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FCC RADIO TEST REPORT

Applicant's company	**Mojo Networks, Inc.**
Applicant Address	339 N. Bernardo Avenue, Suite #200, Mountain View, CA USA
FCC ID	**TOR-C75**
Manufacturer's company	**Lite-On Network Communication (Dongguan) Limited**
Manufacturer Address	30#Keji Rd., Yin Hu Industrial Area, Qingxi Town, DongGuan City, Guangdong, China

Product Name	AirTight Access Point
Brand Name	MOJO, WatchGuard
Model No.	C-75, C-75-E, AP320
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jan. 10, 2014
Final Test Date	Jun. 03, 2016
Submission Type	Class II Change

Statement

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

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

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

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

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

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR411023-08AB	Rev. 01	Initial issue of report	Jul. 26, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	AirTight Access Point
Brand Name	:	MOJO, WatchGuard
Model No.	:	C-75, C-75-E, AP320
Applicant	:	Mojo Networks, 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 Jan. 10, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

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**
4.1	15.207	AC Power Line Conducted Emissions	Complies
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
4.5	15.407(a)	Power Spectral Density	Complies
4.6	15.407(b)	Radiated Emissions	Complies
4.7	15.407(b)	Band Edge Emissions	Complies
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, 1RX) IEEE 802.11n/ac: WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From adapter or PoE
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: IEEE 802.11a: 21.53MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.50 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.04 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 74.39 MHz Band 4: IEEE 802.11a: 20.67 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 21.36 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 38.64 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 23.50 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 24.76 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.05 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 15.68 dBm Band 4: IEEE 802.11a: 22.12 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 26.47 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 26.24 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 24.77 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	☒ Without beamforming
Operate Condition	☒ Indoor	☐ Outdoor

Antenna and Band width

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

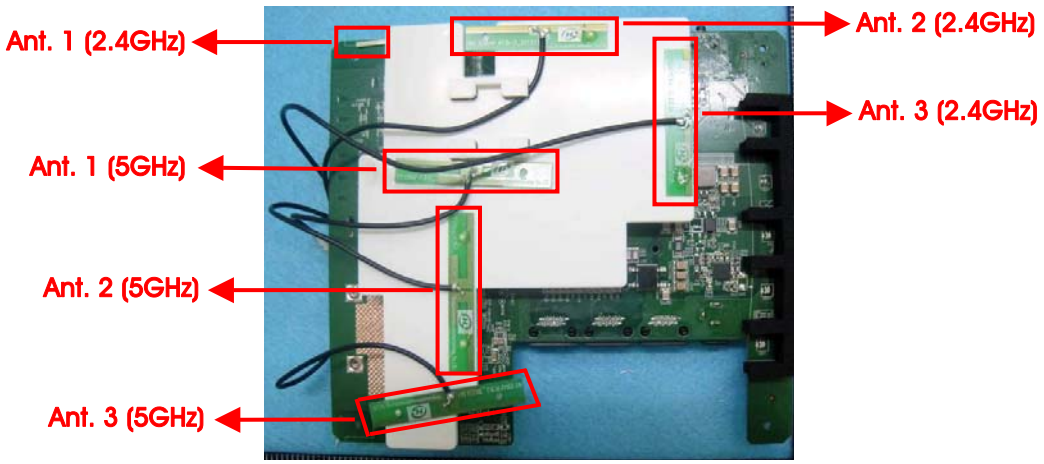
3.2. Accessories

Power	Brand	Model No.	Rating
Adapter	APD	WA-24Q12R	Input: 100-240Vac, 50-60Hz, 0.7A Max. Output: 12Vdc, 2A
Other			
Plug*1			

3.3. Table for Filed Antenna

Model No.: C-75 / AP320: Internal Ant. (low gain)

Ant.	Brand	Model No.	Type	Connector	Antenna Gain		Cable loss		True Gain (dBi)	
					2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	LITEON	WP838 AP	PCB	I-PEX	3.5	6.5	0.2	-	3.3	6.5
2	LITEON	WP838 AP	PCB	I-PEX	6	5.8	-	-	6	5.8
3	LITEON	WP838 AP	PCB	I-PEX	5.4	6.6	-	-	5.4	6.6



Model No.: C-75-E: External Ant.

Ant.	Brand	Model No.	Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	MAG.LAYERS	EDA-1713-25GR2-A7	Dipole	SMA Male RP	5	5
2	MAG.LAYERS	EDA-1713-25GR2-A7	Dipole	SMA Male RP	5	5
3	MAG.LAYERS	EDA-1713-25GR2-A7	Dipole	SMA Male RP	5	5

Model No.: C-75 / AP320: Internal Ant. (higher gain)

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	Galtronics	001174B2AD5F	Dipole Ant.	I-PEX	6.36	6.31
2	Galtronics	001174B2AD5F	Dipole Ant.	I-PEX	6.69	6.64
3	Galtronics	001174B2AD5F	Dipole Ant.	I-PEX	4.78	6.04

<For 2.4GHz Band>

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

Only Ant. 1 could transmit/receive simultaneously.

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

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

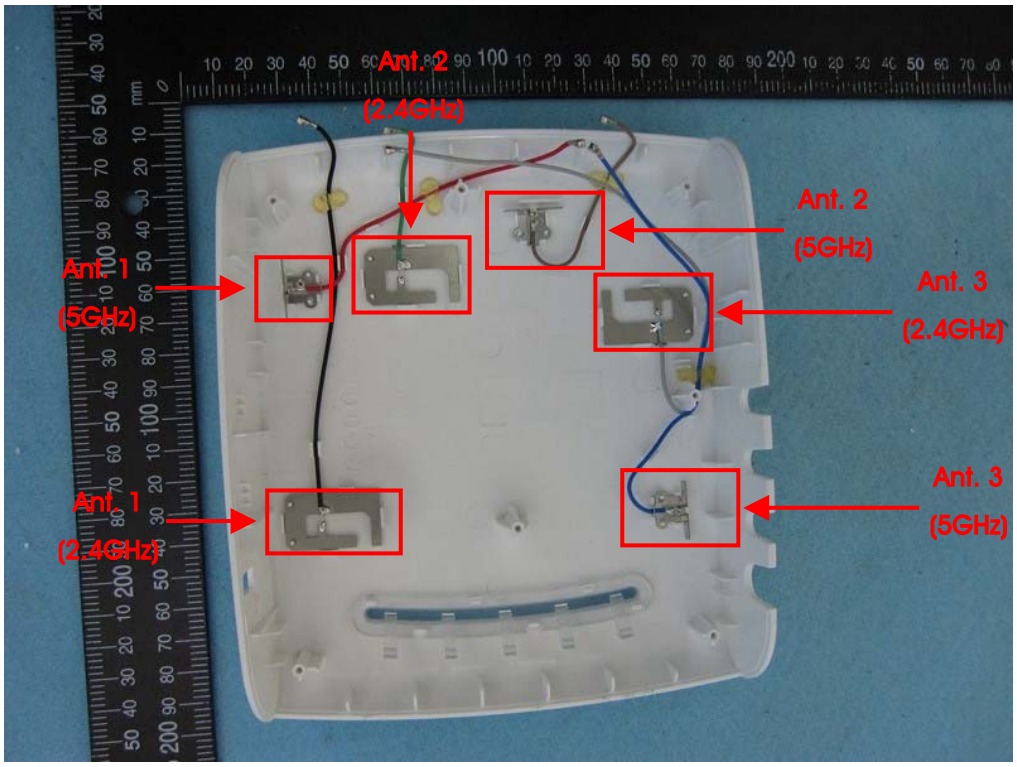
<For 5GHz Band>

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

Only Ant. 1 could transmit/receive simultaneously.

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

Ant. 1, Ant. 2 and Ant. 3 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	Ant.
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
Power Spectral Density	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
6dB Spectrum Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	1
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
Band Edge Emission	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
Frequency Stability	20 MHz	Band 1&4	-	40/157	1
	40 MHz	Band 1&4	-	38/151	1
	80 MHz	Band 1&4	-	42/155	1

Note 1: All the specification of test configurations and test mode was base on customer's request.
Note 2: 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 3: The PoE below are for measurement only, would not be marketed.
The PoE information as below:

Support Unit	Brand	Model Number
PoE	PowerDsine	PD-6561G300

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. EUT + Adapter

For Radiated Emission test<Below 1GHz>:

Mode 1. EUT in Z axis + Adapter

Mode 2. EUT in Y axis + Adapter

Mode 2 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.

Mode 3. EUT in Y axis + PoE

Mode 3 is the worst case, so it was selected to record in this test report.

For Radiated Emission test<Above 1GHz>:

The EUT can be placed in Y-axis and Z-axis. After evaluating, Y-axis was the worst case, so it's recorded in this report.

Mode 1. CTX_EUT in Y axis

For Co-location MPE:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA411023-08) tests is added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	**Site Category**	**Location**	**FCC Designation No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Multiple Listing

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

Brand Name	Model No.	Antenna
MOJO	C-75	Internal antenna
	C-75-E	External antenna
WatchGuard	AP320	Internal antenna

Note: Adding dipole antenna for model: C-75 and AP320. Thus, only model: C-75 was tested.

3.8. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR411023-06AB

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

Modifications	Performance Checking
Adding a set of dipole antenna (P/N: 001174B2AD5F) with higher gain than originally certified antennas for model: C-75 and AP320.	All test items

3.9. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E4300	DoC
Notebook*2	Apple	Mac Book	DoC
Flash disk	Silicon Power	I-Series	DoC
PoE	PowerDsine	PD-6561G300	DoC

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

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E6430	DoC
Flash disk	Silicon	I-Series	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.10. 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.

Test Software Version	ART2-GUI Version 2.3					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	16	22.5	21.5	21	20.5	20.5
802.11ac MCS0/Nss1 VHT20	16.5	19	19	22	21.5	21.5
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	13.5		19.5		21	21
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	10.5				19.5	

3.11. EUT Operation during Test

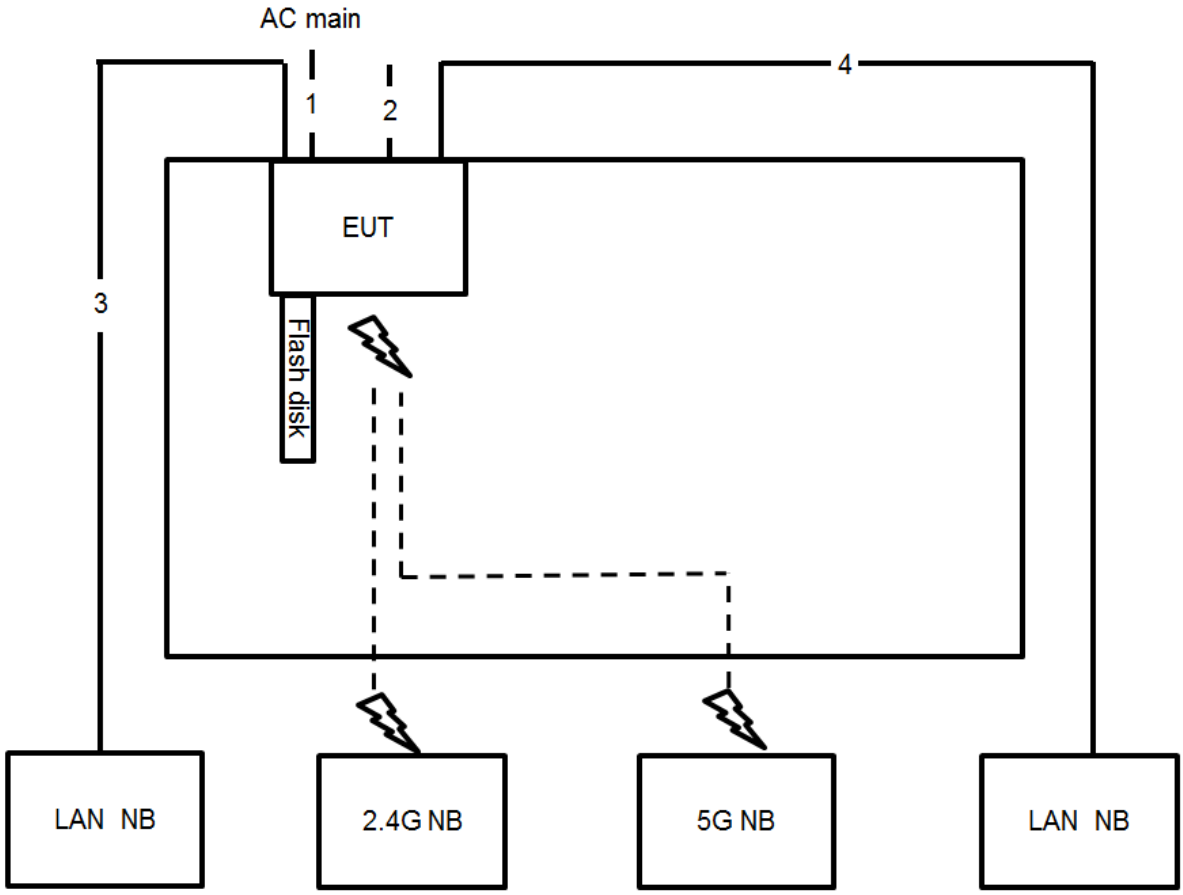
The EUT was programmed to be in continuously transmitting mode.

3.12. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.010	2.030	99.01%	0.04	0.01
802.11ac MCS0/Nss1 VHT20	1.904	2.040	93.33%	0.30	0.53
802.11ac MCS0/Nss1 VHT40	0.930	1.009	92.17%	0.35	1.08
802.11ac MCS0/Nss1 VHT80	0.440	0.499	88.18%	0.55	2.27

3.13. Test Configurations

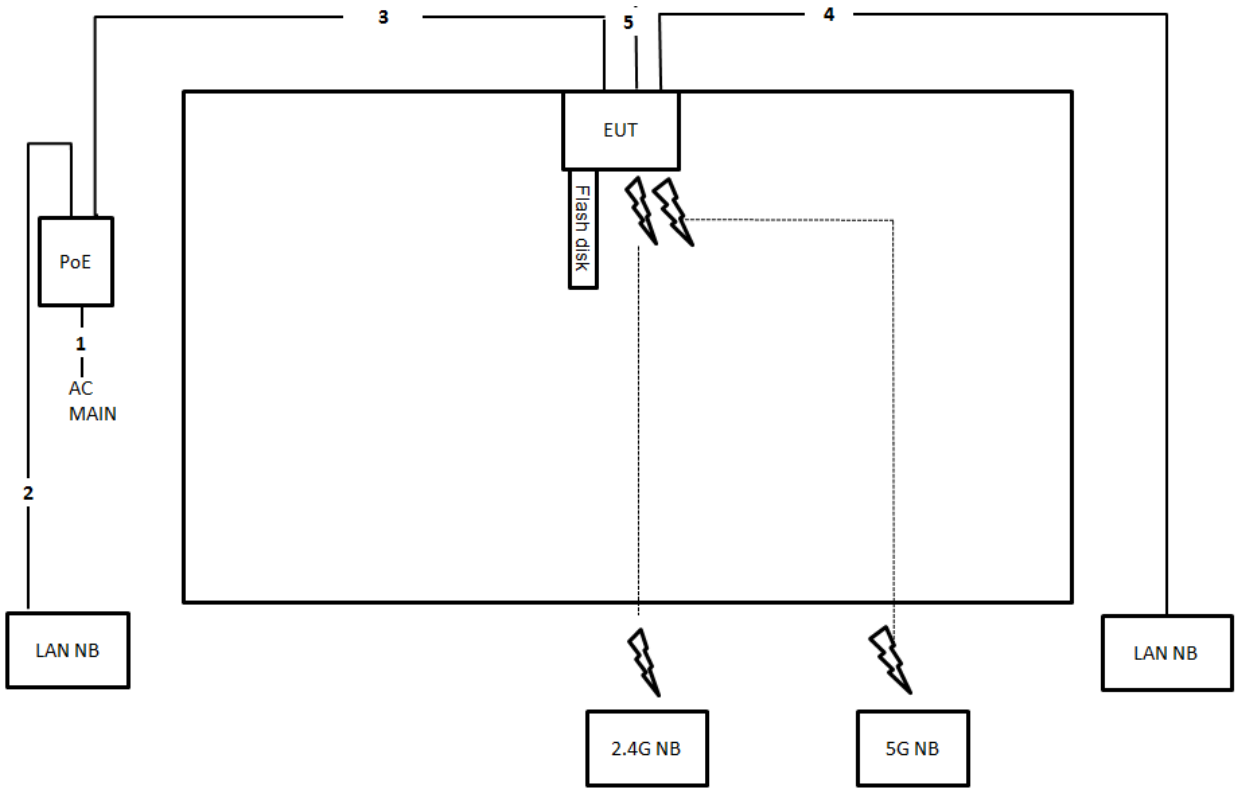
3.13.1. AC Power Line Conduction Emissions Test Configuration



