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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-X6200**

Product Name	AC750 ADSL/VDSL Dual-Band Wi-Fi Modem
Brand Name	LINKSYS
Model No.	X6200
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Aug. 24, 2015
Final Test Date	Nov. 06, 2015
Submission Type	Original Equipment

Statement

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

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

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

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

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

TAF
Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5O1517AB	Rev. 01	Initial issue of report	Dec. 17, 2015
FR5O1517AB	Rev. 02	1. Changing the Applicant 2. Changing the Product Name	Jan. 18, 2016
FR5O1517AB	Rev. 03	Changing the Applicant	Feb. 24, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	AC750 ADSL/VDSL Dual-Band Wi-Fi Modem
Brand Name	:	LINKSYS
Model No.	:	X6200
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 Aug. 24, 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	7.74 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	1.18 dB
4.5	15.407(a)	Power Spectral Density	Complies	1.16 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.01 dB
4.7	15.407(b)	Band Edge Emissions	Complies	1.13 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
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: 26.31 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 28.83 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 38.49 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.54 MHz Band 4: IEEE 802.11a: 29.18 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 34.82 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.63 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.25 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 28.66 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 28.50 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 27.37 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 23.17 dBm Band 4: IEEE 802.11a: 28.82 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 28.82 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.94 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 22.92 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☐ With beamforming	☒ Without beamforming
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	Manufacturer	Trademark	Model	Rating
Adapter 1 (Fixed Plug)	LEI	-	MU18A21201 50-A1	Input: 100-240V ~ 50/60Hz 0.5A Output: 12V, 1.5A
Adapter 2 (Fixed Plug)	DVE	LINKSYS	DSA-18PFG-1 2 FUS 120150	Input: 100-240V ~ 50/60Hz 0.6A Output: 12V, 1.5A
Adapter 3 (Interchangeable Plug)	DVE	LINKSYS	DSA-20CA-12 120150	Input: 100-240V ~ 50/60Hz 0.8A Output: 12V, 1.5A
Others				
RJ-45 Cable*1: Non-shieled, 1.5m Plug*1 (Only for adapter 3 use)				

Note: The power adapter does not affect the test result of RF tests, so only adapter 2 was tested and recorded in this report.

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	INPAQ	AX6200	PIFA Antenna	N/A	3.91	-
2	INPAQ	AX6200	PIFA Antenna	N/A	3.56	-
3	INPAQ	AX6200	PIFA Antenna	I-PEX	-	3.51
4	INPAQ	AX6200	PIFA Antenna	I-PEX	-	3.37

Note: The EUT has four antennas.

For 2.4GHz function:

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

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

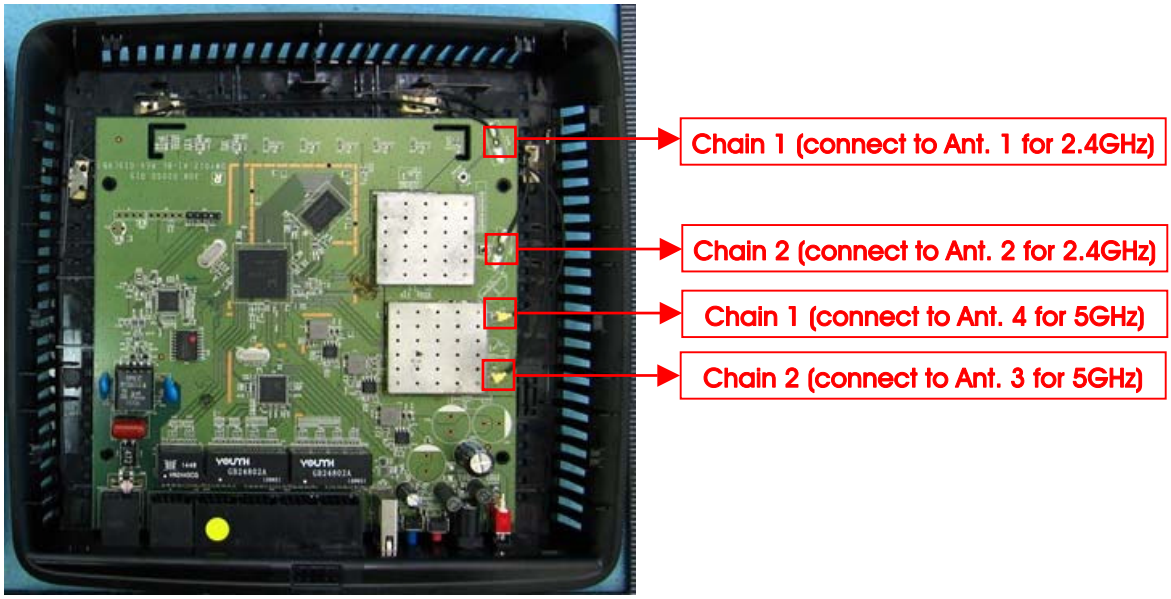
Chain 1 and Chain 2 could transmit/receive simultaneously.

For 5GHz function:

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

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

Chain 1 and Chain 2 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

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

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

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1+2
	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
	40 MHz	Band 1&4	-	38/151	1
	80 MHz	Band 1&4	-	42/155	1

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. EUT with Adapter 1 - VDSL Mode

Mode 2. EUT with Adapter 1 - ADSL Mode

Mode 3. EUT with Adapter 1 - WAN Mode

Mode 3 has been evaluated to be the worst case among Mode 1～3, thus measurement for Mode 4 ～ 5 will follow this same test mode.

Mode 4. EUT with Adapter 2 - WAN Mode

Mode 5. EUT with Adapter 3 - WAN Mode

Mode 4 is the worst case, so it was selected to record in this test report.

For Radiated Emission test<Below 1GHz>:

Mode 1. EUT Z axis with Adapter 1 - WAN Mode

Mode 2. EUT X axis with Adapter 1 - WAN Mode

Mode 1 has been evaluated to be the worst case between Mode 1～2, thus measurement for Mode 3 ～ 4 will follow this same test mode.

Mode 3. EUT Z axis with Adapter 1 - ADSL Mode

Mode 4. EUT Z axis with Adapter 1 - VDSL Mode

Mode 1 has been evaluated to be the worst case among Mode 1～4, thus measurement for Mode 5 ～ 12 will follow this same test mode.

Mode 5. EUT Z axis with Adapter 2 - WAN Mode

Mode 6. EUT Z axis with Adapter 3 - WAN Mode

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 X axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at X axis. So the measurement will follow this same test configuration.

Mode 1. EUT X axis - CTX

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 FA5O1517) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E4300	DoC
Flash Disk	Silicon	I-Series	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E6430	DoC
Flash Disk	Silicon	I-Series	DoC

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

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	RTL819x 3.0 -2014/09/30					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	52/52	63/63	61/61	44/44	61/61	42/41
802.11ac MCS0/Nss1 VHT20	53/52	63/63	54/54	43/43	59/59	45/44
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	49/49		57/57		43/43	46/46
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	47/46				40/40	

3.9. EUT Operation during Test

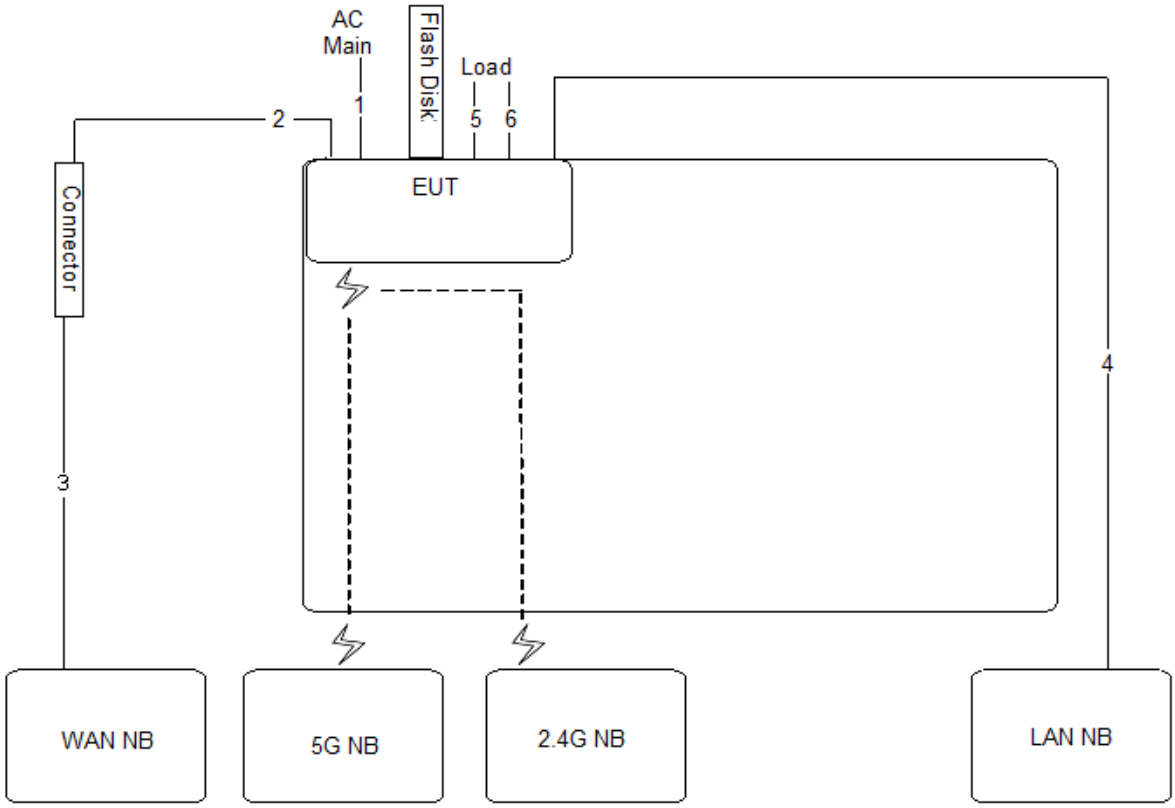
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	1.000	1.000	100.00%	0.00	0.01
802.11ac MCS0/Nss1 VHT20	1.000	1.000	100.00%	0.00	0.01
802.11ac MCS0/Nss1 VHT40	1.000	1.000	100.00%	0.00	0.01
802.11ac MCS0/Nss1 VHT80	1.000	1.000	100.00%	0.00	0.01

3.11. Test Configurations

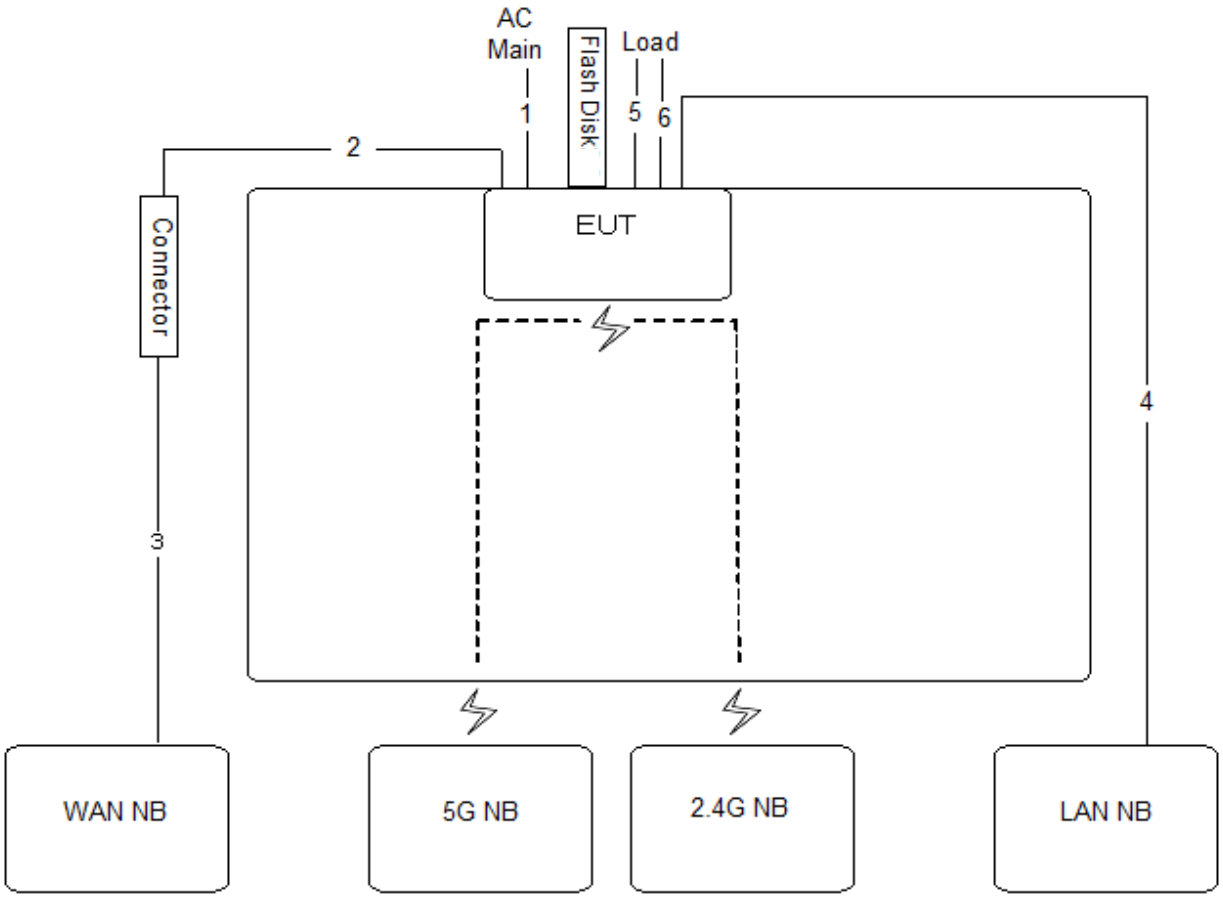
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	RJ-45 cable*3	No	1.5m
6	RJ-11 cable	No	1.5m

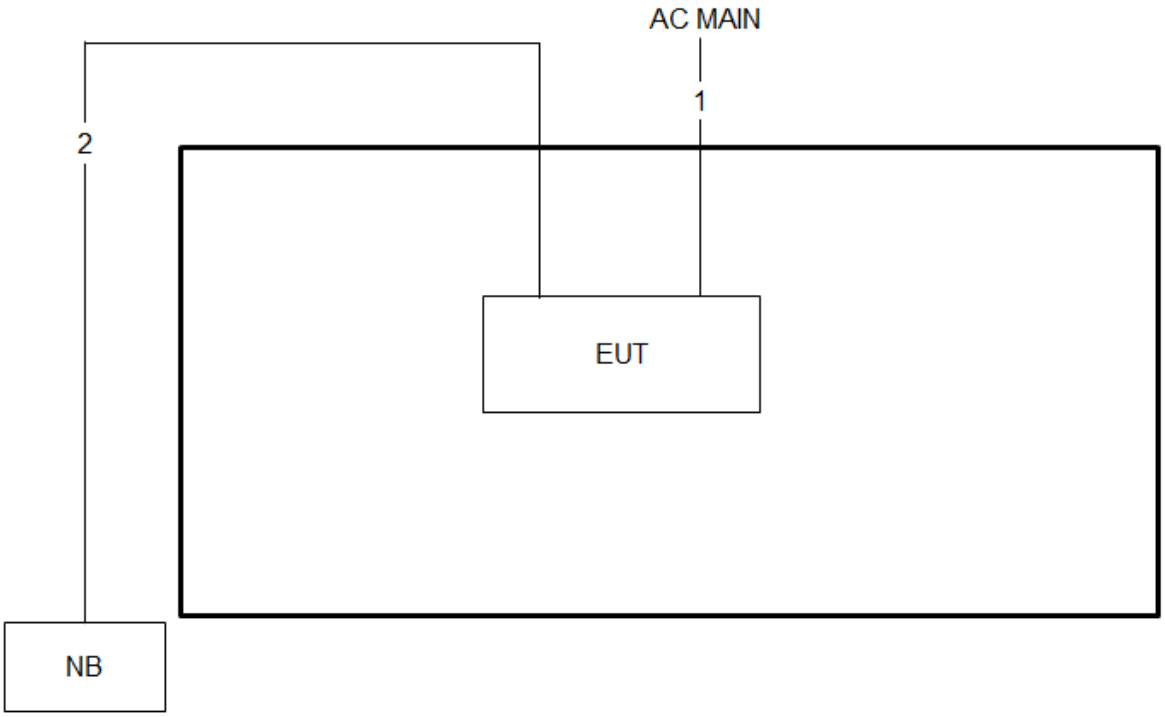
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	RJ-45 cable*3	No	1.5m
6	RJ-11 cable	No	1.5m

