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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	**Z3WAIR4920**
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 4920
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Oct. 22, 2014
Final Test Date	Jan. 07, 2015
Submission Type	Class II Change
Operating Mode	Master and Slave without radar detection

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 D01 v01r04, KDB662911 D01 v02r01, KDB644545 D01 v01r02.**

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
FR490527-03	Rev. 01	Initial issue of report	Feb. 09, 2015
FR490527-03	Rev. 02	Modify the operating Mode to “Master and Slave without radar detection” from “Master” on first page.	Mar. 24, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	2 Port Gigabit Ethernet 11ac/11n Wireless Router
Brand Name	:	AirTies
Model No.	:	Air 4920
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 Oct. 22, 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.

Jordan Hsiao

Jordan Hsiao
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	10.68 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	0.41 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.06 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n/ac

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	12 for 20MHz bandwidth ; 5 for 40MHz bandwidth 2 for 80MHz bandwidth
Channel Band Width (99%)	For Beamforming Mode: Band 2: 802.11ac MCS0/Nss1 (VHT20): 18.24 MHz ; 802.11ac MCS0/Nss1 (VHT40): 37.60 MHz ; 802.11ac MCS0/Nss1 (VHT80): 76.40 MHz Band 3: 802.11ac MCS0/Nss1 (VHT20): 18.24 MHz ; 802.11ac MCS0/Nss1 (VHT40): 37.40 MHz ; 802.11ac MCS0/Nss1 (VHT80): 76.40 MHz
Maximum Conducted Output Power	For Beamforming Mode: Band 2: 802.11ac MCS0/Nss1 (VHT20): 23.98 dBm ; 802.11ac MCS0/Nss1 (VHT40): 23.96 dBm ; 802.11ac MCS0/Nss1 (VHT80): 19.49 dBm Band 3: 802.11ac MCS0/Nss1 (VHT20): 23.94 dBm ; 802.11ac MCS0/Nss1 (VHT40): 23.90 dBm ; 802.11ac MCS0/Nss1 (VHT80): 18.59 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11a

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	12
Channel Band Width (99%)	For Non-Beamforming Mode: Band 2: 27.84 MHz ; Band 3: 30.12 MHz
Maximum Conducted Output Power	For Non-Beamforming Mode: Band 2: 21.78 dBm ; Band 3: 22.51 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 for 802.11n/ac in 5GHz.	☐	Without beamforming

Antenna and Band width

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

IEEE 11n/ac Spec.

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

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT 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-C1000IC12.0-12B-US	Input: 100-240V~50/60Hz, 0.5A max. Output: 12.0V, 1A
Adapter 2	MOSO	MSP-C1500IC12.0-18W-US	Input: 100-240V~50/60Hz, 0.7A max. Output: 12.0V, 1.5A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	-	-	PCB Antenna	NA	2.5	-
2	Airgain	N2420S-T-G50U	PIFA Antenna	I-PEX	2.5	-
3	-	-	PCB Antenna	NA	-	0
4	-	-	PCB Antenna	NA	-	0
5	-	-	PCB Antenna	NA	-	0

Note: The EUT has five antennas. There are two antennas for 2.4GHz and three antennas for 5GHz.

<For 2.4GHz band>

For 802.11b/g mode:

Only Ant. 1 can be used as transmitting/receiving antenna.

For 802.11n mode:

Both Ant. 1 and Ant. 2 support transmit and receive functions.

Ant. 1 and Ant. 2 can transmit and receive signal simultaneously.

<For 5GHz band>

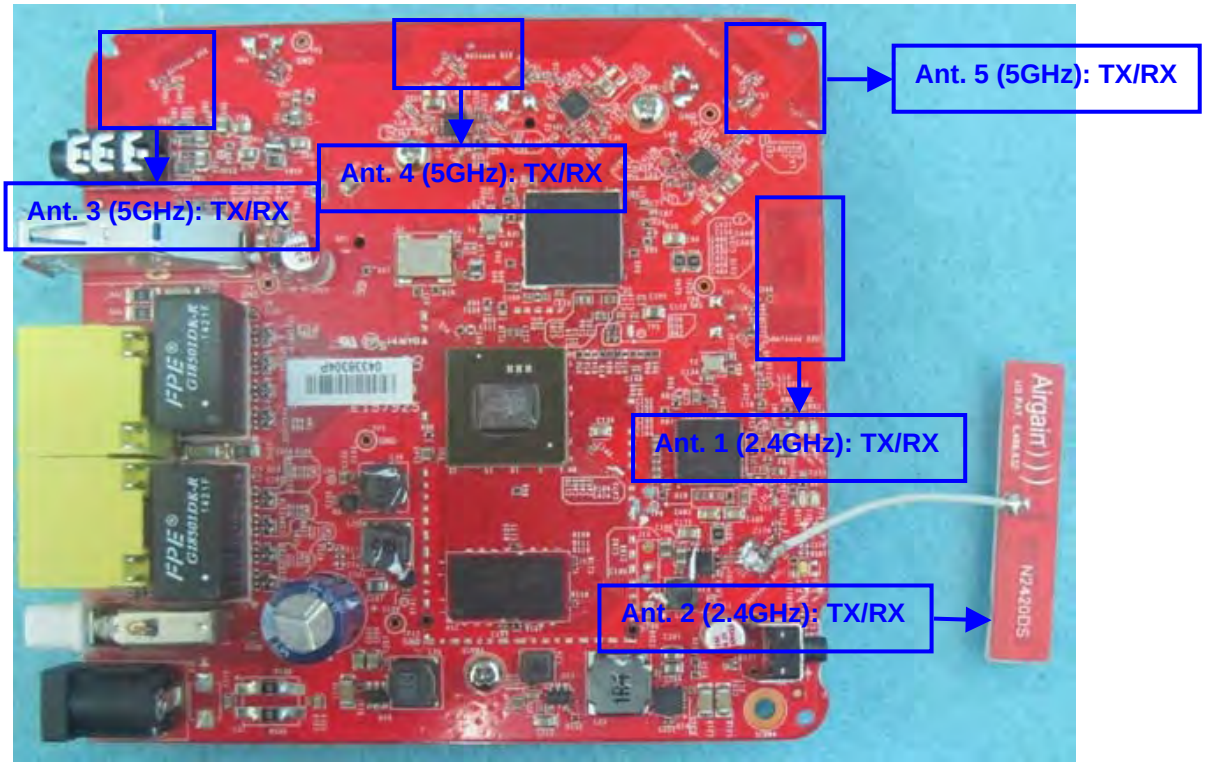
For 802.11a mode:

Only Ant. 3 can be used as transmitting/receiving antenna.

For 802.11n/ac mode:

Ant. 3, Ant. 4 and Ant. 5 support transmit and receive functions.

Ant. 3, Ant. 4 and Ant. 5 can transmit and receive signal simultaneously.



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	11ac VHT20	Band 2~3	MCS0/Nss1	52/60/64/100/116/140	3+4+5
	11ac VHT40	Band 2~3	MCS0/Nss1	54/62/102/110/134	3+4+5
	11ac VHT80	Band 2~3	MCS0/Nss1	58/106	3+4+5
	11a/BPSK	Band 2~3	6Mbps	52/60/64/100/116/140	3
Power Spectral Density	11ac VHT20	Band 2~3	MCS0/Nss1	52/60/64/100/116/140	3+4+5
	11ac VHT40	Band 2~3	MCS0/Nss1	54/62/102/110/134	3+4+5
	11ac VHT80	Band 2~3	MCS0/Nss1	58/106	3+4+5
	11a/BPSK	Band 2~3	6Mbps	52/60/64/100/116/140	3
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement	11ac VHT20	Band 2~3	MCS0/Nss1	52/60/64/100/116/140	3+4+5
	11ac VHT40	Band 2~3	MCS0/Nss1	54/62/102/110/134	3+4+5
	11ac VHT80	Band 2~3	MCS0/Nss1	58/106	3+4+5
	11a/BPSK	Band 2~3	6Mbps	52/60/64/100/116/140	3
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11ac VHT20	Band 2~3	MCS0/Nss1	52/60/64/100/116/140	3+4+5
	11ac VHT40	Band 2~3	MCS0/Nss1	54/62/102/110/134	3+4+5
	11ac VHT80	Band 2~3	MCS0/Nss1	58/106	3+4+5
	11a/BPSK	Band 2~3	6Mbps	52/60/64/100/116/140	3

Band Edge Emission	11ac VHT20	Band 2~3	MCS0/Nss1	52/60/64/100/116/140	3+4+5
	11ac VHT40	Band 2~3	MCS0/Nss1	54/62/102/110/134	3+4+5
	11ac VHT80	Band 2~3	MCS0/Nss1	58/106	3+4+5
	11a/BPSK	Band 2~3	6Mbps	52/60/64/100/116/140	3
Frequency Stability	Un-modulation		-	60/100	3

Note 1: VHT20/VHT40 covers HT20/HT40, due to same modulation.

Note 2: There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802.11n/ac in 5GHz, after evaluating, beamforming mode has been evaluated to be the worst case, so it was selected to test and record in this test report.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link with Adapter 1

Mode 2. Normal Link with Adapter 2

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

For Radiated Emission Below 1GHz test:

Mode 1. Normal Link with Adapter 1

Mode 2. Normal Link with Adapter 2

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emission above 1GHz test:

Mode 1. CTX

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

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

3.6. Table for Testing Locations

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

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 490527-05

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

Description	Performance Checking
Add 5GHz Band 2 and Band 3 (5250~5350 MHz, 5470~5725 MHz) for this device.	Max. Conducted Output Power
	Power Spectral Density
	26dB Spectrum Bandwidth
	99% Occupied Bandwidth Measurement
	Radiated Emission Above 1GHz
	Band Edge Emission
	Frequency Stability
	Maximum Permissible Exposure

Note: It will not affect the test result of AC Power Conducted Emission, Radiated Emission Below 1GHz and Radiated Emission Co-location test, so the test results of above items follow original test report.

3.8. Table for Supporting Units

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

Support Unit	Brand	Model	FCC ID
NB	DELL	M1340	E2K4965AGNM
NB	DELL	E6430	QDS-BRCM1049LE
NB	DELL	D420	E2KWM3945ABG
Flash Disk3.0	TDK	TF30	DoC

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

For Non-Beamforming Mode:

Support Unit	Brand	Model	FCC ID
NB	DELL	M1340	E2K4965AGNM

For Beamforming Mode:

Support Unit	Brand	Model	FCC ID
NB	DELL	M1340	E2K4965AGNM
NB	DELL	E6430	QDS-BRCM1049LE
WLAN ac Dongle	Netgear	A6200	PY31220200

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
Flash Disk3.0	TDK	TF30	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	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.

For Beamforming Mode:

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT20

Test Software Version	Mtool 2.0.0.7					
Frequency	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
MCS0/Nss1 VHT20	71	63	71	72	72	57

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT40

Test Software Version	Mtool 2.0.0.7				
Frequency	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz
MCS0/Nss1 VHT40	70	58	55	72	70

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT80

Test Software Version	Mtool 2.0.0.7	
Frequency	5290 MHz	5530 MHz
MCS0/Nss1 VHT80	52	55

For Non-Beamforming Mode:

Power Parameters of IEEE 802.11a

Test Software Version	Mtool 2.0.0.7					
Frequency	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
802.11a	88	88	82	85	88	80

3.10. EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

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 Mtool 2.0.0.7.
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

For non-beamforming mode:

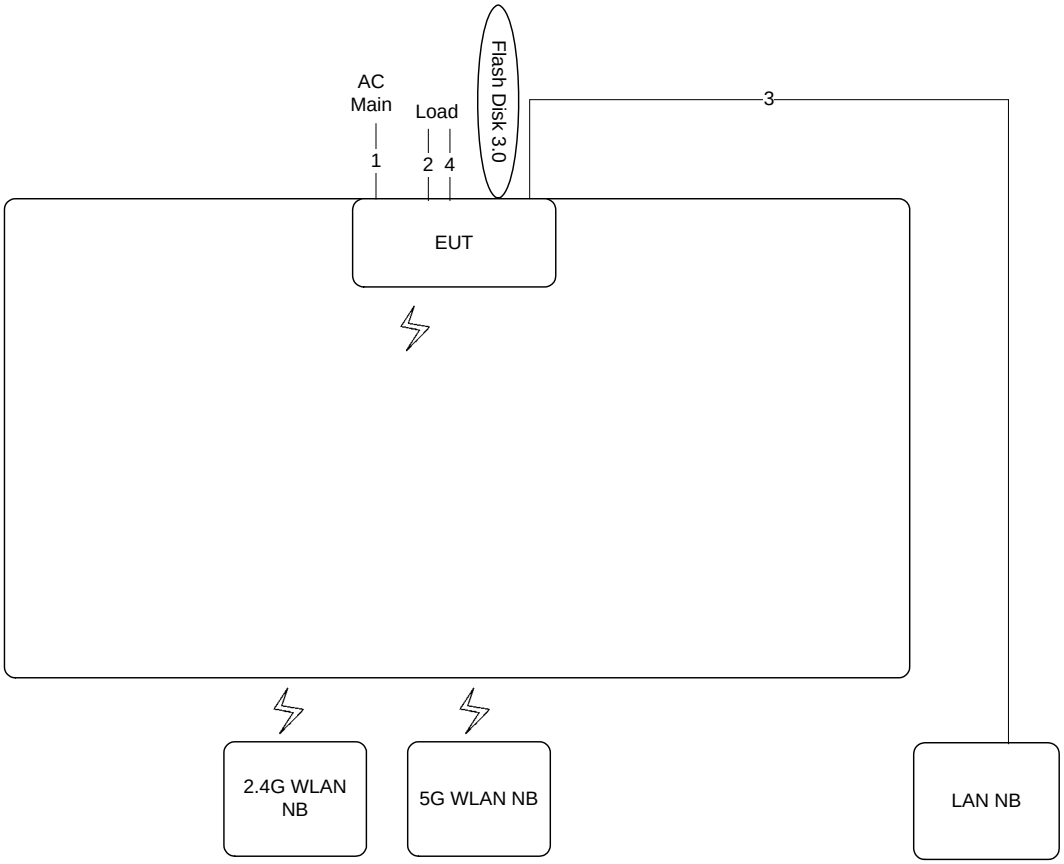
Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.050	2.090	98.09%	0.08	0.01

For beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	3.745	3.844	97.44%	0.11	0.27
802.11ac MCS0/Nss1 VHT40	4.583	4.647	98.62%	0.06	0.01
802.11ac MCS0/Nss1 VHT80	5.051	5.229	96.59%	0.15	0.20

