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FCC RADIO TEST REPORT

Applicant's company	**AirTies Wireless Networks**
Applicant Address	Gülbahar Mah. Avni Dilligil Sok. Celik Is Merkezi ISTANBUL, 34394 Turkey
FCC ID	**Z3WAIR4820**
Manufacturer's company	**SHENZHEN GONGJIN ELECTRONICS CO.,LTD.**
Manufacturer Address	2F/3F/4F Baiying Building,1019#Naihai RD,Nanshan Dist.,Shenzhen,Guangdong,CHINA

Product Name	2 Port Gigabit Ethernet 11ac/11n Wireless Router
Brand Name	AirTies
Model No.	Air 4820
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Apr. 02, 2014
Final Test Date	Nov. 27, 2014
Submission Type	Class II Change

Statement

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

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

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

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

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

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR440257-02	Rev. 01	Initial issue of report	Jan. 26, 2016
FR440257-02	Rev. 02	1. Revising the original test report number to “440257-03”. 2. Adding the operate mode “Mesh mode” 3. Adding a new adapter (Model No.: MSA-C1000IC12.0-12W-US).	Jan. 27, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	2 Port Gigabit Ethernet 11ac/11n Wireless Router
Brand Name	:	AirTies
Model No.	:	Air 4820
Applicant	:	AirTies Wireless Networks
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 Apr. 02, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Cliff Chang

Cliff Chang

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	20.46 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.02 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.29 dB
4.5	15.407(b)	Radiated Emissions	Complies	0.22 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.03 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (4TX, 4RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	12 for 20MHz bandwidth ; 5 for 40MHz bandwidth 2 for 80MHz bandwidth
Channel Band Width (99%)	Band 2: IEEE 802.11a: 16.56 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.51MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.95 MHz Band 3: IEEE 802.11a: 16.44 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.95 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.28 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.95 MHz
Maximum Conducted Output Power	Band 2: IEEE 802.11a: 23.01 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 22.59 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.19 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 22.29 dBm Band 3: IEEE 802.11a: 21.95 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 22.93 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 22.47 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 22.24 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
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☐ With 5600~5650MHz	☒ Without 5600~5650MHz
Beamforming Function	☒ With beamforming	☐ Without beamforming
	The product has beamforming function for 802.11n/ac	
Operating Mode	☐ Outdoor access point	
	☒ Indoor access point	
	☐ Fixed point-to-point access points	
	☐ Mobile and portable client devices	

Antenna and Band width

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

IEEE 11n/ac Spec.

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

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

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

Note 3: Modulation modes consist of below configuration:
HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

Power	Brand	Model	Rating
Adapter 1	MOSO	MSP-C1500IC12.0-18W-US	Input: 100-240V ~ 50/60Hz 0.7A max Output: 12.0V, 1.5A
Adapter 2	MOSO	MSP-C1000IC12.0-12B-US	Input: 100-240V ~ 50/60Hz 0.5A max Output: 12.0V, 1A
Adapter 3	MOSO	MSA-C1000IC12.0-12W-US	Input: 100-240V ~ 50/60Hz 0.5A max. Output: 12.0V, 1A
Other			
RJ-45 cable*1: Non-shielded, 1.5m			

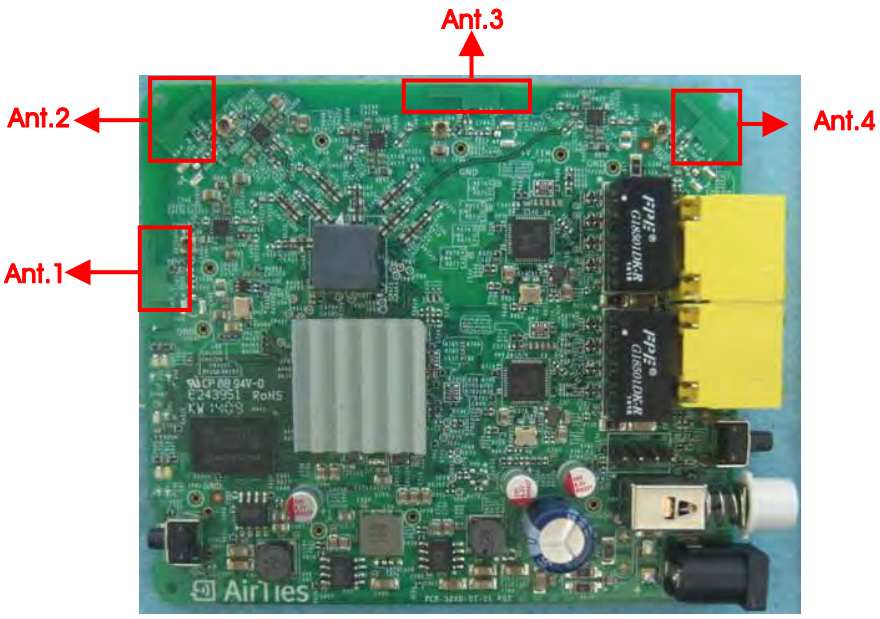
3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					5250 MHz ~ 5350MHz	5470 MHz ~ 5725MHz
1	Airties	Airties#1	Printed Antenna	N/A	0.77	1.03
2	Airties	Airties#1	Printed Antenna	N/A	0.77	1.03
3	Airties	Airties#1	Printed Antenna	N/A	0.77	1.03
4	Airties	Airties#1	Printed Antenna	N/A	0.77	1.03

Note: The EUT has four antennas.

Ant.1, Ant.2, Ant.3 and Ant.4 will transmit/receive the same signal simultaneously.

Ant.1, Ant.2, Ant.3 and Ant.4 can be used as transmitting/receiving antennas



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136, 140.

For 40MHz bandwidth systems, use Channel 54, 62, 102, 110, 134.

For 80MHz bandwidth systems, use Channel 58, 106.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
	58	5290 MHz	-	-
5470~5725 MHz Band 3	100	5500 MHz	112	5560 MHz
	102	5510 MHz	116	5580 MHz
	104	5520 MHz	132	5660 MHz
	106	5530 MHz	134	5670 MHz
	108	5540 MHz	136	5680 MHz
	110	5550 MHz	140	5700 MHz

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Ant.
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 2-3	6Mbps	52/60/64/100/116/140	1+2+3+4
	11ac VHT20	Band 2-3	MCS0/Nss1	52/60/64/100/116/140	1+2+3+4
	11ac VHT40	Band 2-3	MCS0/Nss1	54/62/102/110/134	1+2+3+4
	11ac VHT80	Band 2-3	MCS0/Nss1	58/106	1+2+3+4
Power Spectral Density	11a/BPSK	Band 2-3	6Mbps	52/60/64/100/116/140	1+2+3+4
	11ac VHT20	Band 2-3	MCS0/Nss1	52/60/64/100/116/140	1+2+3+4
	11ac VHT40	Band 2-3	MCS0/Nss1	54/62/102/110/134	1+2+3+4
	11ac VHT80	Band 2-3	MCS0/Nss1	58/106	1+2+3+4
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement	11a/BPSK	Band 2-3	6Mbps	52/60/64/100/116/140	1+2+3+4
	11ac VHT20	Band 2-3	MCS0/Nss1	52/60/64/100/116/140	1+2+3+4
	11ac VHT40	Band 2-3	MCS0/Nss1	54/62/102/110/134	1+2+3+4
	11ac VHT80	Band 2-3	MCS0/Nss1	58/106	1+2+3+4
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 2-3	6Mbps	52/60/64/100/116/140	1+2+3+4
	11ac VHT20	Band 2-3	MCS0/Nss1	52/60/64/100/116/140	1+2+3+4
	11ac VHT40	Band 2-3	MCS0/Nss1	54/62/102/110/134	1+2+3+4
	11ac VHT80	Band 2-3	MCS0/Nss1	58/106	1+2+3+4

Band Edge Emission	11a/BPSK	Band 2-3	6Mbps	52/60/64/100/116/140	1+2+3+4
	11ac VHT20	Band 2-3	MCS0/Nss1	52/60/64/100/116/140	1+2+3+4
	11ac VHT40	Band 2-3	MCS0/Nss1	54/62/102/110/134	1+2+3+4
	11ac VHT80	Band 2-3	MCS0/Nss1	58/106	1+2+3+4
Frequency Stability	20 MHz	Band 2-3	-	60/116	1
	40 MHz	Band 2-3	-	62/110	1
	80 MHz	Band 2-3	-	58/106	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 802.11n/ac, 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	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR440257-03.

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

Modifications	Performance Checking
Adding band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device.	1. 26dB Spectrum Bandwidth. 2. 99% Occupied Bandwidth. 3. Maximum Conducted Output Power. 4. Power Spectral Density. 5. Radiated Emission Above 1GHz. 6. Band Edge Emissions. 7. Frequency Stability.
Adding a new adapter (Model No.: MSA-C1000IC12.0-12W-US).	1. AC Power Conducted Emission. 2. Radiated Emission Below 1GHz.

3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E6430	DoC

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

Support Unit	Brand	Model	FCC ID
Notebook*2	DELL	E4300	DoC

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

For non-beamforming function:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	DoC

For beamforming function:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	DoC
Notebook	DELL	M1340	DoC
WLAN ac Dongle	Netgear	A6200	PY31220200

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC

3.9. Table for Parameters of Test Software Setting

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

Test Software Version	DOS					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
802.11a	19	18	19	18	18	18
802.11ac MCS0/Nss1 VHT20	18	18	18	19	19	19
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz	
	19	16	18	18	18	
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5290 MHz		5530 MHz			
	18		18			

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:

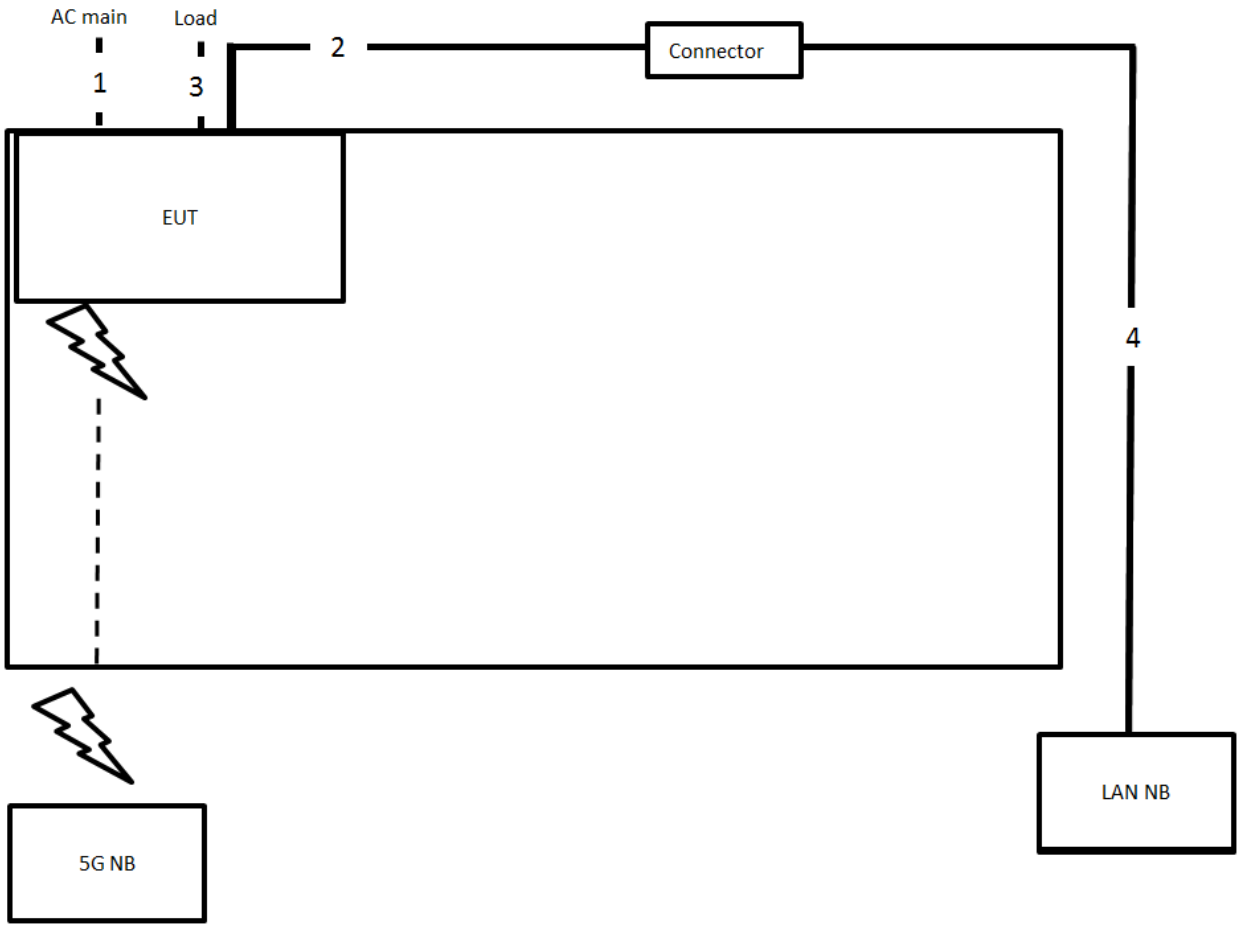
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe" to link with the remote workstation to receive and transmit packet by WLAN ac Dongle and transmit duty cycle no less 98%

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	5.400	5.440	99.26	0.03	0.01
802.11ac MCS0/Nss1 VHT20	3.880	4.000	97.00	0.13	0.26
802.11ac MCS0/Nss1 VHT40	1.720	1.760	97.73	0.10	0.58
802.11ac MCS0/Nss1 VHT80	3.820	3.940	96.95	0.13	0.26

3.12. Test Configurations

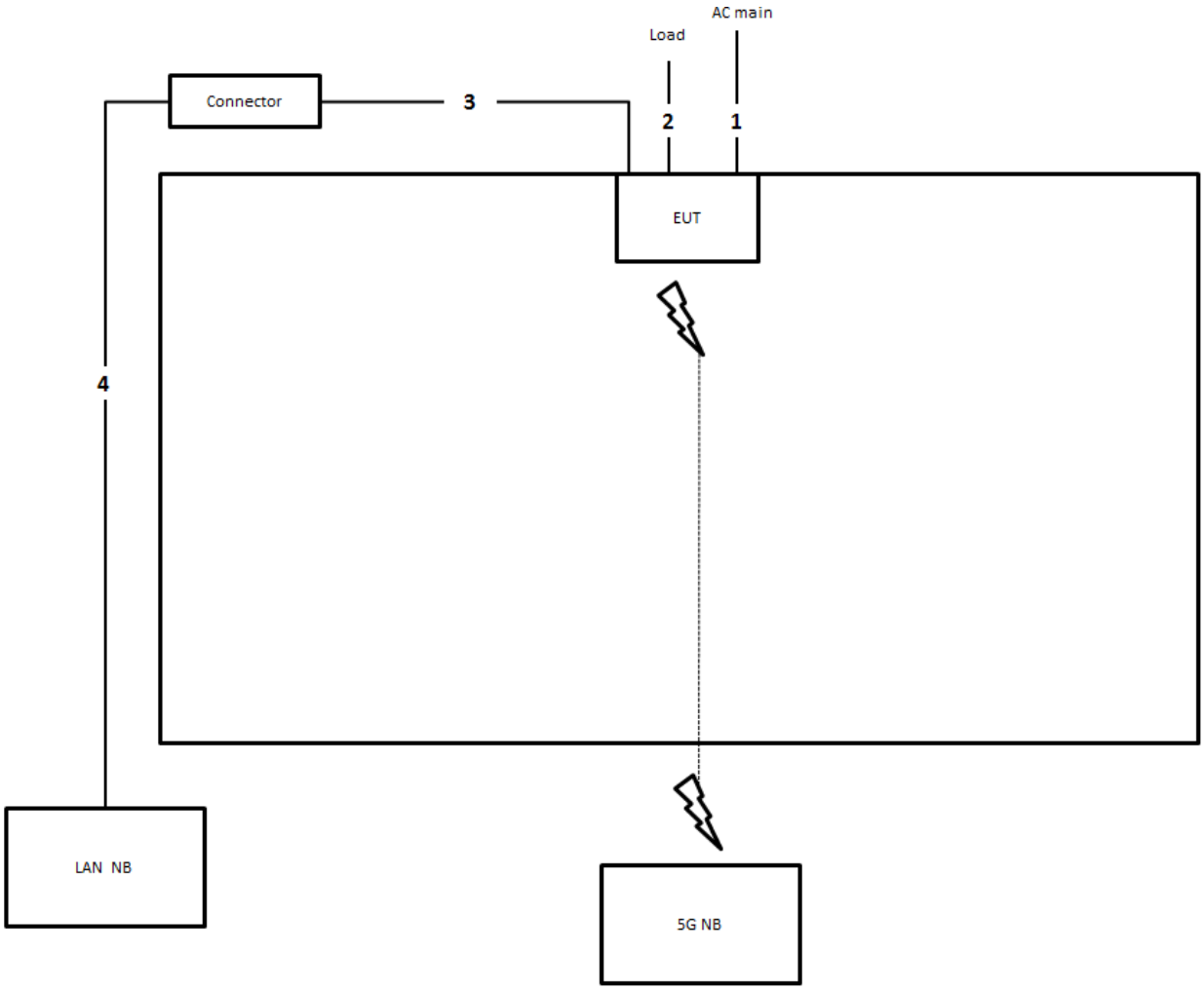
3.12.1. AC Power Line Conduction Emissions Test Configuration



