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FCC RADIO TEST REPORT

Applicant's company	**D-Link Corporation**
Applicant Address	No.289, Sinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
FCC ID	**KA2AP3662A1**

Product Name	Wireless AC1200 Dual Band Outdoor PoE Access Point
Brand Name	D-Link
Model No.	DAP-3662
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5725 ~ 5850 MHz
Received Date	Oct. 22, 2014
Final Test Date	Dec. 19, 2015
Submission Type	Class II Change

Statement

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

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

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

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

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

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4N2206-05AC	Rev. 01	Initial issue of report	Jan. 04, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless AC1200 Dual Band Outdoor PoE Access Point
Brand Name	:	D-Link
Model No.	:	DAP-3662
Applicant	:	D-Link Corporation
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 Oct. 22, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	5.83 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	0.08 dB
4.5	15.407(a)	Power Spectral Density	Complies	13.25 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.58 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 (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter and 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	5725 ~ 5850 MHz
Channel Number	5 for 20MHz bandwidth ; 2 for 40MHz bandwidth 1 for 80MHz bandwidth
Channel Band Width (99%)	IEEE 802.11a: 31.09 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 26.92 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.61 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz
Maximum Conducted Output Power	IEEE 802.11a: 29.72 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.46 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.05 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 20.98 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	Two (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)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
802.11ac (VHT20)	2	MCS 0-9/Nss1-2
802.11ac (VHT40)	2	MCS 0-9/Nss1-2
802.11ac (VHT80)	2	MCS 0-9/Nss1-2
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40. Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80. Note 3: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac		

3.2. Accessories

Power	Brand	Model	Rating
Adapter	LEI	MU24A5480050-A1	Input: 100-240VAC, 50/60Hz 0.7A Output: 48VDC, 0.5A
PoE	LanReady	PE03G	Input: 8-57VDC (Max. 48W) Output: 8-57VDC (Max. 48W)
Others			
Ground Cable*1, Non-shielded, 0.2m			

3.3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	Grand-Tek	OA-58-06-03	Embedded Antenna	I-PEX	-	6.2
2	Grand-Tek	OA-58-05-02	Embedded Antenna	I-PEX	-	6.2
3	Grand-Tek	OA-24-05-06	Embedded Antenna	I-PEX	6.1	-
4	Grand-Tek	OA-24-04-02	Embedded Antenna	I-PEX	4.8	-

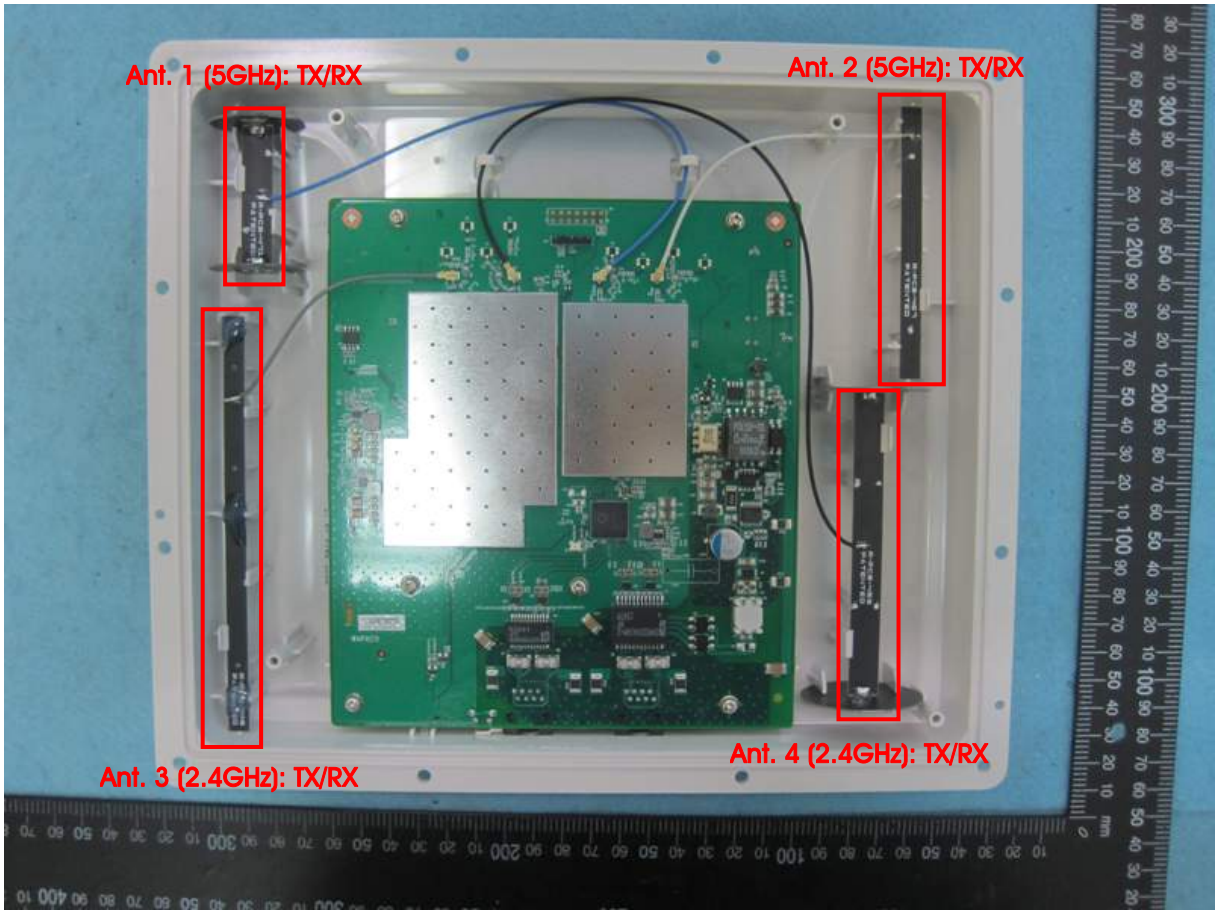
Note: The EUT has four antennas.

For IEEE 802.11a/n/ac mode:

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

For IEEE 802.11b/g/n mode:

Ant. 3 and Ant. 4 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

For 80MHz bandwidth systems, use Channel 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

3.5. Table for Test Modes

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

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

The following test modes were performed for all tests:

For Co-location MPE Test:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA4N2206-05) 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	-
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR4N2206AA

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

Modifications	Performance Checking
1. Add one power adapter Model Name: MU24A5480050-A1	1. AC Conducted Emissions 2. Radiated Emissions Below 1GHz test
2. Updating test standard Band 4 to “New Rule” from “Old Rule”.	1. 26dB Bandwidth and 99% Occupied Bandwidth 2. 6dB Spectrum Bandwidth 3. Maximum Conducted Output Power 4. Power Spectral Density 5. Radiated Emissions Above 1GHz test 6. Band Edge Emissions 7. Frequency Stability

3.8. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E4300	DoC

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

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E6430	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.9. Table for Parameters of Test Software Setting

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

Test Software Version	DOS		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	17	29	23
802.11ac MCS0/Nss1 VHT20	21	28.5	22.5
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz	5795 MHz	
	18	22.5	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	17		

3.10. EUT Operation during Test

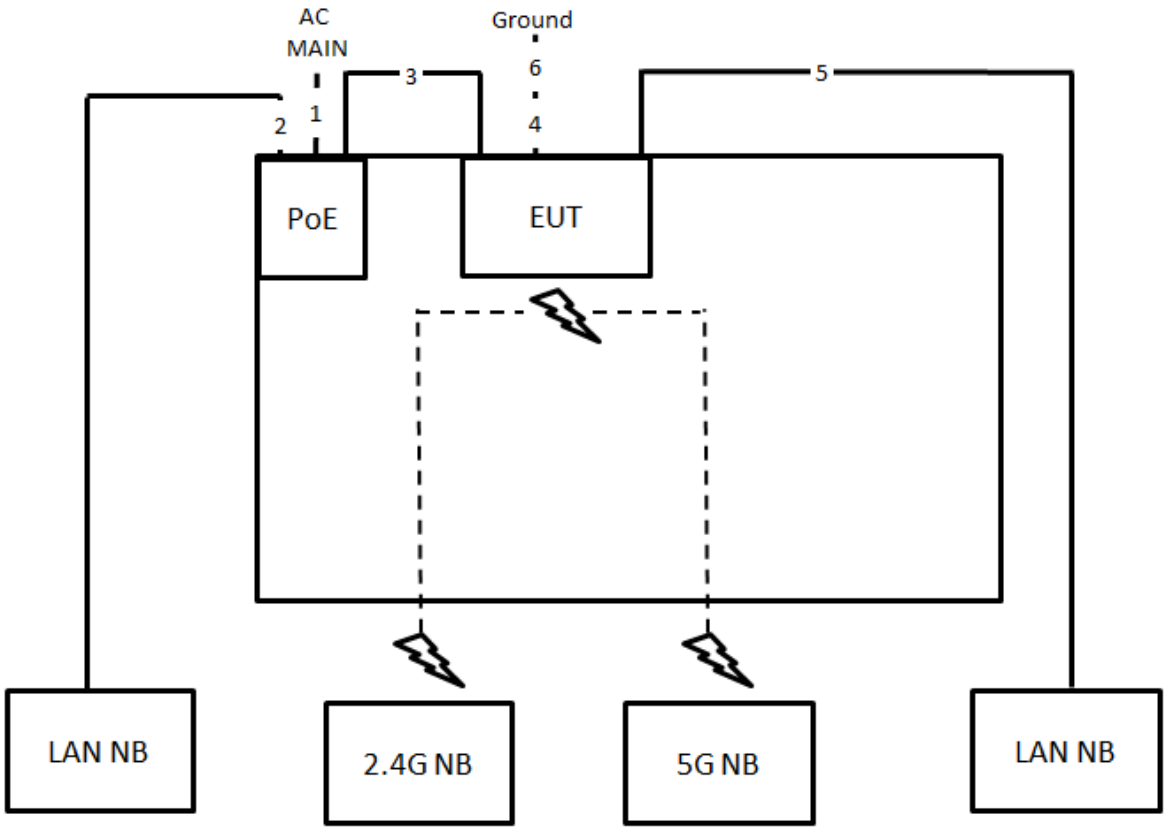
The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.035	2.099	96.95	0.13	0.49
802.11ac MCS0/Nss1 VHT20	1.886	1.970	95.74	0.19	0.53
802.11ac MCS0/Nss1 VHT40	0.904	1.008	89.68	0.47	1.11
802.11ac MCS0/Nss1 VHT80	0.428	0.524	81.68	0.88	2.34

