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FCC RADIO TEST REPORT

Applicant's company	**Cradlepoint, Inc.**
Applicant Address	1111 W. Jefferson Street, Suite 400,Boise, ID 83702 USA
FCC ID	**UXX-S4A525A**

Product Name	AER3100 Advanced Edge Router
Brand Name	cradlepoint
Model No.	S4A525A
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Apr. 21, 2015
Final Test Date	May 11, 2015
Submission Type	Original Equipment

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 C63.10-2009**, **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.

Note: Using 1.5m table as an alternative was permitted by the FCC per TCBC conference call of Dec. 2, 2014.

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR542031AB	Rev. 01	Initial issue of report	Jun. 15, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	AER3100 Advanced Edge Router
Brand Name	:	cradlepoint
Model No.	:	S4A525A
Applicant	:	Cradlepoint, 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 Apr. 21, 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	15.207	AC Power Line Conducted Emissions	Complies	1.97 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	1.45 dB
4.5	15.407(a)	Power Spectral Density	Complies	0.03 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.67 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.01 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	IEEE 802.11a: WLAN (1TX, 3RX) IEEE 802.11n/ac: 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%)	**Band 1:** **For Non-Beamforming Mode:** IEEE 802.11a: 19.97 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.47 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.41 MHz **For Beamforming Mode:** IEEE 802.11ac MCS0/Nss1 (VHT20): 17.89 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.61 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz **Band 4:** **For Non-Beamforming Mode:** IEEE 802.11a: 28.65 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.71 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.19 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.70 MHz **For Beamforming Mode:** IEEE 802.11ac MCS0/Nss1 (VHT20): 17.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.76 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz

Maximum Conducted Output Power	**Band 1:** **For Non-Beamforming Mode:** IEEE 802.11a: 25.11 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 28.55 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 21.80 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 15.90 dBm **For Beamforming Mode:** IEEE 802.11ac MCS0/Nss1 (VHT20): 26.34 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 21.80 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 15.93 dBm **Band 4:** **For Non-Beamforming Mode:** IEEE 802.11a: 23.55 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 22.87 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 24.38 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 19.16 dBm **For Beamforming Mode:** IEEE 802.11ac MCS0/Nss1 (VHT20): 22.17 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.76 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.30 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☒ With beamforming for 802.11n/ac in 5GHz.	☐ Without beamforming
Operating Mode	☐ Outdoor access point	
	☒ Indoor access point	
	☐ Fixed point-to-point access points	
	☐ Mobile and portable client devices	

Antenna and Band width

Antenna	Single (TX)		Three (TX)		
Band width Mode	20 MHz	40 MHz	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X	X	X
IEEE 802.11n	X	X	V	V	X
IEEE 802.11ac	X	X	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	Rating
Adapter 1	FSP	FSP120-AWAN2	Input: 100-240V ~ 1.8A 50-60Hz Output: 54V, 2.22A
Adapter 2	APD	DA-120A54	Input: 100-240V ~ 50-60Hz 2.0A Max Output: 54V, 2.23A
Others			
Power Cable*1: Non-shielded, 1.8m RJ-45 Cable*1: Non-shielded, 1m			

3.3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)		Cable Loss (dB)		True Gain (dBi)	
					2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	JOYMAX	AN2450-9220BRS	Dipole	Reversed-SMA	4.5	5.0	1.2	2.0	3.3	3.0
2	JOYMAX	AN2450-9220BRS	Dipole	Reversed-SMA	4.5	5.0	1.2	2.0	3.3	3.0
3	JOYMAX	AN2450-9220BRS	Dipole	Reversed-SMA	4.5	5.0	1.5	2.5	3.0	2.5

Note: The EUT has three antennas.

For 2.4GHz function:

For IEEE 802.11b mode (1TX/3RX):

Only Chain 1 can be used as transmitting, but Chain 1, Chain 2 and Chain 3 could receive simultaneously.

For IEEE 802.11g mode (1TX/3RX):

Chain 1, Chain 2 and Chain 3 are used as transmitting/receiving antenna, but only one antenna can be used as transmitting antenna at the same time.

Chain 1 generated the worst case than Chain 2 and Chain 3, so it tested and recorded in the report.

Chain 1, Chain 2 and Chain 3 could receive simultaneously.

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

Chain 1, Chain 2 and Chain 3 can be used as transmitting/receiving antenna.

Chain 1, Chain 2 and Chain 3 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a mode (1TX/3RX):

Chain 4, Chain 5 and Chain 6 can be used as transmitting/receiving antenna, but only one antenna can be used as transmitting antenna at the same time.

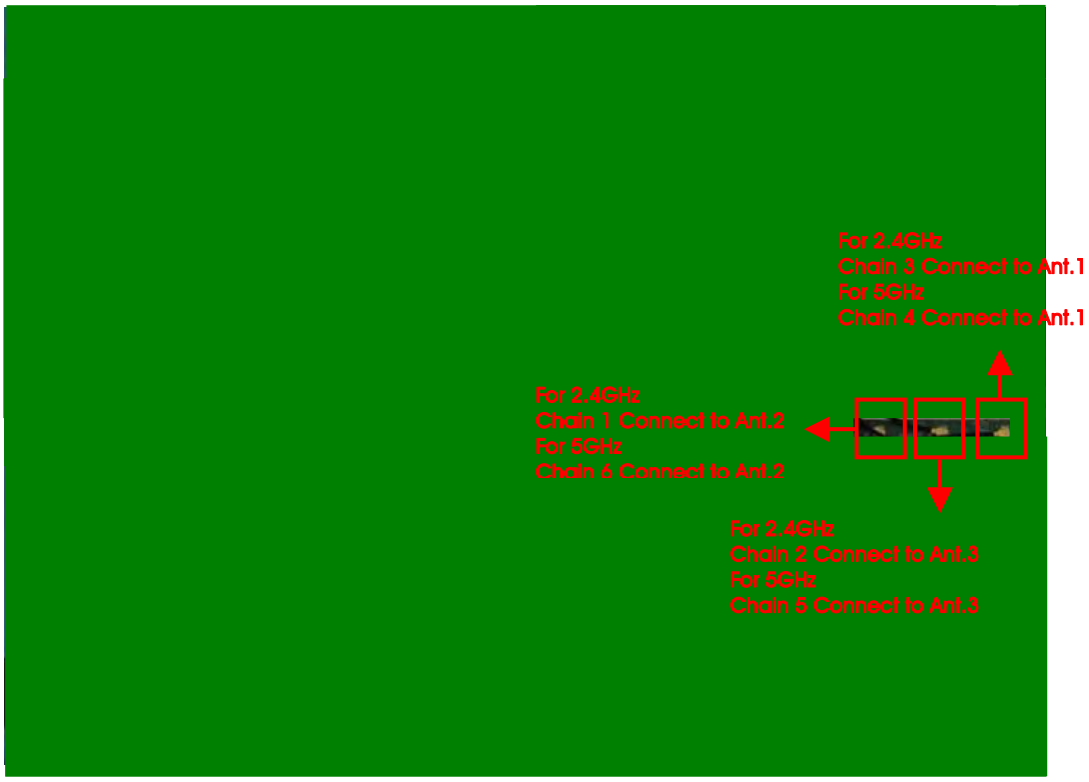
Chain 4 generated the worst case than Chain 5 and Chain 6, so it tested and recorded in the report.

Chain 4, Chain 5 and Chain 6 could receive simultaneously.

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

Chain 4, Chain 5 and Chain 6 can be used as transmitting/receiving antenna.

Chain 4, Chain 5 and Chain 6 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.

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	4+5+6
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	4+5+6
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	4+5+6
Power Spectral Density	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	4+5+6
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	4+5+6
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	4+5+6
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	4+5+6
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	4+5+6
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	4
6dB Spectrum Bandwidth Measurement	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
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	4+5+6
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	4+5+6
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	4+5+6

Band Edge Emission	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	4+5+6
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	4+5+6
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	4+5+6
Frequency Stability	20 MHz	Band 1&4	-	40/157	4
	40 MHz	Band 1&4	-	38/151	4+5+6
	80 MHz	Band 1&4	-	42/155	4+5+6

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 802.11n/ac in 5GHz. All test results were recorded in the report.

Note 3: All the specification of test configurations and test modes were based on customer's request.

Note 4: The EUT can collocate with WWAN/GPS module as additional function.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (2.4GHz & 5GHz) with Adapter 1 - AP Mode

Mode 2. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (2.4GHz & 5GHz) with Adapter 2 - AP Mode

Mode 3. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (links to AP via 5GHz, links to client via 2.4GHz & 5GHz) with Adapter 1 - Repeater Mode

Mode 4. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (links to AP via 5GHz, links to client via 2.4GHz & 5GHz) with Adapter 2 - Repeater Mode

Mode 1 is the worst case, so it was selected to record in this test report.

For Radiated Emission test (Below 1GHz):

Mode 1. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (2.4GHz & 5GHz) with Adapter 1 - AP Mode

Mode 2. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (2.4GHz & 5GHz) with Adapter 2 - AP Mode

Mode 3. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (links to AP via 5GHz, links to client via 2.4GHz & 5GHz) with Adapter 1 - Repeater Mode

Mode 4. GSM link (slot 1)+LTE link (slot 2)+ WiFi link (links to AP via 5GHz, links to client via 2.4GHz & 5GHz) with Adapter 2 - Repeater Mode

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emission test (Above 1GHz):

Mode 1. CTX

For Emission Co-location Test:

The EUT could be applied with WLAN 2.4GHz, WLAN 5GHz, WWAN (slot 1) and WWAN (slot 2) therefore Co-location Maximum Permissible Exposure (Please refer to Appendix B) and Radiated Emission Co-location (please refer to Appendix C) tests are added for simultaneously transmit among WLAN 2.4GHz, WLAN 5GHz, WWAN (slot 1) and WWAN (slot 2).

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	-
CO02-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Supporting Units

For Test Site No: 03CH01-CB (Below 1GHz) and CO01-CB

Support Unit	Brand	Model	FCC ID
NB*5	DELL	E6430	DoC
PoE load	Cardlepoint	ERT-50	N/A
Flash Disk	Silicon	I-Series	DoC
2G base station	R&S	CMU200	N/A
4G base station	Anritsu	MT8820C	N/A
2G SIM card	N/A	N/A	N/A
4G SIM card	N/A	N/A	N/A
SD card	Apacer	SD Card	N/A

For Test Site No: 03CH01-CB (Above1GHz)

For Non-Beamforming Mode:

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

For Beamforming Mode:

Support Unit	Brand	Model	FCC ID
NB*2	DELL	E6430	DoC
WLAN ac Dongle	Netgear	A6200	PY31220200

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.8. 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_2.0.1.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	82	76	87	82	106	90
802.11ac MCS0/Nss1 VHT20	69	60	84	75	75	78
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	56		64		67	83
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	48				60	

For Beamforming Mode:

Test Software Version	Mtool_2.0.1.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11ac MCS0/Nss1 VHT20	63	52	80	70	71	76
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	53		64		60	81
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	50				57	

3.9. 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 ac Dongle and transmit duty cycle no less 98%

3.10. Duty Cycle

For Non-Beamforming Mode:

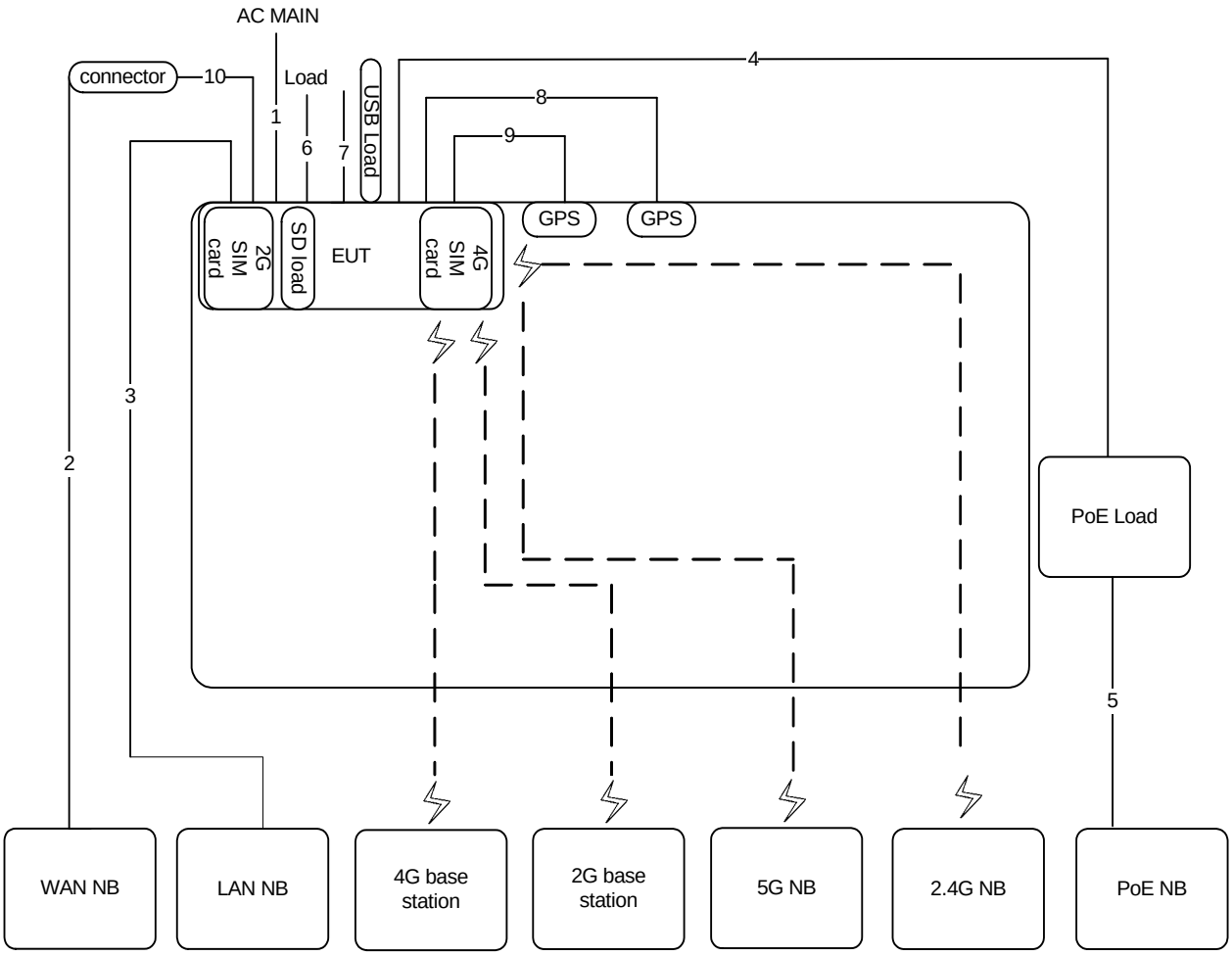
Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.069	2.094	98.78%	0.05	0.01
802.11ac MCS0/Nss1 VHT20	1.923	1.957	98.24%	0.08	0.01
802.11ac MCS0/Nss1 VHT40	0.920	0.979	93.93%	0.27	1.09
802.11ac MCS0/Nss1 VHT80	0.429	0.489	87.86%	0.56	2.33

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	3.758	4.075	92.22%	0.35	0.27
802.11ac MCS0/Nss1 VHT40	4.420	4.700	94.04%	0.27	0.23
802.11ac MCS0/Nss1 VHT80	4.836	5.174	93.47%	0.29	0.21

3.11. Test Configurations

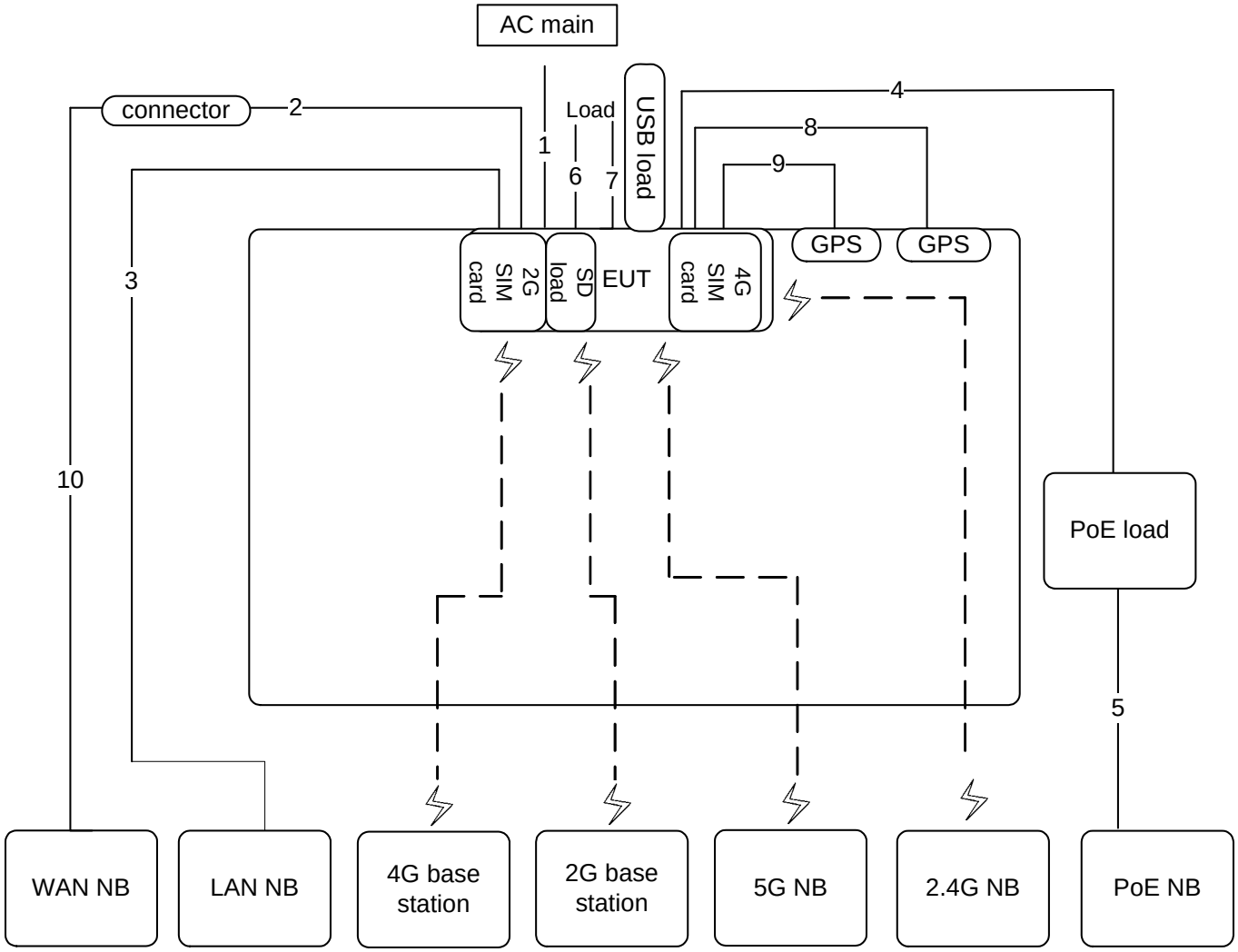
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length	Remark
1	Power cable	No	2.8m	-
2	RJ-45 cable	No	10m	-
3	RJ-45 cable	No	10m	-
4	RJ-45 cable	No	10m	-
5	RJ-45 cable	No	1.5m	-
6	RJ-45 cable*10	No	1.5m	Load
7	Ground cable	No	1.5m	-
8	RF cable	Yes	3m	Load
9	RF cable	Yes	3m	Load
10	RJ-45 cable	No	1m	-

3.11.2. Radiation Emissions Test Configuration

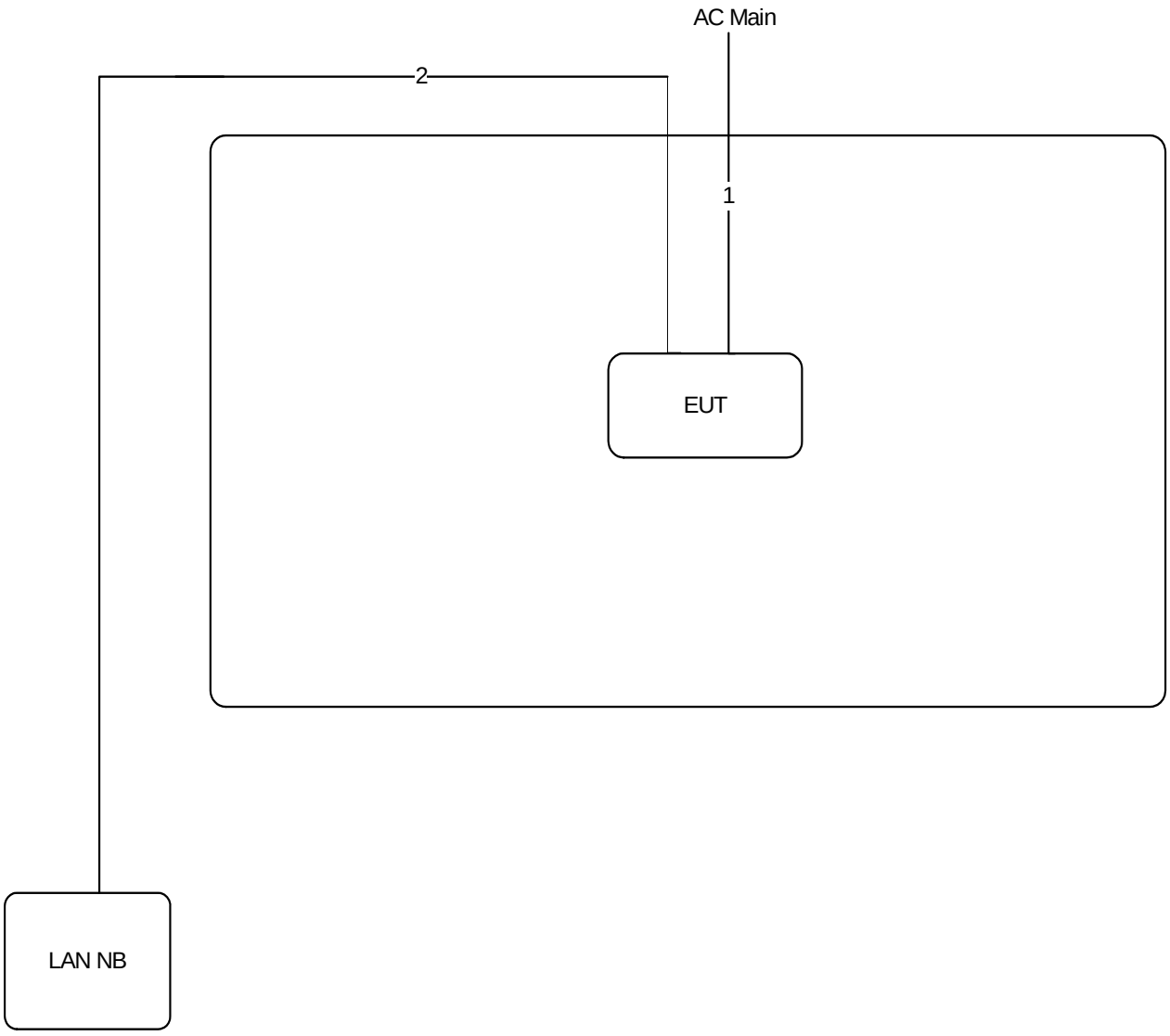
Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length	Remark
1	Power cable	No	3m	-
2	RJ-45 cable	No	1m	-
3	RJ-45 cable	No	10m	-
4	RJ-45 cable	No	10m	-
5	RJ-45 cable	No	1.5m	-
6	RJ-45 cable*10	No	1.5m	Load
7	Ground cable	No	1.5m	-
8	RF cable	Yes	3m	Load
9	RF cable	Yes	3m	Load
10	RJ-45 cable	No	10m	-

