



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	<b>Aerohive Networks, Inc.</b>
Applicant Address	330 Gibraltar Drive, Sunnyvale, CA 94089
FCC ID	<b>WBV-AP3X0</b>
Manufacturer's company	<b>Accton Technology Corporation</b>
Manufacturer Address	1, Creation Road 3, Hsinchu Science Park , Hsinchu 30077 , Taiwan , R.O.C

Product Name	Access Point
Brand Name	Aerohive
Model No.	AP370 / AP390
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250MHz
Received Date	Jun. 20, 2013
Final Test Date	Jul. 28, 2013
Submission Type	Original Equipment
Operating Mode	Master

### Statement

**Test result included is for the IEEE 802.11n and IEEE 802.11a/ac (5150 ~ 5250MHz) 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 C63.10-2009**,

**47 CFR FCC Part 15 Subpart E, KDB 789033 D01 v01r03 and KDB 662911 D01 v02.**

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



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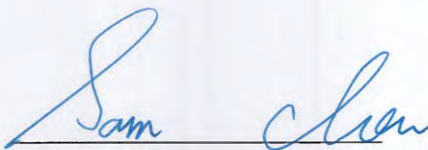
## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR362046AB	Rev. 01	Initial issue of report	Aug. 15, 2013

## 1. CERTIFICATE OF COMPLIANCE

**Product Name :** Access Point  
**Brand Name :** Aerohive  
**Model No. :** AP370 / AP390  
**Applicant :** Aerohive 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 Jun. 20, 2013 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	4.33 dB
4.2	15.407(a)	26dB Spectrum Bandwidth & 99% Occupied Bandwidth	Complies	-
4.3	15.407(a)	Maximum Conducted Output Power	Complies	0.02 dB
4.4	15.407(a)	Power Spectral Density	Complies	0.02 dB
4.5	15.407(a)	Peak Excursion	Complies	1.59 dB
4.6	15.407(b)	Radiated Emissions	Complies	3.03 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.10 dB
4.8	15.407(g)	Frequency Stability	Complies	-
4.9	15.203	Antenna Requirements	Complies	-

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n/ac

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or PoE
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	5150 ~ 5250MHz
Channel Number	4 for 20MHz bandwidth ; 2 for 40MHz bandwidth 1 for 80MHz bandwidth
Channel Band Width (99%)	Mode 1 (EUT 1): 802.11ac MCS0, Nss1 (20MHz): 19.68 MHz ; 802.11ac MCS0, Nss1 (40MHz): 37.12 MHz ; 802.11ac MCS0, Nss1 (80MHz): 77.04 MHz Mode 2 (EUT 2): 802.11ac MCS0, Nss1 (20MHz): 18.08 MHz ; 802.11ac MCS0, Nss1 (40MHz): 36.48 MHz ; 802.11ac MCS0, Nss1 (80MHz): 75.52 MHz
Maximum Conducted Output Power	Mode 1 (EUT 1): 802.11ac MCS0, Nss1 (20MHz): 13.86 dBm ; 802.11ac MCS0, Nss1 (40MHz): 16.90 dBm ; 802.11ac MCS0, Nss1 (80MHz): 16.98 dBm Mode 2 (EUT 2): 802.11ac MCS0, Nss1 (20MHz): 15.39 dBm ; 802.11ac MCS0, Nss1 (40MHz): 16.88 dBm ; 802.11ac MCS0, Nss1 (80MHz): 16.85 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

### IEEE 802.11a

Items	Description
Product Type	WLAN (1TX, 1RX) ; WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or PoE
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5250MHz
Channel Number	4
Channel Band Width (99%)	Mode 1 (EUT 1) / 1TX: 17.12 MHz Mode 1 (EUT 1) / 3TX: 17.28 MHz Mode 2 (EUT 2) / 1TX: 17.28 MHz Mode 2 (EUT 2) / 3TX: 17.12 MHz
Maximum Conducted Output Power	Mode 1 (EUT 1) / 1TX: 16.71 dBm Mode 1 (EUT 1) / 3TX: 13.94 dBm Mode 2 (EUT 2) / 1TX: 16.61 dBm Mode 2 (EUT 2) / 3TX: 14.91 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

### Antenna & Band width

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

### IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9, Nss1-3
802.11ac (VHT40)	3	MCS 0-9, Nss1-3
802.11ac (VHT80)	3	MCS 0-9, Nss1-3
<p>Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40.</p> <p>Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT support VHT20, VHT40 and VHT80.</p> <p>Note 3: Modulation modes consist of below configuration:  11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac</p>		

### 3.2. Accessories

Power	Brand Holder	Model No.	Rating	Remark
Adapter	Powertron Electronics Corp.	PA1024-2HU	INPUT:100-240V~50-60Hz 0.6A OUTPUT:12V 2.0A, 24W Max	With a Core



### 3.3. Table for Filed Antenna

For EUT 1 (Model No. AP370)

Ant.	Brand	Model No.	Type	Connector	True Gain (dBi)	
					2.4GHz	5GHz
1	Accton	AC-02-PB002-004	PIFA	I-PEX	4.42	-
2	Accton	AC-02-PB002-005	PIFA	I-PEX	4.42	-
3	Accton	AC-02-PB002-006	PIFA	I-PEX	4.42	-
4	Accton	AC-02-PB001-004	PIFA	I-PEX	-	4.54
5	Accton	AC-02-PB001-005	PIFA	I-PEX	-	4.54
6	Accton	AC-02-PB001-006	PIFA	I-PEX	-	4.54

Note: Chain 1: Connect to Ant. 1, Chain 2: Connect to Ant. 2, Chain 3: Connect to Ant. 3,  
Chain 4: Connect to Ant. 4, Chain 5: Connect to Ant. 5, Chain 6: Connect to Ant. 6.

For EUT 2 (Model No. AP390)

Ant.	Brand	Model No.	Type	Connector	Gain (dBi)		Cable loss		True Gain (dBi)	
					2.4GHz	5GHz	2.4GHz	5GHz	2.4GHz	5GHz
1	Master Wave	98152MRSX007	Dipole	I-PEX	4	-	0.4	-	3.6	-
2	Master Wave	98152URSX002	Dipole	I-PEX	-	4	-	0.7	-	3.3

Note: Chain 1~ Chain 3: Connect to Ant. 1, Chain 4~ Chain 6: Connect to Ant. 2.

<For 2.4GHz Band:>

**For IEEE 802.11b/g mode (1TX, 1RX):**

Only Chain 1 could transmit/receive simultaneously.

**For IEEE 802.11b/g mode (3TX, 3RX):**

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

**For IEEE 802.11n mode (3TX, 3RX):**

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

<For 5GHz Band:>

For IEEE 802.11a mode (1TX, 1RX):

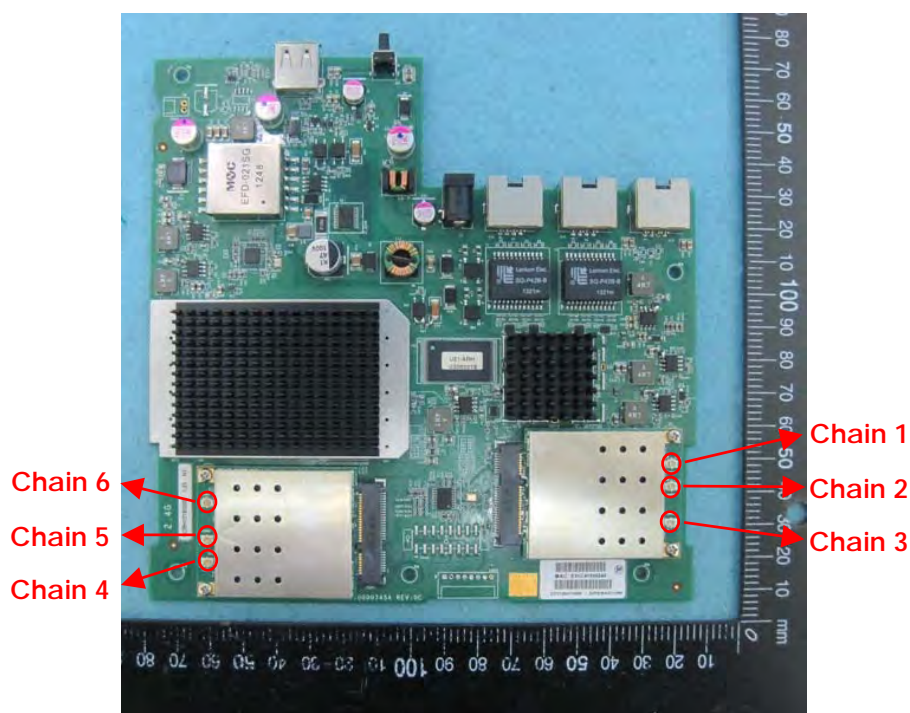
Only Chain 4 could transmit/receive simultaneously.

For IEEE 802.11a mode (3TX, 3RX):

Chain 4, Chain 5 and Chain 6 could transmit/receive simultaneously.

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

Chain 4, Chain 5 and Chain 6 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	Chain
AC Power Conducted Emission	Normal Link		-	-	-
Max. Conducted Output Power	11ac 20MHz	Band 1	MCS0, Nss1	36/40/48	4+5+6
	11ac 40MHz	Band 1	MCS0, Nss1	38/46	4+5+6
	11ac 80MHz	Band 1	MCS0, Nss1	42	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4 4+5+6
Power Spectral Density	11ac 20MHz	Band 1	MCS0, Nss1	36/40/48	4+5+6
	11ac 40MHz	Band 1	MCS0, Nss1	38/46	4+5+6
	11ac 80MHz	Band 1	MCS0, Nss1	42	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4 4+5+6
26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement	11ac 20MHz	Band 1	MCS0, Nss1	36/40/48	4+5+6
	11ac 40MHz	Band 1	MCS0, Nss1	38/46	4+5+6
	11ac 80MHz	Band 1	MCS0, Nss1	42	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4 4+5+6
Peak Excursion	11ac 20MHz	Band 1	MCS0, Nss1	Mode 1 (EUT 1):36	4+5+6
				Mode 2 (EUT 2):36	
	11ac 40MHz	Band 1	MCS0, Nss1	Mode 1 (EUT 1):46	4+5+6
				Mode 2 (EUT 2):46	
	11ac 80MHz	Band 1	MCS0, Nss1	Mode 1 (EUT 1):42	4+5+6
				Mode 2 (EUT 2):42	
	11a/BPSK	Band 1	6Mbps	Mode 1 (EUT 1) 1TX:36 , 3TX:48	4 4+5+6
				Mode 2 (EUT 2) 1TX:36, 3TX:40	
Radiated Emission Below 1GHz	Normal Link		-	-	-

Radiated Emission Above 1GHz	11ac 20MHz	Band 1	MCS0, Nss1	36/40/48	4+5+6
	11ac 40MHz	Band 1	MCS0, Nss1	38/46	4+5+6
	11ac 80MHz	Band 1	MCS0, Nss1	42	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4 4+5+6
Band Edge Emission	11ac 20MHz	Band 1	MCS0, Nss1	36/40/48	4+5+6
	11ac 40MHz	Band 1	MCS0, Nss1	38/46	4+5+6
	11ac 80MHz	Band 1	MCS0, Nss1	42	4+5+6
	11a/BPSK	Band 1	6Mbps	36/40/48	4 4+5+6
Frequency Stability	Un-modulation		-	40	N/A

The following test modes were performed for all tests:

**For AC Power Line Conducted Emissions test:**

Mode 1. EUT 1+Adapter

Mode 2. EUT 1+PoE

Mode 3. EUT 2+Adapter

Mode 4. EUT 2+PoE

Mode 1 and Mode 3 are the worst case, so it was selected to record in this test report.

**For Radiated Emission below 1GHz test:**

Mode 1. EUT 1 put vertically+Adapter

Mode 2. EUT 1 put horizontally+Adapter

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

Mode 3. EUT 1 put vertically+PoE

Mode 4. EUT 2 put vertically+Adapter

Mode 5. EUT 2 put horizontally+Adapter

Mode 4 has been evaluated to be the worst case among Mode 4~5, thus measurement for Mode 6 will follow this same test mode.

Mode 6. EUT 2 put vertically+PoE

Mode 3 and Mode 6 are worst test result among Mode 1~6, and the test result of those modes are selected to record in this test report.

**For Radiated Emissions above 1GHz test:**

Mode 1. EUT 1 put vertically

Mode 2. EUT 1 put horizontally

Mode 3. EUT 2 put vertically

Mode 4. EUT 2 put horizontally

Mode 1 and Mode 3 are the worst case, so it was selected to record in this test report.

**For Others test:**

Mode 1. EUT 1

Mode 2. EUT 2

**For Co-location test:**

The mode "EUT 1 put vertically+PoE" and "EUT 2 put vertically+PoE" has been evaluated to be the worst case for Radiated emission above 1GHz test.

Consequently, measurement for Co-location test will follow this same test modes.

Mode 1. EUT 1 put vertically+PoE

Mode 2. EUT 2 put vertically+PoE

All the test result were recorded in the report.

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

### 3.6. Table for Testing Locations

Test Site 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).

Please refer section 6 for Test Site Address.

### 3.7. Table for Multiple Listing

The model numbers in the following table are all refer to the identical product.

Model No.	Antenna Type	Remark
AP370	PIFA Antenna	EUT 1
AP390	Dipole Antenna	EUT 2

### 3.8. Table for Supporting Units

For AC Power Line Conducted Emissions, Radiated Emission below 1GHz and Co-location tests:

Support Unit	Brand	Model	FCC ID
NB	DELL	E6220	QDS-BRCM1049LE
NB	DELL	E6220	QDS-BRCM1049LE
NB	DELL	E6220	QDS-BRCM1049LE
Flash Disk 3.0	ADATA	C103	DoC
PoE	Powerdsine	PD-3501G/AC	N/A

For Others tests:

Support Unit	Brand	Model	FCC ID
NB	DELL	E6220	QDS-BRCM1049LE

### 3.9. Table for Parameters of Test Software Setting

During testing, Channel & 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 Mode: Mode 1 (EUT 1)

##### Power Parameters of IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3		
Frequency	5180 MHz	5200 MHz	5240 MHz
MCS0, Nss1 20MHz	8.5	8.5	8.5

##### Power Parameters of IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3	
Frequency	5190 MHz	5230 MHz
MCS0, Nss1 40MHz	11.5	11.5

##### Power Parameters of IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3
Frequency	5210 MHz
MCS0, Nss1 80MHz	12

##### Power Parameters of IEEE 802.11a / Chain 4

Test Software Version	ART2 Version 2.3		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	16	16	16

##### Power Parameters of IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	8.5	8	8

Test Mode: Mode 2 (EUT 2)

Power Parameters of IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3		
Frequency	5180 MHz	5200 MHz	5240 MHz
MCS0, Nss1 20MHz	10	10	10

Power Parameters of IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3	
Frequency	5190 MHz	5230 MHz
MCS0, Nss1 40MHz	11.5	11.5

Power Parameters of IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3	
Frequency	5210 MHz	
MCS0, Nss1 80MHz	12	

Power Parameters of IEEE 802.11a / Chain 4

Test Software Version	ART2 Version 2.3		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	15.5	15.5	15.5

Power Parameters of IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Test Software Version	ART2 Version 2.3		
Frequency	5180 MHz	5200 MHz	5240 MHz
IEEE 802.11a	9.5	9.5	9.5

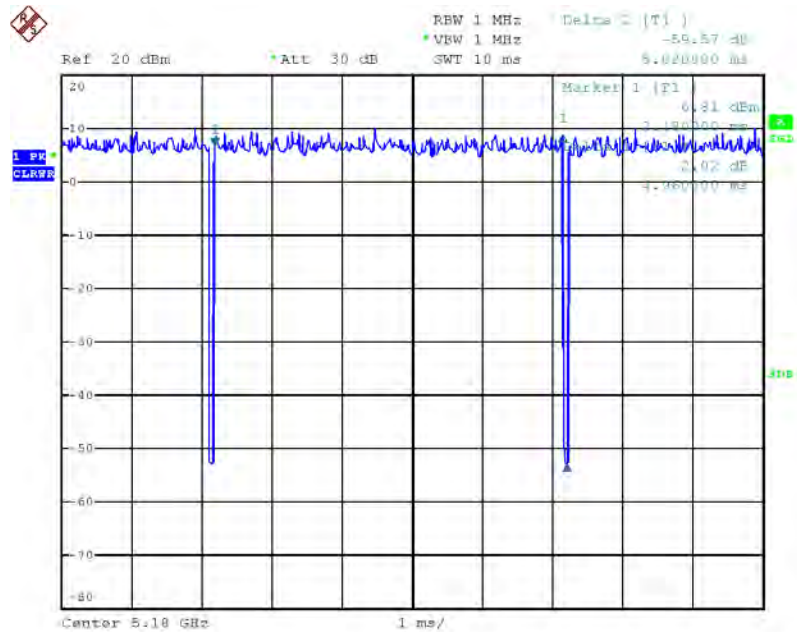
### 3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



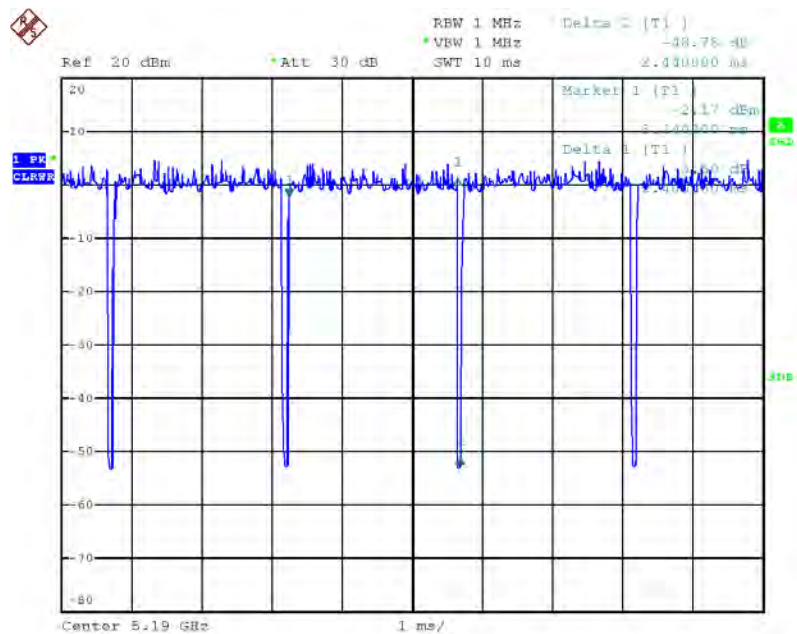
### 3.11. Duty Cycle

IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 1 (EUT 1)



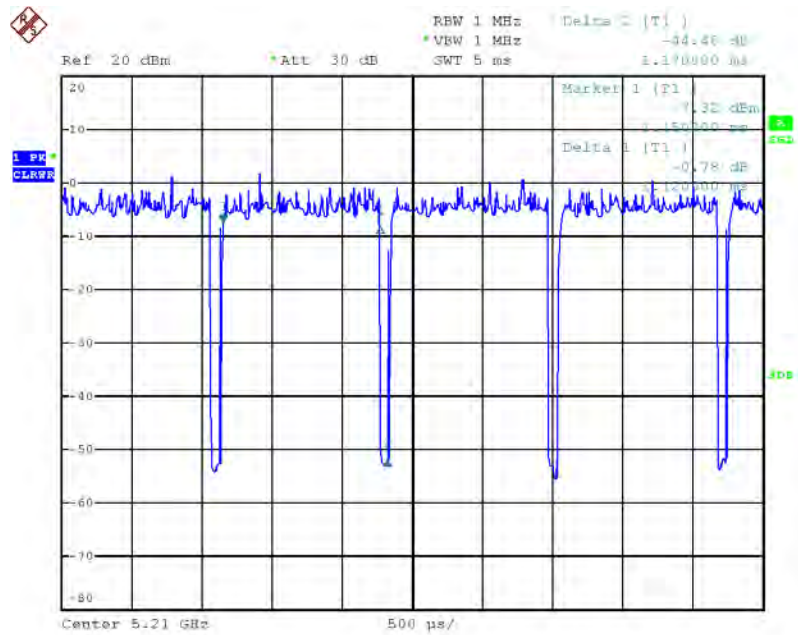
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IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 1 (EUT 1)



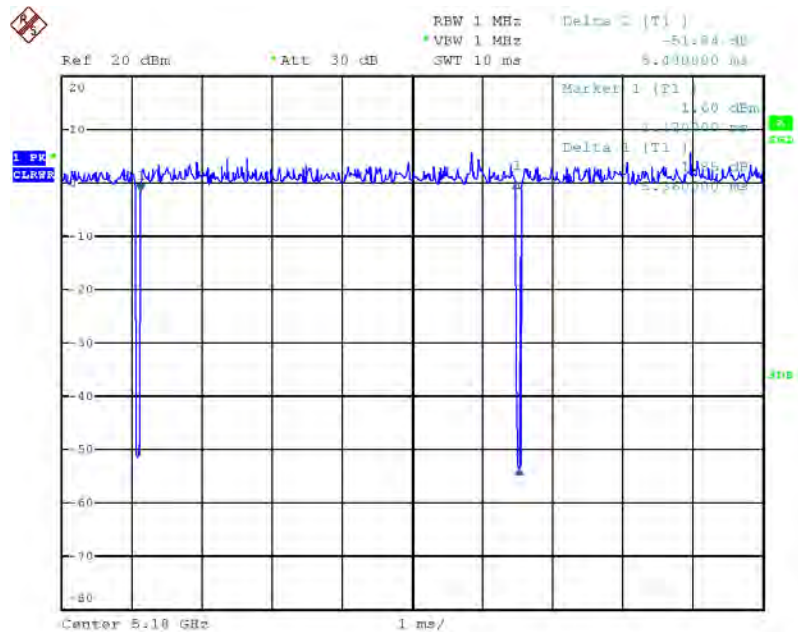
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# IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 1 (EUT 1)



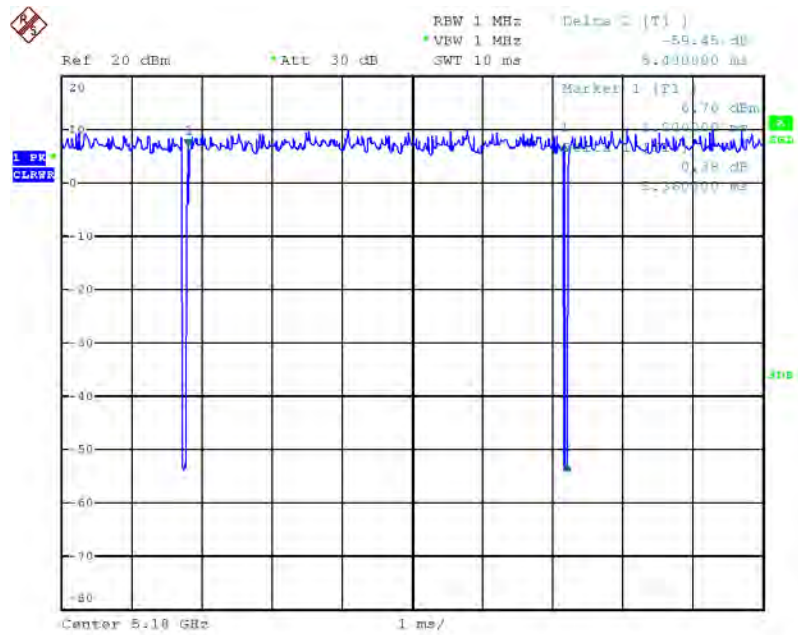
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# IEEE 802.11a / Chain 4 / Test Mode: Mode 1 (EUT 1)



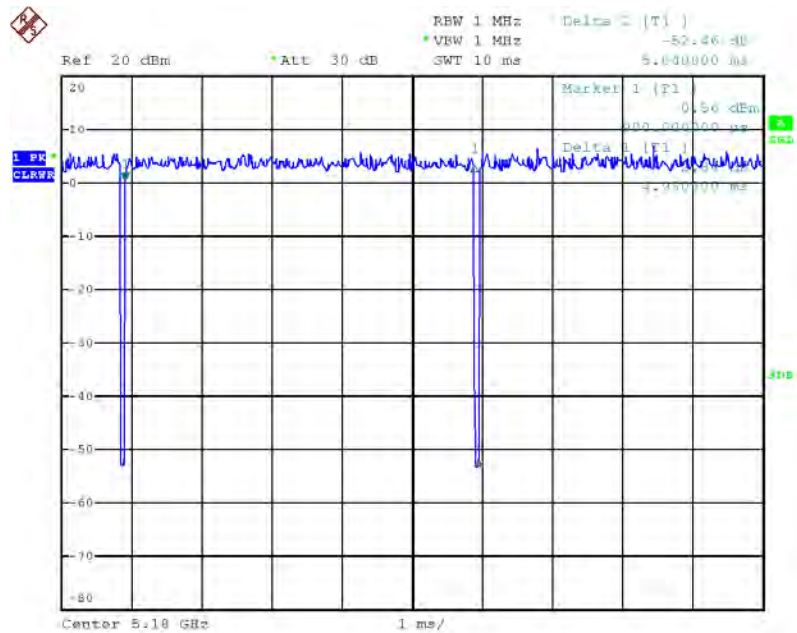
Date: 26.JUL.2013 13:56:06

# IEEE 802.11a / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 1 (EUT 1)



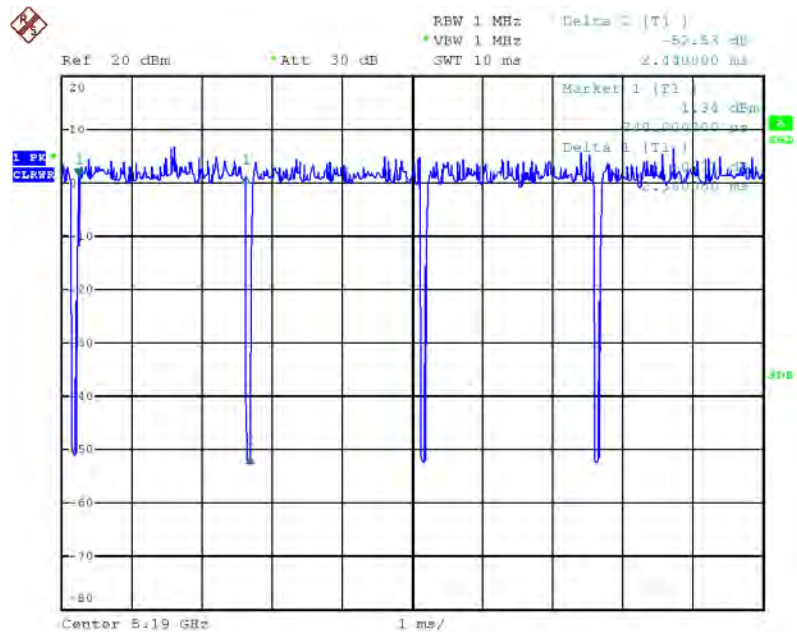
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# IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 2 (EUT 2)



