SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**Linksys LLC**
Applicant Address	121 Theory Drive, Irvine, CA 92617, USA
FCC ID	**Q87-EA6350V2**

Product Name	Linksys Smart Wi-Fi Router AC1200
Brand Name	Linksys
Model No.	EA6350 V2
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jun. 16, 2015
Final Test Date	Aug. 23, 2015
Submission Type	Original Equipment

Statement

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

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

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

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

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

Testing Laboratory
1190

Table of Contents

1. VERIFICATION OF COMPLIANCE 1
2. SUMMARY OF THE TEST RESULT 2
3. GENERAL INFORMATION 3
3.1. Product Details 3
3.2. Accessories 5
3.3. Table for Filed Antenna 5
3.4. Table for Carrier Frequencies 6
3.5. Table for Test Modes 7
3.6. Table for Testing Locations 9
3.7. Table for Supporting Units 9
3.8. Table for Parameters of Test Software Setting 10
3.9. EUT Operation during Test 10
3.10. Duty Cycle 10
3.11. Test Configurations 11
4. TEST RESULT 14
4.1. AC Power Line Conducted Emissions Measurement 14
4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement 18
4.3. 6dB Spectrum Bandwidth Measurement 29
4.4. Maximum Conducted Output Power Measurement 34
4.5. Power Spectral Density Measurement 37
4.6. Radiated Emissions Measurement 47
4.7. Band Edge Emissions Measurement 72
4.8. Frequency Stability Measurement 81
4.9. Antenna Requirements 85
5. LIST OF MEASURING EQUIPMENTS 86
6. MEASUREMENT UNCERTAINTY 87
APPENDIX A. PHOTOGRAPHS OF EUT ..... A1 ~ A22
APPENDIX B. TEST PHOTOS ..... B1 ~ B5
APPENDIX C. MAXIMUM PERMISSIBLE EXPOSURE ..... C1 ~ C3
APPENDIX D. RADIATED EMISSION CO-LOCATION REPORT ..... D1 ~ D3

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR570168AB	Rev. 01	Initial issue of report	Aug. 13, 2015
FR570168AB	Rev. 02	Adding one adapter (Model No.: WA-24Q12FU)	Aug. 26, 2015
FR570168AB	Rev. 03	Modify Appendix A. Photographs of EUT.	Aug. 27, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	Linksys Smart Wi-Fi Router AC1200
Brand Name	:	Linksys
Model No.	:	EA6350 V2
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 Jun. 16, 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

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	9.56 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	3.53 dB
4.5	15.407(a)	Power Spectral Density	Complies	2.94 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.10 dB
4.7	15.407(b)	Band Edge Emissions	Complies	1.01 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	IEEE 802.11a: WLAN (2TX, 2RX) IEEE 802.11n: WLAN (2TX, 2RX) IEEE 802.11ac: WLAN (2TX, 2RX)
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%)	Band 1: IEEE 802.11a: 18.67 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.84 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 39.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz Band 4: IEEE 802.11a: 18.32 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.41 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 39.65 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 25.52 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 25.91 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.85 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 16.86 dBm Band 4: IEEE 802.11a: 26.28 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 26.22 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 26.47 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.15 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 1 (Non-switchable Adapter)	APD	WA-24E12FU	Input: 100-240V~50-60Hz, 0.65A Max Output: 12V, 2A
Adapter 2 (Switchable Adapter)	APD	WA-24E12	Input: 100-240V~50-60Hz, 0.65A Max Output: 12V, 2A
Adapter 3 (Non-switchable Adapter)	APD	WA-24Q12FU	Input: 100-240V~50-60Hz, 0.7A Max Output: 12V, 2A
Others			
US Plug*1 (Only for Adapter 2)			

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	ARISTOTLE	RFA-25-F70-70B-320	Dipole Antenna	I-PEX	1.7	4
2	ARISTOTLE	RFA-25-F70-70-60	Dipole Antenna	I-PEX	2	5

Note: The EUT has two antennas.

For 2.4GHz:

For IEEE 802.11b mode (1TX, 1RX):

Only Chain 1 can be used as transmitting antenna and receiving antenna.

For IEEE 802.11g/n mode (2TX, 2RX):

Chain 1 and Chain 2 will transmit/receive the same signal simultaneously.

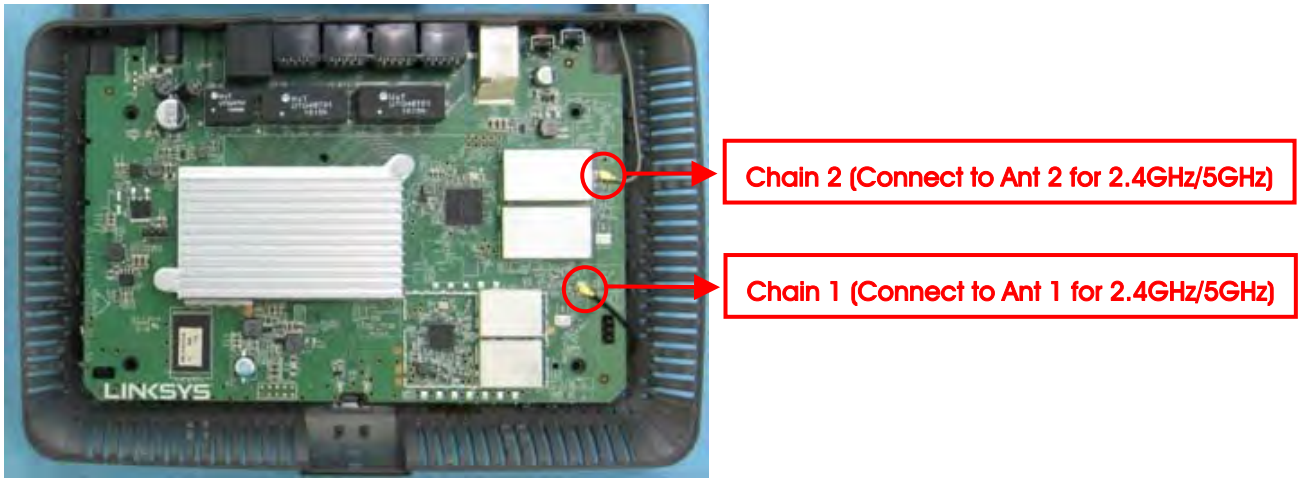
Chain 1 and Chain 2 can be used as transmitting/receiving antennas.

For 5GHz:

For IEEE 802.11a/n/ac mode (2TX, 2RX):

Chain 1 and Chain 2 will transmit/receive the same signal simultaneously.

Chain 1 and Chain 2 can be used as transmitting/receiving antennas.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

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

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

3.5. Table for Test Modes

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

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

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

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

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link - EUT with Adapter 1

Mode 2. Normal Link - EUT with Adapter 2

Mode 3. Normal Link - EUT with Adapter 3

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

For Radiated Emission below 1GHz test:

Mode 1. Normal Link - EUT with Adapter 1 in z-axis

Mode 2. Normal Link - EUT with Adapter 2-US plug in z-axis

Mode 3. Normal Link - EUT with Adapter 3 in z-axis

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

For Radiated Emission above 1GHz test:

Mode 1. CTX - EUT in z-axis

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

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

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E4300	DoC
Flash disk3.0	Silicon Power	B06	DoC

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

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E6430	DoC
Flash disk3.0	Transcend	JetFlash-700	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.8. Table for Parameters of Test Software Setting

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

Test Software Version	Mtool 2.0.2.6					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	86	83	88	73	85	86
802.11ac MCS0/Nss1 VHT20	85	88	88	72	86	82
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz	5230 MHz	5755 MHz	5795 MHz		
	57	87	54	86		
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz	5775 MHz				
	51	54				

3.9. EUT Operation during Test

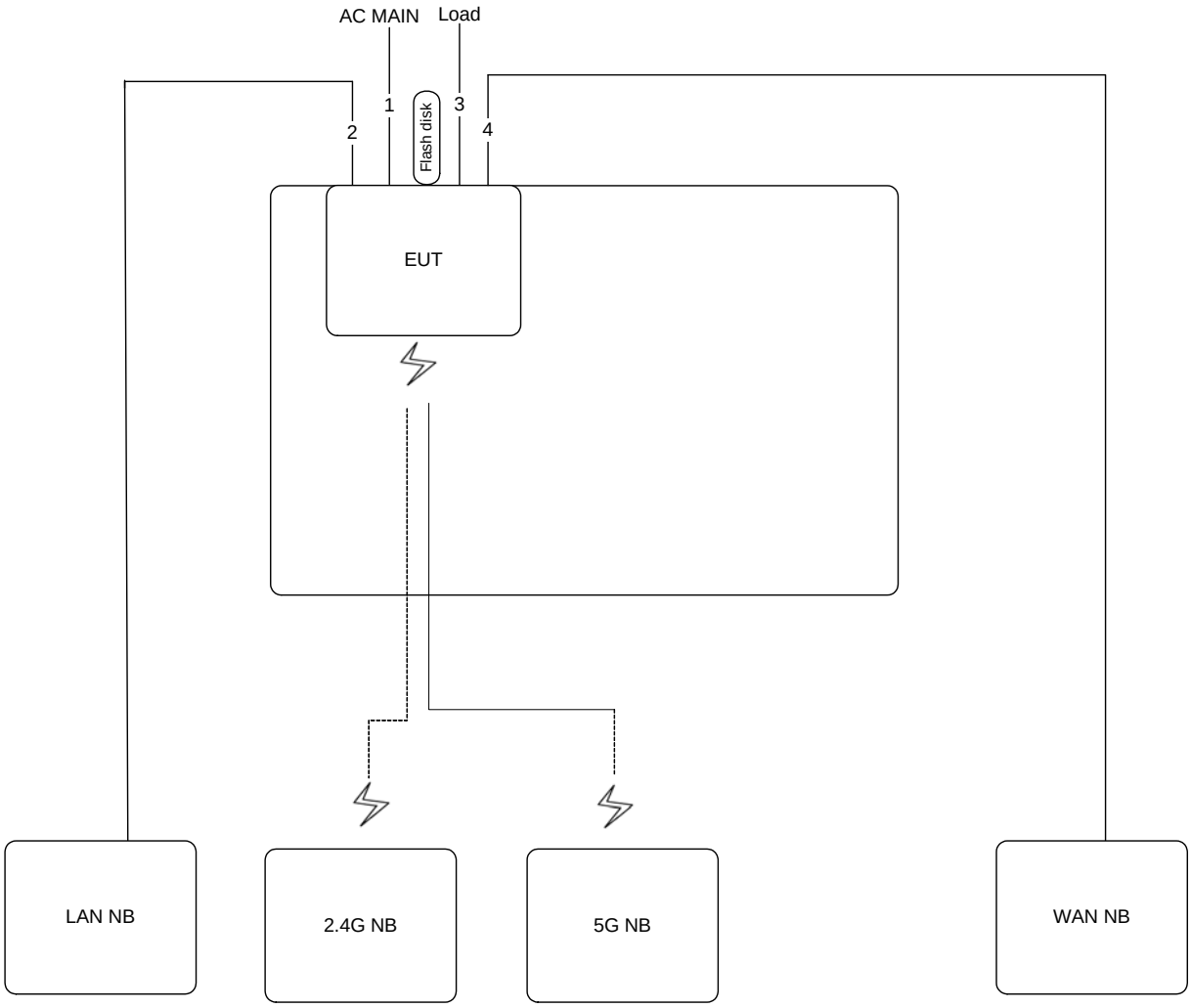
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.039	2.059	99.01%	0.04	0.01
802.11ac MCS0/Nss1 VHT20	1.868	1.888	98.93%	0.05	0.01
802.11ac MCS0/Nss1 VHT40	0.899	0.925	97.14%	0.13	1.11
802.11ac MCS0/Nss1 VHT80	0.430	0.465	92.51%	0.34	2.32

3.11. Test Configurations

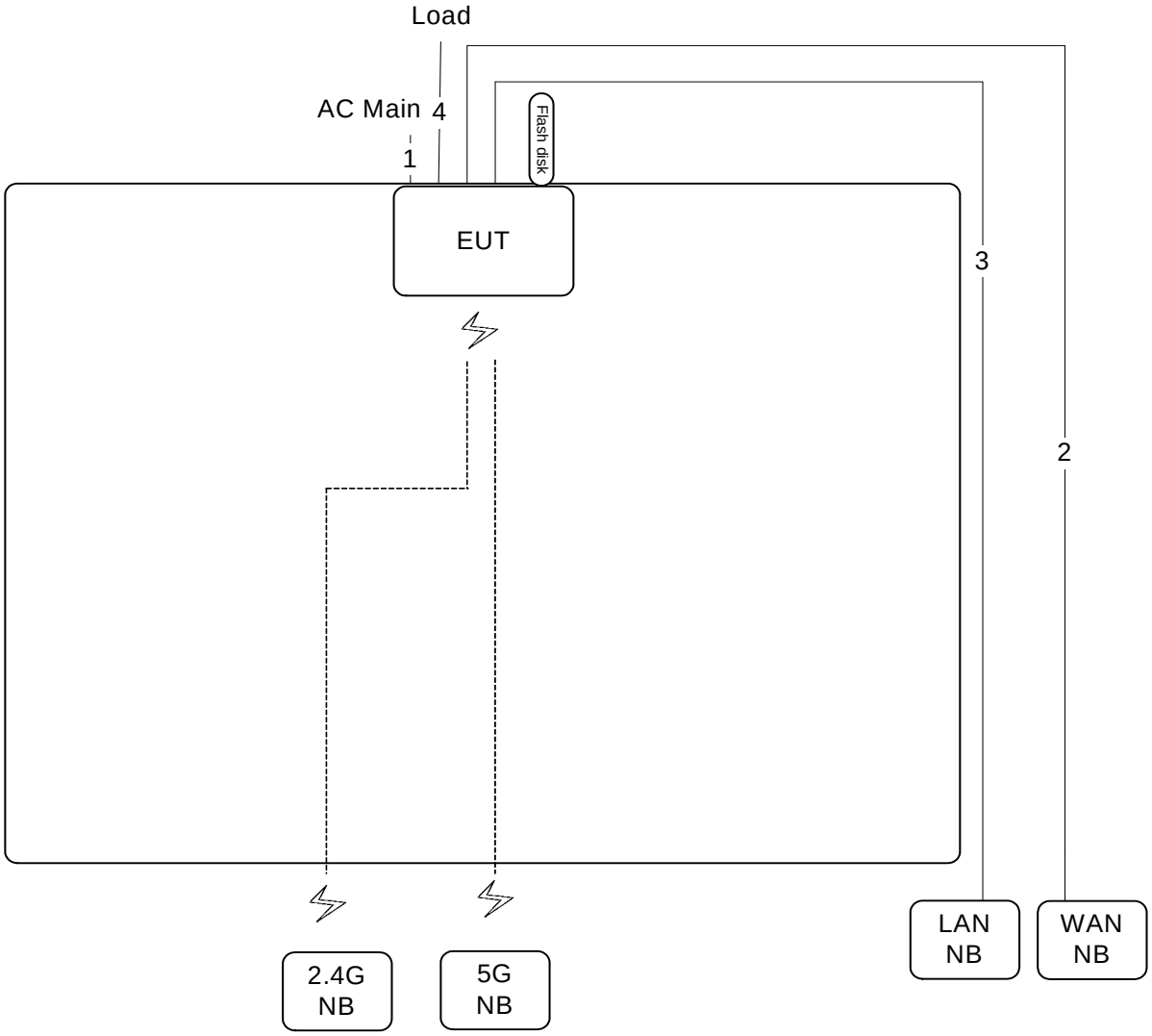
3.11.1. AC Power Line Conduction Emissions Test Configuration



