



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	PY313200230

Product Name	WiFi Range Extender
Brand Name	NETGEAR
Model No.	EX6200
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Oct. 25, 2013
Final Test Date	Nov. 19, 2013
Submission Type	Original Equipment

Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part and IEEE 802.11a/ac (5725 ~ 5850MHz) of the product.

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r01 and KDB 662911 D01 v02.**

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



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.....	6
3.3. Table for Filed Antenna.....	7
3.4. Table for Carrier Frequencies	9
3.5. Table for Product Information	9
3.6. Table for Test Modes	10
3.7. Table for Testing Locations.....	12
3.8. Table for Supporting Units	13
3.9. Table for Parameters of Test Software Setting	14
3.10. EUT Operation during Test	15
3.11. Duty Cycle	16
3.12. Test Configurations	22
4. TEST RESULT	26
4.1. AC Power Line Conducted Emissions Measurement.....	26
4.2. Maximum Conducted Output Power Measurement.....	30
4.3. Power Spectral Density Measurement	34
4.4. 6dB Spectrum Bandwidth Measurement	49
4.5. Radiated Emissions Measurement	59
4.6. Emissions Measurement	92
4.7. Antenna Requirements	127
5. LIST OF MEASURING EQUIPMENTS	128
6. TEST LOCATION.....	130
7. MEASUREMENT UNCERTAINTY.....	131
APPENDIX A. TEST PHOTOS	A1 ~ A5
APPENDIX B. MAXIMUM PERMISSIBLE EXPOSURE	B1 ~ B3
APPENDIX C. CO-LOCATION REPORT.....	C1 ~ C3

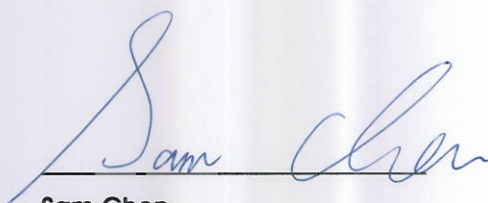
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR3N0906AA	Rev. 01	Initial issue of report	Nov. 26, 2013

1. CERTIFICATE OF COMPLIANCE

Product Name : WIFI Range Extender
Brand Name : NETGEAR
Model No. : EX6200
Applicant : NETGEAR, Inc.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 25, 2013 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.207	AC Power Line Conducted Emissions	Complies	6.10 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.02 dB
4.3	15.247(e)	Power Spectral Density	Complies	3.32 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	0.15 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n/ac

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/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	<u>For 2.4GHz Band:</u> 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth <u>For 5GHz Band:</u> 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	For non-beamforming mode: <u>For 2.4GHz Band:</u> MCS0 (20MHz): 17.92 MHz ; MCS0 (40MHz): 36.16 MHz <u>For 5GHz Band:</u> 802.11n MCS0 (20MHz): 17.76 MHz ; 802.11n MCS0 (40MHz): 36.32 MHz For beamforming mode: <u>For 5GHz Band:</u> 802.11ac MCS2/Nss1 (20MHz): 17.76 MHz ; 802.11ac MCS2/Nss1 (40MHz): 36.64 MHz ; 802.11ac MCS2/Nss1 (80MHz): 75.84 MHz

Maximum Conducted Output Power	For non-beamforming mode: <u>For 2.4GHz Band:</u> MCS0 (20MHz): 27.41 dBm ; MCS0 (40MHz): 22.90 dBm <u>For 5GHz Band:</u> 802.11n MCS0 (20MHz): 29.71 dBm ; 802.11n MCS0 (40MHz): 29.91 dBm ; For beamforming mode: <u>For 5GHz Band:</u> 802.11ac MCS2/Nss1 (20MHz): 28.76 dBm ; 802.11ac MCS2/Nss1 (40MHz): 28.82 dBm ; 802.11ac MCS2/Nss1 (80MHz): 26.29 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Note: The EUT supports beamforming mode for 802.11ac 20/40/80MHz.

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%)	For non-beamforming mode: 11b: 10.16 MHz ; 11g: 16.72 MHz ; 11a: 16.56 MHz
Maximum Conducted Output Power	For non-beamforming mode: 11b: 23.94 dBm ; 11g: 27.38 dBm ; 11a: 29.71 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna and Band width

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

Note: The EUT supports beamforming mode for 802.11ac 20/40/80MHz.

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS0-15
802.11n (HT40)	2	MCS0-15
802.11ac (VHT20)	2	MCS 0-9/Nss1-2
802.11ac (VHT40)	2	MCS 0-9/Nss1-2
802.11ac (VHT80)	2	MCS 0-9/Nss1-2
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT support VHT20, VHT40 and VHT80. Note 3: The test result of beam-forming mode is worse case than non beam-forming mode, so it is recorded in the test report for 802.11ac. Note 4: Modulation modes consist of below configuration: 11a: IEEE 802.11a, HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac		

3.2. Accessories

Power	Brand	Model	P/N	Rating
Adapter 1	NETGEAR	P030WF120B 11200-6LF	332-10200-02	Input: 100-240V~50/60Hz 1.0A Output: 12.0V, 2.5A
Adapter 2	NETGEAR	MU30-5120250-A1	332-10234-01	Input: 100-240V~50/60Hz 0.8A Output: 12V, 2.5A
Others				
RJ-45 Cable*1: Shielded, 1.5m				
Cradle*1				

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector
1	NETGEAR	EX6200	Dipole Antenna	I-PEX
2	NETGEAR	EX6200	Dipole Antenna	I-PEX

Ant.	Frequency	Gain (dBi)		Cable loss		True Gain (dBi)	
		2.4GHz		2.4GHz		2.4GHz	
		20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
1	2412MHz	2.4	-	0.5	-	1.9	-
	2422MHz	-	2.4	-	0.5	-	1.9
	2437MHz	2.5	2.5	0.5	0.5	2	2
	2452MHz	-	2.8	-	0.5	-	2.3
	2462MHz	2.9	-	0.5	-	2.4	-
2	2412MHz	2.4	-	0.6	-	1.8	-
	2422MHz	-	2.4	-	0.6	-	1.8
	2437MHz	2.5	2.5	0.6	0.6	1.9	1.9
	2452MHz	-	2.8	-	0.6	-	2.2
	2462MHz	2.9	-	0.6	-	2.3	-

Ant.	Frequency	Gain (dBi)			Cable loss			True Gain (dBi)		
		5GHz			5GHz			5GHz		
		20MHz	40MHz	80MHz	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz
1	5745MHz	5.1	-	-	1.1	-	-	4	-	-
	5755MHz	-	5.1	-	-	1.1	-	-	4	-
	5775MHz	-	-	5.5	-	-	1.1	-	-	4.4
	5785MHz	5.5	-	-	1.1	-	-	4.4	-	-
	5795MHz	-	5.5	-	-	1.1	-	-	4.4	-
	5825MHz	5.5	-	-	1.1	-	-	4.4	-	-
2	5745MHz	5.1	-	-	0.8	-	-	4.3	-	-
	5755MHz	-	5.1	-	-	0.8	-	-	4.3	-
	5775MHz	-	-	5.5	-	-	0.8	-	-	4.7
	5785MHz	5.5	-	-	0.8	-	-	4.7	-	-
	5795MHz	-	5.5	-	-	0.8	-	-	4.7	-
	5825MHz	5.5	-	-	0.8	-	-	4.7	-	-

Note: The EUT has two antennas

<For 2.4GHz Band:>

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

Only Ant. 1 could transmit/receive simultaneously.

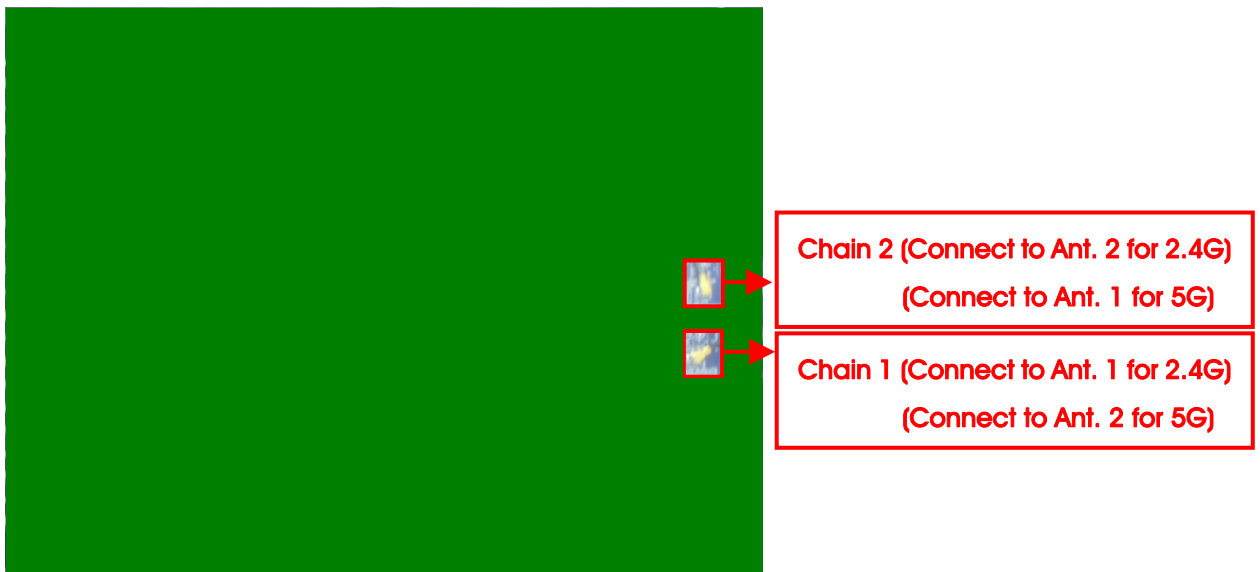
For IEEE 802.11g/n mode (2TX/2RX)

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

<For 5GHz Band:>

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

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



3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

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

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

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

For 5GHz Band:

There are three bandwidth systems.

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

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

For 80MHz bandwidth systems, use Channel 155.

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

3.5. Table for Product Information

Items	Description	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
Beamforming Function	☒ With beamforming for 802.11ac	☐ Without beamforming

3.6. Table for Test Modes

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

For 2.4GHz Band:

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

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+2
	11n 40MHz	MCS0	151/159	1+2
	11ac 20MHz	MCS2/Nss1	149/157/165	1+2
	11ac 40MHz	MCS2/Nss1	151/159	1+2
	11ac 80MHz	MCS2/Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
Power Spectral Density	11n 20MHz	MCS0	149/157/165	1+2
	11n 40MHz	MCS0	151/159	1+2
	11ac 20MHz	MCS2/Nss1	149/157/165	1+2
	11ac 40MHz	MCS2/Nss1	151/159	1+2
	11ac 80MHz	MCS2/Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
6dB Spectrum Bandwidth	11n 20MHz	MCS0	149/157/165	1+2
	11n 40MHz	MCS0	151/159	1+2
	11ac 20MHz	MCS2/Nss1	149/157/165	1+2
	11ac 40MHz	MCS2/Nss1	151/159	1+2
	11ac 80MHz	MCS2/Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n 20MHz	MCS0	149/157/165	1+2
	11n 40MHz	MCS0	151/159	1+2
	11ac 20MHz	MCS2/Nss1	149/157/165	1+2
	11ac 40MHz	MCS2/Nss1	151/159	1+2
	11ac 80MHz	MCS2/Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2
Band Edge Emissions	11n 20MHz	MCS0	149/157/165	1+2
	11n 40MHz	MCS0	151/159	1+2
	11ac 20MHz	MCS2/Nss1	149/157/165	1+2
	11ac 40MHz	MCS2/Nss1	151/159	1+2
	11ac 80MHz	MCS2/Nss1	155	1+2
	11a/BPSK	6 Mbps	149/157/165	1+2

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link - EUT with AC Adapter 1

Mode 2. Normal Link - EUT with AC Adapter 2

Mode 2 is the worst case, so it was selected to record in this test report.

For Radiated Emission 30MHz~1GHz test :

Mode 1. Normal Link - Stand of EUT with AC Adapter 1

Mode 2. Normal Link - Laying of EUT with AC Adapter 1

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

Mode 3. Normal Link - Stand of EUT with AC Adapter 2

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

For Radiated Emission above 1GHz test:

Mode 1. CTX - Stand of EUT

Mode 2. CTX - Laying of EUT

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

For MPE and Co-location Test:

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

Note1: The test result of beam-forming mode is worse case than non beam-forming mode, so it is recorded in the test report for 802.11ac.

3.7. Table for Testing Locations

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

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC). Please refer section 6 for Test Site Address.

3.8. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	QDS-BRCM1049LE
Notebook	DELL	E6430	QDS-BRCM1049LE
Notebook	DELL	E6430	QDS-BRCM1049LE
AP Router	Planex	GW-AP54SGX	KA220030603014-1
Flash Disk	Transcend	604108 8255	DoC

For Test Site No: 03CH01-CB

(Radiated Emission 30MHz~1GHz test)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1340	E2K4965AGNM
Notebook	DELL	E6430	QDS-BRCM1049LE
Notebook	DELL	D420	E2KWM3945ABG
Wireless ac AP	Netgear	R6300V2	PY31300227
USB HDD	CM	4911B	N/A

For Test Site No: 03CH01-CB

(Radiated Emission above 1GHz test) (For Non-Beamforming Mode)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1340	E2K4965AGNM

For Test Site No: 03CH01-CB

(Radiated Emission above 1GHz test) (For Beamforming Mode)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	QDS-BRCM1049LE
Notebook	DELL	D420	E2KWM3945ABG
Wireless ac AP	Netgear	R6300V2	PY31300227
WLAN ac Dongle	Netgear	A6200	PY31220200

For Test Site No: TH01-CB

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

3.9. Table for Parameters of Test Software Setting

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

For non-beamforming mode:

For 2.4GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	Manual Tool Version : 2.0.1.0		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	75	100	82

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 2.0.1.0		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	69	82	70

Power Parameters of IEEE 802.11b/g

Test Software Version	Manual Tool Version : 2.0.1.0		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	86	97	90
IEEE 802.11g	73	100	82

For non-beamforming mode:

For 5GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz

Test Software Version	Manual Tool Version : 2.0.1.0		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0 20MHz	99	99	99

Power Parameters of IEEE 802.11n MCS0 40MHz

Test Software Version	Manual Tool Version : 2.0.1.0	
Frequency	5755 MHz	5795 MHz
MCS0 40MHz	95	100

Power Parameters of IEEE 802.11a

Test Software Version	Manual Tool Version : 2.0.1.0		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	99	99	94

For beamforming mode:

For 5GHz Band

Power Parameters of IEEE 802.11ac MCS2/Nss1 20MHz

Test Software Version	Manual Tool Version : 2.0.1.0		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS2/Nss1 20MHz	96	94	94

Power Parameters of IEEE 802.11ac MCS2/Nss1 40MHz

Test Software Version	Manual Tool Version : 2.0.1.0	
Frequency	5755 MHz	5795 MHz
MCS2/Nss1 40MHz	97	95

Power Parameters of IEEE 802.11ac MCS2/Nss1 80MHz

Test Software Version	Manual Tool Version : 2.0.1.0
Frequency	5775 MHz
MCS2/Nss1 80MHz	90

3.10.EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN XP were executed.

The program was executed as follows:

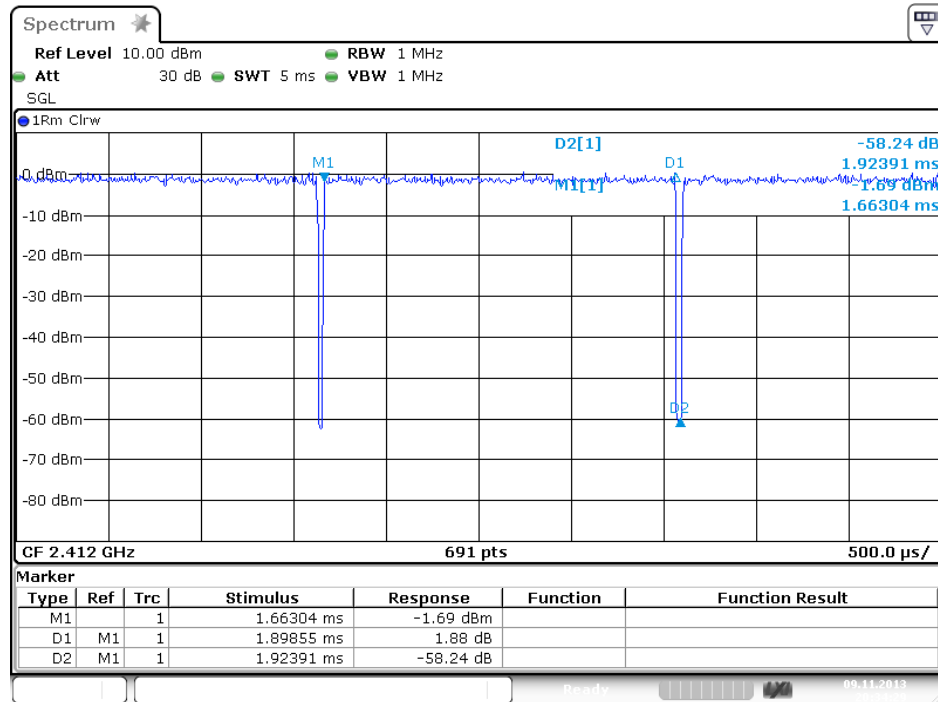
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe " to link with the remote workstation to receive and transmit packet by WLAN ac dongle and transmit duty cycle no less 98%

3.11. Duty Cycle

For non-beamforming mode:

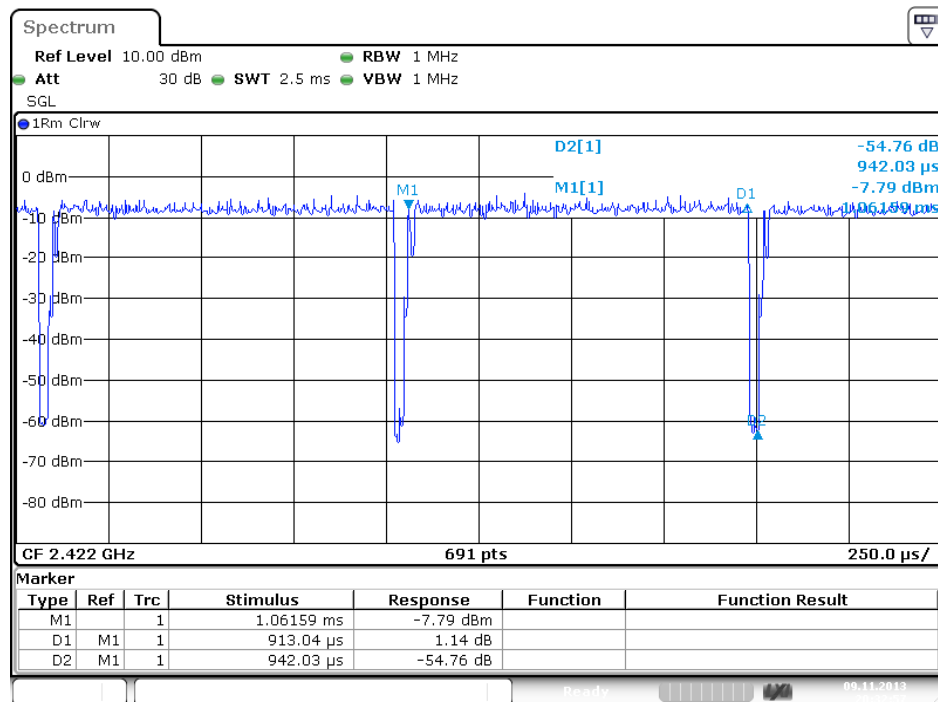
For 2.4GHz Band:

IEEE 802.11n MCS0 20MHz



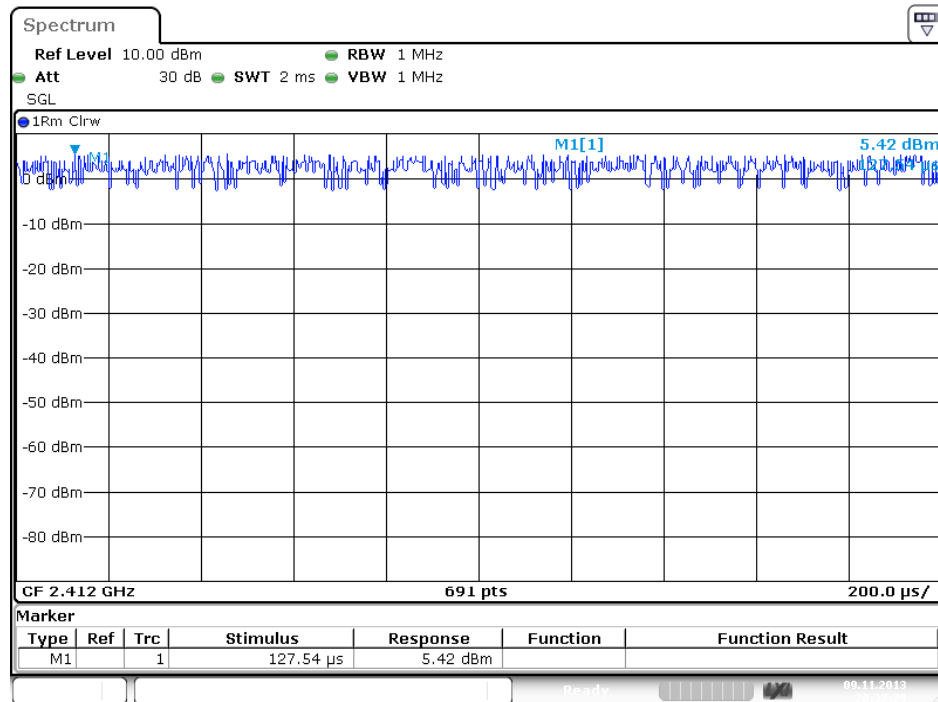
Date: 9.NOV.2013 20:34:29

IEEE 802.11n MCS0 40MHz



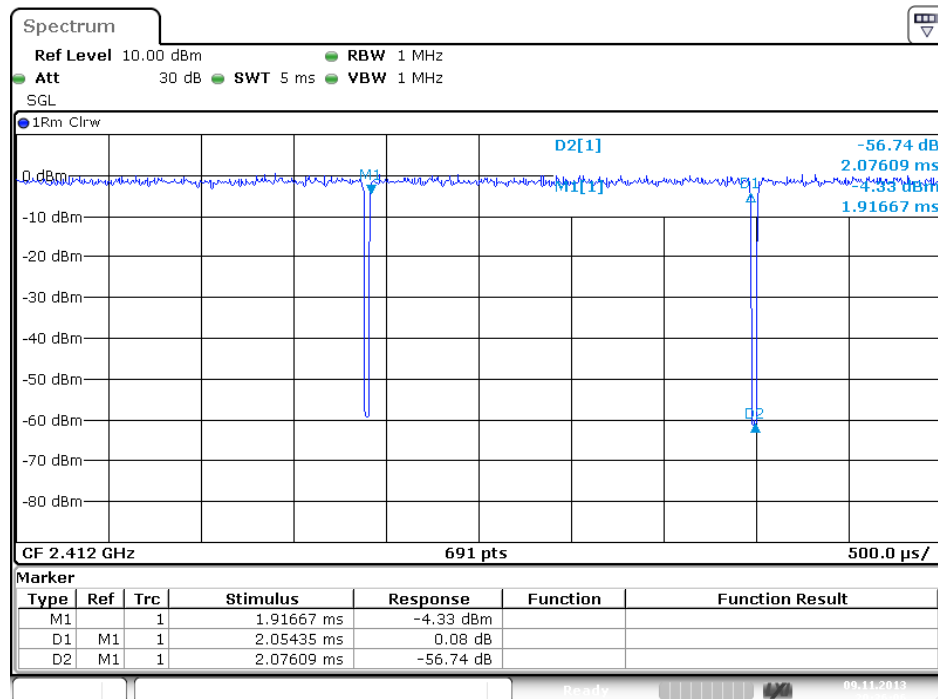
Date: 9.NOV.2013 20:32:57

IEEE 802.11b



Date: 9.NOV.2013 20:37:30

IEEE 802.11g

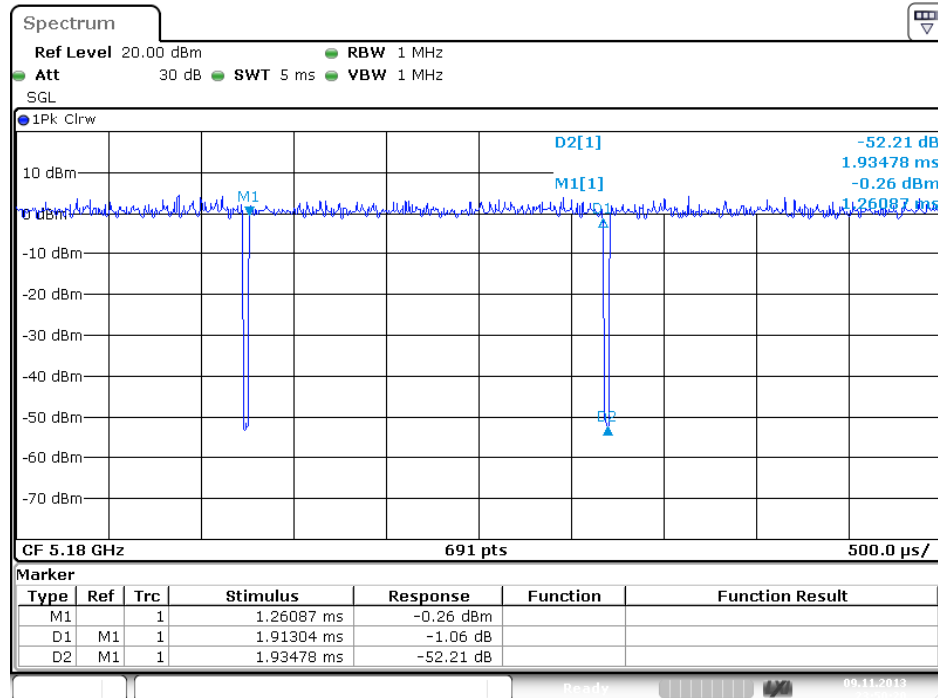


Date: 9.NOV.2013 20:36:07

For non-beamforming mode:

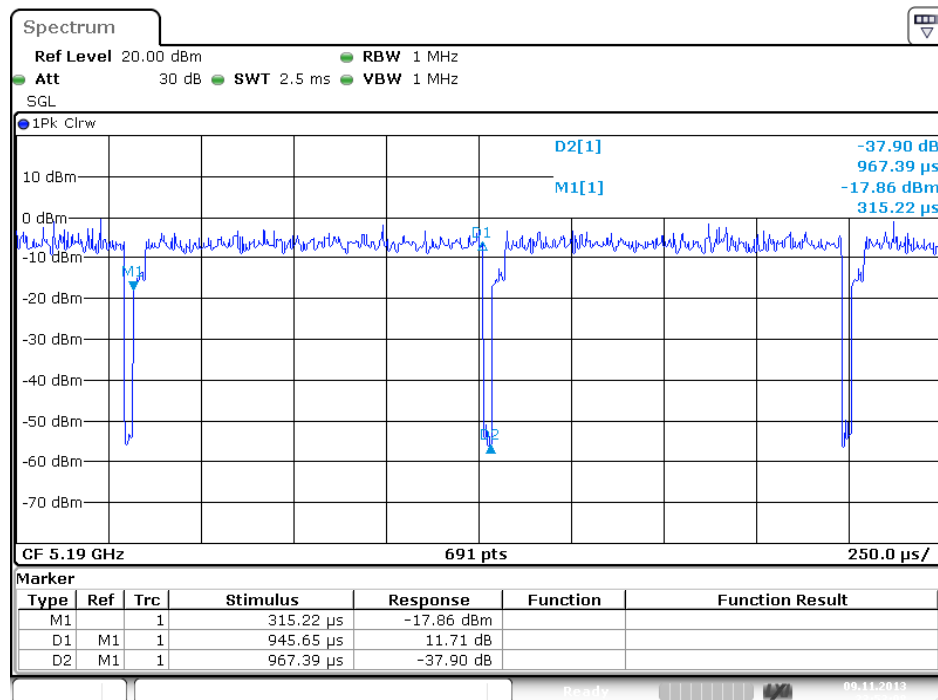
For 5GHz Band:

IEEE 802.11n MCS0 20MHz



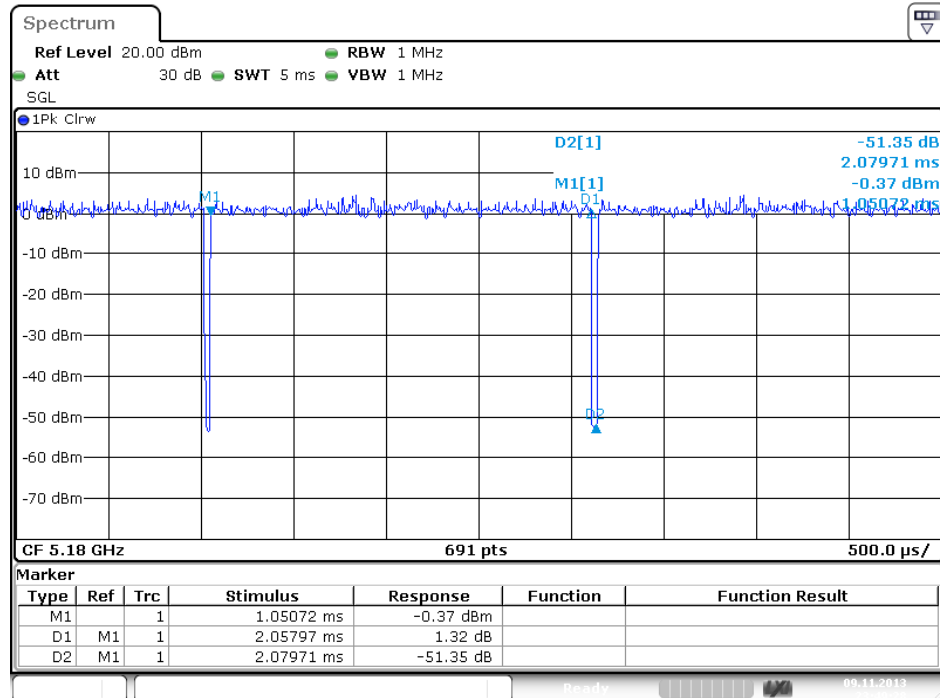
Date: 9.NOV.2013 23:50:20

IEEE 802.11n MCS0 40MHz



Date: 9.NOV.2013 23:53:08

IEEE 802.11a

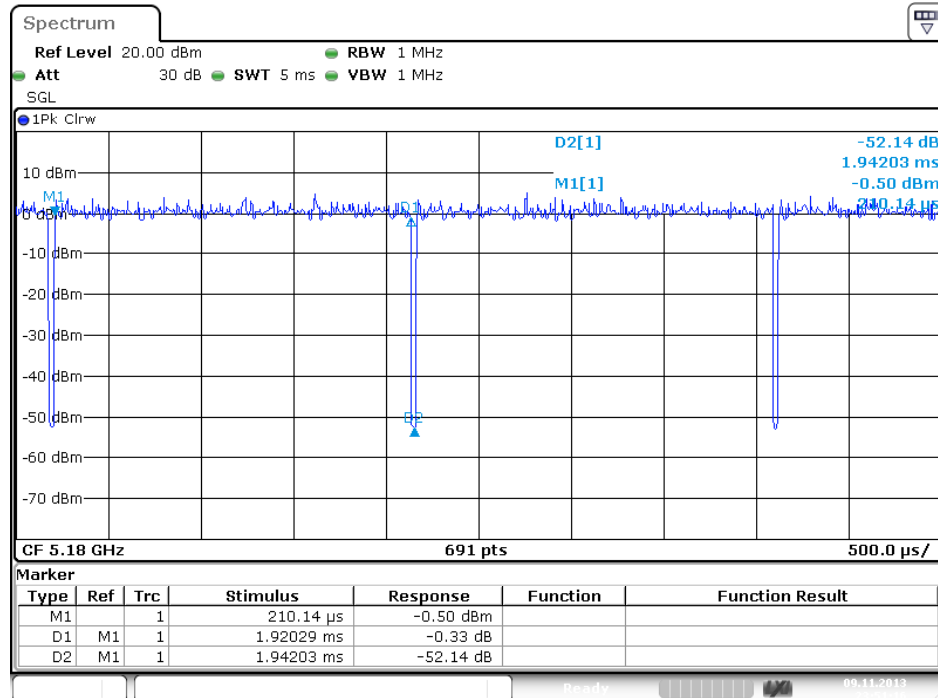


Date: 9.NOV.2013 23:49:28

For beamforming mode:

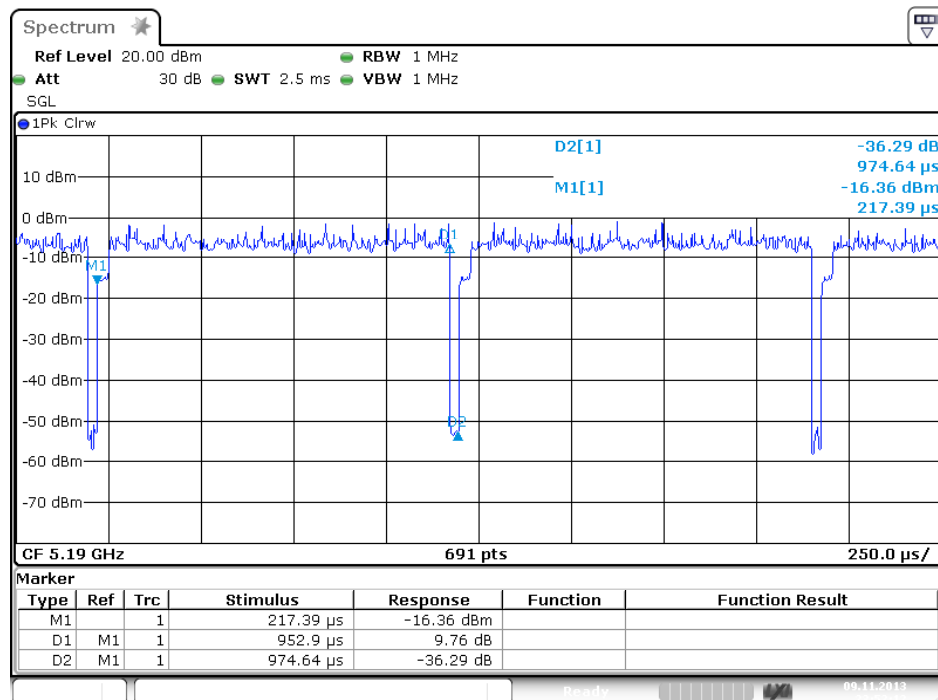
For 5GHz Band:

IEEE 802.11ac MCS2/Nss1 20MHz



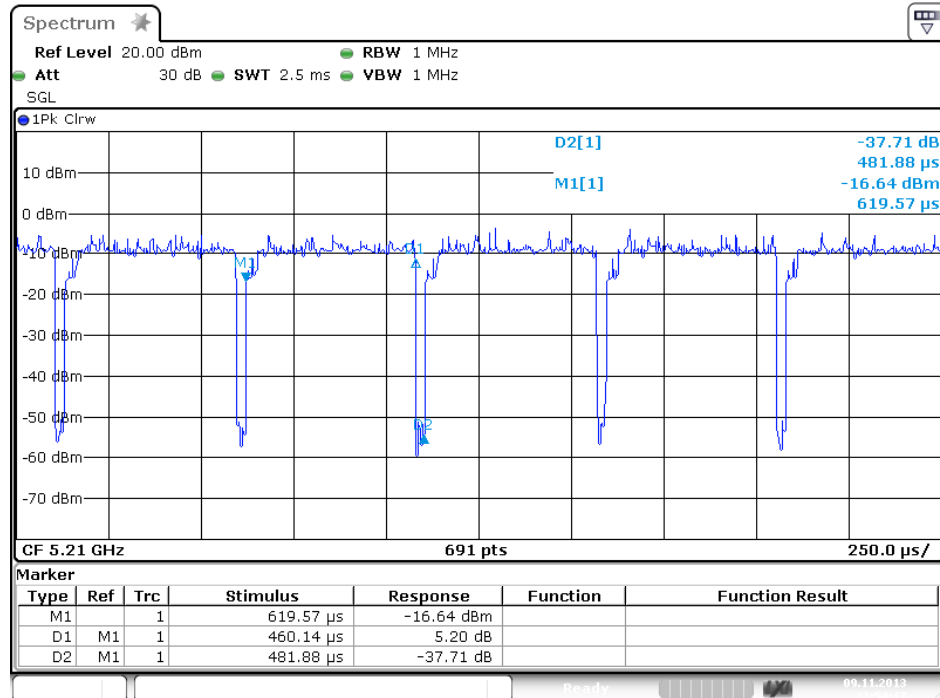
Date: 9.NOV.2013 23:51:16

IEEE 802.11ac MCS2/Nss1 40MHz



Date: 9.NOV.2013 23:52:12

IEEE 802.11ac MCS2/Nss1 80MHz

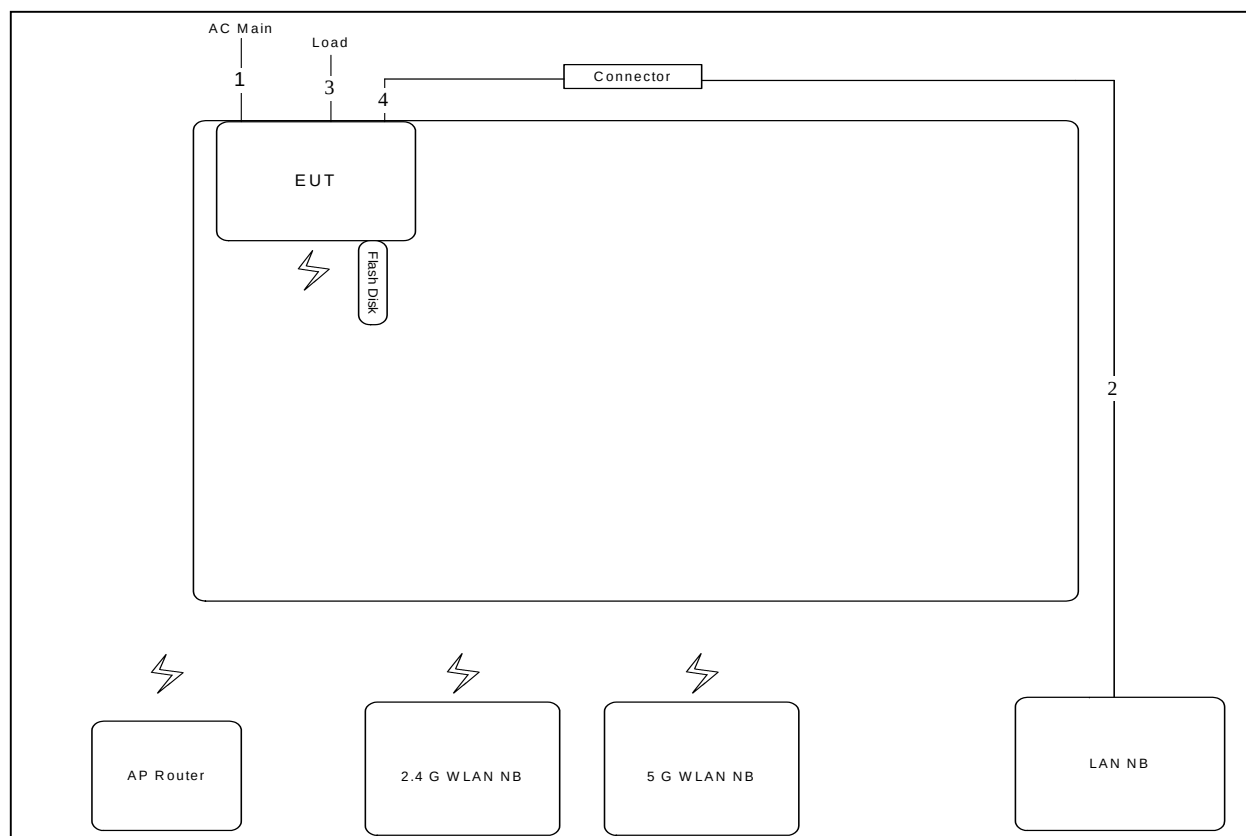


Date: 9.NOV.2013 23:54:18

3.12. Test Configurations

3.12.1. AC Power Line Conduction Emissions Test Configuration

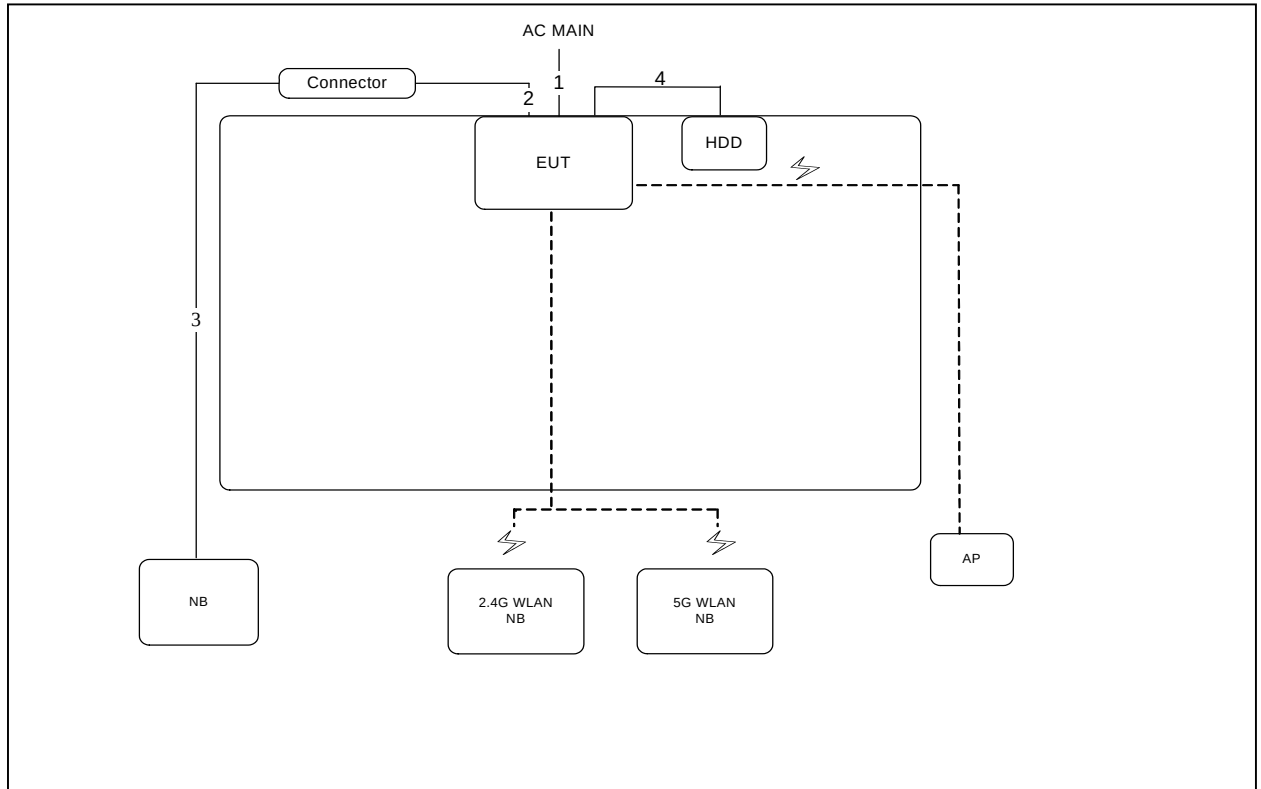
Test Mode: Mode 2



Item	Connection	Shielded	Length(m)
1	Power cable	No	1.8m
2	RJ-45 cable	Yes	10m
3	RJ-45 cable*4	No	3m
4	RJ-45 cable	Yes	1.5m

3.12.2. Radiation Emissions Test Configuration

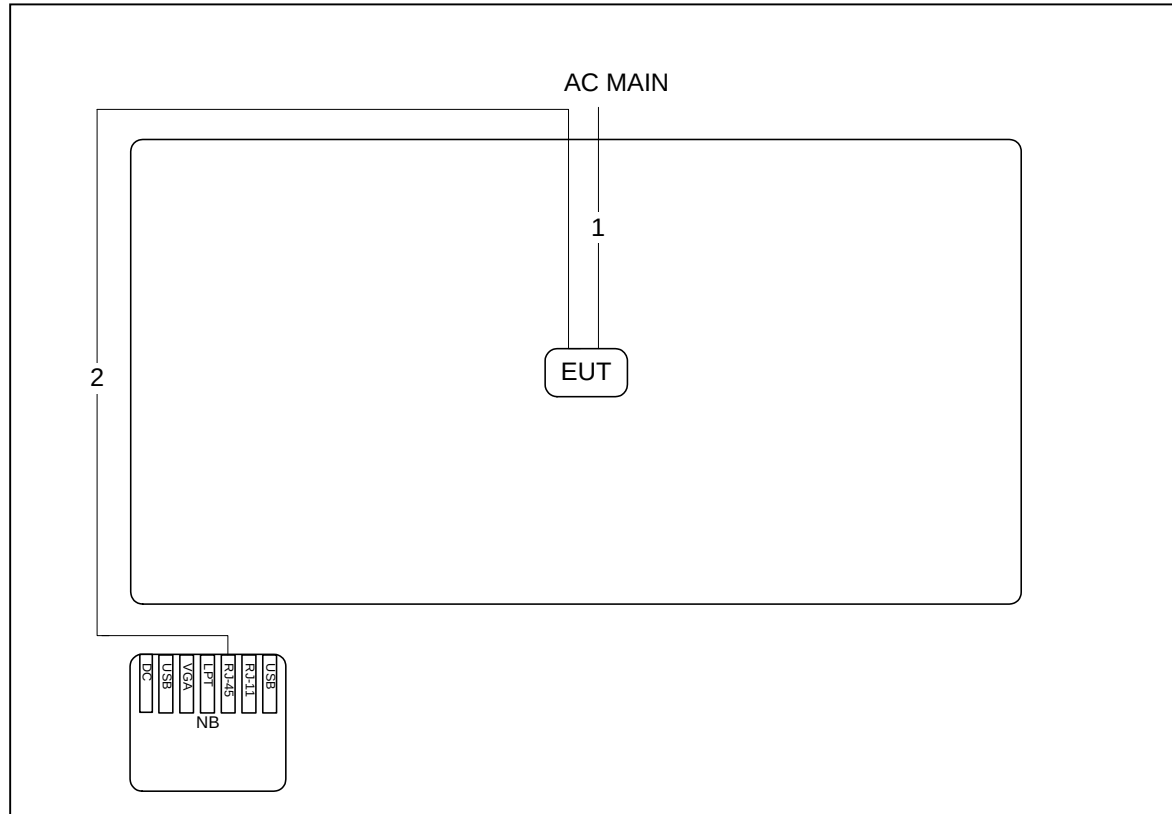
Test Configuration: 30MHz~1GHz / Test Mode: Mode 3



Item	Connection	Shielded	Length(m)
1	Power cable	No	1.8m
2	RJ-45 cable	Yes	1.5m
3	RJ-45 cable	No	10m
4	USB cable	No	0.5m

For Non-Beamforming Mode

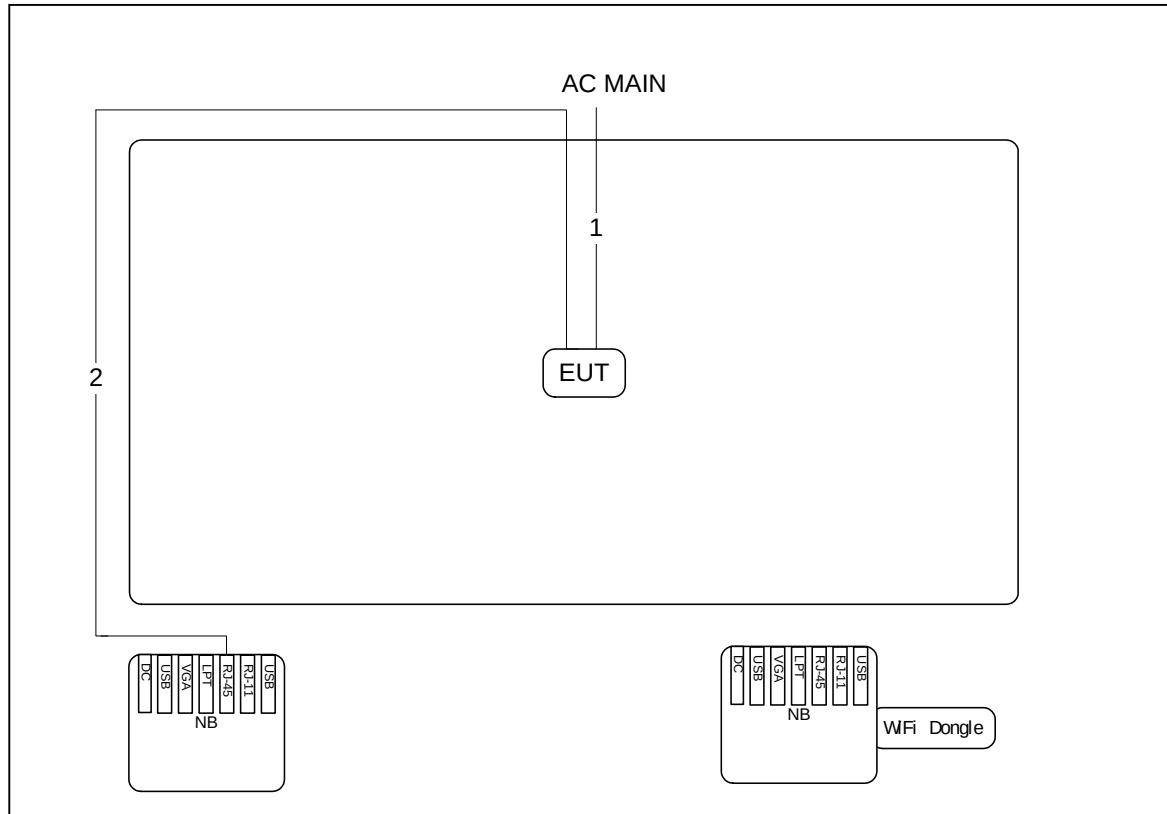
Test Configuration: above 1GHz / Test Mode: Mode 1



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

For Beamforming Mode

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



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

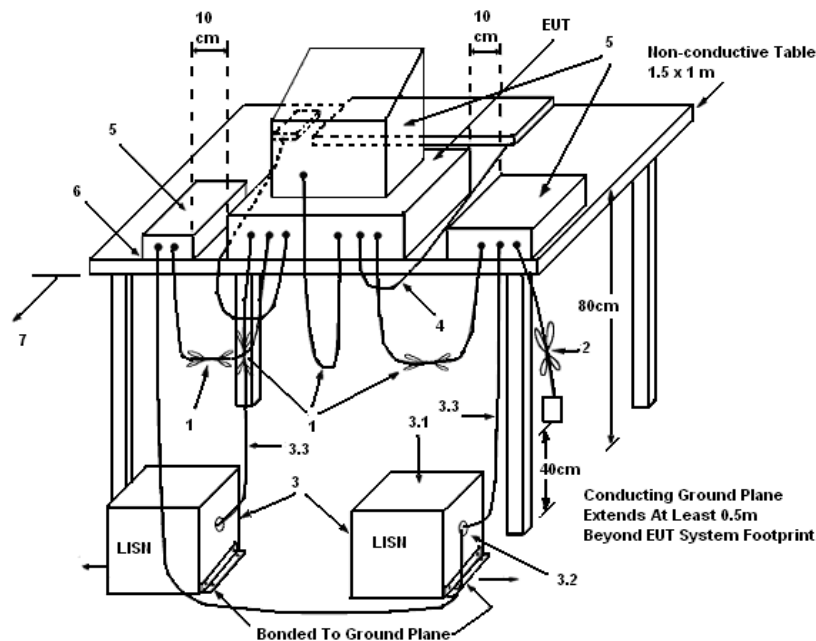
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 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

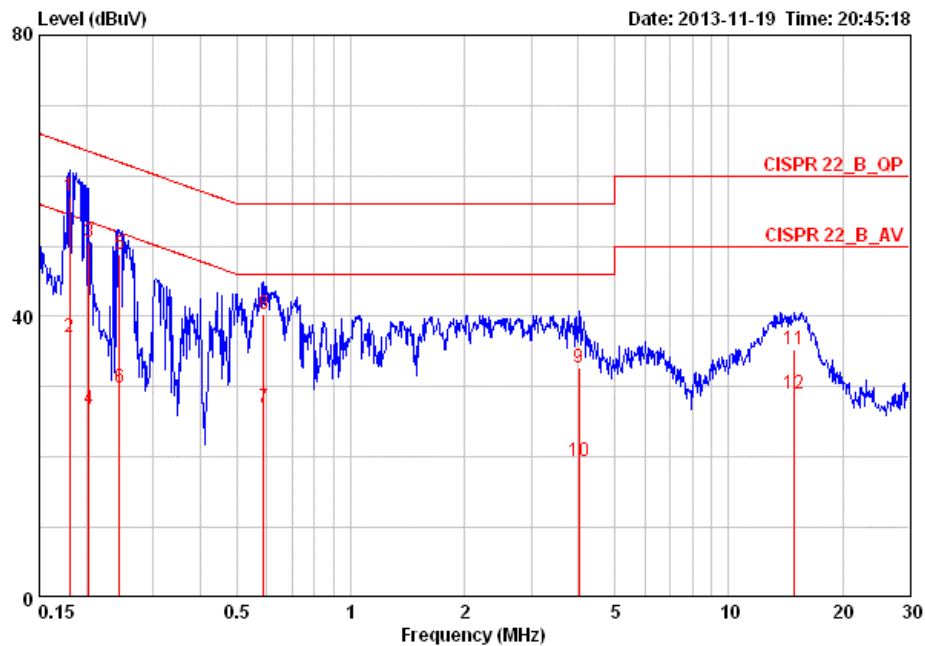
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

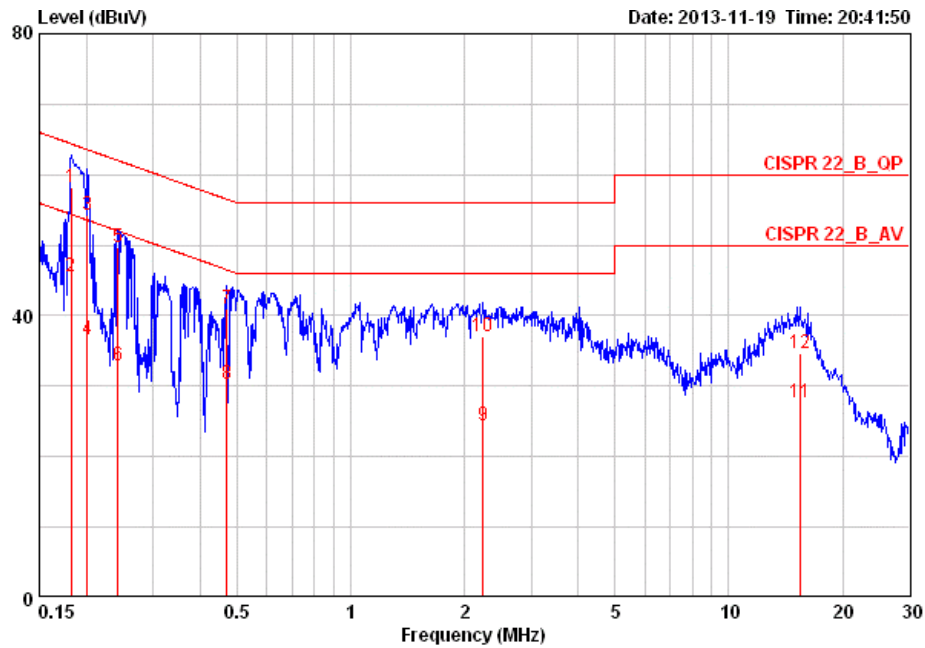
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	53%
Test Engineer	Parody Lin	Phase	Line
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 @	0.18056	57.17	-7.29	64.46	56.83	0.15	0.19	QP
2	0.18056	36.95	-17.51	54.46	36.61	0.15	0.19	AVERAGE
3 @	0.20289	50.48	-13.01	63.49	50.13	0.15	0.20	QP
4	0.20289	26.92	-26.57	53.49	26.57	0.15	0.20	AVERAGE
5 @	0.24422	48.92	-13.03	61.95	48.57	0.15	0.20	QP
6	0.24422	29.97	-21.98	51.95	29.62	0.15	0.20	AVERAGE
7	0.58851	26.98	-19.02	46.00	26.63	0.15	0.20	AVERAGE
8 @	0.58851	40.36	-15.64	56.00	40.01	0.15	0.20	QP
9	4.006	32.75	-23.25	56.00	32.17	0.28	0.30	QP
10	4.006	19.42	-26.58	46.00	18.84	0.28	0.30	AVERAGE
11	14.907	35.33	-24.67	60.00	34.44	0.48	0.41	QP
12	14.907	29.06	-20.94	50.00	28.17	0.48	0.41	AVERAGE

Temperature	24°C	Humidity	53%
Test Engineer	Parody Lin	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 2



