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FCC RADIO TEST REPORT

Applicant's company	**Cambium Networks Inc.**
Applicant Address	3800 Golf Road, Suite 360 Rolling Meadows, IL 60008, USA
FCC ID	**Z8H89FT0023**
Manufacturer's company	**Joy Technology (Shen Zhen) Co. Ltd**
Manufacturer Address	Shangpai, Shangwu, Aiqun Rd., Heng Keng Industrial, Shiyan Town, Shenzhen Guangdong China

Product Name	cnPilot Outdoor E500
Brand Name	Cambium Networks
Model No.	cnPilot Outdoor E500
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	Mar. 10, 2016
Final Test Date	May 03, 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, KDB662911 D01 v02r01, 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
FR570719-06AB	Rev. 01	Initial issue of report	May 12, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	**cnPilot Outdoor E500**
Brand Name	:	**Cambium Networks**
Model No.	:	**cnPilot Outdoor E500**
Applicant	:	**Cambium Networks Inc.**
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 Mar. 10, 2016 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	5.55 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	0.19 dB
4.5	15.407(a)	Power Spectral Density	Complies	3.69 dB
4.6	15.407(b)	Radiated Emissions	Complies	5.09 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.02 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From PoE
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%)	**For P to P and P to M Mode:** Band 1: IEEE 802.11a: 18.58 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.23 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.47 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.70 MHz Band 4: IEEE 802.11a: 20.14 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 21.97 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 38.50 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz

Maximum Conducted Output Power	**For P to P and P to M Mode:** Band 1: IEEE 802.11a: 24.39 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 24.29 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 23.08 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 18.86 dBm Band 4: IEEE 802.11a: 29.80 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.79 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 29.81 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 28.40 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	Two (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)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
802.11ac (VHT20)	2	MCS 0-9/Nss1-2
802.11ac (VHT40)	2	MCS 0-9/Nss1-2
802.11ac (VHT80)	2	MCS 0-9/Nss1-2

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

Wall-mounted rack*1

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz
1	LYNWAVE	120300000183A	Embedded	I-PEX	5.27	-
2	LYNWAVE	120300000184A	Embedded	I-PEX	5.37	-
3	LYNWAVE	120300000185A	Embedded	I-PEX	-	5.01
4	LYNWAVE	120300000186A	Embedded	I-PEX	-	4.92

Note: The EUT has four antennas.

For 2.4GHz function:

For IEEE 802.11b/g/n mode (2TX/2RX):

Chain 1 and Chain 2 can be used as transmitting/receiving antenna.

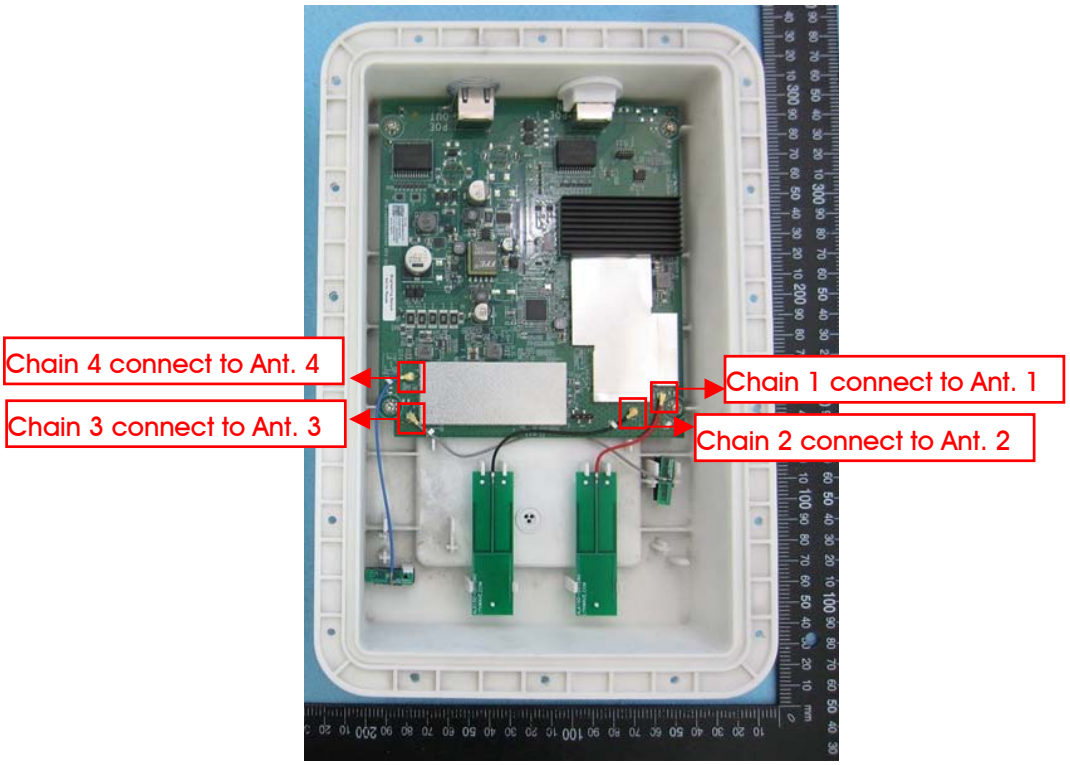
Chain 1 and Chain 2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac mode (2TX/2RX):

Chain 3 and Chain 4 can be used as transmitting/receiving antenna.

Chain 3 and Chain 4 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

There are three bandwidth systems.

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

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

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

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

3.5. Table for Test Modes

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

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

Band Edge Emission	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/157/165	3+4
	11ac VHT20	Band 1&4	MCS0/Nss1	36/40/48/149/157/165	3+4
	11ac VHT40	Band 1&4	MCS0/Nss1	38/46/151/159	3+4
	11ac VHT80	Band 1&4	MCS0/Nss1	42/155	3+4
Frequency Stability	20 MHz	Band 1&4	-	40/157	3
	40 MHz	Band 1&4	-	38/151	3
	80 MHz	Band 1&4	-	42/155	3

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 Radiated Emission test<Below 1GHz>:

Mode 1. Normal Link - Place EUT in Z axis

Mode 2. Normal Link - Place EUT in Y axis

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

For Radiated Emission test<Above 1GHz>:

The EUT was performed at Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.

Mode 1. CTX - Place EUT in Z axis

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

Mode 1. Normal Link - Place EUT in Z axis

Mode 2. Normal Link - Place EUT in Y axis

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

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA570719-06) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

Note: PoE information as below, and the PoE is for measurement only, would not be marketed.

Power	Brand	Model
PoE	Cambium Networks	NET-P30-56IN

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: 03CH01-CB<Below 1GHz>

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E4300	DoC
Device	HP	MRLBB-1302	B94MRLBB1301
PoE	Cambium Networks	NET-P30-56IN	DoC

For Test Site No: TH01-CB and 03CH01-CB <Above 1GHz>

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
PoE	Cambium Networks	NET-P30-56IN	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
Device	HP	MRLBB-1302	B94MRLBB1301
PoE	Cambium Networks	NET-P30-56IN	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	DOS					
Mode	Test Frequency (MHz)					
	NCB: 20MHz					
	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	19.5	19.5	19.5	27.5	27.5	27.5
802.11ac MCS0/Nss1 VHT20	19.5	19.5	19.5	27.5	27.5	27.5
Mode	NCB: 40MHz					
802.11ac MCS0/Nss1 VHT40	5190 MHz		5230 MHz		5755 MHz	5795 MHz
	17		20		28.5	28.5
Mode	NCB: 80MHz					
802.11ac MCS0/Nss1 VHT80	5210 MHz				5775 MHz	
	15.5				26	

3.9. EUT Operation during Test

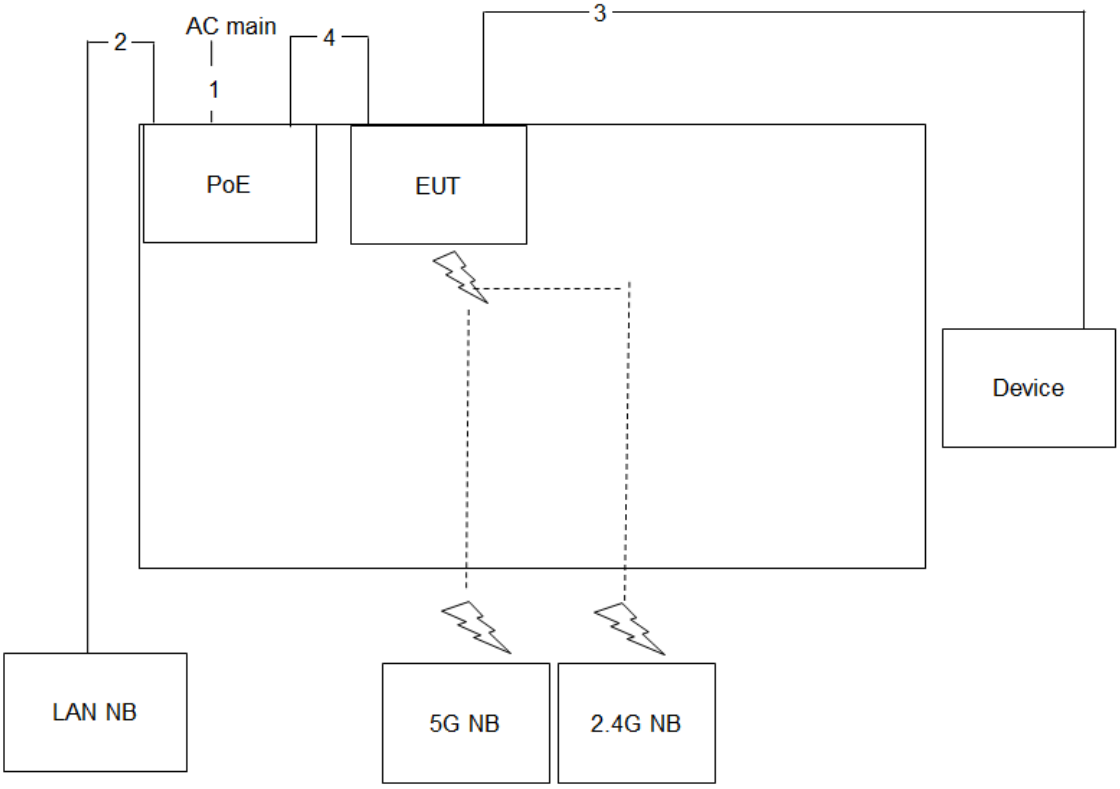
The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	2.017	2.078	97.07%	0.13	0.50
802.11ac MCS0/Nss1 VHT20	1.887	1.948	96.87%	0.14	0.53
802.11ac MCS0/Nss1 VHT40	0.918	0.994	92.35%	0.35	1.09
802.11ac MCS0/Nss1 VHT80	0.450	0.513	87.72%	0.57	2.22

3.11. Test Configurations

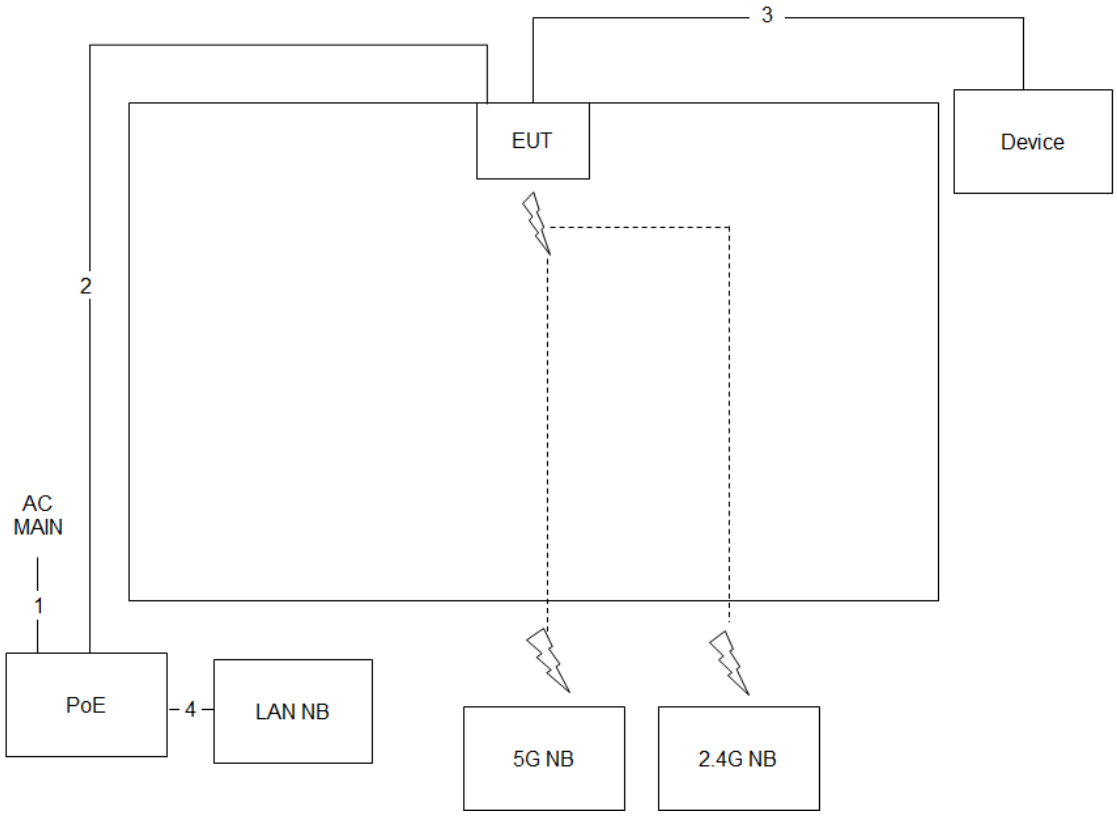
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	0.9m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m

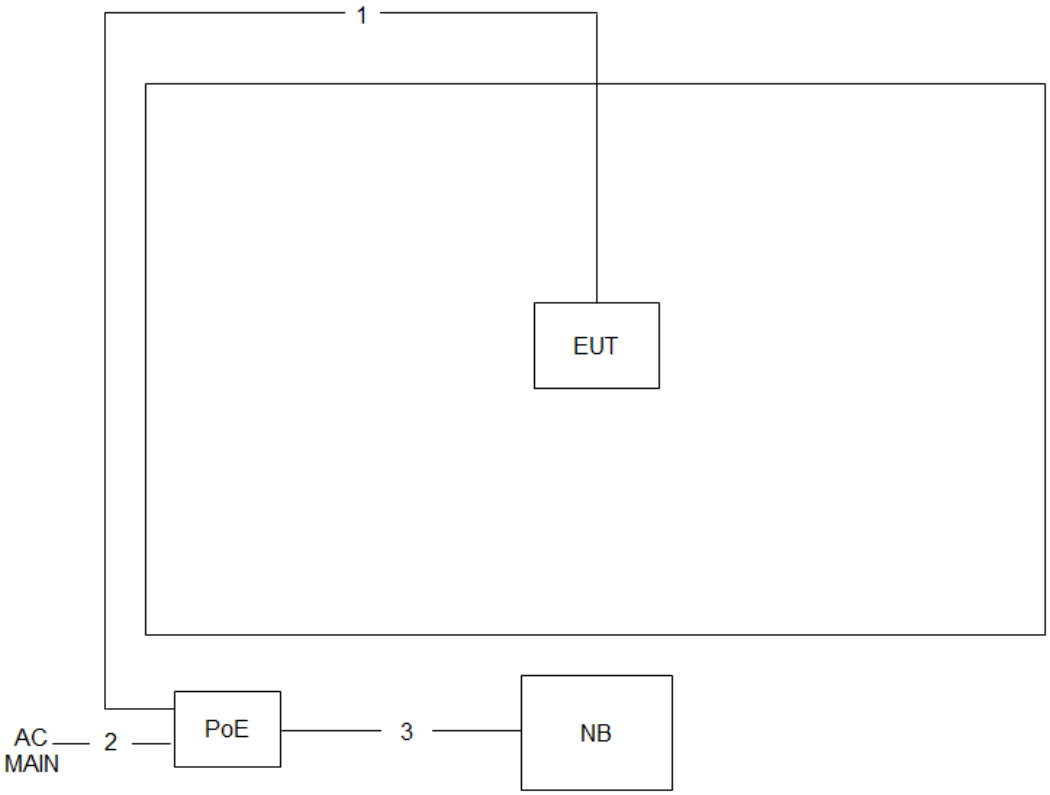
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	0.9m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m

