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FCC RADIO TEST REPORT

Applicant's company	**NETGEAR, Inc.**
Applicant Address	350 East Plumeria Drive, San Jose, California 95134, USA
FCC ID	**PY314200264**

Product Name	AC3200 Smart WiFi Router AC3000 Tri-Band WiFi Router
Brand Name	NETGEAR
Model No.	R8000, R7900
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5725 ~ 5850 MHz
Received Date	Jun. 24, 2015
Final Test Date	Sep. 17, 2015
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a/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 v01, KDB662911 D01 v02r01, KDB644545 D03 v01.**

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR450713-07	Rev. 01	Initial issue of report	Oct. 02, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	AC3200 Smart WiFi Router AC3000 Tri-Band WiFi Router
Brand Name	:	NETGEAR
Model No.	:	R8000, R7900
Applicant	:	NETGEAR, 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 Jun. 24, 2015 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.

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(e)	6dB Spectrum Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	2.76 dB
4.4	15.407(a)	Power Spectral Density	Complies	19.69 dB
4.5	15.407(b)	Radiated Emissions	Complies	3.12 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.16 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

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	5725 ~ 5850 MHz
Channel Number	5 for 20MHz bandwidth ; 2 for 40MHz bandwidth 1 for 80MHz bandwidth
Channel Band Width (99%)	For non-beamforming mode: IEEE 802.11a: 17.04 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.64 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.20 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.40 MHz For beamforming mode: IEEE 802.11ac MCS0/Nss1 (VHT20): 18.12 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 37.00 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 76.00 dBm
Maximum Conducted Output Power	For non-beamforming mode: IEEE 802.11a: 24.53 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 25.54 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 26.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 20.83 dBm For beamforming mode: IEEE 802.11ac MCS0/Nss1 (VHT20): 23.30 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 26.27 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 20.42 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☒ With beamforming for 802.11n/ac in 2.4GHz and 5GHz.	☐ Without beamforming

Antenna and Band width

Antenna	Three (TX)		
Band width Mode	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	P/N	Rating
Adapter 1	NETGEAR	NU60-H120500-I1	332-10122-03	Input: 100-240V~50/60Hz 1.4A Output: 12.0V, 5.0A
Adapter 2	NETGEAR	AD8180LF	332-10318-01	Input: 100-240V~50/60Hz 1.5A Output: 12V, 5.0A
Others				
AC Power cable: Non-Shielded 1.8m				
RJ-45 cable: Shielded, 1.5m				

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector
1	NETGEAR	R8000	Dipole Antenna	I-PEX
2	NETGEAR	R8000	Dipole Antenna	I-PEX
3	NETGEAR	R8000	Dipole Antenna	I-PEX
4	NETGEAR	R8000	Dipole Antenna	I-PEX
5	NETGEAR	R8000	Dipole Antenna	I-PEX
6	NETGEAR	R8000	Dipole Antenna	I-PEX

Ant.	Frequency	2.4GHz	
		Gain (dBi)	
		20MHz	40MHz
1	2412 MHz	1.76	-
	2422 MHz	-	1.69
	2437 MHz	1.56	1.56
	2452 MHz	-	1.47
	2462 MHz	1.49	-
2	2412 MHz	1.76	-
	2422 MHz	-	1.69
	2437 MHz	1.56	1.56
	2452 MHz	-	1.47
	2462 MHz	1.49	-
3	2412 MHz	1.76	-
	2422 MHz	-	1.69
	2437 MHz	1.56	1.56
	2452 MHz	-	1.47
	2462 MHz	1.49	-

Ant.	Frequency	Gain (dBi)		
		5GHz (Band 1)		
		20MHz	40MHz	80MHz
1	5180 MHz	3.07	-	-
	5190 MHz	-	3.12	-
	5200 MHz	3.09	-	-
	5210 MHz	-	-	3.11
	5230 MHz	-	3.04	-
	5240 MHz	3.05	-	-
2	5180 MHz	3.07	-	-
	5190 MHz	-	3.12	-
	5200 MHz	3.09	-	-
	5210 MHz	-	-	3.11
	5230 MHz	-	3.04	-
	5240 MHz	3.05	-	-
3	5180 MHz	3.07	-	-
	5190 MHz	-	3.12	-
	5200 MHz	3.09	-	-
	5210 MHz	-	-	3.11
	5230 MHz	-	3.04	-
	5240 MHz	3.05	-	-

Ant.	Frequency	Gain (dBi)		
		5GHz (Band 4)		
		20MHz	40MHz	80MHz
4	5745 MHz	2.06	-	-
	5755 MHz	-	2.08	-
	5775 MHz	-	-	2.08
	5785 MHz	2.08	-	-
	5795 MHz	-	2.20	-
	5825 MHz	2.15	-	-
5	5745 MHz	2.06	-	-
	5755 MHz	-	2.08	-
	5775 MHz	-	-	2.08
	5785 MHz	2.08	-	-
	5795 MHz	-	2.20	-
	5825 MHz	2.15	-	-
6	5745 MHz	2.06	-	-
	5755 MHz	-	2.08	-
	5775 MHz	-	-	2.08
	5785 MHz	2.08	-	-
	5795 MHz	-	2.20	-
	5825 MHz	2.15	-	-

Note:

The EUT supports beamforming mode for 802 11n/ac in 2.4GHz/5GHz.

<For 2.4GHz and 5GHz B1 Band:>

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

Chain 1、Chain 2、and Chain 3 can be used as transmitting/receiving antennas.

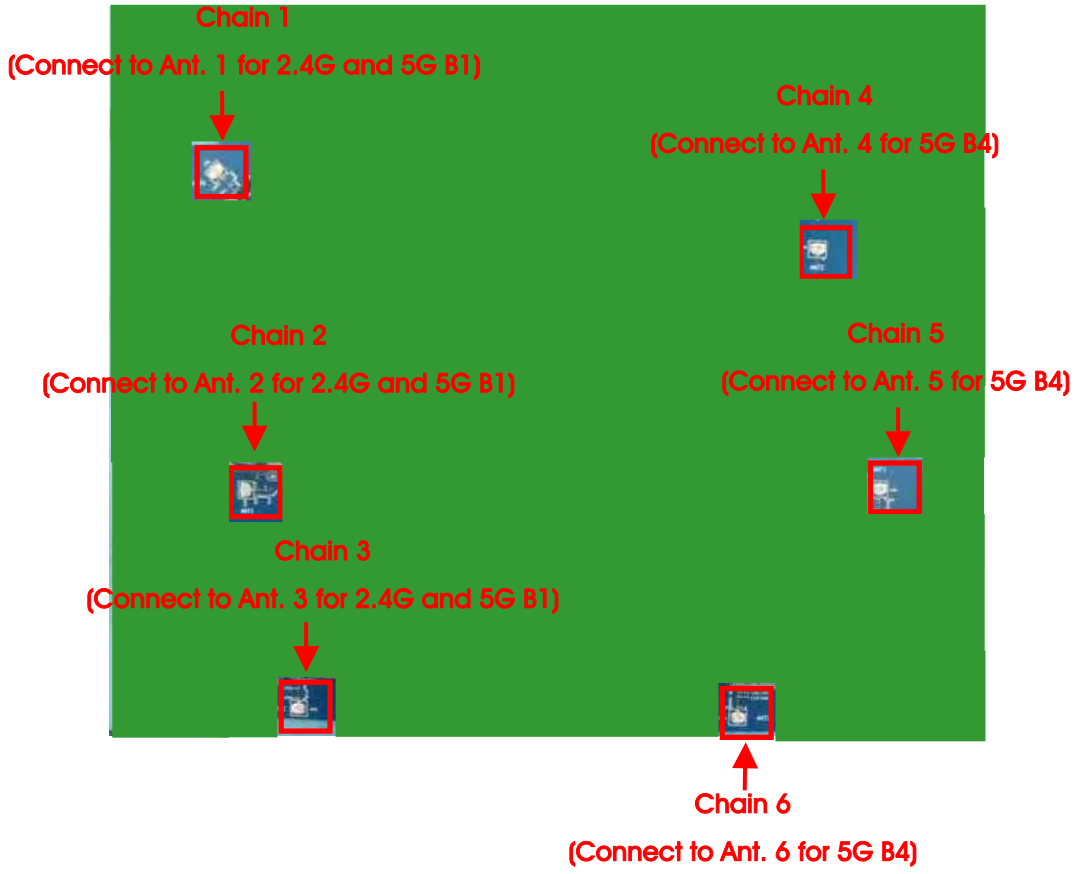
Chain 1、Chain 2、and Chain 3 can transmit/receive signal simultaneously.

<For 5GHz B4 Band:>

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

Chain 4、Chain 5、and Chain 6 can be used as transmitting/receiving antennas.

Chain 4、Chain 5、and Chain 6 can transmit/receive signal simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

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

For 80MHz bandwidth systems, use Channel 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
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.

Test Items	Mode		Data Rate	Channel	Ant.
Max. Conducted Output Power	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
Power Spectral Density	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6

6dB Spectrum Bandwidth Measurement	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
Radiated Emission Above 1GHz	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
Band Edge Emission	<For Non-Beamforming Mode>				
	11a/BPSK	Band 4	6Mbps	149/157/165	4+5+6
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
	<For Beamforming Mode>				
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	4+5+6
	11ac VHT40	Band 4	MCS0/Nss1	151/159	4+5+6
	11ac VHT80	Band 4	MCS0/Nss1	155	4+5+6
Frequency Stability	20 MHz	Band 4	-	157	4
	40 MHz	Band 4	-	151	4
	80 MHz	Band 4	-	155	4

Note 1: VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

Note 2: There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802.11ac in 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:

EUT Z axis - Antenna 90℃ generated the worst case for original report, Consequently, measurement for For radiated Emission test will follow this test mode.

Mode 1. EUT Z axis - Antenna 90℃

For Co-location MPE:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA: 450713-07) test is added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

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 Reg. No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Multiple Listing and Class II Change

The brand/model names in the following table are all refer to the identical product.

Equipment Name	Model Name	Overall Link
AC3200 Smart WiFi Router	R8000	3200
AC3000 Tri-Band WiFi Router	R7900	3000
Description		
These two models leverage the same PCB. The difference between these two models are that R7900 only supports one USB 3.0 port (one USB 2.0 and related discrete components were removed)		

Note: The above difference does not affect the test result of RF tests, so only model No.: R8000 was tested and recorded in this report.

