SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

Applicant's company	**NETGEAR, Inc.**
Applicant Address	350 East Plumeria Drive, San Jose, California 95134, USA
FCC ID	**PY313400243**

Product Name	Universal Dual Band WiFi Range Extender
Brand Name	NETGEAR
Model No.	WN2500RPv2
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Nov. 19, 2013
Final Test Date	Dec. 30, 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 (5725 ~ 5850MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009**, **47 CFR FCC Part 15 Subpart C**, **KDB 558074 D01 v03r01** and **KDB 662911 D01 v02r01**.

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

Testing Laboratory
1190

Table of Contents

1. CERTIFICATE OF COMPLIANCE 1

2. SUMMARY OF THE TEST RESULT 2

3. GENERAL INFORMATION 3

3.1. Product Details 3
3.2. Accessories 5
3.3. Table for Filed Antenna 5
3.4. Table for Carrier Frequencies 7
3.5. Table for Test Modes 8
3.6. Table for Testing Locations 10
3.7. Table for Supporting Units 10
3.8. Table for Parameters of Test Software Setting 11
3.9. EUT Operation during Test 11
3.10. Duty Cycle 12
3.11. Test Configurations 16

4. TEST RESULT 18

4.1. AC Power Line Conducted Emissions Measurement 18
4.2. Maximum Conducted Output Power Measurement 23
4.3. Power Spectral Density Measurement 26
4.4. 6dB Spectrum Bandwidth Measurement 37
4.5. Radiated Emissions Measurement 44
4.6. Emissions Measurement 71
4.7. Antenna Requirements 98

5. LIST OF MEASURING EQUIPMENTS 99

6. MEASUREMENT UNCERTAINTY 101

APPENDIX A. TEST PHOTOS ..... A1 ~ A5

APPENDIX B. MAXIMUM PERMISSIBLE EXPOSURE ..... B1 ~ B3

APPENDIX C. CO-LOCATION REPORT ..... C1 ~ C3

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR3N1913AA	Rev. 01	Initial issue of report	Jan. 15, 2014

Certificate No.: CB10301022

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Universal Dual Band WIFI Range Extender
Brand Name	:	NETGEAR
Model No.	:	WN2500RPv2
Applicant	:	NETGEAR, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 19, 2013 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

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	8.49 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	6.05 dB
4.3	15.247(e)	Power Spectral Density	Complies	2.11 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.07 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.01 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
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
Channel Band Width (99%)	For 2.4GHz Band: MCS0 (20MHz): 17.68MHz ; MCS0 (40MHz): 36.32 MHz For 5GHz Band: MCS0 (20MHz): 18.16 MHz ; MCS0 (40MHz): 57.44 MHz
Maximum Conducted Output Power	For 2.4GHz Band: MCS0 (20MHz): 23.64 dBm ; MCS0 (40MHz): 18.64 dBm For 5GHz Band: MCS0 (20MHz): 23.89 dBm ; MCS0 (40MHz): 23.57 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11a/b/g

Items	Description
Product Type	802.11a/g: WLAN (2TX, 2RX) 802.11b: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
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: 10.24 MHz ; 11g: 16.72 MHz ; 11a: 20.16 MHz
Maximum Conducted Output Power	11b: 20.98 dBm ; 11g: 23.53 dBm ; 11a: 23.95 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Note: BCM5358UB0KFBG chipset supports 2.4GHz and BCM43236BKMLG chipset supports 2.4GHz/5GHz. The 2.4GHz of BCM43236BKMLG chipset is designed only for installation and it will disable when the installation is completed. Thus, only the test of 5GHz for BCM43236BKMLG chipset is required.

Antenna and Band width

Antenna	Single (TX)	Two (TX)	
Band width Mode	20 MHz	20 MHz	40 MHz
IEEE 802.11a	X	V	X
IEEE 802.11b	V	X	X
IEEE 802.11g	X	V	X
IEEE 802.11n	X	V	V

IEEE 11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n		

3.2. Accessories

Power	Brand	Model	P/N	Rating
Adapter 1	NETGEAR	SAL012F1 NA	332-10366-01	Input: 100-120V~47-63Hz 0.6A Output: 12.0V, 1.0A
Adapter 2	NETGEAR	AD810F10	332-10329-02	Input: 100-120V~50/60Hz 0.3A Output: 12V, 1A
Other				
RJ-45 Cable*1: Non-shielded, 1.5m				

3.3. Table for Filed Antenna

For 2.4GHz and 5GHz Band 4

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
					2.4GHz	5GHz (Band 4)
1	NETGEAR	WN2500RPv2	PCB Antenna	I-PEX	-	4.0
2	NETGEAR	WN2500RPv2	PCB Antenna	N/A	2.8	-
3	NETGEAR	WN2500RPv2	PCB Antenna	I-PEX	-	3.8
4	NETGEAR	WN2500RPv2	PCB Antenna	N/A	1.6	-

For 5GHz Band 1

Ant.	Brand	Model Name	Antenna Type	Connector	Correlated directional gain
					5GHz (Band 1)
1	NETGEAR	WN2500RPv2	PCB Antenna	I-PEX	4.28
3	NETGEAR	WN2500RPv2	PCB Antenna	I-PEX	

Note: The EUT has four antennas.

<For 2.4GHz Band>

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

Only Ant. 2 can be used as transmitting/receiving antenna.

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

Ant. 2 and Ant. 4 can be used as transmitting/receiving antennas.

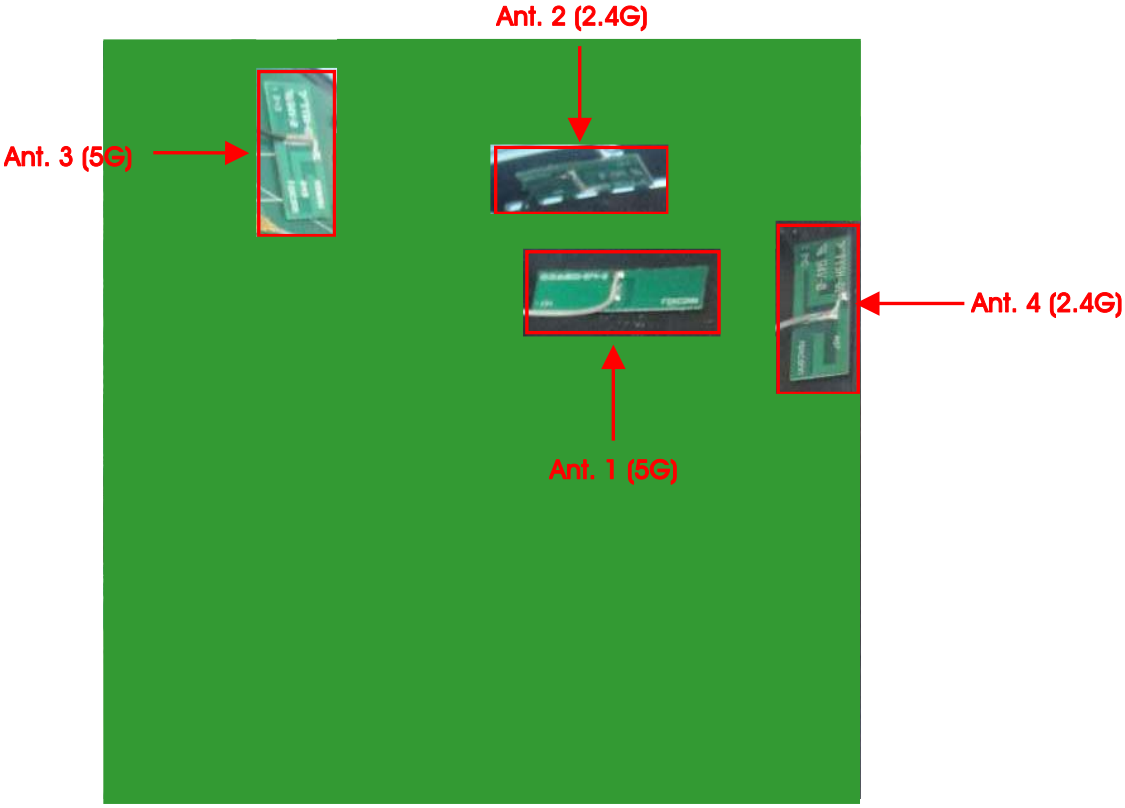
Ant. 2 and Ant. 4 could transmit/receive simultaneously.

<For 5GHz Band>

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

Ant. 1 and Ant. 3 can be used as transmitting/receiving antennas.

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


Ant. 3 (5G)
Ant. 2 (2.4G)
Ant. 1 (5G)
Ant. 4 (2.4G)

3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

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

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

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

For 5GHz Band:

There are two bandwidth systems.

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

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

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	159	5795 MHz
	151	5755 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 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	2+4
	11n 40MHz	MCS0	3/6/9	2+4
	11b/CCK	1 Mbps	1/6/11	2
	11g/BPSK	6 Mbps	1/6/11	2+4
Power Spectral Density	11n 20MHz	MCS0	1/6/11	2+4
	11n 40MHz	MCS0	3/6/9	2+4
	11b/CCK	1 Mbps	1/6/11	2
	11g/BPSK	6 Mbps	1/6/11	2+4
6dB Spectrum Bandwidth	11n 20MHz	MCS0	1/6/11	2+4
	11n 40MHz	MCS0	3/6/9	2+4
	11b/CCK	1 Mbps	1/6/11	2
	11g/BPSK	6 Mbps	1/6/11	2+4
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n 20MHz	MCS0	1/6/11	2+4
	11n 40MHz	MCS0	3/6/9	2+4
	11b/CCK	1 Mbps	1/6/11	2
	11g/BPSK	6 Mbps	1/6/11	2+4
Band Edge Emissions	11n 20MHz	MCS0	1/6/11	2+4
	11n 40MHz	MCS0	3/6/9	2+4
	11b/CCK	1 Mbps	1/6/11	2
	11g/BPSK	6 Mbps	1/6/11	2+4

For 5GHz Band

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

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. EUT with AC Adapter 1

Mode 2. EUT with AC Adapter 2

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

For Radiated Emission test <Below 1GHz>:

Mode 1. Laying of EUT with AC Adapter 1

Mode 2. Stand of EUT with AC Adapter 1

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

Mode 3. Laying of EUT with AC Adapter 2

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

For Radiated Emission test <Above 1GHz>:

Adapter 1 generated the worst case while Radiated Emissions test below 1GHz; thus, the measurement for Radiated Emissions test above 1GHz will follow this same test configuration.

Mode 1. Laying of EUT with AC Adapter 1

Mode 2. Stand of EUT with AC Adapter 1

Mode 2 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 Location				
Address:	No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.			
TEL:	886-3-656-9065			
FAX:	886-3-656-9085			
Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
03CH01-CB	SAC	Hsin Chu	262045	IC 4086D
CO01-CB	Conduction	Hsin Chu	262045	IC 4086D
TH01-CB	OVEN Room	Hsin Chu	-	-

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

3.7. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB*3	DELL	E6430	DoC
AP Router	Planex	GW-AP54SGX	KA220030603014-1

For Test Site No: 03CH01-CB <Below 1GHz>

Support Unit	Brand	Model	FCC ID
NB	DELL	M1340	E2K4965AGNM
NB	DELL	E6430	DoC
NB	DELL	D420	E2KWM3945ABG
Wireless ac AP	Netgear	R6300V2	PY31300227

For Test Site No: TH01-CB and 03CH01-CB <Above 1GHz>

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

3.8. Table for Parameters of Test Software Setting

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

For 2.4GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	Manual Tool Version : 1.0.0.9		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	50	76	52

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 1.0.0.9		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	40	55	46

Power Parameters of IEEE 802.11b/g

Test Software Version	Manual Tool Version : 1.0.0.9		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	73	73	72
IEEE 802.11g	51	76	52

For 5GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	Manual Tool Version : 1.0.0.9		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0 20MHz	74	80	80

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 1.0.0.9	
Frequency	5755 MHz	5795 MHz
MCS0 40MHz	80	80

Power Parameters of IEEE 802.11a

Test Software Version	ART		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	72	80	80

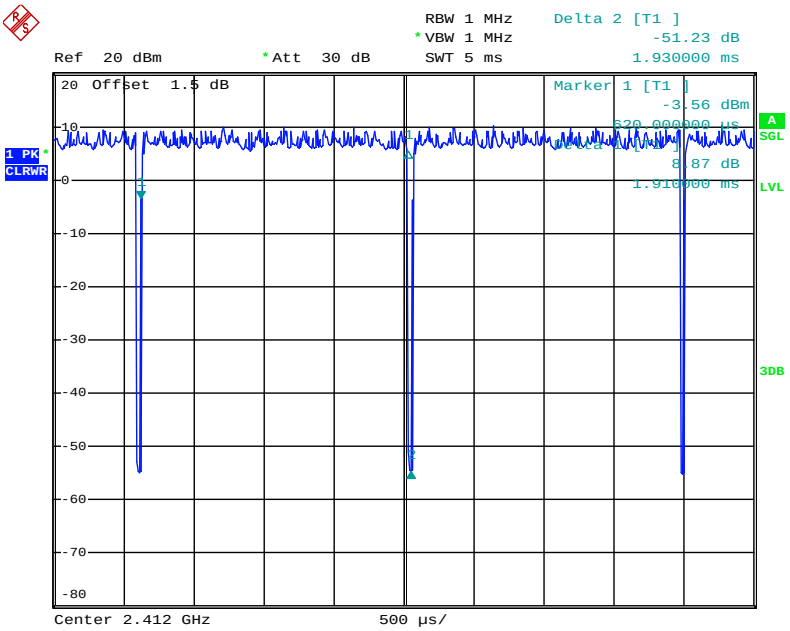
3.9. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.10. Duty Cycle

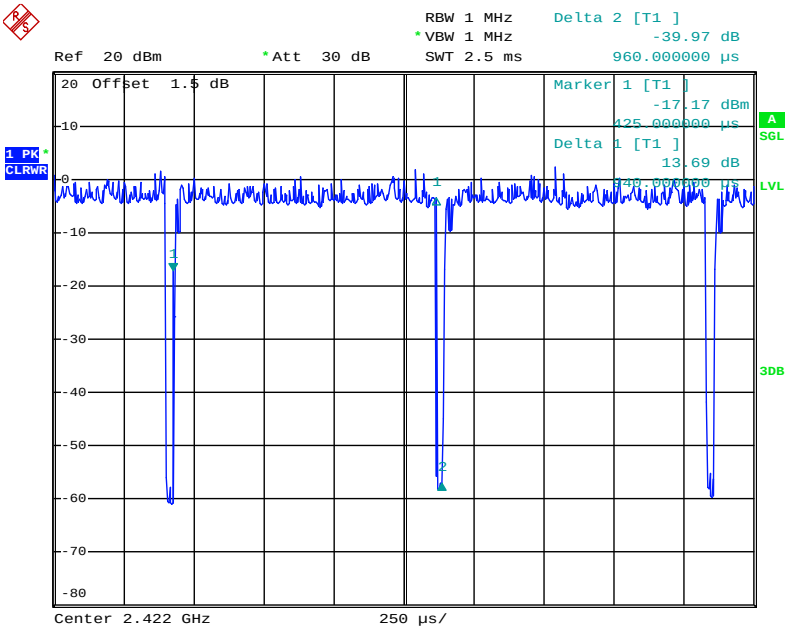
For 2.4GHz Band:

IEEE 802.11n MCS0 20MHz



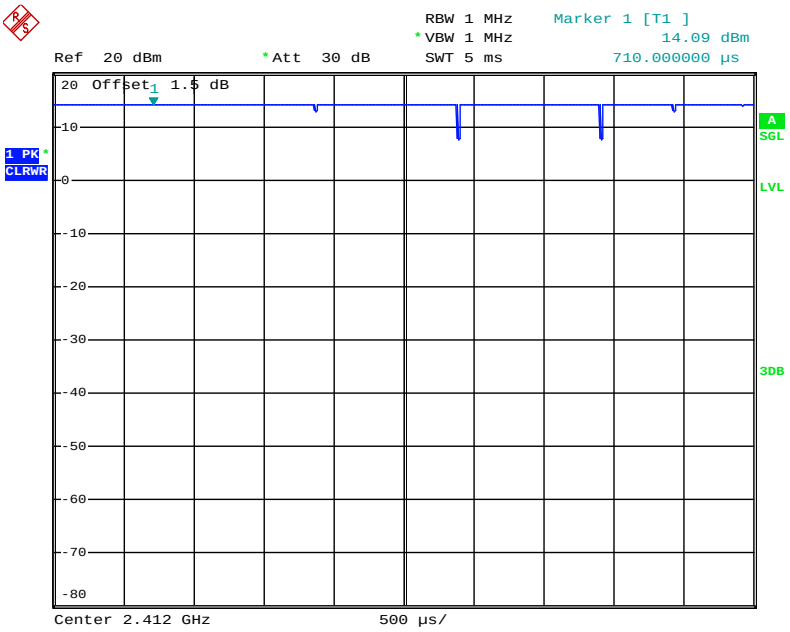
Date: 26.DEC.2013 23:15:15

IEEE 802.11n MCS0 40MHz



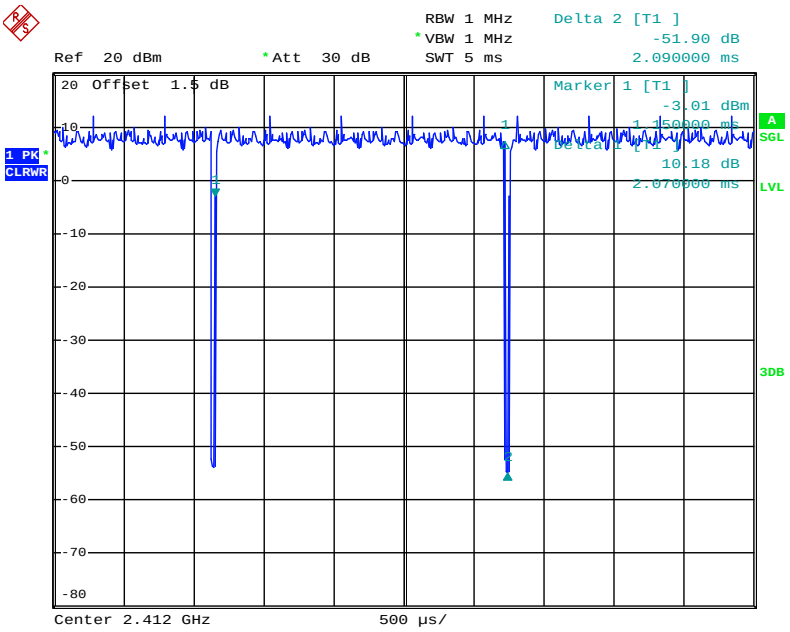
Date: 26.DEC.2013 23:16:25

IEEE 802.11b



Date: 26.DEC.2013 23:13:25

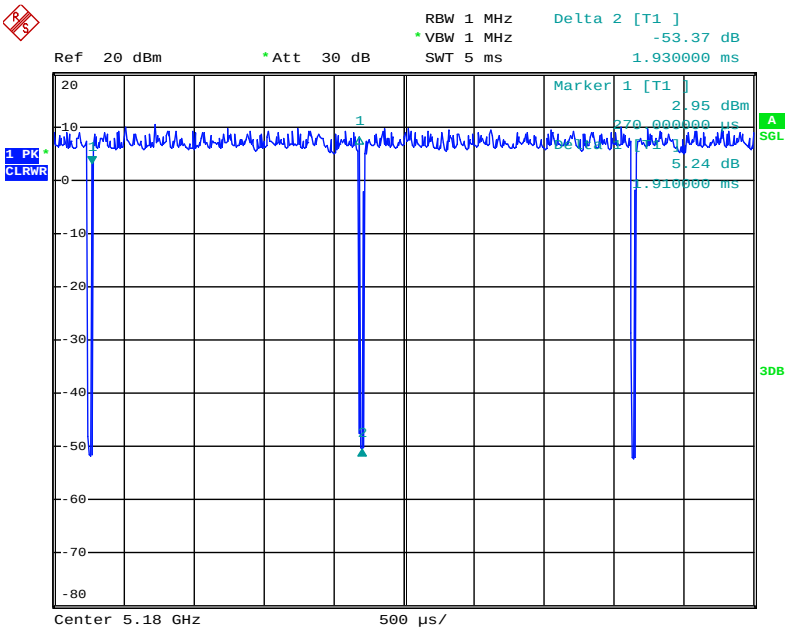
IEEE 802.11g



Date: 26.DEC.2013 23:14:12

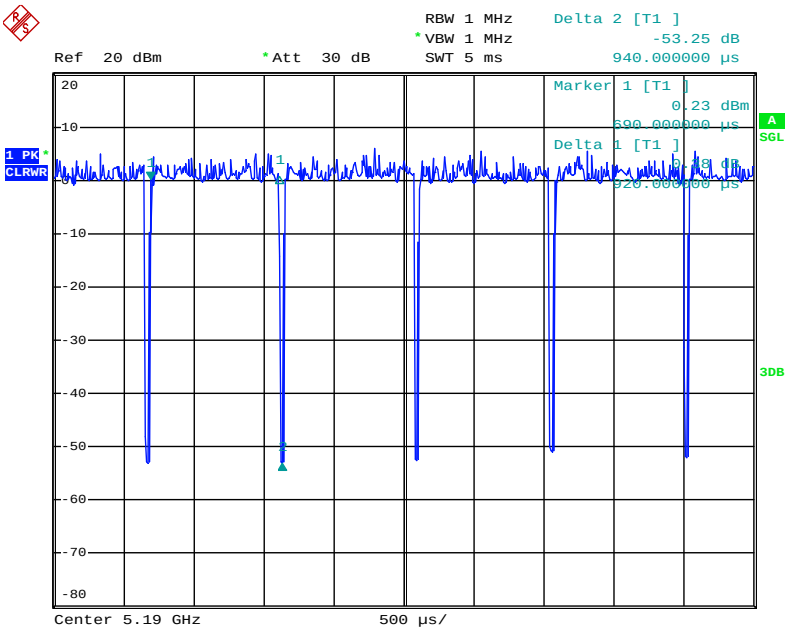
For 5GHz Band:

