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FCC RADIO TEST REPORT

Applicant's company	**Arcadyan Technology Corporation**
Applicant Address	No.8, Sec.2, Guangfu Rd.,Hsinchu, 30071 Taiwan
FCC ID	**RAXWA8001BAC**
Manufacturer's company	**Arcadyan Technology Corporation**
Manufacturer Address	No.8, Sec.2, Guangfu Rd.,Hsinchu, 30071 Taiwan

Product Name	4x4 Video bridge
Brand Name	AIRSONICS
Model No.	GXT542U
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Jan. 22, 2015
Final Test Date	Feb. 25, 2015
Submission Type	Class II Change

Statement

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

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

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

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

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR511636-01	Rev. 01	Initial issue of report	Jul. 31, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	4x4 Video bridge
Brand Name	:	AIRSONICS
Model No.	:	GXT542U
Applicant	:	Arcadyan Technology Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jan. 22, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.2	15.407(a)	Maximum Conducted Output Power	Complies	0.49 dB
4.3	15.407(a)	Power Spectral Density	Complies	3.87 dB
4.4	15.407(b)	Radiated Emissions	Complies	3.06 dB
4.5	15.407(b)	Band Edge Emissions	Complies	0.47 dB
4.6	15.407(g)	Frequency Stability	Complies	-
4.7	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	see the below table
Data Modulation	IEEE 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table
Frequency Range	5250 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	5 for 40MHz bandwidth ; 2 for 80MHz bandwidth
Channel Band Width (99%)	For non-beamforming mode: Band 2: IEEE 802.11ac MCS0/Nss1 (VHT40): 36.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.60 MHz Band 3: IEEE 802.11ac MCS0/Nss1 (VHT40): 37.40 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.20 MHz For beamforming mode: Band 2: IEEE 802.11ac MCS0/Nss1 (VHT40): 37.40 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.00 MHz Band 3: IEEE 802.11ac MCS0/Nss1 (VHT40): 37.40 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.20 MHz

Maximum Conducted Output Power	For non-beamforming mode: Band 2: IEEE 802.11ac MCS0/Nss1 (VHT40): 23.51 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 21.26 dBm Band 3: IEEE 802.11ac MCS0/Nss1 (VHT40): 23.46 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 20.28 dBm For beamforming mode: Band 2: IEEE 802.11ac MCS0/Nss1 (VHT40): 21.36 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.75 dBm Band 3: IEEE 802.11ac MCS0/Nss1 (VHT40): 21.44 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 20.28 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
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	40 MHz	80 MHz
IEEE 802.11n	V	X
IEEE 802.11ac	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT40)	4	MCS 0-31
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 supports HT40. Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT40 and VHT80. Note 3: Modulation modes consist of below configuration: HT40: IEEE 802.11n, VHT40/VHT80: IEEE 802.11ac		

3.2. Accessories

Power	Brand	Model	Rating
Adapter	APD	WA-18G12U	Input:100-240V~50-60Hz 0.5A(Max) Output:12V, 1.5A

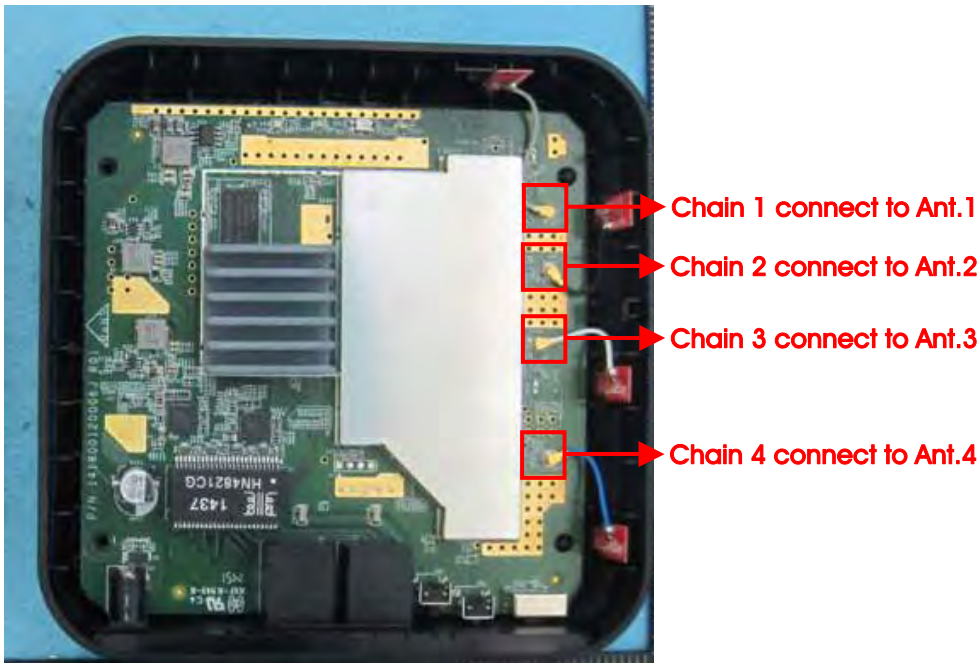
3.3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	Airgain	N5x20SC-PK1-B30UR1	PIFA Antenna	I-PEX	-1.38
2	Airgain	N5x20SC-PK1-B30UR1	PIFA Antenna	I-PEX	-1.38
3	Airgain	N5x20SC-PK1-B30UR1	PIFA Antenna	I-PEX	-1.38
4	Airgain	N5x20SC-PK1-B30UR1	PIFA Antenna	I-PEX	-1.38

Note: The EUT has four antennas.

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

Ant. 1, Ant. 2, Ant. 3 and Ant. 4 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are two bandwidth systems.

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	54	5270 MHz	62	5310 MHz
	58	5290 MHz	-	-
5470~5725 MHz Band 3	102	5510 MHz	110	5550 MHz
	106	5530 MHz	134	5670 MHz

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Chain
Max. Conducted Output Power	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	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	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 Above 1GHz	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	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	40 MHz	Band 2-3	-	62/110	1+2+3+4
	80 MHz	Band 2-3	-	58/106	1+2+3+4

Note: 1. The EUT can only be used at X axis position.

2. VHT40 covers HT40, due to same modulation. The power setting for 802.11n HT40 is the same or lower than 802.11ac VHT40.

3. There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802.11n/ac. All test results were recorded in the 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: FR511636.

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

Modifications	Performance Checking
Adding 5GHz Band 2 and Band 3 (5250~5350 MHz, 5470~5725 MHz) for this device.	1. Max. Conducted Output Power. 2. Power Spectral Density. 3. 26dB Spectrum Bandwidth. 4. 99% Occupied Bandwidth Measurement. 5. Radiated Emission Above 1GHz. 6. Band Edge Emission 7. Frequency Stability. 8. Maximum Permissible Exposure.

Note: 1. Maximum Permissible Exposure (please refer to Appendix C).

2. For Band2 and Band3, it has two bandwidth systems only (40MHz bandwidth systems, 80MHz bandwidth systems).

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB

For non-beamforming mode:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	E2K4965AGNM

For beamforming mode:

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	E2K4965AGNM
Notebook	DELL	E6430	DoC
WLAN ac Dongle	Netgear	A6200	PY31220200

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6220	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 non-beamforming mode:

Test Software Version	DOS				
Mode	NCB: 40MHz				
802.11ac MCS0/Nss1 VHT40	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz
	17	17	15	17	17
Mode	NCB: 80MHz				
802.11ac MCS0/Nss1 VHT80	5290 MHz		5530 MHz		
	15		14		

For beamforming mode:

Test Software Version	DOS				
Mode	NCB: 40MHz				
802.11ac MCS0/Nss1 VHT40	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz
	15	15	13	15	14
Mode	NCB: 80MHz				
802.11ac MCS0/Nss1 VHT80	5290 MHz		5530 MHz		
	13		14		

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 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

For non-beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT40	2.391	2.456	97.35%	0.12	0.42
802.11ac MCS0/Nss1 VHT80	1.104	1.195	92.38%	0.34	0.91

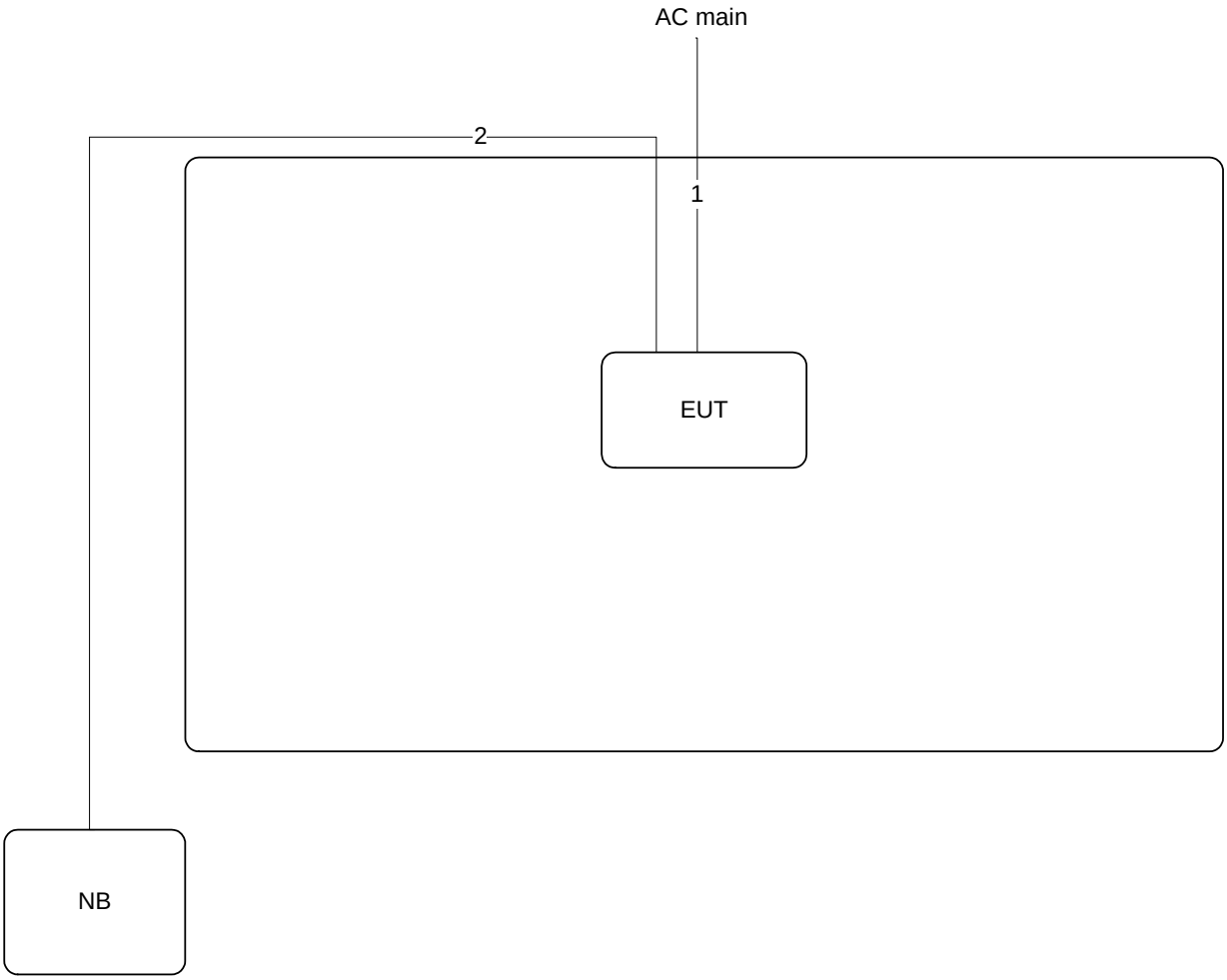
For beamforming mode:

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT40	0.872	1.050	83.09%	0.80	1.15
802.11ac MCS0/Nss1 VHT80	0.811	0.902	89.91%	0.46	1.23

3.12. Test Configurations

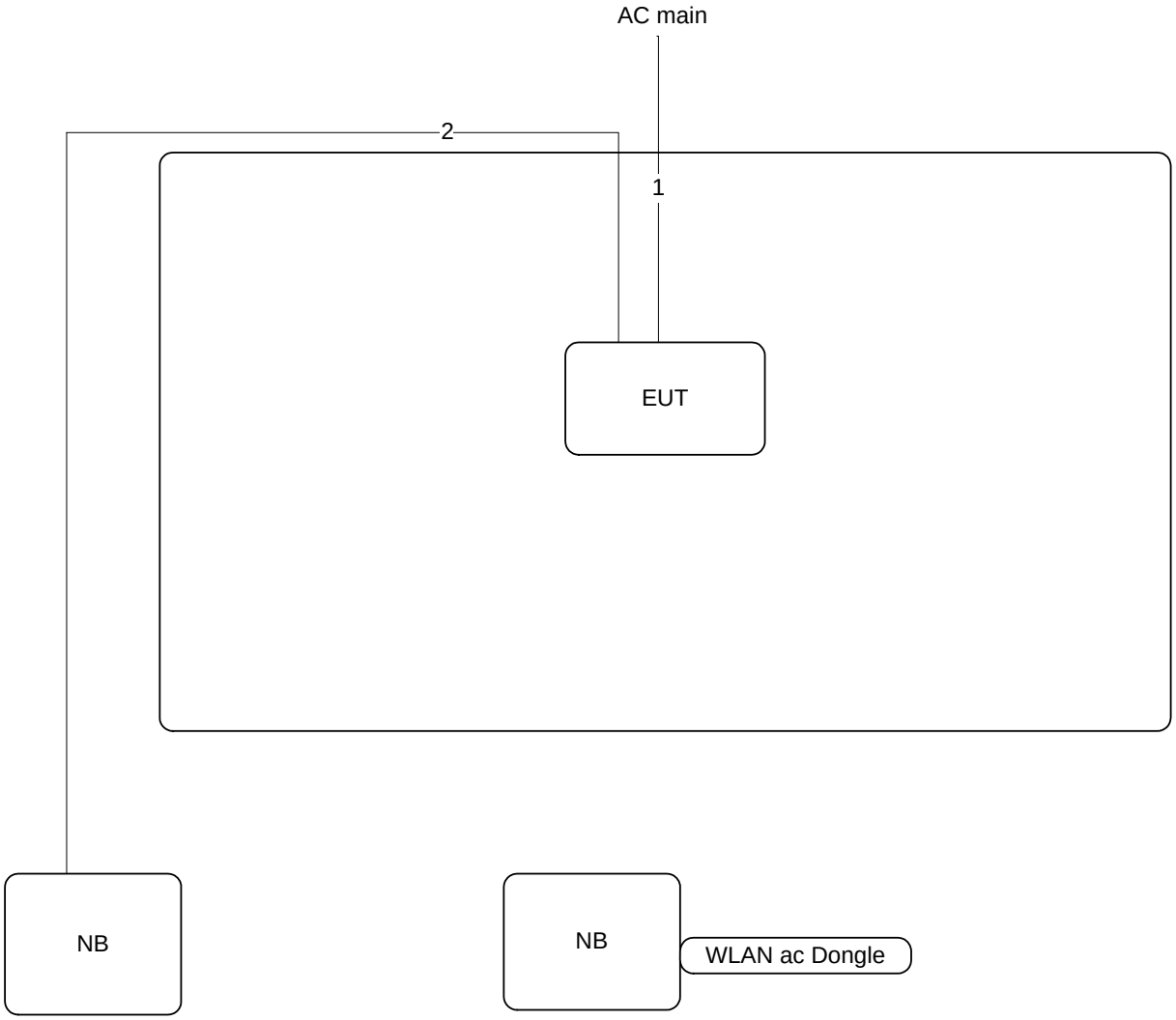
3.12.1. Radiation Emissions Test Configuration

For non-beamforming mode:



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

For beamforming mode:



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

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

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 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

4.1.3. 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%.

4.1.4. Test Setup Layout

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

This test setup layout is the same as that shown in section 4.4.4.

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	26℃	Humidity	63%
Test Engineer	Kenneth Huang		

For non-beamforming mode:

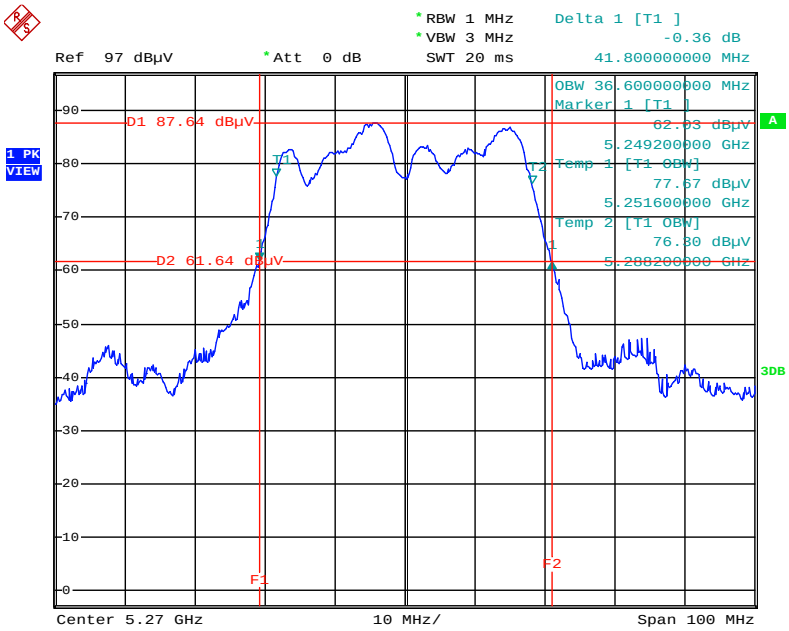
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT40	5270 MHz	41.80	36.60
	5310 MHz	42.60	36.80
	5510 MHz	42.20	37.00
	5550 MHz	41.40	36.60
	5670 MHz	42.60	37.40
802.11ac MCS0/Nss1 VHT80	5290 MHz	80.80	75.60
	5530 MHz	80.40	75.20

For beamforming mode:

Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11ac MCS0/Nss1 VHT40	5270 MHz	43.60	37.40
	5310 MHz	43.20	37.20
	5510 MHz	43.40	37.20
	5550 MHz	43.60	37.20
	5670 MHz	43.80	37.40
802.11ac MCS0/Nss1 VHT80	5290 MHz	80.80	76.00
	5530 MHz	80.40	75.20

For non-beamforming mode:

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



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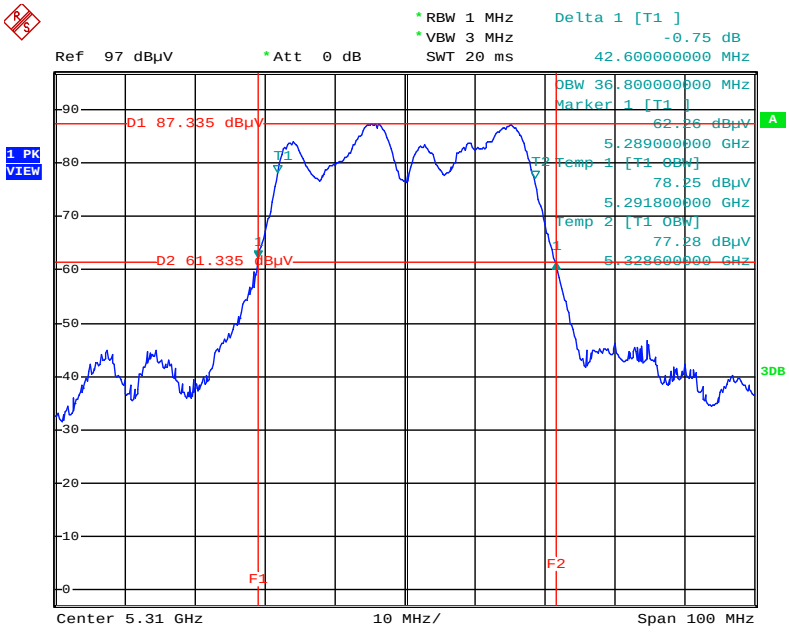
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5310 MHz