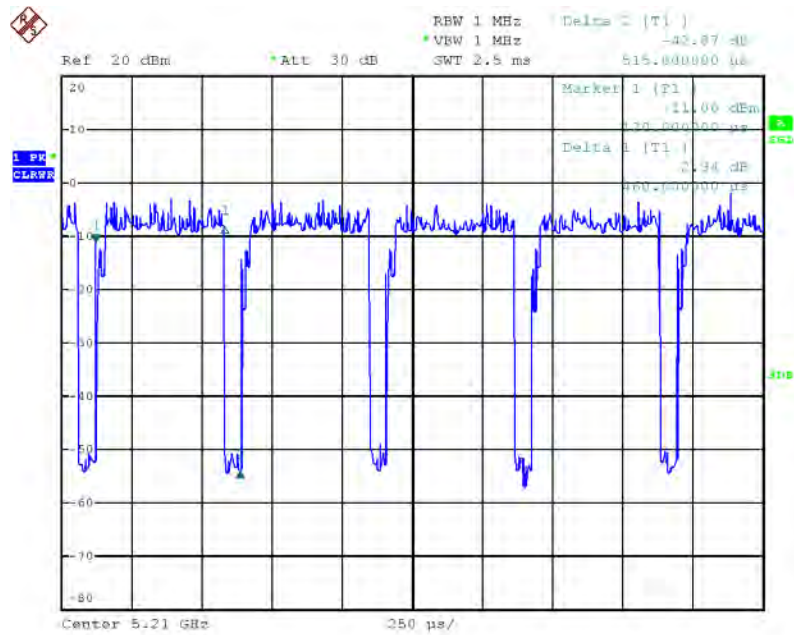
Date: 26.JUL.2013 13:51:40

# IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 2 (EUT 2)



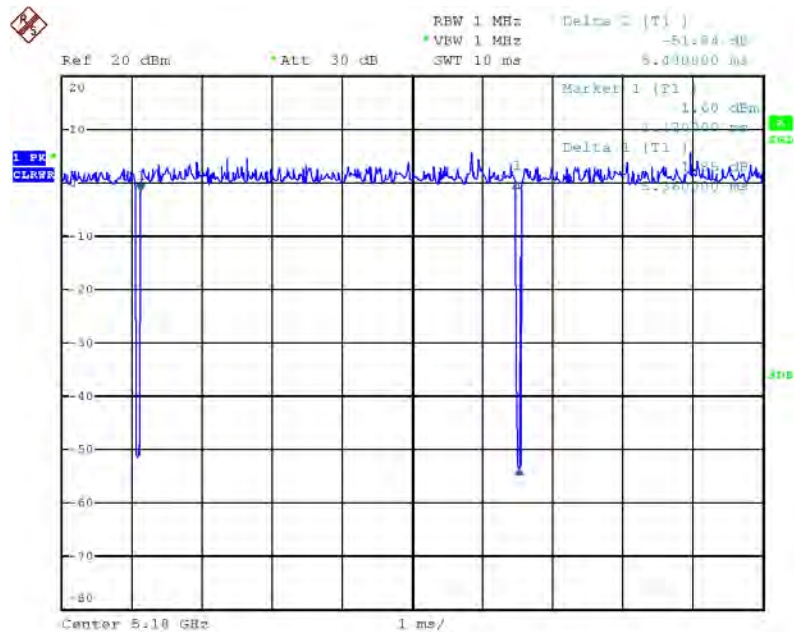
Date: 26.JUL.2013 13:52:56

# IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 2 (EUT 2)



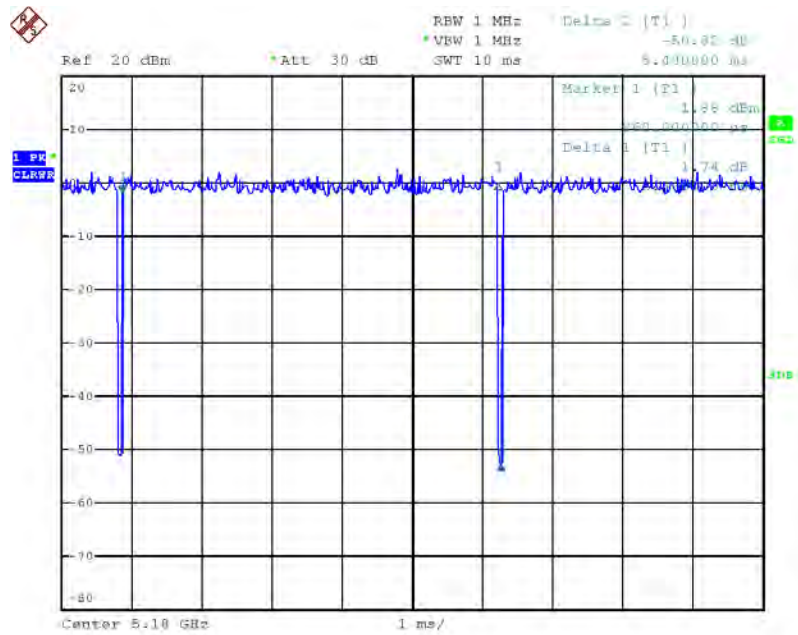
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# IEEE 802.11a / Chain 4 / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 13:56:06

## IEEE 802.11a / Chain 4+ Chain 5+ Chain 6 / Test Mode: Mode 2 (EUT 2)



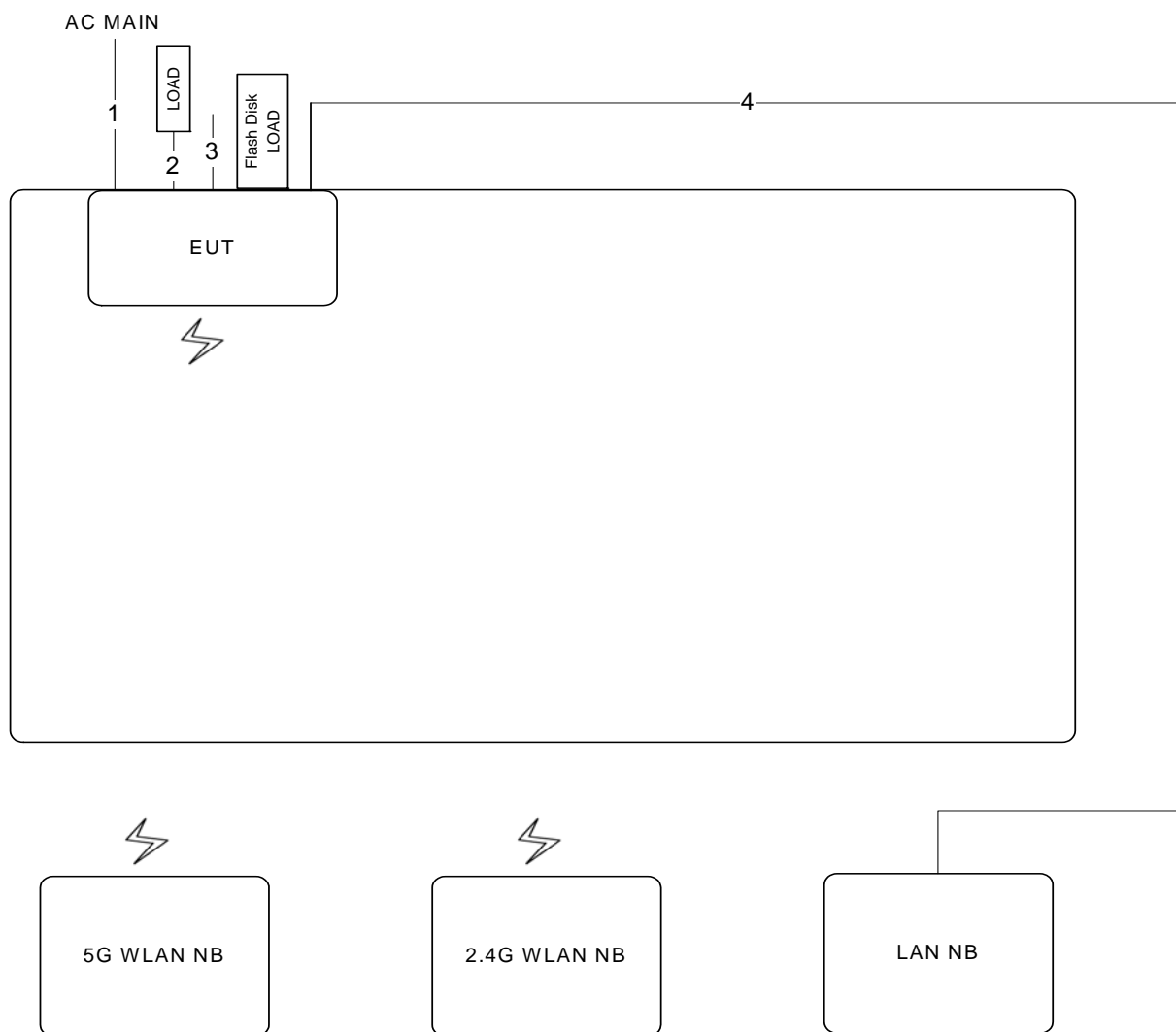
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## 3.12. Test Configurations

### 3.12.1. AC Power Line Conduction Emissions Test Configuration

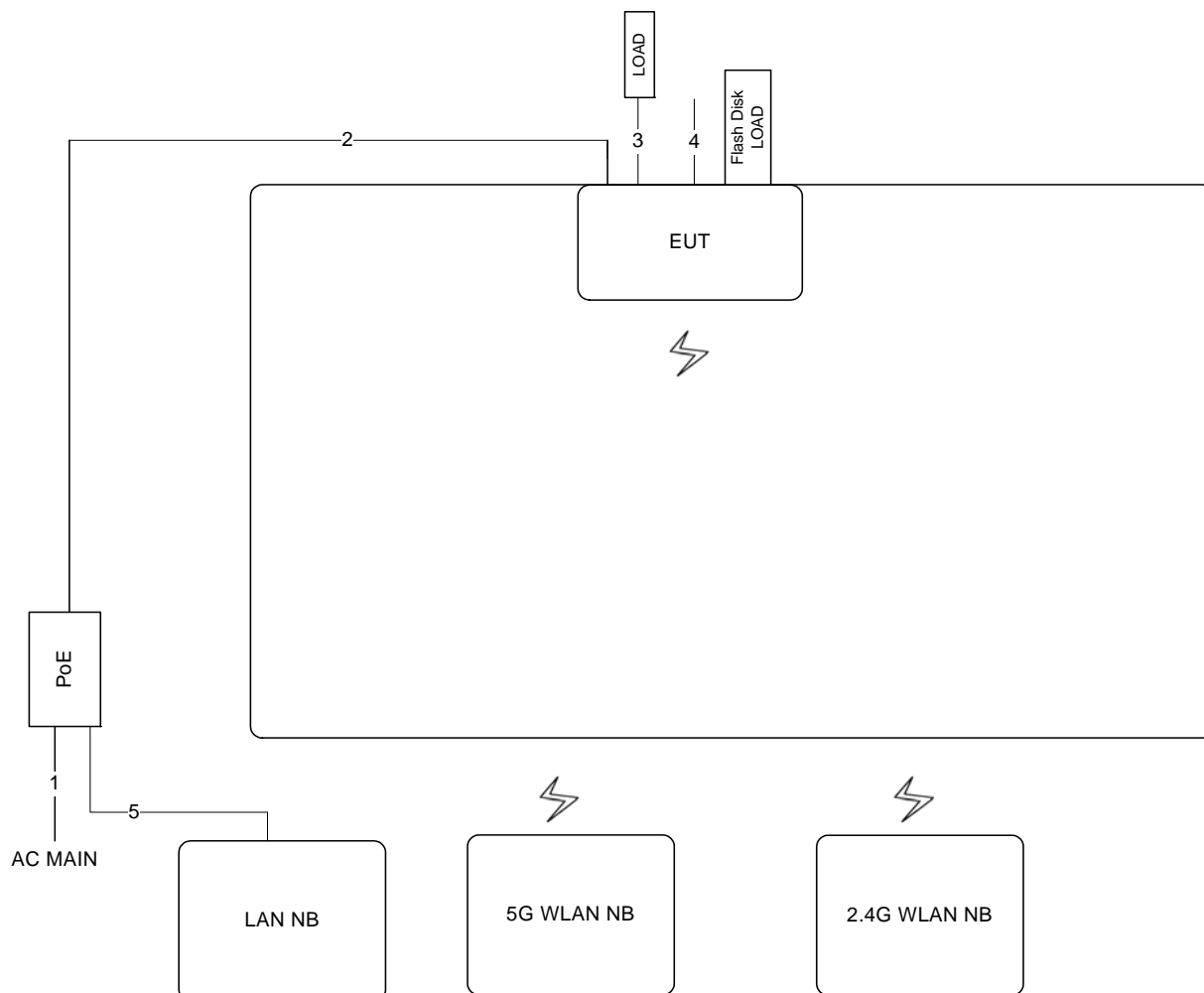
Test Mode: Mode 1, Mode 3



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

### 3.12.2. Radiated Emission Test Configuration

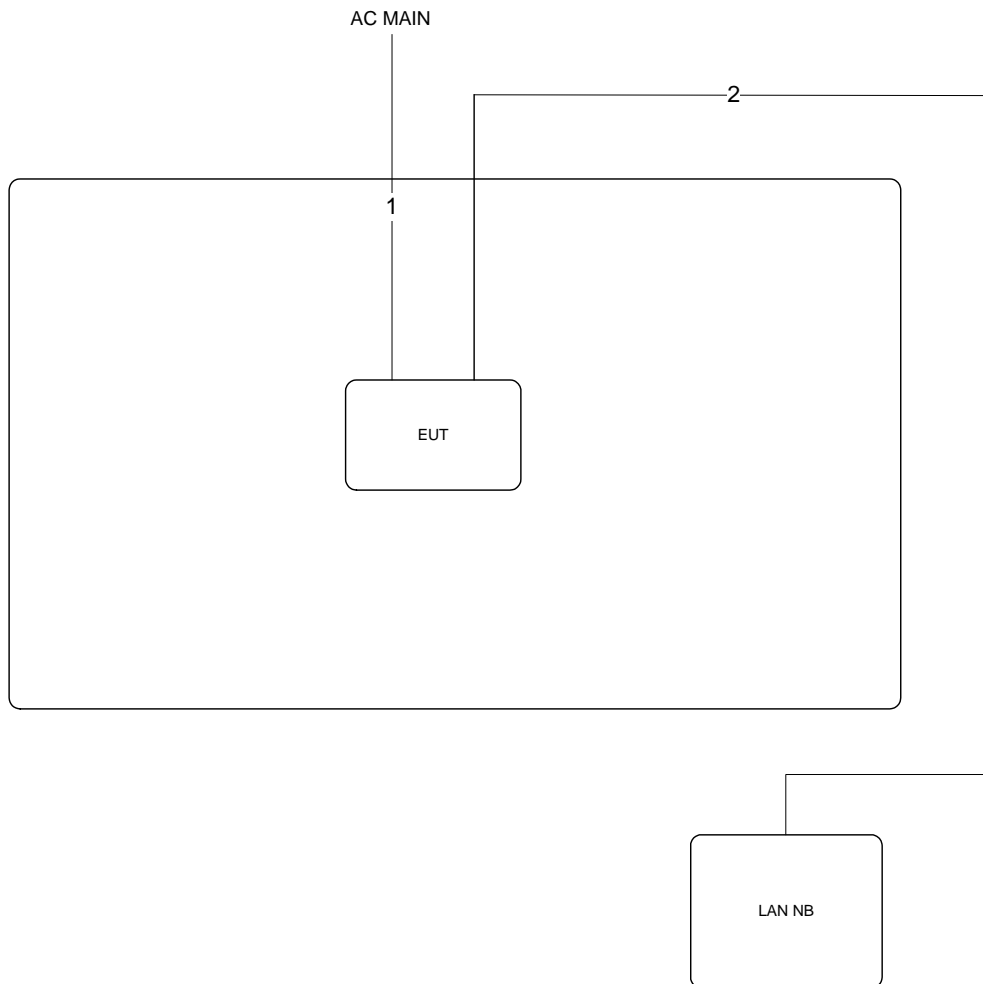
Test Configuration: below 1GHz / Test Mode: Mode 3, Mode 6



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m
3	RJ45 cable	No	1m
4	Console cable	No	1m
5	RJ-45 cable	No	1.5m



Test Configuration: above 1GHz / Test Mode: Mode 1, Mode 3



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m

## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

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

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

#### 4.1.2. Measuring Instruments and Setting

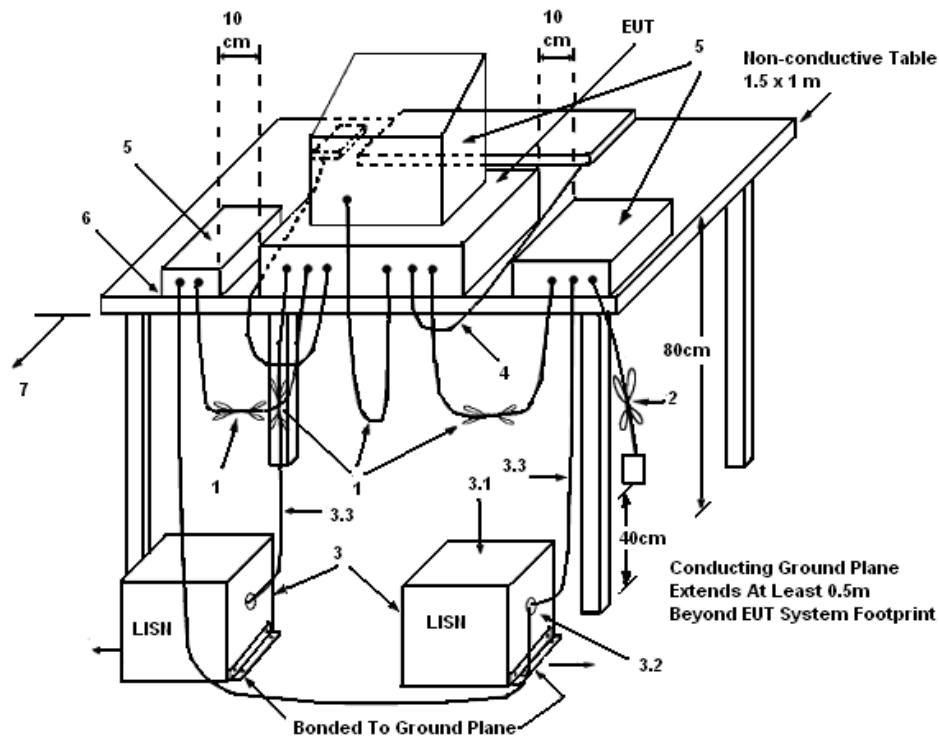
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

#### 4.1.3. Test Procedures

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

#### 4.1.4. Test Setup Layout



##### LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

#### 4.1.5. Test Deviation

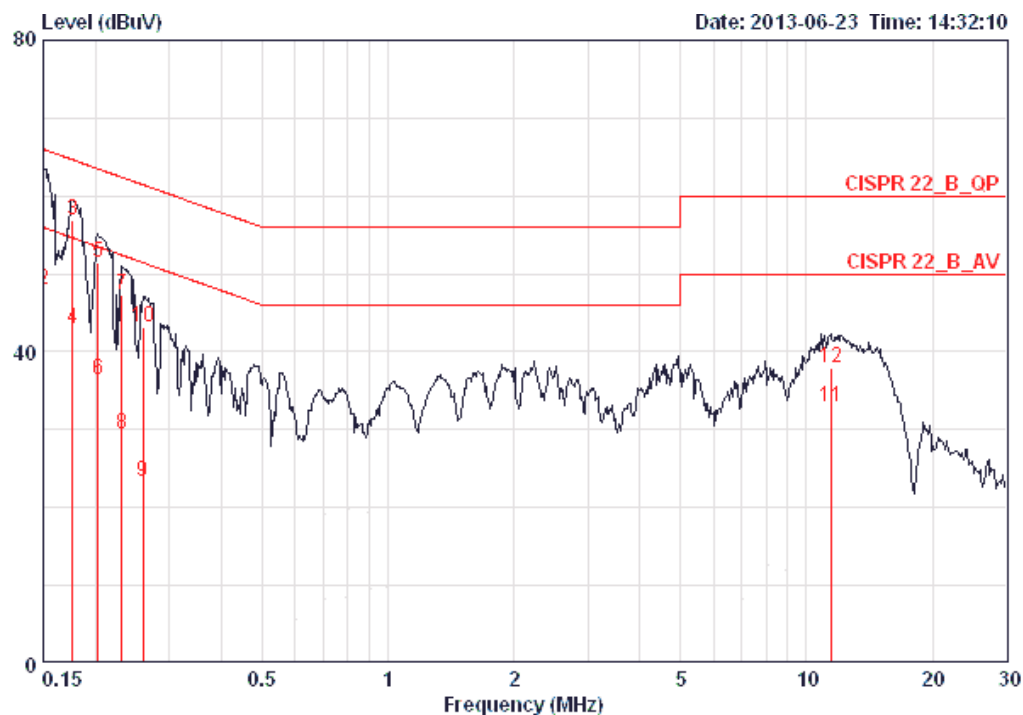
There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

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

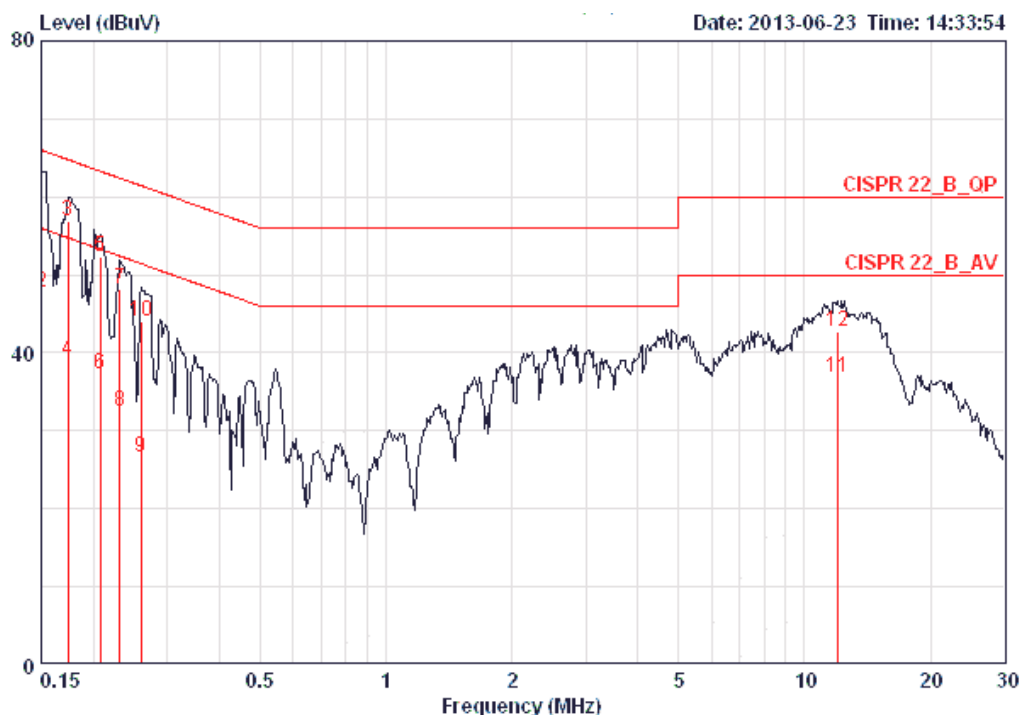
#### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	49%
Test Engineer	Sin Chang	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	0.15000	61.67	-4.33	66.00	61.34	0.15	0.18	LINE	QP
2	0.15000	48.02	-7.98	56.00	47.69	0.15	0.18	LINE	AVERAGE
3	0.17584	56.95	-7.73	64.68	56.61	0.15	0.19	LINE	QP
4	0.17584	42.92	-11.76	54.68	42.58	0.15	0.19	LINE	AVERAGE
5	0.20289	51.48	-12.01	63.49	51.13	0.15	0.20	LINE	QP
6	0.20289	36.35	-17.14	53.49	36.00	0.15	0.20	LINE	AVERAGE
7	0.23162	47.28	-15.11	62.39	46.93	0.15	0.20	LINE	QP
8	0.23162	29.51	-22.88	52.39	29.16	0.15	0.20	LINE	AVERAGE
9	0.26026	23.34	-28.08	51.42	22.99	0.15	0.20	LINE	AVERAGE
10	0.26026	43.11	-18.31	61.42	42.76	0.15	0.20	LINE	QP
11	11.438	32.95	-17.05	50.00	32.16	0.40	0.39	LINE	AVERAGE
12	11.438	37.94	-22.06	60.00	37.15	0.40	0.39	LINE	QP

Temperature	25°C	Humidity	49%
Test Engineer	Sin Chang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1

