SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**TP-LINK TECHNOLOGIES CO., LTD.**
Applicant Address	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Nanshan, Shenzhen,518057, China
FCC ID	**TE7WPA4530**
Manufacturer's company	**TP-LINK TECHNOLOGIES CO., LTD.**
Manufacturer Address	Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park, Nanshan, Shenzhen,518057, China

Product Name	AC750 Wi-Fi Range Extender,AV500 Powerline Edition
Brand Name	TP-LINK
Model No.	TL-WPA4530
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Dec. 10, 2015
Final Test Date	Jun. 16, 2016
Submission Type	Original Equipment

Statement

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

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r02, KDB644545 D03 v01, ET Docket No. 13–49; FCC 16–24.**

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
FR5D0313AB	Rev. 01	Initial issue of report	Jun. 23, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	AC750 WI-FI Range Extender,AV500 Powerline Edition
Brand Name	:	TP-LINK
Model No.	:	TL-WPA4530
Applicant	:	TP-LINK TECHNOLOGIES CO., LTD.
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 Dec. 10, 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

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
4.1	15.207	AC Power Line Conducted Emissions	Complies
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies
4.4	15.407(a)	Maximum Conducted Output Power	Complies
4.5	15.407(a)	Power Spectral Density	Complies
4.6	15.407(b)	Radiated Emissions	Complies
4.7	15.407(b)	Band Edge Emissions	Complies
4.8	15.407(g)	Frequency Stability	Complies
4.9	15.203	Antenna Requirements	Complies

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	Internal power supply
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	9 for 20MHz bandwidth ; 4 for 40MHz bandwidth 2 for 80MHz bandwidth
Channel Band Width (99%)	Band 1: IEEE 802.11a: 17.54 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.32 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 40.38 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 75.83 MHz Band 4: IEEE 802.11a: 39.42 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 39.07 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 49.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 84.23 MHz
Maximum Conducted Output Power	Band 1: IEEE 802.11a: 21.42 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 21.28 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 22.02 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 16.04 dBm Band 4: IEEE 802.11a: 22.79 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 22.75 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 22.32 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 19.74 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☐ With beamforming	☒ Without beamforming
Operate Condition	☒ Indoor	☐ Outdoor

Antenna and Band width

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

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	1	MCS 0-07
802.11n (HT40)	1	MCS 0-07
802.11ac (VHT20)	1	MCS 0-9/Nss1
802.11ac (VHT40)	1	MCS 0-9/Nss1
802.11ac (VHT80)	1	MCS 0-9/Nss1

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

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

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

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
1	TP-LINK	I1380-JW040	PCB Antenna	N/A	1.94	2.4GHz
2	TP-LINK	I1380-JW040	PCB Antenna	N/A	1.94	2.4GHz
3	TP-LINK	I2163-JI040	PCB Antenna	I-PEX	1.64	5GHz

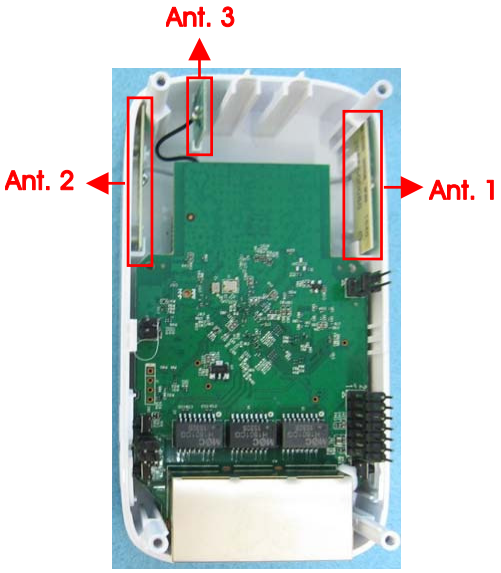
Note: The EUT has three antennas.

<For 2.4GHz WLAN function (2TX/2RX)>

Ant. 1 and Ant. 2 could transmit/receive simultaneously.

<For 5GHz WLAN function (1TX/1RX)>

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



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

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

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

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Ant.
AC Power Conducted Emission	CTX		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1
Power Spectral Density	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1
26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1
6dB Spectrum Bandwidth Measurement	11a/BPSK	Band 4	6Mbps	149/157/165	1
	11ac VHT20	Band 4	MCS0/Nss1	149/157/165	1
	11ac VHT40	Band 4	MCS0/Nss1	151/159	1
	11ac VHT80	Band 4	MCS0/Nss1	155	1
Radiated Emission Below 1GHz	CTX		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1
Band Edge Emission	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	1
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	1
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	1
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	1
Frequency Stability	20 MHz	Band 1&4	-	40/157	1
	40 MHz	Band 1&4	-	38/151	1
	80 MHz	Band 1&4	-	42/155	1

Note: VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. CTX_5GHz

For Radiated Emission test<Below 1GHz>:

Y-axis generated the worst result in 5GHz for Radiated Emissions test <Above 1GHz>, thus the measurement will follow this same test configuration.

Mode 1. CTX_5GHz + Place EUT in Y axis

For Radiated Emission test<Above1GHz>:

The EUT for Radiated emission test was performed at Y axis and Z axis and the worst case was found at Y axis in 5GHz. So the measurement will follow this same test configuration.

Mode 1. CTX_5GHz + Place EUT in Y axis

For Co-location MPE:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA5D0313) test is 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 Designation No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	TW0006	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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

3.7. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

For Test Site No: 03CH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC

3.8. Table for Parameters of Test Software Setting

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

Test Software Version	MT76xxE QA V2.0.10.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	1A	1B	1B	2F	2F	2F
802.11ac MCS0/Nss1 VHT20	19	1A	1B	2F	2F	2F
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz	5230 MHz	5755 MHz	5795 MHz		
	12	1D	26	27		
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz	5775 MHz				
	0E	18				

3.9. EUT Operation during Test

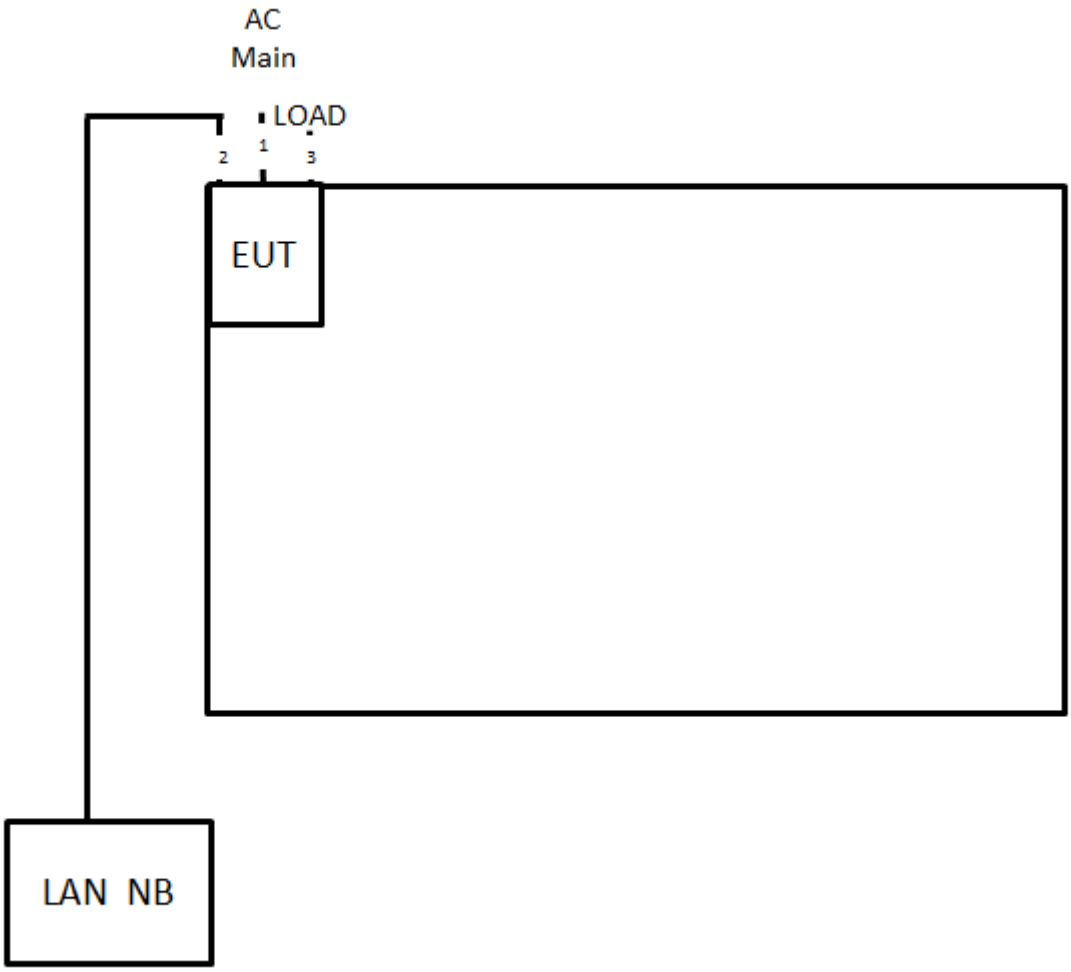
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

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

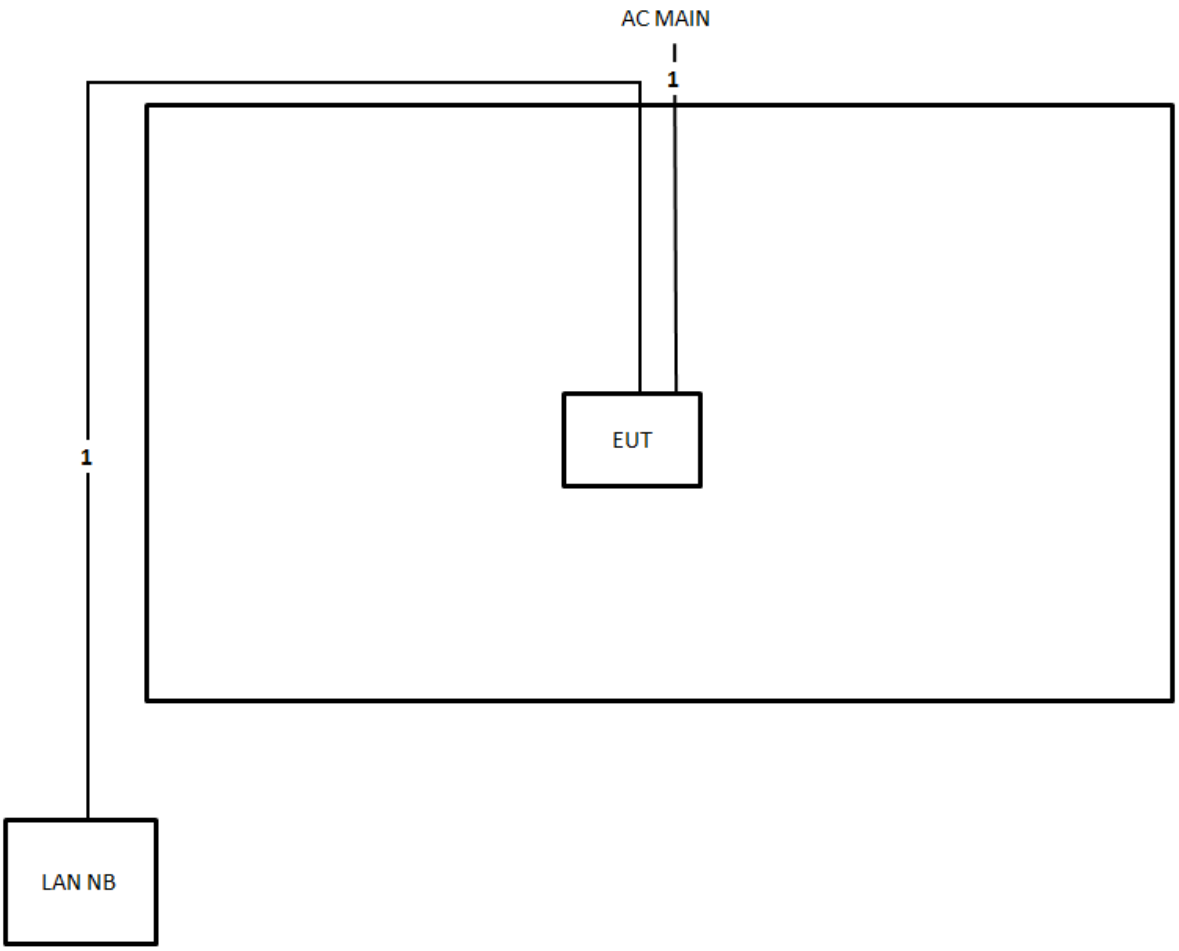
3.11.Test Configurations

3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	0.8m
2	RJ-45 cable	No	10m
3	RJ-45 cable*2	No	1.5m

3.11.2. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	3m

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

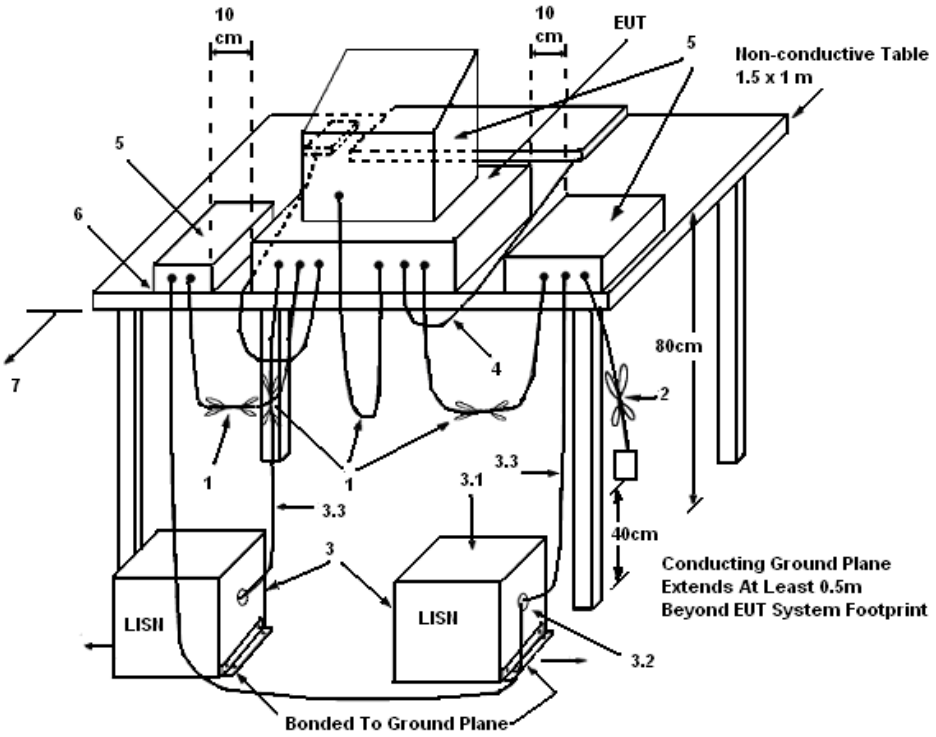
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

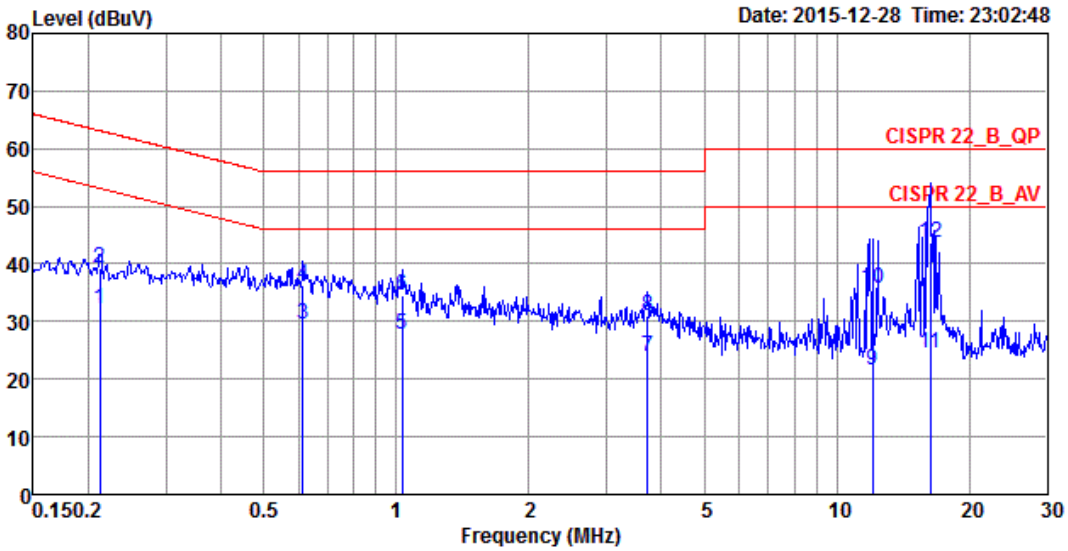
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

