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	**Broadcom Corporation**
Applicant Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.
FCC ID	**QDS-BRCM1082**
Manufacturer's company	**Broadcom Corporation**
Manufacturer Address	190 Mathilda Place Sunnyvale CA 94086 U.S.A.

Product Name	802.11abgn/11ac WLAN + Bluetooth PCI-E Mini Card
Brand Name	Broadcom
Model No.	BCM94360HMB
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Mar. 12, 2014
Final Test Date	May 06, 2014
Submission Type	Original Equipment

Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g and IEEE 802.11a/ac 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**, **KDB 662911 D01 v02r01.**

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

Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR431243AA	Rev. 01	Initial issue of report	May 15, 2014

Certificate No.: CB10305021

1. CERTIFICATE OF COMPLIANCE

Product Name	:	802.11abgn/11ac WLAN + Bluetooth PCI-E Mini Card
Brand Name	:	Broadcom
Model No.	:	BCM94360HMB
Applicant	:	Broadcom Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 12, 2014 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	14.49 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.22 dB
4.3	15.247(e)	Power Spectral Density	Complies	3.28 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.15 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.20 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n/ac

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	For 2.4GHz Band: 13 for 20MHz bandwidth ; 9 for 40MHz bandwidth For 5GHz Band: 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	For non-beamforming mode: For 2.4GHz Band: MCS0 (HT20): 25.12 MHz ; MCS0 (HT40): 35.84 MHz For 5GHz Band: 802.11ac MCS0/Nss1 (VHT20): 28.00 MHz ; 802.11ac MCS0/Nss1 (VHT40): 55.68 MHz ; 802.11ac MCS0/Nss1 (VHT80): 76.84 MHz For beamforming mode: For 5GHz Band: 802.11ac MCS0/Nss1 (VHT20): 24.88 MHz ; 802.11ac MCS0/Nss1 (VHT40): 59.84 MHz ; 802.11ac MCS0/Nss1 (VHT80): 93.76 MHz
Maximum Conducted Output Power	For non-beamforming mode: For 2.4GHz Band: MCS0 (HT20): 27.05 dBm ; MCS0 (HT40): 20.00 dBm For 5GHz Band: 802.11ac MCS0/Nss1 (VHT20): 25.44 dBm ; 802.11ac MCS0/Nss1 (VHT40): 24.70 dBm ; 802.11ac MCS0/Nss1 (VHT80): 22.16 dBm

	For beamforming mode: For 5GHz Band: 802.11ac MCS0/Nss1 (VHT20): 25.21 dBm ; 802.11ac MCS0/Nss1 (VHT40): 24.83 dBm ; 802.11ac MCS0/Nss1 (VHT80): 23.44 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

IEEE 802.11a/b/g

Items	Description
Product Type	802.11a/b/g: WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From host system
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: 13 ; 11a: 5
Channel Band Width (99%)	11b: 12.00 MHz ; 11g: 21.92 MHz ; 11a: 26.72 MHz
Maximum Conducted Output Power	11b: 22.99 dBm ; 11g: 26.29 dBm ; 11a: 25.93 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☒ With beamforming	☐ Without beamforming

Note: 1. The product has beamforming function for 802.11n/ac VHT20 VHT40 VHT8 in 5GHz.

2. The MIMO transmission mode is correlated.

Antenna and Band width

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

Note: The product has beamforming function for 802.11n/ac VHT20 VHT40 VHT80 in 5GHz.

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	3	MCS0-23
802.11n (HT40)	3	MCS0-23
802.11ac (VHT20)	3	MCS 0-9/Nss1-3
802.11ac (VHT40)	3	MCS 0-9/Nss1-3
802.11ac (VHT80)	3	MCS 0-9/Nss1-3
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT support VHT20, VHT40 and VHT80. Note 3: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac		

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Set	Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)				
						2.4G	5G B1	5G B2	5G B3	5G B4
1	1	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	IPEX A13	3.9	3.9	5.6	5.8	5.8
	2	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	IPEX A13	3.9	3.9	5.6	5.8	5.8
	3	Hitachi	HMT05/HFT17-DL07	WLAN/BT antenna	IPEX A13	3.9	3.9	5.6	5.8	5.8

Note: There are three antennas for this set.

<For 2.4GHz Band>

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

Chain 1, Chain 2 and Chain 3 can be used as transmitting/receiving antenna.

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

<For 5GHz Band>

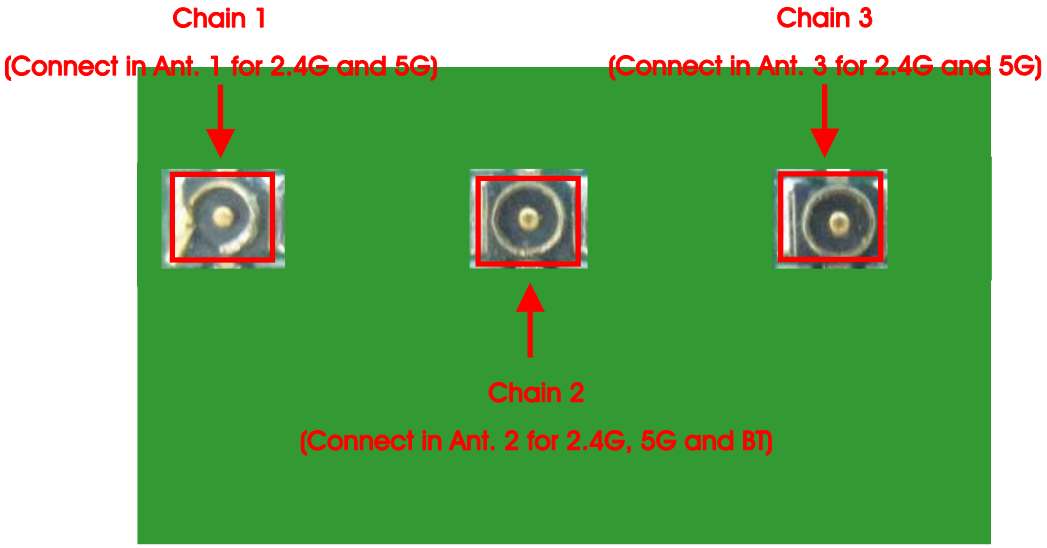
For IEEE 802.11a/n/ac mode (3TX/3RX)

Chain 1, Chain 2 and Chain 3 can be used as transmitting/receiving antenna.

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

For Bluetooth mode (1TX/1RX)

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



3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

For 20MHz bandwidth systems, use Channel 1~Channel 13.

For 40MHz bandwidth systems, use Channel 3~Channel 11.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	8	2447 MHz
	2	2417 MHz	9	2452 MHz
	3	2422 MHz	10	2457 MHz
	4	2427 MHz	11	2462 MHz
	5	2432 MHz	12	2467 MHz
	6	2437 MHz	13	2472 MHz
	7	2442 MHz	-	-

For 5GHz Band:

There are three bandwidth systems.

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

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

For 80MHz bandwidth systems, use Channel 155.

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

3.5. Table for Test Modes

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

For 2.4GHz Band:

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11n HT20	MCS0	1/6/11/12/13	1+2+3
	11n HT40	MCS0	3/6/9/10/11	1+2+3
	11b/CCK	1 Mbps	1/6/11/12/13	1+2+3
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2+3
Power Spectral Density	11n HT20	MCS0	1/6/11/12/13	1+2+3
	11n HT40	MCS0	3/6/9/10/11	1+2+3
	11b/CCK	1 Mbps	1/6/11/12/13	1+2+3
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2+3
6dB Spectrum Bandwidth	11n HT20	MCS0	1/6/11/12/13	1+2+3
	11n HT40	MCS0	3/6/9/10/11	1+2+3
	11b/CCK	1 Mbps	1/6/11/12/13	1+2+3
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2+3
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11n HT20	MCS0	1/6/11/12/13	1+2+3
	11n HT40	MCS0	3/6/9/10/11	1+2+3
	11b/CCK	1 Mbps	1/6/11/12/13	1+2+3
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2+3
Band Edge Emissions	11n HT20	MCS0	1/6/11/12/13	1+2+3
	11n HT40	MCS0	3/6/9/10/11	1+2+3
	11b/CCK	1 Mbps	1/6/11/12/13	1+2+3
	11g/BPSK	6 Mbps	1/6/11/12/13	1+2+3

For 5GHz Band:

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
Power Spectral Density	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
6dB Spectrum Bandwidth	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3
Band Edge Emissions	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3
	11ac VHT40	MCS0/Nss1	151/159	1+2+3
	11ac VHT80	MCS0/Nss1	155	1+2+3
	11a/BPSK	6 Mbps	149/157/165	1+2+3

Note: VHT20/VHT40 covers HT20/HT40, due to same modulation.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. 2.4GHz WLAN Function + Bluetooth Function

Mode 2. 5GHz WLAN Function + Bluetooth Function

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

For Radiated Emission Below 1GHz test:

Mode 1. 2.4GHz WLAN function + Bluetooth function

Mode 2. 5GHz WLAN function + Bluetooth function

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

For Radiated Emission Above 1GHz test:

Mode 1. CTX-EUT

For Co-location test:

Mode 1. 2.4GHz WLAN function + Bluetooth function

Mode 2. 5GHz WLAN function + Bluetooth function

For Co-location MPE and Radiated Emission Co-location Test:

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

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
AP Router	Planex	GW-AP54SGX	KA220030603014-1
NB	DELL	E6430	DoC
802.11abgn/11ac WLAN + Bluetooth PCI-E Mini Card (Device)	Broadcom	BCM94360HMB	QDS-BRCM1082
NB	DELL	E6510	N/A
Mouse	Logitech	M-U0026	DoC
Earphone	SHYARO CHI	MIC-04	N/A
Test Fixture*2	Broadcom	BCM9MC2EC	N/A

For Test Site No: 03CH01-CB

Radiated Emission 30MHz~1GHz test

Support Unit	Brand	Model	FCC ID
Wireless AP	Netgear	R7000	PY313200233
NB	DELL	E4300	RSE-TG233
802.11abgn/11ac WLAN + Bluetooth PCI-E Mini Card (Device)	Broadcom	BCM94360HMB	QDS-BRCM1082
NB	DELL	M1340	E2K4965AGNM
Mouse	Logitech	M-B0001	HC238HR00XY
Earphone	E-BOOKI	E-EPC040	N/A
Test Fixture*2	Broadcom	BCM9MC2EC	N/A

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

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	RSE-TG233
Test Fixture	Broadcom	BCM9MC2EC	N/A

Radiated Emission above 1GHz test (For Beamforming Mode)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	RSE-TG233
Test Fixture	Broadcom	BCM9MC2EC	N/A
Wireless AP	Netgear	R7000	PY313200233

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC

3.8. Table for Parameters of Test Software Setting

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

For non-beamforming mode:

For 2.4GHz Band

Power Parameters of IEEE 802.11n MCS0 HT20

Test Software Version	Manual Tool Version : 2.0.1.6				
Frequency	2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
MCS0 HT20	57	100	52	51	48

Power Parameters of IEEE 802.11n MCS0 HT40

Test Software Version	Manual Tool Version : 2.0.1.6				
Frequency	2422 MHz	2437 MHz	2452 MHz	2457 MHz	2462 MHz
MCS0 HT40	51	65	46	45	44

Power Parameters of IEEE 802.11b/g

Test Software Version	Manual Tool Version : 2.0.1.6				
Frequency	2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz
IEEE 802.11b	73	72	75	67	65
IEEE 802.11g	60	100	60	58	48

For non-beamforming mode:

For 5GHz Band

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT20

Test Software Version	Manual Tool Version : 2.0.1.6		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 VHT20	91	100	91

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT40

Test Software Version	Manual Tool Version : 2.0.1.6	
Frequency	5755 MHz	5795 MHz
MCS0/Nss1 VHT40	76	100

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT80

Test Software Version	Manual Tool Version : 2.0.1.6
Frequency	5775 MHz
MCS0/Nss1 VHT80	74

Power Parameters of IEEE 802.11a

Test Software Version	Manual Tool Version : 2.0.1.6		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	100	100	100

For beamforming mode:

For 5GHz Band

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT20

Test Software Version	Manual Tool Version : 2.0.1.6		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 VHT20	91	90	91

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT40

Test Software Version	Manual Tool Version : 2.0.1.6	
Frequency	5755 MHz	5795 MHz
MCS0/Nss1 VHT40	92	100

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT80

Test Software Version	Manual Tool Version : 2.0.1.6
Frequency	5775 MHz
MCS0/Nss1 VHT80	80

3.9. 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 7 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 Wireless AP and transmit duty cycle no less 98%

3.10. Test Signal Duty Cycle

For non-beamforming mode:

Band	Mode	TX-on (ms)	TX-on+TX-off (ms)	TX-on/(TX-on+TX-off)x100= Duty cycle (%)	Duty Factor (dB)
2.4G	802.11n MCS0 20MHz	1.920	1.940	98.97	0.045
	802.11n MCS0 40MHz	0.950	0.970	97.94	0.090
	802.11b	-	-	100	0
	802.11g	2.070	2.080	99.52	0.021
5G	802.11ac MCS0/Nss1 VHT20	1.930	1.950	98.97	0.045
	802.11ac MCS0/Nss1 VHT40	0.950	0.970	97.94	0.090
	802.11ac MCS0/Nss1 VHT80	0.462	0.482	95.85	0.184
	802.11a	2.070	2.080	99.52	0.021

For beamforming mode:

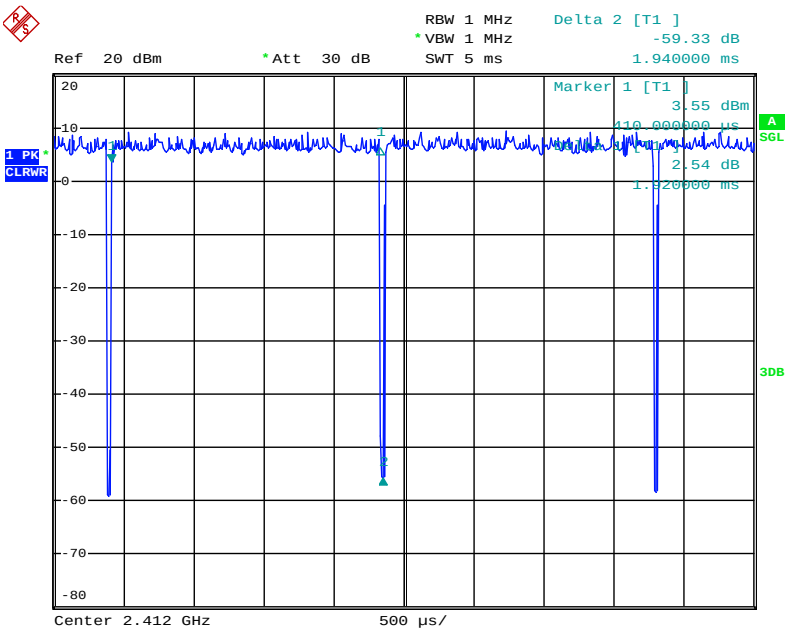
Band	Mode	TX-on (ms)	TX-on+TX-off (ms)	TX-on/(TX-on+TX-off)x100= Duty cycle (%)	Duty Factor (dB)
5G	802.11ac MCS0/Nss1 VHT20	1.841	1.928	95.49	0.200
	802.11ac MCS0/Nss1 VHT40	0.942	1.014	92.90	0.320
	802.11ac MCS0/Nss1 VHT80	0.449	0.486	92.54	0.337

3.11. Plots of Duty Cycle

For non-beamforming mode:

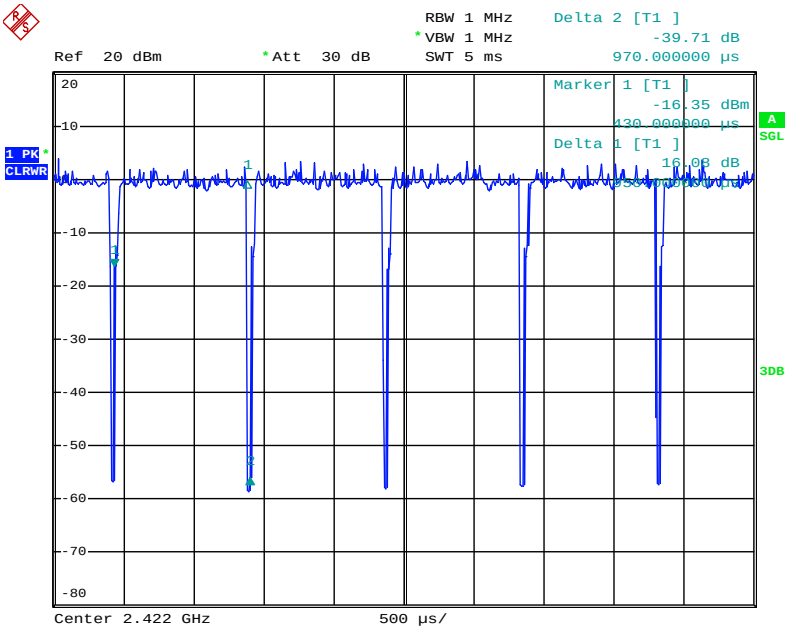
For 2.4GHz Band

IEEE 802.11n MCS0 HT20



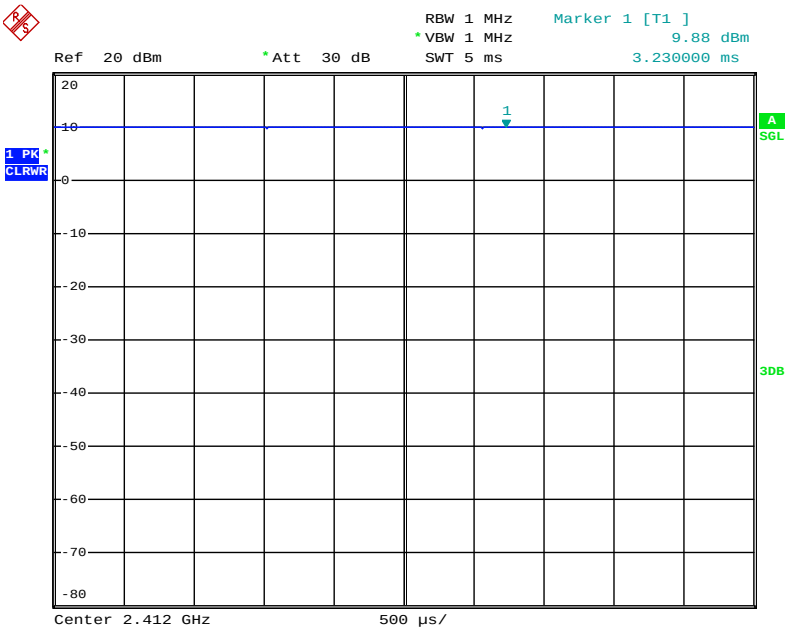
Date: 25.APR.2014 20:47:11

IEEE 802.11n MCS0 HT40



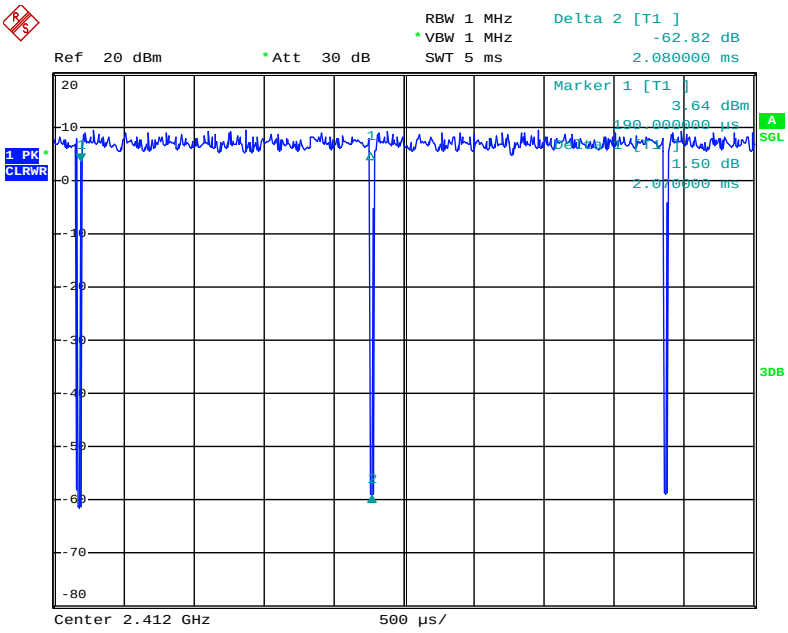
Date: 25.APR.2014 20:54:09

IEEE 802.11b



Date: 25.APR.2014 20:45:52

IEEE 802.11g

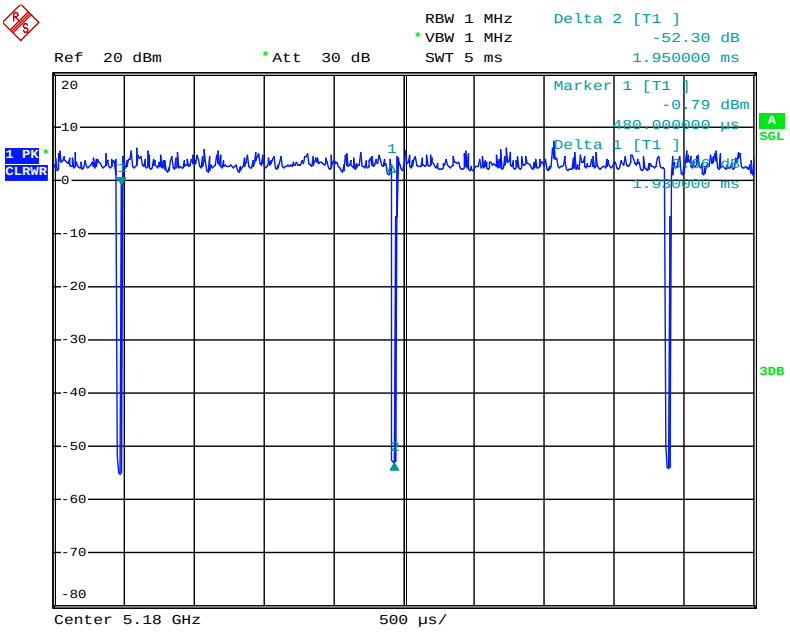


Date: 25.APR.2014 20:46:28

For non-beamforming mode:

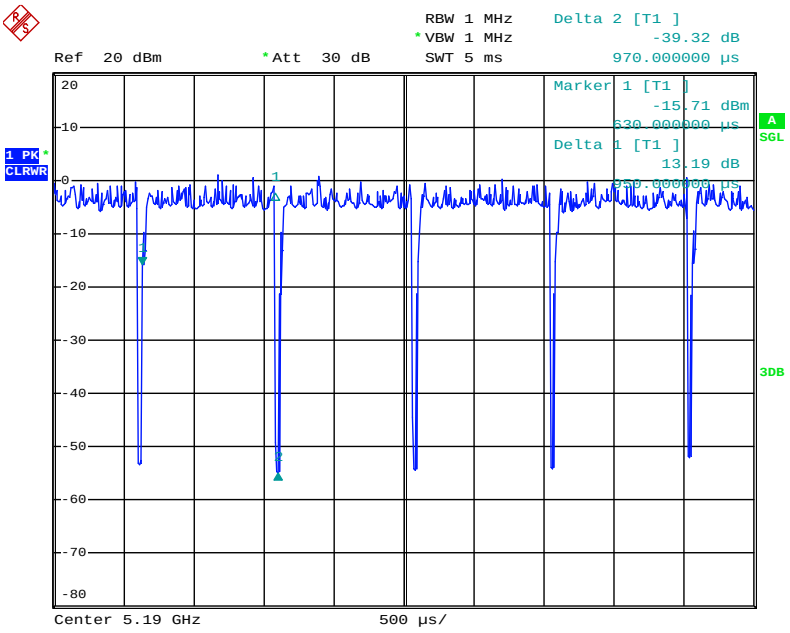
For 5GHz Band

IEEE 802.11ac MCS0/Nss1 VHT20



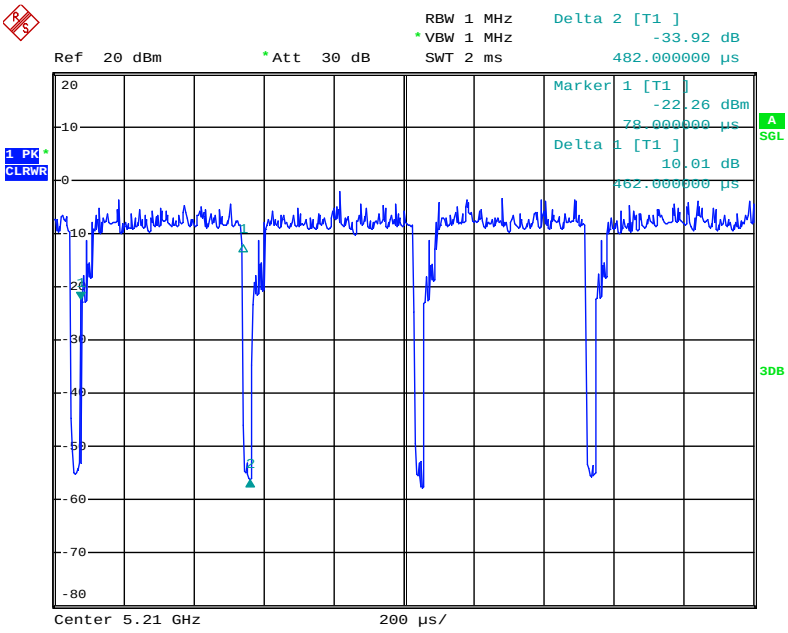
Date: 25.APR.2014 20:49:30

IEEE 802.11ac MCS0/Nss1 VHT40



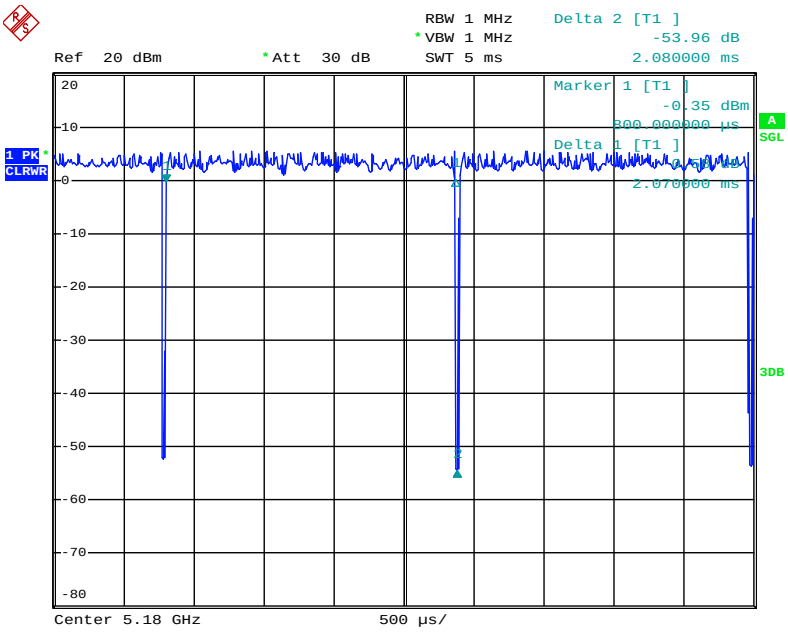
Date: 25.APR.2014 20:50:32

IEEE 802.11ac MCS0/Nss1 VHT80



Date: 25.APR.2014 20:51:18

IEEE 802.11a

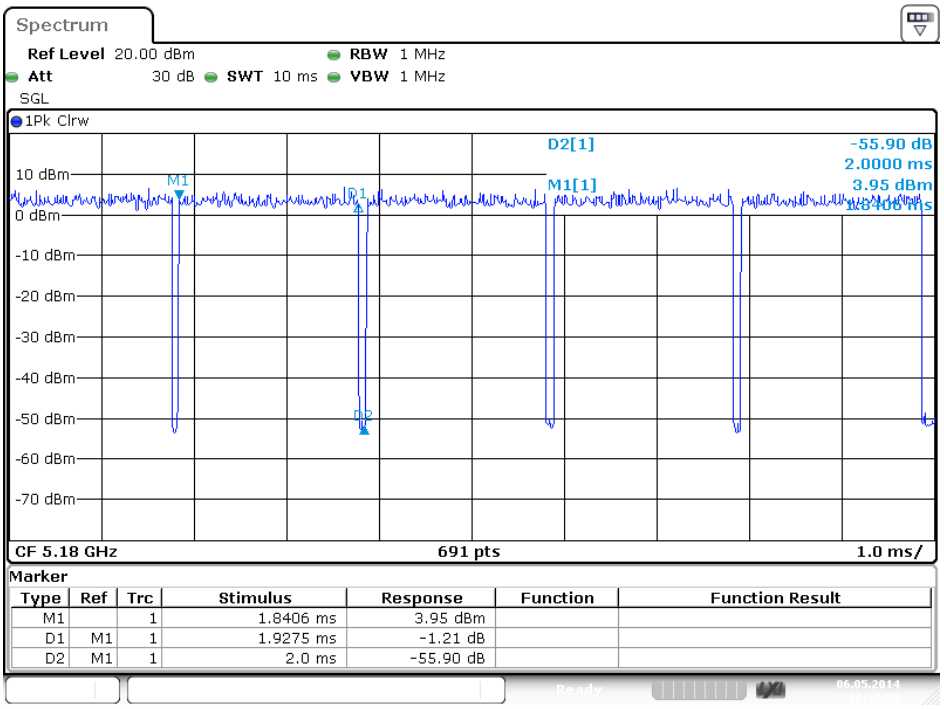


Date: 25.APR.2014 20:48:51

For beamforming mode:

