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FCC RADIO TEST REPORT

Applicant's company	Linksys LLC
Applicant Address	121 Theory Drive, Irvine, CA 92617, USA
FCC ID	Q87-EA8500

Product Name	LINKSYS DUAL-BAND WIRELESS-AC ROUTER
Brand Name	LINKSYS
Model No.	EA8500
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Feb. 25, 2015
Final Test Date	Apr. 06, 2016
Submission Type	Class II Change

Statement

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

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

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The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013, 47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r02, KDB662911 D01 v02r01, KDB644545 D03 v01.**

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



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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR4N1172-38AB	Rev. 01	Initial issue of report	Jun. 22, 2016

1. VERIFICATION OF COMPLIANCE

Product Name : LINKSYS DUAL-BAND WIRELESS-AC ROUTER
Brand Name : LINKSYS
Model No. : EA8500
Applicant : Linksys LLC
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 Feb. 25, 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	16.84 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	0.35 dB
4.5	15.407(a)	Power Spectral Density	Complies	16.81 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.25 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.02 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 power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	9 for 20MHz bandwidth ; 4 for 40MHz bandwidth 2 for 80MHz bandwidth
Channel Band Width (99%)	IEEE 802.11a: 16.49 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.62 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.48 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz
Maximum Conducted Output Power	IEEE 802.11a: 28.41 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 28.29 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 28.42 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 23.70 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description
Communication Mode	<input checked="" type="checkbox"/> IP Based (Load Based) <input type="checkbox"/> Frame Based
Beamforming Function	<input checked="" type="checkbox"/> With beamforming <input type="checkbox"/> Without beamforming
Operate Condition	<input checked="" type="checkbox"/> Indoor <input type="checkbox"/> Outdoor

Note: The product only supports non-beamforming function for 802.11b, and the other modulation only supports beamforming function.

Antenna and Band width

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

IEEE 11n/ac Spec.

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

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).

Then EUT supports HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80.

Note 3: Modulation modes consist of below configuration:

HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

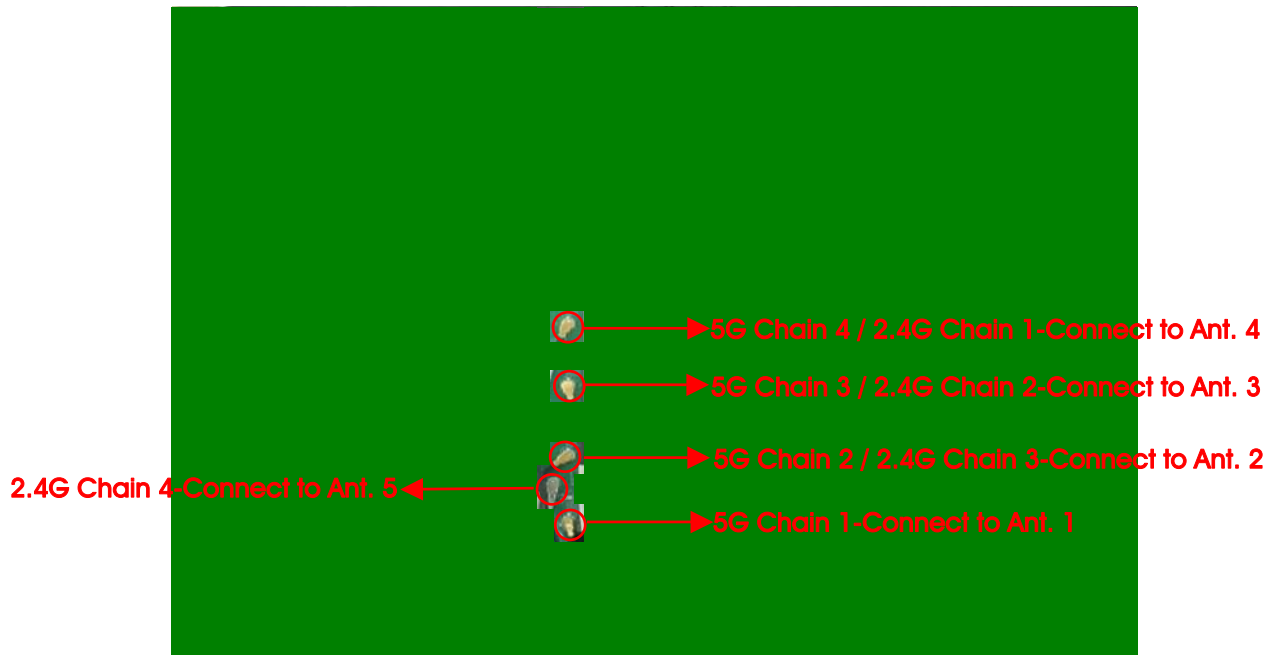
Power	Brand	Model	Rating
Adapter	Ktec	KSAS0501200350HU	Input: 100-240V~50/60Hz, 1.2A Output: 12V, 3.5A
Others			
RJ-45 cable, Non-shielded, 0.9m			

3.3. Table for Filed Antenna

Ant.	Brand	CBT Model Name (Vendor)	Type	Connector	Gain (dBi)		
					2.4GHz	5GHz Band 1	5GHz Band 4
1	Whayu	377.00004.005 (C120-510452-A)	Dipole	I-PEX	0.45	0.69	0.85
2	Whayu	377.00006.005 (C120-510453-A)	Dipole	I-PEX	0.55	0.89	1.15
3	Whayu	377.00003.005 (C120-510450-A)	Dipole	I-PEX	0.65	0.89	1.25
4	Whayu	377.00005.005 (C120-510451-A)	Dipole	I-PEX	0.75	1.09	1.55
5	Galtronics	2365-59600001R (02102073-05960)	PIFA	I-PEX	3.909	-	-

Note: The EUT has five antennas (4TX/4RX).

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



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

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

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

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 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
Power Spectral Density	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
26dB Spectrum Bandwidth & 99% Occupied 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
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 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
Band Edge Emission	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
Frequency Stability	20 MHz	Band 4	-	157	1
	40 MHz	Band 4	-	151	1
	80 MHz	Band 4	-	155	1

- Note: 1. The product only supports non-beamforming function for 802.11b.
 2. The product only supports beamforming function for 802.11a/g/n/ac.
 3. VHT20/VHT40 covers HT20/HT40, due to same modulation.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. EUT with Adapter

For Radiated Emission test (Below 1GHz):

Mode 1. EUT with Adapter in Z-axis

Mode 2. EUT with Adapter in Y-axis

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

For Radiated Emission test (Above 1GHz):

The EUT was performed at Z-axis and Y-axis position. According to the original report, the worst case was found at Y axis. So the measurement will follow this same test configuration.

Mode 1. CTX - EUT with Adapter in Y-axis

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 FA4N1172-38AA) test is added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

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

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR530324AA.

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

Modifications	Performance Checking
1. Updating the Applicant's Address.	Do not effect the test results.
2. Updating adapter (Model name: KSAS0501200350HU) to Level VI energy efficiency.	1. AC Conducted Emissions 2. Radiated Emissions below 1GHz
3. Updating 5GHz Band 4 to "New Rules" from "Old Rules".	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 6. Band Edge Emissions 7. Frequency Stability

3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E6430	DoC
Flash disk	Silicon	I-Series	DoC
Flash disk3.0	Transcend	639205 7755	DoC

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

Support Unit	Brand	Model	FCC ID
NB*4	DELL	E4300	DoC
Flash disk	Silicon Power	Touch 835	DoC
Flash disk3.0	Silicon Power	B06	DoC

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

Support Unit	Brand	Model	FCC ID
NB*2	DELL	E4300	DoC
RX Device	LINKSYS	EA8500	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	Qualcomm V3.0.42.0		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5745 MHz	5785 MHz	5825 MHz
802.11a	18.5	21.5	21
802.11ac MCS0/Nss1 VHT20	18	21.5	20.5
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5755 MHz	5795 MHz	
	17.5	21.5	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5775 MHz		
	17		

3.10. EUT Operation during Test

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

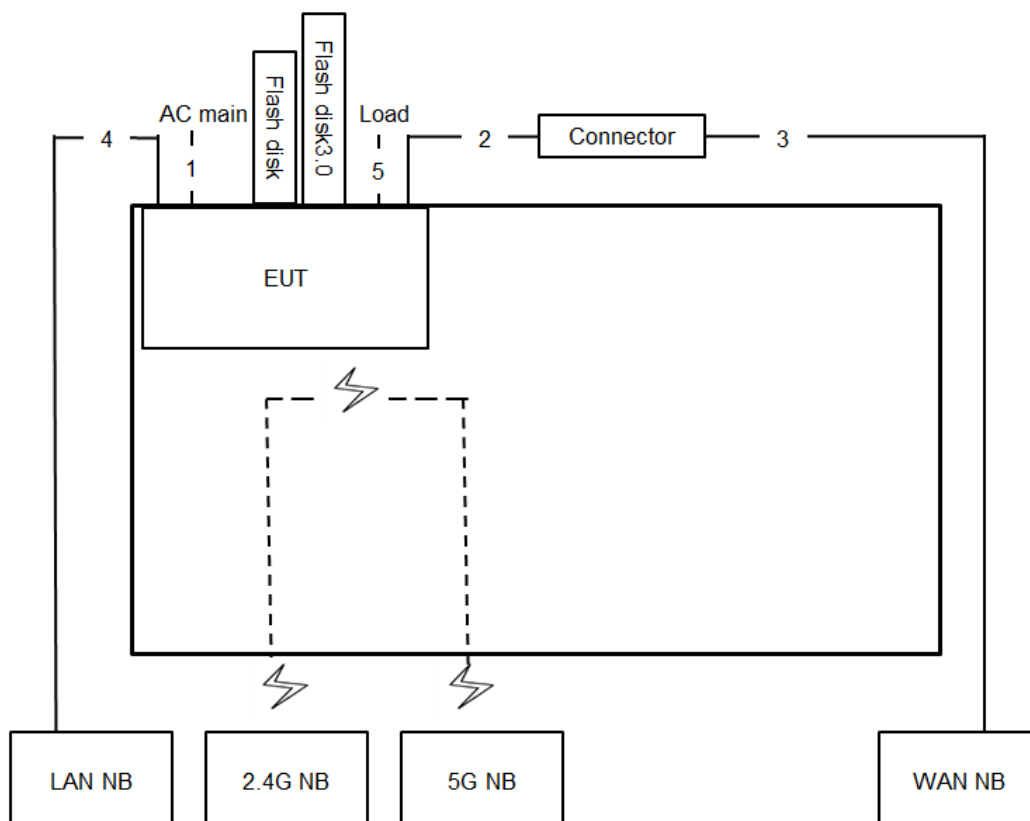
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe " to link with the remote workstation to receive and transmit packet by RX Device and transmit duty cycle no less 98%

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	1.811	1.971	91.88	0.37	0.55
802.11ac MCS0/Nss1 VHT20	1.817	1.971	92.19	0.35	0.55
802.11ac MCS0/Nss1 VHT40	1.771	1.933	91.62	0.38	0.56
802.11ac MCS0/Nss1 VHT80	1.622	1.891	85.77	0.67	0.62