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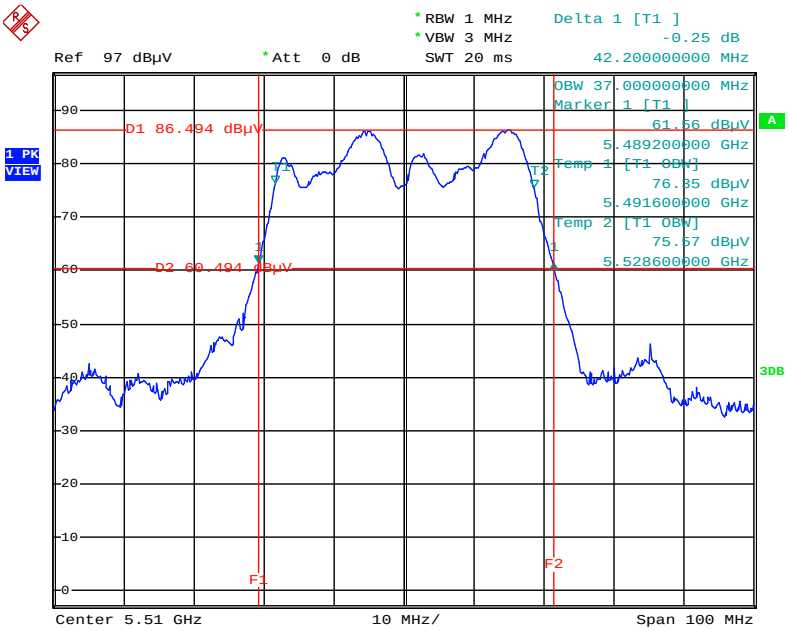
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5510 MHz



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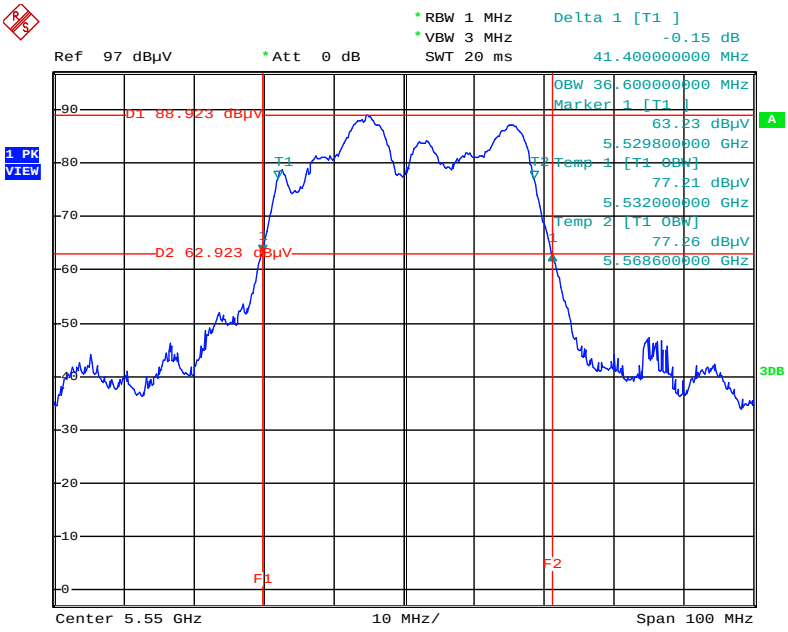
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5550 MHz



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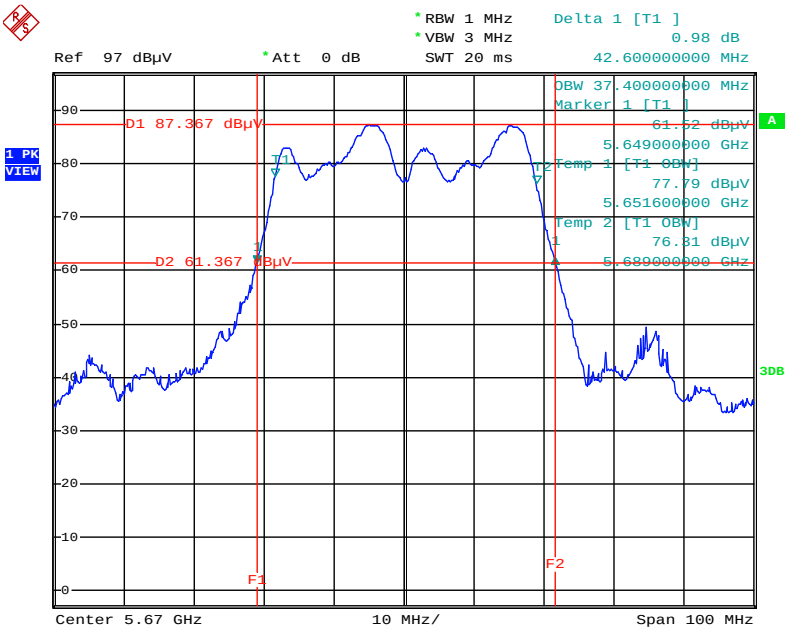
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5670 MHz



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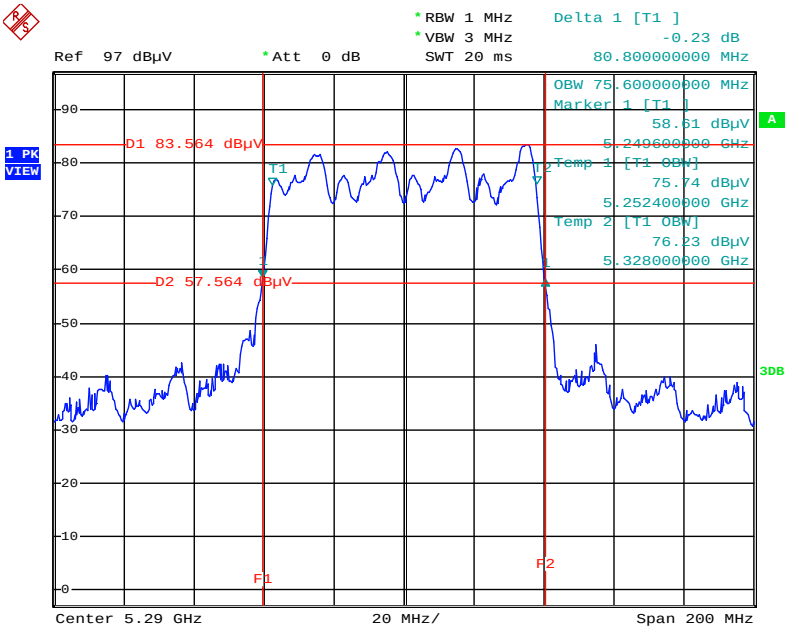
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5290 MHz



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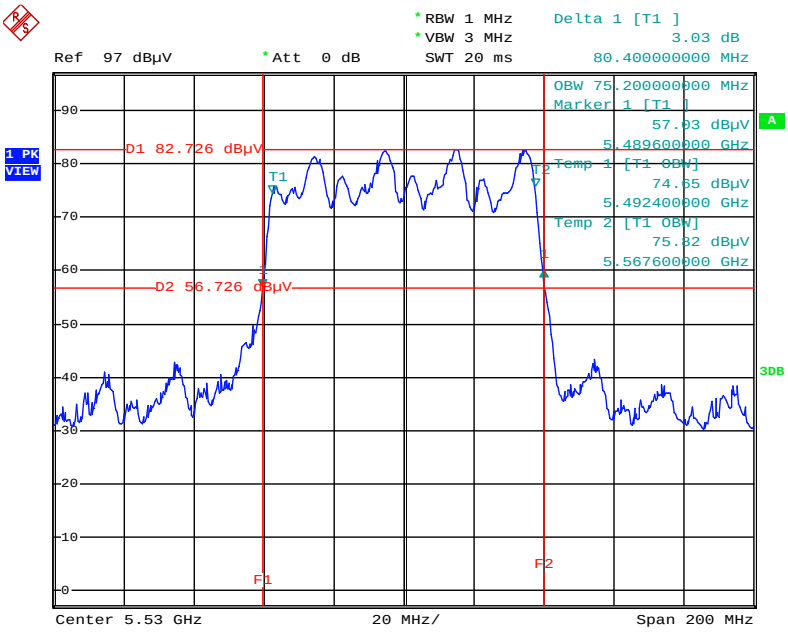
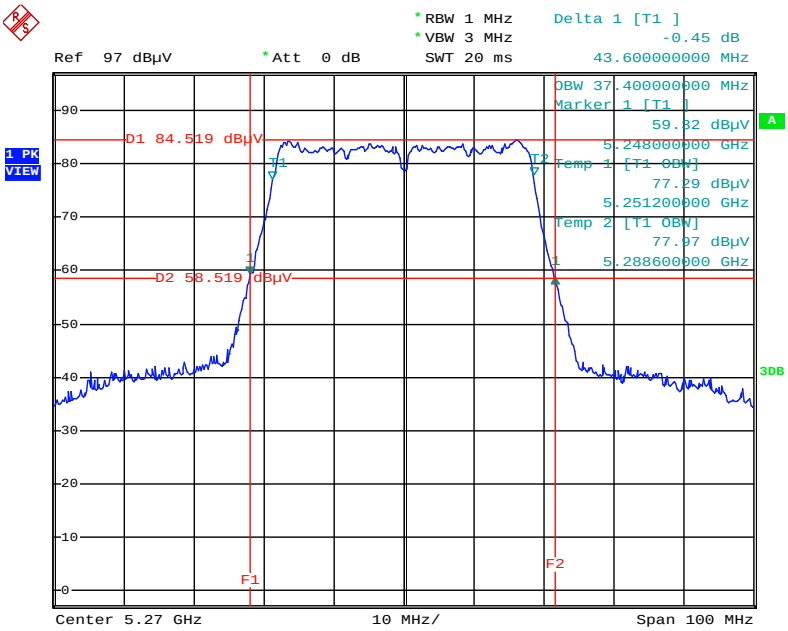


Date: 25.FEB.2015 19:55:26

For beamforming mode:

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



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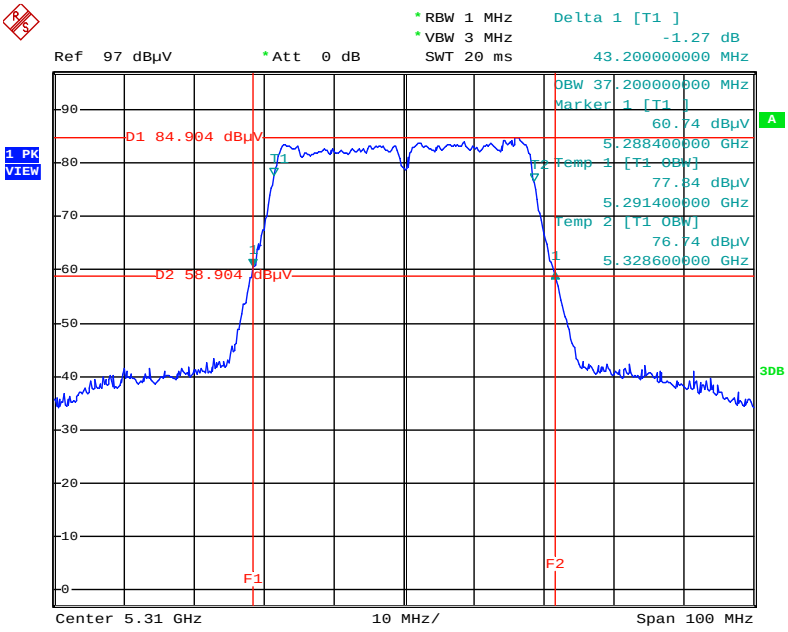

