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FCC RADIO TEST REPORT

Applicant's company	Linksys LLC
Applicant Address	121 Theory Drive, Irvine, CA 92617, USA
FCC ID	Q87-EA9200

Product Name	AC3200 Tri-Band Smart Wi-Fi Router
Brand Name	Linksys LLC
Model No.	EA9200
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Aug. 22, 2014
Final Test Date	Sep.15, 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.

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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 C63.10-2013, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r02, KDB 662911 D01 v02r01, KDB644545 D01 v01r02.**

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



Table of Contents

1. CERTIFICATE OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	5
3.3. Table for Filed Antenna.....	6
3.4. Table for Carrier Frequencies	7
3.5. Table for Test Modes.....	8
3.6. Table for Testing Locations.....	10
3.7. Table for Supporting Units	11
3.8. Table for Parameters of Test Software Setting	12
3.9. EUT Operation during Test	13
3.10. Duty Cycle.....	13
3.11. Test Configurations	14
4. TEST RESULT	17
4.1. AC Power Line Conducted Emissions Measurement.....	17
4.2. Maximum Conducted Output Power Measurement.....	21
4.3. Power Spectral Density Measurement	25
4.4. 6dB Spectrum Bandwidth Measurement	40
4.5. Radiated Emissions Measurement	49
4.6. Emissions Measurement	77
4.7. Antenna Requirements	106
5. LIST OF MEASURING EQUIPMENTS	107
6. MEASUREMENT UNCERTAINTY.....	108
APPENDIX A. PHOTOGRAPHS OF EUT.....	A1 ~ A23
APPENDIX B. TEST PHOTOS.....	B1 ~ B5
APPENDIX C. MAXIMUM PERMISSIBLE EXPOSURE.....	C1 ~C4
APPENDIX D. RADIATED EMISSION CO-LOCATION REPORT	D1 ~ D3

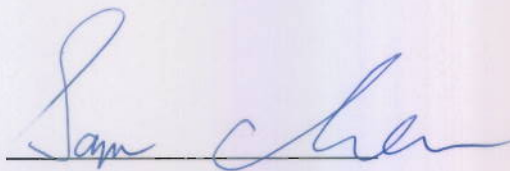
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR482206AA	Rev. 01	Initial issue of report	Oct. 01, 2014

1. CERTIFICATE OF COMPLIANCE

Product Name : AC3200 Tri-Band Smart Wi-Fi Router
Brand Name : Linksys LLC
Model No. : EA9200
Applicant : Linksys LLC
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 Aug. 22, 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	11.62 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	1.23 dB
4.3	15.247(e)	Power Spectral Density	Complies	5.01 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	3.16 dB
4.6	15.247(d)	Band Edge Emissions	Complies	1.03 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n/ac

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	see the below table for IEEE 802.11n/ac
Data Modulation	For 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM) For 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n/ac
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	<u>For 2.4GHz Band:</u> 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth <u>For 5GHz Band:</u> 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth ; 1 for 80MHz bandwidth
Channel Band Width (99%)	<u>For 2.4GHz Band:</u> 802.11ac MCS0/Nss1 (VHT20): 17.69 MHz ; 802.11ac MCS0/Nss1 (VHT40): 36.41 MHz <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (VHT20): 19.92 MHz ; 802.11ac MCS0/Nss1 (VHT40): 51.52 MHz ; 802.11ac MCS0/Nss1 (VHT80): 76.16 MHz
Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> 802.11ac MCS0/Nss1 (VHT20): 26.70 dBm ; 802.11ac MCS0/Nss1 (VHT40): 19.17 dBm <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (VHT20): 26.95 dBm ; 802.11ac MCS0/Nss1 (VHT40): 26.70 dBm ; 802.11ac MCS0/Nss1 (VHT80): 24.43 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	WLAN (1TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 11.66 MHz ; 11g: 16.53 MHz ; 11a: 22.40 MHz
Maximum Conducted Output Power	11b: 23.28 dBm ; 11g: 22.69 dBm ; 11a: 21.33 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Beamforming Function

Band width Mode	Description	
IEEE 802.11a	☐ With beamforming	☒ Without beamforming
IEEE 802.11b	☐ With beamforming	☒ Without beamforming
IEEE 802.11g	☐ With beamforming	☒ Without beamforming
IEEE 802.11n	☒ With beamforming	☐ Without beamforming
IEEE 802.11ac	☒ With beamforming	☐ Without beamforming

Antenna and Band width

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

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

Power	Brand	Model No.	Rating
Adapter	APD	DA-48Q12	Input: 100-240Vac, 50-60Hz, 1.2A Max. Output: 12Vdc, 4A
Other			
Power Cable*1: Non-shielded, 1.8m			

3.3. Table for Filed Antenna

Ant.	Brand	Arcadyan Part No.	Type	Connector	Gain (dBi)	
					2.4GHz	5GHz Band 4
1	GALTRONICS	120300049200J	Dipole	Reversed-SMA	1.81	3.05
2	GALTRONICS	120300049200J	Dipole	Reversed-SMA	1.81	3.05
3	GALTRONICS	120300049200J	Dipole	Reversed-SMA	1.81	3.05

Note: The EUT has three antennas of 2.4 GHz WLAN function and 5GHz Band 4 WLAN function.

Chain 1: Connect to Ant. 1, Chain 2: Connect to Ant. 2, Chain 3: Connect to Ant. 3.

For 2.4 GHz WLAN function:

For IEEE 802.11b/g mode (1TX/3RX):

Only Chain 1 can be used as transmitting.

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

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

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

For 5GHz Band 4 WLAN function:

For IEEE 802.11a mode (1TX/3RX):

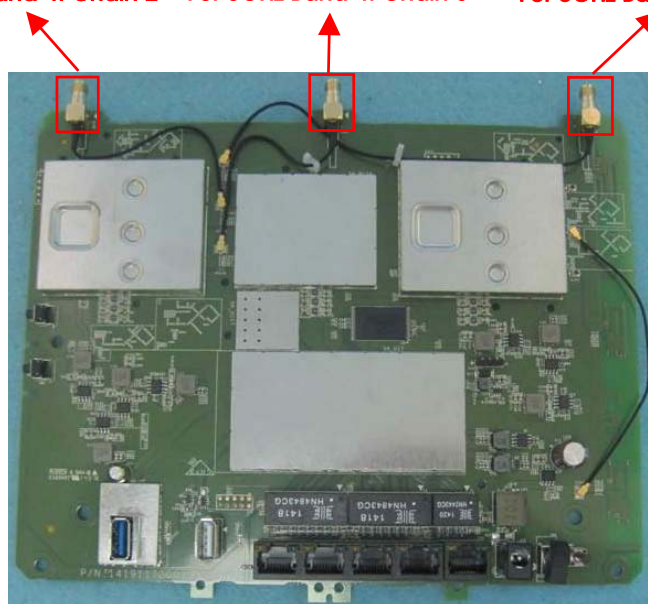
Only Chain 1 can be used as transmitting.

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

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

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

For 2.4GHz: Chain 2 For 2.4GHz: Chain 1 For 2.4GHz: Chain 3
For 5GHz Band 4: Chain 2 For 5GHz Band 4: Chain 3 For 5GHz Band 4: Chain 1



3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

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

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

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

For 5GHz Band:

There are three bandwidth systems.

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

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

For 80MHz bandwidth systems, use Channel 155.

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

3.5. Table for Test Modes

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

For 2.4GHz Band:

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Power Spectral Density	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
6dB Spectrum Bandwidth	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

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
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
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
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
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

Note: 1. VHT20/VHT40 covers HT20/HT40, due to same modulation.

- There are two functions of EUT, one is beamforming function, and the other is non-beamforming function for 802.11n/ac, after evaluating, beamforming function has been evaluated to be the worst case, so it was selected to test and record in this test report.

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

The EUT could be applied with 2.4GHz WLAN function, 5GHz Band 1 WLAN function and 5GHz Band 4 WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to Appendix C) and Radiated Emission Co-location (please refer to Appendix D) tests are added for simultaneously transmit between 2.4GHz WLAN function, 5GHz Band 1 WLAN function and 5GHz Band 4 WLAN function.

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
Flash Disk	Silicon	I-Series	DoC
Flash Disk	Transcend	JetFlash-700	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

For Test Site No: 03CH01-CB (below 1GHz)

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
Flash Disk	Silicon	I-Series	DoC
Flash Disk	Transcend	JetFlash-700	DoC

For Test Site No: 03CH01-CB (above 1GHz)

For non-beamforming function:

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC

For beamforming function:

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
NB	DELL	E6430	DoC
WLAN ac Dongle	Netgear	A6200	PY31220200

3.8. Table for Parameters of Test Software Setting

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

For 2.4GHz Band

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT20

Test Software Version	Mtool 2.0.1.6		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0/Nss1 VHT20	57	90	68

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT40

Test Software Version	Mtool 2.0.1.6		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0/Nss1 VHT40	50	59	60

Power Parameters of IEEE 802.11b/g

Test Software Version	Mtool 2.0.1.6		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	79	90	90
IEEE 802.11g	84	90	81

For 5GHz Band

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT20

Test Software Version	Mtool 2.0.1.6		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 VHT20	89	90	90

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT40

Test Software Version	Mtool 2.0.1.6	
Frequency	5755 MHz	5795 MHz
MCS0/Nss1 VHT40	78	90

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT80

Test Software Version	Mtool 2.0.1.6	
Frequency	5775 MHz	
MCS0/Nss1 VHT80	80	

Power Parameters of IEEE 802.11a

Test Software Version	Mtool 2.0.1.6		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	88	90	90

3.9. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

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:

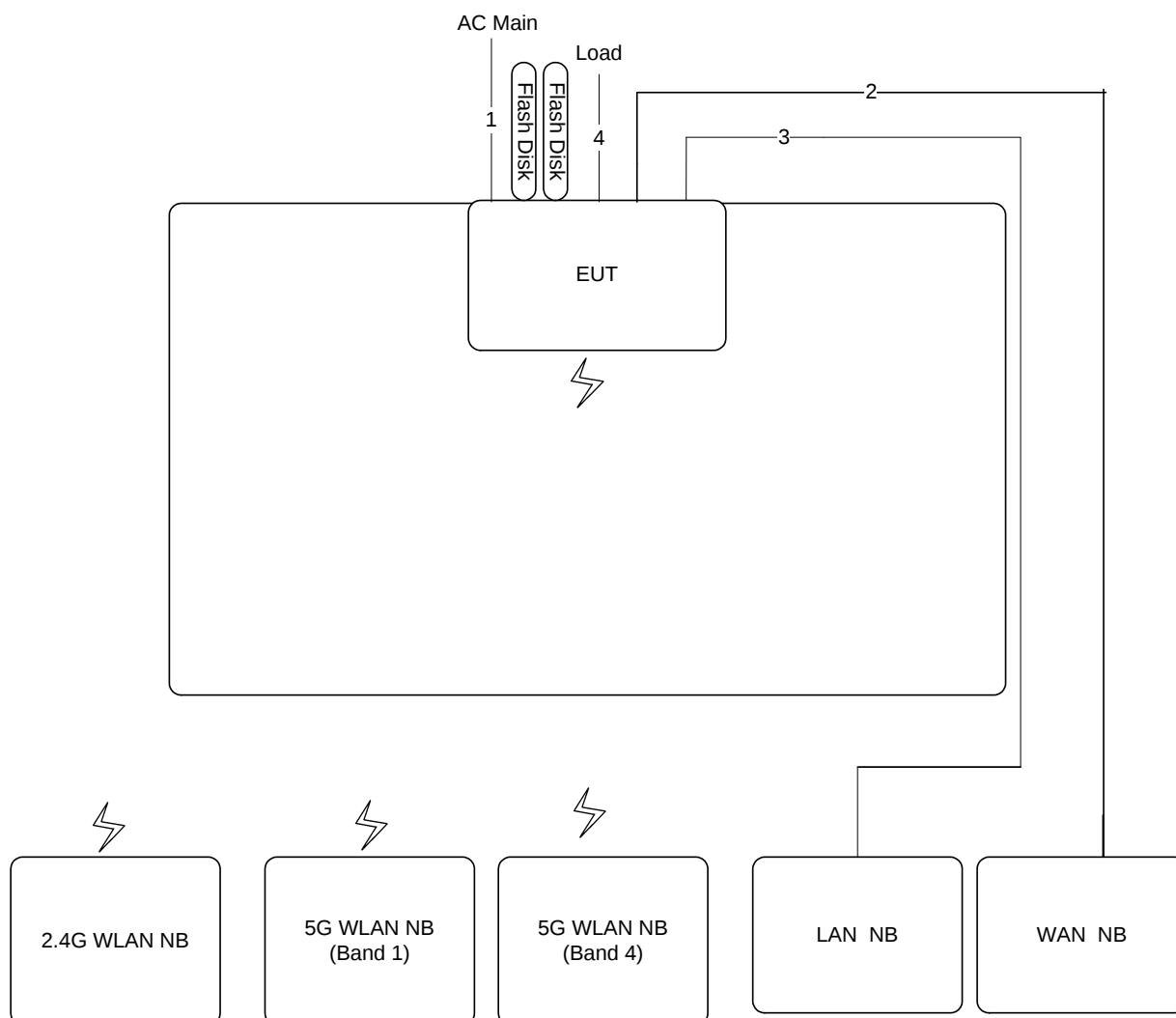
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe " to link with the remote workstation to receive and transmit packet by WLAN ac Dongle and transmit duty cycle no less 98%

3.10. Duty Cycle

Band	Mode	On Time (ms)	On+ Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11ac MCS0/Nss1 VHT20	28.00	28.60	97.90	0.09	0.04
	802.11ac MCS0/Nss1 VHT40	28.40	28.80	98.61	0.06	0.01
	802.11b	1.00	1.00	100.00	0.00	0.01
	802.11g	2.06	2.12	97.17	0.12	0.49
5G	802.11ac MCS0/Nss1 VHT20	3.94	4.15	94.94	0.23	0.25
	802.11ac MCS0/Nss1 VHT40	23.88	25.28	94.46	0.25	0.04
	802.11ac MCS0/Nss1 VHT80	23.00	24.60	93.50	0.29	0.04
	802.11a	2.06	2.10	98.10	0.08	0.01

3.11. Test Configurations

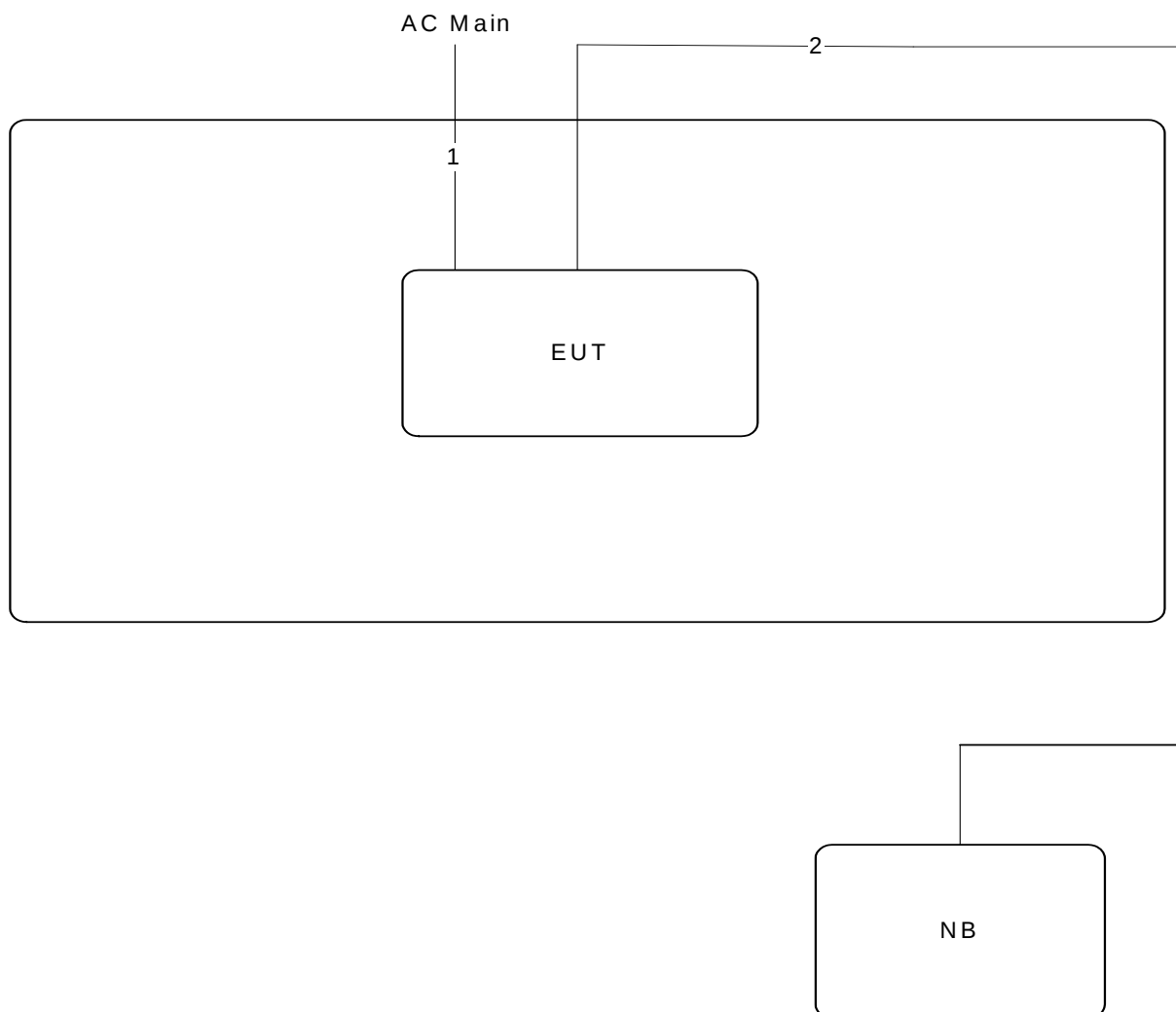
3.11.1. AC Power Line Conduction Emissions and Radiation Emissions below 1GHz Test Configuration



Item	Connection	Shielded	Length	Remark
1	Power cable	No	3m	-
2	RJ-45 cable	No	10m	-
3	RJ-45 cable	No	10m	-
4	RJ-45 cable*3	No	1.5m	Load

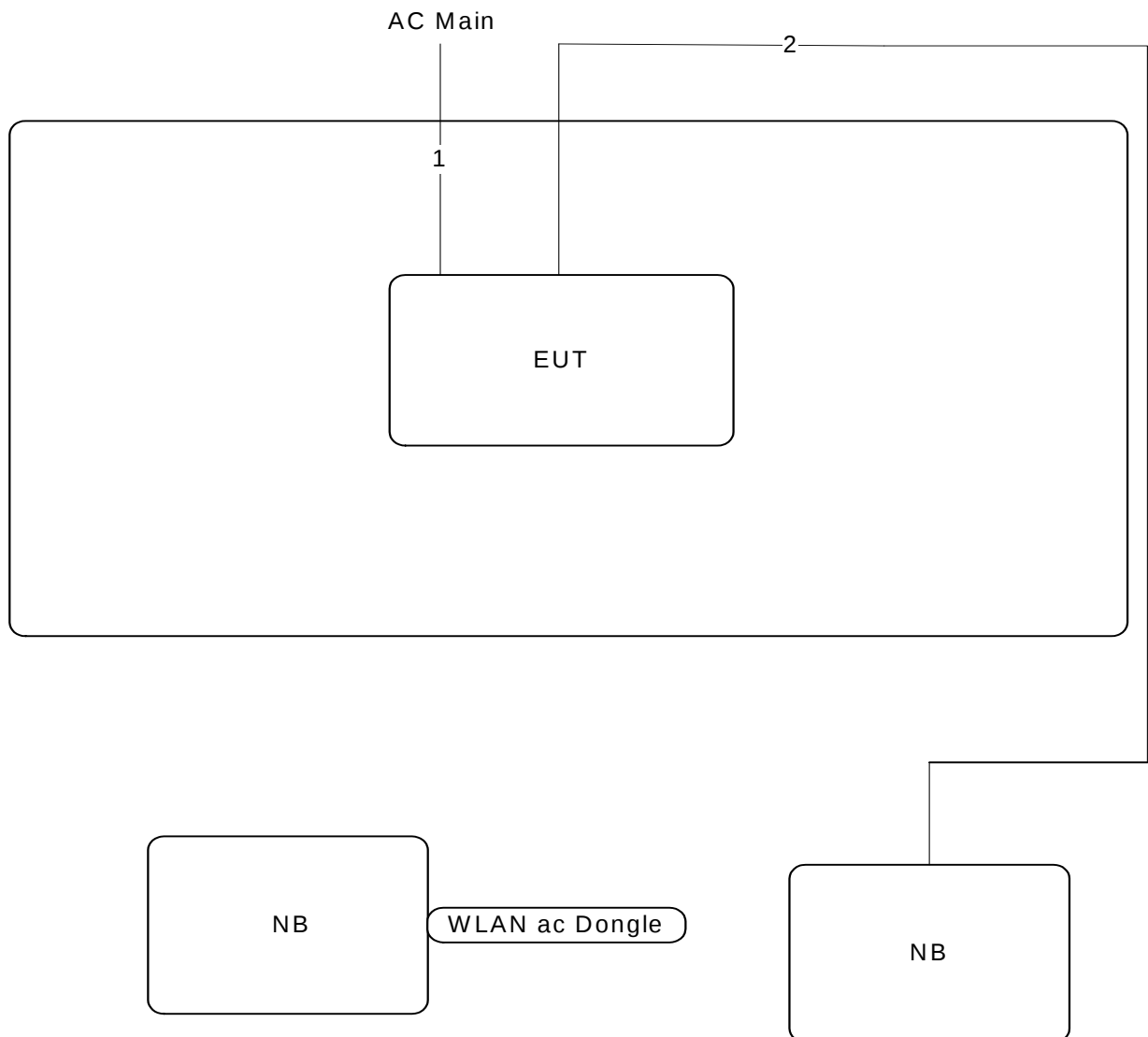
3.11.2. Radiation Emissions above 1GHz Test Configuration

For non-beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	3m
2	RJ-45 cable	No	10m

For beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	3m
2	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