IEEE 802.11n MCS0 20MHz



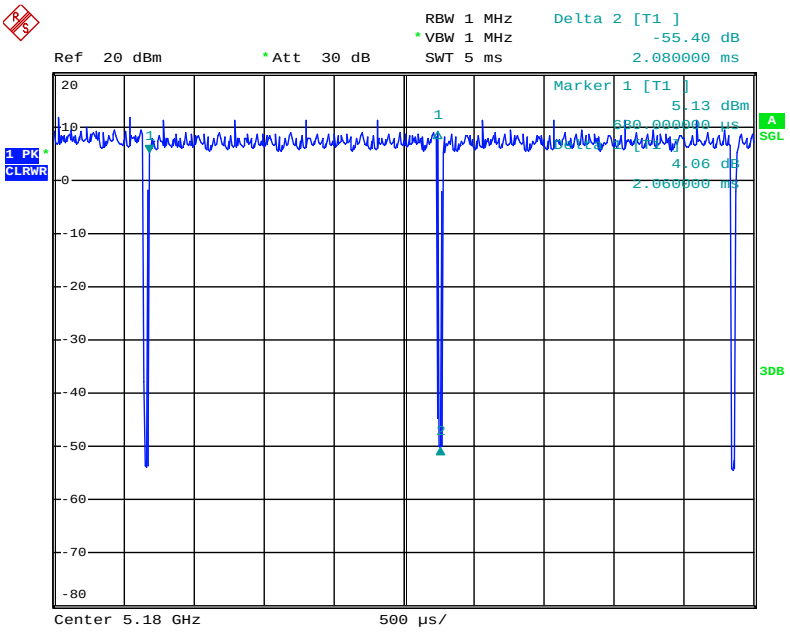
Date: 26.DEC.2013 21:35:29

IEEE 802.11n MCS0 40MHz



Date: 26.DEC.2013 21:36:13

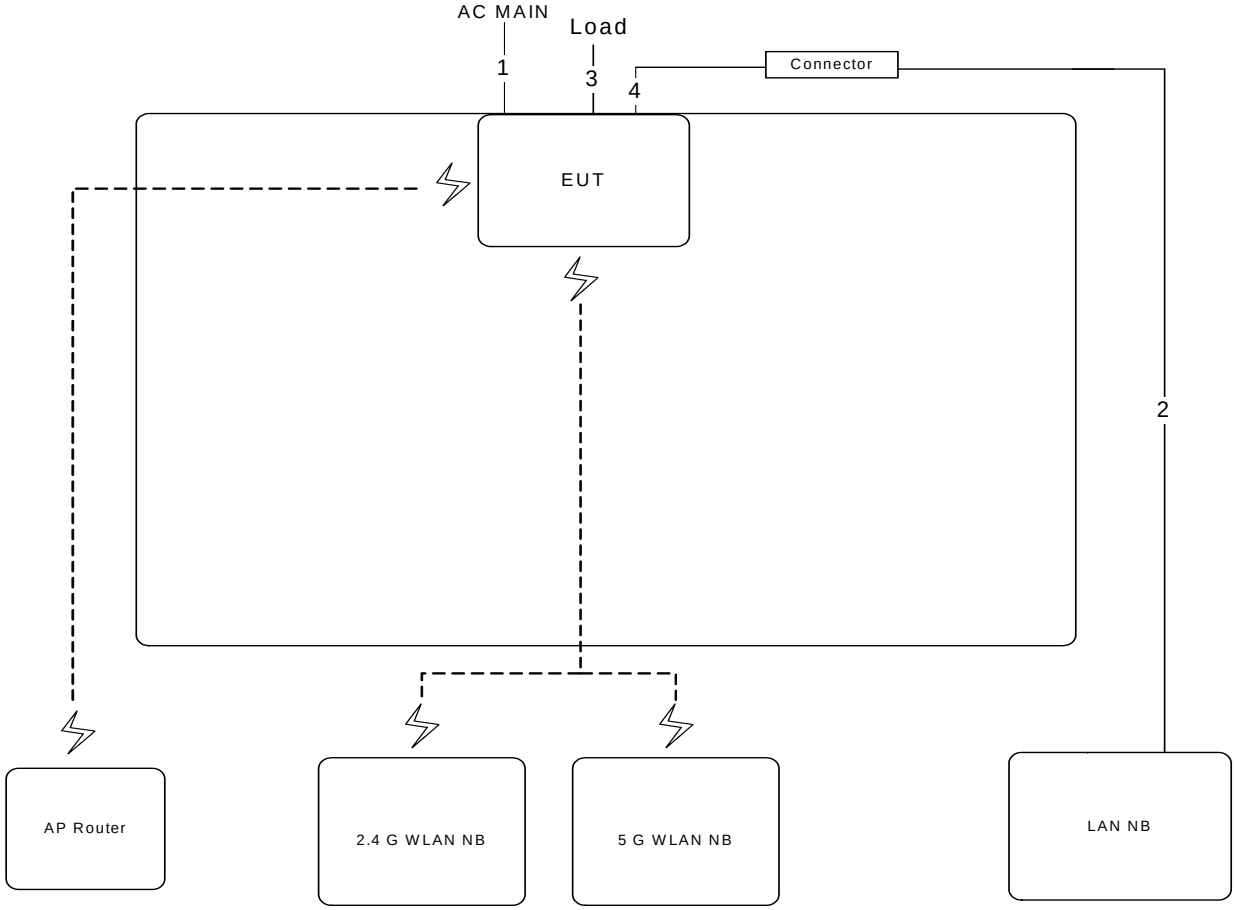
IEEE 802.11a



Date: 26.DEC.2013 21:34:40

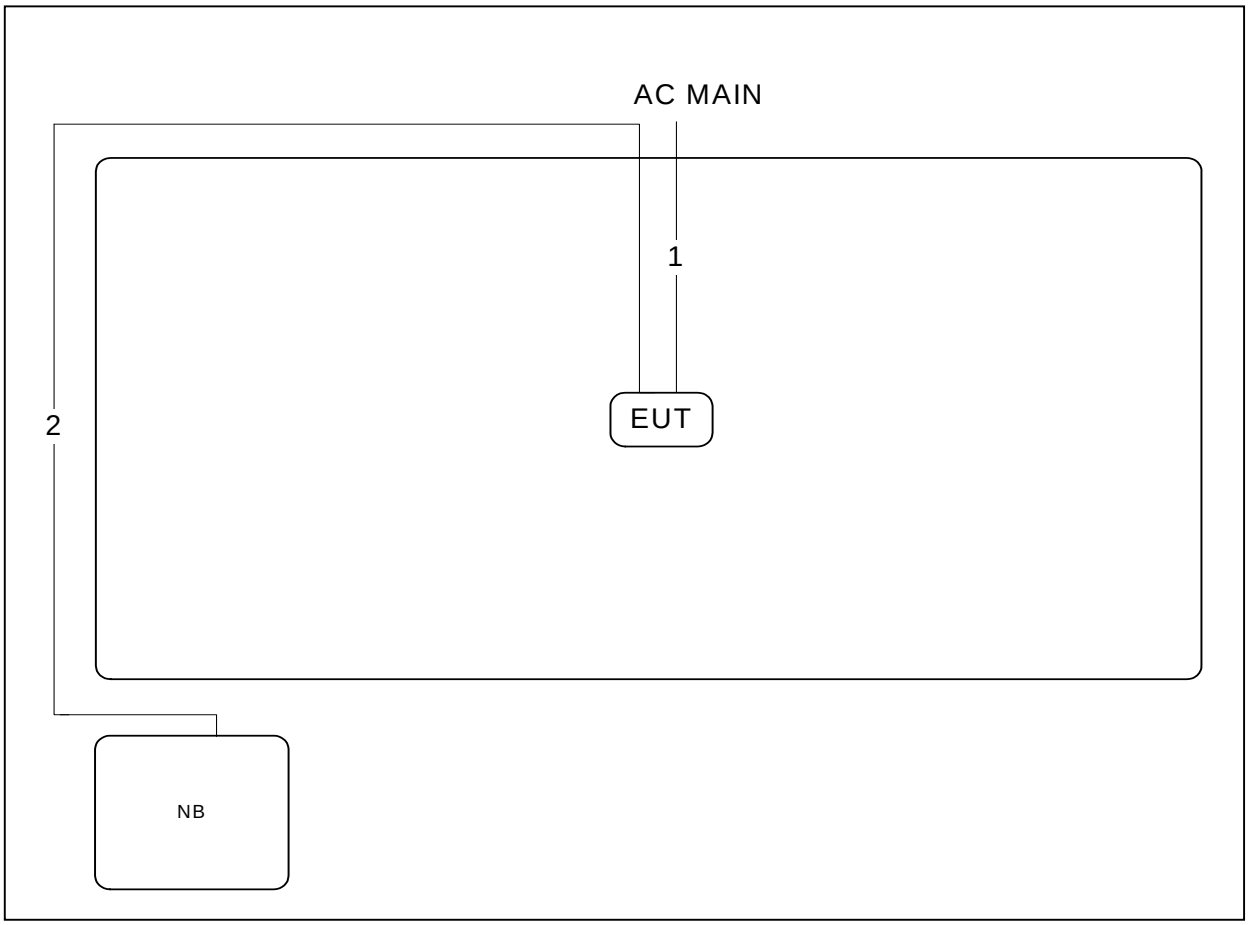
3.11. Test Configurations

3.11.1. AC Power Line Conduction Emissions and Radiation Emissions (Below 1GHz)Test Configuration



Item	Connection	Shield	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m
3	RJ-45 cable*3	No	1.5m
4	RJ-45 cable	No	1.5m

3.11.2. Radiation Emissions Test (above 1GHz) Configuration



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

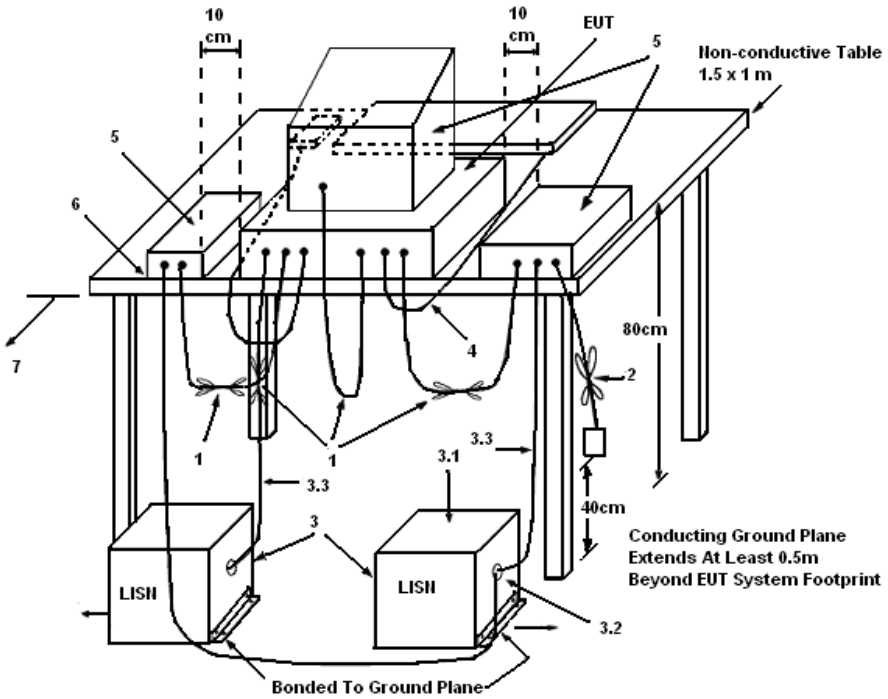
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

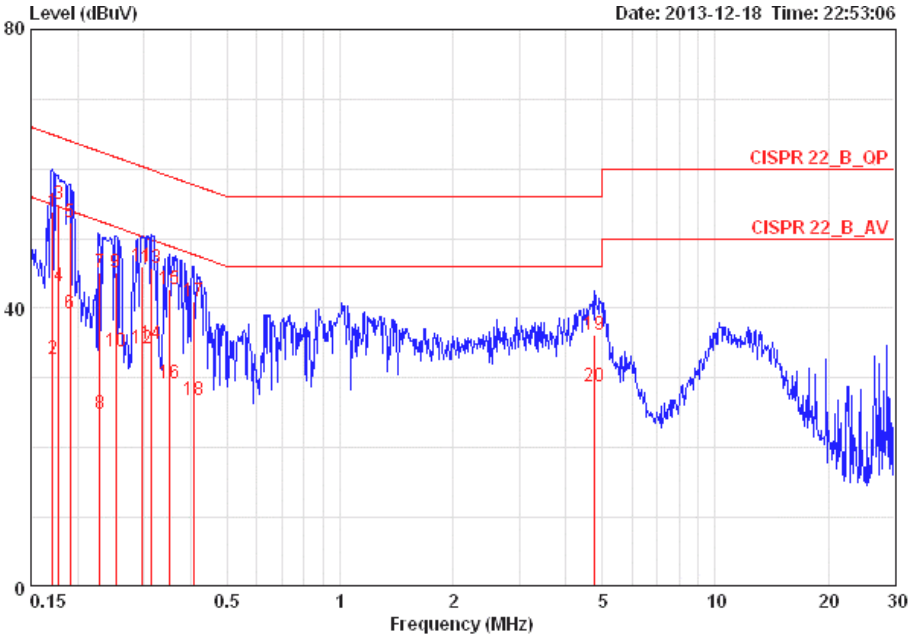
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

4.1.7. Results of AC Power Line Conducted Emissions Measurement

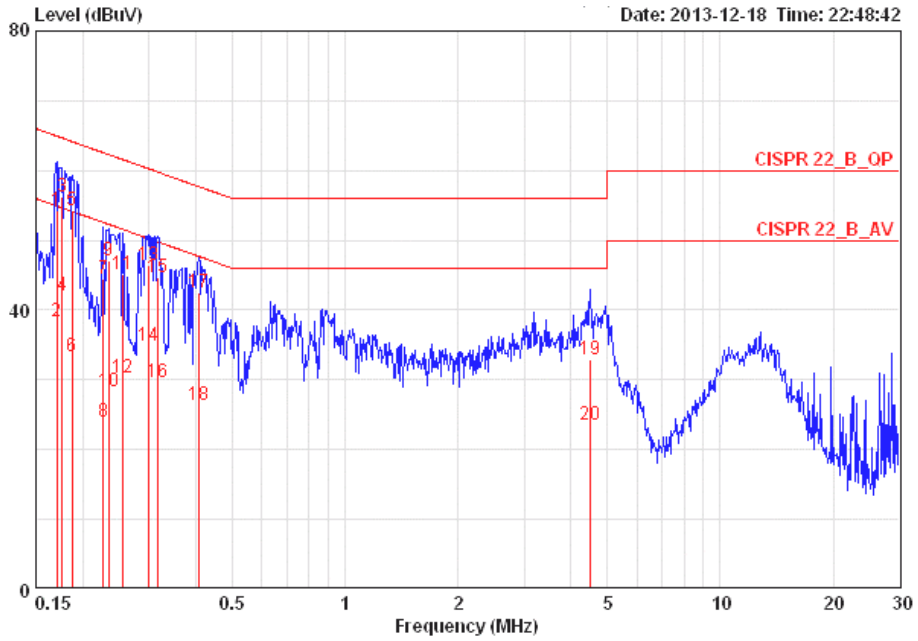
Temperature	24°C	Humidity	53%
Test Engineer	Ryo Fan	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.17125	53.95	-10.95	64.90	53.61	0.15	0.19	LINE	QP
2	0.17125	32.79	-22.11	54.90	32.45	0.15	0.19	LINE	AVERAGE
3	0.17772	55.00	-9.59	64.59	54.66	0.15	0.19	LINE	QP
4	0.17772	43.16	-11.43	54.59	42.82	0.15	0.19	LINE	AVERAGE
5	0.19039	52.22	-11.80	64.02	51.87	0.15	0.20	LINE	QP
6	0.19039	39.21	-14.81	54.02	38.86	0.15	0.20	LINE	AVERAGE
7	0.22918	45.13	-17.35	62.48	44.78	0.15	0.20	LINE	QP
8	0.22918	24.90	-27.58	52.48	24.55	0.15	0.20	LINE	AVERAGE
9	0.25211	45.14	-16.55	61.69	44.79	0.15	0.20	LINE	QP
10	0.25211	33.73	-17.96	51.69	33.38	0.15	0.20	LINE	AVERAGE

11	0.29712	46.09	-14.23	60.32	45.74	0.15	0.20	LINE	QP
12	0.29712	34.31	-16.01	50.32	33.96	0.15	0.20	LINE	AVERAGE
13	0.31495	45.68	-14.16	59.84	45.33	0.15	0.20	LINE	QP
14	0.31495	34.77	-15.07	49.84	34.42	0.15	0.20	LINE	AVERAGE
15	0.35201	42.73	-16.18	58.91	42.38	0.15	0.20	LINE	QP
16	0.35201	29.17	-19.74	48.91	28.82	0.15	0.20	LINE	AVERAGE
17	0.40615	41.07	-16.66	57.73	40.72	0.15	0.20	LINE	QP
18	0.40615	26.79	-20.94	47.73	26.44	0.15	0.20	LINE	AVERAGE
19	4.772	36.26	-19.74	56.00	35.65	0.29	0.32	LINE	QP
20	4.772	28.84	-17.16	46.00	28.23	0.29	0.32	LINE	AVERAGE

Temperature	24℃	Humidity	53%
Test Engineer	Ryo Fan	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	0.17034	54.35	-10.60	64.94	54.09	0.07	0.19	NEUTRAL	QP
2	0.17034	38.28	-16.67	54.94	38.02	0.07	0.19	NEUTRAL	AVERAGE
3	0.17584	56.19	-8.49	64.68	55.93	0.07	0.19	NEUTRAL	QP
4	0.17584	42.11	-12.57	54.68	41.85	0.07	0.19	NEUTRAL	AVERAGE
5	0.18739	54.24	-9.92	64.15	53.97	0.07	0.20	NEUTRAL	QP
6	0.18739	33.43	-20.73	54.15	33.16	0.07	0.20	NEUTRAL	AVERAGE
7	0.22676	44.55	-18.02	62.57	44.28	0.07	0.20	NEUTRAL	QP
8	0.22676	23.94	-28.63	52.57	23.67	0.07	0.20	NEUTRAL	AVERAGE
9	0.23409	47.19	-15.11	62.30	46.92	0.07	0.20	NEUTRAL	QP
10	0.23409	28.43	-23.87	52.30	28.16	0.07	0.20	NEUTRAL	AVERAGE
11	0.25480	45.23	-16.37	61.60	44.96	0.07	0.20	NEUTRAL	QP
12	0.25480	30.26	-21.34	51.60	29.99	0.07	0.20	NEUTRAL	AVERAGE
13	0.29869	46.49	-13.79	60.28	46.22	0.07	0.20	NEUTRAL	QP
14	0.29869	34.97	-15.31	50.28	34.70	0.07	0.20	NEUTRAL	AVERAGE
15	0.31662	44.79	-15.01	59.80	44.52	0.07	0.20	NEUTRAL	QP
16	0.31662	29.73	-20.07	49.80	29.46	0.07	0.20	NEUTRAL	AVERAGE
17	0.40615	42.57	-15.16	57.73	42.30	0.07	0.20	NEUTRAL	QP
18	0.40615	26.31	-21.42	47.73	26.04	0.07	0.20	NEUTRAL	AVERAGE
19	4.501	32.86	-23.14	56.00	32.41	0.14	0.31	NEUTRAL	QP
20	4.501	23.63	-22.37	46.00	23.18	0.14	0.31	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

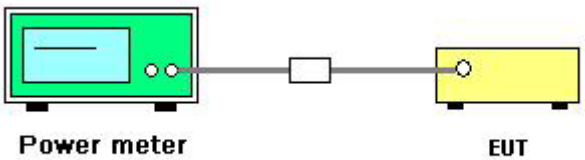
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Average

4.2.3. Test Procedures

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

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	21°C	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11n
Test Date	Dec. 26, 2013		

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 2 + Ant. 4

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 2	Ant. 4	Total		
1	2412 MHz	14.64	14.06	17.37	30.00	Complies
6	2437 MHz	20.84	20.41	23.64	30.00	Complies
11	2462 MHz	14.84	14.58	17.72	30.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Ant. 2 + Ant. 4

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 2	Ant. 4	Total		
3	2422 MHz	11.81	11.71	14.77	30.00	Complies
6	2437 MHz	15.91	15.33	18.64	30.00	Complies
9	2452 MHz	13.32	12.87	16.11	30.00	Complies

For 5GHz Band

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 3	Total		
149	5745 MHz	19.96	20.03	23.01	30.00	Complies
157	5785 MHz	21.06	20.29	23.70	30.00	Complies
165	5825 MHz	21.08	20.68	23.89	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 3	Total		
151	5755 MHz	20.23	20.21	23.23	30.00	Complies
159	5795 MHz	20.18	20.91	23.57	30.00	Complies

Temperature	21°C	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11a/b/g
Test Date	Dec. 26, 2013		

Configuration IEEE 802.11b / Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.98	30.00	Complies
6	2437 MHz	20.95	30.00	Complies
11	2462 MHz	20.61	30.00	Complies

