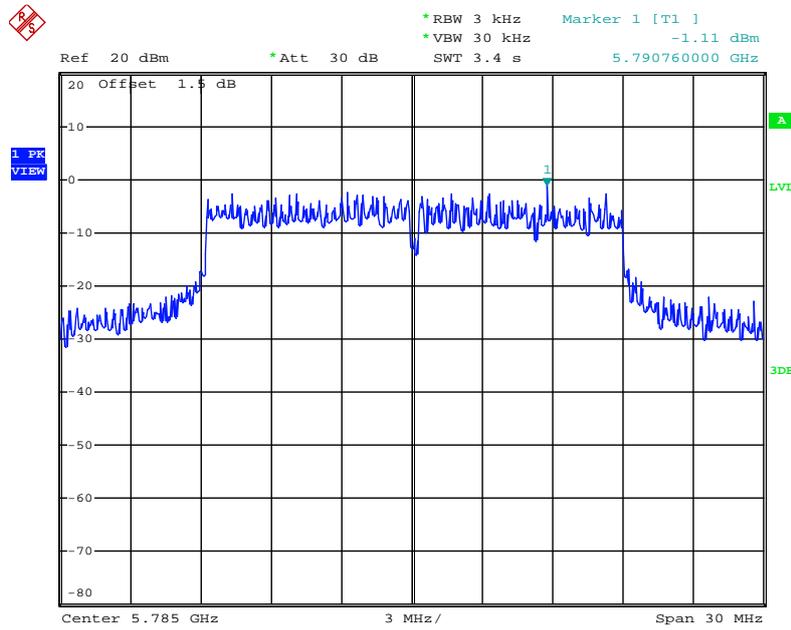
Date: 7.NOV.2014 23:21:35

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 1



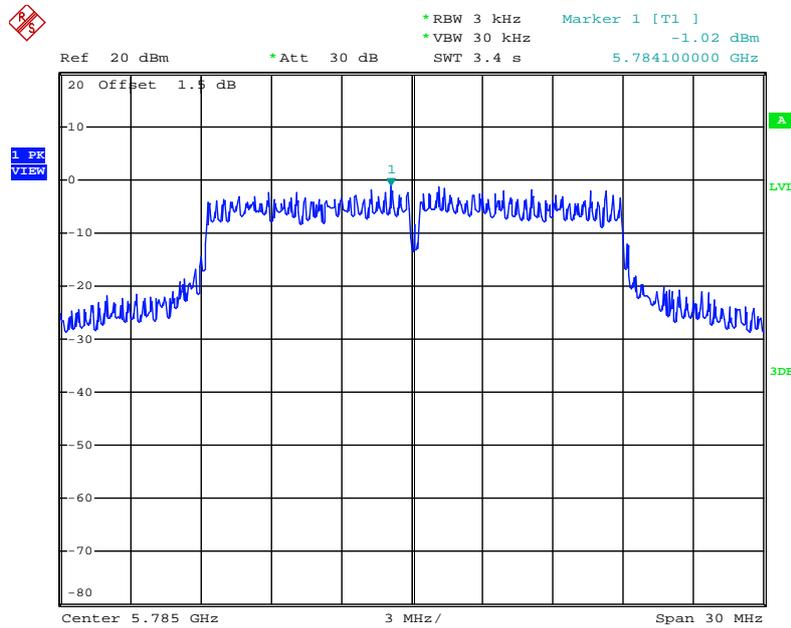
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Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 2



