



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	NETGEAR, Inc.
Applicant Address	350 East Plumeria Drive, San Jose, California 95134, USA
FCC ID	PY313200231

Product Name	WiFi Range Extender
Brand Name	NETGEAR
Model No.	EX6100
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Oct. 14, 2013
Final Test Date	Nov. 01, 2013
Submission Type	Original Equipment

### Statement

**Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part and IEEE 802.11a/ac (5725 ~ 5850MHz) 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 C, KDB 558074 D01 v03r01 and KDB 662911 D01 v02.**

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





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## 1. CERTIFICATE OF COMPLIANCE

Product Name : WIFI Range Extender  
Brand Name : NETGEAR  
Model No. : EX6100  
Applicant : NETGEAR, Inc.  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 14, 2013 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

A handwritten signature in blue ink that reads 'Sam Chen'. The signature is written in a cursive style and is positioned above a horizontal line.

Sam Chen

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	14.92 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	1.98 dB
4.3	15.247(e)	Power Spectral Density	Complies	3.79 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.06 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.11 dB
4.7	15.203	Antenna Requirements	Complies	-

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n/ac

Items	Description
Product Type	802.11n (2.4GHz): WLAN (2TX, 2RX) 802.11n (5GHz): WLAN (1TX, 1RX) 802.11ac: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Internal Power Supply
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	<u>For 2.4GHz Band:</u> 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth <u>For 5GHz Band:</u> 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	<u>For 2.4GHz Band:</u> MCS0 (20MHz): 22.16 MHz ; MCS0 (40MHz): 36.64 MHz <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (20MHz): 24.40 MHz ; 802.11ac MCS0/Nss1 (40MHz): 40.32 MHz ; 802.11ac MCS0/Nss1 (80MHz): 76.16 MHz
Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> MCS0 (20MHz): 23.72 dBm ; MCS0 (40MHz): 17.88 dBm <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (20MHz): 27.64 dBm ; 802.11ac MCS0/Nss1 (40MHz): 27.11 dBm ; 802.11ac MCS0/Nss1 (80MHz): 21.84 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**802.11a/b/g**

Items	Description
Product Type	802.11b/g: WLAN (2TX, 2RX) 802.11a: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Internal Power Supply
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 13.44 MHz ; 11g: 22.96 MHz ; 11a: 24.96 MHz
Maximum Conducted Output Power	11b: 25.65 dBm ; 11g: 23.85 dBm ; 11a: 28.02 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**Antenna and Band width**

Antenna	Single (TX)			Two (TX)		
	20 MHz	40 MHz	80 MHz	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X	X	X	X
IEEE 802.11b	X	X	X	V	X	X
IEEE 802.11g	X	X	X	V	X	X
IEEE 802.11n (2.4GHz)	X	X	X	V	V	X
IEEE 802.11n (5GHz)	V	V	X	X	X	X
IEEE 802.11ac	V	V	V	X	X	X

**IEEE 11n/ac Spec.**

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20) - 2.4GHz	2	MCS0-15
802.11n (HT40) - 2.4GHz	2	MCS0-15
802.11n (HT20) - 5GHz	1	MCS0-7
802.11n (HT40) - 5GHz	1	MCS0-7
802.11ac (VHT20)	1	MCS 0-9/Nss1
802.11ac (VHT40)	1	MCS 0-9/Nss1
802.11ac (VHT80)	1	MCS 0-9/Nss1

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

Then EUT support HT20 and HT40.

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

Note 3: Modulation modes consist of below configuration:

11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

**3.2. Accessories**

Others
RJ-45 Cable, Non-shielded, 1.5m

### 3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		Remark
					2.4GHz	5GHz	
1	Master Wave	X6100-98242	Dipole Antenna	I-PEX	3.31	-	External
2	Foxconn	FX01H74-0G-EF	PCB Antenna	I-PEX	3.66	-	Internal
3	Master Wave	X6100-98242	Dipole Antenna	I-PEX	-	5	External

Note: There are three antennas provided to this EUT and all of them can be used as transmitting and receiving antenna

<For 2.4GHz Band>

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

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

Chain 1 and Chain 2 could transmit/receive simultaneously.

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

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

Chain 1 and Chain 2 could transmit/receive simultaneously.

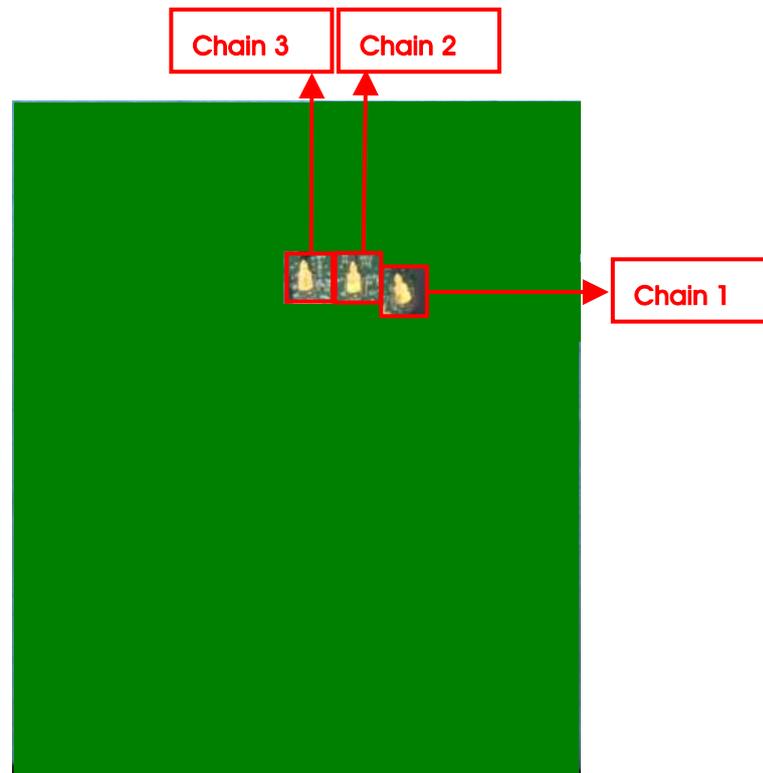
<For 5GHz Band>

**For IEEE 802.11a mode (1TX/1RX):**

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

**For IEEE 802.11n/ac mode (1TX/1RX):**

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



### 3.4. Table for Carrier Frequencies

#### For 2.4GHz Band:

There are two bandwidth systems.

For 20MHz bandwidth systems, use Channel 1~Channel 11.

For 40MHz bandwidth systems, use Channel 3~Channel 9.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz	-	-

#### For 5GHz Band:

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

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

For 80MHz bandwidth systems, use Channel 155.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	157	5785 MHz
	151	5755 MHz	159	5795 MHz
	153	5765 MHz	161	5805 MHz
	155	5775 MHz	165	5825 MHz

### 3.5. Table for Test Modes

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

#### For 2.4GHz Band:

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Power Spectral Density	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
6dB Spectrum Bandwidth	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
Band Edge Emissions	11n 20MHz	MCS0	1/6/11	1+2
	11n 40MHz	MCS0	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2

**For 5GHz Band:**

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11ac 20MHz	MCS0/Nss1	149/157/165	3
	11ac 40MHz	MCS0/Nss1	151/159	3
	11ac 80MHz	MCS0/Nss1	155	3
	11a/BPSK	6 Mbps	149/157/165	3
Power Spectral Density	11ac 20MHz	MCS0/Nss1	149/157/165	3
	11ac 40MHz	MCS0/Nss1	151/159	3
	11ac 80MHz	MCS0/Nss1	155	3
	11a/BPSK	6 Mbps	149/157/165	3
6dB Spectrum Bandwidth	11ac 20MHz	MCS0/Nss1	149/157/165	3
	11ac 40MHz	MCS0/Nss1	151/159	3
	11ac 80MHz	MCS0/Nss1	155	3
	11a/BPSK	6 Mbps	149/157/165	3
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11ac 20MHz	MCS0/Nss1	149/157/165	3
	11ac 40MHz	MCS0/Nss1	151/159	3
	11ac 80MHz	MCS0/Nss1	155	3
	11a/BPSK	6 Mbps	149/157/165	3
Band Edge Emissions	11ac 20MHz	MCS0/Nss1	149/157/165	3
	11ac 40MHz	MCS0/Nss1	151/159	3
	11ac 80MHz	MCS0/Nss1	155	3
	11a/BPSK	6 Mbps	149/157/165	3

The following test modes were performed for all tests:

**For Conducted Emission test:**

Mode 1. Laying of EUT

**For Radiated Emissions Test below 1GHz:**

Mode 1. Place EUT in X axis

Mode 2. Place EUT in Y axis

Mode 3. Place EUT in Z axis

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

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

The EUT was performed at 3-axis and the worst-case was found at Y axis.

So the measurement will follow this same mode

Mode 1. Place EUT in Y axis

### For MPE and Co-location Test:

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

### 3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D
TH01-CB	OVEN Room	Hsin Chu	-	-

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

Please refer section 6 for Test Site Address.

### 3.7. Table for Supporting Units

#### For Test Site No: 03CH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1340	E2K4965AGNM
Notebook	DELL	E6430	QDS-BRCM1049LE
Notebook	DELL	D420	E2KWM3945ABG
Wireless ac AP	Netgear	R6300V2	PY31300227

#### For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*3	DELL	E6430	QDS-BRCM1049LE
Wireless AP	Planex	GW-AP54SGX	N/A

#### For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	QDS-BRCM1049LE

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

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

#### For 2.4GHz Band

##### Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	MT7620 QA V1.0.6.0		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	0E/0F	21/23	05/08

##### Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	MT7620 QA V1.0.6.0		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	0C/0D	0F/10	04/06

##### Power Parameters of IEEE 802.11b/g

Test Software Version	MT7620 QA V1.0.6.0		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	18/19	2F/2F	15/15
IEEE 802.11g	0F/10	22/24	07/0A

#### For 5GHz Band

##### Power Parameters of IEEE 802.11ac MCS0/Nss1 20MHz

Test Software Version	MT76xxE QA V2.0.5.0		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 20MHz	2F	3F	3F

##### Power Parameters of IEEE 802.11ac MCS0/Nss1 40MHz

Test Software Version	MT76xxE QA V2.0.5.0	
Frequency	5755 MHz	5795 MHz
MCS0/Nss1 40MHz	25	3F

##### Power Parameters of IEEE 802.11ac MCS0/Nss1 80MHz

Test Software Version	MT76xxE QA V2.0.5.0
Frequency	5775 MHz
MCS0/Nss1 80MHz	1E

**Power Parameters of IEEE 802.11a**

Test Software Version	MT7620 QA V1.0.6.0		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	39	3F	3F

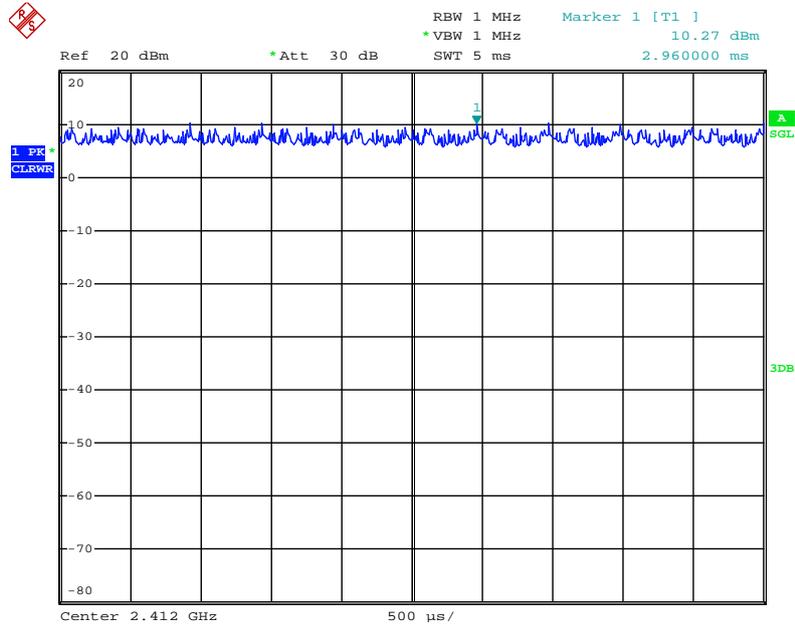
**3.9. EUT Operation during Test**

The EUT was programmed to be in continuously transmitting mode.

### 3.10. Duty Cycle

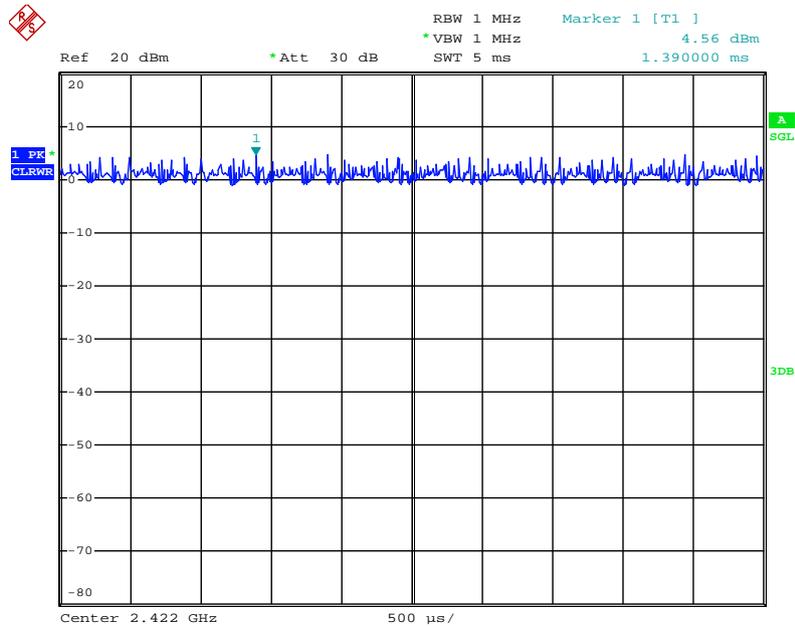
For 2.4GHz Band:

IEEE 802.11n MCS0 20MHz



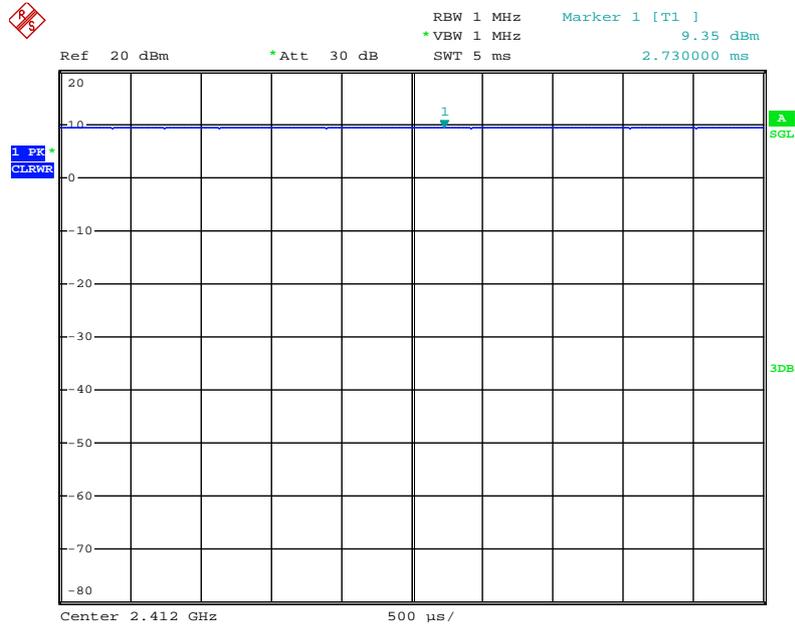
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IEEE 802.11n MCS0 40MHz



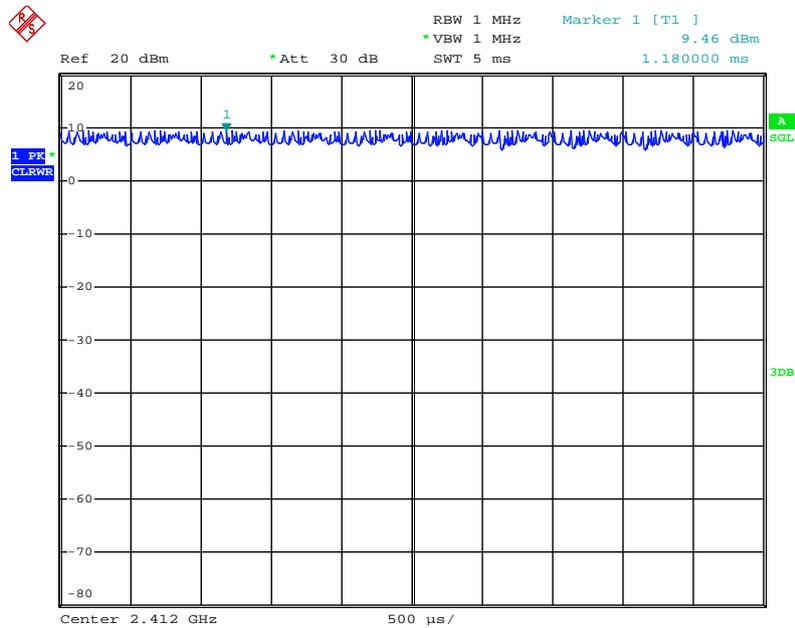
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IEEE 802.11b



Date: 23.OCT.2013 07:24:04

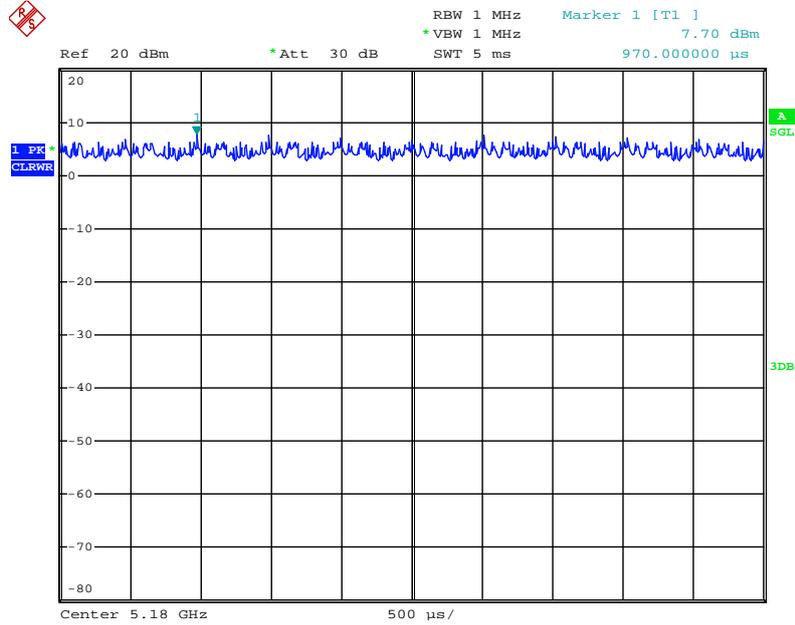
IEEE 802.11g



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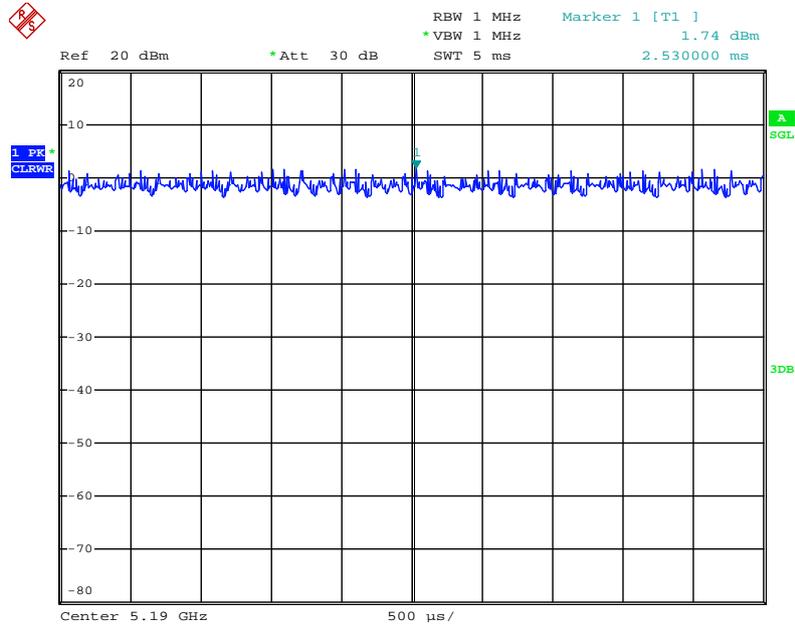
For 5GHz Band:

IEEE 802.11ac MCS0/Nss1 20MHz



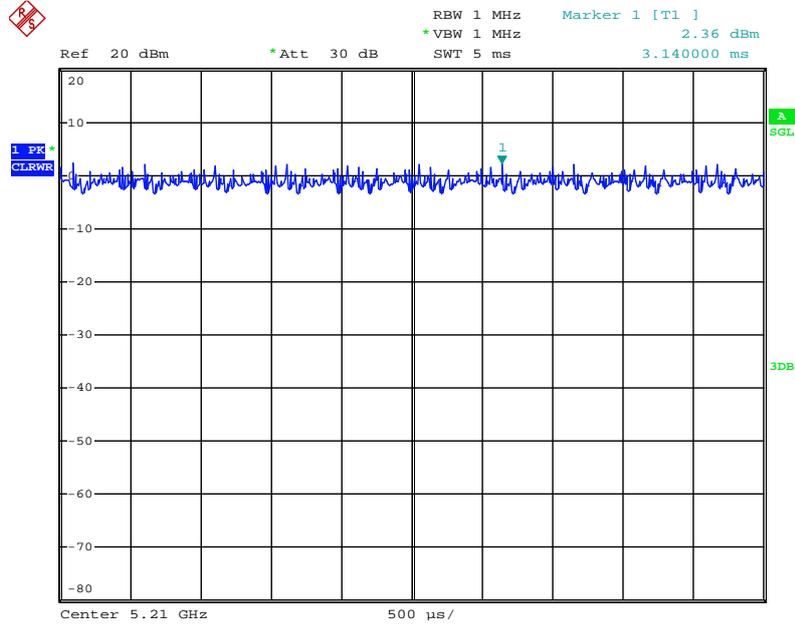
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IEEE 802.11ac MCS0/Nss1 40MHz