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

3.12.2. Radiation Emissions Test Configuration

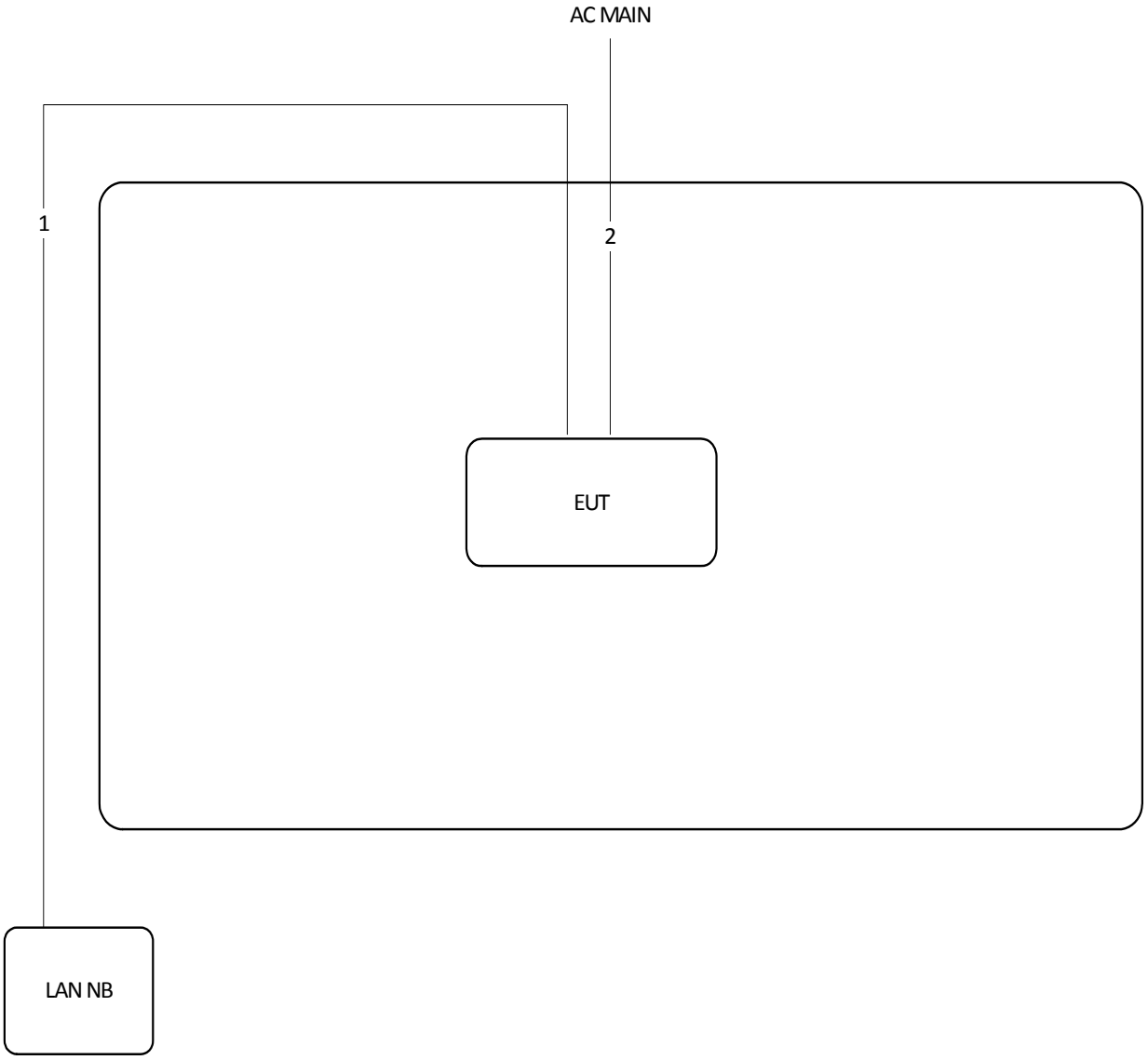
Test Configuration: 30MHz ~1GHz



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

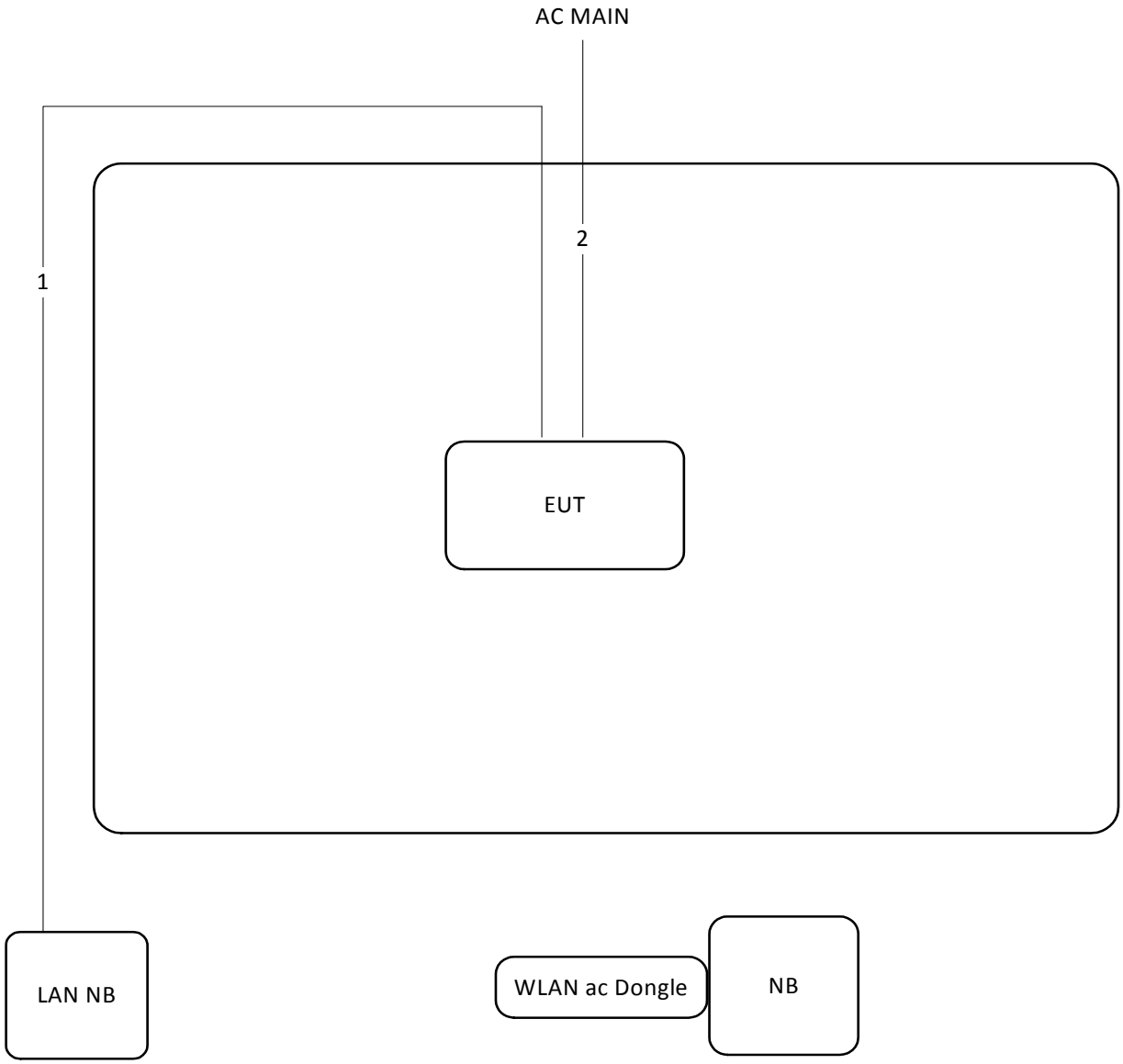
Test Configuration: above 1GHz

For non-beamforming function:



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

For beamforming function:



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

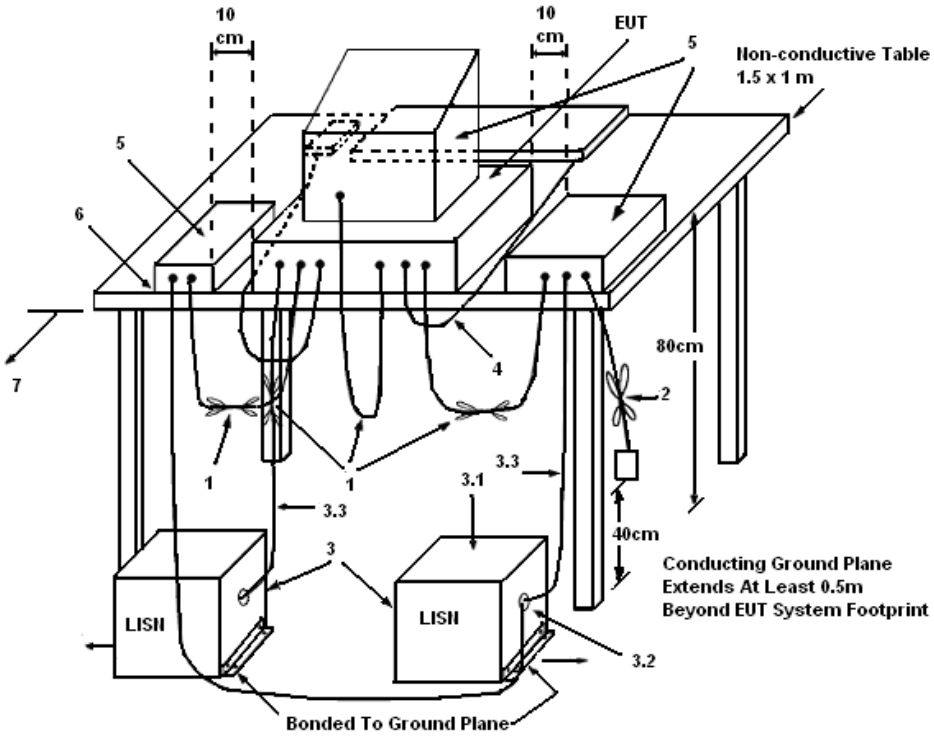
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

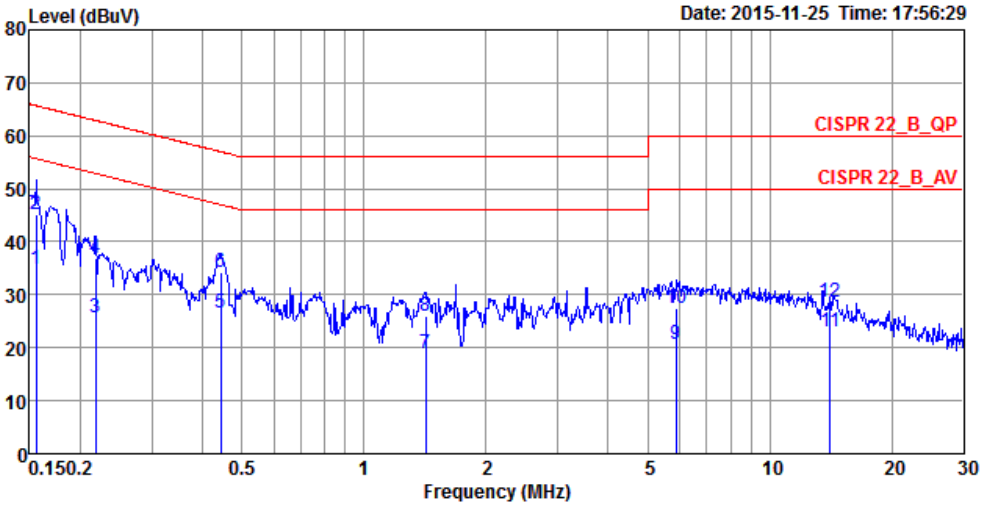
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

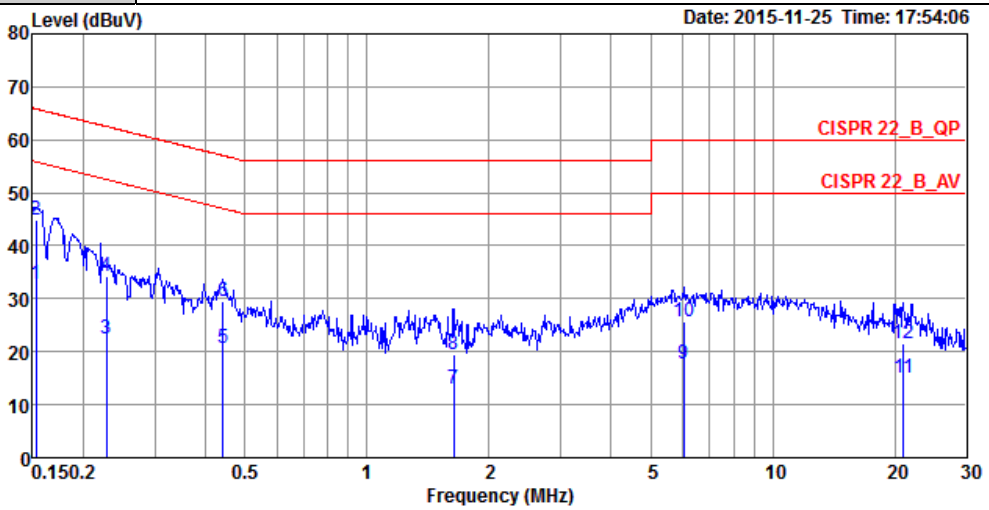
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	58%
Test Engineer	Parody Lin	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	34.98	-20.71	55.69	25.03	9.93	0.02	LINE	Average
2	0.1557	45.06	-20.63	65.69	35.11	9.93	0.02	LINE	QP
3	0.2185	25.71	-27.17	52.88	15.76	9.93	0.02	LINE	Average
4	0.2185	36.82	-26.06	62.88	26.87	9.93	0.02	LINE	QP
5	0.4444	26.52	-20.46	46.98	16.55	9.93	0.04	LINE	Average
6	0.4444	34.12	-22.86	56.98	24.15	9.93	0.04	LINE	QP
7	1.4182	19.02	-26.98	46.00	8.98	9.98	0.06	LINE	Average
8	1.4182	25.98	-30.02	56.00	15.94	9.98	0.06	LINE	QP
9	5.8668	20.71	-29.29	50.00	10.49	10.09	0.13	LINE	Average
10	5.8668	27.47	-32.53	60.00	17.25	10.09	0.13	LINE	QP
11	14.0629	22.99	-27.01	50.00	12.43	10.31	0.25	LINE	Average
12	14.0629	28.49	-31.51	60.00	17.93	10.31	0.25	LINE	QP

Temperature	25°C	Humidity	58%
Test Engineer	Parody Lin	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1532	32.71	-23.11	55.82	22.91	9.78	0.02	NEUTRAL	Average
2	0.1532	44.99	-20.83	65.82	35.19	9.78	0.02	NEUTRAL	QP
3	0.2280	22.52	-30.00	52.52	12.70	9.79	0.03	NEUTRAL	Average
4	0.2280	34.35	-28.17	62.52	24.53	9.79	0.03	NEUTRAL	QP
5	0.4421	20.75	-26.27	47.02	10.92	9.79	0.04	NEUTRAL	Average
6	0.4421	29.49	-27.53	57.02	19.66	9.79	0.04	NEUTRAL	QP
7	1.6363	13.02	-32.98	46.00	3.13	9.83	0.06	NEUTRAL	Average
8	1.6363	19.36	-36.64	56.00	9.47	9.83	0.06	NEUTRAL	QP
9	6.0243	17.70	-32.30	50.00	7.64	9.93	0.13	NEUTRAL	Average
10	6.0243	25.62	-34.38	60.00	15.56	9.93	0.13	NEUTRAL	QP
11	21.0355	15.09	-34.91	50.00	4.63	10.20	0.26	NEUTRAL	Average
12	21.0355	21.42	-38.58	60.00	10.96	10.20	0.26	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

This test setup layout is the same as that shown in section 4.5.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

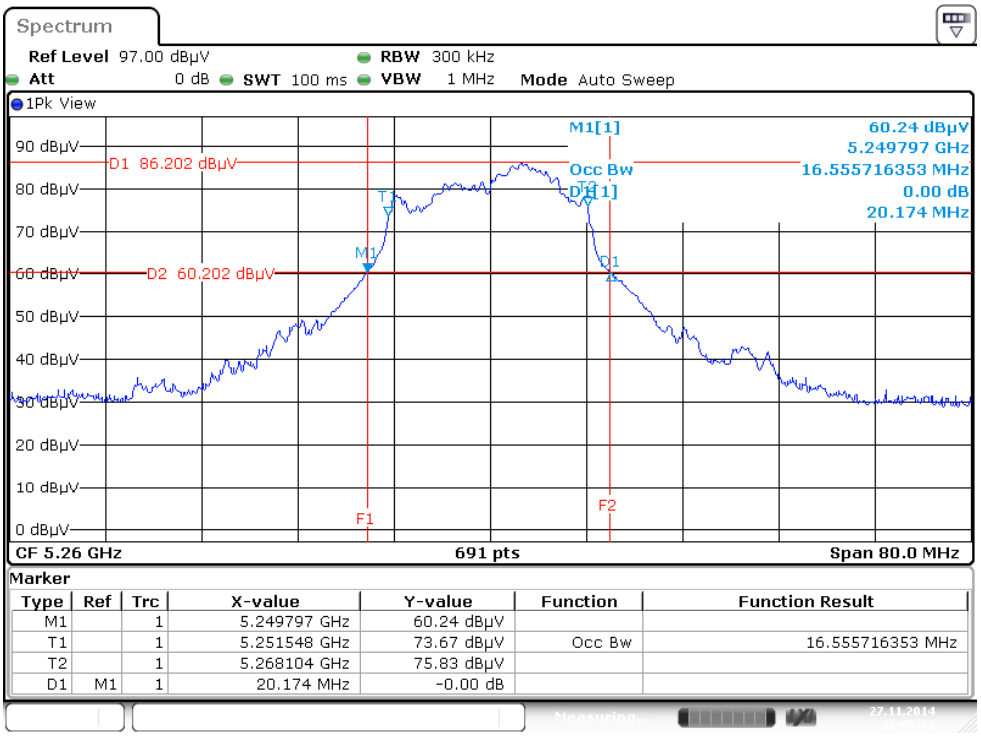
The EUT was programmed to be in continuously transmitting mode.