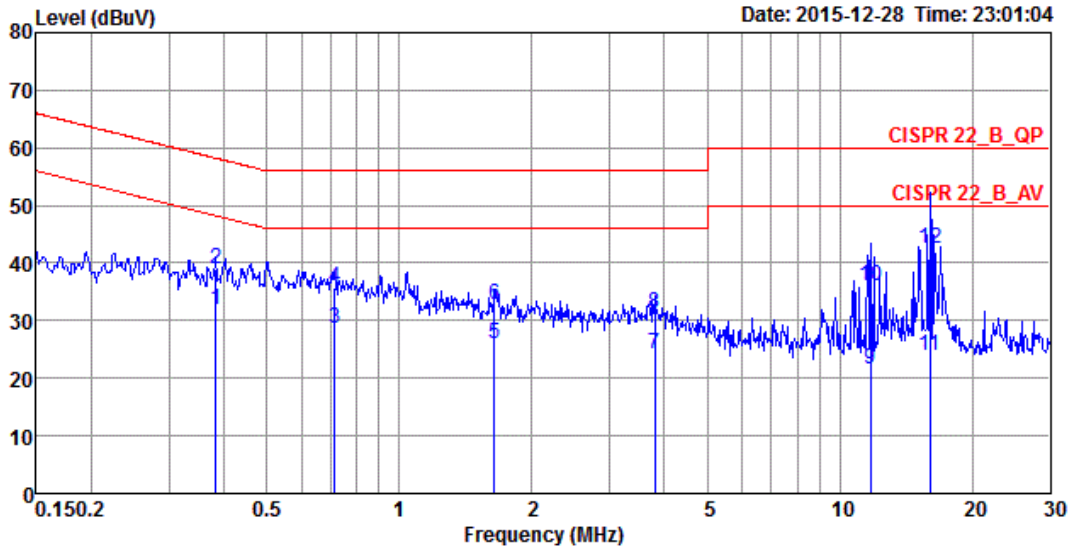
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	58%
Test Engineer	Da Deng	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.2128	32.15	-20.95	53.10	22.01	9.96	Average	LINE
2	0.2128	39.29	-23.81	63.10	29.15	9.96	QP	LINE
3	0.6140	29.39	-16.61	46.00	19.16	10.03	Average	LINE
4	0.6140	36.36	-19.64	56.00	26.13	10.03	QP	LINE
5	1.0320	27.79	-18.21	46.00	17.55	10.05	Average	LINE
6	1.0320	34.62	-21.38	56.00	24.38	10.05	QP	LINE
7	3.7198	24.04	-21.96	46.00	13.61	10.11	Average	LINE
8	3.7198	30.95	-25.05	56.00	20.52	10.11	QP	LINE
9	12.0599	21.65	-28.35	50.00	11.06	10.19	Average	LINE
10	12.0599	35.67	-24.33	60.00	25.08	10.19	QP	LINE
11	16.3118	24.56	-25.44	50.00	13.87	10.24	Average	LINE
12	16.3118	43.79	-16.21	60.00	33.10	10.24	QP	LINE

Temperature	24℃	Humidity	58%
Test Engineer	Da Deng	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.3832	31.78	-16.43	48.21	21.61	9.97	Average	NEUTRAL
2	0.3832	38.94	-19.27	58.21	28.77	9.97	QP	NEUTRAL
3	0.7122	28.56	-17.44	46.00	18.40	9.97	Average	NEUTRAL
4	0.7122	35.63	-20.37	56.00	25.47	9.97	QP	NEUTRAL
5	1.6450	25.94	-20.06	46.00	15.72	9.98	Average	NEUTRAL
6	1.6450	32.84	-23.16	56.00	22.62	9.98	QP	NEUTRAL
7	3.7994	24.24	-21.76	46.00	13.90	10.02	Average	NEUTRAL
8	3.7994	31.24	-24.76	56.00	20.90	10.02	QP	NEUTRAL
9	11.7446	21.64	-28.36	50.00	11.06	10.18	Average	NEUTRAL
10	11.7446	35.87	-24.13	60.00	25.29	10.18	QP	NEUTRAL
11	16.0546	24.00	-26.00	50.00	13.31	10.24	Average	NEUTRAL
12	16.0546	42.45	-17.55	60.00	31.76	10.24	QP	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 4.6.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

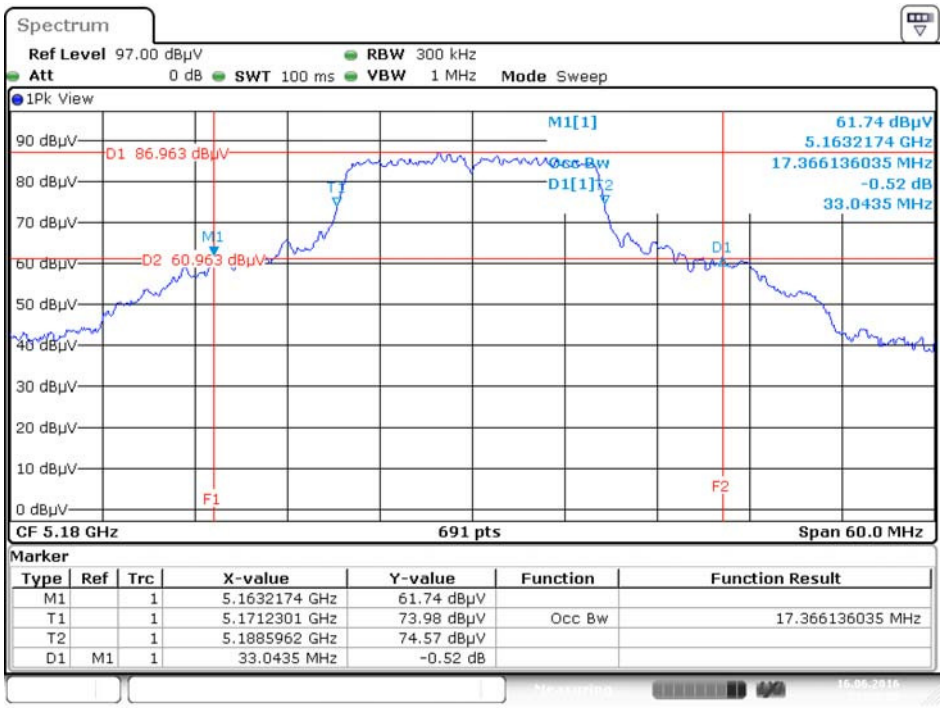
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	23℃	Humidity	47%
Test Engineer	Serway Li		

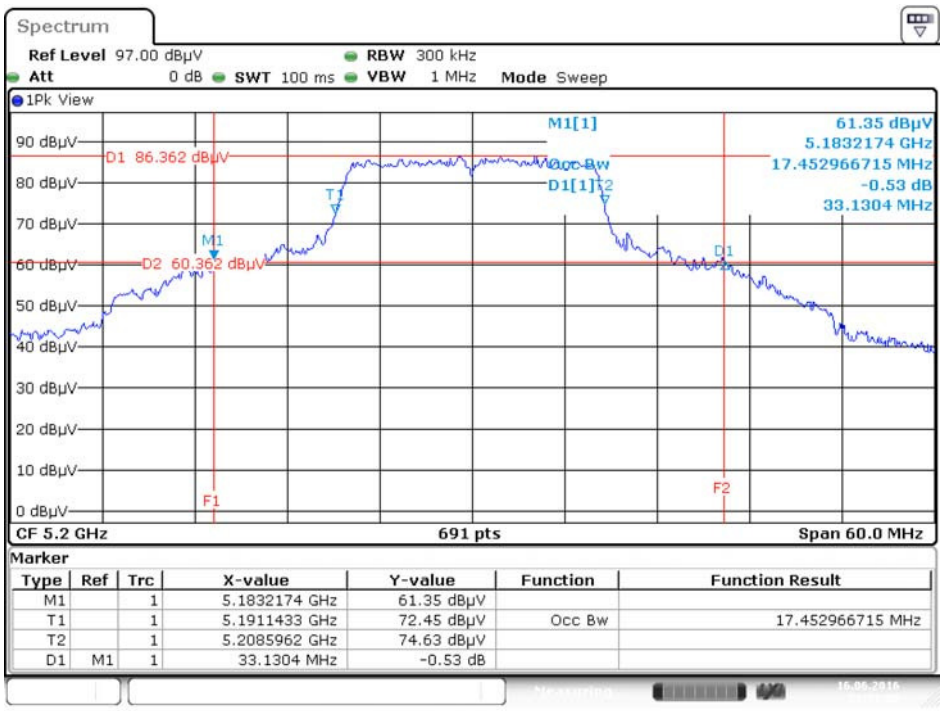
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	33.04	17.37
	5200 MHz	33.13	17.45
	5240 MHz	33.13	17.54
	5745 MHz	57.04	39.16
	5785 MHz	57.74	39.42
	5825 MHz	57.04	36.73
802.11ac MCS0/Nss1 VHT20	5180 MHz	31.57	17.80
	5200 MHz	33.04	17.97
	5240 MHz	33.91	18.32
	5745 MHz	56.87	38.73
	5785 MHz	57.04	38.73
	5825 MHz	57.48	39.07
802.11ac MCS0/Nss1 VHT40	5190 MHz	42.17	36.76
	5230 MHz	77.39	40.38
	5755 MHz	90.58	48.19
	5795 MHz	89.28	49.06
802.11ac MCS0/Nss1 VHT80	5210 MHz	92.17	75.83
	5775 MHz	188.70	84.23

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



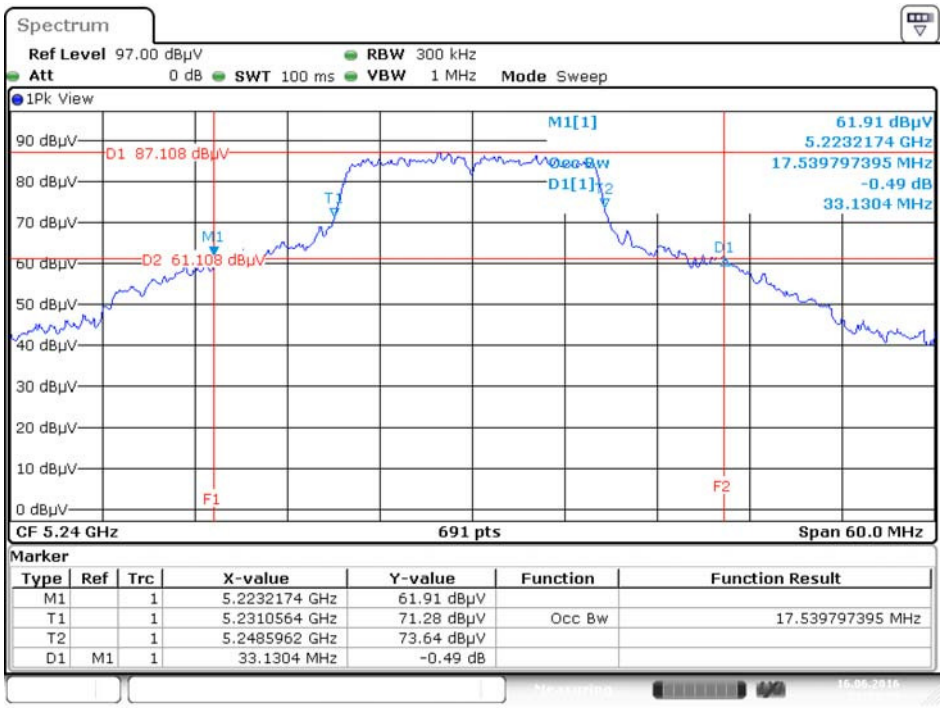
Date: 16.JUN.2016 21:50:19

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



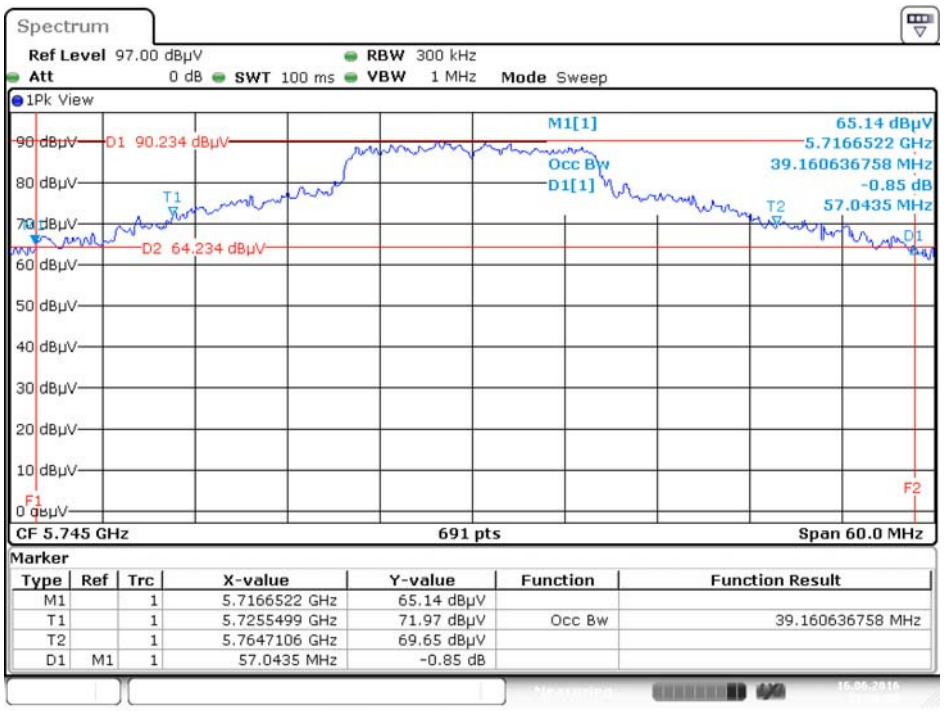
Date: 16.JUN.2016 21:52:21

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



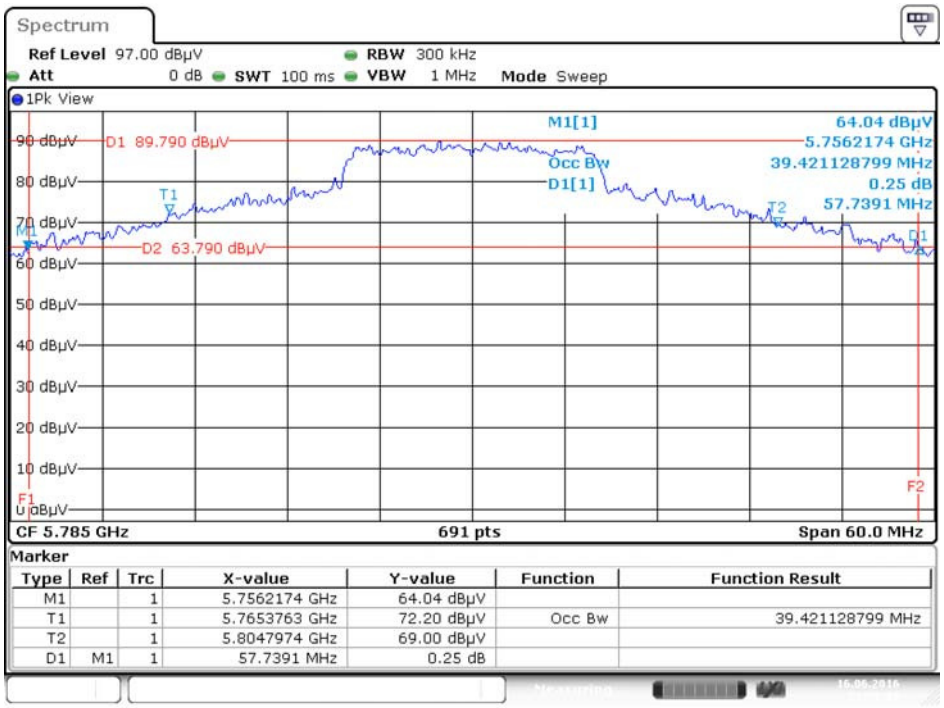
Date: 16.JUN.2016 21:53:53

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



Date: 16.JUN.2016 21:56:28

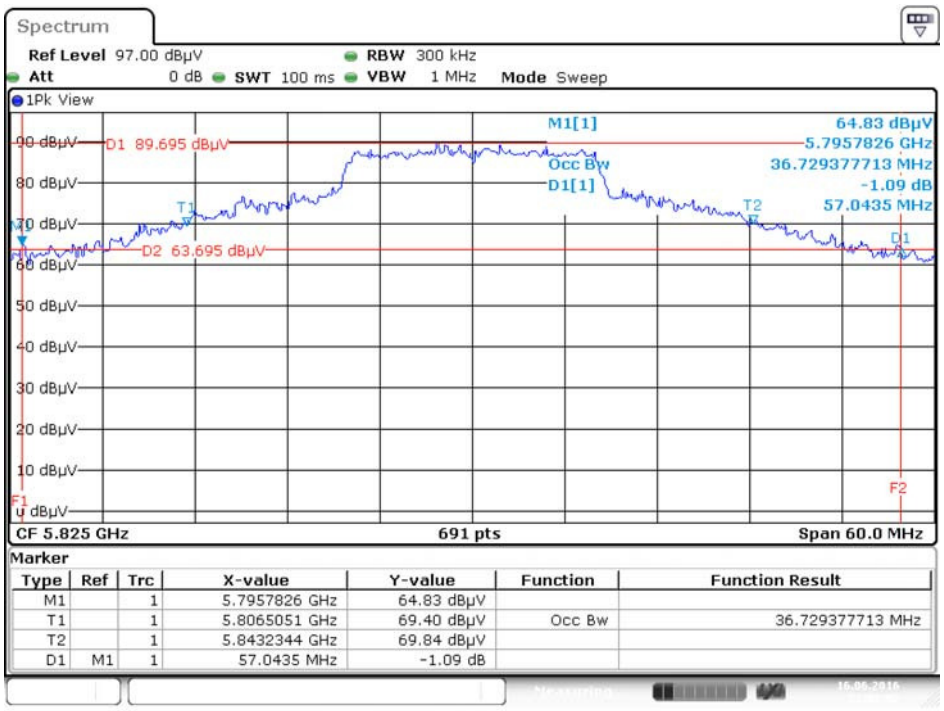
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5785 MHz



Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.7562174 GHz	64.04 dBµV		
T1		1	5.7653763 GHz	72.20 dBµV	Occ Bw	39.421128799 MHz
T2		1	5.8047974 GHz	69.00 dBµV		
D1	M1	1	57.7391 MHz	0.25 dB		

Date: 16.JUN.2016 21:58:39

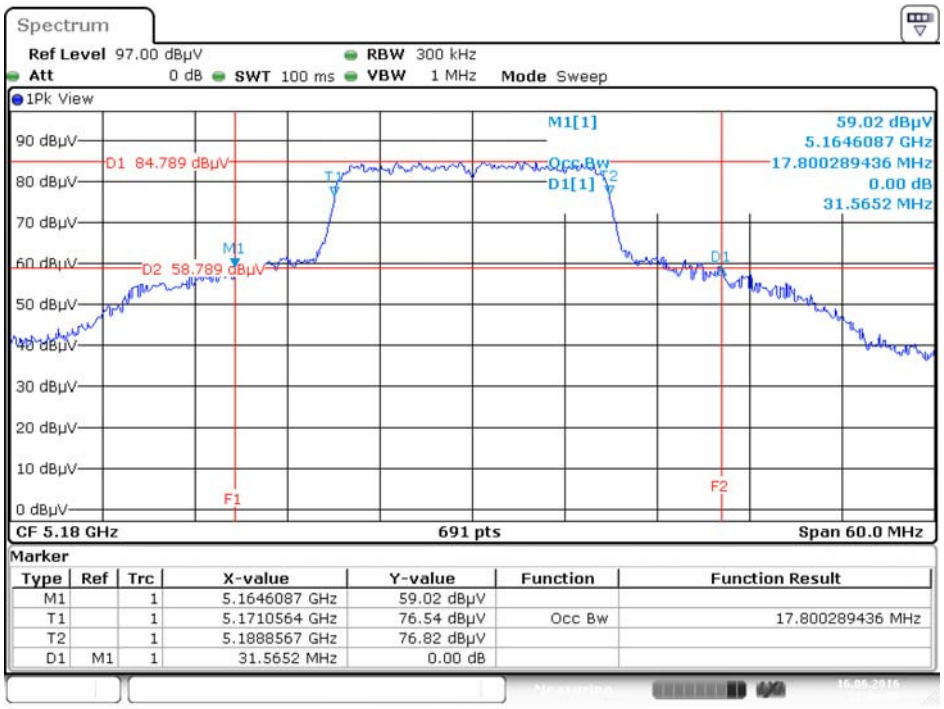
26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5825 MHz



Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.7957826 GHz	64.83 dBµV		
T1		1	5.8065051 GHz	69.40 dBµV	Occ Bw	36.729377713 MHz
T2		1	5.8432344 GHz	69.84 dBµV		
D1	M1	1	57.0435 MHz	-1.09 dB		

Date: 16.JUN.2016 22:08:02

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

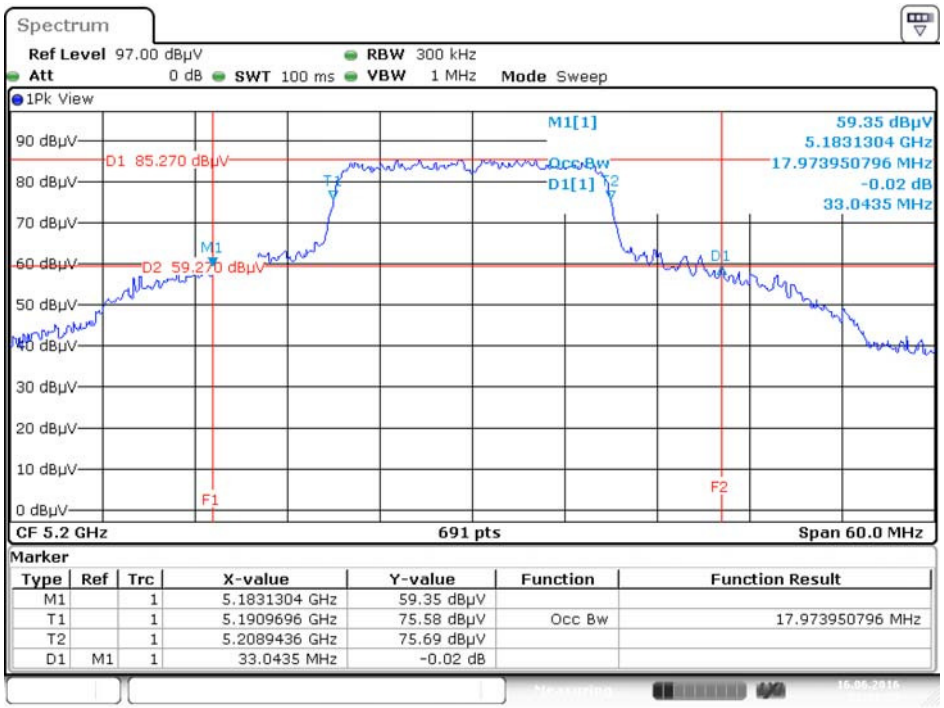


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1646087 GHz	59.02 dBµV		
T1		1	5.1710564 GHz	76.54 dBµV	Occ Bw	17.800289436 MHz
T2		1	5.1888567 GHz	76.82 dBµV		
D1	M1	1	31.5652 MHz	0.00 dB		

Date: 16.JUN.2016 22:09:59

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

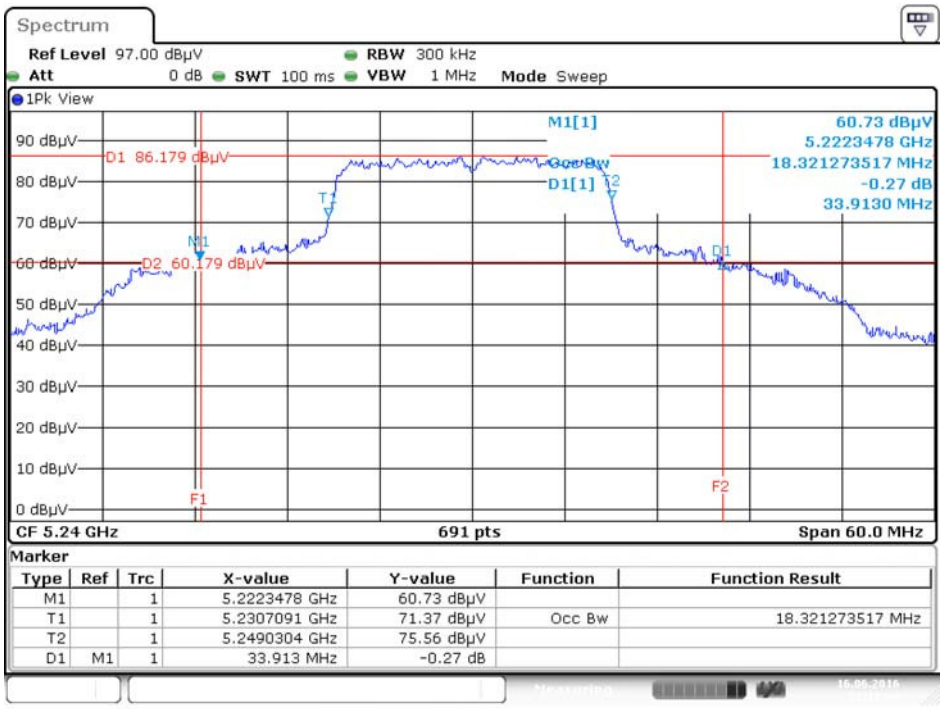


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1831304 GHz	59.35 dBµV		
T1		1	5.1909696 GHz	75.58 dBµV	Occ Bw	17.973950796 MHz
T2		1	5.2089436 GHz	75.69 dBµV		
D1	M1	1	33.0435 MHz	-0.02 dB		