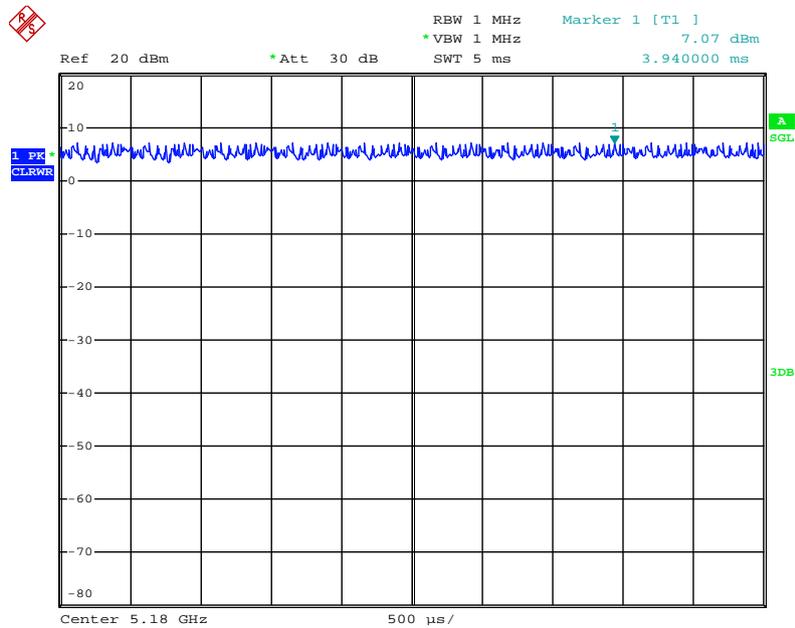
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### IEEE 802.11ac MCS0/Nss1 80MHz



Date: 23.OCT.2013 13:30:20

### IEEE 802.11a

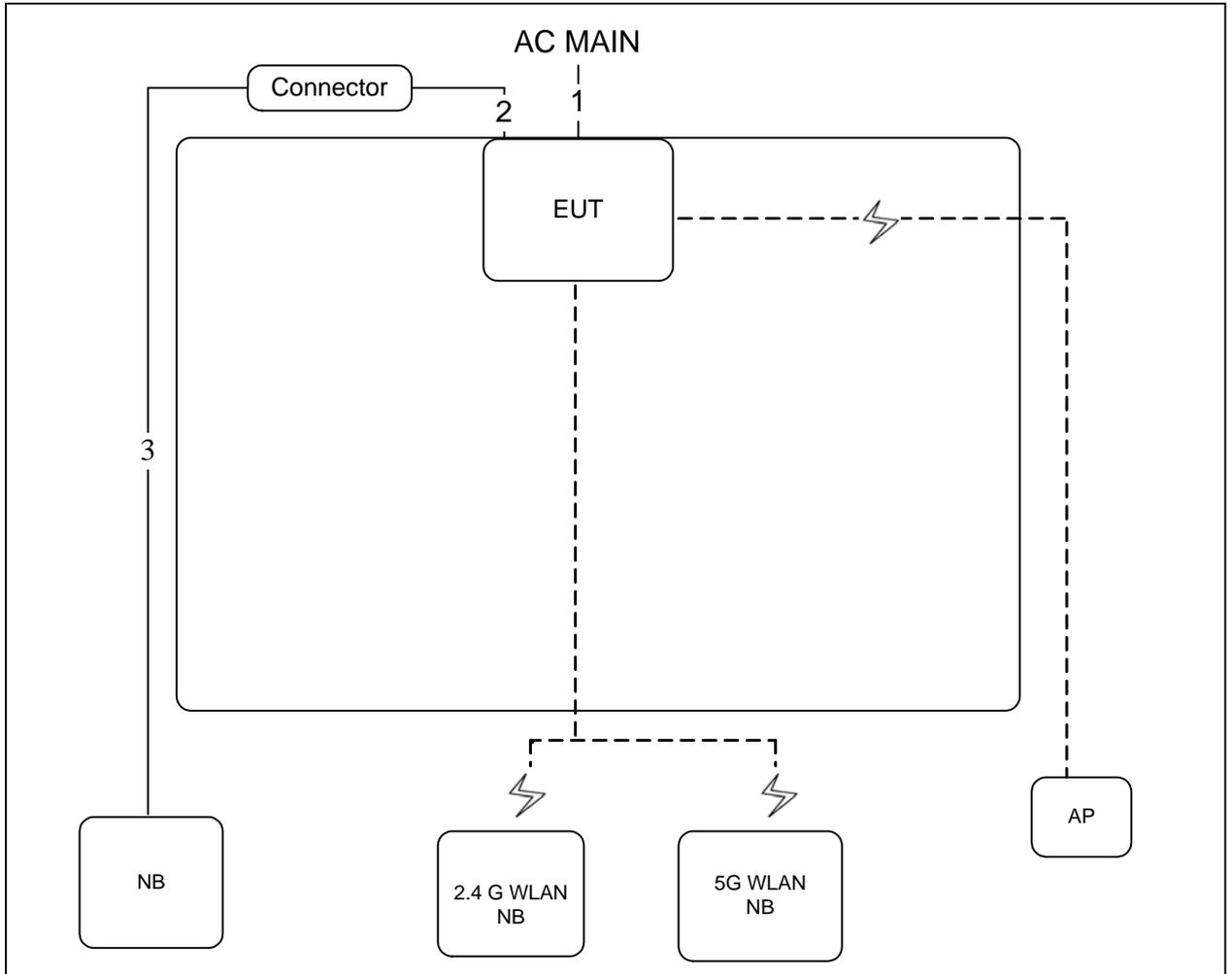


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### 3.11. Test Configurations

#### 3.11.1. AC Power Line Conduction and Radiation Emissions (30MHz~1GHz) Test Configuration

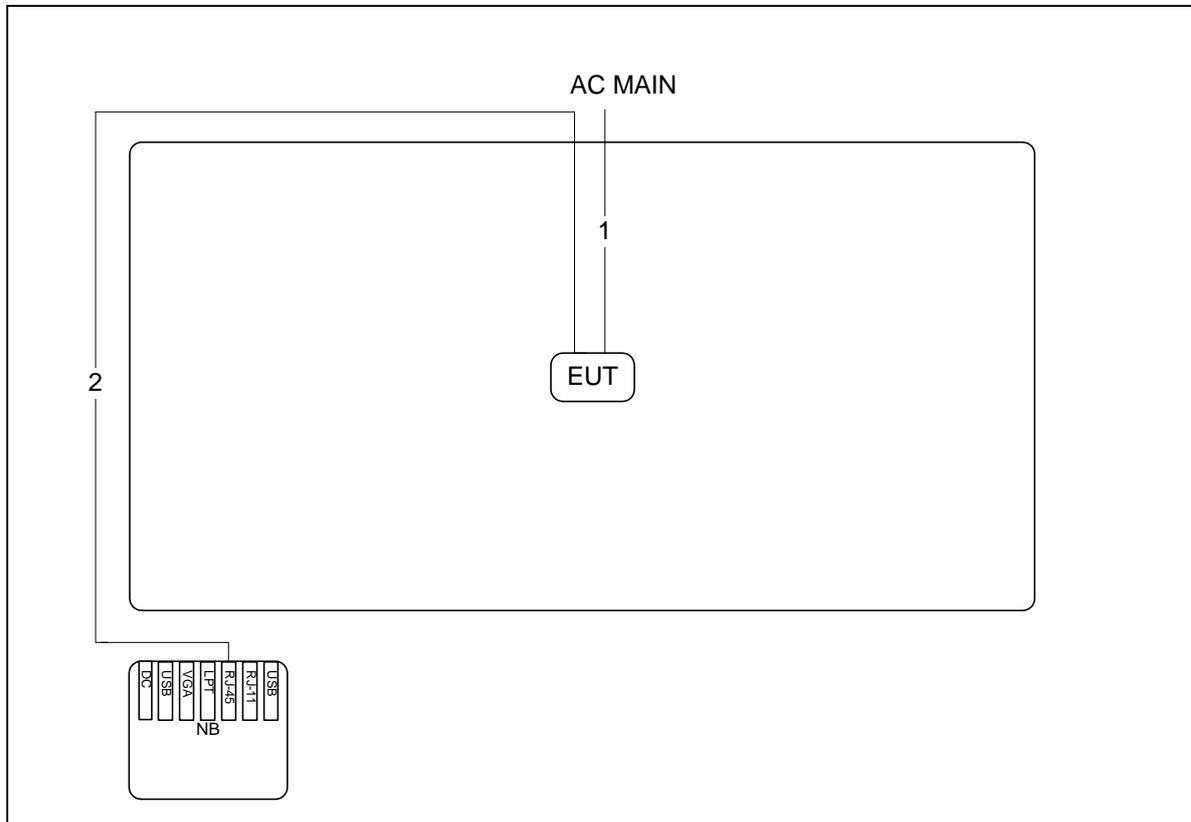
Test Mode: Mode 1



Item	Connection	Shielded	Length(m)
1	Power cable	No	1.8m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m

### 3.11.2. Radiation Emissions (Above 1GHz) Test Configuration

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



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

## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

For this product which is designed to be connected 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

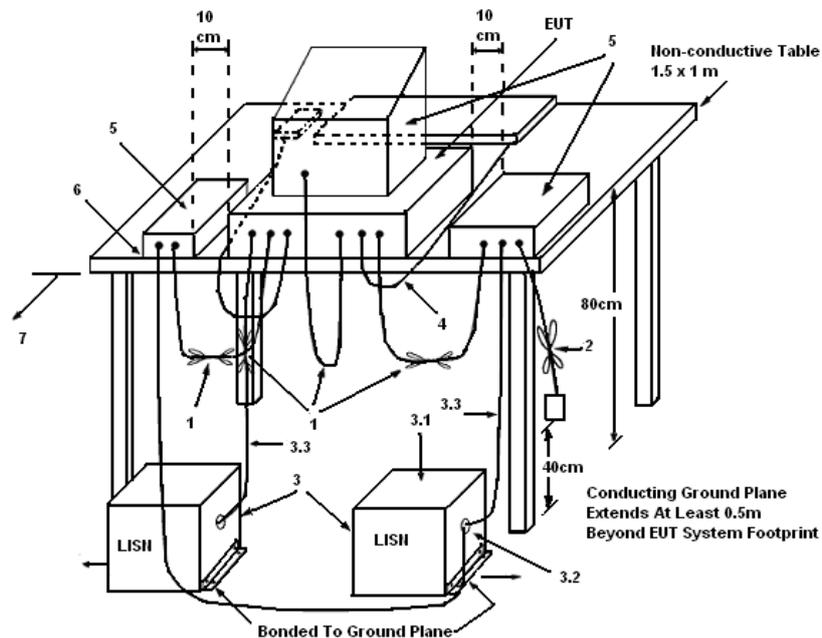
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

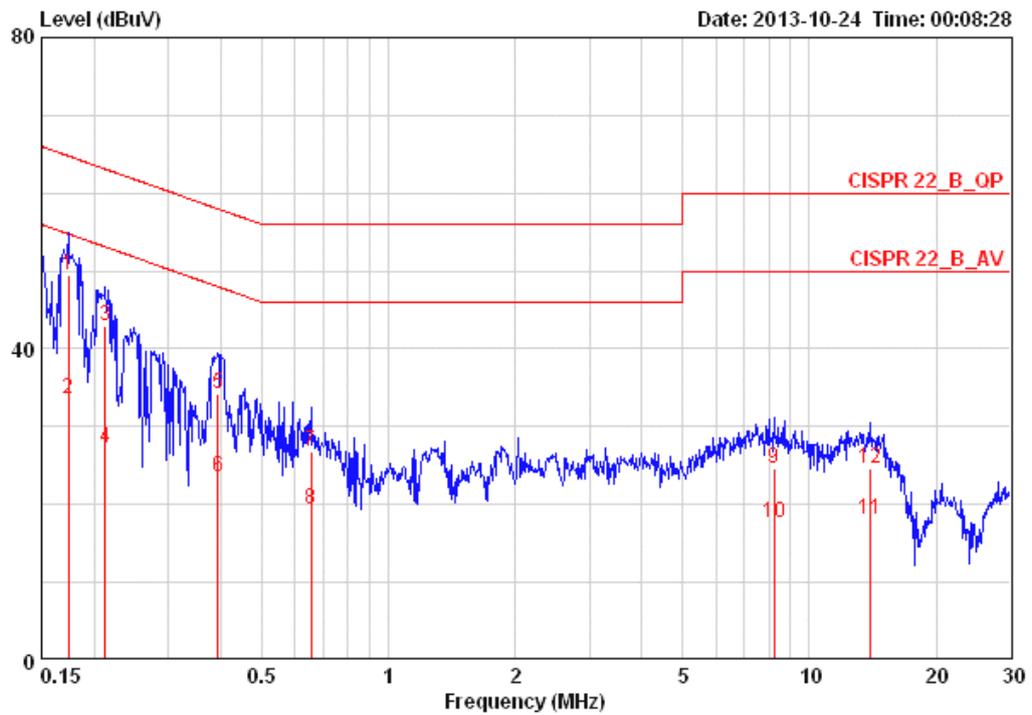
There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

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

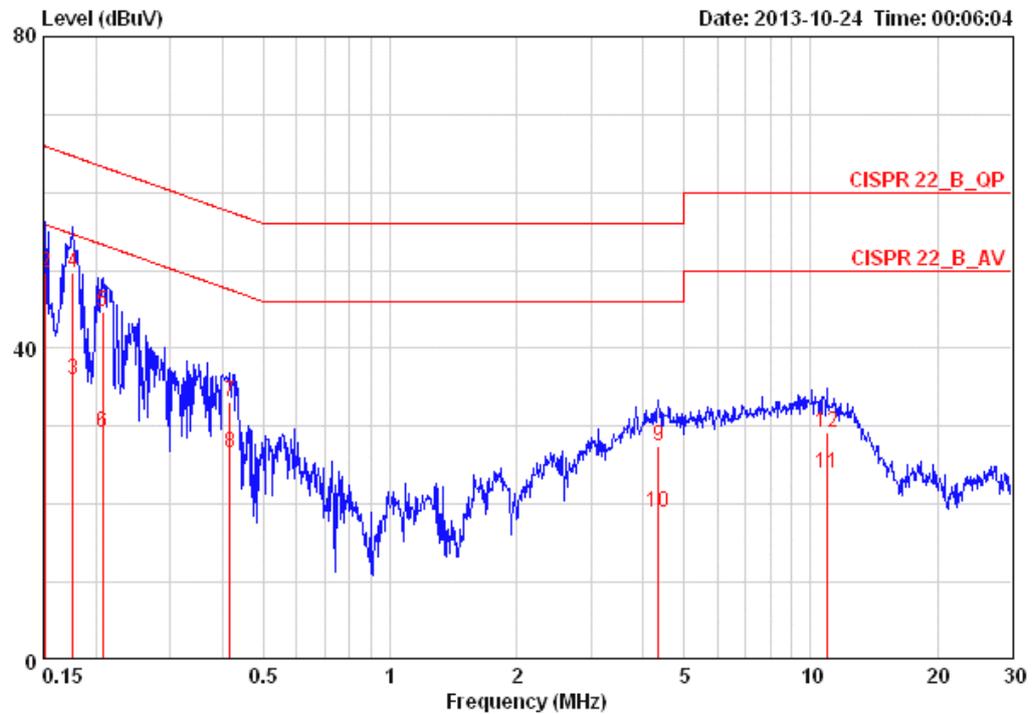
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	55%
Test Engineer	Hank Yang	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.17399	49.41	-15.36	64.77	49.07	0.15	0.19	LINE	QP
2	0.17399	33.56	-21.21	54.77	33.22	0.15	0.19	LINE	AVERAGE
3	0.21279	42.97	-20.13	63.10	42.62	0.15	0.20	LINE	QP
4	0.21279	27.14	-25.96	53.10	26.79	0.15	0.20	LINE	AVERAGE
5	0.39344	34.24	-23.75	57.99	33.89	0.15	0.20	LINE	QP
6	0.39344	23.50	-24.49	47.99	23.15	0.15	0.20	LINE	AVERAGE
7	0.65430	26.83	-29.17	56.00	26.47	0.16	0.20	LINE	QP
8	0.65430	19.48	-26.52	46.00	19.12	0.16	0.20	LINE	AVERAGE
9	8.235	24.61	-35.39	60.00	24.01	0.30	0.30	LINE	QP
10	8.235	17.57	-32.43	50.00	16.97	0.30	0.30	LINE	AVERAGE
11	13.915	18.03	-31.97	50.00	17.24	0.39	0.40	LINE	AVERAGE
12	13.915	24.54	-35.46	60.00	23.75	0.39	0.40	LINE	QP

Temperature	24°C	Humidity	55%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15160	28.30	-27.61	55.91	28.04	0.08	0.18	NEUTRAL	AVERAGE
2	0.15160	49.78	-16.13	65.91	49.52	0.08	0.18	NEUTRAL	QP
3	0.17584	35.92	-18.76	54.68	35.65	0.08	0.19	NEUTRAL	AVERAGE
4	0.17584	49.76	-14.92	64.68	49.49	0.08	0.19	NEUTRAL	QP
5	0.20723	44.72	-18.60	63.32	44.44	0.08	0.20	NEUTRAL	QP
6	0.20723	29.13	-24.19	53.32	28.85	0.08	0.20	NEUTRAL	AVERAGE
7	0.41705	33.08	-24.43	57.51	32.80	0.08	0.20	NEUTRAL	QP
8	0.41705	26.52	-20.99	47.51	26.24	0.08	0.20	NEUTRAL	AVERAGE
9	4.338	27.41	-28.59	56.00	26.97	0.14	0.31	NEUTRAL	QP
10	4.338	19.04	-26.96	46.00	18.60	0.14	0.31	NEUTRAL	AVERAGE
11	10.905	23.87	-26.13	50.00	23.24	0.25	0.38	NEUTRAL	AVERAGE
12	10.905	29.28	-30.72	60.00	28.65	0.25	0.38	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

## 4.2. Maximum Conducted Output Power Measurement

### 4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi. Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter output power.

### 4.2.2. Measuring Instruments and Setting

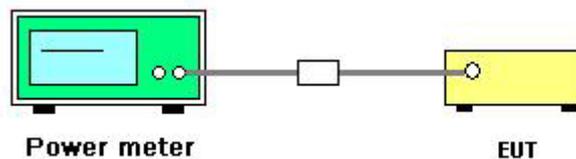
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

### 4.2.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 9.2.2 Measurement using a power meter (PM).
2. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

### 4.2.4. Test Setup Layout



### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	21°C	Humidity	60%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/ac
Test Date	Oct. 23, 2013		

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
1	2412 MHz	14.62	14.97	17.81	30.00	Complies
6	2437 MHz	20.58	20.84	23.72	30.00	Complies
11	2462 MHz	11.84	12.17	15.02	30.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
3	2422 MHz	13.36	13.66	16.52	30.00	Complies
6	2437 MHz	14.88	14.86	17.88	30.00	Complies
9	2452 MHz	10.78	11.04	13.92	30.00	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	27.17	30.00	Complies
157	5785 MHz	27.16	30.00	Complies
165	5825 MHz	27.64	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
151	5755 MHz	25.26	30.00	Complies
159	5795 MHz	27.11	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 3

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
155	5775 MHz	21.84	30.00	Complies

<b>Temperature</b>	21°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11a/b/g
<b>Test Date</b>	Oct. 23, 2013		

**Configuration IEEE 802.11b / Chain 1 + Chain 2**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
1	2412 MHz	19.51	19.44	22.49	30.00	Complies
6	2437 MHz	22.92	22.33	25.65	30.00	Complies
11	2462 MHz	18.32	18.12	21.23	30.00	Complies

**Configuration IEEE 802.11g / Chain 1 + Chain 2**

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
1	2412 MHz	15.27	15.28	18.29	30.00	Complies
6	2437 MHz	20.89	20.79	23.85	30.00	Complies
11	2462 MHz	12.82	13.16	16.00	30.00	Complies

**Configuration IEEE 802.11a / Chain 3**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	27.60	30.00	Complies
157	5785 MHz	27.58	30.00	Complies
165	5825 MHz	28.02	30.00	Complies

### 4.3. Power Spectral Density Measurement

#### 4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

#### 4.3.2. Measuring Instruments and Setting

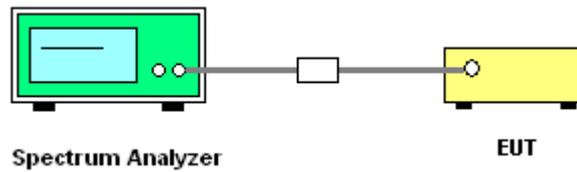
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100\text{kHz}$
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

#### 4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02 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  $\geq 2 \times \text{span}/\text{RBW}$  (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 resulting PSD level must be  $\leq 8 \text{ dBm}$ .