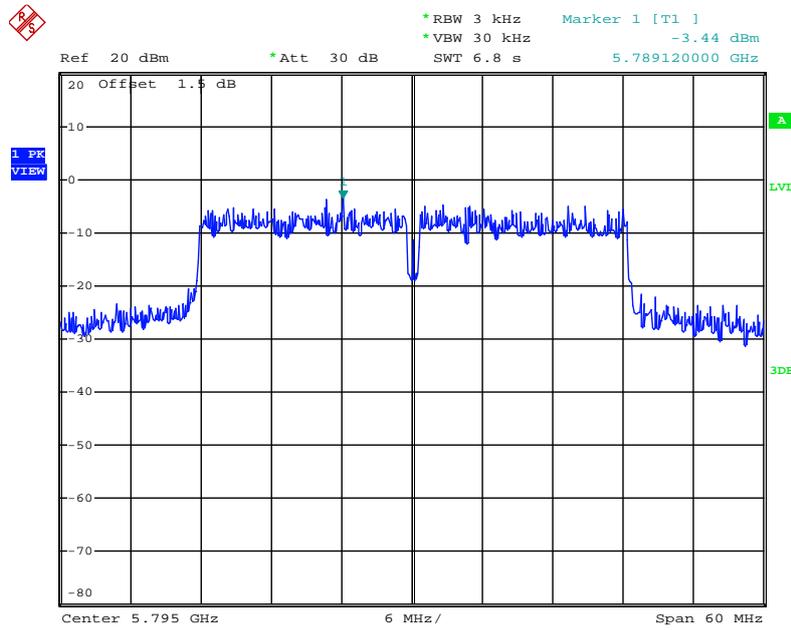
Date: 7.NOV.2014 23:31:07

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 4



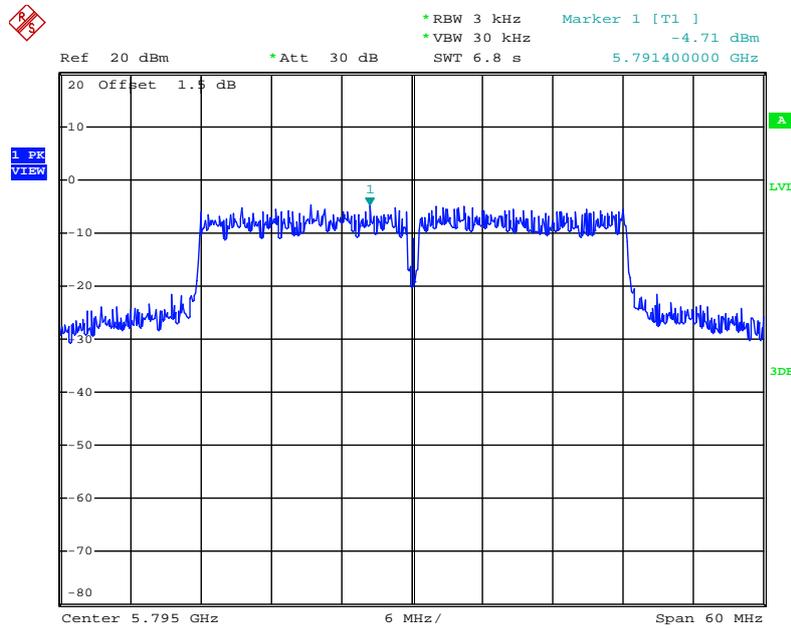
Date: 7.NOV.2014 23:31:32

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 1



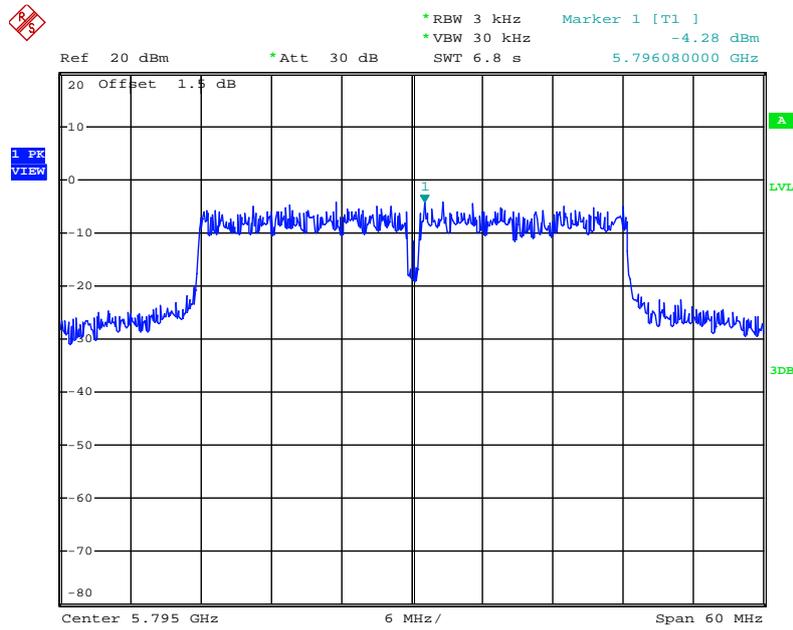
Date: 7.NOV.2014 23:43:39

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 2



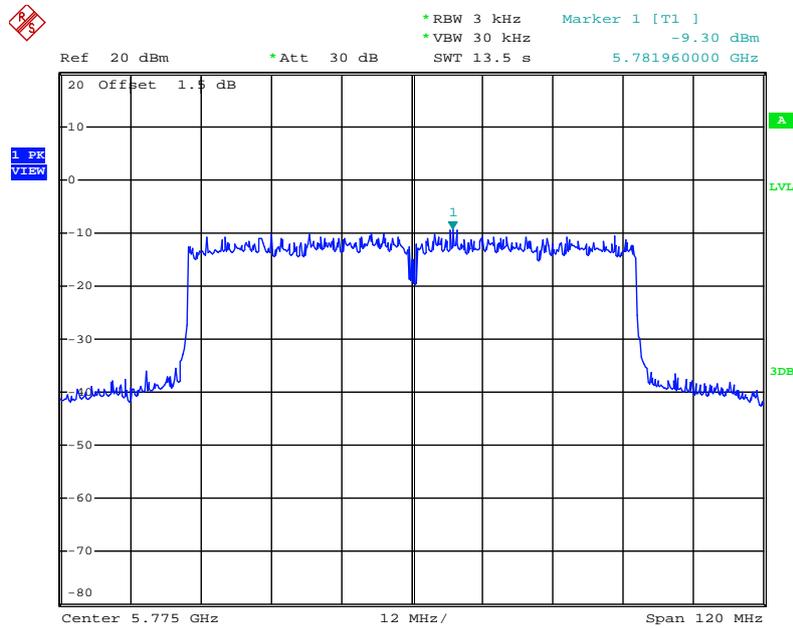
Date: 7.NOV.2014 23:43:57