3.12. Test Configurations

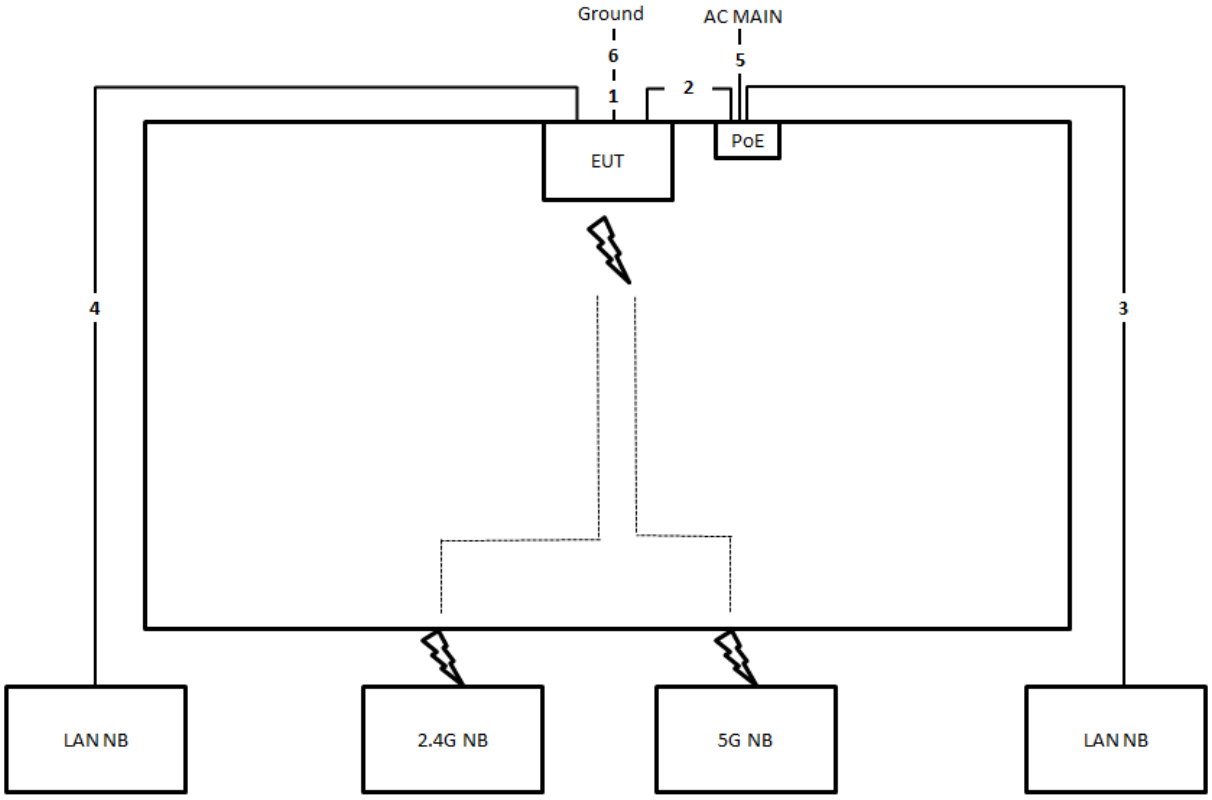
3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.2m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m
4	Ground cable	No	0.2m
5	RJ-45 cable	No	10m
6	Ground cable	No	1.5m

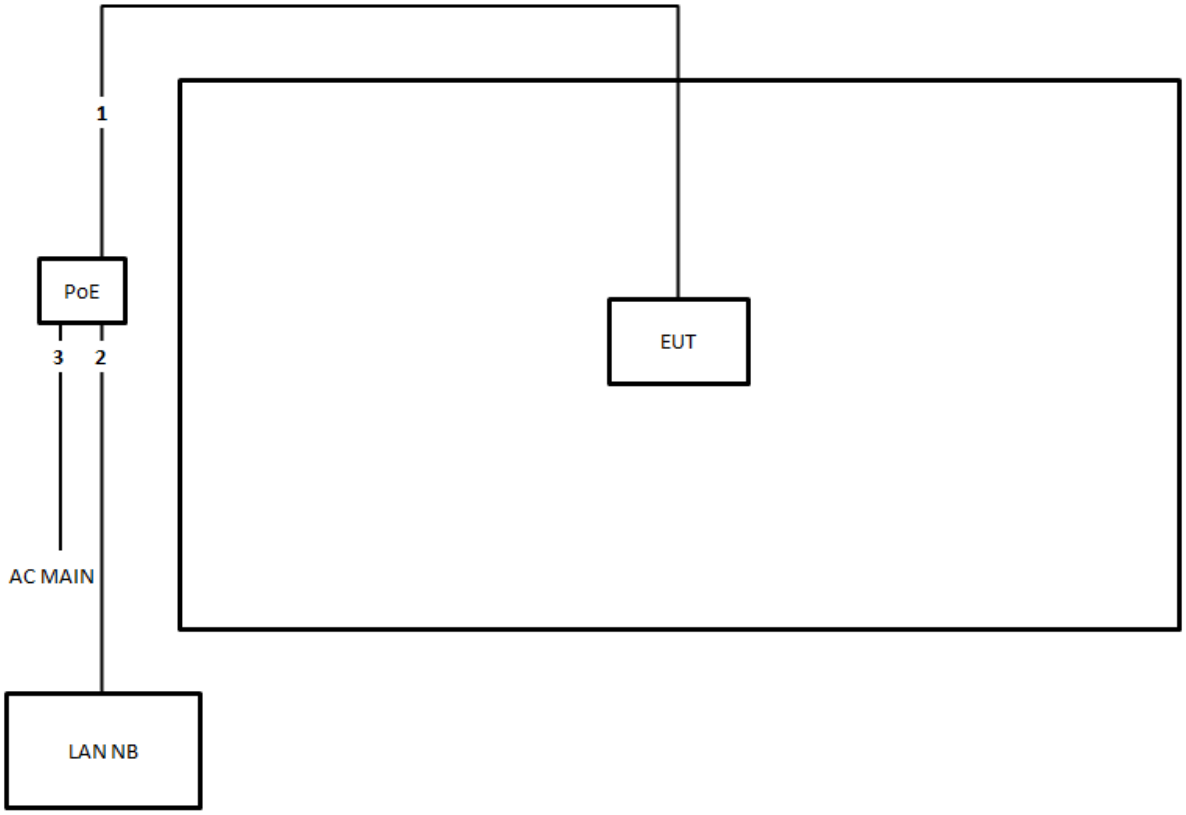
3.12.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	Ground cable	No	0.2m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	Power cable	No	1.2m
6	Ground cable	No	1.5m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	Power cable	No	1.2m

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

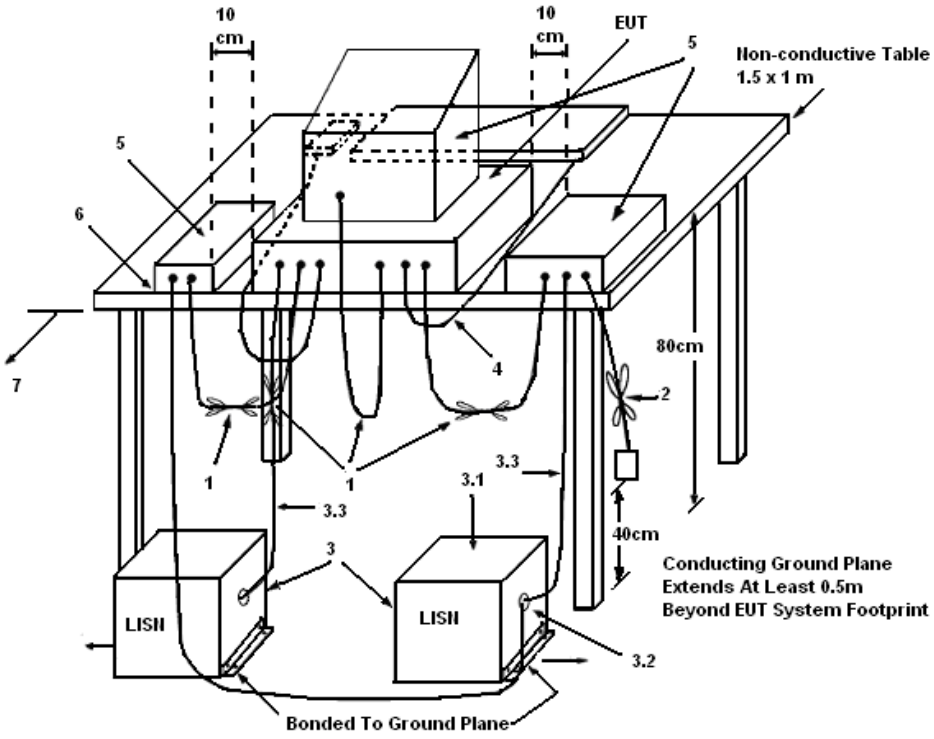
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

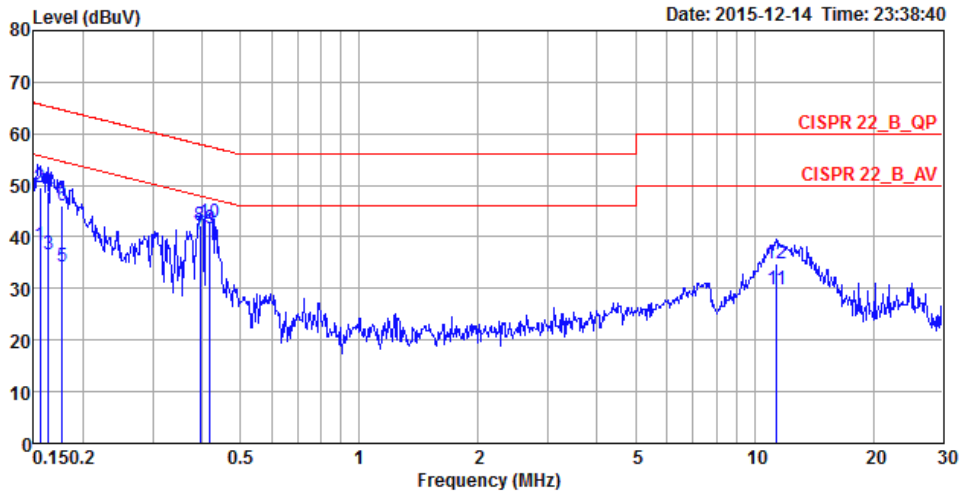
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

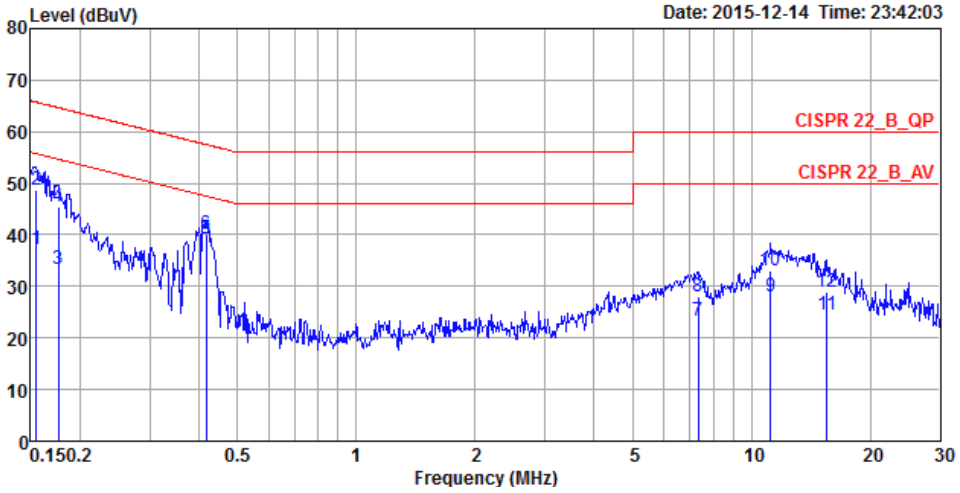
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	56%
Test Engineer	Sollo Luo	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	38.38	-17.31	55.69	28.43	9.93	0.02	LINE	Average
2	0.1557	49.58	-16.11	65.69	39.63	9.93	0.02	LINE	QP
3	0.1633	36.50	-18.80	55.30	26.55	9.93	0.02	LINE	Average
4	0.1633	48.76	-16.54	65.30	38.81	9.93	0.02	LINE	QP
5	0.1768	34.18	-20.46	54.64	24.23	9.93	0.02	LINE	Average
6	0.1768	46.10	-18.54	64.64	36.15	9.93	0.02	LINE	QP
7	0.3955	40.35	-7.60	47.95	30.38	9.93	0.04	LINE	Average
8	0.3955	42.30	-15.65	57.95	32.33	9.93	0.04	LINE	QP
9	0.4193	41.63	-5.83	47.46	31.66	9.93	0.04	LINE	Average
10	0.4193	42.75	-14.71	57.46	32.78	9.93	0.04	LINE	QP
11	11.3771	29.75	-20.25	50.00	19.27	10.23	0.25	LINE	Average
12	11.3771	34.91	-25.09	60.00	24.43	10.23	0.25	LINE	QP