#### 4.3.4. Test Setup Layout



#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	21°C	Humidity	60%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Total		
1	2412 MHz	-12.98	-12.25	-9.59	8.00	Complies
6	2437 MHz	-8.11	-8.05	-5.07	8.00	Complies
11	2462 MHz	-15.96	-16.19	-13.06	8.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Total		
3	2422 MHz	-16.66	-16.74	-13.69	8.00	Complies
6	2437 MHz	-15.82	-16.02	-12.91	8.00	Complies
9	2452 MHz	-18.98	-18.78	-15.87	8.00	Complies

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 3

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
149	5745 MHz	3.65	8.00	Complies
157	5785 MHz	3.83	8.00	Complies
165	5825 MHz	4.21	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 3

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
151	5755 MHz	-3.33	8.00	Complies
159	5795 MHz	3.59	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 3

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
155	5775 MHz	-3.95	8.00	Complies

Temperature	21°C	Humidity	60%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g

**Configuration IEEE 802.11b / Chain 1 + Chain 2**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Total		
1	2412 MHz	-9.81	-10.17	-6.98	8.00	Complies
6	2437 MHz	-6.42	-7.09	-3.73	8.00	Complies
11	2462 MHz	-10.85	-11.14	-7.98	8.00	Complies

**Configuration IEEE 802.11g / Chain 1 + Chain 2**

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Total		
1	2412 MHz	-13.04	-12.92	-9.97	8.00	Complies
6	2437 MHz	-7.43	-8.11	-4.75	8.00	Complies
11	2462 MHz	-15.68	-16.04	-12.85	8.00	Complies

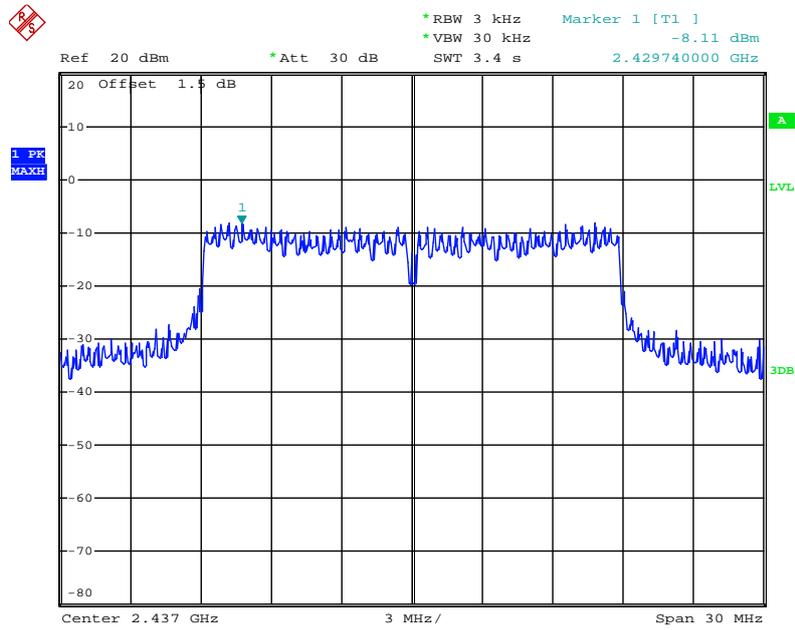
**Configuration IEEE 802.11a / Chain 3**

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
149	5745 MHz	3.21	8.00	Complies
157	5785 MHz	3.17	8.00	Complies
165	5825 MHz	3.15	8.00	Complies

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

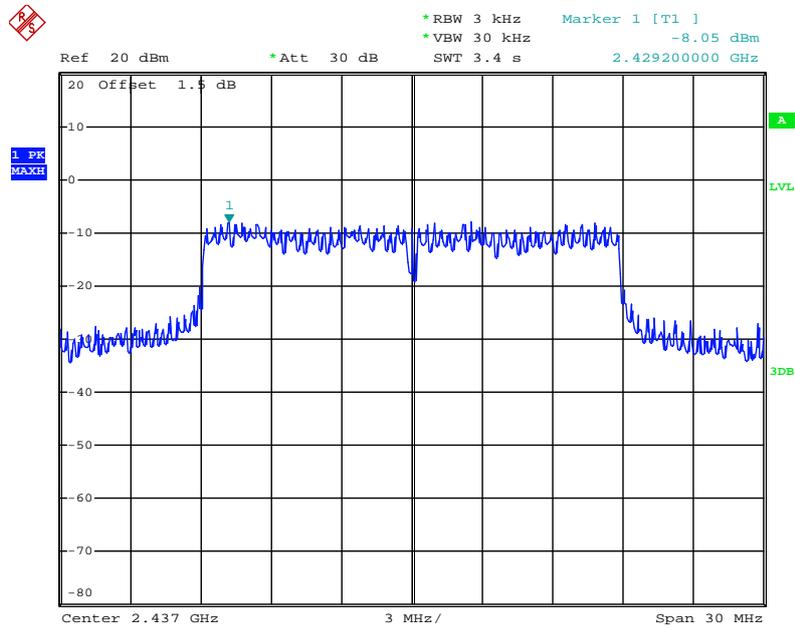
For plots, only the channel with worse result was shown.

**Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 1**



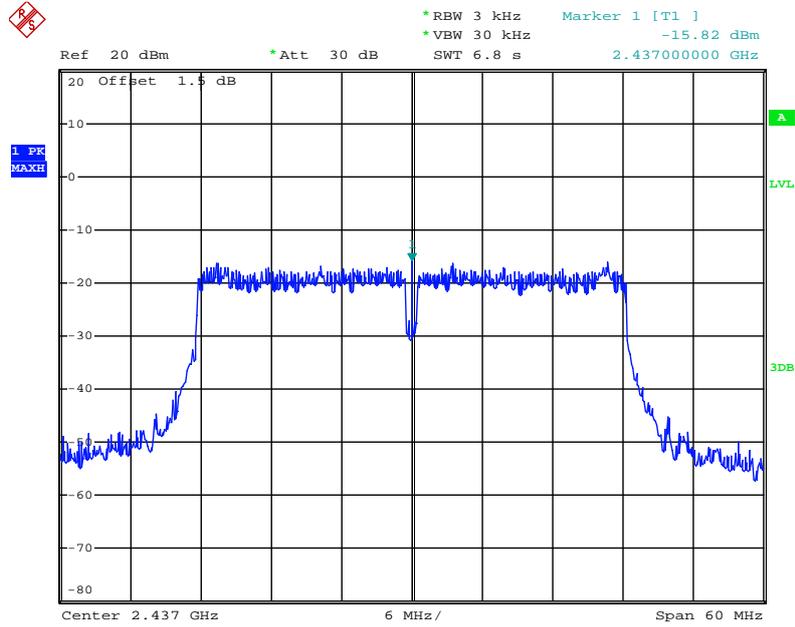
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**Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Chain 2**



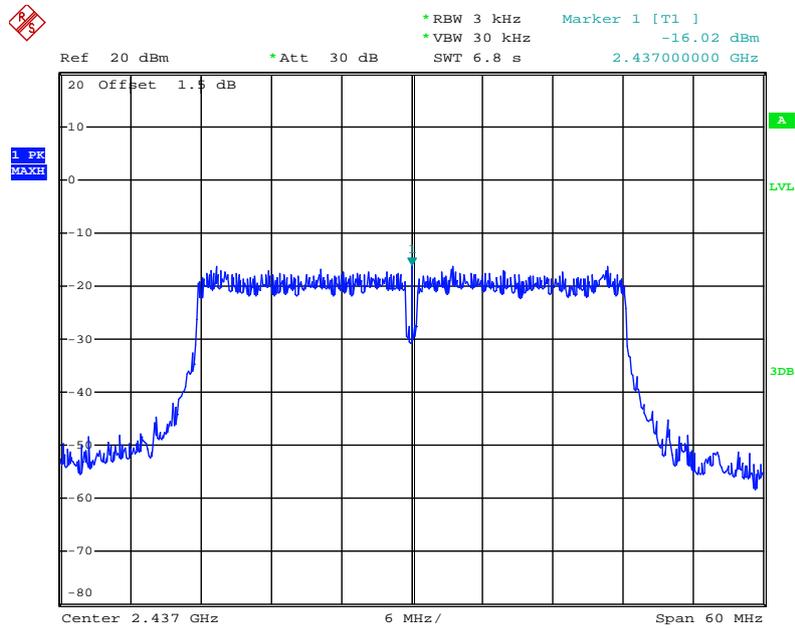
Date: 23.OCT.2013 08:33:25

### Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 1



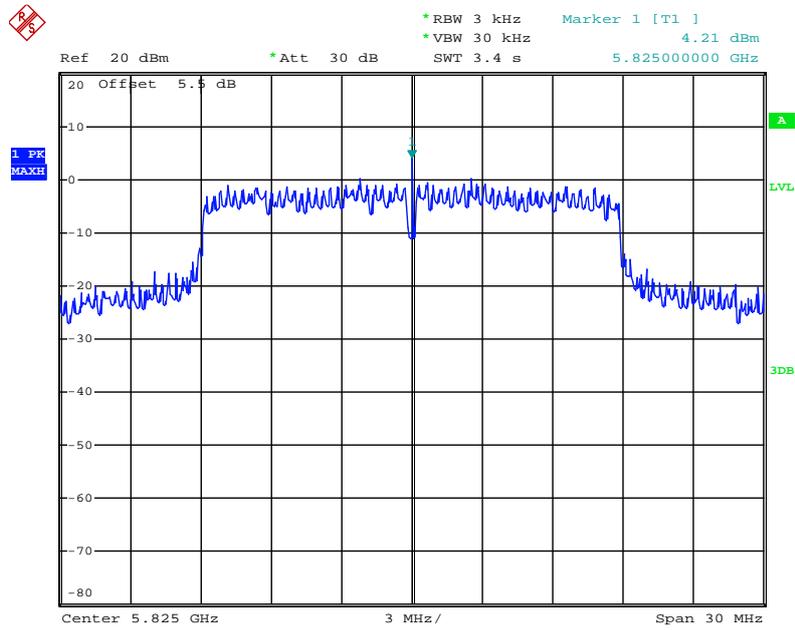
Date: 23.OCT.2013 08:41:28

### Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 2



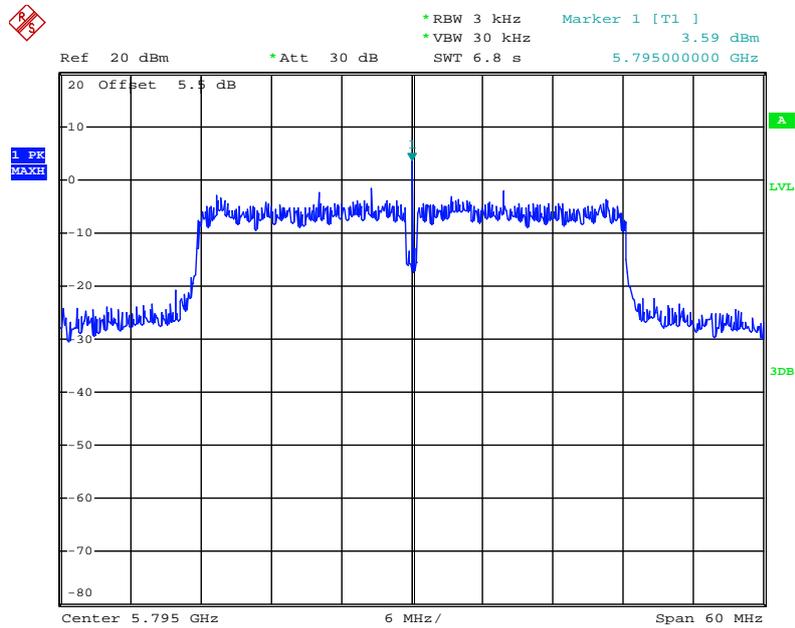
Date: 23.OCT.2013 08:41:16

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5825 MHz / Chain 3**



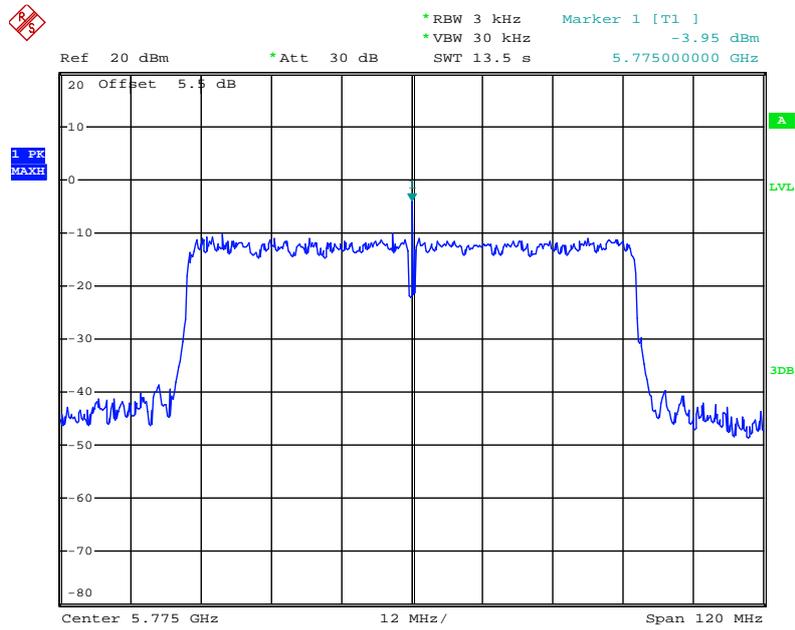
Date: 23.OCT.2013 11:42:09

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5795 MHz / Chain 3**



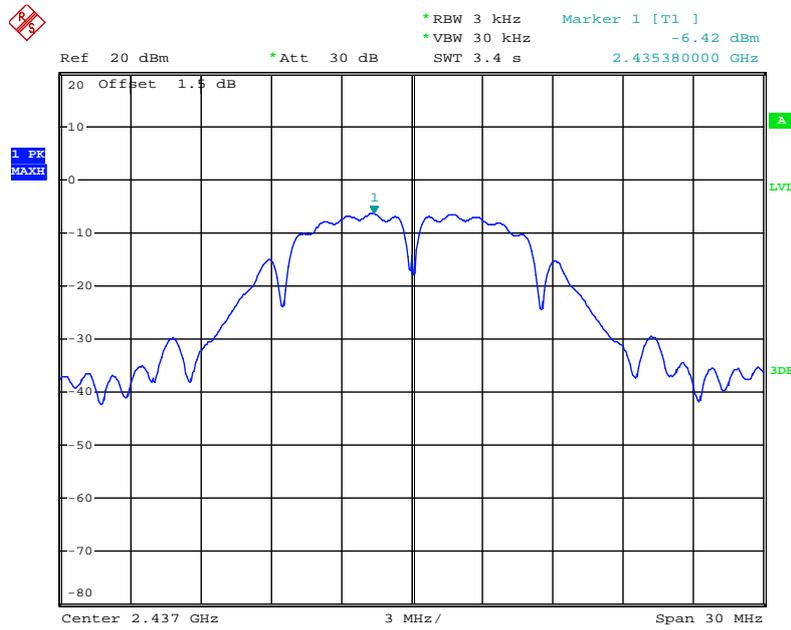
Date: 23.OCT.2013 11:46:29

### Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 3



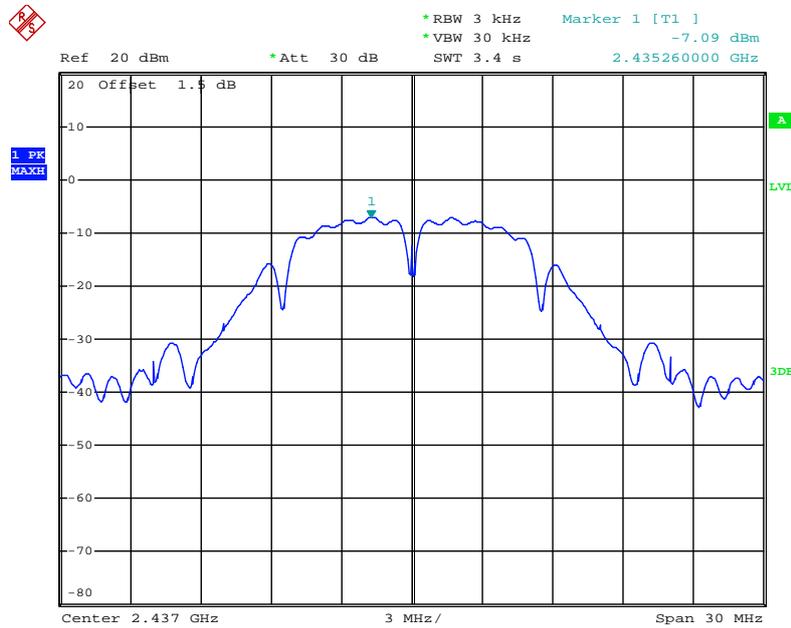
Date: 23.OCT.2013 11:48:04

**Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1**



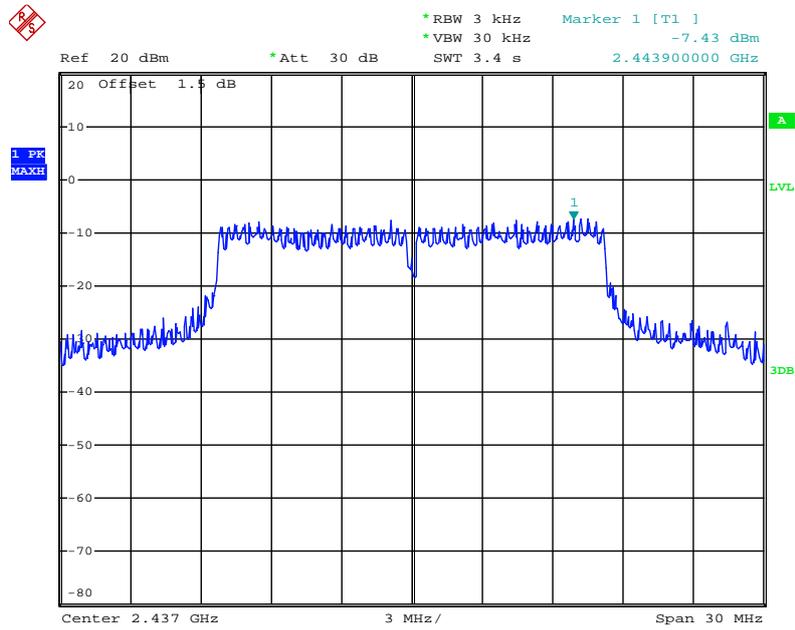
Date: 23.OCT.2013 08:21:01

**Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 2**



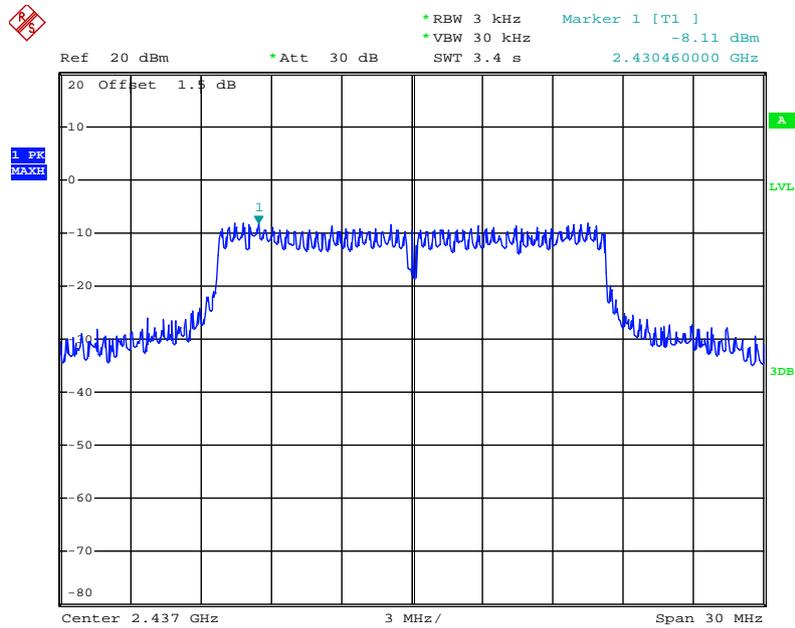
Date: 23.OCT.2013 08:20:05

**Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1**



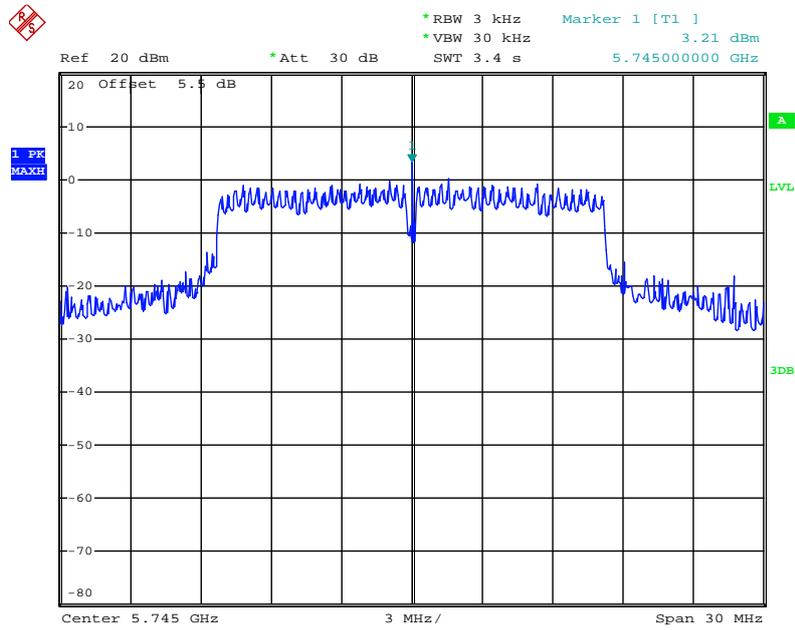
Date: 23.OCT.2013 08:26:53

**Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 2**



Date: 23.OCT.2013 08:27:24

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



Date: 23.OCT.2013 11:38:15

## 4.4. 6dB Spectrum Bandwidth Measurement

### 4.4.1. Limit

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

### 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 spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

7. The transmitter was radiated to the spectrum analyzer in peak hold mode.
8. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth option 1.
9. Multiple antenna system was performed in accordance with KDB 662911 D01 v02 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
10. Measured the spectrum width with power higher than 6dB below carrier.