Test Configuration: above 1GHz



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	0.65m
3	RJ-45 cable	No	1.5m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

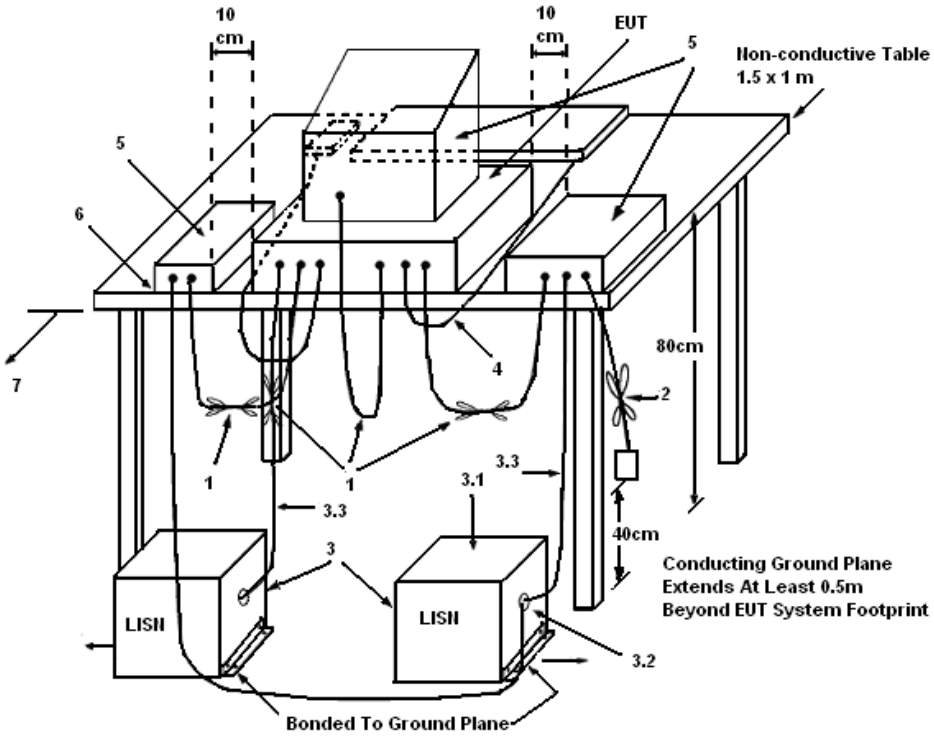
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

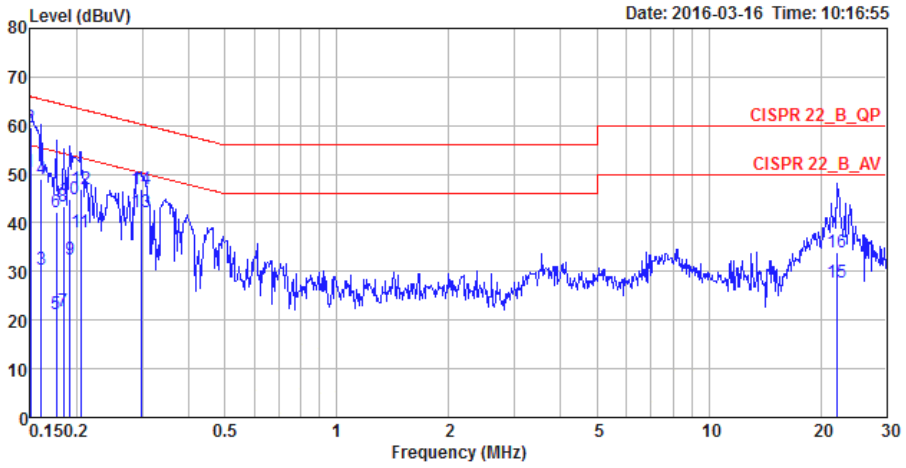
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

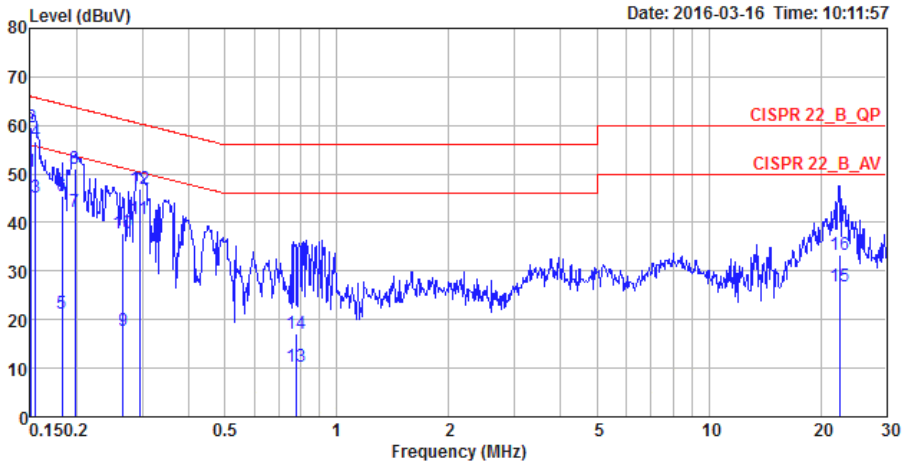
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23℃	Humidity	59%
Test Engineer	Deven Huang	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1500	50.45	-5.55	56.00	40.41	10.02	0.02	LINE	Average
2	0.1500	59.69	-6.31	66.00	49.65	10.02	0.02	LINE	QP
3	0.1607	30.30	-25.13	55.43	20.26	10.02	0.02	LINE	Average
4	0.1607	48.99	-16.44	65.43	38.95	10.02	0.02	LINE	QP
5	0.1758	21.33	-33.35	54.68	11.39	9.92	0.02	LINE	Average
6	0.1758	42.33	-22.35	64.68	32.39	9.92	0.02	LINE	QP
7	0.1844	21.89	-32.39	54.28	11.95	9.92	0.02	LINE	Average
8	0.1844	43.50	-20.78	64.28	33.56	9.92	0.02	LINE	QP
9	0.1914	32.44	-21.54	53.98	22.50	9.92	0.02	LINE	Average
10	0.1914	45.01	-18.97	63.98	35.07	9.92	0.02	LINE	QP
11	0.2050	38.00	-15.40	53.40	28.06	9.92	0.02	LINE	Average
12	0.2050	47.01	-16.39	63.40	37.07	9.92	0.02	LINE	QP
13	0.2971	42.14	-8.18	50.32	32.18	9.92	0.04	LINE	Average
14	0.2971	47.06	-13.26	60.32	37.10	9.92	0.04	LINE	QP
15	22.1801	27.89	-22.11	50.00	17.25	10.37	0.27	LINE	Average
16	22.1801	33.97	-26.03	60.00	23.33	10.37	0.27	LINE	QP

Temperature	23°C	Humidity	59%
Test Engineer	Deven Huang	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1508	50.37	-5.59	55.96	40.33	10.02	0.02	NEUTRAL	Average
2	0.1508	59.76	-6.20	65.96	49.72	10.02	0.02	NEUTRAL	QP
3	0.1548	45.04	-10.70	55.74	35.00	10.02	0.02	NEUTRAL	Average
4	0.1548	56.79	-8.95	65.74	46.75	10.02	0.02	NEUTRAL	QP
5	0.1825	21.17	-33.20	54.37	11.23	9.92	0.02	NEUTRAL	Average
6	0.1825	45.44	-18.93	64.37	35.50	9.92	0.02	NEUTRAL	QP
7	0.1976	42.15	-11.56	53.71	32.21	9.92	0.02	NEUTRAL	Average
8	0.1976	50.99	-12.72	63.71	41.05	9.92	0.02	NEUTRAL	QP
9	0.2658	17.75	-33.50	51.25	7.80	9.92	0.03	NEUTRAL	Average
10	0.2658	37.79	-23.46	61.25	27.84	9.92	0.03	NEUTRAL	QP
11	0.2955	40.63	-9.74	50.37	30.67	9.92	0.04	NEUTRAL	Average
12	0.2955	46.86	-13.51	60.37	36.90	9.92	0.04	NEUTRAL	QP
13	0.7752	10.22	-35.78	46.00	0.26	9.93	0.03	NEUTRAL	Average
14	0.7752	17.19	-38.81	56.00	7.23	9.93	0.03	NEUTRAL	QP
15	22.4163	26.86	-23.14	50.00	16.22	10.37	0.27	NEUTRAL	Average
16	22.4163	33.37	-26.63	60.00	22.73	10.37	0.27	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

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

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

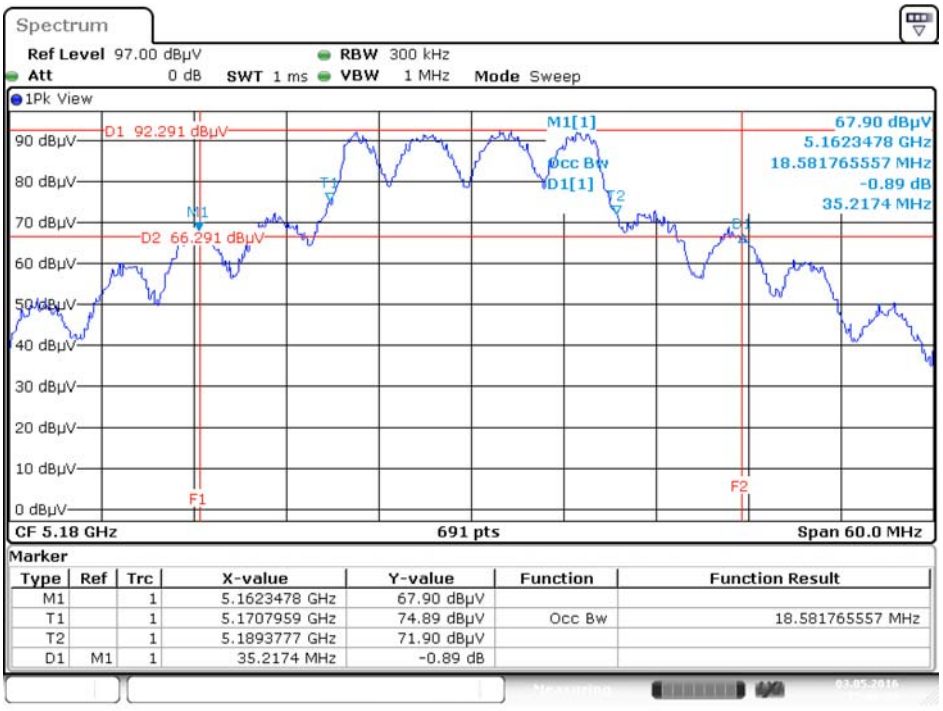
4.2.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

Temperature	22.2°C	Humidity	56%
Test Engineer	Akina Chiu		

For P to P and P to M Mode:

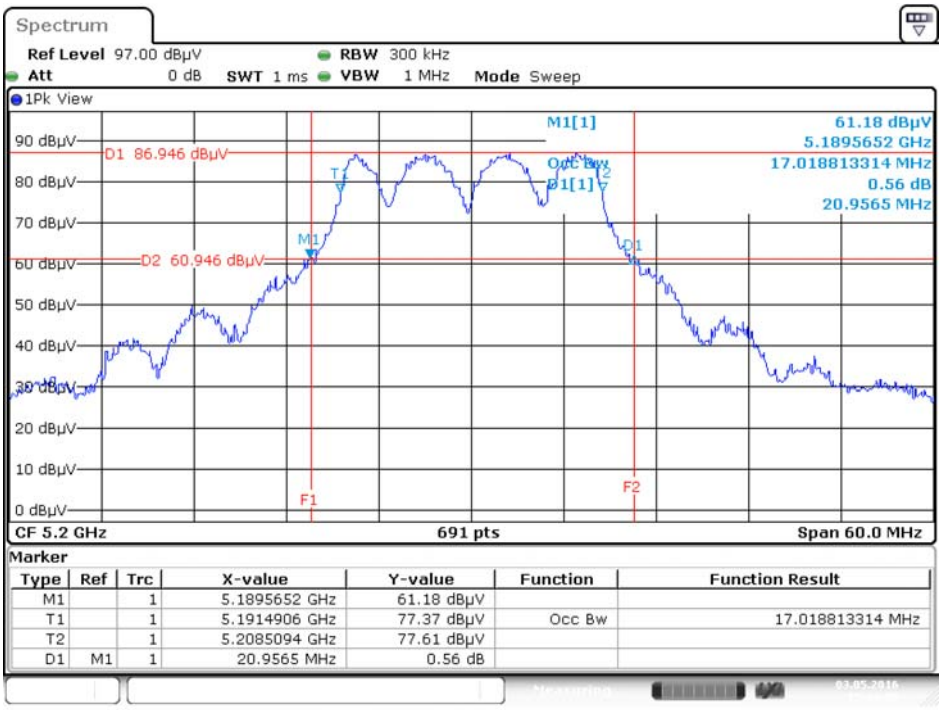
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	35.22	18.58
	5200 MHz	20.96	17.02
	5240 MHz	21.13	17.02
	5745 MHz	30.43	17.28
	5785 MHz	31.04	18.06
	5825 MHz	35.65	20.14
802.11ac MCS0/Nss1 VHT20	5180 MHz	23.13	18.15
	5200 MHz	22.43	18.23
	5240 MHz	23.30	18.23
	5745 MHz	26.87	18.58
	5785 MHz	33.74	21.01
	5825 MHz	34.61	21.97
802.11ac MCS0/Nss1 VHT40	5190 MHz	49.13	36.47
	5230 MHz	41.88	36.04
	5755 MHz	73.62	38.50
	5795 MHz	44.64	37.05
802.11ac MCS0/Nss1 VHT80	5210 MHz	104.64	76.70
	5775 MHz	124.64	76.12