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

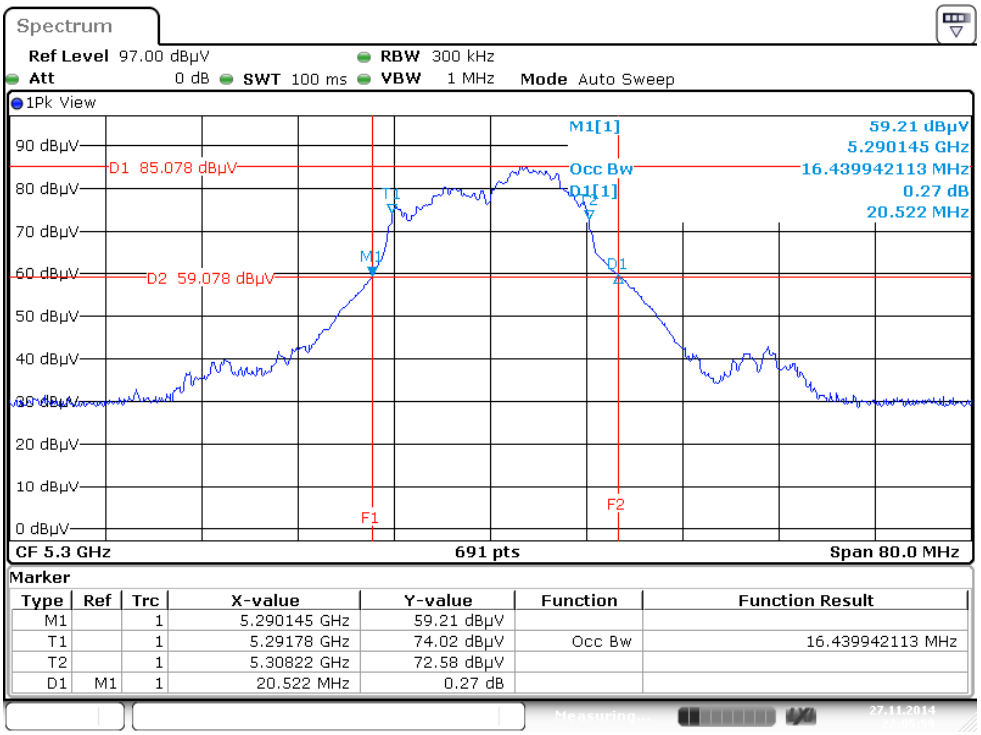
Temperature	26℃	Humidity	63%
Test Engineer	James Chou		

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5260 MHz	20.17	16.56
	5300 MHz	20.52	16.44
	5320 MHz	20.41	16.44
	5500 MHz	19.59	16.44
	5580 MHz	20.06	16.32
	5700 MHz	20.29	16.44
802.11ac MCS0/Nss1 VHT20	5260 MHz	22.73	17.95
	5300 MHz	22.73	18.06
	5320 MHz	22.38	17.95
	5500 MHz	22.49	17.95
	5580 MHz	22.61	17.95
	5700 MHz	22.26	17.95
802.11ac MCS0/Nss1 VHT40	5270 MHz	42.90	37.51
	5310 MHz	42.90	37.05
	5510 MHz	42.67	37.28
	5550 MHz	41.97	36.82
	5670 MHz	42.67	37.05
802.11ac MCS0/Nss1 VHT80	5290 MHz	82.55	75.95
	5530 MHz	80.70	75.95

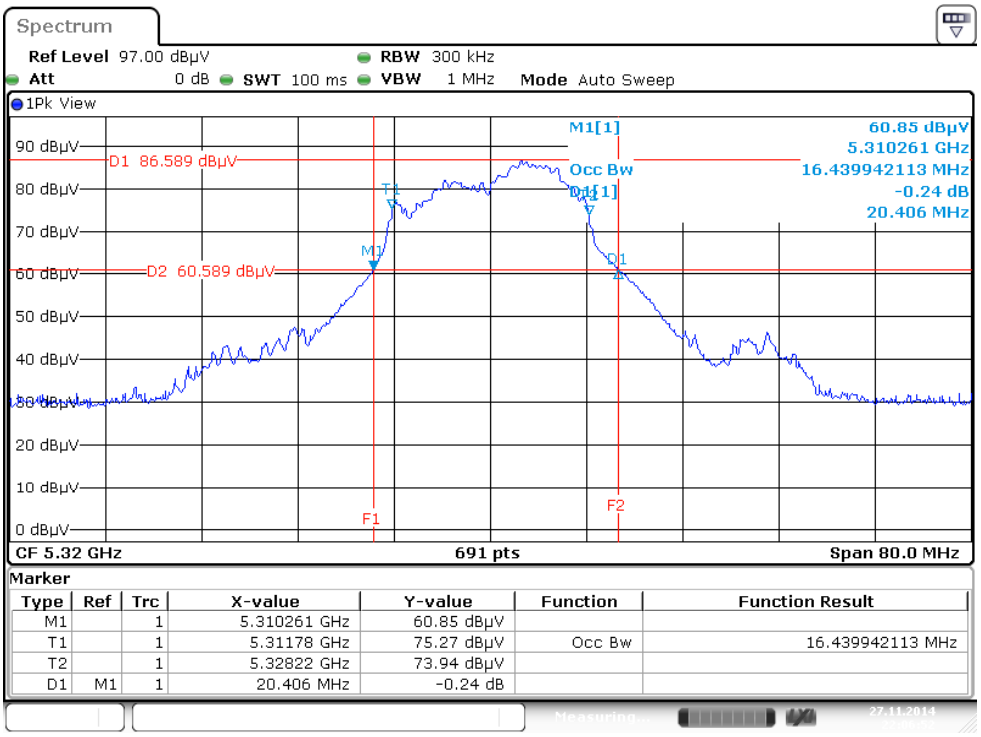
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5260 MHz



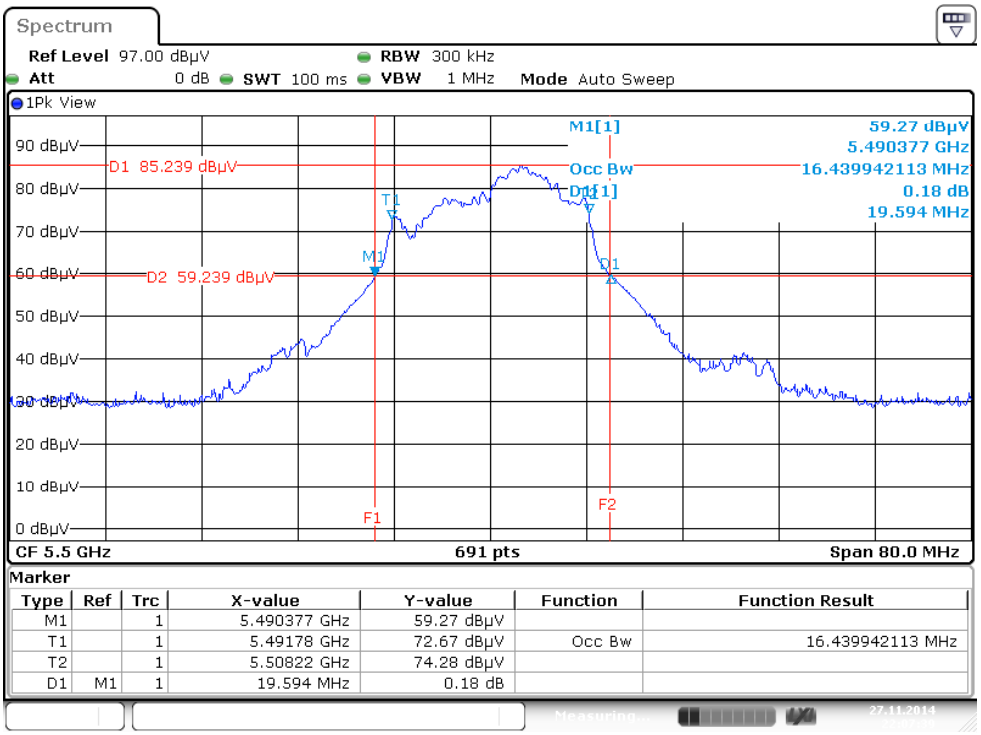
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5300 MHz



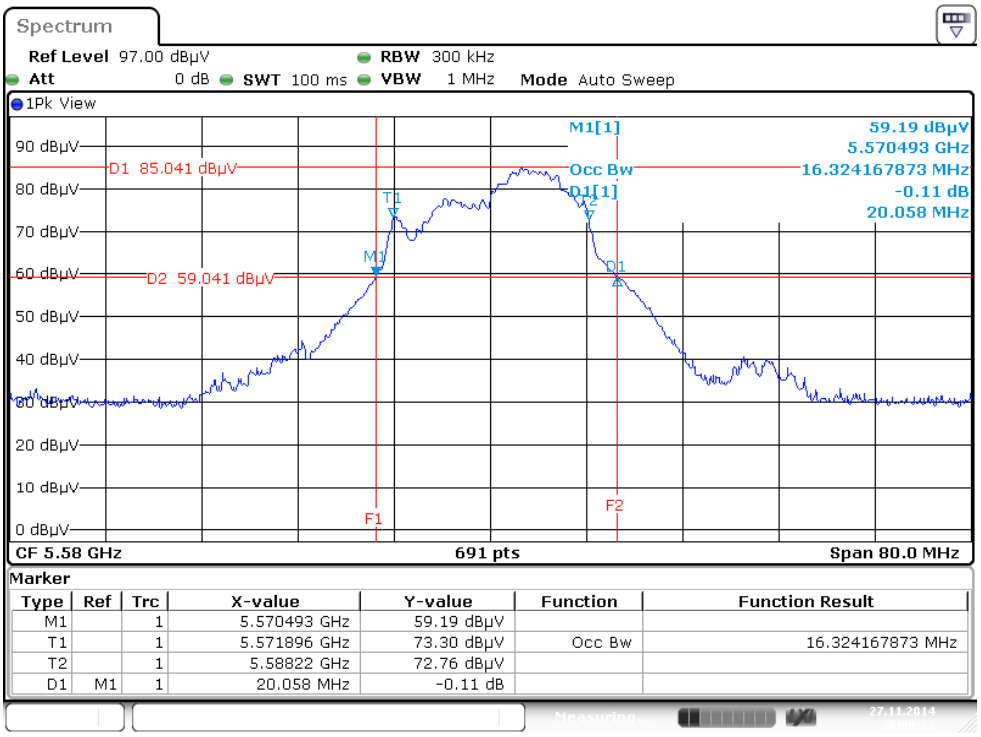
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5320 MHz



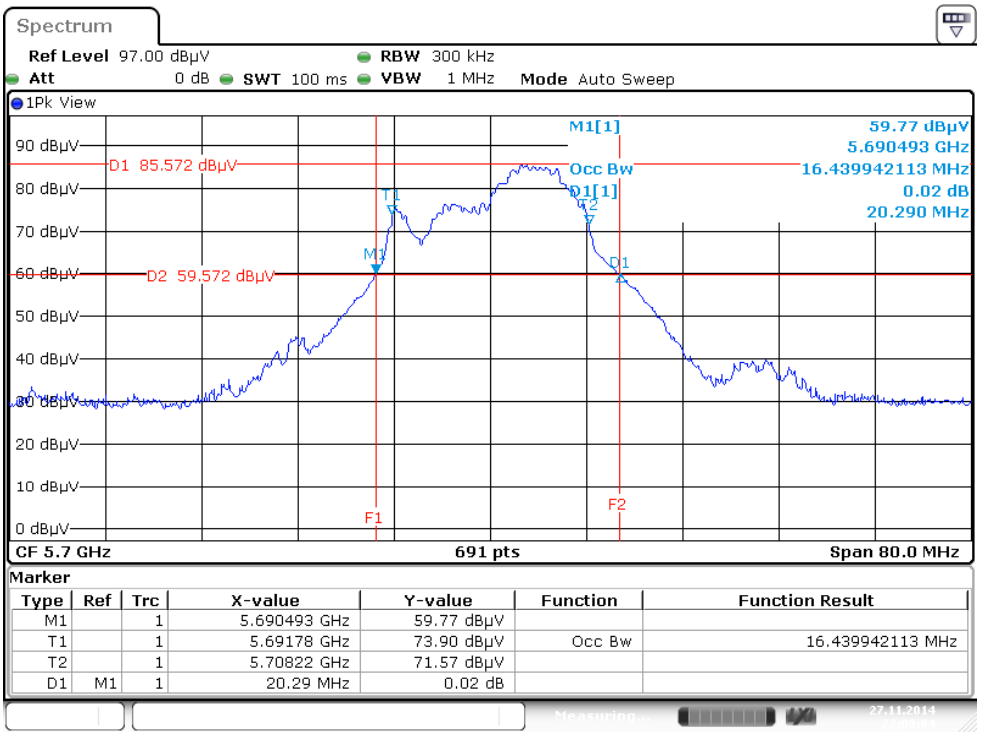
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5500 MHz



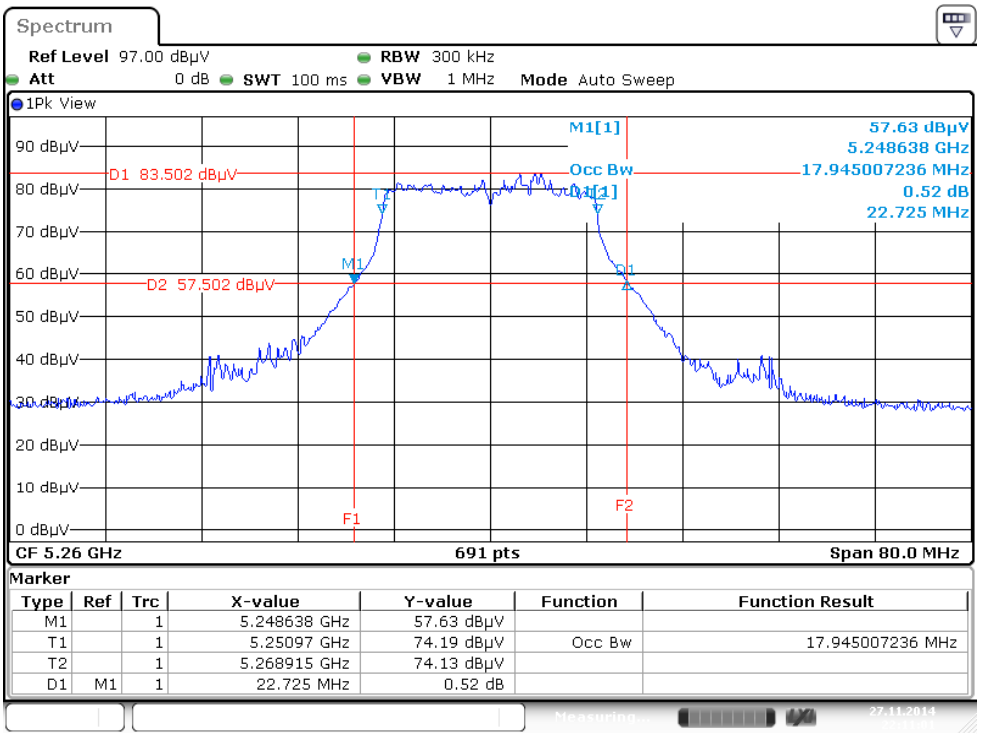
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5580 MHz



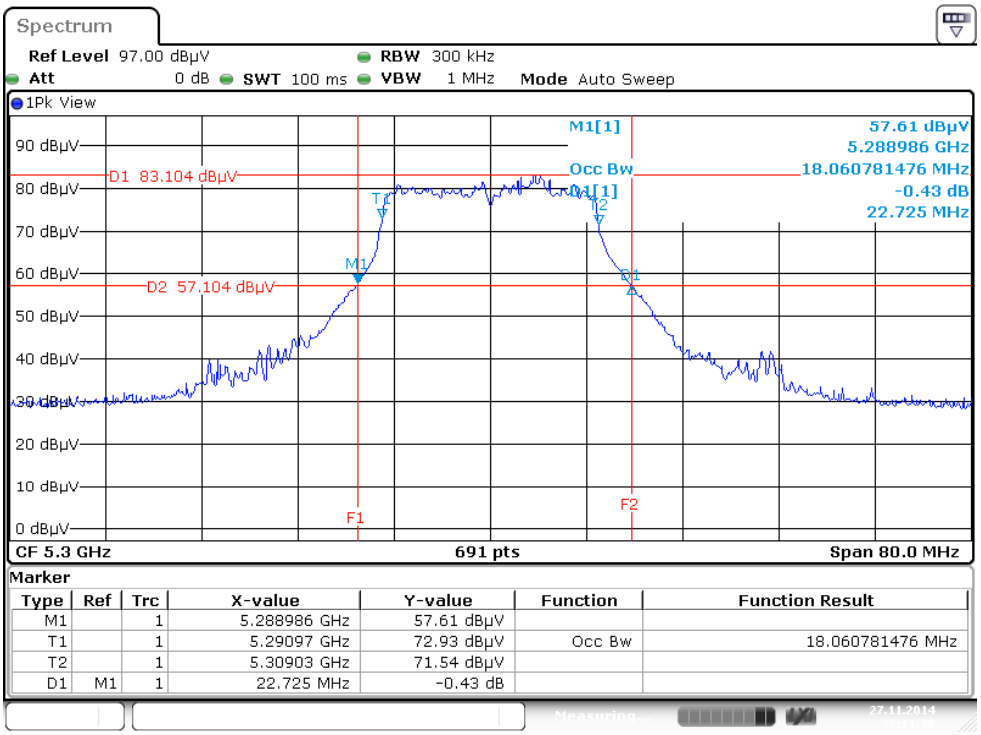
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5700 MHz



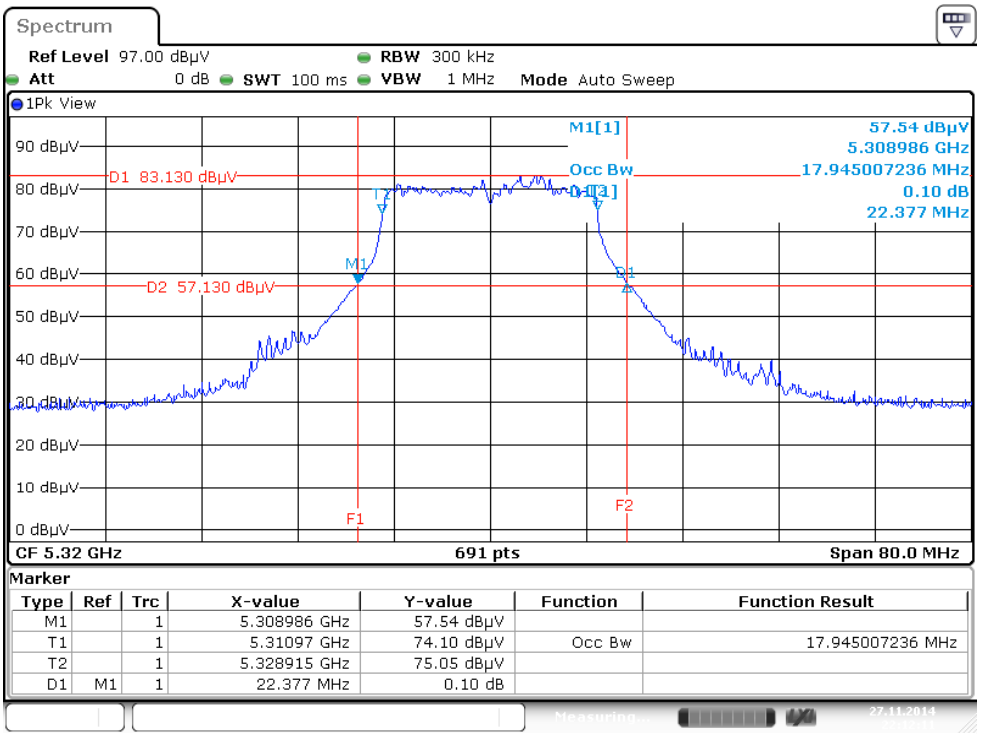
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5260 MHz