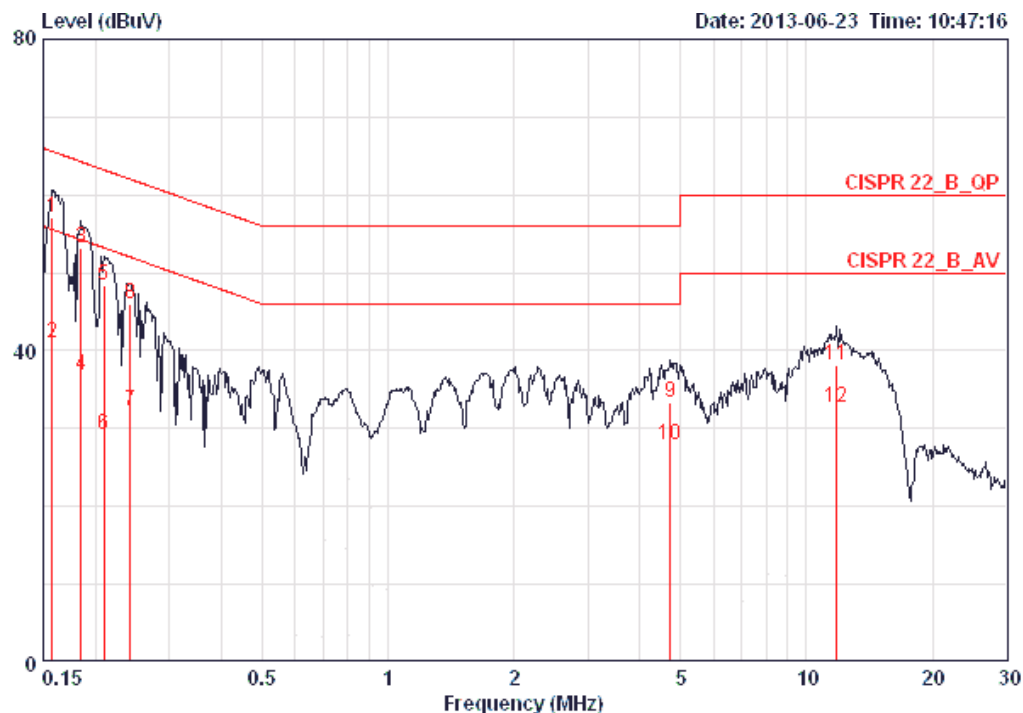


	Freq	Level	Over	Limit	Read	LISN	Cable		
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15000	61.40	-4.60	66.00	61.15	0.07	0.18	NEUTRAL	QP
2	0.15000	47.66	-8.34	56.00	47.41	0.07	0.18	NEUTRAL	AVERAGE
3	0.17399	56.89	-7.88	64.77	56.63	0.07	0.19	NEUTRAL	QP
4	0.17399	38.96	-15.81	54.77	38.70	0.07	0.19	NEUTRAL	AVERAGE
5	0.20723	52.40	-10.92	63.32	52.13	0.07	0.20	NEUTRAL	QP
6	0.20723	37.23	-16.09	53.32	36.96	0.07	0.20	NEUTRAL	AVERAGE
7	0.23162	48.20	-14.19	62.39	47.93	0.07	0.20	NEUTRAL	QP
8	0.23162	32.54	-19.85	52.39	32.27	0.07	0.20	NEUTRAL	AVERAGE
9	0.26026	26.56	-24.86	51.42	26.29	0.07	0.20	NEUTRAL	AVERAGE
10	0.26026	43.95	-17.47	61.42	43.68	0.07	0.20	NEUTRAL	QP
11	11.996	36.93	-13.07	50.00	36.22	0.31	0.40	NEUTRAL	AVERAGE
12	11.996	42.63	-17.37	60.00	41.92	0.31	0.40	NEUTRAL	QP

Note:

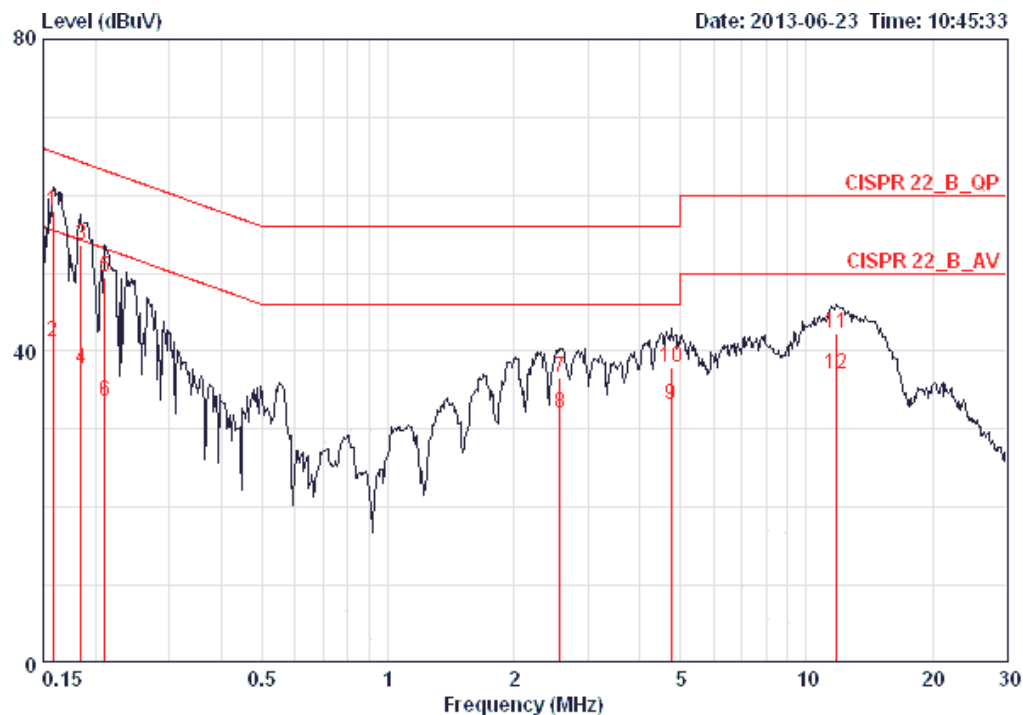
Level = Read Level + LISN Factor + Cable Loss.

Temperature	25°C	Humidity	49%
Test Engineer	Sin Chang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 3



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15733	57.16	-8.44	65.60	56.83	0.15	0.18	LINE	QP
2	0.15733	40.91	-14.69	55.60	40.58	0.15	0.18	LINE	AVERAGE
3	0.18443	53.26	-11.02	64.28	52.92	0.15	0.19	LINE	QP
4	0.18443	36.87	-17.41	54.28	36.53	0.15	0.19	LINE	AVERAGE
5	0.20944	48.46	-14.77	63.23	48.11	0.15	0.20	LINE	QP
6	0.20944	29.31	-23.92	53.23	28.96	0.15	0.20	LINE	AVERAGE
7	0.24165	32.35	-19.69	52.04	32.00	0.15	0.20	LINE	AVERAGE
8	0.24165	45.93	-16.11	62.04	45.58	0.15	0.20	LINE	QP
9	4.721	33.38	-22.62	56.00	32.77	0.29	0.31	LINE	QP
10	4.721	27.87	-18.13	46.00	27.26	0.29	0.31	LINE	AVERAGE
11	11.807	38.09	-21.91	60.00	37.28	0.41	0.40	LINE	QP
12	11.807	32.72	-17.28	50.00	31.91	0.41	0.40	LINE	AVERAGE

Temperature	25°C	Humidity	49%
Test Engineer	Sin Chang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 3



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15816	57.90	-7.66	65.56	57.65	0.07	0.18	NEUTRAL	QP
2	0.15816	41.23	-14.33	55.56	40.98	0.07	0.18	NEUTRAL	AVERAGE
3	0.18443	53.60	-10.68	64.28	53.34	0.07	0.19	NEUTRAL	QP
4	0.18443	37.79	-16.49	54.28	37.53	0.07	0.19	NEUTRAL	AVERAGE
5	0.21055	49.40	-13.78	63.18	49.13	0.07	0.20	NEUTRAL	QP
6	0.21055	33.66	-19.52	53.18	33.39	0.07	0.20	NEUTRAL	AVERAGE
7	2.581	36.69	-19.31	56.00	36.33	0.12	0.24	NEUTRAL	QP
8	2.581	32.03	-13.97	46.00	31.67	0.12	0.24	NEUTRAL	AVERAGE
9	4.746	33.11	-12.89	46.00	32.65	0.15	0.32	NEUTRAL	AVERAGE
10	4.746	38.01	-17.99	56.00	37.55	0.15	0.32	NEUTRAL	QP
11	11.807	42.22	-17.78	60.00	41.52	0.30	0.40	NEUTRAL	QP
12	11.807	37.08	-12.92	50.00	36.38	0.30	0.40	NEUTRAL	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.

## 4.2. 26dB Bandwidth & 99% Occupied Bandwidth Measurement

### 4.2.1. Limit

No restriction limits.

### 4.2.2. Measuring Instruments and Setting

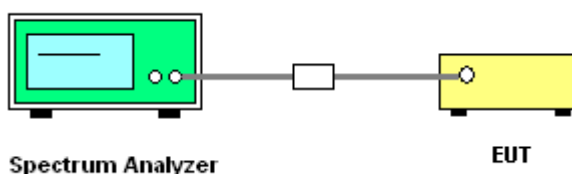
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold

### 4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected 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





#### 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 & 99% Occupied Bandwidth

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Mode	Mode 1 (EUT 1)		

##### Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	25.12	19.68
40	5200 MHz	24.96	19.68
48	5240 MHz	25.12	19.68

##### Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	47.04	37.12
46	5230 MHz	46.40	37.12

##### Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
42	5210 MHz	100.08	77.04

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Mode	Mode 1 (EUT 1)		

#### Configuration IEEE 802.11a / Chain 4

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.32	17.12
40	5200 MHz	24.48	17.12
48	5240 MHz	24.32	17.12

#### Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	24.32	17.28
40	5200 MHz	24.64	17.28
48	5240 MHz	24.64	17.28

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Mode	Mode 2 (EUT 2)		

**Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.88	18.08
40	5200 MHz	22.24	18.08
48	5240 MHz	23.68	17.76

**Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	42.24	36.16
46	5230 MHz	43.20	36.48

**Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
42	5210 MHz	82.56	75.52

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a
Test Mode	Mode 2 (EUT 2)		

#### Configuration IEEE 802.11a / Chain 4

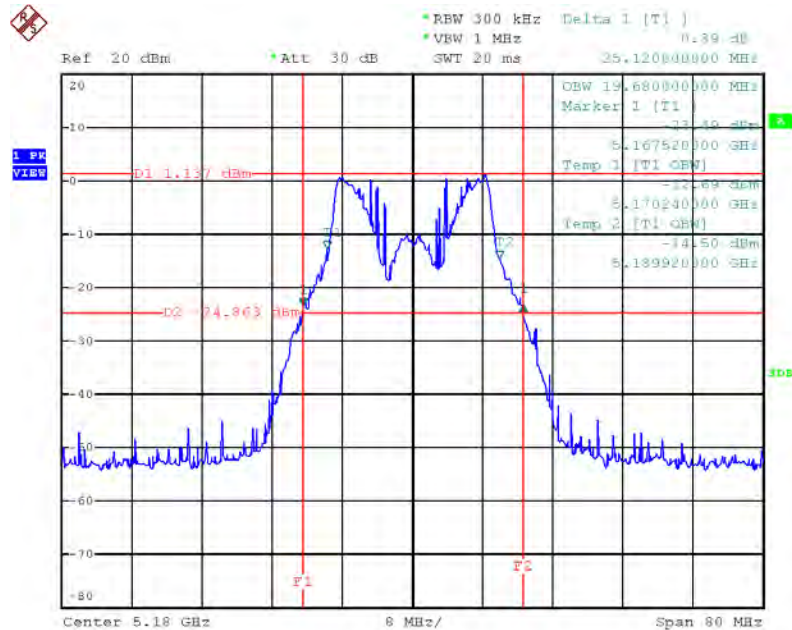
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.84	17.28
40	5200 MHz	24.32	17.28
48	5240 MHz	22.88	17.12

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Mode	Mode 2 (EUT 2)		

**Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6**

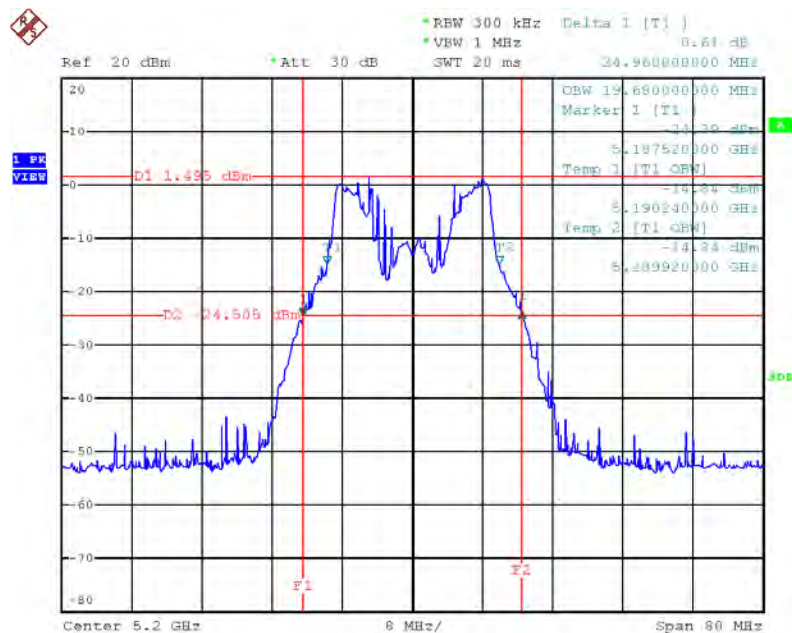
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	22.08	17.12
40	5200 MHz	22.40	17.12
48	5240 MHz	22.40	17.12

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
20MHz / Chain 4+ Chain 5+ Chain 6 / 5180 MHz / Test Mode: Mode 1 (EUT 1)



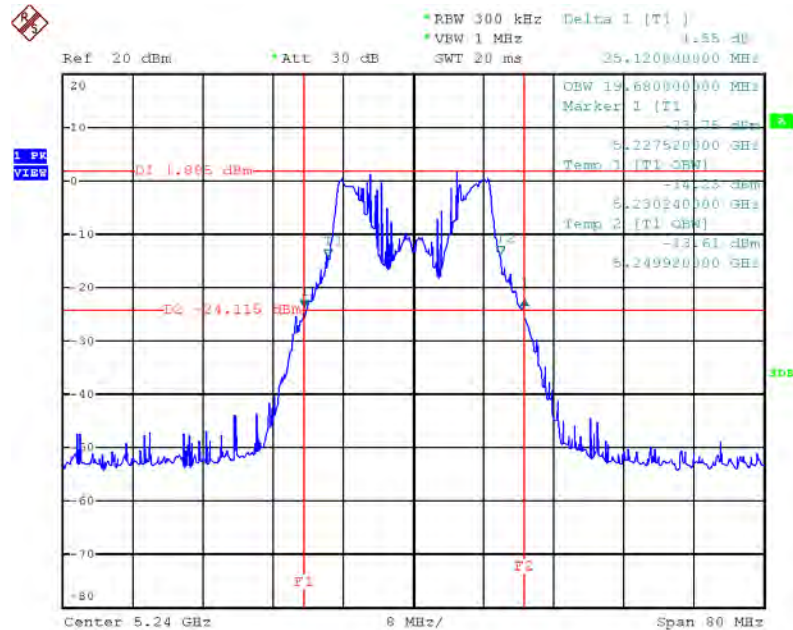
Date: 3.JUL.2013 00:30:22

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
20MHz / Chain 4+ Chain 5+ Chain 6 / 5200 MHz / Test Mode: Mode 1 (EUT 1)



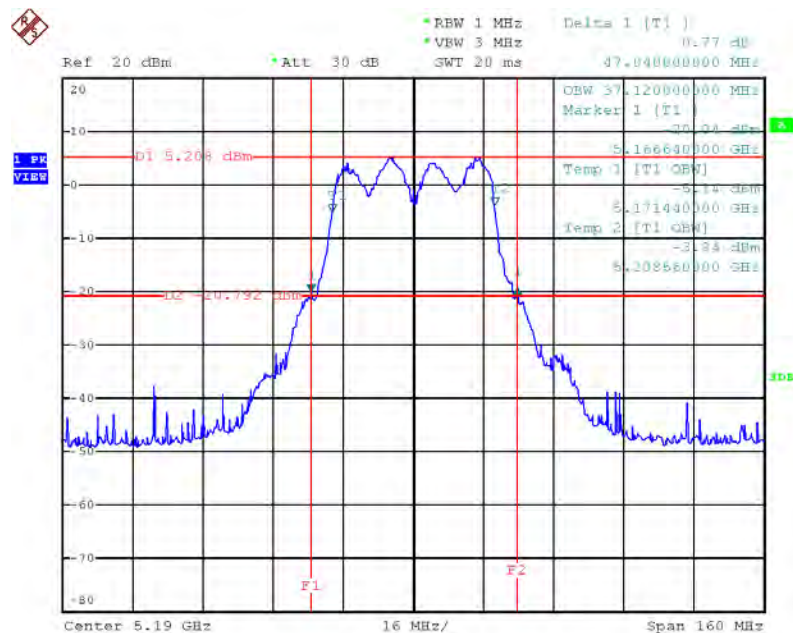
Date: 3.JUL.2013 00:32:24

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
20MHz / Chain 4+ Chain 5+ Chain 6 / 5240 MHz / Test Mode: Mode 1 (EUT 1)



Date: 3.JUL.2013 00:33:48

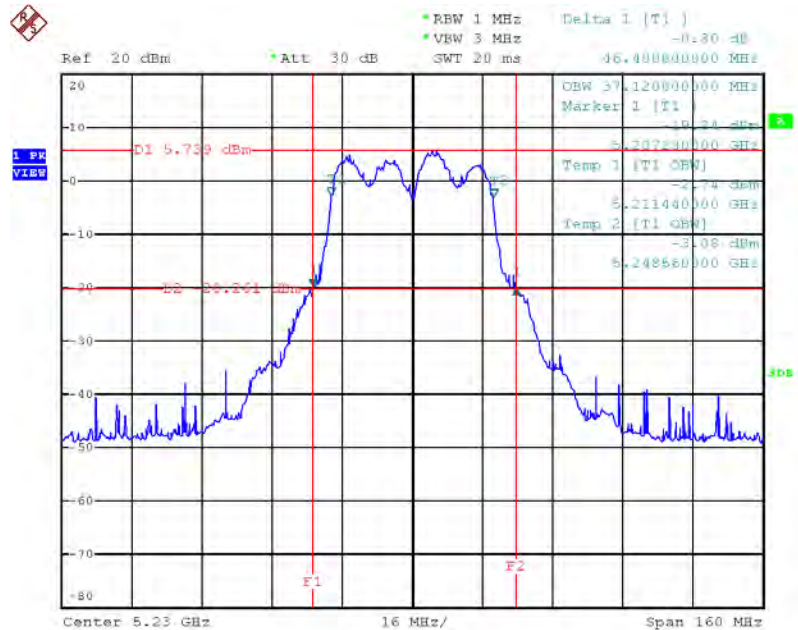
26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
40MHz / Chain 4+ Chain 5+ Chain 6 / 5190 MHz / Test Mode: Mode 1 (EUT 1)



Date: 3.JUL.2013 00:50:36

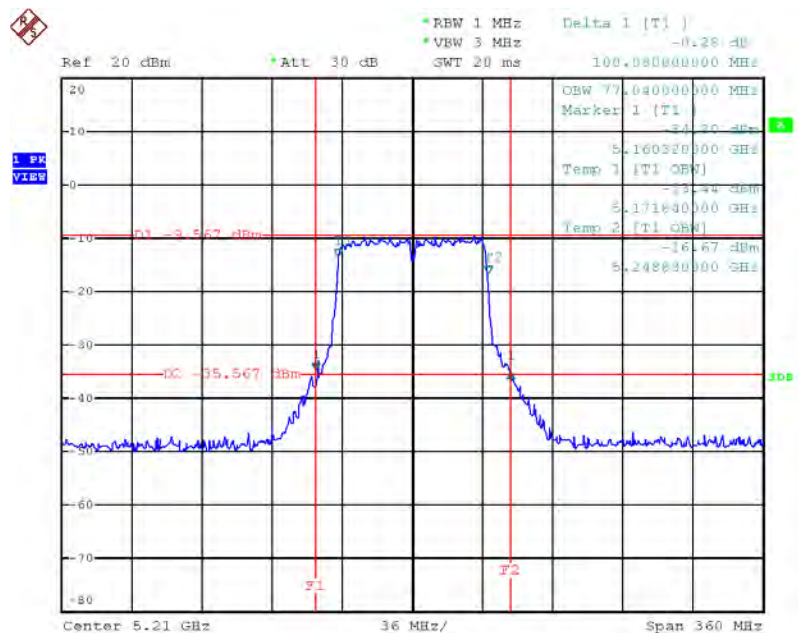


26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
40MHz / Chain 4+ Chain 5+ Chain 6 / 5230 MHz / Test Mode: Mode 1 (EUT 1)



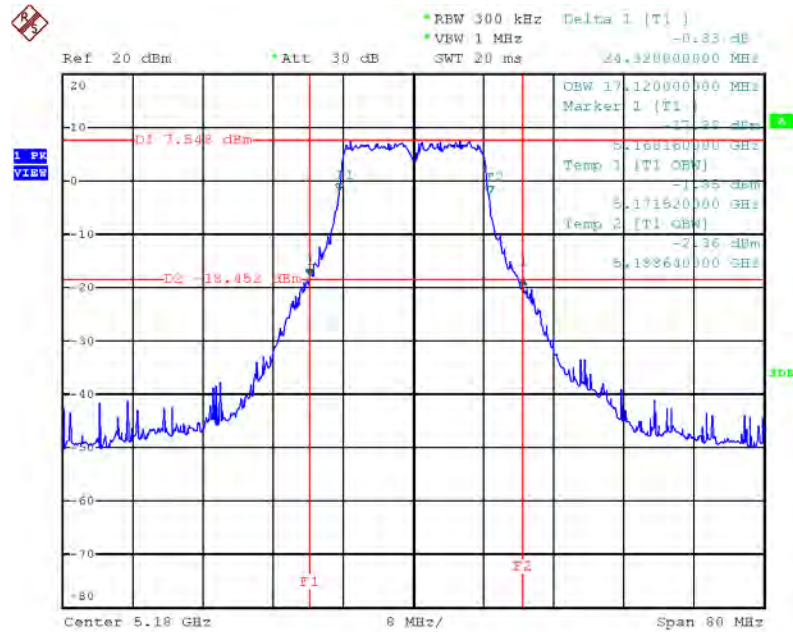
Date: 3.JUL.2013 00:49:08

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
80MHz / Chain 4+ Chain 5+ Chain 6 / 5210 MHz / Test Mode: Mode 1 (EUT 1)



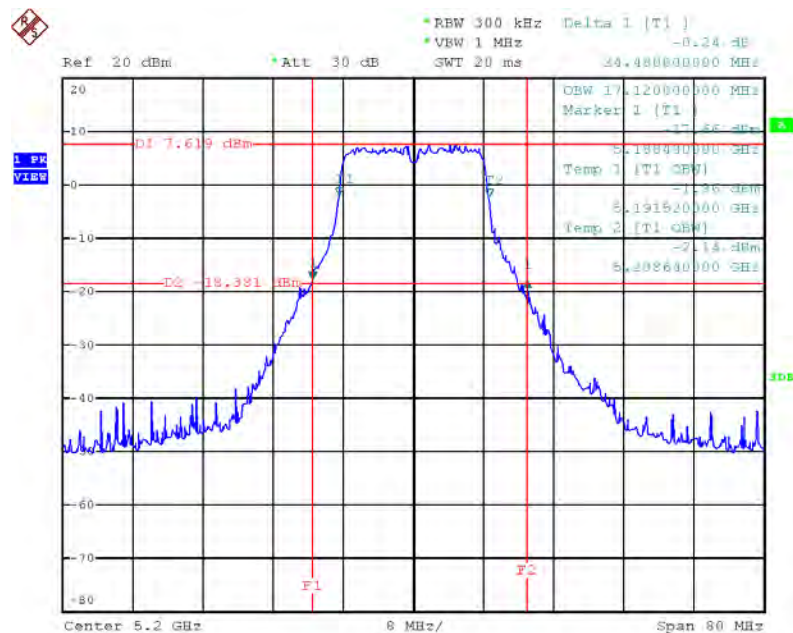
Date: 3.JUL.2013 01:26:09

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 /  
5180 MHz / Test Mode: Mode 1 (EUT 1)



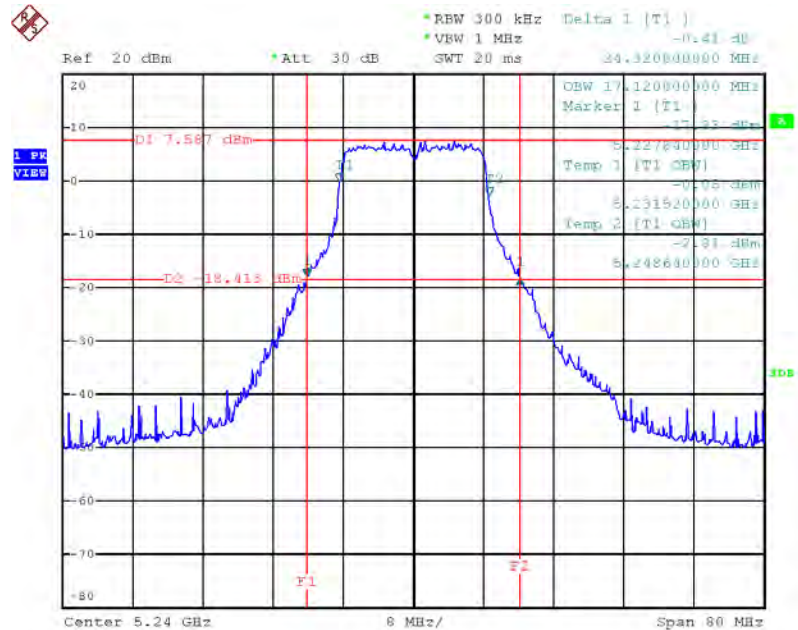
Date: 2.JUL.2013 20:32:01

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 /  
5200 MHz / Test Mode: Mode 1 (EUT 1)