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

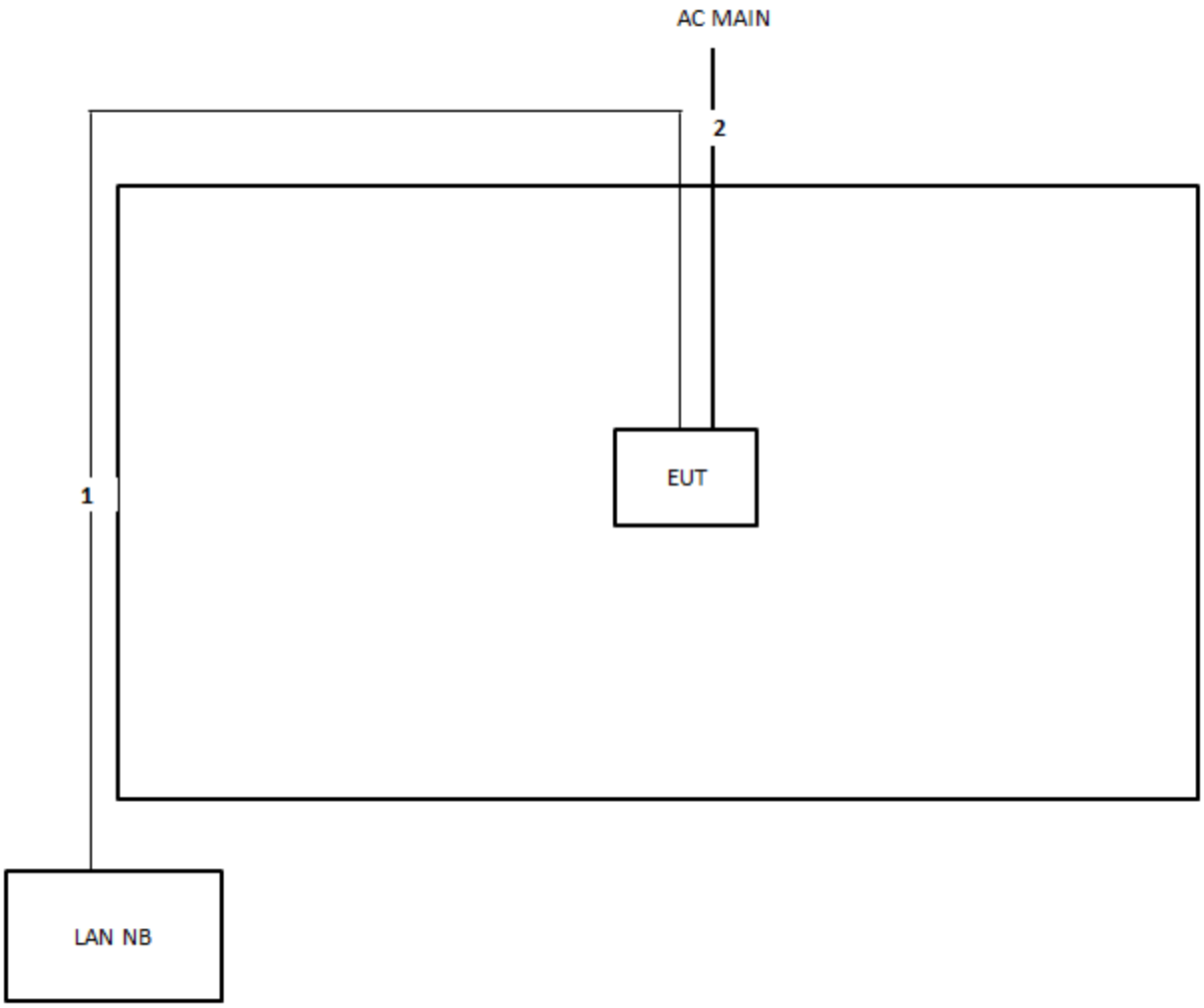
3.13.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	Console cable	No	1.5m

Test Configuration: above 1GHz



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

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

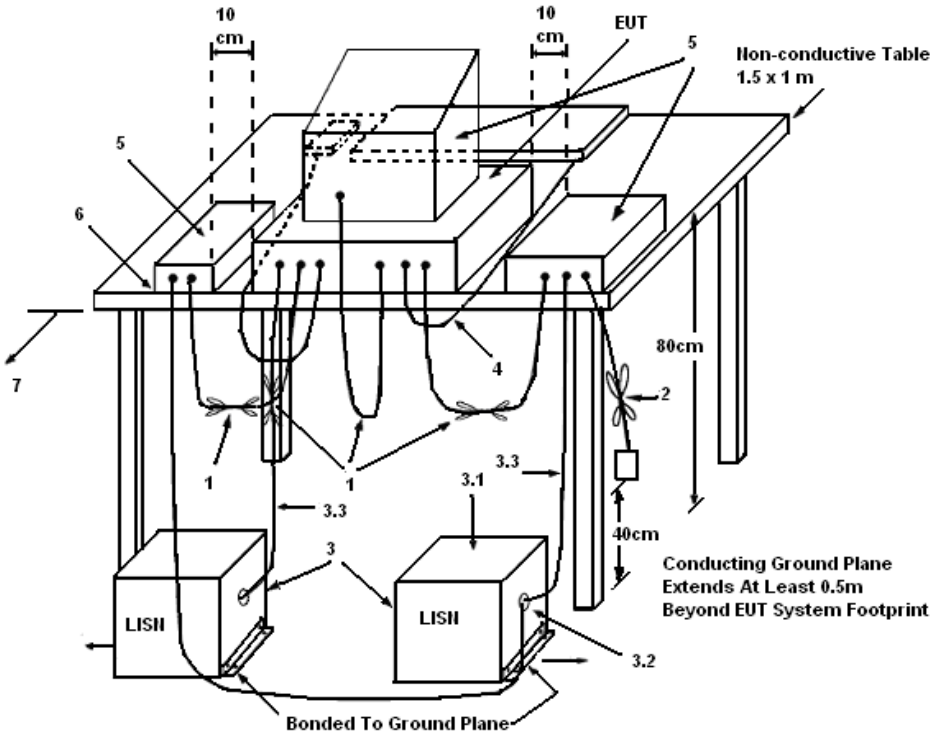
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

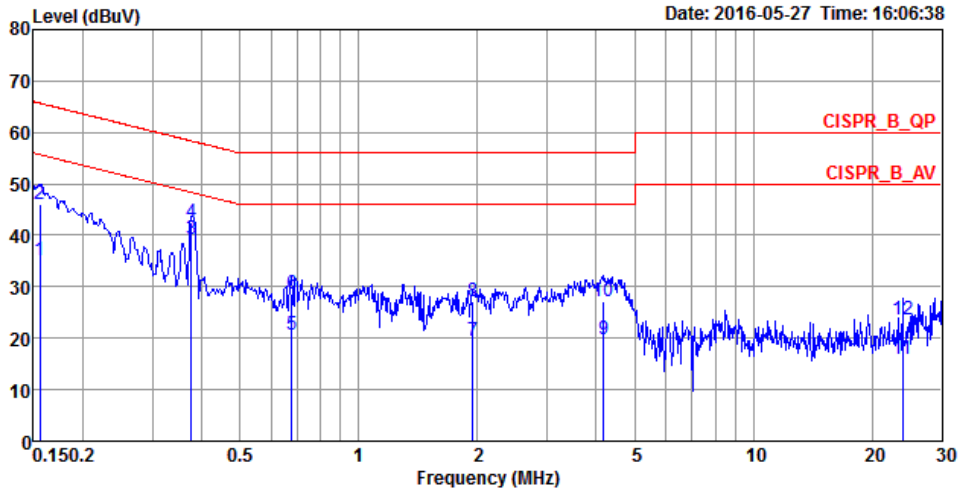
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

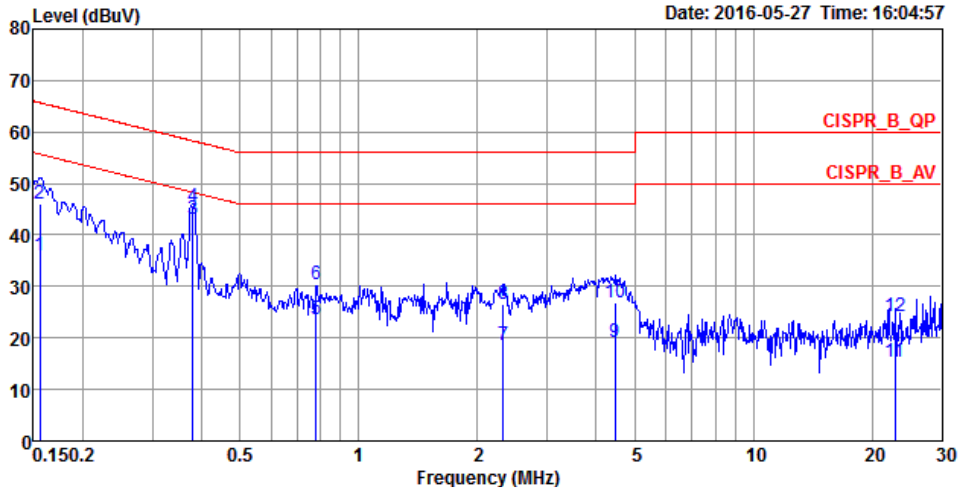
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23℃	Humidity	58%
Test Engineer	Da Deng	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	35.01	-20.68	55.69	24.97	10.02	0.02	LINE	Average
2	0.1557	45.94	-19.75	65.69	35.90	10.02	0.02	LINE	QP
3	0.3771	39.28	-9.06	48.34	29.32	9.92	0.04	LINE	Average
4	0.3771	42.61	-15.73	58.34	32.65	9.92	0.04	LINE	QP
5	0.6754	20.60	-25.40	46.00	10.63	9.93	0.04	LINE	Average
6	0.6754	28.71	-27.29	56.00	18.74	9.93	0.04	LINE	QP
7	1.9489	19.63	-26.37	46.00	9.61	9.96	0.06	LINE	Average
8	1.9489	27.28	-28.72	56.00	17.26	9.96	0.06	LINE	QP
9	4.1796	19.77	-26.23	46.00	9.71	9.99	0.07	LINE	Average
10	4.1796	27.22	-28.78	56.00	17.16	9.99	0.07	LINE	QP
11	23.8878	15.90	-34.10	50.00	5.22	10.41	0.27	LINE	Average
12	23.8878	23.70	-36.30	60.00	13.02	10.41	0.27	LINE	QP

Temperature	23℃	Humidity	58%
Test Engineer	Da Deng	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	36.14	-19.55	55.69	26.10	10.02	0.02	NEUTRAL	Average
2	0.1557	46.18	-19.51	65.69	36.14	10.02	0.02	NEUTRAL	QP
3	0.3791	43.14	-5.16	48.30	33.18	9.92	0.04	NEUTRAL	Average
4	0.3791	45.35	-12.95	58.30	35.39	9.92	0.04	NEUTRAL	QP
5	0.7793	23.68	-22.32	46.00	13.72	9.93	0.03	NEUTRAL	Average
6	0.7793	30.40	-25.60	56.00	20.44	9.93	0.03	NEUTRAL	QP
7	2.3213	18.53	-27.47	46.00	8.51	9.96	0.06	NEUTRAL	Average
8	2.3213	26.59	-29.41	56.00	16.57	9.96	0.06	NEUTRAL	QP
9	4.4540	19.21	-26.79	46.00	9.13	10.00	0.08	NEUTRAL	Average
10	4.4540	26.83	-29.17	56.00	16.75	10.00	0.08	NEUTRAL	QP
11	22.8965	15.21	-34.79	50.00	4.56	10.38	0.27	NEUTRAL	Average
12	22.8965	24.28	-35.72	60.00	13.63	10.38	0.27	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

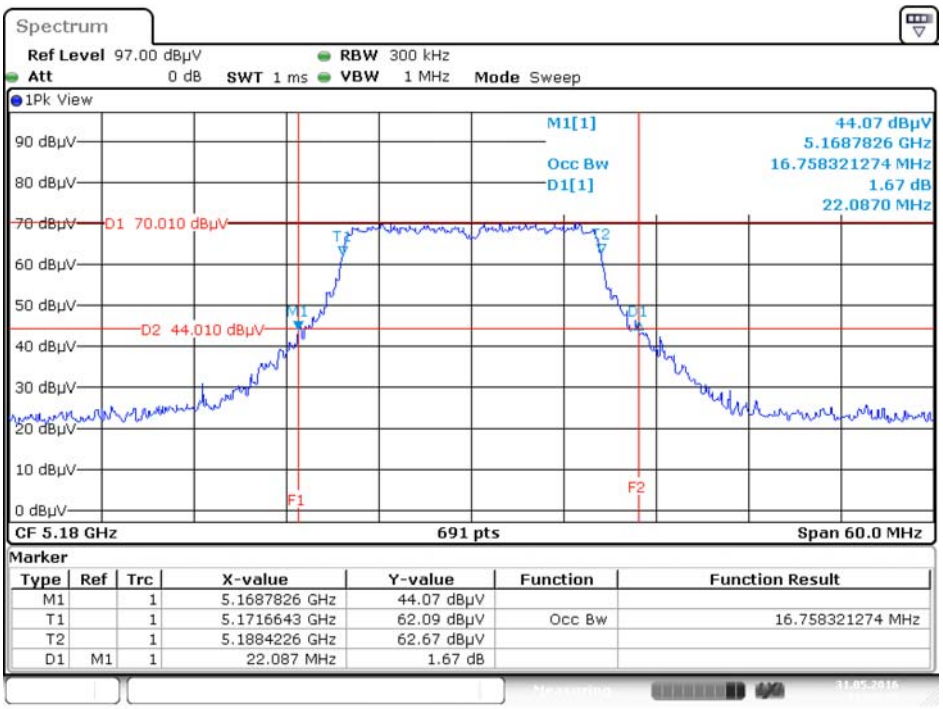
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	24°C	Humidity	60%
Test Engineer	Serway Li		

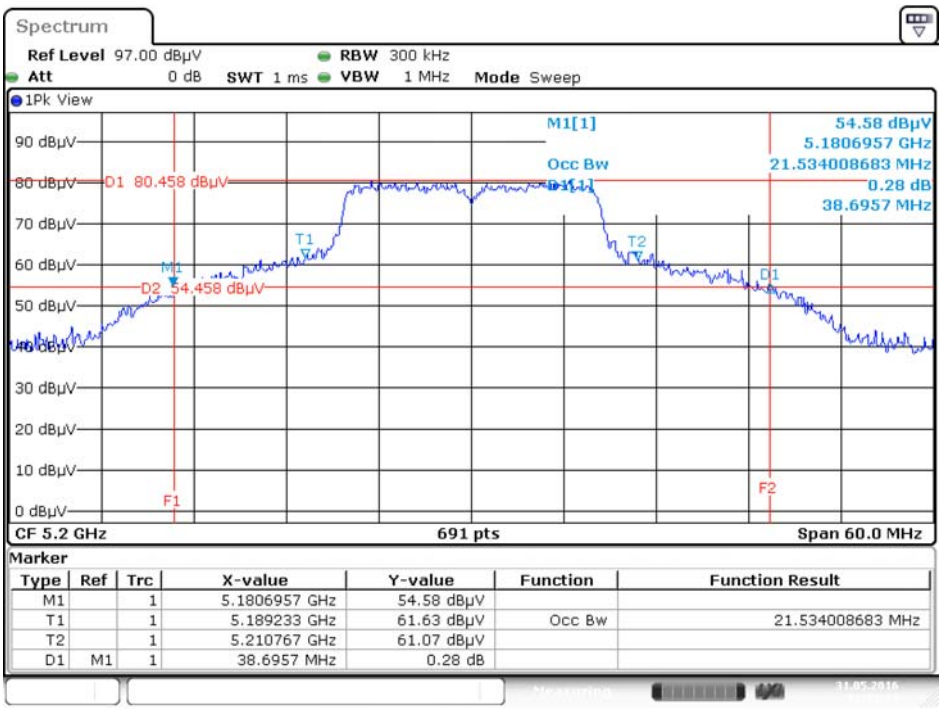
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	22.09	16.76
	5200 MHz	38.70	21.53
	5240 MHz	35.74	18.67
	5745 MHz	37.48	20.67
	5785 MHz	37.04	20.06
	5825 MHz	27.91	17.11
802.11ac MCS0/Nss1 VHT20	5180 MHz	21.22	17.71
	5200 MHz	24.00	18.41
	5240 MHz	24.78	18.50
	5745 MHz	28.35	21.36
	5785 MHz	27.57	20.67
	5825 MHz	26.44	18.67
802.11ac MCS0/Nss1 VHT40	5190 MHz	41.30	36.04
	5230 MHz	42.32	36.04
	5755 MHz	67.25	38.64
	5795 MHz	61.30	38.21
802.11ac MCS0/Nss1 VHT80	5210 MHz	88.12	74.39
	5775 MHz	92.46	76.12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5180 MHz



