



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	<b>D-Link Corporation</b>
Applicant Address	No.289, Shinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
FCC ID	<b>KA2AP2695A1</b>
Manufacturer's company	<b>Alpha Networks Inc.</b>
Manufacturer Address	No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.

Product Name	AirPremier AC Simultaneous Dual Band PoE Access Point
Brand Name	D-Link
Model No.	DAP-2695
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	May 16, 2013
Final Test Date	Jun. 13, 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 v03 and KDB 662911 D01 v01r02.**

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



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### History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR360421AA	Rev. 01	Initial issue of report	Jul. 30, 2013



## 1. CERTIFICATE OF COMPLIANCE

**Product Name** : AirPremier AC Simultaneous Dual Band PoE Access Point  
**Brand Name** : D-Link  
**Model No.** : DAP-2695  
**Applicant** : D-Link Corporation  
**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 May 16, 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' is written over 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	8.37 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.02 dB
4.3	15.247(e)	Power Spectral Density	Complies	3.39 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.57 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.14 dB
4.7	15.203	Antenna Requirements	Complies	-

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n/ac

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or PoE
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	For 2.4GHz Band: 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth For 5GHz Band: 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	For 2.4GHz Band: MCS0 (20MHz): 17.60 MHz ; MCS0 (40MHz): 36.64 MHz For 5GHz Band: 802.11ac MCS0, Nss1 (20MHz): 18.56 MHz ; 802.11ac MCS0, Nss1 (40MHz): 36.80 MHz ; 802.11ac MCS0, Nss1 (80MHz): 76.16 MHz
Maximum Conducted Output Power	For 2.4GHz Band: MCS0 (20MHz): 26.22 dBm ; MCS0 (40MHz): 21.23 dBm For 5GHz Band: 802.11ac MCS0, Nss1 (20MHz): 29.96 dBm ; 802.11ac MCS0, Nss1 (40MHz): 29.86 dBm ; 802.11ac MCS0, Nss1 (80MHz): 29.67 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**802.11a/b/g**

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Power Adapter or PoE
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: 16.56 MHz ; 11g: 16.64 MHz ; 11a: 16.56 MHz
Maximum Conducted Output Power	11b: 29.77 dBm ; 11g: 27.26 dBm ; 11a: 29.98 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**Antenna & Band width**

Antenna	Three (TX)		
	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11b	V	X	X
IEEE 802.11g	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

**IEEE 11n/ac Spec.**

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS 0-23
802.11n (HT40)	3	MCS 0-23
802.11ac (VHT20)	3	MCS 0-9, Nss1-3
802.11ac (VHT40)	3	MCS 0-9, Nss1-3
802.11ac (VHT80)	3	MCS 0-9, Nss1-3
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT 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**

Power	Brand	Model No.	Rating
Adapter	LEI	MU24-B480050-A1	Input: 100-240Vac, 50/60Hz, 1.0A Output: 48Vdc, 0.5A
PoE	LANREADY	PE03G-EIA	Input: 8-57Vdc (Max.48W) Output: 8-57Vdc (Max.48W)



### 3.3. Table for Filed Antenna

Ant.	Brand	Model No.	Antenna Type	Connector	Test Gain (dBi) (Contain cable loss)
1	WHA YU	C037-511272-A(SSR-31154)	Dipole	SMA Straight Plug Reverse	3.5
2	WHA YU	C037-511272-A(SSR-31154)	Dipole	SMA Straight Plug Reverse	3.5
3	WHA YU	C037-511272-A(SSR-31154)	Dipole	SMA Straight Plug Reverse	3.5
4	WHA YU	C037-511274-A(SSR-31153)	Dipole	SMA Plug Reverse	5.0
5	WHA YU	C037-511274-A(SSR-31153)	Dipole	SMA Plug Reverse	5.0
6	WHA YU	C037-511274-A(SSR-31153)	Dipole	SMA Plug Reverse	5.0

Note: The EUT has six antennas.

<For 2.4GHz Band:>

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

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

<For 5GHz Band:>

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

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



### 3.4. Table for Carrier Frequencies

#### For 2.4GHz Band:

There are two bandwidth systems.

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

For both 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	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Power Spectral Density	11n 20MHz	MCS0	1/6/11	1, 2, 3
	11n 40MHz	MCS0	3/6/9	1, 2, 3
	11b/CCK	1 Mbps	1/6/11	1, 2, 3
	11g/BPSK	6 Mbps	1/6/11	1, 2, 3
6dB Spectrum Bandwidth	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Band Edge Emissions	11n 20MHz	MCS0	1/6/11	1+2+3
	11n 40MHz	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3

**For 5GHz Band**

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11ac 20MHz	MCS0, Nss1	149/157/165	4+5+6
	11ac 40MHz	MCS0, Nss1	151/159	4+5+6
	11ac 80MHz	MCS0, Nss1	155	4+5+6
	11a/BPSK	6 Mbps	149/157/165	4+5+6
Power Spectral Density	11ac 20MHz	MCS0, Nss1	149/157/165	4, 5, 6
	11ac 40MHz	MCS0, Nss1	151/159	4, 5, 6
	11ac 80MHz	MCS0, Nss1	155	4, 5, 6
	11a/BPSK	6 Mbps	149/157/165	4, 5, 6
6dB Spectrum Bandwidth	11ac 20MHz	MCS0, Nss1	149/157/165	4+5+6
	11ac 40MHz	MCS0, Nss1	151/159	4+5+6
	11ac 80MHz	MCS0, Nss1	155	4+5+6
	11a/BPSK	6 Mbps	149/157/165	4+5+6
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11ac 20MHz	MCS0, Nss1	149/157/165	4+5+6
	11ac 40MHz	MCS0, Nss1	151/159	4+5+6
	11ac 80MHz	MCS0, Nss1	155	4+5+6
	11a/BPSK	6 Mbps	149/157/165	4+5+6
Band Edge Emissions	11ac 20MHz	MCS0, Nss1	149/157/165	4+5+6
	11ac 40MHz	MCS0, Nss1	151/159	4+5+6
	11ac 80MHz	MCS0, Nss1	155	4+5+6
	11a/BPSK	6 Mbps	149/157/165	4+5+6

The following test modes were performed for all tests:

**For Conducted Emission test:**

Mode 1. EUT + Adapter

Mode 2. EUT + PoE

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

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

Mode 1. Stand of EUT + Adapter

Mode 2. Laying of EUT + Adapter

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

Mode 3. Laying of EUT + PoE

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

#### For Radiated Emissions above 1GHz and Co-location test:

Mode 1. Stand of EUT (CTX)

Mode 2. Laying of EUT (CTX)

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

#### <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 AC Power Line Conducted Emissions and Radiated Emissions below 1GHz tests:

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

#### For Maximum Conducted Output Power, Power Spectral Density, 6dB Spectrum Bandwidth, Band Edge Emissions and Radiated Emissions above 1GHz tests:

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

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

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

#### For 2.4GHz Band

##### Power Parameters of IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3

Test Software Version	art2_ver_4_9_51_Pre_RC_Bin		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	12.5	20.5	12.0

##### Power Parameters of IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3

Test Software Version	art2_ver_4_9_51_Pre_RC_Bin		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	9.0	15.5	10.5

##### Power Parameters of IEEE 802.11b/g / Ant. 1 + Ant. 2 + Ant. 3

Test Software Version	art2_ver_4_9_51_Pre_RC_Bin		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	18.5	25.0	19.0
IEEE 802.11g	15.0	21.5	15.5

**For 5GHz Band**
**Power Parameters of IEEE 802.11ac MCS0, Nss1 20MHz / Ant. 4 + Ant. 5 + Ant. 6**

Test Software Version	art2_ver_4_9_51_Pre_RC_Bin		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0, Nss1 20MHz	23.0	22.5	22.5

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

Test Software Version	art2_ver_4_9_51_Pre_RC_Bin	
Frequency	5755 MHz	5795 MHz
MCS0, Nss1 40MHz	22.5	23.0

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

Test Software Version	art2_ver_4_9_51_Pre_RC_Bin
Frequency	5775 MHz
MCS0, Nss1 80MHz	23.0

**Power Parameters of IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6**

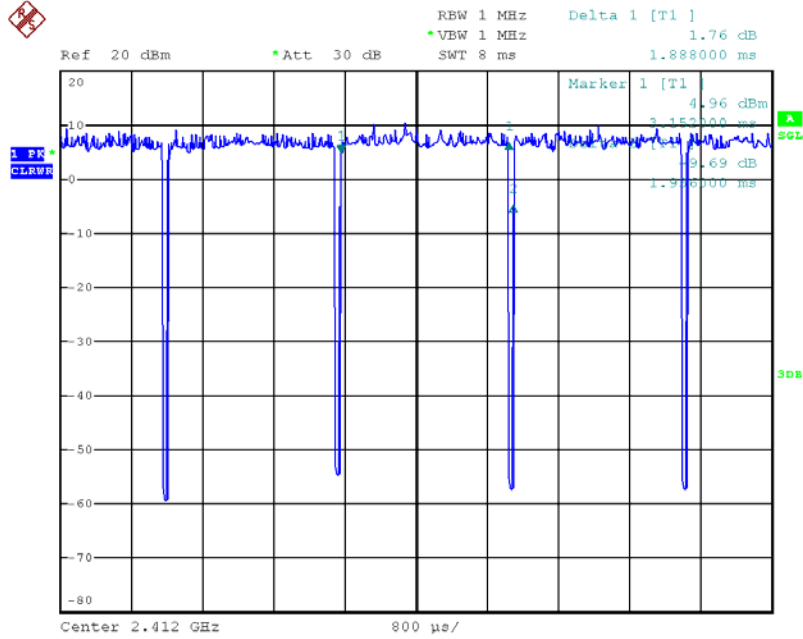
Test Software Version	art2_ver_4_9_51_Pre_RC_Bin		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	23.0	22.5	22.5

### 3.9. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

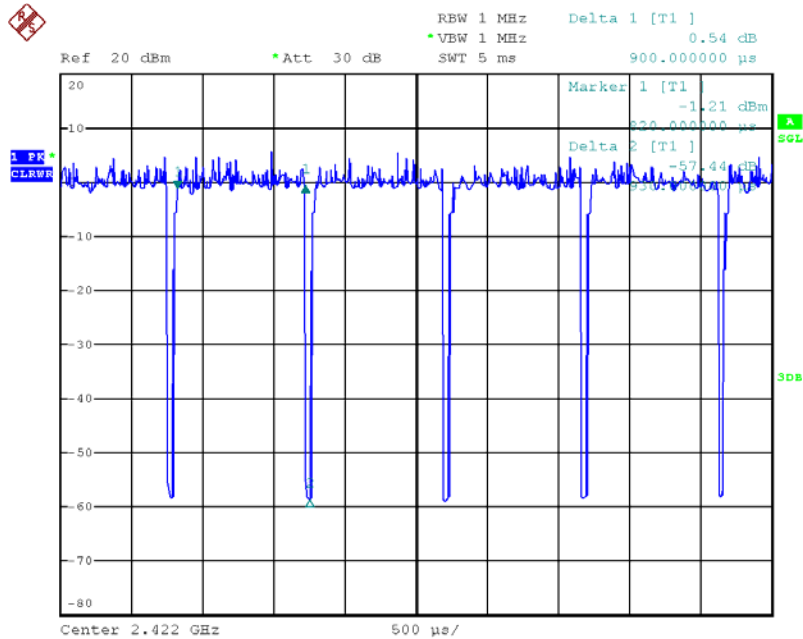
### 3.10. Duty Cycle

#### IEEE 802.11n MCS0 20MHz / For 2.4GHz Band



Date: 24.MAY.2013 20:42:39

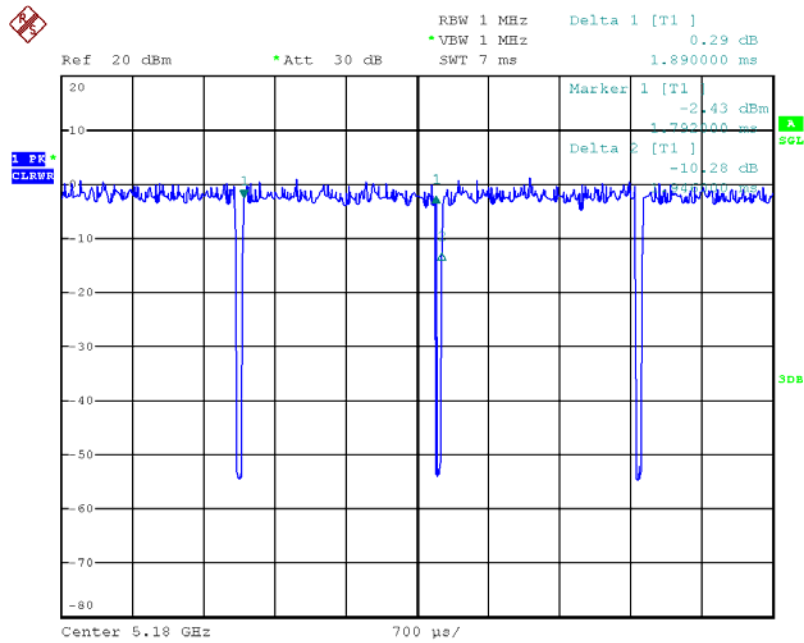
#### IEEE 802.11n MCS0 40MHz / For 2.4GHz Band



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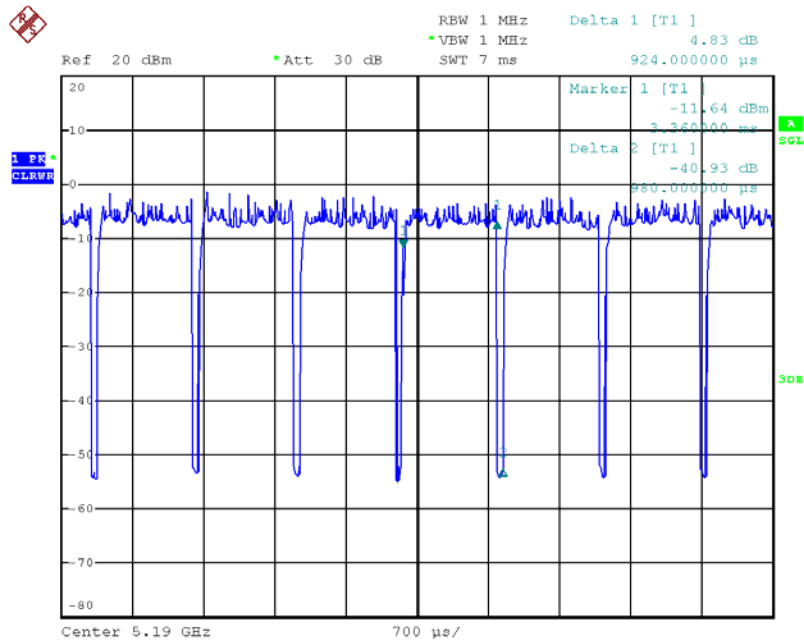


IEEE 802.11ac MCS0, Nss1 20MHz



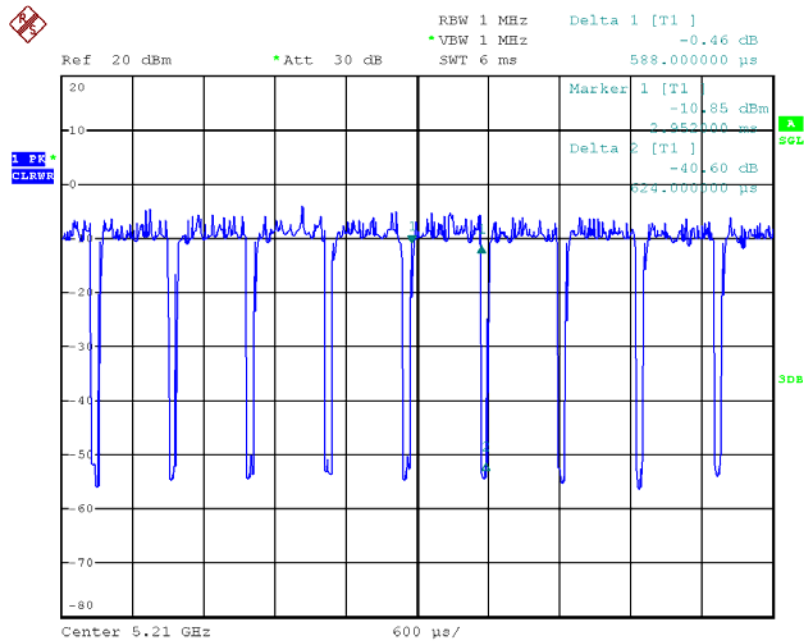
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IEEE 802.11ac MCS0, Nss1 40MHz



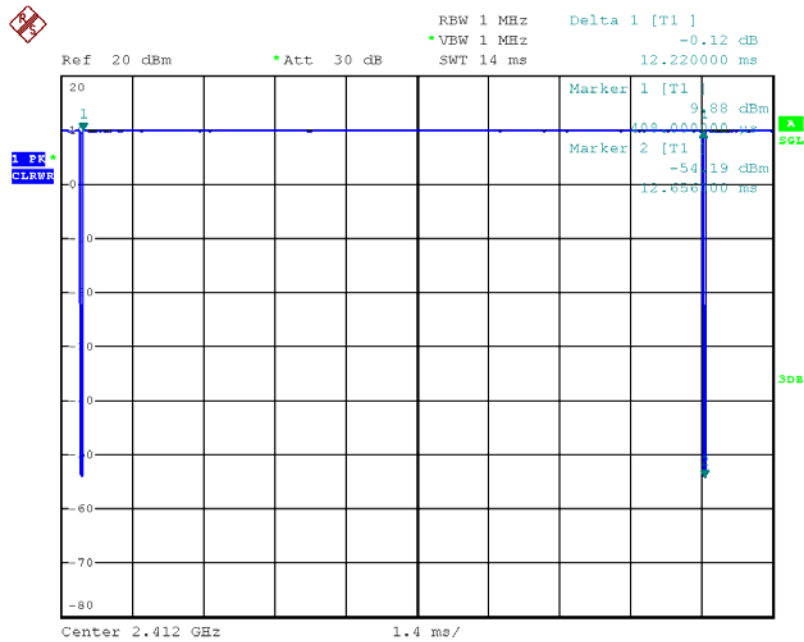
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IEEE 802.11ac MCS0, Nss1 80MHz



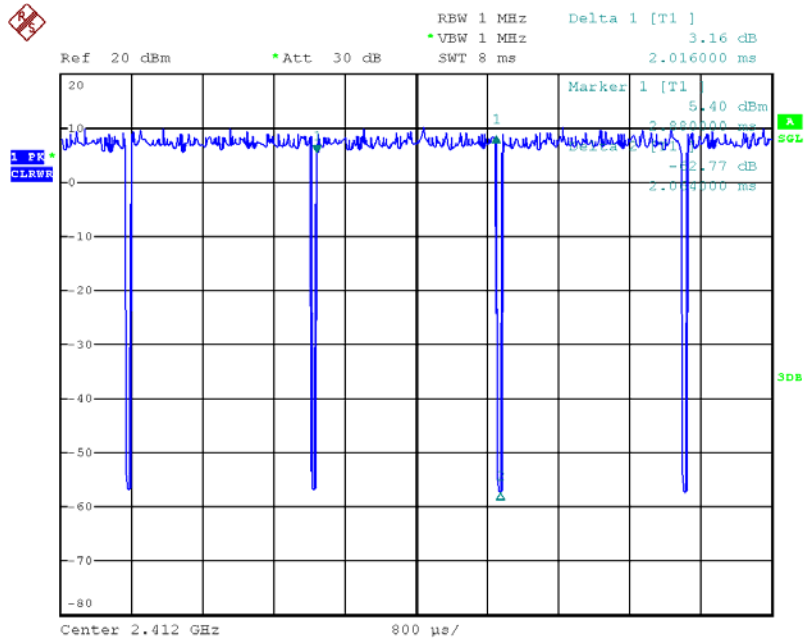
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IEEE 802.11b



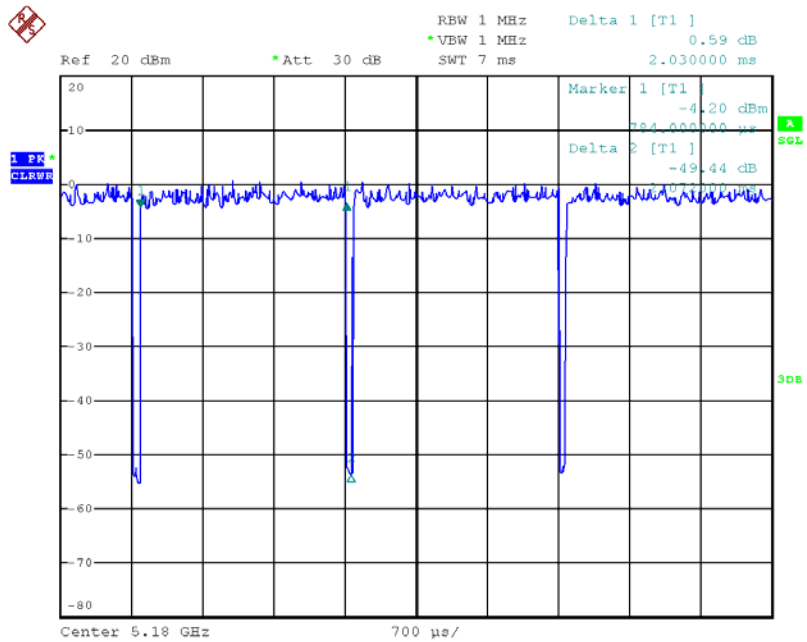
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IEEE 802.11g



