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FCC RADIO TEST REPORT

Applicant's company	**Linksys LLC**
Applicant Address	121 Theory, Irvine CA 92617, United States
FCC ID	**Q87-EA7500**

Product Name	LINKSYS MAX-STREAM AC1900 MU-MIMO GIGABIT ROUTER
Brand Name	LINKSYS
Model No.	EA7500
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Aug. 14, 2015
Final Test Date	Sep. 01, 2015
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 v01, KDB662911 D01 v02r01, KDB644545 D03 v01.**

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

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR582115AB	Rev. 01	Initial issue of report	Oct. 16, 2015
FR582115AB	Rev. 02	Changing the model name of adapter 1 to HK-X142-A12S	Oct. 30, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	LINKSYS MAX-STREAM AC1900 MU-MIMO GIGABIT ROUTER
Brand Name	:	LINKSYS
Model No.	:	EA7500
Applicant	:	Linksys LLC
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 Aug. 14, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	9.16 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.36 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.57 dB
4.5	15.407(b)	Radiated Emissions	Complies	3.29 dB
4.6	15.407(b)	Band Edge Emissions	Complies	0.20 dB
4.7	15.407(g)	Frequency Stability	Complies	-
4.8	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5250MHz
Channel Number	4 for 20MHz bandwidth ; 2 for 40MHz bandwidth 1 for 80MHz bandwidth
Channel Band Width (99%)	IEEE 802.11a: 16.56 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.76 MHz ; IEEE 802.11ac MCS0/Nss1 (VHT40): 36.40 MHz ; IEEE 802.11ac MCS0/Nss1 (VHT80): 76.00 MHz
Maximum Conducted Output Power	IEEE 802.11a: 29.55 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.61 dBm ; IEEE 802.11ac MCS0/Nss1 (VHT40): 29.64 dBm ; IEEE 802.11ac MCS0/Nss1 (VHT80): 24.22 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
Operating Mode	☐ Outdoor access point	
	☒ Indoor access point	
	☐ Fixed point-to-point access points	
	☐ Mobile and portable client devices	

Note:

802.11b supports non-beamforming function only.

802.11g/n/ac in 2.4GHz and 802.11a/n/ac in 5GHz support beamforming function only.

Antenna and Band width

Antenna	Three (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)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT 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 in 2.4GHz and supports VHT20, VHT40, VHT80 in 5GHz.

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

3.2. Accessories

Power	Brand	Model	Rating
Adapter 1 (Fixed plug)	LINKSYS	HK-X142-A12S	Input:100-240V, 50/60Hz 1.5A Output:12V, 3.5A
Adapter 2 (Fixed plug)	LINKSYS	KSAS0501200350HU	Input:100-240V, 50/60Hz 1.2A Output:12V, 3.5A
Adapter 3 (Interchangeable plug)	LINKSYS	KSAS0451200350D5	Input:100-240V, 50/60Hz 1.2A Output:12V, 3.5A
Adapter 4 (Fixed plug)	LINKSYS	HK-X142-A12	Input:100-240V, 50/60Hz 1.5A Output:12V, 0-3.5A
Others			
Plug*1 (For adapter 3 use)			
RJ-45 cable*1, non-shielded, 0.9m			

3.3. Table for Filed Antenna

Ant.	Brand	Model No.	Type	Connector	Antenna Cable	
					Brand	Model No.
1	Galtronics Electronics	02109140-05960	Dipole	Reversed-SMA	M.gear	C120-510456-A (SRF20151271)
2	Galtronics Electronics	02109140-05960	Dipole	Reversed-SMA	M.gear	C120-510457-A (SRF20151272)
3	Galtronics Electronics	02109140-05960	Dipole	Reversed-SMA	M.gear	C120-510458-A (SRF20151273)

Ant.	Band	Gain (dBi)	Cable Loss (dB)	True Gain (dBi)
1	2.4GHz	1.44	1	0.44
	5GHz Band 1	2.29	1.6	0.69
	5GHz Band 4	3.05	1.7	1.35
2	2.4GHz	1.44	0.9	0.54
	5GHz Band 1	2.29	1.6	0.69
	5GHz Band 4	3.05	1.7	1.35
3	2.4GHz	1.44	0.5	0.94
	5GHz Band 1	2.29	0.8	1.49
	5GHz Band 4	3.05	0.9	2.15

Note: The EUT has three antennas.

<For 2.4GHz Band>

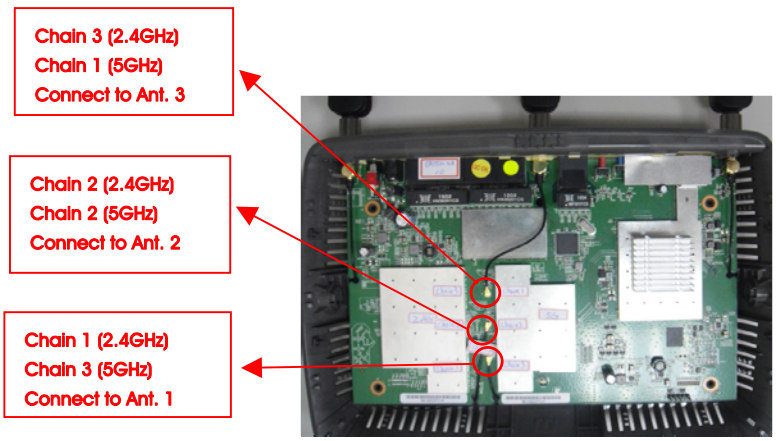
For IEEE 802.11b/g/n/ac mode (3TX/3RX)

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

<For 5GHz Band >

For IEEE 802.11a/n/ac mode (3TX/3RX):

Ant. 1, Ant. 2 and Ant. 3 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.

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

For 80MHz bandwidth systems, use Channel 42.

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	-	-

3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Ant.
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11a/BPSK	Band 1	6Mbps	36/40/48	1+2+3
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	1+2+3
	11ac VHT40	Band 1	MCS0/Nss1	38/46	1+2+3
	11ac VHT80	Band 1	MCS0/Nss1	42	1+2+3
Power Spectral Density	11a/BPSK	Band 1	6Mbps	36/40/48	1+2+3
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	1+2+3
	11ac VHT40	Band 1	MCS0/Nss1	38/46	1+2+3
	11ac VHT80	Band 1	MCS0/Nss1	42	1+2+3
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement	11a/BPSK	Band 1	6Mbps	36/40/48	1+2+3
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	1+2+3
	11ac VHT40	Band 1	MCS0/Nss1	38/46	1+2+3
	11ac VHT80	Band 1	MCS0/Nss1	42	1+2+3
Radiated Emission Below 1GHz	Normal Link		-	-	-
Radiated Emission Above 1GHz	11a/BPSK	Band 1	6Mbps	36/40/48	1+2+3
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	1+2+3
	11ac VHT40	Band 1	MCS0/Nss1	38/46	1+2+3
	11ac VHT80	Band 1	MCS0/Nss1	42	1+2+3

Band Edge Emission	11a/BPSK	Band 1	6Mbps	36/40/48	1+2+3
	11ac VHT20	Band 1	MCS0/Nss1	36/40/48	1+2+3
	11ac VHT40	Band 1	MCS0/Nss1	38/46	1+2+3
	11ac VHT80	Band 1	MCS0/Nss1	42	1+2+3
Frequency Stability	20 MHz	Band 1	-	40	3
	40 MHz	Band 1	-	38	3
	80 MHz	Band 1	-	42	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 Conducted Emission test:

Mode 1. Normal Link – EUT + adapter 1

Mode 2. Normal Link – EUT + adapter 2

Mode 3. Normal Link – EUT + adapter 3

Mode 4. Normal Link – EUT + adapter 4

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

For Radiated Emission test below 1GHz:

Mode 1. Normal Link – Place EUT in Z axis + adapter 1

Mode 2. Normal Link – Place EUT in Y axis + adapter 1

Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 ~ 5 will follow this same test mode.

Mode 3. Normal Link – Place EUT in Z axis + adapter 2

Mode 4. Normal Link – Place EUT in Z axis + adapter 3

Mode 5. Normal Link – Place EUT in Z axis + adapter 4

Mode 3 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 Z axis and Y axis position for Radiated emission above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this same test configuration.

Mode 1. CTX – Place EUT in Y axis

For Band Edge Emissions test:

The EUT was performed at Z axis and Y axis position for Band Edge Emissions 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:

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA: 582115) 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.

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

For Test Site No: 03CH01-CB

(Radiated Emission below 1GHz test)

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E4300	DoC
Flash disk	Silicon Power	I-Series	DoC
Flash disk3.0	Silicon Power	B06	DoC

(Radiated Emission above 1GHz test)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Notebook	DELL	E4300	DoC
RX Device	Belkin	EA8500	N/A

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E6430	DoC
Flash disk	Silicon Power	I-Series	DoC
Flash disk3.0	ADATA	C103	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.8. Table for Parameters of Test Software Setting

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

Test Software Version	QCARCT 3.0.42.0		
Mode	Test Frequency (MHz)		
	NCB: 20MHz		
	5180 MHz	5200 MHz	5240 MHz
802.11a	20	22.5	23.5
802.11ac MCS0/Nss1 VHT20	19.5	22.5	23.5
Mode	NCB: 40MHz		
802.11ac MCS0/Nss1 VHT40	5190 MHz	5230 MHz	
	19	23	
Mode	NCB: 80MHz		
802.11ac MCS0/Nss1 VHT80	5210 MHz		
	18.5		