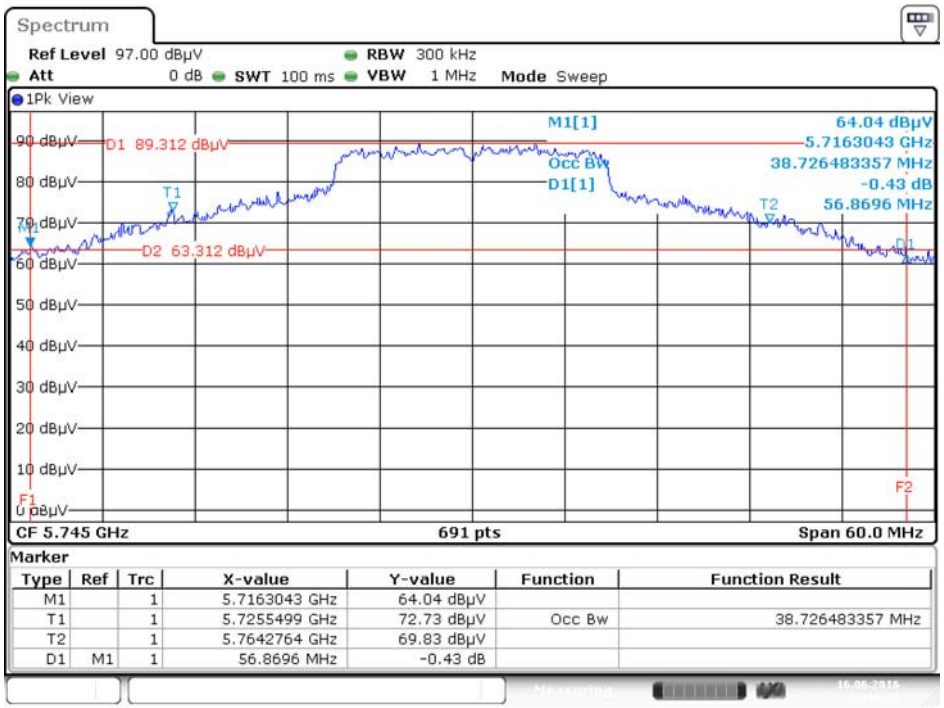
Date: 16.JUN.2016 22:11:23

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



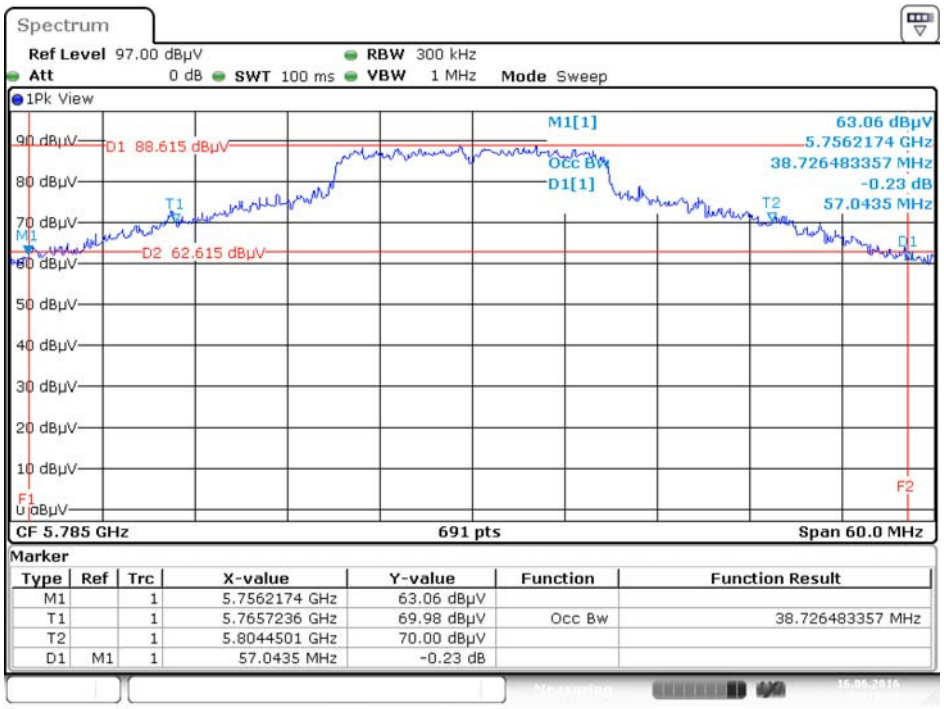
Date: 16.JUN.2016 22:12:34

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



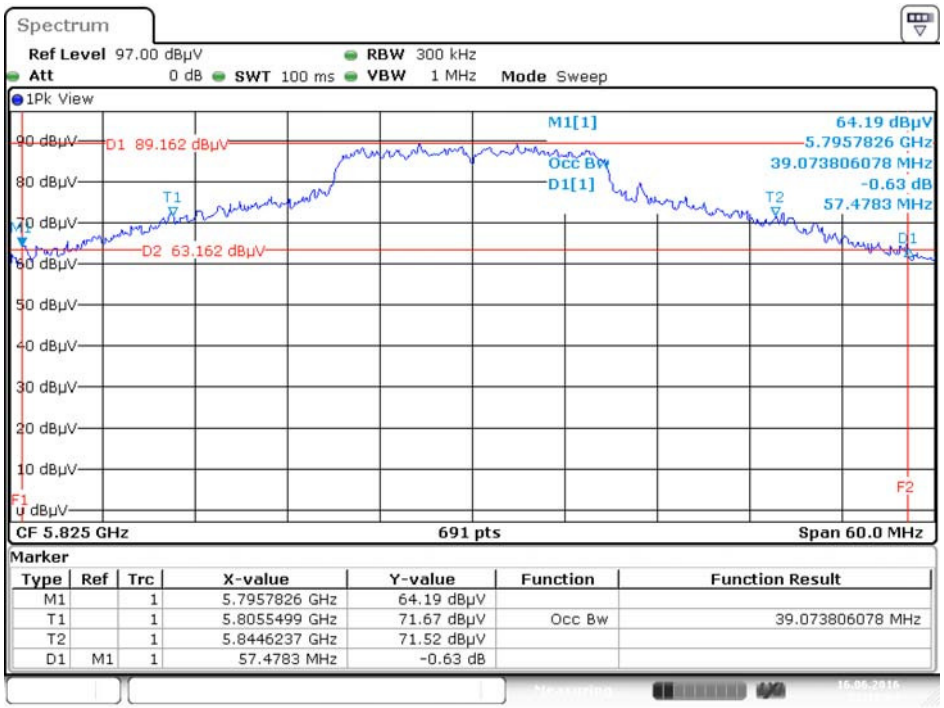
Date: 16.JUN.2016 22:14:21

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



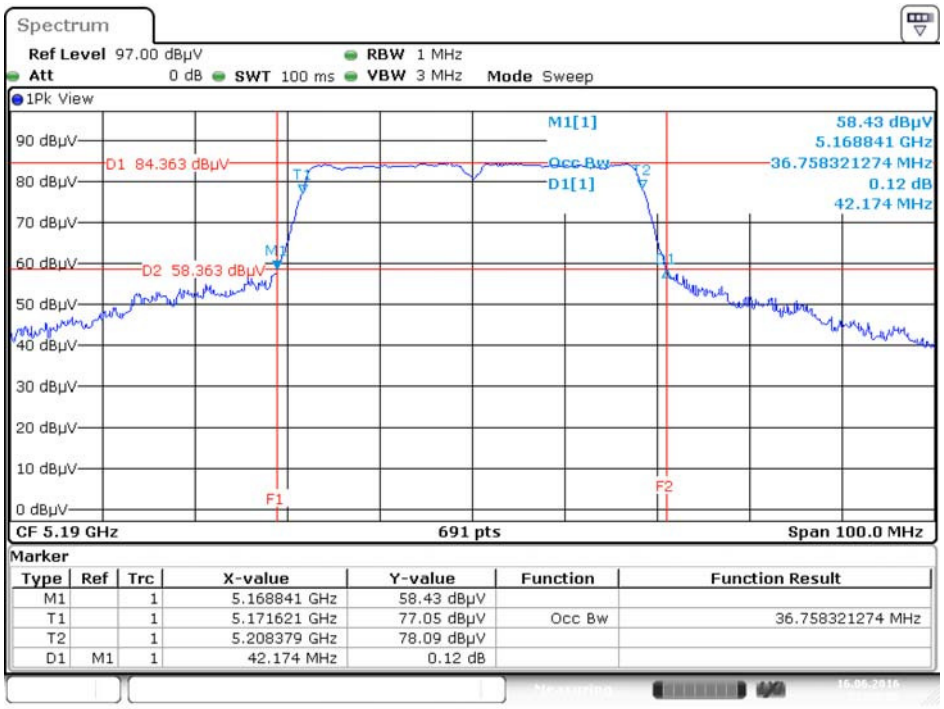
Date: 16.JUN.2016 22:16:19

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



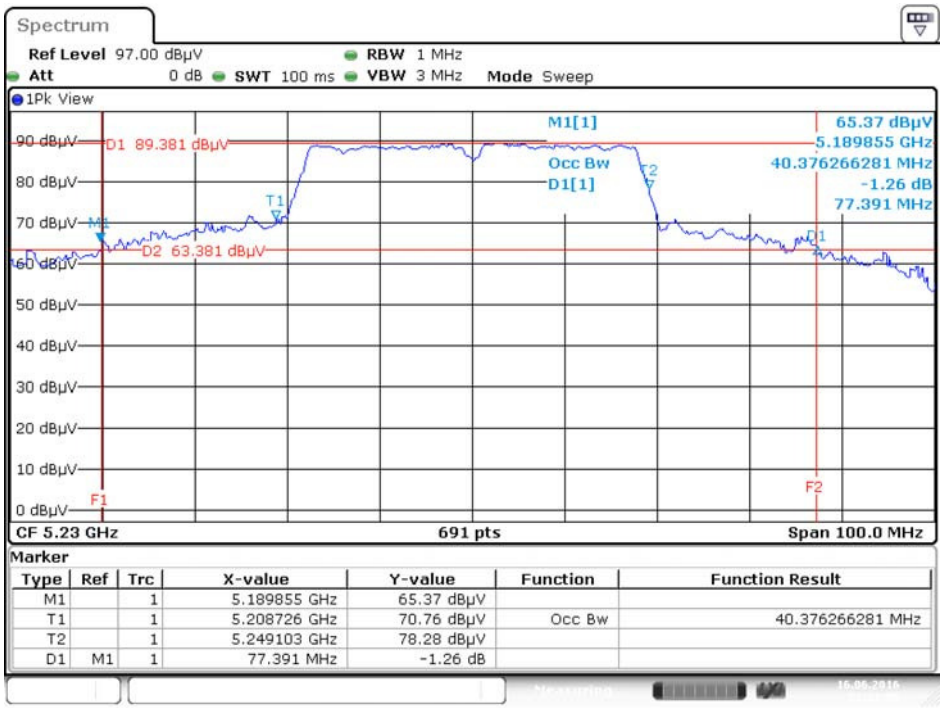
Date: 16.JUN.2016 22:18:04

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



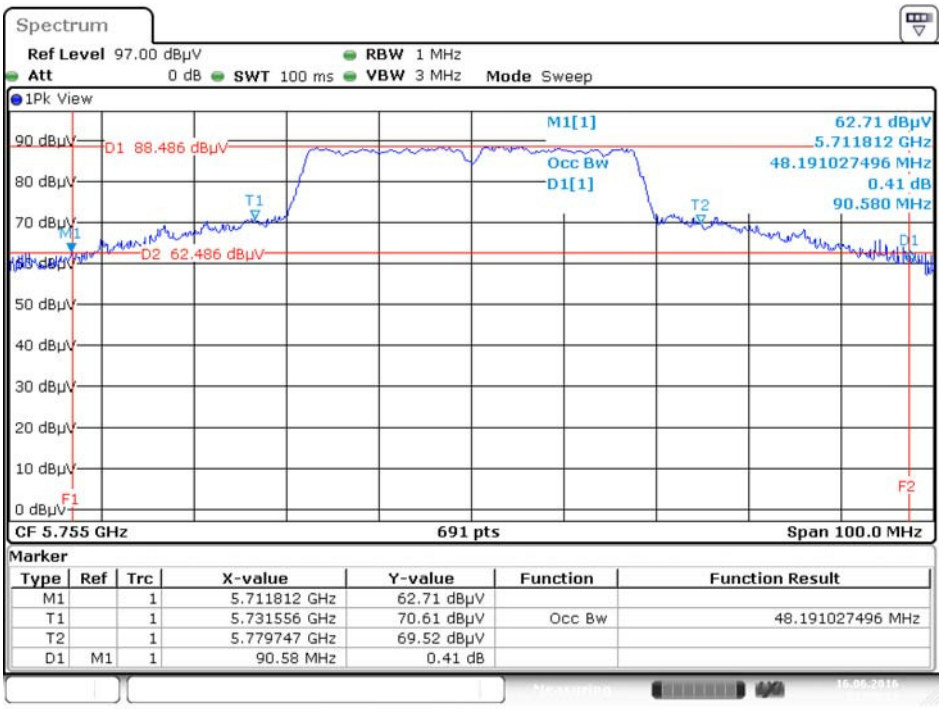
Date: 16.JUN.2016 22:20:36

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



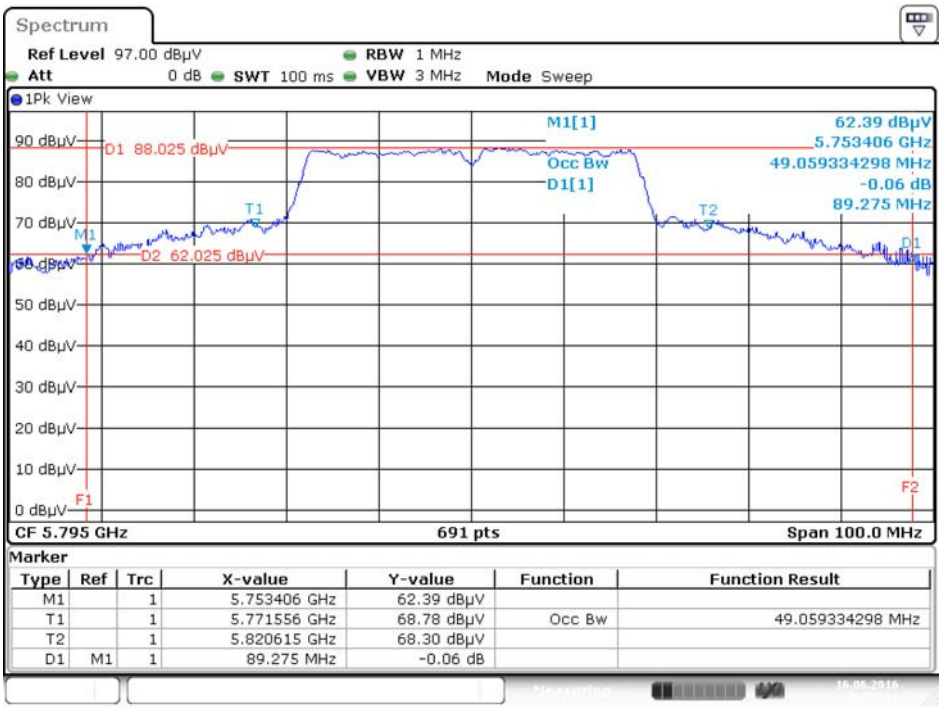
Date: 16.JUN.2016 22:22:05

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



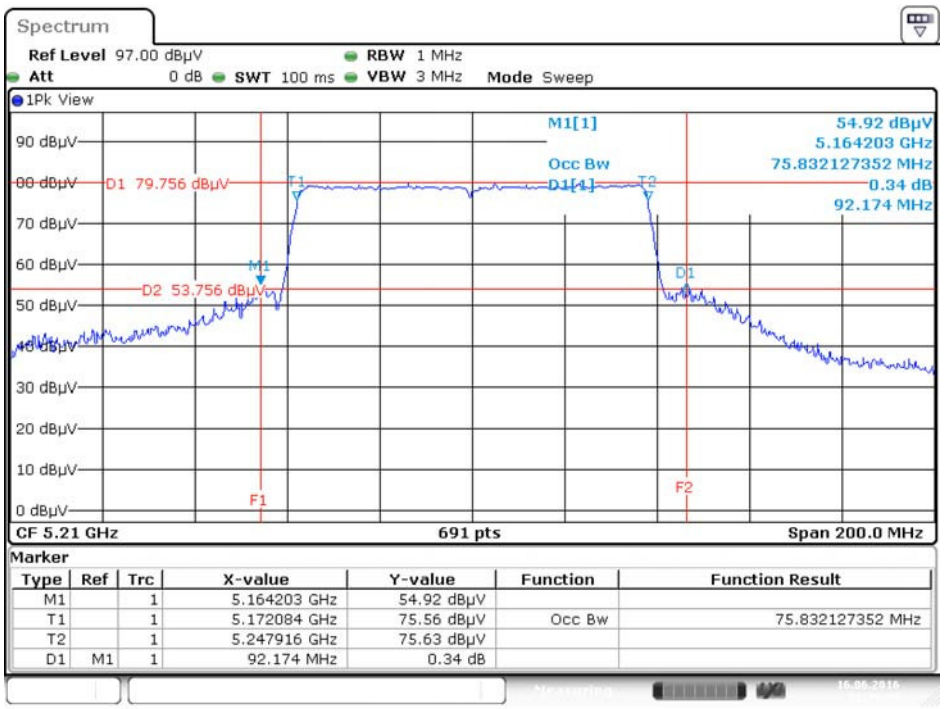
Date: 16.JUN.2016 22:25:16

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



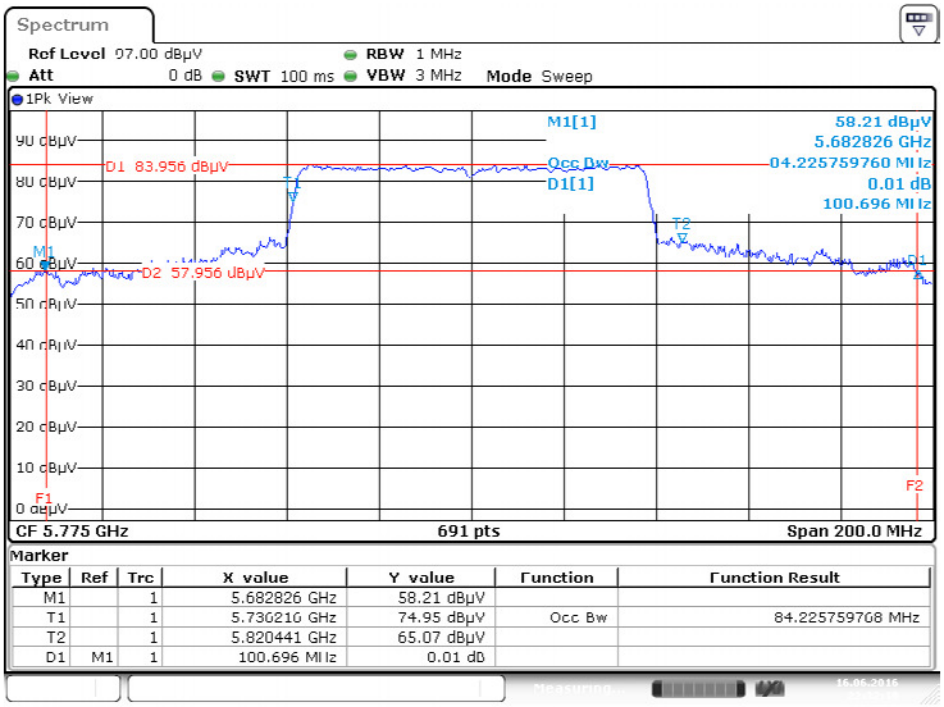
Date: 16.JUN.2016 22:27:22

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



Date: 16.JUN.2016 22:29:35

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



Date: 16.JUN.2016 22:32:11

4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

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

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

4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

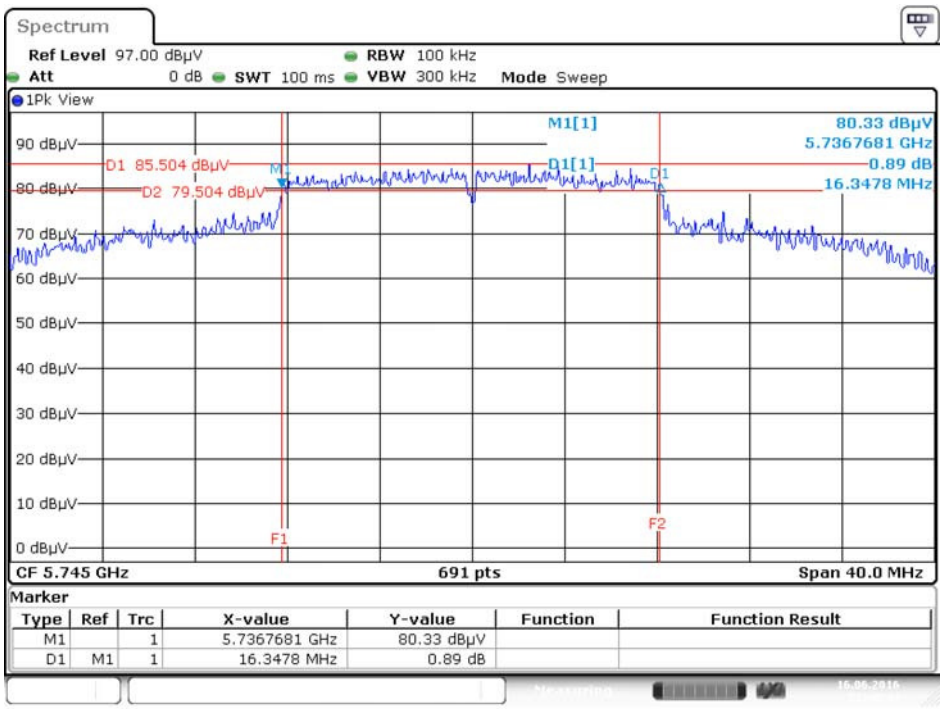
Temperature	23℃	Humidity	47%
Test Engineer	Serway Li		

Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.35	500	Complies
	5785 MHz	16.46	500	Complies
	5825 MHz	16.41	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.74	500	Complies
	5785 MHz	17.68	500	Complies
	5825 MHz	17.68	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.29	500	Complies
	5795 MHz	36.41	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	76.52	500	Complies