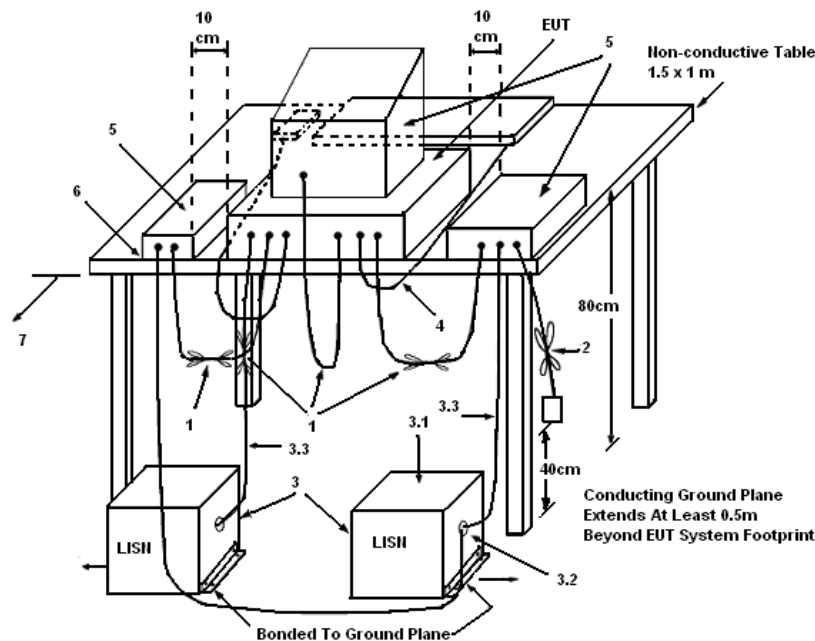
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

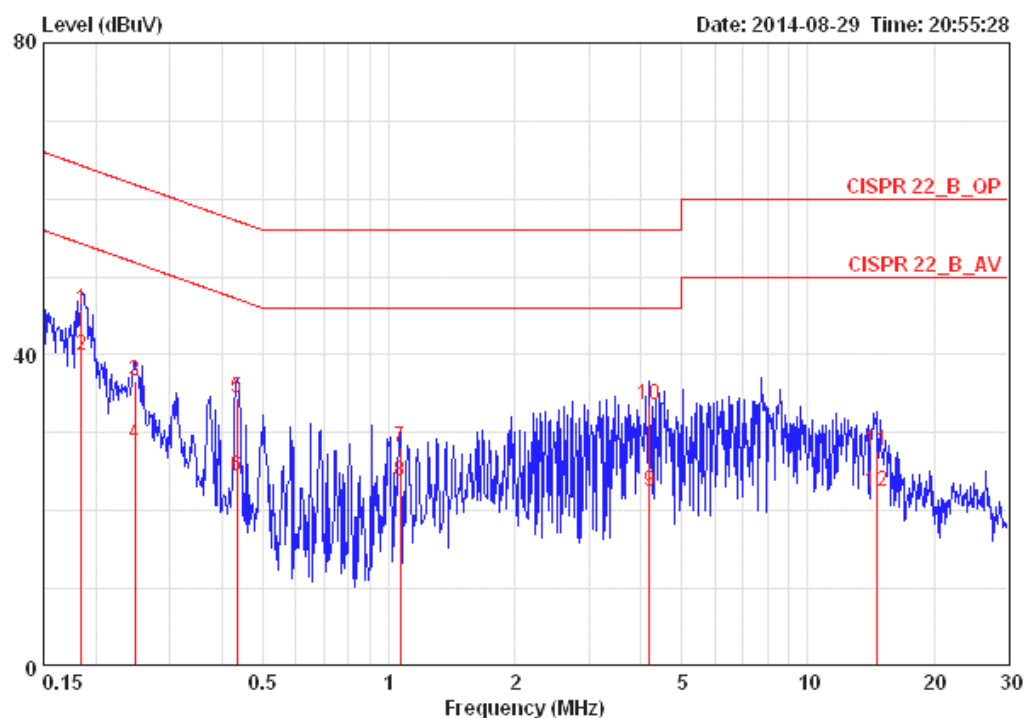
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

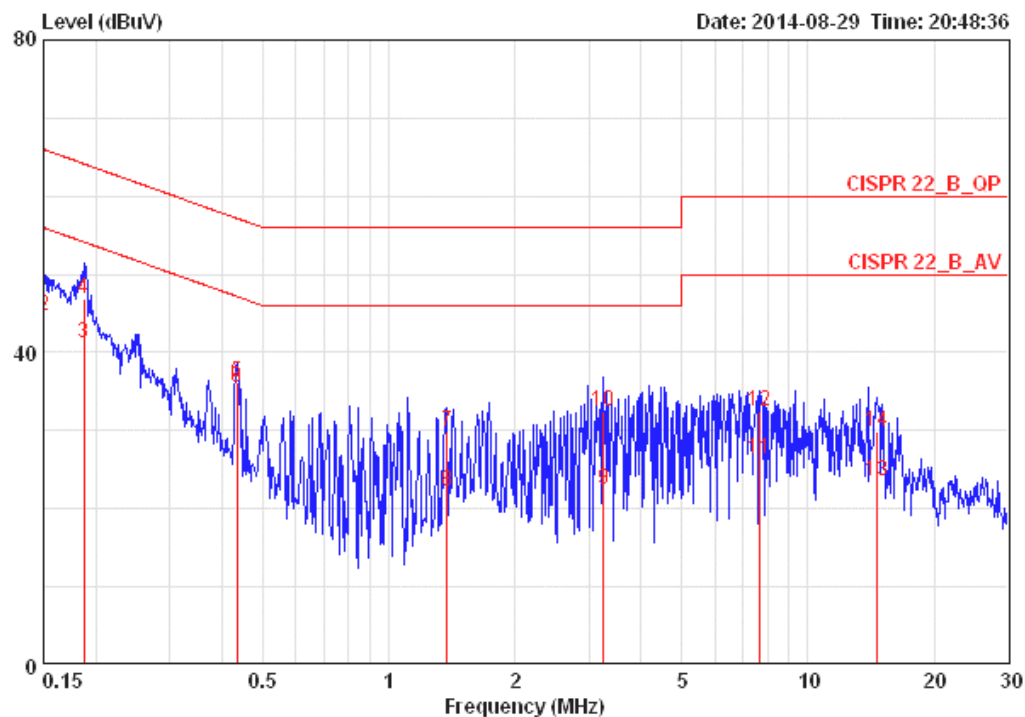
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	54%
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	0.18443	45.86	-18.42	64.28	0.10	45.60	0.16	LINE	QP
2	0.18443	39.99	-14.29	54.28	0.10	39.73	0.16	LINE	AVERAGE
3	0.24814	36.57	-25.25	61.82	0.10	36.30	0.17	LINE	QP
4	0.24814	28.53	-23.29	51.82	0.10	28.26	0.17	LINE	AVERAGE
5	0.43511	34.33	-22.82	57.15	0.10	34.05	0.18	LINE	QP
6	0.43511	24.50	-22.65	47.15	0.10	24.22	0.18	LINE	AVERAGE
7	1.065	28.09	-27.91	56.00	0.13	27.75	0.20	LINE	QP
8	1.065	23.87	-22.13	46.00	0.13	23.53	0.20	LINE	AVERAGE
9	4.180	22.51	-23.49	46.00	0.22	21.99	0.30	LINE	AVERAGE
10	4.180	33.52	-22.48	56.00	0.22	33.00	0.30	LINE	QP
11	14.594	27.72	-32.28	60.00	0.42	26.86	0.44	LINE	QP
12	14.594	22.37	-27.63	50.00	0.42	21.51	0.44	LINE	AVERAGE

Temperature	24°C	Humidity	54%
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	0.15000	35.56	-20.44	56.00	0.09	35.31	0.16	NEUTRAL	AVERAGE
2	0.15000	44.67	-21.33	66.00	0.09	44.42	0.16	NEUTRAL	QP
3	0.18739	41.14	-13.01	54.15	0.09	40.89	0.16	NEUTRAL	AVERAGE
4	0.18739	46.82	-17.33	64.15	0.09	46.57	0.16	NEUTRAL	QP
5	0.43511	36.08	-21.07	57.15	0.09	35.81	0.18	NEUTRAL	QP
6	0.43511	35.53	-11.62	47.15	0.09	35.26	0.18	NEUTRAL	AVERAGE
7	1.374	29.92	-26.08	56.00	0.13	29.57	0.22	NEUTRAL	QP
8	1.374	22.17	-23.83	46.00	0.13	21.82	0.22	NEUTRAL	AVERAGE
9	3.258	22.48	-23.52	46.00	0.17	22.02	0.28	NEUTRAL	AVERAGE
10	3.258	32.57	-23.43	56.00	0.17	32.11	0.28	NEUTRAL	QP
11	7.687	26.44	-23.56	50.00	0.28	25.80	0.36	NEUTRAL	AVERAGE
12	7.687	32.37	-27.63	60.00	0.28	31.73	0.36	NEUTRAL	QP
13	14.672	23.59	-26.41	50.00	0.39	22.76	0.44	NEUTRAL	AVERAGE
14	14.672	29.97	-30.03	60.00	0.39	29.14	0.44	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

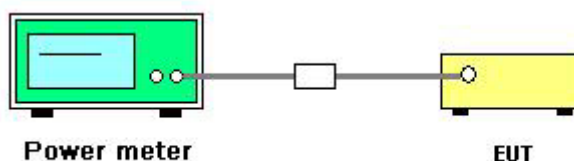
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

4.2.3. Test Procedures

1. Test procedures refer KDB 558074 D01 v03r02 section 9.2.3.2 Measurement using a power meter (PM).
2. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. 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	26°C	Humidity	63%
Test Engineer	Jim Huang	Configurations	IEEE 802.11ac
Test Date	Sep. 04, 2014		

For 2.4GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	13.75	13.98	11.35	17.95	29.42	Complies
6	2437 MHz	22.48	22.11	21.07	26.70	29.42	Complies
11	2462 MHz	16.44	16.46	14.02	20.55	29.42	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 6.58 \text{dBi} > 6 \text{dBi}$, so limit = $30 - (6.58 - 6) = 29.42 \text{dBm}$.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	12.57	12.98	10.09	16.83	29.42	Complies
6	2437 MHz	14.85	15.02	12.44	19.02	29.42	Complies
9	2452 MHz	15.16	15.14	12.35	19.17	29.42	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 6.58 \text{dBi} > 6 \text{dBi}$, so limit = $30 - (6.58 - 6) = 29.42 \text{dBm}$.

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	21.45	22.65	21.93	26.81	28.18	Complies
157	5785 MHz	21.36	22.68	22.39	26.95	28.18	Complies
165	5825 MHz	21.16	22.34	21.89	26.59	28.18	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.82 \text{dBi} > 6 \text{dBi}$, so limit = $30 - (7.82 - 6) = 28.18 \text{dBm}$.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	19.38	20.22	19.59	24.52	28.18	Complies
159	5795 MHz	20.89	22.59	22.12	26.70	28.18	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.82 \text{dBi} > 6 \text{dBi}$, so limit = $30 - (7.82 - 6) = 28.18 \text{dBm}$.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	19.31	20.06	19.56	24.43	28.18	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.82 \text{dBi} > 6 \text{dBi}$, so limit = $30 - (7.82 - 6) = 28.18 \text{dBm}$.

Temperature	26°C	Humidity	63%
Test Engineer	Jim Huang	Configurations	IEEE 802.11a/b/g
Test Date	Sep. 04, 2014		

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.21	30.00	Complies
6	2437 MHz	23.18	30.00	Complies
11	2462 MHz	23.28	30.00	Complies

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	21.08	30.00	Complies
6	2437 MHz	22.69	30.00	Complies
11	2462 MHz	20.70	30.00	Complies

Configuration IEEE 802.11a / Chain 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	21.06	30.00	Complies
157	5785 MHz	21.33	30.00	Complies
165	5825 MHz	20.96	30.00	Complies

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

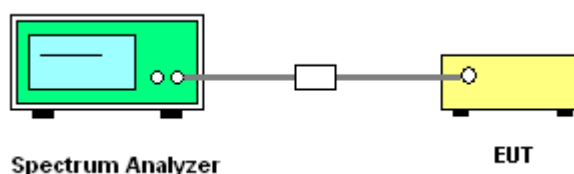
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.3.3. Test Procedures

1. Test was performed in accordance with KDB 558074 D01 v03r02 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - 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 $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be $\leq 8 \text{ dBm}$.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	26°C	Humidity	63%
Test Engineer	Jim Huang	Configurations	IEEE 802.11ac

For 2.4GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-11.30	-11.83	-13.88	-7.43	7.42	Complies
6	2437 MHz	-2.22	-3.35	-4.22	1.59	7.42	Complies
11	2462 MHz	-8.50	-8.16	-11.28	-4.34	7.42	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 6.58 \text{dBi} > 6 \text{dBi}$, so limit = $8 - (6.58 - 6) = 7.42 \text{dBm/3kHz}$.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	-16.23	-14.64	-18.32	-11.37	7.42	Complies
6	2437 MHz	-13.98	-14.02	-15.14	-9.58	7.42	Complies
9	2452 MHz	-13.31	-12.01	-15.90	-8.69	7.42	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 6.58 \text{dBi} > 6 \text{dBi}$, so limit = $8 - (6.58 - 6) = 7.42 \text{dBm/3kHz}$.

For 5GHz Band

Configuration IEEE 802.11ac MCS0/Nss1 VHT20

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-4.43	-3.83	-3.53	0.86	6.18	Complies
157	5785 MHz	-3.78	-3.38	-3.66	1.17	6.18	Complies
165	5825 MHz	-3.92	-2.37	-4.36	1.31	6.18	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.82 \text{dBi} > 6 \text{dBi}$, so limit = $8 - (7.82 - 6) = 6.18 \text{dBm/3kHz}$.

Configuration IEEE 802.11ac MCS0/Nss1 VHT40

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	-9.36	-8.32	-8.63	-3.98	6.18	Complies
159	5795 MHz	-7.84	-6.25	-5.89	-1.81	6.18	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.82 \text{dBi} > 6 \text{dBi}$, so limit = $8 - (7.82 - 6) = 6.18 \text{dBm/3kHz}$.

Configuration IEEE 802.11ac MCS0/Nss1 VHT80

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	-10.79	-10.88	-11.01	-6.12	6.18	Complies

Note: Directional gain = $10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 7.82 \text{dBi} > 6 \text{dBi}$, so limit = $8 - (7.82 - 6) = 6.18 \text{dBm/3kHz}$.

Temperature	26°C	Humidity	63%
Test Engineer	Jim Huang	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	0.10	8.00	Complies
6	2437 MHz	1.02	8.00	Complies
11	2462 MHz	0.21	8.00	Complies

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
1	2412 MHz	-3.90	8.00	Complies
6	2437 MHz	-2.24	8.00	Complies
11	2462 MHz	-5.31	8.00	Complies

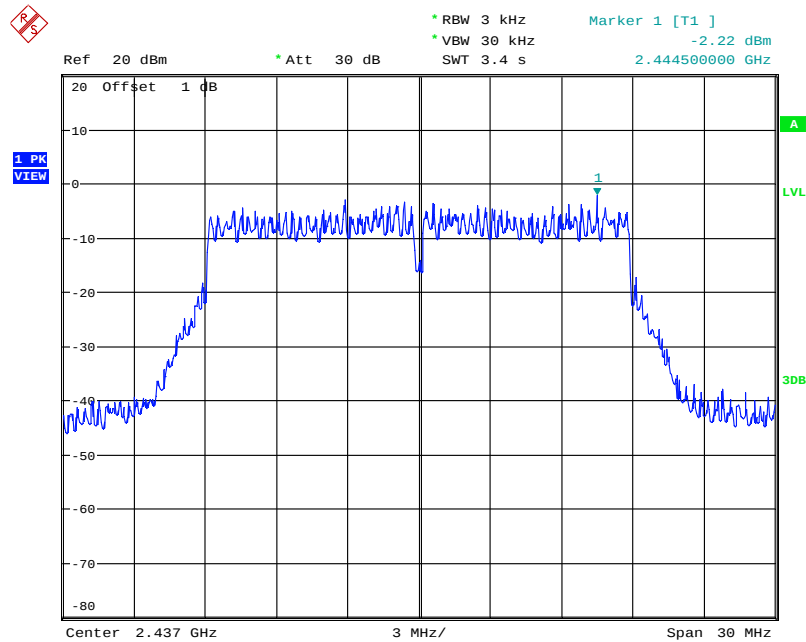
Configuration IEEE 802.11a / Chain 1

Channel	Frequency	Power Density (dBm/3kHz)	Power Density Limit (dBm/3kHz)	Result
149	5745 MHz	-4.06	8.00	Complies
157	5785 MHz	-3.68	8.00	Complies
165	5825 MHz	-4.22	8.00	Complies

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

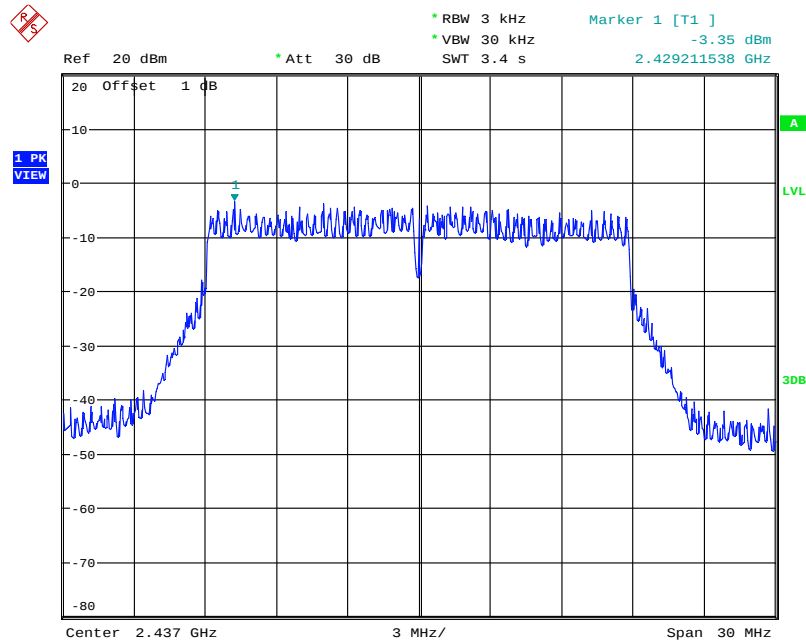
For plots, only the channel with worse result was shown.