3.9. EUT Operation during Test

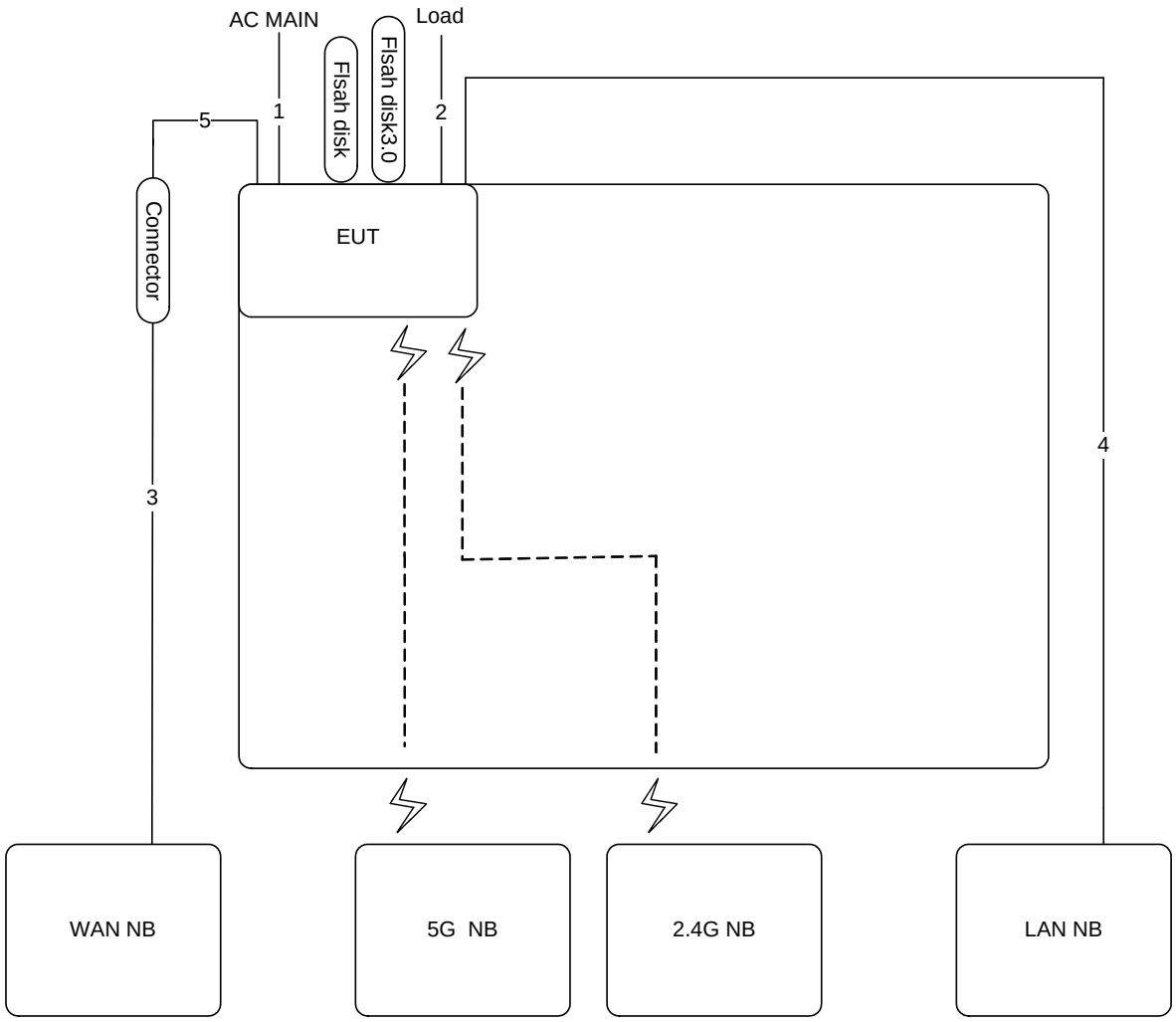
For Conducted Mode:
The EUT was programmed to be in continuously transmitting mode.
For Radiated Mode:
During the test, the following programs under WIN XP were executed.
The program was executed as follows:
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe " to link with the remote workstation to receive and transmit packet by RX Device and transmit duty cycle no less 98%

3.10. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11a	1.936	2.160	89.63%	0.48	0.52
802.11ac MCS0/Nss1 VHT20	1.936	2.090	92.63%	0.33	0.52
802.11ac MCS0/Nss1 VHT40	2.286	2.496	91.59%	0.38	0.44
802.11ac MCS0/Nss1 VHT80	1.523	1.696	89.81%	0.47	0.66

3.11. Test Configurations

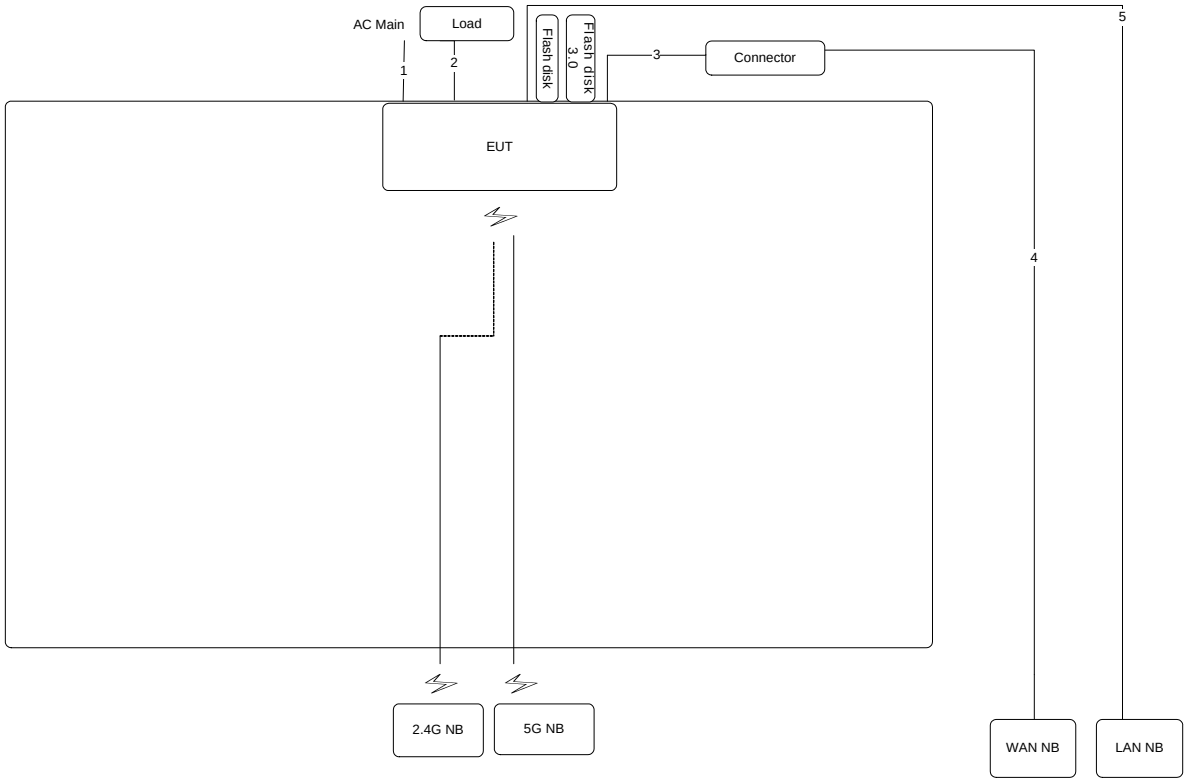
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.9m
2	RJ-45 cable*3	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	0.9m

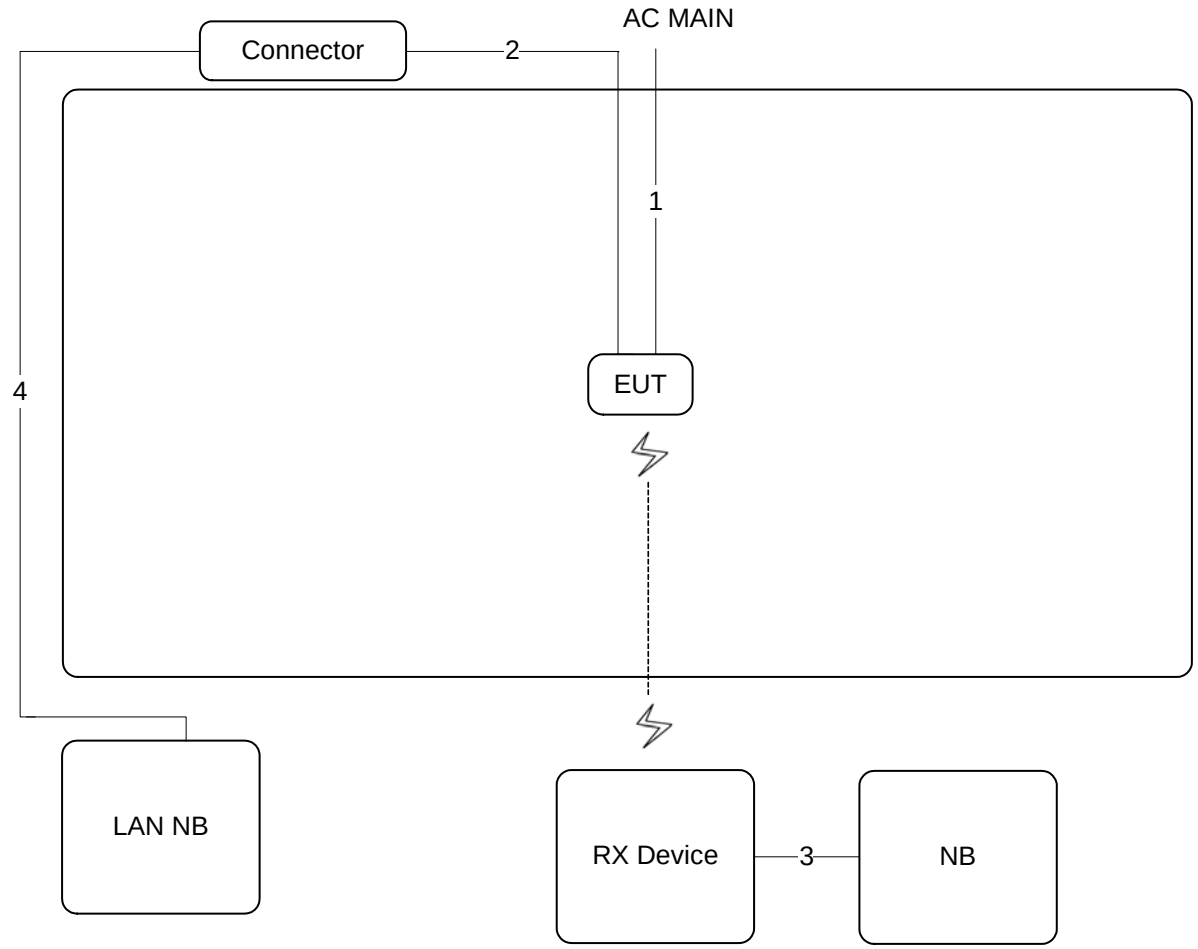
3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz



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

Test Configuration: above 1GHz



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

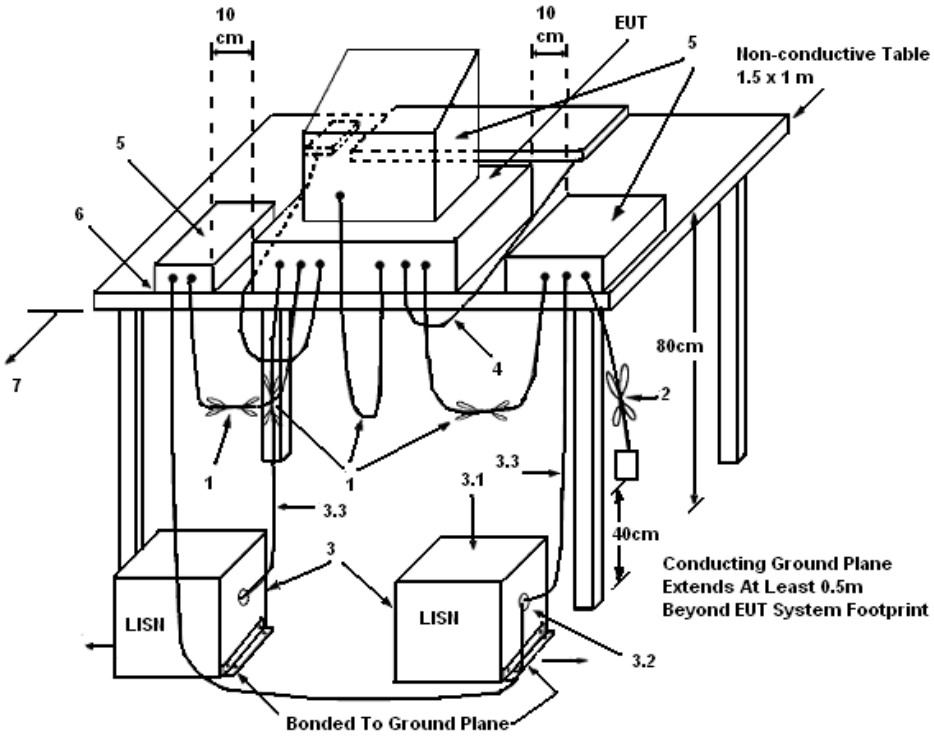
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

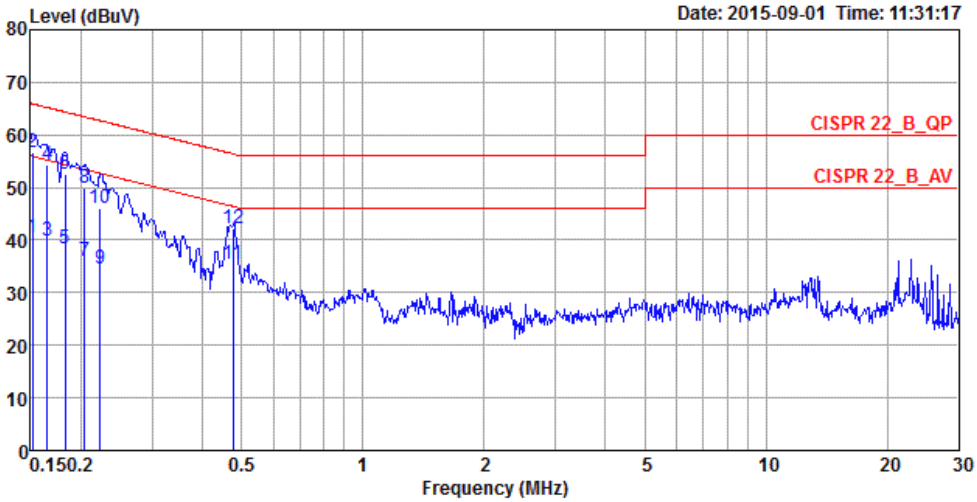
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

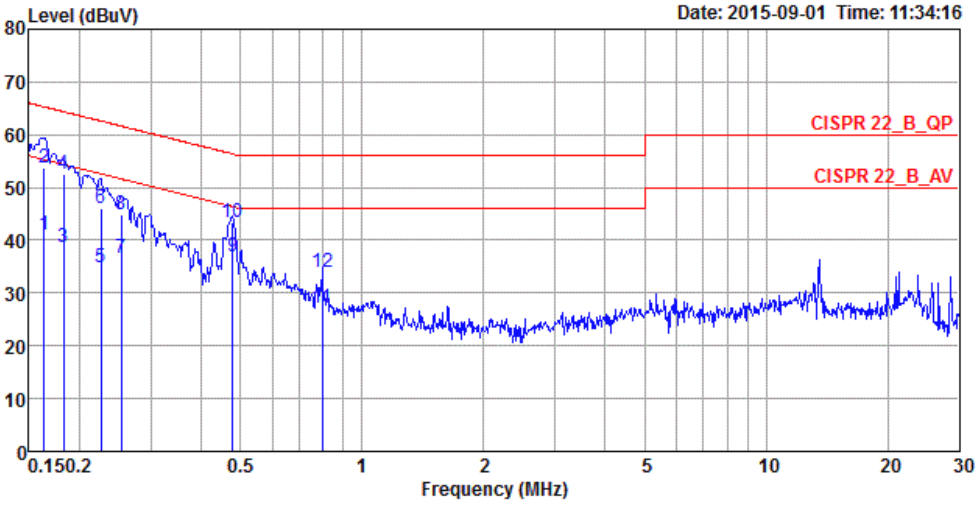
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	52%
Test Engineer	Hank Yang & Da Deng & Edison Lin	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1516	40.52	-15.39	55.91	30.35	10.00	0.17	LINE	Average
2	0.1516	56.75	-9.16	65.91	46.58	10.00	0.17	LINE	QP
3	0.1650	39.80	-15.41	55.21	29.63	10.00	0.17	LINE	Average
4	0.1650	54.40	-10.81	65.21	44.23	10.00	0.17	LINE	QP
5	0.1825	38.37	-16.00	54.37	28.17	10.01	0.19	LINE	Average
6	0.1825	52.48	-11.89	64.37	42.28	10.01	0.19	LINE	QP
7	0.2040	36.10	-17.35	53.45	25.90	10.01	0.19	LINE	Average
8	0.2040	49.77	-13.68	63.45	39.57	10.01	0.19	LINE	QP
9	0.2232	34.44	-18.26	52.70	24.24	10.01	0.19	LINE	Average
10	0.2232	45.99	-16.71	62.70	35.79	10.01	0.19	LINE	QP
11	0.4770	35.37	-11.02	46.39	25.15	10.02	0.20	LINE	Average
12	0.4770	42.28	-14.11	56.39	32.06	10.02	0.20	LINE	QP

Temperature	22°C	Humidity	52%
Test Engineer	Hank Yang & Da Deng & Edison Lin	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1633	40.91	-14.39	55.30	30.74	10.00	0.17	NEUTRAL	Average
2	0.1633	53.64	-11.66	65.30	43.47	10.00	0.17	NEUTRAL	QP
3	0.1825	38.76	-15.61	54.37	28.56	10.01	0.19	NEUTRAL	Average
4	0.1825	52.54	-11.83	64.37	42.34	10.01	0.19	NEUTRAL	QP
5	0.2256	34.88	-17.73	52.61	24.68	10.01	0.19	NEUTRAL	Average
6	0.2256	46.18	-16.43	62.61	35.98	10.01	0.19	NEUTRAL	QP
7	0.2535	36.64	-15.00	51.64	26.44	10.01	0.19	NEUTRAL	Average
8	0.2535	44.97	-16.67	61.64	34.77	10.01	0.19	NEUTRAL	QP
9	0.4785	36.99	-9.37	46.36	26.78	10.01	0.20	NEUTRAL	Average
10	0.4785	43.29	-13.07	56.36	33.08	10.01	0.20	NEUTRAL	QP
11	0.7960	27.03	-18.97	46.00	16.81	10.03	0.19	NEUTRAL	Average
12	0.7960	33.83	-22.17	56.00	23.61	10.03	0.19	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.2.1. Limit

No restriction limits.

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

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

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

4.2.4. Test Setup Layout

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

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

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

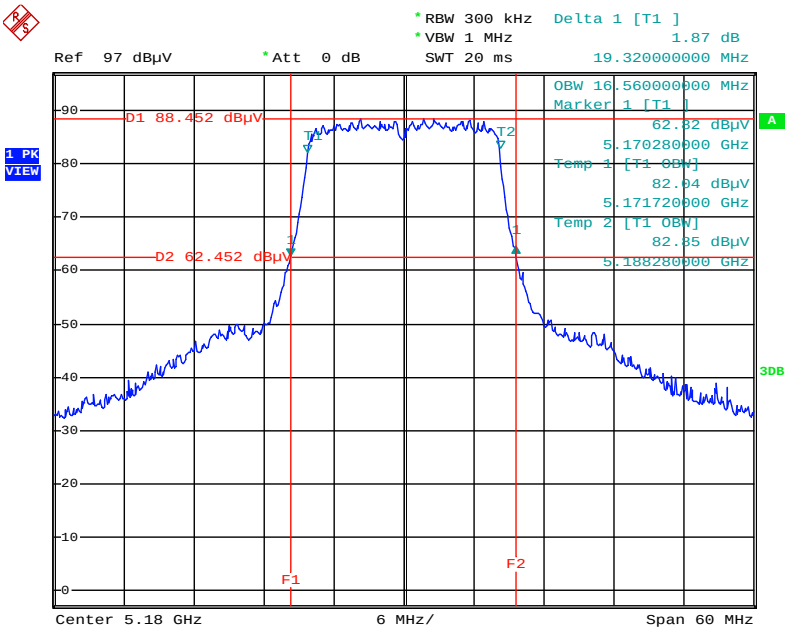
The EUT was programmed to be in continuously transmitting mode.