This product is an extension of original one reported under Sporton project number: FR450713-03

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

Modifications	Performance Checking
Changing 5GHz Band 4 to “New Rules” from “Old Rules”.	1. 26dB Bandwidth and 99% Occupied Bandwidth 2. 6dB Spectrum Bandwidth 3. Maximum Conducted Output Power 4. Power Spectral Density 5. Radiated Emissions (Above 1GHz) 6. Band Edge Emissions 7. Frequency Stability

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB

For non-beamforming mode:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For beamforming mode:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Notebook	DELL	E4300	DoC
PCIE AC Module	N/A	N/A	N/A

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.9. 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	DOS		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	70	70	73
802.11ac MCS0/Nss1 VHT20	69	73	78
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz	5795 MHz	
	69	87	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	58		

For beamforming mode:

Test Software Version	DOS		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	66	67	69
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz	5795 MHz	
	64	83	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	57		

3.10. 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 PCIE AC Module and transmit duty cycle no less 98%

3.11. 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	2.053	2.081	98.65%	0.06	0.01
802.11ac MCS0/Nss1 VHT20	1.921	1.951	98.46%	0.07	0.01
802.11ac MCS0/Nss1 VHT40	0.953	0.978	97.44%	0.11	1.05
802.11ac MCS0/Nss1 VHT80	2.069	2.088	99.09%	0.04	0.01

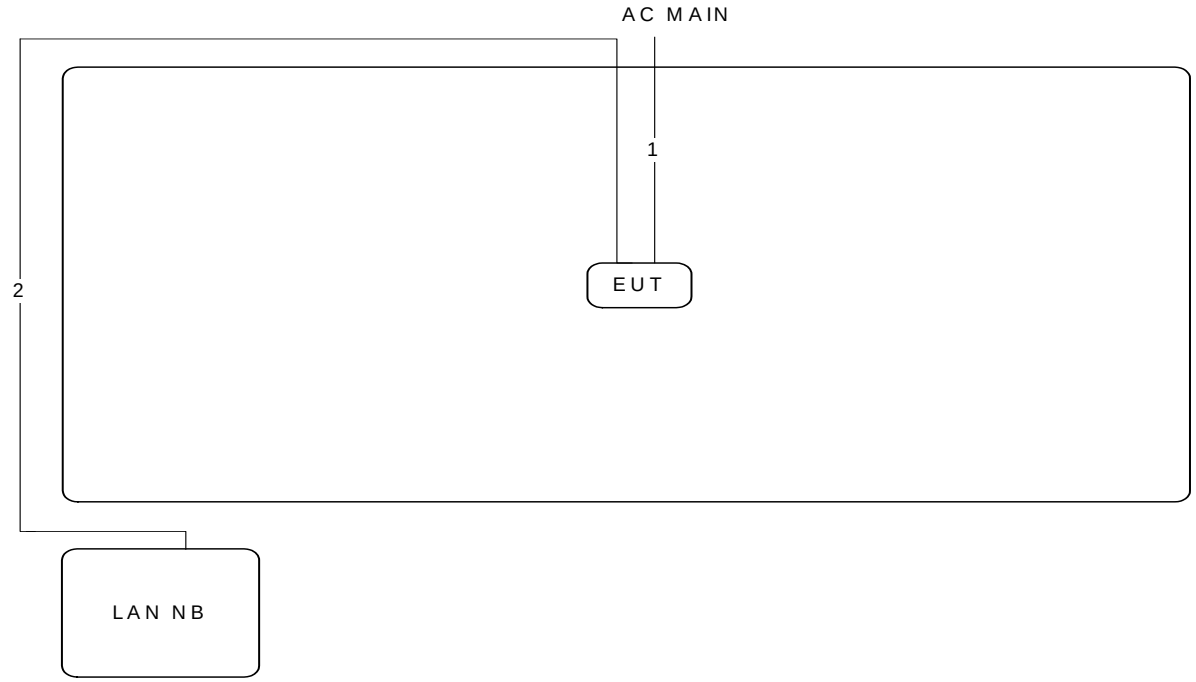
For beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	3.839	3.930	97.68%	0.10	0.26
802.11ac MCS0/Nss1 VHT40	4.591	4.703	97.63%	0.10	0.22
802.11ac MCS0/Nss1 VHT80	5.069	7.608	66.63%	1.76	0.20

3.12. Test Configurations

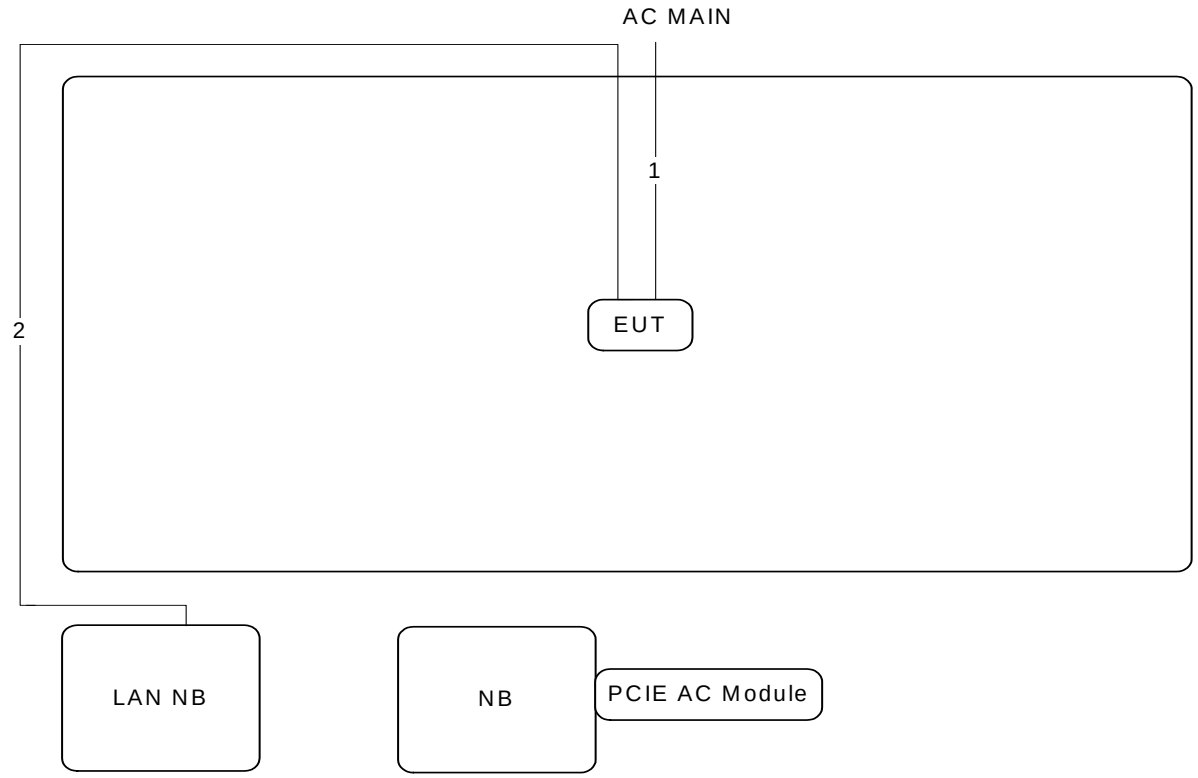
3.12.1. Radiation Emissions Test Configuration

For non-beamforming mode:



Item	Connection	Shielded	Length
1	Power cable	No	3.2m
2	RJ-45 cable	Yes	1.5m

For beamforming mode:



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	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	≥ 3 x 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 4.5.4.

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	24°C	Humidity	56%
Test Engineer	Eddie Weng		

For non-beamforming mode:

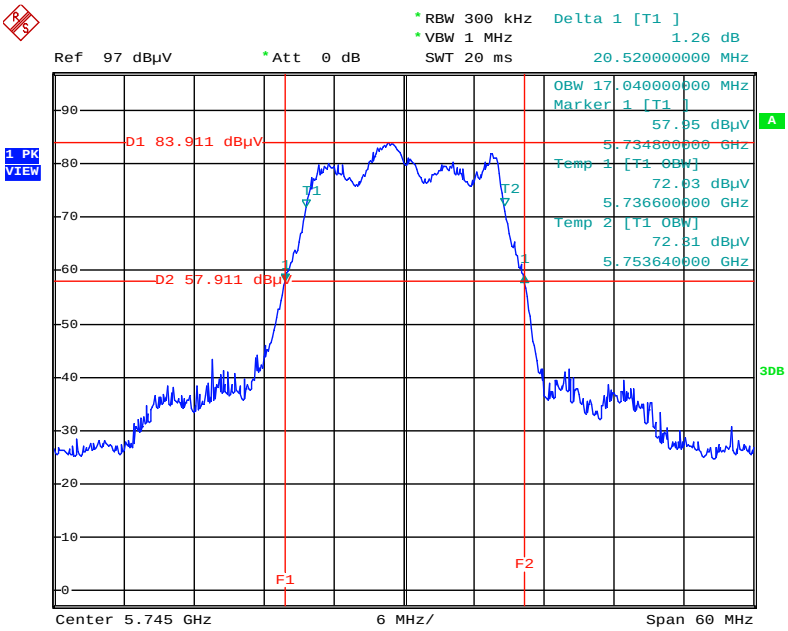
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	20.52	17.04
	5785 MHz	20.40	16.92
	5825 MHz	20.40	16.92
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.88	17.64
	5785 MHz	20.76	17.64
	5825 MHz	20.88	17.64
802.11ac MCS0/Nss1 VHT40	5755 MHz	41.40	37.00
	5795 MHz	41.40	37.20
802.11ac MCS0/Nss1 VHT80	5775 MHz	82.00	76.40

For beamforming mode:

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT20	5745 MHz	21.00	18.12
	5785 MHz	21.00	18.00
	5825 MHz	20.88	18.00
802.11ac MCS0/Nss1 VHT40	5755 MHz	40.80	37.00
	5795 MHz	41.20	37.00
802.11ac MCS0/Nss1 VHT80	5775 MHz	76.00	81.60

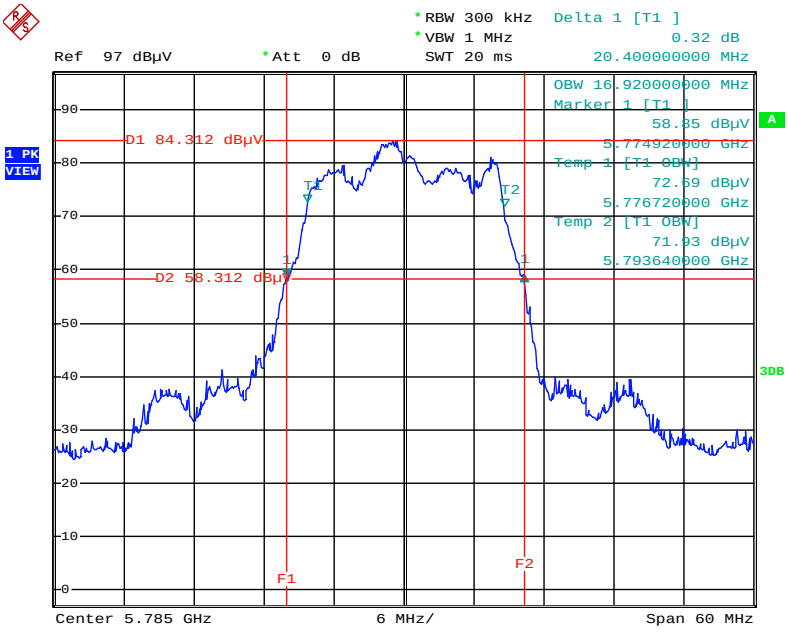
For non-beamforming mode:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



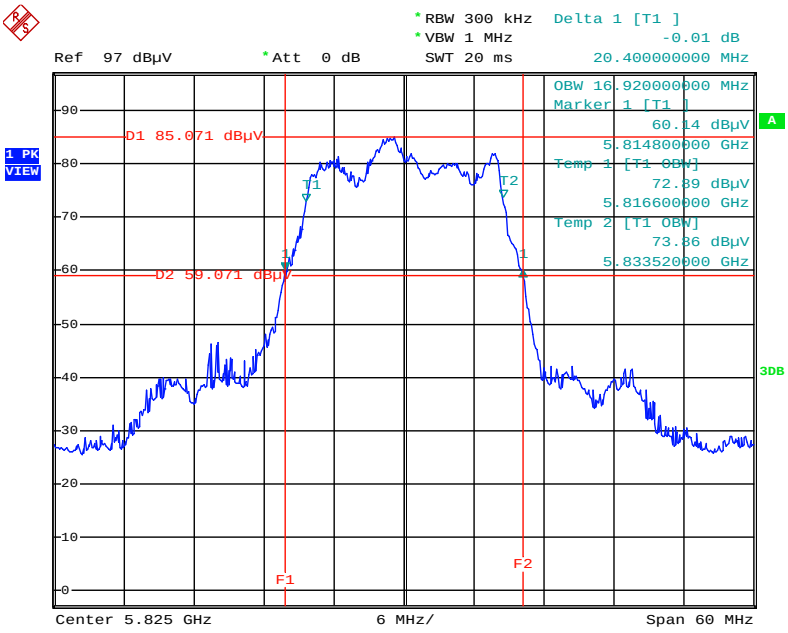
Date: 17.SEP.2015 13:50:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