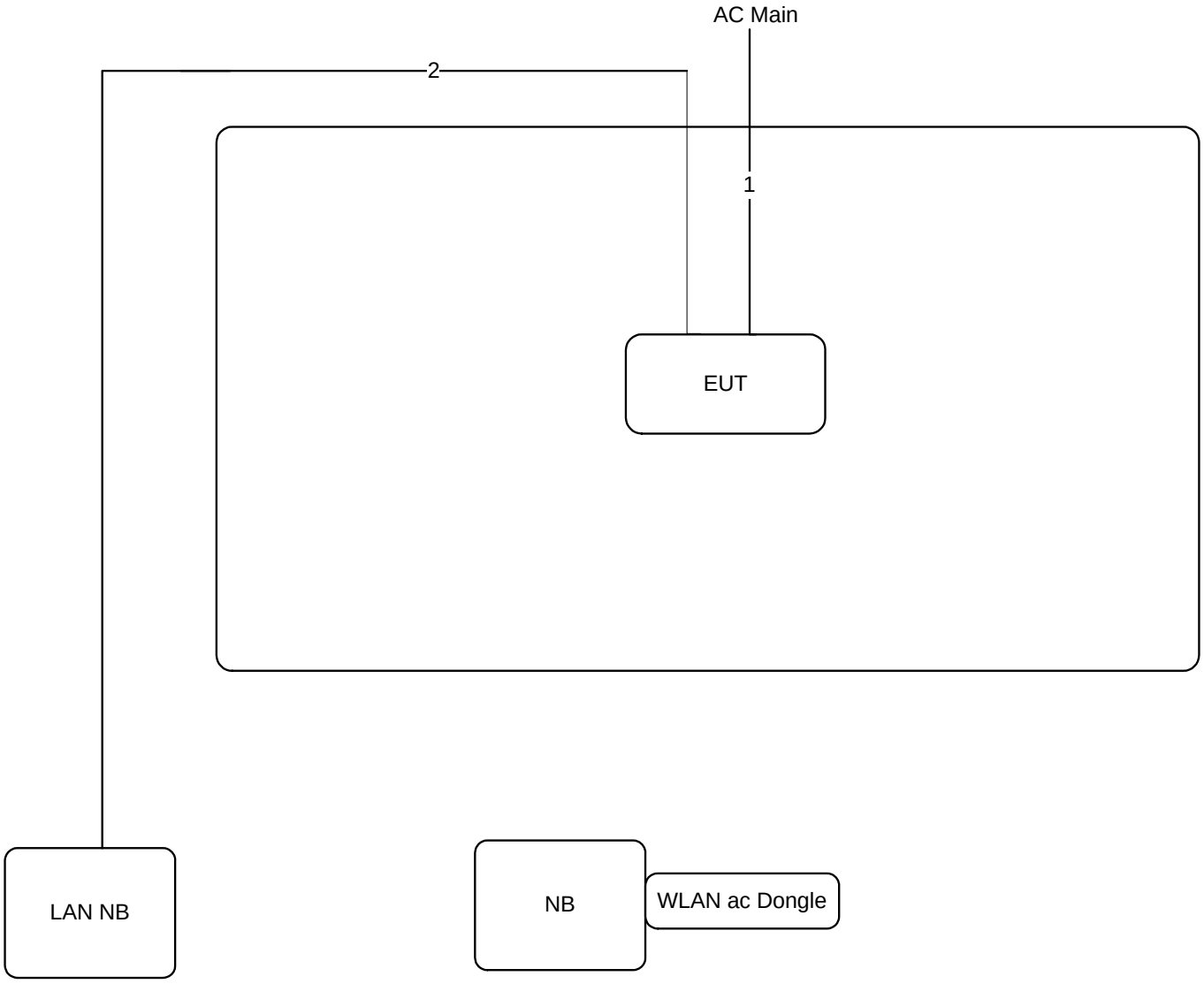
Test Configuration: above 1GHz

For Non-Beamforming Mode:



Item	Connection	Shielded	Length
1	Power cable	No	2.8m
2	RJ-45 cable	No	10m

For Beamforming Mode:



Item	Connection	Shielded	Length
1	Power cable	No	2.8m
2	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

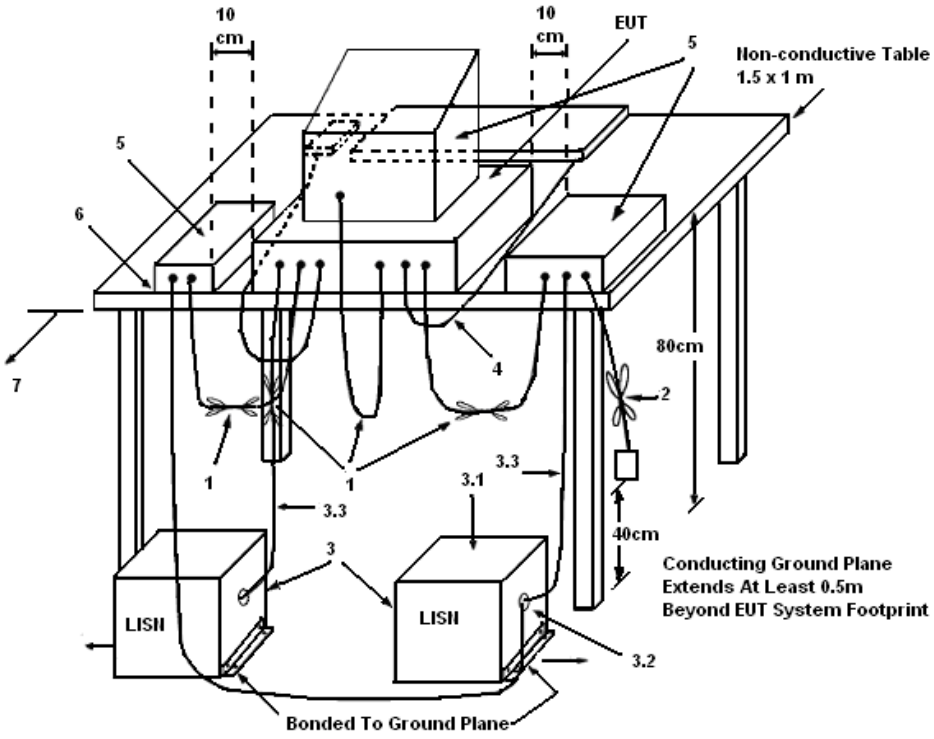
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

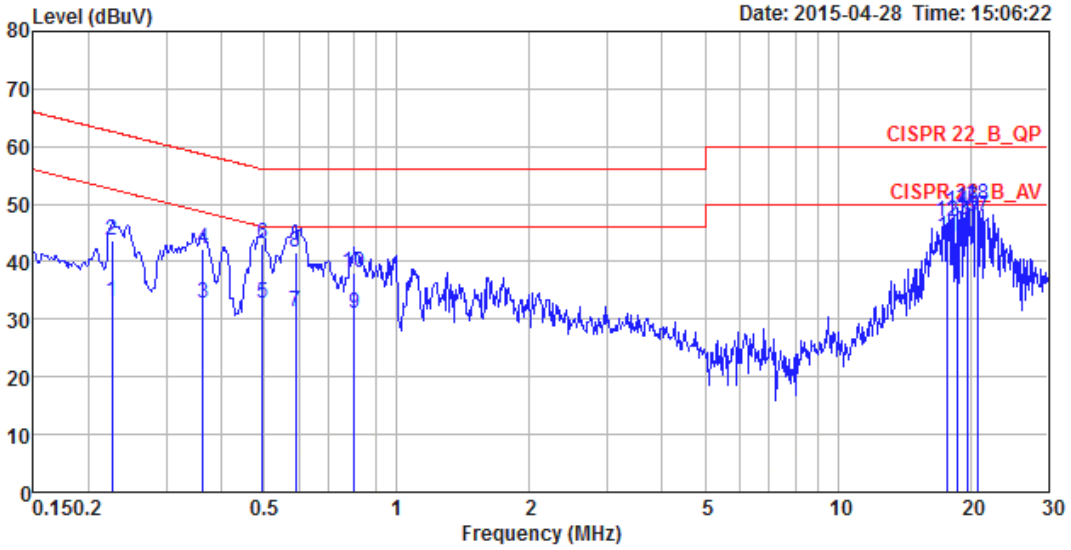
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

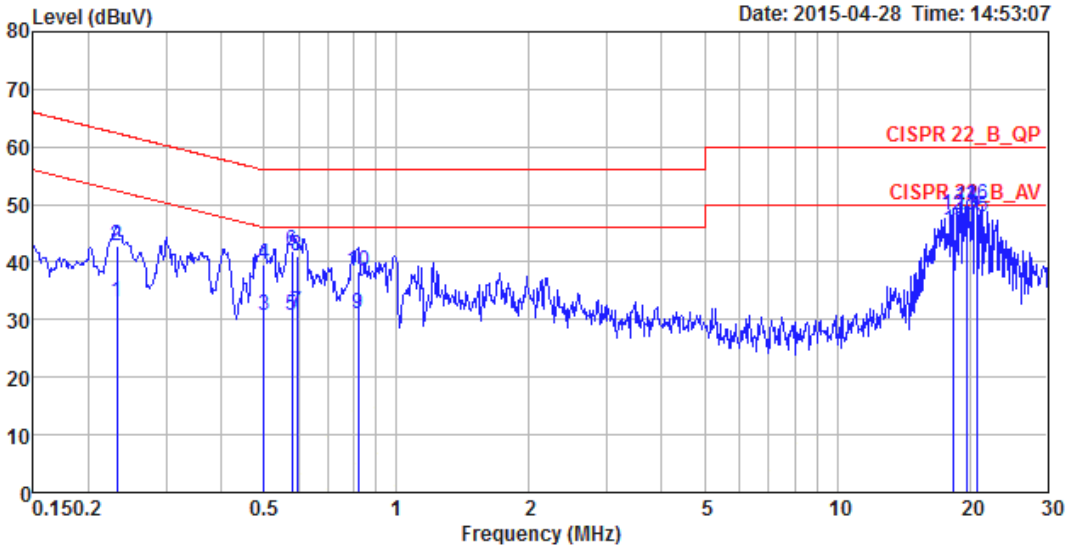
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	59%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link / Mode 1		



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.2256	33.14	-19.47	52.61	10.01	22.94	0.19	LINE	Average
2	0.2256	43.79	-18.82	62.61	10.01	33.59	0.19	LINE	QP
3	0.3634	32.64	-16.01	48.65	10.01	22.43	0.20	LINE	Average
4	0.3634	42.28	-16.37	58.65	10.01	32.07	0.20	LINE	QP
5	0.4967	32.86	-13.19	46.05	10.02	22.64	0.20	LINE	Average
6	0.4967	43.07	-12.98	56.05	10.02	32.85	0.20	LINE	QP
7	0.5885	31.18	-14.82	46.00	10.02	20.96	0.20	LINE	Average
8	0.5885	41.64	-14.36	56.00	10.02	31.42	0.20	LINE	QP
9	0.8002	30.88	-15.12	46.00	10.03	20.66	0.19	LINE	Average
10	0.8002	37.98	-18.02	56.00	10.03	27.76	0.19	LINE	QP
11	17.7683	44.35	-5.65	50.00	10.36	33.53	0.46	LINE	Average
12	17.7683	46.79	-13.21	60.00	10.36	35.97	0.46	LINE	QP
13	18.6055	47.23	-2.77	50.00	10.37	36.39	0.47	LINE	Average
14	18.6055	48.81	-11.19	60.00	10.37	37.97	0.47	LINE	QP
15	19.6506	47.68	-2.32	50.00	10.39	36.81	0.48	LINE	Average
16	19.6506	49.37	-10.63	60.00	10.39	38.50	0.48	LINE	QP
17	20.6944	47.68	-2.32	50.00	10.40	36.79	0.49	LINE	Average
18	20.6944	49.74	-10.26	60.00	10.40	38.85	0.49	LINE	QP

Temperature	24°C	Humidity	59%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	Normal Link / Mode 1		



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.2316	32.94	-19.45	52.39	10.01	22.74	0.19	NEUTRAL	Average
2	0.2316	42.76	-19.63	62.39	10.01	32.56	0.19	NEUTRAL	QP
3	0.4994	30.71	-15.30	46.01	10.01	20.50	0.20	NEUTRAL	Average
4	0.4994	39.62	-16.39	56.01	10.01	29.41	0.20	NEUTRAL	QP
5	0.5800	30.65	-15.35	46.00	10.02	20.43	0.20	NEUTRAL	Average
6	0.5800	41.87	-14.13	56.00	10.02	31.65	0.20	NEUTRAL	QP
7	0.5959	31.22	-14.78	46.00	10.02	21.00	0.20	NEUTRAL	Average
8	0.5959	41.08	-14.92	56.00	10.02	30.86	0.20	NEUTRAL	QP
9	0.8174	31.08	-14.92	46.00	10.03	20.86	0.19	NEUTRAL	Average
10	0.8174	38.27	-17.73	56.00	10.03	28.05	0.19	NEUTRAL	QP
11	18.3938	45.35	-4.65	50.00	10.37	34.52	0.46	NEUTRAL	Average
12	18.3938	48.03	-11.97	60.00	10.37	37.20	0.46	NEUTRAL	QP
13	19.6495	48.03	-1.97	50.00	10.39	37.16	0.48	NEUTRAL	Average
14	19.6495	49.56	-10.44	60.00	10.39	38.69	0.48	NEUTRAL	QP
15	20.6948	47.76	-2.24	50.00	10.40	36.87	0.49	NEUTRAL	Average
16	20.6948	49.82	-10.18	60.00	10.40	38.93	0.49	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

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 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

4.2.3. 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%.

4.2.4. Test Setup Layout

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

This test setup layout is the same as that shown in section 4.6.4.

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 26dB Bandwidth and 99% Occupied Bandwidth

For Non-Beamforming Mode:

Temperature	20℃	Humidity	59%
Test Engineer	Serway Li		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	28.35	17.37
	5200 MHz	20.70	17.11
	5240 MHz	35.39	19.97
	5745 MHz	21.83	17.10
	5785 MHz	41.83	28.65
	5825 MHz	29.57	17.37
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.17	17.63
	5200 MHz	20.17	17.63
	5240 MHz	27.57	18.06
	5745 MHz	20.35	17.71
	5785 MHz	20.26	17.63
	5825 MHz	20.26	17.71
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.15	36.47
	5230 MHz	40.15	36.47
	5755 MHz	40.29	37.05
	5795 MHz	50.00	37.19
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.61	76.41
	5775 MHz	81.74	76.70

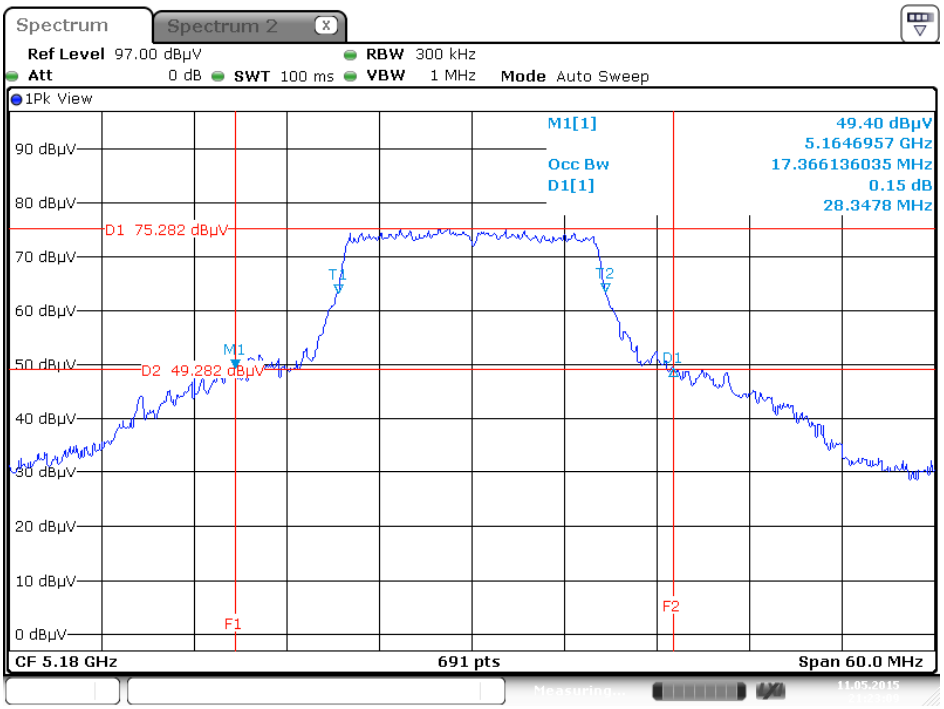
For Beamforming Mode:

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.35	17.80
	5200 MHz	20.35	17.80
	5240 MHz	20.43	17.89
	5745 MHz	20.43	17.80
	5785 MHz	20.26	17.80
	5825 MHz	20.61	17.80
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.44	36.61
	5230 MHz	40.58	36.61
	5755 MHz	40.58	36.76
	5795 MHz	40.58	36.76
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.32	75.83
	5775 MHz	82.03	75.83

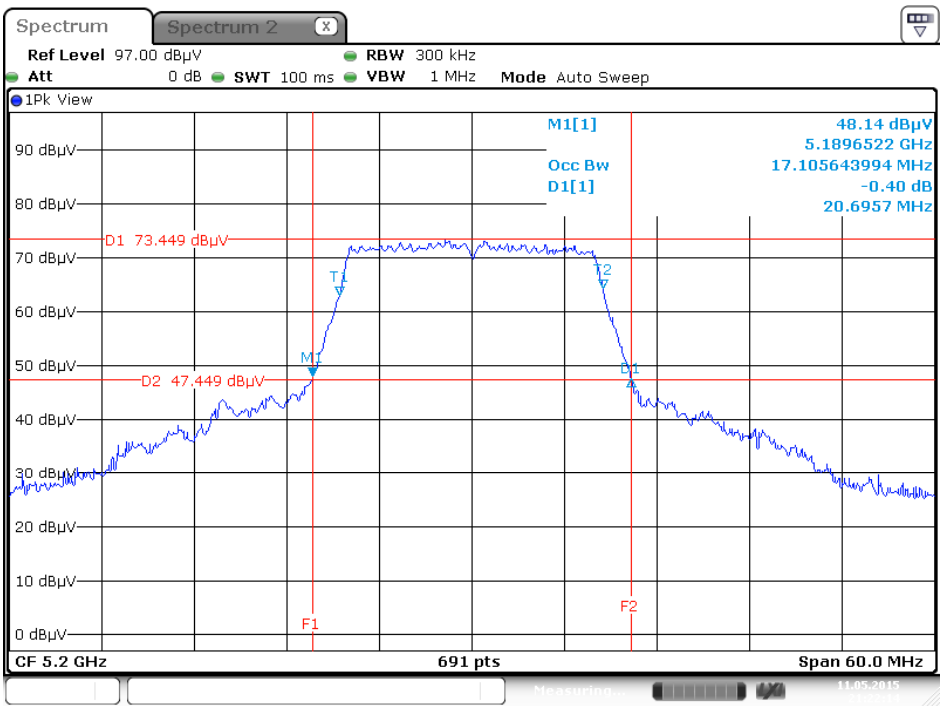
For Non-Beamforming Mode:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5180 MHz



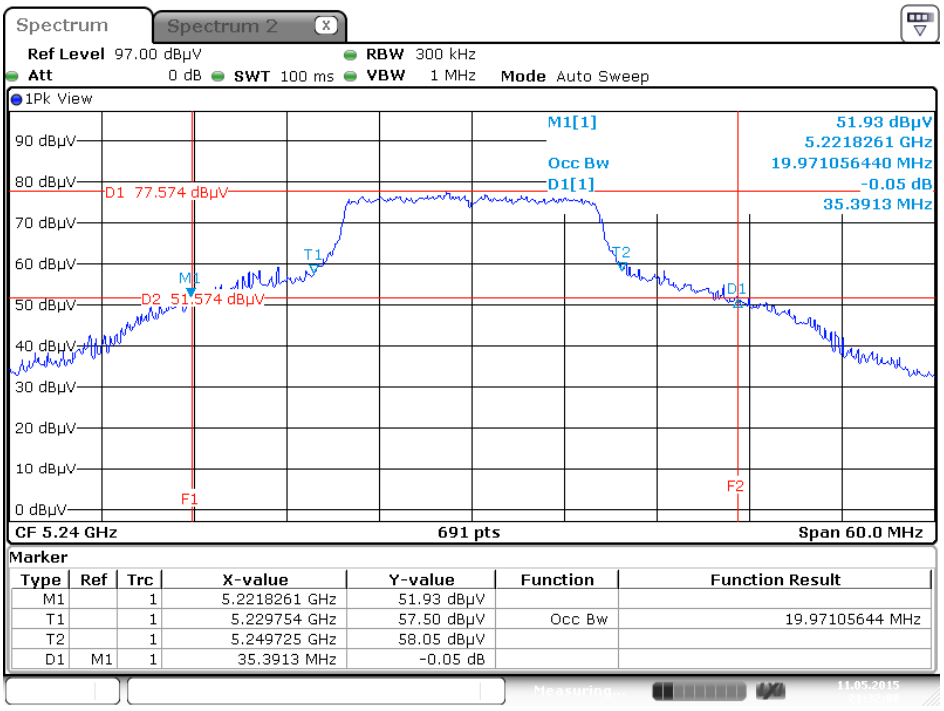
Date: 11.MAY.2015 21:23:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5200 MHz