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

Temperature	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li		

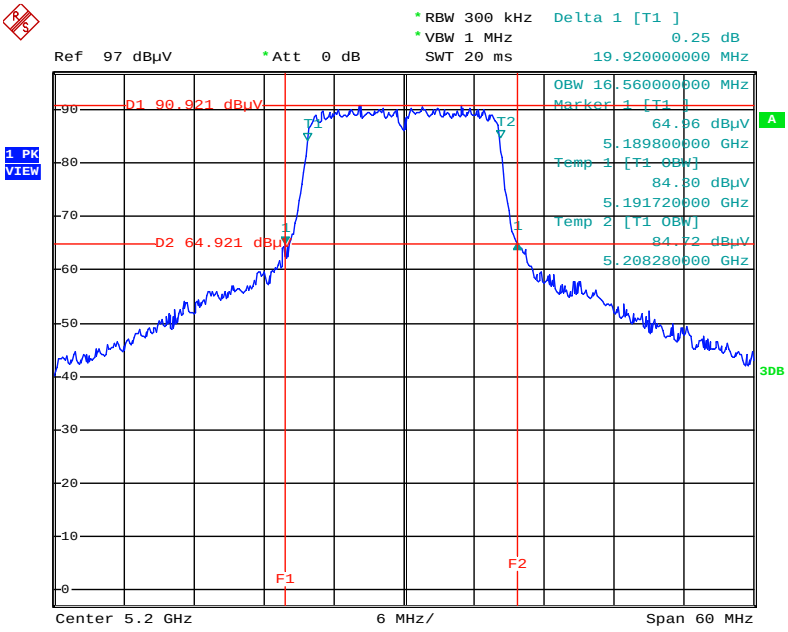
Mode	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5180 MHz	19.32	16.56
	5200 MHz	19.92	16.56
	5240 MHz	21.00	16.56
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.16	17.76
	5200 MHz	20.76	17.76
	5240 MHz	21.48	17.76
802.11ac MCS0/Nss1 VHT40	5190 MHz	40.60	36.20
	5230 MHz	41.40	36.40
802.11ac MCS0/Nss1 VHT80	5210 MHz	84.00	76.00

