



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	Hewlett-Packard Company
Applicant Address	3000 Hanover Street Palo Alto, California 94304 U.S.A.
FCC ID	B94MRLBB1401
Manufacturer's company	Joy Technology (ShenZhen) Corporation
Manufacturer Address	Building A,B,C,D, HengKeng Ind., Shangpai, Shangwu,Aiqun Rd., Shiyan Town,Shenzhen 518135 China

Product Name	HP R110/PS110 Wireless 11n VPN Router
Brand Name	HP
Model No.	MRLBB-1401, MRLBB-1405
Product No.	J9974A(AM), J9975A(WW), JL065A(AM), JL066A(WW)
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Received Date	May 14, 2014
Final Test Date	Aug. 05, 2014
Submission Type	Original Equipment
Operating Mode	Master

### Statement

**Test result included is for the IEEE 802.11n and IEEE 802.11a 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, KDB789033 D02 v01, KDB662911 D01 v02r01.**

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





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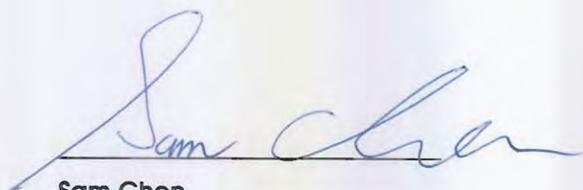
## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR410907-01AB	Rev. 01	Initial issue of report	Aug. 15, 2014

## 1. CERTIFICATE OF COMPLIANCE

Product Name : HP R110/PS110 Wireless 11n VPN Router  
Brand Name : HP  
Model No. : MRLBB-1401, MRLBB-1405  
Product No. : J9974A(AM), J9975A(WW), JLO65A(AM), JLO66A(WW)  
Applicant : Hewlett-Packard Company  
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 May 14, 2014 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	16.75 dB
4.2	15.407(a)	26dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.3	15.407(e)	6dB Spectrum Bandwidth and 99% Occupied Bandwidth	Complies	-
4.4	15.407(a)	Maximum Conducted Output Power	Complies	3.67dB
4.5	15.407(a)	Power Spectral Density	Complies	0.20 dB
4.6	15.407(b)	Radiated Emissions	Complies	1.86 dB
4.7	15.407(b)	Band Edge Emissions	Complies	0.04 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

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	see the below table for IEEE 802.11n
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	5150 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	9 for 20MHz bandwidth ; 4 for 40MHz bandwidth
Channel Band Width (99%)	Band 1: 802.11n MCS0 (HT20): 20.00 MHz ; 802.11n MCS0 (HT40): 37.44 MHz Band 4: 802.11n MCS0 (HT20): 17.76 MHz ; 802.11n MCS0 (HT40): 36.00 MHz
Maximum Conducted Output Power	Band 1: 802.11n MCS0 (HT20): 25.53 dBm ; 802.11n MCS0 (HT40): 23.99 dBm Band 4: 802.11n MCS0 (HT20): 23.19 dBm ; 802.11n MCS0 (HT40): 17.92 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**IEEE 802.11a**

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
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 ~ 5250 MHz / 5725 ~ 5850 MHz
Channel Number	9
Channel Band Width (99%)	Band 1: 19.84 MHz ; Band 4: 16.56 MHz
Maximum Conducted Output Power	Band 1: 25.43 dBm ; Band 4: 23.71 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Communication Mode	<input checked="" type="checkbox"/> IP Based (Load Based)	<input type="checkbox"/> Frame Based
Beamforming Function	<input type="checkbox"/> With beamforming	<input checked="" type="checkbox"/> Without beamforming

**Antenna and Band width**

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

**IEEE 11n Spec.**

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23

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

Note 2: Modulation modes consist of below configuration:  
HT20/HT40: IEEE 802.11n

**3.2. Accessories**

Power	Brand	Model	Rating
Adapter 1	APD	WA-24Q12FU	Input: 100-240V~50-60Hz, 0.6A Max. Output: 12V, 2A
Adapter 2	LITE-ON	PA-1031-71	Input: 100-240V~50-60Hz, 1.0A Output: 12V, 2.5A

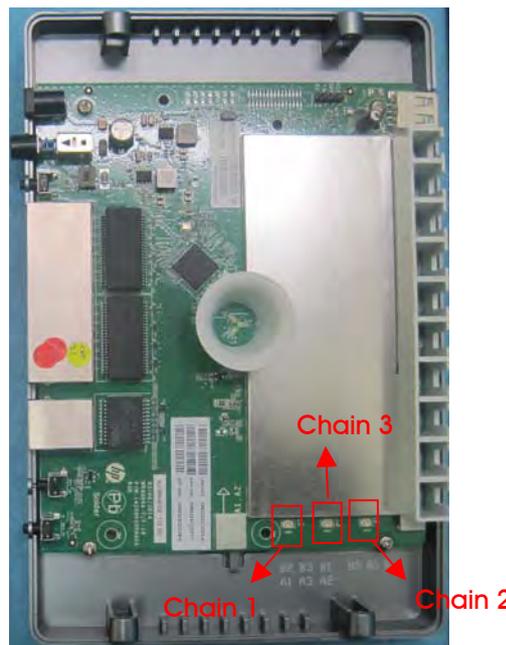
### 3.3. Table for Filed Antenna

Set	Ant.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)		Directional Gain in Correlation	
						2.4GHz	5GHz	2.4GHz	5GHz
1	1	M.gear	120300000091A	Dual-band Omni Patch Antenna	I-PEX	4.4	5.8	9.27	10.60
	2	M.gear	120300000091A	Dual-band Omni Patch Antenna	I-PEX	4.7	6.8		
	3	M.gear	120300000091A	Dual-band Omni Patch Antenna	I-PEX	4.4	4.6		
2	4	M.gear	120300000106A	Dual-band Omni Patch Antenna	I-PEX	4.36	6.30	9.21	10.37
	5	M.gear	120300000106A	Dual-band Omni Patch Antenna	I-PEX	4.34	5.71		
	6	M.gear	120300000106A	Dual-band Omni Patch Antenna	I-PEX	4.61	4.62		

Note: Ant. 1~Ant. 3 are for EUT 1; Ant. 4~Ant. 6 are for EUT 2.

Chain 1: Connect to Ant. 1 or Ant. 4; Chain 2: Connect to Ant. 2 or Ant. 5; Chain 3: Connect to Ant. 3 or Ant. 6.

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



### 3.4. Table for Carrier Frequencies

There are two bandwidth systems.

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

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

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
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	-	-	165	5825 MHz

### 3.5. Table for Test Modes

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

Test Items	Mode		Data Rate	Channel	Chain
AC Power Conducted Emission	CTX		-	-	-
Max. Conducted Output Power	11n HT20	Band 1&4	MCS0	36/40/48/149/1 57/165	1+2+3
	11n HT40	Band 1&4	MCS0	38/46/151/159	1+2+3
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/1 57/165	1+2+3
Power Spectral Density	11n HT20	Band 1&4	MCS0	36/40/48/149/1 57/165	1+2+3
	11n HT40	Band 1&4	MCS0	38/46/151/159	1+2+3
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/1 57/165	1+2+3
26dB&6dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement	11n HT20	Band 1&4	MCS0	36/40/48/149/1 57/165	1+2+3
	11n HT40	Band 1&4	MCS0	38/46/151/159	1+2+3
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/1 57/165	1+2+3
Radiated Emission Below 1GHz	CTX		-	-	-

Radiated Emission Above 1GHz	11n HT20	Band 1&4	MCS0	36/40/48/149/1 57/165	1+2+3
	11n HT40	Band 1&4	MCS0	38/46/151/159	1+2+3
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/1 57/165	1+2+3
Band Edge Emission	11n HT20	Band 1&4	MCS0	36/40/48/149/1 57/165	1+2+3
	11n HT40	Band 1&4	MCS0	38/46/151/159	1+2+3
	11a/BPSK	Band 1&4	6Mbps	36/40/48/149/1 57/165	1+2+3
Frequency Stability	Un-modulation		-	40	1+2+3

The following test modes were performed for all tests:

**For Conducted Emission test:**

Radiated Emissions above 1GHz test was performed at its 3-axis (X-axis, Y-axis and Z-axis). X-axis was the worst case, so Conducted Emission test will follow this same configuration.

Mode 1. CTX- Place EUT 1 in X-axis + Adapter 1

Mode 2. CTX- Place EUT 1 in X-axis + Adapter 2

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

Note: The difference between EUT 1 and EUT 2 is antenna location, and different antenna location doesn't affect Conducted Emission test. Thus, only EUT 1 was tested and recorded in this test report.

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

For EUT 1:

Radiated Emissions above 1GHz test for EUT 1 was performed at its 3-axis (X-axis, Y-axis and Z-axis). X-axis was the worst case, so Emissions below 1GHz test will follow this same configuration.

Mode 1. CTX- Place EUT 1 in X-axis + WLAN 2.4GHz + Adapter 1

Mode 2. CTX- Place EUT 1 in X-axis + WLAN 2.4GHz + Adapter 2

Mode 1 generated the worst case between Mode 1 and Mode 2. Thus, Mode 3 will follow this same configuration.

Mode 3. CTX- Place EUT 1 in X-axis + WLAN 5GHz + Adapter 1

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

For EUT 2:

EUT 1 + WLAN 5GHz + Adapter 1 generated the worst case, so measurements for EUT 2 will follow this configuration.

Radiated Emissions above 1GHz test for EUT 2 was performed at its 3-axis (X-axis, Y-axis and Z-axis). Y-axis was the worst case, so Emissions below 1GHz test will follow this same configuration.

Mode 4. CTX- Place EUT 2 in Y-axis + WLAN 5GHz + Adapter 1

### For Radiated Emission test above 1GHz:

For EUT 1:

Radiated Emissions above 1GHz test for EUT 1 was performed at its 3-axis (X-axis, Y-axis and Z-axis). X-axis was the worst case, so it's recorded in this report.

Mode 1. CTX- Place EUT 1 in X-axis

For EUT 2:

Radiated Emissions above 1GHz test for EUT 2 was performed at its 3-axis (X-axis, Y-axis and Z-axis). Y-axis was the worst case, so it's recorded in this report.

Mode 2. CTX- Place EUT 2 in Y-axis

### 3.6. Table for Testing Locations

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

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

### 3.7. Table for Multiple Listing

EUT	Model No.	Product No.	Antenna Part No.	LED Board (Model No. NI2188006 003E)	Marketing	Description
EUT 1	MRLBB-1401	J9974A(AM)	120300000091A	Without	U.S.A.	The color, shape and antenna location between these two models are different.
		J9975A(WW)			Worldwide	
EUT 2	MRLBB-1405	JL065A(AM)	120300000106A	With	U.S.A.	
		JL066A(WW)			Worldwide	

Note:

- EUT 1's directional gain is higher than that of EUT 2, so for 26dB Bandwidth and 99% Occupied Bandwidth, 6dB Spectrum Bandwidth and 99% Occupied Bandwidth, Maximum Conducted Output Power, Power Spectral Density and Frequency Stability tests, only EUT 1 was tested and recorded in this report.
- For Radiated Emissions and Band Edge and Fundamental Emissions tests, both EUT 1 and EUT 2 were tested and recorded in this report. (EUT 2 was based on EUT 1's output power to test these items.)

### 3.8. Table for Supporting Units

For Test Site No: 03CH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	M1330	DoC

For Test Site No: CO01-CB & TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

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

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

#### Power Parameters of IEEE 802.11n MCS0 HT20

Test Software Version	ART2-GUI Version 2.3					
Frequency	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
MCS0 HT20	16	20	20	10	18	10

#### Power Parameters of IEEE 802.11n MCS0 HT40

Test Software Version	ART2-GUI Version 2.3			
Frequency	5190 MHz	5230 MHz	5755 MHz	5795 MHz
MCS0 HT40	9.5	18.5	9	13

#### Power Parameters of IEEE 802.11a

Test Software Version	ART2-GUI Version 2.3					
Frequency	5180 MHz	5200 MHz	5240 MHz	5745 MHz	5785 MHz	5825 MHz
802.11a	17.5	20.5	20	10	18.5	11

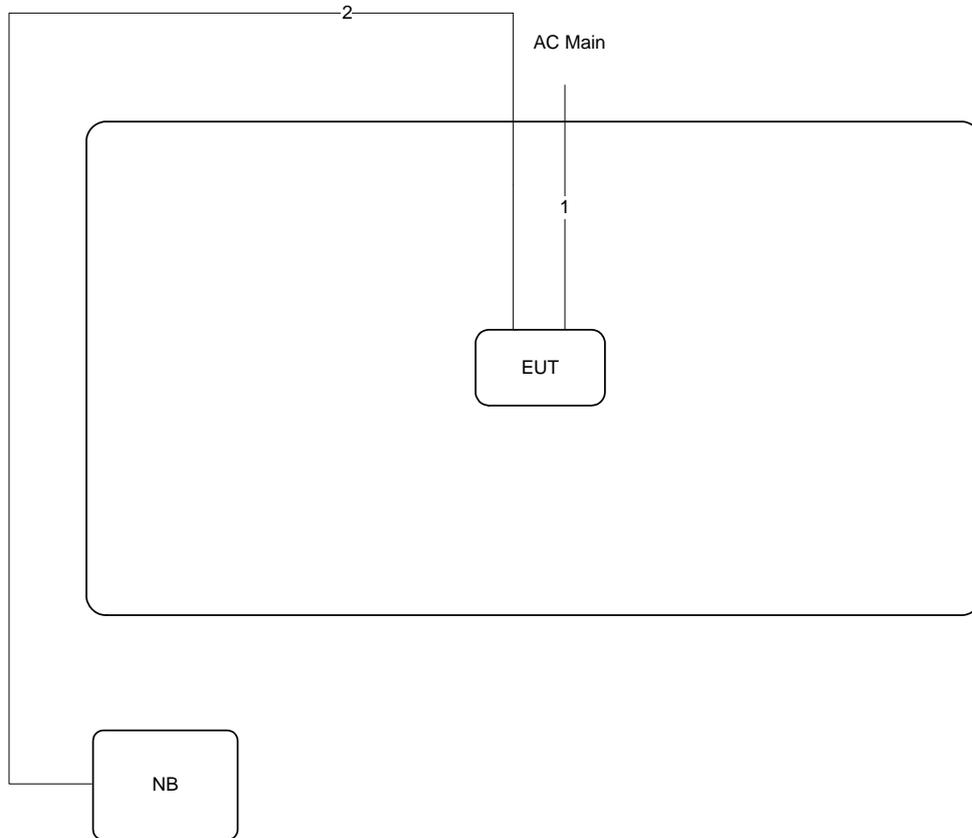
### 3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

### 3.11. Duty Cycle

Mode	On Time(ms)	On+Off Time(ms)	Duty Cycle(%)	1/T Minimum VBW (kHz)
802.11n MCS0 HT20	1.890	1.920	98.44%	0.01
802.11n MCS0 HT40	0.935	0.960	97.40%	1.07
802.11a	2.030	2.060	98.54%	0.01

### 3.12. Test Configurations



Item	Connection	Shield	Length
1	Power cable	No	1.5m
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

