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FCC RADIO TEST REPORT

Applicant's company	**WinMate Inc.**
Applicant Address	9F, No.111-6, Shing-De Rd., San-Chung District, New Taipei City 241, Taiwan.
FCC ID	**PX9-WMOAP8251AG**
Manufacturer's company	**Senao Networks, Inc.**
Manufacturer Address	3F, No. 529, Chung Cheng Rd., Hsintien, Taipei, Taiwan

Product Name	Winmate Outdoor AP
Brand Name	WINMATE
Model No.	WM-OAP8251AG
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Nov. 10, 2015
Final Test Date	Jun. 02, 2016
Submission Type	Original Equipment

Statement

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

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r03, KDB662911 D01 v02r01, KDB644545 D03 v01.**

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

ilac-MRA

TAF
Testing Laboratory
1190

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HISTORY OF THIS TEST REPORT

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR6D2924AB	Rev. 01	Initial issue of report	Feb. 16, 2017

1. VERIFICATION OF COMPLIANCE

Product Name	:	Winmate Outdoor AP
Brand Name	:	WINMATE
Model No.	:	WM-OAP8251AG
Applicant	:	WinMate 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 Nov. 10, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E			
Part	**Rule Section**	**Description of Test**	**Result**
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	WLAN (4TX, 4RX)
Radio Type	Intentional Transceiver
Power Type	From 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: 17.02 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 35.31 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 73.52 MHz Band 4: IEEE 802.11a: 25.35 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 27.87 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 34.88 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 74.96 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 23.92 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 23.64 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 24.84 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 15.95 dBm Band 4: IEEE 802.11a: 27.36 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 27.21 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 24.30 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 15.92 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

Note1: The product has beamforming function for 802.11n/ac.

Note2: Test results of beamforming are recorded in test report: FR6D2924AD. Test results of non-beamforming are recorded in this test report.

Antenna and Band width

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

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	4	MCS 0-31
802.11n (HT40)	4	MCS 0-31
802.11ac (VHT20)	4	MCS 0-9/Nss1-4
802.11ac (VHT40)	4	MCS 0-9/Nss1-4
802.11ac (VHT80)	4	MCS 0-9/Nss1-4

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 in 5GHz.

Note 3: Modulation modes consist of below configuration:
HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Set.	Brand Holder	Model Number (Part No.)	Antenna Type	Connector	Polarized Antenna	Gain (dBi)	
						2.4GHz	5GHz
1	Senao Networks, Inc.	DA2105	Dipole Antenna	N-type plug	X	4.5	-
2	Senao Networks, Inc.	DA5107	Dipole Antenna	N-type plug	X	-	6.01

Note: The EUT has two sets of antennas.

<For 2.4GHz Function>

For IEEE 802.11b/g/n/ac mode (4TX, 4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

<For 5GHz Function>

For IEEE 802.11a/n/ac mode (4TX, 4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

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

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

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
Power Spectral Density	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
6dB Spectrum Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	1+2+3+4
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3+4
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4

Band Edge Emission	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1+2+3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3+4
Frequency Stability	20 MHz	Band 1&4	-	40/157	4
	40 MHz	Band 1&4	-	38/151	4
	80 MHz	Band 1&4	-	42/155	4

Note1: 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.

Note2: There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for 802.11n/ac. Test results of beamforming are recorded in test report: FR6D2924AD. Test results of non-beamforming are recorded in this test report.

Note3:

The PoE are for measurement only, would not be marketed, and their information as below:

Power	Brand	Model
PoE 1	Microsemi	PD-9001GR
PoE 2	Powertron Electronics Corp	EPE-4818GO

Note: The power supply does not affect the test result of RF tests, so only PoE 1 was tested and recorded in this report for Radiated emission above 1GHz and RF Conducted tests.

Note4: All the specification of test configurations and test modes were based on customer's request.

Note5: The console port can not be used by end user. It is generally used for updating FW by professional installer.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. EUT + PoE 1

Mode 2. EUT + PoE 2

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

For Radiated Emission Below 1GHz test:

Mode 1. Place EUT in Y axis + PoE 1

Mode 2. Place EUT in Z axis + PoE 1

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

Mode 3. Place EUT in Z axis + PoE 2

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

For Radiated Emission Above 1GHz test:

The EUT was performed at Y axis and Z axis position. Z axis has been evaluated to be the worst case, thus measurement will follow this same test mode.

Mode 1. Place EUT in Z axis

For Co-location MPE and Radiated Emission Co-location Test:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA6D2924) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	**Site Category**	**Location**	**FCC Reg. No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E4300	DoC
PoE Load	Senao	LT4321UF	N/A
PoE 1	Microsemi	PD-9001GR	N/A

For Test Site No: 03CH01-CB (For Above 1GHz)

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
PoE 1	Microsemi	PD-9001GR	N/A

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E6430	DoC
PoE Load	Senao	LT4321UF	N/A
PoE 2	Powertron Electronics Corp	EPE-4818GO	N/A

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
PoE 1	Microsemi	PD-9001GR	N/A

3.8. Table for Parameters of Test Software Setting

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

Test Software Version	QCA VER3.0.144.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	19	19	19	19	23	20
802.11ac MCS0/Nss1 VHT20	19	19	19	18.5	23	19.5
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	16.5		19.5		16.5	19
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	11				11	

3.9. EUT Operation during Test

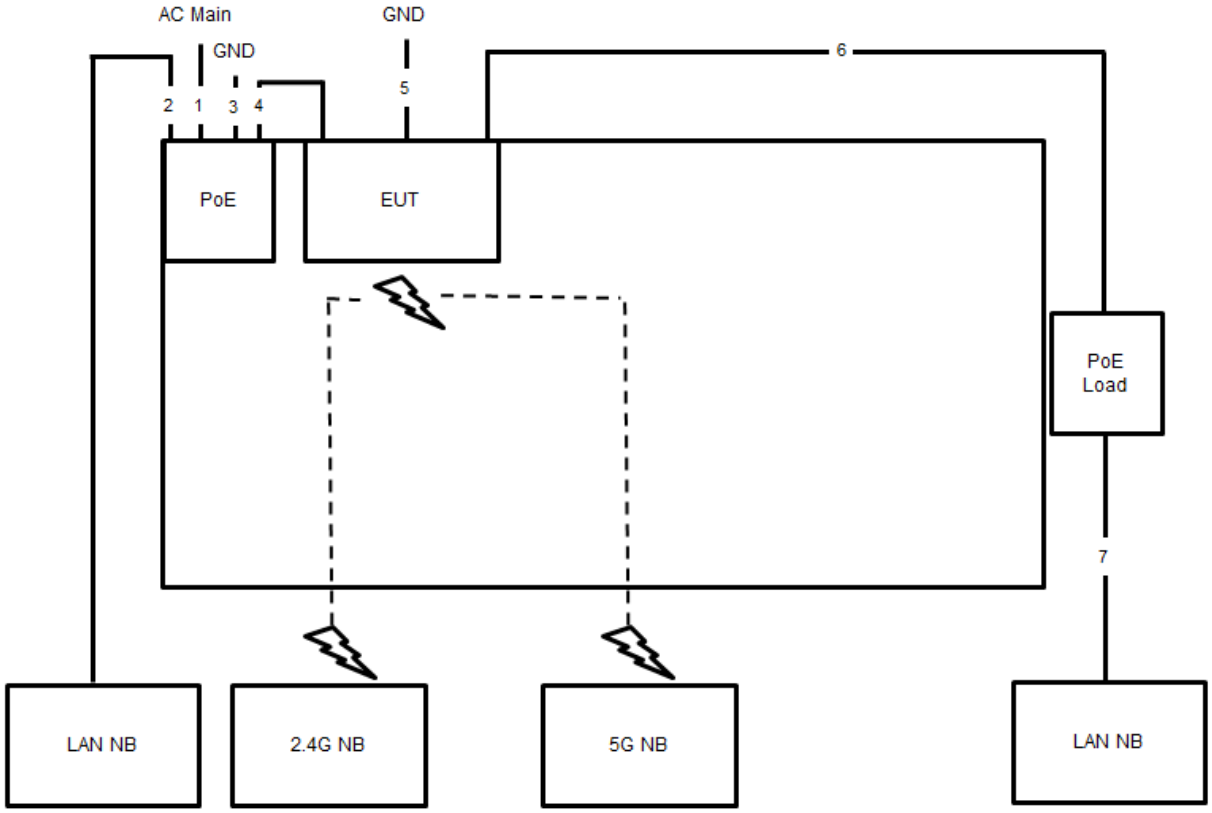
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.060	2.120	97.17	0.12	0.49
802.11ac MCS0/Nss1 VHT20	5.000	5.064	98.73	0.06	0.01
802.11ac MCS0/Nss1 VHT40	2.440	2.500	97.60	0.11	0.41
802.11ac MCS0/Nss1 VHT80	1.140	1.210	94.21	0.26	0.88

3.11. Test Configurations

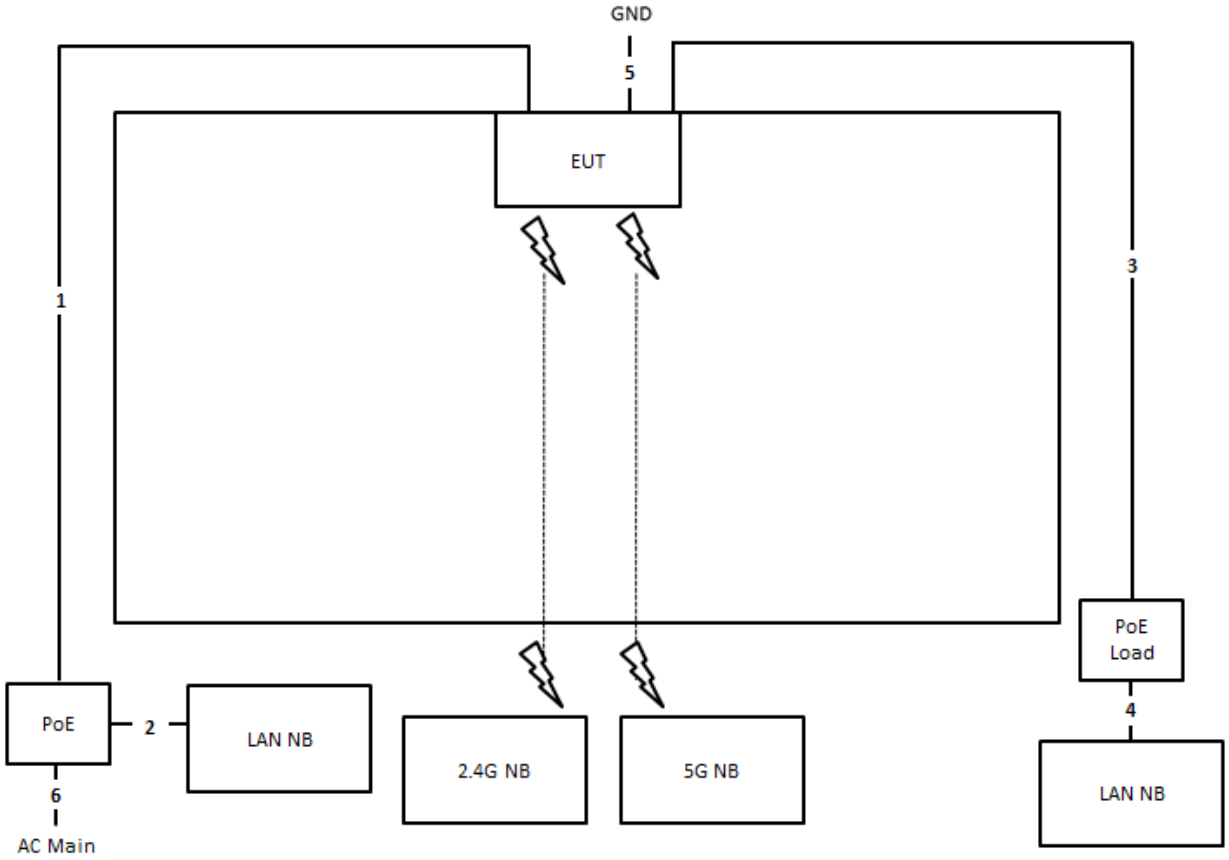
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	4.6m
2	RJ-45 cable	No	10m
3	Ground cable	No	1.5m
4	RJ-45 cable	No	1.5m
5	Ground cable	No	1.5m
6	RJ-45 cable	No	10m
7	RJ-45 cable	No	1.5m

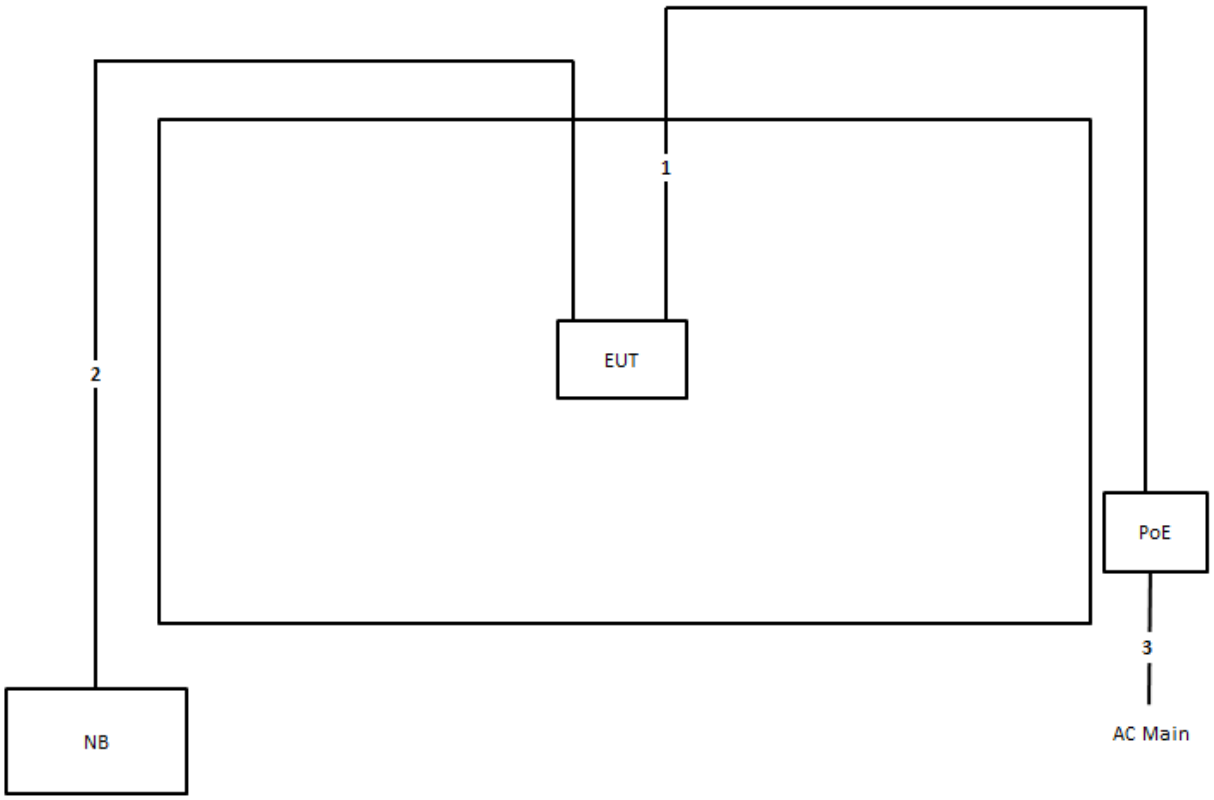
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m
5	Ground cable	No	1.5m
6	Power cable	No	4.6m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	10m
3	Power cable	No	4.6m

