



SPORTON International Inc.

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

FCC RADIO TEST REPORT

Applicant's company	PEGATRON CORPORATION
Applicant Address	5F., NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY 112 Taiwan
FCC ID	VUIDPC3848V
Manufacturer's company	MAINTEK COMPUTER
Manufacturer Address	233 Jinfeng Rd., Suzhou, Jiangsu, PRC

Product Name	Wireless Residential Gateway
Brand Name	Cisco
Model No.	DPC3848V / DPC3848VM
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Mar. 06, 2014
Final Test Date	Jun. 30, 2014
Submission Type	Original Equipment

Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g and IEEE 802.11a/ac of the product.

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

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

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2009, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 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 Multiple List.....	10
3.8. Table for Supporting Units	10
3.9. Table for Parameters of Test Software Setting	11
3.10. EUT Operation during Test	12
3.11. Duty Cycle	13
3.12. Test Configurations	17
4. TEST RESULT	19
4.1. AC Power Line Conducted Emissions Measurement.....	19
4.2. Maximum Conducted Output Power Measurement.....	23
4.3. Power Spectral Density Measurement	26
4.4. 6dB Spectrum Bandwidth Measurement	44
4.5. Radiated Emissions Measurement	53
4.6. Emissions Measurement	81
4.7. Antenna Requirements	110
5. LIST OF MEASURING EQUIPMENTS	111
6. MEASUREMENT UNCERTAINTY.....	113
APPENDIX A. TEST PHOTOS	A1 ~ A5
APPENDIX B. RADIATED EMISSION CO-LOCATION REPORT.....	B1 ~ B3

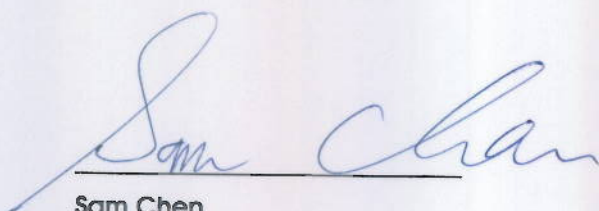
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR462770AA	Rev. 01	Initial issue of report	Jul. 07, 2014

1. CERTIFICATE OF COMPLIANCE

Product Name : Wireless Residential Gateway
Brand Name : Cisco
Model No. : DPC3848V / DPC3848VM
Applicant : PEGATRON CORPORATION
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 06, 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	13.64 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	1.55 dB
4.3	15.247(e)	Power Spectral Density	Complies	3.95 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.05 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.32 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 Internal Power Supply
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> MCS0 (HT20): 19.28 MHz ; MCS0 (HT40): 36.32 MHz <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (VHT20): 20.00 MHz ; 802.11ac MCS0/Nss1 (VHT40): 36.64 MHz ; 802.11ac MCS0/Nss1 (VHT80): 73.92 MHz
Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> MCS0 (HT20): 28.44 dBm ; MCS0 (HT40): 23.18 dBm <u>For 5GHz Band:</u> 802.11ac MCS0/Nss1 (VHT20): 28.33 dBm ; 802.11ac MCS0/Nss1 (VHT40): 27.31 dBm ; 802.11ac MCS0/Nss1 (VHT80): 24.92 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 (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From Internal Power Supply
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: 13.84 MHz ; 11g: 17.12 MHz ; 11a: 23.28 MHz
Maximum Conducted Output Power	11b: 28.45 dBm ; 11g: 27.78 dBm ; 11a: 28.43 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description
Beamforming Function	☐ With beamforming ☒ Without beamforming

Antenna and Band width

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

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). The EUT supports HT20 and HT40. Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). The EUT supports 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 cable*1, Non-shielded, 1.8m