Temperature	24°C	Humidity	56%
Test Engineer	Sollo Luo	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1548	37.20	-18.54	55.74	27.40	9.78	0.02	NEUTRAL	Average
2	0.1548	48.76	-16.98	65.74	38.96	9.78	0.02	NEUTRAL	QP
3	0.1758	33.29	-21.39	54.68	23.48	9.79	0.02	NEUTRAL	Average
4	0.1758	45.34	-19.34	64.68	35.53	9.79	0.02	NEUTRAL	QP
5	0.4171	39.40	-8.11	47.51	29.57	9.79	0.04	NEUTRAL	Average
6	0.4171	40.24	-17.27	57.51	30.41	9.79	0.04	NEUTRAL	QP
7	7.3290	23.32	-26.68	50.00	13.22	9.96	0.14	NEUTRAL	Average
8	7.3290	28.16	-31.84	60.00	18.06	9.96	0.14	NEUTRAL	QP
9	11.1977	27.98	-22.02	50.00	17.69	10.04	0.25	NEUTRAL	Average
10	11.1977	33.07	-26.93	60.00	22.78	10.04	0.25	NEUTRAL	QP
11	15.5523	24.46	-25.54	50.00	14.08	10.12	0.26	NEUTRAL	Average
12	15.5523	28.93	-31.07	60.00	18.55	10.12	0.26	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

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

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

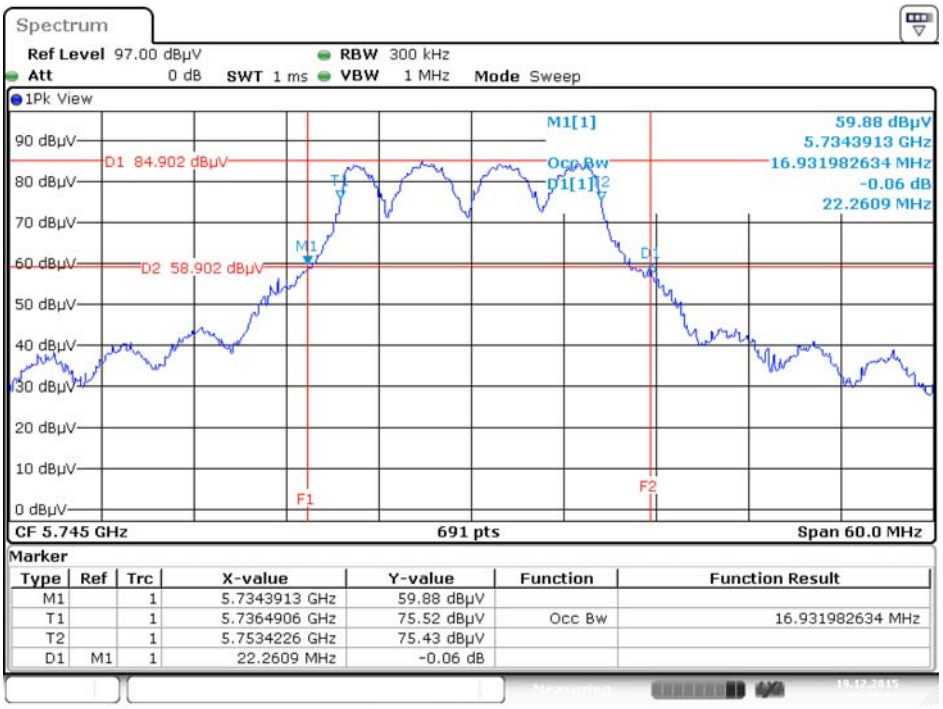
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

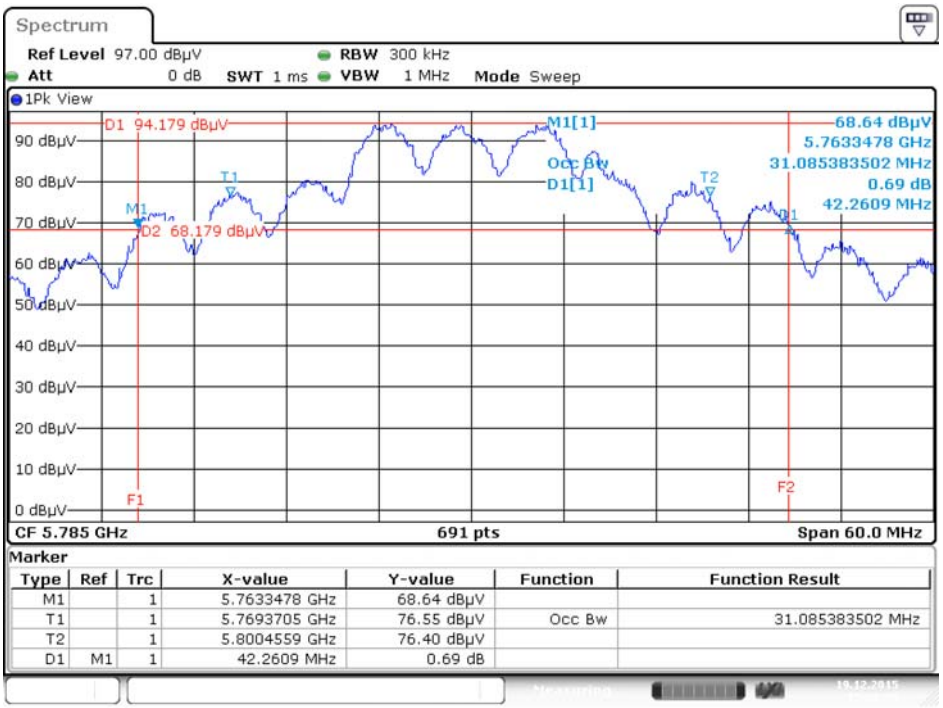
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	22.26	16.93
	5785 MHz	42.26	31.09
	5825 MHz	21.57	16.24
802.11ac MCS0/Nss1 VHT20	5745 MHz	23.30	18.23
	5785 MHz	42.00	26.92
	5825 MHz	23.04	18.23
802.11ac MCS0/Nss1 VHT40	5755 MHz	44.35	36.47
	5795 MHz	44.20	36.61
802.11ac MCS0/Nss1 VHT80	5775 MHz	84.64	76.12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5745 MHz



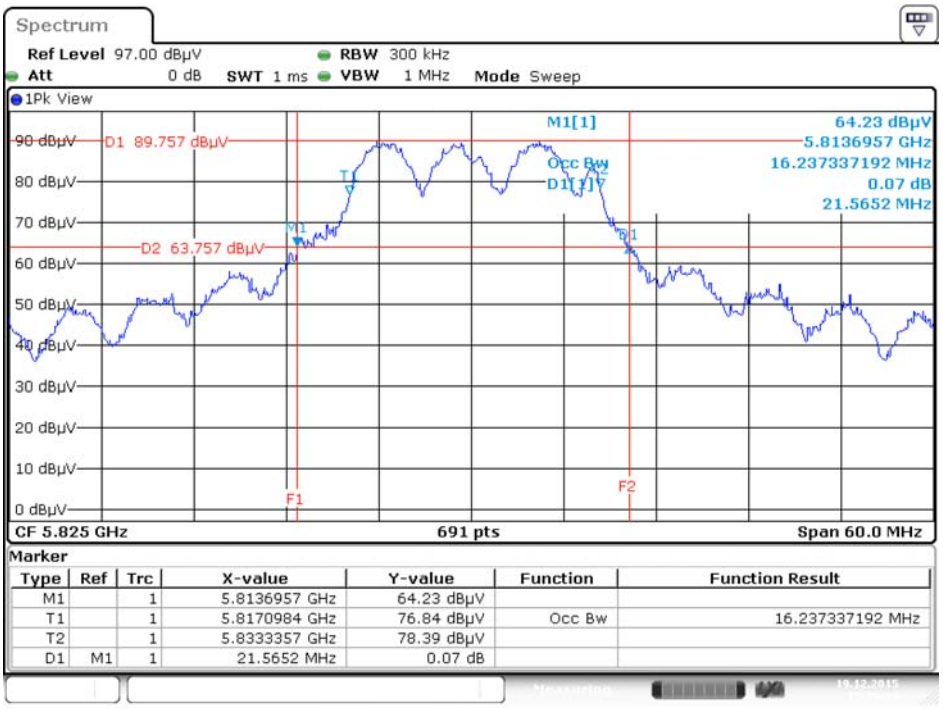
Date: 19.DEC.2015 15:27:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5785 MHz