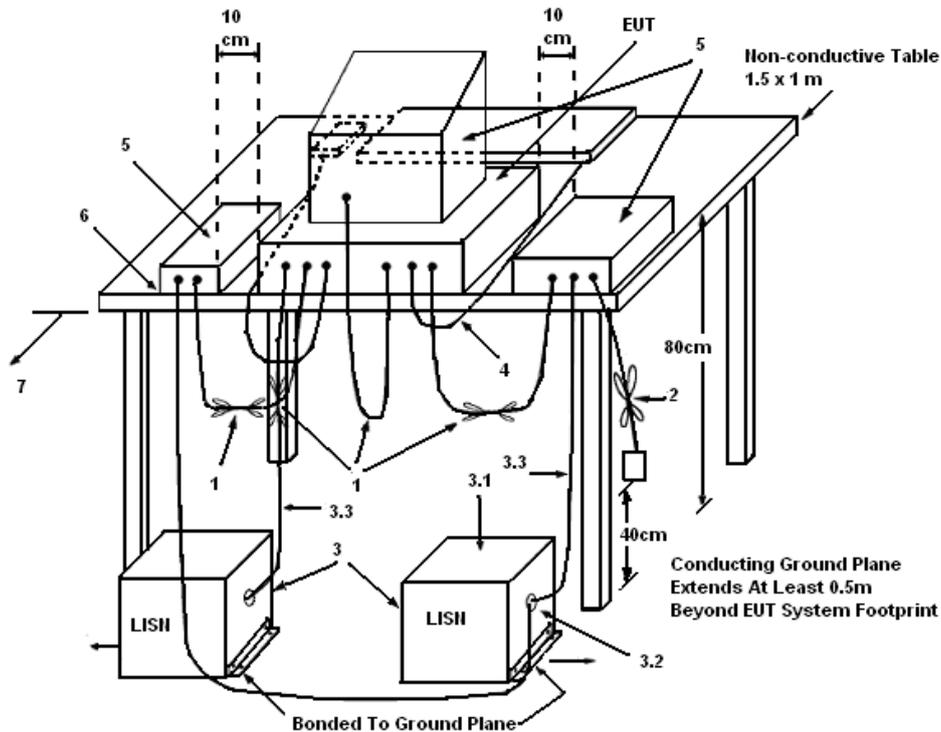
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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  $\Omega$ . LISN can be placed on top of, or immediately beneath, reference ground plane.
  - (3.1) All other equipment powered from additional LISN(s).
  - (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
  - (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

#### 4.1.5. Test Deviation

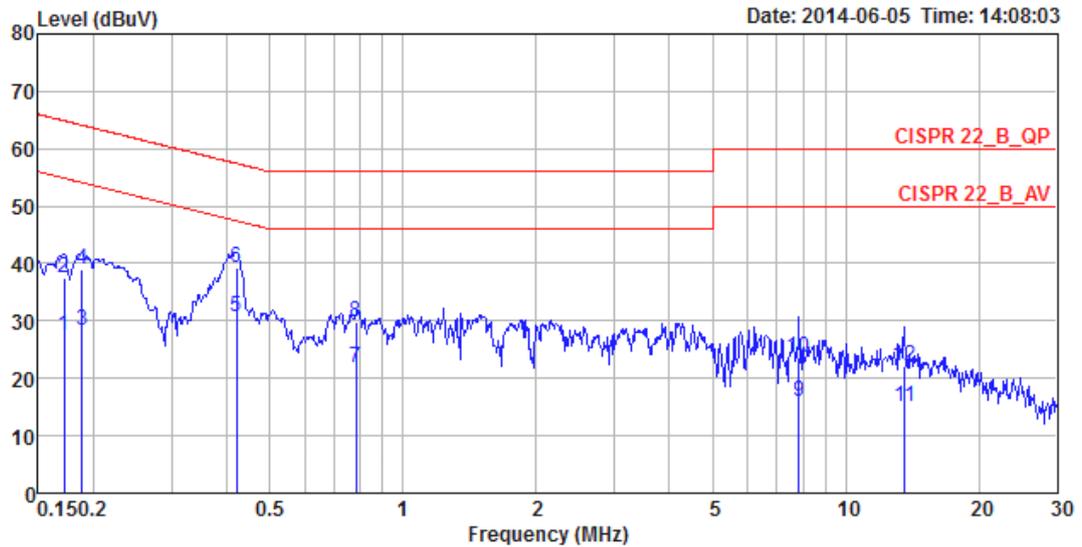
There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

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

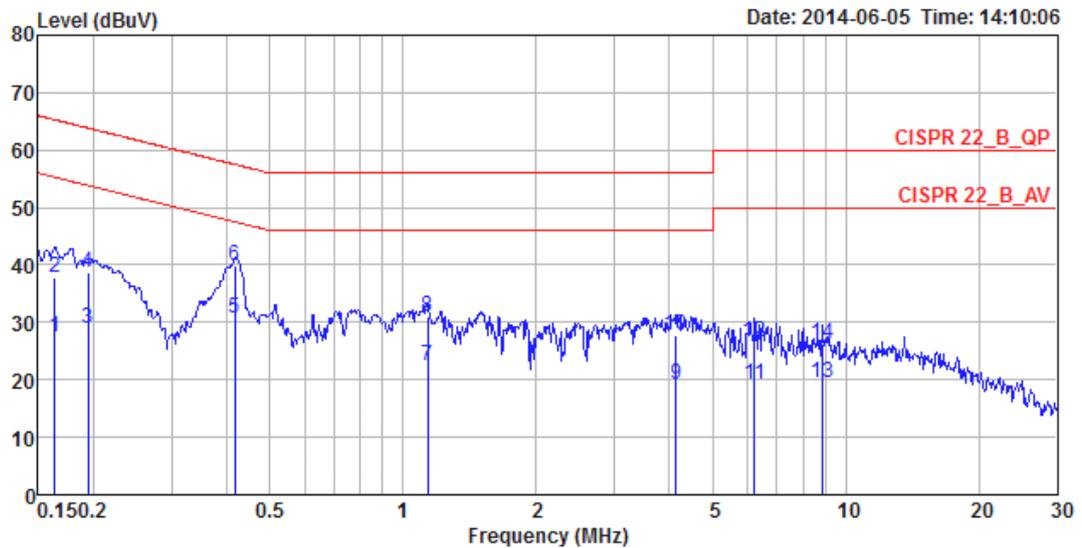
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	54%
Test Engineer	Ryo Fan	Phase	Line
Configuration	CTX	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.1712	27.39	-27.51	54.90	0.22	26.98	0.19	LINE	Average
2	0.1712	37.35	-27.55	64.90	0.22	36.94	0.19	LINE	QP
3	0.1884	28.29	-25.82	54.11	0.21	27.88	0.20	LINE	Average
4	0.1884	39.07	-25.04	64.11	0.21	38.66	0.20	LINE	QP
5 a	0.4215	30.57	-16.85	47.42	0.22	30.15	0.20	LINE	Average
6 q	0.4215	39.22	-18.20	57.42	0.22	38.80	0.20	LINE	QP
7	0.7835	21.87	-24.13	46.00	0.23	21.44	0.20	LINE	Average
8	0.7835	29.87	-26.13	56.00	0.23	29.44	0.20	LINE	QP
9	7.8516	15.97	-34.03	50.00	0.39	15.24	0.34	LINE	Average
10	7.8516	23.62	-36.38	60.00	0.39	22.89	0.34	LINE	QP
11	13.6228	14.93	-35.07	50.00	0.56	13.97	0.40	LINE	Average
12	13.6228	22.06	-37.94	60.00	0.56	21.10	0.40	LINE	QP

Temperature	22°C	Humidity	54%
Test Engineer	Ryo Fan	Phase	Neutral
Configuration	CTX	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.1633	27.37	-27.93	55.30	0.08	27.10	0.19	NEUTRAL	Average
2	0.1633	37.80	-27.50	65.30	0.08	37.53	0.19	NEUTRAL	QP
3	0.1945	28.87	-24.97	53.84	0.07	28.60	0.20	NEUTRAL	Average
4	0.1945	38.80	-25.04	63.84	0.07	38.53	0.20	NEUTRAL	QP
5 a	0.4171	30.76	-16.75	47.51	0.08	30.48	0.20	NEUTRAL	Average
6 q	0.4171	39.78	-17.73	57.51	0.08	39.50	0.20	NEUTRAL	QP
7	1.1352	22.50	-23.50	46.00	0.10	22.19	0.21	NEUTRAL	Average
8	1.1352	30.94	-25.06	56.00	0.10	30.63	0.21	NEUTRAL	QP
9	4.1356	19.05	-26.95	46.00	0.16	18.59	0.30	NEUTRAL	Average
10	4.1356	27.87	-28.13	56.00	0.16	27.41	0.30	NEUTRAL	QP
11	6.2189	19.34	-30.66	50.00	0.22	18.80	0.32	NEUTRAL	Average
12	6.2189	26.46	-33.54	60.00	0.22	25.92	0.32	NEUTRAL	QP
13	8.8223	19.38	-30.62	50.00	0.27	18.77	0.34	NEUTRAL	Average
14	8.8223	26.28	-33.72	60.00	0.27	25.67	0.34	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

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

### 4.2.1. Limit

No restriction limits.

### 4.2.2. Measuring Instruments and Setting

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

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

### 4.2.3. Test Procedures

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

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

### 4.2.4. Test Setup Layout

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

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

### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

<b>Temperature</b>	20°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11n

##### Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.36	18.40
40	5200 MHz	33.76	19.36
48	5240 MHz	33.28	20.00

##### Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3

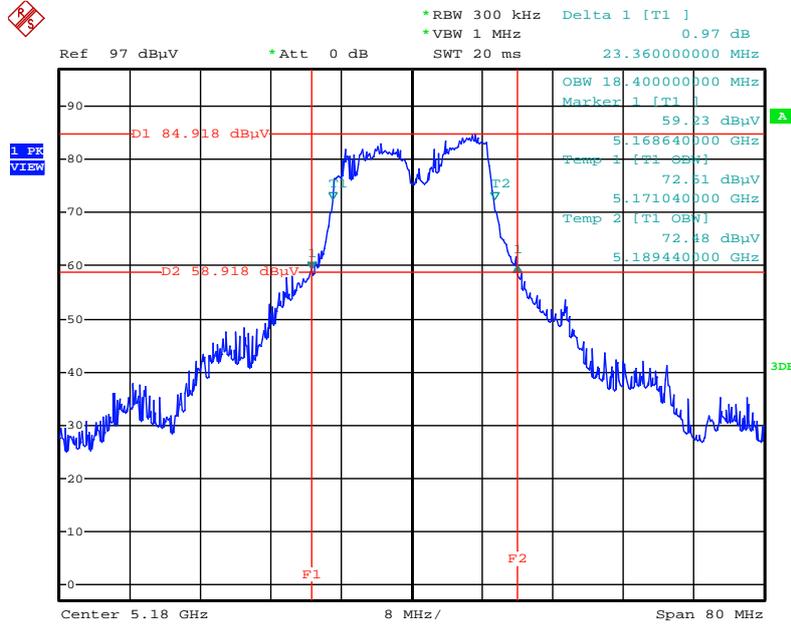
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
38	5190 MHz	40.96	35.84
46	5230 MHz	59.20	37.44

<b>Temperature</b>	20°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11a

**Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3**

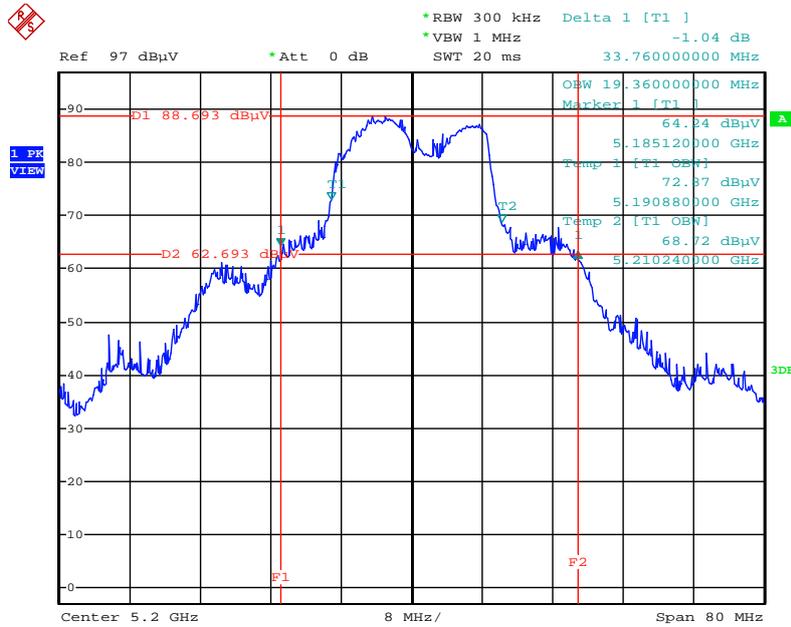
Channel	Frequency	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
36	5180 MHz	23.68	17.28
40	5200 MHz	32.16	19.84
48	5240 MHz	30.40	18.40