Date: 24.MAY.2013 20:40:14

IEEE 802.11a

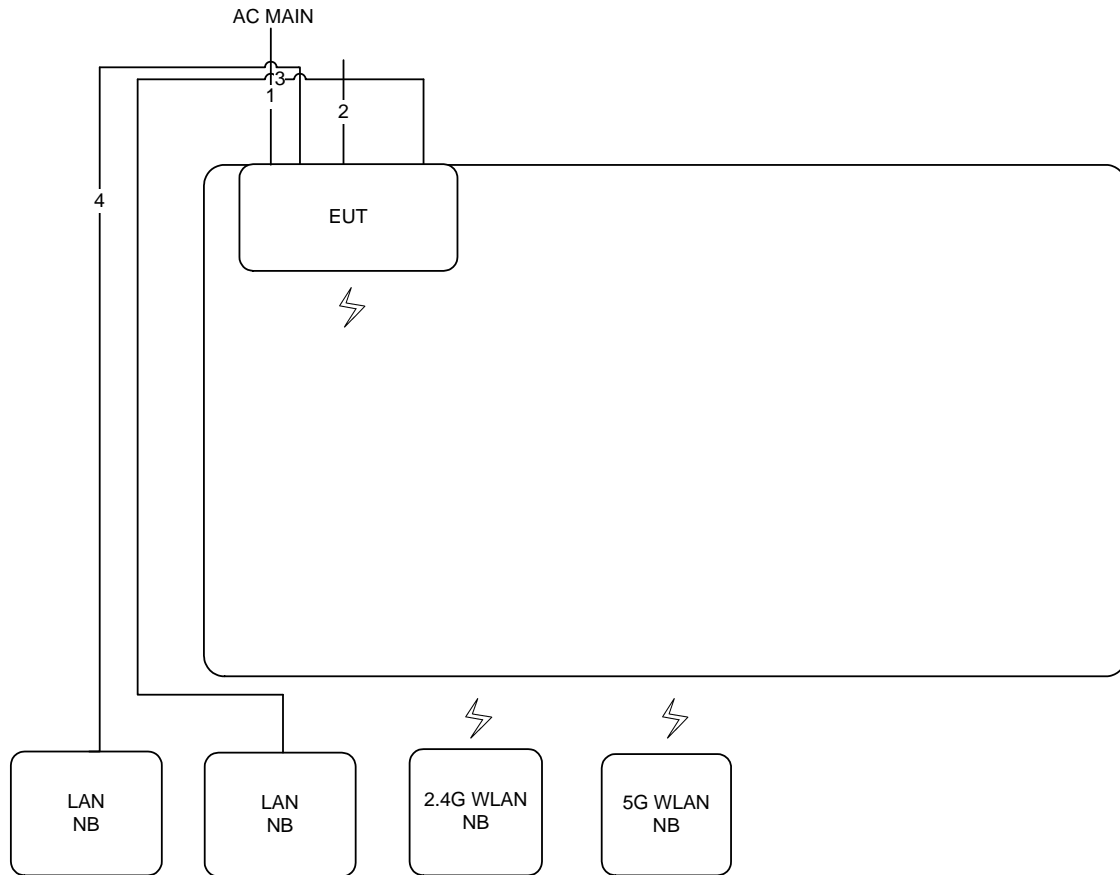


Date: 24.MAY.2013 23:06:27

### 3.11. Test Configurations

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

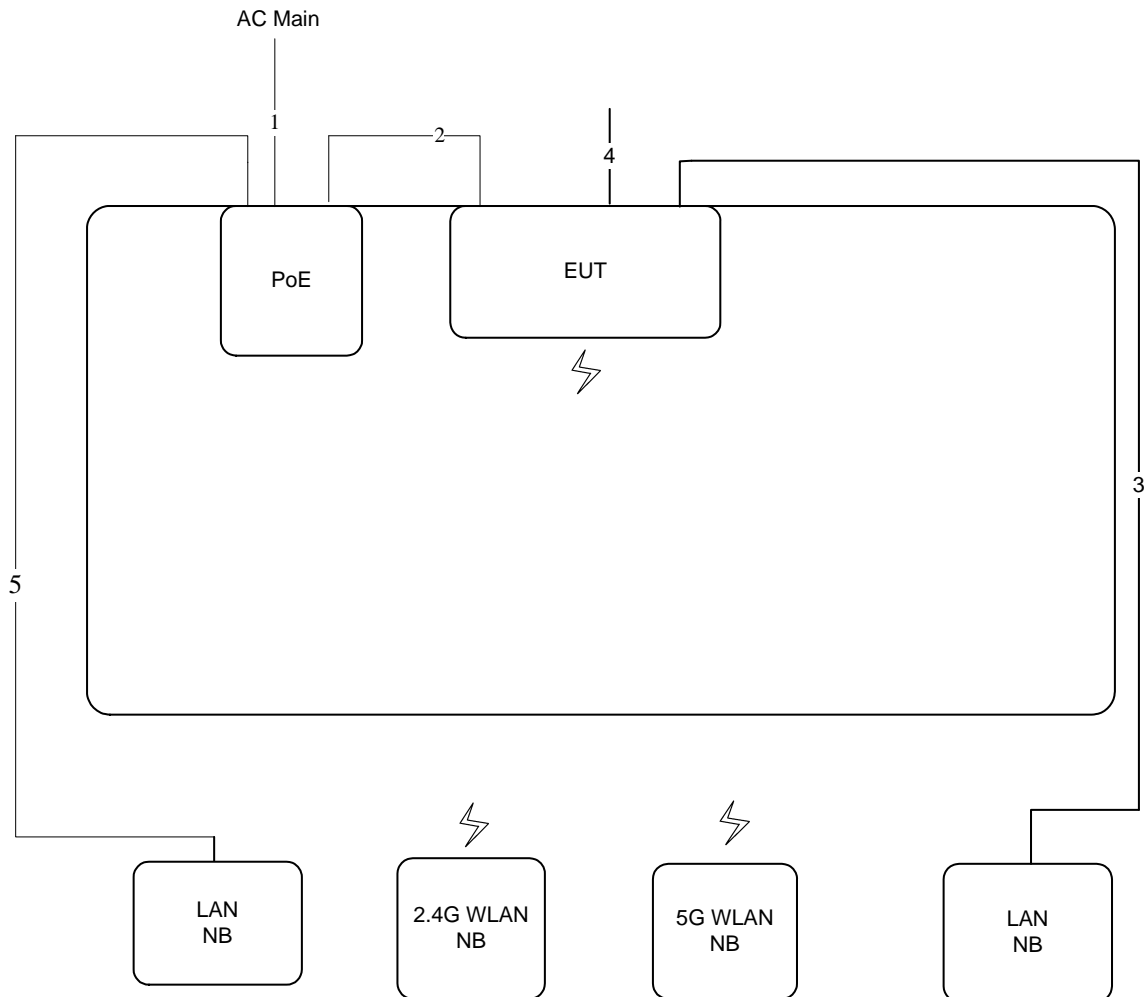
Test Mode: Mode 1



Item	Connection	Shielded	Length
1	Power cable	No	1.45m
2	RJ-45 to Console cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m

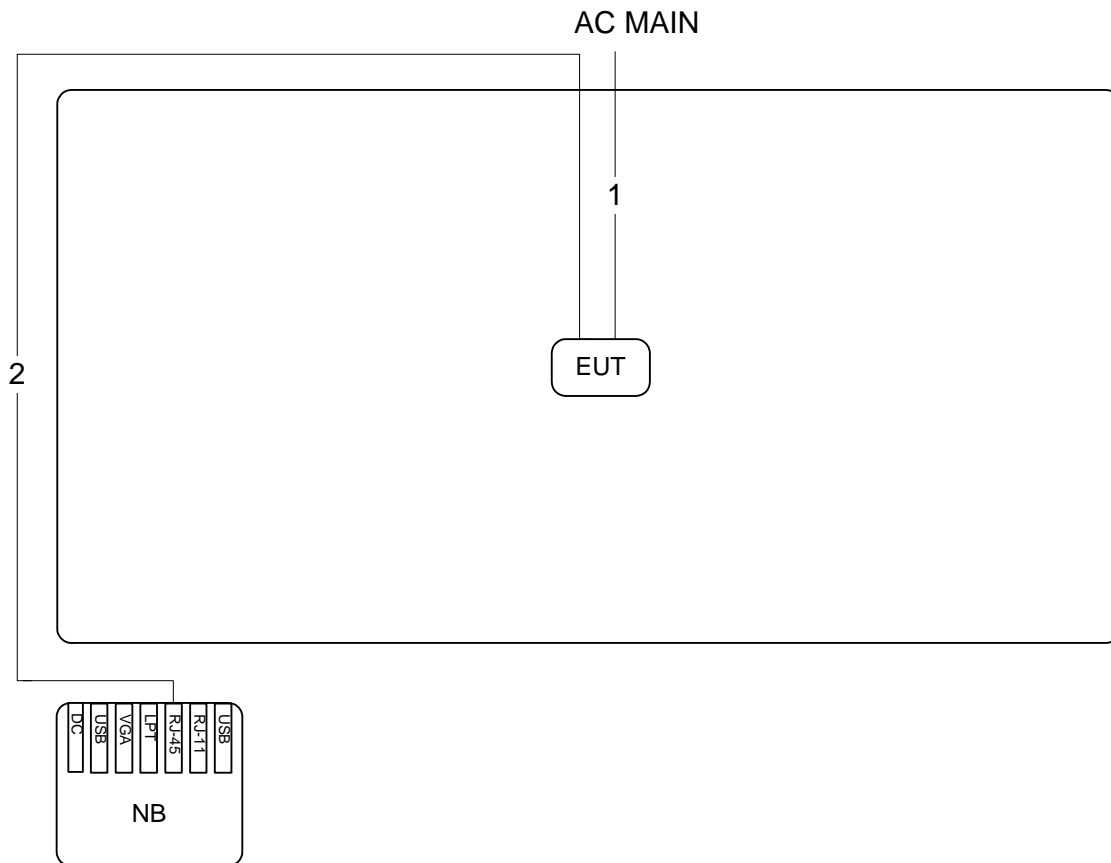
### 3.11.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz / Test Mode: Mode 3



Item	Connection	Shielded	Length
1	Power cable	No	1.55m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 to Console cable	No	1.5m
5	RJ-45 cable	No	1.5m

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



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

## 4. TEST RESULT

### 4.1. AC Power Line Conducted Emissions Measurement

#### 4.1.1. Limit

For this product 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

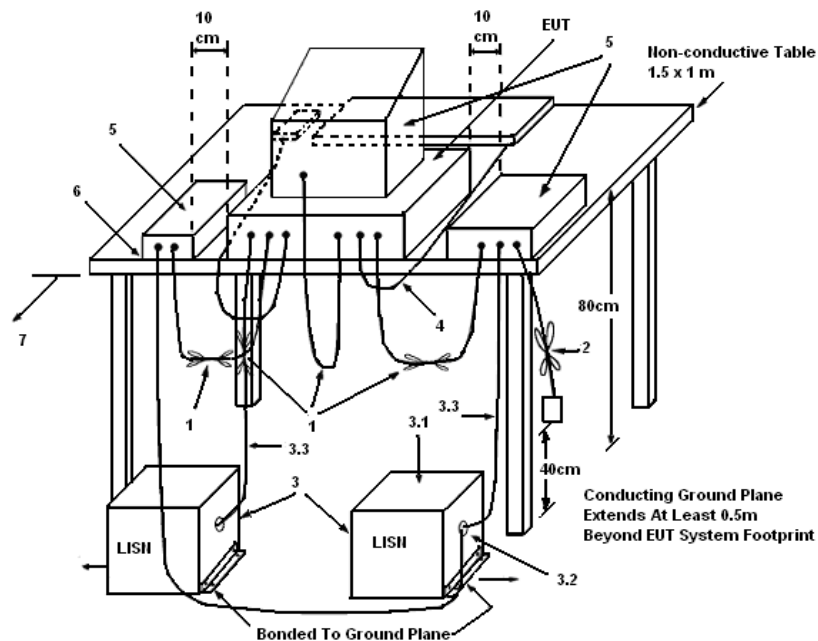
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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.

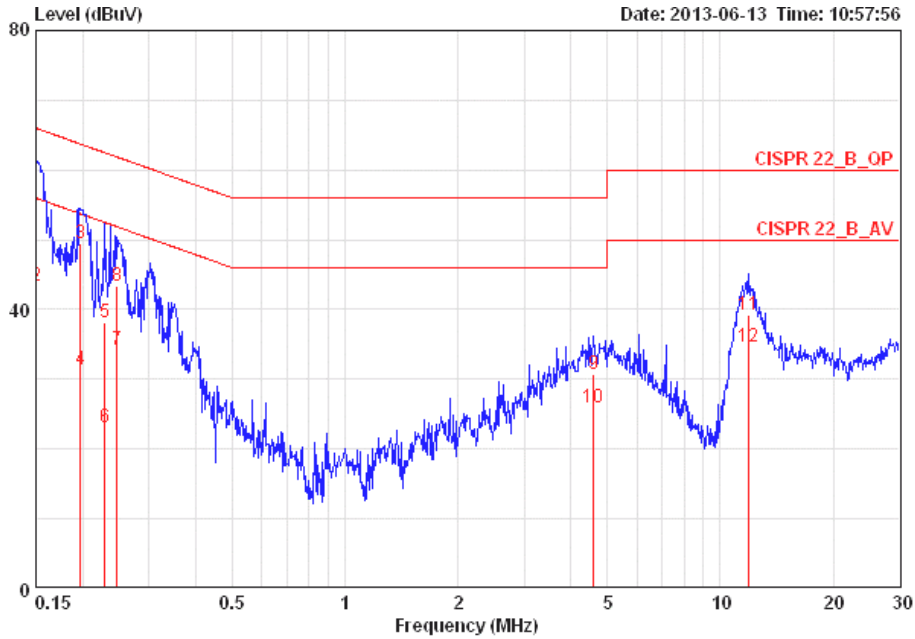
#### 4.1.6. EUT Operation during Test

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



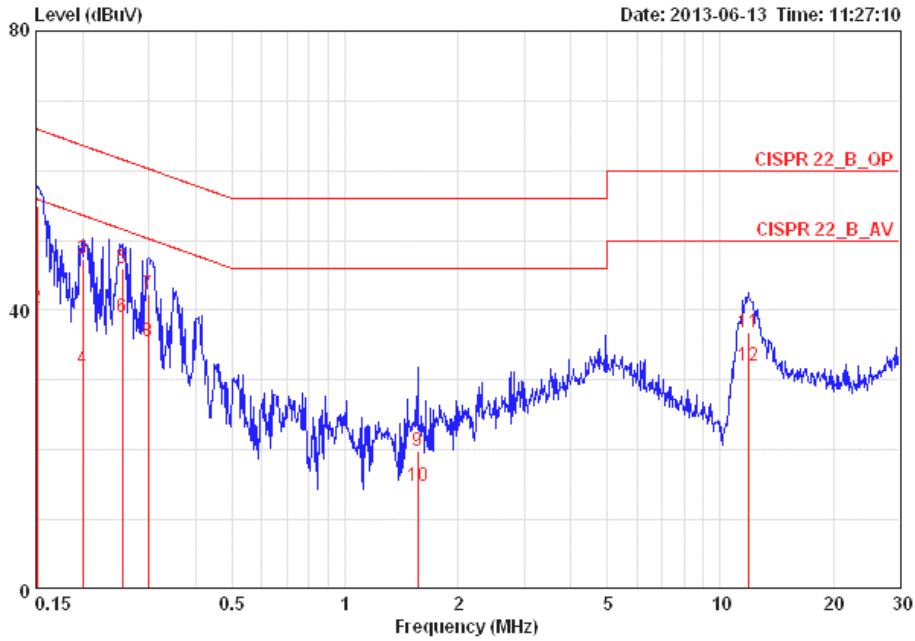
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	59%
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	0.15000	57.63	-8.37	66.00	57.29	0.16	0.18	LINE	QP
2	0.15000	43.39	-12.61	56.00	43.05	0.16	0.18	LINE	AVERAGE
3	0.19758	49.43	-14.28	63.71	49.08	0.15	0.20	LINE	QP
4	0.19758	31.41	-22.30	53.71	31.06	0.15	0.20	LINE	AVERAGE
5	0.22918	38.13	-24.35	62.48	37.78	0.15	0.20	LINE	QP
6	0.22918	23.08	-29.40	52.48	22.73	0.15	0.20	LINE	AVERAGE
7	0.24682	34.30	-17.56	51.86	33.95	0.15	0.20	LINE	AVERAGE
8	0.24682	43.37	-18.49	61.86	43.02	0.15	0.20	LINE	QP
9	4.598	30.68	-25.32	56.00	30.14	0.23	0.31	LINE	QP
10	4.598	25.88	-20.12	46.00	25.34	0.23	0.31	LINE	AVERAGE
11	11.870	39.33	-20.67	60.00	38.57	0.37	0.40	LINE	QP
12	11.870	34.65	-15.35	50.00	33.89	0.37	0.40	LINE	AVERAGE

Temperature	22°C	Humidity	59%
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	0.15080	54.93	-11.03	65.96	54.67	0.08	0.18	NEUTRAL	QP
2	0.15080	40.30	-15.66	55.96	40.04	0.08	0.18	NEUTRAL	AVERAGE
3	0.19969	47.29	-16.33	63.62	47.01	0.08	0.20	NEUTRAL	QP
4	0.19969	31.54	-22.08	53.62	31.26	0.08	0.20	NEUTRAL	AVERAGE
5	0.25480	46.01	-15.59	61.60	45.73	0.08	0.20	NEUTRAL	QP
6	0.25480	38.96	-12.64	51.60	38.68	0.08	0.20	NEUTRAL	AVERAGE
7	0.29869	42.32	-17.96	60.28	42.04	0.08	0.20	NEUTRAL	QP
8	0.29869	35.55	-14.73	50.28	35.27	0.08	0.20	NEUTRAL	AVERAGE
9	1.560	19.74	-36.26	56.00	19.42	0.10	0.22	NEUTRAL	QP
10	1.560	14.85	-31.15	46.00	14.53	0.10	0.22	NEUTRAL	AVERAGE
11	11.870	36.89	-23.11	60.00	36.22	0.27	0.40	NEUTRAL	QP
12	11.870	32.12	-17.88	50.00	31.45	0.27	0.40	NEUTRAL	AVERAGE

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

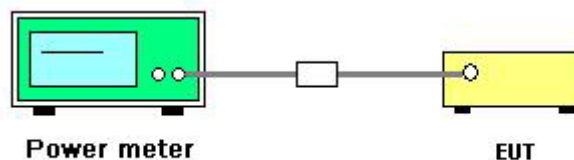
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

### 4.2.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03 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	25°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n/ac
Test Date	May 24, 2013		

##### For 2.4GHz Band

##### Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
1	2412 MHz	13.55	13.53	12.44	17.97	30.00	Complies
6	2437 MHz	21.60	21.33	21.40	26.22	30.00	Complies
11	2462 MHz	13.08	13.30	12.70	17.80	30.00	Complies

##### Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
3	2422 MHz	9.96	9.55	9.74	14.52	30.00	Complies
6	2437 MHz	16.85	16.21	16.29	21.23	30.00	Complies
9	2452 MHz	11.75	11.30	11.05	16.15	30.00	Complies

## For 5GHz Band

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

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 4	Ant. 5	Ant. 6			
149	5745 MHz	25.33	24.10	25.28	29.71	30.00	Complies
157	5785 MHz	25.27	24.39	25.23	29.75	30.00	Complies
165	5825 MHz	25.52	24.47	25.49	29.96	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 4	Ant. 5	Ant. 6			
151	5755 MHz	25.51	24.26	25.38	29.86	30.00	Complies
159	5795 MHz	25.36	24.41	25.18	29.77	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 4	Ant. 5	Ant. 6			
155	5775 MHz	25.14	24.28	25.22	29.67	30.00	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a/b/g
Test Date	May 24, 2013		

**Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant. 3**

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
1	2412 MHz	19.30	18.47	18.65	23.59	30.00	Complies
6	2437 MHz	25.62	25.13	24.12	29.77	30.00	Complies
11	2462 MHz	19.38	18.80	19.40	23.97	30.00	Complies

**Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant. 3**

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3			
1	2412 MHz	16.48	15.93	15.68	20.81	30.00	Complies
6	2437 MHz	22.54	22.46	22.48	27.26	30.00	Complies
11	2462 MHz	16.48	16.94	16.16	21.31	30.00	Complies

**Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6**

Channel	Frequency	Conducted Power (dBm)			Total Conducted Power (dBm)	Max. Limit (dBm)	Result
		Ant. 4	Ant. 5	Ant. 6			
149	5745 MHz	25.63	24.33	25.45	29.94	30.00	Complies
157	5785 MHz	25.39	24.59	24.22	29.53	30.00	Complies
165	5825 MHz	25.55	24.48	25.51	29.98	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

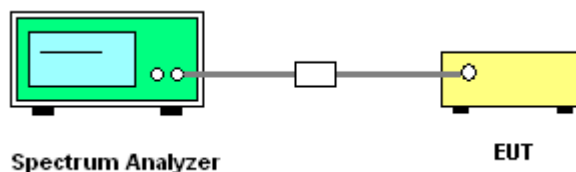
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 v03 section 10.2 Method PKPSD (peak PSD) & KDB 662911 D01 v01r02 section In-Band Power Spectral Density (PSD) Measurements option (2) Measure and add  $10 \log(\text{NANT})$  dB.
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  $\leq 8$  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	25°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3		
1	2412 MHz	-12.54	-13.02	-12.80	3.23	Complies
6	2437 MHz	-4.15	-6.11	-4.97	3.23	Complies
11	2462 MHz	-13.06	-12.94	-14.10	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3		
3	2422 MHz	-18.02	-19.39	-18.90	3.23	Complies
6	2437 MHz	-12.34	-13.31	-12.47	3.23	Complies
9	2452 MHz	-17.40	-16.10	-17.87	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