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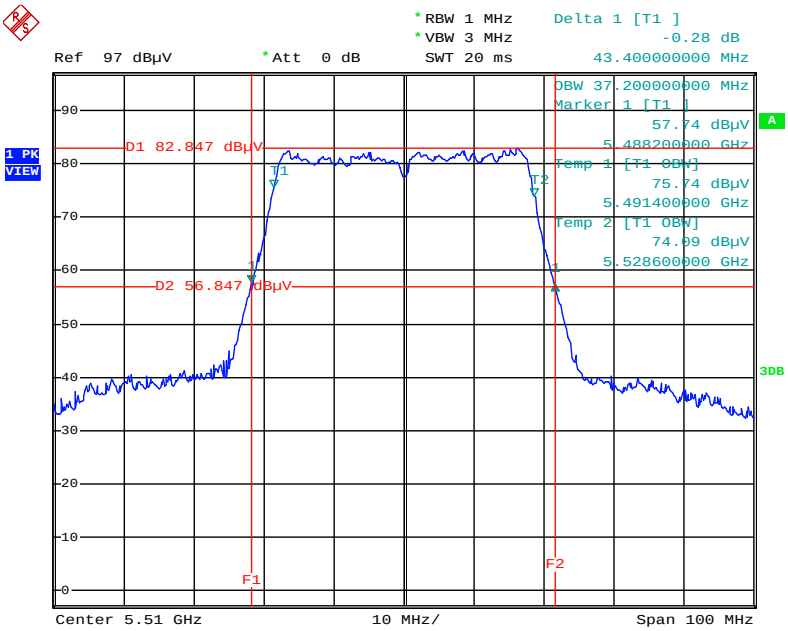
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5510 MHz



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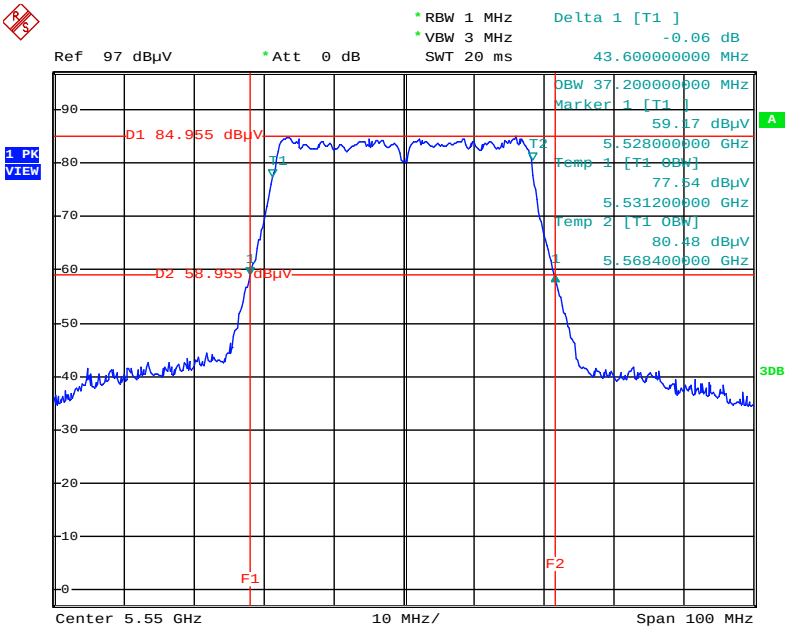
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5550 MHz



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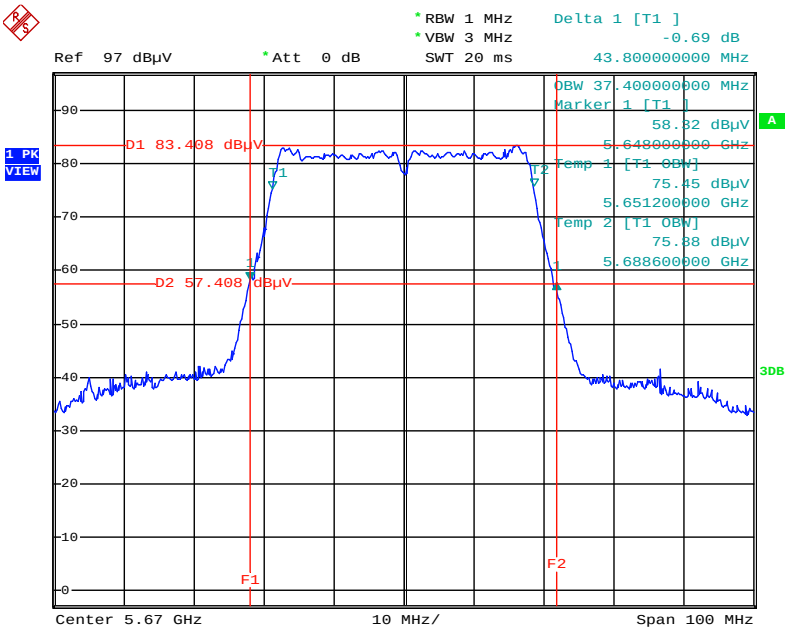
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5670 MHz



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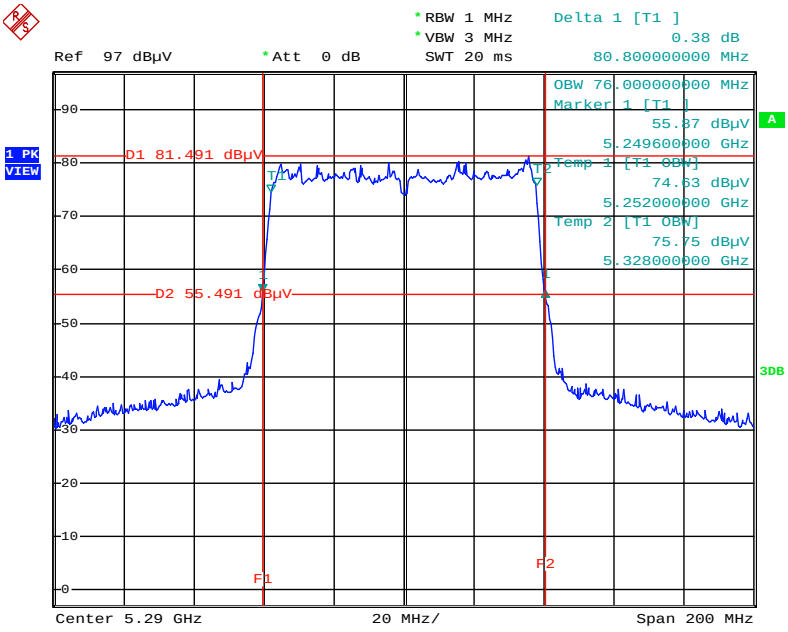
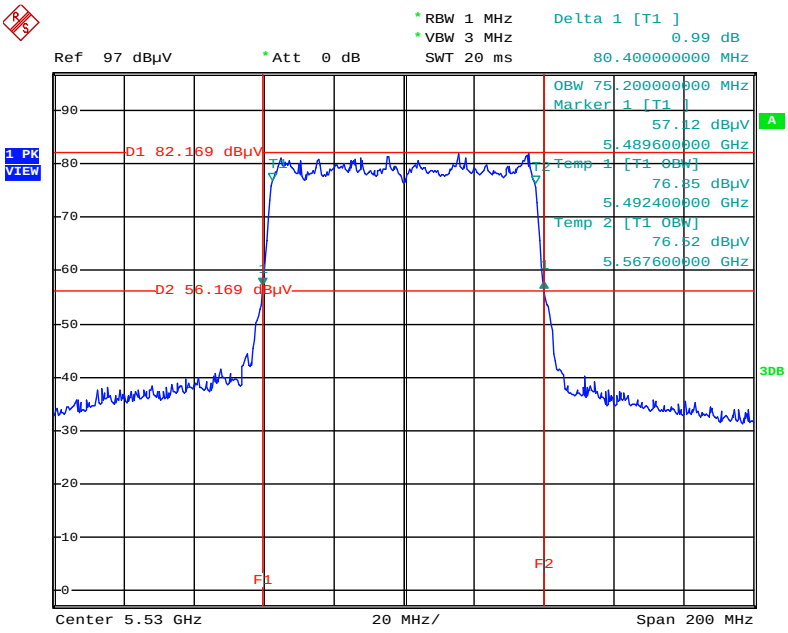
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5290 MHz



Date: 25.FEB.2015 20:04:40

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



Date: 25.FEB.2015 20:04:03

4.2. Maximum Conducted Output Power Measurement

4.2.1. 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	

4.2.2. Measuring Instruments and Setting

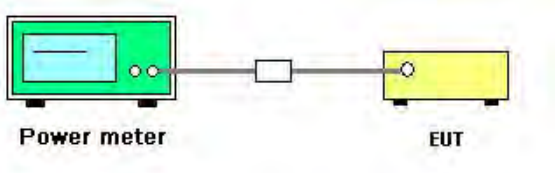
Please refer to section 5 of equipments list in this report The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.2.3. 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.

4.2.4. Test Setup Layout



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 Maximum Conducted Output Power

Temperature	26°C	Humidity	63%
Test Engineer	Kenneth Huang	Test Date	Feb. 25, 2015

For non-beamforming mode:

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11ac MCS0/Nss1 VHT40	5270 MHz	17.13	17.58	17.63	17.59	23.51	24.00	Complies
	5310 MHz	17.07	17.45	17.36	17.79	23.45	24.00	Complies
	5510 MHz	15.72	14.81	15.61	15.56	21.46	24.00	Complies
	5550 MHz	17.85	16.89	17.38	17.57	23.46	24.00	Complies
	5670 MHz	17.79	16.83	17.29	17.36	23.35	24.00	Complies
802.11ac MCS0/Nss1 VHT80	5290 MHz	14.84	15.23	15.43	15.45	21.26	24.00	Complies
	5530 MHz	14.47	13.65	14.35	14.52	20.28	24.00	Complies

For beamforming mode:

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11ac MCS0/Nss1 VHT40	5270 MHz	14.79	15.42	15.63	15.48	21.36	24.00	Complies
	5310 MHz	15.12	15.23	15.12	15.44	21.25	24.00	Complies
	5510 MHz	13.56	12.56	13.07	12.55	18.98	24.00	Complies
	5550 MHz	15.53	15.03	15.42	15.68	21.44	24.00	Complies
	5670 MHz	14.73	14.02	14.92	14.78	20.65	24.00	Complies
802.11ac MCS0/Nss1 VHT80	5290 MHz	13.05	12.58	12.72	12.54	18.75	24.00	Complies
	5530 MHz	14.47	13.65	14.35	14.52	20.28	24.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.64dBi <6dBi, so the limit doesn't reduce.