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3 / 5180 MHz**



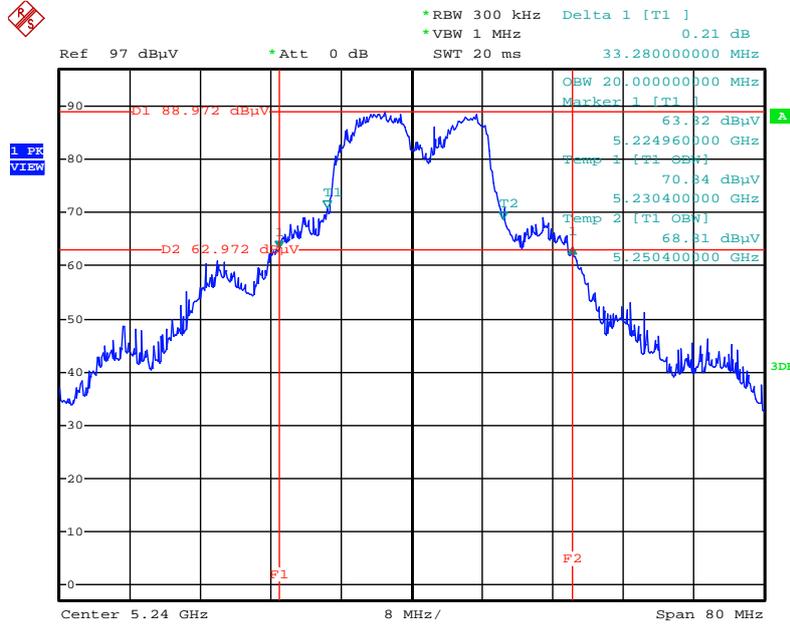
Date: 10.JUL.2014 14:47:42

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3 / 5200 MHz**



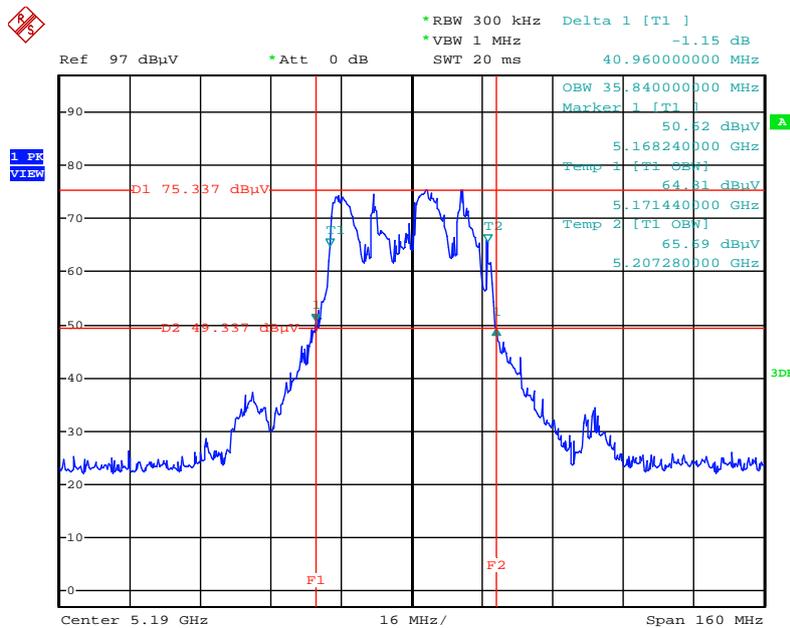
Date: 10.JUL.2014 14:48:33

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3 / 5240 MHz**



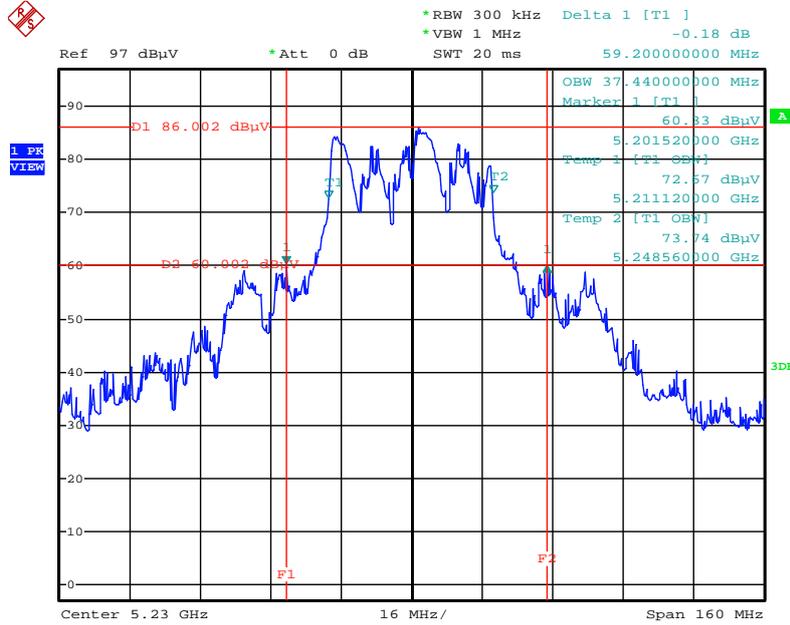
Date: 10.JUL.2014 14:48:53

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3 / 5190 MHz**



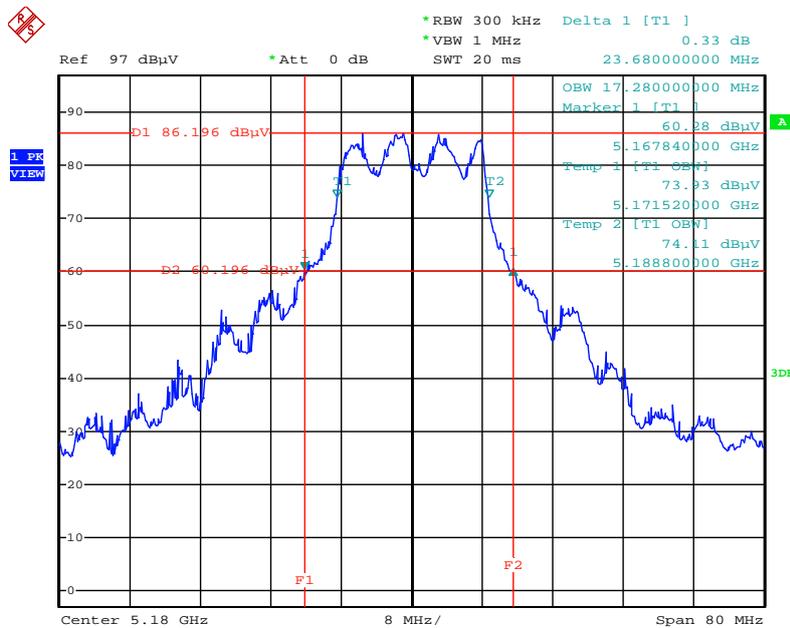
Date: 9.JUL.2014 13:00:15

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3 / 5230 MHz**



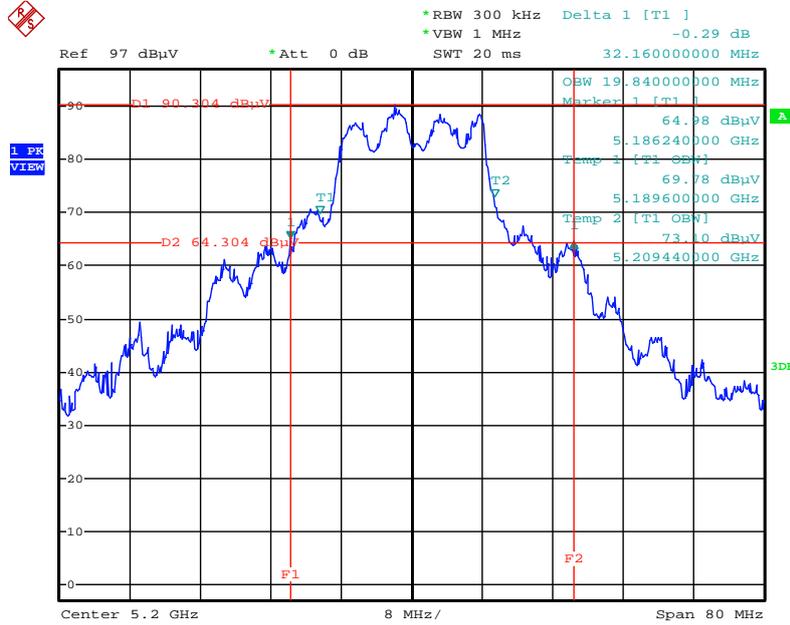
Date: 10.JUL.2014 14:54:59

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



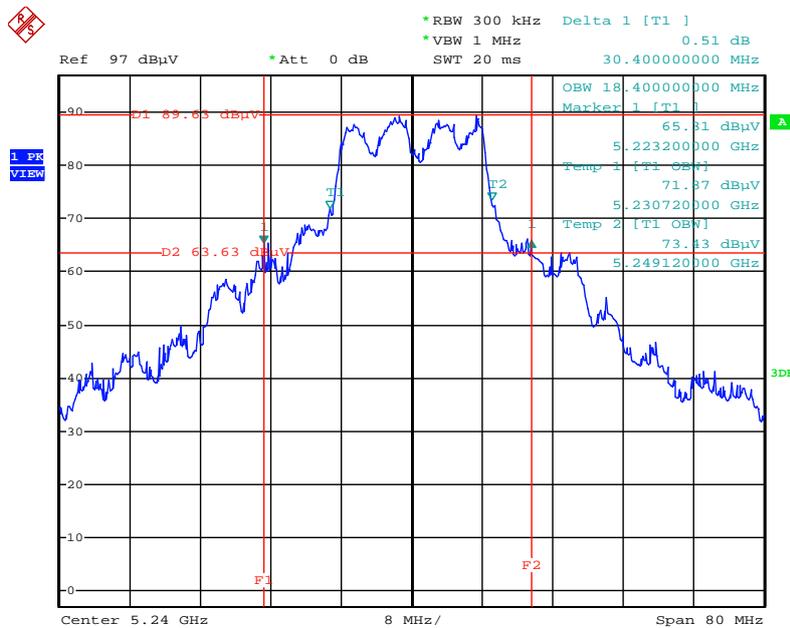
Date: 10.JUL.2014 12:42:45

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



Date: 10.JUL.2014 12:43:56

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



Date: 10.JUL.2014 12:44:35

### 4.3. 6dB Spectrum Bandwidth and 99% Occupied Bandwidth Measurement

#### 4.3.1. Limit

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

#### 4.3.2. Measuring Instruments and Setting

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

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

#### 4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

#### 4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.3.7. Test Result of 6dB Spectrum Bandwidth and 99% Occupied Bandwidth

<b>Temperature</b>	20°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11n

##### Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.68	17.44	500	Complies
157	5785 MHz	16.40	17.76	500	Complies
165	5825 MHz	16.64	17.68	500	Complies

##### Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.84	35.84	500	Complies
159	5795 MHz	34.56	36.00	500	Complies

<b>Temperature</b>	20°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11a

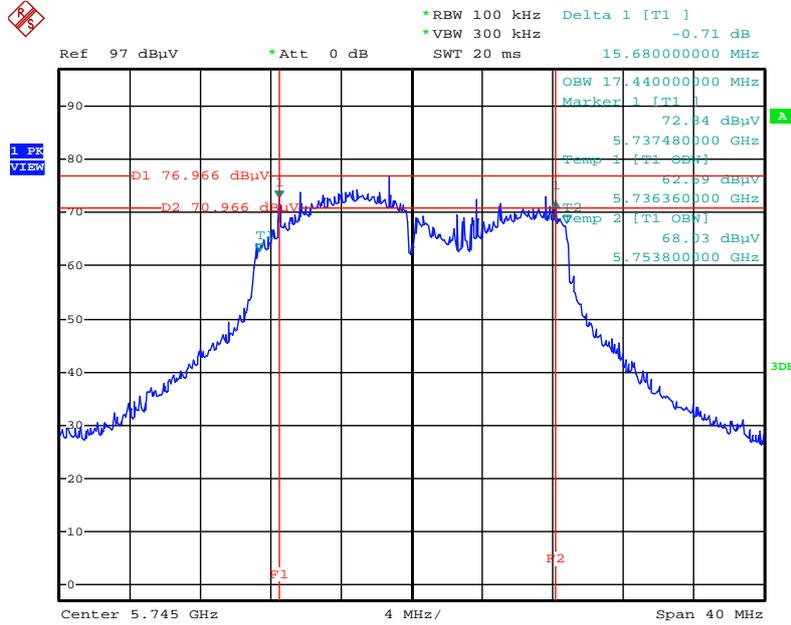
**Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.60	16.56	500	<b>Complies</b>
157	5785 MHz	15.68	16.56	500	<b>Complies</b>
165	5825 MHz	15.28	16.56	500	<b>Complies</b>

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

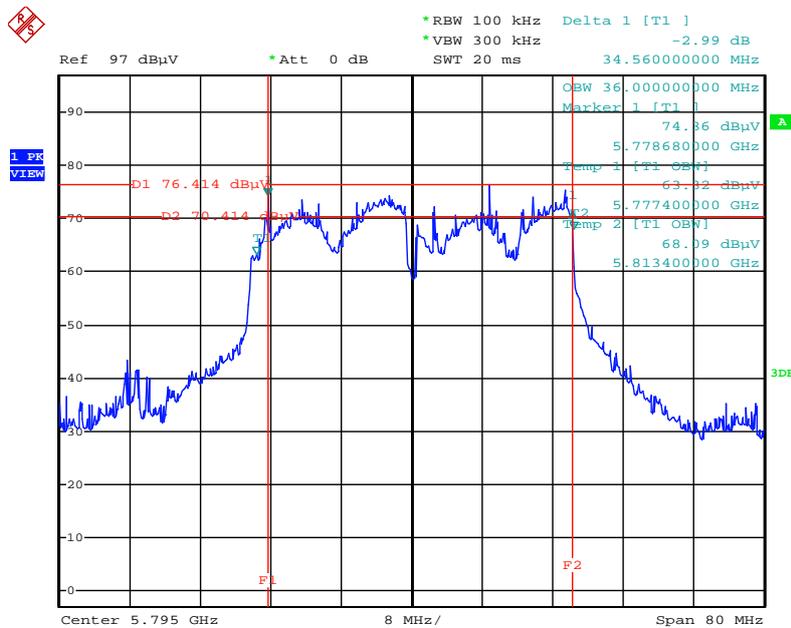
For plots, only the channel with worse result was shown.

**6 dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3 / 5745 MHz**



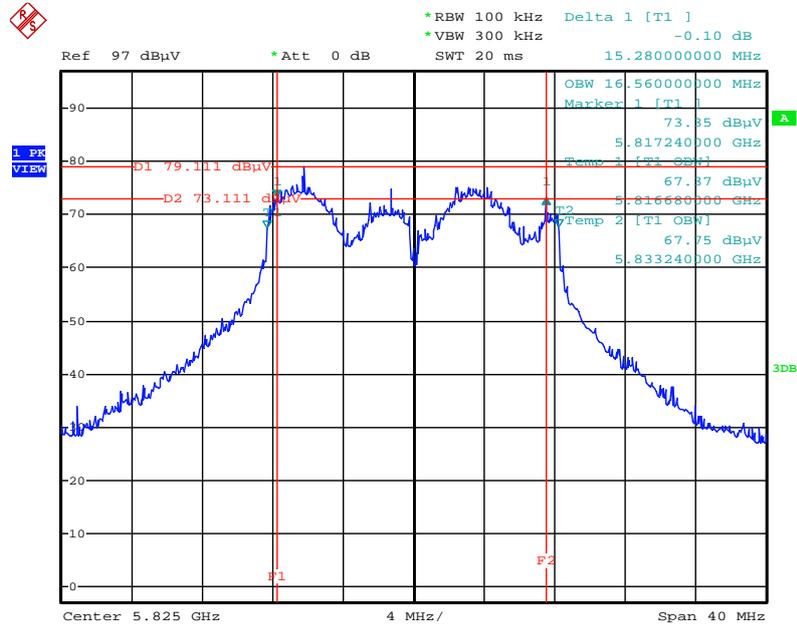
Date: 10.JUL.2014 12:39:31

**6 dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3 / 5795MHz**



Date: 10.JUL.2014 12:41:38

**6 dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 / 5825 MHz**



Date: 10.JUL.2014 12:35:53

## 4.4. Maximum Conducted Output Power Measurement

### 4.4.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725~5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### 4.4.2. Measuring Instruments and Setting

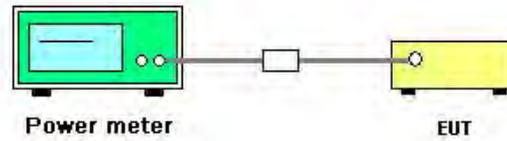
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	AVERAGE

### 4.4.3. Test Procedures

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

#### 4.4.4. Test Setup Layout



#### 4.4.5. Test Deviation

There is no deviation with the original standard.

#### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.4.7. Test Result of Maximum Conducted Output Power

Temperature	20°C	Humidity	60%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Jul. 10, 2014		

##### Configuration IEEE 802.11n MCS0 HT20

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
36	5180 MHz	16.98	15.42	17.34	21.43	29.20	Complies
40	5200 MHz	20.15	20.38	21.12	25.34	29.20	Complies
48	5240 MHz	20.23	20.55	21.41	25.53	29.20	Complies
149	5745 MHz	10.44	10.18	10.78	15.24	29.20	Complies
157	5785 MHz	18.42	18.31	18.52	23.19	29.20	Complies
165	5825 MHz	10.09	9.52	10.14	14.70	29.20	Complies

Note: Max Ant Gain=6.8dBi > 6dBi , so power limit=30-(6.8-6)=29.2dBm

##### Configuration IEEE 802.11n MCS0 HT40

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
38	5190 MHz	9.02	9.43	9.61	14.13	29.20	Complies
46	5230 MHz	18.58	18.09	20.57	23.99	29.20	Complies
151	5755 MHz	9.23	9.13	9.53	14.07	29.20	Complies
159	5795 MHz	13.47	12.54	13.39	17.92	29.20	Complies

Note: Max Ant Gain=6.8dBi > 6dBi , so power limit=30-(6.8-6)=29.2dBm

<b>Temperature</b>	20°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11a
<b>Test Date</b>	Jul. 10, 2014		

**Configuration IEEE 802.11a**

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
36	5180 MHz	17.71	17.07	18.32	22.50	29.20	Complies
40	5200 MHz	19.94	20.12	21.04	25.17	29.20	Complies
48	5240 MHz	20.08	20.53	21.28	25.43	29.20	Complies
149	5745 MHz	10.54	10.44	10.85	15.38	29.20	Complies
157	5785 MHz	18.96	18.69	19.14	23.71	29.20	Complies
165	5825 MHz	10.95	10.36	11.18	15.61	29.20	Complies

Note: Max Ant Gain=6.8dBi > 6dBi , so power limit=30-(6.8-6)=29.2dBm

## 4.5. Power Spectral Density Measurement

### 4.5.1. 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 4.4.1.

Frequency Range	Power Spectral Density limit
5.15~5.25 GHz	17 dBm/MHz
5.725~5.85 GHz	30 dBm/500kHz

### 4.5.2. Measuring Instruments and Setting

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

For 5.15~5.25 GHz

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

For 5.725~5.85 GHz

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	$RBW \geq 1/T$
VBW	$VBW \geq 3 RBW$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.	