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.18249	58.27	-6.10	64.37	58.01	0.07	0.19	QP
2	0.18249	45.52	-8.85	54.37	45.26	0.07	0.19	AVERAGE
3	0.20075	54.19	-9.39	63.58	53.92	0.07	0.20	QP
4	0.20075	36.63	-16.95	53.58	36.36	0.07	0.20	AVERAGE
5	0.24165	49.68	-12.36	62.04	49.41	0.07	0.20	QP
6	0.24165	32.97	-19.07	52.04	32.70	0.07	0.20	AVERAGE
7	0.47110	41.05	-15.44	56.49	40.78	0.07	0.20	QP
8	0.47110	30.36	-16.13	46.49	30.09	0.07	0.20	AVERAGE
9	2.237	24.42	-21.58	46.00	24.07	0.11	0.24	AVERAGE
10	2.237	37.02	-18.98	56.00	36.67	0.11	0.24	QP
11	15.388	27.68	-22.32	50.00	26.91	0.37	0.41	AVERAGE
12	15.388	34.76	-25.24	60.00	33.99	0.37	0.41	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

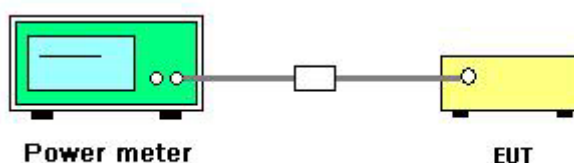
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

4.2.3. Test Procedures

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

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g/n
Test Date	Nov. 18, 2013		

For non-beamforming mode:

For 2.4GHz Band

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	19.24	19.92	22.60	30.00	Complies
6	2437 MHz	24.52	24.27	27.41	30.00	Complies
11	2462 MHz	20.36	20.23	23.31	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	17.18	17.01	20.11	30.00	Complies
6	2437 MHz	19.84	19.93	22.90	30.00	Complies
9	2452 MHz	17.41	17.04	20.24	30.00	Complies

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	21.68	30.00	Complies
6	2437 MHz	23.94	30.00	Complies
11	2462 MHz	22.38	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	18.76	18.51	21.65	30.00	Complies
6	2437 MHz	24.54	24.19	27.38	30.00	Complies
11	2462 MHz	20.41	19.91	23.18	30.00	Complies

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/a
Test Date	Nov. 18, 2013		

For non-beamforming mode:

For 5GHz Band

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	26.99	26.39	29.71	30.00	Complies
157	5785 MHz	26.98	26.41	29.71	30.00	Complies
165	5825 MHz	27.01	26.35	29.70	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
151	5755 MHz	25.68	25.15	28.43	30.00	Complies
159	5795 MHz	27.25	26.51	29.91	30.00	Complies

Configuration IEEE 802.11a / Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	26.98	26.37	29.70	30.00	Complies
157	5785 MHz	26.99	26.38	29.71	30.00	Complies
165	5825 MHz	25.61	25.12	28.38	30.00	Complies

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11ac
Test Date	Nov. 18, 2013		

For beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS2/Nss1 20MHz / Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	25.95	25.53	28.76	28.84	Complies
157	5785 MHz	25.51	25.12	28.33	28.44	Complies
165	5825 MHz	25.47	25.08	28.29	28.44	Complies

Note: Directional gain:

$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.16\text{dBi} > 6\text{dBi}$, So Conducted Output Power Limit = $30 - (7.16 - 6) = 28.84\text{dBm}$

$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.56\text{dBi} > 6\text{dBi}$, So Conducted Output Power Limit = $30 - (7.56 - 6) = 28.44\text{dBm}$

$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.56\text{dBi} > 6\text{dBi}$, So Conducted Output Power Limit = $30 - (7.56 - 6) = 28.44\text{dBm}$

Configuration IEEE 802.11ac MCS2/Nss1 40MHz / Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
151	5755 MHz	26.05	25.55	28.82	28.84	Complies
159	5795 MHz	25.49	25.01	28.27	28.44	Complies

Note: Directional gain:

$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.16\text{dBi} > 6\text{dBi}$, So Conducted Output Power Limit = $30 - (7.16 - 6) = 28.84\text{dBm}$

$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.56\text{dBi} > 6\text{dBi}$, So Conducted Output Power Limit = $30 - (7.56 - 6) = 28.44\text{dBm}$

Configuration IEEE 802.11ac MCS2/Nss1 80MHz / Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Total		
155	5775 MHz	23.61	22.92	26.29	28.44	Complies

Note: Directional gain:

$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] = 7.56\text{dBi} > 6\text{dBi}$, So Conducted Output Power Limit = $30 - (7.56 - 6) = 28.44\text{dBm}$

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

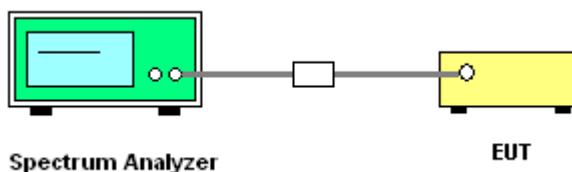
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be $\leq 8 \text{ dBm}$.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g/n

For non-beamforming mode:

For 2.4GHz Band

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-7.00	-7.45	-4.21	8.00	Complies
6	2437 MHz	-1.82	-2.29	0.96	8.00	Complies
11	2462 MHz	-6.47	-6.35	-3.40	8.00	Complies

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
3	2422 MHz	-11.53	-11.51	-8.51	8.00	Complies
6	2437 MHz	-9.36	-9.29	-6.31	8.00	Complies
9	2452 MHz	-11.32	-11.53	-8.41	8.00	Complies

Configuration IEEE 802.11b / Ant. 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	-1.05	8.00	Complies
6	2437 MHz	1.54	8.00	Complies
11	2462 MHz	-0.36	8.00	Complies

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
1	2412 MHz	-7.64	-7.79	-4.70	8.00	Complies
6	2437 MHz	-1.86	-2.04	1.06	8.00	Complies
11	2462 MHz	-5.57	-5.70	-2.62	8.00	Complies

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/a

For non-beamforming mode:

For 5GHz Band

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	1.44	0.87	4.17	8.00	Complies
157	5785 MHz	1.47	0.62	4.08	8.00	Complies
165	5825 MHz	1.43	0.98	4.22	8.00	Complies

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

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
151	5755 MHz	-2.43	-3.05	0.28	8.00	Complies
159	5795 MHz	-0.94	-1.18	1.95	8.00	Complies

Configuration IEEE 802.11a / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	1.95	1.36	4.68	8.00	Complies
157	5785 MHz	1.11	0.72	3.93	8.00	Complies
165	5825 MHz	0.66	-0.19	3.27	8.00	Complies

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11ac

For beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS2/Nss1 20MHz / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
149	5745 MHz	-0.20	-0.69	2.57	6.84	Complies
157	5785 MHz	-0.79	-1.28	1.98	6.44	Complies
165	5825 MHz	-0.35	-0.86	2.41	6.44	Complies

Note: Directional gain:

$$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16\text{dBi} > 6\text{dBi}, \text{ So Power Density Limit} = 8 - (7.16 - 6) = 6.84\text{dBm}$$

$$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.56\text{dBi} > 6\text{dBi}, \text{ So Power Density Limit} = 8 - (7.56 - 6) = 6.44\text{dBm}$$

$$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.56\text{dBi} > 6\text{dBi}, \text{ So Power Density Limit} = 8 - (7.56 - 6) = 6.44\text{dBm}$$

Configuration IEEE 802.11ac MCS2/Nss1 40MHz / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
151	5755 MHz	-2.00	-2.73	0.66	6.84	Complies
159	5795 MHz	-2.59	-3.22	0.12	6.44	Complies

Note: Directional gain:

$$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.16\text{dBi} > 6\text{dBi}, \text{ So Power Density Limit} = 8 - (7.16 - 6) = 6.84\text{dBm}$$

$$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.56\text{dBi} > 6\text{dBi}, \text{ So Power Density Limit} = 8 - (7.56 - 6) = 6.44\text{dBm}$$

Configuration IEEE 802.11ac MCS2/Nss1 80MHz / Ant. 1 + Ant. 2

Channel	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Total		
155	5775 MHz	-6.52	-7.22	-3.85	6.44	Complies

Note: Directional gain:

$$10\log [(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 7.56\text{dBi} > 6\text{dBi}, \text{ So Power Density Limit} = 8 - (7.56 - 6) = 6.44\text{dBm}$$

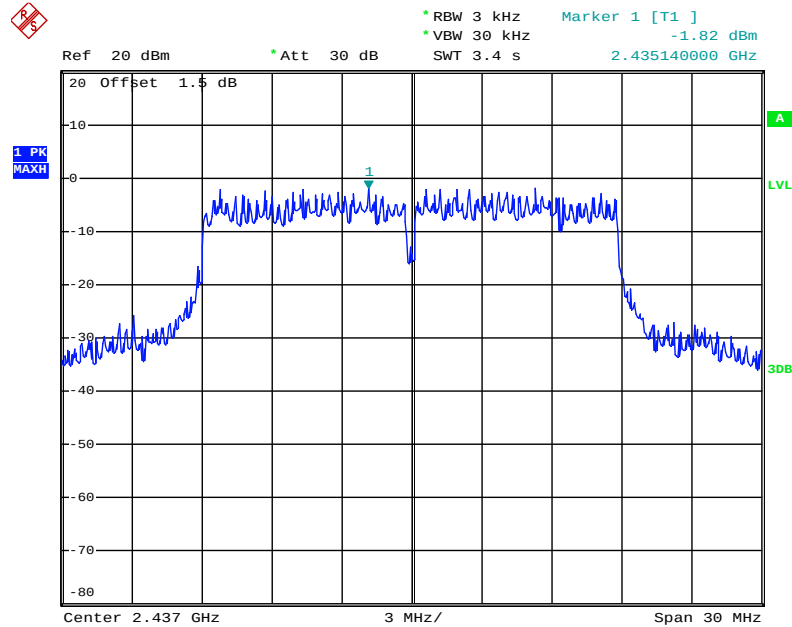
Note: All the test values were listed in the report.

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

For non-beamforming mode:

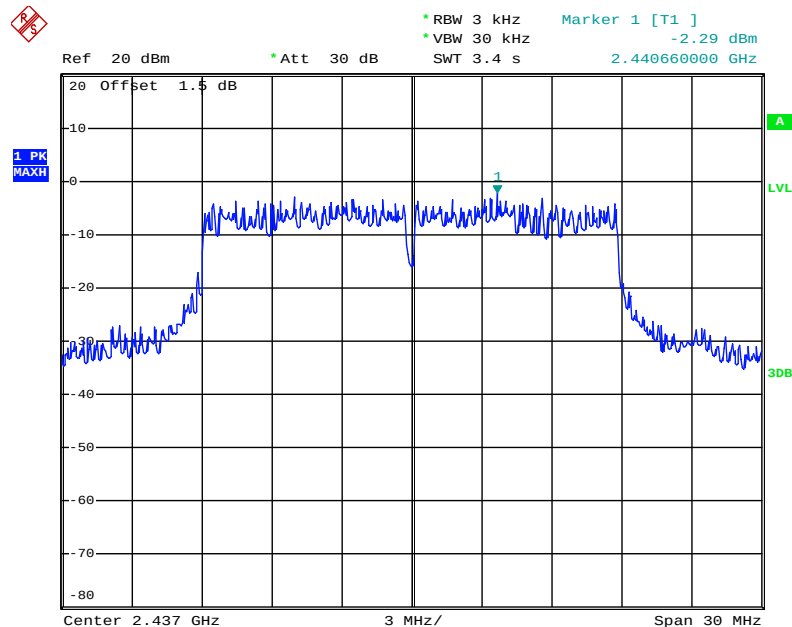
For 2.4GHz Band:

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



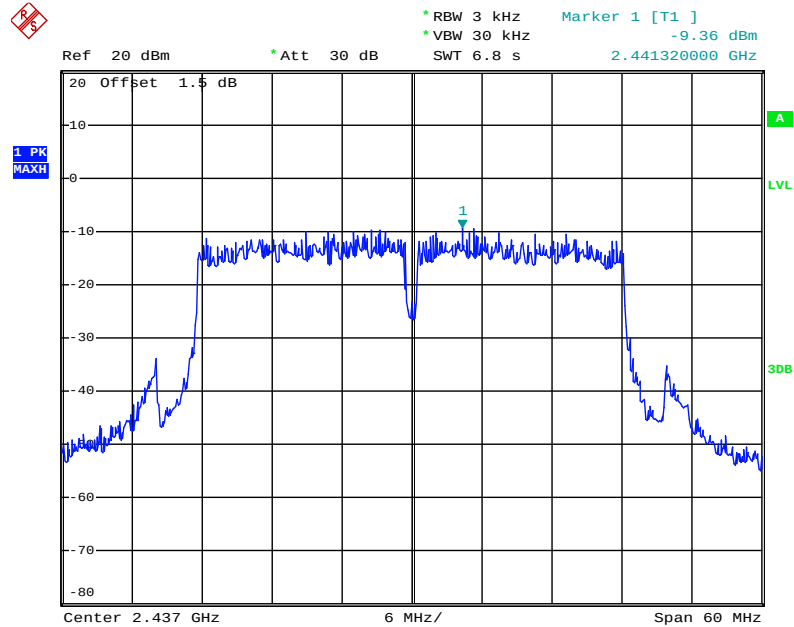
Date: 18.NOV.2013 18:45:28

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



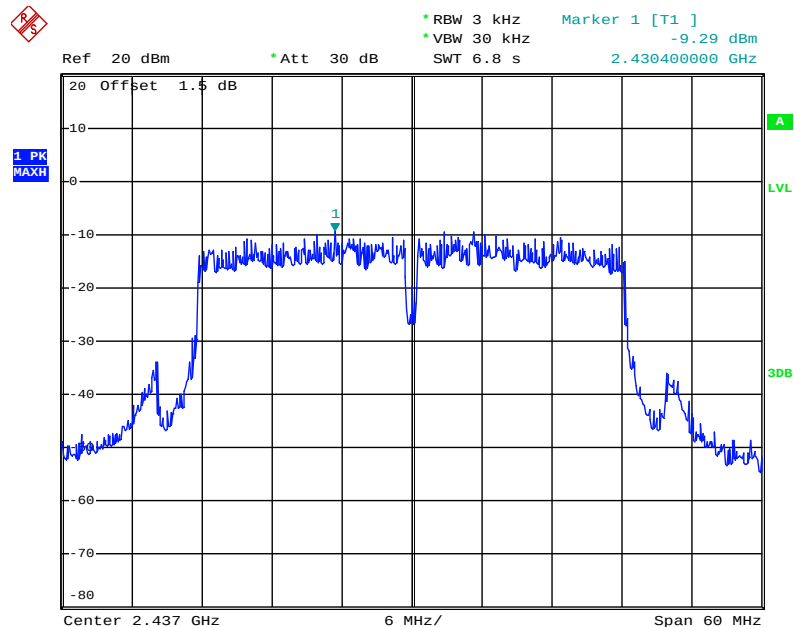
Date: 18.NOV.2013 18:46:28

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



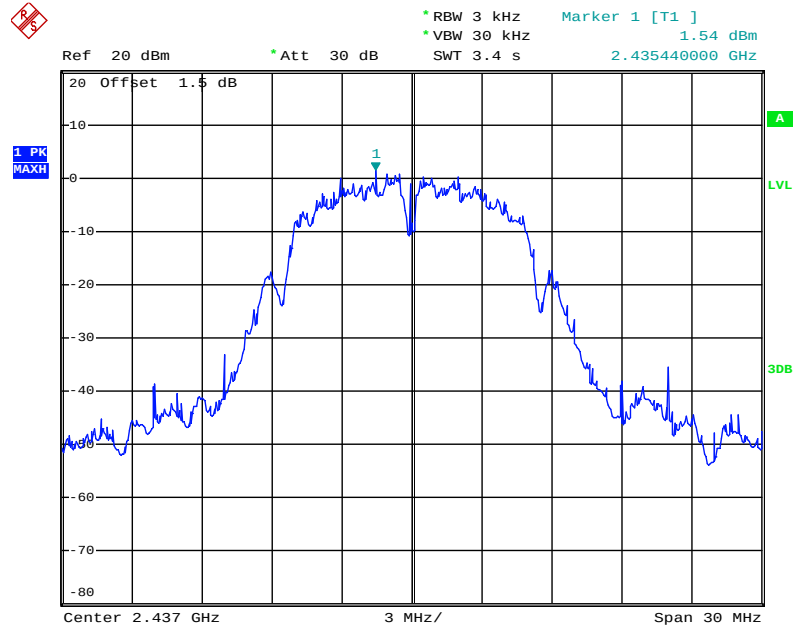
Date: 18.NOV.2013 18:51:17

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



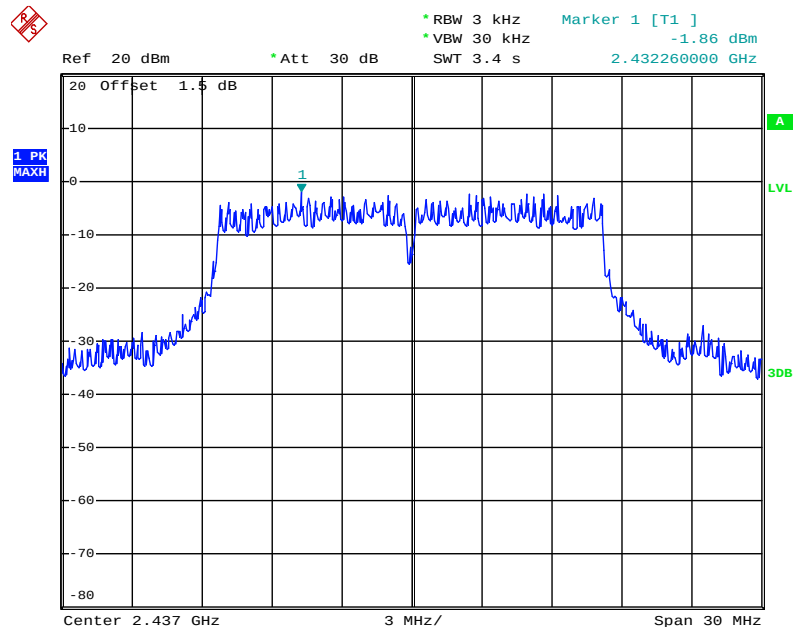
Date: 18.NOV.2013 18:51:59

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



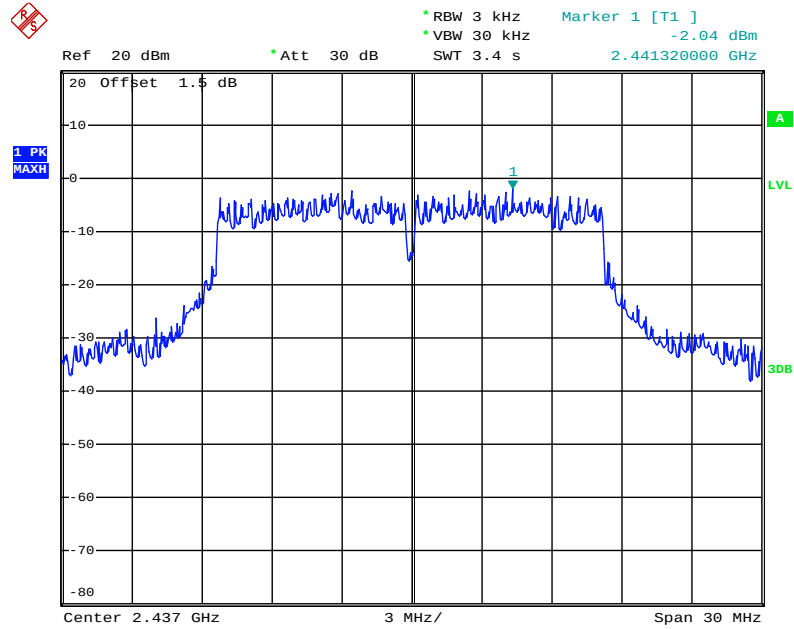
Date: 18.NOV.2013 18:38:14

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



Date: 18.NOV.2013 18:41:23

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

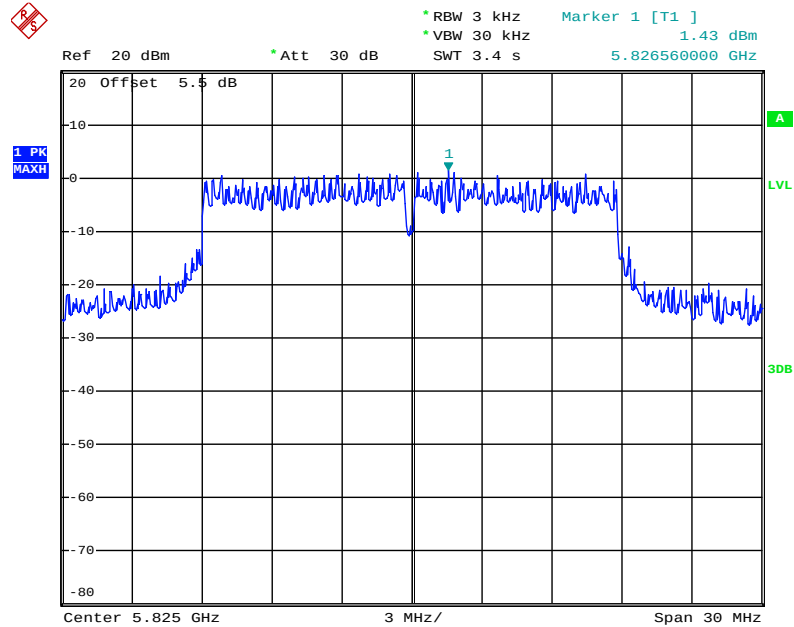


Date: 18.NOV.2013 18:40:57

For non-beamforming mode:

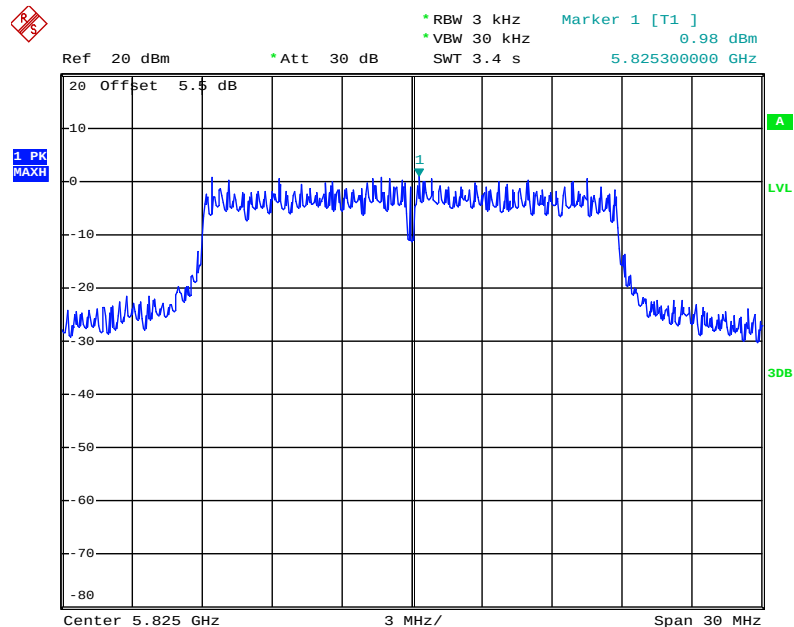
For 5GHz Band:

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 5825 MHz / Ant. 1



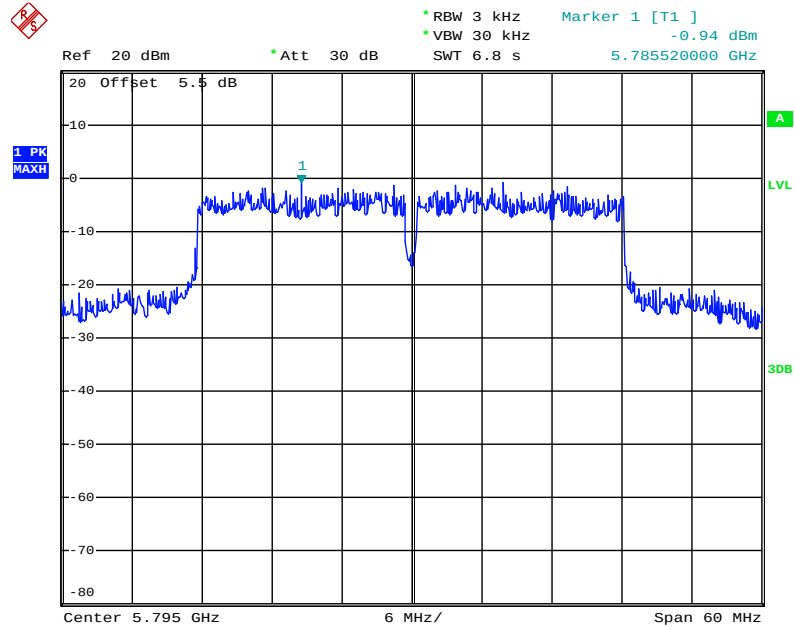
Date: 18.NOV.2013 20:50:25

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 5825 MHz / Ant. 2



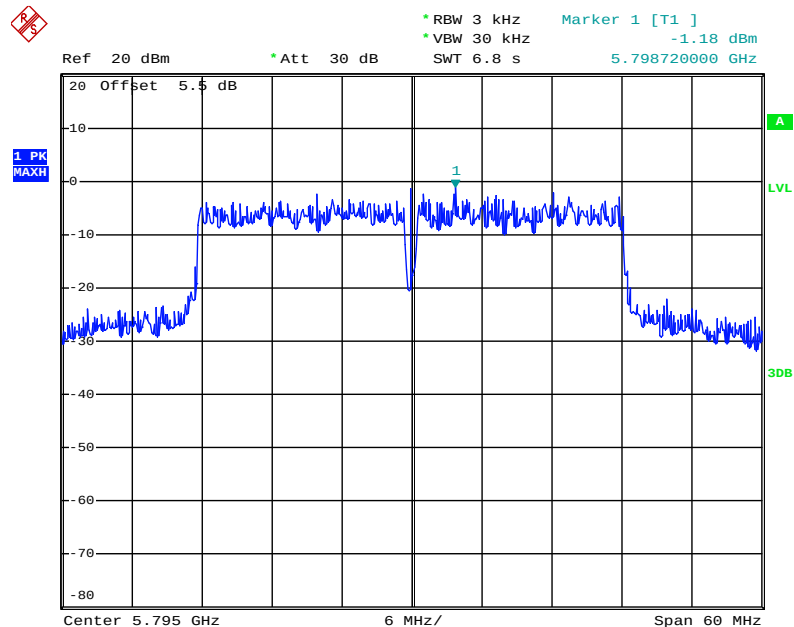
Date: 18.NOV.2013 20:50:01

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 5795 MHz / Ant. 1



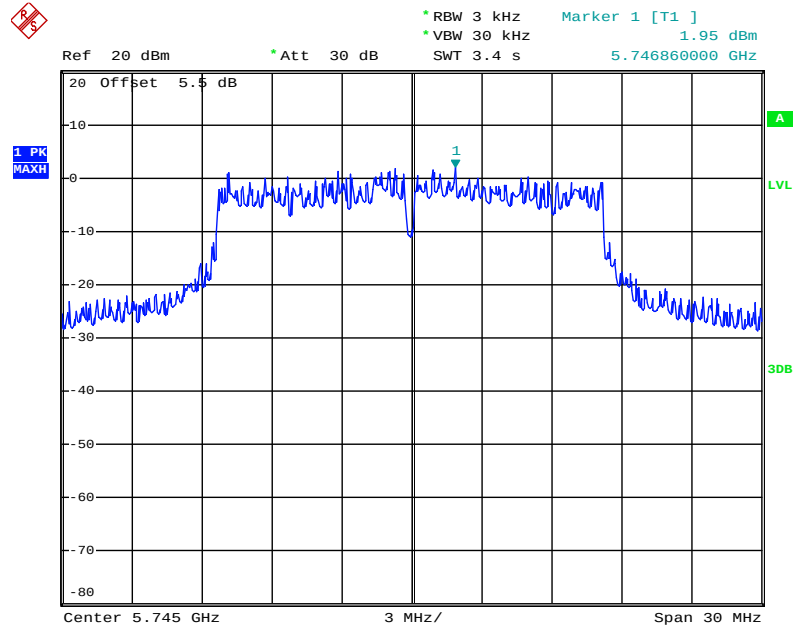
Date: 18.NOV.2013 20:57:08

Power Density Plot on Configuration IEEE 802.11n MCS0 40MHz / 5795 MHz / Ant. 2



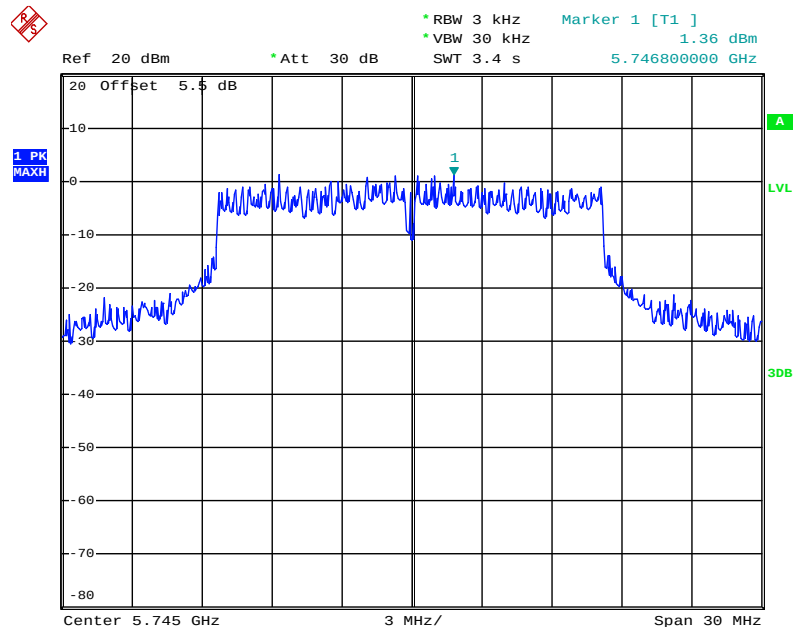
Date: 18.NOV.2013 20:56:20

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 1



Date: 18.NOV.2013 20:36:02

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 2

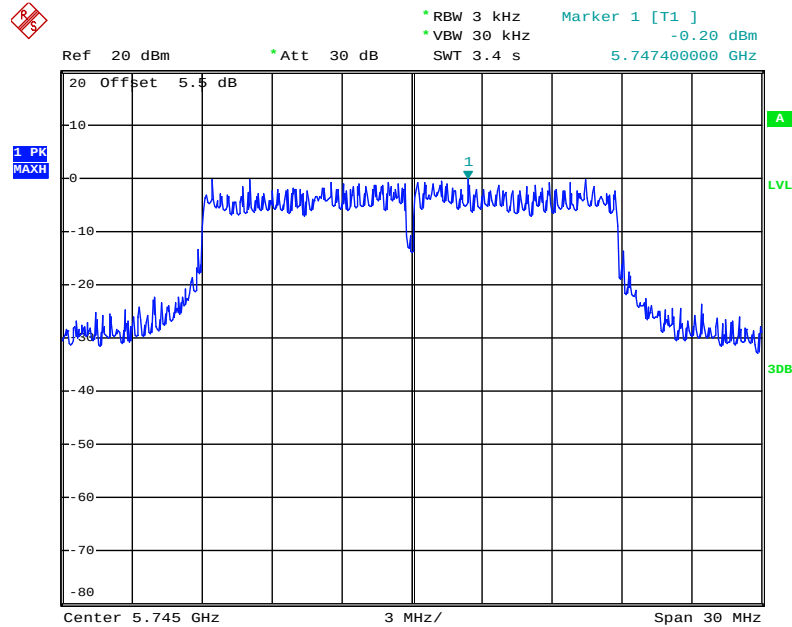


Date: 18.NOV.2013 20:37:37

For beamforming mode:

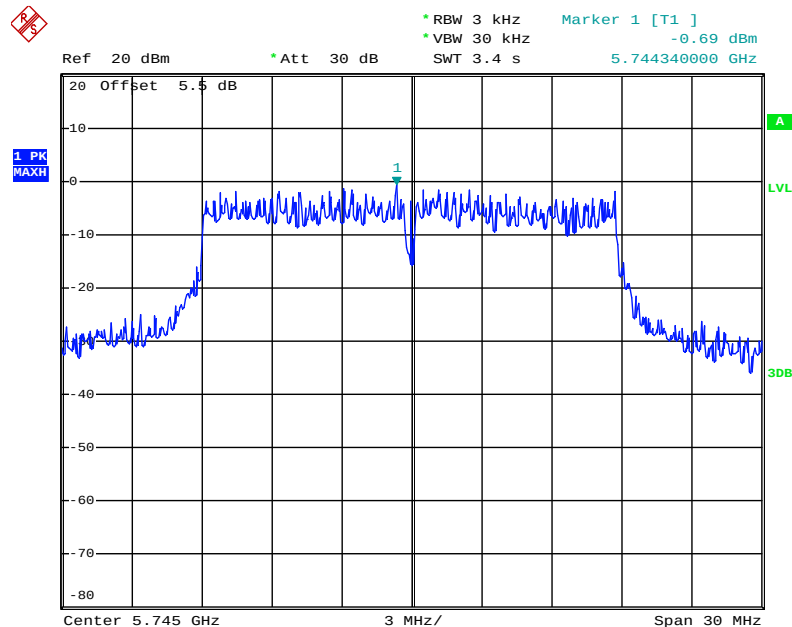
For 5GHz Band:

Power Density Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / 5745 MHz / Ant. 1



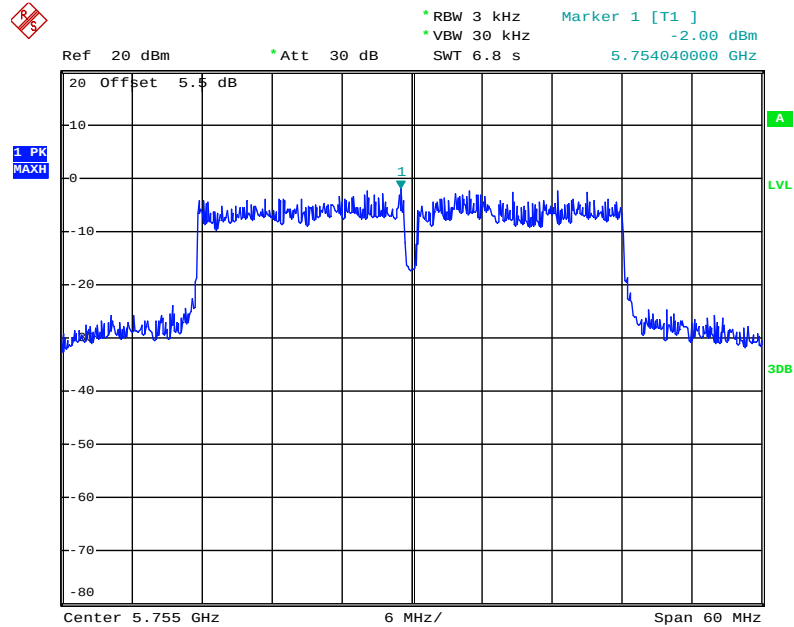
Date: 18.NOV.2013 20:58:54

Power Density Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / 5745 MHz / Ant. 2



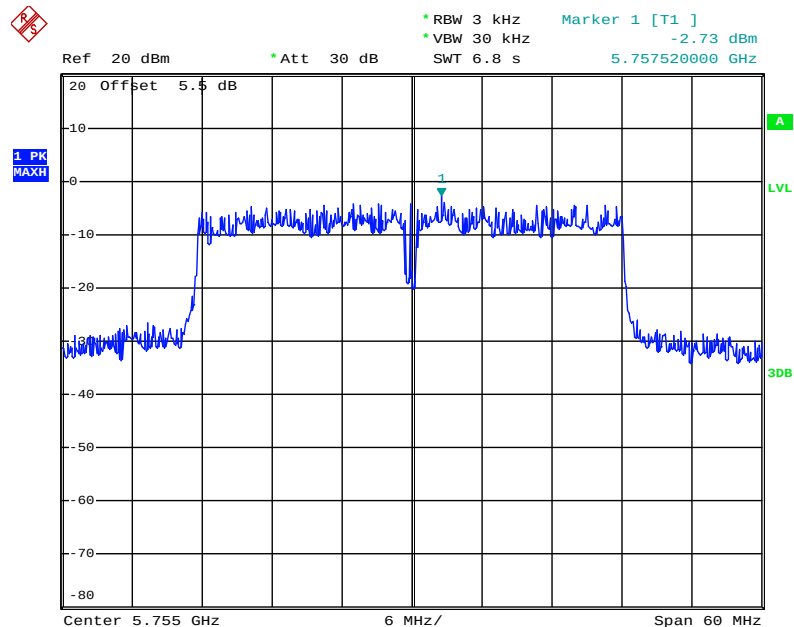
Date: 18.NOV.2013 20:59:36

Power Density Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / 5755 MHz / Ant. 1



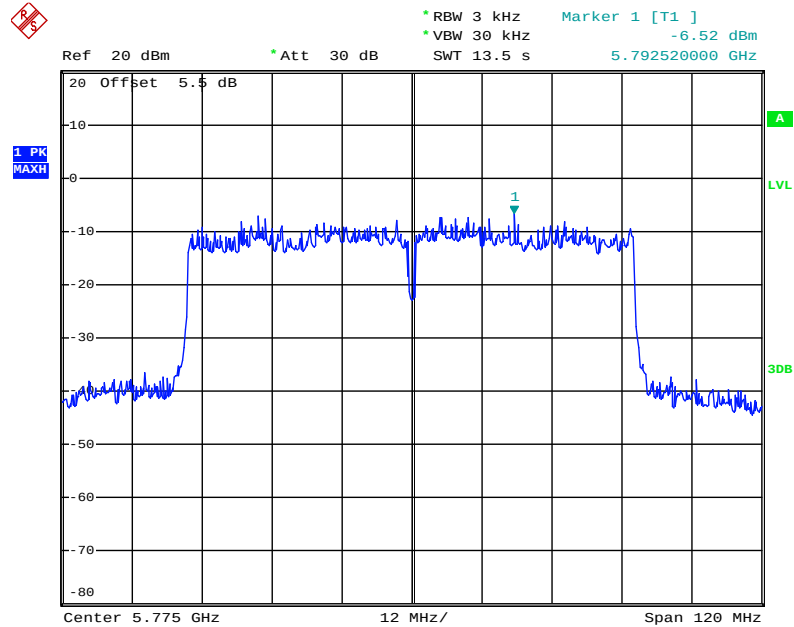
Date: 18.NOV.2013 21:03:58

Power Density Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / 5755 MHz / Ant. 2



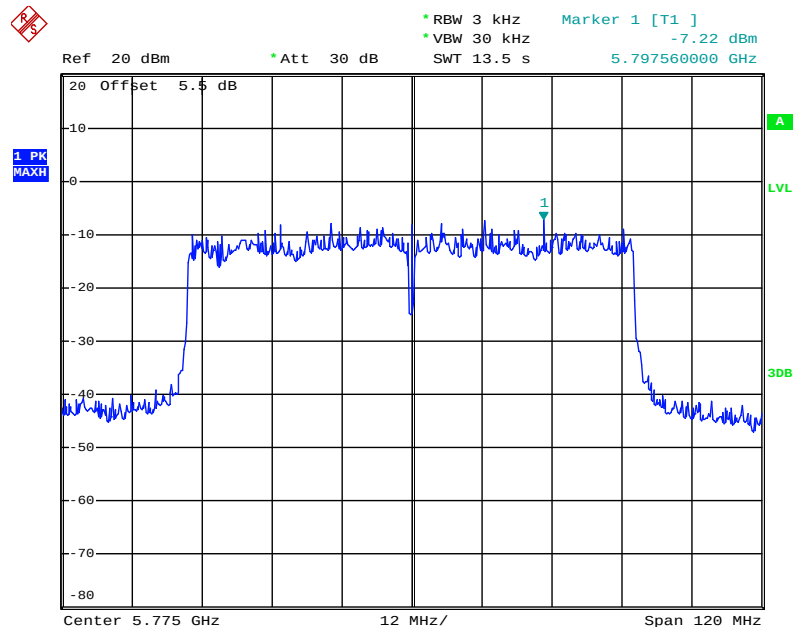
Date: 18.NOV.2013 21:03:28

Power Density Plot on Configuration IEEE 802.11ac MCS2/Nss1 80MHz / 5775 MHz / Ant. 1



Date: 18.NOV.2013 21:07:50

Power Density Plot on Configuration IEEE 802.11ac MCS2/Nss1 80MHz / 5775 MHz / Ant. 2



Date: 18.NOV.2013 21:06:43

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

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

4.4.2. Measuring Instruments and Setting

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

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

4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

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

4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g/n

For non-beamforming mode:

For 2.4GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.60	17.76	500	Complies
6	2437 MHz	17.36	17.92	500	Complies
11	2462 MHz	17.60	17.76	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	33.28	36.00	500	Complies
6	2437 MHz	30.72	36.00	500	Complies
9	2452 MHz	32.80	36.16	500	Complies

Configuration IEEE 802.11b / Ant. 1

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	7.84	10.08	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.40	16.56	500	Complies
6	2437 MHz	15.68	16.72	500	Complies
11	2462 MHz	16.40	16.56	500	Complies

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/a

For non-beamforming mode:

For 5GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.16	17.76	500	Complies
157	5785 MHz	16.72	17.60	500	Complies
165	5825 MHz	16.96	17.68	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	36.16	36.32	500	Complies
159	5795 MHz	36.16	36.32	500	Complies

Configuration IEEE 802.11a / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.44	16.56	500	Complies
157	5785 MHz	15.68	16.56	500	Complies
165	5825 MHz	15.04	16.48	500	Complies

Temperature	20°C	Humidity	63%
Test Engineer	Benson Peng	Configurations	IEEE 802.11ac

For beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS2/Nss1 20MHz / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.88	17.68	500	Complies
157	5785 MHz	17.52	17.76	500	Complies
165	5825 MHz	17.28	17.76	500	Complies

Configuration IEEE 802.11ac MCS2/Nss1 40MHz / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.68	36.64	500	Complies
159	5795 MHz	35.20	36.32	500	Complies

Configuration IEEE 802.11ac MCS2/Nss1 80MHz / Ant. 1 + Ant. 2

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	75.20	75.84	500	Complies

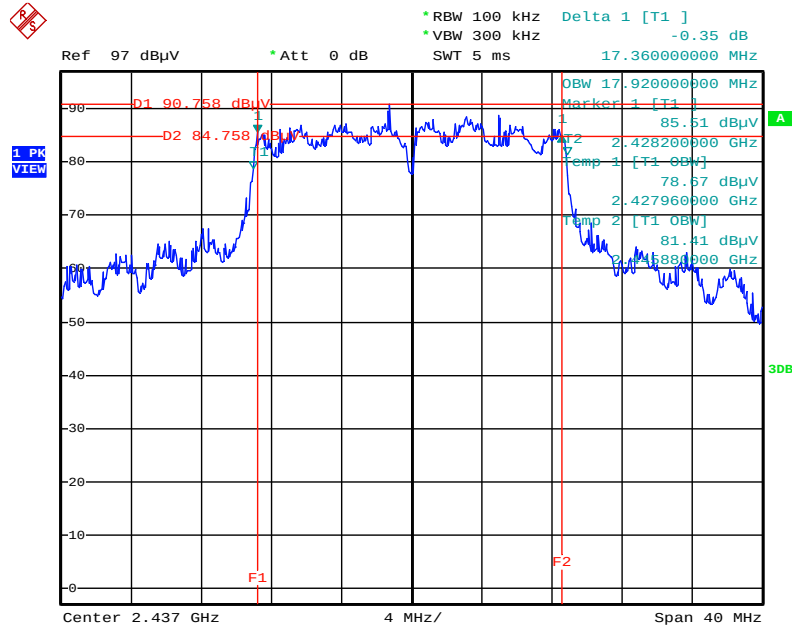
Note: All the test values were listed in the report.

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

For non-beamforming mode:

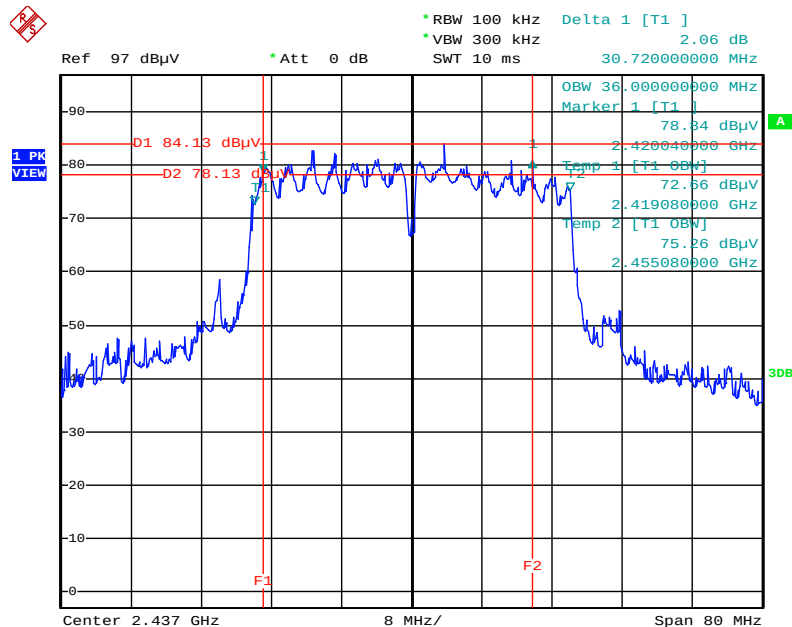
For 2.4GHz Band:

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



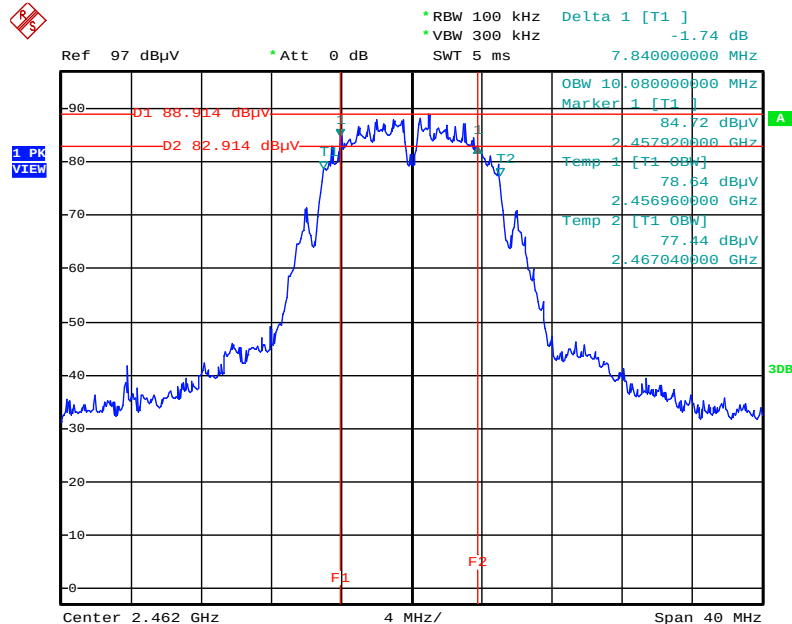
Date: 18.NOV.2013 19:24:42

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



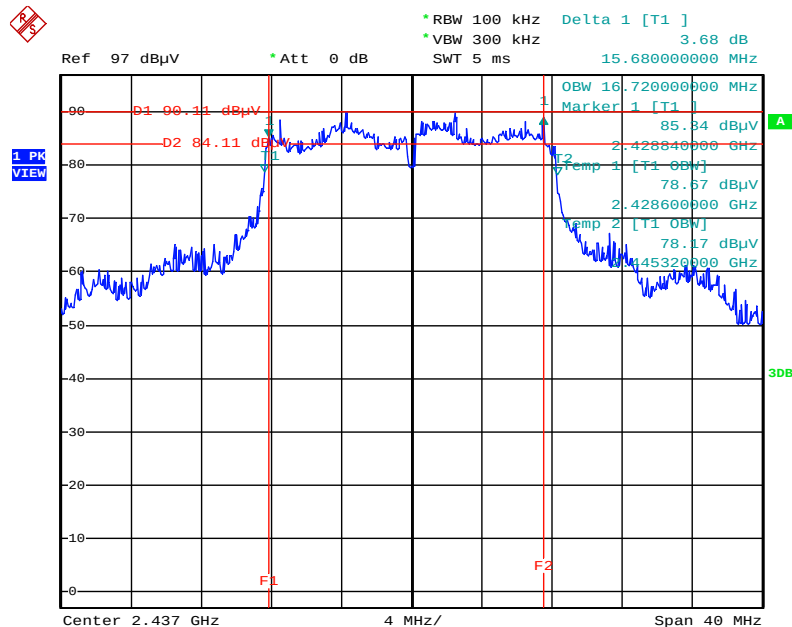
Date: 18.NOV.2013 19:26:11

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2462 MHz / Ant. 1



Date: 18.NOV.2013 19:21:23

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

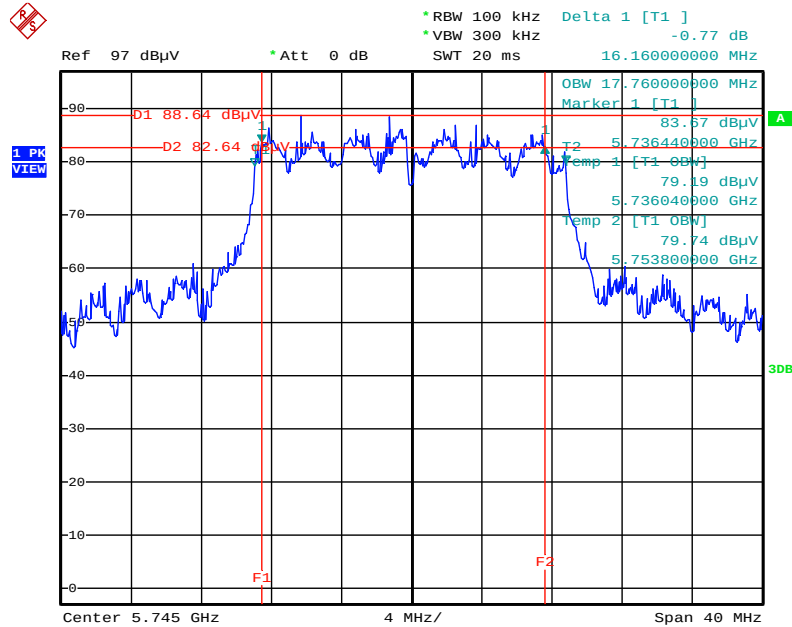


Date: 18.NOV.2013 19:22:27

For non-beamforming mode:

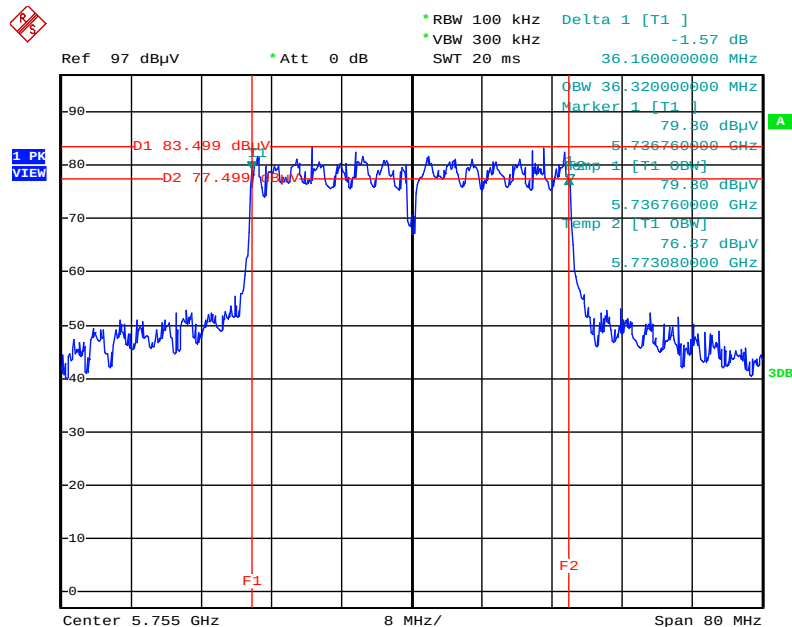
For 5GHz Band:

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz / 5745 MHz / Ant. 1 + Ant. 2



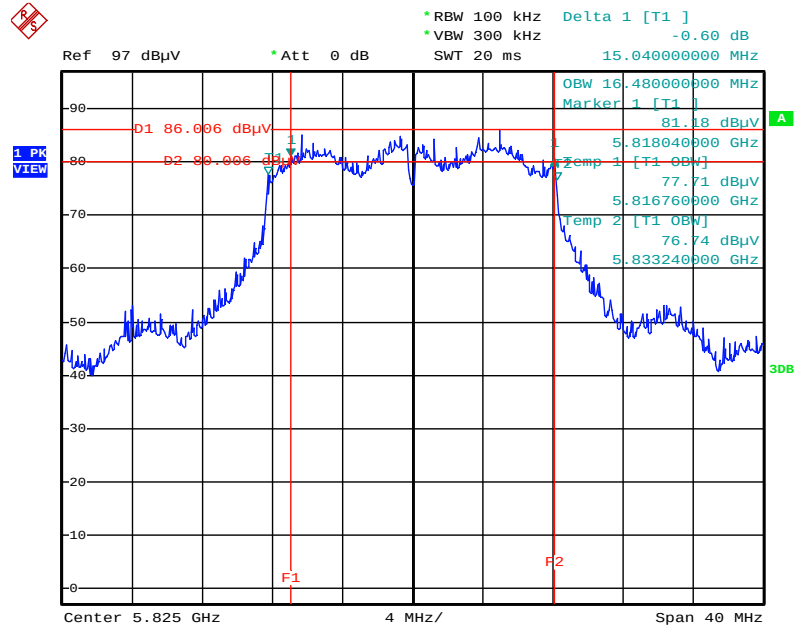
Date: 18.NOV.2013 19:54:52

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 40MHz / 5755 MHz / Ant. 1 + Ant. 2



Date: 18.NOV.2013 19:56:15

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1 + Ant. 2

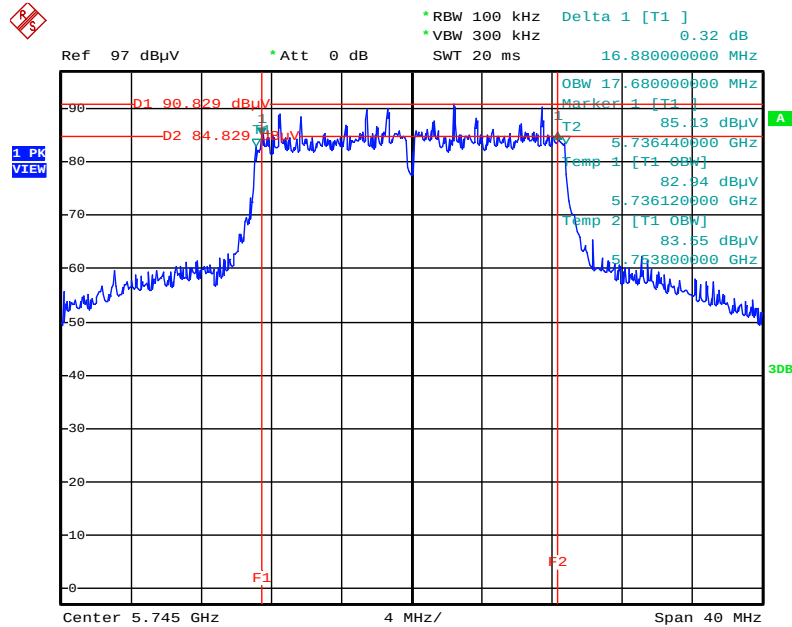


Date: 18.NOV.2013 19:53:32

For beamforming mode:

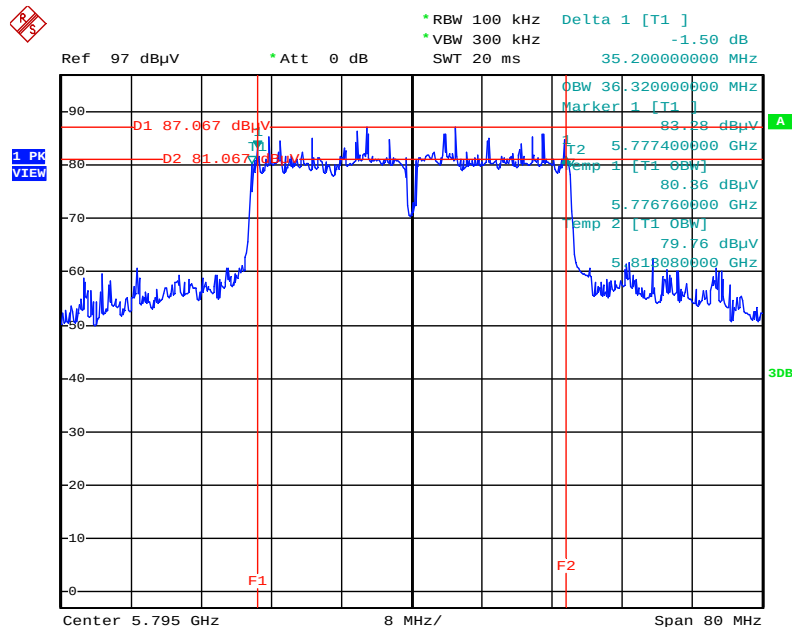
For 5GHz Band:

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / 5745 MHz / Ant. 1 + Ant. 2