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

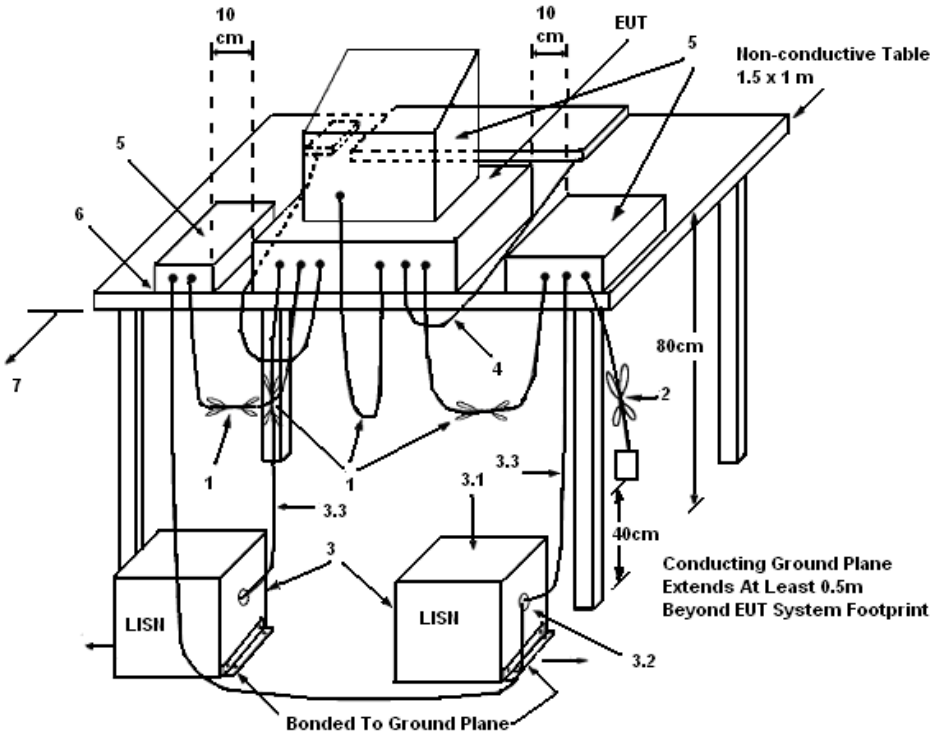
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

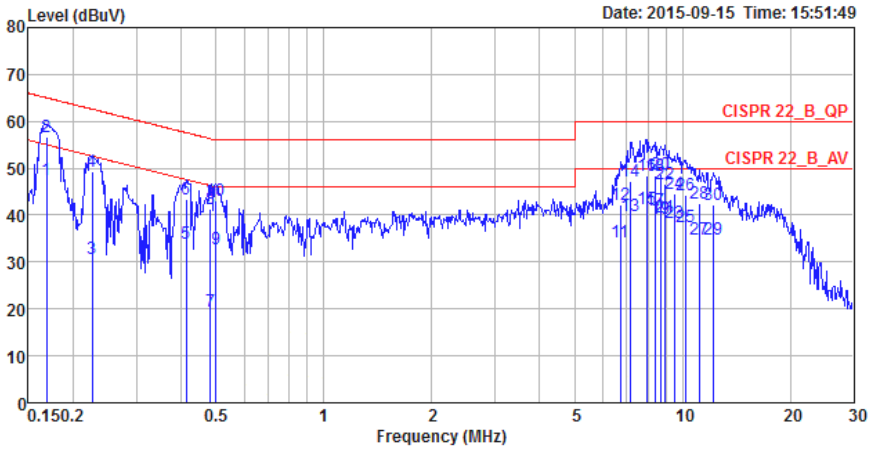
There is no deviation with the original standard.

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

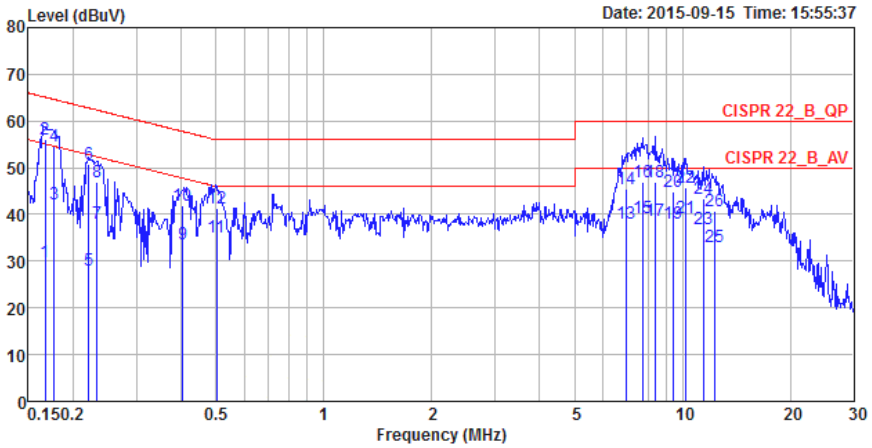
Temperature	25℃	Humidity	62%
Test Engineer	Edison Lin	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1685	47.56	-7.47	55.03	37.61	9.93	0.02	LINE	Average
2	0.1685	56.68	-8.35	65.03	46.73	9.93	0.02	LINE	QP
3	0.2256	30.74	-21.87	52.61	20.78	9.93	0.03	LINE	Average
4	0.2256	49.17	-13.44	62.61	39.21	9.93	0.03	LINE	QP
5	0.4127	33.85	-13.74	47.59	23.88	9.93	0.04	LINE	Average
6	0.4127	43.26	-14.33	57.59	33.29	9.93	0.04	LINE	QP
7	0.4837	19.37	-26.90	46.27	9.39	9.94	0.04	LINE	Average
8	0.4837	41.43	-14.84	56.27	31.45	9.94	0.04	LINE	QP
9	0.4994	32.67	-13.34	46.01	22.69	9.94	0.04	LINE	Average
10	0.4994	43.04	-12.97	56.01	33.06	9.94	0.04	LINE	QP
11	6.6978	34.15	-15.85	50.00	23.90	10.11	0.14	LINE	Average
12	6.6978	42.25	-17.75	60.00	32.00	10.11	0.14	LINE	QP
13	7.1754	39.71	-10.29	50.00	29.45	10.12	0.14	LINE	Average
14	7.1754	47.16	-12.84	60.00	36.90	10.12	0.14	LINE	QP
15	7.9353	41.19	-8.81	50.00	30.88	10.14	0.17	LINE	Average
16	7.9353	48.45	-11.55	60.00	38.14	10.14	0.17	LINE	QP
17	8.3671	41.16	-8.84	50.00	30.83	10.15	0.18	LINE	Average

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
18	8.3671	48.32	-11.68	60.00	37.99	10.15	0.18	LINE	QP
19	8.6832	39.24	-10.76	50.00	28.89	10.15	0.20	LINE	Average
20	8.6832	48.57	-11.43	60.00	38.22	10.15	0.20	LINE	QP
21	8.9637	39.44	-10.56	50.00	29.07	10.16	0.21	LINE	Average
22	8.9637	46.55	-13.45	60.00	36.18	10.16	0.21	LINE	QP
23	9.5016	38.30	-11.70	50.00	27.91	10.17	0.22	LINE	Average
24	9.5016	44.72	-15.28	60.00	34.33	10.17	0.22	LINE	QP
25	10.1791	37.57	-12.43	50.00	27.14	10.19	0.24	LINE	Average
26	10.1791	44.28	-15.72	60.00	33.85	10.19	0.24	LINE	QP
27	11.1977	34.83	-15.17	50.00	24.37	10.22	0.24	LINE	Average
28	11.1977	42.52	-17.48	60.00	32.06	10.22	0.24	LINE	QP
29	12.1884	34.91	-15.09	50.00	24.41	10.25	0.25	LINE	Average
30	12.1884	42.15	-17.85	60.00	31.65	10.25	0.25	LINE	QP

Temperature	25°C	Humidity	62%
Test Engineer	Edison Lin	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	0.1668	29.77	-25.35	55.12	19.97	9.78	0.02	NEUTRAL	Average
2	0.1668	56.12	-9.00	65.12	46.32	9.78	0.02	NEUTRAL	QP
3	0.1768	42.36	-12.28	54.64	32.55	9.79	0.02	NEUTRAL	Average
4	0.1768	54.69	-9.95	64.64	44.88	9.79	0.02	NEUTRAL	QP
5	0.2208	28.18	-24.61	52.79	18.36	9.79	0.03	NEUTRAL	Average
6	0.2208	50.80	-11.99	62.79	40.98	9.79	0.03	NEUTRAL	QP
7	0.2329	38.14	-14.21	52.35	28.32	9.79	0.03	NEUTRAL	Average
8	0.2329	47.07	-15.28	62.35	37.25	9.79	0.03	NEUTRAL	QP
9	0.4040	33.71	-14.06	47.77	23.88	9.79	0.04	NEUTRAL	Average
10	0.4040	41.79	-15.98	57.77	31.96	9.79	0.04	NEUTRAL	QP
11	0.5020	35.00	-11.00	46.00	25.17	9.79	0.04	NEUTRAL	Average
12	0.5020	41.24	-14.76	56.00	31.41	9.79	0.04	NEUTRAL	QP
13	6.9508	38.07	-11.93	50.00	27.98	9.95	0.14	NEUTRAL	Average
14	6.9508	45.44	-14.56	60.00	35.35	9.95	0.14	NEUTRAL	QP
15	7.7278	39.22	-10.78	50.00	29.09	9.97	0.16	NEUTRAL	Average
16	7.7278	46.82	-13.18	60.00	36.69	9.97	0.16	NEUTRAL	QP
17	8.3671	38.75	-11.25	50.00	28.59	9.98	0.18	NEUTRAL	Average

	Freq	Level	Limit	Line	Level	Factor	Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
18	8.3671	46.84	-13.16	60.00	36.68	9.98	0.18	NEUTRAL	QP
19	9.4015	37.98	-12.02	50.00	27.76	10.00	0.22	NEUTRAL	Average
20	9.4015	44.94	-15.06	60.00	34.72	10.00	0.22	NEUTRAL	QP
21	10.1791	39.21	-10.79	50.00	28.96	10.01	0.24	NEUTRAL	Average
22	10.1791	45.68	-14.32	60.00	35.43	10.01	0.24	NEUTRAL	QP
23	11.4376	36.88	-13.12	50.00	26.59	10.04	0.25	NEUTRAL	Average
24	11.4376	43.38	-16.62	60.00	33.09	10.04	0.25	NEUTRAL	QP
25	12.3182	32.99	-17.01	50.00	22.68	10.06	0.25	NEUTRAL	Average
26	12.3182	40.63	-19.37	60.00	30.32	10.06	0.25	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

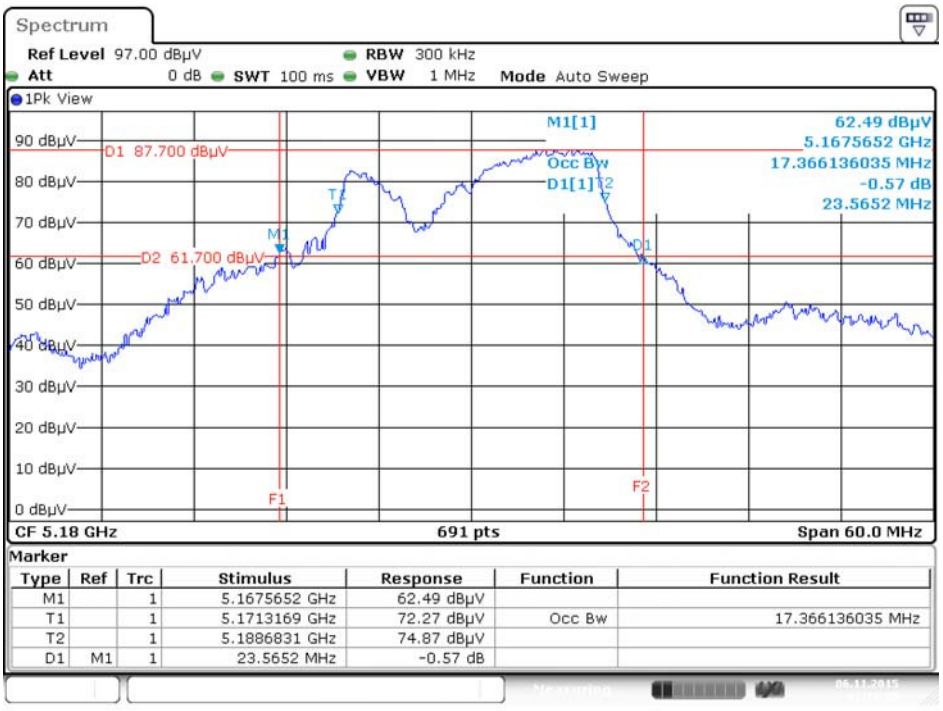
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25℃	Humidity	45%
Test Engineer	Clemens Fang		

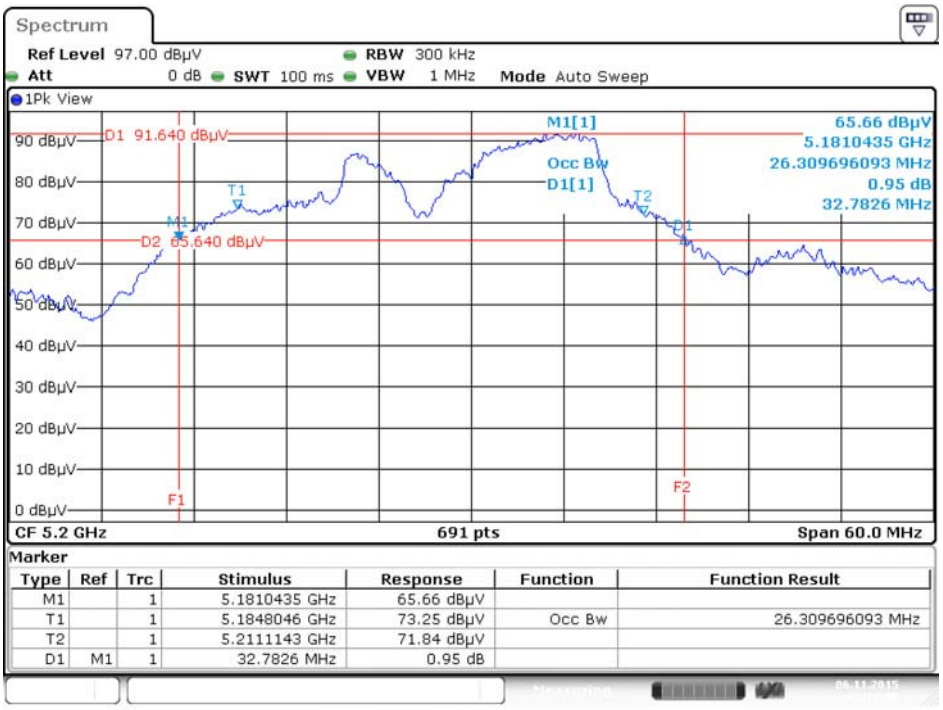
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	23.57	17.37
	5200 MHz	32.78	26.31
	5240 MHz	29.91	22.58
	5745 MHz	21.48	17.28
	5785 MHz	42.17	29.18
	5825 MHz	21.48	17.19
802.11ac MCS0/Nss1 VHT20	5180 MHz	22.17	17.97
	5200 MHz	44.87	28.83
	5240 MHz	36.00	18.84
	5745 MHz	22.17	17.97
	5785 MHz	48.26	34.82
	5825 MHz	23.57	18.15
802.11ac MCS0/Nss1 VHT40	5190 MHz	45.22	37.34
	5230 MHz	72.03	38.49
	5755 MHz	45.07	37.34
	5795 MHz	55.51	37.63
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.61	75.54
	5775 MHz	82.32	75.25