4.3. Power Spectral Density Measurement

4.3.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.2.1.

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

4.3.2. Measuring Instruments and Setting

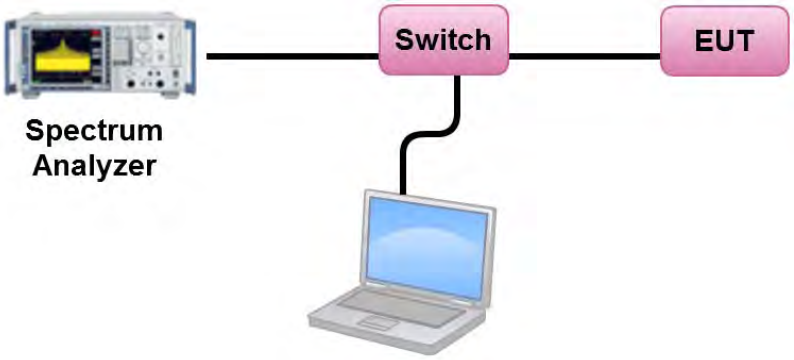
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. 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.

4.3.4. 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 Power Spectral Density

Temperature	26°C	Humidity	63%
Test Engineer	Kenneth Huang	Test Date	Feb. 25, 2015

For non-beamforming mode:

Mode	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
802.11ac MCS0/Nss1 VHT40	5270 MHz	7.13	11.00	Complies
	5310 MHz	7.06	11.00	Complies
	5510 MHz	5.37	11.00	Complies
	5550 MHz	7.04	11.00	Complies
	5670 MHz	6.91	11.00	Complies
802.11ac MCS0/Nss1 VHT80	5290 MHz	2.77	11.00	Complies
	5530 MHz	1.82	11.00	Complies

Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.64dBi <6dBi, so the limit doesn't reduce.

For beamforming mode:

Mode	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
802.11ac MCS0/Nss1 VHT40	5270 MHz	4.78	11.00	Complies
	5310 MHz	4.50	11.00	Complies
	5510 MHz	5.37	11.00	Complies
	5550 MHz	5.01	11.00	Complies
	5670 MHz	4.13	11.00	Complies
802.11ac MCS0/Nss1 VHT80	5290 MHz	2.77	11.00	Complies
	5530 MHz	2.38	11.00	Complies

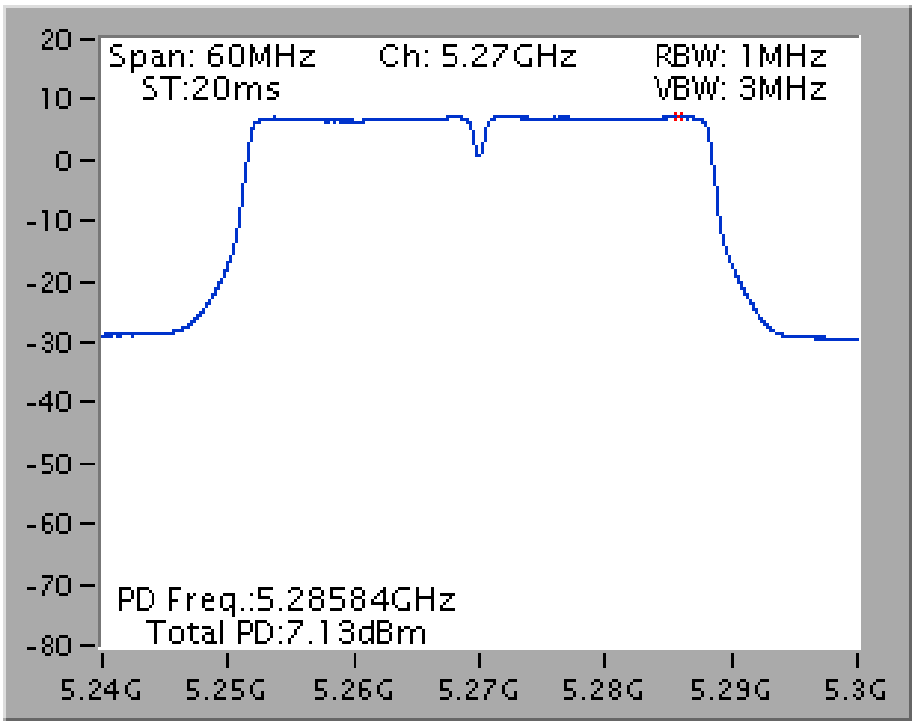
Note: $Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =4.64dBi <6dBi, so the limit doesn't reduce.

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

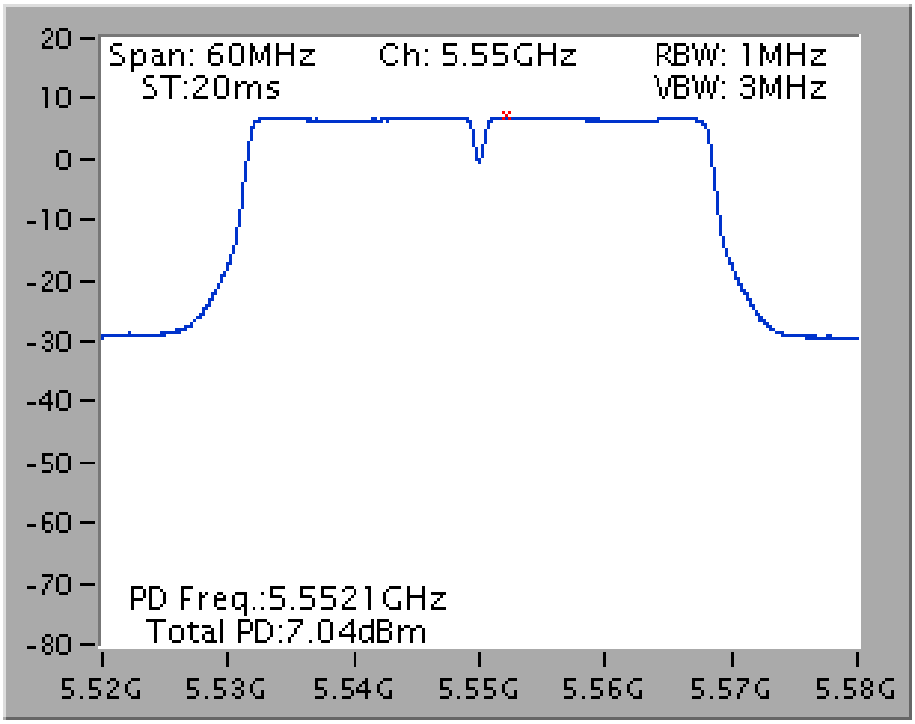
For plots, only the channel with worse result was shown.

For non-beamforming mode:

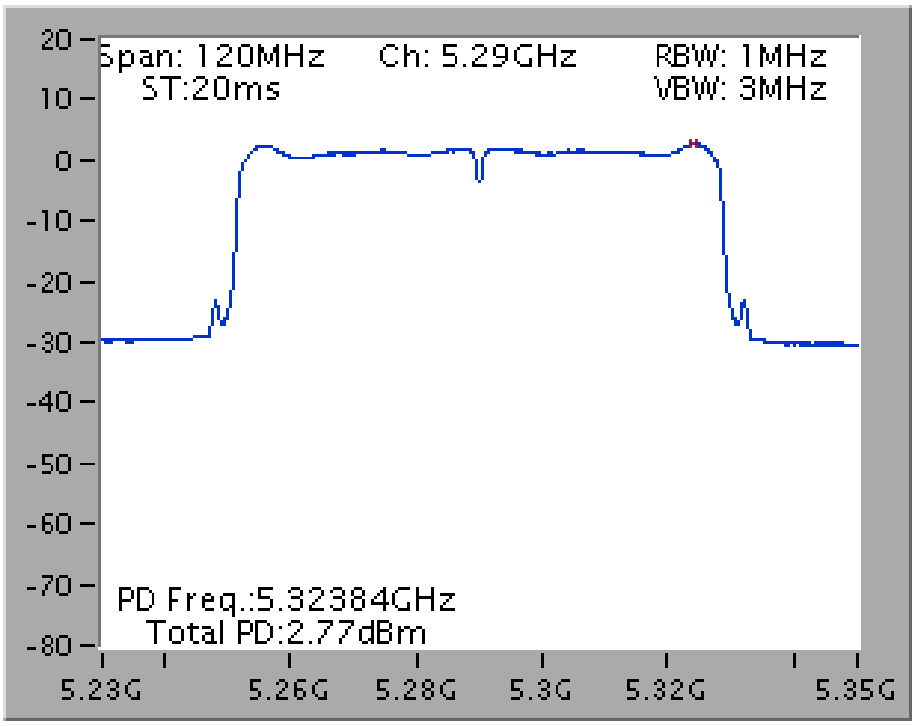
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5270 MHz



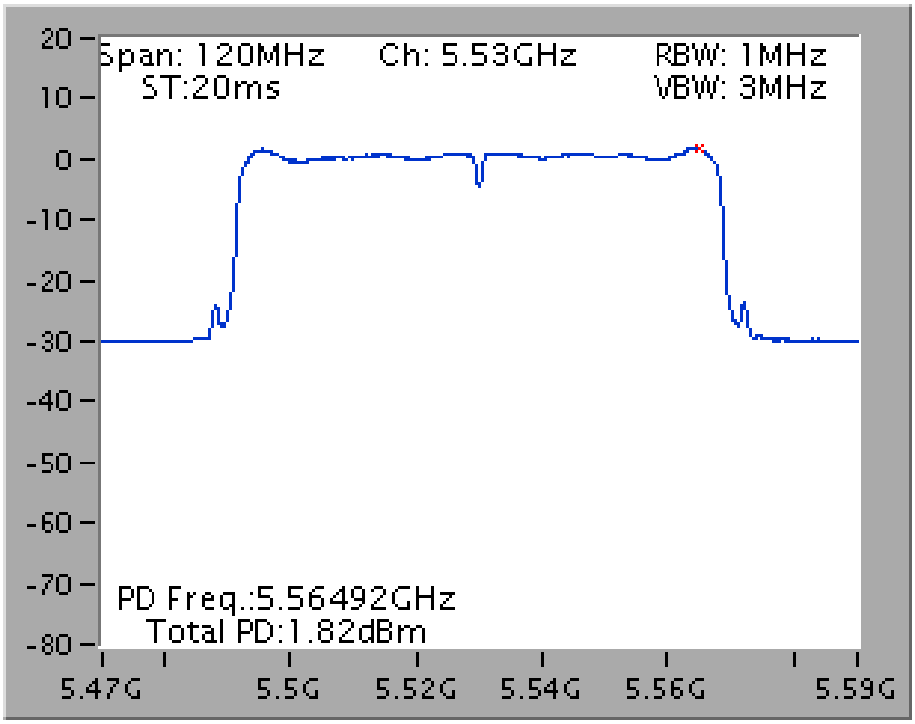
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5550 MHz