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

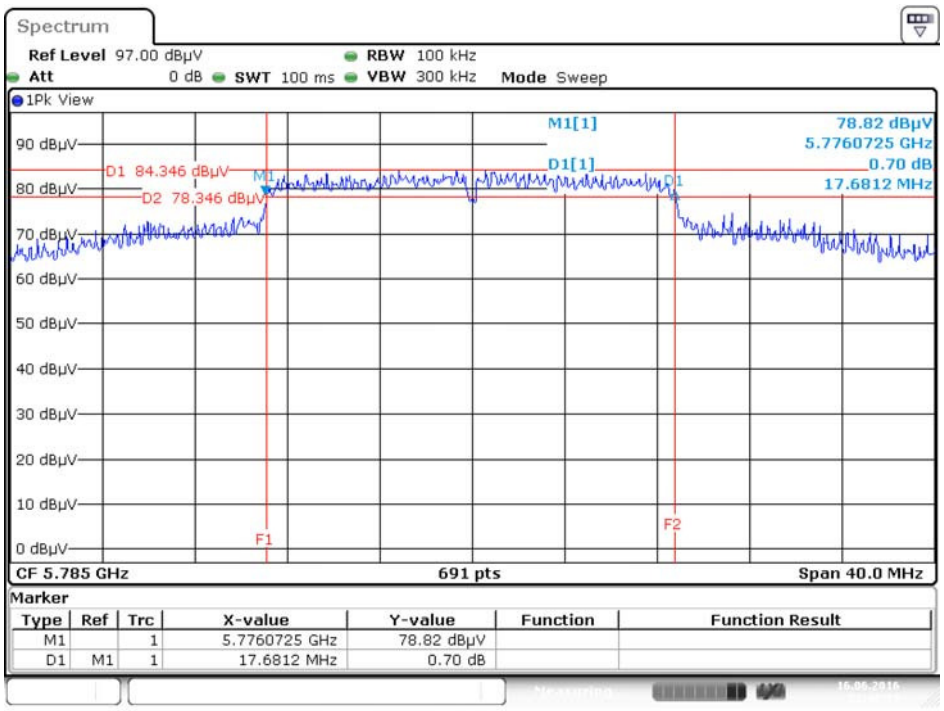
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 / 5745 MHz



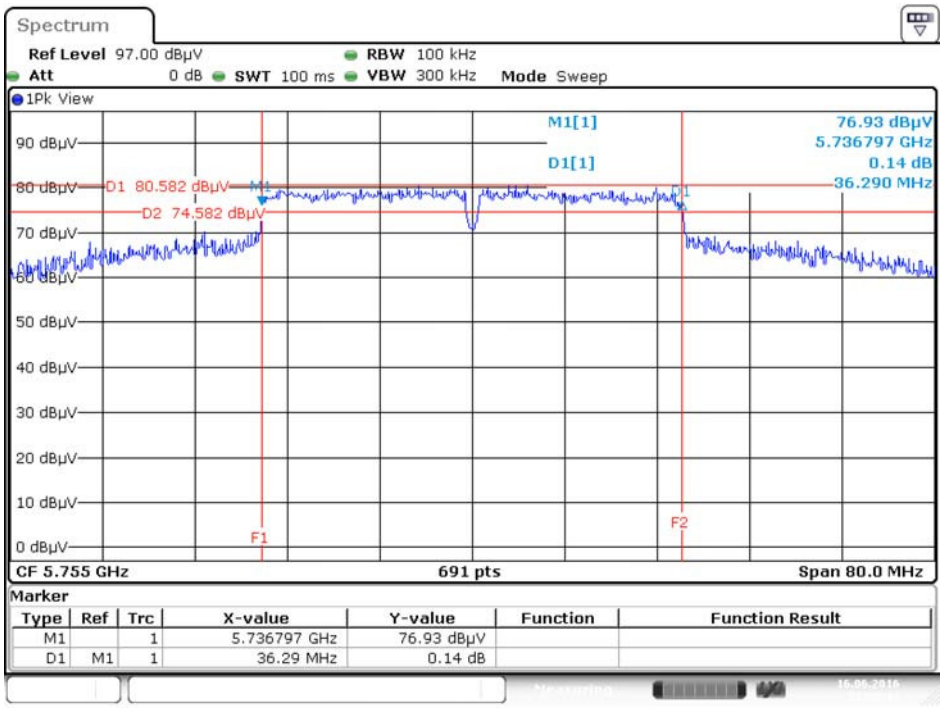
Date: 16.JUN.2016 22:40:45

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 / 5785 MHz



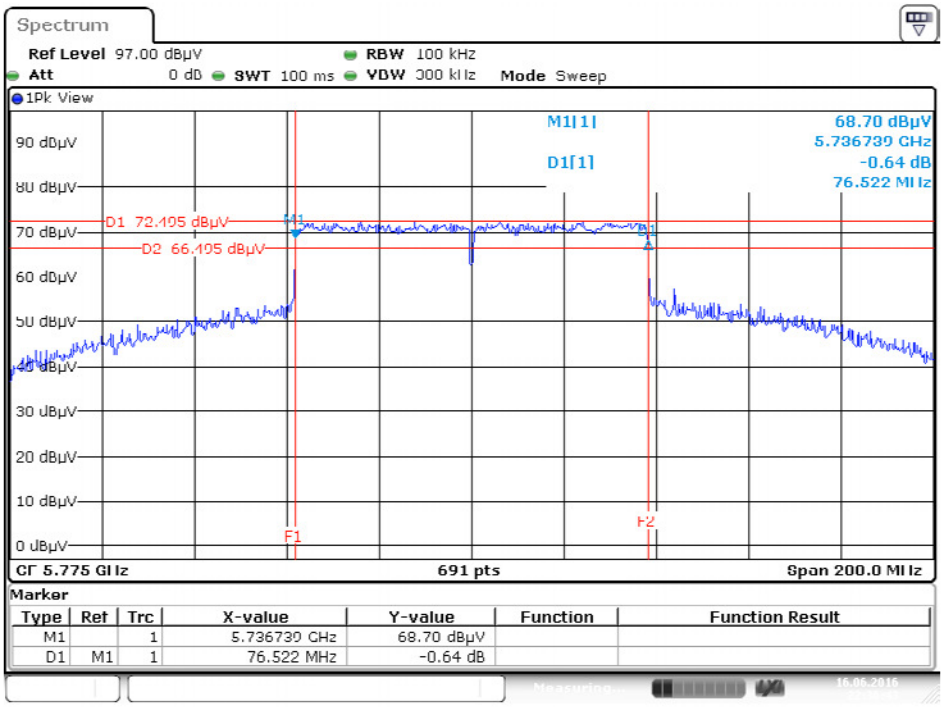
Date: 16.JUN.2016 22:47:39

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 / 5755MHz



Date: 16.JUN.2016 22:50:40

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 / 5775 MHz



Date: 16.JUN.2016 22:36:43

4.4. Maximum Conducted Output Power Measurement

4.4.1. Limit

Frequency Band			Limit
☒	5.15~5.25 GHz		
	Operating Mode		
	☐	Outdoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
	☒	Indoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
	☐	Fixed point-to-point access points	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
	☐	Client devices	The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

☒	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

4.4.2. Measuring Instruments and Setting

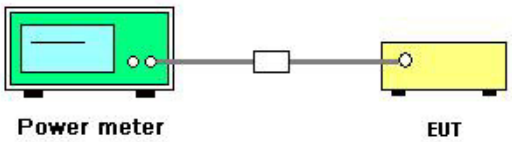
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r02 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. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

Temperature	23°C	Humidity	47%
Test Engineer	Serway Li	Test Date	Jun. 16, 2016

Mode	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1		
802.11a	5180 MHz	20.26	30.00	Complies
	5200 MHz	20.77	30.00	Complies
	5240 MHz	21.42	30.00	Complies
	5745 MHz	22.79	30.00	Complies
	5785 MHz	22.40	30.00	Complies
	5825 MHz	22.23	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.24	30.00	Complies
	5200 MHz	20.81	30.00	Complies
	5240 MHz	21.28	30.00	Complies
	5745 MHz	22.75	30.00	Complies
	5785 MHz	22.53	30.00	Complies
	5825 MHz	22.18	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	17.46	30.00	Complies
	5230 MHz	22.02	30.00	Complies
	5755 MHz	22.32	30.00	Complies
	5795 MHz	22.14	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	16.04	30.00	Complies
	5775 MHz	19.74	30.00	Complies

4.5. Power Spectral Density Measurement

4.5.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.4.1.

Frequency Band			Limit
☒	5.15~5.25 GHz		
	Operating Mode		
	☐	Outdoor access point	17 dBm/MHz
	☒	Indoor access point	17 dBm/MHz
	☐	Fixed point-to-point access points	17 dBm/MHz
	☐	Client devices	11 dBm/MHz
☒	5.725~5.85 GHz		30 dBm/500kHz

4.5.2. Measuring Instruments and Setting

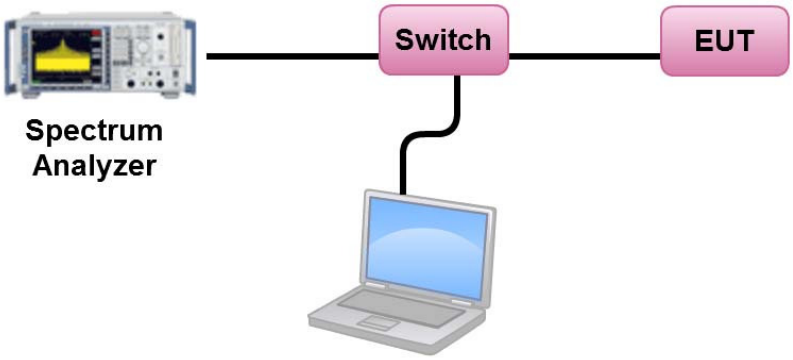
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

4.5.4. Test Setup Layout



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Test Result of Power Spectral Density

Temperature	23°C	Humidity	47%
Test Engineer	Serway Li	Test Date	Jun. 16, 2016

Configuration IEEE 802.11a / Ant. 1

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	7.09	17.00	Complies
40	5200 MHz	7.65	17.00	Complies
48	5240 MHz	8.18	17.00	Complies

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	9.67	-3.01	6.66	30.00	Complies
157	5785 MHz	9.22	-3.01	6.21	30.00	Complies
165	5825 MHz	8.99	-3.01	5.98	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	7.05	17.00	Complies
40	5200 MHz	7.62	17.00	Complies
48	5240 MHz	8.12	17.00	Complies

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	9.57	-3.01	6.56	30.00	Complies
157	5785 MHz	9.42	-3.01	6.41	30.00	Complies
165	5825 MHz	8.98	-3.01	5.97	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	1.31	17.00	Complies
46	5230 MHz	5.90	17.00	Complies

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	6.18	-3.01	3.17	30.00	Complies
159	5795 MHz	5.94	-3.01	2.93	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1

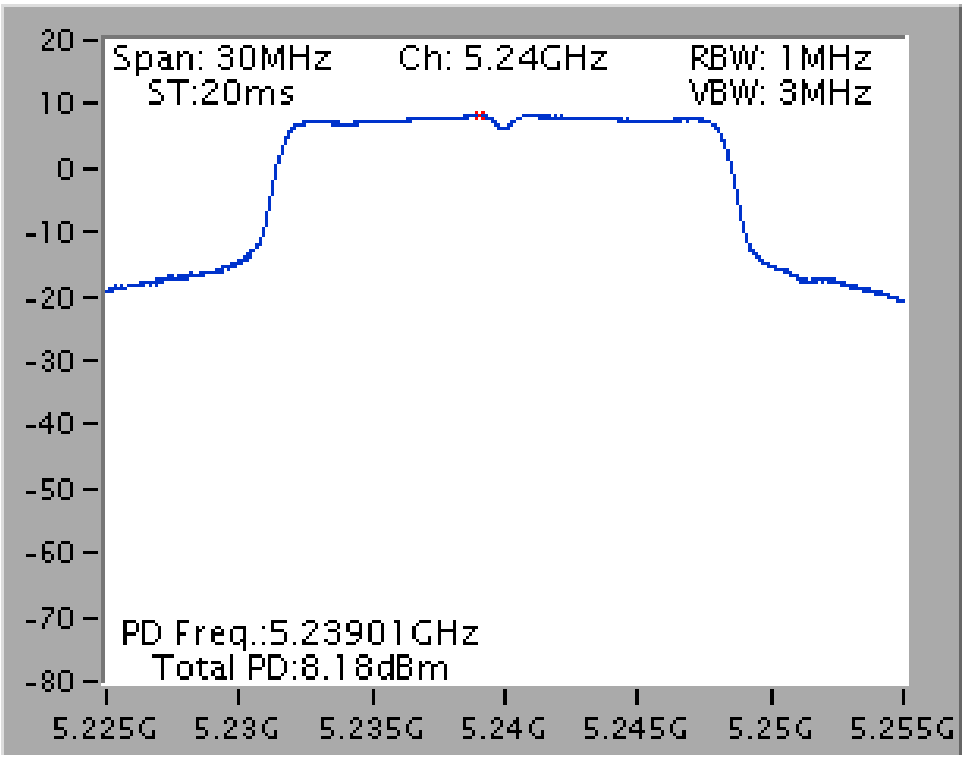
Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-3.14	17.00	Complies

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	0.57	-3.01	-2.44	30.00	Complies

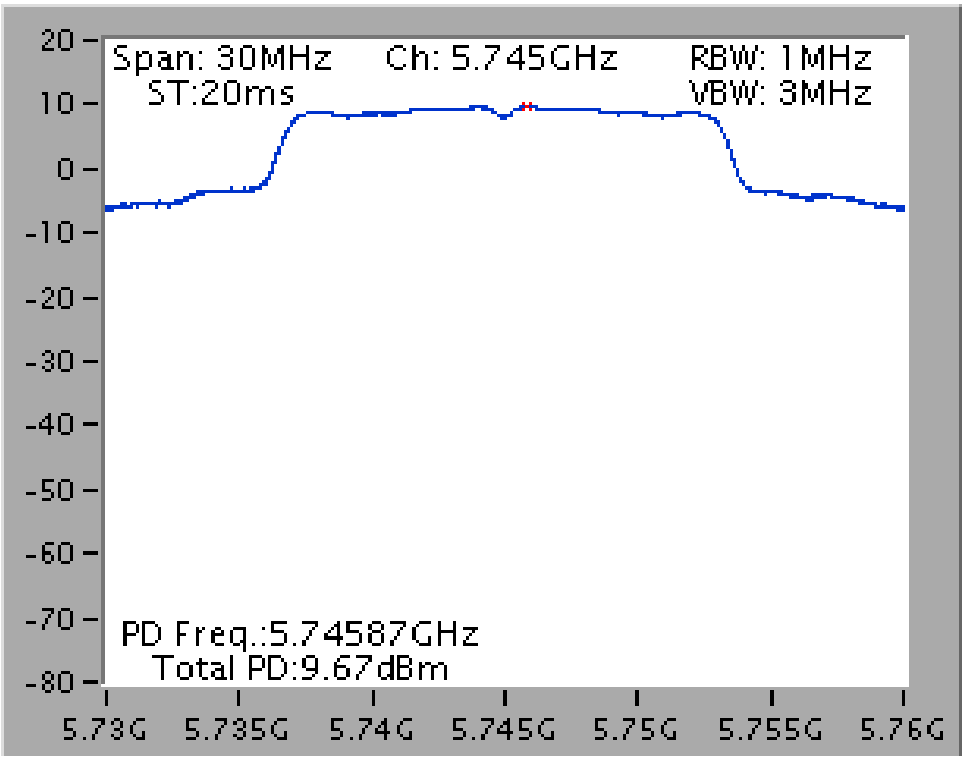
Note: All the test values were listed in the report.