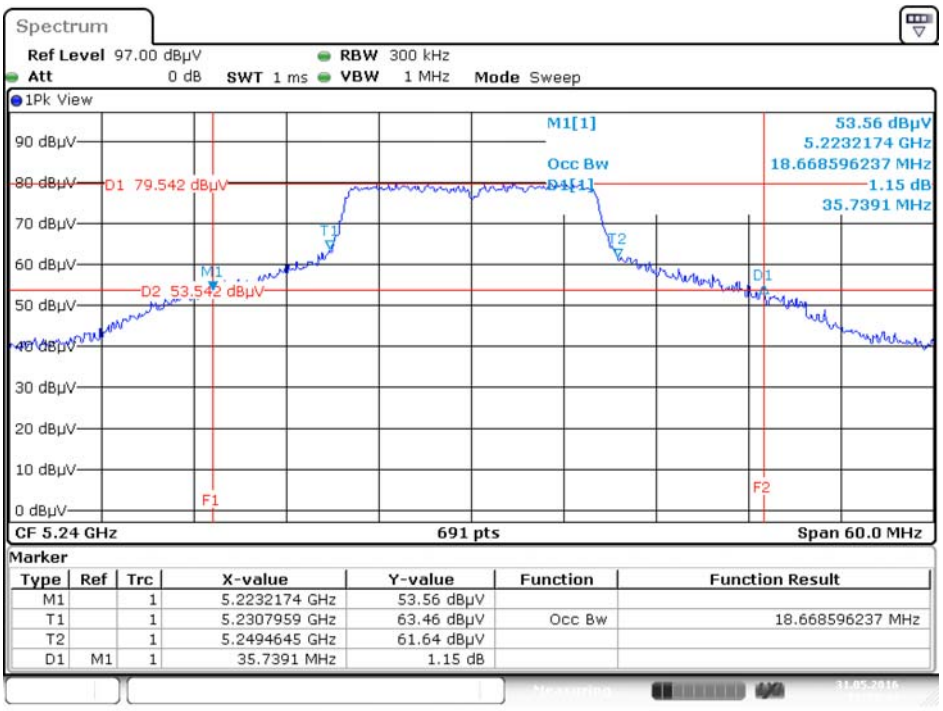
Date: 31.MAY.2016 11:50:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5200 MHz



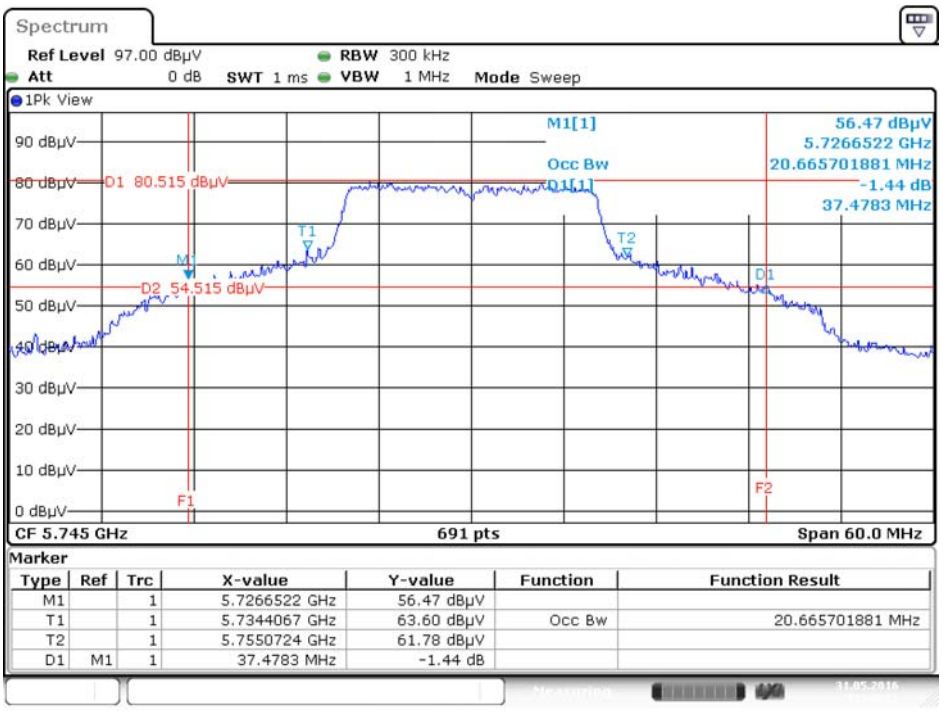
Date: 31.MAY.2016 11:53:13

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5240 MHz



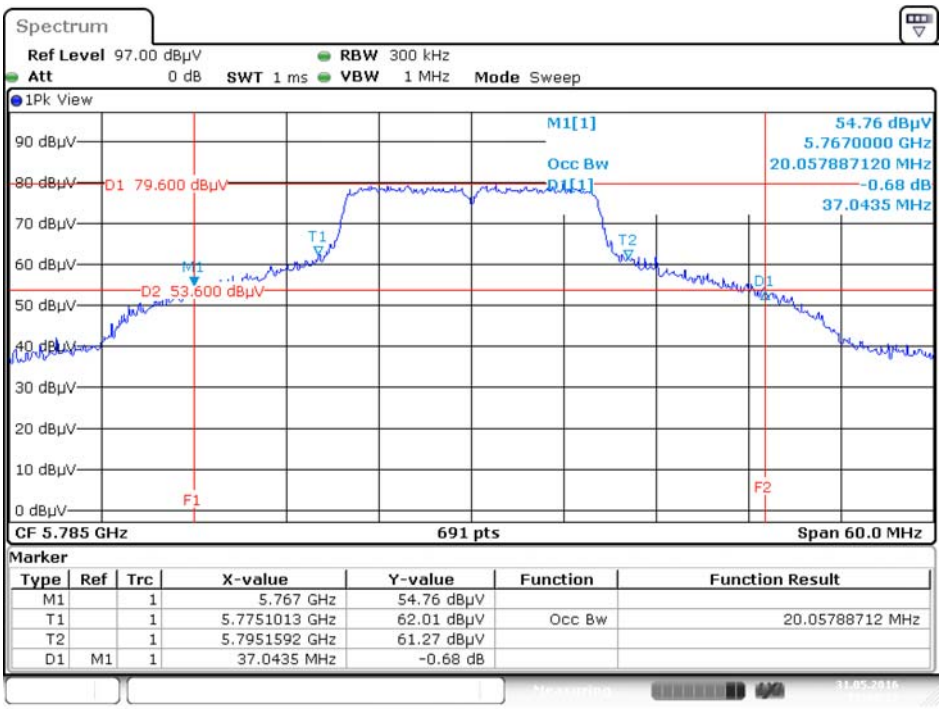
Date: 31.MAY.2016 11:53:44

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5745 MHz



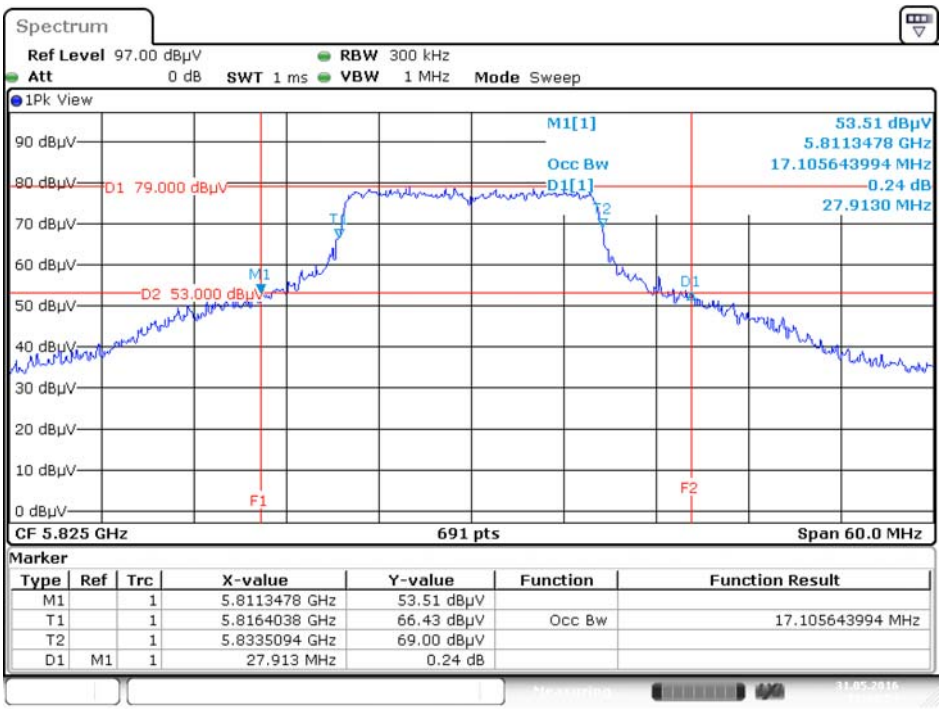
Date: 31.MAY.2016 13:40:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5785 MHz



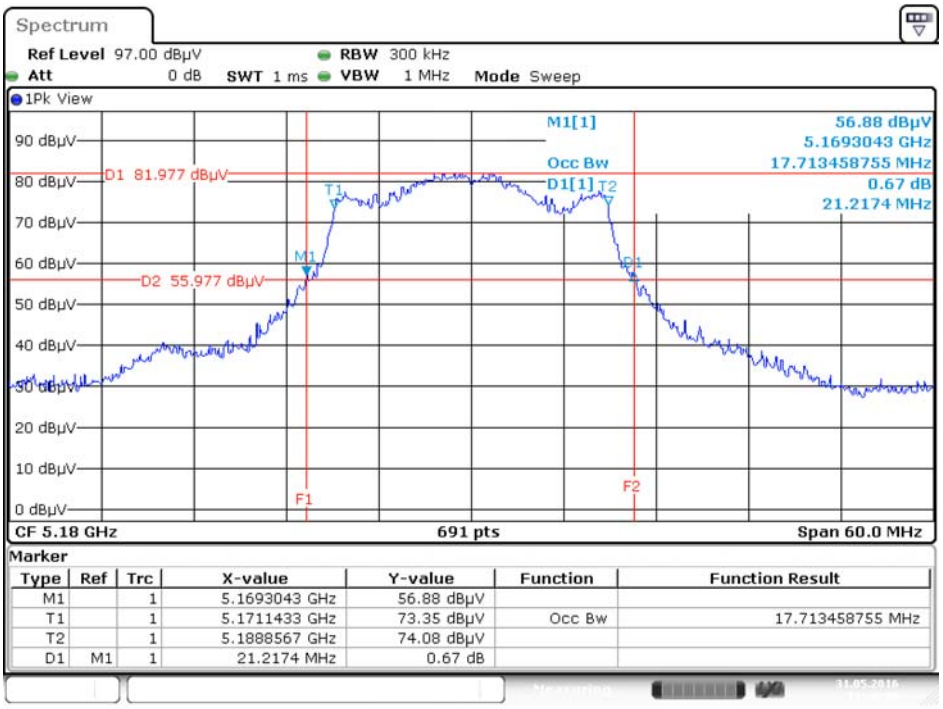
Date: 31.MAY.2016 13:43:23

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5825 MHz



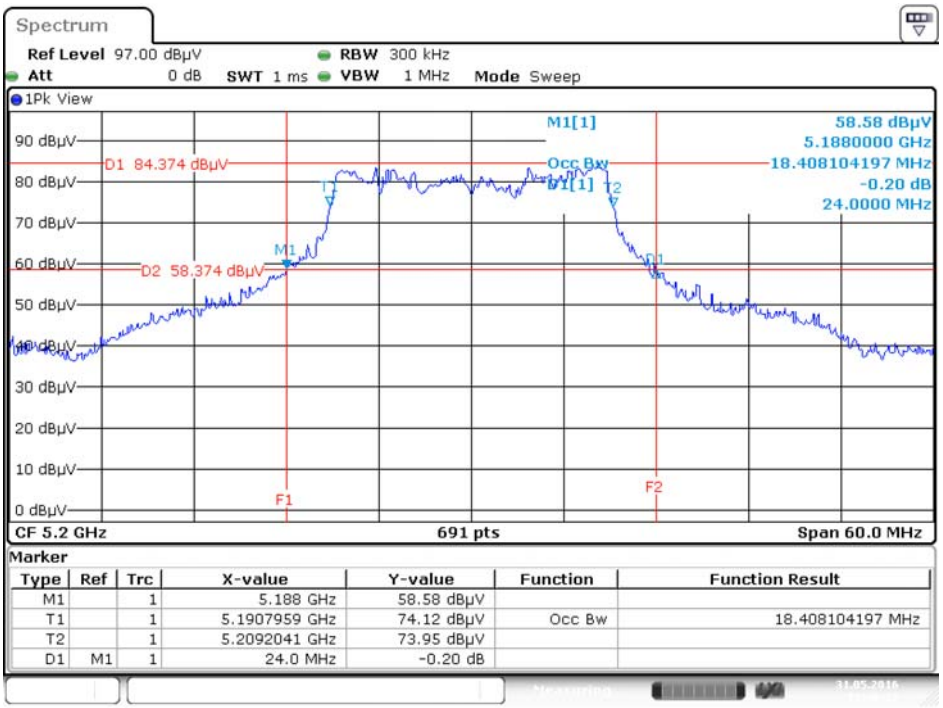
Date: 31.MAY.2016 13:43:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5180 MHz



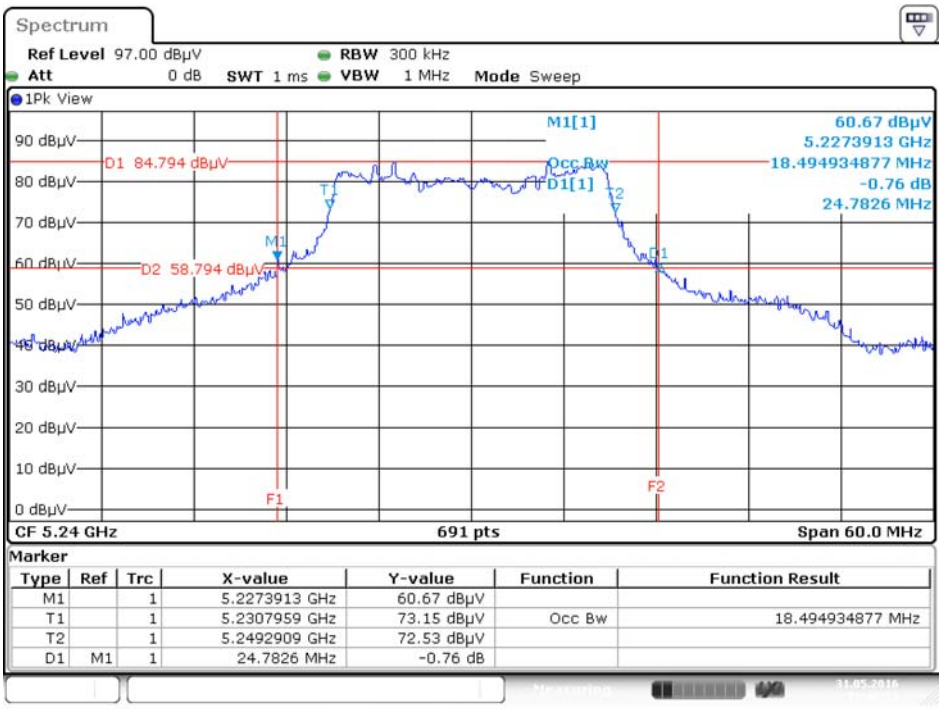
Date: 31.MAY.2016 13:45:28

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5200 MHz



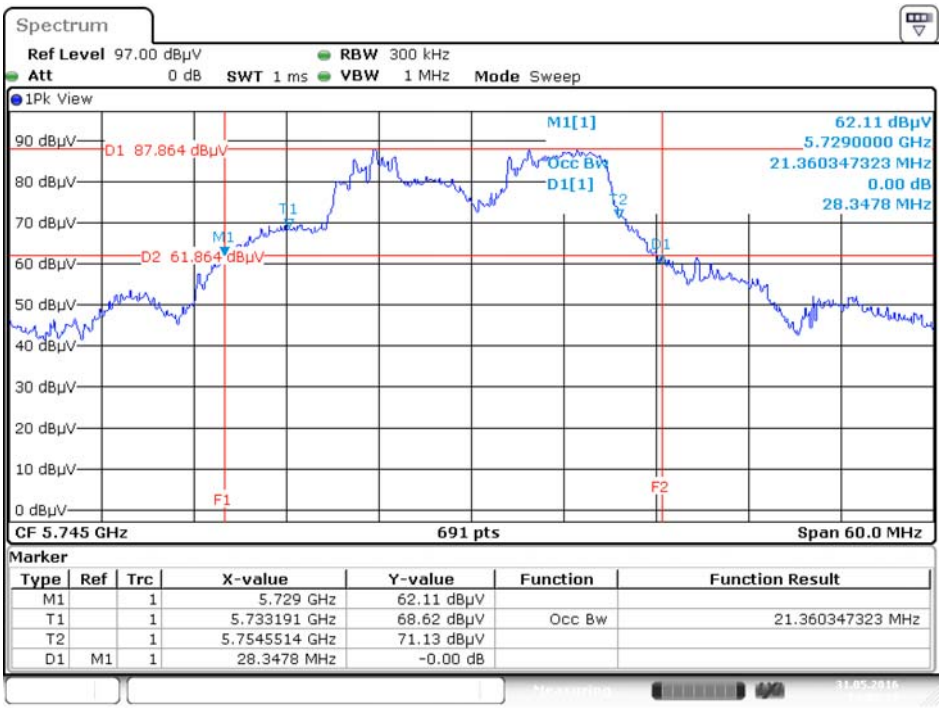
Date: 31.MAY.2016 13:46:12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5240 MHz