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

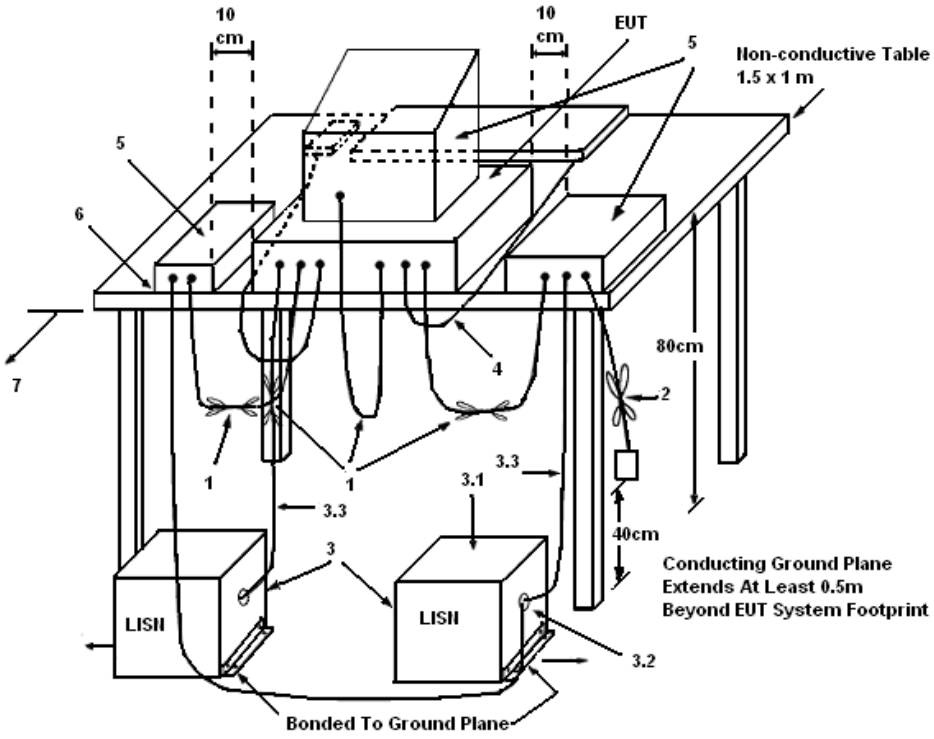
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

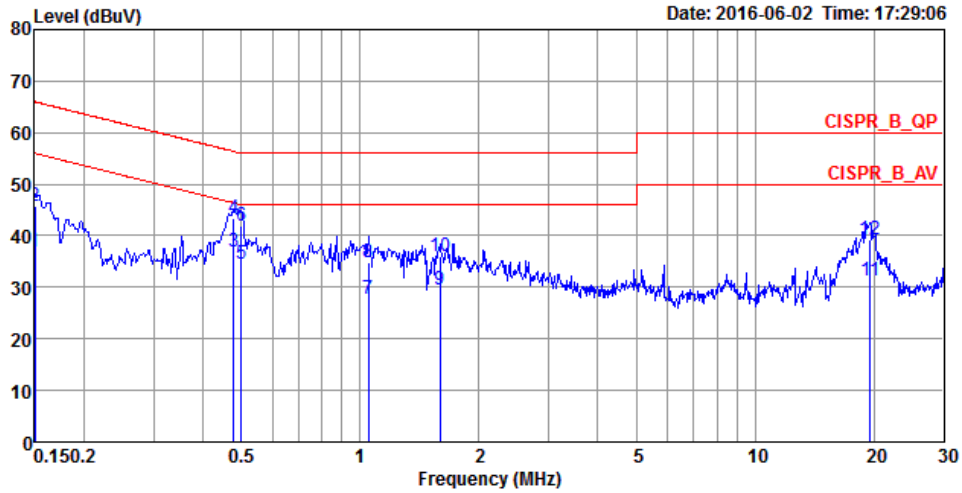
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

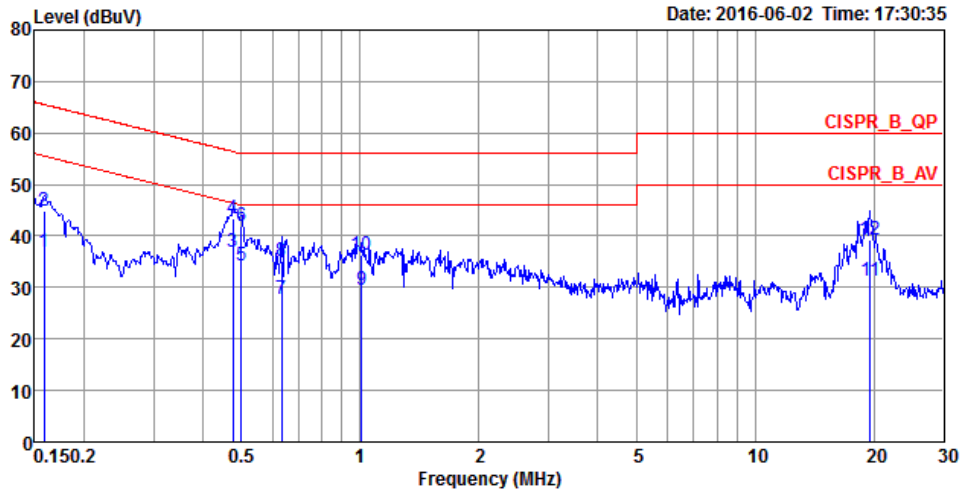
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	60%
Test Engineer	Sollo Luo	Phase	Line
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1500	37.04	-18.96	56.00	27.00	10.02	0.02	LINE	Average
2	0.1500	45.90	-20.10	66.00	35.86	10.02	0.02	LINE	QP
3	0.4786	37.00	-9.36	46.36	27.04	9.92	0.04	LINE	Average
4	0.4786	43.50	-12.86	56.36	33.54	9.92	0.04	LINE	QP
5	0.4994	34.59	-11.42	46.01	24.63	9.92	0.04	LINE	Average
6	0.4994	41.79	-14.22	56.01	31.83	9.92	0.04	LINE	QP
7	1.0485	27.67	-18.33	46.00	17.68	9.94	0.05	LINE	Average
8	1.0485	34.93	-21.07	56.00	24.94	9.94	0.05	LINE	QP
9	1.5935	29.52	-16.48	46.00	19.51	9.95	0.06	LINE	Average
10	1.5935	36.15	-19.85	56.00	26.14	9.95	0.06	LINE	QP
11	19.5316	31.19	-18.81	50.00	20.63	10.30	0.26	LINE	Average
12	19.5316	39.37	-20.63	60.00	28.81	10.30	0.26	LINE	QP

Temperature	23°C	Humidity	60%
Test Engineer	Sollo Luo	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1582	37.00	-18.56	55.56	26.96	10.02	0.02	NEUTRAL	Average
2	0.1582	45.00	-20.56	65.56	34.96	10.02	0.02	NEUTRAL	QP
3	0.4761	36.81	-9.60	46.41	26.85	9.92	0.04	NEUTRAL	Average
4	0.4761	43.43	-12.98	56.41	33.47	9.92	0.04	NEUTRAL	QP
5	0.4994	34.34	-11.67	46.01	24.38	9.92	0.04	NEUTRAL	Average
6	0.4994	42.01	-14.00	56.01	32.05	9.92	0.04	NEUTRAL	QP
7	0.6338	27.70	-18.30	46.00	17.73	9.93	0.04	NEUTRAL	Average
8	0.6338	35.20	-20.80	56.00	25.23	9.93	0.04	NEUTRAL	QP
9	1.0103	29.63	-16.37	46.00	19.64	9.94	0.05	NEUTRAL	Average
10	1.0103	36.42	-19.58	56.00	26.43	9.94	0.05	NEUTRAL	QP
11	19.5316	31.39	-18.61	50.00	20.83	10.30	0.26	NEUTRAL	Average
12	19.5316	39.22	-20.78	60.00	28.66	10.30	0.26	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:

7. The transmitter was radiated to the spectrum analyzer in peak hold mode.
8. 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

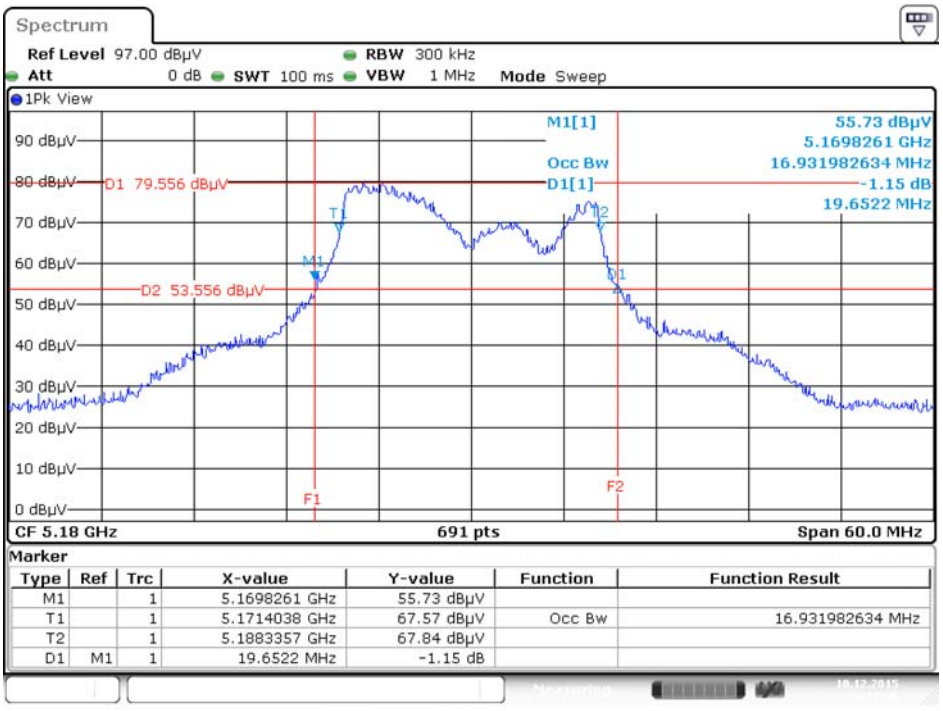
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25°C	Humidity	45%
Test Engineer	Roki Liu		

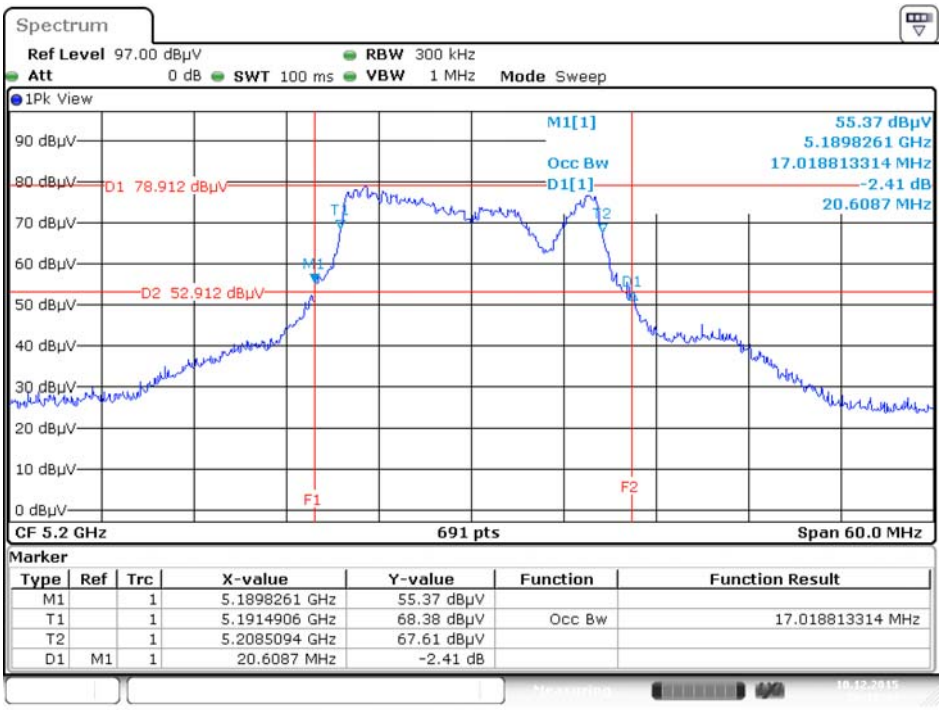
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	19.65	16.93
	5200 MHz	20.61	17.02
	5240 MHz	19.91	16.76
	5745 MHz	16.96	13.81
	5785 MHz	40.00	25.35
	5825 MHz	17.13	15.11
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.35	18.06
	5200 MHz	21.30	18.06
	5240 MHz	20.70	17.89
	5745 MHz	18.52	16.93
	5785 MHz	42.43	27.87
	5825 MHz	18.17	16.15
802.11ac MCS0/Nss1 VHT40	5190 MHz	38.70	35.31
	5230 MHz	38.41	34.30
	5755 MHz	37.68	33.57
	5795 MHz	38.12	34.88
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.03	73.52
	5775 MHz	80.58	74.96

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5180 MHz



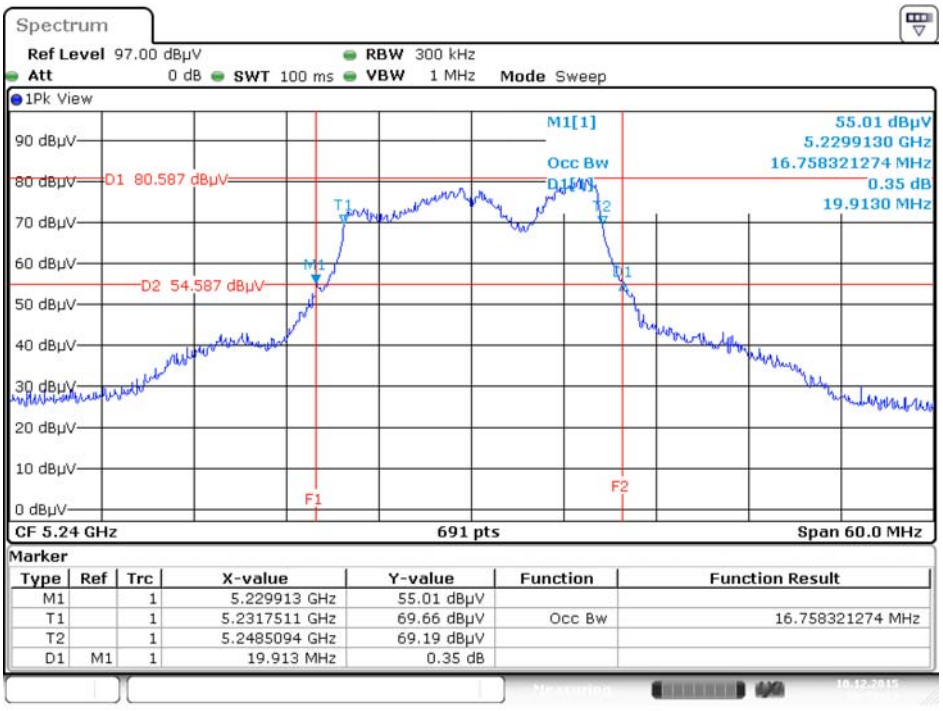
Date: 10.DEC.2015 20:15:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz



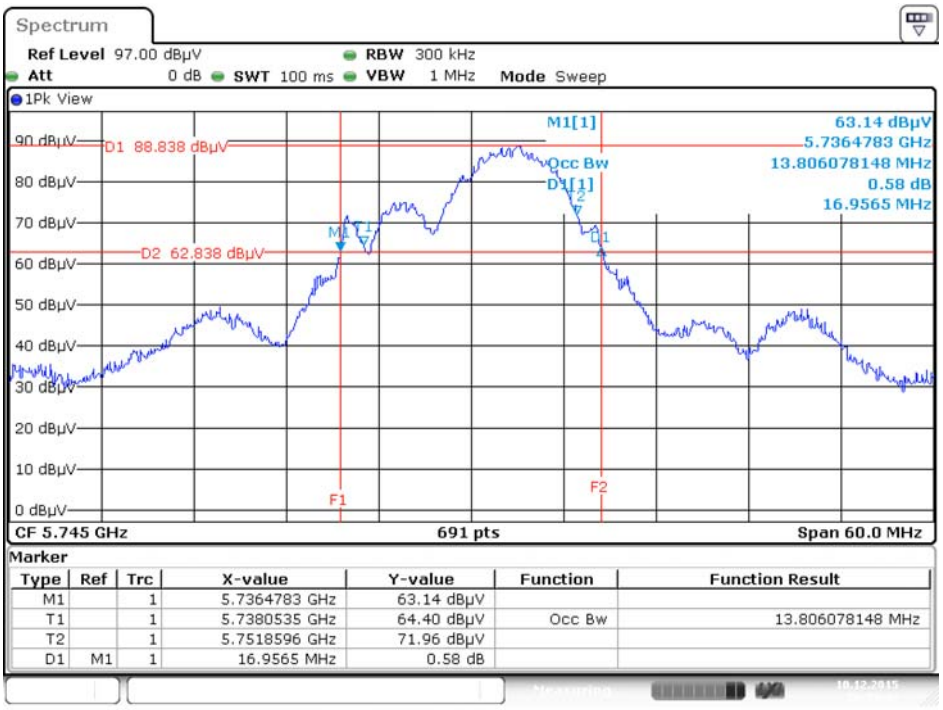
Date: 10.DEC.2015 20:18:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



