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FCC RADIO TEST REPORT

Applicant's company	**Xirrus, Inc.**
Applicant Address	2101 Corporate Center Drive, Thousand Oaks, CA 91320 USA
FCC ID	**SK6-XD2240**
Manufacturer's company	**Lite-On Network Communication (Dongguan) Limited**
Manufacturer Address	30#Keji Rd.,Yin Hu Industrial Area, Qingxi Town, DongGuan City, Guangdong, China

Product Name	Wireless Access Point
Brand Name	XIRRUS
Model No.	XD2240
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Aug. 17, 2015
Final Test Date	Oct. 02, 2015
Submission Type	Original Equipment

Statement

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

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

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

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

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

TAF
Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR582537AB	Rev. 01	Initial issue of report	Oct. 14, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless Access Point
Brand Name	:	XIRRUS
Model No.	:	XD2240
Applicant	:	Xirrus, 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 Aug. 17, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	11.62 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	6.11 dB
4.5	15.407(a)	Power Spectral Density	Complies	6.18 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.33 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.11 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	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: 24.48 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 25.56 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 39.40 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.80 MHz Band 4: IEEE 802.11a: 18.84 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.84 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 39.00 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.40 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 23.83 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 23.81 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.56 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.59 dBm Band 4: IEEE 802.11a: 23.89 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 23.86 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.77 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 19.19 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
Operating Mode	☐ Outdoor access point	
	☒ Indoor access point	
	☐ Fixed point-to-point access points	
	☐ Mobile and portable client devices	

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, VHT80 in 5GHz.

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

3.2. Accessories

Others
Wall-mounted rack*1

3.3. Table for Filed Antenna

<For Radio 1>

Ant.	Brand	Model Name	Antenna Type	Connector
1	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
3	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
5	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
7	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX

Ant.	Frequency (MHz)		
	2412, 2422	2437	2452, 2462
1	2.07	1.35	1.84
3	4.67	3.82	4.52
5	3.68	3.64	3.04
7	4.23	4.10	3.51

Ant.	5GHz Band	
	Band 1	Band 4
1	0.23	3.09
3	4.19	4.29
5	4.93	4.86
7	4.65	3.94

Frequency Band (MHz)	For PSD Correlated Composite Gain (4TX, 1S)	For output power Uncorrelated Composite Gain (4TX, 4S)
2412, 2422	6.99	1.40
2437	7.02	1.36
2452, 2462	7.22	1.68
5150 ~ 5250 (Band 1)	6.10	0.78
5725 ~ 5850 (Band 4)	7.29	1.56

<For Radio 2>

Ant.	Brand	Model Name	Antenna Type	Connector
2	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
4	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
6	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
8	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX

Ant.	Frequency (MHz)		
	2412, 2422	2437	2452, 2462
2	1.79	1.19	1.08
4	3.96	3.51	3.06
6	2.93	2.93	3.38
8	2.10	2.49	1.79

Ant.	5GHz Band	
	Band 1	Band 4
2	1.64	4.60
4	3.02	3.45
6	3.48	4.78
8	3.93	3.69

Frequency Band (MHz)	For PSD Correlated Composite Gain (4TX, 1S)	For output power Uncorrelated Composite Gain (4TX, 4S)
2412, 2422	6.01	0.65
2437	5.86	0.22
2452, 2462	5.33	-0.26
5150 ~ 5250 (Band 1)	4.88	-0.30
5725 ~ 5850 (Band 4)	6.98	1.68

Note: The EUT has eight antennas.

For Conducted Test:

Radio 1 and Radio 2 are the same radios, radio 2 has been evaluated to be the worst case so it's chosen to conduct tests.

Radio 1 and Radio 2 equipped the same type antennas, Radio 1 has the higher gain than radio 2 so it's chosen to conduct the gain test.

For Radiated Test:

Radio 1 and Radio 2 are the same radios; radio 2 has been evaluated to be the worst case so it's chosen to radiate tests.

<For 2.4GHz and 5GHz Band>

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

For Radio 1

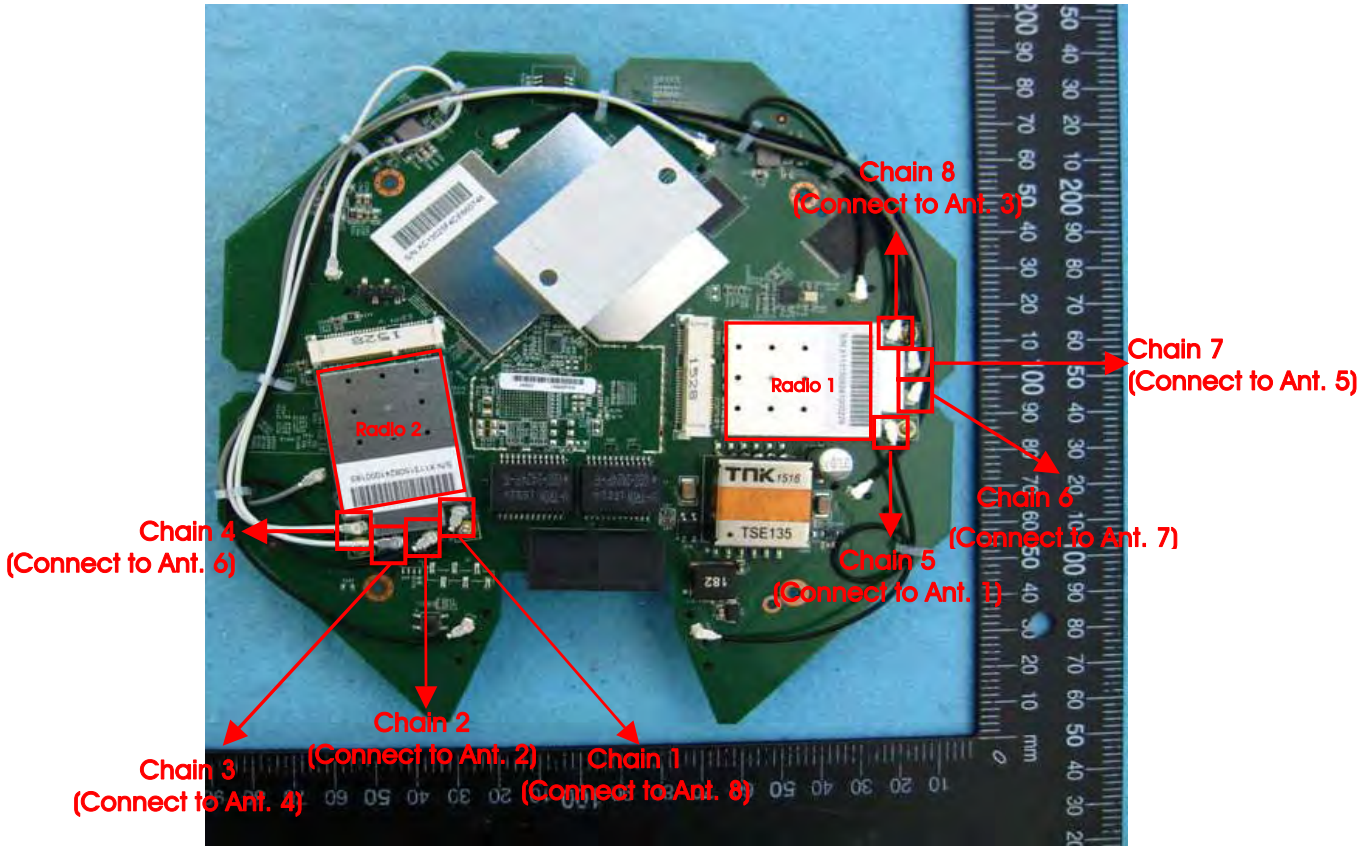
Chain 5, Chain 6, Chain 7 and Chain 8 can be used as transmitting/receiving antenna.

Chain 5, Chain 6, Chain 7 and Chain 8 could transmit/receive simultaneously.

For Radio 2

Chain 1, Chain 2, Chain 3 and Chain 4 can be used as transmitting/receiving antenna.

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	2
	40 MHz	Band 1&4	-	38/151	2
	80 MHz	Band 1&4	-	42/155	2

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

2. The PoE below are for measurement only, would not be marketed.

Power	Brand	Model No.	FCC ID
PoE	H3C	EWPAM1NPoE	N/A

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link_EUT GIG1

Mode 2. Normal Link_EUT GIG2

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

For Radiated Emission test<Below 1GHz>:

Mode 1. Normal Link_Place EUT in Z axis_GIG1

Mode 2. Normal Link_Place EUT in Y axis_GIG1

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

Mode 3. Normal Link_Place EUT in Y axis_GIG2

Mode 2 generated the worst test result, so it was recorded in this report.

For Radiated Emission test<Above 1GHz>:

Mode 1. EUT Y-axis_Radio 1 (WLAN 2.4GHz and 5GHz functions)

Mode 2. EUT Z-axis_Radio 1 (WLAN 2.4GHz and 5GHz functions)

Mode 3. EUT Y-axis_Radio 2 (WLAN 2.4GHz and 5GHz functions)

Mode 4. EUT Z-axis_Radio 2 (WLAN 2.4GHz and 5GHz functions)

Mode 4 generated the worst test result, so it was recorded in this report.

For Radiated Emission test<Above 1GHz>:

Mode 1. EUT Y-axis_Radio 1 (WLAN 2.4GHz and 5GHz functions)

Mode 2. EUT Z-axis_Radio 1 (WLAN 2.4GHz and 5GHz functions)

Mode 3. EUT Y-axis_Radio 2 (WLAN 2.4GHz and 5GHz functions)

Mode 4. EUT Z-axis_Radio 2 (WLAN 2.4GHz and 5GHz functions)

Mode 3 generated the worst test result, so it was recorded in this report.

For Co-location MPE Test:

Mode 1. 2.4GHz WLAN (Radio 1)+ 2.4GHz WLAN (Radio 2) Mode

Mode 2. 2.4GHz WLAN (Radio 1)+5GHz WLAN (Radio 2) Mode

Mode 3. 5GHz WLAN (Radio 1) +2.4GHz WLAN (Radio 2) Mode

Mode 4. 5GHz WLAN (Radio 1) +5GHz WLAN (Radio 2) Mode

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA582537) is added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

Test Site Location					
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.				
TEL:	886-3-656-9065				
FAX:	886-3-656-9085				
Test Site No.	**Site Category**	**Location**	**FCC Reg. No.**	**IC File No.**	**VCCI Reg. No**
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D	-
CO02-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Supporting Units

For Test Site No: CO02-CB and 03CH01-CB<Below 1GHz>

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E4300	DoC
PoE	H3C	EWPAM1NPOE	N/A

For Test Site No: 03CH01-CB<Above 1GHz> and TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
PoE	H3C	EWPAM1NPOE	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	XirCon-Setup-1.0.2.25					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	80	80	68	63	80	74
802.11ac MCS0/Nss1 VHT20	80	80	80	64	80	80
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	57		71		54	73
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	50				52	

3.9. EUT Operation during Test

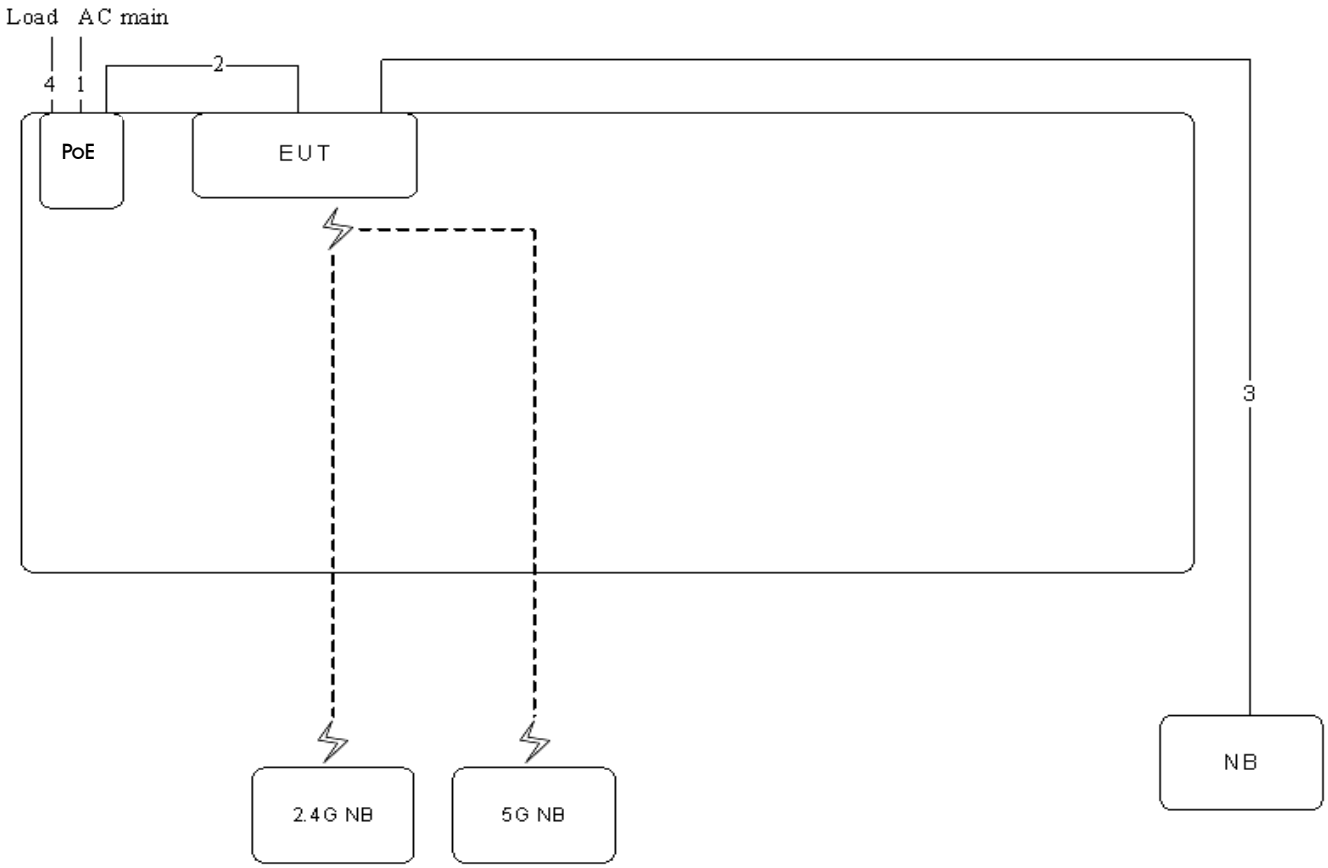
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.053	2.086	98.43%	0.07	0.01
802.11ac MCS0/Nss1 VHT20	1.884	1.928	97.74%	0.10	0.53
802.11ac MCS0/Nss1 VHT40	0.925	0.977	94.68%	0.24	1.08
802.11ac MCS0/Nss1 VHT80	0.427	0.478	89.33%	0.49	2.34