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



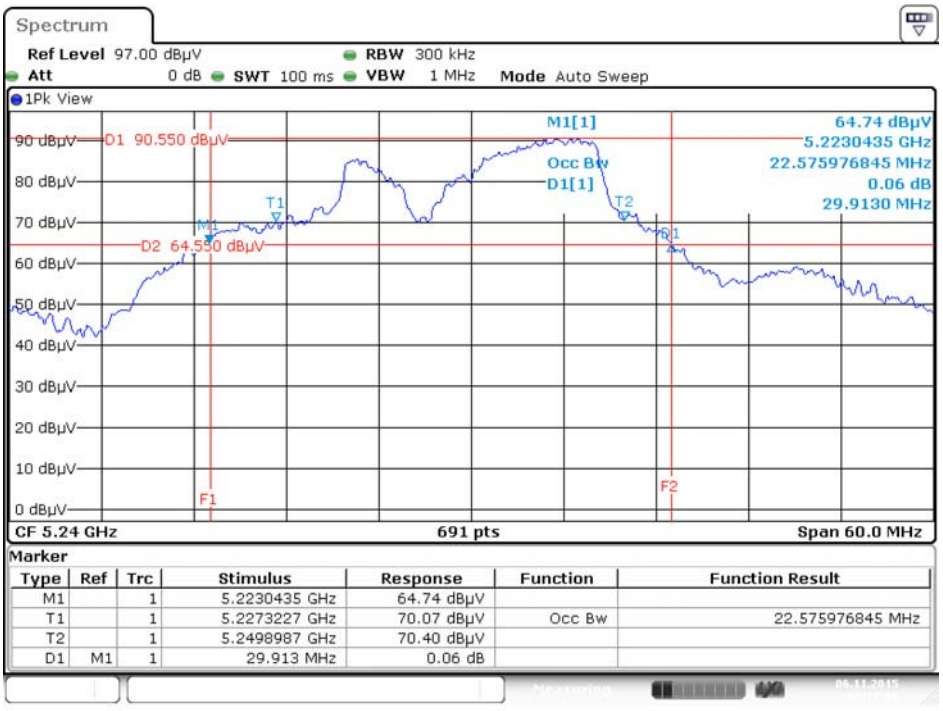
Date: 6.NOV.2015 02:10:09

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



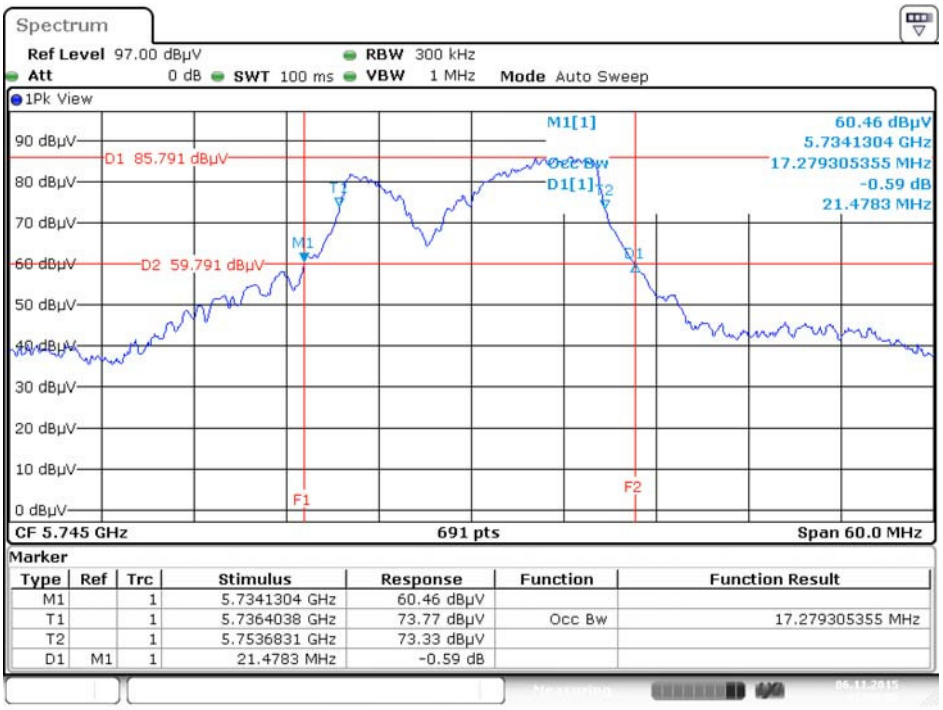
Date: 6.NOV.2015 02:10:57

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



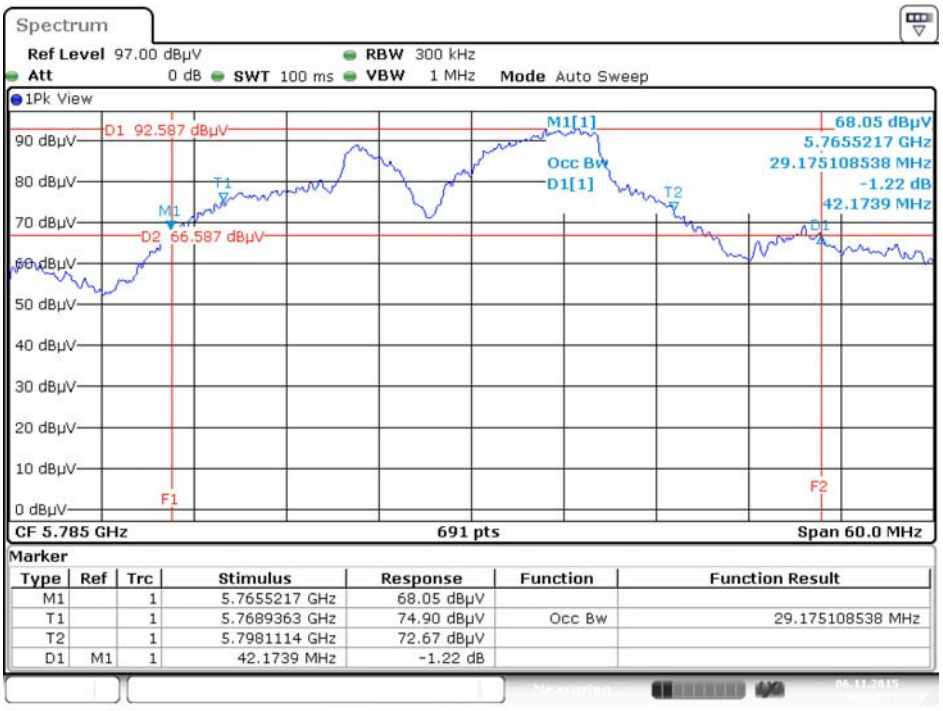
Date: 6.NOV.2015 02:18:17

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



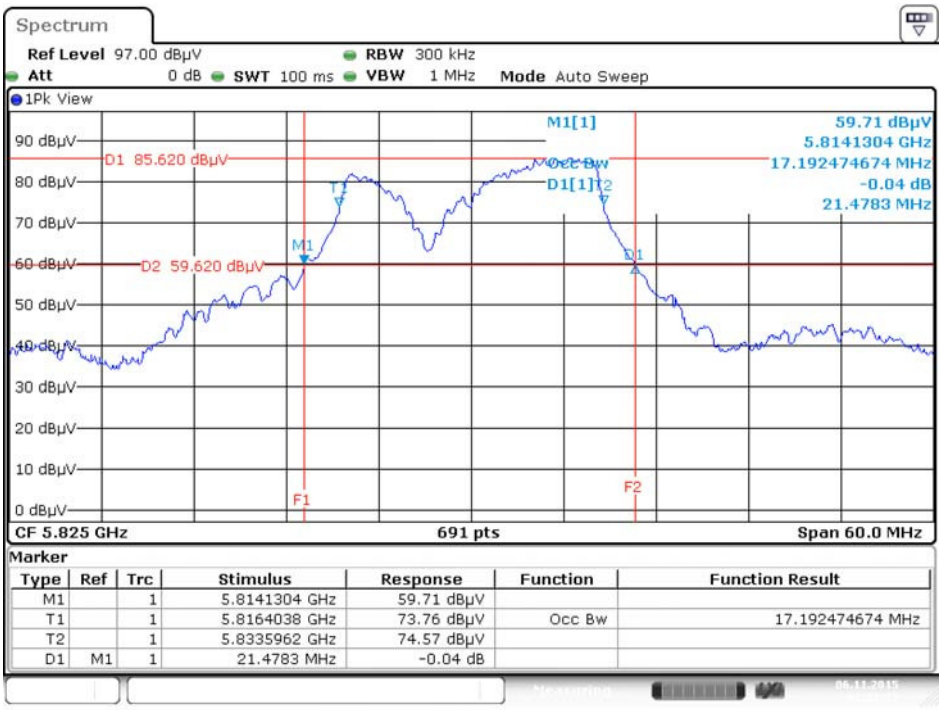
Date: 6.NOV.2015 02:20:36

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



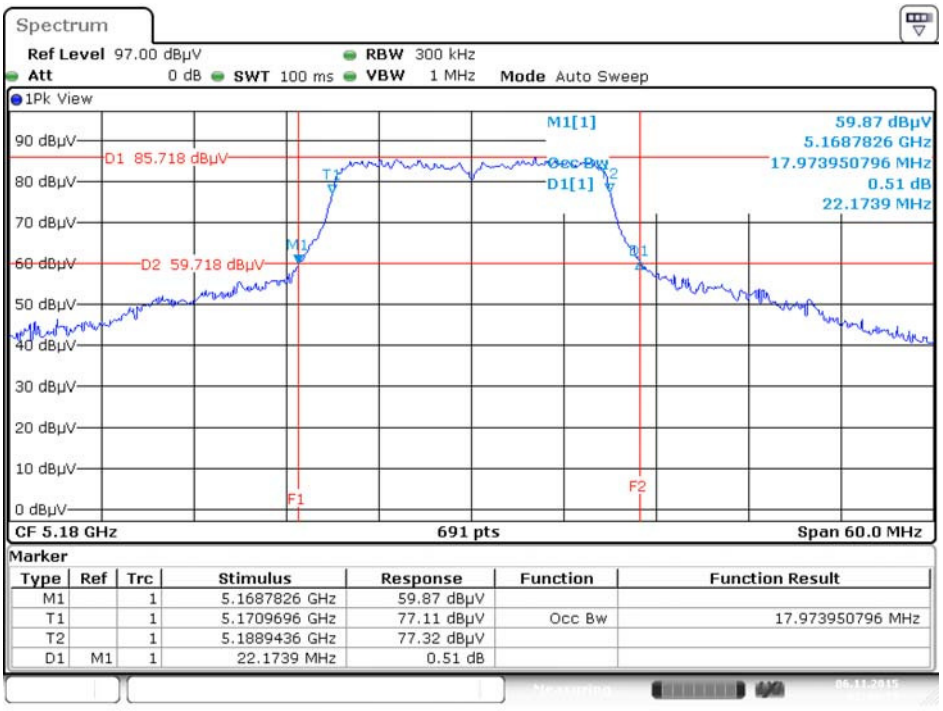
Date: 6.NOV.2015 02:21:31

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



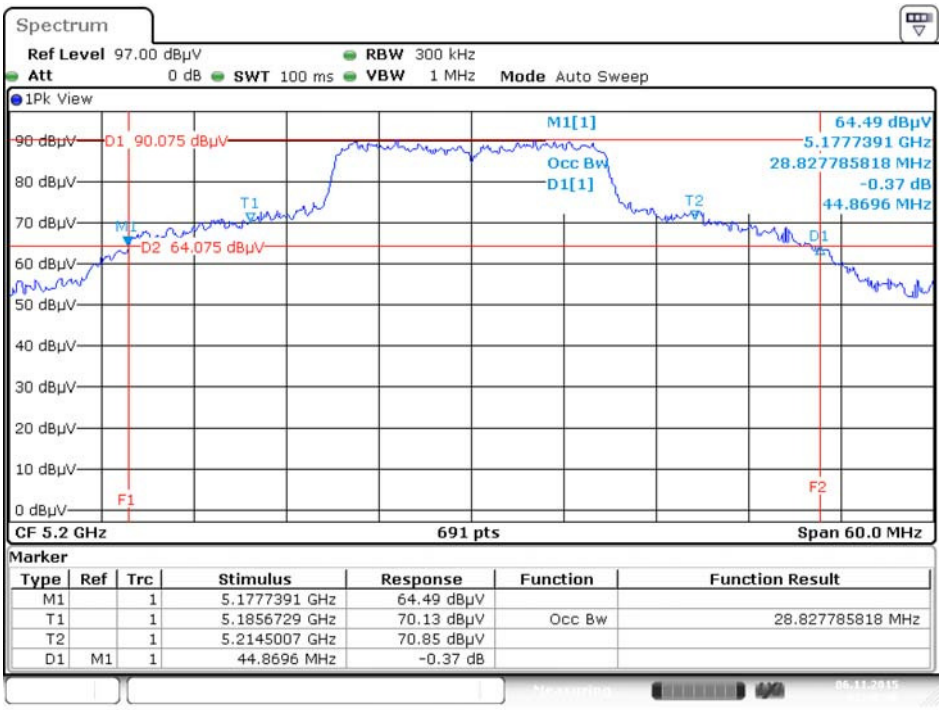
Date: 6.NOV.2015 02:22:28

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



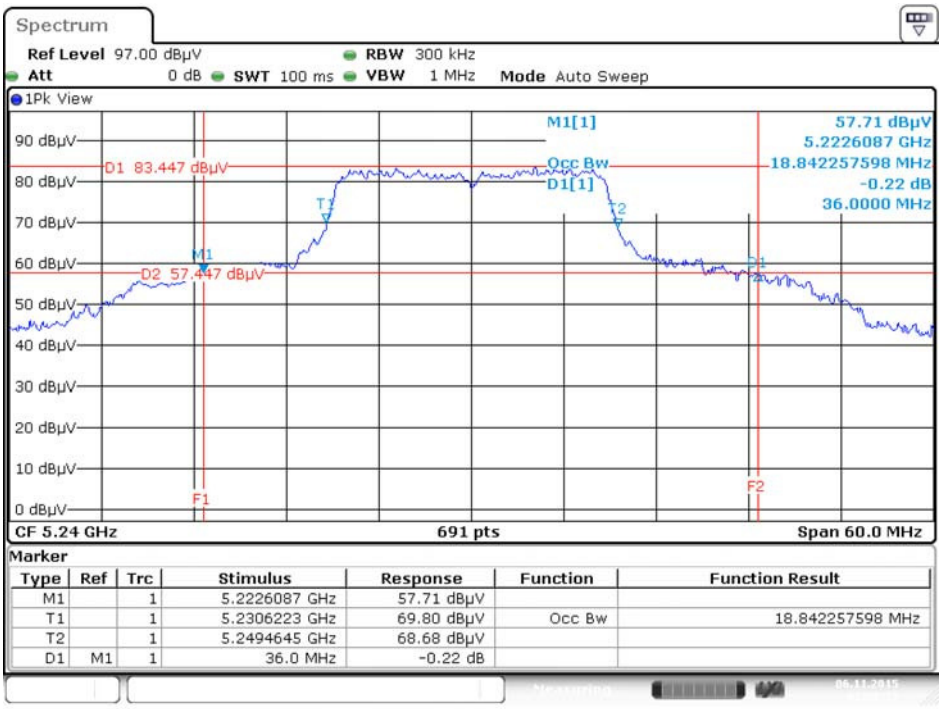
Date: 6.NOV.2015 02:49:34

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



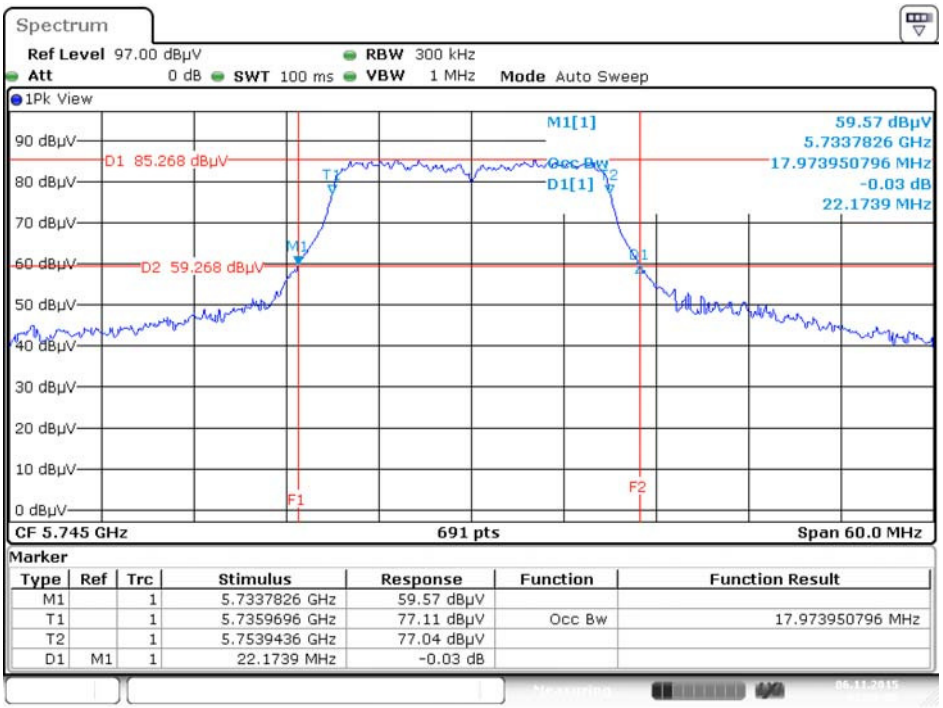
Date: 6.NOV.2015 02:48:46

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



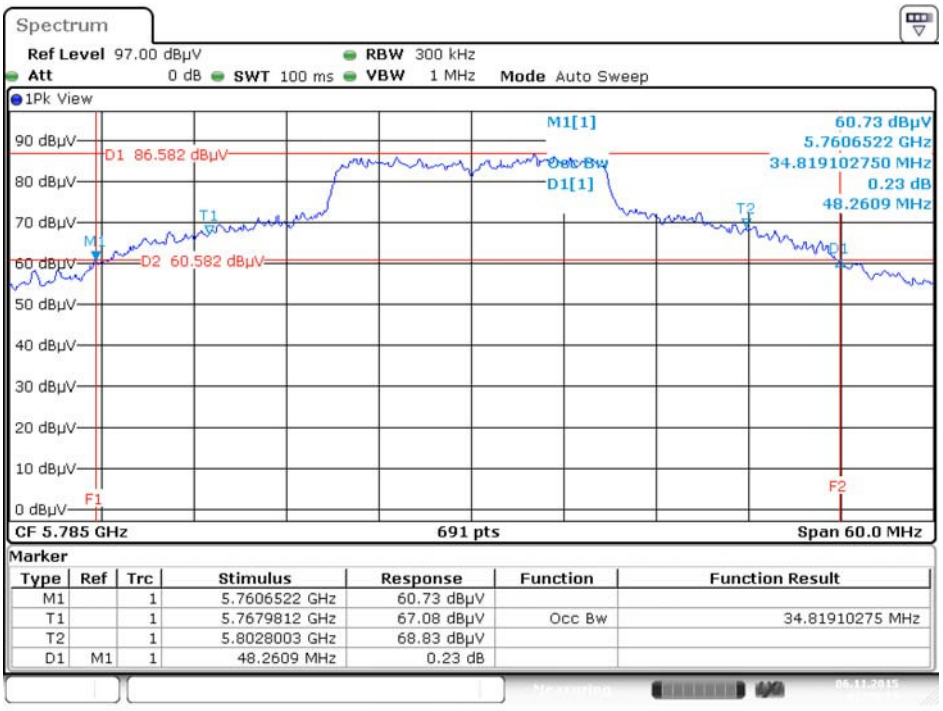
Date: 6.NOV.2015 02:28:27

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



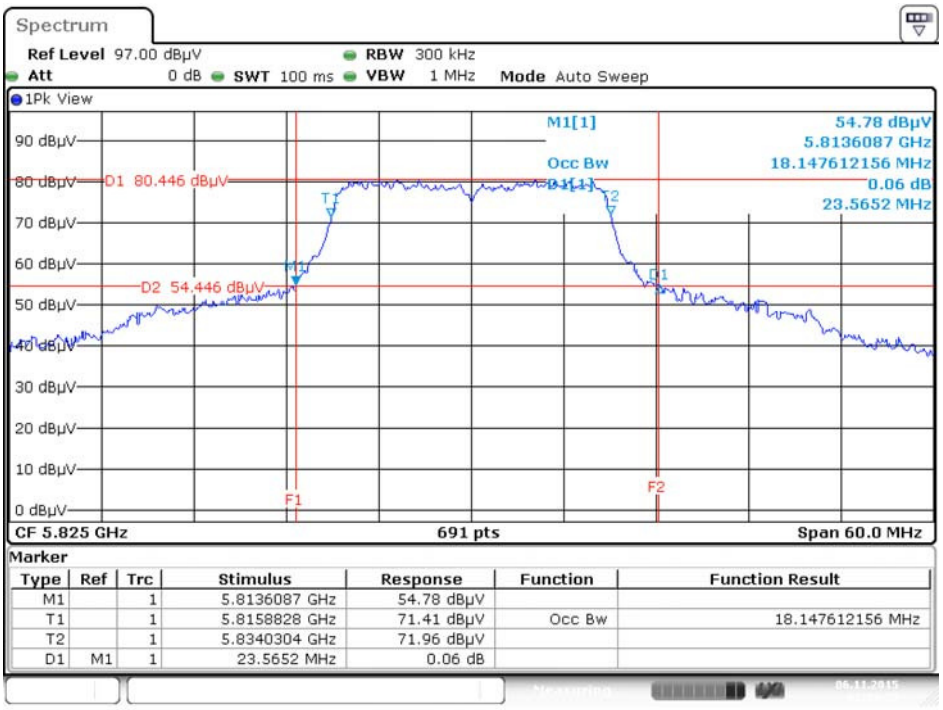
Date: 6.NOV.2015 02:26:07

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



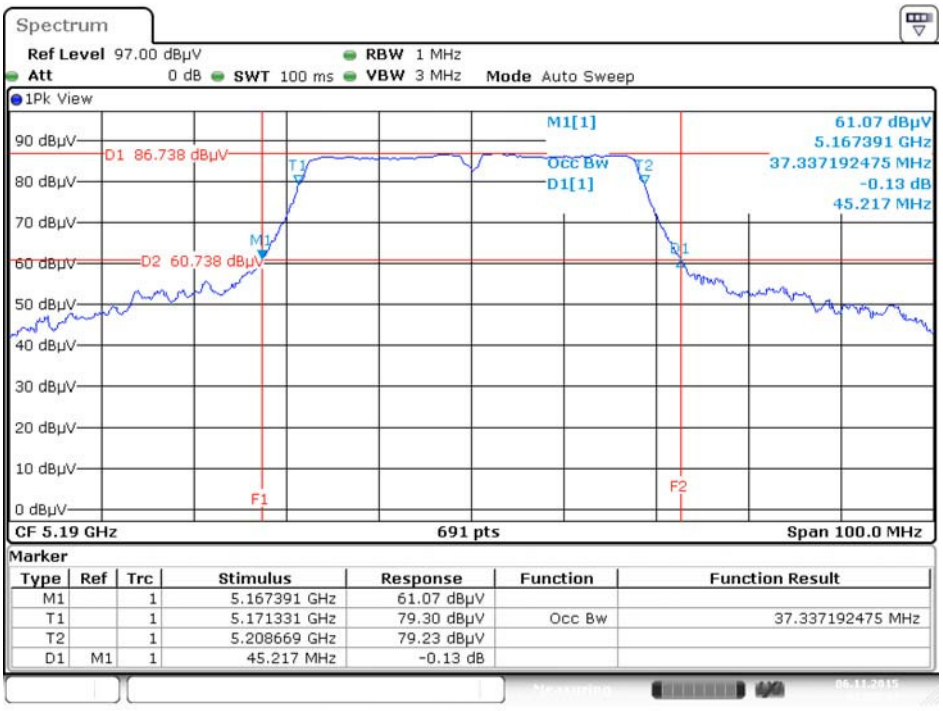
Date: 6.NOV.2015 02:25:13

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



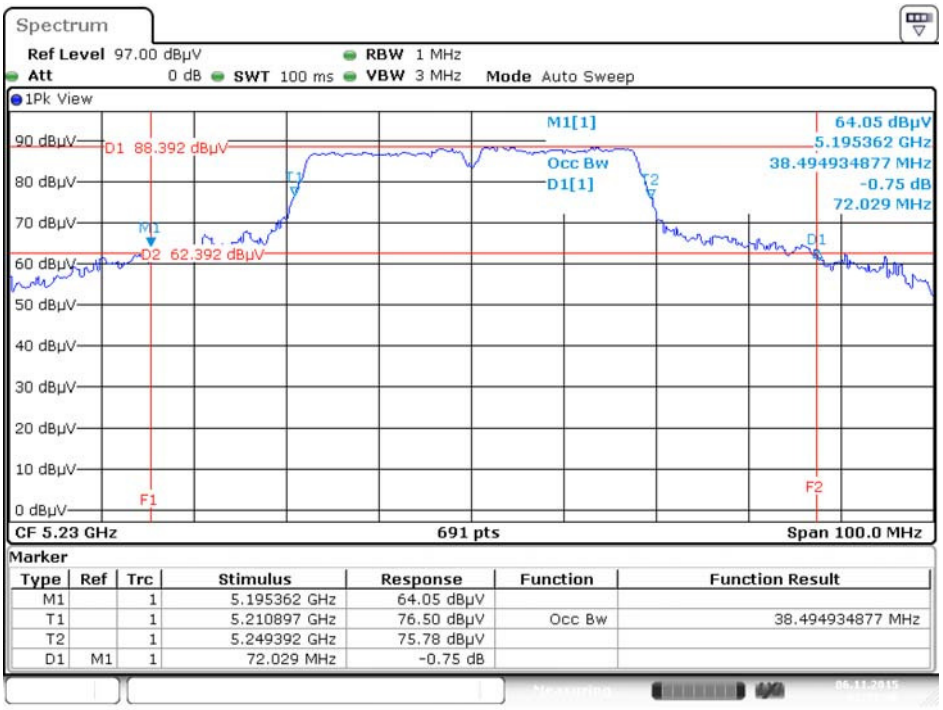
Date: 6.NOV.2015 02:24:23

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