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 1



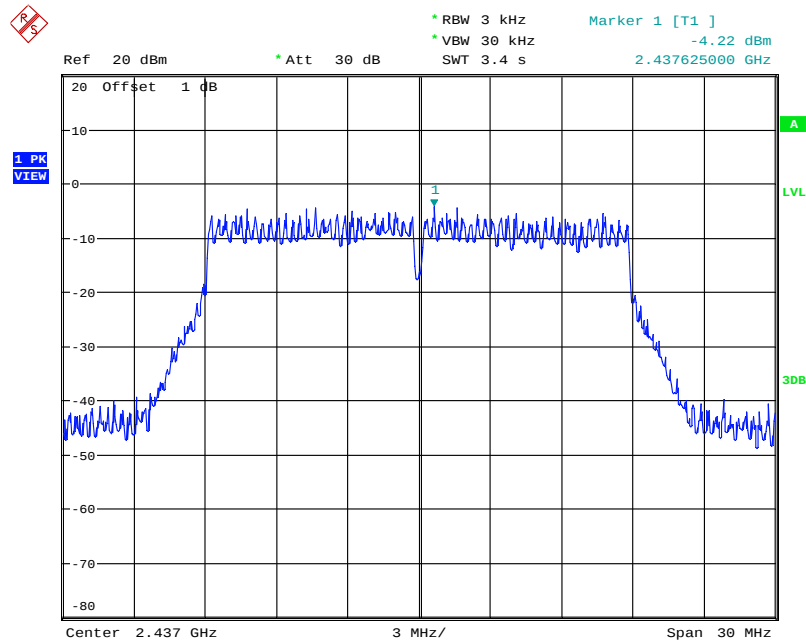
Date: 4.SEP.2014 20:17:15

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 2



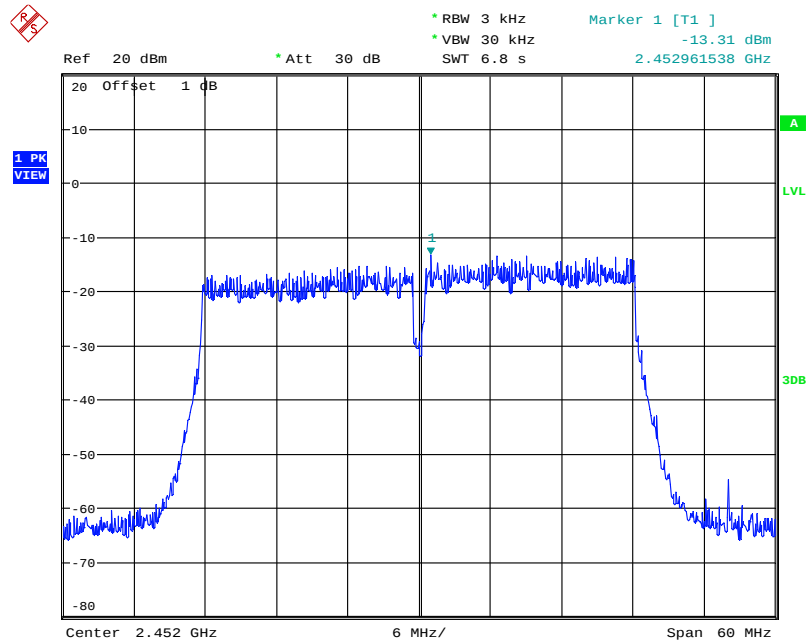
Date: 4.SEP.2014 20:16:40

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 3



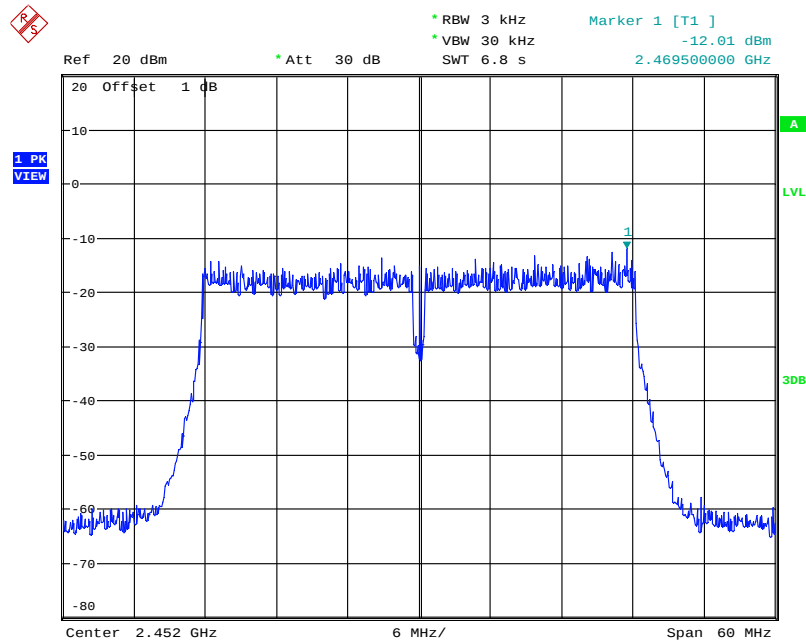
Date: 4.SEP.2014 20:15:57

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2452 MHz / Chain 1



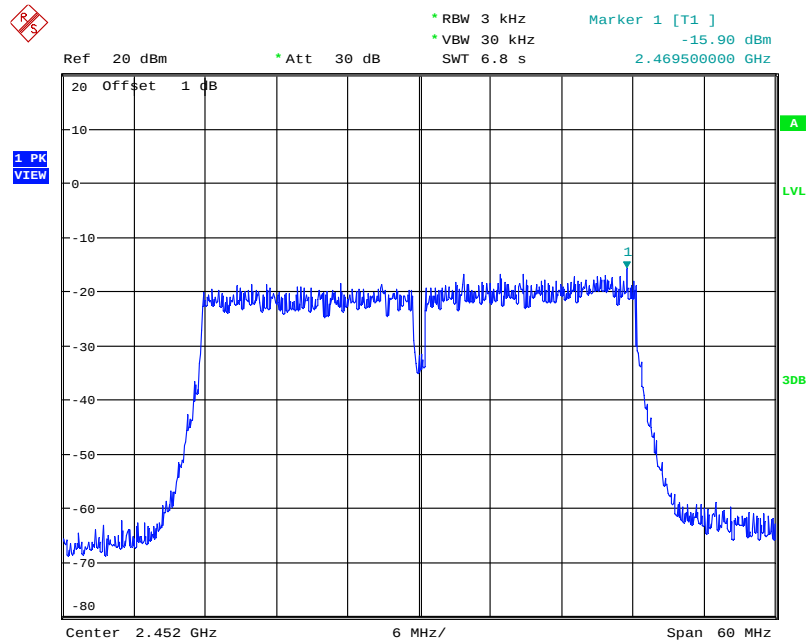
Date: 4.SEP.2014 20:27:56

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2452 MHz / Chain 2



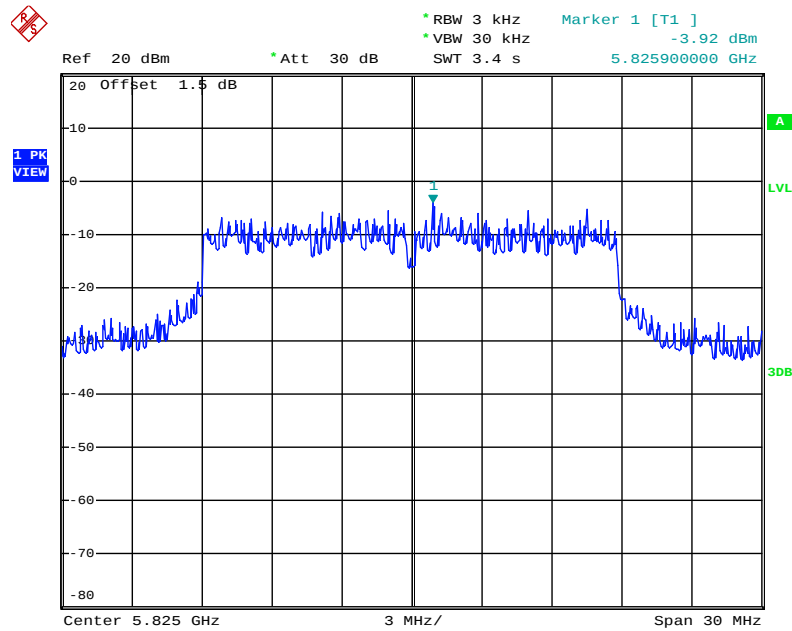
Date: 4.SEP.2014 20:28:41

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2452 MHz / Chain 3



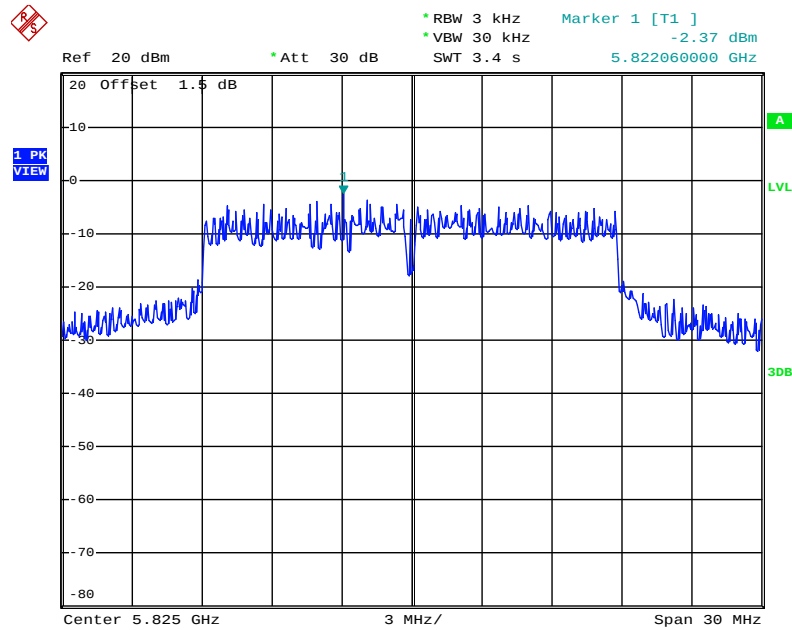
Date: 4.SEP.2014 20:29:20

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



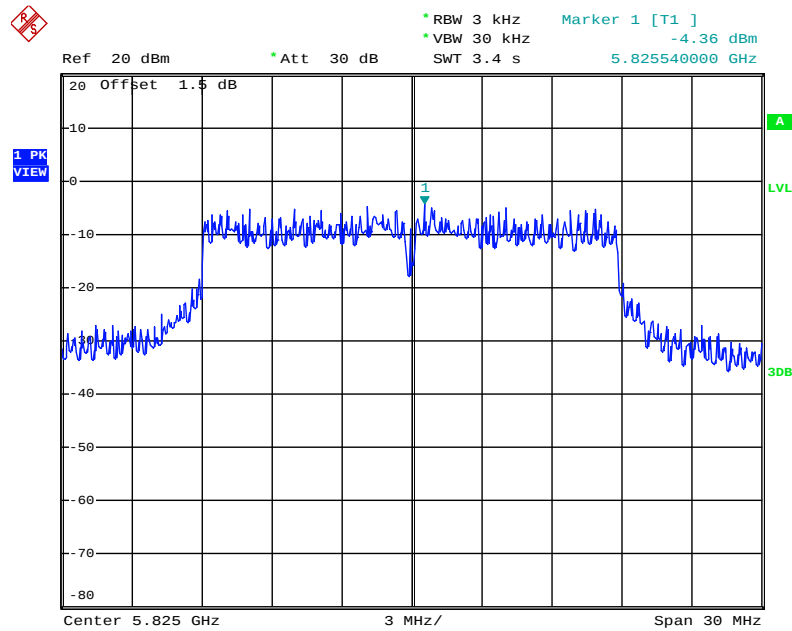
Date: 8.SEP.2014 11:30:35

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



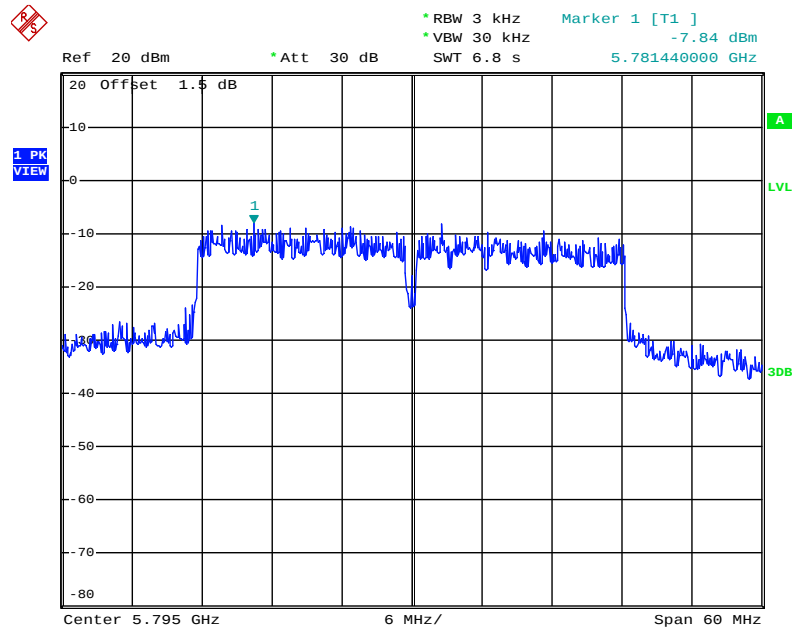
Date: 8.SEP.2014 11:30:55

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



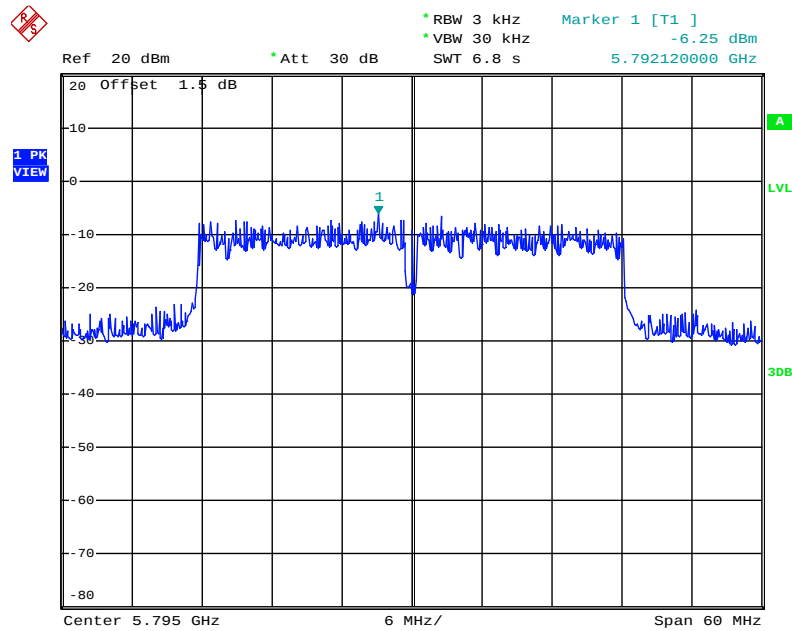
Date: 8.SEP.2014 11:31:16

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



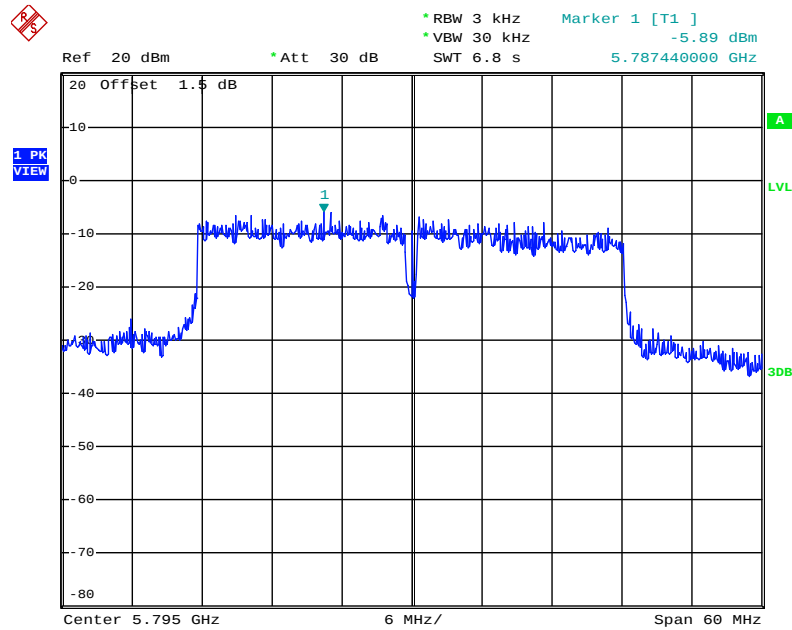
Date: 8.SEP.2014 11:37:45

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



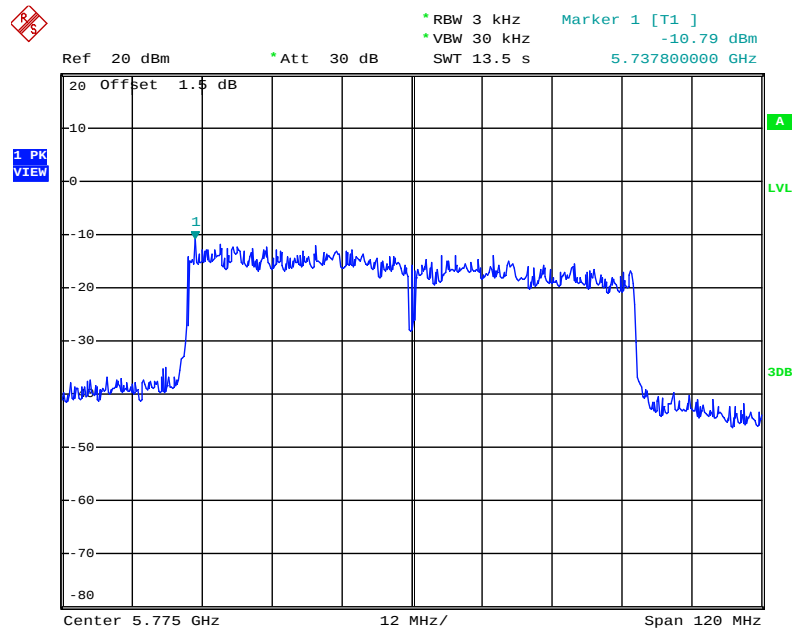
Date: 8.SEP.2014 11:38:17

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



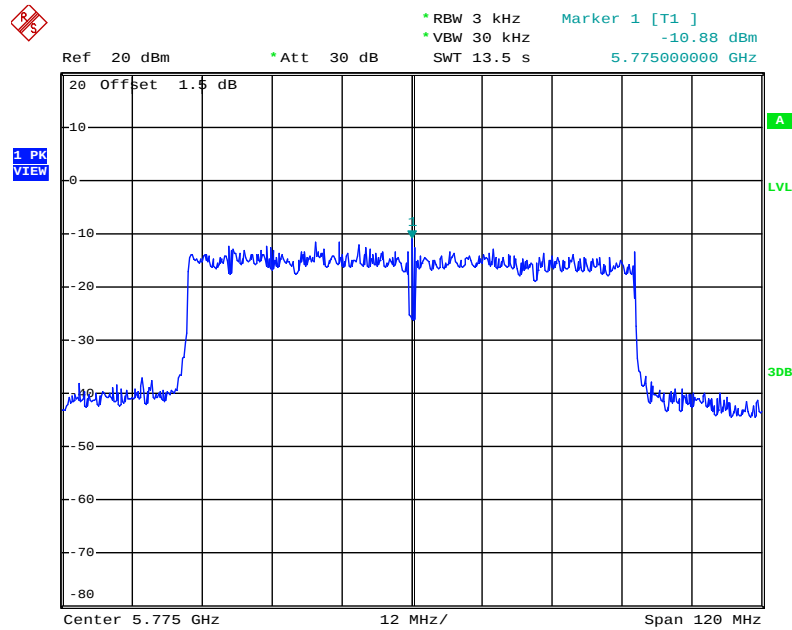
Date: 8.SEP.2014 11:38:59

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



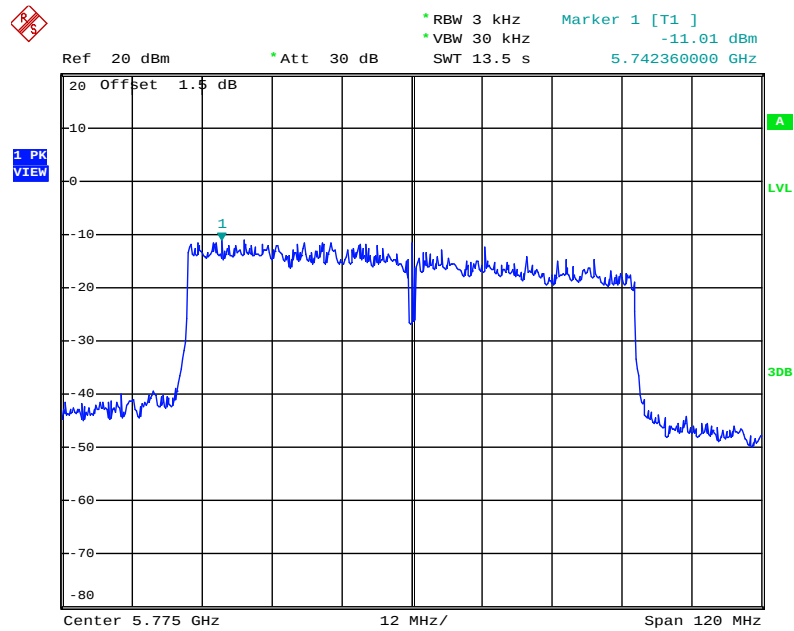
Date: 8.SEP.2014 11:47:05

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



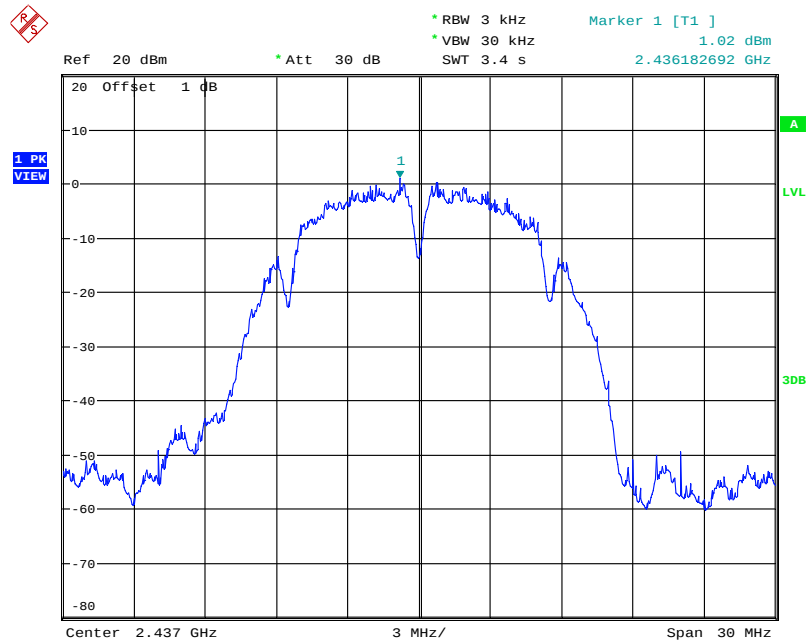
Date: 8.SEP.2014 11:46:31

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



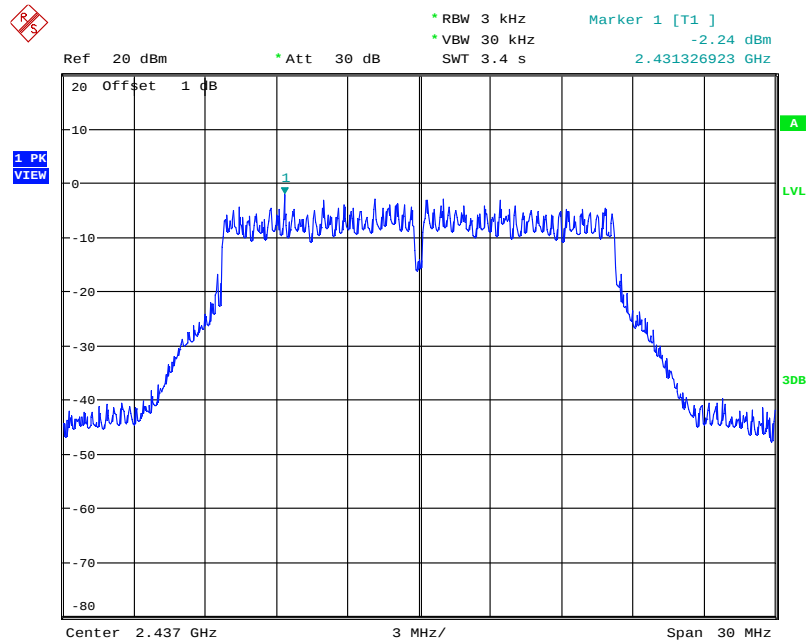
Date: 8.SEP.2014 11:45:57

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



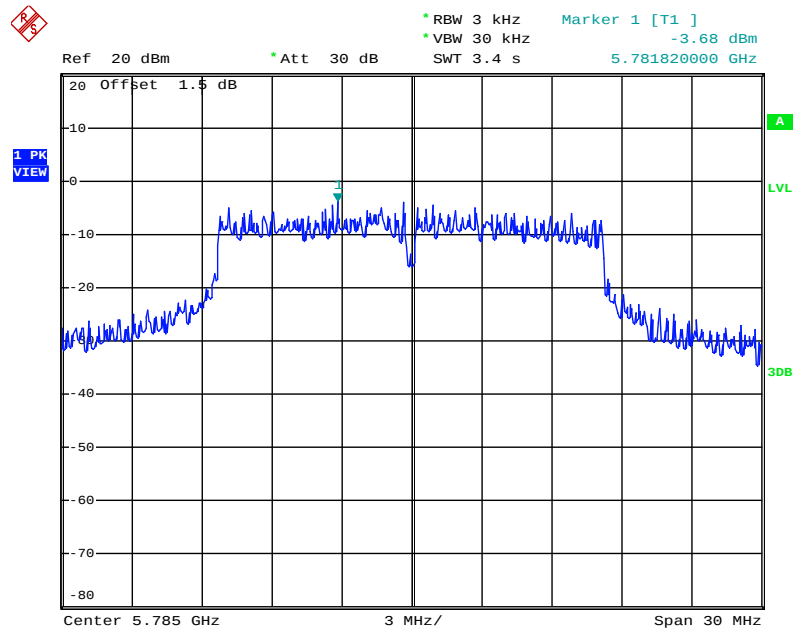
Date: 4.SEP.2014 20:07:55

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



Date: 4.SEP.2014 20:11:06

Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 1



Date: 8.SEP.2014 11:28:57

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

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

4.4.2. Measuring Instruments and Setting

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

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

4.4.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 D01 v03r02 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - section 8.0 DTS bandwidth=> 8.1 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	26°C	Humidity	63%
Test Engineer	Jim Huang	Configurations	IEEE 802.11ac