3.11. Test Configurations

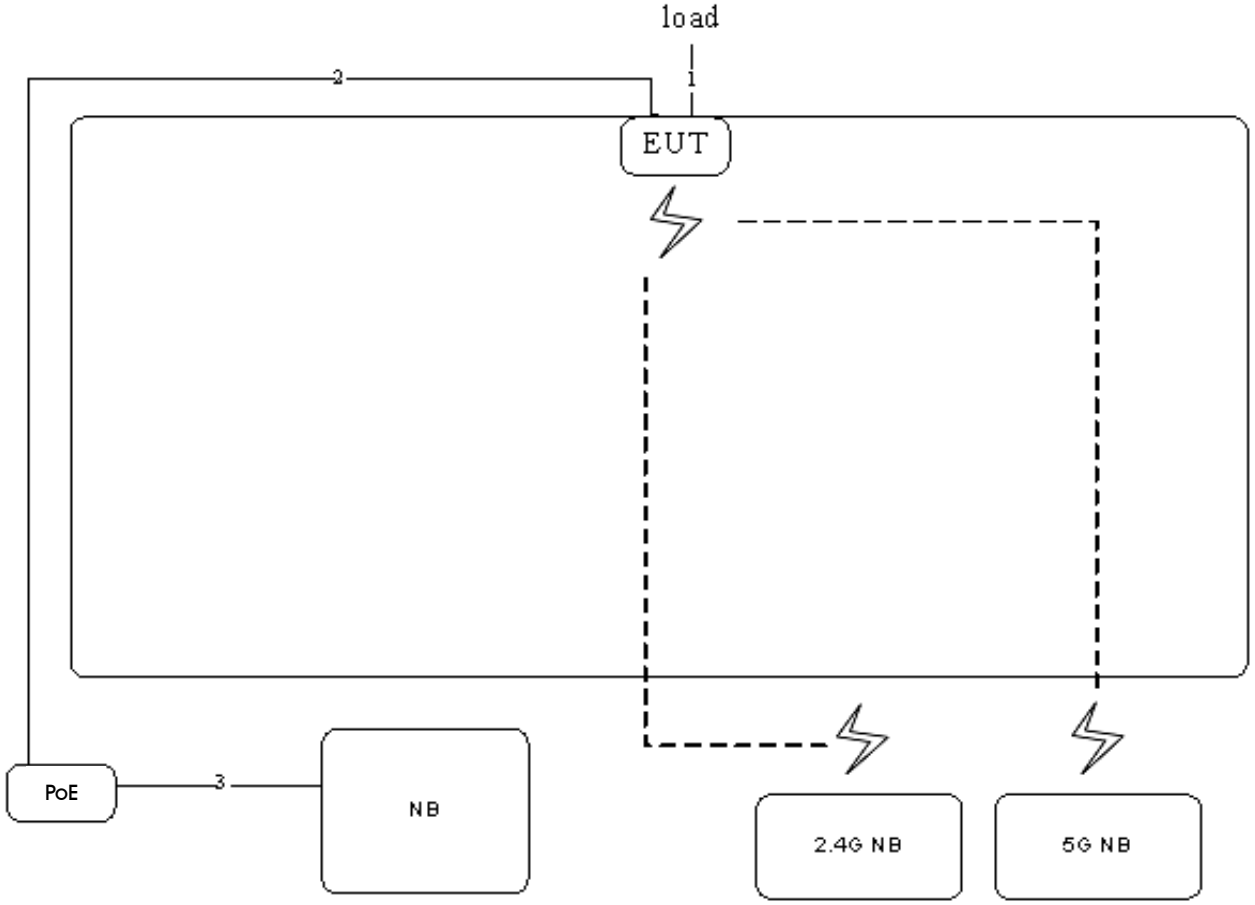
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m

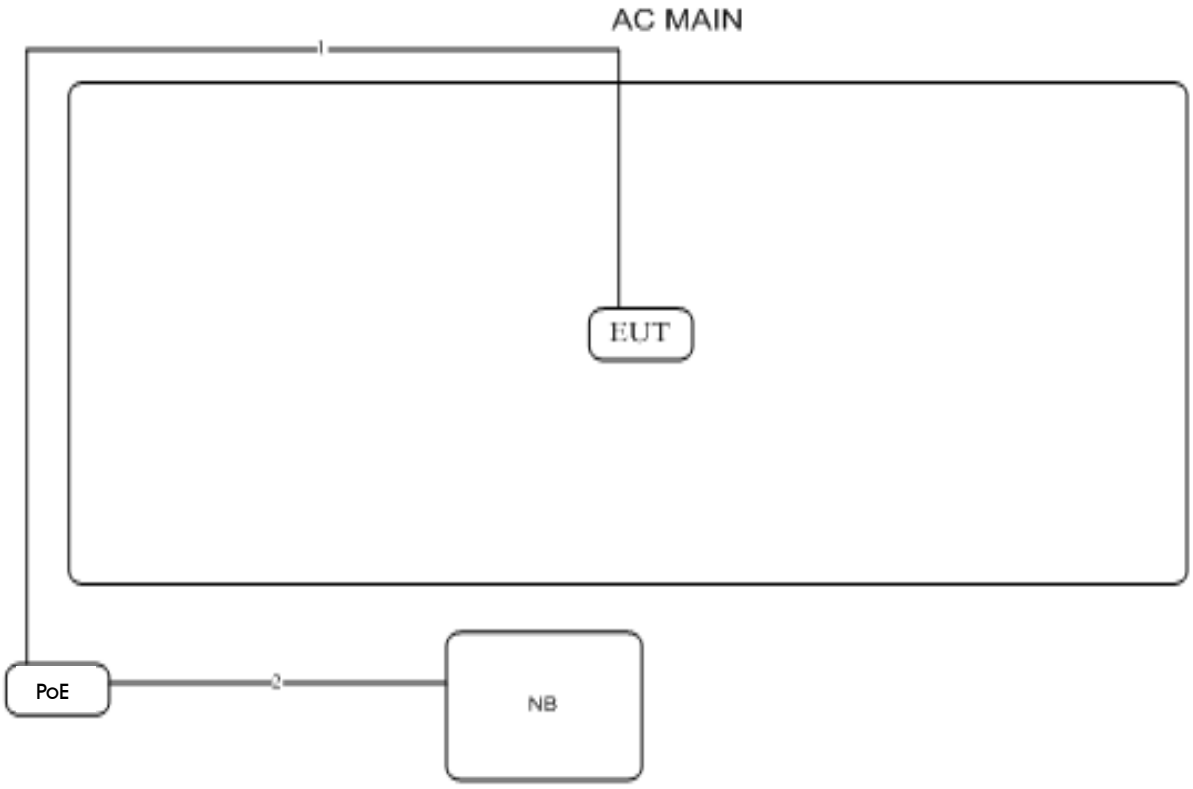
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	RJ-45 Cable	No	1.5m
2	RJ-45 Cable	No	10m
3	RJ-45 Cable	No	1m

Test Configuration: above 1GHz



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

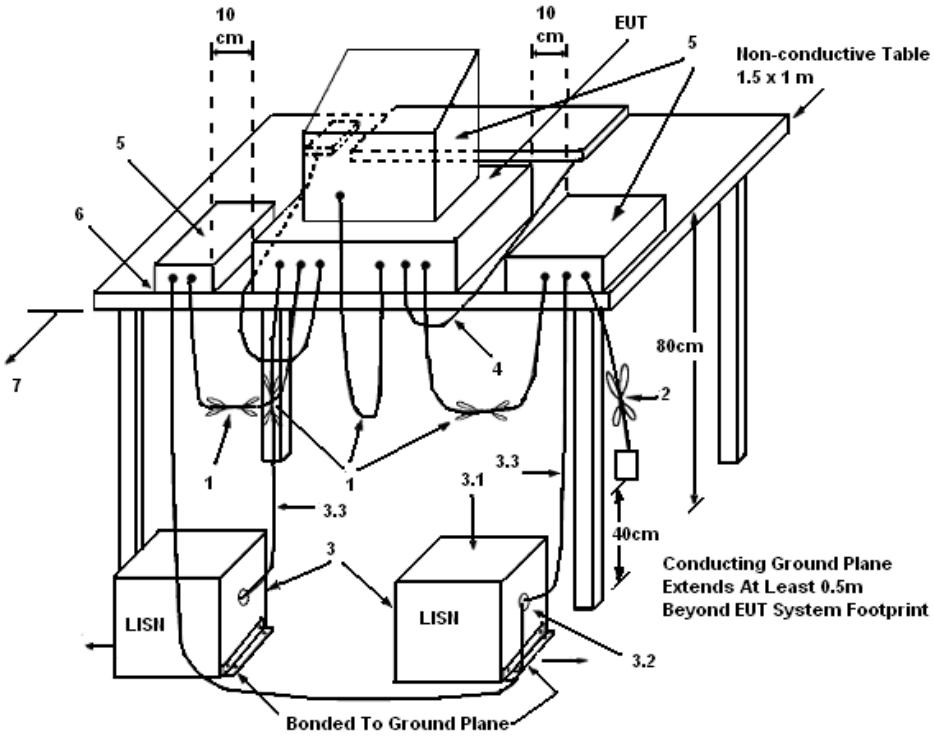
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

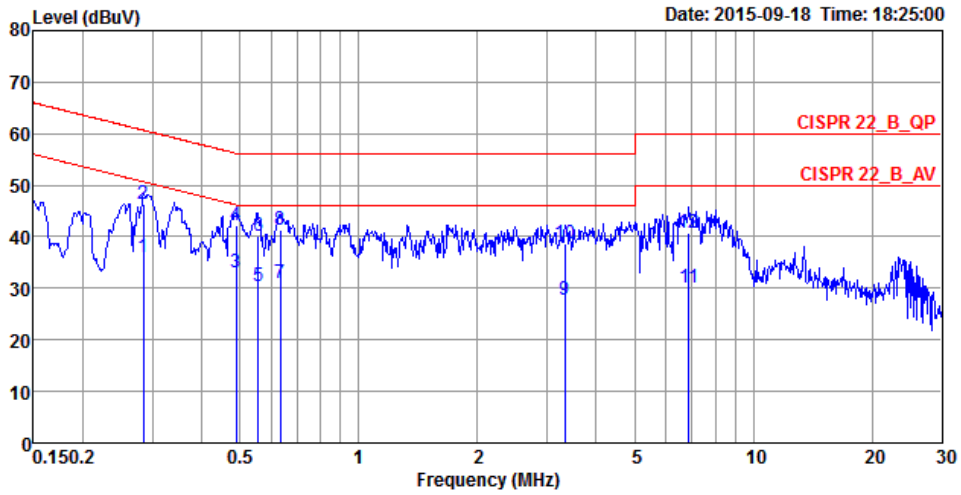
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

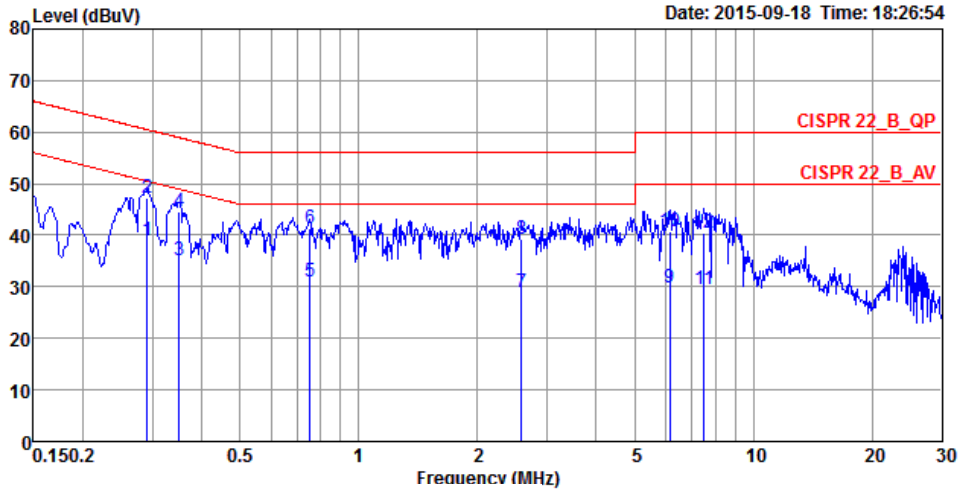
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	50%
Test Engineer	Hank Yang	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	0.2848	36.12	-14.56	50.68	25.92	10.01	0.19	LINE	Average
2	0.2848	46.29	-14.39	60.68	36.09	10.01	0.19	LINE	QP
3	0.4889	32.97	-13.22	46.19	22.75	10.02	0.20	LINE	Average
4	0.4889	42.30	-13.89	56.19	32.08	10.02	0.20	LINE	QP
5	0.5552	30.36	-15.64	46.00	20.14	10.02	0.20	LINE	Average
6	0.5552	40.04	-15.96	56.00	29.82	10.02	0.20	LINE	QP
7	0.6338	31.10	-14.90	46.00	20.88	10.02	0.20	LINE	Average
8	0.6338	41.37	-14.63	56.00	31.15	10.02	0.20	LINE	QP
9	3.3281	27.81	-18.19	46.00	17.44	10.07	0.30	LINE	Average
10	3.3281	38.74	-17.26	56.00	28.37	10.07	0.30	LINE	QP
11	6.8776	29.98	-20.02	50.00	19.48	10.16	0.34	LINE	Average
12	6.8776	40.64	-19.36	60.00	30.14	10.16	0.34	LINE	QP

Temperature	24°C	Humidity	50%
Test Engineer	Hank Yang	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	0.2909	38.88	-11.62	50.50	28.68	10.01	0.19	NEUTRAL	Average
2	0.2909	47.18	-13.32	60.50	36.98	10.01	0.19	NEUTRAL	QP
3	0.3502	35.24	-13.72	48.96	25.03	10.01	0.20	NEUTRAL	Average
4	0.3502	44.48	-14.48	58.96	34.27	10.01	0.20	NEUTRAL	QP
5	0.7509	30.85	-15.15	46.00	20.64	10.02	0.19	NEUTRAL	Average
6	0.7509	41.27	-14.73	56.00	31.06	10.02	0.19	NEUTRAL	QP
7	2.5807	28.85	-17.15	46.00	18.52	10.05	0.28	NEUTRAL	Average
8	2.5807	39.39	-16.61	56.00	29.06	10.05	0.28	NEUTRAL	QP
9	6.1534	29.88	-20.12	50.00	19.40	10.14	0.34	NEUTRAL	Average
10	6.1534	40.61	-19.39	60.00	30.13	10.14	0.34	NEUTRAL	QP
11	7.4860	29.66	-20.34	50.00	19.14	10.17	0.35	NEUTRAL	Average
12	7.4860	40.34	-19.66	60.00	29.82	10.17	0.35	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

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

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

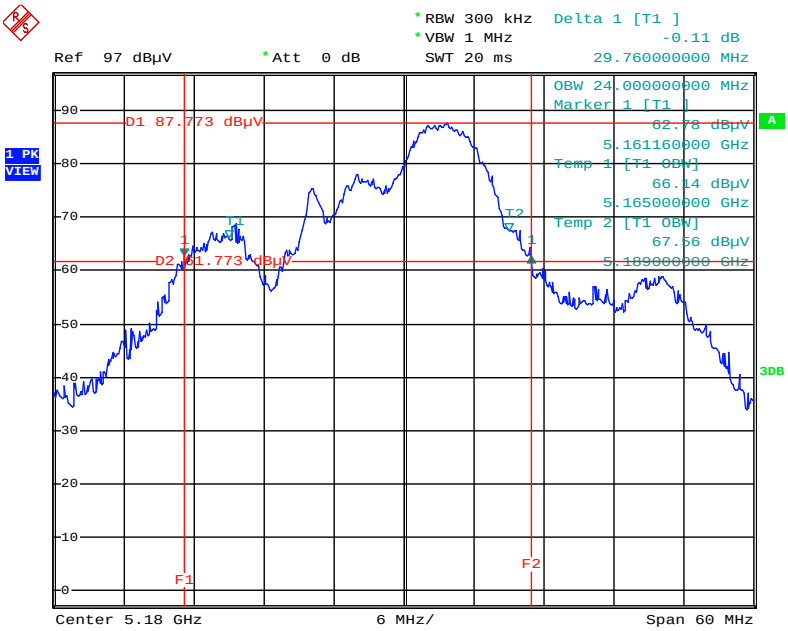
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	23°C	Humidity	56%
Test Engineer	Serway Li		