3.12. Test Configurations

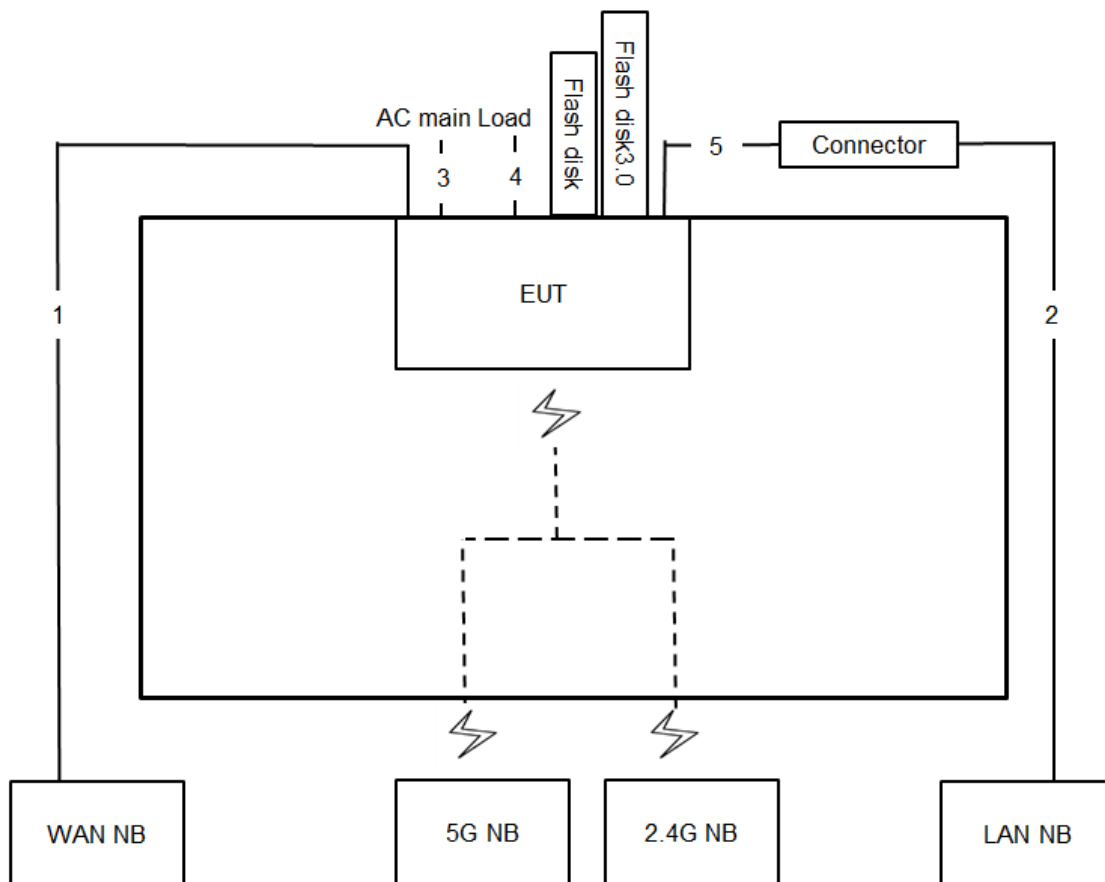
3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	0.9m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	RJ-45 cable*3	No	1.5m

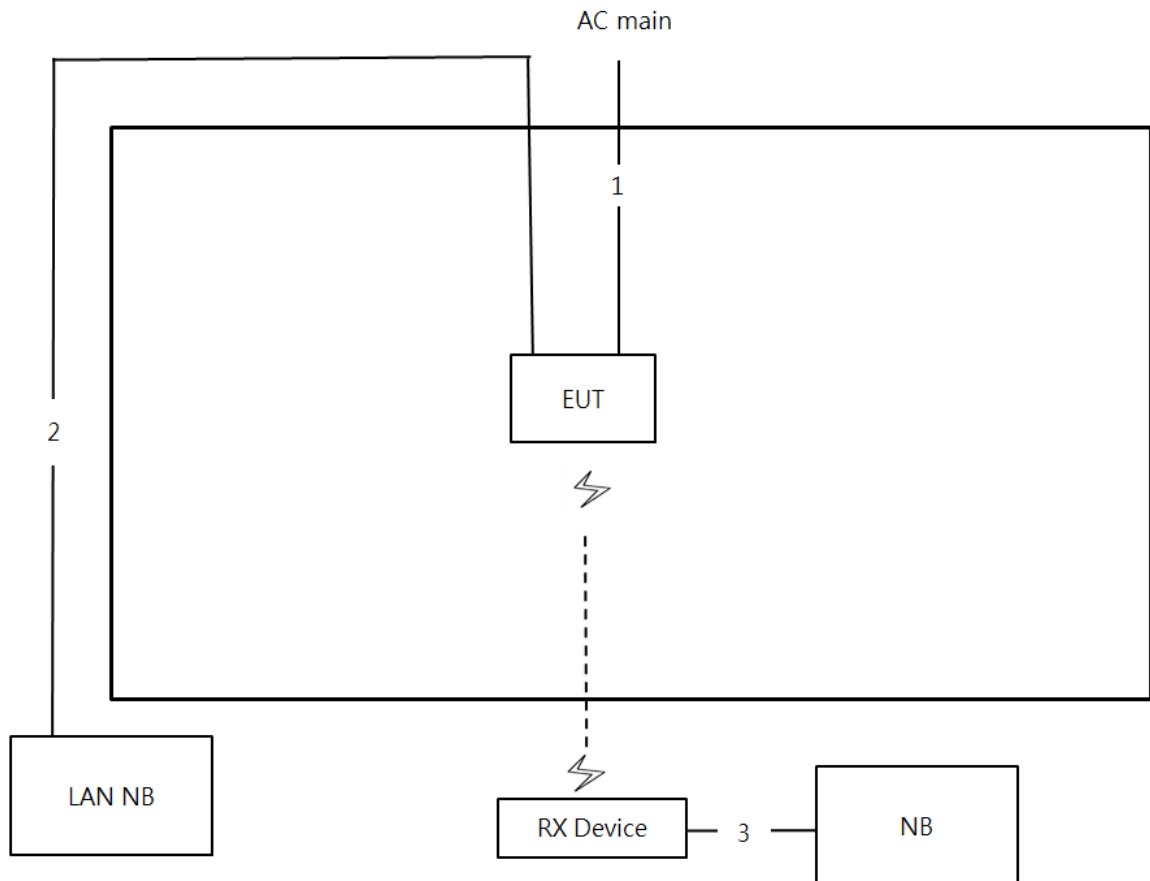
3.12.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	10m
3	Power cable	No	1.5m
4	RJ-45 cable*3	No	1.5m
5	RJ-45 cable	No	0.9m

Test Configuration: above 1GHz



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

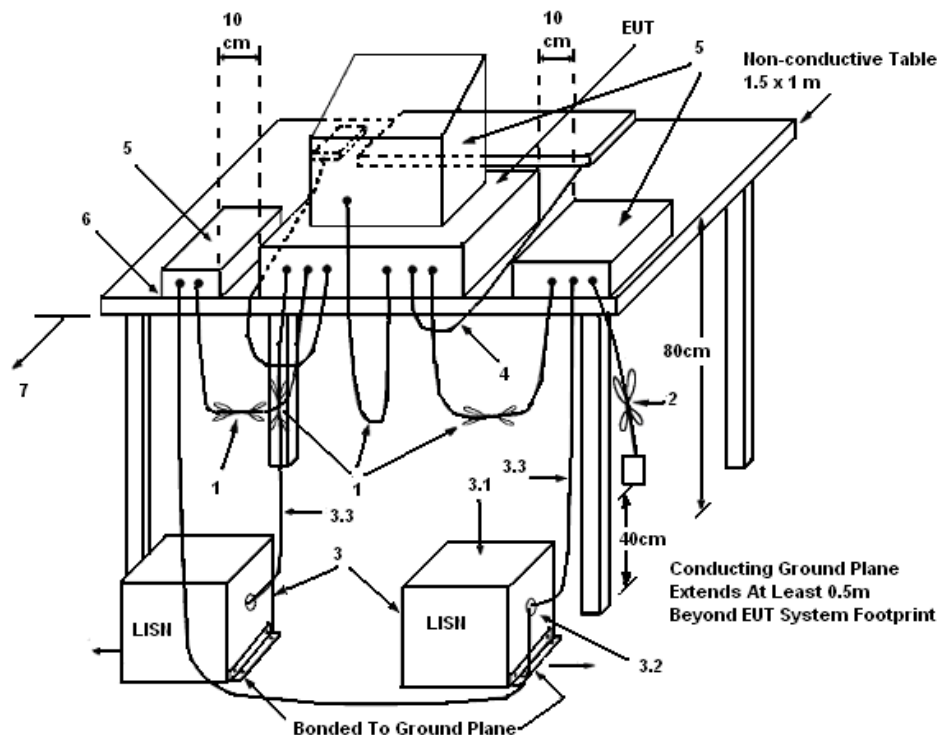
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
 - (3.1) All other equipment powered from additional LISN(s).
 - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
 - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

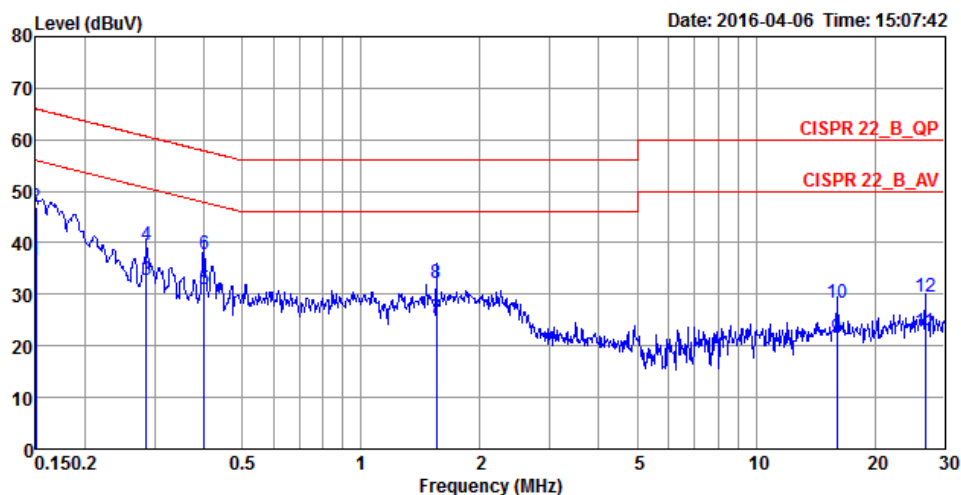
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