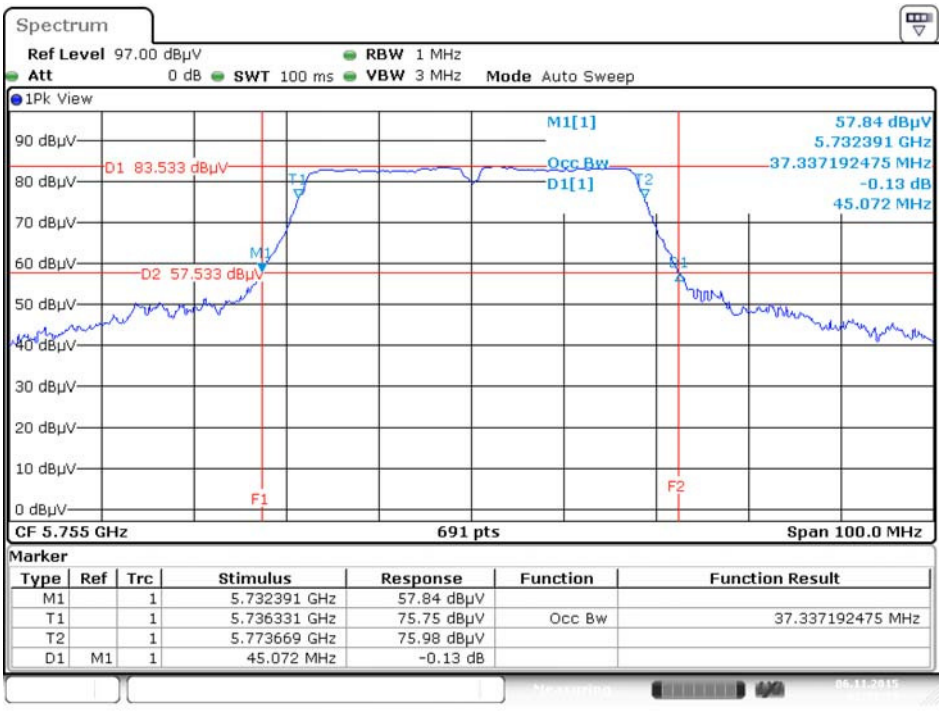
Date: 6.NOV.2015 02:50:45

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



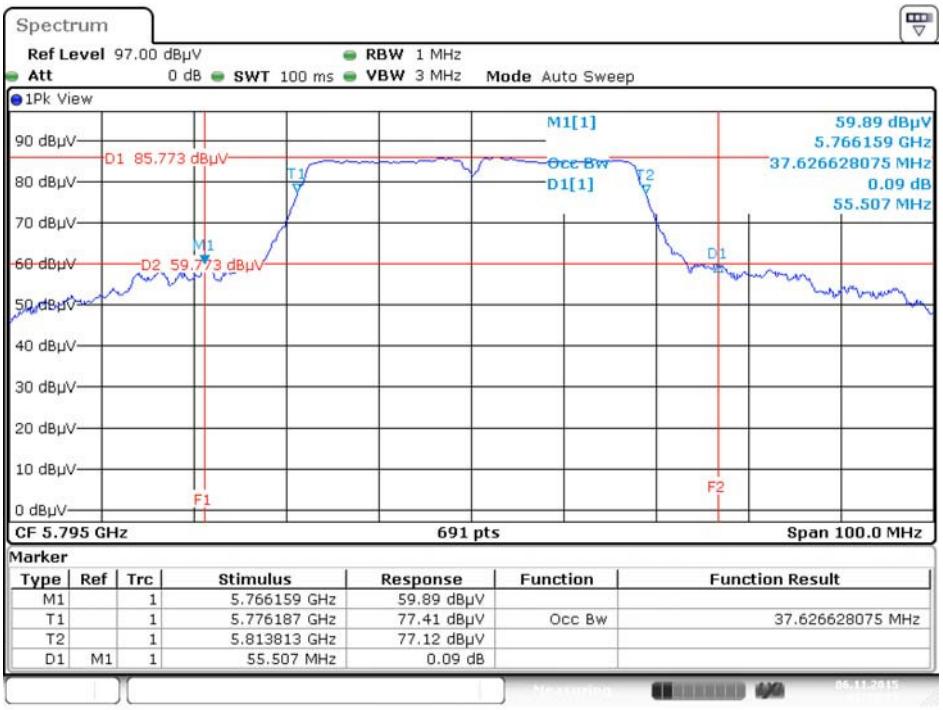
Date: 6.NOV.2015 02:51:47

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



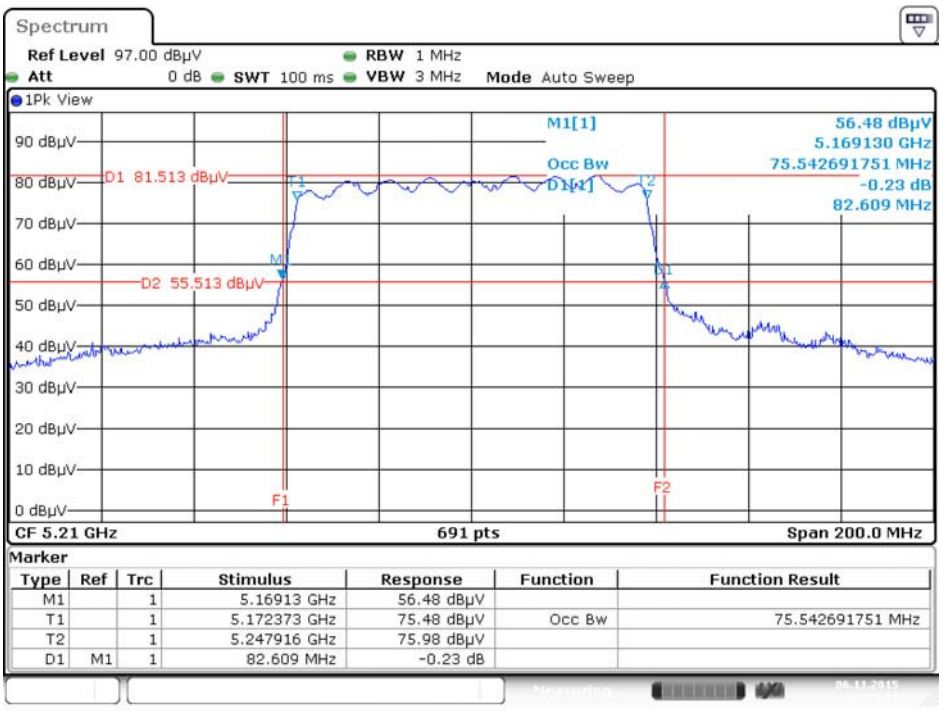
Date: 6.NOV.2015 02:52:33

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



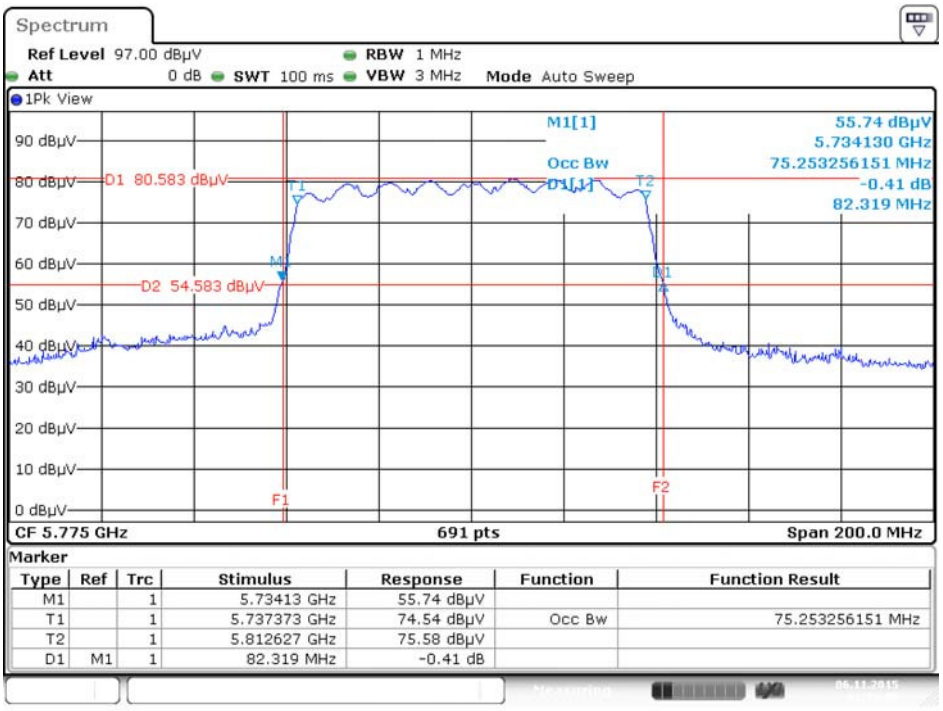
Date: 6.NOV.2015 02:53:15

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



Date: 6.NOV.2015 02:54:14

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



Date: 6.NOV.2015 02:54:51

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

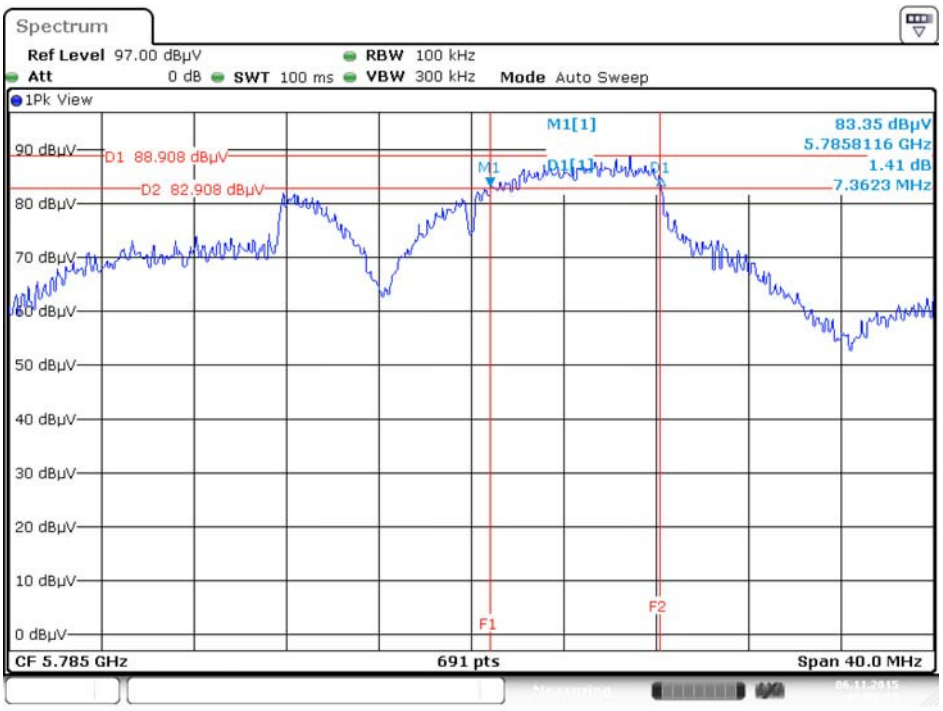
Temperature	25℃	Humidity	45%
Test Engineer	Clemens Fang		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.41	500	Complies
	5785 MHz	7.36	500	Complies
	5825 MHz	16.41	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.74	500	Complies
	5785 MHz	17.74	500	Complies
	5825 MHz	17.80	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.52	500	Complies
	5795 MHz	36.41	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.36	500	Complies

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

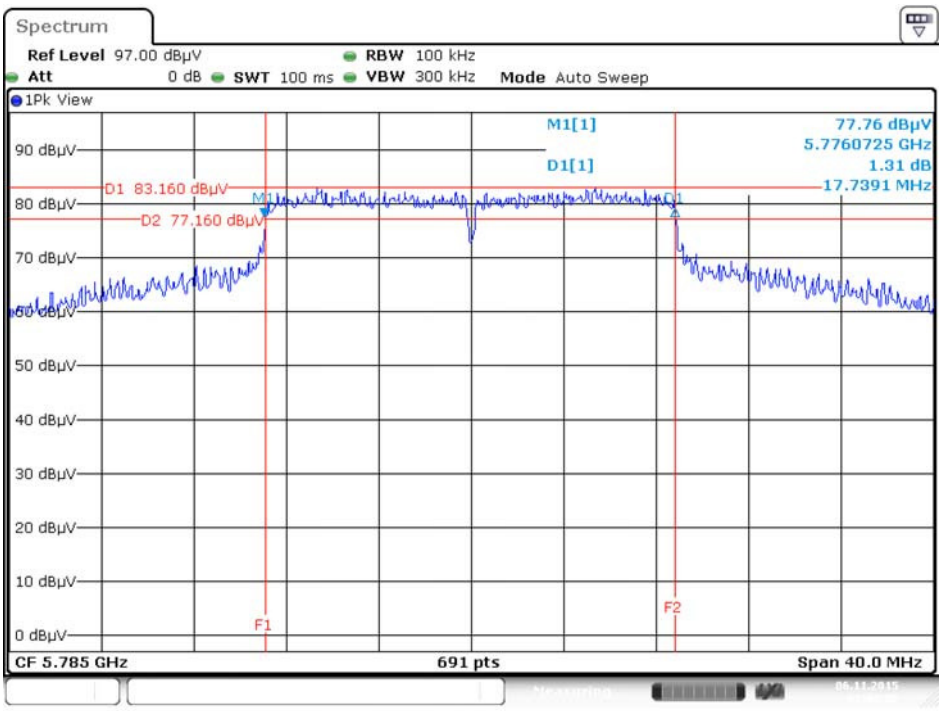
For plots, only the channel with worse result was shown.

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



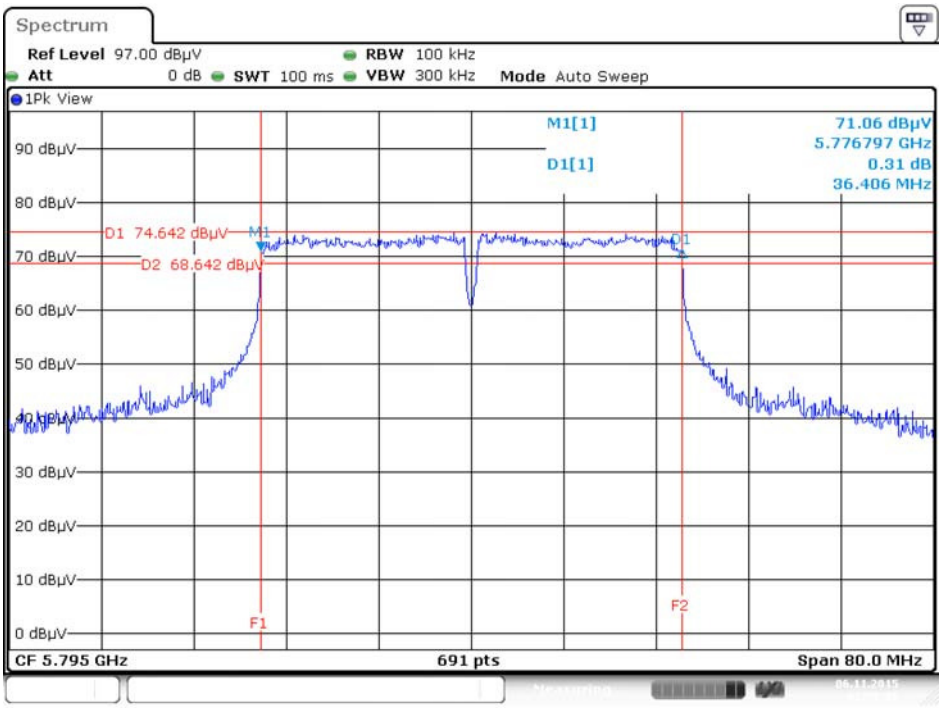
Date: 6.NOV.2015 03:02:38

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