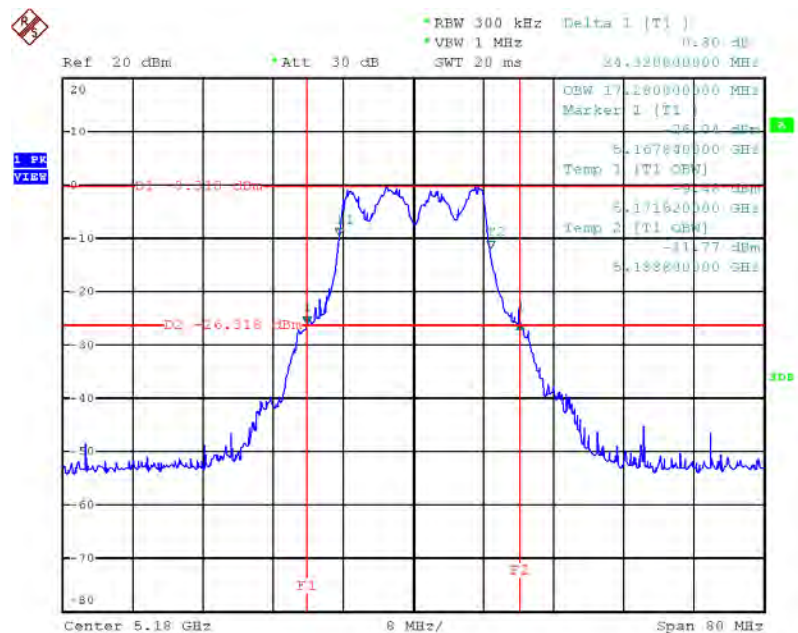
Date: 2.JUL.2013 20:36:44

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 /  
5240 MHz / Test Mode: Mode 1 (EUT 1)



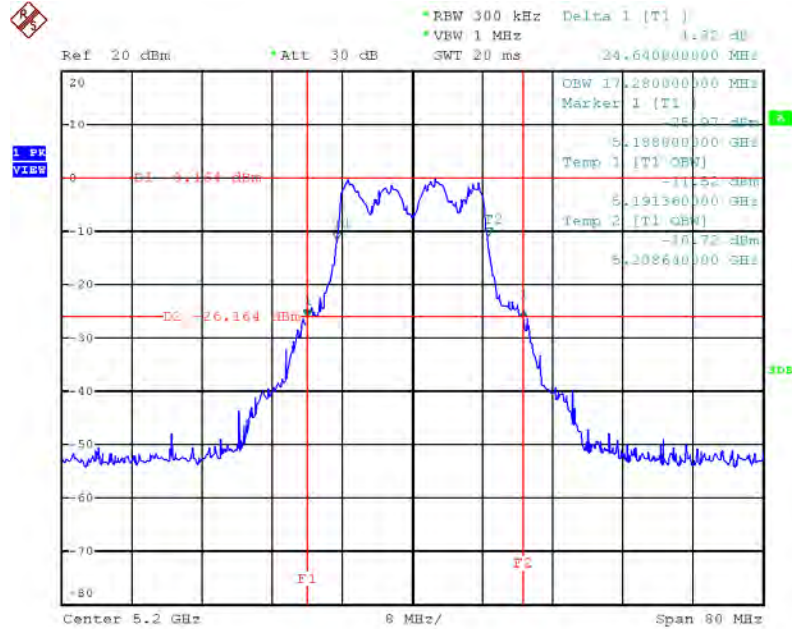
Date: 2.JUL.2013 20:38:25

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a /  
Chain 4+ Chain 5+ Chain 6 / 5180 MHz / Test Mode: Mode 1 (EUT 1)



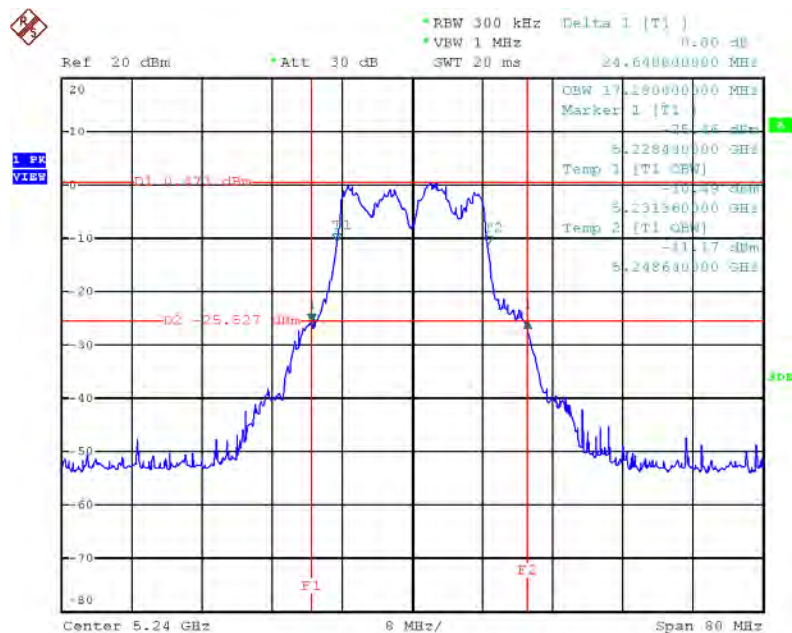
Date: 3.JUL.2013 00:09:16

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a /  
Chain 4+ Chain 5+ Chain 6 / 5200 MHz / Test Mode: Mode 1 (EUT 1)



Date: 3.JUL.2013 00:11:18

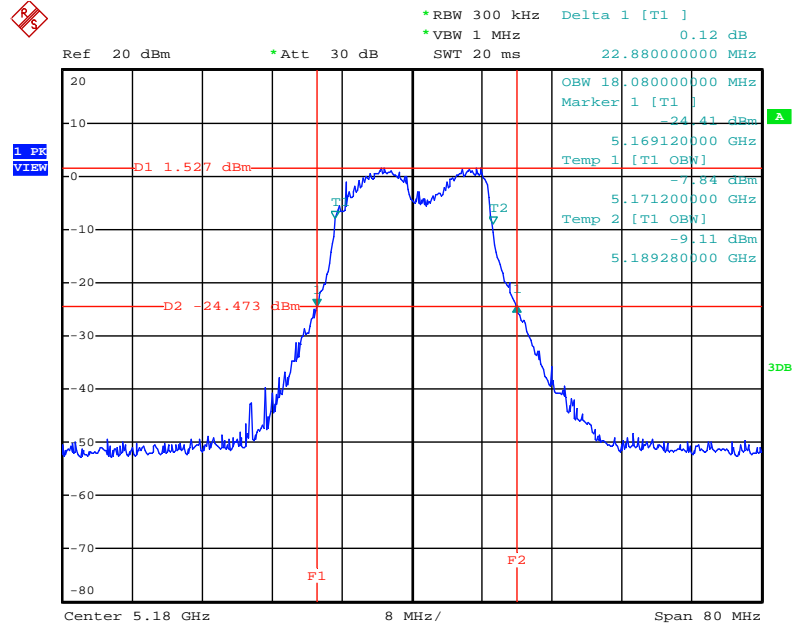
26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a /  
Chain 4+ Chain 5+ Chain 6 / 5240 MHz / Test Mode: Mode 1 (EUT 1)



Date: 3.JUL.2013 00:12:47

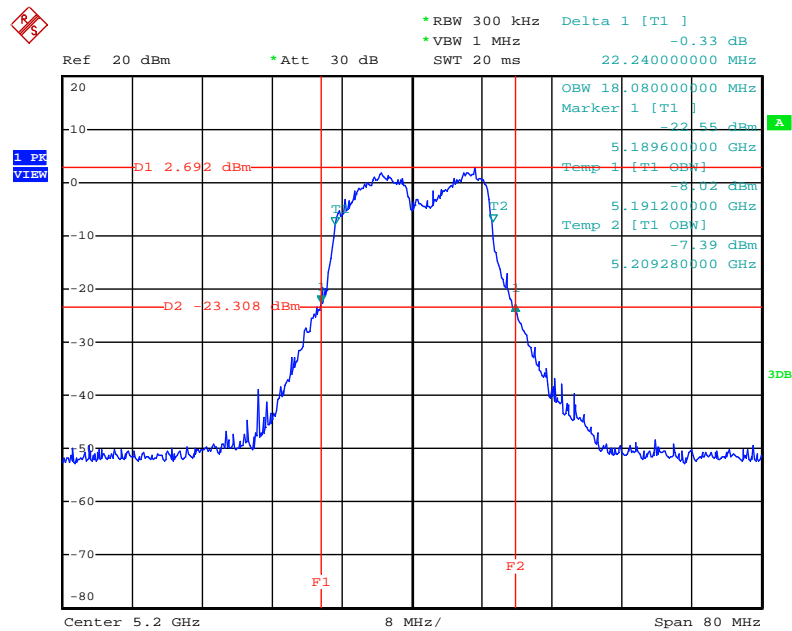


26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
20MHz / Chain 4+ Chain 5+ Chain 6 / 5180 MHz / Test Mode: Mode 2 (EUT 2)



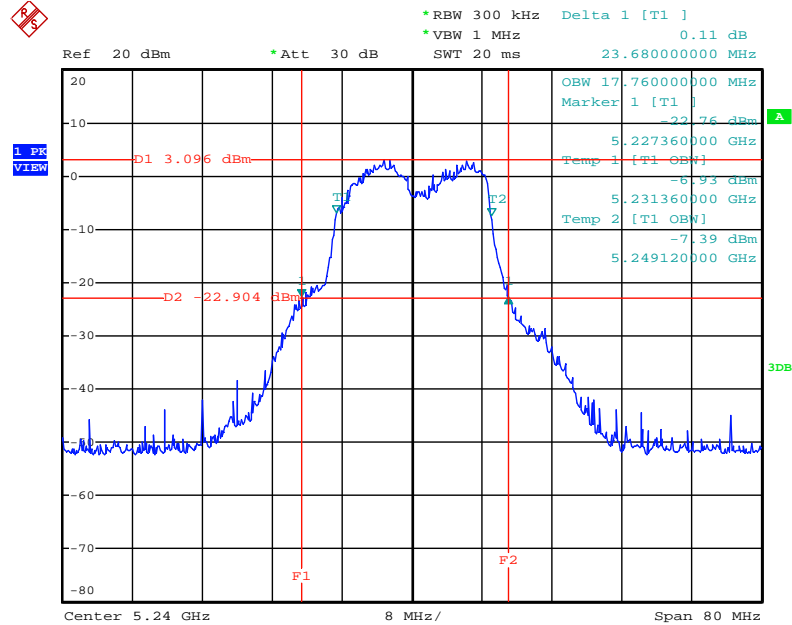
Date: 26.JUL.2013 12:35:58

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
20MHz / Chain 4+ Chain 5+ Chain 6 / 5200 MHz / Test Mode: Mode 2 (EUT 2)



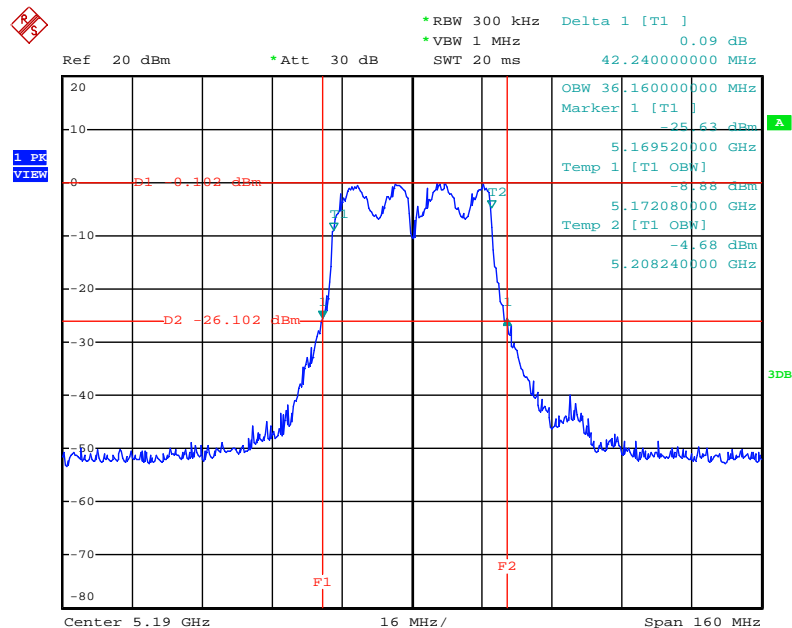
Date: 26.JUL.2013 12:35:02

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
20MHz / Chain 4+ Chain 5+ Chain 6 / 5240 MHz / Test Mode: Mode 2 (EUT 2)



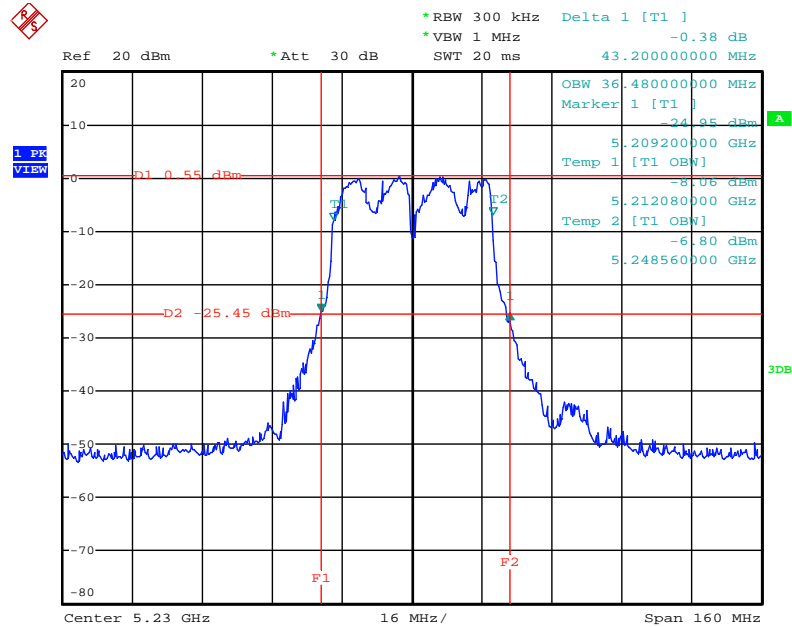
Date: 26.JUL.2013 12:34:24

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
40MHz / Chain 4+ Chain 5+ Chain 6 / 5190 MHz / Test Mode: Mode 2 (EUT 2)



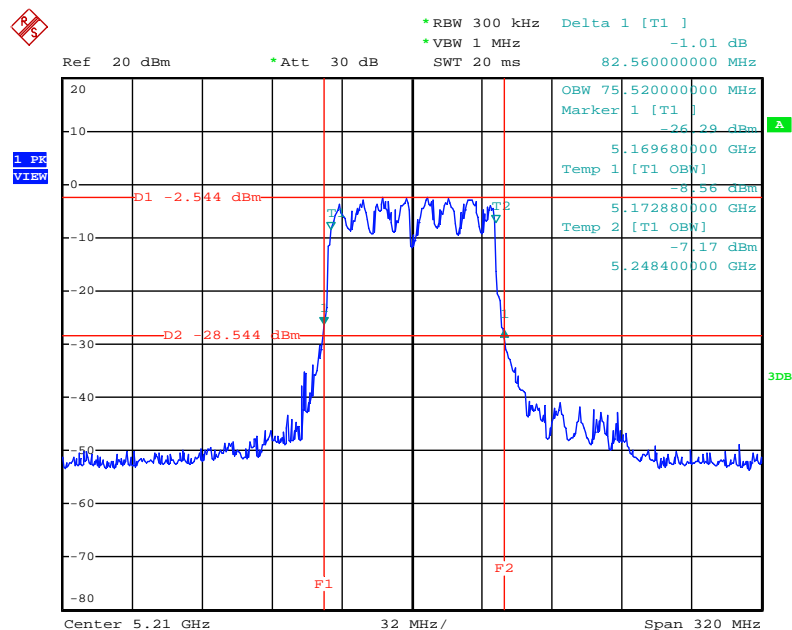
Date: 26.JUL.2013 12:37:08

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
40MHz / Chain 4+ Chain 5+ Chain 6 / 5230 MHz / Test Mode: Mode 2 (EUT 2)



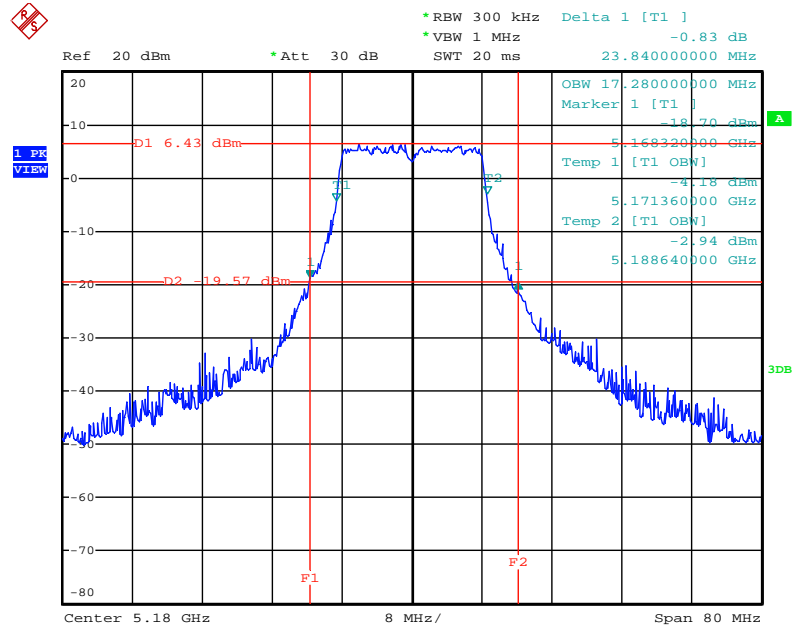
Date: 26.JUL.2013 12:37:42

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1  
80MHz / Chain 4+ Chain 5+ Chain 6 / 5210 MHz / Test Mode: Mode 2 (EUT 2)



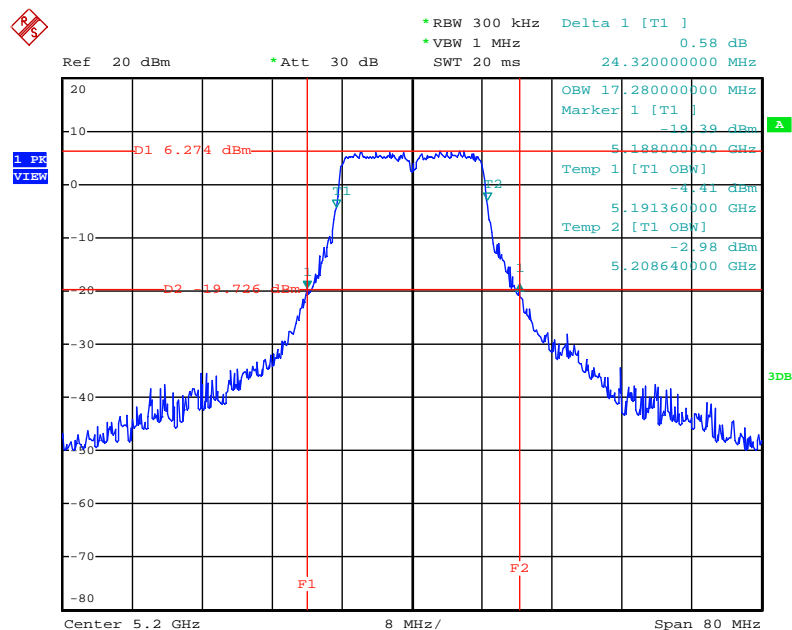
Date: 26.JUL.2013 12:38:22

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 /  
5180 MHz / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 12:39:42

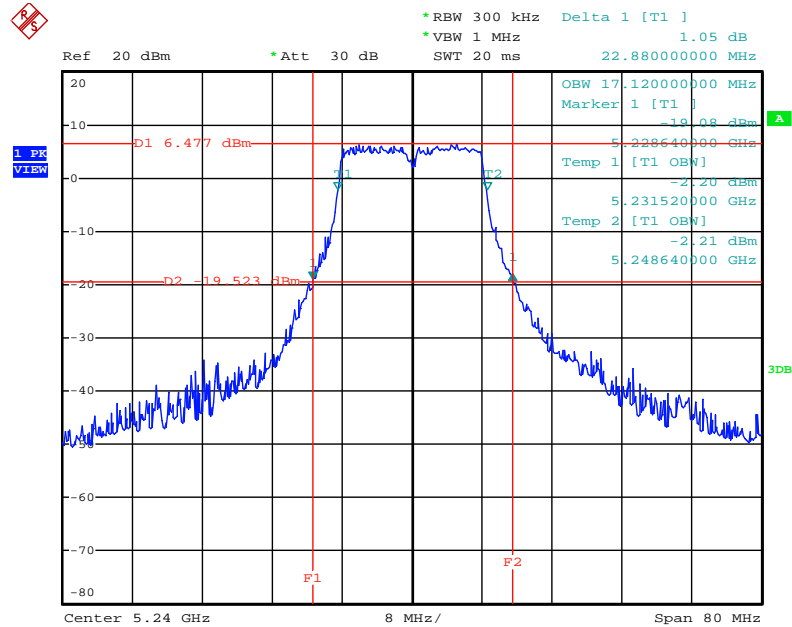
26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 /  
5200 MHz / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 12:40:12

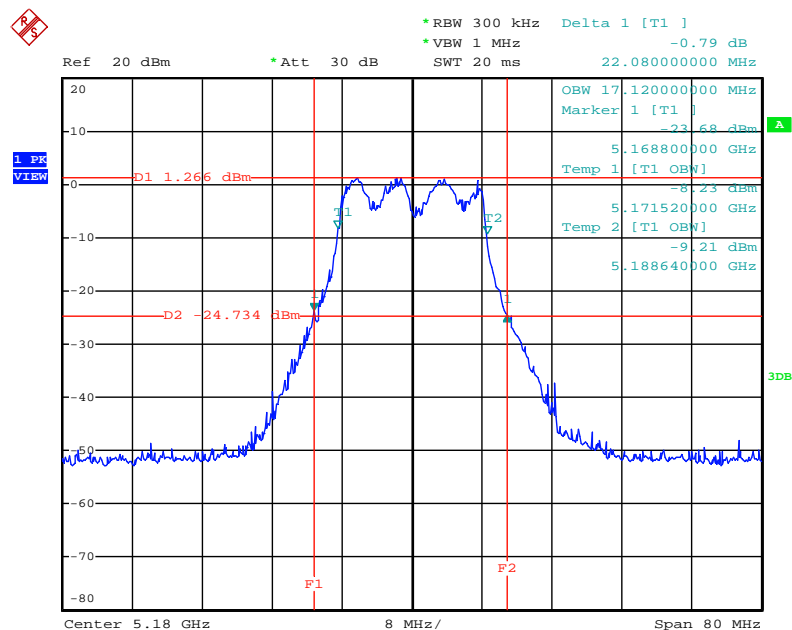


26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 4 /  
5240 MHz / Test Mode: Mode 2 (EUT 2)



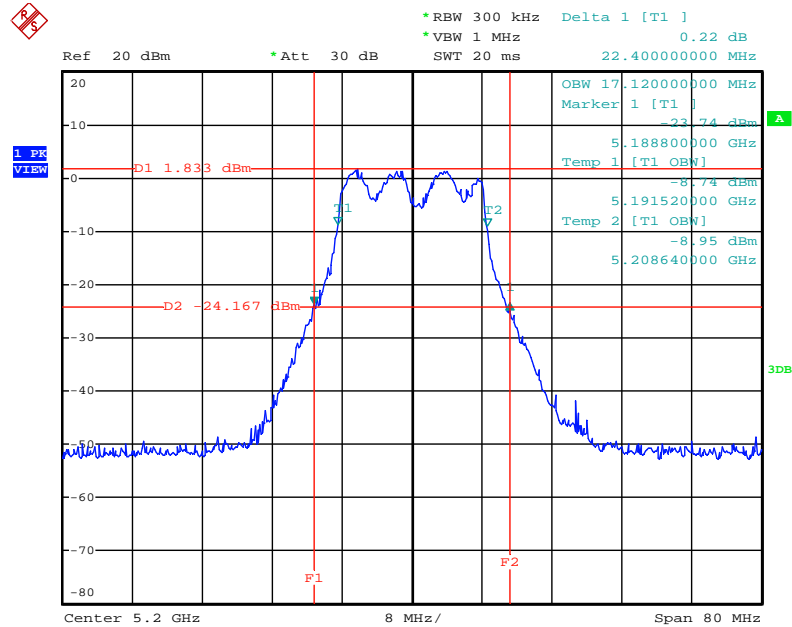
Date: 26.JUL.2013 12:40:43

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a /  
Chain 4+ Chain 5+ Chain 6 / 5180 MHz / Test Mode: Mode 2 (EUT 2)



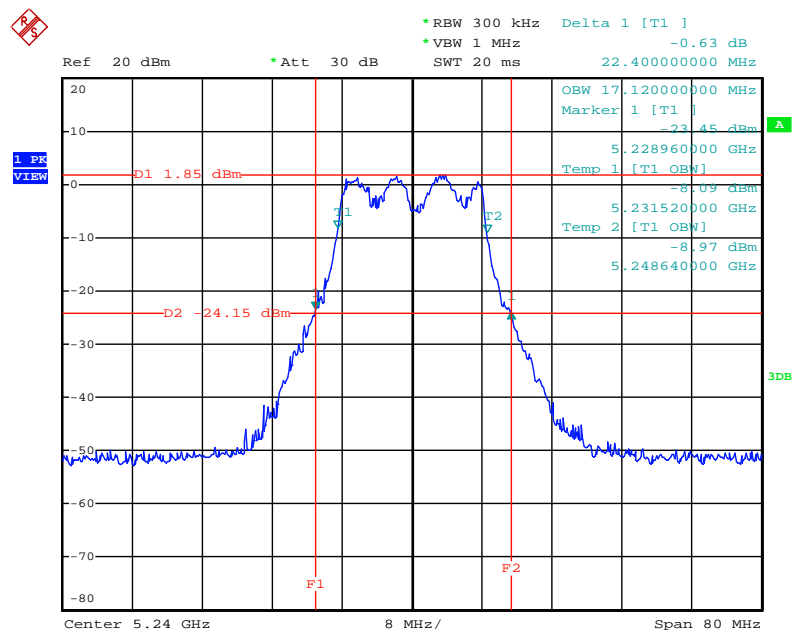
Date: 26.JUL.2013 12:26:17

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a /  
Chain 4+ Chain 5+ Chain 6 / 5200 MHz / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 12:27:13

26dB Bandwidth & 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a /  
Chain 4+ Chain 5+ Chain 6 / 5240 MHz / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 12:30:10

### 4.3. Maximum Conducted Output Power Measurement

#### 4.3.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak 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

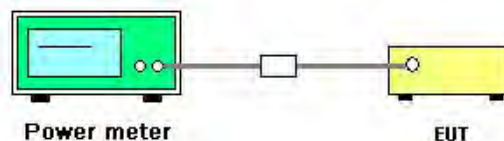
The following table is the setting of the peak power meter.