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 4



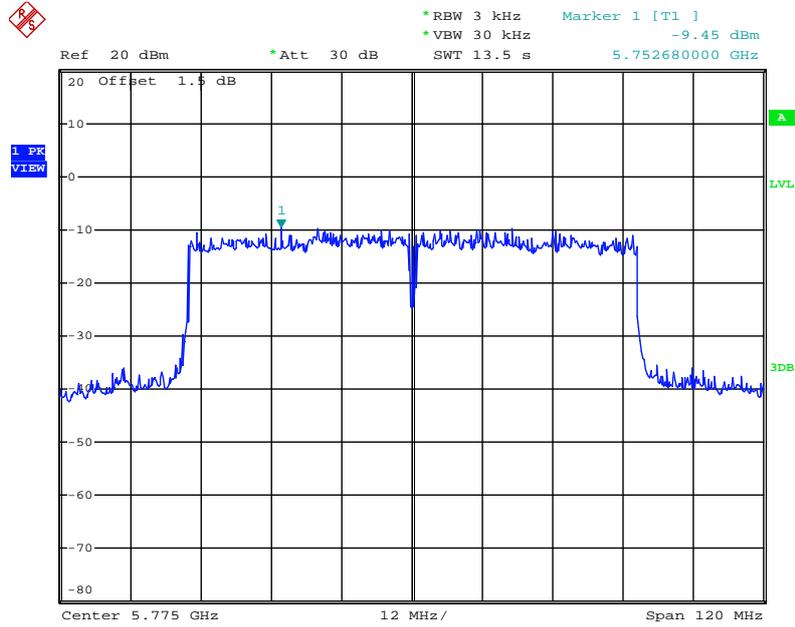
Date: 7.NOV.2014 23:43:22

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1



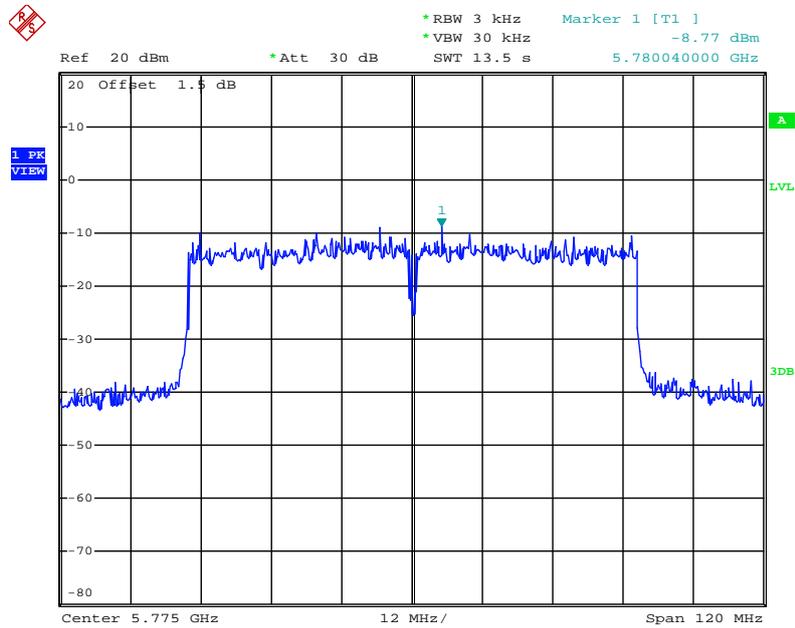
Date: 7.NOV.2014 23:49:46

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 2



Date: 7.NOV.2014 23:51:11

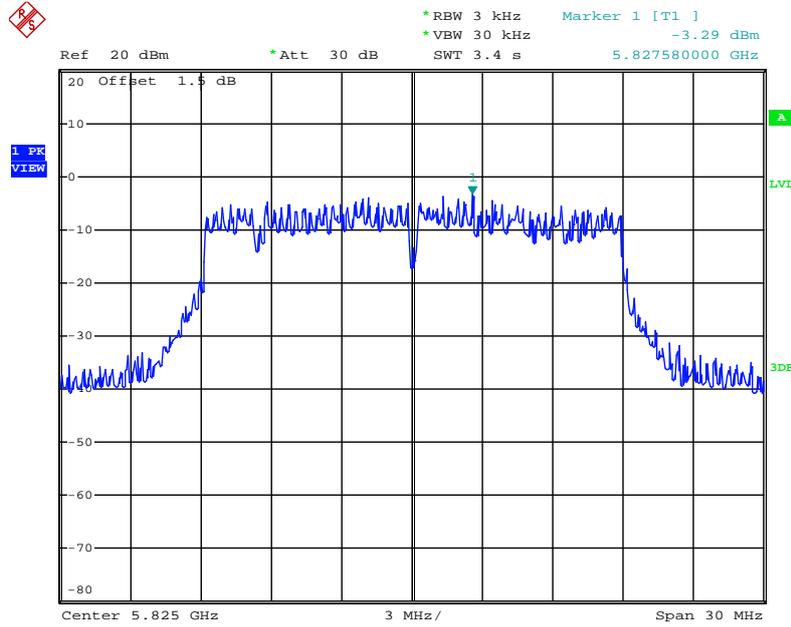
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 4