For 2.4GHz 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
1	2412 MHz	16.28	17.69	500	Complies
6	2437 MHz	16.92	17.69	500	Complies
11	2462 MHz	12.56	17.56	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
3	2422 MHz	35.38	36.28	500	Complies
6	2437 MHz	36.41	36.41	500	Complies
9	2452 MHz	36.28	36.28	500	Complies

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	15.60	18.32	500	Complies
157	5785 MHz	17.60	19.92	500	Complies
165	5825 MHz	15.76	18.72	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	35.04	36.32	500	Complies
159	5795 MHz	35.20	51.52	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	75.52	76.16	500	Complies

Temperature	26°C	Humidity	63%
Test Engineer	Jim Huang	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	8.01	11.66	500	Complies
6	2437 MHz	9.10	11.66	500	Complies
11	2462 MHz	8.52	11.34	500	Complies

Configuration IEEE 802.11g / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.34	16.53	500	Complies
6	2437 MHz	16.28	16.53	500	Complies
11	2462 MHz	15.96	16.47	500	Complies

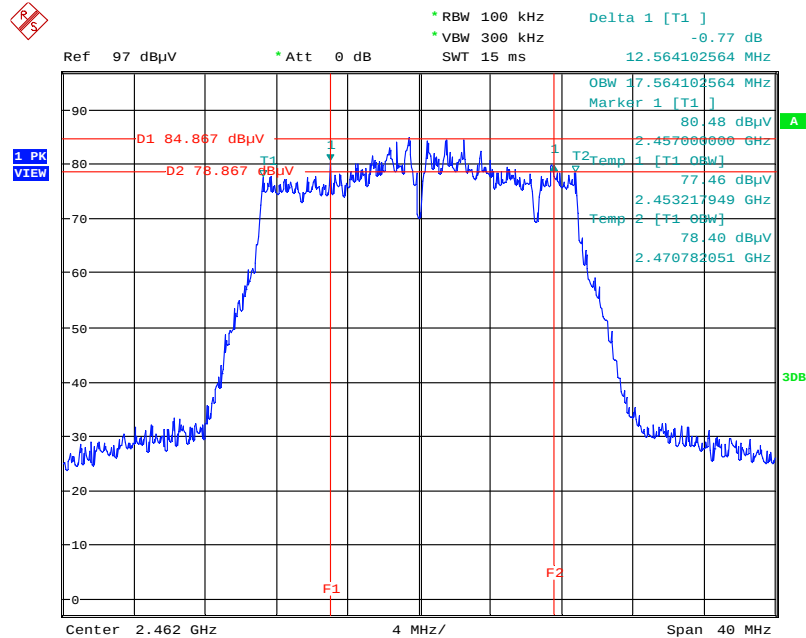
Configuration IEEE 802.11a / Chain 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.32	18.56	500	Complies
157	5785 MHz	16.08	21.36	500	Complies
165	5825 MHz	16.08	22.40	500	Complies

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

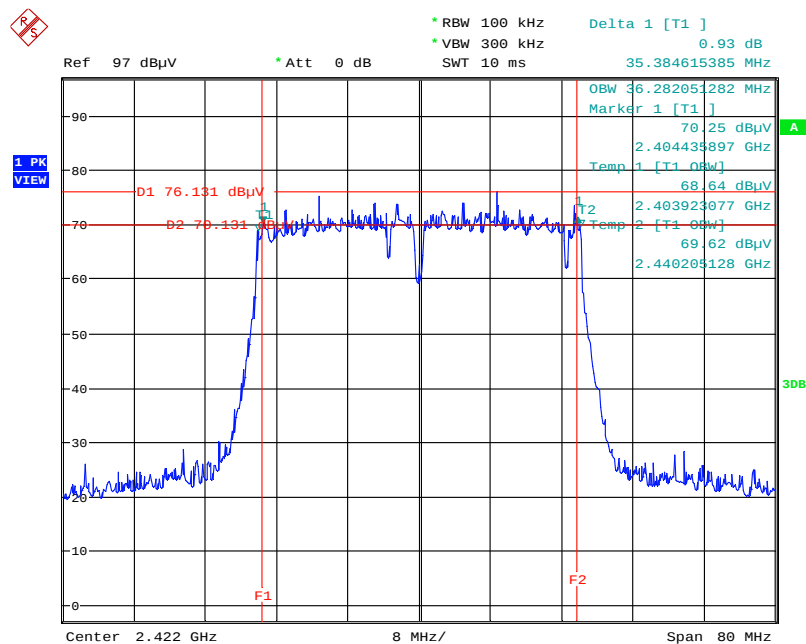
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2462 MHz / Chain 1 + Chain 2 + Chain 3



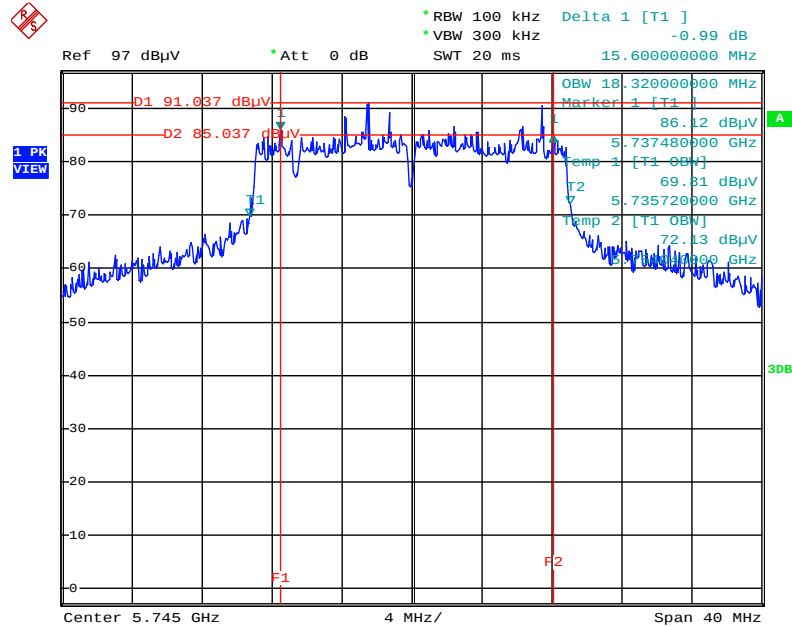
Date: 4.SEP.2014 21:01:03

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2422 MHz / Chain 1 + Chain 2 + Chain 3



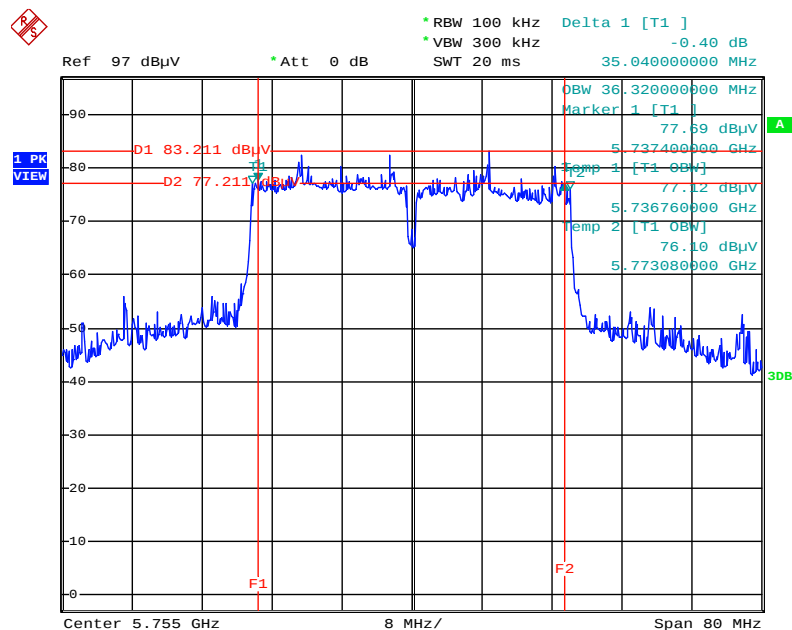
Date: 4.SEP.2014 21:01:35

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



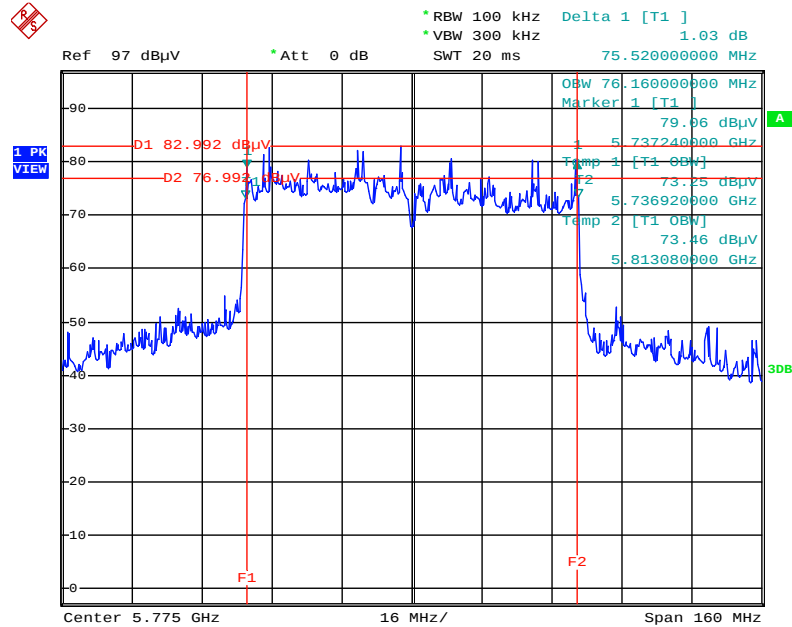
Date: 8.SEP.2014 10:57:05

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



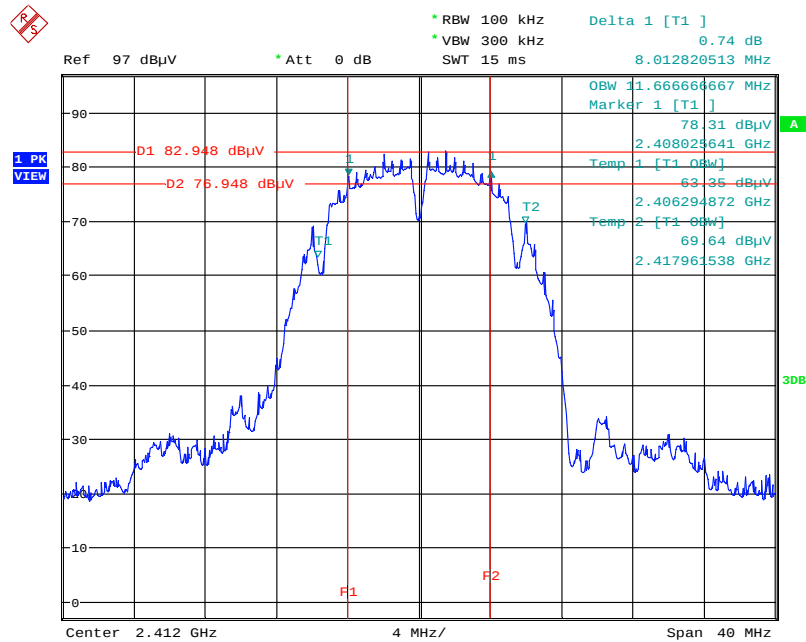
Date: 8.SEP.2014 10:57:58

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



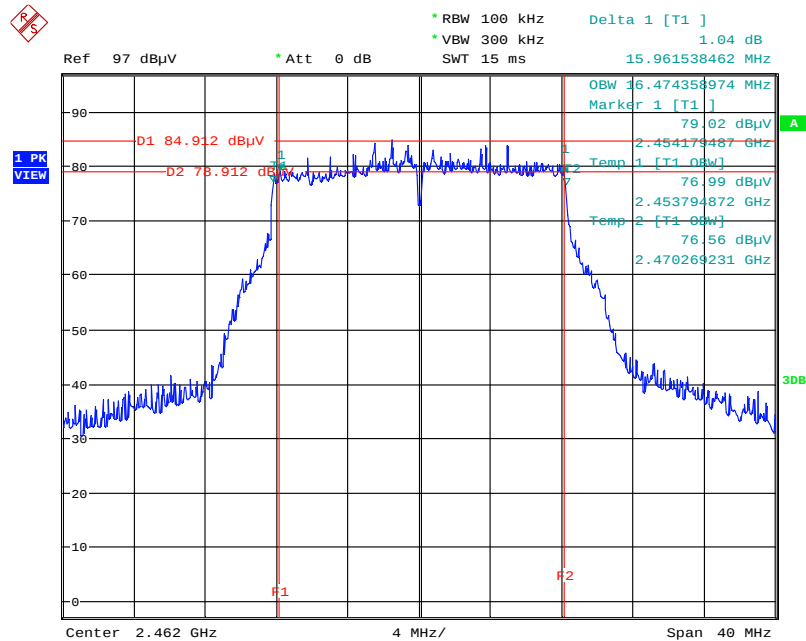
Date: 8.SEP.2014 11:01:22

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2412 MHz / Chain 1



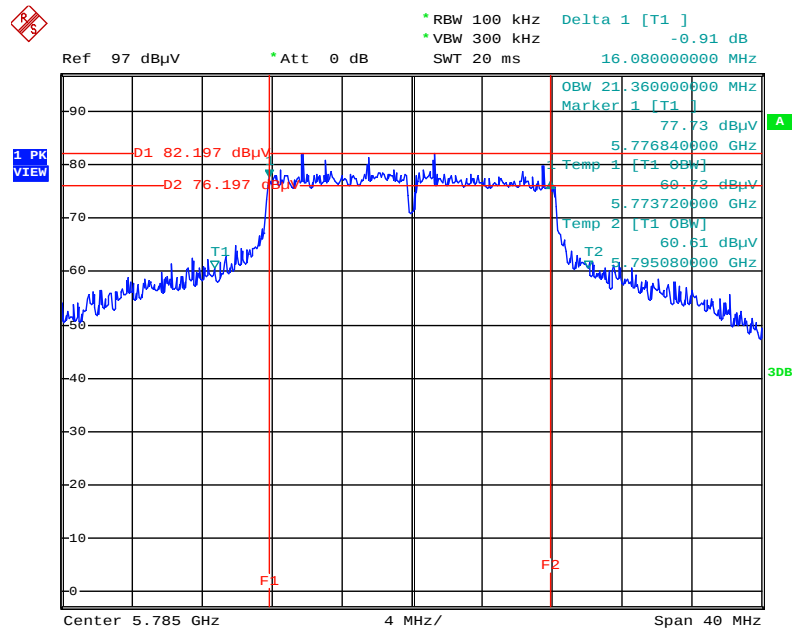
Date: 4.SEP.2014 20:45:43

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2462 MHz / Chain 1



Date: 4.SEP.2014 20:57:09

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



Date: 8.SEP.2014 10:50:39

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

4.5.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

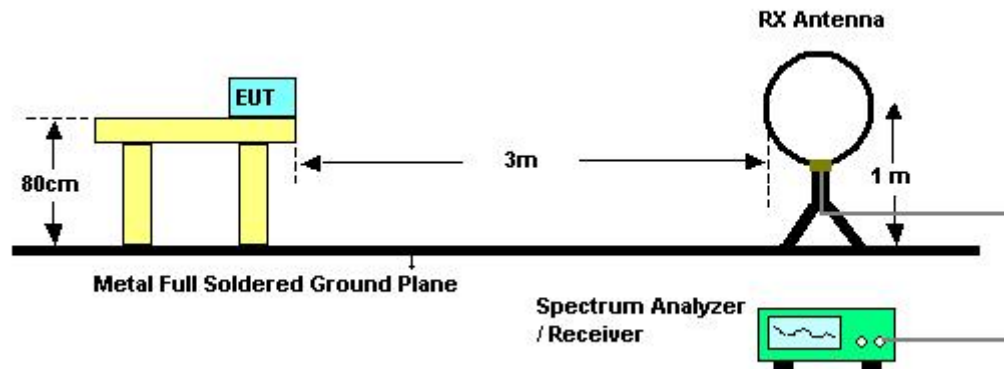
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

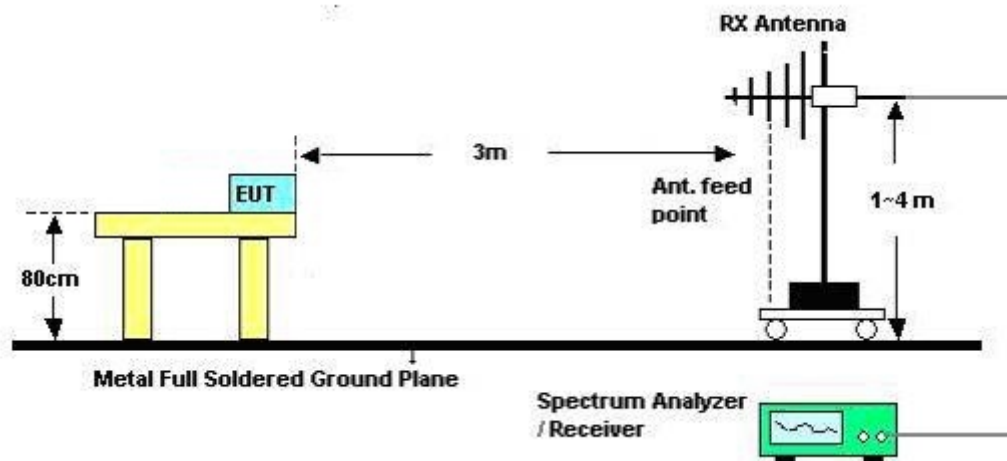
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 1/T VBW for average reading in spectrum analyzer.
7. 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.
8. 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.
9. 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

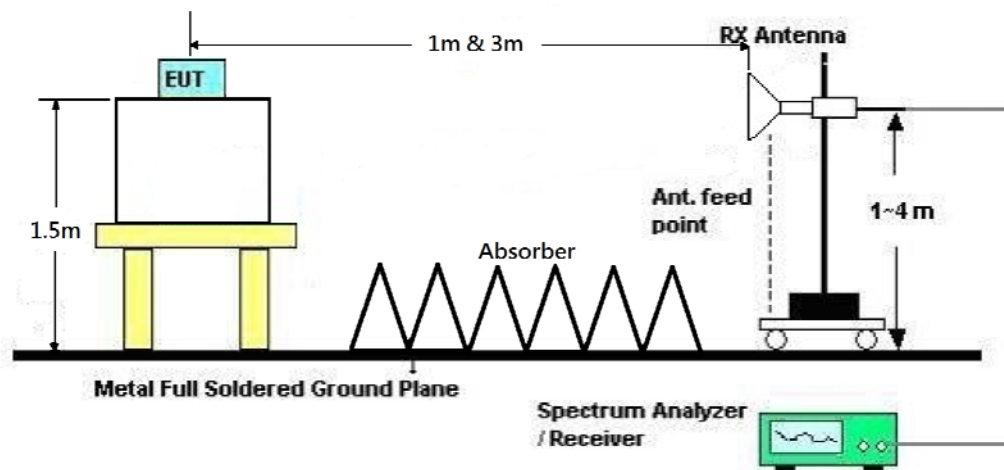
For Radiated Emissions: 9kHz ~30MHz



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 function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	Normal Link
Test Date	Sep. 10, 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.