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 / 5180 MHz



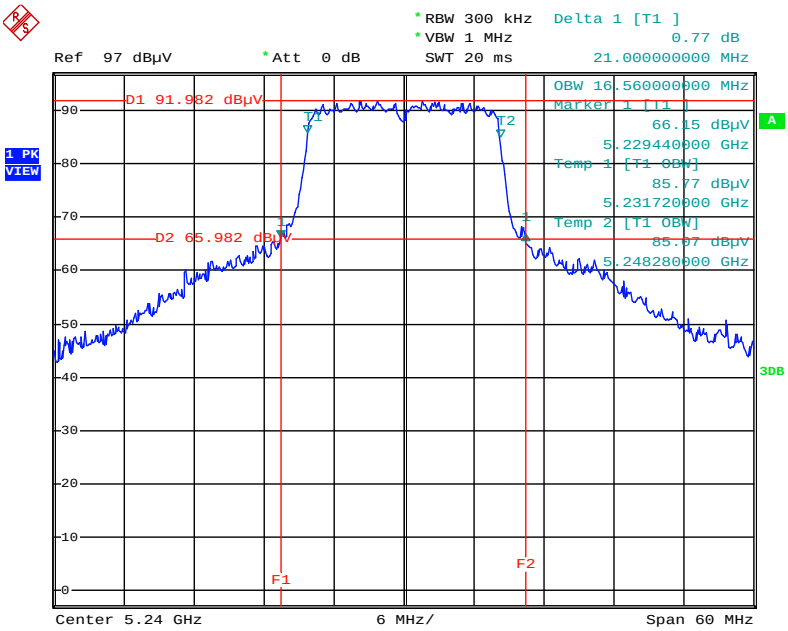
Date: 31.AUG.2015 16:37:07

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 / 5200 MHz



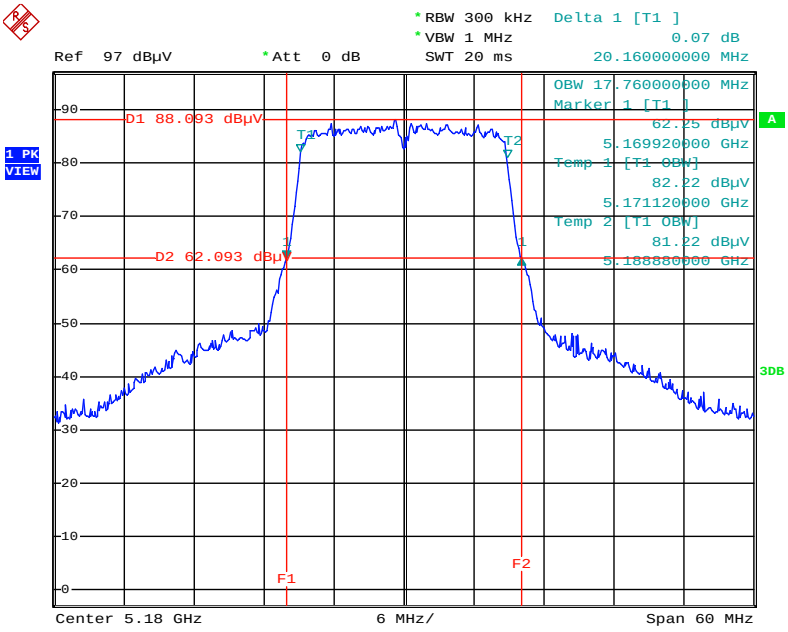
Date: 31.AUG.2015 16:37:46

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 / 5240 MHz



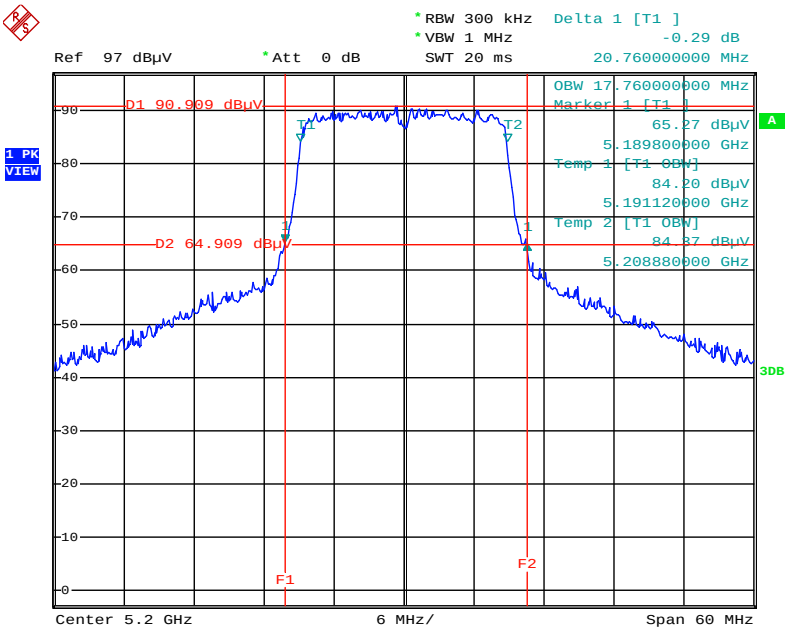
Date: 31.AUG.2015 16:38:18

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5180 MHz



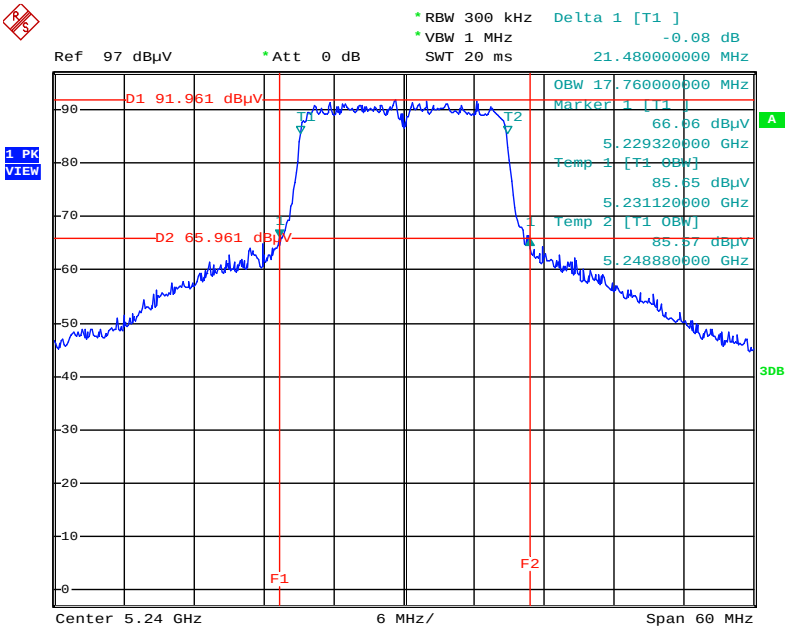
Date: 31.AUG.2015 16:42:57

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5200 MHz



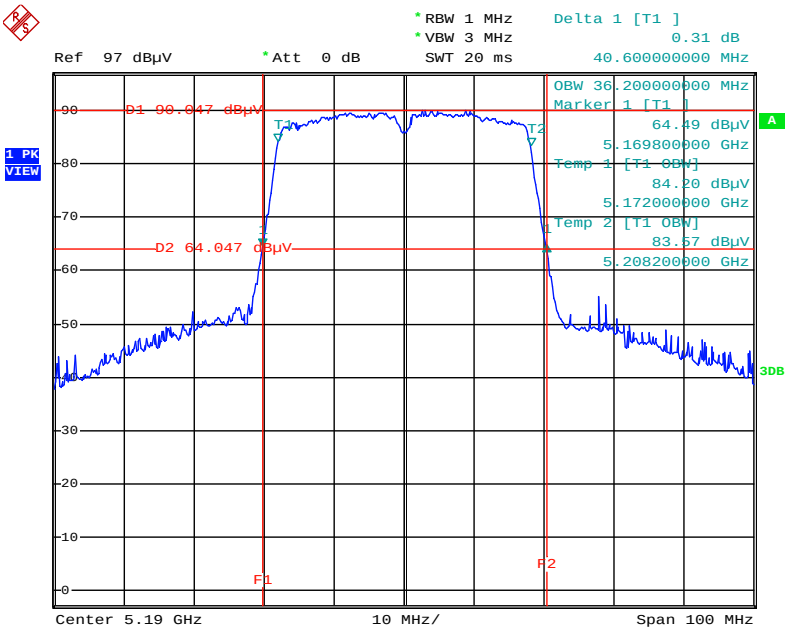
Date: 31.AUG.2015 16:43:40

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5240 MHz



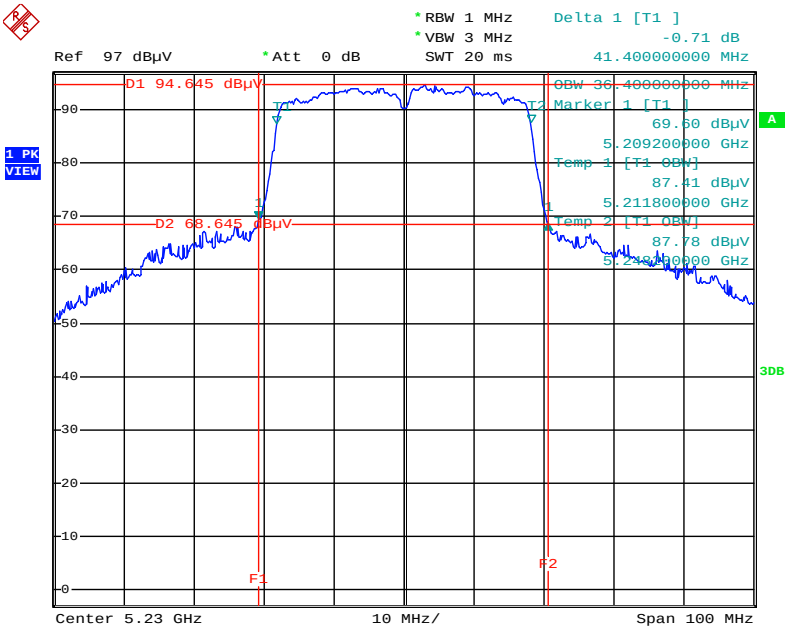
Date: 31.AUG.2015 16:44:11

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5190 MHz



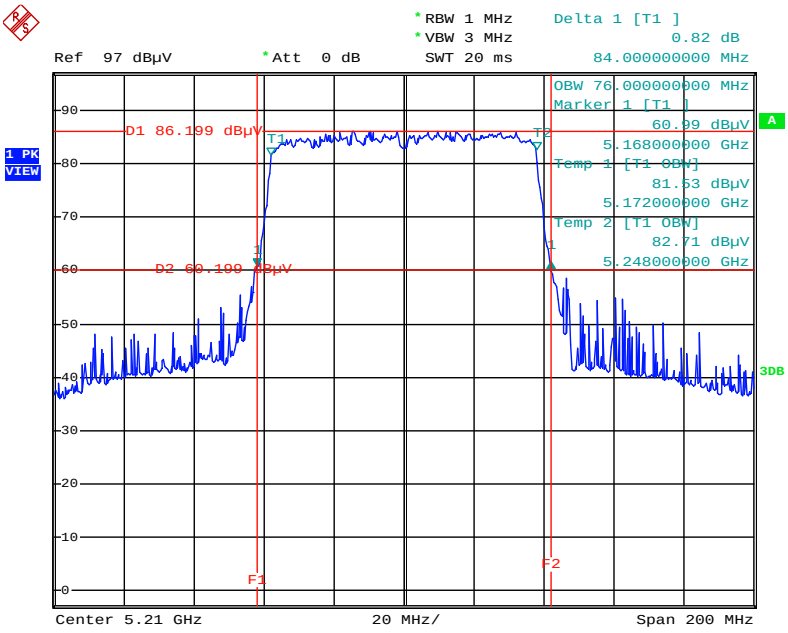
Date: 31.AUG.2015 16:44:53

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5230 MHz



Date: 31.AUG.2015 16:45:29

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5210 MHz



Date: 31.AUG.2015 16:46:07

4.3. Maximum Conducted Output Power Measurement

4.3.1. 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.
☐	Mobile and portable 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.

4.3.2. Measuring Instruments and Setting

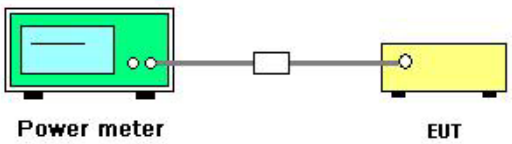
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems,add every result of the values by mathematic formula.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

Temperature	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li	Test Date	Aug. 19, 2015 ~ Aug. 31, 2015

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11a	5180 MHz	21.16	21.41	21.63	26.18	30.00	Complies
	5200 MHz	23.96	23.38	24.12	28.60	30.00	Complies
	5240 MHz	24.89	24.91	24.53	29.55	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	20.64	20.84	21.08	25.63	30.00	Complies
	5200 MHz	23.71	23.72	23.92	28.56	30.00	Complies
	5240 MHz	24.70	24.82	24.99	29.61	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	20.34	20.56	20.78	25.33	30.00	Complies
	5230 MHz	24.91	24.86	24.83	29.64	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	19.27	19.43	19.64	24.22	30.00	Complies

Note:

5GHz Band = $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.74dBi <6dBi, so the limit doesn't reduce.

4.4. Power Spectral Density Measurement

4.4.1. Limit

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

Frequency Band		Limit
5.15~5.25 GHz		
Operating Mode		
☐	Outdoor access point	17 dBm/MHz
☒	Indoor access point	17 dBm/MHz
☐	Fixed point-to-point access points	17 dBm/MHz
☐	Mobile and portable client devices	11 dBm/MHz

4.4.2. Measuring Instruments and Setting

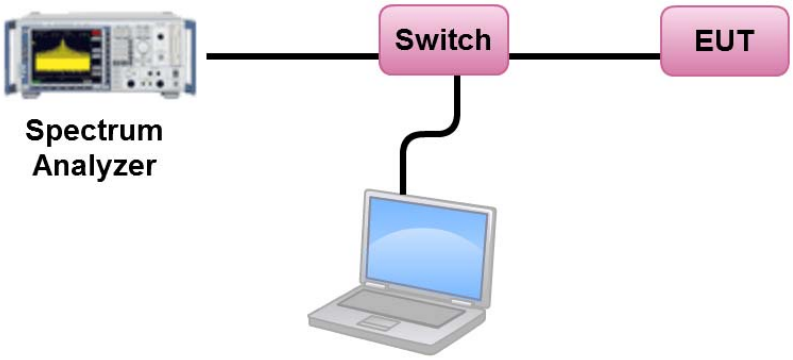
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1000 kHz
VBW	3000 kHz
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li	Test Date	Aug. 19, 2015 ~ Aug. 31, 2015

Mode	Frequency	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
802.11a	5180 MHz	13.02	17.00	Complies
	5200 MHz	15.46	17.00	Complies
	5240 MHz	16.43	17.00	Complies
802.11ac MCS0/Nss1 VHT20	5180 MHz	12.19	17.00	Complies
	5200 MHz	15.31	17.00	Complies
	5240 MHz	16.32	17.00	Complies
802.11ac MCS0/Nss1 VHT40	5190 MHz	9.09	17.00	Complies
	5230 MHz	13.21	17.00	Complies
802.11ac MCS0/Nss1 VHT80	5210 MHz	4.88	17.00	Complies

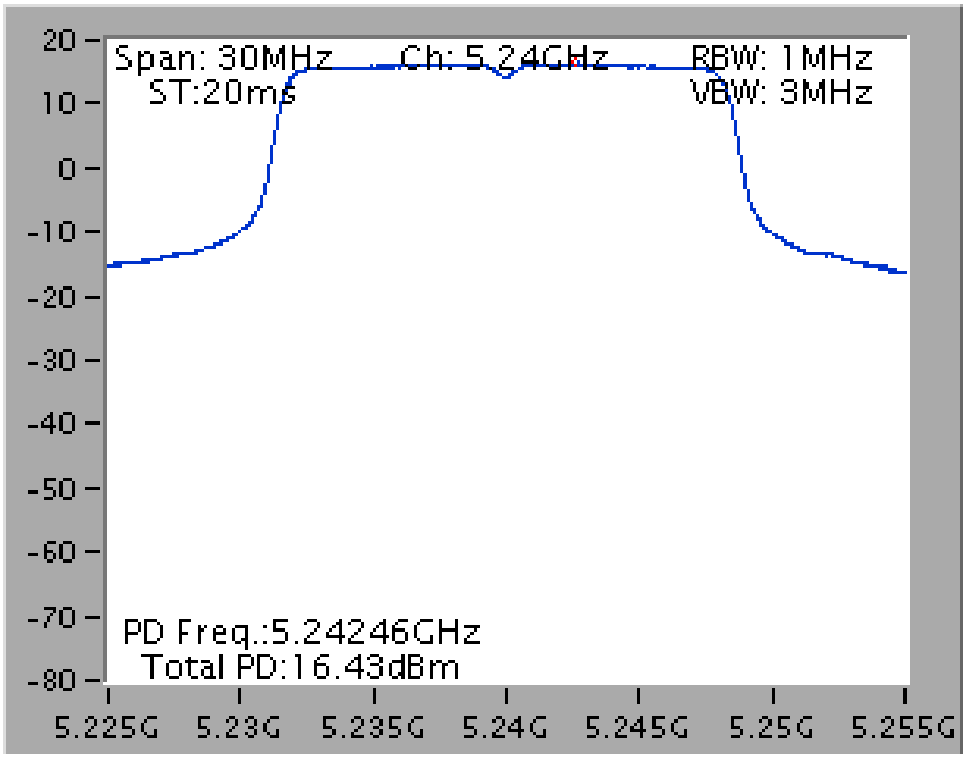
Note:

5GHz Band = $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.74dBi <6dBi, so the limit doesn't reduce.

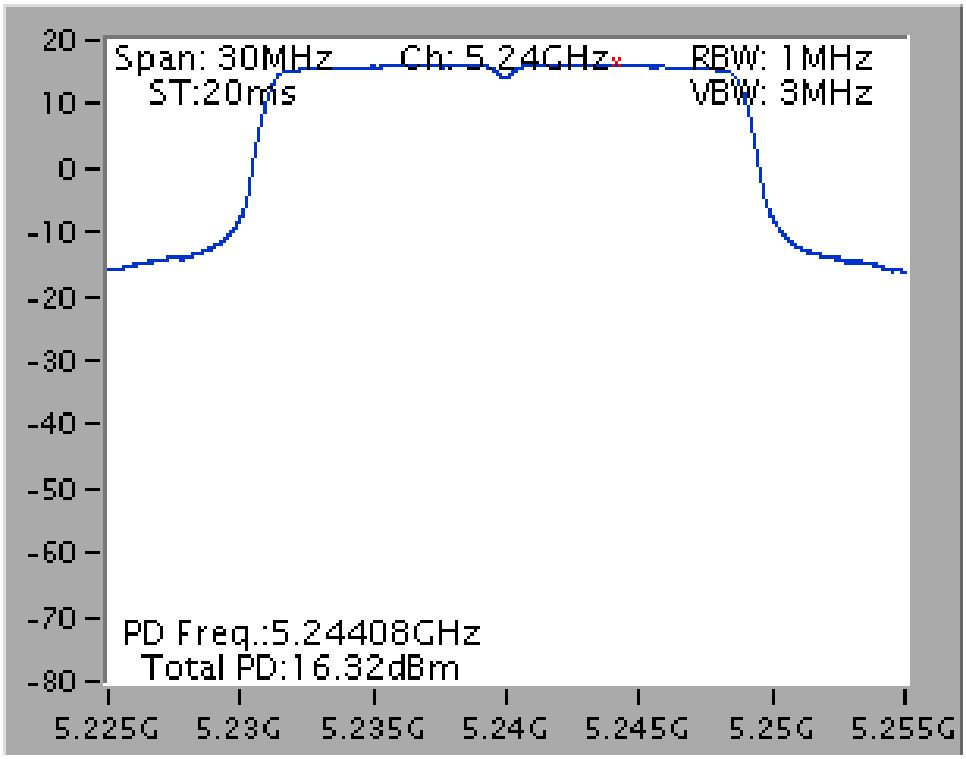
Note: All the test values were listed in the report.