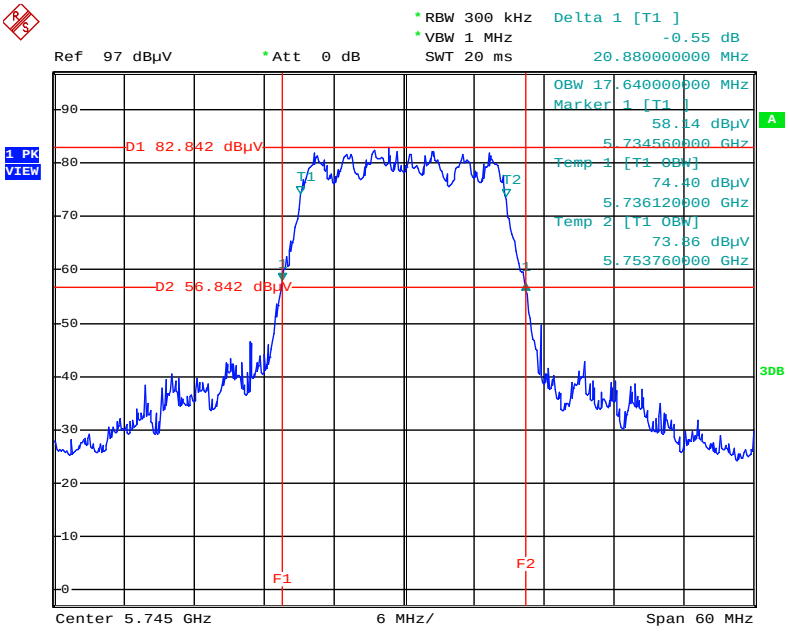
Date: 17.SEP.2015 13:51:33

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



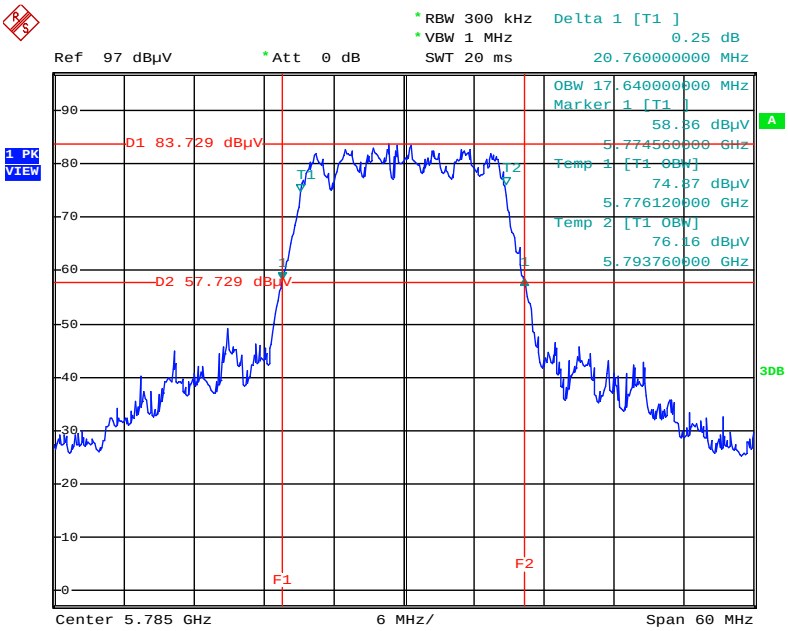
Date: 17.SEP.2015 13:52:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



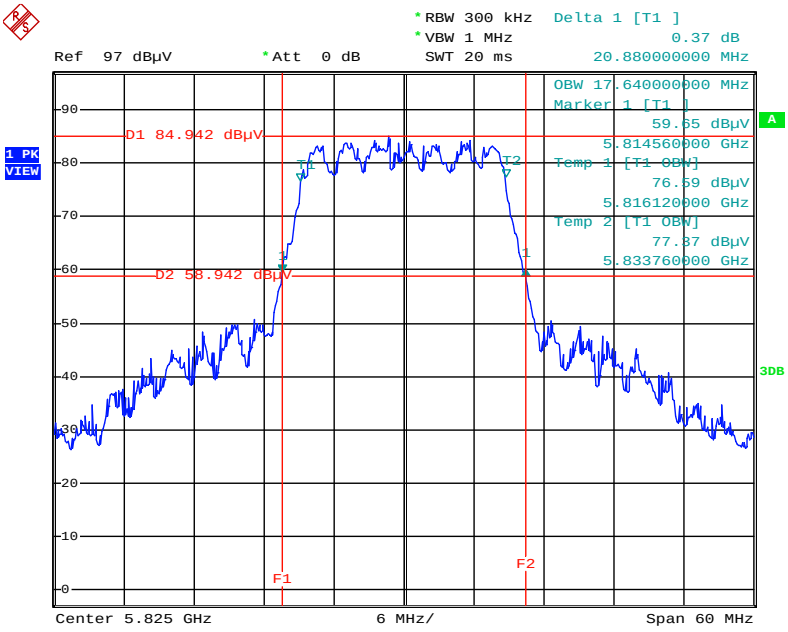
Date: 17.SEP.2015 13:52:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



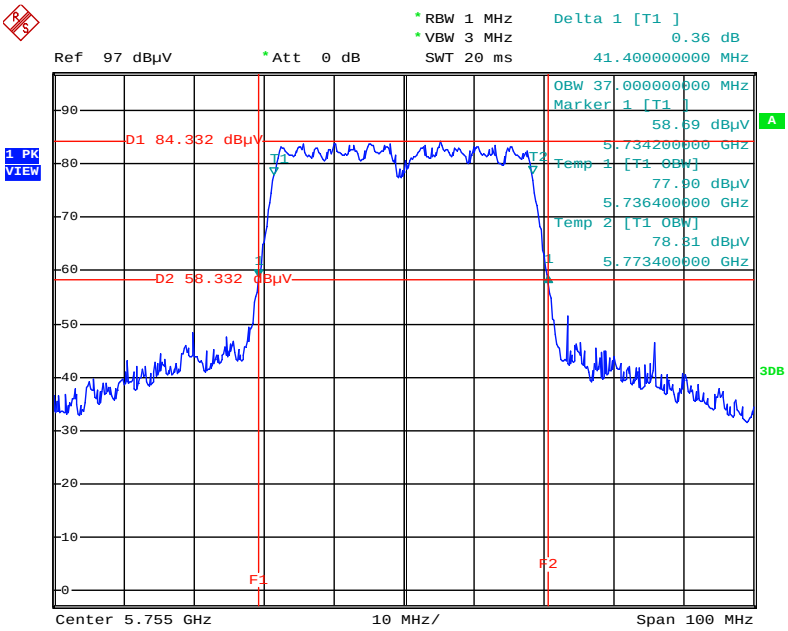
Date: 17.SEP.2015 13:53:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



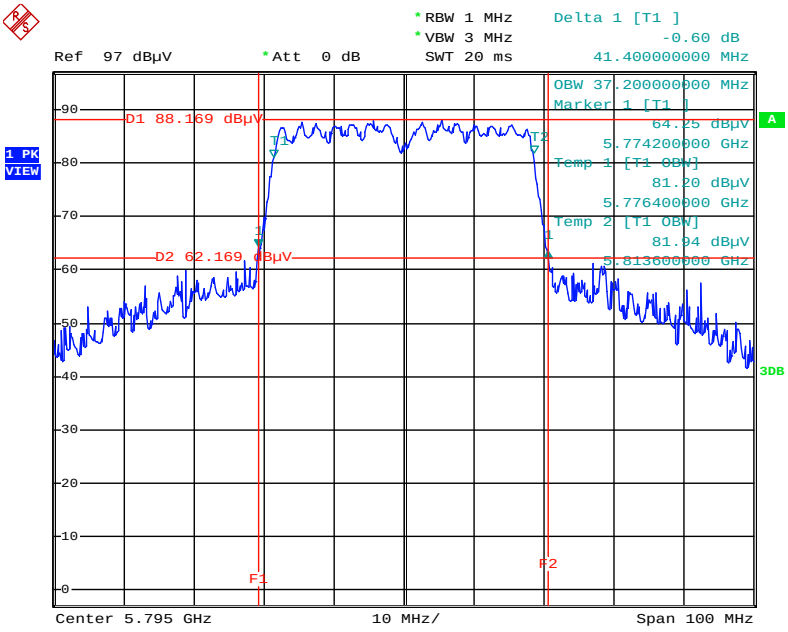
Date: 17.SEP.2015 13:54:08

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6 / 5755 MHz



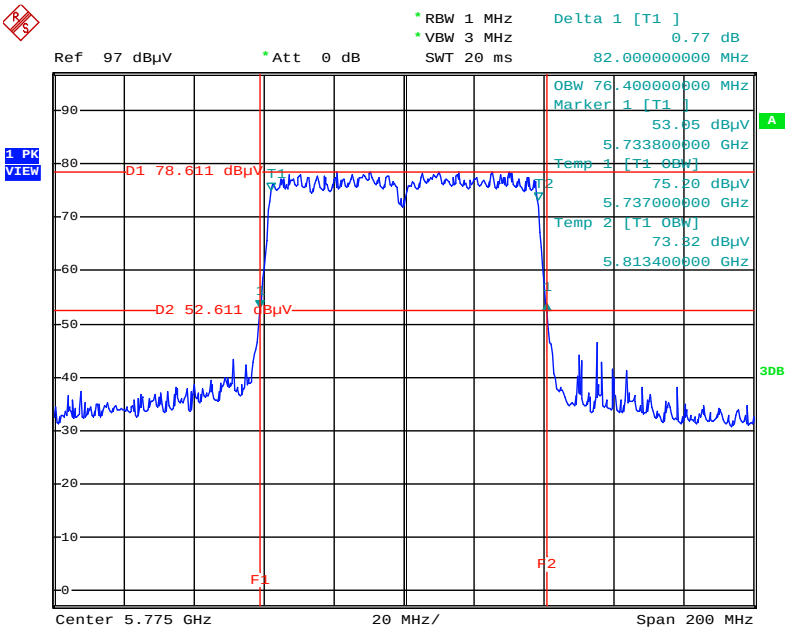
Date: 17.SEP.2015 13:56:07

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6 / 5795 MHz



Date: 17.SEP.2015 13:56:42

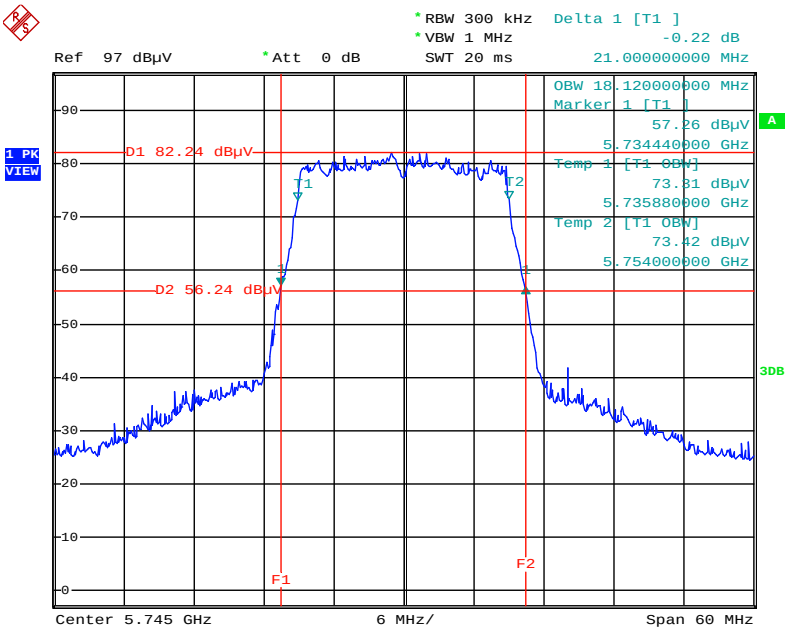
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 17.SEP.2015 13:57:59