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

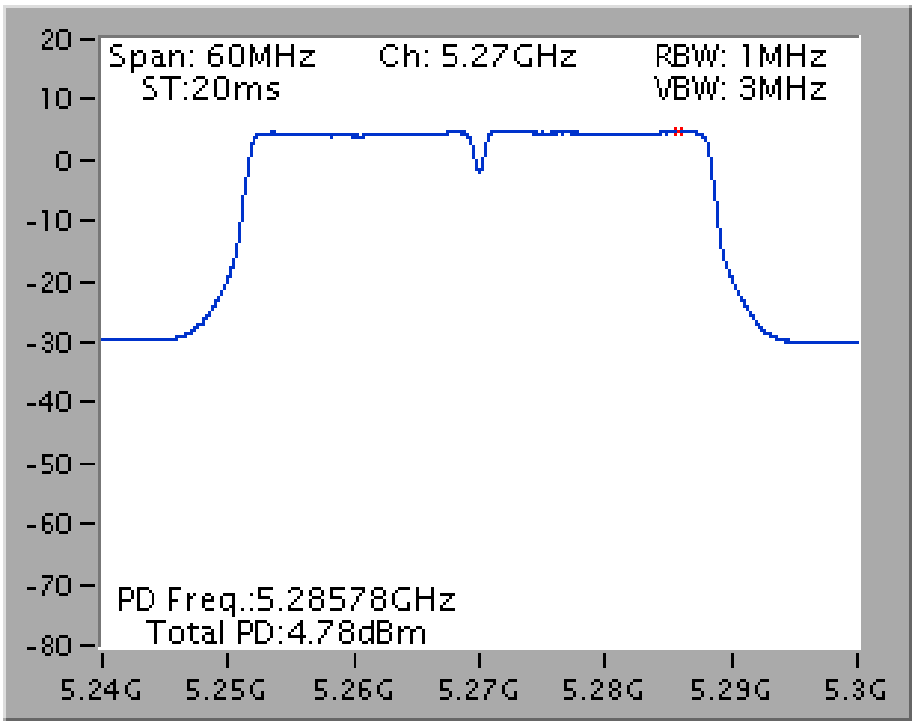


Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5530 MHz

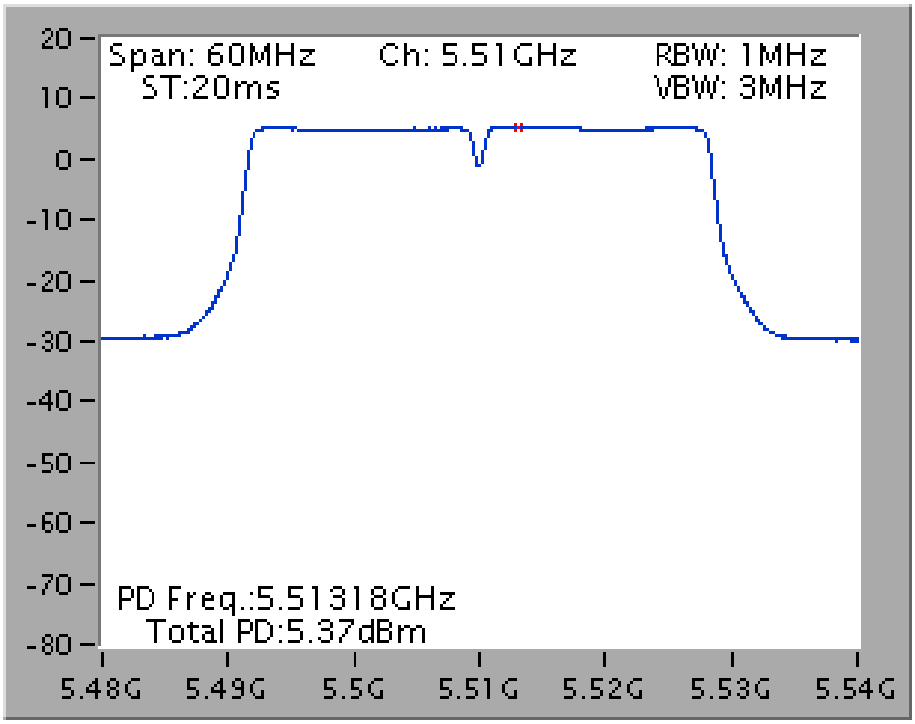


For beamforming mode:

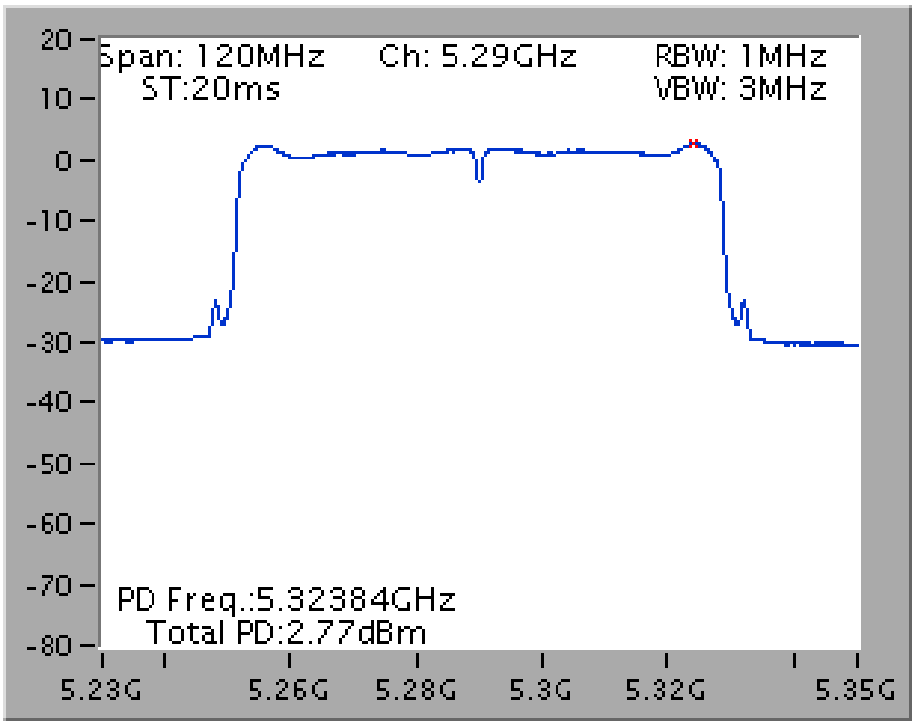
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5270 MHz



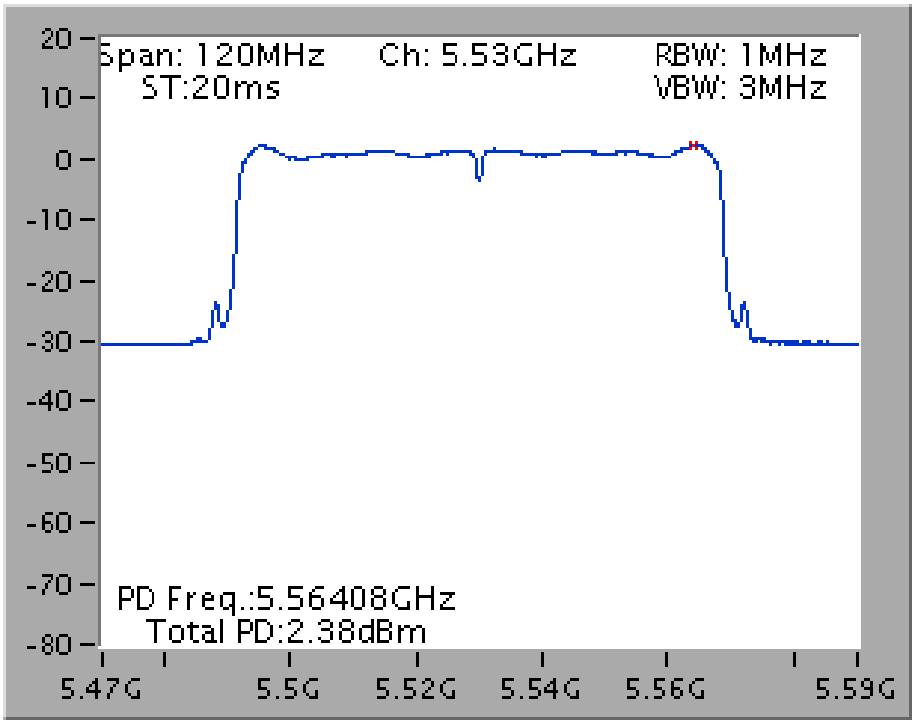
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5510 MHz



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



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



4.4. Radiated Emissions Measurement

4.4.1. 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

4.4.2. 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.

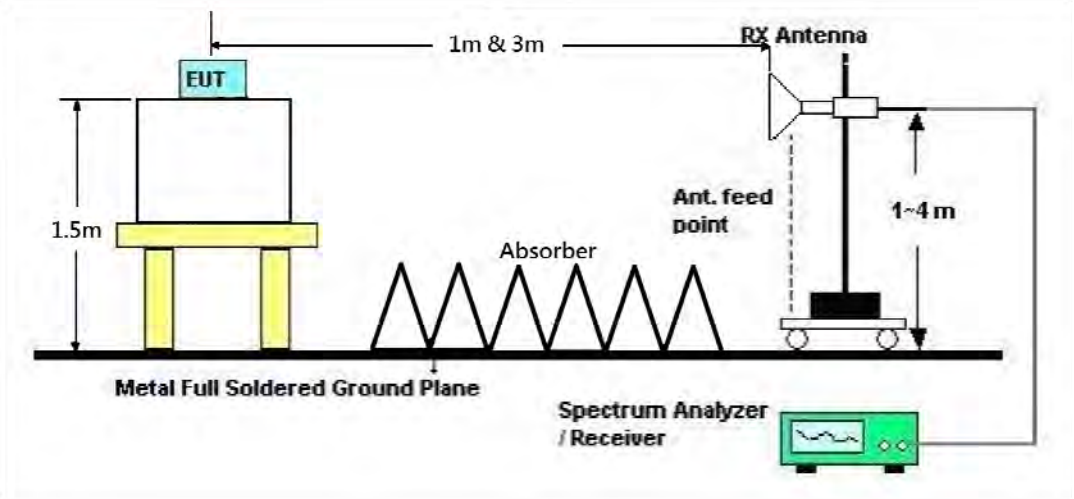
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

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

4.4.3. 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.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

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.