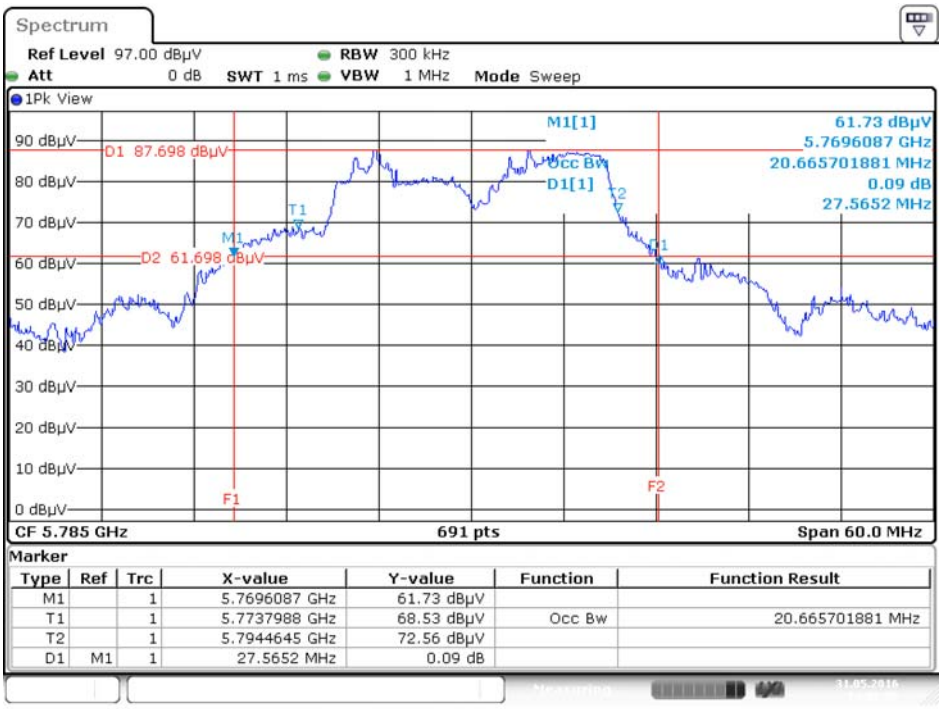
Date: 31.MAY.2016 13:47:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5745 MHz



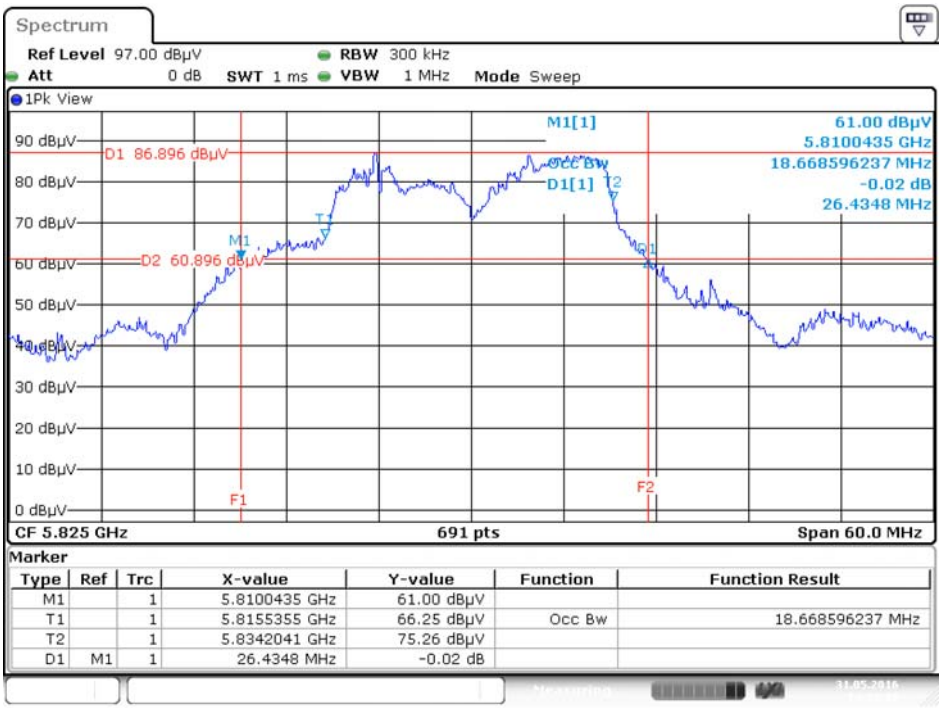
Date: 31.MAY.2016 14:02:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5785 MHz



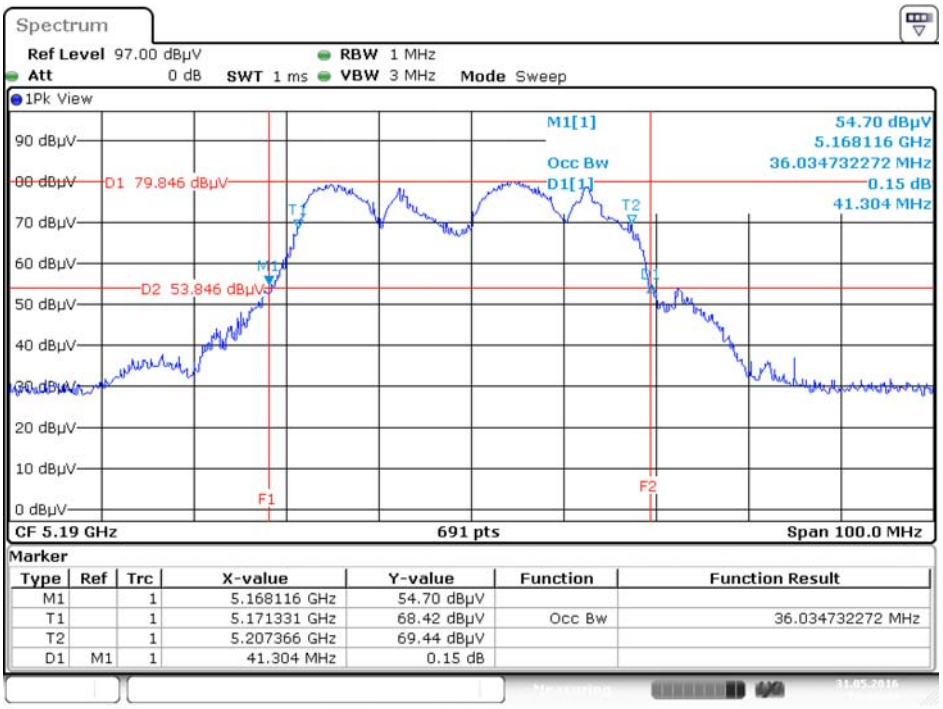
Date: 31.MAY.2016 14:02:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5825 MHz



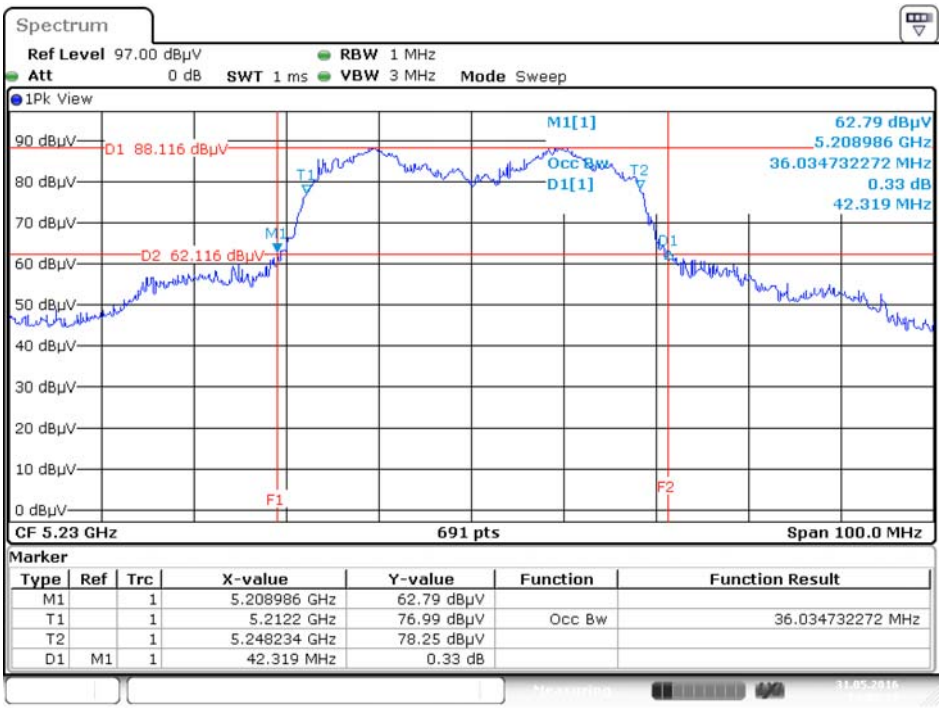
Date: 31.MAY.2016 14:03:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5190 MHz



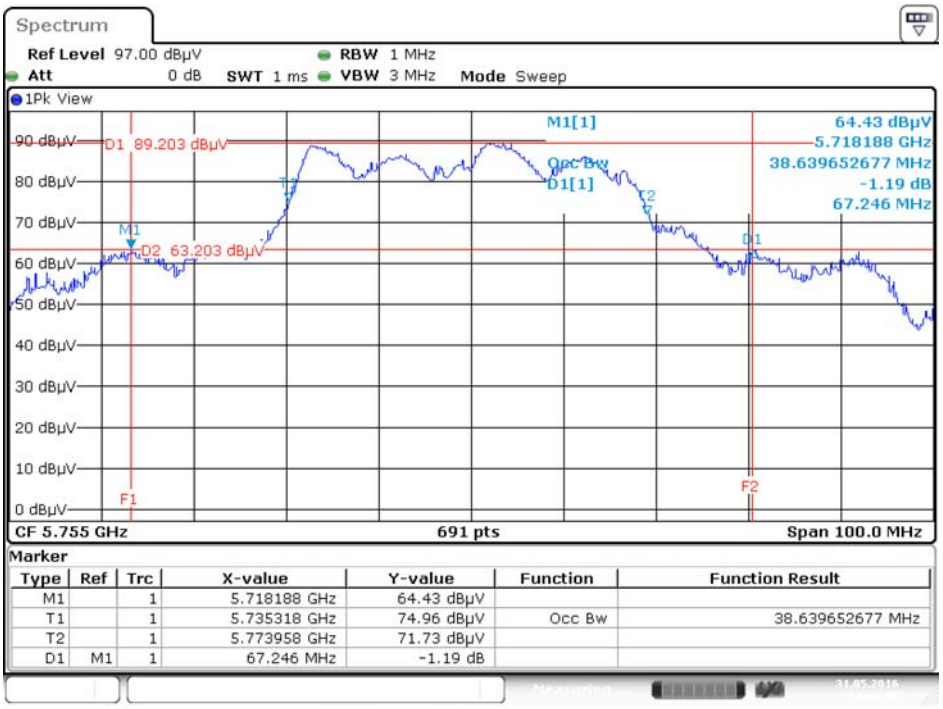
Date: 31.MAY.2016 14:04:45

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5230 MHz



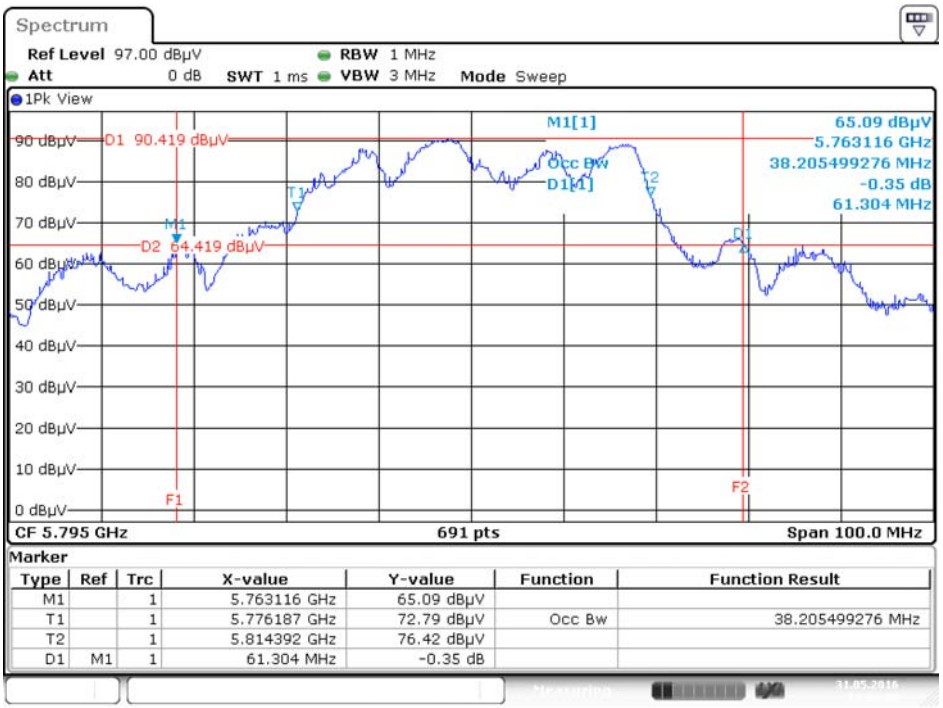
Date: 31.MAY.2016 14:05:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5755 MHz



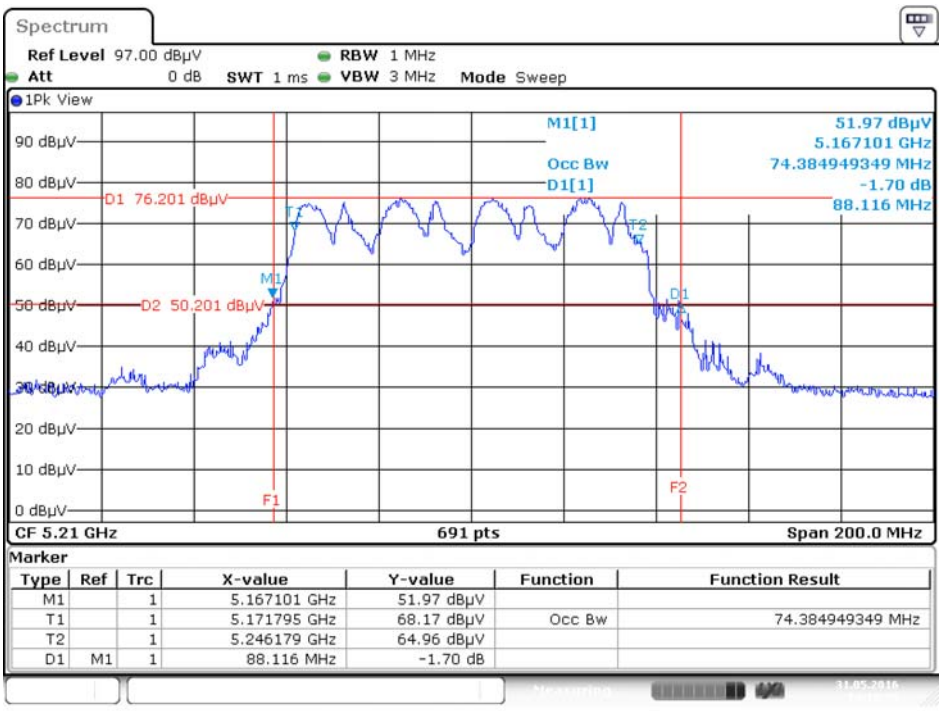
Date: 31.MAY.2016 14:09:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5795 MHz



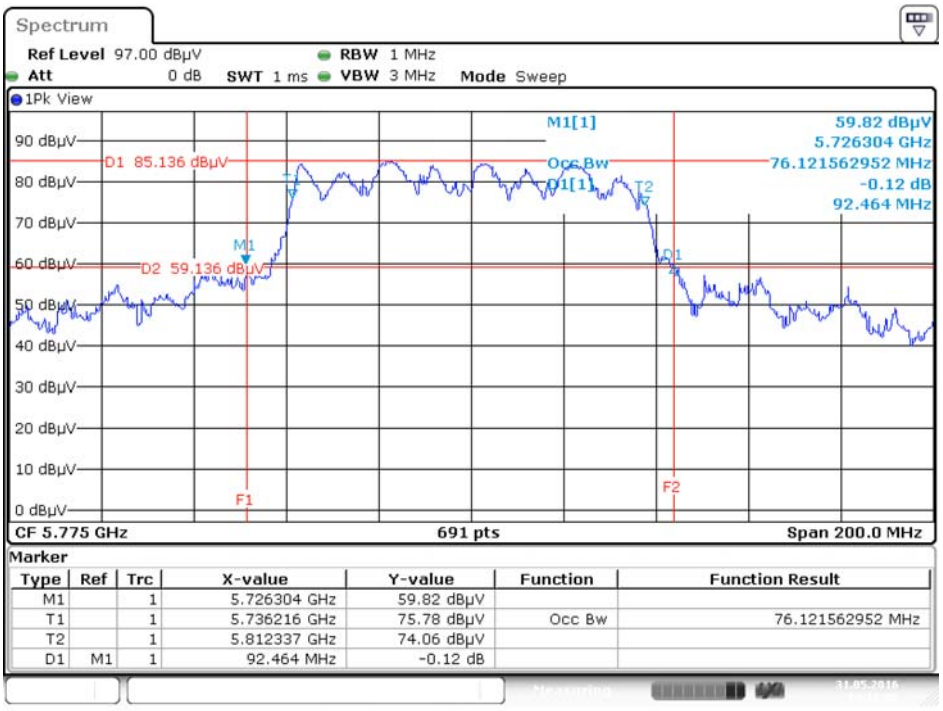
Date: 31.MAY.2016 14:09:28

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5210 MHz



Date: 31.MAY.2016 14:10:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5775 MHz