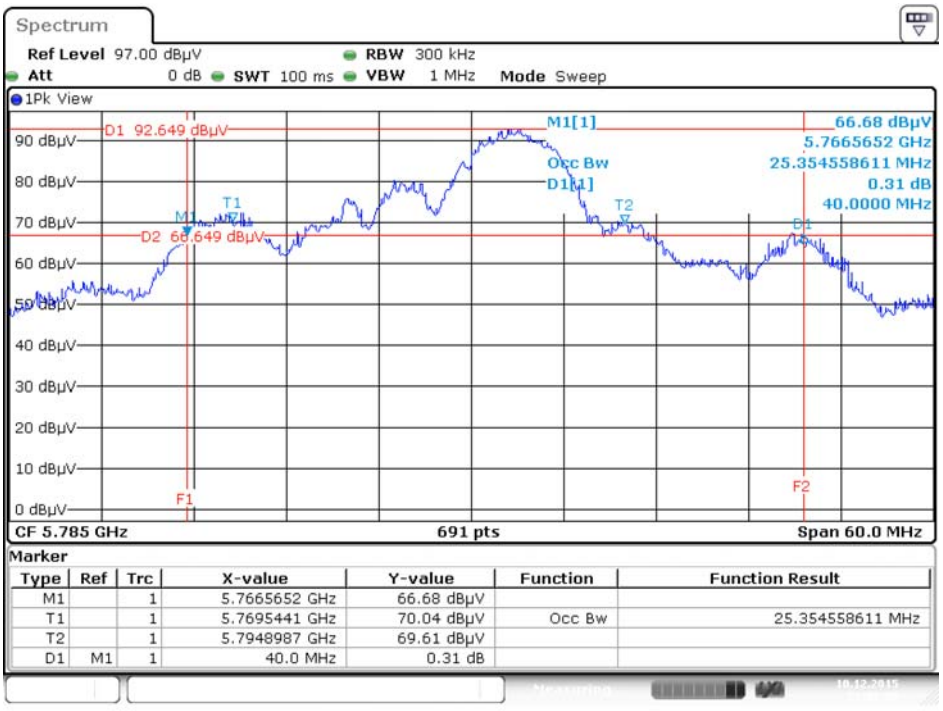
Date: 10.DEC.2015 20:21:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz



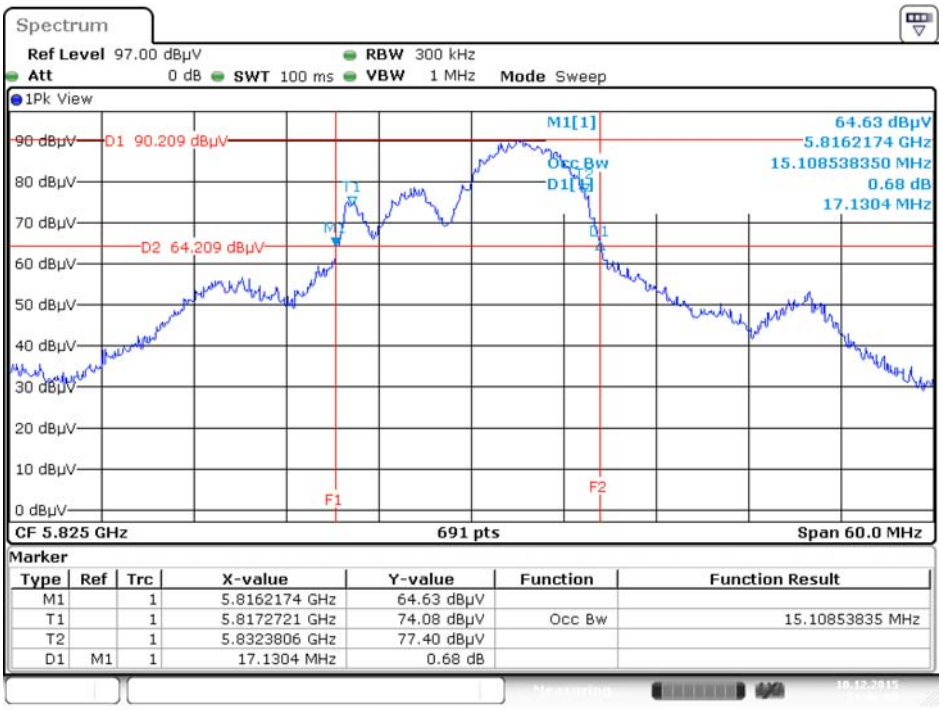
Date: 10.DEC.2015 20:59:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