RJ-45 cable*1, Non-shielded, 1.2m

3.3. Table for Filed Antenna

For Model Name: DPC3848V

Ant.	Brand	Model Name	P/N	Antenna Type	Connector	Gain (dBi)	
						2.4GHz	5GHz
1	WANSIH	WPB279	UC3WFI0134	PCB Antenna	MHF	2.81	3.62
2	WANSIH	WPB287	UC3WFI0147	PCB Antenna	MHF	2.63	3.62
3	WANSIH	WPB289	UC3WFI0132	PCB Antenna	MHF	2.95	3.73

For Model Name: DPC3848VM

Ant.	Brand	Model Name	P/N	Antenna Type	Connector	Gain (dBi)	
						2.4GHz	5GHz
4	WANSIH	WPB279	UC3WFI0125	PCB Antenna	MHF	2.47	3.62
5	WANSIH	WPB287	UC3WFI0124	PCB Antenna	MHF	2.26	3.62
6	WANSIH	WPB289	UC3WFI0123	PCB Antenna	MHF	2.56	3.73

Note:

Ant. 1 ~ 6 are the same type antennas. Only the higher gain antennas "Ant. 1~3" were tested and recorded in the report.

According to the above antennas, there are three antennas will transit simultaneously (one is Horizontal and the others are Vertical), so array gain only add $10\log(2)$.

<For 2.4GHz Band>

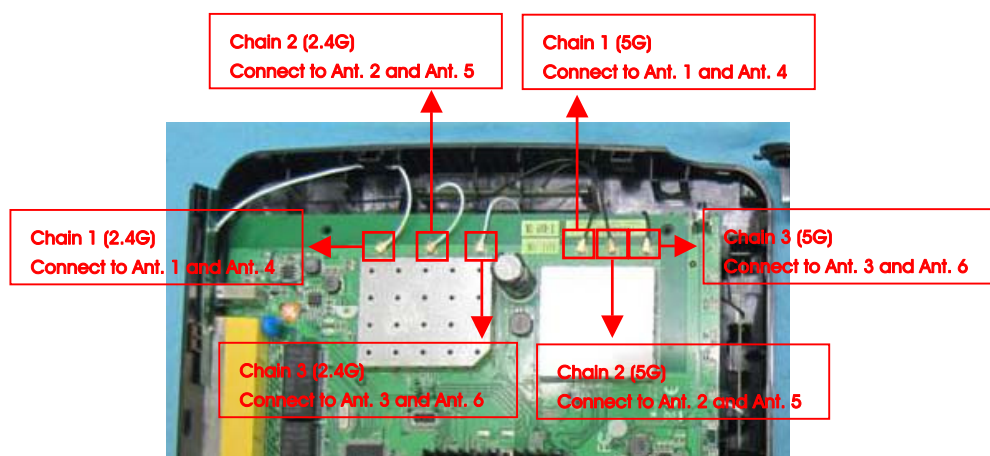
For IEEE 802.11b/g/n mode (3TX/3RX):

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

<For 5GHz Band>

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

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



3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

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

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

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

For 5GHz Band:

There are three bandwidth systems.

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

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

For 80MHz bandwidth systems, use Channel 155.

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

3.5. Table for 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	CTX	-	-	-
Maximum Conducted Output Power	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Power Spectral Density	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
6dB Spectrum Bandwidth	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3
Band Edge Emissions	11n HT20	MCS0	1/6/11	1+2+3
	11n HT40	MCS0	3/6/9	1+2+3
	11b/CCK	1 Mbps	1/6/11	1+2+3
	11g/BPSK	6 Mbps	1/6/11	1+2+3

For 5GHz Band:

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

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. EUT standing (CTX) with 2.4GHz

Mode 2. EUT standing (CTX) with 5GHz

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

For Radiated Emission below 1GHz test:

Mode 1. EUT standing (CTX) with 2.4GHz

Mode 2. EUT standing (CTX) with 5GHz

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

For Radiated Emission above 1GHz test:

Mode 1. EUT standing (CTX)

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

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to Sporton test report: FA462770) and Radiated Emission Co-location (please refer to Appendix b) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

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

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

3.7. Table for Multiple List

The EUT has two model names which are identical to each other in all aspects except for the following table:

Model Name	MoCA Schematic
DPC3848V	X
DPC3848VM	V

From the table above, model name: DPC3848V was selected as representative model for the test and its data was recorded in this report.