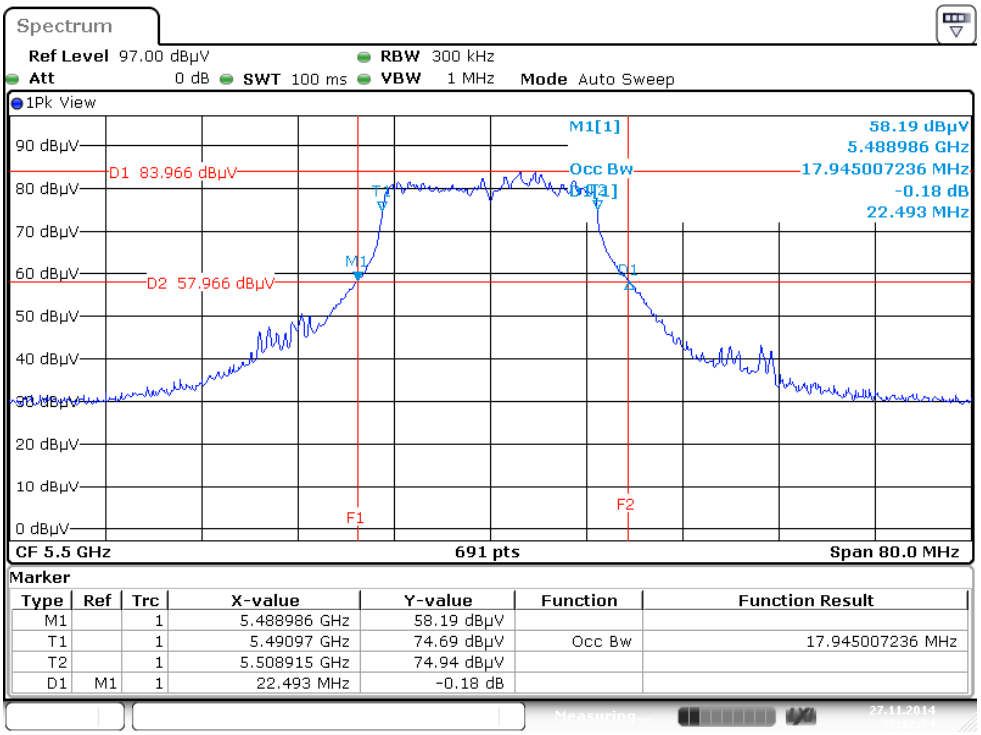
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5300 MHz



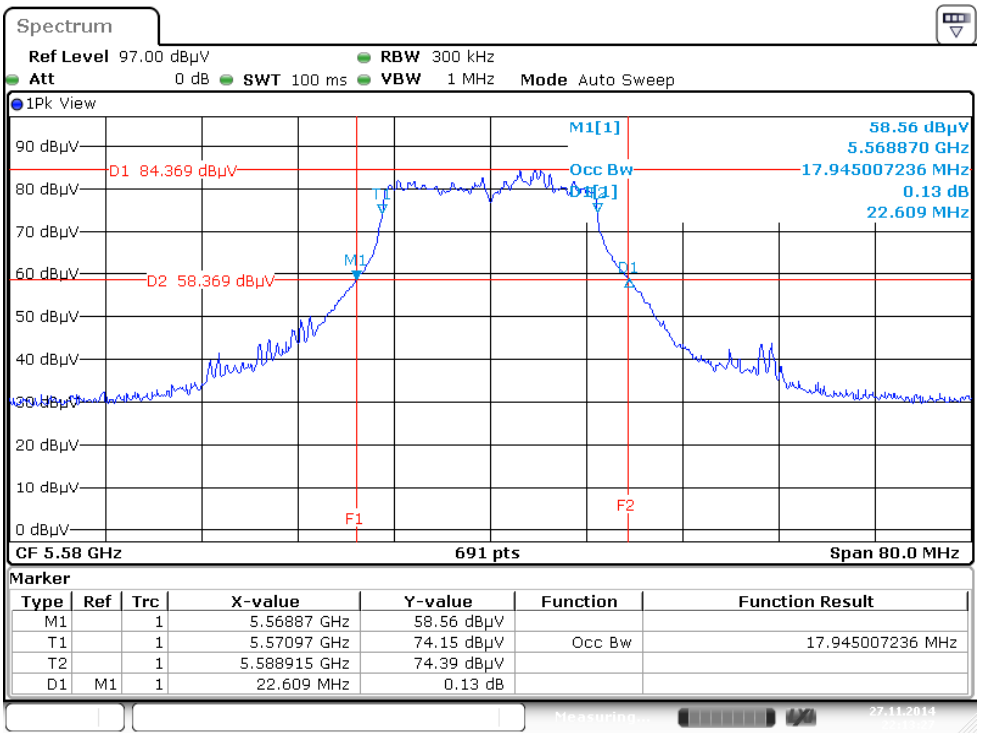
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5320 MHz



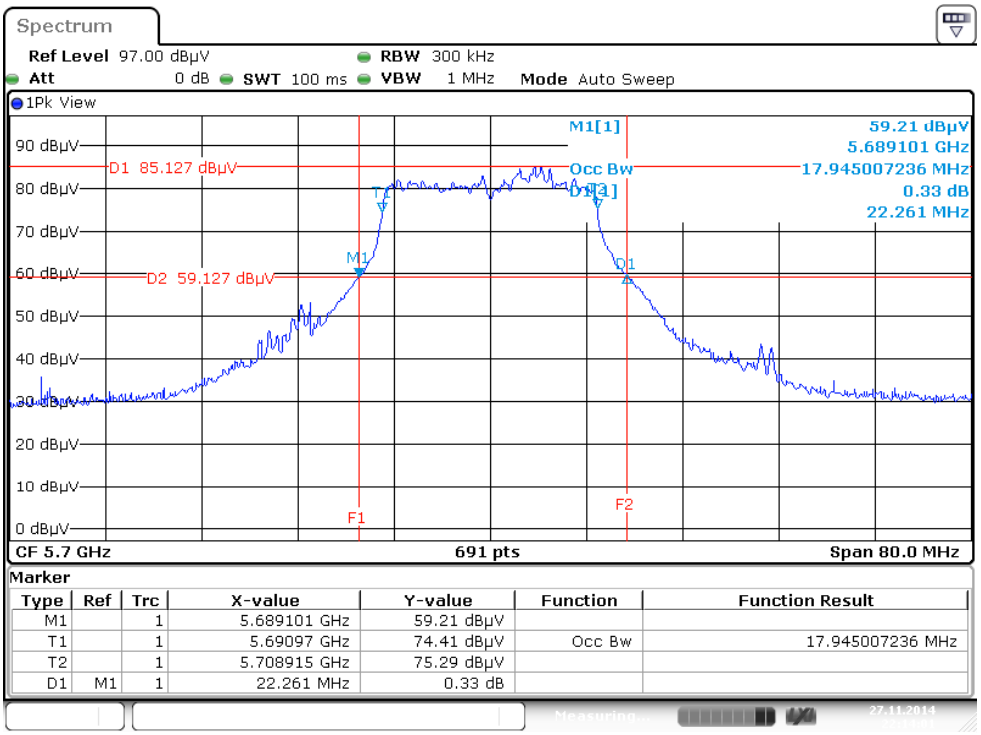
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5500 MHz



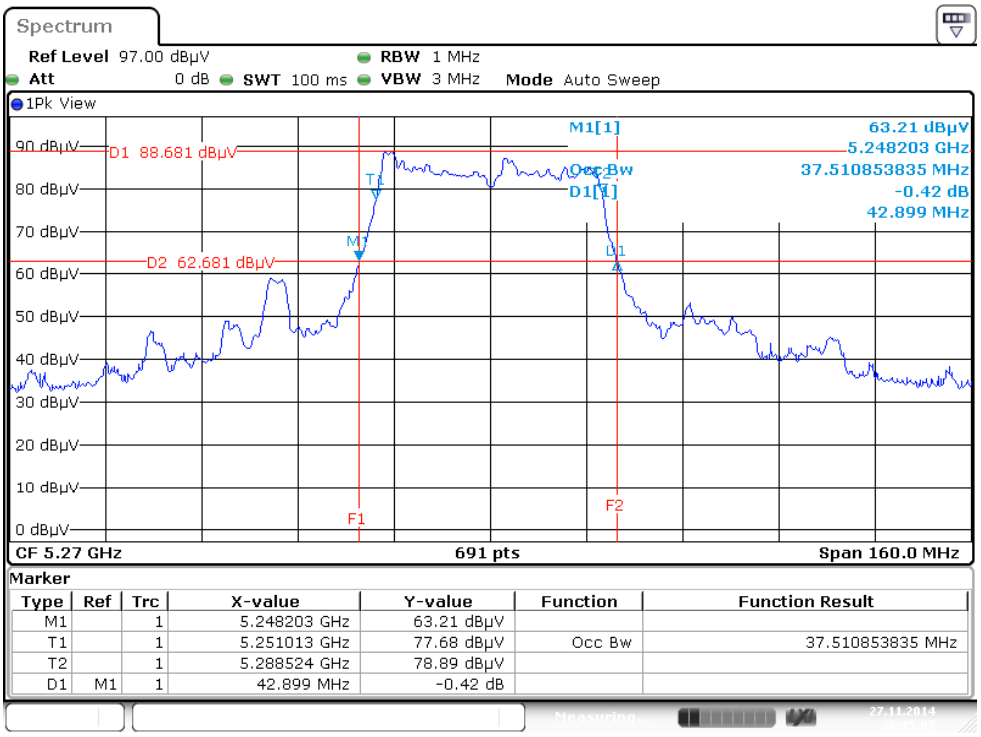
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5580 MHz



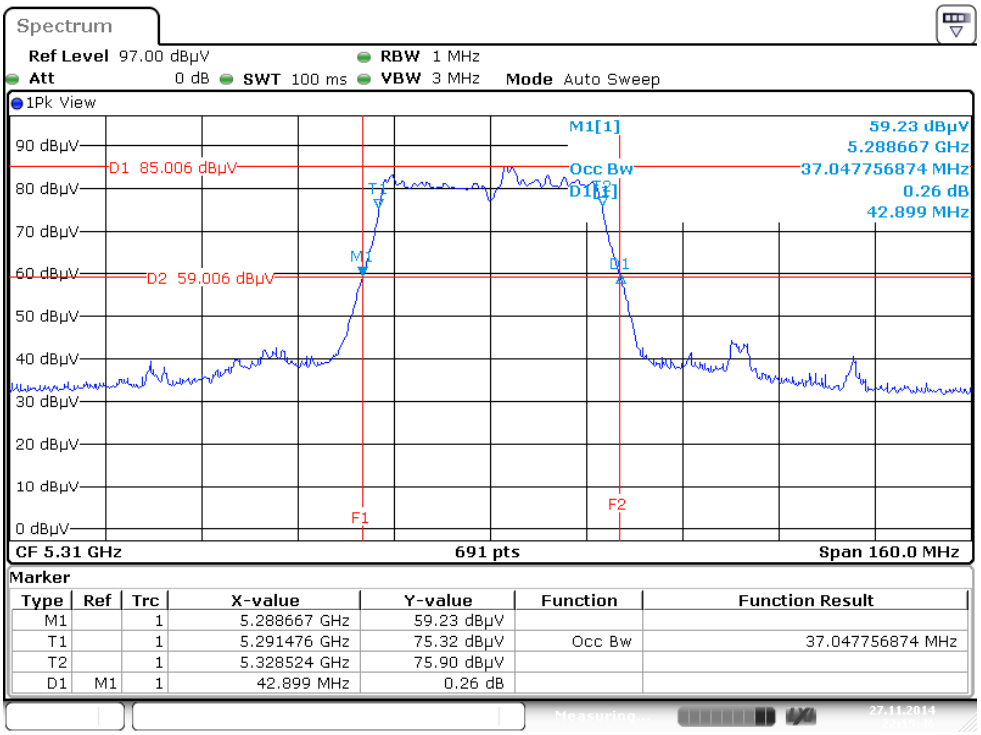
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5700 MHz



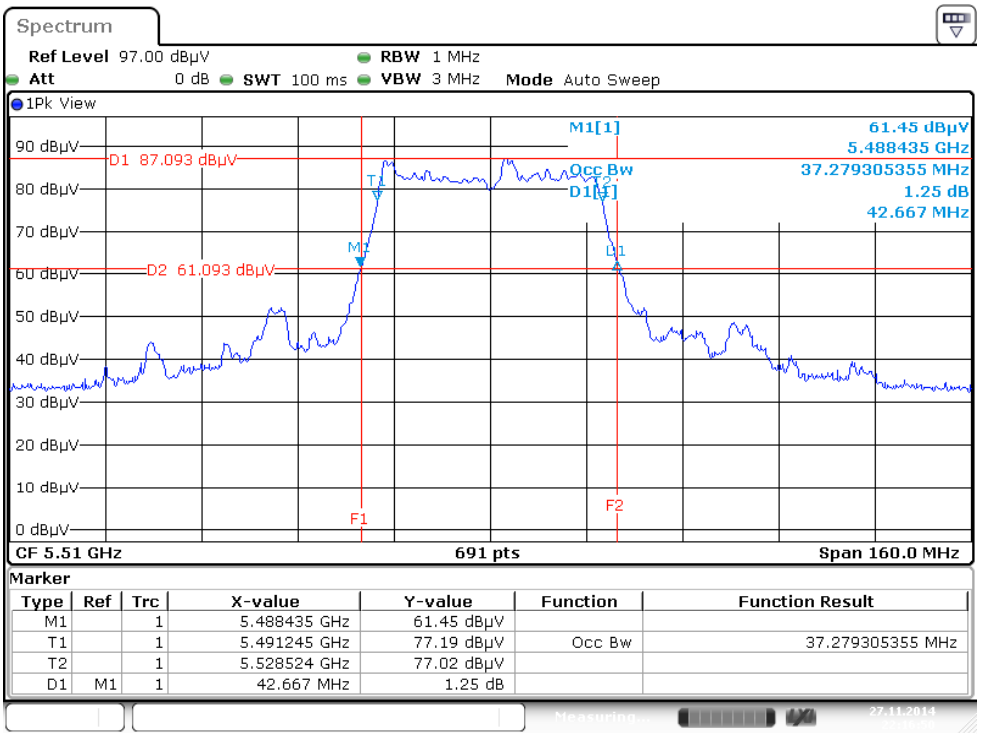
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5270 MHz



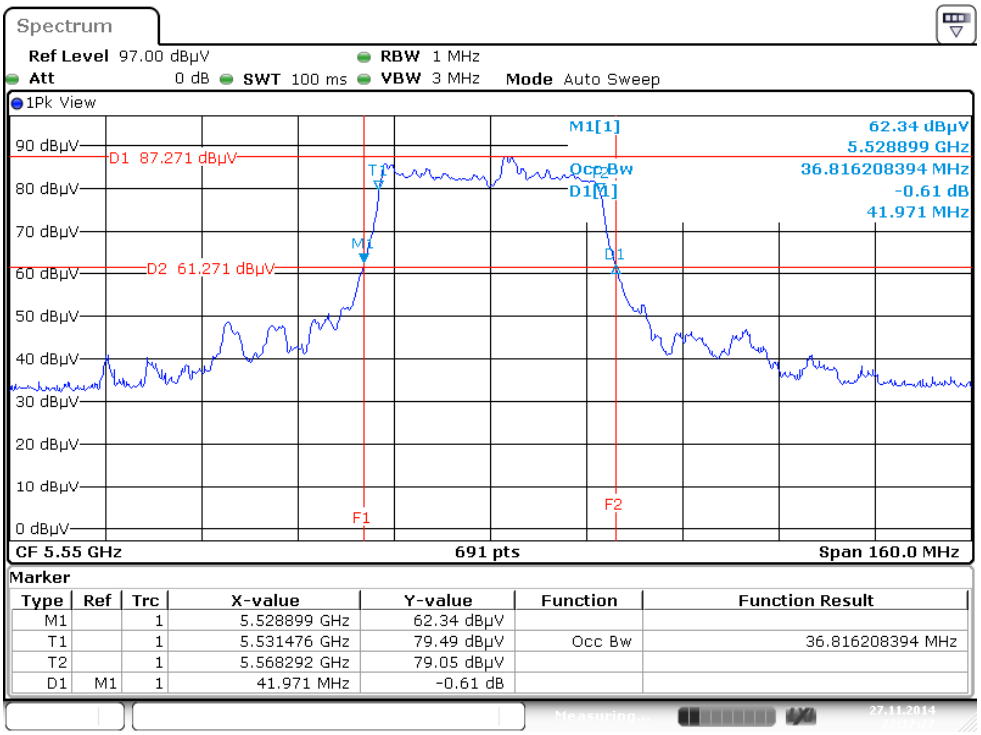
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5310 MHz



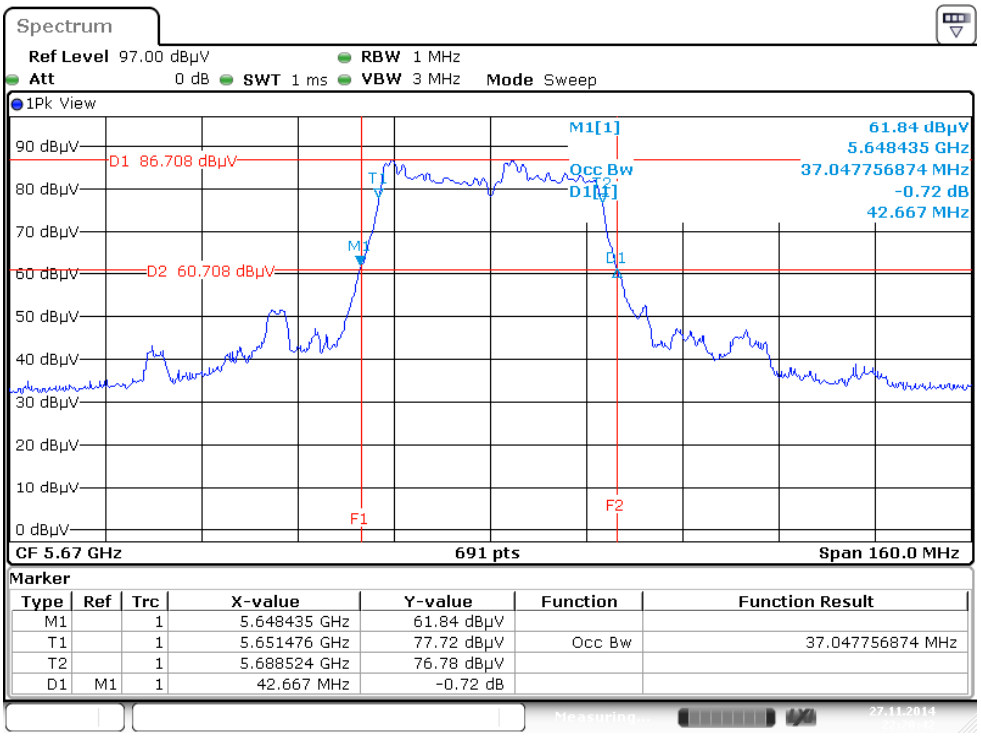
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5510 MHz