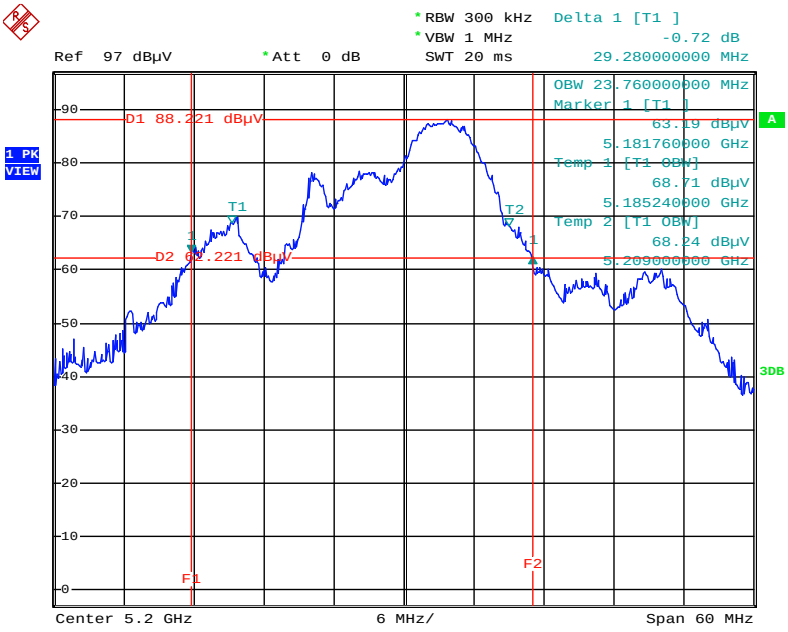
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	29.76	24.00
	5200 MHz	29.28	23.76
	5240 MHz	30.84	24.48
	5745 MHz	19.68	16.44
	5785 MHz	28.44	17.16
	5825 MHz	28.20	18.84
802.11ac MCS0/Nss1 VHT20	5180 MHz	40.56	25.56
	5200 MHz	40.56	24.96
	5240 MHz	37.08	19.92
	5745 MHz	21.00	18.00
	5785 MHz	30.12	18.60
	5825 MHz	33.24	18.84
802.11ac MCS0/Nss1 VHT40	5190 MHz	47.00	37.40
	5230 MHz	73.00	39.40
	5755 MHz	40.60	37.20
	5795 MHz	68.20	39.00
802.11ac MCS0/Nss1 VHT80	5210 MHz	81.20	76.80
	5775 MHz	81.20	76.40