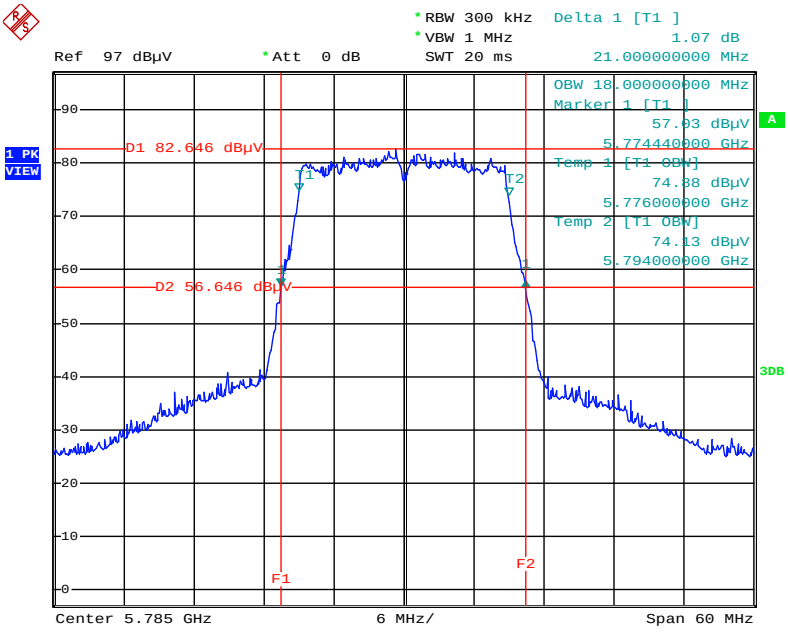
For beamforming mode:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6 / 5745 MHz



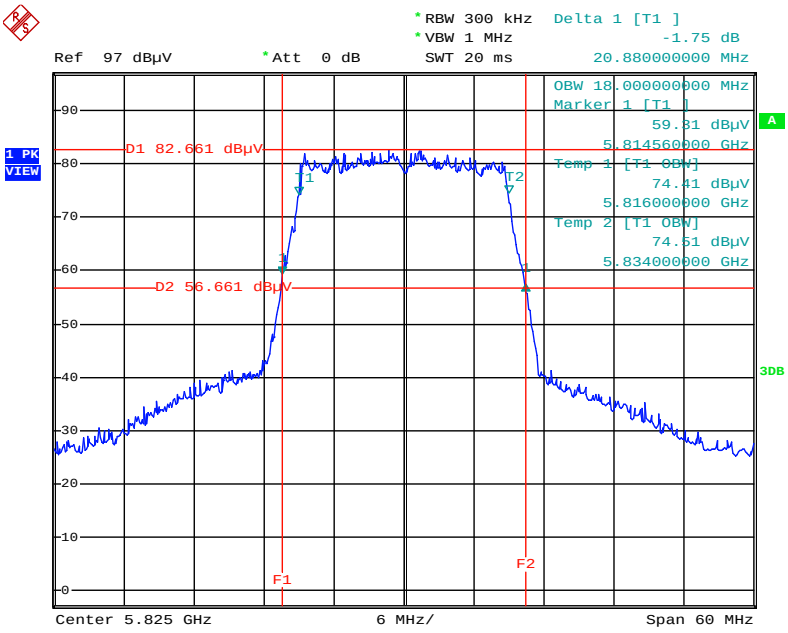
Date: 17.SEP.2015 14:05:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



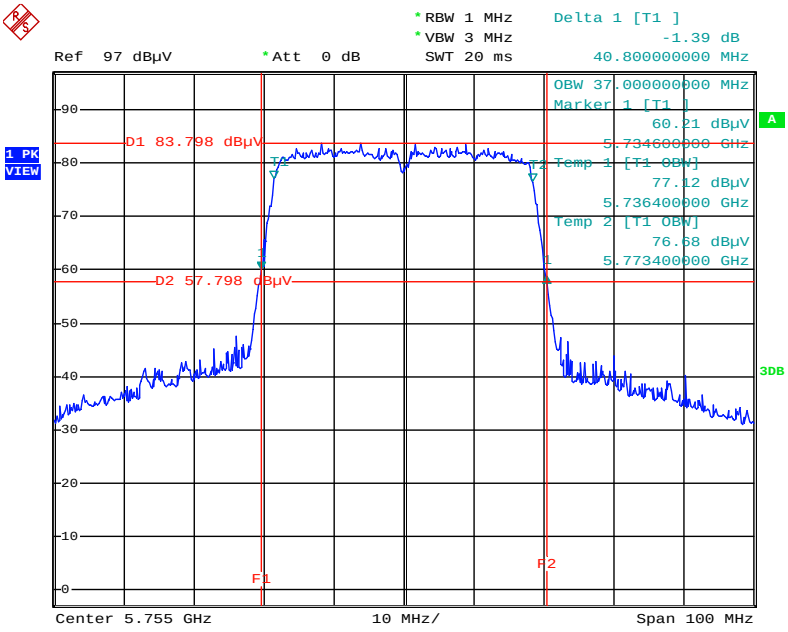
Date: 17.SEP.2015 14:06:19

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



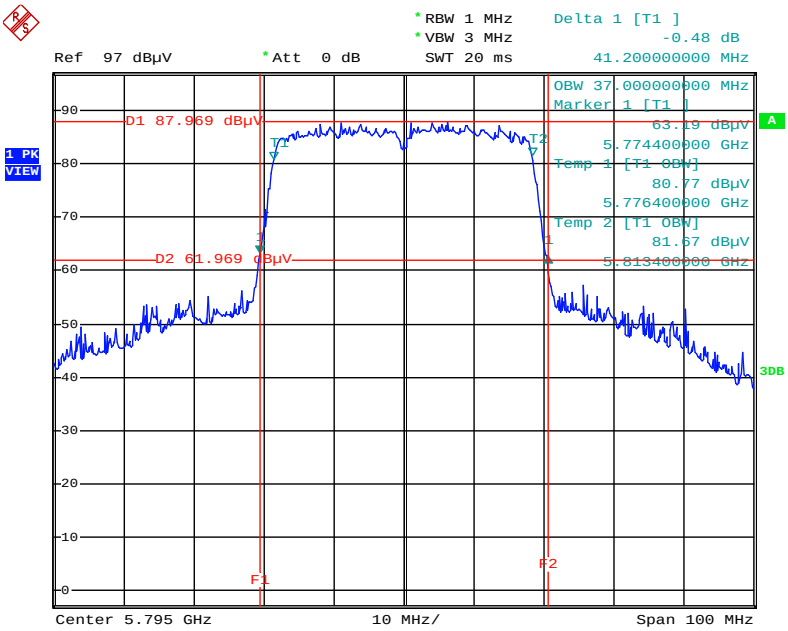
Date: 17.SEP.2015 14:06:48

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6 / 5755 MHz



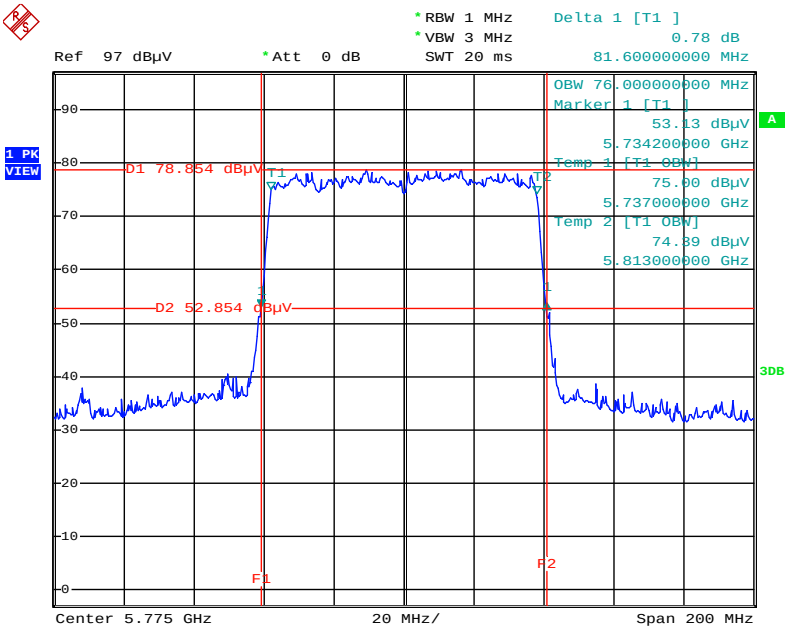
Date: 17.SEP.2015 14:03:23

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6 / 5795 MHz



Date: 17.SEP.2015 14:04:29

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 17.SEP.2015 14:05:08

4.2. 6dB Spectrum Bandwidth Measurement

4.2.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

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 spectrum analyzer.