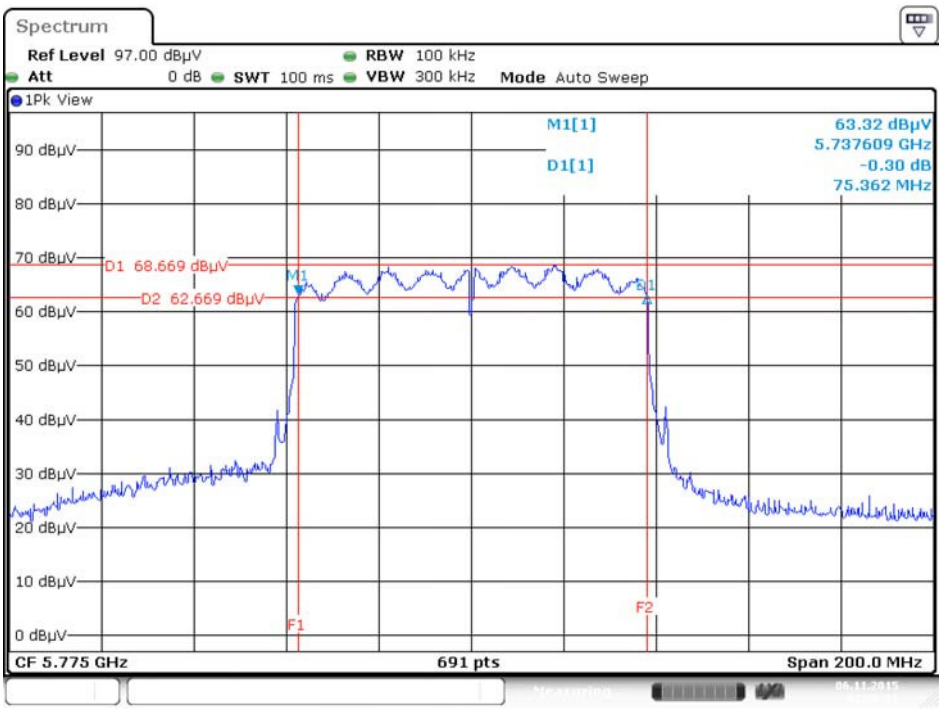
Date: 6.NOV.2015 03:00:08

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



Date: 6.NOV.2015 02:58:17

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



Date: 6.NOV.2015 02:56:12

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

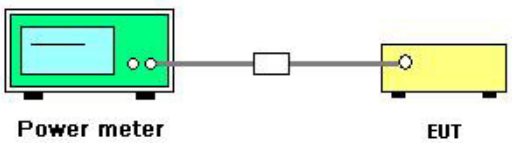
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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	Clemens Fang	Test Date	Nov. 06, 2015

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
802.11a	5180 MHz	22.25	23.30	25.82	30.00	Complies
	5200 MHz	25.40	25.89	28.66	30.00	Complies
	5240 MHz	25.24	25.91	28.60	30.00	Complies
	5745 MHz	22.50	22.70	25.61	30.00	Complies
	5785 MHz	25.64	25.98	28.82	30.00	Complies
	5825 MHz	22.00	22.30	25.16	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	19.02	19.98	22.54	30.00	Complies
	5200 MHz	25.15	25.80	28.50	30.00	Complies
	5240 MHz	22.78	23.68	26.26	30.00	Complies
	5745 MHz	18.84	19.70	22.30	30.00	Complies
	5785 MHz	25.78	25.84	28.82	30.00	Complies
	5825 MHz	20.12	21.19	23.70	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	20.36	21.45	23.95	30.00	Complies
	5230 MHz	23.83	24.83	27.37	30.00	Complies
	5755 MHz	20.78	21.77	24.31	30.00	Complies
	5795 MHz	22.38	23.41	25.94	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	19.65	20.61	23.17	30.00	Complies
	5775 MHz	19.21	20.52	22.92	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

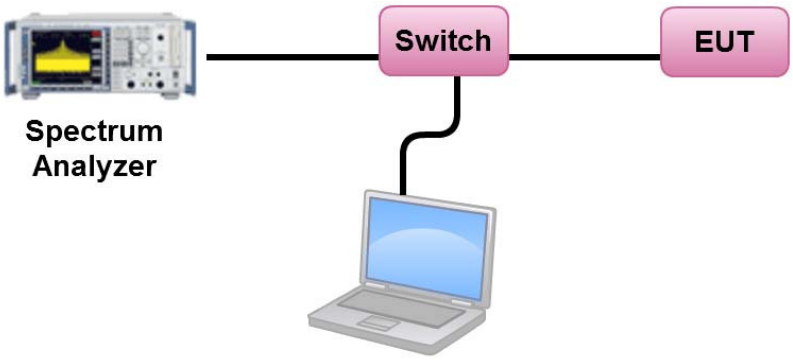
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	Clemens Fang		