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5180 MHz



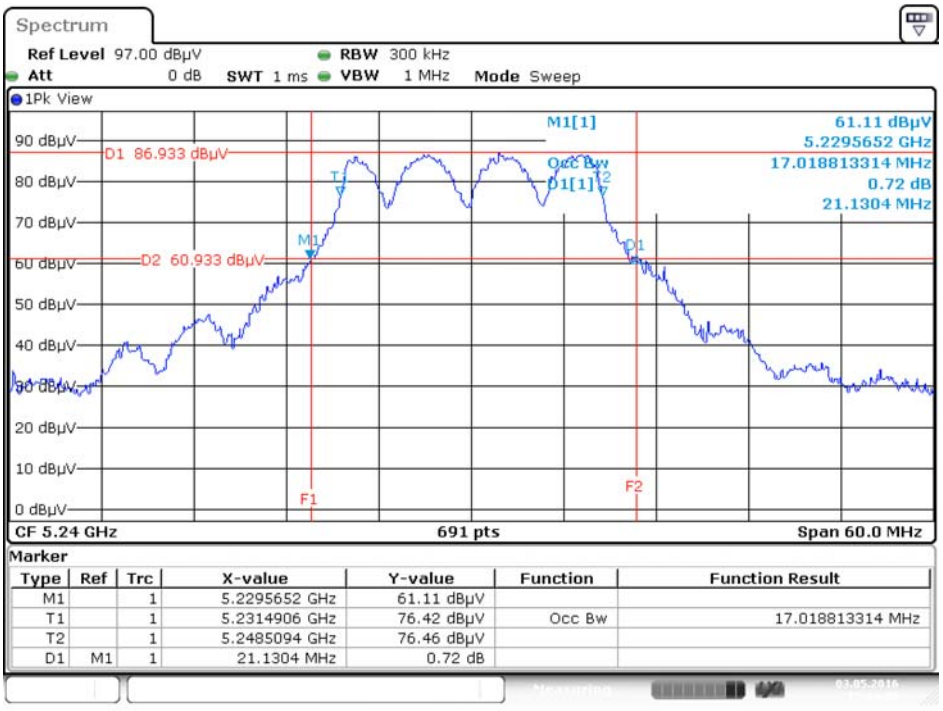
Date: 3.MAY.2016 15:06:25

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5200 MHz



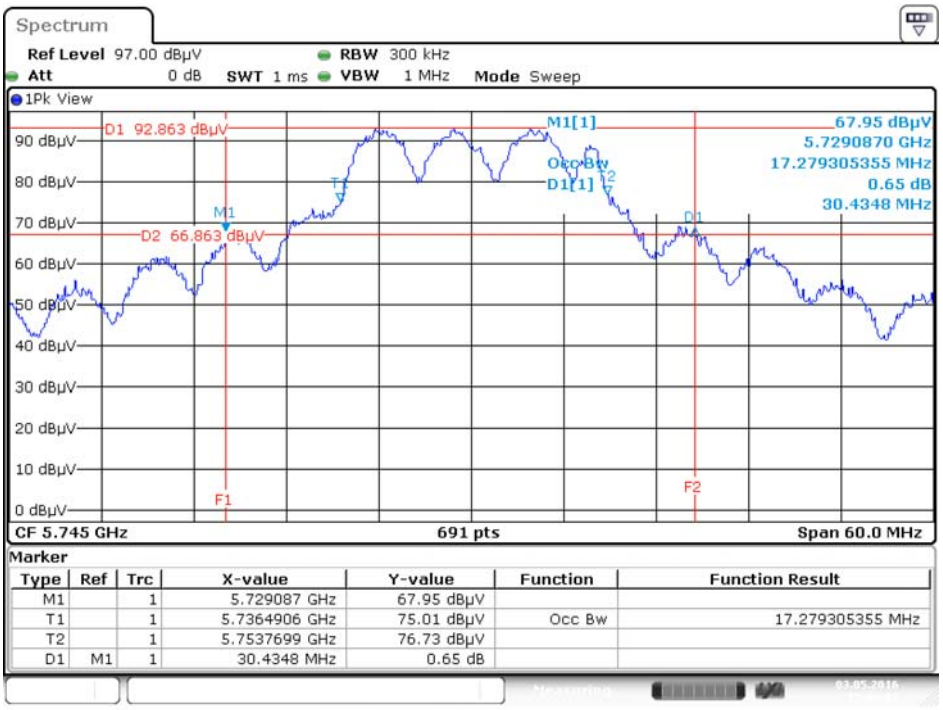
Date: 3.MAY.2016 15:04:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5240 MHz



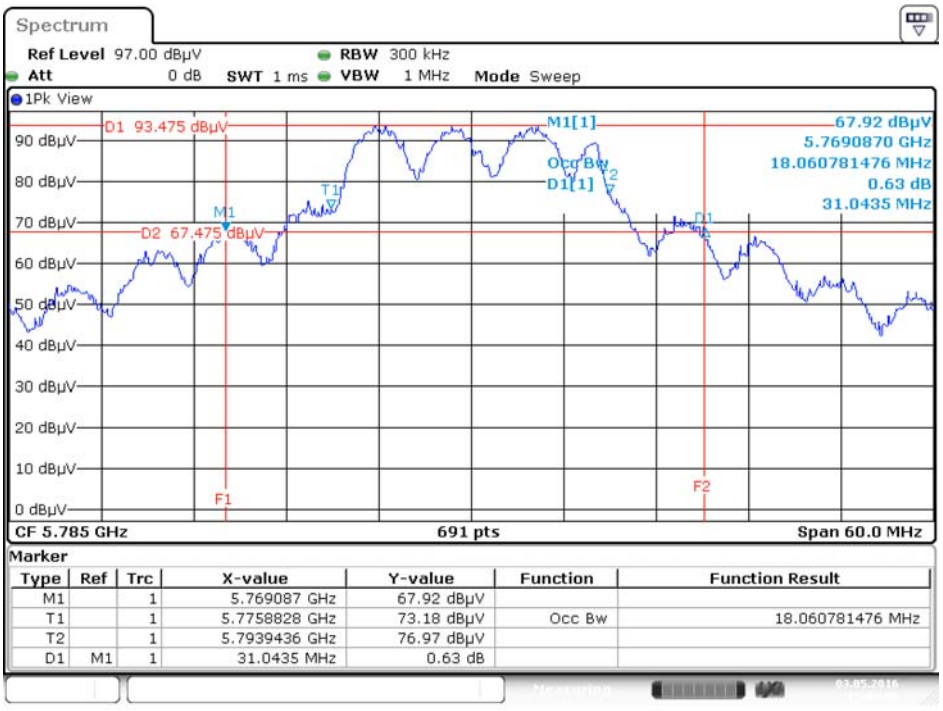
Date: 3.MAY.2016 15:04:01

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5745 MHz



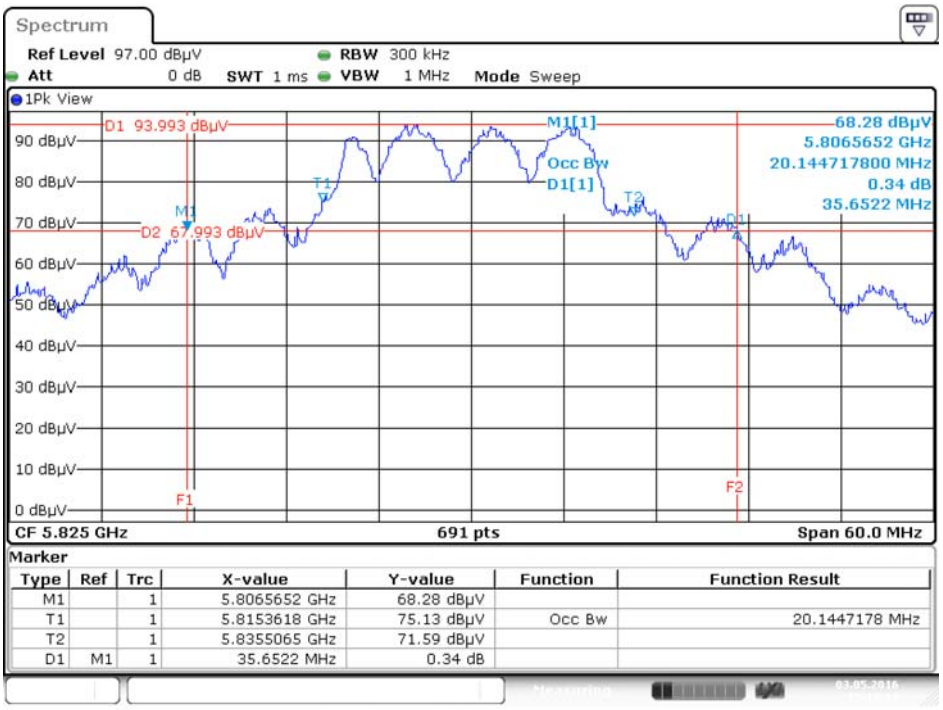
Date: 3.MAY.2016 15:09:01

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5785 MHz



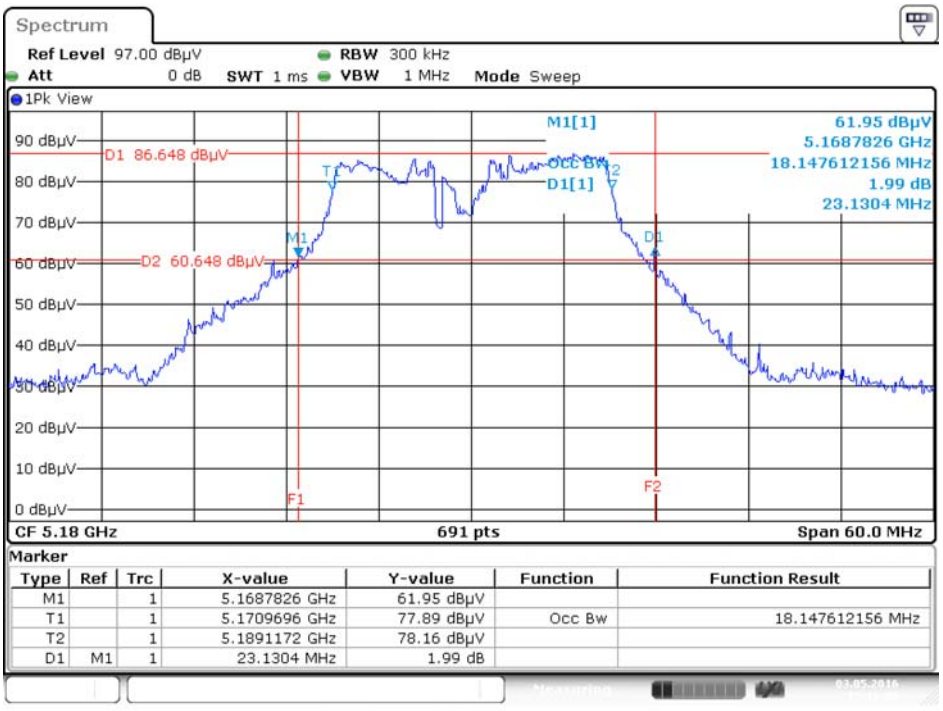
Date: 3.MAY.2016 15:09:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5825 MHz



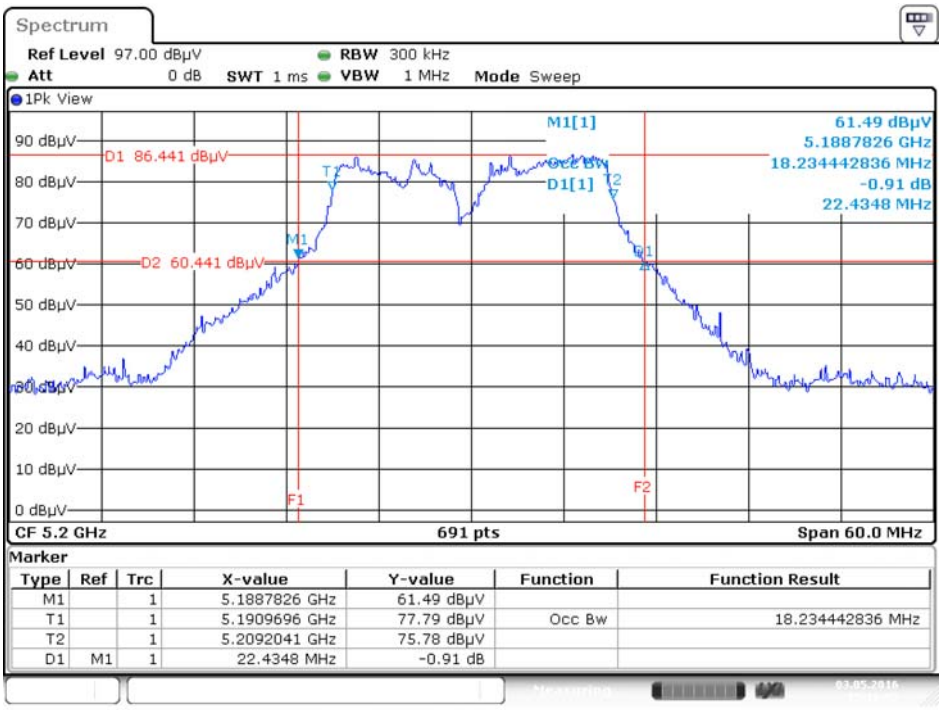
Date: 3.MAY.2016 15:10:19

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5180 MHz



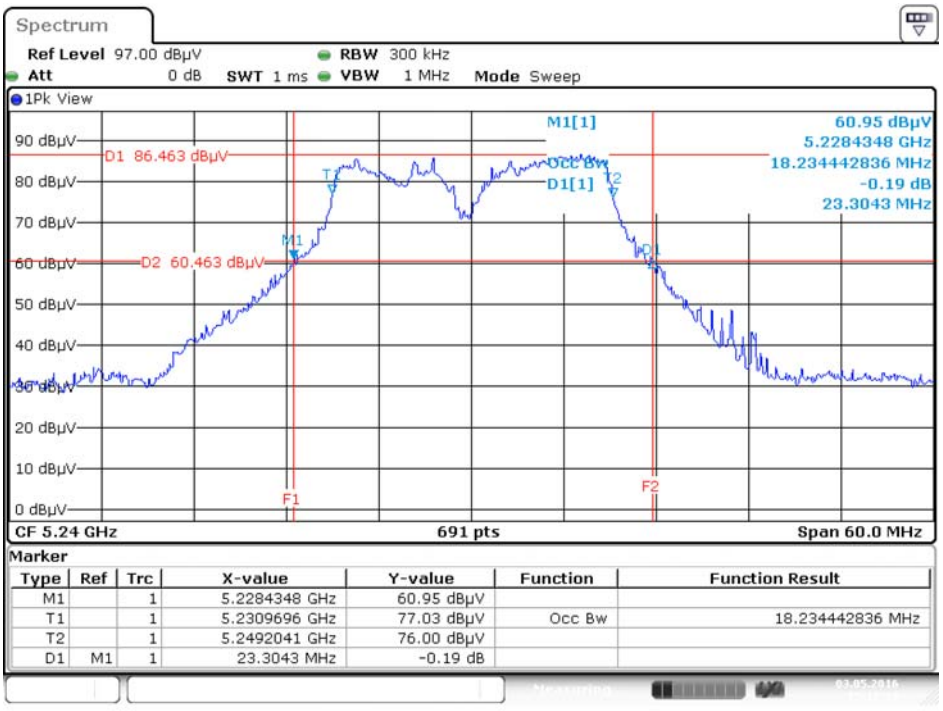
Date: 3.MAY.2016 15:16:20

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5200 MHz



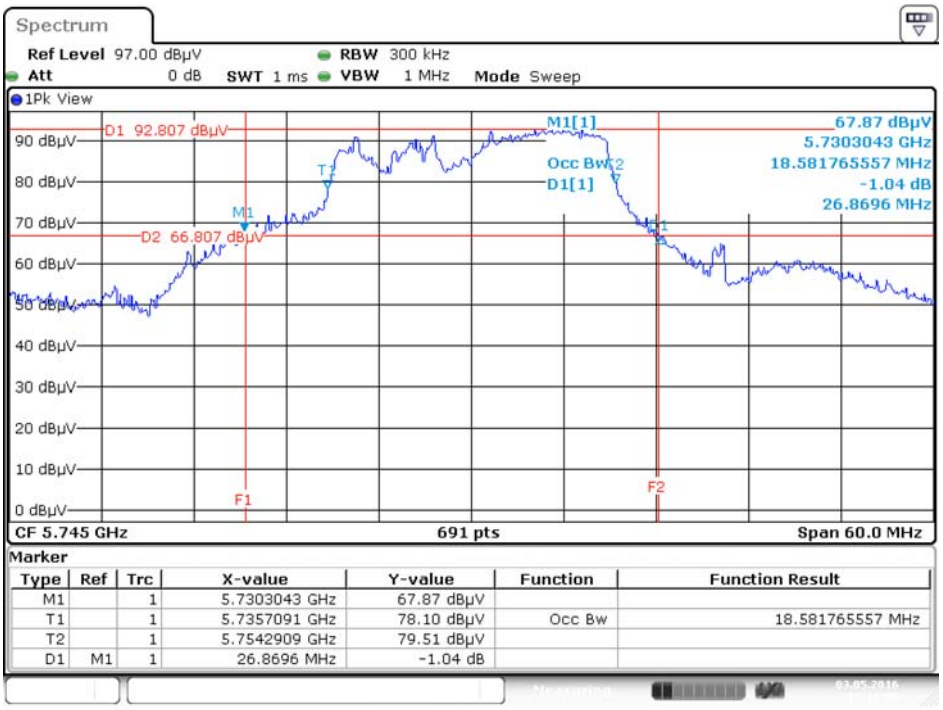
Date: 3.MAY.2016 15:16:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5240 MHz