Configuration IEEE 802.11g / Ant. 2 + Ant. 4

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 2	Ant. 4	Total		
1	2412 MHz	15.04	14.84	17.95	30.00	Complies
6	2437 MHz	20.66	20.38	23.53	30.00	Complies
11	2462 MHz	14.96	14.66	17.82	30.00	Complies

Configuration IEEE 802.11a / Ant. 1 + Ant. 3

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 3	Total		
149	5745 MHz	19.50	19.71	22.62	30.00	Complies
157	5785 MHz	21.05	20.22	23.67	30.00	Complies
165	5825 MHz	21.08	20.79	23.95	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

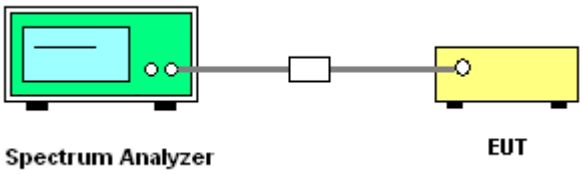
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	3 kHz ≤ RBW ≤ 100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto couple

4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be ≤ 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	21°C	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11n

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 2 + Ant. 4

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 2	Ant. 4	Total		
1	2412 MHz	-11.83	-11.93	-8.87	8.00	Complies
6	2437 MHz	-4.83	-7.21	-2.85	8.00	Complies
11	2462 MHz	-12.20	-13.62	-9.84	8.00	Complies

Configuration IEEE 802.11n MCS0 40MHz / Ant. 2 + Ant. 4

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 2	Ant. 4	Total		
3	2422 MHz	-16.78	-16.16	-13.45	8.00	Complies
6	2437 MHz	-13.56	-13.05	-10.29	8.00	Complies
9	2452 MHz	-16.69	-16.23	-13.44	8.00	Complies

For 5GHz Band

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 3	Total		
149	5745 MHz	-6.60	-6.61	-3.59	8.00	Complies
157	5785 MHz	-4.30	-5.48	-1.84	8.00	Complies
165	5825 MHz	-5.45	-6.07	-2.74	8.00	Complies

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 3	Total		
151	5755 MHz	-7.60	-7.27	-4.42	8.00	Complies
159	5795 MHz	-7.58	-8.18	-4.86	8.00	Complies

Temperature	21°C	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Ant. 2

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	5.89	8.00	Complies
6	2437 MHz	4.92	8.00	Complies
11	2462 MHz	4.11	8.00	Complies

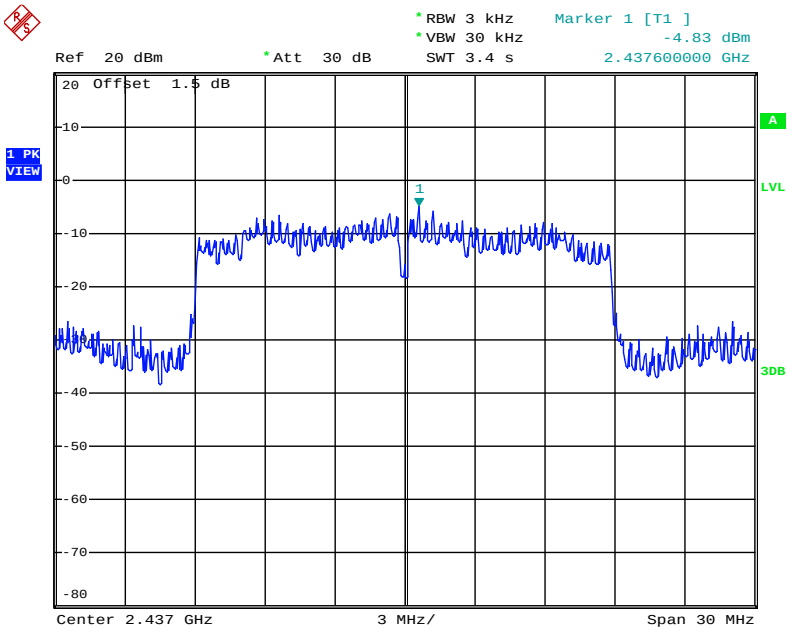
Configuration IEEE 802.11g / Ant. 2 + Ant. 4

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 2	Ant. 4	Total		
1	2412 MHz	-12.15	-11.88	-9.00	8.00	Complies
6	2437 MHz	-7.29	-6.65	-3.95	8.00	Complies
11	2462 MHz	-11.70	-12.65	-9.14	8.00	Complies

Configuration IEEE 802.11a / Ant. 1 + Ant. 3

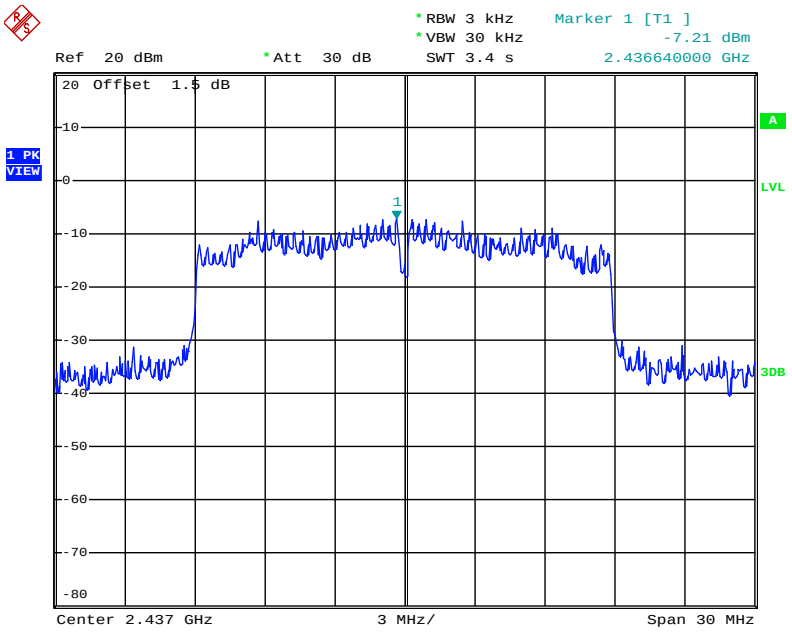
Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 3	Total		
149	5745 MHz	-7.39	-7.16	-4.26	8.00	Complies
157	5785 MHz	-6.59	-7.53	-4.02	8.00	Complies
165	5825 MHz	-6.01	-6.43	-3.20	8.00	Complies