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

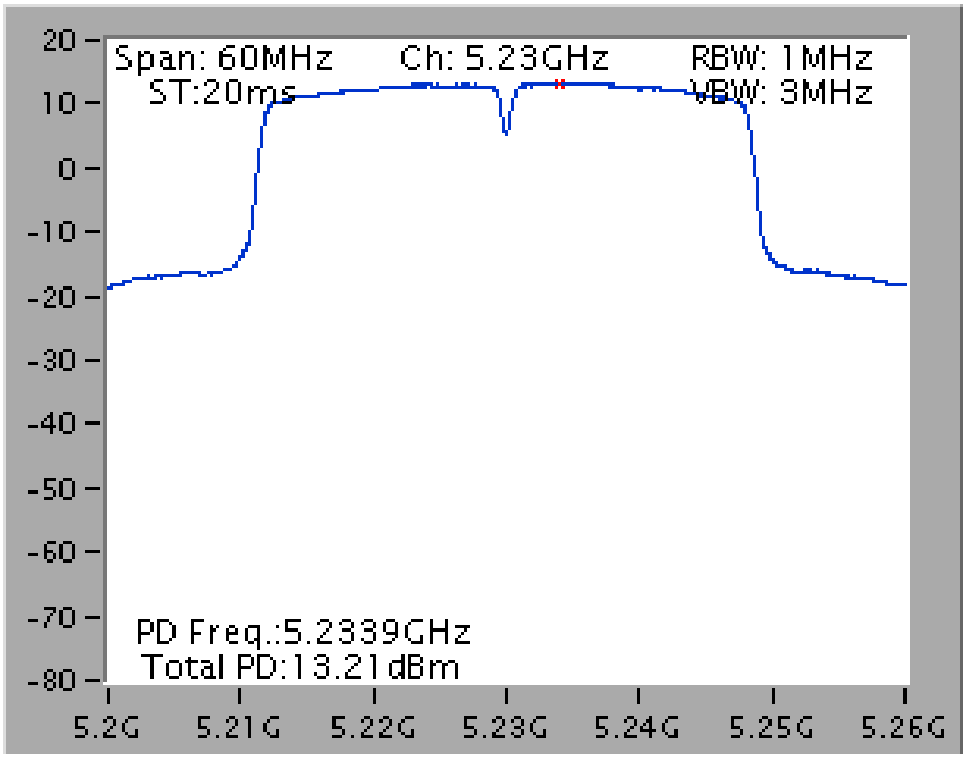
Power Density Plot on Configuration IEEE 802.11a / Ant. 1 + Ant. 2 + Ant. 3 / 5240 MHz



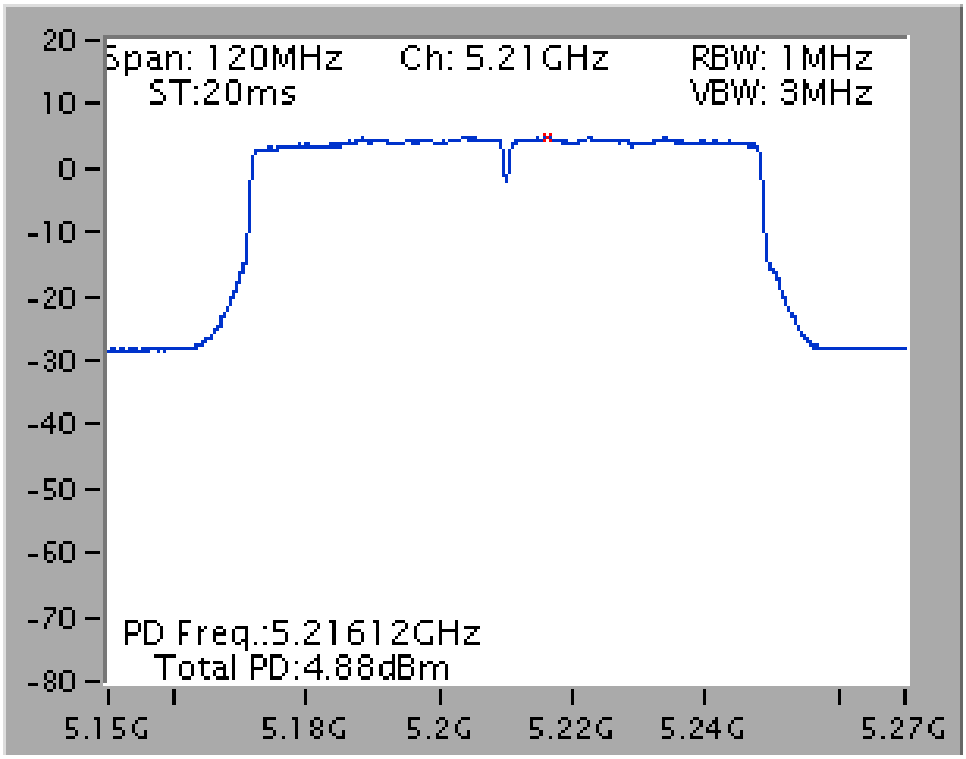
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Ant. 1 + Ant. 2 + Ant. 3 / 5240 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Ant. 1 + Ant. 2 + Ant. 3 / 5230 MHz



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Ant. 1 + Ant. 2 + Ant. 3 / 5210 MHz



4.5. Radiated Emissions Measurement

4.5.1. 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.

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

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

4.5.2. Measuring Instruments and Setting

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

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

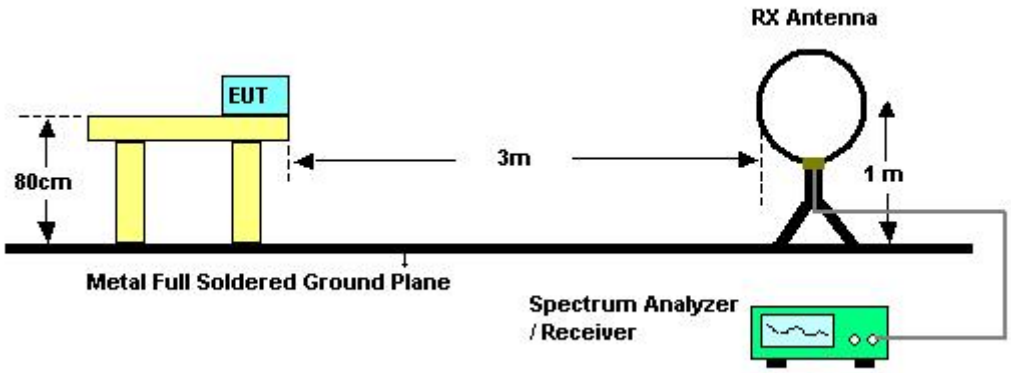
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

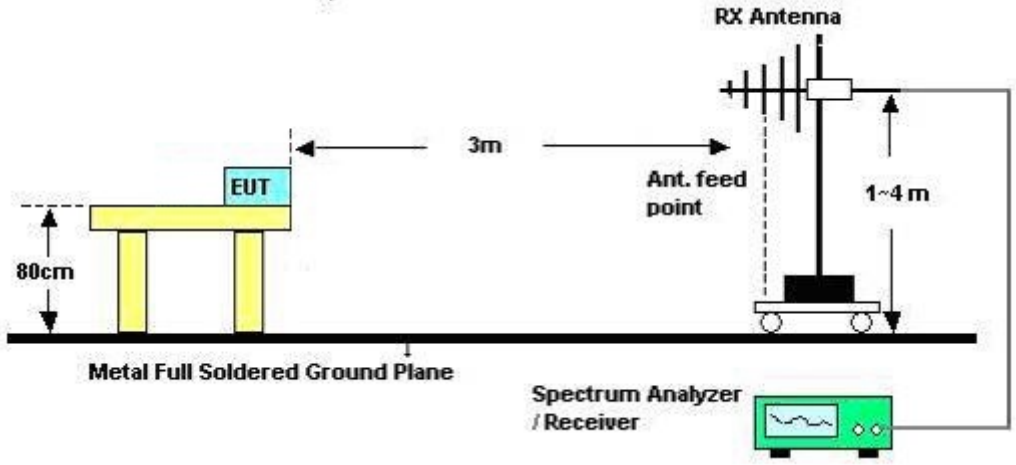
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting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

4.5.4. Test Setup Layout

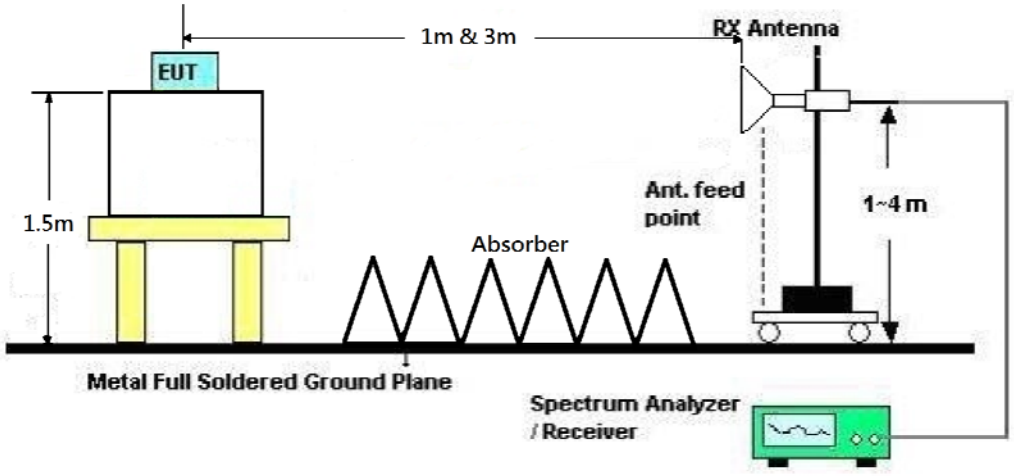
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	Normal Link
Test Date	Aug. 18, 2015	Test Mode	Mode 3