Date: 31.MAY.2016 14:12:07

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 v01r02 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

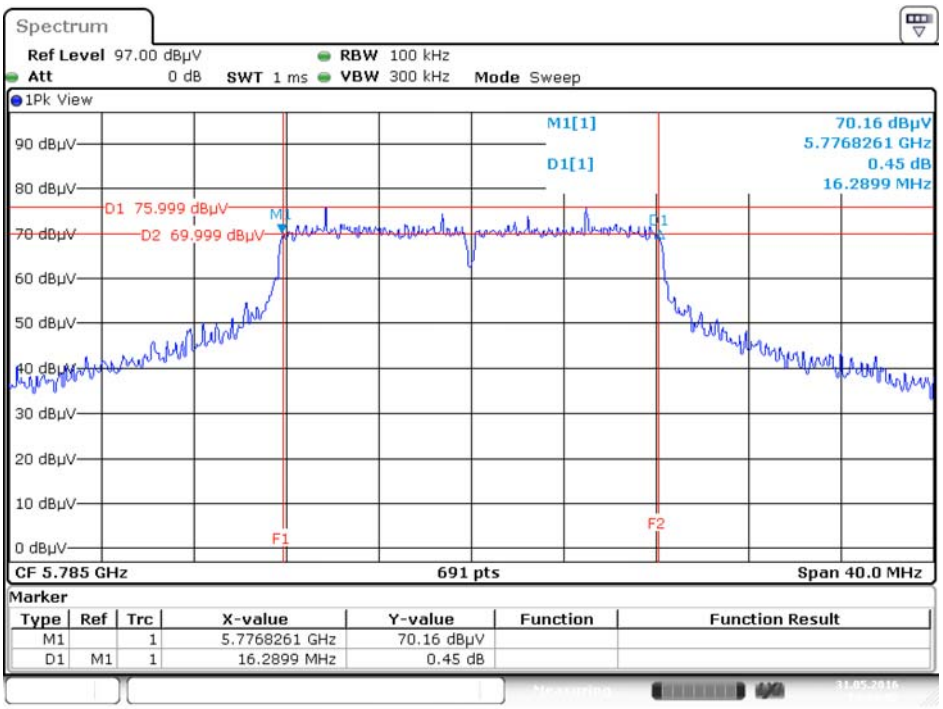
Temperature	24°C	Humidity	60%
Test Engineer	Serway Li		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.35	500	Complies
	5785 MHz	16.29	500	Complies
	5825 MHz	16.35	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	15.13	500	Complies
	5785 MHz	16.35	500	Complies
	5825 MHz	13.80	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	30.73	500	Complies
	5795 MHz	34.44	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	70.15	500	Complies

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

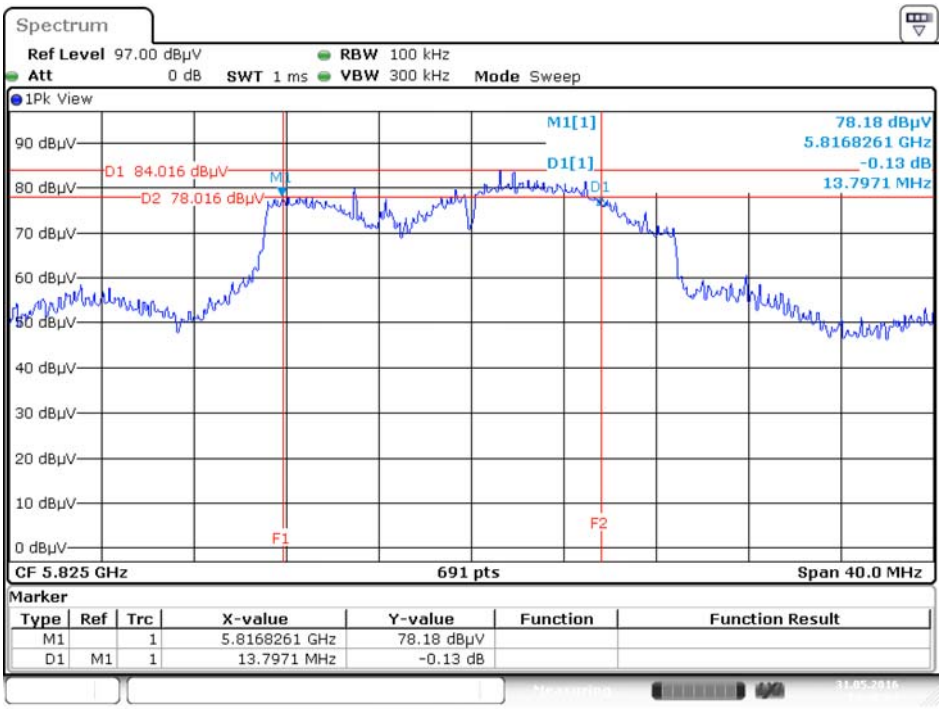
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5785 MHz



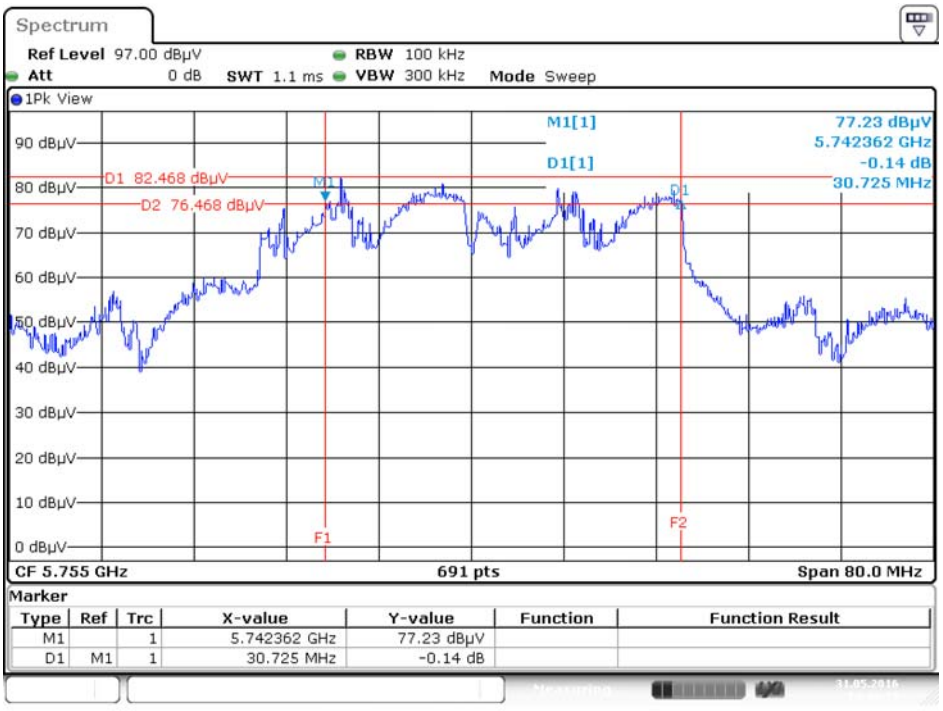
Date: 31.MAY.2016 14:34:03

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5825 MHz



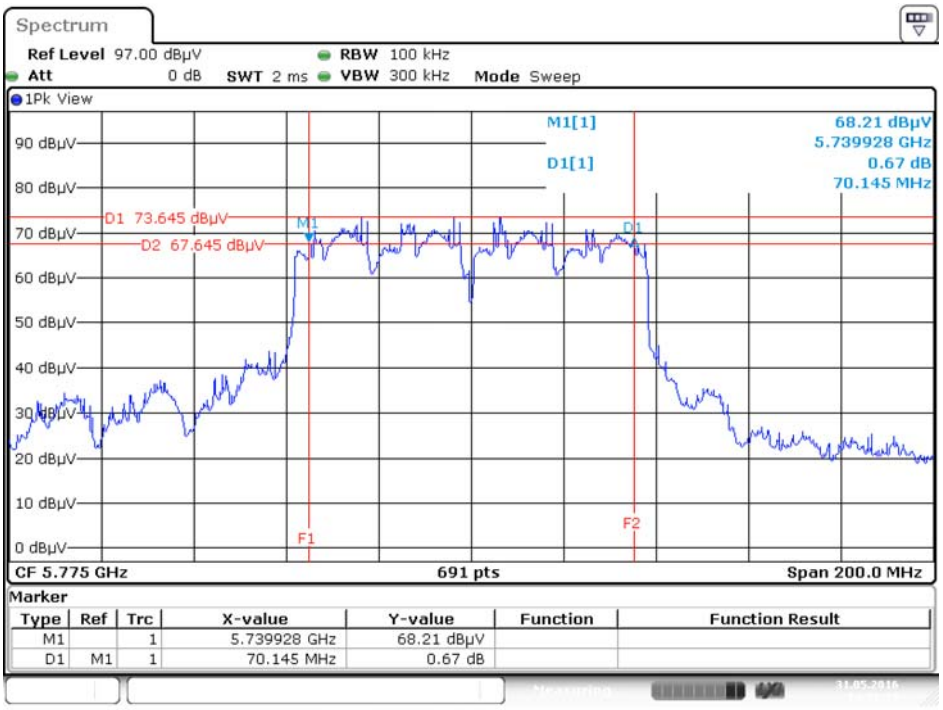
Date: 31.MAY.2016 14:48:04

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5755MHz



Date: 31.MAY.2016 14:49:13

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5775 MHz



Date: 31.MAY.2016 14:51:12

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.
	☐	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

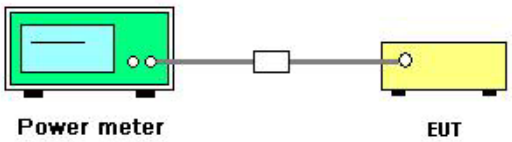
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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

4.4.4. 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

Temperature	24°C	Humidity	60%
Test Engineer	Serway Li	Test Date	May 31, 2016

Mode	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1		
802.11a	5180 MHz	17.23	29.69	Complies
	5200 MHz	23.50	29.69	Complies
	5240 MHz	22.42	29.69	Complies
	5745 MHz	22.05	29.69	Complies
	5785 MHz	22.08	29.69	Complies
	5825 MHz	22.12	29.69	Complies

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	16.38	17.68	18.17	22.24	29.36	Complies
	5200 MHz	19.24	20.06	20.56	24.76	29.36	Complies
	5240 MHz	19.59	19.87	19.91	24.56	29.36	Complies
	5745 MHz	21.35	21.46	22.23	26.47	29.36	Complies
	5785 MHz	21.65	21.35	21.68	26.33	29.36	Complies
	5825 MHz	21.12	21.30	21.25	26.00	29.36	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	13.66	14.46	14.61	19.03	29.36	Complies
	5230 MHz	20.18	20.20	20.44	25.05	29.36	Complies
	5755 MHz	21.13	21.32	21.92	26.24	29.36	Complies
	5795 MHz	21.02	21.14	21.88	26.13	29.36	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	10.54	10.96	11.20	15.68	29.36	Complies
	5775 MHz	19.85	19.73	20.38	24.77	29.36	Complies

Note:

802.11a: Ant. Gain=6.31dBi, so limit =30-(6.31-6)=29.69 dBm

802.11ac MCS0/Nss1 VHT20/VHT40/VHT80: Ant. Gain=6.69dBi, so limit =30-(6.64-6)=29.36 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
	☐	Client devices	11 dBm/MHz
☒	5.725~5.85 GHz		30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

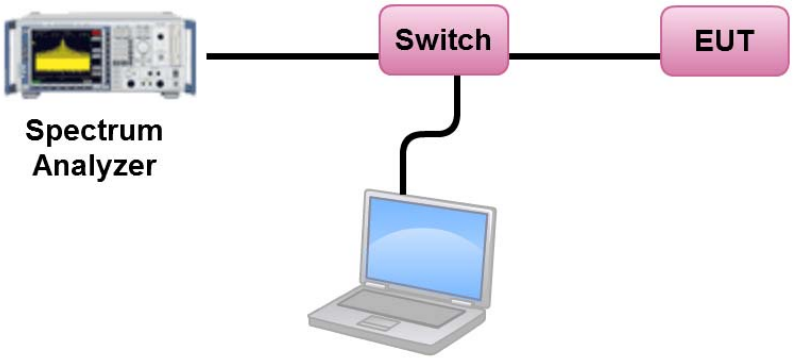
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements and sum the spectra across the outputs.
4. For 5.725~5.85 GHz, the measured result of PSD level must add 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

Temperature	24°C	Humidity	60%
Test Engineer	Serway Li	Test Date	May 31, 2016

Configuration IEEE 802.11a / Ant. 1

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	3.90	16.69	Complies
40	5200 MHz	10.23	16.69	Complies
48	5240 MHz	9.16	16.69	Complies

Note: Ant. Gain =6.31dBi, so limit =17-(6.31-6)=16.69 (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	8.88	-3.01	5.87	29.69	Complies
157	5785 MHz	8.94	-3.01	5.93	29.69	Complies
165	5825 MHz	8.99	-3.01	5.98	29.69	Complies

Note: Ant. Gain =6.31dBi, so limit =30-(6.31-6)=26.69 (dBm/500kHz)

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	9.04	11.90	Complies
40	5200 MHz	11.58	11.90	Complies
48	5240 MHz	11.40	11.90	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =11.10dBi, so limit=17 – (11.10 – 6)=11.90(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	13.10	-3.01	10.09	24.90	Complies
157	5785 MHz	12.98	-3.01	9.97	24.90	Complies
165	5825 MHz	12.69	-3.01	9.68	24.90	Complies

Note: $Directiond\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =11.10dBi, so limit=30 – (11.10 – 6)=24.90(dBm/500kHz)

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	2.74	11.90	Complies
46	5230 MHz	8.81	11.90	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =11.10dBi, so limit=17 – (11.10 – 6)=11.90(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	10.06	-3.01	7.05	24.90	Complies
159	5795 MHz	9.98	-3.01	6.97	24.90	Complies

Note: $Directiond\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =11.10dBi, so limit=30 – (11.10 – 6)=24.90(dBm/500kHz)

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.44	11.90	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =11.10dBi, so limit=17 – (11.10 – 6)=11.90(dBm/MHz)

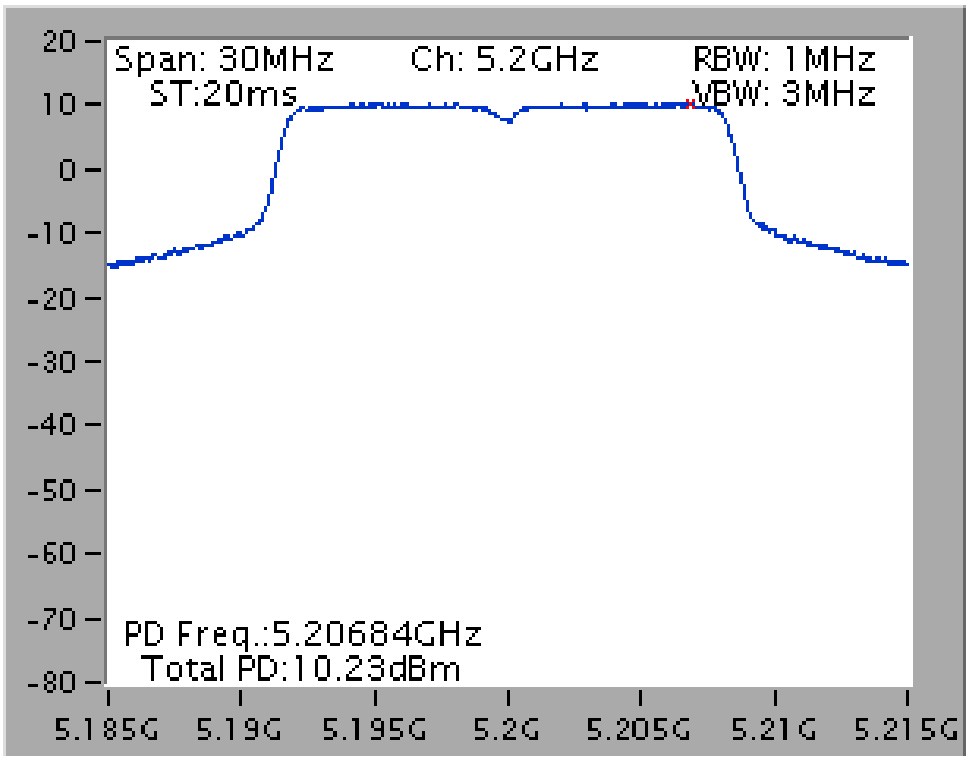
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	5.63	-3.01	2.62	24.90	Complies