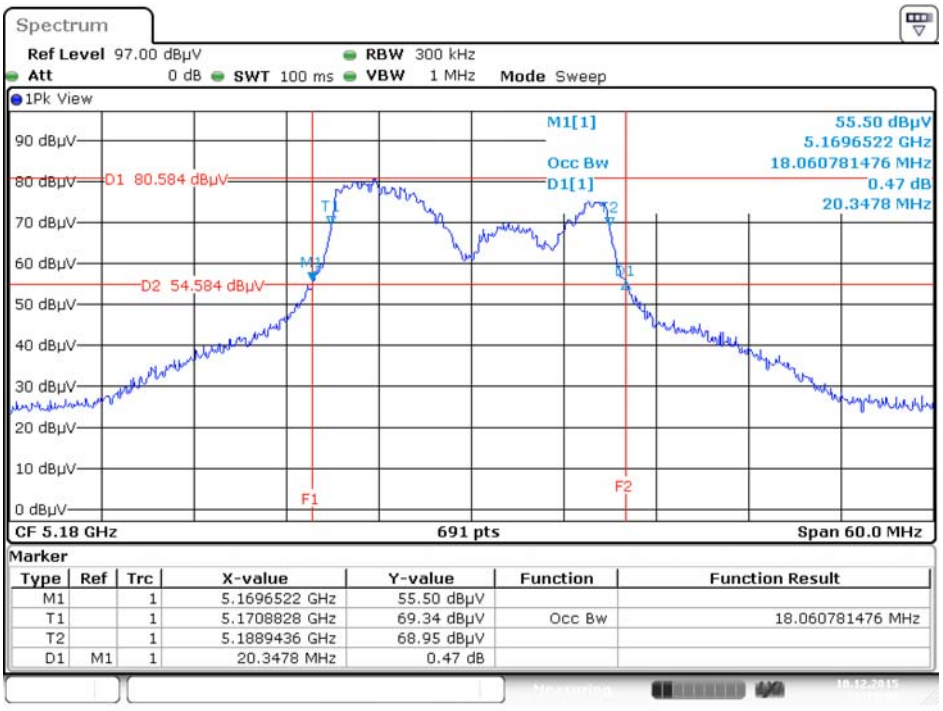
Date: 10.DEC.2015 21:02:09

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz



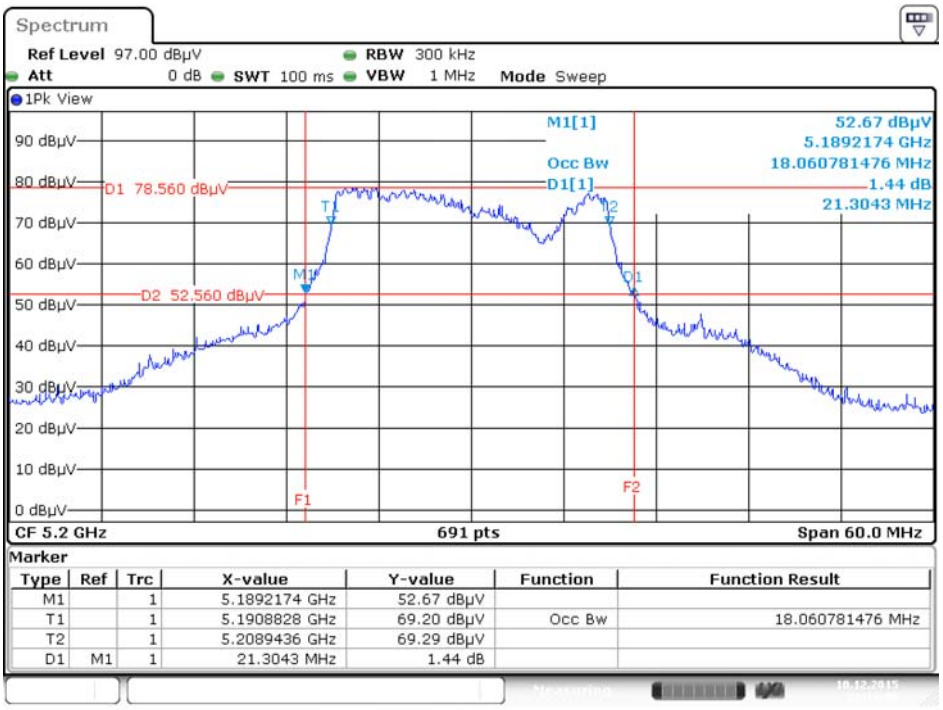
Date: 10.DEC.2015 21:06:07

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5180 MHz



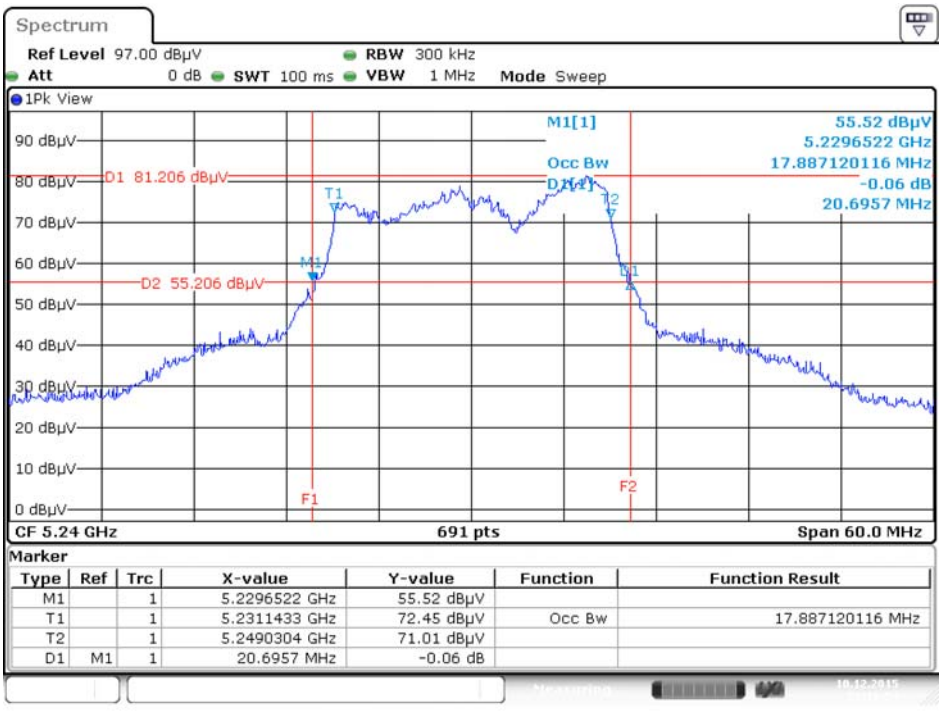
Date: 10.DEC.2015 21:10:20

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz



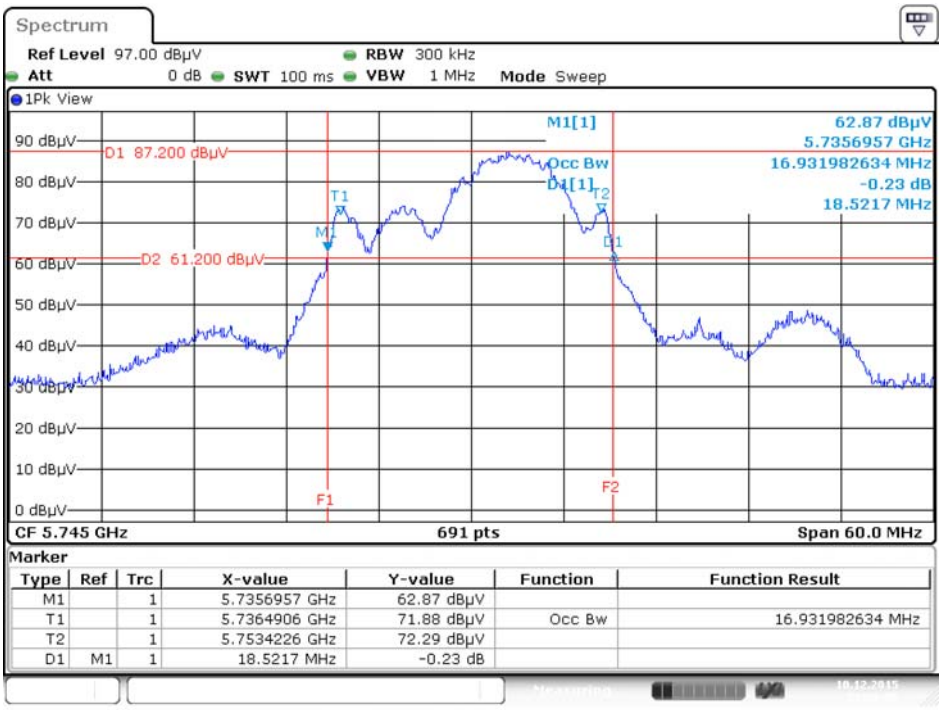
Date: 10.DEC.2015 21:14:05

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



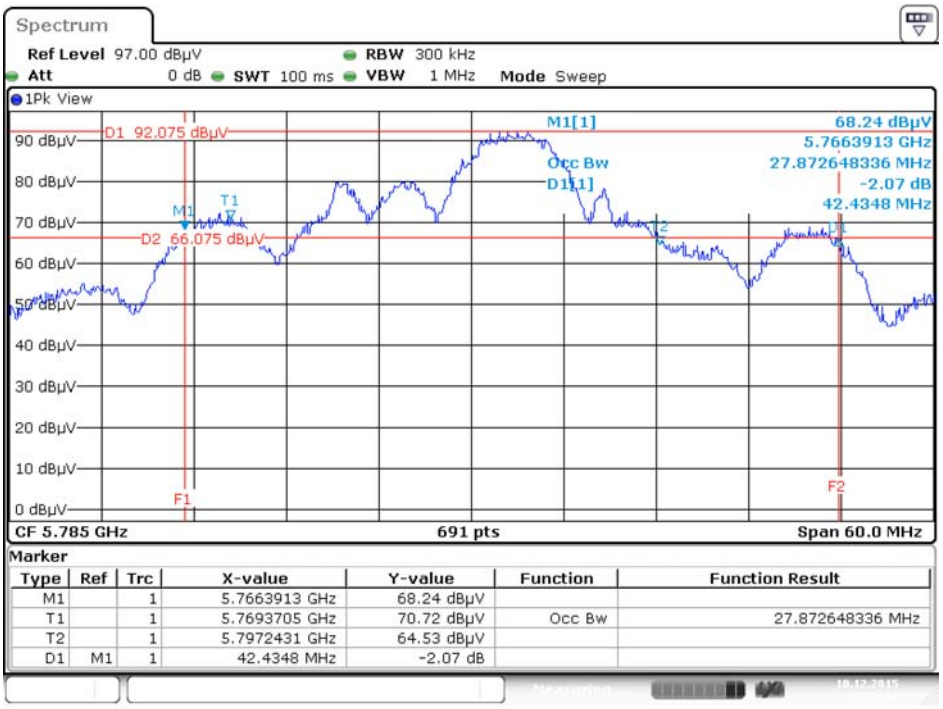
Date: 10.DEC.2015 21:16:53

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz



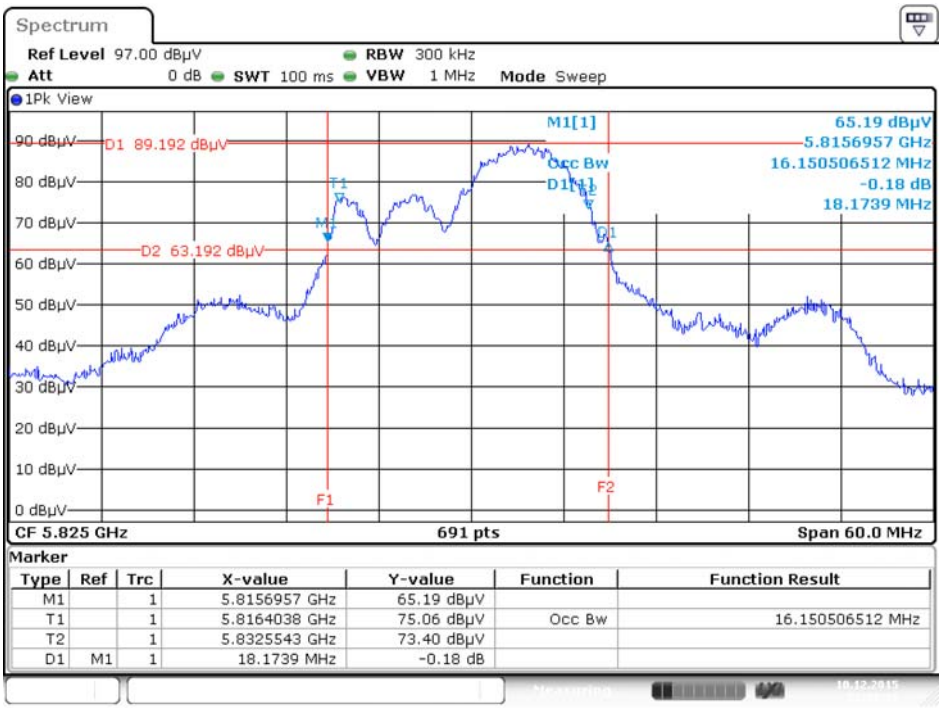
Date: 10.DEC.2015 21:56:56

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



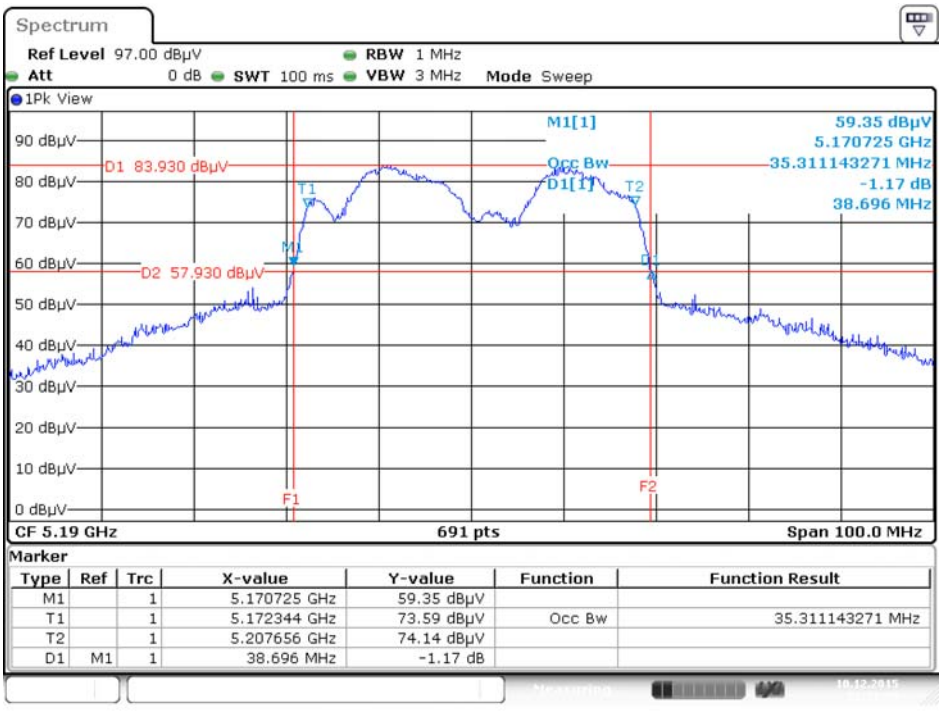
Date: 10.DEC.2015 21:59:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz



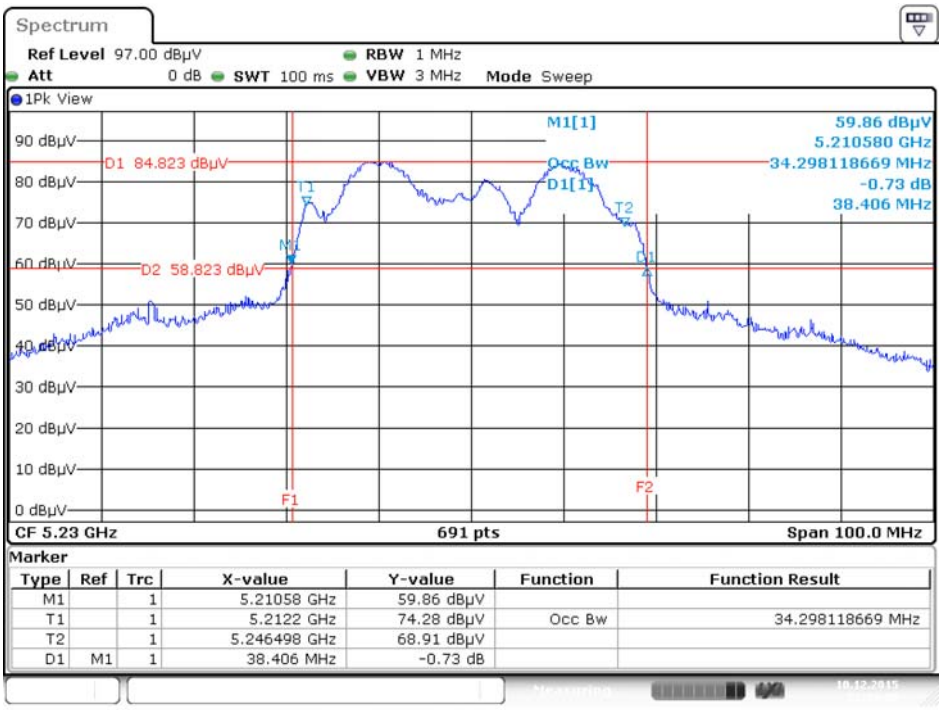
Date: 10.DEC.2015 22:01:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5190 MHz



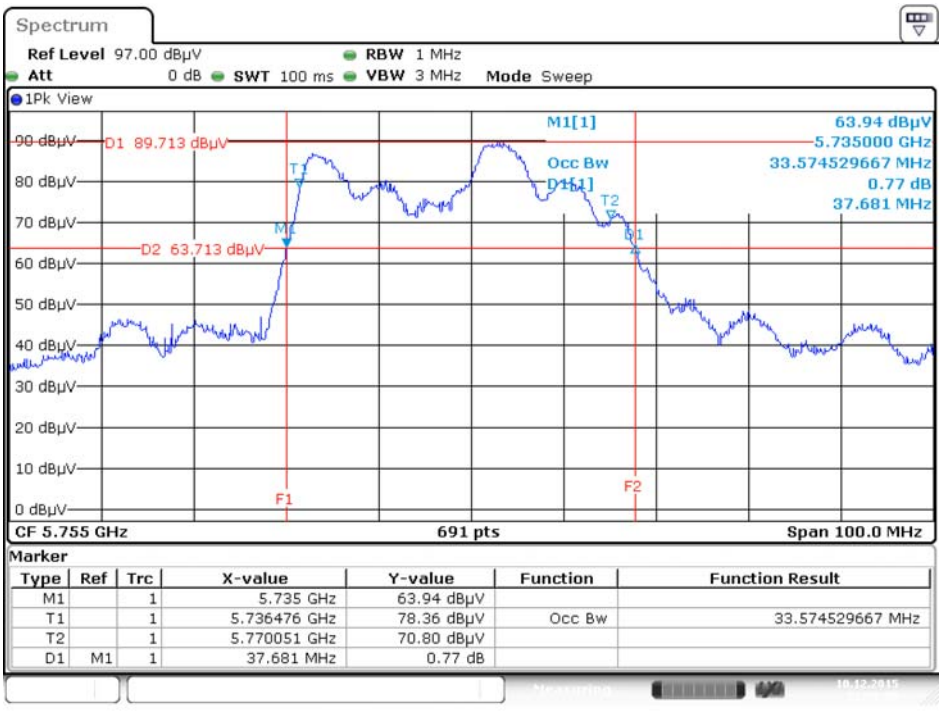
Date: 10.DEC.2015 22:21:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5230 MHz



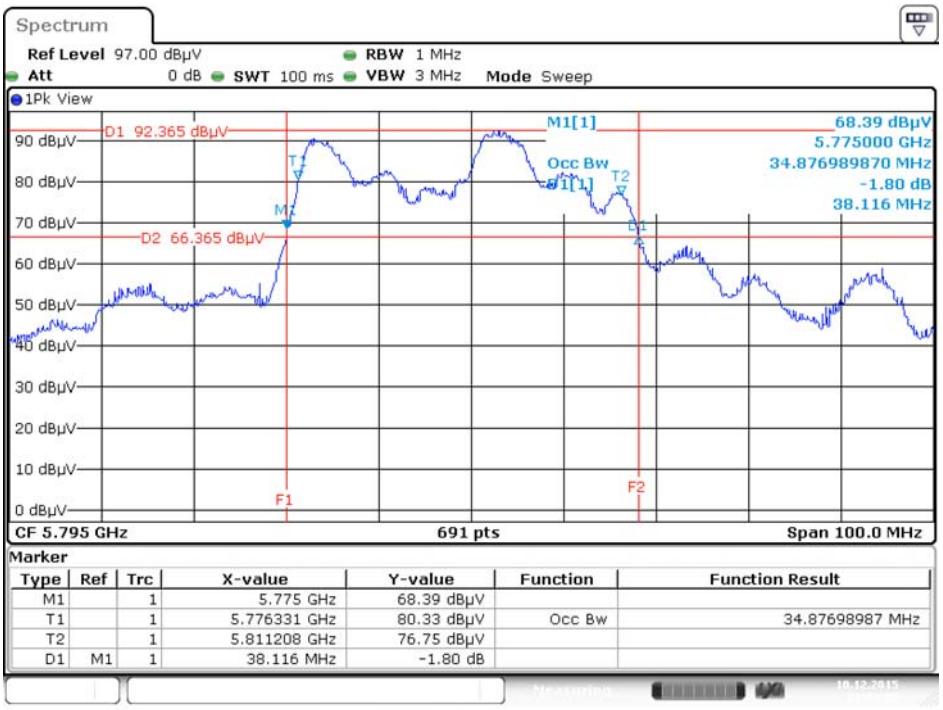
Date: 10.DEC.2015 22:24:27

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5755 MHz



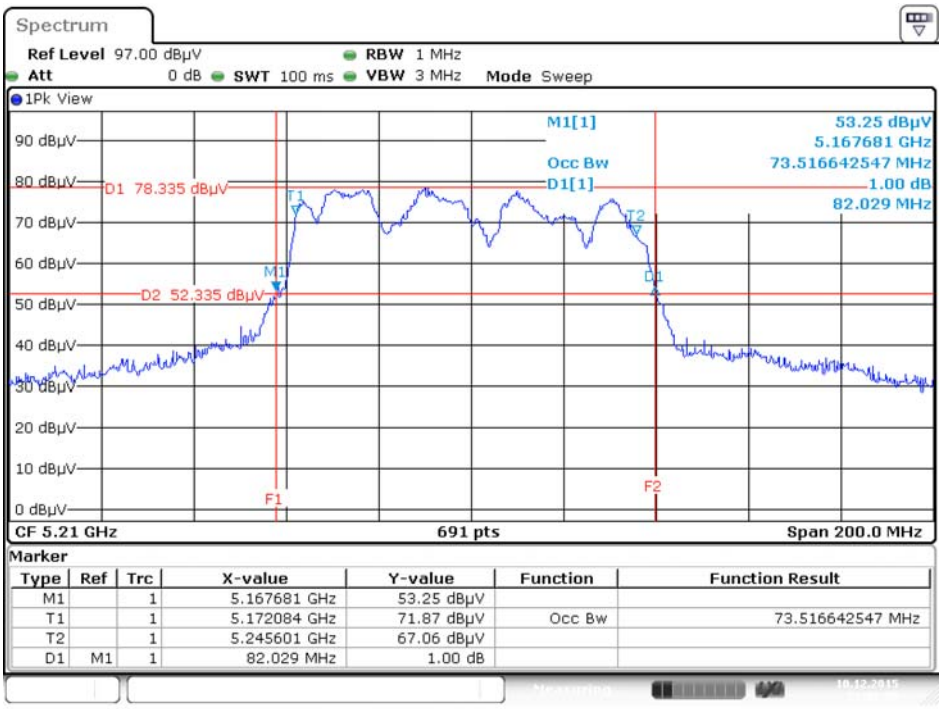
Date: 10.DEC.2015 22:58:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz



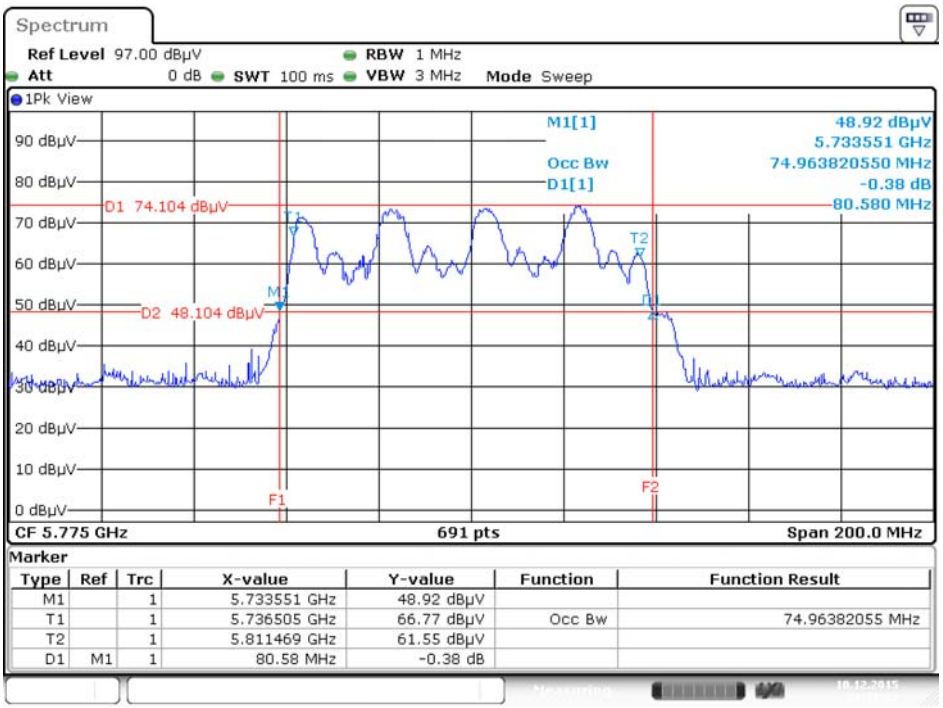
Date: 10.DEC.2015 23:03:09

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5210 MHz



Date: 10.DEC.2015 23:09:00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz



Date: 10.DEC.2015 23:21:22

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 **v01r03** 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

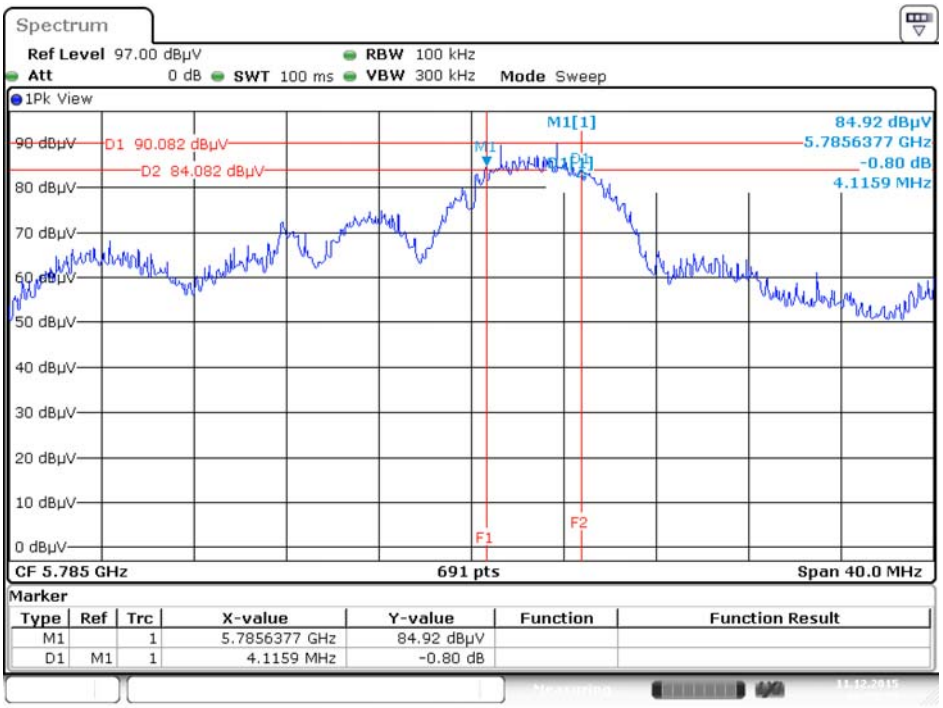
Temperature	25°C	Humidity	45%
Test Engineer	Roki Liu		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	5.16	500	Complies
	5785 MHz	4.12	500	Complies
	5825 MHz	4.41	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	5.22	500	Complies
	5785 MHz	4.12	500	Complies
	5825 MHz	3.83	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.01	500	Complies
	5795 MHz	33.97	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	62.61	500	Complies