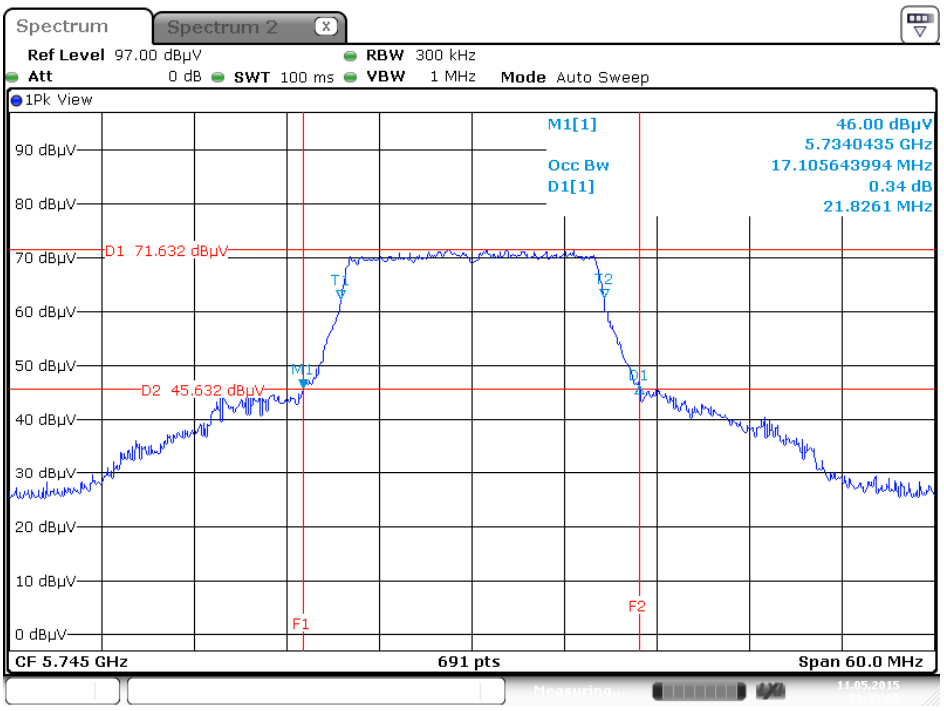
Date: 11.MAY.2015 21:22:15

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5240 MHz



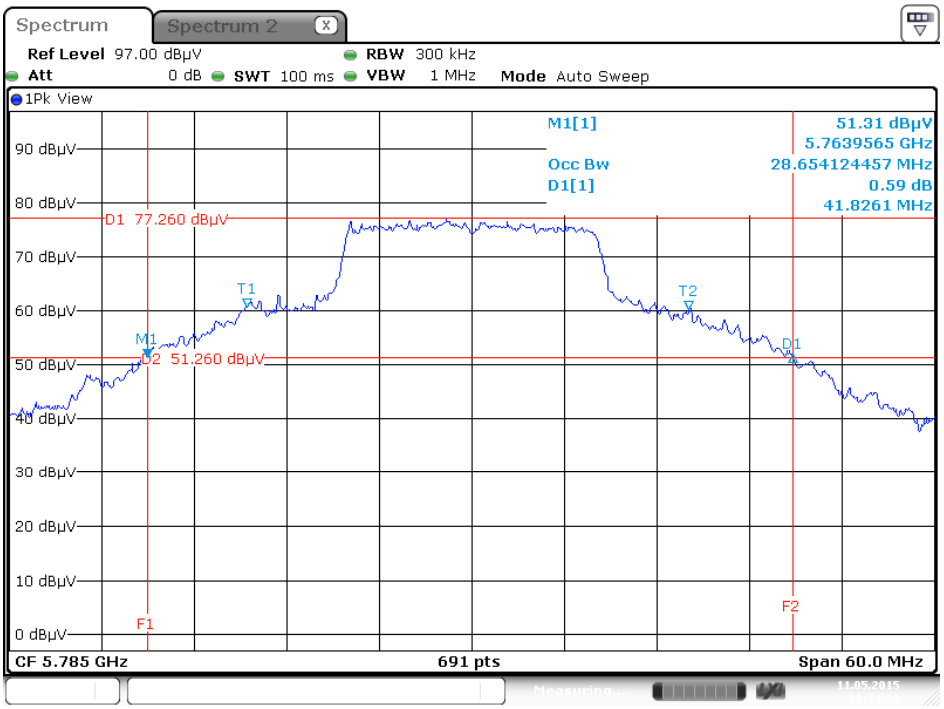
Date: 11.MAY.2015 21:32:08

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



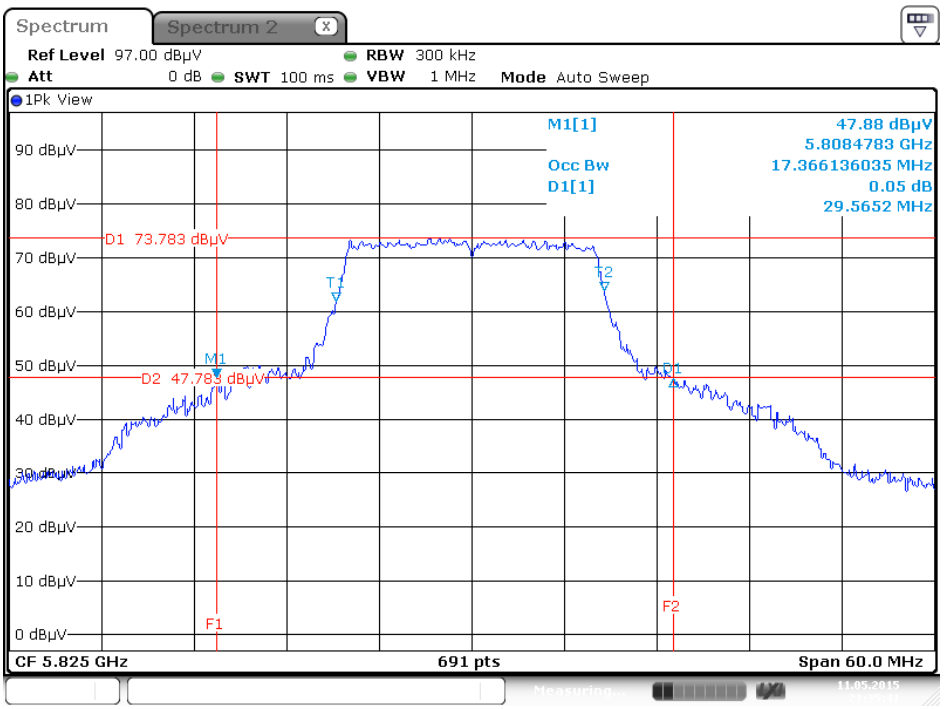
Date: 11.MAY.2015 21:33:06

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



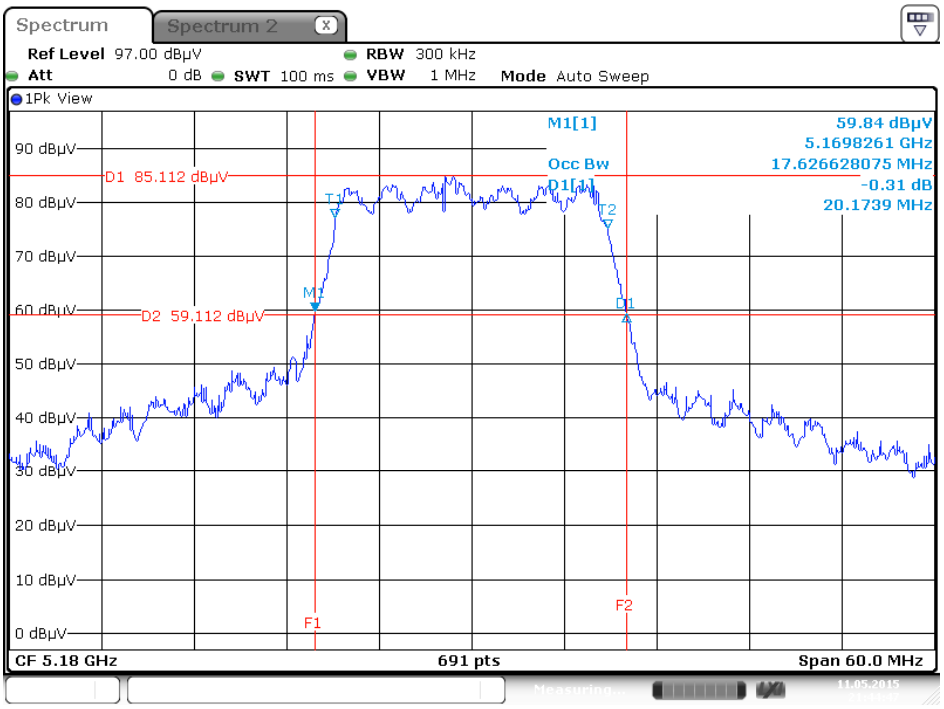
Date: 11.MAY.2015 21:34:30

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



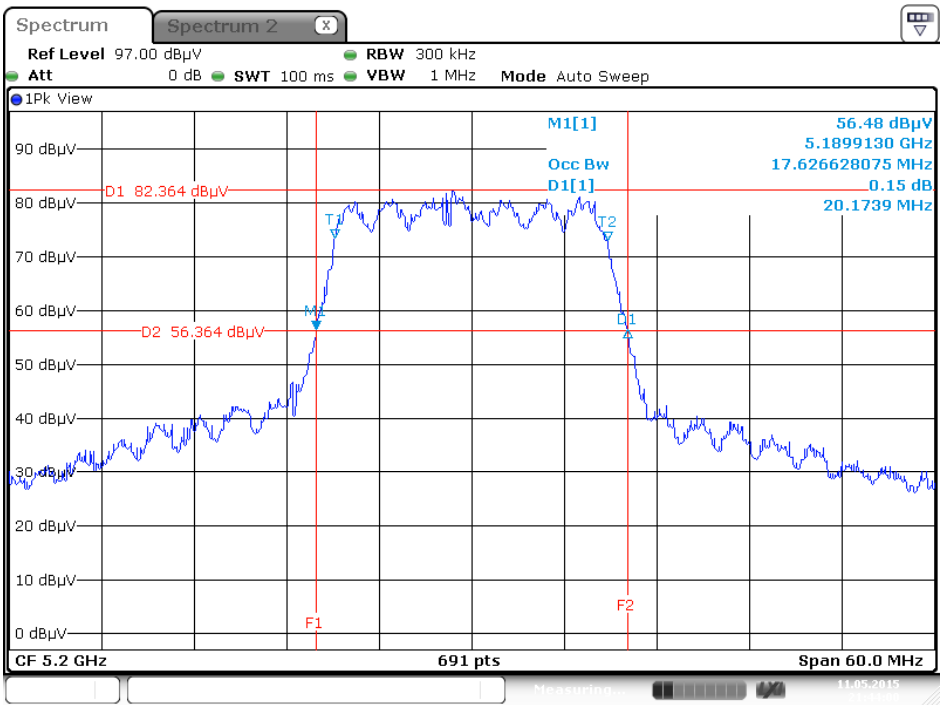
Date: 11.MAY.2015 21:35:41

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5180 MHz



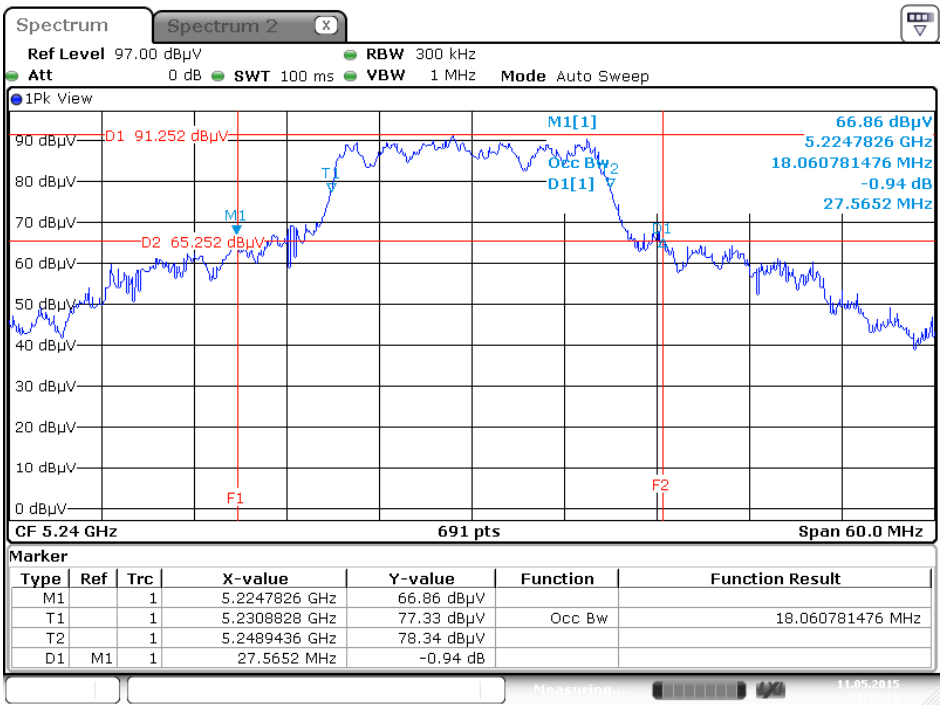
Date: 11.MAY.2015 21:44:47

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5200 MHz



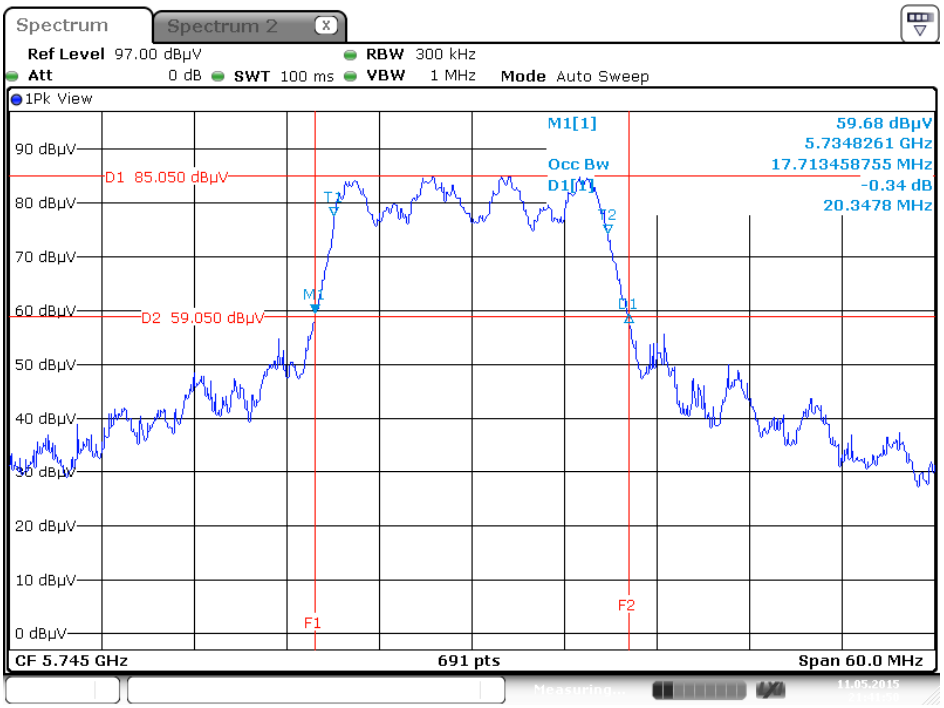
Date: 11.MAY.2015 21:44:01

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5240 MHz



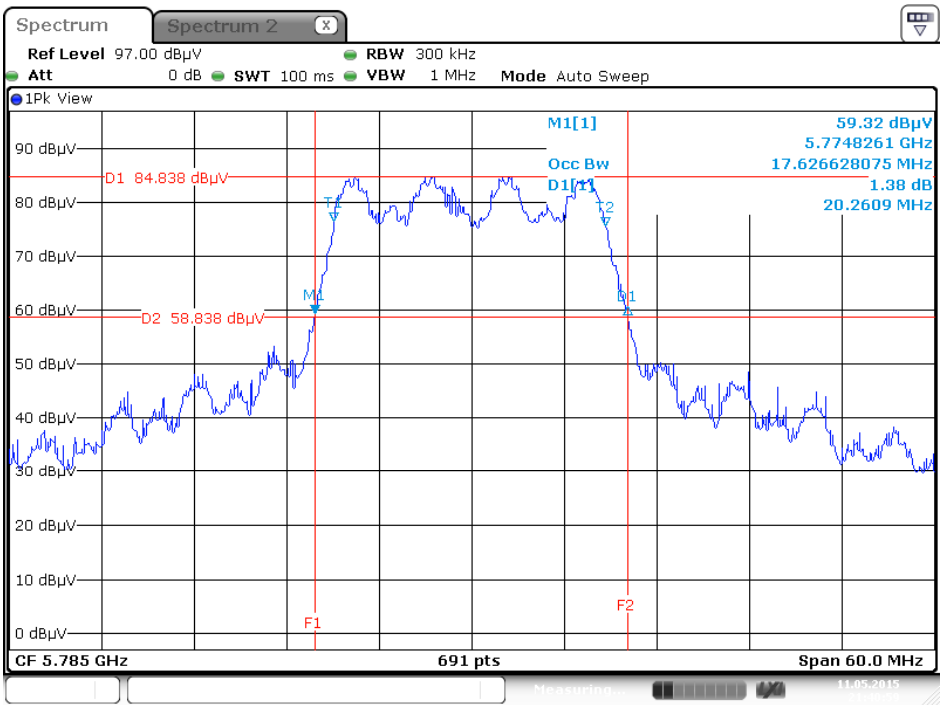
Date: 11.MAY.2015 21:43:16

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



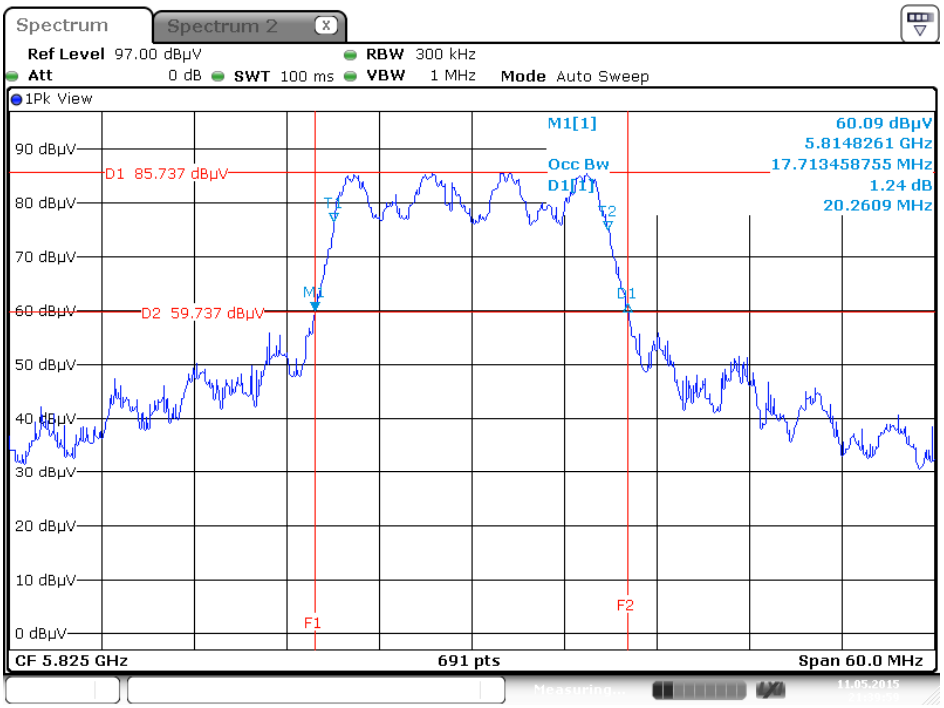
Date: 11.MAY.2015 21:41:49

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



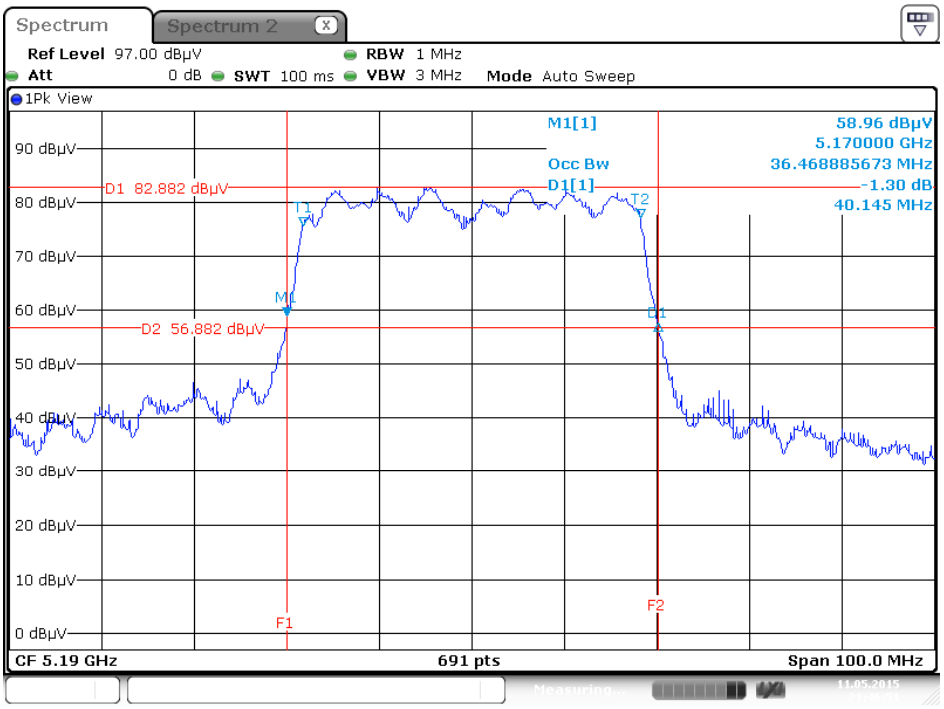
Date: 11.MAY.2015 21:40:59

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



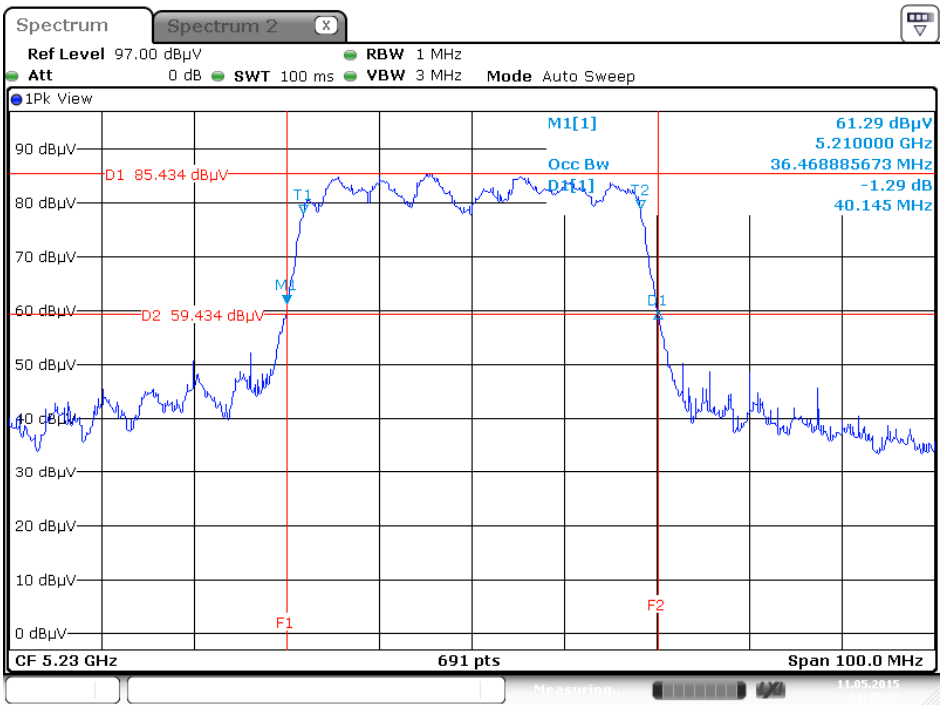
Date: 11.MAY.2015 21:39:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5190 MHz