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

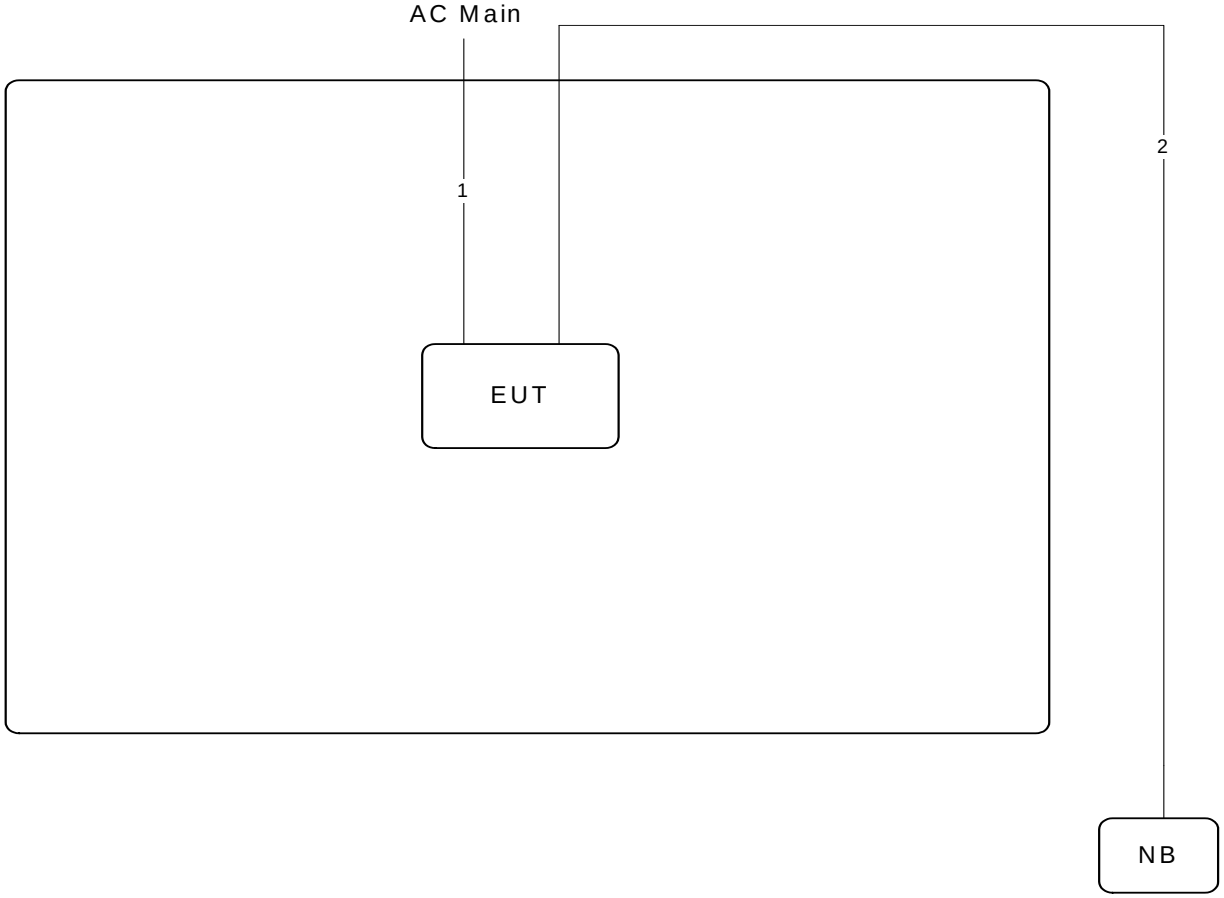
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



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

Test Configuration: above 1GHz



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

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

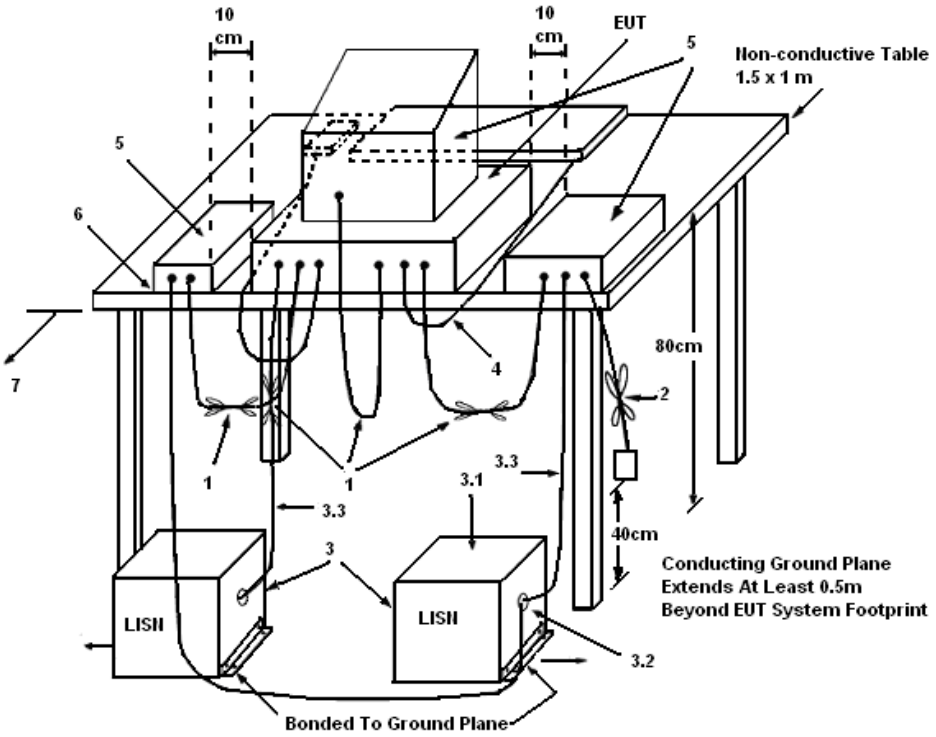
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

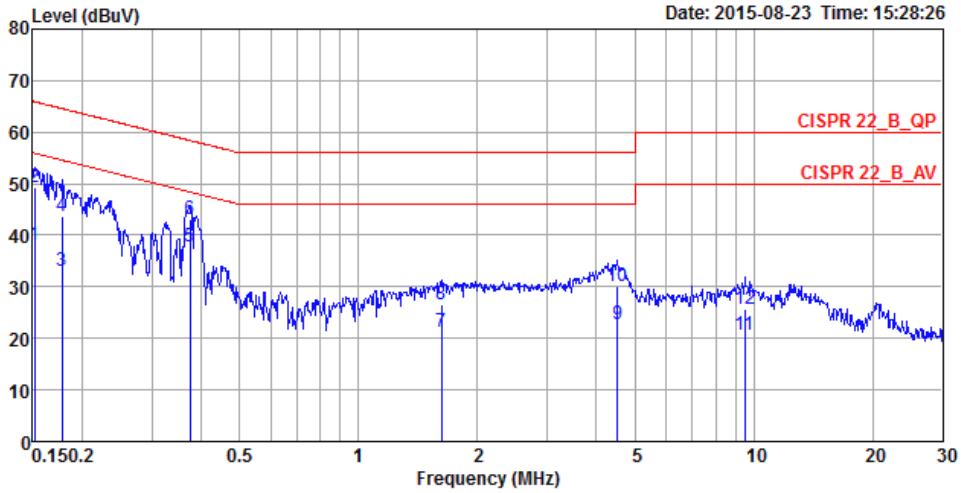
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

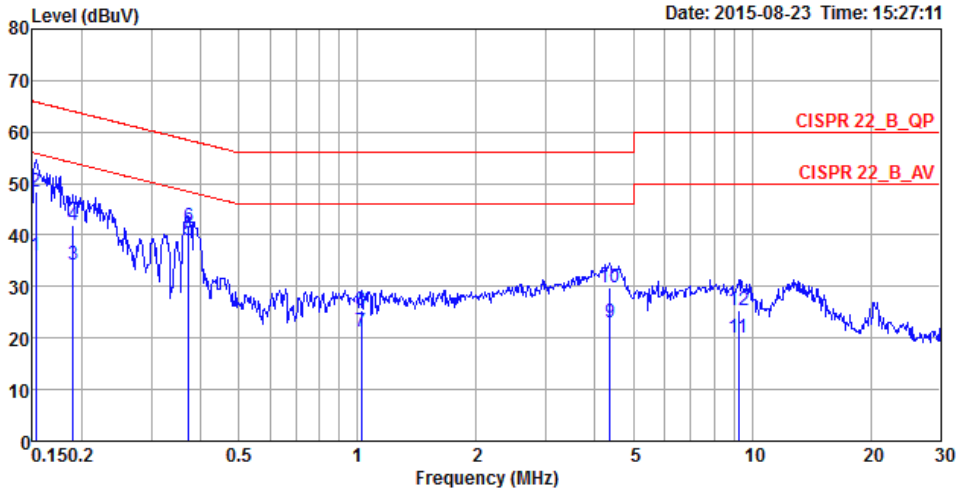
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22℃	Humidity	58%
Test Engineer	Deven Huang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 3



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1516	38.06	-17.85	55.91	28.11	9.93	0.02	LINE	Average
2	0.1516	49.18	-16.73	65.91	39.23	9.93	0.02	LINE	QP
3	0.1777	33.01	-21.58	54.59	23.06	9.93	0.02	LINE	Average
4	0.1777	43.66	-20.93	64.59	33.71	9.93	0.02	LINE	QP
5	0.3751	37.70	-10.69	48.39	27.73	9.93	0.04	LINE	Average
6	0.3751	43.01	-15.38	58.39	33.04	9.93	0.04	LINE	QP
7	1.6190	21.22	-24.78	46.00	11.18	9.98	0.06	LINE	Average
8	1.6190	26.70	-29.30	56.00	16.66	9.98	0.06	LINE	QP
9	4.5254	22.87	-23.13	46.00	12.74	10.04	0.09	LINE	Average
10	4.5254	30.05	-25.95	56.00	19.92	10.04	0.09	LINE	QP
11	9.5016	20.68	-29.32	50.00	10.29	10.17	0.22	LINE	Average
12	9.5016	25.80	-34.20	60.00	15.41	10.17	0.22	LINE	QP

Temperature	22℃	Humidity	58%
Test Engineer	Deven Huang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 3



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1532	35.91	-19.91	55.82	26.11	9.78	0.02	NEUTRAL	Average
2	0.1532	48.39	-17.43	65.82	38.59	9.78	0.02	NEUTRAL	QP
3	0.1904	34.12	-19.90	54.02	24.31	9.79	0.02	NEUTRAL	Average
4	0.1904	41.90	-22.12	64.02	32.09	9.79	0.02	NEUTRAL	QP
5	0.3731	38.87	-9.56	48.43	29.04	9.79	0.04	NEUTRAL	Average
6	0.3731	41.77	-16.66	58.43	31.94	9.79	0.04	NEUTRAL	QP
7	1.0211	21.15	-24.85	46.00	11.29	9.81	0.05	NEUTRAL	Average
8	1.0211	25.44	-30.56	56.00	15.58	9.81	0.05	NEUTRAL	QP
9	4.3606	23.02	-22.98	46.00	13.06	9.88	0.08	NEUTRAL	Average
10	4.3606	29.82	-26.18	56.00	19.86	9.88	0.08	NEUTRAL	QP
11	9.2532	20.19	-29.81	50.00	9.97	10.00	0.22	NEUTRAL	Average
12	9.2532	25.28	-34.72	60.00	15.06	10.00	0.22	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

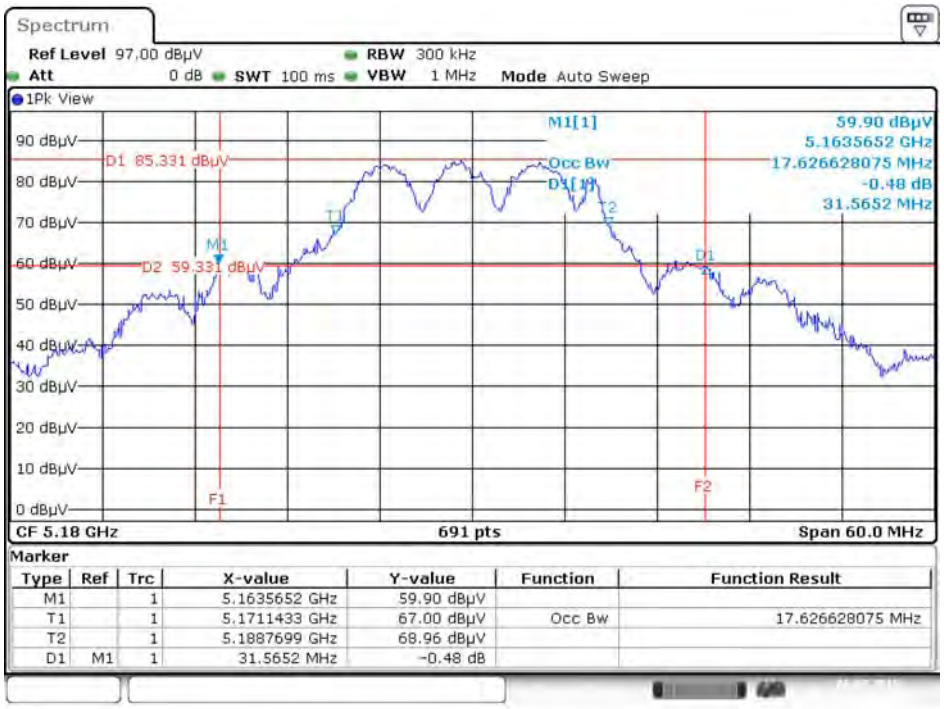
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25℃	Humidity	45%
Test Engineer	Lucas Huang		

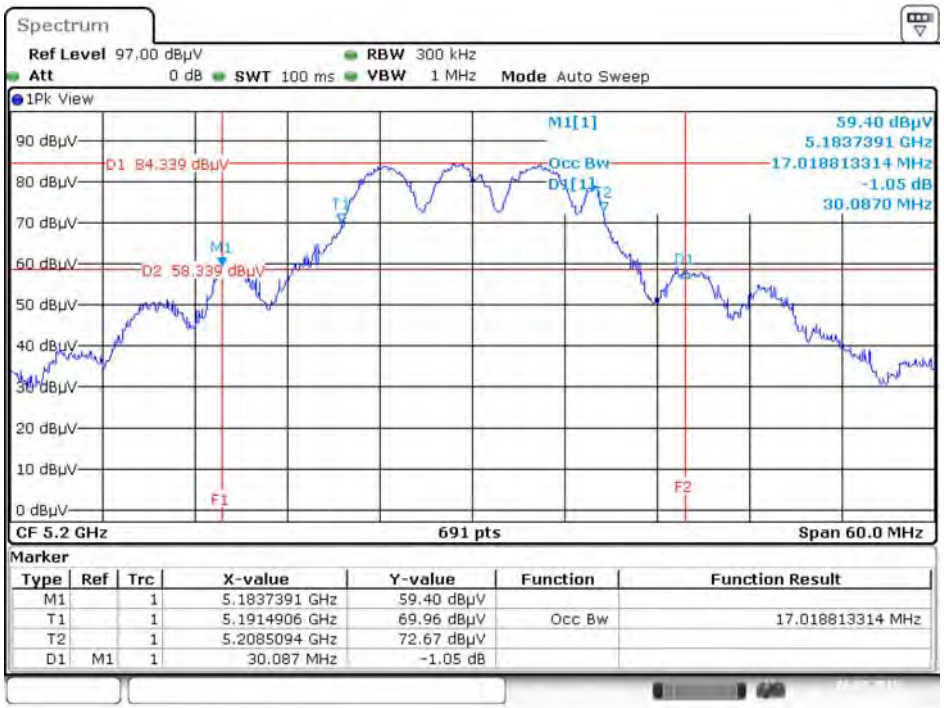
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	31.57	17.63
	5200 MHz	30.09	17.02
	5240 MHz	31.91	18.67
	5745 MHz	20.70	16.41
	5785 MHz	31.74	17.71
	5825 MHz	32.00	18.32
802.11ac MCS0/Nss1 VHT20	5180 MHz	32.00	18.06
	5200 MHz	37.83	18.76
	5240 MHz	35.65	18.84
	5745 MHz	20.43	17.54
	5785 MHz	38.09	18.41
	5825 MHz	30.26	17.89
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.58	36.90
	5230 MHz	83.19	39.80
	5755 MHz	40.73	36.90
	5795 MHz	78.12	39.65
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.32	75.83
	5775 MHz	82.61	76.12