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

Note:

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

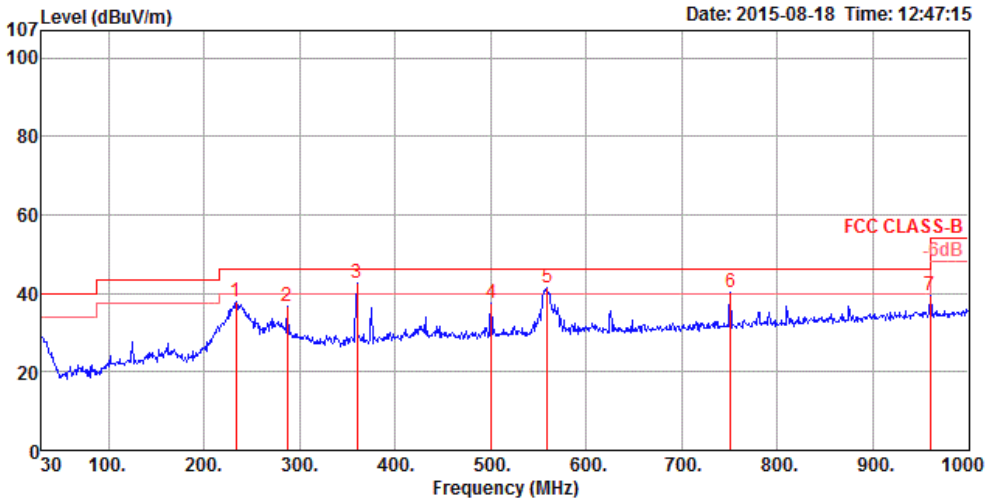
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

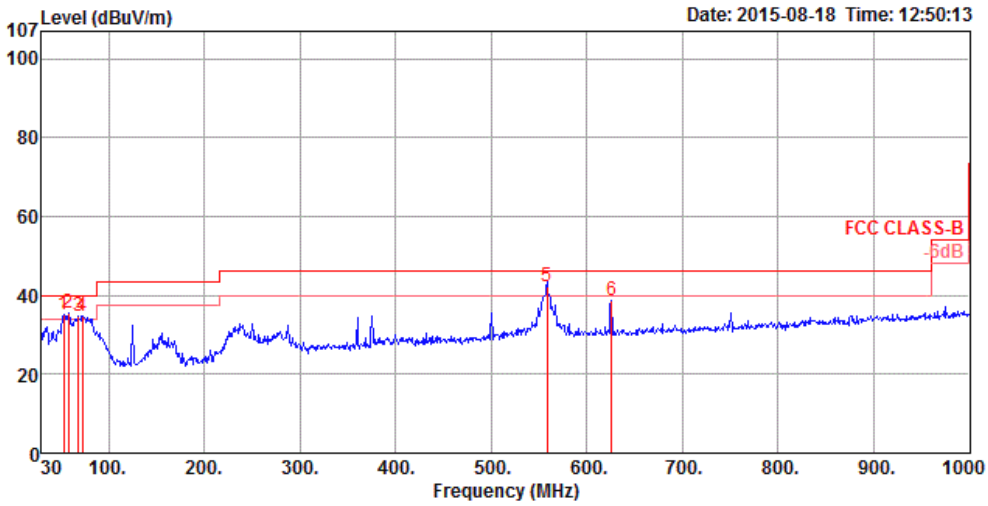
Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	Normal Link
Test Mode	Mode 3		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	233.70	37.75	46.00	-8.25	57.17	1.52	32.54	11.60	HORIZONTAL	150	231	Peak
2	287.05	36.90	46.00	-9.10	54.10	1.68	32.52	13.64	HORIZONTAL	150	38	Peak
3	359.80	42.71	46.00	-3.29	57.83	1.89	32.53	15.52	HORIZONTAL	100	111	QP
4	500.45	37.33	46.00	-8.67	49.90	2.21	32.61	17.83	HORIZONTAL	100	101	Peak
5	559.62	41.48	46.00	-4.52	53.14	2.33	32.66	18.67	HORIZONTAL	200	149	QP
6	750.71	40.21	46.00	-5.79	49.79	2.71	32.49	20.20	HORIZONTAL	150	105	QP
7	960.00	39.29	46.00	-6.71	45.55	3.08	31.30	21.96	HORIZONTAL	100	87	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	53.28	35.29	40.00	-4.71	58.92	0.75	32.62	8.24	VERTICAL	18	125	QP
2	58.13	35.51	40.00	-4.49	60.18	0.77	32.62	7.18	VERTICAL	29	150	QP
3	68.80	34.63	40.00	-5.37	59.59	0.84	32.60	6.80	VERTICAL	308	150	QP
4	72.68	34.70	40.00	-5.30	59.43	0.86	32.60	7.01	VERTICAL	216	150	QP
5	558.65	42.31	46.00	-3.69	53.97	2.33	32.66	18.67	VERTICAL	324	100	QP
6	625.58	38.54	46.00	-7.46	49.49	2.46	32.67	19.26	VERTICAL	127	100	Peak

Note:

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

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

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

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

Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 36 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	6908.50	59.34	68.20	-8.86	52.44	4.98	36.61	34.69	360	188	Peak	HORIZONTAL
2	15540.80	56.40	74.00	-17.60	45.30	7.56	38.16	34.62	105	188	Peak	HORIZONTAL
3	15541.69	43.53	54.00	-10.47	32.43	7.56	38.16	34.62	105	188	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	6906.65	61.36	68.20	-6.84	54.51	4.97	36.57	34.69	177	150	Peak	VERTICAL
2	15542.40	54.56	74.00	-19.44	43.46	7.56	38.16	34.62	48	162	Peak	VERTICAL
3	15542.40	43.57	54.00	-10.43	32.47	7.56	38.16	34.62	48	162	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 40 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 18, 2015		

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	6933.32	59.20	68.20	-9.00	52.26	4.98	36.65	34.69	259	169	Peak	HORIZONTAL
2	15601.90	55.87	74.00	-18.13	44.69	7.58	38.29	34.69	219	186	Peak	HORIZONTAL
3	15601.90	43.90	54.00	-10.10	32.72	7.58	38.29	34.69	219	186	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	7713.32	52.54	74.00	-21.46	44.75	5.25	37.41	34.87	152	167	Peak	VERTICAL
2	7713.32	46.45	54.00	-7.55	38.66	5.25	37.41	34.87	152	167	Average	VERTICAL
3	11568.80	51.21	74.00	-22.79	40.59	6.55	38.71	34.64	104	177	Peak	VERTICAL
4	11568.80	40.76	54.00	-13.24	30.14	6.55	38.71	34.64	104	177	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 48 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 18, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	6986.60	62.03	68.20	-6.17	53.26	6.82	36.70	34.75	165	264	HORIZONTAL	Average
2	15716.39	44.10	54.00	-9.90	31.47	10.09	38.29	35.75	165	149	HORIZONTAL	Average
3	15725.21	56.66	74.00	-17.34	44.03	10.09	38.29	35.75	165	149	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	6986.60	64.82	68.20	-3.38	56.05	6.82	36.70	34.75	238	178	VERTICAL	Peak
2	15720.75	43.38	54.00	-10.62	30.75	10.09	38.29	35.75	165	290	VERTICAL	Average
3	15723.53	56.27	74.00	-17.73	43.64	10.09	38.29	35.75	165	290	VERTICAL	Peak

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	6906.72	53.50	68.20	-14.70	46.65	4.97	36.57	34.69	63	188	Peak	HORIZONTAL
2	15545.68	54.56	74.00	-19.44	43.43	7.56	38.19	34.62	72	188	Peak	HORIZONTAL
3	15545.68	43.59	54.00	-10.41	32.46	7.56	38.19	34.62	72	188	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	6906.64	62.60	68.20	-5.60	55.75	4.97	36.57	34.69	178	155	Peak	VERTICAL
2	15545.68	54.20	74.00	-19.80	43.07	7.56	38.19	34.62	82	164	Peak	VERTICAL
3	15545.68	43.87	54.00	-10.13	32.74	7.56	38.19	34.62	82	164	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	6933.36	50.73	68.20	-17.47	43.79	4.98	36.65	34.69	135	156	Peak	HORIZONTAL
2	15607.60	54.36	74.00	-19.64	43.18	7.58	38.29	34.69	176	167	Peak	HORIZONTAL
3	15607.60	44.34	54.00	-9.66	33.16	7.58	38.29	34.69	176	167	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	6933.28	62.97	68.20	-5.23	56.03	4.98	36.65	34.69	200	211	Peak	VERTICAL
2	15590.00	54.67	74.00	-19.33	43.51	7.57	38.26	34.67	118	193	Peak	VERTICAL
3	15590.00	43.89	54.00	-10.11	32.73	7.57	38.26	34.67	118	193	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	6986.62	52.77	68.20	-15.43	45.71	5.01	36.76	34.71	255	173	Peak	HORIZONTAL
2	15718.97	54.31	74.00	-19.69	42.97	7.62	38.50	34.78	167	158	Peak	HORIZONTAL
3	15718.97	43.06	54.00	-10.94	31.72	7.62	38.50	34.78	167	158	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	6986.65	61.90	68.20	-6.30	54.84	5.01	36.76	34.71	176	172	Peak	VERTICAL
2	15718.97	54.26	74.00	-19.74	42.92	7.62	38.50	34.78	135	165	Peak	VERTICAL
3	15718.97	43.30	54.00	-10.70	31.96	7.62	38.50	34.78	135	165	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	15570.65	55.29	74.00	-18.71	44.14	7.57	38.22	34.64	226	148	Peak	HORIZONTAL
2	15570.65	43.20	54.00	-10.80	32.05	7.57	38.22	34.64	226	148	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	15570.65	55.42	74.00	-18.58	44.27	7.57	38.22	34.64	292	168	Peak	VERTICAL
2	15570.65	43.64	54.00	-10.36	32.49	7.57	38.22	34.64	292	168	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	15676.56	54.97	74.00	-19.03	43.71	7.60	38.41	34.75	267	105	Peak	HORIZONTAL
2	15676.56	43.84	54.00	-10.16	32.58	7.60	38.41	34.75	267	105	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	15670.32	54.49	74.00	-19.51	43.21	7.60	38.41	34.73	316	148	Peak	VERTICAL
2	15670.32	44.10	54.00	-9.90	32.82	7.60	38.41	34.73	316	148	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	15622.48	54.29	74.00	-19.71	43.07	7.59	38.32	34.69	244	150	Peak	HORIZONTAL
2	15622.48	43.82	54.00	-10.18	32.60	7.59	38.32	34.69	244	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	15626.72	54.70	74.00	-19.30	43.50	7.59	38.32	34.71	306	153	Peak	VERTICAL
2	15626.72	44.15	54.00	-9.85	32.95	7.59	38.32	34.71	306	153	Average	VERTICAL

Note:

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

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

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

4.6. Band Edge 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.

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

The test procedure is the same as section 4.5.3.

