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FCC RADIO TEST REPORT

Applicant's company	**PEGATRON CORPORATION**
Applicant Address	5F., NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY 11259, Taiwan
FCC ID	**VUIDPC3949**
Manufacturer's company	**Maintek Computer (Suzhou) Co., Ltd**
Manufacturer Address	Bldg. 6 NB, 233 Jin Feng Rd, Suzhou District Jiangsu China

Product Name	Wireless Residential Gateway
Brand Name	CISCO
Model No.	DPC3949XXXX (X=0-1, A-Z)
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Jun. 26, 2015
Final Test Date	Sep. 04, 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

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR581713	Rev. 01	Initial issue of report	Sep. 11, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	**Wireless Residential Gateway**
Brand Name	:	**CISCO**
Model No.	:	**DPC3949XXXX (X=0-1, A-Z)**
Applicant	:	**PEGATRON CORPORATION**
Test Rule Part(s)	:	**47 CFR FCC Part 15 Subpart E § 15.407**

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jun. 26, 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	15.64 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	0.61 dB
4.5	15.407(a)	Power Spectral Density	Complies	2.17 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.02 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.10 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	IEEE 802.11a: WLAN (1TX, 3RX) IEEE 802.11n: WLAN (3TX, 3RX) IEEE 802.11ac: WLAN (3TX, 3RX)
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: 17.02 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.05 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz Band 4: IEEE 802.11a: 17.02 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.89 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.90 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 25.75 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 27.96 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 28.87 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 24.90 dBm Band 4: IEEE 802.11a: 25.78 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 28.77 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 29.39 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 22.74 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	

Note: The product has beamforming function for 802.11n/ac.

Antenna and Band width

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

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3

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

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

Note 3: Modulation modes consist of below configuration:

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

3.2. Accessories

Power	Brand	Model No.	Rating
Adapter	LITEON	PA-1360-8SA1	Input: 100-240Vac, 50/60Hz, 1.0A Output: 12Vdc, 3.0A
Other			
Power cable*1: Non-shielded, 1.8m			

3.3. Table for Filed Antenna

Set	Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	1	Hong Lin	290-30211	PCB Antenna	I-PEX	2.85
	2	Hong Lin	290-30350	PCB Antenna	I-PEX	2.87
	3	Hong Lin	290-30213	PCB Antenna	I-PEX	2.89
2	1	INPAQ	WA-P-LC-01-022	PCB Antenna	I-PEX	2.83
	2	INPAQ	WA-P-LALC-04-001	PCB Antenna	I-PEX	2.79
	3	INPAQ	WA-P-LC-01-021	PCB Antenna	I-PEX	2.81

Note: 1. The EUT has two sets of antenna, and each set contains three antennas.

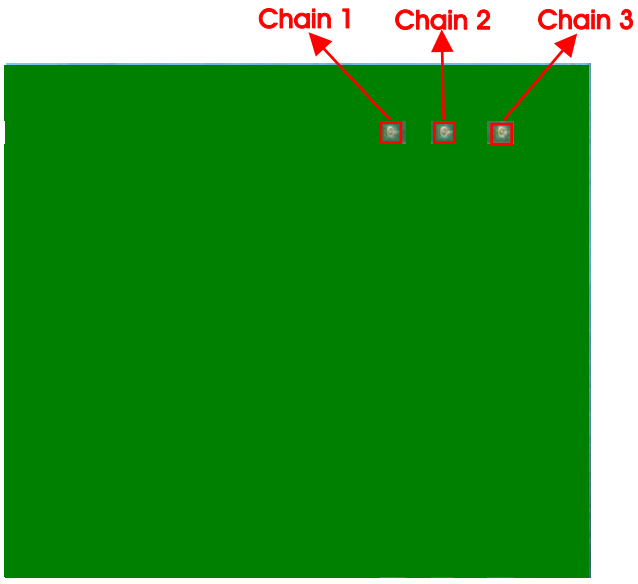
2. Because all antennas are the same type antennas, only the higher gain antennas "set 1" was tested and recorded in the report.
3. One is horizontal and the others are vertical for the antenna position
4. Chain 1: Connect to Ant. 1, Chain 2: Connect to Ant. 2, Chain 3: Connect to Ant. 3.

   For 802.11a mode (1TX, 3RX):

   Only Chain 1 can be use as transmitting chain, but Chain 1, Chain 2 and Chain 3 could receive simultaneously.

   For 802.11n/ac mode (3TX, 3RX):

   Chain 1, Chain 2 and Chain 3 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	CTX		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
Power Spectral Density	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
6dB Spectrum Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	1
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	Band 4	MCS0/Nss1	155	1+2+3
Radiated Emission Below 1GHz	CTX		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3

Band Edge Emission	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1+2+3
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1+2+3
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1+2+3
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: 1. The EUT can only be used at Y axis position.

2. 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.

3. There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for 802.11ac, after evaluating, beamforming function has been evaluated to be the worst case, so it was selected to test and record in this test report.

3.6. Table for Testing Locations

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

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

3.7. Table for Multiple Listing

The model number detail information for the following table:

Model No.	Description
DPC3949XXXX	X=0-1, A-Z

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB

For non-beamforming function:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

For beamforming function:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Notebook	DELL	E4300	DoC
Client Device	Broadcom	Bcm4366	DoC

For Test Site No: CO02-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.9. Table for Parameters of Test Software Setting

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

Test Software Version	Mtool 2.0.1.6					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	100	97	100	92	100	98
802.11ac MCS0/Nss1 VHT20	80	92	78	88	96	97
Mode	**NCB: 40MHz**					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz	5755 MHz		5795 MHz
	83		100	74		99
Mode	**NCB: 80MHz**					
802.11ac MCS0/Nss1 VHT80	5210 MHz			5775 MHz		
	81			73		

3.10. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

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

The program was executed as follows:

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

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.070	2.090	99.04	0.04	0.01
802.11ac MCS0/Nss1 VHT20	3.843	3.927	97.86	0.09	0.26
802.11ac MCS0/Nss1 VHT40	4.600	4.700	97.87	0.09	0.22
802.11ac MCS0/Nss1 VHT80	5.080	5.400	94.07	0.27	0.20

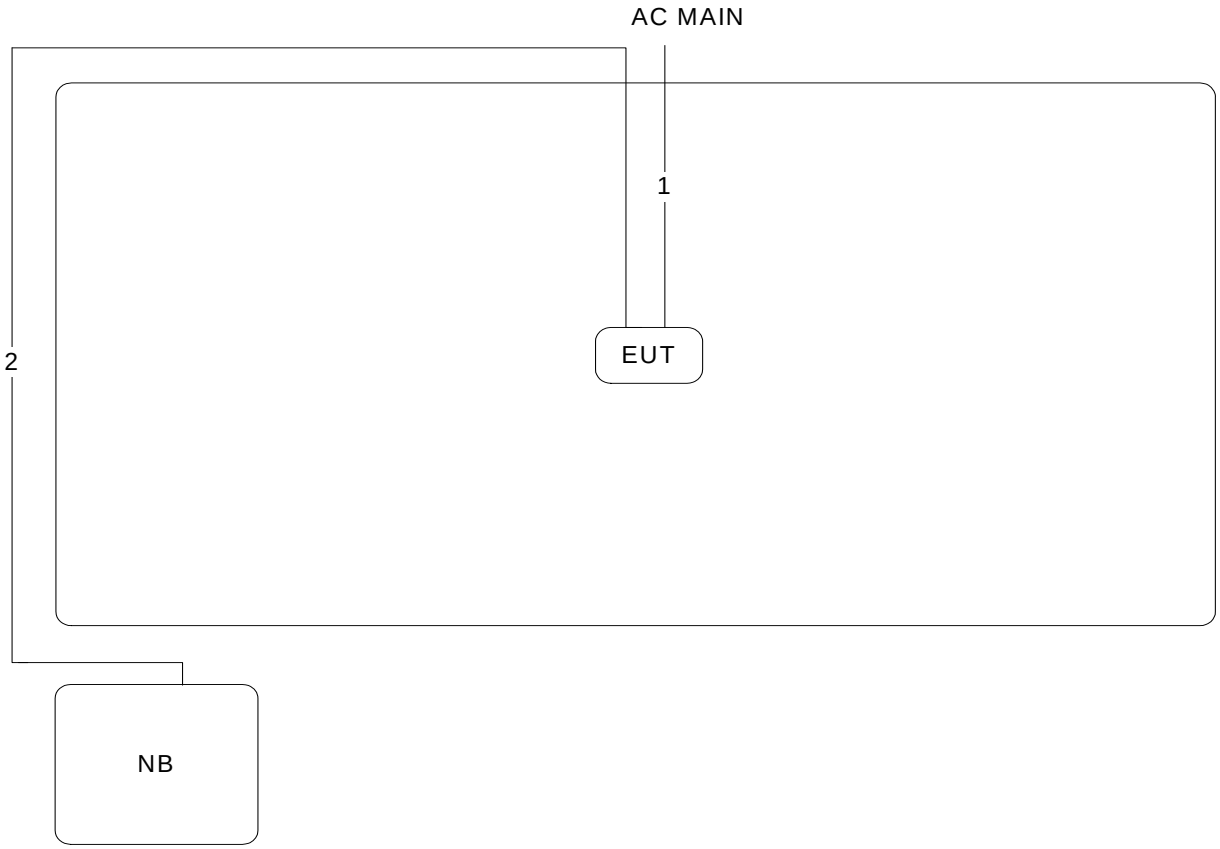
3.12. Test Configurations

3.12.1. AC Power Line Conduction Emissions Test Configuration

Item	Connection	Shielded	Length
1	Power cable	No	3.3m
2	RJ-45 cable	No	10m

3.12.2. Radiation Emissions Test Configuration

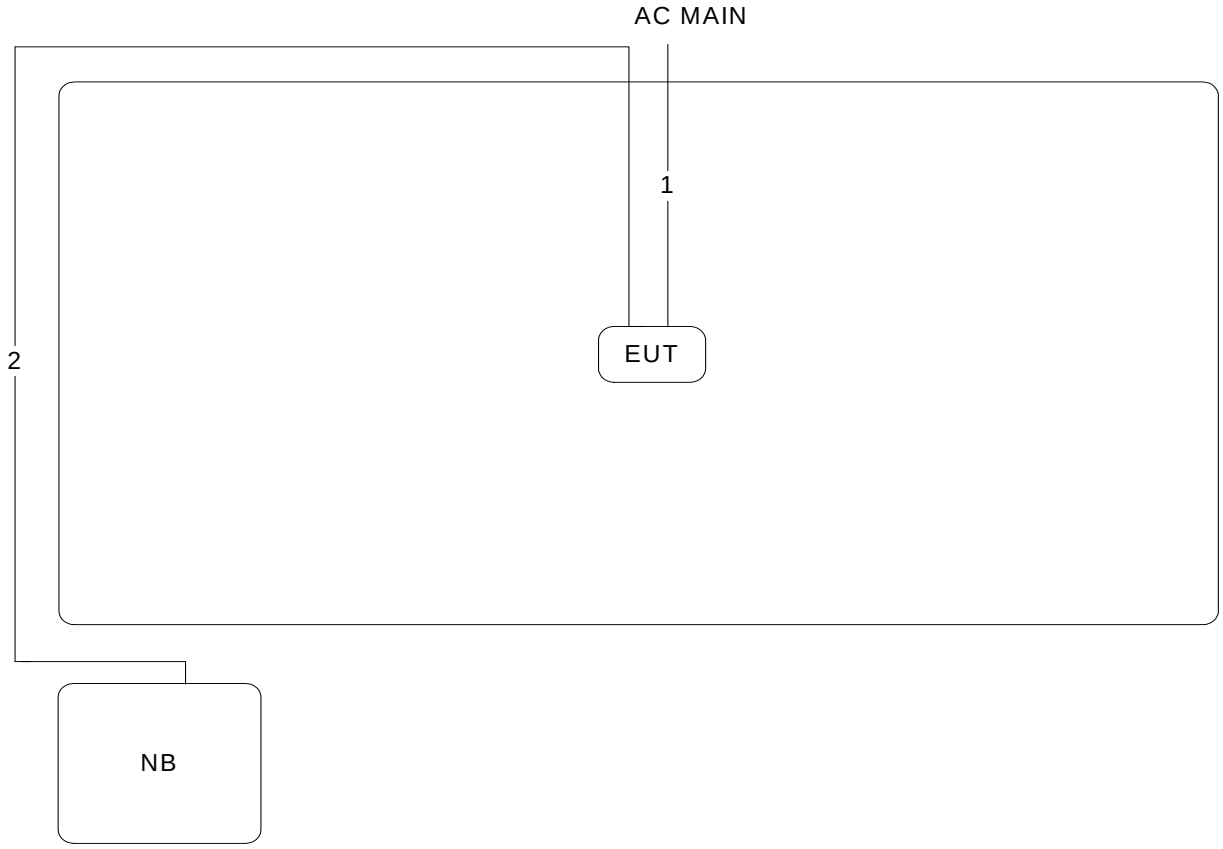
Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	3.3m
2	RJ-45 cable	No	10m

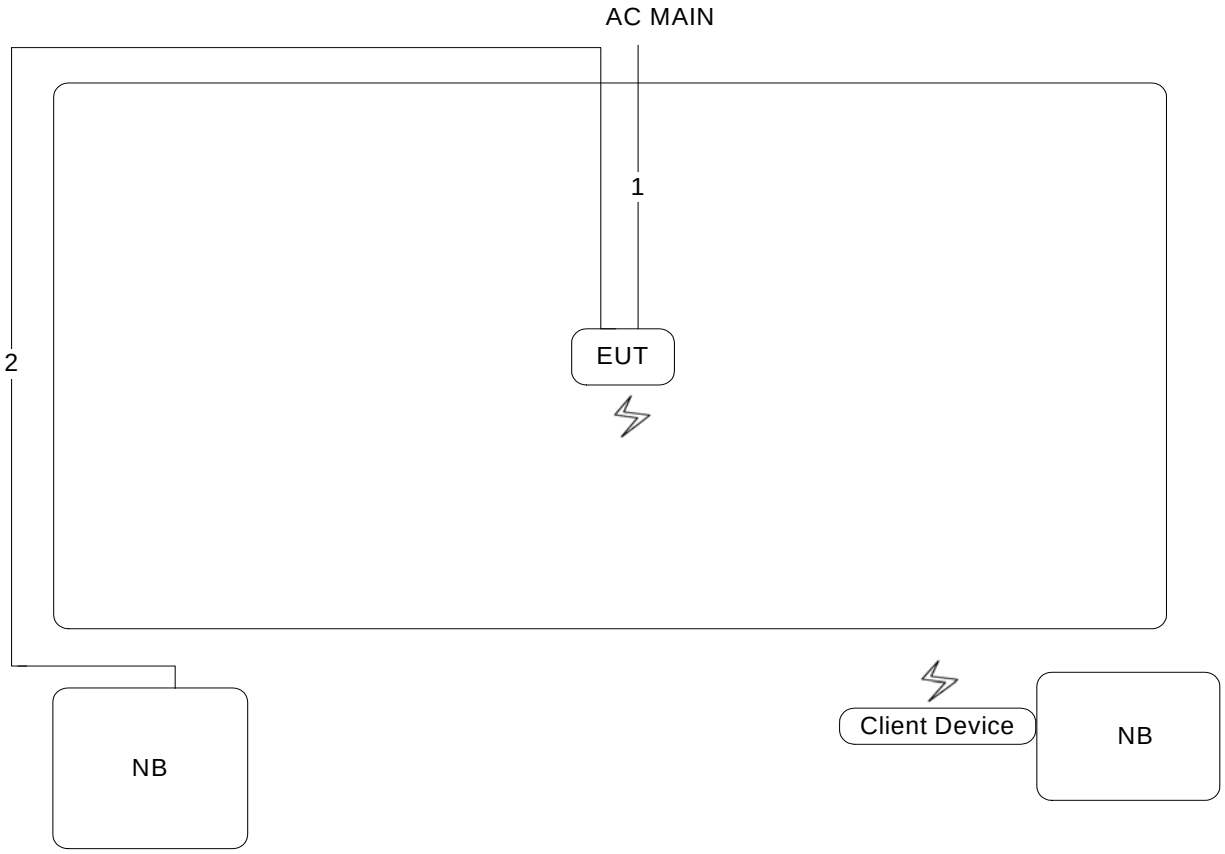
Test Configuration: above 1GHz

For non-beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	3.3m
2	RJ-45 cable	No	10m

For beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	3.3m
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