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



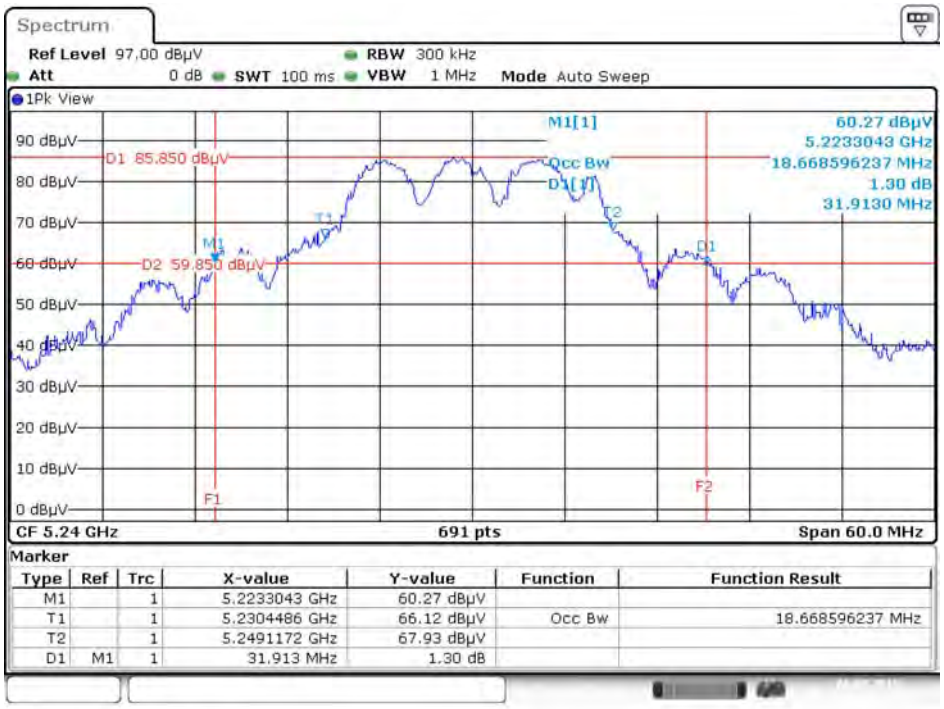
Date: 6.JUL.2015 16:36:59

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



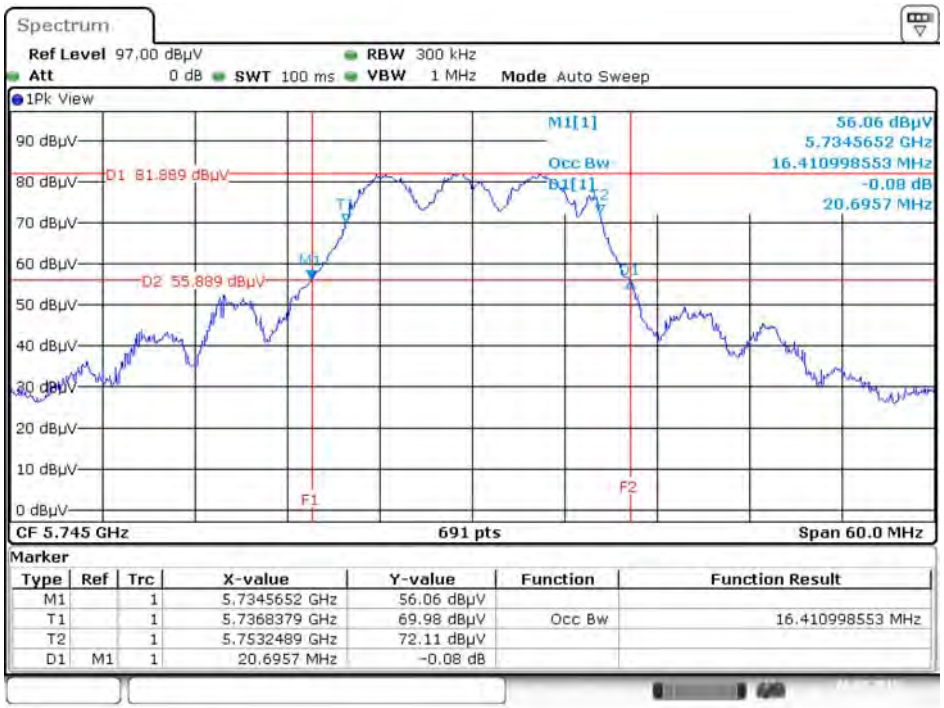
Date: 6.JUL.2015 16:39:36

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



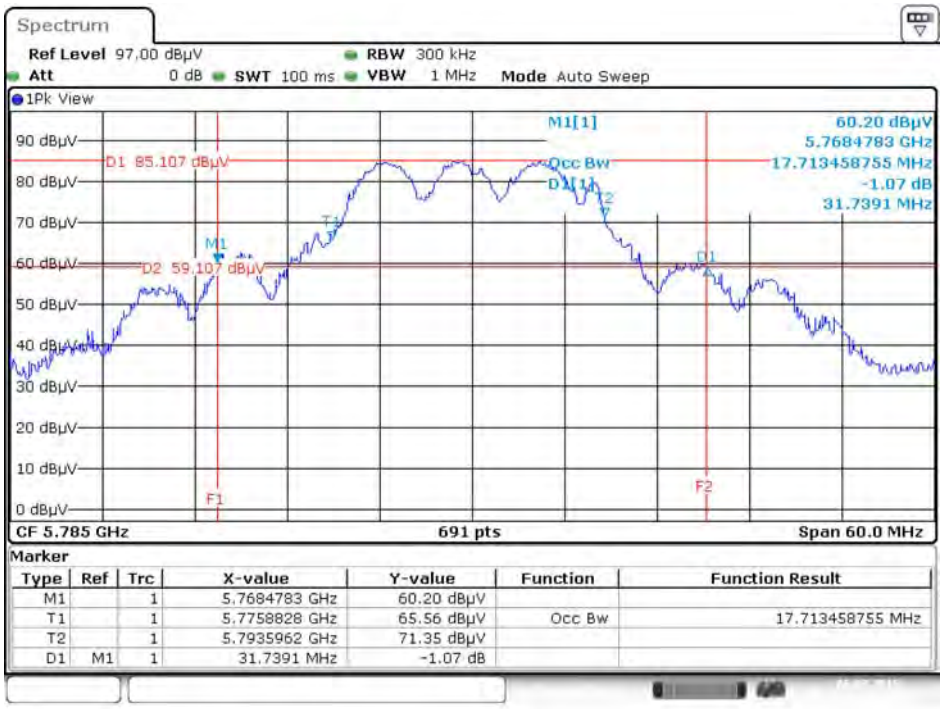
Date: 6.JUL.2015 16:41:09

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



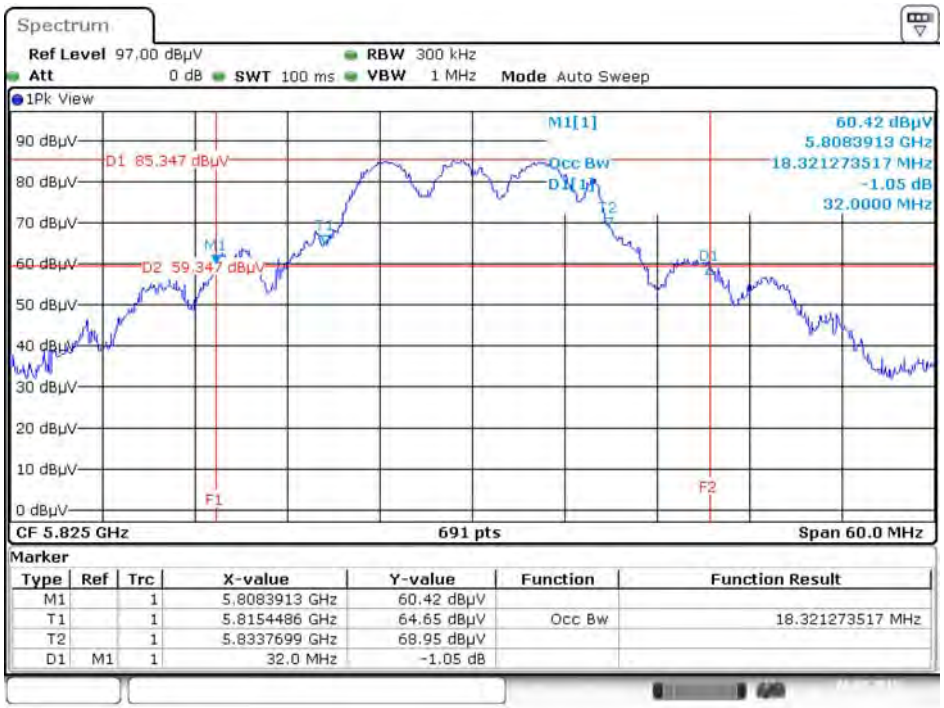
Date: 6.JUL.2015 16:42:37

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



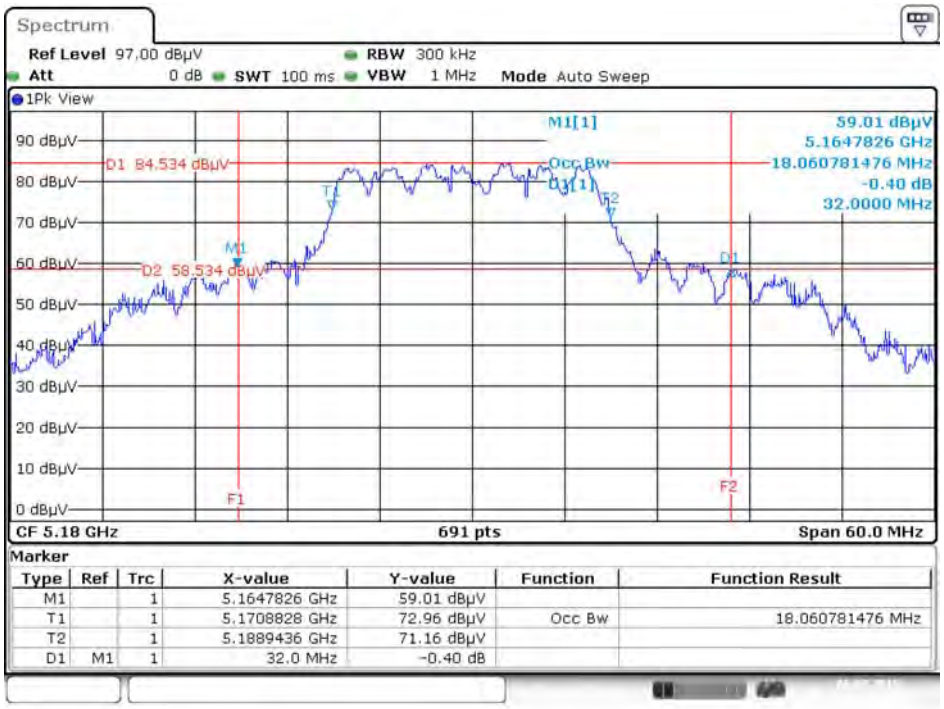
Date: 6.JUL.2015 16:43:59

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



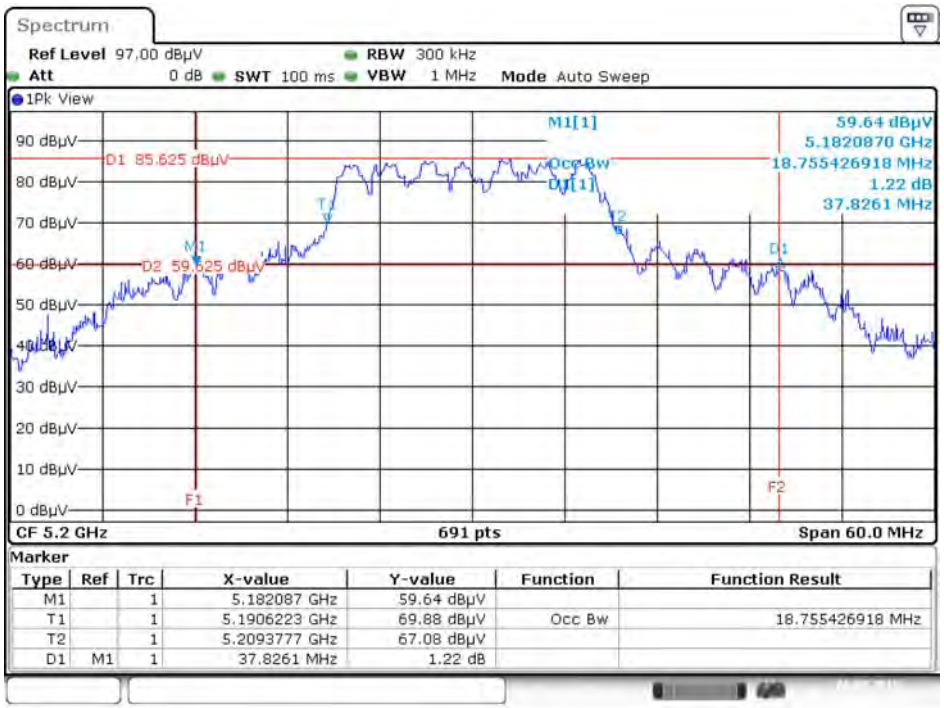
Date: 6.JUL.2015 16:45:13

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



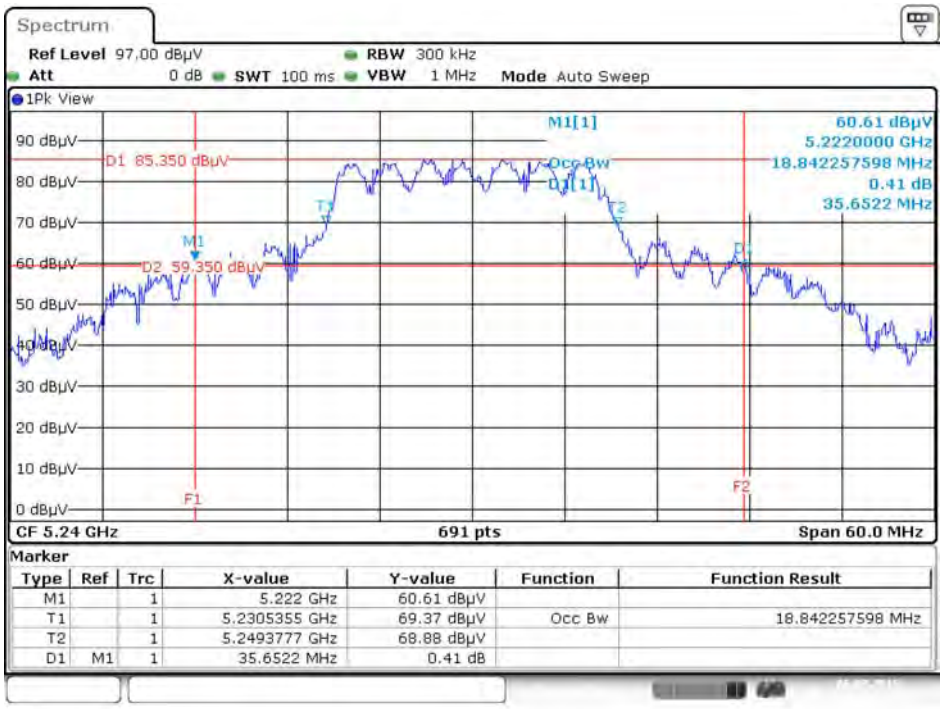
Date: 6.JUL.2015 16:49:28

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



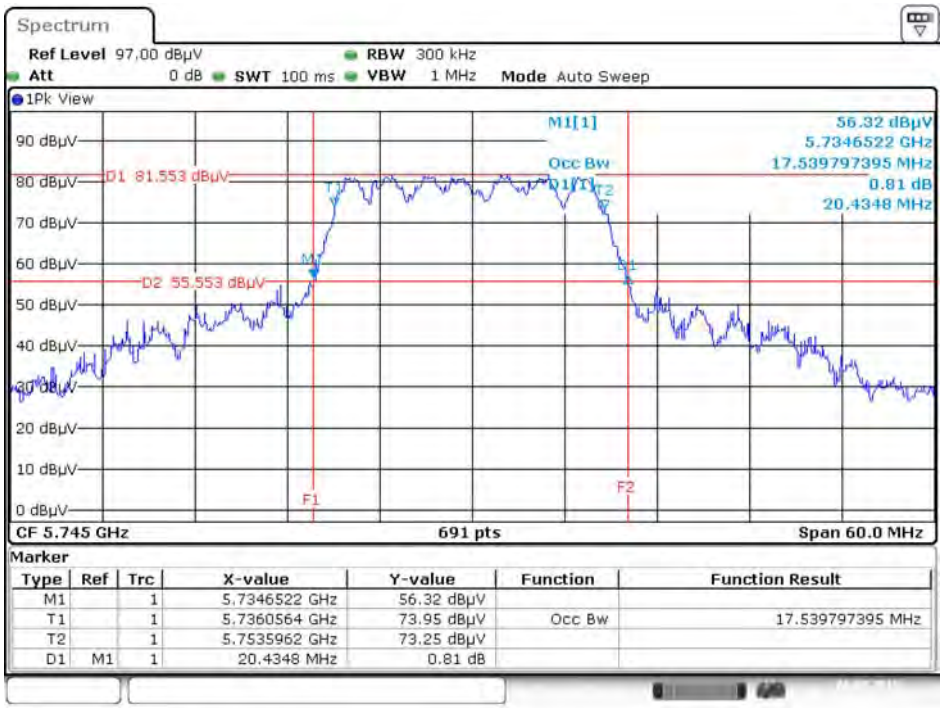
Date: 6.JUL.2015 16:50:50