6dB Spectrum Bandwidth	
Spectrum Parameters	**Setting**
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.2.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

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 6dB Spectrum Bandwidth

Temperature	24°C	Humidity	56%
Test Engineer	Eddie Weng		

For non-beamforming mode:

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	15.68	500	Complies
	5785 MHz	13.84	500	Complies
	5825 MHz	15.68	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	15.68	500	Complies
	5785 MHz	15.68	500	Complies
	5825 MHz	15.68	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.84	500	Complies
	5795 MHz	35.84	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.20	500	Complies

For beamforming mode:

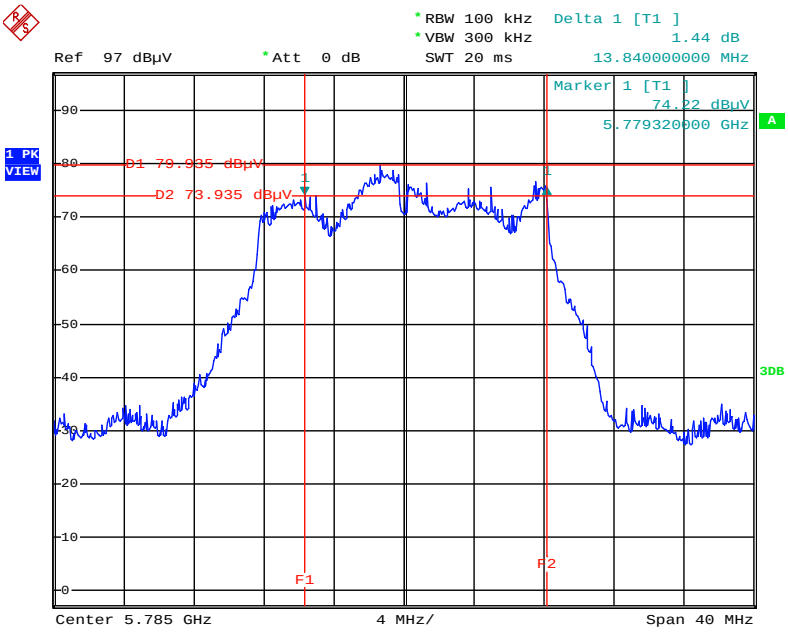
Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.60	500	Complies
	5785 MHz	17.68	500	Complies
	5825 MHz	17.52	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.20	500	Complies
	5795 MHz	35.52	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	74.40	500	Complies

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

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

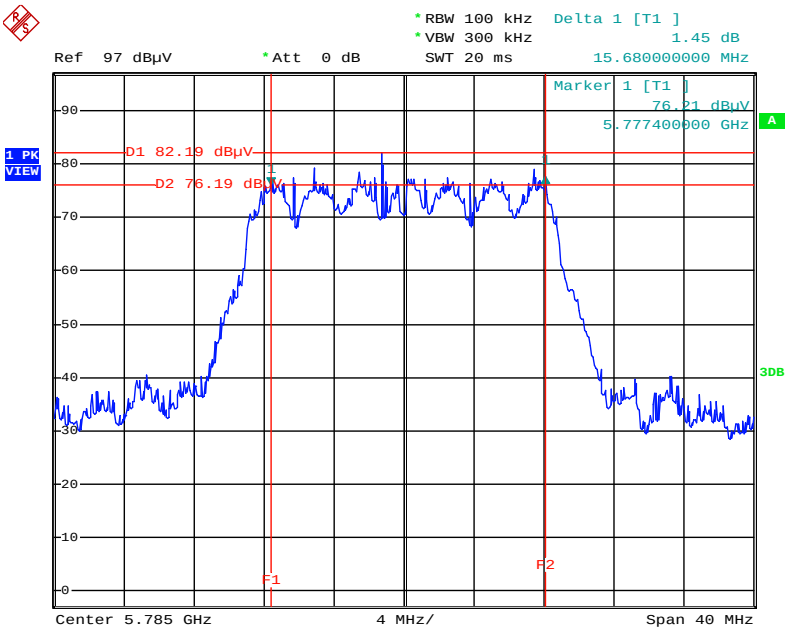
For non-beamforming mode:

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



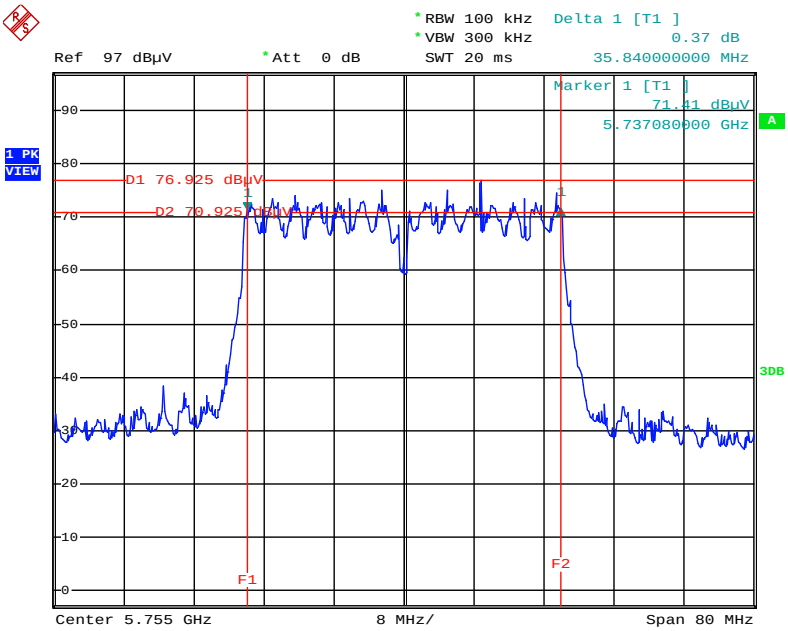
Date: 17.SEP.2015 14:14:36

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



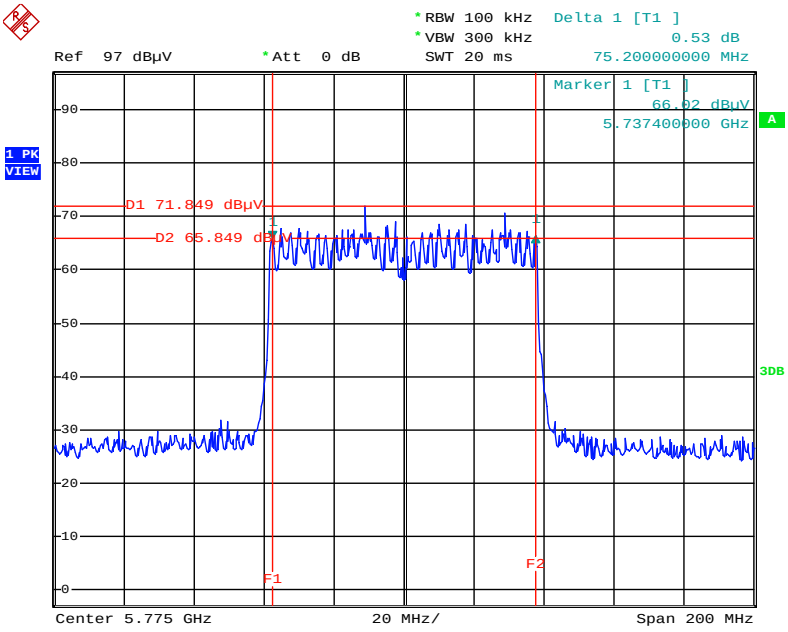
Date: 17.SEP.2015 14:16:58

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6 / 5755MHz



Date: 17.SEP.2015 14:17:47

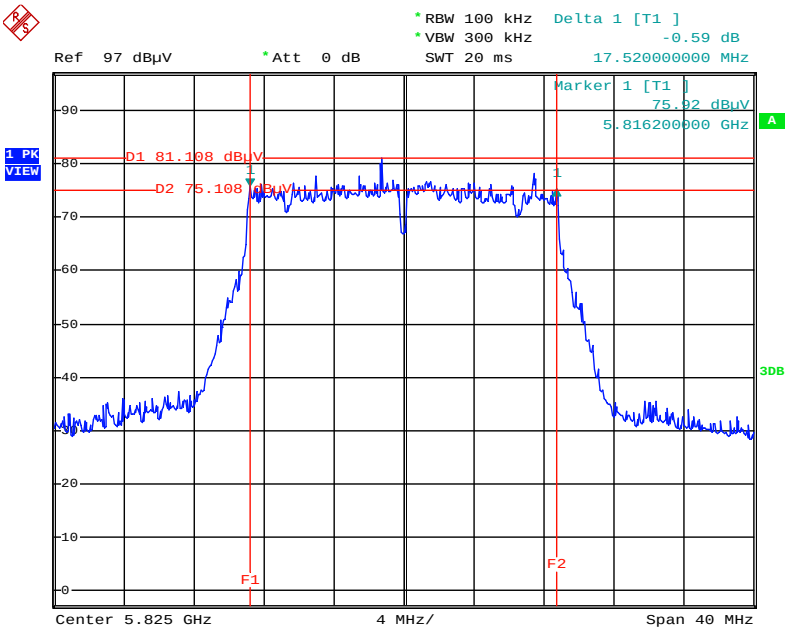
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 17.SEP.2015 14:18:43

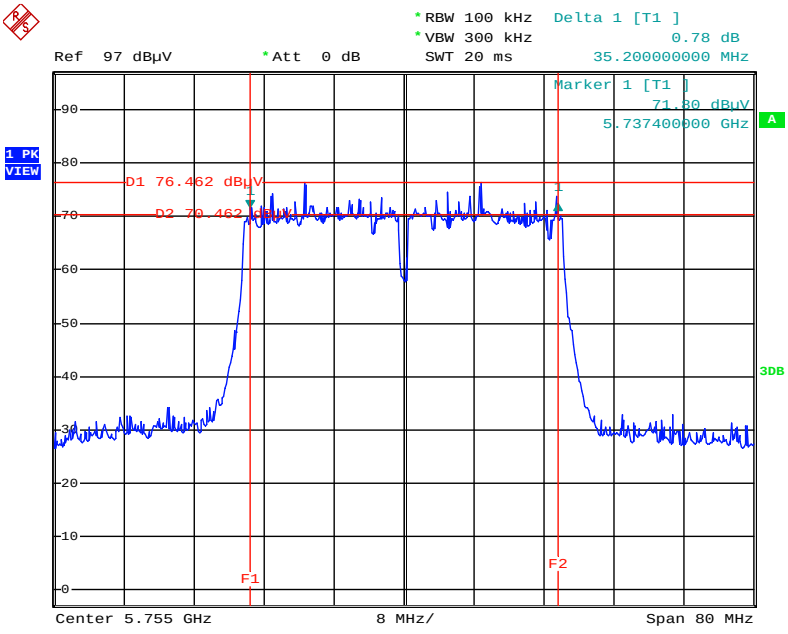
For beamforming mode:

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



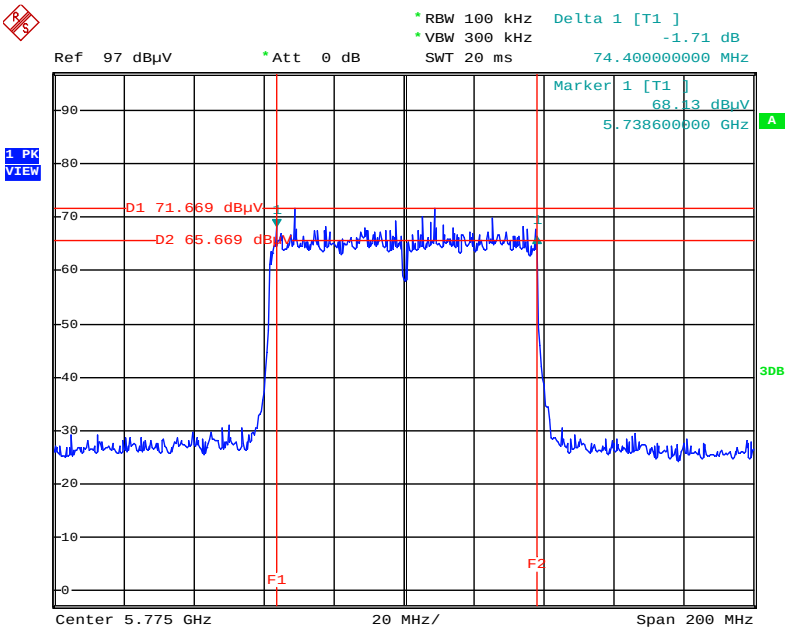
Date: 17.SEP.2015 14:11:07

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6 / 5755MHz



Date: 17.SEP.2015 14:11:52

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



Date: 17.SEP.2015 14:12:56

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☒	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.

4.3.2. Measuring Instruments and Setting

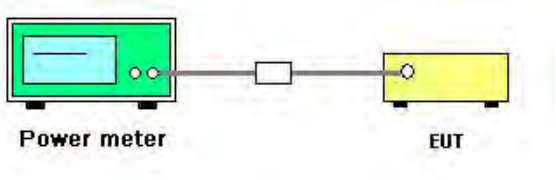
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01 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.