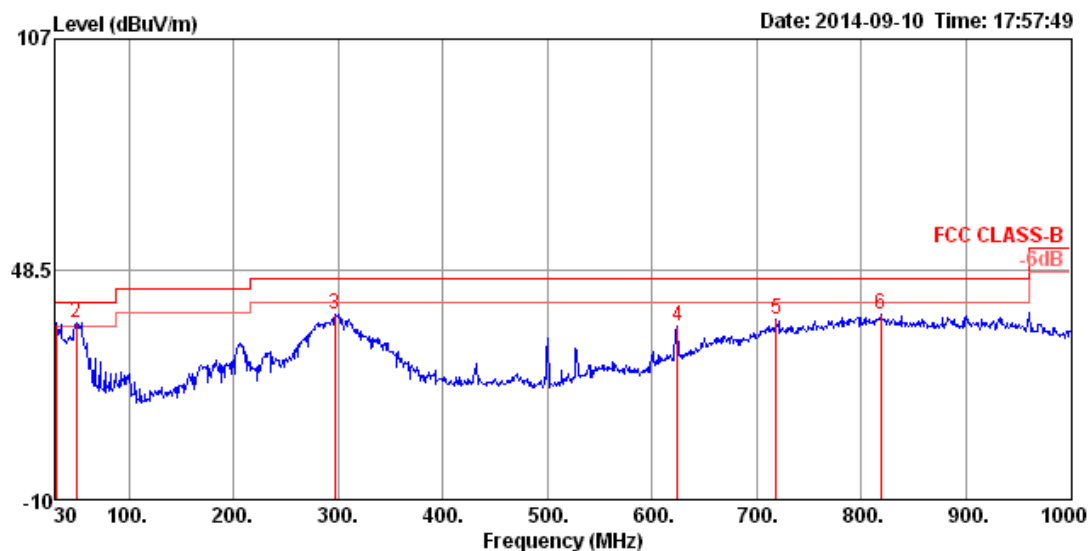
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

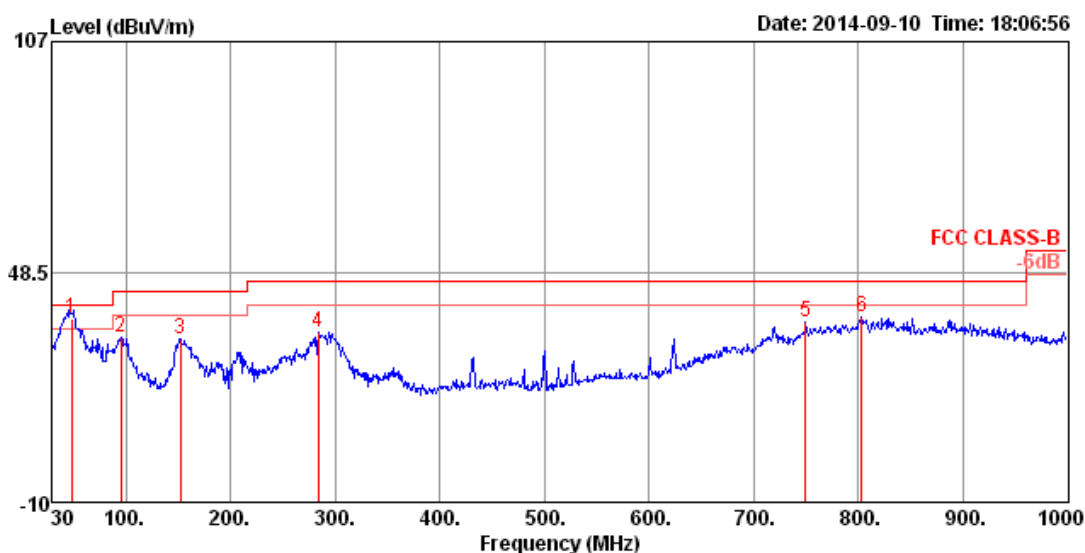
Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	Normal Link

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	30.00	34.45	40.00	-5.55	47.64	0.64	17.98	31.81	150	354	HORIZONTAL Peak
2	49.40	34.87	40.00	-5.13	57.95	0.83	7.88	31.79	150	0	HORIZONTAL Peak
3	296.75	37.06	46.00	-8.94	53.52	2.11	12.89	31.46	100	170	HORIZONTAL Peak
4	624.61	34.01	46.00	-11.99	43.62	3.18	18.61	31.40	150	148	HORIZONTAL Peak
5	718.70	35.74	46.00	-10.26	44.27	3.45	19.26	31.24	125	109	HORIZONTAL Peak
6	818.61	36.92	46.00	-9.08	44.13	3.72	20.27	31.20	100	155	HORIZONTAL Peak

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	48.30	36.84	40.00	-3.16	59.50	0.82	8.32	31.80	125	77 VERTICAL	QP
2	94.99	32.08	43.50	-11.42	52.91	1.16	9.58	31.57	125	37 VERTICAL	Peak
3	152.22	31.65	43.50	-11.85	51.87	1.48	9.86	31.56	100	109 VERTICAL	Peak
4	284.14	33.01	46.00	-12.99	49.92	2.05	12.58	31.54	200	206 VERTICAL	Peak
5	749.74	35.75	46.00	-10.25	43.90	3.53	19.69	31.37	100	222 VERTICAL	Peak
6	803.09	37.11	46.00	-8.89	44.81	3.68	19.88	31.26	100	23 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)

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 05, 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	4822.32	40.21	74.00	-33.79	38.26	3.31	33.56	34.92	Peak	100	155	HORIZONTAL
2	4824.12	28.39	54.00	-25.61	26.44	3.31	33.56	34.92	Average	100	155	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	4820.10	37.68	74.00	-36.32	35.73	3.31	33.56	34.92	Peak	151	287	VERTICAL
2	4823.80	28.34	54.00	-25.66	26.39	3.31	33.56	34.92	Average	151	287	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 05, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4871.30	28.91	54.00	-25.09	26.84	3.33	33.66	34.92	101	200	HORIZONTAL
2	4876.70	38.29	74.00	-35.71	36.22	3.33	33.66	34.92	101	200	HORIZONTAL
3	7308.60	59.48	74.00	-14.52	53.97	4.06	36.64	35.19	204	236	HORIZONTAL
4	7308.90	46.40	54.00	-7.60	40.89	4.06	36.64	35.19	204	236	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4866.32	39.61	74.00	-34.39	37.58	3.33	33.62	34.92	199	204	VERTICAL
2	4872.52	28.81	54.00	-25.19	26.74	3.33	33.66	34.92	199	204	VERTICAL
3	7302.50	63.38	74.00	-10.62	57.87	4.06	36.64	35.19	172	181	VERTICAL
4	7308.90	48.65	54.00	-5.35	43.14	4.06	36.64	35.19	172	181	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 05, 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	4900.00	29.35	54.00	-24.65	27.23	3.34	33.69	34.91	Average	151	40	HORIZONTAL
2	4943.20	39.97	74.00	-34.03	37.71	3.37	33.80	34.91	Peak	151	40	HORIZONTAL
3	7387.40	57.67	74.00	-16.33	51.97	4.06	36.85	35.21	Peak	170	216	HORIZONTAL
4	7387.60	40.95	54.00	-13.05	35.25	4.06	36.85	35.21	Average	170	216	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	4899.30	29.47	54.00	-24.53	27.35	3.34	33.69	34.91	Average	166	238	VERTICAL
2	4910.00	40.52	74.00	-33.48	38.36	3.34	33.73	34.91	Peak	166	238	VERTICAL
3	7387.30	62.08	74.00	-11.92	56.38	4.06	36.85	35.21	Peak	100	212	VERTICAL
4	7388.00	45.14	54.00	-8.86	39.44	4.06	36.85	35.21	Average	100	212	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 05, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4837.80	29.17	54.00	-24.83	27.18	3.32	33.59	34.92	Average	128	77	HORIZONTAL
2	4867.50	42.24	74.00	-31.76	40.17	3.33	33.66	34.92	Peak	128	77	HORIZONTAL
3	7278.60	33.23	54.00	-20.77	27.80	4.06	36.56	35.19	Average	133	68	HORIZONTAL
4	7279.30	44.84	74.00	-29.16	39.41	4.06	36.56	35.19	Peak	133	68	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4838.10	28.59	54.00	-25.41	26.60	3.32	33.59	34.92	Average	151	228	VERTICAL
2	4863.00	42.26	74.00	-31.74	40.24	3.32	33.62	34.92	Peak	151	228	VERTICAL
3	7261.40	34.60	54.00	-19.40	29.21	4.06	36.52	35.19	Average	100	193	VERTICAL
4	7275.40	47.50	74.00	-26.50	42.07	4.06	36.56	35.19	Peak	100	193	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 05, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4897.60	42.71	74.00	-31.29	40.59	3.34	33.69	34.91	Peak	100	175	HORIZONTAL
2	4898.90	29.62	54.00	-24.38	27.50	3.34	33.69	34.91	Average	100	175	HORIZONTAL
3	7305.90	34.47	54.00	-19.53	28.96	4.06	36.64	35.19	Average	161	229	HORIZONTAL
4	7310.70	48.24	74.00	-25.76	42.73	4.06	36.64	35.19	Peak	161	229	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4893.20	43.51	74.00	-30.49	41.39	3.34	33.69	34.91	Peak	162	250	VERTICAL
2	4897.90	30.04	54.00	-23.96	27.92	3.34	33.69	34.91	Average	162	250	VERTICAL
3	7299.30	37.27	54.00	-16.73	31.76	4.06	36.64	35.19	Average	100	180	VERTICAL
4	7317.10	49.44	74.00	-24.56	43.88	4.06	36.69	35.19	Peak	100	180	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 05, 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	4900.30	29.79	54.00	-24.21	27.67	3.34	33.69	34.91	Average	120	57	HORIZONTAL
2	4911.00	42.89	74.00	-31.11	40.73	3.34	33.73	34.91	Peak	120	57	HORIZONTAL
3	7366.10	48.86	74.00	-25.14	43.24	4.06	36.77	35.21	Peak	100	138	HORIZONTAL
4	7367.50	35.43	54.00	-18.57	29.77	4.06	36.81	35.21	Average	100	138	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4899.50	42.76	74.00	-31.24	40.64	3.34	33.69	34.91	Peak	100	107	VERTICAL
2	4910.80	30.10	54.00	-23.90	27.94	3.34	33.73	34.91	Average	100	107	VERTICAL
3	7366.20	54.55	74.00	-19.45	48.93	4.06	36.77	35.21	Peak	180	171	VERTICAL
4	7367.20	40.44	54.00	-13.56	34.78	4.06	36.81	35.21	Average	180	171	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11488.62	53.29	74.00	-20.71	42.91	6.74	38.30	34.66	Peak	151	131	HORIZONTAL
2	11490.80	40.03	54.00	-13.97	29.65	6.74	38.30	34.66	Average	151	131	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11481.09	40.09	54.00	-13.91	29.71	6.74	38.30	34.66	Average	329	150 VERTICAL
2	11493.56	53.88	74.00	-20.12	43.50	6.74	38.30	34.66	Peak	329	150 VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableLoss	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	11573.75	52.72	74.00	-21.28	42.31	6.77	38.33	34.69	Peak	174	128	HORIZONTAL
2	11579.84	40.42	54.00	-13.58	30.01	6.77	38.33	34.69	Average	174	128	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11571.70	53.03	74.00	-20.97	42.62	6.77	38.33	34.69	Peak	127	161	VERTICAL
2	11576.76	39.85	54.00	-14.15	29.44	6.77	38.33	34.69	Average	127	161	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11640.90	52.78	74.00	-21.22	42.33	6.80	38.36	34.71	Peak	113	147 HORIZONTAL
2	11657.69	39.31	54.00	-14.69	28.87	6.80	38.36	34.72	Average	113	147 HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11656.57	40.00	54.00	-14.00	29.56	6.80	38.36	34.72	Average	182	169 VERTICAL
2	11657.69	52.84	74.00	-21.16	42.40	6.80	38.36	34.72	Peak	182	169 VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11514.36	53.24	74.00	-20.76	42.85	6.75	38.30	34.66	Peak	161	122	HORIZONTAL
2	11523.72	39.82	54.00	-14.18	29.42	6.76	38.31	34.67	Average	161	122	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11520.00	39.73	54.00	-14.27	29.33	6.76	38.31	34.67	Average	257	156 VERTICAL
2	11524.55	53.57	74.00	-20.43	43.17	6.76	38.31	34.67	Peak	257	156 VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11589.71	39.61	54.00	-14.39	29.19	6.78	38.33	34.69	Average	214	133	HORIZONTAL
2	11592.47	53.00	74.00	-21.00	42.58	6.78	38.33	34.69	Peak	214	133	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11580.10	39.19	54.00	-14.81	28.78	6.77	38.33	34.69	Average	159	109 VERTICAL
2	11581.15	52.55	74.00	-21.45	42.14	6.77	38.33	34.69	Peak	159	109 VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Sep. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11536.92	52.63	74.00	-21.37	42.23	6.76	38.31	34.67	Peak	223	124	HORIZONTAL
2	11541.92	39.98	54.00	-14.02	29.58	6.76	38.31	34.67	Average	223	124	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11525.26	39.85	54.00	-14.15	29.45	6.76	38.31	34.67	Average	134	158 VERTICAL
2	11568.21	52.76	74.00	-21.24	42.34	6.77	38.33	34.68	Peak	134	158 VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1 / Chain 1
Test Date	Sep. 05, 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	4823.98	41.03	54.00	-12.97	39.08	3.31	33.56	34.92	Average	100	148	HORIZONTAL
2	4824.08	45.69	74.00	-28.31	43.74	3.31	33.56	34.92	Peak	100	148	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	4823.98	50.84	54.00	-3.16	48.89	3.31	33.56	34.92	Average	212	192	VERTICAL
2	4824.02	52.72	74.00	-21.28	50.77	3.31	33.56	34.92	Peak	212	192	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 6 / Chain 1
Test Date	Aug. 25, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	4873.84	49.34	74.00	-24.66	46.10	5.75	32.80	35.31	100	95	HORIZONTAL	Peak
2	4874.00	46.11	54.00	-7.89	42.87	5.75	32.80	35.31	100	95	HORIZONTAL	Average
3	7313.20	49.67	74.00	-24.33	40.85	7.06	37.12	35.36	100	106	HORIZONTAL	Peak
4	7314.28	41.22	54.00	-12.78	32.40	7.06	37.12	35.36	100	106	HORIZONTAL	Average

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	4873.99	49.08	54.00	-4.92	45.84	5.75	32.80	35.31	100	356	VERTICAL	Average
2	4874.02	51.72	74.00	-22.28	48.48	5.75	32.80	35.31	100	356	VERTICAL	Peak
3	7311.78	50.54	74.00	-23.46	41.72	7.06	37.12	35.36	100	162	VERTICAL	Peak
4	7312.56	41.51	54.00	-12.49	32.69	7.06	37.12	35.36	100	162	VERTICAL	Average

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 11 / Chain 1
Test Date	Aug. 25, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	4923.79	50.02	74.00	-23.98	46.70	5.81	32.84	35.33	100	82	HORIZONTAL	Peak
2	4923.98	44.92	54.00	-9.08	41.60	5.81	32.84	35.33	100	82	HORIZONTAL	Average
3	7382.07	51.28	74.00	-22.72	42.36	7.08	37.16	35.32	100	103	HORIZONTAL	Peak
4	7388.89	40.73	54.00	-13.27	31.79	7.09	37.16	35.31	100	103	HORIZONTAL	Average

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	4923.69	49.48	74.00	-24.52	46.16	5.81	32.84	35.33	100	359	VERTICAL	Peak
2	4923.97	44.15	54.00	-9.85	40.83	5.81	32.84	35.33	100	359	VERTICAL	Average
3	7386.80	40.72	54.00	-13.28	31.79	7.09	37.16	35.32	100	311	VERTICAL	Average
4	7388.82	49.65	74.00	-24.35	40.71	7.09	37.16	35.31	100	311	VERTICAL	Peak

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1 / Chain 1
Test Date	Aug. 25, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4821.03	46.32	74.00	-27.68	43.18	5.68	32.76	35.30	100	112	HORIZONTAL Peak
2	4824.90	37.40	54.00	-16.60	34.25	5.69	32.76	35.30	100	112	HORIZONTAL Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4821.60	52.66	74.00	-21.34	49.52	5.68	32.76	35.30	100	357	VERTICAL Peak
2	4826.43	42.82	54.00	-11.18	39.66	5.69	32.77	35.30	100	357	VERTICAL Average

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 6 / Chain 1
Test Date	Aug. 25, 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	4875.80	39.42	54.00	-14.58	36.19	5.75	32.80	35.32	100	100	HORIZONTAL	Average
2	4877.23	49.08	74.00	-24.92	45.85	5.75	32.80	35.32	100	100	HORIZONTAL	Peak
3	7310.01	42.65	54.00	-11.35	33.83	7.06	37.12	35.36	100	14	HORIZONTAL	Average
4	7315.96	52.23	74.00	-21.77	43.40	7.06	37.13	35.36	100	14	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	4870.21	50.98	74.00	-23.02	47.75	5.74	32.80	35.31	100	360	VERTICAL	Peak
2	4870.24	40.84	54.00	-13.16	37.61	5.74	32.80	35.31	100	360	VERTICAL	Average
3	7309.45	51.44	74.00	-22.56	42.62	7.06	37.12	35.36	100	324	VERTICAL	Peak
4	7313.93	42.48	54.00	-11.52	33.66	7.06	37.12	35.36	100	324	VERTICAL	Average

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 11 / Chain 1
Test Date	Aug. 25, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4924.51	47.57	74.00	-26.43	44.25	5.81	32.84	35.33	100	65	HORIZONTAL	Peak
2	4926.37	38.29	54.00	-15.71	34.97	5.81	32.84	35.33	100	65	HORIZONTAL	Average
3	7385.89	41.96	54.00	-12.04	33.03	7.09	37.16	35.32	100	291	HORIZONTAL	Average
4	7387.11	52.09	74.00	-21.91	43.16	7.09	37.16	35.32	100	291	HORIZONTAL	Peak

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4928.37	47.71	74.00	-26.29	44.39	5.81	32.84	35.33	100	352	VERTICAL	Peak
2	4928.83	37.61	54.00	-16.39	34.29	5.81	32.84	35.33	100	352	VERTICAL	Average
3	7383.21	41.95	54.00	-12.05	33.03	7.08	37.16	35.32	100	275	VERTICAL	Average
4	7387.11	52.09	74.00	-21.91	43.16	7.09	37.16	35.32	100	275	VERTICAL	Peak

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 149 / Chain 1
Test Date	Sep. 05, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11449.78	41.84	54.00	-12.16	31.49	6.72	38.30	34.67 Average	119	120	HORIZONTAL
2	11525.42	54.70	74.00	-19.30	44.30	6.76	38.31	34.67 Peak	119	120	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11448.97	52.58	74.00	-21.42	42.23	6.72	38.30	34.67 Peak	295	100	VERTICAL
2	11448.97	40.99	54.00	-13.01	30.64	6.72	38.30	34.67 Average	295	100	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 157 / Chain 1
Test Date	Sep. 05, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11569.52	39.29	74.00	-34.71	28.87	6.77	38.33	34.68 Peak	47	120	HORIZONTAL
2	11569.52	51.66	74.00	-22.34	41.24	6.77	38.33	34.68 Peak	47	120	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11520.00	38.40	54.00	-15.60	28.00	6.76	38.31	34.67 Average	20	130	VERTICAL
2	11606.54	51.42	74.00	-22.58	40.99	6.79	38.34	34.70 Peak	20	130	VERTICAL

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 165 / Chain 1
Test Date	Sep. 05, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	Remark	deg	cm	
1	11649.17	50.02	74.00	-23.98	39.58	6.80	38.36	34.72	Peak	142	116	HORIZONTAL
2	11649.17	38.40	54.00	-15.60	27.96	6.80	38.36	34.72	Average	142	116	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	Remark	deg	cm	
1	11646.96	38.24	54.00	-15.76	27.80	6.80	38.36	34.72	Average	289	100	VERTICAL
2	11656.15	52.89	74.00	-21.11	42.45	6.80	38.36	34.72	Peak	289	100	VERTICAL

Note:

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

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

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

4.6. Emissions Measurement

4.6.1. Limit

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

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

4.6.2. Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (30dBc in any 100 kHz bandwidth emission)	100 kHz / 300 kHz for Peak

4.6.3. Test Procedures

For Radiated band edges Measurement:

- 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:

- Test was performed in accordance with KDB 558074 D01 v03r02 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
- The radiated emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit.
Only worst data of each operating mode is presented.

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Aug. 29, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	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	52.67	54.00	-1.33	20.53	4.09	28.05	0.00 Average	100	3	VERTICAL
2	2390.00	67.20	74.00	-6.80	35.06	4.09	28.05	0.00 Peak	100	3	VERTICAL
3	2414.40	107.41			75.21	4.11	28.09	0.00 Average	100	3	VERTICAL
4	2418.80	118.49			86.25	4.11	28.13	0.00 Peak	100	3	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	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	52.66	54.00	-1.34	20.52	4.09	28.05	0.00 Average	100	2	VERTICAL
2	2390.00	69.37	74.00	-4.63	37.23	4.09	28.05	0.00 Peak	100	2	VERTICAL
3	2429.00	116.18			83.93	4.12	28.13	0.00 Average	100	2	VERTICAL
4	2430.20	128.12			95.87	4.12	28.13	0.00 Peak	100	2	VERTICAL
5	2509.10	52.97	54.00	-1.03	20.43	4.19	28.35	0.00 Average	100	2	VERTICAL
6	2509.50	64.98	74.00	-9.02	32.44	4.19	28.35	0.00 Peak	100	2	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2469.00	109.10			76.70	4.14	28.26	0.00 Average	100	178	VERTICAL
2	2469.60	118.59			86.19	4.14	28.26	0.00 Peak	100	178	VERTICAL
3	2483.50	52.58	54.00	-1.42	20.16	4.16	28.26	0.00 Average	100	178	VERTICAL
4	2483.90	69.93	74.00	-4.07	37.51	4.16	28.26	0.00 Peak	100	178	VERTICAL

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

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3, 6, 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Aug. 29, 2014		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.20	65.21	74.00	-8.79	33.07	4.09	28.05	0.00	Peak	100	360	VERTICAL
2	2390.00	52.69	54.00	-1.31	20.55	4.09	28.05	0.00	Average	100	360	VERTICAL
3	2414.80	114.73			82.53	4.11	28.09	0.00	Peak	100	360	VERTICAL
4	2418.40	103.33			71.09	4.11	28.13	0.00	Average	100	360	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.60	68.20	74.00	-5.80	36.06	4.09	28.05	0.00	Peak	100	351	VERTICAL
2	2390.00	52.97	54.00	-1.03	20.83	4.09	28.05	0.00	Average	100	351	VERTICAL
3	2422.20	105.04			72.79	4.12	28.13	0.00	Average	100	351	VERTICAL
4	2423.00	115.02			82.77	4.12	28.13	0.00	Peak	100	351	VERTICAL
5	2485.10	61.24	74.00	-12.76	28.78	4.16	28.30	0.00	Peak	100	351	VERTICAL
6	2485.10	48.29	74.00	-25.71	15.83	4.16	28.30	0.00	Peak	100	351	VERTICAL

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

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2469.20	114.90			82.50	4.14	28.26	0.00	Peak	100	145	VERTICAL
2	2469.60	103.73			71.33	4.14	28.26	0.00	Average	100	145	VERTICAL
3	2487.50	67.81	74.00	-6.19	35.34	4.17	28.30	0.00	Peak	100	145	VERTICAL
4	2492.70	52.74	54.00	-1.26	20.27	4.17	28.30	0.00	Average	100	145	VERTICAL

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

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1
Test Date	Aug. 25, 2014		

Channel 1

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	2387.00	52.48	54.00	-1.52	20.90	3.68	27.90	0.00	100	356 VERTICAL	Average
2	2389.90	64.69	74.00	-9.31	33.11	3.68	27.90	0.00	100	356 VERTICAL	Peak
3	2412.90	116.96			85.37	3.69	27.90	0.00	100	356 VERTICAL	Peak
4	2413.70	114.97			83.38	3.69	27.90	0.00	100	356 VERTICAL	Average