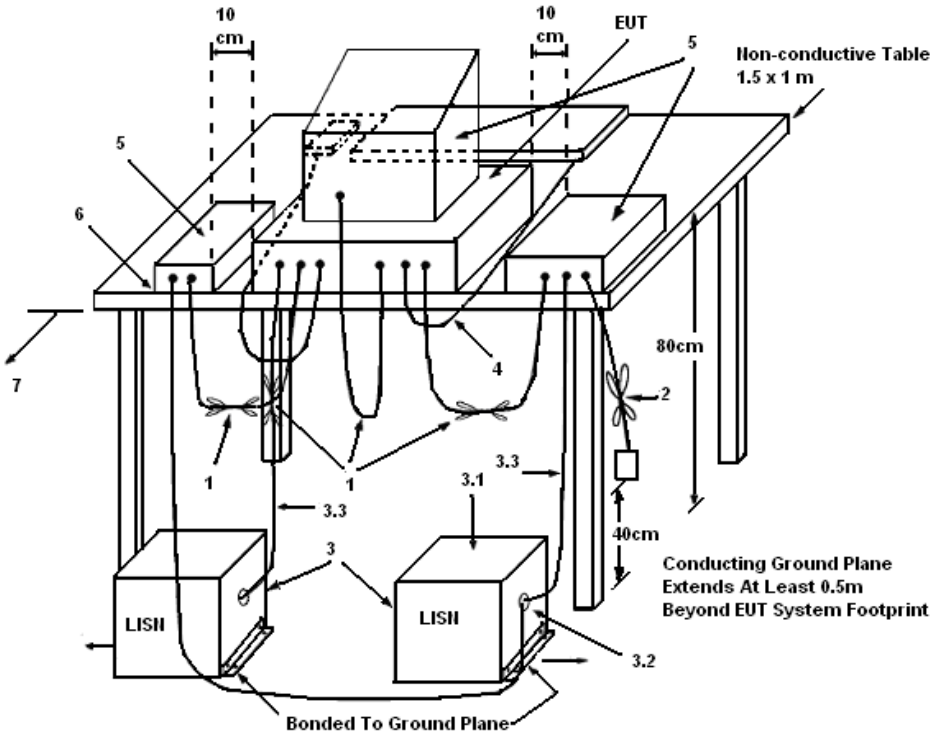
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

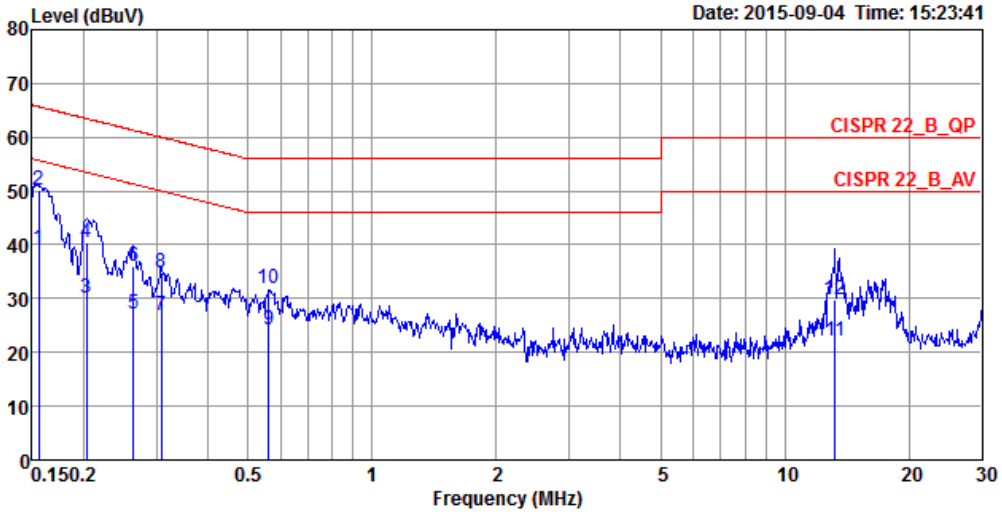
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

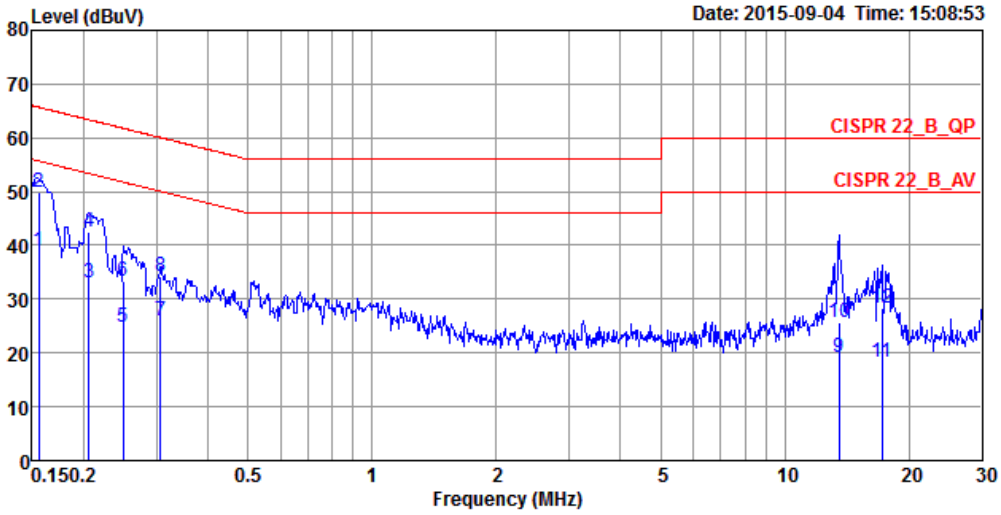
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	60%
Test Engineer	Kane Liu	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	39.28	-16.41	55.69	29.11	10.00	0.17	LINE	Average
2	0.1557	50.05	-15.64	65.69	39.88	10.00	0.17	LINE	QP
3	0.2029	30.14	-23.35	53.49	19.94	10.01	0.19	LINE	Average
4	0.2029	40.59	-22.90	63.49	30.39	10.01	0.19	LINE	QP
5	0.2644	27.11	-24.18	51.29	16.91	10.01	0.19	LINE	Average
6	0.2644	36.00	-25.29	61.29	25.80	10.01	0.19	LINE	QP
7	0.3083	26.90	-23.12	50.02	16.69	10.01	0.20	LINE	Average
8	0.3083	34.92	-25.10	60.02	24.71	10.01	0.20	LINE	QP
9	0.5611	24.35	-21.65	46.00	14.13	10.02	0.20	LINE	Average
10	0.5611	31.75	-24.25	56.00	21.53	10.02	0.20	LINE	QP
11	13.2667	22.22	-27.78	50.00	11.52	10.29	0.41	LINE	Average
12	13.2667	29.74	-30.26	60.00	19.04	10.29	0.41	LINE	QP

Temperature	23°C	Humidity	60%
Test Engineer	Kane Liu	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	38.99	-16.70	55.69	28.82	10.00	0.17	NEUTRAL	Average
2	0.1557	49.89	-15.80	65.69	39.72	10.00	0.17	NEUTRAL	QP
3	0.2061	33.11	-20.25	53.36	22.91	10.01	0.19	NEUTRAL	Average
4	0.2061	42.43	-20.93	63.36	32.23	10.01	0.19	NEUTRAL	QP
5	0.2495	24.92	-26.86	51.78	14.72	10.01	0.19	NEUTRAL	Average
6	0.2495	33.44	-28.34	61.78	23.24	10.01	0.19	NEUTRAL	QP
7	0.3067	26.09	-23.97	50.06	15.88	10.01	0.20	NEUTRAL	Average
8	0.3067	34.26	-25.80	60.06	24.05	10.01	0.20	NEUTRAL	QP
9	13.5509	19.13	-30.87	50.00	8.42	10.29	0.42	NEUTRAL	Average
10	13.5509	25.58	-34.42	60.00	14.87	10.29	0.42	NEUTRAL	QP
11	17.1994	18.31	-31.69	50.00	7.51	10.35	0.45	NEUTRAL	Average
12	17.1994	28.44	-31.56	60.00	17.64	10.35	0.45	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

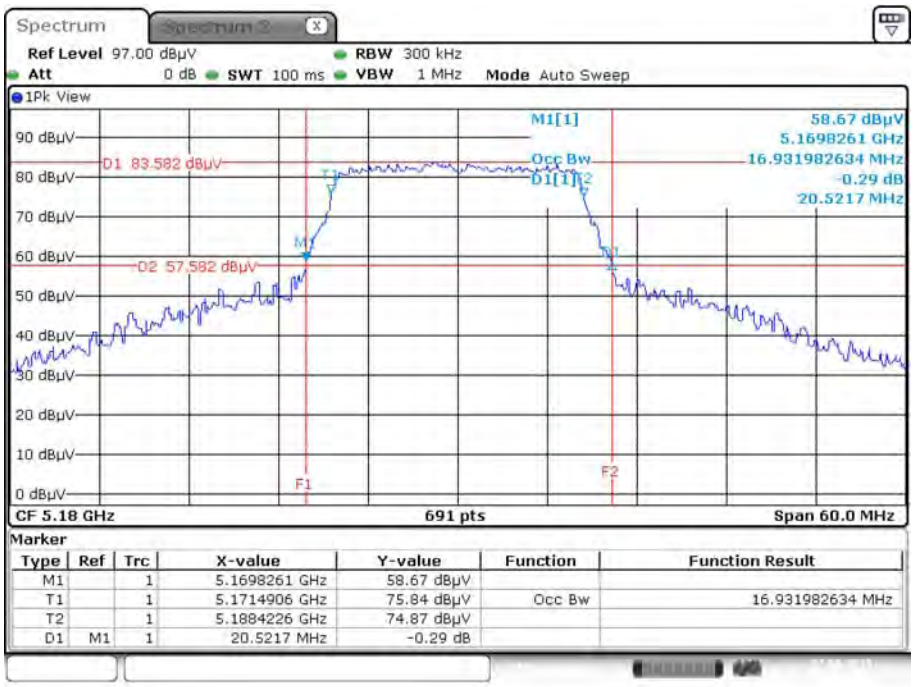
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25°C	Humidity	45%
Test Engineer	Roki Liu / Serway Li		

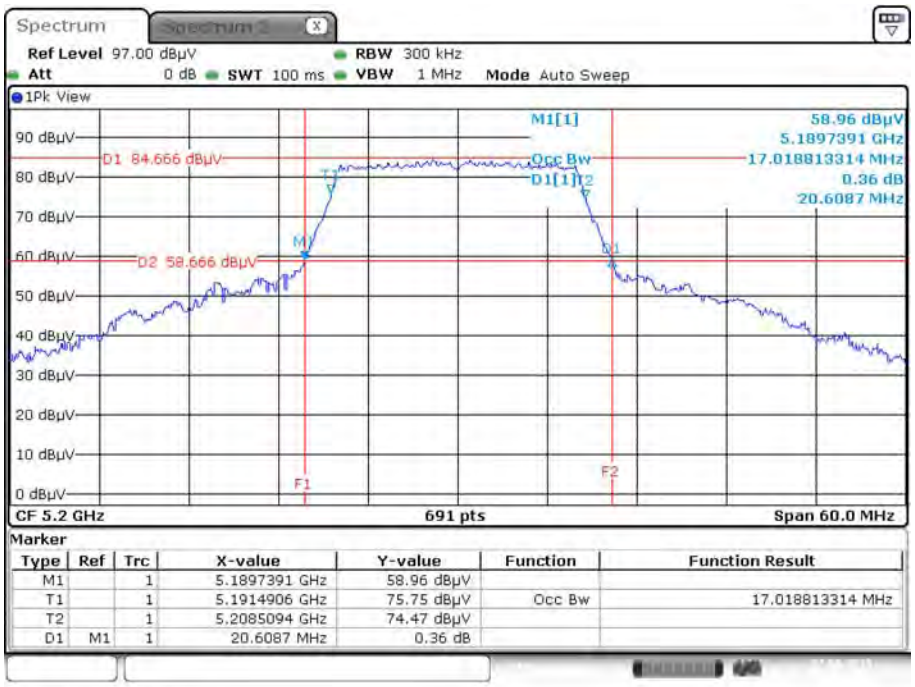
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	20.52	16.93
	5200 MHz	20.61	17.02
	5240 MHz	20.87	17.02
	5745 MHz	20.52	16.93
	5785 MHz	20.61	17.02
	5825 MHz	20.52	16.93
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.26	17.80
	5200 MHz	20.35	17.80
	5240 MHz	20.35	17.80
	5745 MHz	20.26	17.80
	5785 MHz	20.52	17.80
	5825 MHz	20.43	17.89
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.58	36.76
	5230 MHz	53.77	37.05
	5755 MHz	40.44	36.76
	5795 MHz	51.88	36.90
802.11ac MCS0/Nss1 VHT80	5210 MHz	82.32	76.12
	5775 MHz	83.48	76.12