### 4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

### 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 6dB Spectrum Bandwidth

<b>Temperature</b>	21°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Chain 1 + Chain 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.68	500	Complies
6	2437 MHz	17.84	22.16	500	Complies
11	2462 MHz	17.28	17.68	500	Complies

Configuration IEEE 802.11n MCS0 40MHz / Chain 1 + Chain 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.48	36.32	500	Complies
6	2437 MHz	36.00	36.32	500	Complies
9	2452 MHz	36.48	36.64	500	Complies

**For 5GHz Band**
**Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	17.60	20.32	500	Complies
157	5785 MHz	17.60	20.40	500	Complies
165	5825 MHz	17.60	24.40	500	Complies

**Configuration IEEE 802.11ac MCS0/Nss1 40MHz / Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.48	36.48	500	Complies
159	5795 MHz	36.48	40.32	500	Complies

**Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	76.80	76.16	500	Complies

<b>Temperature</b>	21°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Benson Peng	<b>Configurations</b>	IEEE 802.11 a/b/g

**Configuration IEEE 802.11b / Chain 1 + Chain 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	7.12	10.32	500	Complies
6	2437 MHz	6.16	13.44	500	Complies
11	2462 MHz	7.12	10.08	500	Complies

**Configuration IEEE 802.11g / Chain 1 + Chain 2**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.48	16.56	500	Complies
6	2437 MHz	16.64	22.96	500	Complies
11	2462 MHz	16.48	16.48	500	Complies

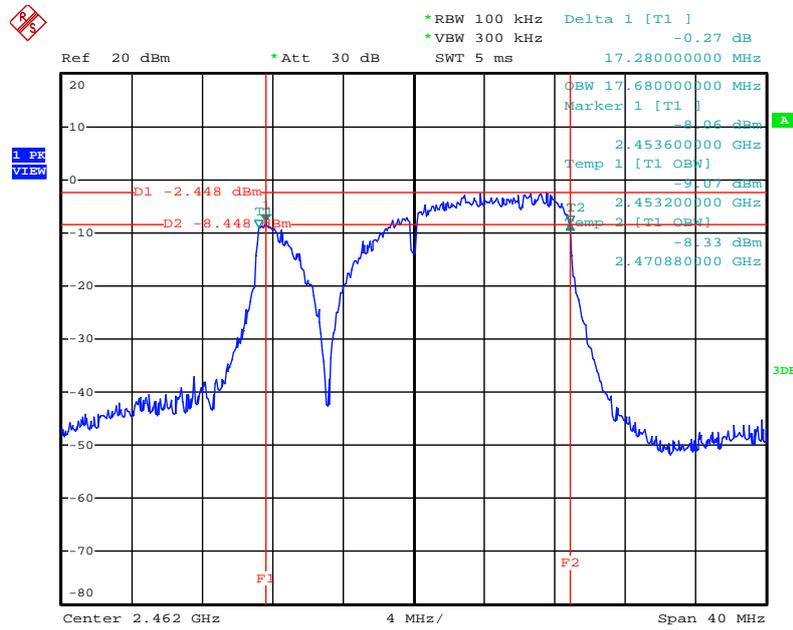
**Configuration IEEE 802.11a / Chain 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.48	21.92	500	Complies
157	5785 MHz	16.56	22.00	500	Complies
165	5825 MHz	16.40	24.96	500	Complies

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

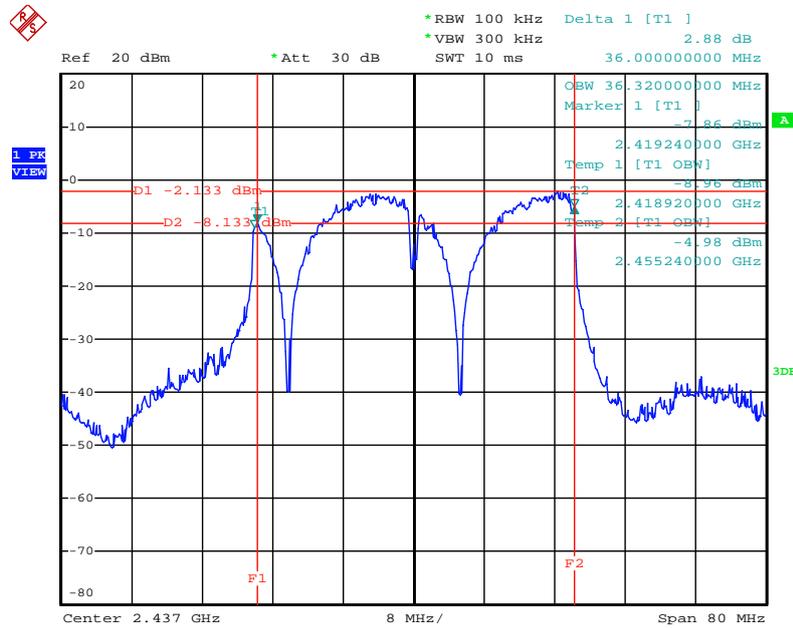
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / 2462 MHz / Chain 1 + Chain 2



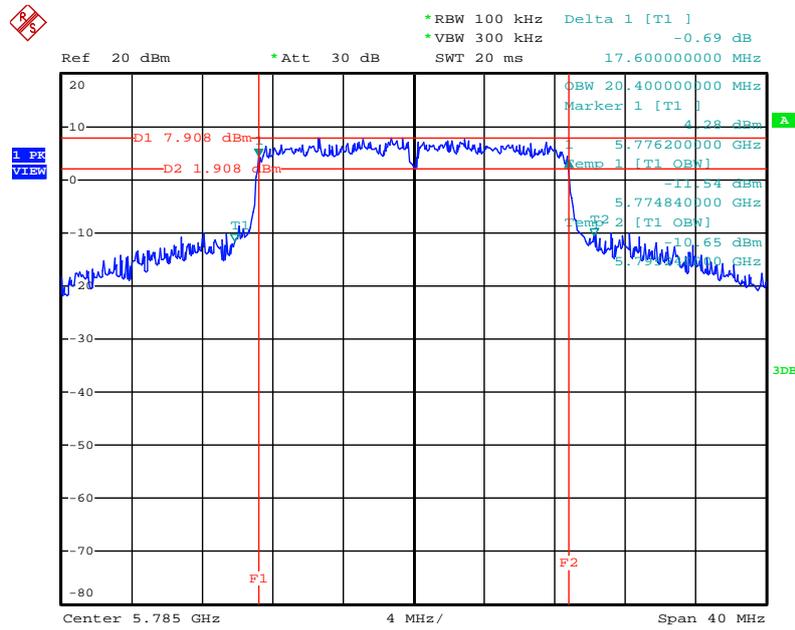
Date: 23.OCT.2013 08:05:59

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Chain 1 + Chain 2



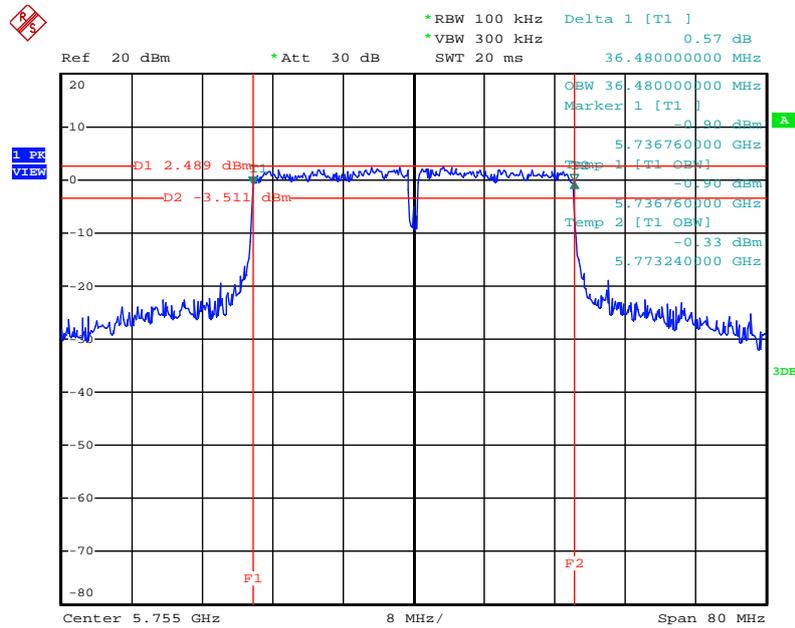
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### 6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / 5785 MHz / Chain 3



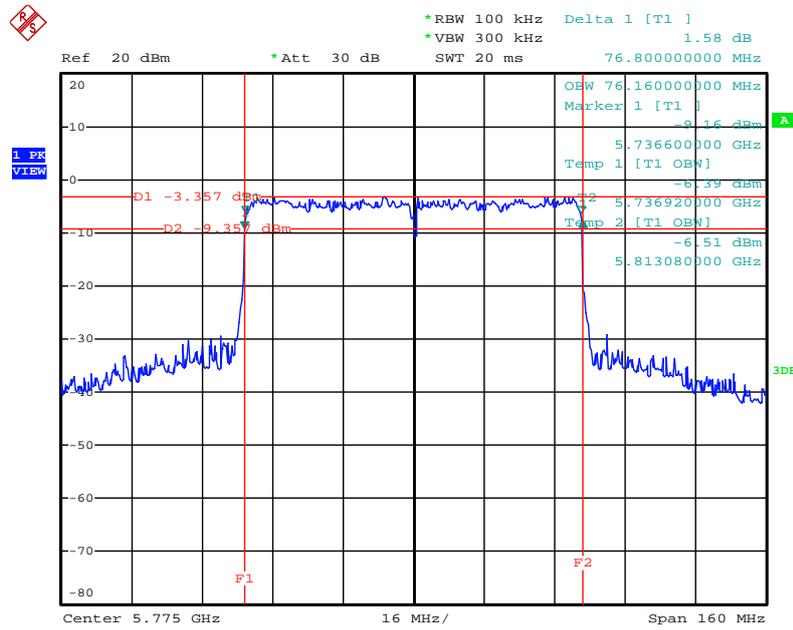
Date: 23.OCT.2013 11:52:37

### 6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / 5755MHz / Chain 3



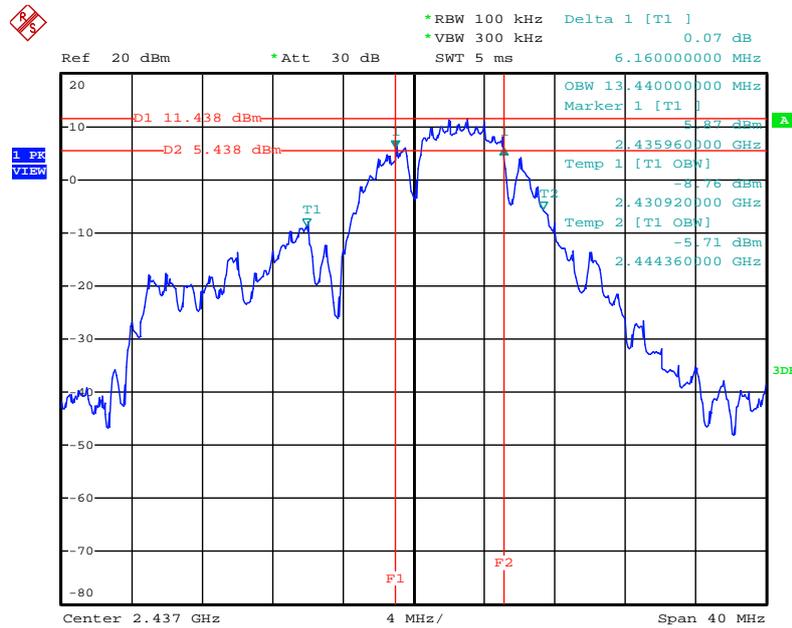
Date: 23.OCT.2013 11:50:17

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / 5775 MHz / Chain 3



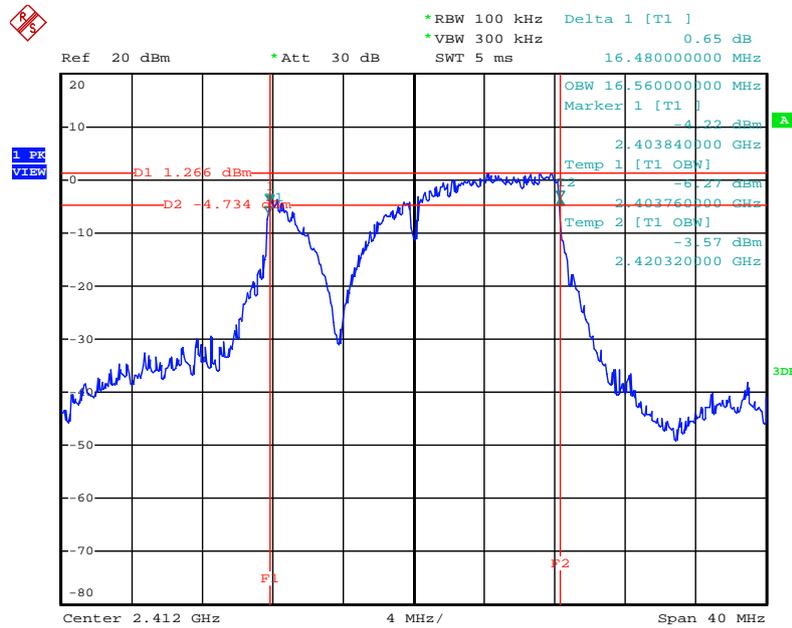
Date: 23.OCT.2013 11:48:51

### 6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1 + Chain 2



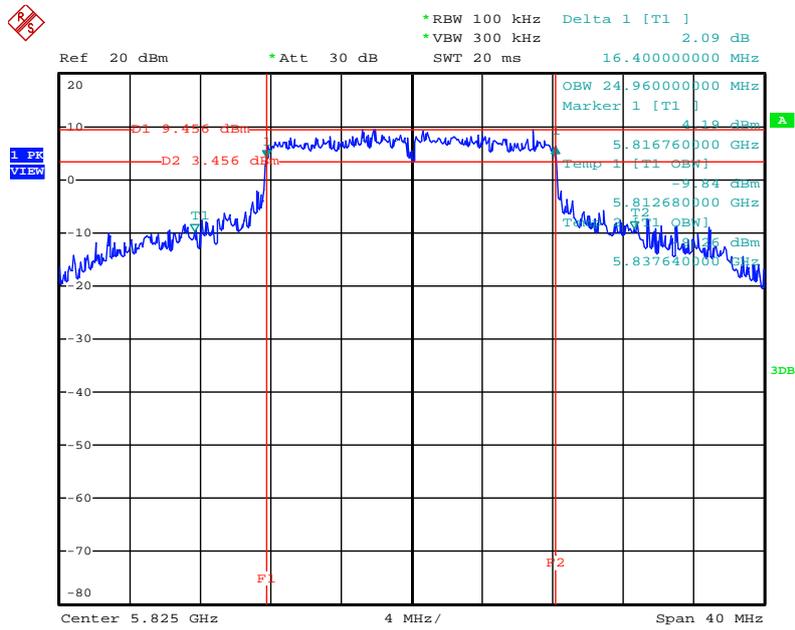
Date: 23.OCT.2013 08:00:10

### 6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz / Chain 1 + Chain 2



Date: 23.OCT.2013 08:04:40

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Chain 3



Date: 23.OCT.2013 11:56:15

## 4.5. Radiated Emissions Measurement

### 4.5.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

### 4.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1GHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

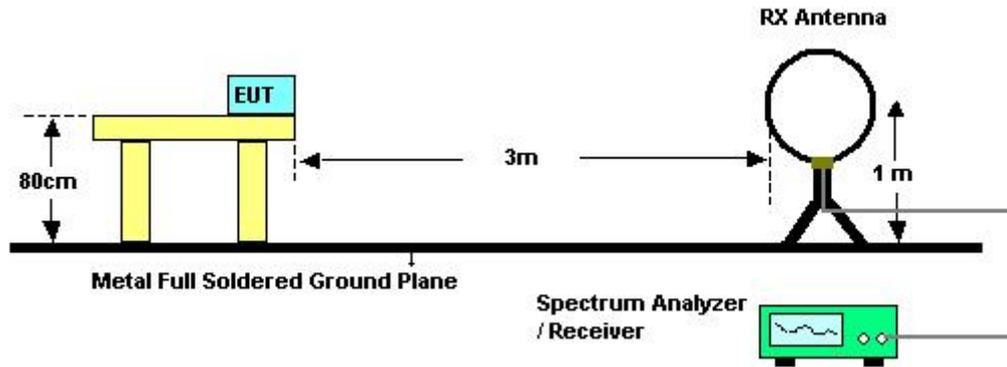
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

#### 4.5.3. Test Procedures

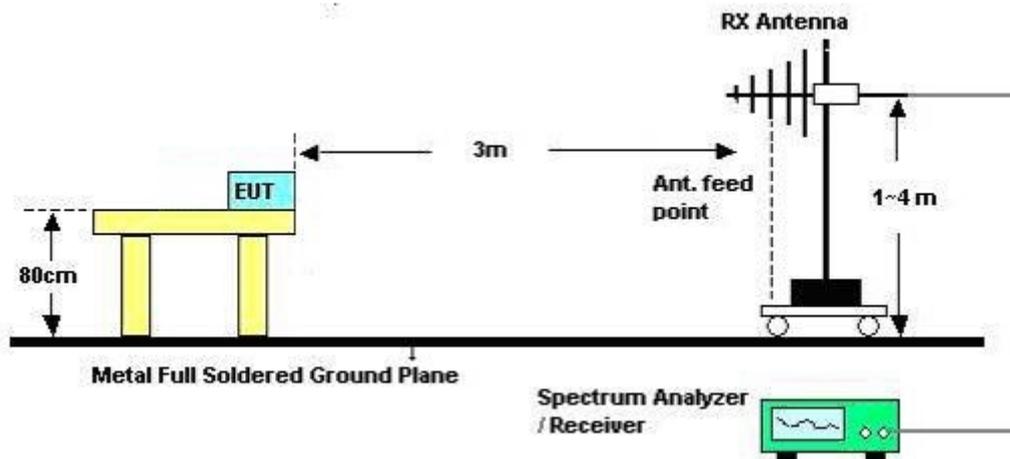
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

#### 4.5.4. Test Setup Layout

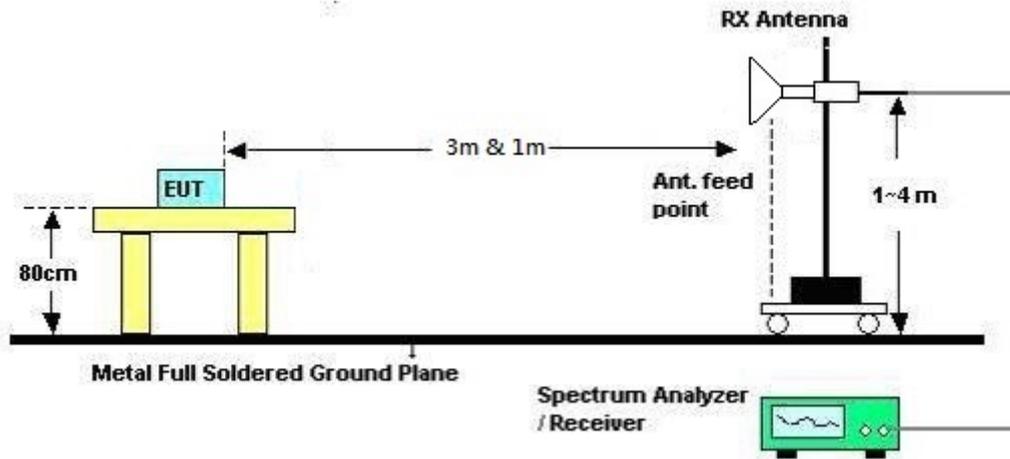
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	Nick Peng	<b>Configurations</b>	Normal Link
<b>Test Date</b>	Nov. 01, 2013		

<b>Freq. (MHz)</b>	<b>Level (dBuV)</b>	<b>Over Limit (dB)</b>	<b>Limit Line (dBuV)</b>	<b>Remark</b>
-	-	-	-	See Note

Note:

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

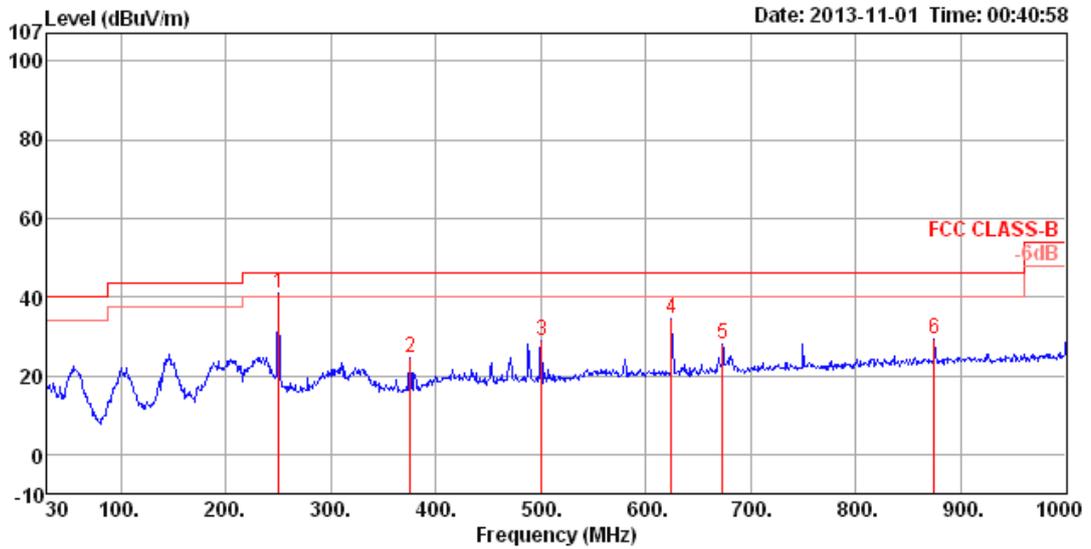
Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

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

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

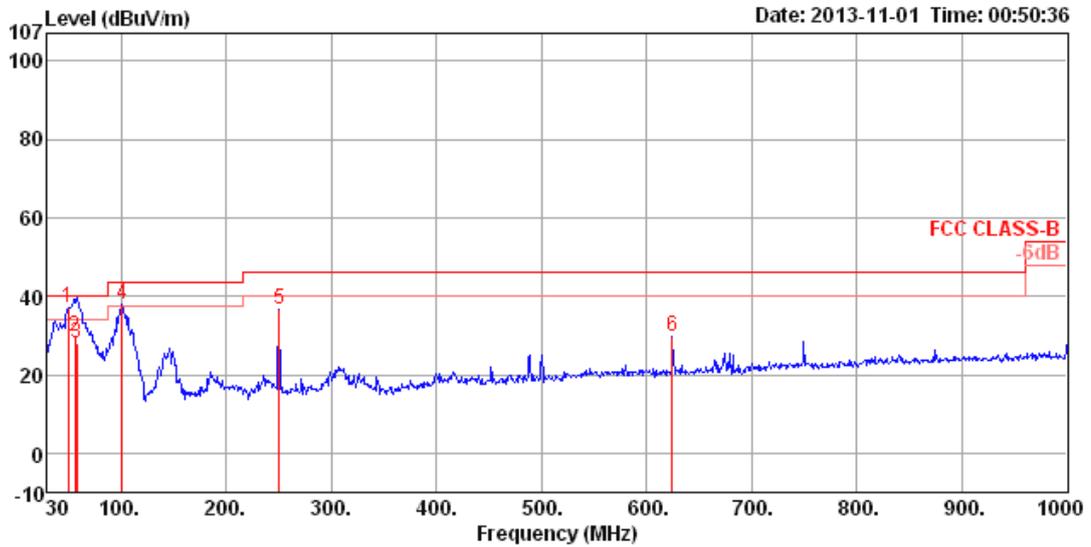
Temperature	25°C	Humidity	54%
Test Engineer	Nick Peng	Configurations	Normal Link