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



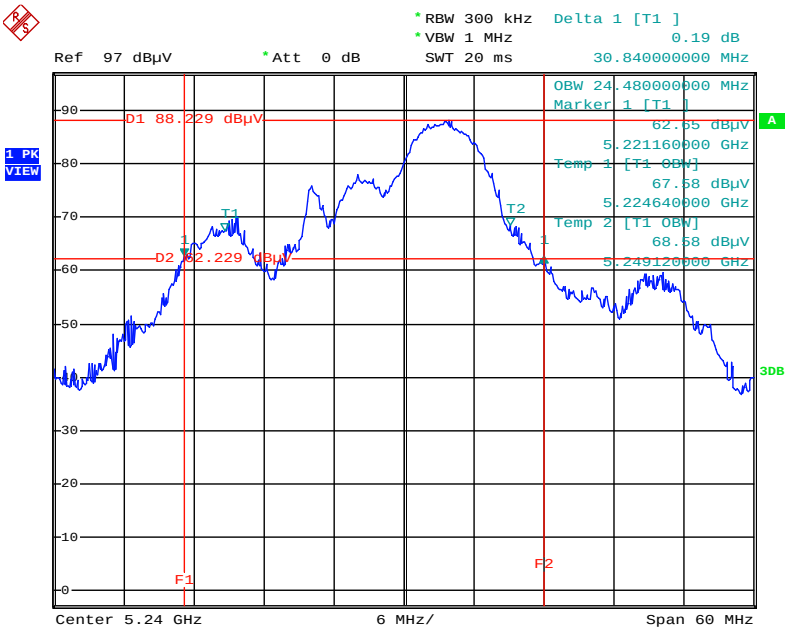
Date: 1.OCT.2015 23:11:42

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



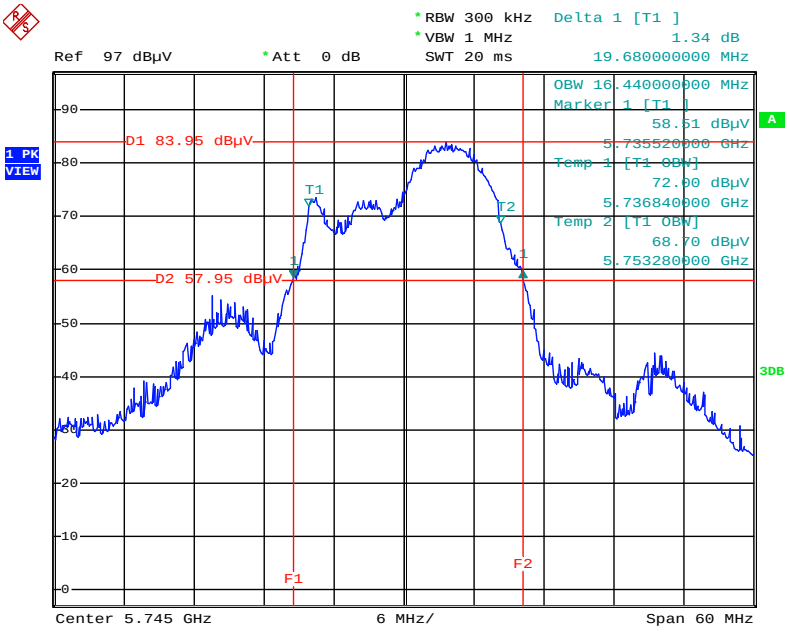
Date: 1.OCT.2015 23:13:26

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



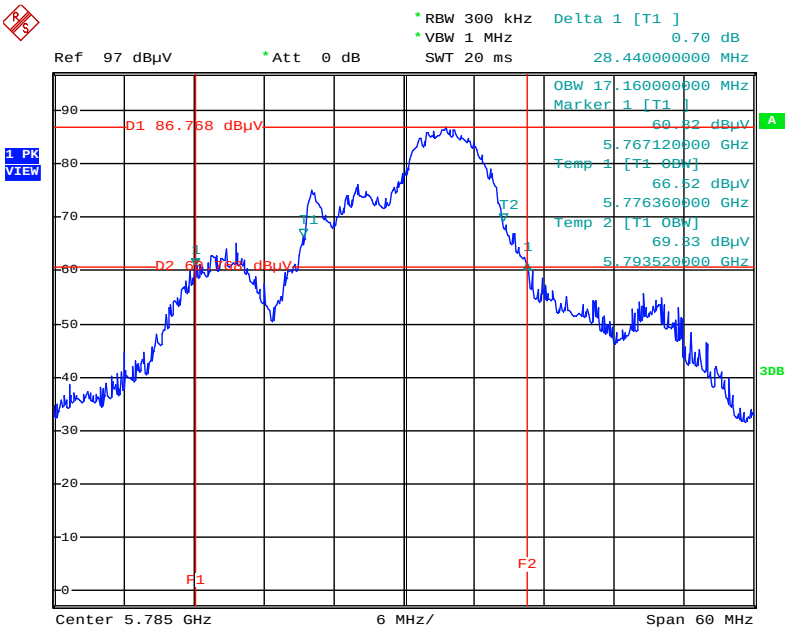
Date: 1.OCT.2015 23:17:23

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



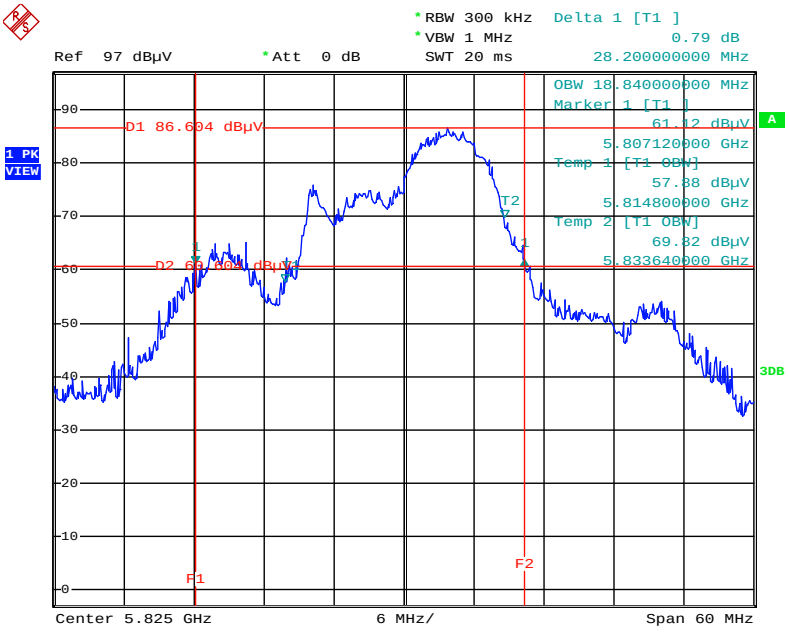
Date: 1.OCT.2015 16:09:20

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



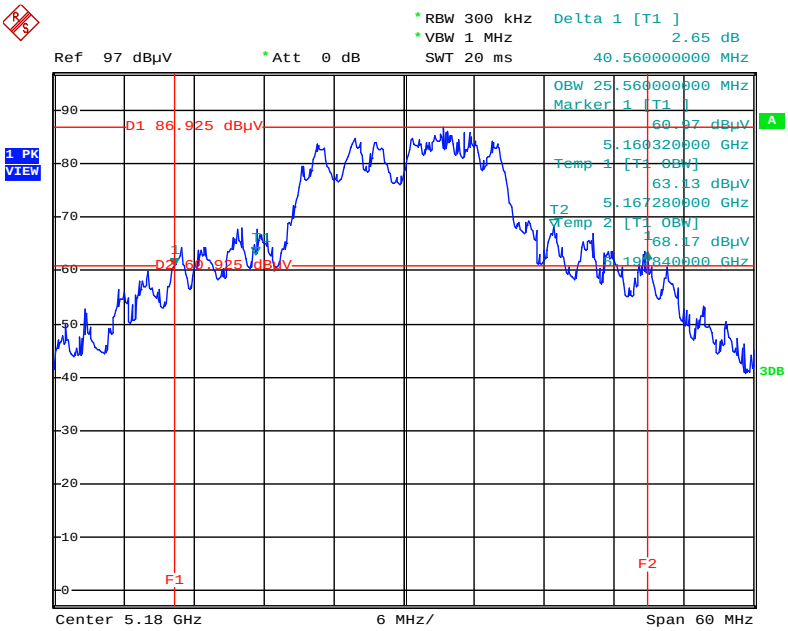
Date: 1.OCT.2015 16:09:46

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



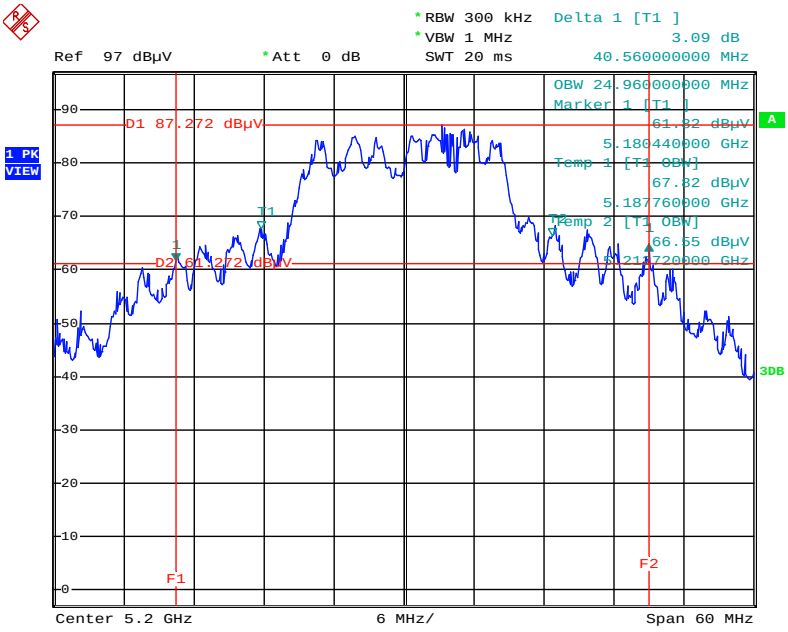
Date: 1.OCT.2015 16:10:17

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



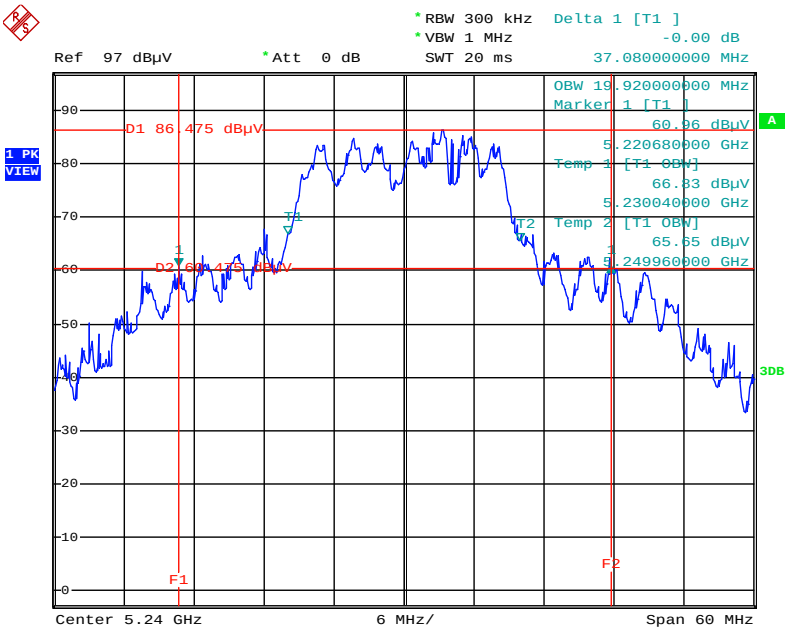
Date: 1.OCT.2015 23:41:03

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



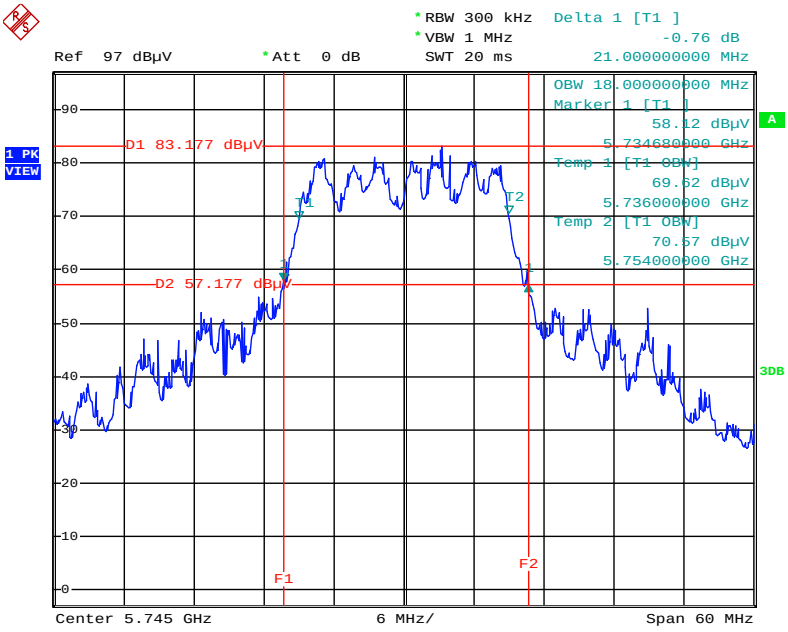
Date: 1.OCT.2015 23:42:59

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



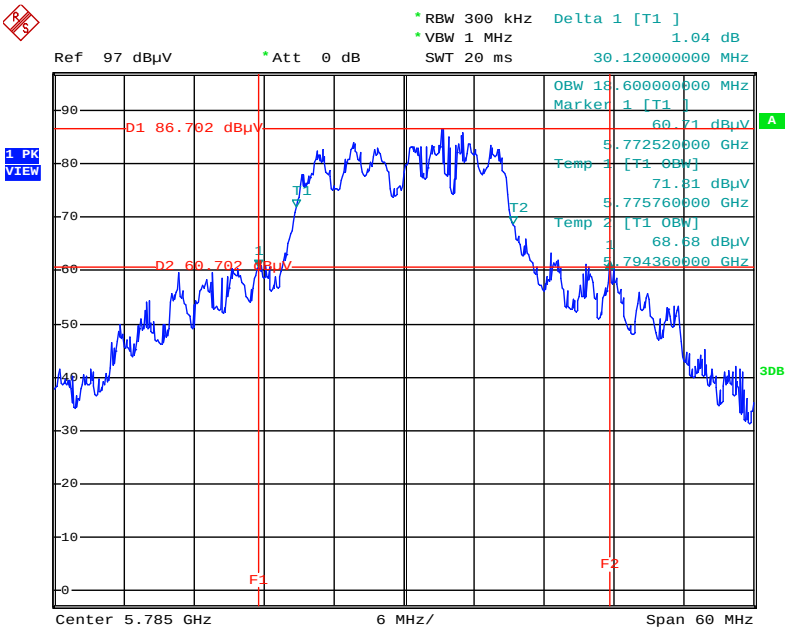
Date: 1.OCT.2015 23:48:25

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



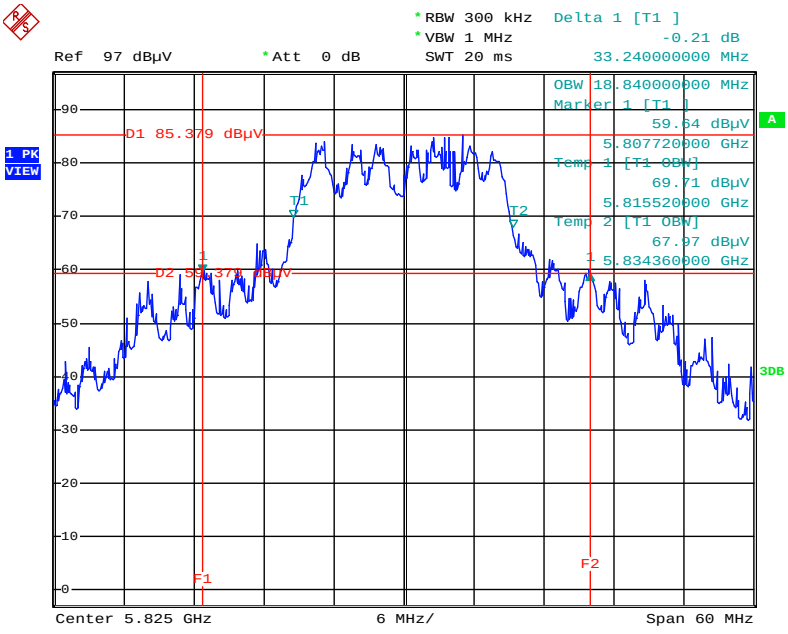
Date: 1.OCT.2015 16:16:43

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



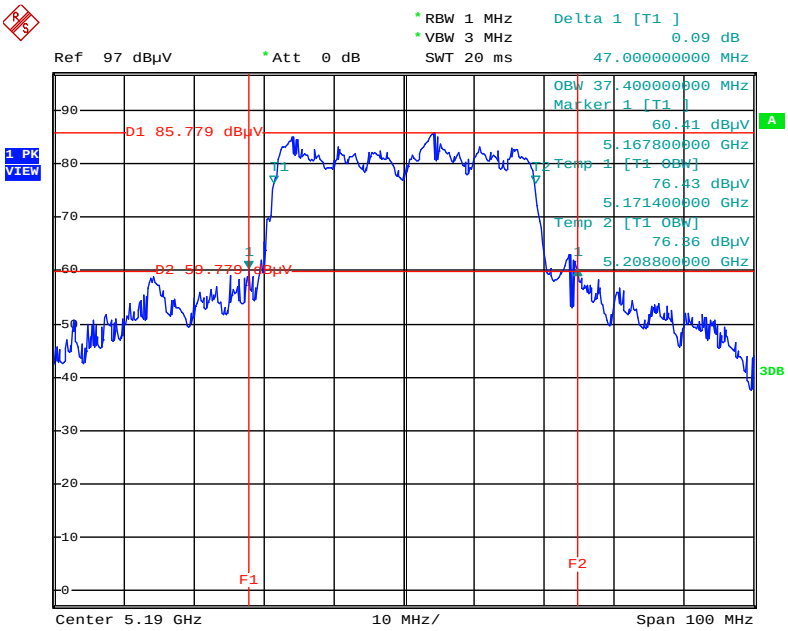
Date: 1.OCT.2015 16:17:01

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



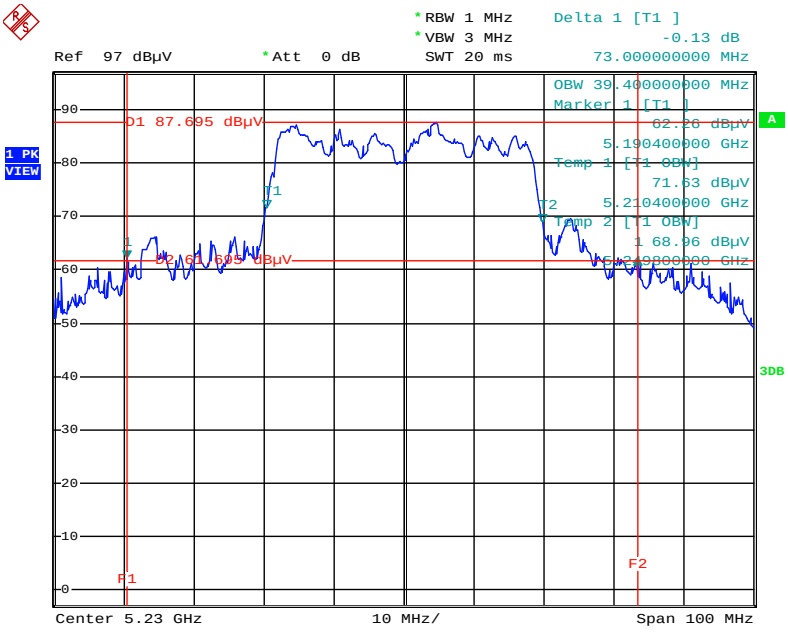
Date: 1.OCT.2015 16:17:30

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



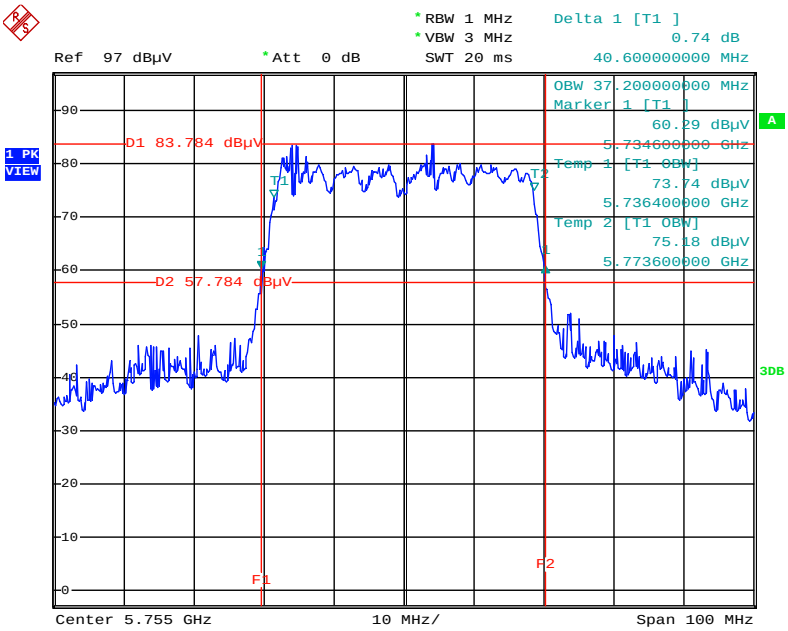
Date: 2.OCT.2015 00:33:41

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



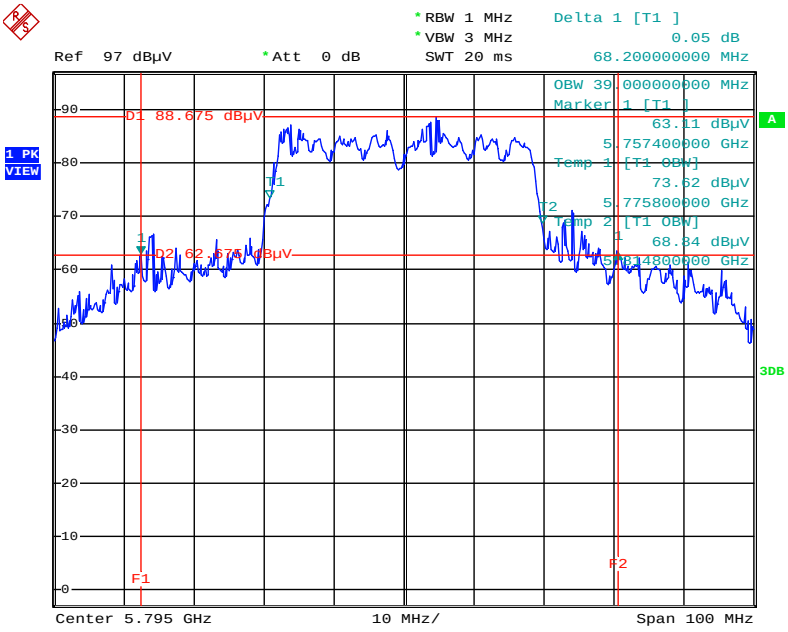
Date: 2.OCT.2015 00:38:02

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



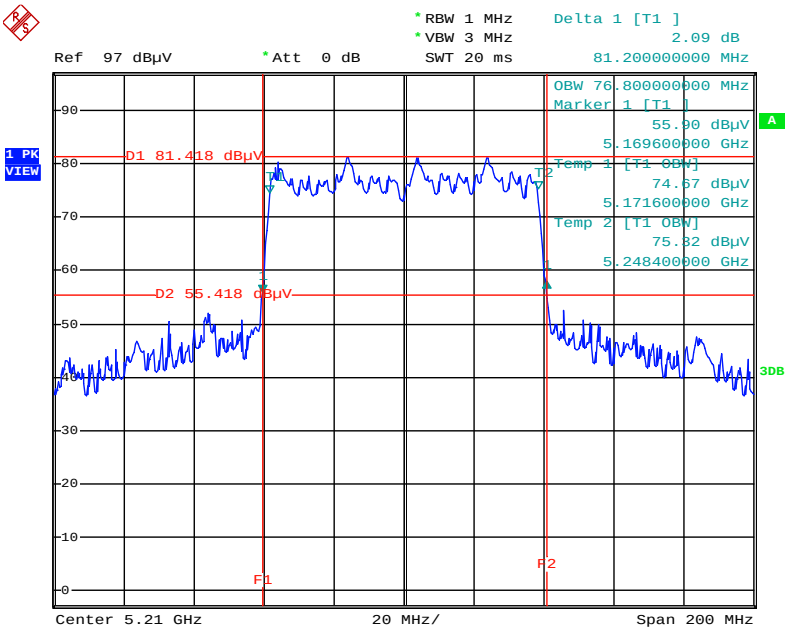
Date: 1.OCT.2015 16:23:26

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



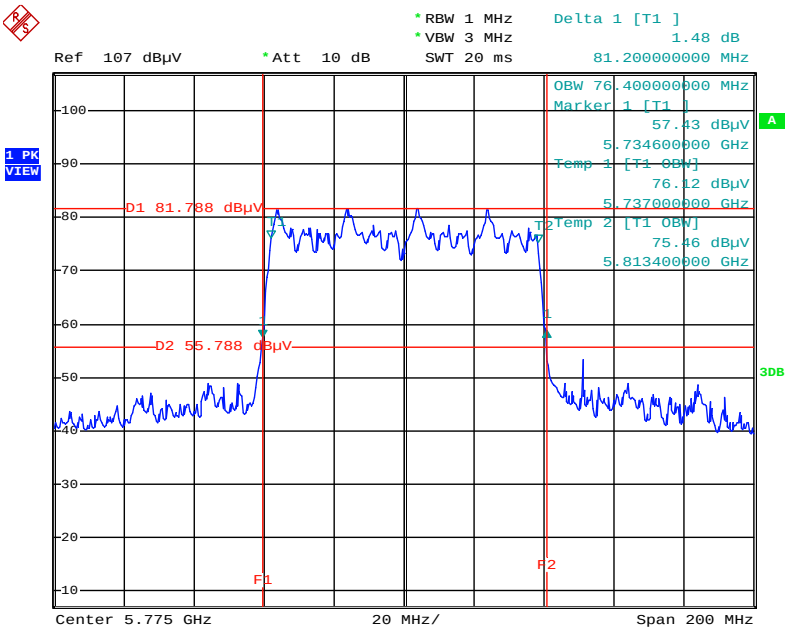
Date: 1.OCT.2015 16:23:39

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: 2.OCT.2015 00:55:41

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: 2.OCT.2015 01:03:37

4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

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

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

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

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

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

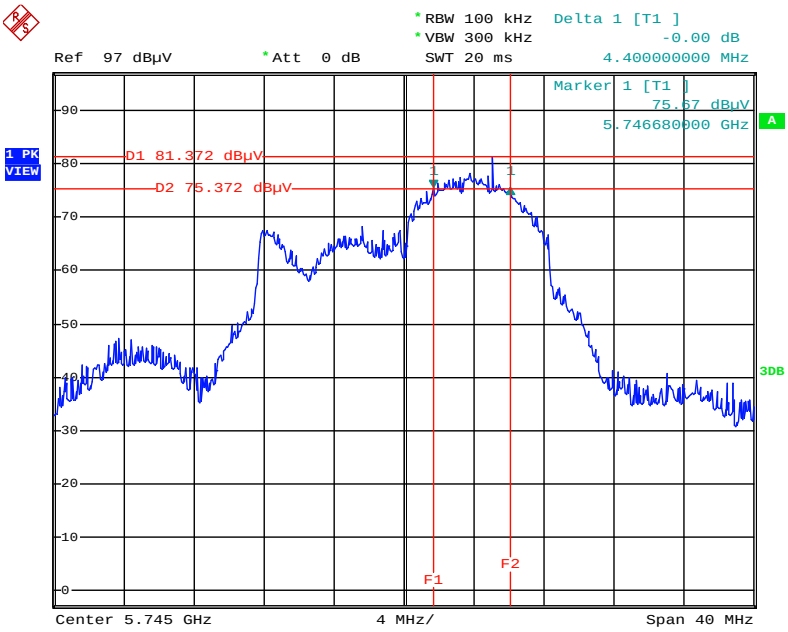
Temperature	23°C	Humidity	56%
Test Engineer	Serway Li		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	4.40	500	Complies
	5785 MHz	4.96	500	Complies
	5825 MHz	5.92	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	15.76	500	Complies
	5785 MHz	10.64	500	Complies
	5825 MHz	15.68	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.20	500	Complies
	5795 MHz	35.20	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	62.80	500	Complies

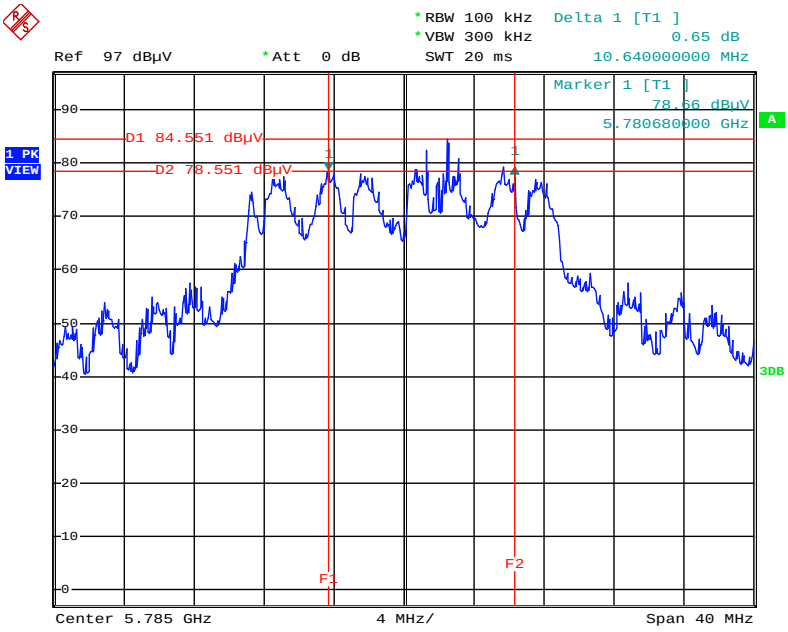
Note: All the test values were listed in the report.