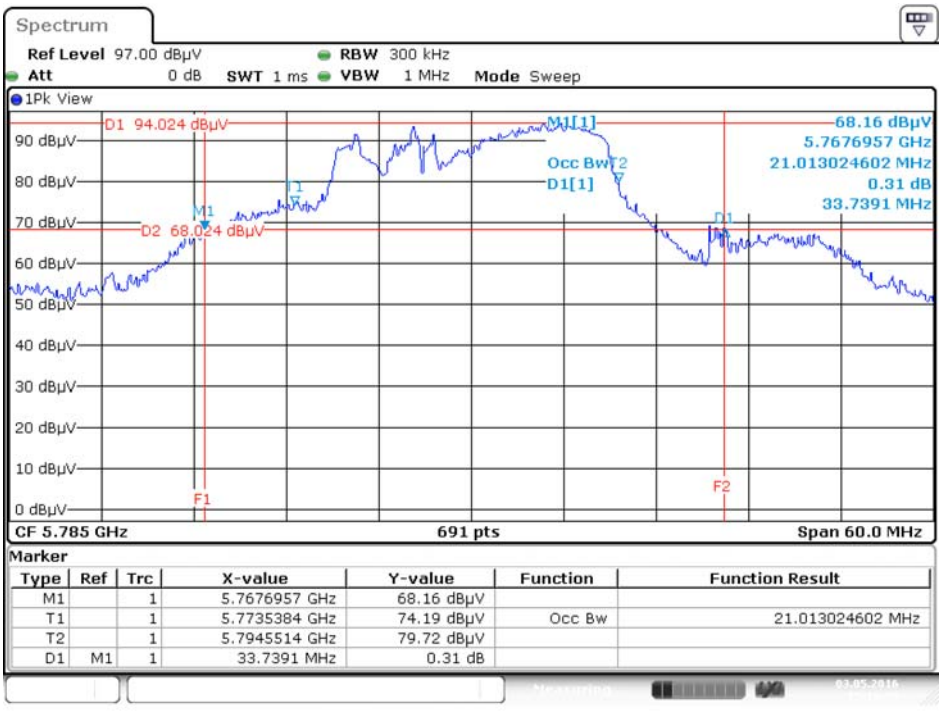
Date: 3.MAY.2016 15:17:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5745 MHz