Date: 7.NOV.2014 23:48:40

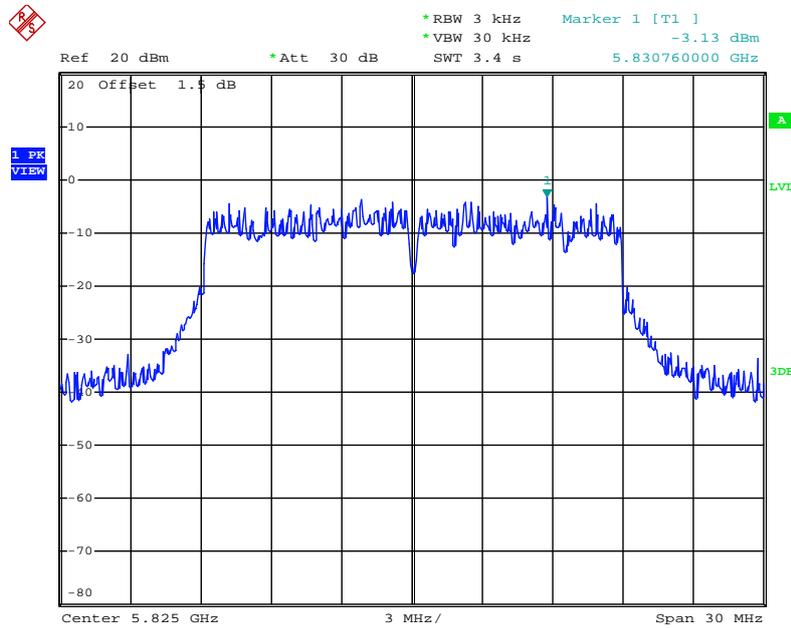
<For Beamforming Mode>

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 1



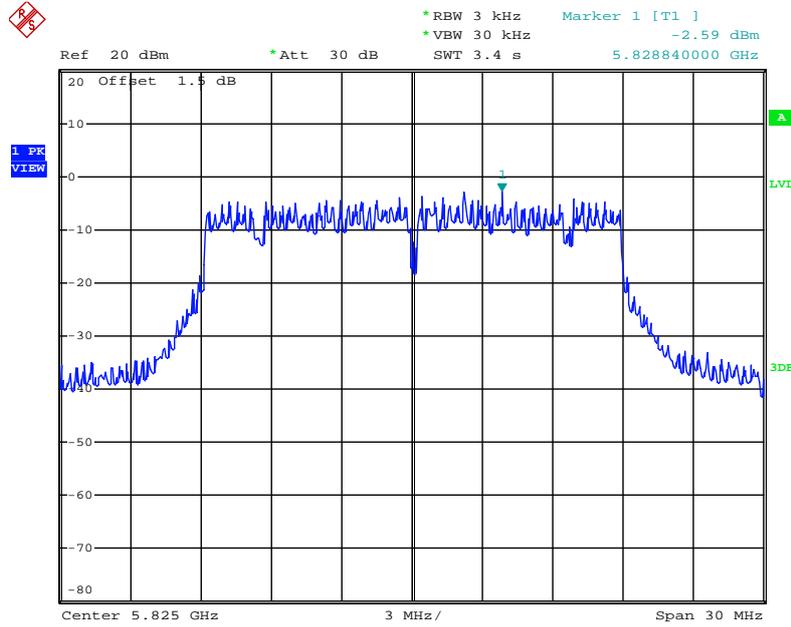
Date: 8.NOV.2014 00:35:53

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 2



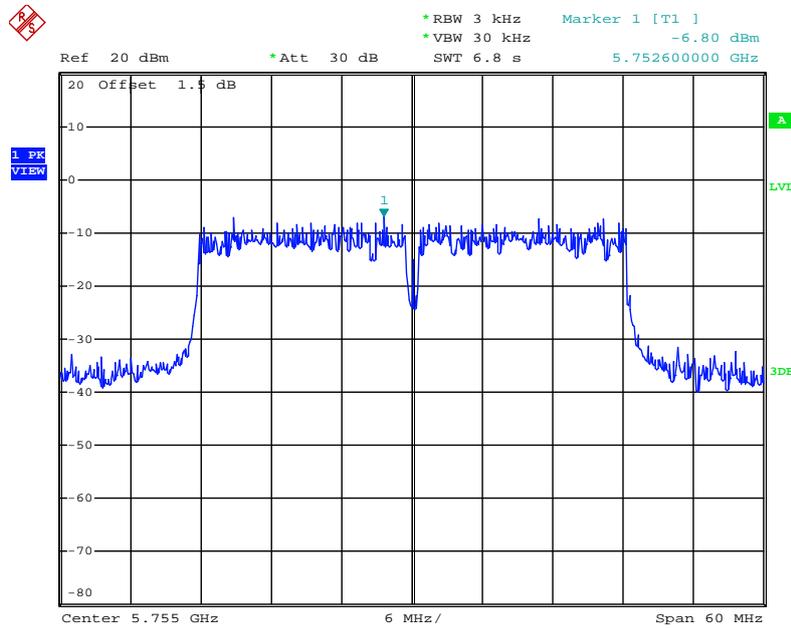
Date: 8.NOV.2014 00:36:03

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 4



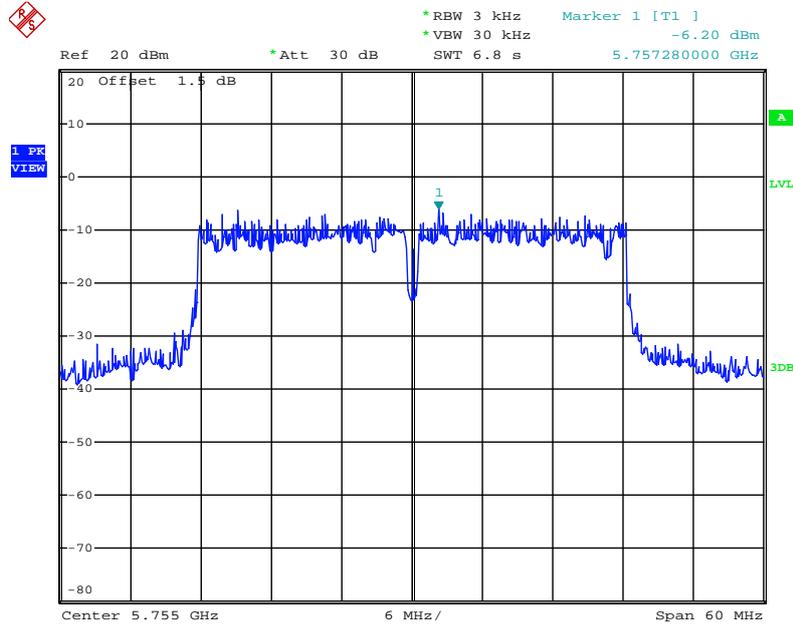
Date: 8.NOV.2014 00:35:43

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 1



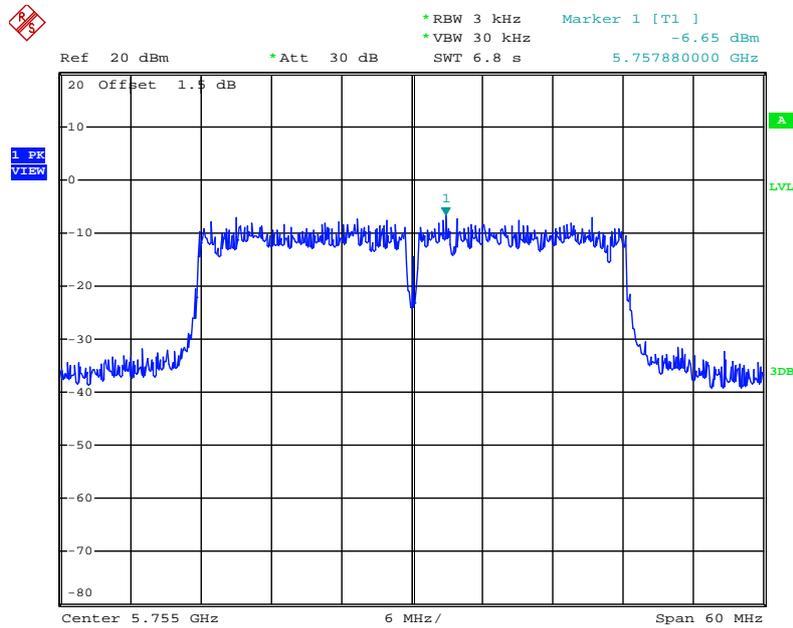
Date: 8.NOV.2014 00:39:10

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 2



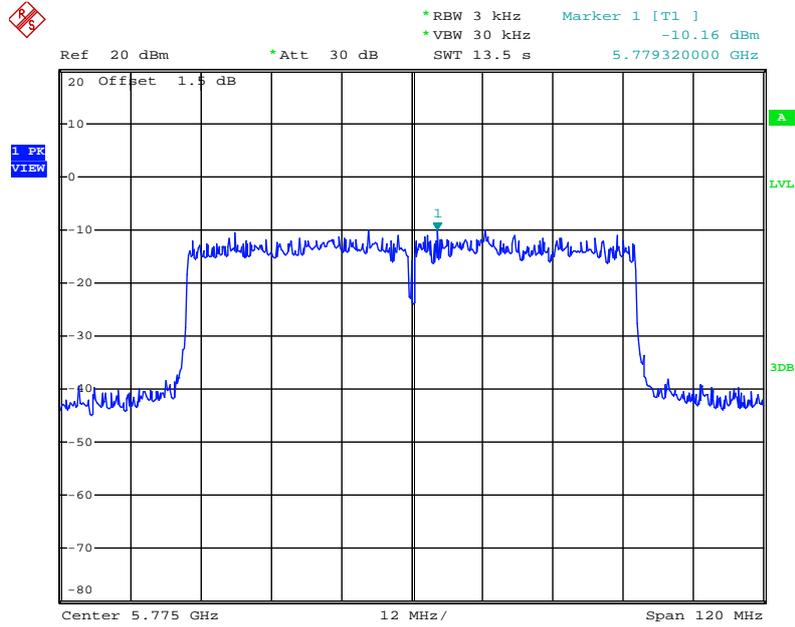
Date: 8.NOV.2014 00:38:34

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 4



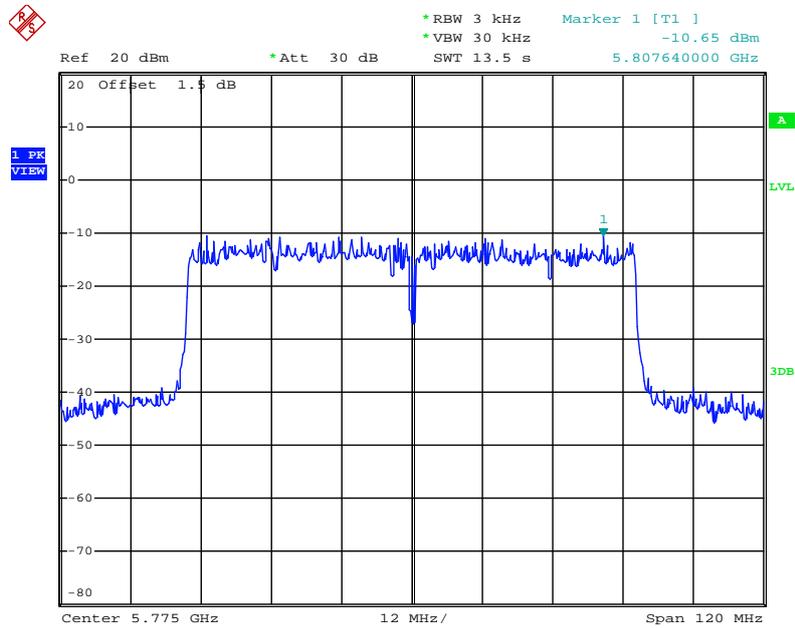
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Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1