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



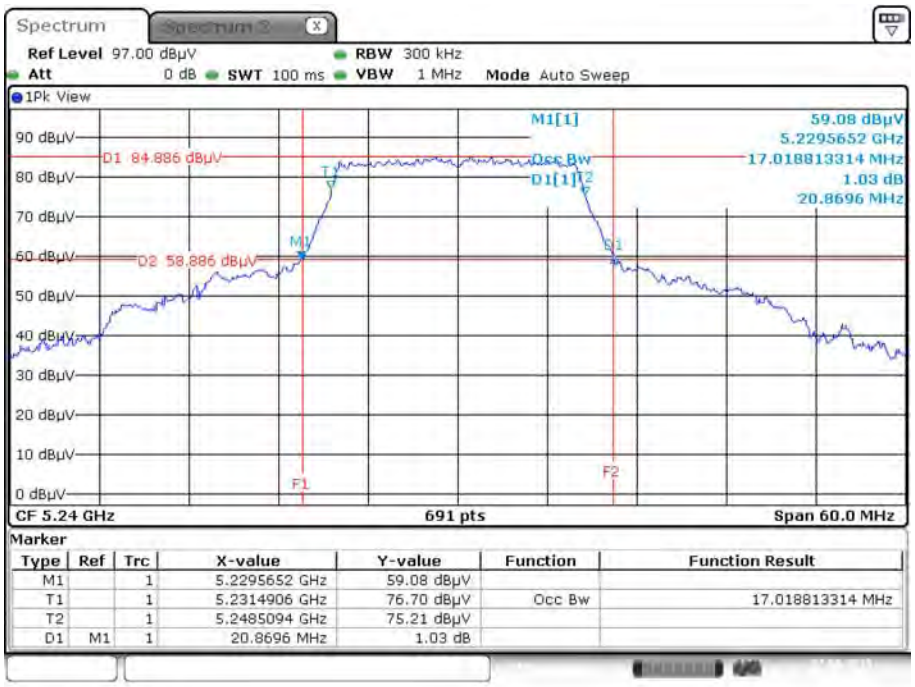
Date: 27.AUG.2015 18:04:58

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

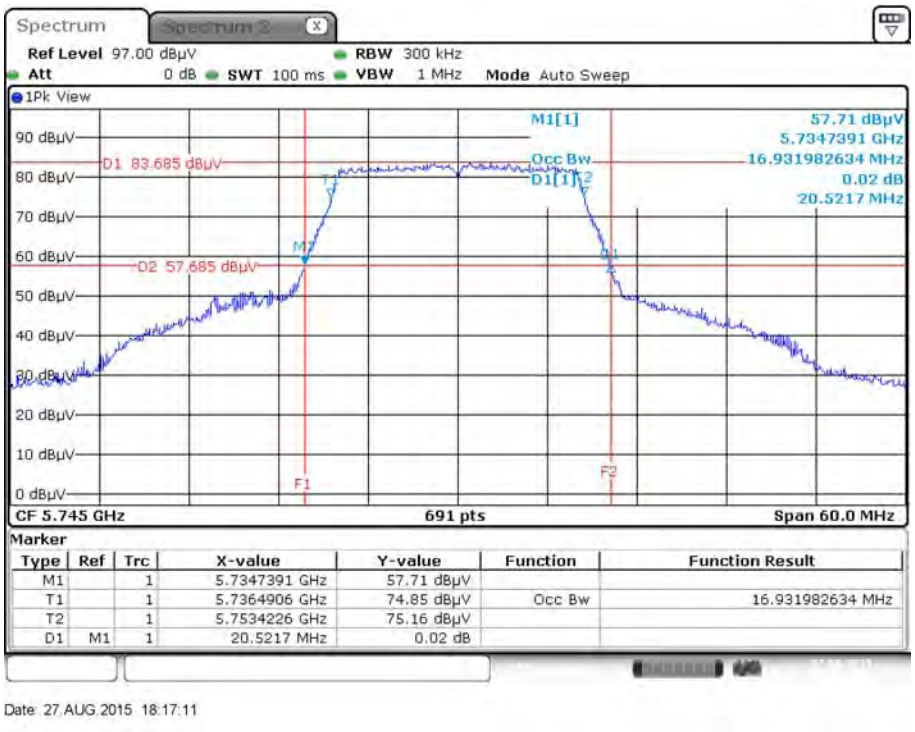


Date: 27.AUG.2015 18:06:34

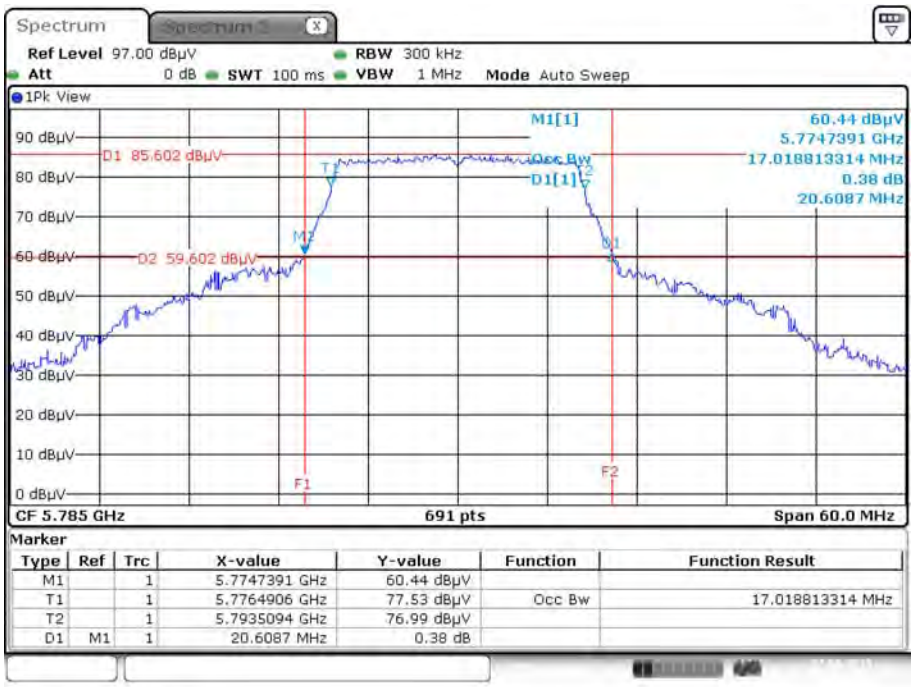
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz



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

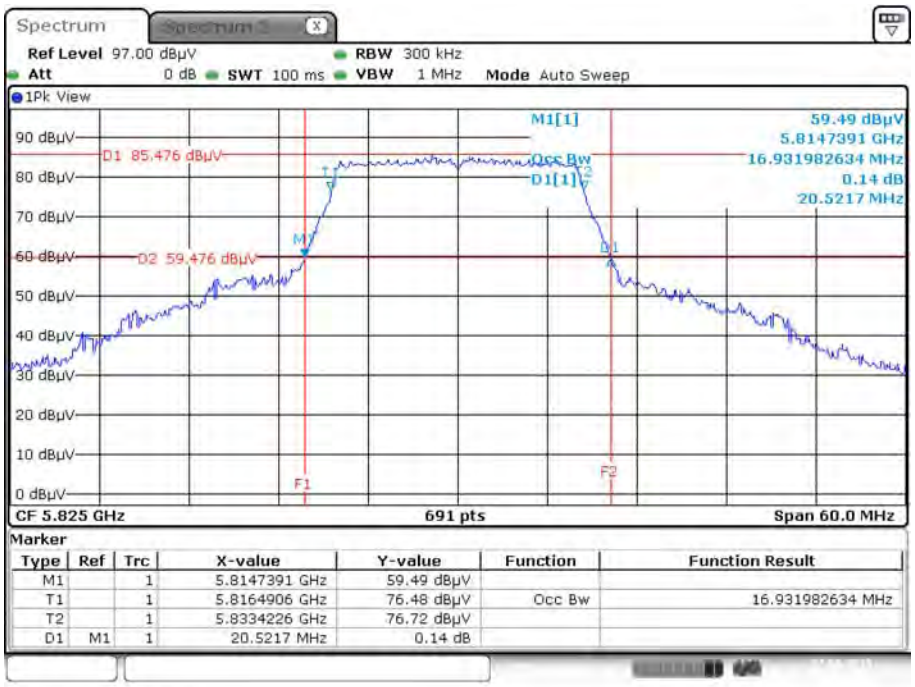


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 / 5785 MHz



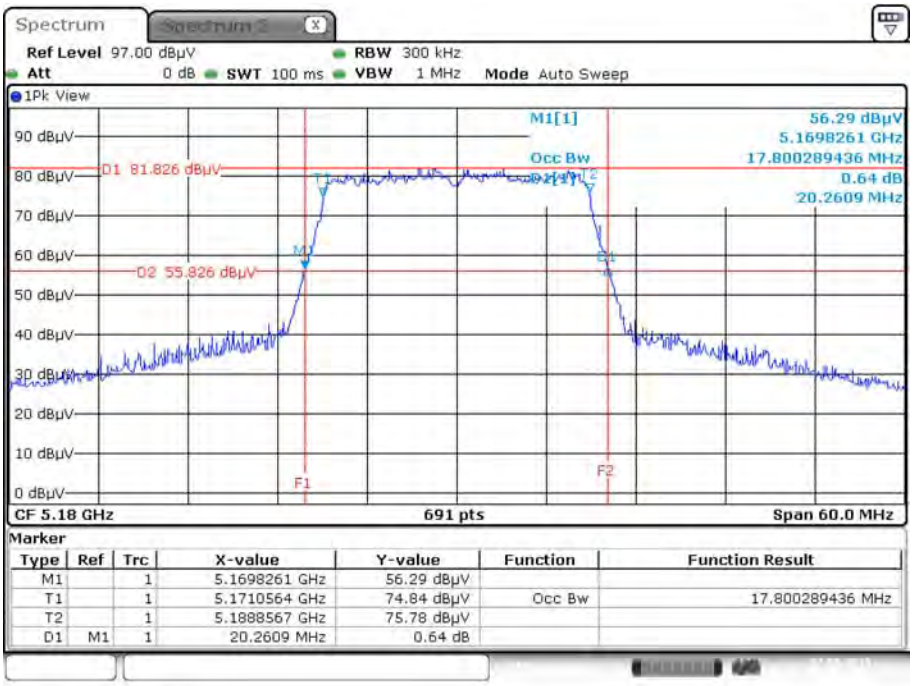
Date: 27.AUG.2015 18:18:16

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



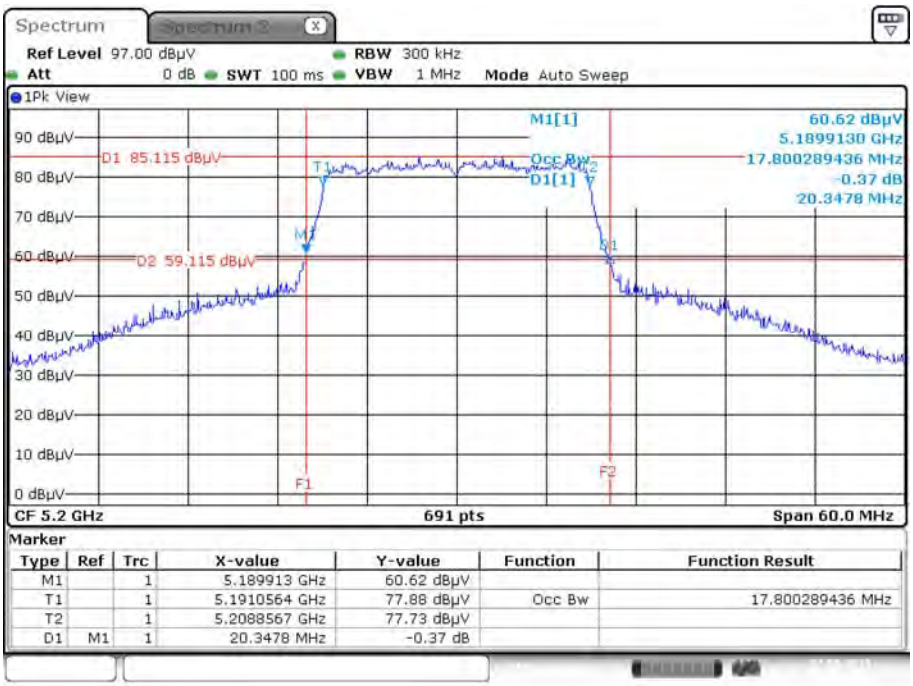
Date: 27.AUG.2015 18:19:26

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5180 MHz



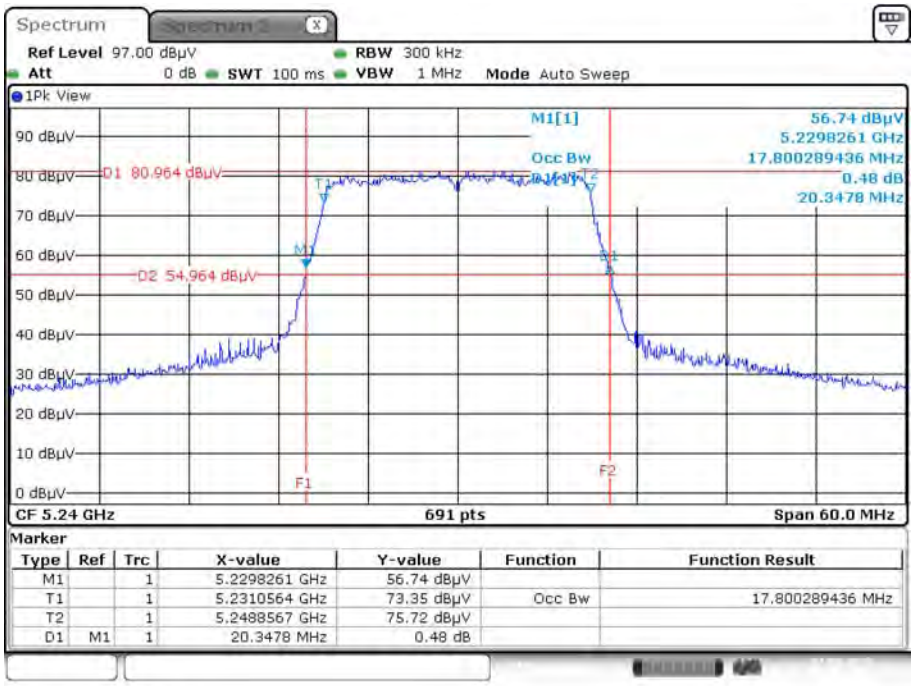
Date: 27.AUG.2015 19:26:10

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5200 MHz

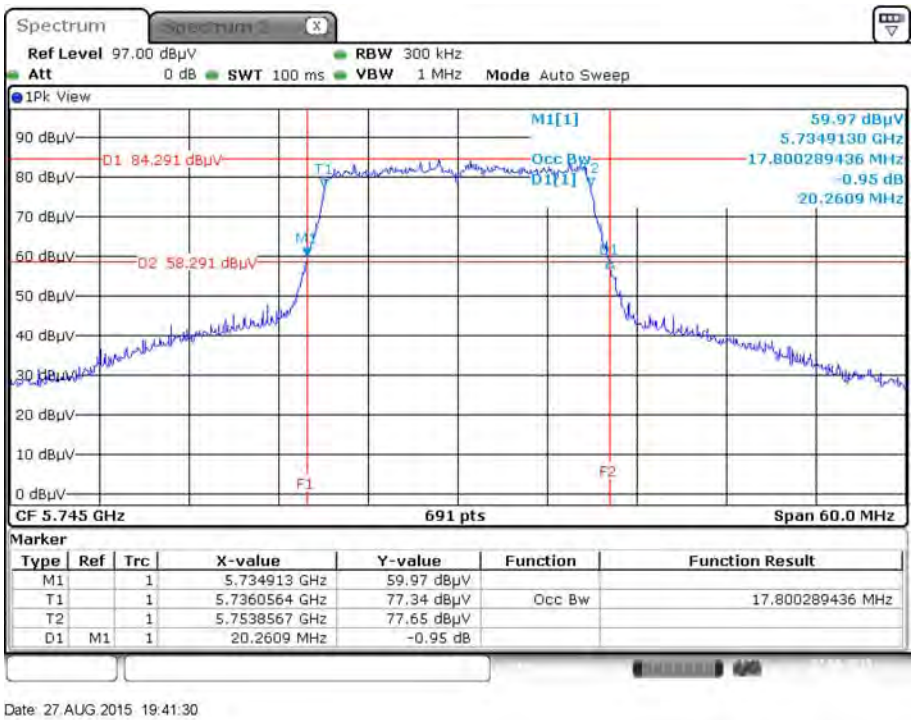


Date: 27.AUG.2015 19:28:06

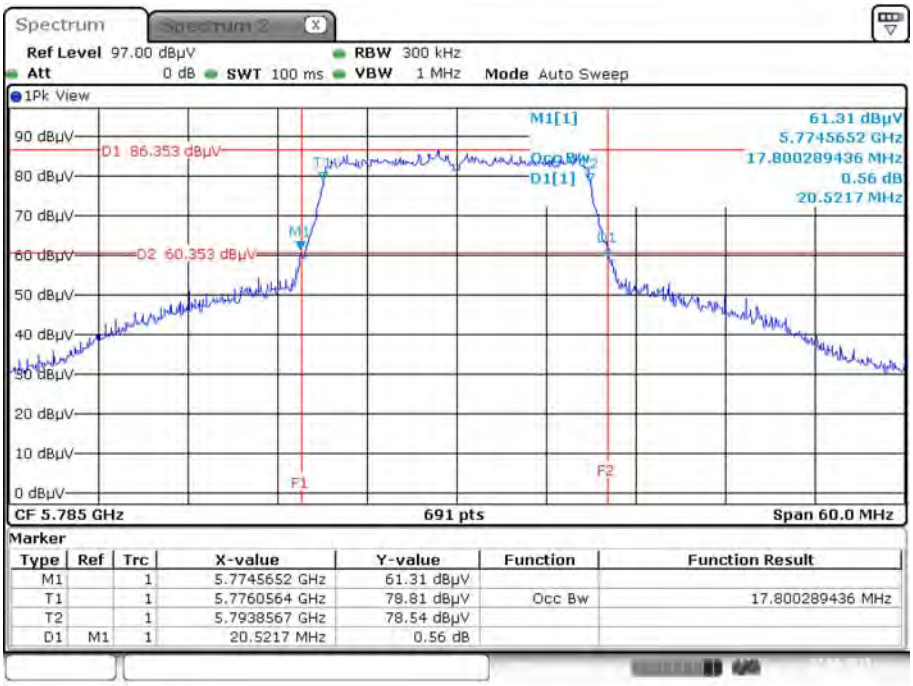
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5240 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5745 MHz