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



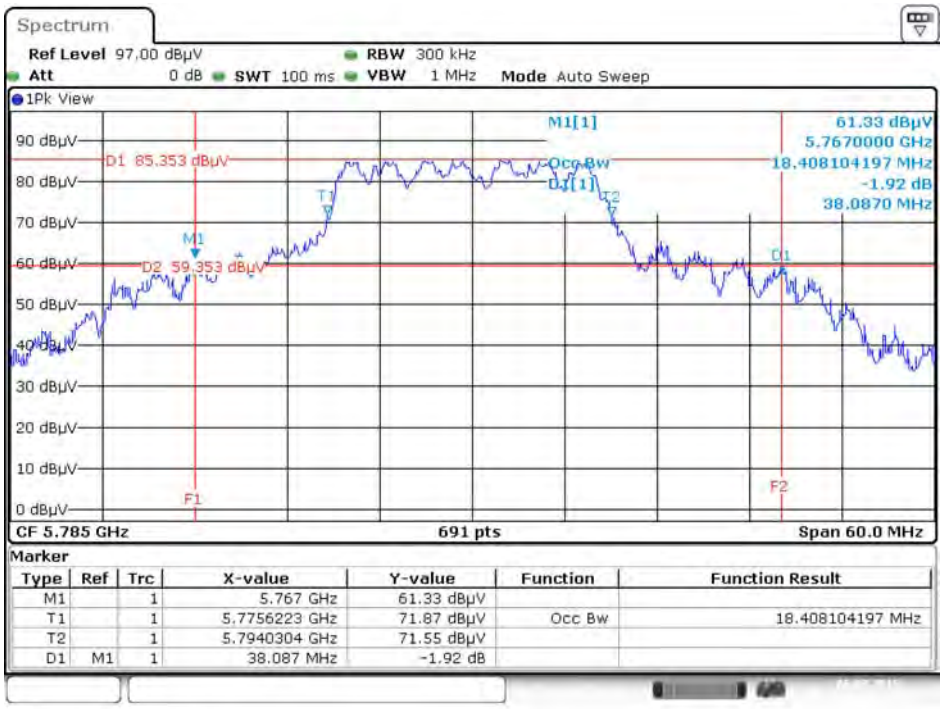
Date: 6.JUL.2015 16:52:56

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



Date: 6.JUL.2015 16:54:05

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

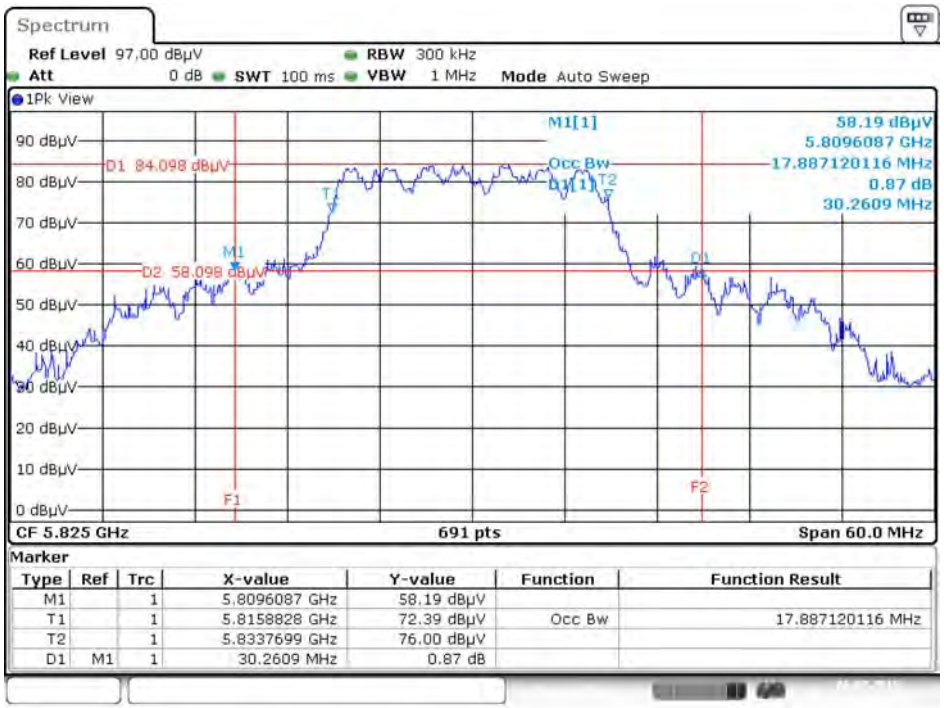


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.767 GHz	61.33 dBµV		
T1		1	5.7756223 GHz	71.87 dBµV	Occ Bw	18.408104197 MHz
T2		1	5.7940304 GHz	71.55 dBµV		
D1	M1	1	38.087 MHz	-1.92 dB		

Date: 6.JUL.2015 16:54:57

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

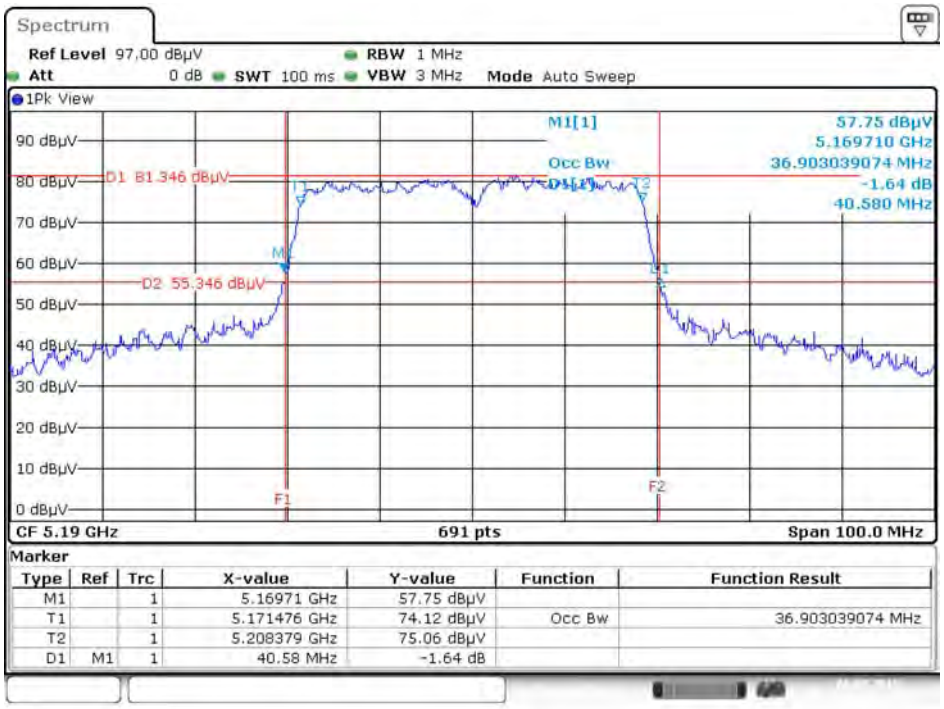


Marker

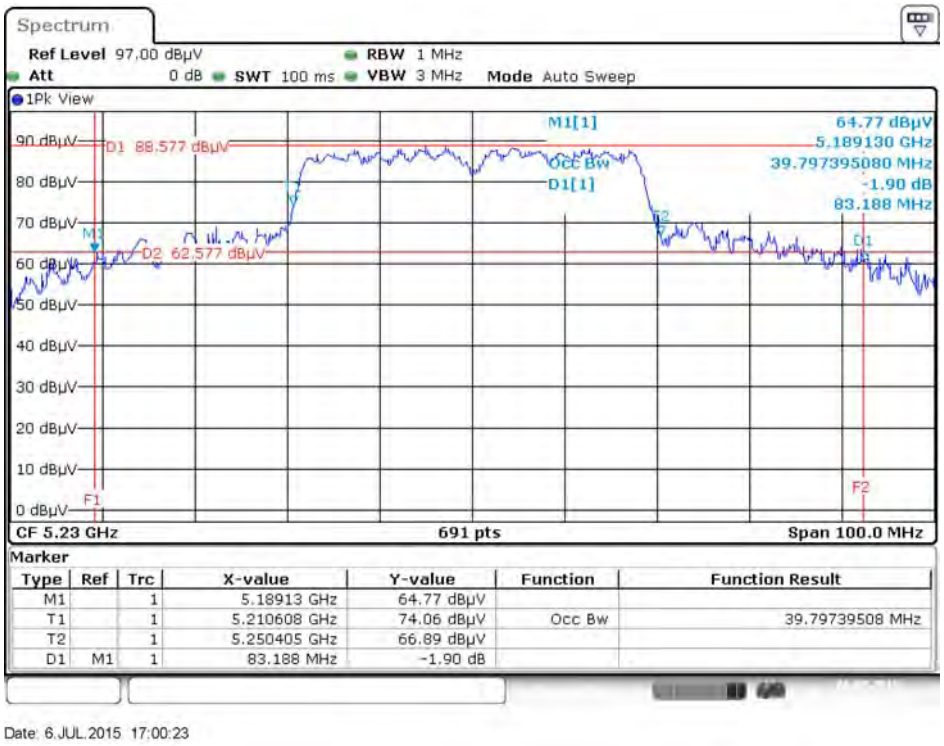
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.8096087 GHz	58.19 dBµV		
T1		1	5.8158828 GHz	72.39 dBµV	Occ Bw	17.887120116 MHz
T2		1	5.8337699 GHz	76.00 dBµV		
D1	M1	1	30.2609 MHz	0.87 dB		

Date: 6.JUL.2015 16:55:41

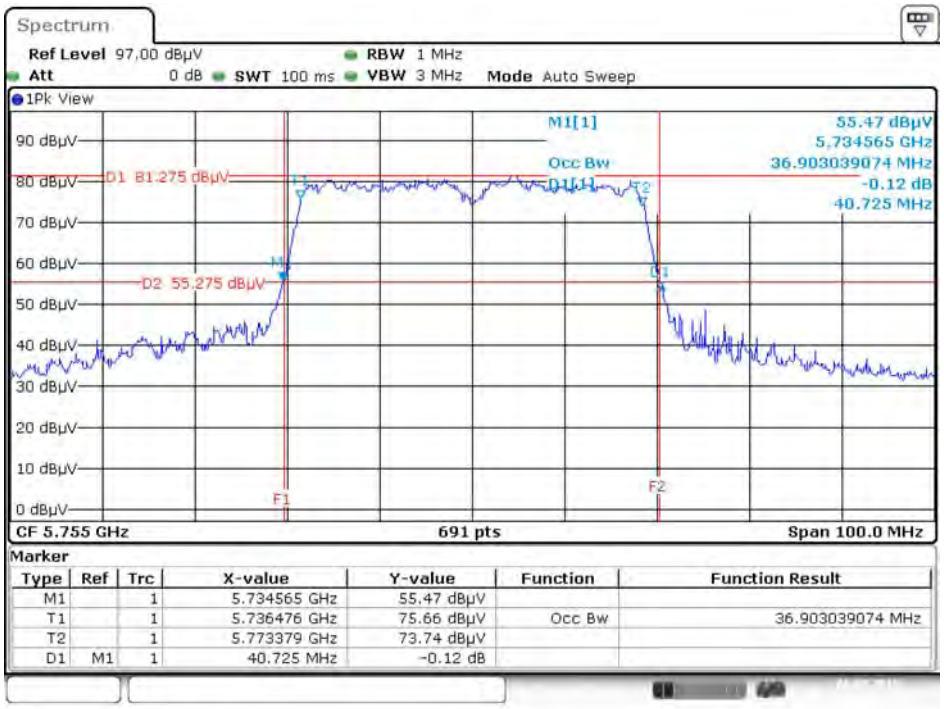
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 / 5190 MHz