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Ant. 2



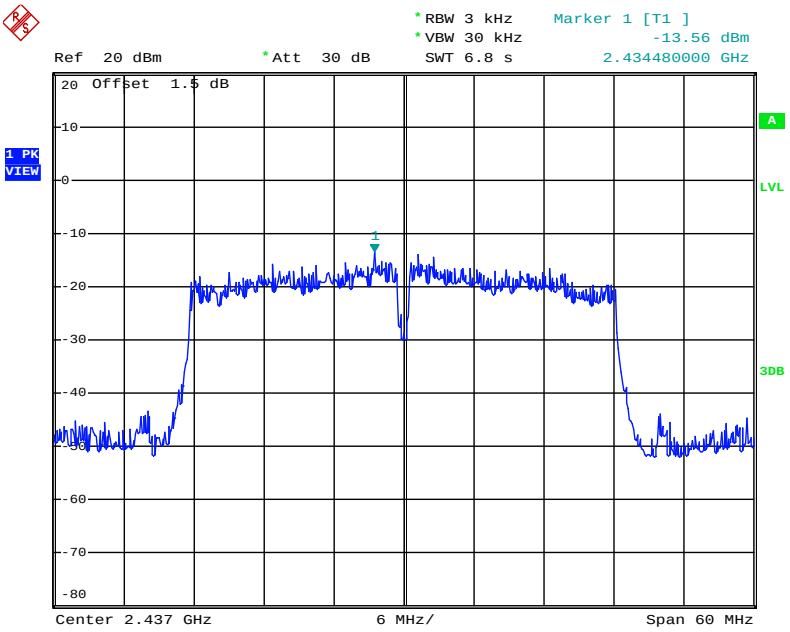
Date: 26.DEC.2013 22:44:53

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Ant. 4



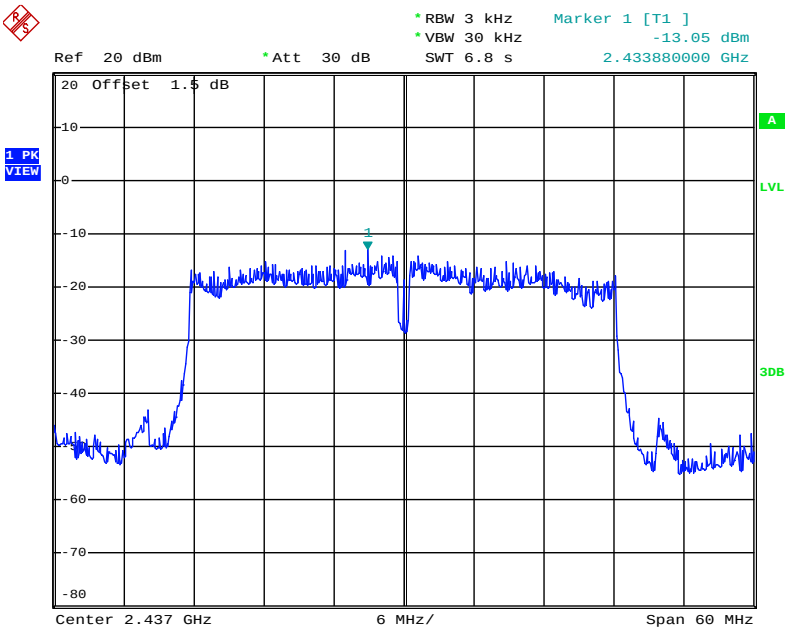
Date: 26.DEC.2013 22:44:23

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Ant. 2



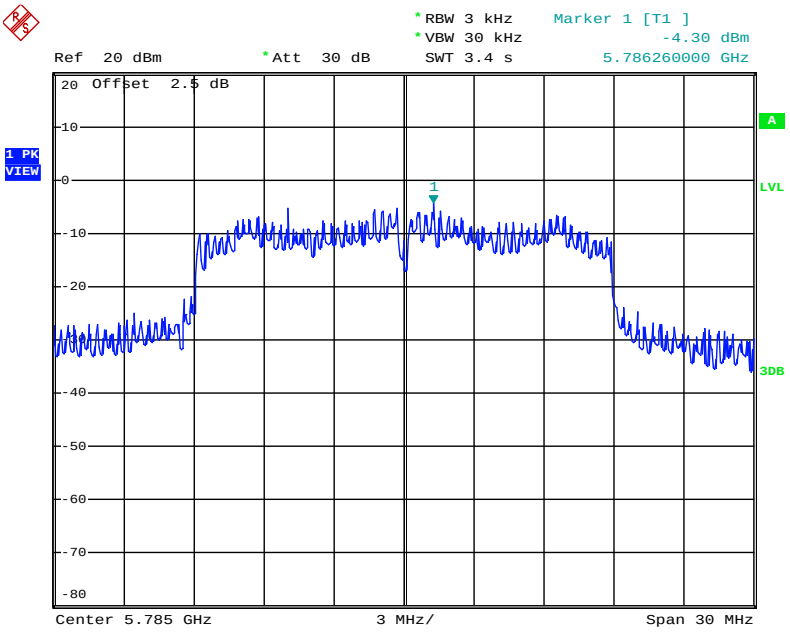
Date: 26.DEC.2013 22:50:07

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Ant. 4



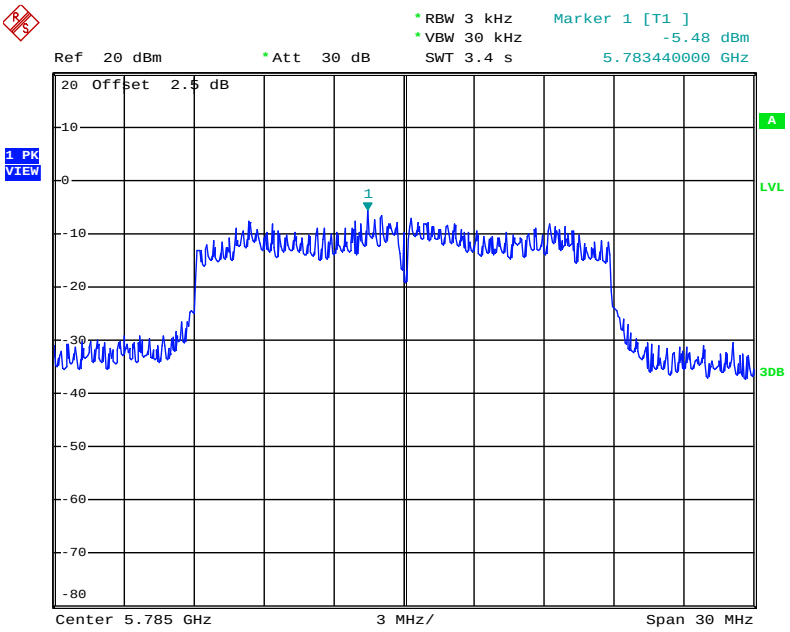
Date: 26.DEC.2013 22:49:11

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 5785 MHz / Ant. 1



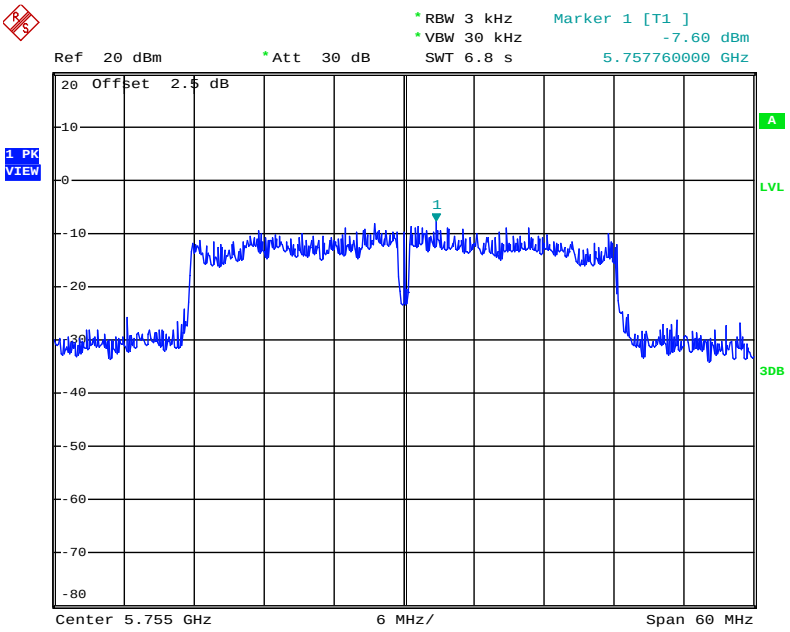
Date: 26.DEC.2013 21:54:44

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 5785 MHz / Ant. 3



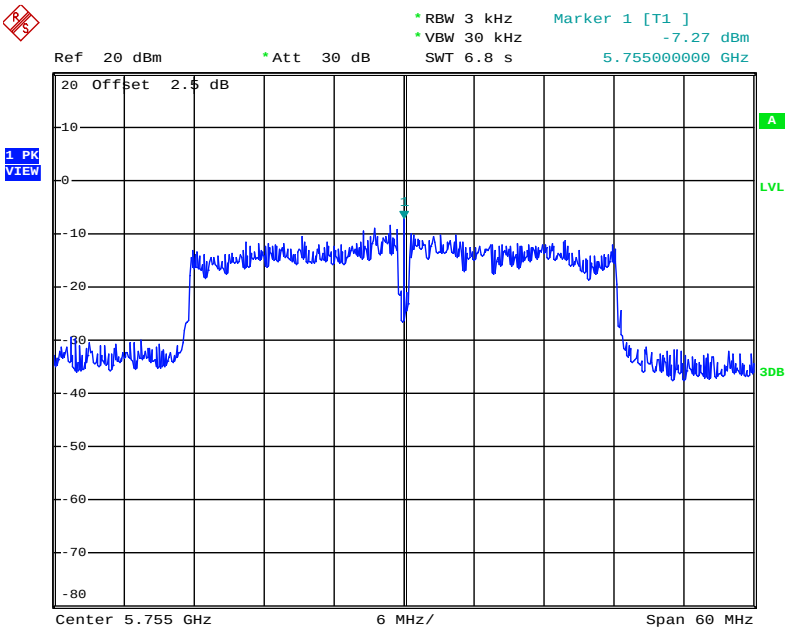
Date: 26.DEC.2013 21:55:15

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 5755 MHz / Ant. 1



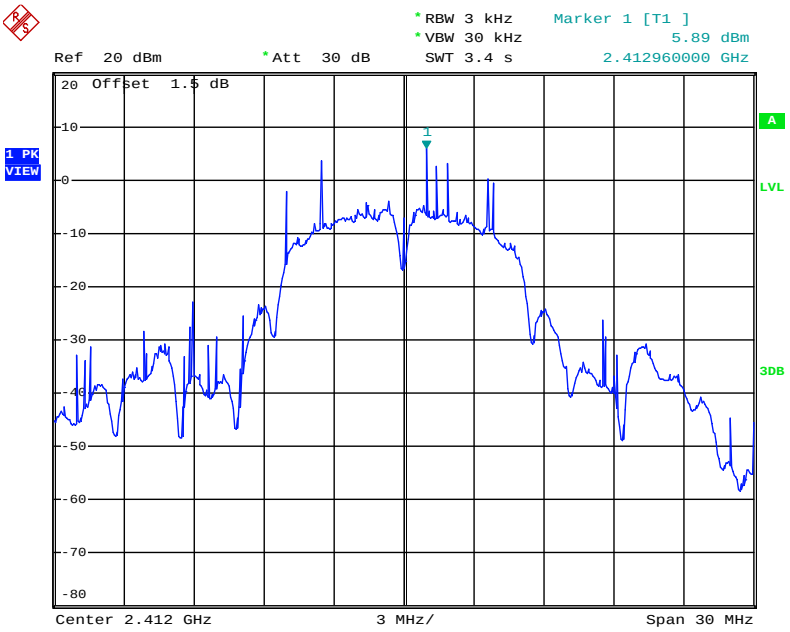
Date: 26.DEC.2013 21:57:18

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 5755 MHz / Ant. 3



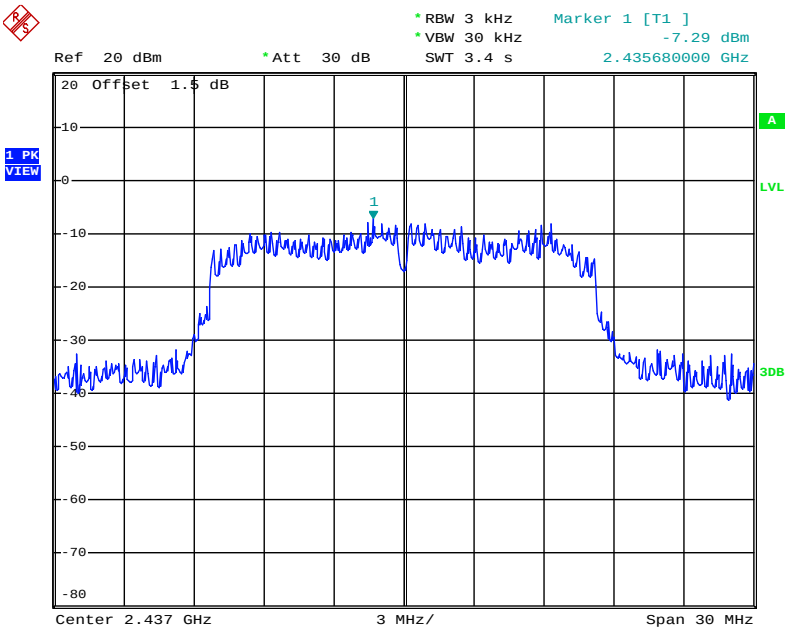
Date: 26.DEC.2013 21:57:56

Power Density Plot on Configuration IEEE 802.11b / 2412 MHz / Ant. 2



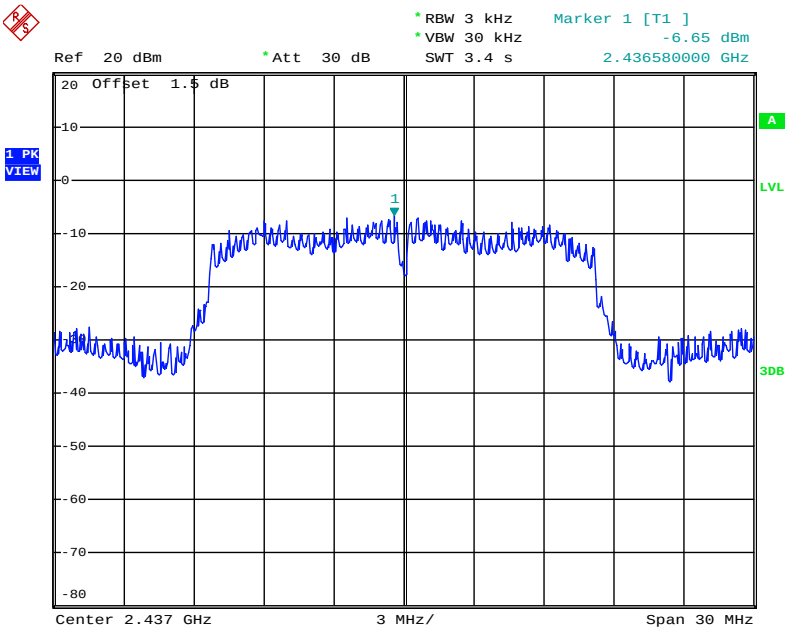
Date: 26.DEC.2013 22:34:55

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 2



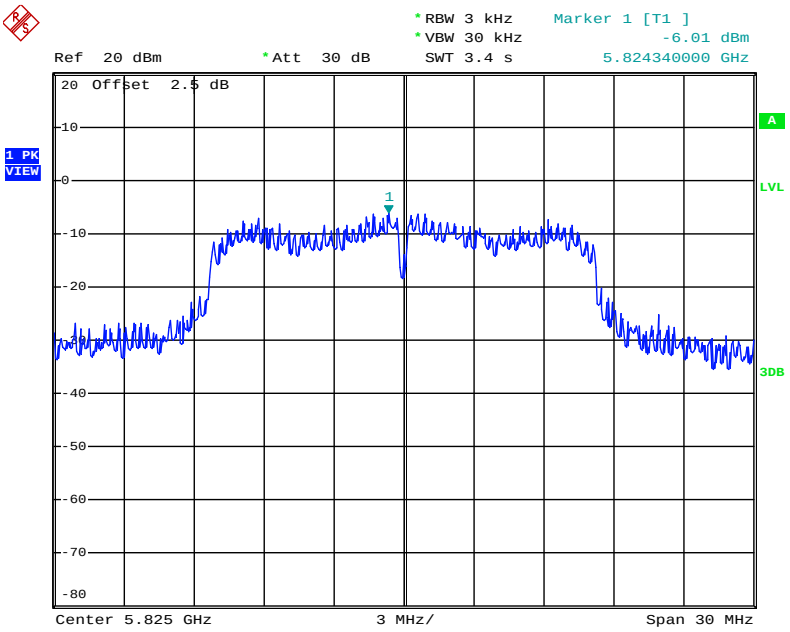
Date: 26.DEC.2013 22:40:45

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 4



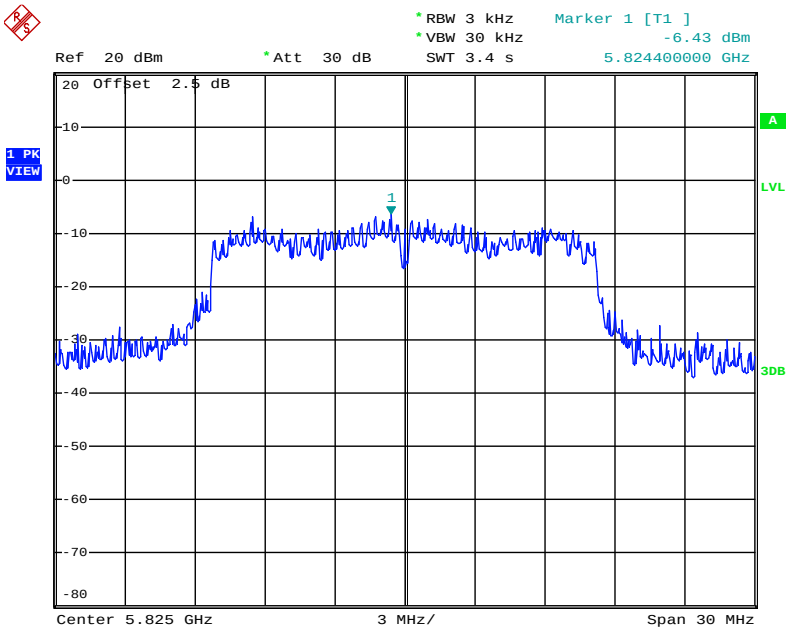
Date: 26.DEC.2013 22:40:06

Power Density Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1



Date: 26.DEC.2013 21:46:09

Power Density Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 3



Date: 26.DEC.2013 21:44:49

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 the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RBW	100kHz
VBW	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth option 1.
3. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	21°C	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11n

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz / Ant. 2 + Ant. 4

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.68	500	Complies
6	2437 MHz	14.16	17.68	500	Complies
11	2462 MHz	15.28	17.60	500	Complies

Configuration IEEE 802.11n MCS0 40MHz / Ant. 2 + Ant. 4

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	30.08	36.00	500	Complies
6	2437 MHz	25.76	36.16	500	Complies
9	2452 MHz	33.28	36.32	500	Complies

For 5GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.76	17.92	500	Complies
157	5785 MHz	15.76	18.16	500	Complies
165	5825 MHz	15.84	18.00	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.68	52.16	500	Complies
159	5795 MHz	35.84	57.44	500	Complies

Temperature	21℃	Humidity	63%
Test Engineer	David Tseng	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	8.08	10.08	500	Complies
6	2437 MHz	8.08	10.16	500	Complies
11	2462 MHz	7.60	10.24	500	Complies

Configuration IEEE 802.11g / Ant. 2 + Ant. 4

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	14.72	16.48	500	Complies
6	2437 MHz	15.20	16.72	500	Complies
11	2462 MHz	15.92	16.48	500	Complies

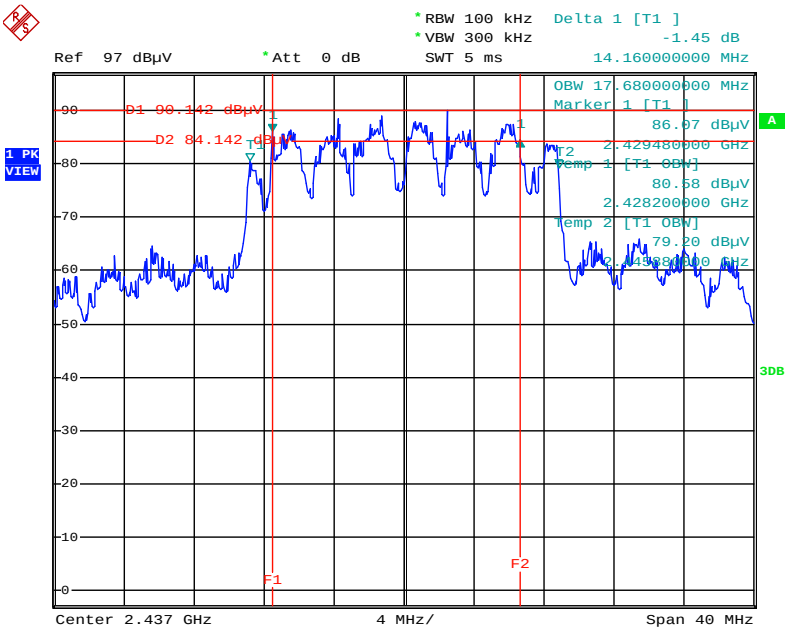
Configuration IEEE 802.11a / Ant. 1 + Ant. 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	12.88	16.72	500	Complies
157	5785 MHz	14.56	18.88	500	Complies
165	5825 MHz	12.64	20.16	500	Complies

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

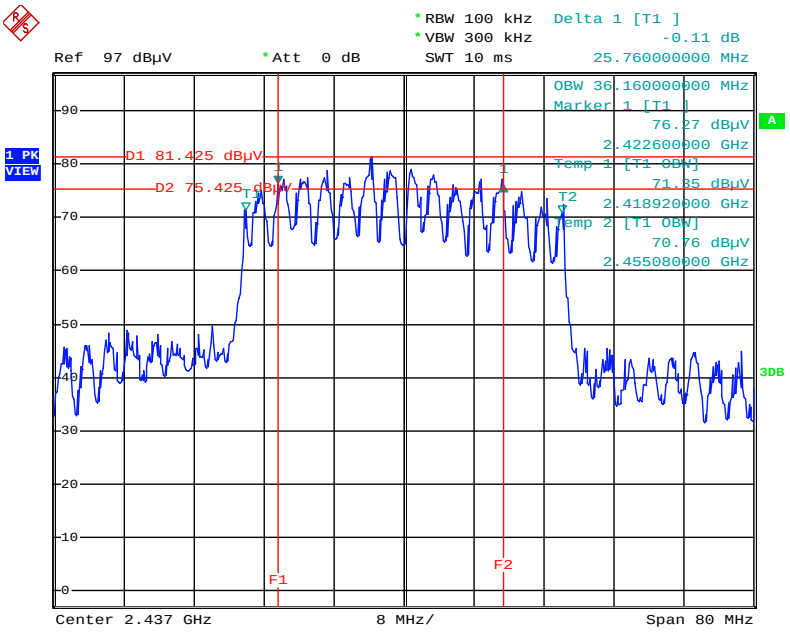
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz / Ant. 2 + Ant. 4



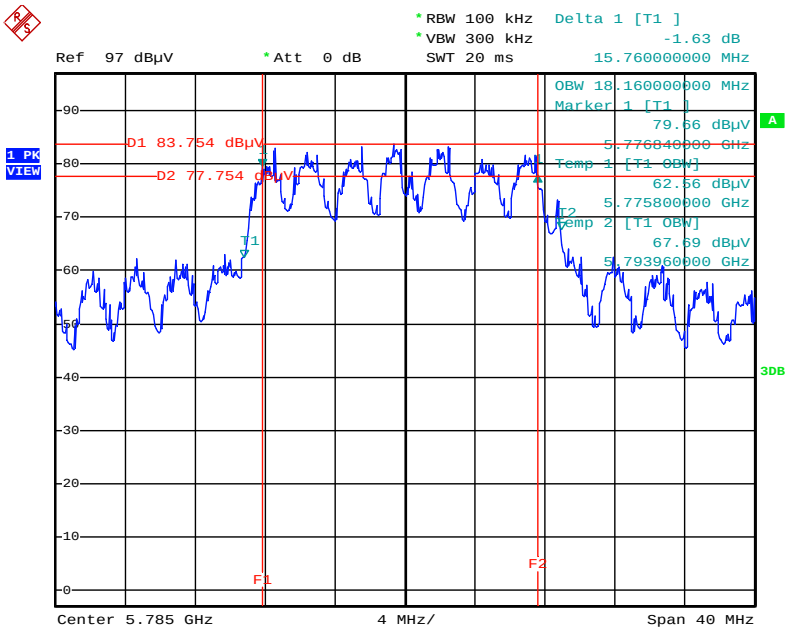
Date: 26.DEC.2013 23:00:46

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / 2437 MHz / Ant. 2 + Ant. 4



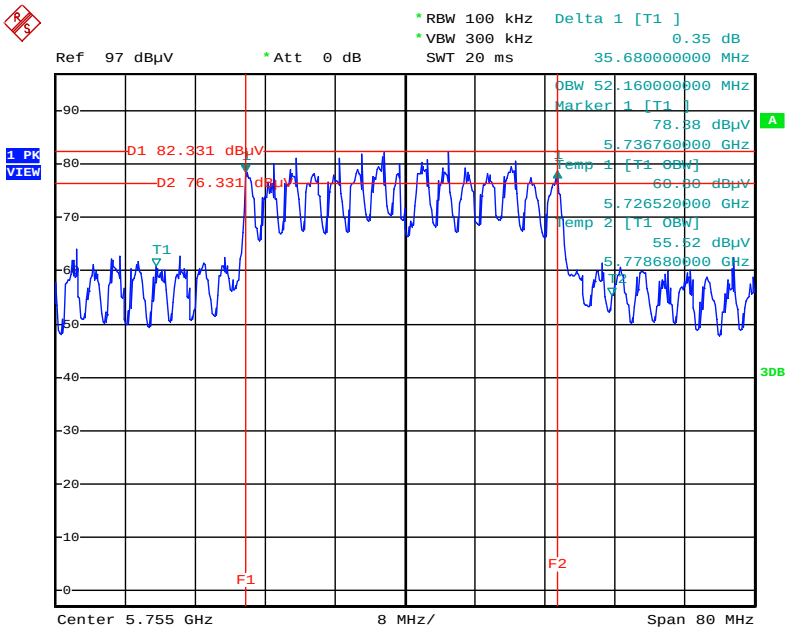
Date: 26.DEC.2013 22:57:28

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / 5785 MHz / Ant. 1 + Ant. 3



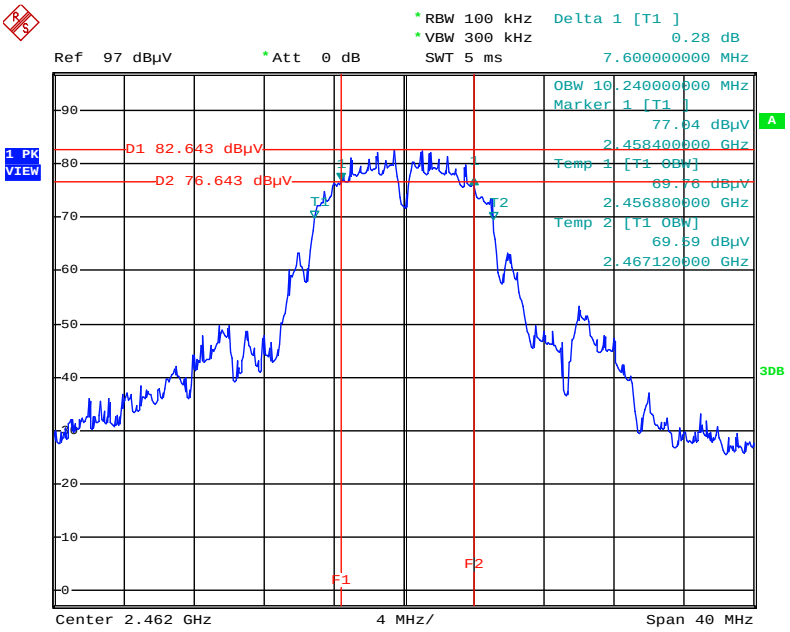
Date: 26.DEC.2013 22:05:17

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / 5755MHz / Ant. 1 + Ant. 3



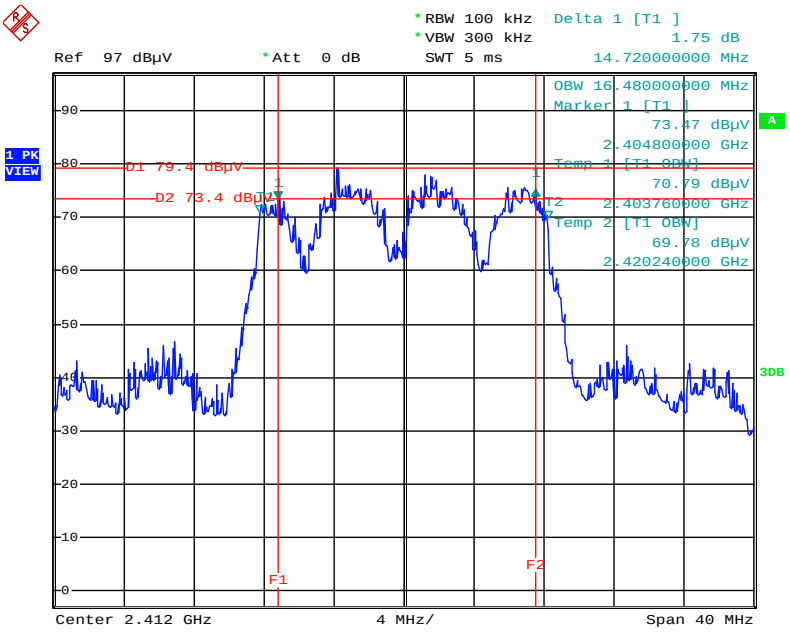
Date: 26.DEC.2013 22:04:16

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2462 MHz / Ant. 2



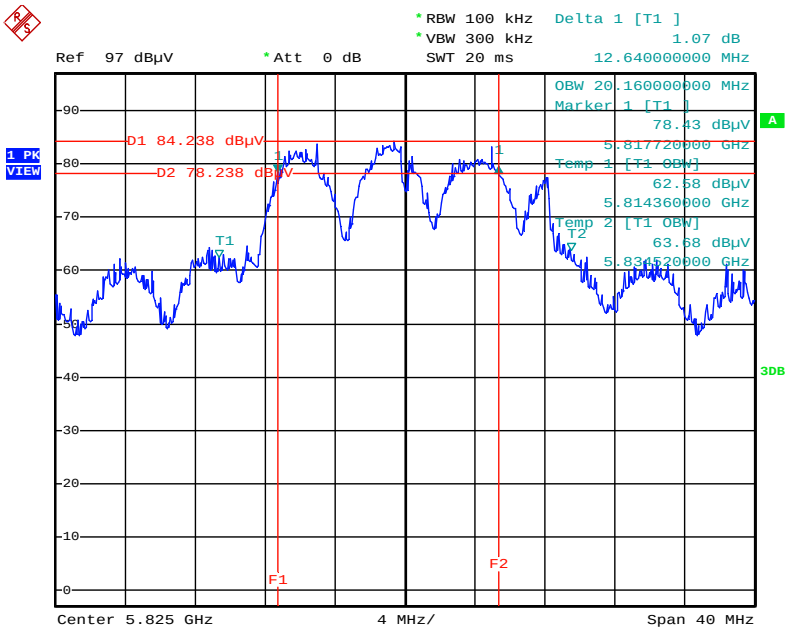
Date: 26.DEC.2013 23:09:59

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz / Ant. 2 + Ant. 4



Date: 26.DEC.2013 23:03:28

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1 + Ant. 3



Date: 26.DEC.2013 22:06:59

4.5. Radiated Emissions Measurement

4.5.1. Limit

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

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

4.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
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

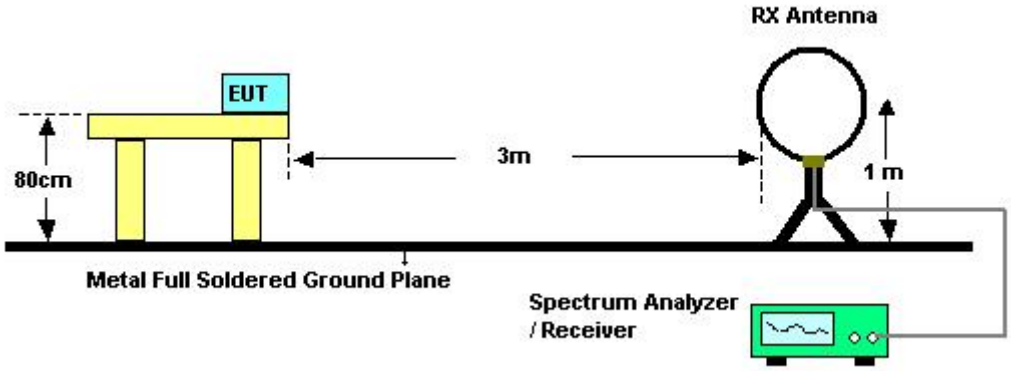
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

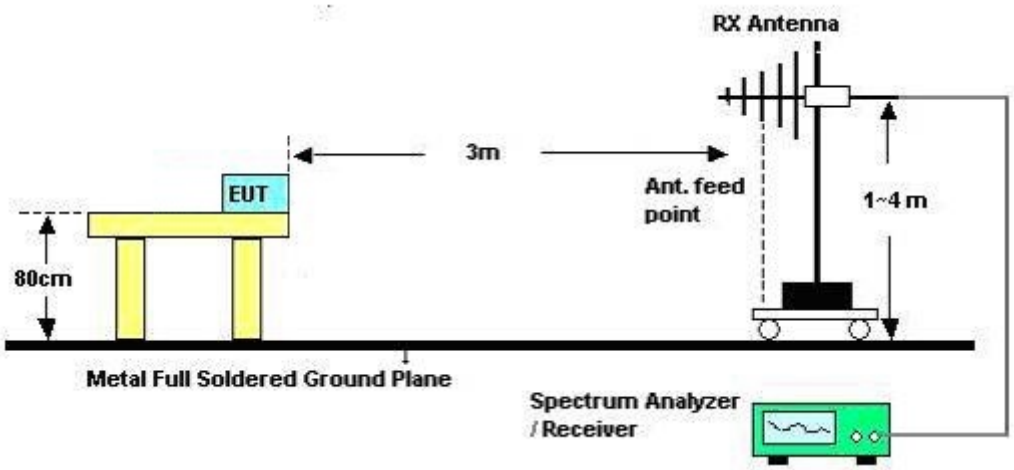
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

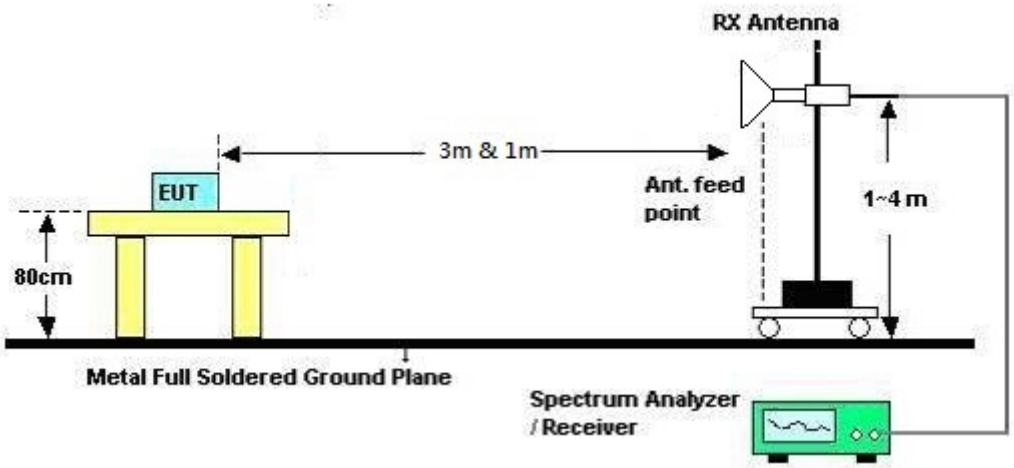
For Radiated Emissions: 9kHz ~30MHz



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	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	Normal Link
Test Date	Dec. 30, 2013	Test Mode	Mode 1

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.