**For 5GHz Band**
**Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Ant. 4 + Ant. 5 + Ant. 6**

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 4	Ant. 5	Ant. 6		
149	5745 MHz	-1.59	-2.85	-1.98	3.23	Complies
157	5785 MHz	-1.94	-3.48	-0.16	3.23	Complies
165	5825 MHz	-2.26	-2.88	-1.77	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

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

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 4	Ant. 5	Ant. 6		
151	5755 MHz	-5.03	-7.01	-6.00	3.23	Complies
159	5795 MHz	-3.86	-4.55	-4.68	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

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

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 4	Ant. 5	Ant. 6		
155	5775 MHz	-6.70	-9.87	-6.83	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

Temperature	25°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a/b/g

**Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant. 3**

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3		
1	2412 MHz	-3.30	-3.80	-4.22	3.23	Complies
6	2437 MHz	2.82	2.45	2.70	3.23	Complies
11	2462 MHz	-2.88	-2.42	-4.01	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

**Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant. 3**

Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3		
1	2412 MHz	-9.16	-9.80	-10.29	3.23	Complies
6	2437 MHz	-2.59	-3.98	-3.75	3.23	Complies
11	2462 MHz	-9.64	-9.13	-10.92	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

**Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6**

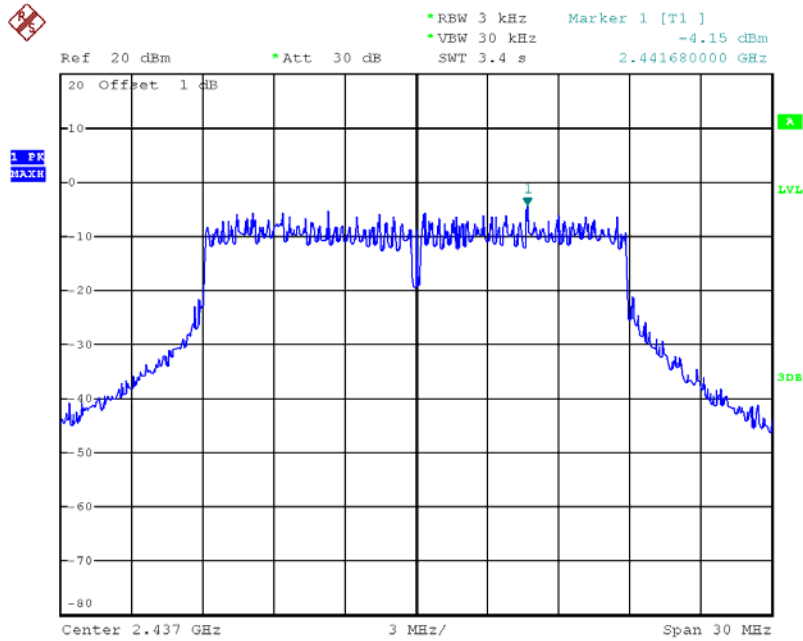
Channel	Frequency	Power Density (dBm/3kHz)			Single Port Limit (dBm/3kHz)	Result
		Ant. 4	Ant. 5	Ant. 6		
149	5745 MHz	-1.12	-2.46	-0.85	3.23	Complies
157	5785 MHz	-0.55	-2.73	-1.13	3.23	Complies
165	5825 MHz	-1.97	-0.58	-0.68	3.23	Complies

Note: PSD Limit = (8dBm/3kHz - (10log(3)))=3.23dBm/3kHz

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

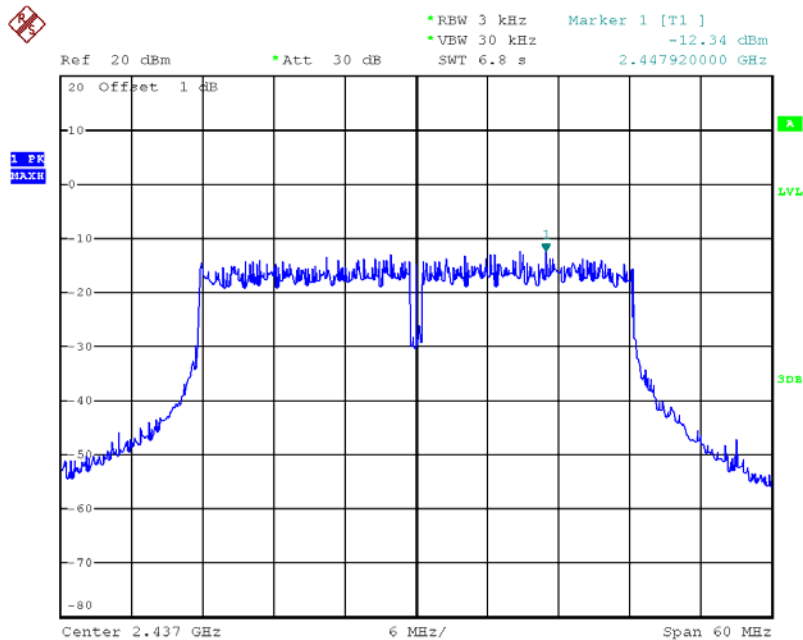
For plots, only the channel with maximum results was shown.

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 / 2437 MHz



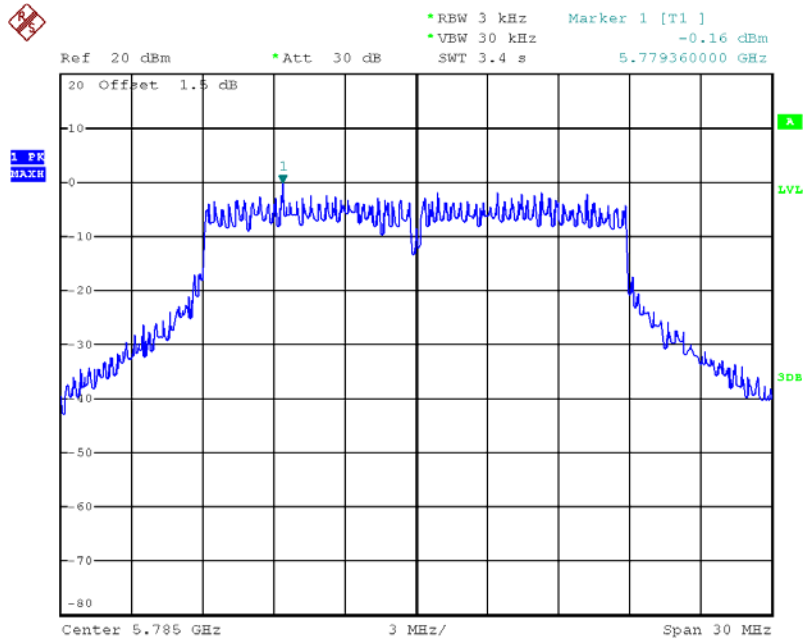
Date: 24.MAY.2013 21:27:57

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 / 2437 MHz



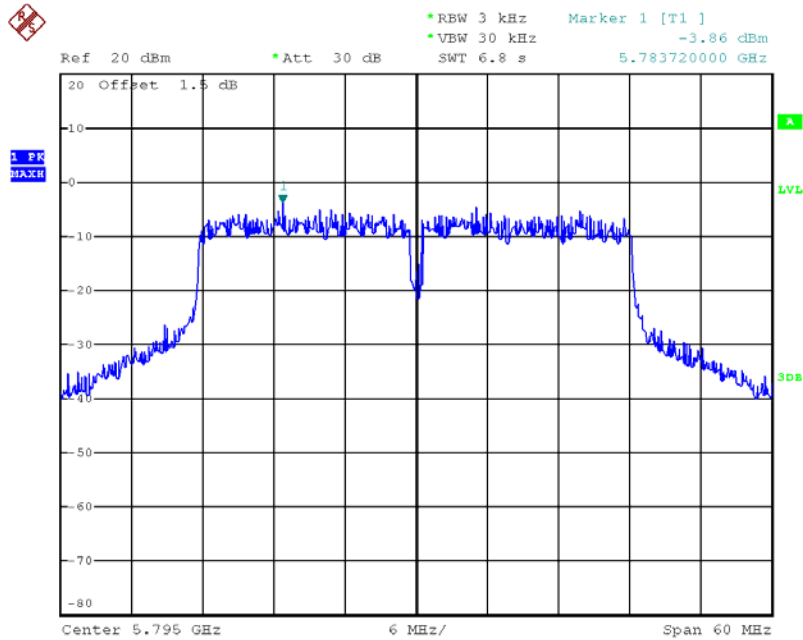
Date: 24.MAY.2013 21:37:01

Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Ant. 6 / 5785 MHz



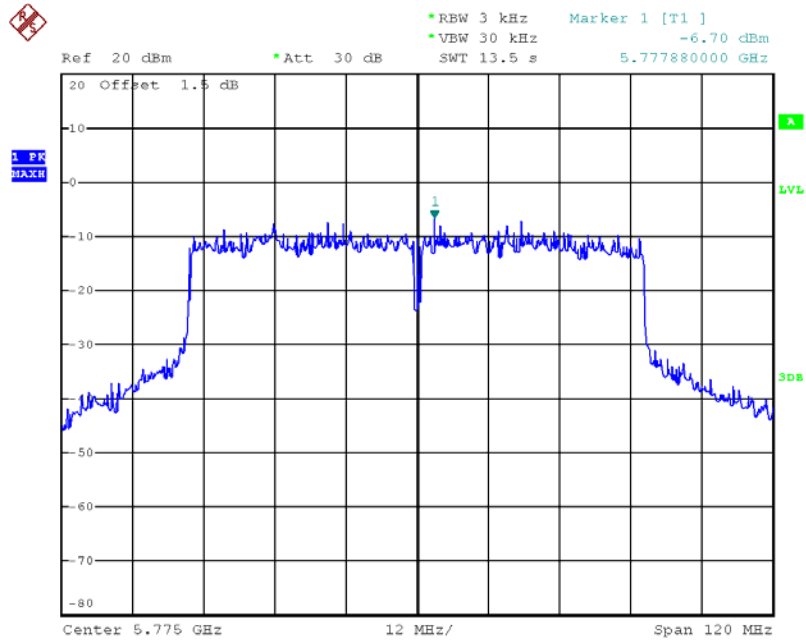
Date: 24.MAY.2013 23:35:57

Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Ant. 4 / 5795 MHz



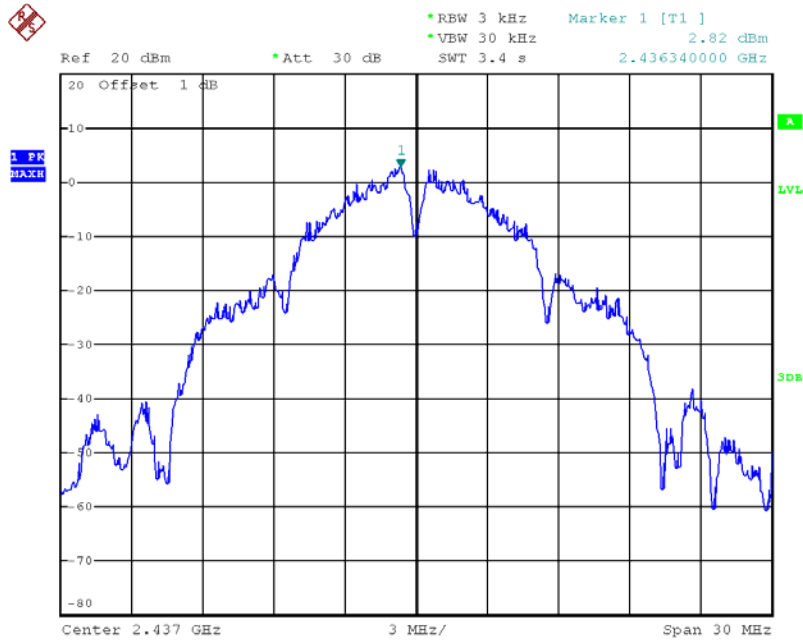
Date: 24.MAY.2013 23:45:32

### Power Density Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Ant. 4 / 5775 MHz



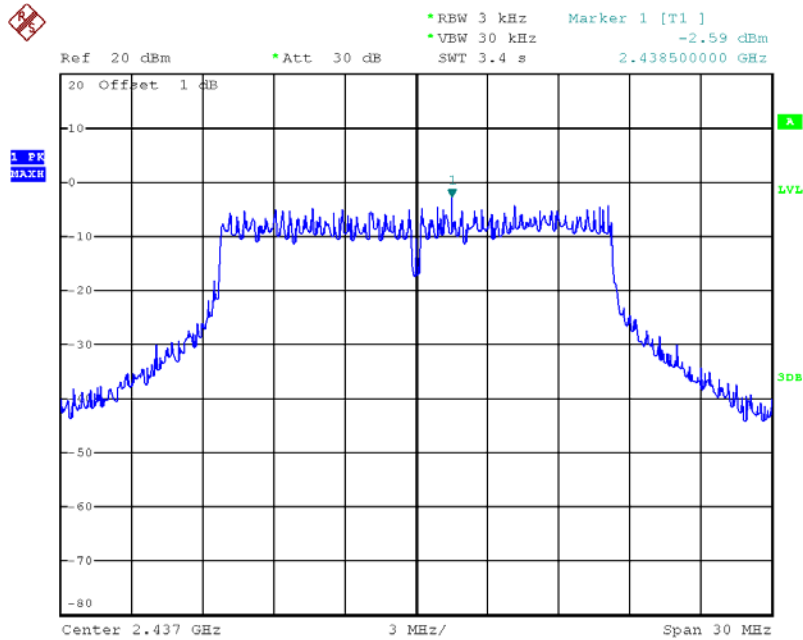
Date: 24.MAY.2013 23:47:13

Power Density Plot on Configuration IEEE 802.11b / Ant. 1 / 2437 MHz



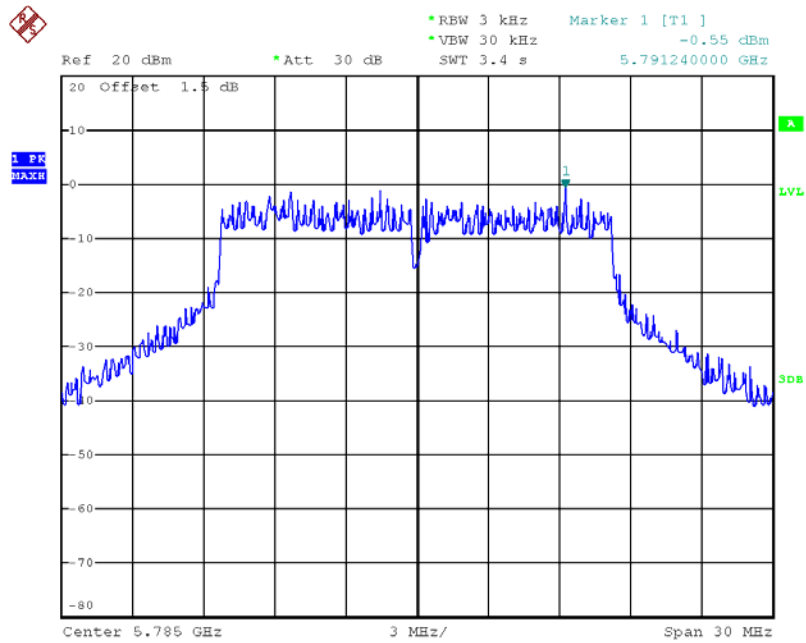
Date: 24.MAY.2013 21:00:05

Power Density Plot on Configuration IEEE 802.11g / Ant. 1 / 2437 MHz



Date: 24.MAY.2013 21:10:09

### Power Density Plot on Configuration IEEE 802.11a / Ant. 4 / 5785 MHz



Date: 24.MAY.2013 23:26:54



## 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

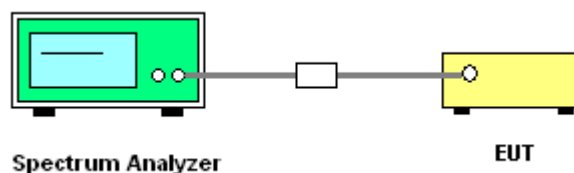
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

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

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v01r02 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

### 4.4.4. Test Setup Layout



### 4.4.5. Test Deviation

There is no deviation with the original standard.

### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	25°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.00	17.44	500	Complies
6	2437 MHz	13.60	17.44	500	Complies
11	2462 MHz	16.40	17.60	500	Complies

Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	30.72	36.64	500	Complies
6	2437 MHz	32.00	35.20	500	Complies
9	2452 MHz	35.84	36.16	500	Complies

**For 5GHz Band**
**Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Ant. 4 + Ant. 5 + Ant. 6**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.12	18.56	500	Complies
157	5785 MHz	14.56	17.44	500	Complies
165	5825 MHz	16.32	18.40	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.48	36.80	500	Complies
159	5795 MHz	28.96	35.52	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	68.80	76.16	500	Complies

Temperature	25°C	Humidity	56%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a/b/g

**Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant. 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	3.60	16.56	500	Complies
6	2437 MHz	3.52	15.92	500	Complies
11	2462 MHz	8.56	12.80	500	Complies

**Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant. 3**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	12.56	15.84	500	Complies
6	2437 MHz	15.84	16.64	500	Complies
11	2462 MHz	16.16	16.64	500	Complies

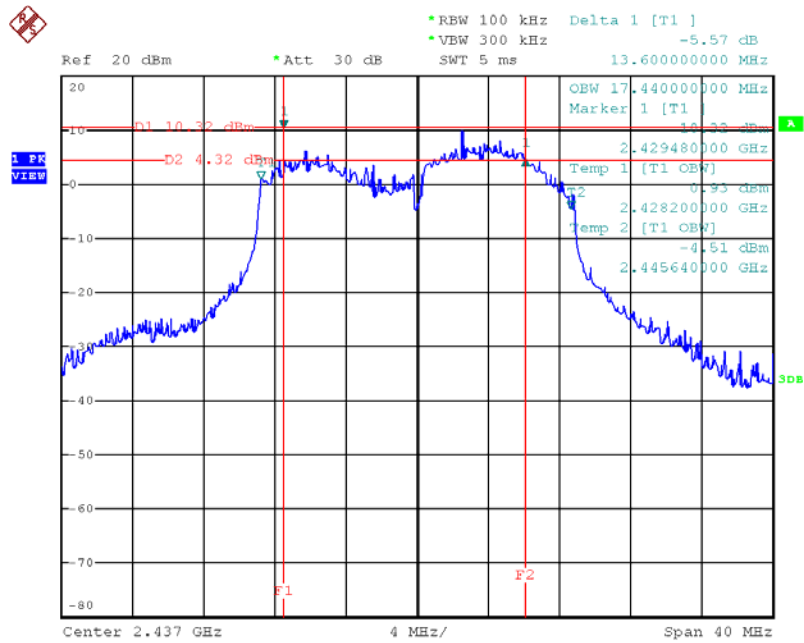
**Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6**

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	12.88	15.92	500	Complies
157	5785 MHz	13.68	16.16	500	Complies
165	5825 MHz	12.88	16.56	500	Complies

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

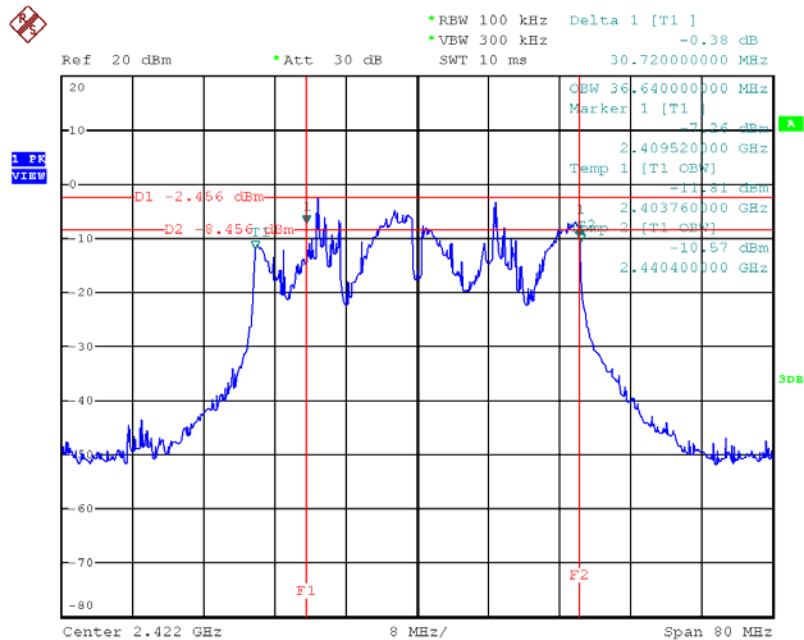
For plots, only the channel with maximum results was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / Ant. 1 + Ant. 2 + Ant. 3 / 2437 MHz



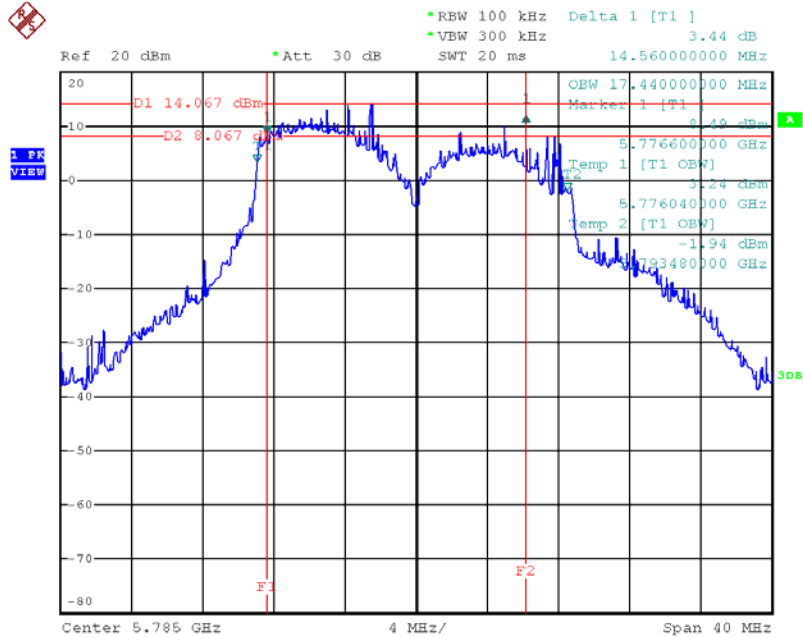
Date: 24.MAY.2013 22:00:56

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / Ant. 1 + Ant. 2 + Ant. 3 / 2422 MHz