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

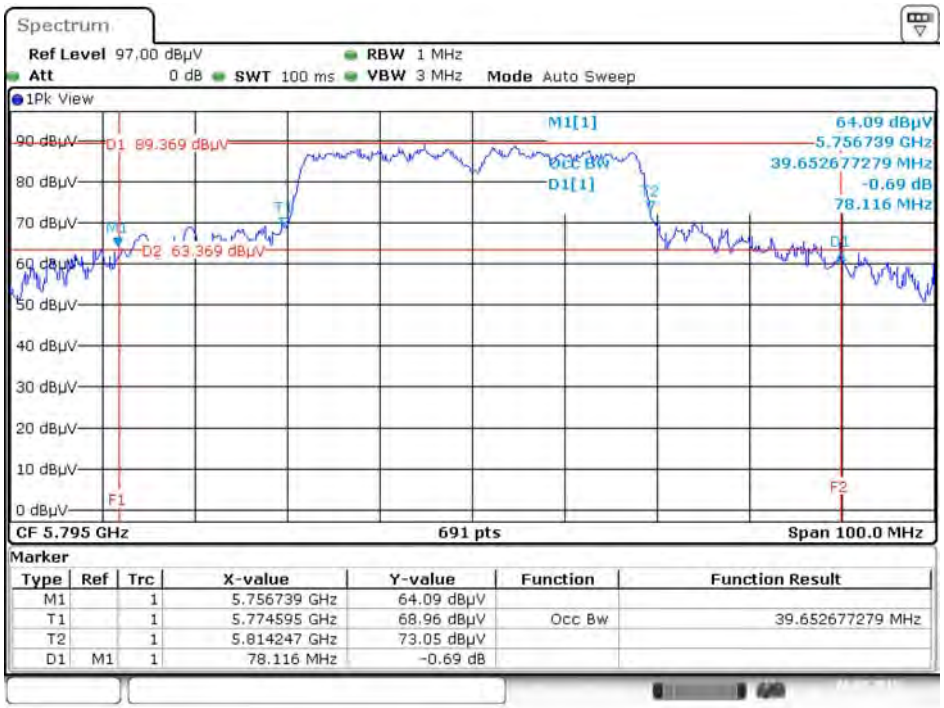


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 / 5755 MHz



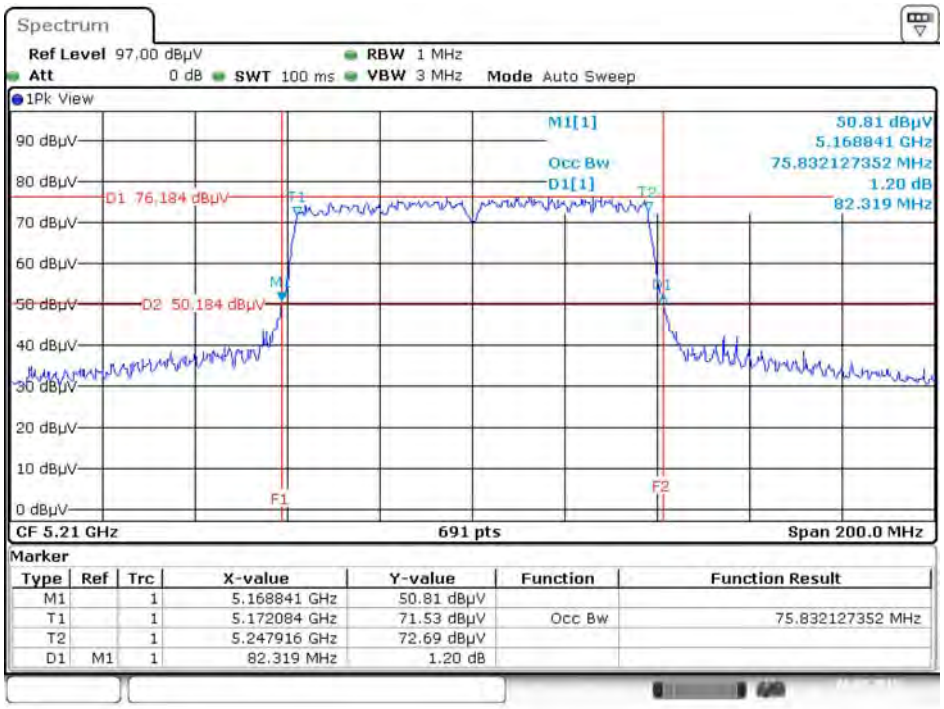
Date: 6.JUL.2015 17:01:12

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

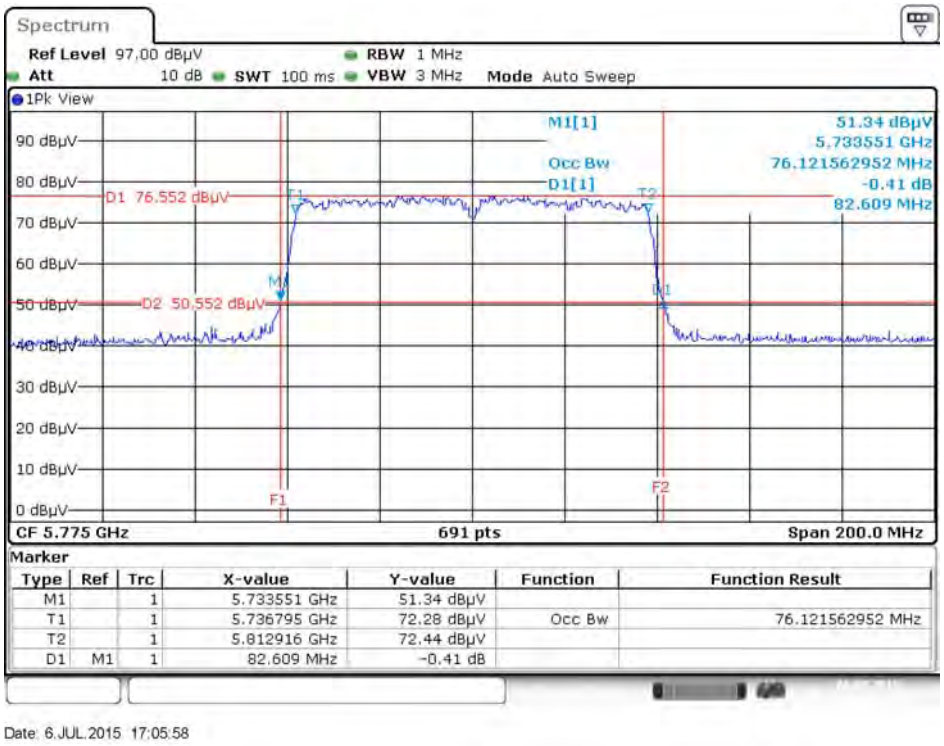


Date: 6.JUL.2015 17:02:28

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



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



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

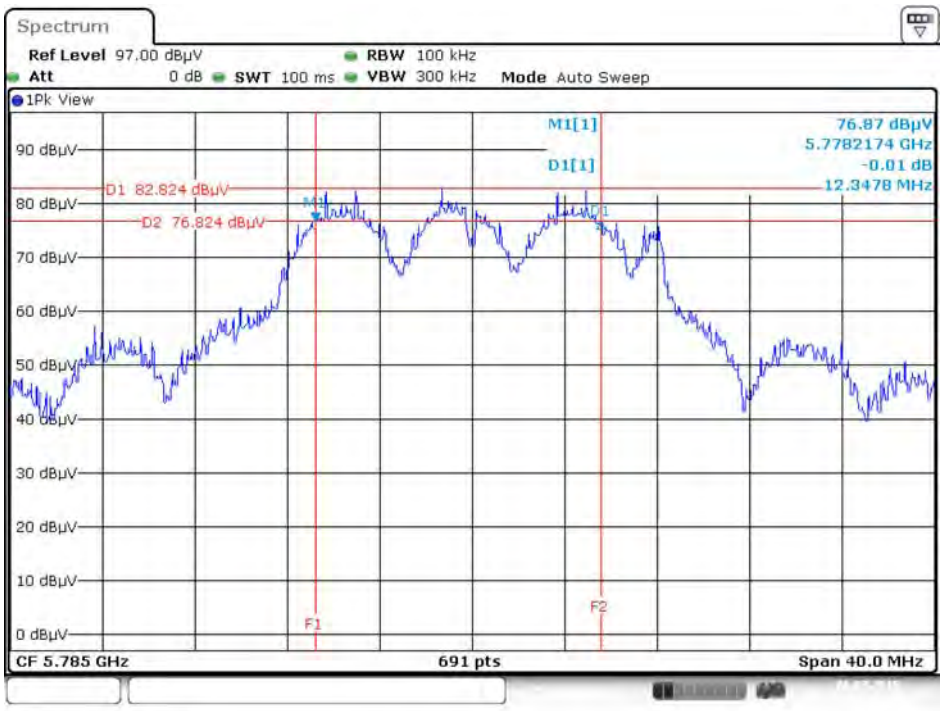
Temperature	25℃	Humidity	45%
Test Engineer	Lucas Huang		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	12.93	500	Complies
	5785 MHz	12.35	500	Complies
	5825 MHz	12.58	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	15.83	500	Complies
	5785 MHz	15.83	500	Complies
	5825 MHz	15.71	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.06	500	Complies
	5795 MHz	35.71	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.94	500	Complies

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

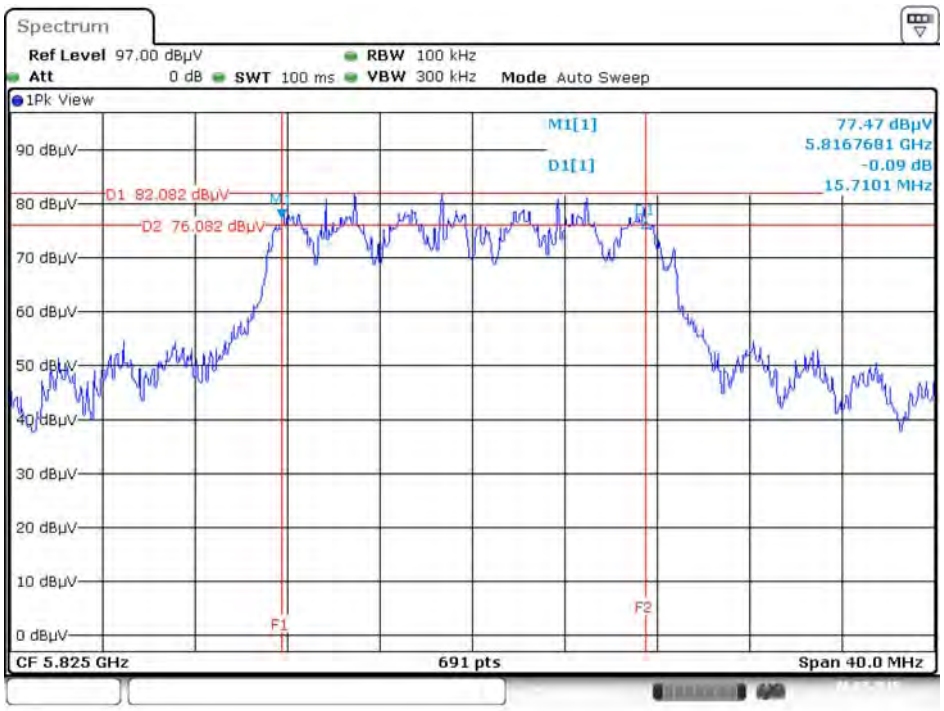
For plots, only the channel with worse result was shown.

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



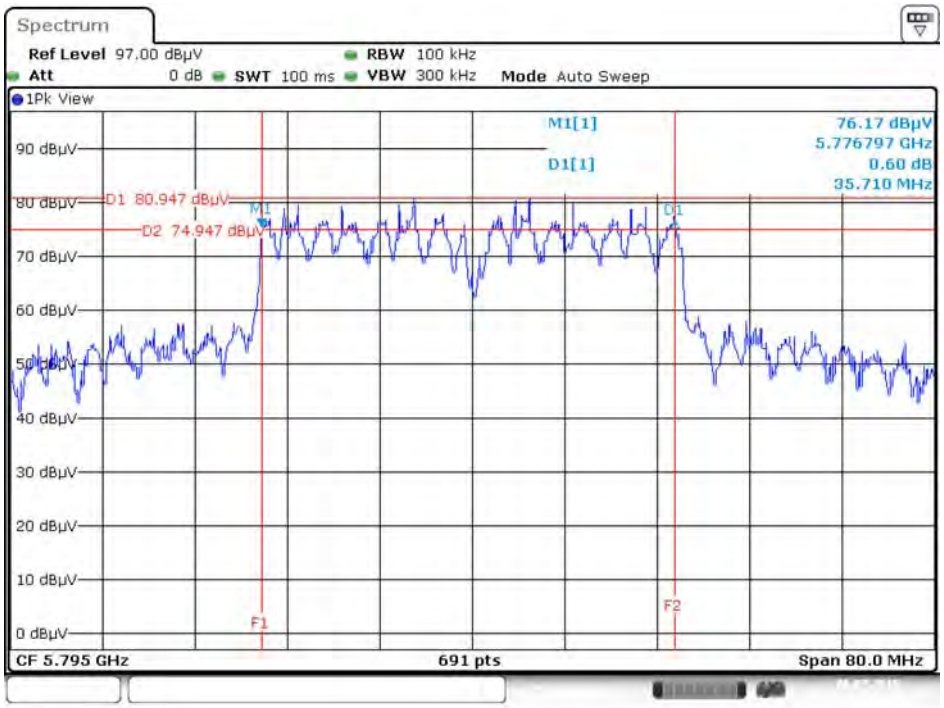
Date: 6.JUL.2015 17:14:39

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



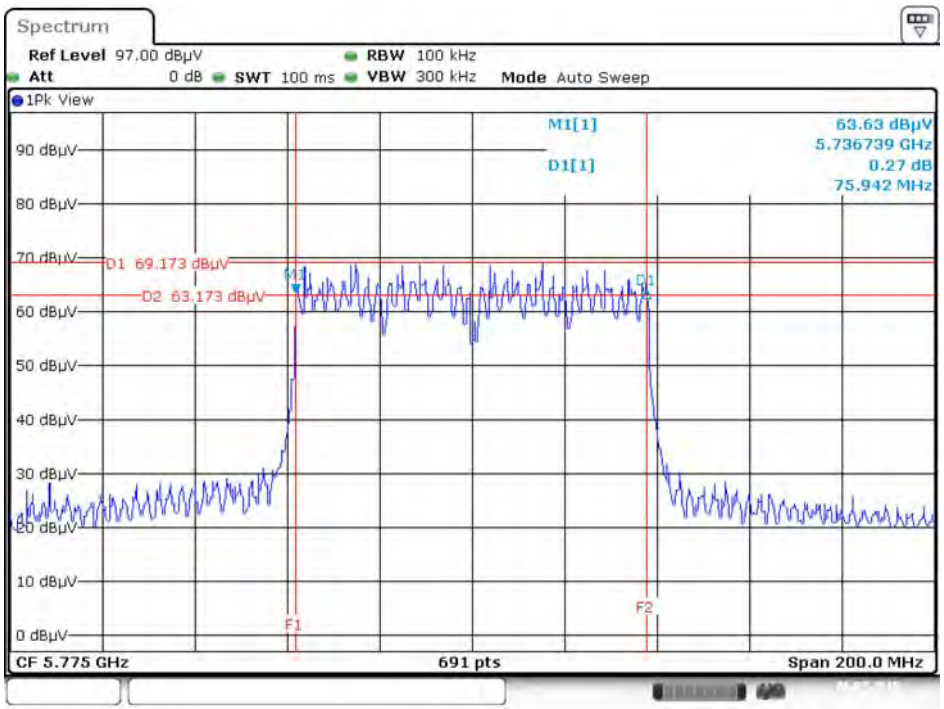
Date: 6.JUL.2015 17:19:08

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



Date: 6.JUL.2015 17:21:31

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



Date: 6.JUL.2015 17:23:17

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

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

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

4.4.2. Measuring Instruments and Setting

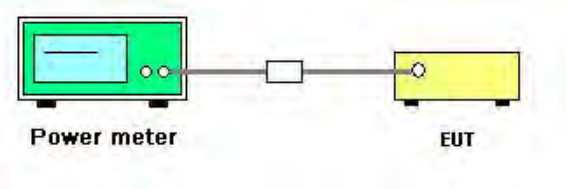
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

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

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

Temperature	25°C	Humidity	45%
Test Engineer	Lucas Huang	Test Date	Jul. 06, 2015

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
802.11a	5180 MHz	22.26	22.64	25.46	30.00	Complies
	5200 MHz	21.48	22.03	24.77	30.00	Complies
	5240 MHz	22.16	22.83	25.52	30.00	Complies
	5745 MHz	20.17	19.88	23.04	30.00	Complies
	5785 MHz	22.90	23.06	25.99	30.00	Complies
	5825 MHz	23.40	23.14	26.28	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	21.77	22.82	25.34	30.00	Complies
	5200 MHz	22.39	23.36	25.91	30.00	Complies
	5240 MHz	22.22	22.91	25.59	30.00	Complies
	5745 MHz	20.06	19.50	22.80	30.00	Complies
	5785 MHz	23.12	23.29	26.22	30.00	Complies
	5825 MHz	22.20	21.87	25.05	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	15.48	16.36	18.95	30.00	Complies
	5230 MHz	22.37	23.27	25.85	30.00	Complies
	5755 MHz	15.77	15.96	18.88	30.00	Complies
	5795 MHz	23.45	23.47	26.47	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	13.26	14.37	16.86	30.00	Complies
	5775 MHz	14.90	15.37	18.15	30.00	Complies

4.5. Power Spectral Density Measurement

4.5.1. Limit

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

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

4.5.2. Measuring Instruments and Setting

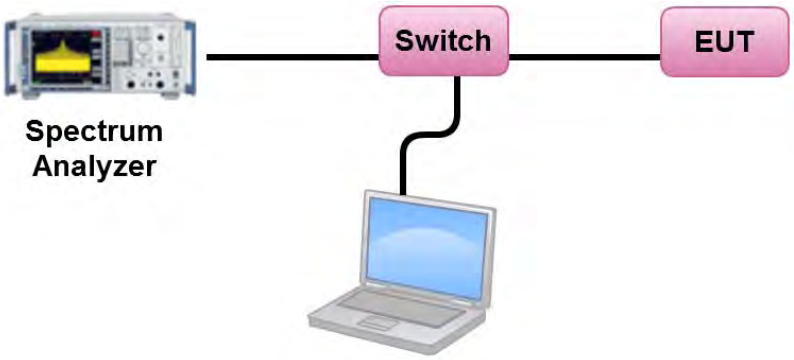
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.5.3. Test Procedures