### 4.5.3. Test Procedures

For 5.15~5.25 GHz

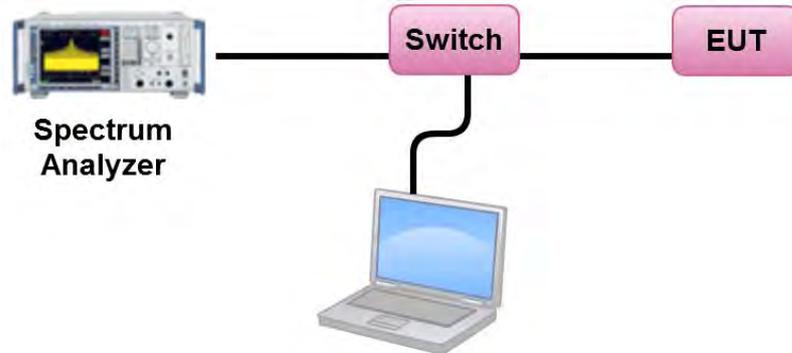
1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple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

For 5.725~5.85 GHz

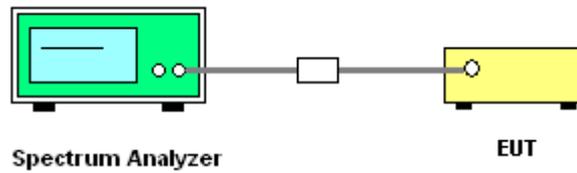
1. Test procedures refer KDB662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$  (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The measured result of PSD level must add  $10\log(500\text{kHz/RBW})$  and the final result should  $\leq 30$  dBm.

#### 4.5.4. Test Setup Layout

For 5.15~5.25 GHz



For 5.725~5.85 GHz



#### 4.5.5. Test Deviation

There is no deviation with the original standard.

#### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.5.7. Test Result of Power Spectral Density

Temperature	20°C	Humidity	60%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n
Test Date	Jul. 10, 2014		

##### Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	8.53	12.40	Complies
40	5200 MHz	12.08	12.40	Complies
48	5240 MHz	12.20	12.40	Complies

Note: Directional gain =  $10 \cdot \log \left[ \frac{\sum_{i=1}^M \sum_{j=1}^N |R_{ij}|^2}{N_{ant}}, So Band1 Limit =  $17 - (10.6 - 6) = 12.4\text{dBm/MHz}$$

Channel	Frequency	Power Density (dBm/3kHz)				BWCF factor 3kHz to 500kHz	Total Power Density dBm/500kHz	Power Density Limit dBm/500kHz	Result
		Chain 1	Chain 2	Chain 3	Total				
149	5745 MHz	-15.75	-15.85	-15.01	-10.75	22.22	11.47	25.40	Complies
157	5785 MHz	-6.77	-7.17	-6.66	-2.09	22.22	20.13	25.40	Complies
165	5825 MHz	-15.63	-15.47	-14.93	-10.56	22.22	11.66	25.40	Complies

Note: Directional gain =  $10 \cdot \log \left[ \frac{\sum_{i=1}^M \sum_{j=1}^N |R_{ij}|^2}{N_{ant}}, So Limit =  $30 - (10.6 - 6) = 25.4\text{dBm/500kHz}$$

##### Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
38	5190 MHz	-2.66	12.40	Complies
46	5230 MHz	8.13	12.40	Complies

Note: Directional gain =  $10 \cdot \log \left[ \frac{\sum_{i=1}^M \sum_{j=1}^N |R_{ij}|^2}{N_{ant}}, So Band1 Limit =  $17 - (10.6 - 6) = 12.4\text{dBm/MHz}$$

Channel	Frequency	Power Density (dBm/3kHz)				BWCF factor 3kHz to 500kHz	Total Power Density dBm/500kHz	Power Density Limit dBm/500kHz	Result
		Chain 1	Chain 2	Chain 3	Total				
151	5755 MHz	-19.59	-19.14	-19.01	-14.47	22.22	7.75	25.40	Complies
159	5795 MHz	-15.68	-15.84	-15.06	-10.74	22.22	11.48	25.40	Complies

Note: Directional gain =  $10 \cdot \log \left[ \frac{\sum_{i=1}^M \sum_{j=1}^N |R_{ij}|^2}{N_{ant}}, So Limit =  $30 - (10.6 - 6) = 25.4\text{dBm/500kHz}$$

Temperature	20°C	Humidity	60%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a
Test Date	Jul. 10, 2014		

**Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3**

Channel	Frequency	Total Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
36	5180 MHz	9.81	12.40	Complies
40	5200 MHz	12.02	12.40	Complies
48	5240 MHz	12.12	12.40	Complies

Note: Directional gain =  $10 \cdot \log \left[ \frac{\sum_{i=1}^N |E_{\theta_i}|^2}{N} \right]$  = 10.6dBi > 6dBi, So Band1 Limit = 17 - (10.6 - 6) = 12.4 dBm/MHz

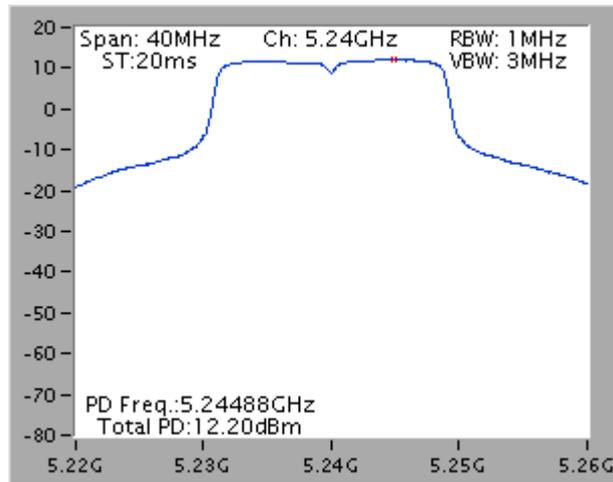
Channel	Frequency	Power Density (dBm/3kHz)				BWCF factor 3kHz to 500kHz	Total Power Density dBm/500kHz	Power Density Limit dBm/500kHz	Result
		Chain 1	Chain 2	Chain 3	Total				
149	5745 MHz	-14.89	-15.66	-14.81	-10.33	22.22	11.89	25.40	Complies
157	5785 MHz	-6.03	-5.85	-5.41	-0.98	22.22	21.24	25.40	Complies
165	5825 MHz	-13.67	-13.7	-13.76	-8.94	22.22	13.28	25.40	Complies

Note: Directional gain =  $10 \cdot \log \left[ \frac{\sum_{i=1}^N |E_{\theta_i}|^2}{N} \right]$  = 10.6dBi > 6dBi, So Limit = 30 - (10.6 - 6) = 25.4 dBm/500kHz

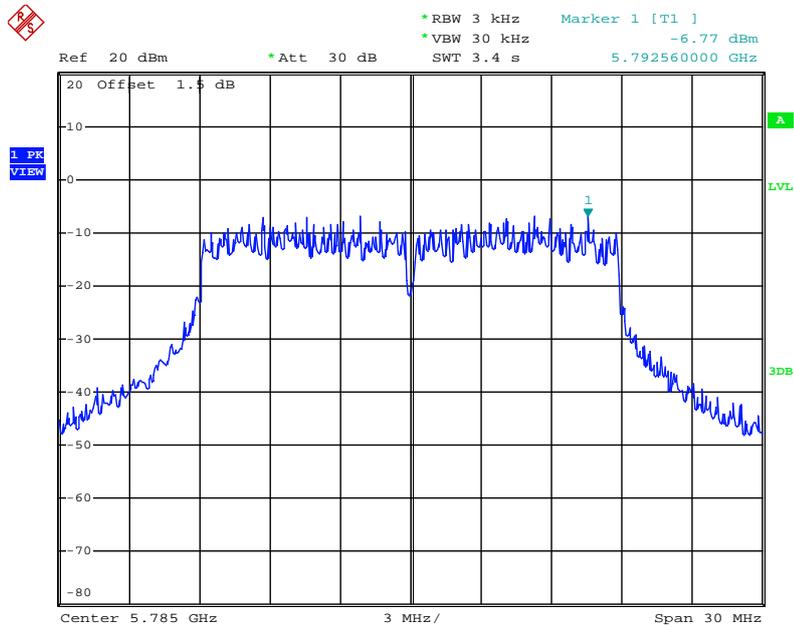
Note: All the test values were listed in the report.