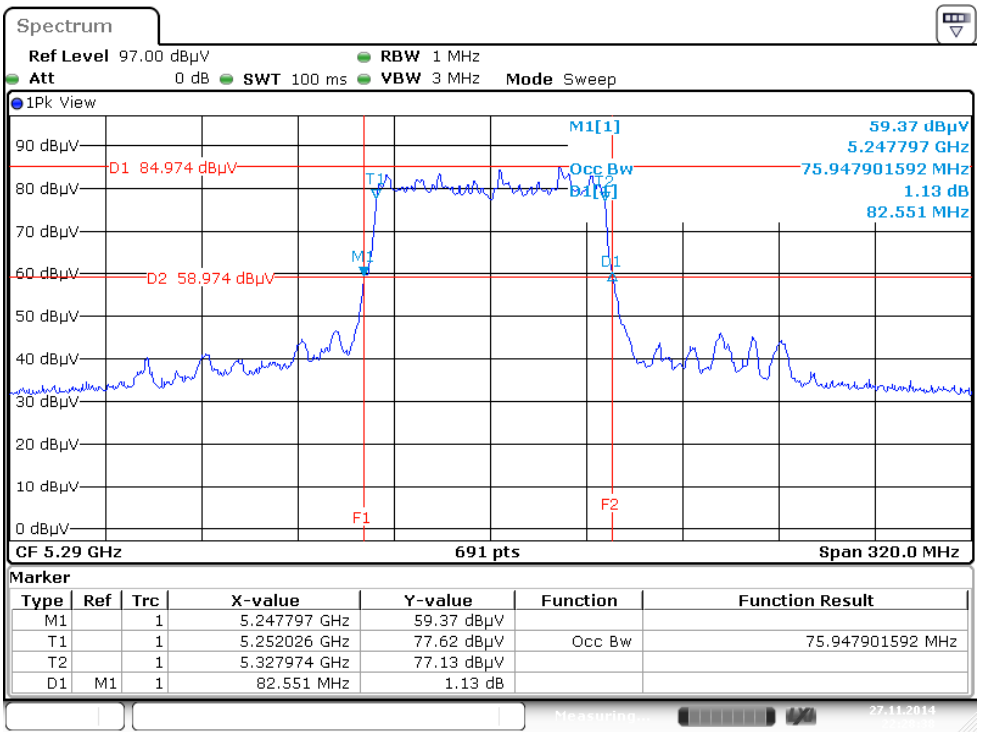
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5550 MHz



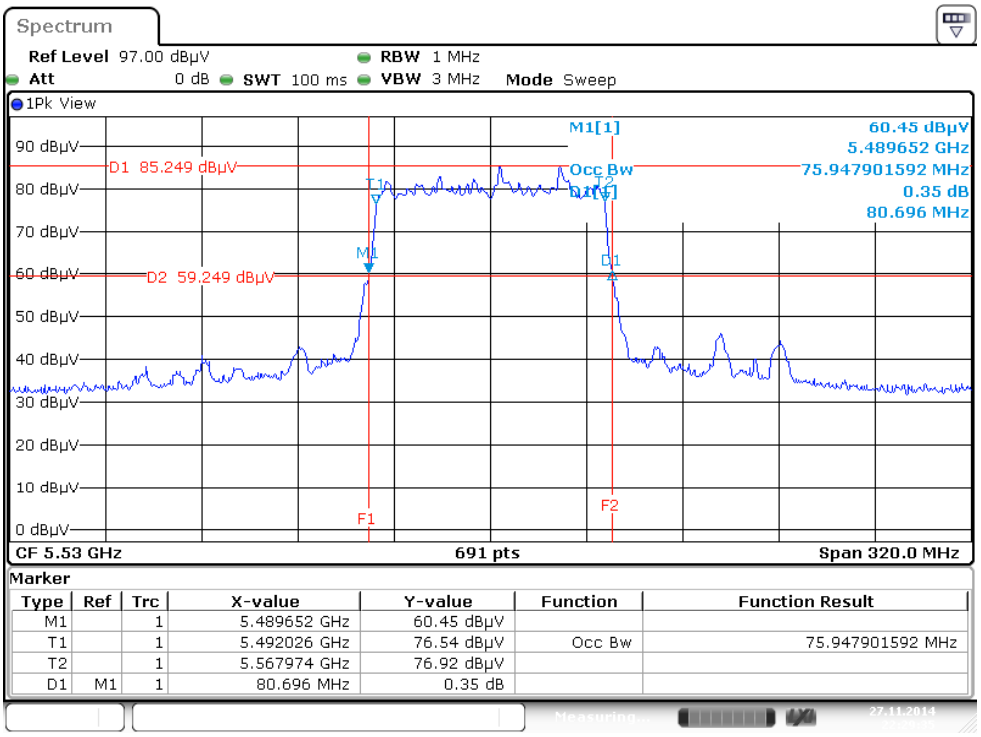
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5670 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5290 MHz



26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5530 MHz



4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

Frequency Band		Limit
☒	5.25-5.35 GHz	The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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.
☒	5.470-5.725 GHz	

4.3.2. Measuring Instruments and Setting

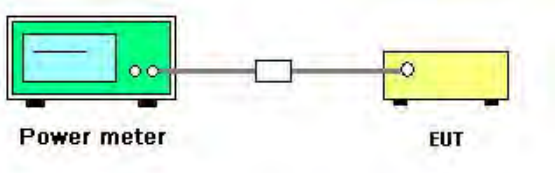
Please refer to section 5 of equipments list in this report The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.3.3. 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.

4.3.4. Test Setup Layout



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 Maximum Conducted Output Power

Temperature	26°C	Humidity	63%
Test Engineer	James Chou	Test Date	Nov. 27, 2014

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3	Ant. 4	Total		
802.11a	5260 MHz	17.47	16.38	17.56	15.66	22.86	24.00	Complies
	5300 MHz	16.53	14.85	16.37	15.86	21.97	24.00	Complies
	5320 MHz	17.43	16.06	17.55	16.75	23.01	24.00	Complies
	5500 MHz	16.63	14.96	16.13	15.83	21.95	23.92	Complies
	5580 MHz	16.63	14.59	15.93	15.38	21.72	24.00	Complies
	5700 MHz	16.46	14.43	15.88	15.31	21.60	24.00	Complies
802.11ac MCS0/Nss1 VHT20	5260 MHz	16.69	16.87	16.64	16.03	22.59	23.21	Complies
	5300 MHz	16.46	16.56	16.81	16.22	22.54	23.21	Complies
	5320 MHz	16.10	16.66	16.60	16.32	22.45	23.21	Complies
	5500 MHz	17.36	16.67	16.51	17.06	22.93	22.95	Complies
	5580 MHz	17.43	16.46	16.78	16.55	22.84	22.95	Complies
	5700 MHz	17.36	16.36	16.71	16.92	22.87	22.95	Complies
802.11ac MCS0/Nss1 VHT40	5270 MHz	17.65	16.42	17.56	16.92	23.19	23.21	Complies
	5310 MHz	14.56	13.39	14.81	14.59	20.39	23.21	Complies
	5510 MHz	16.52	15.28	15.96	16.12	22.01	22.95	Complies
	5550 MHz	16.61	16.93	16.13	16.06	22.47	22.95	Complies
	5670 MHz	16.56	16.49	16.17	16.13	22.36	22.95	Complies
802.11ac MCS0/Nss1 VHT80	5290 MHz	16.36	16.43	16.23	16.06	22.29	23.21	Complies
	5530 MHz	16.37	16.48	16.06	15.94	22.24	22.95	Complies

Note: 1. 802.11a 5500MHz power limit=11+10*log(B) or 24dBm, 11+10*log(19.59)=23.92dBm<24dBm, so limit=23.92dBm.

2. $$Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$

802.11ac band 2 directional gain=6.79dBi >6dBi, so limit=24 – (6.79 – 6)= 23.21dBm.

802.11ac band 3 directional gain=7.05dBi >6dBi, so limit=24 – (7.05 – 6)= 22.95dBm.

4.4. Power Spectral Density Measurement

4.4.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Band		Limit
☒	5.25-5.35 GHz	11 dBm/MHz
☒	5.470-5.725 GHz	11 dBm/MHz

4.4.2. Measuring Instruments and Setting

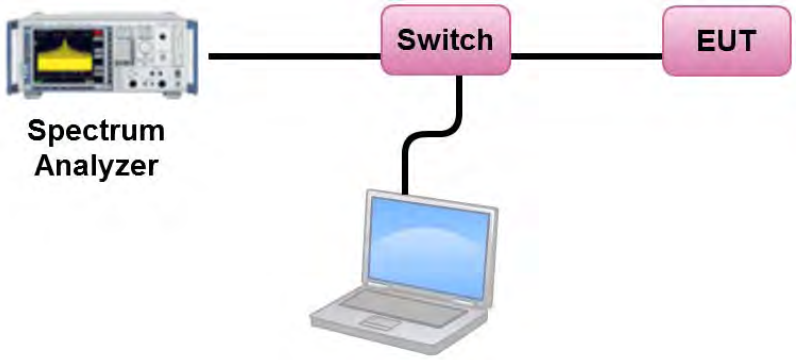
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.4.3. 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.

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 Power Spectral Density

Temperature	26°C	Humidity	63%
Test Engineer	James Chou	Test Date	Nov. 27, 2014

Mode	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
802.11a	5260 MHz	9.34	10.21	Complies
	5300 MHz	8.24	10.21	Complies
	5320 MHz	9.40	10.21	Complies
	5500 MHz	8.82	9.95	Complies
	5580 MHz	8.45	9.95	Complies
	5700 MHz	8.19	9.95	Complies
802.11ac MCS0/Nss1 VHT20	5260 MHz	8.29	10.21	Complies
	5300 MHz	8.17	10.21	Complies
	5320 MHz	8.44	10.21	Complies
	5500 MHz	9.66	9.95	Complies
	5580 MHz	9.49	9.95	Complies
	5700 MHz	8.55	9.95	Complies
802.11ac MCS0/Nss1 VHT40	5270 MHz	6.47	10.21	Complies
	5310 MHz	3.52	10.21	Complies
	5510 MHz	6.01	9.95	Complies
	5550 MHz	5.85	9.95	Complies
	5670 MHz	5.38	9.95	Complies
802.11ac MCS0/Nss1 VHT80	5290 MHz	2.77	10.21	Complies
	5530 MHz	3.71	9.95	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$

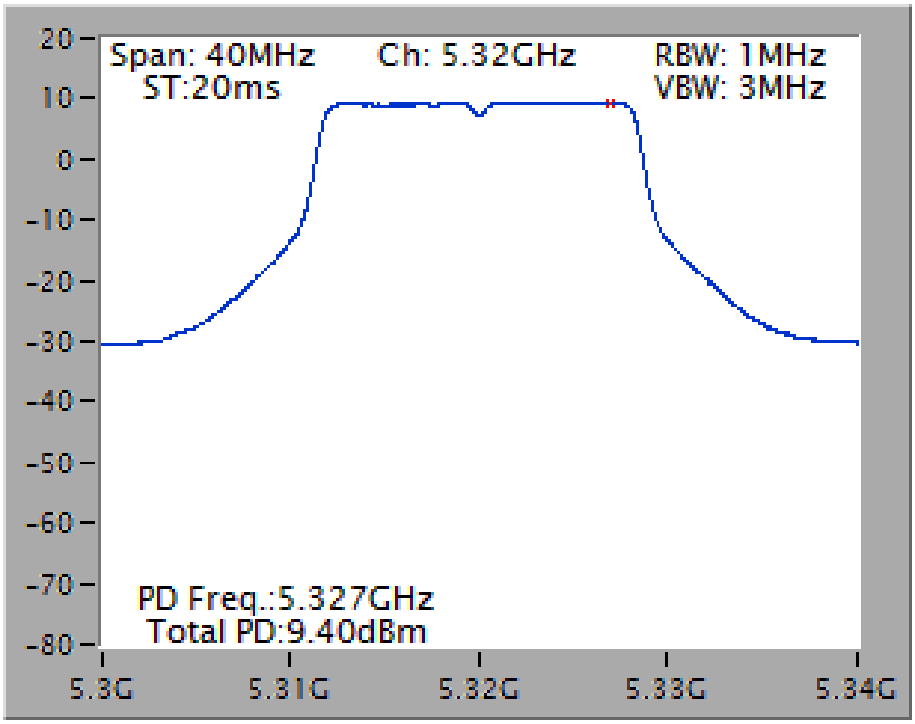
Band 2 directional gain=6.79dBi >6dBi, so limit=11 – (6.79 – 6)= 10.21dBm/MHz.

Band 3 directional gain=7.05dBi >6dBi, so limit=11 – (7.05 – 6)= 9.95dBm/MHz.

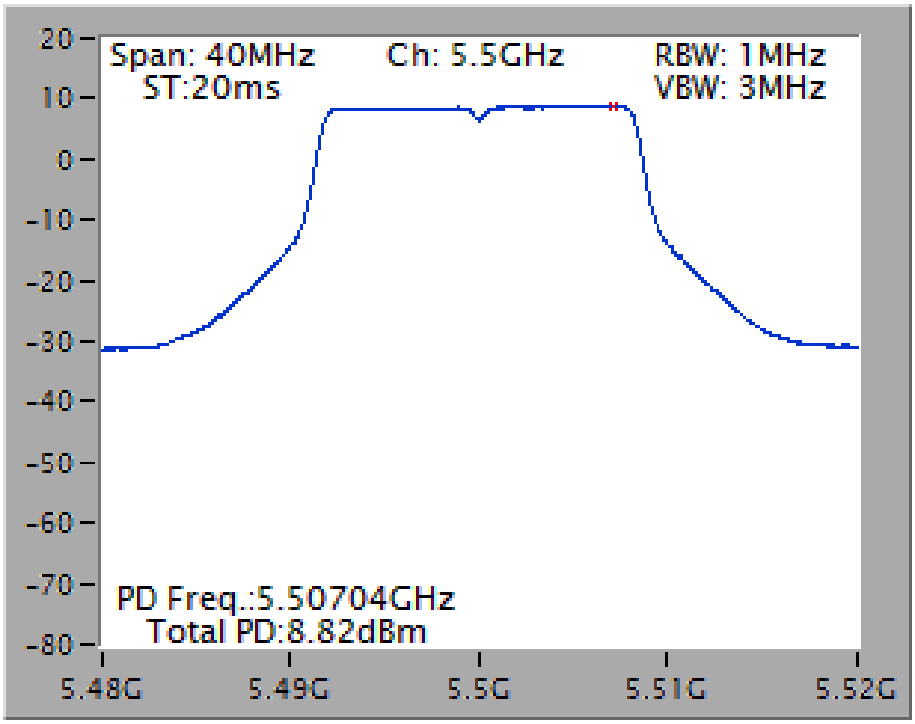
Note: All the test values were listed in the report.