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

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	45%
Test Engineer	Lucas Huang		

Configuration IEEE 802.11a / Chain 1 + Chain 2

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	12.26	15.46	Complies
40	5200 MHz	11.32	15.46	Complies
48	5240 MHz	12.52	15.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.54dBi, so limit=17-(7.54-6)=15.46dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	9.54	-3.01	6.53	28.46	Complies
157	5785 MHz	12.73	-3.01	9.72	28.46	Complies
165	5825 MHz	12.89	-3.01	9.88	28.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.54dBi, so limit=30-(7.54-6)=28.46dBm/500kHz

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	12.19	15.46	Complies
40	5200 MHz	12.40	15.46	Complies
48	5240 MHz	12.22	15.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.54dBi, so limit=17-(7.54-6)=15.46dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	9.50	-3.01	6.49	28.46	Complies
157	5785 MHz	12.91	-3.01	9.90	28.46	Complies
165	5825 MHz	11.45	-3.01	8.44	28.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.54dBi, so limit=30-(7.54-6)=28.46dBm/500kHz

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	2.84	15.46	Complies
46	5230 MHz	9.85	15.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.54dBi, so limit=17-(7.54-6)=15.46dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	2.62	-3.01	-0.39	28.46	Complies
159	5795 MHz	10.40	-3.01	7.39	28.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.54dBi, so limit=30-(7.54-6)=28.46dBm/500kHz

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-2.27	15.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 7.54dBi, so limit=17-(7.54-6)=15.46dBm/MHz

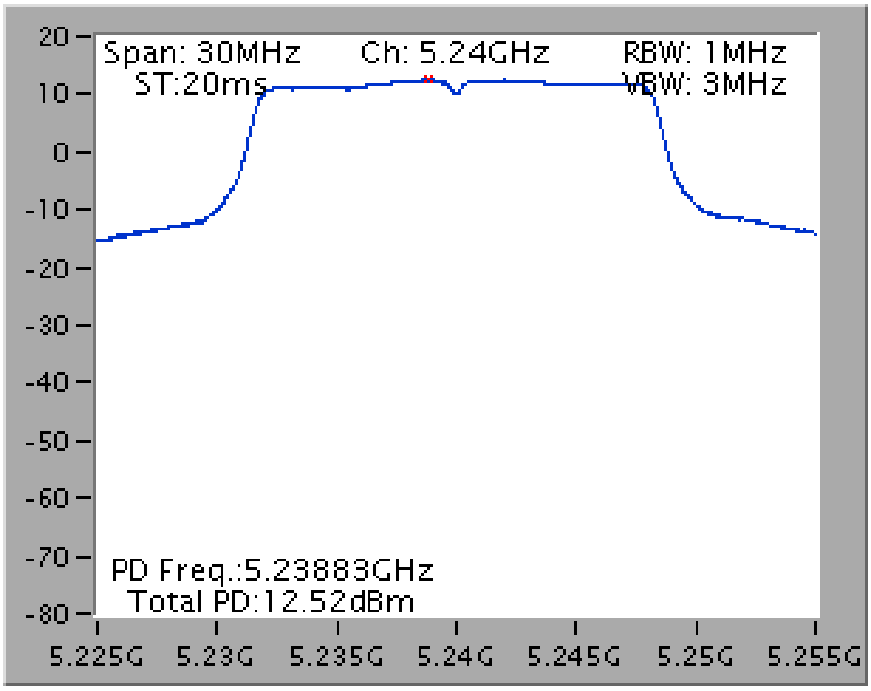
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	-1.17	-3.01	-4.18	28.46	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.54dBi, so limit=30-(7.54-6)=28.46dBm/500kHz

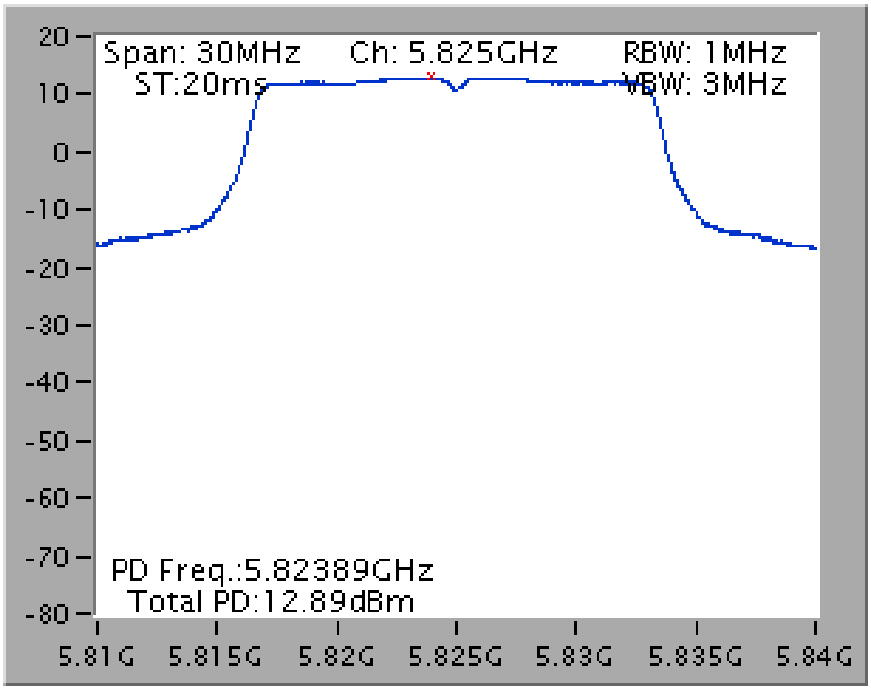
Note: All the test values were listed in the report.

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

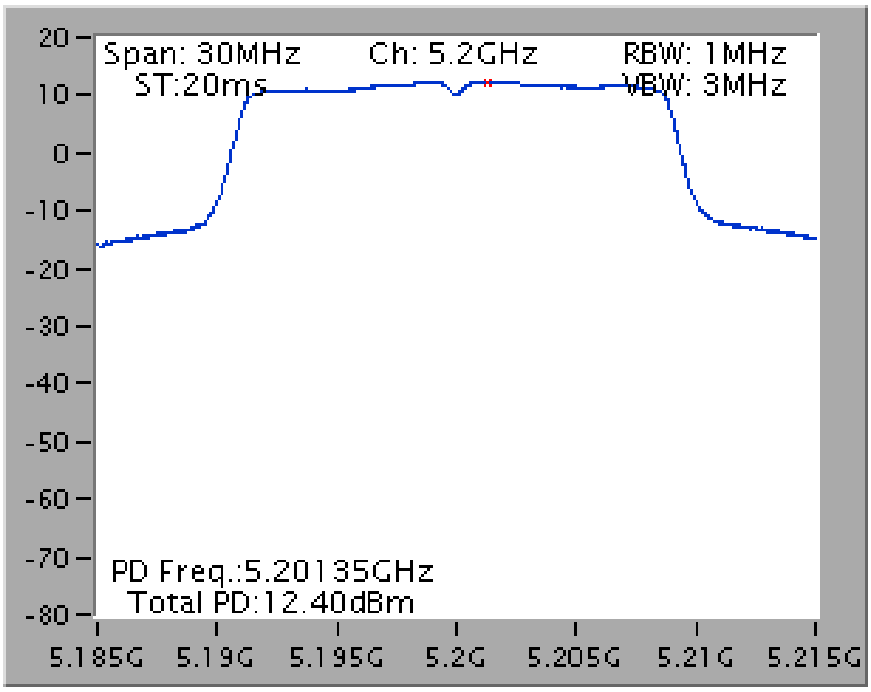
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5240 MHz



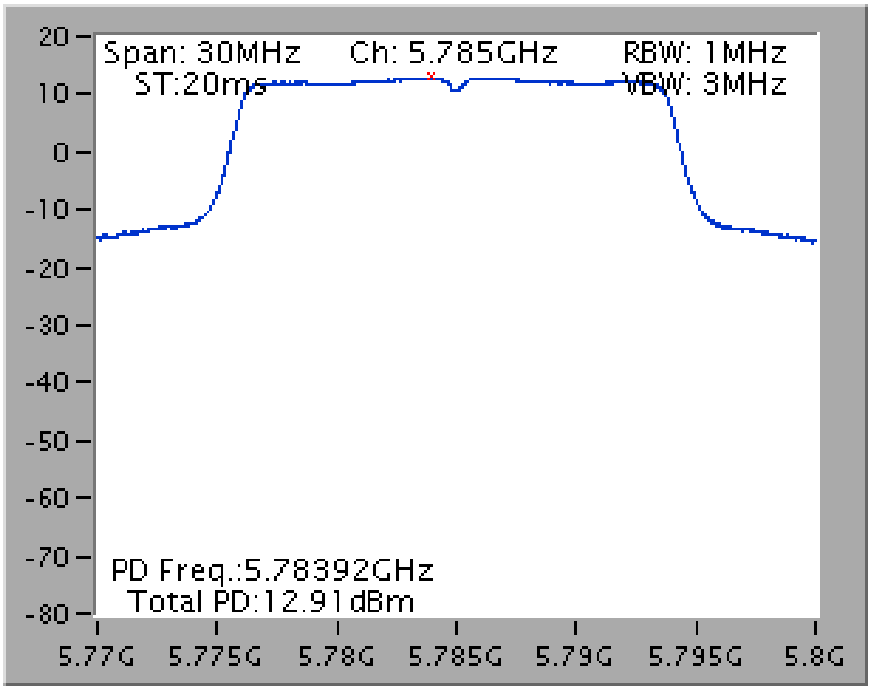
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5825 MHz



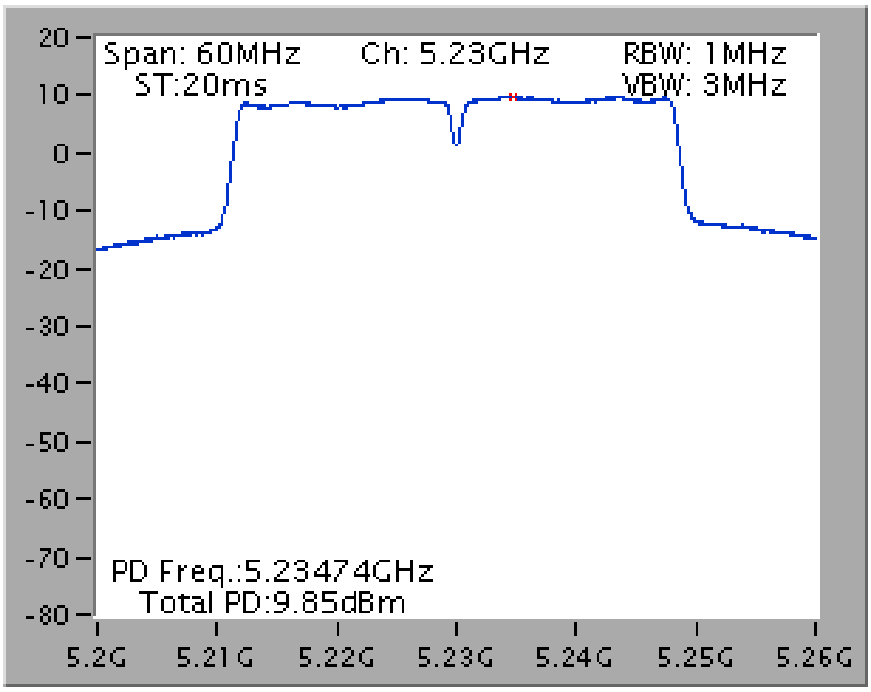
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 / 5200 MHz



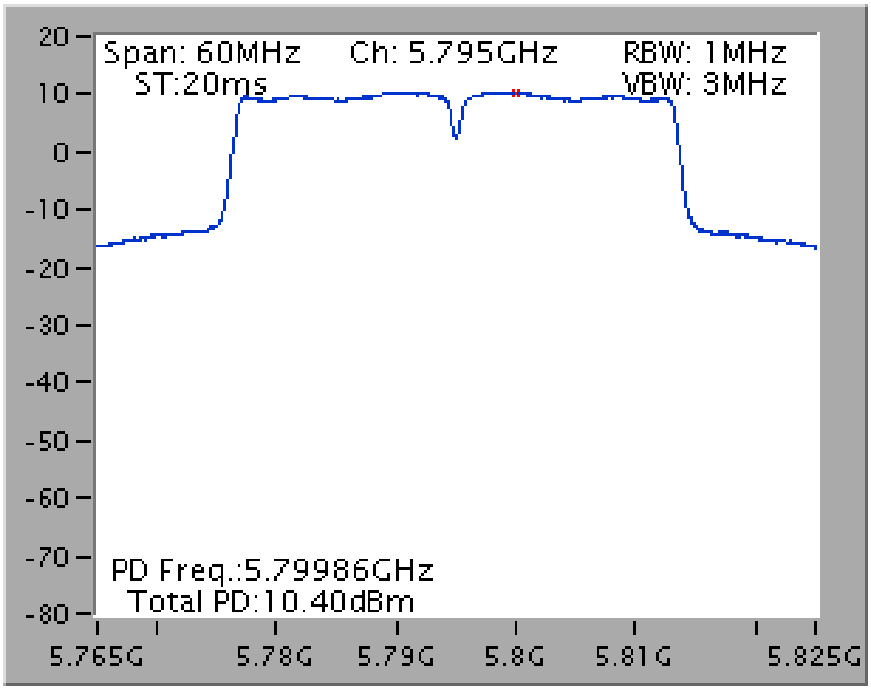
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 / 5785 MHz



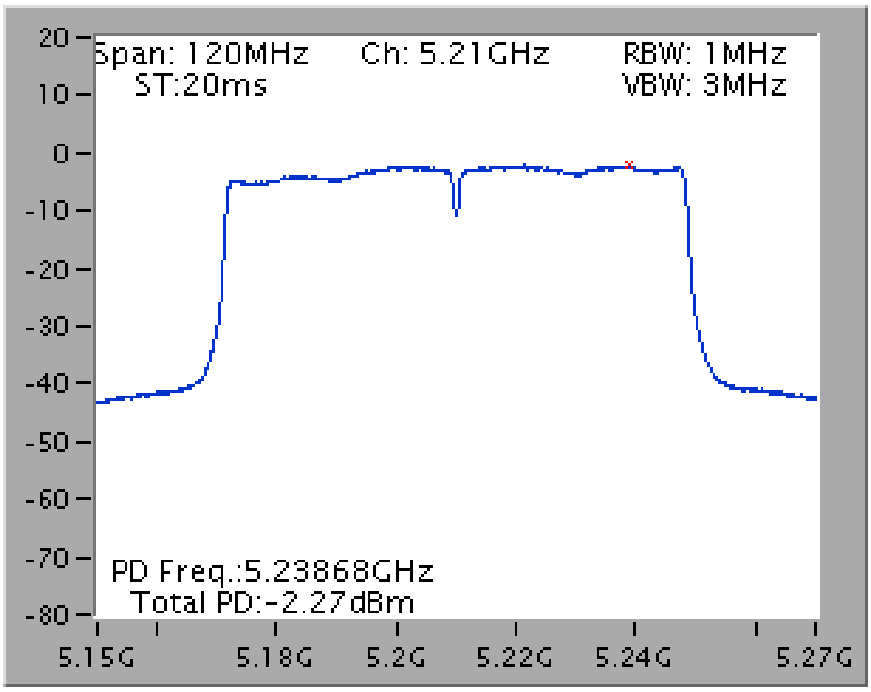
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 / 5230 MHz