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

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 + Chain 3 / 5240 MHz

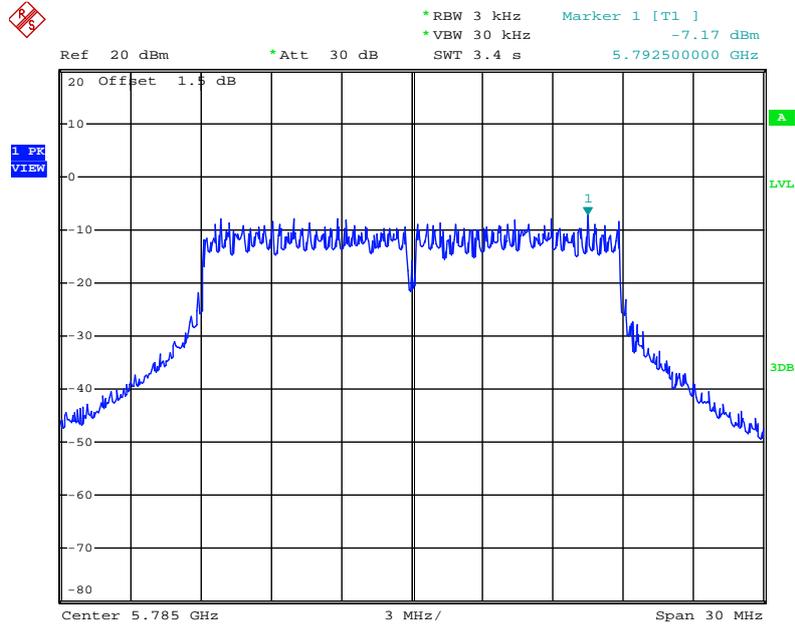


Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5785 MHz



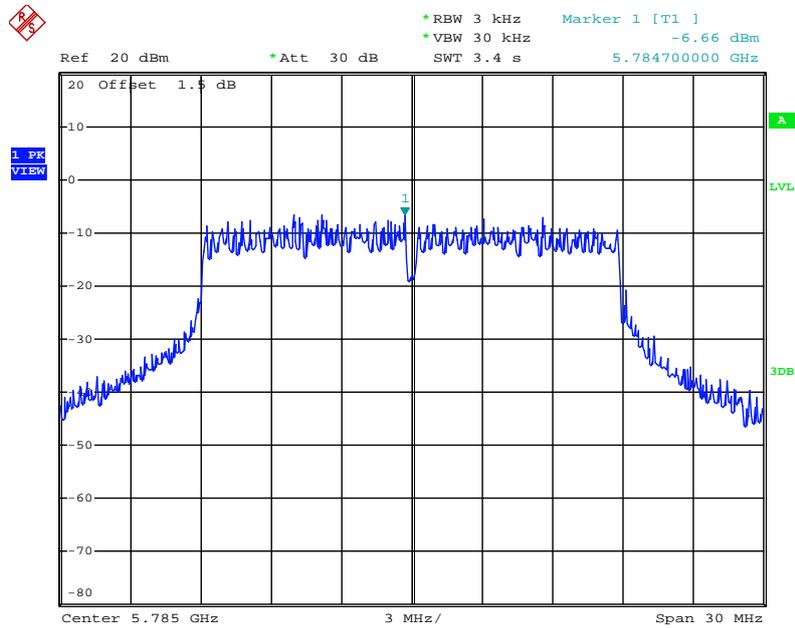
Date: 10.JUL.2014 16:44:52

## Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 2 / 5785 MHz



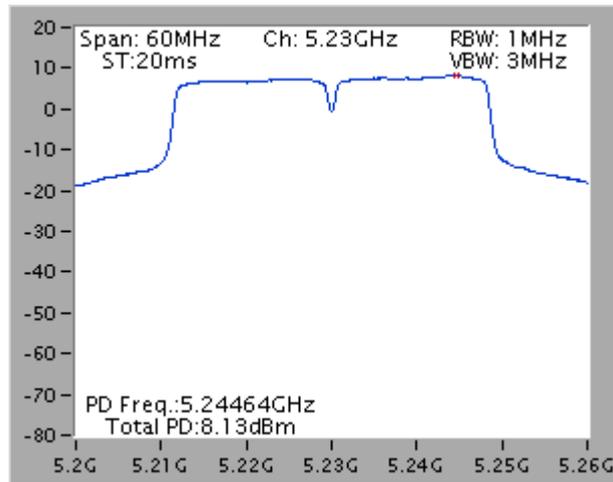
Date: 10.JUL.2014 16:45:16

## Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 3 / 5785 MHz

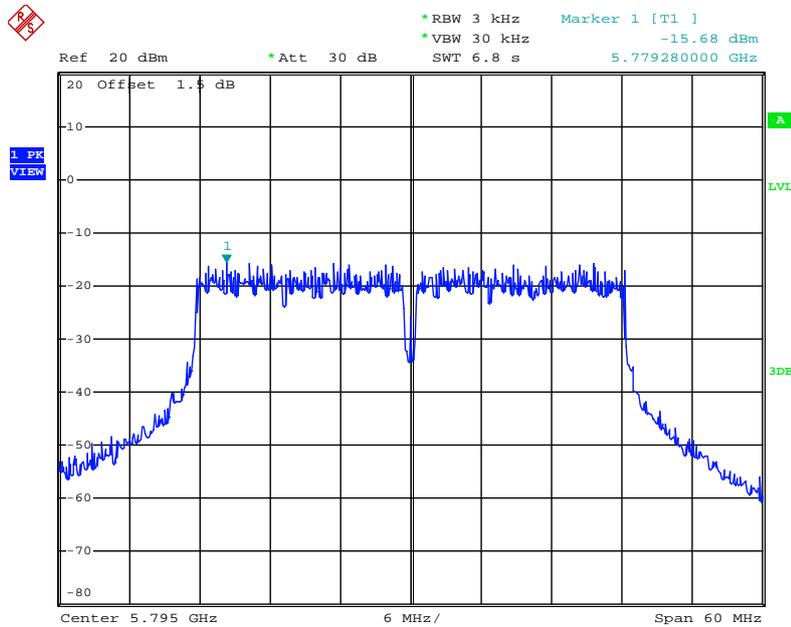


Date: 10.JUL.2014 16:45:56

Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 + Chain 3 / 5230 MHz

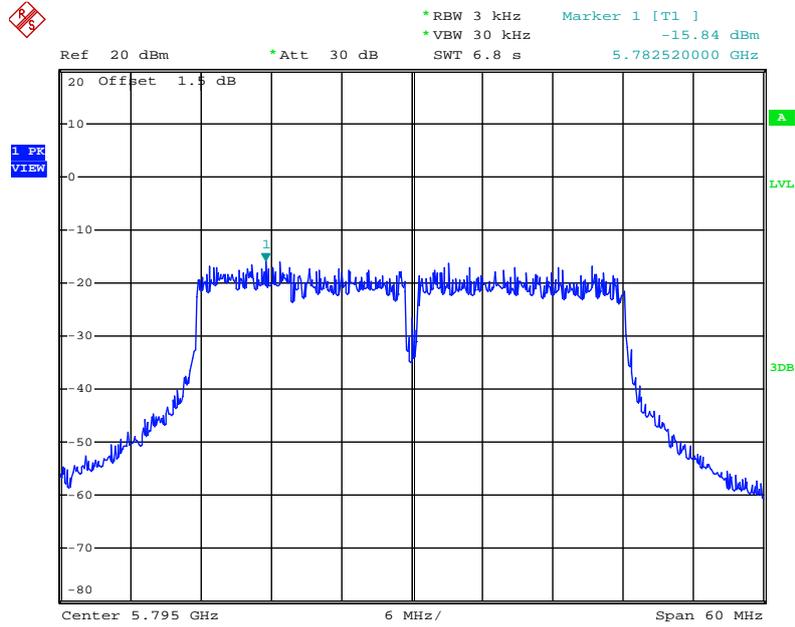


Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5795 MHz



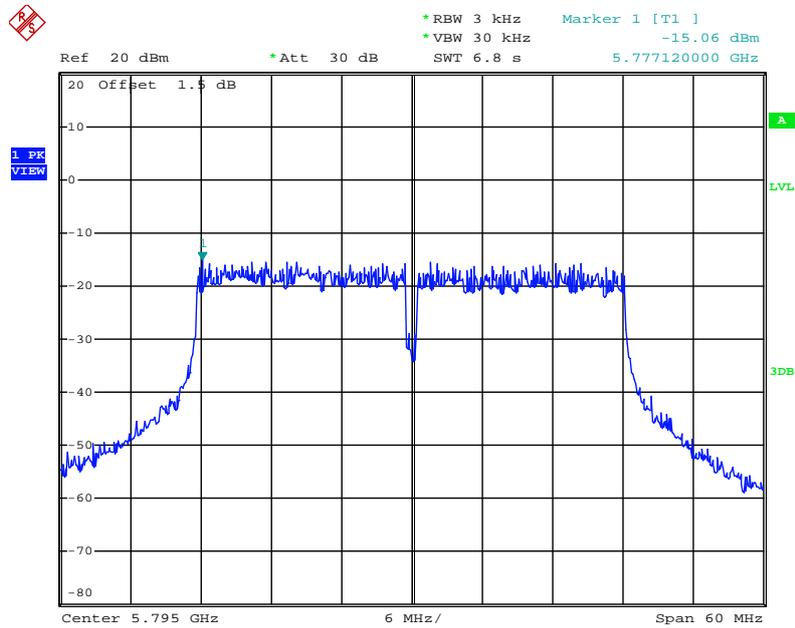
Date: 10.JUL.2014 16:52:17

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 2 / 5795 MHz**



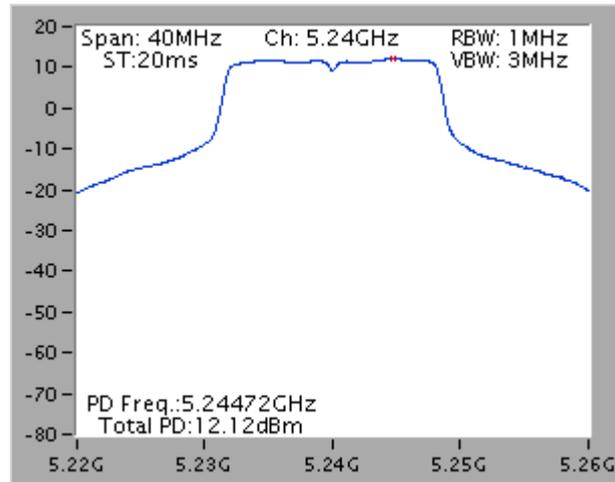
Date: 10.JUL.2014 16:51:53

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 3 / 5795 MHz**

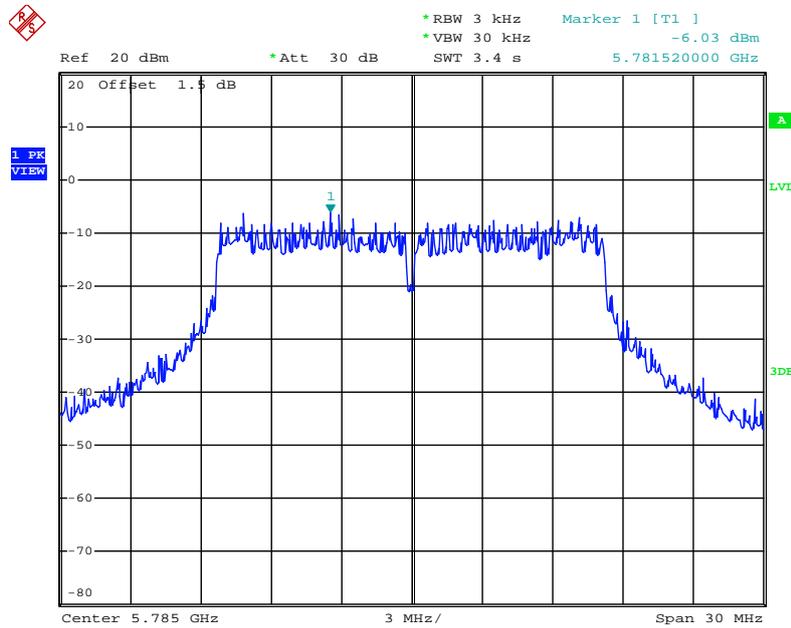


Date: 10.JUL.2014 16:51:25

**Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 / 5240 MHz**

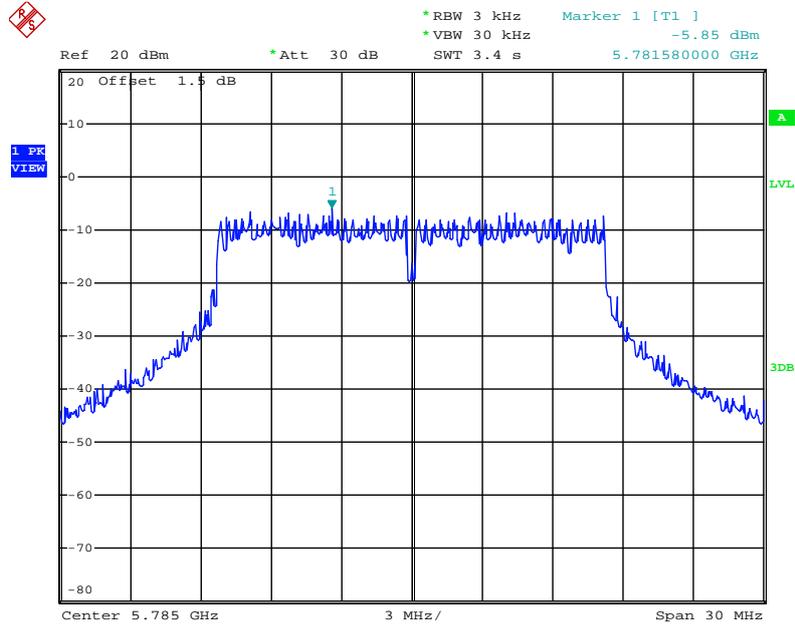


**Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5785 MHz**



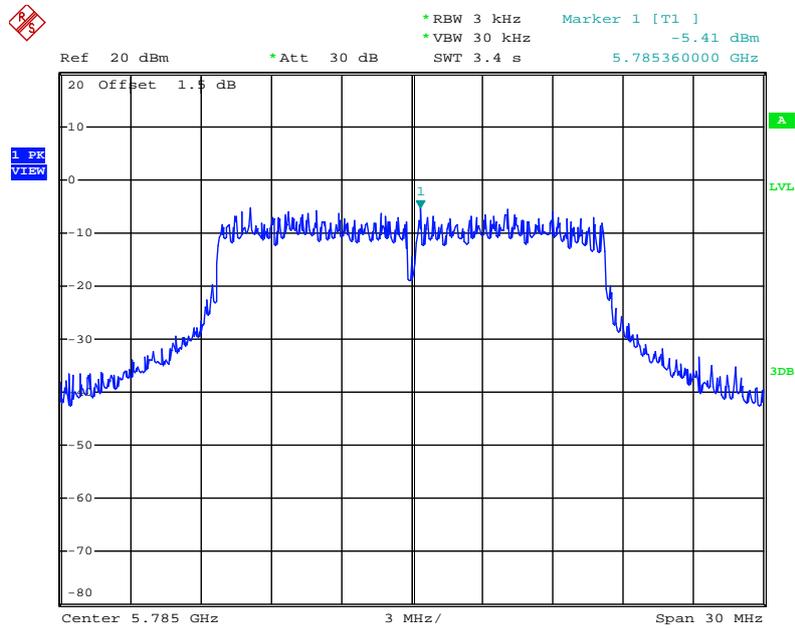
Date: 10.JUL.2014 15:58:59

### Power Density Plot on Configuration IEEE 802.11a / Chain 2 / 5785 MHz



Date: 10.JUL.2014 15:57:28

### Power Density Plot on Configuration IEEE 802.11a / Chain 3 / 5785 MHz



Date: 10.JUL.2014 15:56:58

## 4.6. Radiated Emissions Measurement

### 4.6.1. Limit

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

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of  $-17$  dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.

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

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

### 4.6.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1 MHz / 3MHz for Peak, Please refer to section 3.11 for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for peak

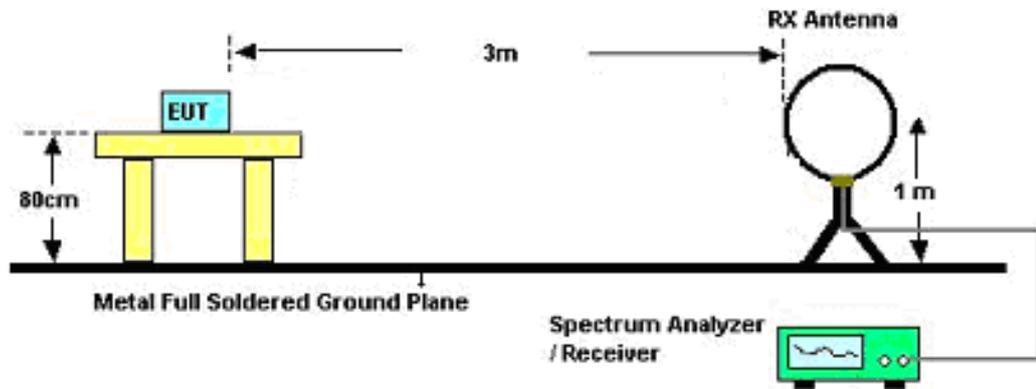
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

#### 4.6.3. Test Procedures

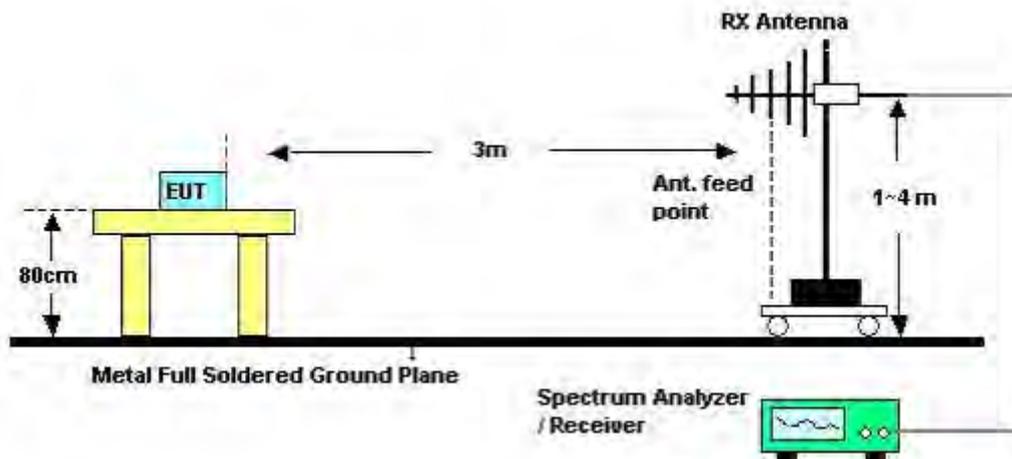
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

#### 4.6.4. Test Setup Layout

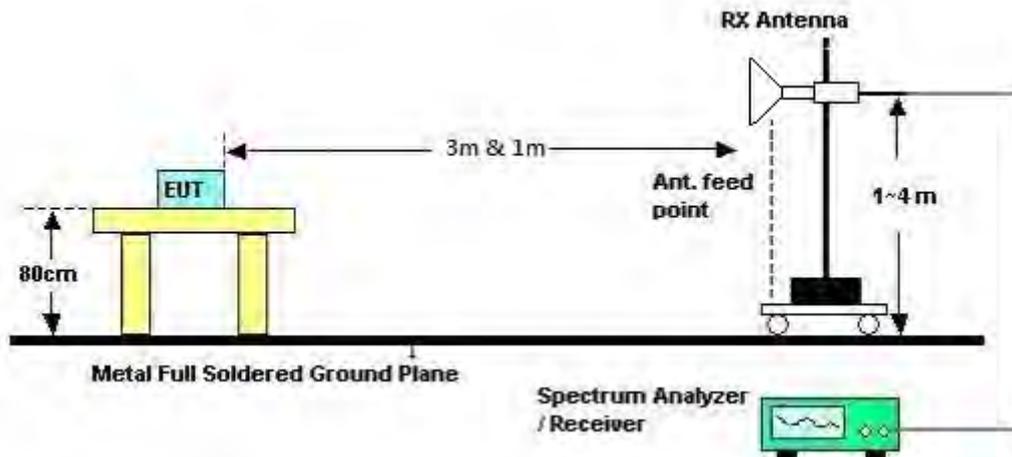
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



#### 4.6.5. Test Deviation

There is no deviation with the original standard.

#### 4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

For EUT 1:

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	CTX
<b>Test Date</b>	Jul. 14, 2014	<b>Test Mode</b>	Mode 3

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

For EUT 2:

<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	CTX
<b>Test Date</b>	Aug. 05, 2014	<b>Test Mode</b>	Mode 4

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);

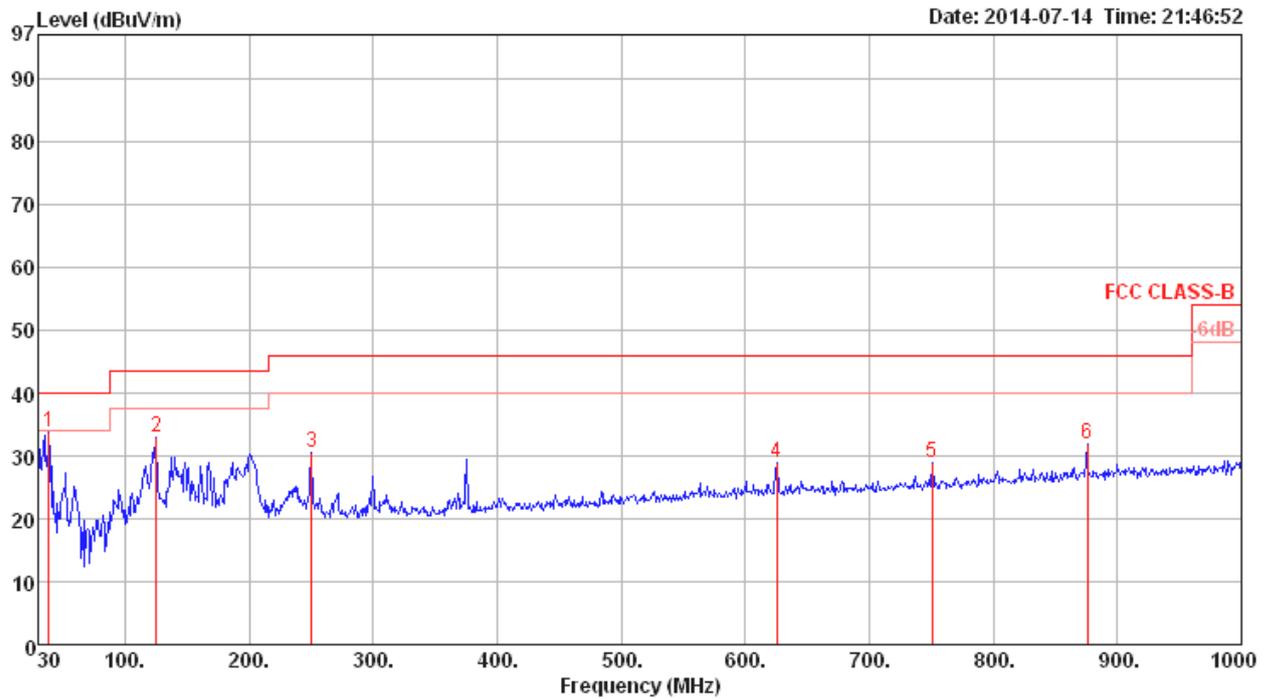
Limit line = specific limits (dBuV) + distance extrapolation factor.