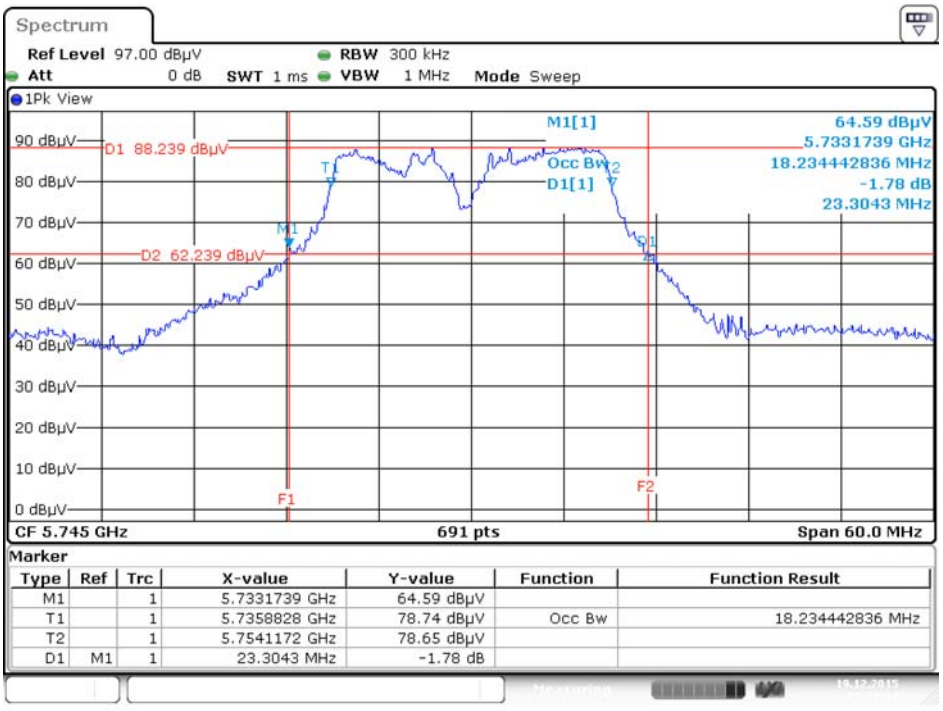


Date: 19.DEC.2015 15:28:35

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5825 MHz

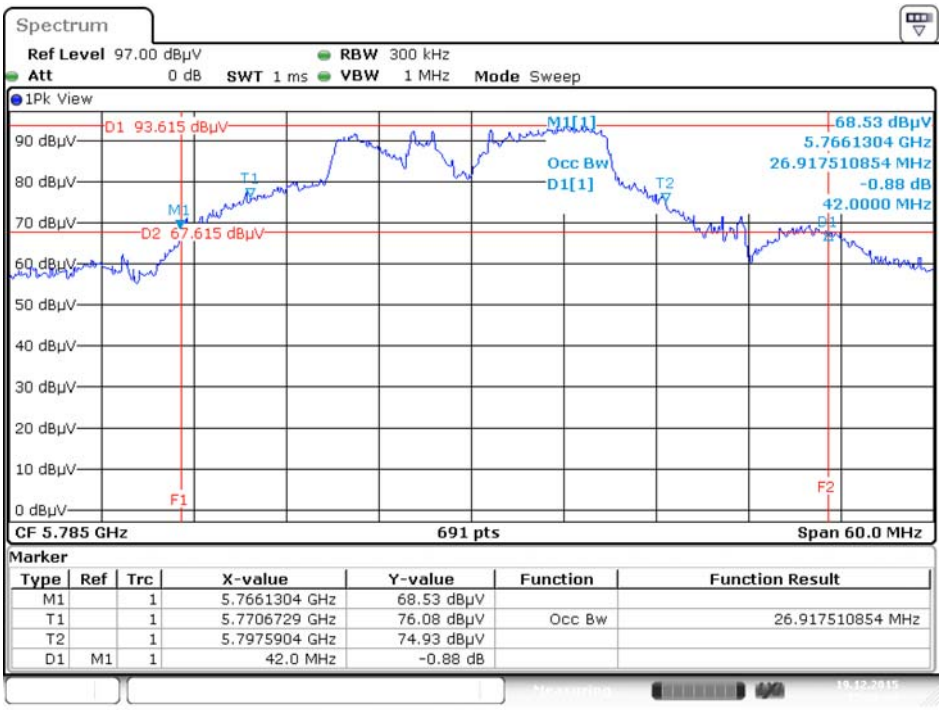


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5745 MHz



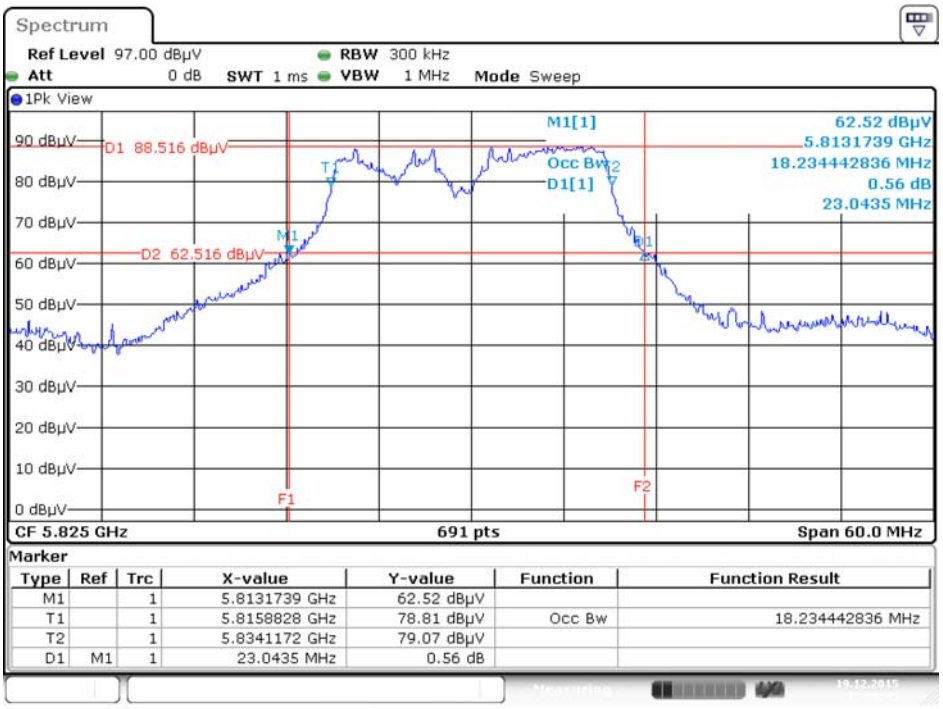
Date: 19.DEC.2015 15:27:14

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



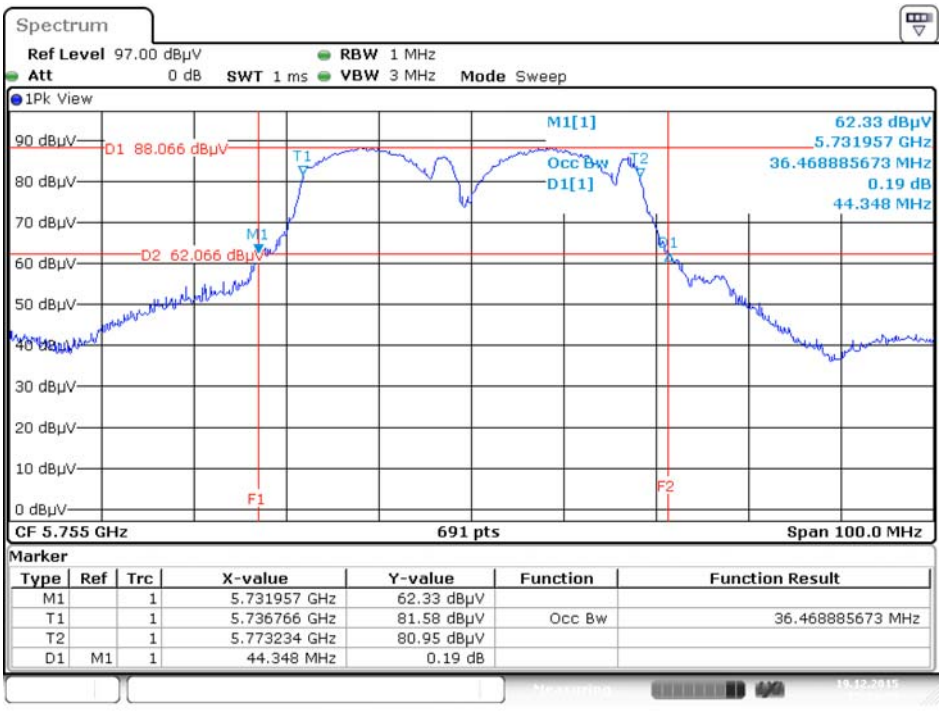
Date: 19.DEC.2015 15:26:35

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



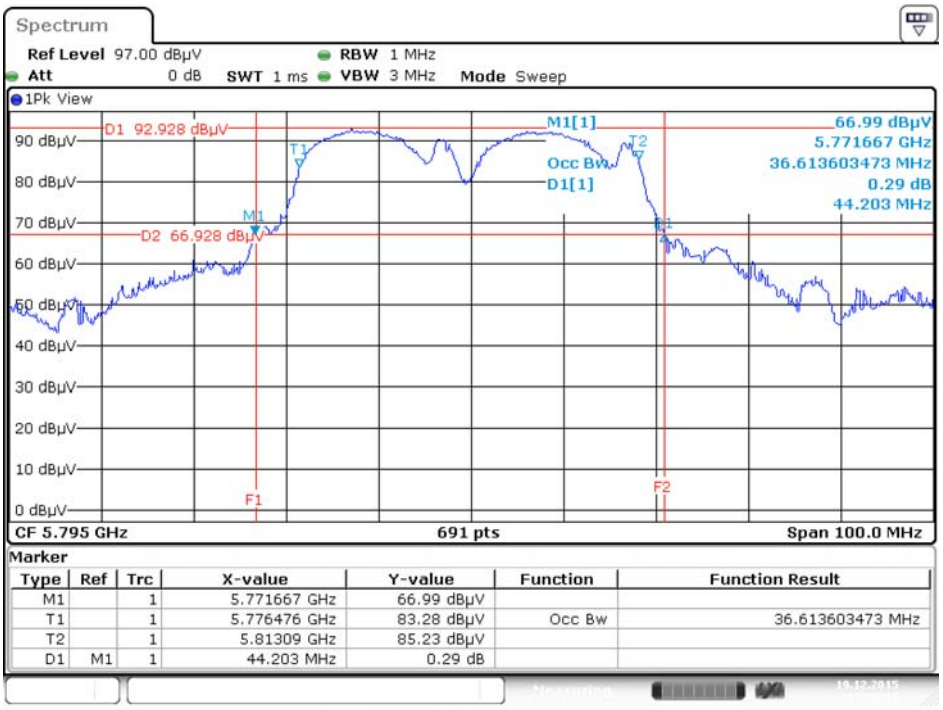
Date: 19.DEC.2015 15:25:44

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



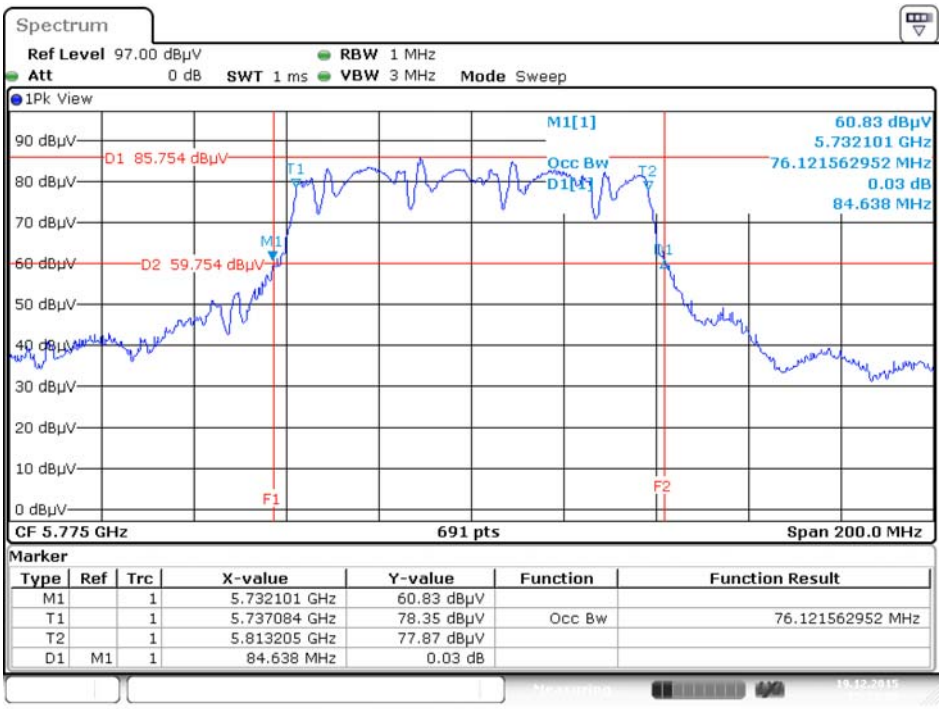
Date: 19.DEC.2015 15:24:29

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



Date: 19.DEC.2015 15:25:12

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



Date: 19.DEC.2015 15:23:28

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

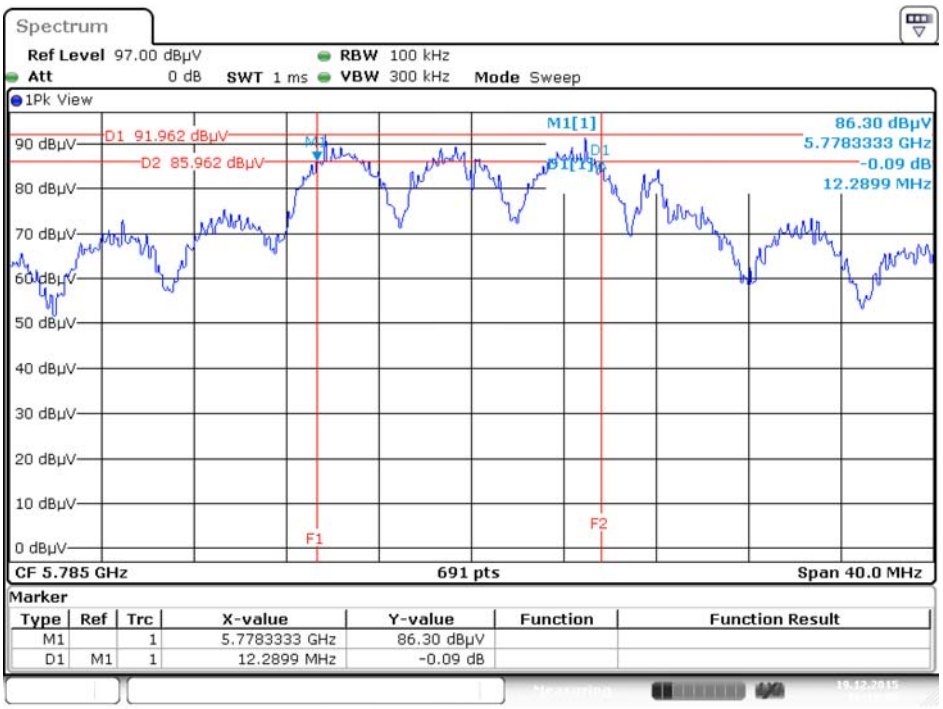
Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.35	500	Complies
	5785 MHz	12.29	500	Complies
	5825 MHz	16.12	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	11.13	500	Complies
	5785 MHz	11.71	500	Complies
	5825 MHz	12.29	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	34.44	500	Complies
	5795 MHz	35.13	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	500	Complies

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

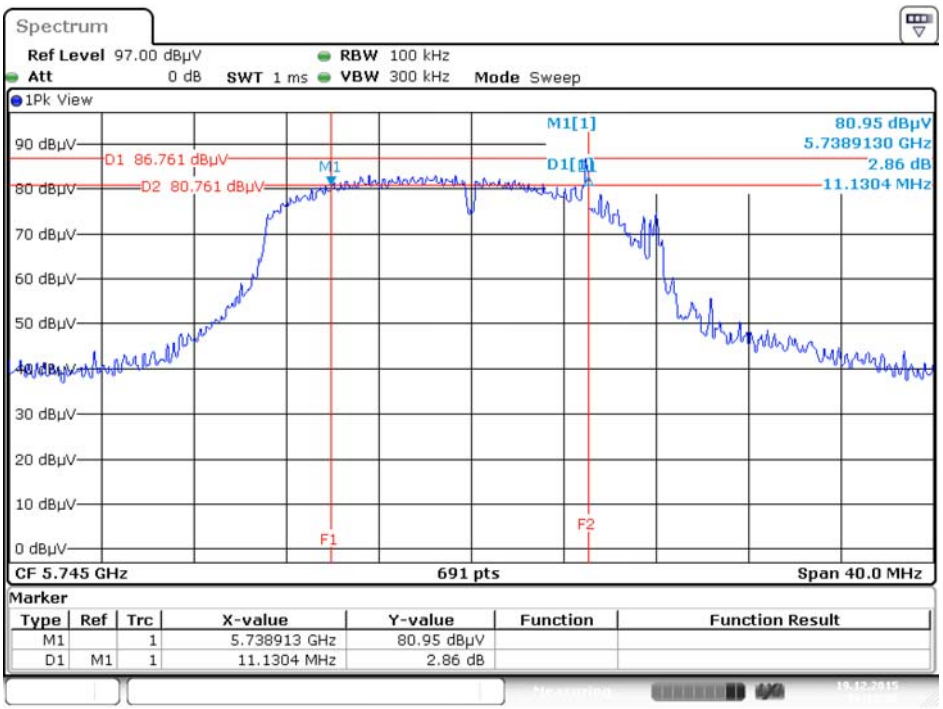
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5785 MHz



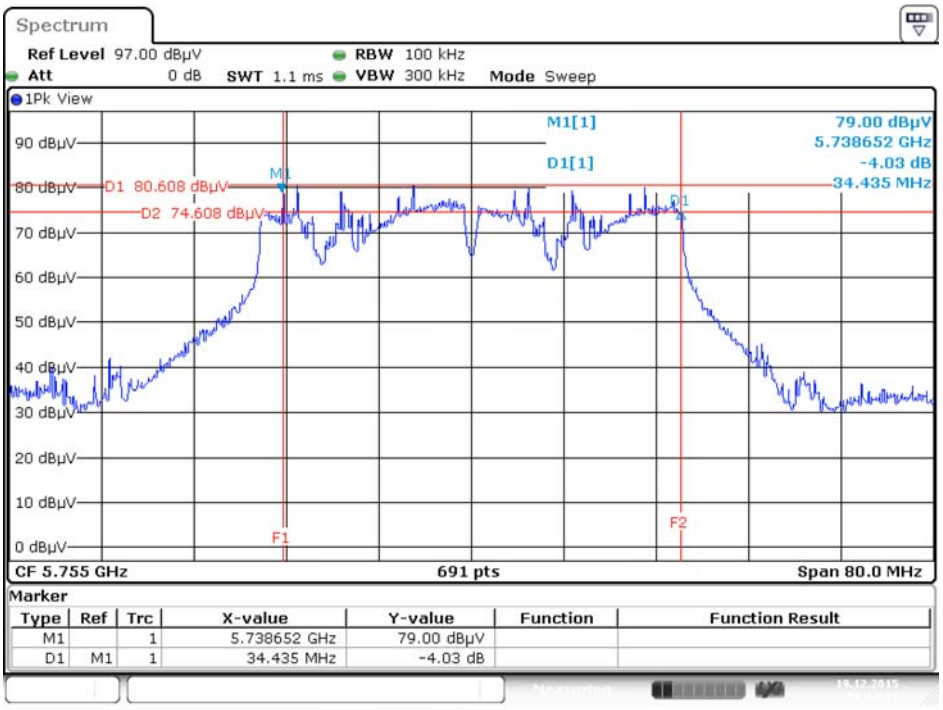
Date: 19.DEC.2015 16:10:55

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5745 MHz



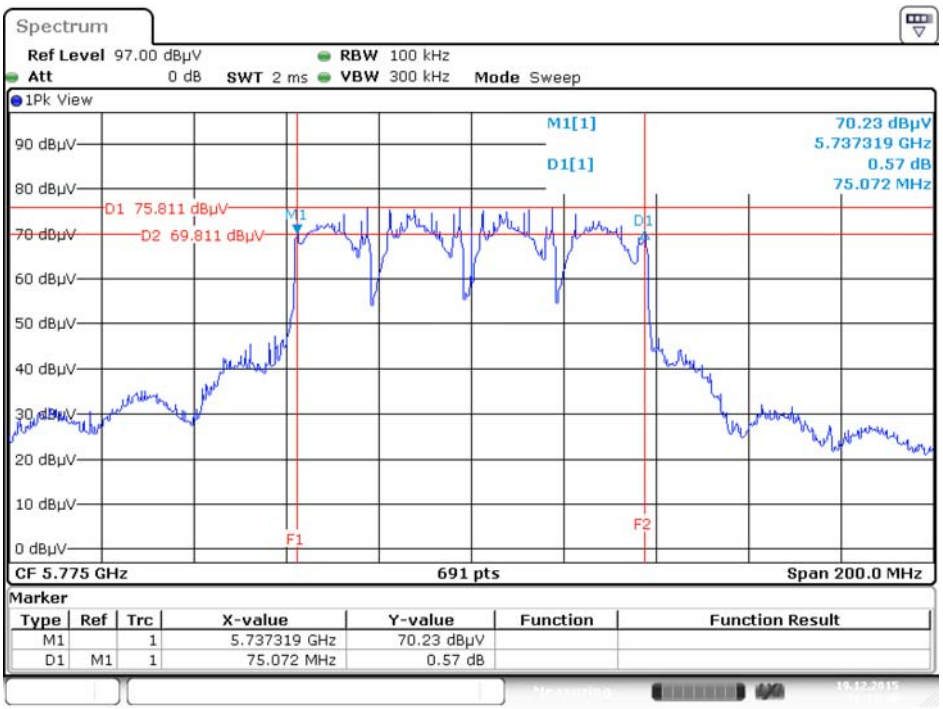
Date: 19.DEC.2015 16:13:36

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



Date: 19.DEC.2015 16:14:11

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