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	250.19	40.78	46.00	-5.22	58.46	1.90	11.91	31.49	150	44	HORIZONTAL	Peak
2	375.32	24.58	46.00	-21.42	38.64	2.44	14.93	31.43	100	64	HORIZONTAL	Peak
3	500.45	28.79	46.00	-17.21	40.46	2.82	16.92	31.41	150	201	HORIZONTAL	Peak
4	624.61	34.61	46.00	-11.39	44.22	3.18	18.61	31.40	150	78	HORIZONTAL	Peak
5	673.11	28.17	46.00	-17.83	37.41	3.32	18.81	31.37	100	34	HORIZONTAL	Peak
6	874.87	29.43	46.00	-16.57	36.45	3.89	20.24	31.15	150	211	HORIZONTAL	Peak

**Vertical**



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	49.40	36.99	40.00	-3.01	60.07	0.83	7.88	31.79	100	228	VERTICAL	Peak
2	56.19	29.89	40.00	-10.11	55.10	0.87	5.70	31.78	100	30	VERTICAL	QP
3	58.13	27.87	40.00	-12.13	53.46	0.88	5.31	31.78	125	133	VERTICAL	QP
4	100.81	38.10	43.50	-5.40	58.07	1.19	10.44	31.60	125	22	VERTICAL	Peak
5	250.19	36.66	46.00	-9.34	54.34	1.90	11.91	31.49	125	126	VERTICAL	Peak
6	624.61	29.87	46.00	-16.13	39.48	3.18	18.61	31.40	150	88	VERTICAL	Peak

**Note:**

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

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

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

#### 4.5.9. Results for Radiated Emissions (1GHz~10<sup>th</sup> Harmonic)

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 20MHz CH 1 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

##### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.99	52.46	54.00	-1.54	59.86	2.25	35.05	25.40	Average	176	100	HORIZONTAL
2	1500.00	53.80	74.00	-20.20	61.20	2.25	35.05	25.40	Peak	176	100	HORIZONTAL
3	4823.73	29.04	54.00	-24.96	26.96	4.21	34.69	32.56	Average	329	100	HORIZONTAL
4	4824.73	43.08	74.00	-30.92	41.00	4.21	34.69	32.56	Peak	329	100	HORIZONTAL

##### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.98	50.09	54.00	-3.91	57.49	2.25	35.05	25.40	Average	32	100	VERTICAL
2	1500.04	51.50	74.00	-22.50	58.90	2.25	35.05	25.40	Peak	32	100	VERTICAL
3	4823.41	43.43	74.00	-30.57	41.35	4.21	34.69	32.56	Peak	170	100	VERTICAL
4	4823.45	28.95	54.00	-25.05	26.87	4.21	34.69	32.56	Average	170	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 20MHz CH 6 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.93	52.41	54.00	-1.59	59.81	2.25	35.05	25.40	Average	172	100	HORIZONTAL
2	1500.00	53.84	74.00	-20.16	61.24	2.25	35.05	25.40	Peak	172	100	HORIZONTAL
3	4873.07	42.76	74.00	-31.24	40.55	4.22	34.67	32.66	Peak	323	100	HORIZONTAL
4	4873.18	28.38	54.00	-25.62	26.17	4.22	34.67	32.66	Average	323	100	HORIZONTAL
5	7317.60	43.60	54.00	-10.40	36.20	5.35	34.94	36.99	Average	112	142	HORIZONTAL
6	7317.80	60.67	74.00	-13.33	53.27	5.35	34.94	36.99	Peak	112	142	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.97	49.81	54.00	-4.19	57.21	2.25	35.05	25.40	Average	31	100	VERTICAL
2	1500.00	51.22	74.00	-22.78	58.62	2.25	35.05	25.40	Peak	31	100	VERTICAL
3	4873.37	42.75	74.00	-31.25	40.54	4.22	34.67	32.66	Peak	278	100	VERTICAL
4	4873.42	28.45	54.00	-25.55	26.24	4.22	34.67	32.66	Average	278	100	VERTICAL
5	7309.60	40.48	54.00	-13.52	33.10	5.34	34.93	36.97	Average	98	100	VERTICAL
6	7312.40	54.83	74.00	-19.17	47.46	5.34	34.94	36.97	Peak	98	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 20MHz CH 11 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.96	53.92	74.00	-20.08	61.32	2.25	35.05	25.40	Peak	166	100	HORIZONTAL
2	1499.97	52.46	54.00	-1.54	59.86	2.25	35.05	25.40	Average	166	100	HORIZONTAL
3	4923.57	42.04	74.00	-31.96	39.70	4.23	34.65	32.76	Peak	263	100	HORIZONTAL
4	4924.78	28.29	54.00	-25.71	25.95	4.23	34.65	32.76	Average	263	100	HORIZONTAL
5	7385.06	34.18	54.00	-19.82	26.70	5.36	34.96	37.08	Average	31	100	HORIZONTAL
6	7386.15	48.32	74.00	-25.68	40.84	5.36	34.96	37.08	Peak	31	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.98	50.09	54.00	-3.91	57.49	2.25	35.05	25.40	Average	31	100	VERTICAL
2	1500.01	51.69	74.00	-22.31	59.09	2.25	35.05	25.40	Peak	31	100	VERTICAL
3	4923.25	42.69	74.00	-31.31	40.35	4.23	34.65	32.76	Peak	178	100	VERTICAL
4	4924.97	28.27	54.00	-25.73	25.93	4.23	34.65	32.76	Average	178	100	VERTICAL
5	7385.25	34.12	54.00	-19.88	26.64	5.36	34.96	37.08	Average	228	100	VERTICAL
6	7386.71	49.42	74.00	-24.58	41.94	5.36	34.96	37.08	Peak	228	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz CH 3 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.99	52.46	54.00	-1.54	59.86	2.25	35.05	25.40	Average	169	100	HORIZONTAL
2	1500.00	53.84	74.00	-20.16	61.24	2.25	35.05	25.40	Peak	169	100	HORIZONTAL
3	7265.07	32.93	54.00	-21.07	25.59	5.34	34.93	36.93	Average	0	100	HORIZONTAL
4	7265.72	47.06	74.00	-26.94	39.72	5.34	34.93	36.93	Peak	0	100	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.94	51.42	74.00	-22.58	58.82	2.25	35.05	25.40	Peak	32	100	VERTICAL
2	1499.97	50.09	54.00	-3.91	57.49	2.25	35.05	25.40	Average	32	100	VERTICAL
3	7265.07	32.90	54.00	-21.10	25.56	5.34	34.93	36.93	Average	134	100	VERTICAL
4	7265.44	47.49	74.00	-26.51	40.15	5.34	34.93	36.93	Peak	134	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz CH 6 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.94	53.56	74.00	-20.44	60.96	2.25	35.05	25.40	Peak	165	100	HORIZONTAL
2	1499.97	52.20	54.00	-1.80	59.60	2.25	35.05	25.40	Average	165	100	HORIZONTAL
3	4871.51	44.12	74.00	-29.88	41.91	4.22	34.67	32.66	Peak	266	100	HORIZONTAL
4	4871.75	28.39	54.00	-25.61	26.18	4.22	34.67	32.66	Average	266	100	HORIZONTAL
5	7310.98	47.94	74.00	-26.06	40.56	5.34	34.93	36.97	Peak	75	100	HORIZONTAL
6	7312.00	34.02	54.00	-19.98	26.65	5.34	34.94	36.97	Average	75	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.99	49.64	54.00	-4.36	57.04	2.25	35.05	25.40	Average	34	100	VERTICAL
2	1500.00	51.17	74.00	-22.83	58.57	2.25	35.05	25.40	Peak	34	100	VERTICAL
3	4873.49	28.31	54.00	-25.69	26.10	4.22	34.67	32.66	Average	86	100	VERTICAL
4	4874.04	42.32	74.00	-31.68	40.11	4.22	34.67	32.66	Peak	86	100	VERTICAL
5	7310.63	33.98	54.00	-20.02	26.60	5.34	34.93	36.97	Average	241	100	VERTICAL
6	7310.83	48.22	74.00	-25.78	40.84	5.34	34.93	36.97	Peak	241	100	VERTICAL



<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz CH 9 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.98	52.49	54.00	-1.51	59.89	2.25	35.05	25.40	Average	163	100	HORIZONTAL
2	1500.00	53.90	74.00	-20.10	61.30	2.25	35.05	25.40	Peak	163	100	HORIZONTAL
3	4904.00	41.43	74.00	-32.57	39.14	4.22	34.66	32.73	Peak	320	100	HORIZONTAL
4	4904.00	27.68	54.00	-26.32	25.39	4.22	34.66	32.73	Average	320	100	HORIZONTAL
5	7356.00	48.15	74.00	-25.85	40.72	5.35	34.95	37.03	Peak	171	100	HORIZONTAL
6	7356.00	33.71	54.00	-20.29	26.28	5.35	34.95	37.03	Average	171	100	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.98	51.33	74.00	-22.67	58.73	2.25	35.05	25.40	Peak	27	100	VERTICAL
2	1500.00	49.87	54.00	-4.13	57.27	2.25	35.05	25.40	Average	27	100	VERTICAL
3	4904.00	41.42	74.00	-32.58	39.13	4.22	34.66	32.73	Peak	234	100	VERTICAL
4	4904.00	27.57	54.00	-26.43	25.28	4.22	34.66	32.73	Average	234	100	VERTICAL
5	7356.00	47.95	74.00	-26.05	40.52	5.35	34.95	37.03	Peak	96	100	VERTICAL
6	7356.00	33.77	54.00	-20.23	26.34	5.35	34.95	37.03	Average	96	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 20MHz CH 149 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

**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	11489.74	40.40	54.00	-13.60	26.74	9.24	39.50	35.08	Average	100	162	HORIZONTAL
2	11490.16	54.24	74.00	-19.76	40.58	9.24	39.50	35.08	Peak	100	162	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	11489.64	54.14	74.00	-19.86	40.48	9.24	39.50	35.08	Peak	100	279	VERTICAL
2	11489.70	40.44	54.00	-13.56	26.78	9.24	39.50	35.08	Average	100	279	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 20MHz CH 157 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

### 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	11569.20	56.77	74.00	-17.23	43.13	9.26	39.47	35.09	Peak	100	98	HORIZONTAL
2	11569.87	42.42	54.00	-11.58	28.78	9.26	39.47	35.09	Average	100	98	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	11569.06	57.70	74.00	-16.30	44.06	9.26	39.47	35.09	Peak	100	104	VERTICAL
2	11570.10	43.19	54.00	-10.81	29.55	9.26	39.47	35.09	Average	100	104	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 20MHz CH 165 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

### 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	11649.17	44.53	54.00	-9.47	30.88	9.28	39.44	35.07	Average	100	147	HORIZONTAL
2	11649.93	58.96	74.00	-15.04	45.31	9.28	39.44	35.07	Peak	100	147	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	11650.07	44.38	54.00	-9.62	30.73	9.28	39.44	35.07	Average	100	243	VERTICAL
2	11650.76	59.12	74.00	-14.88	45.47	9.28	39.44	35.07	Peak	100	243	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 40MHz CH 151 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

**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	11509.70	55.31	74.00	-18.69	41.66	9.25	39.50	35.10	Peak	100	191	HORIZONTAL
2	11510.30	40.24	54.00	-13.76	26.59	9.25	39.50	35.10	Average	100	191	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	11510.76	40.11	54.00	-13.89	26.46	9.25	39.50	35.10	Average	100	168	VERTICAL
2	11510.89	54.44	74.00	-19.56	40.79	9.25	39.50	35.10	Peak	100	168	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 40MHz CH 159 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

### 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	11589.78	56.73	74.00	-17.27	43.07	9.27	39.47	35.08	Peak	100	147	HORIZONTAL
2	11590.10	42.94	54.00	-11.06	29.28	9.27	39.47	35.08	Average	100	147	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	11589.83	57.70	74.00	-16.30	44.04	9.27	39.47	35.08	Peak	100	242	VERTICAL
2	11589.99	42.82	54.00	-11.18	29.16	9.27	39.47	35.08	Average	100	242	VERTICAL



<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 80MHz CH 155 / Chain 3
<b>Test Date</b>	Oct. 16, 2013		

**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	11550.76	40.79	54.00	-13.21	27.14	9.26	39.48	35.09	Average	100	166	HORIZONTAL
2	11550.76	54.75	74.00	-19.25	41.10	9.26	39.48	35.09	Peak	100	166	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	11549.72	54.78	74.00	-19.22	41.12	9.26	39.49	35.09	Peak	100	233	VERTICAL
2	11550.21	40.78	54.00	-13.22	27.12	9.26	39.49	35.09	Average	100	233	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 1 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.96	55.21	74.00	-18.79	62.61	2.25	35.05	25.40	Peak	174	100	HORIZONTAL
2	1499.98	53.94	54.00	-0.06	61.34	2.25	35.05	25.40	Average	174	100	HORIZONTAL
3	1624.93	55.63	74.00	-18.37	62.02	2.36	34.98	26.23	Peak	68	100	HORIZONTAL
4	1624.98	52.69	54.00	-1.31	59.08	2.36	34.98	26.23	Average	68	100	HORIZONTAL
5	4823.86	43.45	74.00	-30.55	41.37	4.21	34.69	32.56	Peak	309	100	HORIZONTAL
6	4824.07	30.71	54.00	-23.29	28.63	4.21	34.69	32.56	Average	309	100	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.96	52.63	74.00	-21.37	60.03	2.25	35.05	25.40	Peak	31	105	VERTICAL
2	1500.00	51.09	54.00	-2.91	58.49	2.25	35.05	25.40	Average	31	105	VERTICAL
3	1624.96	50.51	74.00	-23.49	56.90	2.36	34.98	26.23	Peak	302	105	VERTICAL
4	1624.97	47.27	54.00	-6.73	53.66	2.36	34.98	26.23	Average	302	105	VERTICAL
5	4824.00	37.48	54.00	-16.52	35.40	4.21	34.69	32.56	Average	283	104	VERTICAL
6	4824.04	45.77	74.00	-28.23	43.69	4.21	34.69	32.56	Peak	283	104	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 6 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.94	52.83	74.00	-21.17	60.23	2.25	35.05	25.40	Peak	29	109	HORIZONTAL
2	1499.98	51.48	54.00	-2.52	58.88	2.25	35.05	25.40	Average	29	109	HORIZONTAL
3	4865.52	46.63	74.00	-27.37	44.47	4.21	34.67	32.62	Peak	64	117	HORIZONTAL
4	4865.52	31.96	54.00	-22.04	29.80	4.21	34.67	32.62	Average	64	117	HORIZONTAL
5	7310.12	58.03	74.00	-15.97	50.65	5.34	34.93	36.97	Peak	219	100	HORIZONTAL
6	7310.36	50.35	54.00	-3.65	42.97	5.34	34.93	36.97	Average	219	100	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1500.00	53.83	54.00	-0.17	61.23	2.25	35.05	25.40	Average	161	100	VERTICAL
2	1500.09	54.85	74.00	-19.15	62.25	2.25	35.05	25.40	Peak	161	100	VERTICAL
3	4871.92	45.23	74.00	-28.77	43.02	4.22	34.67	32.66	Peak	257	100	VERTICAL
4	4873.92	31.45	54.00	-22.55	29.24	4.22	34.67	32.66	Average	257	100	VERTICAL
5	7308.36	51.51	54.00	-2.49	44.13	5.34	34.93	36.97	Average	105	100	VERTICAL
6	7308.96	58.22	74.00	-15.78	50.84	5.34	34.93	36.97	Peak	105	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 11 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.94	55.00	74.00	-19.00	62.40	2.25	35.05	25.40	Peak	162	100	HORIZONTAL
2	1499.98	53.80	54.00	-0.20	61.20	2.25	35.05	25.40	Average	162	100	HORIZONTAL
3	4922.84	45.38	74.00	-28.62	43.04	4.23	34.65	32.76	Peak	282	100	HORIZONTAL
4	4933.40	31.93	54.00	-22.07	29.59	4.23	34.65	32.76	Average	282	100	HORIZONTAL
5	7384.04	52.40	74.00	-21.60	44.92	5.36	34.96	37.08	Peak	103	100	HORIZONTAL
6	7385.96	39.37	54.00	-14.63	31.89	5.36	34.96	37.08	Average	103	100	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1500.00	51.73	54.00	-2.27	59.13	2.25	35.05	25.40	Average	32	100	VERTICAL
2	1500.01	53.26	74.00	-20.74	60.66	2.25	35.05	25.40	Peak	32	100	VERTICAL
3	4924.04	45.53	74.00	-28.47	43.19	4.23	34.65	32.76	Peak	154	100	VERTICAL
4	4925.60	31.24	54.00	-22.76	28.90	4.23	34.65	32.76	Average	154	100	VERTICAL
5	7381.22	37.59	54.00	-16.41	30.13	5.36	34.96	37.06	Average	326	100	VERTICAL
6	7381.40	51.05	74.00	-22.95	43.59	5.36	34.96	37.06	Peak	326	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 1 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.95	54.41	74.00	-19.59	61.81	2.25	35.05	25.40	Peak	169	100	HORIZONTAL
2	1499.97	53.22	54.00	-0.78	60.62	2.25	35.05	25.40	Average	169	100	HORIZONTAL
3	1624.98	55.82	74.00	-18.18	62.21	2.36	34.98	26.23	Peak	242	100	HORIZONTAL
4	1624.98	51.68	54.00	-2.32	58.07	2.36	34.98	26.23	Average	242	100	HORIZONTAL
5	4823.45	44.14	74.00	-29.86	42.06	4.21	34.69	32.56	Peak	112	100	HORIZONTAL
6	4823.68	29.09	54.00	-24.91	27.01	4.21	34.69	32.56	Average	112	100	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.96	51.79	74.00	-22.21	59.19	2.25	35.05	25.40	Peak	29	100	VERTICAL
2	1499.97	50.18	54.00	-3.82	57.58	2.25	35.05	25.40	Average	29	100	VERTICAL
3	1624.94	49.05	74.00	-24.95	55.44	2.36	34.98	26.23	Peak	331	100	VERTICAL
4	1624.97	45.68	54.00	-8.32	52.07	2.36	34.98	26.23	Average	331	100	VERTICAL
5	4812.50	42.79	74.00	-31.21	40.76	4.20	34.69	32.52	Peak	302	100	VERTICAL
6	4825.60	28.85	54.00	-25.15	26.77	4.21	34.69	32.56	Average	302	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 6 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.97	53.23	54.00	-0.77	60.63	2.25	35.05	25.40	Average	172	100	HORIZONTAL
2	1499.98	54.56	74.00	-19.44	61.96	2.25	35.05	25.40	Peak	172	100	HORIZONTAL
3	1624.96	52.38	54.00	-1.62	58.77	2.36	34.98	26.23	Average	68	100	HORIZONTAL
4	1625.00	55.37	74.00	-18.63	61.76	2.36	34.98	26.23	Peak	68	100	HORIZONTAL
5	4873.73	28.37	54.00	-25.63	26.16	4.22	34.67	32.66	Average	301	100	HORIZONTAL
6	4873.74	42.29	74.00	-31.71	40.08	4.22	34.67	32.66	Peak	301	100	HORIZONTAL
7	7310.35	34.14	54.00	-19.86	26.76	5.34	34.93	36.97	Average	113	100	HORIZONTAL
8	7310.65	48.28	74.00	-25.72	40.90	5.34	34.93	36.97	Peak	113	100	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.96	50.85	54.00	-3.15	58.25	2.25	35.05	25.40	Average	30	100	VERTICAL
2	1499.99	52.12	74.00	-21.88	59.52	2.25	35.05	25.40	Peak	30	100	VERTICAL
3	1624.89	45.78	54.00	-8.22	52.17	2.36	34.98	26.23	Average	332	100	VERTICAL
4	1625.00	49.44	74.00	-24.56	55.83	2.36	34.98	26.23	Peak	332	100	VERTICAL
5	4873.18	28.38	54.00	-25.62	26.17	4.22	34.67	32.66	Average	307	100	VERTICAL
6	4874.03	43.03	74.00	-30.97	40.82	4.22	34.67	32.66	Peak	307	100	VERTICAL
7	7310.31	34.13	54.00	-19.87	26.75	5.34	34.93	36.97	Average	206	100	VERTICAL
8	7311.42	48.45	74.00	-25.55	41.08	5.34	34.94	36.97	Peak	206	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11g CH 11 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.94	54.32	74.00	-19.68	61.72	2.25	35.05	25.40	Peak	175	100	HORIZONTAL
2	1499.98	53.00	54.00	-1.00	60.40	2.25	35.05	25.40	Average	175	100	HORIZONTAL
3	4923.50	42.95	74.00	-31.05	40.61	4.23	34.65	32.76	Peak	117	100	HORIZONTAL
4	4924.84	28.33	54.00	-25.67	25.99	4.23	34.65	32.76	Average	117	100	HORIZONTAL
5	7386.42	34.33	54.00	-19.67	26.85	5.36	34.96	37.08	Average	199	100	HORIZONTAL
6	7386.46	48.48	74.00	-25.52	41.00	5.36	34.96	37.08	Peak	199	100	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	1499.98	51.92	74.00	-22.08	59.32	2.25	35.05	25.40	Peak	204	108	VERTICAL
2	1500.00	50.20	54.00	-3.80	57.60	2.25	35.05	25.40	Average	204	108	VERTICAL
3	4924.42	43.45	74.00	-30.55	41.11	4.23	34.65	32.76	Peak	95	100	VERTICAL
4	4924.46	28.32	54.00	-25.68	25.98	4.23	34.65	32.76	Average	95	100	VERTICAL
5	7385.23	49.48	74.00	-24.52	42.00	5.36	34.96	37.08	Peak	254	100	VERTICAL
6	7386.60	34.36	54.00	-19.64	26.88	5.36	34.96	37.08	Average	254	100	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 149 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

### 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	1499.90	38.33	74.00	-35.67	44.47	3.16	25.60	34.90	Peak	100	191	HORIZONTAL
2	1499.98	33.87	54.00	-20.13	40.01	3.16	25.60	34.90	Average	100	191	HORIZONTAL
3	11489.75	39.93	54.00	-14.07	26.27	9.24	39.50	35.08	Average	100	251	HORIZONTAL
4	11489.89	53.97	74.00	-20.03	40.31	9.24	39.50	35.08	Peak	100	251	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	1499.91	40.37	74.00	-33.63	46.51	3.16	25.60	34.90	Peak	100	151	VERTICAL
2	1499.98	33.09	54.00	-20.91	39.23	3.16	25.60	34.90	Average	100	151	VERTICAL
3	11489.66	40.10	54.00	-13.90	26.44	9.24	39.50	35.08	Average	100	107	VERTICAL
4	11492.28	53.84	74.00	-20.16	40.18	9.24	39.50	35.08	Peak	100	107	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 157 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

### 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	11569.49	55.27	74.00	-18.73	41.63	9.26	39.47	35.09	Peak	100	263	HORIZONTAL
2	11570.98	40.73	54.00	-13.27	27.09	9.26	39.47	35.09	Average	100	263	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	11569.55	55.46	74.00	-18.54	41.82	9.26	39.47	35.09	Peak	100	225	VERTICAL
2	11572.36	40.74	54.00	-13.26	27.09	9.26	39.47	35.08	Average	100	225	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11a CH 165 / Chain 3
<b>Test Date</b>	Oct. 15, 2013		

### 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	11649.07	55.08	74.00	-18.92	41.43	9.28	39.44	35.07	Peak	100	133	HORIZONTAL
2	11649.76	41.09	54.00	-12.91	27.44	9.28	39.44	35.07	Average	100	133	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	11649.09	41.06	54.00	-12.94	27.41	9.28	39.44	35.07	Average	100	228	VERTICAL
2	11650.83	55.58	74.00	-18.42	41.93	9.28	39.44	35.07	Peak	100	228	VERTICAL

### Note:

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

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

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

## 4.6. Emissions Measurement

### 4.6.1. Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

### 4.6.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1 MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100 kHz / 300 kHz for Peak

### 4.6.3. Test Procedures

For Radiated band edges Measurement:

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around band edges.