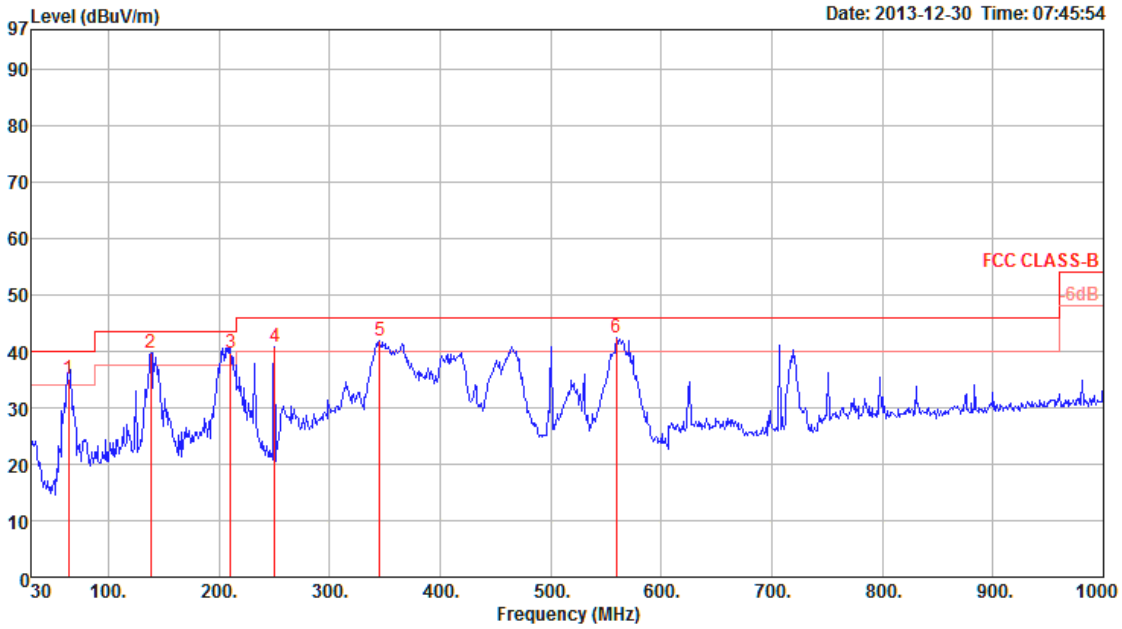
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

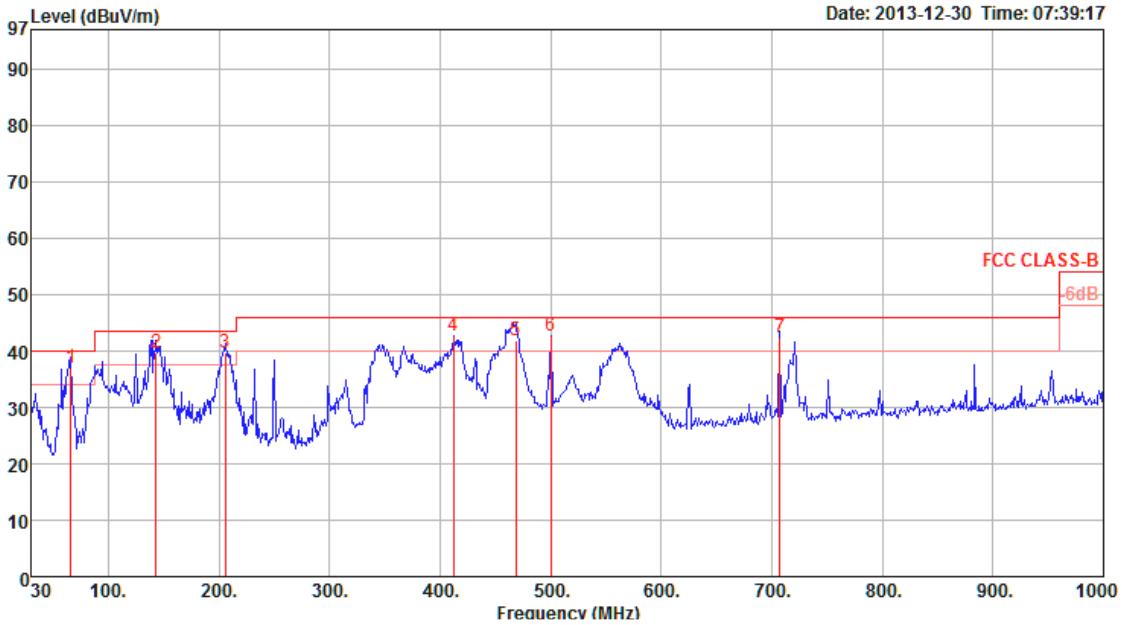
Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	Normal Link
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	63.95	35.12	40.00	-4.88	55.03	1.19	27.96	-19.91	QP	169	100	HORIZONTAL
2	138.64	39.67	43.50	-3.83	53.36	1.71	27.57	-13.69	Peak	0	100	HORIZONTAL
3	210.42	39.78	43.50	-3.72	54.17	2.18	27.17	-14.39	QP	132	100	HORIZONTAL
4	250.19	40.84	46.00	-5.16	52.51	2.38	26.95	-11.67	Peak	0	100	HORIZONTAL
5	345.25	41.78	46.00	-4.22	50.89	2.77	27.04	-9.11	Peak	0	100	HORIZONTAL
6	559.62	42.42	46.00	-3.58	47.77	3.58	27.83	-5.35	Peak	0	100	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	65.89	36.93	40.00	-3.07	56.83	1.22	27.96	-19.90	QP	236	105	VERTICAL
2	143.49	39.80	43.50	-3.70	53.83	1.74	27.54	-14.03	QP	135	100	VERTICAL
3	205.57	39.67	43.50	-3.83	54.23	2.14	27.21	-14.56	QP	289	112	VERTICAL
4	412.18	42.63	46.00	-3.37	50.54	3.05	27.58	-7.91	Peak	0	400	VERTICAL
5	468.44	41.75	46.00	-4.25	49.04	3.29	27.87	-7.29	QP	165	100	VERTICAL
6	500.45	42.82	46.00	-3.18	49.57	3.38	27.93	-6.75	Peak	0	400	VERTICAL
7	707.06	42.48	46.00	-3.52	45.37	4.17	27.09	-2.89	QP	111	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.

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 1 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4823.68	38.06	54.00	-15.94	36.72	3.31	33.06	35.03	Average	100	215	HORIZONTAL
2	4823.74	51.23	74.00	-22.77	49.89	3.31	33.06	35.03	Peak	100	215	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4818.71	44.80	74.00	-29.20	43.50	3.31	33.02	35.03	Peak	100	222	VERTICAL
2	4823.90	32.31	54.00	-21.69	30.97	3.31	33.06	35.03	Average	100	222	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 6 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.74	45.15	54.00	-8.85	43.69	3.33	33.16	35.03	Average	155	214	HORIZONTAL
2	4873.78	59.40	74.00	-14.60	57.94	3.33	33.16	35.03	Peak	155	214	HORIZONTAL
3	7310.36	49.63	54.00	-4.37	45.01	4.06	35.96	35.40	Average	109	289	HORIZONTAL
4	7310.42	63.80	74.00	-10.20	59.18	4.06	35.96	35.40	Peak	109	289	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.87	55.63	74.00	-18.37	54.17	3.33	33.16	35.03	Peak	112	264	VERTICAL
2	4874.10	42.43	54.00	-11.57	40.97	3.33	33.16	35.03	Average	112	264	VERTICAL
3	7308.53	60.65	74.00	-13.35	56.03	4.06	35.96	35.40	Peak	140	254	VERTICAL
4	7310.81	47.89	54.00	-6.11	43.27	4.06	35.96	35.40	Average	140	254	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 11 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.90	50.37	74.00	-23.63	48.77	3.35	33.26	35.01	Peak	100	199	HORIZONTAL
2	4924.00	37.14	54.00	-16.86	35.54	3.35	33.26	35.01	Average	100	199	HORIZONTAL
3	7380.90	52.29	74.00	-21.71	47.54	4.06	36.09	35.40	Peak	100	299	HORIZONTAL
4	7385.78	36.46	54.00	-17.54	31.71	4.06	36.09	35.40	Average	100	299	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4924.06	47.00	74.00	-27.00	45.40	3.35	33.26	35.01	Peak	100	367	VERTICAL
2	4924.29	33.52	54.00	-20.48	31.92	3.35	33.26	35.01	Average	100	367	VERTICAL
3	7386.29	34.50	54.00	-19.50	29.75	4.06	36.09	35.40	Average	100	205	VERTICAL
4	7388.56	47.55	74.00	-26.45	42.80	4.06	36.09	35.40	Peak	100	205	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz CH 3 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4836.28	33.48	54.00	-20.52	32.14	3.31	33.06	35.03	Average	100	308	HORIZONTAL
2	4841.18	46.40	74.00	-27.60	45.02	3.32	33.09	35.03	Peak	100	308	HORIZONTAL
3	7269.94	33.05	54.00	-20.95	28.54	4.06	35.85	35.40	Average	100	357	HORIZONTAL
4	7270.07	46.28	74.00	-27.72	41.77	4.06	35.85	35.40	Peak	100	357	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4839.40	29.42	54.00	-24.58	28.04	3.32	33.09	35.03	Average	100	258	VERTICAL
2	4841.44	43.26	74.00	-30.74	41.88	3.32	33.09	35.03	Peak	100	258	VERTICAL
3	7264.08	45.52	74.00	-28.48	41.01	4.06	35.85	35.40	Peak	100	99	VERTICAL
4	7265.86	33.07	54.00	-20.93	28.56	4.06	35.85	35.40	Average	100	99	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz CH 6 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.25	49.92	74.00	-24.08	48.46	3.33	33.16	35.03	Peak	100	224	HORIZONTAL
2	4874.02	37.54	54.00	-16.46	36.08	3.33	33.16	35.03	Average	100	224	HORIZONTAL
3	7312.81	36.66	54.00	-17.34	32.04	4.06	35.96	35.40	Average	100	291	HORIZONTAL
4	7314.97	50.68	74.00	-23.32	46.06	4.06	35.96	35.40	Peak	100	291	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.28	45.90	74.00	-28.10	44.44	3.33	33.16	35.03	Peak	100	123	VERTICAL
2	4874.21	33.36	54.00	-20.64	31.90	3.33	33.16	35.03	Average	100	123	VERTICAL
3	7309.19	34.69	54.00	-19.31	30.07	4.06	35.96	35.40	Average	100	53	VERTICAL
4	7311.91	48.43	74.00	-25.57	43.81	4.06	35.96	35.40	Peak	100	53	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz CH 9 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4903.68	43.78	74.00	-30.22	42.27	3.34	33.19	35.02	Peak	100	269	HORIZONTAL
2	4903.94	34.28	54.00	-19.72	32.77	3.34	33.19	35.02	Average	100	269	HORIZONTAL
3	7357.92	33.71	54.00	-20.29	29.03	4.06	36.02	35.40	Average	100	196	HORIZONTAL
4	7360.86	46.96	74.00	-27.04	42.24	4.06	36.06	35.40	Peak	100	196	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4901.53	42.55	74.00	-31.45	41.04	3.34	33.19	35.02	Peak	100	247	VERTICAL
2	4903.87	30.97	54.00	-23.03	29.46	3.34	33.19	35.02	Average	100	247	VERTICAL
3	7352.68	33.38	54.00	-20.62	28.70	4.06	36.02	35.40	Average	100	309	VERTICAL
4	7355.20	46.37	74.00	-27.63	41.69	4.06	36.02	35.40	Peak	100	309	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 149 / Ant. 1 + Ant. 3
Test Date	Dec. 24, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.56	53.69	54.00	-0.31	40.03	9.24	39.50	35.08	Average	135	101	HORIZONTAL
2	11489.68	67.90	74.00	-6.10	54.24	9.24	39.50	35.08	Peak	135	101	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.76	47.95	54.00	-6.05	34.29	9.24	39.50	35.08	Average	173	291	VERTICAL
2	11489.78	62.70	74.00	-11.30	49.04	9.24	39.50	35.08	Peak	173	291	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 157 / Ant. 1 + Ant. 3
Test Date	Dec. 05, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.68	53.40	54.00	-0.60	44.74	5.13	38.83	35.30	Average	100	119	HORIZONTAL
2	11569.84	68.65	74.00	-5.35	59.98	5.14	38.83	35.30	Peak	100	119	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.65	63.08	74.00	-10.92	54.42	5.13	38.83	35.30	Peak	100	297	VERTICAL
2	11569.97	50.79	54.00	-3.21	42.12	5.14	38.83	35.30	Average	100	297	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 165 / Ant. 1 + Ant. 3
Test Date	Dec. 05, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.78	65.66	74.00	-8.34	56.94	5.16	38.86	35.30	Peak	100	168	HORIZONTAL
2	11649.94	52.43	54.00	-1.57	43.71	5.16	38.86	35.30	Average	100	168	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.87	67.89	74.00	-6.11	59.17	5.16	38.86	35.30	Peak	100	296	VERTICAL
2	11649.94	52.12	54.00	-1.88	43.40	5.16	38.86	35.30	Average	100	296	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz CH 151 / Ant. 1 + Ant. 3
Test Date	Dec. 05, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11506.70	65.15	74.00	-8.85	56.52	5.12	38.79	35.28	Peak	100	120	HORIZONTAL
2	11509.81	52.05	54.00	-1.95	43.42	5.12	38.79	35.28	Average	100	120	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11509.71	59.62	74.00	-14.38	50.99	5.12	38.79	35.28	Peak	100	322	VERTICAL
2	11509.74	48.49	54.00	-5.51	39.86	5.12	38.79	35.28	Average	100	322	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz CH 159 / Ant. 1 + Ant. 3
Test Date	Dec. 05, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11586.70	62.50	74.00	-11.50	53.83	5.14	38.83	35.30	Peak	100	121	HORIZONTAL
2	11589.58	50.73	54.00	-3.27	42.06	5.14	38.83	35.30	Average	100	121	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11589.78	64.88	74.00	-9.12	56.21	5.14	38.83	35.30	Peak	100	297	VERTICAL
2	11589.90	51.90	54.00	-2.10	43.23	5.14	38.83	35.30	Average	100	297	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1 / Ant. 2
Test Date	Nov. 27, 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	4823.84	55.89	74.00	-18.11	53.81	4.21	34.69	32.56	Peak	350	115	HORIZONTAL
2	4823.97	53.49	54.00	-0.51	51.41	4.21	34.69	32.56	Average	350	115	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	4823.95	52.00	74.00	-22.00	49.92	4.21	34.69	32.56	Peak	232	123	VERTICAL
2	4823.95	48.73	54.00	-5.27	46.65	4.21	34.69	32.56	Average	232	123	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 6 / Ant. 2
Test Date	Nov. 27, 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	4873.97	53.19	54.00	-0.81	50.98	4.22	34.67	32.66	Average	195	130	HORIZONTAL
2	4874.00	55.63	74.00	-18.37	53.42	4.22	34.67	32.66	Peak	195	130	HORIZONTAL
3	7310.20	53.67	54.00	-0.33	46.29	5.34	34.93	36.97	Average	283	126	HORIZONTAL
4	7311.88	59.05	74.00	-14.95	51.68	5.34	34.94	36.97	Peak	283	126	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	4873.87	52.23	74.00	-21.77	50.02	4.22	34.67	32.66	Peak	79	118	VERTICAL
2	4873.98	49.56	54.00	-4.44	47.35	4.22	34.67	32.66	Average	79	118	VERTICAL
3	7309.88	53.59	74.00	-20.41	46.21	5.34	34.93	36.97	Peak	173	100	VERTICAL
4	7310.17	46.49	54.00	-7.51	39.11	5.34	34.93	36.97	Average	173	100	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 11 / Ant. 2
Test Date	Nov. 27, 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	4923.94	53.17	54.00	-0.83	50.83	4.23	34.65	32.76	Average	213	129	HORIZONTAL
2	4923.97	55.37	74.00	-18.63	53.03	4.23	34.65	32.76	Peak	213	129	HORIZONTAL
3	7385.22	52.90	54.00	-1.10	45.42	5.36	34.96	37.08	Average	284	127	HORIZONTAL
4	7386.87	58.24	74.00	-15.76	50.76	5.36	34.96	37.08	Peak	284	127	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	4923.87	50.62	74.00	-23.38	48.28	4.23	34.65	32.76	Peak	239	119	VERTICAL
2	4923.97	47.70	54.00	-6.30	45.36	4.23	34.65	32.76	Average	239	8995	VERTICAL
3	7385.38	52.36	74.00	-21.64	44.88	5.36	34.96	37.08	Peak	258	100	VERTICAL
4	7386.66	43.74	54.00	-10.26	36.26	5.36	34.96	37.08	Average	258	119	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4822.81	38.82	54.00	-15.18	37.48	3.31	33.06	35.03	Average	100	217	HORIZONTAL
2	4823.62	51.34	74.00	-22.66	50.00	3.31	33.06	35.03	Peak	100	217	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4823.90	47.44	74.00	-26.56	46.10	3.31	33.06	35.03	Peak	100	257	VERTICAL
2	4824.10	33.83	54.00	-20.17	32.49	3.31	33.06	35.03	Average	100	257	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 6 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4867.53	57.45	74.00	-16.55	56.03	3.33	33.12	35.03	Peak	127	215	HORIZONTAL
2	4873.49	45.50	54.00	-8.50	44.04	3.33	33.16	35.03	Average	127	215	HORIZONTAL
3	7309.78	49.86	54.00	-4.14	45.24	4.06	35.96	35.40	Average	100	287	HORIZONTAL
4	7314.46	63.17	74.00	-10.83	58.55	4.06	35.96	35.40	Peak	100	287	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.26	42.99	54.00	-11.01	41.53	3.33	33.16	35.03	Average	116	263	VERTICAL
2	4874.96	55.36	74.00	-18.64	53.90	3.33	33.16	35.03	Peak	116	263	VERTICAL
3	7305.17	61.58	74.00	-12.42	57.00	4.06	35.92	35.40	Peak	134	254	VERTICAL
4	7310.10	48.59	54.00	-5.41	43.97	4.06	35.96	35.40	Average	134	254	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 11 / Ant. 2 + Ant. 4
Test Date	Dec. 04, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.81	52.51	74.00	-21.49	50.91	3.35	33.26	35.01	Peak	153	215	HORIZONTAL
2	4924.16	38.33	54.00	-15.67	36.73	3.35	33.26	35.01	Average	153	215	HORIZONTAL
3	7385.42	36.78	54.00	-17.22	32.03	4.06	36.09	35.40	Average	100	284	HORIZONTAL
4	7385.71	53.24	74.00	-20.76	48.49	4.06	36.09	35.40	Peak	100	284	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.81	48.32	74.00	-25.68	46.72	3.35	33.26	35.01	Peak	100	257	VERTICAL
2	4924.45	34.05	54.00	-19.95	32.45	3.35	33.26	35.01	Average	100	257	VERTICAL
3	7377.19	47.44	74.00	-26.56	42.69	4.06	36.09	35.40	Peak	100	56	VERTICAL
4	7387.06	34.40	54.00	-19.60	29.65	4.06	36.09	35.40	Average	100	56	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 149 / Ant. 1 + Ant. 3
Test Date	Dec. 24, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.22	67.47	74.00	-6.53	53.81	9.24	39.50	35.08	Peak	140	80	HORIZONTAL
2	11489.58	53.93	54.00	-0.07	40.27	9.24	39.50	35.08	Average	140	80	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11488.52	60.05	74.00	-13.95	46.39	9.24	39.50	35.08	Peak	100	71	VERTICAL
2	11489.60	47.50	54.00	-6.50	33.84	9.24	39.50	35.08	Average	100	71	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 157 / Ant. 1 + Ant. 3
Test Date	Dec. 24, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.04	53.24	54.00	-0.76	39.60	9.26	39.47	35.09	Average	135	99	HORIZONTAL
2	11569.36	66.24	74.00	-7.76	52.60	9.26	39.47	35.09	Peak	135	99	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11570.04	50.23	54.00	-3.77	36.59	9.26	39.47	35.09	Average	100	295	VERTICAL
2	11570.72	62.17	74.00	-11.83	48.53	9.26	39.47	35.09	Peak	100	295	VERTICAL

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 165 / Ant. 1 + Ant. 3
Test Date	Dec. 24, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.12	52.73	54.00	-1.27	39.08	9.28	39.44	35.07	Average	136	103	HORIZONTAL
2	11649.24	65.34	74.00	-8.66	51.69	9.28	39.44	35.07	Peak	136	103	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.32	61.25	74.00	-12.75	47.60	9.28	39.44	35.07	Peak	100	318	VERTICAL
2	11650.12	49.49	54.00	-4.51	35.84	9.28	39.44	35.07	Average	100	318	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, 1MHz / 10Hz for Average
RBW / VBW (Emission in non-restricted band)	100 kHz / 300 kHz for Peak

4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB 558074 D01 v03r01 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 10.1 Unwanted Emissions into Non-Restricted Frequency Bands Measurement Procedure
2. The radiated emission test is performed on each TX port of operating mode without summing or adding 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	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz CH 1, 6, 11 / Ant. 2 + Ant. 4
Test date	Nov. 27, 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	2388.56	72.45	74.00	-1.55	40.31	4.09	28.05	0.00	Peak	151	280	HORIZONTAL
2	2390.00	53.96	54.00	-0.04	21.82	4.09	28.05	0.00	Average	151	280	HORIZONTAL
3	2411.36	109.74			77.54	4.11	28.09	0.00	Peak	151	280	HORIZONTAL
4	2411.68	99.98			67.78	4.11	28.09	0.00	Average	151	280	HORIZONTAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2387.76	67.50	54.00	13.50	36.72	2.91	0.00	27.87	Average	305	124	HORIZONTAL
2	2390.00	50.49	54.00	-3.51	19.71	2.91	0.00	27.87	Average	305	124	HORIZONTAL
3	2436.68	105.24			74.52	2.94	0.00	27.78	Average	305	124	HORIZONTAL
4	2436.68	114.89			84.17	2.94	0.00	27.78	Average	305	124	HORIZONTAL
5	2483.50	68.20	54.00	14.20	37.51	2.96	0.00	27.73	Average	305	124	HORIZONTAL
6	2483.80	48.08	54.00	-5.92	17.39	2.96	0.00	27.73	Average	305	124	HORIZONTAL