3.12. Test Configurations

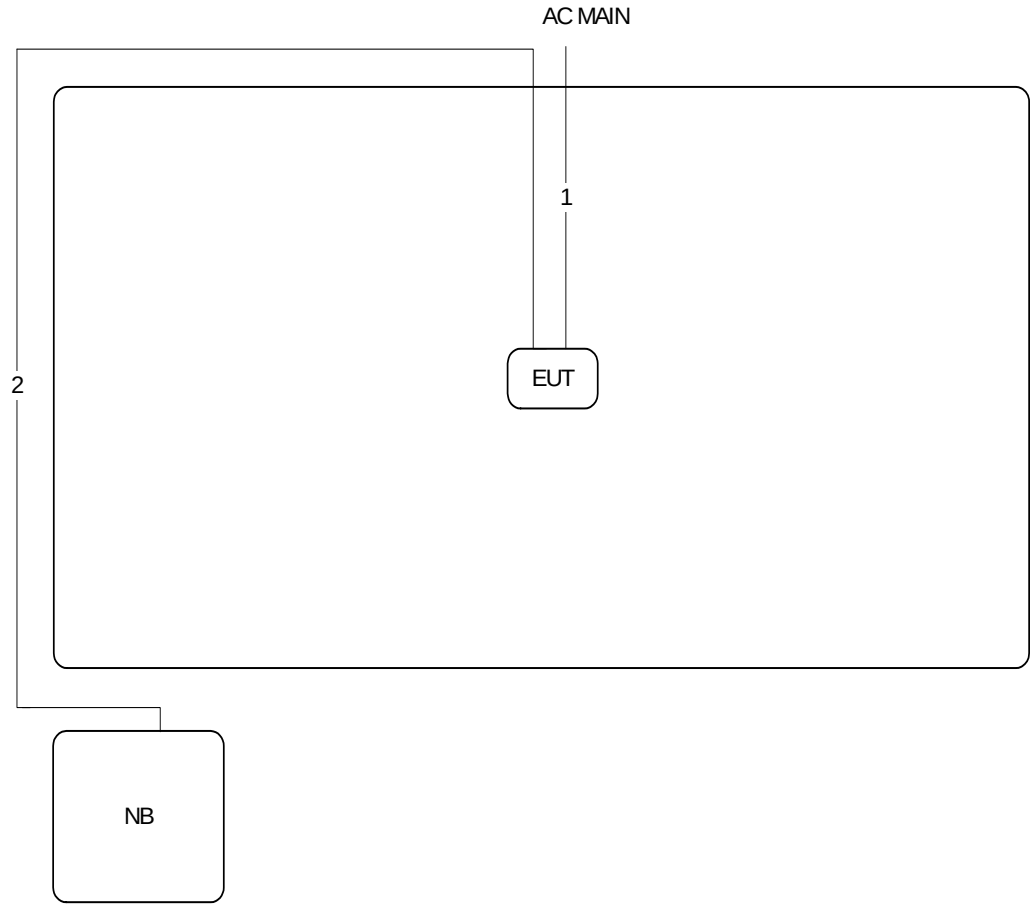
3.12.1. AC Power Line Conduction Emissions and Radiation Emissions below 1GHz Test Configuration



Item	Connection	Shielded	Length	Remark
1	Power cable	No	1.5m	-
2	RJ-45 cable	No	1.5m	Load
3	RJ-45 cable	No	10m	-
4	Audio cable	No	1.6m	Load

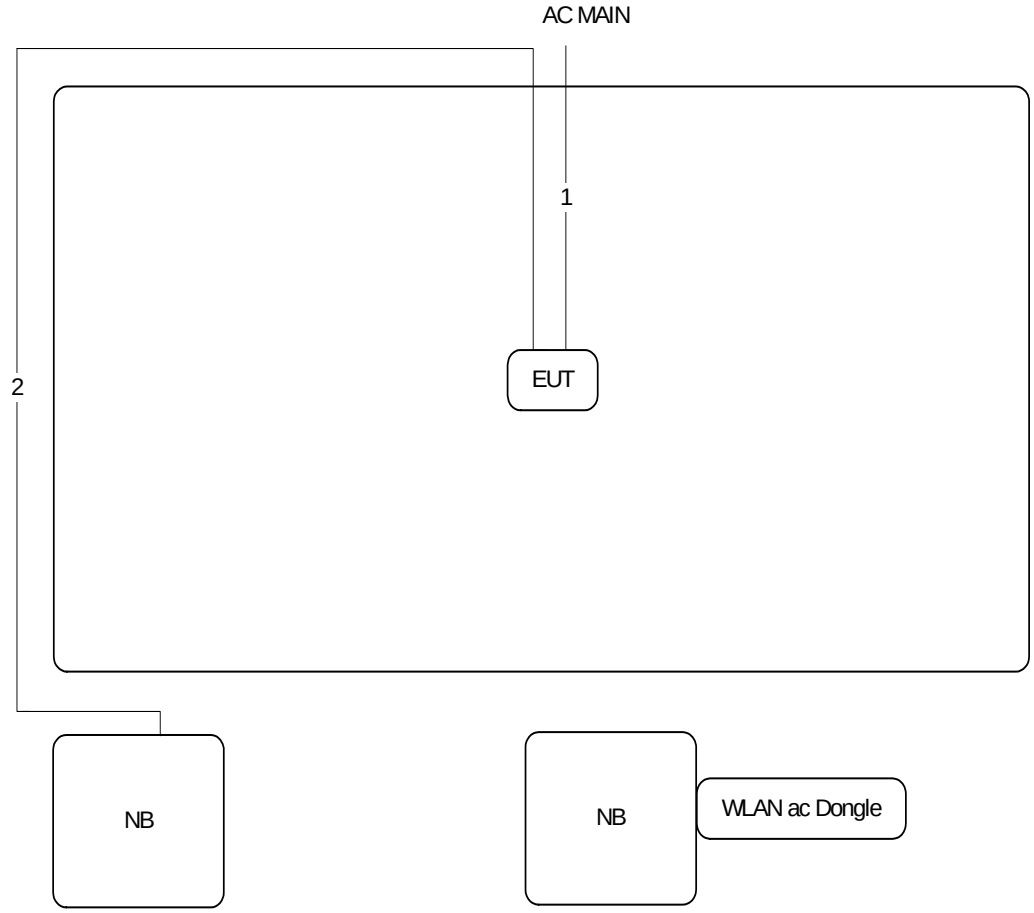
3.12.2. Radiation Emissions above 1GHz Test Configuration

For Non-Beamforming Mode



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

For Beamforming Mode



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

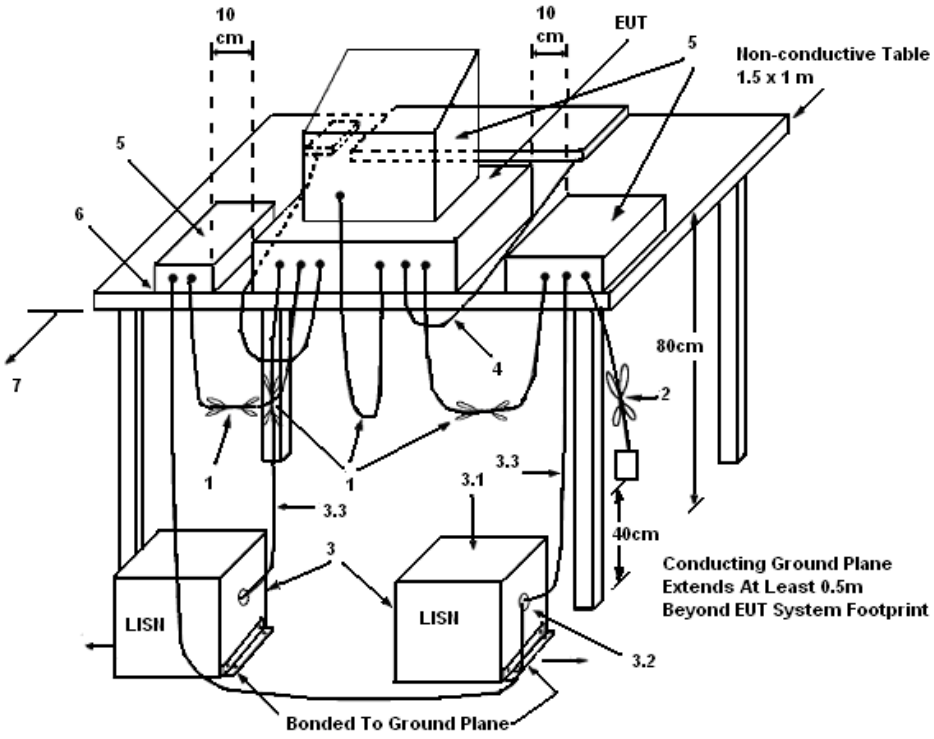
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

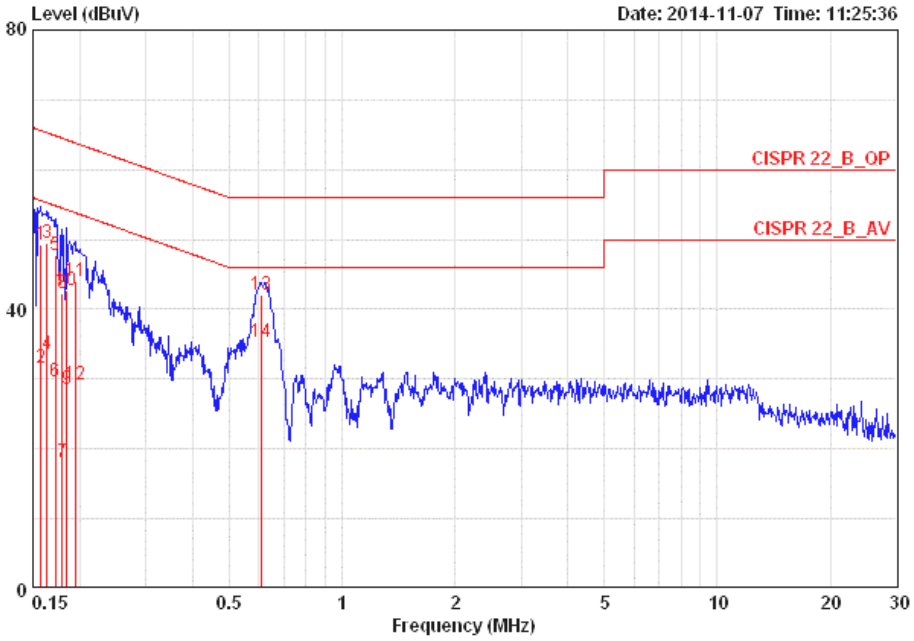
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

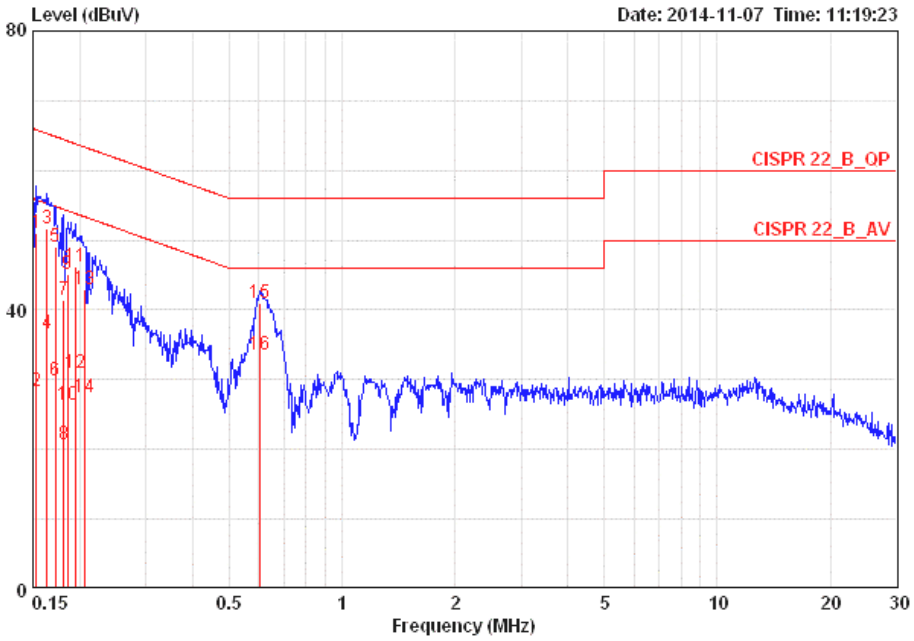
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	63%
Test Engineer	Edison Lin	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15733	49.36	-16.24	65.60	39.24	9.96	0.16	QP	LINE
2	0.15733	31.65	-23.95	55.60	21.53	9.96	0.16	AVERAGE	LINE
3	0.16327	49.47	-15.83	65.30	39.35	9.96	0.16	QP	LINE
4	0.16327	33.51	-21.79	55.30	23.39	9.96	0.16	AVERAGE	LINE
5	0.17215	47.79	-17.06	64.86	37.67	9.96	0.16	QP	LINE
6	0.17215	29.62	-25.23	54.86	19.50	9.96	0.16	AVERAGE	LINE
7	0.17961	18.14	-36.36	54.50	8.02	9.96	0.16	AVERAGE	LINE
8	0.17961	42.29	-22.21	64.50	32.17	9.96	0.16	QP	LINE
9	0.18443	28.51	-25.77	54.28	18.39	9.96	0.16	AVERAGE	LINE
10	0.18443	42.79	-21.49	64.28	32.67	9.96	0.16	QP	LINE
11	0.19447	43.98	-19.86	63.84	33.86	9.96	0.16	QP	LINE
12	0.19447	29.27	-24.57	53.84	19.15	9.96	0.16	AVERAGE	LINE
13	0.61075	41.97	-14.03	56.00	31.81	9.97	0.19	QP	LINE
14 @	0.61075	35.32	-10.68	46.00	25.16	9.97	0.19	AVERAGE	LINE

Temperature	22°C	Humidity	63%
Test Engineer	Edison Lin	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15321	50.99	-14.83	65.82	40.88	9.95	0.16	QP	NEUTRAL
2	0.15321	28.39	-27.43	55.82	18.28	9.95	0.16	AVERAGE	NEUTRAL
3	0.16327	51.62	-13.68	65.30	41.51	9.95	0.16	QP	NEUTRAL
4	0.16327	36.63	-18.67	55.30	26.52	9.95	0.16	AVERAGE	NEUTRAL
5	0.17215	48.96	-15.89	64.86	38.85	9.95	0.16	QP	NEUTRAL
6	0.17215	29.79	-25.06	54.86	19.68	9.95	0.16	AVERAGE	NEUTRAL
7	0.18152	41.45	-22.96	64.42	31.34	9.95	0.16	QP	NEUTRAL
8	0.18152	20.62	-33.79	54.42	10.51	9.95	0.16	AVERAGE	NEUTRAL
9	0.18541	45.21	-19.03	64.24	35.10	9.95	0.16	QP	NEUTRAL
10	0.18541	26.44	-27.80	54.24	16.33	9.95	0.16	AVERAGE	NEUTRAL
11	0.19447	46.18	-17.66	63.84	36.07	9.95	0.16	QP	NEUTRAL
12	0.19447	30.88	-22.96	53.84	20.77	9.95	0.16	AVERAGE	NEUTRAL
13	0.20614	42.97	-20.39	63.36	32.85	9.95	0.17	QP	NEUTRAL
14	0.20614	27.47	-25.89	53.36	17.35	9.95	0.17	AVERAGE	NEUTRAL
15	0.60112	41.04	-14.96	56.00	30.89	9.96	0.19	QP	NEUTRAL
16 @	0.60112	33.49	-12.51	46.00	23.34	9.96	0.19	AVERAGE	NEUTRAL

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

For Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
52	5260 MHz	29.64	18.12
60	5300 MHz	20.76	18.00
64	5320 MHz	26.88	18.24
100	5500 MHz	25.80	18.12
116	5580 MHz	28.68	18.24
140	5700 MHz	20.40	18.00

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
54	5270 MHz	70.40	37.60
62	5310 MHz	42.40	37.20
102	5510 MHz	41.80	37.00
110	5550 MHz	67.80	37.40
134	5670 MHz	69.20	37.40

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
58	5290 MHz	82.00	76.40
106	5530 MHz	82.00	76.40

For Non-Beamforming Mode:

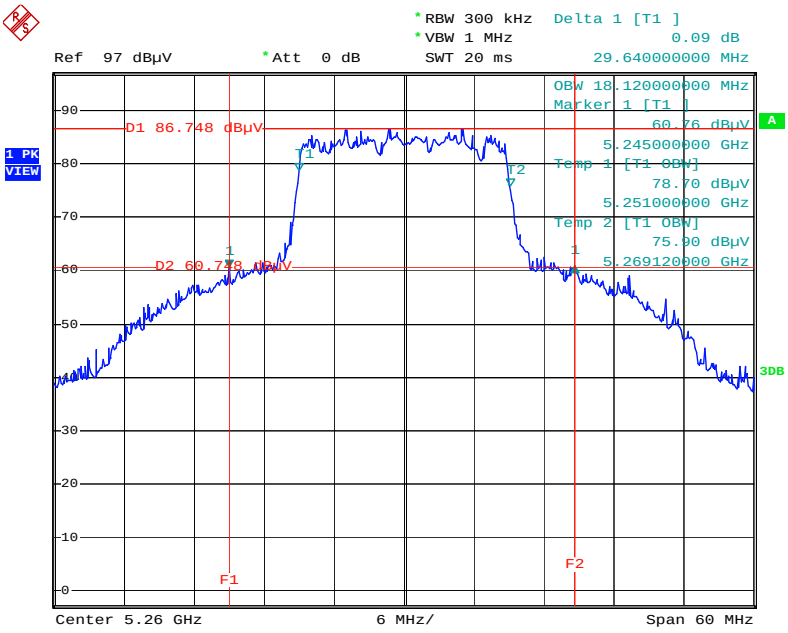
Temperature	26°C	Humidity	63%
Test Engineer	Serway Li	Configurations	IEEE 802.11a

Configuration IEEE 802.11a / Ant. 3

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
52	5260 MHz	41.52	25.20
60	5300 MHz	43.56	27.84
64	5320 MHz	40.80	24.36
100	5500 MHz	41.52	26.40
116	5580 MHz	45.60	30.12
140	5700 MHz	34.32	19.20

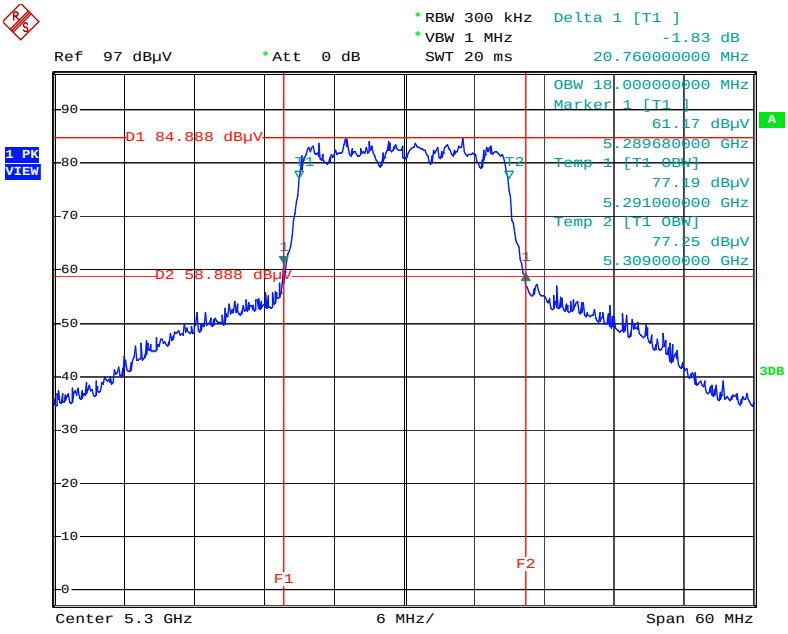
For Beamforming Mode:

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5260 MHz



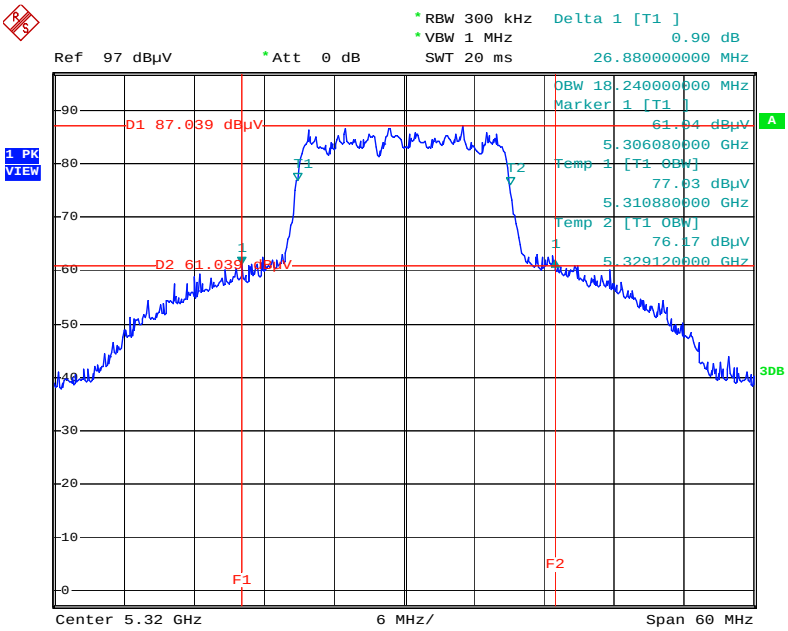
Date: 1.DEC.2014 20:33:07

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5300 MHz



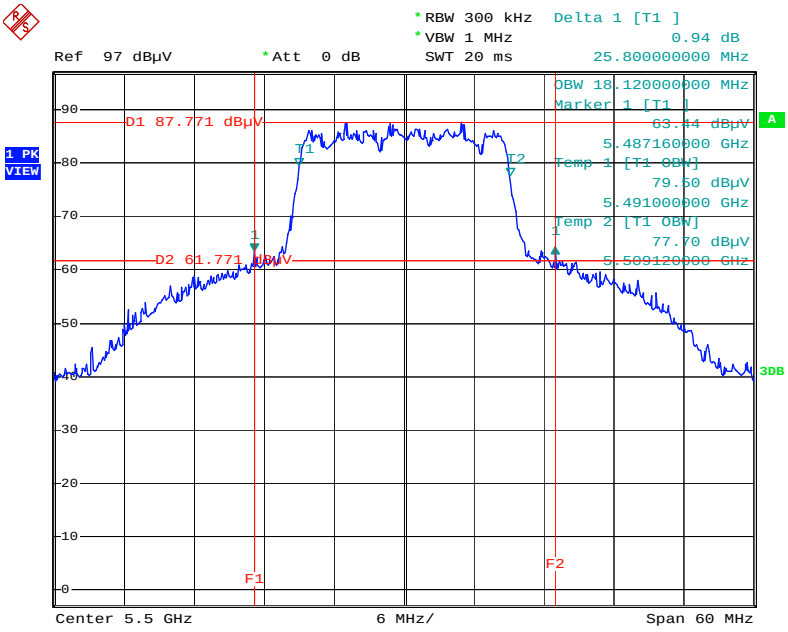
Date: 1.DEC.2014 20:33:54

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5320 MHz



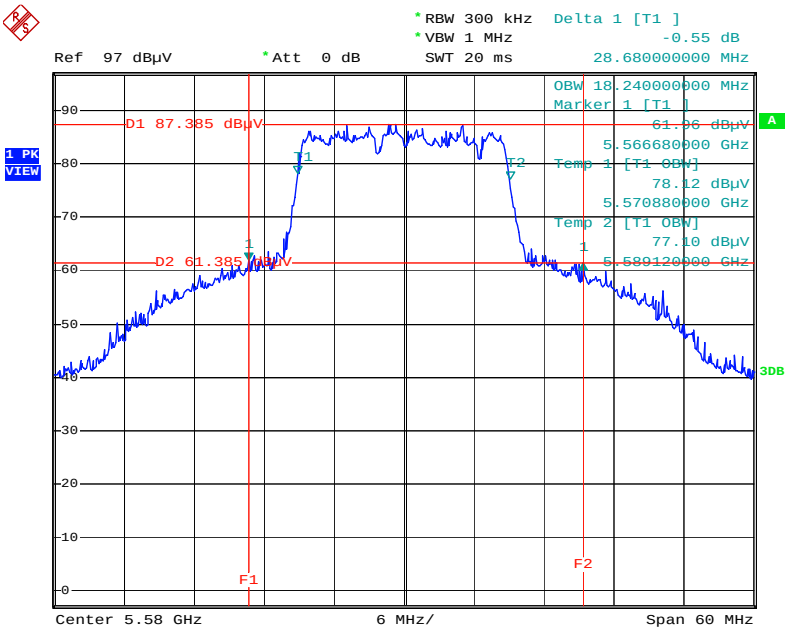
Date: 1.DEC.2014 20:34:31

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5500 MHz



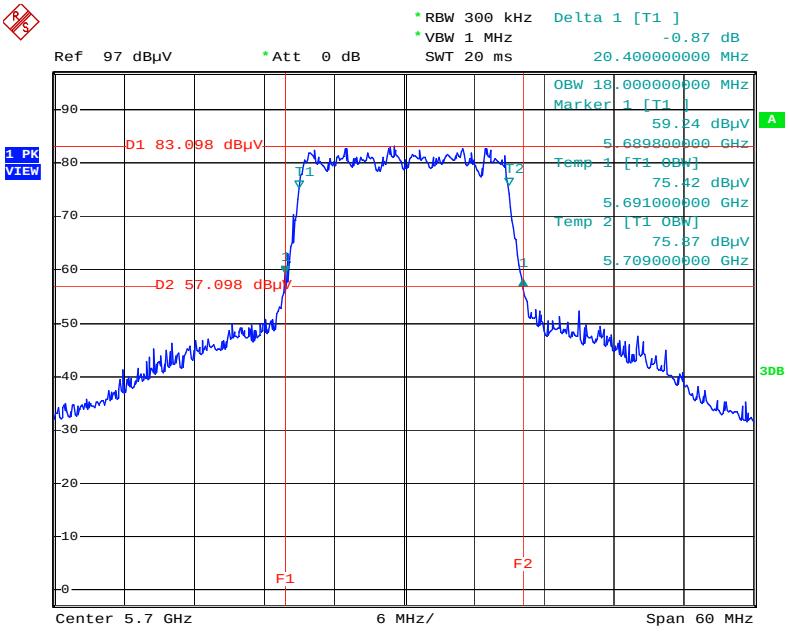
Date: 1.DEC.2014 20:44:44

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5580 MHz



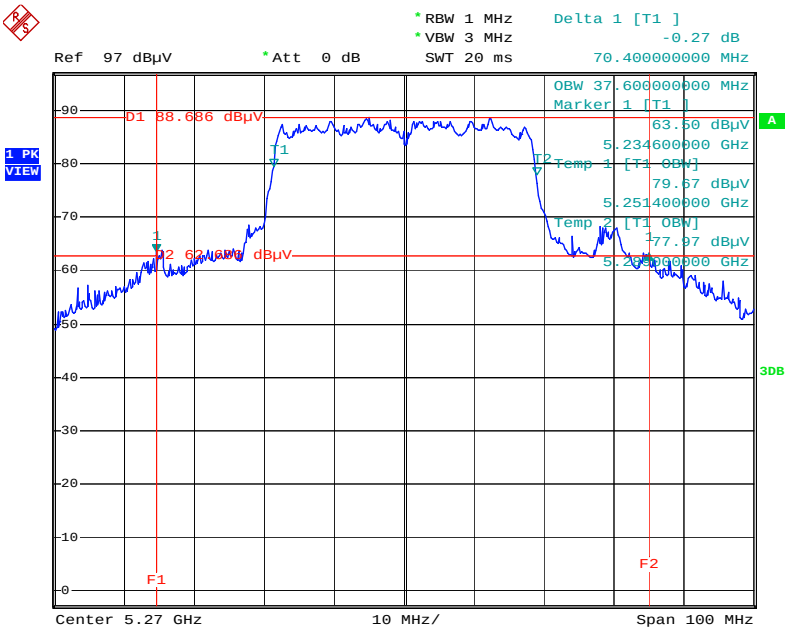
Date: 1.DEC.2014 20:45:25

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5700 MHz



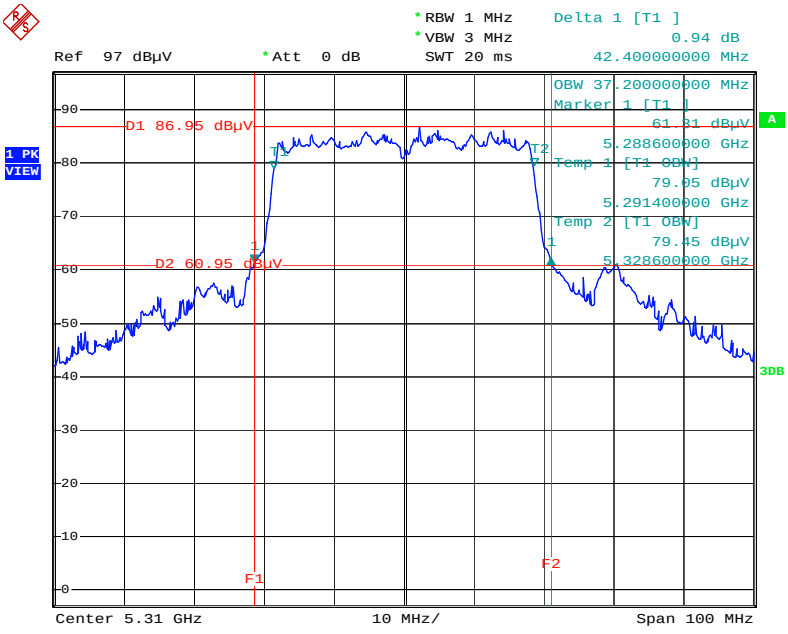
Date: 1.DEC.2014 20:46:12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5270 MHz