Configuration IEEE 802.11a / Chain 1 + Chain 2

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	13.09	16.55	Complies
40	5200 MHz	13.84	16.55	Complies
48	5240 MHz	15.39	16.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =17-(6.45-6)=16.55 dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	12.66	-3.01	9.65	29.55	Complies
157	5785 MHz	14.90	-3.01	11.89	29.55	Complies
165	5825 MHz	11.75	-3.01	8.74	29.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =30-(6.45-6)=29.55 dBm/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	8.70	16.55	Complies
40	5200 MHz	15.09	16.55	Complies
48	5240 MHz	12.85	16.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =17-(6.45-6)=16.55 dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	7.26	-3.01	4.25	29.55	Complies
157	5785 MHz	15.93	-3.01	12.92	29.55	Complies
165	5825 MHz	7.70	-3.01	4.69	29.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =30-(6.45-6)=29.55 dBm/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	7.72	16.55	Complies
46	5230 MHz	10.98	16.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =17-(6.45-6)=16.55 dBm/MHz

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	7.73	-3.01	4.72	29.55	Complies
159	5795 MHz	9.49	-3.01	6.48	29.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =30-(6.45-6)=29.55 dBm/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	3.45	16.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =17-(6.45-6)=16.55 dBm/MHz

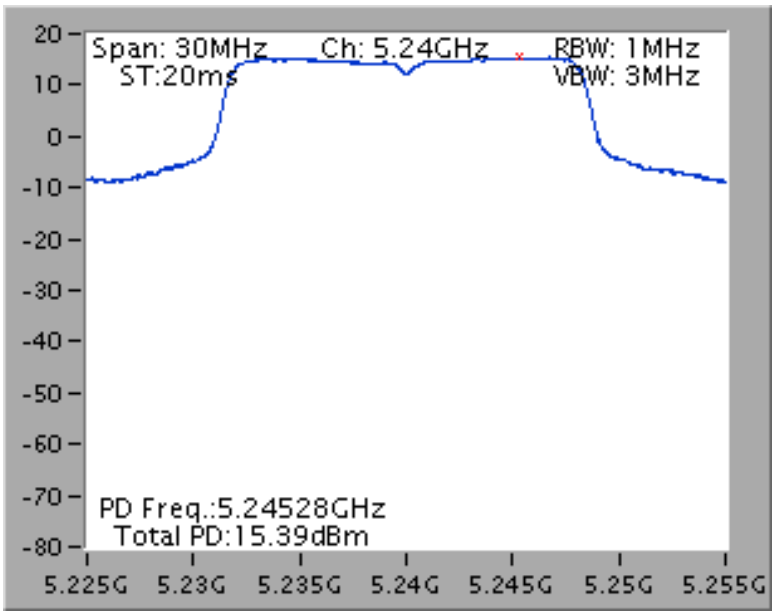
Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	3.65	-3.01	0.64	29.55	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =6.45 dBi, so limit =30-(6.45-6)=29.55 dBm/500kHz

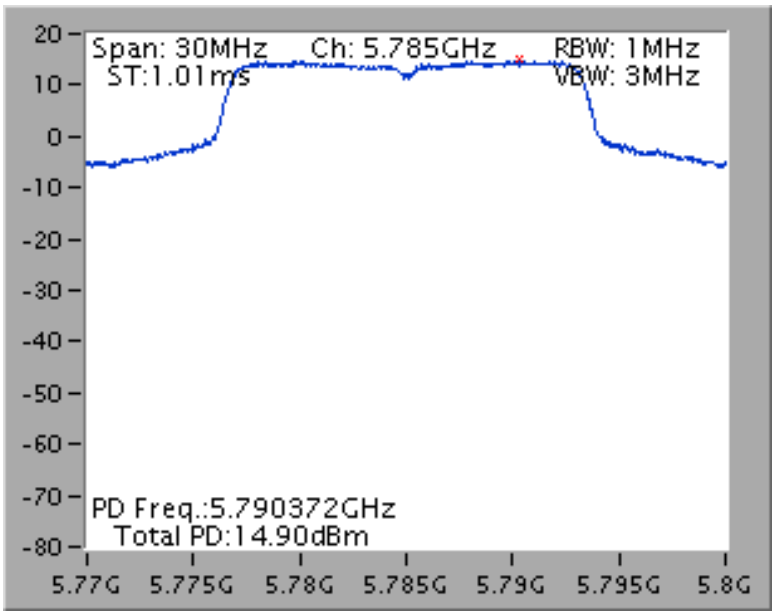
Note: All the test values were listed in the report.

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

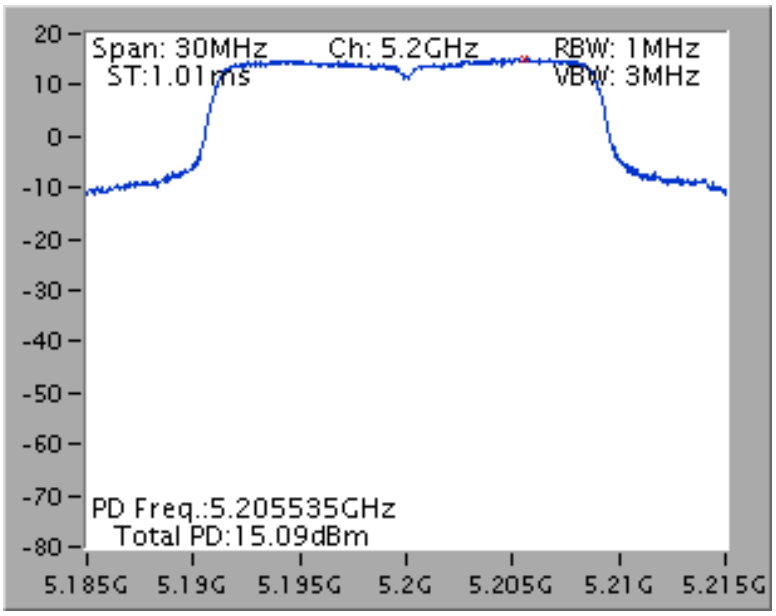
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5240 MHz



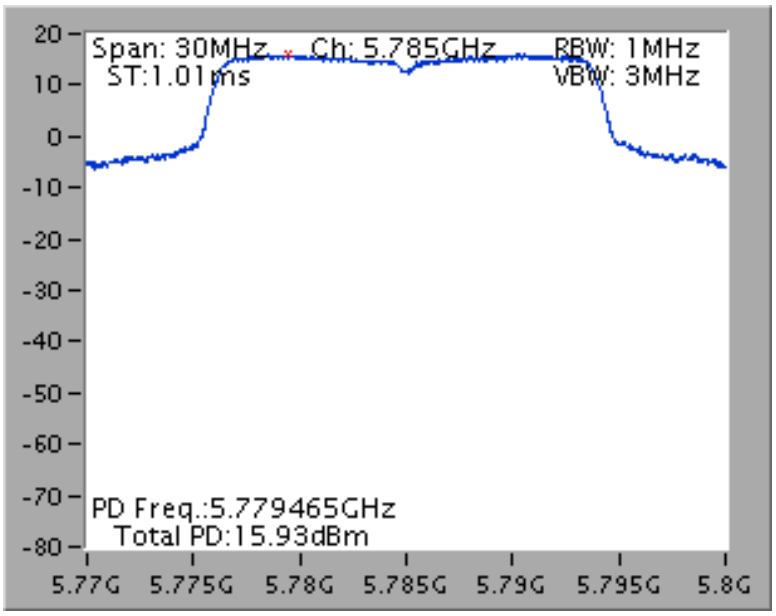
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5785 MHz



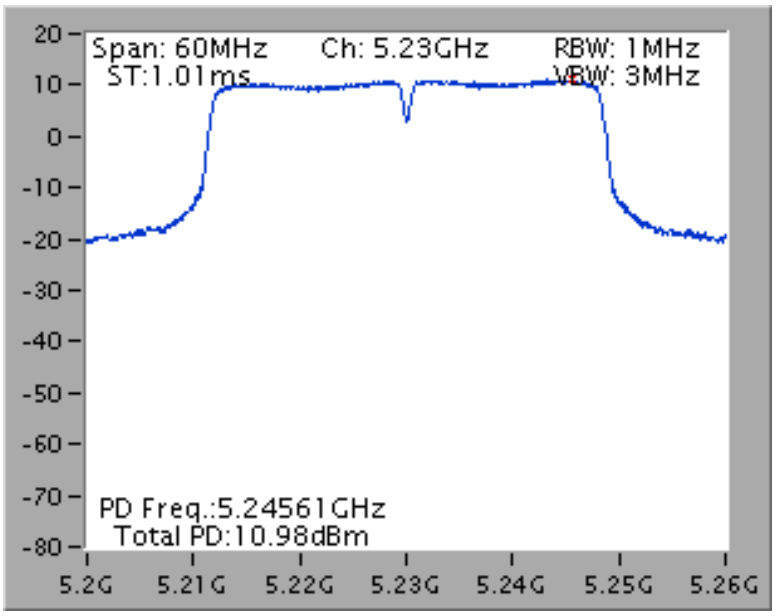
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 / 5200 MHz



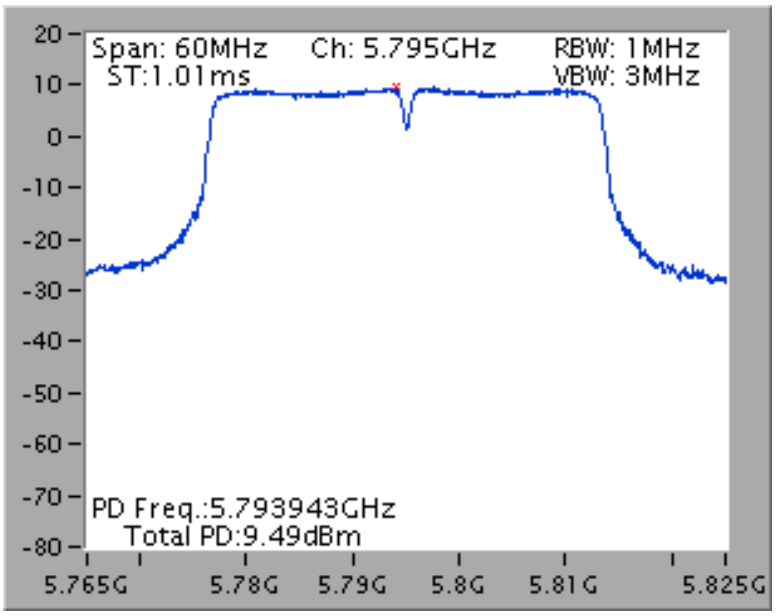
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 / 5785 MHz



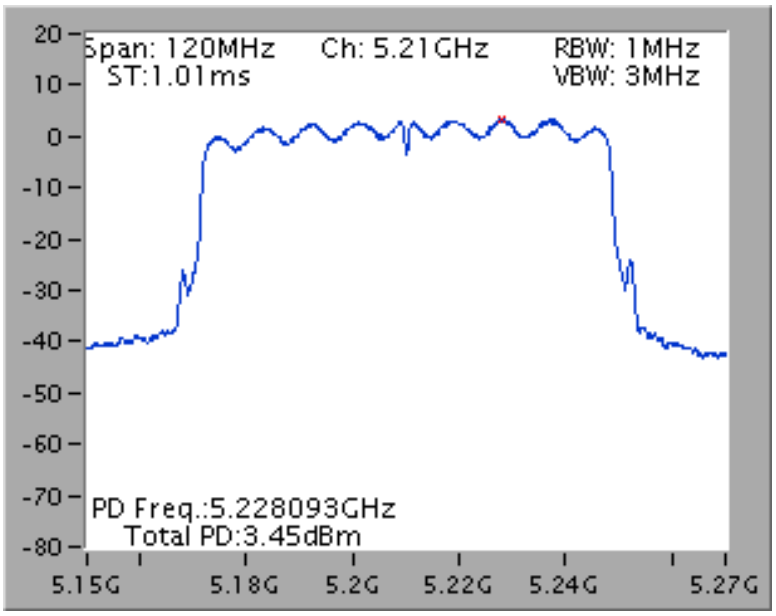
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 / 5230 MHz



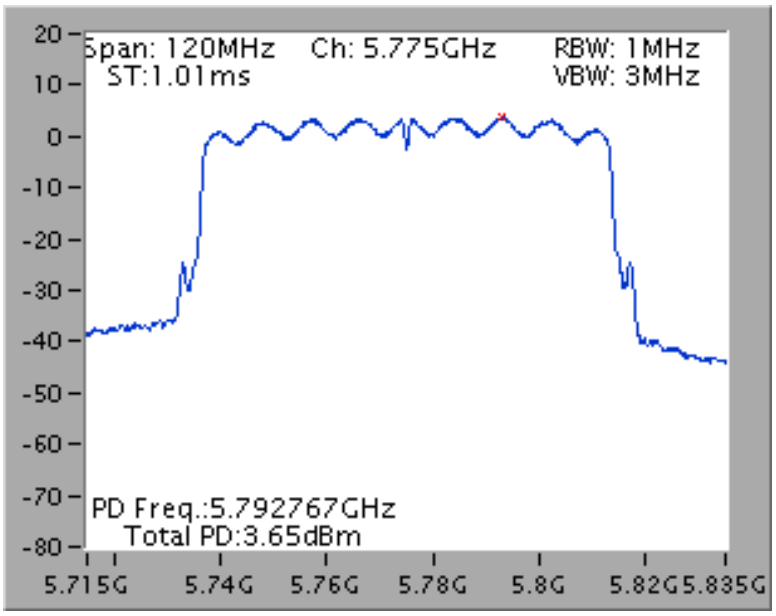
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 / 5795 MHz



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

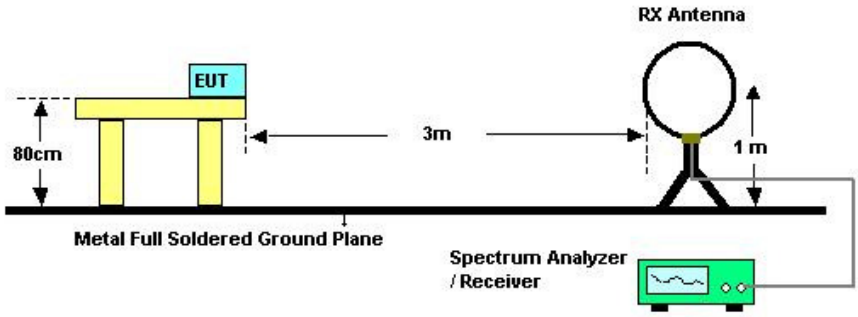
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

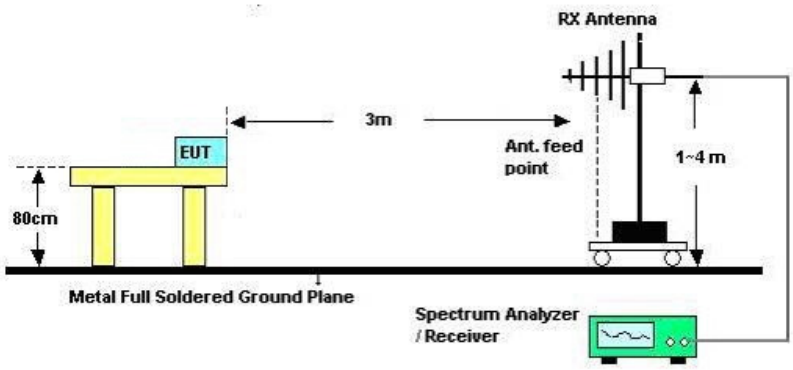
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