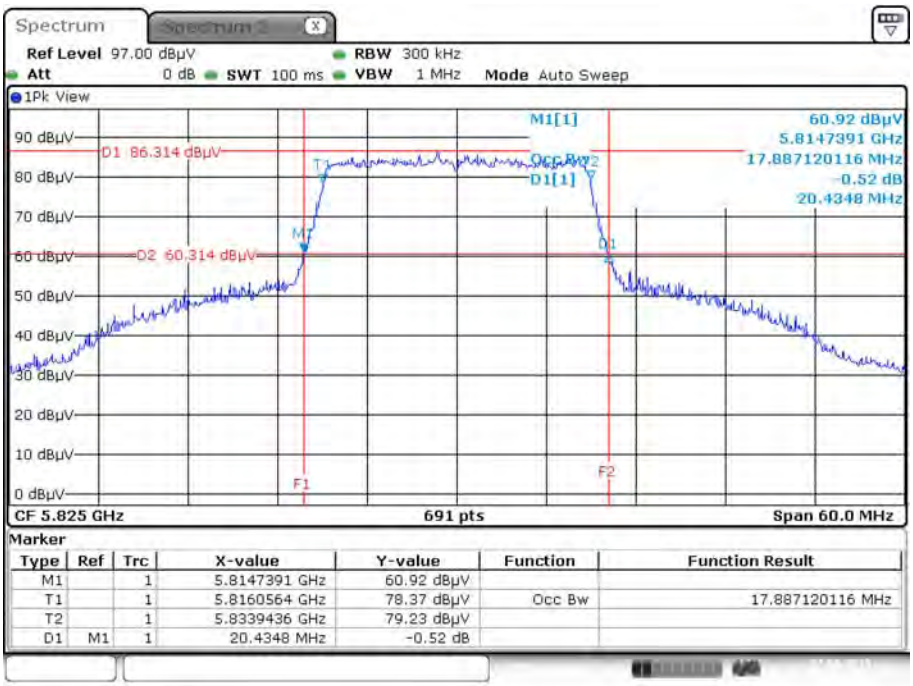


26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5785 MHz



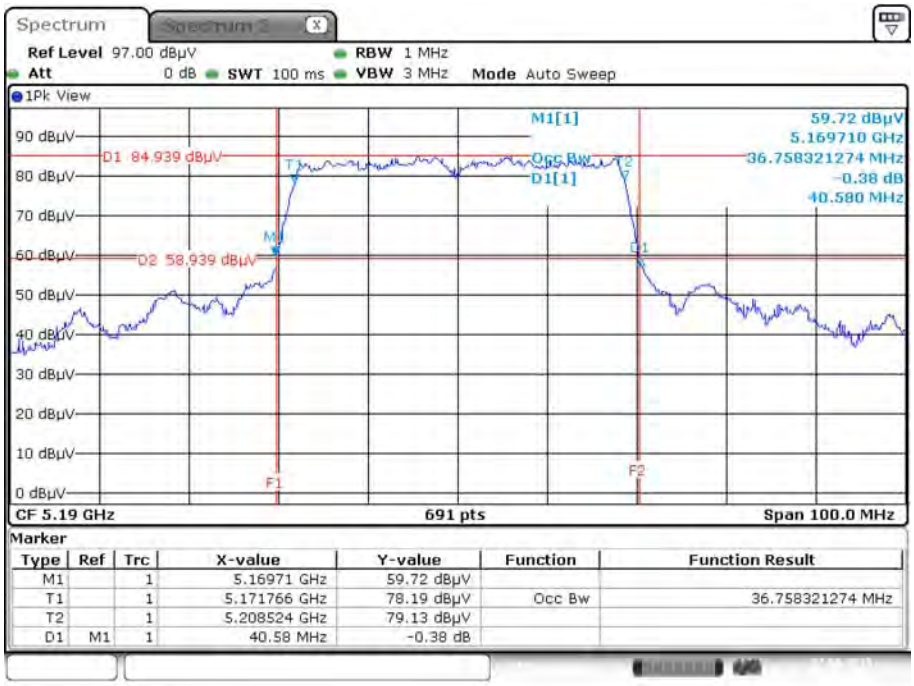
Date: 27.AUG.2015 19:43:12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5825 MHz



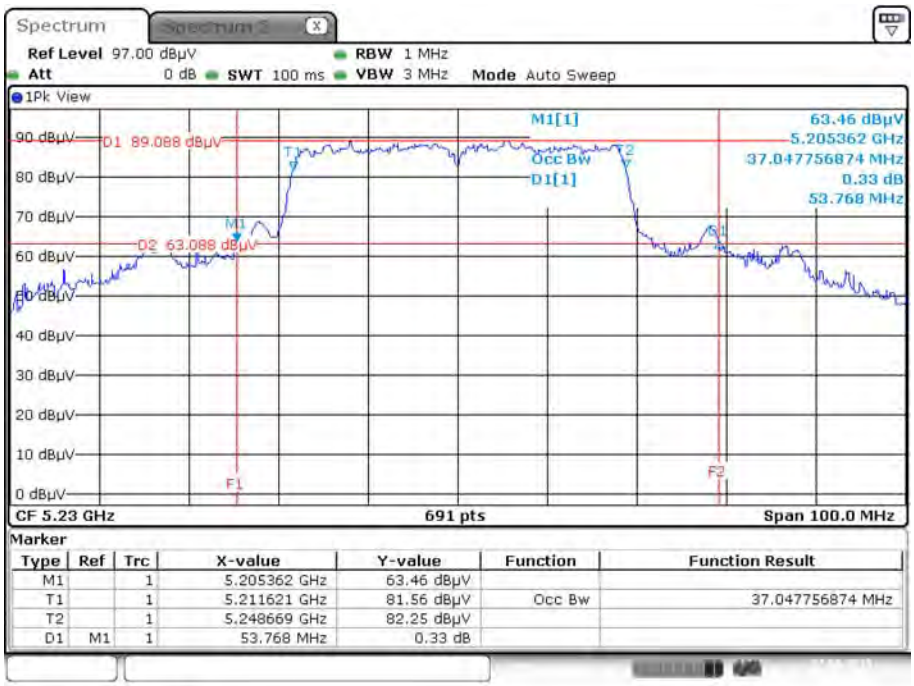
Date: 27.AUG.2015 19:44:21

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5190 MHz



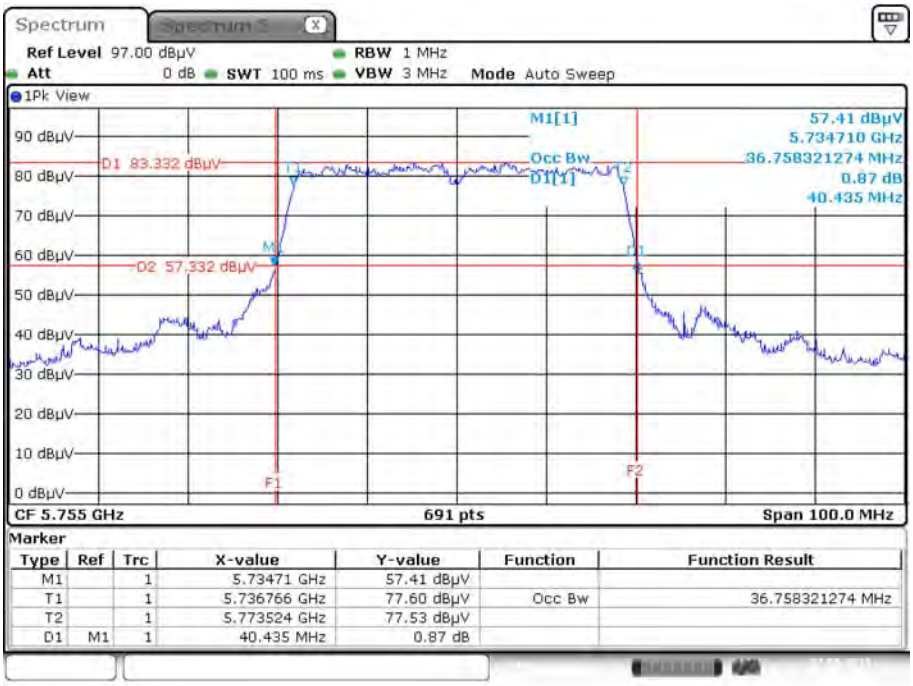
Date: 27.AUG.2015 19:47:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5230 MHz

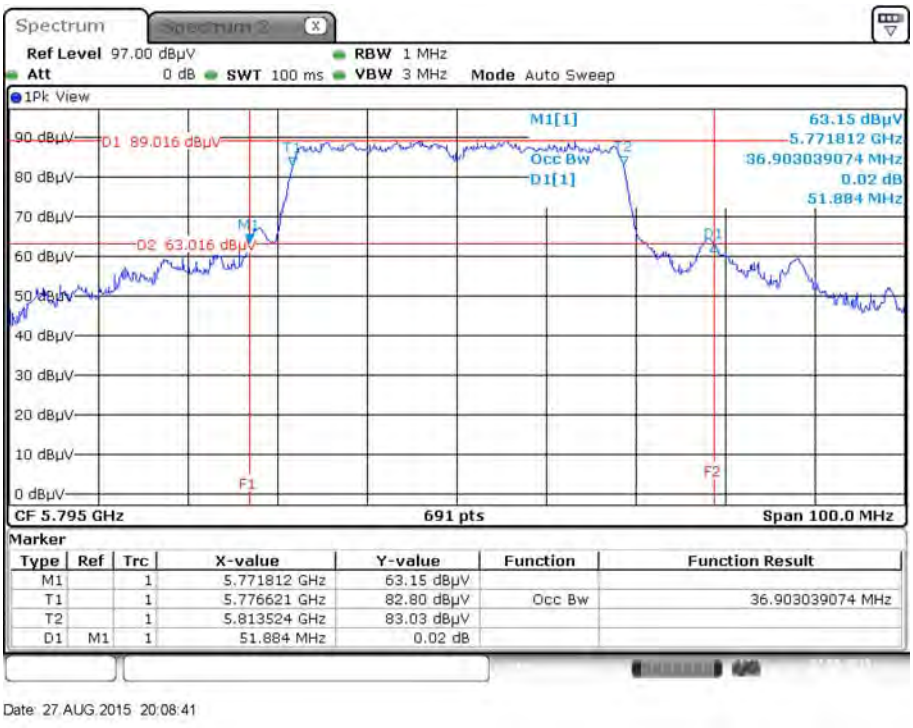


Date: 27.AUG.2015 19:51:22

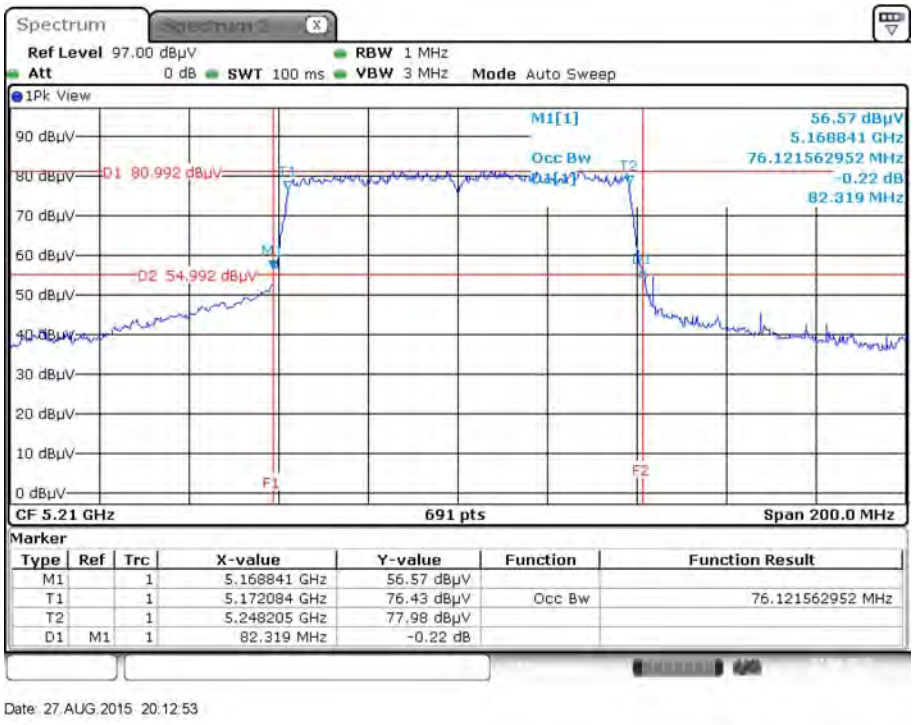
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5755 MHz



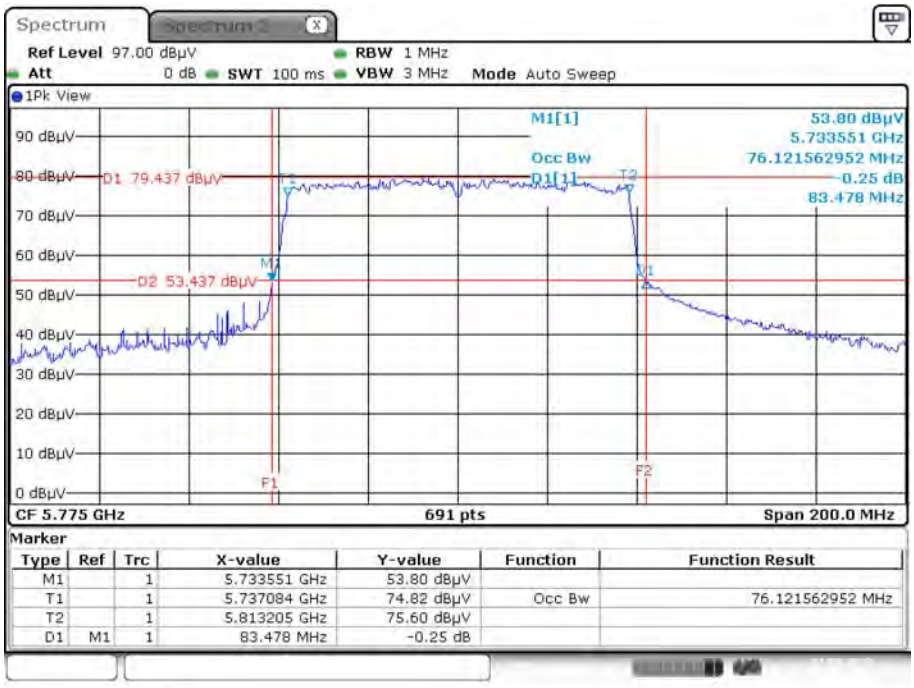
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5795 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 / 5210 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 / 5775 MHz



4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

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

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

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

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

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

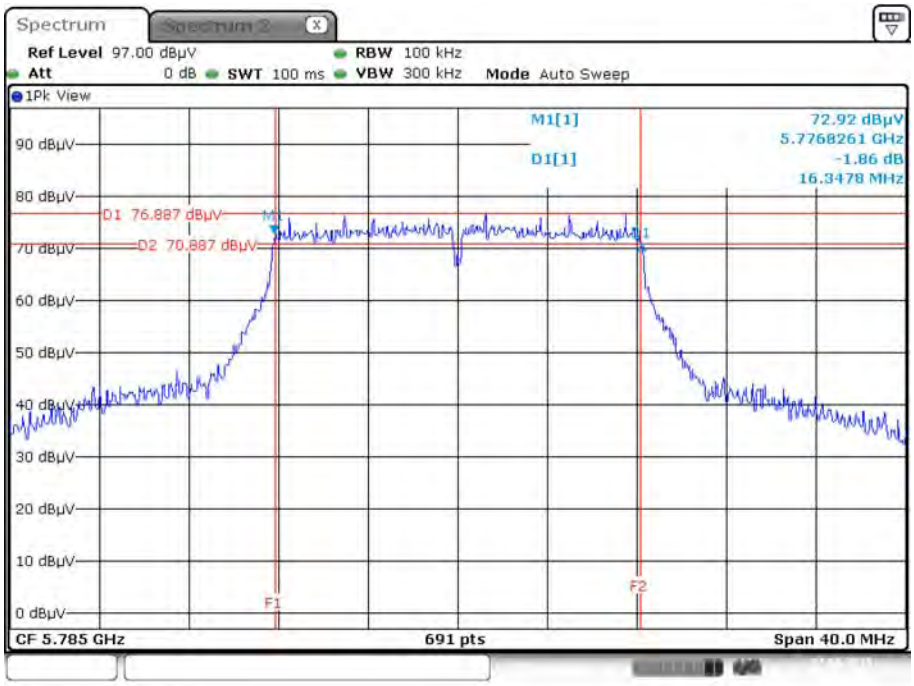
Temperature	25°C	Humidity	45%
Test Engineer	Roki Liu / Serway Li		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.41	500	Complies
	5785 MHz	16.35	500	Complies
	5825 MHz	16.41	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.64	500	Complies
	5785 MHz	16.64	500	Complies
	5825 MHz	16.93	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	35.36	500	Complies
	5795 MHz	35.94	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	74.49	500	Complies

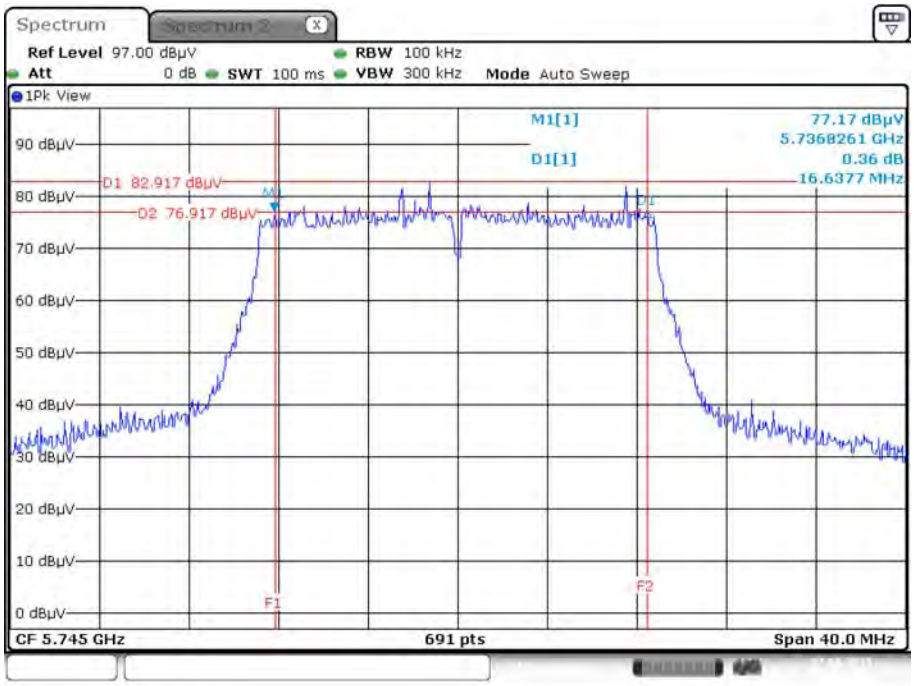
Note: All the test values were listed in the report.