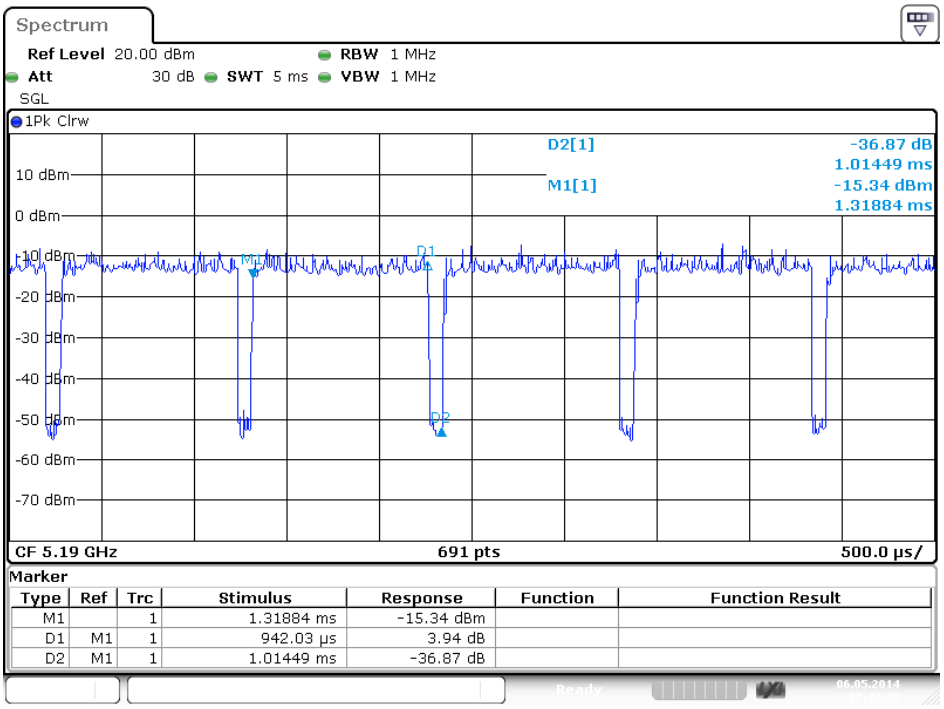
For 5GHz Band

IEEE 802.11ac MCS0/Nss1 VHT20



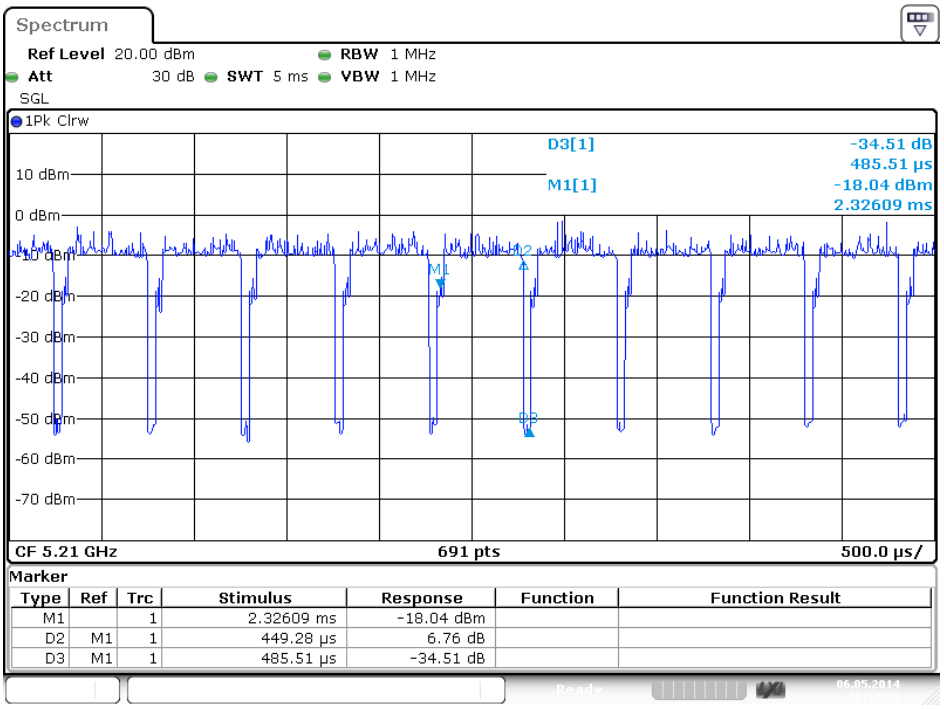
Date: 6.MAY.2014 17:37:50

IEEE 802.11ac MCS0/Nss1 VHT40



Date: 6.MAY.2014 17:42:29

IEEE 802.11ac MCS0/Nss1 VHT80

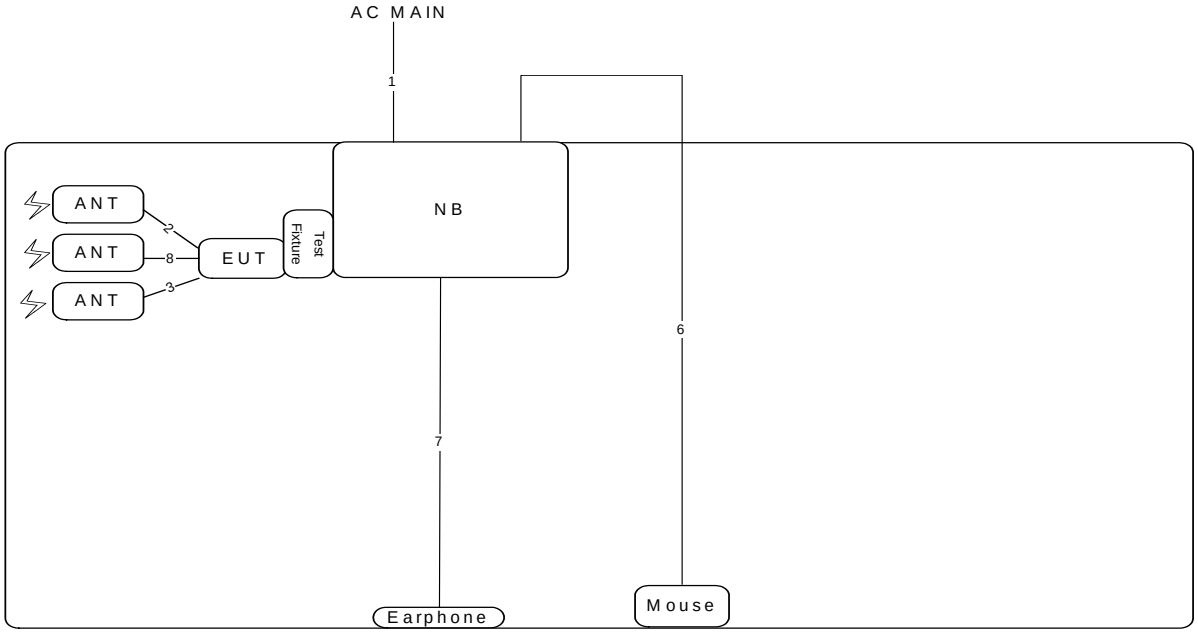


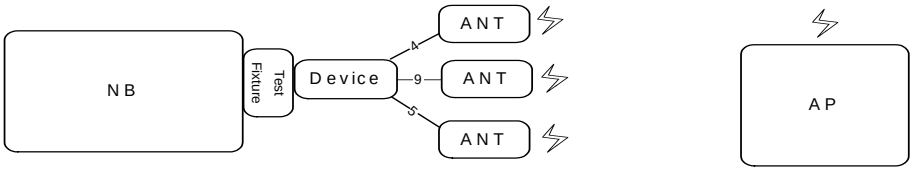
Date: 6.MAY.2014 20:32:36

3.12. Test Configurations

3.12.1. AC Power Line Conduction Emissions Test Configuration

Test Mode: Mode 2

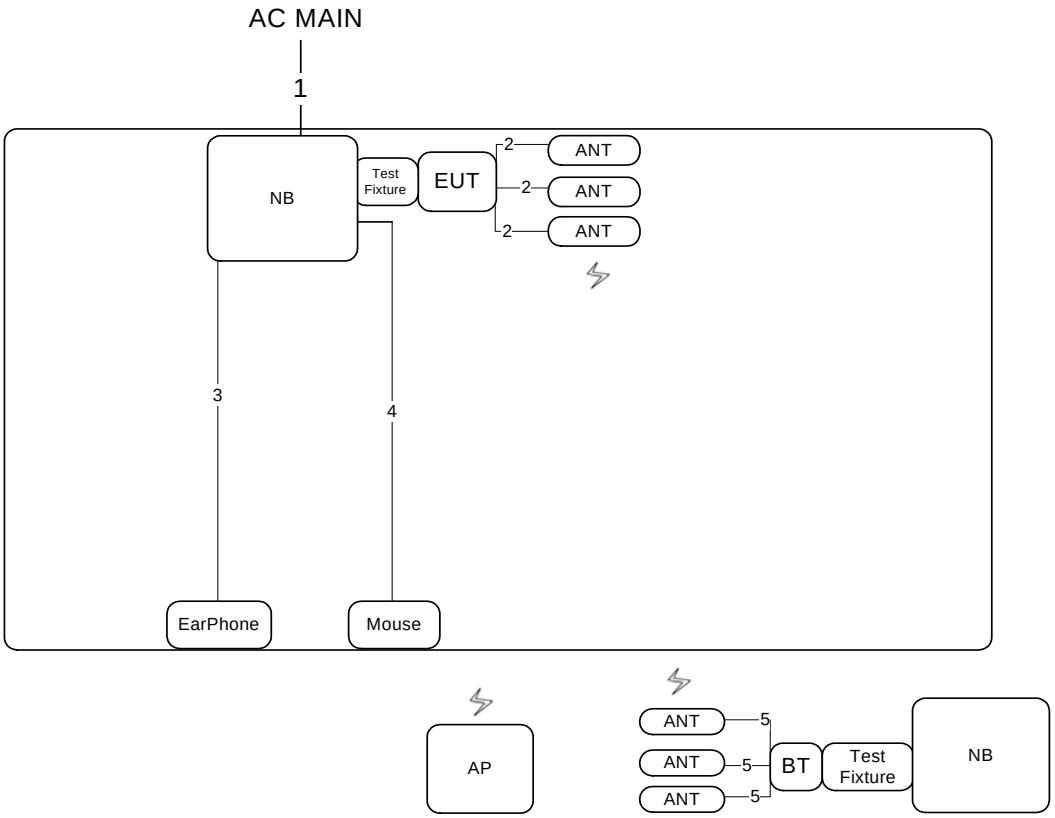




Item	Connection	Shield	Length
1	Power cable	No	2.6m
2	ANT cable	Yes	0.2m
3	ANT cable	Yes	0.2m
4	ANT cable	Yes	0.2m
5	ANT cable	Yes	0.2m
6	USB cable	Yes	1.8m
7	Audio cable	No	1.5m
8	ANT cable	Yes	0.2m
9	ANT cable	Yes	0.2m

3.12.2. Radiation Emissions Test Configuration

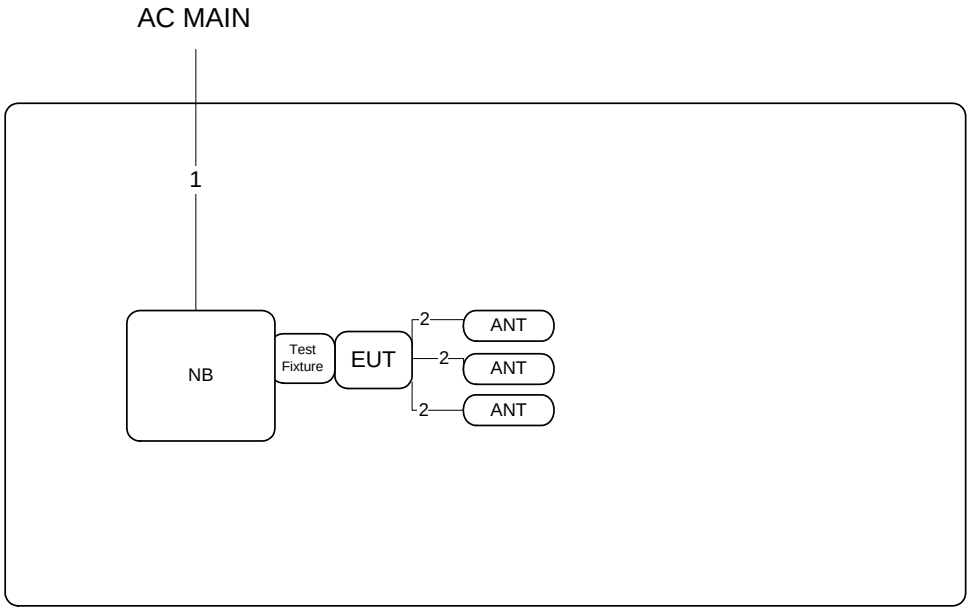
Test Configuration: 30MHz~1GHz / Test Mode 2



Item	Connection	Shield	Length
1	Power cable	No	2.6m
2	ANT cable*3	Yes	0.2m
3	Audio cable	No	1.1m
4	USB cable	Yes	1.8m
5	ANT cable*3	Yes	0.2m

For Non-Beamforming Mode

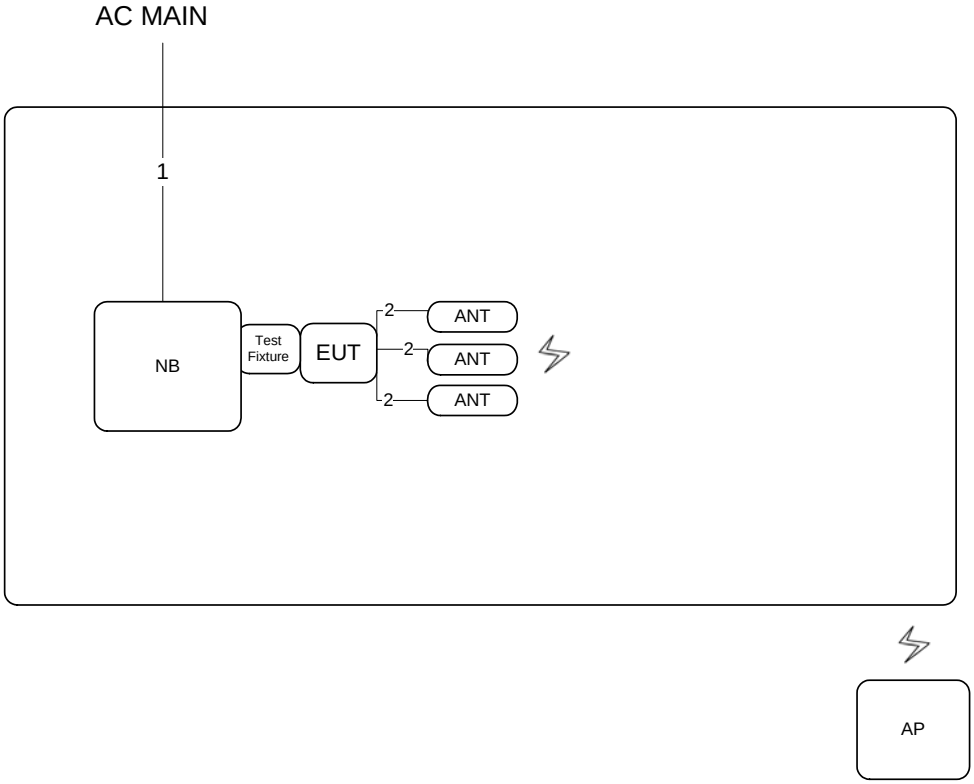
Test Configuration: above 1GHz



Item	Connection	Shield	Length
1	Power cable	No	1.8m
2	ANT cable*3	Yes	0.2m

For Beamforming Mode

Test Configuration: above 1GHz



Item	Connection	Shield	Length
1	Power cable	No	1.8m
2	ANT cable*3	Yes	0.2m

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

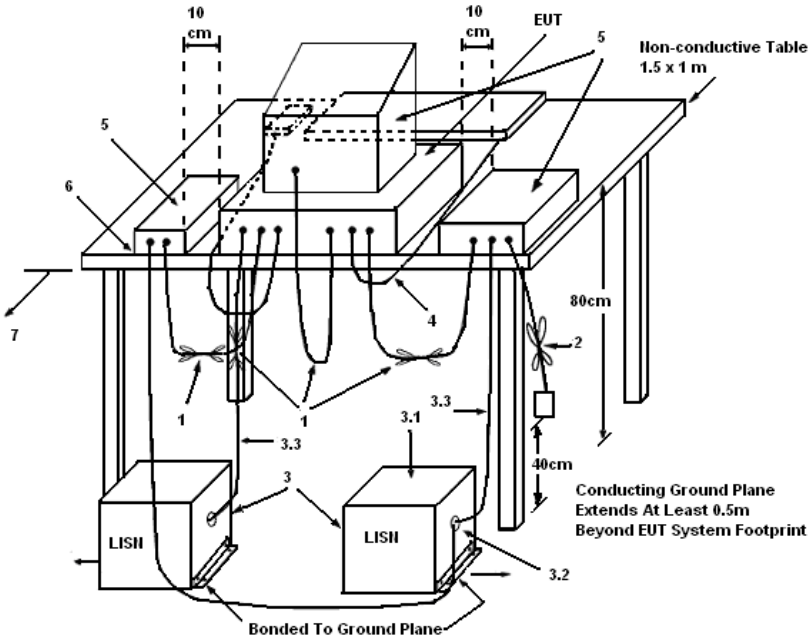
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

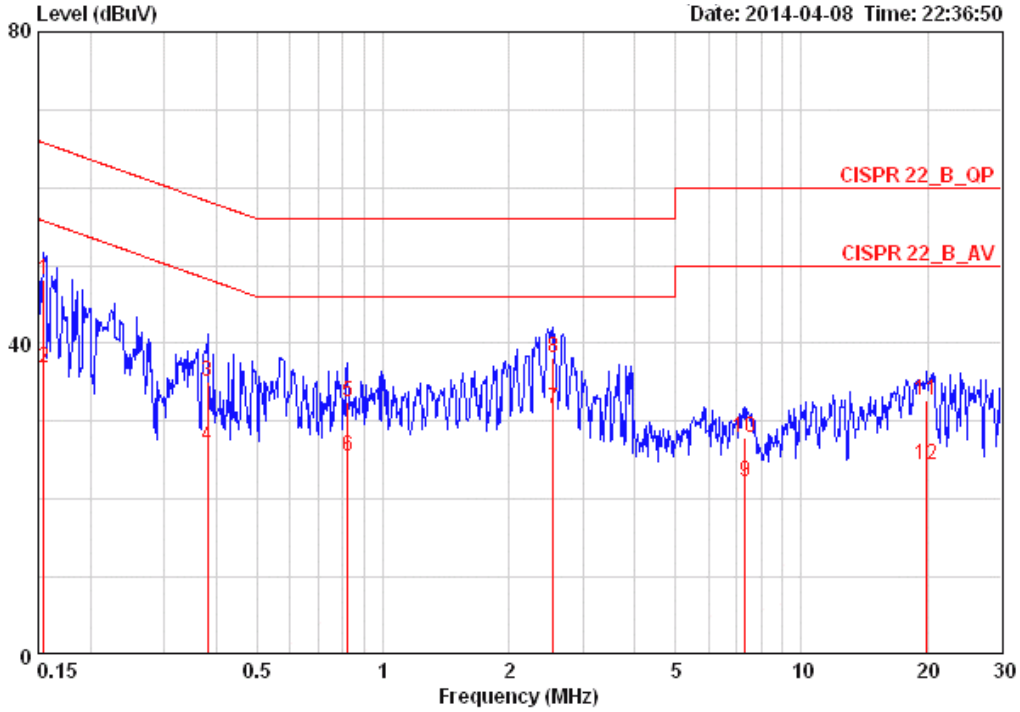
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

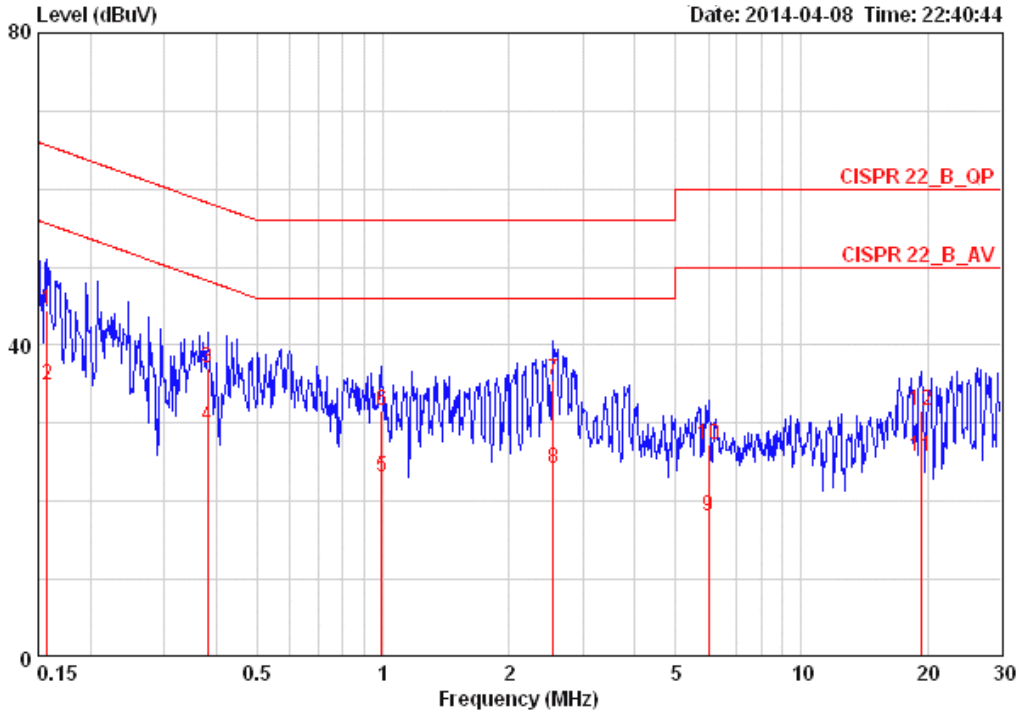
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	52%
Test Engineer	Parody Lin	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.15485	48.09	-17.64	65.74	0.15	47.76	0.18	LINE	QP
2	0.15485	36.89	-18.84	55.74	0.15	36.56	0.18	LINE	AVERAGE
3	0.38113	35.03	-23.22	58.25	0.15	34.68	0.20	LINE	QP
4	0.38113	26.72	-21.53	48.25	0.15	26.37	0.20	LINE	AVERAGE
5	0.82172	32.46	-23.54	56.00	0.16	32.10	0.20	LINE	QP
6	0.82172	25.51	-20.49	46.00	0.16	25.15	0.20	LINE	AVERAGE
7 @	2.554	31.51	-14.49	46.00	0.22	31.05	0.24	LINE	AVERAGE
8	2.554	38.06	-17.94	56.00	0.22	37.60	0.24	LINE	QP
9	7.329	22.32	-27.68	50.00	0.33	21.69	0.30	LINE	AVERAGE
10	7.329	27.94	-32.06	60.00	0.33	27.31	0.30	LINE	QP
11	19.950	32.76	-27.24	60.00	0.60	31.66	0.50	LINE	QP
12	19.950	24.41	-25.59	50.00	0.60	23.31	0.50	LINE	AVERAGE

Temperature	25°C	Humidity	52%
Test Engineer	Parody Lin	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.15733	44.53	-21.07	65.60	0.07	44.28	0.18	NEUTRAL	QP
2	0.15733	34.81	-20.79	55.60	0.07	34.56	0.18	NEUTRAL	AVERAGE
3	0.38113	37.11	-21.14	58.25	0.07	36.84	0.20	NEUTRAL	QP
4	0.38113	29.57	-18.68	48.25	0.07	29.30	0.20	NEUTRAL	AVERAGE
5	0.99440	23.06	-22.94	46.00	0.08	22.83	0.15	NEUTRAL	AVERAGE
6	0.99440	31.53	-24.47	56.00	0.08	31.30	0.15	NEUTRAL	QP
7	2.554	35.64	-20.36	56.00	0.12	35.28	0.24	NEUTRAL	QP
8	2.554	24.29	-21.71	46.00	0.12	23.93	0.24	NEUTRAL	AVERAGE
9	5.993	18.15	-31.85	50.00	0.18	17.64	0.33	NEUTRAL	AVERAGE
10	5.993	27.20	-32.80	60.00	0.18	26.69	0.33	NEUTRAL	QP
11	19.326	25.76	-24.24	50.00	0.44	24.82	0.50	NEUTRAL	AVERAGE
12	19.326	31.65	-28.35	60.00	0.44	30.71	0.50	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

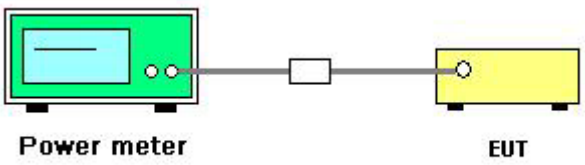
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

4.2.3. Test Procedures

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

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Conducted Output Power

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g/n
Test Date	Apr. 25, 2014		

For non-beamforming mode:

For 2.4GHz Band

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

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	0.05	13.51	14.47	13.62	18.66	30.00	Complies
6	2437 MHz		22.27	21.64	22.84	27.05	30.00	Complies
11	2462 MHz		12.03	12.54	12.47	17.12	30.00	Complies
12	2467 MHz		11.48	11.48	11.71	16.33	30.00	Complies
13	2472 MHz		10.91	10.64	11.01	15.63	30.00	Complies

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

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	0.09	12.13	11.75	12.42	16.88	30.00	Complies
6	2437 MHz		15.53	14.15	15.83	20.00	30.00	Complies
9	2452 MHz		11.04	10.13	11.34	15.64	30.00	Complies
10	2457 MHz		10.65	9.07	10.54	14.92	30.00	Complies
11	2462 MHz		10.48	8.79	10.46	14.75	30.00	Complies

Configuration IEEE 802.11b / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	0	17.76	17.64	17.91	22.54	30.00	Complies
6	2437 MHz		17.53	17.02	17.69	22.19	30.00	Complies
11	2462 MHz		18.42	17.47	18.67	22.99	30.00	Complies
12	2467 MHz		15.8	15.33	15.84	20.43	30.00	Complies
13	2472 MHz		15.33	14.81	15.38	19.95	30.00	Complies

Configuration IEEE 802.11g / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	0.02	13.79	14.72	13.81	18.90	30.00	Complies
6	2437 MHz		21.71	20.49	22.18	26.29	30.00	Complies
11	2462 MHz		13.83	13.89	14.02	18.69	30.00	Complies
12	2467 MHz		13.41	13.22	13.61	18.19	30.00	Complies
13	2472 MHz		10.87	10.54	11.08	15.61	30.00	Complies

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/ac
Test Date	Apr. 25, 2014		

For non-beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	0.04	20.71	19.66	20.15	24.97	30.00	Complies
157	5785 MHz		21.04	20.62	20.32	25.44	30.00	Complies
165	5825 MHz		20.79	19.35	20.12	24.90	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	0.09	17.28	19.05	17.48	22.78	30.00	Complies
159	5795 MHz		20.15	19.18	20.36	24.70	30.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	0.18	16.88	18.23	16.92	22.16	30.00	Complies

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

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	0.02	20.98	20.62	21.78	25.93	30.00	Complies
157	5785 MHz		21.29	19.88	20.32	25.31	30.00	Complies
165	5825 MHz		20.72	19.38	20.48	25.00	30.00	Complies

Temperature	20°C	Humidity	52%
Test Engineer	Cliff Chang	Configurations	IEEE 802.11ac
Test Date	Apr. 25, 2014		

For beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	0.04	20.71	19.66	20.15	24.97	25.43	Complies
157	5785 MHz		20.84	20.32	20.12	25.21	25.43	Complies
165	5825 MHz		20.79	19.35	20.12	24.90	25.43	Complies

Note: $Directional\ gain = G_{ANT} + 10\ log(N_{ANT}/N_{SS})$

=10.57dBi >6dBi,So Band4 Limit =30-(10.57-6)=25.43dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	0.09	20.8	19.48	19.77	24.83	25.43	Complies
159	5795 MHz		20.15	19.18	20.36	24.70	25.43	Complies

Note: $Directional\ gain = G_{ANT} + 10\ log(N_{ANT}/N_{SS})$

=10.57dBi >6dBi,So Band4 Limit =30-(10.57-6)=25.43dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Duty Factor	Conducted Power (dBm)				Max. Limit (dBm)	Result
			Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	0.18	18.42	19.32	18.17	23.44	25.43	Complies

Note: $Directional\ gain = G_{ANT} + 10\ log(N_{ANT}/N_{SS})$

=10.57dBi >6dBi,So Band4 Limit =30-(10.57-6)=25.43dBm/MHz

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

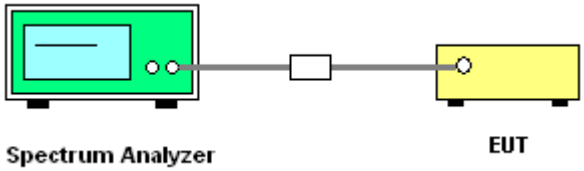
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.2 Method PKPSD (peak PSD) and KDB 662911 D01 v02r01 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be ≤ 8 dBm.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g/n

For non-beamforming mode:

For 2.4GHz Band

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-13.00	-11.58	-12.63	-7.59	8.00	Complies
6	2437 MHz	-4.50	-4.52	-4.22	0.36	8.00	Complies
11	2462 MHz	-13.60	-12.14	-12.89	-8.06	8.00	Complies
12	2467 MHz	-13.51	-13.51	-13.73	-8.81	8.00	Complies
13	2472 MHz	-14.26	-14.39	-14.75	-9.69	8.00	Complies

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	-16.26	-15.95	-16.46	-11.45	8.00	Complies
6	2437 MHz	-12.88	-11.84	-12.39	-7.58	8.00	Complies
9	2452 MHz	-17.43	-17.04	-17.72	-12.62	8.00	Complies
10	2457 MHz	-17.14	-16.78	-17.83	-12.46	8.00	Complies
11	2462 MHz	-18.27	-18.35	-17.97	-13.42	8.00	Complies

Configuration IEEE 802.11b / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-5.63	-4.92	-5.24	-0.48	8.00	Complies
6	2437 MHz	-5.54	-4.90	-5.21	-0.44	8.00	Complies
11	2462 MHz	-5.11	-4.68	-4.69	-0.05	8.00	Complies
12	2467 MHz	-6.59	-6.89	-6.49	-1.88	8.00	Complies
13	2472 MHz	-7.08	-6.99	-7.17	-2.31	8.00	Complies

Configuration IEEE 802.11g / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-10.47	-9.44	-10.79	-5.42	8.00	Complies
6	2437 MHz	-4.20	-4.43	-4.39	0.43	8.00	Complies
11	2462 MHz	-11.16	-10.59	-11.17	-6.19	8.00	Complies
12	2467 MHz	-12.63	-12.59	-12.94	-7.95	8.00	Complies
13	2472 MHz	-14.46	-14.14	-14.28	-9.52	8.00	Complies

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/ac

For non-beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-5.89	-6.93	-6.11	-1.52	8.00	Complies
157	5785 MHz	-6.47	-6.25	-5.62	-1.33	8.00	Complies
165	5825 MHz	-5.78	-6.19	-6.09	-1.25	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	-12.84	-13.88	-13.10	-8.48	8.00	Complies
159	5795 MHz	-7.87	-8.66	-7.92	-3.36	8.00	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	-13.99	-13.12	-13.68	-8.81	8.00	Complies

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-6.01	-6.71	-6.67	-1.68	8.00	Complies
157	5785 MHz	-6.89	-6.74	-6.47	-1.93	8.00	Complies
165	5825 MHz	-6.32	-6.04	-6.29	-1.44	8.00	Complies

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11ac

For beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-4.78	-3.67	-5.65	0.15	3.43	Complies
157	5785 MHz	-5.57	-5.83	-5.94	-1.01	3.43	Complies
165	5825 MHz	-4.65	-5.46	-5.01	-0.26	3.43	Complies

Note: $Directional\ gain = G_{ANT} + 10\ log(N_{ANT}/N_{SS})$

=10.57dBi >6dBi,So Band4 Limit =8-(10.57-6)=3.43dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	-6.34	-7.47	-6.60	-2.01	3.43	Complies
159	5795 MHz	-7.67	-6.77	-7.19	-2.42	3.43	Complies

Note: $Directional\ gain = G_{ANT} + 10\ log(N_{ANT}/N_{SS})$

=10.57dBi >6dBi,So Band4 Limit =8-(10.57-6)=3.43dBm/MHz

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	-12.38	-12.25	-13.99	-8.03	3.43	Complies

Note: $Directional\ gain = G_{ANT} + 10\ log(N_{ANT}/N_{SS})$

=10.57dBi >6dBi,So Band4 Limit =8-(10.57-6)=3.43dBm/MHz

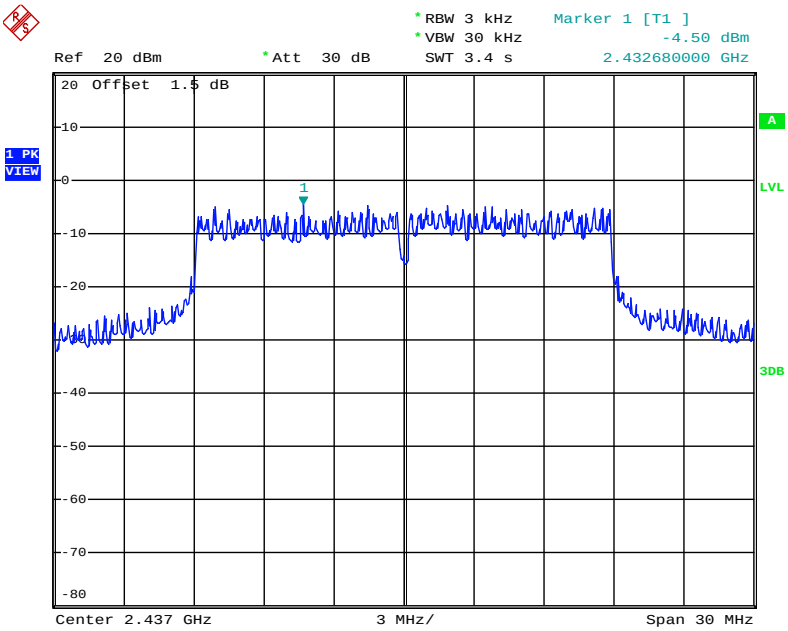
Note: All the test values were listed in the report.