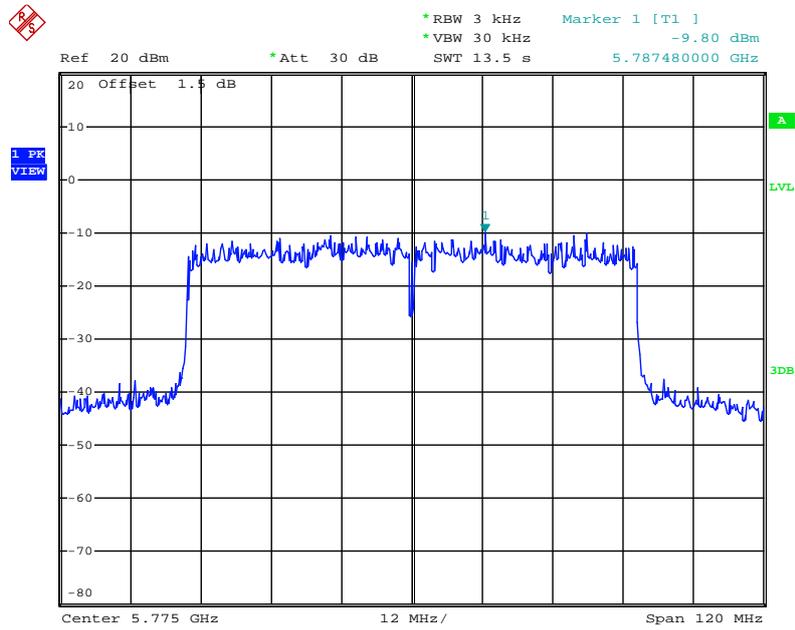
Date: 8.NOV.2014 00:24:46

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 2



Date: 8.NOV.2014 00:25:45

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 4



Date: 8.NOV.2014 00:26:12

4.4. Radiated Emissions Measurement

4.4.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

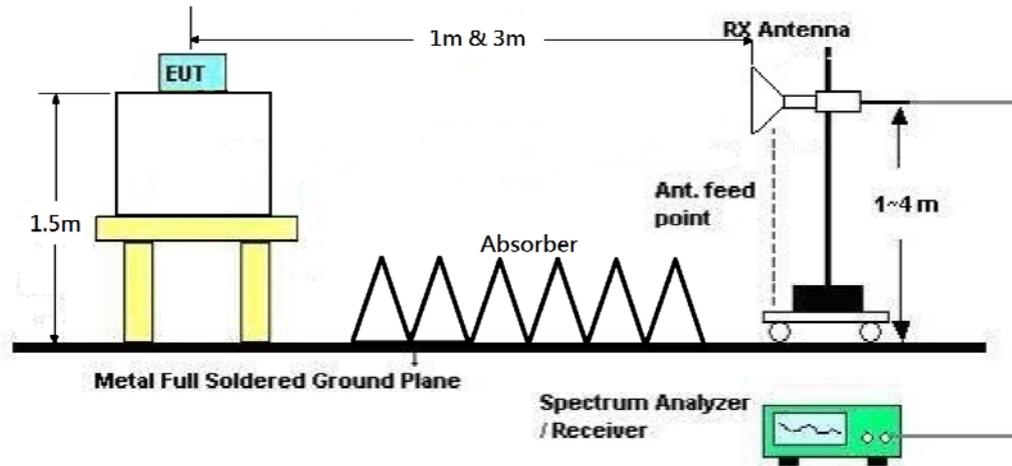
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for peak

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.4.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.4.7. Results for Radiated Emissions (1GHz~40GHz)

<For Non-Beamforming Mode>

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11a CH 36 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 18, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	15535.80	57.96	74.00	-16.04	43.21	11.23	38.16	34.64	237	150 Peak	HORIZONTAL
2	15563.20	45.56	54.00	-8.44	30.77	11.24	38.23	34.68	237	150 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	15527.10	58.72	74.00	-15.28	43.97	11.23	38.16	34.64	85	150 Peak	VERTICAL
2	15560.40	45.75	54.00	-8.25	30.96	11.24	38.23	34.68	85	150 Average	VERTICAL



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11a CH 40 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 29, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15598.72	46.40	54.00	-7.60	29.82	12.30	38.05	33.77	150	98 Average	HORIZONTAL
2	15602.45	59.16	74.00	-14.84	42.64	12.31	37.98	33.77	150	98 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15599.00	60.44	74.00	-13.56	43.86	12.30	38.05	33.77	150	317 Peak	VERTICAL
2	15600.62	46.47	54.00	-7.53	29.95	12.31	37.98	33.77	150	317 Average	VERTICAL

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11a CH 48 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 18, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15704.60	46.28	54.00	-7.72	31.36	11.27	38.42	34.77	208	150 Average	HORIZONTAL
2	15731.50	58.83	74.00	-15.17	43.95	11.27	38.42	34.81	208	150 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15706.90	46.61	54.00	-7.39	31.69	11.27	38.42	34.77	42	150 Average	VERTICAL
2	15721.10	59.33	74.00	-14.67	44.45	11.27	38.42	34.81	42	150 Peak	VERTICAL

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 18, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15539.50	45.56	54.00	-8.44	30.81	11.23	38.16	236	150	Average	HORIZONTAL
2	15554.50	57.93	74.00	-16.07	43.18	11.23	38.16	236	150	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15532.80	58.69	74.00	-15.31	43.94	11.23	38.16	74	150	Peak	VERTICAL
2	15560.00	45.81	54.00	-8.19	31.02	11.24	38.23	74	150	Average	VERTICAL



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 29, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15598.72	46.79	54.00	-7.21	30.21	12.30	38.05	33.77	150	99 Average	HORIZONTAL
2	15602.45	59.38	74.00	-14.62	42.86	12.31	37.98	33.77	150	99 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15599.00	60.64	74.00	-13.36	44.06	12.30	38.05	33.77	150	336 Peak	VERTICAL
2	15600.62	46.63	54.00	-7.37	30.11	12.31	37.98	33.77	150	336 Average	VERTICAL

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 18, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15698.90	46.29	54.00	-7.71	31.37	11.27	38.42	34.77	259	150 Average	HORIZONTAL
2	15738.20	59.01	74.00	-14.99	44.05	11.29	38.48	34.81	259	150 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15705.60	46.38	54.00	-7.62	31.46	11.27	38.42	34.77	97	150 Average	VERTICAL
2	15721.60	58.98	74.00	-15.02	44.10	11.27	38.42	34.81	97	150 Peak	VERTICAL