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

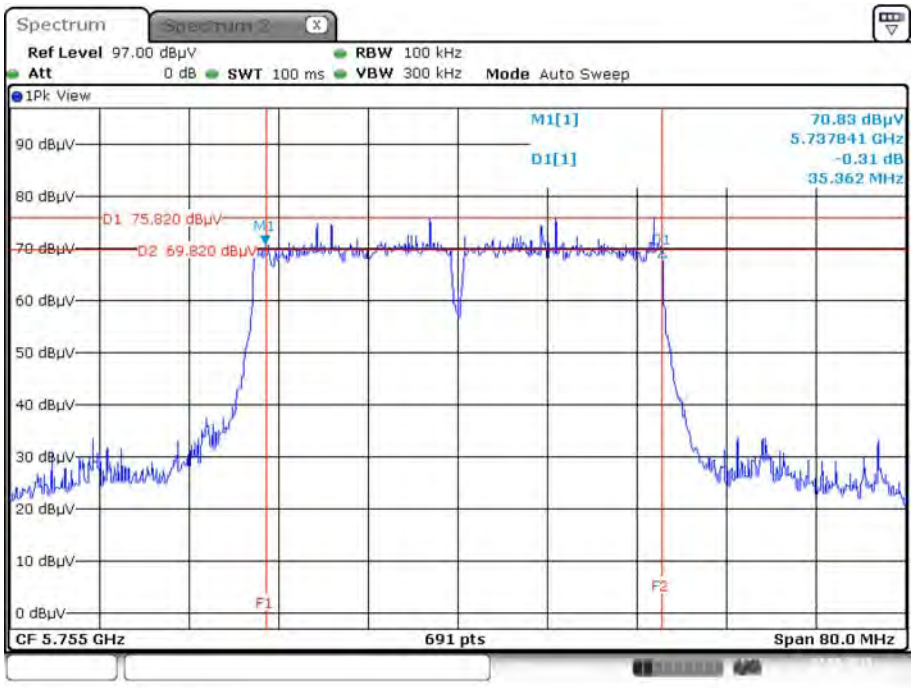
6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1/ 5785 MHz



6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5745 MHz



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



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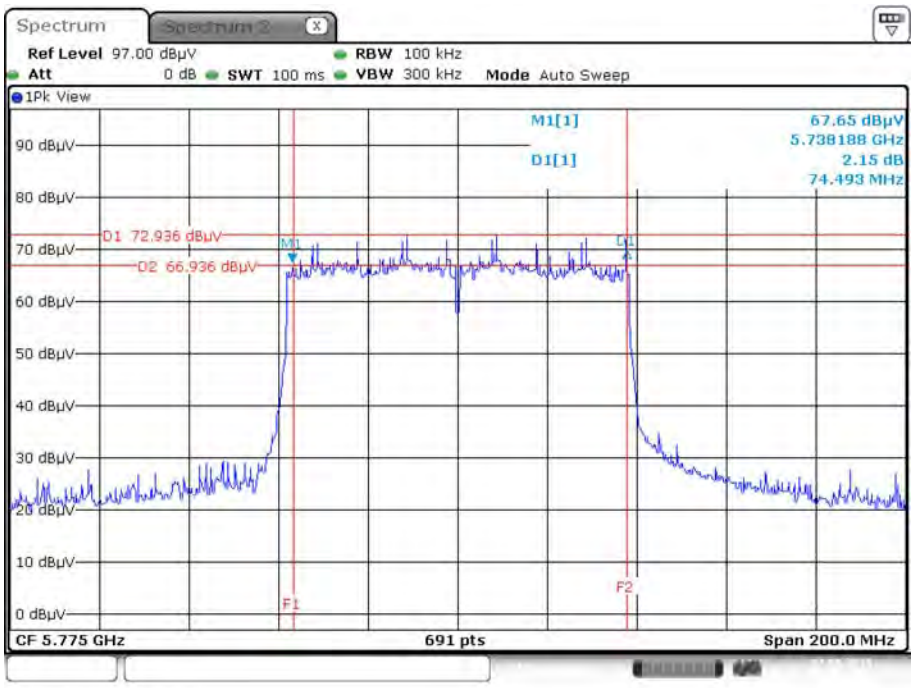
6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 / 5775 MHz



Date: 27.AUG.2015 21:00:08

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

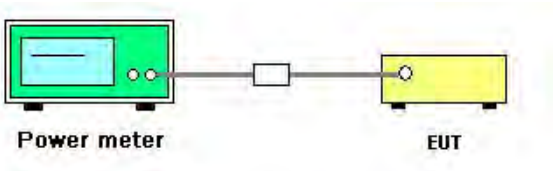
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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	Roki Liu / Serway Li	Test Date	Aug. 27, 2015

Mode	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
		Chain 1		
802.11a	5180 MHz	25.54	30.00	Complies
	5200 MHz	24.81	30.00	Complies
	5240 MHz	25.75	30.00	Complies
	5745 MHz	23.80	30.00	Complies
	5785 MHz	25.73	30.00	Complies
	5825 MHz	25.78	30.00	Complies

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.68	20.08	20.50	25.20	30.00	Complies
	5200 MHz	23.40	22.89	23.25	27.96	30.00	Complies
	5240 MHz	19.93	19.82	19.40	24.49	30.00	Complies
	5745 MHz	22.84	22.04	22.65	27.29	30.00	Complies
	5785 MHz	23.70	23.05	24.56	28.59	30.00	Complies
	5825 MHz	23.75	23.22	24.86	28.77	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	20.43	20.29	20.63	25.22	30.00	Complies
	5230 MHz	24.59	22.85	24.62	28.87	30.00	Complies
	5755 MHz	18.91	18.52	18.85	23.53	30.00	Complies
	5795 MHz	24.63	23.78	25.32	29.39	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	20.03	19.98	20.38	24.90	30.00	Complies
	5775 MHz	18.25	17.58	18.05	22.74	30.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.88dBi<6dBi, so the limit doesn't reduce.

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

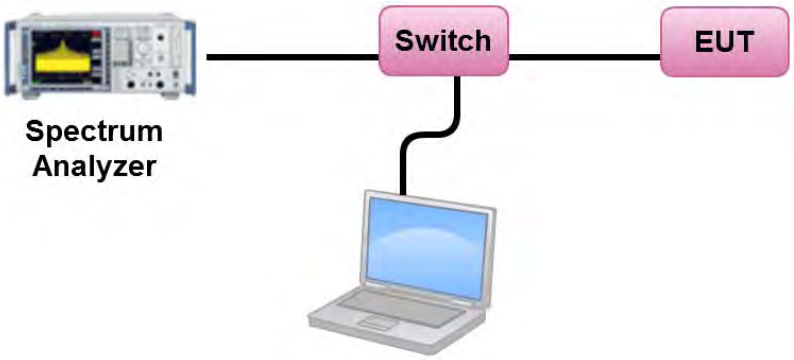
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	Roki Liu / Serway Li	Test Date	Aug. 27, 2015

Configuration IEEE 802.11a / Chain 1

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	12.07	17.00	Complies
40	5200 MHz	11.62	17.00	Complies
48	5240 MHz	12.43	17.00	Complies

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	10.82	-3.01	7.81	30.00	Complies
157	5785 MHz	12.44	-3.01	9.43	30.00	Complies
165	5825 MHz	12.50	-3.01	9.49	30.00	Complies

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

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	11.89	17.00	Complies
40	5200 MHz	14.83	17.00	Complies
48	5240 MHz	11.55	17.00	Complies

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	14.34	-3.01	11.33	30.00	Complies
157	5785 MHz	15.65	-3.01	12.64	30.00	Complies
165	5825 MHz	15.92	-3.01	12.91	30.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.88dBi<6dBi, so the limit doesn't reduce.

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

Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
38	5190 MHz	7.81		17.00		Complies
46	5230 MHz	12.62		17.00		Complies
Channel	**Frequency**	**Power Density (dBm/MHz)**	**10log(500kHz/RBW) Factor (dB)**	**Power Density (dBm/500kHz)**	**Power Density Limit (dBm/500kHz)**	**Result**
151	5755 MHz	7.16	-3.01	4.15	30.00	Complies
159	5795 MHz	13.01	-3.01	10.00	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.88dBi<6dBi, so the limit doesn't reduce.

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

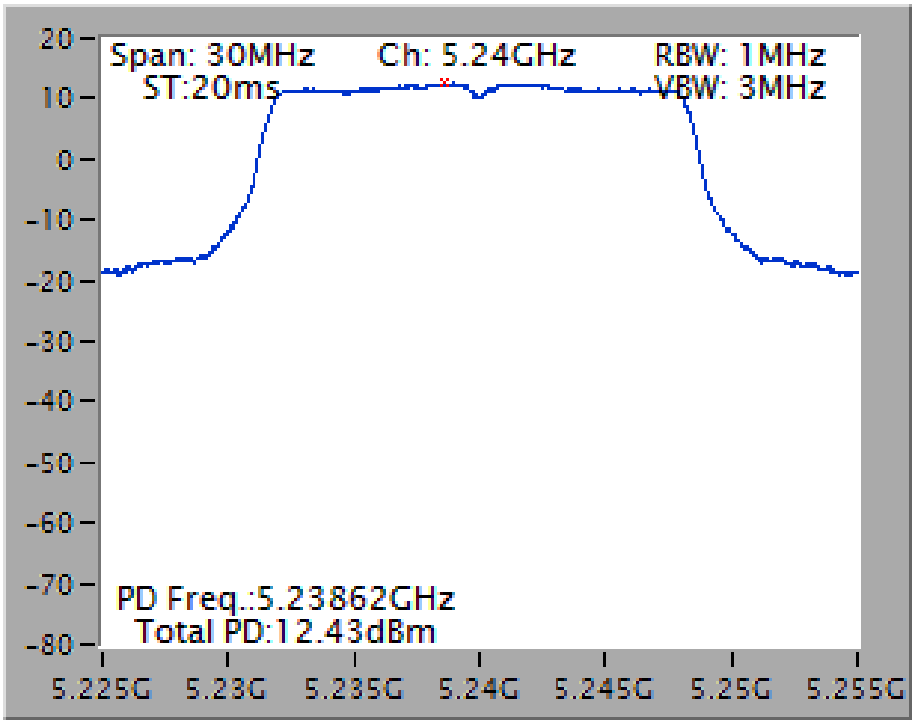
Channel	Frequency	Power Density (dBm/MHz)		Max. Limit (dBm/MHz)		Result
42	5210 MHz	5.53		17.00		Complies
Channel	**Frequency**	**Power Density (dBm/MHz)**	**10log(500kHz/RBW) Factor (dB)**	**Power Density (dBm/500kHz)**	**Power Density Limit (dBm/500kHz)**	**Result**
155	5775 MHz	3.60	-3.01	0.59	30.00	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.88dBi<6dBi, so the limit doesn't reduce.

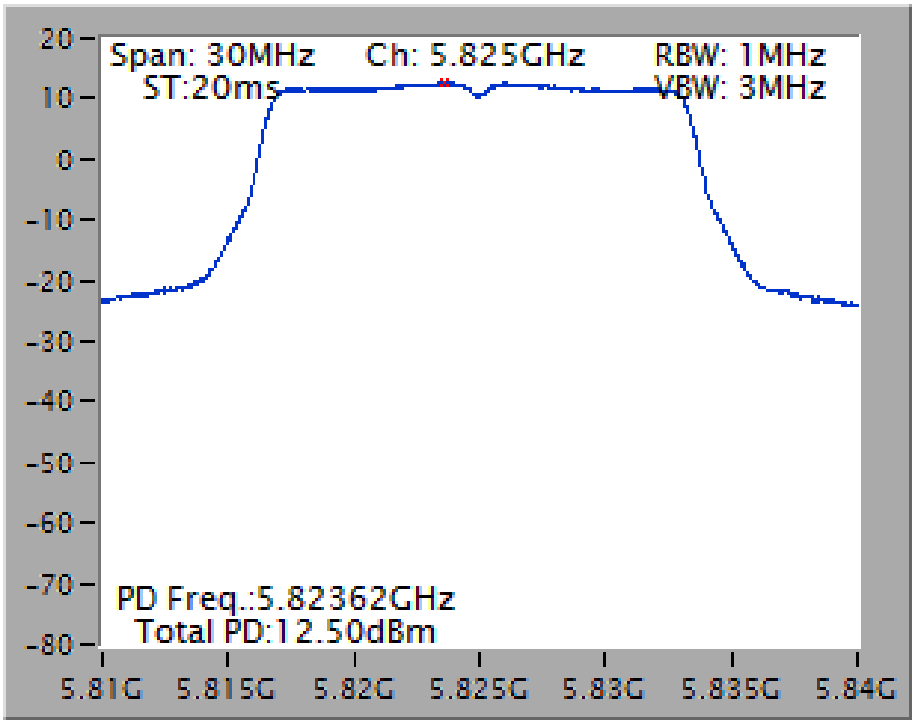
Note: All the test values were listed in the report.