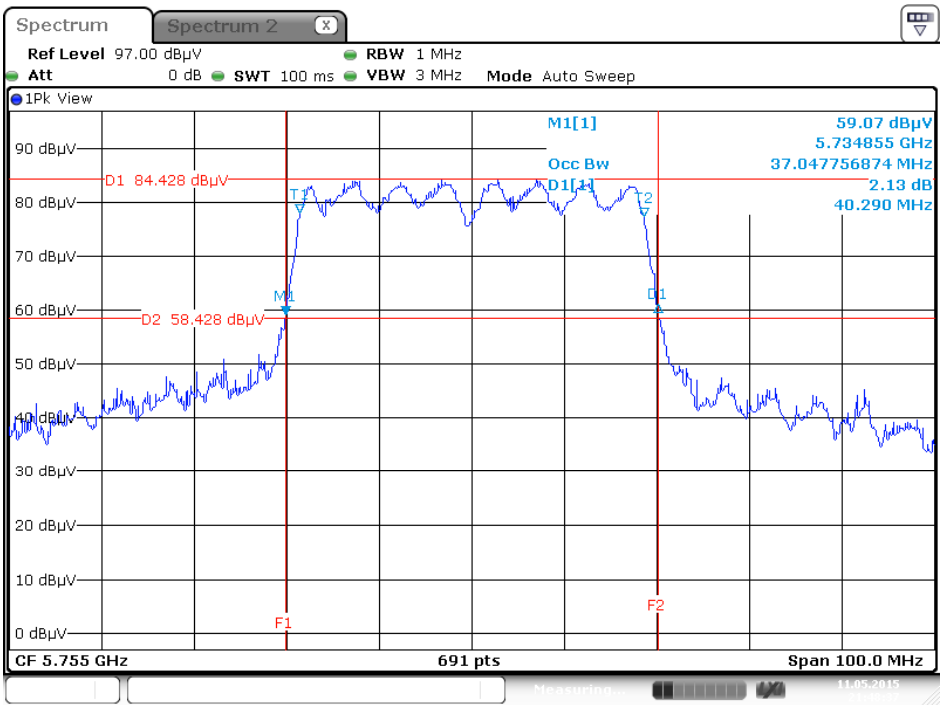
Date: 11.MAY.2015 21:46:51

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5230 MHz



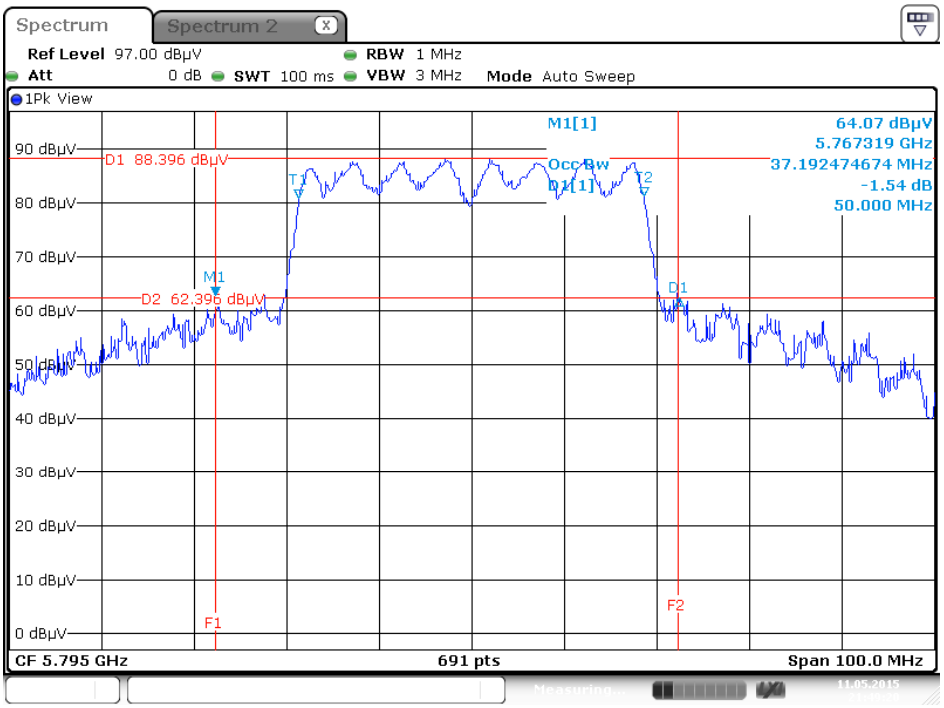
Date: 11.MAY.2015 21:47:47

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



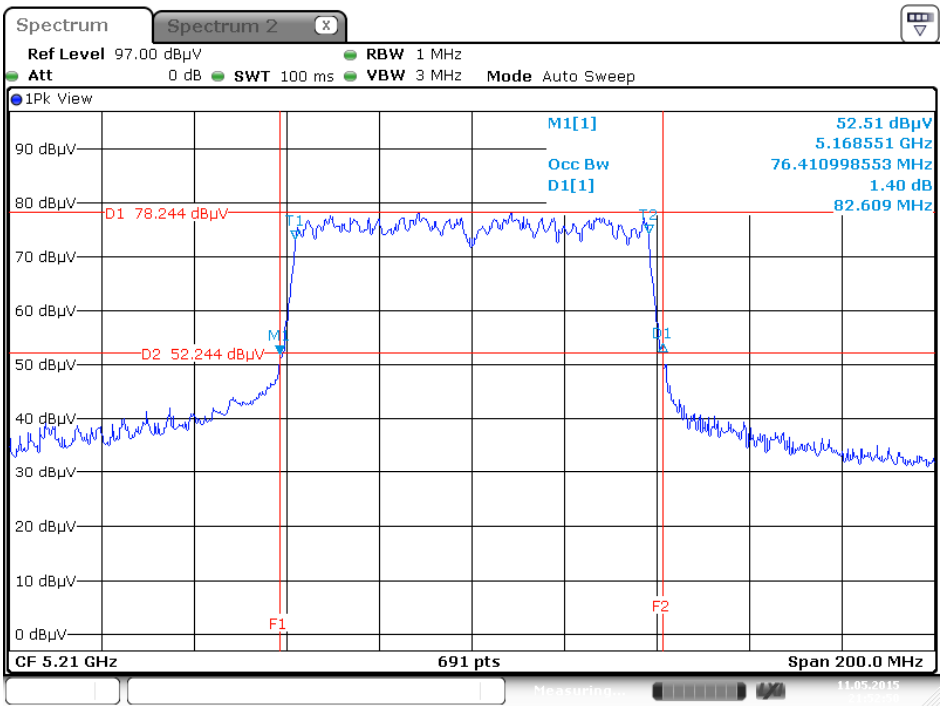
Date: 11.MAY.2015 21:48:37

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



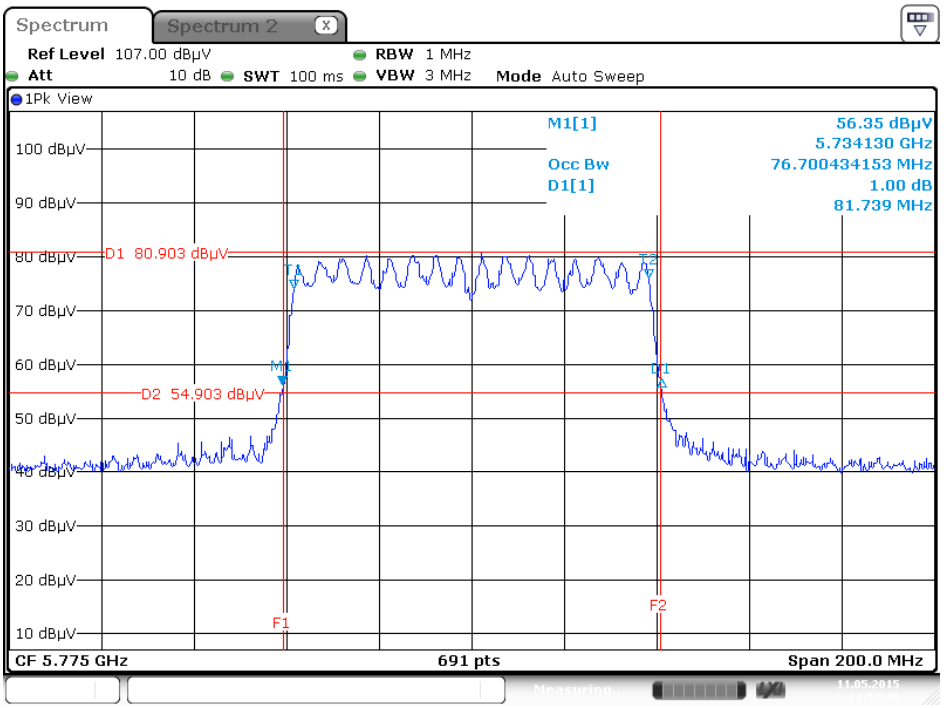
Date: 11.MAY.2015 21:49:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5210 MHz



Date: 11.MAY.2015 21:52:50

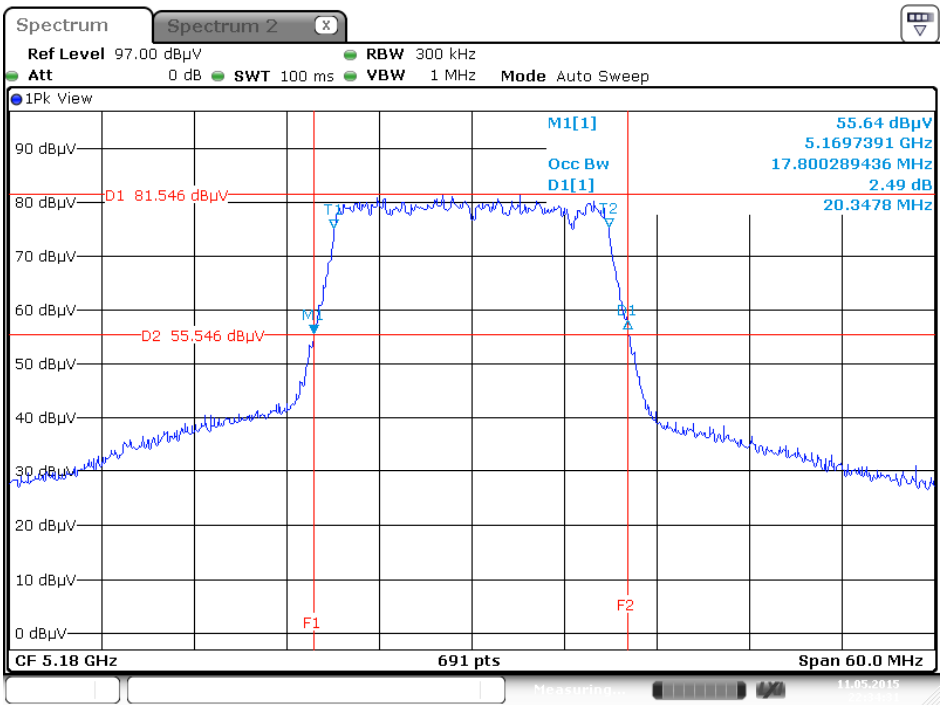
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5775 MHz



Date: 11.MAY.2015 21:53:48

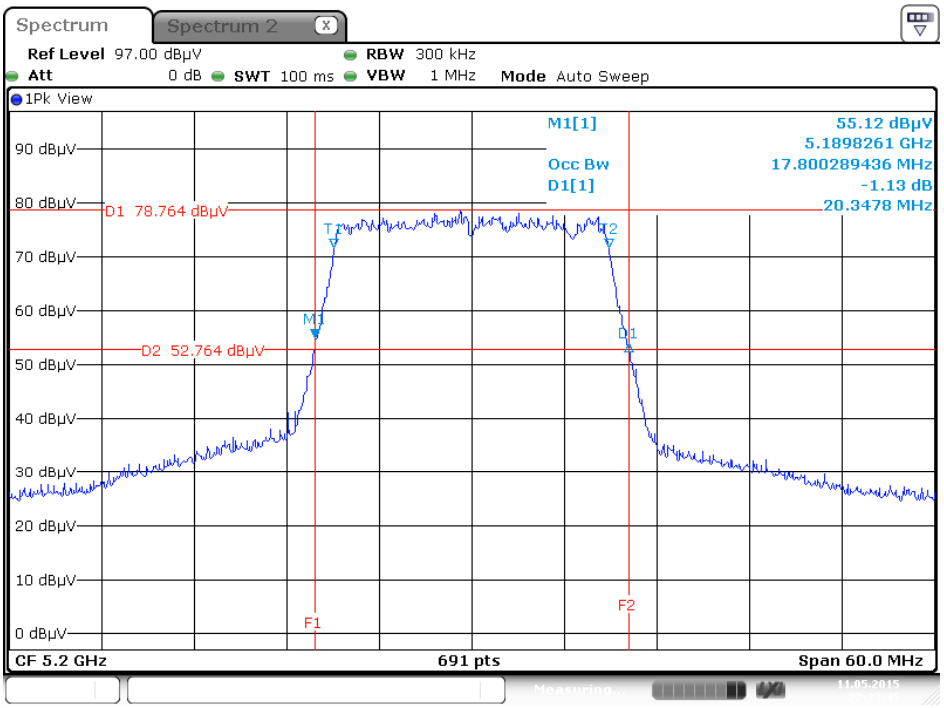
For Beamforming Mode:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5180 MHz