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	2462.48	99.69			67.33	4.14	28.22	0.00	Average	145	306	HORIZONTAL
2	2462.64	110.07			77.71	4.14	28.22	0.00	Peak	145	306	HORIZONTAL
3	2483.50	53.97	54.00	-0.03	21.55	4.16	28.26	0.00	Average	145	306	HORIZONTAL
4	2485.26	73.90	74.00	-0.10	41.44	4.16	28.30	0.00	Peak	145	306	HORIZONTAL

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

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz CH 3, 6, 9 / Ant. 2 + Ant. 4
Test date	Nov. 27, 2013		

Channel 3

	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	2390.00	68.68	74.00	-5.32	37.90	2.91	0.00	27.87	Peak	260	119	HORIZONTAL
2	2390.00	53.50	54.00	-0.50	22.72	2.91	0.00	27.87	Average	260	119	HORIZONTAL
3	2410.46	103.89			73.13	2.92	0.00	27.84	Peak	260	119	HORIZONTAL
4	2423.92	93.04			62.30	2.93	0.00	27.81	Average	260	119	HORIZONTAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2389.68	72.34	74.00	-1.66	41.56	2.91	0.00	27.87	Peak	300	149	HORIZONTAL
2	2390.00	53.93	54.00	-0.07	23.15	2.91	0.00	27.87	Average	300	149	HORIZONTAL
3	2434.44	97.45			66.71	2.93	0.00	27.81	Average	300	149	HORIZONTAL
4	2439.24	108.16			77.44	2.94	0.00	27.78	Peak	300	149	HORIZONTAL
5	2484.46	69.06	74.00	-4.94	38.37	2.96	0.00	27.73	Peak	300	149	HORIZONTAL
6	2484.80	50.51	54.00	-3.49	19.82	2.96	0.00	27.73	Average	300	149	HORIZONTAL

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

Channel 9

	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	2449.44	94.31			63.59	2.94	0.00	27.78	Average	307	154	HORIZONTAL
2	2449.76	105.48			74.76	2.94	0.00	27.78	Peak	307	154	HORIZONTAL
3	2484.78	53.99	54.00	-0.01	23.30	2.96	0.00	27.73	Average	307	154	HORIZONTAL
4	2487.35	70.51	74.00	-3.49	39.82	2.96	0.00	27.73	Peak	307	154	HORIZONTAL

Item 3, 4 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	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 2
Test date	Dec. 04, 2013		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.84	63.68	74.00	-10.32	33.29	2.22	28.17	0.00	Peak	167	308	HORIZONTAL
2	2390.00	53.47	54.00	-0.53	23.08	2.22	28.17	0.00	Average	167	308	HORIZONTAL
3	2411.04	113.83			83.40	2.22	28.21	0.00	Peak	167	308	HORIZONTAL
4	2411.20	110.11			79.68	2.22	28.21	0.00	Average	167	308	HORIZONTAL

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	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2388.08	48.52	54.00	-5.48	18.14	2.21	28.17	0.00	Average	138	307	HORIZONTAL
2	2388.08	60.98	74.00	-13.02	30.60	2.21	28.17	0.00	Peak	138	307	HORIZONTAL
3	2436.04	112.78			82.26	2.23	28.29	0.00	Peak	138	307	HORIZONTAL
4	2436.36	109.21			78.69	2.23	28.29	0.00	Average	138	307	HORIZONTAL
5	2483.50	45.14	54.00	-8.86	14.50	2.26	28.38	0.00	Average	138	307	HORIZONTAL
6	2485.42	56.11	74.00	-17.89	25.43	2.26	28.42	0.00	Peak	138	307	HORIZONTAL

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	2461.04	111.93			81.36	2.24	28.33	0.00	Peak	140	306	HORIZONTAL
2	2461.20	108.21			77.64	2.24	28.33	0.00	Average	140	306	HORIZONTAL
3	2483.82	49.11	54.00	-4.89	18.47	2.26	28.38	0.00	Average	140	306	HORIZONTAL
4	2483.98	59.81	74.00	-14.19	29.17	2.26	28.38	0.00	Peak	140	306	HORIZONTAL

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

Temperature	25℃	Humidity	54%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 2 + Ant. 4
Test date	Nov. 27, 2013		

Channel 1

	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	2390.00	72.69	74.00	-1.31	41.91	2.91	0.00	27.87	Peak	298	151	HORIZONTAL
2	2390.00	53.16	54.00	-0.84	22.38	2.91	0.00	27.87	Average	298	151	HORIZONTAL
3	2411.52	101.51			70.75	2.92	0.00	27.84	Average	298	151	HORIZONTAL
4	2412.00	111.64			80.88	2.92	0.00	27.84	Peak	298	151	HORIZONTAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2389.04	64.68	74.00	-9.32	33.90	2.91	0.00	27.87	Peak	331	149	HORIZONTAL
2	2390.00	46.69	54.00	-7.31	15.91	2.91	0.00	27.87	Average	331	149	HORIZONTAL
3	2437.32	113.72			83.00	2.94	0.00	27.78	Peak	331	149	HORIZONTAL
4	2437.32	103.93			73.21	2.94	0.00	27.78	Average	331	149	HORIZONTAL
5	2483.50	67.62	74.00	-6.38	36.93	2.96	0.00	27.73	Peak	331	149	HORIZONTAL
6	2483.50	47.36	54.00	-6.64	16.67	2.96	0.00	27.73	Average	331	0	HORIZONTAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	2462.48	100.92			70.21	2.95	0.00	27.76	Average	292	147	HORIZONTAL
2	2462.80	110.77			80.06	2.95	0.00	27.76	Peak	292	147	HORIZONTAL
3	2483.50	70.78	74.00	-3.22	40.09	2.96	0.00	27.73	Peak	292	147	HORIZONTAL
4	2483.50	53.71	54.00	-0.29	23.02	2.96	0.00	27.73	Average	292	147	HORIZONTAL

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

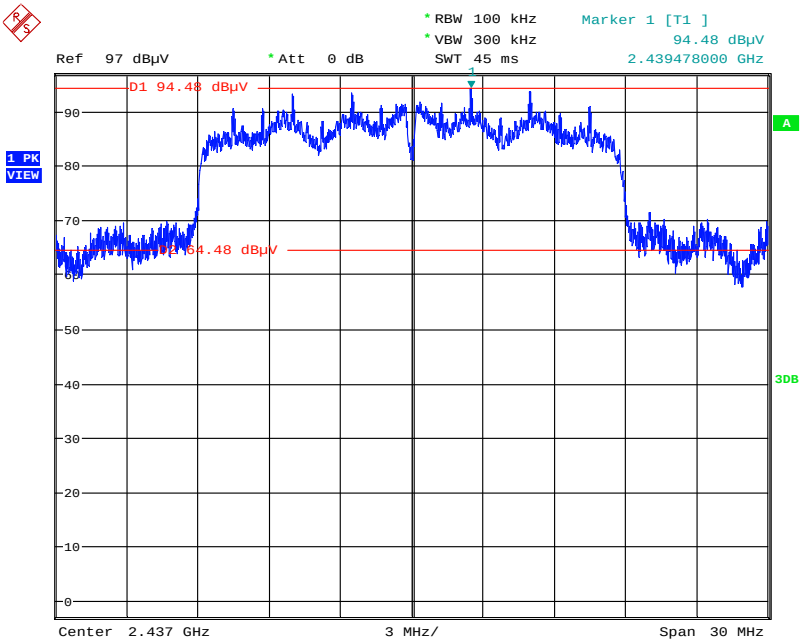
Note:

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

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

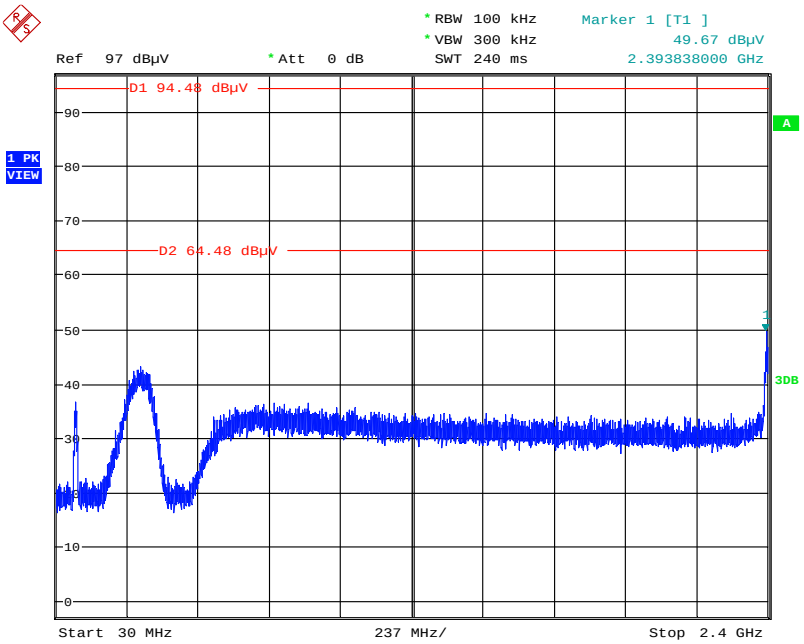
For Emission not in Restricted Band

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



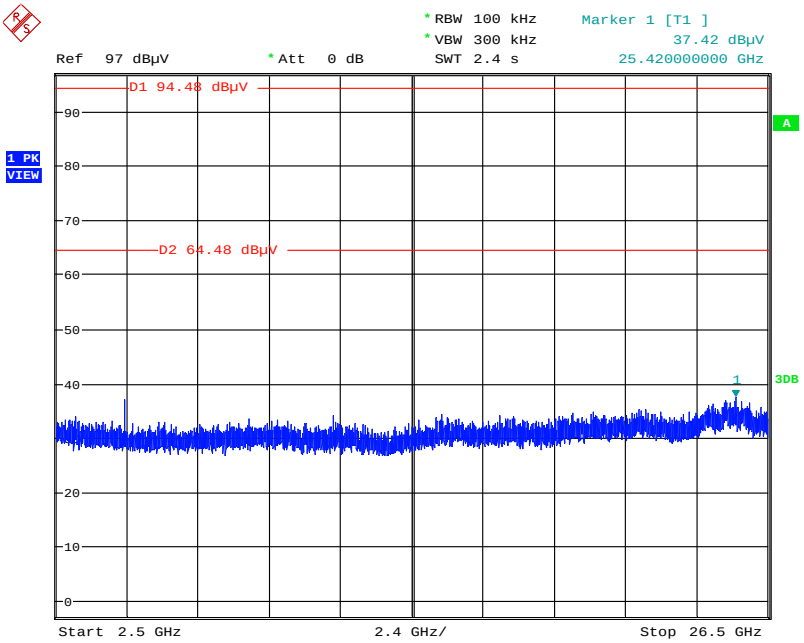
Date: 4.DEC.2013 22:03:35

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



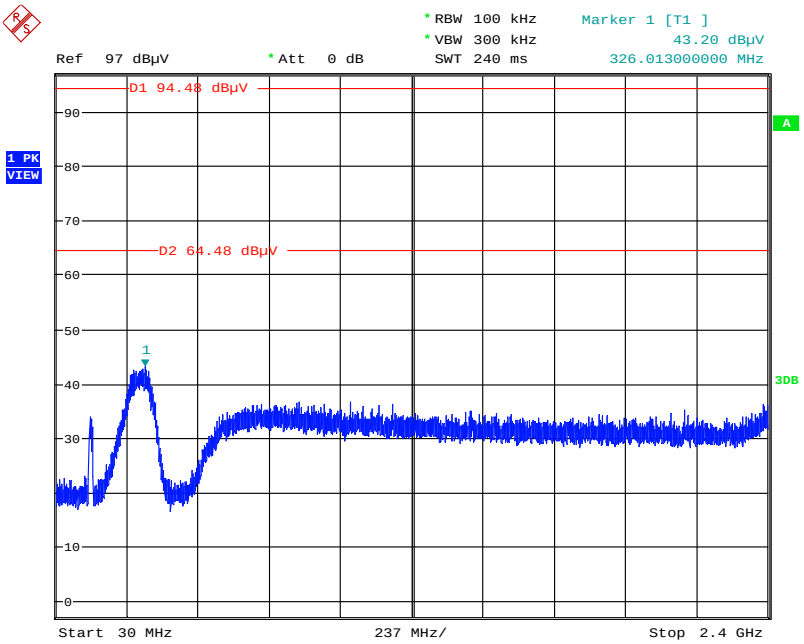
Date: 4.DEC.2013 22:04:13

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



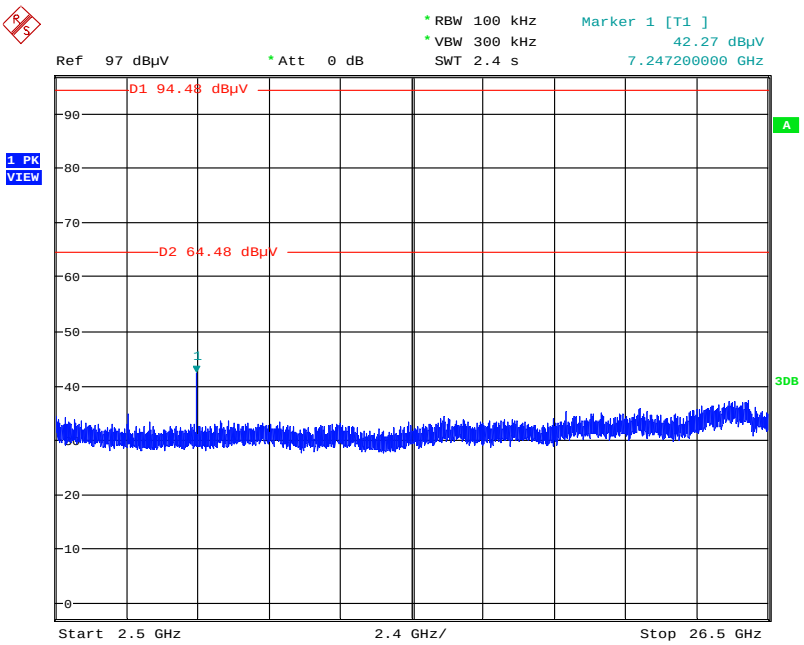
Date: 4.DEC.2013 22:04:35

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



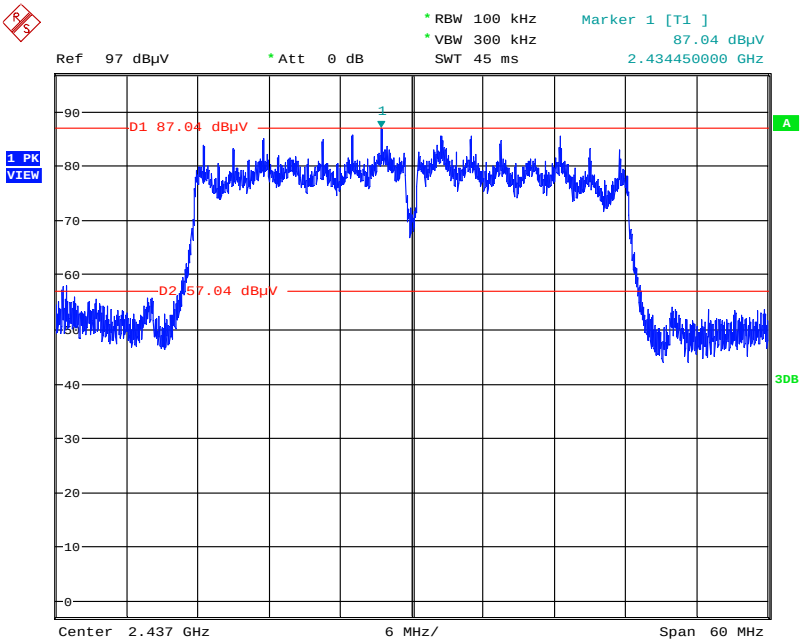
Date: 4.DEC.2013 22:05:48

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



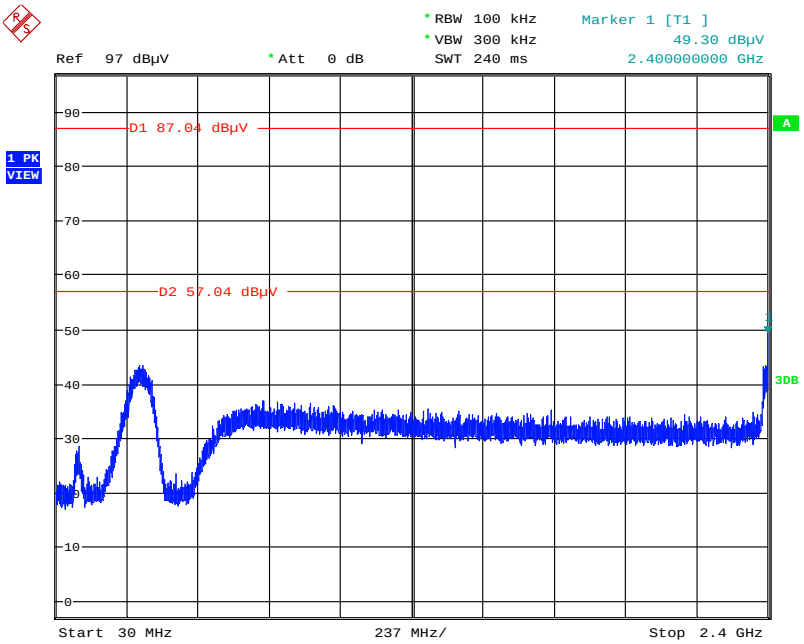
Date: 4.DEC.2013 22:05:24

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



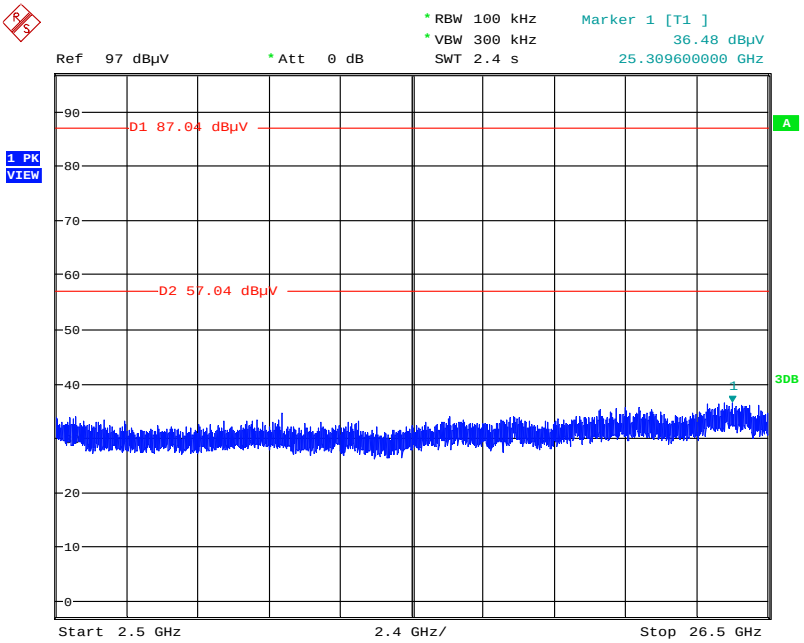
Date: 4.DEC.2013 22:00:13

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



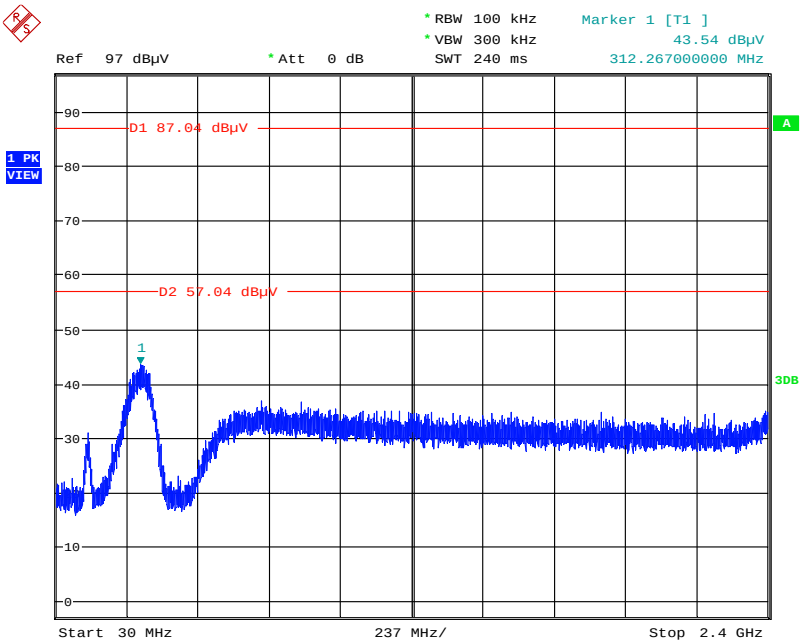
Date: 4.DEC.2013 22:00:47

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



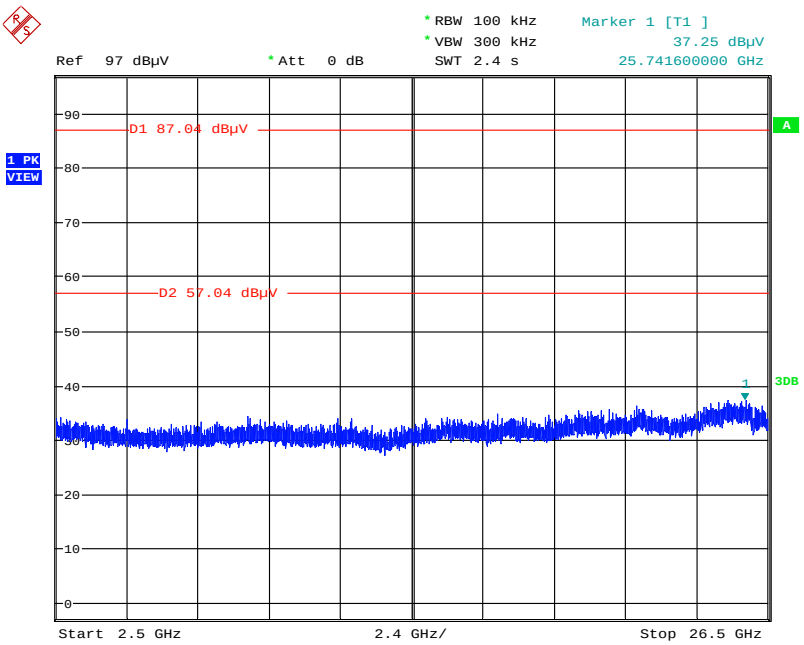
Date: 4.DEC.2013 22:01:26

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



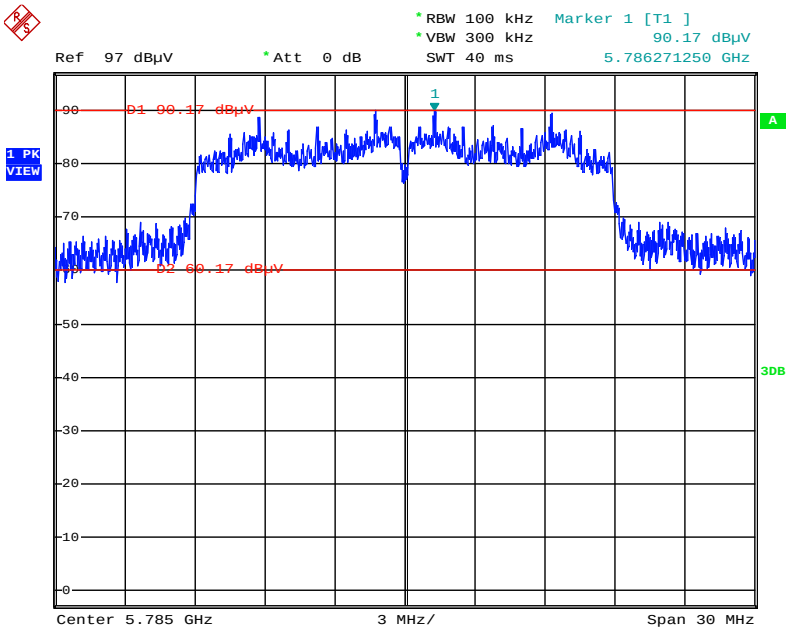
Date: 4.DEC.2013 22:02:31

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



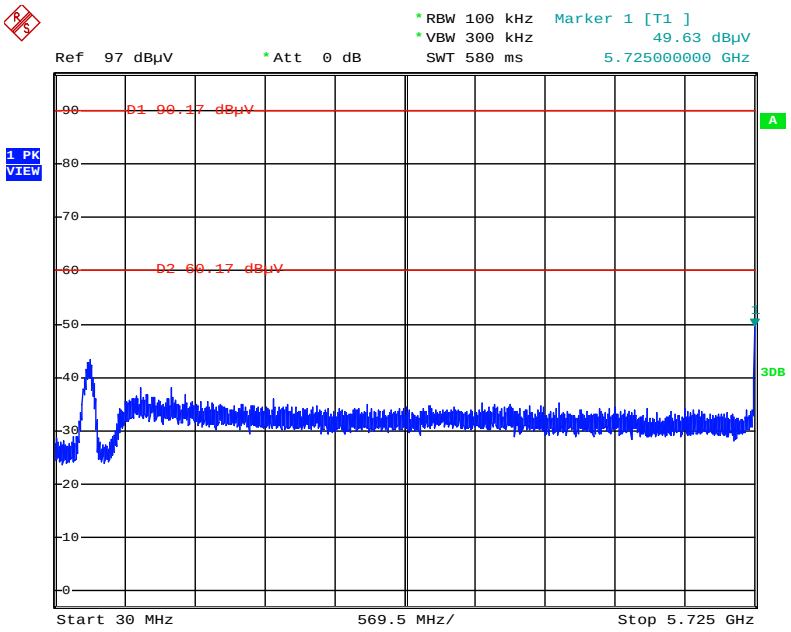
Date: 4.DEC.2013 22:02:12

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



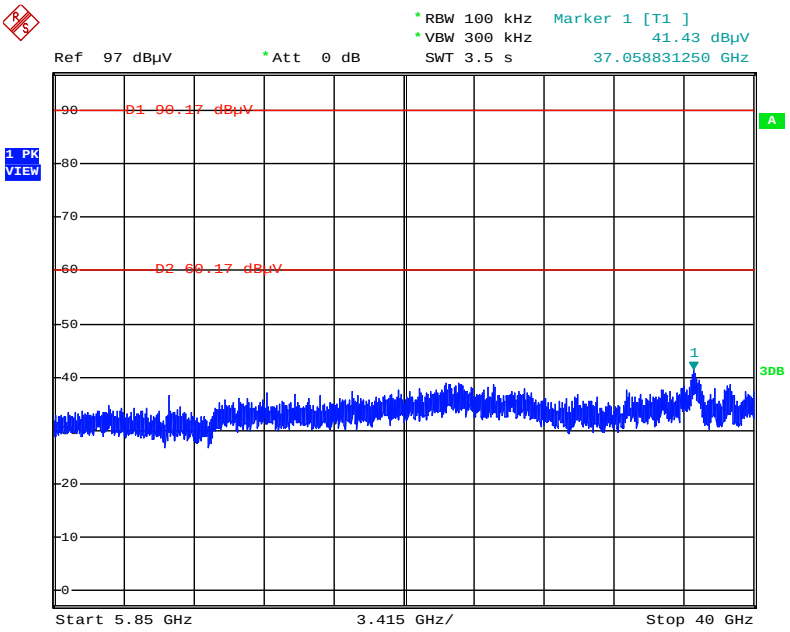
Date: 4.DEC.2013 22:31:21

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



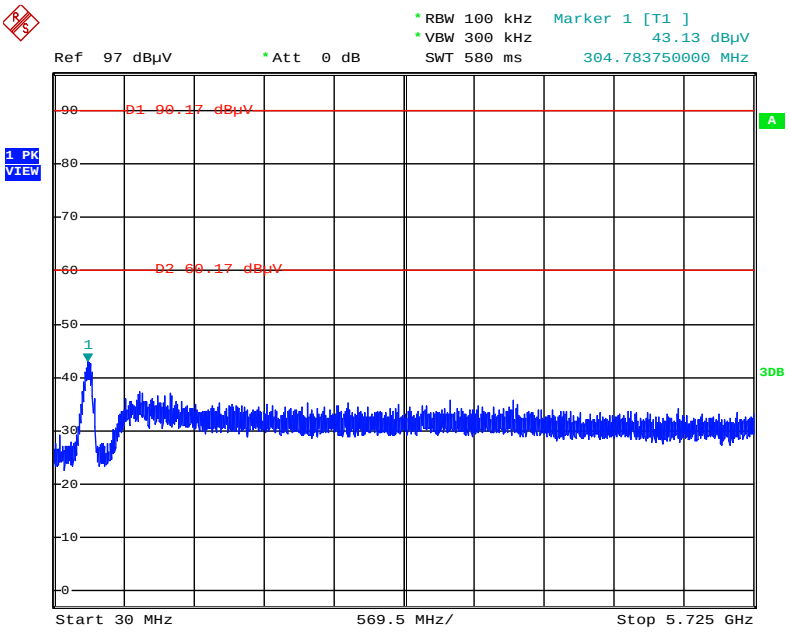
Date: 4.DEC.2013 22:32:40

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



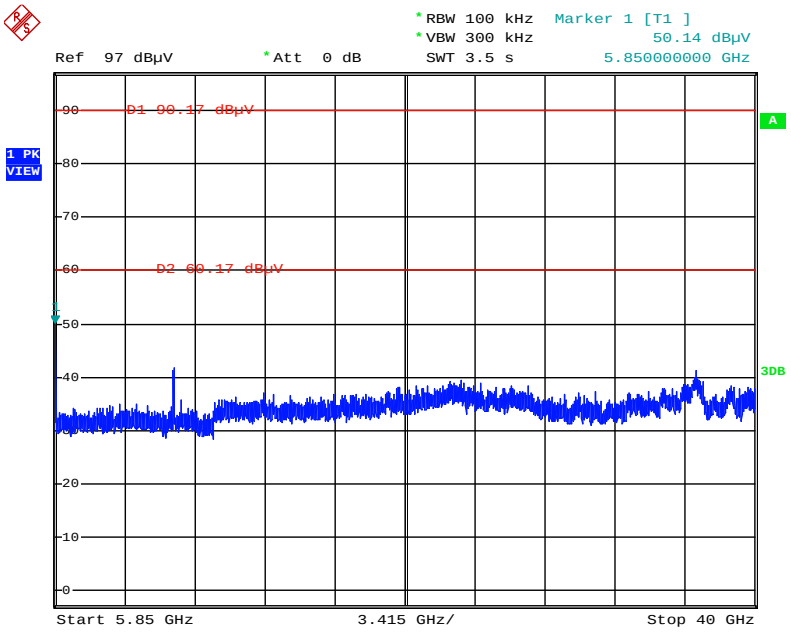
Date: 4.DEC.2013 22:33:09

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



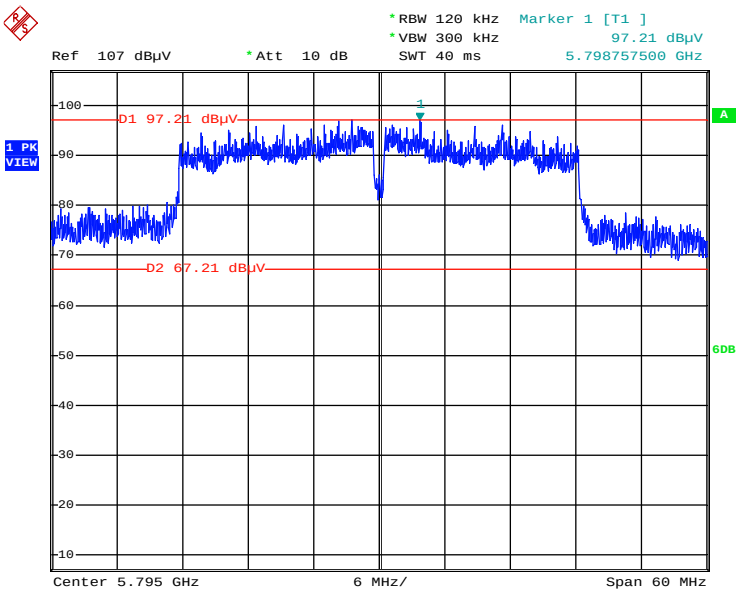
Date: 4.DEC.2013 22:34:22

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



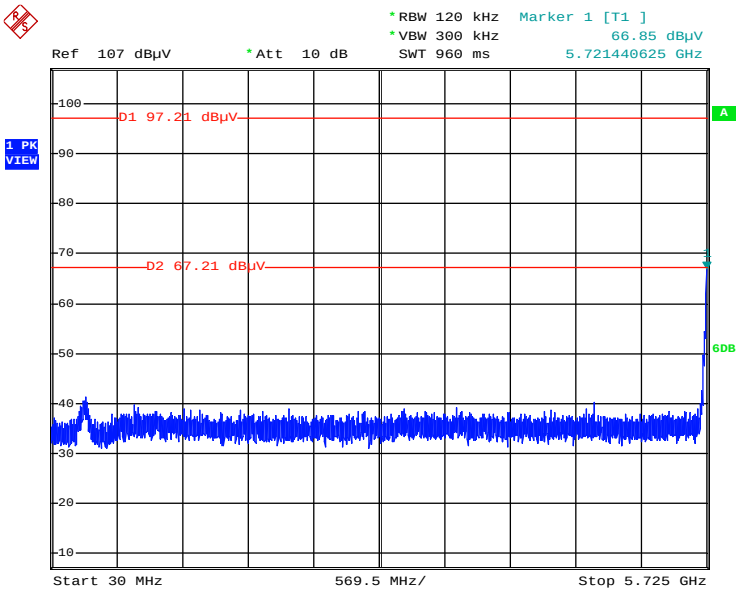
Date: 4.DEC.2013 22:33:49

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



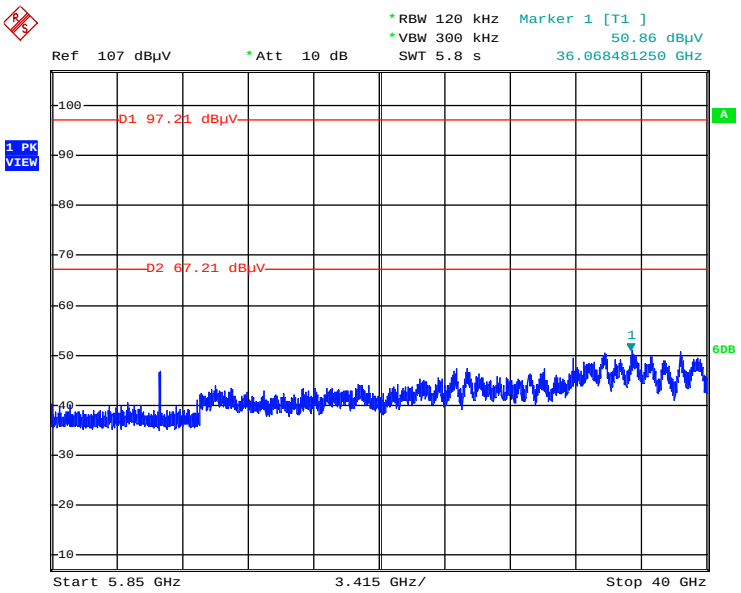
Date: 26.NOV.2013 23:44:42

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 151 / 30MHz~5725MHz (down 30dBc)



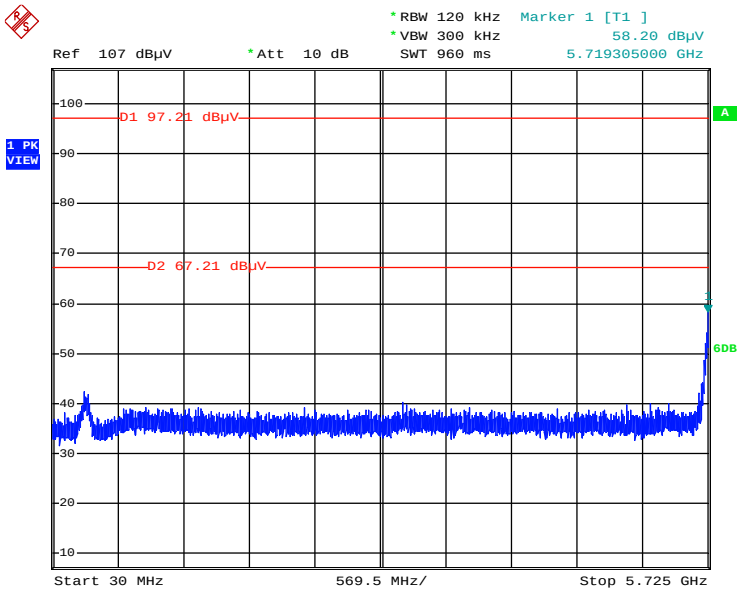
Date: 26.NOV.2013 23:48:31

Plot on Configuration IEEE 802.11n MCS0 40MHz / CH 151 / 5850MHz~40000MHz (down 30dBc)