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

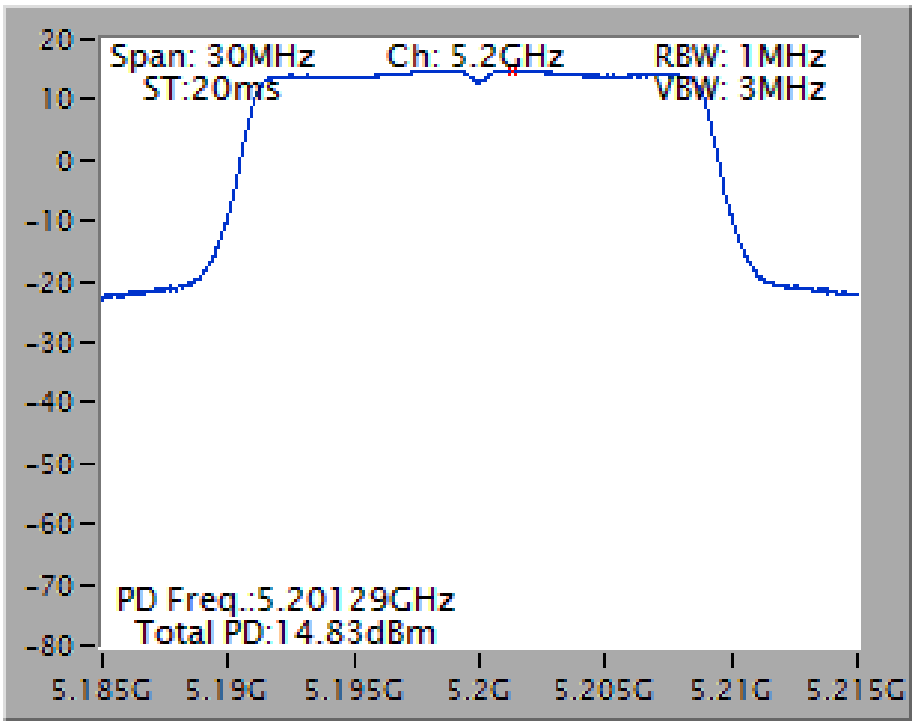
Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5240 MHz



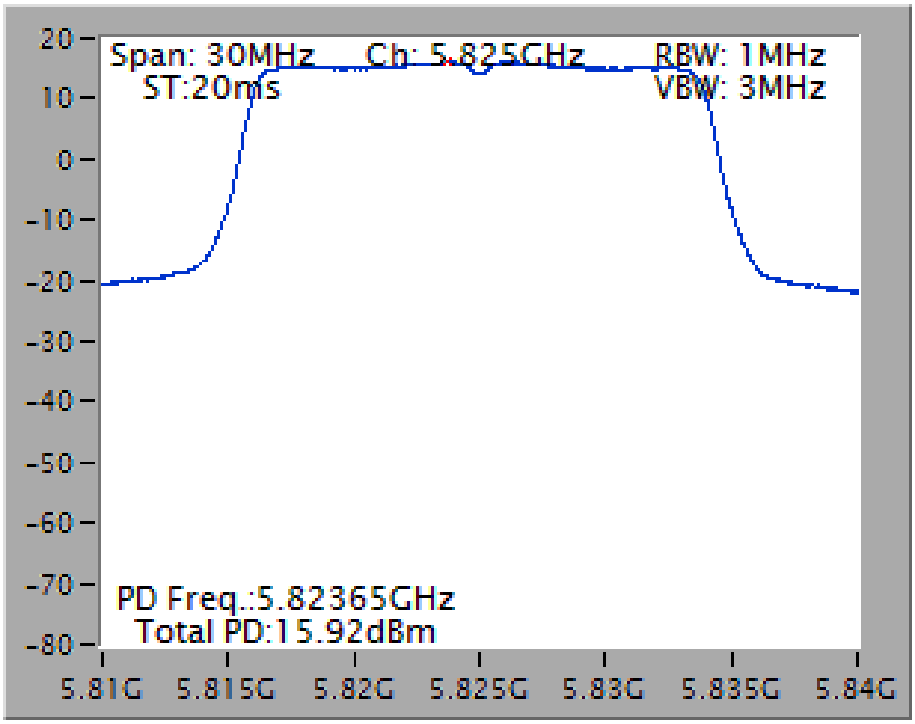
Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5825 MHz



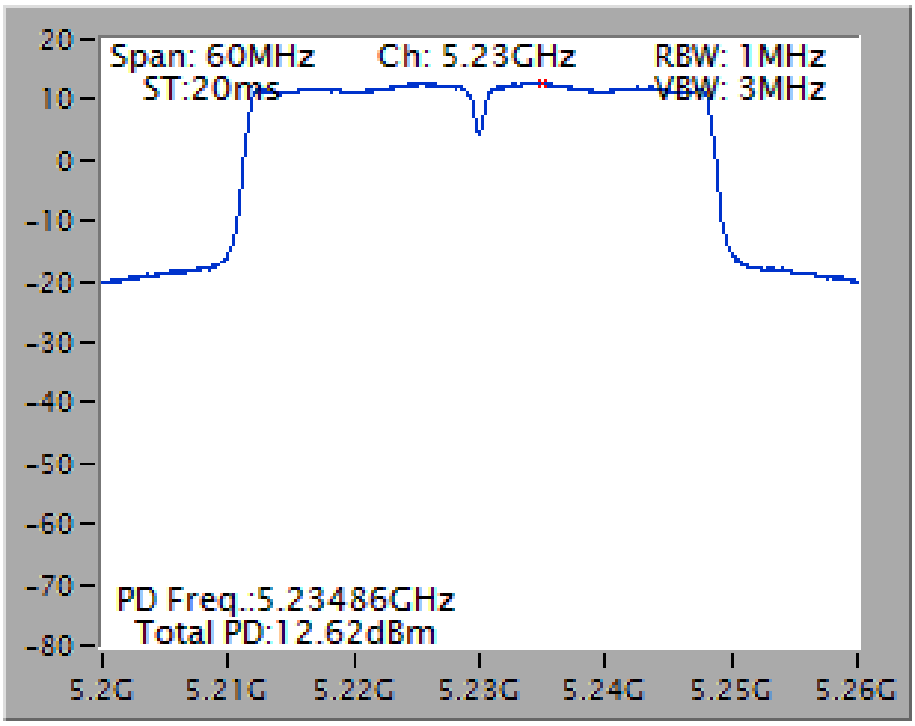
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5200 MHz



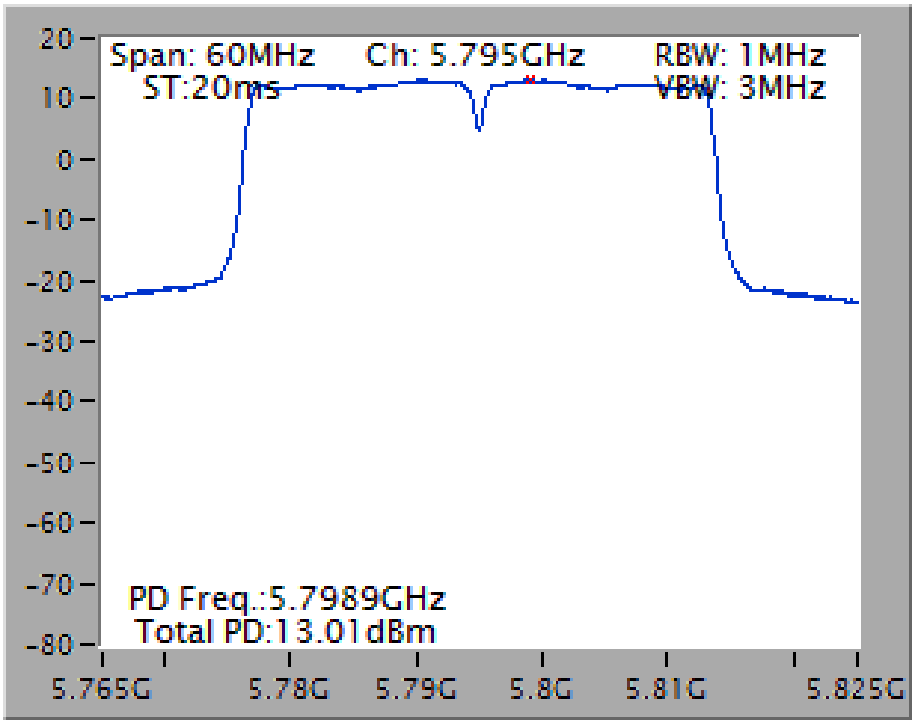
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 / 5825 MHz



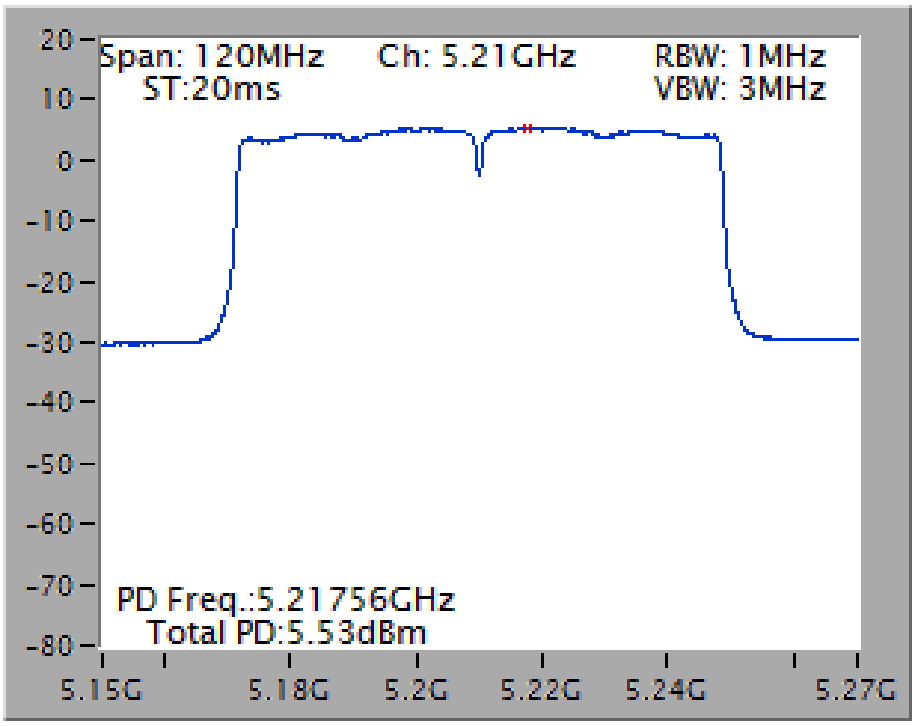
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5230 MHz



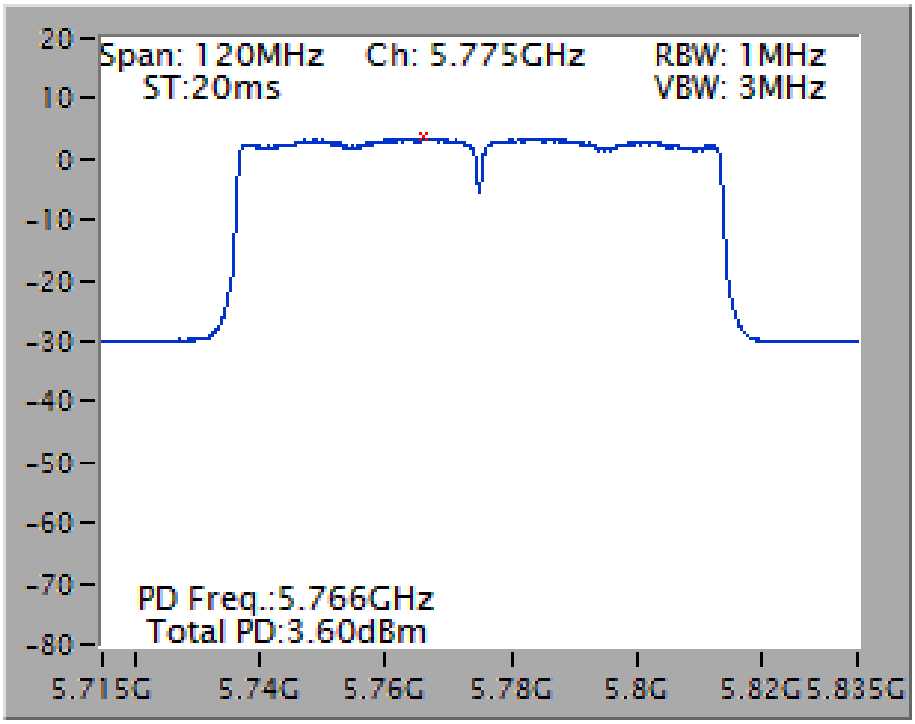
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 / 5795 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 / 5210 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 / 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

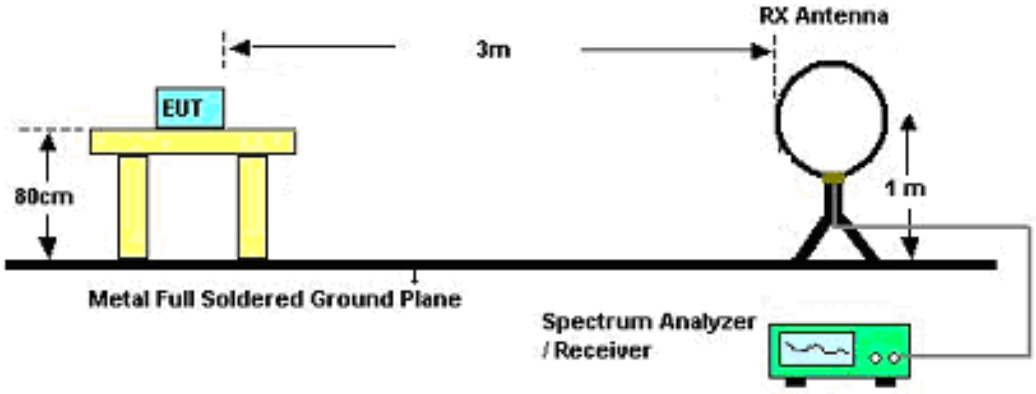
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

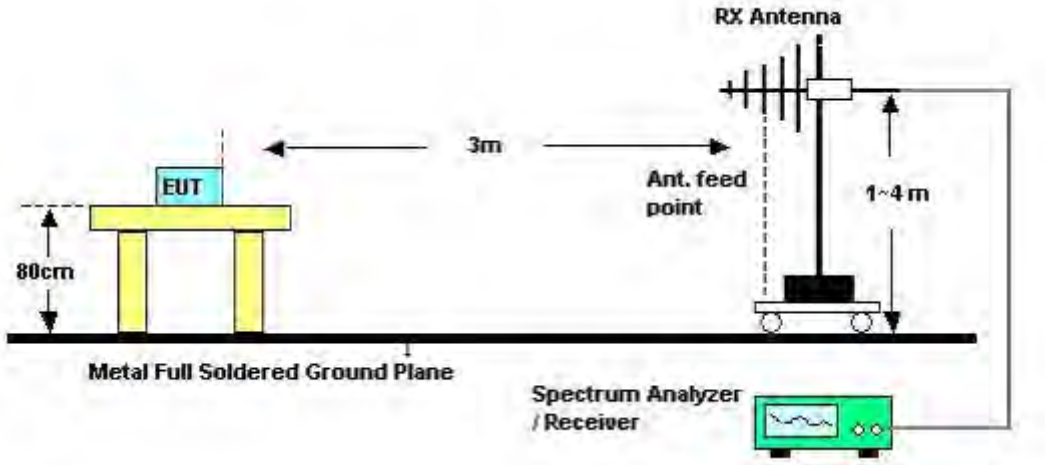
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

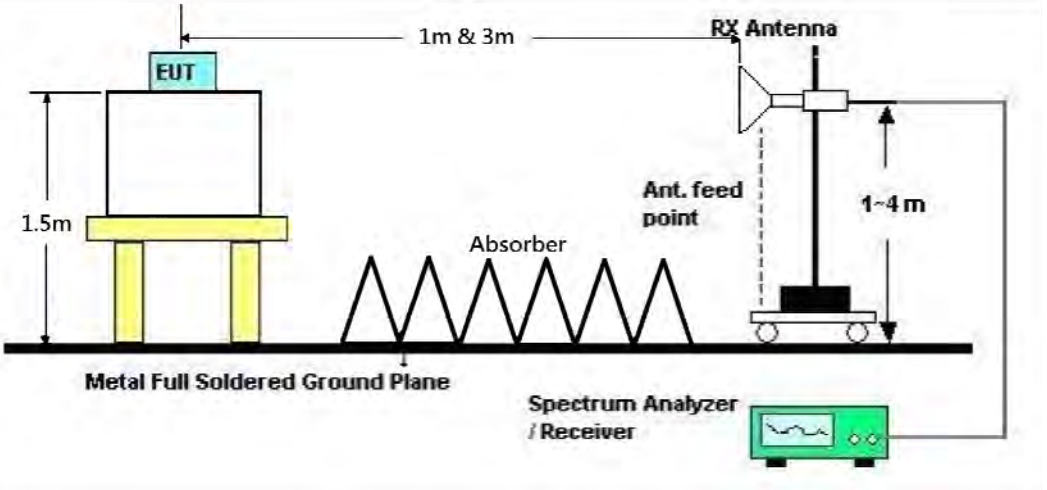
For Radiated Emissions: 9kHz ~30MHz



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

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	24.5℃	Humidity	66%
Test Engineer	Gary Chu	Configurations	CTX
Test Date	Sep. 04, 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.