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

For non-beamforming mode:

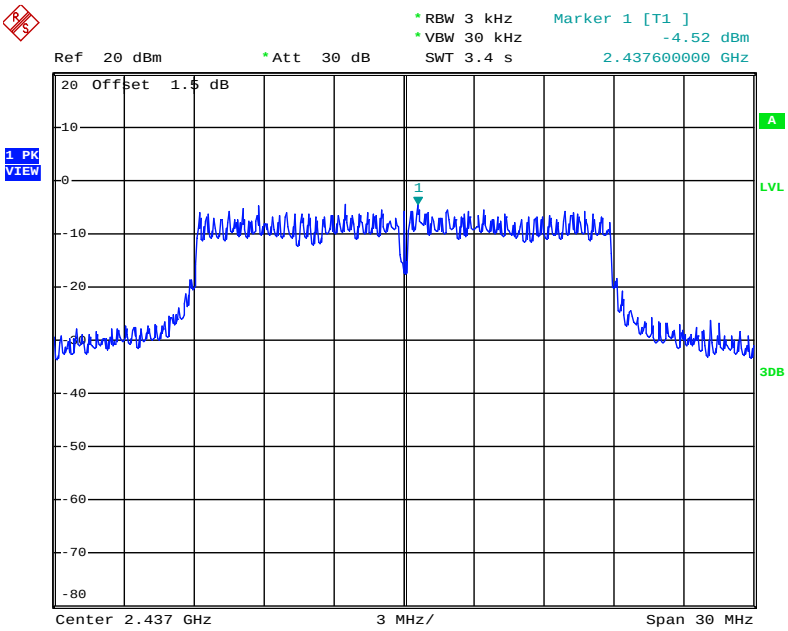
For 2.4GHz Band:

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 1



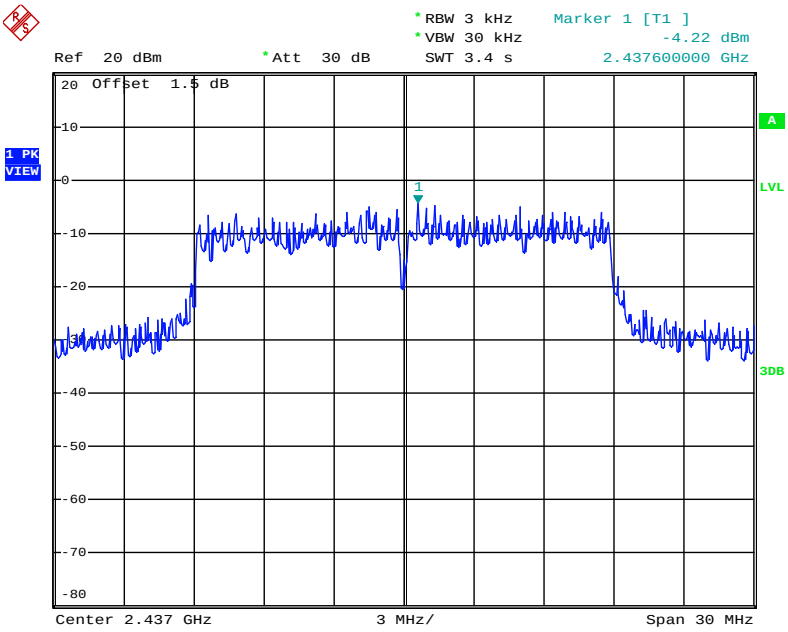
Date: 26.APR.2014 00:13:04

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 2



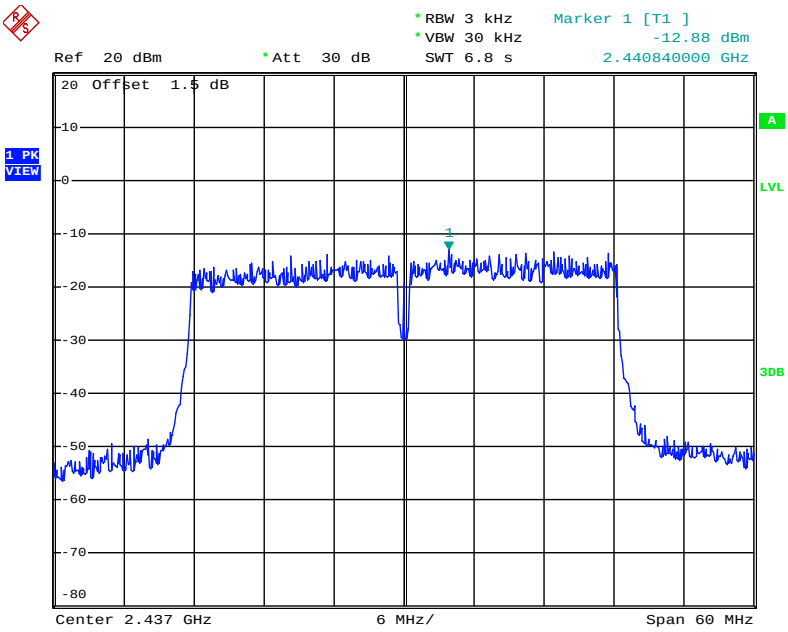
Date: 26.APR.2014 01:04:10

Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 3



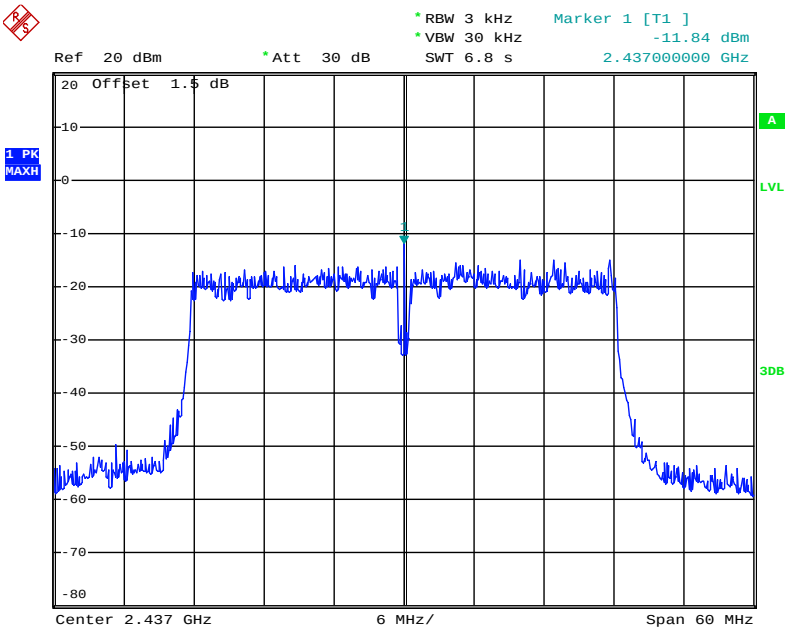
Date: 26.APR.2014 01:22:29

Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Chain 1



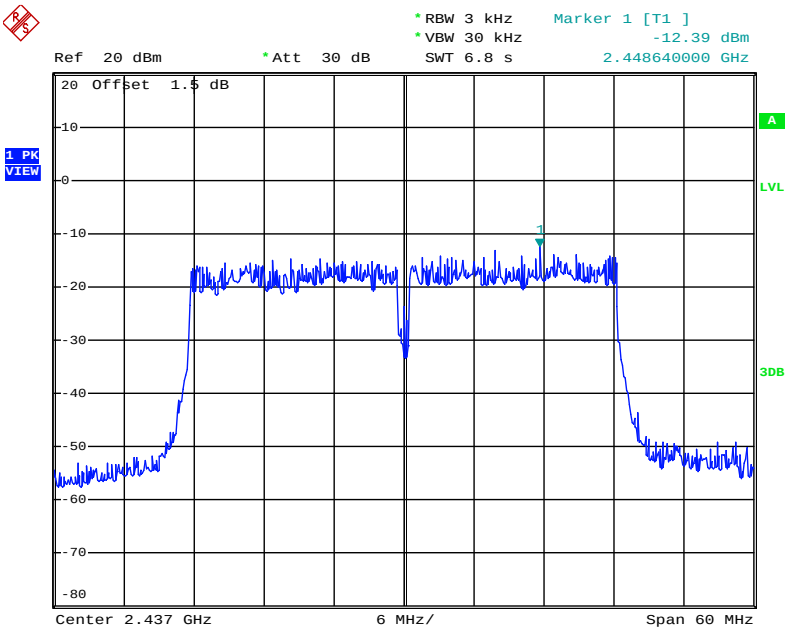
Date: 26.APR.2014 00:19:02

Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Chain 2



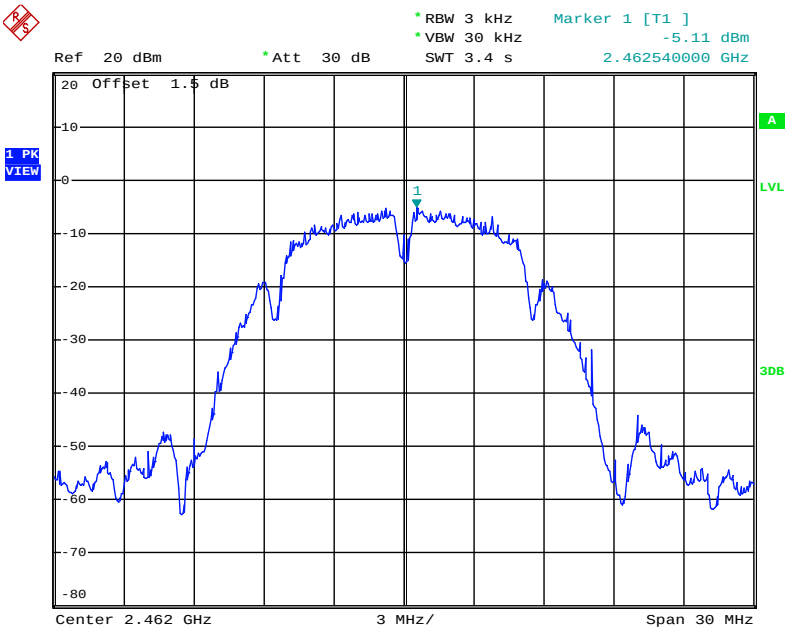
Date: 25.APR.2014 13:32:23

Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Chain 3



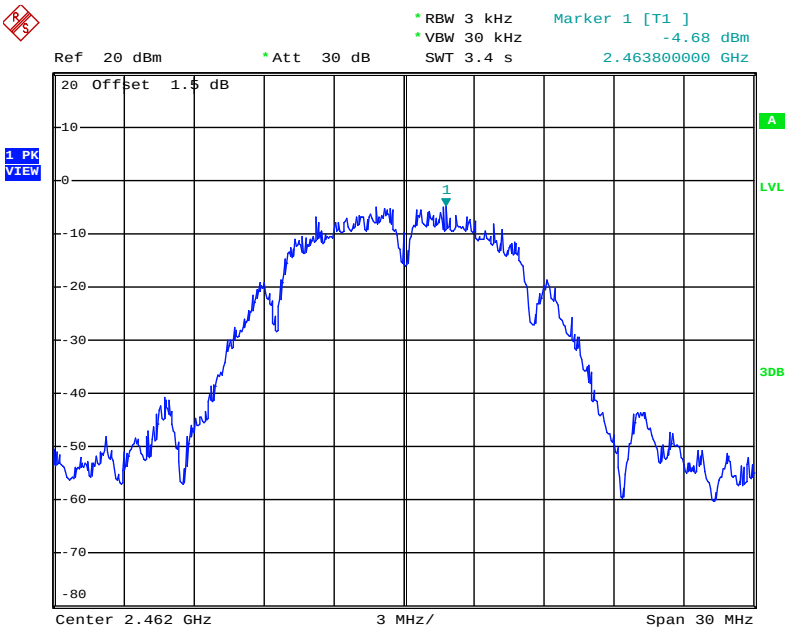
Date: 26.APR.2014 01:26:20

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz / Chain 1



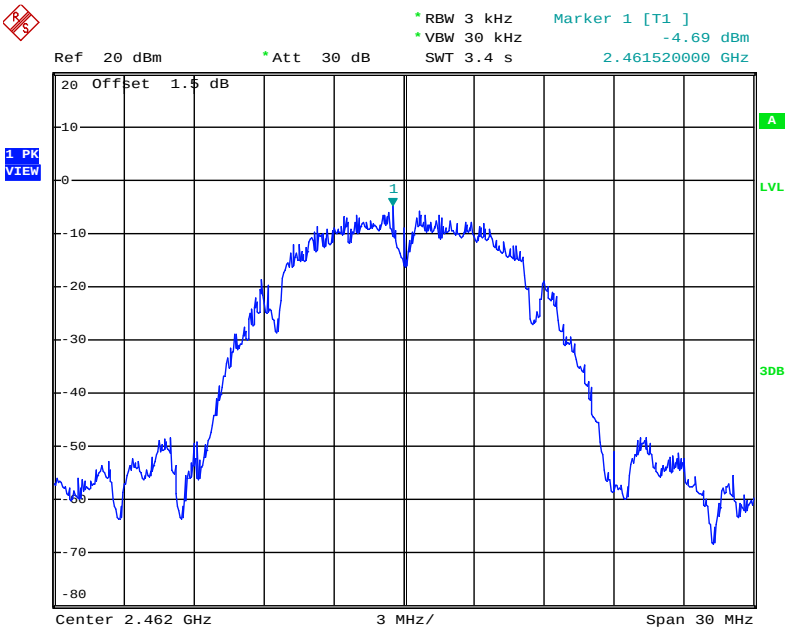
Date: 26.APR.2014 00:02:56

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz / Chain 2



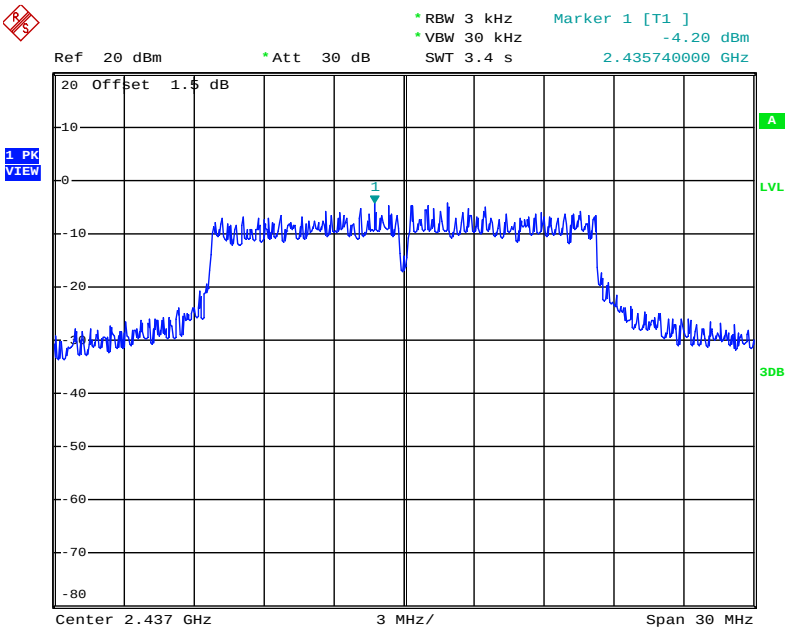
Date: 26.APR.2014 00:25:48

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz / Chain 3



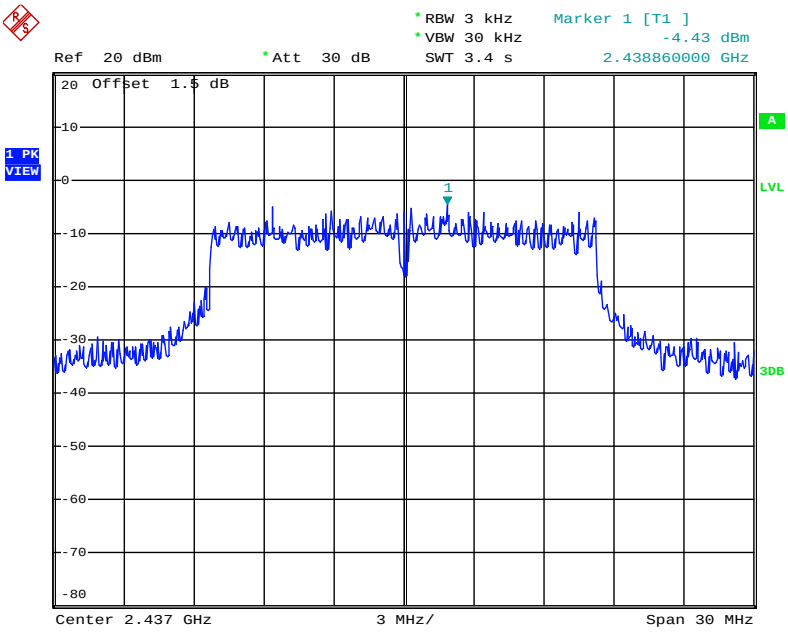
Date: 26.APR.2014 01:15:51

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



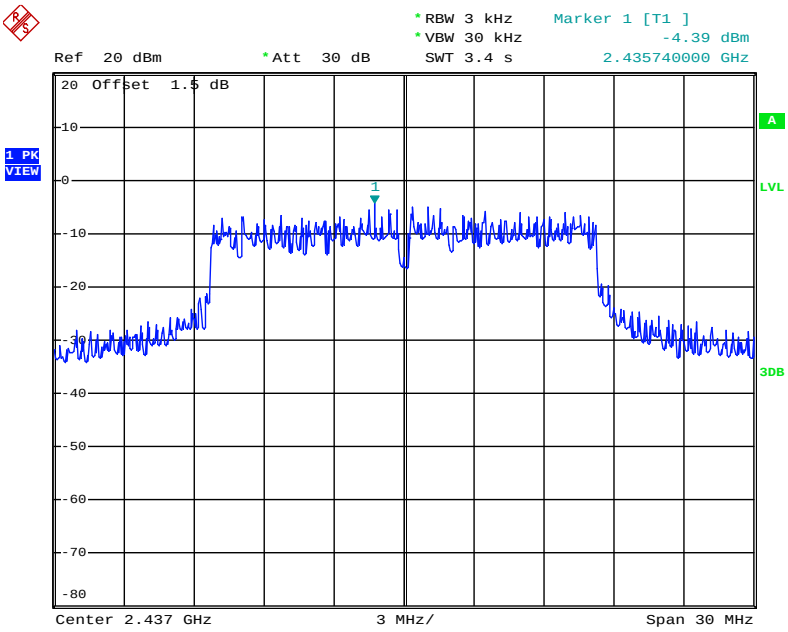
Date: 26.APR.2014 00:09:16

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



Date: 26.APR.2014 00:30:12

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 3

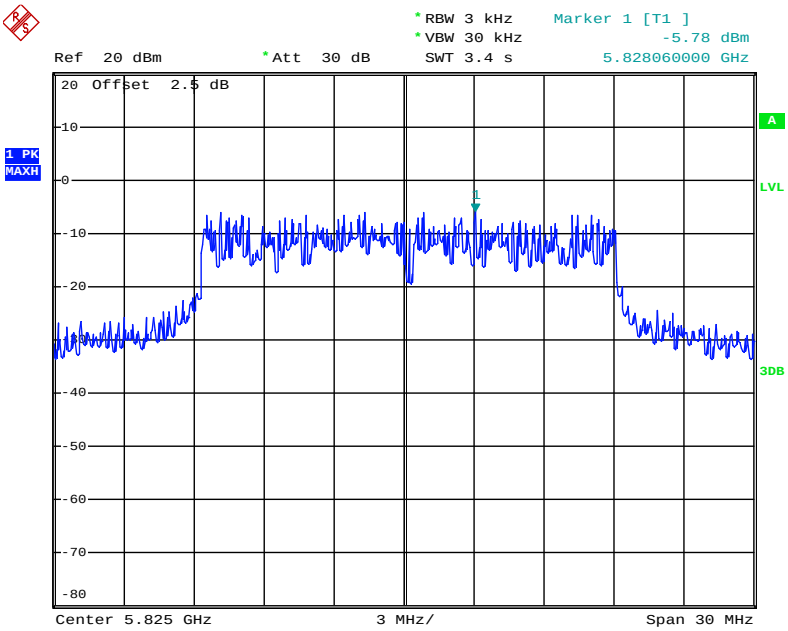


Date: 26.APR.2014 01:18:52

For non-beamforming mode:

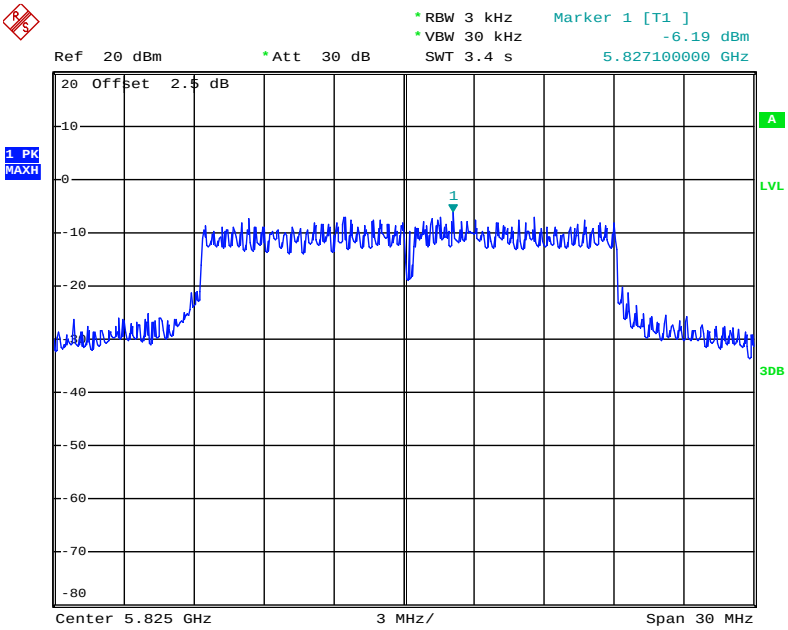
For 5GHz Band:

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 1



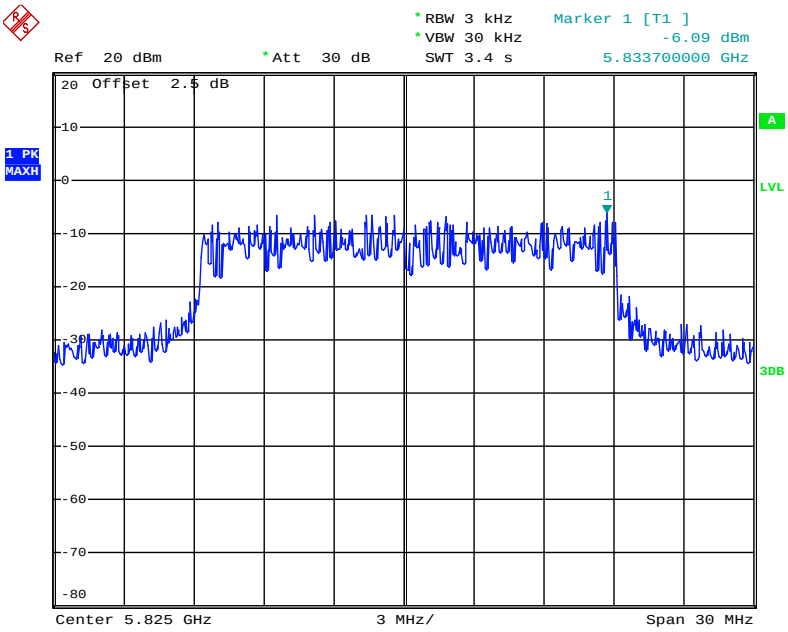
Date: 25.APR.2014 14:17:46

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 2



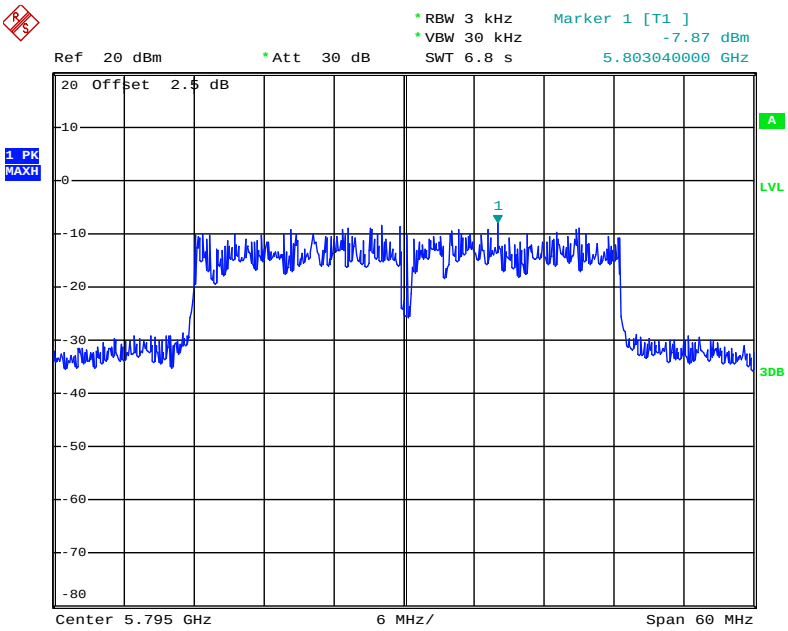
Date: 25.APR.2014 14:17:02

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 3



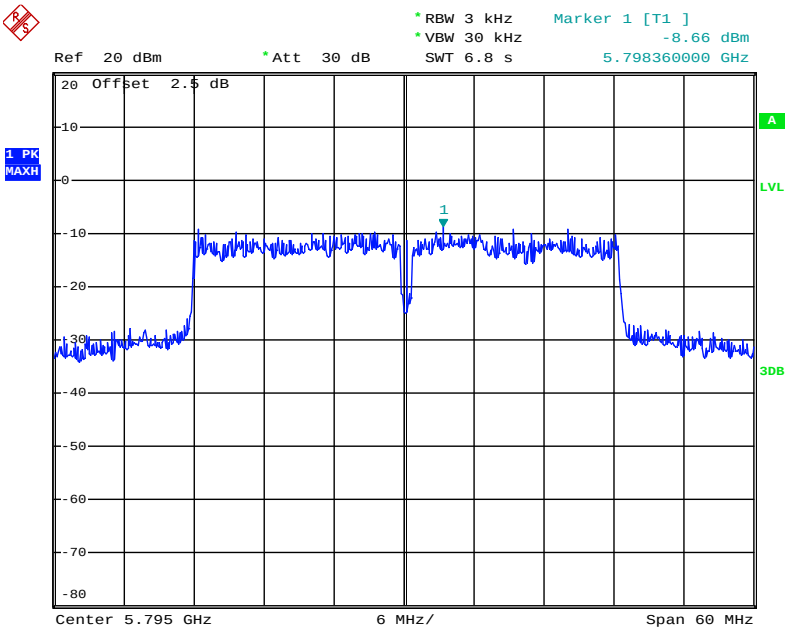
Date: 25.APR.2014 14:16:01

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 1



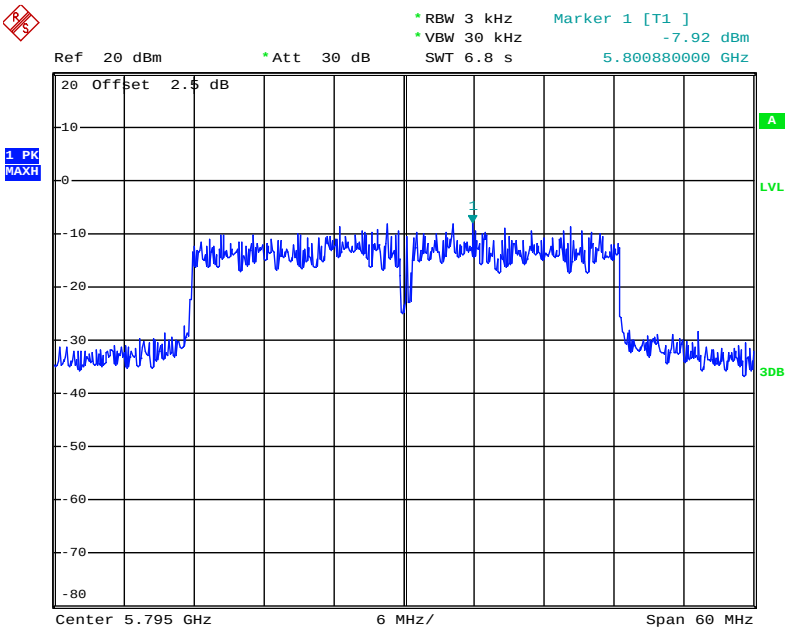
Date: 25.APR.2014 14:24:20

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 2



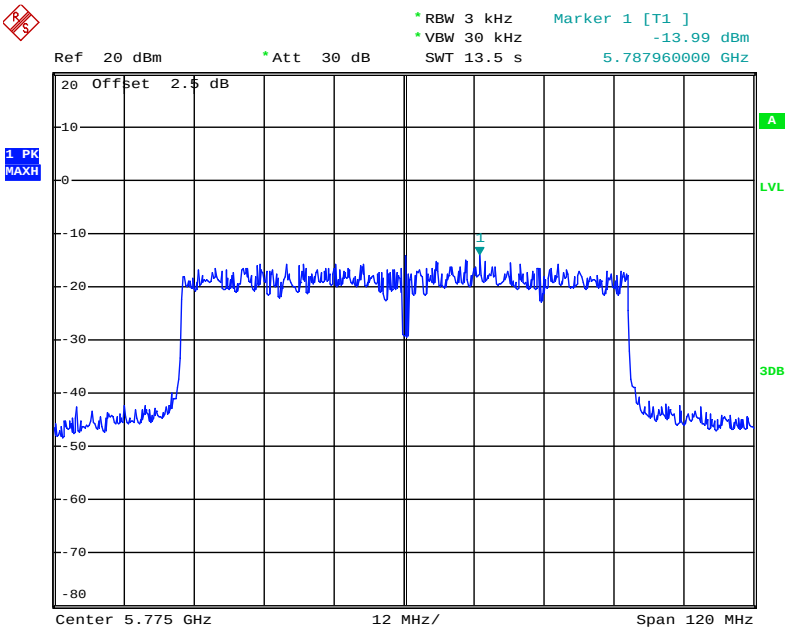
Date: 25.APR.2014 14:23:40

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 3



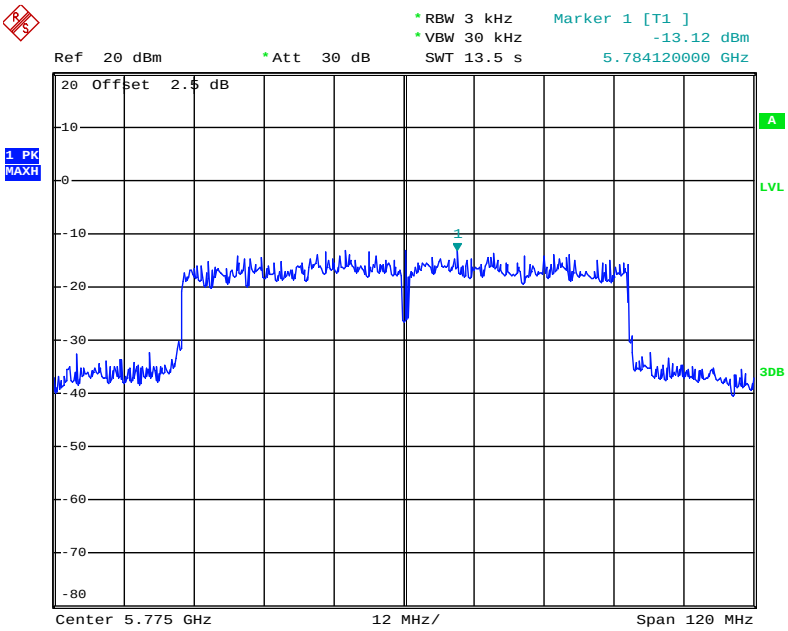
Date: 25.APR.2014 14:22:13

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1



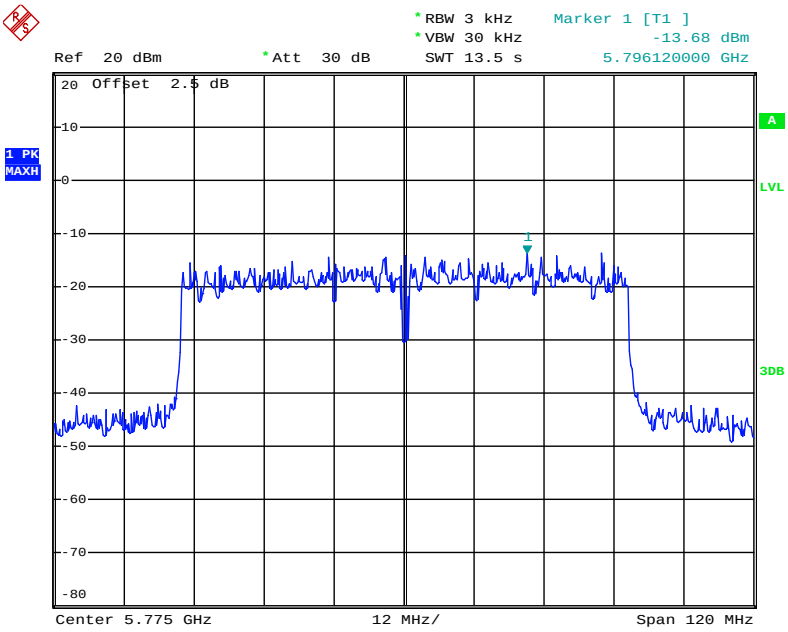
Date: 25.APR.2014 14:26:06

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 2



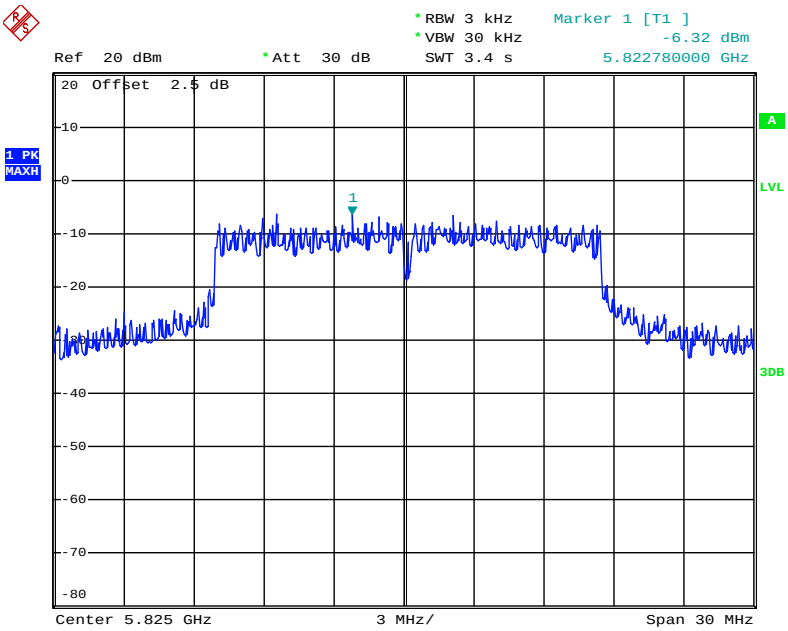
Date: 25.APR.2014 14:26:41

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 3



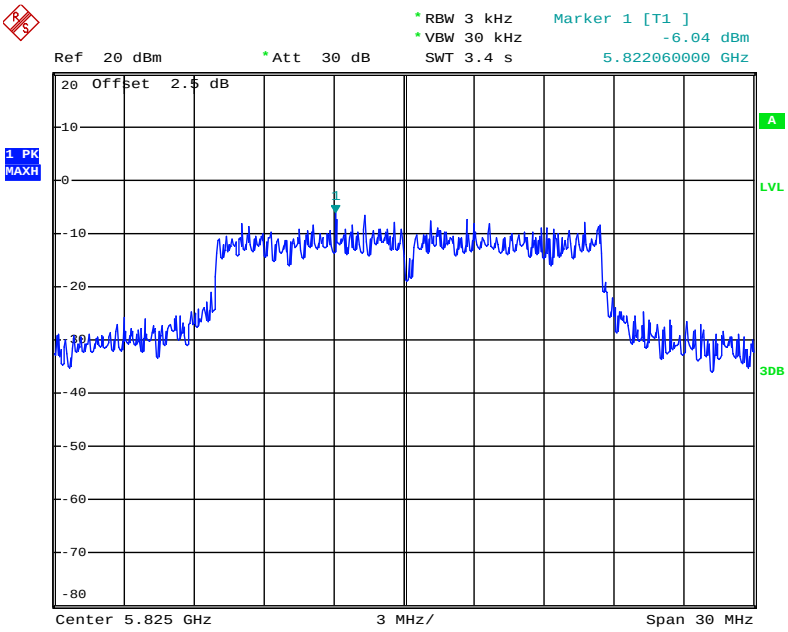
Date: 25.APR.2014 14:27:18

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



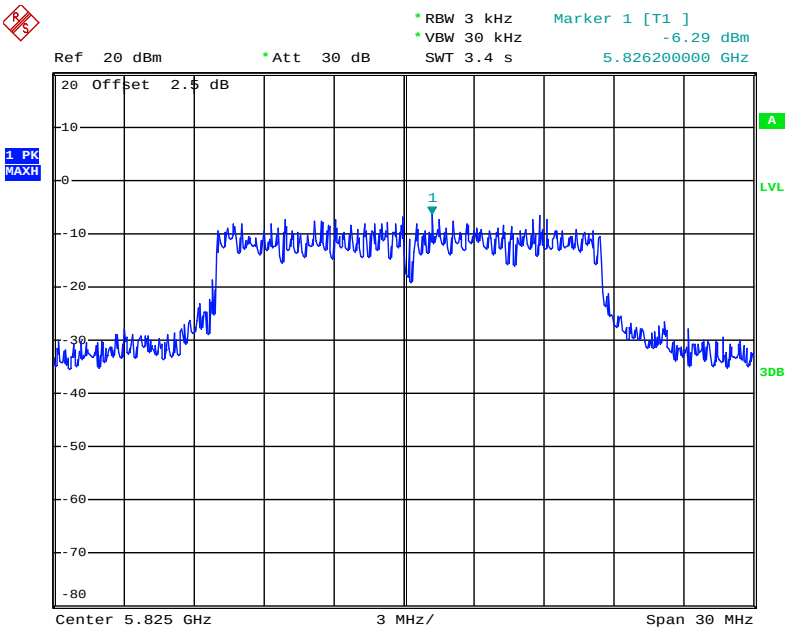
Date: 25.APR.2014 14:07:53

Power Density Plot on Configuration IEEE 802.11a / 5825 MHz / Chain 2



Date: 25.APR.2014 14:08:21

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

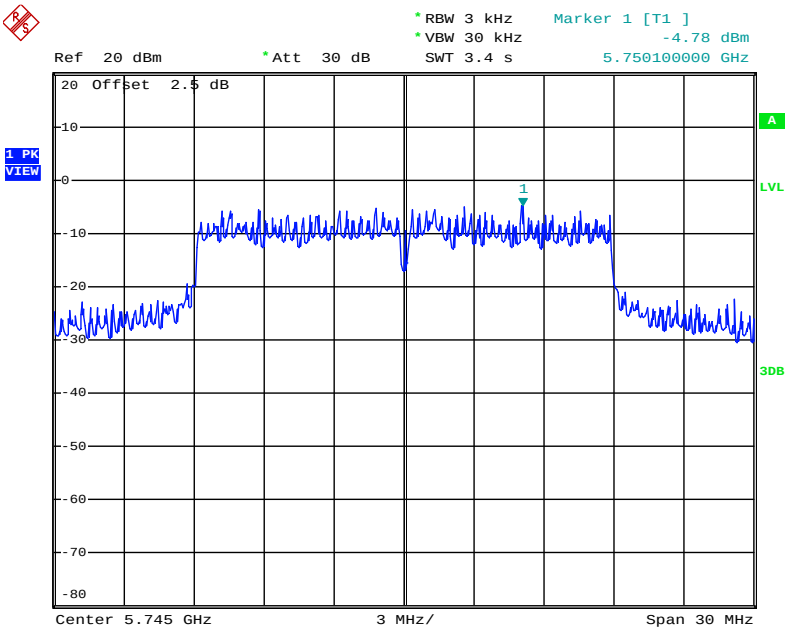


Date: 25.APR.2014 14:08:43

For beamforming mode:

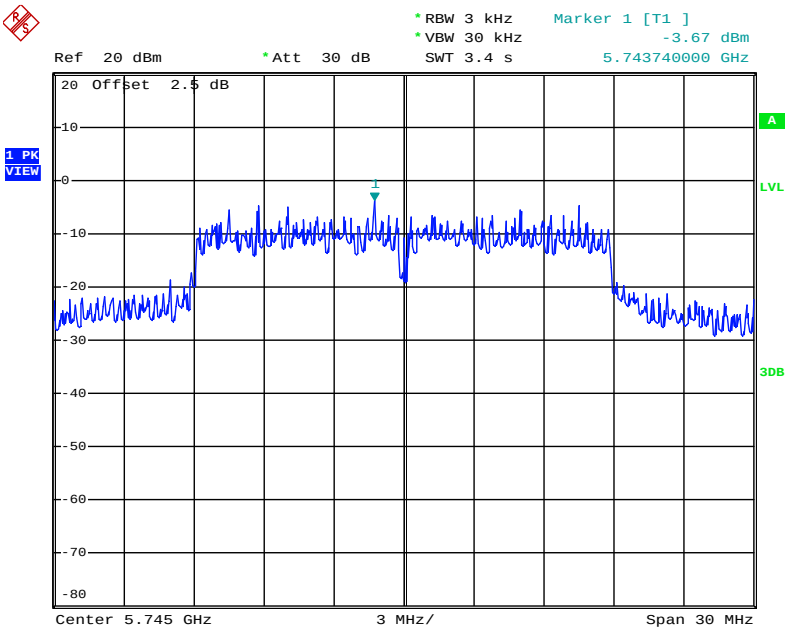
For 5GHz Band:

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5745 MHz / Chain 1



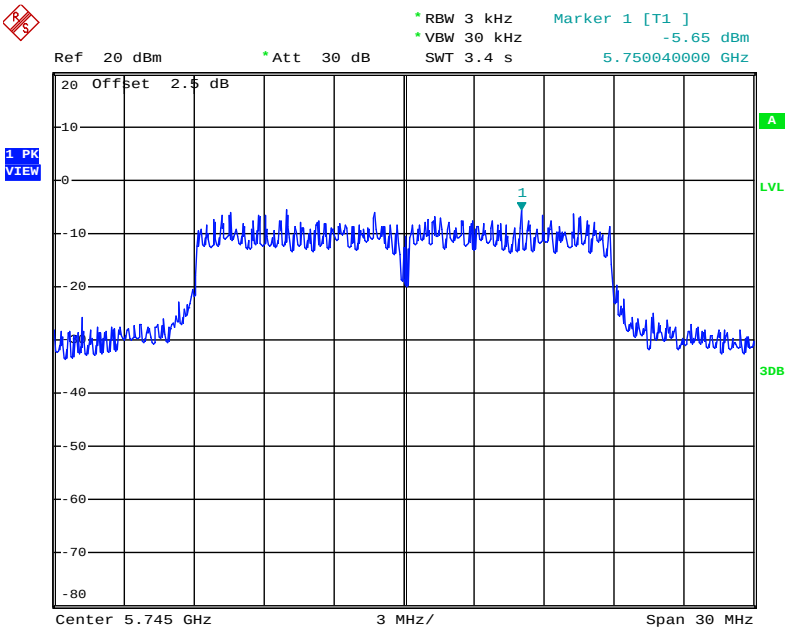
Date: 26.APR.2014 04:49:14

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5745 MHz / Chain 2



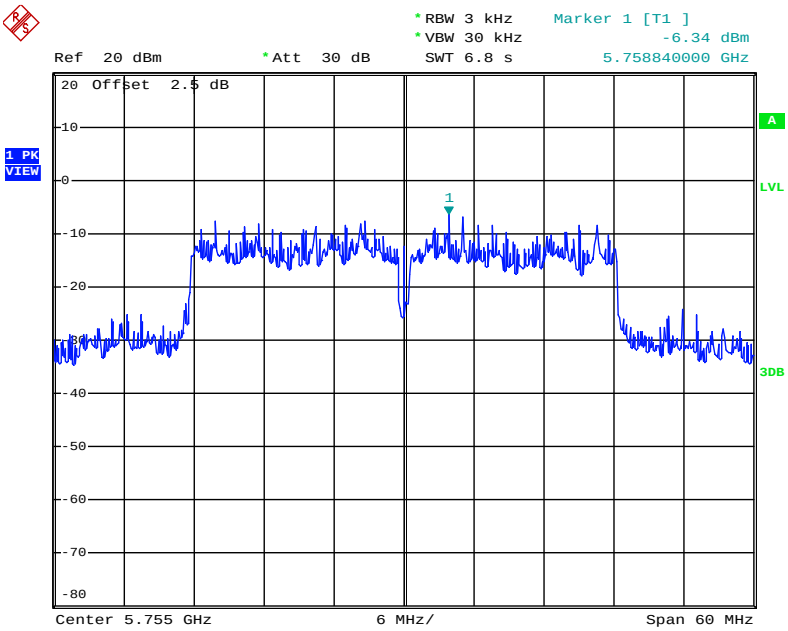
Date: 26.APR.2014 04:48:08

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5745 MHz / Chain 3



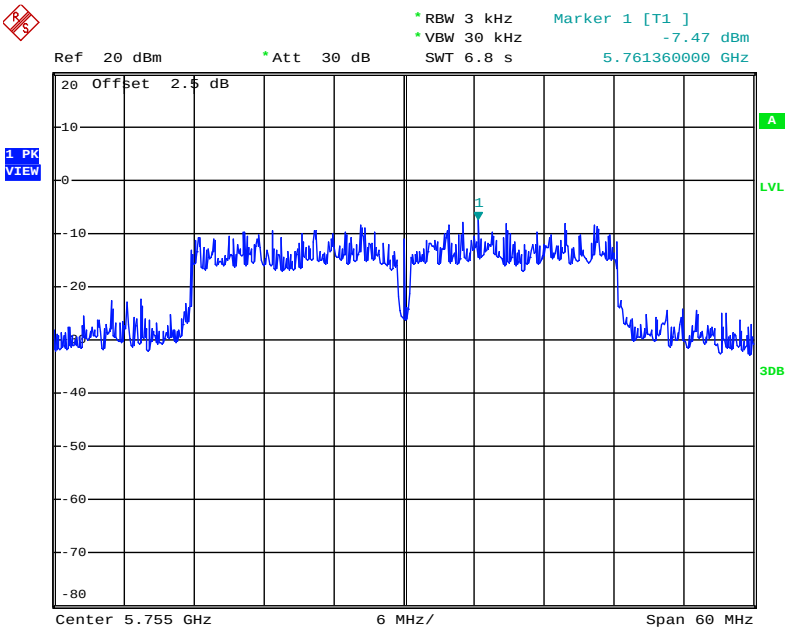
Date: 26.APR.2014 04:50:08

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 1



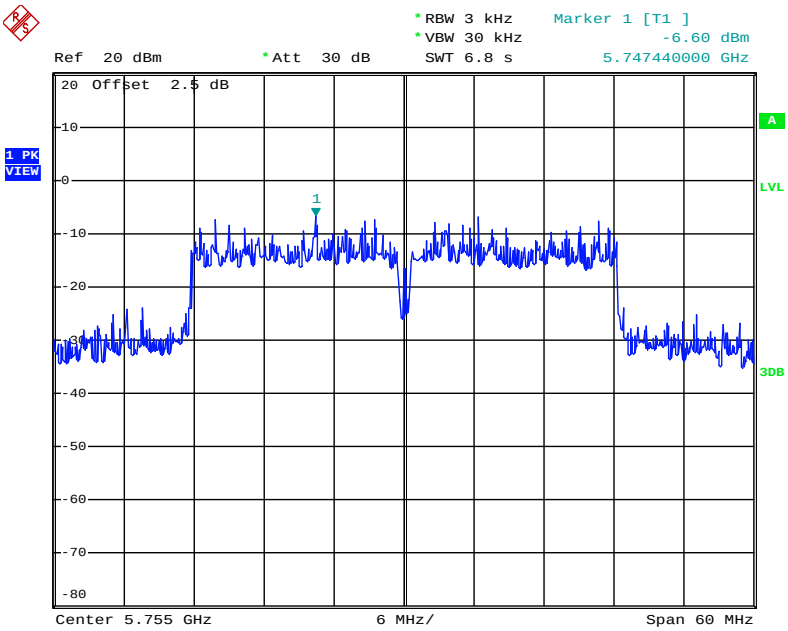
Date: 26.APR.2014 04:58:26

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 2



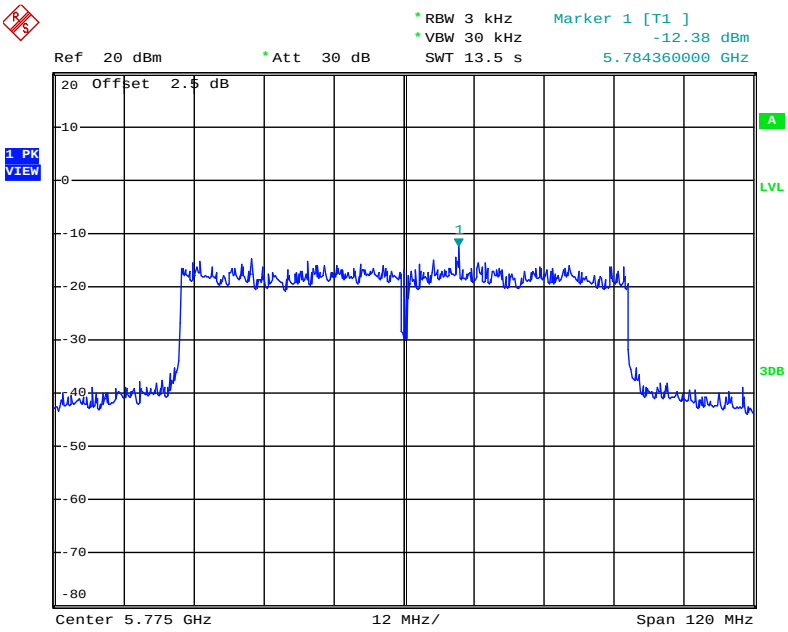
Date: 26.APR.2014 04:57:17

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 3



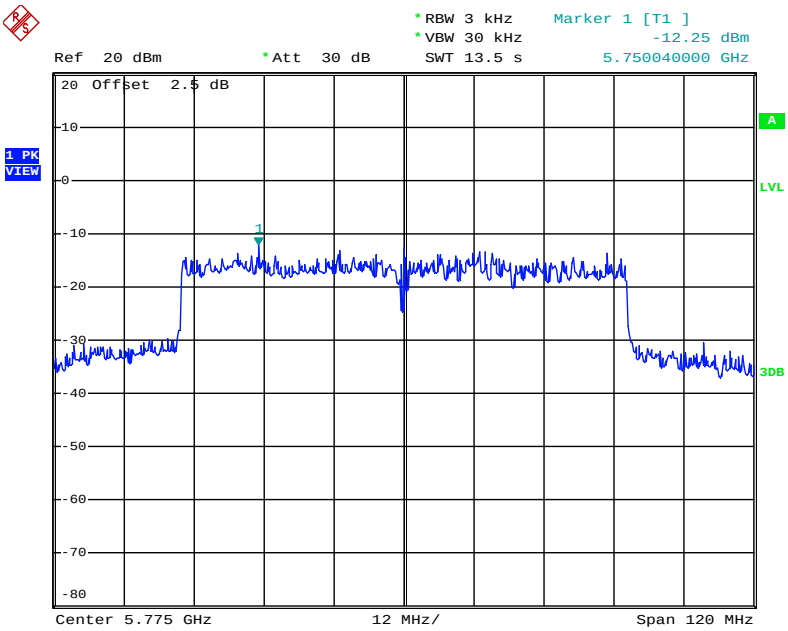
Date: 26.APR.2014 04:56:08

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1



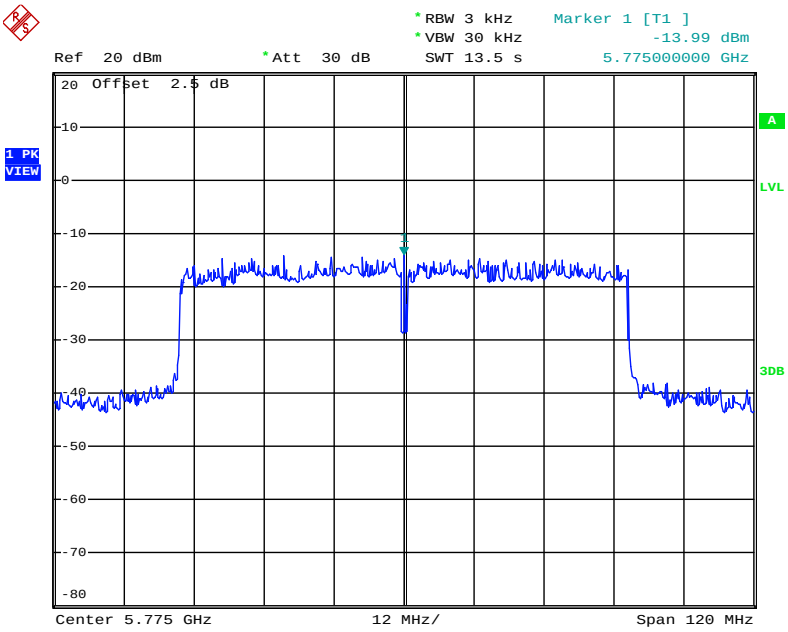
Date: 26.APR.2014 05:06:38

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 2



Date: 26.APR.2014 05:04:30

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 3



Date: 26.APR.2014 05:05:41

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	≥ 3 x RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

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

4.4.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

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

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11b/g/n

For non-beamforming mode:

For 2.4GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.24	17.52	500	Complies
6	2437 MHz	15.28	25.12	500	Complies
11	2462 MHz	15.52	17.52	500	Complies
12	2467 MHz	15.44	17.52	500	Complies
13	2472 MHz	15.52	17.52	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	33.92	35.84	500	Complies
6	2437 MHz	33.92	35.84	500	Complies
9	2452 MHz	34.24	35.84	500	Complies
10	2457 MHz	32.00	35.68	500	Complies
11	2462 MHz	34.72	35.68	500	Complies

Configuration IEEE 802.11b / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	8.56	12.00	500	Complies
6	2437 MHz	8.48	12.00	500	Complies
11	2462 MHz	9.12	11.92	500	Complies
12	2467 MHz	8.64	11.84	500	Complies
13	2472 MHz	9.04	11.84	500	Complies

Configuration IEEE 802.11g / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.40	16.48	500	Complies
6	2437 MHz	15.68	21.92	500	Complies
11	2462 MHz	15.76	16.48	500	Complies
12	2467 MHz	15.04	16.48	500	Complies
13	2472 MHz	15.60	16.48	500	Complies

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/ac

For non-beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.32	27.04	500	Complies
157	5785 MHz	16.32	27.84	500	Complies
165	5825 MHz	16.32	28.00	500	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.68	37.28	500	Complies
159	5795 MHz	33.92	55.68	500	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	64.00	76.48	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.68	26.72	500	Complies
157	5785 MHz	15.68	26.24	500	Complies
165	5825 MHz	15.76	25.76	500	Complies

Temperature	20°C	Humidity	52%
Test Engineer	Benson Peng	Configurations	IEEE 802.11ac

For beamforming mode:

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	15.12	24.88	500	Complies
157	5785 MHz	15.60	24.64	500	Complies
165	5825 MHz	15.68	23.76	500	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	35.52	59.84	500	Complies
159	5795 MHz	36.32	59.84	500	Complies

Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
155	5775 MHz	73.92	93.76	500	Complies

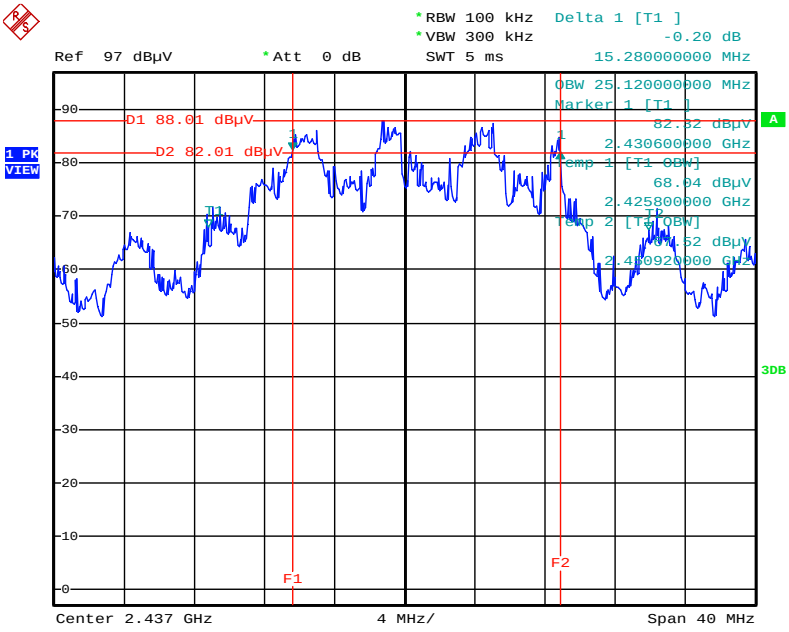
Note: All the test values were listed in the report.

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

For non-beamforming mode:

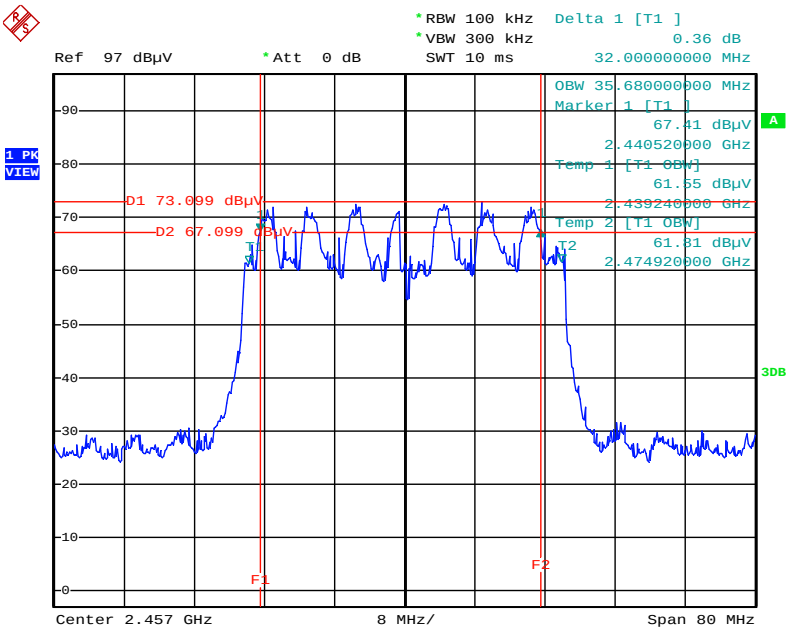
For 2.4GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 1 + Chain 2 + Chain 3



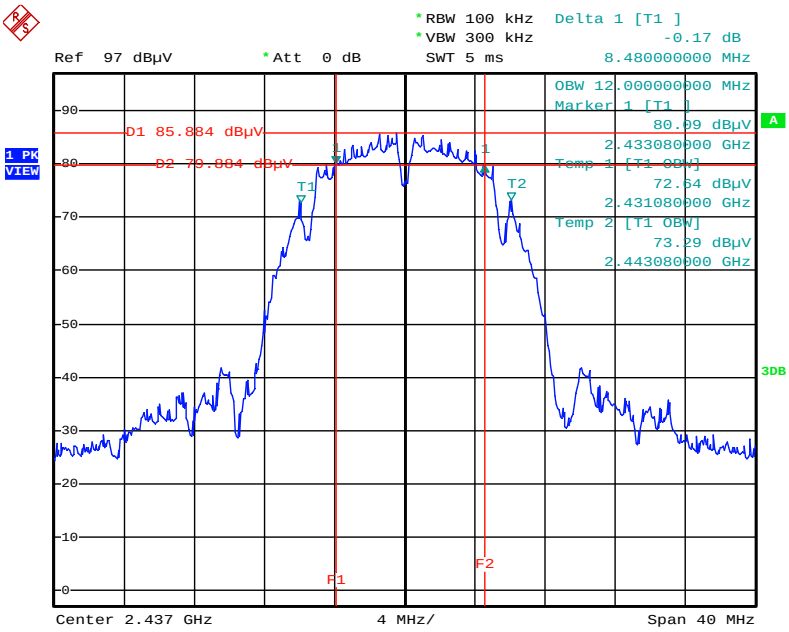
Date: 25.APR.2014 15:28:49

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2457 MHz / Chain 1 + Chain 2 + Chain 3



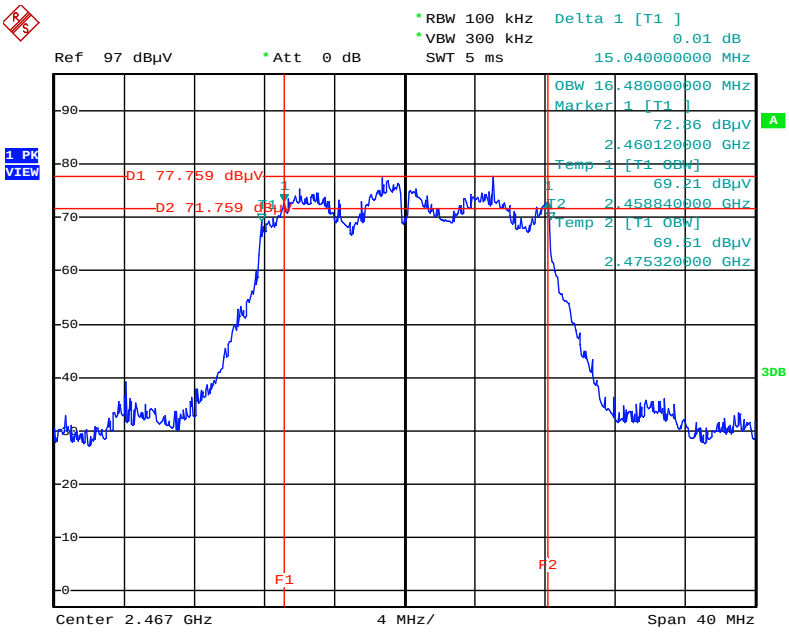
Date: 25.APR.2014 20:40:22

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



Date: 25.APR.2014 15:25:13

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2467 MHz / Chain 1 + Chain 2 + Chain 3

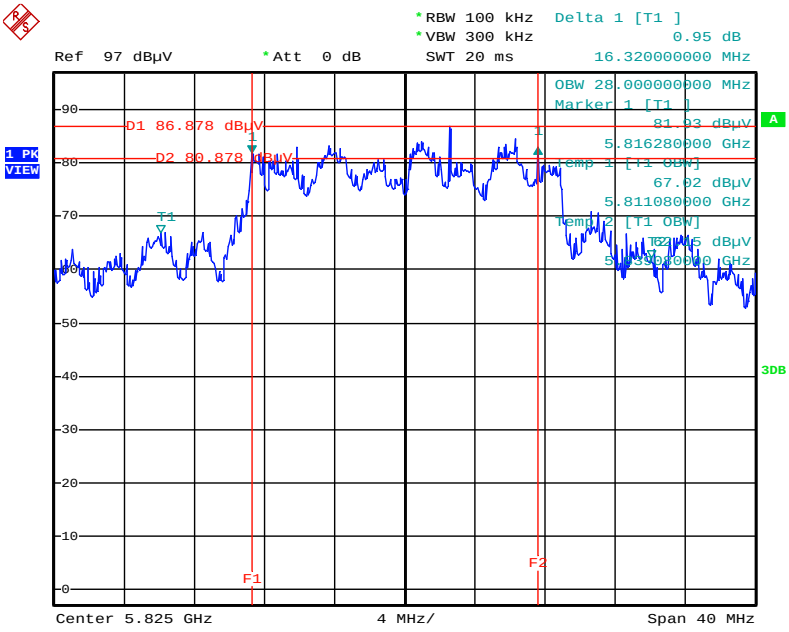


Date: 25.APR.2014 20:37:40

For non-beamforming mode:

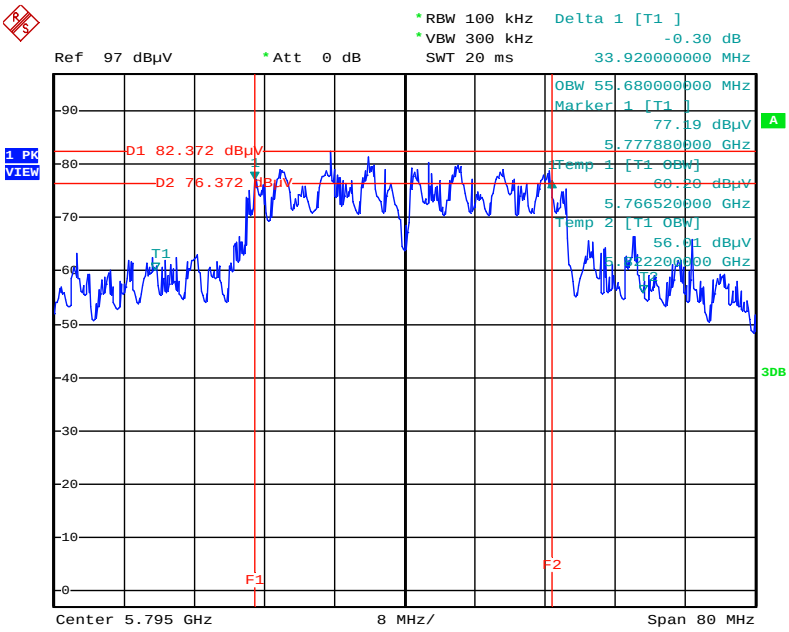
For 5GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Chain 1 + Chain 2 + Chain 3



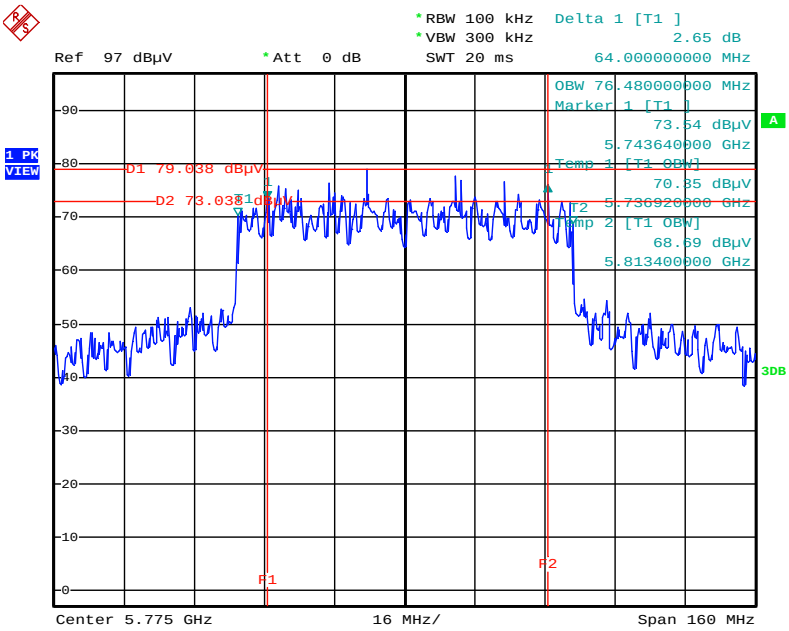
Date: 25.APR.2014 14:54:34

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795MHz / Chain 1 + Chain 2 + Chain 3



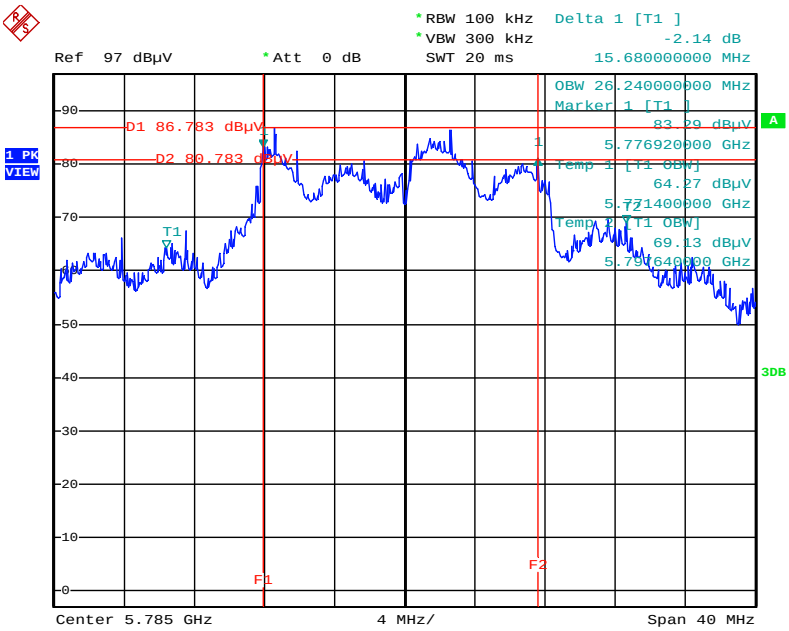
Date: 25.APR.2014 15:00:53

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1 + Chain 2 + Chain 3



Date: 25.APR.2014 15:01:36

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 1 + Chain 2 + Chain 3

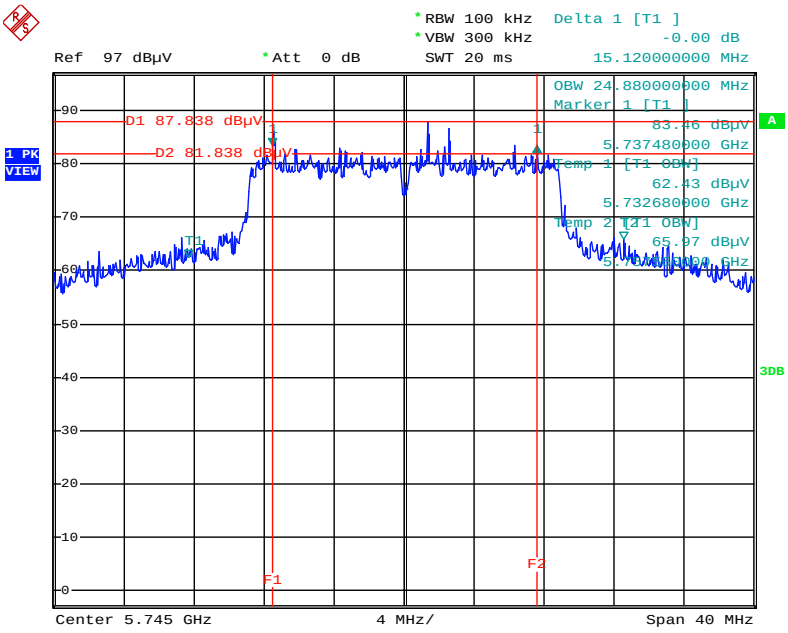


Date: 25.APR.2014 14:52:25

For beamforming mode:

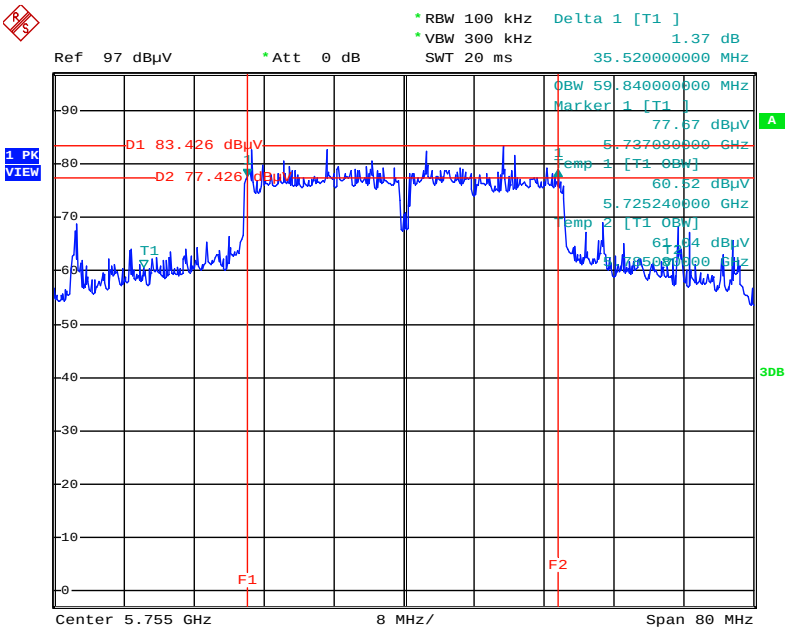
For 5GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5745 MHz / Chain 1 + Chain 2 + Chain 3



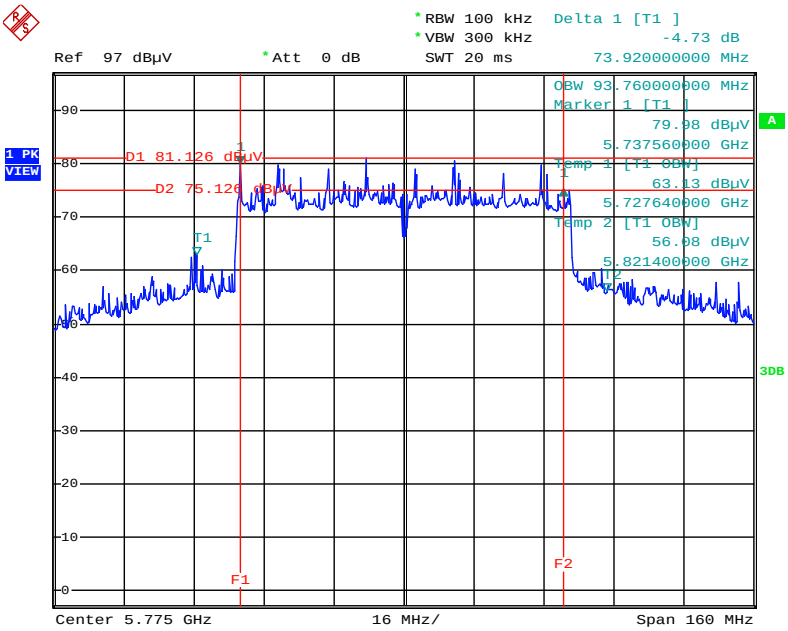
Date: 26.APR.2014 02:06:56

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755MHz / Chain 1 + Chain 2 + Chain 3



Date: 26.APR.2014 02:09:58

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1 + Chain 2 + Chain 3



Date: 26.APR.2014 02:13:42

4.5. Radiated Emissions Measurement

4.5.1. Limit

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

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

4.5.2. Measuring Instruments and Setting

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

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

For non-beamforming mode:

Mode	On Time(ms)	On+Off Time(ms)	Duty Cycle(%)	1/T Minimum VBW (kHz)
802.11n MCS0 20MHz	1.920	1.940	98.97	0.01
802.11n MCS0 40MHz	0.950	0.970	97.94	1.05
802.11b	-	-	100	0.01
802.11g	2.070	2.080	99.52	0.01
802.11ac MCS0/Nss1 VHT20	1.930	1.950	98.97	0.01
802.11ac MCS0/Nss1 VHT40	0.950	0.970	97.94	1.05
802.11ac MCS0/Nss1 VHT80	0.462	0.482	95.85	2.16
802.11a	2.070	2.080	99.52	0.01

For beamforming mode:

Mode	On Time(ms)	On+Off Time(ms)	Duty Cycle(%)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	1.841	1.928	95.49	0.54
802.11ac MCS0/Nss1 VHT40	0.942	1.014	92.90	1.06
802.11ac MCS0/Nss1 VHT80	0.449	0.486	92.54	2.23

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

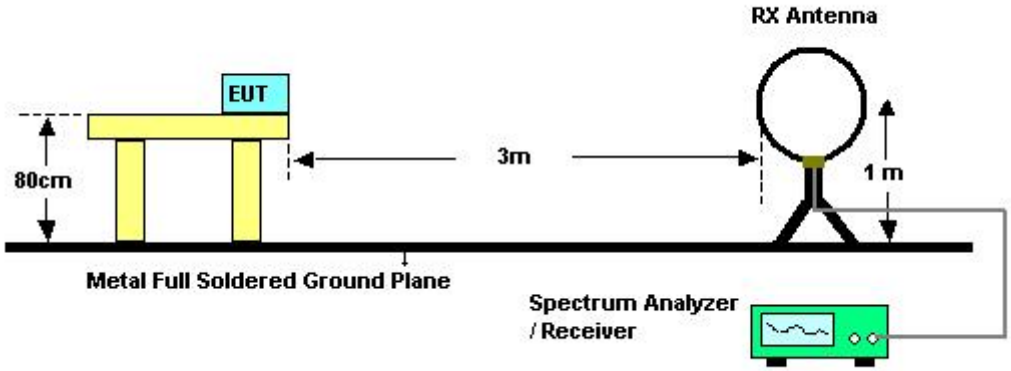
4.5.3. Test Procedures

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.

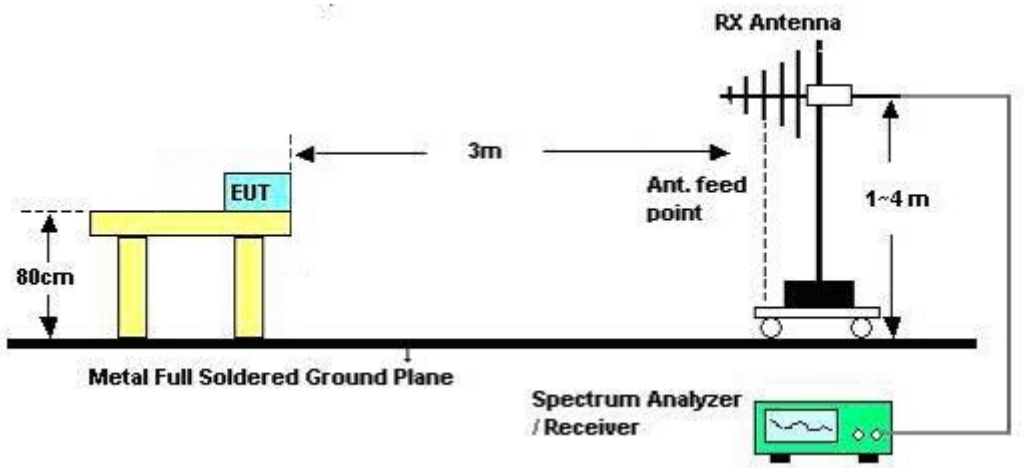
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 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

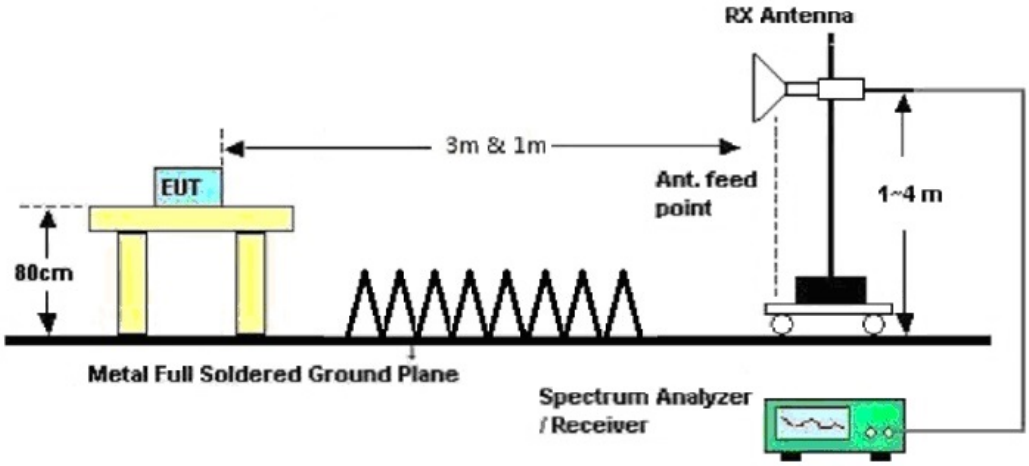
For Radiated Emissions: 9kHz ~30MHz



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	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	Normal Link / Mode 2
Test Date	Apr. 04, 2014		

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

Note:

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

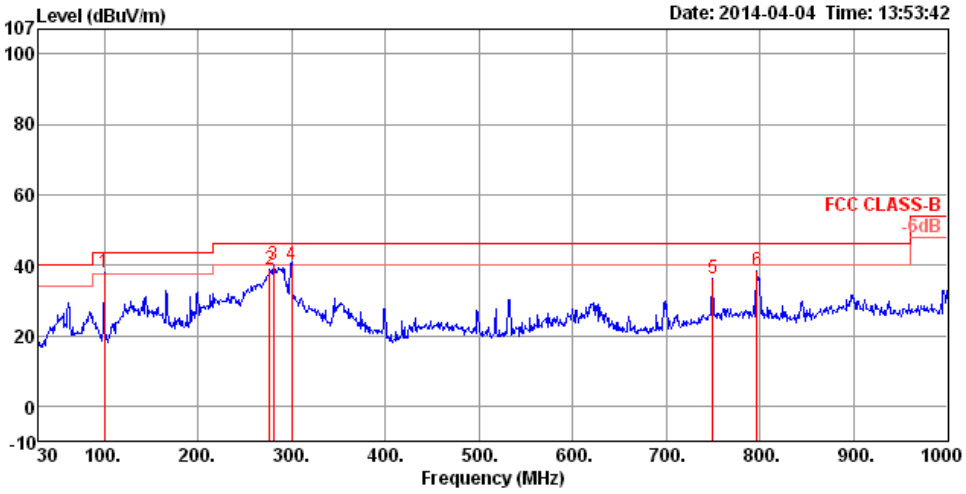
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

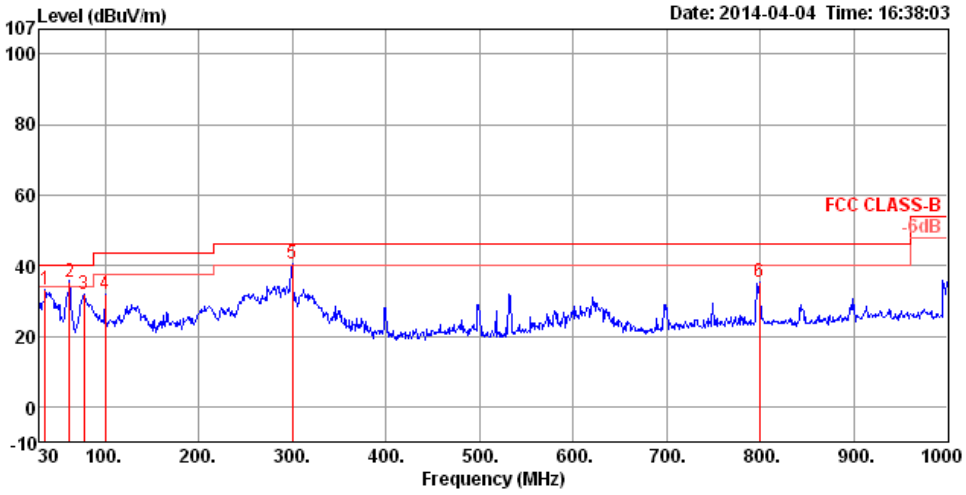
Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	Normal Link / Mode 2

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	99.84	37.75	43.50	-5.75	57.87	1.18	10.31	31.61	300	138	HORIZONTAL	Peak
2	276.38	38.72	46.00	-7.28	55.79	2.01	12.47	31.55	125	308	HORIZONTAL	Peak
3	280.26	39.88	46.00	-6.12	56.85	2.02	12.56	31.55	125	300	HORIZONTAL	Peak
4	299.66	40.07	46.00	-5.93	56.34	2.13	13.02	31.42	125	197	HORIZONTAL	Peak
5	749.74	36.05	46.00	-9.95	44.20	3.53	19.69	31.37	150	308	HORIZONTAL	Peak
6	796.30	38.49	46.00	-7.51	46.36	3.66	19.75	31.28	150	15	HORIZONTAL	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	35.82	33.27	40.00	-6.73	49.83	0.70	14.62	31.88	100	193	VERTICAL	Peak
2	62.01	35.50	40.00	-4.50	61.57	0.91	4.82	31.80	300	357	VERTICAL	Peak
3	77.53	31.68	40.00	-8.32	55.82	1.03	6.53	31.70	150	272	VERTICAL	Peak
4	99.84	31.68	43.50	-11.82	51.80	1.18	10.31	31.61	100	193	VERTICAL	Peak
5	299.66	40.41	46.00	-5.59	56.68	2.13	13.02	31.42	200	125	VERTICAL	Peak
6	799.21	35.31	46.00	-10.69	43.15	3.67	19.76	31.27	100	275	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	24°C	**Humidity**	51%
Test Engineer	David Tseng	**Configurations**	IEEE 802.11n MCS0 HT20 CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4820.92	51.03	74.00	-22.97	48.84	4.21	32.56	34.58	Peak	352	100	HORIZONTAL
2	4823.30	37.56	54.00	-16.44	35.37	4.21	32.56	34.58	Average	352	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4822.56	40.20	54.00	-13.80	38.01	4.21	32.56	34.58	Average	196	100	VERTICAL
2	4825.36	54.30	74.00	-19.70	52.11	4.21	32.56	34.58	Peak	196	100	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4875.09	60.87	74.00	-13.13	58.56	4.22	32.66	34.57	Peak	211	100	HORIZONTAL
2	4875.99	46.56	54.00	-7.44	44.25	4.22	32.66	34.57	Average	211	100	HORIZONTAL
3	7313.00	55.17	74.00	-18.83	47.59	5.34	37.07	34.83	Peak	226	100	HORIZONTAL
4	7313.00	42.94	54.00	-11.06	35.36	5.34	37.07	34.83	Average	226	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4873.94	62.72	74.00	-11.28	60.41	4.22	32.66	34.57	Peak	0	100	VERTICAL
2	4874.51	48.12	54.00	-5.88	45.81	4.22	32.66	34.57	Average	0	100	VERTICAL
3	7311.06	56.25	74.00	-17.75	48.66	5.34	37.07	34.82	Peak	2	175	VERTICAL
4	7312.09	44.11	54.00	-9.89	36.53	5.34	37.07	34.83	Average	2	175	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4924.74	31.51	54.00	-22.49	29.07	4.23	32.76	34.55	Average	311	100	HORIZONTAL
2	4925.19	43.19	74.00	-30.81	40.75	4.23	32.76	34.55	Peak	311	100	HORIZONTAL
3	7378.21	48.96	74.00	-25.04	41.28	5.36	37.16	34.84	Peak	195	100	HORIZONTAL
4	7392.22	36.06	54.00	-17.94	28.36	5.36	37.18	34.84	Average	195	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4925.15	31.49	54.00	-22.51	29.05	4.23	32.76	34.55	Average	356	100	VERTICAL
2	4930.38	44.34	74.00	-29.66	41.90	4.23	32.76	34.55	Peak	356	100	VERTICAL
3	7380.94	36.19	54.00	-17.81	28.51	5.36	37.16	34.84	Average	114	100	VERTICAL
4	7382.19	48.51	74.00	-25.49	40.83	5.36	37.16	34.84	Peak	114	100	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 12 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4933.67	46.11	74.00	-27.89	41.76	5.97	33.58	35.20	Peak	100	240	HORIZONTAL
2	4934.40	32.76	54.00	-21.24	28.41	5.97	33.58	35.20	Average	100	240	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	4934.05	33.64	54.00	-20.36	29.29	5.97	33.58	35.20	Average	100	160	VERTICAL
2	4934.47	45.77	74.00	-28.23	41.42	5.97	33.58	35.20	Peak	100	160	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 13 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4943.97	32.90	54.00	-21.10	28.51	5.98	33.61	35.20	Average	100	207	HORIZONTAL
2	4944.34	45.46	74.00	-28.54	41.07	5.98	33.61	35.20	Peak	100	207	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	4943.72	33.91	54.00	-20.09	29.52	5.98	33.61	35.20	Average	100	102	VERTICAL
2	4943.74	45.43	74.00	-28.57	41.04	5.98	33.61	35.20	Peak	100	102	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 3 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4843.55	31.55	54.00	-22.45	27.45	5.88	33.42	35.20	Average	100	245	HORIZONTAL
2	4843.94	44.70	74.00	-29.30	40.60	5.88	33.42	35.20	Peak	100	245	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4844.17	45.00	74.00	-29.00	40.90	5.88	33.42	35.20	Peak	100	135	VERTICAL
2	4844.28	32.01	54.00	-21.99	27.91	5.88	33.42	35.20	Average	100	135	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4873.53	32.29	54.00	-21.71	28.09	5.92	33.48	35.20	Average	100	266	HORIZONTAL
2	4873.94	46.03	74.00	-27.97	41.83	5.92	33.48	35.20	Peak	100	266	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.33	48.24	74.00	-25.76	44.04	5.92	33.48	35.20	Peak	100	111	VERTICAL
2	4874.38	36.92	54.00	-17.08	32.72	5.92	33.48	35.20	Average	100	111	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4904.28	32.08	54.00	-21.92	27.82	5.95	33.51	35.20	Average	100	188	HORIZONTAL
2	4904.29	45.32	74.00	-28.68	41.06	5.95	33.51	35.20	Peak	100	188	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4904.19	32.92	54.00	-21.08	28.66	5.95	33.51	35.20	Average	100	133	VERTICAL
2	4904.46	44.93	74.00	-29.07	40.67	5.95	33.51	35.20	Peak	100	133	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 10 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4913.92	45.44	74.00	-28.56	41.15	5.95	33.54	35.20	Peak	100	192	HORIZONTAL
2	4914.32	32.28	54.00	-21.72	27.99	5.95	33.54	35.20	Average	100	192	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	4913.57	32.35	54.00	-21.65	28.06	5.95	33.54	35.20	Average	100	277	VERTICAL
2	4913.64	45.41	74.00	-28.59	41.12	5.95	33.54	35.20	Peak	100	277	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.60	32.87	54.00	-21.13	28.52	5.97	33.58	35.20	Average	100	178	HORIZONTAL
2	4923.89	45.48	74.00	-28.52	41.13	5.97	33.58	35.20	Peak	100	178	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	4924.27	32.48	54.00	-21.52	28.13	5.97	33.58	35.20	Average	100	32	VERTICAL
2	4924.32	45.16	74.00	-28.84	40.81	5.97	33.58	35.20	Peak	100	32	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 27, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4824.08	49.44	54.00	-4.56	47.25	4.21	32.56	34.58	Average	17	100	HORIZONTAL
2	4824.09	52.37	74.00	-21.63	50.18	4.21	32.56	34.58	Peak	17	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	4824.07	53.73	54.00	-0.27	51.54	4.21	32.56	34.58	Average	92	146	VERTICAL
2	4824.08	55.89	74.00	-18.11	53.70	4.21	32.56	34.58	Peak	92	146	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.12	46.76	54.00	-7.24	42.56	5.92	33.48	35.20	Average	106	338	HORIZONTAL
2	4874.12	50.81	74.00	-23.19	46.61	5.92	33.48	35.20	Peak	106	338	HORIZONTAL
3	7311.46	59.50	74.00	-14.50	51.29	7.13	36.51	35.43	Peak	107	20	HORIZONTAL
4	7311.86	53.85	54.00	-0.15	45.64	7.13	36.51	35.43	Average	107	20	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.08	50.74	54.00	-3.26	46.54	5.92	33.48	35.20	Average	104	325	VERTICAL
2	4874.08	53.39	74.00	-20.61	49.19	5.92	33.48	35.20	Peak	104	325	VERTICAL
3	7310.44	51.15	54.00	-2.85	42.94	7.13	36.51	35.43	Average	100	22	VERTICAL
4	7311.98	57.32	74.00	-16.68	49.11	7.13	36.51	35.43	Peak	100	22	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.96	51.71	74.00	-22.29	47.36	5.97	33.58	35.20	Peak	104	320	HORIZONTAL
2	4924.06	47.50	54.00	-6.50	43.15	5.97	33.58	35.20	Average	104	320	HORIZONTAL
3	7386.88	53.38	54.00	-0.62	45.06	7.17	36.61	35.46	Average	100	5	HORIZONTAL
4	7387.06	59.08	74.00	-14.92	50.76	7.17	36.61	35.46	Peak	100	5	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	4924.02	55.65	74.00	-18.35	51.30	5.97	33.58	35.20	Peak	102	325	VERTICAL
2	4924.10	53.40	54.00	-0.60	49.05	5.97	33.58	35.20	Average	102	325	VERTICAL
3	7385.18	58.51	74.00	-15.49	50.19	7.17	36.61	35.46	Peak	102	329	VERTICAL
4	7385.42	52.79	54.00	-1.21	44.47	7.17	36.61	35.46	Average	102	329	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 12 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4933.96	52.66	74.00	-21.34	48.31	5.97	33.58	35.20	Peak	123	288	HORIZONTAL
2	4934.03	48.48	54.00	-5.52	44.13	5.97	33.58	35.20	Average	123	288	HORIZONTAL
3	7400.30	53.61	54.00	-0.39	45.26	7.17	36.64	35.46	Average	122	291	HORIZONTAL
4	7401.77	58.60	74.00	-15.40	50.24	7.18	36.64	35.46	Peak	122	291	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4934.05	53.53	74.00	-20.47	49.18	5.97	33.58	35.20	Peak	100	339	VERTICAL
2	4934.06	49.98	54.00	-4.02	45.63	5.97	33.58	35.20	Average	100	339	VERTICAL
3	7401.03	57.70	74.00	-16.30	49.34	7.18	36.64	35.46	Peak	101	201	VERTICAL
4	7401.83	52.89	54.00	-1.11	44.53	7.18	36.64	35.46	Average	101	201	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 13 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4943.98	54.00	74.00	-20.00	49.61	5.98	33.61	35.20	Peak	127	272	HORIZONTAL
2	4944.03	50.77	54.00	-3.23	46.38	5.98	33.61	35.20	Average	127	272	HORIZONTAL
3	7415.36	52.75	54.00	-1.25	44.37	7.18	36.67	35.47	Average	126	302	HORIZONTAL
4	7417.03	58.51	74.00	-15.49	50.13	7.18	36.67	35.47	Peak	126	302	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	4944.02	52.28	54.00	-1.72	47.89	5.98	33.61	35.20	Average	142	227	VERTICAL
2	4944.10	54.67	74.00	-19.33	50.28	5.98	33.61	35.20	Peak	142	227	VERTICAL
3	7415.39	52.59	54.00	-1.41	44.21	7.18	36.67	35.47	Average	121	189	VERTICAL
4	7416.48	57.70	74.00	-16.30	49.32	7.18	36.67	35.47	Peak	121	189	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4824.13	45.26	74.00	-28.74	41.20	5.87	33.39	35.20	Peak	100	234	HORIZONTAL
2	4824.21	31.81	54.00	-22.19	27.75	5.87	33.39	35.20	Average	100	234	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4823.90	34.98	54.00	-19.02	30.92	5.87	33.39	35.20	Average	100	163	VERTICAL
2	4824.00	47.46	74.00	-26.54	43.40	5.87	33.39	35.20	Peak	100	163	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4870.07	42.71	54.00	-11.29	38.54	5.92	33.45	35.20	Average	121	268	HORIZONTAL
2	4872.48	55.58	74.00	-18.42	51.38	5.92	33.48	35.20	Peak	121	268	HORIZONTAL
3	7313.97	55.56	74.00	-18.44	47.35	7.13	36.51	35.43	Peak	128	300	HORIZONTAL
4	7314.69	44.18	54.00	-9.82	35.97	7.13	36.51	35.43	Average	128	300	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4872.72	58.86	74.00	-15.14	54.66	5.92	33.48	35.20	Peak	102	188	VERTICAL
2	4874.72	46.03	54.00	-7.97	41.83	5.92	33.48	35.20	Average	102	188	VERTICAL
3	7311.72	40.64	54.00	-13.36	32.43	7.13	36.51	35.43	Average	117	229	VERTICAL
4	7312.12	52.73	74.00	-21.27	44.52	7.13	36.51	35.43	Peak	117	229	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4923.58	45.58	74.00	-28.42	41.23	5.97	33.58	35.20	Peak	100	217	HORIZONTAL
2	4924.49	33.03	54.00	-20.97	28.68	5.97	33.58	35.20	Average	100	217	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4924.15	35.06	54.00	-18.94	30.71	5.97	33.58	35.20	Average	100	331	VERTICAL
2	4924.49	47.63	74.00	-26.37	43.28	5.97	33.58	35.20	Peak	100	331	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 12 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4933.89	46.02	74.00	-27.98	41.67	5.97	33.58	35.20	Peak	100	132	HORIZONTAL
2	4934.19	33.39	54.00	-20.61	29.04	5.97	33.58	35.20	Average	100	132	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	4934.03	34.93	54.00	-19.07	30.58	5.97	33.58	35.20	Average	102	204	VERTICAL
2	4934.35	47.82	74.00	-26.18	43.47	5.97	33.58	35.20	Peak	102	204	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 13 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4944.10	45.89	74.00	-28.11	41.50	5.98	33.61	35.20	Peak	100	306	HORIZONTAL
2	4944.41	32.91	54.00	-21.09	28.52	5.98	33.61	35.20	Average	100	306	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	4944.03	33.92	54.00	-20.08	29.53	5.98	33.61	35.20	Average	100	174	VERTICAL
2	4944.24	47.08	74.00	-26.92	42.69	5.98	33.61	35.20	Peak	100	174	VERTICAL

For 5GHz Band:

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	11487.60	55.77	74.00	-18.23	45.39	6.74	38.30	34.66	Peak	217	100	HORIZONTAL
2	11492.48	42.44	54.00	-11.56	32.06	6.74	38.30	34.66	Average	217	100	HORIZONTAL
3	17223.54	59.81	74.00	-14.19	43.98	8.09	41.68	33.94	Peak	329	100	HORIZONTAL
4	17255.91	47.71	54.00	-6.29	31.80	8.09	41.75	33.93	Average	329	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	11491.28	43.29	54.00	-10.71	32.91	6.74	38.30	34.66	Average	186	100	VERTICAL
2	11498.09	55.07	74.00	-18.93	44.68	6.75	38.30	34.66	Peak	183	100	VERTICAL
3	17252.07	59.90	74.00	-14.10	43.99	8.09	41.75	33.93	Peak	60	100	VERTICAL
4	17259.20	47.58	54.00	-6.42	31.67	8.09	41.75	33.93	Average	60	100	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11570.03	43.18	54.00	-10.82	29.54	9.26	39.47	35.09	Average	100	182	HORIZONTAL
2	11570.41	54.62	74.00	-19.38	40.98	9.26	39.47	35.09	Peak	100	182	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.76	56.72	74.00	-17.28	43.08	9.26	39.47	35.09	Peak	109	296	VERTICAL
2	11570.56	45.78	54.00	-8.22	32.14	9.26	39.47	35.09	Average	109	296	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 28, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	11651.76	42.13	54.00	-11.87	31.69	6.80	38.36	34.72	Average	186	100	HORIZONTAL
2	11656.01	54.56	74.00	-19.44	44.12	6.80	38.36	34.72	Peak	190	100	HORIZONTAL
3	17465.63	59.37	74.00	-14.63	42.95	8.12	42.23	33.93	Peak	81	100	HORIZONTAL
4	17485.50	46.66	54.00	-7.34	30.21	8.12	42.26	33.93	Average	81	100	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	11650.08	43.17	54.00	-10.83	32.73	6.80	38.36	34.72	Average	317	100	VERTICAL
2	11656.01	53.19	74.00	-20.81	42.75	6.80	38.36	34.72	Peak	317	100	VERTICAL
3	17499.36	46.88	54.00	-7.12	30.38	8.13	42.30	33.93	Average	202	100	VERTICAL
4	17500.00	59.46	74.00	-14.54	42.96	8.13	42.30	33.93	Peak	202	100	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11510.01	54.91	74.00	-19.09	41.26	9.25	39.50	35.10	Peak	100	76	HORIZONTAL
2	11510.09	42.01	54.00	-11.99	28.36	9.25	39.50	35.10	Average	100	76	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11509.74	56.03	74.00	-17.97	42.38	9.25	39.50	35.10	Peak	111	274	VERTICAL
2	11510.30	43.09	54.00	-10.91	29.44	9.25	39.50	35.10	Average	111	274	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11590.29	55.41	74.00	-18.59	41.75	9.27	39.47	35.08	Peak	100	119	HORIZONTAL
2	11590.48	42.32	54.00	-11.68	28.66	9.27	39.47	35.08	Average	100	119	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11589.79	42.82	54.00	-11.18	29.16	9.27	39.47	35.08	Average	123	273	VERTICAL
2	11590.03	55.49	74.00	-18.51	41.83	9.27	39.47	35.08	Peak	123	273	VERTICAL

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11550.19	41.94	54.00	-12.06	28.28	9.26	39.49	35.09	Average	100	157	HORIZONTAL
2	11550.39	54.99	74.00	-19.01	41.34	9.26	39.48	35.09	Peak	100	157	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11549.52	54.97	74.00	-19.03	41.31	9.26	39.49	35.09	Peak	100	267	VERTICAL
2	11550.04	42.43	54.00	-11.57	28.77	9.26	39.49	35.09	Average	100	267	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11489.98	42.94	54.00	-11.06	29.28	9.24	39.50	35.08	Average	100	38	HORIZONTAL
2	11490.31	54.79	74.00	-19.21	41.13	9.24	39.50	35.08	Peak	100	38	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	11492.57	59.03	74.00	-14.97	45.37	9.24	39.50	35.08	Peak	175	276	VERTICAL
2	11492.60	44.94	54.00	-9.06	31.28	9.24	39.50	35.08	Average	175	276	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11569.93	42.76	54.00	-11.24	29.12	9.26	39.47	35.09	Average	100	50	HORIZONTAL
2	11570.35	55.58	74.00	-18.42	41.94	9.26	39.47	35.09	Peak	100	50	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	11572.08	44.70	54.00	-9.30	31.05	9.26	39.47	35.08	Average	116	275	VERTICAL
2	11572.21	57.14	74.00	-16.86	43.49	9.26	39.47	35.08	Peak	116	275	VERTICAL

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11650.02	43.68	54.00	-10.32	30.03	9.28	39.44	35.07	Average	110	127	HORIZONTAL
2	11650.04	56.32	74.00	-17.68	42.67	9.28	39.44	35.07	Peak	110	127	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11649.68	55.39	74.00	-18.61	41.74	9.28	39.44	35.07	Peak	100	346	VERTICAL
2	11650.96	45.02	54.00	-8.98	31.37	9.28	39.44	35.07	Average	100	346	VERTICAL

For beamforming mode:

For 5GHz Band:

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.70	43.78	54.00	-10.22	30.44	9.09	39.10	34.85	100	170	HORIZONTAL	Average
2	11491.51	54.79	74.00	-19.21	41.45	9.09	39.10	34.85	100	170	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11489.07	46.11	54.00	-7.89	32.77	9.09	39.10	34.85	100	1	VERTICAL	Average
2	11489.74	53.29	74.00	-20.71	39.95	9.09	39.10	34.85	100	1	VERTICAL	Peak

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11570.66	54.25	74.00	-19.75	40.98	9.11	39.01	34.85	100	92	HORIZONTAL	Peak
2	11570.68	41.83	54.00	-12.17	28.56	9.11	39.01	34.85	100	92	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11567.61	46.10	54.00	-7.90	32.83	9.11	39.01	34.85	100	278	VERTICAL	Average
2	11569.11	54.28	74.00	-19.72	41.01	9.11	39.01	34.85	100	278	VERTICAL	Peak

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11651.07	53.77	74.00	-20.23	40.62	9.11	38.89	34.85	100	161	HORIZONTAL	Peak
2	11651.42	43.20	54.00	-10.80	30.05	9.11	38.89	34.85	100	161	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11648.66	45.73	54.00	-8.27	32.54	9.11	38.93	34.85	100	328	VERTICAL	Average
2	11649.88	53.77	74.00	-20.23	40.58	9.11	38.93	34.85	100	328	VERTICAL	Peak

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11514.58	42.37	54.00	-11.63	29.02	9.10	39.10	34.85	100	64	HORIZONTAL	Average
2	11514.85	54.09	74.00	-19.91	40.74	9.10	39.10	34.85	100	64	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11513.24	53.13	74.00	-20.87	39.78	9.10	39.10	34.85	100	168	VERTICAL	Peak
2	11514.64	44.14	54.00	-9.86	30.79	9.10	39.10	34.85	100	168	VERTICAL	Average

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11589.90	42.21	54.00	-11.79	28.98	9.11	38.97	34.85	100	196	HORIZONTAL	Average
2	11590.05	53.57	74.00	-20.43	40.34	9.11	38.97	34.85	100	196	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11591.72	44.04	54.00	-9.96	30.81	9.11	38.97	34.85	100	107	VERTICAL	Average
2	11593.84	53.28	74.00	-20.72	40.05	9.11	38.97	34.85	100	107	VERTICAL	Peak

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 17, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11587.77	41.91	54.00	-12.09	28.68	9.11	38.97	34.85	100	120	HORIZONTAL	Average
2	11593.13	53.35	74.00	-20.65	40.12	9.11	38.97	34.85	100	120	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	11586.18	42.78	54.00	-11.22	29.55	9.11	38.97	34.85	100	237	VERTICAL	Average
2	11594.94	54.06	74.00	-19.94	40.83	9.11	38.97	34.85	100	237	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.