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

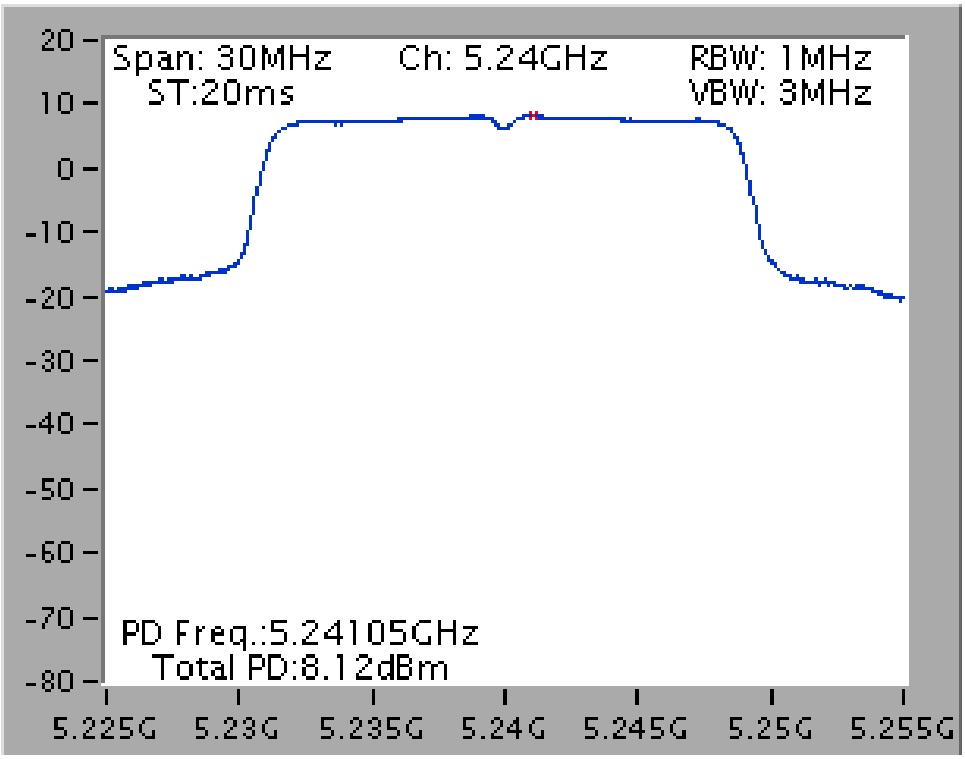
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5240 MHz



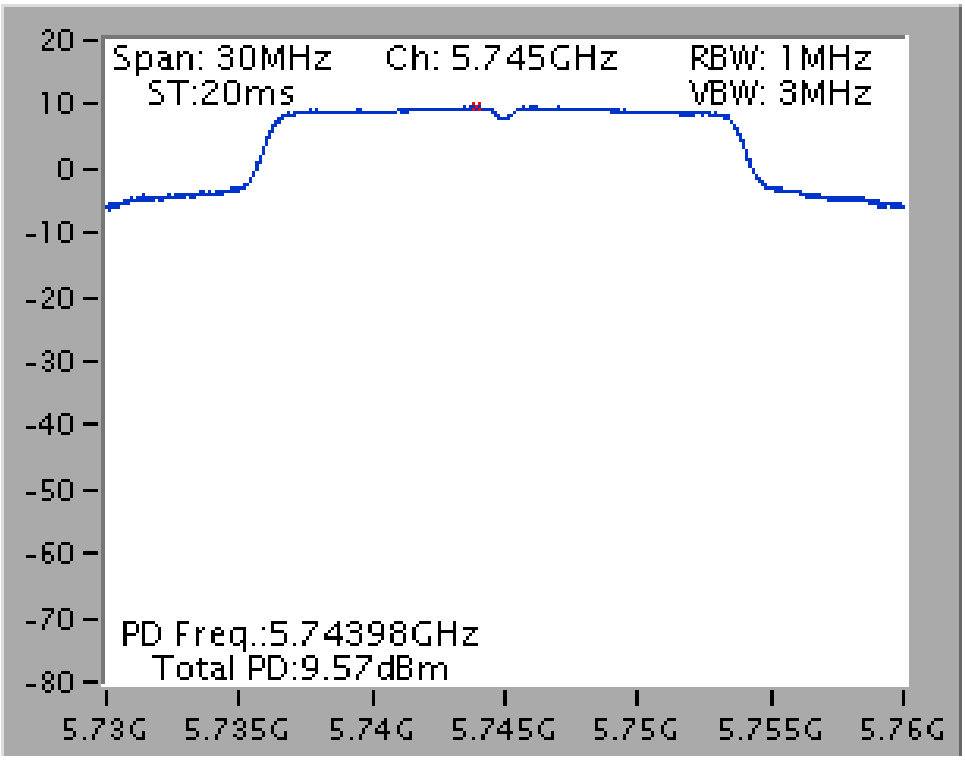
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5745 MHz



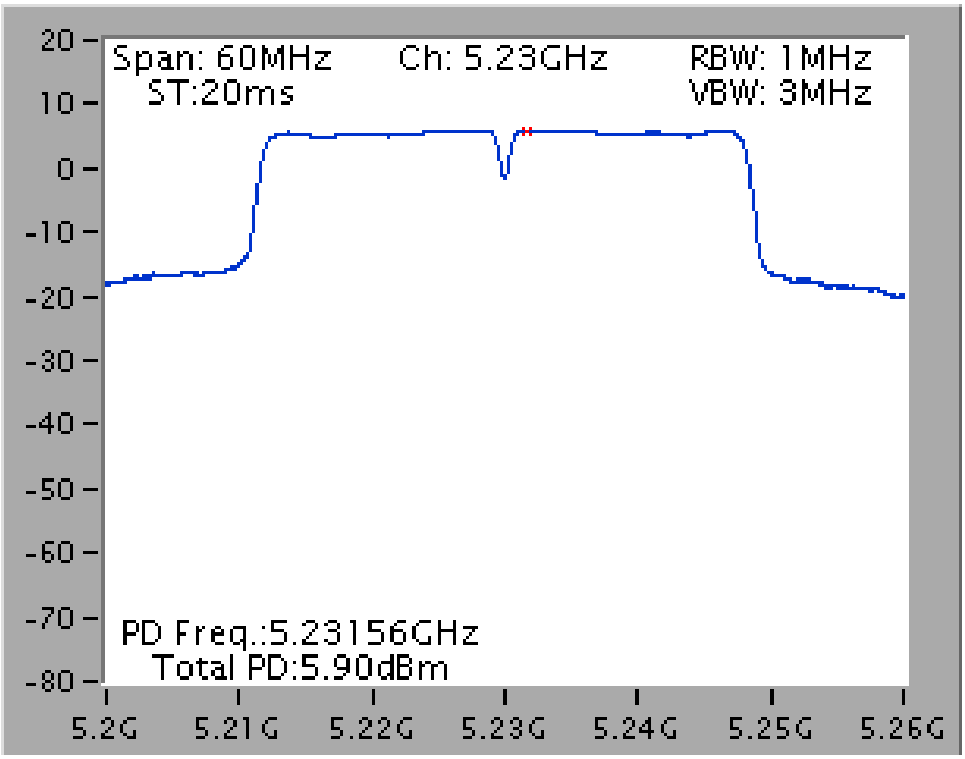
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 / 5240 MHz



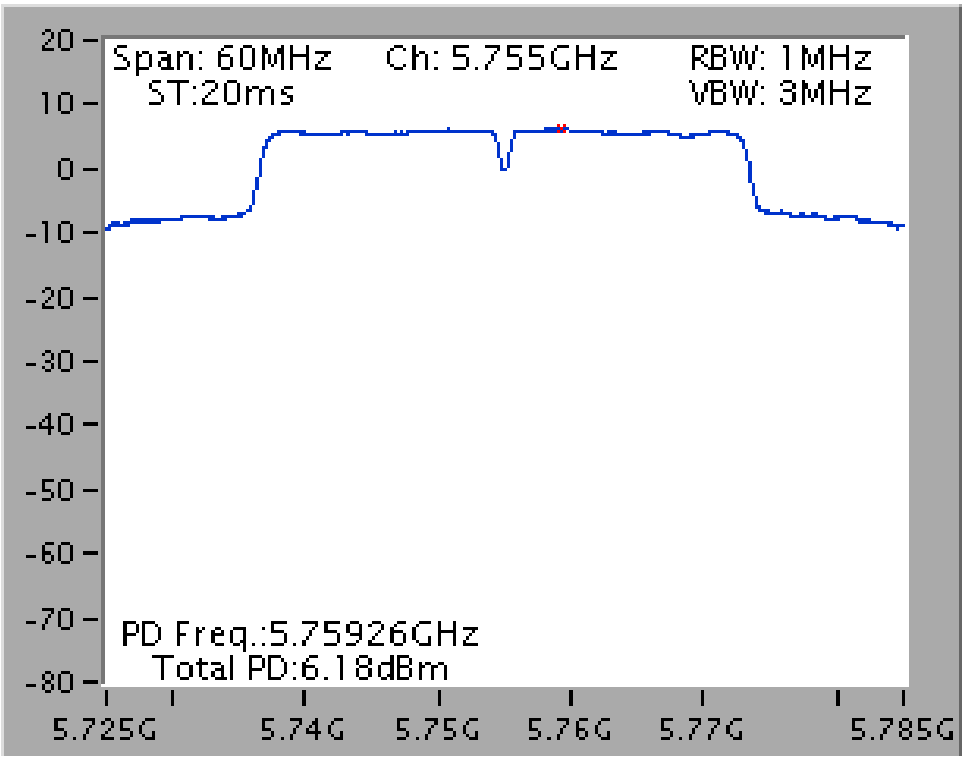
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 / 5745 MHz



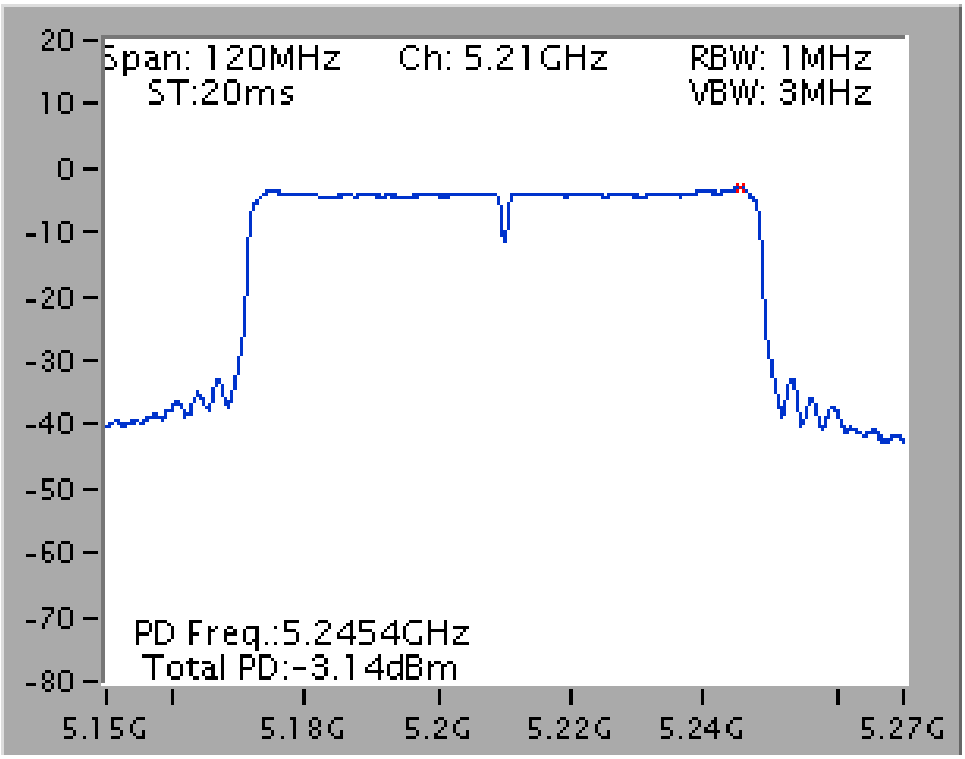
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 / 5230 MHz



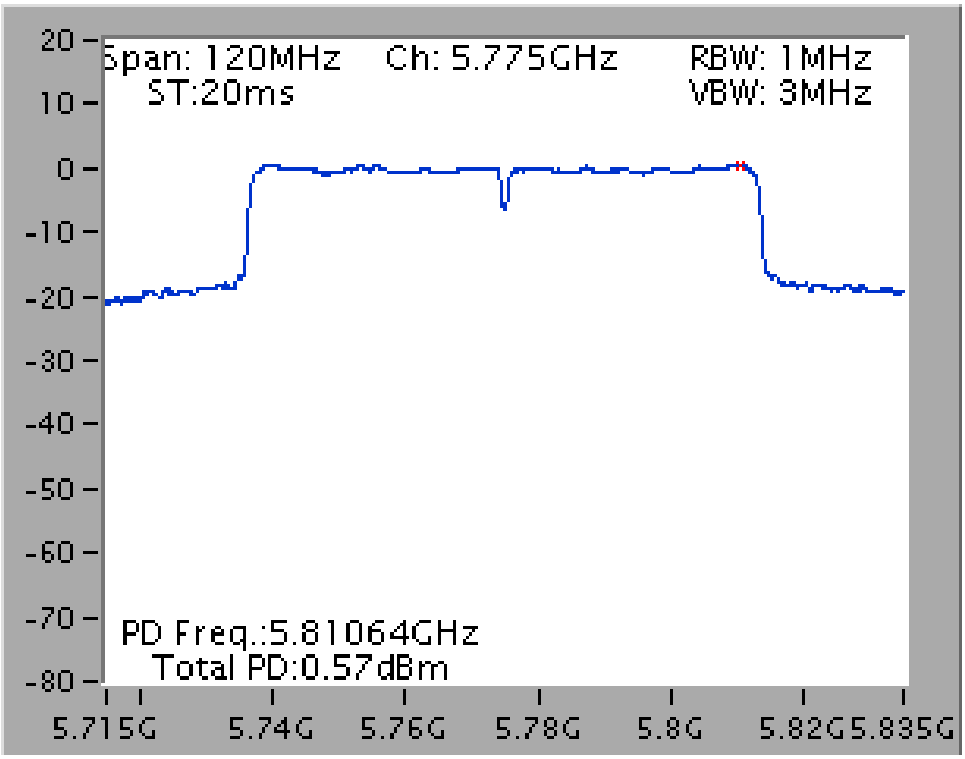
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 / 5755 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 / 5210 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 / 5775 MHz



4.6. Radiated Emissions Measurement

4.6.1. Limit

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

For transmitters operating in the 5.725-5.85 GHz band: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

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

4.6.2. Measuring Instruments and Setting

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

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

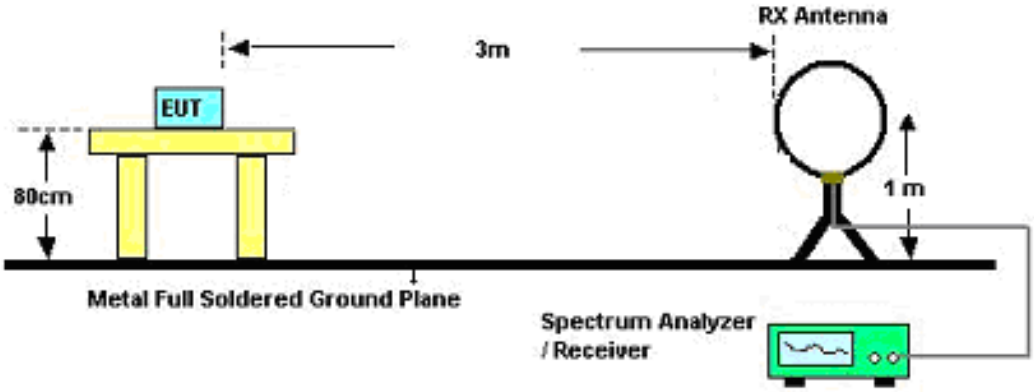
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

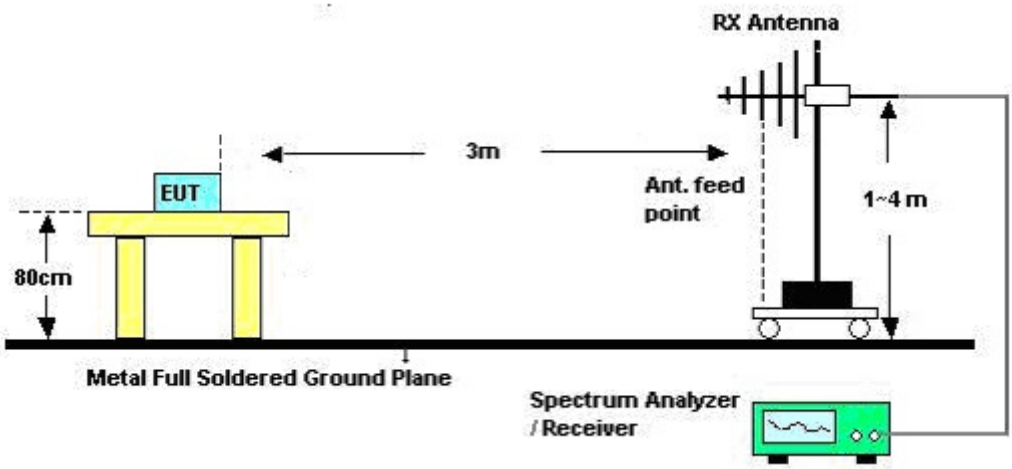
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.6.4. Test Setup Layout