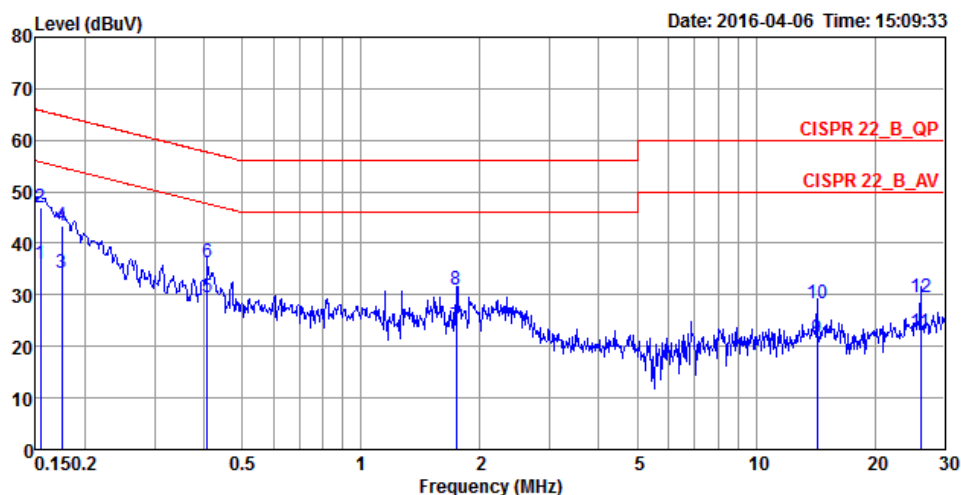
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	62%
Test Engineer	Deven Huang	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	0.1500	36.56	-19.44	56.00	26.52	10.02	0.02	LINE	Average
2	0.1500	46.92	-19.08	66.00	36.88	10.02	0.02	LINE	QP
3	0.2863	32.79	-17.84	50.63	22.83	9.92	0.04	LINE	Average
4	0.2863	39.67	-20.96	60.63	29.71	9.92	0.04	LINE	QP
5	0.3997	31.02	-16.84	47.86	21.06	9.92	0.04	LINE	Average
6	0.3997	37.65	-20.21	57.86	27.69	9.92	0.04	LINE	QP
7	1.5518	25.45	-20.55	46.00	15.44	9.95	0.06	LINE	Average
8	1.5518	32.10	-23.90	56.00	22.09	9.95	0.06	LINE	QP
9	16.0546	21.68	-28.32	50.00	11.17	10.25	0.26	LINE	Average
10	16.0546	28.31	-31.69	60.00	17.80	10.25	0.26	LINE	QP
11	26.8411	22.72	-27.28	50.00	11.96	10.49	0.27	LINE	Average
12	26.8411	29.45	-30.55	60.00	18.69	10.49	0.27	LINE	QP

Temperature	24°C	Humidity	62%
Test Engineer	Deven Huang	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	0.1540	36.06	-19.72	55.78	26.02	10.02	0.02	NEUTRAL	Average
2	0.1540	46.99	-18.79	65.78	36.95	10.02	0.02	NEUTRAL	QP
3	0.1749	34.30	-20.42	54.72	24.36	9.92	0.02	NEUTRAL	Average
4	0.1749	43.36	-21.36	64.72	33.42	9.92	0.02	NEUTRAL	QP
5	0.4083	29.56	-18.12	47.68	19.60	9.92	0.04	NEUTRAL	Average
6	0.4083	36.23	-21.45	57.68	26.27	9.92	0.04	NEUTRAL	QP
7	1.7437	24.05	-21.95	46.00	14.03	9.96	0.06	NEUTRAL	Average
8	1.7437	30.91	-25.09	56.00	20.89	9.96	0.06	NEUTRAL	QP
9	14.2882	21.61	-28.39	50.00	11.13	10.22	0.26	NEUTRAL	Average
10	14.2882	28.47	-31.53	60.00	17.99	10.22	0.26	NEUTRAL	QP
11	26.1393	22.78	-27.22	50.00	12.04	10.47	0.27	NEUTRAL	Average
12	26.1393	29.45	-30.55	60.00	18.71	10.47	0.27	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

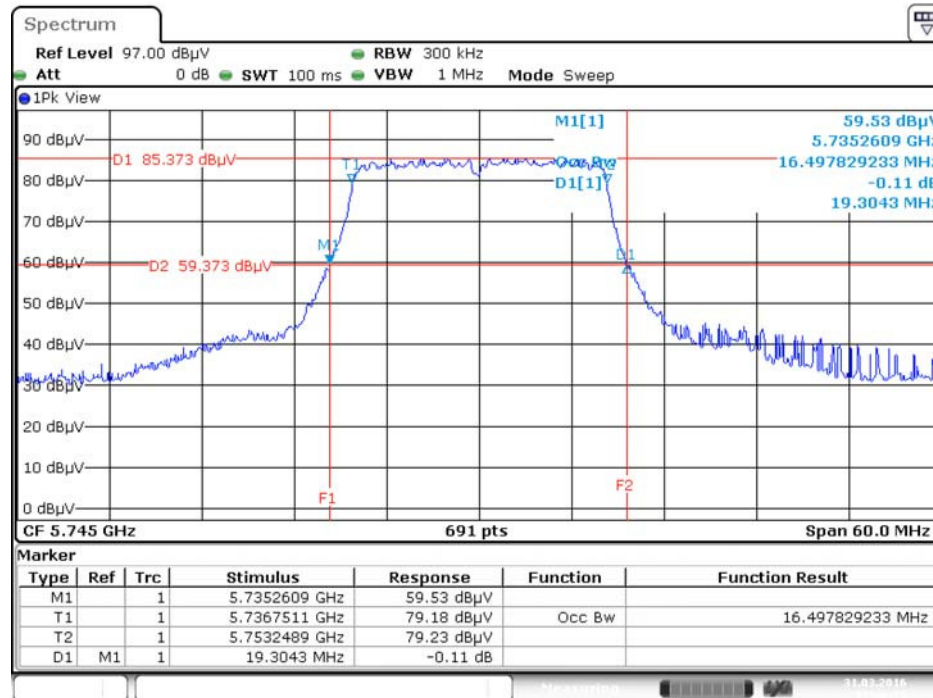
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	24.5°C	Humidity	61%
Test Engineer	Taka Hsu		

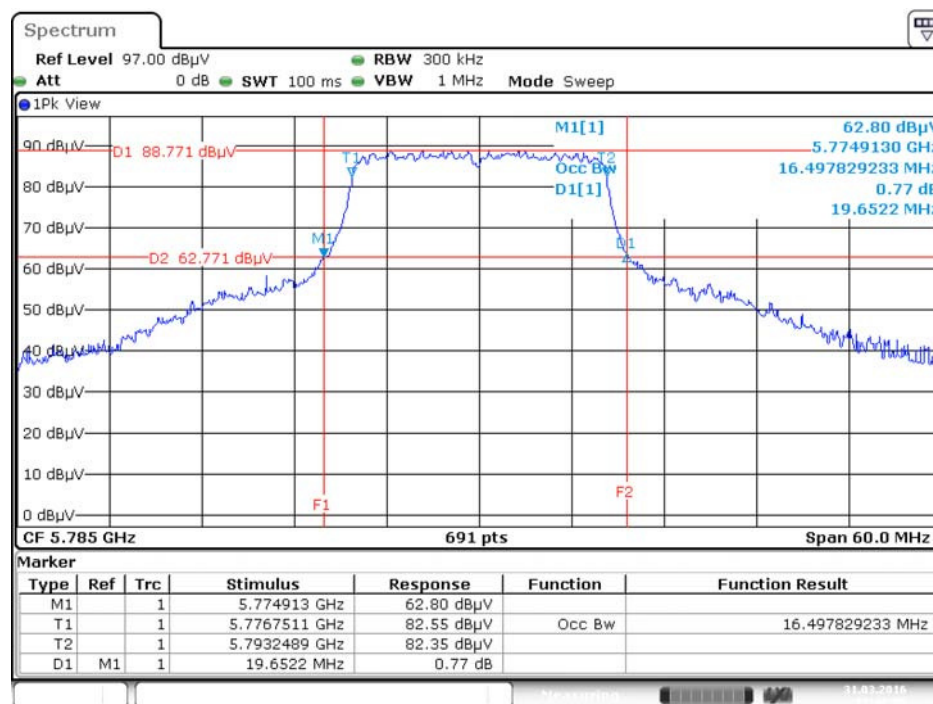
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5745 MHz	19.30	16.49
	5785 MHz	19.65	16.49
	5825 MHz	19.30	16.49
802.11ac MCS0/Nss1 VHT20	5745 MHz	20.08	17.62
	5785 MHz	20.26	17.62
	5825 MHz	20.17	17.62
802.11ac MCS0/Nss1 VHT40	5755 MHz	40.58	36.32
	5795 MHz	41.01	36.48
802.11ac MCS0/Nss1 VHT80	5775 MHz	84.92	75.54