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 18, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15591.70	58.33	74.00	-15.67	43.54	11.24	38.23	34.68	248	150 Peak	HORIZONTAL
2	15594.60	46.06	54.00	-7.94	31.27	11.24	38.23	34.68	248	150 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15592.30	46.13	54.00	-7.87	31.34	11.24	38.23	34.68	81	150 Average	VERTICAL
2	15593.90	59.42	74.00	-14.58	44.63	11.24	38.23	34.68	81	150 Peak	VERTICAL



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 18, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15684.60	59.44	74.00	-14.56	44.60	11.26	38.35	34.77	236	150 Peak	HORIZONTAL
2	15700.50	46.78	54.00	-7.22	31.86	11.27	38.42	34.77	236	150 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15668.90	46.69	54.00	-7.31	31.85	11.26	38.35	34.77	89	150 Average	VERTICAL
2	15687.40	59.73	74.00	-14.27	44.89	11.26	38.35	34.77	89	150 Peak	VERTICAL

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 19, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15644.80	58.52	74.00	-15.48	43.71	11.25	38.29	34.73	286	150 Peak	HORIZONTAL
2	15667.20	46.50	54.00	-7.50	31.66	11.26	38.35	34.77	286	150 Average	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	15669.80	59.43	74.00	-14.57	44.59	11.26	38.35	34.77	87	150 Peak	VERTICAL
2	15671.20	46.71	54.00	-7.29	31.87	11.26	38.35	34.77	87	150 Average	VERTICAL

<For Beamforming Mode>

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15531.35	59.05	74.00	-14.95	42.37	12.28	38.13	33.73	200	69	Peak	HORIZONTAL
2	15534.62	45.02	54.00	-8.98	28.34	12.28	38.13	33.73	200	69	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15548.91	58.33	74.00	-15.67	41.65	12.28	38.13	33.73	200	267	Peak	VERTICAL
2	15549.87	45.10	54.00	-8.90	28.42	12.28	38.13	33.73	200	267	Average	VERTICAL



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15601.51	57.49	74.00	-16.51	40.97	12.31	37.98	33.77	200	81	Peak	HORIZONTAL
2	15604.17	45.76	54.00	-8.24	29.24	12.31	37.98	33.77	200	81	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15597.24	57.80	74.00	-16.20	41.22	12.30	38.05	33.77	200	253	Peak	VERTICAL
2	15606.12	45.74	54.00	-8.26	29.22	12.31	37.98	33.77	200	253	Average	VERTICAL

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15563.53	56.67	74.00	-17.33	40.09	12.30	38.05	33.77	200	89	Peak	HORIZONTAL
2	15578.88	44.77	54.00	-9.23	28.19	12.30	38.05	33.77	200	89	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15570.71	44.85	54.00	-9.15	28.27	12.30	38.05	33.77	200	239	Average	VERTICAL
2	15576.76	57.07	74.00	-16.93	40.49	12.30	38.05	33.77	200	239	Peak	VERTICAL



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15687.56	57.72	74.00	-16.28	41.35	12.33	37.91	33.87	200	51	Peak	HORIZONTAL
2	15692.85	44.90	54.00	-9.10	28.58	12.35	37.84	33.87	200	51	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15692.60	58.84	74.00	-15.16	42.52	12.35	37.84	33.87	200	234	Peak	VERTICAL
2	15693.08	44.83	54.00	-9.17	28.51	12.35	37.84	33.87	200	234	Average	VERTICAL

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15622.95	58.02	74.00	-15.98	41.55	12.31	37.98	33.82	200	93	Peak	HORIZONTAL
2	15624.10	44.59	54.00	-9.41	28.12	12.31	37.98	33.82	200	93	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15623.37	57.48	74.00	-16.52	41.01	12.31	37.98	33.82	200	263	Peak	VERTICAL
2	15629.20	44.76	54.00	-9.24	28.29	12.31	37.98	33.82	200	263	Average	VERTICAL

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.5. Band Edge Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micovolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for Peak
RBW / VBW (30dBc in any 100 kHz bandwidth emission)	100 kHz / 300 kHz for Peak

4.5.3. Test Procedures

For Radiated band edges Measurement:

The test procedure is the same as section 4.4.3.

For Radiated Emissions in non-restricted frequency bands Measurement:

Test was performed in accordance with Clause 11.11 of ANSI C63.10-2013 and/or in Section 11.0 of KDB Publication 558074.

4.5.4. Test Setup Layout

For Radiated band edges Measurement:

This test setup layout is the same as that shown in section 4.4.4.

For Radiated Emissions in non-restricted frequency bands Measurement:

This test setup layout is the same as that shown in section 4.4.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

For Non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.5.7. Test Result of Band Edge and Fundamental Emissions

<For Non-Beamforming Mode>

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 3 + Chain 5 + Chain 6
Test Date	May 11, 2016		

Channel 36

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5147.15	67.28	74.00	-6.72	58.63	7.96	33.74	33.05	293	219	Peak	VERTICAL
2	5148.75	52.95	54.00	-1.05	44.30	7.96	33.74	33.05	293	219	Average	VERTICAL
3	5176.80	117.92			109.20	7.98	33.79	33.05	293	219	Peak	VERTICAL
4	5177.60	107.65			98.93	7.98	33.79	33.05	293	219	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Channel 40

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5119.07	51.82	54.00	-2.18	43.25	7.93	33.69	33.05	300	158	Average	VERTICAL
2	5119.07	62.63	74.00	-11.37	54.06	7.93	33.69	33.05	300	158	Peak	VERTICAL
3	5199.20	106.39			97.63	7.99	33.82	33.05	300	158	Average	VERTICAL
4	5199.20	116.27			107.51	7.99	33.82	33.05	300	158	Peak	VERTICAL
5	5359.46	52.90	54.00	-1.10	43.73	8.15	34.08	33.06	300	158	Average	VERTICAL
6	5359.46	64.01	74.00	-9.99	54.84	8.15	34.08	33.06	300	158	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Channel 48

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5078.14	61.99	74.00	-12.01	53.52	7.90	33.62	33.05	281	175	Peak	VERTICAL
2	5084.55	50.34	54.00	-3.66	41.83	7.91	33.65	33.05	281	175	Average	VERTICAL
3	5239.20	109.34			100.47	8.03	33.89	33.05	281	175	Average	VERTICAL
4	5239.20	118.86			109.99	8.03	33.89	33.05	281	175	Peak	VERTICAL
5	5399.46	52.97	54.00	-1.03	43.72	8.18	34.13	33.06	281	175	Average	VERTICAL
6	5399.46	63.24	74.00	-10.76	53.99	8.18	34.13	33.06	281	175	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 3 + Chain 5 + Chain 6
Test Date	May 11, 2016		