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

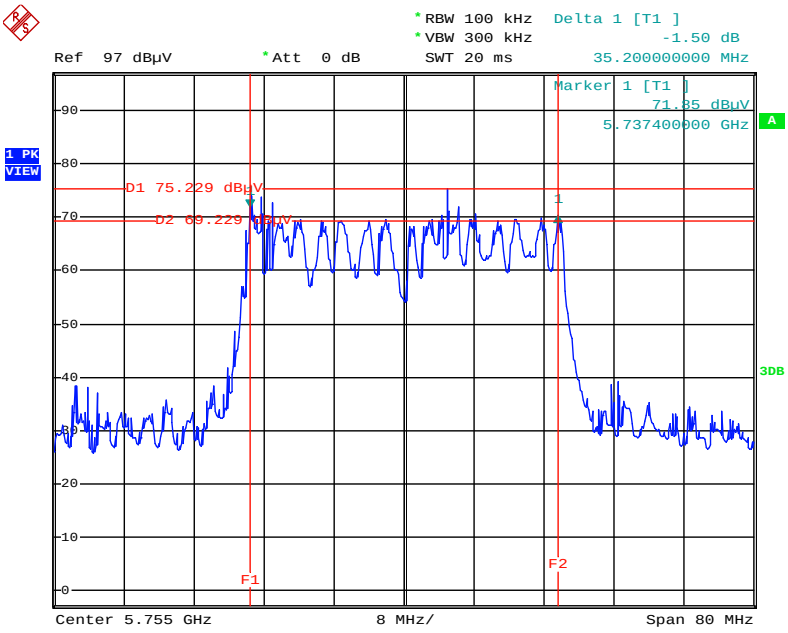
6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz



6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz

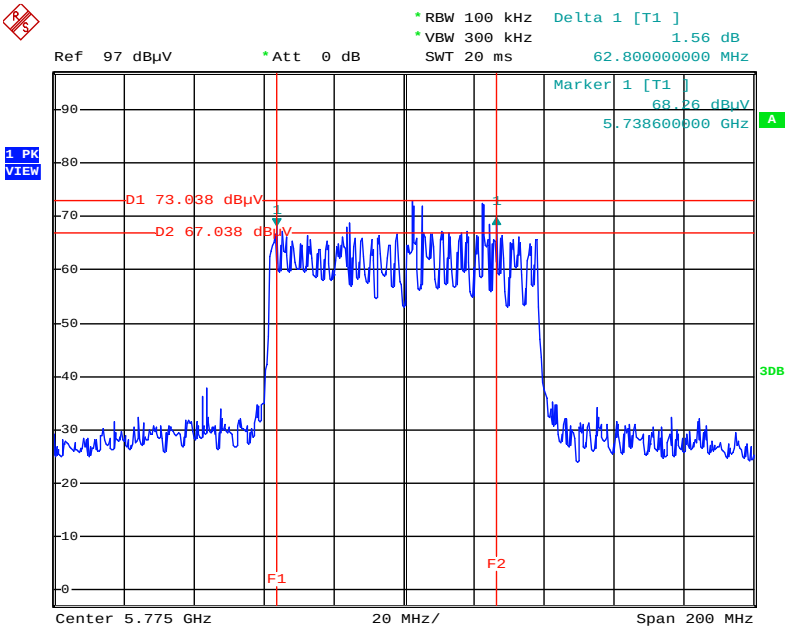


6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5755MHz



Date: 1.OCT.2015 16:40:03

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



Date: 1.OCT.2015 16:41:24

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

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

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

4.4.2. Measuring Instruments and Setting

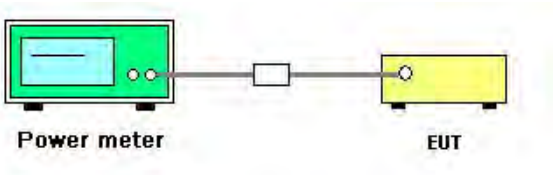
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

Temperature	23°C	Humidity	54%
Test Engineer	Serway Li	Test Date	Oct. 01, 2015

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11a	5180 MHz	17.34	18.14	17.48	17.46	23.64	30.00	Complies
	5200 MHz	17.09	18.59	17.84	17.56	23.83	30.00	Complies
	5240 MHz	16.04	17.03	16.72	16.91	22.71	30.00	Complies
	5745 MHz	14.14	16.85	15.16	15.34	21.50	30.00	Complies
	5785 MHz	16.44	18.78	17.73	18.13	23.87	30.00	Complies
	5825 MHz	16.57	18.79	17.88	17.94	23.89	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	16.70	17.76	17.51	17.69	23.46	30.00	Complies
	5200 MHz	17.03	18.15	17.64	17.76	23.68	30.00	Complies
	5240 MHz	17.24	18.40	17.72	17.73	23.81	30.00	Complies
	5745 MHz	14.12	16.47	15.16	15.48	21.41	30.00	Complies
	5785 MHz	16.30	18.51	17.40	17.82	23.60	30.00	Complies
	5825 MHz	16.63	18.66	17.70	18.11	23.86	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	13.43	14.82	14.11	13.74	20.08	30.00	Complies
	5230 MHz	17.02	17.94	17.37	17.76	23.56	30.00	Complies
	5755 MHz	12.21	14.47	13.06	13.27	19.35	30.00	Complies
	5795 MHz	16.45	18.61	17.79	17.86	23.77	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	11.95	13.14	12.53	12.56	18.59	30.00	Complies
	5775 MHz	12.04	14.25	13.08	13.02	19.19	30.00	Complies

4.5. Power Spectral Density Measurement

4.5.1. Limit

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

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

4.5.2. Measuring Instruments and Setting

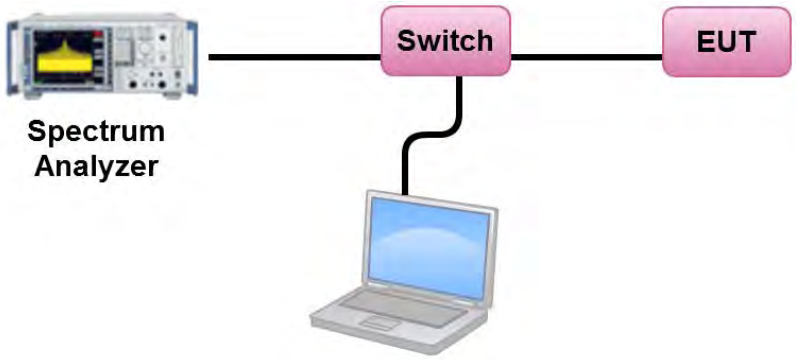
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
5. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

Temperature	23°C	Humidity	54%
Test Engineer	Serway Li	Test Data	Oct. 01, 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	10.46	16.90	Complies
40	5200 MHz	10.72	16.90	Complies
48	5240 MHz	9.54	16.90	Complies

Note: $Directiona\,lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.10dBi, so limit=17-(6.10-6)=16.90 dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	8.38	-3.01	5.37	28.71	Complies
157	5785 MHz	10.73	-3.01	7.72	28.71	Complies
165	5825 MHz	10.76	-3.01	7.75	28.71	Complies

Note: $Directiona\,lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.29dBi, so limit=30-(7.29-6)=28.71 dBm/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	10.33	16.90	Complies
40	5200 MHz	10.48	16.90	Complies
48	5240 MHz	10.68	16.90	Complies

Note: $Directiona\ lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.10dBi, so limit=17-(6.10-6)=16.90 dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	8.25	-3.01	5.24	28.71	Complies
157	5785 MHz	10.45	-3.01	7.44	28.71	Complies
165	5825 MHz	10.76	-3.01	7.75	28.71	Complies

Note: $Directiona\ lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.29dBi, so limit=30-(7.29-6)=28.71 dBm/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	3.92	16.90	Complies
46	5230 MHz	7.40	16.90	Complies

Note: $Directiona\ lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.10dBi, so limit=17-(6.10-6)=16.90 dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	3.20	-3.01	0.19	28.71	Complies
159	5795 MHz	7.62	-3.01	4.61	28.71	Complies

Note: $Directiona\ lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.29dBi, so limit=30-(7.29-6)=28.71 dBm/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	-0.51	16.90	Complies

Note: $Directiona\,lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.10dBi, so limit=17-(6.10-6)=16.90 dBm/MHz

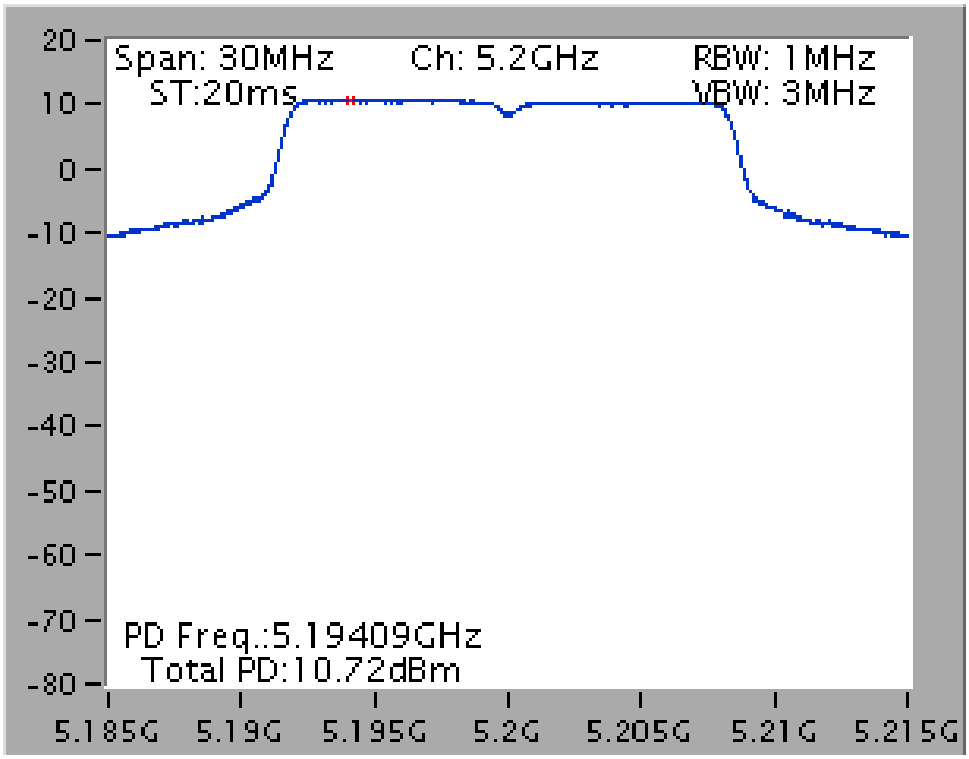
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	0.12	-3.01	-2.89	28.71	Complies

Note: $Directiona\,lGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.29dBi, so limit=30-(7.29-6)=28.71 dBm/500kHz

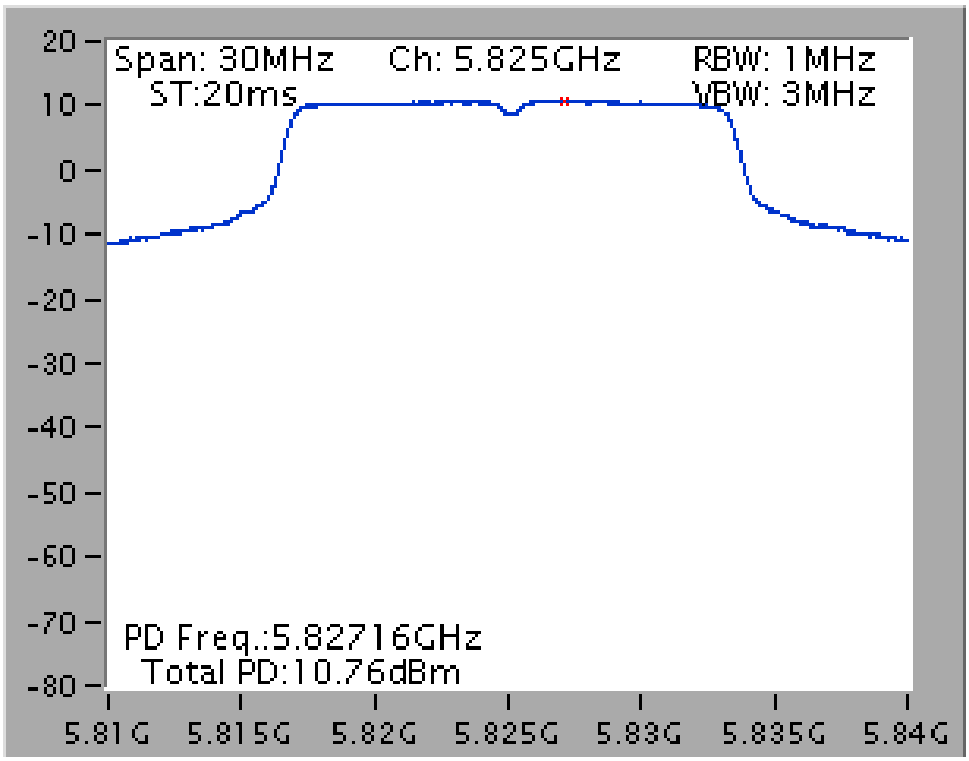
Note: All the test values were listed in the report.