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

Channel 6

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	2375.40	45.49	54.00	-8.51	13.92	3.67	27.90	0.00	100	0 VERTICAL	Average
2	2378.00	58.14	74.00	-15.86	26.57	3.67	27.90	0.00	100	0 VERTICAL	Peak
3	2435.20	110.76			79.16	3.70	27.90	0.00	100	0 VERTICAL	Average
4	2436.20	112.69			81.08	3.71	27.90	0.00	100	0 VERTICAL	Peak
5	2483.50	48.32	54.00	-5.68	16.69	3.73	27.90	0.00	100	0 VERTICAL	Average
6	2485.50	59.71	74.00	-14.29	28.08	3.73	27.90	0.00	100	0 VERTICAL	Peak

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

Channel 11

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	2463.80	111.22			79.60	3.72	27.90	0.00	100	360 VERTICAL	Average
2	2464.80	113.00			81.38	3.72	27.90	0.00	100	360 VERTICAL	Peak
3	2483.50	64.22	74.00	-9.78	32.59	3.73	27.90	0.00	100	360 VERTICAL	Peak
4	2493.00	48.46	54.00	-5.54	16.82	3.74	27.90	0.00	100	360 VERTICAL	Average

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

Temperature	26°C	Humidity	68%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1, 6, 11 / Chain 1
Test Date	Aug. 25, 2014		

Channel 1

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	2390.00	52.50	54.00	-1.50	20.92	3.68	27.90	0.00	100	183 VERTICAL	Average
2	2390.00	68.33	74.00	-5.67	36.75	3.68	27.90	0.00	100	183 VERTICAL	Peak
3	2413.00	107.08			75.49	3.69	27.90	0.00	100	183 VERTICAL	Average
4	2418.60	114.82			83.22	3.70	27.90	0.00	100	183 VERTICAL	Peak

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

Channel 6

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	2375.40	44.69	54.00	-9.31	13.12	3.67	27.90	0.00	100	181 VERTICAL	Average
2	2390.00	57.27	74.00	-16.73	25.69	3.68	27.90	0.00	100	181 VERTICAL	Peak
3	2429.60	107.70			76.10	3.70	27.90	0.00	100	181 VERTICAL	Average
4	2430.00	114.77			83.17	3.70	27.90	0.00	100	181 VERTICAL	Peak
5	2483.50	48.33	54.00	-5.67	16.70	3.73	27.90	0.00	100	181 VERTICAL	Average
6	2483.50	60.07	74.00	-13.93	28.44	3.73	27.90	0.00	100	181 VERTICAL	Peak

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

Channel 11

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	2463.20	105.52			73.90	3.72	27.90	0.00	100	184 VERTICAL	Average
2	2468.70	113.17			81.55	3.72	27.90	0.00	100	184 VERTICAL	Peak
3	2483.50	52.24	54.00	-1.76	20.61	3.73	27.90	0.00	100	184 VERTICAL	Average
4	2483.50	69.08	74.00	-4.92	37.45	3.73	27.90	0.00	100	184 VERTICAL	Peak

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

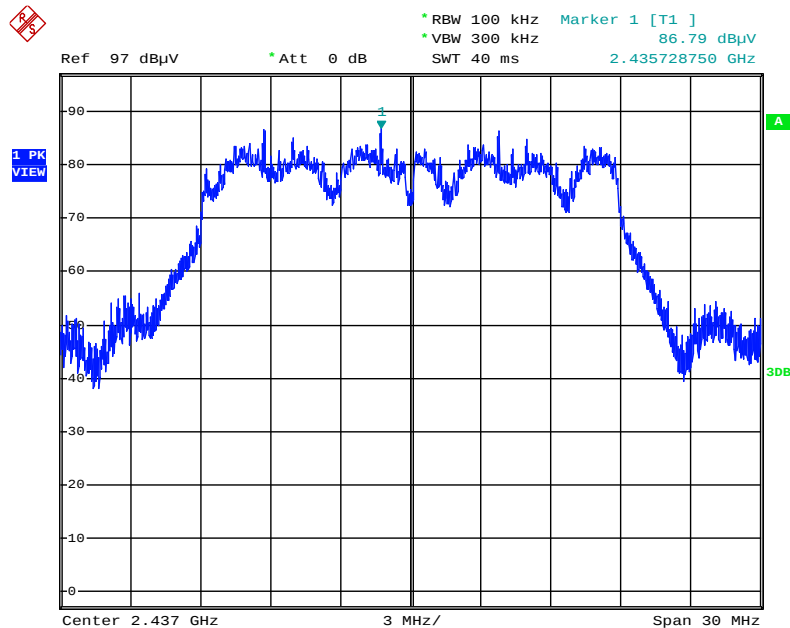
Note:

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

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

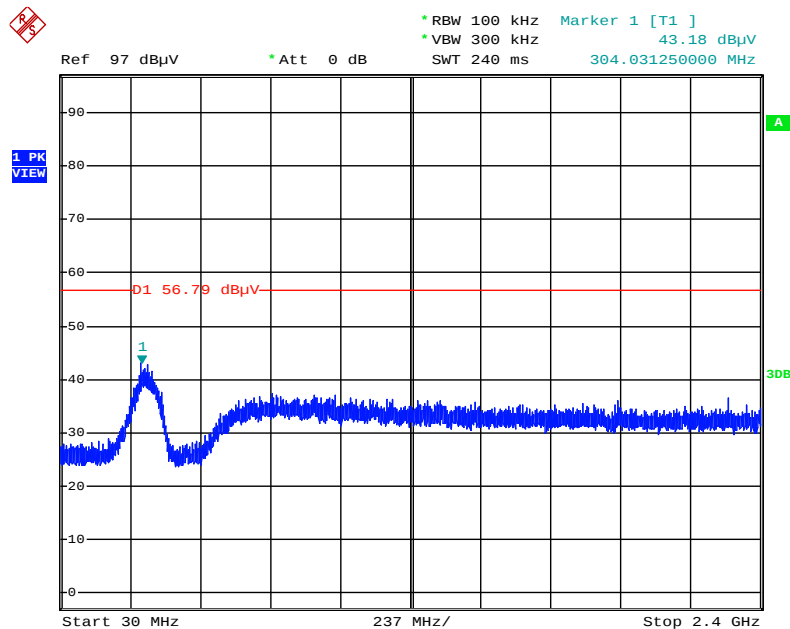
For Emission not in Restricted Band

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



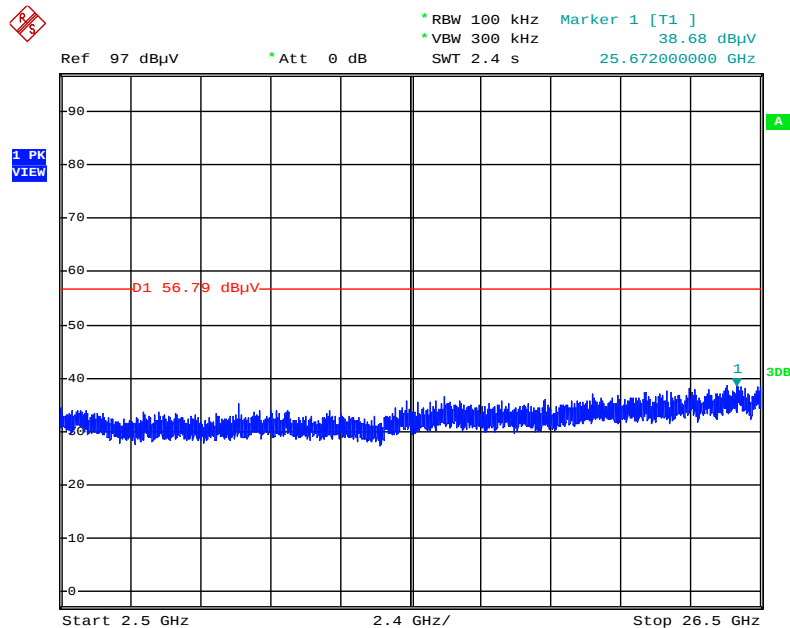
Date: 6.SEP.2014 03:44:14

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 1 / 30MHz~2400MHz (down 30dBc)



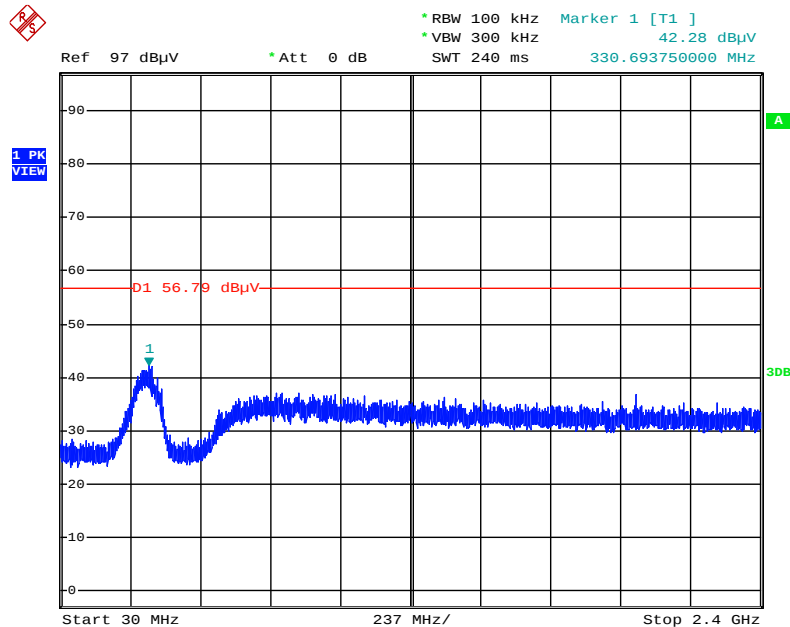
Date: 6.SEP.2014 03:46:18

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



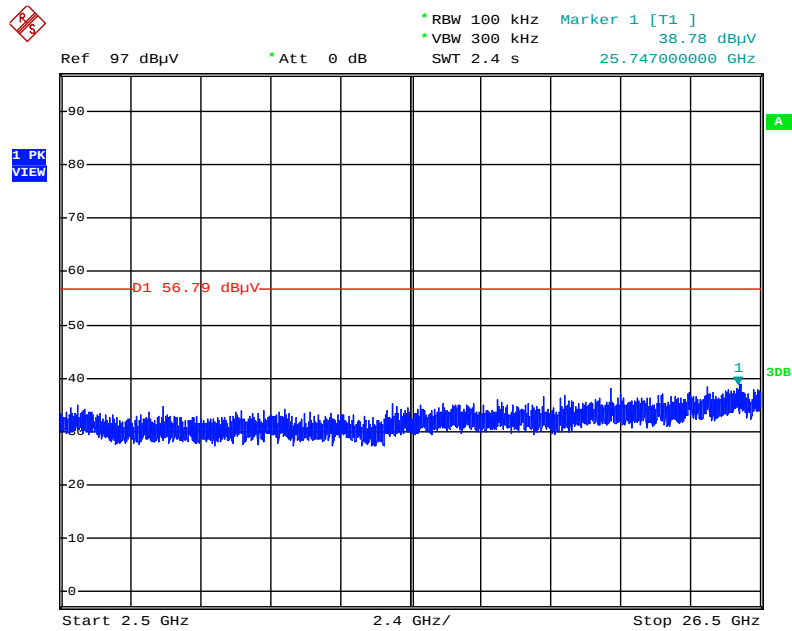
Date: 6.SEP.2014 03:47:09

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 11 / 30MHz~2400MHz (down 30dBc)



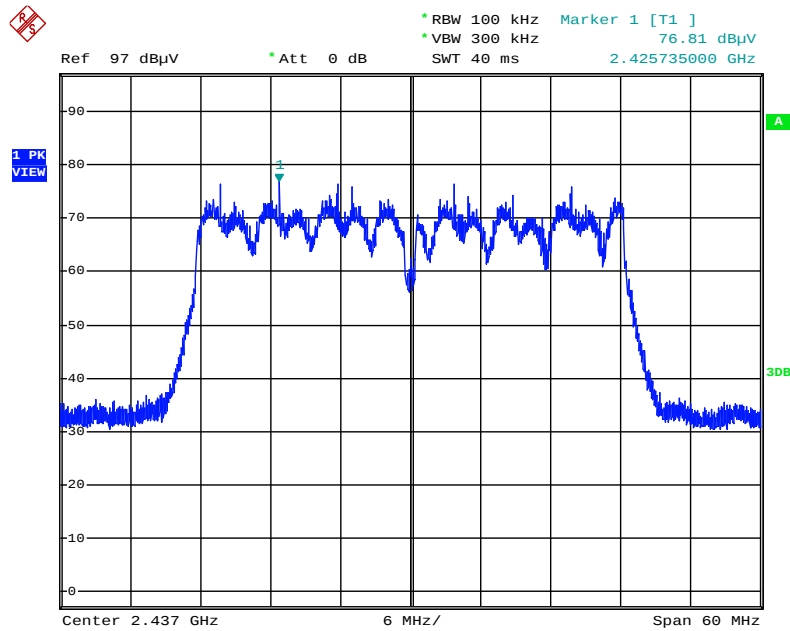
Date: 6.SEP.2014 03:50:44

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



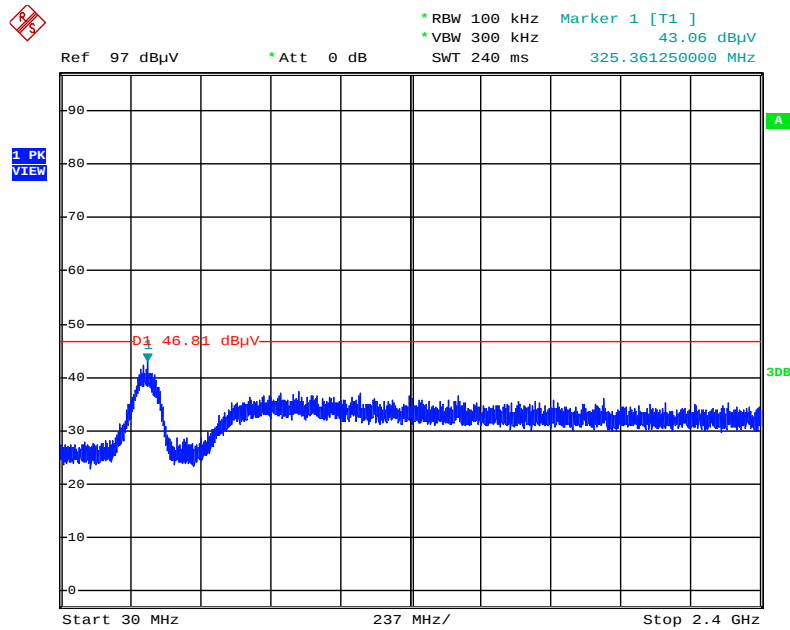
Date: 6.SEP.2014 03:50:07

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



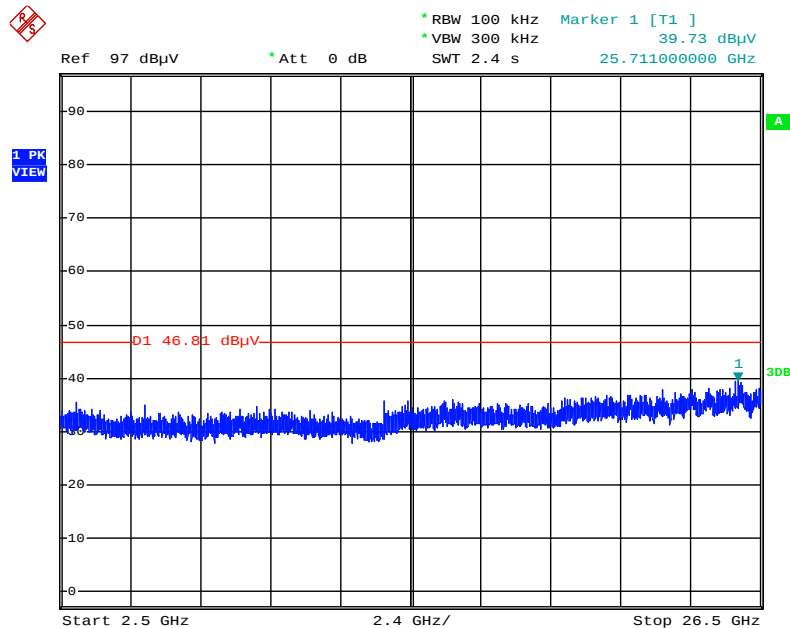
Date: 6.SEP.2014 03:53:28

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 3 / 30MHz~2400MHz (down 30dBc)



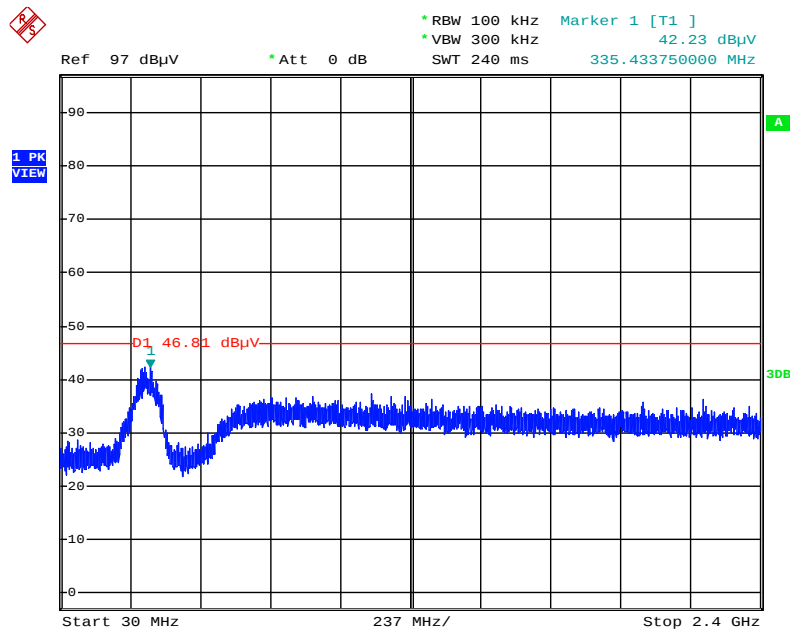
Date: 6.SEP.2014 03:57:38

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 3 / 2500MHz~26500MHz (down 30dBc)



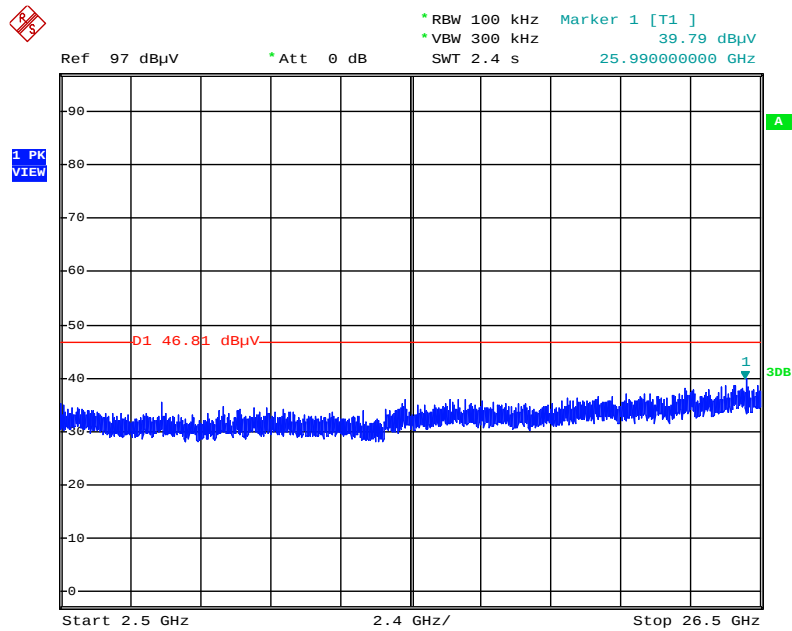
Date: 6.SEP.2014 03:58:15

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 9 / 30MHz~2400MHz (down 30dBc)