4.6.4. Test Setup Layout

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 36, 40, 48 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015 ~ Aug. 18, 2015		

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	70.47	74.00	-3.53	67.41	4.26	33.27	34.47	175	169	Peak	VERTICAL
2	5150.00	53.80	54.00	-0.20	50.74	4.26	33.27	34.47	175	169	Average	VERTICAL
3	5177.20	118.29			115.16	4.27	33.33	34.47	175	169	Peak	VERTICAL
4	5181.20	106.20			103.07	4.27	33.33	34.47	175	169	Average	VERTICAL

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

Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5146.80	67.83	74.00	-6.17	63.49	5.51	33.17	34.34	175	181	VERTICAL	Peak
2	5149.68	52.82	54.00	-1.18	48.48	5.51	33.17	34.34	175	181	VERTICAL	Average
3	5197.44	121.27			116.83	5.53	33.25	34.34	175	181	VERTICAL	Peak
4	5202.56	109.42			104.95	5.53	33.28	34.34	175	181	VERTICAL	Average

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

Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5119.81	49.43	54.00	-4.57	45.16	5.50	33.12	34.35	175	188	VERTICAL	Average
2	5140.48	58.93	74.00	-15.07	54.61	5.51	33.15	34.34	175	188	VERTICAL	Peak
3	5235.67	110.62			106.08	5.54	33.34	34.34	175	188	VERTICAL	Average
4	5236.15	121.47			116.93	5.54	33.34	34.34	175	188	VERTICAL	Peak

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

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 36, 40, 48 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	71.40	74.00	-2.60	68.34	4.26	33.27	34.47	206	192	Peak	VERTICAL
2	5150.00	53.70	54.00	-0.30	50.64	4.26	33.27	34.47	206	192	Average	VERTICAL
3	5177.60	106.08			102.95	4.27	33.33	34.47	206	192	Average	VERTICAL
4	5184.00	117.67			114.54	4.27	33.33	34.47	206	192	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	5150.00	67.67	74.00	-6.33	64.61	4.26	33.27	34.47	179	174	Peak	VERTICAL
2	5150.00	53.30	54.00	-0.70	50.24	4.26	33.27	34.47	179	174	Average	VERTICAL
3	5197.00	110.24			107.07	4.28	33.36	34.47	179	174	Average	VERTICAL
4	5197.60	122.00			118.83	4.28	33.36	34.47	179	174	Peak	VERTICAL

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	5120.00	52.59	54.00	-1.41	49.61	4.24	33.21	34.47	183	180	Average	VERTICAL
2	5150.00	60.74	74.00	-13.26	57.68	4.26	33.27	34.47	183	180	Peak	VERTICAL
3	5239.00	112.43			109.18	4.30	33.42	34.47	183	180	Average	VERTICAL
4	5242.00	124.39			121.11	4.30	33.45	34.47	183	180	Peak	VERTICAL
5	5350.00	49.52	54.00	-4.48	46.01	4.35	33.63	34.47	183	180	Average	VERTICAL
6	5352.00	60.63	74.00	-13.37	57.12	4.35	33.63	34.47	183	180	Peak	VERTICAL

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

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	5140.00	66.90	74.00	-7.10	63.84	4.26	33.27	34.47	216	211	Peak	VERTICAL
2	5150.00	53.20	54.00	-0.80	50.14	4.26	33.27	34.47	216	211	Average	VERTICAL
3	5183.20	114.92			111.79	4.27	33.33	34.47	216	211	Peak	VERTICAL
4	5191.20	103.29			100.12	4.28	33.36	34.47	216	211	Average	VERTICAL

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

Channel 46

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	5150.00	66.79	74.00	-7.21	63.73	4.26	33.27	34.47	259	184	Peak	VERTICAL
2	5150.00	52.83	54.00	-1.17	49.77	4.26	33.27	34.47	259	184	Average	VERTICAL
3	5225.20	121.46			118.21	4.30	33.42	34.47	259	184	Peak	VERTICAL
4	5231.20	109.92			106.67	4.30	33.42	34.47	259	184	Average	VERTICAL
5	5350.00	60.60	74.00	-13.40	57.09	4.35	33.63	34.47	259	184	Peak	VERTICAL
6	5350.00	51.45	54.00	-2.55	47.94	4.35	33.63	34.47	259	184	Average	VERTICAL

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

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

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	5144.00	68.10	74.00	-5.90	65.04	4.26	33.27	34.47	182	175	Peak	VERTICAL
2	5149.00	53.65	54.00	-0.35	50.59	4.26	33.27	34.47	182	175	Average	VERTICAL
3	5206.00	100.05			96.88	4.28	33.36	34.47	182	175	Average	VERTICAL
4	5225.00	109.33			106.08	4.30	33.42	34.47	182	175	Peak	VERTICAL

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

Note:

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

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

4.7. Frequency Stability Measurement

4.7.1. Limit

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

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

4.7.2. Measuring Instruments and Setting

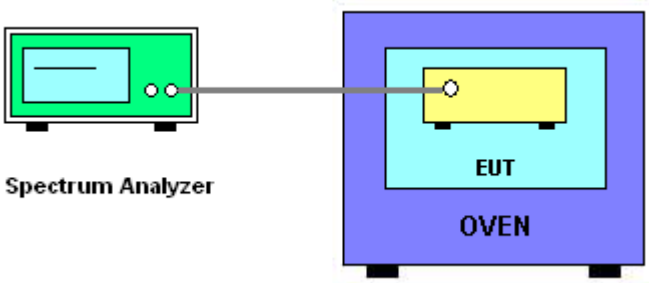
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.7.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is -20°C~50°C.

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

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

4.7.7. Test Result of Frequency Stability

Temperature	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li	Test Date	Aug. 19, 2015 ~ Aug. 31, 2015

Mode: 20 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5199.9792	5199.9784	5199.9782	5199.9778
110.00	5199.9856	5199.9826	5199.9808	5199.9790
93.50	5199.9796	5199.9788	5199.9784	5199.9780
Max. Deviation (MHz)	0.0208	0.0216	0.0218	0.0222
Max. Deviation (ppm)	4.00	4.15	4.19	4.27
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5200 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5199.9888	5199.9862	5199.9838	5199.9831
-10	5199.9876	5199.9856	5199.9834	5199.9824
0	5199.9864	5199.9844	5199.9828	5199.9816
10	5199.9858	5199.9832	5199.9816	5199.9805
20	5199.9856	5199.9826	5199.9808	5199.9790
30	5199.9842	5199.9814	5199.9804	5199.9778
40	5199.9836	5199.9808	5199.9779	5199.9774
50	5199.9832	5199.9800	5199.9777	5199.9772
Max. Deviation (MHz)	0.0168	0.0200	0.0223	0.0228
Max. Deviation (ppm)	3.23	3.85	4.29	4.38
Result	Complies			

Mode: 40 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5189.9792	5189.9784	5189.9782	5189.9778
110.00	5189.9856	5189.9826	5189.9808	5189.9790
93.50	5189.9796	5189.9788	5189.9784	5189.9780
Max. Deviation (MHz)	0.0208	0.0216	0.0218	0.0222
Max. Deviation (ppm)	4.01	4.16	4.20	4.28
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5190 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5189.9888	5189.9862	5189.9838	5189.9831
-10	5189.9876	5189.9856	5189.9834	5189.9824
0	5189.9864	5189.9844	5189.9828	5189.9816
10	5189.9858	5189.9832	5189.9816	5189.9805
20	5189.9856	5189.9826	5189.9808	5189.9790
30	5189.9842	5189.9814	5189.9804	5189.9778
40	5189.9836	5189.9808	5189.9779	5189.9774
50	5189.9832	5189.9800	5189.9777	5189.9772
Max. Deviation (MHz)	0.0168	0.0200	0.0223	0.0228
Max. Deviation (ppm)	3.24	3.85	4.30	4.39
Result	Complies			

Mode: 80 MHz / Ant. 3

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)			
(V)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
126.50	5209.9792	5209.9784	5209.9782	5209.9778
110.00	5209.9856	5209.9826	5209.9808	5209.9790
93.50	5209.9796	5209.9788	5209.9784	5209.9780
Max. Deviation (MHz)	0.0208	0.0216	0.0218	0.0222
Max. Deviation (ppm)	3.99	4.15	4.18	4.26
Result	Complies			

Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)			
(°C)	5210 MHz			
	0 Minute	2 Minute	5 Minute	10 Minute
-20	5209.9888	5209.9862	5209.9838	5209.9831
-10	5209.9876	5209.9856	5209.9834	5209.9824
0	5209.9864	5209.9844	5209.9828	5209.9816
10	5209.9858	5209.9832	5209.9816	5209.9805
20	5209.9856	5209.9826	5209.9808	5209.9790
30	5209.9842	5209.9814	5209.9804	5209.9778
40	5209.9836	5209.9808	5209.9779	5209.9774
50	5209.9832	5209.9800	5209.9777	5209.9772
Max. Deviation (MHz)	0.0168	0.0200	0.0223	0.0228
Max. Deviation (ppm)	3.22	3.84	4.28	4.38
Result	Complies			

4.8. Antenna Requirements

4.8.1. Limit

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

4.8.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	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	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100979	9kHz~40GHz	Dec. 12, 2014	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-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)

RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	Conducted (TH01-CB)

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

"*" Calibration Interval of instruments listed above is two years.

NCR 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%