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
2. The radiated emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit.  
Only worst data of each operating mode is presented.

#### **4.6.4. Test Setup Layout**

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

#### **4.6.5. Test Deviation**

There is no deviation with the original standard.

#### **4.6.6. EUT Operation during Test**

The EUT was programmed to be in continuously transmitting mode.

#### 4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	25°C	Humidity	54%
Test Engineer	Jim Huang	Configurations	IEEE 802.11n MCS0 20MHz CH 1, 6, 11 / Chain 1 + Chain 2
Test date	Oct. 14, 2013		

##### Channel 1

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2389.60	73.84	74.00	-0.16	43.06	2.91	0.00	27.87	Peak	95	189	HORIZONTAL
2	2390.00	53.67	54.00	-0.33	22.89	2.91	0.00	27.87	Average	95	189	HORIZONTAL
3	2418.80	110.79			80.03	2.92	0.00	27.84	Peak	95	189	HORIZONTAL
4	2419.00	101.22			70.46	2.92	0.00	27.84	Average	95	189	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

##### Channel 6

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2384.80	48.49	54.00	-5.51	17.70	2.90	0.00	27.89	Average	89	181	HORIZONTAL
2	2386.00	64.62	74.00	-9.38	33.84	2.91	0.00	27.87	Peak	89	181	HORIZONTAL
3	2443.40	118.36			87.64	2.94	0.00	27.78	Peak	89	181	HORIZONTAL
4	2444.20	108.71			77.99	2.94	0.00	27.78	Average	89	181	HORIZONTAL
5	2483.50	71.38	74.00	-2.62	40.69	2.96	0.00	27.73	Peak	89	181	HORIZONTAL
6	2483.50	53.53	54.00	-0.47	22.84	2.96	0.00	27.73	Average	89	181	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

##### Channel 11

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2465.20	100.21			69.50	2.95	0.00	27.76	Average	101	178	HORIZONTAL
2	2465.40	109.74			79.03	2.95	0.00	27.76	Peak	101	178	HORIZONTAL
3	2483.50	71.51	74.00	-2.49	40.82	2.96	0.00	27.73	Peak	101	178	HORIZONTAL
4	2483.50	53.51	54.00	-0.49	22.82	2.96	0.00	27.73	Average	101	178	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	Jim Huang	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz CH 3, 6, 9 / Chain 1 + Chain 2
<b>Test date</b>	Oct. 14, 2013		

**Channel 3**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2388.80	53.69	54.00	-0.31	22.91	2.91	0.00	27.87	Average	88	178	HORIZONTAL
2	2389.20	69.39	74.00	-4.61	38.61	2.91	0.00	27.87	Peak	88	178	HORIZONTAL
3	2427.20	97.03			66.29	2.93	0.00	27.81	Average	88	178	HORIZONTAL
4	2428.80	106.80			76.06	2.93	0.00	27.81	Peak	88	178	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2422 MHz.

**Channel 6**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2388.40	65.72	74.00	-8.28	34.94	2.91	0.00	27.87	Peak	89	181	HORIZONTAL
2	2390.00	51.08	54.00	-2.92	20.30	2.91	0.00	27.87	Average	89	181	HORIZONTAL
3	2447.40	109.88			79.16	2.94	0.00	27.78	Peak	89	181	HORIZONTAL
4	2448.60	99.32			68.60	2.94	0.00	27.78	Average	89	181	HORIZONTAL
5	2483.50	68.56	74.00	-5.44	37.87	2.96	0.00	27.73	Peak	89	181	HORIZONTAL
6	2484.30	53.12	54.00	-0.88	22.43	2.96	0.00	27.73	Average	89	181	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 9**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2468.00	106.37			75.66	2.95	0.00	27.76	Peak	91	177	HORIZONTAL
2	2468.00	96.76			66.05	2.95	0.00	27.76	Average	91	177	HORIZONTAL
3	2483.90	53.89	54.00	-0.11	23.20	2.96	0.00	27.73	Average	91	177	HORIZONTAL
4	2487.10	69.24	74.00	-4.76	38.55	2.96	0.00	27.73	Peak	91	177	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2452 MHz.

Note:

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

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

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	YC Chen	<b>Configurations</b>	IEEE 802.11b CH 1, 6, 11 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 15, 2013		

**Channel 1**

	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	2389.40	53.80	54.00	-0.20	21.66	4.09	28.05	0.00	Average	149	86	HORIZONTAL
2	2389.60	64.01	74.00	-9.99	31.87	4.09	28.05	0.00	Peak	149	86	HORIZONTAL
3	2413.00	116.92			84.72	4.11	28.09	0.00	Peak	149	86	HORIZONTAL
4	2413.80	113.02			80.82	4.11	28.09	0.00	Peak	149	86	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2382.80	60.62	74.00	-13.38	29.83	2.90	0.00	27.89	Peak	86	150	HORIZONTAL
2	2385.60	49.64	54.00	-4.36	18.86	2.91	0.00	27.87	Average	86	150	HORIZONTAL
3	2439.80	114.46			83.74	2.94	0.00	27.78	Average	86	150	HORIZONTAL
4	2441.00	118.06			87.34	2.94	0.00	27.78	Peak	86	150	HORIZONTAL
5	2483.50	63.60	74.00	-10.40	32.91	2.96	0.00	27.73	Peak	86	150	HORIZONTAL
6	2483.50	52.18	54.00	-1.82	21.49	2.96	0.00	27.73	Average	86	150	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 11**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2463.60	117.68			86.97	2.95	0.00	27.76	Peak	89	177	VERTICAL
2	2464.80	113.03			82.32	2.95	0.00	27.76	Average	89	177	VERTICAL
3	2483.50	53.25	54.00	-0.75	22.56	2.96	0.00	27.73	Average	89	177	VERTICAL
4	2484.50	63.99	74.00	-10.01	33.30	2.96	0.00	27.73	Peak	89	177	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

<b>Temperature</b>	25°C	<b>Humidity</b>	54%
<b>Test Engineer</b>	Jim Huang	<b>Configurations</b>	IEEE 802.11g CH 1, 6, 11 / Chain 1 + Chain 2
<b>Test Date</b>	Oct. 14, 2013		

**Channel 1**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2390.00	71.15	74.00	-2.85	40.37	2.91	0.00	27.87	Peak	100	184	HORIZONTAL
2	2390.00	53.58	54.00	-0.42	22.80	2.91	0.00	27.87	Average	100	184	HORIZONTAL
3	2410.60	111.95			81.19	2.92	0.00	27.84	Peak	100	184	HORIZONTAL
4	2410.80	102.51			71.75	2.92	0.00	27.84	Average	100	184	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

**Channel 6**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2384.40	63.15	74.00	-10.85	32.36	2.90	0.00	27.89	Peak	88	181	HORIZONTAL
2	2384.40	48.60	54.00	-5.40	17.81	2.90	0.00	27.89	Average	88	181	HORIZONTAL
3	2443.80	109.43			78.71	2.94	0.00	27.78	Average	88	181	HORIZONTAL
4	2444.20	118.91			88.19	2.94	0.00	27.78	Peak	88	181	HORIZONTAL
5	2483.50	53.67	54.00	-0.33	22.98	2.96	0.00	27.73	Average	88	181	HORIZONTAL
6	2484.70	70.93	74.00	-3.07	40.24	2.96	0.00	27.73	Peak	88	181	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 11**

	Freq	Level	Limit	Over	Read	Cable	Preamp	Antenna	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2460.20	100.95			70.24	2.95	0.00	27.76	Average	98	181	HORIZONTAL
2	2460.80	109.90			79.19	2.95	0.00	27.76	Peak	98	181	HORIZONTAL
3	2483.50	69.63	74.00	-4.37	38.94	2.96	0.00	27.73	Peak	98	181	HORIZONTAL
4	2483.50	53.32	54.00	-0.68	22.63	2.96	0.00	27.73	Average	98	181	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

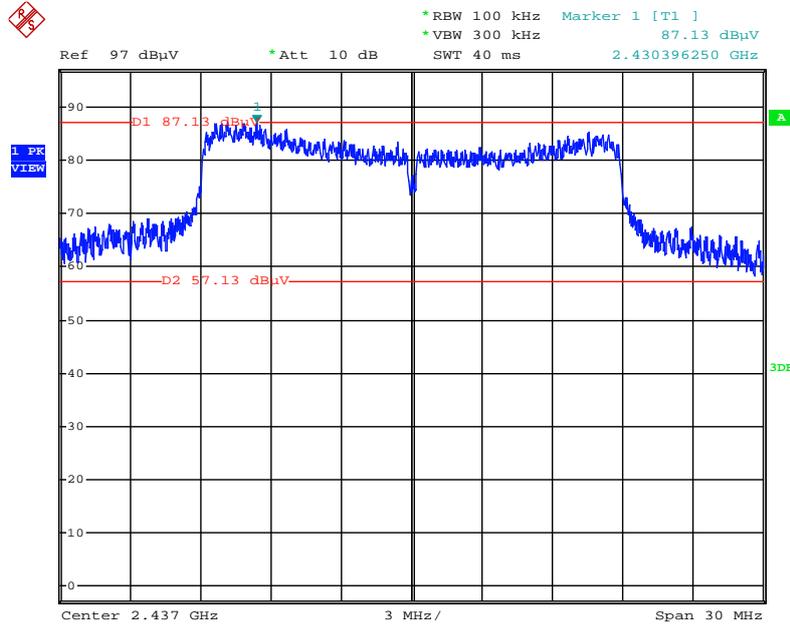
Note:

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

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

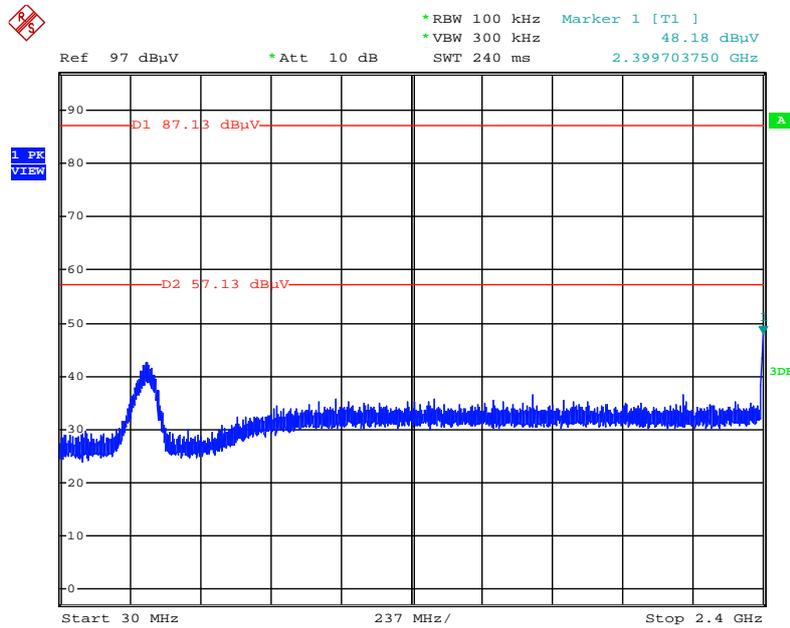
**For Emission not in Restricted Band**

**Plot on Configuration IEEE 802.11n MCS0 20MHz / Reference Level**



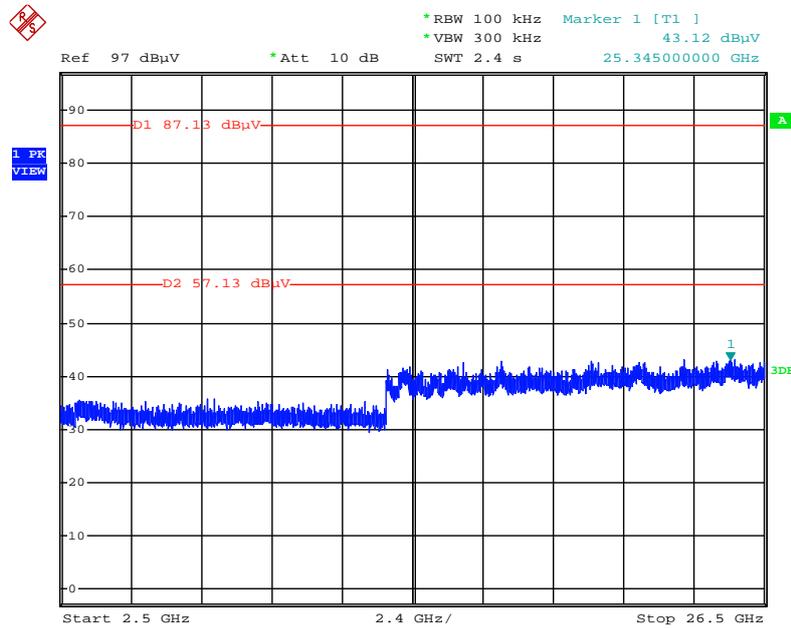
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**Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 / 30MHz~2400MHz (down 30dBc)**



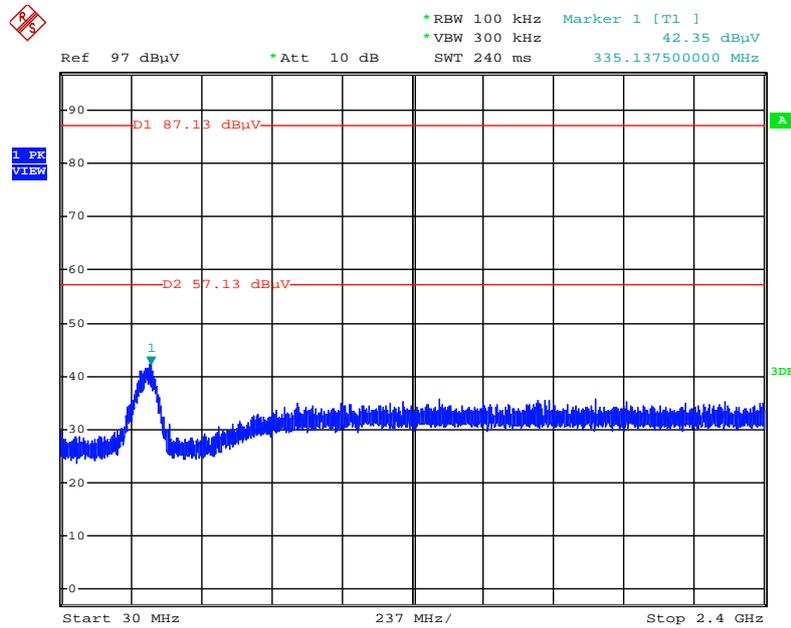
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Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 1 / 2500MHz~26500MHz (down 30dBc)



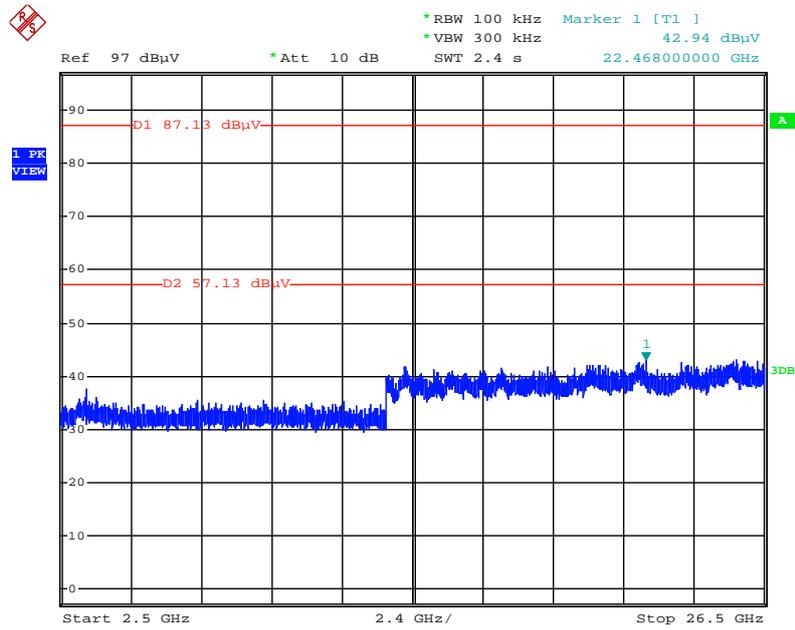
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Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 / 30MHz~2400MHz (down 30dBc)



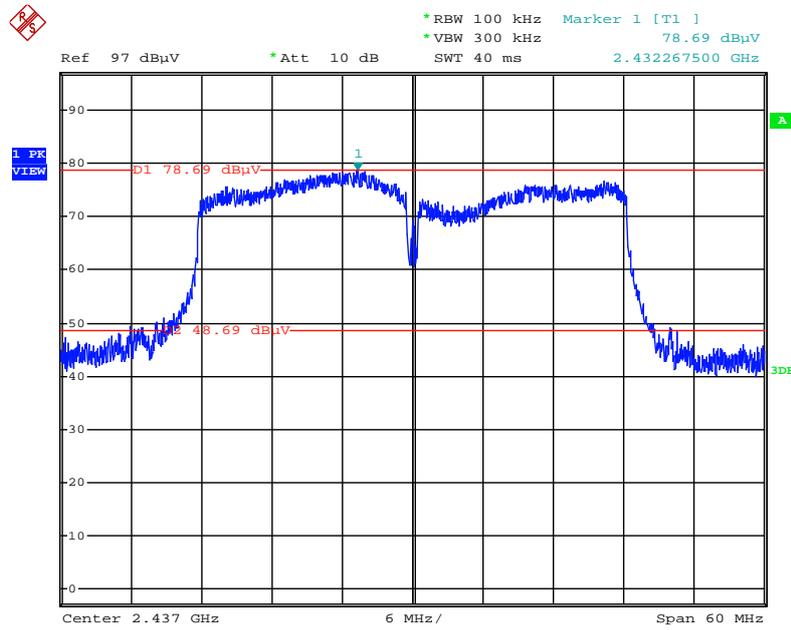
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Plot on Configuration IEEE 802.11n MCS0 20MHz / CH 11 / 2500MHz~26500MHz (down 30dBc)



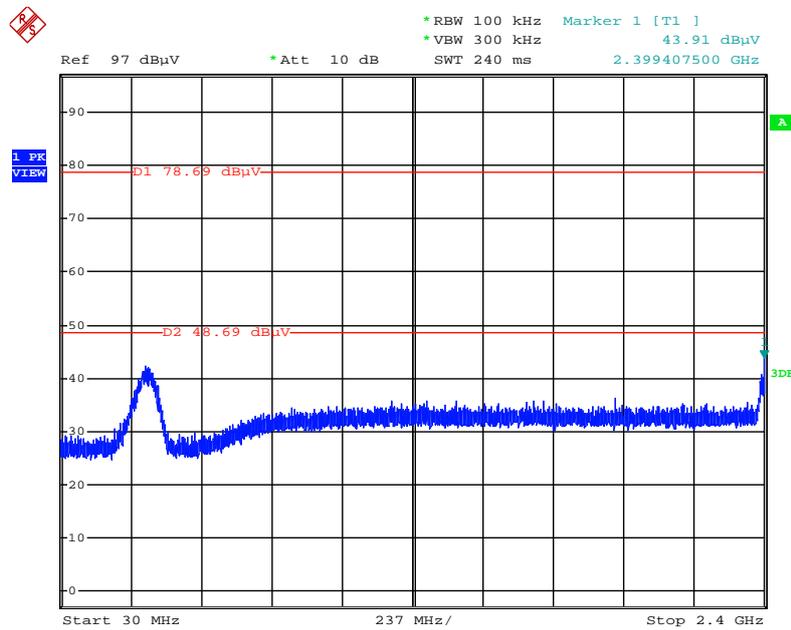
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Plot on Configuration IEEE 802.11n MCS0 40MHz / Reference Level