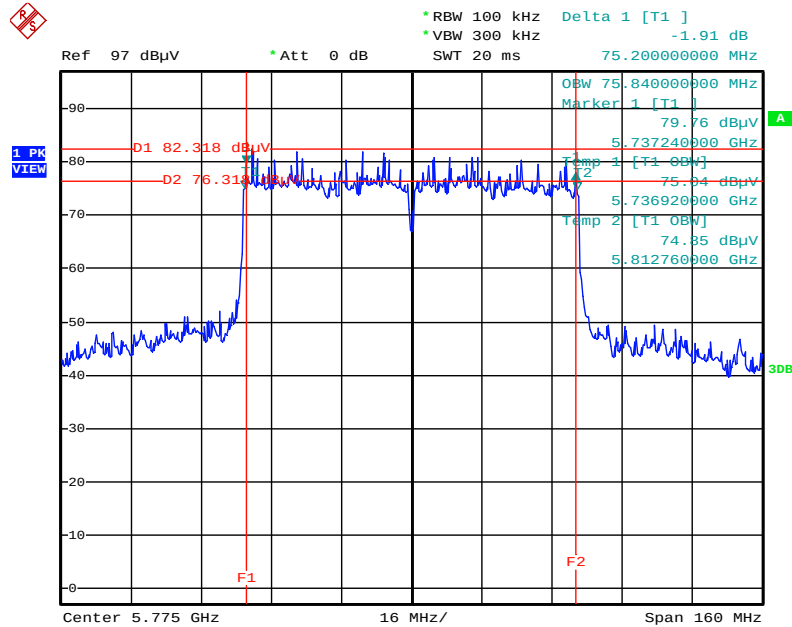
Date: 18.NOV.2013 20:19:44

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / 5795 MHz / Ant. 1 + Ant. 2



Date: 18.NOV.2013 20:17:55

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS2/Nss1 80MHz / 5775 MHz / Ant. 1 + Ant. 2



Date: 18.NOV.2013 20:15:51

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

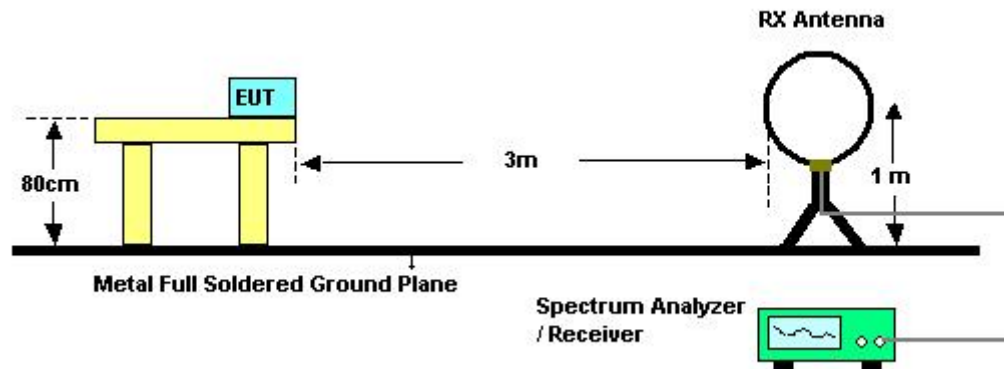
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

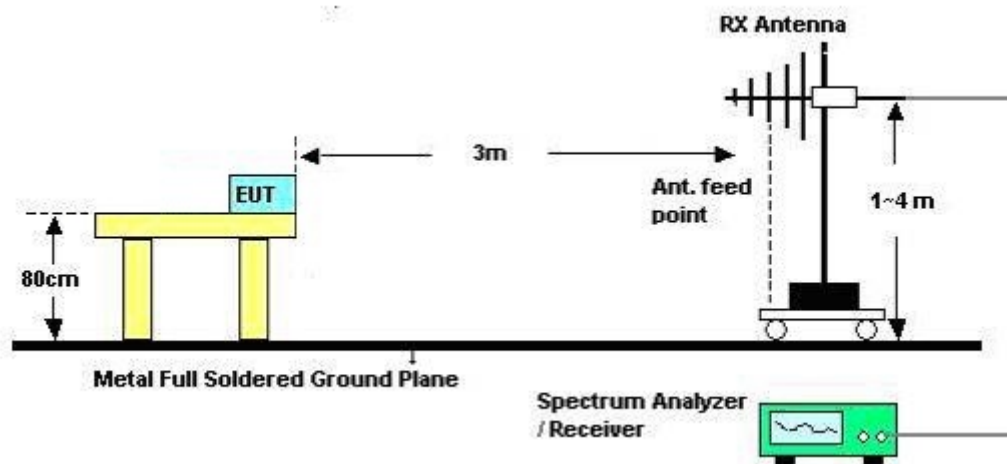
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout

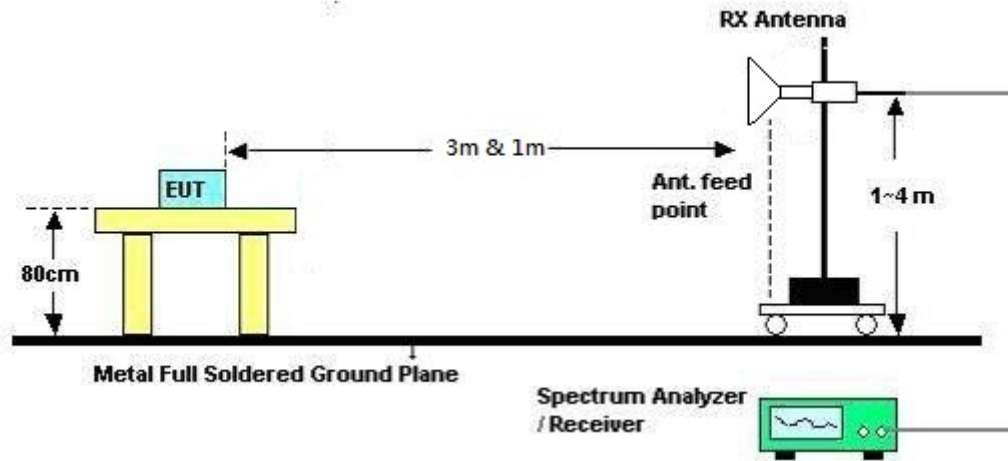
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	Normal Link
Test Date	Nov. 15, 2013		

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

Note:

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

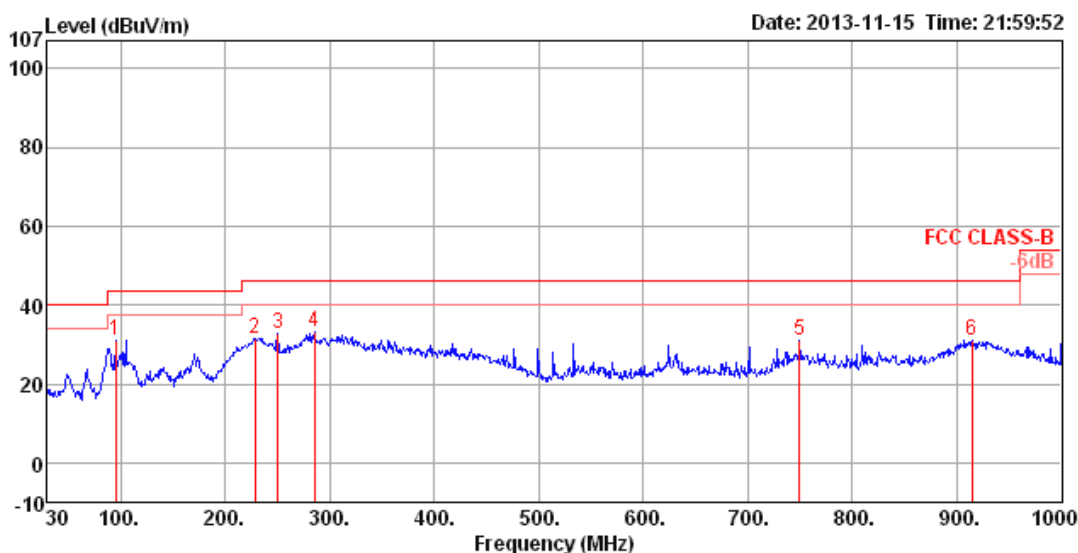
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

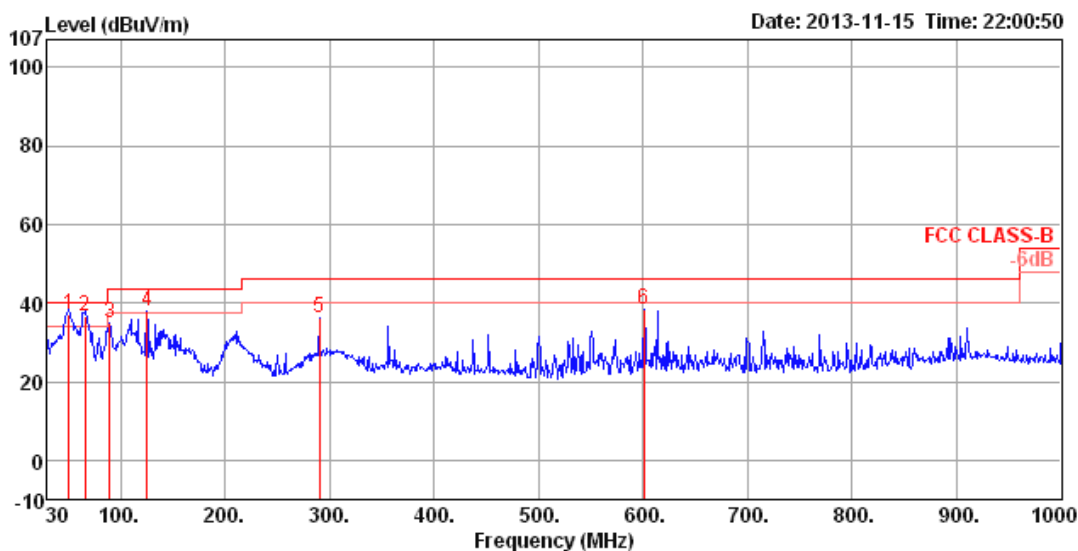
Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	Normal Link / Mode 3

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	94.99	31.15	43.50	-12.35	51.98	1.16	9.58	31.57	100	341	HORIZONTAL	Peak
2	228.85	31.65	46.00	-14.35	51.70	1.83	9.57	31.45	150	265	HORIZONTAL	Peak
3	250.19	32.92	46.00	-13.08	50.60	1.90	11.91	31.49	125	269	HORIZONTAL	Peak
4	285.11	33.09	46.00	-12.91	50.00	2.05	12.58	31.54	100	258	HORIZONTAL	Peak
5	749.74	31.02	46.00	-14.98	39.17	3.53	19.69	31.37	125	136	HORIZONTAL	Peak
6	914.64	31.21	46.00	-14.79	37.72	3.99	20.68	31.18	100	136	HORIZONTAL	Peak

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	50.37	36.94	40.00	-3.06	60.45	0.84	7.44	31.79	100	201	VERTICAL QP
2	65.89	36.44	40.00	-3.56	62.40	0.96	4.90	31.82	300	157	VERTICAL QP
3	89.17	34.95	43.50	-8.55	56.89	1.12	8.54	31.60	100	111	VERTICAL Peak
4	125.06	38.12	43.50	-5.38	56.63	1.33	11.73	31.57	125	219	VERTICAL Peak
5	289.96	36.20	46.00	-9.80	52.96	2.08	12.69	31.53	150	138	VERTICAL Peak
6	600.36	38.26	46.00	-7.74	47.93	3.12	18.45	31.24	200	164	VERTICAL Peak

Note:

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

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

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

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

For non-beamforming mode:

For 2.4GHz Band:

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 20MHz CH 1 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4822.04	35.16	54.00	-18.84	33.82	3.31	33.06	35.03	Average	100	97	HORIZONTAL
2	4824.60	46.23	74.00	-27.77	44.89	3.31	33.06	35.03	Peak	100	97	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4821.44	54.71	74.00	-19.29	53.37	3.31	33.06	35.03	Peak	112	253	VERTICAL
2	4824.04	41.67	54.00	-12.33	40.33	3.31	33.06	35.03	Average	112	253	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 20MHz CH 6 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 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	4874.96	40.51	54.00	-13.49	39.05	3.33	33.16	35.03	Average	162	149	HORIZONTAL
2	4880.16	54.82	74.00	-19.18	53.36	3.33	33.16	35.03	Peak	162	149	HORIZONTAL
3	7309.48	45.38	54.00	-8.62	40.76	4.06	35.96	35.40	Average	136	309	HORIZONTAL
4	7309.48	55.38	74.00	-18.62	50.76	4.06	35.96	35.40	Peak	136	309	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	4873.44	48.68	54.00	-5.32	47.22	3.33	33.16	35.03	Average	112	246	VERTICAL
2	4875.80	64.00	74.00	-10.00	62.54	3.33	33.16	35.03	Peak	112	246	VERTICAL
3	7306.72	65.75	74.00	-8.25	61.17	4.06	35.92	35.40	Peak	112	274	VERTICAL
4	7308.52	53.36	54.00	-0.64	48.74	4.06	35.96	35.40	Average	112	274	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 20MHz CH 11 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 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	4923.52	33.69	54.00	-20.31	32.09	3.35	33.26	35.01	Average	166	138	HORIZONTAL
2	4928.68	46.01	74.00	-27.99	44.41	3.35	33.26	35.01	Peak	166	138	HORIZONTAL
3	7384.48	48.38	74.00	-25.62	43.63	4.06	36.09	35.40	Peak	100	138	HORIZONTAL
4	7387.28	34.30	54.00	-19.70	29.55	4.06	36.09	35.40	Average	100	138	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	4924.08	39.73	54.00	-14.27	38.13	3.35	33.26	35.01	Average	145	243	VERTICAL
2	4924.16	52.01	74.00	-21.99	50.41	3.35	33.26	35.01	Peak	145	243	VERTICAL
3	7381.20	56.35	74.00	-17.65	51.60	4.06	36.09	35.40	Peak	145	245	VERTICAL
4	7384.08	39.26	54.00	-14.74	34.51	4.06	36.09	35.40	Average	145	245	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 40MHz CH 3 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 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	4836.52	45.87	74.00	-28.13	44.53	3.31	33.06	35.03	Peak	100	73	HORIZONTAL
2	4844.36	33.03	54.00	-20.97	31.65	3.32	33.09	35.03	Average	100	73	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	4844.16	50.87	74.00	-23.13	49.49	3.32	33.09	35.03	Peak	100	245	VERTICAL
2	4846.24	37.50	54.00	-16.50	36.12	3.32	33.09	35.03	Average	100	245	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 40MHz CH 6 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4872.16	31.17	54.00	-22.83	29.71	3.33	33.16	35.03	100	122	HORIZONTAL
2	4881.40	48.50	74.00	-25.50	47.04	3.33	33.16	35.03	100	122	HORIZONTAL
3	7304.24	45.98	74.00	-28.02	41.40	4.06	35.92	35.40	100	194	HORIZONTAL
4	7305.12	35.71	54.00	-18.29	31.13	4.06	35.92	35.40	100	194	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4874.00	50.87	74.00	-23.13	49.41	3.33	33.16	35.03	109	248	VERTICAL
2	4874.16	39.21	54.00	-14.79	37.75	3.33	33.16	35.03	109	248	VERTICAL
3	7301.52	35.04	54.00	-18.96	30.46	4.06	35.92	35.40	109	283	VERTICAL
4	7310.84	47.61	74.00	-26.39	42.99	4.06	35.96	35.40	109	283	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 40MHz CH 9 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4904.76	30.57	54.00	-23.43	29.02	3.34	33.23	35.02	Average	100	144 HORIZONTAL
2	4911.44	44.48	74.00	-29.52	42.93	3.34	33.23	35.02	Peak	100	144 HORIZONTAL
3	7361.60	33.59	54.00	-20.41	28.87	4.06	36.06	35.40	Average	100	116 HORIZONTAL
4	7362.96	47.40	74.00	-26.60	42.68	4.06	36.06	35.40	Peak	100	116 HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4904.24	32.63	54.00	-21.37	31.12	3.34	33.19	35.02	Average	100	280 VERTICAL
2	4911.52	52.07	74.00	-21.93	50.52	3.34	33.23	35.02	Peak	100	280 VERTICAL
3	7362.76	33.54	54.00	-20.46	28.82	4.06	36.06	35.40	Average	100	193 VERTICAL
4	7365.84	45.60	74.00	-28.40	40.88	4.06	36.06	35.40	Peak	100	193 VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11b CH 1 / Ant. 1
Test Date	Oct. 29, 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	4823.00	48.70	54.00	-5.30	47.36	3.31	33.06	35.03	Average	100	250	HORIZONTAL
2	4823.00	48.24	74.00	-25.76	46.90	3.31	33.06	35.03	Peak	100	250	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	4823.92	53.70	54.00	-0.30	52.36	3.31	33.06	35.03	Average	110	252	VERTICAL
2	4823.92	56.24	74.00	-17.76	54.90	3.31	33.06	35.03	Peak	110	252	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11b CH 6 / Ant. 1
Test Date	Oct. 29, 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	4873.00	47.87	54.00	-6.13	46.41	3.33	33.16	35.03	Average	100	255	HORIZONTAL
2	4873.00	49.89	74.00	-24.11	48.43	3.33	33.16	35.03	Peak	100	255	HORIZONTAL
3	7311.12	43.87	54.00	-10.13	39.25	4.06	35.96	35.40	Average	110	198	HORIZONTAL
4	7311.12	45.87	74.00	-28.13	41.25	4.06	35.96	35.40	Peak	110	198	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.72	55.89	74.00	-18.11	54.43	3.33	33.16	35.03	Peak	120	285	VERTICAL
2	4873.92	51.87	54.00	-2.13	50.41	3.33	33.16	35.03	Average	120	285	VERTICAL
3	7311.00	41.89	54.00	-12.11	37.27	4.06	35.96	35.40	Average	111	250	VERTICAL
4	7311.00	47.89	74.00	-26.11	43.27	4.06	35.96	35.40	Peak	111	250	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11b CH 11 / Ant. 1
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.00	49.93	54.00	-4.07	48.33	3.35	33.26	35.01	Average	100	222	HORIZONTAL
2	4923.88	52.41	74.00	-21.59	50.81	3.35	33.26	35.01	Peak	100	222	HORIZONTAL
3	7386.00	46.93	54.00	-7.07	42.18	4.06	36.09	35.40	Average	105	254	HORIZONTAL
4	7386.00	46.93	74.00	-27.07	42.18	4.06	36.09	35.40	Peak	105	254	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.88	53.93	54.00	-0.07	52.33	3.35	33.26	35.01	Average	109	246	VERTICAL
2	4923.88	56.41	74.00	-17.59	54.81	3.35	33.26	35.01	Peak	109	246	VERTICAL
3	7386.00	46.93	54.00	-7.07	42.18	4.06	36.09	35.40	Average	100	240	VERTICAL
4	7386.00	50.93	74.00	-23.07	46.18	4.06	36.09	35.40	Peak	100	240	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4825.12	34.46	54.00	-19.54	33.12	3.31	33.06	35.03	Average	165	84	HORIZONTAL
2	4825.36	48.13	74.00	-25.87	46.79	3.31	33.06	35.03	Peak	165	84	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4823.60	53.69	74.00	-20.31	52.35	3.31	33.06	35.03	Peak	113	251	VERTICAL
2	4824.04	40.09	54.00	-13.91	38.75	3.31	33.06	35.03	Average	113	251	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.80	38.05	54.00	-15.95	36.59	3.33	33.16	35.03	Average	110	107	HORIZONTAL
2	4875.20	53.10	74.00	-20.90	51.64	3.33	33.16	35.03	Peak	110	107	HORIZONTAL
3	7311.32	43.89	54.00	-10.11	39.27	4.06	35.96	35.40	Average	130	91	HORIZONTAL
4	7315.44	59.26	74.00	-14.74	54.64	4.06	35.96	35.40	Peak	130	91	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4871.88	57.59	74.00	-16.41	56.13	3.33	33.16	35.03	Peak	159	260	VERTICAL
2	4874.04	41.42	54.00	-12.58	39.96	3.33	33.16	35.03	Average	159	260	VERTICAL
3	7307.08	62.33	74.00	-11.67	57.75	4.06	35.92	35.40	Peak	159	275	VERTICAL
4	7311.08	49.55	54.00	-4.45	44.93	4.06	35.96	35.40	Average	159	275	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4925.48	48.28	74.00	-25.72	46.68	3.35	33.26	35.01	Peak	100	49	HORIZONTAL
2	4925.52	35.25	54.00	-18.75	33.65	3.35	33.26	35.01	Average	100	49	HORIZONTAL
3	7382.48	35.10	54.00	-18.90	30.35	4.06	36.09	35.40	Average	100	276	HORIZONTAL
4	7387.52	49.28	74.00	-24.72	44.53	4.06	36.09	35.40	Peak	100	276	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4924.60	41.29	54.00	-12.71	39.69	3.35	33.26	35.01	Average	110	249	VERTICAL
2	4925.08	53.98	74.00	-20.02	52.38	3.35	33.26	35.01	Peak	110	249	VERTICAL
3	7382.36	35.23	54.00	-18.77	30.48	4.06	36.09	35.40	Average	100	2	VERTICAL
4	7387.40	48.96	74.00	-25.04	44.21	4.06	36.09	35.40	Peak	100	2	VERTICAL

For 5GHz Band:

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n 20MHz CH 149 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11490.64	44.57	54.00	-9.43	35.96	5.11	38.78	35.28	Average	100	319	HORIZONTAL
2	11495.77	59.01	74.00	-14.99	50.39	5.12	38.78	35.28	Peak	100	319	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11495.61	46.95	54.00	-7.05	38.33	5.12	38.78	35.28	Average	100	254	VERTICAL
2	11498.09	60.71	74.00	-13.29	52.09	5.12	38.78	35.28	Peak	100	254	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n 20MHz CH 157 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 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	11567.95	59.73	74.00	-14.27	51.07	5.13	38.83	35.30	Peak	100	226	HORIZONTAL
2	11570.51	44.86	54.00	-9.14	36.19	5.14	38.83	35.30	Average	100	226	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	11568.17	65.09	74.00	-8.91	56.43	5.13	38.83	35.30	Peak	100	254	VERTICAL
2	11568.24	50.06	54.00	-3.94	41.40	5.13	38.83	35.30	Average	100	254	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n 20MHz CH 165 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 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	11650.42	47.65	54.00	-6.35	38.93	5.16	38.86	35.30	Average	100	319	HORIZONTAL
2	11655.67	62.81	74.00	-11.19	54.09	5.16	38.86	35.30	Peak	100	319	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11650.71	52.83	54.00	-1.17	44.11	5.16	38.86	35.30	Average	100	250	VERTICAL
2	11650.77	67.10	74.00	-6.90	58.38	5.16	38.86	35.30	Peak	100	250	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n 40MHz CH 151 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 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	11511.20	55.04	74.00	-18.96	46.41	5.12	38.79	35.28	Peak	100	317	HORIZONTAL
2	11520.66	41.16	54.00	-12.84	32.52	5.13	38.80	35.29	Average	100	317	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	11511.12	59.11	74.00	-14.89	50.48	5.12	38.79	35.28	Peak	100	254	VERTICAL
2	11515.69	44.85	54.00	-9.15	36.23	5.12	38.79	35.29	Average	100	254	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n 40MHz CH 159 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11590.08	57.86	74.00	-16.14	49.19	5.14	38.83	35.30	Peak	100	323	HORIZONTAL
2	11590.64	43.24	54.00	-10.76	34.57	5.14	38.83	35.30	Average	100	323	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11585.67	48.00	54.00	-6.00	39.33	5.14	38.83	35.30	Average	100	249	VERTICAL
2	11591.20	61.94	74.00	-12.06	53.27	5.14	38.83	35.30	Peak	100	249	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11a CH 149 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
			Line	Limit	Level	Loss	Factor	Factor	Remark			Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11490.32	59.67	74.00	-14.33	51.06	5.11	38.78	35.28	Peak	102	322	HORIZONTAL
2	11491.12	45.71	54.00	-8.29	37.10	5.11	38.78	35.28	Average	102	322	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
			Line	Limit	Level	Loss	Factor	Factor	Remark			Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11486.39	61.35	74.00	-12.65	52.74	5.11	38.78	35.28	Peak	100	249	VERTICAL
2	11491.28	48.00	54.00	-6.00	39.39	5.11	38.78	35.28	Average	100	249	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11a CH 157 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 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	11570.24	60.72	74.00	-13.28	52.05	5.14	38.83	35.30	Peak	99	318	HORIZONTAL
2	11571.28	46.36	54.00	-7.64	37.69	5.14	38.83	35.30	Average	99	318	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	11570.32	64.25	74.00	-9.75	55.58	5.14	38.83	35.30	Peak	99	246	VERTICAL
2	11571.28	50.14	54.00	-3.86	41.47	5.14	38.83	35.30	Average	99	246	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11a CH 165 / Ant. 1 + Ant. 2
Test Date	Nov. 09, 2013		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11650.40	61.66	74.00	-12.34	52.94	5.16	38.86	35.30	Peak	100	321	HORIZONTAL
2	11651.44	48.28	54.00	-5.72	39.56	5.16	38.86	35.30	Average	100	321	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11650.24	67.45	74.00	-6.55	58.73	5.16	38.86	35.30	Peak	100	250	VERTICAL
2	11651.44	53.64	54.00	-0.36	44.92	5.16	38.86	35.30	Average	100	250	VERTICAL

For beamforming mode:

For 5GHz Band:

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11ac MCS2/Nss1 20MHz CH 149 / Ant. 1 + Ant. 2
Test Date	Nov. 12, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11485.43	45.75	54.00	-8.25	37.14	5.11	38.78	35.28	Average	100	305 HORIZONTAL
2	11491.12	57.25	74.00	-16.75	48.64	5.11	38.78	35.28	Peak	100	305 HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11489.13	45.46	54.00	-8.54	36.85	5.11	38.78	35.28	Average	100	272 VERTICAL
2	11491.12	58.23	74.00	-15.77	49.62	5.11	38.78	35.28	Peak	100	272 VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11ac MCS2/Nss1 20MHz CH 157 / Ant. 1 + Ant. 2
Test Date	Nov. 12, 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	11566.79	44.02	54.00	-9.98	35.37	5.13	38.82	35.30	Average	100	230	HORIZONTAL
2	11569.36	55.34	74.00	-18.66	46.68	5.13	38.83	35.30	Peak	100	230	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	11576.97	46.34	54.00	-7.66	37.67	5.14	38.83	35.30	Average	100	308	VERTICAL
2	11577.21	58.85	74.00	-15.15	50.18	5.14	38.83	35.30	Peak	100	308	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11ac MCS2/Nss1 20MHz CH 165 / Ant. 1 + Ant. 2
Test Date	Nov. 12, 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	11648.48	46.99	54.00	-7.01	38.27	5.16	38.86	35.30	Average	100	247	HORIZONTAL
2	11650.96	59.79	74.00	-14.21	51.07	5.16	38.86	35.30	Peak	100	247	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	11640.95	47.83	54.00	-6.17	39.11	5.16	38.86	35.30	Average	100	298	VERTICAL
2	11651.12	62.82	74.00	-11.18	54.10	5.16	38.86	35.30	Peak	100	298	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11ac MCS2/Nss1 40MHz CH 151 / Ant. 1 + Ant. 2
Test Date	Nov. 12, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11510.08	58.52	74.00	-15.48	49.89	5.12	38.79	35.28	Peak	100	243 HORIZONTAL
2	11514.17	43.45	54.00	-10.55	34.82	5.12	38.79	35.28	Average	100	243 HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	11504.55	44.03	54.00	-9.97	35.40	5.12	38.79	35.28	Average	100	274 VERTICAL
2	11509.68	57.91	74.00	-16.09	49.28	5.12	38.79	35.28	Peak	100	274 VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11ac MCS2/Nss1 40MHz CH 159 / Ant. 1 + Ant. 2
Test Date	Nov. 12, 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	11588.24	56.58	74.00	-17.42	47.91	5.14	38.83	35.30	Peak	100	236	HORIZONTAL
2	11590.08	44.27	54.00	-9.73	35.60	5.14	38.83	35.30	Average	100	236	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	11588.64	45.30	54.00	-8.70	36.63	5.14	38.83	35.30	Average	100	271	VERTICAL
2	11589.92	62.26	74.00	-11.74	53.59	5.14	38.83	35.30	Peak	100	271	VERTICAL

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11ac MCS2/Nss1 80MHz CH 155 / Ant. 1 + Ant. 2
Test Date	Nov. 12, 2013		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4999.73	57.23	74.00	-16.77	55.46	3.39	33.39	35.01	100	161	HORIZONTAL
2	4999.96	49.84	54.00	-4.16	48.07	3.39	33.39	35.01	100	161	HORIZONTAL
3	11560.42	40.13	54.00	-13.87	31.48	5.13	38.82	35.30	100	312	HORIZONTAL
4	11571.07	51.67	74.00	-22.33	43.00	5.14	38.83	35.30	100	312	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4999.62	51.19	54.00	-2.81	49.41	3.39	33.40	35.01	100	52	VERTICAL
2	5000.08	58.87	74.00	-15.13	57.09	3.39	33.40	35.01	100	52	VERTICAL
3	11558.81	40.31	54.00	-13.69	31.66	5.13	38.82	35.30	100	255	VERTICAL
4	11571.15	51.61	74.00	-22.39	42.94	5.14	38.83	35.30	100	255	VERTICAL

Note:

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

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

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

4.6. Emissions Measurement

4.6.1. Limit

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

For non-beamforming mode:

For 2.4GHz Band:

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 20MHz CH 1, 6, 11 / Ant. 1 + Ant. 2
Test date	Oct. 29, 2013		

Channel 1

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
			dBuV/m	dB	dBuV	dB	dB/m	dB				
1	2387.80	70.72	74.00	-3.28	40.34	2.21	28.17	0.00	Peak	100	234	VERTICAL
2	2390.00	53.65	54.00	-0.35	23.26	2.22	28.17	0.00	Average	100	234	VERTICAL
3	2408.00	103.53			73.10	2.22	28.21	0.00	Average	100	234	VERTICAL
4	2408.20	114.13			83.70	2.22	28.21	0.00	Peak	100	234	VERTICAL

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

Channel 6

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
			dBuV/m	dB	dBuV	dB	dB/m	dB				
1	2390.00	53.70	54.00	-0.30	23.31	2.22	28.17	0.00	Average	101	204	VERTICAL
2	2390.00	69.47	74.00	-4.53	39.08	2.22	28.17	0.00	Peak	101	204	VERTICAL
3	2433.00	109.55			79.07	2.23	28.25	0.00	Average	101	204	VERTICAL
4	2441.00	120.30			89.77	2.24	28.29	0.00	Peak	101	204	VERTICAL
5	2483.50	53.69	54.00	-0.31	23.06	2.26	28.37	0.00	Average	101	204	VERTICAL
6	2483.90	71.61	74.00	-2.39	40.98	2.26	28.37	0.00	Peak	101	204	VERTICAL

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

Channel 11

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
			dBuV/m	dB	dBuV	dB	dB/m	dB				
1	2465.40	105.47			74.90	2.24	28.33	0.00	Average	100	320	VERTICAL
2	2467.80	116.02			85.43	2.26	28.33	0.00	Peak	100	320	VERTICAL
3	2483.50	73.72	74.00	-0.28	43.09	2.26	28.37	0.00	Peak	100	320	VERTICAL
4	2483.54	53.35	54.00	-0.65	22.72	2.26	28.37	0.00	Average	100	320	VERTICAL

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

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11n MCS0 40MHz CH 3, 6, 9 / Ant. 1 + Ant. 2
Test date	Oct. 29, 2013		

Channel 3

	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	2383.60	67.02	74.00	-6.98	36.64	2.21	28.17	0.00	Peak	108	207	VERTICAL
2	2388.80	53.85	54.00	-0.15	23.47	2.21	28.17	0.00	Average	108	207	VERTICAL
3	2426.00	100.31			69.83	2.23	28.25	0.00	Average	108	207	VERTICAL
4	2426.00	111.58			81.10	2.23	28.25	0.00	Peak	108	207	VERTICAL

Item 3, 4 are the fundamental frequency at 2422 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	2390.00	53.43	54.00	-0.57	23.04	2.22	28.17	0.00	Average	100	208	VERTICAL
2	2390.00	68.84	74.00	-5.16	38.45	2.22	28.17	0.00	Peak	100	208	VERTICAL
3	2430.20	113.08			82.60	2.23	28.25	0.00	Peak	100	208	VERTICAL
4	2433.00	101.57			71.09	2.23	28.25	0.00	Average	100	208	VERTICAL
5	2483.50	53.48	54.00	-0.52	22.85	2.26	28.37	0.00	Average	100	208	VERTICAL
6	2483.50	68.31	74.00	-5.69	37.68	2.26	28.37	0.00	Peak	100	208	VERTICAL

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

Channel 9

	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	2446.00	98.88			68.35	2.24	28.29	0.00	Average	153	203	VERTICAL
2	2446.40	110.69			80.16	2.24	28.29	0.00	Peak	153	203	VERTICAL
3	2483.50	53.65	54.00	-0.35	23.02	2.26	28.37	0.00	Average	153	203	VERTICAL
4	2485.90	68.09	74.00	-5.91	37.42	2.26	28.41	0.00	Peak	153	203	VERTICAL

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

Note:

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

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

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 1
Test Date	Oct. 29, 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	2387.20	61.81	74.00	-12.19	31.43	2.21	28.17	0.00	Peak	100	290	VERTICAL
2	2390.00	50.43	54.00	-3.57	20.04	2.22	28.17	0.00	Average	100	290	VERTICAL
3	2411.00	113.46			83.03	2.22	28.21	0.00	Peak	100	290	VERTICAL
4	2411.20	109.84			79.41	2.22	28.21	0.00	Average	100	290	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2386.80	63.43	74.00	-10.57	33.05	2.21	28.17	0.00	Peak	123	69	VERTICAL
2	2387.60	51.30	54.00	-2.70	20.92	2.21	28.17	0.00	Average	123	69	VERTICAL
3	2436.20	112.29			81.77	2.23	28.29	0.00	Average	123	69	VERTICAL
4	2436.20	116.16			85.64	2.23	28.29	0.00	Peak	123	69	VERTICAL
5	2499.90	53.00	54.00	-1.00	22.32	2.27	28.41	0.00	Average	123	69	VERTICAL
6	2499.90	62.61	74.00	-11.39	31.93	2.27	28.41	0.00	Peak	123	69	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2461.00	114.19			83.62	2.24	28.33	0.00	Peak	116	287	VERTICAL
2	2461.20	110.36			79.79	2.24	28.33	0.00	Average	116	287	VERTICAL
3	2485.70	64.80	74.00	-9.20	34.13	2.26	28.41	0.00	Peak	116	287	VERTICAL
4	2487.70	52.47	54.00	-1.53	21.80	2.26	28.41	0.00	Average	116	287	VERTICAL

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

Temperature	25°C	Humidity	54%
Test Engineer	James Chou	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2
Test Date	Oct. 29, 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	2388.20	71.48	74.00	-2.52	41.10	2.21	28.17	0.00	Peak	112	230	VERTICAL
2	2390.00	53.85	54.00	-0.15	23.46	2.22	28.17	0.00	Average	112	230	VERTICAL
3	2409.00	106.07			75.64	2.22	28.21	0.00	Average	112	230	VERTICAL
4	2409.40	116.44			86.01	2.22	28.21	0.00	Peak	112	230	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.20	52.08	54.00	-1.92	21.70	2.21	28.17	0.00	Average	152	202	VERTICAL
2	2390.00	65.53	74.00	-8.47	35.14	2.22	28.17	0.00	Peak	152	202	VERTICAL
3	2440.60	109.16			78.64	2.23	28.29	0.00	Average	152	202	VERTICAL
4	2441.00	119.36			88.83	2.24	28.29	0.00	Peak	152	202	VERTICAL
5	2500.30	52.72	54.00	-1.28	22.04	2.27	28.41	0.00	Average	152	202	VERTICAL
6	2500.30	62.49	74.00	-11.51	31.81	2.27	28.41	0.00	Peak	152	202	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2464.60	106.49			75.92	2.24	28.33	0.00	Average	107	288	VERTICAL
2	2464.80	116.97			86.40	2.24	28.33	0.00	Peak	107	288	VERTICAL
3	2484.50	53.40	54.00	-0.60	22.77	2.26	28.37	0.00	Average	107	288	VERTICAL
4	2485.10	73.10	74.00	-0.90	42.43	2.26	28.41	0.00	Peak	107	288	VERTICAL

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

Note:

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

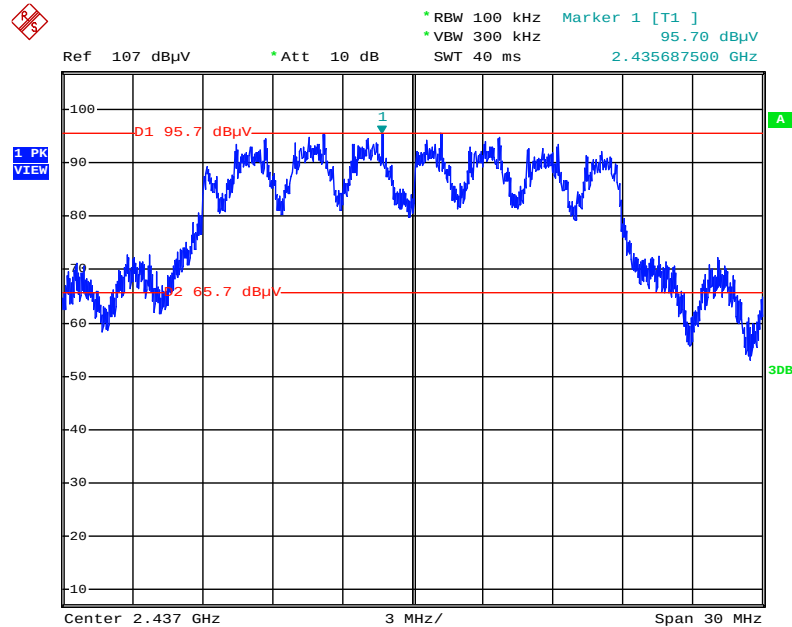
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For Emission not in Restricted Band

For non-beamforming mode:

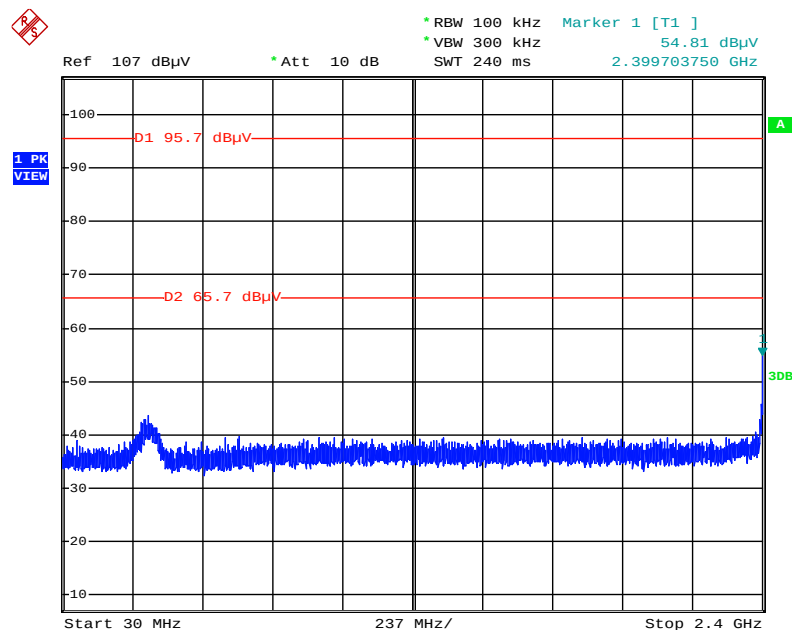
For 2.4GHz Band:

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



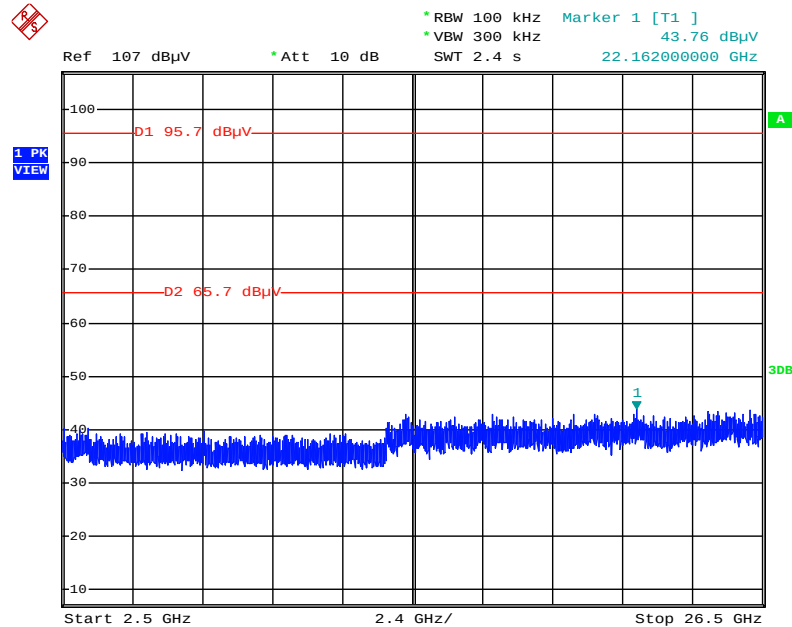
Date: 30.OCT.2013 01:22:07

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



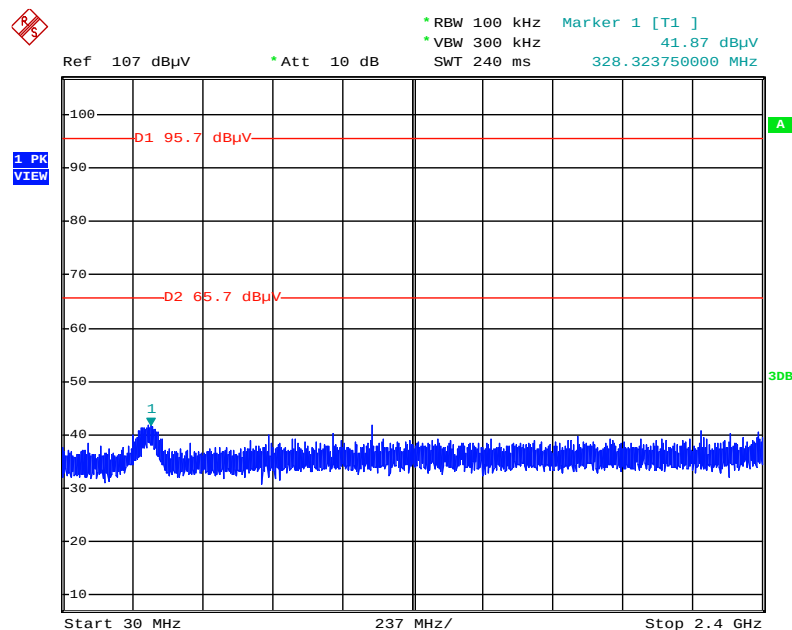
Date: 30.OCT.2013 01:23:20

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



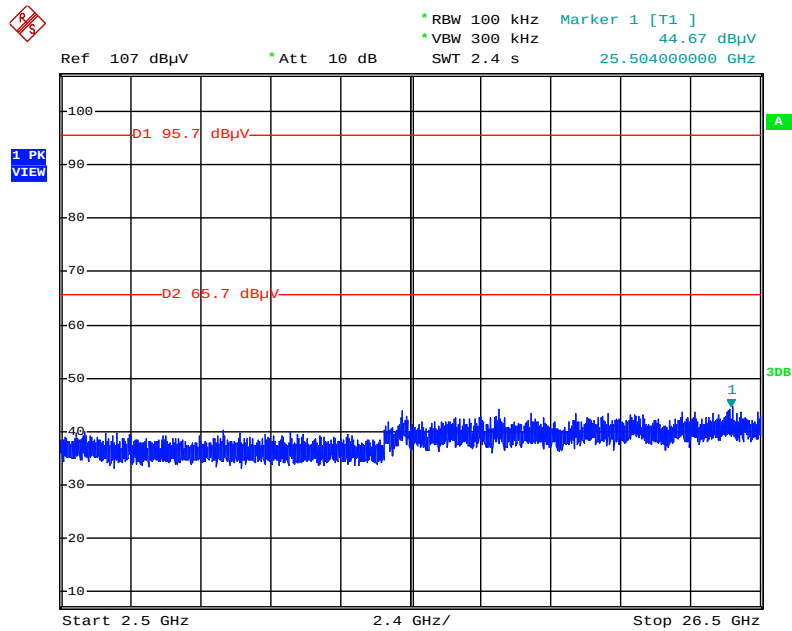
Date: 30.OCT.2013 01:23:50

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



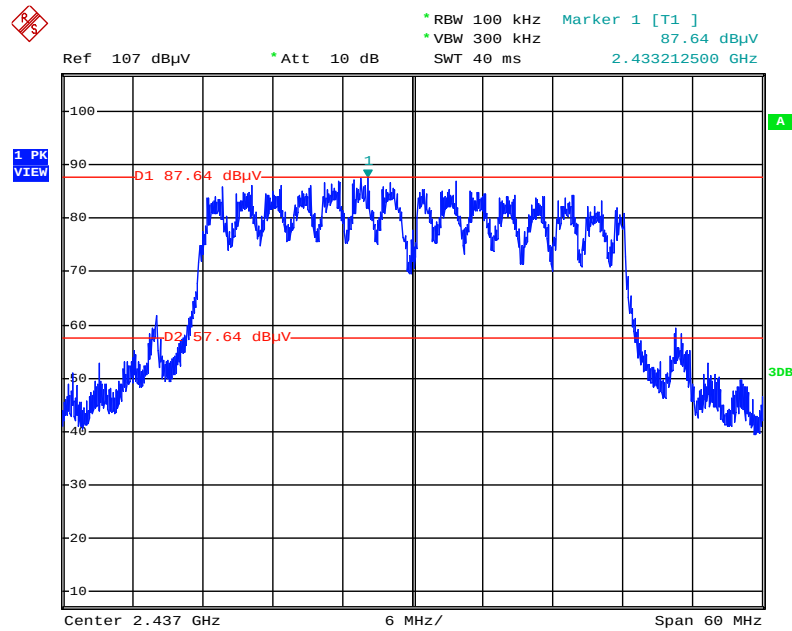
Date: 30.OCT.2013 01:25:38

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



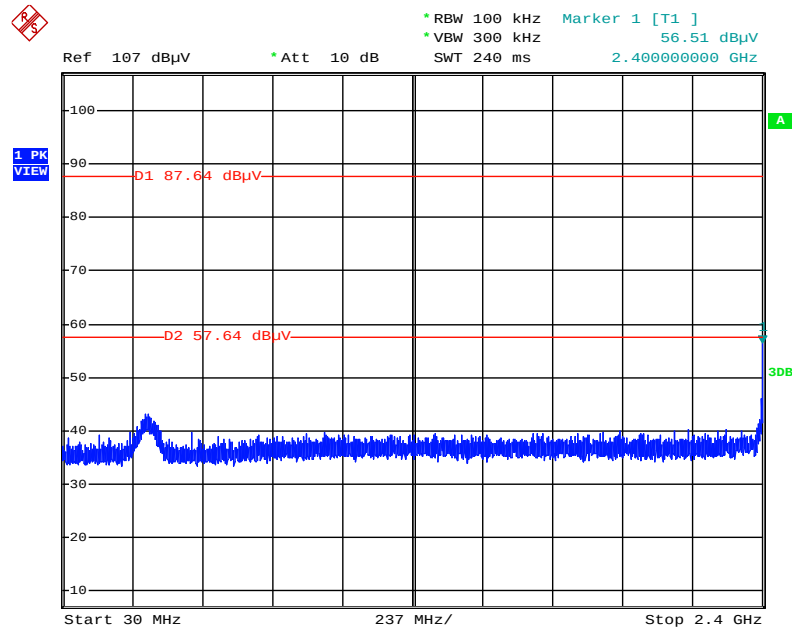
Date: 30.OCT.2013 01:24:49

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



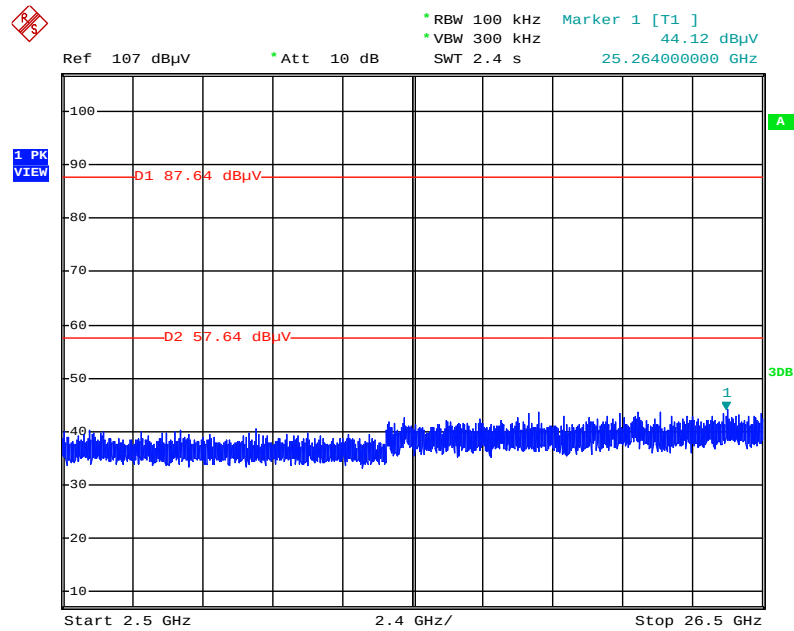
Date: 30.OCT.2013 01:29:50

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



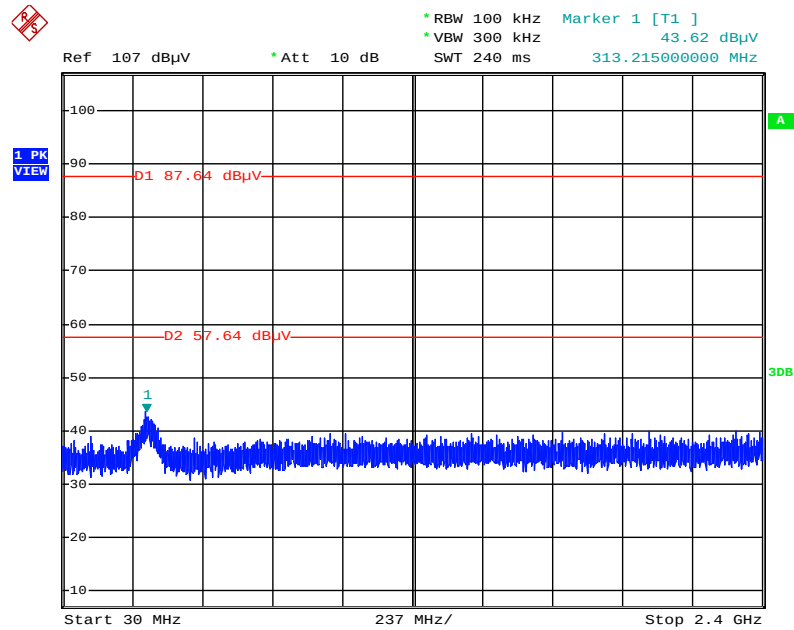
Date: 30.OCT.2013 01:31:36

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



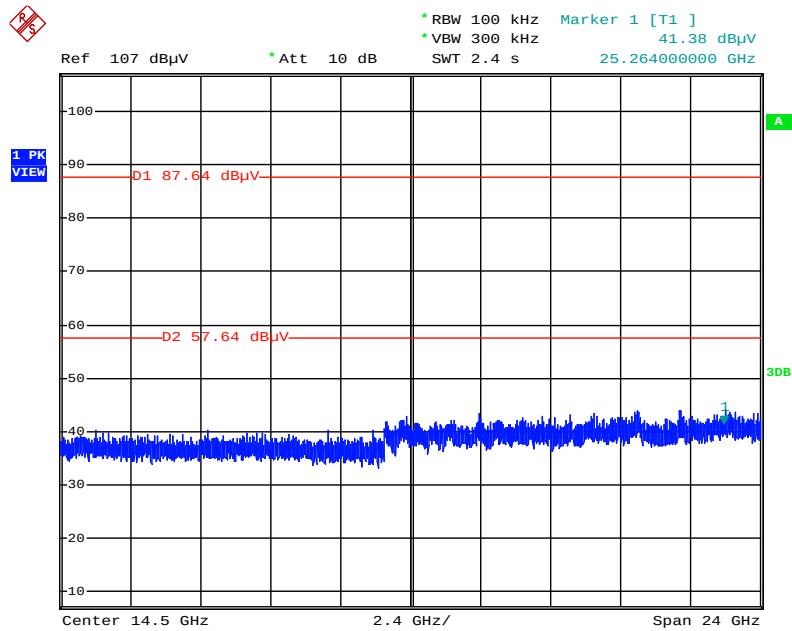
Date: 30.OCT.2013 01:32:14

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



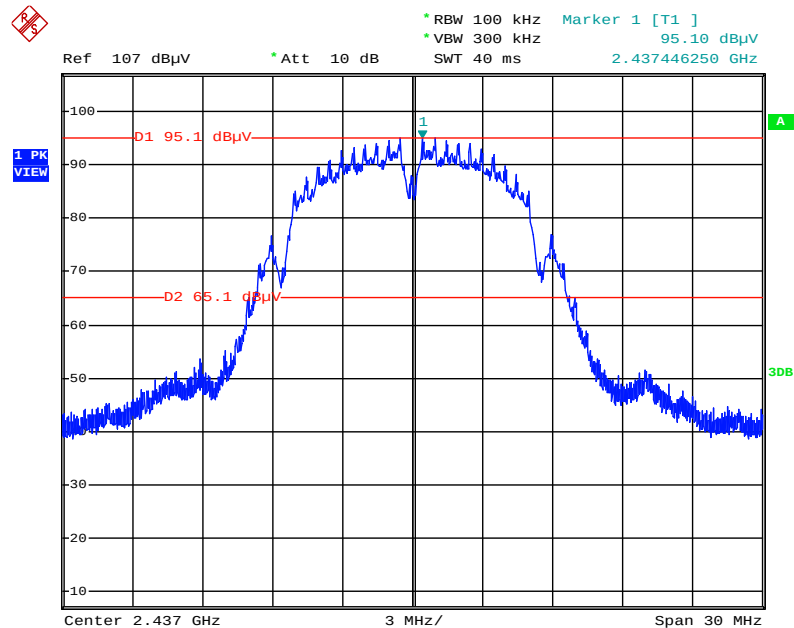
Date: 30.OCT.2013 01:33:45

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



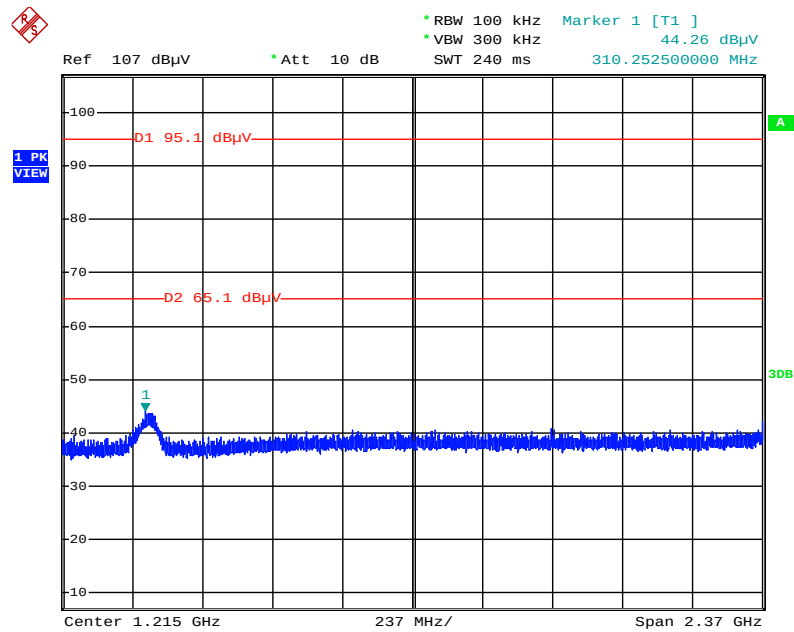
Date: 30.OCT.2013 01:33:07

Plot on Configuration IEEE 802.11b / Reference Level



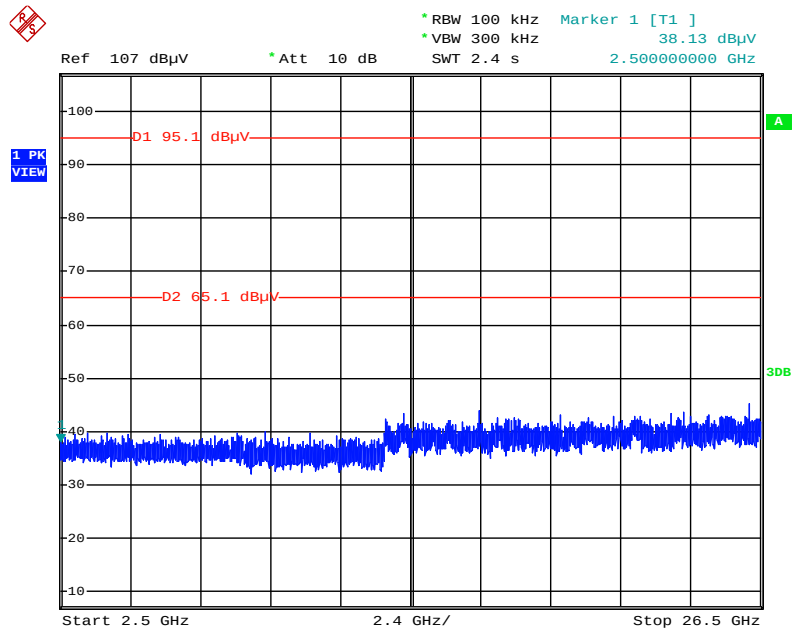
Date: 30.OCT.2013 01:07:05

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



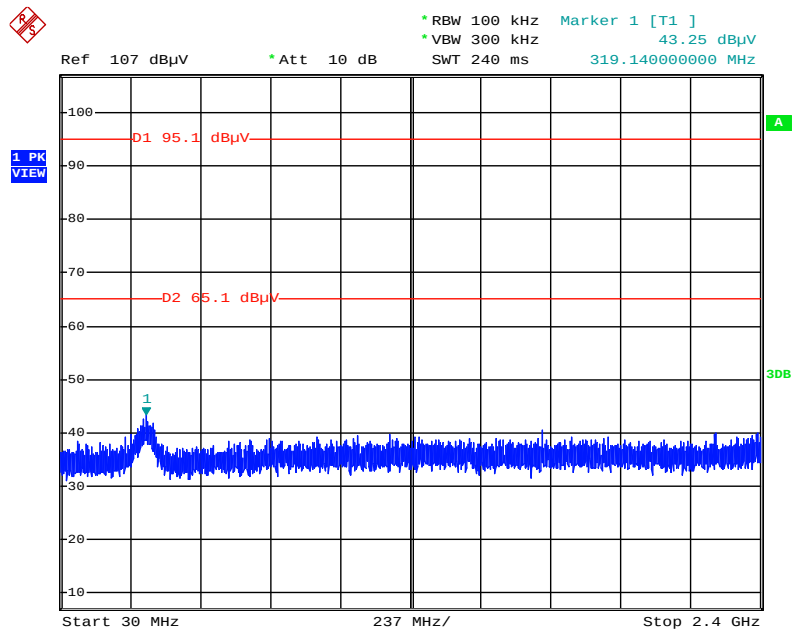
Date: 30.OCT.2013 01:10:53

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



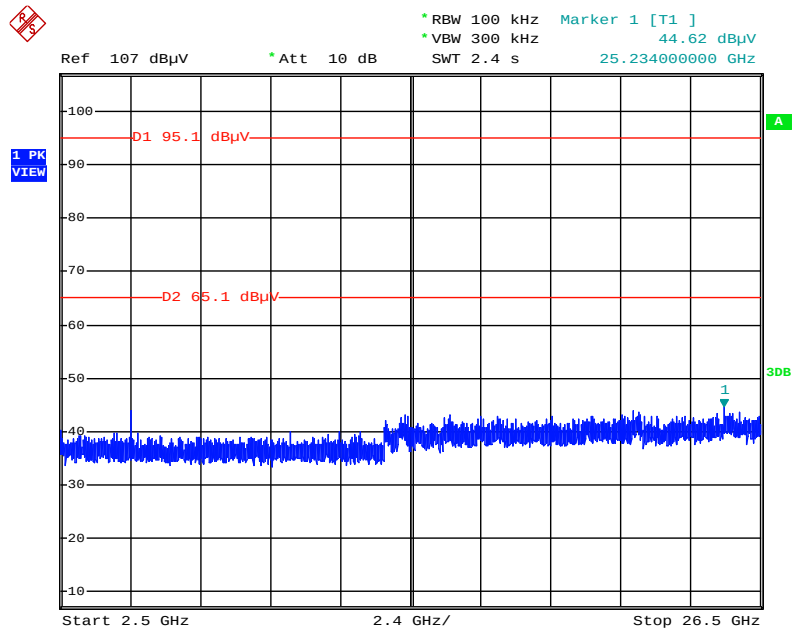
Date: 30.OCT.2013 01:11:38

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



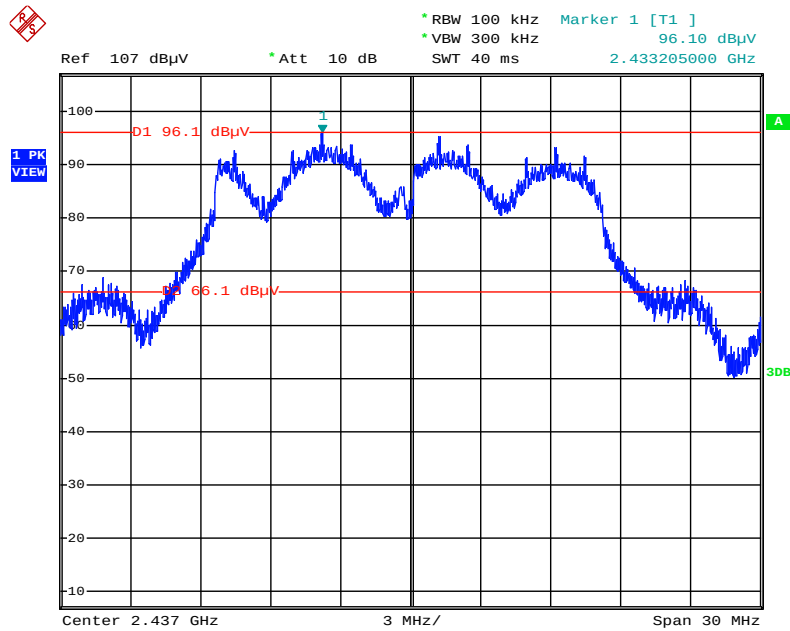
Date: 30.OCT.2013 01:12:37

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



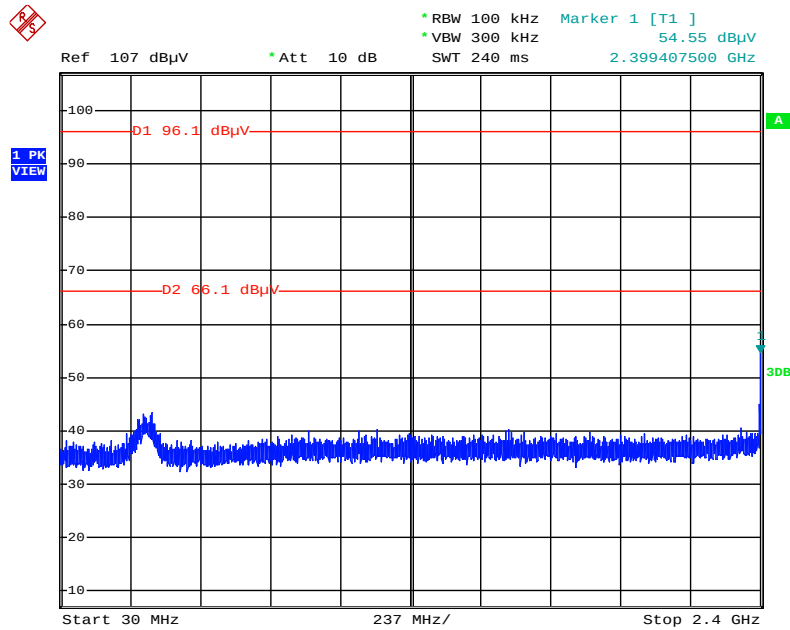
Date: 30.OCT.2013 01:12:15

Plot on Configuration IEEE 802.11g / Reference Level



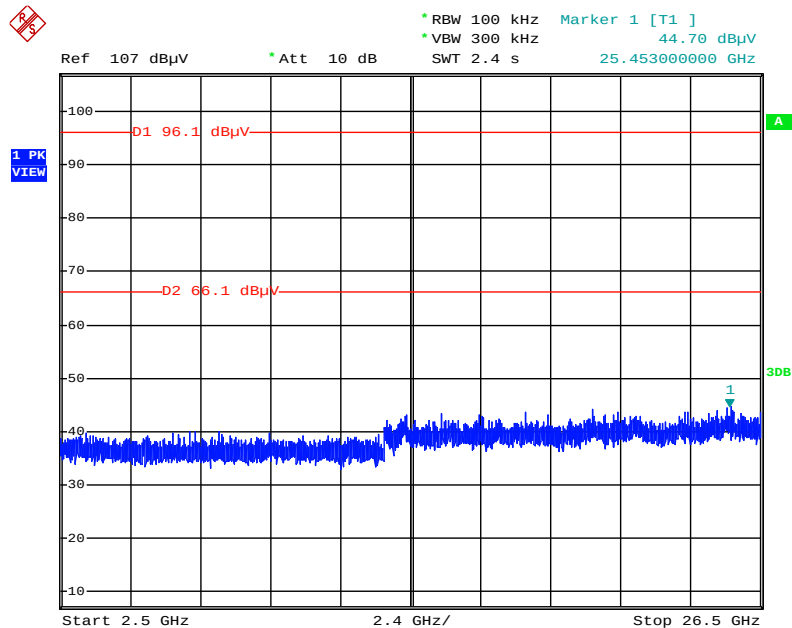
Date: 30.OCT.2013 01:15:56

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



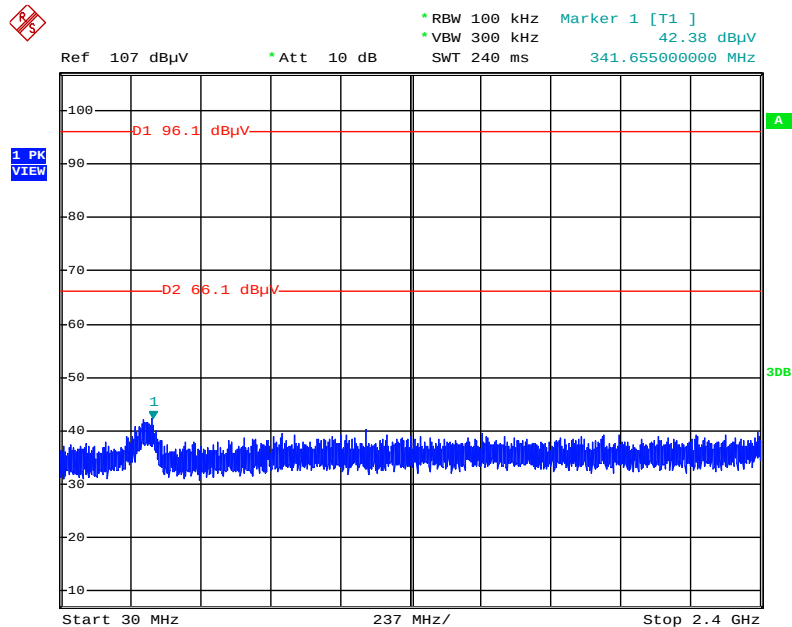
Date: 30.OCT.2013 01:17:22

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



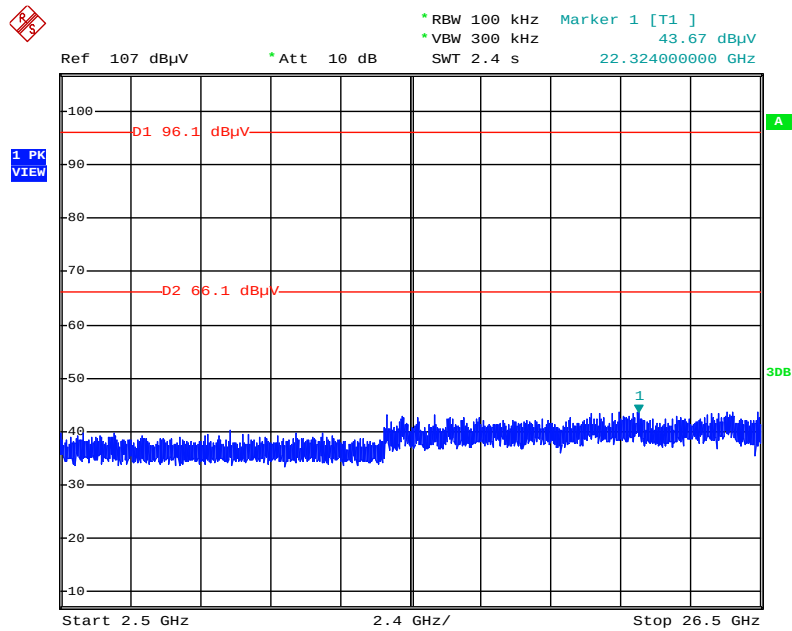
Date: 30.OCT.2013 01:17:48

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



Date: 30.OCT.2013 01:19:16

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

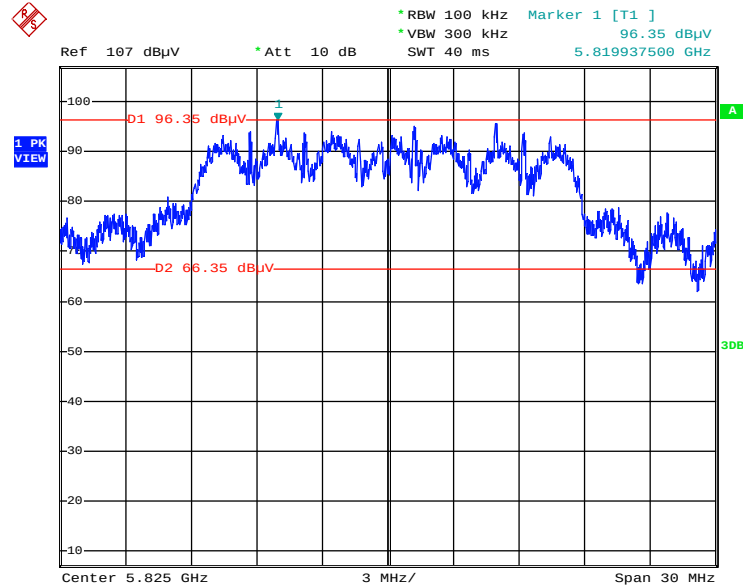


Date: 30.OCT.2013 01:18:51

For non-beamforming mode:

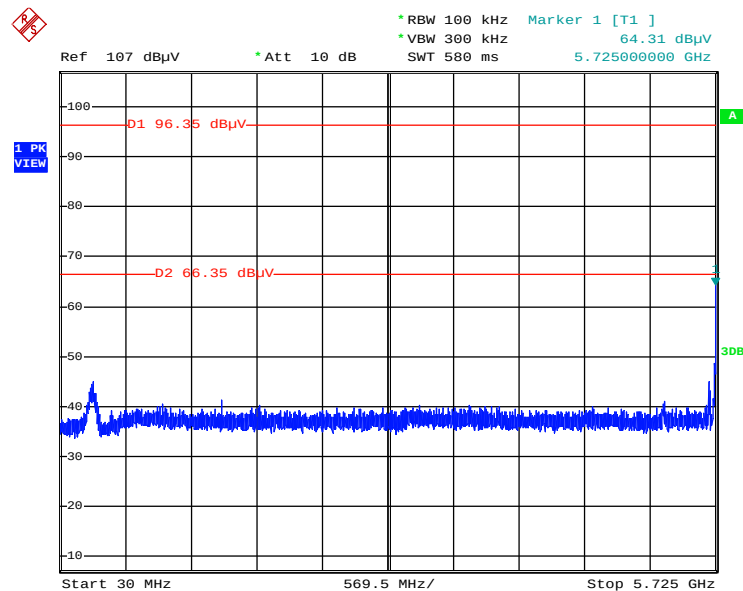
For 5GHz Band:

Plot on Configuration IEEE 802.11n 20MHz / Reference Level



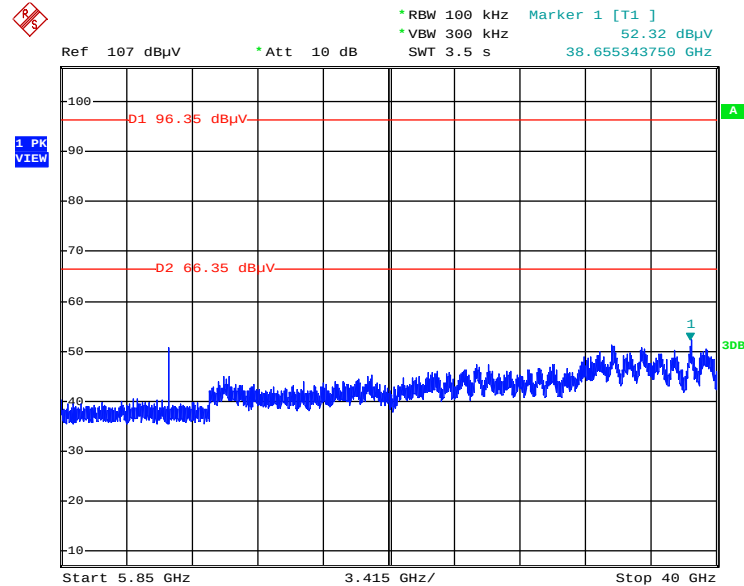
Date: 9.NOV.2013 18:24:10

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



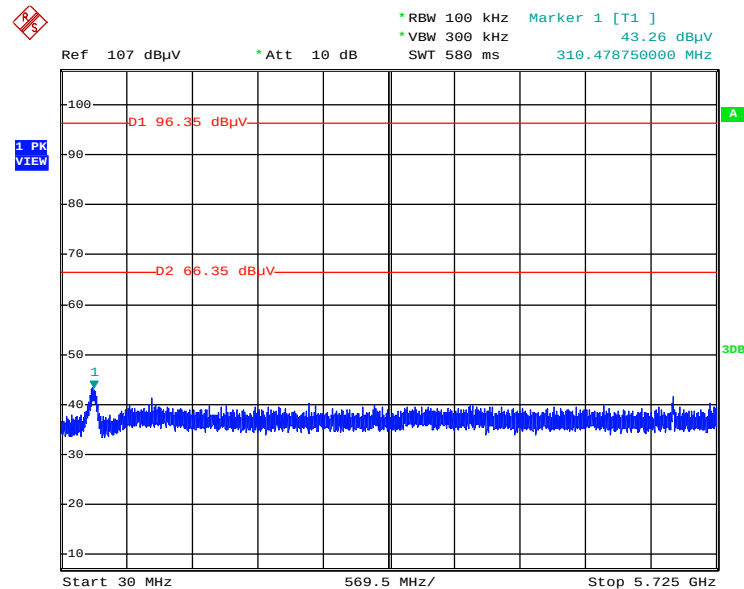
Date: 9.NOV.2013 18:29:17

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



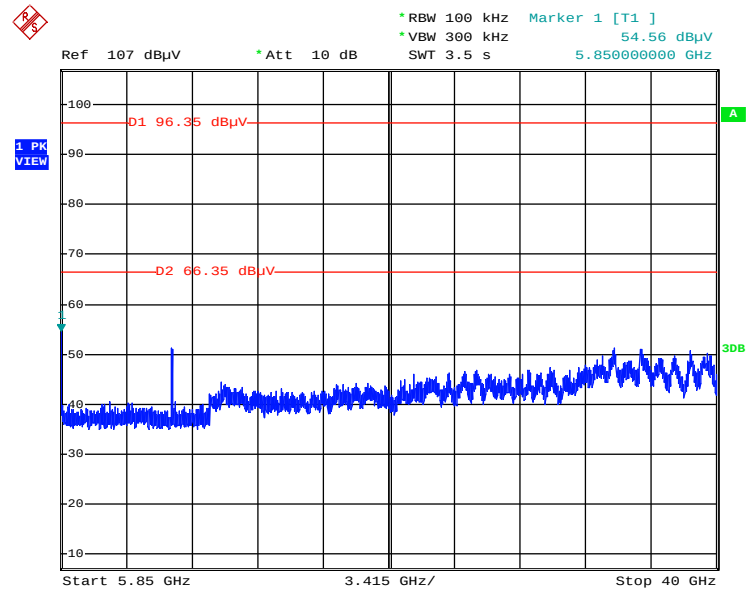
Date: 9.NOV.2013 18:30:06

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



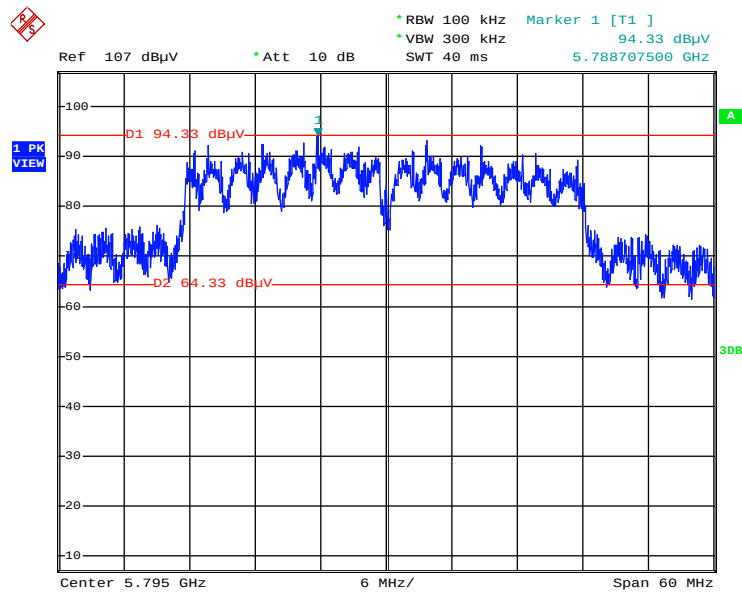
Date: 9.NOV.2013 18:24:46

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



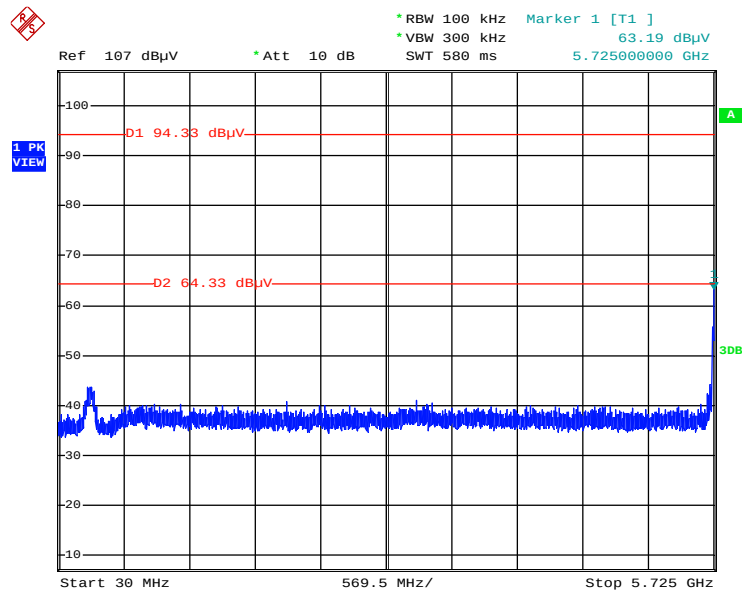
Date: 9.NOV.2013 18:25:23

Plot on Configuration IEEE 802.11n 40MHz / Reference Level



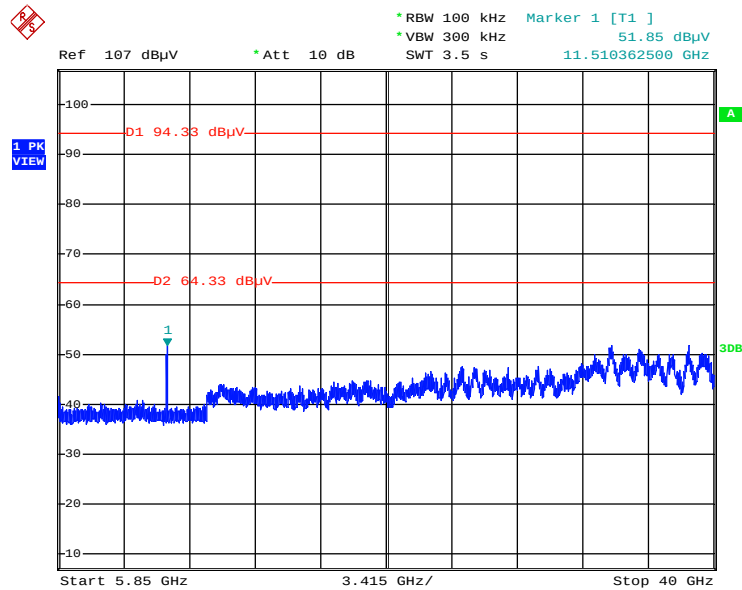
Date: 9.NOV.2013 18:12:44

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



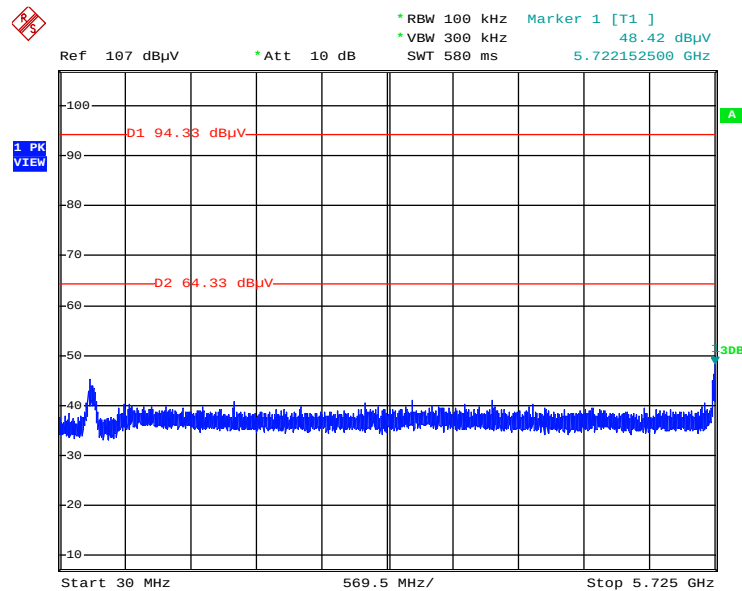
Date: 9.NOV.2013 18:16:24

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



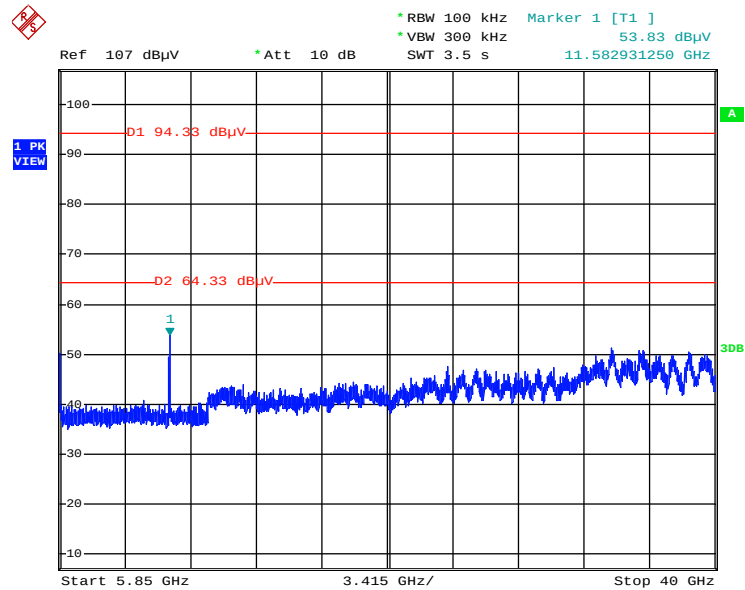
Date: 9.NOV.2013 18:17:39

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



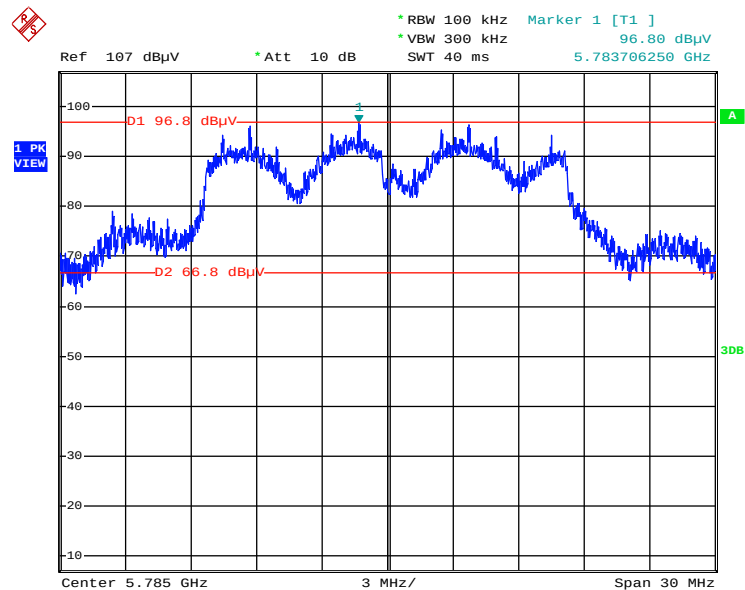
Date: 9.NOV.2013 18:13:26

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



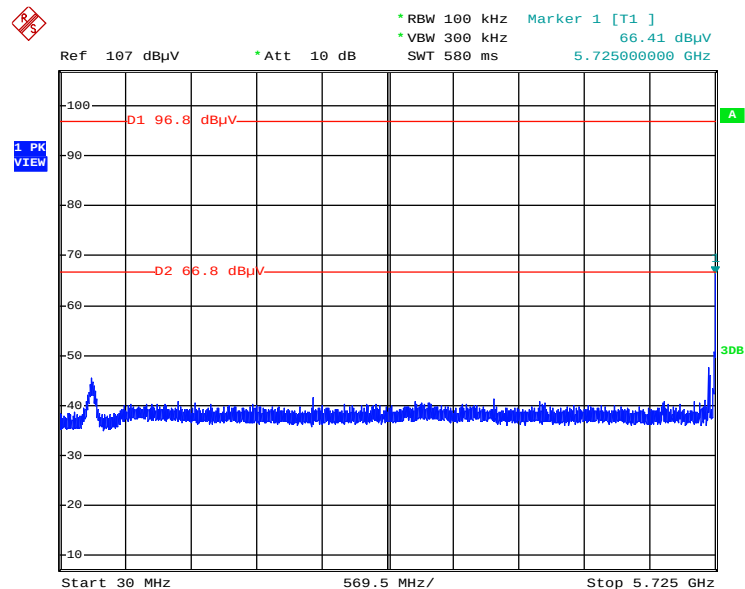
Date: 9.NOV.2013 18:14:05

Plot on Configuration IEEE 802.11a / Reference Level



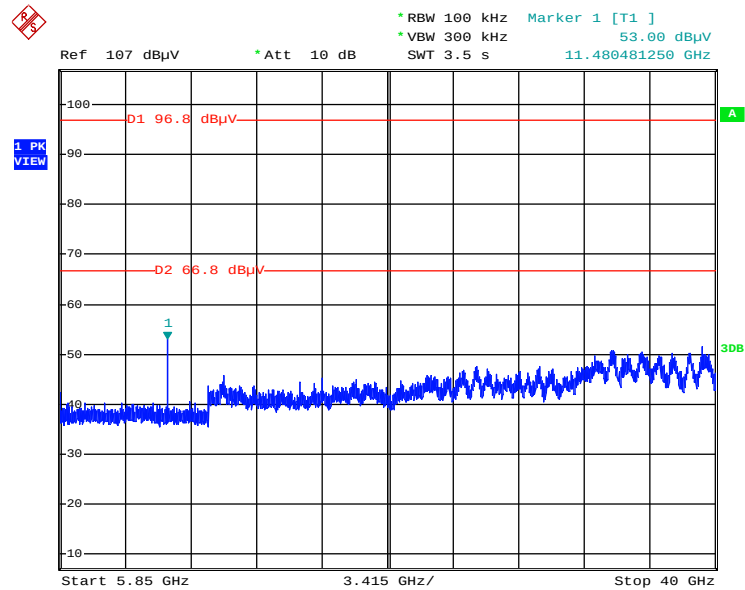
Date: 9.NOV.2013 18:41:34

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



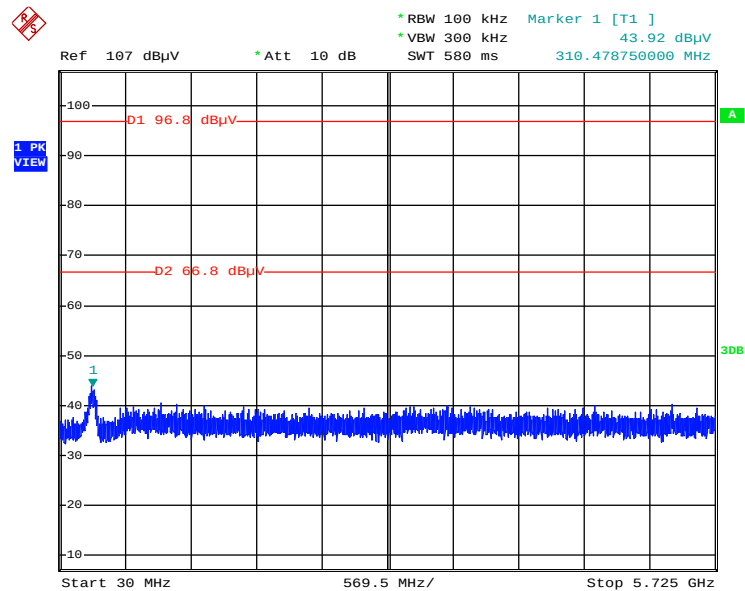
Date: 9.NOV.2013 18:44:04

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



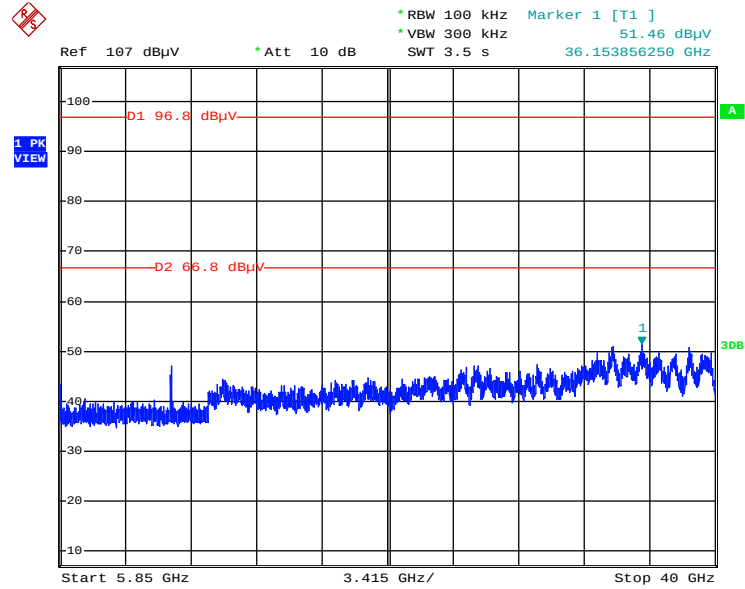
Date: 9.NOV.2013 18:45:05

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



Date: 9.NOV.2013 18:52:57

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

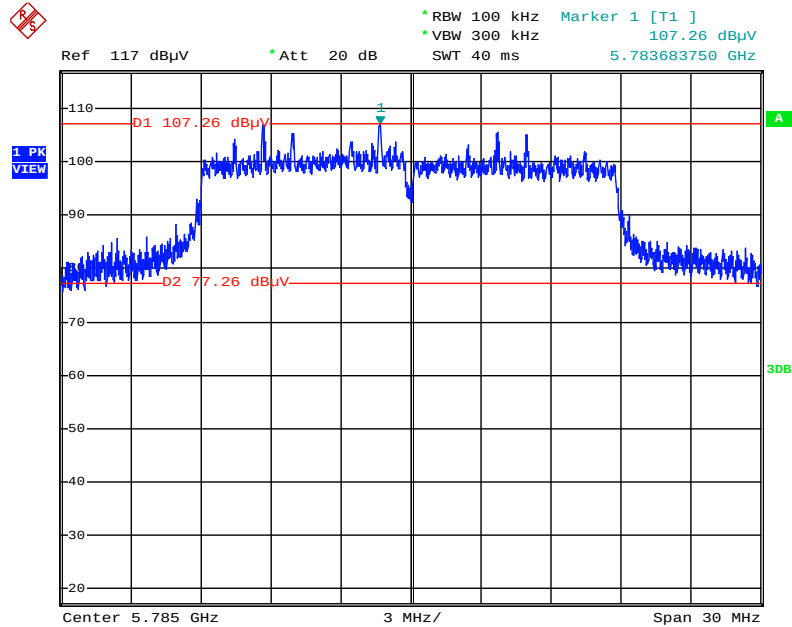


Date: 9.NOV.2013 18:53:31

For beamforming mode:

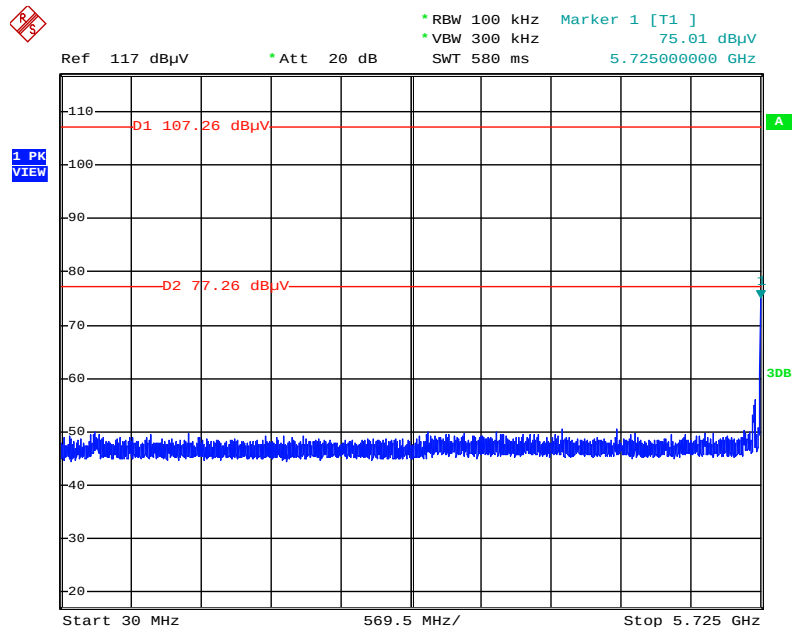
For 5GHz Band:

Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / Reference Level



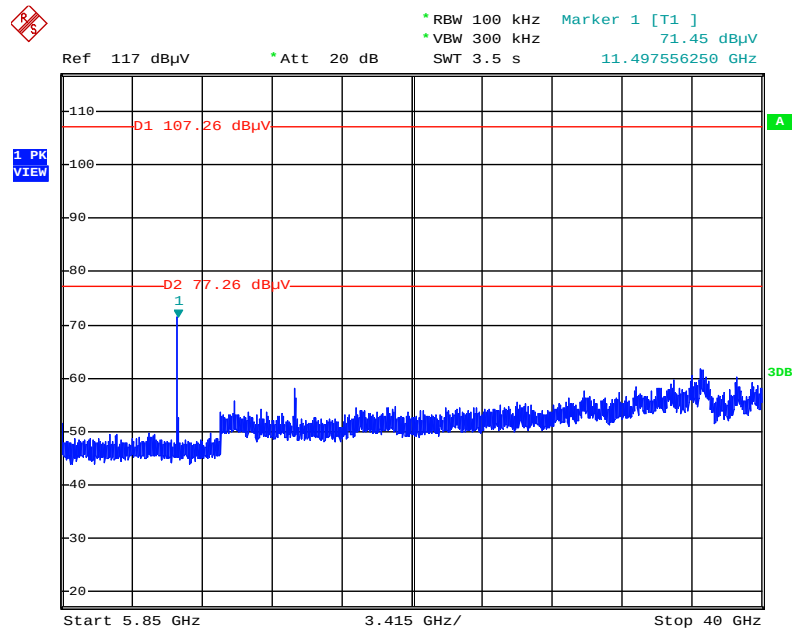
Date: 12.NOV.2013 19:32:39

Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / CH 149 / 30MHz~5725MHz (down 30dBc)



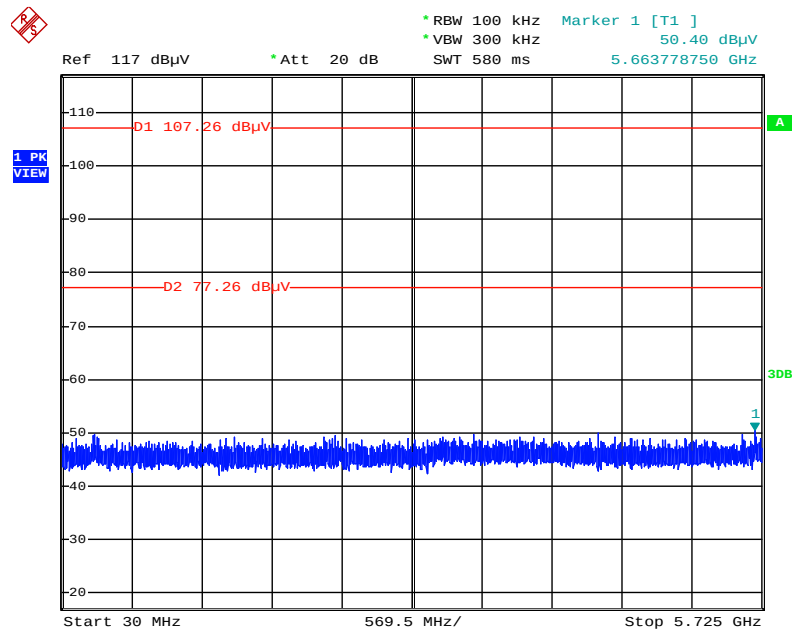
Date: 12.NOV.2013 19:35:59

Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / CH 149 / 5850MHz~40000MHz (down 30dBc)



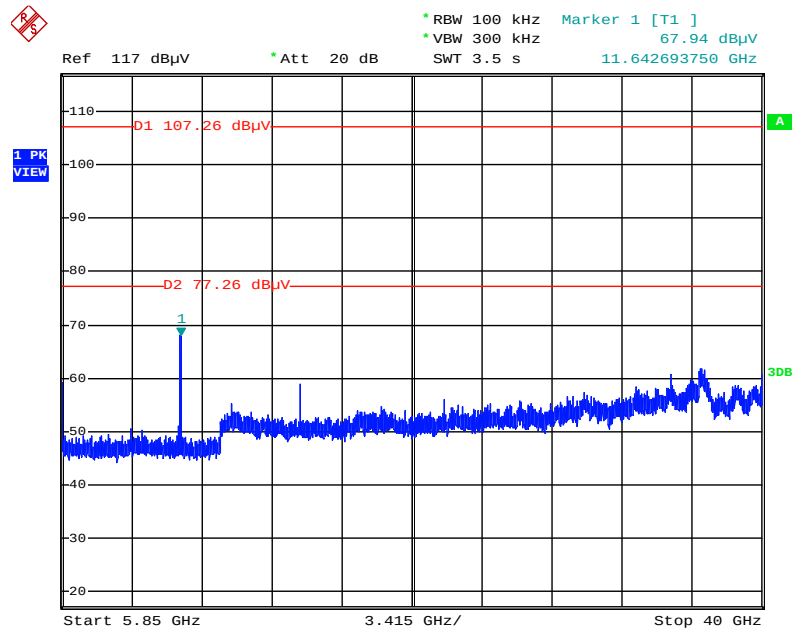
Date: 12.NOV.2013 19:36:45

Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / CH 165 / 30MHz~5725MHz (down 30dBc)



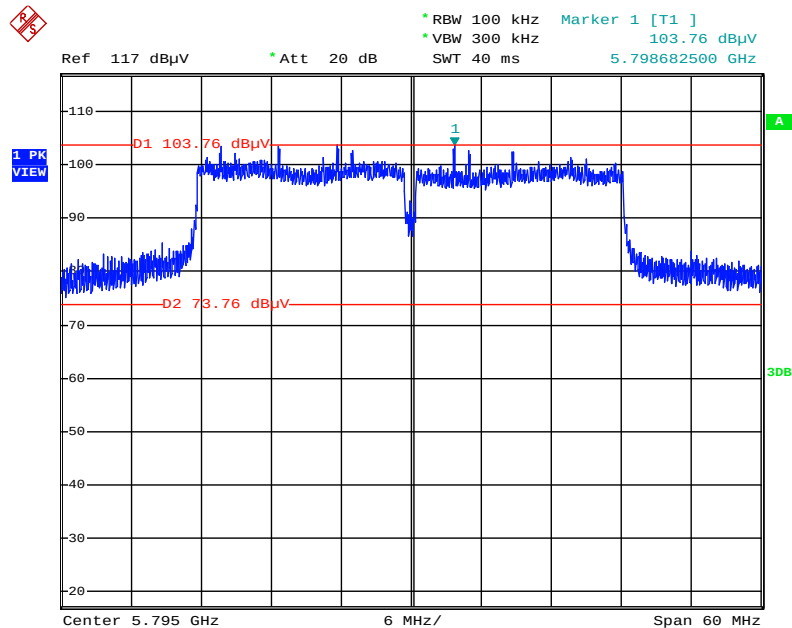
Date: 12.NOV.2013 19:38:02

Plot on Configuration IEEE 802.11ac MCS2/Nss1 20MHz / CH 165 / 5850MHz~40000MHz (down 30dBc)



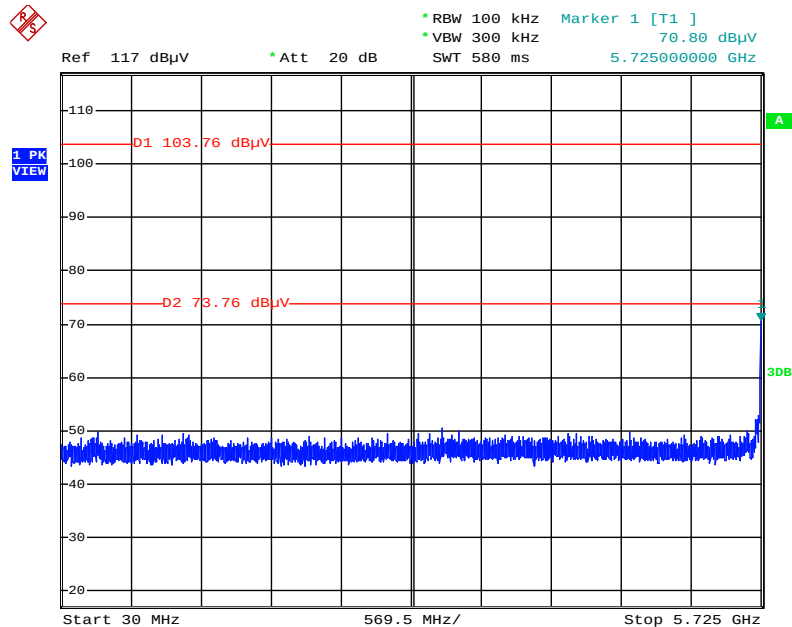
Date: 12.NOV.2013 19:38:34

Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / Reference Level



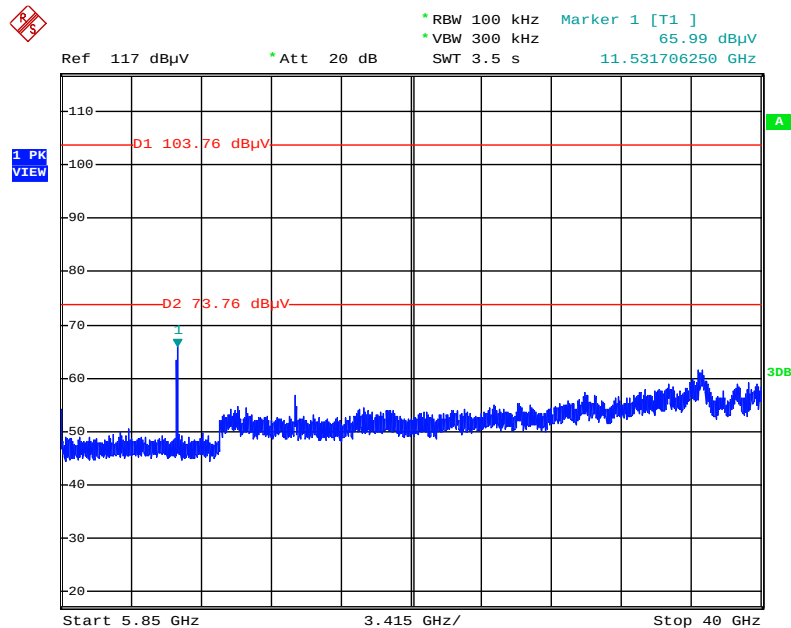
Date: 12.NOV.2013 19:25:13

Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / CH 151 / 30MHz~5725MHz (down 30dBc)



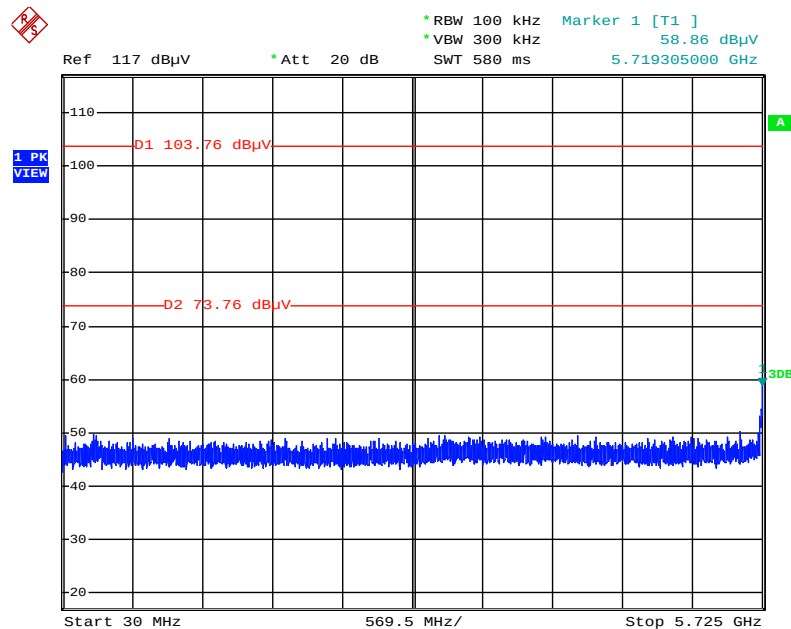
Date: 12.NOV.2013 19:28:04

Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / CH 151 / 5850MHz~40000MHz (down 30dBc)



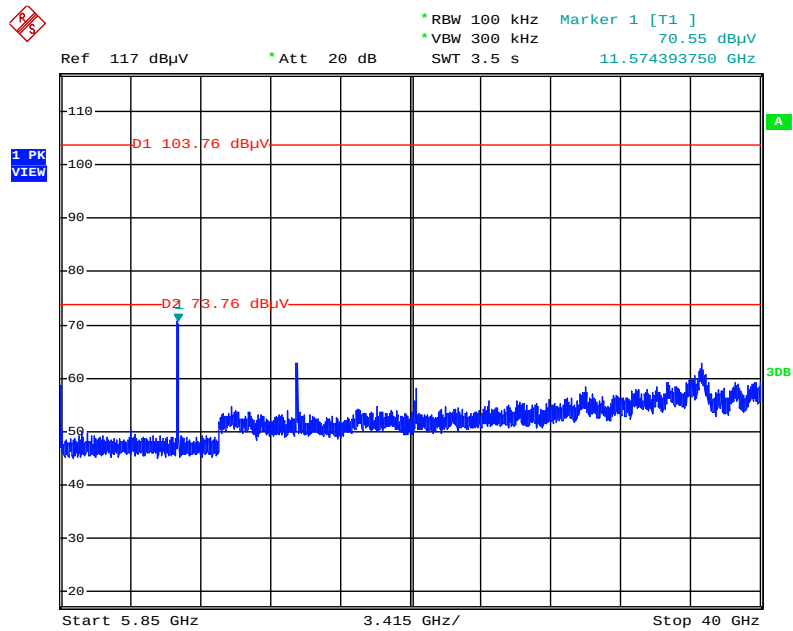
Date: 12.NOV.2013 19:28:51

Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / CH 159 / 30MHz~5725MHz (down 30dBc)



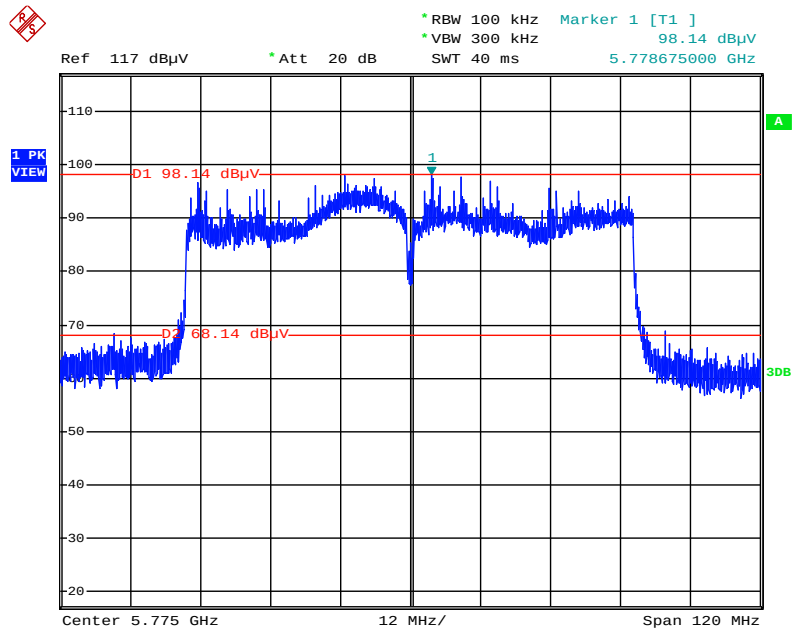
Date: 12.NOV.2013 19:25:45

Plot on Configuration IEEE 802.11ac MCS2/Nss1 40MHz / CH 159 / 5850MHz~40000MHz (down 30dBc)



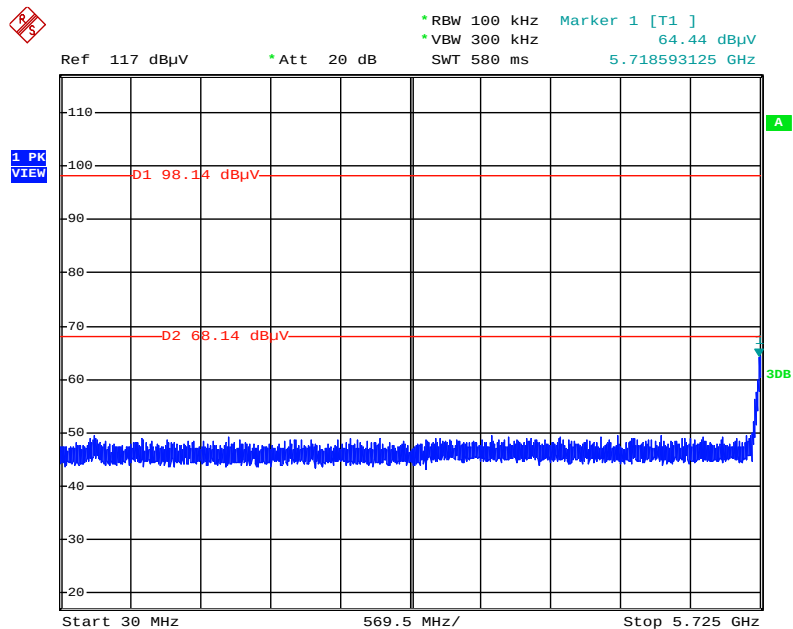
Date: 12.NOV.2013 19:26:33

Plot on Configuration IEEE 802.11ac MCS2/Nss1 80MHz / Reference Level



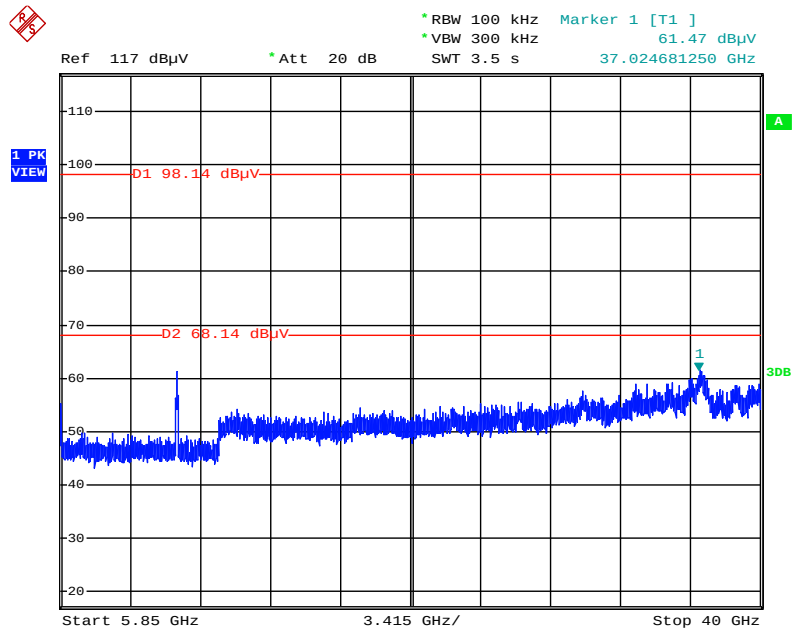
Date: 12.NOV.2013 19:07:07

Plot on Configuration IEEE 802.11ac MCS2/Nss1 80MHz / CH 155 / 30MHz~5725MHz (down 30dBc)



Date: 12.NOV.2013 19:08:26

Plot on Configuration IEEE 802.11ac MCS2/Nss1 80MHz / CH 155 / 5850MHz~40000MHz (down 30dBc)



Date: 12.NOV.2013 19:09:12

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. 26, 2012	Conduction (CO01-CB)
V- LISN	Schwarzbeck	NSLK 8127	8127478	9 kHz ~ 30 MHz	Jul. 17, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150 kHz ~ 30 MHz	Dec. 04, 2012	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	-	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 27, 2012	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2012	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100056	9kHz~40GHz	Nov. 16, 2012	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Nov. 26, 2012	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)
Spectrum analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Nov. 27, 2012	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz ~ 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 19, 2012	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 18, 2013	Conducted (TH01-CB)

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

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

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

6. TEST LOCATION

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

7. MEASUREMENT UNCERTAINTY

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

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

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

Contribution	Uncertainty of x_i			$u(x_i)$
	Value	Unit	Probability Distribution k	
Receiver reading	± 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 $U_c(y)$				1.778
Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$				3.555

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

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

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

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

Uncertainty of Conducted Emission Measurement

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