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 KDB 789033 D01 v01r03 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, section (E) Maximum conducted output power =>(3) Method PM (Measurement using an RF average power meter) Multiple antenna systems was performed in accordance with KDB 662911 D01 v02 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. 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	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Date	Jul. 28, 2013	Test Mode	Mode 1 (EUT 1)

##### Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
36	5180 MHz	8.71	9.47	8.71	13.75	17.00	Complies
40	5200 MHz	8.88	9.55	8.79	13.86	17.00	Complies
48	5240 MHz	8.82	9.46	8.94	13.85	17.00	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
38	5190 MHz	11.72	12.23	11.68	16.66	17.00	Complies
46	5230 MHz	11.98	12.45	11.95	16.90	17.00	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
42	5210 MHz	12.05	12.48	12.08	16.98	17.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Date	Jul. 28, 2013	Test Mode	Mode 1 (EUT 1)

#### Configuration IEEE 802.11a / Chain 4

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.59	17.00	Complies
40	5200 MHz	16.71	17.00	Complies
48	5240 MHz	16.58	17.00	Complies

#### Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
36	5180 MHz	9.11	9.56	8.81	13.94	17.00	Complies
40	5200 MHz	8.3	9.21	8.48	13.45	17.00	Complies
48	5240 MHz	8.09	8.84	8.39	13.22	17.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Date	Jul. 28, 2013	Test Mode	Mode 2 (EUT 2)

**Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
36	5180 MHz	10.81	10.49	10.54	15.39	17.00	Complies
40	5200 MHz	10.46	10.53	10.62	15.31	17.00	Complies
48	5240 MHz	10.49	10.53	10.78	15.37	17.00	Complies

**Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
38	5190 MHz	11.91	11.85	11.97	16.68	17.00	Complies
46	5230 MHz	12.21	11.96	12.15	16.88	17.00	Complies

**Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
42	5210 MHz	12.14	11.93	12.15	16.85	17.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a
Test Date	Jul. 26, 2013	Test Mode	Mode 2 (EUT 2)

**Configuration IEEE 802.11a / Chain 4**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.61	17.00	Complies
40	5200 MHz	16.52	17.00	Complies
48	5240 MHz	16.48	17.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Date	Jul. 28, 2013	Test Mode	Mode 2 (EUT 2)

#### Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Conducted Power (dBm)			Total Conducted Output Power (dBm)	Max. Limit (dBm)	Result
		Chain 4	Chain 5	Chain 6			
36	5180 MHz	10.34	9.91	9.99	14.86	17.00	Complies
40	5200 MHz	10.10	10.11	10.22	14.91	17.00	Complies
48	5240 MHz	9.96	10.09	10.27	14.88	17.00	Complies



## 4.4. Power Spectral Density Measurement

### 4.4.1. Limit

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

Frequency Range	Power Spectral Density limit (dBm/MHz)
5.15~5.25 GHz	4

### 4.4.2. Measuring Instruments and Setting

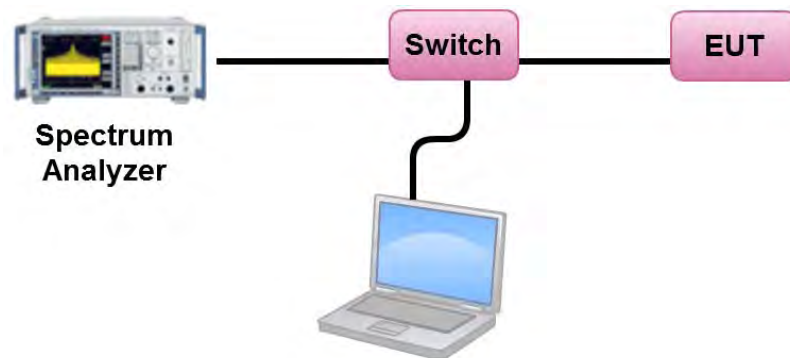
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 KDB 789033 D01 v01r03 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, section (C) Maximum conducted output power => (d) Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).
3. Multiple antenna systems was performed in accordance KDB 662911 D01 v02 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	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Date	Jul. 28, 2013	Test Mode	Mode 1 (EUT 1)

##### Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	0.39	0.69	Complies
40	5200 MHz	0.62	0.69	Complies
48	5240 MHz	0.63	0.69	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=9.31dBi >6dBi, so limit=4 – (9.31 – 6)=0.69dBm/MHz.

##### Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	0.46	0.69	Complies
46	5230 MHz	0.30	0.69	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=9.31dBi >6dBi, so limit=4 – (9.31 – 6)=0.69dBm/MHz.

##### Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-2.30	0.69	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=9.31dBi >6dBi, so limit=4 – (9.31 – 6)=0.69dBm/MHz.

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Date	Jul. 28, 2013	Test Mode	Mode 1 (EUT 1)

#### Configuration IEEE 802.11a / Chain 4

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	3.47	4.00	Complies
40	5200 MHz	3.71	4.00	Complies
48	5240 MHz	3.79	4.00	Complies

#### Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	0.53	0.69	Complies
40	5200 MHz	0.24	0.69	Complies
48	5240 MHz	0.40	0.69	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=9.31dBi >6dBi, so limit=4 – (9.31 – 6)=0.69dBm/MHz.

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Date	Jul. 28, 2013	Test Mode	Mode 2 (EUT 2)

**Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	1.91	1.93	Complies
40	5200 MHz	1.88	1.93	Complies
48	5240 MHz	1.87	1.93	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=8.07dBi >6dBi, so limit=4 – (8.07 – 6)=1.93dBm/MHz.

**Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	0.42	1.93	Complies
46	5230 MHz	0.77	1.93	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=8.07dBi >6dBi, so limit=4 – (8.07 – 6)=1.93dBm/MHz.

**Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6**

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
42	5210 MHz	-1.69	1.93	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=8.07dBi >6dBi, so limit=4 – (8.07 – 6)=1.93dBm/MHz.

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a
Test Date	Jul. 26, 2013	Test Mode	Mode 2 (EUT 2)

#### Configuration IEEE 802.11a / Chain 4

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	3.50	4.00	Complies
40	5200 MHz	3.71	4.00	Complies
48	5240 MHz	3.56	4.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Date	Jul. 28, 2013	Test Mode	Mode 2 (EUT 2)

**Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6**

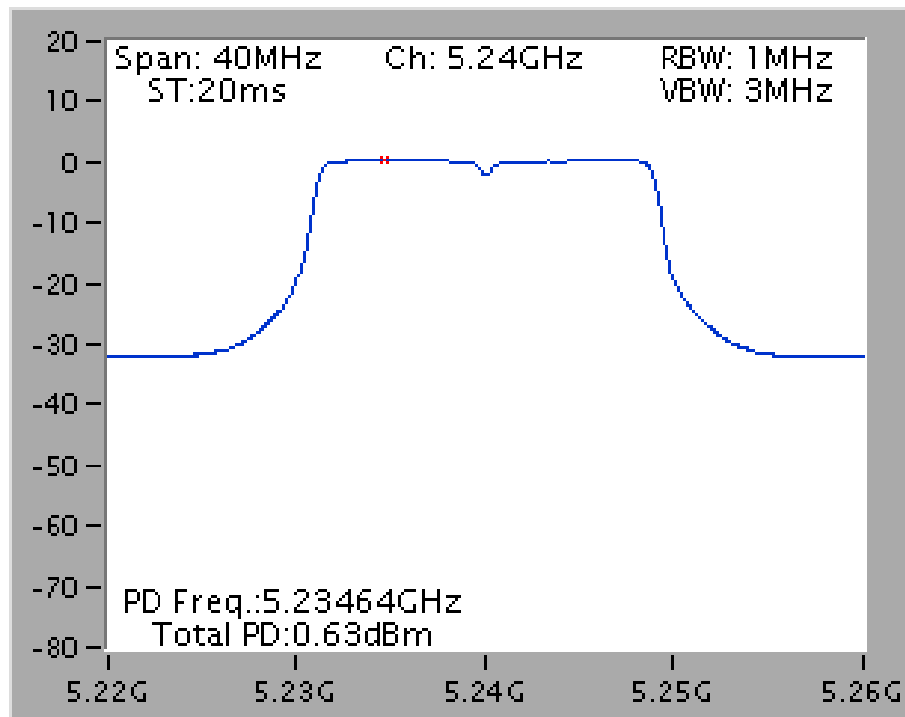
Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	1.46	1.93	Complies
40	5200 MHz	1.67	1.93	Complies
48	5240 MHz	1.53	1.93	Complies

Note: Directional gain=GANT+10log(NANT/Nss)=8.07dBi >6dBi, so limit=4 – (8.07 – 6)=1.93dBm/MHz.

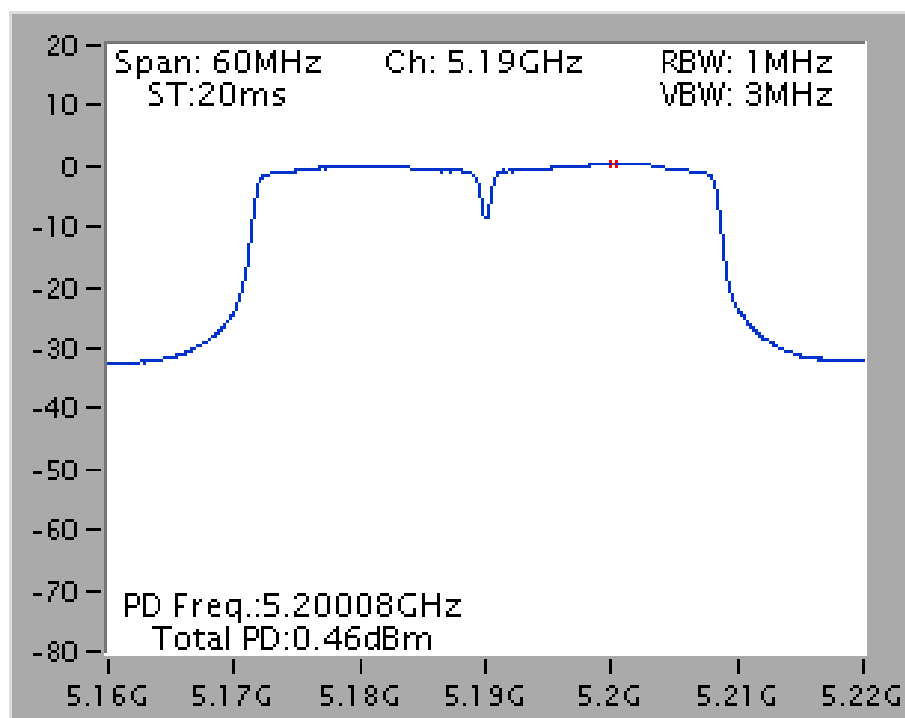
Note: All the test values were listed in the report.

For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6  
/ 5240 MHz / Test Mode: Mode 1 (EUT 1)

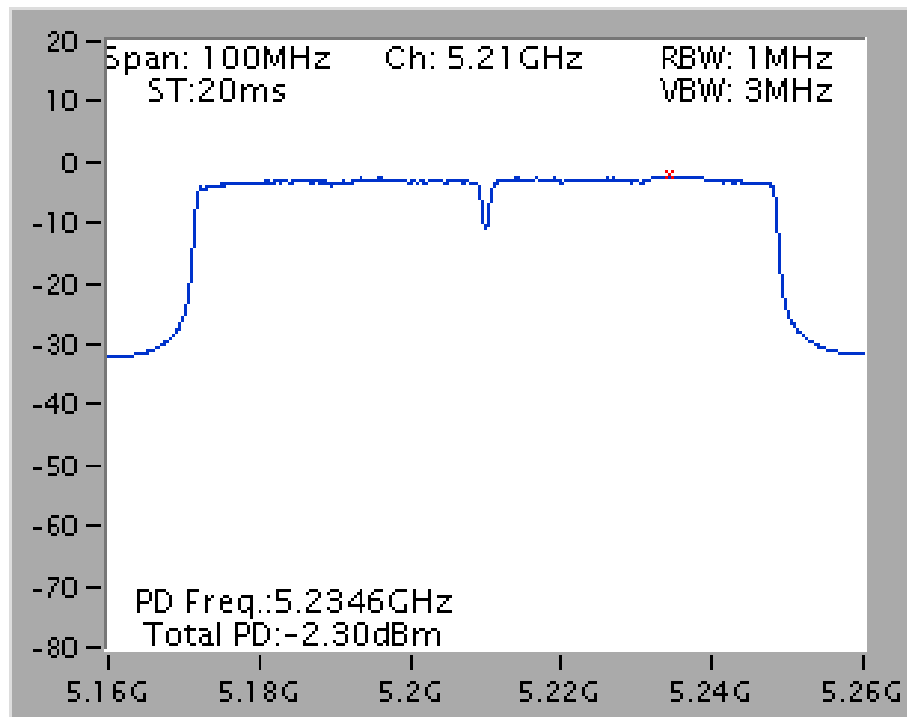


Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6  
/ 5190 MHz / Test Mode: Mode 1 (EUT 1)

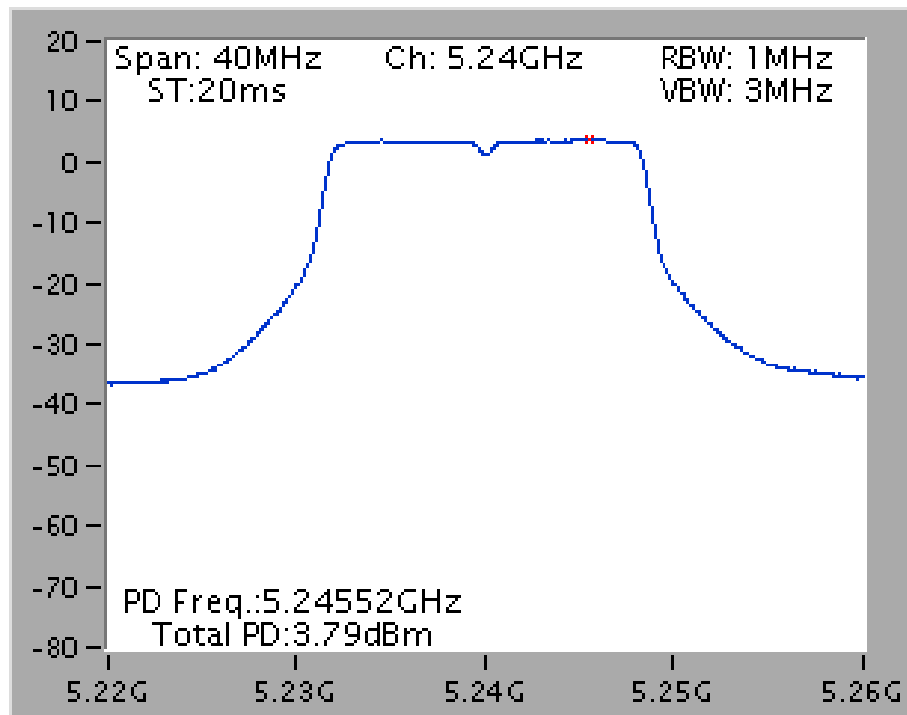




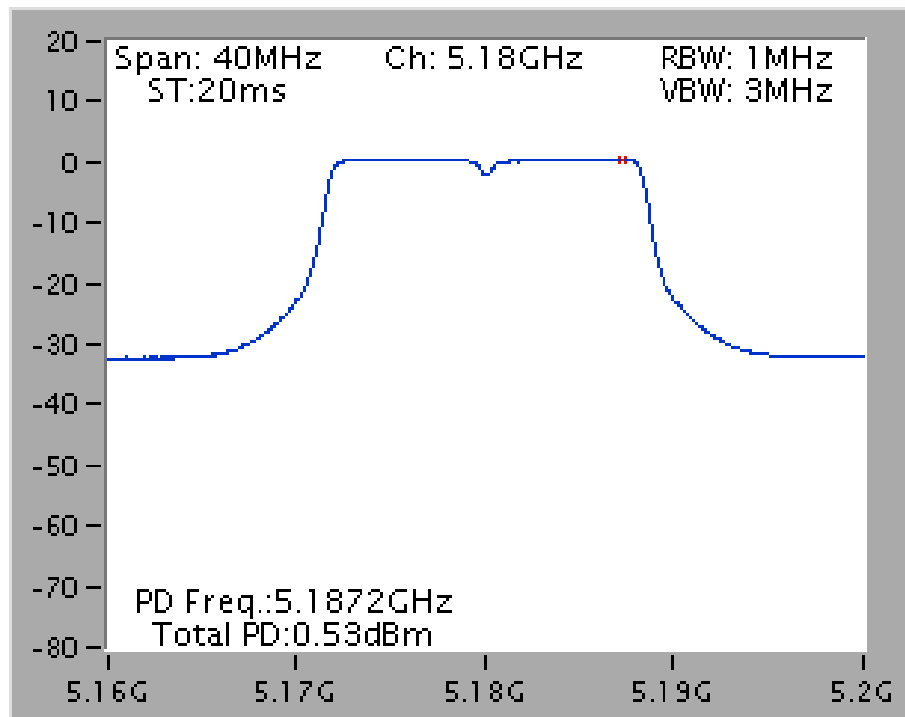
Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6  
/ 5210 MHz / Test Mode: Mode 1 (EUT 1)



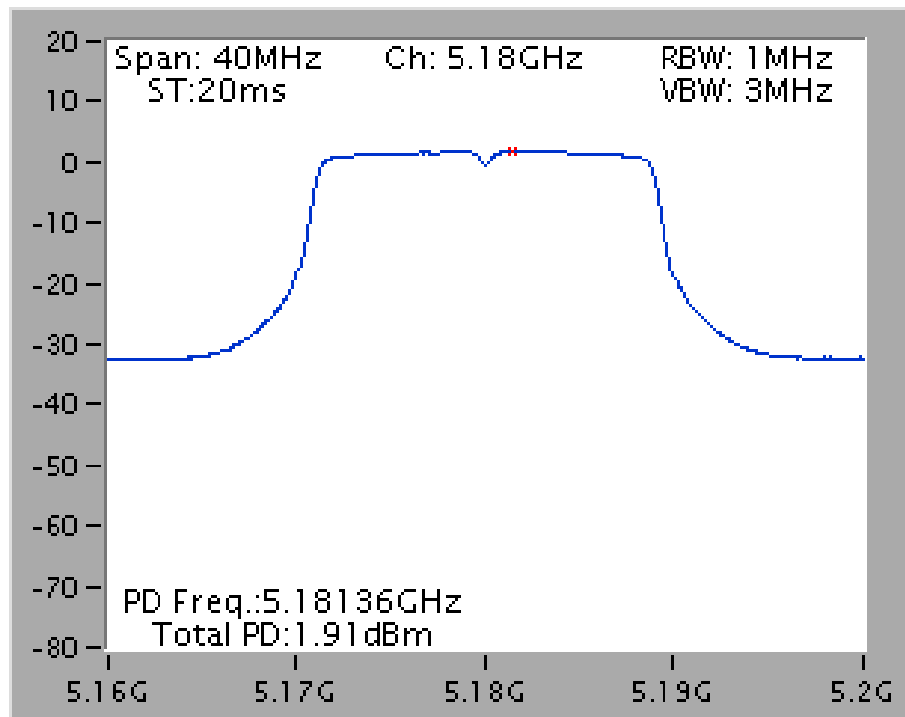
Power Density Plot on Configuration IEEE 802.11a / Chain 4 / 5240 MHz / Test Mode: Mode 1 (EUT 1)



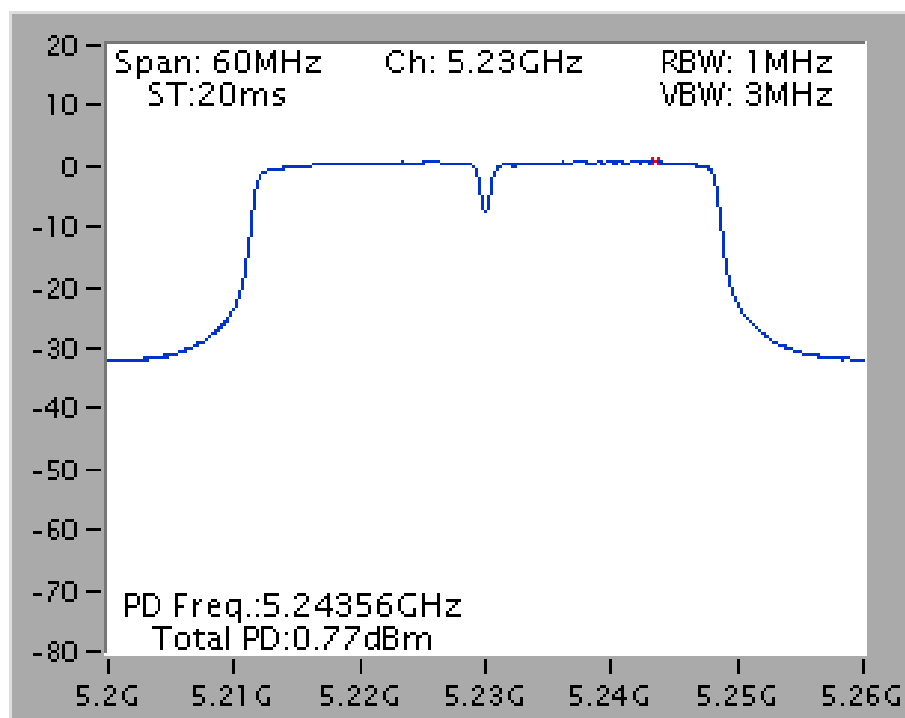
Power Density Plot on Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6 / 5180 MHz /  
Test Mode: Mode 1 (EUT 1)



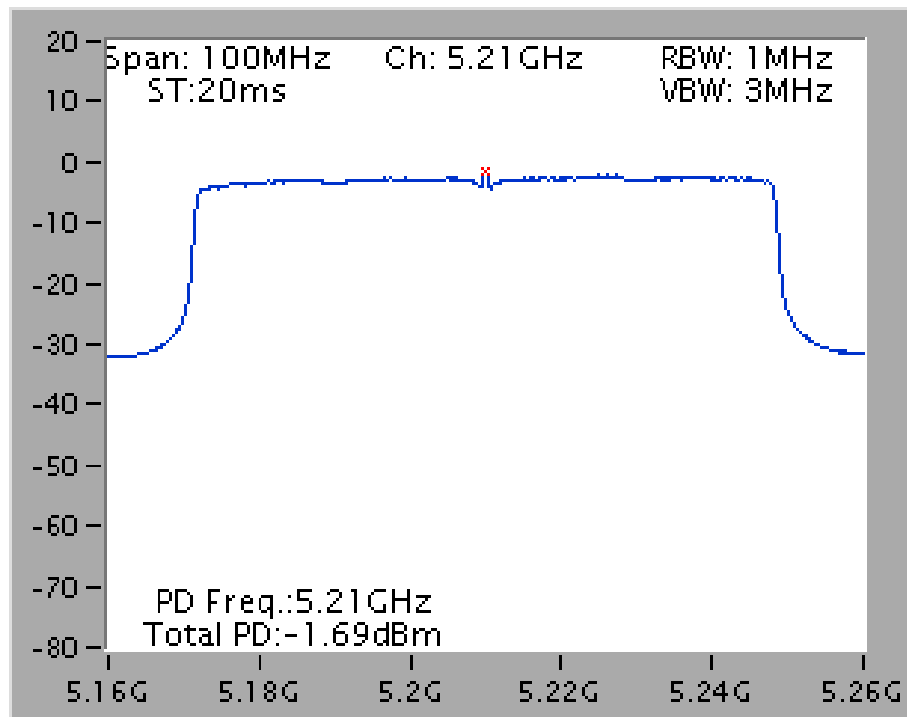
Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6  
/ 5180 MHz / Test Mode: Mode 2 (EUT 2)



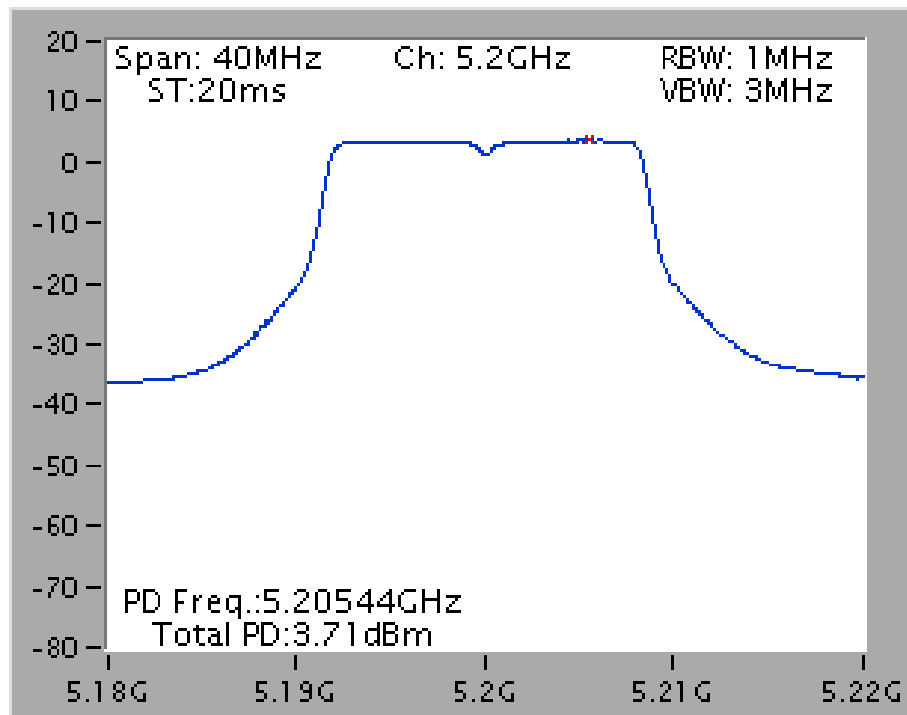
Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6  
/ 5230 MHz / Test Mode: Mode 2 (EUT 2)



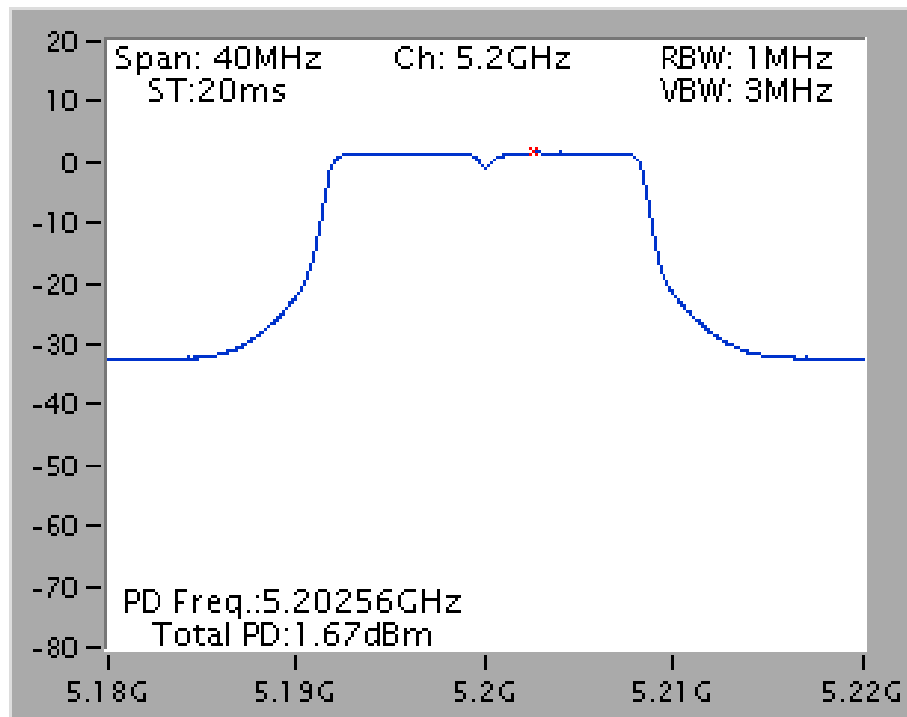
Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6  
/ 5210 MHz / Test Mode: Mode 2 (EUT 2)



Power Density Plot on Configuration IEEE 802.11a / Chain 4 / 5200 MHz / Test Mode: Mode 2 (EUT 2)



Power Density Plot on Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6 / 5200 MHz /  
Test Mode: Mode 2 (EUT 2)



## 4.5. Peak Excursion Measurement

### 4.5.1. Limit

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.