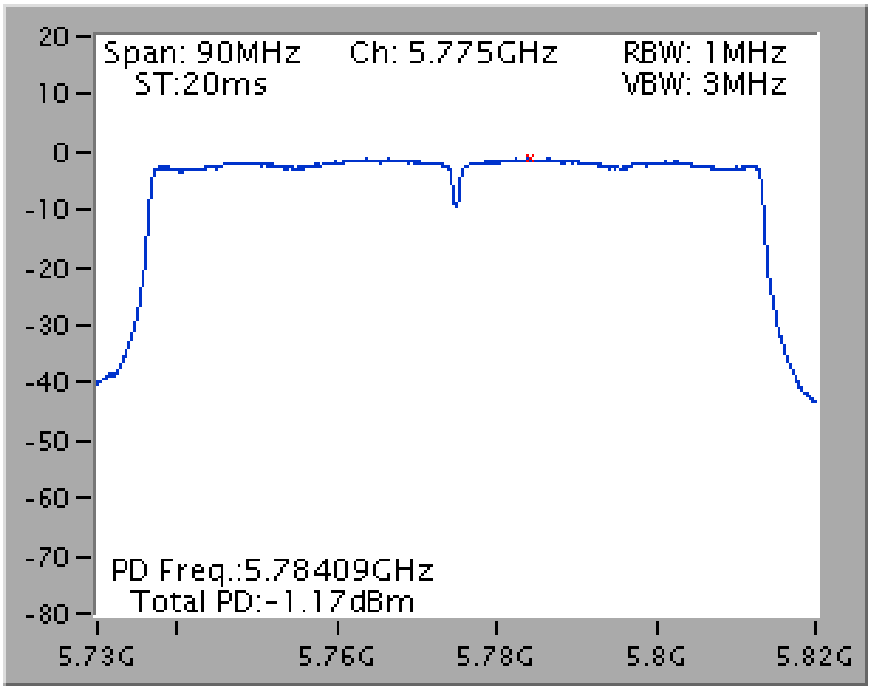
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 / 5795 MHz



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



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



4.6. Radiated Emissions Measurement

4.6.1. Limit

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

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

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

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

4.6.2. Measuring Instruments and Setting

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

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

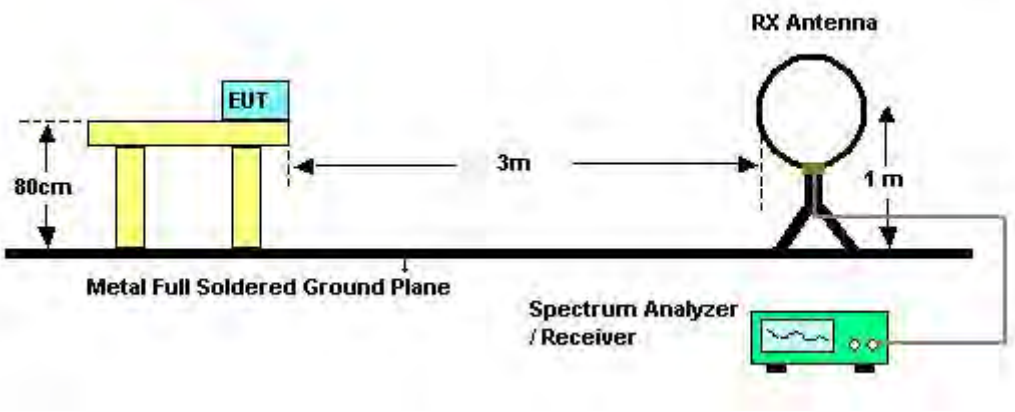
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

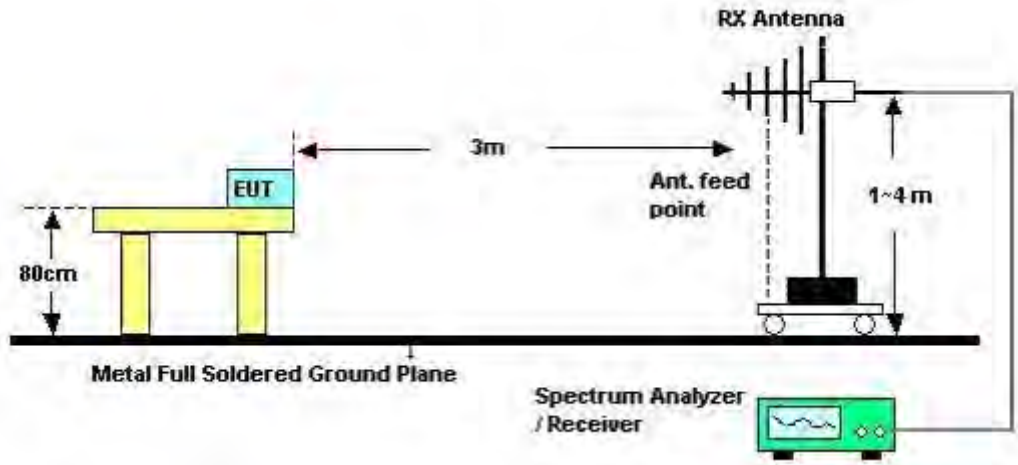
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

4.6.4. Test Setup Layout

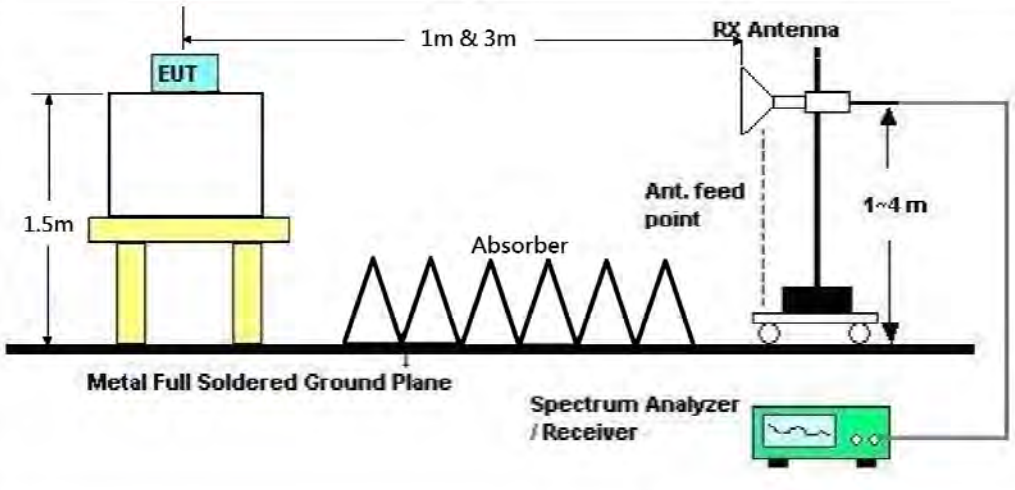
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	Normal Link
Test Date	Jul. 07, 2015	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.

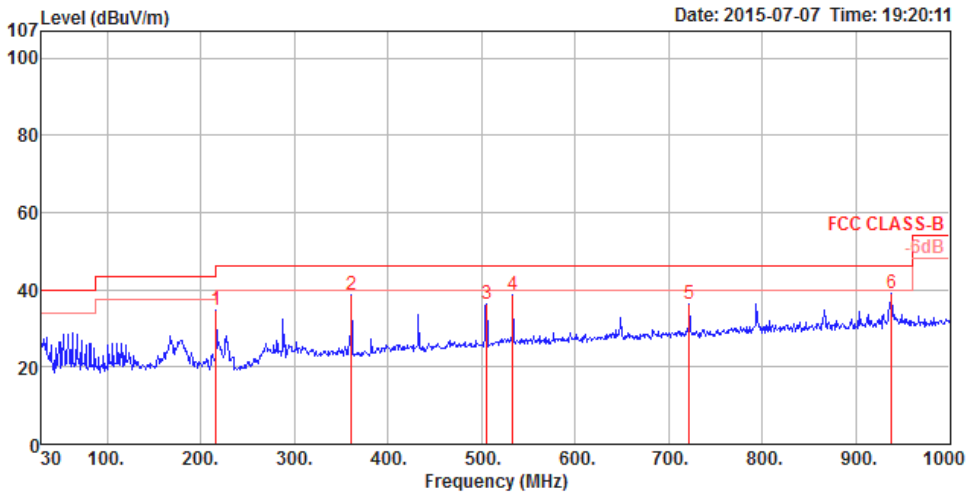
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

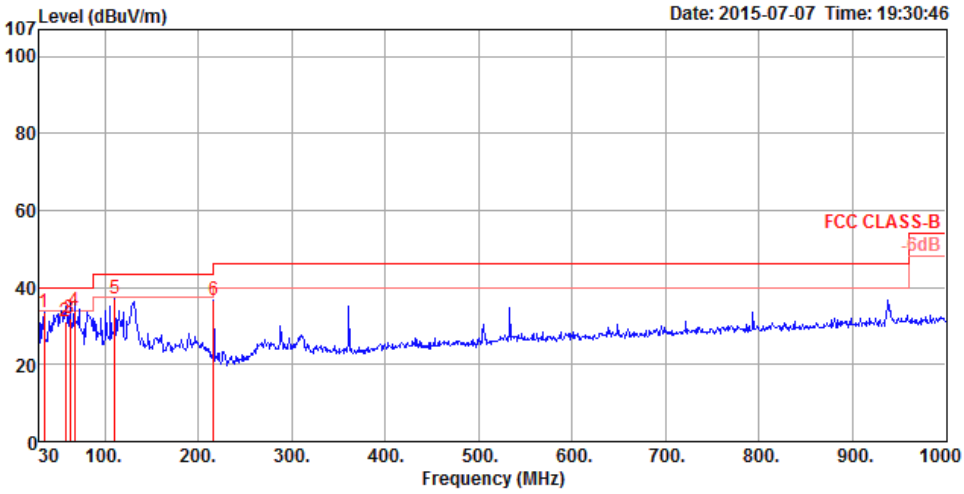
Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	216.24	34.90	46.00	-11.10	55.35	10.64	1.45	32.54	150	122	HORIZONTAL	Peak
2	360.77	38.68	46.00	-7.32	53.77	15.55	1.89	32.53	125	136	HORIZONTAL	Peak
3	505.30	36.17	46.00	-9.83	48.67	17.89	2.22	32.61	100	129	HORIZONTAL	Peak
4	533.43	38.58	46.00	-7.42	50.60	18.34	2.28	32.64	125	356	HORIZONTAL	Peak
5	721.61	36.18	46.00	-9.82	46.13	19.93	2.66	32.54	125	122	HORIZONTAL	Peak
6	937.92	39.29	46.00	-6.71	45.95	21.84	3.04	31.54	200	86	HORIZONTAL	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	34.85	33.66	40.00	-6.34	48.61	17.07	0.62	32.64	125	166	VERTICAL	Peak
2	58.13	31.29	40.00	-8.71	55.96	7.18	0.77	32.62	100	38	VERTICAL	QP
3	62.98	31.84	40.00	-8.16	56.85	6.80	0.80	32.61	100	137	VERTICAL	QP
4	67.83	33.99	40.00	-6.01	58.95	6.80	0.84	32.60	100	255	VERTICAL	QP
5	110.51	37.17	43.50	-6.33	56.37	12.32	1.05	32.57	100	295	VERTICAL	Peak
6	216.00	36.74	43.50	-6.76	57.19	10.64	1.45	32.54	125	119	VERTICAL	Peak

Note:

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

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

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

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

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 36 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15542.24	41.78	54.00	-12.22	30.27	7.56	38.67	34.72	325	121	Average	HORIZONTAL
2	15563.08	54.87	74.00	-19.13	43.40	7.57	38.64	34.74	325	121	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15547.16	54.72	74.00	-19.28	43.22	7.56	38.66	34.72	137	149	Peak	VERTICAL
2	15564.46	41.82	54.00	-12.18	30.35	7.57	38.64	34.74	137	149	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 40 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15577.42	56.08	74.00	-17.92	44.64	7.57	38.64	34.77	245	100	Peak	HORIZONTAL
2	15581.98	41.74	54.00	-12.26	30.31	7.57	38.63	34.77	245	100	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15590.38	55.90	74.00	-18.10	44.47	7.57	38.63	34.77	245	112	Peak	VERTICAL
2	15598.19	41.91	54.00	-12.09	30.48	7.58	38.62	34.77	245	112	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 48 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15720.94	42.26	54.00	-11.74	31.00	7.62	38.52	34.88	195	136	Average	HORIZONTAL
2	15724.05	54.78	74.00	-19.22	43.52	7.62	38.52	34.88	195	136	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15718.19	45.29	54.00	-8.71	34.03	7.62	38.52	34.88	48	136	Average	VERTICAL
2	15723.62	60.42	74.00	-13.58	49.16	7.62	38.52	34.88	48	136	Peak	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11490.29	43.68	54.00	-10.32	33.51	6.53	38.30	34.66	51	107	Average	HORIZONTAL
2	11490.80	57.15	74.00	-16.85	46.98	6.53	38.30	34.66	51	107	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11486.53	50.13	54.00	-3.87	39.96	6.53	38.30	34.66	191	108	Average	VERTICAL
2	11495.86	63.30	74.00	-10.70	53.13	6.53	38.30	34.66	191	108	Peak	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11572.10	58.43	74.00	-15.57	48.24	6.55	38.33	34.69	74	106	Peak	HORIZONTAL
2	11572.97	45.66	54.00	-8.34	35.47	6.55	38.33	34.69	74	106	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11571.95	50.39	54.00	-3.61	40.20	6.55	38.33	34.69	191	106	Average	VERTICAL
2	11572.32	65.23	74.00	-8.77	55.04	6.55	38.33	34.69	191	106	Peak	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11651.45	45.43	54.00	-8.57	35.23	6.56	38.36	34.72	53	104	Average	HORIZONTAL
2	11656.22	57.14	74.00	-16.86	46.94	6.56	38.36	34.72	53	104	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11646.67	50.34	54.00	-3.66	40.14	6.56	38.36	34.72	168	106	Average	VERTICAL
2	11651.88	63.43	74.00	-10.57	53.23	6.56	38.36	34.72	168	106	Peak	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15515.11	41.71	54.00	-12.29	30.17	7.55	38.69	34.70	222	123	Average	HORIZONTAL
2	15553.17	55.07	74.00	-18.93	43.59	7.56	38.66	34.74	222	123	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15517.13	54.57	74.00	-19.43	43.03	7.55	38.69	34.70	257	109	Peak	VERTICAL
2	15558.81	41.78	54.00	-12.22	30.30	7.56	38.66	34.74	257	109	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15585.46	41.84	54.00	-12.16	30.41	7.57	38.63	34.77	314	103	Average	HORIZONTAL
2	15610.42	55.83	74.00	-18.17	44.42	7.58	38.62	34.79	314	103	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15581.19	55.49	74.00	-18.51	44.06	7.57	38.63	34.77	354	124	Peak	VERTICAL
2	15595.73	41.97	54.00	-12.03	30.54	7.58	38.62	34.77	354	124	Average	VERTICAL

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15720.65	42.37	54.00	-11.63	31.11	7.62	38.52	34.88	82	138	Average	HORIZONTAL
2	15722.32	54.92	74.00	-19.08	43.66	7.62	38.52	34.88	82	138	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15714.57	56.92	74.00	-17.08	45.66	7.62	38.52	34.88	223	128	Peak	VERTICAL
2	15722.10	44.43	54.00	-9.57	33.17	7.62	38.52	34.88	223	128	Average	VERTICAL