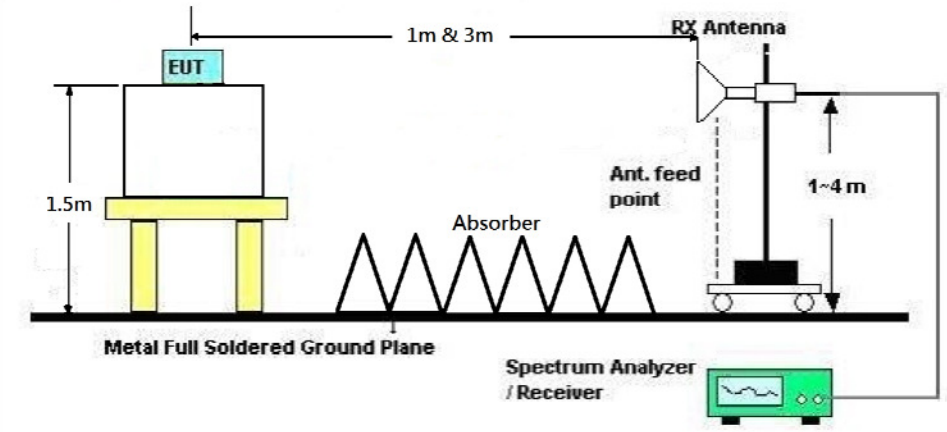
For Radiated Emissions: 9kHz ~30MHz



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	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	Normal Link
Test Date	Sep. 17, 2015		

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

Note:

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

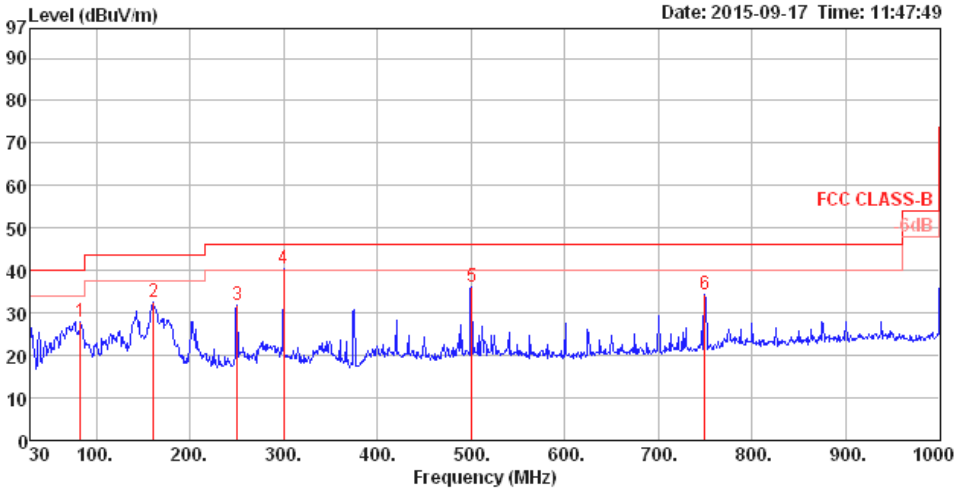
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

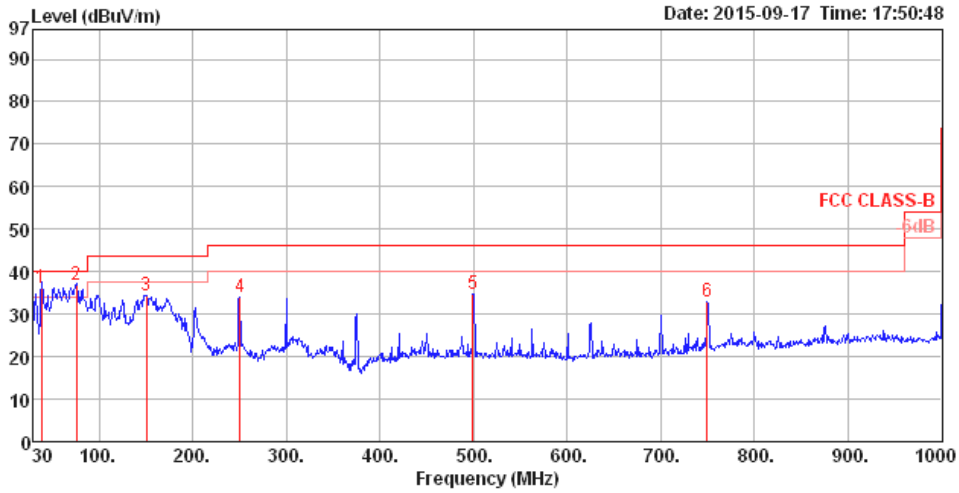
Temperature	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	Normal Link

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	83.35	27.99	40.00	-12.01	44.48	1.07	8.07	25.63	100	0	HORIZONTAL	Peak
2	160.95	32.67	43.50	-10.83	49.71	1.53	10.54	29.11	100	0	HORIZONTAL	Peak
3	250.19	31.94	46.00	-14.06	47.12	1.90	12.90	29.98	100	0	HORIZONTAL	Peak
4	299.66	40.51	46.00	-5.49	54.17	2.13	13.78	29.57	100	0	HORIZONTAL	Peak
5	500.45	36.33	46.00	-9.67	42.58	2.82	17.93	27.00	100	0	HORIZONTAL	Peak
6	749.74	34.30	46.00	-11.70	38.20	3.53	20.20	27.63	100	0	HORIZONTAL	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	38.73	36.17	40.00	-3.83	44.84	0.73	14.61	24.01	400	0	VERTICAL	QP
2	75.59	36.90	40.00	-3.10	54.13	1.02	7.16	25.41	100	116	VERTICAL	QP
3	150.28	34.53	43.50	-8.97	50.67	1.47	11.07	28.68	400	0	VERTICAL	Peak
4	250.19	34.11	46.00	-11.89	49.29	1.90	12.90	29.98	400	0	VERTICAL	Peak
5	499.48	34.87	46.00	-11.13	41.13	2.82	17.90	26.98	400	0	VERTICAL	Peak
6	749.74	32.83	46.00	-13.17	36.73	3.53	20.20	27.63	400	0	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	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11a CH 36 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15535.44	49.33	54.00	-4.67	33.42	12.92	35.35	38.34	HORIZONTAL	117	327	Average
2	15536.31	61.35	74.00	-12.65	45.44	12.92	35.35	38.34	HORIZONTAL	117	327	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15538.55	62.69	74.00	-11.31	47.45	12.92	35.35	37.67	VERTICAL	100	338	Peak
2	15538.77	50.12	54.00	-3.88	34.88	12.92	35.35	37.67	VERTICAL	100	338	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11a CH 40 / Chain 1 + Chain 2
Test Date	Oct. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	10398.00	55.93	74.00	-18.07	40.59	10.50	34.85	39.69	HORIZONTAL	150	190	Peak
2	10399.00	43.12	54.00	-10.88	27.78	10.50	34.85	39.69	HORIZONTAL	150	190	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	10401.33	56.12	74.00	-17.88	40.78	10.50	34.85	39.69	VERTICAL	150	80	Peak
2	10402.01	43.25	54.00	-10.75	27.91	10.50	34.85	39.69	VERTICAL	150	80	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11a CH 48 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15715.44	62.53	74.00	-11.47	47.36	13.03	35.38	37.52	HORIZONTAL	201	250	Peak
2	15716.96	50.22	54.00	-3.78	35.05	13.03	35.38	37.52	HORIZONTAL	201	250	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15725.14	61.27	74.00	-12.73	46.10	13.03	35.38	37.52	VERTICAL	203	123	Peak
2	15728.97	48.88	54.00	-5.12	33.70	13.04	35.38	37.52	VERTICAL	203	123	Average

Temperature	25℃	Humidity	55%
Test Engineer	Ted Chiu	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11491.81	49.61	54.00	-4.39	33.69	11.04	35.23	40.11	HORIZONTAL	100	27	Average
2	11492.46	62.56	74.00	-11.44	46.64	11.04	35.23	40.11	HORIZONTAL	100	27	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11490.00	50.73	54.00	-3.27	34.82	11.03	35.23	40.11	VERTICAL	196	110	Average
2	11490.29	62.50	74.00	-11.50	46.59	11.03	35.23	40.11	VERTICAL	196	110	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Ted Chiu	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2
Test Date	Oct. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11570.47	44.57	54.00	-9.43	28.96	11.07	35.23	39.77	HORIZONTAL	150	207	Average
2	11570.68	57.53	74.00	-16.47	41.92	11.07	35.23	39.77	HORIZONTAL	150	207	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11570.68	43.67	54.00	-10.33	28.06	11.07	35.23	39.77	VERTICAL	150	334	Average
2	11570.68	54.99	74.00	-19.01	39.38	11.07	35.23	39.77	VERTICAL	150	334	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Ted Chiu	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11643.49	50.84	54.00	-3.16	35.19	11.10	35.22	39.77	HORIZONTAL	205	130	Average
2	11643.49	62.87	74.00	-11.13	47.22	11.10	35.22	39.77	HORIZONTAL	205	130	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11643.78	50.82	54.00	-3.18	35.17	11.10	35.22	39.77	VERTICAL	125	278	Average
2	11644.57	63.76	74.00	-10.24	48.11	11.10	35.22	39.77	VERTICAL	125	278	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15530.23	62.74	74.00	-11.26	47.51	12.91	35.35	37.67	HORIZONTAL	224	223	Peak
2	15539.78	49.80	54.00	-4.20	34.56	12.92	35.35	37.67	HORIZONTAL	224	223	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15536.02	48.96	54.00	-5.04	33.72	12.92	35.35	37.67	VERTICAL	101	336	Average
2	15553.31	61.64	74.00	-12.36	46.40	12.93	35.35	37.66	VERTICAL	101	336	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2
Test Date	Oct. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	10399.65	57.34	74.00	-16.66	42.00	10.50	34.85	39.69	HORIZONTAL	150	154	Peak
2	10400.11	44.91	54.00	-9.09	29.57	10.50	34.85	39.69	HORIZONTAL	150	154	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	10400.28	56.71	74.00	-17.29	41.37	10.50	34.85	39.69	VERTICAL	150	238	Peak
2	10400.96	42.73	54.00	-11.27	27.39	10.50	34.85	39.69	VERTICAL	150	238	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15719.13	50.33	54.00	-3.67	35.16	13.03	35.38	37.52	HORIZONTAL	192	73	Average
2	15726.58	63.62	74.00	-10.38	48.45	13.03	35.38	37.52	HORIZONTAL	192	73	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15715.66	49.09	54.00	-4.91	33.92	13.03	35.38	37.52	VERTICAL	100	327	Average
2	15728.90	61.61	74.00	-12.39	46.43	13.04	35.38	37.52	VERTICAL	100	327	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11471.33	60.63	74.00	-13.37	44.71	11.02	35.23	40.13	HORIZONTAL	101	32	Peak
2	11493.26	49.27	54.00	-4.73	33.35	11.04	35.23	40.11	HORIZONTAL	101	32	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11487.68	61.92	74.00	-12.08	46.01	11.03	35.23	40.11	VERTICAL	100	272	Peak
2	11490.51	50.25	54.00	-3.75	34.34	11.03	35.23	40.11	VERTICAL	100	272	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2
Test Date	Oct. 22, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11568.51	59.63	74.00	-14.37	44.02	11.07	35.23	39.77	HORIZONTAL	150	301	Peak
2	11568.84	46.44	54.00	-7.56	30.83	11.07	35.23	39.77	HORIZONTAL	150	301	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11568.51	59.34	74.00	-14.66	43.73	11.07	35.23	39.77	VERTICAL	150	162	Peak
2	11569.38	44.98	54.00	-9.02	29.37	11.07	35.23	39.77	VERTICAL	150	162	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015, Oct. 28, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11637.41	60.82	74.00	-13.18	45.17	11.10	35.22	39.77	HORIZONTAL	102	316	Peak
2	11644.28	48.51	54.00	-5.49	32.86	11.10	35.22	39.77	HORIZONTAL	102	316	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11648.84	50.99	54.00	-3.01	35.34	11.10	35.22	39.77	VERTICAL	112	239	Average
2	11651.66	63.33	74.00	-10.67	47.72	11.10	35.22	39.73	VERTICAL	112	239	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15565.30	48.73	54.00	-5.27	33.51	12.94	35.36	37.64	HORIZONTAL	190	244	Average
2	15566.24	61.29	74.00	-12.71	46.07	12.94	35.36	37.64	HORIZONTAL	190	244	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15554.44	60.60	74.00	-13.40	45.36	12.93	35.35	37.66	VERTICAL	102	337	Peak
2	15565.51	48.31	54.00	-5.69	33.09	12.94	35.36	37.64	VERTICAL	102	337	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15691.38	62.48	74.00	-11.52	47.29	13.01	35.37	37.55	HORIZONTAL	188	43	Peak
2	15693.04	49.40	54.00	-4.60	34.21	13.01	35.37	37.55	HORIZONTAL	188	43	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15682.47	48.52	54.00	-5.48	33.33	13.01	35.37	37.55	VERTICAL	109	341	Average
2	15702.30	61.14	74.00	-12.86	45.96	13.02	35.37	37.53	VERTICAL	109	341	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11509.49	61.13	74.00	-12.87	45.22	11.04	35.23	40.10	HORIZONTAL	103	30	Peak
2	11510.00	49.07	54.00	-4.93	33.16	11.04	35.23	40.10	HORIZONTAL	103	30	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11509.93	50.57	54.00	-3.43	34.66	11.04	35.23	40.10	VERTICAL	102	258	Average
2	11511.38	62.56	74.00	-11.44	46.65	11.04	35.23	40.10	VERTICAL	102	258	Peak

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11589.64	49.13	54.00	-4.87	33.38	11.08	35.22	39.89	HORIZONTAL	114	26	Average
2	11597.89	61.48	74.00	-12.52	45.73	11.08	35.22	39.89	HORIZONTAL	114	26	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11584.14	63.12	74.00	-10.88	47.39	11.07	35.23	39.89	VERTICAL	118	257	Peak
2	11589.93	50.86	54.00	-3.14	35.11	11.08	35.22	39.89	VERTICAL	118	257	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15648.89	48.35	54.00	-5.65	33.14	12.99	35.36	37.58	HORIZONTAL	200	72	Average
2	15650.62	60.68	74.00	-13.32	45.47	12.99	35.36	37.58	HORIZONTAL	200	72	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	15635.93	60.95	74.00	-13.05	45.74	12.98	35.36	37.59	VERTICAL	134	122	Peak
2	15648.38	47.69	54.00	-6.31	32.48	12.99	35.36	37.58	VERTICAL	134	122	Average

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11549.93	48.23	54.00	-5.77	32.42	11.06	35.23	39.98	HORIZONTAL	210	106	Average
2	11557.02	61.20	74.00	-12.80	45.39	11.06	35.23	39.98	HORIZONTAL	210	106	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11550.00	48.27	54.00	-5.73	32.46	11.06	35.23	39.98	VERTICAL	116	256	Average
2	11551.81	61.15	74.00	-12.85	45.34	11.06	35.23	39.98	VERTICAL	116	256	Peak

Note:

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

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

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

4.7. Band Edge Emissions Measurement

4.7.1. Limit

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

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

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

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

4.7.2. Measuring Instruments and Setting

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

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

4.7.3. Test Procedures

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

4.7.4. Test Setup Layout

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

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015 ~ Aug. 25, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5149.42	66.08	74.00	-7.92	60.16	7.33	32.94	31.53	VERTICAL	245	347	Peak
2	5150.00	52.11	54.00	-1.89	46.19	7.33	32.94	31.53	VERTICAL	245	347	Average
3	5174.79	105.37			99.42	7.35	32.94	31.54	VERTICAL	245	347	Average
4	5175.37	114.26			108.31	7.35	32.94	31.54	VERTICAL	245	347	Peak

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5147.68	67.68	74.00	-6.32	61.77	7.33	32.94	31.52	HORIZONTAL	100	170	Peak
2	5149.42	51.79	54.00	-2.21	45.88	7.33	32.94	31.52	HORIZONTAL	100	170	Average
3	5205.79	114.07			108.06	7.38	32.94	31.57	HORIZONTAL	100	170	Peak
4	5206.37	104.67			98.66	7.38	32.94	31.57	HORIZONTAL	100	170	Average

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5133.21	60.36	74.00	-13.64	54.46	7.31	32.94	31.53	VERTICAL	246	338	Peak
2	5150.00	48.20	54.00	-5.80	42.28	7.33	32.94	31.53	VERTICAL	246	338	Average
3	5234.79	109.52			103.50	7.41	32.94	31.55	VERTICAL	246	338	Average
4	5234.79	118.62			112.60	7.41	32.94	31.55	VERTICAL	246	338	Peak
5	5356.95	61.61	74.00	-12.39	55.44	7.53	32.93	31.57	VERTICAL	246	338	Peak
6	5399.78	50.56	54.00	-3.44	44.34	7.57	32.93	31.58	VERTICAL	246	338	Average