### 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	1MHz (Peak Trace) / 1MHz (Average Trace)
VBW	$\geq 3$ MHz (Peak Trace) / $\geq 3$ MHz (Average Trace)
Detector	Peak (Peak Trace) / RMS (Average Trace)
Trace	Trace: Max hold (Peak Trace) / Trace Average Sweep Count 100 (Average Trace)
Sweep Time	AUTO

### 4.5.3. Test Procedures

1. Trace A, Set RBW =1MHz, VBW = 3MHz, Span >26dB bandwidth, Max. hold.
2. Delta Mark trace A Maximum frequency and trace B same frequency.
3. Repeat the above procedure until measurements for all frequencies were complete.
4. Testing each modulation mode on a single channel in single operating band at single output port. All signal types need test (DSSS, OFDM). All modulation types need test (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM). All bandwidth modes need test.

### 4.5.4. Test Setup Layout

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

### 4.5.5. Test Deviation

There is no deviation with the original standard.

### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.5.7. Test Result of Peak Excursion

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Mode	Mode 1 (EUT 1)		

##### Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (MCS0)	5180 MHz	8.92	13	Complies
QPSK (MCS1)	5180 MHz	8.95	13	Complies
16QAM (MCS3)	5180 MHz	9.18	13	Complies
64QAM (MCS5)	5180 MHz	9.59	13	Complies
256QAM (MCS8)	5180 MHz	9.98	13	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (MCS0)	5230 MHz	9.15	13	Complies
QPSK (MCS1)	5230 MHz	8.89	13	Complies
16QAM (MCS3)	5230 MHz	10.54	13	Complies
64QAM (MCS5)	5230 MHz	10.93	13	Complies
256QAM (MCS8)	5230 MHz	10.35	13	Complies

##### Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (MCS0)	5210 MHz	8.93	13	Complies
QPSK (MCS1)	5210 MHz	11.37	13	Complies
16QAM (MCS3)	5210 MHz	10.92	13	Complies
64QAM (MCS5)	5210 MHz	11.41	13	Complies
256QAM (MCS8)	5210 MHz	10.33	13	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Mode	Mode 1 (EUT 1)		

#### Configuration IEEE 802.11a / Chain 4

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (6Mbps)	5180 MHz	9.02	13	Complies
QPSK (12Mbps)	5180 MHz	9.18	13	Complies
16QAM (24Mbps)	5180 MHz	10.20	13	Complies
64QAM (48Mbps)	5180 MHz	9.62	13	Complies

#### Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (6Mbps)	5240 MHz	9.22	13	Complies
QPSK (12Mbps)	5240 MHz	9.06	13	Complies
16QAM (24Mbps)	5240 MHz	9.25	13	Complies
64QAM (48Mbps)	5240 MHz	10.19	13	Complies



Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11ac
Test Mode	Mode 2 (EUT 2)		

**Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6**

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (MCS0)	5180 MHz	8.98	13	Complies
QPSK (MCS1)	5180 MHz	9.07	13	Complies
16QAM (MCS3)	5180 MHz	9.11	13	Complies
64QAM (MCS5)	5180 MHz	9.30	13	Complies
256QAM (MCS8)	5180 MHz	9.75	13	Complies

**Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6**

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (MCS0)	5230 MHz	8.69	13	Complies
QPSK (MCS1)	5230 MHz	8.90	13	Complies
16QAM (MCS3)	5230 MHz	9.24	13	Complies
64QAM (MCS5)	5230 MHz	9.17	13	Complies
256QAM (MCS8)	5230 MHz	9.87	13	Complies

**Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6**

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (MCS0)	5210 MHz	9.39	13	Complies
QPSK (MCS1)	5210 MHz	9.57	13	Complies
16QAM (MCS3)	5210 MHz	9.89	13	Complies
64QAM (MCS5)	5210 MHz	10.60	13	Complies
256QAM (MCS8)	5210 MHz	11.30	13	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a
Test Mode	Mode 2 (EUT 2)		

**Configuration IEEE 802.11a / Chain 4**

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (6Mbps)	5180 MHz	8.76	13	Complies
QPSK (12Mbps)	5180 MHz	9.05	13	Complies
16QAM (24Mbps)	5180 MHz	9.76	13	Complies
64QAM (48Mbps)	5180 MHz	9.80	13	Complies

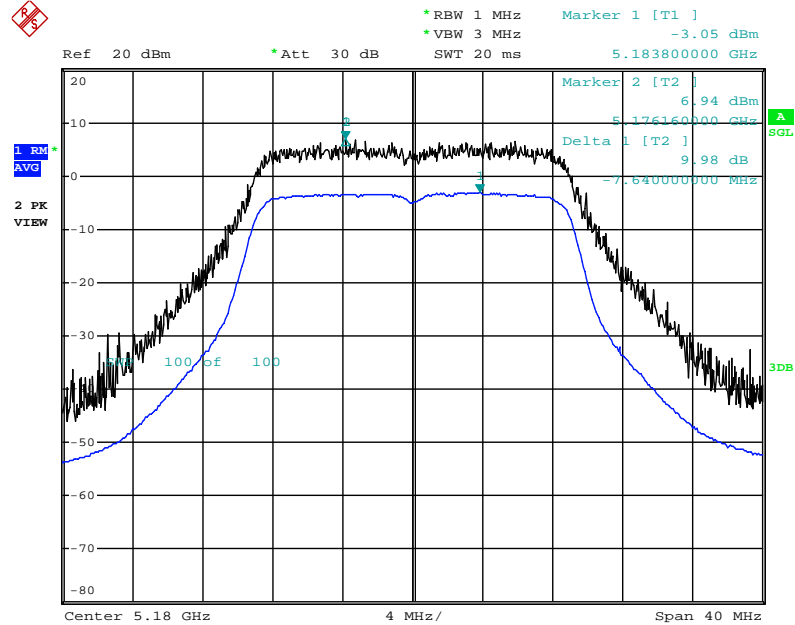
Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Configurations	IEEE 802.11a
Test Mode	Mode 2 (EUT 2)		

#### Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6

Modulation	Frequency	Peak Excursion (dB)	Max. Limit (dB)	Result
BSPK (6Mbps)	5200 MHz	8.61	13	Complies
QPSK (12Mbps)	5200 MHz	8.93	13	Complies
16QAM (24Mbps)	5200 MHz	8.65	13	Complies
64QAM (48Mbps)	5200 MHz	9.49	13	Complies

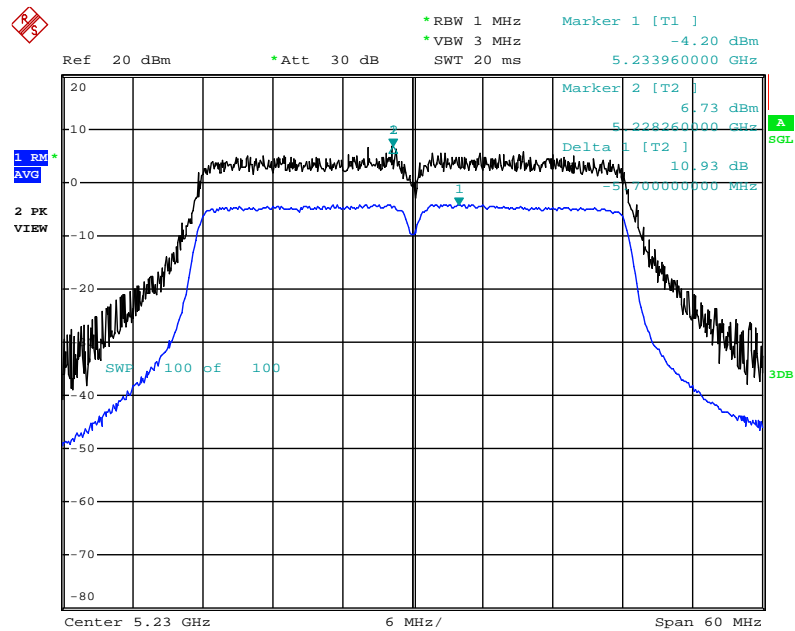
Note: Only the channel with maximum results was listed in the report.

Peak Excursion Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6 / 256QAM (MCS8) / 5180 MHz / Test Mode: Mode 1 (EUT 1)



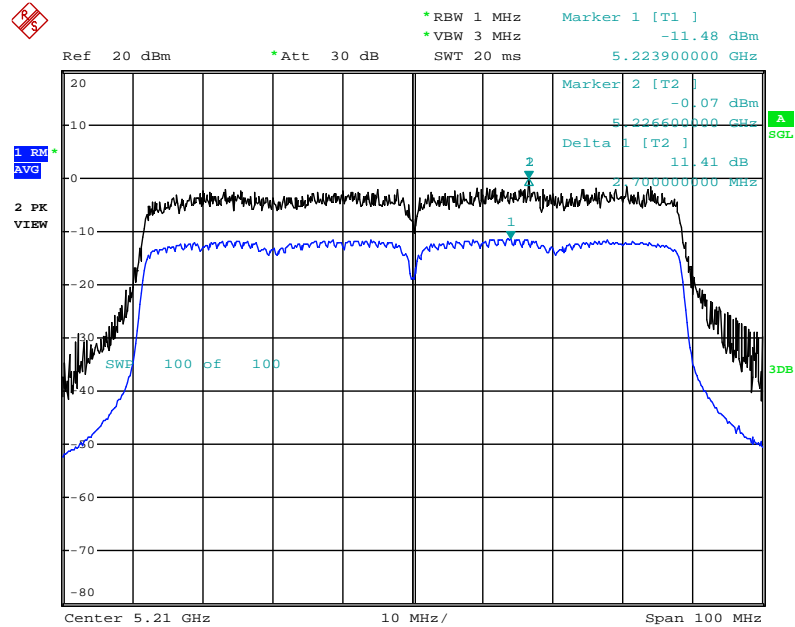
Date: 3.JUL.2013 16:24:34

Peak Excursion Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6 / 64QAM (MCS5) / 5230 MHz / Test Mode: Mode 1 (EUT 1)



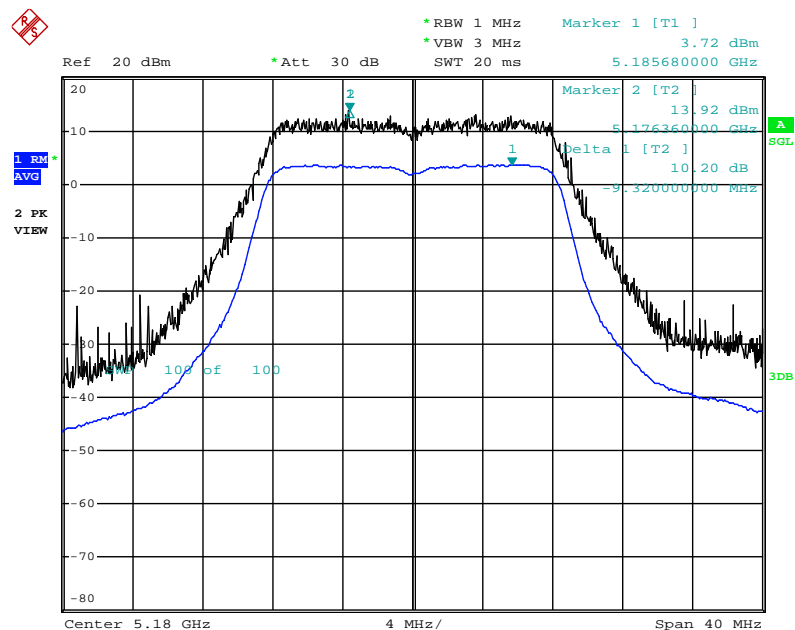
Date: 3.JUL.2013 16:42:19

# Peak Excursion Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6 / 64QAM (MCS5) / 5210 MHz / Test Mode: Mode 1 (EUT 1)



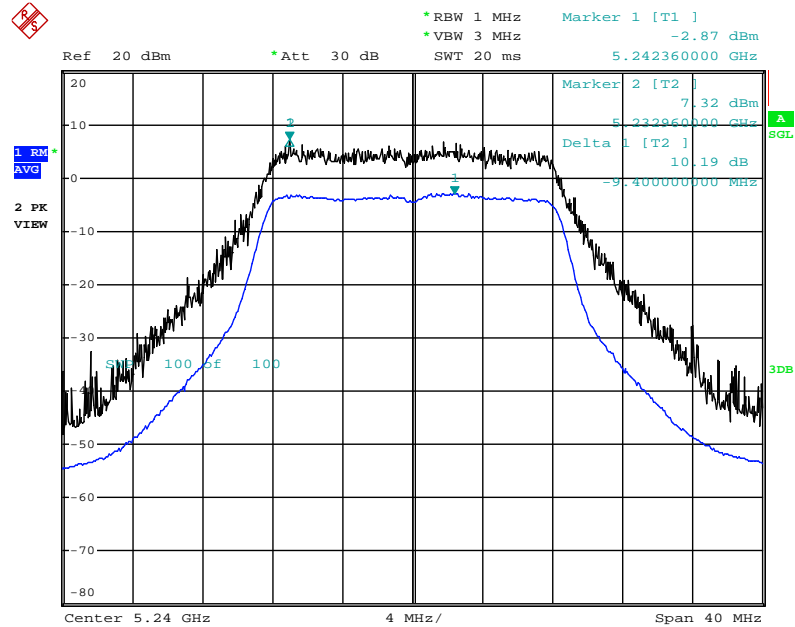
Date: 3.JUL.2013 16:47:37

# Peak Excursion Plot on Configuration IEEE 802.11a / Chain 4 / 16QAM (24Mbps) / 5180 MHz / Test Mode: Mode 1 (EUT 1)



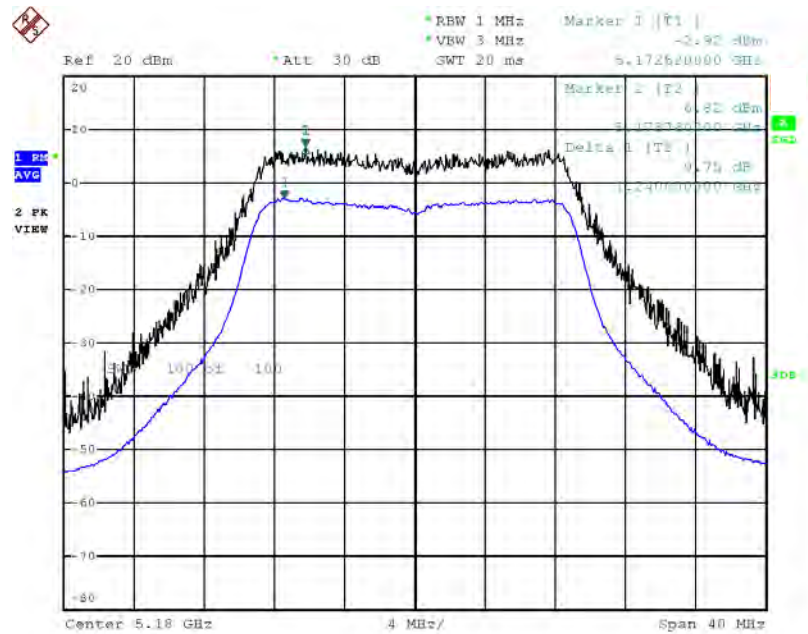
Date: 3.JUL.2013 12:50:03

Peak Excursion Plot on Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6 / 64QAM (48Mbps) / 5240 MHz / Test Mode: Mode 1 (EUT 1)



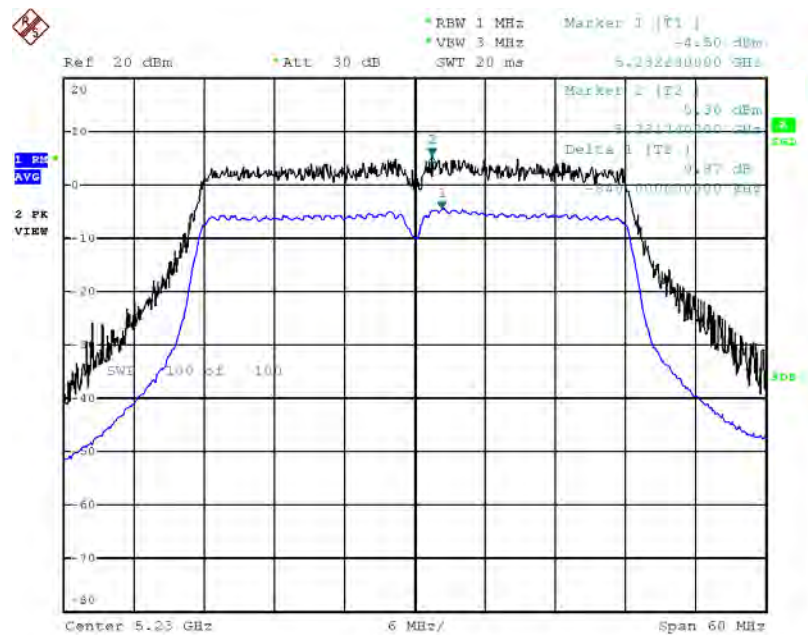
Date: 3.JUL.2013 16:12:25

Peak Excursion Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Chain 4+ Chain 5+ Chain 6 / 256QAM (MCS8) / 5180 MHz / Test Mode: Mode 2 (EUT 2)



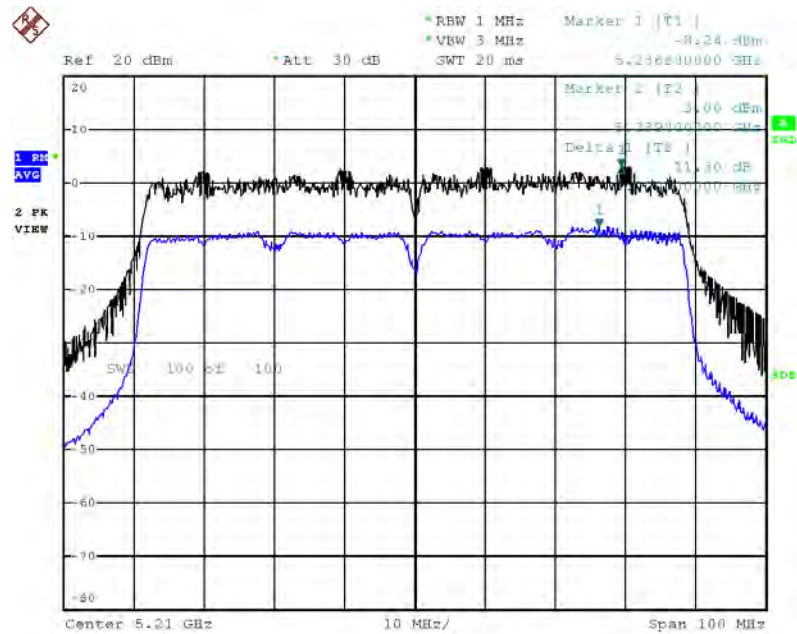
Date: 26.JUL.2013 13:05:21

Peak Excursion Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Chain 4+ Chain 5+ Chain 6 / 256QAM (MCS8) / 5230 MHz / Test Mode: Mode 2 (EUT 2)



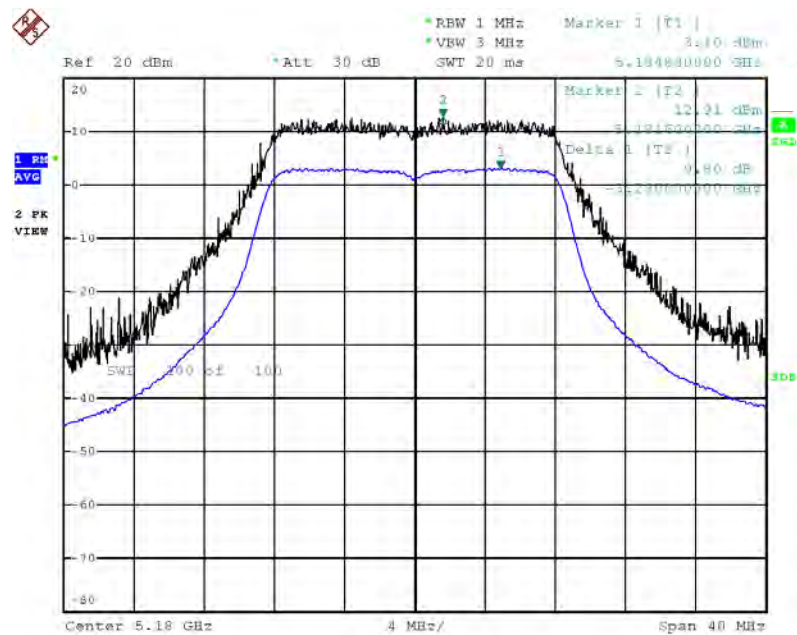
Date: 26.JUL.2013 13:24:38

Peak Excursion Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Chain 4+ Chain 5+ Chain 6 / 256QAM (MCS8) / 5210 MHz / Test Mode: Mode 1 (EUT 1)



Date: 26.JUL.2013 13:32:07

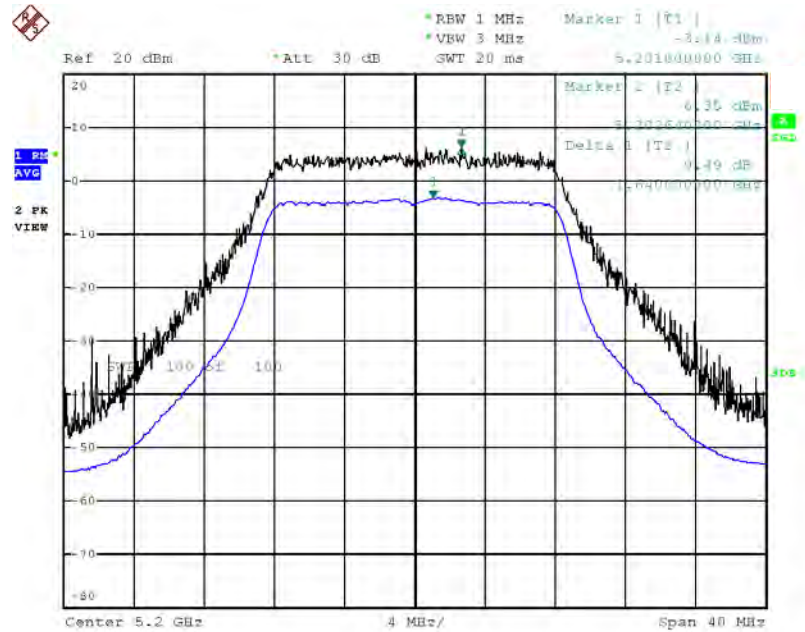
Peak Excursion Plot on Configuration IEEE 802.11a / Chain 4 / 64QAM (48Mbps) / 5180 MHz / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 12:55:36