4.6. 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, Please refer to below table for Average
RBW / VBW (Emission in non-restricted band)	100 kHz / 300 kHz for Peak

For non-beamforming mode:

Mode	On Time(ms)	On+Off Time(ms)	Duty Cycle(%)	1/T Minimum VBW (kHz)
802.11n MCS0 20MHz	1.920	1.940	98.97	0.01
802.11n MCS0 40MHz	0.950	0.970	97.94	1.05
802.11b	-	-	100	0.01
802.11g	2.070	2.080	99.52	0.01
802.11ac MCS0/Nss1 VHT20	1.930	1.950	98.97	0.01
802.11ac MCS0/Nss1 VHT40	0.950	0.970	97.94	1.05
802.11ac MCS0/Nss1 VHT80	0.462	0.482	95.85	2.16
802.11a	2.070	2.080	99.52	0.01

For beamforming mode:

Mode	On Time(ms)	On+Off Time(ms)	Duty Cycle(%)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	1.841	1.928	95.49	0.54
802.11ac MCS0/Nss1 VHT40	0.942	1.014	92.90	1.06
802.11ac MCS0/Nss1 VHT80	0.449	0.486	92.54	2.23

4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

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	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test date	Mar. 28, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2390.00	70.15	74.00	-3.85	39.32	2.91	27.92	0.00	Peak	326	107	VERTICAL
2	2390.00	53.36	54.00	-0.64	22.53	2.91	27.92	0.00	Average	326	107	VERTICAL
3	2413.12	102.66	54.00			2.92	27.90	0.00	Average	326	107	VERTICAL
4	2413.28	111.53	74.00			2.92	27.90	0.00	Peak	326	107	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	2390.00	52.09	54.00	-1.91	19.95	4.09	28.05	0.00	Average	104	339	VERTICAL
2	2390.00	65.20	74.00	-8.80	33.06	4.09	28.05	0.00	Peak	104	339	VERTICAL
3	2435.56	108.92			76.62	4.12	28.18	0.00	Average	104	339	VERTICAL
4	2440.37	120.02			87.71	4.13	28.18	0.00	Peak	104	339	VERTICAL
5	2483.50	48.24	54.00	-5.76	15.82	4.16	28.26	0.00	Average	104	339	VERTICAL
6	2487.35	64.18	74.00	-9.82	31.72	4.16	28.30	0.00	Peak	104	339	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2458.31	111.17			80.38	2.95	27.84	0.00	Peak	350	130	VERTICAL
2	2463.44	101.38			70.59	2.95	27.84	0.00	Average	350	130	VERTICAL
3	2483.50	53.56	54.00	-0.44	22.78	2.96	27.82	0.00	Average	350	130	VERTICAL
4	2483.66	70.59	74.00	-3.41	39.81	2.96	27.82	0.00	Peak	350	130	VERTICAL

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

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT20 CH 12, 13 / Chain 1 + Chain 2 + Chain 3
Test date	Apr. 12, 2014		

Channel 12

	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	2475.17	102.09			69.67	4.16	28.26	0.00	Average	102	336	VERTICAL
2	2475.17	111.82			79.40	4.16	28.26	0.00	Peak	102	336	VERTICAL
3	2484.94	53.52	54.00	-0.48	21.10	4.16	28.26	0.00	Average	102	336	VERTICAL
4	2485.74	69.76	74.00	-4.24	37.30	4.16	28.30	0.00	Peak	102	336	VERTICAL

Item 1, 2 are the fundamental frequency at 2467 MHz.

Channel 13

	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	2470.24	110.63			78.23	4.14	28.26	0.00	Peak	102	335	VERTICAL
2	2470.40	99.74			67.34	4.14	28.26	0.00	Average	102	335	VERTICAL
3	2484.94	53.55	54.00	-0.45	21.13	4.16	28.26	0.00	Average	102	335	VERTICAL
4	2485.58	73.19	74.00	-0.81	40.73	4.16	28.30	0.00	Peak	102	335	VERTICAL

Item 1, 2 are the fundamental frequency at 2472 MHz.

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 3, 6, 9 / Chain 1 + Chain 2 + Chain 3
Test date	Apr. 12, 2014		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2385.19	66.65	74.00	-7.35	35.81	2.90	27.94	0.00	Peak	348	132	VERTICAL
2	2390.00	53.58	54.00	-0.42	22.75	2.91	27.92	0.00	Average	348	132	VERTICAL
3	2418.15	107.22			76.40	2.92	27.90	0.00	Peak	348	132	VERTICAL
4	2425.53	98.49			67.68	2.93	27.88	0.00	Average	348	132	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	53.13	54.00	-0.87	20.99	4.09	28.05	0.00	Average	105	337	VERTICAL
2	2390.00	68.07	74.00	-5.93	35.93	4.09	28.05	0.00	Peak	105	337	VERTICAL
3	2440.21	100.99			68.68	4.13	28.18	0.00	Average	105	337	VERTICAL
4	2440.21	112.23			79.92	4.13	28.18	0.00	Peak	105	337	VERTICAL
5	2485.42	52.55	54.00	-1.45	20.09	4.16	28.30	0.00	Average	105	337	VERTICAL
6	2486.06	71.75	74.00	-2.25	39.29	4.16	28.30	0.00	Peak	105	337	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	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2458.09	106.40			75.61	2.95	27.84	0.00	Peak	353	190	VERTICAL
2	2458.09	97.73			66.94	2.95	27.84	0.00	Average	353	190	VERTICAL
3	2483.50	67.32	74.00	-6.68	36.54	2.96	27.82	0.00	Peak	353	190	VERTICAL
4	2483.50	53.53	54.00	-0.47	22.75	2.96	27.82	0.00	Average	353	190	VERTICAL

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

Temperature	24℃	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11n MCS0 HT40 CH 10, 11 / Chain 1 + Chain 2 + Chain 3
Test date	Apr. 12, 2014		

Channel 10

	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	2470.46	97.91			65.51	4.14	28.26	0.00	Average	104	336	VERTICAL
2	2470.46	108.39			75.99	4.14	28.26	0.00	Peak	104	336	VERTICAL
3	2485.42	53.13	54.00	-0.87	20.67	4.16	28.30	0.00	Average	104	336	VERTICAL
4	2490.87	69.63	74.00	-4.37	37.16	4.17	28.30	0.00	Peak	104	336	VERTICAL

Item 1, 2 are the fundamental frequency at 2457 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	2475.46	97.28			64.86	4.16	28.26	0.00	Average	104	335	VERTICAL
2	2475.46	106.53			74.11	4.16	28.26	0.00	Peak	104	335	VERTICAL
3	2483.50	69.25	74.00	-4.75	36.83	4.16	28.26	0.00	Peak	104	335	VERTICAL
4	2485.10	53.43	54.00	-0.57	20.97	4.16	28.30	0.00	Average	104	335	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.

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Mar. 27, 2014 ~ Mar. 28, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	2390.00	56.18	74.00	-17.82	25.35	2.91	27.92	0.00	Peak	38	149	HORIZONTAL
2	2390.00	44.89	54.00	-9.11	14.06	2.91	27.92	0.00	Average	38	149	HORIZONTAL
3	2411.40	109.90			79.08	2.92	27.90	0.00	Average	38	149	HORIZONTAL
4	2413.00	113.64			82.82	2.92	27.90	0.00	Peak	38	149	HORIZONTAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2358.59	47.87	54.00	-6.13	15.83	4.07	27.97	0.00	Average	158	40	HORIZONTAL
2	2359.87	60.08	74.00	-13.92	28.04	4.07	27.97	0.00	Peak	158	40	HORIZONTAL
3	2436.36	110.63			78.33	4.12	28.18	0.00	Average	158	40	HORIZONTAL
4	2436.36	114.37			82.07	4.12	28.18	0.00	Peak	158	40	HORIZONTAL
5	2483.50	47.54	54.00	-6.46	15.12	4.16	28.26	0.00	Average	158	40	HORIZONTAL
6	2487.03	59.41	74.00	-14.59	26.95	4.16	28.30	0.00	Peak	158	40	HORIZONTAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2462.80	105.10			72.74	4.14	28.22	0.00	Average	100	34	VERTICAL
2	2463.00	108.90			76.54	4.14	28.22	0.00	Peak	100	34	VERTICAL
3	2483.50	45.68	54.00	-8.32	13.26	4.16	28.26	0.00	Average	100	34	VERTICAL
4	2483.50	55.67	74.00	-18.33	23.25	4.16	28.26	0.00	Peak	100	34	VERTICAL

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

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11b CH 12, 13 / Chain 1 + Chain 2 + Chain 3
Test date	Apr. 12, 2014		

Channel 12

	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	2468.12	109.16			76.76	4.14	28.26	0.00	Peak	100	9	VERTICAL
2	2468.76	105.28			72.88	4.14	28.26	0.00	Average	100	9	VERTICAL
3	2483.50	58.43	74.00	-15.57	26.01	4.16	28.26	0.00	Peak	100	9	VERTICAL
4	2483.70	49.05	54.00	-4.95	16.63	4.16	28.26	0.00	Average	100	9	VERTICAL

Item 1, 2 are the fundamental frequency at 2467 MHz.

Channel 13

	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	2471.20	108.49			76.07	4.16	28.26	0.00	Average	147	37	HORIZONTAL
2	2472.96	112.19			79.77	4.16	28.26	0.00	Peak	147	37	HORIZONTAL
3	2483.50	53.34	54.00	-0.66	20.92	4.16	28.26	0.00	Average	147	37	HORIZONTAL
4	2483.50	61.72	74.00	-12.28	29.30	4.16	28.26	0.00	Peak	147	37	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2472 MHz.

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Apr. 12, 2014		

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	2390.00	51.68	54.00	-2.32	19.54	4.09	28.05	0.00	Average	162	47	HORIZONTAL
2	2390.00	73.11	74.00	-0.89	40.97	4.09	28.05	0.00	Peak	162	47	HORIZONTAL
3	2410.88	114.25			82.05	4.11	28.09	0.00	Peak	162	47	HORIZONTAL
4	2411.36	105.02			72.82	4.11	28.09	0.00	Average	162	47	HORIZONTAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2390.00	52.69	54.00	-1.31	20.55	4.09	28.05	0.00	Average	105	337	VERTICAL
2	2390.00	69.05	74.00	-4.95	36.91	4.09	28.05	0.00	Peak	105	337	VERTICAL
3	2440.21	113.65			81.34	4.13	28.18	0.00	Average	105	337	VERTICAL
4	2440.53	123.68			91.37	4.13	28.18	0.00	Peak	105	337	VERTICAL
5	2483.50	51.09	54.00	-2.91	18.67	4.16	28.26	0.00	Average	105	337	VERTICAL
6	2484.46	67.51	74.00	-6.49	35.09	4.16	28.26	0.00	Peak	105	337	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	2463.12	103.92			71.56	4.14	28.22	0.00	Average	154	46	HORIZONTAL
2	2463.28	113.81			81.45	4.14	28.22	0.00	Peak	154	46	HORIZONTAL
3	2483.50	50.98	54.00	-3.02	18.56	4.16	28.26	0.00	Average	154	46	HORIZONTAL
4	2483.98	73.56	74.00	-0.44	41.14	4.16	28.26	0.00	Peak	154	46	HORIZONTAL

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

Temperature	24°C	Humidity	51%
Test Engineer	David Tseng	Configurations	IEEE 802.11g CH 12, 13 / Chain 1 + Chain 2 + Chain 3
Test date	Apr. 12, 2014		

Channel 12

	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	2465.88	113.77			81.41	4.14	28.22	0.00	Peak	158	49	HORIZONTAL
2	2466.20	102.95			70.59	4.14	28.22	0.00	Average	158	49	HORIZONTAL
3	2484.94	52.91	54.00	-1.09	20.49	4.16	28.26	0.00	Average	158	49	HORIZONTAL
4	2486.39	73.80	74.00	-0.20	41.34	4.16	28.30	0.00	Peak	158	49	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2467 MHz.

Channel 13

	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	2473.12	99.62			67.20	4.16	28.26	0.00	Average	151	38	HORIZONTAL
2	2473.12	110.05			77.63	4.16	28.26	0.00	Peak	151	38	HORIZONTAL
3	2483.50	53.74	54.00	-0.26	21.32	4.16	28.26	0.00	Average	151	38	HORIZONTAL
4	2483.98	69.00	74.00	-5.00	36.58	4.16	28.26	0.00	Peak	151	38	HORIZONTAL

Item 1, 2 are the fundamental frequency at 2472 MHz.

Note:

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

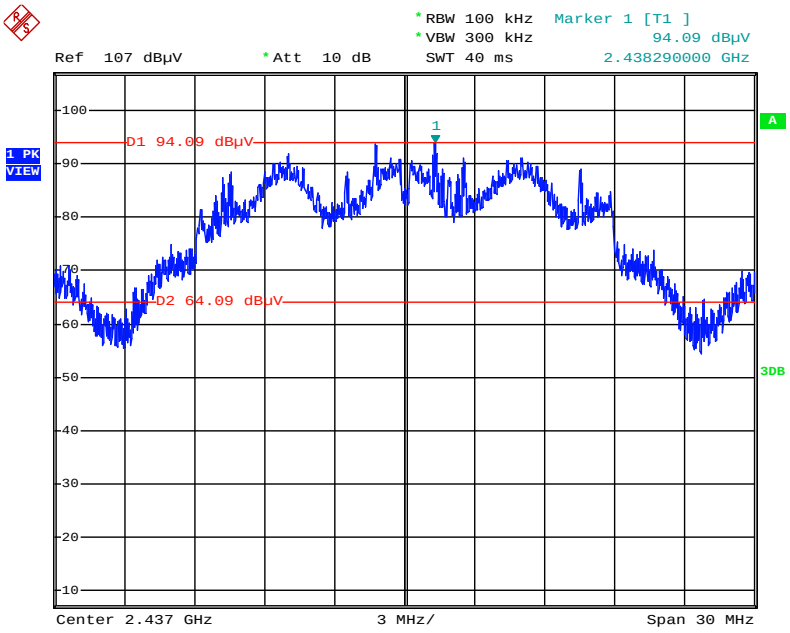
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

For non-beamforming mode:

For 2.4GHz Band:

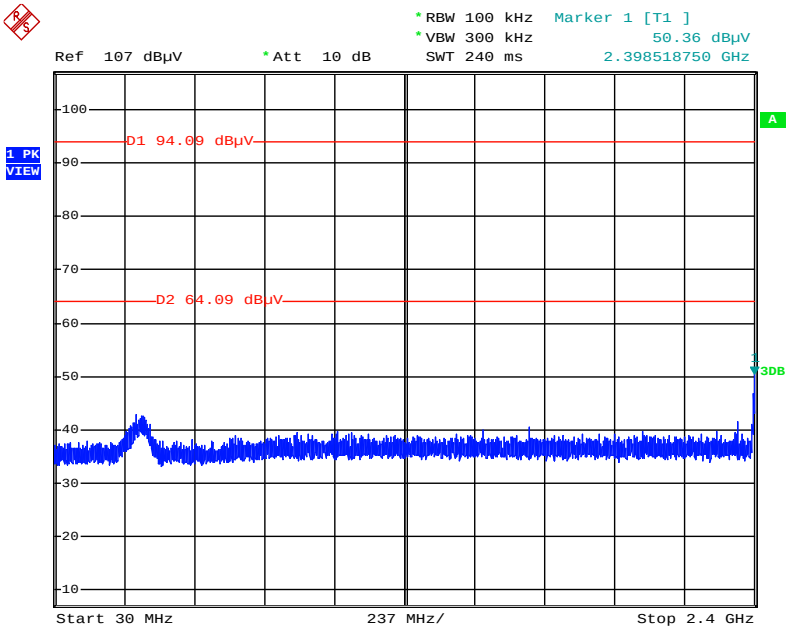
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level



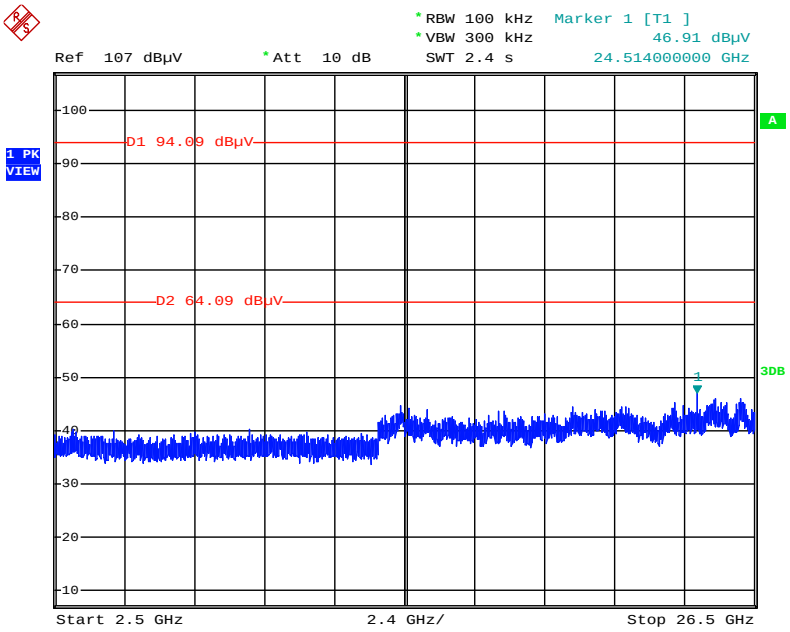
Date: 12.APR.2014 19:57:53

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 30MHz~2400MHz (down 30dBc)



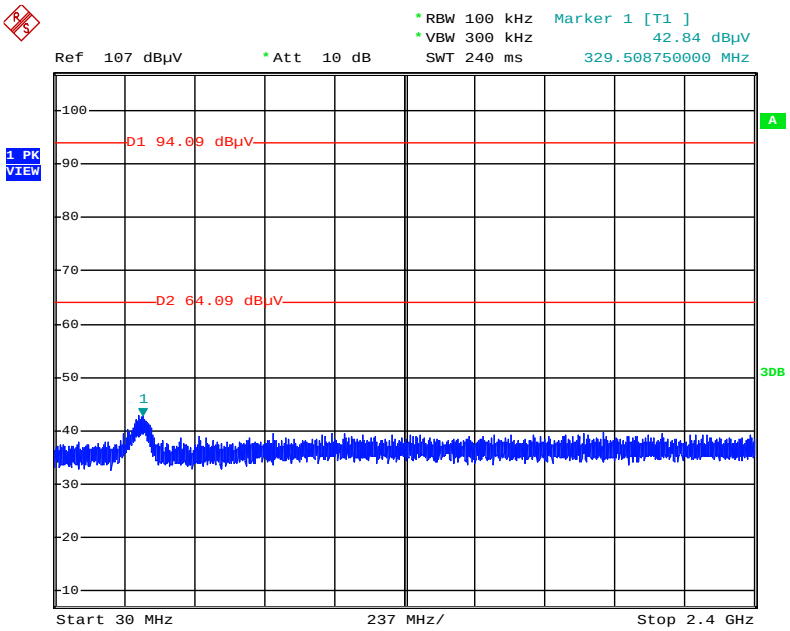
Date: 12.APR.2014 19:59:32

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



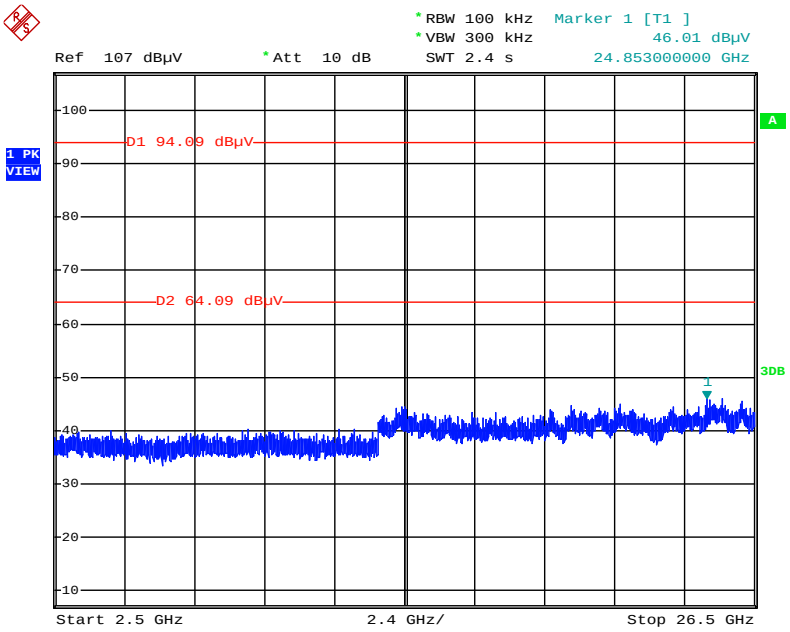
Date: 12.APR.2014 20:00:21

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 30MHz~2400MHz (down 30dBc)

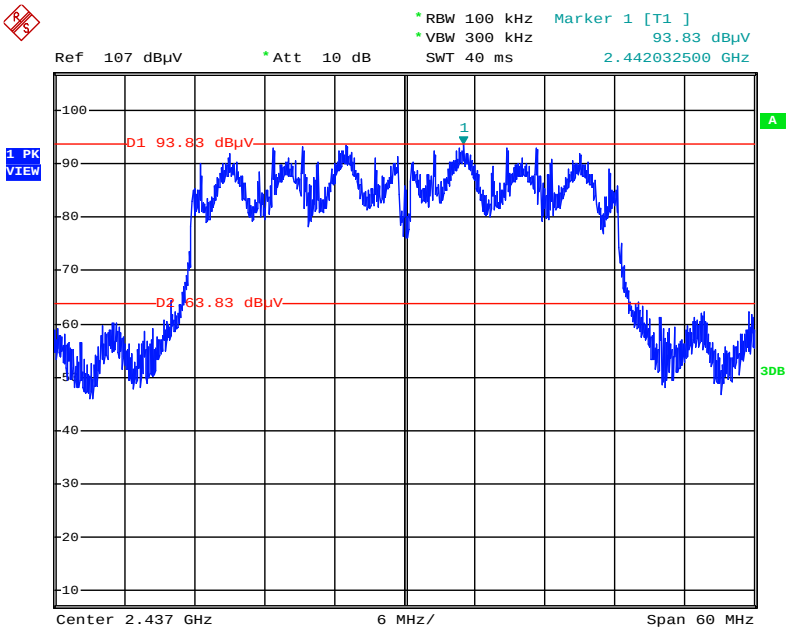


Date: 12.APR.2014 20:01:35

Plot on Configuration IEEE 802.11n MCS0 HT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)

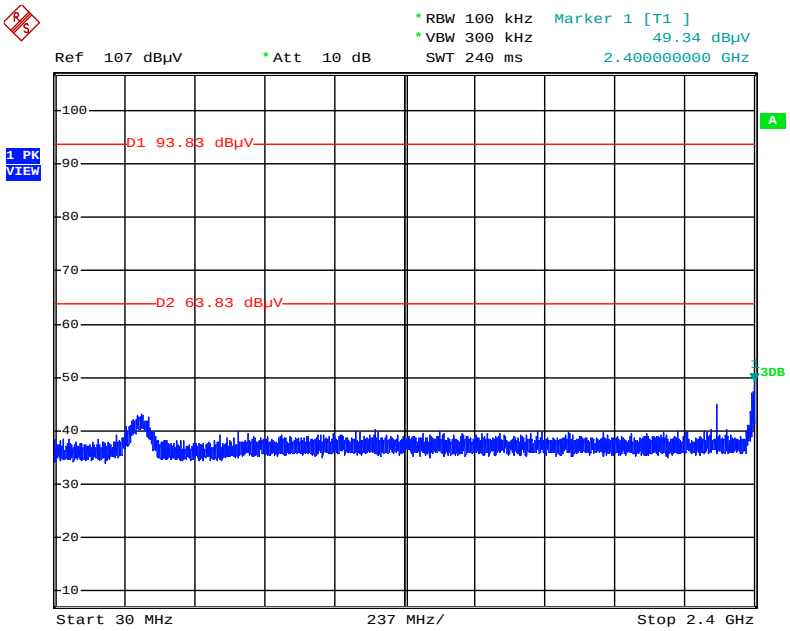


Plot on Configuration IEEE 802.11n MCS0 HT40 / Reference Level



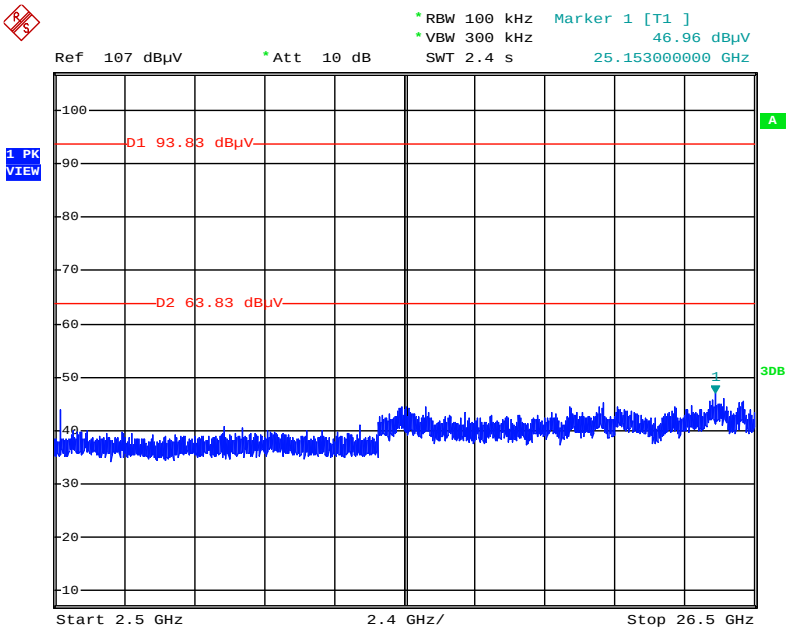
Date: 12.APR.2014 19:46:10

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 30MHz~2400MHz (down 30dBc)



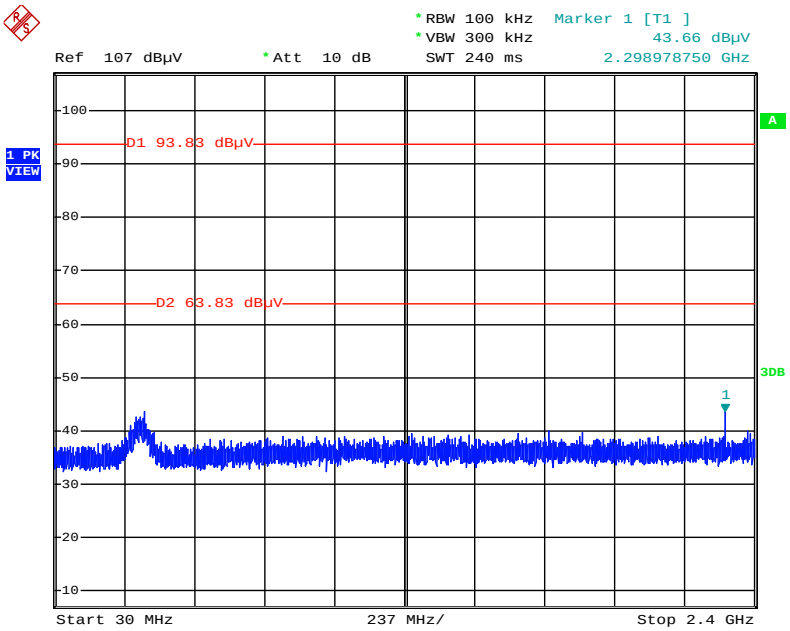
Date: 12.APR.2014 19:47:38

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



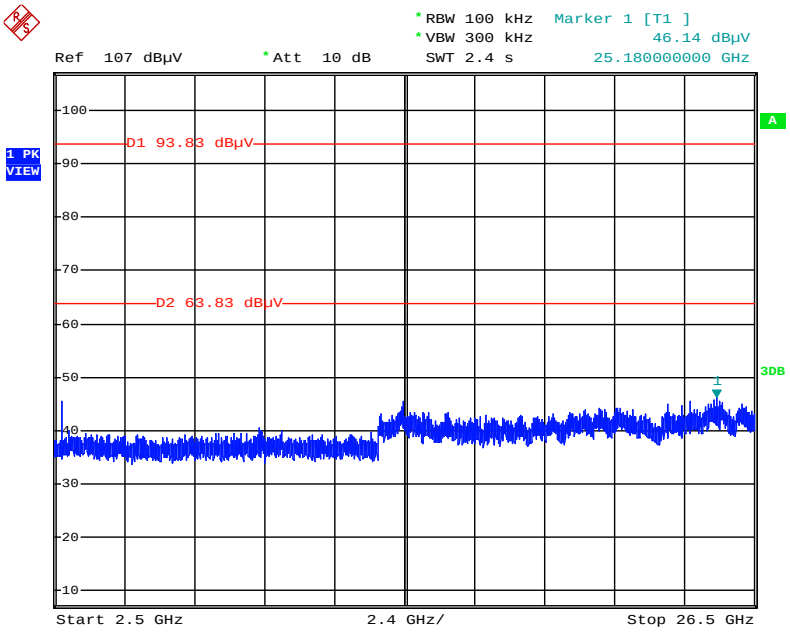
Date: 12.APR.2014 19:48:35

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 30MHz~2400MHz (down 30dBc)



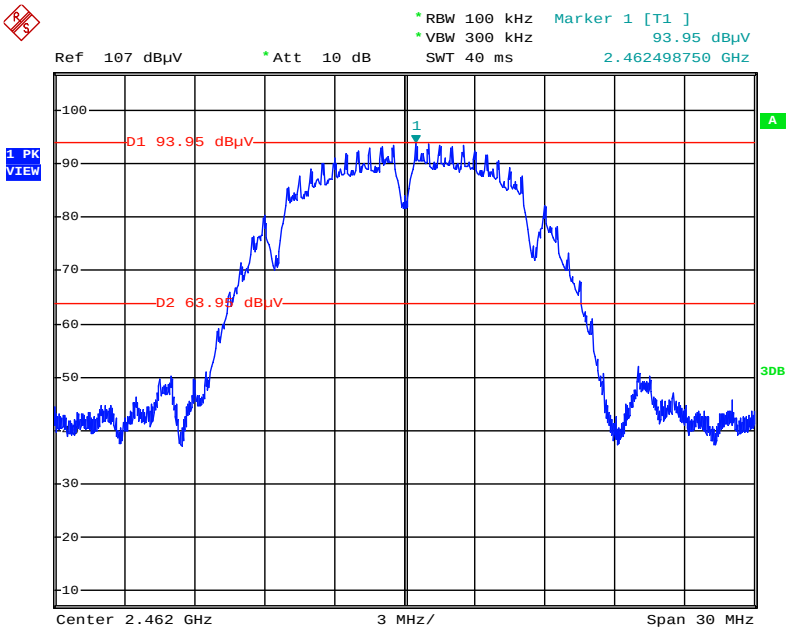
Date: 12.APR.2014 19:49:42

Plot on Configuration IEEE 802.11n MCS0 HT40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