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

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015 ~ Aug. 25, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5715.00	66.85	68.20	-1.35	60.17	7.79	33.00	31.89	HORIZONTAL	227	188	Peak
2	5725.00	75.08	78.20	-3.12	68.38	7.79	33.00	31.91	HORIZONTAL	227	188	Peak
3	5738.05	111.12			104.39	7.80	33.01	31.94	HORIZONTAL	227	188	Peak
4	5738.63	102.46			95.73	7.80	33.01	31.94	HORIZONTAL	227	188	Average

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5713.26	65.86	68.20	-2.34	59.01	7.79	33.00	32.06	HORIZONTAL	100	1	Peak
2	5722.11	68.55	78.20	-9.65	61.70	7.79	33.00	32.06	HORIZONTAL	100	1	Peak
3	5787.89	115.06			108.12	7.83	33.03	32.14	HORIZONTAL	100	1	Peak
4	5788.47	105.32			98.38	7.83	33.03	32.14	HORIZONTAL	100	1	Average
5	5854.05	67.15	78.20	-11.05	60.11	7.87	33.05	32.22	HORIZONTAL	100	1	Peak
6	5860.58	65.07	68.20	-3.13	58.02	7.87	33.06	32.24	HORIZONTAL	100	1	Peak

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5818.05	112.14			105.30	7.85	33.04	32.03	HORIZONTAL	248	190	Peak
2	5818.63	103.32			96.48	7.85	33.04	32.03	HORIZONTAL	248	190	Peak
3	5850.00	73.26	78.20	-4.94	66.36	7.87	33.05	32.08	HORIZONTAL	248	190	Peak
4	5860.00	65.54	68.20	-2.66	58.62	7.87	33.06	32.11	HORIZONTAL	248	190	Peak

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

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 1 + Chain 2
Test Date	Aug. 25, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5145.20	69.89	74.00	-4.11	63.99	7.32	32.94	31.52	VERTICAL	259	347	Peak
2	5150.00	52.54	54.00	-1.46	46.63	7.33	32.94	31.52	VERTICAL	259	347	Average
3	5174.40	109.03			103.07	7.35	32.94	31.55	VERTICAL	259	347	Peak
4	5185.60	99.41			93.44	7.36	32.94	31.55	VERTICAL	259	347	Average

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5150.00	51.25	54.00	-2.75	45.34	7.33	32.94	31.52	HORIZONTAL	100	30	Average
2	5150.00	68.10	74.00	-5.90	62.19	7.33	32.94	31.52	HORIZONTAL	100	30	Peak
3	5205.21	102.62			96.61	7.38	32.94	31.57	HORIZONTAL	100	30	Average
4	5206.37	112.61			106.60	7.38	32.94	31.57	HORIZONTAL	100	30	Peak

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5140.40	58.43	74.00	-15.57	52.54	7.32	32.94	31.51	VERTICAL	291	301	Peak
2	5150.00	46.54	54.00	-7.46	40.63	7.33	32.94	31.52	VERTICAL	291	301	Average
3	5245.60	106.95			100.87	7.42	32.93	31.59	VERTICAL	291	301	Average
4	5246.40	116.94			110.86	7.42	32.93	31.59	VERTICAL	291	301	Peak
5	5350.00	46.00	54.00	-8.00	39.73	7.52	32.93	31.68	VERTICAL	291	301	Average
6	5355.60	60.68	74.00	-13.32	54.39	7.53	32.93	31.69	VERTICAL	291	301	Peak

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

Temperature	25℃	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2
Test Date	Aug. 25, 2015, Oct. 26, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5713.80	68.69	74.00	-5.31	61.62	8.01	33.00	32.06	HORIZONTAL	250	282	Peak
2	5715.00	49.57	54.00	-4.43	42.50	8.01	33.00	32.06	HORIZONTAL	250	282	Average
3	5724.60	76.42	78.20	-1.78	69.31	8.03	33.00	32.08	HORIZONTAL	250	282	Peak
4	5739.40	99.10			91.95	8.06	33.01	32.10	HORIZONTAL	250	282	Average
5	5739.80	109.26			102.11	8.06	33.01	32.10	HORIZONTAL	250	282	Peak

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5712.68	66.70	68.20	-1.50	59.85	7.79	33.00	32.06	VERTICAL	166	341	Peak
2	5724.42	73.57	78.20	-4.63	66.70	7.79	33.00	32.08	VERTICAL	166	341	Peak
3	5777.47	115.65			108.72	7.82	33.03	32.14	VERTICAL	166	341	Peak
4	5790.21	105.82			98.86	7.83	33.03	32.16	VERTICAL	166	341	Average
5	5850.58	70.74	78.20	-7.46	63.70	7.87	33.05	32.22	VERTICAL	166	341	Peak
6	5860.00	66.40	68.20	-1.80	59.35	7.87	33.06	32.24	VERTICAL	166	341	Peak

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5830.20	100.83			93.52	8.16	33.05	32.20	HORIZONTAL	250	277	Average
2	5831.40	110.58			103.27	8.16	33.05	32.20	HORIZONTAL	250	277	Peak
3	5850.00	76.98	78.20	-1.22	69.63	8.18	33.05	32.22	HORIZONTAL	250	277	Peak
4	5860.00	50.52	54.00	-3.48	43.16	8.18	33.06	32.24	HORIZONTAL	250	277	Average
5	5861.40	69.73	74.00	-4.27	62.35	8.20	33.06	32.24	HORIZONTAL	250	277	Peak

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

Temperature	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 1 + Chain 2
Test Date	Aug. 24, 2015 ~ Aug. 25, 2015		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5150.00	52.62	54.00	-1.38	46.71	7.33	32.94	31.52	VERTICAL	263	308	Average
2	5150.00	67.63	74.00	-6.37	61.72	7.33	32.94	31.52	VERTICAL	263	308	Peak
3	5200.40	104.94			98.94	7.38	32.94	31.56	VERTICAL	263	308	Peak
4	5204.40	95.28			89.27	7.38	32.94	31.57	VERTICAL	263	308	Average

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5145.37	67.04	74.00	-6.96	61.14	7.32	32.94	31.52	VERTICAL	160	321	Peak
2	5150.00	52.71	54.00	-1.29	46.80	7.33	32.94	31.52	VERTICAL	160	321	Average
3	5243.31	111.62			105.54	7.42	32.93	31.59	VERTICAL	160	321	Peak
4	5245.05	102.17			96.09	7.42	32.93	31.59	VERTICAL	160	321	Average

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

Temperature	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2
Test Date	Aug. 25, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5709.21	67.07	68.20	-1.13	60.23	7.78	33.00	32.06	HORIZONTAL	103	360	Peak
2	5723.84	71.92	78.20	-6.28	65.05	7.79	33.00	32.08	HORIZONTAL	103	360	Peak
3	5753.26	104.81			97.92	7.81	33.02	32.10	HORIZONTAL	103	360	Peak
4	5756.74	94.87			87.96	7.81	33.02	32.12	HORIZONTAL	103	360	Average

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5713.26	63.54	68.20	-4.66	56.69	7.79	33.00	32.06	HORIZONTAL	100	18	Peak
2	5724.42	64.97	78.20	-13.23	58.10	7.79	33.00	32.08	HORIZONTAL	100	18	Peak
3	5791.53	107.51			100.55	7.83	33.03	32.16	HORIZONTAL	100	18	Peak
4	5793.26	97.38			90.42	7.83	33.03	32.16	HORIZONTAL	100	18	Average
5	5850.58	69.38	78.20	-8.82	62.34	7.87	33.05	32.22	HORIZONTAL	100	18	Peak
6	5861.74	66.72	68.20	-1.48	59.67	7.87	33.06	32.24	HORIZONTAL	100	18	Peak

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

Temperature	25°C	Humidity	55%
Test Engineer	Roki Liu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 1 + Chain 2
Test Date	Aug. 25, 2015		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5149.42	66.73	74.00	-7.27	60.82	7.33	32.94	31.52	VERTICAL	231	337	Peak
2	5150.00	52.73	54.00	-1.27	46.82	7.33	32.94	31.52	VERTICAL	231	337	Average
3	5227.37	103.89			97.85	7.40	32.94	31.58	VERTICAL	231	337	Peak
4	5227.95	93.76			87.72	7.40	32.94	31.58	VERTICAL	231	337	Average
5	5350.00	45.93	54.00	-8.07	39.66	7.52	32.93	31.68	VERTICAL	231	337	Average
6	5351.16	59.28	74.00	-14.72	53.01	7.52	32.93	31.68	VERTICAL	231	337	Peak

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

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	5714.42	66.53	68.20	-1.67	59.68	7.79	33.00	32.06	HORIZONTAL	100	18	Peak
2	5723.84	67.94	78.20	-10.26	61.07	7.79	33.00	32.08	HORIZONTAL	100	18	Peak
3	5792.37	91.79			84.83	7.83	33.03	32.16	HORIZONTAL	100	18	Average
4	5792.37	102.22			95.26	7.83	33.03	32.16	HORIZONTAL	100	18	Peak
5	5854.05	65.27	78.20	-12.93	58.23	7.87	33.05	32.22	HORIZONTAL	100	18	Peak
6	5863.47	64.43	68.20	-3.77	57.38	7.87	33.06	32.24	HORIZONTAL	100	18	Peak

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

Note:

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

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

4.8. Frequency Stability Measurement

4.8.1. Limit

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

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

4.8.2. Measuring Instruments and Setting

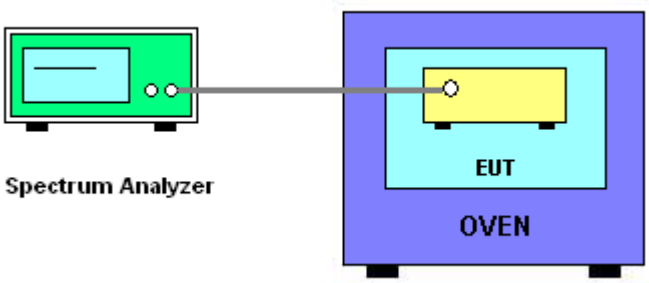
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.8.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is 0°C~40°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	25°C	Humidity	45%
Test Engineer	Clemens Fang	Test Date	Nov. 06, 2015

Mode: 20 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9817	5199.9803	5199.9785	5199.9764
110.00	5199.9805	5199.9792	5199.9776	5199.9757
93.50	5199.9791	5199.9780	5199.9768	5199.9746
Max. Deviation (MHz)	**0.0209**	**0.0220**	**0.0232**	**0.0254**
Max. Deviation (ppm)	**4.03**	**4.24**	**4.47**	**4.89**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5199.9830	5199.9818	5199.9799	5199.9777
10	5199.9817	5199.9804	5199.9789	5199.9771
20	5199.9805	5199.9792	5199.9776	5199.9757
30	5199.9791	5199.9780	5199.9766	5199.9750
40	5199.9775	5199.9760	5199.9744	5199.9724
Max. Deviation (MHz)	**0.0225**	**0.0240**	**0.0256**	**0.0276**
Max. Deviation (ppm)	**4.33**	**4.62**	**4.93**	**5.32**
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9795	5784.9781	5784.9763	5784.9742
110.00	5784.9783	5784.9770	5784.9754	5784.9735
93.50	5784.9769	5784.9758	5784.9746	5784.9724
Max. Deviation (MHz)	**0.0231**	**0.0242**	**0.0254**	**0.0276**
Max. Deviation (ppm)	**3.99**	**4.18**	**4.39**	**4.77**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5784.9808	5784.9796	5784.9777	5784.9755
10	5784.9795	5784.9782	5784.9767	5784.9749
20	5784.9783	5784.9770	5784.9754	5784.9735
30	5784.9769	5784.9758	5784.9744	5784.9728
40	5784.9753	5784.9738	5784.9722	5784.9702
Max. Deviation (MHz)	**0.0247**	**0.0262**	**0.0278**	**0.0298**
Max. Deviation (ppm)	**4.27**	**4.53**	**4.81**	**5.15**
Result	Complies			

Mode: 40 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9821	5189.9807	5189.9789	5189.9768
110.00	5189.9809	5189.9796	5189.9780	5189.9761
93.50	5189.9795	5189.9784	5189.9772	5189.9750
Max. Deviation (MHz)	**0.0205**	**0.0216**	**0.0228**	**0.0250**
Max. Deviation (ppm)	**3.95**	**4.16**	**4.39**	**4.82**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5189.9834	5189.9822	5189.9803	5189.9781
10	5189.9821	5189.9808	5189.9793	5189.9775
20	5189.9809	5189.9796	5189.9780	5189.9761
30	5189.9795	5189.9784	5189.9770	5189.9754
40	5189.9779	5189.9764	5189.9748	5189.9728
Max. Deviation (MHz)	**0.0221**	**0.0236**	**0.0252**	**0.0272**
Max. Deviation (ppm)	**4.26**	**4.55**	**4.86**	**5.24**
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9808	5754.9794	5754.9776	5754.9755
110.00	5754.9796	5754.9783	5754.9767	5754.9748
93.50	5754.9782	5754.9771	5754.9759	5754.9737
Max. Deviation (MHz)	**0.0218**	**0.0229**	**0.0241**	**0.0263**
Max. Deviation (ppm)	**3.79**	**3.98**	**4.19**	**4.57**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5754.9821	5754.9809	5754.9790	5754.9768
10	5754.9808	5754.9795	5754.9780	5754.9762
20	5754.9796	5754.9783	5754.9767	5754.9748
30	5754.9782	5754.9771	5754.9757	5754.9741
40	5754.9766	5754.9751	5754.9735	5754.9715
Max. Deviation (MHz)	**0.0234**	**0.0249**	**0.0265**	**0.0285**
Max. Deviation (ppm)	**4.07**	**4.33**	**4.61**	**4.95**
Result	Complies			

Mode: 80 MHz / Chain 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9825	5209.9811	5209.9793	5209.9772
110.00	5209.9813	5209.9800	5209.9784	5209.9765
93.50	5209.9799	5209.9788	5209.9776	5209.9754
Max. Deviation (MHz)	**0.0201**	**0.0212**	**0.0224**	**0.0246**
Max. Deviation (ppm)	**3.85**	**4.06**	**4.29**	**4.72**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5209.9838	5209.9826	5209.9807	5209.9785
10	5209.9825	5209.9812	5209.9797	5209.9779
20	5209.9813	5209.9800	5209.9784	5209.9765
30	5209.9799	5209.9788	5209.9774	5209.9758
40	5209.9783	5209.9768	5209.9752	5209.9732
Max. Deviation (MHz)	**0.0217**	**0.0232**	**0.0248**	**0.0268**
Max. Deviation (ppm)	**4.16**	**4.45**	**4.75**	**5.14**
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9808	5774.9794	5774.9776	5774.9755
110.00	5774.9796	5774.9783	5774.9767	5774.9748
93.50	5774.9782	5774.9771	5774.9759	5774.9737
Max. Deviation (MHz)	**0.0218**	**0.0229**	**0.0241**	**0.0263**
Max. Deviation (ppm)	**3.78**	**3.97**	**4.17**	**4.56**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5774.9821	5774.9809	5774.9790	5774.9768
10	5774.9808	5774.9795	5774.9780	5774.9762
20	5774.9796	5774.9783	5774.9767	5774.9748
30	5774.9782	5774.9771	5774.9757	5774.9741
40	5774.9766	5774.9751	5774.9735	5774.9715
Max. Deviation (MHz)	**0.0234**	**0.0249**	**0.0265**	**0.0285**
Max. Deviation (ppm)	**4.05**	**4.31**	**4.59**	**4.94**
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. 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	6.120210n	-	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	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	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. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

"*" Calibration Interval of instruments listed above is two years.

N.C.R means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

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