Note: $Directiond\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =11.10dBi, so limit=30 – (11.10 – 6)=24.90(dBm/500kHz)

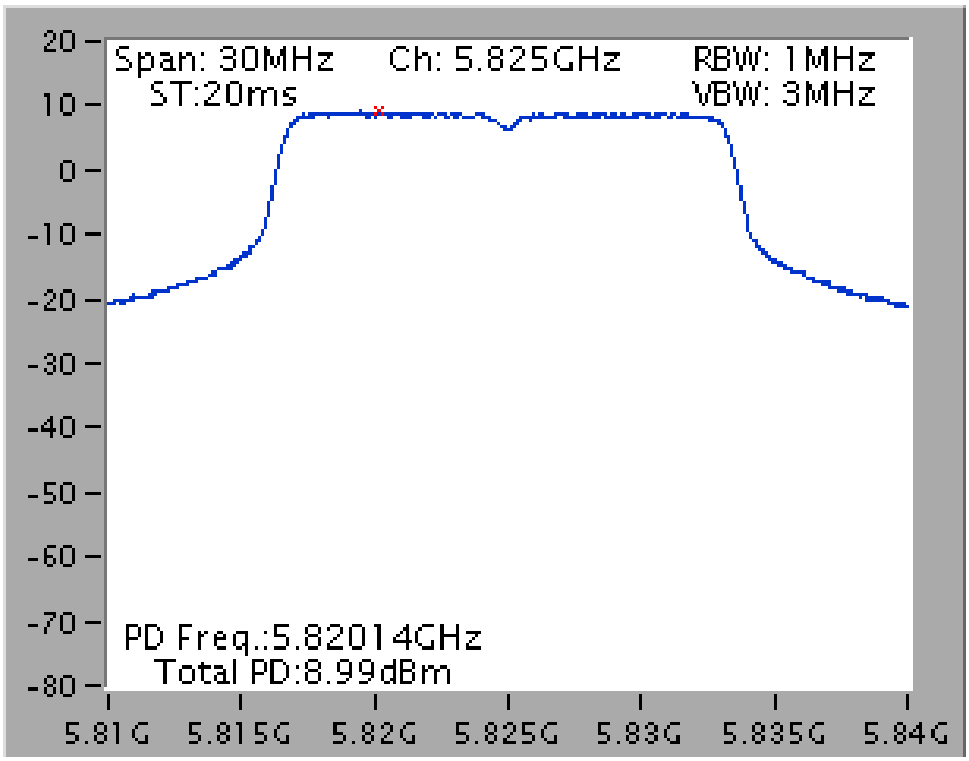
Note: All the test values were listed in the report.

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

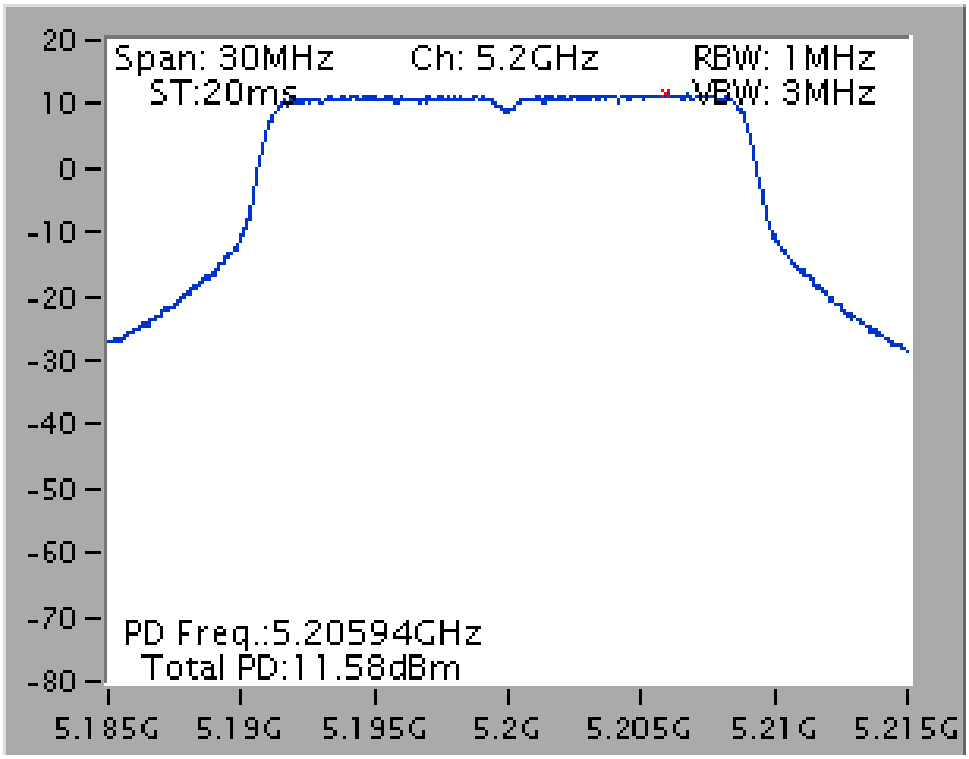
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5200 MHz



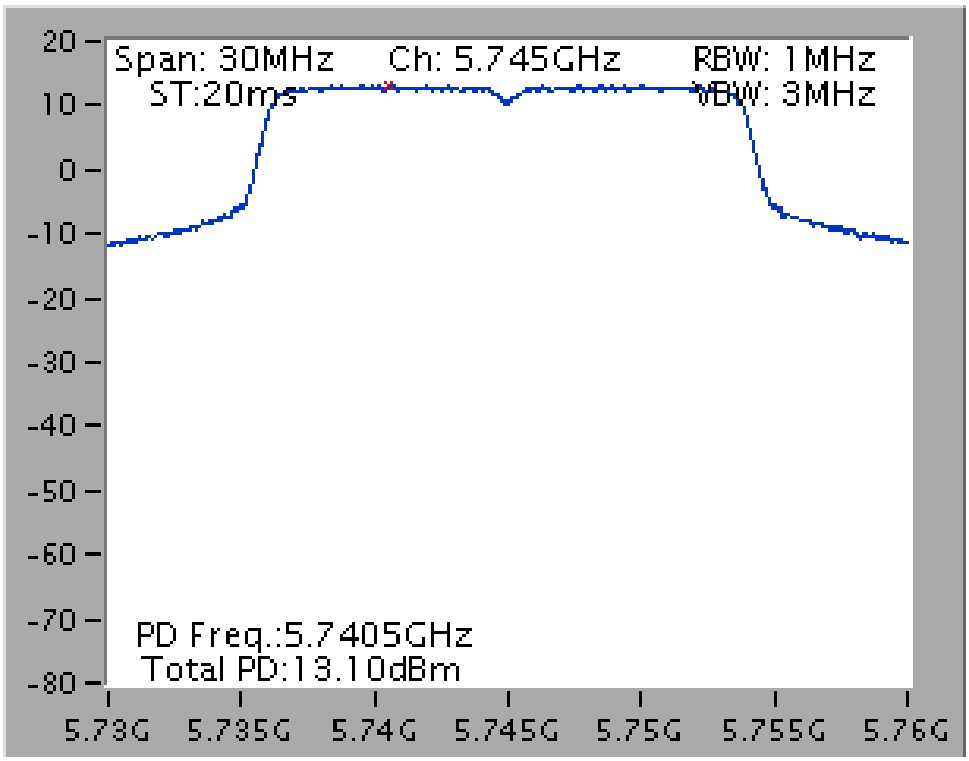
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5825 MHz



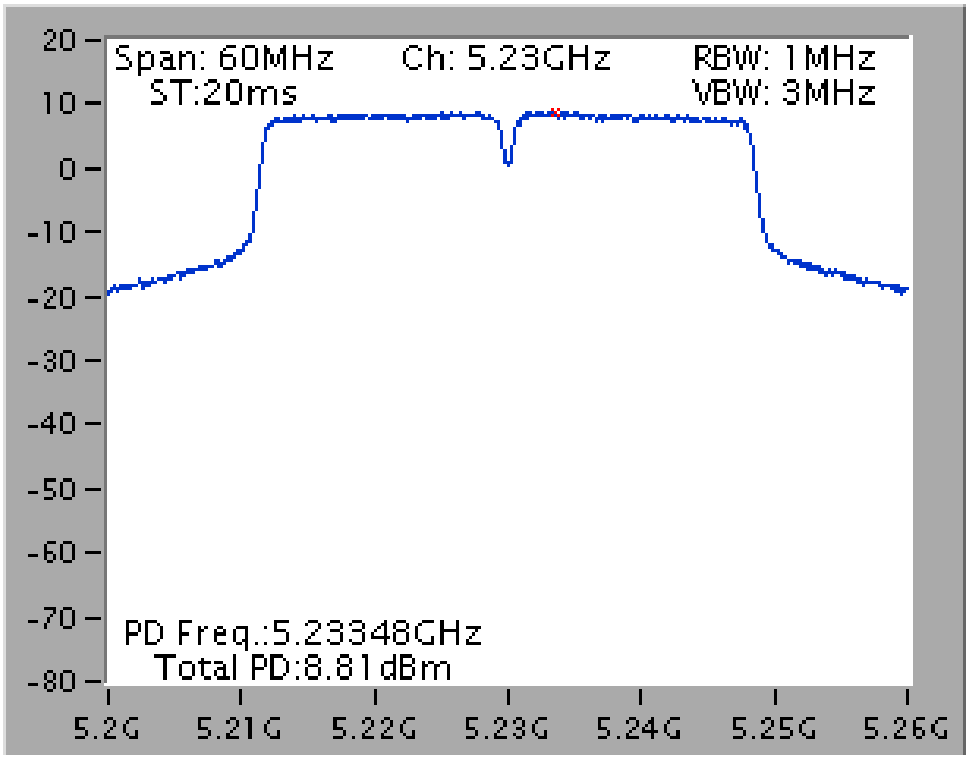
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5200MHz



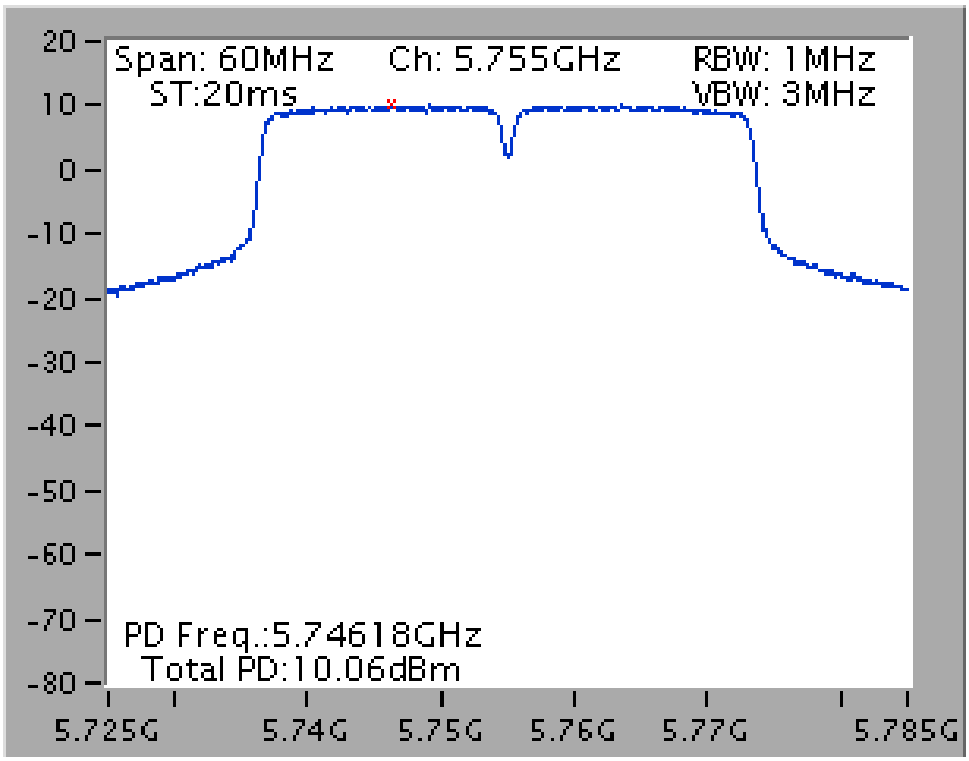
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5745 MHz



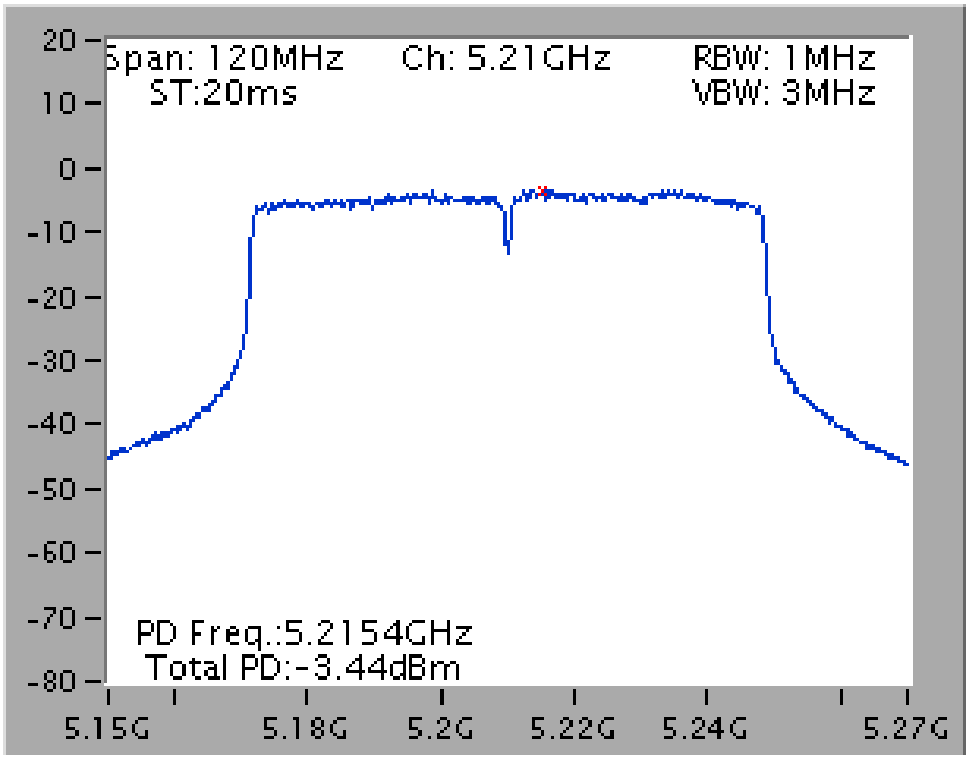
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5230 MHz



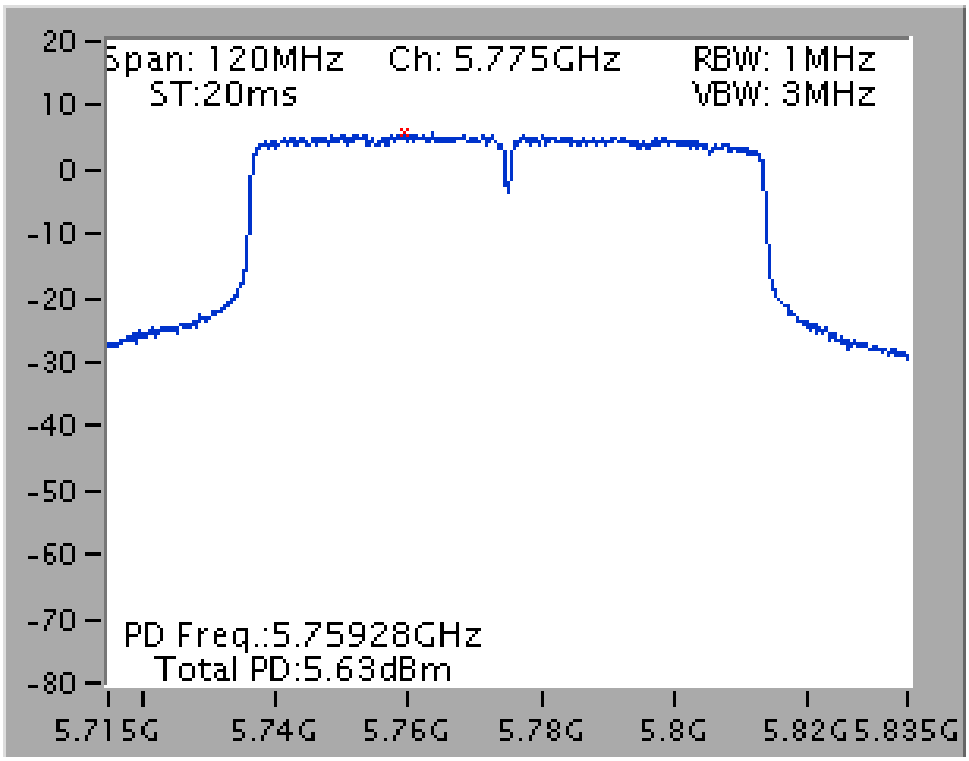
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5755 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5210 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 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 shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