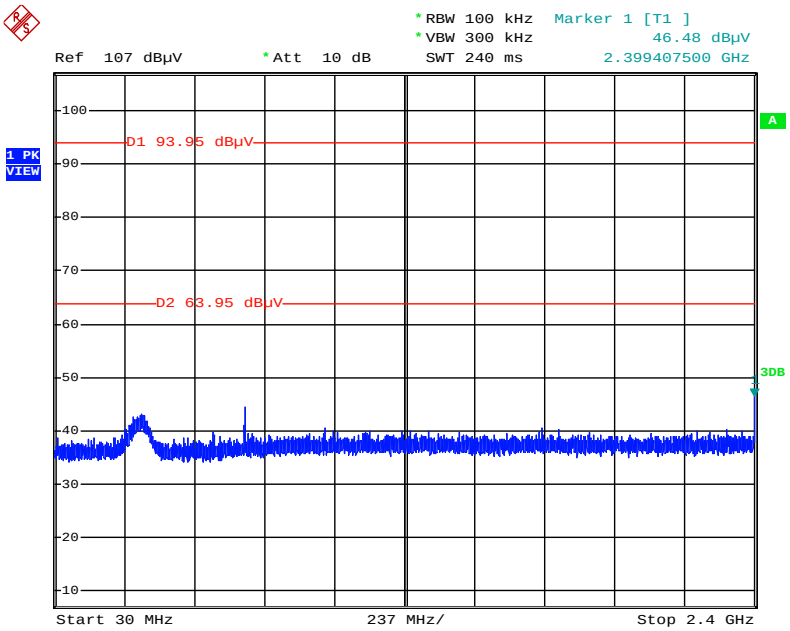
Date: 12.APR.2014 19:50:37

Plot on Configuration IEEE 802.11b / Reference Level



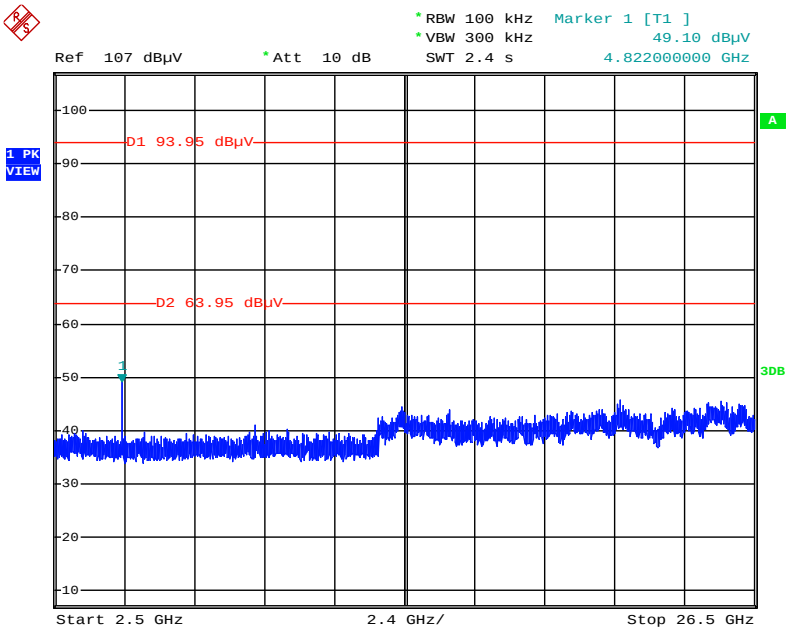
Date: 12.APR.2014 20:18:51

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



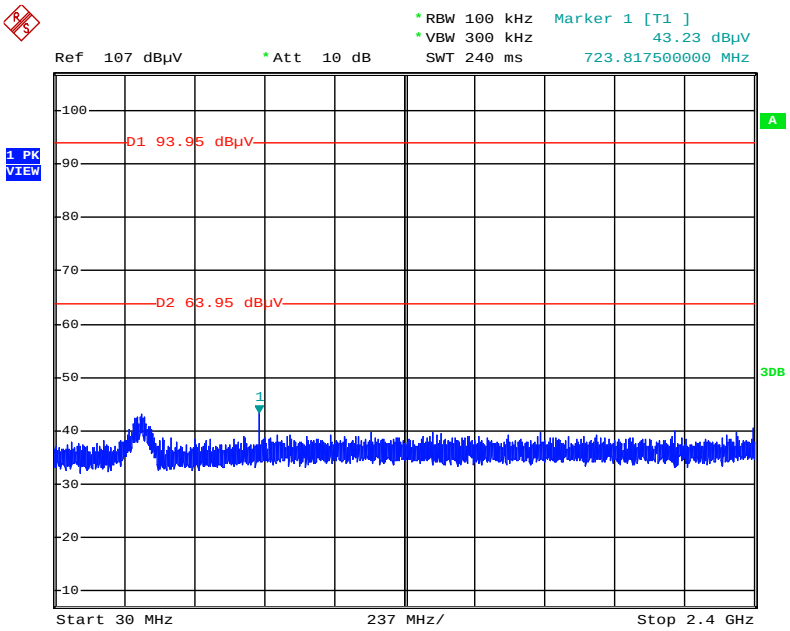
Date: 12.APR.2014 20:21:53

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



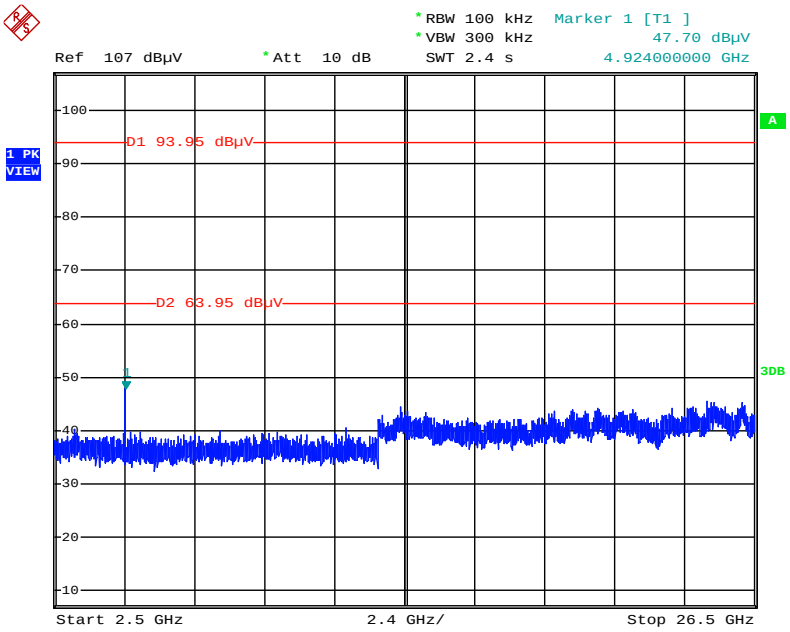
Date: 12.APR.2014 20:22:34

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



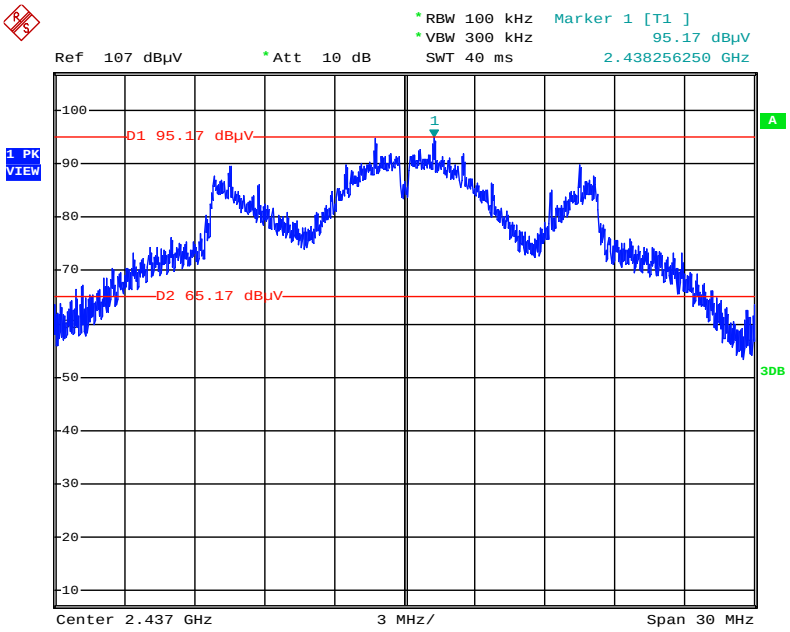
Date: 12.APR.2014 20:19:25

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



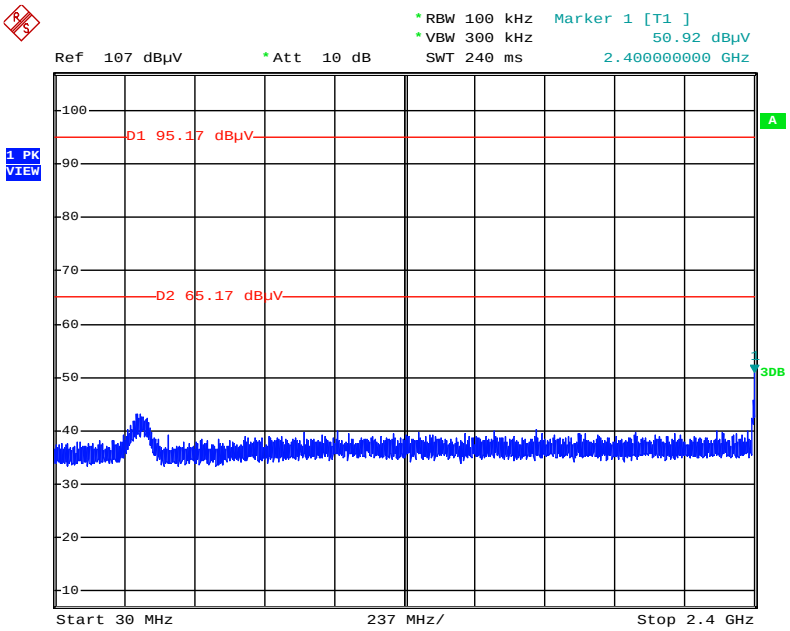
Date: 12.APR.2014 20:20:10

Plot on Configuration IEEE 802.11g / Reference Level



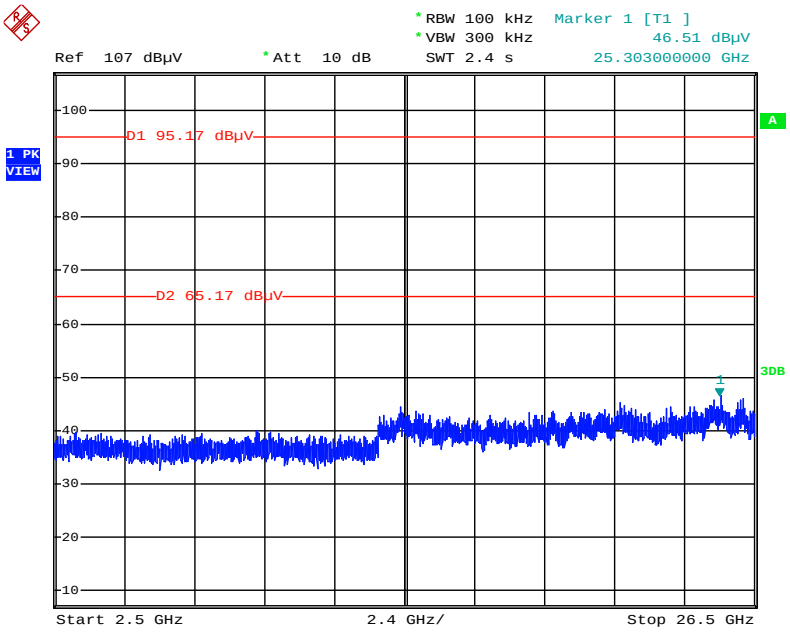
Date: 12.APR.2014 20:08:44

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



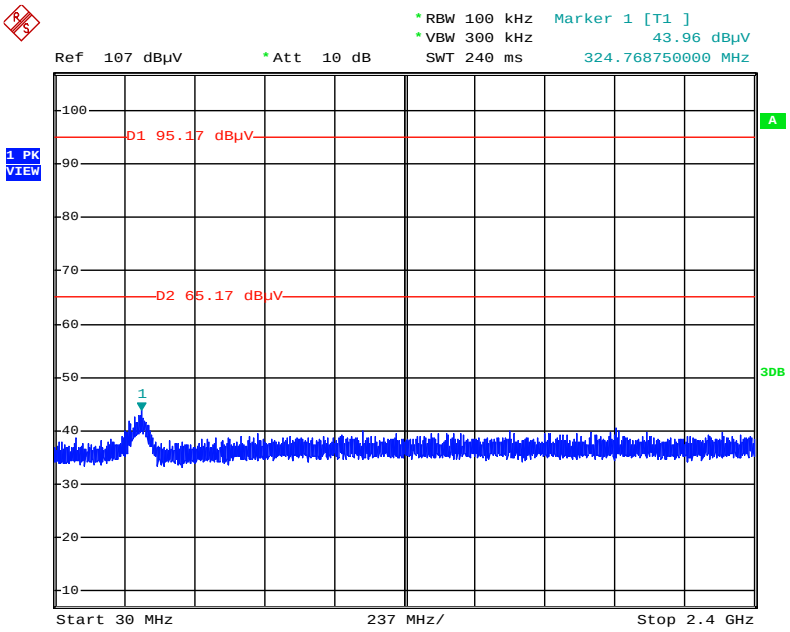
Date: 12.APR.2014 20:09:53

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



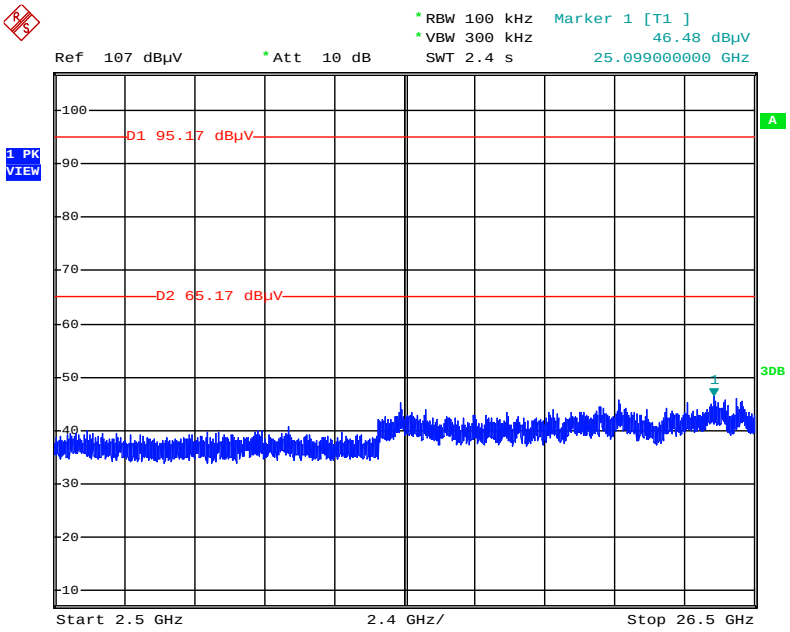
Date: 12.APR.2014 20:10:41

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



Date: 12.APR.2014 20:11:46

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

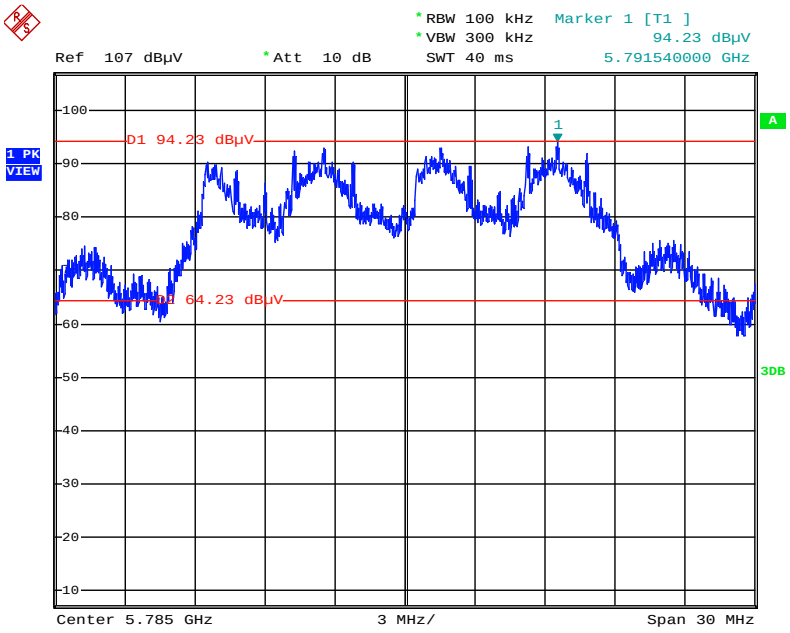


Date: 12.APR.2014 20:12:34

For non-beamforming mode:

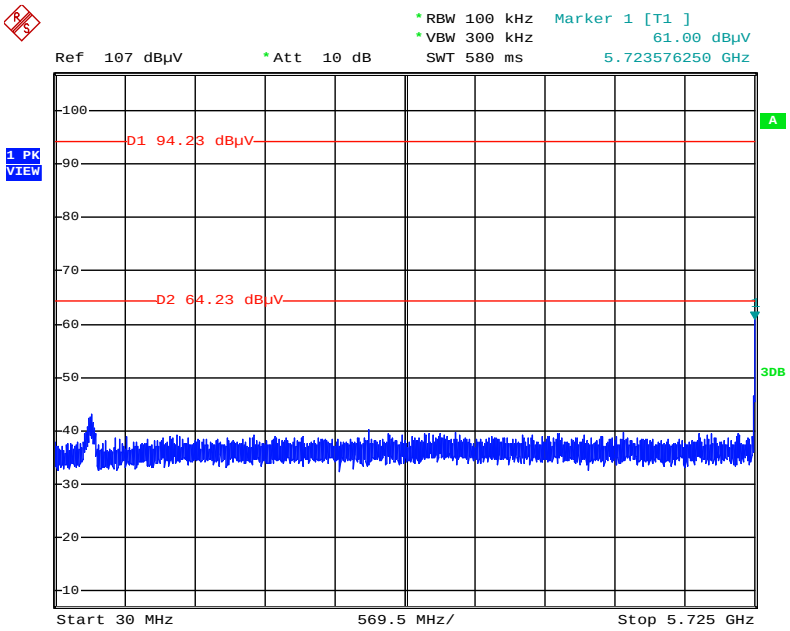
For 5GHz Band:

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Reference Level



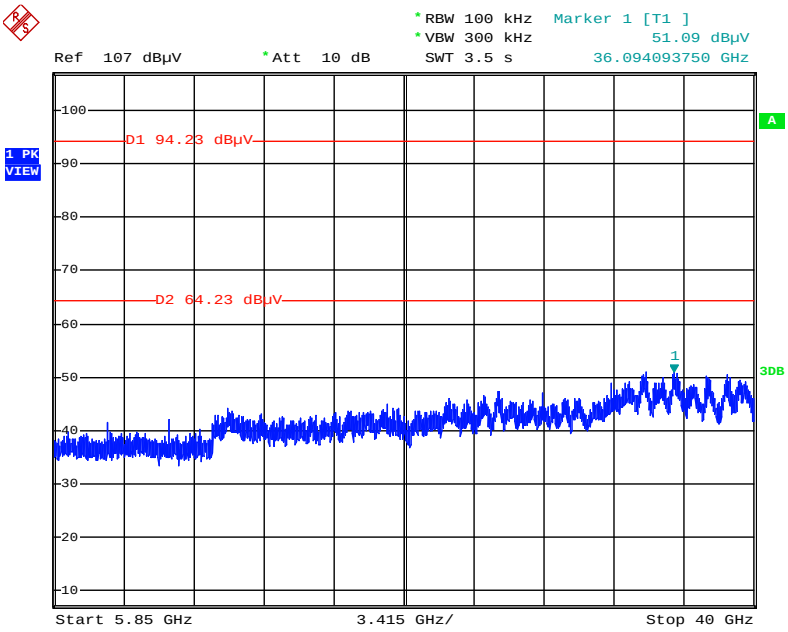
Date: 12.APR.2014 19:29:52

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 149 / 30MHz~5725MHz (down 30dBc)



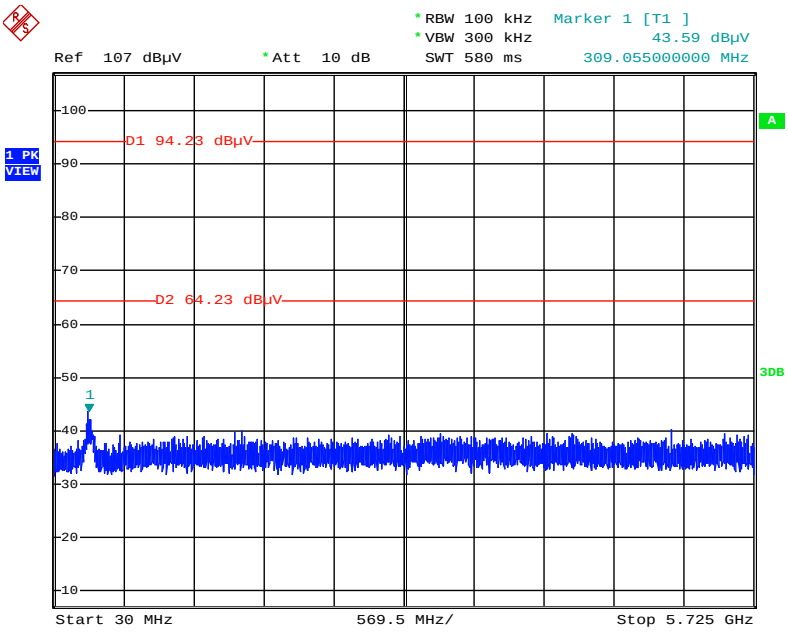
Date: 12.APR.2014 19:31:10

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 149 / 5850MHz~40000MHz (down 30dBc)



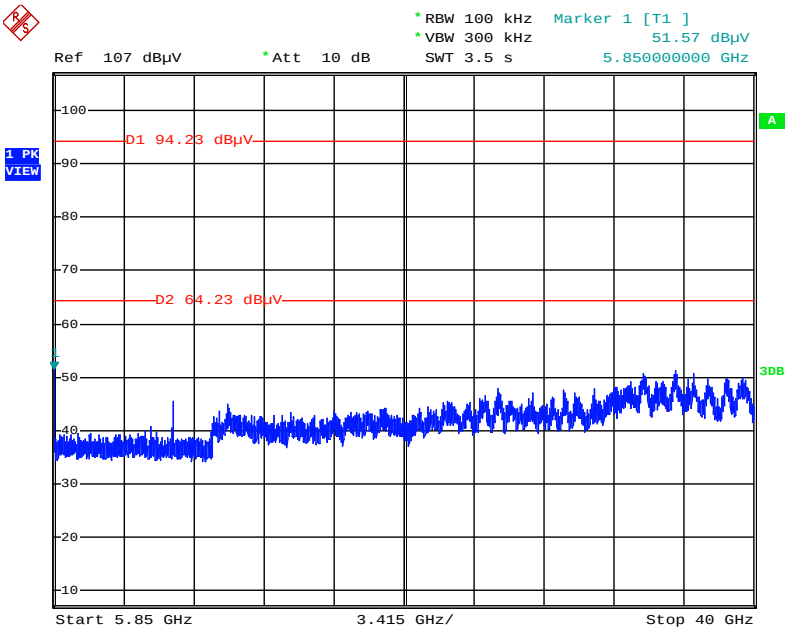
Date: 12.APR.2014 19:31:59

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 165 / 30MHz~5725MHz (down 30dBc)



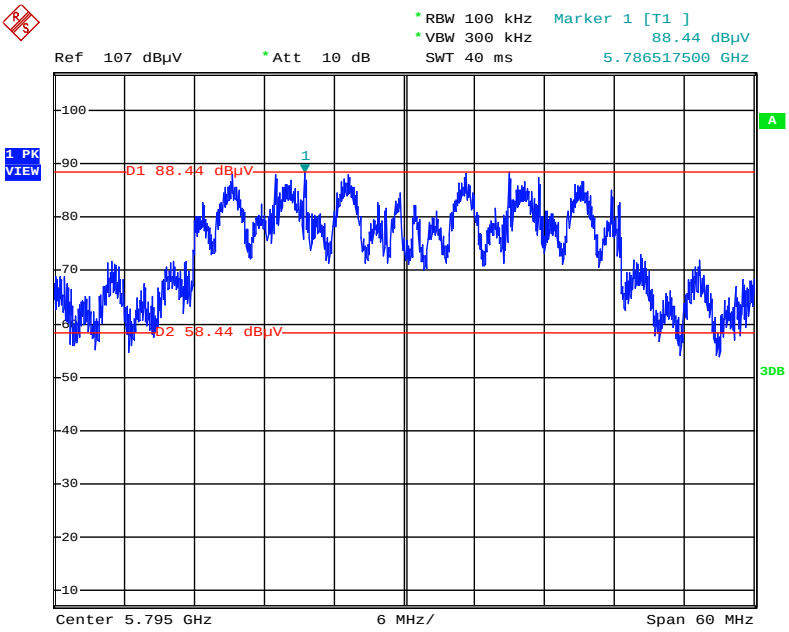
Date: 12.APR.2014 19:32:50

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 165 / 5850MHz~40000MHz (down 30dBc)



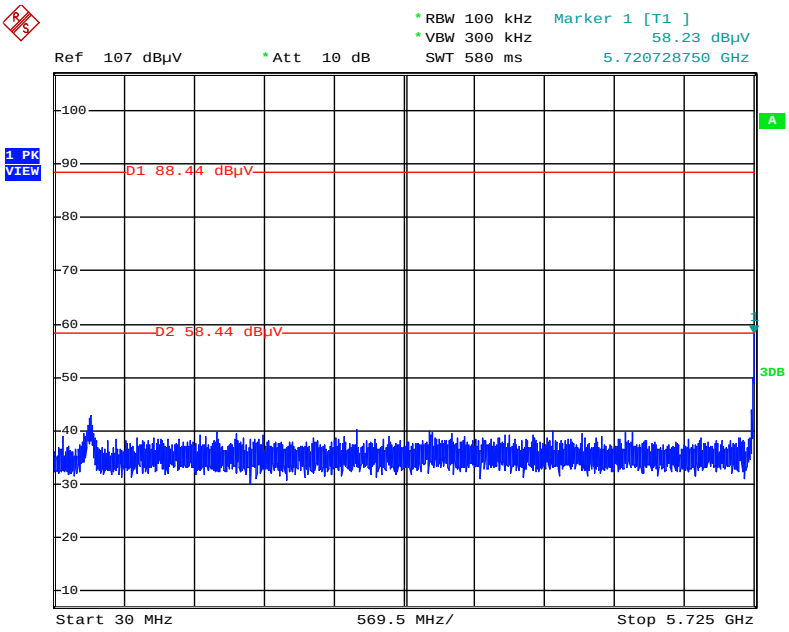
Date: 12.APR.2014 19:33:35

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Reference Level



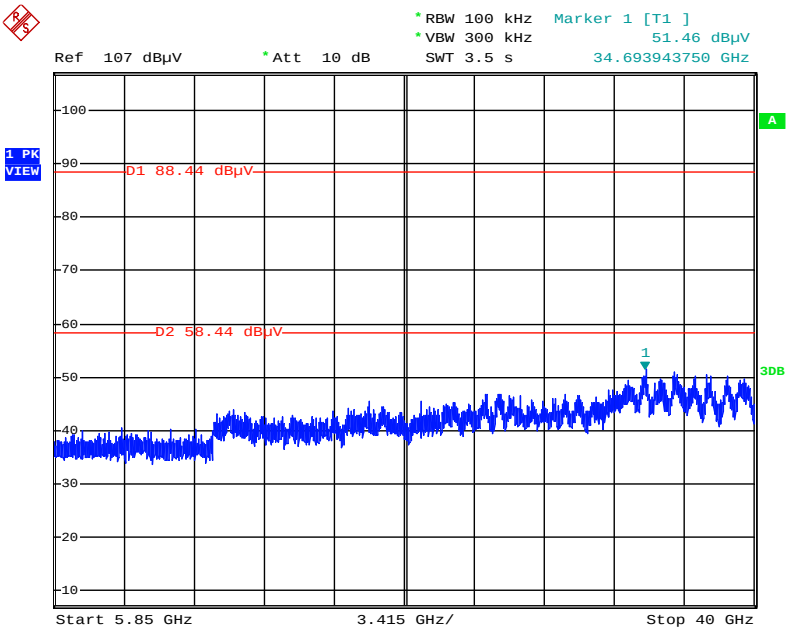
Date: 12.APR.2014 19:15:03

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 151 / 30MHz~5725MHz (down 30dBc)



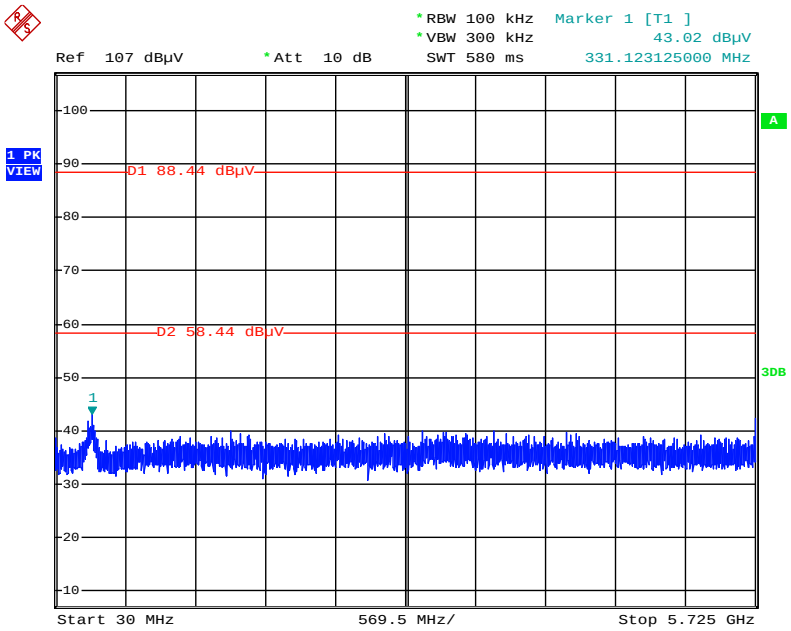
Date: 12.APR.2014 19:22:39

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 151 / 5850MHz~40000MHz (down 30dBc)



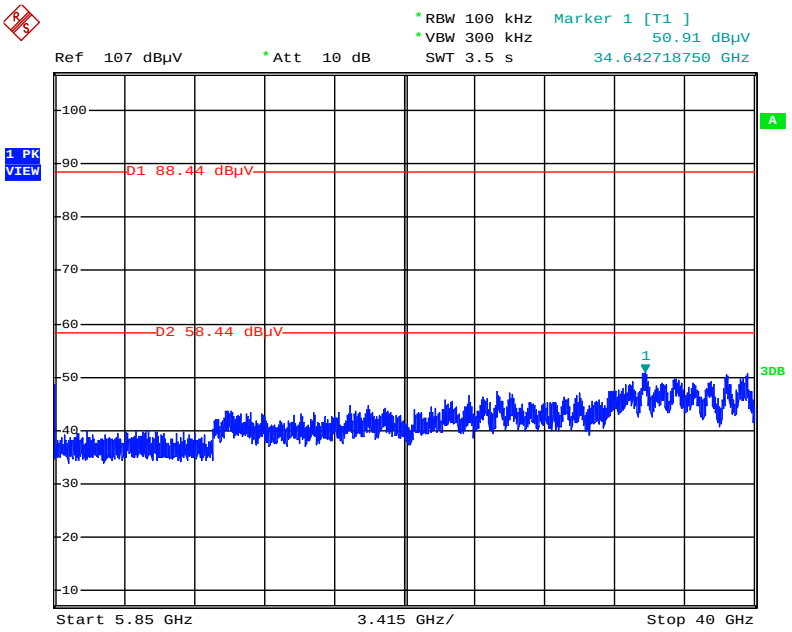
Date: 12.APR.2014 19:23:47

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 159 / 30MHz~5725MHz (down 30dBc)



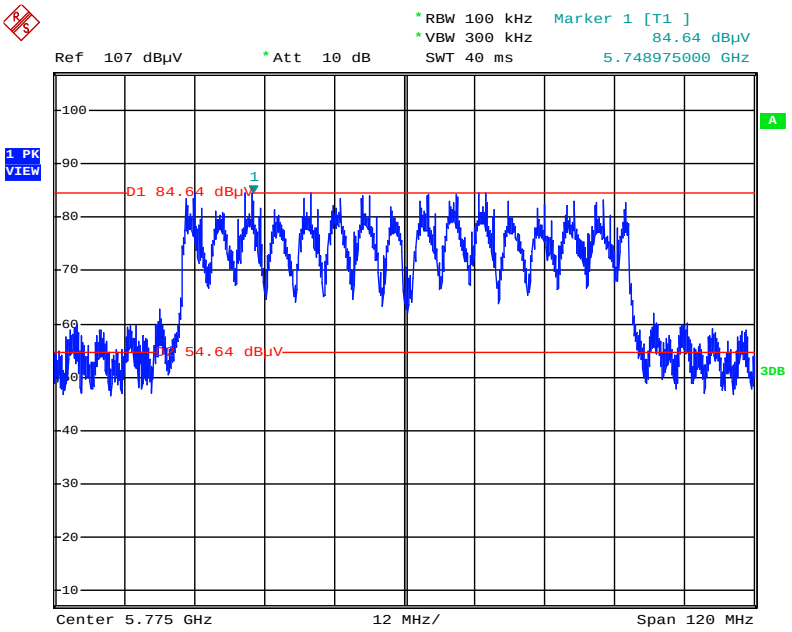
Date: 12.APR.2014 19:15:53

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 159 / 5850MHz~40000MHz (down 30dBc)