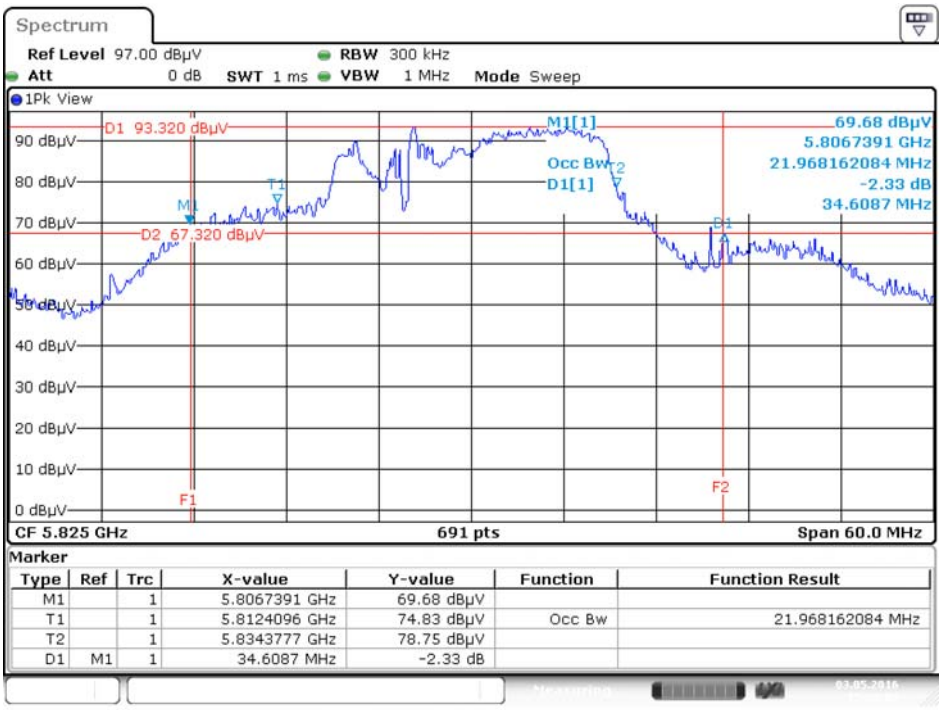
Date: 3.MAY.2016 15:17:58

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5785 MHz



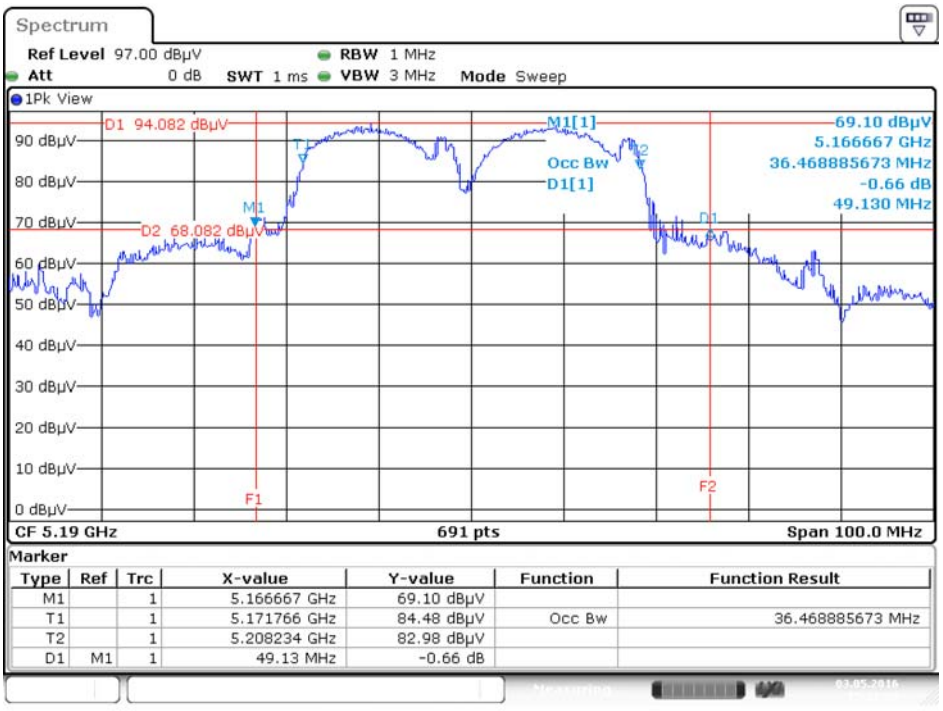
Date: 3.MAY.2016 15:19:29

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5825 MHz



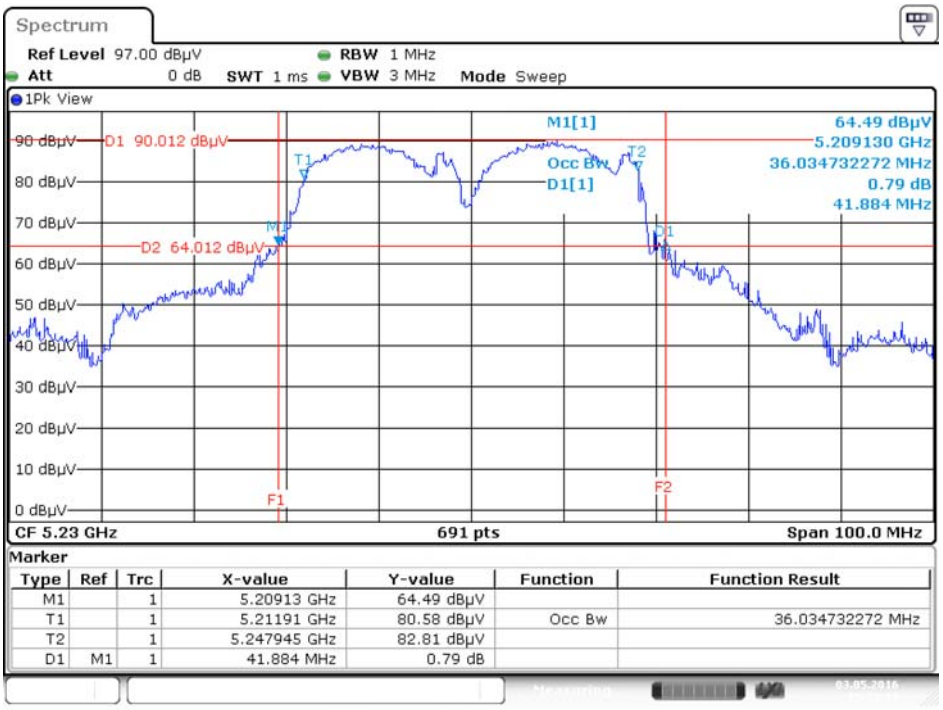
Date: 3.MAY.2016 15:20:04

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5190 MHz



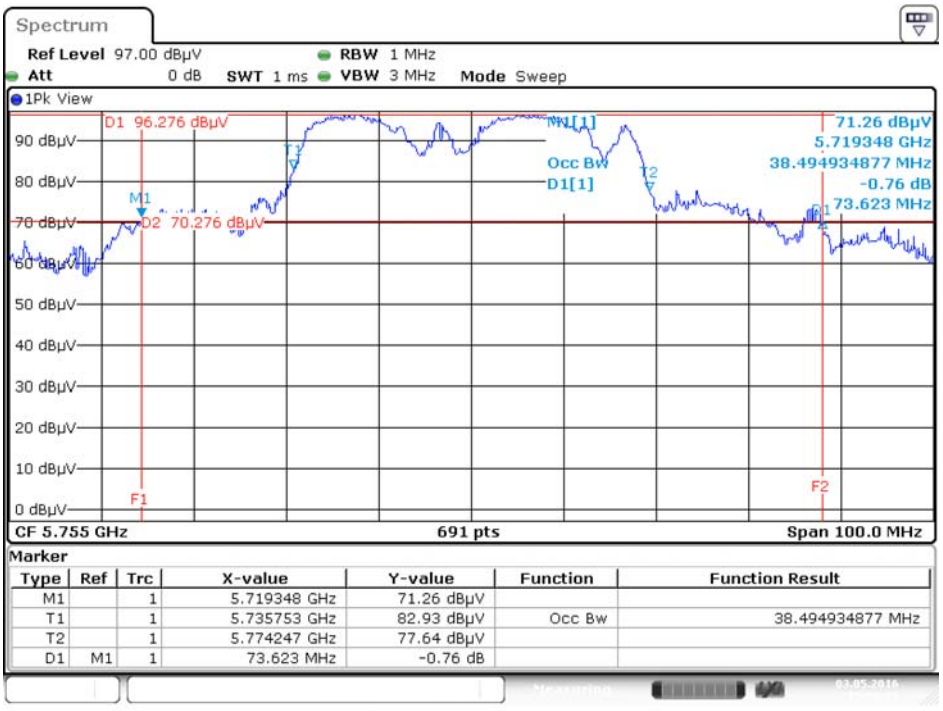
Date: 3.MAY.2016 15:22:25

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5230 MHz



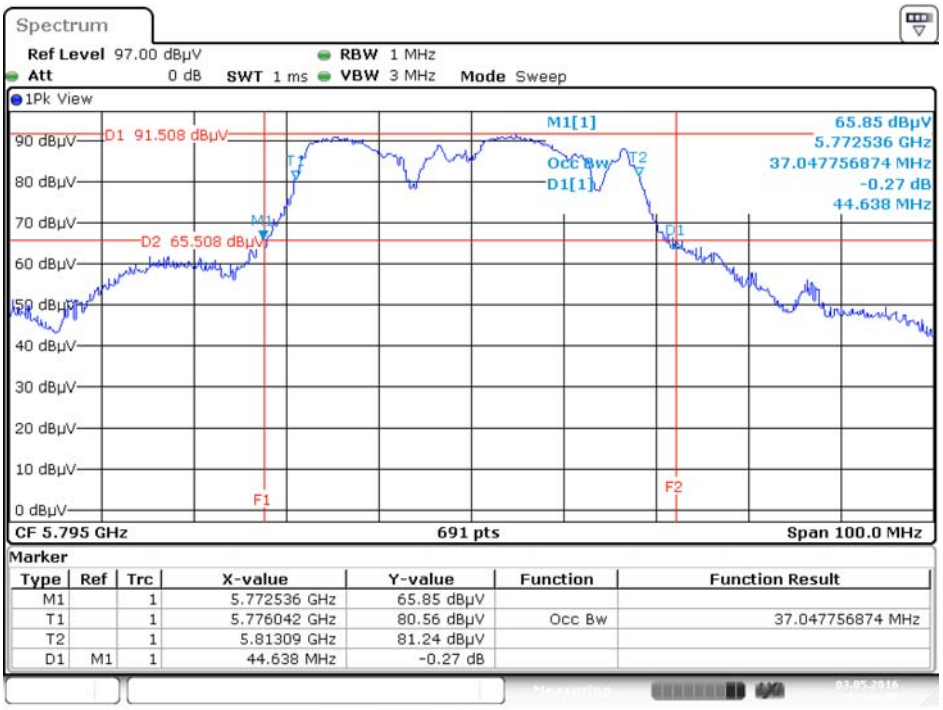
Date: 3.MAY.2016 15:23:34

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5755 MHz



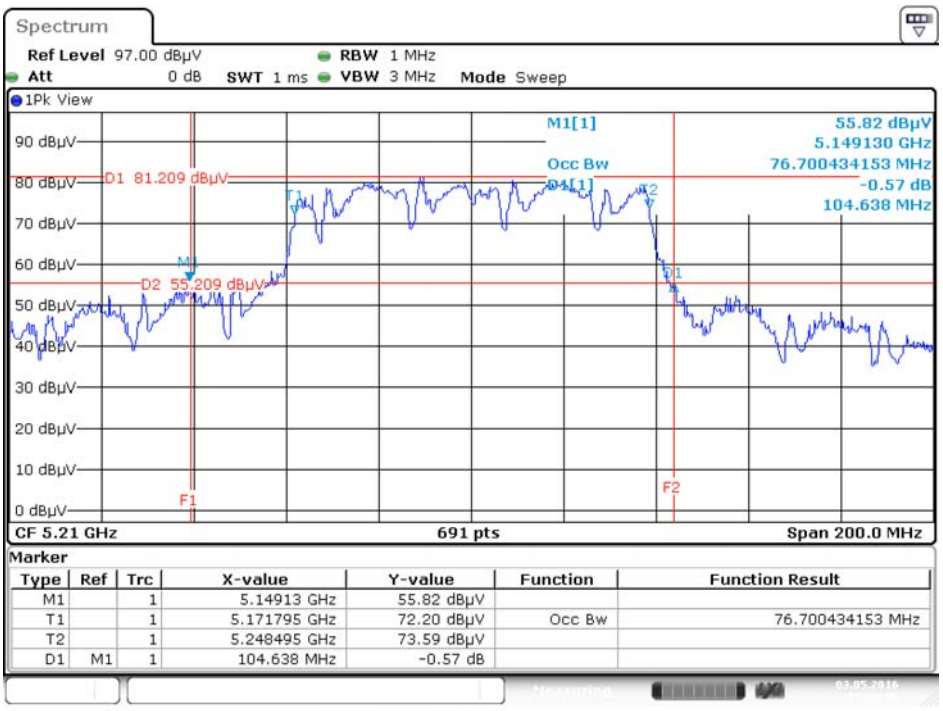
Date: 3.MAY.2016 15:25:52

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5795 MHz



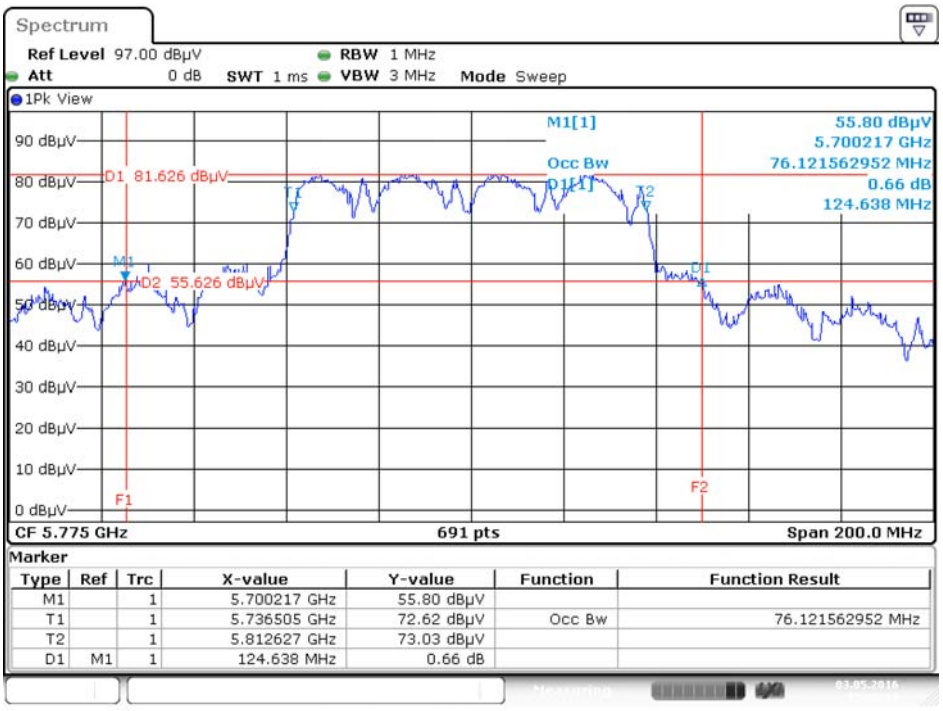
Date: 3.MAY.2016 17:40:58

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 / 5210 MHz



Date: 3.MAY.2016 15:30:56

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 / 5775 MHz



Date: 3.MAY.2016 15:30:10

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. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of 6dB Spectrum Bandwidth

Temperature	22.2°C	Humidity	56%
Test Engineer	Akina Chiu		

For P to P and P to M Mode:

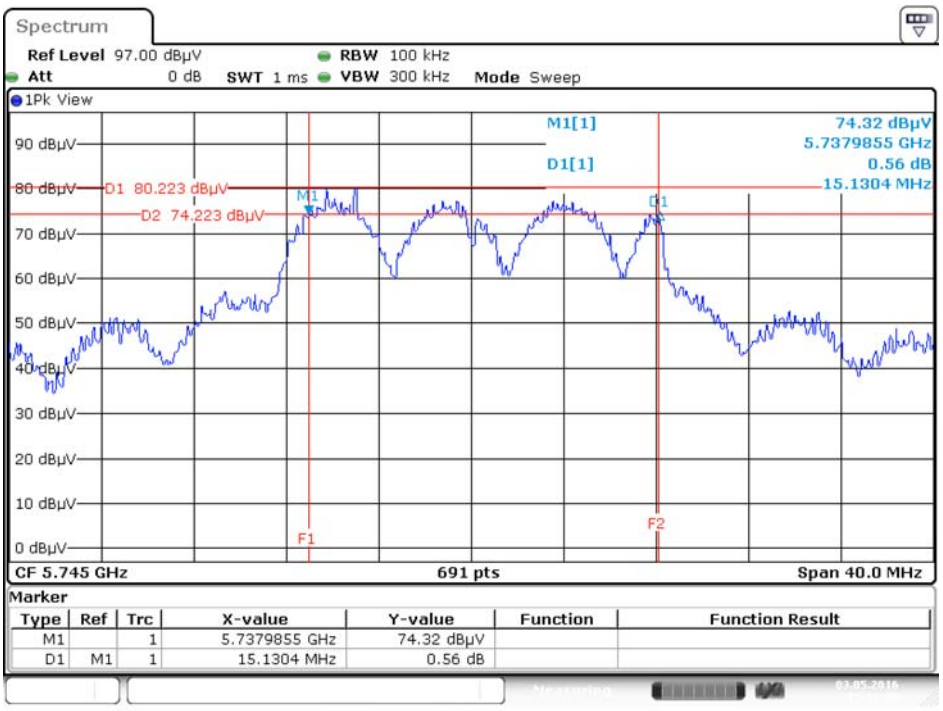
Mode	Frequency	6dB Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	15.13	500	Complies
	5785 MHz	15.71	500	Complies
	5825 MHz	16.17	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	16.99	500	Complies
	5785 MHz	17.68	500	Complies
	5825 MHz	15.71	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	34.78	500	Complies
	5795 MHz	35.59	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	72.75	500	Complies

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

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

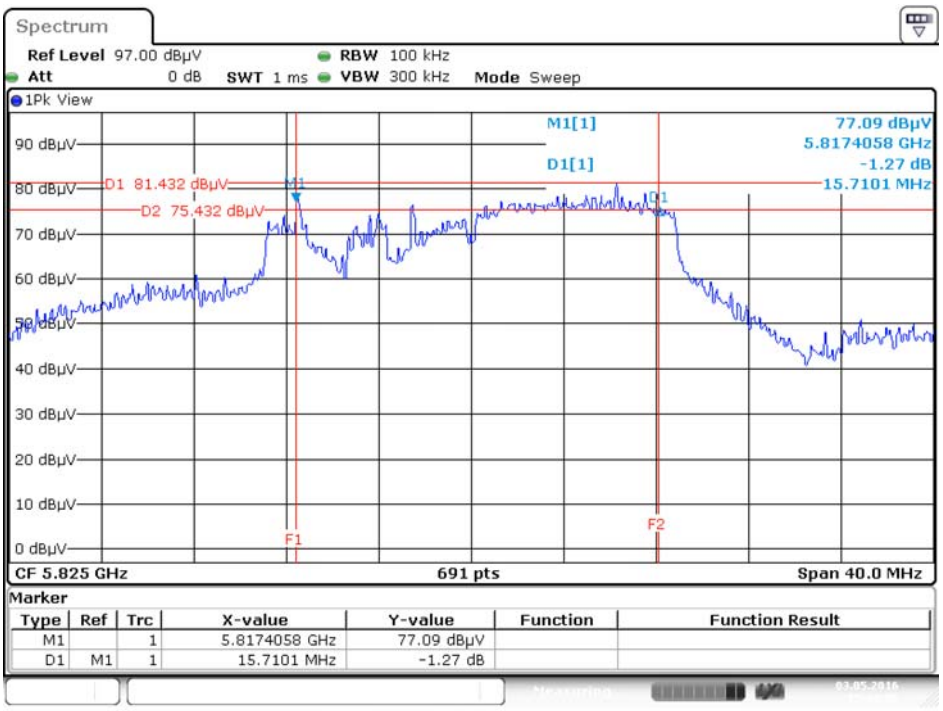
For P to P and P to M Mode:

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5745 MHz



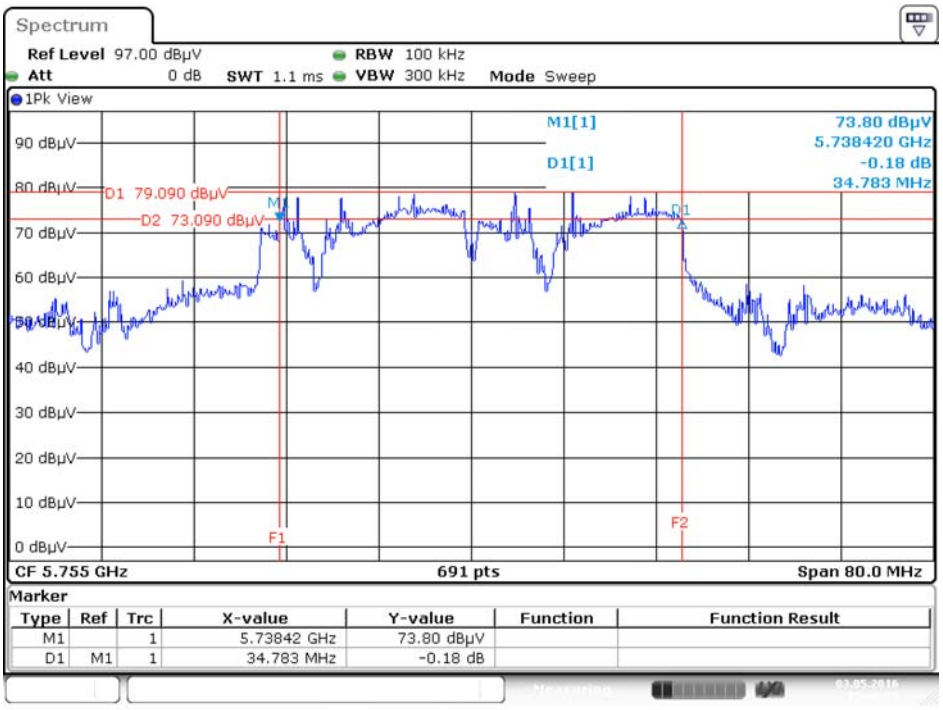
Date: 3.MAY.2016 15:38:50

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5825 MHz



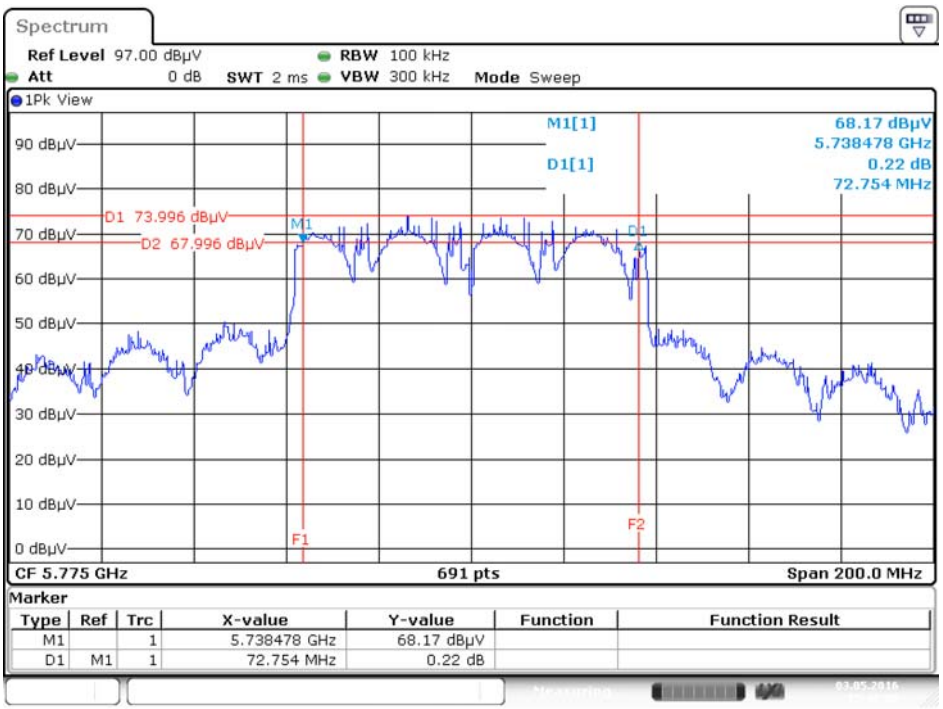
Date: 3.MAY.2016 15:43:57

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5755MHz



Date: 3.MAY.2016 15:45:30

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 / 5775 MHz



Date: 3.MAY.2016 15:47:28

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

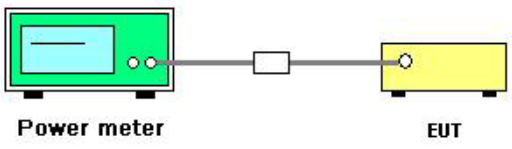
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Maximum Conducted Output Power

Temperature	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Test Date	May 03, 2016

For P to P and P to M Mode:

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 3	Chain 4	Total		
802.11a	5180 MHz	21.45	21.31	24.39	30.00	Complies
	5200 MHz	21.11	21.25	24.19	30.00	Complies
	5240 MHz	20.11	19.81	22.97	30.00	Complies
	5745 MHz	26.85	26.72	29.80	30.00	Complies
	5785 MHz	26.87	26.68	29.79	30.00	Complies
	5825 MHz	26.81	26.51	29.67	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	21.32	21.23	24.29	30.00	Complies
	5200 MHz	21.22	21.15	24.20	30.00	Complies
	5240 MHz	19.85	19.95	22.91	30.00	Complies
	5745 MHz	26.81	26.71	29.77	30.00	Complies
	5785 MHz	26.75	26.76	29.77	30.00	Complies
	5825 MHz	26.81	26.75	29.79	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	17.82	18.11	20.98	30.00	Complies
	5230 MHz	20.16	19.98	23.08	30.00	Complies
	5755 MHz	26.81	26.78	29.81	30.00	Complies
	5795 MHz	26.79	26.75	29.78	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	15.73	15.96	18.86	30.00	Complies
	5775 MHz	25.45	25.32	28.40	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