Date: 19.DEC.2015 16:15:48

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

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

4.4.2. Measuring Instruments and Setting

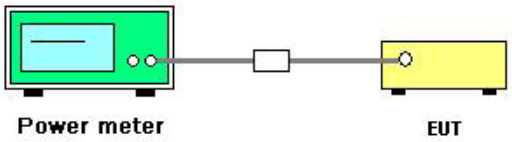
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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	24°C	Humidity	60%
Test Engineer	Clemens Fang	Test Date	Dec. 19, 2015

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
802.11a	5745 MHz	17.55	17.62	20.60	29.80	Complies
	5785 MHz	26.52	26.89	29.72	29.80	Complies
	5825 MHz	22.16	22.65	25.42	29.80	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	21.58	21.82	24.71	29.80	Complies
	5785 MHz	26.41	26.48	29.46	29.80	Complies
	5825 MHz	21.85	22.11	24.99	29.80	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	18.03	18.19	21.12	29.80	Complies
	5795 MHz	21.93	22.15	25.05	29.80	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	17.89	18.05	20.98	29.80	Complies

Note: Max Ant. Gain =6.20dBi > 6dBi, So Limit =30-(6.20-6)=29.80dBm.

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
☒	5.725~5.85 GHz	30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

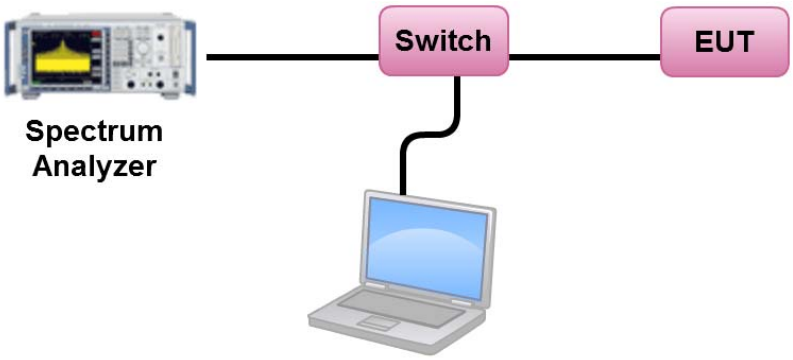
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	24°C	Humidity	60%
Test Engineer	Clemens Fang		

Configuration IEEE 802.11a / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.46	-3.01	4.45	26.79	Complies
157	5785 MHz	16.55	-3.01	13.54	26.79	Complies
165	5825 MHz	12.31	-3.01	9.30	26.79	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.21dBi > 6dBi, So Limit =30-(9.21-6)=26.79dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	11.59	-3.01	8.58	26.79	Complies
157	5785 MHz	16.32	-3.01	13.31	26.79	Complies
165	5825 MHz	11.91	-3.01	8.90	26.79	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.21dBi > 6dBi, So Limit =30-(9.21-6)=26.79dBm/500kHz.