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

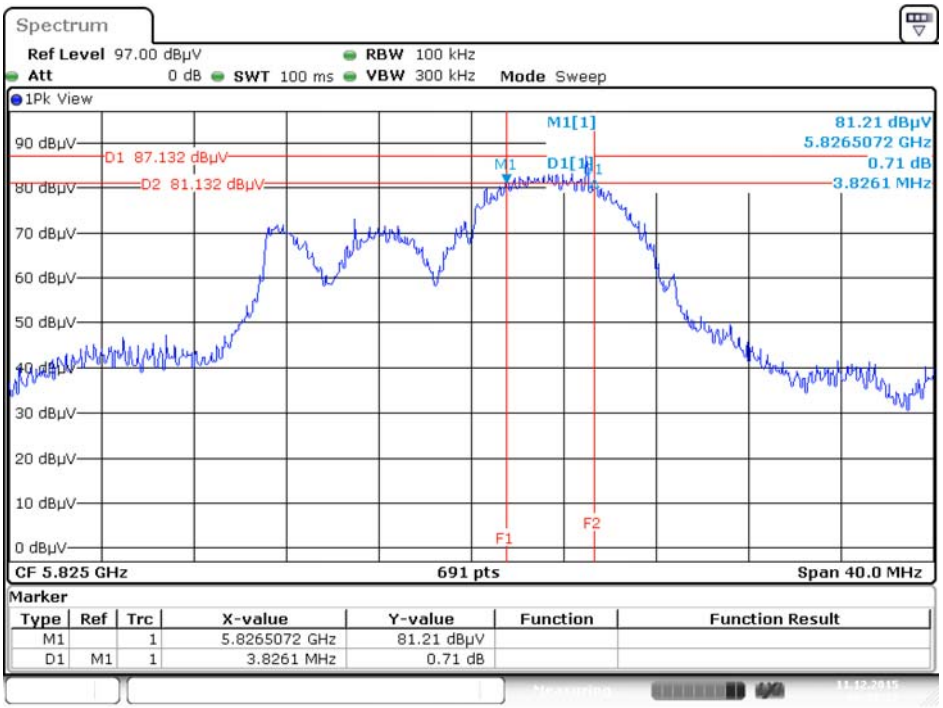
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



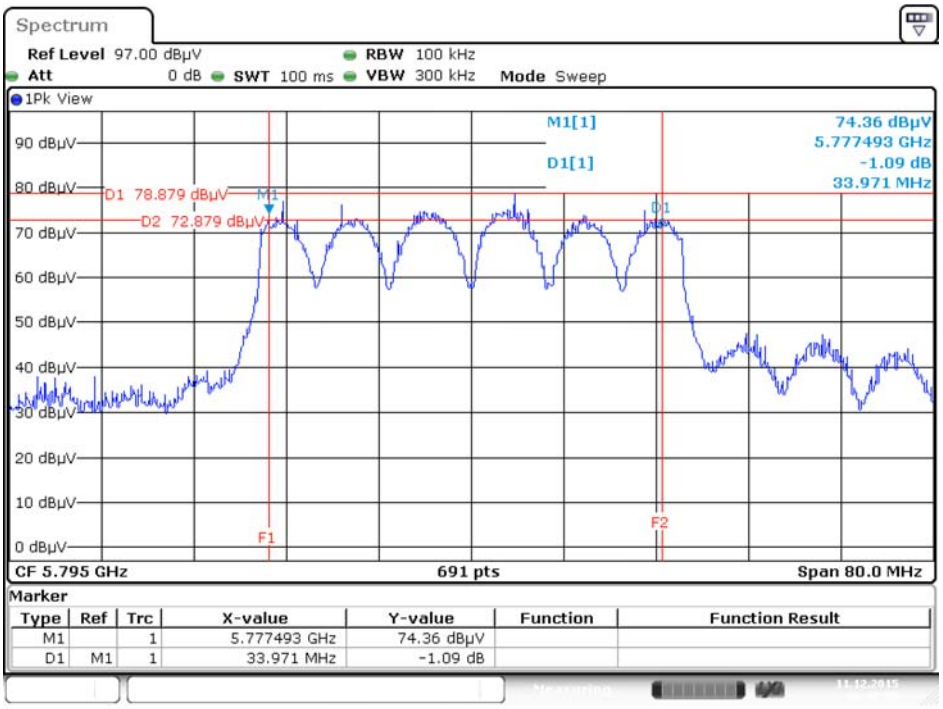
Date: 11.DEC.2015 00:25:29

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz



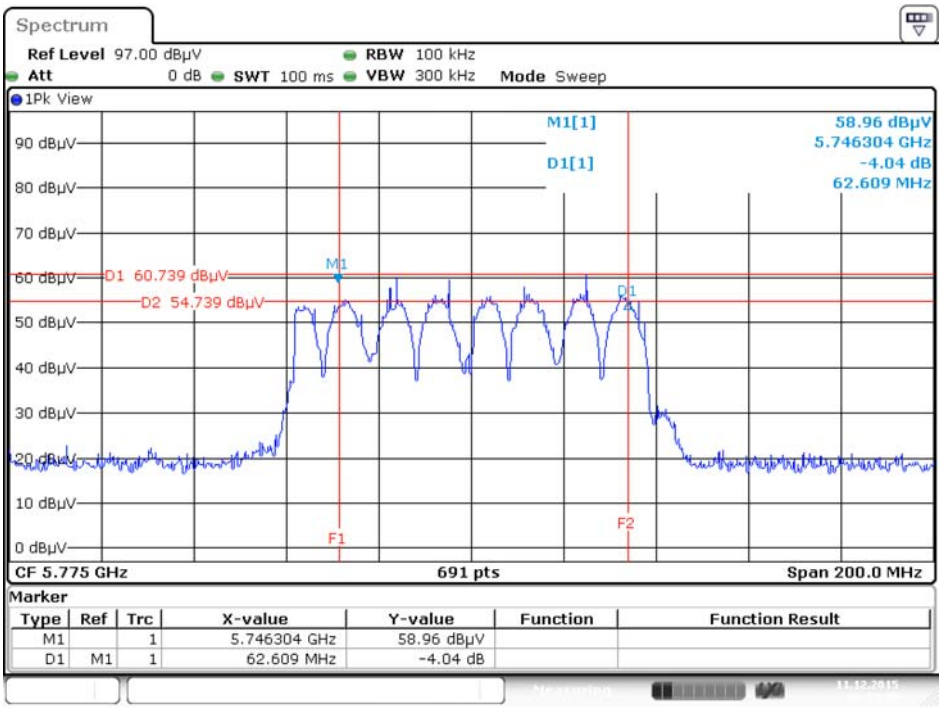
Date: 11.DEC.2015 00:38:13

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz



Date: 11.DEC.2015 00:47:59

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz



Date: 11.DEC.2015 00:53:59

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

Frequency Band			Limit
☒	5.15~5.25 GHz		
	Operating Mode		
	☒	Outdoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
	☐	Indoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
	☐	Fixed point-to-point access points	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
	☐	Mobile and portable client devices	The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.4.2. Measuring Instruments and Setting

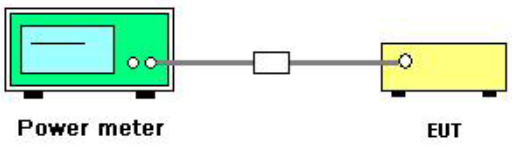
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 **v01r03** 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	25°C	Humidity	45%
Test Engineer	Roki Liu	Test Date	Dec. 11, 2015 ~ Dec. 14, 2015

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11a	5180 MHz	18.24	17.72	17.68	17.95	23.92	29.99	Complies
	5200 MHz	18.06	17.78	17.54	17.89	23.84	29.99	Complies
	5240 MHz	18.01	17.57	17.56	17.99	23.81	29.99	Complies
	5745 MHz	17.13	17.66	18.33	17.45	23.69	29.99	Complies
	5785 MHz	21.35	21.22	21.14	21.63	27.36	29.99	Complies
	5825 MHz	18.82	18.92	19.45	19.28	25.15	29.99	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	18.05	17.38	17.46	17.55	23.64	29.99	Complies
	5200 MHz	17.87	17.38	17.56	17.62	23.63	29.99	Complies
	5240 MHz	17.78	17.52	17.39	17.56	23.59	29.99	Complies
	5745 MHz	16.47	16.89	17.54	16.79	22.96	29.99	Complies
	5785 MHz	21.15	21.34	21.09	21.17	27.21	29.99	Complies
	5825 MHz	18.04	18.27	18.93	17.94	24.33	29.99	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	16.22	15.95	15.77	15.73	21.94	29.99	Complies
	5230 MHz	18.98	18.54	18.76	18.99	24.84	29.99	Complies
	5755 MHz	15.28	15.57	16.52	15.57	21.78	29.99	Complies
	5795 MHz	17.89	18.34	19.07	17.68	24.30	29.99	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	9.92	10.05	10.01	9.73	15.95	29.99	Complies
	5775 MHz	9.51	9.54	10.60	9.85	15.92	29.99	Complies

Note: Antenna gain=6.01dBi > 6dBi, So Limit =30-(6.01-6)=29.99dBm.

4.5. Power Spectral Density Measurement

4.5.1. Limit

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

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

4.5.2. Measuring Instruments and Setting

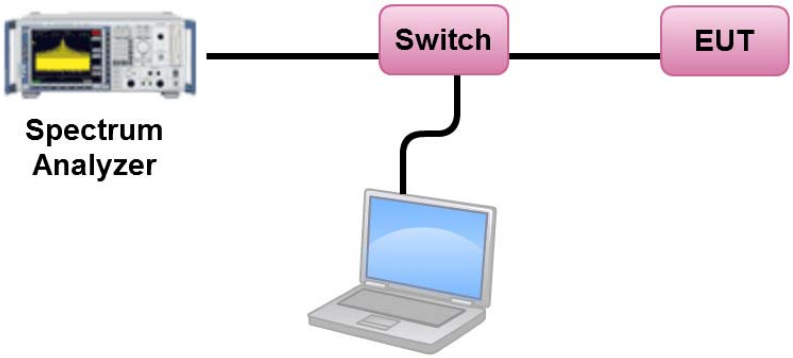
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.5.3. Test Procedures

5. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
6. Test was performed in accordance with KDB789033 D02 **v01r03** for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
7. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
8. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
9. 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	25°C	Humidity	45%
Test Engineer	Roki Liu	Test Date	Dec. 11, 2015 ~ Dec. 14, 2015

Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	10.78	10.97	Complies
40	5200 MHz	10.82	10.97	Complies
48	5240 MHz	10.55	10.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =17-(12.03-6)=10.97dBm/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	10.52	-3.01	7.51	23.97	Complies
157	5785 MHz	14.06	-3.01	11.05	23.97	Complies
165	5825 MHz	11.82	-3.01	8.81	23.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =30-(12.03-6)=23.97dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	10.48	10.97	Complies
40	5200 MHz	10.45	10.97	Complies
48	5240 MHz	10.63	10.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =17-(12.03-6)=10.97dBm/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	9.71	-3.01	6.70	23.97	Complies
157	5785 MHz	13.97	-3.01	10.96	23.97	Complies
165	5825 MHz	11.10	-3.01	8.09	23.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =30-(12.03-6)=23.97dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	5.46	10.97	Complies
46	5230 MHz	8.52	10.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =17-(12.03-6)=10.97dBm/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	5.45	-3.01	2.44	23.97	Complies
159	5795 MHz	8.04	-3.01	5.03	23.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =30-(12.03-6)=23.97dBm/500kHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.48	10.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =17-(12.03-6)=10.97dBm/MHz.

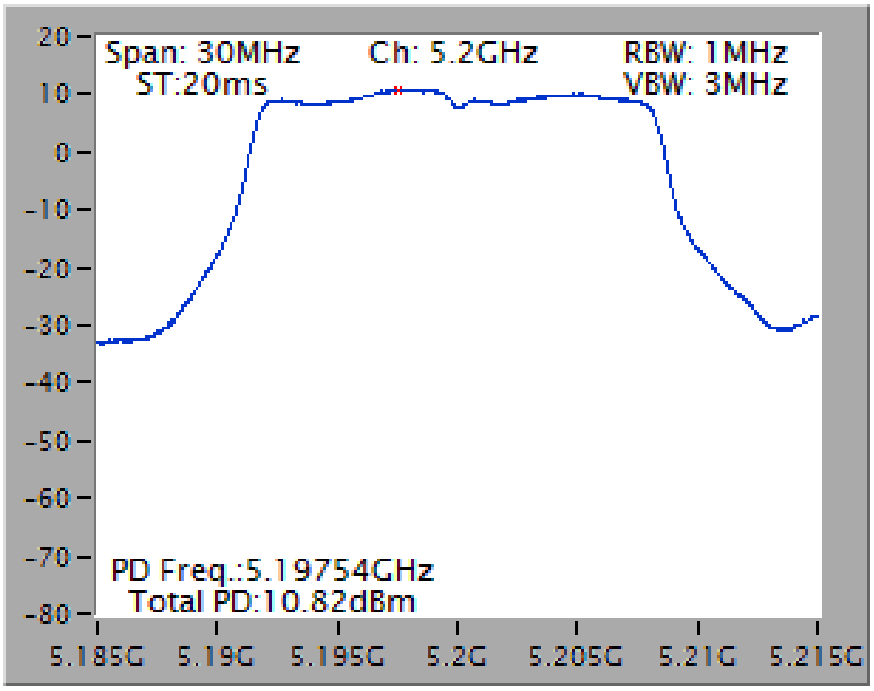
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-3.25	-3.01	-6.26	23.97	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.03dBi > 6dBi, So Limit =30-(12.03-6)=23.97dBm/500kHz.

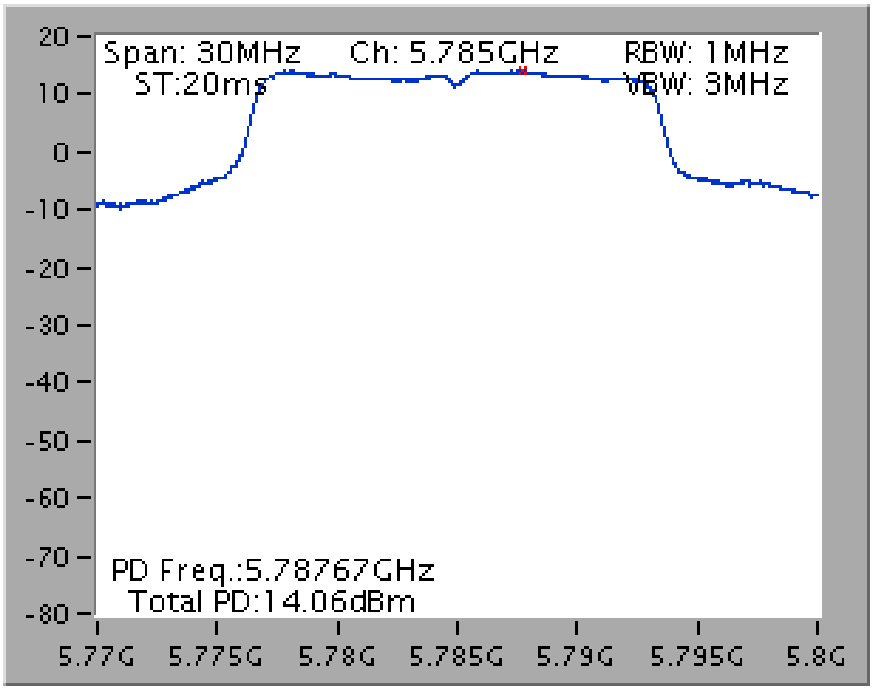
Note: All the test values were listed in the report.