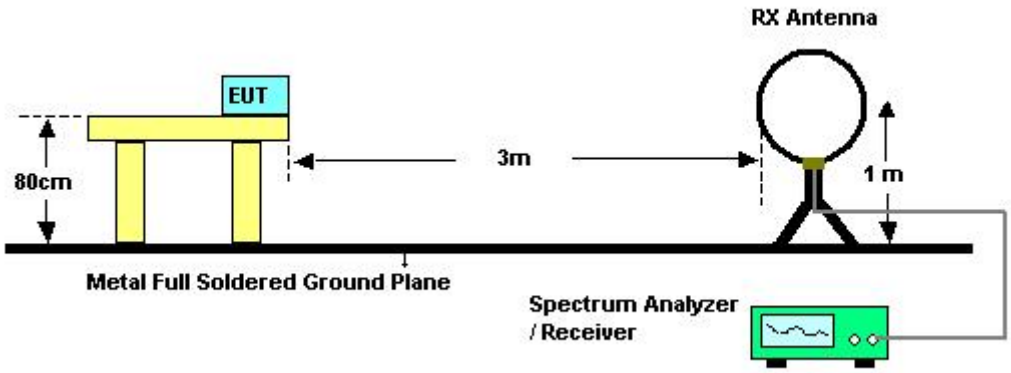
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

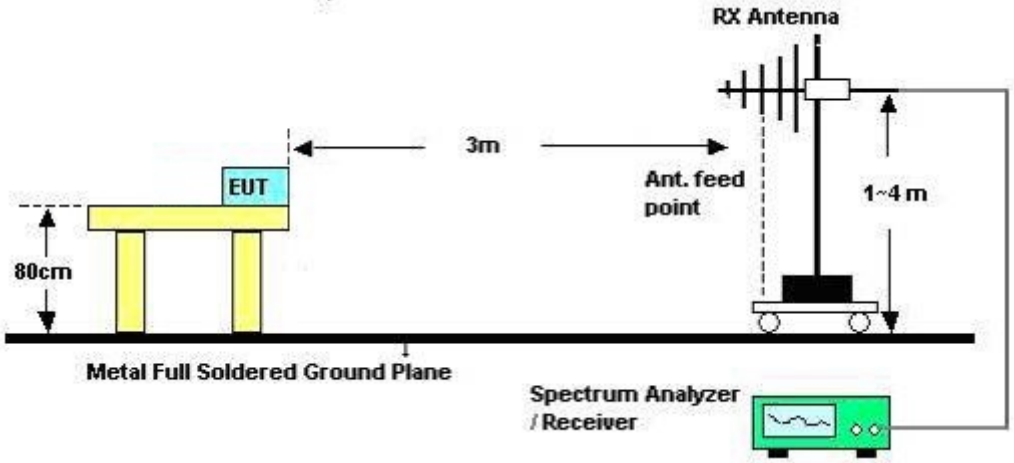
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

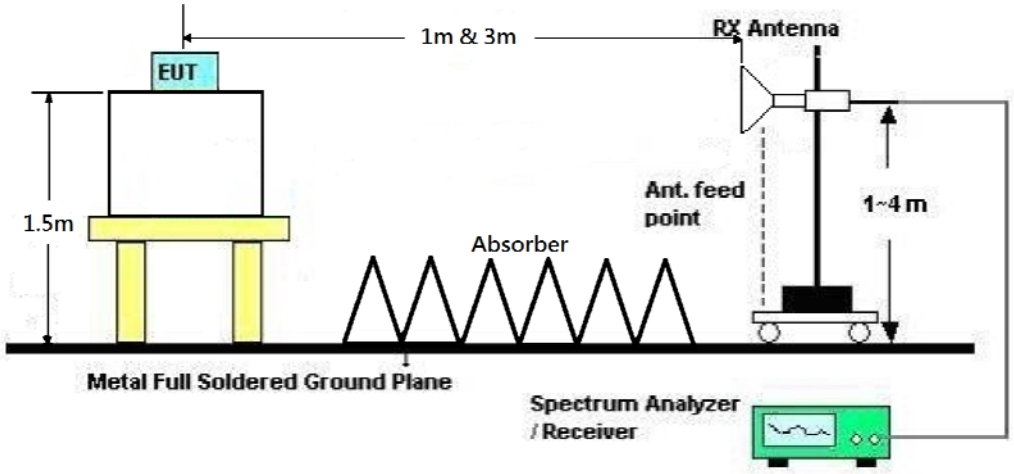
For Radiated Emissions: 9kHz ~30MHz



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

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	Normal Link
Test Date	Jun. 03, 2016	Test Mode	Mode 3

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

Note:

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

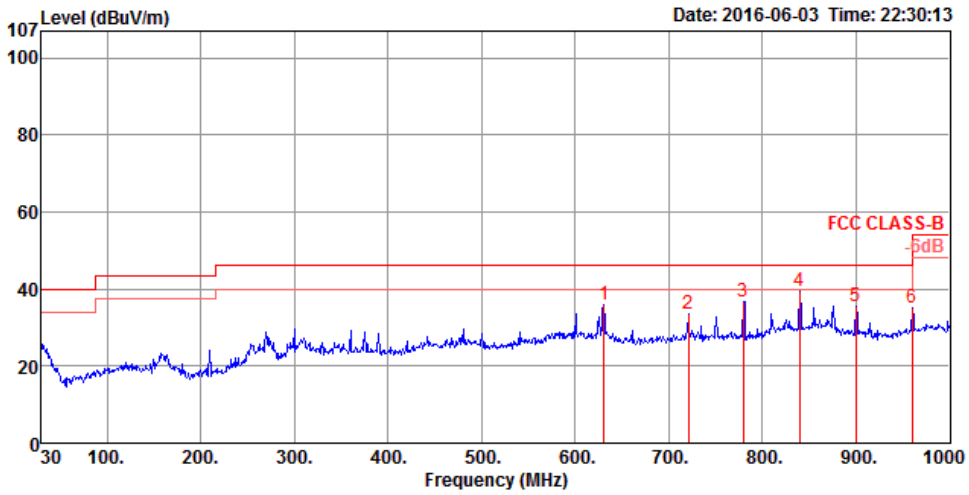
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

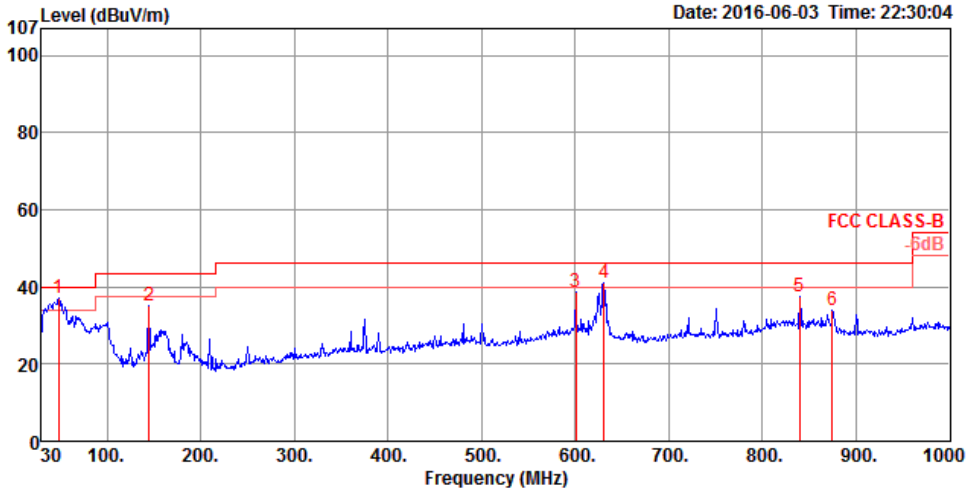
Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	Normal Link
Test Mode	Mode 3		

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	630.43	35.94	46.00	-10.06	41.21	1.98	25.20	32.45	125	205	Peak	HORIZONTAL
2	720.64	33.60	46.00	-12.40	38.28	2.13	25.73	32.54	125	168	Peak	HORIZONTAL
3	779.81	36.81	46.00	-9.19	40.77	2.25	26.31	32.52	100	182	Peak	HORIZONTAL
4	839.95	39.44	46.00	-6.56	42.72	2.34	26.89	32.51	100	161	Peak	HORIZONTAL
5	900.09	35.57	46.00	-10.43	38.32	2.40	27.30	32.45	125	336	Peak	HORIZONTAL
6	960.23	35.05	54.00	-18.95	37.36	2.44	27.72	32.47	100	172	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	48.43	36.99	40.00	-3.01	52.69	0.61	15.43	31.74	125	72	Peak	VERTICAL
2	144.46	35.14	43.50	-8.36	48.73	0.95	17.34	31.88	100	108	Peak	VERTICAL
3	600.36	38.74	46.00	-7.26	44.32	1.93	24.90	32.41	125	331	Peak	VERTICAL
4	630.43	40.93	46.00	-5.07	46.20	1.98	25.20	32.45	150	346	Peak	VERTICAL
5	839.95	37.42	46.00	-8.58	40.70	2.34	26.89	32.51	125	158	Peak	VERTICAL
6	874.87	34.01	46.00	-11.99	36.97	2.38	27.15	32.49	100	328	Peak	VERTICAL

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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)

Temperature	23°C	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 36 / Ant. 1
Test Date	May 21, 2016		

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	15541.28	61.12	74.00	-12.88	44.96	13.26	38.25	35.35	105	49	Peak	HORIZONTAL
2	15541.72	47.98	54.00	-6.02	31.82	13.26	38.25	35.35	105	49	Average	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	15537.56	47.93	54.00	-6.07	31.77	13.26	38.25	35.35	100	0	Average	VERTICAL
2	15541.62	60.58	74.00	-13.42	44.42	13.26	38.25	35.35	100	0	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 40 / Ant. 1
Test Date	May 21, 2016		

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	15597.20	60.24	74.00	-13.76	44.13	13.28	38.19	35.36	110	285	Peak	HORIZONTAL
2	15599.00	48.08	54.00	-5.92	31.97	13.28	38.19	35.36	110	285	Average	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	15599.00	60.58	74.00	-13.42	44.47	13.28	38.19	35.36	112	50	Peak	VERTICAL
2	15599.64	50.53	54.00	-3.47	34.42	13.28	38.19	35.36	112	50	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 48 / Ant. 1
Test Date	May 21, 2016		

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	15719.86	47.67	54.00	-6.33	31.67	13.35	38.03	35.38	112	192	Average	HORIZONTAL
2	15719.88	59.96	74.00	-14.04	43.96	13.35	38.03	35.38	112	192	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	15719.30	49.89	54.00	-4.11	33.89	13.35	38.03	35.38	105	3	Average	VERTICAL
2	15719.96	60.57	74.00	-13.43	44.57	13.35	38.03	35.38	105	3	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 149 / Ant. 1
Test Date	May 21, 2016		

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	11490.36	45.03	54.00	-8.97	28.66	11.60	40.00	35.23	116	323	Average	HORIZONTAL
2	11491.92	57.87	74.00	-16.13	41.50	11.60	40.00	35.23	116	323	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	11485.08	58.09	74.00	-15.91	41.72	11.60	40.00	35.23	116	155	Peak	VERTICAL
2	11485.62	45.18	54.00	-8.82	28.81	11.60	40.00	35.23	116	155	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 157 / Ant. 1
Test Date	May 21, 2016		

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	11571.24	58.47	74.00	-15.53	42.19	11.64	39.87	35.23	114	214	Peak	HORIZONTAL
2	11574.00	45.80	54.00	-8.20	29.52	11.64	39.87	35.23	114	214	Average	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	11567.30	58.44	74.00	-15.56	42.16	11.64	39.87	35.23	111	337	Peak	VERTICAL
2	11573.10	45.75	54.00	-8.25	29.47	11.64	39.87	35.23	111	337	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 165 / Ant. 1
Test Date	May 21, 2016		

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	11648.66	46.52	54.00	-7.48	30.32	11.69	39.73	35.22	120	104	Average	HORIZONTAL
2	11648.82	59.49	74.00	-14.51	43.29	11.69	39.73	35.22	120	104	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	11645.54	46.30	54.00	-7.70	30.10	11.69	39.73	35.22	125	181	Average	VERTICAL
2	11648.96	58.94	74.00	-15.06	42.74	11.69	39.73	35.22	125	181	Peak	VERTICAL

Temperature	23°C	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	15538.78	47.87	54.00	-6.13	31.71	13.26	38.25	35.35	124	108	Average	HORIZONTAL
2	15544.04	60.62	74.00	-13.38	44.46	13.26	38.25	35.35	124	108	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	15540.94	61.58	74.00	-12.42	45.42	13.26	38.25	35.35	123	3	Peak	VERTICAL
2	15541.16	47.82	54.00	-6.18	31.66	13.26	38.25	35.35	123	3	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	15602.46	60.78	74.00	-13.22	44.69	13.31	38.14	35.36	126	290	Peak	HORIZONTAL
2	15604.38	47.44	54.00	-6.56	31.35	13.31	38.14	35.36	126	290	Average	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	15597.62	47.34	54.00	-6.66	31.23	13.28	38.19	35.36	125	193	Average	VERTICAL
2	15599.94	60.15	74.00	-13.85	44.04	13.28	38.19	35.36	125	193	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	15716.08	46.85	54.00	-7.15	30.85	13.35	38.03	35.38	124	262	Average	HORIZONTAL
2	15719.40	59.72	74.00	-14.28	43.72	13.35	38.03	35.38	124	262	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	15715.80	60.46	74.00	-13.54	44.46	13.35	38.03	35.38	123	70	Peak	VERTICAL
2	15720.50	47.75	54.00	-6.25	31.75	13.35	38.03	35.38	123	70	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	11490.76	57.21	74.00	-16.79	40.84	11.60	40.00	35.23	128	309	Peak	HORIZONTAL
2	11493.06	44.93	54.00	-9.07	28.56	11.60	40.00	35.23	128	309	Average	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	11486.32	44.78	54.00	-9.22	28.41	11.60	40.00	35.23	139	276	Average	VERTICAL
2	11493.72	57.08	74.00	-16.92	40.71	11.60	40.00	35.23	139	276	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	11567.54	45.60	54.00	-8.40	29.32	11.64	39.87	35.23	144	271	Average	HORIZONTAL
2	11567.92	58.46	74.00	-15.54	42.18	11.64	39.87	35.23	144	271	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	11569.60	45.56	54.00	-8.44	29.28	11.64	39.87	35.23	142	357	Average	VERTICAL
2	11570.82	58.24	74.00	-15.76	41.96	11.64	39.87	35.23	142	357	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	11646.28	45.98	54.00	-8.02	29.78	11.69	39.73	35.22	140	253	Average	HORIZONTAL
2	11648.62	59.09	74.00	-14.91	42.89	11.69	39.73	35.22	140	253	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	11648.68	46.99	54.00	-7.01	30.79	11.69	39.73	35.22	140	227	Average	VERTICAL
2	11654.24	58.56	74.00	-15.44	42.40	11.71	39.67	35.22	140	227	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	15565.94	60.34	74.00	-13.66	44.23	13.28	38.19	35.36	130	148	Peak	HORIZONTAL
2	15573.40	47.33	54.00	-6.67	31.22	13.28	38.19	35.36	130	148	Average	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	15568.86	60.12	74.00	-13.88	44.01	13.28	38.19	35.36	136	11	Peak	VERTICAL
2	15570.18	47.27	54.00	-6.73	31.16	13.28	38.19	35.36	136	11	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	15690.34	46.78	54.00	-7.22	30.74	13.33	38.08	35.37	114	116	Average	HORIZONTAL
2	15693.36	60.41	74.00	-13.59	44.40	13.35	38.03	35.37	114	116	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	15688.68	47.03	54.00	-6.97	30.99	13.33	38.08	35.37	138	223	Average	VERTICAL
2	15689.02	59.82	74.00	-14.18	43.78	13.33	38.08	35.37	138	223	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	11505.48	44.99	54.00	-9.01	28.62	11.60	40.00	35.23	133	152	Average	HORIZONTAL
2	11514.26	58.06	74.00	-15.94	41.69	11.60	40.00	35.23	133	152	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	11510.02	58.11	74.00	-15.89	41.74	11.60	40.00	35.23	133	70	Peak	VERTICAL
2	11514.84	46.07	54.00	-7.93	29.70	11.60	40.00	35.23	133	70	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	11588.14	58.87	74.00	-15.13	42.62	11.67	39.80	35.22	161	38	Peak	HORIZONTAL
2	11593.26	45.71	54.00	-8.29	29.46	11.67	39.80	35.22	161	38	Average	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	11586.94	57.85	74.00	-16.15	41.60	11.67	39.80	35.22	136	182	Peak	VERTICAL
2	11587.22	46.85	54.00	-7.15	30.60	11.67	39.80	35.22	136	182	Average	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	15627.48	46.79	54.00	-7.21	30.70	13.31	38.14	35.36	150	174	Average	HORIZONTAL
2	15633.04	59.84	74.00	-14.16	43.75	13.31	38.14	35.36	150	174	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	15628.96	46.87	54.00	-7.13	30.78	13.31	38.14	35.36	126	37	Average	VERTICAL
2	15631.98	59.55	74.00	-14.45	43.46	13.31	38.14	35.36	126	37	Peak	VERTICAL

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

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	11545.30	45.63	54.00	-8.37	29.31	11.62	39.93	35.23	145	319	Average	HORIZONTAL
2	11546.92	57.90	74.00	-16.10	41.58	11.62	39.93	35.23	145	319	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	11545.60	46.57	54.00	-7.43	30.25	11.62	39.93	35.23	107	219	Average	VERTICAL
2	11550.02	58.22	74.00	-15.78	41.90	11.62	39.93	35.23	107	219	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.