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

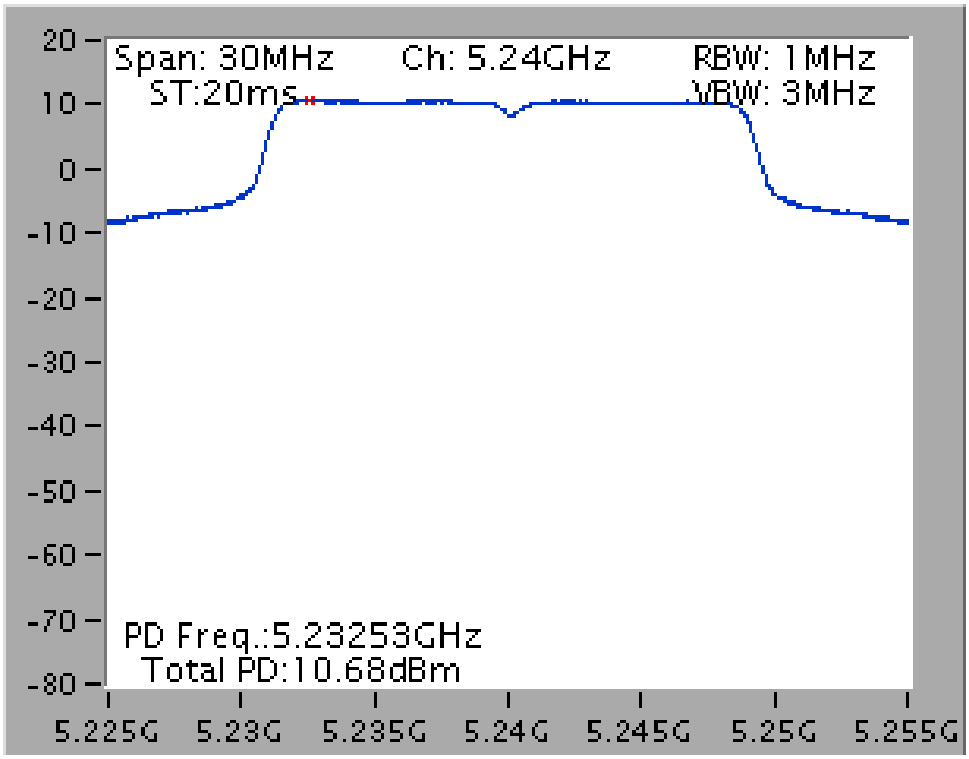
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz



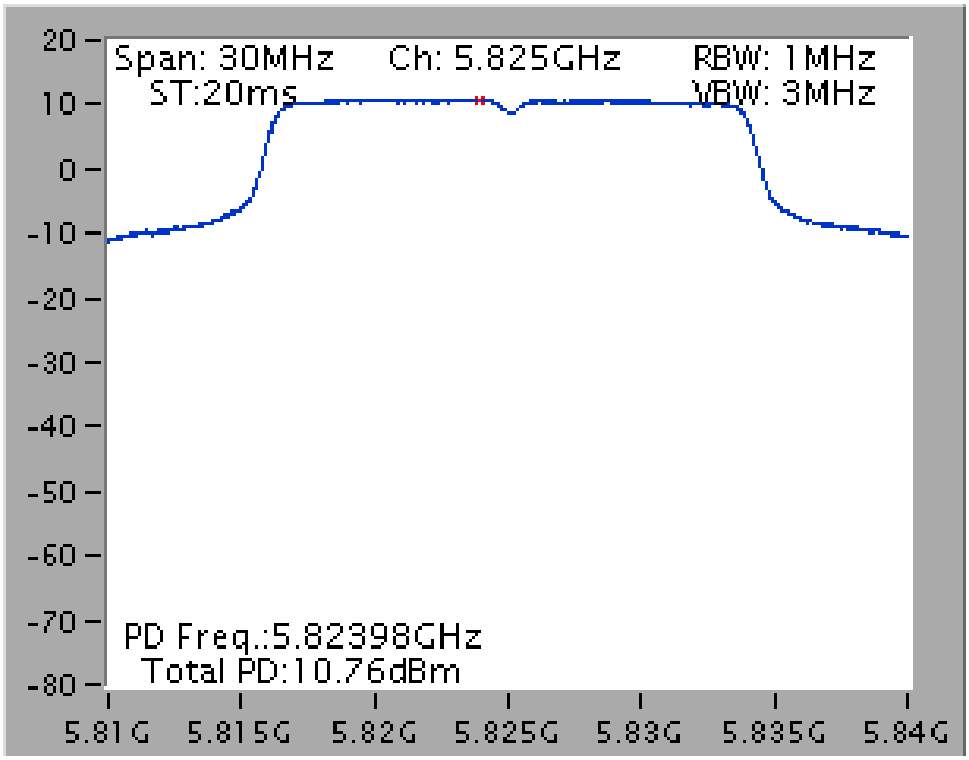
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz



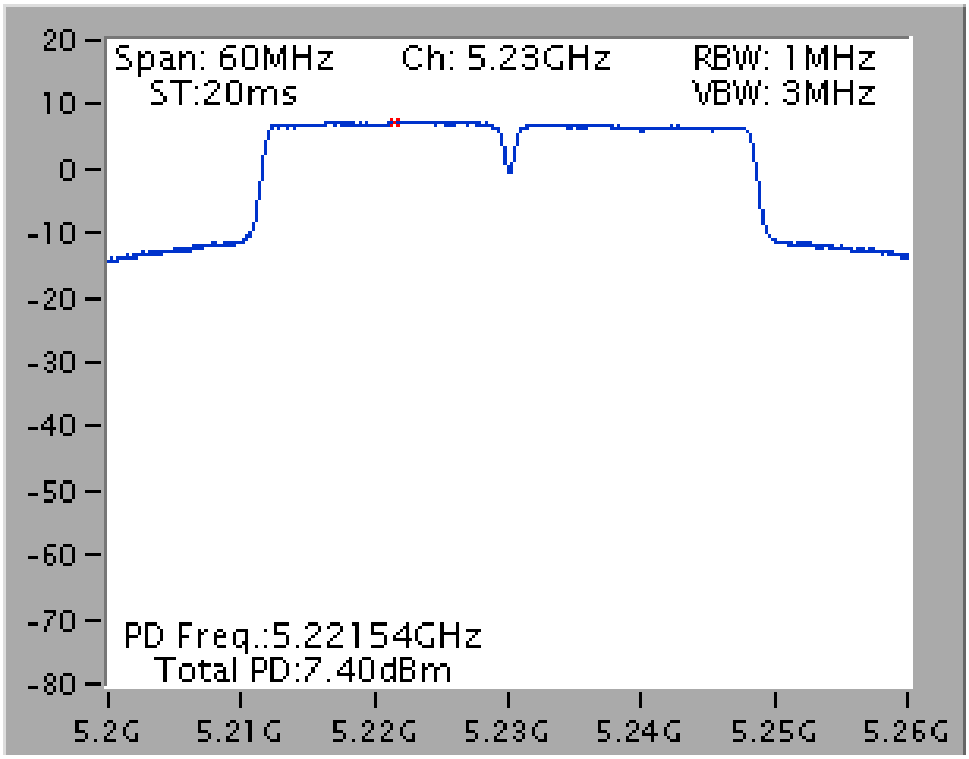
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz



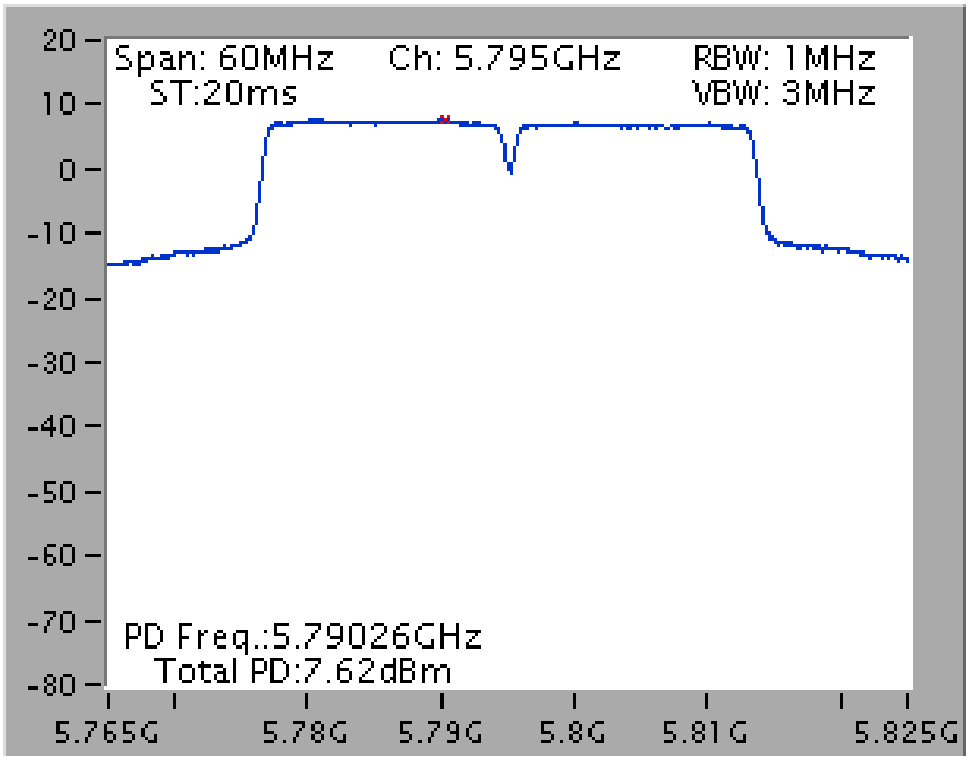
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz



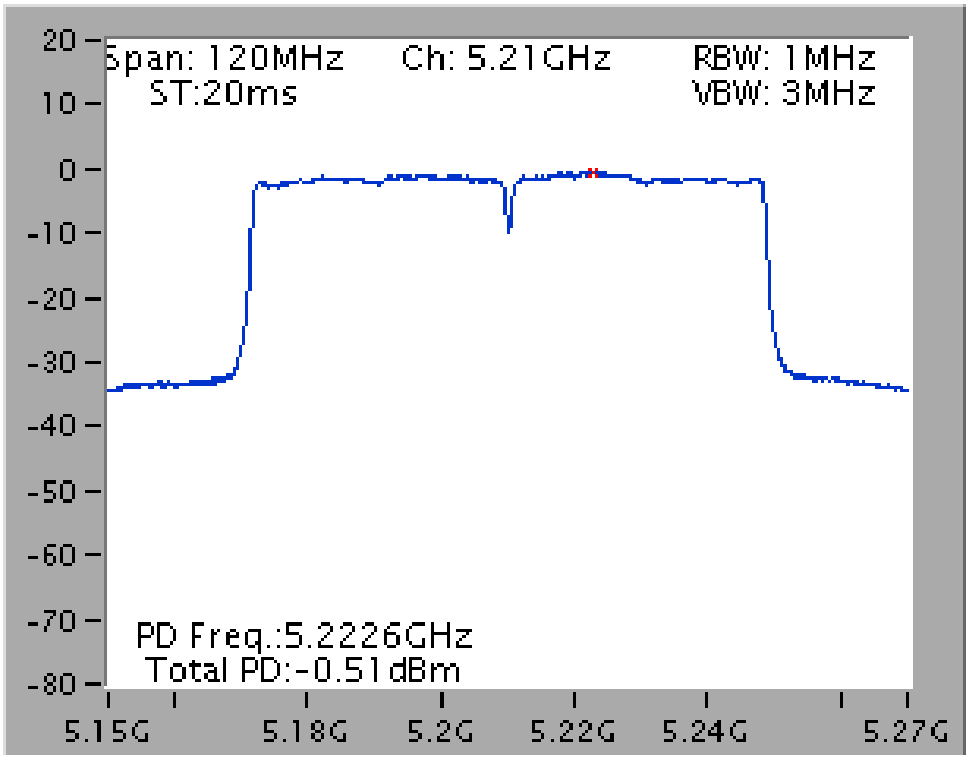
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5230 MHz



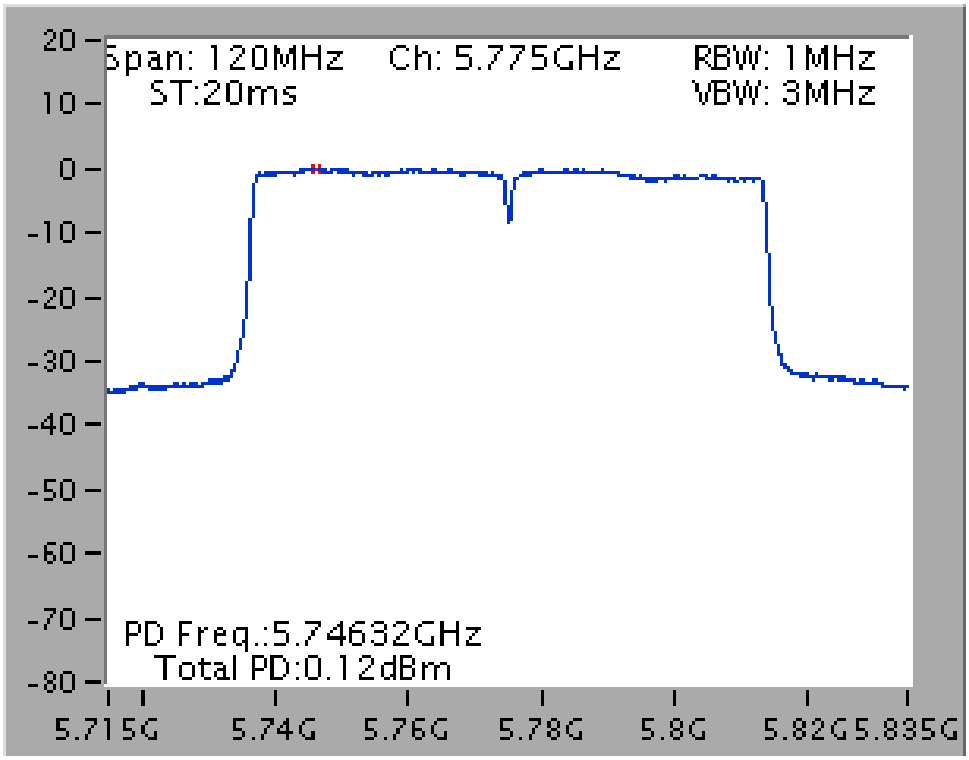
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz



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

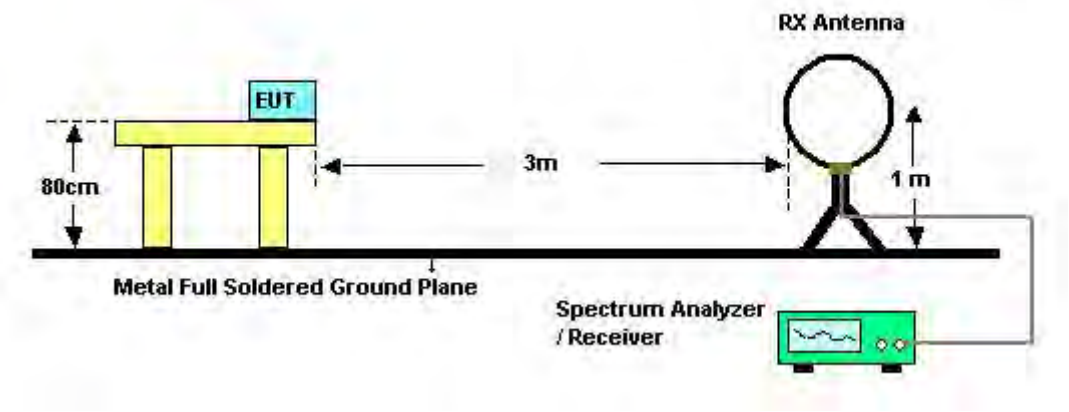
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

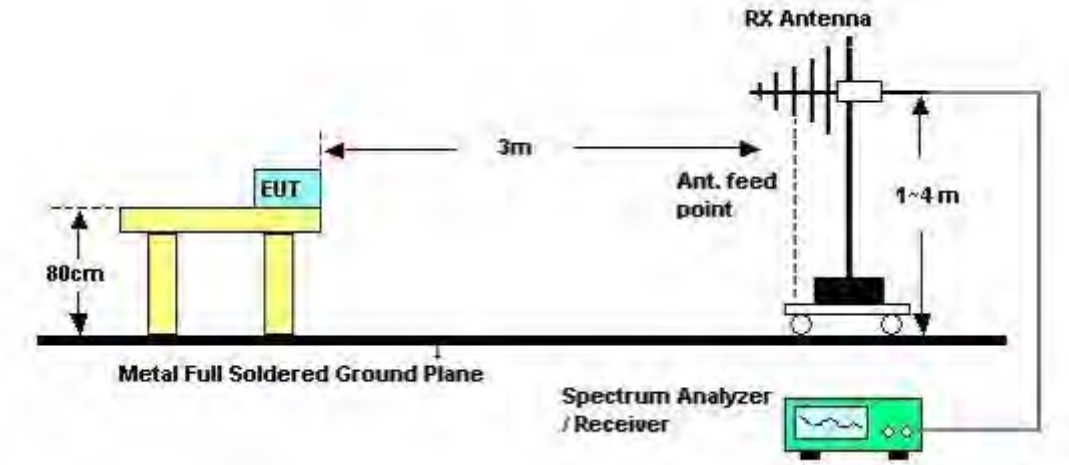
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