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



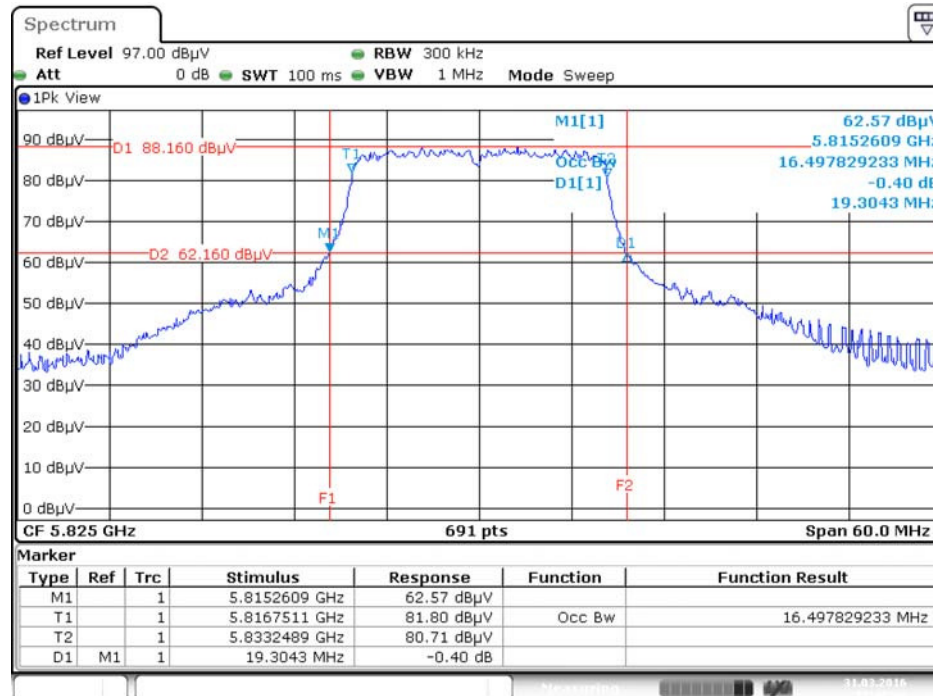
Date: 31.MAR.2016 17:46:15

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



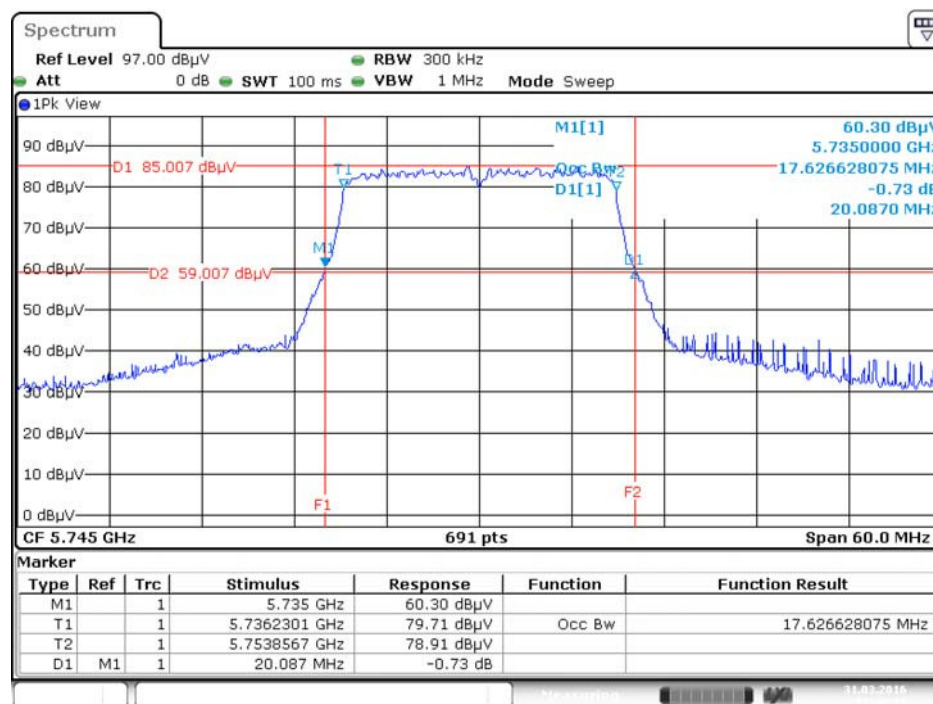
Date: 31.MAR.2016 17:47:05

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



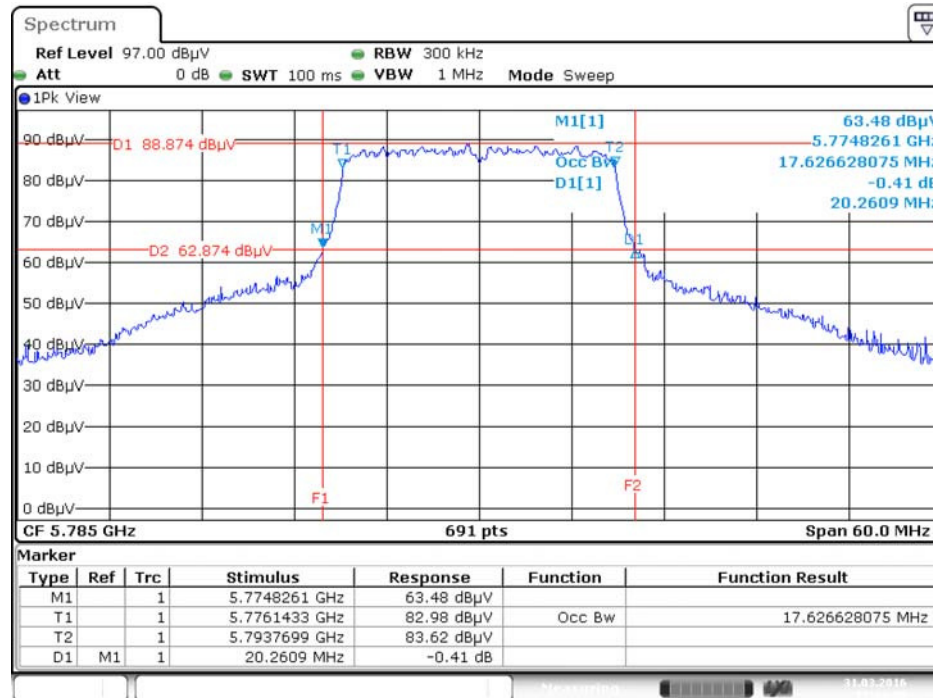
Date: 31.MAR.2016 17:47:47

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

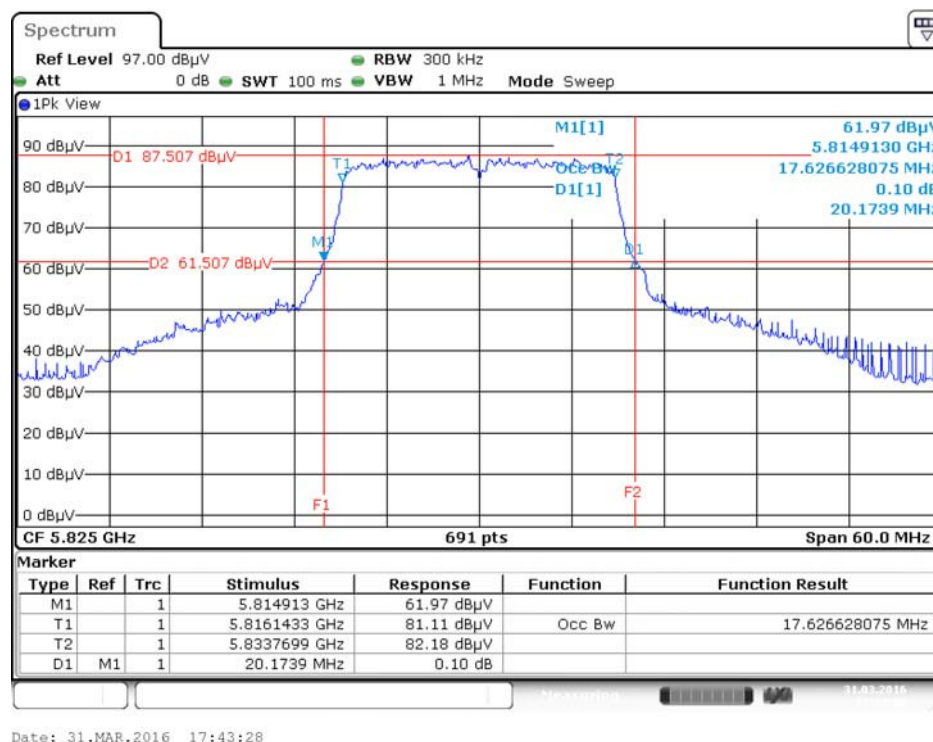


Date: 31.MAR.2016 17:45:15

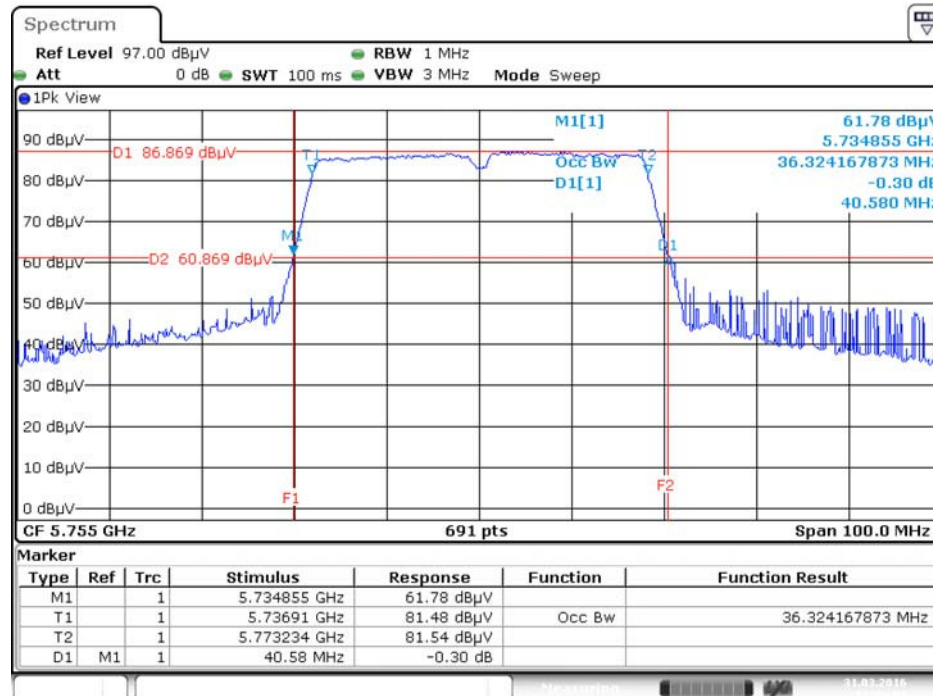
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



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

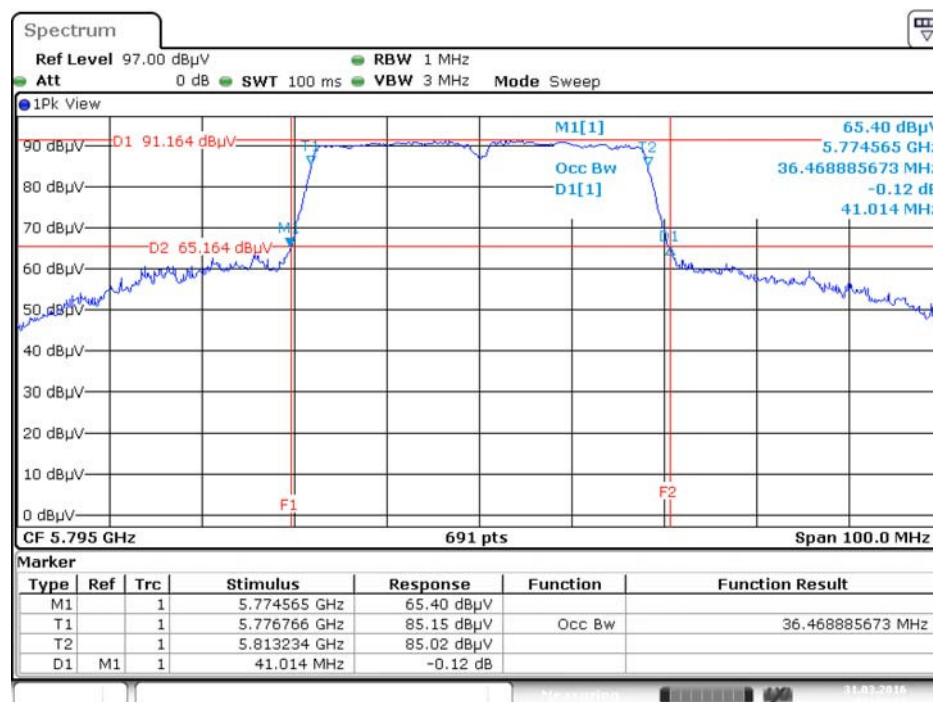


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5755 MHz



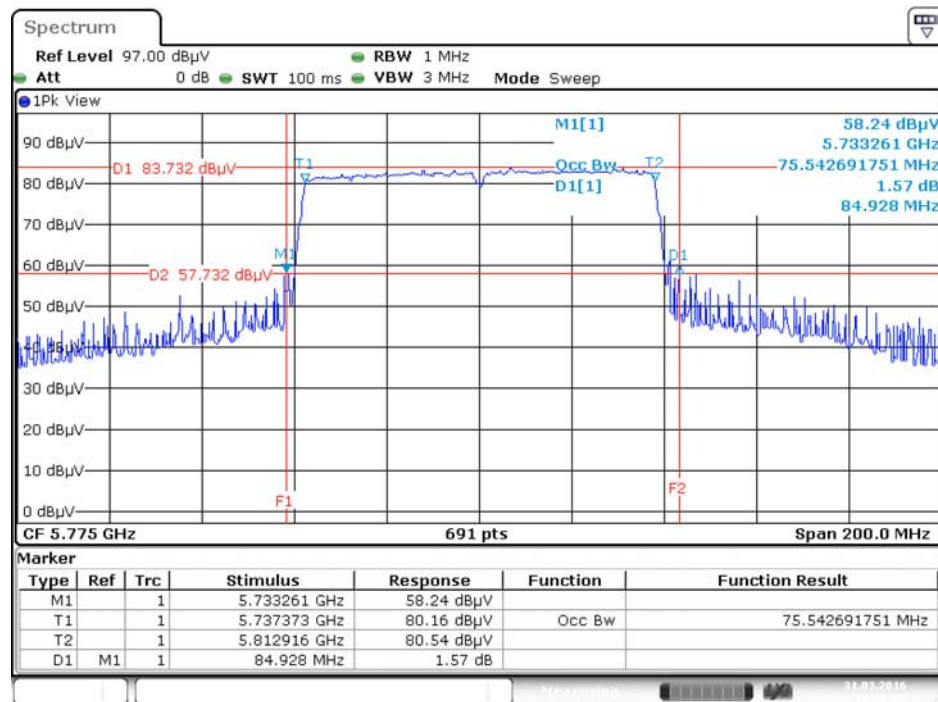
Date: 31.MAR.2016 17:39:03

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: 31.MAR.2016 17:42:12

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: 31.MAR.2016 17:36:29

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	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