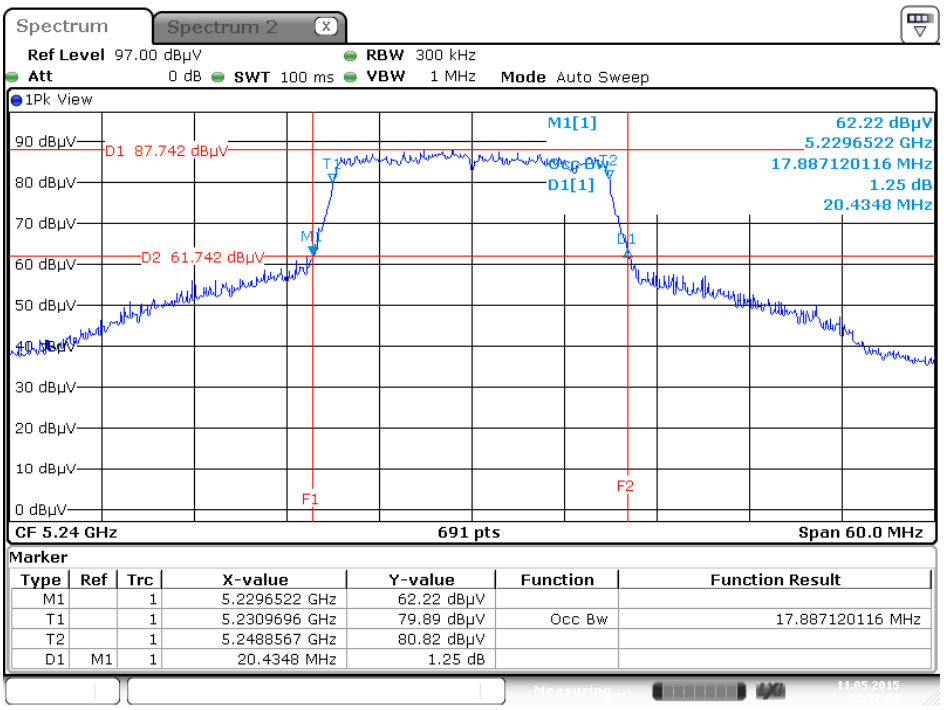
Date: 11.MAY.2015 22:34:31

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5200 MHz



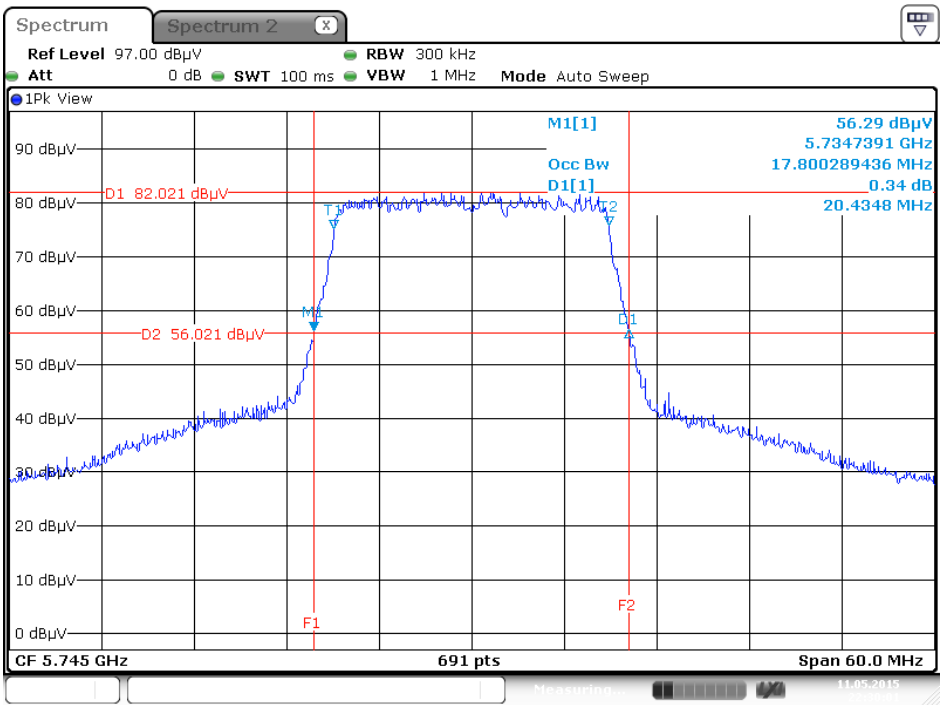
Date: 11.MAY.2015 22:33:45

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5240 MHz



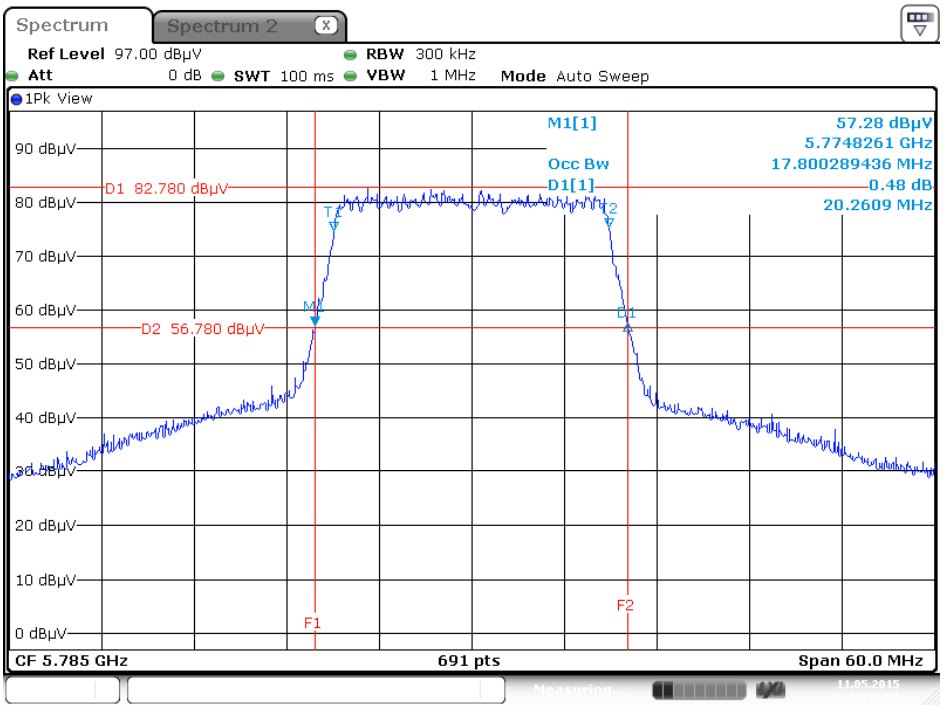
Date: 11.MAY.2015 22:32:28

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



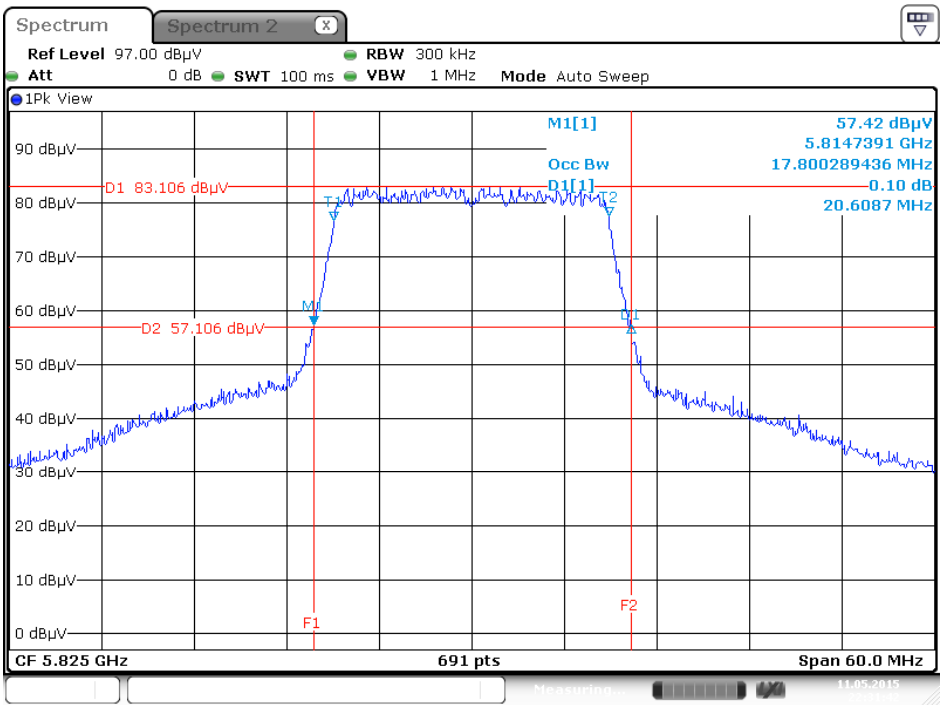
Date: 11.MAY.2015 22:30:01

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



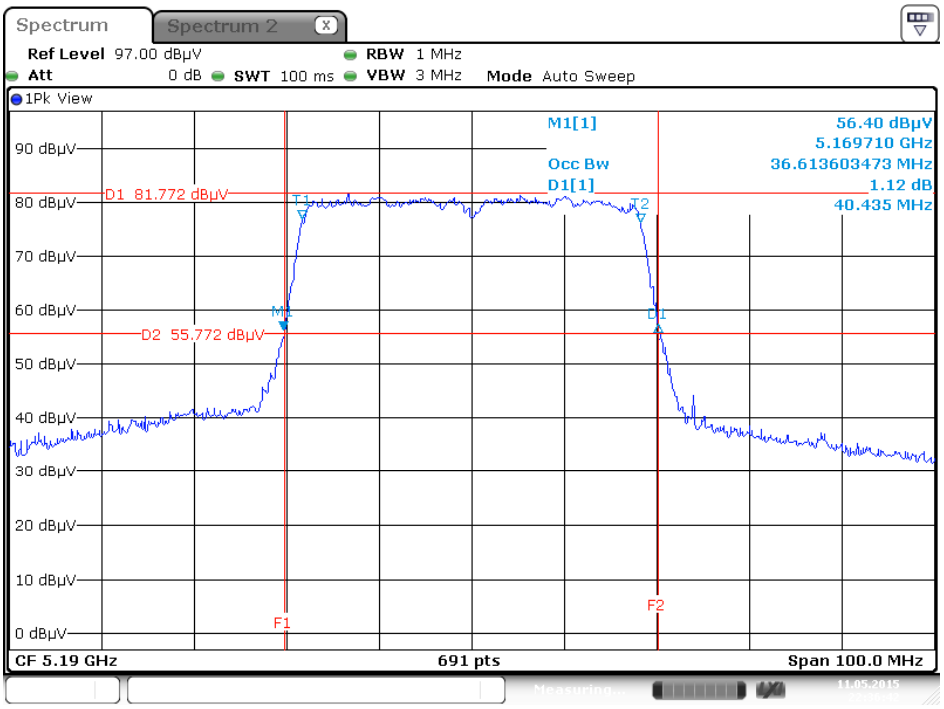
Date: 11.MAY.2015 22:30:54

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



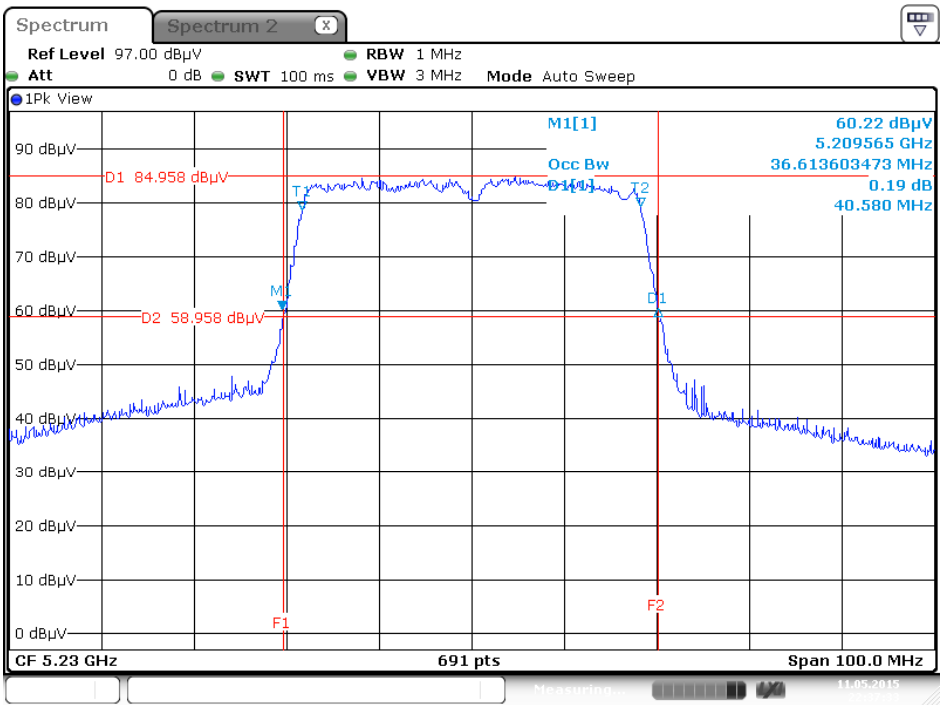
Date: 11.MAY.2015 22:31:42

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5190 MHz



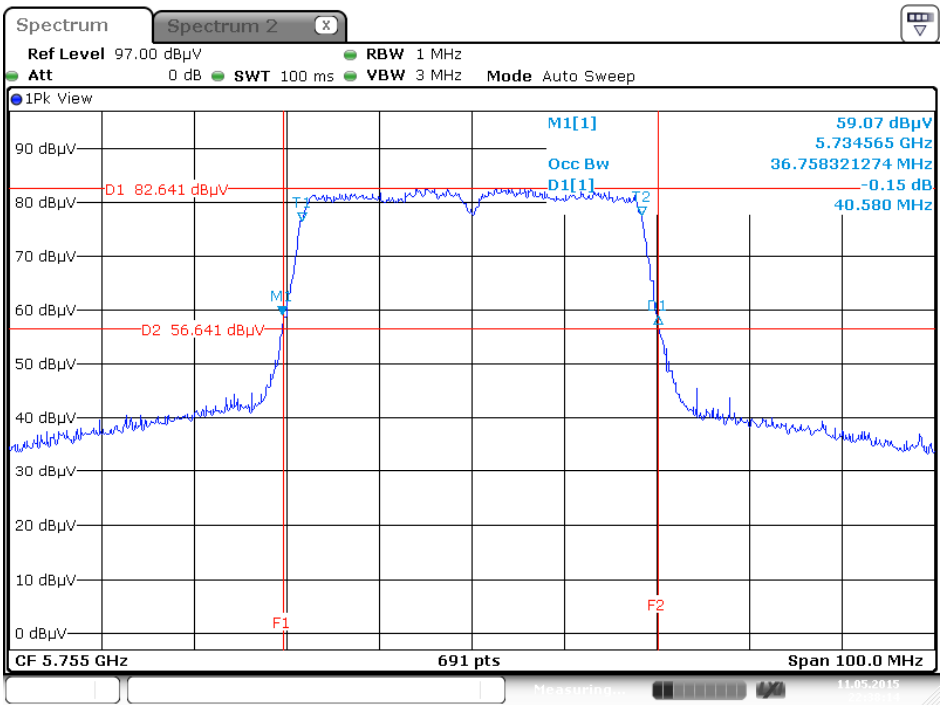
Date: 11.MAY.2015 22:36:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5230 MHz



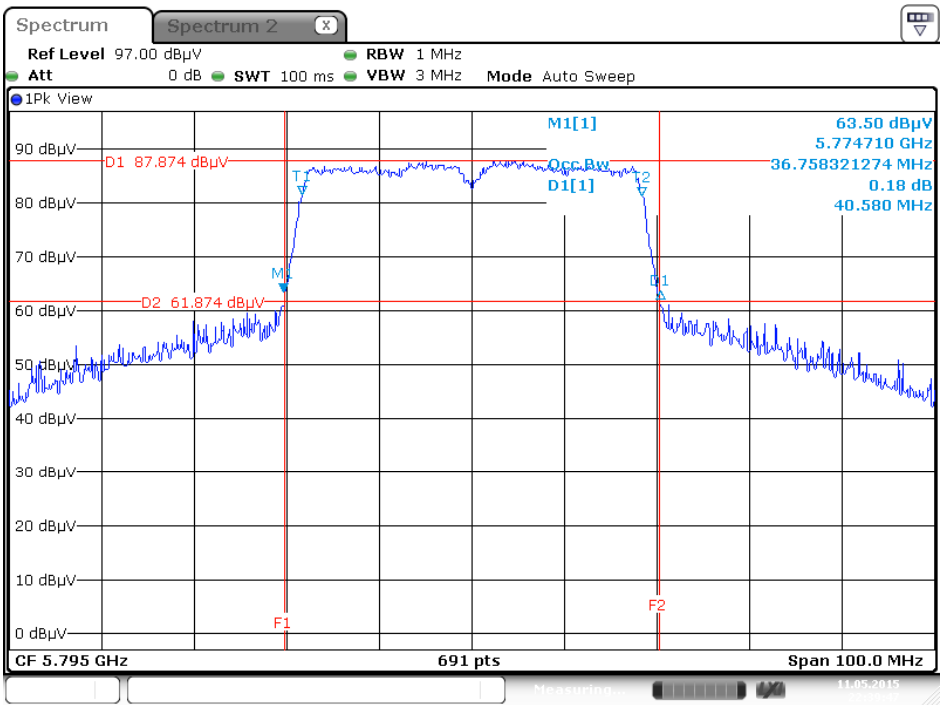
Date: 11.MAY.2015 22:37:33

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



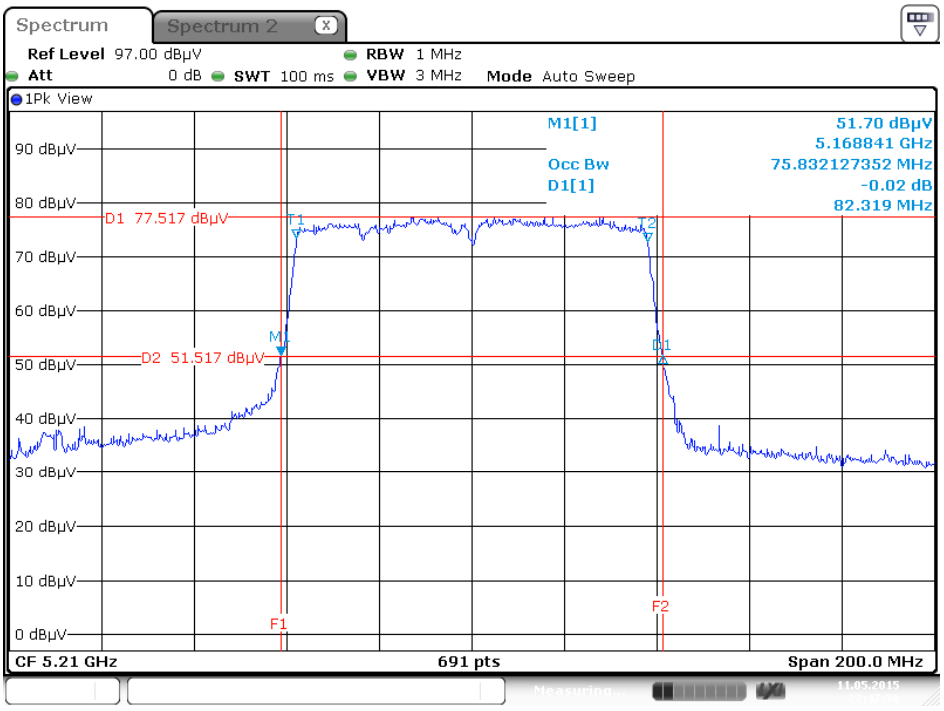
Date: 11.MAY.2015 22:38:15

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



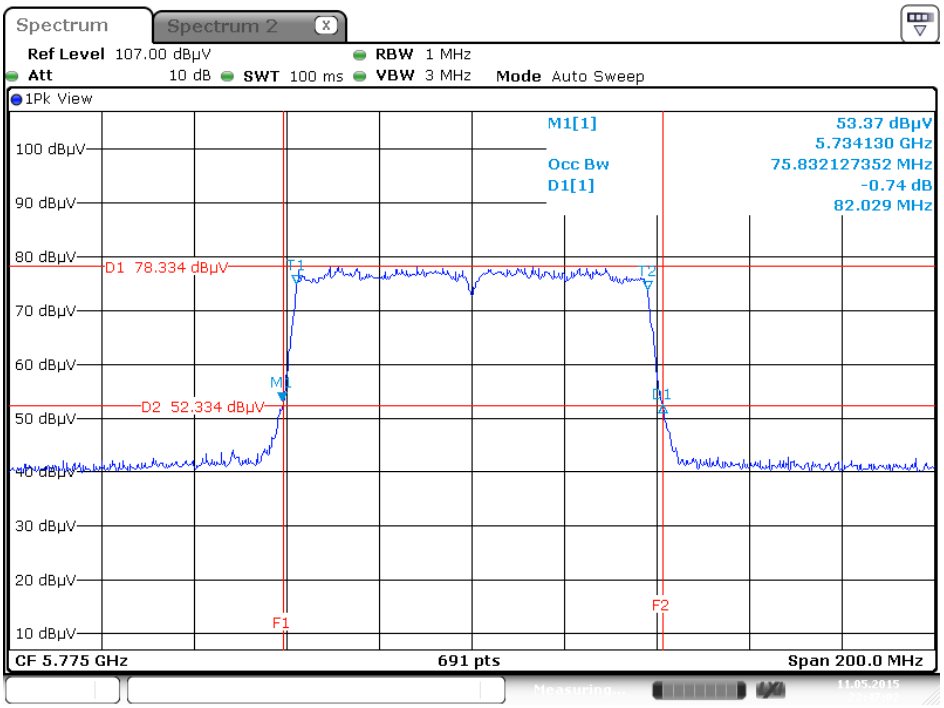
Date: 11.MAY.2015 22:39:47

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5210 MHz



Date: 11.MAY.2015 22:47:56

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



Date: 11.MAY.2015 22:47:02

4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

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 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

4.3.3. 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.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.6.4.

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 6dB Spectrum Bandwidth

For Non-Beamforming Mode:

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.35	500	Complies
	5785 MHz	16.35	500	Complies
	5825 MHz	16.41	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.99	500	Complies
	5785 MHz	16.99	500	Complies
	5825 MHz	17.33	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.41	500	Complies
	5795 MHz	36.41	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	76.23	500	Complies

For Beamforming Mode:

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li		

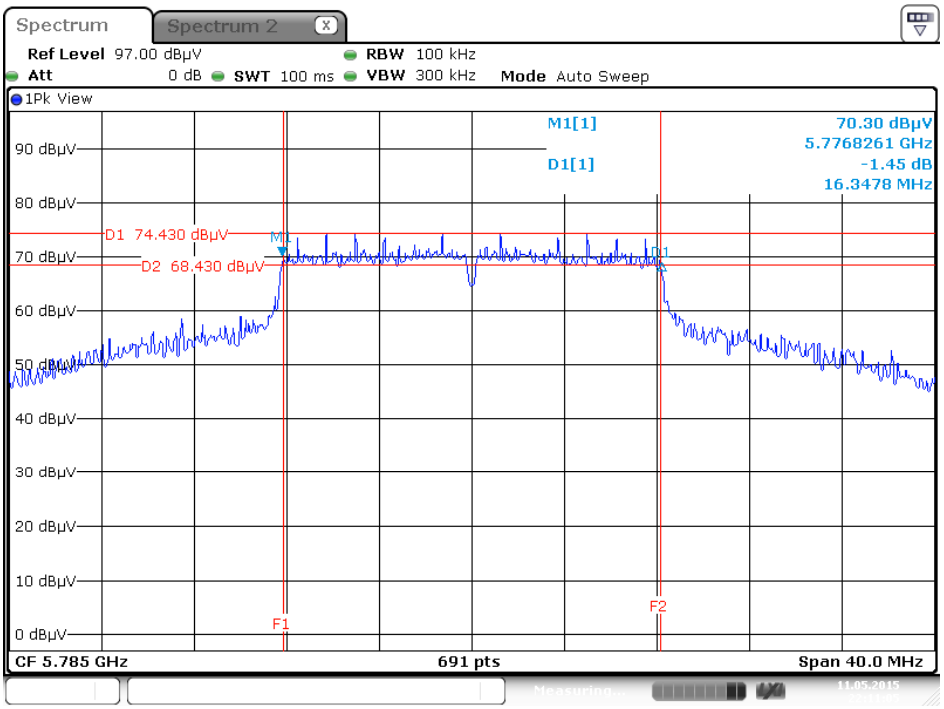
Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.68	500	Complies
	5785 MHz	17.62	500	Complies
	5825 MHz	17.57	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.41	500	Complies
	5795 MHz	36.29	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	76.52	500	Complies

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

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

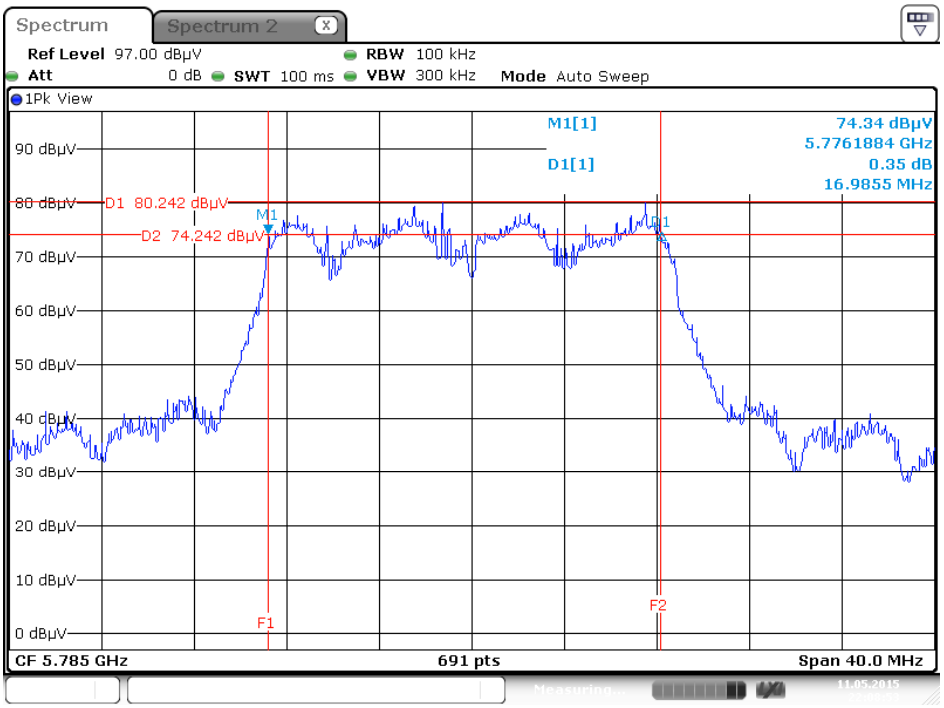
For Non-Beamforming Mode:

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 / 5785 MHz



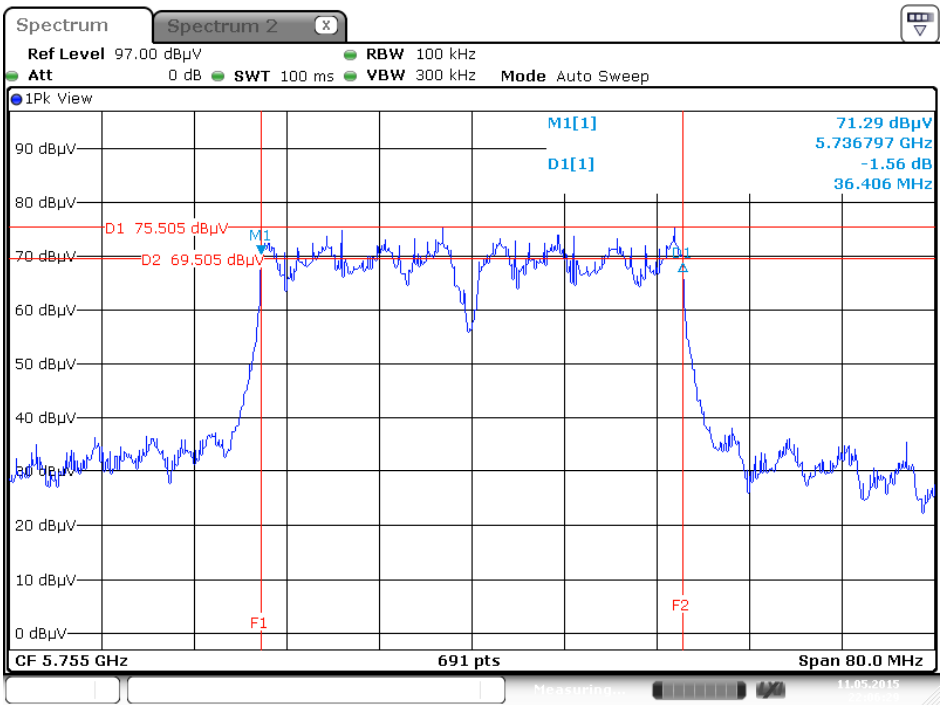
Date: 11.MAY.2015 22:11:05

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



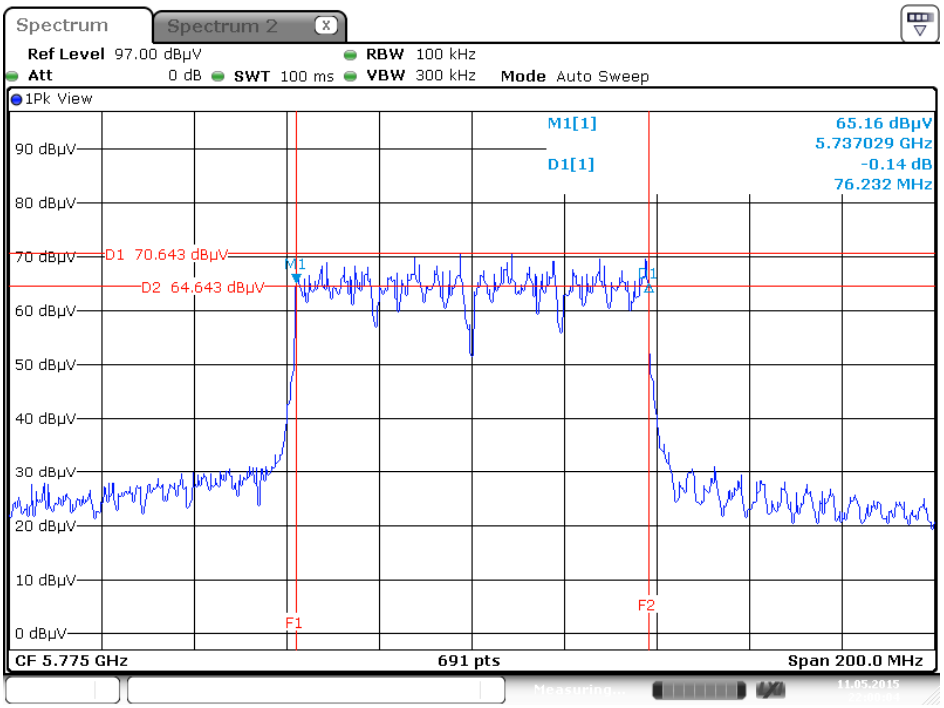
Date: 11.MAY.2015 22:08:53

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



Date: 11.MAY.2015 22:06:29

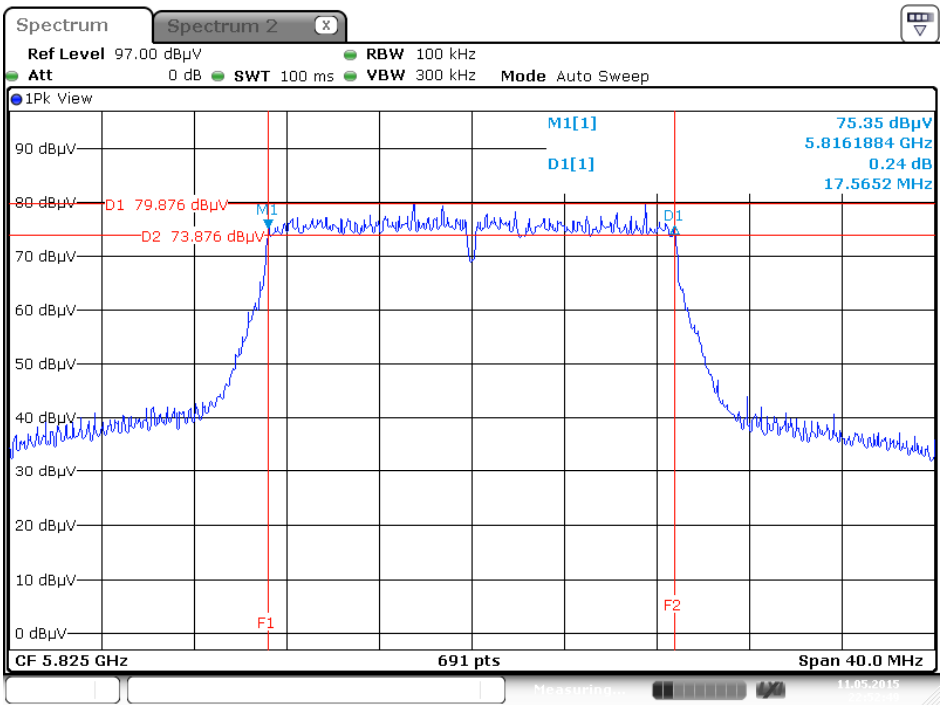
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5775 MHz