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC

3.9. Table for Parameters of Test Software Setting

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

For 2.4GHz Band

Power Parameters of IEEE 802.11n MCS0 HT20

Test Software Version	ART2-GUI Version 2.3		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 HT20	18	25	16

Power Parameters of IEEE 802.11n MCS0 HT40

Test Software Version	ART2-GUI Version 2.3		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 HT40	13.5	18.5	13

Power Parameters of IEEE 802.11b/g

Test Software Version	ART2-GUI Version 2.3		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	22	25	23
IEEE 802.11g	17.5	24	17

For 5GHz Band

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT20

Test Software Version	DOS		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0/Nss1 VHT20	26	26	26

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT40

Test Software Version	DOS	
Frequency	5755 MHz	5795 MHz
MCS0/Nss1 VHT40	25	26

Power Parameters of IEEE 802.11ac MCS0/Nss1 VHT80

Test Software Version	DOS
Frequency	5775 MHz
MCS0/Nss1 VHT80	23

Power Parameters of IEEE 802.11a

Test Software Version	DOS		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	26	26	26

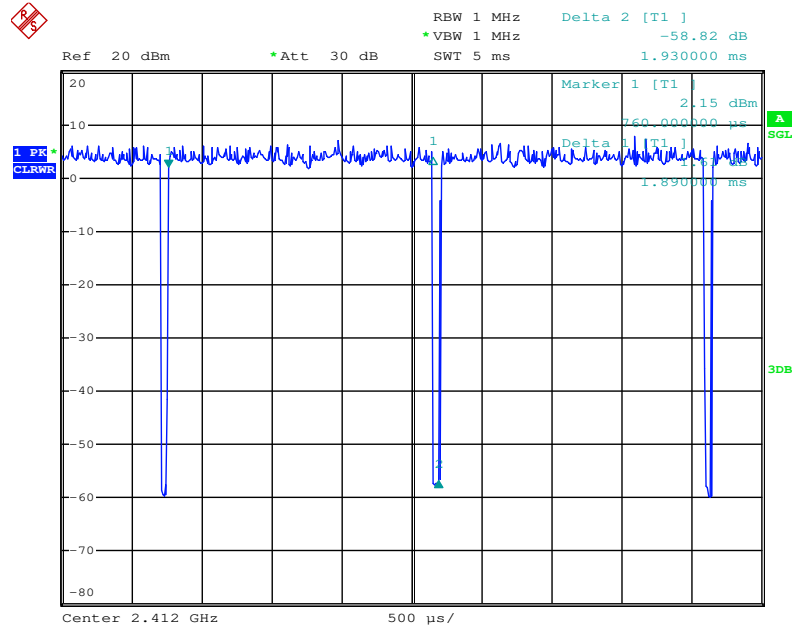
3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