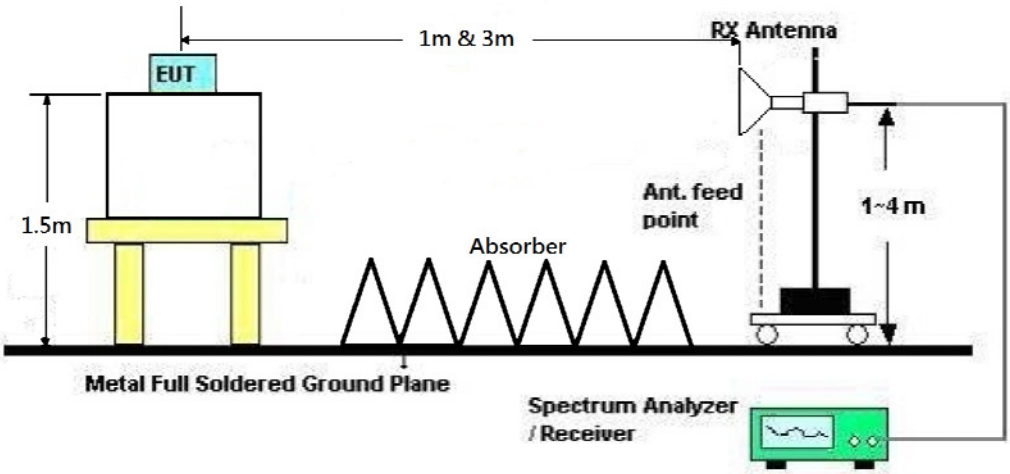
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	CTX
Test Date	May 23, 2016		

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

Note:

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

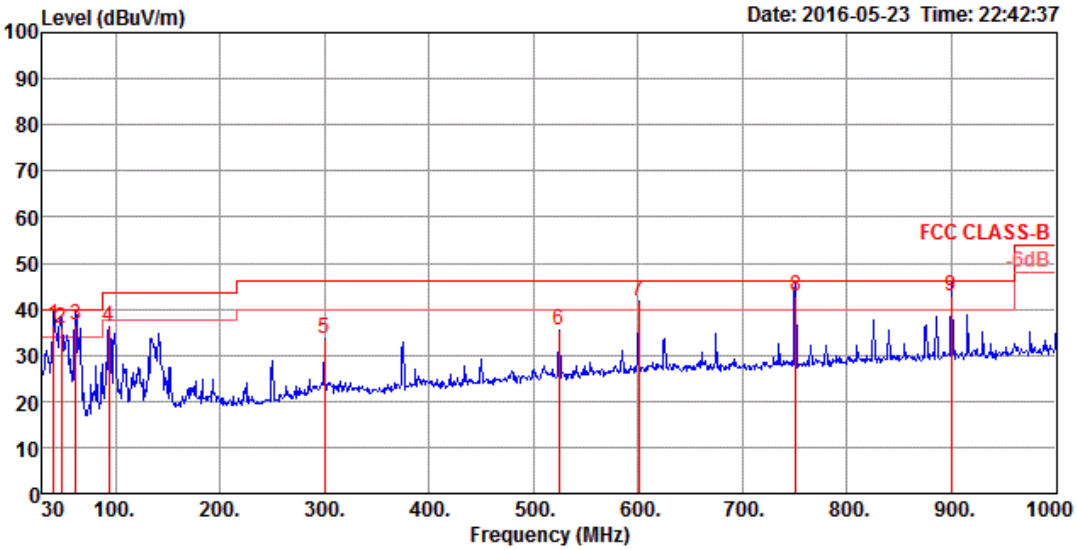
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

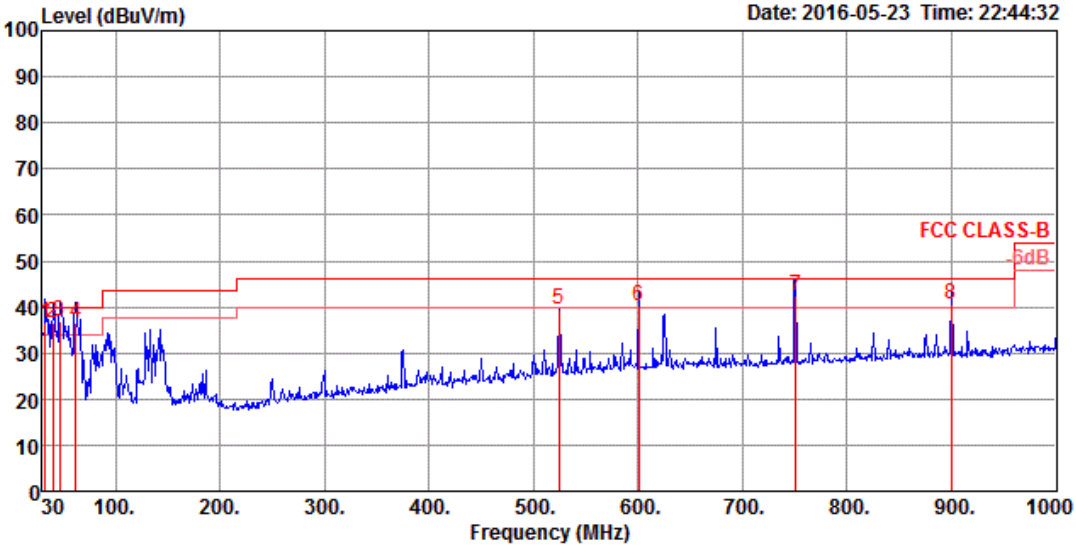
Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	CTX

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	40.67	36.39	40.00	-3.61	48.51	0.55	19.74	32.41	150	324	QP	HORIZONTAL
2	48.43	35.86	40.00	-4.14	52.10	0.61	15.56	32.41	200	301	QP	HORIZONTAL
3	62.01	36.43	40.00	-3.57	54.60	0.69	13.54	32.40	200	100	QP	HORIZONTAL
4	94.02	36.16	43.50	-7.34	51.30	0.84	16.41	32.39	200	66	Peak	HORIZONTAL
5	299.66	33.56	46.00	-12.44	44.38	1.48	19.98	32.28	100	231	Peak	HORIZONTAL
6	524.70	35.30	46.00	-10.70	41.28	1.99	24.40	32.37	200	182	Peak	HORIZONTAL
7	600.36	41.65	46.00	-4.35	46.54	2.12	25.40	32.41	200	138	Peak	HORIZONTAL
8	750.71	42.97	46.00	-3.03	46.50	2.37	26.40	32.30	125	235	QP	HORIZONTAL
9	900.09	42.73	46.00	-3.27	44.20	2.57	27.70	31.74	100	269	QP	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	32.91	36.65	40.00	-3.35	44.30	0.51	24.24	32.40	100	337	QP	VERTICAL
2	39.70	36.70	40.00	-3.30	48.21	0.54	20.36	32.41	125	184	QP	VERTICAL
3	46.49	36.83	40.00	-3.17	52.20	0.60	16.44	32.41	100	29	QP	VERTICAL
4	62.01	36.43	40.00	-3.57	54.60	0.69	13.54	32.40	125	130	QP	VERTICAL
5	524.70	39.44	46.00	-6.56	45.42	1.99	24.40	32.37	125	113	Peak	VERTICAL
6	600.36	40.31	46.00	-5.69	45.20	2.12	25.40	32.41	100	144	QP	VERTICAL
7	750.71	42.27	46.00	-3.73	45.80	2.37	26.40	32.30	100	341	QP	VERTICAL
8	900.09	40.63	46.00	-5.37	42.10	2.57	27.70	31.74	125	17	QP	VERTICAL

Note:

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

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

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

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

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 36 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10359.69	60.45	68.20	-7.75	47.10	10.52	38.75	35.92	131	315	Peak	HORIZONTAL
2	15540.22	55.99	74.00	-18.01	42.45	11.01	38.39	35.86	134	274	Peak	HORIZONTAL
3	15540.24	43.04	54.00	-10.96	29.50	11.01	38.39	35.86	134	274	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10363.30	67.84	68.20	-0.36	54.50	10.52	38.75	35.93	127	331	Peak	VERTICAL
2	15540.17	43.16	54.00	-10.84	29.62	11.01	38.39	35.86	152	215	Average	VERTICAL
3	15540.32	55.77	74.00	-18.23	42.23	11.01	38.39	35.86	152	215	Peak	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 40 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10401.00	60.42	68.20	-7.78	47.05	10.52	38.78	35.93	125	293	Peak	HORIZONTAL
2	15600.16	56.26	74.00	-17.74	42.73	11.01	38.38	35.86	122	257	Peak	HORIZONTAL
3	15600.41	42.49	54.00	-11.51	28.96	11.01	38.38	35.86	122	257	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10398.60	67.89	68.20	-0.31	54.52	10.52	38.78	35.93	121	331	Peak	VERTICAL
2	15600.19	55.34	74.00	-18.66	41.81	11.01	38.38	35.86	143	218	Peak	VERTICAL
3	15600.38	42.74	54.00	-11.26	29.21	11.01	38.38	35.86	143	218	Average	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 48 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10479.92	60.95	68.20	-7.25	47.49	10.52	38.87	35.93	144	298	Peak	HORIZONTAL
2	15719.57	42.50	54.00	-11.50	29.00	11.01	38.35	35.86	134	250	Average	HORIZONTAL
3	15719.91	56.00	74.00	-18.00	42.50	11.01	38.35	35.86	134	250	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10482.30	67.67	68.20	-0.53	54.21	10.52	38.87	35.93	130	330	Peak	VERTICAL
2	15719.72	55.16	74.00	-18.84	41.66	11.01	38.35	35.86	143	223	Peak	VERTICAL
3	15720.23	43.16	54.00	-10.84	29.66	11.01	38.35	35.86	143	223	Average	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 149 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11490.10	50.57	54.00	-3.43	36.79	10.51	39.20	35.93	173	163	Average	HORIZONTAL
2	11492.10	62.89	74.00	-11.11	49.11	10.51	39.20	35.93	173	163	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11490.10	53.91	54.00	-0.09	40.13	10.51	39.20	35.93	157	242	Average	VERTICAL
2	11494.90	66.81	74.00	-7.19	53.03	10.51	39.20	35.93	157	242	Peak	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 157 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11570.00	48.18	54.00	-5.82	34.44	10.51	39.15	35.92	171	169	Average	HORIZONTAL
2	11570.90	60.91	74.00	-13.09	47.17	10.51	39.15	35.92	171	169	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11570.20	51.86	54.00	-2.14	38.12	10.51	39.15	35.92	162	243	Average	VERTICAL
2	11570.70	63.66	74.00	-10.34	49.92	10.51	39.15	35.92	162	243	Peak	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 165 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11650.10	44.12	54.00	-9.88	30.43	10.51	39.09	35.91	124	217	Average	HORIZONTAL
2	11652.20	56.10	74.00	-17.90	42.43	10.51	39.07	35.91	124	217	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11649.90	49.71	54.00	-4.29	36.02	10.51	39.09	35.91	103	10	Average	VERTICAL
2	11650.80	61.56	74.00	-12.44	47.89	10.51	39.07	35.91	103	10	Peak	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10359.53	57.63	68.20	-10.57	44.28	10.52	38.75	35.92	160	290	Peak	HORIZONTAL
2	15540.25	55.90	74.00	-18.10	42.36	11.01	38.39	35.86	155	157	Peak	HORIZONTAL
3	15540.30	43.03	54.00	-10.97	29.49	11.01	38.39	35.86	155	157	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10350.00	68.04	68.20	-0.16	54.69	10.52	38.75	35.92	131	332	Peak	VERTICAL
2	15540.12	43.17	54.00	-10.83	29.63	11.01	38.39	35.86	150	208	Average	VERTICAL
3	15540.40	55.84	74.00	-18.16	42.30	11.01	38.39	35.86	150	208	Peak	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10400.11	55.79	68.20	-12.41	42.42	10.52	38.78	35.93	110	249	Peak	HORIZONTAL
2	15600.32	42.98	54.00	-11.02	29.45	11.01	38.38	35.86	149	275	Average	HORIZONTAL
3	15600.41	55.16	74.00	-18.84	41.63	11.01	38.38	35.86	149	275	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10395.30	67.61	68.20	-0.59	54.24	10.52	38.78	35.93	125	332	Peak	VERTICAL
2	15600.07	56.26	74.00	-17.74	42.73	11.01	38.38	35.86	137	303	Peak	VERTICAL
3	15600.32	43.14	54.00	-10.86	29.61	11.01	38.38	35.86	137	303	Average	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10488.70	56.16	68.20	-12.04	42.70	10.52	38.87	35.93	146	109	Peak	HORIZONTAL
2	15719.52	42.73	54.00	-11.27	29.23	11.01	38.35	35.86	132	160	Average	HORIZONTAL
3	15720.32	55.24	74.00	-18.76	41.74	11.01	38.35	35.86	132	160	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10483.60	67.66	68.20	-0.54	54.20	10.52	38.87	35.93	125	329	Peak	VERTICAL
2	15719.66	55.50	74.00	-18.50	42.00	11.01	38.35	35.86	149	218	Peak	VERTICAL
3	15720.05	42.88	54.00	-11.12	29.38	11.01	38.35	35.86	149	218	Average	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.80	49.16	54.00	-4.84	35.38	10.51	39.20	35.93	175	166	Average	HORIZONTAL
2	11490.60	62.08	74.00	-11.92	48.30	10.51	39.20	35.93	175	166	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.70	52.62	54.00	-1.38	38.84	10.51	39.20	35.93	211	80	Average	VERTICAL
2	11492.80	65.00	74.00	-9.00	51.22	10.51	39.20	35.93	211	80	Peak	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11568.20	59.12	74.00	-14.88	45.38	10.51	39.15	35.92	173	237	Peak	HORIZONTAL
2	11569.60	46.24	54.00	-7.76	32.50	10.51	39.15	35.92	173	237	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11568.10	63.35	74.00	-10.65	49.61	10.51	39.15	35.92	163	243	Peak	VERTICAL
2	11569.80	49.58	54.00	-4.42	35.84	10.51	39.15	35.92	163	243	Average	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11648.20	58.46	74.00	-15.54	44.77	10.51	39.09	35.91	126	253	Peak	HORIZONTAL
2	11648.90	45.44	54.00	-8.56	31.75	10.51	39.09	35.91	126	253	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11647.90	59.77	74.00	-14.23	46.08	10.51	39.09	35.91	211	85	Peak	VERTICAL
2	11649.50	47.60	54.00	-6.40	33.91	10.51	39.09	35.91	211	85	Average	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10385.70	57.53	68.20	-10.67	44.16	10.52	38.78	35.93	122	288	Peak	HORIZONTAL
2	15569.76	42.11	54.00	-11.89	28.58	11.01	38.38	35.86	132	240	Average	HORIZONTAL
3	15570.48	55.05	74.00	-18.95	41.52	11.01	38.38	35.86	132	240	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10380.20	58.57	68.20	-9.63	45.20	10.52	38.78	35.93	125	328	Peak	VERTICAL
2	15570.29	54.17	74.00	-19.83	40.64	11.01	38.38	35.86	150	176	Peak	VERTICAL
3	15570.32	42.03	54.00	-11.97	28.50	11.01	38.38	35.86	150	176	Average	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10452.10	59.43	68.20	-8.77	46.00	10.52	38.84	35.93	126	288	Peak	HORIZONTAL
2	15689.52	55.33	74.00	-18.67	41.82	11.01	38.36	35.86	124	170	Peak	HORIZONTAL
3	15689.52	42.76	54.00	-11.24	29.25	11.01	38.36	35.86	124	170	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	10460.40	67.78	68.20	-0.42	54.35	10.52	38.84	35.93	123	329	Peak	VERTICAL
2	15689.77	42.83	54.00	-11.17	29.32	11.01	38.36	35.86	142	210	Average	VERTICAL
3	15689.98	55.45	74.00	-18.55	41.94	11.01	38.36	35.86	142	210	Peak	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11509.63	57.29	74.00	-16.71	43.50	10.51	39.20	35.92	138	182	Peak	HORIZONTAL
2	11509.98	44.51	54.00	-9.49	30.72	10.51	39.20	35.92	138	182	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11502.60	51.04	54.00	-2.96	37.26	10.51	39.20	35.93	118	236	Average	VERTICAL
2	11510.30	63.37	74.00	-10.63	49.58	10.51	39.20	35.92	118	236	Peak	VERTICAL

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11589.96	45.86	54.00	-8.14	32.14	10.51	39.12	35.91	131	258	Average	HORIZONTAL
2	11590.72	57.92	74.00	-16.08	44.20	10.51	39.12	35.91	131	258	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11580.92	62.64	74.00	-11.36	48.90	10.51	39.15	35.92	118	312	Peak	VERTICAL
2	11590.04	51.24	54.00	-2.76	37.52	10.51	39.12	35.91	118	312	Average	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15629.84	55.15	74.00	-18.85	41.63	11.01	38.37	35.86	118	192	Peak	HORIZONTAL
2	15630.47	42.15	54.00	-11.85	28.63	11.01	38.37	35.86	118	192	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	15630.46	55.42	74.00	-18.58	41.90	11.01	38.37	35.86	123	230	Peak	VERTICAL
2	15630.47	42.65	54.00	-11.35	29.13	11.01	38.37	35.86	123	230	Average	VERTICAL

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1
Test Date	May 11, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11550.25	42.61	54.00	-11.39	28.87	10.51	39.15	35.92	106	168	Average	HORIZONTAL
2	11550.31	55.48	74.00	-18.52	41.74	10.51	39.15	35.92	106	168	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11549.55	58.94	74.00	-15.06	45.18	10.51	39.17	35.92	125	238	Peak	VERTICAL
2	11550.48	46.25	54.00	-7.75	32.51	10.51	39.15	35.92	125	238	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.