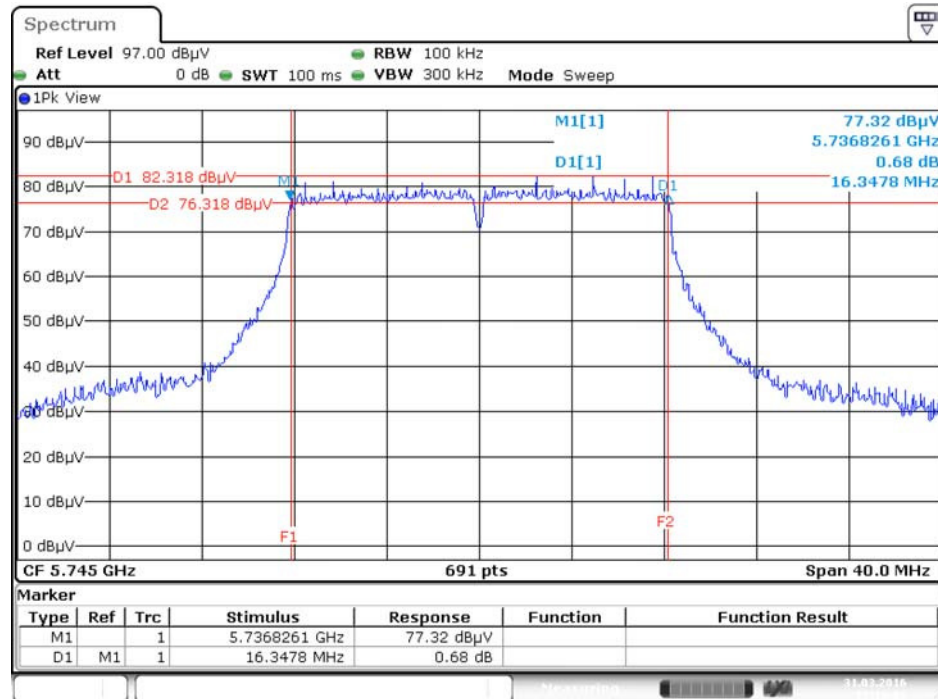
Temperature	24.5°C	Humidity	61%
Test Engineer	Taka Hsu		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.34	500	Complies
	5785 MHz	16.34	500	Complies
	5825 MHz	16.34	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.62	500	Complies
	5785 MHz	17.56	500	Complies
	5825 MHz	17.56	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.05	500	Complies
	5795 MHz	35.47	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.07	500	Complies

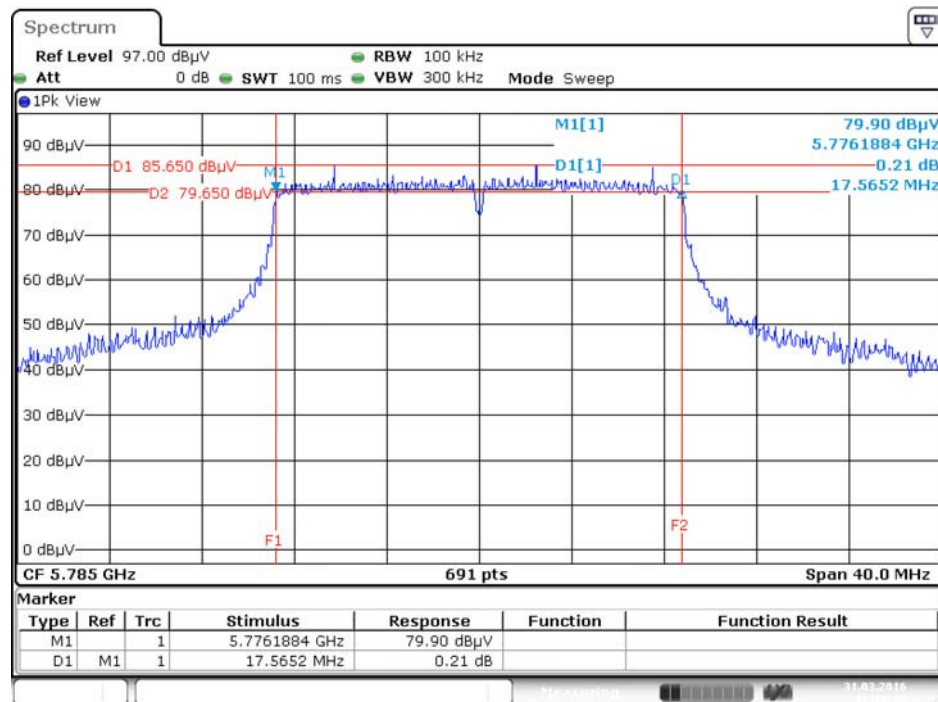
Note: All the test values were listed in the report.

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

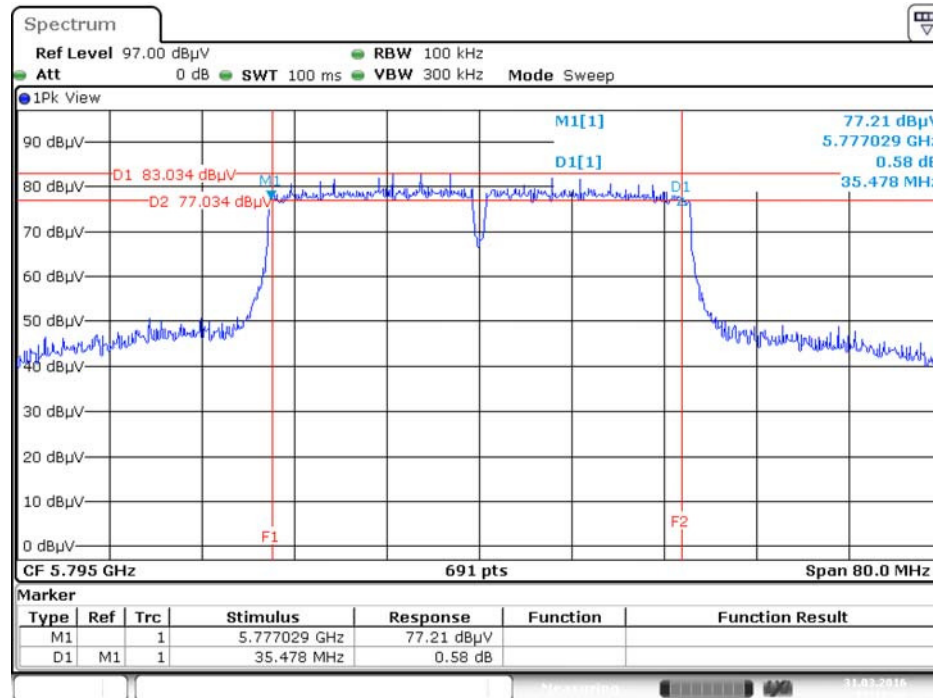
6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3+ Chain 4 / 5745 MHz



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

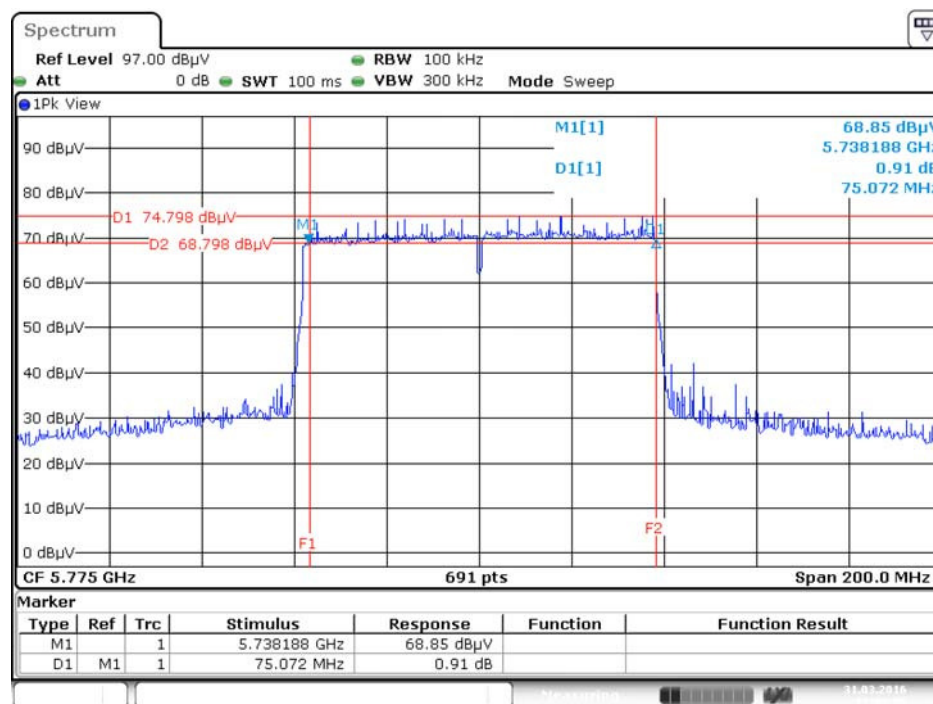


6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795MHz



Date: 31.MAR.2016 17:12:47

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



Date: 31.MAR.2016 17:05:55

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

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

4.4.2. Measuring Instruments and Setting

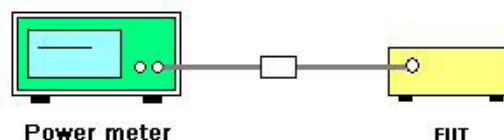
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

Temperature	24.5°C	Humidity	61%
Test Engineer	Taka Hsu	Test Date	Mar. 31, 2016

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11a	5745 MHz	18.94	18.91	18.75	19.45	25.04	28.77	Complies
	5785 MHz	22.17	22.38	22.25	22.74	28.41	28.77	Complies
	5825 MHz	21.75	21.95	22.05	22.15	28.00	28.77	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	18.63	18.51	18.55	18.58	24.59	28.77	Complies
	5785 MHz	22.21	22.23	22.18	22.47	28.29	28.77	Complies
	5825 MHz	21.18	21.11	21.48	21.52	27.35	28.77	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	18.32	18.21	18.23	18.52	24.34	28.77	Complies
	5795 MHz	22.31	22.34	22.41	22.52	28.42	28.77	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	17.77	17.81	17.75	17.38	23.70	28.77	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.23\text{dBi}$, so limit = 30-(7.23-6)= 28.77 dBm.