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	5.10	-3.01	2.09	26.79	Complies
159	5795 MHz	9.00	-3.01	5.99	26.79	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.21dBi > 6dBi, So Limit =30-(9.21-6)=26.79dBm/500kHz.

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

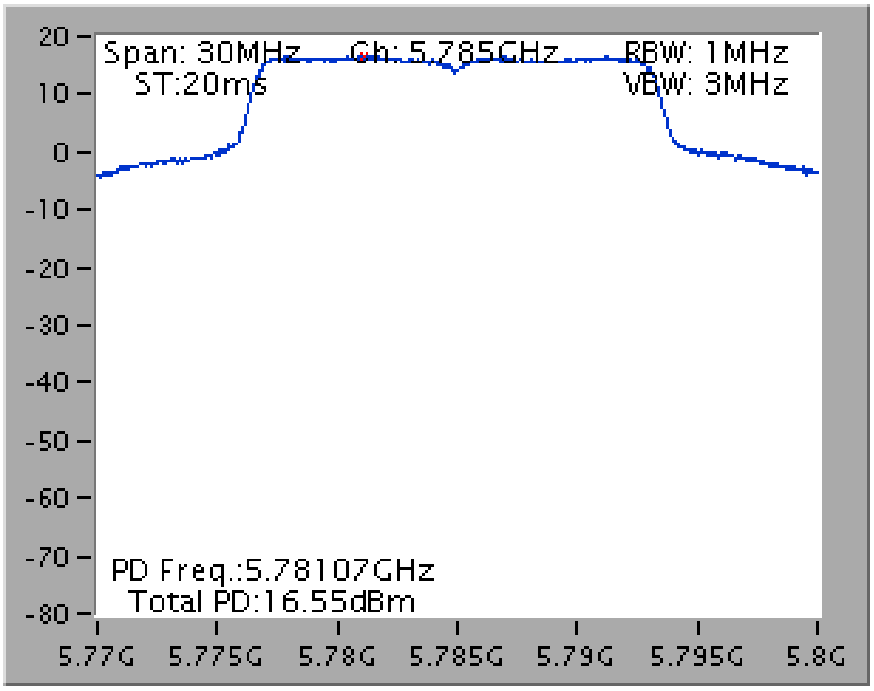
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	1.89	-3.01	-1.12	26.79	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =9.21dBi > 6dBi, So Limit =30-(9.21-6)=26.79dBm/500kHz.

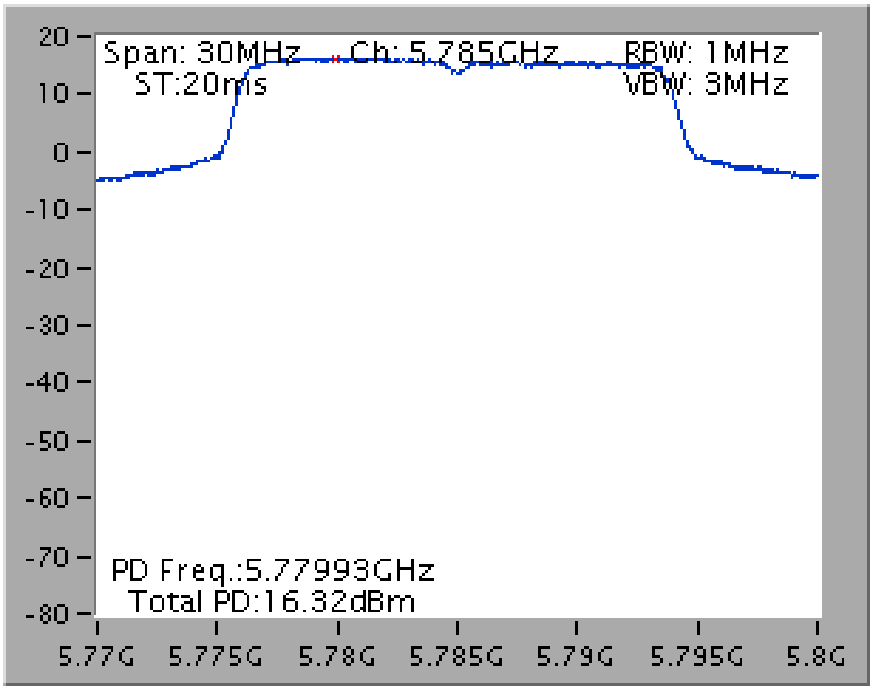
Note: All the test values were listed in the report.

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

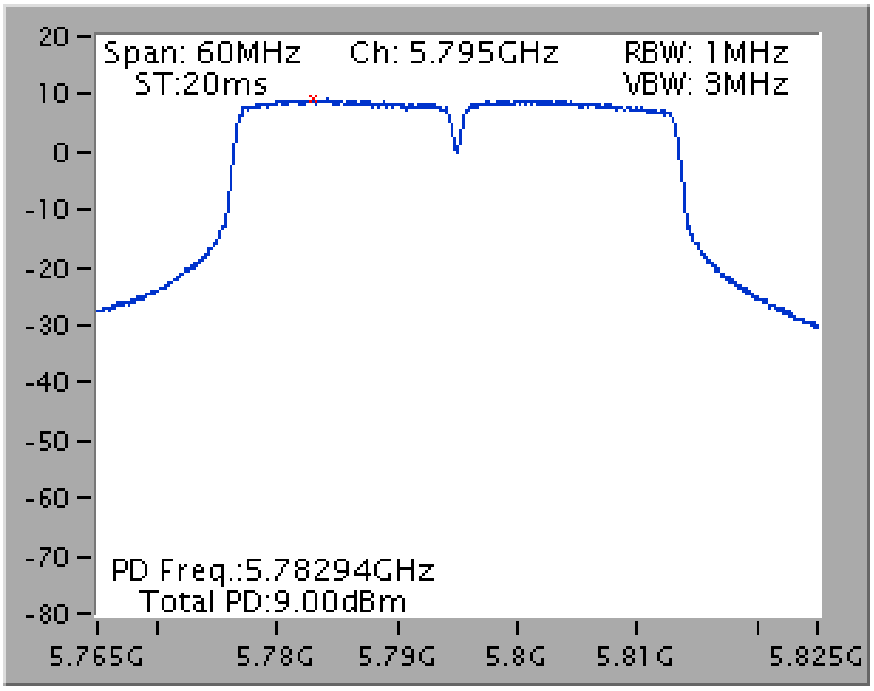
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 / 5785 MHz



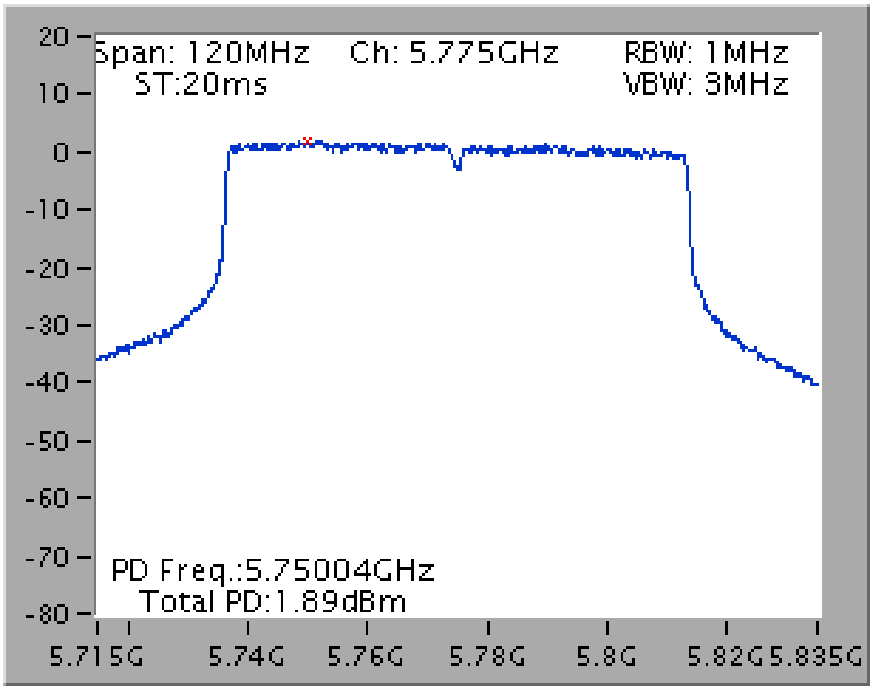
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 / 5785 MHz



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



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



4.6. Radiated Emissions Measurement

4.6.1. Limit

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

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

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

4.6.2. Measuring Instruments and Setting

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

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

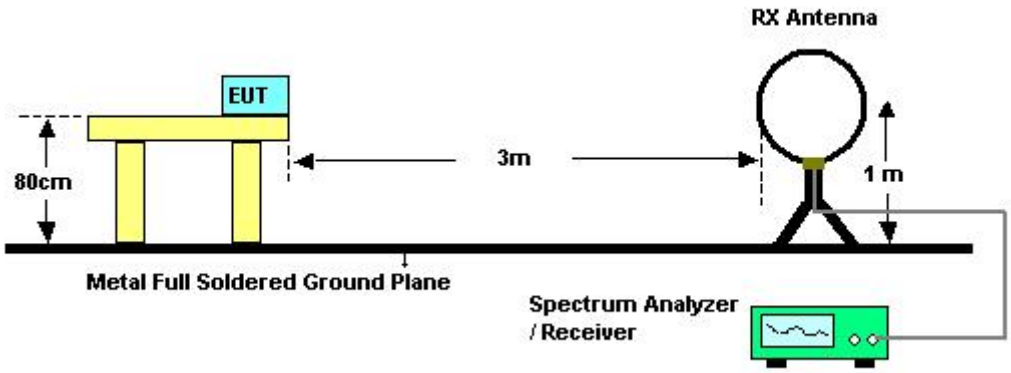
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

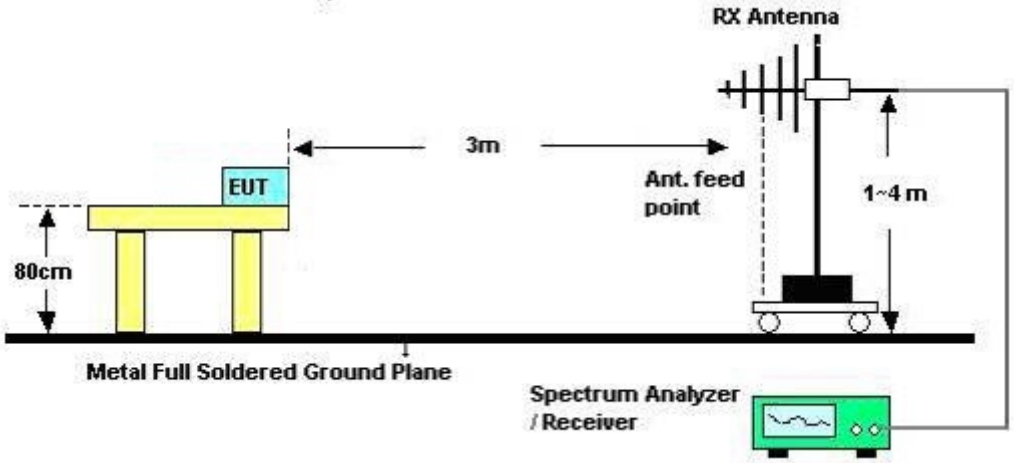
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