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

For EUT 1:

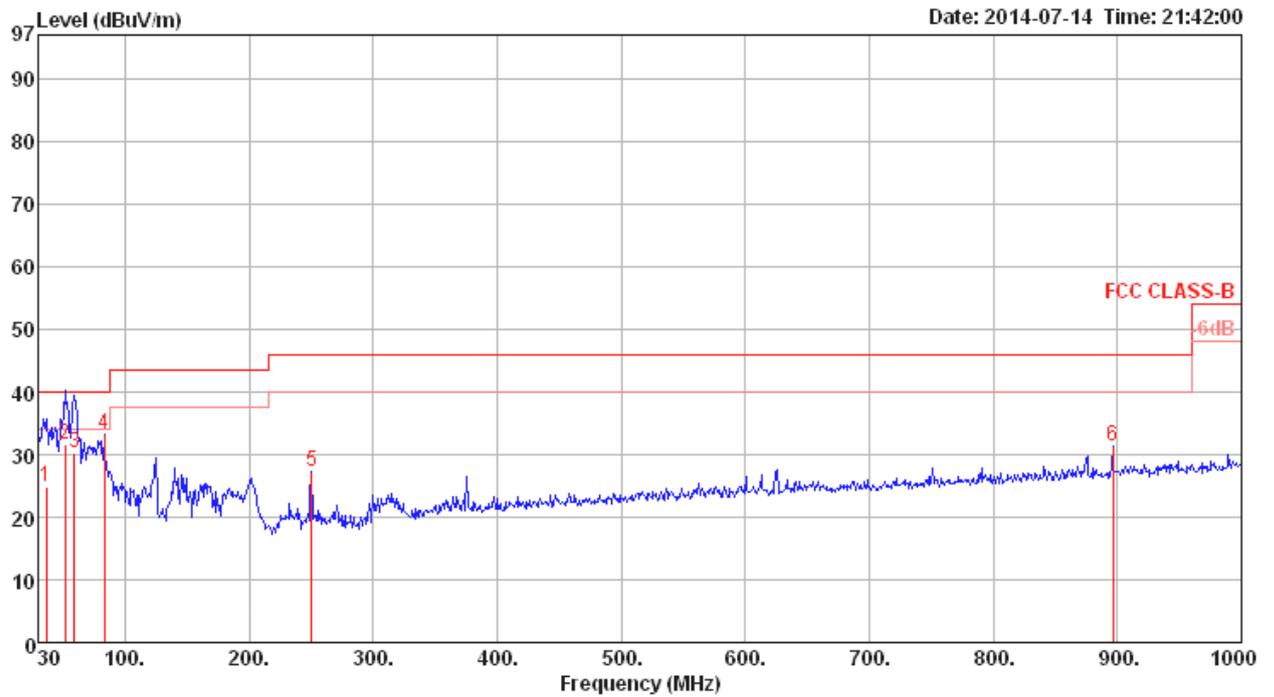
Temperature	23°C	Humidity	61%
Test Engineer	Magic Lai	Configurations	CTX
Test Mode	Mode 3		

##### Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	38.73	33.78	40.00	-6.22	47.21	0.67	13.70	27.80	QP	100	0	HORIZONTAL
2	125.06	32.94	43.50	-10.56	46.88	1.33	12.21	27.48	QP	100	0	HORIZONTAL
3	250.19	30.56	46.00	-15.44	43.01	1.78	12.77	27.00	QP	100	0	HORIZONTAL
4	625.58	28.96	46.00	-17.04	35.28	2.90	18.85	28.07	QP	100	0	HORIZONTAL
5	750.71	29.01	46.00	-16.99	34.18	3.20	19.43	27.80	QP	100	0	HORIZONTAL
6	875.84	31.89	46.00	-14.11	35.53	3.46	20.35	27.45	QP	100	0	HORIZONTAL

**Vertical**



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	36.79	24.94	40.00	-15.06	37.17	0.68	14.89	27.80	QP	100	65 VERTICAL
2	51.34	31.53	40.00	-8.47	50.11	0.86	8.35	27.79	QP	100	251 VERTICAL
3	59.10	30.23	40.00	-9.77	50.14	0.90	6.95	27.76	QP	100	56 VERTICAL
4	83.35	33.13	40.00	-6.87	52.02	1.07	7.71	27.67	QP	400	0 VERTICAL
5	250.19	27.36	46.00	-18.64	39.81	1.78	12.77	27.00	QP	400	0 VERTICAL
6	896.21	31.31	46.00	-14.69	34.68	3.54	20.50	27.41	QP	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.

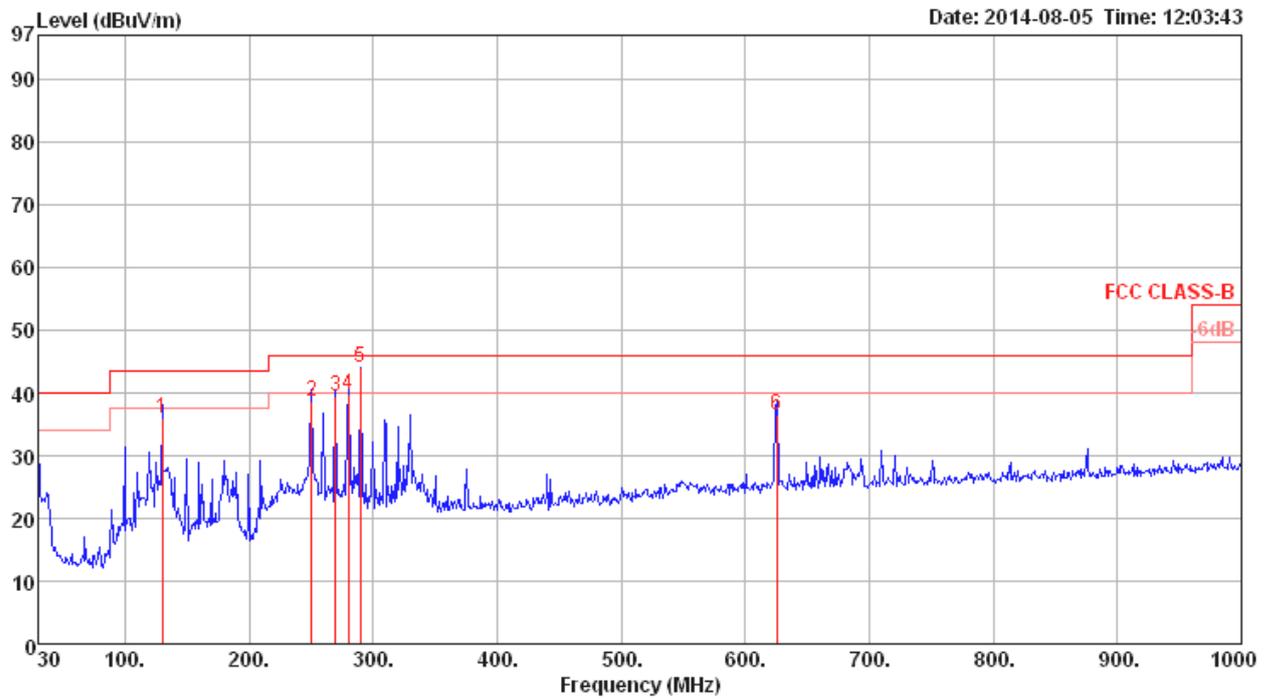
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

For EUT 2:

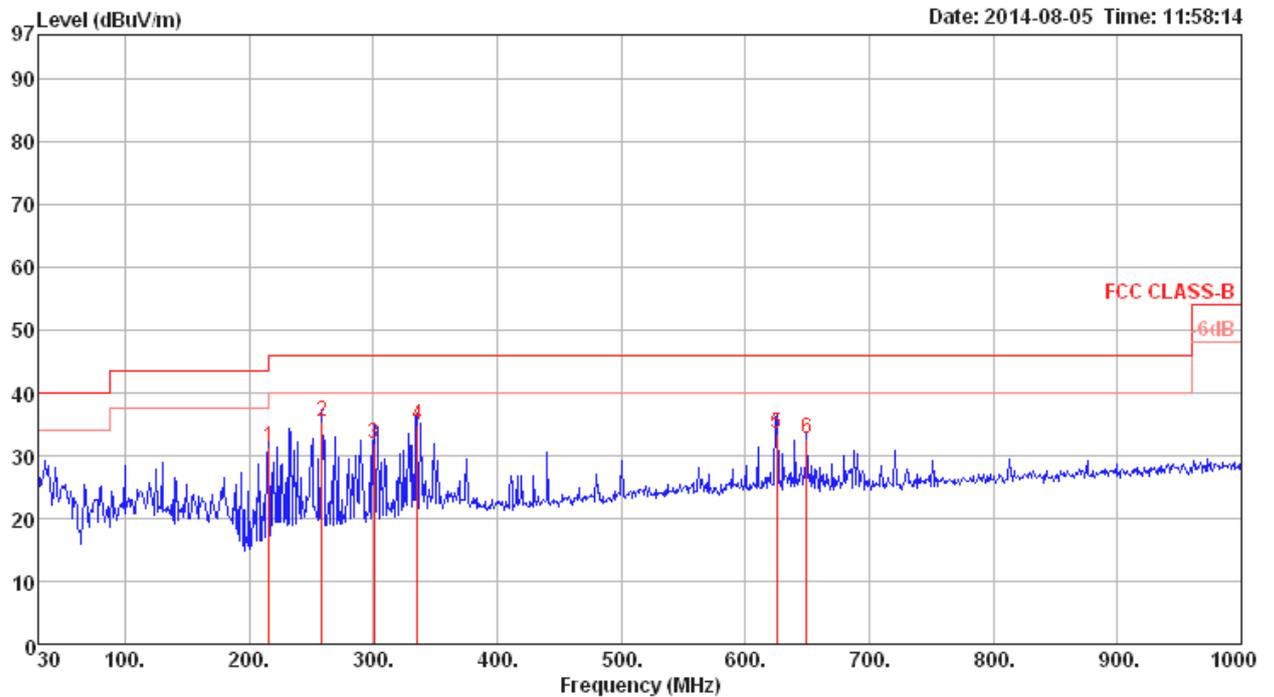
Temperature	28°C	Humidity	62%
Test Engineer	YC Chen	Configurations	CTX
Test Mode	Mode 4		

**Horizontal**



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	PoI/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	129.91	36.03	43.50	-7.47	49.85	1.37	12.26	27.45	QP	100	254	HORIZONTAL
2	250.19	38.52	46.00	-7.48	50.97	1.78	12.77	27.00	QP	100	333	HORIZONTAL
3	269.59	39.32	46.00	-6.68	51.40	1.88	13.00	26.96	QP	100	120	HORIZONTAL
4	280.26	39.61	46.00	-6.39	51.49	1.93	13.13	26.94	QP	100	156	HORIZONTAL
5	289.96	44.14	46.00	-1.86	55.84	1.98	13.24	26.92	QP	100	124	HORIZONTAL
6	625.58	36.57	46.00	-9.43	42.89	2.90	18.85	28.07	QP	100	323	HORIZONTAL

**Vertical**



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	Remark	cm	deg	PoI/Phase
1	216.24	31.43	46.00	-14.57	46.53	1.70	10.27	27.07	QP	100	124	VERTICAL
2	258.92	35.41	46.00	-10.59	47.70	1.82	12.87	26.98	QP	100	233	VERTICAL
3	300.63	31.87	46.00	-14.13	43.35	2.03	13.39	26.90	QP	100	111	VERTICAL
4	335.55	34.84	46.00	-11.16	45.58	2.08	14.33	27.15	QP	100	124	VERTICAL
5	625.58	33.38	46.00	-12.62	39.70	2.90	18.85	28.07	QP	100	222	VERTICAL
6	649.83	32.61	46.00	-13.39	38.74	2.99	18.93	28.05	QP	100	127	VERTICAL

**Note:**

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

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

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

**Results for Radiated Emissions (1GHz~40GHz)**

For EUT 1:

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 36 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	15531.68	51.33	74.00	-22.67	41.92	6.13	38.45	35.17	Peak	100	94	HORIZONTAL
2	15537.20	39.54	54.00	-14.46	30.13	6.13	38.45	35.17	Average	100	94	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	15538.44	39.37	54.00	-14.63	29.96	6.13	38.45	35.17	Average	100	135	VERTICAL
2	15548.64	52.22	74.00	-21.78	42.83	6.13	38.43	35.17	Peak	100	135	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 40 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15604.40	39.40	54.00	-14.60	30.10	6.13	38.36	35.19	Average	100	234 HORIZONTAL
2	15608.92	52.37	74.00	-21.63	43.07	6.13	38.36	35.19	Peak	100	234 HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15592.56	51.08	74.00	-22.92	41.75	6.13	38.38	35.18	Peak	100	306 VERTICAL
2	15599.88	39.43	54.00	-14.57	30.13	6.13	38.36	35.19	Average	100	306 VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**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	15714.84	51.86	74.00	-22.14	42.74	6.14	38.19	35.21	Peak	100	300	HORIZONTAL
2	15726.52	40.11	54.00	-13.89	31.00	6.14	38.19	35.22	Average	100	300	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	15718.16	52.31	74.00	-21.69	43.19	6.14	38.19	35.21	Peak	100	346	VERTICAL
2	15723.00	39.99	54.00	-14.01	30.87	6.14	38.19	35.21	Average	100	346	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 149 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**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	11504.40	52.21	74.00	-21.79	42.74	5.12	39.40	35.05	Peak	100	173	HORIZONTAL
2	11513.16	39.48	54.00	-14.52	30.01	5.12	39.40	35.05	Average	100	173	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	11499.24	39.53	54.00	-14.47	30.06	5.12	39.40	35.05	Average	100	293	VERTICAL
2	11516.04	52.50	74.00	-21.50	43.02	5.12	39.41	35.05	Peak	100	293	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 157 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	11595.20	52.24	74.00	-21.76	42.71	5.14	39.45	35.06	Peak	100	173	HORIZONTAL
2	11598.20	39.26	54.00	-14.74	29.73	5.15	39.45	35.07	Average	100	173	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	11572.40	41.04	54.00	-12.96	31.52	5.14	39.44	35.06	Average	100	300	VERTICAL
2	11573.96	52.94	74.00	-21.06	43.42	5.14	39.44	35.06	Peak	100	300	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**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	11512.28	52.22	74.00	-21.78	42.75	5.12	39.40	35.05	Peak	100	311	HORIZONTAL
2	11537.96	39.86	54.00	-14.14	30.36	5.13	39.42	35.05	Average	100	311	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	11535.68	52.65	74.00	-21.35	43.15	5.13	39.42	35.05	Peak	100	112	VERTICAL
2	11537.48	39.77	54.00	-14.23	30.27	5.13	39.42	35.05	Average	100	112	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 38 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	15565.20	40.19	54.00	-13.81	30.83	6.13	38.40	35.17	Average	100	315	HORIZONTAL
2	15574.56	52.33	74.00	-21.67	42.98	6.13	38.40	35.18	Peak	100	315	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	15574.32	52.36	74.00	-21.64	43.01	6.13	38.40	35.18	Peak	100	247	VERTICAL
2	15576.52	39.86	54.00	-14.14	30.51	6.13	38.40	35.18	Average	100	247	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 46 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**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	15686.36	52.62	74.00	-21.38	43.46	6.14	38.23	35.21	Peak	100	298	HORIZONTAL
2	15691.80	39.55	54.00	-14.45	30.39	6.14	38.23	35.21	Average	100	298	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	15685.20	51.25	74.00	-22.75	42.09	6.14	38.23	35.21	Peak	100	95	VERTICAL
2	15691.16	39.47	54.00	-14.53	30.31	6.14	38.23	35.21	Average	100	95	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 151 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11537.96	39.75	54.00	-14.25	30.25	5.13	39.42	35.05	Average	100	313 HORIZONTAL
2	11539.52	52.50	74.00	-21.50	43.00	5.13	39.42	35.05	Peak	100	313 HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11498.48	52.90	74.00	-21.10	43.43	5.12	39.40	35.05	Peak	100	207 VERTICAL
2	11534.60	39.62	54.00	-14.38	30.12	5.13	39.42	35.05	Average	100	207 VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 159 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**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	11585.08	52.77	74.00	-21.23	43.24	5.14	39.45	35.06	Peak	100	134	HORIZONTAL
2	11604.04	39.45	54.00	-14.55	29.91	5.15	39.46	35.07	Average	100	134	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	11612.32	40.09	54.00	-13.91	30.55	5.15	39.46	35.07	Average	100	208	VERTICAL
2	11615.08	53.03	74.00	-20.97	43.49	5.15	39.46	35.07	Peak	100	208	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 36 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**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	15531.68	51.33	74.00	-22.67	41.92	6.13	38.45	35.17	Peak	100	94	HORIZONTAL
2	15537.20	39.54	54.00	-14.46	30.13	6.13	38.45	35.17	Average	100	94	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	15538.44	39.37	54.00	-14.63	29.96	6.13	38.45	35.17	Average	100	135	VERTICAL
2	15548.64	52.22	74.00	-21.78	42.83	6.13	38.43	35.17	Peak	100	135	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 40 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15604.40	39.40	54.00	-14.60	30.10	6.13	38.36	35.19 Average	100	234	HORIZONTAL
2	15608.92	52.37	74.00	-21.63	43.07	6.13	38.36	35.19 Peak	100	234	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	15592.56	51.08	74.00	-22.92	41.75	6.13	38.38	35.18 Peak	100	306	VERTICAL
2	15599.88	39.43	54.00	-14.57	30.13	6.13	38.36	35.19 Average	100	306	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**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	15714.84	51.86	74.00	-22.14	42.74	6.14	38.19	35.21	Peak	100	300	HORIZONTAL
2	15726.52	40.11	54.00	-13.89	31.00	6.14	38.19	35.22	Average	100	300	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	15718.16	52.31	74.00	-21.69	43.19	6.14	38.19	35.21	Peak	100	346	VERTICAL
2	15723.00	39.99	54.00	-14.01	30.87	6.14	38.19	35.21	Average	100	346	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**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	11486.16	52.65	74.00	-21.35	43.20	5.11	39.39	35.05	Peak	100	245	HORIZONTAL
2	11510.40	39.56	54.00	-14.44	30.09	5.12	39.40	35.05	Average	100	245	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	11469.24	52.28	74.00	-21.72	42.85	5.11	39.37	35.05	Peak	100	137	VERTICAL
2	11499.12	39.36	54.00	-14.64	29.89	5.12	39.40	35.05	Average	100	137	VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11566.40	41.66	54.00	-12.34	32.15	5.13	39.44	35.06	Average	100	127 HORIZONTAL
2	11586.20	52.81	74.00	-21.19	43.28	5.14	39.45	35.06	Peak	100	127 HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11572.40	41.37	54.00	-12.63	31.85	5.14	39.44	35.06	Average	100	253 VERTICAL
2	11580.68	54.00	74.00	-20.00	44.48	5.14	39.44	35.06	Peak	100	253 VERTICAL