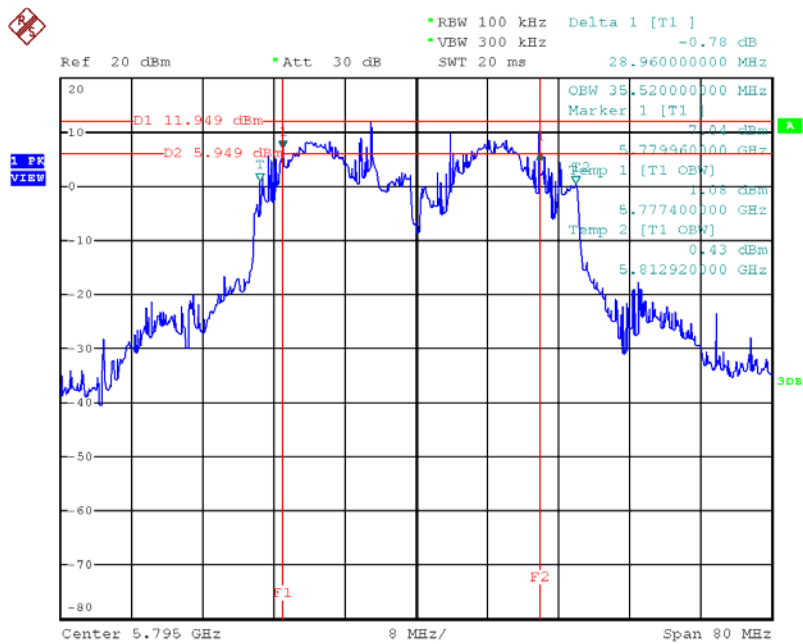
Date: 24.MAY.2013 22:04:29

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / Ant. 4 + Ant. 5 + Ant. 6 / 5785 MHz



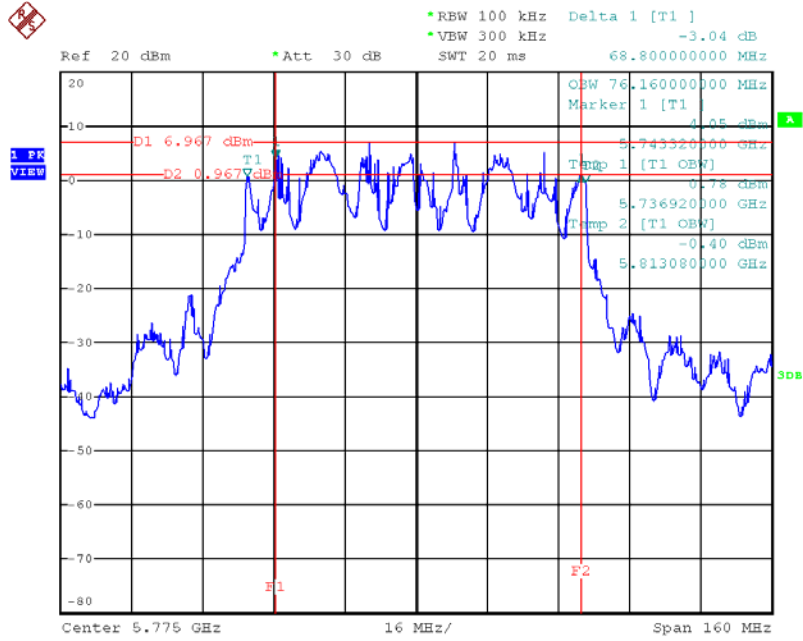
Date: 24.MAY.2013 22:32:14

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / Ant. 4 + Ant. 5 + Ant. 6 / 5795 MHz



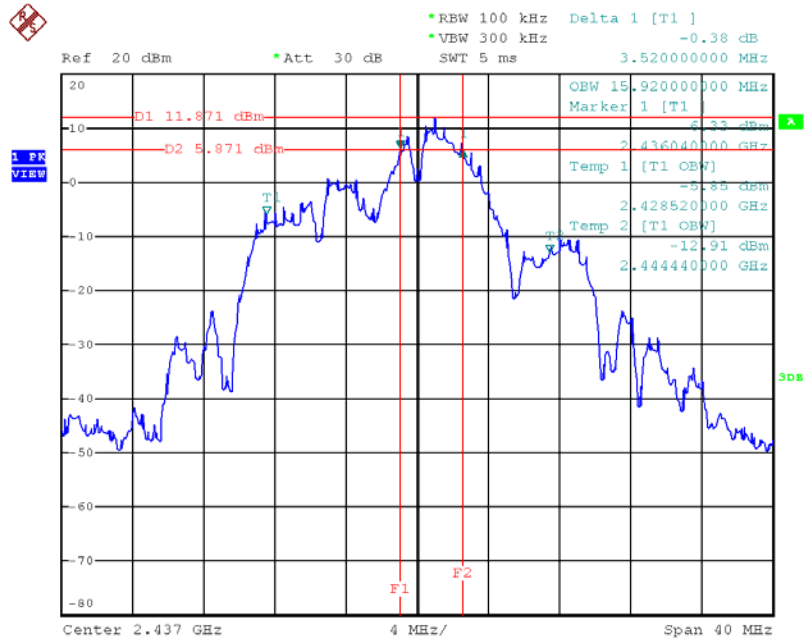
Date: 24.MAY.2013 22:37:07

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / Ant. 4 + Ant. 5 + Ant. 6 / 5775 MHz



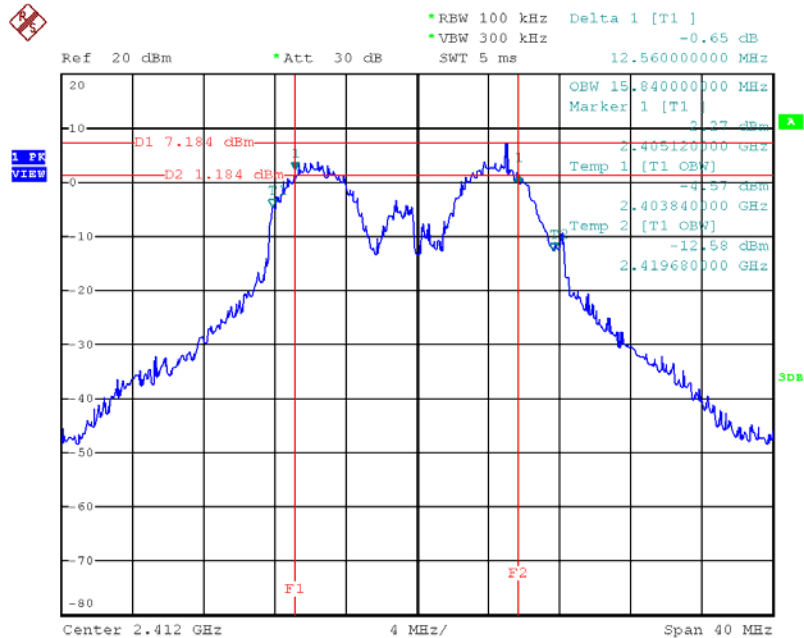
Date: 24.MAY.2013 22:40:05

6 dB Bandwidth Plot on Configuration IEEE 802.11b / Ant. 1 + Ant. 2 + Ant. 3 / 2437 MHz



Date: 24.MAY.2013 21:52:42

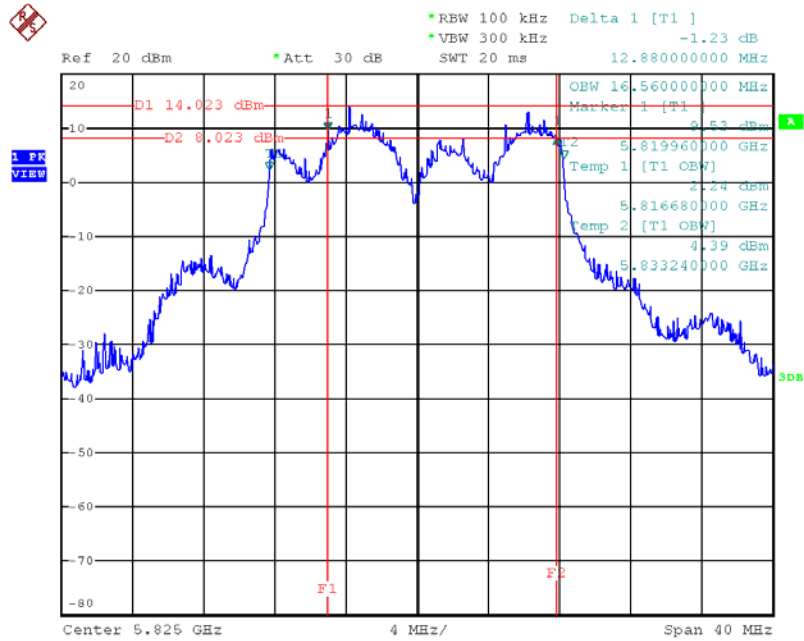
6 dB Bandwidth Plot on Configuration IEEE 802.11g / Ant. 1 + Ant. 2 + Ant. 3 / 2412 MHz



Date: 24.MAY.2013 21:54:38



6 dB Bandwidth Plot on Configuration IEEE 802.11a / Ant. 4 + Ant. 5 + Ant. 6 / 5825 MHz



Date: 24.MAY.2013 22:29:26

## 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 (micровolts/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

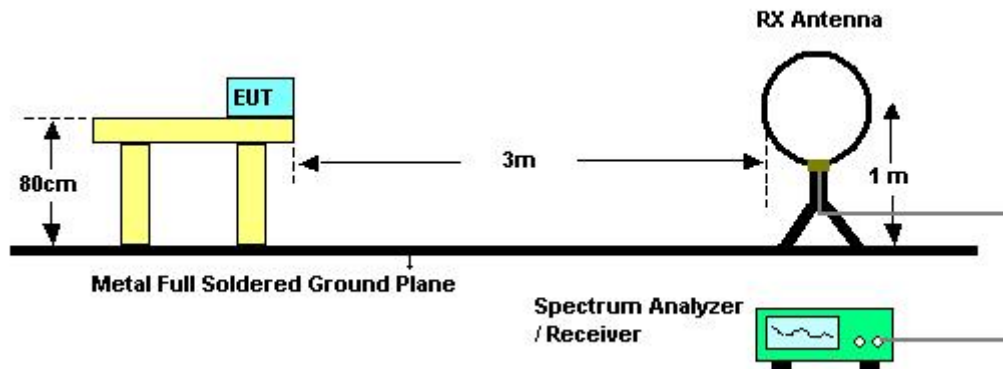
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

#### 4.5.3. Test Procedures

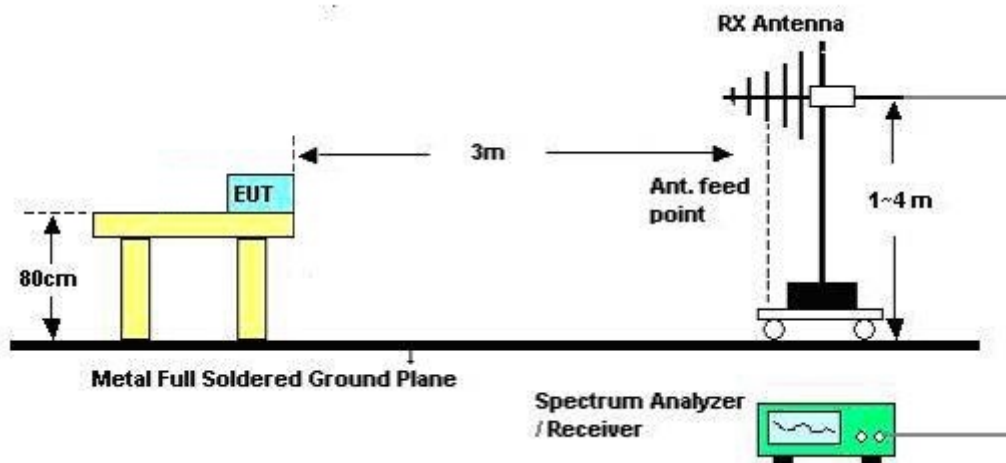
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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

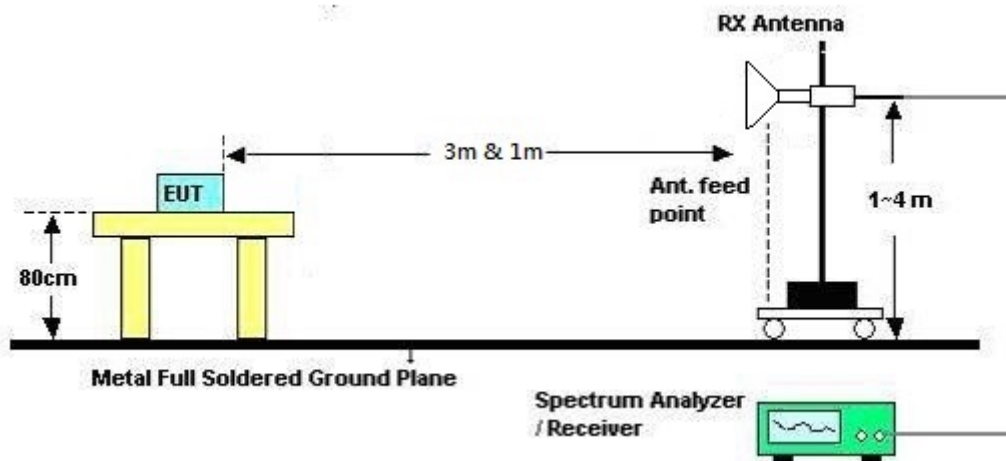
For Radiated Emissions: 9kHz ~30MHz



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)

Temperature	24.5°C	Humidity	60%
Test Engineer	David Tseng	Configurations	Normal Link
Test Date	May 23, 2013		

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

Note:

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

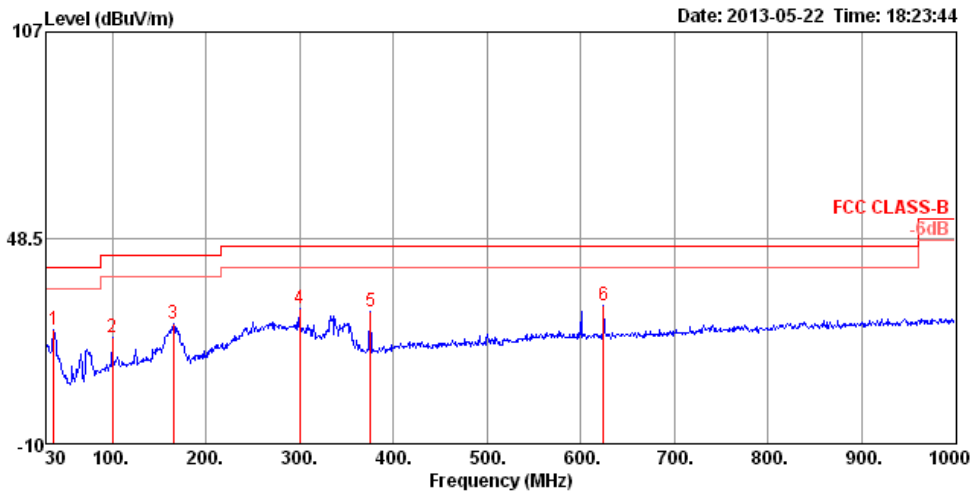
Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

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

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

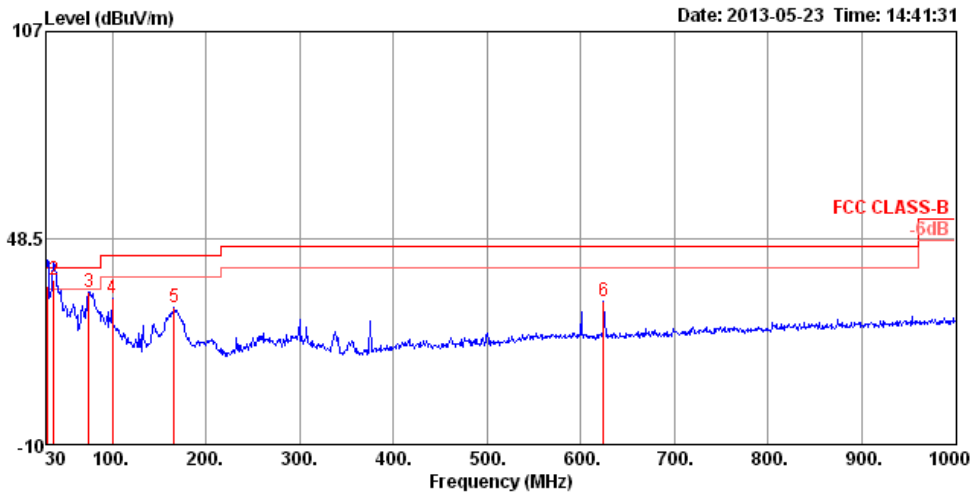
Temperature	24.5°C	Humidity	60%
Test Engineer	David Tseng	Configurations	Normal Link
Test Mode	Mode 3		

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	37.76	22.29	40.00	-17.71	39.67	0.72	13.78	31.88	125	147	HORIZONTAL Peak
2	99.84	20.08	43.50	-23.42	40.20	1.18	10.31	31.61	150	317	HORIZONTAL Peak
3	164.83	23.90	43.50	-19.60	44.46	1.55	9.44	31.55	200	98	HORIZONTAL Peak
4	299.66	28.61	46.00	-17.39	44.88	2.13	13.02	31.42	100	318	HORIZONTAL Peak
5	375.32	27.75	46.00	-18.25	41.81	2.44	14.93	31.43	100	305	HORIZONTAL Peak
6	624.61	29.50	46.00	-16.50	39.11	3.18	18.61	31.40	100	102	HORIZONTAL Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1 !	30.23	35.11	40.00	-4.89	48.30	0.64	17.98	31.81	112	341	VERTICAL QP
2	37.76	36.69	40.00	-3.31	54.07	0.72	13.78	31.88	100	228	VERTICAL QP
3 pk	74.62	33.13	40.00	-6.87	57.84	1.02	5.95	31.68	150	352	VERTICAL Peak
4	99.84	31.24	43.50	-12.26	51.36	1.18	10.31	31.61	100	266	VERTICAL Peak
5	165.80	28.99	43.50	-14.51	49.59	1.56	9.38	31.54	200	170	VERTICAL Peak
6	624.61	30.49	46.00	-15.51	40.10	3.18	18.61	31.40	100	188	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)

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

*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 pk	4821.84	44.86	74.00	-29.14	41.72	5.68	32.76	35.30	100	211	HORIZONTAL	Peak
2	4832.16	34.78	54.00	-19.22	31.61	5.70	32.77	35.30	100	211	HORIZONTAL	Average

*Vertical*

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4827.82	34.56	54.00	-19.44	31.40	5.69	32.77	35.30	100	146	VERTICAL	Average
2 pk	4828.94	46.18	74.00	-27.82	43.02	5.69	32.77	35.30	100	146	VERTICAL	Peak

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4881.42	50.50	74.00	-23.50	47.25	5.76	32.81	35.32	100	285	HORIZONTAL Peak
2	4882.18	37.99	54.00	-16.01	34.74	5.76	32.81	35.32	100	285	HORIZONTAL Average
3 pk	7302.92	51.36	74.00	-22.64	42.55	7.05	37.12	35.36	100	235	HORIZONTAL Peak
4	7308.96	40.53	54.00	-13.47	31.71	7.06	37.12	35.36	100	235	HORIZONTAL Average

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4866.98	49.24	74.00	-24.76	46.02	5.74	32.79	35.31	100	80	VERTICAL Peak
2	4867.94	38.12	54.00	-15.88	34.89	5.74	32.80	35.31	100	80	VERTICAL Average
3	7302.54	40.79	54.00	-13.21	31.98	7.05	37.12	35.36	100	150	VERTICAL Average
4 pk	7308.96	51.00	74.00	-23.00	42.18	7.06	37.12	35.36	100	150	VERTICAL Peak

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 20MHz Ch 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4922.14	46.91	74.00	-27.09	43.60	5.81	32.83	35.33	100	318	HORIZONTAL Peak
2	4932.26	35.25	54.00	-18.75	31.93	5.82	32.84	35.34	100	318	HORIZONTAL Average
3	7384.42	39.81	54.00	-14.19	30.89	7.08	37.16	35.32	100	219	HORIZONTAL Average
4 pk	7394.82	51.00	74.00	-23.00	42.06	7.09	37.16	35.31	100	219	HORIZONTAL Peak

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4919.52	34.71	54.00	-19.29	31.41	5.80	32.83	35.33	100	265	VERTICAL Average
2	4923.96	45.31	74.00	-28.69	41.99	5.81	32.84	35.33	100	265	VERTICAL Peak
3	7392.32	39.76	54.00	-14.24	30.82	7.09	37.16	35.31	100	149	VERTICAL Average
4 pk	7392.42	50.56	74.00	-23.44	41.62	7.09	37.16	35.31	100	149	VERTICAL Peak

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4842.52	34.84	54.00	-19.16	31.65	5.71	32.78	35.30	100	147	HORIZONTAL Average
2	4844.78	46.52	74.00	-27.48	43.33	5.71	32.78	35.30	100	147	HORIZONTAL Peak
3	7256.60	40.23	54.00	-13.77	31.48	7.03	37.11	35.39	100	211	HORIZONTAL Average
4 pk	7275.90	58.00	74.00	-16.00	49.22	7.04	37.12	35.38	100	211	HORIZONTAL Peak