Peak Excursion Plot on Configuration IEEE 802.11a / Chain 4+ Chain 5+ Chain 6 / 64QAM (48Mbps) / 5200 MHz / Test Mode: Mode 2 (EUT 2)



Date: 26.JUL.2013 13:00:02

## 4.6. Radiated Emissions Measurement

### 4.6.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (microvolt/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 / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	1MHz / 3MHz for peak

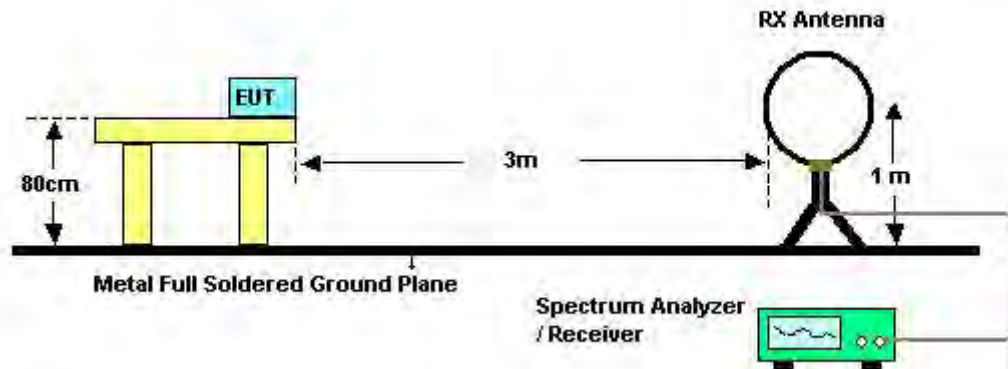
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

#### 4.6.3. Test Procedures

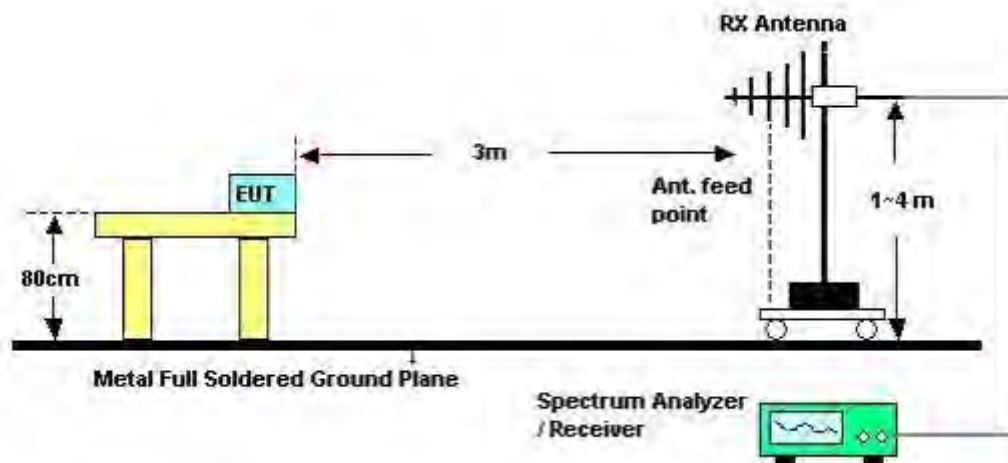
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. 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.
9. 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.
10. 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

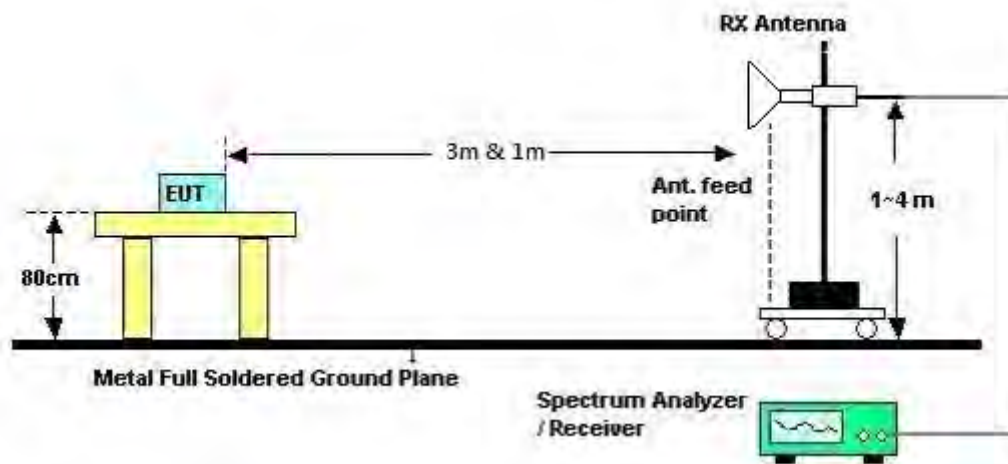
For Radiated Emissions: 9kHz ~30MHz



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	24.5°C	Humidity	57%
Test Engineer	Serway Li	Configurations	Normal Link
Test Date	Jul. 27, 2013		

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.

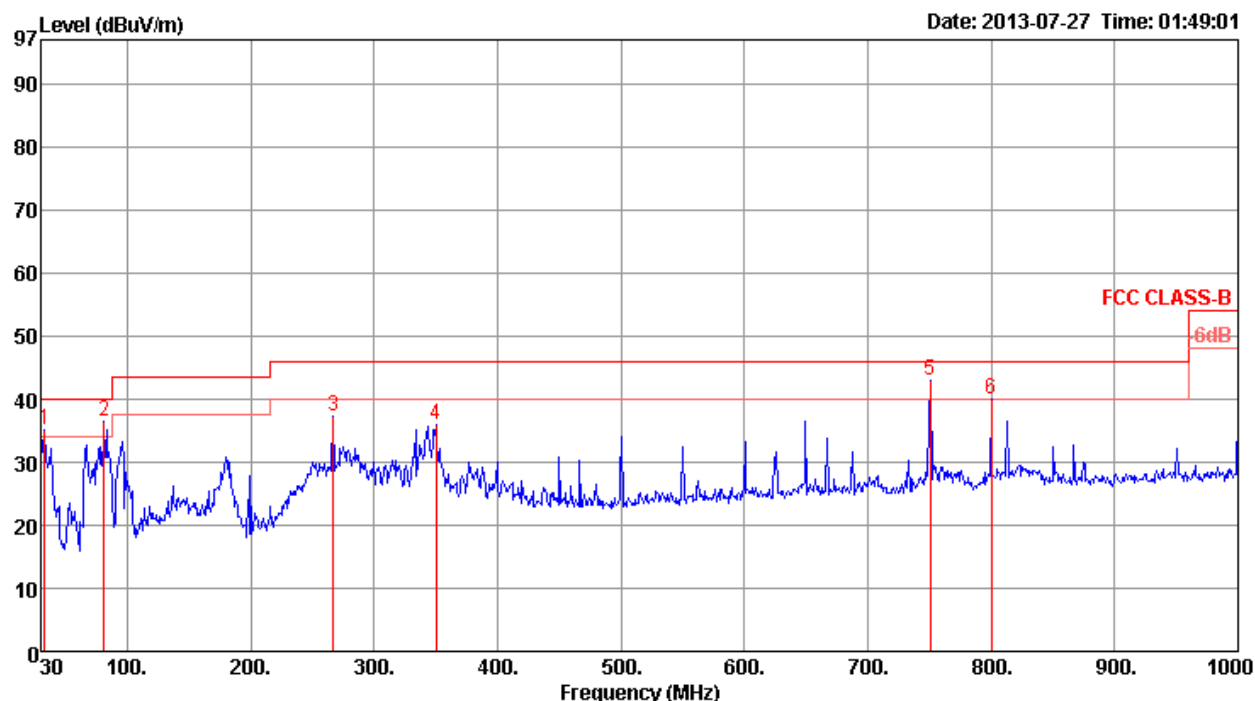
Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

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

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

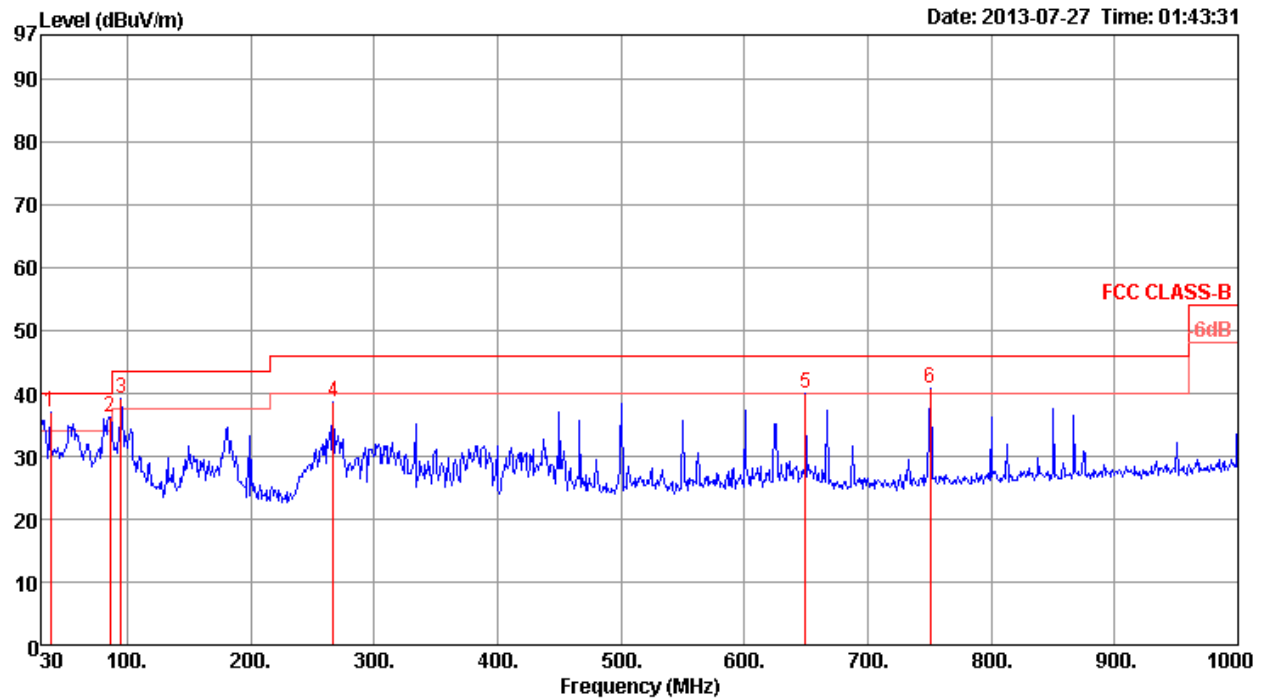
Temperature	24.5°C	Humidity	57%
Test Engineer	Serway Li	Configurations	Normal Link
Test Mode	Mode 3		

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	32.91	35.19	40.00	-4.81	45.18	0.66	17.15	27.80	Peak	400	0 HORIZONTAL
2	81.41	36.61	40.00	-3.39	55.94	1.00	7.35	27.68	Peak	400	0 HORIZONTAL
3	266.68	37.18	46.00	-8.82	49.32	1.86	12.97	26.97	Peak	400	0 HORIZONTAL
4	350.10	35.90	46.00	-10.10	46.33	2.10	14.72	27.25	Peak	400	0 HORIZONTAL
5	750.71	42.97	46.00	-3.03	48.14	3.20	19.43	27.80	Peak	400	0 HORIZONTAL
6	800.18	40.05	46.00	-5.95	44.66	3.22	19.77	27.60	Peak	400	0 HORIZONTAL

# Vertical

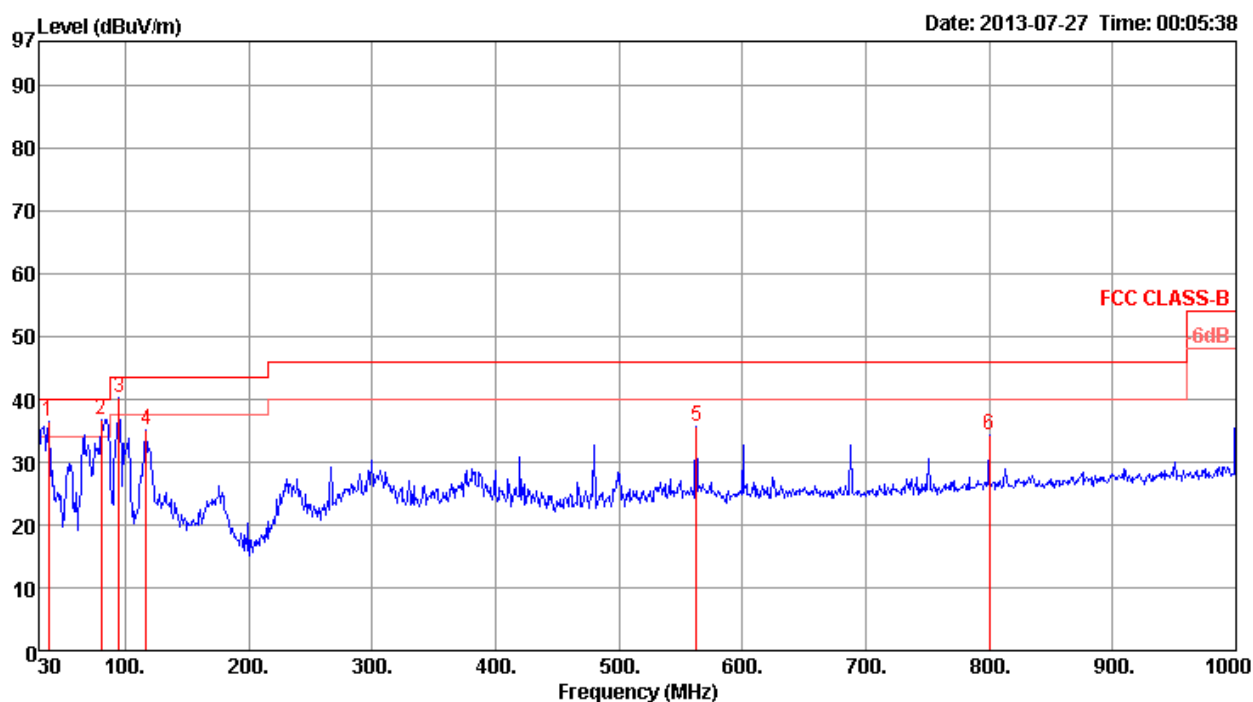


	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	37.76	36.92	40.00	-3.08	49.74	0.68	14.30	27.80	Peak	400	0 VERTICAL
2	86.26	36.24	40.00	-3.76	54.53	1.11	8.26	27.66	Peak	400	0 VERTICAL
3	94.99	39.31	43.50	-4.19	55.76	1.19	9.98	27.62	Peak	400	0 VERTICAL
4	266.68	38.69	46.00	-7.31	50.83	1.86	12.97	26.97	Peak	400	0 VERTICAL
5	649.83	40.06	46.00	-5.94	46.19	2.99	18.93	28.05	Peak	400	0 VERTICAL
6	750.71	40.85	46.00	-5.15	46.02	3.20	19.43	27.80	Peak	400	0 VERTICAL



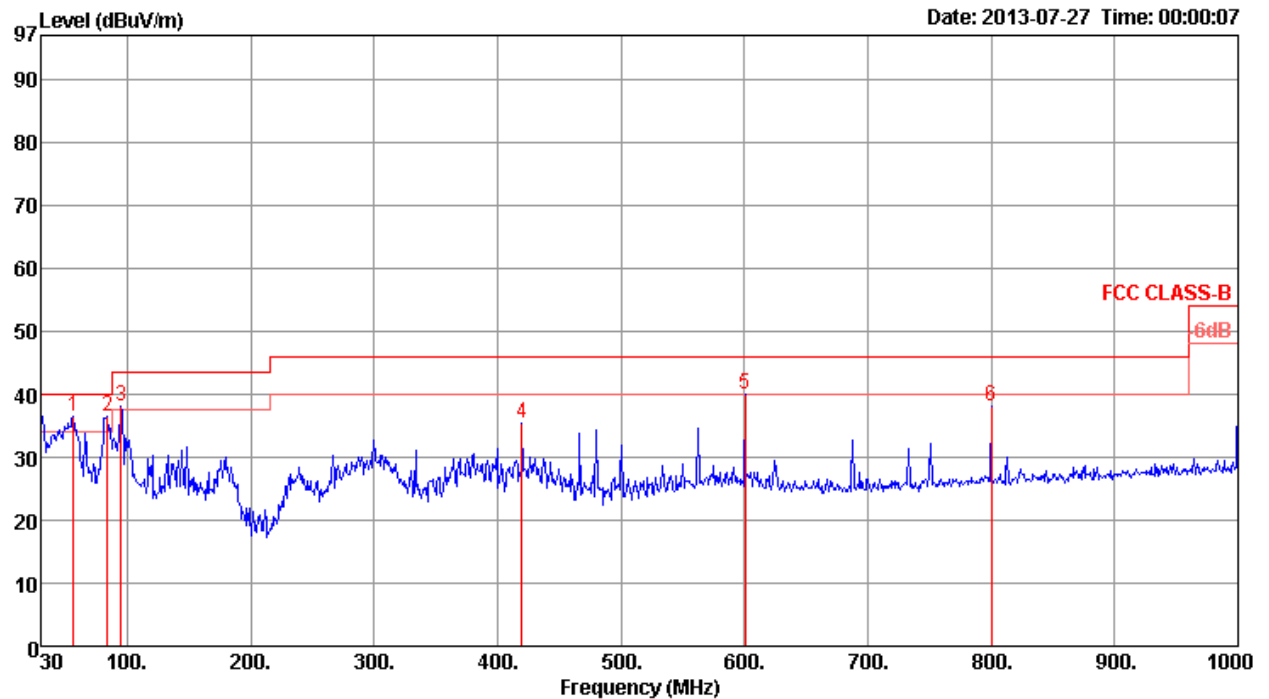
Temperature	24.5°C	Humidity	57%
Test Engineer	Serway Li	Configurations	Normal Link
Test Mode	Mode 6		

### Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp			A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	
1	37.76	36.34	40.00	-3.66	49.16	0.68	14.30	27.80	Peak	400	0	HORIZONTAL
2	80.44	36.74	40.00	-3.26	56.28	0.97	7.17	27.68	Peak	400	0	HORIZONTAL
3	94.99	40.35	43.50	-3.15	56.80	1.19	9.98	27.62	Peak	400	0	HORIZONTAL
4	117.30	35.23	43.50	-8.27	49.16	1.28	12.31	27.52	Peak	400	0	HORIZONTAL
5	562.53	35.75	46.00	-10.25	42.72	2.79	18.34	28.10	Peak	400	0	HORIZONTAL
6	800.18	34.29	46.00	-11.71	38.90	3.22	19.77	27.60	Peak	400	0	HORIZONTAL

# Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
1	56.19	36.37	40.00	-3.63	55.83	0.85	7.47	27.78	Peak	400	0 VERTICAL
2	84.32	36.53	40.00	-3.47	55.20	1.10	7.89	27.66	Peak	400	0 VERTICAL
3	94.99	38.17	43.50	-5.33	54.62	1.19	9.98	27.62	Peak	400	0 VERTICAL
4	419.94	35.51	46.00	-10.49	44.46	2.37	16.38	27.70	Peak	400	0 VERTICAL
5	600.36	40.09	46.00	-5.91	46.61	2.81	18.77	28.10	Peak	400	0 VERTICAL
6	800.18	38.12	46.00	-7.88	42.73	3.22	19.77	27.60	Peak	400	0 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.

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch36 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

##### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15535.12	44.70	54.00	-9.30	31.37	10.77	38.15	35.59	Average	100	177	HORIZONTAL
2	15543.28	57.33	74.00	-16.67	44.03	10.77	38.12	35.59	Peak	100	177	HORIZONTAL

##### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15536.28	44.71	54.00	-9.29	31.38	10.77	38.15	35.59	Average	100	266	VERTICAL
2	15537.52	56.83	74.00	-17.17	43.50	10.77	38.15	35.59	Peak	100	266	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch40 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	15596.24	44.26	54.00	-9.74	31.02	10.78	38.04	35.58	Average	100	124
2	15596.90	56.79	74.00	-17.21	43.55	10.78	38.04	35.58	Peak	100	124

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	15595.26	56.84	74.00	-17.16	43.60	10.78	38.04	35.58	Peak	100	209
2	15596.42	44.38	54.00	-9.62	31.14	10.78	38.04	35.58	Average	100	209

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15723.30	44.54	54.00	-9.46	31.46	10.79	37.85	35.56	Average	100	185	HORIZONTAL
2	15723.42	56.43	74.00	-17.57	43.35	10.79	37.85	35.56	Peak	100	185	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15715.92	56.25	74.00	-17.75	43.17	10.79	37.85	35.56	Peak	100	276	VERTICAL
2	15717.50	44.20	54.00	-9.80	31.12	10.79	37.85	35.56	Average	100	276	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz Ch38 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15573.74	44.40	54.00	-9.60	31.13	10.78	38.07	35.58	Average	100	281	HORIZONTAL
2	15574.38	56.99	74.00	-17.01	43.72	10.78	38.07	35.58	Peak	100	281	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15567.40	57.34	74.00	-16.66	44.05	10.78	38.09	35.58	Peak	100	167	VERTICAL
2	15574.54	44.50	54.00	-9.50	31.23	10.78	38.07	35.58	Average	100	167	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz Ch46 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15690.60	44.02	54.00	-9.98	30.88	10.79	37.91	35.56	Average	100	112	HORIZONTAL
2	15692.28	57.28	74.00	-16.72	44.17	10.79	37.88	35.56	Peak	100	112	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15689.84	43.97	54.00	-10.03	30.83	10.79	37.91	35.56	Average	100	233	VERTICAL
2	15690.60	56.90	74.00	-17.10	43.76	10.79	37.91	35.56	Peak	100	233	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 80MHz Ch42 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss Factor	Factor	Remark	cm	deg	Pol/Phase
1	15626.28	56.98	74.00	-17.02	43.78	10.78	37.99	35.57 Peak	100	213	HORIZONTAL
2	15634.34	44.04	54.00	-9.96	30.84	10.78	37.99	35.57 Average	100	213	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss Factor	Factor	Remark	cm	deg	Pol/Phase
1	15625.86	44.12	54.00	-9.88	30.92	10.78	37.99	35.57 Average	100	85	VERTICAL
2	15629.02	56.58	74.00	-17.42	43.38	10.78	37.99	35.57 Peak	100	85	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.



Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36 / Chain 4
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

#### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15531.08	51.50	74.00	-22.50	42.99	6.13	37.67	35.29	Peak	100	175	HORIZONTAL
2	15543.40	38.63	54.00	-15.37	30.16	6.13	37.65	35.31	Average	100	175	HORIZONTAL

#### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15530.68	38.81	54.00	-15.19	30.24	6.13	37.73	35.29	Average	100	83	VERTICAL
2	15538.52	51.46	74.00	-22.54	42.95	6.13	37.69	35.31	Peak	100	83	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 40 / Chain 4
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15608.16	50.43	74.00	-23.57	42.06	6.13	37.58	35.34	Peak	100	256	HORIZONTAL
2	15608.28	38.45	54.00	-15.55	30.08	6.13	37.58	35.34	Average	100	256	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15602.20	50.69	74.00	-23.31	42.30	6.13	37.60	35.34	Peak	100	148	VERTICAL
2	15604.16	38.40	54.00	-15.60	30.01	6.13	37.60	35.34	Average	100	148	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 48 / Chain 4
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15724.76	52.52	74.00	-21.48	44.29	6.14	37.48	35.39	Peak	100	198	HORIZONTAL
2	15728.12	38.99	54.00	-15.01	30.78	6.14	37.46	35.39	Average	100	198	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15727.84	39.14	54.00	-14.86	30.93	6.14	37.46	35.39	Average	100	308	VERTICAL
2	15729.96	51.53	74.00	-22.47	43.32	6.14	37.46	35.39	Peak	100	308	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15535.42	44.57	54.00	-9.43	31.24	10.77	38.15	35.59	Average	100	166	HORIZONTAL
2	15538.90	57.13	74.00	-16.87	43.83	10.77	38.12	35.59	Peak	100	166	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15535.86	44.52	54.00	-9.48	31.19	10.77	38.15	35.59	Average	100	302	VERTICAL
2	15537.04	56.78	74.00	-17.22	43.45	10.77	38.15	35.59	Peak	100	302	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 40 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15595.12	44.43	54.00	-9.57	31.19	10.78	38.04	35.58	Average	100	133	HORIZONTAL
2	15604.96	56.87	74.00	-17.13	43.63	10.78	38.04	35.58	Peak	100	133	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15595.30	44.30	54.00	-9.70	31.06	10.78	38.04	35.58	Average	100	222	VERTICAL
2	15603.32	57.21	74.00	-16.79	43.97	10.78	38.04	35.58	Peak	100	222	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

#### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15721.52	44.54	54.00	-9.46	31.46	10.79	37.85	35.56	Average	100	238	HORIZONTAL
2	15723.30	57.33	74.00	-16.67	44.25	10.79	37.85	35.56	Peak	100	238	HORIZONTAL

#### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	15716.80	56.91	74.00	-17.09	43.83	10.79	37.85	35.56	Peak	100	142	VERTICAL
2	15723.16	44.30	54.00	-9.70	31.22	10.79	37.85	35.56	Average	100	142	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.