4.6.4. Test Setup Layout

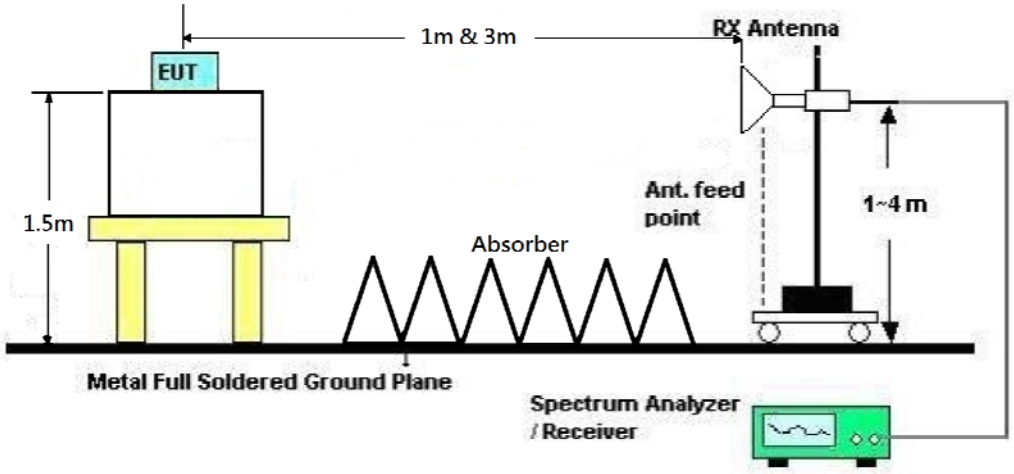
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	23°C	Humidity	51%
Test Engineer	Brian Sun	Configurations	Normal Link
Test Date	Dec. 07, 2015		

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

Note:

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

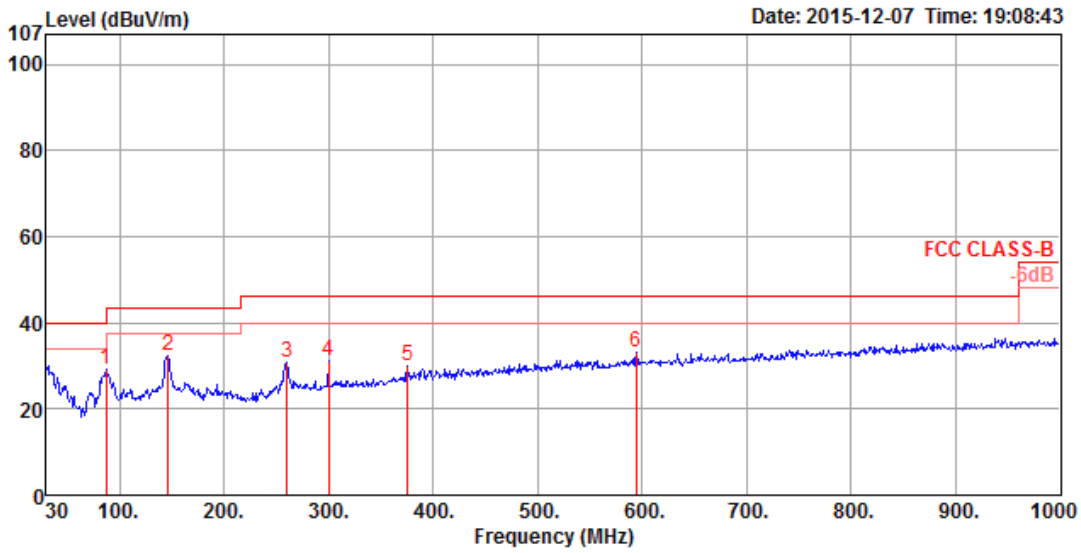
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

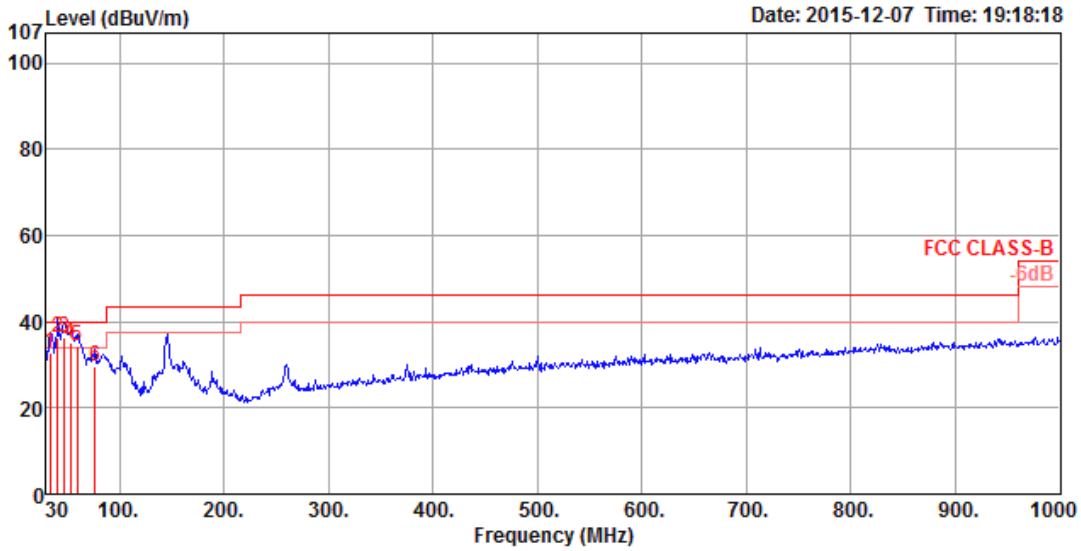
Temperature	23°C	Humidity	51%
Test Engineer	Brian Sun	Configurations	Normal Link

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	87.23	29.17	40.00	-10.83	51.70	1.21	32.58	8.84	HORIZONTAL	173	200	Peak
2	146.40	32.37	43.50	-11.13	51.88	1.47	32.56	11.58	HORIZONTAL	187	150	Peak
3	259.89	30.70	46.00	-15.30	47.40	1.93	32.53	13.90	HORIZONTAL	208	100	Peak
4	299.66	31.10	46.00	-14.90	47.69	2.05	32.52	13.88	HORIZONTAL	208	100	Peak
5	375.32	29.83	46.00	-16.17	44.20	2.24	32.54	15.93	HORIZONTAL	189	100	Peak
6	594.54	33.16	46.00	-12.84	44.05	2.82	32.69	18.98	HORIZONTAL	175	200	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	33.88	32.66	40.00	-7.34	46.80	0.81	32.64	17.69	VERTICAL	359	100	QP
2	40.67	36.29	40.00	-3.71	54.30	0.95	32.63	13.67	VERTICAL	180	100	QP
3	47.46	36.32	40.00	-3.68	57.90	0.95	32.63	10.10	VERTICAL	280	100	QP
4	53.28	35.09	40.00	-4.91	58.52	0.95	32.62	8.24	VERTICAL	38	150	QP
5	59.10	34.28	40.00	-5.72	58.82	1.07	32.62	7.01	VERTICAL	5	100	QP
6	76.56	29.67	40.00	-10.33	53.72	1.21	32.59	7.33	VERTICAL	119	125	QP

Note:

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

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

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

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

Temperature	23°C	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11a CH 149 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11486.40	47.92	54.00	-6.08	31.43	11.72	35.23	40.00	HORIZONTAL	72	118	Average
2	11497.56	60.12	74.00	-13.88	43.63	11.72	35.23	40.00	HORIZONTAL	72	118	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11496.56	59.72	74.00	-14.28	43.23	11.72	35.23	40.00	VERTICAL	96	133	Peak
2	11497.52	47.07	54.00	-6.93	30.58	11.72	35.23	40.00	VERTICAL	96	133	Average

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11a CH 157 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11570.28	64.59	74.00	-9.41	48.20	11.75	35.23	39.87	HORIZONTAL	51	108	Peak
2	11570.32	52.42	54.00	-1.58	36.03	11.75	35.23	39.87	HORIZONTAL	51	108	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11570.56	62.55	74.00	-11.45	46.16	11.75	35.23	39.87	VERTICAL	313	116	Peak
2	11570.72	50.65	54.00	-3.35	34.26	11.75	35.23	39.87	VERTICAL	313	116	Average

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11a CH 165 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11649.80	60.92	74.00	-13.08	44.63	11.78	35.22	39.73	HORIZONTAL	59	117	Peak
2	11651.12	48.70	54.00	-5.30	32.45	11.80	35.22	39.67	HORIZONTAL	59	117	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11647.20	46.98	54.00	-7.02	30.69	11.78	35.22	39.73	VERTICAL	96	119	Average
2	11657.32	59.96	74.00	-14.04	43.71	11.80	35.22	39.67	VERTICAL	96	119	Peak

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11493.26	61.83	74.00	-12.17	45.34	11.72	35.23	40.00	HORIZONTAL	55	102	Peak
2	11493.60	49.34	54.00	-4.66	32.85	11.72	35.23	40.00	HORIZONTAL	55	102	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11488.04	47.50	54.00	-6.50	31.01	11.72	35.23	40.00	VERTICAL	76	123	Average
2	11493.66	60.01	74.00	-13.99	43.52	11.72	35.23	40.00	VERTICAL	76	123	Peak

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11571.02	50.64	54.00	-3.36	34.25	11.75	35.23	39.87	HORIZONTAL	50	100	Average
2	11571.80	62.50	74.00	-11.50	46.11	11.75	35.23	39.87	HORIZONTAL	50	100	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11567.18	47.89	54.00	-6.11	31.50	11.75	35.23	39.87	VERTICAL	309	158	Average
2	11568.00	60.35	74.00	-13.65	43.96	11.75	35.23	39.87	VERTICAL	309	158	Peak

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11648.20	47.09	54.00	-6.91	30.80	11.78	35.22	39.73	HORIZONTAL	159	172	Average
2	11650.34	59.87	74.00	-14.13	43.58	11.78	35.22	39.73	HORIZONTAL	159	172	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11650.74	47.30	54.00	-6.70	31.01	11.78	35.22	39.73	VERTICAL	146	186	Average
2	11651.32	60.53	74.00	-13.47	44.28	11.80	35.22	39.67	VERTICAL	146	186	Peak

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11507.38	47.24	54.00	-6.76	30.75	11.72	35.23	40.00	HORIZONTAL	174	163	Average
2	11514.48	60.88	74.00	-13.12	44.39	11.72	35.23	40.00	HORIZONTAL	174	163	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11509.98	60.27	74.00	-13.73	43.78	11.72	35.23	40.00	VERTICAL	184	168	Peak
2	11514.06	47.29	54.00	-6.71	30.80	11.72	35.23	40.00	VERTICAL	184	168	Average