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

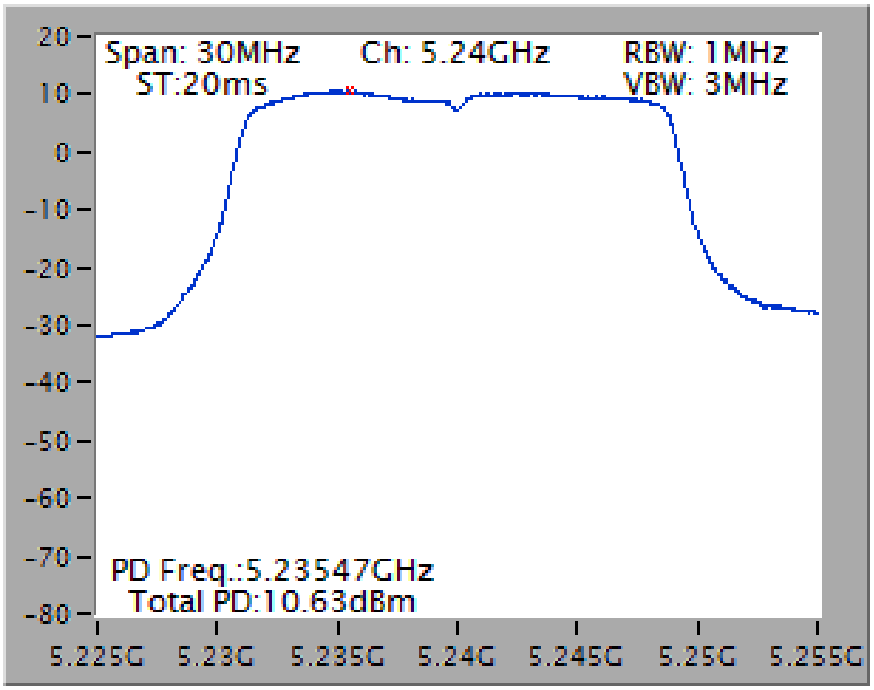
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz



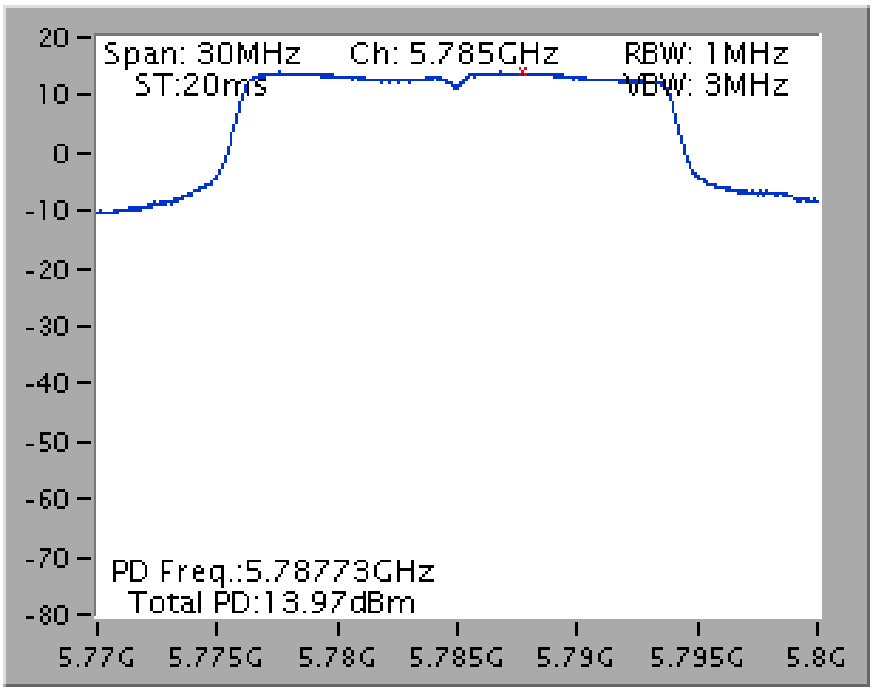
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



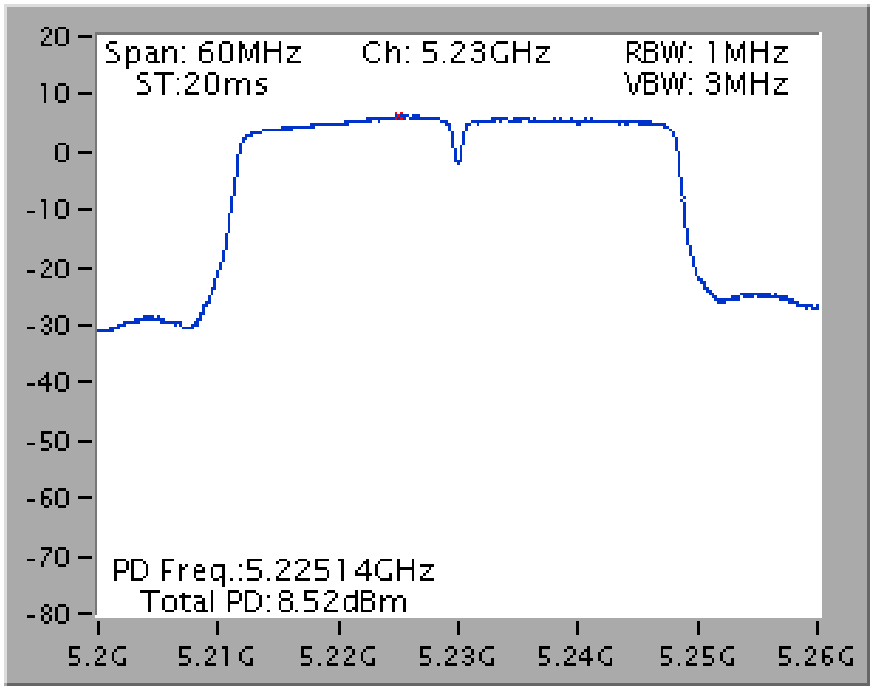
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



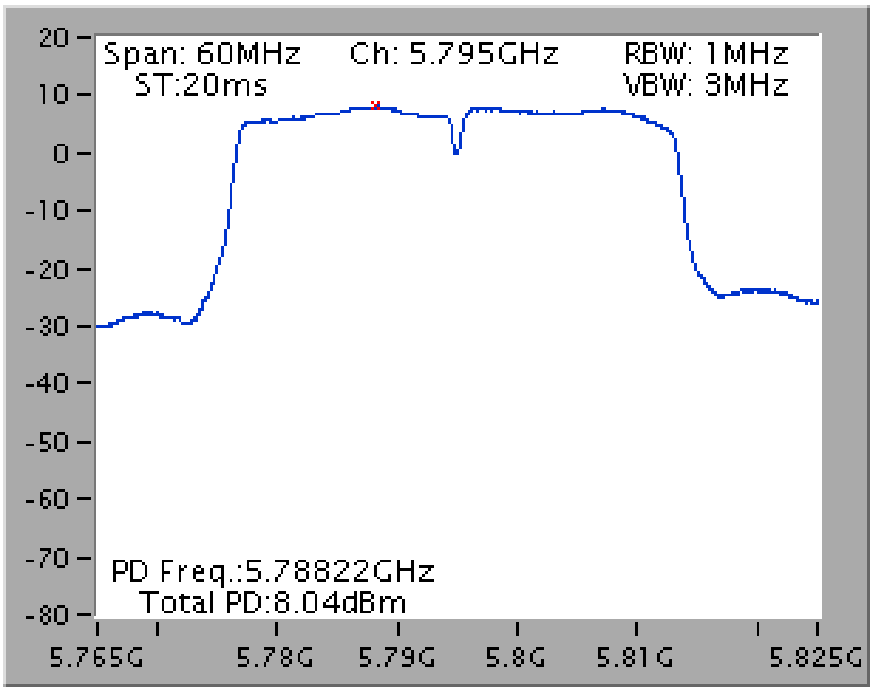
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



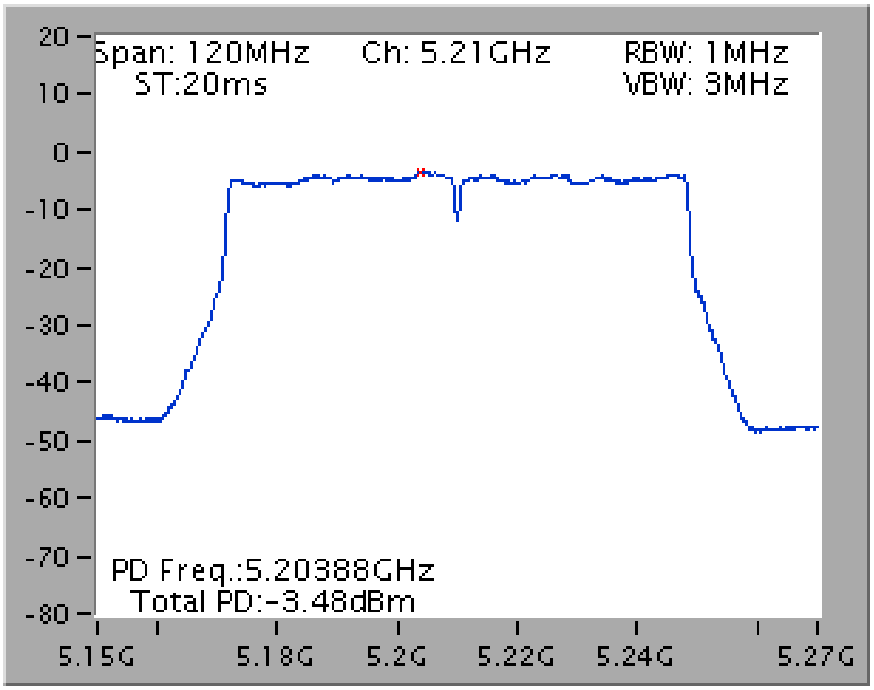
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5230 MHz



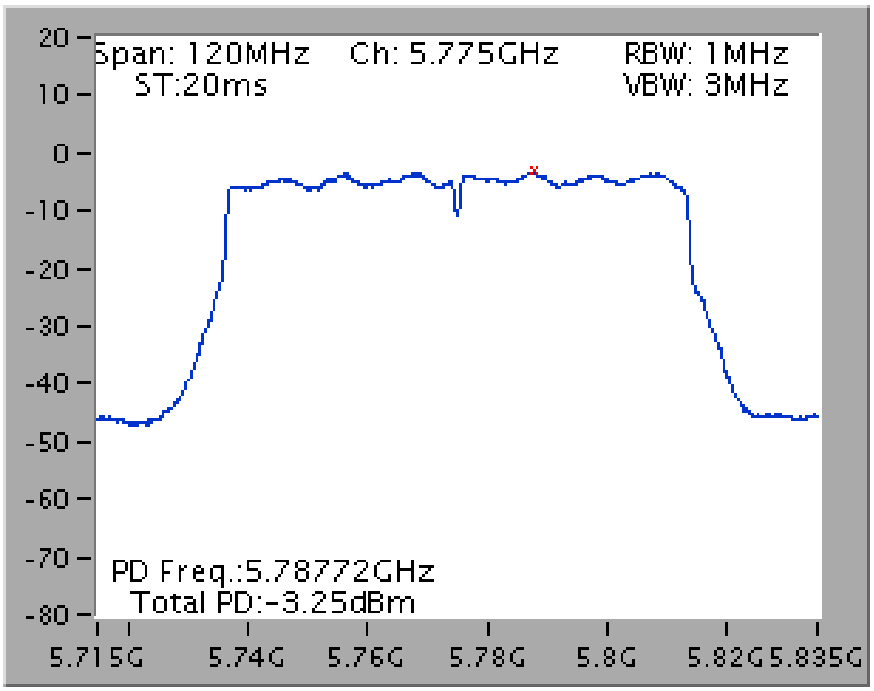
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5210 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz



4.6. Radiated Emissions Measurement

4.6.1. Limit

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

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

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

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

4.6.2. Measuring Instruments and Setting

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

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

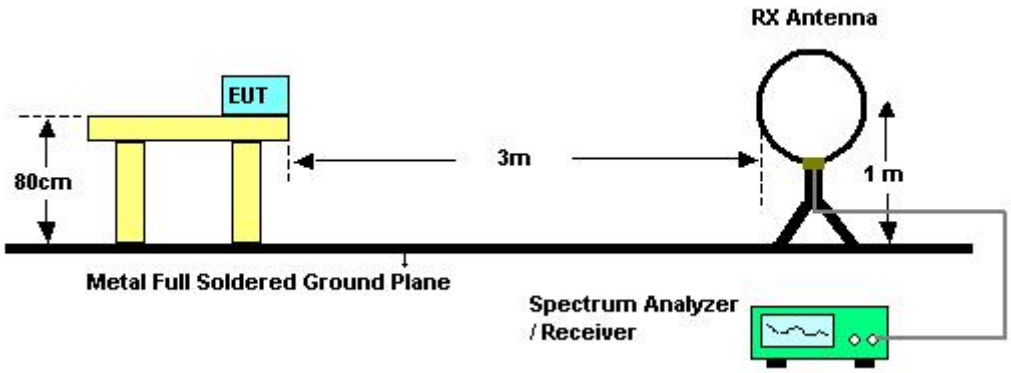
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

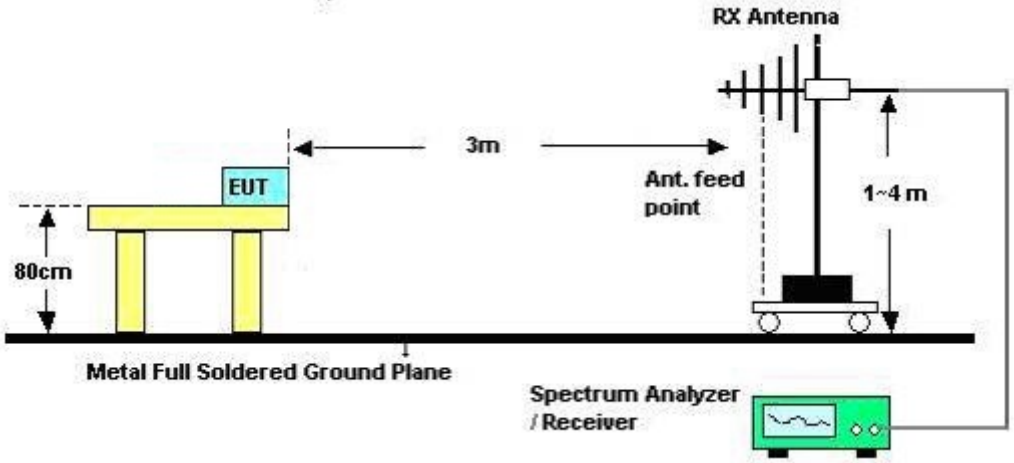
10. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
11. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
12. 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.
13. 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.
14. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
15. 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.
16. 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.
17. 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.
18. 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

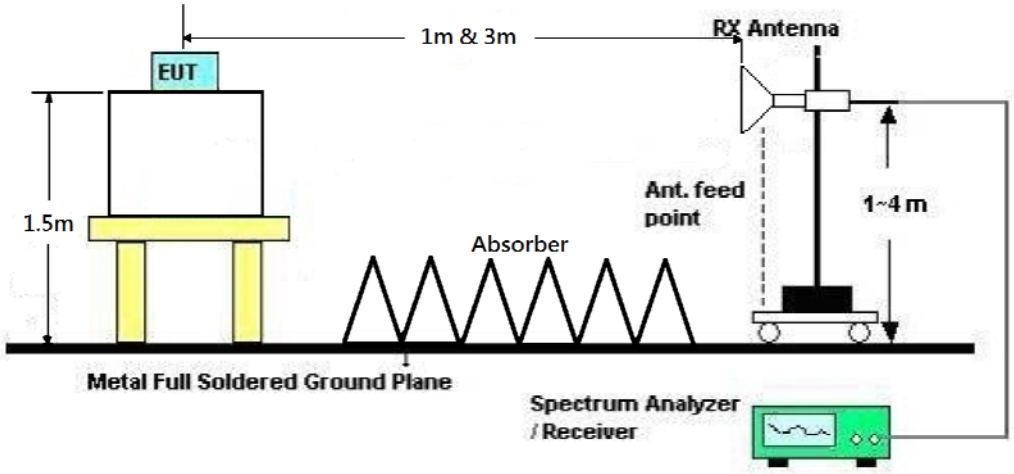
For Radiated Emissions: 9kHz ~30MHz



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	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	Normal Link
Test Date	Nov. 18, 2015	Test Mode	Mode 2

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

Note:

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

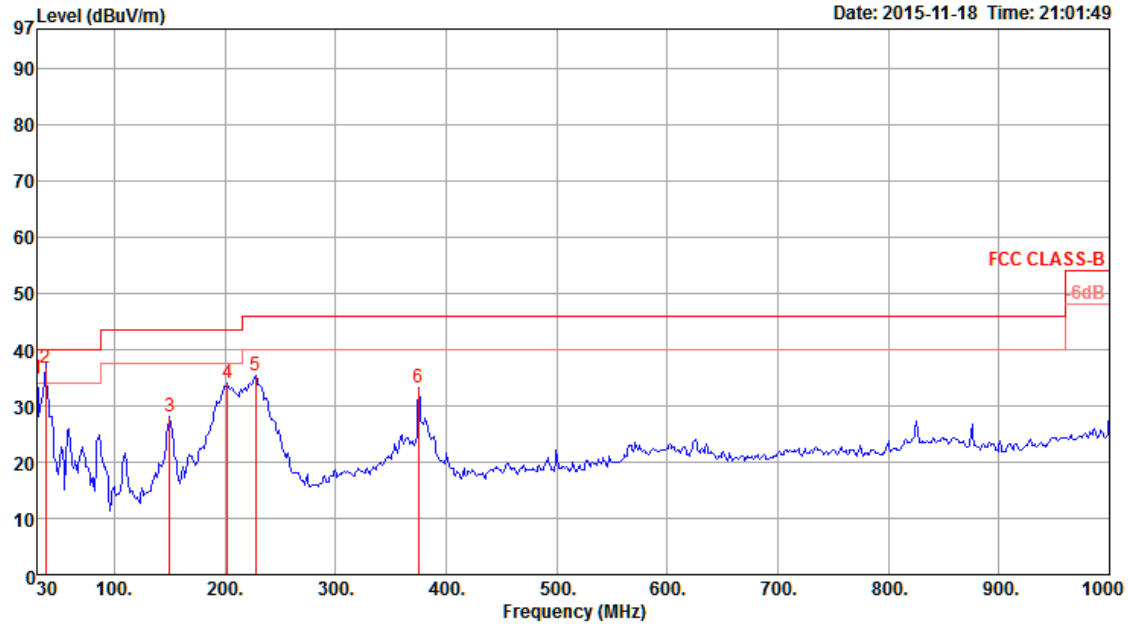
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

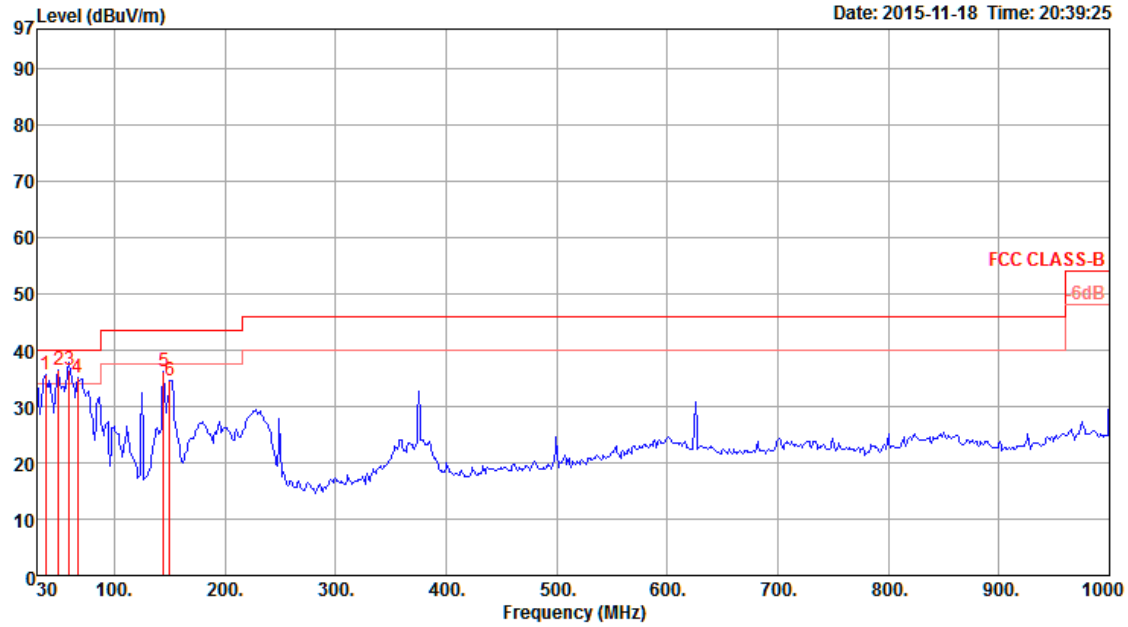
Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	Normal Link
Test Mode	Mode 2		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	30.00	34.93	40.00	-5.07	44.42	0.20	19.80	29.49	360	100	Peak	HORIZONTAL
2	37.76	36.66	40.00	-3.34	50.87	0.26	15.01	29.48	245	122	QP	HORIZONTAL
3	150.28	28.15	43.50	-15.35	45.07	0.92	11.17	29.01	360	100	Peak	HORIZONTAL
4	202.66	34.13	43.50	-9.37	51.27	1.14	10.53	28.81	360	100	Peak	HORIZONTAL
5	227.88	35.32	46.00	-10.68	51.59	1.24	11.16	28.67	360	100	Peak	HORIZONTAL
6	375.32	33.18	46.00	-12.82	44.36	1.73	15.98	28.89	360	100	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	37.76	35.57	40.00	-4.43	49.78	0.26	15.01	29.48	360	100	Peak	VERTICAL
2	49.40	36.45	40.00	-3.55	56.46	0.37	9.08	29.46	360	100	Peak	VERTICAL
3	59.10	36.42	40.00	-3.58	58.22	0.44	7.17	29.41	227	114	QP	VERTICAL
4	66.86	35.13	40.00	-4.87	57.18	0.47	6.86	29.38	360	100	Peak	VERTICAL
5	144.46	36.16	43.50	-7.34	52.60	0.90	11.69	29.03	360	100	Peak	VERTICAL
6	150.28	34.69	43.50	-8.81	51.61	0.92	11.17	29.01	360	100	Peak	VERTICAL

Note:

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

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

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

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 36 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15535.51	59.39	74.00	-14.61	42.52	13.84	38.24	35.21	Peak	148	352	HORIZONTAL
2	15544.71	47.28	54.00	-6.72	30.41	13.84	38.24	35.21	Average	148	352	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15538.81	47.39	54.00	-6.61	30.52	13.84	38.24	35.21	Average	148	360	VERTICAL
2	15546.15	60.59	74.00	-13.41	43.72	13.84	38.24	35.21	Peak	148	360	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 40 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15599.97	59.60	74.00	-14.40	42.83	13.83	38.17	35.23	Peak	150	134	HORIZONTAL
2	15607.53	47.00	54.00	-7.00	30.29	13.83	38.11	35.23	Average	150	134	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15592.28	46.89	54.00	-7.11	30.12	13.83	38.17	35.23	Average	159	115	VERTICAL
2	15608.53	59.98	74.00	-14.02	43.27	13.83	38.11	35.23	Peak	159	115	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15713.65	46.56	54.00	-7.44	30.06	13.82	37.98	35.30	Average	229	79	HORIZONTAL
2	15729.71	59.20	74.00	-14.80	42.70	13.82	37.98	35.30	Peak	229	79	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15712.02	46.92	54.00	-7.08	30.40	13.82	37.98	35.28	Average	242	137	VERTICAL
2	15729.84	59.39	74.00	-14.61	42.89	13.82	37.98	35.30	Peak	242	137	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.23	56.15	74.00	-17.85	41.60	10.25	39.10	34.80	Peak	138	165	HORIZONTAL
2	11499.36	44.16	54.00	-9.84	29.61	10.25	39.10	34.80	Average	138	165	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11481.12	44.26	54.00	-9.74	29.76	10.24	39.06	34.80	Average	162	169	VERTICAL
2	11483.88	56.71	74.00	-17.29	42.16	10.25	39.10	34.80	Peak	162	169	VERTICAL

Temperature	22℃	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11575.54	43.82	54.00	-10.18	29.21	10.29	39.14	34.82	Average	147	81	HORIZONTAL
2	11575.99	56.05	74.00	-17.95	41.44	10.29	39.14	34.82	Peak	147	81	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11560.87	56.47	74.00	-17.53	41.86	10.29	39.14	34.82	Peak	129	97	VERTICAL
2	11565.87	45.97	54.00	-8.03	31.36	10.29	39.14	34.82	Average	129	97	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11640.16	56.50	74.00	-17.50	41.84	10.32	39.18	34.84	Peak	158	92	HORIZONTAL
2	11641.35	43.98	54.00	-10.02	29.32	10.32	39.18	34.84	Average	158	92	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11642.40	56.71	74.00	-17.29	42.05	10.32	39.18	34.84	Peak	133	64	VERTICAL
2	11646.96	44.96	54.00	-9.04	30.30	10.32	39.18	34.84	Average	133	64	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15540.00	60.03	74.00	-13.97	43.16	13.84	38.24	35.21	Peak	164	152	HORIZONTAL
2	15548.72	47.17	54.00	-6.83	30.30	13.84	38.24	35.21	Average	164	152	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15537.88	59.88	74.00	-14.12	43.01	13.84	38.24	35.21	Peak	184	137	VERTICAL
2	15547.02	47.08	54.00	-6.92	30.21	13.84	38.24	35.21	Average	184	137	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15600.74	59.38	74.00	-14.62	42.67	13.83	38.11	35.23	Peak	153	99	HORIZONTAL
2	15608.75	46.73	54.00	-7.27	30.02	13.83	38.11	35.23	Average	153	99	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15598.97	59.82	74.00	-14.18	43.05	13.83	38.17	35.23	Peak	181	126	VERTICAL
2	15604.23	46.84	54.00	-7.16	30.13	13.83	38.11	35.23	Average	181	126	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15711.03	46.85	54.00	-7.15	30.33	13.82	37.98	35.28	Average	152	68	HORIZONTAL
2	15712.08	59.69	74.00	-14.31	43.17	13.82	37.98	35.28	Peak	152	68	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15712.76	46.80	54.00	-7.20	30.30	13.82	37.98	35.30	Average	175	129	VERTICAL
2	15723.85	59.48	74.00	-14.52	42.98	13.82	37.98	35.30	Peak	175	129	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11490.71	44.28	54.00	-9.72	29.73	10.25	39.10	34.80	Average	227	228	HORIZONTAL
2	11494.52	57.10	74.00	-16.90	42.55	10.25	39.10	34.80	Peak	227	228	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11485.03	44.20	54.00	-9.80	29.65	10.25	39.10	34.80	Average	125	183	VERTICAL
2	11488.46	57.19	74.00	-16.81	42.64	10.25	39.10	34.80	Peak	125	183	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11567.69	44.33	54.00	-9.67	29.72	10.29	39.14	34.82	Average	219	175	HORIZONTAL
2	11577.76	56.27	74.00	-17.73	41.66	10.29	39.14	34.82	Peak	219	175	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11567.98	43.84	54.00	-10.16	29.23	10.29	39.14	34.82	Average	200	83	VERTICAL
2	11577.69	56.23	74.00	-17.77	41.62	10.29	39.14	34.82	Peak	200	83	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11640.90	56.27	74.00	-17.73	41.61	10.32	39.18	34.84	Peak	168	173	HORIZONTAL
2	11644.68	43.91	54.00	-10.09	29.25	10.32	39.18	34.84	Average	168	173	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11646.19	44.03	54.00	-9.97	29.37	10.32	39.18	34.84	Average	186	138	VERTICAL
2	11659.20	56.74	74.00	-17.26	42.05	10.33	39.20	34.84	Peak	186	138	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15560.29	47.01	54.00	-6.99	30.24	13.83	38.17	35.23	Average	164	215	HORIZONTAL
2	15564.26	60.03	74.00	-13.97	43.26	13.83	38.17	35.23	Peak	164	215	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15563.56	59.64	74.00	-14.36	42.87	13.83	38.17	35.23	Peak	154	268	VERTICAL
2	15567.05	47.09	54.00	-6.91	30.32	13.83	38.17	35.23	Average	154	268	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15681.19	59.20	74.00	-14.80	42.60	13.83	38.05	35.28	Peak	178	184	HORIZONTAL
2	15699.07	46.90	54.00	-7.10	30.38	13.82	37.98	35.28	Average	178	184	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15685.48	59.70	74.00	-14.30	43.10	13.83	38.05	35.28	Peak	146	248	VERTICAL
2	15697.37	46.91	54.00	-7.09	30.39	13.82	37.98	35.28	Average	146	248	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11500.26	45.36	54.00	-8.64	30.81	10.25	39.10	34.80	Average	100	128	HORIZONTAL
2	11500.58	57.72	74.00	-16.28	43.17	10.25	39.10	34.80	Peak	100	128	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11508.14	45.31	54.00	-8.69	30.76	10.25	39.10	34.80	Average	150	224	VERTICAL
2	11517.15	56.46	74.00	-17.54	41.88	10.27	39.12	34.81	Peak	150	224	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11588.08	57.49	74.00	-16.51	42.86	10.30	39.16	34.83	Peak	191	164	HORIZONTAL
2	11597.82	45.19	54.00	-8.81	30.56	10.30	39.16	34.83	Average	191	164	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11582.76	45.23	54.00	-8.77	30.62	10.29	39.14	34.82	Average	138	59	VERTICAL
2	11596.92	58.07	74.00	-15.93	43.44	10.30	39.16	34.83	Peak	138	59	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15620.45	60.67	74.00	-13.33	43.99	13.83	38.11	35.26	Peak	148	213	HORIZONTAL
2	15628.40	48.08	54.00	-5.92	31.40	13.83	38.11	35.26	Average	148	213	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15622.34	60.31	74.00	-13.69	43.63	13.83	38.11	35.26	Peak	150	121	VERTICAL
2	15636.09	47.95	54.00	-6.05	31.27	13.83	38.11	35.26	Average	150	121	VERTICAL

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11541.99	57.11	74.00	-16.89	42.53	10.27	39.12	34.81	Peak	148	336	HORIZONTAL
2	11544.23	45.14	54.00	-8.86	30.56	10.27	39.12	34.81	Average	148	336	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11544.97	56.99	74.00	-17.01	42.41	10.27	39.12	34.81	Peak	150	266	VERTICAL
2	11545.74	45.54	54.00	-8.46	30.96	10.27	39.12	34.81	Average	150	266	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 within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

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

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

4.7.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for Peak

4.7.3. Test Procedures

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	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 23, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5140.90	52.75	54.00	-1.25	47.10	6.63	34.02	35.00	Average	102	359	HORIZONTAL
2	5148.59	66.69	74.00	-7.31	61.01	6.64	34.04	35.00	Peak	102	359	HORIZONTAL
3	5180.64	124.00			118.24	6.67	34.09	35.00	Peak	102	359	HORIZONTAL
4	5180.96	114.10			108.34	6.67	34.09	35.00	Average	102	359	HORIZONTAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5142.63	52.86	54.00	-1.14	47.18	6.64	34.04	35.00	Average	102	4	HORIZONTAL
2	5142.95	67.98	74.00	-6.02	62.30	6.64	34.04	35.00	Peak	102	4	HORIZONTAL
3	5203.21	115.03			109.19	6.70	34.14	35.00	Average	102	4	HORIZONTAL
4	5203.21	126.31			120.47	6.70	34.14	35.00	Peak	102	4	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5138.08	47.53	54.00	-6.47	41.88	6.63	34.02	35.00	Average	100	176	HORIZONTAL
2	5141.44	59.63	74.00	-14.37	53.98	6.63	34.02	35.00	Peak	100	176	HORIZONTAL
3	5234.71	116.18			110.26	6.73	34.19	35.00	Average	100	176	HORIZONTAL
4	5235.67	125.63			119.71	6.73	34.19	35.00	Peak	100	176	HORIZONTAL
5	5350.00	46.35	54.00	-7.65	40.15	6.84	34.36	35.00	Average	100	176	HORIZONTAL
6	5355.29	57.16	74.00	-16.84	50.93	6.85	34.38	35.00	Peak	100	176	HORIZONTAL

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 23, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5714.23	63.46	68.20	-4.74	56.83	7.02	34.64	35.03	Peak	100	3	HORIZONTAL
2	5723.69	77.18	78.20	-1.02	70.57	6.99	34.65	35.03	Peak	100	3	HORIZONTAL
3	5741.64	111.99			105.43	6.95	34.65	35.04	Average	100	3	HORIZONTAL
4	5741.80	122.79			116.23	6.95	34.65	35.04	Peak	100	3	HORIZONTAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5714.49	63.11	68.20	-5.09	56.48	7.02	34.64	35.03	Peak	100	4	HORIZONTAL
2	5720.90	63.66	78.20	-14.54	57.03	7.02	34.64	35.03	Peak	100	4	HORIZONTAL
3	5779.39	114.26			107.76	6.89	34.66	35.05	Average	100	4	HORIZONTAL
4	5780.19	124.93			118.43	6.89	34.66	35.05	Peak	100	4	HORIZONTAL
5	5850.00	64.00	78.20	-14.20	57.54	6.85	34.67	35.06	Peak	100	4	HORIZONTAL
6	5861.12	61.63	68.20	-6.57	55.17	6.85	34.67	35.06	Peak	100	4	HORIZONTAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5818.59	121.31			114.84	6.86	34.66	35.05	Peak	100	4	HORIZONTAL
2	5819.71	111.24			104.77	6.86	34.66	35.05	Average	100	4	HORIZONTAL
3	5851.28	73.47	78.20	-4.73	67.01	6.85	34.67	35.06	Peak	100	4	HORIZONTAL
4	5860.00	66.89	68.20	-1.31	60.43	6.85	34.67	35.06	Peak	100	4	HORIZONTAL