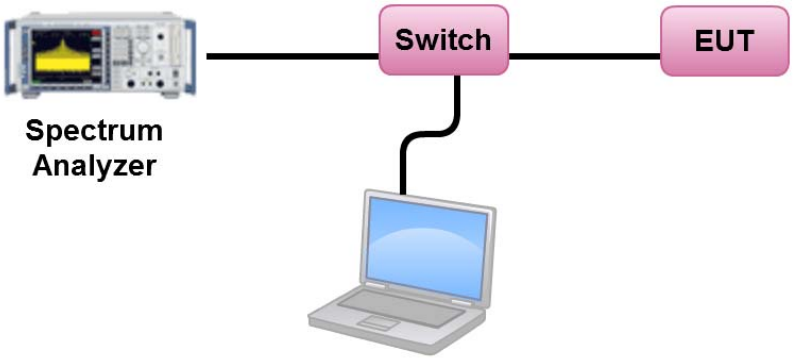
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements and sum the spectra across the outputs.
4. 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	22.2°C	Humidity	56%
Test Engineer	Akina Chiu		

For P to P Mode:

Configuration IEEE 802.11a / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	11.33	17.00	Complies
40	5200 MHz	11.08	17.00	Complies
48	5240 MHz	9.88	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	16.71	-3.01	13.70	30.00	Complies
157	5785 MHz	16.70	-3.01	13.69	30.00	Complies
165	5825 MHz	16.57	-3.01	13.56	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	11.24	17.00	Complies
40	5200 MHz	11.12	17.00	Complies
48	5240 MHz	9.84	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	16.65	-3.01	13.64	30.00	Complies
157	5785 MHz	16.73	-3.01	13.72	30.00	Complies
165	5825 MHz	16.74	-3.01	13.73	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	4.94	17.00	Complies
46	5230 MHz	6.86	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	13.76	-3.01	10.75	30.00	Complies
159	5795 MHz	13.67	-3.01	10.66	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-0.24	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	9.24	-3.01	6.23	30.00	Complies

For P to M Mode:

Configuration IEEE 802.11a / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	11.33	15.02	Complies
40	5200 MHz	11.08	15.02	Complies
48	5240 MHz	9.88	15.02	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.98 dBi, so limit=17-(7.98-6)=15.02 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	16.71	-3.01	13.70	28.02	Complies
157	5785 MHz	16.70	-3.01	13.69	28.02	Complies
165	5825 MHz	16.57	-3.01	13.56	28.02	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.98 dBi, so limit=30-(7.98-6)=28.02 dBm/MHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	11.24	15.02	Complies
40	5200 MHz	11.12	15.02	Complies
48	5240 MHz	9.84	15.02	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.98 dBi, so limit=17-(7.98-6)=15.02 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
149	5745 MHz	16.65	-3.01	13.64	28.02	Complies
157	5785 MHz	16.73	-3.01	13.72	28.02	Complies
165	5825 MHz	16.74	-3.01	13.73	28.02	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.98 dBi, so limit=30-(7.98-6)=28.02 dBm/MHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	4.94	15.02	Complies
46	5230 MHz	6.86	15.02	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.98 dBi, so limit=17-(7.98-6)=15.02 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
151	5755 MHz	13.76	-3.01	10.75	28.02	Complies
159	5795 MHz	13.67	-3.01	10.66	28.02	Complies

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.98 dBi, so limit=30-(7.98-6)=28.02 dBm/MHz.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4

Channel	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-0.24	15.02	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =7.98 dBi, so limit=17-(7.98-6)=15.02 dBm/MHz.

Channel	Frequency	Power Density (dBm/MHz)	10log(500kHz/RBW) Factor (dB)	Power Density (dBm/500kHz)	Power Density Limit (dBm/500kHz)	Result
155	5775 MHz	9.24	-3.01	6.23	28.02	Complies

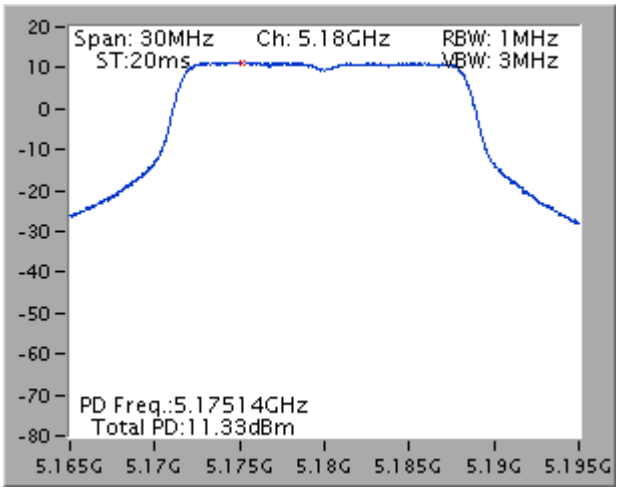
Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =7.98 dBi, so limit=30-(7.98-6)=28.02 dBm/MHz.

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

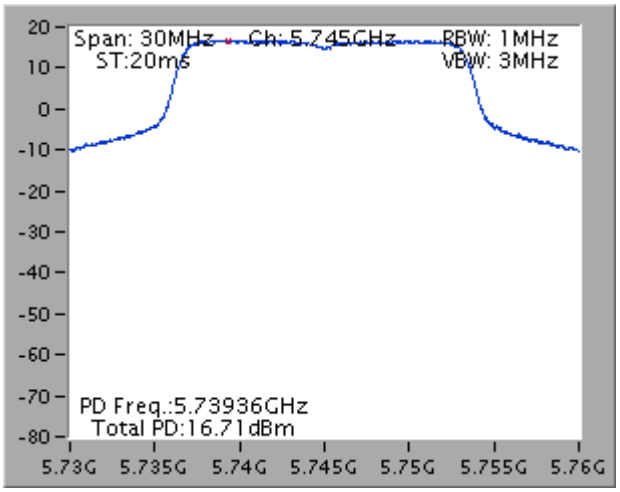
For plots, only the channel with worse result was shown.

For P to P and P to M Mode:

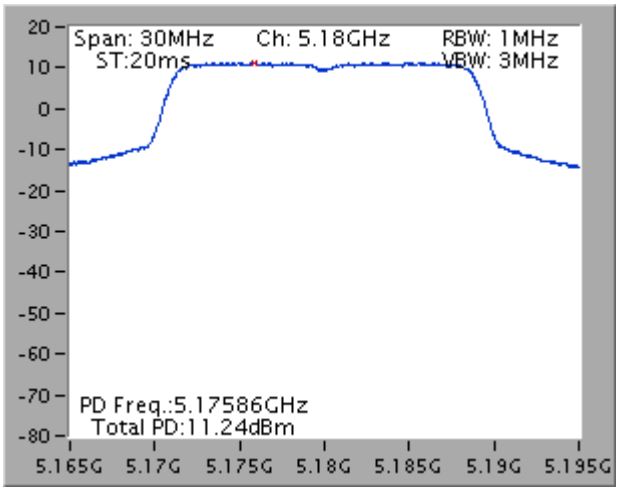
Power Density Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5180 MHz



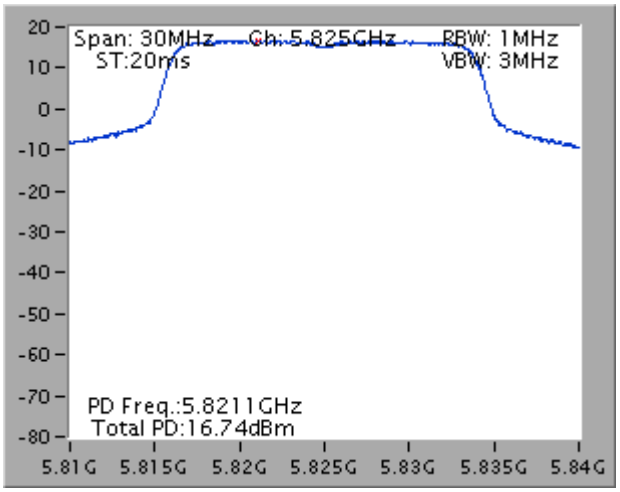
Power Density Plot on Configuration IEEE 802.11a / Chain 3 + Chain 4 / 5745 MHz



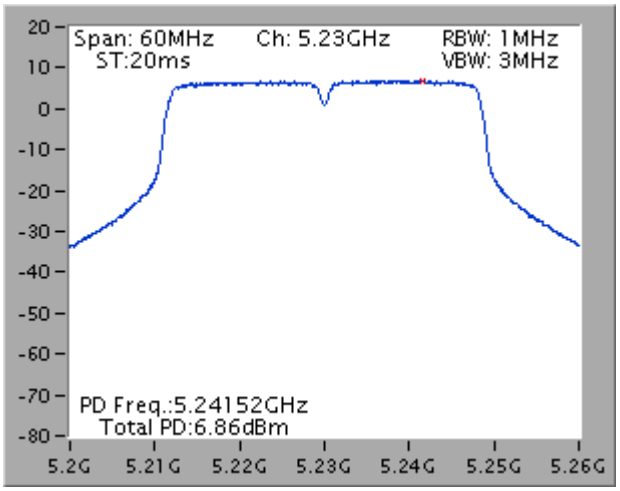
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5180 MHz



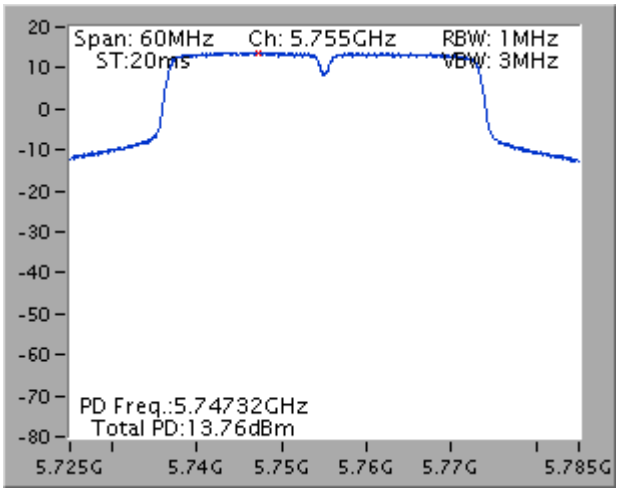
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 3 + Chain 4 / 5825 MHz



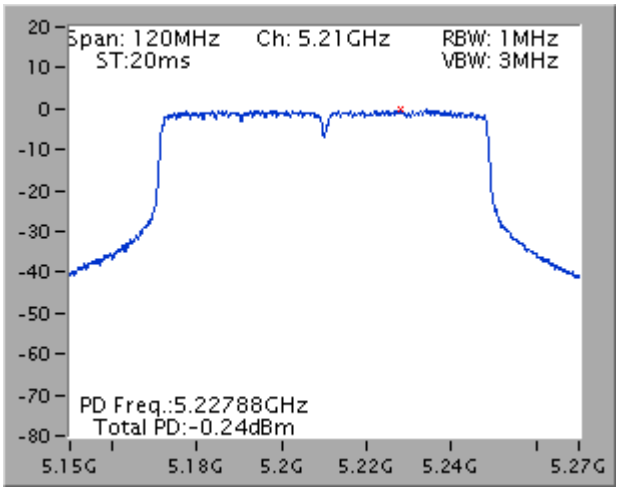
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5230 MHz



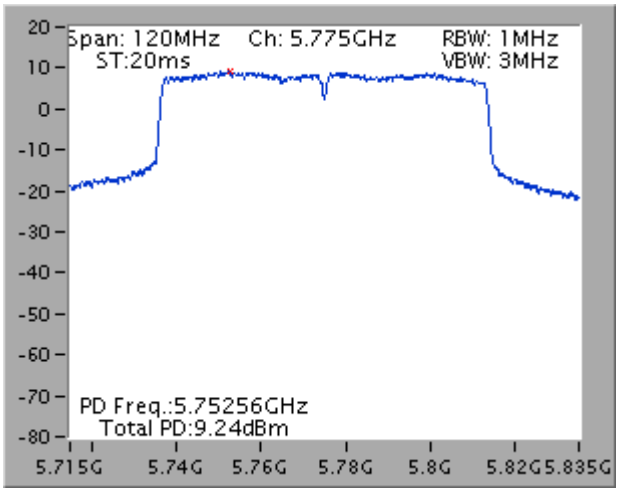
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 3 + Chain 4 / 5755 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 3 + Chain 4 / 5210 MHz



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

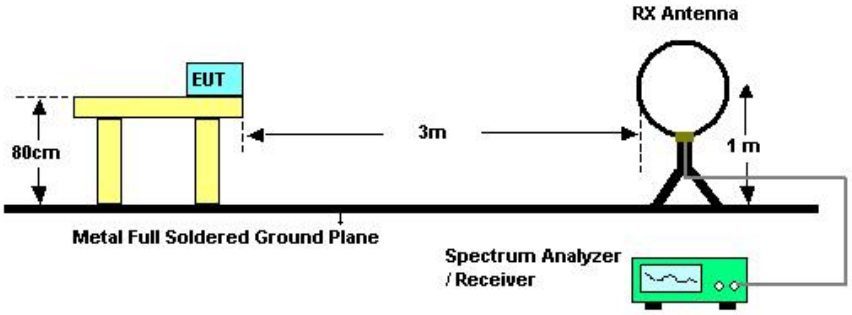
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.6.3. Test Procedures

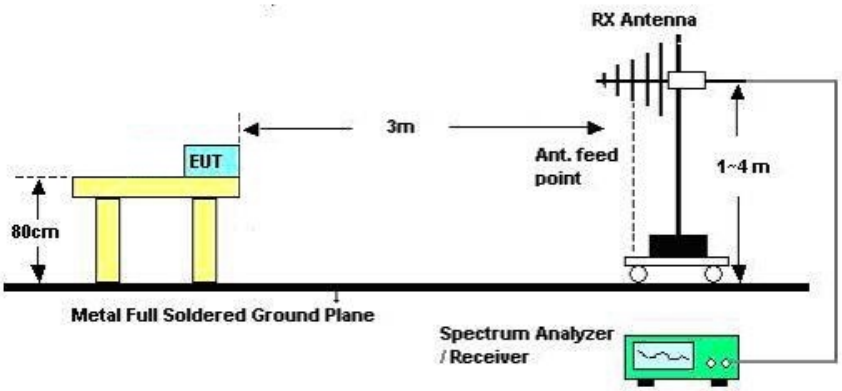
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

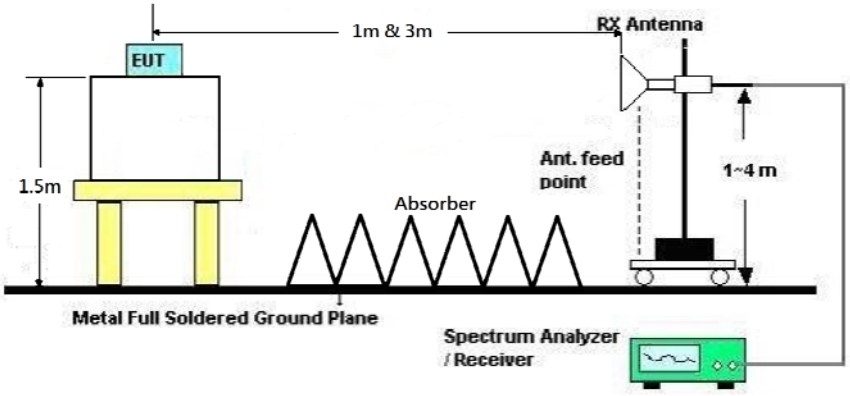
For Radiated Emissions: 9kHz ~30MHz



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	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Configurations	Normal Link / Mode 1
Test Date	Mar. 28, 2016		

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

Note:

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

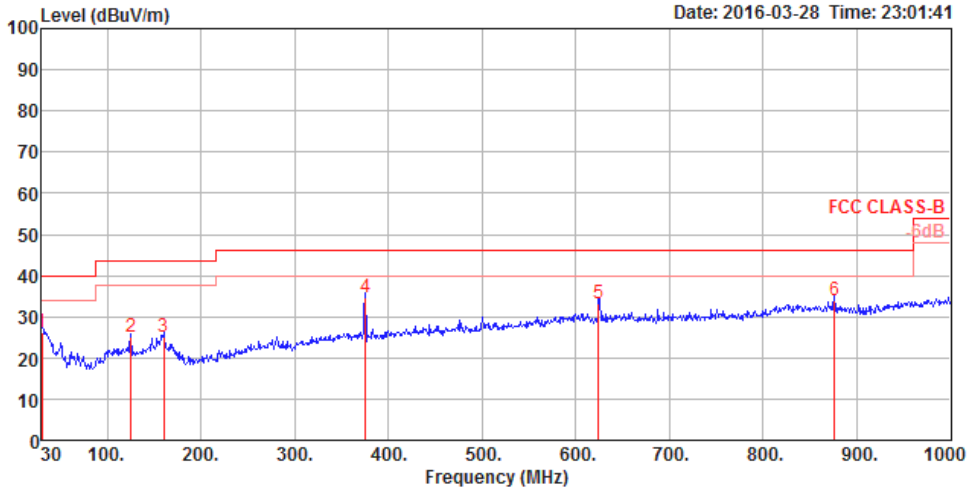
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

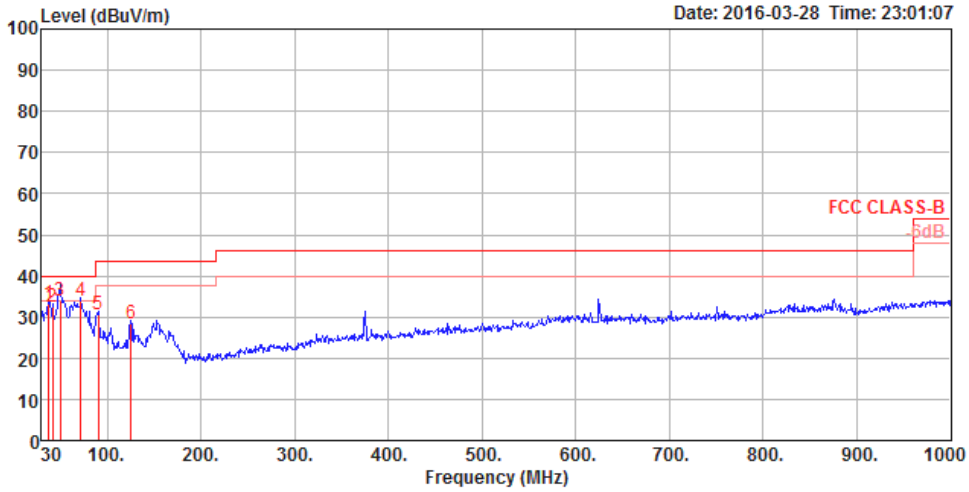
Temperature	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Configurations	Normal Link / Mode 1

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	30.00	26.31	40.00	-13.69	32.62	0.49	25.60	32.40	100	169	QP	HORIZONTAL
2	125.06	25.00	43.50	-18.50	37.46	0.97	18.94	32.37	150	107	QP	HORIZONTAL
3	159.98	25.25	43.50	-18.25	39.62	1.08	16.90	32.35	200	67	QP	HORIZONTAL
4	375.32	34.74	46.00	-11.26	43.31	1.67	22.08	32.32	100	57	QP	HORIZONTAL
5	624.61	33.29	46.00	-12.71	37.76	2.16	25.77	32.40	150	98	QP	HORIZONTAL
6	875.84	34.07	46.00	-11.93	35.83	2.55	27.55	31.86	100	157	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	37.76	33.17	40.00	-6.83	43.53	0.53	21.51	32.40	100	244	QP	VERTICAL
2	41.64	32.38	40.00	-7.62	45.12	0.56	19.11	32.41	100	252	QP	VERTICAL
3	49.40	33.92	40.00	-6.08	50.53	0.61	15.19	32.41	100	1	QP	VERTICAL
4	71.71	33.82	40.00	-6.18	52.46	0.73	13.03	32.40	200	68	QP	VERTICAL
5	90.14	30.49	43.50	-13.01	46.49	0.82	15.57	32.39	100	203	QP	VERTICAL
6	125.06	28.25	43.50	-15.25	40.71	0.97	18.94	32.37	100	18	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	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 36 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15530.80	46.12	54.00	-7.88	31.37	11.23	38.16	34.64	302	168	Average	HORIZONTAL
2	15544.16	59.03	74.00	-14.97	44.28	11.23	38.16	34.64	302	168	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15530.88	46.15	54.00	-7.85	31.40	11.23	38.16	34.64	48	198	Average	VERTICAL
2	15544.24	59.11	74.00	-14.89	44.36	11.23	38.16	34.64	48	198	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 40 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15591.44	59.48	74.00	-14.52	44.69	11.24	38.23	34.68	349	150	Peak	HORIZONTAL
2	15598.64	46.79	54.00	-7.21	32.00	11.24	38.23	34.68	349	150	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15594.80	59.53	74.00	-14.47	44.74	11.24	38.23	34.68	83	150	Peak	VERTICAL
2	15607.84	46.72	54.00	-7.28	31.86	11.25	38.29	34.68	83	150	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 48 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15714.20	60.16	74.00	-13.84	45.28	11.27	38.42	34.81	259	206	Peak	HORIZONTAL
2	15714.96	46.54	54.00	-7.46	31.66	11.27	38.42	34.81	259	206	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15712.56	46.75	54.00	-7.25	31.87	11.27	38.42	34.81	104	266	Average	VERTICAL
2	15719.56	60.72	74.00	-13.28	45.84	11.27	38.42	34.81	104	266	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 149 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11486.16	58.23	74.00	-15.77	44.73	9.62	38.50	34.62	99	171	Peak	HORIZONTAL
2	11490.60	47.63	54.00	-6.37	34.13	9.62	38.50	34.62	99	171	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11490.96	47.87	54.00	-6.13	34.37	9.62	38.50	34.62	309	195	Average	VERTICAL
2	11495.76	60.41	74.00	-13.59	46.91	9.62	38.50	34.62	309	195	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 157 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11570.12	48.21	54.00	-5.79	34.72	9.61	38.53	34.65	44	177	Average	HORIZONTAL
2	11570.48	60.19	74.00	-13.81	46.70	9.61	38.53	34.65	44	177	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11570.84	48.01	54.00	-5.99	34.52	9.61	38.53	34.65	309	192	Average	VERTICAL
2	11571.20	60.21	74.00	-13.79	46.72	9.61	38.53	34.65	309	192	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 165 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11640.28	58.19	74.00	-15.81	44.72	9.60	38.55	34.68	43	175	Peak	HORIZONTAL
2	11650.72	47.83	54.00	-6.17	34.36	9.60	38.55	34.68	43	175	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11650.96	47.35	54.00	-6.65	33.86	9.60	38.57	34.68	307	187	Average	VERTICAL
2	11656.12	57.83	74.00	-16.17	44.34	9.60	38.57	34.68	307	187	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15530.96	58.84	74.00	-15.16	44.09	11.23	38.16	34.64	148	150	Peak	HORIZONTAL
2	15531.00	46.30	54.00	-7.70	31.55	11.23	38.16	34.64	148	150	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15531.44	59.29	74.00	-14.71	44.54	11.23	38.16	34.64	230	150	Peak	VERTICAL
2	15534.04	46.38	54.00	-7.62	31.63	11.23	38.16	34.64	230	150	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15591.04	59.68	74.00	-14.32	44.89	11.24	38.23	34.68	194	150	Peak	HORIZONTAL
2	15602.44	46.41	54.00	-7.59	31.55	11.25	38.29	34.68	194	150	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15604.08	46.52	54.00	-7.48	31.66	11.25	38.29	34.68	215	150	Average	VERTICAL
2	15607.96	59.07	74.00	-14.93	44.21	11.25	38.29	34.68	215	150	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15722.40	46.72	54.00	-7.28	31.84	11.27	38.42	34.81	170	150	Average	HORIZONTAL
2	15729.44	60.13	74.00	-13.87	45.25	11.27	38.42	34.81	170	150	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15720.64	59.43	74.00	-14.57	44.55	11.27	38.42	34.81	197	150	Peak	VERTICAL
2	15723.00	46.65	54.00	-7.35	31.77	11.27	38.42	34.81	197	150	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11490.84	48.51	54.00	-5.49	35.01	9.62	38.50	34.62	45	182	Average	HORIZONTAL
2	11492.28	61.12	74.00	-12.88	47.62	9.62	38.50	34.62	45	182	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11491.92	61.14	74.00	-12.86	47.64	9.62	38.50	34.62	310	202	Peak	VERTICAL
2	11492.64	48.91	54.00	-5.09	35.41	9.62	38.50	34.62	310	202	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11570.60	48.31	54.00	-5.69	34.82	9.61	38.53	34.65	43	184	Average	HORIZONTAL
2	11572.16	60.03	74.00	-13.97	46.54	9.61	38.53	34.65	43	184	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11571.32	48.66	54.00	-5.34	35.17	9.61	38.53	34.65	309	204	Average	VERTICAL
2	11572.28	60.62	74.00	-13.38	47.13	9.61	38.53	34.65	309	204	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11649.76	46.47	54.00	-7.53	33.00	9.60	38.55	34.68	45	188	Average	HORIZONTAL
2	11650.84	57.69	74.00	-16.31	44.20	9.60	38.57	34.68	45	188	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11650.00	58.03	74.00	-15.97	44.56	9.60	38.55	34.68	313	216	Peak	VERTICAL
2	11651.68	47.32	54.00	-6.68	33.83	9.60	38.57	34.68	313	216	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15562.08	59.55	74.00	-14.45	44.76	11.24	38.23	34.68	291	150	Peak	HORIZONTAL
2	15578.20	46.45	54.00	-7.55	31.66	11.24	38.23	34.68	291	150	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15576.44	59.47	74.00	-14.53	44.68	11.24	38.23	34.68	214	150	Peak	VERTICAL
2	15578.76	46.35	54.00	-7.65	31.56	11.24	38.23	34.68	214	150	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15684.72	60.21	74.00	-13.79	45.37	11.26	38.35	34.77	90	150	Peak	HORIZONTAL
2	15693.64	46.84	54.00	-7.16	31.92	11.27	38.42	34.77	90	150	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15681.76	46.96	54.00	-7.04	32.12	11.26	38.35	34.77	149	150	Average	VERTICAL
2	15690.00	59.76	74.00	-14.24	44.92	11.26	38.35	34.77	149	150	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11513.84	46.61	54.00	-7.39	33.12	9.62	38.50	34.63	45	186	Average	HORIZONTAL
2	11514.32	59.42	74.00	-14.58	45.93	9.62	38.50	34.63	45	186	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11493.04	58.02	74.00	-15.98	44.52	9.62	38.50	34.62	311	199	Peak	VERTICAL
2	11512.40	47.21	54.00	-6.79	33.72	9.62	38.50	34.63	311	199	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11590.96	45.99	54.00	-8.01	32.51	9.60	38.54	34.66	45	178	Average	HORIZONTAL
2	11593.36	57.82	74.00	-16.18	44.34	9.60	38.54	34.66	45	178	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11592.24	58.46	74.00	-15.54	44.98	9.60	38.54	34.66	310	212	Peak	VERTICAL
2	11593.20	46.26	54.00	-7.74	32.78	9.60	38.54	34.66	310	212	Average	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15625.40	46.57	54.00	-7.43	31.76	11.25	38.29	34.73	240	150	Average	HORIZONTAL
2	15625.52	59.73	74.00	-14.27	44.92	11.25	38.29	34.73	240	150	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	15635.96	46.61	54.00	-7.39	31.80	11.25	38.29	34.73	149	150	Average	VERTICAL
2	15636.60	59.64	74.00	-14.36	44.83	11.25	38.29	34.73	149	150	Peak	VERTICAL

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11551.92	43.85	54.00	-10.15	30.36	9.61	38.53	34.65	43	178	Average	HORIZONTAL
2	11570.00	56.77	74.00	-17.23	43.28	9.61	38.53	34.65	43	178	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11551.60	44.09	54.00	-9.91	30.60	9.61	38.53	34.65	308	202	Average	VERTICAL
2	11574.64	56.92	74.00	-17.08	43.43	9.61	38.53	34.65	308	202	Peak	VERTICAL

Note:

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

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

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

4.7. 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

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	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 36, 40, 48 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5150.00	69.55	74.00	-4.45	62.81	7.90	33.31	34.47	132	229	Peak	VERTICAL
2	5150.00	53.75	54.00	-0.25	47.01	7.90	33.31	34.47	132	229	Average	VERTICAL
3	5186.00	105.99			99.16	7.95	33.35	34.47	132	229	Average	VERTICAL
4	5186.40	115.70			108.87	7.95	33.35	34.47	132	229	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5145.20	68.41	74.00	-5.59	61.67	7.90	33.31	34.47	64	211	Peak	HORIZONTAL
2	5150.00	53.98	54.00	-0.02	47.24	7.90	33.31	34.47	64	211	Average	HORIZONTAL
3	5195.60	119.49			112.60	7.98	33.38	34.47	64	211	Peak	HORIZONTAL
4	5195.60	108.73			101.84	7.98	33.38	34.47	64	211	Average	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5109.80	47.17	54.00	-6.83	40.57	7.82	33.25	34.47	32	219	Average	HORIZONTAL
2	5136.80	60.39	74.00	-13.61	53.69	7.88	33.29	34.47	32	219	Peak	HORIZONTAL
3	5233.40	120.07			113.15	7.95	33.44	34.47	32	219	Peak	HORIZONTAL
4	5235.80	109.88			102.96	7.95	33.44	34.47	32	219	Average	HORIZONTAL
5	5378.60	48.24	54.00	-5.76	41.21	7.87	33.63	34.47	32	219	Average	HORIZONTAL
6	5385.20	61.30	74.00	-12.70	54.26	7.86	33.65	34.47	32	219	Peak	HORIZONTAL

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

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11a CH 149, 157, 165 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5566.92	62.69	68.20	-5.51	55.23	7.94	34.00	34.48	311	205	Peak	VERTICAL
2	5742.96	121.98			114.09	7.86	34.55	34.52	311	205	Peak	VERTICAL
3	5747.28	111.38			103.49	7.86	34.55	34.52	311	205	Average	VERTICAL
4	5966.52	61.79	68.20	-6.41	53.42	7.73	35.20	34.56	311	205	Peak	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5471.88	64.45	68.20	-3.75	57.26	7.90	33.76	34.47	46	237	Peak	HORIZONTAL
2	5778.60	122.99			115.03	7.84	34.65	34.53	46	237	Peak	HORIZONTAL
3	5778.60	113.07			105.11	7.84	34.65	34.53	46	237	Average	HORIZONTAL
4	5951.40	62.87	68.20	-5.33	54.54	7.74	35.15	34.56	46	237	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5466.48	65.35	68.20	-2.85	58.16	7.90	33.76	34.47	48	245	Peak	HORIZONTAL
2	5818.56	121.90			113.86	7.82	34.75	34.53	48	245	Peak	HORIZONTAL
3	5818.56	112.28			104.24	7.82	34.75	34.53	48	245	Average	HORIZONTAL
4	5939.52	63.74	68.20	-4.46	55.45	7.75	35.10	34.56	48	245	Peak	HORIZONTAL