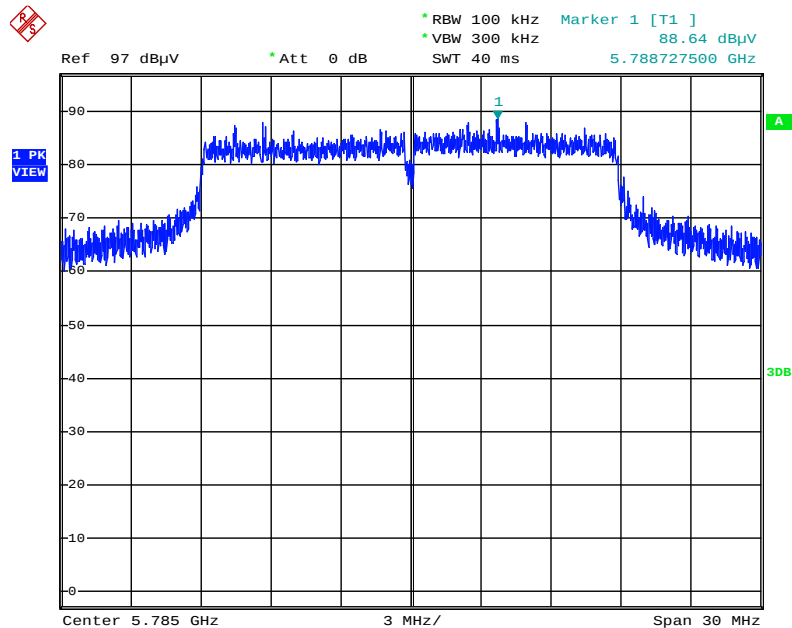
Date: 6.SEP.2014 04:00:18

Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



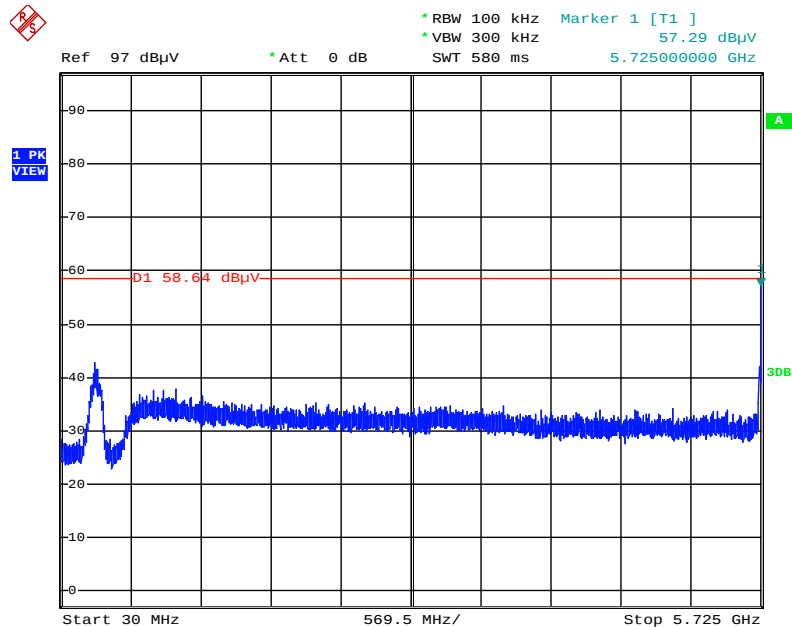
Date: 6.SEP.2014 03:59:43

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



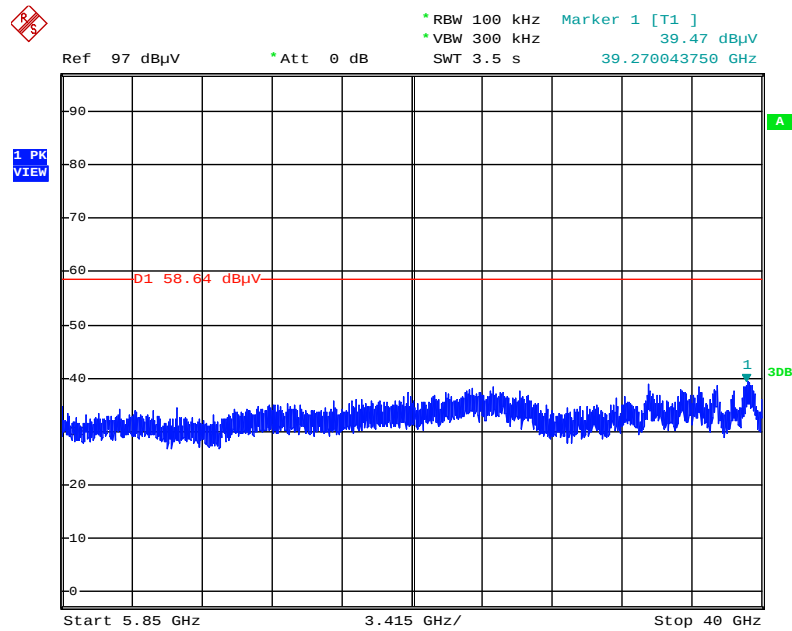
Date: 6.SEP.2014 02:50:02

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



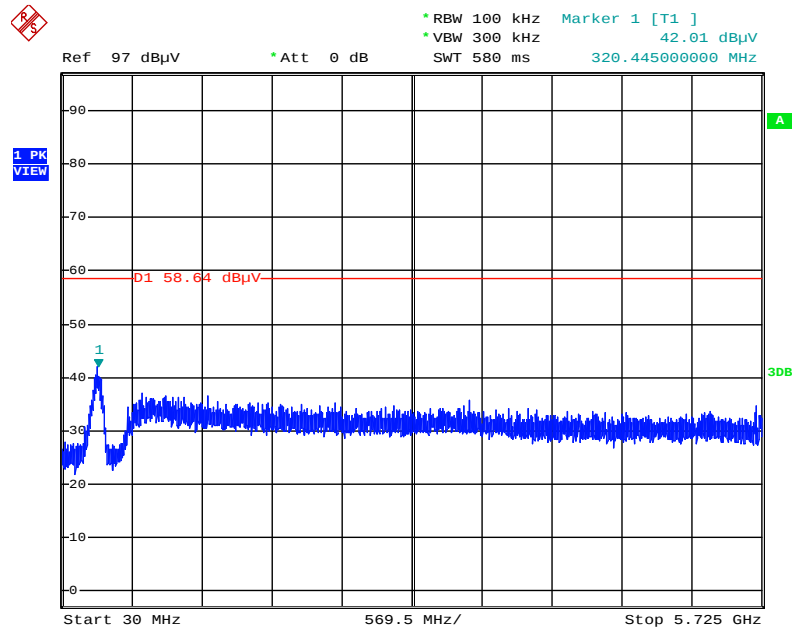
Date: 6.SEP.2014 02:51:43

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



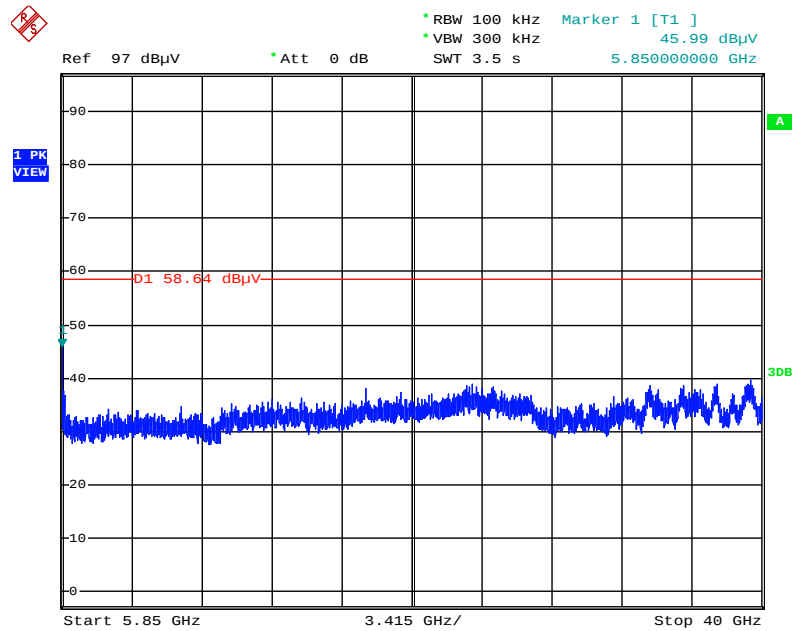
Date: 6.SEP.2014 02:52:27

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



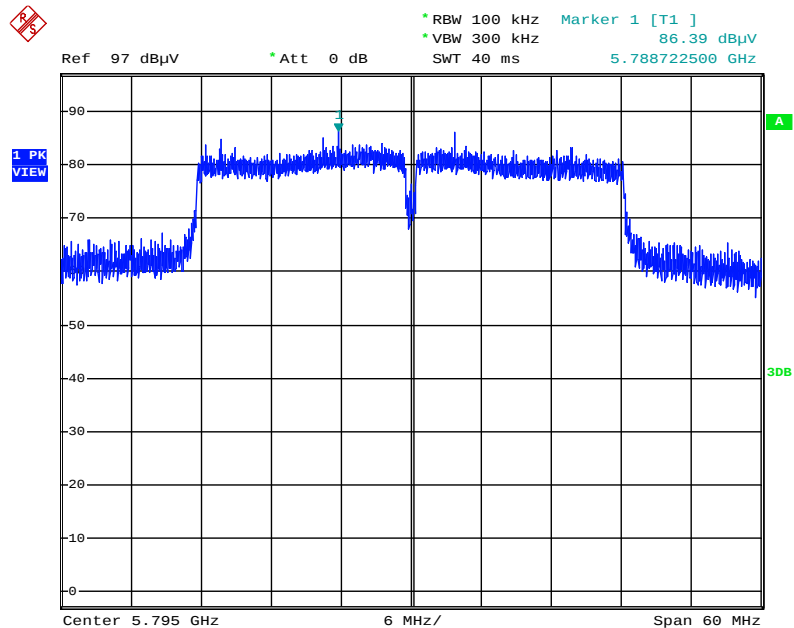
Date: 6.SEP.2014 02:54:27

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



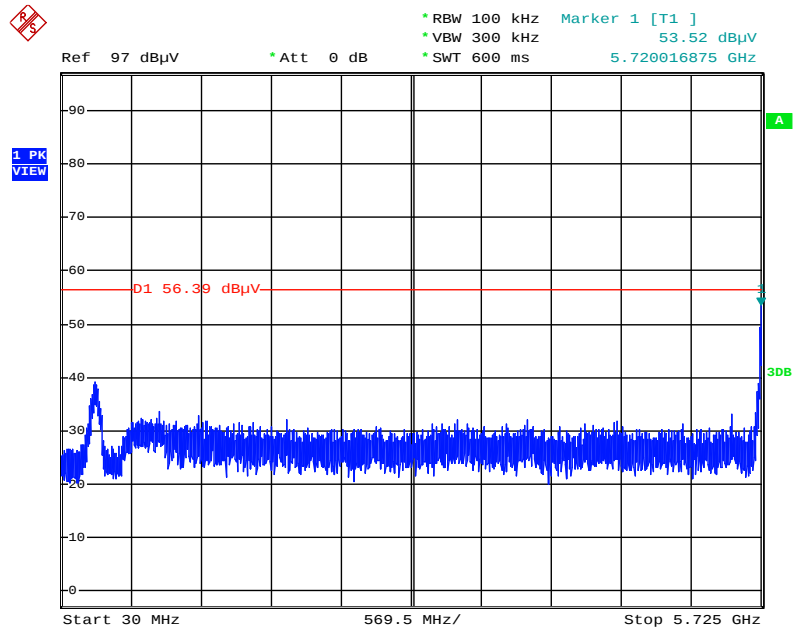
Date: 6.SEP.2014 02:53:55

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



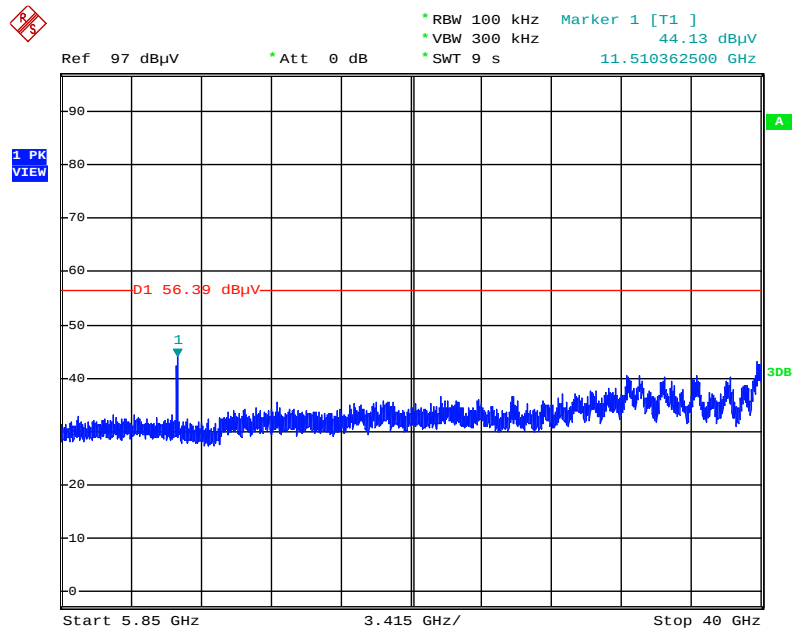
Date: 6.SEP.2014 02:41:41

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



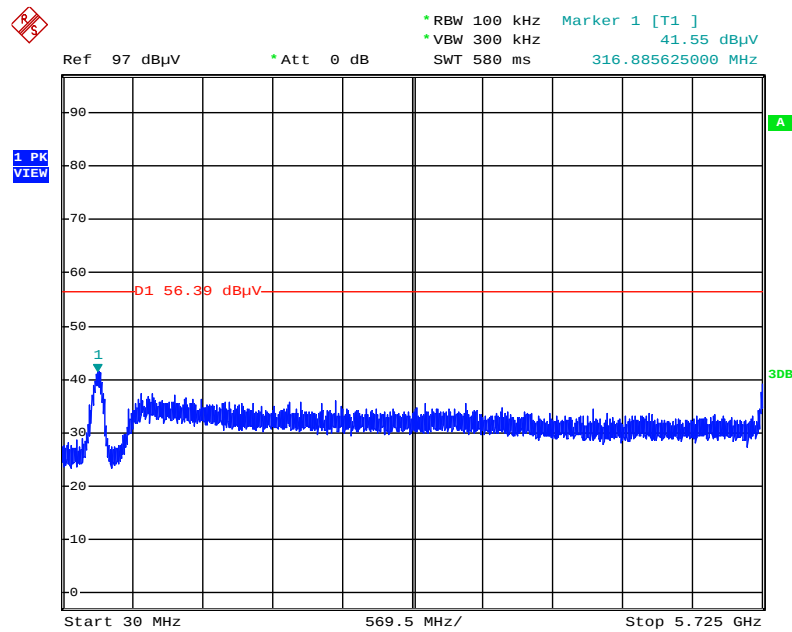
Date: 15.SEP.2014 16:43:34

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



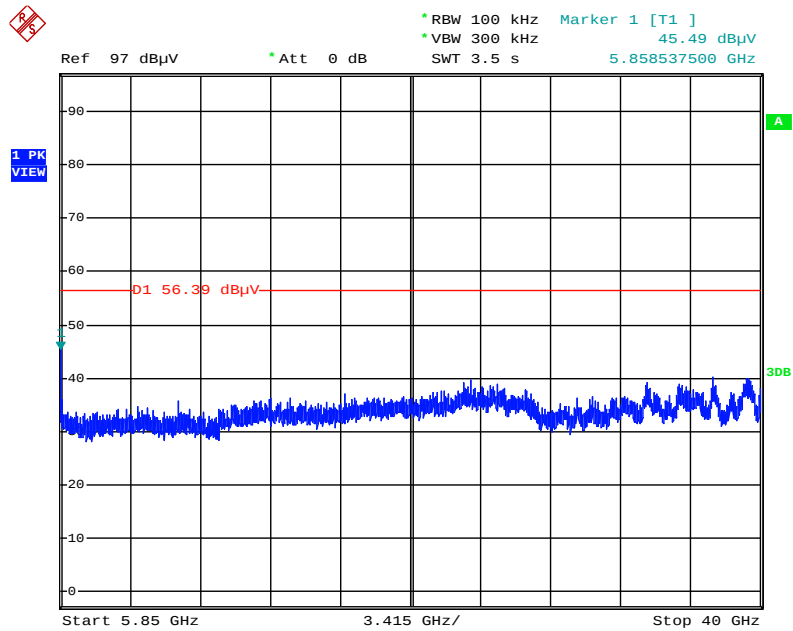
Date: 15.SEP.2014 16:45:28

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



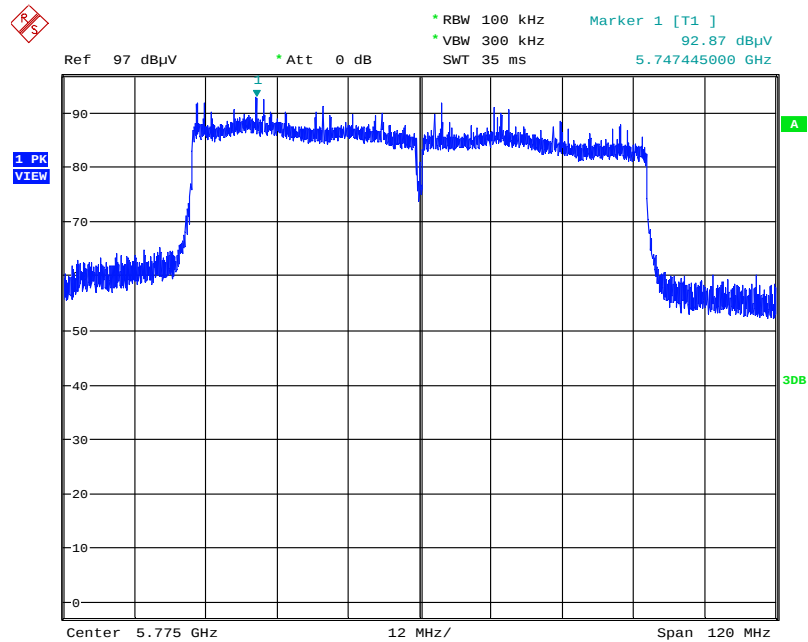
Date: 6.SEP.2014 02:43:02

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



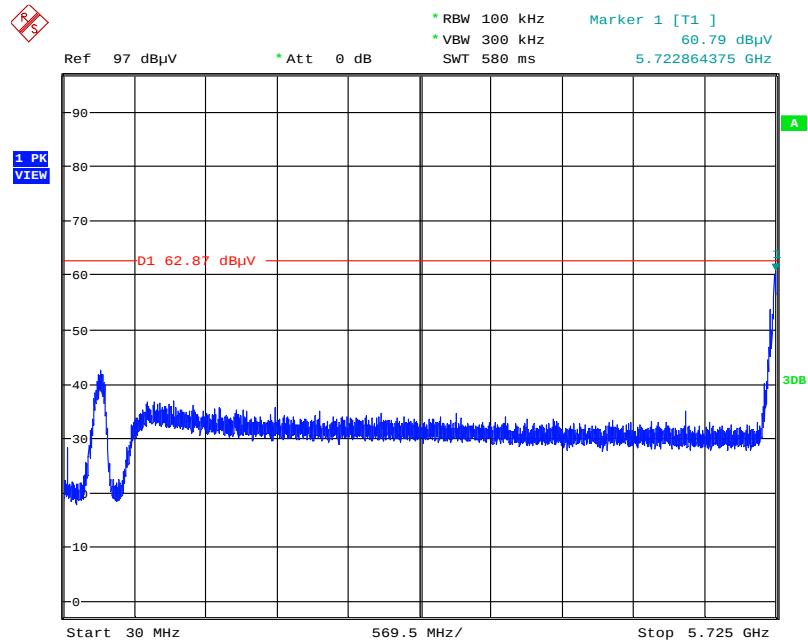
Date: 6.SEP.2014 02:44:07

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



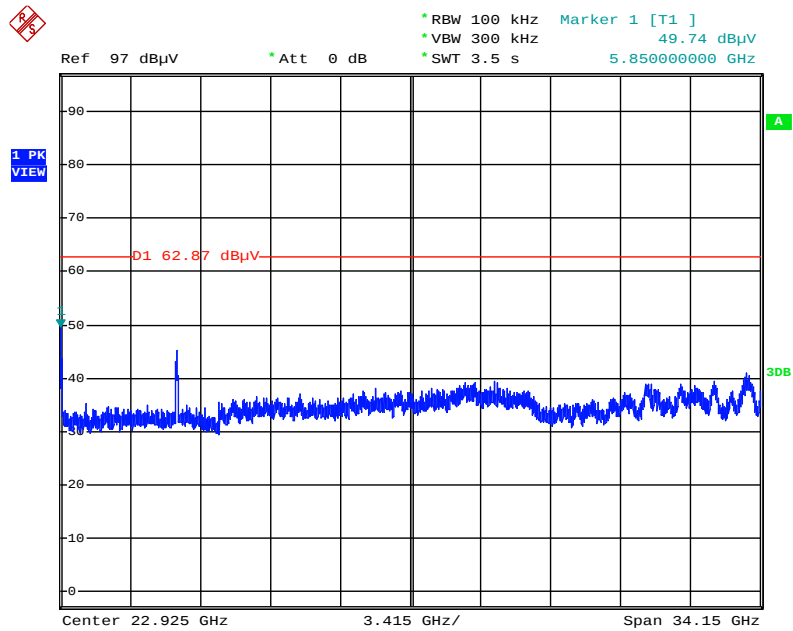
Date: 6.SEP.2014 02:26:35

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



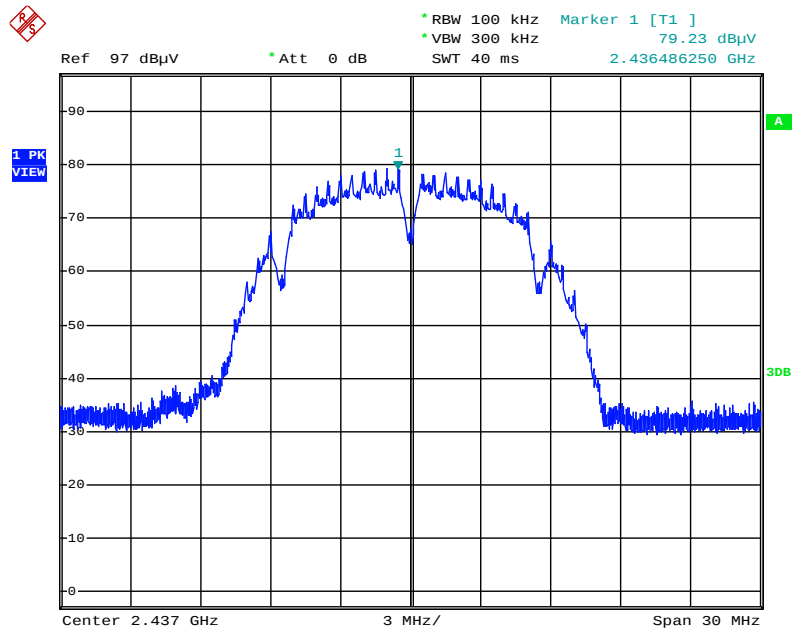
Date: 6.SEP.2014 02:27:59

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



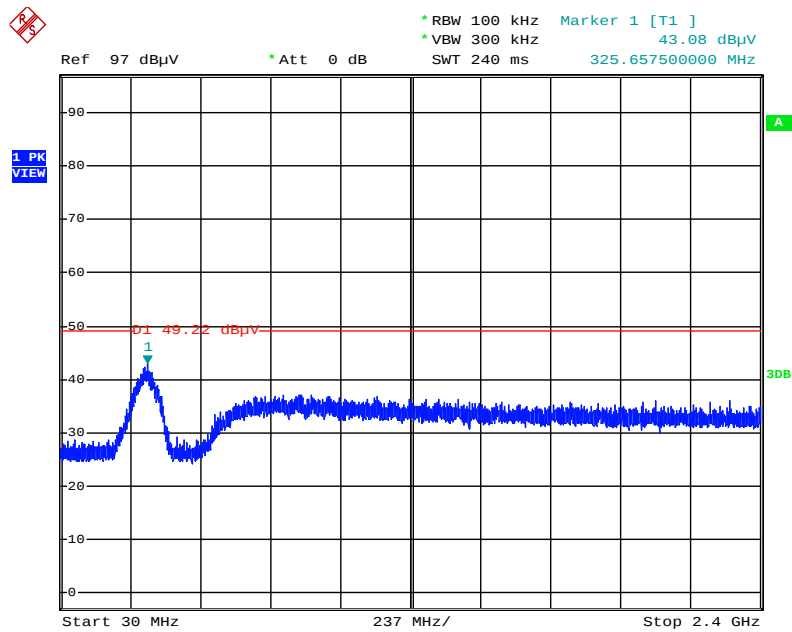
Date: 6.SEP.2014 02:00:03

Plot on Configuration IEEE 802.11b / Reference Level



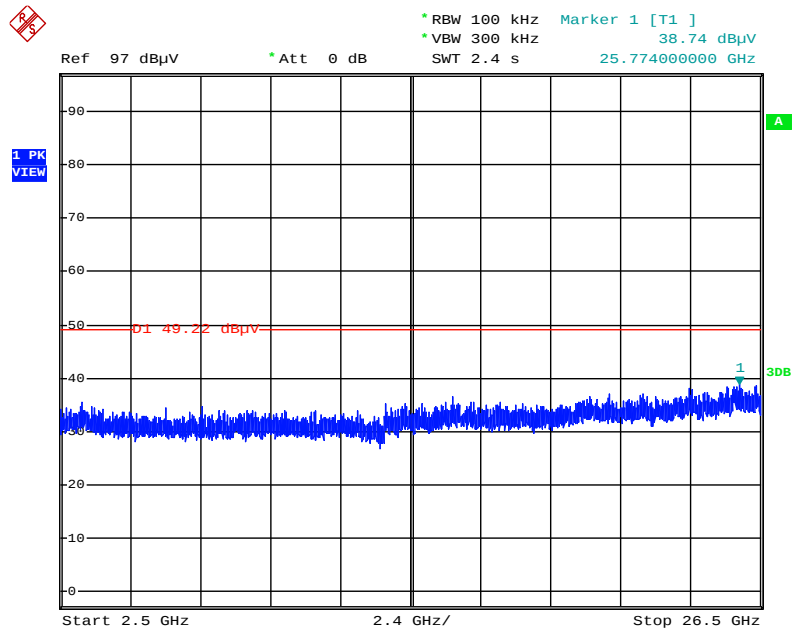
Date: 6.SEP.2014 03:24:32

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



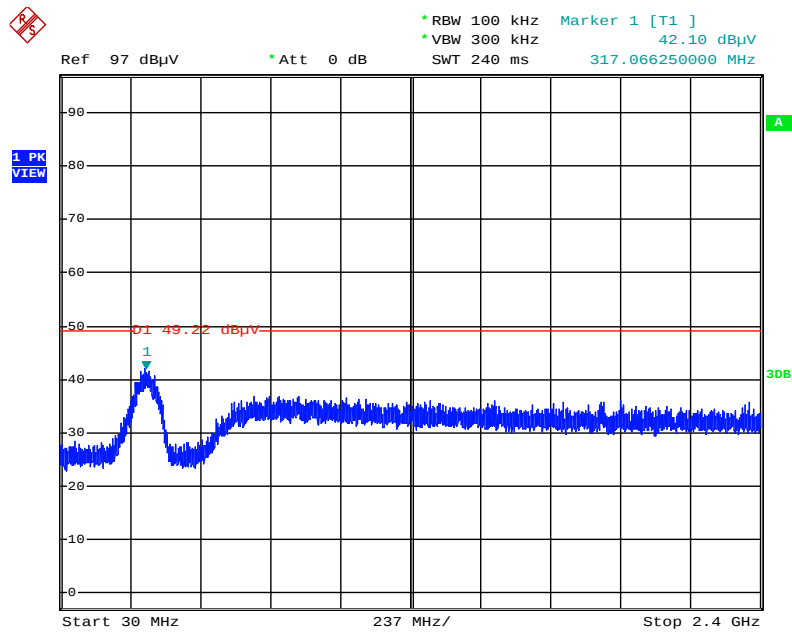
Date: 6.SEP.2014 03:26:16

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



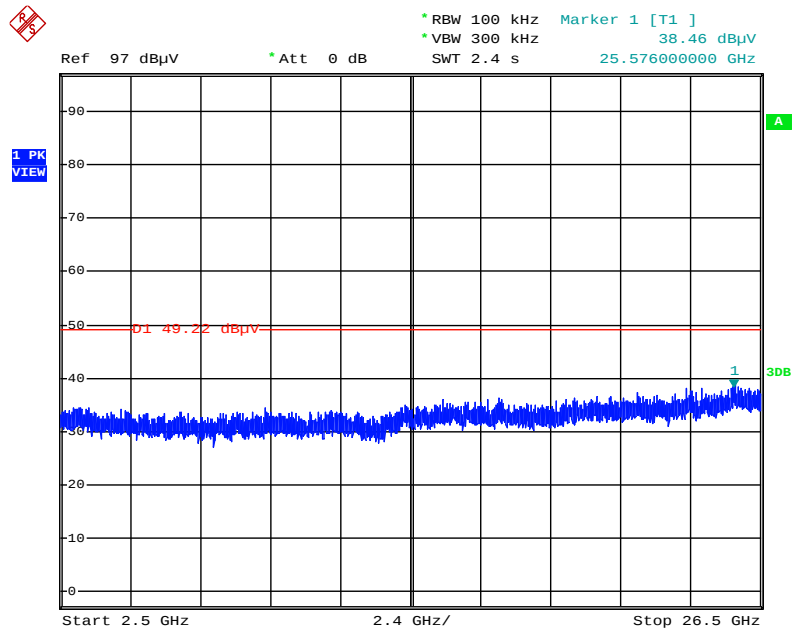
Date: 6.SEP.2014 03:27:36