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11589.44	60.14	74.00	-13.86	43.79	11.77	35.22	39.80	HORIZONTAL	125	133	Peak
2	11592.16	47.27	54.00	-6.73	30.92	11.77	35.22	39.80	HORIZONTAL	125	133	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11587.92	60.29	74.00	-13.71	43.94	11.77	35.22	39.80	VERTICAL	277	137	Peak
2	11591.78	47.05	54.00	-6.95	30.70	11.77	35.22	39.80	VERTICAL	277	137	Average

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11545.80	47.00	54.00	-7.00	30.56	11.74	35.23	39.93	HORIZONTAL	249	130	Average
2	11549.78	60.49	74.00	-13.51	44.05	11.74	35.23	39.93	HORIZONTAL	249	130	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	11546.20	47.16	54.00	-6.84	30.72	11.74	35.23	39.93	VERTICAL	131	103	Average
2	11546.88	59.52	74.00	-14.48	43.08	11.74	35.23	39.93	VERTICAL	131	103	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 5.725-5.85 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	23°C	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 1 + Ant. 2
Test Date	Dec. 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	5714.23	69.00	74.00	-5.00	61.07	7.88	34.41	34.36	125	183	VERTICAL	Peak
2	5715.00	53.65	54.00	-0.35	45.72	7.88	34.41	34.36	125	183	VERTICAL	Average
3	5723.53	76.03	78.20	-2.17	68.07	7.87	34.45	34.36	125	183	VERTICAL	Peak
4	5738.27	108.15			100.19	7.87	34.45	34.36	125	183	VERTICAL	Average
5	5738.91	118.99			110.99	7.86	34.50	34.36	125	183	VERTICAL	Peak

Item 4, 5 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5714.00	67.30	74.00	-6.70	60.22	8.02	33.00	32.06	VERTICAL	182	100	Peak
2	5715.00	52.65	54.00	-1.35	45.57	8.02	33.00	32.06	VERTICAL	182	100	Average
3	5722.00	71.73	78.20	-6.47	64.65	8.02	33.00	32.06	VERTICAL	182	100	Peak
4	5781.00	107.81			100.60	8.10	33.03	32.14	VERTICAL	182	100	Average
5	5782.00	118.60			111.39	8.10	33.03	32.14	VERTICAL	182	100	Peak
6	5851.00	73.97	78.20	-4.23	66.62	8.18	33.05	32.22	VERTICAL	182	100	Peak
7	5862.00	52.69	54.00	-1.31	45.32	8.19	33.06	32.24	VERTICAL	182	100	Average
8	5866.00	68.25	74.00	-5.75	60.88	8.19	33.06	32.24	VERTICAL	182	100	Peak

Item 4, 5 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5820.60	115.81			108.53	8.14	33.04	32.18	VERTICAL	182	100	Peak
2	5821.00	104.87			97.60	8.14	33.05	32.18	VERTICAL	182	100	Average
3	5851.00	77.07	78.20	-1.13	69.72	8.18	33.05	32.22	VERTICAL	182	100	Peak
4	5860.00	68.51	74.00	-5.49	61.14	8.19	33.06	32.24	VERTICAL	182	100	Peak
5	5860.60	53.45	54.00	-0.55	46.08	8.19	33.06	32.24	VERTICAL	182	100	Average

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

Temperature	23℃	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5714.60	68.93	74.00	-5.07	61.85	8.02	33.00	32.06	VERTICAL	181	100	Peak
2	5715.00	53.85	54.00	-0.15	46.77	8.02	33.00	32.06	VERTICAL	181	100	Average
3	5724.60	76.38	78.20	-1.82	69.26	8.04	33.00	32.08	VERTICAL	181	100	Peak
4	5738.60	103.64			96.53	8.04	33.01	32.08	VERTICAL	181	100	Average
5	5740.20	114.00			106.85	8.06	33.01	32.10	VERTICAL	181	100	Peak

Item 4, 5 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5711.00	66.61	74.00	-7.39	59.53	8.02	33.00	32.06	HORIZONTAL	307	170	Peak
2	5715.00	53.42	54.00	-0.58	46.34	8.02	33.00	32.06	HORIZONTAL	307	170	Average
3	5725.00	72.22	78.20	-5.98	65.10	8.04	33.00	32.08	HORIZONTAL	307	170	Peak
4	5790.00	106.49			99.24	8.12	33.03	32.16	HORIZONTAL	307	170	Average
5	5793.00	117.74			110.49	8.12	33.03	32.16	HORIZONTAL	307	170	Peak
6	5850.00	74.12	78.20	-4.08	66.77	8.18	33.05	32.22	HORIZONTAL	307	170	Peak
7	5860.00	53.80	54.00	-0.20	46.43	8.19	33.06	32.24	HORIZONTAL	307	170	Average
8	5865.00	68.86	74.00	-5.14	61.49	8.19	33.06	32.24	HORIZONTAL	307	170	Peak

Item 4, 5 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5818.60	105.57			98.29	8.14	33.04	32.18	VERTICAL	190	102	Average
2	5818.60	115.40			108.12	8.14	33.04	32.18	VERTICAL	190	102	Peak
3	5855.40	71.00	78.20	-7.20	63.65	8.18	33.05	32.22	VERTICAL	190	102	Peak
4	5860.60	53.89	54.00	-0.11	46.52	8.19	33.06	32.24	VERTICAL	190	102	Average
5	5861.80	68.27	74.00	-5.73	60.90	8.19	33.06	32.24	VERTICAL	190	102	Peak

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

Temperature	23°C	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5713.40	53.85	54.00	-0.15	46.77	8.02	33.00	32.06	VERTICAL	182	112	Average
2	5714.20	68.58	74.00	-5.42	61.50	8.02	33.00	32.06	VERTICAL	182	112	Peak
3	5725.00	72.55	78.20	-5.65	65.43	8.04	33.00	32.08	VERTICAL	182	112	Peak
4	5750.20	98.48			91.34	8.06	33.02	32.10	VERTICAL	182	112	Average
5	5751.40	108.58			101.44	8.06	33.02	32.10	VERTICAL	182	112	Peak

Item 4, 5 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5708.00	62.14	74.00	-11.86	55.06	8.02	33.00	32.06	HORIZONTAL	309	167	Peak
2	5715.00	49.57	54.00	-4.43	42.49	8.02	33.00	32.06	HORIZONTAL	309	167	Average
3	5717.00	64.02	78.20	-14.18	56.94	8.02	33.00	32.06	HORIZONTAL	309	167	Peak
4	5791.00	109.82			102.57	8.12	33.03	32.16	HORIZONTAL	309	167	Peak
5	5793.00	99.56			92.31	8.12	33.03	32.16	HORIZONTAL	309	167	Average
6	5852.00	69.98	78.20	-8.22	62.63	8.18	33.05	32.22	HORIZONTAL	309	167	Peak
7	5860.00	53.71	54.00	-0.29	46.34	8.19	33.06	32.24	HORIZONTAL	309	167	Average
8	5861.00	69.78	74.00	-4.22	62.41	8.19	33.06	32.24	HORIZONTAL	309	167	Peak

Item 4, 5 are the fundamental frequency at 5795 MHz.

Temperature	23°C	Humidity	51%
Test Engineer	Brian Sun	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2
Test Date	Dec. 14, 2015		

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5714.00	68.01	68.20	-0.19	60.93	8.02	33.00	32.06	VERTICAL	171	112	Peak
2	5725.00	73.80	78.20	-4.40	66.68	8.04	33.00	32.08	VERTICAL	171	112	Peak
3	5754.00	91.54			84.40	8.06	33.02	32.10	VERTICAL	171	112	Average
4	5764.00	105.34			98.16	8.08	33.02	32.12	VERTICAL	171	112	Peak
5	5852.00	62.04	78.20	-16.16	54.69	8.18	33.05	32.22	VERTICAL	171	112	Peak
6	5863.00	60.71	68.20	-7.49	53.34	8.19	33.06	32.24	VERTICAL	171	112	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

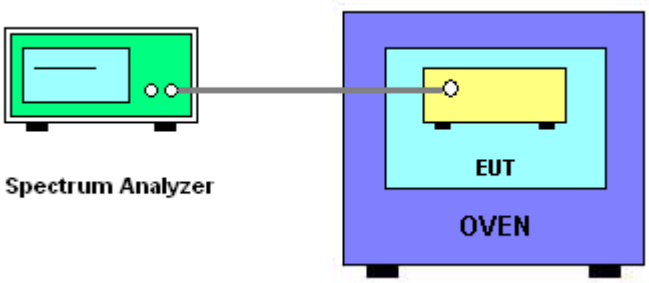
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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~40°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang	Test Date	Dec. 19, 2015

Mode: 20 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9455	5784.9441	5784.9423	5784.9402
110.00	5784.9443	5784.9430	5784.9414	5784.9395
93.50	5784.9429	5784.9418	5784.9406	5784.9384
Max. Deviation (MHz)	0.0571	0.0582	0.0594	0.0616
Max. Deviation (ppm)	9.87	10.06	10.27	10.65
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5784.9468	5784.9456	5784.9437	5784.9415
10	5784.9455	5784.9442	5784.9427	5784.9409
20	5784.9443	5784.9430	5784.9414	5784.9395
30	5784.9429	5784.9418	5784.9404	5784.9388
40	5784.9413	5784.9398	5784.9382	5784.9362
Max. Deviation (MHz)	0.0604	0.0616	0.0631	0.0658
Max. Deviation (ppm)	10.44	10.65	10.91	11.37
Result	Complies			

Mode: 40 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9452	5754.9438	5754.9420	5754.9399
110.00	5754.9440	5754.9427	5754.9411	5754.9392
93.50	5754.9426	5754.9415	5754.9403	5754.9381
Max. Deviation (MHz)	0.0574	0.0585	0.0597	0.0619
Max. Deviation (ppm)	9.98	10.17	10.38	10.76
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5754.9465	5754.9453	5754.9434	5754.9412
10	5754.9452	5754.9439	5754.9424	5754.9406
20	5754.9440	5754.9427	5754.9411	5754.9392
30	5754.9426	5754.9415	5754.9401	5754.9385
40	5754.9410	5754.9395	5754.9379	5754.9359
Max. Deviation (MHz)	0.0607	0.0619	0.0634	0.0661
Max. Deviation (ppm)	10.55	10.76	11.02	11.49
Result	Complies			

Mode: 80 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9452	5774.9438	5774.9420	5774.9399
110.00	5774.9440	5774.9427	5774.9411	5774.9392
93.50	5774.9426	5774.9415	5774.9403	5774.9381
Max. Deviation (MHz)	0.0574	0.0585	0.0597	0.0619
Max. Deviation (ppm)	9.94	10.13	10.34	10.72
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5774.9465	5774.9453	5774.9434	5774.9412
10	5774.9452	5774.9439	5774.9424	5774.9406
20	5774.9440	5774.9427	5774.9411	5774.9392
30	5774.9426	5774.9415	5774.9401	5774.9385
40	5774.9410	5774.9395	5774.9379	5774.9359
Max. Deviation (MHz)	0.0607	0.0619	0.0634	0.0661
Max. Deviation (ppm)	10.51	10.72	10.98	11.45
Result	Complies			

4.9. Antenna Requirements

4.9.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.9.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 08, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 16, 2015	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 25, 2015	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Feb.10, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

*Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%