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch36 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15516.70	42.53	54.00	-11.47	30.95	7.85	34.77	38.50	Average	199	100	HORIZONTAL
2 p	15563.10	54.70	74.00	-19.30	43.16	7.86	34.81	38.49	Peak	199	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15521.40	42.43	54.00	-11.57	30.85	7.85	34.77	38.50	Average	270	100	VERTICAL
2 p	15531.60	54.97	74.00	-19.03	43.42	7.85	34.79	38.49	Peak	270	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch40 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15607.30	42.80	54.00	-11.20	31.30	7.88	34.86	38.48	Average	76	100	HORIZONTAL
2 p	15617.30	55.59	74.00	-18.41	44.09	7.88	34.86	38.48	Peak	76	100	HORIZONTAL

#### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15581.90	54.69	74.00	-19.31	43.17	7.87	34.83	38.48	Peak	219	100	VERTICAL
2 a	15609.10	42.36	54.00	-11.64	30.86	7.88	34.86	38.48	Average	219	100	VERTICAL



Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15726.90	46.00	54.00	-8.00	34.58	7.92	34.96	38.46	Average	299	100	HORIZONTAL
2 p	15727.00	59.67	74.00	-14.33	48.25	7.92	34.96	38.46	Peak	299	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15708.70	57.45	74.00	-16.55	46.02	7.91	34.94	38.46	Peak	285	135	VERTICAL
2 a	15727.20	44.02	54.00	-9.98	32.60	7.92	34.96	38.46	Average	285	135	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz Ch38 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1 p	15570.64	54.85	74.00	-19.15	43.31	7.86	34.81	38.49	Peak	235	100	HORIZONTAL
2 a	15575.96	42.19	54.00	-11.81	30.67	7.86	34.83	38.49	Average	235	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1 a	15561.24	42.11	54.00	-11.89	30.57	7.86	34.81	38.49	Average	115	100	VERTICAL
2 p	15563.80	55.11	74.00	-18.89	43.57	7.86	34.81	38.49	Peak	115	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz Ch46 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15683.48	41.95	54.00	-12.05	30.51	7.90	34.92	38.46	Average	227	100	HORIZONTAL
2 p	15693.48	54.96	74.00	-19.04	43.52	7.90	34.92	38.46	Peak	227	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15685.12	54.69	74.00	-19.31	43.25	7.90	34.92	38.46	Peak	116	100	VERTICAL
2 a	15694.72	41.81	54.00	-12.19	30.37	7.90	34.92	38.46	Average	116	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 80MHz Ch42 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15637.84	42.25	54.00	-11.75	30.77	7.89	34.88	38.47	Average	160	100	HORIZONTAL
2 p	15638.32	54.53	74.00	-19.47	43.05	7.89	34.88	38.47	Peak	160	100	HORIZONTAL

#### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15620.32	54.94	74.00	-19.06	43.44	7.88	34.86	38.48	Peak	259	100	VERTICAL
2 a	15621.00	42.19	54.00	-11.81	30.69	7.88	34.86	38.48	Average	259	100	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.

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36 / Chain 4
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1 p	15535.76	55.92	74.00	-18.08	44.37	7.85	34.79	38.49	Peak	258	100	HORIZONTAL
2 a	15540.52	43.03	54.00	-10.97	31.48	7.85	34.79	38.49	Average	258	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1 p	15537.54	55.63	74.00	-18.37	44.08	7.85	34.79	38.49	Peak	137	100	VERTICAL
2 a	15540.94	42.95	54.00	-11.05	31.40	7.85	34.79	38.49	Average	137	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 40 / Chain 4
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1 p	15603.56	55.13	74.00	-18.87	43.63	7.88	34.86	38.48	Peak	228	100	HORIZONTAL
2 a	15603.78	43.46	54.00	-10.54	31.96	7.88	34.86	38.48	Average	228	100	HORIZONTAL

#### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	Pol/Phase
1 a	15597.34	42.98	54.00	-11.02	31.45	7.88	34.83	38.48	Average	147	100	VERTICAL
2 p	15603.62	55.79	74.00	-18.21	44.29	7.88	34.86	38.48	Peak	147	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 48 / Chain 4
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15719.06	42.68	54.00	-11.32	31.24	7.92	34.94	38.46	Average	154	100	HORIZONTAL
2 p	15720.94	55.96	74.00	-18.04	44.52	7.92	34.94	38.46	Peak	154	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15720.76	55.08	74.00	-18.92	43.64	7.92	34.94	38.46	Peak	93	100	VERTICAL
2 a	15723.52	42.67	54.00	-11.33	31.23	7.92	34.94	38.46	Average	93	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1 a	15535.32	42.61	54.00	-11.39	31.06	7.85	34.79	38.49	Average	108	100	HORIZONTAL
2 p	15535.38	55.11	74.00	-18.89	43.56	7.85	34.79	38.49	Peak	108	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	deg	cm	
1 p	15538.08	55.83	74.00	-18.17	44.28	7.85	34.79	38.49	Peak	241	100	VERTICAL
2 a	15539.58	42.67	54.00	-11.33	31.12	7.85	34.79	38.49	Average	241	100	VERTICAL



Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 40 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15595.84	55.05	74.00	-18.95	43.52	7.88	34.83	38.48	Peak	198	100	HORIZONTAL
2 a	15604.92	42.29	54.00	-11.71	30.79	7.88	34.86	38.48	Average	198	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15599.32	54.86	74.00	-19.14	43.36	7.88	34.86	38.48	Peak	313	100	VERTICAL
2 a	15602.38	42.64	54.00	-11.36	31.14	7.88	34.86	38.48	Average	313	100	VERTICAL

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 a	15723.84	46.20	54.00	-7.80	34.76	7.92	34.94	38.46	Average	303	100	HORIZONTAL
2 p	15724.28	60.93	74.00	-13.07	49.49	7.92	34.94	38.46	Peak	303	100	HORIZONTAL

#### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	Remark	deg	cm	
1 p	15713.68	58.95	74.00	-15.05	47.51	7.92	34.94	38.46	Peak	299	121	VERTICAL
2 a	15723.76	45.56	54.00	-8.44	34.12	7.92	34.94	38.46	Average	299	121	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 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

### 4.7.2. 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 / 10Hz 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, only the frequency range investigated is limited to 100MHz around bandedges.

### 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	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch 36, 40, 48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

##### Channel 36

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	5148.60	73.90	74.00	-0.10	36.80	3.43	33.67	0.00	Peak	125	75 HORIZONTAL
2	5150.00	48.84	54.00	-5.16	11.74	3.43	33.67	0.00	Average	125	75 HORIZONTAL
3	5178.80	105.63			68.46	3.44	33.73	0.00	Average	125	75 HORIZONTAL
4	5179.00	117.45			80.28	3.44	33.73	0.00	Peak	125	75 HORIZONTAL

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

##### Channel 40

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	5149.20	70.14	74.00	-3.86	33.04	3.43	33.67	0.00	Peak	123	80 HORIZONTAL
2	5150.00	53.72	54.00	-0.28	16.62	3.43	33.67	0.00	Average	123	80 HORIZONTAL
3	5194.80	120.07			82.86	3.45	33.76	0.00	Peak	123	80 HORIZONTAL
4	5199.20	108.63			71.42	3.45	33.76	0.00	Average	123	80 HORIZONTAL

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

##### Channel 48

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg
1	5139.20	64.29	74.00	-9.71	27.22	3.43	33.64	0.00	Peak	122	72 HORIZONTAL
2	5143.40	49.86	54.00	-4.14	12.76	3.43	33.67	0.00	Average	122	72 HORIZONTAL
3	5243.00	124.27			86.99	3.46	33.82	0.00	Peak	122	72 HORIZONTAL
4	5243.60	113.26			75.98	3.46	33.82	0.00	Average	122	72 HORIZONTAL
5	5352.40	49.96	54.00	-4.04	12.44	3.49	34.03	0.00	Average	122	72 HORIZONTAL
6	5352.40	61.72	74.00	-12.28	24.20	3.49	34.03	0.00	Peak	122	72 HORIZONTAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz Ch 38, 46 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

#### Channel 38

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5148.80	53.63	54.00	-0.37	16.53	3.43	33.67	0.00	Average	125	69 HORIZONTAL
2	5149.20	72.00	74.00	-2.00	34.90	3.43	33.67	0.00	Peak	125	69 HORIZONTAL
3	5178.80	100.42			63.25	3.44	33.73	0.00	Average	125	69 HORIZONTAL
4	5179.60	112.06			74.89	3.44	33.73	0.00	Peak	125	69 HORIZONTAL

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

#### Channel 46

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5150.00	53.89	54.00	-0.11	16.79	3.43	33.67	0.00	Average	125	71 HORIZONTAL
2	5150.00	72.07	74.00	-1.93	34.97	3.43	33.67	0.00	Peak	125	71 HORIZONTAL
3	5228.40	117.59			80.34	3.46	33.79	0.00	Peak	125	71 HORIZONTAL
4	5238.40	105.40			68.12	3.46	33.82	0.00	Average	125	71 HORIZONTAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 80MHz Ch 42 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

#### Channel 42

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5150.00	53.44	54.00	-0.56	16.34	3.43	33.67	0.00	Average	125	68	HORIZONTAL
2	5150.00	73.90	74.00	-0.10	36.80	3.43	33.67	0.00	Peak	125	68	HORIZONTAL
3	5194.00	108.55			71.38	3.44	33.73	0.00	Peak	125	68	HORIZONTAL
4	5233.00	96.10			58.82	3.46	33.82	0.00	Average	125	68	HORIZONTAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36, 40, 48 / Chain 4
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

#### Channel 36

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5148.40	73.50	74.00	-0.50	36.40	3.43	33.67	0.00	Peak	100	306	HORIZONTAL
2	5150.00	50.49	54.00	-3.51	13.39	3.43	33.67	0.00	Average	100	306	HORIZONTAL
3	5183.20	114.98			77.81	3.44	33.73	0.00	Peak	100	306	HORIZONTAL
4	5187.00	103.62			66.45	3.44	33.73	0.00	Average	100	306	HORIZONTAL

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

#### Channel 40

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5146.80	52.48	54.00	-1.52	15.38	3.43	33.67	0.00	Average	112	301	HORIZONTAL
2	5149.60	73.65	74.00	-0.35	36.55	3.43	33.67	0.00	Peak	112	301	HORIZONTAL
3	5193.20	108.95			71.78	3.44	33.73	0.00	Average	112	301	HORIZONTAL
4	5196.40	120.08			82.87	3.45	33.76	0.00	Peak	112	301	HORIZONTAL

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

#### Channel 48

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5150.00	48.44	54.00	-5.56	11.34	3.43	33.67	0.00	Average	111	302	HORIZONTAL
2	5150.00	59.79	74.00	-14.21	22.69	3.43	33.67	0.00	Peak	111	302	HORIZONTAL
3	5246.00	109.82			72.51	3.46	33.85	0.00	Average	111	302	HORIZONTAL
4	5246.80	120.88			83.57	3.46	33.85	0.00	Peak	111	302	HORIZONTAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36, 40, 48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 26, 2013	Test Mode	Mode 1 (EUT 1)

#### Channel 36

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5149.40	49.98	54.00	-4.02	12.88	3.43	33.67	0.00	Average	112	71 HORIZONTAL
2	5149.60	73.76	74.00	-0.24	36.66	3.43	33.67	0.00	Peak	112	71 HORIZONTAL
3	5174.40	106.95			69.81	3.44	33.70	0.00	Average	112	71 HORIZONTAL
4	5174.40	118.30			81.16	3.44	33.70	0.00	Peak	112	71 HORIZONTAL

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

#### Channel 40

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5149.20	53.85	54.00	-0.15	16.75	3.43	33.67	0.00	Average	112	68 HORIZONTAL
2	5149.20	71.65	74.00	-2.35	34.55	3.43	33.67	0.00	Peak	112	68 HORIZONTAL
3	5199.20	110.23			73.02	3.45	33.76	0.00	Average	112	68 HORIZONTAL
4	5199.20	120.40			83.19	3.45	33.76	0.00	Peak	112	68 HORIZONTAL

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

#### Channel 48

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5139.80	49.23	54.00	-4.77	12.16	3.43	33.64	0.00	Average	100	69 HORIZONTAL
2	5141.60	64.76	74.00	-9.24	27.69	3.43	33.64	0.00	Peak	100	69 HORIZONTAL
3	5238.20	123.35			86.07	3.46	33.82	0.00	Peak	100	69 HORIZONTAL
4	5238.80	112.18			74.90	3.46	33.82	0.00	Average	100	69 HORIZONTAL
5	5350.00	49.16	54.00	-4.84	11.64	3.49	34.03	0.00	Average	100	69 HORIZONTAL
6	5350.00	61.96	74.00	-12.04	24.44	3.49	34.03	0.00	Peak	100	69 HORIZONTAL

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

Note:

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

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



Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz Ch 36, 40, 48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Channel 36

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5148.40	50.14	54.00	-3.86	13.04	3.43	33.67	0.00	Average	100	209 VERTICAL
2	5149.20	73.83	74.00	-0.17	36.73	3.43	33.67	0.00	Peak	100	209 VERTICAL
3	5177.00	108.29			71.15	3.44	33.70	0.00	Average	100	209 VERTICAL
4	5177.00	119.20			82.06	3.44	33.70	0.00	Peak	100	209 VERTICAL

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

#### Channel 40

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5148.80	73.67	74.00	-0.33	36.57	3.43	33.67	0.00	Peak	100	150 VERTICAL
2	5150.00	53.20	54.00	-0.80	16.10	3.43	33.67	0.00	Average	100	150 VERTICAL
3	5207.60	110.31			73.10	3.45	33.76	0.00	Average	100	150 VERTICAL
4	5207.60	120.62			83.41	3.45	33.76	0.00	Peak	100	150 VERTICAL

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

#### Channel 48

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5150.00	49.29	54.00	-4.71	12.19	3.43	33.67	0.00	Average	109	147 VERTICAL
2	5150.00	60.97	74.00	-13.03	23.87	3.43	33.67	0.00	Peak	109	147 VERTICAL
3	5247.20	114.13			76.82	3.46	33.85	0.00	Average	109	147 VERTICAL
4	5247.20	125.37			88.06	3.46	33.85	0.00	Peak	109	147 VERTICAL
5	5350.00	49.52	54.00	-4.48	12.00	3.49	34.03	0.00	Average	109	147 VERTICAL
6	5350.00	61.57	74.00	-12.43	24.05	3.49	34.03	0.00	Peak	109	147 VERTICAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz Ch 38, 46 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Channel 38

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5150.00	53.44	54.00	-0.56	16.34	3.43	33.67	0.00	Average	100	157 VERTICAL
2	5150.00	72.74	74.00	-1.26	35.64	3.43	33.67	0.00	Peak	100	157 VERTICAL
3	5180.40	99.66			62.49	3.44	33.73	0.00	Average	100	157 VERTICAL
4	5188.80	111.18			74.01	3.44	33.73	0.00	Peak	100	157 VERTICAL

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

#### Channel 46

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg
			dBuV/m	dB	dBuV	dB	dB/m	dB			Pol/Phase
1	5148.80	71.10	74.00	-2.90	34.00	3.43	33.67	0.00	Peak	109	198 VERTICAL
2	5150.00	53.77	54.00	-0.23	16.67	3.43	33.67	0.00	Average	109	198 VERTICAL
3	5231.20	118.39			81.11	3.46	33.82	0.00	Peak	109	198 VERTICAL
4	5232.00	107.05			69.77	3.46	33.82	0.00	Average	109	198 VERTICAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11ac MCS0, Nss1 80MHz Ch 42 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Channel 42

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5150.00	53.70	54.00	-0.30	16.60	3.43	33.67	0.00	Average	100	198	VERTICAL
2	5150.00	67.68	74.00	-6.32	30.58	3.43	33.67	0.00	Peak	100	198	VERTICAL
3	5190.00	108.84			71.67	3.44	33.73	0.00	Peak	100	198	VERTICAL
4	5210.00	96.99			59.78	3.45	33.76	0.00	Average	100	198	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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36, 40, 48 / Chain 4
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Channel 36

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	5147.20	72.69	74.00	-1.31	35.59	3.43	33.67	0.00	Peak	100	242	VERTICAL
2	5150.00	53.57	54.00	-0.43	16.47	3.43	33.67	0.00	Average	100	242	VERTICAL
3	5174.80	103.69			66.55	3.44	33.70	0.00	Average	100	242	VERTICAL
4	5175.60	113.95			76.81	3.44	33.70	0.00	Peak	100	242	VERTICAL

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

#### Channel 40

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	5148.80	71.03	74.00	-2.97	33.93	3.43	33.67	0.00	Peak	100	21	VERTICAL
2	5150.00	51.70	54.00	-2.30	14.60	3.43	33.67	0.00	Average	100	21	VERTICAL
3	5192.80	117.00			79.83	3.44	33.73	0.00	Peak	100	21	VERTICAL
4	5193.20	106.21			69.04	3.44	33.73	0.00	Average	100	21	VERTICAL

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

#### Channel 48

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	5117.00	55.05	74.00	-18.95	18.02	3.42	33.61	0.00	Peak	100	146	VERTICAL
2	5118.20	43.18	54.00	-10.82	6.15	3.42	33.61	0.00	Average	100	146	VERTICAL
3	5238.20	117.91			80.63	3.46	33.82	0.00	Peak	100	146	VERTICAL
4	5246.00	107.56			70.25	3.46	33.85	0.00	Average	100	146	VERTICAL
5	5352.40	58.74	74.00	-15.26	21.22	3.49	34.03	0.00	Peak	100	146	VERTICAL
6	5354.80	44.95	54.00	-9.05	7.43	3.49	34.03	0.00	Average	100	146	VERTICAL

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

Temperature	24°C	Humidity	58%
Test Engineer	Wen Chao	Configurations	IEEE 802.11a Ch 36, 40, 48 / Chain 4+ Chain 5+ Chain 6
Test Date	Jun. 27, 2013	Test Mode	Mode 3 (EUT 2)

#### Channel 36

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5147.60	50.85	54.00	-3.15	13.75	3.43	33.67	0.00	Average	100	198	VERTICAL
2	5148.00	73.76	74.00	-0.24	36.66	3.43	33.67	0.00	Peak	100	198	VERTICAL
3	5182.60	118.57			81.40	3.44	33.73	0.00	Peak	100	198	VERTICAL
4	5182.80	107.58			70.41	3.44	33.73	0.00	Average	100	198	VERTICAL

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

#### Channel 40

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5150.00	53.41	54.00	-0.59	16.31	3.43	33.67	0.00	Average	100	155	VERTICAL
2	5150.00	72.05	74.00	-1.95	34.95	3.43	33.67	0.00	Peak	100	155	VERTICAL
3	5199.20	120.55			83.34	3.45	33.76	0.00	Peak	100	155	VERTICAL
4	5199.60	109.93			72.72	3.45	33.76	0.00	Average	100	155	VERTICAL

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

#### Channel 48

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	5147.60	63.87	74.00	-10.13	26.77	3.43	33.67	0.00	Peak	100	198	VERTICAL
2	5150.00	50.33	54.00	-3.67	13.23	3.43	33.67	0.00	Average	100	198	VERTICAL
3	5245.40	114.02			76.74	3.46	33.82	0.00	Average	100	198	VERTICAL
4	5245.40	125.24			87.96	3.46	33.82	0.00	Peak	100	198	VERTICAL
5	5350.00	48.71	54.00	-5.29	11.19	3.49	34.03	0.00	Average	100	198	VERTICAL
6	5350.00	60.18	74.00	-13.82	22.66	3.49	34.03	0.00	Peak	100	198	VERTICAL

Item 3, 4 are the fundamental frequency at 5240 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  $\pm 20$  ppm maximum for the 5 GHz band (IEEE 802.11n specification).

### 4.8.2. Measuring Instruments and Setting

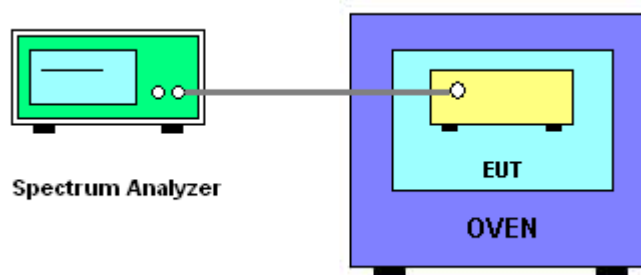
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

- The transmitter output (antenna port) was connected to the spectrum analyzer.
- EUT have transmitted absence of modulation signal and fixed channelize.
- Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
- Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
- $f_c$  is declaring of channel frequency. Then the frequency error formula is  $(f_c - f)/f_c \times 10^6$  ppm and the limit is less than  $\pm 20$  ppm (IEEE 802.11n specification).
- The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
- Extreme temperature: Mode 1 (EUT 1) is 0°C~40°C, Mode 3 (EUT 2) is 0°C~55°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	25°C	Humidity	56%
Test Engineer	Denis Su	Test Date	Jul. 28, 2013
Test Mode	Mode 1 (EUT 1)		

#### Voltage vs. Frequency Stability / Chain 4

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0292
110.00	5200.0294
93.50	5200.0296
Max. Deviation (MHz)	0.029600
Max. Deviation (ppm)	5.69

#### Temperature vs. Frequency Stability / Chain 4

Temperature	Measurement Frequency (MHz)
(°C)	5200
0	5200.0295
10	5200.0296
20	5200.0294
30	5200.0292
40	5200.0290
Max. Deviation (MHz)	0.031000
Max. Deviation (ppm)	5.96



Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Test Date	Jul. 28, 2013
Test Mode	Mode 1 (EUT 1)		

#### Voltage vs. Frequency Stability / Chain 4+ Chain 5+ Chain 6

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0036
110.00	5200.0075
93.50	5200.0014
Max. Deviation (MHz)	0.007500
Max. Deviation (ppm)	1.44

#### Temperature vs. Frequency Stability / Chain 4+ Chain 5+ Chain 6

Temperature	Measurement Frequency (MHz)
(°C)	5200
0	5200.0018
10	5200.0035
20	5200.0026
30	5200.0036
40	5200.0045
Max. Deviation (MHz)	0.004500
Max. Deviation (ppm)	0.87

Temperature	25°C	Humidity	56%
Test Engineer	Benson Peng	Test Date	Jul. 26, 2013
Test Mode	Mode 3 (EUT 2)		

#### Voltage vs. Frequency Stability / Chain 4

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0052
110.00	5200.0050
93.50	5200.0068
Max. Deviation (MHz)	0.006800
Max. Deviation (ppm)	1.31

#### Temperature vs. Frequency Stability / Chain 4

Temperature	Measurement Frequency (MHz)
(°C)	5200
0	5200.0042
10	5200.0046
20	5200.0050
30	5200.0054
40	5200.0062
50	5200.0056
55	5200.0058
Max. Deviation (MHz)	0.006200
Max. Deviation (ppm)	1.19

Temperature	25°C	Humidity	56%
Test Engineer	Denis Su	Test Date	Jul. 28, 2013
Test Mode	Mode 3 (EUT 2)		

#### Voltage vs. Frequency Stability / Chain 4+ Chain 5+ Chain 6

Voltage	Measurement Frequency (MHz)
(V)	5200
126.50	5200.0024
110.00	5200.0030
93.50	5200.0028
Max. Deviation (MHz)	0.003000
Max. Deviation (ppm)	0.58

#### Temperature vs. Frequency Stability / Chain 4+ Chain 5+ Chain 6

Temperature	Measurement Frequency (MHz)
(°C)	5200
0	5200.0020
10	5200.0026
20	5200.0030
30	5200.0032
40	5200.0028
50	5200.0038
55	5200.0069
Max. Deviation (MHz)	0.003800
Max. Deviation (ppm)	0.73

## **4.9. Antenna Requirements**

### **4.9.1. Limit**

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

### **4.9.2. Antenna Connector Construction**

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

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100377	9kHz ~ 2.75GHz	Oct. 23, 2012	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 26, 2012	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Jun. 26, 2012	Conduction (CO01-CB)
Impulsbegrenzer Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz~30MHz	Feb. 21, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	0.15MHz~30MHz	Dec. 04, 2012	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 31, 2012	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9kHz~40GHz	Nov. 16, 2012	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz ~ 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz ~ 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Oct. 08, 2012	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 28, 2012	Conducted (TH01-CB)



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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 27, 2012	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. TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 <sup>nd</sup> Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : 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

## 7. MEASUREMENT UNCERTAINTY

### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.026	dB	normal(k=2)	0.013
Cable loss	0.002	dB	normal(k=2)	0.001
AMN/LISN specification	1.200	dB	normal(k=2)	0.600
Mismatch Receiver VSWR $1=$ AMN/LISN VSWR $2=$	-0.080	dB	U-shaped	0.060
Combined standard uncertainty $U_c(y)$				1.2
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				2.4

### Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	$\pm 0.173$	dB	K=1	0.086
Cable loss	$\pm 0.174$	dB	K=2	0.087
Antenna gain	$\pm 0.169$	dB	K=2	0.084
Site imperfection	$\pm 0.433$	dB	Triangular	0.214
Pre-amplifier gain	$\pm 0.366$	dB	K=2	0.183
Transmitter antenna	$\pm 1.200$	dB	Rectangular	0.600
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.778
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.555



### Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	$\pm 0.191$	dB	K=1	0.095
Cable loss	$\pm 0.169$	dB	K=2	0.084
Antenna gain	$\pm 0.191$	dB	K=2	0.096
Site imperfection	$\pm 0.582$	dB	Triangular	0.291
Pre-amplifier gain	$\pm 0.304$	dB	K=2	0.152
Transmitter antenna	$\pm 1.200$	dB	Rectangular	0.600
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.839
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.678

### Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	$\pm 0.186$	dB	K=1	0.093
Cable loss	$\pm 0.167$	dB	K=2	0.083
Antenna gain	$\pm 0.190$	dB	K=2	0.095
Site imperfection	$\pm 0.488$	dB	Triangular	0.244
Pre-amplifier gain	$\pm 0.269$	dB	K=2	0.134
Transmitter antenna	$\pm 1.200$	dB	Rectangular	0.600
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				1.771
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.541

### Uncertainty of Conducted Emission Measurement

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	$\pm 0.038$	dB	K=2	0.019
Attenuator	$\pm 0.047$	dB	K=2	0.024
Power Meter specification	$\pm 0.300$	dB	Triangular	0.150
Power Sensor specification	$\pm 0.300$	dB	Rectangular	0.150
Signal generator	$\pm 0.461$	dB	Rectangular	0.231
Mismatch	$\pm 0.080$	dB	U-shape	0.040
Spectrum analyzer	$\pm 0.500$	dB	Rectangular	0.250
Combined standard uncertainty $U_c(y)$				0.863
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				1.726