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

Temperature	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5148.00	68.28	74.00	-5.72	61.54	7.90	33.31	34.47	2	251	Peak	HORIZONTAL
2	5150.00	53.64	54.00	-0.36	46.90	7.90	33.31	34.47	2	251	Average	HORIZONTAL
3	5186.40	116.75			109.92	7.95	33.35	34.47	2	251	Peak	HORIZONTAL
4	5187.60	107.99			101.10	7.98	33.38	34.47	2	251	Average	HORIZONTAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5149.20	69.98	74.00	-4.02	63.24	7.90	33.31	34.47	30	260	Peak	HORIZONTAL
2	5150.00	53.81	54.00	-0.19	47.07	7.90	33.31	34.47	30	260	Average	HORIZONTAL
3	5194.00	111.63			104.74	7.98	33.38	34.47	30	260	Average	HORIZONTAL
4	5195.20	120.72			113.83	7.98	33.38	34.47	30	260	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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5142.40	60.19	74.00	-13.81	53.45	7.90	33.31	34.47	35	254	Peak	HORIZONTAL
2	5142.40	48.30	54.00	-5.70	41.56	7.90	33.31	34.47	35	254	Average	HORIZONTAL
3	5245.20	121.49			114.57	7.95	33.44	34.47	35	254	Peak	HORIZONTAL
4	5248.00	111.35			104.42	7.94	33.46	34.47	35	254	Average	HORIZONTAL

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

Temperature	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149, 157, 165 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Channel 149

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5560.44	63.20	68.20	-5.00	55.74	7.94	34.00	34.48	236	198	Peak	HORIZONTAL
2	5737.56	110.42			102.57	7.87	34.50	34.52	236	198	Average	HORIZONTAL
3	5738.64	120.73			112.88	7.87	34.50	34.52	236	198	Peak	HORIZONTAL
4	5970.84	61.61	68.20	-6.59	53.24	7.73	35.20	34.56	236	198	Peak	HORIZONTAL

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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5518.32	62.44	68.20	-5.76	55.14	7.92	33.85	34.47	242	218	Peak	VERTICAL
2	5788.32	120.18			112.22	7.84	34.65	34.53	242	218	Peak	VERTICAL
3	5788.32	110.05			102.09	7.84	34.65	34.53	242	218	Average	VERTICAL
4	5961.12	61.33	68.20	-6.87	52.96	7.73	35.20	34.56	242	218	Peak	VERTICAL

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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5472.96	64.18	68.20	-4.02	56.99	7.90	33.76	34.47	47	243	Peak	HORIZONTAL
2	5829.36	122.30			114.23	7.81	34.80	34.54	47	243	Peak	HORIZONTAL
3	5830.44	112.13			104.06	7.81	34.80	34.54	47	243	Average	HORIZONTAL
4	5933.04	65.50	68.20	-2.70	57.21	7.75	35.10	34.56	47	243	Peak	HORIZONTAL

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

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016		

Channel 38

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5150.00	67.59	74.00	-6.41	60.85	7.90	33.31	34.47	26	260	Peak	HORIZONTAL
2	5150.00	53.81	54.00	-0.19	47.07	7.90	33.31	34.47	26	260	Average	HORIZONTAL
3	5192.40	108.52			101.63	7.98	33.38	34.47	26	260	Peak	HORIZONTAL
4	5192.40	99.32			92.43	7.98	33.38	34.47	26	260	Average	HORIZONTAL

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5150.00	65.99	74.00	-8.01	59.25	7.90	33.31	34.47	21	257	Peak	HORIZONTAL
2	5150.00	53.83	54.00	-0.17	47.09	7.90	33.31	34.47	21	257	Average	HORIZONTAL
3	5217.40	118.12			111.21	7.96	33.42	34.47	21	257	Peak	HORIZONTAL
4	5217.40	108.37			101.46	7.96	33.42	34.47	21	257	Average	HORIZONTAL

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

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151, 159 / Chain 3 + Chain 4
Test Date	Apr. 13, 2016		

Channel 151

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5643.60	65.49	68.20	-2.71	57.82	7.92	34.25	34.50	44	249	Peak	HORIZONTAL
2	5744.04	118.90			111.01	7.86	34.55	34.52	44	249	Peak	HORIZONTAL
3	5745.12	108.74			100.85	7.86	34.55	34.52	44	249	Average	HORIZONTAL
4	5960.04	61.89	68.20	-6.31	53.52	7.73	35.20	34.56	44	249	Peak	HORIZONTAL

Item 2, 3 are the fundamental frequency at 5755 MHz.

Channel 159

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5509.68	63.57	68.20	-4.63	56.33	7.91	33.80	34.47	46	244	Peak	HORIZONTAL
2	5787.24	117.88			109.92	7.84	34.65	34.53	46	244	Peak	HORIZONTAL
3	5787.24	108.40			100.44	7.84	34.65	34.53	46	244	Average	HORIZONTAL
4	5934.12	64.76	68.20	-3.44	56.47	7.75	35.10	34.56	46	244	Peak	HORIZONTAL

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

Temperature	22.2℃	Humidity	56%
Test Engineer	Akina Chiu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42, 155 / Chain 3 + Chain 4
Test Date	Mar. 25, 2016 / Apr. 13, 2016		

Channel 42

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5150.00	63.83	74.00	-10.17	57.09	7.90	33.31	34.47	24	259	Peak	HORIZONTAL
2	5150.00	53.88	54.00	-0.12	47.14	7.90	33.31	34.47	24	259	Average	HORIZONTAL
3	5215.60	104.65			97.75	7.97	33.40	34.47	24	259	Peak	HORIZONTAL
4	5230.00	94.92			88.01	7.96	33.42	34.47	24	259	Average	HORIZONTAL

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	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5647.92	68.15	68.20	-0.05	60.48	7.92	34.25	34.50	42	246	Peak	HORIZONTAL
2	5762.40	113.29			105.36	7.85	34.60	34.52	42	246	Peak	HORIZONTAL
3	5786.16	101.31			93.35	7.84	34.65	34.53	42	246	Average	HORIZONTAL
4	5926.56	63.62	68.20	-4.58	55.33	7.75	35.10	34.56	42	246	Peak	HORIZONTAL

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

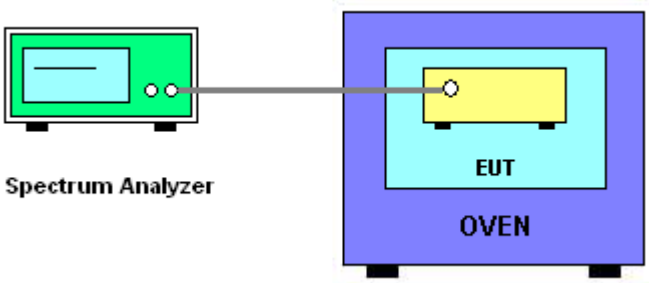
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 -40°C~70°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	22.2°C	Humidity	56%
Test Engineer	Akina Chiu	Test Date	May 03, 2016

Mode: 20 MHz / Chain 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9804	5199.9793	5199.9778	5199.9758
110.00	5199.9792	5199.9779	5199.9763	5199.9744
93.50	5199.9778	5199.9769	5199.9755	5199.9737
Max. Deviation (MHz)	**0.0222**	**0.0231**	**0.0245**	**0.0263**
Max. Deviation (ppm)	**4.28**	**4.45**	**4.72**	**5.07**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5199.9872	5199.9850	5199.9834	5199.9819
-30	5199.9864	5199.9848	5199.9833	5199.9809
-20	5199.9846	5199.9833	5199.9816	5199.9795
-10	5199.9831	5199.9819	5199.9803	5199.9784
0	5199.9817	5199.9803	5199.9784	5199.9762
10	5199.9804	5199.9791	5199.9776	5199.9758
20	5199.9792	5199.9779	5199.9763	5199.9744
30	5199.9778	5199.9767	5199.9753	5199.9737
40	5199.9763	5199.9750	5199.9734	5199.9715
50	5199.9746	5199.9734	5199.9719	5199.9696
60	5199.9743	5199.9732	5199.9713	5199.9686
70	5199.9742	5199.9731	5199.9712	5199.9676
Max. Deviation (MHz)	**0.0258**	**0.0269**	**0.0288**	**0.0324**
Max. Deviation (ppm)	**4.97**	**5.18**	**5.55**	**6.24**
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5784.9991	5784.9980	5784.9965	5784.9945
110.00	5784.9979	5784.9966	5784.9950	5784.9931
93.50	5784.9965	5784.9956	5784.9942	5784.9924
Max. Deviation (MHz)	**0.0035**	**0.0044**	**0.0058**	**0.0076**
Max. Deviation (ppm)	**0.60**	**0.76**	**1.00**	**1.31**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5785 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5785.0052	5785.0037	5785.0021	5784.9997
-30	5785.0051	5785.0035	5785.0020	5784.9996
-20	5785.0033	5785.0020	5785.0003	5784.9982
-10	5785.0018	5785.0006	5784.9990	5784.9971
0	5785.0004	5784.9990	5784.9971	5784.9949
10	5784.9991	5784.9978	5784.9963	5784.9945
20	5784.9979	5784.9966	5784.9950	5784.9931
30	5784.9965	5784.9954	5784.9940	5784.9924
40	5784.9950	5784.9937	5784.9921	5784.9902
50	5784.9933	5784.9921	5784.9906	5784.9883
60	5784.9930	5784.9920	5784.9901	5784.9881
70	5784.9925	5784.9918	5784.9898	5784.9879
Max. Deviation (MHz)	**0.0075**	**0.0082**	**0.0102**	**0.0121**
Max. Deviation (ppm)	**1.29**	**1.41**	**1.76**	**2.09**
Result	Complies			

Mode: 40 MHz / Chain 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9727	5189.9716	5189.9701	5189.9681
110.00	5189.9715	5189.9702	5189.9686	5189.9667
93.50	5189.9701	5189.9692	5189.9678	5189.9660
Max. Deviation (MHz)	**0.0299**	**0.0308**	**0.0322**	**0.0340**
Max. Deviation (ppm)	**5.76**	**5.94**	**6.21**	**6.55**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5189.9786	5189.9751	5189.9752	5189.9729
-30	5189.9787	5189.9771	5189.9756	5189.9732
-20	5189.9769	5189.9756	5189.9739	5189.9718
-10	5189.9754	5189.9742	5189.9726	5189.9707
0	5189.9740	5189.9726	5189.9707	5189.9685
10	5189.9727	5189.9714	5189.9699	5189.9681
20	5189.9715	5189.9702	5189.9686	5189.9667
30	5189.9701	5189.9690	5189.9676	5189.9660
40	5189.9686	5189.9673	5189.9657	5189.9638
50	5189.9669	5189.9657	5189.9642	5189.9619
60	5189.9666	5189.9656	5189.9637	5189.9612
70	5189.9659	5189.9652	5189.9634	5189.9611
Max. Deviation (MHz)	**0.0341**	**0.0348**	**0.0366**	**0.0389**
Max. Deviation (ppm)	**6.57**	**6.71**	**7.05**	**7.50**
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5754.9798	5754.9787	5754.9772	5754.9752
110.00	5754.9786	5754.9773	5754.9757	5754.9738
93.50	5754.9772	5754.9763	5754.9749	5754.9731
Max. Deviation (MHz)	**0.0228**	**0.0237**	**0.0251**	**0.0269**
Max. Deviation (ppm)	**3.96**	**4.12**	**4.36**	**4.68**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5755 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5754.9857	5754.9851	5754.9830	5754.9813
-30	5754.9858	5754.9842	5754.9827	5754.9803
-20	5754.9840	5754.9827	5754.9810	5754.9789
-10	5754.9825	5754.9813	5754.9797	5754.9778
0	5754.9811	5754.9797	5754.9778	5754.9756
10	5754.9798	5754.9785	5754.9770	5754.9752
20	5754.9786	5754.9773	5754.9757	5754.9738
30	5754.9772	5754.9761	5754.9747	5754.9731
40	5754.9757	5754.9744	5754.9728	5754.9709
50	5754.9740	5754.9728	5754.9713	5754.9690
60	5754.9737	5754.9724	5754.9712	5754.9689
70	5754.9733	5754.9723	5754.9708	5754.9683
Max. Deviation (MHz)	**0.0267**	**0.0277**	**0.0292**	**0.0317**
Max. Deviation (ppm)	**4.64**	**4.81**	**5.08**	**5.51**
Result	Complies			

Mode: 80 MHz / Chain 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9797	5209.9786	5209.9771	5209.9751
110.00	5209.9785	5209.9772	5209.9756	5209.9737
93.50	5209.9771	5209.9762	5209.9748	5209.9730
Max. Deviation (MHz)	**0.0229**	**0.0238**	**0.0252**	**0.0270**
Max. Deviation (ppm)	**4.40**	**4.57**	**4.84**	**5.18**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5209.9858	5209.9844	5209.9828	5209.9812
-30	5209.9857	5209.9841	5209.9826	5209.9802
-20	5209.9839	5209.9826	5209.9809	5209.9788
-10	5209.9824	5209.9812	5209.9796	5209.9777
0	5209.9810	5209.9796	5209.9777	5209.9755
10	5209.9797	5209.9784	5209.9769	5209.9751
20	5209.9785	5209.9772	5209.9756	5209.9737
30	5209.9771	5209.9760	5209.9746	5209.9730
40	5209.9756	5209.9743	5209.9727	5209.9708
50	5209.9739	5209.9727	5209.9712	5209.9689
60	5209.9733	5209.9723	5209.9711	5209.9686
70	5209.9731	5209.9718	5209.9709	5209.9682
Max. Deviation (MHz)	**0.0269**	**0.0282**	**0.0291**	**0.0318**
Max. Deviation (ppm)	**5.17**	**5.41**	**5.59**	**6.11**
Result	Complies			

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5774.9804	5774.9793	5774.9778	5774.9758
110.00	5774.9792	5774.9779	5774.9763	5774.9744
93.50	5774.9778	5774.9769	5774.9755	5774.9737
Max. Deviation (MHz)	**0.0222**	**0.0231**	**0.0245**	**0.0263**
Max. Deviation (ppm)	**3.85**	**4.00**	**4.24**	**4.56**
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5775 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-40	5774.9869	5774.9850	5774.9838	5774.9812
-30	5774.9864	5774.9848	5774.9833	5774.9809
-20	5774.9846	5774.9833	5774.9816	5774.9795
-10	5774.9831	5774.9819	5774.9803	5774.9784
0	5774.9817	5774.9803	5774.9784	5774.9762
10	5774.9804	5774.9791	5774.9776	5774.9758
20	5774.9792	5774.9779	5774.9763	5774.9744
30	5774.9778	5774.9767	5774.9753	5774.9737
40	5774.9763	5774.9750	5774.9734	5774.9715
50	5774.9746	5774.9734	5774.9719	5774.9696
60	5774.9739	5774.9731	5774.9714	5774.9685
70	5774.9736	5774.9729	5774.9711	5774.9682
Max. Deviation (MHz)	**0.0264**	**0.0271**	**0.0289**	**0.0318**
Max. Deviation (ppm)	**4.57**	**4.69**	**5.01**	**5.51**
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 Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 27, 0216	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	Schaffner	CBL6112D	37880	20MHz ~ 2GHz	Sep. 03, 2015	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)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-l0-7	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. 02, 2015	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)
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 years.

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%