4.5. Power Spectral Density Measurement

4.5.1. Limit

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

Frequency Band		Limit
<input checked="" type="checkbox"/>	5.725~5.85 GHz	30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

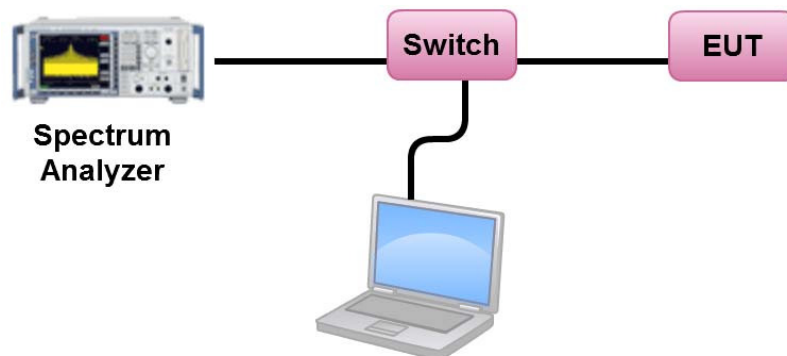
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements and sum the spectra across the outputs.
4. For 5.725~5.85 GHz, the measured result of PSD level must add $10\log(500\text{kHz}/\text{RBW})$ 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	24.5°C	Humidity	61%
Test Engineer	Taka Hsu		

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	11.73	-3.01	8.72	28.77	Complies
157	5785 MHz	14.94	-3.01	11.93	28.77	Complies
165	5825 MHz	14.61	-3.01	11.60	28.77	Complies

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	11.24	-3.01	8.23	28.77	Complies
157	5785 MHz	14.97	-3.01	11.96	28.77	Complies
165	5825 MHz	13.87	-3.01	10.86	28.77	Complies

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

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	8.16	-3.01	5.15	28.77	Complies
159	5795 MHz	12.26	-3.01	9.25	28.77	Complies

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

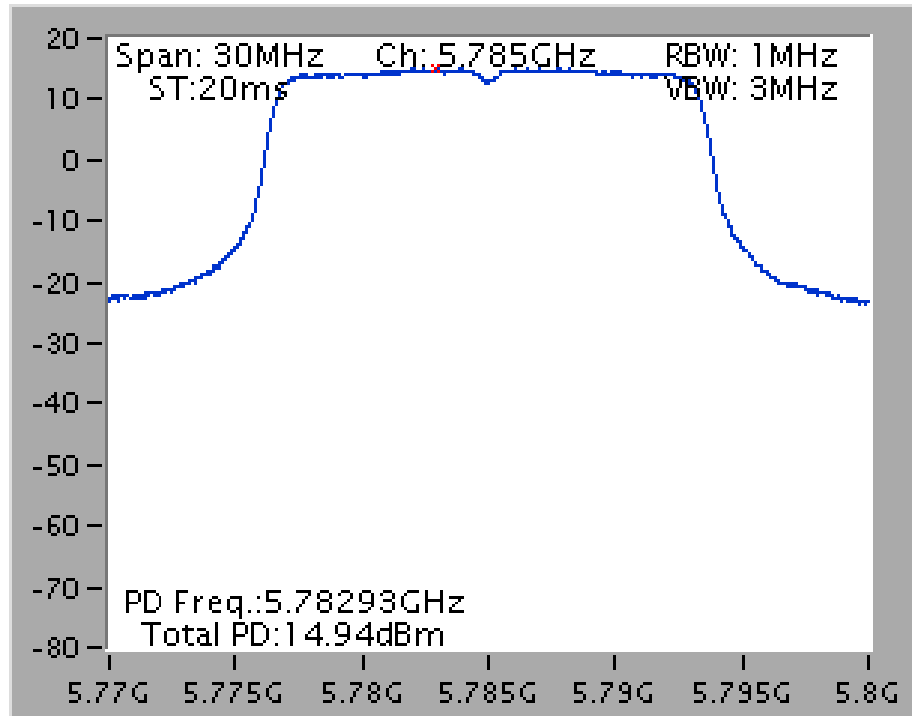
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	4.61	-3.01	1.60	28.77	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.23 \text{ dBi}$, so limit = 30-(7.23-6)= 28.77 dBm/500kHz

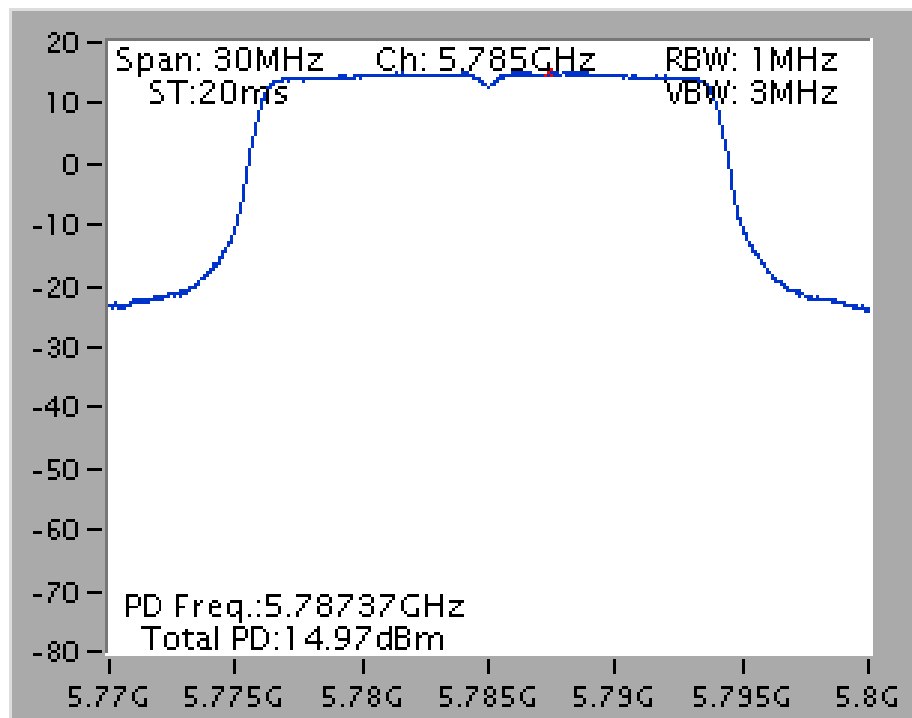
Note: All the test values were listed in the report.

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

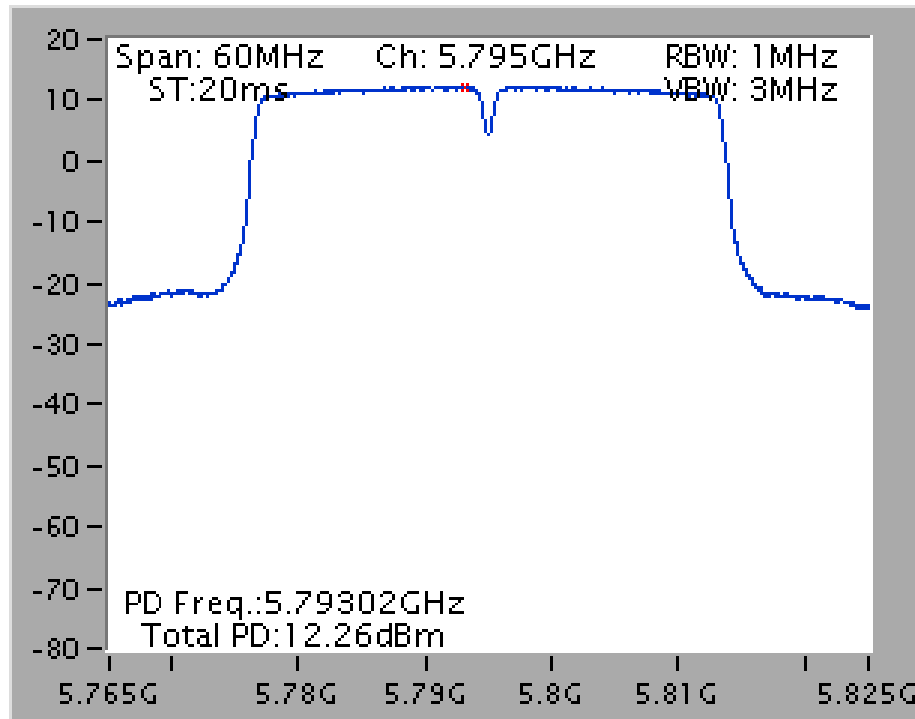
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



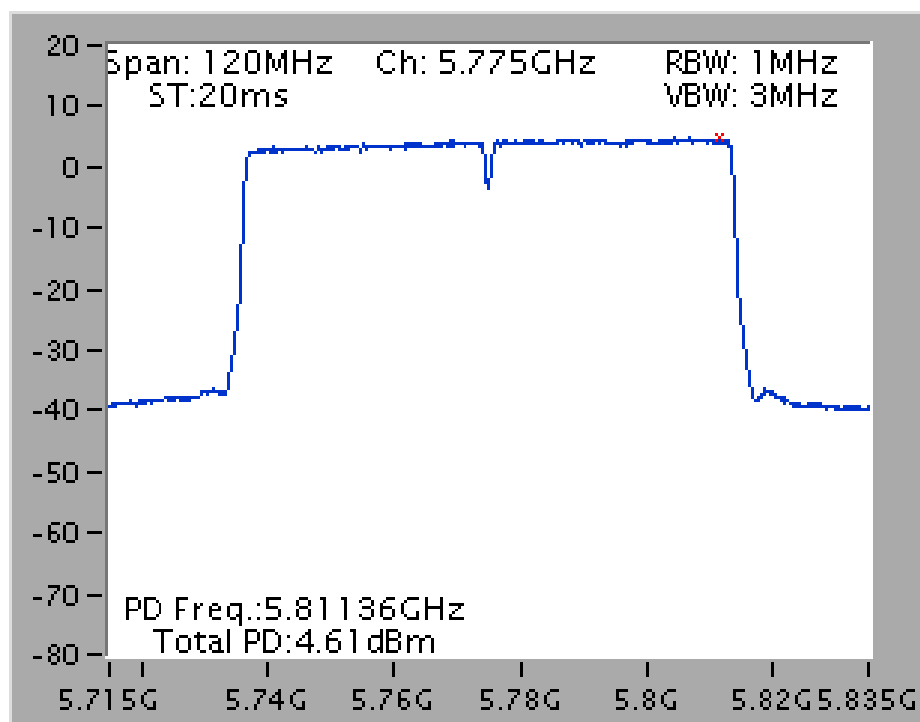
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 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 5.725-5.85 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 (microvolts/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)	1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for peak

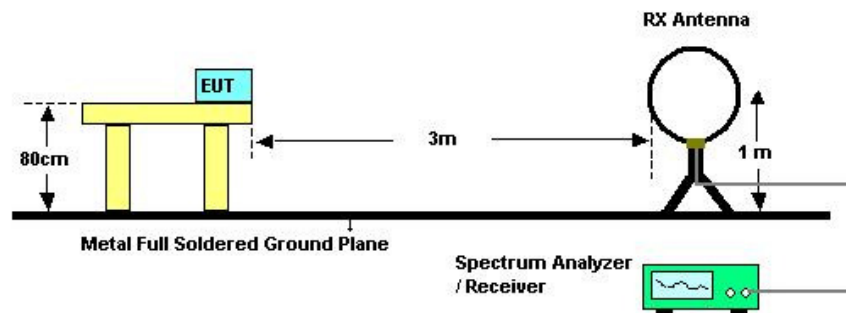
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