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

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 02, 2015	Test Mode	Non-beamforming mode

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	15790.09	43.46	54.00	-10.54	29.47	10.83	34.83	37.99	HORIZONTAL	289	194	Average
2	15798.02	56.86	74.00	-17.14	42.88	10.83	34.83	37.98	HORIZONTAL	289	194	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	15802.30	60.34	74.00	-13.66	46.39	10.83	34.83	37.95	VERTICAL	139	197	Peak
2	15814.51	47.29	54.00	-6.71	33.35	10.83	34.84	37.95	VERTICAL	139	197	Average

Temperature	25°C	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 62 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 02, 2015	Test Mode	Non-beamforming mode

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	10632.27	44.56	54.00	-9.44	30.12	8.76	34.30	39.98	HORIZONTAL	123	100	Average
2	10632.74	58.11	74.00	-15.89	43.67	8.76	34.30	39.98	HORIZONTAL	123	100	Peak
3	15905.69	57.28	74.00	-16.72	43.45	10.87	34.87	37.83	HORIZONTAL	143	207	Peak
4	15907.57	43.61	54.00	-10.39	29.78	10.87	34.87	37.83	HORIZONTAL	143	207	Average

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	10620.23	46.90	54.00	-7.10	32.46	8.76	34.28	39.96	VERTICAL	110	100	Average
2	10621.97	59.23	74.00	-14.77	44.77	8.76	34.28	39.98	VERTICAL	110	100	Peak
3	15911.11	57.38	74.00	-16.62	43.55	10.87	34.87	37.83	VERTICAL	135	212	Peak
4	15915.09	44.30	54.00	-9.70	30.48	10.87	34.88	37.83	VERTICAL	135	212	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Non-beamforming mode

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	11026.02	43.99	54.00	-10.01	29.88	8.94	35.01	40.18	HORIZONTAL	195	105	Average
2	11027.64	56.70	74.00	-17.30	42.59	8.94	35.01	40.18	HORIZONTAL	195	105	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	11020.70	45.29	54.00	-8.71	31.16	8.94	35.01	40.20	VERTICAL	257	100	Average
2	11021.85	58.06	74.00	-15.94	43.93	8.94	35.01	40.20	VERTICAL	257	100	Peak

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 110 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Non-beamforming mode

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	11098.55	61.69	74.00	-12.31	47.60	8.96	35.01	40.14	HORIZONTAL	133	107	Peak
2	11100.17	48.19	54.00	-5.81	34.10	8.96	35.01	40.14	HORIZONTAL	133	107	Average

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	11104.57	50.60	54.00	-3.40	36.51	8.96	35.01	40.14	VERTICAL	265	106	Average
2	11105.09	64.20	74.00	-9.80	50.09	8.98	35.01	40.14	VERTICAL	265	106	Peak

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 134 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Non-beamforming mode

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	11345.96	47.27	54.00	-6.73	33.27	9.03	35.02	39.99	HORIZONTAL	9	100	Average
2	11346.89	60.51	74.00	-13.49	46.51	9.03	35.02	39.99	HORIZONTAL	9	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	11338.44	63.56	74.00	-10.44	49.55	9.03	35.02	40.00	VERTICAL	310	105	Peak
2	11340.23	50.84	54.00	-3.16	36.83	9.03	35.02	40.00	VERTICAL	310	105	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Non-beamforming mode

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	10612.07	44.57	54.00	-9.43	30.13	8.73	34.26	39.97	HORIZONTAL	191	112	Average
2	10617.40	57.25	74.00	-16.75	42.82	8.73	34.27	39.97	HORIZONTAL	191	112	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	10612.65	44.72	54.00	-9.28	30.29	8.73	34.26	39.96	VERTICAL	120	107	Average
2	10615.77	57.48	74.00	-16.52	43.06	8.73	34.27	39.96	VERTICAL	120	107	Peak

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 106 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Non-beamforming mode

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	11024.92	44.42	54.00	-9.58	30.31	8.94	35.01	40.18	HORIZONTAL	144	109	Average
2	11046.34	57.23	74.00	-16.77	43.11	8.96	35.01	40.17	HORIZONTAL	144	109	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	11022.14	57.27	74.00	-16.73	43.14	8.94	35.01	40.20	VERTICAL	86	110	Peak
2	11063.36	44.56	54.00	-9.44	30.45	8.96	35.01	40.16	VERTICAL	86	110	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

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	15803.24	43.82	54.00	-10.18	29.85	10.83	34.83	37.97	HORIZONTAL	228	141	Average
2	15812.40	56.63	74.00	-17.37	42.68	10.83	34.84	37.96	HORIZONTAL	228	141	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	15807.28	57.42	74.00	-16.58	43.47	10.83	34.83	37.95	VERTICAL	215	128	Peak
2	15807.69	44.78	54.00	-9.22	30.83	10.83	34.83	37.95	VERTICAL	215	128	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 62 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	10614.65	56.97	74.00	-17.03	42.54	39.97	8.73	34.27	110	48	HORIZONTAL	Peak
2	10623.43	44.93	54.00	-9.07	30.47	39.98	8.76	34.28	110	48	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	10616.67	60.47	74.00	-13.53	46.05	39.96	8.73	34.27	100	293	VERTICAL	Peak
2	10620.51	46.89	54.00	-7.11	32.45	39.96	8.76	34.28	100	293	VERTICAL	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11018.53	45.25	54.00	-8.75	31.13	40.19	8.94	35.01	125	155	HORIZONTAL	Average
2	11026.92	57.03	74.00	-16.97	42.92	40.18	8.94	35.01	125	155	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11019.97	61.73	74.00	-12.27	47.60	40.20	8.94	35.01	105	292	VERTICAL	Peak
2	11020.19	48.68	54.00	-5.32	34.55	40.20	8.94	35.01	105	292	VERTICAL	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 110 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

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	11099.90	60.11	74.00	-13.89	46.02	8.96	35.01	40.14	HORIZONTAL	40	102	Peak
2	11100.03	46.58	54.00	-7.42	32.49	8.96	35.01	40.14	HORIZONTAL	40	102	Average

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	11099.87	50.94	54.00	-3.06	36.85	8.96	35.01	40.14	VERTICAL	263	102	Average
2	11104.36	64.89	74.00	-9.11	50.80	8.96	35.01	40.14	VERTICAL	263	102	Peak

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 134 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

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	11333.49	56.97	74.00	-17.03	42.96	9.03	35.02	40.00	HORIZONTAL	197	107	Peak
2	11342.47	44.34	54.00	-9.66	30.34	9.03	35.02	39.99	HORIZONTAL	197	107	Average

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	11337.47	57.71	74.00	-16.29	43.70	9.03	35.02	40.00	VERTICAL	233	138	Peak
2	11345.64	44.17	54.00	-9.83	30.16	9.03	35.02	40.00	VERTICAL	233	138	Average

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	15865.40	44.32	54.00	-9.68	30.46	37.89	10.83	34.86	106	228	HORIZONTAL	Average
2	15872.32	57.50	74.00	-16.50	43.65	37.88	10.83	34.86	106	228	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	15869.78	44.42	54.00	-9.58	30.56	37.89	10.83	34.86	141	284	VERTICAL	Average
2	15871.70	56.96	74.00	-17.04	43.10	37.89	10.83	34.86	141	284	VERTICAL	Peak

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 106 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11062.05	45.34	54.00	-8.66	31.23	40.16	8.96	35.01	136	90	HORIZONTAL	Average
2	11063.46	57.69	74.00	-16.31	43.58	40.16	8.96	35.01	136	90	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg		
1	11060.24	47.53	54.00	-6.47	33.42	40.16	8.96	35.01	110	68	VERTICAL	Average
2	11061.51	60.40	74.00	-13.60	46.29	40.16	8.96	35.01	110	68	VERTICAL	Peak

Note:

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

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

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

4.5. Band Edge 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 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

4.5.3. Test Procedures

1. The test procedure is the same as section 4.4.3.

4.5.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.4.4.

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. Test Result of Band Edge and Fundamental Emissions

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54, 62 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Jan. 31, 2015	Test Mode	Non-beamforming mode

Channel 54

	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	5260.74	104.61			100.53	6.01	33.54	31.61	VERTICAL	26	100	Average
2	5261.61	113.25			109.17	6.01	33.54	31.61	VERTICAL	26	100	Peak
3	5350.00	60.36	74.00	-13.64	56.13	6.06	33.51	31.68	VERTICAL	26	100	Peak
4	5350.29	48.43	54.00	-5.57	44.20	6.06	33.51	31.68	VERTICAL	26	100	Average

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

Channel 62

	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	5300.45	99.78			95.62	6.04	33.52	31.64	VERTICAL	17	132	Average
2	5301.61	109.31			105.15	6.04	33.52	31.64	VERTICAL	17	132	Peak
3	5350.00	52.85	54.00	-1.15	48.62	6.06	33.51	31.68	VERTICAL	17	132	Average
4	5350.00	65.41	74.00	-8.59	61.18	6.06	33.51	31.68	VERTICAL	17	132	Peak

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

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102, 110, 134 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Jan. 31, 2015	Test Mode	Non-beamforming mode

Channel 102

	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	5460.00	47.79	54.00	-6.21	43.35	6.15	33.47	31.76	VERTICAL	294	100	Average
2	5460.00	60.41	74.00	-13.59	55.97	6.15	33.47	31.76	VERTICAL	294	100	Peak
3	5462.19	67.17	68.20	-1.03	62.73	6.15	33.47	31.76	VERTICAL	294	100	Peak
4	5516.66	97.92			93.38	6.17	33.45	31.82	VERTICAL	294	100	Average
5	5516.95	108.22			103.68	6.17	33.45	31.82	VERTICAL	294	100	Peak

Item 4, 5 are the fundamental frequency at 5510 MHz.