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11488.55	56.08	74.00	-17.92	45.91	6.53	38.30	34.66	99	104	Peak	HORIZONTAL
2	11491.01	42.72	54.00	-11.28	32.55	6.53	38.30	34.66	99	104	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11490.72	49.66	54.00	-4.34	39.49	6.53	38.30	34.66	192	104	Average	VERTICAL
2	11496.08	63.16	74.00	-10.84	52.99	6.53	38.30	34.66	192	104	Peak	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11567.97	57.74	74.00	-16.26	47.54	6.55	38.33	34.68	48	106	Peak	HORIZONTAL
2	11570.80	45.30	54.00	-8.70	35.11	6.55	38.33	34.69	48	106	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11571.16	65.46	74.00	-8.54	55.27	6.55	38.33	34.69	191	108	Peak	VERTICAL
2	11571.16	50.90	54.00	-3.10	40.71	6.55	38.33	34.69	191	108	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11651.23	56.85	74.00	-17.15	46.65	6.56	38.36	34.72	242	111	Peak	HORIZONTAL
2	11651.38	44.22	54.00	-9.78	34.02	6.56	38.36	34.72	242	111	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11648.70	63.46	74.00	-10.54	53.26	6.56	38.36	34.72	192	111	Peak	VERTICAL
2	11648.70	50.08	54.00	-3.92	39.88	6.56	38.36	34.72	192	111	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15581.87	41.74	54.00	-12.26	30.31	7.57	38.63	34.77	154	101	Average	HORIZONTAL
2	15593.66	54.36	74.00	-19.64	42.93	7.57	38.63	34.77	154	101	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15567.97	54.37	74.00	-19.63	42.90	7.57	38.64	34.74	144	107	Peak	VERTICAL
2	15570.22	41.60	54.00	-12.40	30.13	7.57	38.64	34.74	144	107	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15703.96	54.38	74.00	-19.62	43.11	7.62	38.53	34.88	149	202	Peak	HORIZONTAL
2	15714.31	41.80	54.00	-12.20	30.54	7.62	38.52	34.88	149	202	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15690.51	42.26	54.00	-11.74	30.95	7.61	38.55	34.85	104	122	Average	VERTICAL
2	15708.38	55.26	74.00	-18.74	43.99	7.62	38.53	34.88	104	122	Peak	VERTICAL

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11516.51	39.35	54.00	-14.65	29.16	6.54	38.31	34.66	125	100	Average	HORIZONTAL
2	11523.53	51.98	74.00	-22.02	41.80	6.54	38.31	34.67	125	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11510.72	42.34	54.00	-11.66	32.16	6.54	38.30	34.66	192	100	Average	VERTICAL
2	11511.08	55.60	74.00	-18.40	45.42	6.54	38.30	34.66	192	100	Peak	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11589.20	43.91	54.00	-10.09	33.72	6.55	38.33	34.69	74	110	Average	HORIZONTAL
2	11601.72	55.87	74.00	-18.13	45.68	6.55	38.34	34.70	74	110	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11588.63	62.18	74.00	-11.82	51.99	6.55	38.33	34.69	192	106	Peak	VERTICAL
2	11591.23	49.64	54.00	-4.36	39.45	6.55	38.33	34.69	192	106	Average	VERTICAL

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15649.54	54.48	74.00	-19.52	43.11	7.60	38.58	34.81	132	118	Peak	HORIZONTAL
2	15654.53	41.82	54.00	-12.18	30.47	7.60	38.58	34.83	132	118	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15649.83	41.71	54.00	-12.29	30.36	7.60	38.58	34.83	214	100	Average	VERTICAL
2	15650.62	54.92	74.00	-19.08	43.57	7.60	38.58	34.83	214	100	Peak	VERTICAL

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11528.80	52.26	74.00	-21.74	42.08	6.54	38.31	34.67	18	106	Peak	HORIZONTAL
2	11536.18	39.39	54.00	-14.61	29.21	6.54	38.31	34.67	18	106	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11546.17	40.36	54.00	-13.64	30.19	6.54	38.31	34.68	181	113	Average	VERTICAL
2	11564.54	53.03	74.00	-20.97	42.84	6.55	38.32	34.68	181	113	Peak	VERTICAL

Note:

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

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

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

4.7. Band Edge Emissions Measurement

4.7.1. Limit

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

For transmitters operating in the 5.725-5.85 GHz band: all emissions 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	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5147.11	71.93	74.00	-2.07	69.06	4.26	33.14	34.53	167	189	Peak	VERTICAL
2	5148.55	52.59	54.00	-1.41	49.72	4.26	33.14	34.53	167	189	Average	VERTICAL
3	5178.55	117.91			114.98	4.27	33.19	34.53	167	189	Peak	VERTICAL
4	5178.55	107.55			104.62	4.27	33.19	34.53	167	189	Average	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5121.06	52.89	54.00	-1.11	50.09	4.24	33.09	34.53	175	186	Average	VERTICAL
2	5121.35	64.27	74.00	-9.73	61.47	4.24	33.09	34.53	175	186	Peak	VERTICAL
3	5201.45	106.71			103.74	4.28	33.22	34.53	175	186	Average	VERTICAL
4	5202.03	116.97			114.00	4.28	33.22	34.53	175	186	Peak	VERTICAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5120.91	44.95	54.00	-9.05	42.15	4.24	33.09	34.53	176	163	Average	VERTICAL
2	5128.29	58.10	74.00	-15.90	55.27	4.25	33.11	34.53	176	163	Peak	VERTICAL
3	5241.30	107.31			104.27	4.30	33.27	34.53	176	163	Average	VERTICAL
4	5242.17	117.32			114.25	4.30	33.30	34.53	176	163	Peak	VERTICAL
5	5357.38	46.68	54.00	-7.32	43.40	4.35	33.46	34.53	176	163	Average	VERTICAL
6	5358.68	59.79	74.00	-14.21	56.51	4.35	33.46	34.53	176	163	Peak	VERTICAL

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

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5713.26	62.35	68.20	-5.85	58.12	4.49	34.32	34.58	0	126	Peak	VERTICAL
2	5723.26	76.90	78.20	-1.30	72.61	4.50	34.37	34.58	0	126	Peak	VERTICAL
3	5742.97	104.06			99.72	4.50	34.42	34.58	0	126	Average	VERTICAL
4	5743.26	114.94			110.60	4.50	34.42	34.58	0	126	Peak	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5704.16	66.58	68.20	-1.62	62.34	4.49	34.32	34.57	179	114	Peak	VERTICAL
2	5720.66	59.71	78.20	-18.49	55.42	4.50	34.37	34.58	179	114	Peak	VERTICAL
3	5784.13	117.76			113.30	4.52	34.53	34.59	179	114	Peak	VERTICAL
4	5784.42	107.56			103.10	4.52	34.53	34.59	179	114	Average	VERTICAL
5	5850.87	59.77	78.20	-18.43	55.10	4.54	34.73	34.60	179	114	Peak	VERTICAL
6	5864.18	66.33	68.20	-1.87	61.59	4.55	34.79	34.60	179	114	Peak	VERTICAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5826.45	107.51			102.90	4.53	34.68	34.60	172	111	Average	VERTICAL
2	5827.03	117.58			112.97	4.53	34.68	34.60	172	111	Peak	VERTICAL
3	5850.29	73.35	78.20	-4.85	68.68	4.54	34.73	34.60	172	111	Peak	VERTICAL
4	5862.60	67.05	68.20	-1.15	62.31	4.55	34.79	34.60	172	111	Peak	VERTICAL

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

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5145.66	69.11	74.00	-4.89	66.24	4.26	33.14	34.53	173	204	Peak	VERTICAL
2	5148.26	52.37	54.00	-1.63	49.50	4.26	33.14	34.53	173	204	Average	VERTICAL
3	5178.55	105.47			102.54	4.27	33.19	34.53	173	204	Average	VERTICAL
4	5180.87	115.57			112.64	4.27	33.19	34.53	173	204	Peak	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5121.06	52.37	54.00	-1.63	49.57	4.24	33.09	34.53	210	197	Average	VERTICAL
2	5121.35	62.96	74.00	-11.04	60.16	4.24	33.09	34.53	210	197	Peak	VERTICAL
3	5198.84	105.45			102.48	4.28	33.22	34.53	210	197	Average	VERTICAL
4	5199.13	116.49			113.52	4.28	33.22	34.53	210	197	Peak	VERTICAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5121.78	58.50	74.00	-15.50	55.70	4.24	33.09	34.53	168	175	Peak	VERTICAL
2	5126.12	44.91	54.00	-9.09	42.08	4.25	33.11	34.53	168	175	Average	VERTICAL
3	5239.13	106.02			102.98	4.30	33.27	34.53	168	175	Average	VERTICAL
4	5242.17	116.35			113.28	4.30	33.30	34.53	168	175	Peak	VERTICAL
5	5352.17	45.65	54.00	-8.35	42.37	4.35	33.46	34.53	168	175	Average	VERTICAL
6	5354.78	57.79	74.00	-16.21	54.51	4.35	33.46	34.53	168	175	Peak	VERTICAL

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

Temperature	28℃	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5665.80	64.85	68.20	-3.35	60.77	4.47	34.17	34.56	0	126	Peak	VERTICAL
2	5724.28	74.90	78.20	-3.30	70.61	4.50	34.37	34.58	0	126	Peak	VERTICAL
3	5744.28	114.13			109.79	4.50	34.42	34.58	0	126	Peak	VERTICAL
4	5746.45	104.42			100.08	4.50	34.42	34.58	0	126	Average	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5713.26	66.21	68.20	-1.99	61.98	4.49	34.32	34.58	0	126	Peak	VERTICAL
2	5721.53	59.45	78.20	-18.75	55.16	4.50	34.37	34.58	0	126	Peak	VERTICAL
3	5785.00	117.02			112.56	4.52	34.53	34.59	0	126	Peak	VERTICAL
4	5786.74	107.37			102.86	4.52	34.58	34.59	0	126	Average	VERTICAL
5	5850.87	58.86	78.20	-19.34	54.19	4.54	34.73	34.60	0	126	Peak	VERTICAL
6	5862.16	65.01	68.20	-3.19	60.27	4.55	34.79	34.60	0	126	Peak	VERTICAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5827.60	105.92			101.31	4.53	34.68	34.60	179	108	Average	VERTICAL
2	5831.95	115.50			110.89	4.53	34.68	34.60	179	108	Peak	VERTICAL
3	5850.00	77.01	78.20	-1.19	72.34	4.54	34.73	34.60	179	108	Peak	VERTICAL
4	5898.21	65.03	68.20	-3.17	60.19	4.56	34.89	34.61	179	108	Peak	VERTICAL

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

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5147.83	66.67	74.00	-7.33	63.80	4.26	33.14	34.53	152	190	Peak	VERTICAL
2	5148.55	52.99	54.00	-1.01	50.12	4.26	33.14	34.53	152	190	Average	VERTICAL
3	5188.55	106.88			103.95	4.27	33.19	34.53	152	190	Peak	VERTICAL
4	5193.62	97.63			94.66	4.28	33.22	34.53	152	190	Average	VERTICAL

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5147.11	51.67	54.00	-2.33	48.80	4.26	33.14	34.53	168	175	Average	VERTICAL
2	5148.55	61.97	74.00	-12.03	59.10	4.26	33.14	34.53	168	175	Peak	VERTICAL
3	5234.34	104.17			101.13	4.30	33.27	34.53	168	175	Average	VERTICAL
4	5237.24	113.49			110.45	4.30	33.27	34.53	168	175	Peak	VERTICAL

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

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5713.26	67.17	68.20	-1.03	62.94	4.49	34.32	34.58	172	119	Peak	VERTICAL
2	5723.26	70.39	78.20	-7.81	66.10	4.50	34.37	34.58	172	119	Peak	VERTICAL
3	5752.83	97.74			93.33	4.51	34.48	34.58	172	119	Average	VERTICAL
4	5758.47	108.63			104.22	4.51	34.48	34.58	172	119	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5711.09	66.52	68.20	-1.68	62.29	4.49	34.32	34.58	152	102	Peak	VERTICAL
2	5721.09	71.21	78.20	-6.99	66.92	4.50	34.37	34.58	152	102	Peak	VERTICAL
3	5791.09	114.88			110.37	4.52	34.58	34.59	152	102	Peak	VERTICAL
4	5791.09	105.24			100.73	4.52	34.58	34.59	152	102	Average	VERTICAL
5	5851.74	73.53	78.20	-4.67	68.86	4.54	34.73	34.60	152	102	Peak	VERTICAL
6	5861.74	67.13	68.20	-1.07	62.39	4.55	34.79	34.60	152	102	Peak	VERTICAL

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

Temperature	28°C	Humidity	57%
Test Engineer	Alvin Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 1 + Chain 2
Test Date	Jun. 18, 2015		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5144.21	64.24	74.00	-9.76	61.37	4.26	33.14	34.53	168	177	Peak	VERTICAL
2	5149.28	52.74	54.00	-1.26	49.87	4.26	33.14	34.53	168	177	Average	VERTICAL
3	5219.41	93.42			90.41	4.29	33.25	34.53	168	177	Average	VERTICAL
4	5222.30	102.97			99.96	4.29	33.25	34.53	168	177	Peak	VERTICAL

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

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5708.49	66.72	68.20	-1.48	62.49	4.49	34.32	34.58	169	100	Peak	VERTICAL
2	5723.55	69.97	78.20	-8.23	65.68	4.50	34.37	34.58	169	100	Peak	VERTICAL
3	5765.59	91.37			86.96	4.51	34.48	34.58	169	100	Average	VERTICAL
4	5780.79	104.11			99.64	4.52	34.53	34.58	169	100	Peak	VERTICAL
5	5853.62	62.52	78.20	-15.68	57.78	4.55	34.79	34.60	169	100	Peak	VERTICAL
6	5861.45	62.11	68.20	-6.09	57.37	4.55	34.79	34.60	169	100	Peak	VERTICAL

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

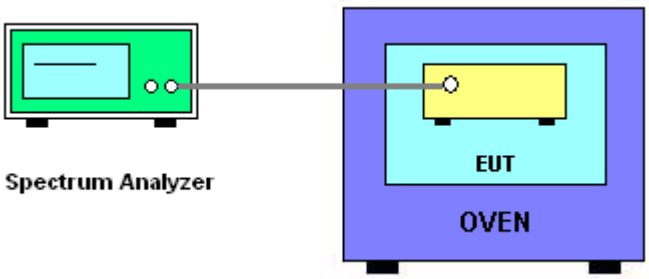
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C～50°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	25°C	Humidity	45%
Test Engineer	Lucas Huang	Test Date	Jul. 06, 2015

Mode: 20 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5200 MHz	5785 MHz
126.50	5199.9496	5784.9413
110.00	5199.9483	5784.9421
93.50	5199.9491	5784.9417
Max. Deviation (MHz)	0.0517	0.0587
Max. Deviation (ppm)	9.94	10.15

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5200 MHz	5785 MHz
-20	5199.9485	5784.9426
-10	5199.9488	5784.9417
0	5199.9487	5784.9423
10	5199.9492	5784.9421
20	5199.9283	5784.9419
30	5199.9495	5784.9427
40	5199.9499	5784.9496
50	5199.9482	5784.9491
Max. Deviation (MHz)	0.0717	0.0583
Max. Deviation (ppm)	13.79	10.08

Mode: 40 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5190 MHz	5755 MHz
126.50	5189.9436	5754.9464
110.00	5189.9440	5754.9463
93.50	5189.9442	5754.9459
Max. Deviation (MHz)	0.0564	0.0541
Max. Deviation (ppm)	10.87	9.40

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5190 MHz	5755 MHz
-20	5189.9449	5754.9472
-10	5189.9452	5754.9469
0	5189.9447	5754.9477
10	5189.9451	5754.9482
20	5189.9462	5754.9479
30	5189.9466	5754.9486
40	5189.9457	5754.9499
50	5189.9462	5754.9489
Max. Deviation (MHz)	0.0553	0.0531
Max. Deviation (ppm)	10.66	9.23

Mode: 80 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5210 MHz	5775 MHz
126.50	5209.9488	5774.9463
110.00	5209.9479	5774.9461
93.50	5209.9485	5774.9459
Max. Deviation (MHz)	0.0521	0.0541
Max. Deviation (ppm)	10.00	9.37

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5210 MHz	5775 MHz
-20	5209.9436	5774.9418
-10	5209.9439	5774.9422
0	5209.9442	5774.9436
10	5209.9448	5774.9428
20	5209.9437	5774.9429
30	5209.9433	5774.9441
40	5209.9445	5774.9437
50	5209.9430	5774.9440
Max. Deviation (MHz)	0.0570	0.0582
Max. Deviation (ppm)	10.94	10.08

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. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	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. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

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

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

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%