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4838.08	46.35	74.00	-27.65	43.18	5.70	32.77	35.30	100	236	VERTICAL Peak
2	4845.36	34.74	54.00	-19.26	31.55	5.71	32.78	35.30	100	236	VERTICAL Average
3	7263.26	40.35	54.00	-13.65	31.59	7.04	37.11	35.39	100	152	VERTICAL Average
4 pk	7268.18	51.58	74.00	-22.42	42.81	7.04	37.11	35.38	100	152	VERTICAL Peak

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4874.28	35.02	54.00	-18.98	31.78	5.75	32.80	35.31	100	93 HORIZONTAL	Average
2	4881.28	45.59	74.00	-28.41	42.34	5.76	32.81	35.32	100	94 HORIZONTAL	Peak
3	7303.06	39.70	54.00	-14.30	30.89	7.05	37.12	35.36	100	226 HORIZONTAL	Average
4 pk	7311.44	50.52	74.00	-23.48	41.70	7.06	37.12	35.36	100	226 HORIZONTAL	Peak

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	7309.60	39.94	54.00	-14.06	31.12	7.06	37.12	35.36	100	312 VERTICAL	Average
2	7309.78	49.78	74.00	-24.22	40.96	7.06	37.12	35.36	100	312 VERTICAL	Peak
3	9742.88	41.16	54.00	-12.84	30.03	8.13	38.10	35.10	100	234 VERTICAL	Average
4 pk	9753.14	53.48	74.00	-20.52	42.34	8.13	38.10	35.09	100	234 VERTICAL	Peak

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4902.06	45.22	74.00	-28.78	41.94	5.78	32.82	35.32	100	92	HORIZONTAL Peak
2	4902.12	34.12	54.00	-19.88	30.84	5.78	32.82	35.32	100	92	HORIZONTAL Average
3	7347.00	39.81	54.00	-14.19	30.94	7.07	37.14	35.34	100	202	HORIZONTAL Average
4 pk	7349.16	50.38	74.00	-23.62	41.51	7.07	37.14	35.34	100	202	HORIZONTAL Peak

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4899.04	46.13	74.00	-27.87	42.85	5.78	32.82	35.32	100	166	VERTICAL Peak
2	4905.30	35.01	54.00	-18.99	31.73	5.79	32.82	35.33	100	166	VERTICAL Average
3 pk	7353.20	51.01	74.00	-22.99	42.14	7.07	37.14	35.34	100	234	VERTICAL Peak
4	7360.76	39.65	54.00	-14.35	30.75	7.08	37.15	35.33	100	234	VERTICAL Average



Temperature	24.5°C	Humidity	57%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz CH 149 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 18, 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	5098.00	42.43	54.00	-11.57	37.62	6.10	33.91	35.20	Average	100	62	HORIZONTAL
2	5098.00	54.09	74.00	-19.91	49.28	6.10	33.91	35.20	Peak	100	62	HORIZONTAL
3	11491.18	40.14	54.00	-13.86	26.48	9.24	39.50	35.08	Average	100	279	HORIZONTAL
4	11494.96	53.81	74.00	-20.19	40.15	9.24	39.50	35.08	Peak	100	279	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	5098.80	50.47	54.00	-3.53	45.66	6.10	33.91	35.20	Average	100	153	VERTICAL
2	5099.12	63.32	74.00	-10.68	58.51	6.10	33.91	35.20	Peak	100	153	VERTICAL
3	11491.34	42.35	54.00	-11.65	28.69	9.24	39.50	35.08	Average	100	184	VERTICAL
4	11492.56	54.64	74.00	-19.36	40.98	9.24	39.50	35.08	Peak	100	184	VERTICAL

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz CH 157 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5148.40	42.30	54.00	-11.70	38.70	5.99	33.02	35.41	100	118	HORIZONTAL Average
2	5157.50	49.80	74.00	-24.20	46.19	6.00	33.03	35.42	100	118	HORIZONTAL Peak
3	11570.50	42.17	54.00	-11.83	28.90	9.11	39.01	34.85	100	33	HORIZONTAL Average
4 pk	11578.14	51.60	74.00	-22.40	38.33	9.11	39.01	34.85	100	33	HORIZONTAL Peak

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5152.60	50.30	54.00	-3.70	46.70	5.99	33.02	35.41	100	335	VERTICAL Average
2 pk	5195.30	57.62	74.00	-16.38	53.98	6.02	33.05	35.43	100	335	VERTICAL Peak
3	11570.06	54.76	74.00	-19.24	41.49	9.11	39.01	34.85	100	165	VERTICAL Peak
4	11571.90	42.70	54.00	-11.30	29.43	9.11	39.01	34.85	100	165	VERTICAL Average



Temperature	24.5°C	Humidity	57%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0, Nss1 20MHz CH 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 18, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5188.64	56.23	74.00	-17.77	51.20	6.15	34.08	35.20	Peak	117	87 HORIZONTAL
2	5189.17	42.53	54.00	-11.47	37.50	6.15	34.08	35.20	Average	117	87 HORIZONTAL
3	11649.30	55.89	74.00	-18.11	42.24	9.28	39.44	35.07	Peak	100	86 HORIZONTAL
4	11649.62	42.03	54.00	-11.97	28.38	9.28	39.44	35.07	Average	100	86 HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5189.70	66.48	74.00	-7.52	61.45	6.15	34.08	35.20	Peak	100	189 VERTICAL
2	5189.90	53.43	54.00	-0.57	48.40	6.15	34.08	35.20	Average	100	189 VERTICAL
3	11650.50	46.72	54.00	-7.28	33.07	9.28	39.44	35.07	Average	100	201 VERTICAL
4	11650.80	60.14	74.00	-13.86	46.49	9.28	39.44	35.07	Peak	100	201 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz CH 151 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 18, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5104.89	55.43	74.00	-18.57	50.62	6.10	33.91	35.20	Peak	100	239 HORIZONTAL
2	5105.79	41.85	54.00	-12.15	37.03	6.11	33.91	35.20	Average	100	239 HORIZONTAL
3	11512.18	39.98	54.00	-14.02	26.33	9.25	39.50	35.10	Average	100	80 HORIZONTAL
4	11513.02	53.61	74.00	-20.39	39.96	9.25	39.50	35.10	Peak	100	80 HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5105.60	51.04	54.00	-2.96	46.22	6.11	33.91	35.20	Average	116	160 VERTICAL
2	5106.20	64.56	74.00	-9.44	59.74	6.11	33.91	35.20	Peak	116	160 VERTICAL
3	11509.98	41.28	54.00	-12.72	27.63	9.25	39.50	35.10	Average	100	172 VERTICAL
4	11511.32	54.86	74.00	-19.14	41.21	9.25	39.50	35.10	Peak	100	172 VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0, Nss1 40MHz CH 159 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 18, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5149.70	42.55	54.00	-11.45	37.61	6.13	34.01	35.20 Average	100	235	HORIZONTAL
2	5150.18	55.24	74.00	-18.76	50.30	6.13	34.01	35.20 Peak	100	235	HORIZONTAL
3	11583.16	40.85	54.00	-13.15	27.19	9.27	39.47	35.08 Average	100	171	HORIZONTAL
4	11595.08	53.60	74.00	-20.40	39.94	9.27	39.47	35.08 Peak	100	213	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	5151.38	51.83	54.00	-2.17	46.89	6.13	34.01	35.20 Average	115	159	VERTICAL
2	5153.38	65.05	74.00	-8.95	60.11	6.13	34.01	35.20 Peak	115	159	VERTICAL
3	11590.44	41.84	54.00	-12.16	28.18	9.27	39.47	35.08 Average	100	126	VERTICAL
4	11591.46	54.20	74.00	-19.80	40.54	9.27	39.47	35.08 Peak	100	126	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	Kenneth Huang	Configurations	IEEE 802.11ac MCS0, Nss1 80MHz CH 155 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 18, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5118.00	41.92	54.00	-12.08	37.07	6.11	33.94	35.20	Average	100	347	HORIZONTAL
2	5118.00	53.60	74.00	-20.40	48.75	6.11	33.94	35.20	Peak	100	347	HORIZONTAL
3	11544.16	53.00	74.00	-21.00	39.34	9.26	39.49	35.09	Peak	100	181	HORIZONTAL
4	11557.04	40.40	54.00	-13.60	26.75	9.26	39.48	35.09	Average	100	181	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	5118.00	48.96	54.00	-5.04	44.11	6.11	33.94	35.20	Average	119	30	VERTICAL
2	5118.00	62.76	74.00	-11.24	57.91	6.11	33.94	35.20	Peak	119	30	VERTICAL
3	11551.24	40.88	54.00	-13.12	27.23	9.26	39.48	35.09	Average	100	188	VERTICAL
4	11552.88	53.20	74.00	-20.80	39.55	9.26	39.48	35.09	Peak	100	188	VERTICAL

Temperature	24.5°C	Humidity	57%
Test Engineer	Jim Huang	Configurations	IEEE 802.11b CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 16, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	4824.09	33.40	54.00	-20.60	29.34	5.87	33.39	35.20	Average	106	150	HORIZONTAL
2	4824.18	45.79	74.00	-28.21	41.73	5.87	33.39	35.20	Peak	106	150	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	4823.93	49.15	74.00	-24.85	45.09	5.87	33.39	35.20	Peak	102	326	VERTICAL
2	4824.04	42.24	54.00	-11.76	38.18	5.87	33.39	35.20	Average	102	326	VERTICAL

Temperature	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11b CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 17, 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 p	4873.93	56.59	74.00	-17.41	54.38	4.22	34.67	32.66	Peak	202	100	VERTICAL
2 a	4874.00	52.41	54.00	-1.59	50.20	4.22	34.67	32.66	Average	202	100	VERTICAL
3 l	7311.74	50.55	54.00	-3.45	43.18	5.34	34.94	36.97	Average	4	145	VERTICAL
4	7311.88	56.08	74.00	-17.92	48.71	5.34	34.94	36.97	Peak	4	145	VERTICAL

### 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	4873.98	38.76	54.00	-15.24	36.55	4.22	34.67	32.66	Average	320	126	HORIZONTAL
2	4874.00	46.35	74.00	-27.65	44.14	4.22	34.67	32.66	Peak	320	126	HORIZONTAL
3 a	7312.32	45.56	54.00	-8.44	38.19	5.34	34.94	36.97	Average	155	127	HORIZONTAL
4 p	7312.48	53.80	74.00	-20.20	46.43	5.34	34.94	36.97	Peak	155	127	HORIZONTAL



Temperature	24.5°C	Humidity	57%
Test Engineer	Jim Huang	Configurations	IEEE 802.11b CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 16, 2013		

*Horizontal*

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4924.00	40.14	54.00	-13.86	35.79	5.97	33.58	35.20	Average	100	200	HORIZONTAL
2	4924.08	49.37	74.00	-24.63	45.02	5.97	33.58	35.20	Peak	100	200	HORIZONTAL
3	7377.96	48.82	74.00	-25.18	40.50	7.16	36.61	35.45	Peak	100	265	HORIZONTAL
4	7387.64	36.06	54.00	-17.94	27.74	7.17	36.61	35.46	Average	100	265	HORIZONTAL

*Vertical*

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	Remark	A/Pos	T/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4923.96	53.28	74.00	-20.72	48.93	5.97	33.58	35.20	Peak	138	326	VERTICAL
2	4923.97	49.40	54.00	-4.60	45.05	5.97	33.58	35.20	Average	138	326	VERTICAL
3	7386.40	48.79	74.00	-25.21	40.47	7.17	36.61	35.46	Peak	100	109	VERTICAL
4	7387.64	37.14	54.00	-16.86	28.82	7.17	36.61	35.46	Average	100	109	VERTICAL

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### 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	4822.85	34.34	54.00	-19.66	31.20	5.68	32.76	35.30	100	167	HORIZONTAL	Average
2 pk	4827.14	44.93	74.00	-29.07	41.77	5.69	32.77	35.30	100	167	HORIZONTAL	Peak

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1 pk	4818.40	46.42	74.00	-27.58	43.27	5.68	32.76	35.29	100	235	VERTICAL	Peak
2	4822.50	34.43	54.00	-19.57	31.29	5.68	32.76	35.30	100	235	VERTICAL	Average



Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	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	4883.38	37.59	54.00	-16.41	34.34	5.76	32.81	35.32	100	291	HORIZONTAL	Average
2 pk	4884.85	50.80	74.00	-23.20	47.55	5.76	32.81	35.32	100	291	HORIZONTAL	Peak
3	7302.73	48.26	74.00	-25.74	39.45	7.05	37.12	35.36	100	231	HORIZONTAL	Peak
4	7310.58	38.16	54.00	-15.84	29.34	7.06	37.12	35.36	100	231	HORIZONTAL	Average

### 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	4875.52	37.40	54.00	-16.60	35.19	4.22	34.67	32.66	Average	163	144	VERTICAL
2	4876.12	51.33	74.00	-22.67	49.12	4.22	34.67	32.66	Peak	163	144	VERTICAL
3 a	7317.30	39.85	54.00	-14.15	32.45	5.35	34.94	36.99	Average	162	143	VERTICAL
4 p	7318.80	53.33	74.00	-20.67	45.93	5.35	34.94	36.99	Peak	162	143	VERTICAL

Temperature	24.5°C	Humidity	60%
Test Engineer	Simon Yang	Configurations	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 21, 2013		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4916.56	45.89	74.00	-28.11	42.59	5.80	32.83	35.33	100	235	HORIZONTAL Peak
2	4923.38	35.04	54.00	-18.96	31.73	5.81	32.83	35.33	100	235	HORIZONTAL Average
3	7378.86	38.79	54.00	-15.21	29.88	7.08	37.15	35.32	100	170	HORIZONTAL Average
4 pk	7394.10	51.69	74.00	-22.31	42.75	7.09	37.16	35.31	100	170	HORIZONTAL Peak

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4923.92	34.92	54.00	-19.08	31.60	5.81	32.84	35.33	100	249	VERTICAL Average
2	4925.28	47.10	74.00	-26.90	43.78	5.81	32.84	35.33	100	249	VERTICAL Peak
3 pk	7382.92	51.23	74.00	-22.77	42.31	7.08	37.16	35.32	100	194	VERTICAL Peak
4	7385.50	39.49	54.00	-14.51	30.56	7.09	37.16	35.32	100	194	VERTICAL Average

Temperature	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11a CH 149 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 17, 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 p	5423.70	52.62	74.00	-21.38	49.15	4.52	34.62	33.57	Peak	149	104	HORIZONTAL
2	5428.98	40.33	54.00	-13.67	36.83	4.53	34.62	33.59	Average	149	104	HORIZONTAL
3	11490.56	50.86	74.00	-23.14	40.44	6.74	34.82	38.50	Peak	196	100	HORIZONTAL
4 a	11490.56	40.67	54.00	-13.33	30.25	6.74	34.82	38.50	Average	196	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 p	5424.58	61.42	74.00	-12.58	57.95	4.52	34.62	33.57	Peak	150	104	VERTICAL
2 a	5424.58	48.99	54.00	-5.01	45.52	4.52	34.62	33.57	Average	150	104	VERTICAL
3	11490.96	56.80	74.00	-17.20	46.38	6.74	34.82	38.50	Peak	194	100	VERTICAL
4	11490.96	44.66	54.00	-9.34	34.24	6.74	34.82	38.50	Average	194	100	VERTICAL

Temperature	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11a CH 157 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 17, 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 p	11455.28	52.65	74.00	-21.35	42.26	6.72	34.82	38.49	Peak	225	100	HORIZONTAL
2 a	11455.28	39.50	54.00	-14.50	29.11	6.72	34.82	38.49	Average	225	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 a	5458.46	51.93	54.00	-2.07	48.39	4.54	34.62	33.62	Average	159	105	VERTICAL
2 p	5458.68	64.85	74.00	-9.15	61.31	4.54	34.62	33.62	Peak	159	105	VERTICAL
3	11445.92	56.36	74.00	-17.64	45.98	6.71	34.82	38.49	Peak	207	100	VERTICAL
4	11445.92	43.89	54.00	-10.11	33.51	6.71	34.82	38.49	Average	207	100	VERTICAL

Temperature	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11a CH 165 / Ant. 4 + Ant. 5 + Ant. 6
Test Date	May 17, 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 p	11650.40	54.16	74.00	-19.84	43.73	6.80	34.87	38.50	Peak	198	100	HORIZONTAL
2 a	11650.40	42.27	54.00	-11.73	31.84	6.80	34.87	38.50	Average	198	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 p	11650.40	58.98	74.00	-15.02	48.55	6.80	34.87	38.50	Peak	195	100	VERTICAL
2 a	11650.40	46.33	54.00	-7.67	35.90	6.80	34.87	38.50	Average	195	100	VERTICAL

#### Note:

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

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

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

## 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 v03 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 10log (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	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 20MHz Ch 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 17, 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	70.07	74.00	-3.93	39.29	2.91	0.00	27.87	Peak	152	100	VERTICAL
2 !	2390.00	53.75	54.00	-0.25	22.97	2.91	0.00	27.87	Average	152	100	VERTICAL
3 a	2411.00	104.56			73.80	2.92	0.00	27.84	Average	152	100	VERTICAL
4 p	2411.60	116.07			85.31	2.92	0.00	27.84	Peak	152	100	VERTICAL

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 !	2362.40	68.90	74.00	-5.10	38.09	2.89	0.00	27.92	Peak	329	103	VERTICAL
2 !	2390.00	51.28	54.00	-2.72	20.50	2.91	0.00	27.87	Average	329	103	VERTICAL
3 a	2441.20	112.34			81.62	2.94	0.00	27.78	Average	329	103	VERTICAL
4 p	2441.40	124.42			93.70	2.94	0.00	27.78	Peak	329	103	VERTICAL
5 !	2483.50	52.58	54.00	-1.42	21.89	2.96	0.00	27.73	Average	329	103	VERTICAL
6 !	2483.90	71.38	74.00	-2.62	40.69	2.96	0.00	27.73	Peak	329	103	VERTICAL

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

##### 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 *	2461.00	103.50			72.79	2.95	0.00	27.76	Average	208	100	VERTICAL
2 a	2462.80	115.52			84.81	2.95	0.00	27.76	Average	208	100	VERTICAL
3 !	2483.50	53.56	54.00	-0.44	22.87	2.96	0.00	27.73	Average	208	100	VERTICAL
4 *	2483.50	70.06	54.00	16.06	39.37	2.96	0.00	27.73	Average	208	100	VERTICAL

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



Temperature	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 17, 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 !	2385.60	51.84	54.00	-2.16	21.06	2.91	0.00	27.87	Average	338	103	VERTICAL
2 !	2388.80	71.96	74.00	-2.04	41.18	2.91	0.00	27.87	Peak	338	103	VERTICAL
3 p	2428.40	109.76			79.02	2.93	0.00	27.81	Peak	338	103	VERTICAL
4 a	2434.80	97.56			66.82	2.93	0.00	27.81	Average	338	103	VERTICAL

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 !	2390.00	70.12	74.00	-3.88	39.34	2.91	0.00	27.87	Peak	217	100	VERTICAL
2 !	2390.00	53.79	54.00	-0.21	23.01	2.91	0.00	27.87	Average	217	100	VERTICAL
3 p	2453.00	115.94			85.22	2.94	0.00	27.78	Peak	217	100	VERTICAL
4 a	2453.00	103.76			73.04	2.94	0.00	27.78	Average	217	100	VERTICAL
5 !	2483.50	69.12	74.00	-4.88	38.43	2.96	0.00	27.73	Peak	217	100	VERTICAL
6 !	2483.50	51.87	54.00	-2.13	21.18	2.96	0.00	27.73	Average	217	100	VERTICAL

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

**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 p	2453.80	108.50			77.79	2.95	0.00	27.76	Peak	215	100	VERTICAL
2 a	2453.80	96.29			65.58	2.95	0.00	27.76	Average	215	100	VERTICAL
3 !	2483.50	53.83	54.00	-0.17	23.14	2.96	0.00	27.73	Average	215	100	VERTICAL
4 !	2483.70	69.19	74.00	-4.81	38.50	2.96	0.00	27.73	Peak	215	100	VERTICAL

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.