Channel 110

	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	5457.40	59.26	74.00	-14.74	54.84	6.13	33.47	31.76	VERTICAL	293	118	Peak
2	5458.26	46.40	54.00	-7.60	41.98	6.13	33.47	31.76	VERTICAL	293	118	Average
3	5470.00	48.45	54.00	-5.55	43.98	6.15	33.46	31.78	VERTICAL	293	118	Average
4	5470.00	61.68	74.00	-12.32	57.21	6.15	33.46	31.78	VERTICAL	293	118	Peak
5	5556.95	113.02			108.40	6.19	33.43	31.86	VERTICAL	293	118	Peak
6	5557.38	103.12			98.50	6.19	33.43	31.86	VERTICAL	293	118	Average

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

Channel 134

	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	5656.98	112.41			107.57	6.24	33.40	32.00	VERTICAL	294	129	Peak
2	5677.53	103.02			98.13	6.26	33.39	32.02	VERTICAL	294	129	Average
3	5732.53	66.65	68.20	-1.55	61.66	6.28	33.37	32.08	VERTICAL	294	129	Peak

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

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58, 106 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Jan. 31, 2015	Test Mode	Non-beamforming mode

Channel 58

	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	5130.46	57.68	74.00	-16.32	53.84	5.92	33.59	31.51	HORIZONTAL	261	128	Peak
2	5150.00	44.13	54.00	-9.87	40.27	5.92	33.58	31.52	HORIZONTAL	261	128	Average
3	5269.02	91.17			87.08	6.01	33.54	31.62	HORIZONTAL	261	128	Average
4	5314.60	102.06			97.88	6.04	33.52	31.66	HORIZONTAL	261	128	Peak
5	5352.89	53.53	54.00	-0.47	49.29	6.06	33.51	31.69	HORIZONTAL	261	128	Average
6	5354.34	65.86	74.00	-8.14	61.61	6.06	33.50	31.69	HORIZONTAL	261	128	Peak

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

Channel 106

	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	5458.55	51.23	54.00	-2.77	46.81	6.13	33.47	31.76	VERTICAL	19	136	Average
2	5459.28	64.85	74.00	-9.15	60.43	6.13	33.47	31.76	VERTICAL	19	136	Peak
3	5470.00	52.74	54.00	-1.26	48.27	6.15	33.46	31.78	VERTICAL	19	136	Average
4	5470.00	64.98	74.00	-9.02	60.51	6.15	33.46	31.78	VERTICAL	19	136	Peak
5	5562.56	93.22			88.58	6.19	33.43	31.88	VERTICAL	19	136	Average
6	5563.29	102.51			97.87	6.19	33.43	31.88	VERTICAL	19	136	Peak
7	5725.00	46.03	54.00	-7.97	41.04	6.28	33.37	32.08	VERTICAL	19	136	Average
8	5725.72	58.49	74.00	-15.51	53.50	6.28	33.37	32.08	VERTICAL	19	136	Peak

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

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 54, 62 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Beamforming mode

Channel 54

	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	5266.53	106.60			102.51	6.01	33.54	31.62	VERTICAL	270	100	Average
2	5267.97	116.85			112.76	6.01	33.54	31.62	VERTICAL	270	100	Peak
3	5350.00	48.79	54.00	-5.21	44.56	6.06	33.51	31.68	VERTICAL	270	100	Average
4	5350.00	61.53	74.00	-12.47	57.30	6.06	33.51	31.68	VERTICAL	270	100	Peak

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

Channel 62

	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	5303.34	111.77			107.61	6.04	33.52	31.64	VERTICAL	8	140	Peak
2	5317.81	100.21			96.04	6.04	33.52	31.65	VERTICAL	8	140	Average
3	5350.00	52.62	54.00	-1.38	48.39	6.06	33.51	31.68	VERTICAL	8	140	Average
4	5350.29	64.82	74.00	-9.18	60.59	6.06	33.51	31.68	VERTICAL	8	140	Peak

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

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 102, 110, 134 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 03, 2015	Test Mode	Beamforming mode

Channel 102

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5460.00	48.37	54.00	-5.63	43.93	6.15	33.47	31.76	VERTICAL	287	102	Average
2	5460.00	59.99	74.00	-14.01	55.55	6.15	33.47	31.76	VERTICAL	287	102	Peak
3	5470.00	52.62	54.00	-1.38	48.15	6.15	33.46	31.78	VERTICAL	287	102	Average
4	5470.00	67.47	74.00	-6.53	63.00	6.15	33.46	31.78	VERTICAL	287	102	Peak
5	5515.21	111.64			107.10	6.17	33.45	31.82	VERTICAL	287	102	Peak
6	5526.79	100.73			96.18	6.17	33.44	31.82	VERTICAL	287	102	Average

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

Channel 110

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5457.11	63.63	74.00	-10.37	59.21	6.13	33.47	31.76	VERTICAL	283	100	Peak
2	5460.00	50.30	54.00	-3.70	45.86	6.15	33.47	31.76	VERTICAL	283	100	Average
3	5466.53	63.29	74.00	-10.71	58.82	6.15	33.46	31.78	VERTICAL	283	100	Peak
4	5470.00	50.92	54.00	-3.08	46.45	6.15	33.46	31.78	VERTICAL	283	100	Average
5	5546.24	118.52			113.91	6.19	33.44	31.86	VERTICAL	283	100	Peak
6	5546.82	107.67			103.06	6.19	33.44	31.86	VERTICAL	283	100	Average

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

Channel 134

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	PreampFactor	AntennaFactor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	5686.21	115.70			110.81	6.26	33.39	32.02	VERTICAL	251	100	Peak
2	5686.50	105.09			100.20	6.26	33.39	32.02	VERTICAL	251	100	Average
3	5725.00	52.27	54.00	-1.73	47.28	6.28	33.37	32.08	VERTICAL	251	100	Average
4	5727.03	69.59	74.00	-4.41	64.60	6.28	33.37	32.08	VERTICAL	251	100	Peak

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

Temperature	25℃	Humidity	40%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 58, 106 / Chain 1 + Chain 2 + Chain 3+ Chain 4
Test Date	Feb. 04, 2015	Test Mode	Beamforming mode

Channel 58

	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	5112.37	61.06	74.00	-12.94	57.26	5.90	33.60	31.50	VERTICAL	271	100	Peak
2	5150.00	47.76	54.00	-6.24	43.90	5.92	33.58	31.52	VERTICAL	271	100	Average
3	5307.37	96.70			92.54	6.04	33.52	31.64	VERTICAL	271	100	Average
4	5308.09	107.46			103.29	6.04	33.52	31.65	VERTICAL	271	100	Peak
5	5350.00	52.22	54.00	-1.78	47.99	6.06	33.51	31.68	VERTICAL	271	100	Average
6	5355.07	65.25	74.00	-8.75	61.00	6.06	33.50	31.69	VERTICAL	271	100	Peak

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

Channel 106

	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	5458.55	64.60	74.00	-9.40	60.18	6.13	33.47	31.76	VERTICAL	281	100	Peak
2	5460.00	51.51	54.00	-2.49	47.07	6.15	33.47	31.76	VERTICAL	281	100	Average
3	5464.93	67.34	74.00	-6.66	62.87	6.15	33.46	31.78	VERTICAL	281	100	Peak
4	5470.00	52.62	54.00	-1.38	48.15	6.15	33.46	31.78	VERTICAL	281	100	Average
5	5542.30	96.57			91.98	6.19	33.44	31.84	VERTICAL	281	100	Average
6	5545.20	109.32			104.71	6.19	33.44	31.86	VERTICAL	281	100	Peak
7	5725.00	48.93	54.00	-5.07	43.94	6.28	33.37	32.08	VERTICAL	281	100	Average
8	5734.41	62.15	74.00	-11.85	57.16	6.28	33.37	32.08	VERTICAL	281	100	Peak

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

4.6. Frequency Stability Measurement

4.6.1. 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).

4.6.2. Measuring Instruments and Setting

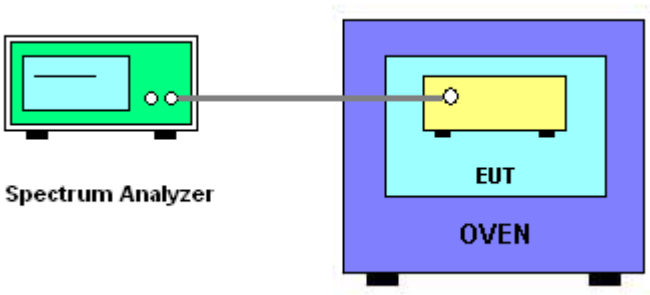
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.6.3. 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 -30°C~50°C.

4.6.4. Test Setup Layout



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

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

4.6.7. Test Result of Frequency Stability

Temperature	26°C	Humidity	63%
Test Engineer	Kenneth Huang	Test Date	Feb. 25, 2015

Mode: 40 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5310 MHz	5550 MHz
126.50	5309.9712	5549.9700
110.00	5309.9742	5549.9664
93.50	5309.9712	5549.9676
Max. Deviation (MHz)	0.0288	0.0336
Max. Deviation (ppm)	5.42	6.05

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5310 MHz	5550 MHz
-30	5310.0228	5550.0240
-20	5310.0210	5550.0240
-10	5310.0132	5550.0198
0	5310.0114	5550.0156
10	5310.0102	5550.0138
20	5309.9874	5549.9898
30	5309.9814	5549.9772
40	5309.9724	5549.9706
50	5309.9700	5549.9682
Max. Deviation (MHz)	0.0300	0.0318
Max. Deviation (ppm)	5.65	5.73

Mode: 80 MHz

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)	
(V)	5290 MHz	5530 MHz
126.50	5289.9700	5529.9730
110.00	5289.9730	5529.9670
93.50	5289.9730	5529.9718
Max. Deviation (MHz)	0.0300	0.0330
Max. Deviation (ppm)	5.67	5.97

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)	
(°C)	5290 MHz	5530 MHz
-30	5290.0210	5530.0234
-20	5290.0222	5530.0228
-10	5290.0138	5530.0168
0	5290.0096	5530.0120
10	5289.9922	5529.9928
20	5289.9910	5529.9880
30	5289.9802	5529.9742
40	5289.9682	5529.9700
50	5289.9706	5529.9670
Max. Deviation (MHz)	0.0318	0.0330
Max. Deviation (ppm)	6.01	5.97

4.7. Antenna Requirements

4.7.1. 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.

4.7.2. 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
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)
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	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)

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

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
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%