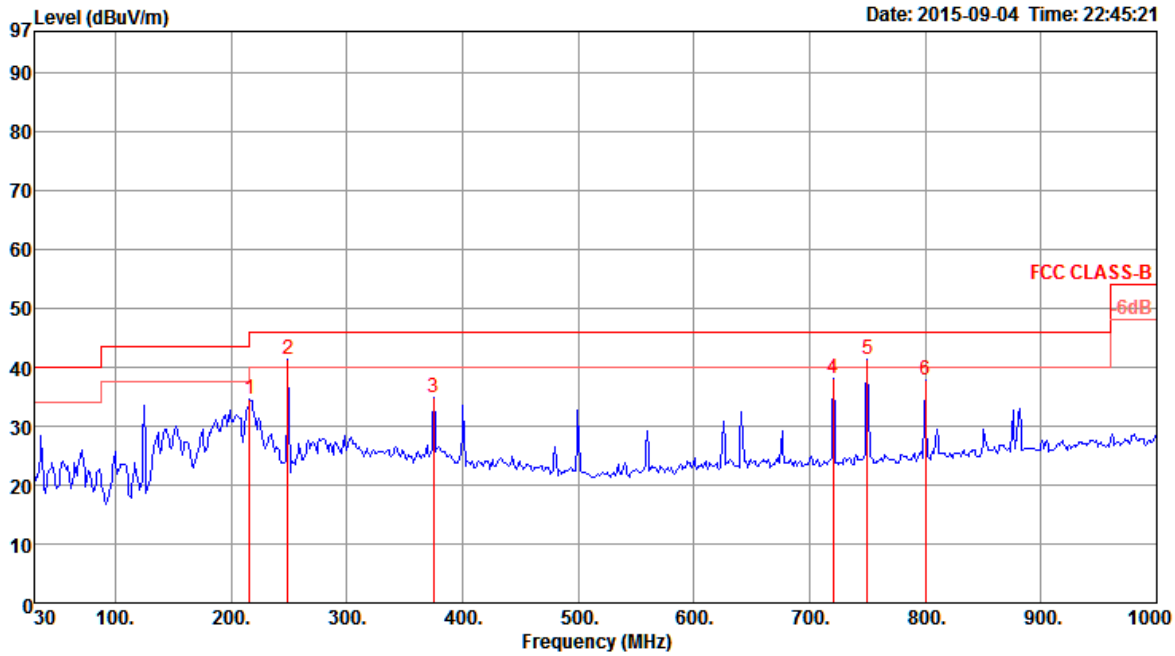
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

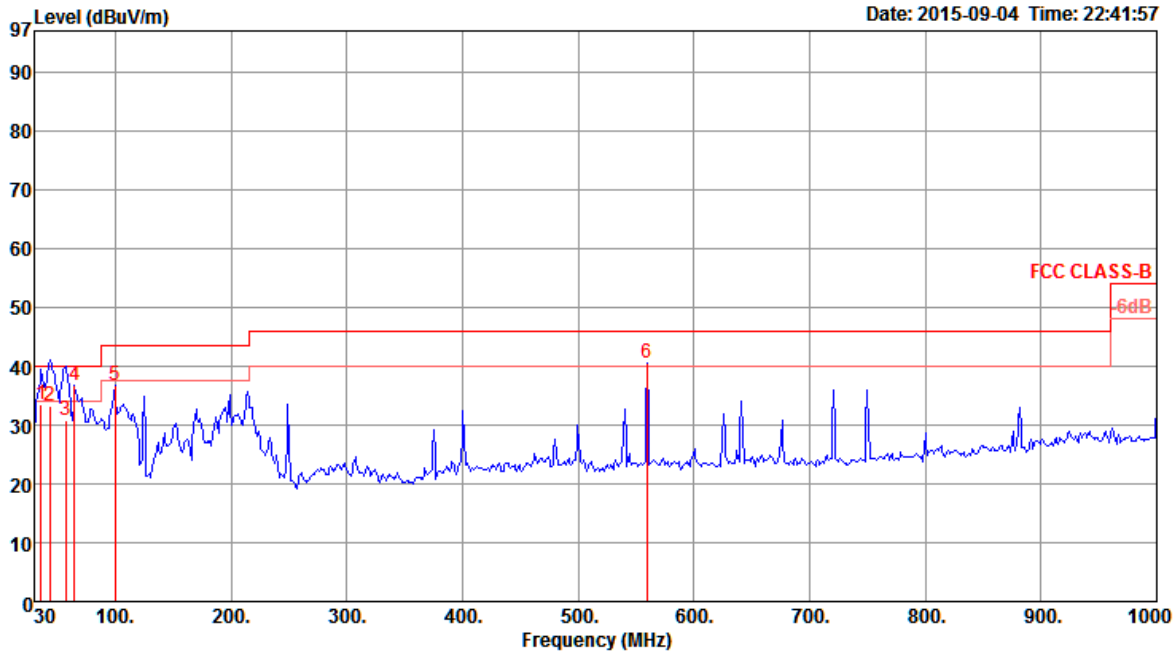
Temperature	24.5℃	Humidity	66%
Test Engineer	Gary Chu	Configurations	CTX

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	216.24	34.58	46.00	-11.42	51.45	1.22	10.66	28.75	0	100	Peak	HORIZONTAL
2	249.22	41.29	46.00	-4.71	55.71	1.32	12.84	28.58	0	100	Peak	HORIZONTAL
3	375.32	34.77	46.00	-11.23	46.10	1.58	15.96	28.87	0	100	Peak	HORIZONTAL
4	720.64	37.97	46.00	-8.03	44.80	2.16	19.86	28.85	0	100	Peak	HORIZONTAL
5	749.74	41.36	46.00	-4.64	47.81	2.21	20.10	28.76	0	100	Peak	HORIZONTAL
6	800.18	37.70	46.00	-8.30	43.41	2.29	20.60	28.60	0	100	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	35.82	33.42	40.00	-6.58	46.13	0.61	16.18	29.50	58	108	QP	VERTICAL
2	43.58	33.11	40.00	-6.89	50.53	0.60	11.46	29.48	53	147	QP	VERTICAL
3	57.16	30.87	40.00	-9.13	52.07	0.69	7.54	29.43	187	112	QP	VERTICAL
4	64.92	36.79	40.00	-3.21	58.56	0.73	6.90	29.40	0	100	Peak	VERTICAL
5	99.84	36.82	43.50	-6.68	53.94	0.85	11.30	29.27	0	100	Peak	VERTICAL
6	559.62	40.54	46.00	-5.46	48.89	1.92	19.00	29.27	0	100	Peak	VERTICAL

Note:

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

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

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

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

Temperature	24.5°C	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 36 / Chain 1
Test Date	Jul. 10, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15518.80	55.78	74.00	-18.22	44.70	7.55	38.13	34.60	167	116	Peak	HORIZONTAL
2	15519.80	43.45	54.00	-10.55	32.37	7.55	38.13	34.60	167	116	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15531.00	56.16	74.00	-17.84	45.06	7.56	38.16	34.62	106	140	Peak	VERTICAL
2	15534.50	43.50	54.00	-10.50	32.40	7.56	38.16	34.62	106	140	Average	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 40 / Chain 1
Test Date	Aug. 19, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15597.45	59.42	74.00	-14.58	48.22	7.58	38.29	34.67	151	114	Peak	HORIZONTAL
2	15597.74	44.82	54.00	-9.18	33.62	7.58	38.29	34.67	151	114	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15597.28	48.33	54.00	-5.67	37.13	7.58	38.29	34.67	143	235	Average	VERTICAL
2	15601.50	65.22	74.00	-8.78	54.04	7.58	38.29	34.69	143	235	Peak	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 48 / Chain 1
Test Date	Jul. 10, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15717.04	50.82	54.00	-3.18	39.48	7.62	38.50	34.78	198	167	Average	HORIZONTAL
2	15721.92	67.75	74.00	-6.25	56.41	7.62	38.50	34.78	198	167	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15717.12	52.98	54.00	-1.02	41.64	7.62	38.50	34.78	327	153	Average	VERTICAL
2	15721.68	69.45	74.00	-4.55	58.11	7.62	38.50	34.78	327	153	Peak	VERTICAL

Temperature	24.5°C	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 149 / Chain 1
Test Date	Jun. 26, 2015 / Aug. 19, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11486.32	53.75	74.00	-20.25	43.14	6.53	38.70	34.62	324	154	Peak	HORIZONTAL
2	11489.91	41.59	54.00	-12.41	30.98	6.53	38.70	34.62	324	154	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11490.20	43.27	54.00	-10.73	29.75	9.24	39.08	34.80	Average	182	147	VERTICAL
2	11505.20	55.22	74.00	-18.78	41.67	9.25	39.10	34.80	Peak	182	147	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 157 / Chain 1
Test Date	Aug. 19, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11568.41	55.98	74.00	-18.02	45.36	6.55	38.71	34.64	48	214	Peak	HORIZONTAL
2	11569.97	43.35	54.00	-10.65	32.74	6.55	38.71	34.65	48	214	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11569.94	43.03	54.00	-10.97	32.42	6.55	38.71	34.65	234	221	Average	VERTICAL
2	11578.57	55.40	74.00	-18.60	44.79	6.55	38.71	34.65	234	221	Peak	VERTICAL

Temperature	24.5°C	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 165 / Chain 1
Test Date	Jun. 26, 2015 / Aug. 19, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11646.64	39.53	54.00	-14.47	28.92	6.56	38.73	34.68	45	150	Average	HORIZONTAL
2	11650.55	53.94	74.00	-20.06	43.33	6.56	38.73	34.68	45	150	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11648.30	57.89	74.00	-16.11	44.27	9.28	39.18	34.84	Peak	174	310	VERTICAL
2	11652.90	44.71	54.00	-9.29	31.08	9.28	39.19	34.84	Average	174	310	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15517.90	43.34	54.00	-10.66	29.48	10.77	38.28	35.19	Average	165	193	HORIZONTAL
2	15562.30	55.82	74.00	-18.18	42.05	10.78	38.20	35.21	Peak	165	193	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15515.30	43.27	54.00	-10.73	29.41	10.77	38.28	35.19	Average	165	25	VERTICAL
2	15564.40	56.14	74.00	-17.86	42.37	10.78	38.20	35.21	Peak	165	25	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15575.50	55.90	74.00	-18.10	42.14	10.78	38.20	35.22	Peak	165	258	HORIZONTAL
2	15620.00	43.41	54.00	-10.59	29.74	10.78	38.13	35.24	Average	165	258	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15618.70	43.35	54.00	-10.65	29.68	10.78	38.13	35.24	Average	165	163	VERTICAL
2	15624.50	56.67	74.00	-17.33	43.01	10.78	38.13	35.25	Peak	165	163	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15738.60	56.20	74.00	-17.80	42.74	10.79	37.96	35.29	Peak	165	185	HORIZONTAL
2	15742.10	43.64	54.00	-10.36	30.18	10.79	37.96	35.29	Average	165	185	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15705.00	43.65	54.00	-10.35	30.13	10.79	38.01	35.28	Average	165	120	VERTICAL
2	15715.30	56.42	74.00	-17.58	42.92	10.79	37.99	35.28	Peak	165	120	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11484.00	61.87	74.00	-12.13	48.35	9.24	39.08	34.80	Peak	144	147	HORIZONTAL
2	11484.10	47.00	54.00	-7.00	33.48	9.24	39.08	34.80	Average	144	147	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11488.00	59.33	74.00	-14.67	45.81	9.24	39.08	34.80	Peak	157	131	VERTICAL
2	11490.00	46.96	54.00	-7.04	33.44	9.24	39.08	34.80	Average	157	131	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11563.50	64.73	74.00	-9.27	51.15	9.26	39.13	34.81	Peak	221	119	HORIZONTAL
2	11569.50	49.64	54.00	-4.36	36.05	9.26	39.14	34.81	Average	221	119	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11570.40	46.09	54.00	-7.91	32.51	9.26	39.14	34.82	Average	166	132	VERTICAL
2	11570.50	59.05	74.00	-14.95	45.47	9.26	39.14	34.82	Peak	166	132	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11648.90	58.78	74.00	-15.22	45.16	9.28	39.18	34.84	Peak	239	141	HORIZONTAL
2	11650.40	46.42	54.00	-7.58	32.80	9.28	39.18	34.84	Average	239	141	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11663.10	46.11	54.00	-7.89	32.48	9.28	39.19	34.84	Average	240	304	VERTICAL
2	11663.10	59.35	74.00	-14.65	45.72	9.28	39.19	34.84	Peak	240	304	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15559.20	57.21	74.00	-16.79	43.41	10.78	38.23	35.21	Peak	150	274	HORIZONTAL
2	15572.16	44.10	54.00	-9.90	30.33	10.78	38.20	35.21	Average	150	274	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15576.00	44.24	54.00	-9.76	30.48	10.78	38.20	35.22	Average	150	141	VERTICAL
2	15581.44	56.72	74.00	-17.28	42.98	10.78	38.18	35.22	Peak	150	141	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15688.60	56.22	74.00	-17.78	42.67	10.79	38.03	35.27	Peak	150	293	HORIZONTAL
2	15697.10	44.00	54.00	-10.00	30.47	10.79	38.01	35.27	Average	150	293	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15666.70	56.80	74.00	-17.20	43.21	10.79	38.06	35.26	Peak	150	199	VERTICAL
2	15703.20	44.75	54.00	-9.25	31.23	10.79	38.01	35.28	Average	150	199	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11522.48	60.88	74.00	-13.12	47.33	9.25	39.11	34.81	Peak	155	123	HORIZONTAL
2	11522.80	47.25	54.00	-6.75	33.70	9.25	39.11	34.81	Average	155	123	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11488.72	43.50	54.00	-10.50	29.98	9.24	39.08	34.80	Average	214	229	VERTICAL
2	11490.32	55.44	74.00	-18.56	41.92	9.24	39.08	34.80	Peak	214	229	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11560.40	45.21	54.00	-8.79	31.63	9.26	39.13	34.81	Average	163	150	HORIZONTAL
2	11580.88	57.57	74.00	-16.43	43.99	9.26	39.14	34.82	Peak	163	150	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11579.76	43.38	54.00	-10.62	29.80	9.26	39.14	34.82	Average	148	133	VERTICAL
2	11601.68	54.79	74.00	-19.21	41.19	9.27	39.16	34.83	Peak	148	133	VERTICAL

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15596.56	57.37	74.00	-16.63	43.65	10.78	38.16	35.22	Peak	150	158	HORIZONTAL
2	15612.40	44.38	54.00	-9.62	30.71	10.78	38.13	35.24	Average	150	158	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15605.52	44.44	54.00	-9.56	30.74	10.78	38.16	35.24	Average	150	285	VERTICAL
2	15632.88	56.90	74.00	-17.10	43.26	10.78	38.11	35.25	Peak	150	285	VERTICAL

Temperature	24.5°C	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11546.80	52.82	74.00	-21.18	39.25	9.26	39.12	34.81	Peak	150	101	HORIZONTAL
2	11584.24	40.77	54.00	-13.23	27.17	9.27	39.15	34.82	Average	150	101	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11548.56	53.53	74.00	-20.47	39.95	9.26	39.13	34.81	Peak	150	196	VERTICAL
2	11589.68	40.75	54.00	-13.25	27.15	9.27	39.15	34.82	Average	150	196	VERTICAL

Note:

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

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

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

4.7. Band Edge Emissions Measurement

4.7.1. Limit

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

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

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

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

4.7.2. Measuring Instruments and Setting

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

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

4.7.3. Test Procedures

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

4.7.4. Test Setup Layout

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

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 1
Test Date	Jun. 26, 2015 / Jul. 15, 2015 / Aug. 18, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5147.20	70.20	74.00	-3.80	65.03	6.13	34.04	35.00	Peak	199	41	VERTICAL
2	5150.00	52.97	54.00	-1.03	47.80	6.13	34.04	35.00	Average	199	41	VERTICAL
3	5178.20	114.95			109.71	6.15	34.09	35.00	Peak	199	41	VERTICAL
4	5179.00	103.72			98.48	6.15	34.09	35.00	Average	199	41	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5078.44	63.10	74.00	-10.90	58.93	5.48	33.04	34.35	159	300	VERTICAL	Peak
2	5080.75	51.10	54.00	-2.90	46.93	5.48	33.04	34.35	159	300	VERTICAL	Average
3	5198.84	117.29			112.85	5.53	33.25	34.34	159	300	VERTICAL	Peak
4	5201.16	106.87			102.43	5.53	33.25	34.34	159	300	VERTICAL	Average
5	5358.03	65.20	74.00	-8.80	60.38	5.59	33.55	34.32	159	300	VERTICAL	Peak
6	5360.93	53.82	54.00	-0.18	49.00	5.59	33.55	34.32	159	300	VERTICAL	Average

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5084.00	59.34	74.00	-14.66	54.33	6.09	33.93	35.01	Peak	189	354	VERTICAL
2	5127.00	47.55	54.00	-6.45	42.42	6.12	34.01	35.00	Average	189	354	VERTICAL
3	5239.00	103.55			98.20	6.18	34.17	35.00	Average	189	354	VERTICAL
4	5240.00	114.34			108.99	6.18	34.17	35.00	Peak	189	354	VERTICAL
5	5398.00	62.56	74.00	-11.44	56.82	6.29	34.44	34.99	Peak	189	354	VERTICAL
6	5399.00	50.94	54.00	-3.06	45.20	6.29	34.44	34.99	Average	189	354	VERTICAL