4.3.4. 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 Maximum Conducted Output Power

Temperature	24°C	Humidity	56%
Test Engineer	Eddie Weng	Test Date	Sep. 17, 2015

For non-beamforming mode:

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 4	Ant. 5	Ant. 6	Total		
802.11a	5745 MHz	19.32	19.43	18.98	24.02	30.00	Complies
	5785 MHz	19.37	19.29	18.93	23.97	30.00	Complies
	5825 MHz	19.95	19.76	19.57	24.53	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	18.92	18.95	18.61	23.60	30.00	Complies
	5785 MHz	20.07	20.04	19.69	24.71	30.00	Complies
	5825 MHz	20.96	20.86	20.48	25.54	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	18.80	18.70	18.39	23.40	30.00	Complies
	5795 MHz	22.26	22.02	21.88	26.83	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	16.24	15.95	15.98	20.83	30.00	Complies

For beamforming mode:

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 4	Ant. 5	Ant. 6	Total		
802.11ac MCS0/Nss1 VHT20	5745 MHz	18.29	18.20	17.82	22.88	29.17	Complies
	5785 MHz	18.57	18.23	18.15	23.09	29.15	Complies
	5825 MHz	18.71	18.48	18.39	23.30	29.08	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	17.69	17.43	17.21	22.22	29.15	Complies
	5795 MHz	21.71	21.52	21.25	26.27	29.03	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	15.87	15.67	15.40	20.42	29.15	Complies

Note:

5745 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.83dBi, so limit=30(6.83-6)= 29.17 dBm

5755, 5775, 5785 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.83dBi, so limit=30(6.85-6)= 29.15 dBm

5825 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.83dBi, so limit=30(6.92-6)= 29.08 dBm

5795 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.97dBi, so limit=30(6.97-6)= 29.03 dBm

4.4. Power Spectral Density Measurement

4.4.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Band		Limit
☒	5.725~5.85 GHz	30 dBm/500kHz

4.4.2. Measuring Instruments and Setting

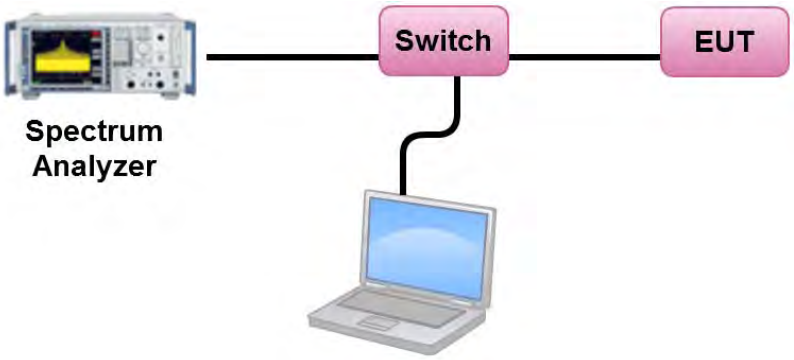
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.4.3. 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 v01 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 (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
5. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

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

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	24°C	Humidity	56%
Test Engineer	Eddie Weng		

For non-beamforming mode:

Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	10.83	-3.01	7.82	29.17	Complies
157	5785 MHz	10.69	-3.01	7.68	29.15	Complies
165	5825 MHz	11.28	-3.01	8.27	29.08	Complies

Note:

5745 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.83dBi, so limit=30(6.83-6)= 29.17 dBm/3kHz.

5785 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.83dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

5825 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.83dBi, so limit=30(6.92-6)= 29.08 dBm/3kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	10.48	-3.01	7.47	29.17	Complies
157	5785 MHz	11.44	-3.01	8.43	29.15	Complies
165	5825 MHz	12.40	-3.01	9.39	29.08	Complies

Note:

5745 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.83dBi, so limit=30(6.83-6)= 29.17 dBm/3kHz.

5785 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.85dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

5825 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.92dBi, so limit=30(6.92-6)= 29.08 dBm/3kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	7.11	-3.01	4.10	29.15	Complies
159	5795 MHz	10.72	-3.01	7.71	29.03	Complies

Note:

5755 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.85dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

5795 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.97dBi, so limit=30(6.97-6)= 29.03 dBm/3kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	1.52	-3.01	-1.49	29.15	Complies

Note:

5775 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.85dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

For beamforming mode:

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	9.87	-3.01	6.86	29.17	Complies
157	5785 MHz	9.92	-3.01	6.91	29.15	Complies
165	5825 MHz	10.02	-3.01	7.01	29.08	Complies

Note:

5745 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.83dBi, so limit=30(6.83-6)= 29.17 dBm/3kHz.

5785 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.85dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

5825 MHz: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.92dBi, so limit=30(6.92-6)= 29.08 dBm/3kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	5.93	-3.01	2.92	29.15	Complies
159	5795 MHz	10.01	-3.01	7.00	29.03	Complies

Note:

5755 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.85dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

5795 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.97dBi, so limit=30(6.97-6)= 29.03 dBm/3kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 4 + Ant. 5 + Ant. 6

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	1.21	-3.01	-1.80	29.15	Complies

Note:

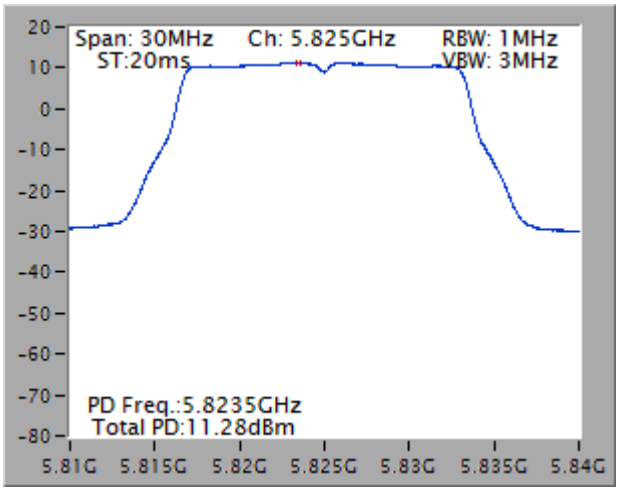
5775 MHz: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =6.85dBi, so limit=30(6.85-6)= 29.15 dBm/3kHz.

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

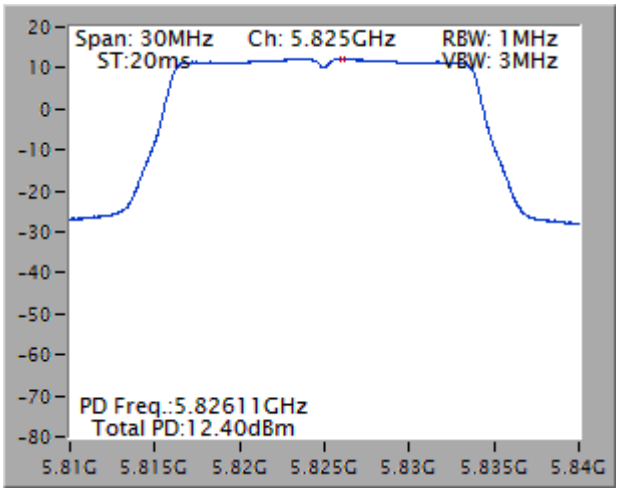
For plots, only the channel with worse result was shown.

For non-beamforming mode:

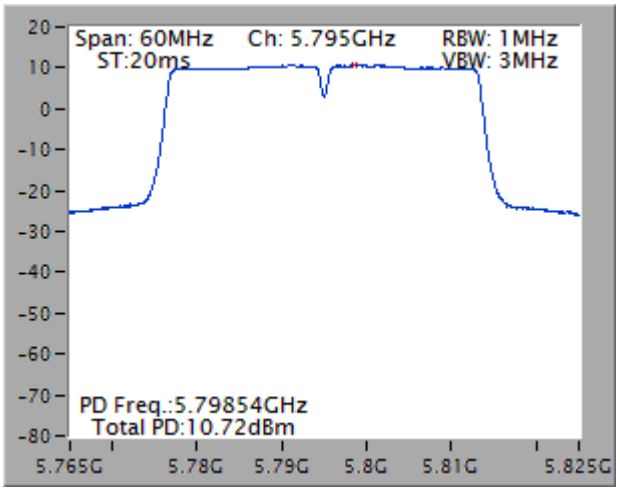
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 / 5825 MHz



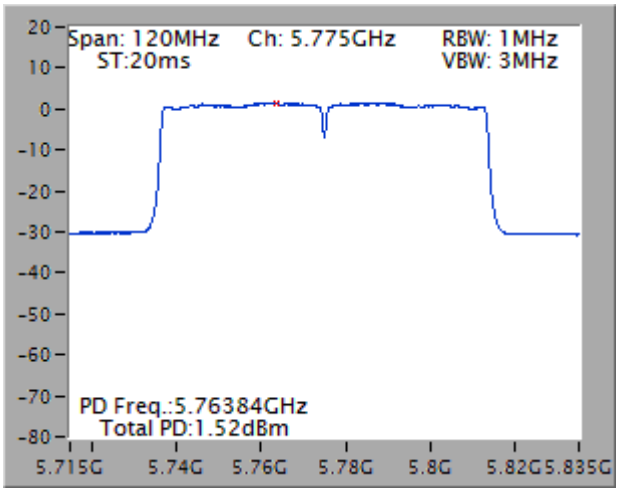
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5825 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5795 MHz

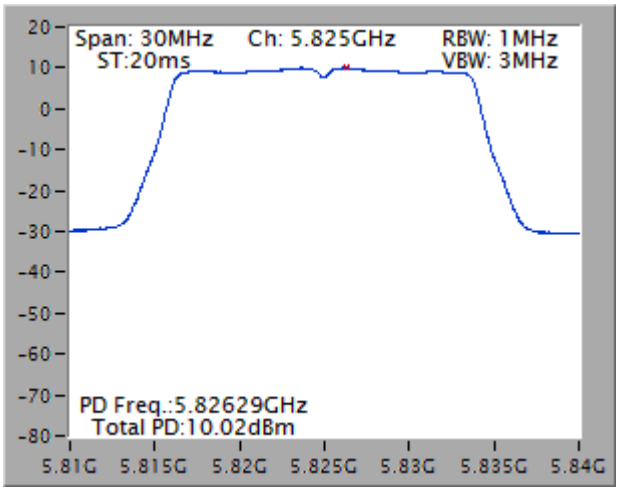


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5775 MHz

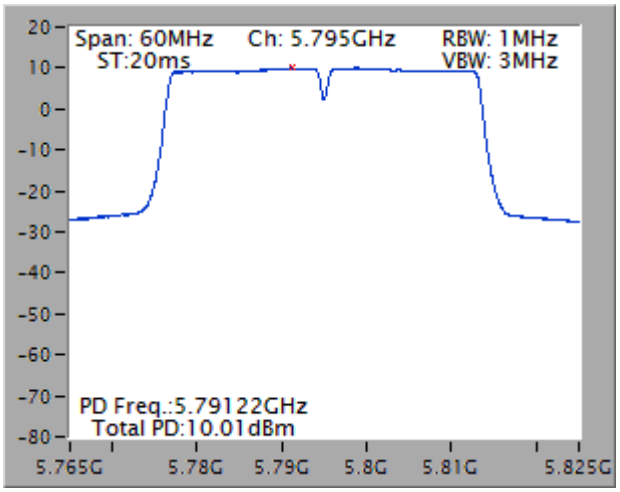


For beamforming mode:

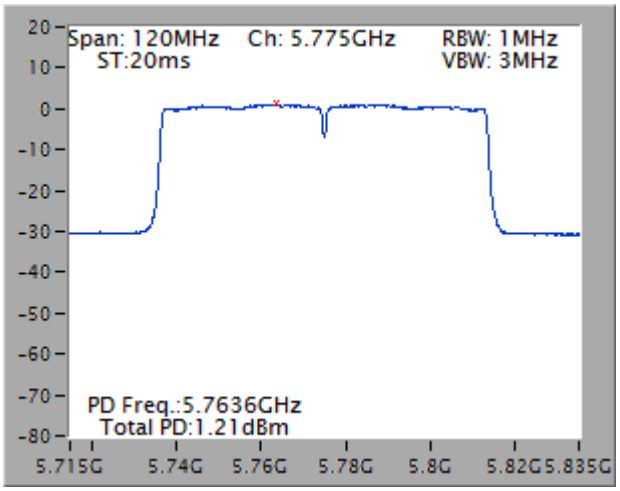
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5825 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5775 MHz



4.5. Radiated Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions 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

4.5.2. 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.