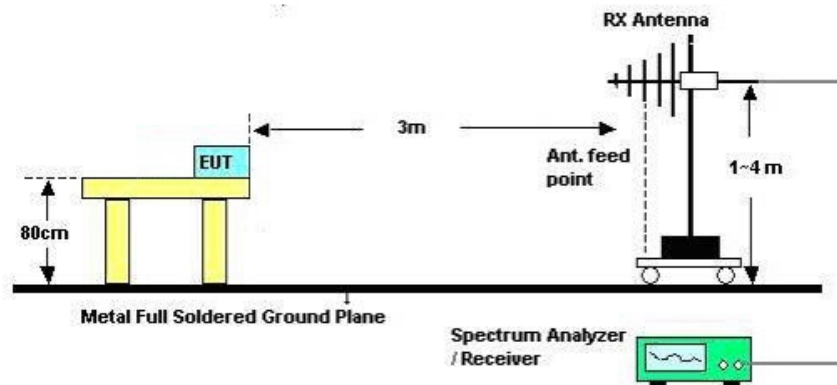
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

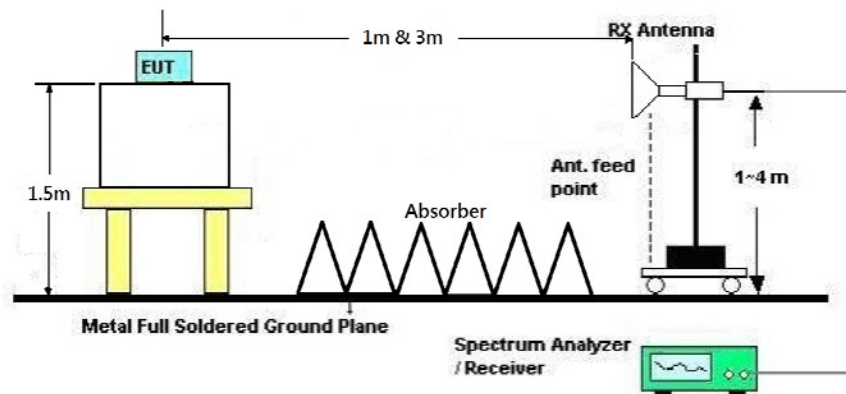
For Radiated Emissions: 9kHz ~30MHz



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 beamforming transmitting mode.

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

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	Normal Link
Test Date	Mar. 29, 2016	Test Mode	Mode 1

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.

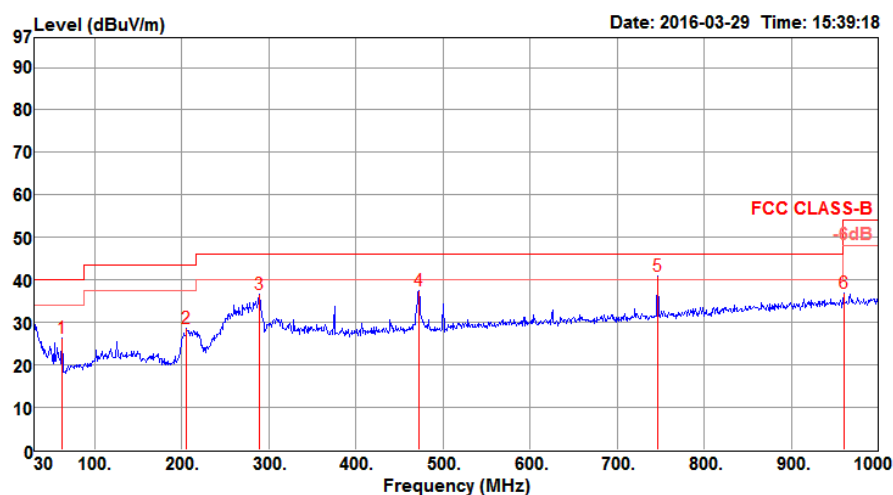
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

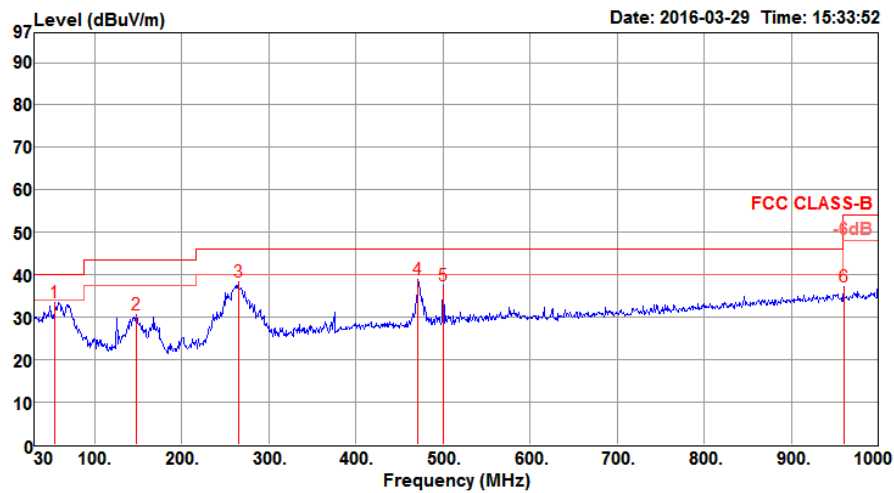
Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	62.01	26.29	40.00	-13.71	40.91	1.41	12.38	28.41	100	94 Peak	HORIZONTAL
2	205.57	28.55	43.50	-14.95	38.24	1.87	16.14	27.70	100	88 Peak	HORIZONTAL
3	288.99	36.56	46.00	-9.44	42.57	2.10	19.39	27.50	100	247 Peak	HORIZONTAL
4	472.32	37.40	46.00	-8.60	40.20	2.53	23.23	28.56	150	181 Peak	HORIZONTAL
5	746.83	40.83	46.00	-5.17	40.01	3.22	26.07	28.47	100	239 Peak	HORIZONTAL
6	960.23	36.87	54.00	-17.13	32.67	3.64	28.16	27.60	100	122 Peak	HORIZONTAL

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	54.25	33.62	40.00	-6.38	47.09	1.35	13.63	28.45	100	125 Peak	VERTICAL
2	147.37	30.62	43.50	-12.88	40.01	1.68	16.90	27.97	150	301 Peak	VERTICAL
3	264.74	38.36	46.00	-7.64	44.32	2.02	19.57	27.55	100	112 Peak	VERTICAL
4	471.35	39.07	46.00	-6.93	41.87	2.53	23.23	28.56	100	164 Peak	VERTICAL
5	500.45	37.62	46.00	-8.38	40.08	2.58	23.64	28.68	150	241 Peak	VERTICAL
6	960.23	37.12	54.00	-16.88	32.92	3.64	28.16	27.60	100	106 Peak	VERTICAL

Note:

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

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

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

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

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 04, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11489.21	46.62	54.00	-7.38	31.05	11.02	39.90	35.35	184	349 Average	HORIZONTAL
2	11492.05	59.61	74.00	-14.39	44.04	11.02	39.90	35.35	184	349 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11487.87	44.14	54.00	-9.86	28.57	11.02	39.90	35.35	146	38 Average	VERTICAL
2	11489.01	57.26	74.00	-16.74	41.69	11.02	39.90	35.35	146	38 Peak	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 04, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11570.62	50.75	54.00	-3.25	35.30	11.05	39.77	35.37	214	60 Average	HORIZONTAL
2	11571.30	63.43	74.00	-10.57	47.98	11.05	39.77	35.37	214	60 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11570.30	59.15	74.00	-14.85	43.70	11.05	39.77	35.37	115	15 Peak	VERTICAL
2	11572.42	46.45	54.00	-7.55	31.00	11.05	39.77	35.37	115	15 Average	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 04, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11650.20	49.88	54.00	-4.12	34.56	11.08	39.63	35.39	190	352 Average	HORIZONTAL
2	11650.69	62.64	74.00	-11.36	47.32	11.08	39.63	35.39	190	352 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11649.97	46.20	54.00	-7.80	30.88	11.08	39.63	35.39	145	12 Average	VERTICAL
2	11650.51	59.16	74.00	-14.84	43.84	11.08	39.63	35.39	145	12 Peak	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.80	57.97	74.00	-16.03	41.48	11.72	40.00	35.23	153	176	Peak	HORIZONTAL
2	11490.56	45.08	54.00	-8.92	28.59	11.72	40.00	35.23	153	176	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11489.38	45.24	54.00	-8.76	28.75	11.72	40.00	35.23	160	341	Average
2	11490.68	58.40	74.00	-15.60	41.91	11.72	40.00	35.23	160	341	Peak

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11570.13	44.80	54.00	-9.20	28.41	11.75	39.87	35.23	169	207 Average	HORIZONTAL
2	11570.15	57.60	74.00	-16.40	41.21	11.75	39.87	35.23	169	207 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	11570.94	45.41	54.00	-8.59	29.02	11.75	39.87	35.23	205	80 Average	VERTICAL
2	11571.00	56.97	74.00	-17.03	40.58	11.75	39.87	35.23	205	80 Peak	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11649.28	58.66	74.00	-15.34	42.37	11.78	39.73	35.22	130	300	Peak	HORIZONTAL
2	11649.34	46.27	54.00	-7.73	29.98	11.78	39.73	35.22	130	300	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11649.18	45.80	54.00	-8.20	29.51	11.78	39.73	35.22	107	226	Average	VERTICAL
2	11649.80	58.01	74.00	-15.99	41.72	11.78	39.73	35.22	107	226	Peak	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11509.18	57.85	74.00	-16.15	41.36	11.72	40.00	35.23	125	11 Peak	HORIZONTAL
2	11509.32	45.04	54.00	-8.96	28.55	11.72	40.00	35.23	125	11 Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11510.30	44.70	54.00	-9.30	28.21	11.72	40.00	35.23	129	148 Average	VERTICAL
2	11510.62	57.17	74.00	-16.83	40.68	11.72	40.00	35.23	129	148 Peak	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11590.74	58.16	74.00	-15.84	41.81	11.77	39.80	35.22	136	303	Peak	HORIZONTAL
2	11591.00	45.07	54.00	-8.93	28.72	11.77	39.80	35.22	136	303	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11590.16	45.84	54.00	-8.16	29.49	11.77	39.80	35.22	121	353	Average	VERTICAL
2	11590.31	57.64	74.00	-16.36	41.29	11.77	39.80	35.22	121	353	Peak	VERTICAL

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11549.11	45.21	54.00	-8.79	28.77	11.74	39.93	35.23	125	163	Average	HORIZONTAL
2	11549.59	57.50	74.00	-16.50	41.06	11.74	39.93	35.23	125	163	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11549.10	57.47	74.00	-16.53	41.03	11.74	39.93	35.23	163	274	Peak	VERTICAL
2	11549.19	44.93	54.00	-9.07	28.49	11.74	39.93	35.23	163	274	Average	VERTICAL

Note:

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

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

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

4.7. Band Edge Emissions Measurement

4.7.1. Limit

For transmitters operating in the 5.725-5.85 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 (micровolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.7.2. Measuring Instruments and Setting

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

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

4.7.3. Test Procedures

The test procedure is the same as section 4.6.3.