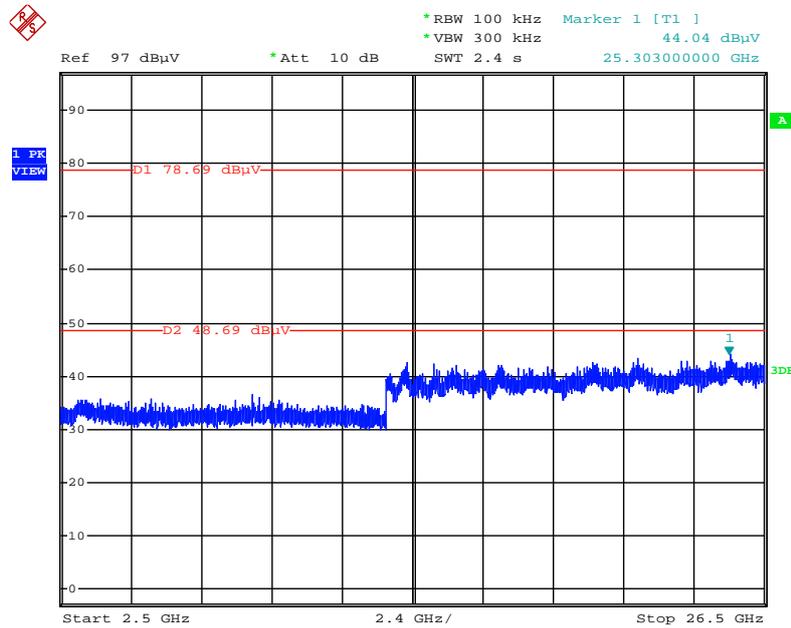
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Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 / 30MHz~2400MHz (down 30dBc)



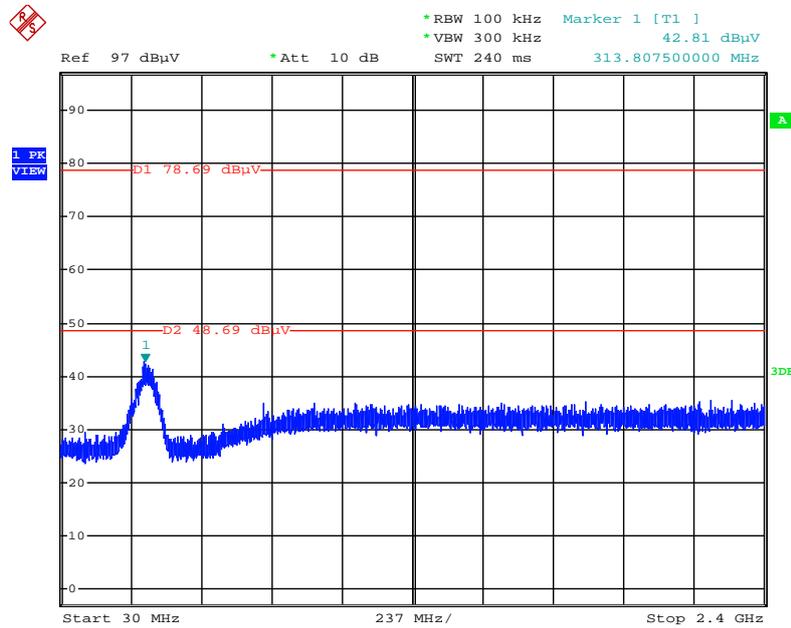
Date: 16.OCT.2013 04:28:16

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 3 / 2500MHz~26500MHz (down 30dBc)



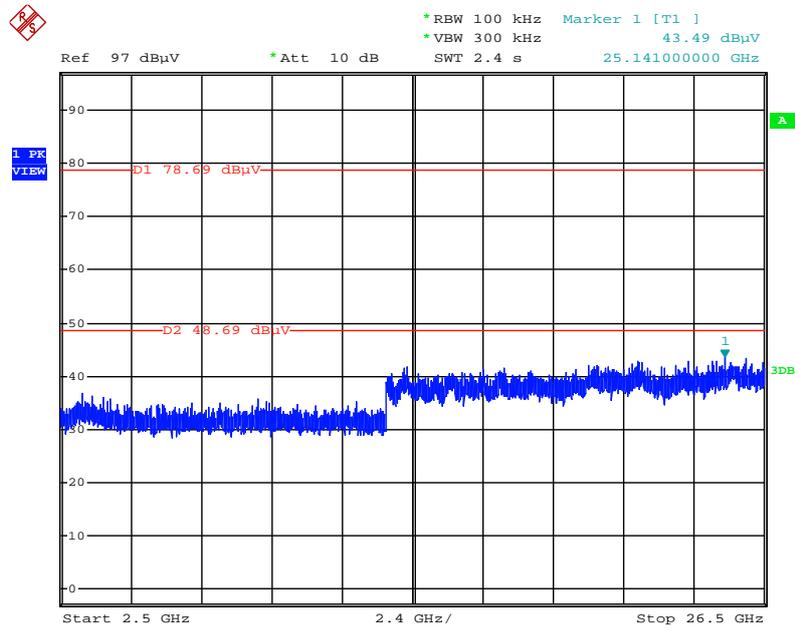
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Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 30MHz~2400MHz (down 30dBc)



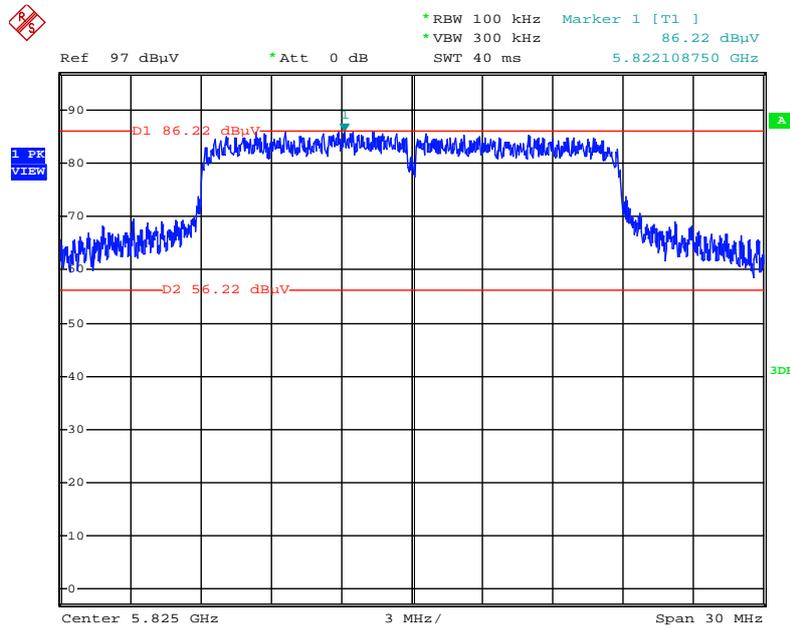
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Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 2500MHz~26500MHz (down 30dBc)



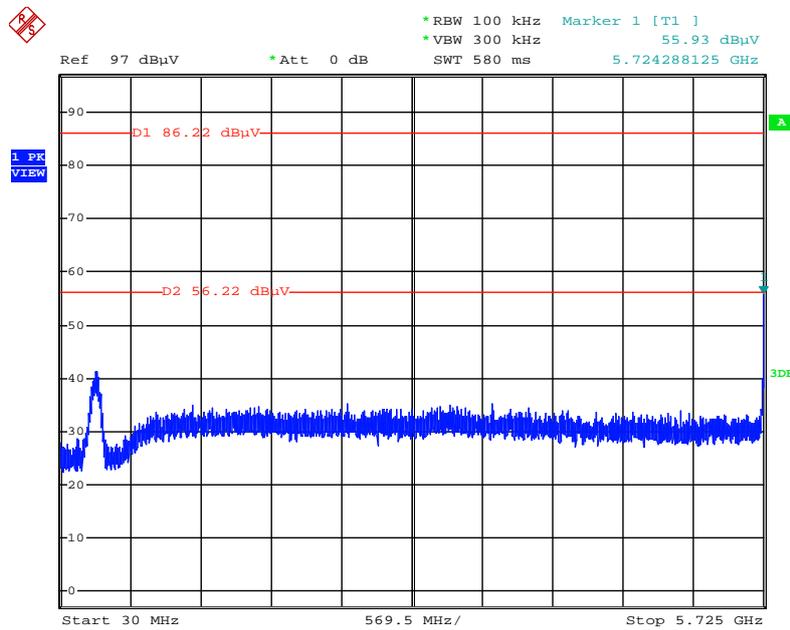
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / Reference Level



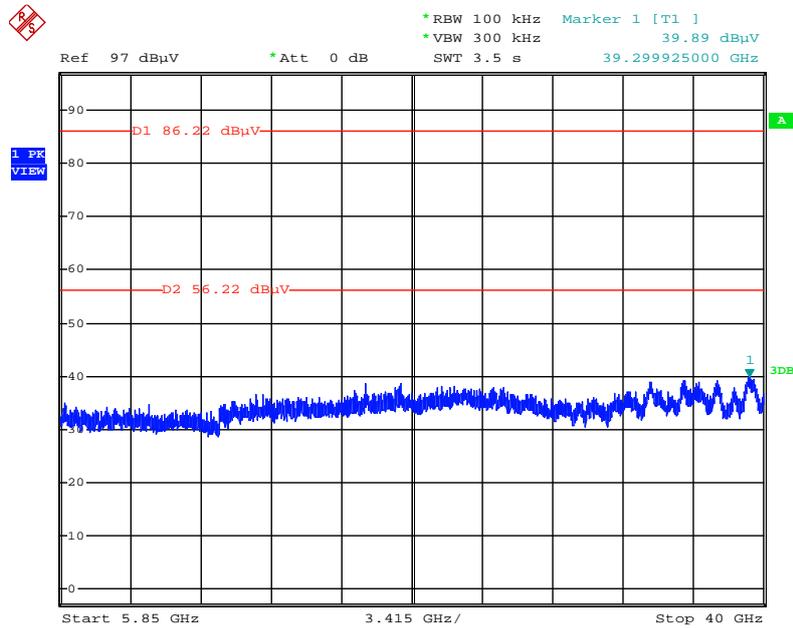
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 149 / 30MHz~5725MHz (down 30dBc)



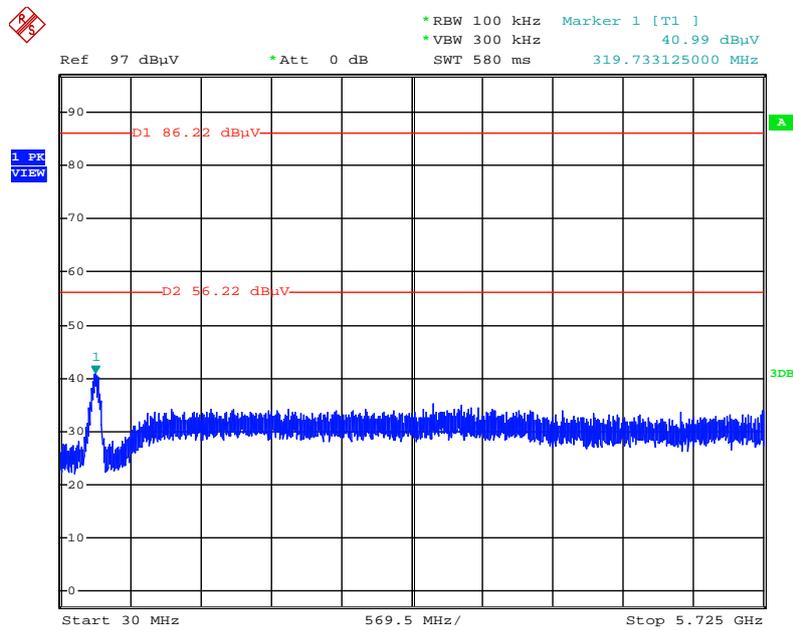
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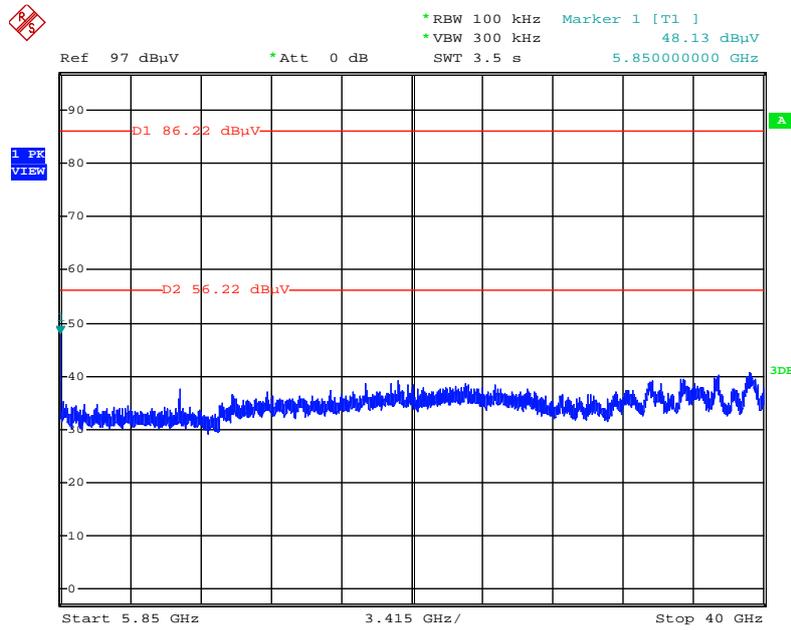
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 165 / 30MHz~5725MHz (down 30dBc)



Date: 16.OCT.2013 02:43:58

Plot on Configuration IEEE 802.11ac MCS0/Nss1 20MHz / CH 165 / 5850MHz~40000MHz (down 30dBc)

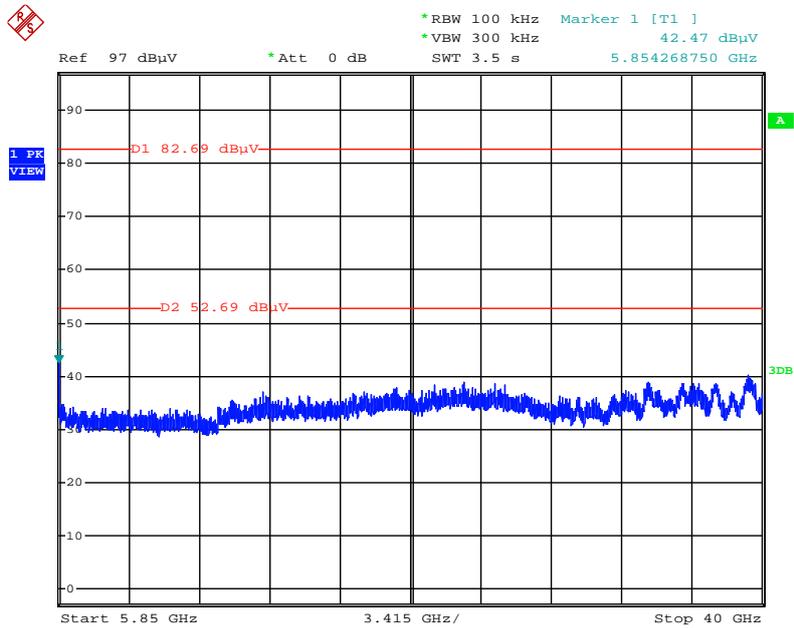


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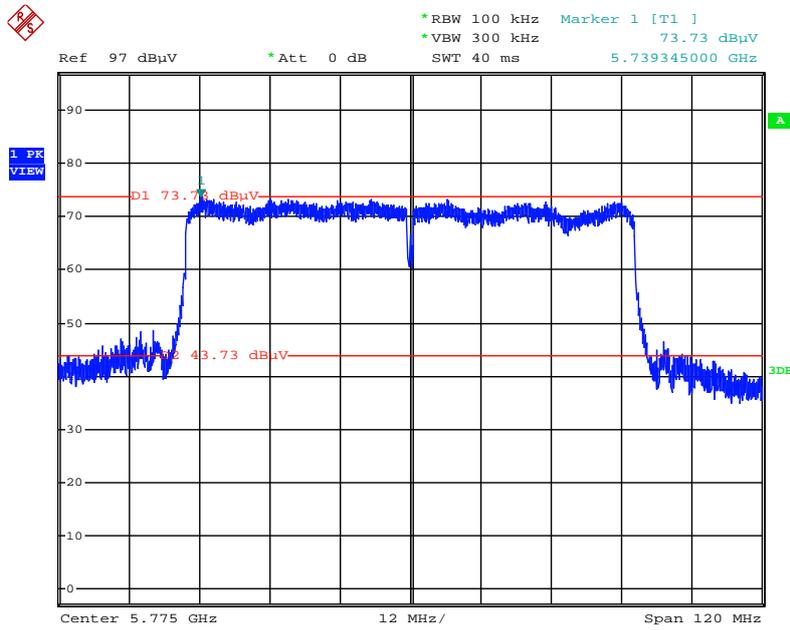


Plot on Configuration IEEE 802.11ac MCS0/Nss1 40MHz / CH 159 / 5850MHz~40000MHz (down 30dBc)



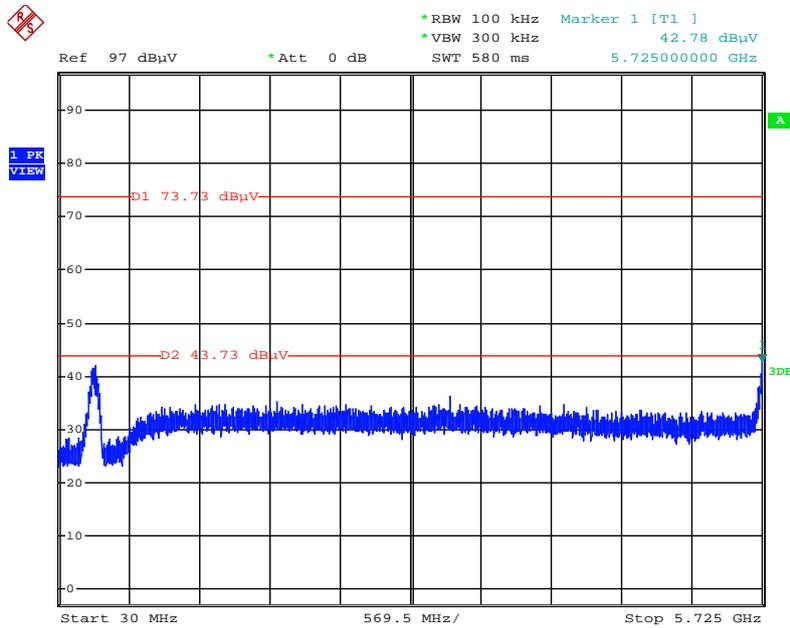
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / Reference Level



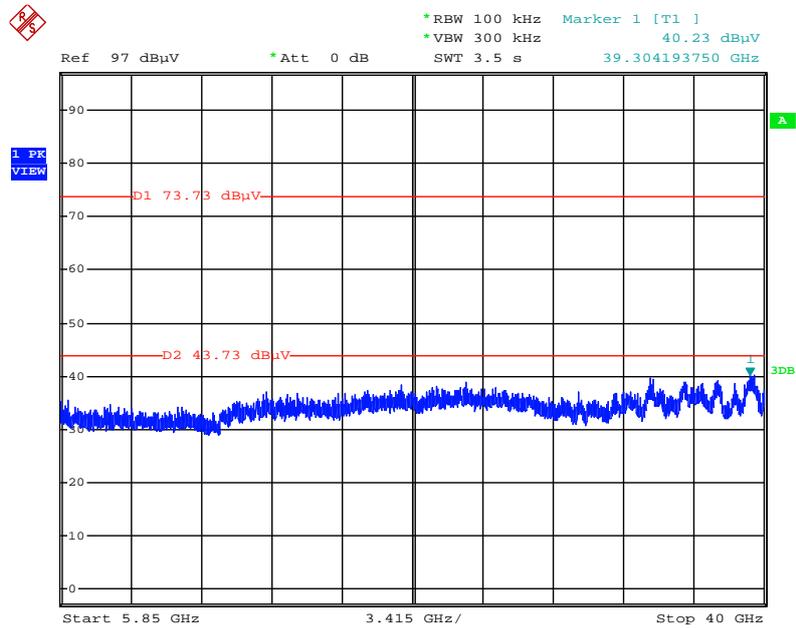
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / CH 155 / 30MHz~5725MHz (down 30dBc)



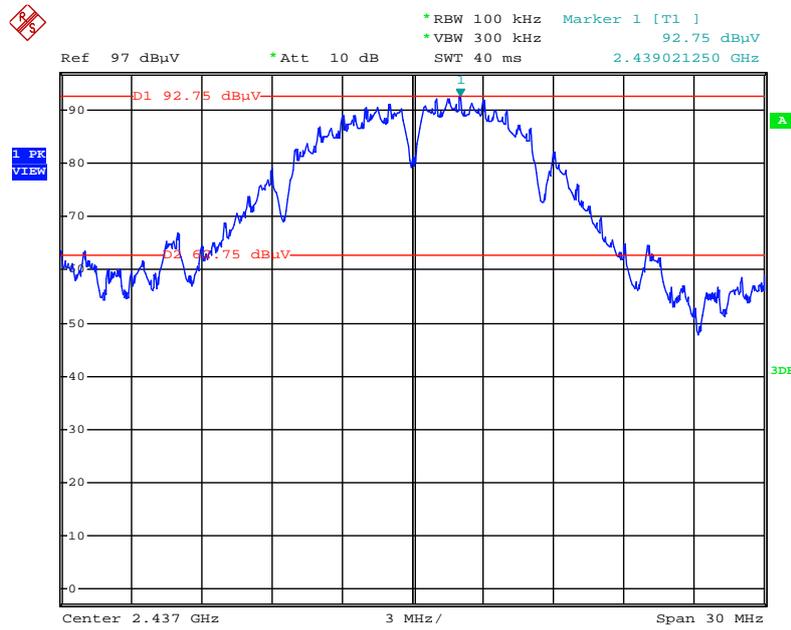
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## Plot on Configuration IEEE 802.11ac MCS0/Nss1 80MHz / CH 155 / 5850MHz~40000MHz (down 30dBc)