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

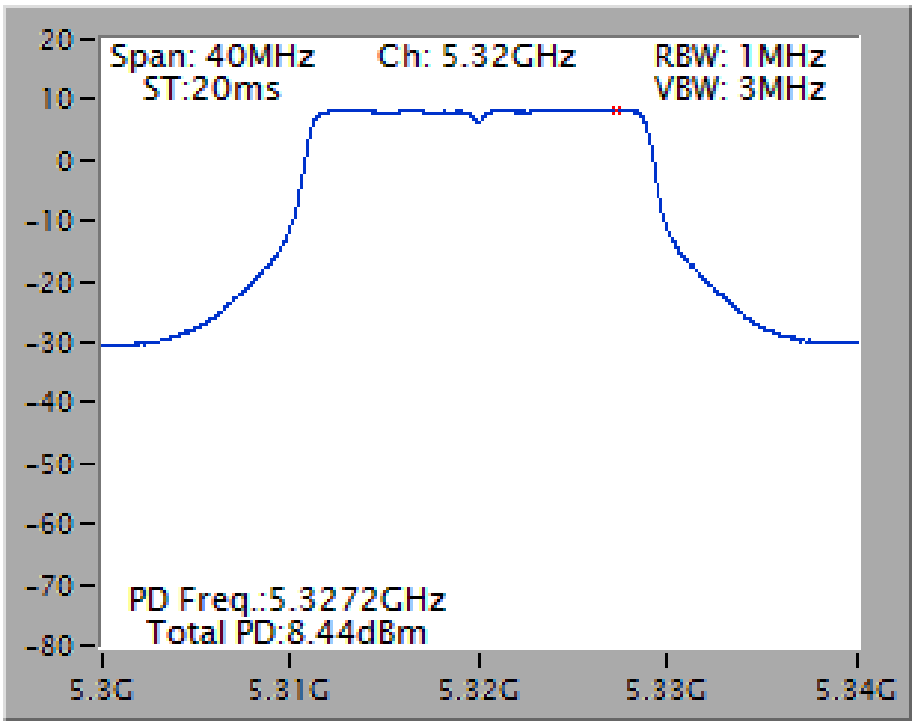
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5320 MHz



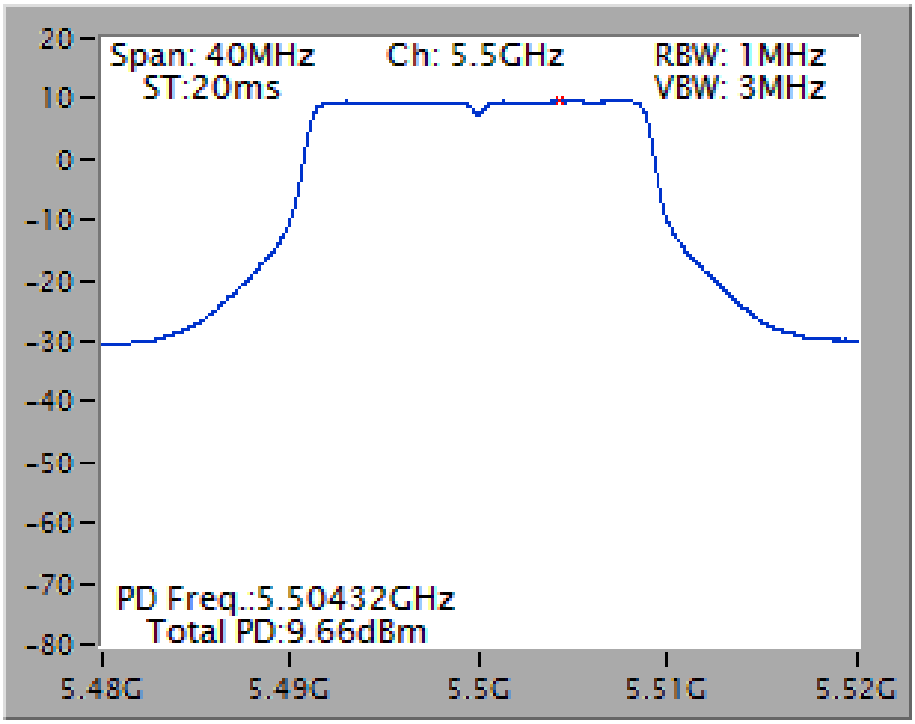
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5500 MHz



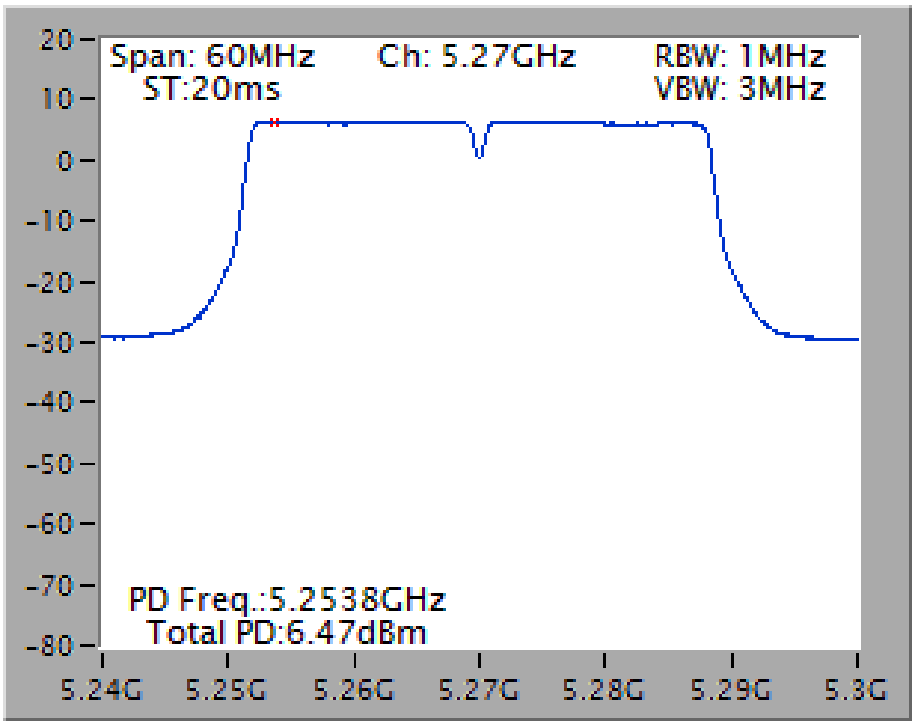
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5320 MHz



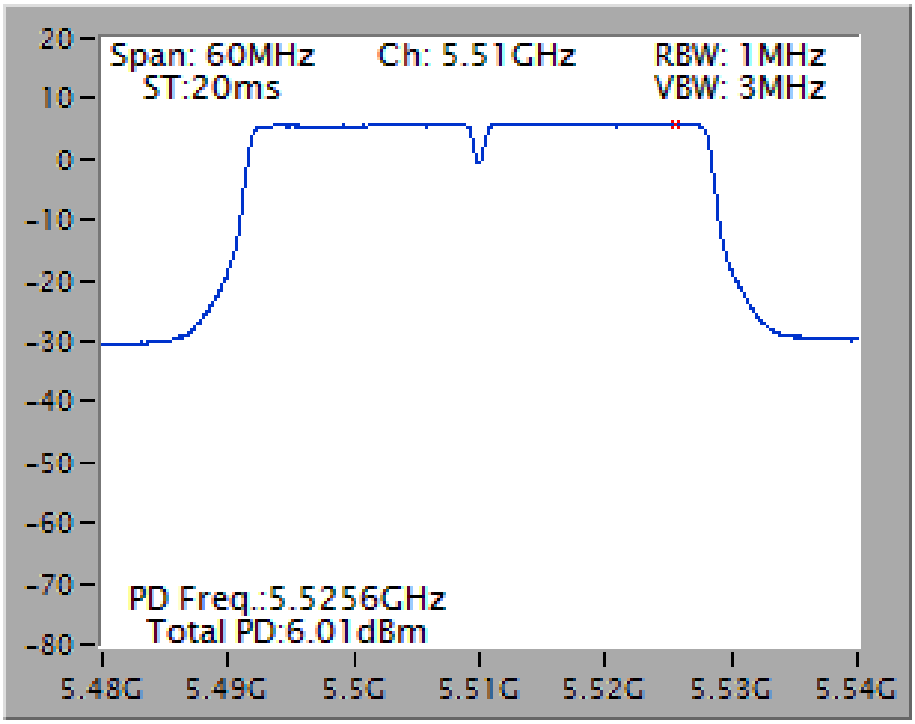
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5500 MHz



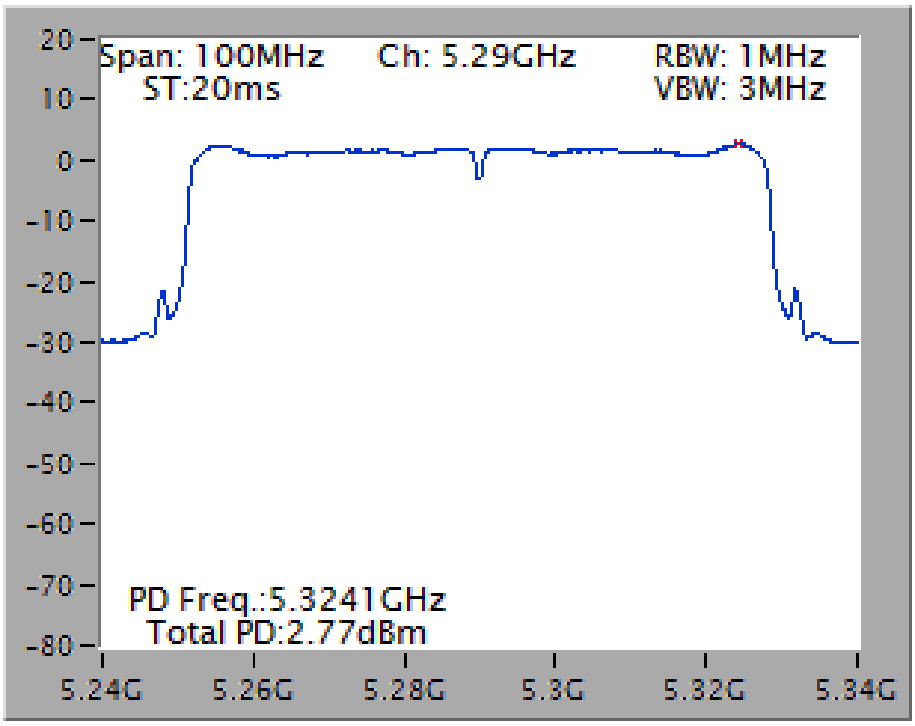
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5270 MHz



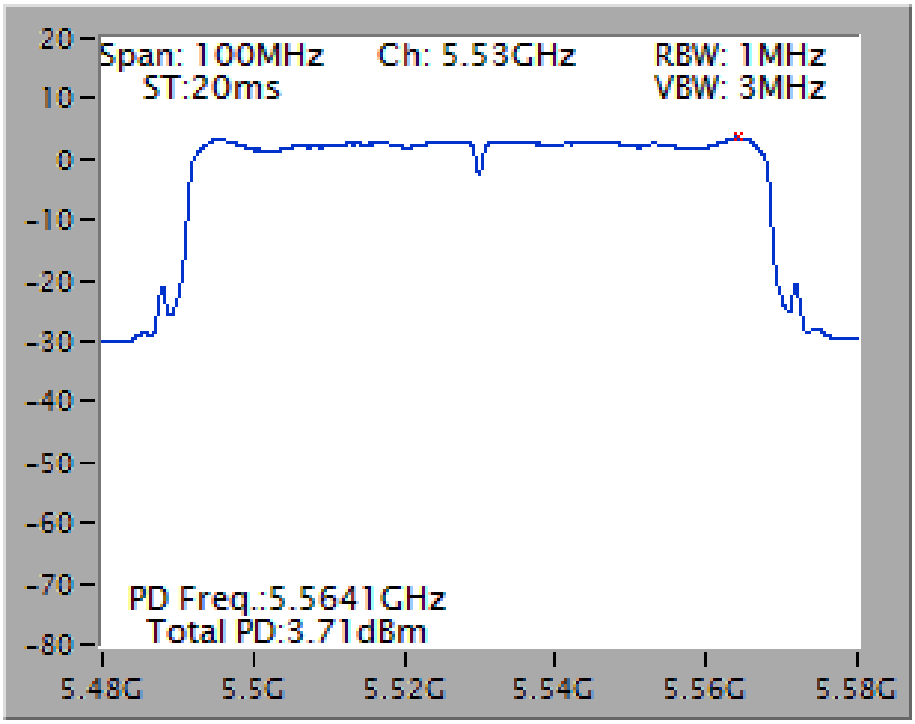
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5510 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5290 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 + Ant. 4 / 5530 MHz



4.5. Radiated Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.25-5.35 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 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band 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

4.5.2. 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

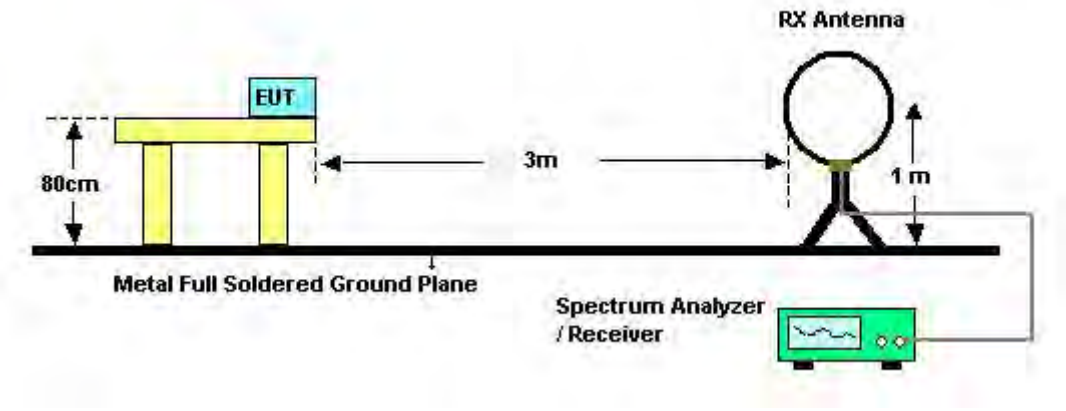
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

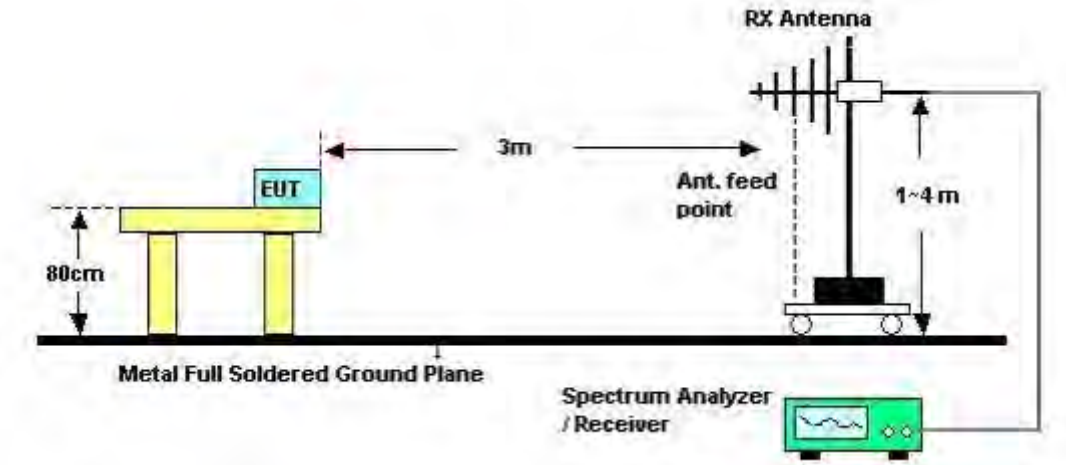
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

4.5.4. Test Setup Layout

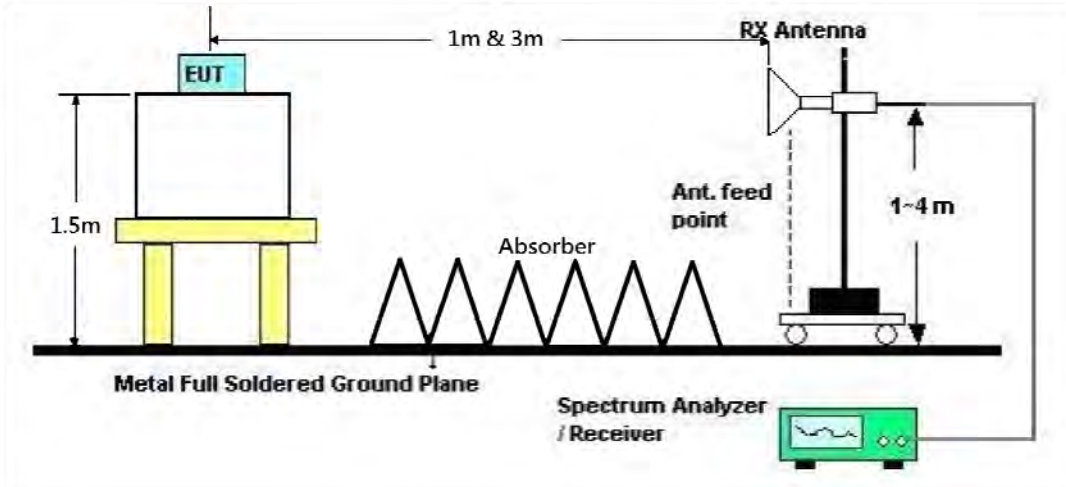
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. 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.

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

Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung	Configurations	Normal Link
Test Date	Nov. 27, 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 20 dB below the permissible value has no need to be reported.

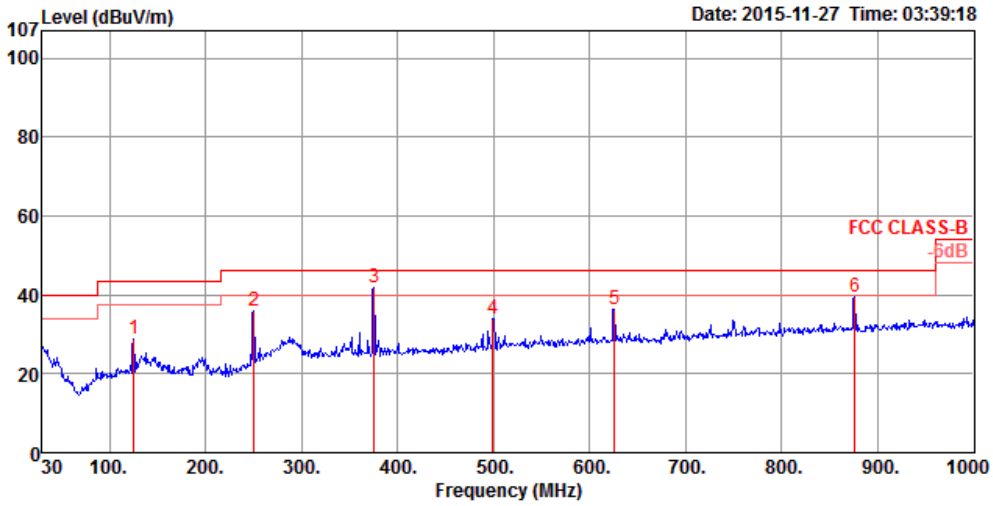
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

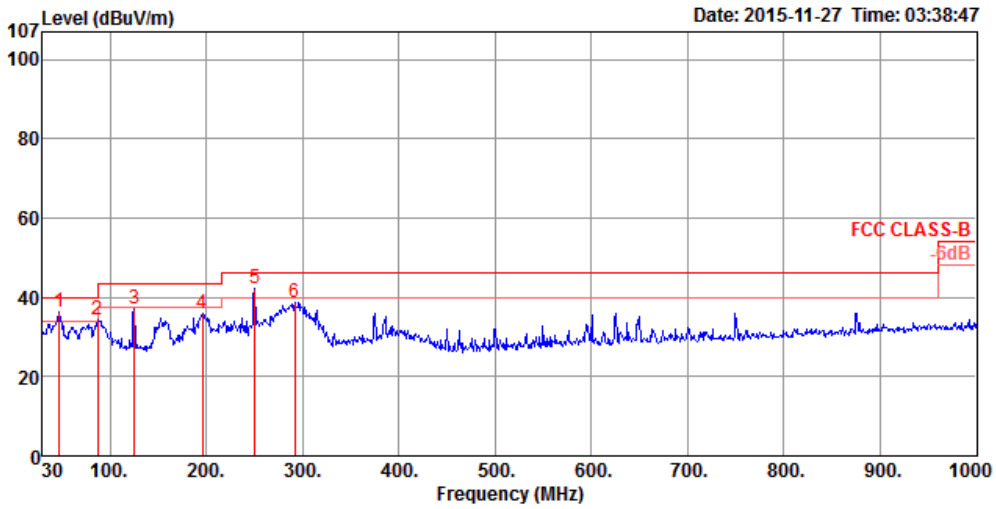
Temperature	22°C	Humidity	55%
Test Engineer	Stim Sung	Configurations	Normal Link