4.7.4. Test Setup Layout

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

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in beamforming transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 04, 2016		

Channel 149

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5712.87	70.54	74.00	-3.46	64.60	7.48	32.06	33.60	166	323 Peak	VERTICAL
2	5715.00	50.82	54.00	-3.18	44.88	7.48	32.06	33.60	166	323 Average	VERTICAL
3	5724.45	78.06	78.20	-0.14	72.16	7.42	32.08	33.60	166	323 Peak	VERTICAL
4 0	5743.99	117.38			111.52	7.36	32.10	33.60	166	323 Peak	VERTICAL
5 0	5746.16	103.57			97.71	7.36	32.10	33.60	166	323 Average	VERTICAL

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

Channel 157

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5712.93	50.71	54.00	-3.29	44.77	7.48	32.06	33.60	180	17 Average	VERTICAL
2	5714.23	65.58	74.00	-8.42	59.64	7.48	32.06	33.60	180	17 Peak	VERTICAL
3	5723.35	68.01	78.20	-10.19	62.11	7.42	32.08	33.60	180	17 Peak	VERTICAL
4 0	5788.04	110.05			104.27	7.24	32.14	33.60	180	17 Average	VERTICAL
5 0	5791.51	120.56			114.82	7.18	32.16	33.60	180	17 Peak	VERTICAL
6	5852.60	66.72	78.20	-11.48	60.88	7.23	32.22	33.61	180	17 Peak	VERTICAL
7	5860.00	50.18	54.00	-3.82	44.30	7.25	32.24	33.61	180	17 Average	VERTICAL
8	5862.17	65.02	74.00	-8.98	59.14	7.25	32.24	33.61	180	17 Peak	VERTICAL

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

Channel 165

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1 0	5819.65	105.61			99.84	7.20	32.18	33.61	162	49 Average	VERTICAL
2 0	5820.08	118.39			112.62	7.20	32.18	33.61	162	49 Peak	VERTICAL
3	5850.18	76.19	78.20	-2.01	70.35	7.23	32.22	33.61	162	49 Peak	VERTICAL
4	5860.17	53.97	54.00	-0.03	48.09	7.25	32.24	33.61	162	49 Average	VERTICAL
5	5860.17	70.07	74.00	-3.93	64.19	7.25	32.24	33.61	162	49 Peak	VERTICAL

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

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5713.40	67.38	74.00	-6.62	60.30	8.02	32.06	33.00	207	301	Peak	VERTICAL
2	5714.80	50.69	54.00	-3.31	43.61	8.02	32.06	33.00	207	301	Average	VERTICAL
3	5724.80	77.85	78.20	-0.35	70.73	8.04	32.08	33.00	207	301	Peak	VERTICAL
4	5744.20	115.01			107.86	8.06	32.10	33.01	207	301	Peak	VERTICAL
5	5744.60	103.04			95.89	8.06	32.10	33.01	207	301	Average	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5713.80	48.89	54.00	-5.11	41.81	8.02	32.06	33.00	206	247	Average	VERTICAL
2	5714.60	61.10	74.00	-12.90	54.02	8.02	32.06	33.00	206	247	Peak	VERTICAL
3	5724.20	65.03	78.20	-13.17	57.91	8.04	32.08	33.00	206	247	Peak	VERTICAL
4	5785.80	116.97			109.76	8.10	32.14	33.03	206	247	Peak	VERTICAL
5	5787.00	105.56			98.35	8.10	32.14	33.03	206	247	Average	VERTICAL
6	5851.80	65.32	78.20	-12.88	57.97	8.18	32.22	33.05	206	247	Peak	VERTICAL
7	5863.40	49.93	54.00	-4.07	42.56	8.19	32.24	33.06	206	247	Average	VERTICAL
8	5867.40	62.28	74.00	-11.72	54.91	8.19	32.24	33.06	206	247	Peak	VERTICAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5818.40	116.47			109.19	8.14	32.18	33.04	205	64	Peak	VERTICAL
2	5819.40	104.22			96.94	8.14	32.18	33.04	205	64	Average	VERTICAL
3	5850.40	75.15	78.20	-3.05	67.80	8.18	32.22	33.05	205	64	Peak	VERTICAL
4	5860.40	53.63	54.00	-0.37	46.26	8.19	32.24	33.06	205	64	Average	VERTICAL
5	5861.20	71.05	74.00	-2.95	63.68	8.19	32.24	33.06	205	64	Peak	VERTICAL

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

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5709.00	67.85	68.20	-0.35	60.77	8.02	32.06	33.00	201	233	Peak	VERTICAL
2	5724.20	68.92	78.20	-9.28	61.80	8.04	32.08	33.00	201	233	Peak	VERTICAL
3	5740.60	113.74			106.59	8.06	32.10	33.01	201	233	Peak	VERTICAL
4	5769.00	102.29			95.12	8.08	32.12	33.03	201	233	Average	VERTICAL

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5711.00	66.04	74.00	-7.96	58.96	8.02	32.06	33.00	200	235	Peak	VERTICAL
2	5713.40	51.46	54.00	-2.54	44.38	8.02	32.06	33.00	200	235	Average	VERTICAL
3	5719.80	67.31	78.20	-10.89	60.23	8.02	32.06	33.00	200	235	Peak	VERTICAL
4	5783.80	109.01			101.80	8.10	32.14	33.03	200	235	Average	VERTICAL
5	5789.80	116.82			109.57	8.12	32.16	33.03	200	235	Peak	VERTICAL
6	5850.00	67.49	78.20	-10.71	60.14	8.18	32.22	33.05	200	235	Peak	VERTICAL
7	5860.60	53.69	54.00	-0.31	46.32	8.19	32.24	33.06	200	235	Average	VERTICAL
8	5861.40	68.21	74.00	-5.79	60.84	8.19	32.24	33.06	200	235	Peak	VERTICAL

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

Temperature	22.6°C	Humidity	51%
Test Engineer	Stim Song	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4
Test Date	Mar. 01, 2016		

Channel 155

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5712.00	53.98	54.00	-0.02	46.90	8.02	32.06	33.00	200	122	Average	VERTICAL
2	5712.00	71.42	74.00	-2.58	64.34	8.02	32.06	33.00	200	122	Peak	VERTICAL
3	5718.00	72.52	78.20	-5.68	65.44	8.02	32.06	33.00	200	122	Peak	VERTICAL
4	5767.00	101.56			94.39	8.08	32.12	33.03	200	122	Average	VERTICAL
5	5772.00	111.13			103.92	8.10	32.14	33.03	200	122	Peak	VERTICAL
6	5850.00	66.89	78.20	-11.31	59.54	8.18	32.22	33.05	200	122	Peak	VERTICAL
7	5860.00	51.03	54.00	-2.97	43.66	8.19	32.24	33.06	200	122	Average	VERTICAL
8	5862.00	65.55	74.00	-8.45	58.18	8.19	32.24	33.06	200	122	Peak	VERTICAL

Item 4, 5 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

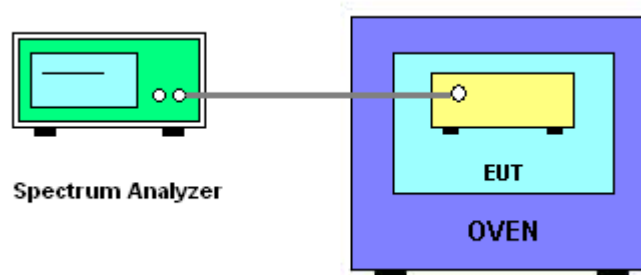
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
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 $-30^\circ\text{C} \sim 50^\circ\text{C}$.

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	24.5°C	Humidity	61%
Test Engineer	Taka Hsu	Test Date	Mar. 31, 2016

Mode: 20 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9892	5784.9885	5784.9884	5784.9875
110.00	5784.9887	5784.9885	5784.9878	5784.9876
93.50	5784.9882	5784.9878	5784.9873	5784.9866
Max. Deviation (MHz)	0.0118	0.0122	0.0127	0.0134
Max. Deviation (ppm)	2.04	2.11	2.20	2.32
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-30	5784.9931	5784.9923	5784.9916	5784.9907
-20	5784.9929	5784.9923	5784.9917	5784.9907
-10	5784.9923	5784.9922	5784.9918	5784.9911
0	5784.9920	5784.9916	5784.9909	5784.9899
10	5784.9904	5784.9897	5784.9889	5784.9886
20	5784.9887	5784.9886	5784.9879	5784.9869
30	5784.9882	5784.9874	5784.9871	5784.9869
40	5784.9877	5784.9876	5784.9866	5784.9862
50	5784.9867	5784.9859	5784.9851	5784.9850
Max. Deviation (MHz)	0.0133	0.0141	0.0149	0.0150
Max. Deviation (ppm)	2.30	2.44	2.58	2.59
Result	Complies			

Mode: 40 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9894	5754.9891	5754.9889	5754.9887
110.00	5754.9887	5754.9884	5754.9880	5754.9876
93.50	5754.9886	5754.9877	5754.9876	5754.9870
Max. Deviation (MHz)	0.0114	0.0123	0.0124	0.0130
Max. Deviation (ppm)	1.98	2.14	2.15	2.26
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-30	5754.9927	5754.9926	5754.9919	5754.9918
-20	5754.9926	5754.9916	5754.9911	5754.9905
-10	5754.9916	5754.9914	5754.9905	5754.9903
0	5754.9913	5754.9909	5754.9908	5754.9907
10	5754.9898	5754.9896	5754.9887	5754.9878
20	5754.9887	5754.9886	5754.9884	5754.9874
30	5754.9882	5754.9881	5754.9875	5754.9872
40	5754.9869	5754.9859	5754.9855	5754.9851
50	5754.9857	5754.9849	5754.9840	5754.9831
Max. Deviation (MHz)	0.0143	0.0151	0.0160	0.0169
Max. Deviation (ppm)	2.48	2.62	2.78	2.94
Result	Complies			

Mode: 80 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9888	5774.9882	5774.9881	5774.9877
110.00	5774.9887	5774.9881	5774.9880	5774.9879
93.50	5774.9880	5774.9872	5774.9865	5774.9858
Max. Deviation (MHz)	0.0120	0.0128	0.0135	0.0142
Max. Deviation (ppm)	2.08	2.22	2.34	2.46
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-30	5774.9925	5774.9921	5774.9918	5774.9917
-20	5774.9917	5774.9907	5774.9906	5774.9898
-10	5774.9914	5774.9906	5774.9901	5774.9897
0	5774.9894	5774.9884	5774.9879	5774.9878
10	5774.9891	5774.9884	5774.9876	5774.9872
20	5774.9887	5774.9880	5774.9876	5774.9875
30	5774.9882	5774.9876	5774.9872	5774.9867
40	5774.9873	5774.9863	5774.9862	5774.9860
50	5774.9855	5774.9850	5774.9846	5774.9837
Max. Deviation (MHz)	0.0145	0.0150	0.0154	0.0163
Max. Deviation (ppm)	2.51	2.60	2.67	2.82
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	8127647	9kHz ~ 30MHz	Dec. 23, 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)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 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	2944A10940	0.1MHz ~ 1.3GHz	Feb. 24, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov.13, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 27, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-10-7	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-6	1 GHz ~ 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz ~ 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

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

“*” Calibration Interval of instruments listed above is two years.

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

6. MEASUREMENT UNCERTAINTY

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