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



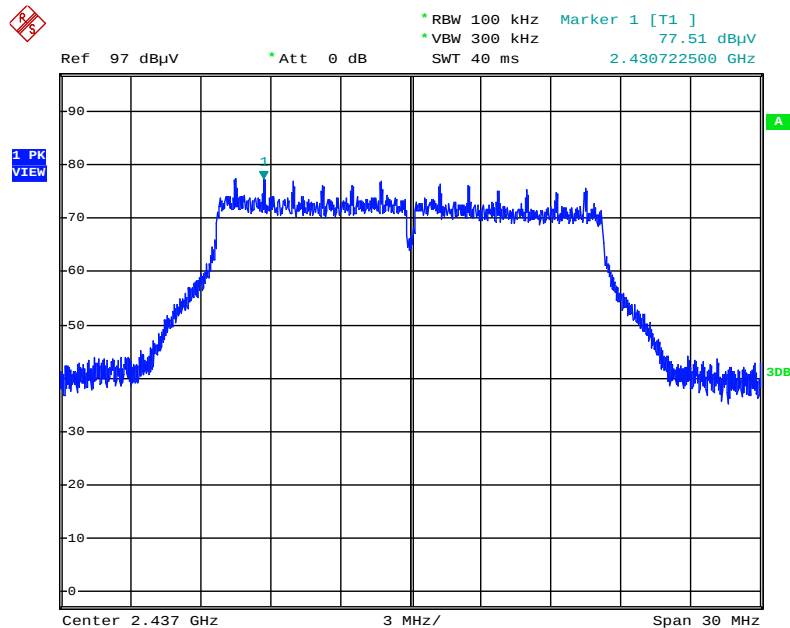
Date: 6.SEP.2014 03:29:07

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



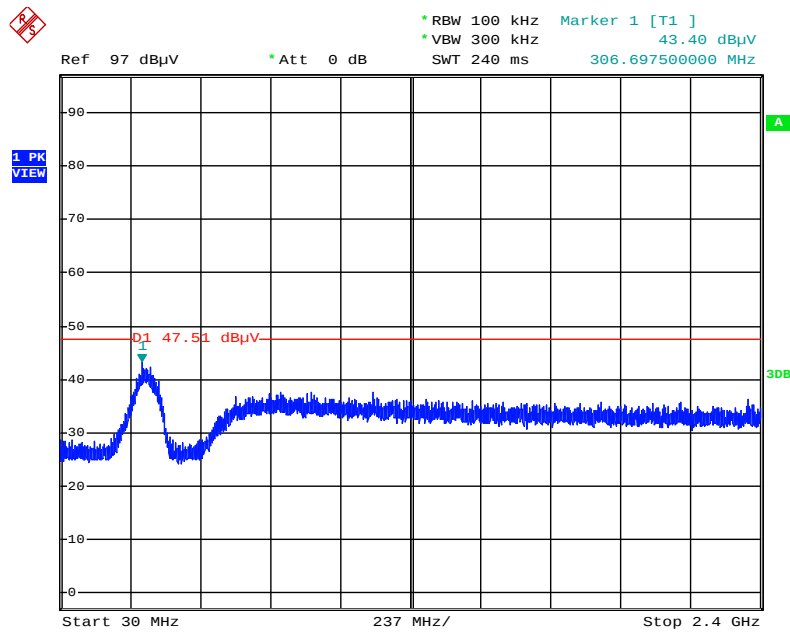
Date: 6.SEP.2014 03:28:26

Plot on Configuration IEEE 802.11g / Reference Level



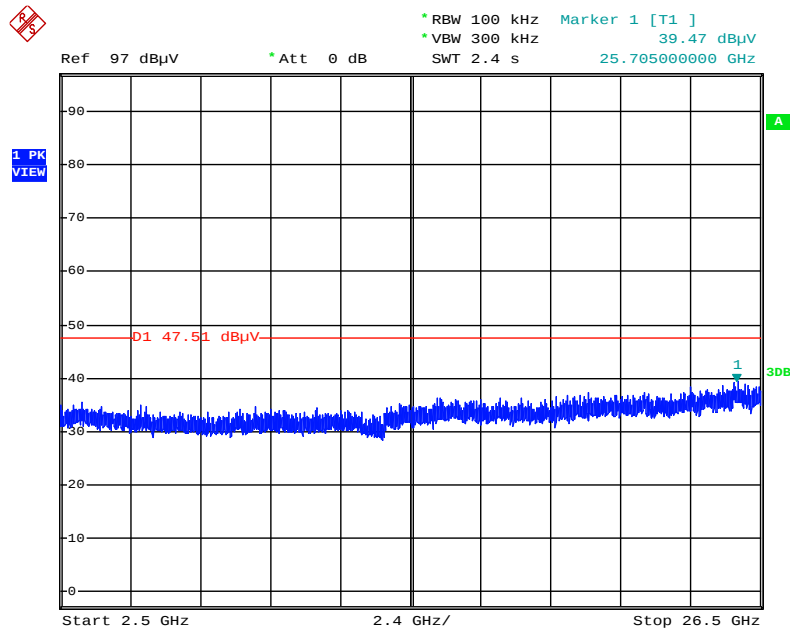
Date: 6.SEP.2014 03:30:31

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



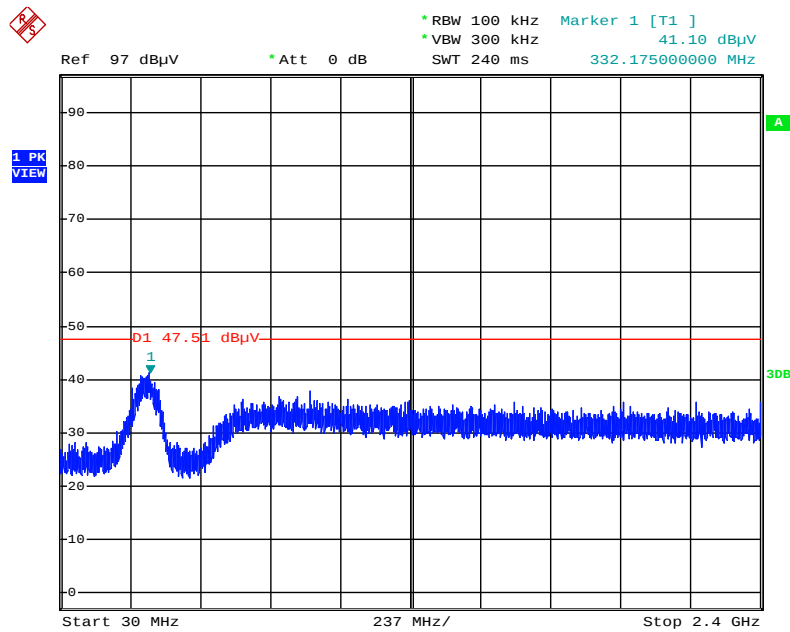
Date: 6.SEP.2014 03:31:55

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



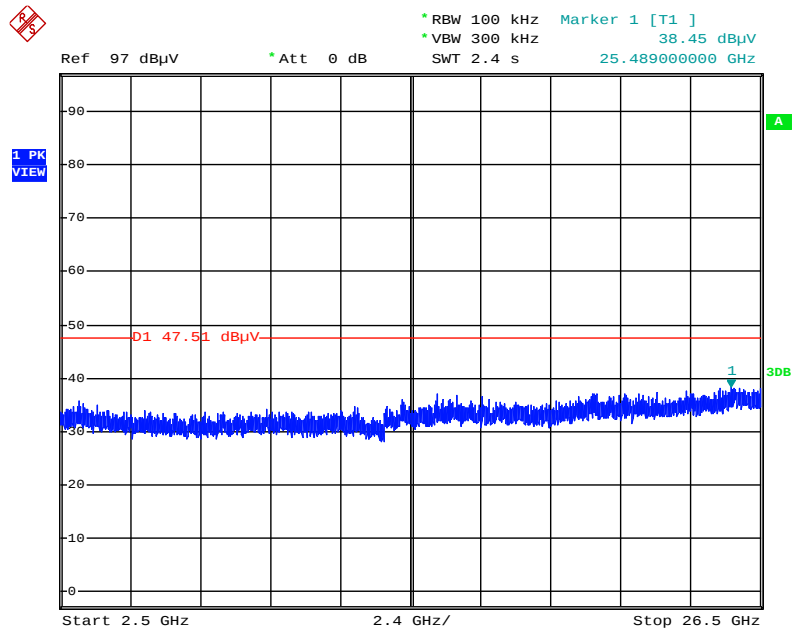
Date: 6.SEP.2014 03:32:55

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



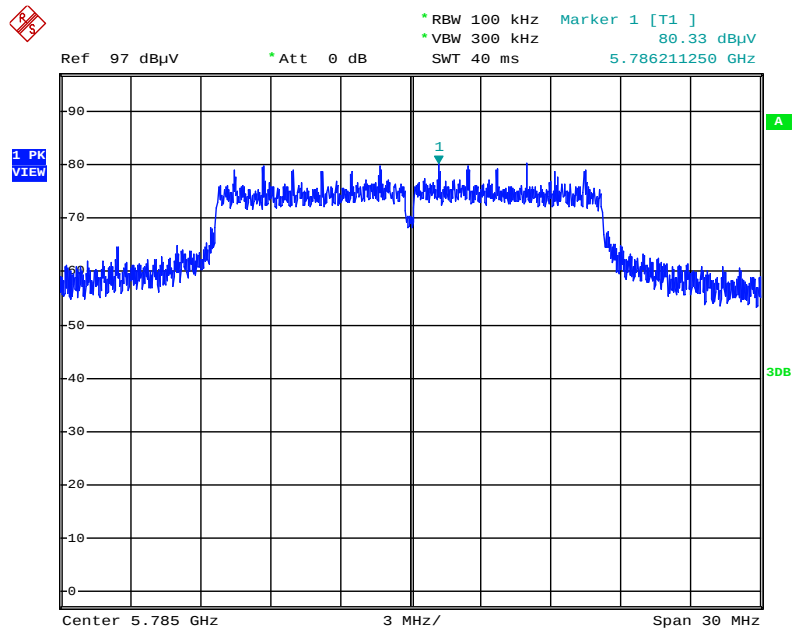
Date: 6.SEP.2014 03:34:58

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



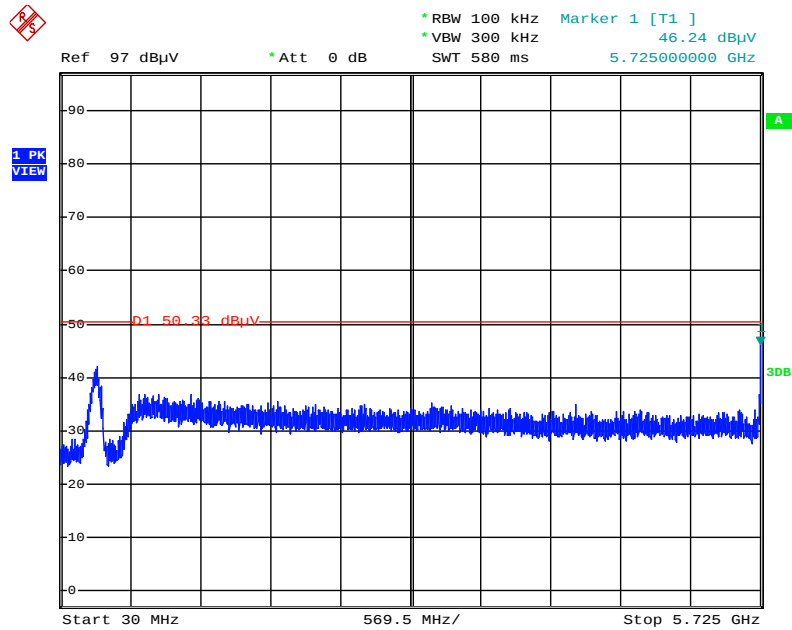
Date: 6.SEP.2014 03:34:30

Plot on Configuration IEEE 802.11a / Reference Level



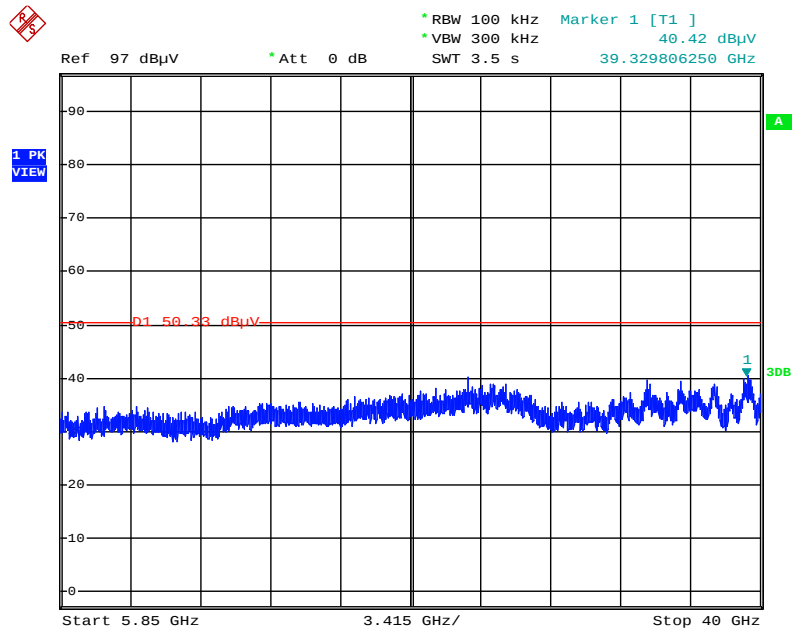
Date: 6.SEP.2014 03:07:04

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



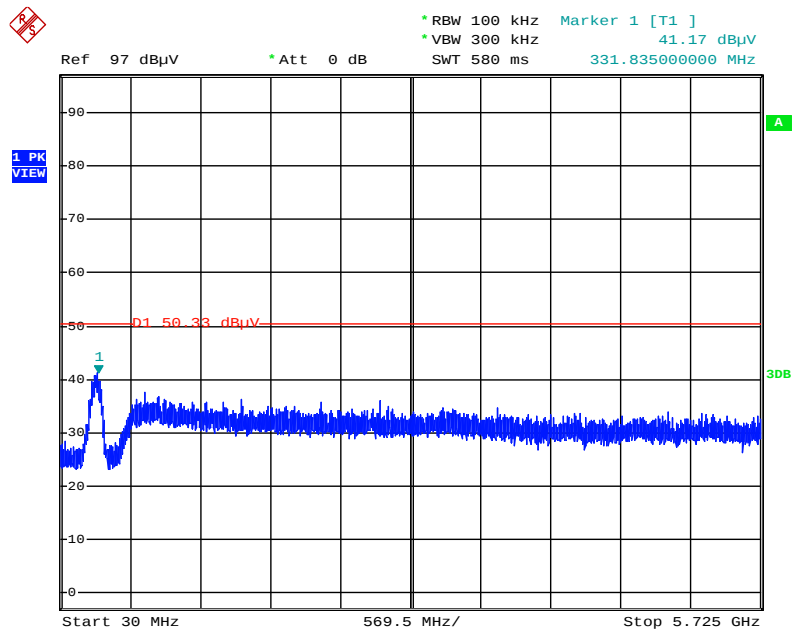
Date: 6.SEP.2014 03:09:38

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



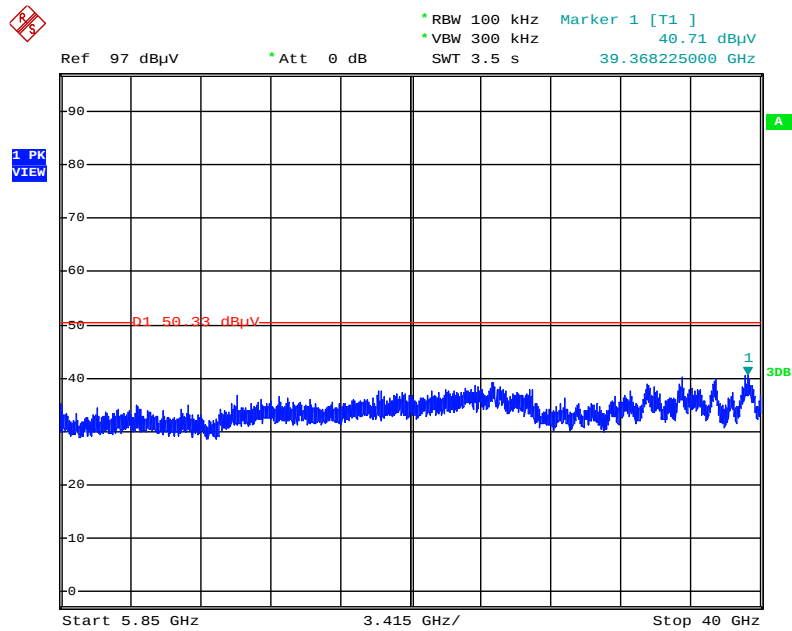
Date: 6.SEP.2014 03:10:32

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



Date: 6.SEP.2014 03:12:30

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



Date: 6.SEP.2014 03:11:49

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. 23, 2014	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)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 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)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Sep. 30, 2013	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Sep. 30, 2013	Conducted (TH01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 26, 2014	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	Aug. 22, 2014	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-1	N/A	1 GHz ~ 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz ~ 26.5 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)

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

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%