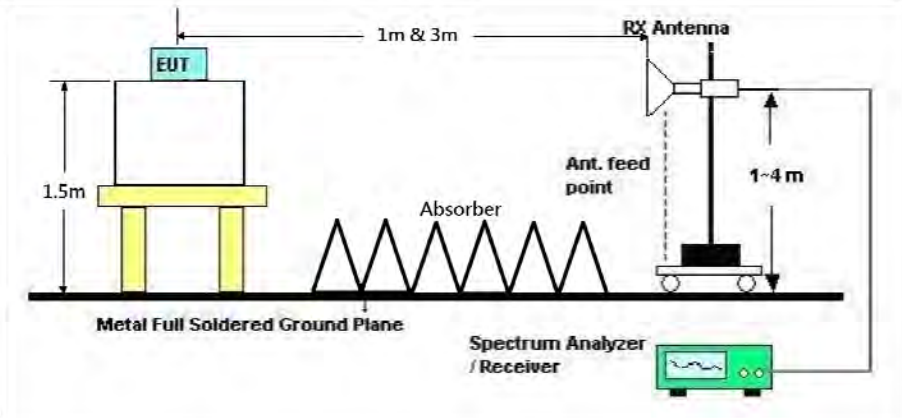
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

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

4.5.3. 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.

4.5.4. Test Setup Layout



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

For non-beamforming mode:

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 149 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11490.13	45.97	54.00	-8.03	30.06	39.91	11.03	35.03	151	188	HORIZONTAL	Average
2	11491.73	59.17	74.00	-14.83	43.26	39.90	11.04	35.03	151	188	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11488.63	59.13	74.00	-14.87	43.23	39.90	11.03	35.03	150	48	VERTICAL	Peak
2	11491.45	45.91	54.00	-8.09	30.01	39.90	11.03	35.03	150	48	VERTICAL	Average

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 157 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11569.57	45.84	54.00	-8.16	30.04	39.76	11.07	35.03	151	210	HORIZONTAL	Average
2	11570.13	58.51	74.00	-15.49	42.71	39.76	11.07	35.03	151	210	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11566.22	48.57	54.00	-5.43	32.76	39.77	11.07	35.03	151	357	VERTICAL	Average
2	11571.58	60.25	74.00	-13.75	44.44	39.77	11.07	35.03	151	357	VERTICAL	Peak

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11646.86	58.20	74.00	-15.80	42.54	39.60	11.10	35.04	151	116	HORIZONTAL	Peak
2	11647.47	45.51	54.00	-8.49	29.85	39.60	11.10	35.04	151	116	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11653.00	47.98	54.00	-6.02	32.35	39.57	11.10	35.04	151	243	VERTICAL	Average
2	11653.82	61.15	74.00	-12.85	45.52	39.57	11.10	35.04	151	243	VERTICAL	Peak

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11488.55	46.06	54.00	-7.94	30.15	39.91	11.03	35.03	152	279	HORIZONTAL	Average
2	11488.87	58.82	74.00	-15.18	42.91	39.91	11.03	35.03	152	279	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11487.74	48.43	54.00	-5.57	32.53	39.90	11.03	35.03	152	224	VERTICAL	Average
2	11488.29	61.58	74.00	-12.42	45.68	39.90	11.03	35.03	152	224	VERTICAL	Peak

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11570.72	46.05	54.00	-7.95	30.25	39.76	11.07	35.03	152	156	HORIZONTAL	Average
2	11571.50	58.75	74.00	-15.25	42.96	39.75	11.07	35.03	152	156	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11566.27	63.51	74.00	-10.49	47.70	39.77	11.07	35.03	150	175	VERTICAL	Peak
2	11571.94	49.88	54.00	-4.12	34.07	39.77	11.07	35.03	150	175	VERTICAL	Average

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11646.84	58.99	74.00	-15.01	43.33	39.60	11.10	35.04	149	210	HORIZONTAL	Peak
2	11651.00	45.69	54.00	-8.31	30.04	39.59	11.10	35.04	149	210	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11649.48	48.45	54.00	-5.55	32.76	39.63	11.10	35.04	152	252	VERTICAL	Average
2	11654.02	61.76	74.00	-12.24	46.13	39.57	11.10	35.04	152	252	VERTICAL	Peak

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11510.36	45.95	54.00	-8.05	30.06	39.88	11.04	35.03	149	283	HORIZONTAL	Average
2	11514.36	58.95	74.00	-15.05	43.06	39.87	11.05	35.03	149	283	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11509.81	58.75	74.00	-15.25	42.84	39.90	11.04	35.03	149	320	VERTICAL	Peak
2	11510.97	46.42	54.00	-7.58	30.51	39.90	11.04	35.03	149	320	VERTICAL	Average

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11587.87	58.63	74.00	-15.37	42.86	39.72	11.08	35.03	147	338	HORIZONTAL	Peak
2	11590.94	45.82	54.00	-8.18	30.06	39.71	11.08	35.03	147	338	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11586.17	50.01	54.00	-3.99	34.26	39.70	11.08	35.03	139	183	VERTICAL	Average
2	11586.21	65.12	74.00	-8.88	49.37	39.70	11.08	35.03	139	183	VERTICAL	Peak

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11551.29	58.93	74.00	-15.07	43.10	39.80	11.06	35.03	147	188	HORIZONTAL	Peak
2	11551.79	45.78	54.00	-8.22	29.96	39.79	11.06	35.03	147	188	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11550.13	59.07	74.00	-14.93	43.21	39.83	11.06	35.03	147	62	VERTICAL	Peak
2	11553.03	45.85	54.00	-8.15	30.05	39.77	11.06	35.03	147	62	VERTICAL	Average

For beamforming mode:

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11487.95	59.22	74.00	-14.78	43.31	39.91	11.03	35.03	150	24	HORIZONTAL	Peak
2	11492.44	46.70	54.00	-7.30	30.79	39.90	11.04	35.03	150	24	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11491.61	59.61	74.00	-14.39	43.70	39.90	11.04	35.03	150	76	VERTICAL	Peak
2	11492.16	46.67	54.00	-7.33	30.76	39.90	11.04	35.03	150	76	VERTICAL	Average

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11567.73	46.40	54.00	-7.60	30.60	39.76	11.07	35.03	157	36	HORIZONTAL	Average
2	11571.77	59.58	74.00	-14.42	43.79	39.75	11.07	35.03	157	36	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11570.36	49.39	54.00	-4.61	33.58	39.77	11.07	35.03	162	206	VERTICAL	Average
2	11572.30	62.12	74.00	-11.88	46.31	39.77	11.07	35.03	162	206	VERTICAL	Peak

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11648.52	59.44	74.00	-14.56	43.78	39.60	11.10	35.04	156	187	HORIZONTAL	Peak
2	11651.53	46.43	54.00	-7.57	30.78	39.59	11.10	35.04	156	187	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11649.26	61.03	74.00	-12.97	45.34	39.63	11.10	35.04	157	129	VERTICAL	Peak
2	11650.26	47.34	54.00	-6.66	31.65	39.63	11.10	35.04	157	129	VERTICAL	Average

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11509.42	60.49	74.00	-13.51	44.60	39.88	11.04	35.03	152	220	HORIZONTAL	Peak
2	11510.32	46.54	54.00	-7.46	30.65	39.88	11.04	35.03	152	220	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11508.65	59.73	74.00	-14.27	43.82	39.90	11.04	35.03	152	140	VERTICAL	Peak
2	11509.54	46.93	54.00	-7.07	31.02	39.90	11.04	35.03	152	140	VERTICAL	Average

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11583.20	46.71	54.00	-7.29	30.94	39.73	11.07	35.03	158	301	HORIZONTAL	Average
2	11599.32	59.66	74.00	-14.34	43.91	39.70	11.08	35.03	158	301	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11597.06	50.68	54.00	-3.32	34.93	39.70	11.08	35.03	142	183	VERTICAL	Average
2	11599.38	65.20	74.00	-8.80	49.45	39.70	11.08	35.03	142	183	VERTICAL	Peak

Temperature	22℃	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11547.70	59.26	74.00	-14.74	43.43	39.80	11.06	35.03	156	155	HORIZONTAL	Peak
2	11552.31	46.35	54.00	-7.65	30.53	39.79	11.06	35.03	156	155	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11549.01	60.35	74.00	-13.65	44.49	39.83	11.06	35.03	150	30	VERTICAL	Peak
2	11551.77	46.56	54.00	-7.44	30.76	39.77	11.06	35.03	150	30	VERTICAL	Average

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.

4.6. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions 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

4.6.2. 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	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. 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.

4.6.7. Test Result of Band Edge and Fundamental Emissions

For non-beamforming mode:

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5666.81	67.72	68.20	-0.48	61.35	32.00	7.76	33.39	168	243	VERTICAL	Peak
2	5725.00	69.07	78.20	-9.13	62.57	32.08	7.79	33.37	168	243	VERTICAL	Peak
3	5746.30	106.26			99.72	32.10	7.81	33.37	168	243	VERTICAL	Average
4	5746.74	116.15			109.61	32.10	7.81	33.37	168	243	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5705.74	67.70	68.20	-0.50	61.24	32.06	7.78	33.38	164	242	VERTICAL	Peak
2	5725.00	60.25	78.20	-17.95	53.75	32.08	7.79	33.37	164	242	VERTICAL	Peak
3	5786.16	115.80			109.18	32.14	7.83	33.35	164	242	VERTICAL	Peak
4	5786.16	105.96			99.34	32.14	7.83	33.35	164	242	VERTICAL	Average
5	5851.45	59.96	78.20	-18.24	53.20	32.22	7.87	33.33	164	242	VERTICAL	Peak
6	5866.37	66.74	68.20	-1.46	59.95	32.24	7.87	33.32	164	242	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5825.87	106.58			99.87	32.20	7.85	33.34	175	242	VERTICAL	Average
2	5826.16	116.49			109.78	32.20	7.85	33.34	175	242	VERTICAL	Peak
3	5855.79	62.68	78.20	-15.52	55.92	32.22	7.87	33.33	175	242	VERTICAL	Peak
4	5906.89	67.33	68.20	-0.87	60.46	32.28	7.90	33.31	175	242	VERTICAL	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5666.37	68.02	68.20	-0.18	61.65	32.00	7.76	33.39	174	220	VERTICAL	Peak
2	5722.11	71.12	78.20	-7.08	64.64	32.06	7.79	33.37	174	220	VERTICAL	Peak
3	5746.16	116.01			109.47	32.10	7.81	33.37	174	220	VERTICAL	Peak
4	5746.16	104.61			98.07	32.10	7.81	33.37	174	220	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5706.75	67.46	68.20	-0.74	61.00	32.06	7.78	33.38	175	221	VERTICAL	Peak
2	5725.00	60.33	78.20	-17.87	53.83	32.08	7.79	33.37	175	221	VERTICAL	Peak
3	5786.30	105.15			98.53	32.14	7.83	33.35	175	221	VERTICAL	Peak
4	5786.30	116.04			109.42	32.14	7.83	33.35	175	221	VERTICAL	Peak
5	5856.51	65.55	78.20	-12.65	58.77	32.24	7.87	33.33	175	221	VERTICAL	Peak
6	5871.29	66.42	68.20	-1.78	59.62	32.24	7.88	33.32	175	221	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5826.45	105.66			98.95	32.20	7.85	33.34	175	224	VERTICAL	Average
2	5831.37	116.39			109.68	32.20	7.85	33.34	175	224	VERTICAL	Peak
3	5851.45	67.61	78.20	-10.59	60.85	32.22	7.87	33.33	175	224	VERTICAL	Peak
4	5906.31	67.57	68.20	-0.63	60.70	32.28	7.90	33.31	175	224	VERTICAL	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5711.53	67.46	68.20	-0.74	60.99	32.06	7.79	33.38	173	220	VERTICAL	Peak
2	5716.90	73.72	78.20	-4.48	67.25	32.06	7.79	33.38	173	220	VERTICAL	Peak
3	5746.32	111.61			105.07	32.10	7.81	33.37	173	220	VERTICAL	Peak
4	5751.53	101.80			95.25	32.10	7.81	33.36	173	220	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5709.79	66.62	68.20	-1.58	60.16	32.06	7.78	33.38	175	239	VERTICAL	Peak
2	5725.00	66.95	78.20	-11.25	60.45	32.08	7.79	33.37	175	239	VERTICAL	Peak
3	5789.79	105.85			99.21	32.16	7.83	33.35	175	239	VERTICAL	Average
4	5790.37	116.14			109.50	32.16	7.83	33.35	175	239	VERTICAL	Peak
5	5850.00	68.02	78.20	-10.18	61.26	32.22	7.87	33.33	175	239	VERTICAL	Peak
6	5860.58	67.98	68.20	-0.22	61.20	32.24	7.87	33.33	175	239	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5795 MHz.

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5704.87	67.71	68.20	-0.49	61.27	32.04	7.78	33.38	175	242	VERTICAL	Peak
2	5718.49	72.11	78.20	-6.09	65.63	32.06	7.79	33.37	175	242	VERTICAL	Peak
3	5785.85	107.04			100.42	32.14	7.83	33.35	175	242	VERTICAL	Peak
4	5785.85	96.86			90.24	32.14	7.83	33.35	175	242	VERTICAL	Average
5	5857.24	63.46	78.20	-14.74	56.68	32.24	7.87	33.33	175	242	VERTICAL	Peak
6	5867.24	64.35	68.20	-3.85	57.55	32.24	7.88	33.32	175	242	VERTICAL	Peak

Item 4, 5 are the fundamental frequency at 5775 MHz.

For beamforming mode:

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5663.19	67.52	68.20	-0.68	61.15	32.00	7.76	33.39	175	200	VERTICAL	Peak
2	5723.84	73.44	78.20	-4.76	66.94	32.08	7.79	33.37	175	200	VERTICAL	Peak
3	5751.37	116.19			109.64	32.10	7.81	33.36	175	200	VERTICAL	Peak
4	5751.37	105.77			99.22	32.10	7.81	33.36	175	200	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5697.20	67.91	68.20	-0.29	61.47	32.04	7.78	33.38	170	240	VERTICAL	Peak
2	5721.53	59.87	78.20	-18.33	53.39	32.06	7.79	33.37	170	240	VERTICAL	Peak
3	5777.62	107.59			100.98	32.14	7.82	33.35	170	240	VERTICAL	Average
4	5778.05	118.02			111.41	32.14	7.82	33.35	170	240	VERTICAL	Peak
5	5856.95	68.64	78.20	-9.56	61.86	32.24	7.87	33.33	170	240	VERTICAL	Peak
6	5860.42	66.12	68.20	-2.08	59.34	32.24	7.87	33.33	170	240	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5817.19	117.41			110.72	32.18	7.85	33.34	175	186	VERTICAL	Peak
2	5817.19	108.07			101.38	32.18	7.85	33.34	175	186	VERTICAL	Average
3	5850.00	66.45	78.20	-11.75	59.69	32.22	7.87	33.33	175	186	VERTICAL	Peak
4	5897.05	68.04	68.20	-0.16	61.18	32.28	7.89	33.31	175	186	VERTICAL	Peak

Item 1, 2 are the fundamental frequency at 5825 MHz.

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5714.71	67.91	68.20	-0.29	61.44	32.06	7.79	33.38	172	220	VERTICAL	Peak
2	5725.00	72.13	78.20	-6.07	65.63	32.08	7.79	33.37	172	220	VERTICAL	Peak
3	5751.24	113.80			107.25	32.10	7.81	33.36	172	220	VERTICAL	Peak
4	5757.60	102.56			95.99	32.12	7.81	33.36	172	220	VERTICAL	Average

Item 3, 4 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5710.95	66.96	68.20	-1.24	60.49	32.06	7.79	33.38	175	238	VERTICAL	Peak
2	5724.13	66.01	78.20	-12.19	59.51	32.08	7.79	33.37	175	238	VERTICAL	Peak
3	5784.29	117.07			110.45	32.14	7.83	33.35	175	238	VERTICAL	Peak
4	5786.90	104.77			98.15	32.14	7.83	33.35	175	238	VERTICAL	Average
5	5855.21	66.13	78.20	-12.07	59.37	32.22	7.87	33.33	175	238	VERTICAL	Peak
6	5865.21	67.74	68.20	-0.46	60.95	32.24	7.87	33.32	175	238	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5795 MHz.

Temperature	22°C	Humidity	51%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	Jul. 15, 2015		

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	5705.59	67.94	68.20	-0.26	61.50	32.04	7.78	33.38	175	86	VERTICAL	Peak
2	5724.28	67.49	78.20	-10.71	60.99	32.08	7.79	33.37	175	86	VERTICAL	Peak
3	5746.78	108.79			102.25	32.10	7.81	33.37	175	86	VERTICAL	Peak
4	5788.75	97.73			91.09	32.16	7.83	33.35	175	86	VERTICAL	Average
5	5852.17	63.68	78.20	-14.52	56.92	32.22	7.87	33.33	175	86	VERTICAL	Peak
6	5863.62	65.26	68.20	-2.94	58.48	32.24	7.87	33.33	175	86	VERTICAL	Peak

Item 3, 4 are the fundamental frequency at 5775 MHz.

Note:

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

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

4.7. Frequency Stability Measurement

4.7.1. 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).

4.7.2. Measuring Instruments and Setting

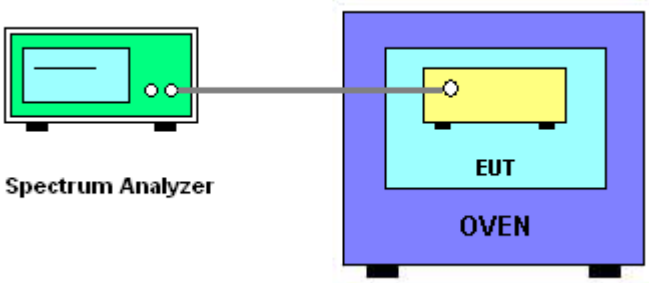
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.7.3. 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. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
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 -20°C~50°C.

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

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

4.7.7. Test Result of Frequency Stability

Temperature	24°C	Humidity	56%
Test Engineer	Eddie Weng	Test Date	Sep. 17, 2015

Mode: 20 MHz / Ant. 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9852	5784.9839	5784.9823	5784.9804
110.00	5784.9840	5784.9827	5784.9811	5784.9792
93.50	5784.9826	5784.9813	5784.9797	5784.9778
Max. Deviation (MHz)	**0.0174**	**0.0187**	**0.0203**	**0.0222**
Max. Deviation (ppm)	**3.01**	**3.23**	**3.51**	**3.84**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5784.9896	5784.9883	5784.9866	5784.9845
-10	5784.9879	5784.9866	5784.9850	5784.9831
0	5784.9865	5784.9852	5784.9836	5784.9817
10	5784.9852	5784.9839	5784.9823	5784.9804
20	5784.9840	5784.9827	5784.9811	5784.9792
30	5784.9825	5784.9812	5784.9796	5784.9777
40	5784.9810	5784.9797	5784.9781	5784.9762
50	5784.9789	5784.9775	5784.9758	5784.9737
Max. Deviation (MHz)	**0.0211**	**0.0225**	**0.0242**	**0.0263**
Max. Deviation (ppm)	**3.65**	**3.89**	**4.18**	**4.55**
Result	Complies			

Mode: 40 MHz / Ant. 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9692	5754.9679	5754.9663	5754.9644
110.00	5754.9680	5754.9667	5754.9651	5754.9632
93.50	5754.9666	5754.9653	5754.9637	5754.9618
Max. Deviation (MHz)	**0.0334**	**0.0347**	**0.0363**	**0.0382**
Max. Deviation (ppm)	**5.80**	**6.03**	**6.31**	**6.64**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5754.9736	5754.9723	5754.9706	5754.9685
-10	5754.9719	5754.9706	5754.9690	5754.9671
0	5754.9705	5754.9692	5754.9676	5754.9657
10	5754.9692	5754.9679	5754.9663	5754.9644
20	5754.9680	5754.9667	5754.9651	5754.9632
30	5754.9665	5754.9652	5754.9636	5754.9617
40	5754.9650	5754.9637	5754.9621	5754.9602
50	5754.9629	5754.9615	5754.9598	5754.9577
Max. Deviation (MHz)	**0.0371**	**0.0385**	**0.0402**	**0.0423**
Max. Deviation (ppm)	**6.45**	**6.69**	**6.99**	**7.35**
Result	Complies			

Mode: 80 MHz / Ant. 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9932	5774.9919	5774.9903	5774.9884
110.00	5774.9920	5774.9907	5774.9891	5774.9872
93.50	5774.9906	5774.9893	5774.9877	5774.9858
Max. Deviation (MHz)	**0.0094**	**0.0107**	**0.0123**	**0.0142**
Max. Deviation (ppm)	**1.63**	**1.85**	**2.13**	**2.46**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5774.9976	5774.9963	5774.9946	5774.9925
-10	5774.9959	5774.9946	5774.9930	5774.9911
0	5774.9945	5774.9932	5774.9916	5774.9897
10	5774.9932	5774.9919	5774.9903	5774.9884
20	5774.9920	5774.9907	5774.9891	5774.9872
30	5774.9905	5774.9892	5774.9876	5774.9857
40	5774.9890	5774.9877	5774.9861	5774.9842
50	5774.9869	5774.9855	5774.9838	5774.9817
Max. Deviation (MHz)	**0.0131**	**0.0145**	**0.0162**	**0.0183**
Max. Deviation (ppm)	**2.27**	**2.51**	**2.81**	**3.17**
Result	Complies			

4.8. Antenna Requirements

4.8.1. 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.

4.8.2. 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. 28, 2014	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. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100979	9kHz~40GHz	Dec. 12, 2014	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	RG402	High Cable-7	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. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	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. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

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

N.C.R means Non-Calibration required.

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%