Temperature	24.5°C	Humidity	57%
Test Engineer	Jim Huang	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 16, 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	2371.40	64.74	74.00	-9.26	32.65	4.08	28.01	0.00	Peak	100	356	VERTICAL
2	2372.60	53.86	54.00	-0.14	21.77	4.08	28.01	0.00	Average	100	356	VERTICAL
3	2411.20	118.24			86.04	4.11	28.09	0.00	Average	100	356	VERTICAL
4	2411.20	122.17			89.97	4.11	28.09	0.00	Peak	100	356	VERTICAL

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

**Channel 6**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1 !	2356.40	70.05	74.00	-3.95	39.24	2.89	0.00	27.92	Peak	144	119	VERTICAL
2 !	2356.40	53.38	54.00	-0.62	22.57	2.89	0.00	27.92	Average	144	119	VERTICAL
3 a	2437.80	124.09			93.37	2.94	0.00	27.78	Average	144	119	VERTICAL
4 p	2438.20	128.35			97.63	2.94	0.00	27.78	Peak	144	119	VERTICAL
5	2501.10	65.33	74.00	-8.67	34.66	2.97	0.00	27.70	Peak	144	119	VERTICAL
6 !	2520.30	52.74	54.00	-1.26	22.01	2.98	0.00	27.75	Average	144	119	VERTICAL

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

**Channel 11**

	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	2461.20	116.41			84.05	4.14	28.22	0.00	Average	100	281	VERTICAL
2	2461.20	119.82			87.46	4.14	28.22	0.00	Peak	100	281	VERTICAL
3	2500.00	53.19	54.00	-0.81	20.72	4.17	28.30	0.00	Average	100	281	VERTICAL
4	2500.00	62.74	74.00	-11.26	30.27	4.17	28.30	0.00	Peak	100	281	VERTICAL

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

Temperature	23°C	Humidity	63%
Test Engineer	Simon Yang	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	May 17, 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	2388.40	67.55	74.00	-6.45	36.77	2.91	0.00	27.87	Peak	198	105	VERTICAL
2	2388.80	52.93	54.00	-1.07	22.15	2.91	0.00	27.87	Average	198	105	VERTICAL
3	2413.40	118.79			88.03	2.92	0.00	27.84	Peak	198	105	VERTICAL
4	2413.40	107.15			76.39	2.92	0.00	27.84	Average	198	105	VERTICAL

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	2386.60	52.27	54.00	-1.73	21.49	2.91	0.00	27.87	Average	342	100	VERTICAL
2	2386.80	68.53	74.00	-5.47	37.75	2.91	0.00	27.87	Peak	342	100	VERTICAL
3	2435.40	125.11			94.37	2.93	0.00	27.81	Peak	342	100	VERTICAL
4	2435.80	113.14			82.40	2.93	0.00	27.81	Average	342	100	VERTICAL
5	2484.70	67.38	74.00	-6.62	36.69	2.96	0.00	27.73	Peak	342	100	VERTICAL
6	2485.10	52.03	54.00	-1.97	21.34	2.96	0.00	27.73	Average	342	100	VERTICAL

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	2467.20	107.85			77.14	2.95	0.00	27.76	Average	210	100	VERTICAL
2	2467.80	119.63			88.92	2.95	0.00	27.76	Peak	210	100	VERTICAL
3	2483.50	53.62	54.00	-0.38	22.93	2.96	0.00	27.73	Average	210	100	VERTICAL
4	2485.50	69.73	74.00	-4.27	39.04	2.96	0.00	27.73	Peak	210	100	VERTICAL

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

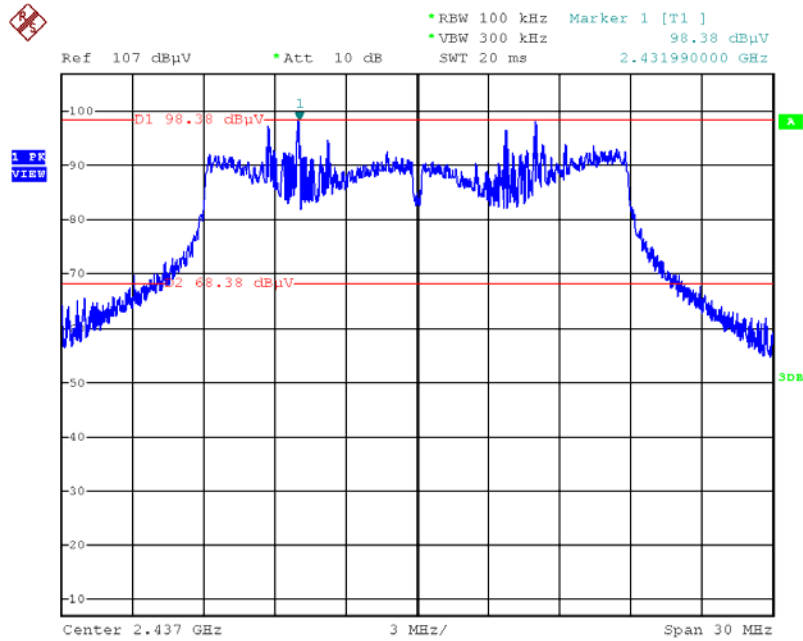
Note:

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

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

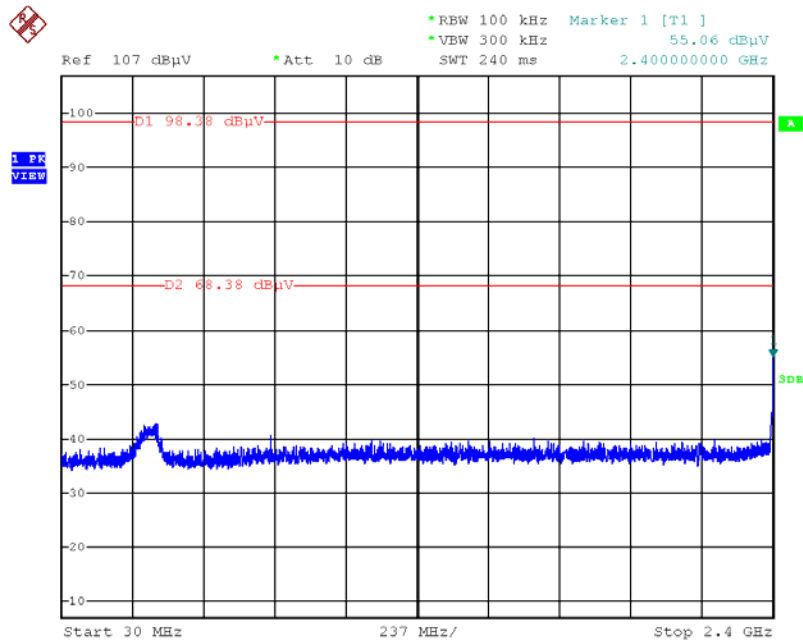
For Emission not in Restricted Band

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



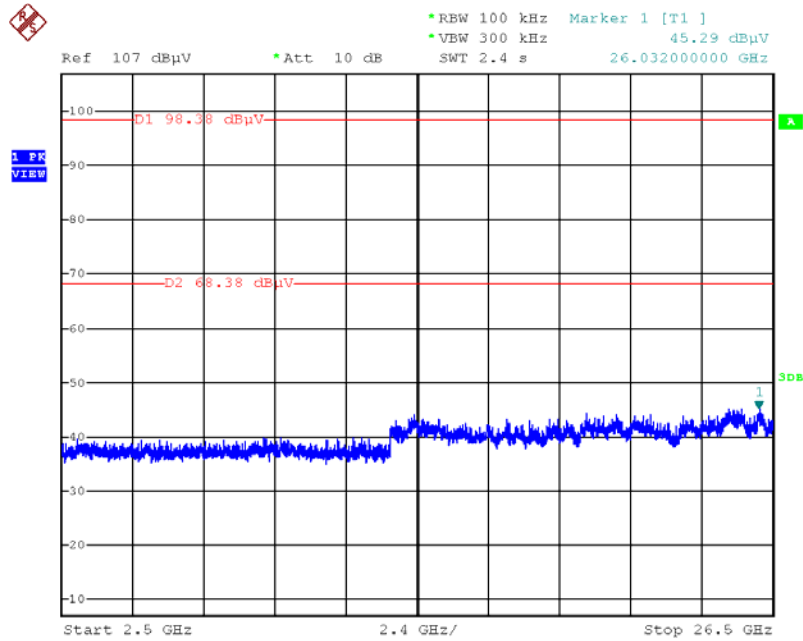
Date: 18.MAY.2013 04:34:11

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



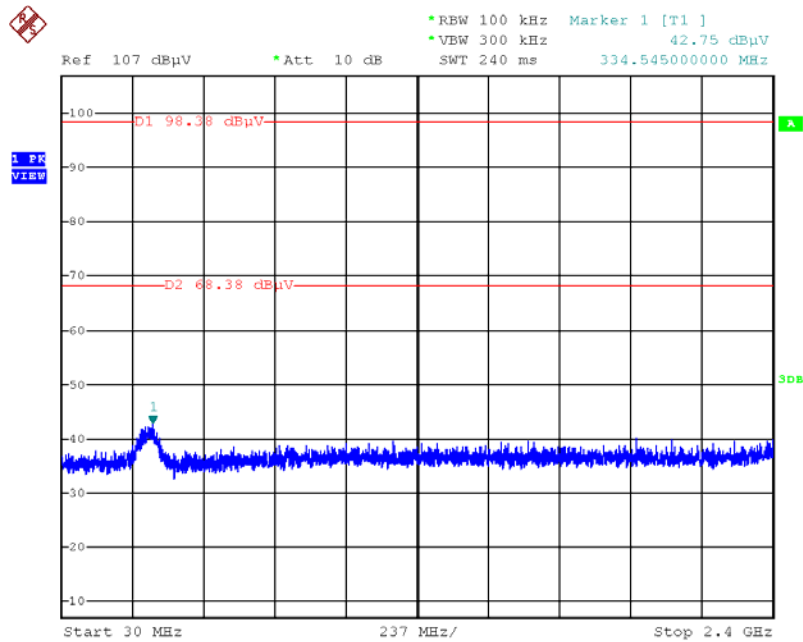
Date: 18.MAY.2013 04:36:01

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



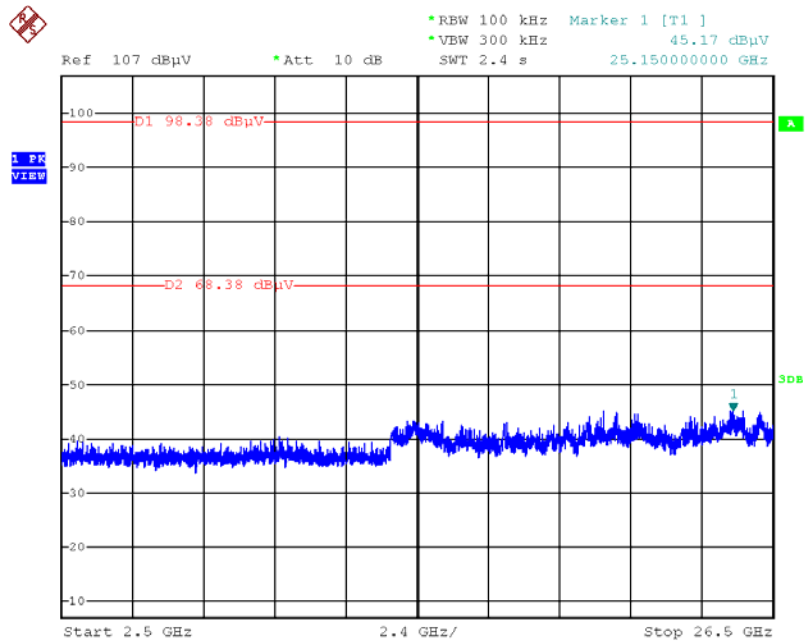
Date: 18.MAY.2013 04:36:31

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



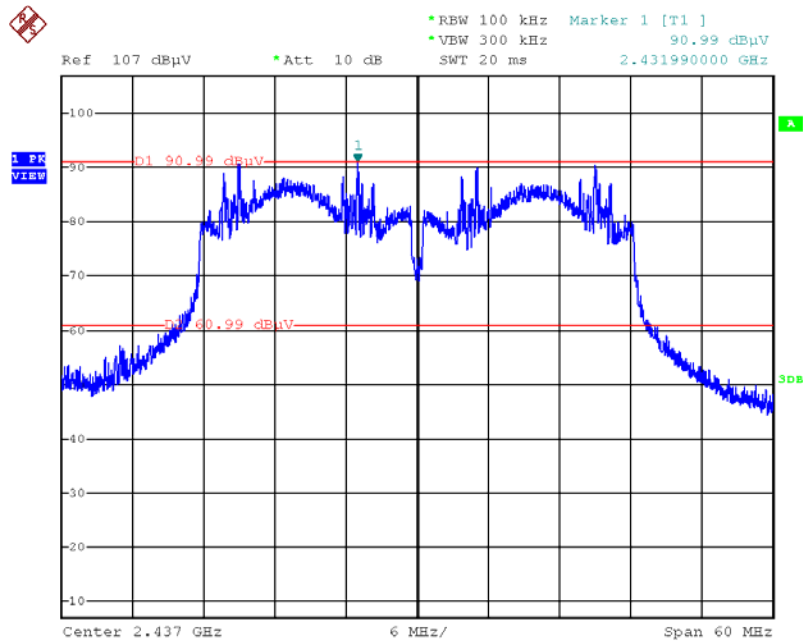
Date: 18.MAY.2013 04:37:53

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



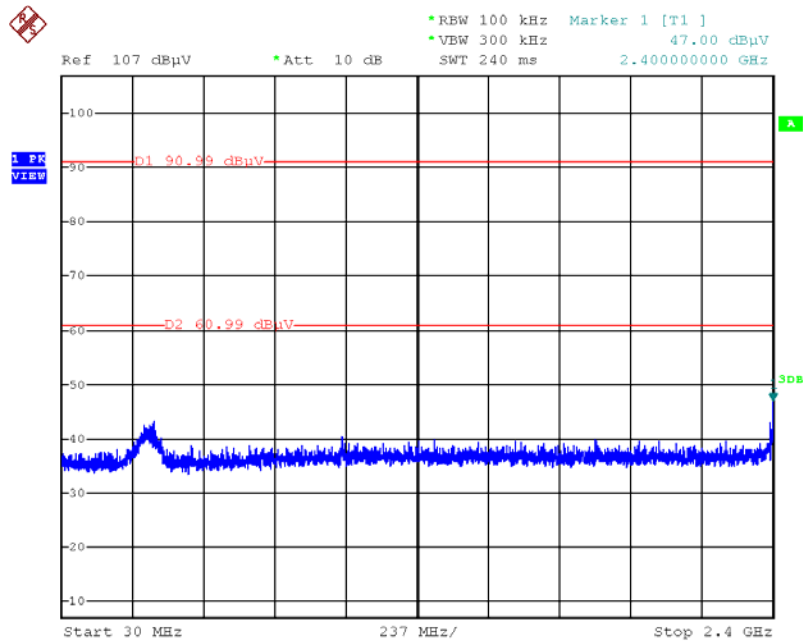
Date: 18.MAY.2013 04:37:29

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



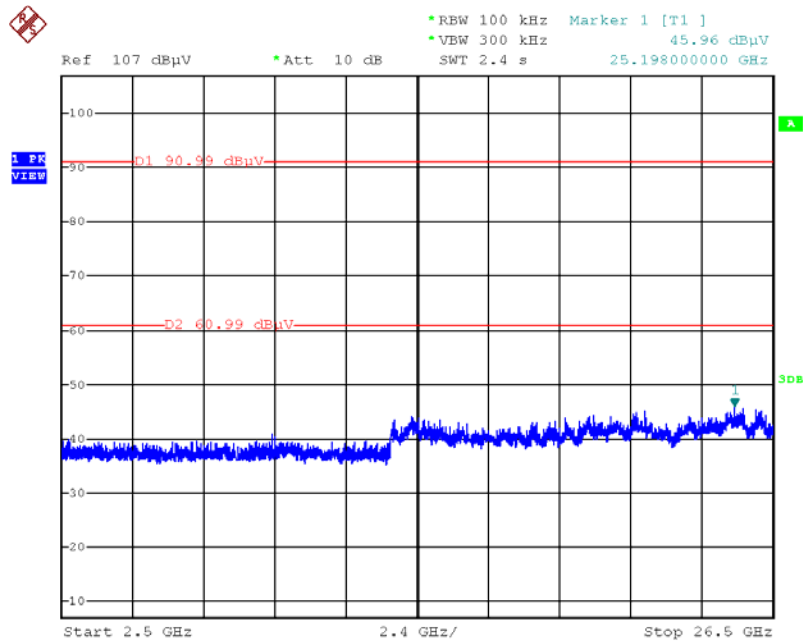
Date: 18.MAY.2013 04:28:06

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



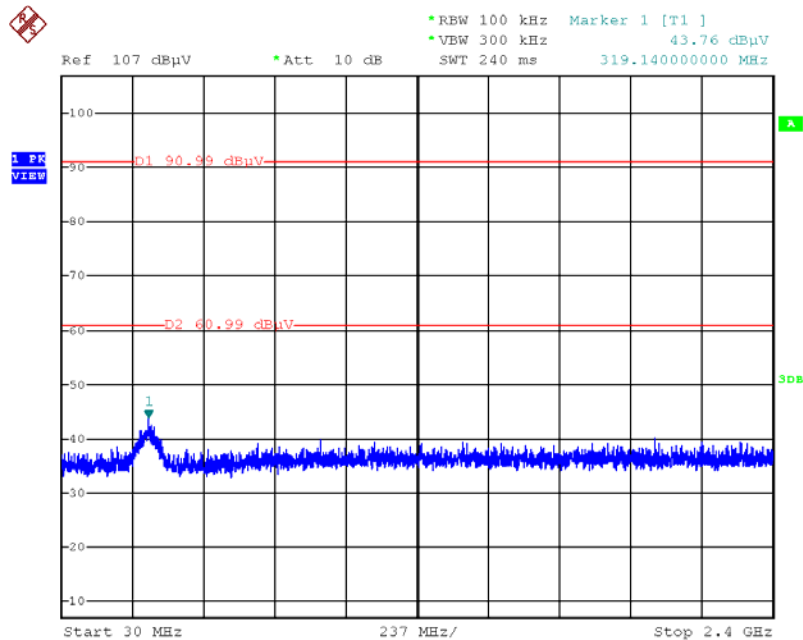
Date: 18.MAY.2013 04:29:28

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



Date: 18.MAY.2013 04:30:03

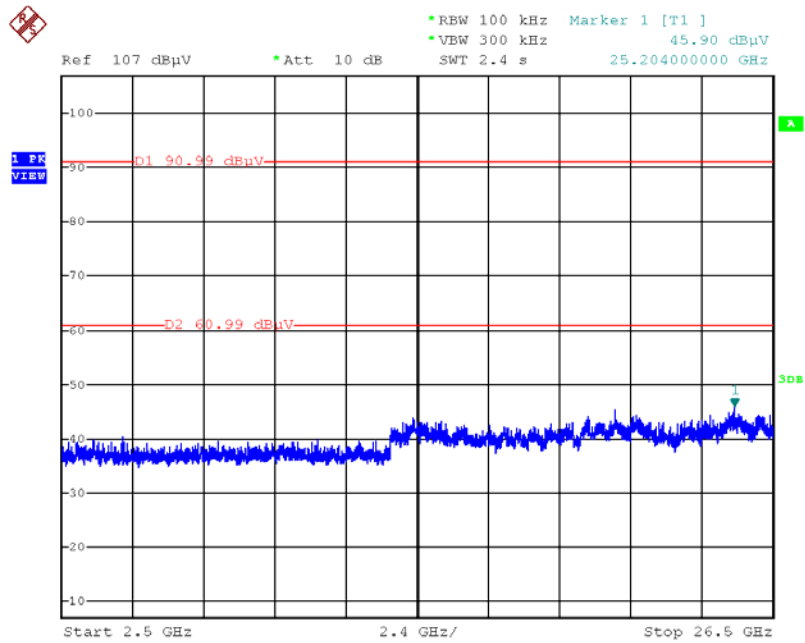
Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 30MHz~2400MHz (down 30dBc)



Date: 18.MAY.2013 04:31:39

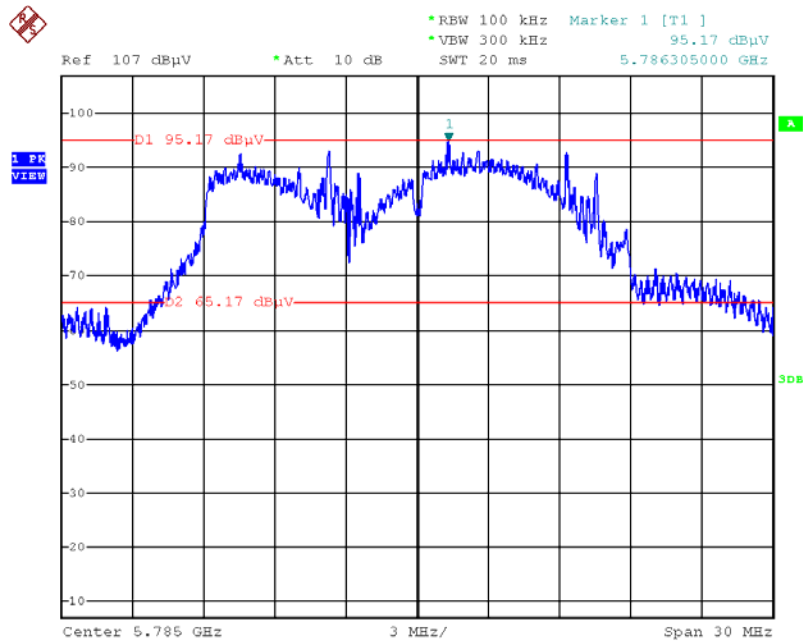


Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 9 / 2500MHz~26500MHz (down 30dBc)