Channel 36

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5147.95	52.98	54.00	-1.02	44.33	7.96	33.74	33.05	279	335 Average	VERTICAL
2	5148.75	68.33	74.00	-5.67	59.68	7.96	33.74	33.05	279	335 Peak	VERTICAL
3	5178.40	106.69			97.97	7.98	33.79	33.05	279	335 Average	VERTICAL
4	5179.20	117.37			108.65	7.98	33.79	33.05	279	335 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Channel 40

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5120.67	52.88	54.00	-1.12	44.31	7.93	33.69	33.05	279	345 Average	VERTICAL
2	5121.47	63.96	74.00	-10.04	55.39	7.93	33.69	33.05	279	345 Peak	VERTICAL
3	5200.80	108.19			99.43	7.99	33.82	33.05	279	345 Average	VERTICAL
4	5200.80	117.97			109.21	7.99	33.82	33.05	279	345 Peak	VERTICAL
5	5361.06	52.12	54.00	-1.88	42.95	8.15	34.08	33.06	279	345 Average	VERTICAL
6	5366.67	63.33	74.00	-10.67	54.16	8.15	34.08	33.06	279	345 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Channel 48

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5086.15	50.95	54.00	-3.05	42.44	7.91	33.65	33.05	279	296 Average	VERTICAL
2	5087.76	62.68	74.00	-11.32	54.17	7.91	33.65	33.05	279	296 Peak	VERTICAL
3	5240.80	109.26			100.39	8.03	33.89	33.05	279	296 Average	VERTICAL
4	5241.60	119.37			110.51	8.03	33.89	33.06	279	296 Peak	VERTICAL
5	5401.06	52.94	54.00	-1.06	43.66	8.19	34.15	33.06	279	296 Average	VERTICAL
6	5406.67	63.80	74.00	-10.20	54.52	8.19	34.15	33.06	279	296 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 MHz.

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 3 + Chain 5 + Chain 6
Test Date	May 11, 2016		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.33	66.34	74.00	-7.66	57.69	7.96	33.74	33.05	272	339	Peak	VERTICAL
2	5149.14	52.90	54.00	-1.10	44.25	7.96	33.74	33.05	272	339	Average	VERTICAL
3	5193.21	99.01			90.25	7.99	33.82	33.05	272	339	Average	VERTICAL
4	5193.21	110.27			101.51	7.99	33.82	33.05	272	339	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5190 MHz.

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5141.86	65.03	74.00	-8.97	56.38	7.96	33.74	33.05	271	14	Peak	VERTICAL
2	5147.47	52.76	54.00	-1.24	44.11	7.96	33.74	33.05	271	14	Average	VERTICAL
3	5226.80	107.14			98.31	8.02	33.86	33.05	271	14	Average	VERTICAL
4	5232.40	118.17			109.30	8.03	33.89	33.05	271	14	Peak	VERTICAL
5	5387.05	64.28	74.00	-9.72	55.03	8.18	34.13	33.06	271	14	Peak	VERTICAL
6	5387.85	52.93	54.00	-1.07	43.68	8.18	34.13	33.06	271	14	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5230 MHz.

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 3 + Chain 5 + Chain 6
Test Date	May 11, 2016		

Channel 42

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5145.10	64.37	74.00	-9.63	55.72	7.96	33.74	33.05	283	348 Peak	VERTICAL
2	5150.00	52.89	54.00	-1.11	44.24	7.96	33.74	33.05	283	348 Average	VERTICAL
3	5221.22	95.05			86.22	8.02	33.86	33.05	283	348 Average	VERTICAL
4	5221.22	104.73			95.90	8.02	33.86	33.05	283	348 Peak	VERTICAL
5	5355.83	48.24	54.00	-5.76	39.07	8.15	34.08	33.06	283	348 Average	VERTICAL
6	5357.44	60.85	74.00	-13.15	51.68	8.15	34.08	33.06	283	348 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5210 MHz.

<For Beamforming Mode>

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5107.89	52.96	54.00	-1.04	44.42	7.92	33.67	33.05	238	165	Average	VERTICAL
2	5150.00	66.80	74.00	-7.20	58.15	7.96	33.74	33.05	238	165	Peak	VERTICAL
3	5187.21	110.49			101.73	7.99	33.82	33.05	238	165	Average	VERTICAL
4	5188.01	119.59			110.83	7.99	33.82	33.05	238	165	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5118.27	52.53	54.00	-1.47	43.96	7.93	33.69	33.05	258	206	Average	VERTICAL
2	5118.27	63.04	74.00	-10.96	54.47	7.93	33.69	33.05	258	206	Peak	VERTICAL
3	5197.60	120.37			111.61	7.99	33.82	33.05	258	206	Peak	VERTICAL
4	5198.40	110.48			101.72	7.99	33.82	33.05	258	206	Average	VERTICAL
5	5356.25	63.60	74.00	-10.40	54.43	8.15	34.08	33.06	258	206	Peak	VERTICAL
6	5357.85	52.99	54.00	-1.01	43.82	8.15	34.08	33.06	258	206	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.

Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Channel 38

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5147.53	63.03	74.00	-10.97	54.38	7.96	33.74	33.05	268	165 Peak	VERTICAL
2	5150.00	52.66	54.00	-1.34	44.01	7.96	33.74	33.05	268	165 Average	VERTICAL
3	5181.19	110.55			101.83	7.98	33.79	33.05	268	165 Peak	VERTICAL
4	5185.19	101.43			92.71	7.98	33.79	33.05	268	165 Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5190 MHz.

Channel 46

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5147.47	50.92	54.00	-3.08	42.27	7.96	33.74	33.05	264	167 Average	VERTICAL
2	5150.00	61.38	74.00	-12.62	52.73	7.96	33.74	33.05	264	167 Peak	VERTICAL
3	5227.60	116.26			107.43	8.02	33.86	33.05	264	167 Peak	VERTICAL
4	5228.40	106.17			97.34	8.02	33.86	33.05	264	167 Average	VERTICAL
5	5388.65	52.64	54.00	-1.36	43.39	8.18	34.13	33.06	264	167 Average	VERTICAL
6	5388.65	63.66	74.00	-10.34	54.41	8.18	34.13	33.06	264	167 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5230 MHz.