Date: 11.MAY.2015 22:00:04

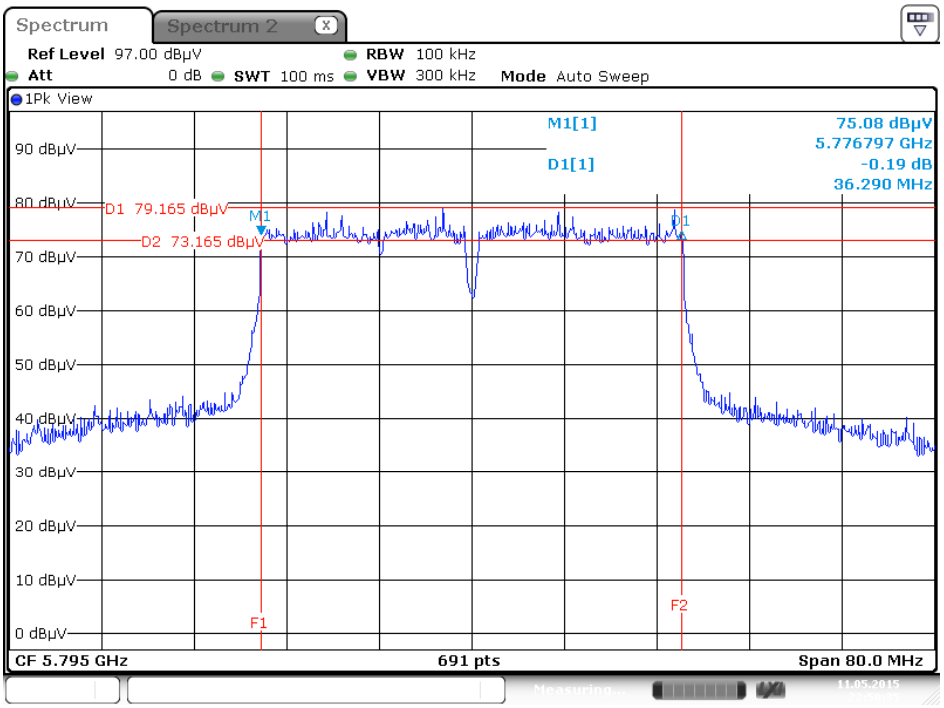
For Beamforming Mode:

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



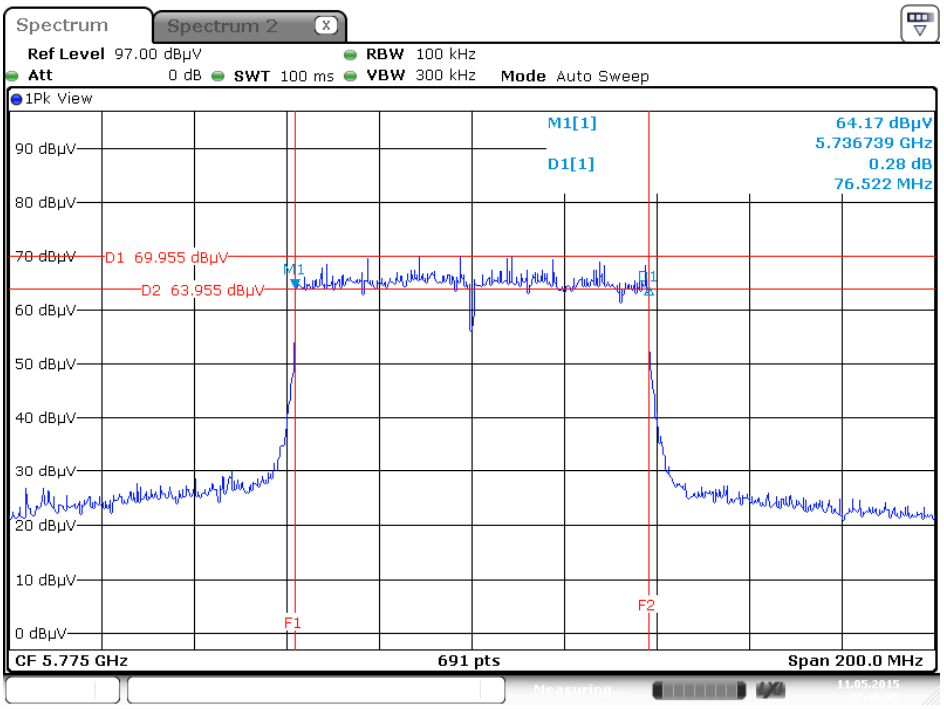
Date: 11.MAY.2015 22:52:49

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5795MHz



Date: 11.MAY.2015 22:50:34

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



Date: 11.MAY.2015 22:46:05

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

Frequency Band			Limit
☒	5.15~5.25 GHz		
	Operating Mode		
	☐	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).
	☒	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.
	☐	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.
	☐	Mobile and portable 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.

4.4.2. Measuring Instruments and Setting

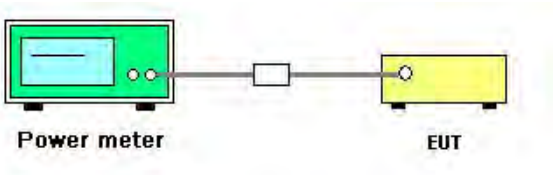
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. 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.

4.4.4. 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 Maximum Conducted Output Power

For Non-Beamforming Mode:

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li	Test Date	May 11, 2015

Mode	Frequency	Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
802.11a	5180 MHz	21.72	30.00	Complies
	5200 MHz	19.06	30.00	Complies
	5240 MHz	25.11	30.00	Complies
	5745 MHz	18.67	30.00	Complies
	5785 MHz	23.55	30.00	Complies
	5825 MHz	20.09	30.00	Complies

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	16.89	18.46	18.36	22.73	30.00	Complies
	5200 MHz	14.22	15.83	15.89	20.15	30.00	Complies
	5240 MHz	22.72	24.62	23.79	28.55	30.00	Complies
	5745 MHz	16.94	16.99	17.98	22.10	30.00	Complies
	5785 MHz	16.95	18.22	17.54	22.37	30.00	Complies
	5825 MHz	17.44	18.78	17.96	22.87	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	14.42	14.92	14.82	19.50	30.00	Complies
	5230 MHz	17.04	17.13	16.91	21.80	30.00	Complies
	5755 MHz	15.84	16.57	16.43	21.06	30.00	Complies
	5795 MHz	19.12	19.99	19.67	24.38	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	10.67	11.47	11.22	15.90	30.00	Complies
	5775 MHz	14.22	14.61	14.33	19.16	30.00	Complies

For Beamforming Mode:

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li	Test Date	May 11, 2015

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	15.54	15.94	15.87	20.56	28.39	Complies
	5200 MHz	12.88	13.07	12.85	17.71	28.39	Complies
	5240 MHz	21.06	22.03	21.55	26.34	28.39	Complies
	5745 MHz	16.02	16.45	15.92	20.91	28.39	Complies
	5785 MHz	16.39	16.54	15.79	21.02	28.39	Complies
	5825 MHz	17.58	17.86	16.67	22.17	28.39	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	14.34	14.38	14.25	19.09	28.39	Complies
	5230 MHz	17.04	17.13	16.91	21.80	28.39	Complies
	5755 MHz	13.92	14.23	14.07	18.85	28.39	Complies
	5795 MHz	18.72	19.35	18.88	23.76	28.39	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	11.04	11.42	11.00	15.93	28.39	Complies
	5775 MHz	13.22	13.77	13.57	18.30	28.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=30-(7.61-6)= 28.39 dBm.

4.5. Power Spectral Density Measurement

4.5.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.4.1.

Frequency Band			Limit
☒	5.15~5.25 GHz		
	Operating Mode		
	☐	Outdoor access point	17 dBm/MHz
	☒	Indoor access point	17 dBm/MHz
	☐	Fixed point-to-point access points	17 dBm/MHz
	☐	Mobile and portable client devices	11 dBm/MHz
☒	5.725~5.85 GHz		30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

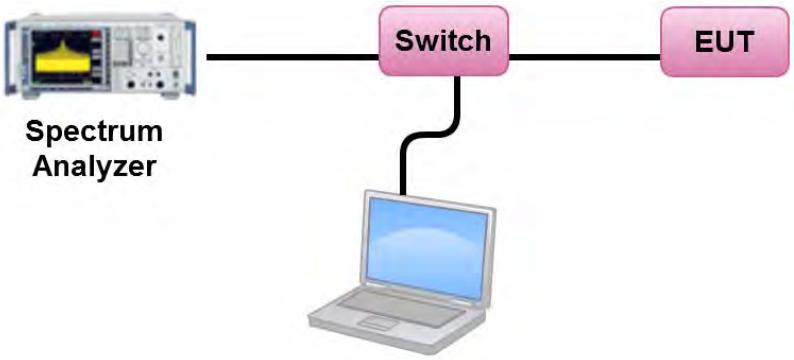
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	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.	

4.5.3. 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.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

For Non-Beamforming Mode:

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li		

Configuration IEEE 802.11a / Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	8.57	17.00	Complies
40	5200 MHz	5.87	17.00	Complies
48	5240 MHz	11.96	17.00	Complies

Note: Antenna gain=3dBi <6dBi, so the limit doesn't reduce.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	5.43	-3.01	2.42	30.00	Complies
157	5785 MHz	10.35	-3.01	7.34	30.00	Complies
165	5825 MHz	6.90	-3.01	3.89	30.00	Complies

Note: Antenna gain=3dBi <6dBi, so the limit doesn't reduce.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	9.55	15.39	Complies
40	5200 MHz	6.90	15.39	Complies
48	5240 MHz	15.36	15.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=17-(7.61-6)= 15.39 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	8.87	-3.01	5.86	28.39	Complies
157	5785 MHz	9.05	-3.01	6.04	28.39	Complies
165	5825 MHz	9.66	-3.01	6.65	28.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=30-(7.61-6)= 28.39 dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	3.40	15.39	Complies
46	5230 MHz	5.54	15.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=17-(7.61-6)= 15.39 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	4.97	-3.01	1.96	28.39	Complies
159	5795 MHz	8.16	-3.01	5.15	28.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.61dBi, so limit=30-(7.61-6)= 28.39 dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.16	15.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=17-(7.61-6)= 15.39 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	0.02	-3.01	-2.99	28.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.61dBi, so limit=30-(7.61-6)= 28.39 dBm/500kHz.

For Beamforming Mode:

Temperature	20°C	Humidity	70%
Test Engineer	Serway Li		

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	7.04	15.39	Complies
40	5200 MHz	4.21	15.39	Complies
48	5240 MHz	12.96	15.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=17-(7.61-6)= 15.39 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.76	-3.01	4.75	28.39	Complies
157	5785 MHz	7.86	-3.01	4.85	28.39	Complies
165	5825 MHz	8.97	-3.01	5.96	28.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.61dBi, so limit=30-(7.61-6)= 28.39 dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	2.82	15.39	Complies
46	5230 MHz	5.56	15.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=17-(7.61-6)= 15.39 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	2.62	-3.01	-0.39	28.39	Complies
159	5795 MHz	7.62	-3.01	4.61	28.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.61dBi, so limit=30-(7.61-6)= 28.39 dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.19	15.39	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.61dBi, so limit=17-(7.61-6)= 15.39 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-0.81	-3.01	-3.82	28.39	Complies

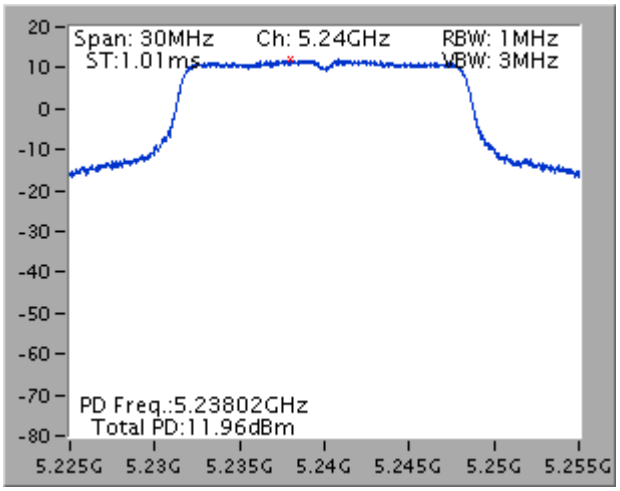
Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.61dBi, so limit=30-(7.61-6)= 28.39 dBm/500kHz.

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

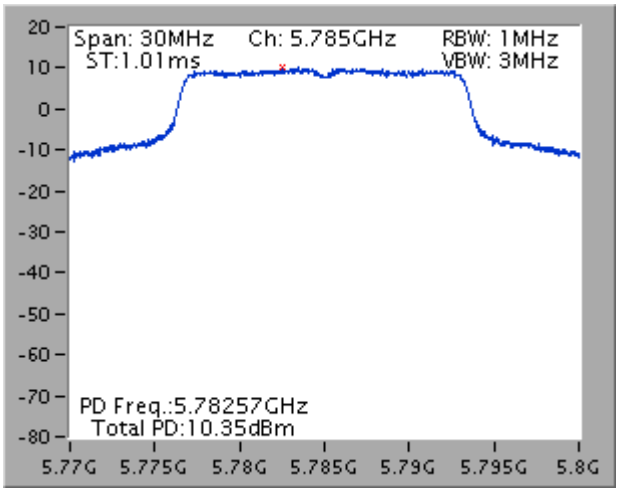
For plots, only the channel with worse result was shown.

For Non-Beamforming Mode:

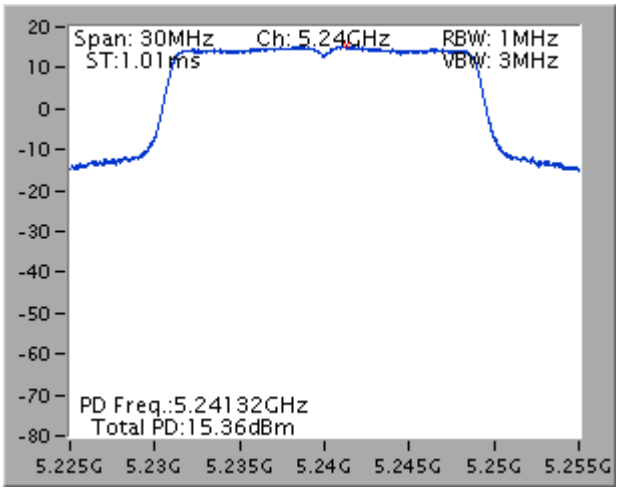
Power Density Plot on Configuration IEEE 802.11a / Chain 4 / 5240 MHz



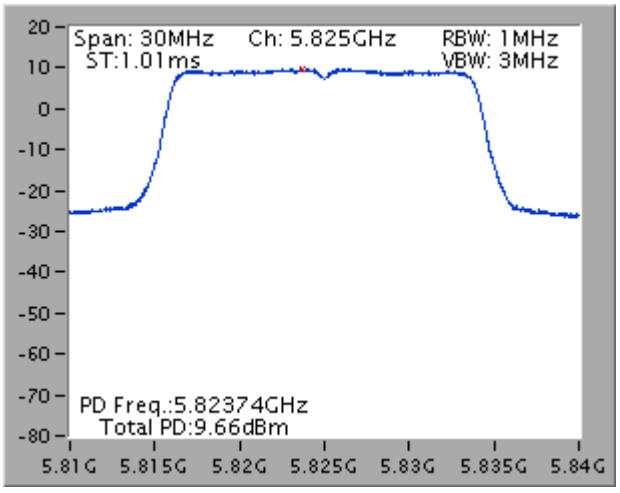
Power Density Plot on Configuration IEEE 802.11a / Chain 4 / 5785 MHz



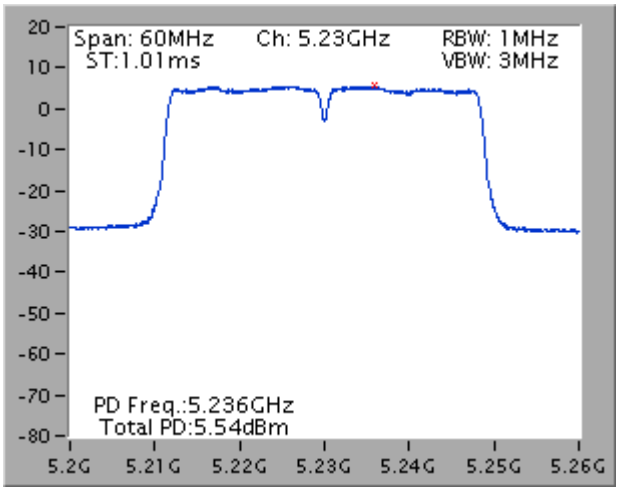
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5240 MHz



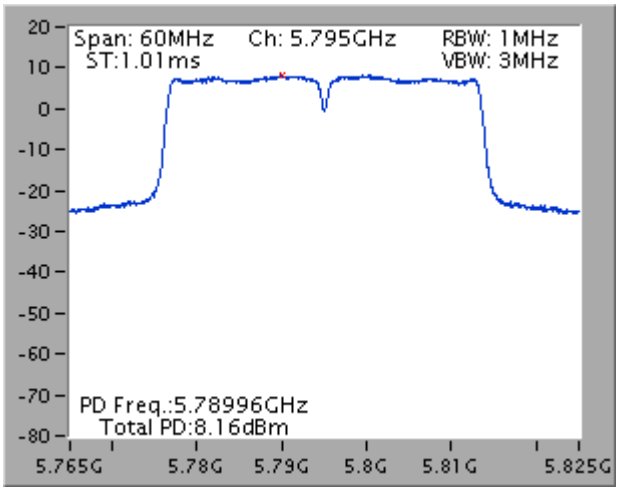
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5825 MHz



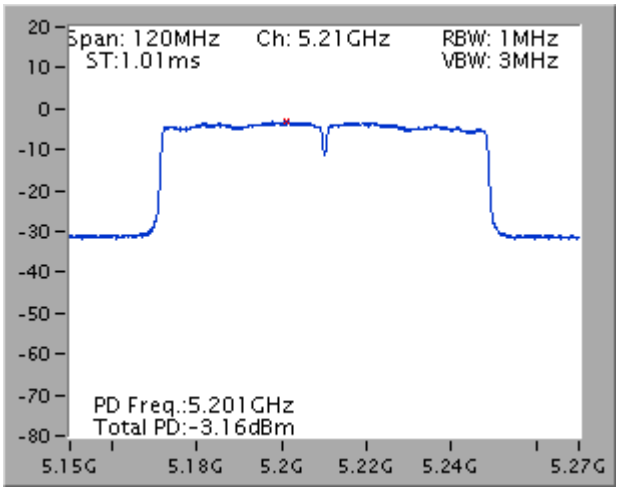
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5230 MHz



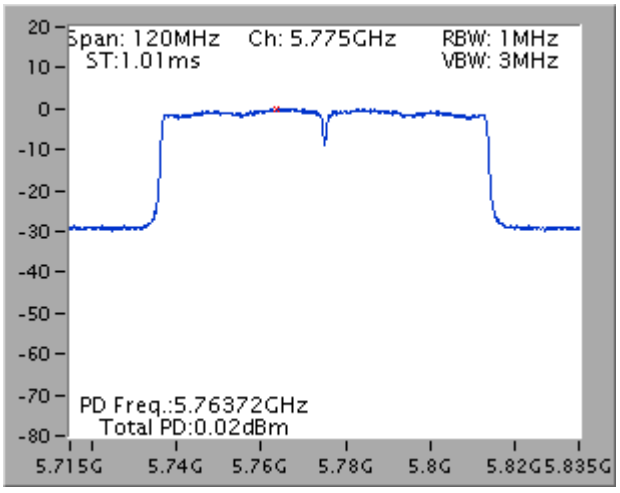
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5210 MHz

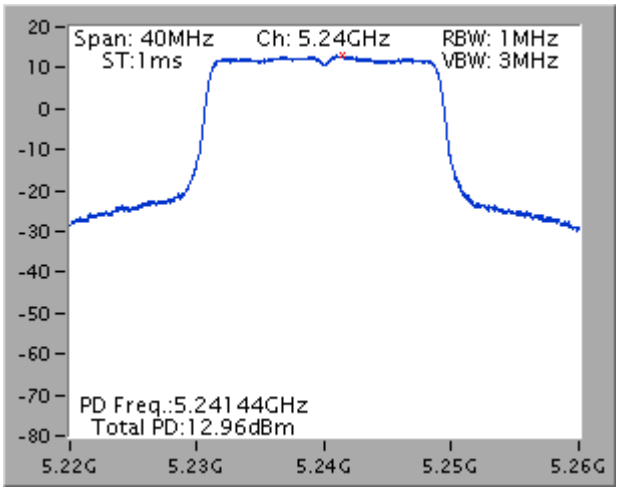


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5775 MHz

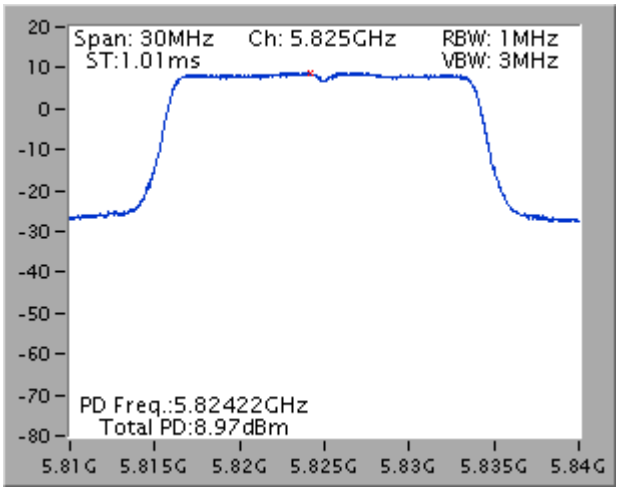


For Beamforming Mode:

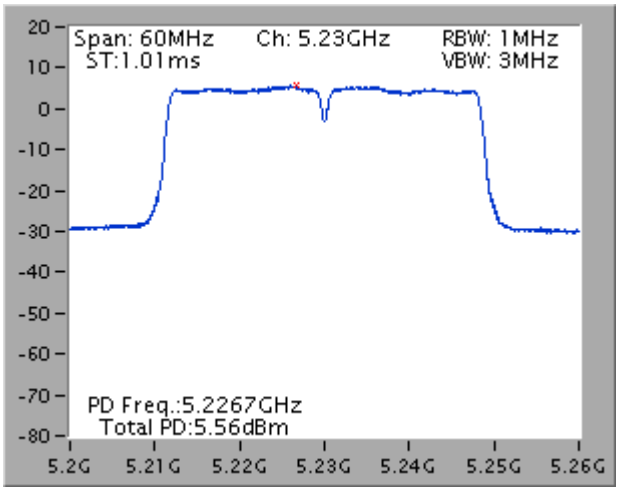
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5240 MHz



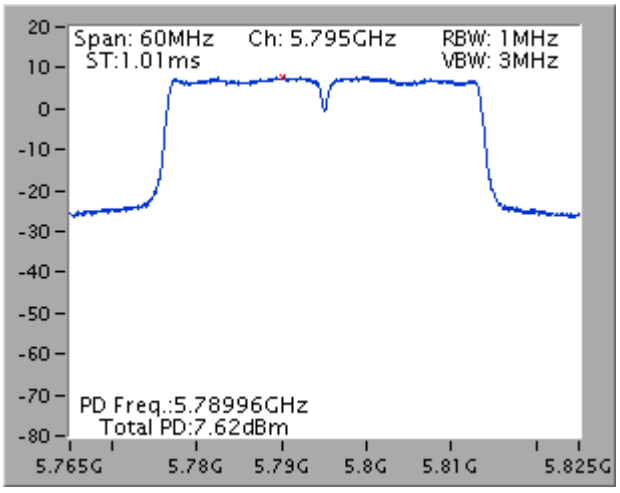
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 4 + Chain 5 + Chain 6 / 5825 MHz



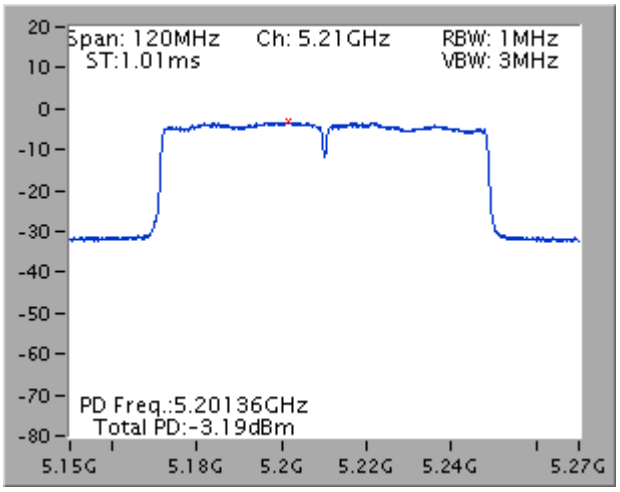
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5230 MHz



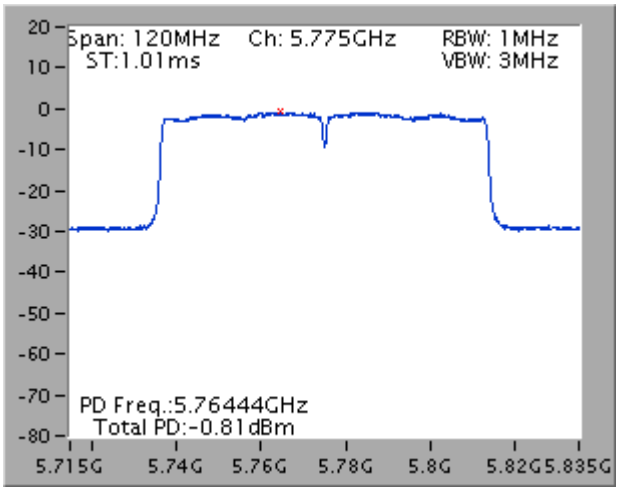
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 4 + Chain 5 + Chain 6 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5210 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 4 + Chain 5 + Chain 6 / 5775 MHz



4.6. Radiated Emissions Measurement

4.6.1. 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.

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 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

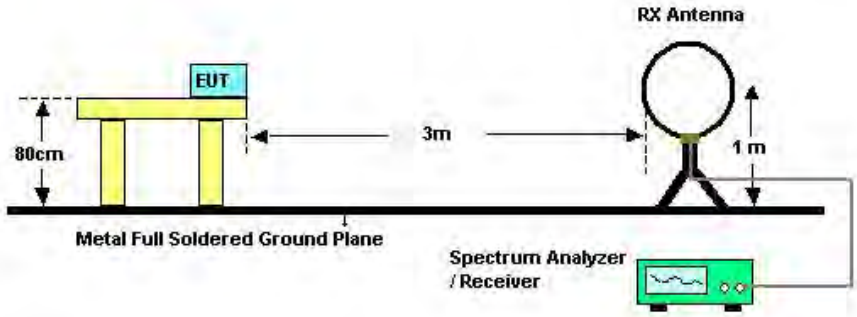
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

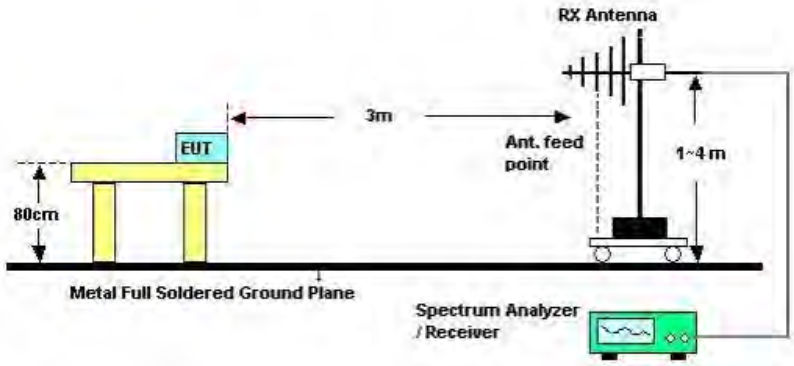
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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.

4.6.4. Test Setup Layout

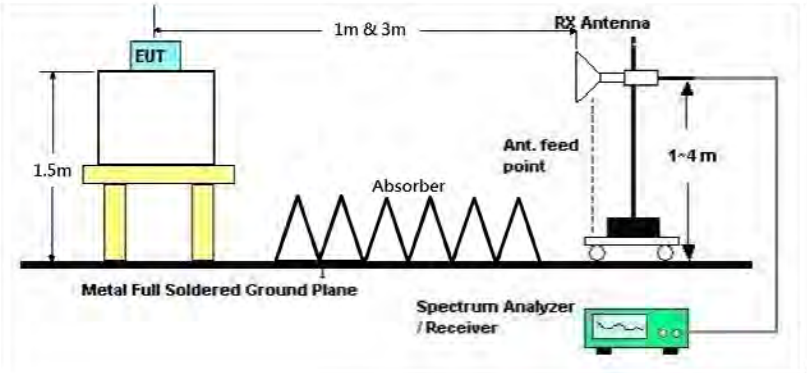
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



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. Results of Radiated Emissions (9kHz~30MHz)

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	Normal Link
Test Date	Apr. 30, 2015		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

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

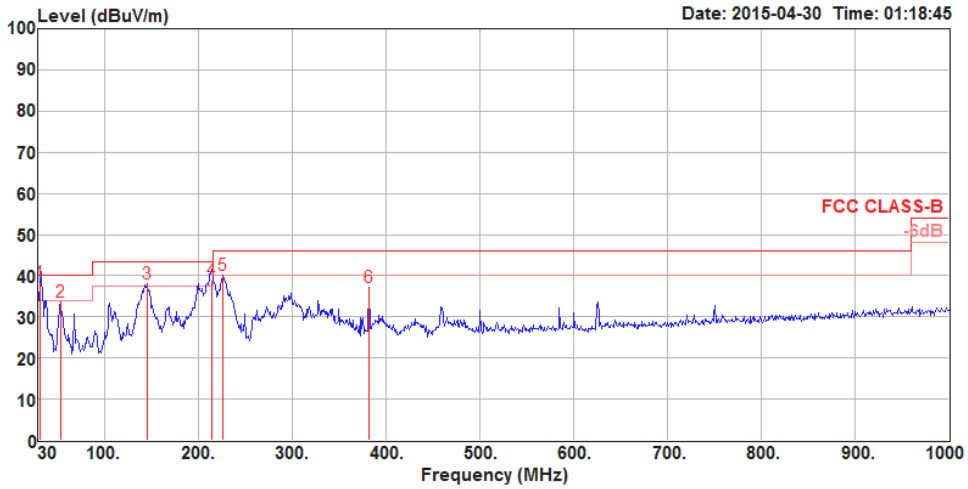
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.6.8. Results of Radiated Emissions (30MHz~1GHz)

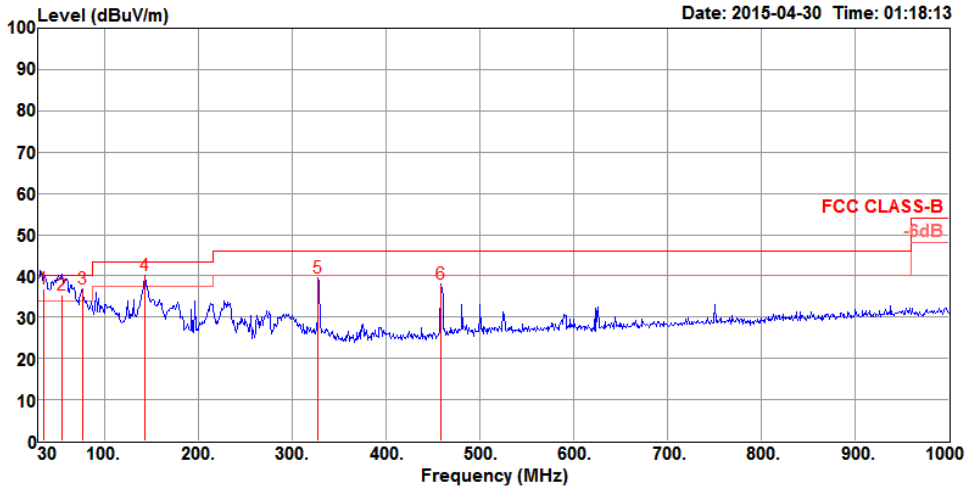
Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	Normal Link

Horizontal



	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	31.94	38.33	40.00	-1.67	51.03	0.64	18.90	32.24	150	357	QP	HORIZONTAL
2	53.28	33.52	40.00	-6.48	56.72	0.74	8.37	32.31	300	13	Peak	HORIZONTAL
3	145.43	37.95	43.50	-5.55	57.41	1.09	11.61	32.16	300	172	Peak	HORIZONTAL
4	214.30	38.84	43.50	-4.66	58.84	1.30	10.76	32.06	125	3	QP	HORIZONTAL
5	225.94	40.17	46.00	-5.83	59.83	1.33	11.06	32.05	150	28	Peak	HORIZONTAL
6	382.11	37.30	46.00	-8.70	51.57	1.69	16.08	32.04	100	293	Peak	HORIZONTAL

Vertical



	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	34.85	36.81	40.00	-3.19	51.22	0.64	17.18	32.23	100	284	QP	VERTICAL
2	55.22	35.55	40.00	-4.45	59.24	0.75	7.86	32.30	125	357	QP	VERTICAL
3	76.56	36.97	40.00	-3.03	60.96	0.84	7.34	32.17	200	38	Peak	VERTICAL
4	143.49	40.23	43.50	-3.27	59.53	1.08	11.78	32.16	100	140	Peak	VERTICAL
5	327.79	39.47	46.00	-6.53	55.26	1.56	14.70	32.05	100	102	Peak	VERTICAL
6	458.74	37.94	46.00	-8.06	50.91	1.83	17.23	32.03	100	214	Peak	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.

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

For Non-Beamforming Mode:

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 36 / Chain 4
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15539.73	42.00	63.54	-21.54	28.38	10.77	38.44	35.59	Average	150	92	HORIZONTAL
2	15540.52	55.27	83.54	-28.27	41.65	10.77	38.44	35.59	Peak	150	92	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15540.18	41.98	63.54	-21.56	28.36	10.77	38.44	35.59	Average	150	317	VERTICAL
2	15540.38	55.13	83.54	-28.41	41.51	10.77	38.44	35.59	Peak	150	317	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 40 / Chain 4
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15599.35	56.10	83.54	-27.44	42.52	10.78	38.38	35.58	Peak	150	100	HORIZONTAL
2	15599.45	42.27	63.54	-21.27	28.69	10.78	38.38	35.58	Average	150	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15599.14	55.46	83.54	-28.08	41.88	10.78	38.38	35.58	Peak	150	13	VERTICAL
2	15599.61	42.27	63.54	-21.27	28.69	10.78	38.38	35.58	Average	150	13	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 48 / Chain 4
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15719.27	56.90	83.54	-26.64	43.43	10.79	38.24	35.56	Peak	150	15	HORIZONTAL
2	15720.15	42.00	63.54	-21.54	28.53	10.79	38.24	35.56	Average	150	15	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15719.91	42.33	63.54	-21.21	28.86	10.79	38.24	35.56	Average	150	98	VERTICAL
2	15720.40	55.60	83.54	-27.94	42.13	10.79	38.24	35.56	Peak	150	98	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 149 / Chain 4
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.97	43.86	63.54	-19.68	29.70	9.24	40.00	35.08	Average	150	18	HORIZONTAL
2	11490.16	55.61	83.54	-27.93	41.45	9.24	40.00	35.08	Peak	150	18	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.84	44.83	63.54	-18.71	30.67	9.24	40.00	35.08	Average	150	49	VERTICAL
2	11490.04	56.40	83.54	-27.14	42.24	9.24	40.00	35.08	Peak	150	49	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 157 / Chain 4
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.47	56.67	83.54	-26.87	42.57	9.26	39.93	35.09	Peak	150	6	HORIZONTAL
2	11569.98	44.95	63.54	-18.59	30.85	9.26	39.93	35.09	Average	150	6	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.07	59.37	83.54	-24.17	45.27	9.26	39.93	35.09	Peak	150	42	VERTICAL
2	11569.89	46.52	63.54	-17.02	32.42	9.26	39.93	35.09	Average	150	42	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 165 / Chain 4
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.95	44.67	63.54	-18.87	30.60	9.28	39.86	35.07	Average	146	4	HORIZONTAL
2	11650.31	56.78	83.54	-26.76	42.71	9.28	39.86	35.07	Peak	146	4	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.90	45.00	63.54	-18.54	30.93	9.28	39.86	35.07	Average	150	63	VERTICAL
2	11650.01	56.64	83.54	-26.90	42.57	9.28	39.86	35.07	Peak	150	63	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15539.46	41.88	63.54	-21.66	28.26	10.77	38.44	35.59	Average	150	84	HORIZONTAL
2	15539.54	54.48	83.54	-29.06	40.86	10.77	38.44	35.59	Peak	150	84	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15539.89	41.90	63.54	-21.64	28.28	10.77	38.44	35.59	Average	150	296	VERTICAL
2	15540.13	55.61	83.54	-27.93	41.99	10.77	38.44	35.59	Peak	150	296	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15599.90	42.32	63.54	-21.22	28.74	10.78	38.38	35.58	Average	150	72	HORIZONTAL
2	15600.28	55.44	83.54	-28.10	41.86	10.78	38.38	35.58	Peak	150	72	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15599.84	42.25	63.54	-21.29	28.67	10.78	38.38	35.58	Average	150	12	VERTICAL
2	15600.29	55.41	83.54	-28.13	41.83	10.78	38.38	35.58	Peak	150	12	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15719.16	55.55	83.54	-27.99	42.08	10.79	38.24	35.56	Peak	150	112	HORIZONTAL
2	15719.45	42.17	63.54	-21.37	28.70	10.79	38.24	35.56	Average	150	112	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15719.40	55.71	83.54	-27.83	42.24	10.79	38.24	35.56	Peak	150	10	VERTICAL
2	15719.81	42.15	63.54	-21.39	28.68	10.79	38.24	35.56	Average	150	10	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.46	55.24	83.54	-28.30	41.08	9.24	40.00	35.08	Peak	150	68	HORIZONTAL
2	11490.00	42.48	63.54	-21.06	28.32	9.24	40.00	35.08	Average	150	68	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.96	45.39	63.54	-18.15	31.23	9.24	40.00	35.08	Average	150	51	VERTICAL
2	11490.29	56.77	83.54	-26.77	42.61	9.24	40.00	35.08	Peak	150	51	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11570.01	41.80	63.54	-21.74	27.70	9.26	39.93	35.09	Average	150	150	HORIZONTAL
2	11570.51	54.73	83.54	-28.81	40.63	9.26	39.93	35.09	Peak	150	150	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.98	44.41	63.54	-19.13	30.31	9.26	39.93	35.09	Average	150	62	VERTICAL
2	11570.74	55.66	83.54	-27.88	41.56	9.26	39.93	35.09	Peak	150	62	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.15	55.04	83.54	-28.50	40.97	9.28	39.86	35.07	Peak	150	134	HORIZONTAL
2	11650.16	41.85	63.54	-21.69	27.78	9.28	39.86	35.07	Average	150	134	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.61	55.85	83.54	-27.69	41.78	9.28	39.86	35.07	Peak	150	13	VERTICAL
2	11650.88	44.57	63.54	-18.97	30.50	9.28	39.86	35.07	Average	150	13	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15569.55	42.47	63.54	-21.07	28.85	10.78	38.42	35.58	Average	150	95	HORIZONTAL
2	15570.60	55.37	83.54	-28.17	41.75	10.78	38.42	35.58	Peak	150	95	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15569.81	55.52	83.54	-28.02	41.90	10.78	38.42	35.58	Peak	150	8	VERTICAL
2	15570.40	42.45	63.54	-21.09	28.83	10.78	38.42	35.58	Average	150	8	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15689.30	42.29	63.54	-21.25	28.78	10.79	38.28	35.56	Average	150	79	HORIZONTAL
2	15690.89	55.57	83.54	-27.97	42.06	10.79	38.28	35.56	Peak	150	79	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15690.37	42.26	63.54	-21.28	28.75	10.79	38.28	35.56	Average	150	13	VERTICAL
2	15690.63	55.23	83.54	-28.31	41.72	10.79	38.28	35.56	Peak	150	13	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11509.59	55.05	83.54	-28.49	40.90	9.25	40.00	35.10	Peak	150	89	HORIZONTAL
2	11509.99	43.17	63.54	-20.37	29.02	9.25	40.00	35.10	Average	150	89	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11510.09	42.62	63.54	-20.92	28.47	9.25	40.00	35.10	Average	150	9	VERTICAL
2	11510.14	55.31	83.54	-28.23	41.16	9.25	40.00	35.10	Peak	150	9	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11589.93	55.96	83.54	-27.58	41.86	9.27	39.91	35.08	Peak	150	62	HORIZONTAL
2	11590.34	42.24	63.54	-21.30	28.14	9.27	39.91	35.08	Average	150	62	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11589.99	44.09	63.54	-19.45	29.99	9.27	39.91	35.08	Average	150	7	VERTICAL
2	11590.16	55.45	83.54	-28.09	41.35	9.27	39.91	35.08	Peak	150	7	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15629.38	42.37	63.54	-21.17	28.82	10.78	38.34	35.57	Average	150	14	HORIZONTAL
2	15629.48	55.35	83.54	-28.19	41.80	10.78	38.34	35.57	Peak	150	14	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15629.25	55.58	83.54	-27.96	42.03	10.78	38.34	35.57	Peak	150	62	VERTICAL
2	15629.32	42.16	63.54	-21.38	28.61	10.78	38.34	35.57	Average	150	62	VERTICAL

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11549.92	44.02	63.54	-19.52	29.88	9.26	39.97	35.09	Average	150	10	HORIZONTAL
2	11550.11	57.34	83.54	-26.20	43.20	9.26	39.97	35.09	Peak	150	10	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11549.95	43.65	63.54	-19.89	29.51	9.26	39.97	35.09	Average	150	65	VERTICAL
2	11550.05	55.54	83.54	-28.00	41.40	9.26	39.97	35.09	Peak	150	65	VERTICAL

For Beamforming Mode:

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	15537.80	47.69	63.54	-15.85	31.14	38.35	12.92	34.72	118	235	HORIZONTAL	Average
2	15540.20	60.18	83.54	-23.36	43.64	38.34	12.92	34.72	118	235	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	15541.08	60.33	83.54	-23.21	43.80	38.34	12.92	34.73	107	260	VERTICAL	Peak
2	15542.82	47.62	63.54	-15.92	31.09	38.34	12.92	34.73	107	260	VERTICAL	Average

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	15598.78	47.46	63.54	-16.08	30.99	38.26	12.96	34.75	106	237	HORIZONTAL	Average
2	15601.64	60.91	83.54	-22.63	44.44	38.26	12.96	34.75	106	237	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	15600.62	60.87	83.54	-22.67	44.45	38.21	12.96	34.75	109	273	VERTICAL	Peak
2	15601.34	47.22	63.54	-16.32	30.80	38.21	12.96	34.75	109	273	VERTICAL	Average

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	15718.16	46.66	63.54	-16.88	30.34	38.09	13.03	34.80	111	293	HORIZONTAL	Average
2	15719.40	59.82	83.54	-23.72	43.50	38.09	13.03	34.80	111	293	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	15719.56	46.92	63.54	-16.62	30.61	38.08	13.03	34.80	146	264	VERTICAL	Average
2	15720.72	60.72	83.54	-22.82	44.41	38.08	13.03	34.80	146	264	VERTICAL	Peak

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	11490.14	45.34	63.54	-18.20	29.43	39.91	11.03	35.03	123	239	HORIZONTAL	Average
2	11491.32	58.08	83.54	-25.46	42.17	39.91	11.03	35.03	123	239	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	11488.78	45.38	63.54	-18.16	29.48	39.90	11.03	35.03	121	214	VERTICAL	Average
2	11494.86	58.12	83.54	-25.42	42.21	39.90	11.04	35.03	121	214	VERTICAL	Peak

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	11565.38	59.07	83.54	-24.47	43.26	39.77	11.07	35.03	120	225	HORIZONTAL	Peak
2	11572.56	45.16	63.54	-18.38	29.37	39.75	11.07	35.03	120	225	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	11567.96	58.31	83.54	-25.23	42.50	39.77	11.07	35.03	116	199	VERTICAL	Peak
2	11569.92	45.00	63.54	-18.54	29.19	39.77	11.07	35.03	116	199	VERTICAL	Average

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	11645.48	57.65	83.54	-25.89	41.99	39.60	11.10	35.04	101	221	HORIZONTAL	Peak
2	11646.12	44.61	63.54	-18.93	28.95	39.60	11.10	35.04	101	221	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	11649.84	58.41	83.54	-25.13	42.72	39.63	11.10	35.04	118	202	VERTICAL	Peak
2	11653.62	44.58	63.54	-18.96	28.95	39.57	11.10	35.04	118	202	VERTICAL	Average

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	15568.86	60.64	83.54	-22.90	44.14	38.30	12.94	34.74	116	179	HORIZONTAL	Peak
2	15573.78	47.71	63.54	-15.83	31.21	38.30	12.94	34.74	116	179	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	15566.90	60.98	83.54	-22.56	44.51	38.27	12.94	34.74	118	114	VERTICAL	Peak
2	15571.60	47.91	63.54	-15.63	31.44	38.27	12.94	34.74	118	114	VERTICAL	Average

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	15686.40	47.24	63.54	-16.30	30.87	38.14	13.01	34.78	118	111	HORIZONTAL	Average
2	15689.42	60.14	83.54	-23.40	43.79	38.13	13.01	34.79	118	111	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	15691.86	47.27	63.54	-16.27	30.97	38.08	13.01	34.79	113	136	VERTICAL	Average
2	15692.14	60.08	83.54	-23.46	43.78	38.08	13.01	34.79	113	136	VERTICAL	Peak

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	11508.74	45.39	63.54	-18.15	29.50	39.88	11.04	35.03	105	159	HORIZONTAL	Average
2	11511.94	58.61	83.54	-24.93	42.72	39.88	11.04	35.03	105	159	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	11508.82	45.51	63.54	-18.03	29.60	39.90	11.04	35.03	103	135	VERTICAL	Average
2	11514.90	58.68	83.54	-24.86	42.76	39.90	11.05	35.03	103	135	VERTICAL	Peak

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	11587.26	57.96	83.54	-25.58	42.19	39.72	11.08	35.03	105	141	HORIZONTAL	Peak
2	11589.86	45.03	63.54	-18.51	29.26	39.72	11.08	35.03	105	141	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	11585.48	58.83	83.54	-24.71	43.09	39.70	11.07	35.03	107	125	VERTICAL	Peak
2	11586.78	45.34	63.54	-18.20	29.59	39.70	11.08	35.03	107	125	VERTICAL	Average

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	15628.84	48.02	63.54	-15.52	31.59	38.22	12.97	34.76	111	90	HORIZONTAL	Average
2	15633.82	62.11	83.54	-21.43	45.68	38.21	12.98	34.76	111	90	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	15629.74	48.40	63.54	-15.14	31.97	38.21	12.98	34.76	117	102	VERTICAL	Average
2	15633.78	61.30	83.54	-22.24	44.87	38.21	12.98	34.76	117	102	VERTICAL	Peak

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	11554.36	45.87	63.54	-17.67	30.05	39.79	11.06	35.03	129	129	HORIZONTAL	Average
2	11554.62	58.52	83.54	-25.02	42.70	39.79	11.06	35.03	129	129	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	11550.02	46.75	63.54	-16.79	30.89	39.83	11.06	35.03	129	251	VERTICAL	Average
2	11551.80	59.51	83.54	-24.03	43.71	39.77	11.06	35.03	129	251	VERTICAL	Peak

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.