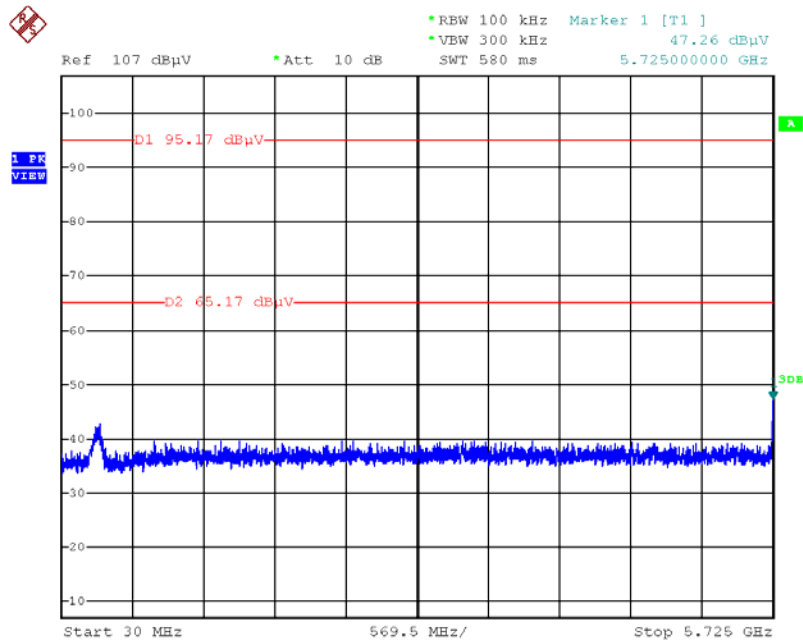
Date: 18.MAY.2013 04:31:19

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



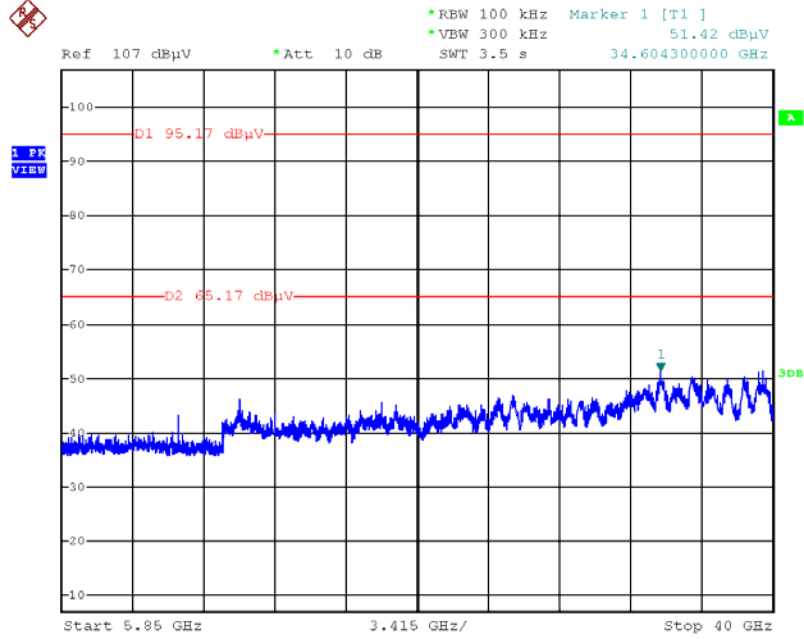
Date: 18.MAY.2013 03:59:01

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



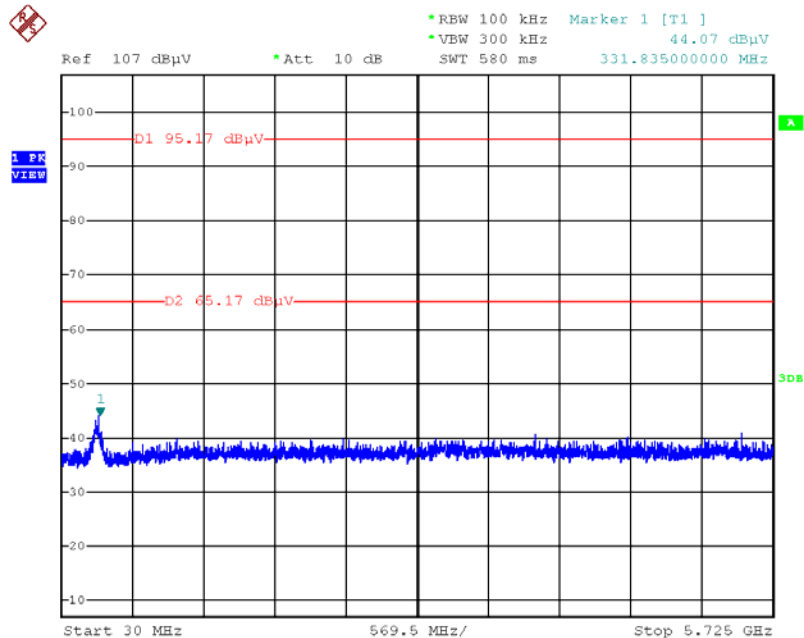
Date: 18.MAY.2013 04:00:12

Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / CH 149 / 5850MHz~40000MHz  
(down 30dBc)



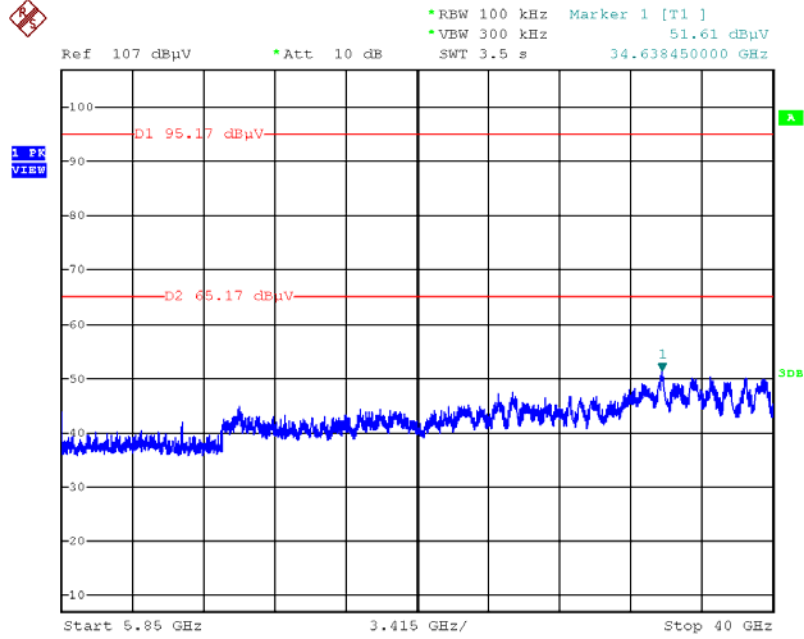
Date: 18.MAY.2013 04:00:43

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



Date: 18.MAY.2013 04:02:30

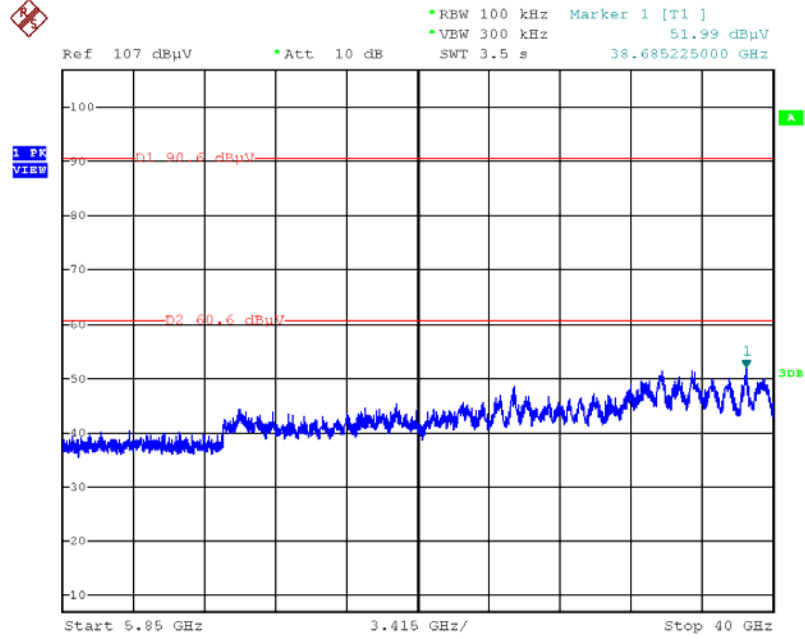
Plot on Configuration IEEE 802.11ac MCS0, Nss1 20MHz / CH 165 / 5850MHz~4000MHz  
(down 30dBc)



Date: 18.MAY.2013 04:01:43

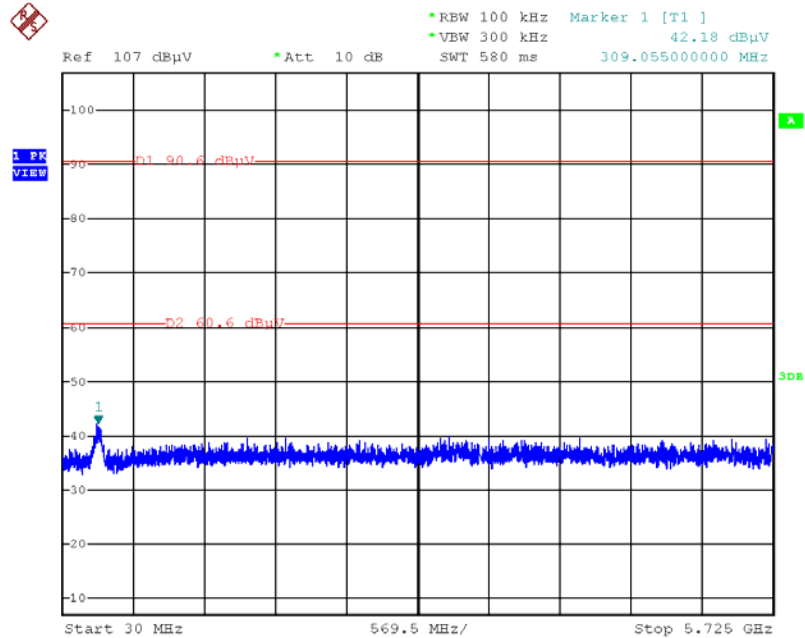


Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / CH 151 / 5850MHz~4000MHz  
(down 30dBc)



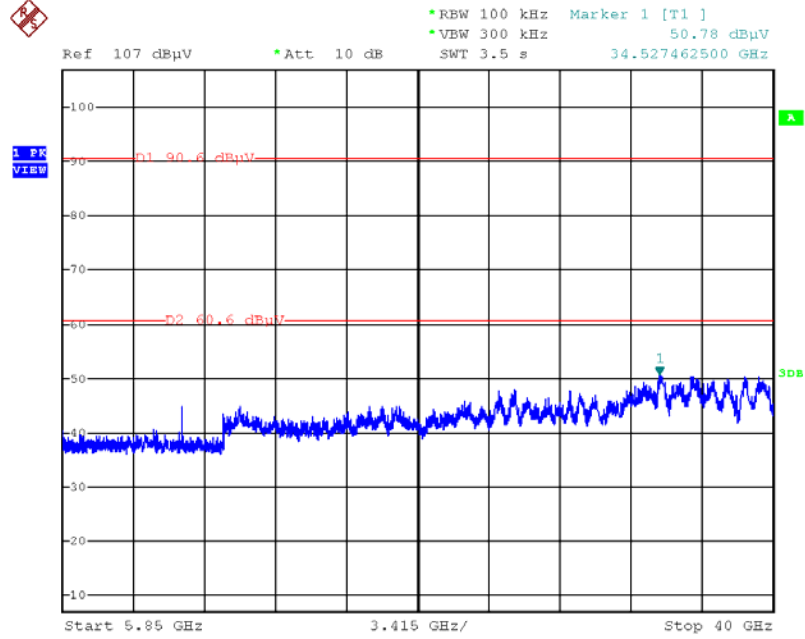
Date: 18.MAY.2013 04:10:31

Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / CH 159 / 30MHz~5725MHz (down 30dBc)



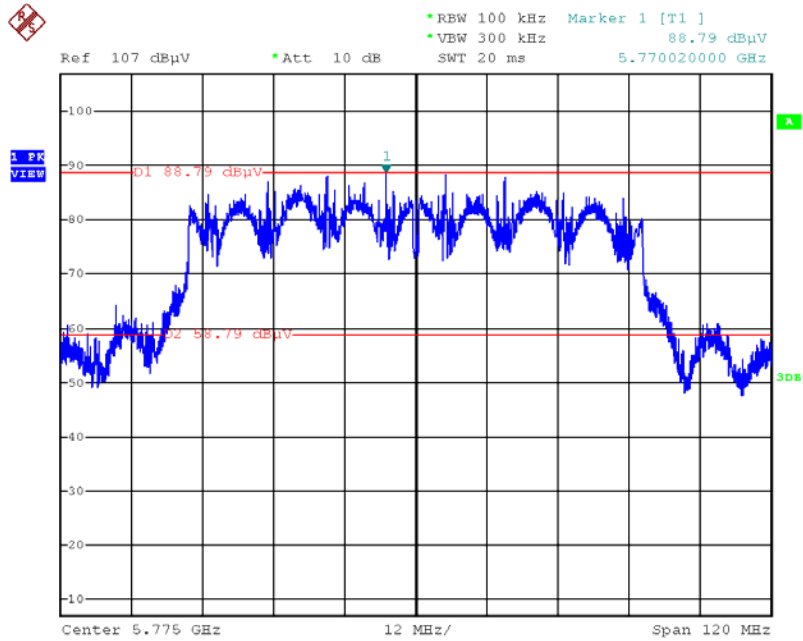
Date: 18.MAY.2013 04:07:24

Plot on Configuration IEEE 802.11ac MCS0, Nss1 40MHz / CH 159 / 5850MHz~4000MHz  
(down 30dBc)



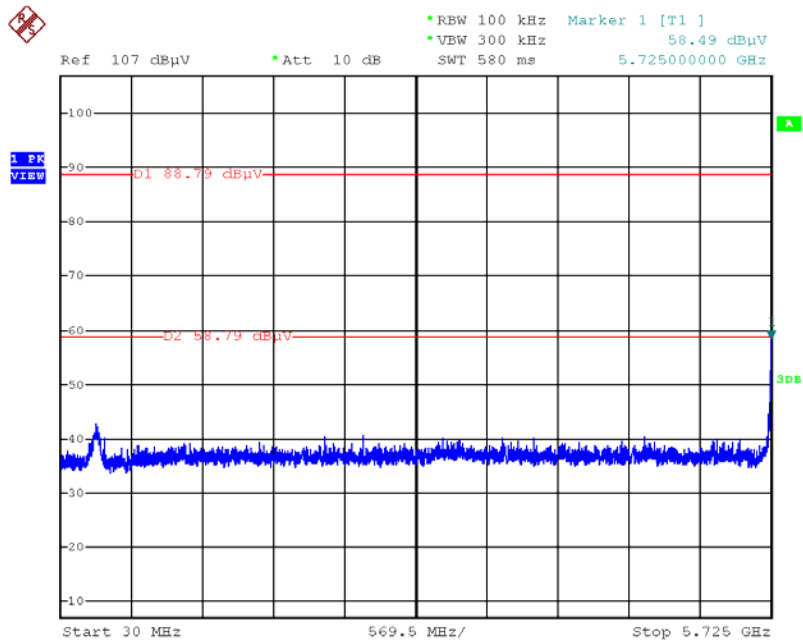
Date: 18.MAY.2013 04:08:04

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



Date: 18.MAY.2013 04:13:19

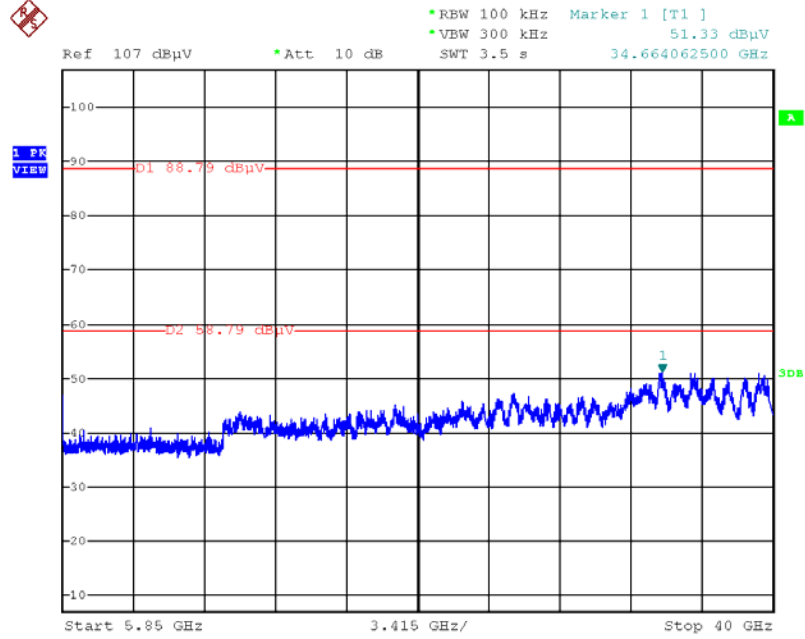
Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / CH 155 / 30MHz~5725MHz (down 30dBc)



Date: 18.MAY.2013 04:17:46



Plot on Configuration IEEE 802.11ac MCS0, Nss1 80MHz / CH 155 / 5850MHz~4000MHz  
(down 30dBc)