Temperature	25°C	Humidity	61%
Test Engineer	Steven Liang/ Brian Sun/Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 3 + Chain 5 + Chain 6
Test Date	Apr. 30, 2016		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5143.49	64.00	74.00	-10.00	55.35	7.96	33.74	33.05	252	329	Peak	VERTICAL
2	5150.00	52.85	54.00	-1.15	44.20	7.96	33.74	33.05	252	329	Average	VERTICAL
3	5179.55	96.10			87.38	7.98	33.79	33.05	252	329	Average	VERTICAL
4	5181.96	106.29			97.57	7.98	33.79	33.05	252	329	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5210 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

4.6. Frequency Stability Measurement

4.6.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

4.6.2. Measuring Instruments and Setting

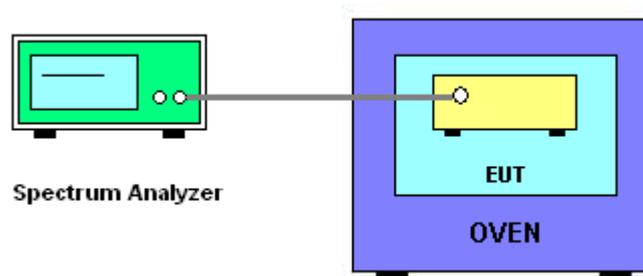
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Entire absence of modulation emissions bandwidth
RBW	10 kHz
VBW	10 kHz
Sweep Time	Auto

4.6.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is $0^\circ\text{C} \sim 40^\circ\text{C}$.

4.6.4. Test Setup Layout



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

4.6.7. Test Result of Frequency Stability

Temperature	26°C	Humidity	63%
Test Engineer	Gary Chu	Test Date	May 10, 2016

For Band 1:

Mode: 20 MHz / Chain 3

Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)			
	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9719	5199.9713	5199.9707	5199.9698
110.00	5199.9709	5199.9706	5199.9702	5199.9694
93.50	5199.9706	5199.9704	5199.9696	5199.9692
Max. Deviation (MHz)	0.0294	0.0296	0.0304	0.0308
Max. Deviation (ppm)	5.65	5.69	5.84	5.92
Result	Complies			

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)			
	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5199.9731	5199.9721	5199.9712	5199.9702
10	5199.9711	5199.9706	5199.9699	5199.9694
20	5199.9709	5199.9707	5199.9702	5199.9697
30	5199.9048	5199.9042	5199.9036	5199.9028
40	5199.9031	5199.9024	5199.9021	5199.9020
Max. Deviation (MHz)	0.0969	0.0976	0.0979	0.0980
Max. Deviation (ppm)	18.63	18.77	18.83	18.85
Result	Complies			

Mode: 40 MHz / Chain 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9719	5189.9714	5189.9706	5189.9702
110.00	5189.9709	5189.9702	5189.9695	5189.9688
93.50	5189.9699	5189.9694	5189.9687	5189.9686
Max. Deviation (MHz)	0.0301	0.0306	0.0313	0.0314
Max. Deviation (ppm)	5.80	5.89	6.03	6.05
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5189.9717	5189.9711	5189.9707	5189.9697
10	5189.9710	5189.9705	5189.9697	5189.9689
20	5189.9709	5189.9701	5189.9693	5189.9691
30	5189.9048	5189.9039	5189.9035	5189.9028
40	5189.9038	5189.9029	5189.9020	5189.9010
Max. Deviation (MHz)	0.0962	0.0971	0.0980	0.0990
Max. Deviation (ppm)	18.54	18.71	18.88	19.08
Result	Complies			

Mode: 80 MHz / Chain 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9713	5209.9711	5209.9708	5209.9707
110.00	5209.9709	5209.9705	5209.9702	5209.9701
93.50	5209.9705	5209.9700	5209.9699	5209.9691
Max. Deviation (MHz)	0.0295	0.0300	0.0301	0.0309
Max. Deviation (ppm)	5.66	5.76	5.78	5.93
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5209.9714	5209.9707	5209.9705	5209.9697
10	5209.9711	5209.9708	5209.9703	5209.9696
20	5209.9709	5209.9708	5209.9700	5209.9696
30	5209.9048	5209.9047	5209.9039	5209.9031
40	5209.9031	5209.9027	5209.9024	5209.9014
Max. Deviation (MHz)	0.0969	0.0973	0.0976	0.0986
Max. Deviation (ppm)	18.60	18.68	18.73	18.93
Result	Complies			

Temperature	24°C	Humidity	62%
Test Engineer	Eddie Weng	Test Date	Mar. 21, 2016

For Band 4:

Mode: 20 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage (V)	Measurement Frequency (MHz)			
	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5785.0075	5785.0072	5785.0067	5785.0058
110.00	5785.0072	5785.0065	5785.0057	5785.0052
93.50	5785.0070	5785.0066	5785.0065	5785.0056
Max. Deviation (MHz)	0.0075	0.0072	0.0067	0.0058
Max. Deviation (ppm)	1.30	1.24	1.16	1.00
Result	Complies			

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)			
	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5785.0056	5785.0050	5785.0044	5785.0042
10	5785.0063	5785.0060	5785.0051	5785.0049
20	5785.0072	5785.0068	5785.0059	5785.0050
30	5785.0087	5785.0080	5785.0070	5785.0061
40	5785.0104	5785.0094	5785.0084	5785.0081
Max. Deviation (MHz)	0.0118	0.0113	0.0112	0.0111
Max. Deviation (ppm)	2.04	1.95	1.94	1.92
Result	Complies			

Mode: 40 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5755.0075	5755.0074	5755.0065	5755.0060
110.00	5755.0072	5755.0067	5755.0065	5755.0061
93.50	5755.0066	5755.0062	5755.0058	5755.0057
Max. Deviation (MHz)	0.0075	0.0074	0.0065	0.0061
Max. Deviation (ppm)	1.30	1.29	1.13	1.06
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5755.0036	5755.0031	5755.0023	5755.0022
10	5755.0053	5755.0046	5755.0044	5755.0039
20	5755.0072	5755.0068	5755.0061	5755.0054
30	5755.0087	5755.0077	5755.0067	5755.0066
40	5755.0099	5755.0089	5755.0083	5755.0082
Max. Deviation (MHz)	0.0104	0.0100	0.0096	0.0089
Max. Deviation (ppm)	1.81	1.74	1.67	1.55
Result	Complies			

Mode: 80 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5775.0080	5775.0071	5775.0070	5775.0061
110.00	5775.0072	5775.0071	5775.0065	5775.0056
93.50	5775.0071	5775.0068	5775.0067	5775.0066
Max. Deviation (MHz)	0.0080	0.0071	0.0070	0.0066
Max. Deviation (ppm)	1.39	1.23	1.21	1.14
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5775.0054	5775.0050	5775.0049	5775.0040
10	5775.0062	5775.0052	5775.0046	5775.0043
20	5775.0072	5775.0066	5775.0056	5775.0046
30	5775.0087	5775.0086	5775.0077	5775.0075
40	5775.0088	5775.0083	5775.0077	5775.0067
Max. Deviation (MHz)	0.0106	0.0099	0.0097	0.0096
Max. Deviation (ppm)	1.84	1.71	1.68	1.66
Result	Complies			

4.7. Antenna Requirements

4.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 13, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Conducted (TH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Oct. 06, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Oct. 06, 2014	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%