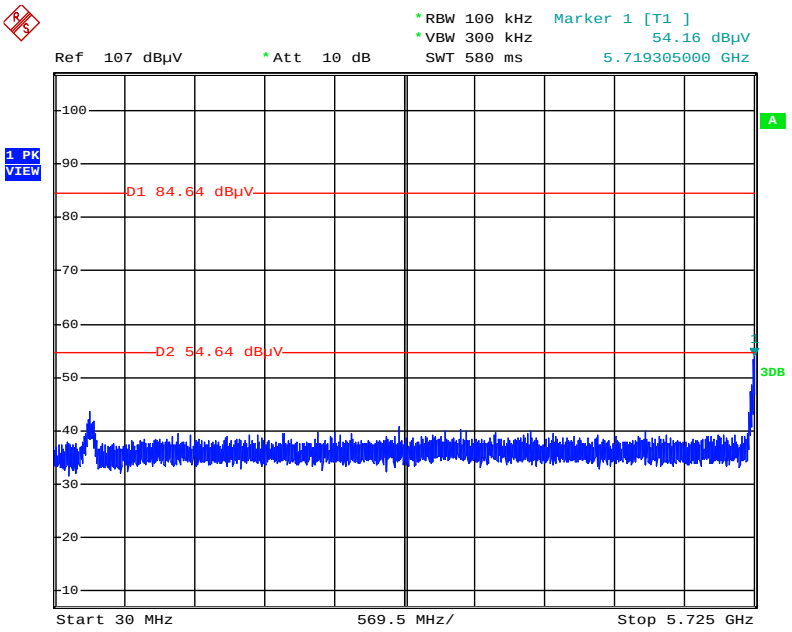
Date: 12.APR.2014 19:16:39

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Reference Level



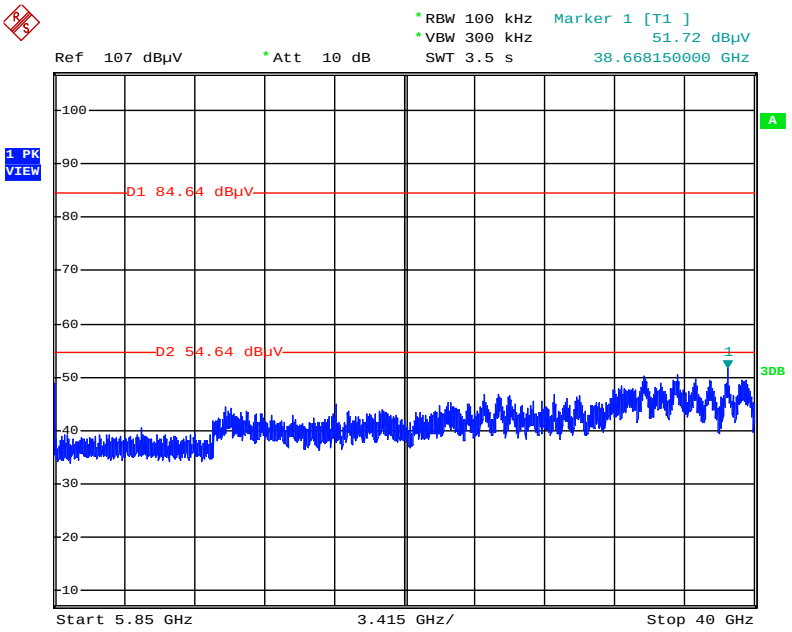
Date: 12.APR.2014 19:03:16

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 30MHz~5725MHz (down 30dBc)



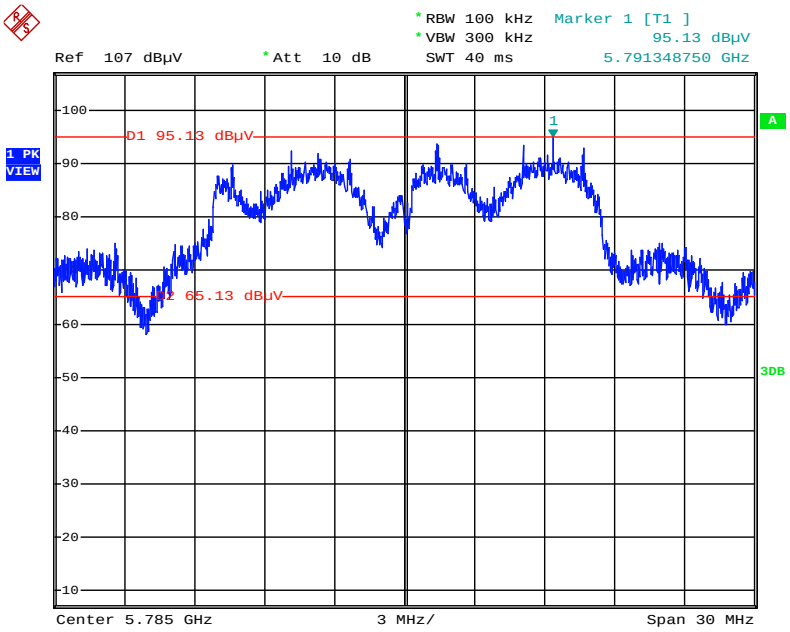
Date: 12.APR.2014 19:08:06

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 5850MHz~40000MHz (down 30dBc)



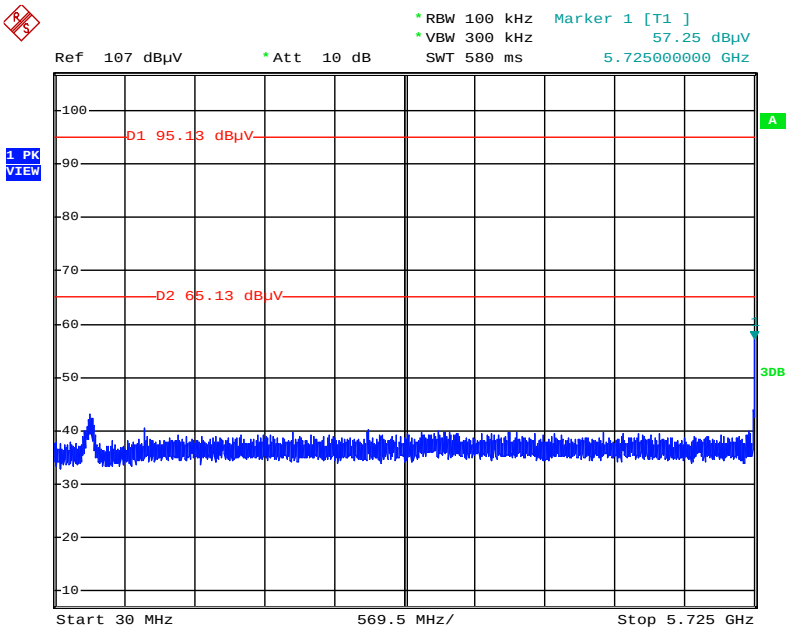
Date: 12.APR.2014 19:08:49

Plot on Configuration IEEE 802.11a / Reference Level



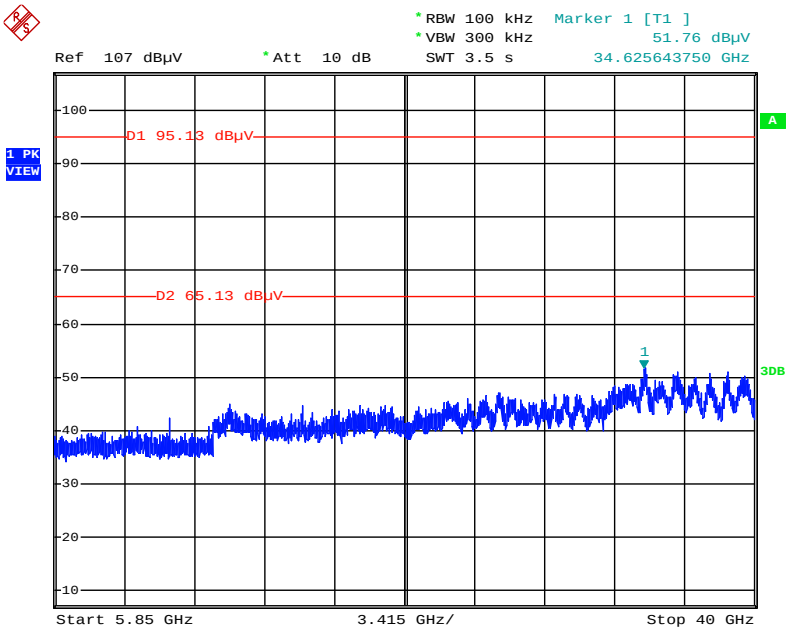
Date: 12.APR.2014 19:36:01

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



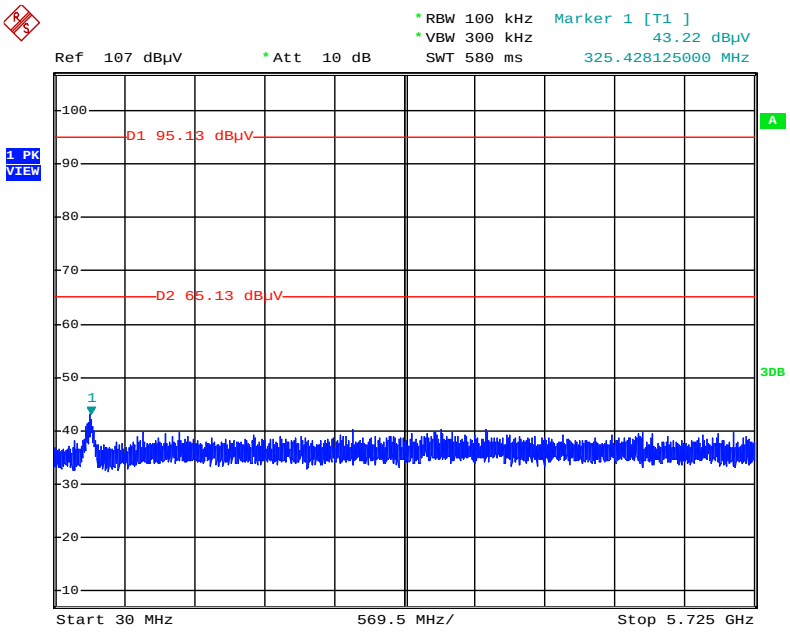
Date: 12.APR.2014 19:37:06

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



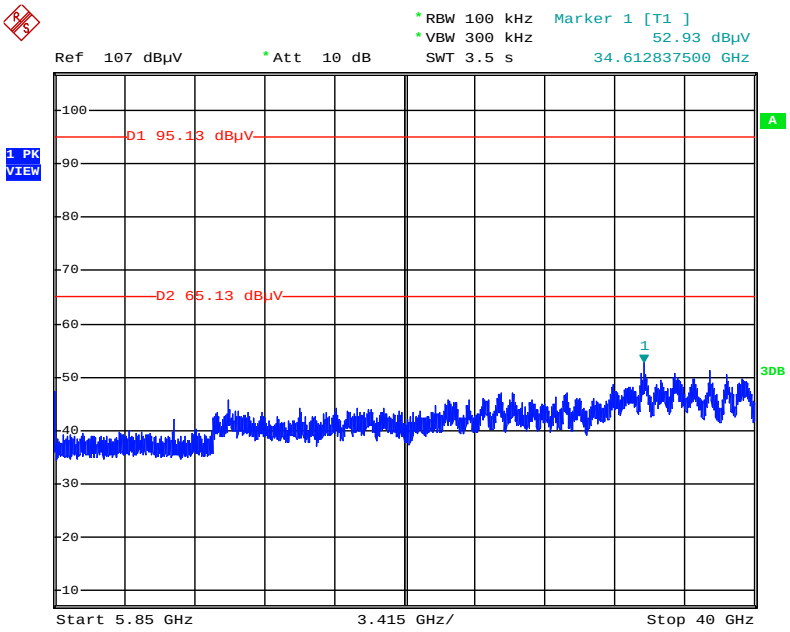
Date: 12.APR.2014 19:37:54

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



Date: 12.APR.2014 19:38:42

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

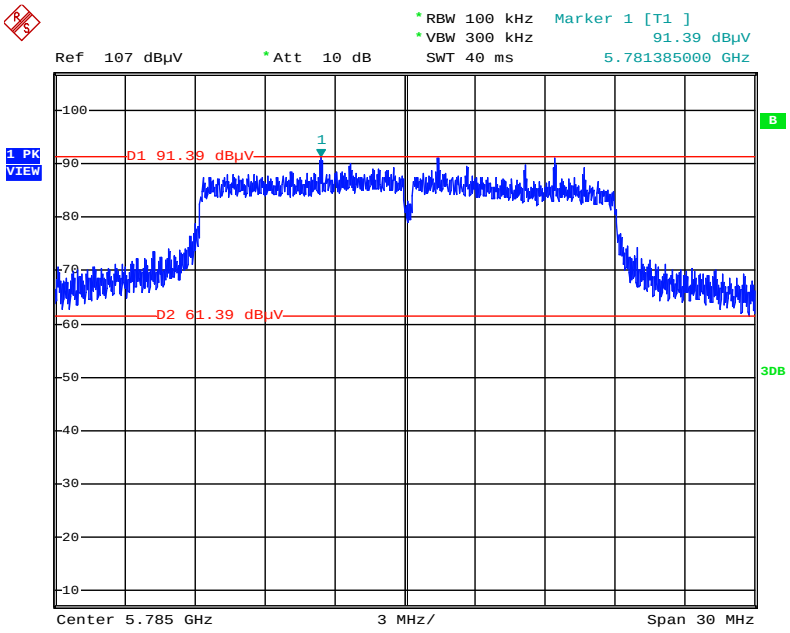


Date: 12.APR.2014 19:39:31

For beamforming mode:

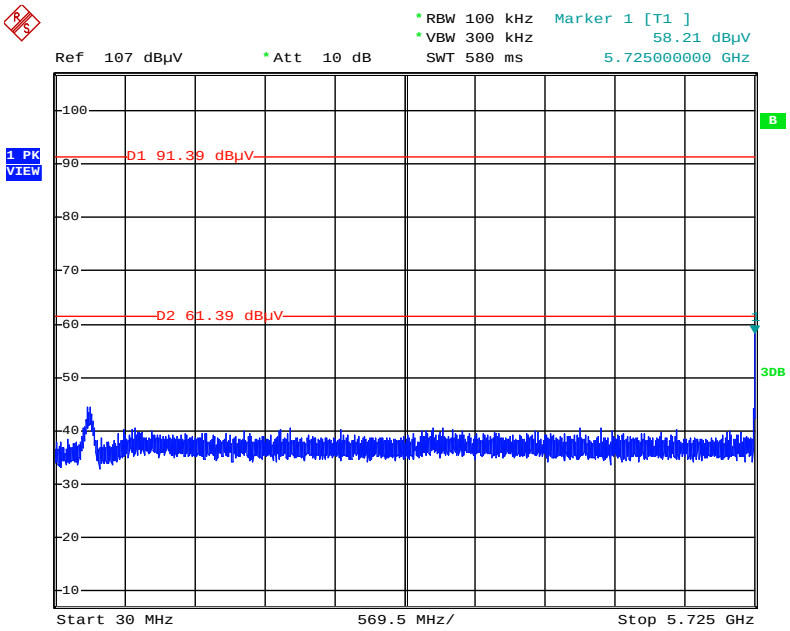
For 5GHz Band:

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Reference Level



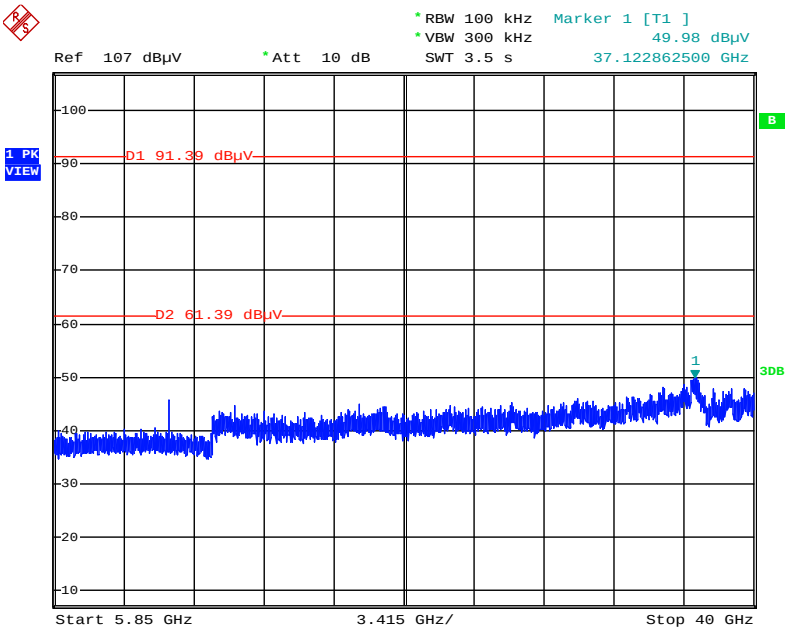
Date: 18.APR.2014 00:23:11

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 149 / 30MHz~5725MHz (down 30dBc)



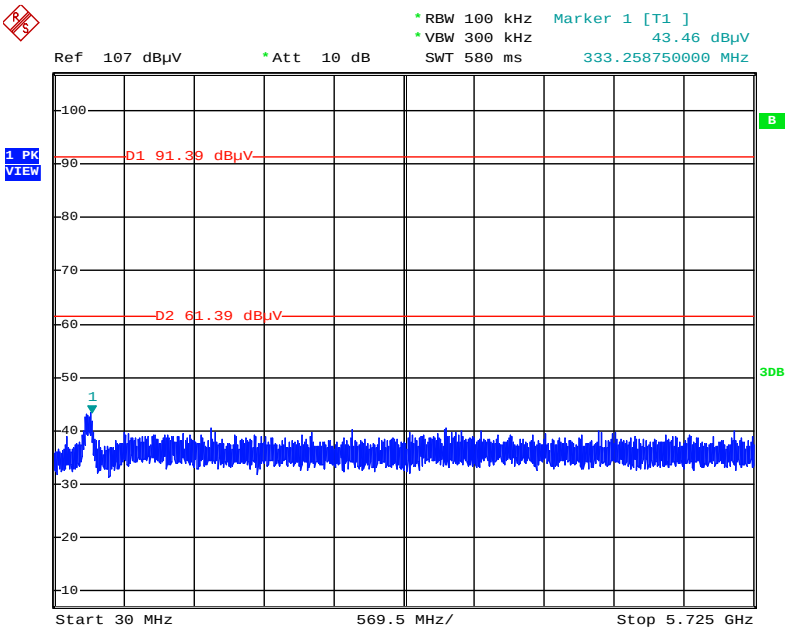
Date: 18.APR.2014 00:24:29

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 149 / 5850MHz~40000MHz (down 30dBc)



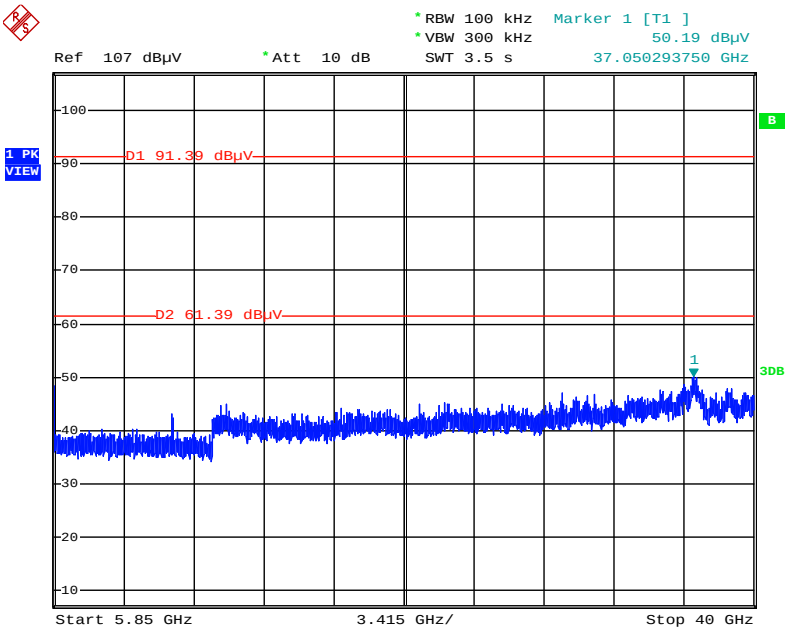
Date: 18.APR.2014 00:25:06

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 165 / 30MHz~5725MHz (down 30dBc)



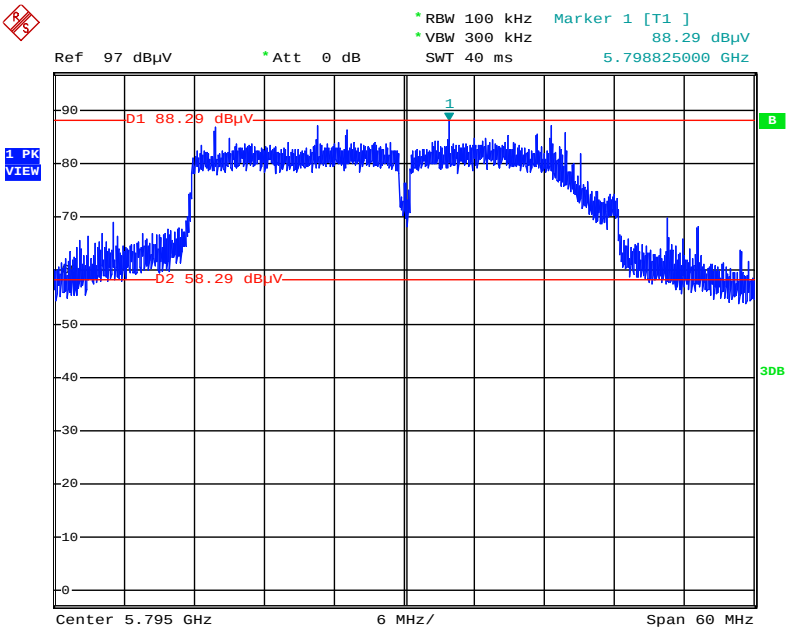
Date: 18.APR.2014 00:26:10

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 165 / 5850MHz~40000MHz (down 30dBc)



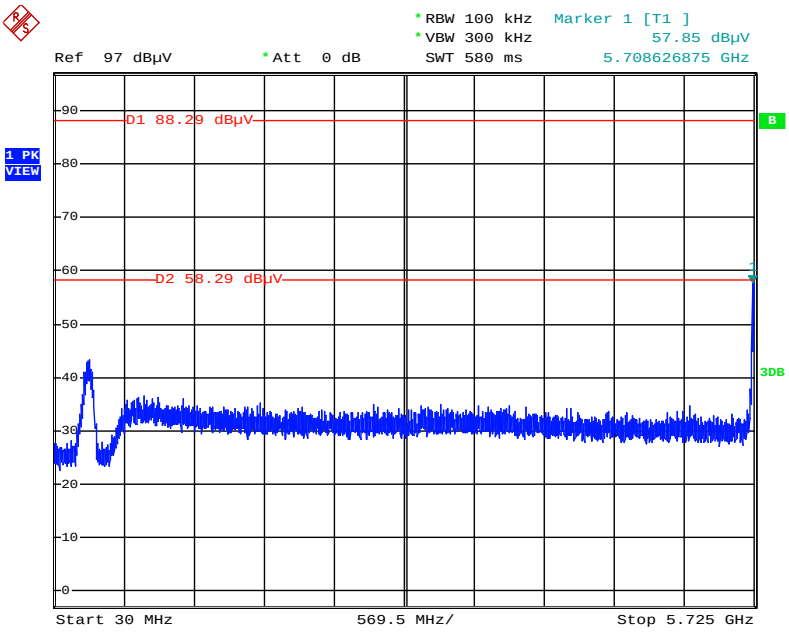
Date: 18.APR.2014 00:25:52

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Reference Level



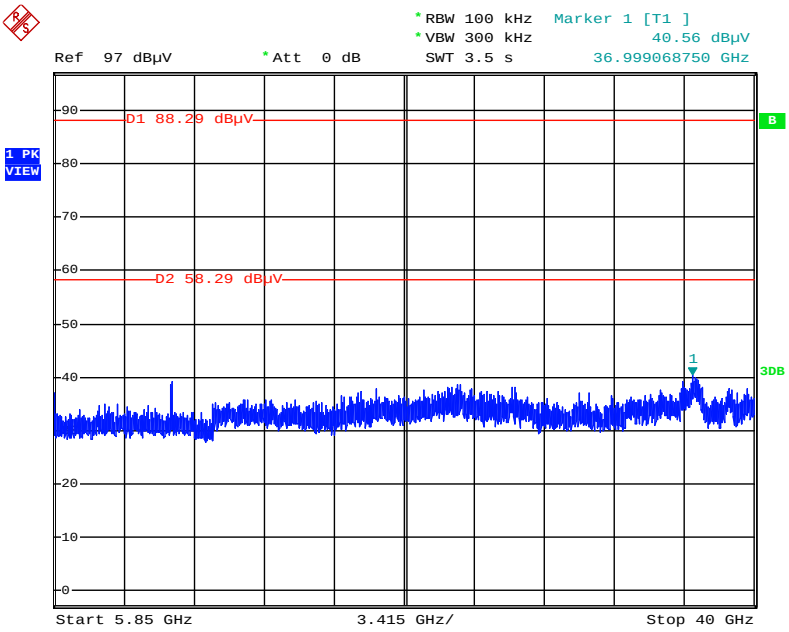
Date: 18.APR.2014 00:37:27

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 151 / 30MHz~5725MHz (down 30dBc)



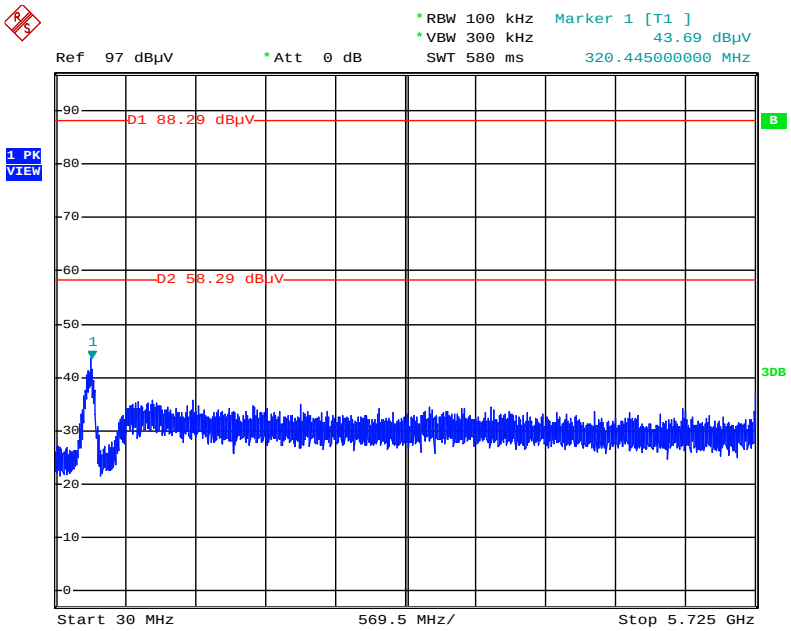
Date: 18.APR.2014 00:41:24

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 151 / 5850MHz~40000MHz (down 30dBc)



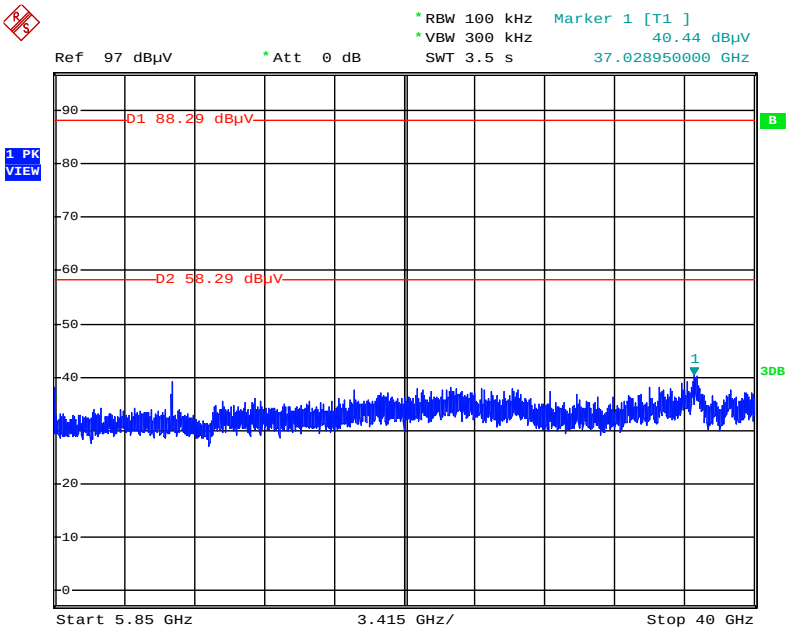
Date: 18.APR.2014 00:39:16

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 159 / 30MHz~5725MHz (down 30dBc)



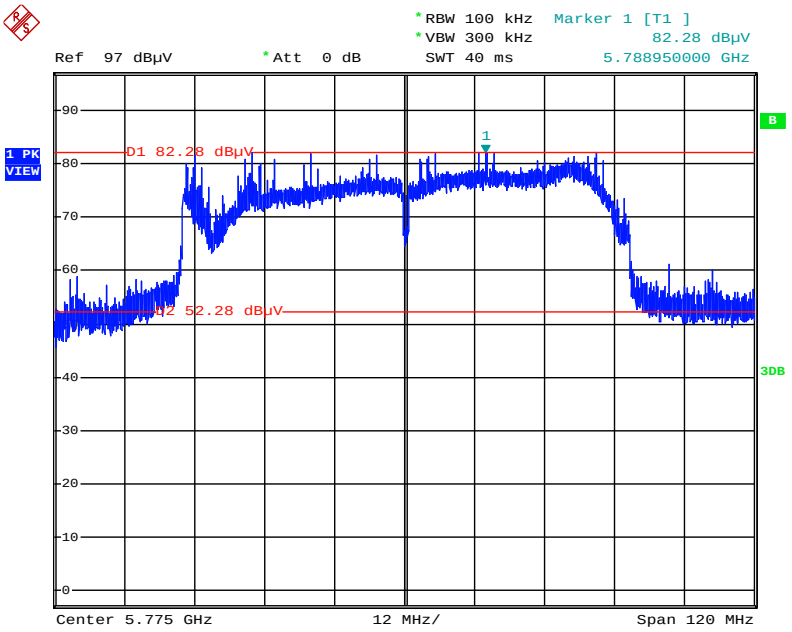
Date: 18.APR.2014 00:37:53

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 159 / 5850MHz~40000MHz (down 30dBc)



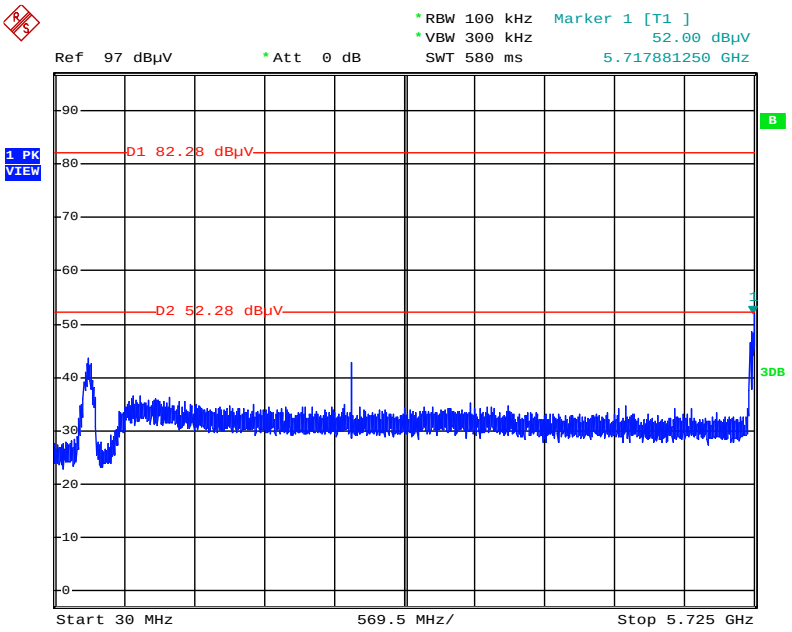
Date: 18.APR.2014 00:38:15

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Reference Level



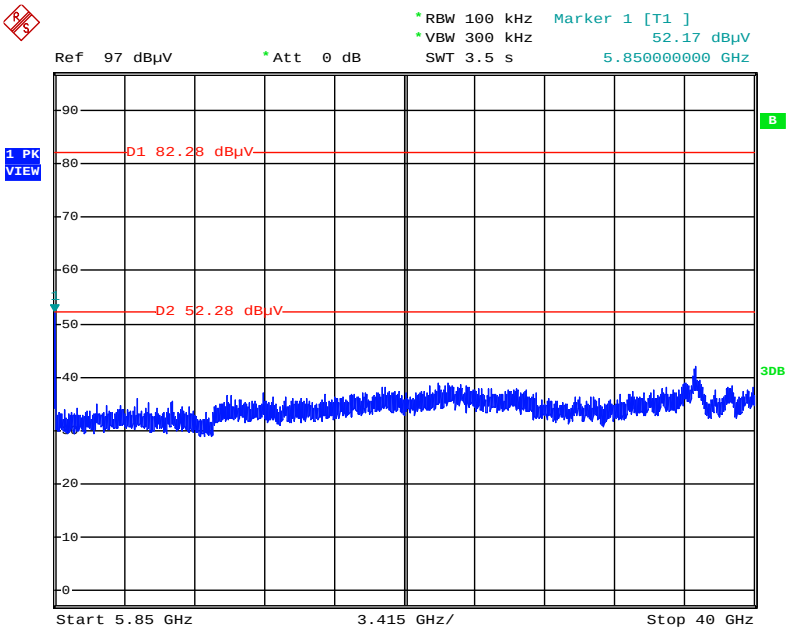
Date: 18.APR.2014 00:47:53

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 30MHz~5725MHz (down 30dBc)



Date: 18.APR.2014 00:48:38

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 5850MHz~40000MHz (down 30dBc)



Date: 18.APR.2014 00:49:29

4.7. Antenna Requirements

4.7.1. Limit

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

4.7.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESCS 30	100355	9 kHz ~ 2.75 GHz	Apr. 12, 2013	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150 kHz ~ 100 MHz	Nov. 23, 2013	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 11, 2013	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150 kHz ~ 30 MHz	Dec. 04, 2013	Conduction (CO01-CB)
Software	Audix	E3	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Apr. 16, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2013	Conducted (TH01-CB)

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

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

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

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

6. MEASUREMENT UNCERTAINTY

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

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

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

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

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

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

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

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

Uncertainty of Conducted Emission Measurement

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