4.7. Band Edge Emissions Measurement

4.7.1. 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.

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

4.7.2. 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	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

4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3, only the frequency range investigated is limited to 100MHz around band edges.

4.7.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. 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.

4.7.7. Test Result of Band Edge and Fundamental Emissions

For Non-Beamforming Mode:

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 36, 40, 48 /Chain 4
Test Date	Apr. 26, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5146.80	81.22	83.54	-2.32	40.28	6.13	34.81	0.00	Peak	178	85	VERTICAL
2	5150.00	63.36	63.54	-0.18	22.42	6.13	34.81	0.00	Average	178	85	VERTICAL
3	5178.08	123.71			82.68	6.15	34.88	0.00	Peak	178	85	VERTICAL
4	5181.28	112.65			71.62	6.15	34.88	0.00	Average	178	85	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5117.31	72.99	83.54	-10.55	32.14	6.11	34.74	0.00	Peak	182	91	VERTICAL
2	5118.91	63.05	63.54	-0.49	22.20	6.11	34.74	0.00	Average	182	91	VERTICAL
3	5199.04	109.03			67.96	6.16	34.91	0.00	Average	182	91	VERTICAL
4	5200.00	119.54			78.47	6.16	34.91	0.00	Peak	182	91	VERTICAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5077.56	71.30	83.54	-12.24	30.54	6.09	34.67	0.00	Peak	174	98	VERTICAL
2	5081.41	59.63	63.54	-3.91	18.87	6.09	34.67	0.00	Average	174	98	VERTICAL
3	5237.44	115.26			74.10	6.18	34.98	0.00	Average	174	98	VERTICAL
4	5237.44	125.96			84.80	6.18	34.98	0.00	Peak	174	98	VERTICAL
5	5362.18	70.31	83.54	-13.23	28.82	6.27	35.22	0.00	Peak	174	98	VERTICAL
6	5392.31	58.35	63.54	-5.19	16.78	6.28	35.29	0.00	Average	174	98	VERTICAL

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 4
Test Date	Apr. 26, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5714.68	75.13	77.74	-2.61	33.10	6.44	35.59	0.00	Peak	179	175	VERTICAL
2	5725.00	87.45	87.74	-0.29	45.41	6.45	35.59	0.00	Peak	179	175	VERTICAL
3	5746.28	109.81			67.76	6.45	35.60	0.00	Average	179	175	VERTICAL
4	5747.24	120.66			78.61	6.45	35.60	0.00	Peak	179	175	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5703.14	77.39	77.74	-0.35	35.37	6.44	35.58	0.00	Peak	179	176	VERTICAL
2	5725.00	73.33	87.74	-14.41	31.29	6.45	35.59	0.00	Peak	179	176	VERTICAL
3	5784.04	115.11			73.04	6.46	35.61	0.00	Average	179	176	VERTICAL
4	5784.04	124.95			82.88	6.46	35.61	0.00	Peak	179	176	VERTICAL
5	5853.21	73.22	87.74	-14.52	31.09	6.49	35.64	0.00	Peak	179	176	VERTICAL
6	5863.21	77.04	77.74	-0.70	34.89	6.50	35.65	0.00	Peak	179	176	VERTICAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5823.40	121.20			79.09	6.48	35.63	0.00	Peak	174	176	VERTICAL
2	5826.28	110.39			68.28	6.48	35.63	0.00	Average	174	176	VERTICAL
3	5850.64	81.00	87.74	-6.74	38.87	6.49	35.64	0.00	Peak	174	176	VERTICAL
4	5863.53	77.53	77.74	-0.21	35.38	6.50	35.65	0.00	Peak	174	176	VERTICAL

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Channel 36

	Freq	Level	Line	Limit	Level	Loss	Factor	Factor	Remark			Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5099.04	63.25	63.54	-0.29	22.44	6.10	34.71	0.00	Average	181	116	VERTICAL
2	5099.04	73.83	83.54	-9.71	33.02	6.10	34.71	0.00	Peak	181	116	VERTICAL
3	5178.72	124.04			83.01	6.15	34.88	0.00	Peak	181	116	VERTICAL
4	5179.36	112.85			71.82	6.15	34.88	0.00	Average	181	116	VERTICAL

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

Channel 40

	Freq	Level	Line	Limit	Level	Loss	Factor	Factor	Remark			Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5121.47	63.41	63.54	-0.13	22.56	6.11	34.74	0.00	Average	184	264	VERTICAL
2	5121.80	74.41	83.54	-9.13	33.56	6.11	34.74	0.00	Peak	184	264	VERTICAL
3	5201.60	110.86			69.79	6.16	34.91	0.00	Average	184	264	VERTICAL
4	5206.09	121.81			80.74	6.16	34.91	0.00	Peak	184	264	VERTICAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5080.77	74.46	83.54	-9.08	33.70	6.09	34.67	0.00	Peak	181	268	VERTICAL
2	5081.41	63.40	63.54	-0.14	22.64	6.09	34.67	0.00	Average	181	268	VERTICAL
3	5236.80	118.79			77.63	6.18	34.98	0.00	Average	181	268	VERTICAL
4	5236.80	130.10			88.94	6.18	34.98	0.00	Peak	181	268	VERTICAL

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5672.05	77.61	77.74	-0.13	35.61	6.43	35.57	0.00	Peak	181	2	VERTICAL
2	5723.40	87.07	87.74	-0.67	45.03	6.45	35.59	0.00	Peak	181	2	VERTICAL
3	5747.56	124.98			82.93	6.45	35.60	0.00	Peak	181	2	VERTICAL
4	5747.89	113.69			71.64	6.45	35.60	0.00	Average	181	2	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5712.12	77.68	77.74	-0.06	35.65	6.44	35.59	0.00	Peak	184	360	VERTICAL
2	5724.36	69.23	87.74	-18.51	27.19	6.45	35.59	0.00	Peak	184	360	VERTICAL
3	5783.72	124.71			82.64	6.46	35.61	0.00	Peak	184	360	VERTICAL
4	5787.24	112.91			70.83	6.47	35.61	0.00	Average	184	360	VERTICAL
5	5850.80	67.89	87.74	-19.85	25.76	6.49	35.64	0.00	Peak	184	360	VERTICAL
6	5862.20	75.77	77.74	-1.97	33.62	6.50	35.65	0.00	Peak	184	360	VERTICAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5817.63	124.52			82.41	6.48	35.63	0.00	Peak	180	0	VERTICAL
2	5827.56	113.62			71.51	6.48	35.63	0.00	Average	180	0	VERTICAL
3	5853.85	81.16	87.74	-6.58	39.02	6.50	35.64	0.00	Peak	180	0	VERTICAL
4	5902.63	77.50	77.74	-0.24	35.33	6.51	35.66	0.00	Peak	180	0	VERTICAL

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5146.80	63.47	63.54	-0.07	22.53	6.13	34.81	0.00	Average	193	262	VERTICAL
2	5147.76	75.49	83.54	-8.05	34.55	6.13	34.81	0.00	Peak	193	262	VERTICAL
3	5176.86	108.74			67.75	6.15	34.84	0.00	Average	193	262	VERTICAL
4	5181.99	118.00			76.97	6.15	34.88	0.00	Peak	193	262	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5147.12	63.35	63.54	-0.19	22.41	6.13	34.81	0.00	Average	187	268	VERTICAL
2	5147.12	73.82	83.54	-9.72	32.88	6.13	34.81	0.00	Peak	187	268	VERTICAL
3	5226.80	110.49			69.36	6.18	34.95	0.00	Average	187	268	VERTICAL
4	5226.80	120.19			79.06	6.18	34.95	0.00	Peak	187	268	VERTICAL

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5712.60	77.67	77.74	-0.07	35.64	6.44	35.59	0.00	Peak	175	0	VERTICAL
2	5724.04	83.71	87.74	-4.03	41.67	6.45	35.59	0.00	Peak	175	0	VERTICAL
3	5737.69	110.41			68.37	6.45	35.59	0.00	Average	175	0	VERTICAL
4	5737.69	120.68			78.64	6.45	35.59	0.00	Peak	175	0	VERTICAL

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5712.12	76.51	77.74	-1.23	34.48	6.44	35.59	0.00	Peak	175	2	VERTICAL
2	5722.60	78.57	87.74	-9.17	36.53	6.45	35.59	0.00	Peak	175	2	VERTICAL
3	5777.69	113.47			71.40	6.46	35.61	0.00	Average	175	2	VERTICAL
4	5777.69	122.95			80.88	6.46	35.61	0.00	Peak	175	2	VERTICAL
5	5852.89	78.81	87.74	-8.93	36.68	6.49	35.64	0.00	Peak	175	2	VERTICAL
6	5862.40	77.48	77.74	-0.26	35.33	6.50	35.65	0.00	Peak	175	2	VERTICAL

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 4 + Chain 5 + Chain 6
Test Date	Apr. 26, 2015		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5145.19	75.21	83.54	-8.33	34.27	6.13	34.81	0.00	Peak	178	110	VERTICAL
2	5150.00	63.14	63.54	-0.40	22.20	6.13	34.81	0.00	Average	178	110	VERTICAL
3	5199.90	103.62			62.55	6.16	34.91	0.00	Average	178	110	VERTICAL
4	5199.90	113.72			72.65	6.16	34.91	0.00	Peak	178	110	VERTICAL

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

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5713.56	77.64	77.74	-0.10	35.61	6.44	35.59	0.00	Peak	183	2	VERTICAL
2	5723.56	78.86	87.74	-8.88	36.82	6.45	35.59	0.00	Peak	183	2	VERTICAL
3	5747.60	104.70			62.65	6.45	35.60	0.00	Average	183	2	VERTICAL
4	5762.98	114.60			72.53	6.46	35.61	0.00	Peak	183	2	VERTICAL
5	5852.89	72.89	87.74	-14.85	30.76	6.49	35.64	0.00	Peak	183	2	VERTICAL
6	5863.37	71.94	77.74	-5.80	29.79	6.50	35.65	0.00	Peak	183	2	VERTICAL

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

For Beamforming Mode:

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 2015		

Channel 36

	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	5094.40	74.30	83.54	-9.24	35.56	31.47	7.27	0.00	141	126	VERTICAL	Peak
2	5100.80	63.47	63.54	-0.07	24.71	31.48	7.28	0.00	141	126	VERTICAL	Average
3	5181.60	115.26			76.35	31.55	7.36	0.00	141	126	VERTICAL	Average
4	5184.00	125.07			86.16	31.55	7.36	0.00	141	126	VERTICAL	Peak

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

Channel 40

	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	5121.60	63.40	63.54	-0.14	24.60	31.50	7.30	0.00	130	128	VERTICAL	Average
2	5127.20	74.04	83.54	-9.50	35.22	31.51	7.31	0.00	130	128	VERTICAL	Peak
3	5198.40	112.45			73.51	31.56	7.38	0.00	130	128	VERTICAL	Average
4	5202.40	122.46			83.51	31.57	7.38	0.00	130	128	VERTICAL	Peak

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

Channel 48

	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	5076.40	74.68	83.54	-8.86	35.96	31.46	7.26	0.00	132	123	VERTICAL	Peak
2	5081.60	63.32	63.54	-0.22	24.60	31.46	7.26	0.00	132	123	VERTICAL	Average
3	5238.40	130.59			91.59	31.59	7.41	0.00	132	123	VERTICAL	Peak
4	5239.20	120.40			81.39	31.59	7.42	0.00	132	123	VERTICAL	Average
5	5392.80	61.01	63.54	-2.53	21.73	31.72	7.56	0.00	132	123	VERTICAL	Average
6	5407.20	71.84	83.54	-11.70	32.54	31.73	7.57	0.00	132	123	VERTICAL	Peak

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	5662.60	76.91	77.74	-0.83	37.15	32.00	7.76	0.00	126	243	VERTICAL	Peak
2	5725.00	87.55	87.74	-0.19	47.68	32.08	7.79	0.00	126	243	VERTICAL	Peak
3	5743.40	125.27			85.37	32.10	7.80	0.00	126	243	VERTICAL	Peak
4	5743.40	115.23			75.33	32.10	7.80	0.00	126	243	VERTICAL	Average
5	5856.40	69.62	87.74	-18.12	29.51	32.24	7.87	0.00	126	243	VERTICAL	Peak
6	5902.60	72.47	77.74	-5.27	32.29	32.28	7.90	0.00	126	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	5697.80	77.68	77.74	-0.06	37.86	32.04	7.78	0.00	124	244	VERTICAL	Peak
2	5724.20	68.66	87.74	-19.08	28.79	32.08	7.79	0.00	124	244	VERTICAL	Peak
3	5777.80	125.59			85.63	32.14	7.82	0.00	124	244	VERTICAL	Peak
4	5783.40	114.45			74.48	32.14	7.83	0.00	124	244	VERTICAL	Average
5	5858.00	75.12	87.74	-12.62	35.01	32.24	7.87	0.00	124	244	VERTICAL	Peak
6	5864.00	76.54	77.74	-1.20	36.43	32.24	7.87	0.00	124	244	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	5821.00	125.78			85.75	32.18	7.85	0.00	129	0	VERTICAL	Peak
2	5826.60	115.27			75.22	32.20	7.85	0.00	129	0	VERTICAL	Average
3	5850.00	82.47	87.74	-5.27	42.38	32.22	7.87	0.00	129	0	VERTICAL	Peak
4	5903.40	77.55	77.74	-0.19	37.37	32.28	7.90	0.00	129	0	VERTICAL	Peak

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 2015		

Channel 38

	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	5150.00	76.21	83.54	-7.33	37.36	31.52	7.33	0.00	143	121	VERTICAL	Peak
2	5150.00	63.42	63.54	-0.12	24.57	31.52	7.33	0.00	143	121	VERTICAL	Average
3	5184.40	120.74			81.83	31.55	7.36	0.00	143	121	VERTICAL	Peak
4	5184.40	110.47			71.56	31.55	7.36	0.00	143	121	VERTICAL	Average

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

Channel 46

	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	5144.40	73.88	83.54	-9.66	35.04	31.52	7.32	0.00	137	121	VERTICAL	Peak
2	5145.20	63.35	63.54	-0.19	24.51	31.52	7.32	0.00	137	121	VERTICAL	Average
3	5224.40	113.12			74.14	31.58	7.40	0.00	137	121	VERTICAL	Average
4	5232.40	123.53			84.53	31.59	7.41	0.00	137	121	VERTICAL	Peak

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 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	5715.00	77.73	77.74	-0.01	37.88	32.06	7.79	0.00	128	243	VERTICAL	Peak
2	5725.00	82.40	87.74	-5.34	42.53	32.08	7.79	0.00	128	243	VERTICAL	Peak
3	5747.00	120.45			80.54	32.10	7.81	0.00	128	243	VERTICAL	Peak
4	5749.40	109.54			69.63	32.10	7.81	0.00	128	243	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	5697.40	77.46	77.74	-0.28	37.64	32.04	7.78	0.00	128	236	VERTICAL	Peak
2	5724.20	77.47	87.74	-10.27	37.60	32.08	7.79	0.00	128	236	VERTICAL	Peak
3	5790.20	113.31			73.32	32.16	7.83	0.00	128	236	VERTICAL	Average
4	5791.80	123.32			83.33	32.16	7.83	0.00	128	236	VERTICAL	Peak
5	5858.00	78.13	87.74	-9.61	38.02	32.24	7.87	0.00	128	236	VERTICAL	Peak
6	5867.80	76.48	77.74	-1.26	36.36	32.24	7.88	0.00	128	236	VERTICAL	Peak

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

Temperature	24°C	Humidity	68%
Test Engineer	Mars Lin	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 4 + Chain 5 + Chain 6
Test Date	May 05, 2015		

Channel 42

	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	5139.00	76.23	83.54	-7.31	37.40	31.51	7.32	0.00	140	238	VERTICAL	Peak
2	5148.00	63.48	63.54	-0.06	24.63	31.52	7.33	0.00	140	238	VERTICAL	Average
3	5182.00	118.07			79.16	31.55	7.36	0.00	140	238	VERTICAL	Peak
4	5198.00	105.15			66.21	31.56	7.38	0.00	140	238	VERTICAL	Average
5	5350.00	55.40	63.54	-8.14	16.20	31.68	7.52	0.00	140	238	VERTICAL	Average
6	5368.00	68.82	83.54	-14.72	29.59	31.69	7.54	0.00	140	238	VERTICAL	Peak

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

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	5700.00	77.52	77.74	-0.22	37.70	32.04	7.78	0.00	129	244	VERTICAL	Peak
2	5725.00	79.41	87.74	-8.33	39.54	32.08	7.79	0.00	129	244	VERTICAL	Peak
3	5751.00	117.63			77.72	32.10	7.81	0.00	129	244	VERTICAL	Peak
4	5766.00	105.48			65.54	32.12	7.82	0.00	129	244	VERTICAL	Average
5	5852.00	72.81	87.74	-14.93	32.72	32.22	7.87	0.00	129	244	VERTICAL	Peak
6	5862.00	71.93	77.74	-5.81	31.82	32.24	7.87	0.00	129	244	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

4.8. Frequency Stability Measurement

4.8.1. 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).

4.8.2. Measuring Instruments and Setting

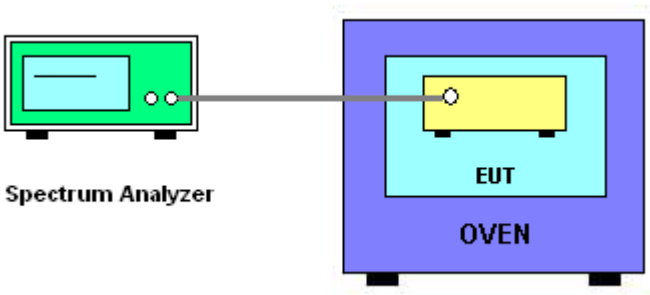
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.8.3. 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. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is 0°C~50°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	20°C	Humidity	59%
Test Engineer	Serway Li	Test Date	May 11, 2015

Mode: 20 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5200 MHz	5785 MHz
126.50	5199.9839	5784.9813
110.00	5199.9857	5784.9818
93.50	5199.9844	5784.9813
Max. Deviation (MHz)	**0.016060**	**0.018670**
Max. Deviation (ppm)	**3.09**	**3.23**

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5200 MHz	5785 MHz
0	5199.9857	5784.9818
10	5199.9856	5784.9817
20	5199.9857	5784.9818
30	5199.9856	5784.9817
40	5199.9856	5784.9817
50	5199.9856	5784.9817
Max. Deviation (MHz)	**0.014440**	**0.018340**
Max. Deviation (ppm)	**2.78**	**3.17**

Mode: 40 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5190 MHz	5755 MHz
126.50	5189.9826	5754.9805
110.00	5189.9826	5754.9805
93.50	5189.9826	5754.9805
Max. Deviation (MHz)	**0.017400**	**0.019540**
Max. Deviation (ppm)	**3.35**	**3.40**

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5190 MHz	5755 MHz
0	5189.9826	5754.9806
10	5189.9826	5754.9805
20	5189.9826	5754.9805
30	5189.9826	5754.9805
40	5189.9826	5754.9804
50	5189.9826	5754.9804
Max. Deviation (MHz)	**0.017460**	**0.019580**
Max. Deviation (ppm)	**3.36**	**3.40**

Mode: 80 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5210 MHz	5775 MHz
126.50	5209.9822	5774.9805
110.00	5209.9822	5774.9804
93.50	5209.9822	5774.9805
Max. Deviation (MHz)	**0.017840**	**0.019560**
Max. Deviation (ppm)	**3.42**	**3.39**

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5210 MHz	5775 MHz
0	**5209.9823**	**5774.9805**
10	**5209.9823**	**5774.9805**
20	**5209.9822**	**5774.9804**
30	**5209.9821**	**5774.9805**
40	**5209.9822**	**5774.9805**
50	**5209.9822**	**5774.9804**
Max. Deviation (MHz)	**0.017860**	**0.019580**
Max. Deviation (ppm)	**3.43**	**3.39**

4.9. Antenna Requirements

4.9.1. 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.

4.9.2. 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
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
MXE EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 30MHz	Jan. 13, 2015	Conduction (CO02-CB)
COND Cable	Woken	Cable	01	0.15MHz ~ 30MHz	Dec. 01, 2014	Conduction (CO02-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO02-CB)
Pulse Limiter	Schwarzbeck	VTSD 9561F	9561-F073	9kHz ~ 30MHz	Sep. 26, 2014	Conduction (CO02-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	Radiation (03CH01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015	Radiation (03CH01-CB))
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 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)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Jan. 21, 2015	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO 2000	N/A	1 m ~ 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	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)
Thermometer	HTC-1	HTC-1	TP-1	-50℃~70℃	Mar. 11, 2015	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	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.

NCR means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
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%