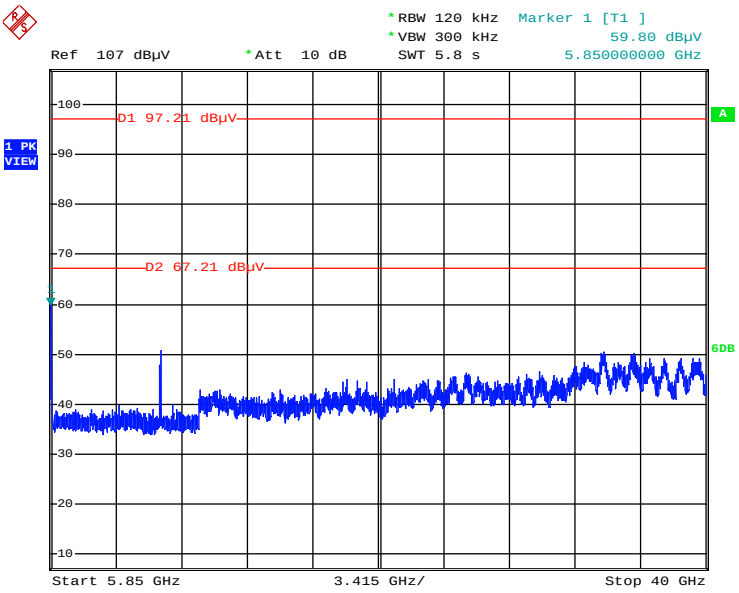
Date: 26.NOV.2013 23:49:41

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



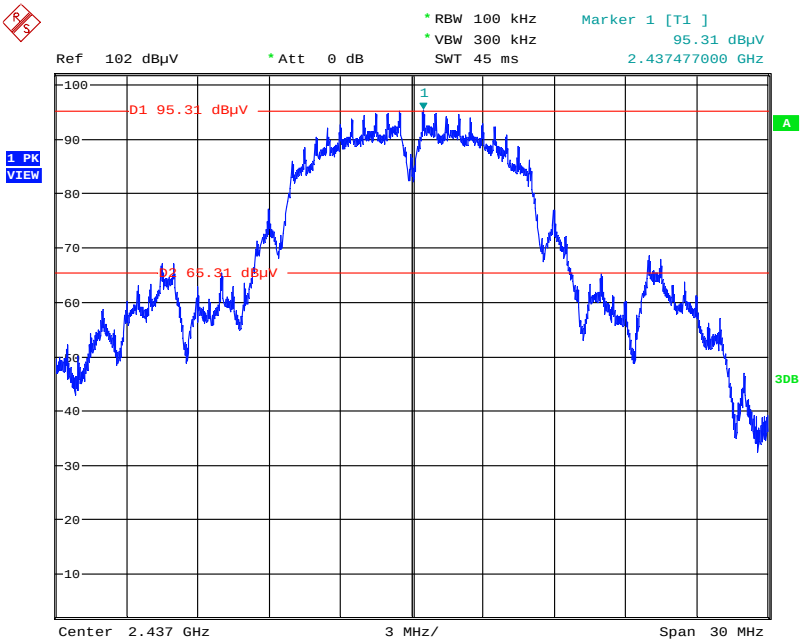
Date: 26.NOV.2013 23:50:49

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



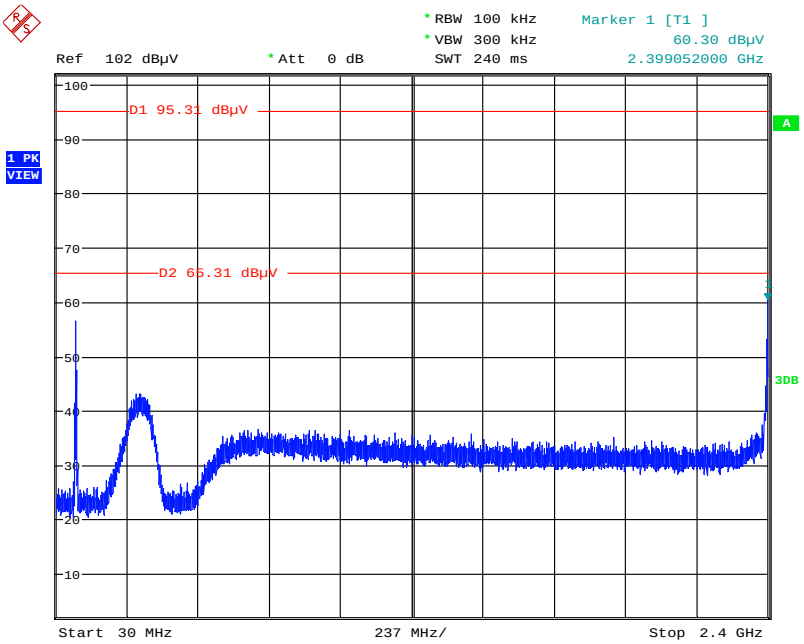
Date: 26.NOV.2013 23:50:26

Plot on Configuration IEEE 802.11b / Reference Level



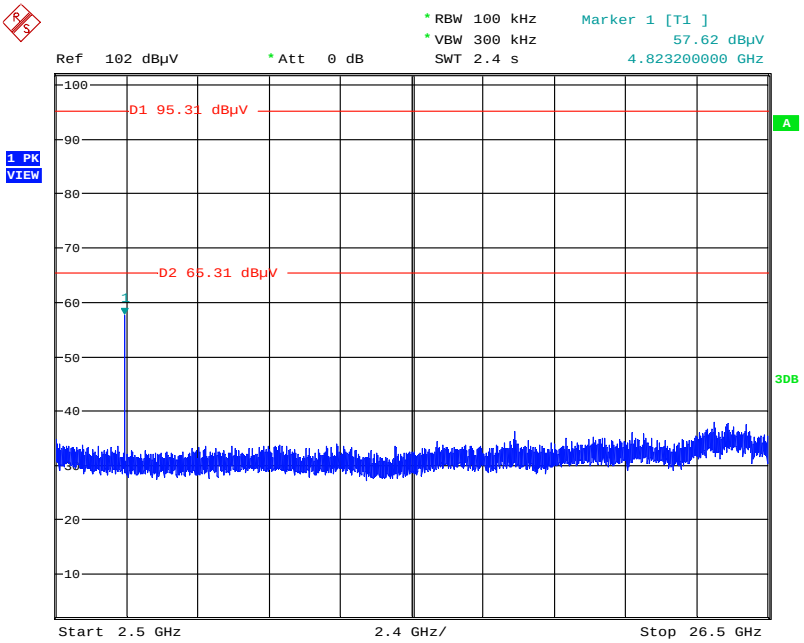
Date: 4.DEC.2013 22:10:35

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



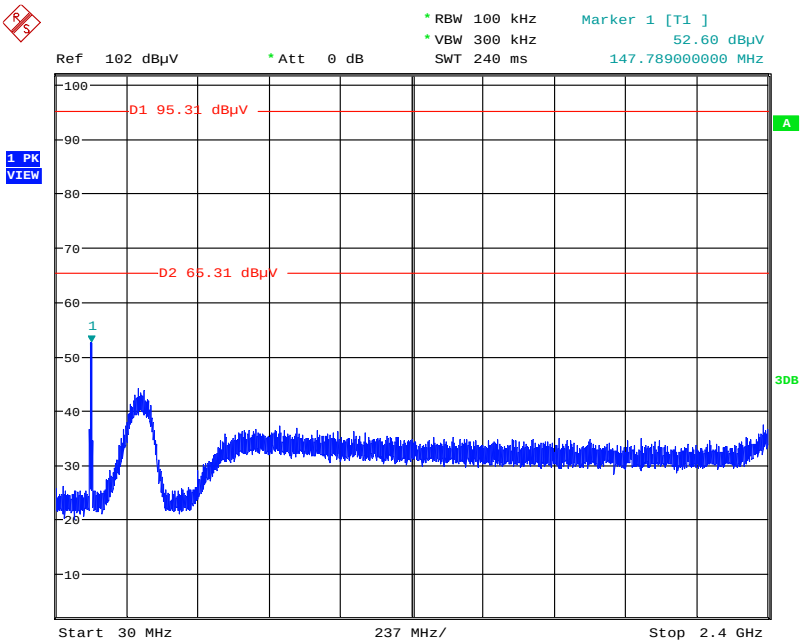
Date: 4.DEC.2013 22:11:09

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



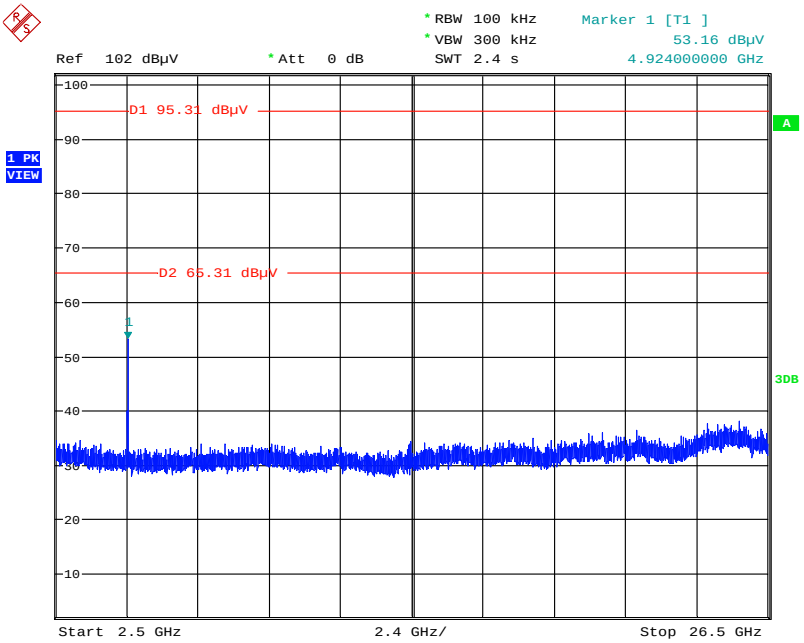
Date: 4.DEC.2013 22:11:31

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



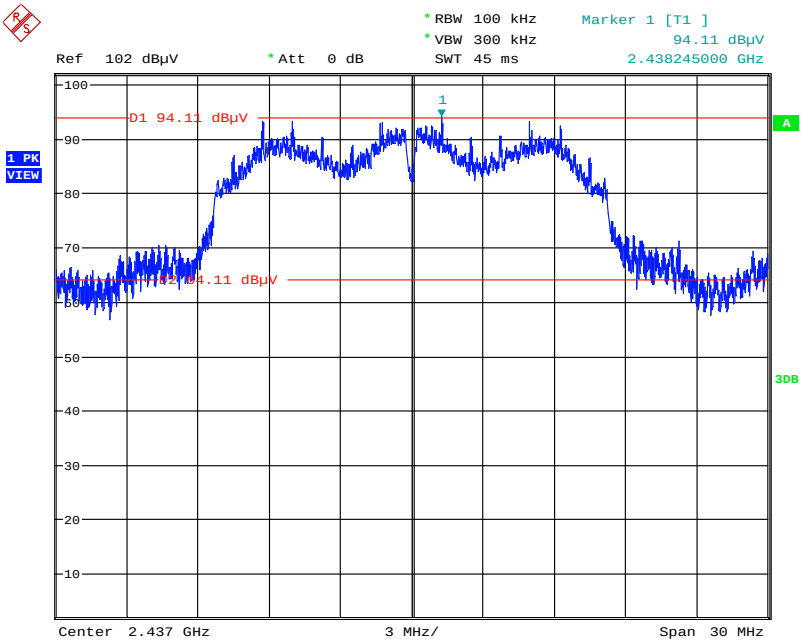
Date: 4.DEC.2013 22:12:32

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



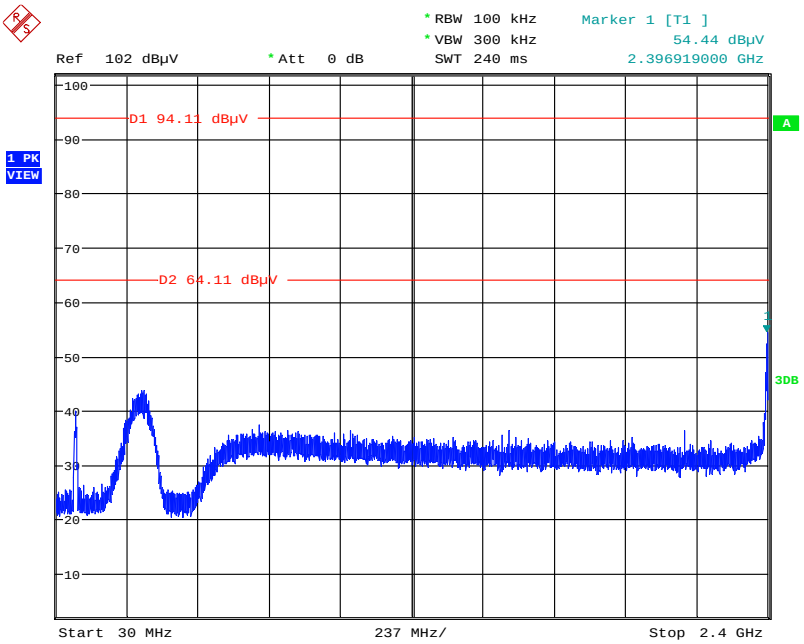
Date: 4.DEC.2013 22:12:06

Plot on Configuration IEEE 802.11g / Reference Level



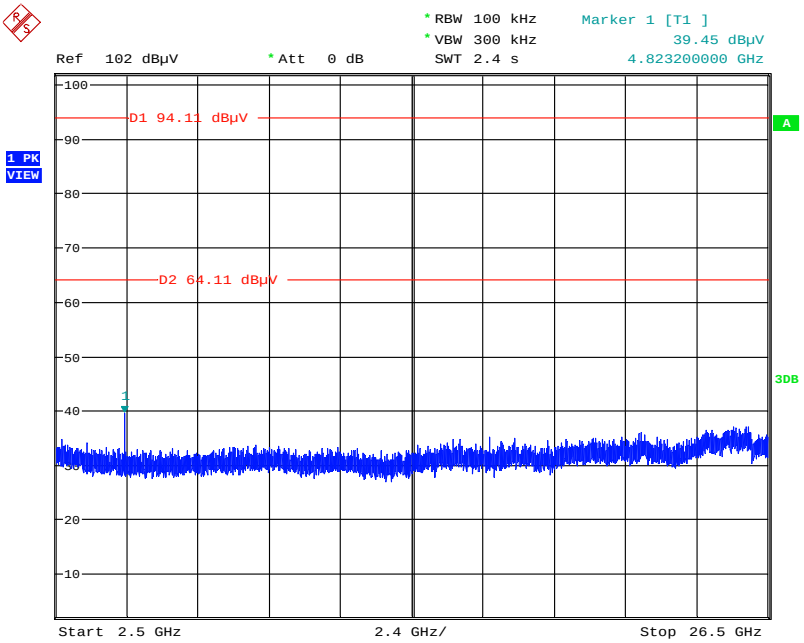
Date: 4.DEC.2013 22:07:09

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



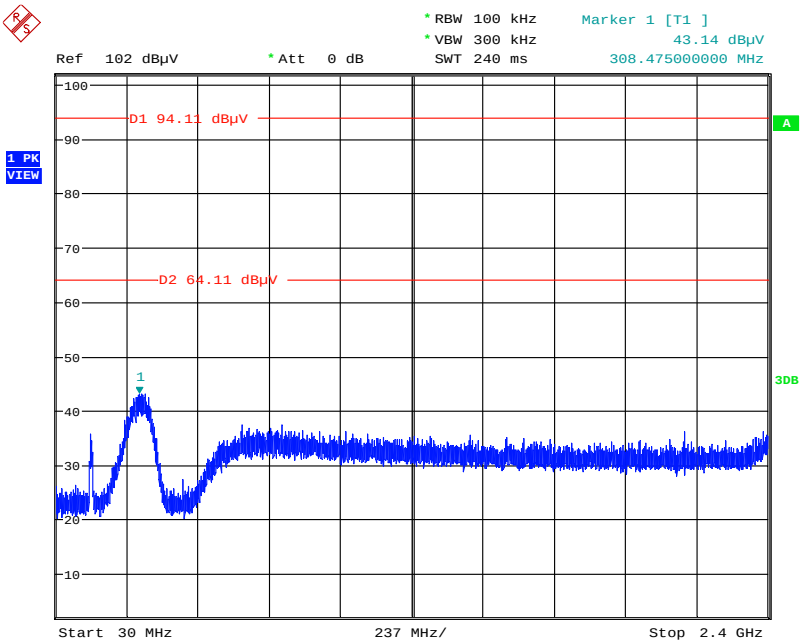
Date: 4.DEC.2013 22:07:54

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



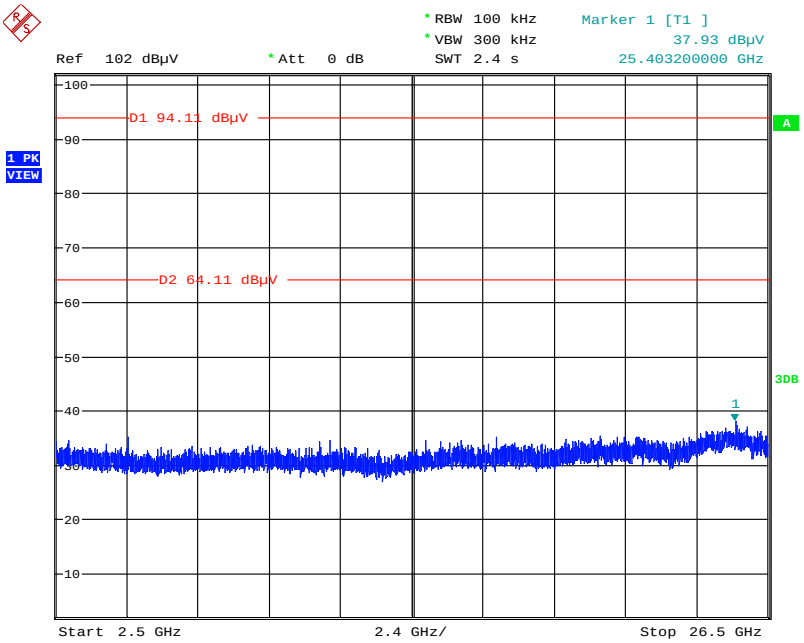
Date: 4.DEC.2013 22:08:30

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



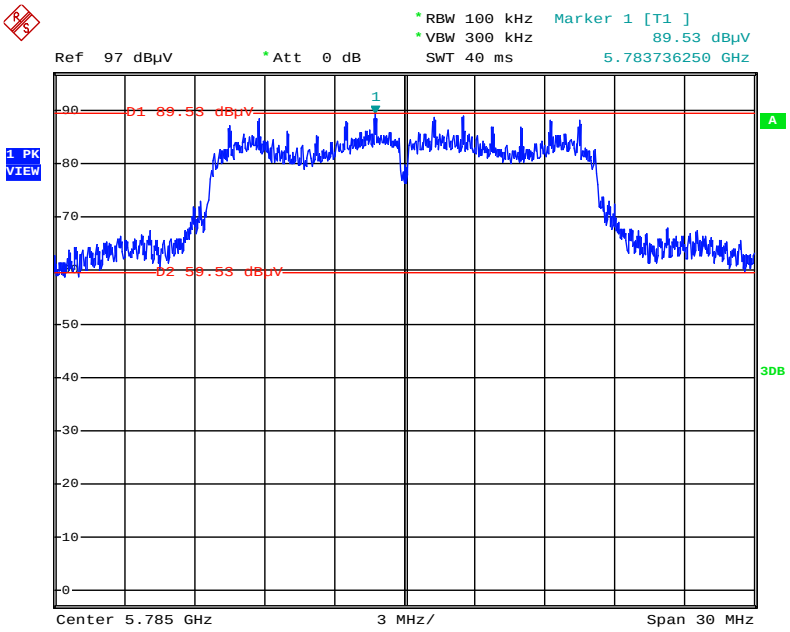
Date: 4.DEC.2013 22:09:19

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



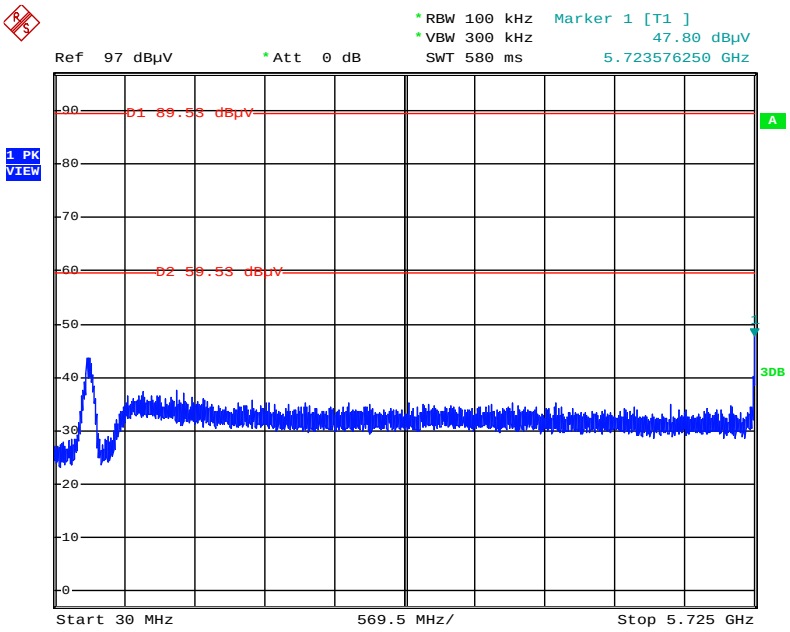
Date: 4.DEC.2013 22:08:59

Plot on Configuration IEEE 802.11a / Reference Level



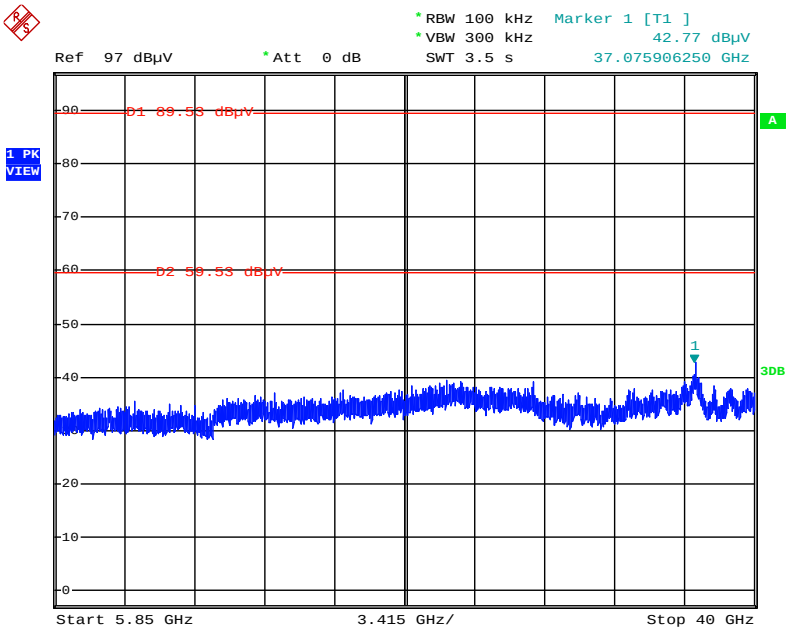
Date: 4.DEC.2013 22:26:52

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



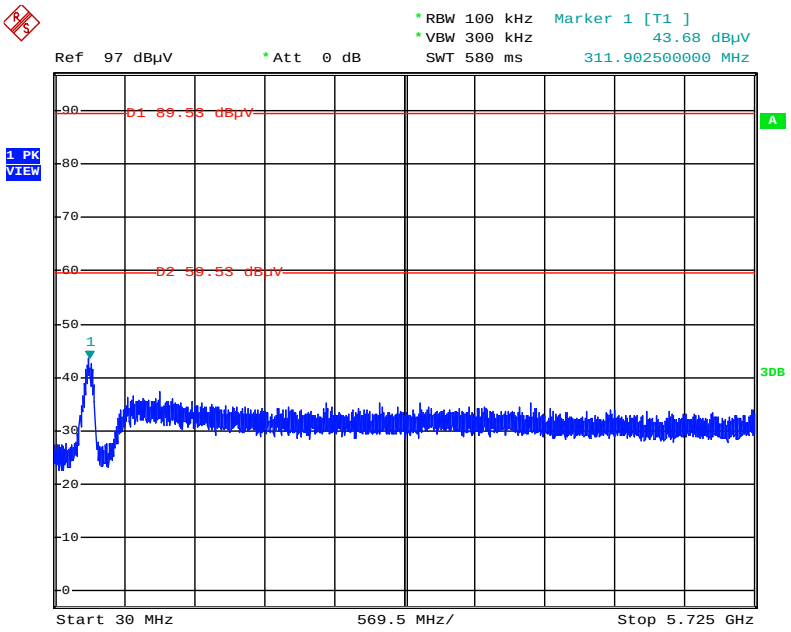
Date: 4.DEC.2013 22:28:05

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



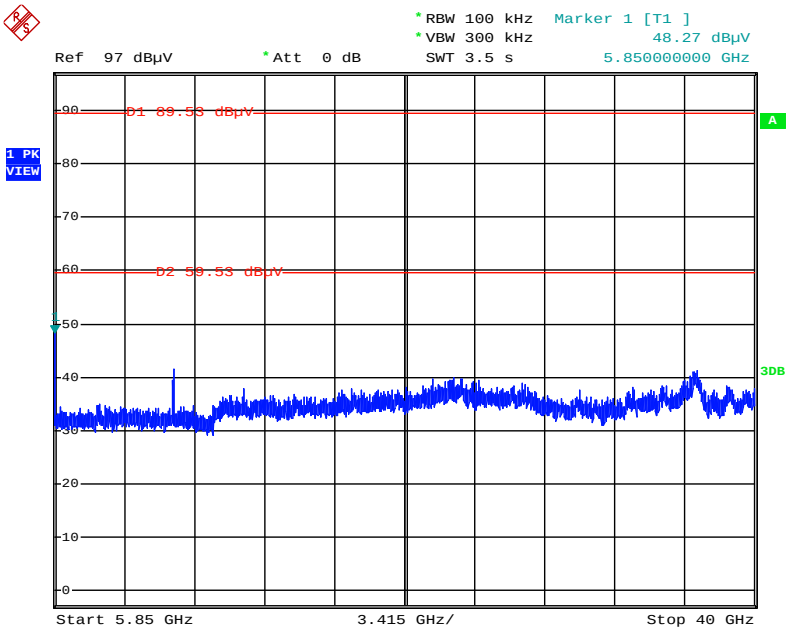
Date: 4.DEC.2013 22:28:33

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



Date: 4.DEC.2013 22:30:05

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



Date: 4.DEC.2013 22:29:31

4.7. Antenna Requirements

4.7.1. Limit

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

4.7.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9 kHz ~ 2.75 GHz	Apr. 12, 2013	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150 kHz ~ 100 MHz	Nov. 23, 2013	Conduction (CO01-CB)
Arifical Mains Network	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Nov. 23, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150 kHz ~ 30 MHz	Dec. 04, 2013	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. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	9170-507	15GHz ~ 40GHz	Jan. 14, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP	100019	9kHz ~ 40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
Spectrum analyzer	Rohde&Schwarz	FSV30	101026	9kHz ~ 30GHz	Nov. 15, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

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

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

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

6. MEASUREMENT UNCERTAINTY

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 Uc(y)				1.2
Measuring uncertainty for a level of confidence of 95% U=2Uc(y)				2.4

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

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

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

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

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

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

Uncertainty of Conducted Emission Measurement

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