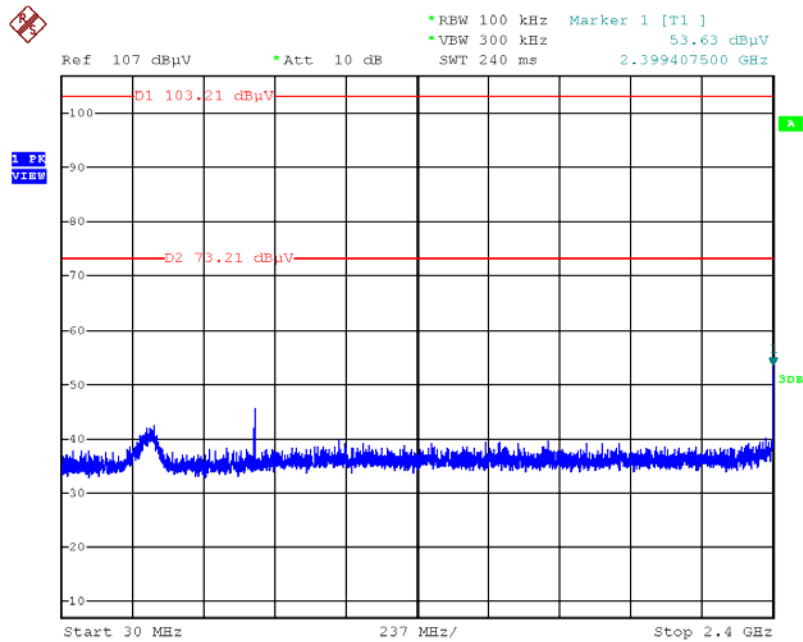
Date: 18.MAY.2013 04:18:32

Plot on Configuration IEEE 802.11b / Reference Level



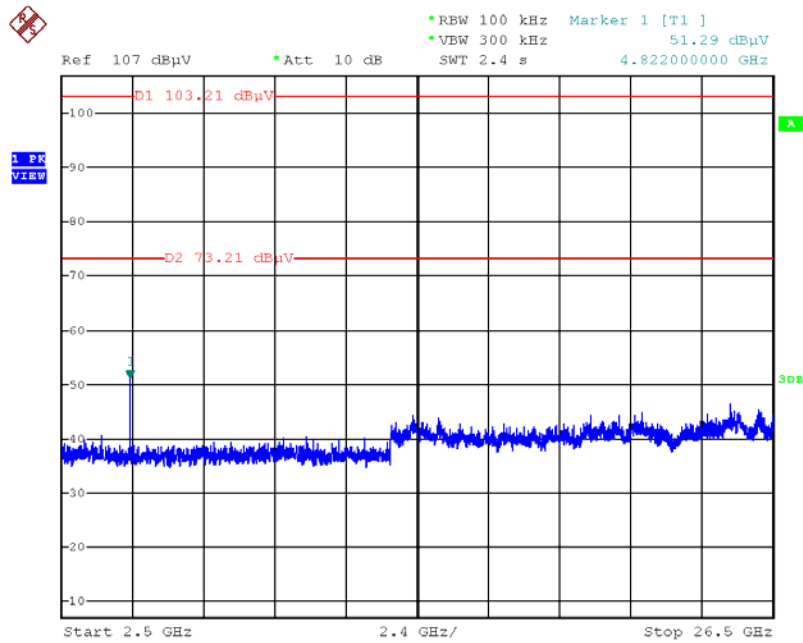
Date: 18.MAY.2013 04:46:35

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



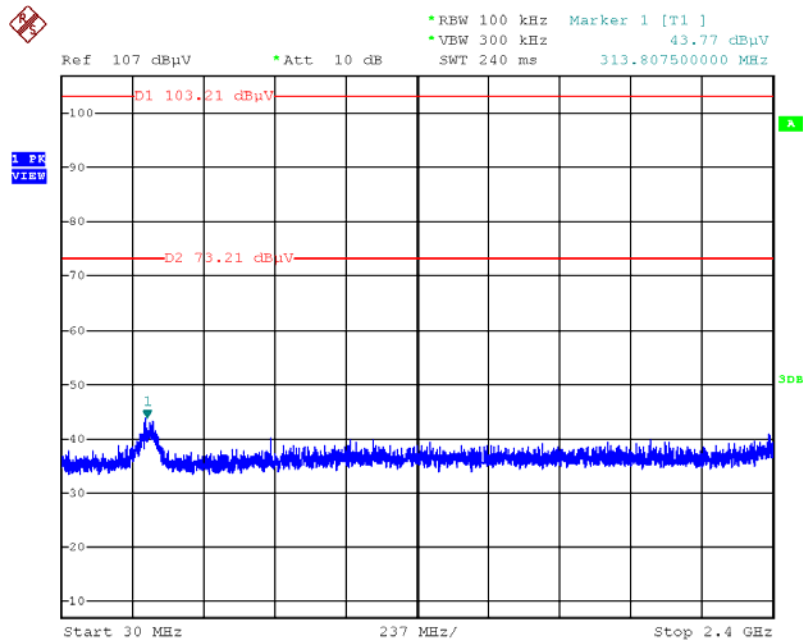
Date: 18.MAY.2013 04:47:29

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



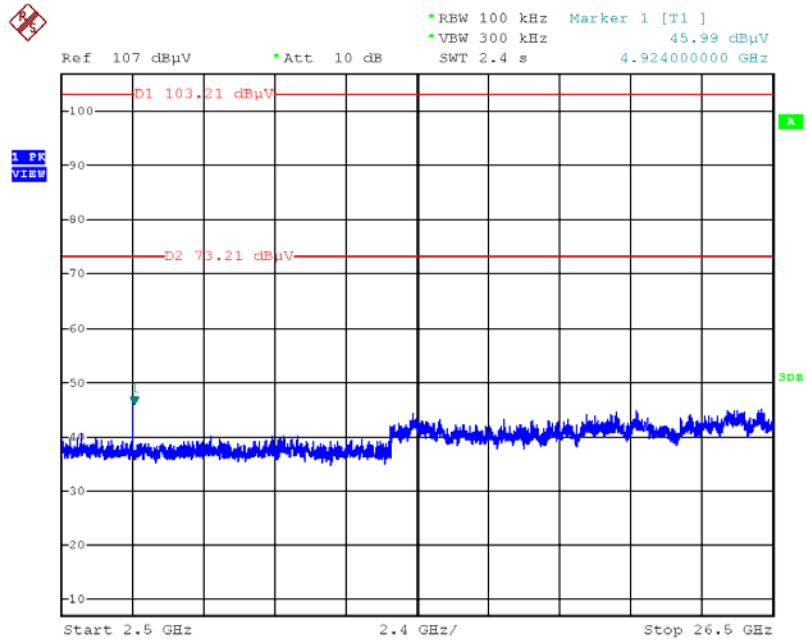
Date: 18.MAY.2013 04:47:50

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



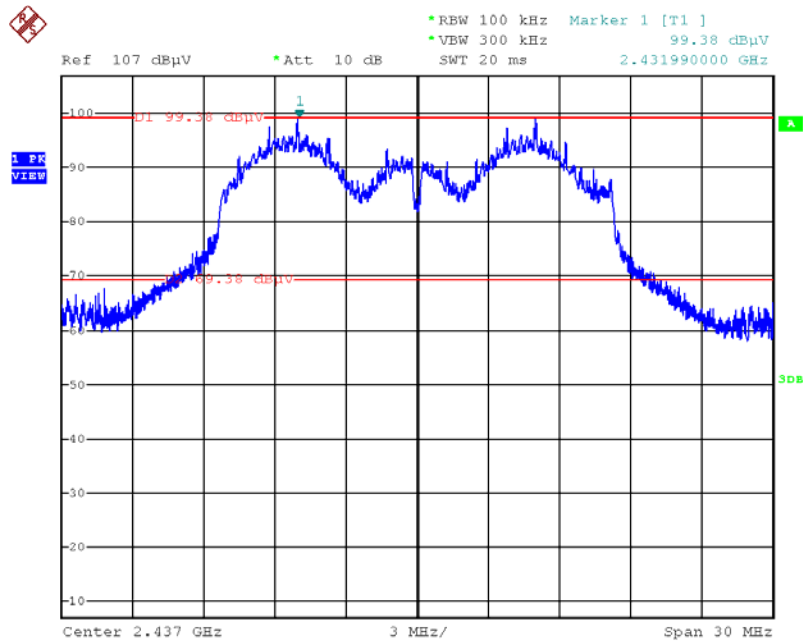
Date: 18.MAY.2013 04:49:28

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



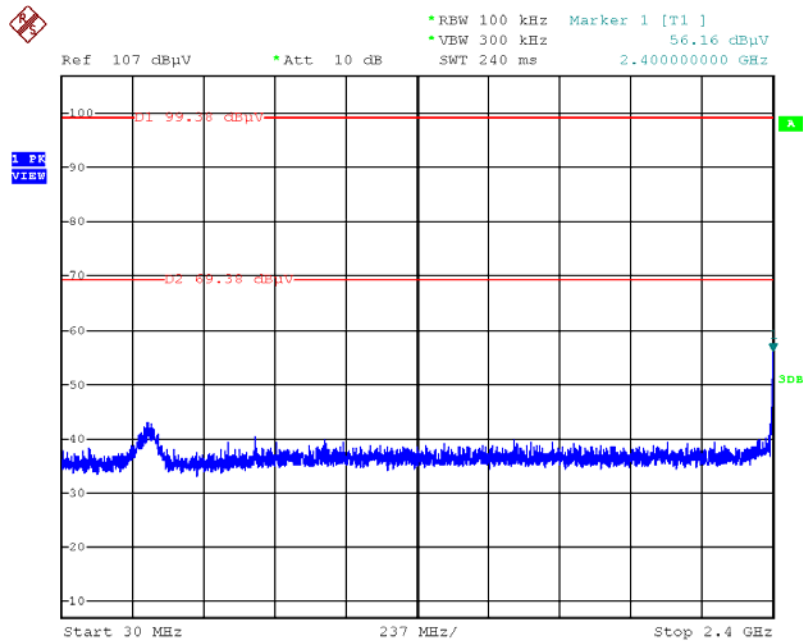
Date: 18.MAY.2013 04:49:02

Plot on Configuration IEEE 802.11g / Reference Level



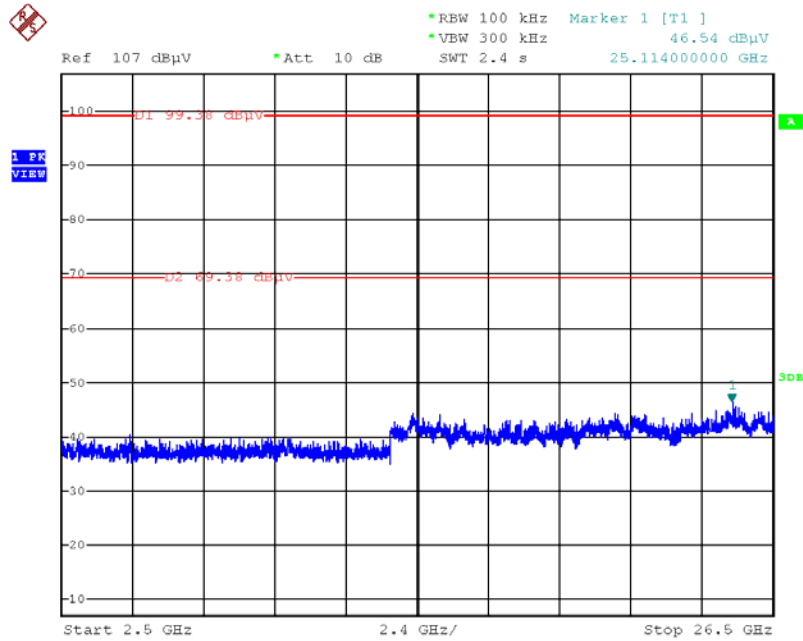
Date: 18.MAY.2013 04:39:35

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



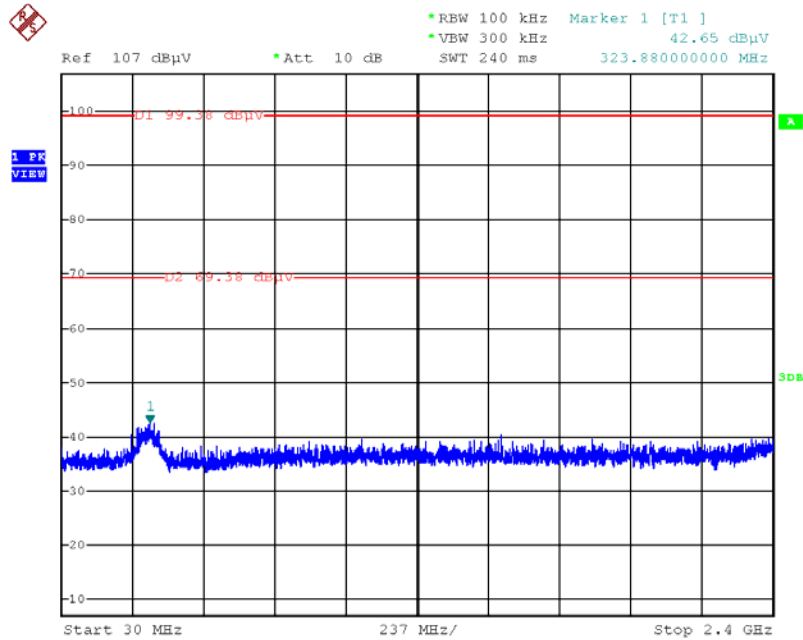
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Plot on Configuration IEEE 802.11g / CH 1 / 2500MHz~26500MHz (down 30dBc)



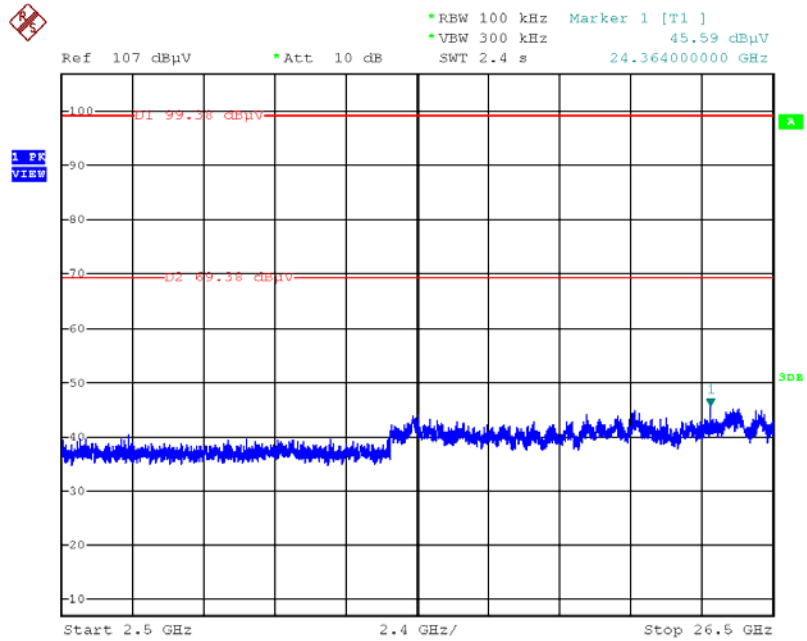
Date: 18.MAY.2013 04:41:01

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



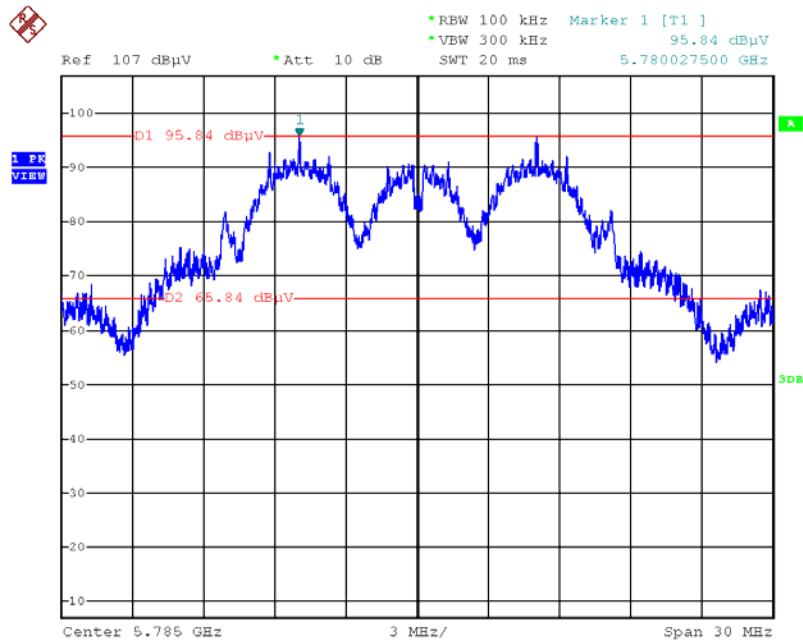
Date: 18.MAY.2013 04:42:26

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



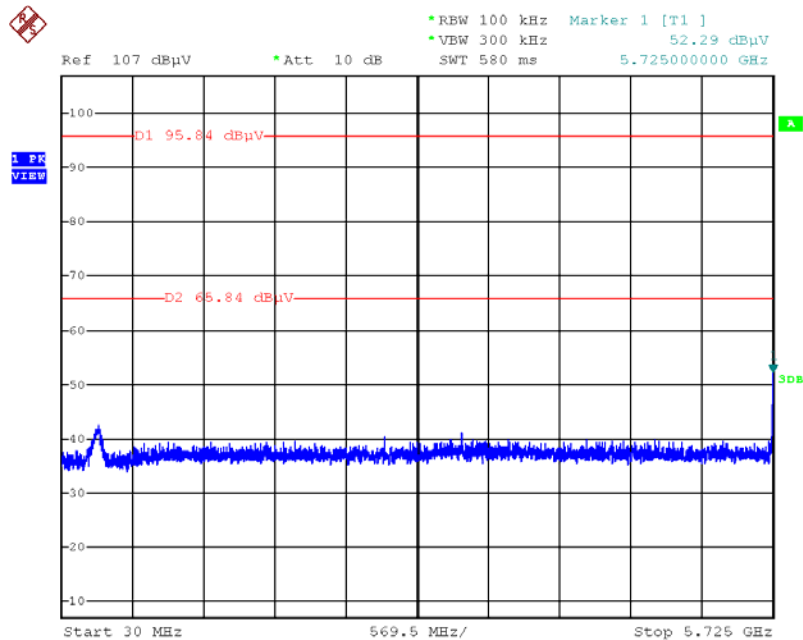
Date: 18.MAY.2013 04:42:04

Plot on Configuration IEEE 802.11a / Reference Level



Date: 18.MAY.2013 03:48:35

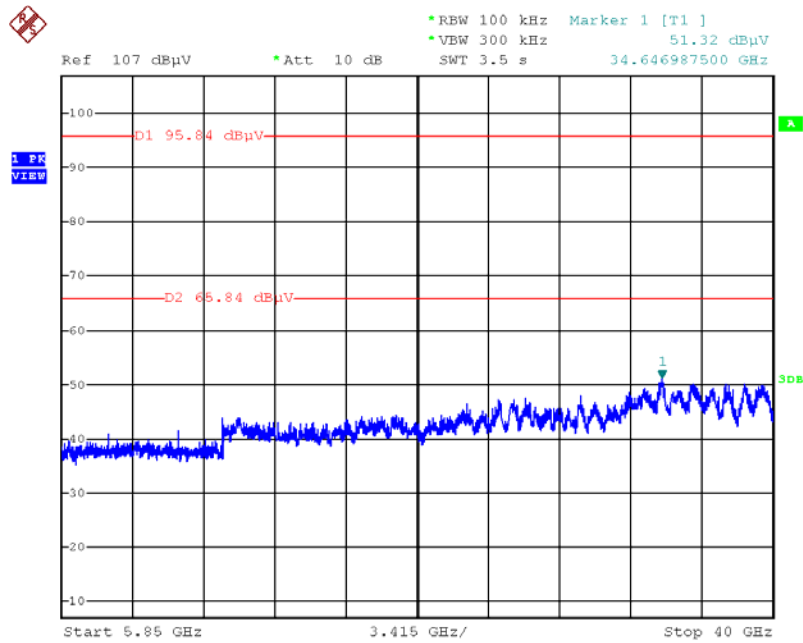
Plot on Configuration IEEE 802.11a / CH 149 / 30MHz~5725MHz (down 30dBc)



Date: 18.MAY.2013 03:50:40

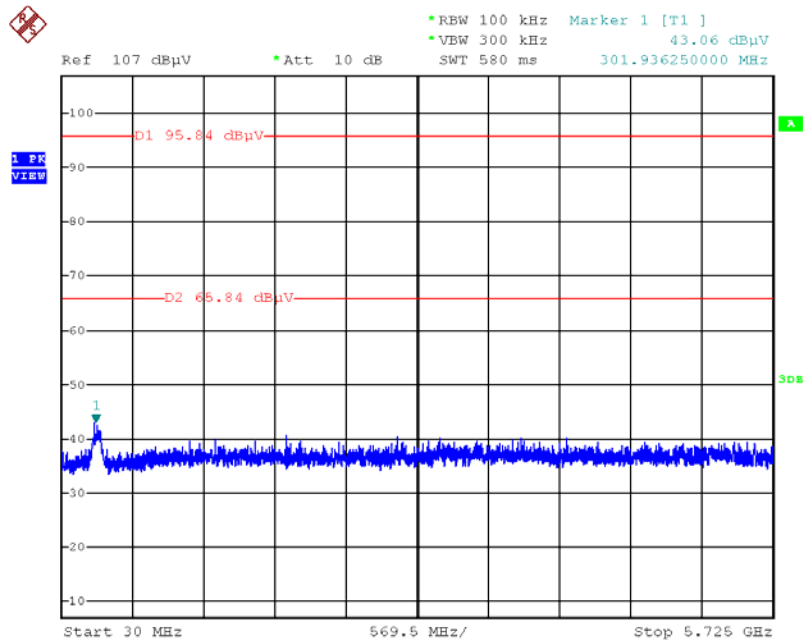


Plot on Configuration IEEE 802.11a / CH 149 / 5850MHz~40000MHz (down 30dBc)



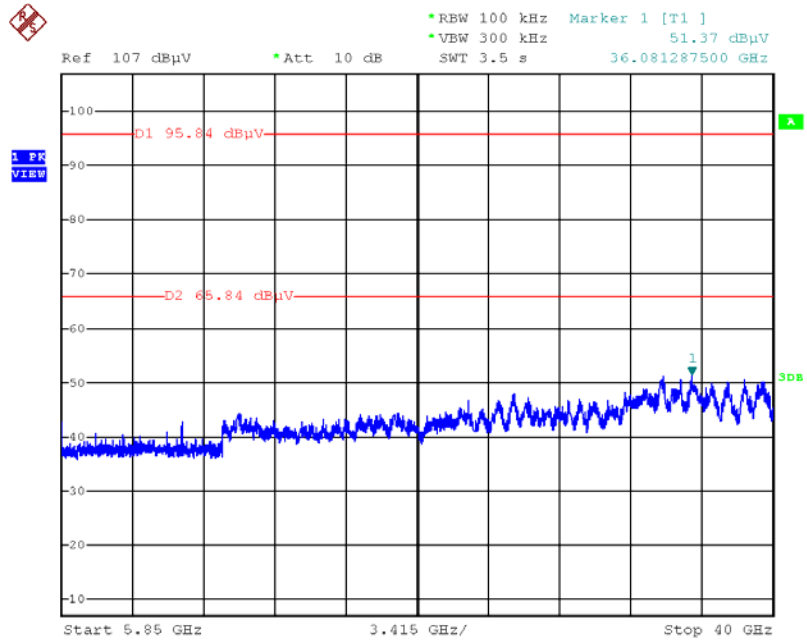
Date: 18.MAY.2013 03:51:36

Plot on Configuration IEEE 802.11a / CH 165 / 30MHz~5725MHz (down 30dBc)



Date: 18.MAY.2013 03:54:47

Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~40000MHz (down 30dBc)



Date: 18.MAY.2013 03:53:54

## 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	100377	9kHz ~ 2.75GHz	Oct. 23, 2012	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Nov. 26, 2012	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127-478	9kHz ~ 30MHz	Jun. 22, 2012	Conduction (CO01-CB)
Impulsbegrenzer Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz~30MHz	Feb. 21, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	0.15MHz~30MHz	Dec. 04, 2012	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Jul. 31, 2012	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9KHz~40GHz	Nov. 16, 2012	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Apr. 15, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 18, 2012	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9KHz~40GHz	Oct. 08, 2012	Conducted (TH01-CB)
RF Power Divider	Woken	3 Way	MDC2366	2GHz ~ 18GHz	Nov. 18, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Nov. 28, 2012	Conducted (TH01-CB)



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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Nov. 27, 2012	Conducted (TH01-CB)

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

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

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

## 6. TEST LOCATION

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

## 7. MEASUREMENT UNCERTAINTY

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

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

### Uncertainty of Conducted Emission Measurement

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Cable loss	0.038	dB	normal(k=2)	0.019
Attenuator	0.047	dB	normal(k=2)	0.024
Power Meter specification	0.300	dB	normal(k=2)	0.150
Power Sensor specification	0.300	dB	normal(k=2)	0.150
Mismatch Receiver VSWR 1= Antenna VSWR 2= Pre Amplifier VSWR 3=	-0.080	dB	U-shaped	0.060
combined standard uncertainty $Ue(y)$	0.403			
Measuring uncertainty for a level of confidence of 95% $U=2Ue(y)$	0.806			

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

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.1727	dB	normal(k=1)	0.1727
Cable loss	0.1736	dB	normal(k=2)	0.0868
Antenna gain	0.1687	dB	normal(k=2)	0.0843
Site imperfection	0.4898	dB	Triangular	0.2
Pre-amplifier gain	0.3661	dB	normal(k=2)	0.183
Transmitter antenna	1.7	dB	rectangular	0.9815
Signal generator	0.5	dB	rectangular	0.2887
Mismatch	0.08	dB	u-shape	0.244
Spectrum analyzer	0.5	dB	rectangular	0.2887
combined standard uncertainty $U_e(y)$	1.1434			
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	2.2869			

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

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.1908	dB	normal(k=1)	0.1908
Cable loss	0.1685	dB	normal(k=2)	0.0843
Antenna gain	0.1912	dB	normal(k=2)	0.0956
Site imperfection	1.3091	dB	Triangular	0.5344
Pre-amplifier gain	0.3043	dB	normal(k=2)	0.1521
Transmitter antenna	1.7	dB	rectangular	0.9815
Signal generator	0.5	dB	rectangular	0.2887
Mismatch	0.08	dB	u-shape	0.244
Spectrum analyzer	0.8	dB	rectangular	0.4619
combined standard uncertainty $U_e(y)$	1.2965			
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	2.593			



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

Contribution	Uncertainty of $x_i$			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	0.1864	dB	normal(k=1)	0.1864
Cable loss	0.1666	dB	normal(k=2)	0.0833
Antenna gain	0.1904	dB	normal(k=2)	0.0952
Site imperfection	0.4882	dB	Triangular	0.1993
Pre-amplifier gain	0.2688	dB	normal(k=2)	0.1344
Transmitter antenna	1.7	dB	rectangular	0.9815
Signal generator	0.5	dB	rectangular	0.2887
Mismatch	0.08	dB	u-shape	0.244
Spectrum analyzer	0.8	dB	rectangular	0.4619
combined standard uncertainty $U_e(y)$	1.1874			
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	2.3749			