4.6.4. Test Setup Layout

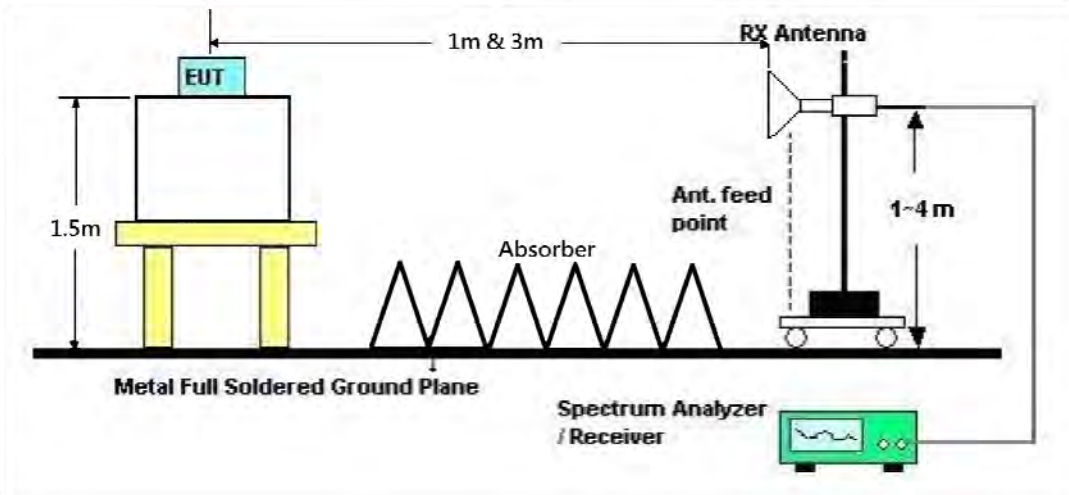
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	Normal Link
Test Date	Sep. 17, 2015	Test Mode	Mode 2

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

Note:

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

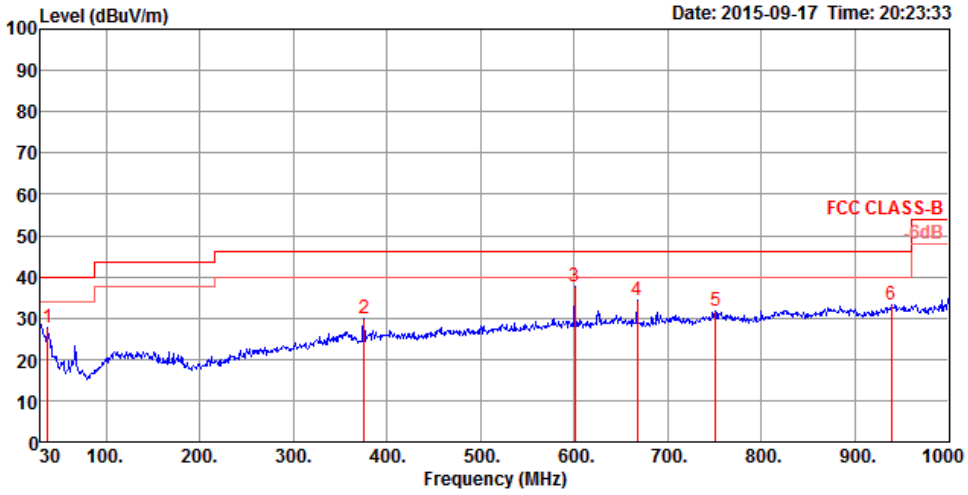
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

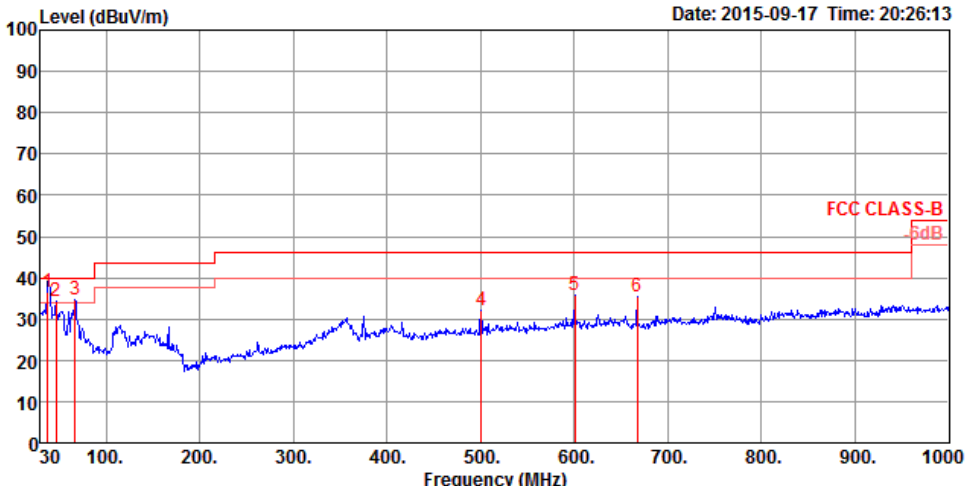
Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	Normal Link
Test Mode	Mode 2		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	37.76	27.52	40.00	-12.48	43.90	0.66	15.36	32.40	125	80	Peak	HORIZONTAL
2	375.32	30.03	46.00	-15.97	44.74	1.68	15.93	32.32	150	62	Peak	HORIZONTAL
3	600.36	37.48	46.00	-8.52	48.73	2.06	19.10	32.41	175	355	Peak	HORIZONTAL
4	667.29	34.17	46.00	-11.83	44.79	2.12	19.64	32.38	150	317	Peak	HORIZONTAL
5	750.71	31.92	46.00	-14.08	41.60	2.22	20.40	32.30	175	153	Peak	HORIZONTAL
6	938.89	33.34	46.00	-12.66	40.30	2.48	21.94	31.38	300	202	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	37.76	36.67	40.00	-3.33	53.05	0.66	15.36	32.40	100	257	QP	VERTICAL
2	46.49	34.29	40.00	-5.71	55.40	0.69	10.61	32.41	100	55	Peak	VERTICAL
3	66.86	34.54	40.00	-5.46	59.30	0.81	6.83	32.40	200	357	Peak	VERTICAL
4	500.45	32.06	46.00	-13.94	44.68	1.90	17.83	32.35	100	165	Peak	VERTICAL
5	600.36	35.92	46.00	-10.08	47.17	2.06	19.10	32.41	125	352	Peak	VERTICAL
6	667.29	35.46	46.00	-10.54	46.08	2.12	19.64	32.38	100	11	Peak	VERTICAL

Note:

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

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

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

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

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 36 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15539.86	57.33	74.00	-16.67	44.79	10.04	38.22	35.72	144	149	HORIZONTAL	Peak
2	15540.89	44.09	54.00	-9.91	31.55	10.04	38.22	35.72	144	149	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15540.02	57.15	74.00	-16.85	44.61	10.04	38.22	35.72	186	109	VERTICAL	Peak
2	15540.66	43.79	54.00	-10.21	31.25	10.04	38.22	35.72	186	109	VERTICAL	Average

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 40 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15599.46	44.16	54.00	-9.84	31.59	10.06	38.24	35.73	173	153	HORIZONTAL	Average
2	15599.64	58.09	74.00	-15.91	45.52	10.06	38.24	35.73	173	153	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15600.75	44.22	54.00	-9.78	31.64	10.06	38.25	35.73	130	163	VERTICAL	Average
2	15600.83	57.18	74.00	-16.82	44.60	10.06	38.25	35.73	130	163	VERTICAL	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15719.25	43.77	54.00	-10.23	31.14	10.09	38.29	35.75	191	118	HORIZONTAL	Average
2	15720.97	56.74	74.00	-17.26	44.11	10.09	38.29	35.75	191	118	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15720.69	43.78	54.00	-10.22	31.15	10.09	38.29	35.75	150	168	VERTICAL	Average
2	15720.83	57.41	74.00	-16.59	44.78	10.09	38.29	35.75	150	168	VERTICAL	Peak

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.17	55.91	74.00	-18.09	42.31	8.73	39.20	34.33	179	195	HORIZONTAL	Peak
2	11490.41	42.96	54.00	-11.04	29.36	8.73	39.20	34.33	179	195	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.75	55.92	74.00	-18.08	42.32	8.73	39.20	34.33	151	237	VERTICAL	Peak
2	11490.04	43.11	54.00	-10.89	29.51	8.73	39.20	34.33	151	237	VERTICAL	Average

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11569.16	56.23	74.00	-17.77	42.65	8.78	39.17	34.37	155	216	HORIZONTAL	Peak
2	11570.42	43.15	54.00	-10.85	29.57	8.78	39.17	34.37	155	216	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11569.51	42.98	54.00	-11.02	29.40	8.78	39.17	34.37	168	151	VERTICAL	Average
2	11569.58	55.99	74.00	-18.01	42.41	8.78	39.17	34.37	168	151	VERTICAL	Peak

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11649.60	43.19	54.00	-10.81	29.63	8.82	39.15	34.41	173	152	HORIZONTAL	Average
2	11650.77	56.28	74.00	-17.72	42.74	8.82	39.13	34.41	173	152	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11649.12	43.30	54.00	-10.70	29.74	8.82	39.15	34.41	151	258	VERTICAL	Average
2	11650.85	56.77	74.00	-17.23	43.23	8.82	39.13	34.41	151	258	VERTICAL	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15548.48	58.29	74.00	-15.71	45.74	10.05	38.22	35.72	165	225	HORIZONTAL	Peak
2	15558.96	44.84	54.00	-9.16	32.28	10.05	38.24	35.73	165	225	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15548.72	57.40	74.00	-16.60	44.85	10.05	38.22	35.72	165	156	VERTICAL	Peak
2	15551.36	45.17	54.00	-8.83	32.62	10.05	38.22	35.72	165	156	VERTICAL	Average

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15604.96	44.63	54.00	-9.37	32.05	10.06	38.25	35.73	165	306	HORIZONTAL	Average
2	15605.84	56.74	74.00	-17.26	44.16	10.06	38.25	35.73	165	306	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15604.72	45.10	54.00	-8.90	32.52	10.06	38.25	35.73	165	146	VERTICAL	Average
2	15607.92	57.63	74.00	-16.37	45.05	10.06	38.25	35.73	165	146	VERTICAL	Peak

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15716.32	57.12	74.00	-16.88	44.49	10.09	38.29	35.75	165	323	HORIZONTAL	Peak
2	15716.40	44.36	54.00	-9.64	31.73	10.09	38.29	35.75	165	323	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15714.64	57.84	74.00	-16.16	45.21	10.09	38.29	35.75	165	192	VERTICAL	Peak
2	15729.68	44.48	54.00	-9.52	31.85	10.09	38.29	35.75	165	192	VERTICAL	Average

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11476.08	42.35	54.00	-11.65	28.76	8.71	39.21	34.33	165	258	HORIZONTAL	Average
2	11483.20	55.10	74.00	-18.90	41.49	8.73	39.21	34.33	165	258	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11473.60	41.82	54.00	-12.18	28.23	8.71	39.21	34.33	165	140	VERTICAL	Average
2	11508.96	54.53	74.00	-19.47	40.95	8.73	39.20	34.35	165	140	VERTICAL	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11558.16	42.17	54.00	-11.83	28.59	8.78	39.17	34.37	165	45	HORIZONTAL	Average
2	11578.08	54.62	74.00	-19.38	41.04	8.78	39.17	34.37	165	45	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11563.60	54.53	74.00	-19.47	40.95	8.78	39.17	34.37	165	147	VERTICAL	Peak
2	11563.92	42.18	54.00	-11.82	28.60	8.78	39.17	34.37	165	147	VERTICAL	Average

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11636.24	54.10	74.00	-19.90	40.54	8.82	39.15	34.41	165	287	HORIZONTAL	Peak
2	11636.32	41.98	54.00	-12.02	28.42	8.82	39.15	34.41	165	287	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11632.56	54.86	74.00	-19.14	41.30	8.82	39.15	34.41	165	186	VERTICAL	Peak
2	11632.80	42.33	54.00	-11.67	28.77	8.82	39.15	34.41	165	186	VERTICAL	Average

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15566.96	57.39	74.00	-16.61	44.83	10.05	38.24	35.73	165	265	HORIZONTAL	Peak
2	15568.32	44.79	54.00	-9.21	32.23	10.05	38.24	35.73	165	265	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15571.36	44.77	54.00	-9.23	32.21	10.05	38.24	35.73	165	88	VERTICAL	Average
2	15587.36	57.99	74.00	-16.01	45.43	10.05	38.24	35.73	165	88	VERTICAL	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15670.00	44.94	54.00	-9.06	32.34	10.07	38.27	35.74	165	293	HORIZONTAL	Average
2	15692.24	57.21	74.00	-16.79	44.59	10.07	38.29	35.74	165	293	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15670.48	57.96	74.00	-16.04	45.36	10.07	38.27	35.74	165	94	VERTICAL	Peak
2	15678.48	44.92	54.00	-9.08	32.32	10.07	38.27	35.74	165	94	VERTICAL	Average

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11511.76	54.97	74.00	-19.03	41.39	8.73	39.20	34.35	165	244	HORIZONTAL	Peak
2	11514.80	42.32	54.00	-11.68	28.74	8.73	39.20	34.35	165	244	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11499.20	42.15	54.00	-11.85	28.55	8.73	39.20	34.33	165	127	VERTICAL	Average
2	11507.84	54.09	74.00	-19.91	40.49	8.73	39.20	34.33	165	127	VERTICAL	Peak

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11574.16	54.34	74.00	-19.66	40.76	8.78	39.17	34.37	165	264	HORIZONTAL	Peak
2	11590.48	41.83	54.00	-12.17	28.28	8.78	39.16	34.39	165	264	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11581.68	54.57	74.00	-19.43	40.99	8.78	39.17	34.37	165	132	VERTICAL	Peak
2	11605.76	41.92	54.00	-12.08	28.35	8.80	39.16	34.39	165	132	VERTICAL	Average

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2 + Chain 3
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15625.60	57.47	74.00	-16.53	44.89	10.06	38.25	35.73	165	317	HORIZONTAL	Peak
2	15631.04	44.51	54.00	-9.49	31.93	10.06	38.25	35.73	165	317	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15619.60	57.12	74.00	-16.88	44.54	10.06	38.25	35.73	165	214	VERTICAL	Peak
2	15621.52	44.58	54.00	-9.42	32.00	10.06	38.25	35.73	165	214	VERTICAL	Average

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Aug. 21, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11532.24	42.18	54.00	-11.82	28.59	8.75	39.19	34.35	165	134	HORIZONTAL	Average
2	11535.76	54.37	74.00	-19.63	40.78	8.75	39.19	34.35	165	134	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11530.32	42.22	54.00	-11.78	28.63	8.75	39.19	34.35	165	271	VERTICAL	Average
2	11545.44	54.79	74.00	-19.21	41.20	8.75	39.19	34.35	165	271	VERTICAL	Peak

Note:

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

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

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

4.7. Band Edge Emissions Measurement

4.7.1. Limit

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

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

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

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

4.7.2. Measuring Instruments and Setting

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

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

4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3.