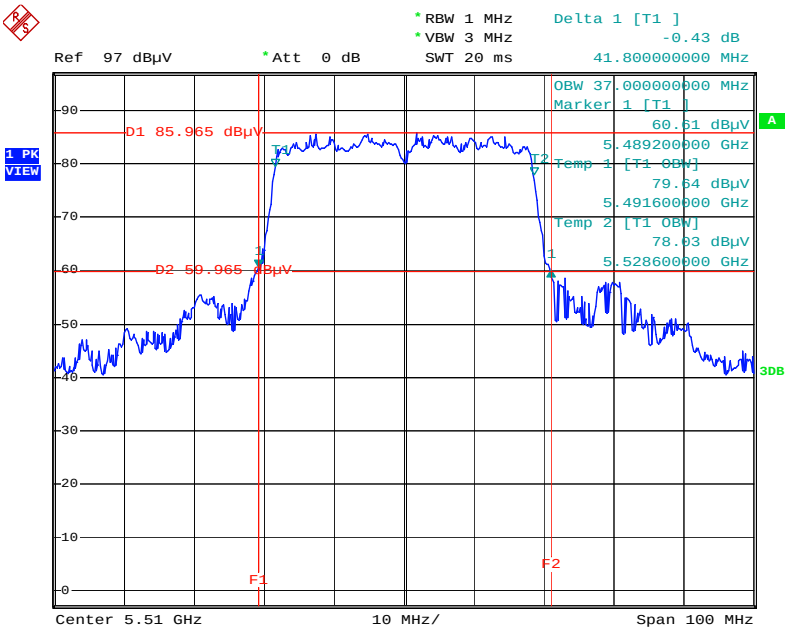
Date: 1.DEC.2014 20:38:08

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5310 MHz



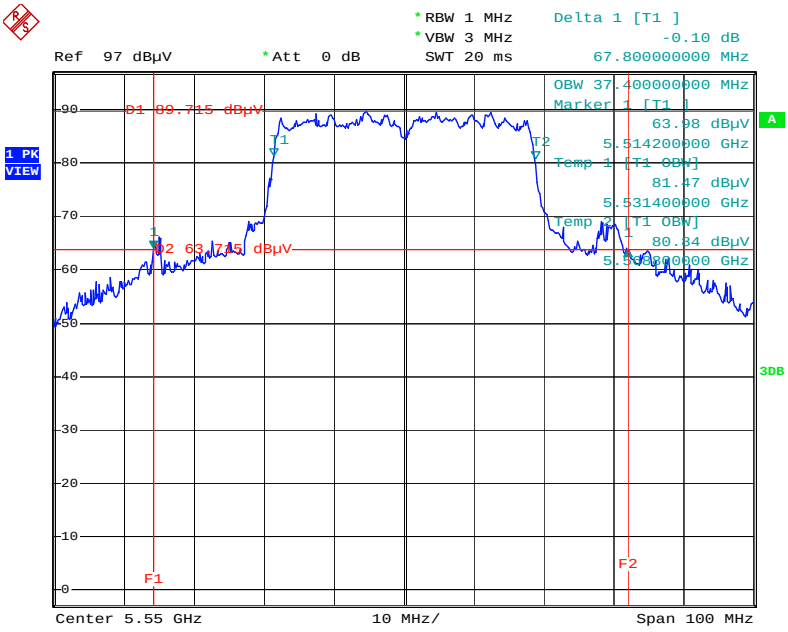
Date: 1.DEC.2014 20:39:43

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5510 MHz



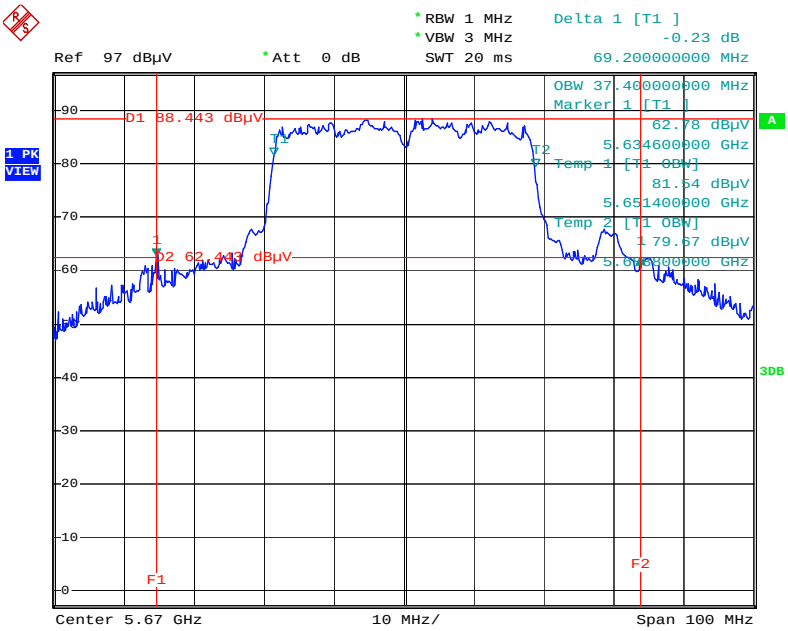
Date: 1.DEC.2014 20:41:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5550 MHz



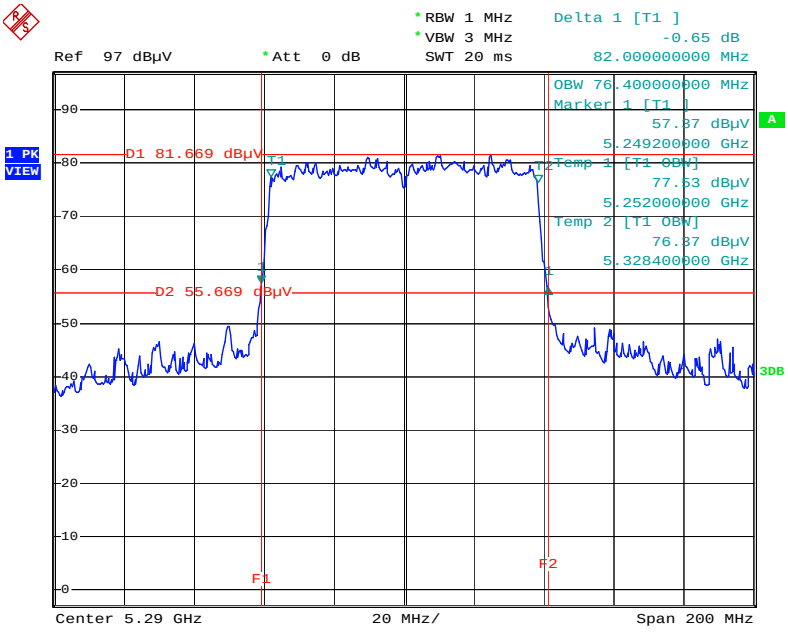
Date: 1.DEC.2014 20:42:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5670 MHz



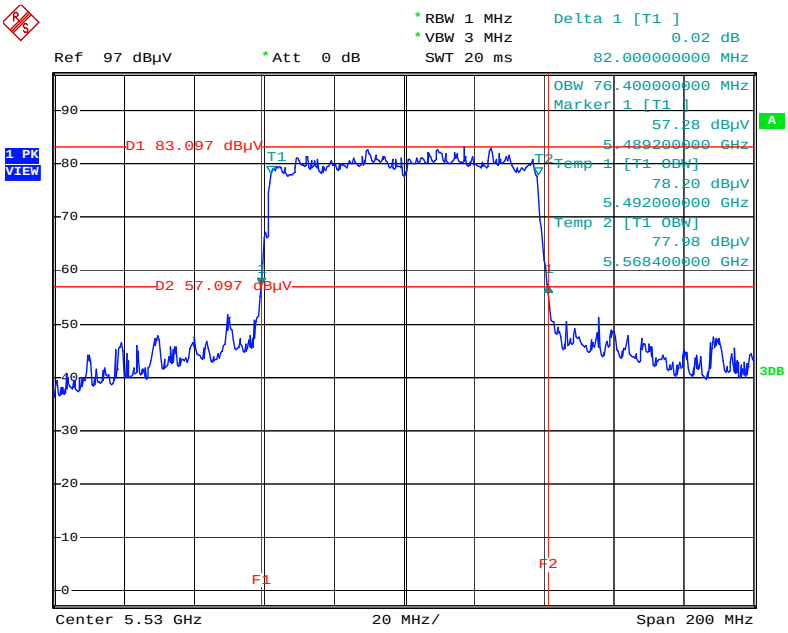
Date: 1.DEC.2014 20:43:39

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5290 MHz



Date: 1.DEC.2014 20:49:26

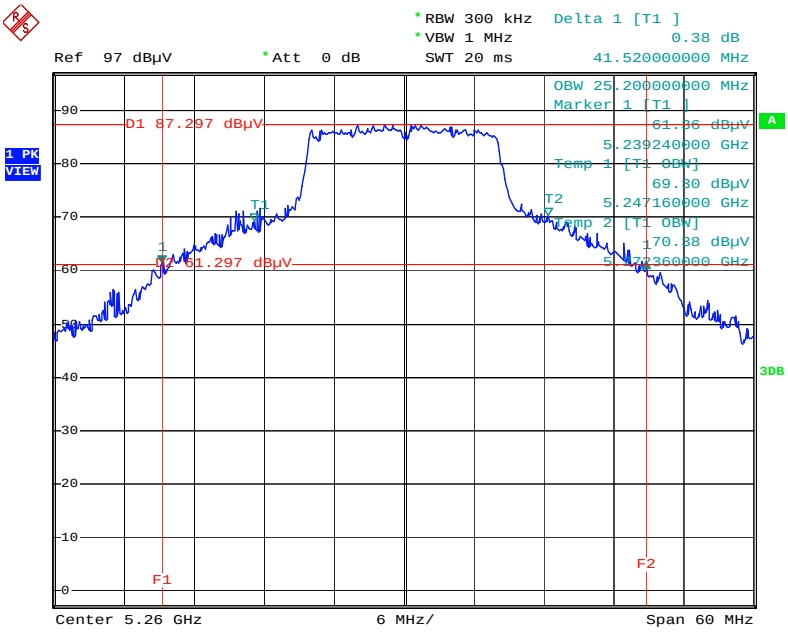
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5530 MHz



Date: 1.DEC.2014 20:52:11

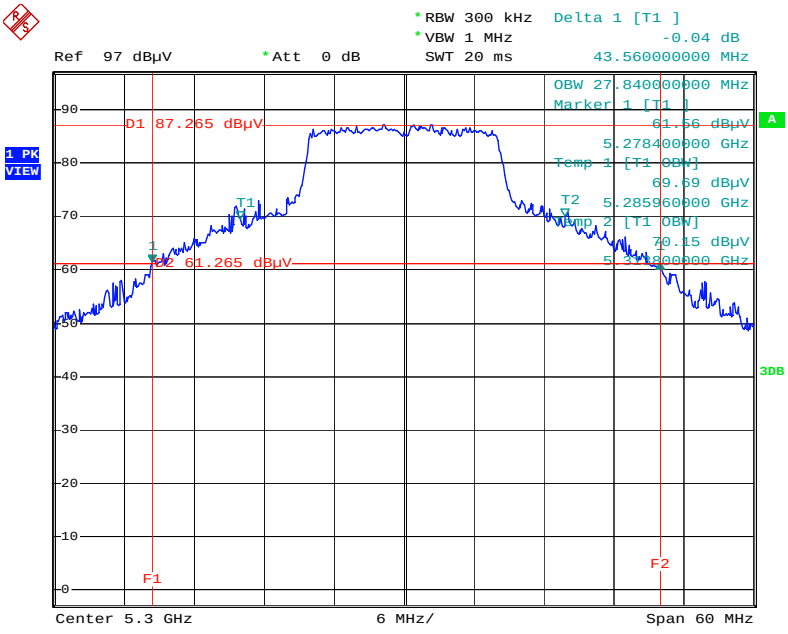
For Non-Beamforming Mode:

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



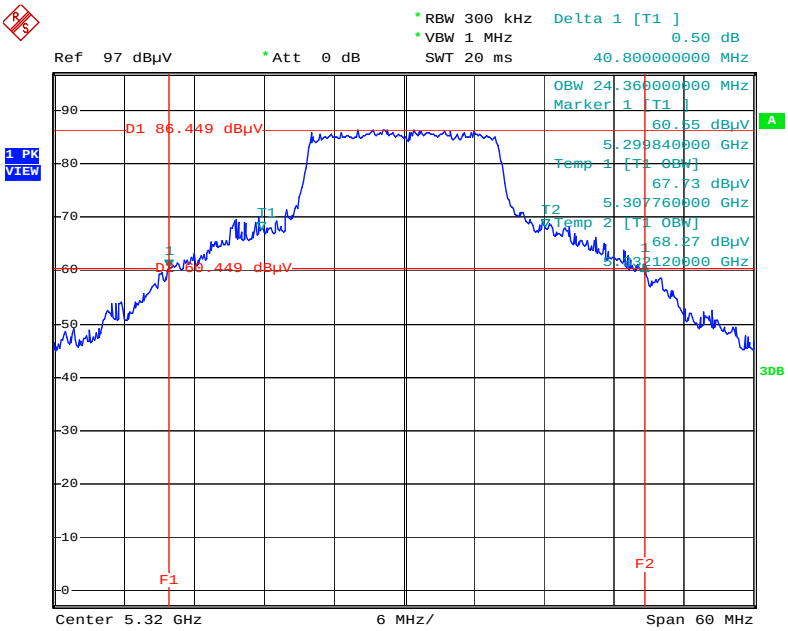
Date: 1.DEC.2014 20:02:47

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



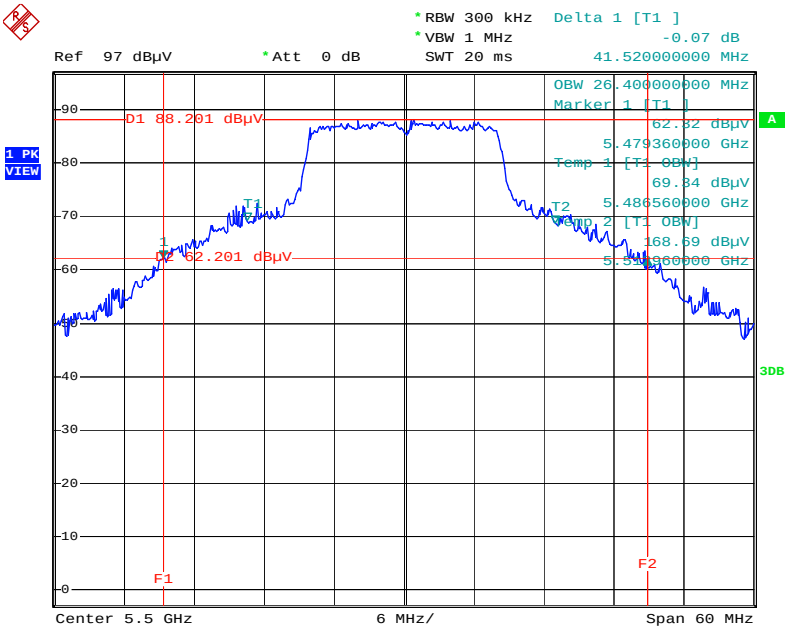
Date: 1.DEC.2014 20:14:23

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



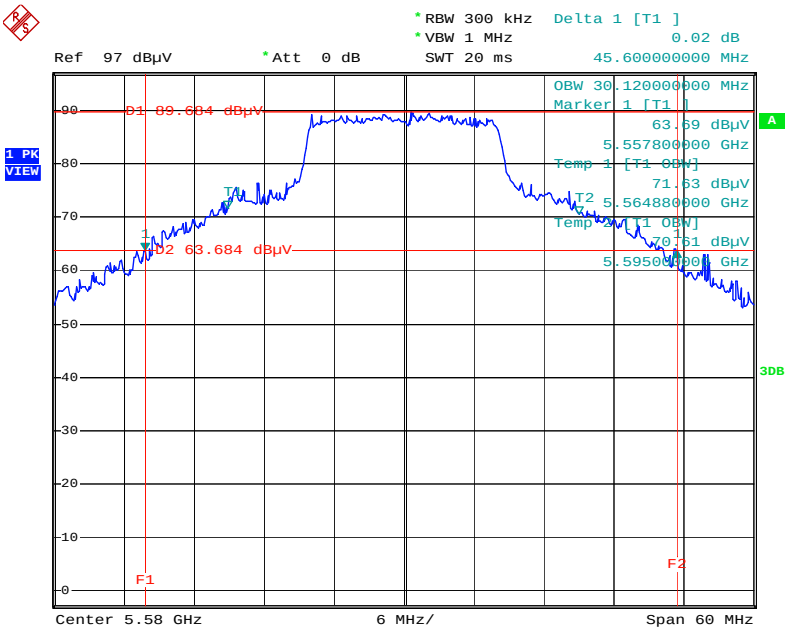
Date: 1.DEC.2014 20:16:07

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



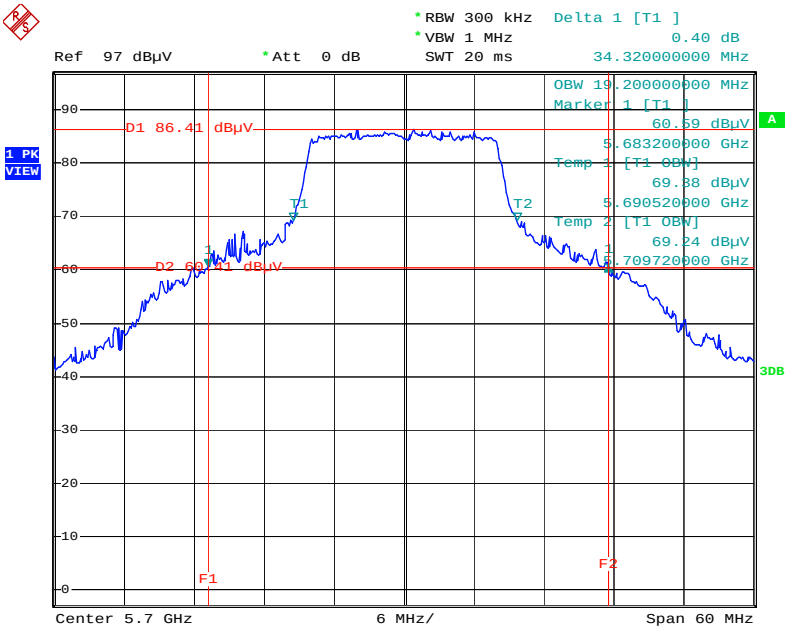
Date: 1.DEC.2014 20:17:46

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



Date: 1.DEC.2014 20:18:58

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



Date: 1.DEC.2014 20:20:44

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

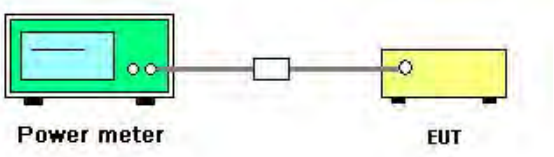
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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 D01 v01r04 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

For Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11ac MCS0/Nss1 VHT20

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Total		
52	5260 MHz	18.04	19.51	19.86	23.98	24.00	Complies
60	5300 MHz	16.36	17.73	18.07	22.22	24.00	Complies
64	5320 MHz	18.24	19.51	19.58	23.92	24.00	Complies
100	5500 MHz	18.12	19.24	19.72	23.85	24.00	Complies
116	5580 MHz	18.52	19.22	19.68	23.94	24.00	Complies
140	5700 MHz	14.78	15.51	15.87	20.18	24.00	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.77dBi<6dBi, so the limit does not reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Total		
54	5270 MHz	18.06	19.35	19.95	23.96	24.00	Complies
62	5310 MHz	15.05	15.31	15.85	20.19	24.00	Complies
102	5510 MHz	13.68	13.45	14.67	18.74	24.00	Complies
110	5550 MHz	18.41	19.22	19.67	23.90	24.00	Complies
134	5670 MHz	17.89	18.65	19.43	23.47	24.00	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.77dBi<6dBi, so the limit does not reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 3	Ant. 4	Ant. 5	Total		
58	5290 MHz	13.65	14.84	15.47	19.49	24.00	Complies
106	5530 MHz	13.51	13.32	14.53	18.59	24.00	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.77dBi<6dBi, so the limit does not reduce.

For Non-Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Serway Li	Configurations	IEEE 802.11a
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11a / Ant. 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
52	5260 MHz	21.45	24.00	Complies
60	5300 MHz	21.78	24.00	Complies
64	5320 MHz	20.61	24.00	Complies
100	5500 MHz	21.47	24.00	Complies
116	5580 MHz	22.51	24.00	Complies
140	5700 MHz	20.21	24.00	Complies

4.4. Power Spectral Density Measurement

4.4.1. Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.25-5.35 GHz	11
5.470-5.725 GHz	11

4.4.2. Measuring Instruments and Setting

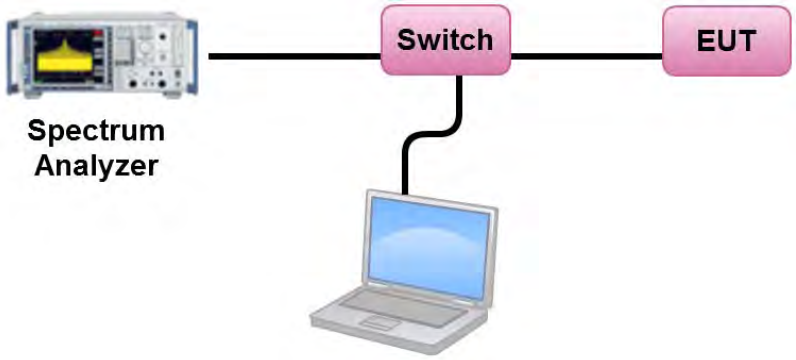
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 D01 v01r04 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Peak power spectral density (PPSD).
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

For Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
52	5260 MHz	10.31	11.00	Complies
60	5300 MHz	8.72	11.00	Complies
64	5320 MHz	10.71	11.00	Complies
100	5500 MHz	10.70	11.00	Complies
116	5580 MHz	10.71	11.00	Complies
140	5700 MHz	6.54	11.00	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.77dBi<6dBi, so the limit does not reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
54	5270 MHz	7.50	11.00	Complies
62	5310 MHz	4.76	11.00	Complies
102	5510 MHz	3.65	11.00	Complies
110	5550 MHz	7.35	11.00	Complies
134	5670 MHz	6.14	11.00	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.77dBi<6dBi, so the limit does not reduce.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
58	5290 MHz	-0.22	11.00	Complies
106	5530 MHz	0.74	11.00	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$=4.77dBi<6dBi, so the limit does not reduce.

For Non-Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Serway Li	Configurations	IEEE 802.11a
Test Date	Nov. 28, 2014		

Configuration IEEE 802.11a / Ant. 3

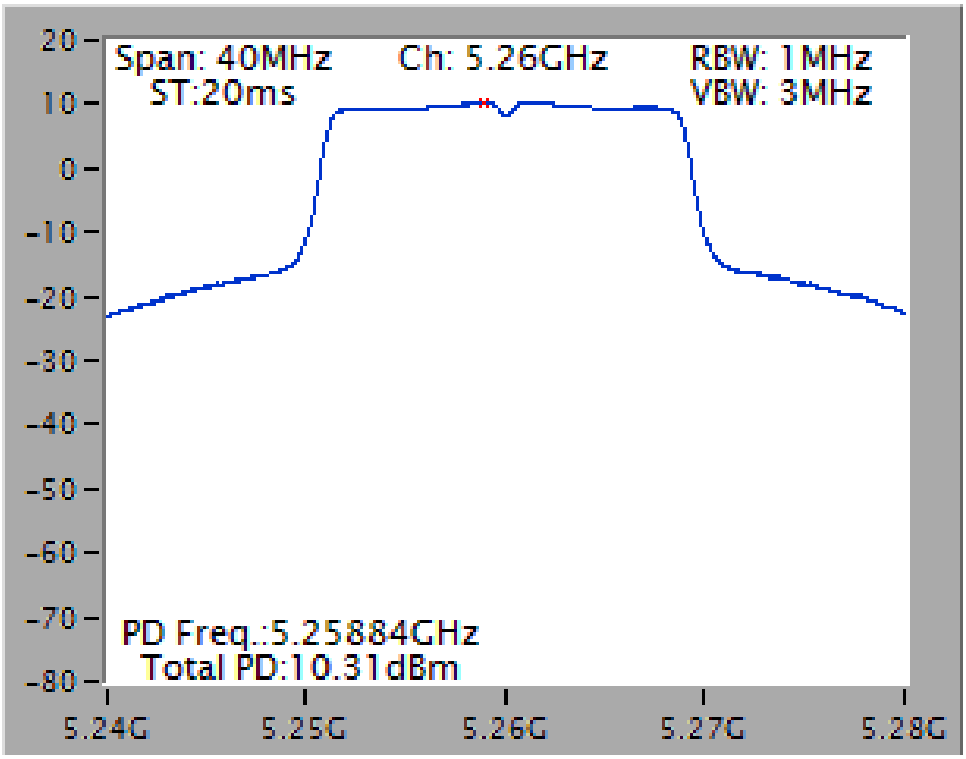
Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
52	5260 MHz	7.40	11.00	Complies
60	5300 MHz	7.97	11.00	Complies
64	5320 MHz	7.24	11.00	Complies
100	5500 MHz	8.46	11.00	Complies
116	5580 MHz	9.58	11.00	Complies
140	5700 MHz	6.38	11.00	Complies

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

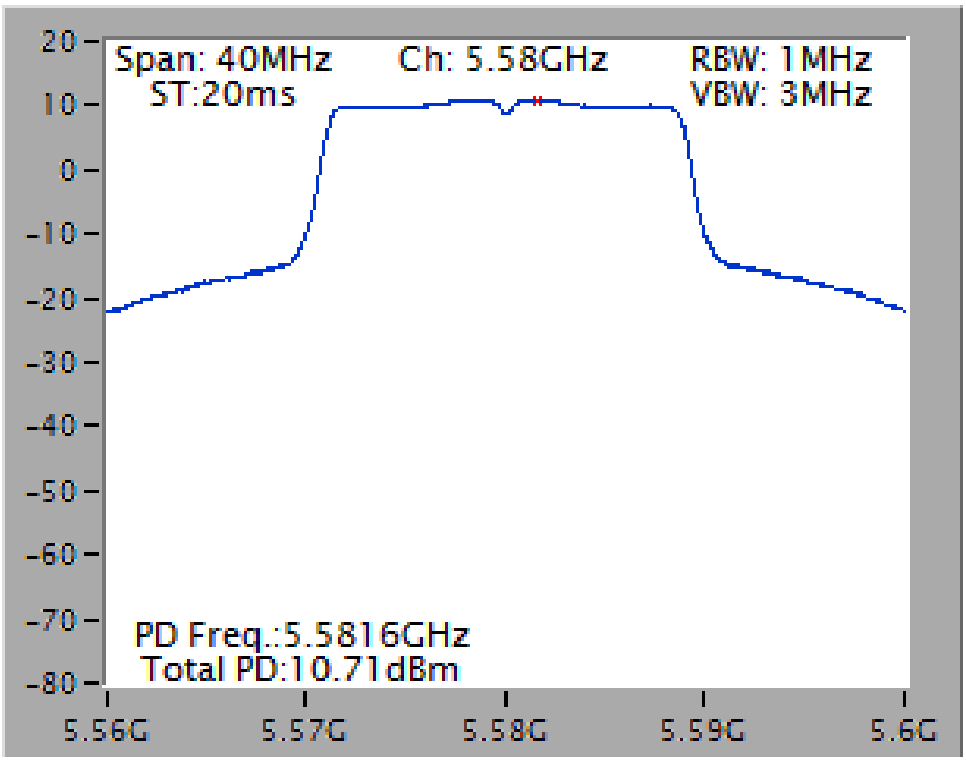
For plots, only the channel with worse result was shown.

For Beamforming Mode:

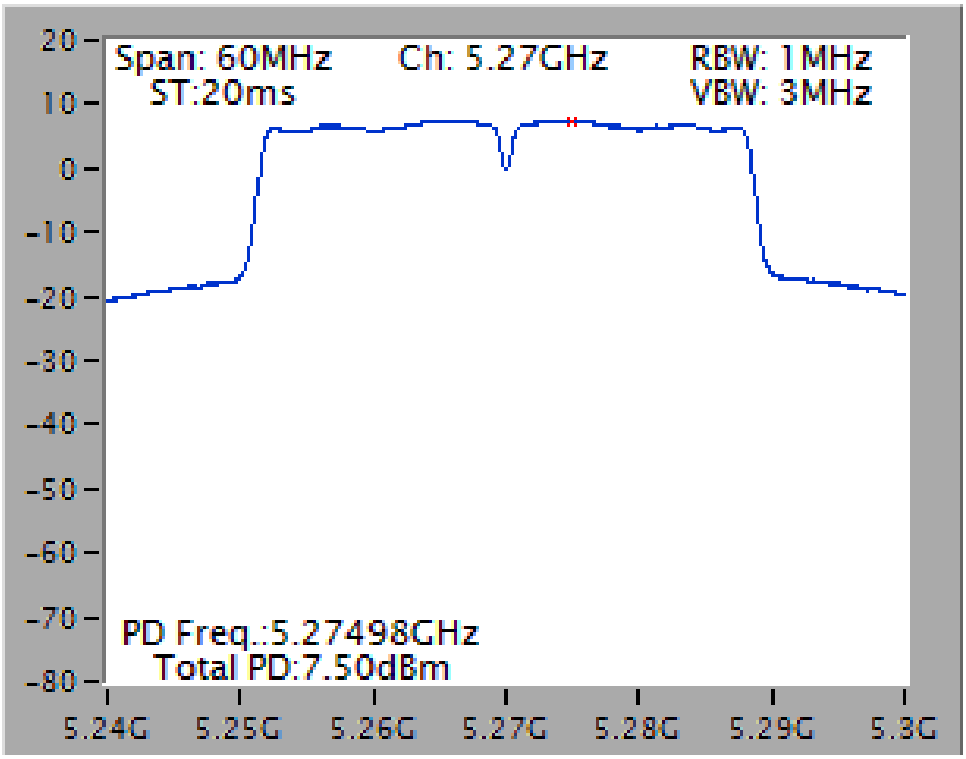
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5260 MHz



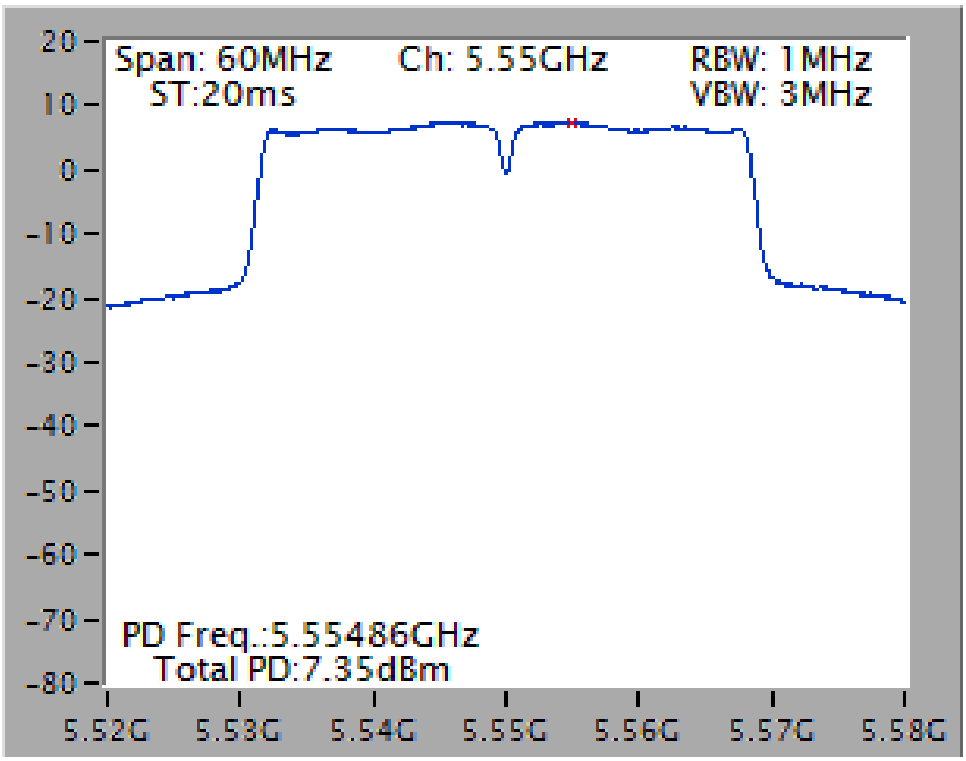
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 3 + Ant. 4 + Ant. 5 / 5580 MHz