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	125.06	28.86	43.50	-14.64	47.37	1.40	32.56	12.65	HORIZONTAL	152	150	Peak
2	250.19	35.74	46.00	-10.26	53.47	1.90	32.53	12.90	HORIZONTAL	257	125	Peak
3	375.32	41.67	46.00	-4.33	56.04	2.24	32.54	15.93	HORIZONTAL	109	100	Peak
4	499.48	34.02	46.00	-11.98	46.12	2.61	32.61	17.90	HORIZONTAL	115	100	Peak
5	625.58	36.45	46.00	-9.55	46.97	2.89	32.67	19.26	HORIZONTAL	123	125	Peak
6	875.84	39.39	46.00	-6.61	46.64	3.34	31.99	21.40	HORIZONTAL	144	100	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	47.46	36.48	40.00	-3.52	58.06	0.95	32.63	10.10	VERTICAL	272	100	Peak
2	87.23	34.35	40.00	-5.65	56.88	1.21	32.58	8.84	VERTICAL	201	125	Peak
3	125.06	36.98	43.50	-6.52	55.49	1.40	32.56	12.65	VERTICAL	244	100	Peak
4	195.87	35.89	43.50	-7.61	56.64	1.68	32.55	10.12	VERTICAL	34	100	Peak
5	250.19	42.24	46.00	-3.76	59.97	1.90	32.53	12.90	VERTICAL	355	100	Peak
6	291.90	38.86	46.00	-7.14	55.61	2.03	32.52	13.74	VERTICAL	111	125	Peak

Note:

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

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

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

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

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 52 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 07, 2014		

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	10513.04	64.22	74.00	-9.78	50.87	8.57	39.98	35.20	Peak	185	106	HORIZONTAL
2	10513.88	50.41	54.00	-3.59	37.06	8.57	39.98	35.20	Average	185	106	HORIZONTAL
3	15776.92	48.79	54.00	-5.21	35.78	10.80	37.75	35.54	Average	185	203	HORIZONTAL
4	15780.00	62.09	74.00	-11.91	49.08	10.80	37.75	35.54	Peak	185	203	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	10521.86	61.97	74.00	-12.03	48.62	8.57	39.98	35.20	Peak	156	5	VERTICAL
2	10521.92	48.17	54.00	-5.83	34.82	8.57	39.98	35.20	Average	156	5	VERTICAL
3	15774.62	69.66	74.00	-4.34	56.63	10.80	37.77	35.54	Peak	165	4	VERTICAL
4	15775.77	53.55	54.00	-0.45	40.52	10.80	37.77	35.54	Average	165	4	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 60 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 07, 2014		

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	10592.82	62.46	74.00	-11.54	49.07	8.62	39.91	35.14	Peak	193	106	HORIZONTAL
2	10593.78	49.18	54.00	-4.82	35.79	8.62	39.91	35.14	Average	193	106	HORIZONTAL
3	15901.99	65.61	74.00	-8.39	52.76	10.81	37.56	35.52	Peak	164	57	HORIZONTAL
4	15902.12	51.72	54.00	-2.28	38.87	10.81	37.56	35.52	Average	164	57	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	10592.15	60.89	74.00	-13.11	47.50	8.62	39.91	35.14	Peak	178	102	VERTICAL
2	10593.72	47.58	54.00	-6.42	34.19	8.62	39.91	35.14	Average	178	102	VERTICAL
3	15896.67	68.11	74.00	-5.89	55.26	10.81	37.56	35.52	Peak	168	4	VERTICAL
4	15897.05	53.29	54.00	-0.71	40.44	10.81	37.56	35.52	Average	168	4	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 64 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 10, 2014		

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	10633.48	62.06	74.00	-11.94	47.22	10.21	38.93	34.30	108	206	Peak	HORIZONTAL
2	10633.56	48.36	54.00	-5.64	33.52	10.21	38.93	34.30	108	206	Average	HORIZONTAL
3	15959.32	52.41	54.00	-1.59	36.89	12.56	37.85	34.89	137	177	Average	HORIZONTAL
4	15959.84	67.01	74.00	-6.99	51.49	12.56	37.85	34.89	137	177	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	10632.70	61.66	74.00	-12.34	46.82	10.21	38.93	34.30	108	246	Peak	VERTICAL
2	10633.60	47.46	54.00	-6.54	32.62	10.21	38.93	34.30	108	246	Average	VERTICAL
3	15959.52	67.47	74.00	-6.53	51.95	12.56	37.85	34.89	108	166	Peak	VERTICAL
4	15960.12	53.50	54.00	-0.50	37.98	12.56	37.85	34.89	108	166	Average	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 100 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 07, 2014		

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	10996.12	59.90	74.00	-14.10	46.27	8.93	39.50	34.80	Peak	106	182	HORIZONTAL
2	10998.11	47.40	54.00	-6.60	33.77	8.93	39.50	34.80	Average	106	182	HORIZONTAL
3	16496.06	52.82	54.00	-1.18	38.61	11.21	38.20	35.20	Average	164	131	HORIZONTAL
4	16498.65	67.46	74.00	-6.54	53.25	11.21	38.20	35.20	Peak	164	131	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	10993.01	63.26	74.00	-10.74	49.63	8.93	39.50	34.80	Peak	191	82	VERTICAL
2	10998.08	50.56	54.00	-3.44	36.93	8.93	39.50	34.80	Average	191	82	VERTICAL
3	16492.24	68.61	74.00	-5.39	54.41	11.20	38.20	35.20	Peak	164	6	VERTICAL
4	16495.83	53.48	54.00	-0.52	39.27	11.21	38.20	35.20	Average	164	6	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 116 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 11, 2014		

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	11159.84	45.40	54.00	-8.60	30.69	10.60	39.13	35.02	224	257	Average	HORIZONTAL
2	11161.88	59.27	74.00	-14.73	44.55	10.61	39.13	35.02	224	257	Peak	HORIZONTAL
3	16731.48	50.22	54.00	-3.78	31.90	13.29	40.27	35.24	207	160	Average	HORIZONTAL
4	16738.60	62.84	74.00	-11.16	44.43	13.29	40.36	35.24	207	160	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	11158.04	47.67	54.00	-6.33	32.96	10.60	39.13	35.02	56	213	Average	VERTICAL
2	11158.04	60.91	74.00	-13.09	46.20	10.60	39.13	35.02	56	213	Peak	VERTICAL
3	16737.00	52.61	54.00	-1.39	34.20	13.29	40.36	35.24	4	164	Average	VERTICAL
4	16738.40	67.07	74.00	-6.93	48.66	13.29	40.36	35.24	4	164	Peak	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 140 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 11, 2014		

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	11400.16	47.72	54.00	-6.28	32.74	10.69	39.32	35.03	143	238	Average	HORIZONTAL
2	11400.24	62.13	74.00	-11.87	47.15	10.69	39.32	35.03	143	238	Peak	HORIZONTAL
3	17090.92	52.31	54.00	-1.69	31.92	13.54	42.18	35.33	249	162	Average	HORIZONTAL
4	17091.92	64.79	74.00	-9.21	44.40	13.54	42.18	35.33	249	162	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	11400.12	58.66	74.00	-15.34	43.68	10.69	39.32	35.03	53	167	Peak	VERTICAL
2	11400.28	46.37	54.00	-7.63	31.39	10.69	39.32	35.03	53	167	Average	VERTICAL
3	17090.40	53.78	54.00	-0.22	33.47	13.54	42.10	35.33	3	158	Average	VERTICAL
4	17098.52	68.18	74.00	-5.82	47.79	13.54	42.18	35.33	3	158	Peak	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 52 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

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	10519.80	45.44	54.00	-8.56	31.75	10.09	38.90	35.30	Average	196	148	HORIZONTAL
2	10519.80	57.07	74.00	-16.93	43.38	10.09	38.90	35.30	Peak	196	148	HORIZONTAL
3	15782.60	51.14	54.00	-2.86	35.72	12.57	38.09	35.24	Average	179	313	HORIZONTAL
4	15785.10	63.43	74.00	-10.57	48.01	12.57	38.09	35.24	Peak	179	313	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	10518.80	45.78	54.00	-8.22	32.09	10.09	38.90	35.30	Average	158	14	VERTICAL
2	10518.80	56.13	74.00	-17.87	42.44	10.09	38.90	35.30	Peak	158	14	VERTICAL
3	15779.80	53.61	54.00	-0.39	38.17	12.57	38.11	35.24	Average	154	13	VERTICAL
4	15779.80	66.16	74.00	-7.84	50.72	12.57	38.11	35.24	Peak	154	13	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 60 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

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	10599.90	48.92	54.00	-5.08	35.09	10.16	38.92	35.25	Average	168	118	HORIZONTAL
2	10600.00	60.21	74.00	-13.79	46.38	10.16	38.92	35.25	Peak	168	118	HORIZONTAL
3	15881.70	64.57	74.00	-9.43	49.29	12.57	37.97	35.26	Peak	173	274	HORIZONTAL
4	15896.90	51.02	54.00	-2.98	35.77	12.57	37.94	35.26	Average	173	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	10597.20	59.96	74.00	-14.04	46.13	10.16	38.92	35.25	Peak	243	123	VERTICAL
2	10599.40	46.81	54.00	-7.19	32.98	10.16	38.92	35.25	Average	243	123	VERTICAL
3	15899.90	65.25	74.00	-8.75	50.00	12.57	37.94	35.26	Peak	172	290	VERTICAL
4	15900.10	51.88	54.00	-2.12	36.63	12.57	37.94	35.26	Average	172	290	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 64 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 11, 2014		

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	10638.30	58.82	74.00	-15.18	43.99	10.21	38.93	34.31	140	189	Peak	HORIZONTAL
2	10640.00	45.71	54.00	-8.29	30.89	10.21	38.93	34.32	140	189	Average	HORIZONTAL
3	15958.80	53.73	54.00	-0.27	38.21	12.56	37.85	34.89	59	199	Average	HORIZONTAL
4	15962.40	67.96	74.00	-6.04	52.45	12.56	37.85	34.90	59	199	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	10631.20	44.85	54.00	-9.15	30.01	10.21	38.93	34.30	115	184	Average	VERTICAL
2	10632.80	57.86	74.00	-16.14	43.02	10.21	38.93	34.30	115	184	Peak	VERTICAL
3	15959.64	50.86	54.00	-3.14	35.34	12.56	37.85	34.89	354	204	Average	VERTICAL
4	15966.96	65.49	74.00	-8.51	49.98	12.56	37.85	34.90	354	204	Peak	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 100 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

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	10999.10	43.55	54.00	-10.45	28.98	10.55	39.00	34.98	Average	192	193	HORIZONTAL
2	11001.00	56.23	74.00	-17.77	41.66	10.55	39.00	34.98	Peak	192	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	11000.40	45.29	54.00	-8.71	30.72	10.55	39.00	34.98	Average	195	120	VERTICAL
2	11004.20	58.26	74.00	-15.74	43.69	10.55	39.00	34.98	Peak	195	120	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 116 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

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	11159.70	57.11	74.00	-16.89	42.38	10.60	39.13	35.00	Peak	238	125	HORIZONTAL
2	11160.10	45.05	54.00	-8.95	30.32	10.60	39.13	35.00	Average	238	125	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	11158.40	57.02	74.00	-16.98	42.29	10.60	39.13	35.00	Peak	173	129	VERTICAL
2	11160.20	44.91	54.00	-9.09	30.18	10.60	39.13	35.00	Average	173	129	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 140 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

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	11398.70	58.69	74.00	-15.31	43.72	10.69	39.32	35.04	Peak	223	188	HORIZONTAL
2	11400.90	45.92	54.00	-8.08	30.95	10.69	39.32	35.04	Average	223	188	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	11402.10	44.99	54.00	-9.01	30.02	10.69	39.32	35.04	Average	157	108	VERTICAL
2	11404.10	55.54	74.00	-18.46	40.57	10.69	39.32	35.04	Peak	157	108	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 19, 2014		

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	15801.20	50.48	54.00	-3.52	35.08	12.57	38.07	35.24	Average	170	121	HORIZONTAL
2	15803.40	62.88	74.00	-11.12	47.48	12.57	38.07	35.24	Peak	170	121	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	15793.40	60.27	74.00	-13.73	44.85	12.57	38.09	35.24	Peak	165	117	VERTICAL
2	15810.30	47.38	54.00	-6.62	31.98	12.57	38.07	35.24	Average	165	117	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 62 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 19, 2014		

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	10598.80	43.19	54.00	-10.81	29.36	10.16	38.92	35.25	Average	178	170	HORIZONTAL
2	10614.90	55.35	74.00	-18.65	41.47	10.19	38.92	35.23	Peak	178	170	HORIZONTAL
3	15905.20	45.72	54.00	-8.28	30.51	12.56	37.92	35.27	Average	143	146	HORIZONTAL
4	15906.90	56.85	74.00	-17.15	41.64	12.56	37.92	35.27	Peak	143	146	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	10599.40	42.37	54.00	-11.63	28.54	10.16	38.92	35.25	Average	141	208	VERTICAL
2	10602.70	53.31	74.00	-20.69	39.43	10.19	38.92	35.23	Peak	141	208	VERTICAL
3	15907.30	45.40	54.00	-8.60	30.19	12.56	37.92	35.27	Average	192	173	VERTICAL
4	15938.50	57.48	74.00	-16.52	42.33	12.56	37.87	35.28	Peak	192	173	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 19, 2014		

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	10999.70	43.24	54.00	-10.76	28.67	10.55	39.00	34.98	Average	161	203	HORIZONTAL
2	11014.40	54.46	74.00	-19.54	39.87	10.56	39.01	34.98	Peak	161	203	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	11020.10	44.72	54.00	-9.28	30.13	10.56	39.01	34.98	Average	191	193	VERTICAL
2	11022.70	56.45	74.00	-17.55	41.84	10.56	39.03	34.98	Peak	191	193	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 110 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 19, 2014		

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	11080.60	56.21	74.00	-17.79	41.55	10.58	39.07	34.99	Peak	253	158	HORIZONTAL
2	11100.10	44.64	54.00	-9.36	29.97	10.58	39.08	34.99	Average	253	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	11085.70	45.43	54.00	-8.57	30.77	10.58	39.07	34.99	Average	245	135	VERTICAL
2	11085.90	56.66	74.00	-17.34	42.00	10.58	39.07	34.99	Peak	245	135	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 134 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 19, 2014		

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	11334.10	57.28	74.00	-16.72	42.38	10.66	39.27	35.03	Peak	176	193	HORIZONTAL
2	11345.40	44.02	54.00	-9.98	29.10	10.67	39.28	35.03	Average	176	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	11344.90	57.45	74.00	-16.55	42.53	10.67	39.28	35.03	Peak	228	138	VERTICAL
2	11348.60	44.49	54.00	-9.51	29.57	10.67	39.28	35.03	Average	228	138	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 11, 2014		

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	10579.88	43.84	54.00	-10.16	28.96	10.16	38.92	34.20	37	229	Average	HORIZONTAL
2	10580.32	57.37	74.00	-16.63	42.49	10.16	38.92	34.20	37	229	Peak	HORIZONTAL
3	15867.50	60.44	74.00	-13.56	44.76	12.57	37.97	34.86	186	167	Peak	HORIZONTAL
4	15882.40	46.88	54.00	-7.12	31.20	12.57	37.97	34.86	186	167	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	10540.00	56.59	74.00	-17.41	41.69	10.11	38.91	34.12	359	227	Peak	VERTICAL
2	10582.72	43.10	54.00	-10.90	28.22	10.16	38.92	34.20	358	227	Average	VERTICAL
3	15902.96	60.13	74.00	-13.87	44.51	12.57	37.92	34.87	291	206	Peak	VERTICAL
4	15908.72	46.94	54.00	-7.06	31.33	12.56	37.92	34.87	291	206	Average	VERTICAL

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 106 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Nov. 11, 2014		

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	11057.92	55.97	74.00	-18.03	41.36	10.57	39.05	35.01	317	217	Peak	HORIZONTAL
2	11091.36	43.24	54.00	-10.76	28.59	10.58	39.08	35.01	317	217	Average	HORIZONTAL
3	16602.48	49.03	54.00	-4.97	31.41	13.16	39.64	35.18	189	169	Average	HORIZONTAL
4	16605.36	63.11	74.00	-10.89	45.50	13.16	39.64	35.19	189	169	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	11054.40	56.21	74.00	-17.79	41.61	10.57	39.04	35.01	88	219	Peak	VERTICAL
2	11095.84	43.37	54.00	-10.63	28.72	10.58	39.08	35.01	88	219	Average	VERTICAL
3	16596.88	48.82	54.00	-5.18	31.29	13.16	39.55	35.18	212	172	Average	VERTICAL
4	16609.36	62.49	74.00	-11.51	44.88	13.16	39.64	35.19	212	172	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. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.25-5.35 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 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band 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 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

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

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. Test Result of Band Edge and Fundamental Emissions

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 52, 60, 64 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 17, 2014		

Channel 52

	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	5144.00	44.38	54.00	-9.62	38.97	6.21	34.11	34.91	Average	225	229	HORIZONTAL
2	5148.80	57.27	74.00	-16.73	51.86	6.21	34.11	34.91	Peak	225	229	HORIZONTAL
3	5267.20	103.08			97.38	6.34	34.27	34.91	Average	225	229	HORIZONTAL
4	5267.20	113.54			107.84	6.34	34.27	34.91	Peak	225	229	HORIZONTAL
5	5356.60	45.28	54.00	-8.72	39.33	6.47	34.39	34.91	Average	225	229	HORIZONTAL
6	5359.60	58.04	74.00	-15.96	52.09	6.47	34.39	34.91	Peak	225	229	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5260 MHz.

Channel 60

	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	5294.40	112.75			106.97	6.37	34.32	34.91	Peak	100	246	VERTICAL
2	5294.80	103.37			97.59	6.37	34.32	34.91	Average	100	246	VERTICAL
3	5350.00	46.50	54.00	-7.50	40.55	6.47	34.39	34.91	Average	100	246	VERTICAL
4	5355.20	58.57	74.00	-15.43	52.62	6.47	34.39	34.91	Peak	100	246	VERTICAL

Item 1, 2 are the fundamental frequency at 5300 MHz.

Channel 64

	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	5313.20	112.54			106.71	6.40	34.34	34.91	Peak	100	240	VERTICAL
2	5313.60	103.11			97.28	6.40	34.34	34.91	Average	100	240	VERTICAL
3	5353.20	64.13	74.00	-9.87	58.18	6.47	34.39	34.91	Peak	100	240	VERTICAL
4	5354.40	48.11	54.00	-5.89	42.16	6.47	34.39	34.91	Average	100	240	VERTICAL

Item 1, 2 are the fundamental frequency at 5320 MHz.