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 12, 2014		

**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	11662.00	53.16	74.00	-20.84	43.59	5.16	39.49	35.08	Peak	100	188	HORIZONTAL
2	11664.64	40.20	54.00	-13.80	30.63	5.16	39.49	35.08	Average	100	188	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	11650.36	52.78	74.00	-21.22	43.22	5.16	39.48	35.08	Peak	100	61	VERTICAL
2	11663.32	40.00	54.00	-14.00	30.43	5.16	39.49	35.08	Average	100	61	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.

For EUT 2:

<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 36 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15540.01	58.26	74.00	-15.74	44.96	10.77	38.12	35.59	Peak	100	108	HORIZONTAL
2	15540.15	45.37	54.00	-8.63	32.07	10.77	38.12	35.59	Average	100	108	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15539.74	58.83	74.00	-15.17	45.53	10.77	38.12	35.59	Peak	100	180	VERTICAL
2	15540.22	45.65	54.00	-8.35	32.35	10.77	38.12	35.59	Average	100	180	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 40 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	15600.13	57.76	74.00	-16.24	44.52	10.78	38.04	35.58	Peak	100	206	HORIZONTAL
2	15600.47	44.81	54.00	-9.19	31.57	10.78	38.04	35.58	Average	100	206	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	15599.65	44.85	54.00	-9.15	31.61	10.78	38.04	35.58	Average	100	357	VERTICAL
2	15599.99	57.82	74.00	-16.18	44.58	10.78	38.04	35.58	Peak	100	357	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**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	15720.12	58.04	74.00	-15.96	44.96	10.79	37.85	35.56	Peak	100	262	HORIZONTAL
2	15720.22	45.10	54.00	-8.90	32.02	10.79	37.85	35.56	Average	100	262	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	15719.66	45.06	54.00	-8.94	31.98	10.79	37.85	35.56	Average	100	78	VERTICAL
2	15719.70	57.94	74.00	-16.06	44.86	10.79	37.85	35.56	Peak	100	78	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 149 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11490.21	53.92	74.00	-20.08	40.26	9.24	39.50	35.08	Peak	100	76	HORIZONTAL
2	11490.41	40.54	54.00	-13.46	26.88	9.24	39.50	35.08	Average	100	76	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11490.34	53.36	74.00	-20.64	39.70	9.24	39.50	35.08	Peak	100	131	VERTICAL
2	11490.44	40.40	54.00	-13.60	26.74	9.24	39.50	35.08	Average	100	131	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 157 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11609.62	53.56	74.00	-20.44	39.91	9.27	39.46	35.08	Peak	100	262	HORIZONTAL
2	11610.28	40.22	54.00	-13.78	26.57	9.27	39.46	35.08	Average	100	262	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11609.88	53.33	74.00	-20.67	39.68	9.27	39.46	35.08	Peak	100	164	VERTICAL
2	11610.00	40.38	54.00	-13.62	26.73	9.27	39.46	35.08	Average	100	164	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**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	11649.51	40.87	54.00	-13.13	27.22	9.28	39.44	35.07	Average	100	266	HORIZONTAL
2	11650.32	54.04	74.00	-19.96	40.39	9.28	39.44	35.07	Peak	100	266	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	11649.75	41.23	54.00	-12.77	27.58	9.28	39.44	35.07	Average	100	211	VERTICAL
2	11650.19	54.67	74.00	-19.33	41.02	9.28	39.44	35.07	Peak	100	211	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 38 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**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	15569.53	45.28	54.00	-8.72	31.99	10.78	38.09	35.58	Average	100	213	HORIZONTAL
2	15570.41	58.64	74.00	-15.36	45.35	10.78	38.09	35.58	Peak	100	213	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	15570.34	58.15	74.00	-15.85	44.86	10.78	38.09	35.58	Peak	100	138	VERTICAL
2	15570.45	45.18	54.00	-8.82	31.89	10.78	38.09	35.58	Average	100	138	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 46 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15690.09	57.52	74.00	-16.48	44.38	10.79	37.91	35.56	Peak	100	220	HORIZONTAL
2	15690.13	44.68	54.00	-9.32	31.54	10.79	37.91	35.56	Average	100	220	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15689.62	57.54	74.00	-16.46	44.40	10.79	37.91	35.56	Peak	100	162	VERTICAL
2	15690.35	44.63	54.00	-9.37	31.49	10.79	37.91	35.56	Average	100	162	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 151 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**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	11510.33	40.35	54.00	-13.65	26.70	9.25	39.50	35.10	Average	100	281	HORIZONTAL
2	11510.61	54.33	74.00	-19.67	40.68	9.25	39.50	35.10	Peak	100	281	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	11502.72	40.59	54.00	-13.41	26.94	9.25	39.50	35.10	Average	100	141	VERTICAL
2	11510.64	53.91	74.00	-20.09	40.26	9.25	39.50	35.10	Peak	100	141	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 159 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11589.87	53.35	74.00	-20.65	39.69	9.27	39.47	35.08	Peak	100	11	HORIZONTAL
2	11590.16	40.09	54.00	-13.91	26.43	9.27	39.47	35.08	Average	100	11	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11589.52	52.98	74.00	-21.02	39.32	9.27	39.47	35.08	Peak	100	100	VERTICAL
2	11590.08	40.15	54.00	-13.85	26.49	9.27	39.47	35.08	Average	100	100	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 36 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**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	15539.58	45.38	54.00	-8.62	32.08	10.77	38.12	35.59	Average	100	298	HORIZONTAL
2	15540.09	58.33	74.00	-15.67	45.03	10.77	38.12	35.59	Peak	100	298	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	15539.67	58.37	74.00	-15.63	45.07	10.77	38.12	35.59	Peak	100	116	VERTICAL
2	15540.38	45.33	54.00	-8.67	32.03	10.77	38.12	35.59	Average	100	116	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 40 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15599.84	57.91	74.00	-16.09	44.67	10.78	38.04	35.58	100	256	HORIZONTAL
2	15600.04	44.88	54.00	-9.12	31.64	10.78	38.04	35.58	100	256	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	15599.99	57.70	74.00	-16.30	44.46	10.78	38.04	35.58	100	144	VERTICAL
2	15600.42	44.95	54.00	-9.05	31.71	10.78	38.04	35.58	100	144	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15719.64	45.45	54.00	-8.55	32.37	10.79	37.85	35.56	Average	100	89	HORIZONTAL
2	15720.34	57.96	74.00	-16.04	44.88	10.79	37.85	35.56	Peak	100	89	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	15719.66	44.92	54.00	-9.08	31.84	10.79	37.85	35.56	Average	100	217	VERTICAL
2	15720.06	58.45	74.00	-15.55	45.37	10.79	37.85	35.56	Peak	100	217	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11490.38	53.27	74.00	-20.73	39.61	9.24	39.50	35.08	Peak	100	151	HORIZONTAL
2	11490.48	40.36	54.00	-13.64	26.70	9.24	39.50	35.08	Average	100	151	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.76	53.42	74.00	-20.58	39.76	9.24	39.50	35.08	Peak	100	194	VERTICAL
2	11490.45	40.66	54.00	-13.34	27.00	9.24	39.50	35.08	Average	100	194	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11569.53	53.57	74.00	-20.43	39.93	9.26	39.47	35.09	Peak	100	177	HORIZONTAL
2	11569.85	40.80	54.00	-13.20	27.16	9.26	39.47	35.09	Average	100	177	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	11561.28	55.56	74.00	-18.44	41.91	9.26	39.48	35.09	Peak	100	122	VERTICAL
2	11569.00	44.56	54.00	-9.44	30.92	9.26	39.47	35.09	Average	100	122	VERTICAL



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11642.92	55.10	74.00	-18.90	41.45	9.28	39.44	35.07	Peak	100	93	HORIZONTAL
2	11649.56	41.07	54.00	-12.93	27.42	9.28	39.44	35.07	Average	100	93	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11657.40	40.90	54.00	-13.10	27.25	9.28	39.44	35.07	Average	100	224	VERTICAL
2	11657.56	54.13	74.00	-19.87	40.48	9.28	39.44	35.07	Peak	100	224	VERTICAL

**Note:**

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

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

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

## 4.7. Band Edge Emissions Measurement

### 4.7.1. Limit

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

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of  $-17$  dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.

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

Frequencies (MHz)	Field Strength (microvolts/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)	1 MHz / 3MHz for Peak, Please refer to section 3.11 for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for Peak

### 4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3, only the frequency range investigated is limited to 100MHz around band edges.

### 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

For EUT 1:

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

##### Channel 36

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5148.00	73.84	74.00	-0.16	71.21	3.43	34.11	34.91	Peak	159	93	HORIZONTAL
2	5149.60	52.51	54.00	-1.49	49.88	3.43	34.11	34.91	Average	159	93	HORIZONTAL
3	5188.00	118.46			115.77	3.44	34.16	34.91	Peak	159	93	HORIZONTAL
4	5188.20	107.22			104.53	3.44	34.16	34.91	Average	159	93	HORIZONTAL

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

##### Channel 40

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5150.00	52.33	54.00	-1.67	49.70	3.43	34.11	34.91	Average	157	104	HORIZONTAL
2	5150.00	73.54	74.00	-0.46	70.91	3.43	34.11	34.91	Peak	157	104	HORIZONTAL
3	5201.20	108.97			106.25	3.45	34.18	34.91	Average	157	104	HORIZONTAL
4	5201.20	120.59			117.87	3.45	34.18	34.91	Peak	157	104	HORIZONTAL

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

##### Channel 48

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5136.20	63.40	74.00	-10.60	60.79	3.43	34.09	34.91	Peak	155	97	HORIZONTAL
2	5150.00	49.27	54.00	-4.73	46.64	3.43	34.11	34.91	Average	155	97	HORIZONTAL
3	5246.60	114.34			111.54	3.46	34.25	34.91	Average	155	97	HORIZONTAL
4	5246.60	125.98			123.18	3.46	34.25	34.91	Peak	155	97	HORIZONTAL
5	5360.20	49.47	54.00	-4.53	46.50	3.49	34.39	34.91	Average	155	97	HORIZONTAL
6	5360.20	61.07	74.00	-12.93	58.10	3.49	34.39	34.91	Peak	155	97	HORIZONTAL

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

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Channel 149**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5715.00	67.96	68.20	-0.24	64.62	3.60	34.68	34.94	Peak	160	103	HORIZONTAL
2	5724.60	74.81	78.20	-3.39	71.46	3.60	34.69	34.94	Peak	160	103	HORIZONTAL
3	5737.00	102.44			99.07	3.61	34.70	34.94	Average	160	103	HORIZONTAL
4	5737.80	113.30			109.93	3.61	34.70	34.94	Peak	160	103	HORIZONTAL
5	5852.00	59.06	78.20	-19.14	55.63	3.64	34.74	34.95	Peak	160	103	HORIZONTAL
6	5864.00	58.63	68.20	-9.57	55.19	3.65	34.74	34.95	Peak	160	103	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5745 MHz.

**Channel 157**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5709.80	65.87	68.20	-2.33	62.53	3.60	34.68	34.94	Peak	156	106	HORIZONTAL
2	5722.20	67.13	78.20	-11.07	63.78	3.60	34.69	34.94	Peak	156	106	HORIZONTAL
3	5780.00	111.32			107.93	3.62	34.71	34.94	Average	156	106	HORIZONTAL
4	5780.20	122.41			119.02	3.62	34.71	34.94	Peak	156	106	HORIZONTAL
5	5854.40	67.25	78.20	-10.95	63.82	3.64	34.74	34.95	Peak	156	106	HORIZONTAL
6	5862.00	67.90	68.20	-0.30	64.46	3.65	34.74	34.95	Peak	156	106	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5785 MHz.

**Channel 165**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5683.00	65.29	68.20	-2.91	61.97	3.59	34.67	34.94	Peak	154	99	HORIZONTAL
2	5725.00	64.56	78.20	-13.64	61.21	3.60	34.69	34.94	Peak	154	99	HORIZONTAL
3	5827.00	103.12			99.71	3.63	34.73	34.95	Average	154	99	HORIZONTAL
4	5827.80	114.63			111.22	3.63	34.73	34.95	Peak	154	99	HORIZONTAL
5	5850.00	75.89	78.20	-2.31	72.46	3.64	34.74	34.95	Peak	154	99	HORIZONTAL
6	5866.40	68.09	68.20	-0.11	64.65	3.65	34.74	34.95	Peak	154	99	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5825 MHz.