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 23, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5141.70	66.26	74.00	-7.74	60.61	6.63	34.02	35.00	Peak	100	4	HORIZONTAL
2	5142.66	52.99	54.00	-1.01	47.31	6.64	34.04	35.00	Average	100	4	HORIZONTAL
3	5182.40	113.26			107.50	6.67	34.09	35.00	Average	100	4	HORIZONTAL
4	5182.40	123.49			117.73	6.67	34.09	35.00	Peak	100	4	HORIZONTAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5136.54	65.63	74.00	-8.37	59.98	6.63	34.02	35.00	Peak	100	176	HORIZONTAL
2	5149.36	52.70	54.00	-1.30	47.02	6.64	34.04	35.00	Average	100	176	HORIZONTAL
3	5197.12	115.85			110.04	6.69	34.12	35.00	Average	100	176	HORIZONTAL
4	5198.08	125.53			119.72	6.69	34.12	35.00	Peak	100	176	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5135.19	60.31	74.00	-13.69	54.66	6.63	34.02	35.00	Peak	100	184	HORIZONTAL
2	5136.15	47.85	54.00	-6.15	42.20	6.63	34.02	35.00	Average	100	184	HORIZONTAL
3	5234.71	115.56			109.64	6.73	34.19	35.00	Average	100	184	HORIZONTAL
4	5235.67	125.78			119.86	6.73	34.19	35.00	Peak	100	184	HORIZONTAL
5	5350.00	46.36	54.00	-7.64	40.16	6.84	34.36	35.00	Average	100	184	HORIZONTAL
6	5372.21	58.25	74.00	-15.75	51.96	6.87	34.41	34.99	Peak	100	184	HORIZONTAL

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5714.23	63.40	68.20	-4.80	56.77	7.02	34.64	35.03	Peak	100	1	HORIZONTAL
2	5722.89	77.18	78.20	-1.02	70.57	6.99	34.65	35.03	Peak	100	1	HORIZONTAL
3	5741.80	121.23			114.67	6.95	34.65	35.04	Peak	100	1	HORIZONTAL
4	5742.28	110.83			104.27	6.95	34.65	35.04	Average	100	1	HORIZONTAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5700.71	62.94	68.20	-5.26	56.28	7.05	34.64	35.03	Peak	100	4	HORIZONTAL
2	5719.94	65.17	78.20	-13.03	58.54	7.02	34.64	35.03	Peak	100	4	HORIZONTAL
3	5779.87	114.04			107.54	6.89	34.66	35.05	Average	100	4	HORIZONTAL
4	5780.83	124.70			118.20	6.89	34.66	35.05	Peak	100	4	HORIZONTAL
5	5850.00	61.29	78.20	-16.91	54.83	6.85	34.67	35.06	Peak	100	4	HORIZONTAL
6	5860.00	60.87	68.20	-7.33	54.41	6.85	34.67	35.06	Peak	100	4	HORIZONTAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5819.71	111.14			104.67	6.86	34.66	35.05	Average	100	357	HORIZONTAL
2	5820.67	121.51			115.04	6.86	34.66	35.05	Peak	100	357	HORIZONTAL
3	5850.80	71.36	78.20	-6.84	64.90	6.85	34.67	35.06	Peak	100	357	HORIZONTAL
4	5860.00	66.80	68.20	-1.40	60.34	6.85	34.67	35.06	Peak	100	357	HORIZONTAL

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 23, 2015		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5147.37	52.98	54.00	-1.02	47.30	6.64	34.04	35.00	Average	100	176	HORIZONTAL
2	5147.37	65.65	74.00	-8.35	59.97	6.64	34.04	35.00	Peak	100	176	HORIZONTAL
3	5187.12	117.38			111.57	6.69	34.12	35.00	Peak	100	176	HORIZONTAL
4	5187.44	107.75			101.94	6.69	34.12	35.00	Average	100	176	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5150.00	52.98	54.00	-1.02	47.30	6.64	34.04	35.00	Average	100	6	HORIZONTAL
2	5150.00	64.62	74.00	-9.38	58.94	6.64	34.04	35.00	Peak	100	6	HORIZONTAL
3	5231.92	110.10			104.18	6.73	34.19	35.00	Average	100	6	HORIZONTAL
4	5231.92	119.74			113.82	6.73	34.19	35.00	Peak	100	6	HORIZONTAL

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 24, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5711.73	67.16	68.20	-1.04	60.53	7.02	34.64	35.03	Peak	100	2	HORIZONTAL
2	5720.39	73.73	78.20	-4.47	67.10	7.02	34.64	35.03	Peak	100	2	HORIZONTAL
3	5751.15	116.74			110.18	6.95	34.65	35.04	Peak	100	2	HORIZONTAL
4	5751.80	107.14			100.58	6.95	34.65	35.04	Average	100	2	HORIZONTAL

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5708.94	64.63	68.20	-3.57	58.00	7.02	34.64	35.03	Peak	100	357	HORIZONTAL
2	5721.92	66.11	78.20	-12.09	59.48	7.02	34.64	35.03	Peak	100	357	HORIZONTAL
3	5789.23	109.71			103.24	6.86	34.66	35.05	Average	100	357	HORIZONTAL
4	5789.71	120.02			113.55	6.86	34.66	35.05	Peak	100	357	HORIZONTAL
5	5850.00	72.24	78.20	-5.96	65.78	6.85	34.67	35.06	Peak	100	357	HORIZONTAL
6	5860.87	66.91	68.20	-1.29	60.45	6.85	34.67	35.06	Peak	100	357	HORIZONTAL

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung & Owen Hsu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Nov. 23, 2015 ~ Nov. 24, 2015		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5149.10	52.83	54.00	-1.17	47.15	6.64	34.04	35.00	Average	100	0	HORIZONTAL
2	5149.10	64.36	74.00	-9.64	58.68	6.64	34.04	35.00	Peak	100	0	HORIZONTAL
3	5188.37	97.89			92.08	6.69	34.12	35.00	Average	100	0	HORIZONTAL
4	5188.37	107.54			101.73	6.69	34.12	35.00	Peak	100	0	HORIZONTAL
5	5350.00	45.86	54.00	-8.14	39.66	6.84	34.36	35.00	Average	100	0	HORIZONTAL
6	5350.00	57.09	74.00	-16.91	50.89	6.84	34.36	35.00	Peak	100	0	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	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5693.27	67.09	68.20	-1.11	60.43	7.05	34.64	35.03	Peak	100	1	HORIZONTAL
2	5725.00	67.37	78.20	-10.83	60.76	6.99	34.65	35.03	Peak	100	1	HORIZONTAL
3	5752.56	106.24			99.68	6.95	34.65	35.04	Peak	100	1	HORIZONTAL
4	5753.37	97.10			90.54	6.95	34.65	35.04	Average	100	1	HORIZONTAL
5	5854.33	63.43	78.20	-14.77	56.97	6.85	34.67	35.06	Peak	100	1	HORIZONTAL
6	5866.35	62.99	68.20	-5.21	56.53	6.85	34.67	35.06	Peak	100	1	HORIZONTAL

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

Note:

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

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

4.8. Frequency Stability Measurement

4.8.1. Limit

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

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

4.8.2. Measuring Instruments and Setting

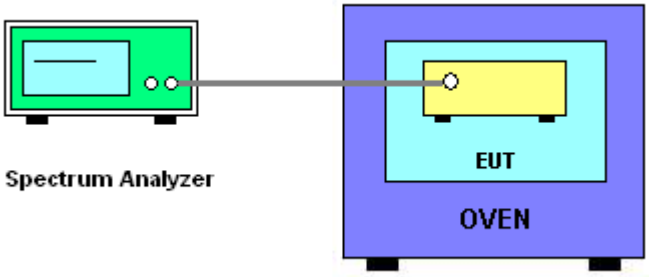
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.8.3. Test Procedures

19. The transmitter output (antenna port) was connected to the spectrum analyzer.
20. EUT have transmitted absence of modulation signal and fixed channelize.
21. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
22. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
23. 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).
24. 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.
25. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
26. Extreme temperature is -40°C~70°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	25°C	Humidity	45%
Test Engineer	Roki Liu	Test Date	Dec. 11, 2015 ~ Dec. 14, 2015

Mode: 20 MHz / Chain 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9880	5199.9474	5199.9461	5199.9477
110.00	5199.9501	5199.9466	5199.9455	5199.9620
93.50	5199.9499	5199.9449	5199.9438	5199.9441
Max. Deviation (MHz)	0.0501	0.0551	0.0562	0.0559
Max. Deviation (ppm)	9.63	10.60	10.81	10.75
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5199.9610	5199.9522	5199.9499	5199.9511
-30	5199.9605	5199.9521	5199.9496	5199.9505
-20	5199.9602	5199.9516	5199.9494	5199.9501
-10	5199.9588	5199.9494	5199.9481	5199.9480
0	5199.9503	5199.9482	5199.9456	5199.9476
10	5199.9495	5199.9473	5199.9450	5199.9455
20	5199.9481	5199.9462	5199.9432	5199.9440
30	5199.9462	5199.9441	5199.9417	5199.9412
40	5199.9451	5199.9416	5199.9401	5199.9403
50	5199.9433	5199.9415	5199.9388	5199.9385
60	5199.9429	5199.9415	5199.9385	5199.9375
70	5199.9425	5199.9416	5199.9375	5199.9373
Max. Deviation (MHz)	0.0575	0.0584	0.0625	0.0627
Max. Deviation (ppm)	11.06	11.23	12.02	12.06
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9460	5784.9462	5784.9432	5784.9486
110.00	5784.9455	5784.9433	5784.9405	5784.9476
93.50	5784.9395	5784.9417	5784.9382	5784.9402
Max. Deviation (MHz)	0.0605	0.0583	0.0618	0.0598
Max. Deviation (ppm)	10.46	10.08	10.68	10.34
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5784.9496	5784.9527	5784.9495	5784.9477
-30	5784.9491	5784.9513	5784.9487	5784.9461
-20	5784.9488	5784.9498	5784.9477	5784.9458
-10	5784.9471	5784.9488	5784.9462	5784.9449
0	5784.9460	5784.9488	5784.9435	5784.9422
10	5784.9449	5784.9465	5784.9425	5784.9419
20	5784.9439	5784.9451	5784.9417	5784.9398
30	5784.9417	5784.9426	5784.9402	5784.9382
40	5784.9403	5784.9406	5784.9395	5784.9372
50	5784.9394	5784.9395	5784.9374	5784.9342
60	5784.9394	5784.9391	5784.9374	5784.9335
70	5784.9385	5784.9381	5784.9369	5784.9333
Max. Deviation (MHz)	0.0615	0.0619	0.0631	0.0667
Max. Deviation (ppm)	10.63	10.70	10.91	11.53
Result	Complies			

Mode: 40 MHz / Chain 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9666	5189.9621	5189.9588	5189.9516
110.00	5189.9651	5189.9617	5189.9587	5189.9501
93.50	5189.9602	5189.9509	5189.9477	5189.9479
Max. Deviation (MHz)	0.0398	0.0491	0.0523	0.0521
Max. Deviation (ppm)	7.67	9.46	10.08	10.04
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5189.9641	5189.9511	5189.9516	5189.9479
-30	5189.9632	5189.9503	5189.9509	5189.9462
-20	5189.9612	5189.9495	5189.9484	5189.9456
-10	5189.9581	5189.9481	5189.9463	5189.9320
0	5189.9566	5189.9459	5189.9442	5189.9219
10	5189.9454	5189.9438	5189.9432	5189.9414
20	5189.9448	5189.9435	5189.9426	5189.9401
30	5189.9434	5189.9423	5189.9413	5189.9374
40	5189.9422	5189.9411	5189.9387	5189.9367
50	5189.9411	5189.9389	5189.9374	5189.9341
60	5189.9401	5189.9371	5189.9361	5189.9333
70	5189.9398	5189.9368	5189.9341	5189.9326
Max. Deviation (MHz)	0.0602	0.0632	0.0659	0.0781
Max. Deviation (ppm)	11.60	12.18	12.70	15.05
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9402	5754.9385	5754.9374	5754.9361
110.00	5754.9393	5754.9374	5754.9366	5754.9351
93.50	5754.9374	5754.9368	5754.9351	5754.9322
Max. Deviation (MHz)	0.0626	0.0632	0.0649	0.0678
Max. Deviation (ppm)	10.88	10.98	11.28	11.78
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5754.9476	5754.9492	5754.9482	5754.9476
-30	5754.9473	5754.9485	5754.9477	5754.9471
-20	5754.9476	5754.9472	5754.9468	5754.9464
-10	5754.9443	5754.9431	5754.9415	5754.9396
0	5754.9429	5754.9413	5754.9398	5754.9376
10	5754.9416	5754.9404	5754.9386	5754.9372
20	5754.9404	5754.9391	5754.9375	5754.9365
30	5754.9390	5754.9379	5754.9365	5754.9349
40	5754.9374	5754.9359	5754.9343	5754.9323
50	5754.9362	5754.9348	5754.9400	5754.9313
60	5754.9362	5754.9341	5754.9388	5754.9309
70	5754.9362	5754.9335	5754.9374	5754.9302
Max. Deviation (MHz)	0.0638	0.0665	0.0657	0.0698
Max. Deviation (ppm)	11.09	11.56	11.42	12.13
Result	Complies			

Mode: 80 MHz / Chain 4

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9664	5209.9663	5209.9644	5209.9632
110.00	5209.9655	5209.9646	5209.9632	5209.9611
93.50	5209.9643	5209.9629	5209.9628	5209.9601
Max. Deviation (MHz)	0.0357	0.0371	0.0372	0.0399
Max. Deviation (ppm)	6.85	7.12	7.14	7.66
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5209.9728	5209.9691	5209.9706	5209.9672
-30	5209.9713	5209.9682	5209.9695	5209.9668
-20	5209.9703	5209.9677	5209.9674	5209.9656
-10	5209.9684	5209.9667	5209.9651	5209.9632
0	5209.9674	5209.9653	5209.9634	5209.9626
10	5209.9652	5209.9639	5209.9617	5209.9613
20	5209.9650	5209.9627	5209.9612	5209.9592
30	5209.9643	5209.9615	5209.9601	5209.9585
40	5209.9638	5209.9595	5209.9579	5209.9563
50	5209.9617	5209.9577	5209.9571	5209.9541
60	5209.9612	5209.9560	5209.9562	5209.9528
70	5209.9601	5209.9542	5209.9544	5209.9516
Max. Deviation (MHz)	0.0399	0.0458	0.0456	0.0484
Max. Deviation (ppm)	7.66	8.79	8.75	9.29
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9772	5774.9753	5774.9745	5774.9730
110.00	5774.9761	5774.9748	5774.9739	5774.9712
93.50	5774.9755	5774.9740	5774.9728	5774.9701
Max. Deviation (MHz)	0.0245	0.0260	0.0272	0.0299
Max. Deviation (ppm)	4.24	4.50	4.71	5.18
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5774.9891	5774.9866	5774.9856	5774.9850
-30	5774.9886	5774.9866	5774.9844	5774.9852
-20	5774.9874	5774.9863	5774.9838	5774.9822
-10	5774.9864	5774.9838	5774.9822	5774.9813
0	5774.9852	5774.9820	5774.9809	5774.9796
10	5774.9826	5774.9810	5774.9795	5774.9781
20	5774.9811	5774.9798	5774.9782	5774.9763
30	5774.9797	5774.9784	5774.9769	5774.9756
40	5774.9791	5774.9766	5774.9750	5774.9732
50	5774.9777	5774.9759	5774.9744	5774.9725
60	5774.9752	5774.9740	5774.9734	5774.9717
70	5774.9750	5774.9735	5774.9730	5774.9711
Max. Deviation (MHz)	0.0250	0.0265	0.0270	0.0289
Max. Deviation (ppm)	4.33	4.59	4.68	5.00
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 Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Jan. 27, 2016	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 16, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 13, 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	Schaffner	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 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	Feb. 24, 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. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Feb.10, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 27, 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-l0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	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)
RF Cable-high	Woken	RG402	High Cable-6	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 years.

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%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74×10^{-8}	Confidence levels of 95%
Frequency Stability	6.06×10^{-8}	Confidence levels of 95%