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 100, 116, 140 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 17, 2014		

Channel 100

	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	5452.80	60.40	74.00	-13.60	54.19	6.60	34.53	34.92	Peak	197	269	HORIZONTAL
2	5460.00	48.41	54.00	-5.59	42.20	6.60	34.53	34.92	Average	197	269	HORIZONTAL
3	5466.80	48.72	54.00	-5.28	42.49	6.60	34.55	34.92	Average	197	269	HORIZONTAL
4	5468.00	63.17	74.00	-10.83	56.94	6.60	34.55	34.92	Peak	197	269	HORIZONTAL
5	5494.00	103.83			97.54	6.63	34.58	34.92	Average	197	269	HORIZONTAL
6	5494.40	113.70			107.41	6.63	34.58	34.92	Peak	197	269	HORIZONTAL

Item 5, 6 are the fundamental frequency at 5500 MHz.

Channel 116

	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	5456.40	46.56	54.00	-7.44	40.35	6.60	34.53	34.92	Average	187	219	HORIZONTAL
2	5457.00	58.37	74.00	-15.63	52.16	6.60	34.53	34.92	Peak	187	219	HORIZONTAL
3	5469.40	58.61	74.00	-15.39	52.38	6.60	34.55	34.92	Peak	187	219	HORIZONTAL
4	5470.00	46.10	54.00	-7.90	39.87	6.60	34.55	34.92	Average	187	219	HORIZONTAL
5	5587.20	115.49			109.07	6.72	34.63	34.93	Peak	187	219	HORIZONTAL
6	5587.80	105.95			99.53	6.72	34.63	34.93	Average	187	219	HORIZONTAL
7	5725.00	46.06	54.00	-7.94	39.48	6.83	34.69	34.94	Average	187	219	HORIZONTAL
8	5726.80	57.38	74.00	-16.62	50.80	6.83	34.69	34.94	Peak	187	219	HORIZONTAL

Item 5, 6 are the fundamental frequency at 5580 MHz.

Channel 140

	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	5694.00	103.89			97.34	6.81	34.68	34.94	Average	102	246	VERTICAL
2	5694.00	113.16			106.61	6.81	34.68	34.94	Peak	102	246	VERTICAL
3	5725.80	49.41	54.00	-4.59	42.83	6.83	34.69	34.94	Average	102	246	VERTICAL
4	5725.80	62.54	74.00	-11.46	55.96	6.83	34.69	34.94	Peak	102	246	VERTICAL

Item 1, 2 are the fundamental frequency at 5700 MHz.

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 52, 60, 64 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 17, 2014		

Channel 52

	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	5145.20	45.47	54.00	-8.53	40.06	6.21	34.11	34.91	Average	101	187	VERTICAL
2	5148.80	57.71	74.00	-16.29	52.30	6.21	34.11	34.91	Peak	101	187	VERTICAL
3	5266.60	105.37			99.67	6.34	34.27	34.91	Average	101	187	VERTICAL
4	5267.80	115.18			109.48	6.34	34.27	34.91	Peak	101	187	VERTICAL
5	5351.80	58.24	74.00	-15.76	52.29	6.47	34.39	34.91	Peak	101	187	VERTICAL
6	5353.60	46.11	54.00	-7.89	40.16	6.47	34.39	34.91	Average	101	187	VERTICAL

Item 3, 4 are the fundamental frequency at 5260 MHz.

Channel 60

	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	5293.60	110.52			104.74	6.37	34.32	34.91	Peak	100	254	HORIZONTAL
2	5296.80	100.76			94.95	6.40	34.32	34.91	Average	100	254	HORIZONTAL
3	5350.00	46.30	54.00	-7.70	40.35	6.47	34.39	34.91	Average	100	254	HORIZONTAL
4	5353.60	58.32	74.00	-15.68	52.37	6.47	34.39	34.91	Peak	100	254	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5300 MHz.

Channel 64

	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	5315.60	113.23			107.40	6.40	34.34	34.91	185	103	Peak	VERTICAL
2	5318.80	103.28			97.45	6.40	34.34	34.91	185	103	Average	VERTICAL
3	5350.00	48.75	54.00	-5.25	42.80	6.47	34.39	34.91	185	103	Average	VERTICAL
4	5350.00	63.08	74.00	-10.92	57.13	6.47	34.39	34.91	185	103	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5320 MHz.

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 100, 116, 140 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 17, 2014		

Channel 100

	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	5455.20	48.80	54.00	-5.20	42.59	6.60	34.53	34.92	Average	203	244	VERTICAL
2	5456.40	60.44	74.00	-13.56	54.23	6.60	34.53	34.92	Peak	203	244	VERTICAL
3	5469.60	63.35	74.00	-10.65	57.12	6.60	34.55	34.92	Peak	203	244	VERTICAL
4	5470.00	49.81	54.00	-4.19	43.58	6.60	34.55	34.92	Average	203	244	VERTICAL
5	5492.40	106.66			100.37	6.63	34.58	34.92	Average	203	244	VERTICAL
6	5495.20	116.62			110.33	6.63	34.58	34.92	Peak	203	244	VERTICAL

Item 5, 6 are the fundamental frequency at 5500 MHz.

Channel 116

	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	5451.20	58.89	74.00	-15.11	52.68	6.60	34.53	34.92	Peak	100	249	VERTICAL
2	5456.80	46.64	54.00	-7.36	40.43	6.60	34.53	34.92	Average	100	249	VERTICAL
3	5465.20	59.33	74.00	-14.67	53.10	6.60	34.55	34.92	Peak	100	249	VERTICAL
4	5468.40	46.77	54.00	-7.23	40.54	6.60	34.55	34.92	Average	100	249	VERTICAL
5	5573.60	113.48			107.08	6.70	34.63	34.93	Peak	100	249	VERTICAL
6	5578.40	104.07			97.65	6.72	34.63	34.93	Average	100	249	VERTICAL
7	5729.00	46.41	54.00	-7.59	39.83	6.83	34.69	34.94	Average	100	249	VERTICAL
8	5737.00	58.32	74.00	-15.68	51.70	6.86	34.70	34.94	Peak	100	249	VERTICAL

Item 5, 6 are the fundamental frequency at 5580 MHz.

Channel 140

	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	5693.60	105.94			99.39	6.81	34.68	34.94	Average	185	20	VERTICAL
2	5694.80	116.35			109.80	6.81	34.68	34.94	Peak	185	20	VERTICAL
3	5725.00	53.65	54.00	-0.35	47.07	6.83	34.69	34.94	Average	185	20	VERTICAL
4	5725.00	71.25	74.00	-2.75	64.67	6.83	34.69	34.94	Peak	185	20	VERTICAL

Item 1, 2 are the fundamental frequency at 5700 MHz.

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54, 62 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

Channel 54

	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	5264.40	114.93			109.23	6.34	34.27	34.91	Peak	253	186	VERTICAL
2	5266.00	102.74			97.04	6.34	34.27	34.91	Average	253	186	VERTICAL
3	5350.00	46.96	54.00	-7.04	41.01	6.47	34.39	34.91	Average	253	186	VERTICAL
4	5352.40	59.53	74.00	-14.47	53.58	6.47	34.39	34.91	Peak	253	186	VERTICAL

Item 1, 2 are the fundamental frequency at 5270 MHz.

Channel 62

	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	5307.60	112.61			106.80	6.40	34.32	34.91	Peak	206	8	VERTICAL
2	5326.00	101.05			95.19	6.43	34.34	34.91	Average	206	8	VERTICAL
3	5350.00	50.83	54.00	-3.17	44.88	6.47	34.39	34.91	Average	206	8	VERTICAL
4	5350.00	73.51	74.00	-0.49	67.56	6.47	34.39	34.91	Peak	206	8	VERTICAL

Item 1, 2 are the fundamental frequency at 5310 MHz.

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102, 110, 134 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 18, 2014		

Channel 102

	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	5459.60	65.08	74.00	-8.92	58.87	6.60	34.53	34.92	Peak	190	18	VERTICAL
2	5460.00	50.28	54.00	-3.72	44.07	6.60	34.53	34.92	Average	190	18	VERTICAL
3	5470.00	53.97	54.00	-0.03	47.74	6.60	34.55	34.92	Average	190	18	VERTICAL
4	5470.00	70.63	74.00	-3.37	64.40	6.60	34.55	34.92	Peak	190	18	VERTICAL
5	5507.20	102.66			96.33	6.65	34.60	34.92	Average	190	18	VERTICAL
6	5507.60	114.96			108.63	6.65	34.60	34.92	Peak	190	18	VERTICAL

Item 5, 6 are the fundamental frequency at 5510 MHz.

Channel 110

	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	5454.00	61.10	74.00	-12.90	54.89	6.60	34.53	34.92	Peak	199	12	VERTICAL
2	5460.00	47.84	54.00	-6.16	41.63	6.60	34.53	34.92	Average	199	12	VERTICAL
3	5466.40	60.36	74.00	-13.64	54.13	6.60	34.55	34.92	Peak	199	12	VERTICAL
4	5470.00	47.77	54.00	-6.23	41.54	6.60	34.55	34.92	Average	199	12	VERTICAL
5	5547.60	103.68			97.30	6.68	34.62	34.92	Average	199	12	VERTICAL
6	5547.60	115.81			109.43	6.68	34.62	34.92	Peak	199	12	VERTICAL

Item 5, 6 are the fundamental frequency at 5550 MHz.

Channel 134

	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	5653.60	102.51			96.02	6.76	34.66	34.93	Average	205	11	VERTICAL
2	5667.60	114.39			107.86	6.79	34.67	34.93	Peak	205	11	VERTICAL
3	5725.00	50.15	54.00	-3.85	43.57	6.83	34.69	34.94	Average	205	11	VERTICAL
4	5727.40	63.62	74.00	-10.38	57.04	6.83	34.69	34.94	Peak	205	11	VERTICAL

Item 1, 2 are the fundamental frequency at 5670 MHz.

Temperature	24°C	Humidity	62%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58, 106 / Ant. 1 + Ant. 2 + Ant. 3+ Ant. 4
Test Date	Sep. 19, 2014 / Nov. 11, 2014		

Channel 58

	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	5144.40	57.74	74.00	-16.26	52.33	6.21	34.11	34.91	Peak	240	205	VERTICAL
2	5150.00	44.65	54.00	-9.35	39.24	6.21	34.11	34.91	Average	240	205	VERTICAL
3	5254.80	107.69			102.01	6.34	34.25	34.91	Peak	240	205	VERTICAL
4	5273.20	95.85			90.12	6.37	34.27	34.91	Average	240	205	VERTICAL
5	5350.00	52.04	54.00	-1.96	46.09	6.47	34.39	34.91	Average	240	205	VERTICAL
6	5366.00	69.69	74.00	-4.31	63.72	6.47	34.41	34.91	Peak	240	205	VERTICAL

Item 3, 4 are the fundamental frequency at 5290 MHz.

Channel 106

	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	5452.00	69.23	74.00	-4.77	61.57	6.60	34.53	33.47	1	223	Peak	VERTICAL
2	5460.00	53.13	54.00	-0.87	45.47	6.60	34.53	33.47	1	223	Average	VERTICAL
3	5463.60	71.31	74.00	-2.69	63.62	6.60	34.55	33.46	1	223	Peak	VERTICAL
4	5470.00	53.63	54.00	-0.37	45.94	6.60	34.55	33.46	1	223	Average	VERTICAL
5	5495.60	99.93			92.17	6.63	34.58	33.45	1	223	Average	VERTICAL
6	5497.00	112.41			104.63	6.63	34.60	33.45	1	223	Peak	VERTICAL
7	5725.80	47.84	54.00	-6.16	39.69	6.83	34.69	33.37	1	223	Average	VERTICAL
8	5726.60	60.30	74.00	-13.70	52.15	6.83	34.69	33.37	1	223	Peak	VERTICAL

Item 5, 6 are the fundamental frequency at 5530 MHz.

Note:

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

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

4.7. Frequency Stability Measurement

4.7.1. 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).

4.7.2. Measuring Instruments and Setting

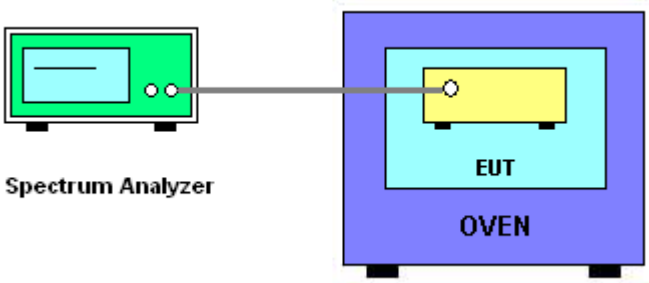
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.7.3. Test Procedures

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

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

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

4.7.7. Test Result of Frequency Stability

Temperature	26°C	Humidity	63%
Test Engineer	James Chou	Test Date	Nov. 27, 2014

Mode: 20 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5300 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5299.9641	5299.9636	5299.9634	5299.9627
110.00	5299.9635	5299.9626	5299.9619	5299.9617
93.50	5299.9625	5299.9623	5299.9613	5299.9603
Max. Deviation (MHz)	0.0375	0.0377	0.0387	0.0397
Max. Deviation (ppm)	7.08	7.11	7.30	7.49
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5300 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5299.9652	5299.9649	5299.9639	5299.9634
10	5299.9647	5299.9645	5299.9640	5299.9635
20	5299.9635	5299.9625	5299.9621	5299.9617
30	5299.9483	5299.9477	5299.9471	5299.9464
40	5299.9482	5299.9481	5299.9474	5299.9464
Max. Deviation (MHz)	0.0526	0.0528	0.0537	0.0540
Max. Deviation (ppm)	9.92	9.96	10.13	10.19
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5580 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5579.9638	5579.9635	5579.9633	5579.9627
110.00	5579.9635	5579.9632	5579.9631	5579.9629
93.50	5579.9633	5579.9628	5579.9627	5579.9617
Max. Deviation (MHz)	0.0367	0.0372	0.0373	0.0383
Max. Deviation (ppm)	6.58	6.67	6.68	6.86
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5580 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5579.9660	5579.9658	5579.9652	5579.9642
10	5579.9655	5579.9652	5579.9649	5579.9644
20	5579.9635	5579.9633	5579.9626	5579.9623
30	5579.9483	5579.9477	5579.9472	5579.9468
40	5579.9465	5579.9461	5579.9451	5579.9444
Max. Deviation (MHz)	0.0541	0.0545	0.0555	0.0562
Max. Deviation (ppm)	9.70	9.77	9.95	10.07
Result	Complies			

Mode: 40 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5310 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5309.9644	5309.9635	5309.9631	5309.9621
110.00	5309.9635	5309.9625	5309.9615	5309.9612
93.50	5309.9628	5309.9622	5309.9615	5309.9609
Max. Deviation (MHz)	0.0372	0.0378	0.0385	0.0391
Max. Deviation (ppm)	7.01	7.12	7.25	7.36
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5310 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5309.9650	5309.9640	5309.9639	5309.9635
10	5309.9646	5309.9640	5309.9632	5309.9631
20	5309.9635	5309.9633	5309.9624	5309.9617
30	5309.9483	5309.9479	5309.9469	5309.9460
40	5309.9482	5309.9478	5309.9468	5309.9461
Max. Deviation (MHz)	0.0532	0.0533	0.0534	0.0540
Max. Deviation (ppm)	10.02	10.04	10.06	10.17
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5550 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5549.9643	5549.9636	5549.9635	5549.9627
110.00	5549.9635	5549.9627	5549.9619	5549.9617
93.50	5549.9631	5549.9623	5549.9617	5549.9614
Max. Deviation (MHz)	0.0369	0.0377	0.0383	0.0386
Max. Deviation (ppm)	6.65	6.79	6.90	6.95
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5550 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5549.9654	5549.9648	5549.9638	5549.9631
10	5549.9647	5549.9646	5549.9641	5549.9639
20	5549.9635	5549.9625	5549.9623	5549.9613
30	5549.9483	5549.9477	5549.9470	5549.9463
40	5549.9481	5549.9472	5549.9469	5549.9464
Max. Deviation (MHz)	0.0521	0.0528	0.0531	0.0537
Max. Deviation (ppm)	9.39	9.51	9.57	9.68
Result	Complies			

Mode: 80 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5290 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5289.9643	5289.9640	5289.9636	5289.9628
110.00	5289.9635	5289.9627	5289.9619	5289.9609
93.50	5289.9627	5289.9625	5289.9624	5289.9621
Max. Deviation (MHz)	0.0373	0.0375	0.0381	0.0391
Max. Deviation (ppm)	7.05	7.09	7.20	7.39
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5290 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5289.9640	5289.9639	5289.9629	5289.9621
10	5289.9637	5289.9631	5289.9626	5289.9616
20	5289.9635	5289.9630	5289.9623	5289.9617
30	5289.9483	5289.9478	5289.9476	5289.9466
40	5289.9463	5289.9462	5289.9456	5289.9447
Max. Deviation (MHz)	0.0554	0.0561	0.0563	0.0571
Max. Deviation (ppm)	10.47	10.60	10.64	10.79
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5530 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5529.9638	5529.9637	5529.9636	5529.9631
110.00	5529.9635	5529.9632	5529.9629	5529.9625
93.50	5529.9627	5529.9622	5529.9612	5529.9603
Max. Deviation (MHz)	0.0373	0.0378	0.0388	0.0397
Max. Deviation (ppm)	6.75	6.84	7.02	7.18
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5530 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5529.9661	5529.9660	5529.9658	5529.9648
10	5529.9654	5529.9646	5529.9636	5529.9634
20	5529.9635	5529.9625	5529.9622	5529.9620
30	5529.9483	5529.9479	5529.9476	5529.9473
40	5529.9470	5529.9465	5529.9462	5529.9458
Max. Deviation (MHz)	0.0533	0.0535	0.0538	0.0542
Max. Deviation (ppm)	9.64	9.67	9.73	9.80
Result	Complies			

4.8. Antenna Requirements

4.8.1. 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.

4.8.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Apr. 22, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO 2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-CB)
RF Power Divider	Woken	2 Way	0120A02056002D	2GHz ~ 18GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Power Divider	Woken	4 Way	0120A04056002D	2GHz ~ 18GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Oct. 06, 2014	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Oct. 06, 2014	Conducted (TH01-CB)

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

*Calibration Interval of instruments listed above is two year.

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

6. MEASUREMENT UNCERTAINTY

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