<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 38, 46 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Channel 38**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5150.00	53.36	54.00	-0.64	50.73	3.43	34.11	34.91	Average	157	92	HORIZONTAL
2	5150.00	69.64	74.00	-4.36	67.01	3.43	34.11	34.91	Peak	157	92	HORIZONTAL
3	5200.40	106.32			103.60	3.45	34.18	34.91	Peak	157	92	HORIZONTAL
4	5200.80	94.64			91.92	3.45	34.18	34.91	Average	157	92	HORIZONTAL

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

**Channel 46**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5146.00	70.25	74.00	-3.75	67.62	3.43	34.11	34.91	Peak	155	102	HORIZONTAL
2	5150.00	53.49	54.00	-0.51	50.86	3.43	34.11	34.91	Average	155	102	HORIZONTAL
3	5232.80	105.55			102.77	3.46	34.23	34.91	Average	155	102	HORIZONTAL
4	5233.20	117.18			114.40	3.46	34.23	34.91	Peak	155	102	HORIZONTAL

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

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014 & Jun. 12, 2014		

**Channel 151**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	5709.00	68.16	68.20	-0.04	64.82	3.60	34.68	34.94	Peak	164	105	HORIZONTAL
2	5720.20	76.17	78.20	-2.03	72.82	3.60	34.69	34.94	Peak	164	105	HORIZONTAL
3	5740.00	97.87			94.50	3.61	34.70	34.94	Average	164	105	HORIZONTAL
4	5741.40	110.23			106.86	3.61	34.70	34.94	Peak	164	105	HORIZONTAL
5	5850.00	58.30	78.20	-19.90	54.87	3.64	34.74	34.95	Peak	164	105	HORIZONTAL
6	5876.00	58.37	68.20	-9.83	54.92	3.65	34.75	34.95	Peak	164	105	HORIZONTAL

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

**Channel 159**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor		cm	deg	
1	5713.00	66.62	68.20	-1.58	63.28	3.60	34.68	34.94	Peak	160	106	HORIZONTAL
2	5723.80	68.17	78.20	-10.03	64.82	3.60	34.69	34.94	Peak	160	106	HORIZONTAL
3	5790.00	101.97			98.56	3.63	34.72	34.94	Average	160	106	HORIZONTAL
4	5791.40	113.91			110.50	3.63	34.72	34.94	Peak	160	106	HORIZONTAL
5	5852.00	73.63	78.20	-4.57	70.20	3.64	34.74	34.95	Peak	160	106	HORIZONTAL
6	5872.00	67.54	68.20	-0.66	64.09	3.65	34.75	34.95	Peak	160	106	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5795 MHz.

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 10, 2014		

**Channel 36**

	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	5148.40	51.10	54.00	-2.90	48.47	3.43	34.11	34.91	Average	141	103	HORIZONTAL
2	5149.00	73.45	74.00	-0.55	70.82	3.43	34.11	34.91	Peak	141	103	HORIZONTAL
3	5178.00	105.90			103.21	3.44	34.16	34.91	Average	141	103	HORIZONTAL
4	5178.20	117.36			114.67	3.44	34.16	34.91	Peak	141	103	HORIZONTAL

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

**Channel 40**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5147.60	72.86	74.00	-1.14	70.23	3.43	34.11	34.91	Peak	155	266	HORIZONTAL
2	5150.00	53.59	54.00	-0.41	50.96	3.43	34.11	34.91	Average	155	266	HORIZONTAL
3	5198.40	110.98			108.26	3.45	34.18	34.91	Average	155	266	HORIZONTAL
4	5198.40	122.26			119.54	3.45	34.18	34.91	Peak	155	266	HORIZONTAL

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

**Channel 48**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5148.80	65.34	74.00	-8.66	62.71	3.43	34.11	34.91	Peak	151	257	HORIZONTAL
2	5150.00	49.56	54.00	-4.44	46.93	3.43	34.11	34.91	Average	151	257	HORIZONTAL
3	5244.20	113.43			110.63	3.46	34.25	34.91	Average	151	257	HORIZONTAL
4	5244.20	125.06			122.26	3.46	34.25	34.91	Peak	151	257	HORIZONTAL
5	5353.60	48.17	54.00	-5.83	45.20	3.49	34.39	34.91	Average	151	257	HORIZONTAL
6	5354.20	61.58	74.00	-12.42	58.61	3.49	34.39	34.91	Peak	151	257	HORIZONTAL

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

<b>Temperature</b>	23°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Magic Lai	<b>Configurations</b>	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Jun. 11, 2014		

**Channel 149**

	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	5712.60	67.35	68.20	-0.85	64.01	3.60	34.68	34.94	Peak	157	100	HORIZONTAL
2	5724.60	75.99	78.20	-2.21	72.64	3.60	34.69	34.94	Peak	157	100	HORIZONTAL
3	5743.40	100.76			97.39	3.61	34.70	34.94	Average	157	100	HORIZONTAL
4	5743.40	111.97			108.60	3.61	34.70	34.94	Peak	157	100	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5745 MHz.

**Channel 157**

	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	5710.20	63.00	68.20	-5.20	59.66	3.60	34.68	34.94	Peak	157	104	HORIZONTAL
2	5723.00	66.50	78.20	-11.70	63.15	3.60	34.69	34.94	Peak	157	104	HORIZONTAL
3	5782.20	123.15			119.75	3.63	34.71	34.94	Peak	157	104	HORIZONTAL
4	5782.60	111.37			107.97	3.63	34.71	34.94	Average	157	104	HORIZONTAL
5	5852.40	74.08	78.20	-4.12	70.65	3.64	34.74	34.95	Peak	157	104	HORIZONTAL
6	5864.00	68.05	68.20	-0.15	64.61	3.65	34.74	34.95	Peak	157	104	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5785 MHz.

**Channel 165**

	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	5715.00	66.50	68.20	-1.70	63.16	3.60	34.68	34.94	Peak	153	101	HORIZONTAL
2	5725.00	63.99	78.20	-14.21	60.64	3.60	34.69	34.94	Peak	153	101	HORIZONTAL
3	5823.00	103.29			99.88	3.63	34.73	34.95	Average	153	101	HORIZONTAL
4	5823.20	114.42			111.01	3.63	34.73	34.95	Peak	153	101	HORIZONTAL
5	5853.20	74.84	78.20	-3.36	71.41	3.64	34.74	34.95	Peak	153	101	HORIZONTAL
6	5867.20	67.90	68.20	-0.30	64.46	3.65	34.74	34.95	Peak	153	101	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5825 MHz.

Note:

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

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

For EUT 2:

<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Channel 36**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.20	65.55	74.00	-8.45	60.61	6.13	34.01	35.20	Peak	157	272	HORIZONTAL
2	5150.00	47.79	54.00	-6.21	42.85	6.13	34.01	35.20	Average	157	272	HORIZONTAL
3	5178.80	111.59			106.56	6.15	34.08	35.20	Peak	157	272	HORIZONTAL
4	5179.20	102.06			97.03	6.15	34.08	35.20	Average	157	272	HORIZONTAL

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

**Channel 40**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5146.40	65.93	74.00	-8.07	60.99	6.13	34.01	35.20	Peak	100	275	HORIZONTAL
2	5150.00	50.50	54.00	-3.50	45.56	6.13	34.01	35.20	Average	100	275	HORIZONTAL
3	5201.60	105.80			100.73	6.16	34.11	35.20	Average	100	275	HORIZONTAL
4	5202.00	115.46			110.39	6.16	34.11	35.20	Peak	100	275	HORIZONTAL

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

**Channel 48**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5150.00	45.22	54.00	-8.78	40.28	6.13	34.01	35.20	Average	100	279	HORIZONTAL
2	5150.00	56.37	74.00	-17.63	51.43	6.13	34.01	35.20	Peak	100	279	HORIZONTAL
3	5237.60	106.16			101.00	6.18	34.18	35.20	Average	100	279	HORIZONTAL
4	5238.80	115.36			110.20	6.18	34.18	35.20	Peak	100	279	HORIZONTAL

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

<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT20 CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**Channel 149**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5711.80	59.41	68.20	-8.79	53.30	6.44	34.87	35.20 Peak	100	257	HORIZONTAL
2	5724.60	63.39	78.20	-14.81	57.25	6.45	34.89	35.20 Peak	100	257	HORIZONTAL
3	5741.40	97.20			91.05	6.45	34.90	35.20 Average	100	257	HORIZONTAL
4	5742.20	106.35			100.20	6.45	34.90	35.20 Peak	100	257	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5745 MHz.

**Channel 157**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5791.40	115.58			109.37	6.47	34.94	35.20 Peak	100	256	HORIZONTAL
2	5791.80	105.70			99.49	6.47	34.94	35.20 Average	100	256	HORIZONTAL
3	5850.40	58.37	78.20	-19.83	52.10	6.49	34.98	35.20 Peak	100	256	HORIZONTAL
4	5861.60	58.95	68.20	-9.25	52.66	6.50	34.99	35.20 Average	100	256	HORIZONTAL

Item 1, 2 are the fundamental frequency at 5785 MHz.

**Channel 165**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5830.60	96.84			90.59	6.48	34.97	35.20 Peak	100	285	VERTICAL
2	5833.12	86.19			79.94	6.48	34.97	35.20 Average	100	285	VERTICAL
3	5850.80	56.53	78.20	-21.67	50.26	6.49	34.98	35.20 Peak	100	285	VERTICAL
4	5861.60	57.44	68.20	-10.76	51.15	6.50	34.99	35.20 Peak	100	285	VERTICAL

Item 1, 2 are the fundamental frequency at 5825 MHz.



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 38, 46 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Channel 38**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5150.00	49.17	54.00	-4.83	44.23	6.13	34.01	35.20	Average	103	280	HORIZONTAL
2	5150.00	62.20	74.00	-11.80	57.26	6.13	34.01	35.20	Peak	103	280	HORIZONTAL
3	5192.40	92.64			87.60	6.16	34.08	35.20	Average	103	280	HORIZONTAL
4	5193.20	101.94			96.90	6.16	34.08	35.20	Peak	103	280	HORIZONTAL

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

**Channel 46**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5147.60	65.06	74.00	-8.94	60.12	6.13	34.01	35.20	Peak	102	279	HORIZONTAL
2	5148.00	47.71	54.00	-6.29	42.77	6.13	34.01	35.20	Average	102	279	HORIZONTAL
3	5238.80	112.68			107.52	6.18	34.18	35.20	Peak	102	279	HORIZONTAL
4	5240.00	103.12			97.96	6.18	34.18	35.20	Average	102	279	HORIZONTAL

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



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 HT40 CH 151, 159 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**Channel 151**

	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	5709.40	60.60	68.20	-7.60	54.49	6.44	34.87	35.20	Peak	100	258	HORIZONTAL
2	5725.00	68.29	78.20	-9.91	62.15	6.45	34.89	35.20	Peak	100	258	HORIZONTAL
3	5761.80	93.63			87.46	6.46	34.91	35.20	Average	100	258	HORIZONTAL
4	5762.20	103.19			97.02	6.46	34.91	35.20	Peak	100	258	HORIZONTAL

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

**Channel 159**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5710.20	62.51	68.20	-5.69	56.40	6.44	34.87	35.20	Peak	100	262	HORIZONTAL
2	5725.00	61.24	78.20	-16.96	55.10	6.45	34.89	35.20	Peak	100	262	HORIZONTAL
3	5788.20	98.01			91.81	6.47	34.93	35.20	Average	100	262	HORIZONTAL
4	5850.40	65.48	78.20	-12.72	59.21	6.49	34.98	35.20	Peak	100	262	HORIZONTAL
5	5870.40	61.59	68.20	-6.61	55.30	6.50	34.99	35.20	Peak	100	262	HORIZONTAL

Item 3 is the fundamental frequency at 5795 MHz.



<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 36, 40, 48 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 01, 2014		

**Channel 36**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.40	67.81	74.00	-6.19	62.87	6.13	34.01	35.20	Peak	154	264	HORIZONTAL
2	5150.00	49.31	54.00	-4.69	44.37	6.13	34.01	35.20	Average	154	264	HORIZONTAL
3	5181.20	114.20			109.17	6.15	34.08	35.20	Peak	154	264	HORIZONTAL
4	5181.40	104.39			99.36	6.15	34.08	35.20	Average	154	264	HORIZONTAL

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

**Channel 40**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.20	62.46	74.00	-11.54	57.52	6.13	34.01	35.20	Peak	100	258	HORIZONTAL
2	5150.00	48.29	54.00	-5.71	43.35	6.13	34.01	35.20	Average	100	258	HORIZONTAL
3	5205.60	115.12			110.05	6.16	34.11	35.20	Peak	100	258	HORIZONTAL
4	5207.20	105.26			100.19	6.16	34.11	35.20	Average	100	258	HORIZONTAL

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

**Channel 48**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5149.20	56.21	74.00	-17.79	51.27	6.13	34.01	35.20	Peak	100	273	HORIZONTAL
2	5150.00	45.23	54.00	-8.77	40.29	6.13	34.01	35.20	Average	100	273	HORIZONTAL
3	5237.20	105.71			100.55	6.18	34.18	35.20	Average	100	273	HORIZONTAL
4	5245.60	115.29			110.07	6.20	34.22	35.20	Peak	100	273	HORIZONTAL

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

<b>Temperature</b>	28°C	<b>Humidity</b>	62%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3
<b>Test Date</b>	Aug. 02, 2014		

**Channel 149**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5715.00	62.13	68.20	-6.07	56.02	6.44	34.87	35.20	Peak	100	248	HORIZONTAL
2	5722.60	66.65	78.20	-11.55	60.53	6.45	34.87	35.20	Peak	100	248	HORIZONTAL
3	5740.20	98.70			92.55	6.45	34.90	35.20	Average	100	248	HORIZONTAL
4	5740.20	107.81			101.66	6.45	34.90	35.20	Peak	100	248	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5745 MHz.

**Channel 157**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5708.60	59.35	68.20	-8.85	53.24	6.44	34.87	35.20	Peak	100	265	HORIZONTAL
2	5724.20	57.83	78.20	-20.37	51.69	6.45	34.89	35.20	Peak	100	265	HORIZONTAL
3	5786.60	116.00			109.80	6.47	34.93	35.20	Peak	100	265	HORIZONTAL
4	5787.00	105.92			99.72	6.47	34.93	35.20	Average	100	265	HORIZONTAL
5	5851.60	58.28	78.20	-19.92	52.01	6.49	34.98	35.20	Peak	100	265	HORIZONTAL
6	5861.20	59.73	68.20	-8.47	53.44	6.50	34.99	35.20	Peak	100	265	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5785 MHz.

**Channel 165**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	5818.60	98.49			92.26	6.48	34.95	35.20	Average	100	263	HORIZONTAL
2	5829.40	108.56			102.31	6.48	34.97	35.20	Peak	100	263	HORIZONTAL
3	5850.80	61.56	78.20	-16.64	55.29	6.49	34.98	35.20	Peak	100	263	HORIZONTAL
4	5860.00	58.24	68.20	-9.96	51.95	6.50	34.99	35.20	Peak	100	263	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5825 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

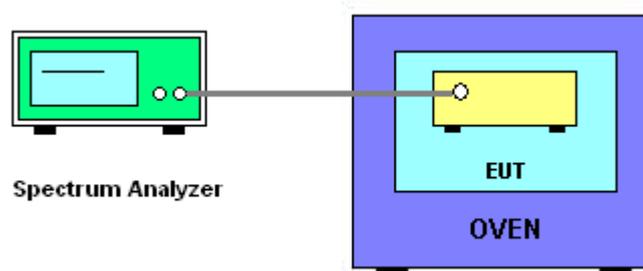
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5.  $f_c$  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).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is  $0^\circ\text{C} \sim 40^\circ\text{C}$ .

### 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

<b>Temperature</b>	20°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Test Date</b>	Jul. 10, 2014

#### Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
(V)	5200 MHz
126.50	5199.9940
110.00	5199.9948
93.50	5199.9946
Max. Deviation (MHz)	<b>0.006000</b>
Max. Deviation (ppm)	<b>1.15</b>

#### Temperature vs. Frequency Stability

Temperature	Measurement Frequency (MHz)
(°C)	5200 MHz
0	5199.9936
10	5199.9942
20	5199.9948
30	5199.9950
40	5199.9948
Max. Deviation (MHz)	<b>0.006400</b>
Max. Deviation (ppm)	<b>1.23</b>

## 4.9. Antenna Requirements

### 4.9.1. Limit

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

### 4.9.2. Antenna Connector Construction

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

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9 kHz ~ 2.75 GHz	Apr. 23, 2014	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150 kHz ~ 100 MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 11, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150 kHz ~ 30 MHz	Dec. 04, 2013	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112B	2928	30MHz ~ 2GHz	Dec. 27, 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. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 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. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

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

“\*” Calibration Interval of instruments listed above is two years.

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

## 6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%