4.7. Band Edge Emissions Measurement

4.7.1. Limit

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

For transmitters operating in the 5.725-5.85 GHz band: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

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

4.7.2. Measuring Instruments and Setting

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

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

4.7.3. Test Procedures

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

4.7.4. Test Setup Layout

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

4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.7.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 36, 40, 48 / Ant. 1
Test Date	May 12, 2016		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.40	70.25	74.00	-3.75	65.70	7.88	33.17	36.50	290	213	Peak	VERTICAL
2	5150.00	53.61	54.00	-0.39	49.06	7.88	33.17	36.50	290	213	Average	VERTICAL
3	5176.80	111.41			106.76	7.91	33.23	36.49	290	213	Peak	VERTICAL
4	5179.20	101.94			97.29	7.91	33.23	36.49	290	213	Average	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.60	64.45	74.00	-9.55	59.90	7.88	33.17	36.50	196	222	Peak	HORIZONTAL
2	5150.00	49.76	54.00	-4.24	45.21	7.88	33.17	36.50	196	222	Average	HORIZONTAL
3	5199.20	99.34			94.66	7.92	33.25	36.49	196	222	Average	HORIZONTAL
4	5202.80	109.64			104.93	7.92	33.28	36.49	196	222	Peak	HORIZONTAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5099.60	57.73	74.00	-16.27	53.31	7.84	33.09	36.51	284	210	Peak	VERTICAL
2	5120.60	45.38	54.00	-8.62	40.92	7.85	33.12	36.51	284	210	Average	VERTICAL
3	5238.20	111.48			106.71	7.91	33.34	36.48	284	210	Peak	VERTICAL
4	5238.80	101.93			97.16	7.91	33.34	36.48	284	210	Average	VERTICAL
5	5364.20	58.05	74.00	-15.95	53.08	7.88	33.55	36.46	284	210	Peak	VERTICAL
6	5386.40	44.87	54.00	-9.13	39.84	7.87	33.61	36.45	284	210	Average	VERTICAL

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

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11a CH 149, 157, 165 / Ant. 1
Test Date	May 12, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5647.00	64.99	68.20	-3.21	58.71	8.45	34.22	36.39	210	237	Peak	VERTICAL
2	5740.00	113.26			106.71	8.42	34.50	36.37	210	237	Peak	VERTICAL
3	5744.00	103.16			96.61	8.42	34.50	36.37	210	237	Average	VERTICAL

Item 2, 3 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5595.00	60.22	68.20	-7.98	54.08	8.47	34.08	36.41	290	318	Peak	HORIZONTAL
2	5780.00	109.02			102.38	8.41	34.59	36.36	290	318	Peak	HORIZONTAL
3	5784.00	99.30			92.65	8.41	34.59	36.35	290	318	Average	HORIZONTAL
4	6032.00	59.26	68.20	-8.94	51.85	8.47	35.24	36.30	290	318	Peak	HORIZONTAL

Item 2, 3 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5616.00	60.43	68.20	-7.77	54.24	8.46	34.13	36.40	245	242	Peak	VERTICAL
2	5828.00	101.05			94.27	8.39	34.73	36.34	245	242	Average	VERTICAL
3	5829.00	111.62			104.84	8.39	34.73	36.34	245	242	Peak	VERTICAL
4	6075.00	61.30	68.20	-6.90	53.71	8.59	35.29	36.29	245	242	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5825 MHz.

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Ant. 1
Test Date	May 12, 2016		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.80	69.11	74.00	-4.89	64.56	7.88	33.17	36.50	196	172	Peak	VERTICAL
2	5150.00	52.58	54.00	-1.42	48.03	7.88	33.17	36.50	196	172	Average	VERTICAL
3	5182.40	109.62			104.97	7.91	33.23	36.49	196	172	Peak	VERTICAL
4	5183.20	100.74			96.09	7.91	33.23	36.49	196	172	Average	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.60	49.50	54.00	-4.50	44.95	7.88	33.17	36.50	273	221	Average	HORIZONTAL
2	5150.00	64.35	74.00	-9.65	59.80	7.88	33.17	36.50	273	221	Peak	HORIZONTAL
3	5201.20	99.56			94.88	7.92	33.25	36.49	273	221	Average	HORIZONTAL
4	5203.20	109.75			105.04	7.92	33.28	36.49	273	221	Peak	HORIZONTAL

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5134.40	57.85	74.00	-16.15	53.33	7.87	33.15	36.50	192	121	Peak	VERTICAL
2	5146.40	45.04	54.00	-8.96	40.49	7.88	33.17	36.50	192	121	Average	VERTICAL
3	5238.80	100.20			95.43	7.91	33.34	36.48	192	121	Average	VERTICAL
4	5243.00	109.51			104.74	7.91	33.34	36.48	192	121	Peak	VERTICAL
5	5379.80	58.03	74.00	-15.97	53.04	7.87	33.58	36.46	192	121	Peak	VERTICAL
6	5384.00	44.85	54.00	-9.15	39.85	7.87	33.58	36.45	192	121	Average	VERTICAL

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

Temperature	23℃	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Ant. 1
Test Date	May 12, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5649.00	62.61	68.20	-5.59	56.33	8.45	34.22	36.39	217	243	Peak	VERTICAL
2	5743.00	113.54			106.99	8.42	34.50	36.37	217	243	Peak	VERTICAL
3	5744.00	103.26			96.71	8.42	34.50	36.37	217	243	Average	VERTICAL

Item 2, 3 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5598.00	60.08	68.20	-8.12	53.93	8.47	34.08	36.40	202	326	Peak	HORIZONTAL
2	5784.00	99.09			92.44	8.41	34.59	36.35	202	326	Average	HORIZONTAL
3	5788.00	108.87			102.22	8.41	34.59	36.35	202	326	Peak	HORIZONTAL
4	5986.00	61.03	68.20	-7.17	53.83	8.36	35.15	36.31	202	326	Peak	HORIZONTAL

Item 2, 3 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5598.00	60.51	68.20	-7.69	54.36	8.47	34.08	36.40	217	232	Peak	VERTICAL
2	5827.00	101.56			94.78	8.39	34.73	36.34	217	232	Average	VERTICAL
3	5829.00	112.52			105.74	8.39	34.73	36.34	217	232	Peak	VERTICAL
4	5923.00	65.88	69.67	-3.79	58.86	8.38	34.97	36.33	217	232	Peak	VERTICAL
5	5934.00	62.73	68.20	-5.47	55.68	8.37	35.01	36.33	217	232	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5825 MHz.

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Ant. 1
Test Date	May 12, 2016		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5146.40	70.05	74.00	-3.95	65.50	7.88	33.17	36.50	200	169	Peak	VERTICAL
2	5150.00	53.88	54.00	-0.12	49.33	7.88	33.17	36.50	200	169	Average	VERTICAL
3	5185.60	95.14			90.49	7.91	33.23	36.49	200	169	Average	VERTICAL
4	5186.00	104.62			99.97	7.91	33.23	36.49	200	169	Peak	VERTICAL

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5148.80	67.82	74.00	-6.18	63.27	7.88	33.17	36.50	195	181	Peak	VERTICAL
2	5150.00	53.52	54.00	-0.48	48.97	7.88	33.17	36.50	195	181	Average	VERTICAL
3	5235.40	99.53			94.76	7.91	33.34	36.48	195	181	Average	VERTICAL
4	5240.20	108.93			104.16	7.91	33.34	36.48	195	181	Peak	VERTICAL

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

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Ant. 1
Test Date	May 12, 2016		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5645.00	67.48	68.20	-0.72	61.20	8.45	34.22	36.39	225	255	Peak	VERTICAL
2	5760.00	99.36			92.76	8.41	34.55	36.36	225	255	Average	VERTICAL
3	5760.00	109.09			102.49	8.41	34.55	36.36	225	255	Peak	VERTICAL
4	5938.00	60.68	68.20	-7.52	53.62	8.37	35.01	36.32	225	255	Peak	VERTICAL

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

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5646.00	63.24	68.20	-4.96	56.96	8.45	34.22	36.39	212	232	Peak	VERTICAL
2	5783.00	109.24			102.59	8.41	34.59	36.35	212	232	Peak	VERTICAL
3	5784.00	98.91			92.26	8.41	34.59	36.35	212	232	Average	VERTICAL
4	5926.00	67.65	68.20	-0.55	60.60	8.37	35.01	36.33	212	232	Peak	VERTICAL
5	5928.00	66.35	68.20	-1.85	59.30	8.37	35.01	36.33	212	232	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5795 MHz.

Temperature	23°C	Humidity	54%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Ant. 1
Test Date	May 12, 2016		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5144.60	53.41	54.00	-0.59	48.86	7.88	33.17	36.50	200	169	Average	VERTICAL
2	5147.00	68.44	74.00	-5.56	63.89	7.88	33.17	36.50	200	169	Peak	VERTICAL
3	5174.60	89.97			85.32	7.91	33.23	36.49	200	169	Average	VERTICAL
4	5174.60	99.99			95.34	7.91	33.23	36.49	200	169	Peak	VERTICAL

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

Channel 155

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5646.00	65.62	68.20	-2.58	59.34	8.45	34.22	36.39	217	234	Peak	VERTICAL
2	5739.00	103.58			97.03	8.42	34.50	36.37	217	234	Peak	VERTICAL
3	5740.00	93.83			87.28	8.42	34.50	36.37	217	234	Average	VERTICAL
4	5931.00	67.36	68.20	-0.84	60.31	8.37	35.01	36.33	217	234	Peak	VERTICAL

Item 2, 3 are the fundamental frequency at 5775 MHz.

Note:

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

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

4.8. Frequency Stability Measurement

4.8.1. Limit

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

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

4.8.2. Measuring Instruments and Setting

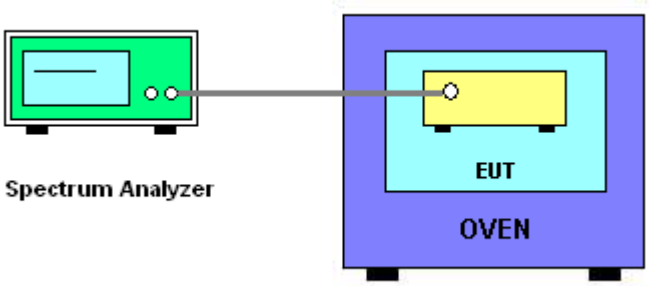
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.8.3. Test Procedures

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

4.8.4. Test Setup Layout



4.8.5. Test Deviation

There is no deviation with the original standard.

4.8.6. EUT Operation during Test

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

4.8.7. Test Result of Frequency Stability

Temperature	23°C	Humidity	47%
Test Engineer	Peter Wu	Test Date	Jun. 16, 2016

Mode: 20 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9593	5199.9588	5199.9585	5199.9582
110.00	5199.9591	5199.9583	5199.9581	5199.9573
93.50	5199.9590	5199.9585	5199.9575	5199.9570
Max. Deviation (MHz)	0.0410	0.0417	0.0425	0.0430
Max. Deviation (ppm)	7.88	8.02	8.17	8.27
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5199.9565	5199.9558	5199.9549	5199.9544
10	5199.9579	5199.9573	5199.9571	5199.9570
20	5199.9591	5199.9590	5199.9582	5199.9574
30	5199.9609	5199.9607	5199.9602	5199.9594
40	5199.9613	5199.9606	5199.9601	5199.9597
Max. Deviation (MHz)	0.0435	0.0442	0.0451	0.0456
Max. Deviation (ppm)	8.37	8.50	8.67	8.77
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9592	5784.9588	5784.9585	5784.9578
110.00	5784.9591	5784.9589	5784.9587	5784.9583
93.50	5784.9581	5784.9577	5784.9572	5784.9562
Max. Deviation (MHz)	0.0419	0.0423	0.0428	0.0438
Max. Deviation (ppm)	7.24	7.31	7.40	7.57
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5784.9569	5784.9565	5784.9563	5784.9555
10	5784.9582	5784.9579	5784.9573	5784.9569
20	5784.9591	5784.9590	5784.9587	5784.9577
30	5784.9609	5784.9608	5784.9598	5784.9596
40	5784.9622	5784.9620	5784.9612	5784.9602
Max. Deviation (MHz)	0.0431	0.0435	0.0437	0.0445
Max. Deviation (ppm)	7.45	7.52	7.55	7.69
Result	Complies			

Mode: 40 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9601	5189.9597	5189.9594	5189.9587
110.00	5189.9591	5189.9582	5189.9572	5189.9571
93.50	5189.9583	5189.9579	5189.9576	5189.9572
Max. Deviation (MHz)	0.0417	0.0421	0.0428	0.0429
Max. Deviation (ppm)	8.03	8.11	8.25	8.27
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5189.9568	5189.9567	5189.9558	5189.9557
10	5189.9588	5189.9578	5189.9575	5189.9573
20	5189.9591	5189.9590	5189.9582	5189.9581
30	5189.9609	5189.9605	5189.9603	5189.9593
40	5189.9616	5189.9609	5189.9603	5189.9596
Max. Deviation (MHz)	0.0432	0.0433	0.0442	0.0443
Max. Deviation (ppm)	8.32	8.34	8.52	8.54
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9592	5754.9590	5754.9584	5754.9575
110.00	5754.9591	5754.9583	5754.9574	5754.9567
93.50	5754.9584	5754.9576	5754.9570	5754.9565
Max. Deviation (MHz)	0.0416	0.0424	0.0430	0.0435
Max. Deviation (ppm)	7.23	7.37	7.47	7.56
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5754.9577	5754.9571	5754.9566	5754.9561
10	5754.9587	5754.9582	5754.9577	5754.9574
20	5754.9591	5754.9585	5754.9575	5754.9572
30	5754.9609	5754.9607	5754.9597	5754.9594
40	5754.9623	5754.9615	5754.9609	5754.9606
Max. Deviation (MHz)	0.0423	0.0429	0.0434	0.0439
Max. Deviation (ppm)	7.35	7.45	7.54	7.63
Result	Complies			

Mode: 80 MHz / Ant. 1

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9592	5209.9585	5209.9582	5209.9578
110.00	5209.9591	5209.9583	5209.9581	5209.9571
93.50	5209.9589	5209.9581	5209.9578	5209.9574
Max. Deviation (MHz)	0.0411	0.0419	0.0422	0.0429
Max. Deviation (ppm)	7.89	8.04	8.10	8.23
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5209.9581	5209.9574	5209.9568	5209.9564
10	5209.9588	5209.9586	5209.9581	5209.9571
20	5209.9591	5209.9581	5209.9578	5209.9576
30	5209.9609	5209.9600	5209.9594	5209.9589
40	5209.9616	5209.9615	5209.9613	5209.9606
Max. Deviation (MHz)	0.0419	0.0426	0.0432	0.0436
Max. Deviation (ppm)	8.04	8.18	8.29	8.37
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9600	5774.9591	5774.9586	5774.9585
110.00	5774.9591	5774.9589	5774.9581	5774.9579
93.50	5774.9585	5774.9577	5774.9572	5774.9569
Max. Deviation (MHz)	0.0415	0.0423	0.0428	0.0431
Max. Deviation (ppm)	7.19	7.32	7.41	7.46
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
0	5774.9571	5774.9563	5774.9560	5774.9553
10	5774.9579	5774.9569	5774.9565	5774.9563
20	5774.9591	5774.9586	5774.9581	5774.9572
30	5774.9609	5774.9604	5774.9603	5774.9594
40	5774.9613	5774.9610	5774.9601	5774.9600
Max. Deviation (MHz)	0.0429	0.0437	0.0440	0.0447
Max. Deviation (ppm)	7.43	7.57	7.62	7.74
Result	Complies			

4.9. Antenna Requirements

4.9.1. Limit

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

4.9.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 08, 2015	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 23, 2015	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 25, 2015	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	TESEQ	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 15, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 18, 2016	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 13, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 27, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz～18GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

*Calibration Interval of instruments listed above is two year.

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

6. MEASUREMENT UNCERTAINTY

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