4.7. 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 shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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.

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

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23°C	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 36, 40, 48 / Ant. 1
Test Date	May 21, 2016		

Channel 36

	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	5144.80	58.36	74.00	-15.64	52.55	7.23	31.52	32.94	184	45	Peak	VERTICAL
2	5149.40	46.27	54.00	-7.73	40.46	7.23	31.52	32.94	184	45	Average	VERTICAL
3 0	5185.80	99.02			93.15	7.26	31.55	32.94	184	45	Average	VERTICAL
4 0	5185.80	108.77			102.90	7.26	31.55	32.94	184	45	Peak	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	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.00	64.75	74.00	-9.25	58.94	7.23	31.52	32.94	180	46	Peak	VERTICAL
2	5150.00	49.96	54.00	-4.04	44.15	7.23	31.52	32.94	180	46	Average	VERTICAL
3 0	5203.20	114.24			108.32	7.29	31.57	32.94	180	46	Peak	VERTICAL
4 0	5204.40	103.55			97.63	7.29	31.57	32.94	180	46	Average	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	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5144.60	59.11	74.00	-14.89	53.30	7.23	31.52	32.94	180	44	Peak	VERTICAL
2	5150.00	47.45	54.00	-6.55	41.64	7.23	31.52	32.94	180	44	Average	VERTICAL
3 0	5234.60	114.45			108.49	7.31	31.59	32.94	180	44	Peak	VERTICAL
4 0	5243.00	104.66			98.69	7.31	31.59	32.93	180	44	Average	VERTICAL
5	5350.00	48.66	54.00	-5.34	42.54	7.37	31.68	32.93	180	44	Average	VERTICAL
6	5375.60	61.36	74.00	-12.64	55.20	7.39	31.70	32.93	180	44	Peak	VERTICAL

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

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 1
Test Date	May 21, 2016		

Channel 149

	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	5553.00	60.86	68.20	-7.34	54.39	7.55	31.86	32.94	174	72	Peak	VERTICAL
2	5739.00	102.99			96.17	7.73	32.10	33.01	174	72	Average	VERTICAL
3	5739.00	112.92			106.10	7.73	32.10	33.01	174	72	Peak	VERTICAL
4	5994.00	59.15	68.20	-9.05	52.01	7.84	32.40	33.10	174	72	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5745 MHz.

Channel 157

	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	5580.00	61.10	68.20	-7.10	54.58	7.58	31.90	32.96	189	70	Peak	VERTICAL
2	5780.00	102.59			95.72	7.76	32.14	33.03	189	70	Average	VERTICAL
3	5782.00	112.62			105.75	7.76	32.14	33.03	189	70	Peak	VERTICAL
4	6033.00	59.47	68.20	-8.73	52.19	7.88	32.52	33.12	189	70	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5785 MHz.

Channel 165

	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	5612.00	61.02	68.20	-7.18	54.43	7.61	31.94	32.96	178	61	Peak	VERTICAL
2	5820.00	101.98			95.06	7.78	32.18	33.04	178	61	Average	VERTICAL
3	5820.00	111.66			104.74	7.78	32.18	33.04	178	61	Peak	VERTICAL
4	5959.00	59.27	68.20	-8.93	52.18	7.83	32.36	33.10	178	61	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5825 MHz.

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

Channel 36

	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	5149.60	63.75	74.00	-10.25	57.94	7.23	31.52	32.94	188	340	Peak	VERTICAL
2	5150.00	49.96	54.00	-4.04	44.15	7.23	31.52	32.94	188	340	Average	VERTICAL
3 0	5188.00	103.38			97.48	7.28	31.56	32.94	188	340	Average	VERTICAL
4 0	5188.00	112.52			106.62	7.28	31.56	32.94	188	340	Peak	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	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5150.00	47.70	54.00	-6.30	41.89	7.23	31.52	32.94	176	352	Average	HORIZONTAL
2	5150.00	61.01	74.00	-12.99	55.20	7.23	31.52	32.94	176	352	Peak	HORIZONTAL
3 0	5204.80	113.46			107.54	7.29	31.57	32.94	176	352	Peak	HORIZONTAL
4 0	5206.00	103.92			98.00	7.29	31.57	32.94	176	352	Average	HORIZONTAL

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	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5133.20	58.63	74.00	-15.37	52.84	7.22	31.51	32.94	198	16	Peak	VERTICAL
2	5150.00	46.47	54.00	-7.53	40.66	7.23	31.52	32.94	198	16	Average	VERTICAL
3 0	5245.40	106.35			100.38	7.31	31.59	32.93	198	16	Average	VERTICAL
4 0	5246.00	116.39			110.42	7.31	31.59	32.93	198	16	Peak	VERTICAL
5	5350.00	47.73	54.00	-6.27	41.61	7.37	31.68	32.93	198	16	Average	VERTICAL
6	5381.00	60.09	74.00	-13.91	53.93	7.39	31.70	32.93	198	16	Peak	VERTICAL

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

Temperature	23℃	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

Channel 149

	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	5631.00	59.59	68.20	-8.61	52.97	7.63	31.96	32.97	188	359	Peak	VERTICAL
2	5753.00	106.15			99.34	7.73	32.10	33.02	188	359	Average	VERTICAL
3	5753.00	115.50			108.69	7.73	32.10	33.02	188	359	Peak	VERTICAL
4	5948.00	58.47	68.20	-9.73	51.40	7.82	32.34	33.09	188	359	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5745 MHz.

Channel 157

	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	5596.00	59.96	68.20	-8.24	53.40	7.60	31.92	32.96	199	73	Peak	VERTICAL
2	5791.00	116.88			109.98	7.77	32.16	33.03	199	73	Peak	VERTICAL
3	5792.00	106.80			99.90	7.77	32.16	33.03	199	73	Average	VERTICAL
4	6002.00	59.29	68.20	-8.91	52.16	7.84	32.40	33.11	199	73	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5785 MHz.

Channel 165

	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	5641.00	60.05	68.20	-8.15	53.41	7.64	31.98	32.98	165	0	Peak	VERTICAL
2	5818.00	105.82			98.90	7.78	32.18	33.04	165	0	Average	VERTICAL
3	5819.00	115.65			108.73	7.78	32.18	33.04	165	0	Peak	VERTICAL
4	6054.00	58.65	68.20	-9.55	51.31	7.89	32.58	33.13	165	0	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5825 MHz.

Temperature	23°C	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.40	62.36	74.00	-11.64	56.55	7.23	31.52	32.94	177	1	Peak	HORIZONTAL
2	5150.00	50.24	54.00	-3.76	44.43	7.23	31.52	32.94	177	1	Average	HORIZONTAL
3 0	5188.00	95.37			89.47	7.28	31.56	32.94	177	1	Average	HORIZONTAL
4 0	5192.00	105.09			99.19	7.28	31.56	32.94	177	1	Peak	HORIZONTAL

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5150.00	51.88	54.00	-2.12	46.07	7.23	31.52	32.94	155	0	Average	HORIZONTAL
2	5150.00	66.11	74.00	-7.89	60.30	7.23	31.52	32.94	155	0	Peak	HORIZONTAL
3 0	5238.40	101.77			95.81	7.31	31.59	32.94	155	0	Average	HORIZONTAL
4 0	5240.80	112.22			106.26	7.31	31.59	32.94	155	0	Peak	HORIZONTAL
5	5350.00	47.70	54.00	-6.30	41.58	7.37	31.68	32.93	155	0	Average	HORIZONTAL
6	5350.60	59.43	74.00	-14.57	53.31	7.37	31.68	32.93	155	0	Peak	HORIZONTAL

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

Temperature	23°C	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

Channel 151

	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	5645.00	61.03	68.20	-7.17	54.39	7.64	31.98	32.98	168	360	Peak	VERTICAL
2	5743.00	103.92			97.10	7.73	32.10	33.01	168	360	Average	VERTICAL
3	5764.00	113.63			106.79	7.74	32.12	33.02	168	360	Peak	VERTICAL
4	5966.00	60.04	68.20	-8.16	52.95	7.83	32.36	33.10	168	360	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5755 MHz.

Channel 159

	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	5632.00	60.71	68.20	-7.49	54.09	7.63	31.96	32.97	215	71	Peak	VERTICAL
2	5782.00	104.43			97.56	7.76	32.14	33.03	215	71	Average	VERTICAL
3	5802.00	113.99			107.10	7.77	32.16	33.04	215	71	Peak	VERTICAL
4	5932.00	59.71	68.20	-8.49	52.65	7.82	32.32	33.08	215	71	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5795 MHz.

Temperature	23°C	Humidity	63%
Test Engineer	Eddie Weng / Stim Song / Paul Chen	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2016		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5147.00	60.14	74.00	-13.86	54.33	7.23	31.52	32.94	173	2	Peak	HORIZONTAL
2	5150.00	50.52	54.00	-3.48	44.71	7.23	31.52	32.94	173	2	Average	HORIZONTAL
3 0	5189.00	89.88			83.98	7.28	31.56	32.94	173	2	Average	HORIZONTAL
4 0	5219.00	101.13			95.19	7.30	31.58	32.94	173	2	Peak	HORIZONTAL
5	5350.00	46.86	54.00	-7.14	40.74	7.37	31.68	32.93	173	2	Average	HORIZONTAL
6	5382.00	57.80	74.00	-16.20	51.64	7.39	31.70	32.93	173	2	Peak	HORIZONTAL

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	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5645.00	67.22	68.20	-0.98	60.58	7.64	31.98	32.98	172	1	Peak	VERTICAL
2	5763.00	109.08			102.24	7.74	32.12	33.02	172	1	Peak	VERTICAL
3	5764.00	99.99			93.15	7.74	32.12	33.02	172	1	Average	VERTICAL
4	5930.00	60.12	68.20	-8.08	53.06	7.82	32.32	33.08	172	1	Peak	VERTICAL

Item 2, 3 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

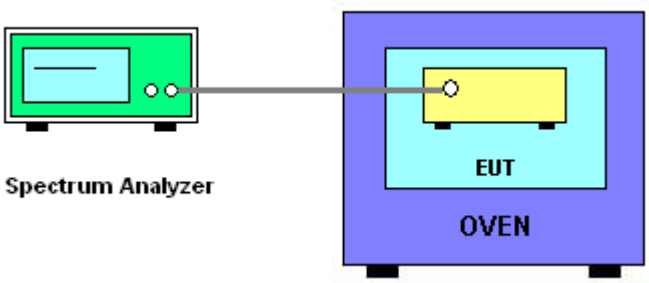
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is 0°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	24°C	Humidity	60%
Test Engineer	Serway Li	Test Date	May 31, 2016

Mode: 20 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9593	5199.9583	5199.9579	5199.9578
110.00	5199.9583	5199.9573	5199.9564	5199.9560
93.50	5199.9579	5199.9574	5199.9567	5199.9561
Max. Deviation (MHz)	0.0421	0.0427	0.0436	0.0440
Max. Deviation (ppm)	8.09	8.21	8.38	8.46
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5199.9606	5199.9600	5199.9592	5199.9586
10	5199.9595	5199.9588	5199.9582	5199.9572
20	5199.9583	5199.9579	5199.9572	5199.9570
30	5199.9576	5199.9569	5199.9560	5199.9559
40	5199.9574	5199.9569	5199.9568	5199.9564
50	5199.9555	5199.9549	5199.9547	5199.9546
Max. Deviation (MHz)	0.0445	0.0451	0.0453	0.0454
Max. Deviation (ppm)	8.56	8.67	8.71	8.73
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9584	5784.9581	5784.9578	5784.9571
110.00	5784.9583	5784.9579	5784.9574	5784.9567
93.50	5784.9582	5784.9575	5784.9565	5784.9564
Max. Deviation (MHz)	0.0418	0.0425	0.0435	0.0436
Max. Deviation (ppm)	7.22	7.34	7.52	7.53
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5784.9602	5784.9601	5784.9597	5784.9589
10	5784.9593	5784.9591	5784.9590	5784.9587
20	5784.9583	5784.9576	5784.9573	5784.9572
30	5784.9576	5784.9566	5784.9559	5784.9552
40	5784.9560	5784.9555	5784.9546	5784.9538
50	5784.9555	5784.9546	5784.9540	5784.9531
Max. Deviation (MHz)	0.0445	0.0454	0.0460	0.0469
Max. Deviation (ppm)	7.69	7.85	7.95	8.11
Result	Complies			

Mode: 40 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9591	5189.9587	5189.9586	5189.9582
110.00	5189.9583	5189.9576	5189.9570	5189.9566
93.50	5189.9580	5189.9578	5189.9572	5189.9569
Max. Deviation (MHz)	0.0420	0.0424	0.0430	0.0434
Max. Deviation (ppm)	8.09	8.17	8.28	8.36
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5189.9608	5189.9599	5189.9592	5189.9588
10	5189.9597	5189.9595	5189.9591	5189.9589
20	5189.9583	5189.9575	5189.9573	5189.9566
30	5189.9576	5189.9571	5189.9570	5189.9560
40	5189.9558	5189.9557	5189.9551	5189.9548
50	5189.9543	5189.9537	5189.9531	5189.9525
Max. Deviation (MHz)	0.0457	0.0463	0.0469	0.0475
Max. Deviation (ppm)	8.81	8.92	9.04	9.15
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9591	5754.9581	5754.9574	5754.9571
110.00	5754.9583	5754.9578	5754.9574	5754.9565
93.50	5754.9581	5754.9577	5754.9569	5754.9564
Max. Deviation (MHz)	0.0419	0.0423	0.0431	0.0436
Max. Deviation (ppm)	7.28	7.35	7.49	7.57
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5754.9599	5754.9589	5754.9581	5754.9571
10	5754.9592	5754.9588	5754.9583	5754.9580
20	5754.9583	5754.9577	5754.9571	5754.9563
30	5754.9576	5754.9572	5754.9568	5754.9565
40	5754.9575	5754.9568	5754.9560	5754.9554
50	5754.9555	5754.9552	5754.9545	5754.9539
Max. Deviation (MHz)	0.0445	0.0448	0.0455	0.0461
Max. Deviation (ppm)	7.73	7.78	7.91	8.01
Result	Complies			

Mode: 80 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9591	5209.9584	5209.9578	5209.9573
110.00	5209.9583	5209.9577	5209.9576	5209.9567
93.50	5209.9581	5209.9577	5209.9572	5209.9562
Max. Deviation (MHz)	0.0419	0.0423	0.0428	0.0438
Max. Deviation (ppm)	8.04	8.12	8.21	8.40
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5209.9608	5209.9607	5209.9602	5209.9598
10	5209.9603	5209.9596	5209.9588	5209.9587
20	5209.9583	5209.9580	5209.9576	5209.9567
30	5209.9576	5209.9575	5209.9573	5209.9569
40	5209.9565	5209.9557	5209.9556	5209.9553
50	5209.9553	5209.9548	5209.9541	5209.9535
Max. Deviation (MHz)	0.0447	0.0452	0.0459	0.0465
Max. Deviation (ppm)	8.58	8.68	8.81	8.93
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9589	5774.9581	5774.9576	5774.9571
110.00	5774.9583	5774.9579	5774.9574	5774.9570
93.50	5774.9579	5774.9577	5774.9568	5774.9561
Max. Deviation (MHz)	0.0421	0.0423	0.0432	0.0439
Max. Deviation (ppm)	7.29	7.32	7.48	7.60
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5774.9606	5774.9601	5774.9593	5774.9590
10	5774.9587	5774.9582	5774.9581	5774.9571
20	5774.9583	5774.9579	5774.9575	5774.9571
30	5774.9576	5774.9567	5774.9564	5774.9561
40	5774.9568	5774.9561	5774.9554	5774.9544
50	5774.9554	5774.9546	5774.9539	5774.9536
Max. Deviation (MHz)	0.0446	0.0454	0.0461	0.0464
Max. Deviation (ppm)	7.72	7.86	7.98	8.03
Result	Complies			

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
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 27, 2016	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 08, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 23, 2015	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 24, 2016	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	TESEQ	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Conduction (CO01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 15, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 13, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 16, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

*Calibration Interval of instruments listed above is two year.

N.C.R. means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 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%