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

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 1
Test Date	Jun. 26, 2015 / Jul. 15, 2015 / Aug. 18, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5715.00	65.28	68.20	-2.92	59.23	6.44	34.64	35.03	Peak	199	30	VERTICAL
2	5723.00	76.77	78.20	-1.43	70.71	6.45	34.64	35.03	Peak	199	30	VERTICAL
3	5743.80	105.14			99.08	6.45	34.65	35.04	Average	199	30	VERTICAL
4	5744.00	116.49			110.43	6.45	34.65	35.04	Peak	199	30	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5661.70	66.55	68.20	-1.65	60.81	5.79	34.30	34.35	174	288	VERTICAL	Peak
2	5720.95	62.67	78.20	-15.53	56.73	5.85	34.45	34.36	174	288	VERTICAL	Peak
3	5783.26	118.70			112.53	5.90	34.65	34.38	174	288	VERTICAL	Peak
4	5783.84	109.06			102.87	5.92	34.65	34.38	174	288	VERTICAL	Average
5	5858.10	65.04	78.20	-13.16	58.58	5.95	34.90	34.39	174	288	VERTICAL	Peak
6	5904.25	67.94	68.20	-0.26	61.35	5.99	35.00	34.40	174	288	VERTICAL	Peak

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5826.20	107.25	-- --	-- --	101.16	6.48	34.67	35.06	Average	165	288	VERTICAL
2	5826.20	118.45			112.36	6.48	34.67	35.06	Peak	165	288	VERTICAL
3	5850.60	76.76	78.20	-1.44	70.66	6.49	34.67	35.06	Peak	165	288	VERTICAL
4	5861.40	66.89	68.20	-1.31	60.79	6.50	34.67	35.07	Peak	165	288	VERTICAL

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

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 22, 2015		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4961.00	50.39	54.00	-3.61	45.68	6.00	33.72	35.01	Average	153	352	HORIZONTAL
2	4963.00	60.46	74.00	-13.54	55.75	6.00	33.72	35.01	Peak	153	352	HORIZONTAL
3	5178.00	113.95			108.71	6.15	34.09	35.00	Peak	153	352	HORIZONTAL
4	5179.00	104.07			98.83	6.15	34.09	35.00	Average	153	352	HORIZONTAL
5	5395.00	53.68	54.00	-0.32	47.94	6.29	34.44	34.99	Average	153	352	HORIZONTAL
6	5395.00	63.37	74.00	-10.63	57.63	6.29	34.44	34.99	Peak	153	352	HORIZONTAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5046.40	47.40	54.00	-6.60	42.47	6.06	33.88	35.01	Average	186	42	HORIZONTAL
2	5086.40	59.01	74.00	-14.99	54.00	6.09	33.93	35.01	Peak	186	42	HORIZONTAL
3	5206.40	103.45			98.17	6.16	34.12	35.00	Average	186	42	HORIZONTAL
4	5207.20	112.68			107.40	6.16	34.12	35.00	Peak	186	42	HORIZONTAL
5	5368.00	53.51	54.00	-0.49	47.85	6.27	34.39	35.00	Average	186	42	HORIZONTAL
6	5368.00	63.52	74.00	-10.48	57.86	6.27	34.39	35.00	Peak	186	42	HORIZONTAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5080.80	58.53	74.00	-15.47	53.52	6.09	33.93	35.01	Peak	160	0	HORIZONTAL
2	5081.60	47.43	54.00	-6.57	42.42	6.09	33.93	35.01	Average	160	0	HORIZONTAL
3	5240.00	111.65			106.30	6.18	34.17	35.00	Peak	160	0	HORIZONTAL
4	5241.60	102.04			96.64	6.20	34.20	35.00	Average	160	0	HORIZONTAL
5	5401.60	62.21	74.00	-11.79	56.47	6.29	34.44	34.99	Peak	160	0	HORIZONTAL
6	5403.20	51.70	54.00	-2.30	45.96	6.29	34.44	34.99	Average	160	0	HORIZONTAL

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

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 22, 2015		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5713.80	62.63	68.20	-5.57	56.58	6.44	34.64	35.03	Peak	191	313	VERTICAL
2	5724.20	77.83	78.20	-0.37	71.77	6.45	34.64	35.03	Peak	191	313	VERTICAL
3	5737.00	105.74			99.68	6.45	34.65	35.04	Average	191	313	VERTICAL
4	5738.60	116.31			110.25	6.45	34.65	35.04	Peak	191	313	VERTICAL

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

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5617.00	65.62	68.20	-2.58	59.60	6.41	34.62	35.01	Peak	150	0	HORIZONTAL
2	5725.00	58.89	78.20	-19.31	52.83	6.45	34.64	35.03	Peak	150	0	HORIZONTAL
3	5777.80	109.26			103.19	6.46	34.66	35.05	Average	150	0	HORIZONTAL
4	5777.80	119.33			113.26	6.46	34.66	35.05	Peak	150	0	HORIZONTAL
5	5858.00	65.70	78.20	-12.50	59.60	6.50	34.67	35.07	Peak	150	0	HORIZONTAL
6	5937.00	67.77	68.20	-0.43	61.64	6.52	34.69	35.08	Peak	150	0	HORIZONTAL

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

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5832.60	117.60			111.51	6.48	34.67	35.06	Peak	200	191	HORIZONTAL
2	5833.00	108.36			102.27	6.48	34.67	35.06	Average	200	191	HORIZONTAL
3	5850.00	78.01	78.20	-0.19	71.91	6.49	34.67	35.06	Peak	200	191	HORIZONTAL
4	5912.20	64.21	68.20	-3.99	58.09	6.52	34.68	35.08	Peak	200	191	HORIZONTAL

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

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 22, 2015		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5148.00	68.66	74.00	-5.34	63.49	6.13	34.04	35.00	Peak	176	357	HORIZONTAL
2	5150.00	53.58	54.00	-0.42	48.41	6.13	34.04	35.00	Average	176	357	HORIZONTAL
3	5186.00	102.42			97.18	6.15	34.09	35.00	Average	176	357	HORIZONTAL
4	5186.00	112.01			106.77	6.15	34.09	35.00	Peak	176	357	HORIZONTAL

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5066.80	50.24	54.00	-3.76	45.27	6.07	33.91	35.01	Average	200	180	VERTICAL
2	5150.00	62.70	74.00	-11.30	57.53	6.13	34.04	35.00	Peak	200	180	VERTICAL
3	5221.20	114.05			108.73	6.17	34.15	35.00	Peak	200	180	VERTICAL
4	5226.00	104.39			99.04	6.18	34.17	35.00	Average	200	180	VERTICAL

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

Temperature	24.5℃	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 22, 2015		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5715.00	68.10	68.20	-0.10	62.05	6.44	34.64	35.03	Peak	156	354	HORIZONTAL
2	5724.00	73.94	78.20	-4.26	67.88	6.45	34.64	35.03	Peak	156	354	HORIZONTAL
3	5737.00	102.79			96.73	6.45	34.65	35.04	Average	156	354	HORIZONTAL
4	5738.00	112.28			106.22	6.45	34.65	35.04	Peak	156	354	HORIZONTAL

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5623.00	63.63	68.20	-4.57	57.61	6.41	34.62	35.01	Peak	202	304	VERTICAL
2	5725.00	64.75	78.20	-13.45	58.69	6.45	34.64	35.03	Peak	202	304	VERTICAL
3	5781.00	108.41			102.34	6.46	34.66	35.05	Average	202	304	VERTICAL
4	5781.00	117.82			111.75	6.46	34.66	35.05	Peak	202	304	VERTICAL
5	5859.00	71.36	78.20	-6.84	65.26	6.50	34.67	35.07	Peak	202	304	VERTICAL
6	5863.00	68.10	68.20	-0.10	62.00	6.50	34.67	35.07	Peak	202	304	VERTICAL

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

Temperature	24.5°C	Humidity	66%
Test Engineer	Charlie Cheng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Jul. 23, 2015		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5146.00	69.74	74.00	-4.26	64.57	6.13	34.04	35.00	Peak	168	292	VERTICAL
2	5149.20	53.73	54.00	-0.27	48.56	6.13	34.04	35.00	Average	168	292	VERTICAL
3	5184.40	107.03			101.79	6.15	34.09	35.00	Peak	168	292	VERTICAL
4	5185.20	98.37			93.13	6.15	34.09	35.00	Average	168	292	VERTICAL
5	5354.80	49.22	54.00	-4.78	43.60	6.26	34.36	35.00	Average	168	292	VERTICAL
6	5354.80	60.60	74.00	-13.40	54.98	6.26	34.36	35.00	Peak	168	292	VERTICAL

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

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5696.60	67.77	68.20	-0.43	61.73	6.43	34.64	35.03	Peak	145	343	HORIZONTAL
2	5721.80	64.89	78.20	-13.31	58.83	6.45	34.64	35.03	Peak	145	343	HORIZONTAL
3	5811.00	102.39			96.31	6.48	34.66	35.06	Average	145	343	HORIZONTAL
4	5811.00	111.76			105.68	6.48	34.66	35.06	Peak	145	343	HORIZONTAL
5	5852.60	69.63	78.20	-8.57	63.53	6.49	34.67	35.06	Peak	145	343	HORIZONTAL
6	5867.00	67.94	68.20	-0.26	61.84	6.50	34.67	35.07	Peak	145	343	HORIZONTAL

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

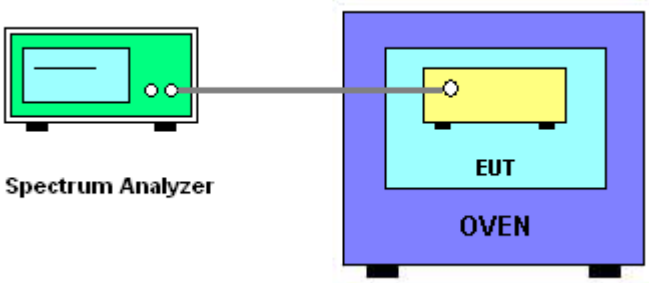
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 -20°C~50°C.

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	25℃	Humidity	45%
Test Engineer	Roki Liu / Serway Li	Test Date	Aug. 27, 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	5199.9854	5199.9854	5199.9854	5199.9854
110.00	5199.9802	5199.9804	5199.9806	5199.9808
93.50	5199.9854	5199.9854	5199.9854	5199.9854
Max. Deviation (MHz)	0.0198	0.0196	0.0194	0.0192
Max. Deviation (ppm)	3.81	3.77	3.73	3.69
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(℃)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5199.9844	5199.9846	5199.9846	5199.9844
-10	5199.9836	5199.9836	5199.9838	5199.9836
0	5199.9824	5199.9826	5199.9828	5199.9832
10	5199.9808	5199.9810	5199.9814	5199.9818
20	5199.9802	5199.9804	5199.9806	5199.9808
30	5199.9776	5199.9778	5199.9782	5199.9786
40	5199.9772	5199.9776	5199.9778	5199.9780
50	5199.9762	5199.9768	5199.9772	5199.9776
Max. Deviation (MHz)	0.0238	0.0232	0.0228	0.0224
Max. Deviation (ppm)	4.58	4.46	4.38	4.31
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9882	5784.9882	5784.9882	5784.9882
110.00	5784.9802	5784.9804	5784.9806	5784.9808
93.50	5784.9882	5784.9882	5784.9882	5784.9882
Max. Deviation (MHz)	0.0198	0.0196	0.0194	0.0192
Max. Deviation (ppm)	3.42	3.39	3.35	3.32
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5784.9844	5784.9846	5784.9844	5784.9844
-10	5784.9836	5784.9838	5784.9838	5784.9836
0	5784.9824	5784.9826	5784.9828	5784.9832
10	5784.9808	5784.9810	5784.9814	5784.9818
20	5784.9802	5784.9804	5784.9806	5784.9808
30	5784.9776	5784.9778	5784.9782	5784.9786
40	5784.9772	5784.9776	5784.9778	5784.9780
50	5784.9762	5784.9768	5784.9772	5784.9776
Max. Deviation (MHz)	0.0238	0.0232	0.0228	0.0224
Max. Deviation (ppm)	4.11	4.01	3.94	3.87
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	5189.9818	5189.9818	5189.9818	5189.9818
110.00	5189.9802	5189.9804	5189.9806	5189.9808
93.50	5189.9818	5189.9818	5189.9818	5189.9818
Max. Deviation (MHz)	0.0198	0.0196	0.0194	0.0192
Max. Deviation (ppm)	3.82	3.78	3.74	3.70
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5189.9844	5189.9846	5189.9846	5189.9844
-10	5189.9836	5189.9838	5189.9836	5189.9836
0	5189.9824	5189.9826	5189.9828	5189.9832
10	5189.9808	5189.9810	5189.9814	5189.9818
20	5189.9802	5189.9804	5189.9806	5189.9808
30	5189.9776	5189.9778	5189.9782	5189.9786
40	5189.9772	5189.9776	5189.9778	5189.9780
50	5189.9762	5189.9768	5189.9772	5189.9776
Max. Deviation (MHz)	0.0238	0.0232	0.0228	0.0224
Max. Deviation (ppm)	4.59	4.47	4.39	4.32
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9854	5754.9854	5754.9854	5754.9854
110.00	5754.9802	5754.9804	5754.9806	5754.9808
93.50	5754.9854	5754.9854	5754.9854	5754.9854
Max. Deviation (MHz)	0.0198	0.0196	0.0194	0.0192
Max. Deviation (ppm)	3.44	3.41	3.37	3.34
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5754.9844	5754.9846	5754.9844	5754.9844
-10	5754.9836	5754.9838	5754.9838	5754.9836
0	5754.9824	5754.9826	5754.9828	5754.9832
10	5754.9808	5754.9810	5754.9814	5754.9818
20	5754.9802	5754.9804	5754.9806	5754.9808
30	5754.9776	5754.9778	5754.9782	5754.9786
40	5754.9772	5754.9776	5754.9778	5754.9780
50	5754.9762	5754.9768	5754.9772	5754.9776
Max. Deviation (MHz)	0.0238	0.0232	0.0228	0.0224
Max. Deviation (ppm)	4.14	4.03	3.96	3.89
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	5209.9854	5209.9854	5209.9854	5209.9854
110.00	5209.9802	5209.9804	5209.9806	5209.9808
93.50	5209.9854	5209.9854	5209.9854	5209.9854
Max. Deviation (MHz)	0.0198	0.0196	0.0194	0.0192
Max. Deviation (ppm)	3.80	3.76	3.72	3.69
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5209.9844	5209.9846	5209.9846	5209.9844
-10	5209.9836	5209.9838	5209.9836	5209.9836
0	5209.9824	5209.9826	5209.9828	5209.9832
10	5209.9808	5209.9810	5209.9814	5209.9818
20	5209.9802	5209.9804	5209.9806	5209.9808
30	5209.9776	5209.9778	5209.9782	5209.9786
40	5209.9772	5209.9776	5209.9778	5209.9780
50	5209.9762	5209.9768	5209.9772	5209.9776
Max. Deviation (MHz)	0.0238	0.0232	0.0228	0.0224
Max. Deviation (ppm)	4.57	4.45	4.38	4.30
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9818	5774.9818	5774.9818	5774.9818
110.00	5774.9802	5774.9804	5774.9806	5774.9808
93.50	5774.9818	5774.9818	5774.9818	5774.9818
Max. Deviation (MHz)	0.0198	0.0196	0.0194	0.0192
Max. Deviation (ppm)	3.43	3.39	3.36	3.32
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5774.9844	5774.9846	5774.9846	5774.9844
-10	5774.9836	5774.9838	5774.9836	5774.9836
0	5774.9824	5774.9826	5774.9828	5774.9832
10	5774.9808	5774.9810	5774.9814	5774.9818
20	5774.9802	5774.9804	5774.9806	5774.9808
30	5774.9776	5774.9778	5774.9782	5774.9786
40	5774.9772	5774.9776	5774.9778	5774.9780
50	5774.9762	5774.9768	5774.9772	5774.9776
Max. Deviation (MHz)	0.0238	0.0232	0.0228	0.0224
Max. Deviation (ppm)	4.12	4.02	3.95	3.88
Result	Complies			

4.9. Antenna Requirements

4.9.1. Limit

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

4.9.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	Jan. 13, 2015	Conduction (CO02-CB)
COND Cable	Woken	Cable	01	0.15MHz ~ 30MHz	Dec. 01, 2014	Conduction (CO02-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO02-CB)
Pulse Limiter	Schwarzbeck	VTSD 9561F	9561-F073	9kHz ~ 30MHz	Sep. 26, 2014	Conduction (CO02-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	Radiation (03CH01-CB)
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)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

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

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

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

6. MEASUREMENT UNCERTAINTY

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