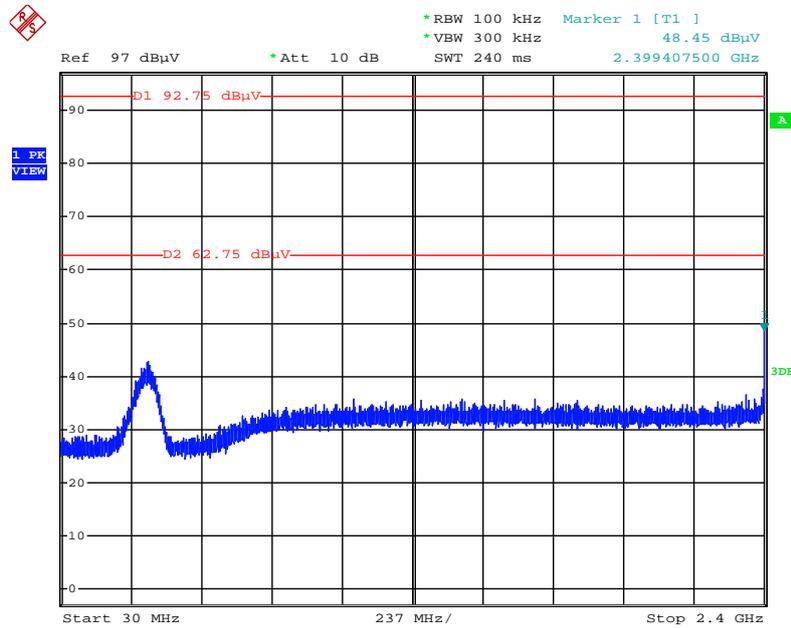
Date: 16.OCT.2013 02:11:41

Plot on Configuration IEEE 802.11b / Reference Level



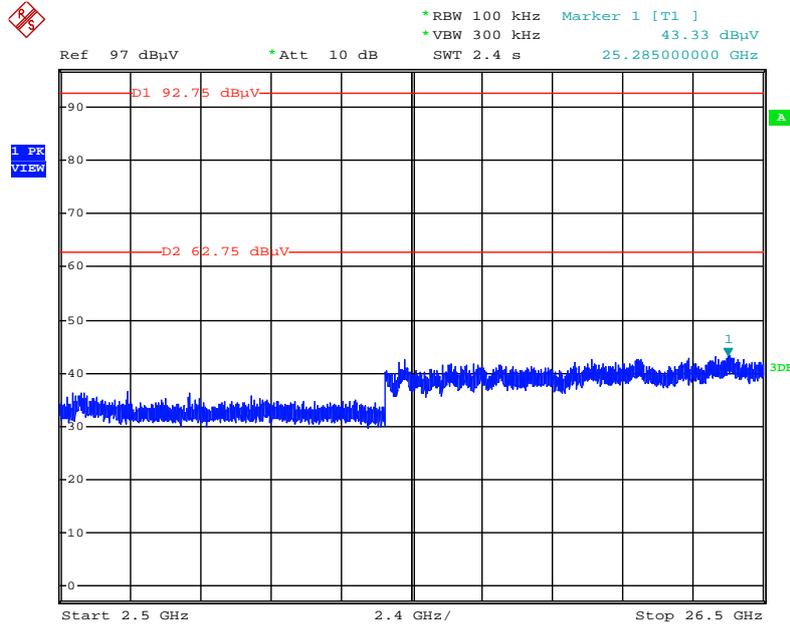
Date: 16.OCT.2013 03:28:01

Plot on Configuration IEEE 802.11b / CH 1 / 30MHz~2400MHz (down 30dBc)



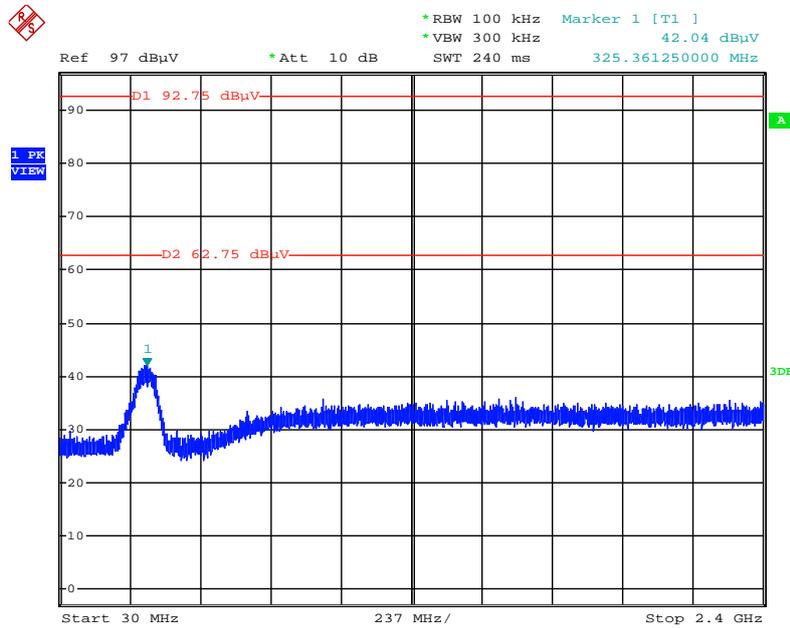
Date: 16.OCT.2013 03:29:24

Plot on Configuration IEEE 802.11b / CH 1 / 2500MHz~26500MHz (down 30dBc)



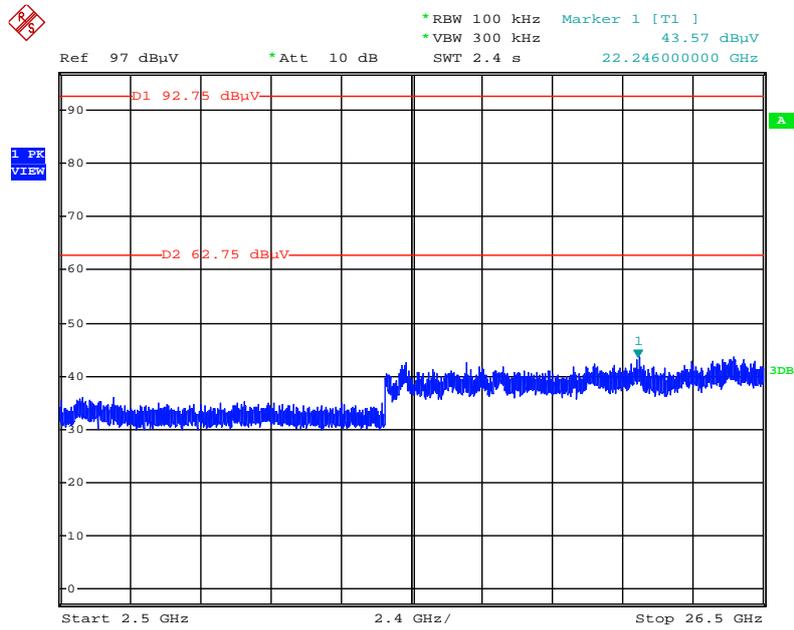
Date: 16.OCT.2013 03:30:05

Plot on Configuration IEEE 802.11b / CH 11 / 30MHz~2400MHz (down 30dBc)



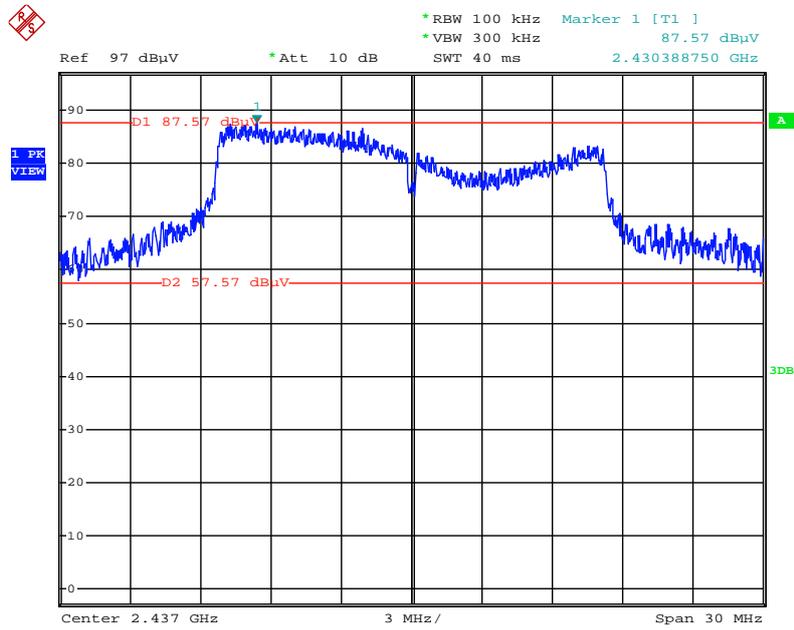
Date: 16.OCT.2013 03:31:24

Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



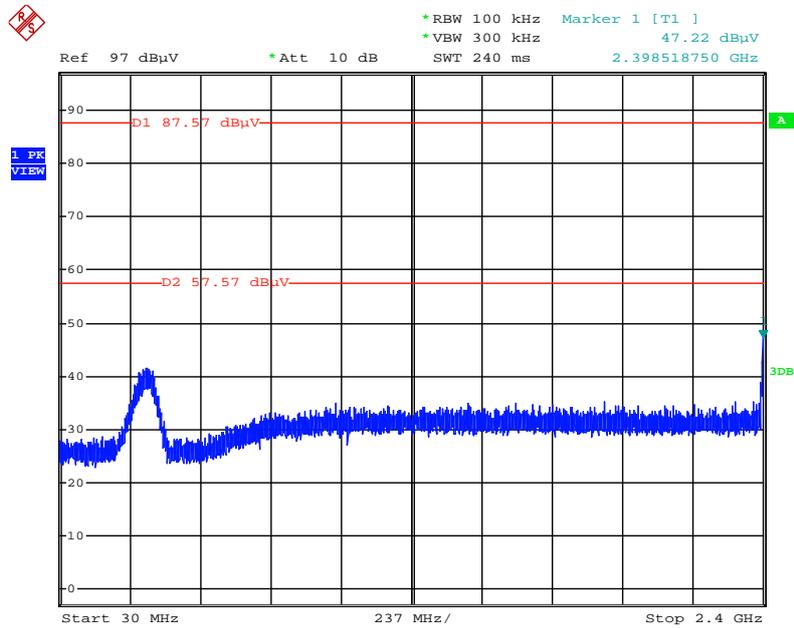
Date: 16.OCT.2013 03:47:15

Plot on Configuration IEEE 802.11g / Reference Level



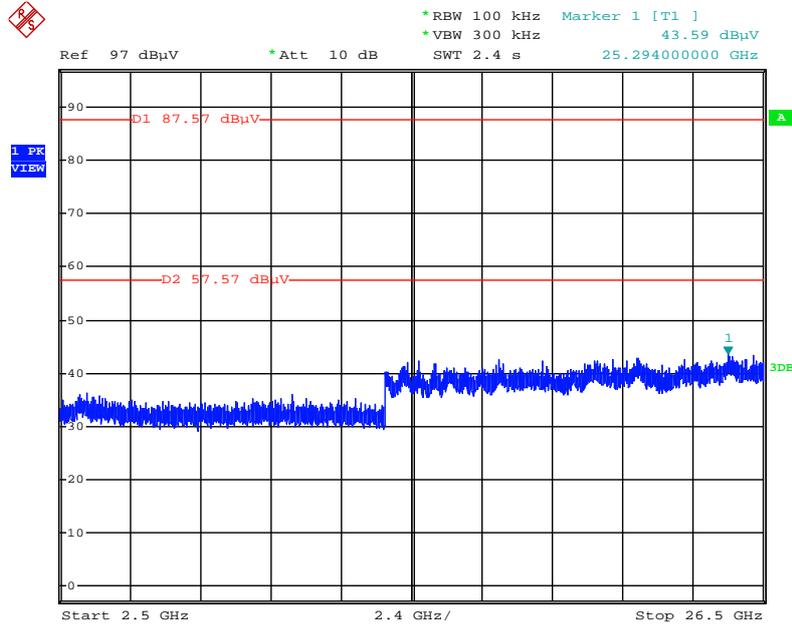
Date: 16.OCT.2013 04:05:30

Plot on Configuration IEEE 802.11g / CH 1 / 30MHz~2400MHz (down 30dBc)



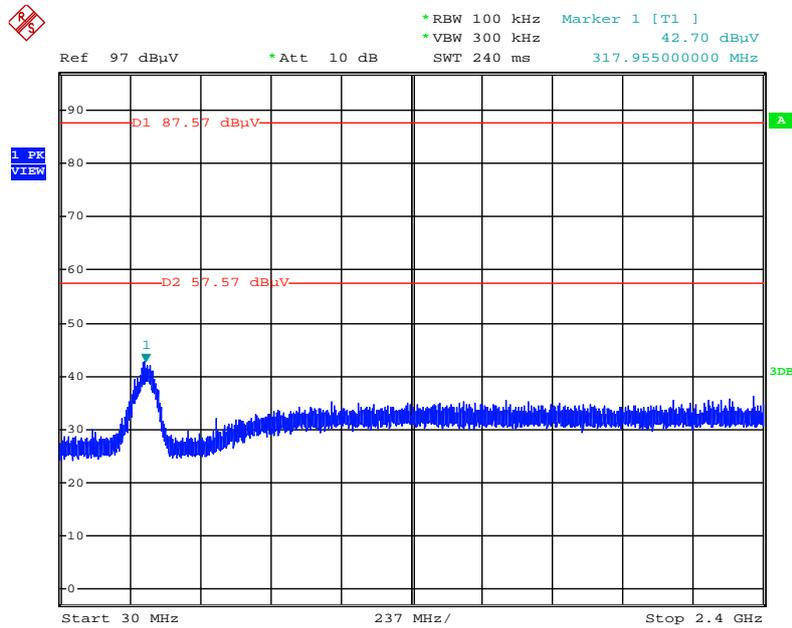
Date: 16.OCT.2013 04:07:03

Plot on Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



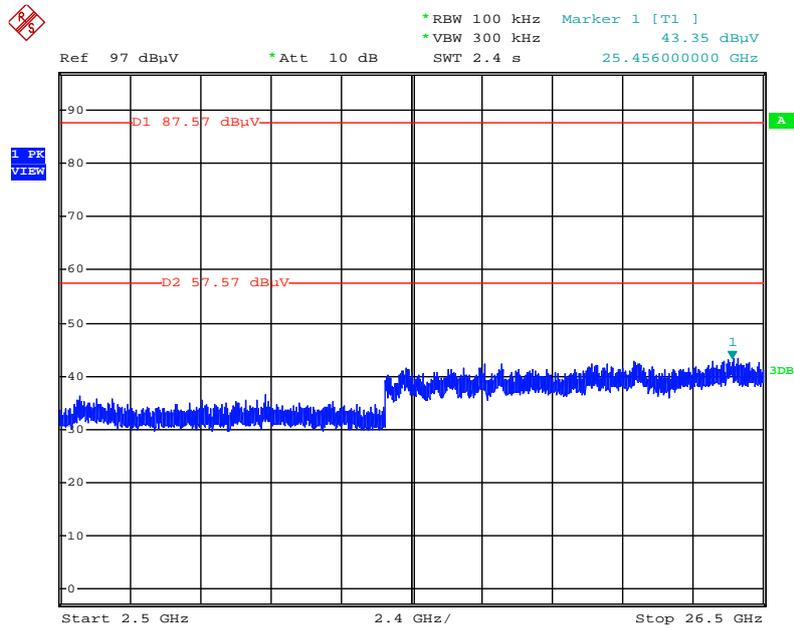
Date: 16.OCT.2013 04:09:41

Plot on Configuration IEEE 802.11g / CH 11 / 30MHz~2400MHz (down 30dBc)



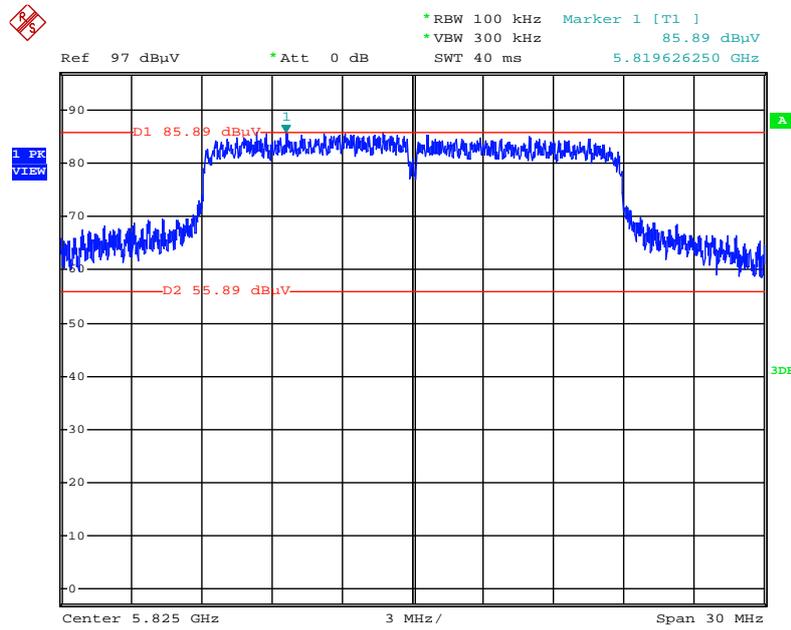
Date: 16.OCT.2013 04:09:14

Plot on Configuration IEEE 802.11g / CH 11 / 2500MHz~26500MHz (down 30dBc)



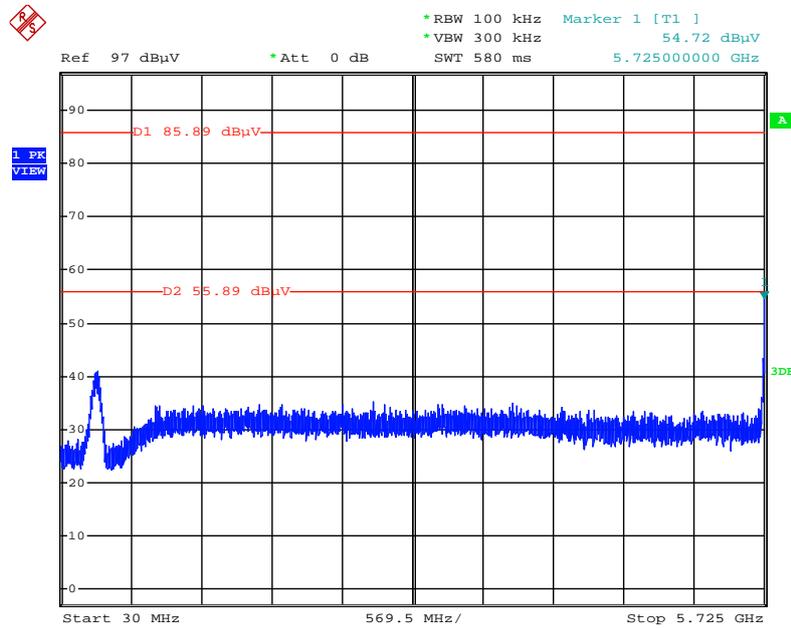
Date: 16.OCT.2013 04:07:58

Plot on Configuration IEEE 802.11a / Reference Level



Date: 16.OCT.2013 03:01:37

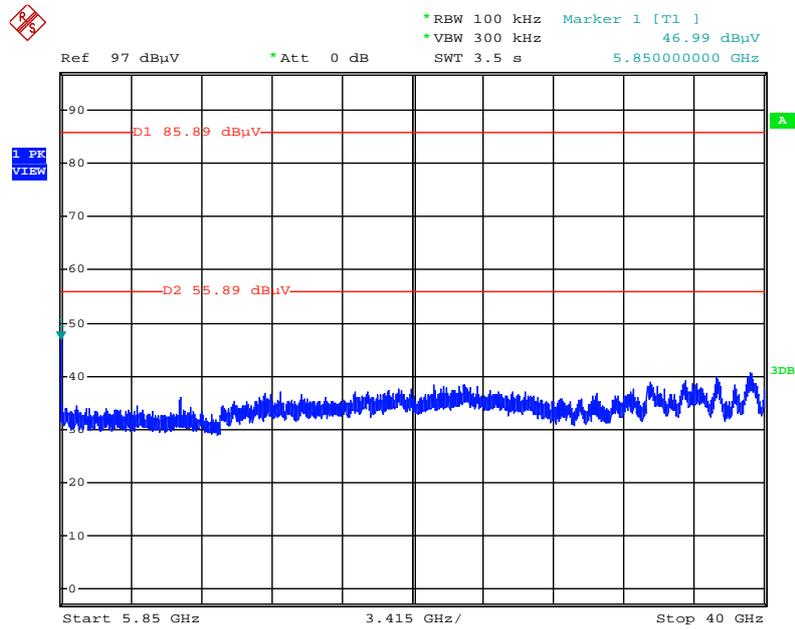
Plot on Configuration IEEE 802.11a / CH 149 / 30MHz~5725MHz (down 30dBc)



Date: 16.OCT.2013 03:08:58



Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~4000MHz (down 30dBc)



Date: 16.OCT.2013 03:03:06

## 4.7. Antenna Requirements

### 4.7.1. 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.

### 4.7.2. Antenna Connector Construction

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

## 5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 12, 2013	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 26, 2012	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Jul. 17, 2013	Conduction (CO01-CB)
Impulsbegrenzer Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz~30MHz	Feb. 21, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	0.15MHz~30MHz	Dec. 04, 2012	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9kHz~40GHz	Nov. 16, 2012	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9kHz ~ 2.75GHz	Apr. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz - 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz - 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Nov. 27, 2012	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Power Divider	Woken	2 Way	0120A02056002D	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Power Divider	Woken	4 Way	0120A04056002D	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	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-可以 Calibration required.

## 6. TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 <sup>nd</sup> Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

## 7. MEASUREMENT UNCERTAINTY

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

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

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

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

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

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

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

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

### Uncertainty of Conducted Emission Measurement

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