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	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.19	47.07	54.00	-6.93	42.73	5.51	33.17	34.34	201	153	VERTICAL	Average
2	5148.19	63.23	74.00	-10.77	58.89	5.51	33.17	34.34	201	153	VERTICAL	Peak
3	5206.37	114.82			110.34	5.54	33.28	34.34	201	153	VERTICAL	Peak
4	5206.66	104.36			99.88	5.54	33.28	34.34	201	153	VERTICAL	Average

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5147.87	70.49	74.00	-3.51	66.15	5.51	33.17	34.34	218	222	VERTICAL	Peak
2	5149.61	52.09	54.00	-1.91	47.75	5.51	33.17	34.34	218	222	VERTICAL	Average
3	5175.37	102.99			98.58	5.52	33.23	34.34	218	222	VERTICAL	Average
4	5175.37	113.60			109.19	5.52	33.23	34.34	218	222	VERTICAL	Peak

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.39	44.95	54.00	-9.05	40.61	5.51	33.17	34.34	206	217	VERTICAL	Average
2	5150.00	58.00	74.00	-16.00	53.66	5.51	33.17	34.34	206	217	VERTICAL	Peak
3	5236.53	102.44			97.90	5.54	33.34	34.34	206	217	VERTICAL	Average
4	5236.96	112.79			108.25	5.54	33.34	34.34	206	217	VERTICAL	Peak
5	5350.00	45.19	54.00	-8.81	40.39	5.59	33.53	34.32	206	217	VERTICAL	Average
6	5350.00	58.07	74.00	-15.93	53.27	5.59	33.53	34.32	206	217	VERTICAL	Peak

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

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Sep. 14, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5714.03	65.25	68.20	-2.95	59.31	5.85	34.45	34.36	259	162	VERTICAL	Peak
2	5725.00	77.45	78.20	-0.75	71.46	5.85	34.50	34.36	259	162	VERTICAL	Peak
3	5747.32	112.37			106.31	5.88	34.55	34.37	259	162	VERTICAL	Peak
4	5747.89	101.88			95.82	5.88	34.55	34.37	259	162	VERTICAL	Average

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	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5707.43	61.33	68.20	-6.87	55.40	5.83	34.45	34.35	239	161	VERTICAL	Peak
2	5723.55	60.42	78.20	-17.78	54.43	5.85	34.50	34.36	239	161	VERTICAL	Peak
3	5787.32	115.74			109.55	5.92	34.65	34.38	239	161	VERTICAL	Peak
4	5787.89	105.28			99.09	5.92	34.65	34.38	239	161	VERTICAL	Average
5	5850.00	61.75	78.20	-16.45	55.34	5.95	34.85	34.39	239	161	VERTICAL	Peak
6	5860.00	61.91	68.20	-6.29	55.45	5.95	34.90	34.39	239	161	VERTICAL	Peak

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	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5827.32	116.20			109.84	5.94	34.80	34.38	229	159	VERTICAL	Peak
2	5827.89	106.43			100.07	5.94	34.80	34.38	229	159	VERTICAL	Average
3	5850.00	77.68	78.20	-0.52	71.27	5.95	34.85	34.39	229	159	VERTICAL	Peak
4	5862.60	67.82	68.20	-0.38	61.34	5.97	34.90	34.39	229	159	VERTICAL	Peak

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

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 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	5149.60	51.67	54.00	-2.33	47.13	6.13	33.35	34.94	Average	250	38	VERTICAL
2	5149.80	73.89	74.00	-0.11	69.35	6.13	33.35	34.94	Peak	250	38	VERTICAL
3	5184.60	101.88			97.29	6.15	33.38	34.94	Average	250	38	VERTICAL
4	5185.40	112.38			107.79	6.15	33.38	34.94	Peak	250	38	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5034.40	46.66	54.00	-7.34	42.33	6.05	33.23	34.95	Average	250	40	VERTICAL
2	5145.60	59.63	74.00	-14.37	55.09	6.13	33.35	34.94	Peak	250	40	VERTICAL
3	5204.80	102.48			97.86	6.16	33.40	34.94	Average	250	40	VERTICAL
4	5204.80	112.41			107.79	6.16	33.40	34.94	Peak	250	40	VERTICAL
5	5355.20	47.75	54.00	-6.25	42.88	6.26	33.55	34.94	Average	250	40	VERTICAL
6	5355.20	59.91	74.00	-14.09	55.04	6.26	33.55	34.94	Peak	250	40	VERTICAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5142.40	58.56	74.00	-15.44	54.22	5.51	33.17	34.34	237	136	VERTICAL	Peak
2	5148.40	44.60	54.00	-9.40	40.26	5.51	33.17	34.34	237	136	VERTICAL	Average
3	5244.00	102.71			98.15	5.55	33.34	34.33	237	136	VERTICAL	Average
4	5244.40	112.81			108.25	5.55	33.34	34.33	237	136	VERTICAL	Peak

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

Temperature	25℃	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5715.00	63.86	68.20	-4.34	57.92	5.85	34.45	34.36	279	172	VERTICAL	Peak
2	5725.00	77.89	78.20	-0.31	71.90	5.85	34.50	34.36	279	172	VERTICAL	Peak
3	5740.60	100.83			94.77	5.87	34.55	34.36	279	172	VERTICAL	Average
4	5740.60	110.31			104.25	5.87	34.55	34.36	279	172	VERTICAL	Peak

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	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5707.40	61.54	68.20	-6.66	55.61	5.83	34.45	34.35	259	152	VERTICAL	Peak
2	5719.00	60.54	78.20	-17.66	54.60	5.85	34.45	34.36	259	152	VERTICAL	Peak
3	5783.80	104.16			97.97	5.92	34.65	34.38	259	152	VERTICAL	Average
4	5783.80	115.10			108.91	5.92	34.65	34.38	259	152	VERTICAL	Peak
5	5850.00	60.74	78.20	-17.46	54.33	5.95	34.85	34.39	259	152	VERTICAL	Peak
6	5870.20	60.91	68.20	-7.29	54.43	5.97	34.90	34.39	259	152	VERTICAL	Peak

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	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5823.80	104.04			97.68	5.94	34.80	34.38	266	149	VERTICAL	Average
2	5823.80	114.72			108.36	5.94	34.80	34.38	266	149	VERTICAL	Peak
3	5850.00	78.07	78.20	-0.13	71.66	5.95	34.85	34.39	266	149	VERTICAL	Peak
4	5862.20	68.03	68.20	-0.17	61.55	5.97	34.90	34.39	266	149	VERTICAL	Peak

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

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.00	71.28	74.00	-2.72	66.94	5.51	33.17	34.34	276	134	VERTICAL	Peak
2	5148.80	53.64	54.00	-0.36	49.30	5.51	33.17	34.34	276	134	VERTICAL	Average
3	5193.60	106.41			101.97	5.53	33.25	34.34	276	134	VERTICAL	Peak
4	5204.00	96.60			92.13	5.53	33.28	34.34	276	134	VERTICAL	Average

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5084.00	48.26	54.00	-5.74	44.07	5.48	33.06	34.35	242	53	VERTICAL	Average
2	5150.00	60.57	74.00	-13.43	56.23	5.51	33.17	34.34	242	53	VERTICAL	Peak
3	5235.00	99.29			94.75	5.54	33.34	34.34	242	53	VERTICAL	Average
4	5235.00	109.30			104.76	5.54	33.34	34.34	242	53	VERTICAL	Peak

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

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5715.00	67.90	68.20	-0.30	61.96	5.85	34.45	34.36	260	58	VERTICAL	Peak
2	5720.00	71.36	78.20	-6.84	65.42	5.85	34.45	34.36	260	58	VERTICAL	Peak
3	5740.00	106.42			100.36	5.87	34.55	34.36	260	58	VERTICAL	Peak
4	5750.00	95.65			89.59	5.88	34.55	34.37	260	58	VERTICAL	Average

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	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5788.60	110.95			104.76	5.92	34.65	34.38	257	153	VERTICAL	Peak
2	5789.00	101.56			95.32	5.92	34.70	34.38	257	153	VERTICAL	Average
3	5851.00	73.36	78.20	-4.84	66.95	5.95	34.85	34.39	257	153	VERTICAL	Peak
4	5860.00	53.34	54.00	-0.66	46.88	5.95	34.90	34.39	257	153	VERTICAL	Average
5	5862.60	68.62	74.00	-5.38	62.14	5.97	34.90	34.39	257	153	VERTICAL	Peak

Item 1, 2 are the fundamental frequency at 5795 MHz.

Temperature	25°C	Humidity	56%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Aug. 21, 2015		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.00	53.84	54.00	-0.16	49.50	5.51	33.17	34.34	258	136	VERTICAL	Average
2	5149.00	66.23	74.00	-7.77	61.89	5.51	33.17	34.34	258	136	VERTICAL	Peak
3	5224.00	93.08			88.57	5.54	33.31	34.34	258	136	VERTICAL	Average
4	5224.00	101.91			97.40	5.54	33.31	34.34	258	136	VERTICAL	Peak
5	5350.00	45.93	54.00	-8.07	41.13	5.59	33.53	34.32	258	136	VERTICAL	Average
6	5353.00	57.29	74.00	-16.71	52.49	5.59	33.53	34.32	258	136	VERTICAL	Peak

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

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5715.00	67.67	68.20	-0.53	61.73	5.85	34.45	34.36	276	56	VERTICAL	Peak
2	5721.00	71.02	78.20	-7.18	65.08	5.85	34.45	34.36	276	56	VERTICAL	Peak
3	5740.00	92.83			86.77	5.87	34.55	34.36	276	56	VERTICAL	Average
4	5745.00	102.96			96.90	5.87	34.55	34.36	276	56	VERTICAL	Peak
5	5853.00	65.27	78.20	-12.93	58.86	5.95	34.85	34.39	276	56	VERTICAL	Peak
6	5860.00	64.30	68.20	-3.90	57.84	5.95	34.90	34.39	276	56	VERTICAL	Peak

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

Note:

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

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

4.8. Frequency Stability Measurement

4.8.1. Limit

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

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

4.8.2. Measuring Instruments and Setting

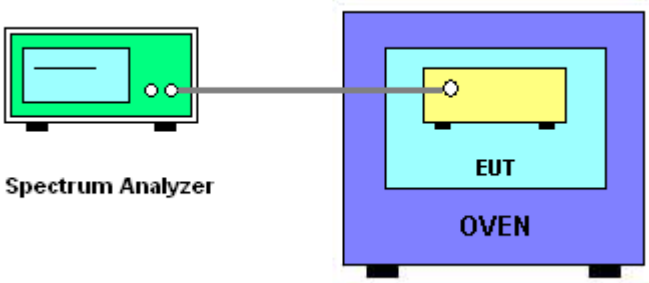
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.8.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is 0°C~50°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	23°C	Humidity	56%
Test Engineer	Kenneth Huang	Test Date	Oct. 01, 2015

Mode: 20 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5200.0072	5200.0059	5200.0043	5200.0024
110.00	5200.0060	5200.0047	5200.0031	5200.0012
93.50	5200.0046	5200.0033	5200.0017	5199.9998
Max. Deviation (MHz)	0.0072	0.0059	0.0043	0.0024
Max. Deviation (ppm)	1.38	1.13	0.83	0.46
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5200.0085	5200.0072	5200.0056	5200.0037
10	5200.0072	5200.0059	5200.0043	5200.0024
20	5200.0060	5200.0047	5200.0031	5200.0012
30	5200.0045	5200.0032	5200.0016	5199.9997
40	5200.0030	5200.0017	5200.0001	5199.9982
50	5200.0009	5199.9995	5199.9978	5199.9957
Max. Deviation (MHz)	0.0085	0.0072	0.0056	0.0043
Max. Deviation (ppm)	1.63	1.38	1.08	0.83
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5785.0012	5784.9999	5784.9983	5784.9964
110.00	5785.0000	5784.9987	5784.9971	5784.9952
93.50	5784.9986	5784.9973	5784.9957	5784.9938
Max. Deviation (MHz)	0.0014	0.0027	0.0043	0.0062
Max. Deviation (ppm)	0.24	0.47	0.74	1.07
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5785.0025	5785.0012	5784.9996	5784.9977
10	5785.0012	5784.9999	5784.9983	5784.9964
20	5785.0000	5784.9987	5784.9971	5784.9952
30	5784.9985	5784.9972	5784.9956	5784.9937
40	5784.9970	5784.9957	5784.9941	5784.9922
50	5784.9949	5784.9935	5784.9918	5784.9897
Max. Deviation (MHz)	0.0051	0.0065	0.0082	0.0103
Max. Deviation (ppm)	0.88	1.12	1.42	1.78
Result	Complies			

Mode: 40 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5190.0112	5189.9889	5190.0114	5189.9891
110.00	5189.9940	5190.0001	5190.0002	5190.0003
93.50	5189.9901	5190.0100	5189.9903	5190.0102
Max. Deviation (MHz)	0.0112	0.0111	0.0114	0.0109
Max. Deviation (ppm)	2.16	2.14	2.20	2.10
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5190.0151	5189.9730	5190.0153	5189.9732
10	5190.0052	5189.9829	5190.0054	5189.9831
20	5189.9940	5189.9941	5189.9942	5189.9943
30	5189.9841	5190.0040	5189.9843	5190.0042
40	5189.9740	5190.0141	5189.9742	5190.0143
50	5189.9636	5190.0245	5189.9638	5190.0247
Max. Deviation (MHz)	0.0364	0.0270	0.0362	0.0268
Max. Deviation (ppm)	7.01	5.20	6.97	5.16
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5755.0018	5755.0005	5754.9989	5754.9970
110.00	5755.0006	5754.9993	5754.9977	5754.9958
93.50	5754.9992	5754.9979	5754.9963	5754.9944
Max. Deviation (MHz)	0.0018	0.0021	0.0037	0.0056
Max. Deviation (ppm)	0.31	0.36	0.64	0.97
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5755.0045	5755.0032	5755.0016	5754.9997
10	5755.0031	5755.0018	5755.0002	5754.9983
20	5755.0006	5755.0005	5754.9989	5754.9970
30	5755.0006	5754.9993	5754.9977	5754.9958
40	5754.9991	5754.9978	5754.9962	5754.9943
50	5754.9976	5754.9963	5754.9947	5754.9928
Max. Deviation (MHz)	0.0045	0.0037	0.0053	0.0072
Max. Deviation (ppm)	0.78	0.64	0.92	1.25
Result	Complies			

Mode: 80 MHz / Chain 2

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9964	5209.9951	5209.9935	5209.9916
110.00	5209.9952	5209.9939	5209.9923	5209.9904
93.50	5209.9938	5209.9925	5209.9909	5209.9890
Max. Deviation (MHz)	0.0062	0.0075	0.0091	0.0110
Max. Deviation (ppm)	1.19	1.44	1.75	2.11
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5209.9977	5209.9964	5209.9948	5209.9929
10	5209.9964	5209.9951	5209.9935	5209.9916
20	5209.9952	5209.9939	5209.9923	5209.9904
30	5209.9937	5209.9924	5209.9908	5209.9889
40	5209.9922	5209.9909	5209.9893	5209.9874
50	5209.9901	5209.9887	5209.9870	5209.9849
Max. Deviation (MHz)	0.0099	0.0113	0.0130	0.0151
Max. Deviation (ppm)	1.90	2.17	2.50	2.90
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5775.0012	5774.9999	5774.9983	5774.9964
110.00	5775.0000	5774.9987	5774.9971	5774.9952
93.50	5774.9986	5774.9973	5774.9957	5774.9938
Max. Deviation (MHz)	0.0014	0.0027	0.0043	0.0062
Max. Deviation (ppm)	0.24	0.47	0.74	1.07
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5775.0039	5775.0026	5775.0010	5774.9991
10	5775.0025	5775.0012	5774.9996	5774.9977
20	5775.0000	5774.9999	5774.9983	5774.9964
30	5775.0000	5774.9987	5774.9971	5774.9952
40	5774.9985	5774.9972	5774.9956	5774.9937
50	5774.9970	5774.9957	5774.9941	5774.9922
Max. Deviation (MHz)	0.0039	0.0043	0.0059	0.0078
Max. Deviation (ppm)	0.68	0.74	1.02	1.35
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
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 13, 2015	Conduction (CO02-CB)
COND Cable	Woken	Cable	01	0.15MHz ~ 30MHz	Dec. 01, 2014	Conduction (CO02-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO02-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

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

"*" 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)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%