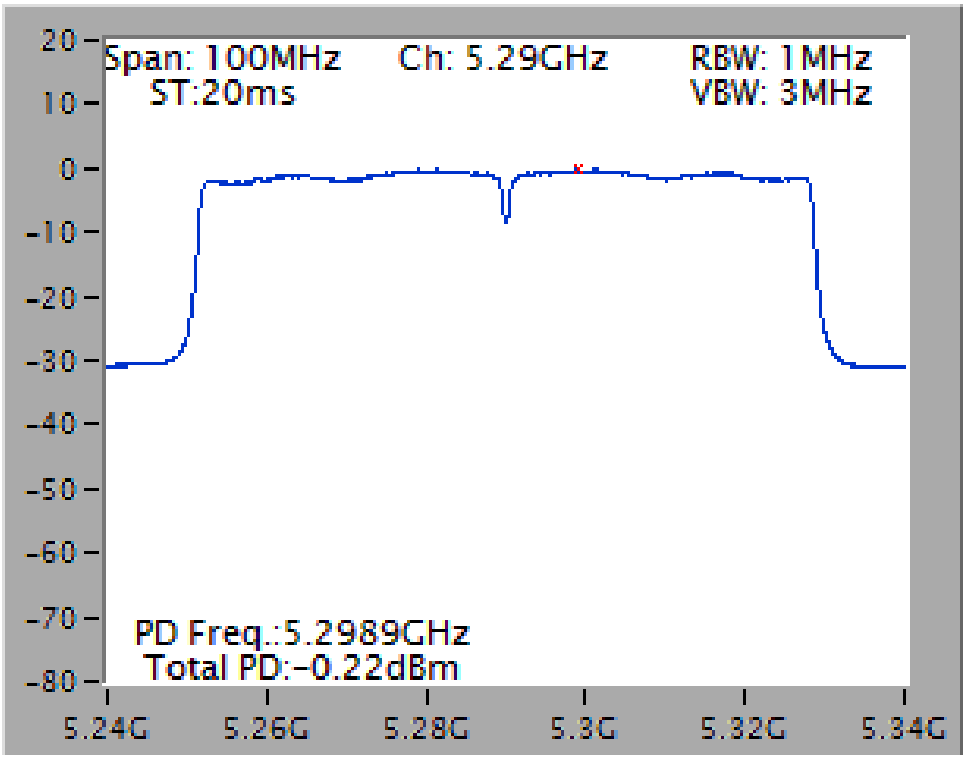
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5270 MHz



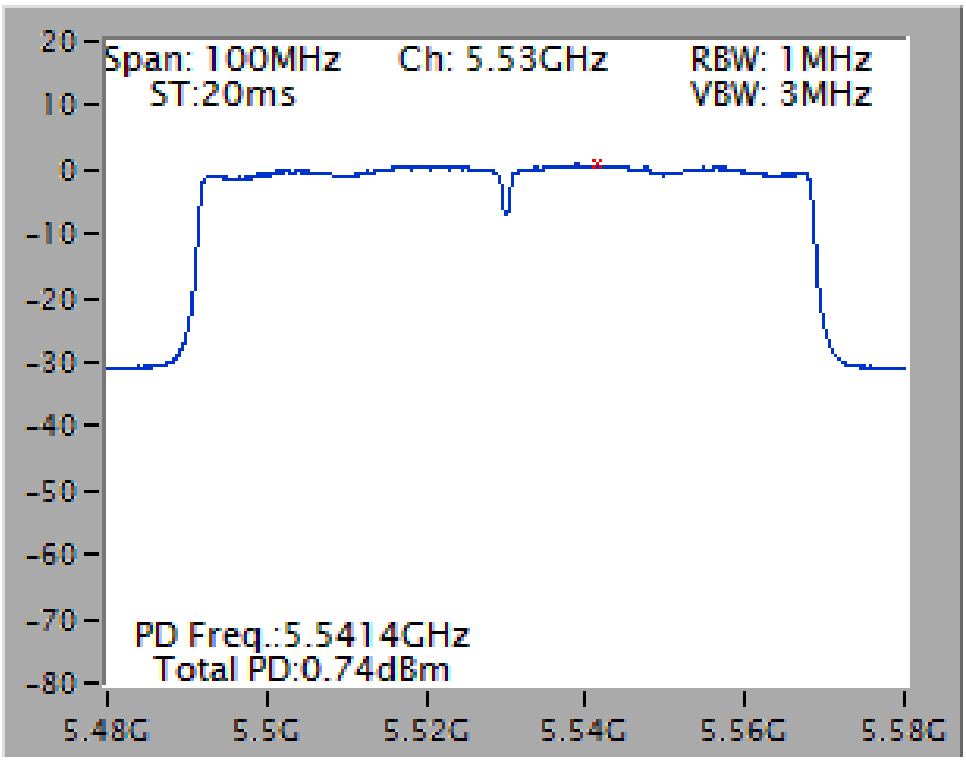
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 3 + Ant. 4 + Ant. 5 / 5550 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5290 MHz

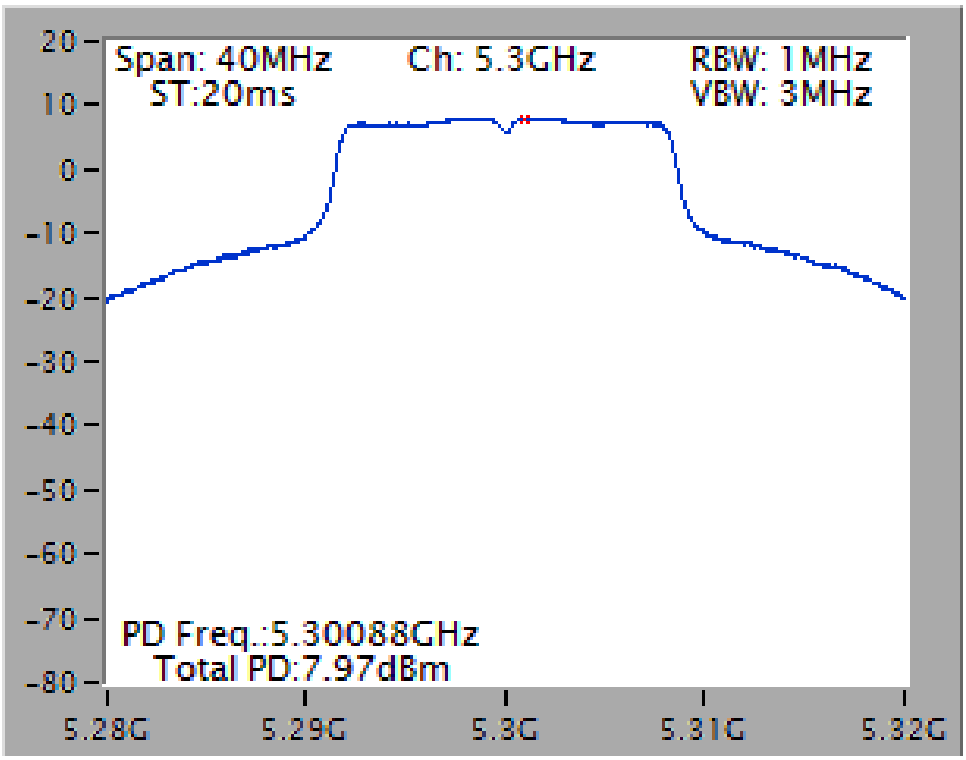


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 3 + Ant. 4 + Ant. 5 / 5530 MHz

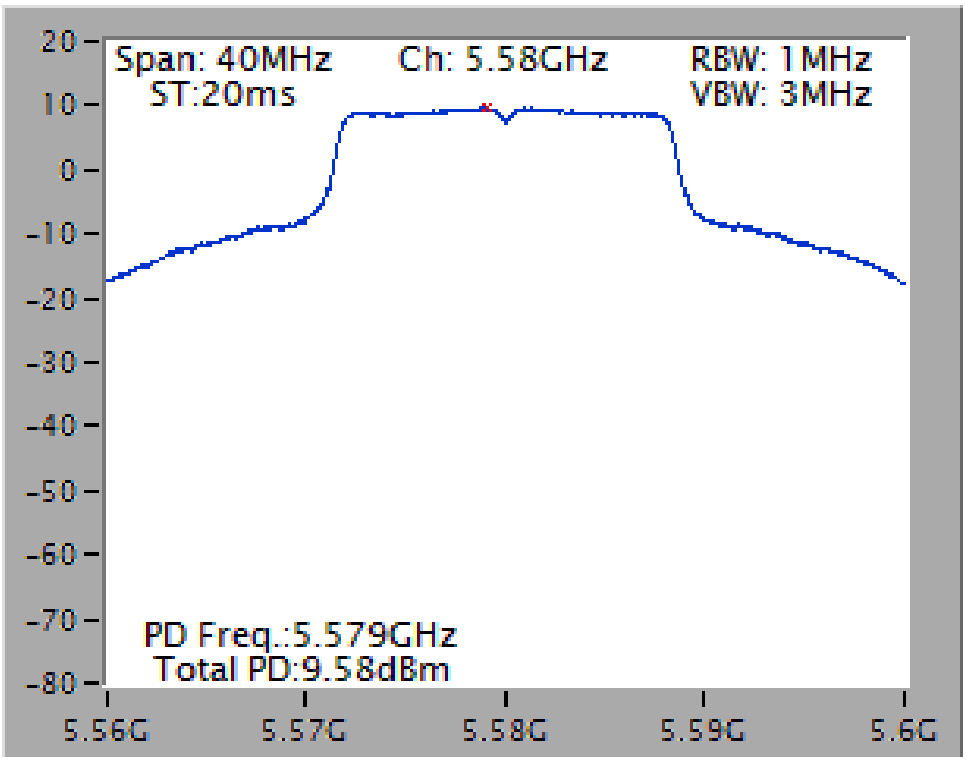


For Non-Beamforming Mode:

Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5300 MHz



Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5580 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 5.25-5.35 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. 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

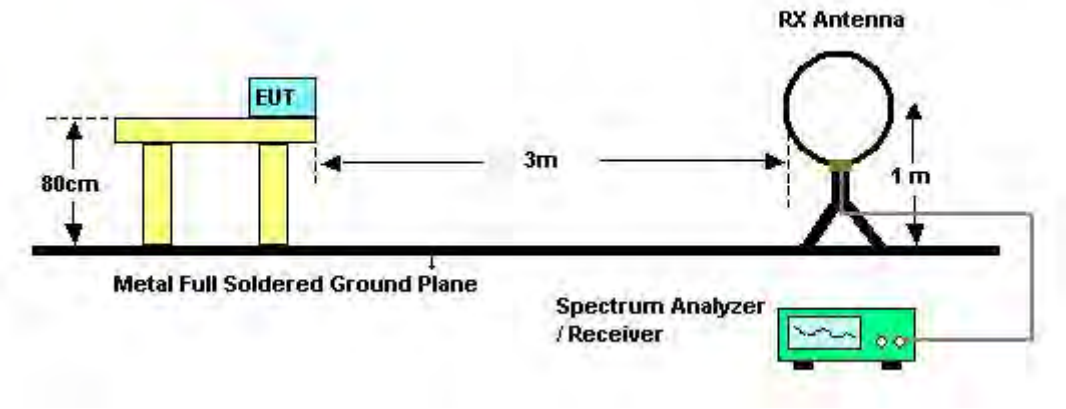
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

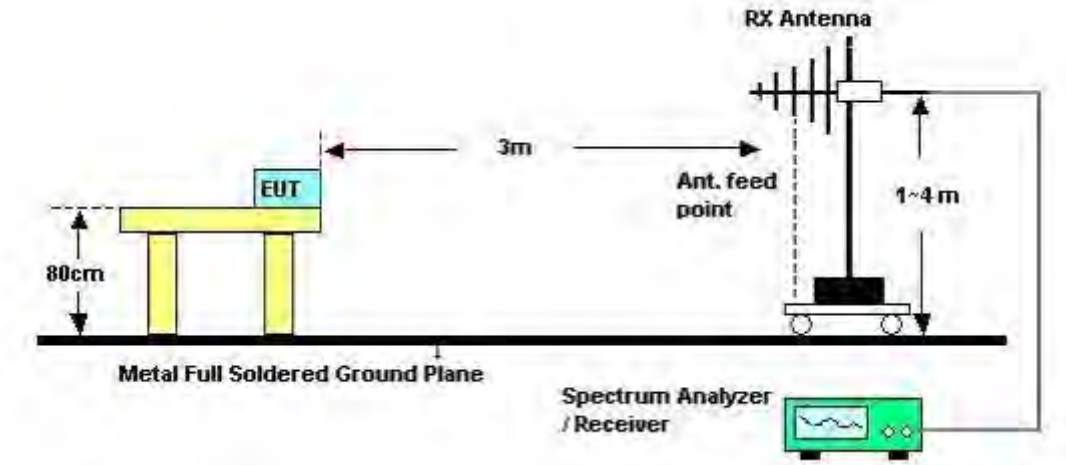
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

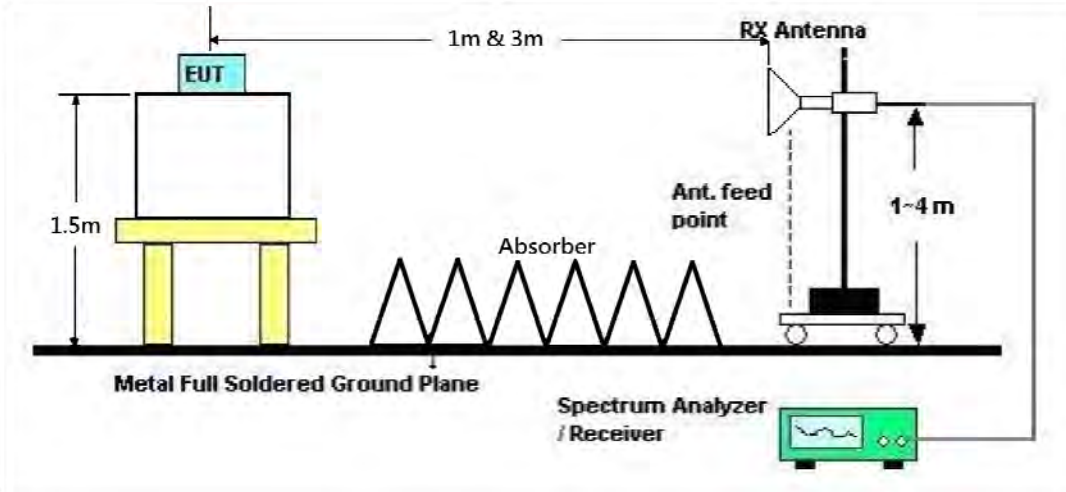
For Radiated Emissions: 9kHz ~30MHz



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 mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	Normal Link
Test Mode	Mode 2	Test Date	Dec. 27, 2014

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

Note:

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

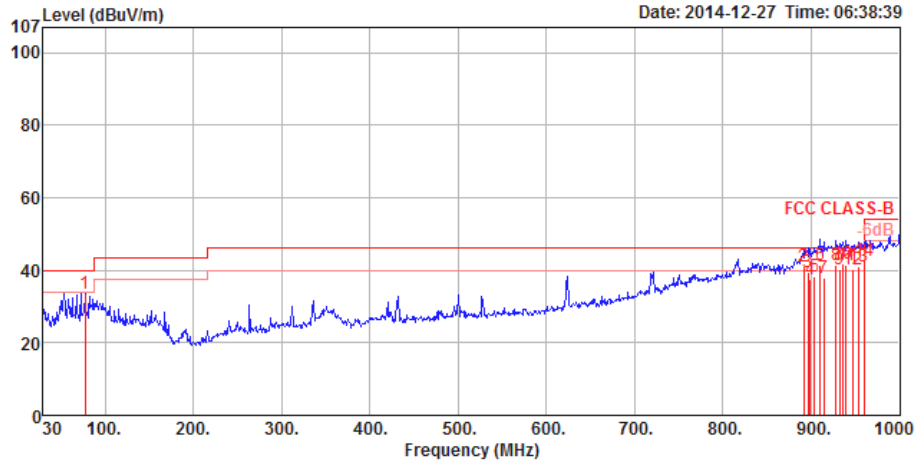
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

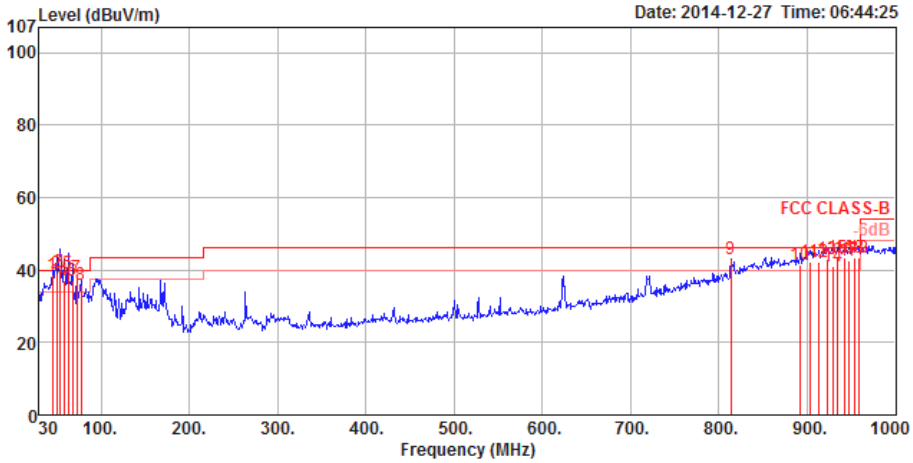
Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	Normal Link

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	77.53	33.61	40.00	-6.39	57.92	0.64	32.36	7.41	HORIZONTAL	238	200	Peak
2	891.36	41.26	46.00	-4.74	49.49	2.15	31.90	21.52	HORIZONTAL	299	125	Peak
3	896.21	39.41	46.00	-6.59	47.53	2.16	31.84	21.56	HORIZONTAL	126	100	QP
4	899.12	37.64	46.00	-8.36	45.68	2.17	31.80	21.59	HORIZONTAL	121	100	QP
5	903.97	38.13	46.00	-7.87	46.05	2.17	31.71	21.62	HORIZONTAL	121	100	QP
6	910.76	41.32	46.00	-4.68	49.02	2.21	31.58	21.67	HORIZONTAL	271	125	QP
7	914.64	37.86	46.00	-8.14	45.47	2.21	31.51	21.69	HORIZONTAL	277	125	QP
8	928.22	41.62	46.00	-4.38	48.98	2.28	31.41	21.77	HORIZONTAL	282	125	QP
9	932.10	40.39	46.00	-5.61	47.74	2.28	31.42	21.79	HORIZONTAL	277	125	QP
10	935.98	41.70	46.00	-4.30	48.99	2.31	31.42	21.82	HORIZONTAL	282	125	QP
11	939.86	41.31	46.00	-4.69	48.58	2.31	31.42	21.84	HORIZONTAL	282	125	QP
12	946.65	40.19	46.00	-5.81	47.32	2.35	31.36	21.88	HORIZONTAL	279	100	QP
13	954.41	40.93	46.00	-5.07	47.91	2.38	31.29	21.93	HORIZONTAL	282	125	QP
14	960.23	42.57	54.00	-11.43	49.45	2.40	31.24	21.96	HORIZONTAL	104	100	QP

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	44.55	38.77	40.00	-1.23	59.52	0.48	32.43	11.20	VERTICAL	264	100	QP
2	49.40	39.24	40.00	-0.76	61.89	0.50	32.52	9.37	VERTICAL	191	100	QP
3	53.28	39.59	40.00	-0.41	63.24	0.52	32.51	8.34	VERTICAL	360	100	QP
4	58.13	37.14	40.00	-2.86	61.85	0.55	32.50	7.24	VERTICAL	1	150	QP
5	62.98	39.19	40.00	-0.81	64.33	0.57	32.51	6.80	VERTICAL	37	100	QP
6	67.83	37.21	40.00	-2.79	62.33	0.60	32.52	6.80	VERTICAL	360	200	QP
7	72.68	37.89	40.00	-2.11	62.69	0.62	32.44	7.02	VERTICAL	280	100	QP
8	77.53	36.08	40.00	-3.92	60.42	0.64	32.36	7.38	VERTICAL	26	100	QP
9	813.76	42.98	46.00	-3.02	52.45	2.05	32.26	20.74	VERTICAL	198	150	Peak
10	892.33	41.60	46.00	-4.40	49.82	2.15	31.89	21.52	VERTICAL	76	150	QP
11	903.00	42.23	46.00	-3.77	50.17	2.17	31.73	21.62	VERTICAL	356	150	QP
12	913.67	42.36	46.00	-3.64	50.00	2.21	31.53	21.68	VERTICAL	76	150	QP
13	922.40	43.16	46.00	-2.84	50.57	2.26	31.41	21.74	VERTICAL	37	150	QP
14	930.16	41.21	46.00	-4.79	48.57	2.28	31.42	21.78	VERTICAL	87	150	QP
15	935.01	43.37	46.00	-2.63	50.67	2.31	31.42	21.81	VERTICAL	82	150	QP
16	942.77	43.46	46.00	-2.54	50.66	2.33	31.39	21.86	VERTICAL	222	125	QP
17	947.62	42.77	46.00	-3.23	49.88	2.35	31.35	21.89	VERTICAL	71	125	QP
18	953.44	43.45	46.00	-2.55	50.45	2.38	31.30	21.92	VERTICAL	171	125	QP
19	958.29	43.25	46.00	-2.75	50.16	2.40	31.26	21.95	VERTICAL	76	125	QP

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)

For Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 52 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 12, 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	15780.16	47.56	54.00	-6.44	31.70	12.57	38.11	34.82	212	100	Average	HORIZONTAL
2	15784.44	59.56	74.00	-14.44	43.72	12.57	38.09	34.82	212	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15774.64	46.66	54.00	-7.34	30.80	12.57	38.11	34.82	82	100	Average	VERTICAL
2	15775.48	59.94	74.00	-14.06	44.08	12.57	38.11	34.82	82	100	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 60 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 12, 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	10598.80	44.79	54.00	-9.21	29.94	10.16	38.92	34.23	342	100	Average	HORIZONTAL
2	10602.28	57.75	74.00	-16.25	42.88	10.19	38.92	34.24	342	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	10597.96	46.24	54.00	-7.76	31.39	10.16	38.92	34.23	279	142	Average	VERTICAL
2	10598.80	59.39	74.00	-14.61	44.54	10.16	38.92	34.23	279	142	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 64 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 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	10633.99	45.69	54.00	-8.31	31.77	10.21	38.93	35.22	263	160	Average	HORIZONTAL
2	10634.50	58.71	74.00	-15.29	44.79	10.21	38.93	35.22	263	160	Peak	HORIZONTAL
3	15957.76	56.55	74.00	-17.45	41.42	12.56	37.85	35.28	85	137	Peak	HORIZONTAL
4	15962.97	43.55	54.00	-10.45	28.42	12.56	37.85	35.28	85	137	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	10638.99	54.88	74.00	-19.12	40.96	10.21	38.93	35.22	279	101	Peak	VERTICAL
2	10641.81	42.10	54.00	-11.90	28.18	10.21	38.93	35.22	279	101	Average	VERTICAL
3	15938.94	56.42	74.00	-17.58	41.27	12.56	37.87	35.28	17	204	Peak	VERTICAL
4	15959.64	43.72	54.00	-10.28	28.59	12.56	37.85	35.28	17	204	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 100 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 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	11001.45	44.25	54.00	-9.75	29.68	10.55	39.00	34.98	214	187	Average	HORIZONTAL
2	11002.89	56.12	74.00	-17.88	41.55	10.55	39.00	34.98	214	187	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	10992.76	54.16	74.00	-19.84	39.59	10.55	39.00	34.98	261	217	Peak	VERTICAL
2	10993.92	41.44	54.00	-12.56	26.87	10.55	39.00	34.98	261	217	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 116 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 12, 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	10595.92	43.24	54.00	-10.76	28.39	10.16	38.92	34.23	277	100	Average	HORIZONTAL
2	10604.84	56.20	74.00	-17.80	41.34	10.19	38.92	34.25	277	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	10597.32	56.98	74.00	-17.02	42.13	10.16	38.92	34.23	162	100	Peak	VERTICAL
2	10597.96	43.28	54.00	-10.72	28.43	10.16	38.92	34.23	162	100	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 140 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 13, 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	11397.84	44.04	54.00	-9.96	29.06	10.69	39.32	35.03	191	100	Average	HORIZONTAL
2	11408.88	57.12	74.00	-16.88	42.14	10.69	39.32	35.03	191	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11390.12	56.53	74.00	-17.47	41.57	10.68	39.31	35.03	138	100	Peak	VERTICAL
2	11395.64	44.17	54.00	-9.83	29.19	10.69	39.32	35.03	138	100	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 13, 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	15791.04	59.77	74.00	-14.23	43.94	12.57	38.09	34.83	164	101	Peak	HORIZONTAL
2	15824.96	46.51	54.00	-7.49	30.74	12.57	38.04	34.84	164	101	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	15824.48	46.68	54.00	-7.32	30.91	12.57	38.04	34.84	223	101	Average	VERTICAL
2	15828.88	59.79	74.00	-14.21	44.02	12.57	38.04	34.84	223	101	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 62 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 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	10621.01	59.21	74.00	-14.79	45.33	10.19	38.92	35.23	249	191	Peak	HORIZONTAL
2	10625.93	47.39	54.00	-6.61	33.51	10.19	38.92	35.23	249	191	Average	HORIZONTAL
3	15912.49	49.84	74.00	-24.16	34.63	12.56	37.92	35.27	302	168	Peak	HORIZONTAL
4	15959.96	37.33	54.00	-16.67	22.20	12.56	37.85	35.28	302	168	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	10601.04	42.96	54.00	-11.04	29.08	10.19	38.92	35.23	247	101	Average	VERTICAL
2	10625.93	52.23	74.00	-21.77	38.35	10.19	38.92	35.23	247	101	Peak	VERTICAL
3	15906.56	44.73	54.00	-9.27	29.52	12.56	37.92	35.27	111	203	Average	VERTICAL
4	15948.96	56.32	74.00	-17.68	41.17	12.56	37.87	35.28	111	203	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 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	11020.43	43.16	54.00	-10.84	28.57	10.56	39.01	34.98	258	188	Average	HORIZONTAL
2	11029.99	56.09	74.00	-17.91	41.48	10.56	39.03	34.98	258	188	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	11001.48	43.69	54.00	-10.31	29.12	10.55	39.00	34.98	233	170	Average	VERTICAL
2	11028.10	55.10	74.00	-18.90	40.49	10.56	39.03	34.98	233	170	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 110 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 13, 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	11096.72	44.90	54.00	-9.10	30.25	10.58	39.08	35.01	152	100	Average	HORIZONTAL
2	11115.68	55.97	74.00	-18.03	41.30	10.59	39.09	35.01	152	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11100.40	60.17	74.00	-13.83	45.52	10.58	39.08	35.01	281	183	Peak	VERTICAL
2	11107.52	48.14	54.00	-5.86	33.48	10.58	39.09	35.01	281	183	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 134 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 13, 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	11339.84	59.32	74.00	-14.68	44.41	10.66	39.27	35.02	256	164	Peak	HORIZONTAL
2	11350.48	47.75	54.00	-6.25	32.82	10.67	39.28	35.02	256	164	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	11340.00	43.84	54.00	-10.16	28.93	10.66	39.27	35.02	256	100	Average	VERTICAL
2	11340.08	58.44	74.00	-15.56	43.53	10.66	39.27	35.02	256	100	Peak	VERTICAL

Temperature	26°C	Humidity	23%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Nov. 13, 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	15840.40	59.23	74.00	-14.77	43.49	12.57	38.02	34.85	295	100	Peak	HORIZONTAL
2	15907.60	46.44	54.00	-7.56	30.83	12.56	37.92	34.87	295	100	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15883.92	58.83	74.00	-15.17	43.18	12.57	37.94	34.86	278	100	Peak	VERTICAL
2	15904.24	46.69	54.00	-7.31	31.07	12.57	37.92	34.87	278	100	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 106 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 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	11055.00	39.07	54.00	-14.93	24.45	10.57	39.04	34.99	302	160	Average	HORIZONTAL
2	11063.08	52.92	74.00	-21.08	38.28	10.58	39.05	34.99	302	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	11055.31	52.78	74.00	-21.22	38.16	10.57	39.04	34.99	115	154	Peak	VERTICAL
2	11059.58	39.52	54.00	-14.48	24.89	10.57	39.05	34.99	115	154	Average	VERTICAL

Note:

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

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

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

For Non-Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 52 / Ant. 3
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	15775.76	46.46	54.00	-7.54	30.60	12.57	38.11	34.82	252	100	Average	HORIZONTAL
2	15781.60	59.80	74.00	-14.20	43.96	12.57	38.09	34.82	252	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15775.84	46.33	54.00	-7.67	30.47	12.57	38.11	34.82	78	100	Average	VERTICAL
2	15782.52	59.04	74.00	-14.96	43.20	12.57	38.09	34.82	78	100	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 60 / Ant. 3
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	10593.20	43.50	54.00	-10.50	28.64	10.16	38.92	34.22	23	100	Average	HORIZONTAL
2	10598.92	55.39	74.00	-18.61	40.54	10.16	38.92	34.23	23	100	Peak	HORIZONTAL
3	15900.56	59.74	74.00	-14.26	44.12	12.57	37.92	34.87	201	100	Peak	HORIZONTAL
4	15907.52	46.53	54.00	-7.47	30.92	12.56	37.92	34.87	201	100	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	10603.88	56.27	74.00	-17.73	41.40	10.19	38.92	34.24	175	100	Peak	VERTICAL
2	10607.00	43.12	54.00	-10.88	28.26	10.19	38.92	34.25	175	100	Average	VERTICAL
3	15895.84	59.53	74.00	-14.47	43.89	12.57	37.94	34.87	124	100	Peak	VERTICAL
4	15907.00	46.46	54.00	-7.54	30.85	12.56	37.92	34.87	124	100	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 64 / Ant. 3
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	10639.72	43.34	54.00	-10.66	28.51	10.21	38.93	34.31	299	100	Average	HORIZONTAL
2	10643.92	56.59	74.00	-17.41	41.77	10.21	38.93	34.32	299	100	Peak	HORIZONTAL
3	15956.44	59.50	74.00	-14.50	43.98	12.56	37.85	34.89	93	100	Peak	HORIZONTAL
4	15964.60	46.33	54.00	-7.67	30.82	12.56	37.85	34.90	93	100	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	10637.72	42.58	54.00	-11.42	27.75	10.21	38.93	34.31	73	100	Average	VERTICAL
2	10639.88	55.80	74.00	-18.20	40.98	10.21	38.93	34.32	73	100	Peak	VERTICAL
3	15966.20	59.05	74.00	-14.95	43.54	12.56	37.85	34.90	255	100	Peak	VERTICAL
4	15967.68	46.32	54.00	-7.68	30.81	12.56	37.85	34.90	255	100	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 100 / Ant. 3
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	10992.20	56.03	74.00	-17.97	41.48	10.55	39.00	35.00	288	101	Peak	HORIZONTAL
2	11004.80	42.82	54.00	-11.18	28.27	10.55	39.01	35.01	288	101	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	10992.08	55.76	74.00	-18.24	41.20	10.55	39.00	34.99	126	100	Peak	VERTICAL
2	10998.20	42.35	54.00	-11.65	27.81	10.55	39.00	35.01	126	100	Average	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 116 / Ant. 3
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	11156.12	47.97	54.00	-6.03	33.27	10.60	39.12	35.02	230	231	Average	HORIZONTAL
2	11158.60	61.11	74.00	-12.89	46.40	10.60	39.13	35.02	230	231	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	11156.24	49.08	54.00	-4.92	34.38	10.60	39.12	35.02	263	225	Average	VERTICAL
2	11157.48	61.99	74.00	-12.01	47.29	10.60	39.12	35.02	263	225	Peak	VERTICAL

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 140 / Ant. 3
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	11391.76	43.20	54.00	-10.80	28.23	10.69	39.31	35.03	18	100	Average	HORIZONTAL
2	11395.28	56.15	74.00	-17.85	41.18	10.69	39.31	35.03	18	100	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11399.72	43.20	54.00	-10.80	28.22	10.69	39.32	35.03	281	100	Average	VERTICAL
2	11402.04	56.66	74.00	-17.34	41.68	10.69	39.32	35.03	281	100	Peak	VERTICAL

Note:

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

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

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

4.6. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. 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, only the frequency range investigated is limited to 100MHz around bandedges.

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 mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

For Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 52, 60, 64 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 2014 ~ Nov. 12, 2014		

Channel 52

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5144.79	46.17	54.00	-7.83	40.76	6.21	34.11	34.91	172	205	Average	VERTICAL
2	5146.09	60.30	74.00	-13.70	54.89	6.21	34.11	34.91	172	205	Peak	VERTICAL
3	5265.21	115.52			109.82	6.34	34.27	34.91	172	205	Peak	VERTICAL
4	5267.81	105.06			99.36	6.34	34.27	34.91	172	205	Average	VERTICAL
5	5386.03	60.80	74.00	-13.20	54.78	6.50	34.44	34.92	172	205	Peak	VERTICAL
6	5387.77	47.98	54.00	-6.02	41.96	6.50	34.44	34.92	172	205	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5291.60	104.36			97.22	6.37	34.30	33.53	186	194	Average	VERTICAL
2	5292.80	113.47			106.31	6.37	34.32	33.53	186	194	Peak	VERTICAL
3	5372.60	53.82	54.00	-0.18	46.44	6.47	34.41	33.50	186	194	Average	VERTICAL
4	5381.60	64.41	74.00	-9.59	56.96	6.50	34.44	33.49	186	194	Peak	VERTICAL

Item 3, 4 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	5311.67	110.47			104.64	6.40	34.34	34.91	171	207	Peak	VERTICAL
2	5311.99	101.24			95.41	6.40	34.34	34.91	171	207	Average	VERTICAL
3	5350.32	53.73	54.00	-0.27	47.78	6.47	34.39	34.91	171	207	Average	VERTICAL
4	5351.28	70.48	74.00	-3.52	64.53	6.47	34.39	34.91	171	207	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5320 MHz.

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 100, 116, 140 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 2014 ~ Nov. 12, 2014		

Channel 100

	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	5427.87	52.09	54.00	-1.91	45.97	6.56	34.48	34.92	1	188	Average	VERTICAL
2	5428.45	62.96	74.00	-11.04	56.84	6.56	34.48	34.92	1	188	Peak	VERTICAL
3	5468.84	73.28	74.00	-0.72	67.05	6.60	34.55	34.92	1	188	Peak	VERTICAL
4	5470.00	53.86	54.00	-0.14	47.63	6.60	34.55	34.92	1	188	Average	VERTICAL
5	5508.10	104.92			98.59	6.65	34.60	34.92	1	188	Average	VERTICAL
6	5508.39	114.67			108.34	6.65	34.60	34.92	1	188	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5457.60	49.87	54.00	-4.13	42.21	6.60	34.53	33.47	179	210	Average	VERTICAL
2	5459.40	62.19	74.00	-11.81	54.53	6.60	34.53	33.47	179	210	Peak	VERTICAL
3	5461.00	49.82	54.00	-4.18	42.16	6.60	34.53	33.47	179	210	Average	VERTICAL
4	5466.40	62.03	74.00	-11.97	54.34	6.60	34.55	33.46	179	210	Peak	VERTICAL
5	5581.80	119.90			111.97	6.72	34.63	33.42	179	210	Peak	VERTICAL
6	5587.20	109.64			101.71	6.72	34.63	33.42	179	210	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5692.40	103.61			95.50	6.81	34.68	33.38	352	193	Average	VERTICAL
2	5692.40	112.18			104.07	6.81	34.68	33.38	352	193	Peak	VERTICAL
3	5725.00	53.73	54.00	-0.27	45.58	6.83	34.69	33.37	352	193	Average	VERTICAL
4	5725.00	71.41	74.00	-2.59	63.26	6.83	34.69	33.37	352	193	Peak	VERTICAL

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

Temperature	26℃	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54, 62 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 2014 ~ Nov. 12, 2014		

Channel 54

	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	5264.60	114.61			107.54	6.34	34.27	33.54	199	214	Peak	VERTICAL
2	5274.80	103.03			95.92	6.37	34.27	33.53	199	214	Average	VERTICAL
3	5351.00	67.04	74.00	-6.96	59.69	6.47	34.39	33.51	199	214	Peak	VERTICAL
4	5354.00	53.94	54.00	-0.06	46.58	6.47	34.39	33.50	199	214	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5293.02	93.62			87.84	6.37	34.32	34.91	110	191	Average	HORIZONTAL
2	5297.21	104.77			98.96	6.40	34.32	34.91	110	191	Peak	HORIZONTAL
3	5351.20	53.46	54.00	-0.54	47.51	6.47	34.39	34.91	110	191	Average	HORIZONTAL
4	5352.80	73.83	74.00	-0.17	67.88	6.47	34.39	34.91	110	191	Peak	HORIZONTAL

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

Temperature	26℃	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102, 110, 134 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 2014 ~ Nov. 12, 2014		

Channel 102

	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	5458.20	56.10	74.00	-17.90	49.89	6.60	34.53	34.92	164	207	Peak	VERTICAL
2	5460.00	49.40	54.00	-4.60	43.19	6.60	34.53	34.92	164	207	Average	VERTICAL
3	5467.97	71.75	74.00	-2.25	65.52	6.60	34.55	34.92	164	207	Peak	VERTICAL
4	5469.71	53.93	54.00	-0.07	47.70	6.60	34.55	34.92	164	207	Average	VERTICAL
5	5513.76	98.49			92.15	6.65	34.61	34.92	164	207	Average	VERTICAL
6	5513.76	108.81			102.47	6.65	34.61	34.92	164	207	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5452.20	52.85	54.00	-1.15	45.19	6.60	34.53	33.47	199	221	Average	VERTICAL
2	5452.20	67.02	74.00	-6.98	59.36	6.60	34.53	33.47	199	221	Peak	VERTICAL
3	5464.00	66.54	74.00	-7.46	58.85	6.60	34.55	33.46	199	221	Peak	VERTICAL
4	5468.80	53.88	54.00	-0.12	46.19	6.60	34.55	33.46	199	221	Average	VERTICAL
5	5556.00	102.57			94.68	6.70	34.62	33.43	199	221	Average	VERTICAL
6	5556.00	116.69			108.80	6.70	34.62	33.43	199	221	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5665.80	113.42			105.36	6.79	34.66	33.39	190	220	Peak	VERTICAL
2	5666.40	102.03			93.97	6.79	34.66	33.39	190	220	Average	VERTICAL
3	5728.20	71.24	74.00	-2.76	63.09	6.83	34.69	33.37	190	220	Peak	VERTICAL
4	5737.20	53.77	54.00	-0.23	45.58	6.86	34.70	33.37	190	220	Average	VERTICAL

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

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58, 106 / Ant. 3 + Ant. 4 + Ant. 5
Test Date	Oct. 22, 2014 ~ Nov. 12, 2014		

Channel 58

	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	5291.60	93.40			86.26	6.37	34.30	33.53	222	211	Average	HORIZONTAL
2	5293.20	103.49			96.33	6.37	34.32	33.53	222	211	Peak	HORIZONTAL
3	5350.00	69.73	74.00	-4.27	62.38	6.47	34.39	33.51	222	211	Peak	HORIZONTAL
4	5352.40	53.72	54.00	-0.28	46.37	6.47	34.39	33.51	222	211	Average	HORIZONTAL

Item 1, 2 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	5457.11	68.80	74.00	-5.20	62.59	6.60	34.53	34.92	359	207	Peak	VERTICAL
2	5459.28	53.00	54.00	-1.00	46.79	6.60	34.53	34.92	359	207	Average	VERTICAL
3	5467.11	70.02	74.00	-3.98	63.79	6.60	34.55	34.92	359	207	Peak	VERTICAL
4	5469.28	53.63	54.00	-0.37	47.40	6.60	34.55	34.92	359	207	Average	VERTICAL
5	5505.40	108.10			101.77	6.65	34.60	34.92	359	207	Peak	VERTICAL
6	5538.68	94.11			87.74	6.68	34.61	34.92	359	207	Average	VERTICAL
7	5725.00	45.63	54.00	-8.37	39.05	6.83	34.69	34.94	359	207	Average	VERTICAL
8	5730.07	58.06	74.00	-15.94	51.48	6.83	34.69	34.94	359	207	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

For Non-Beamforming Mode:

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 52, 60, 64 / Ant. 3
Test Date	Nov. 11, 2014		

Channel 52

	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	5132.00	57.02	74.00	-16.98	50.35	6.17	34.09	33.59	199	211	Peak	VERTICAL
2	5147.00	44.06	54.00	-9.94	37.32	6.21	34.11	33.58	199	211	Average	VERTICAL
3	5264.00	111.12			104.05	6.34	34.27	33.54	199	211	Peak	VERTICAL
4	5267.00	100.03			92.96	6.34	34.27	33.54	199	211	Average	VERTICAL
5	5374.00	46.50	54.00	-7.50	39.09	6.50	34.41	33.50	199	211	Average	VERTICAL
6	5374.00	58.67	74.00	-15.33	51.26	6.50	34.41	33.50	199	211	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5299.00	111.86			104.67	6.40	34.32	33.53	185	210	Peak	VERTICAL
2	5301.00	100.96			93.76	6.40	34.32	33.52	185	210	Average	VERTICAL
3	5377.00	63.71	74.00	-10.29	56.30	6.50	34.41	33.50	185	210	Peak	VERTICAL
4	5379.00	52.46	54.00	-1.54	45.02	6.50	34.44	33.50	185	210	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5321.00	99.99			92.77	6.40	34.34	33.52	182	207	Average	VERTICAL
2	5321.00	110.41			103.19	6.40	34.34	33.52	182	207	Peak	VERTICAL
3	5350.00	53.77	54.00	-0.23	46.42	6.47	34.39	33.51	182	207	Average	VERTICAL
4	5350.00	69.97	74.00	-4.03	62.62	6.47	34.39	33.51	182	207	Peak	VERTICAL

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

Temperature	26°C	Humidity	63%
Test Engineer	Lucas Huang / Andy Tsai	Configurations	IEEE 802.11a CH 100, 140 / Ant. 3
Test Date	Nov. 11, 2014		

Channel 100

	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	5426.00	59.85	74.00	-14.15	52.29	6.56	34.48	33.48	152	151	Peak	VERTICAL
2	5427.00	49.09	54.00	-4.91	41.53	6.56	34.48	33.48	152	151	Average	VERTICAL
3	5470.00	53.75	54.00	-0.25	46.06	6.60	34.55	33.46	152	151	Average	VERTICAL
4	5470.00	69.95	74.00	-4.05	62.26	6.60	34.55	33.46	152	151	Peak	VERTICAL
5	5501.00	99.54			91.74	6.65	34.60	33.45	152	151	Average	VERTICAL
6	5504.00	110.37			102.57	6.65	34.60	33.45	152	151	Peak	VERTICAL

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

Channel 140

	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	5699.00	96.84			88.73	6.81	34.68	33.38	204	100	Average	VERTICAL
2	5699.00	106.90			98.79	6.81	34.68	33.38	204	100	Peak	VERTICAL
3	5725.00	53.85	54.00	-0.15	45.70	6.83	34.69	33.37	204	100	Average	VERTICAL
4	5725.00	69.74	74.00	-4.26	61.59	6.83	34.69	33.37	204	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5700 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

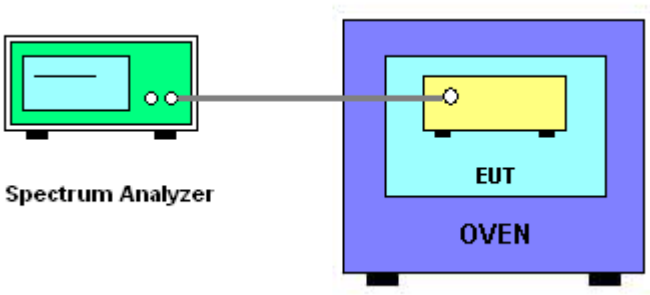
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. 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	Lucas Huang / Andy Tsai	Test Date	Serway Li

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5300 MHz	5500 MHz
126.50	5299.9958	5499.9958
110.00	5299.9962	5499.9962
93.50	5299.9964	5499.9964
Max. Deviation (MHz)	0.004200	0.004200
Max. Deviation (ppm)	0.79	0.76

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5300 MHz	5500 MHz
0	5299.9952	5499.9952
10	5299.9956	5499.9956
20	5299.9958	5499.9958
30	5299.9958	5499.9958
40	5299.9960	5499.9960
Max. Deviation (MHz)	0.004800	0.004800
Max. Deviation (ppm)	0.91	0.87

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. 23, 2014	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 17, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 04, 2014	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	Radiation (03CH01-CB)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jul. 28, 2014	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	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02009	1GHz ~ 26.5GHz	Dec. 17, 2014	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Apr. 22, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100080	9kHz ~ 40GHz	Dec. 30, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
MXE EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 30MHz	Jan. 22, 2014	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-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-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	Dec.12, 2014	Conducted (TH01-CB)
Signal analyzer	Agilent	N9010A	MY52220519	10Hz~44GHz	Dec. 11, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
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)
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.

NCR means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

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