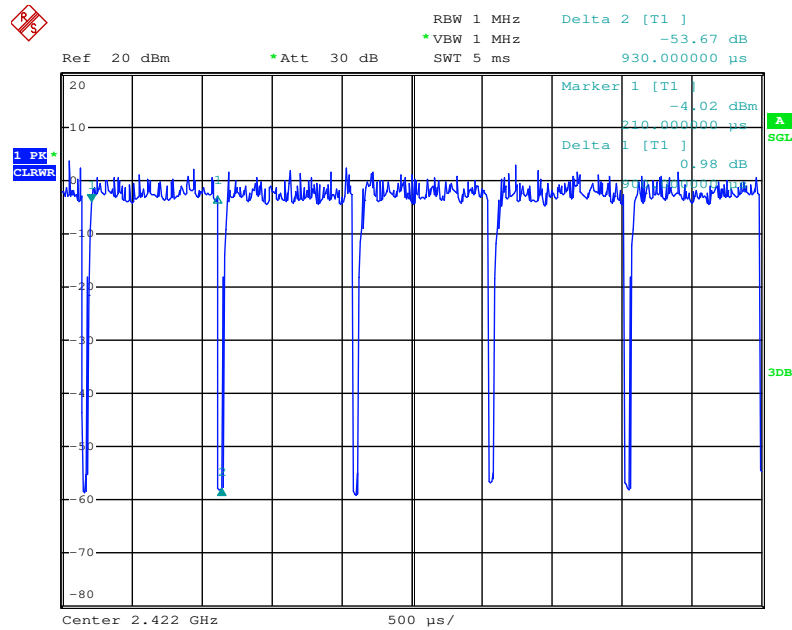
For 2.4GHz Band:

IEEE 802.11n MCS0 HT20



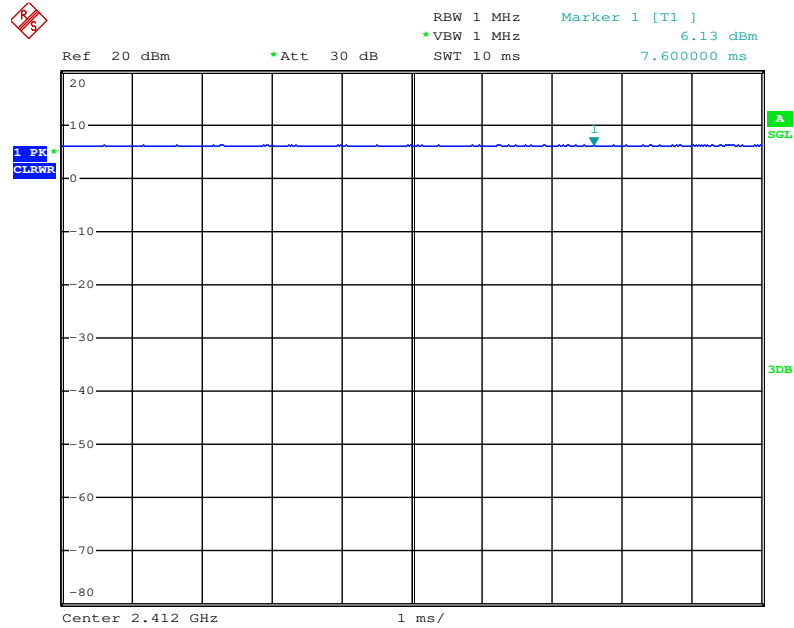
Date: 27.JUN.2014 15:23:34

IEEE 802.11n MCS0 HT40



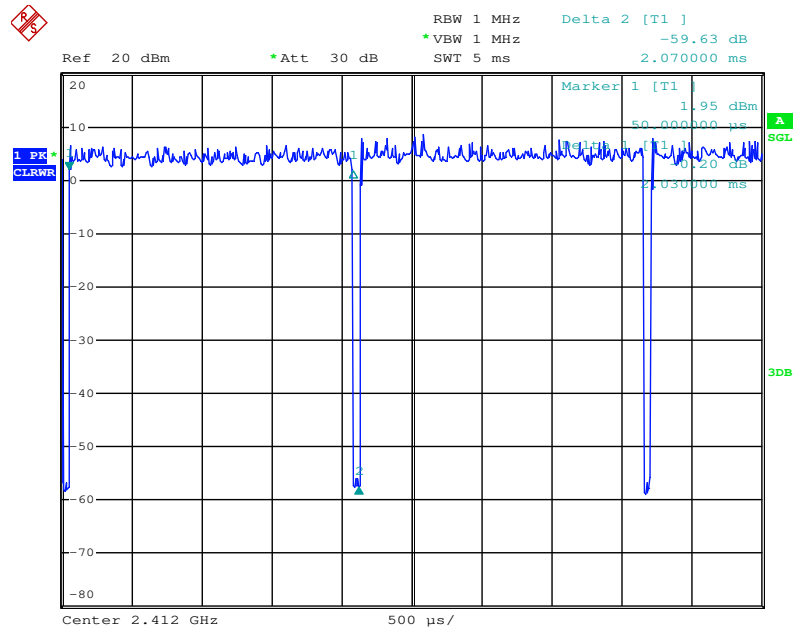
Date: 27.JUN.2014 15:24:19

IEEE 802.11b



Date: 27.JUN.2014 15:21:40

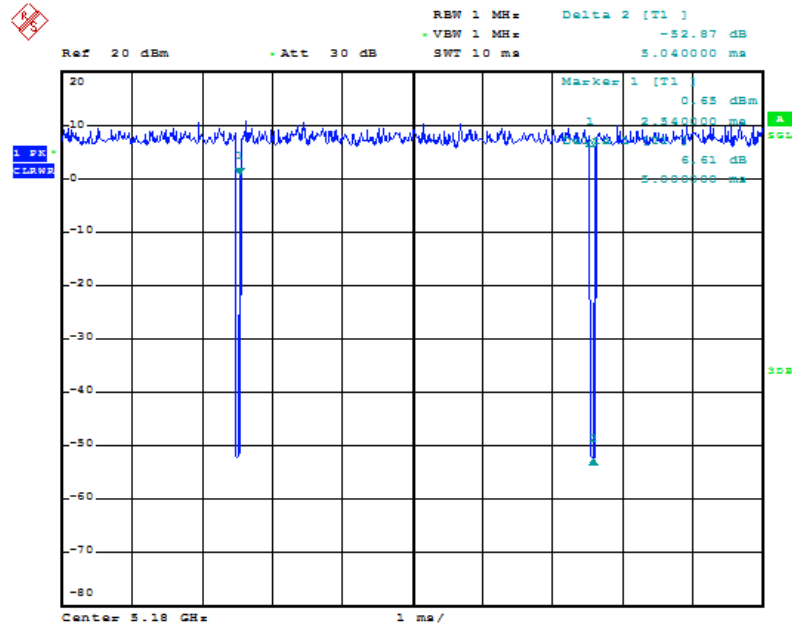
IEEE 802.11g



Date: 27.JUN.2014 15:22:33

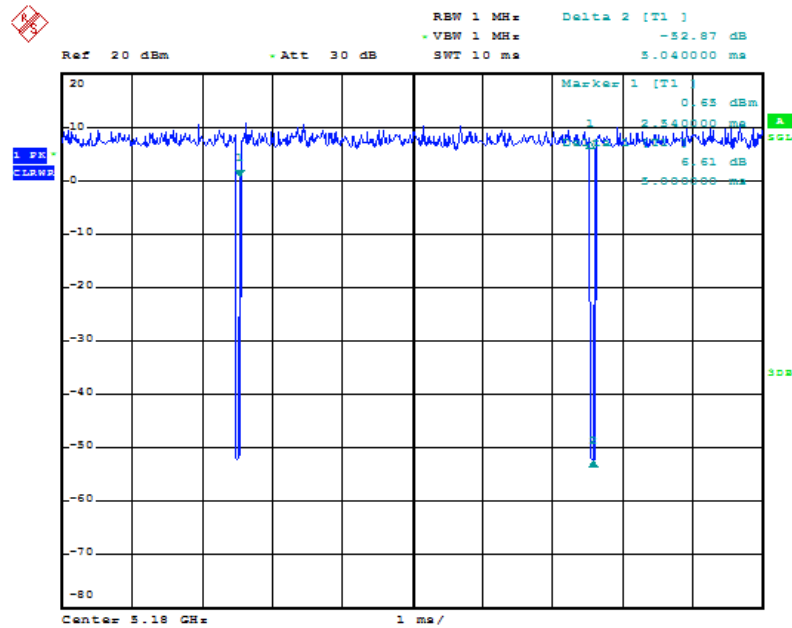
For 5GHz Band:

IEEE 802.11ac MCS0/Nss1 VHT20



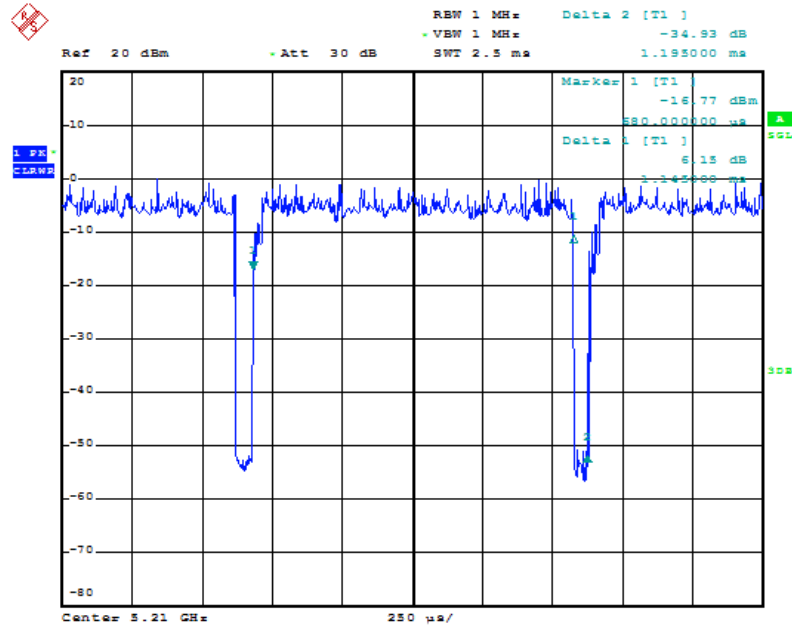
Date: 17.MAY.2014 07:19:30

IEEE 802.11ac MCS0/Nss1 VHT40



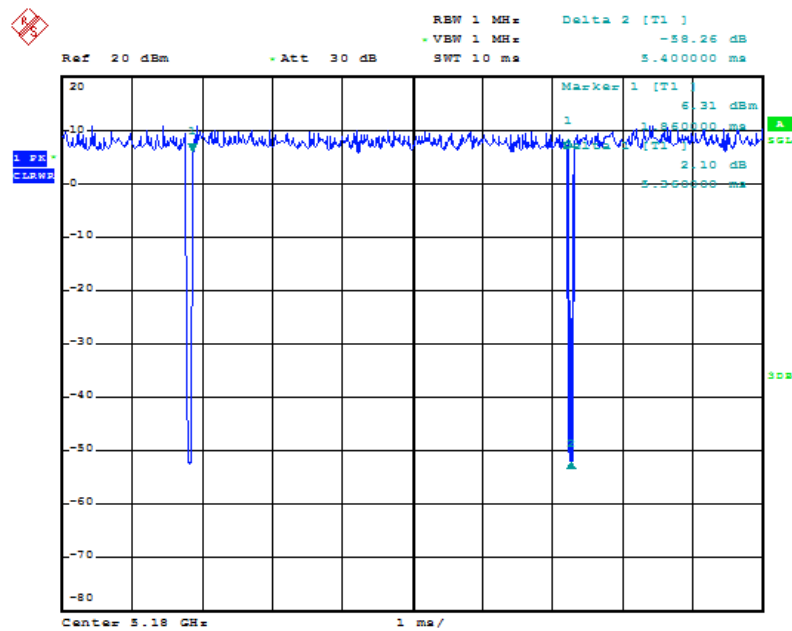
Date: 17.MAY.2014 07:19:30

IEEE 802.11ac MCS0/Nss1 VHT80



Date: 17.MAY.2014 07:21:53

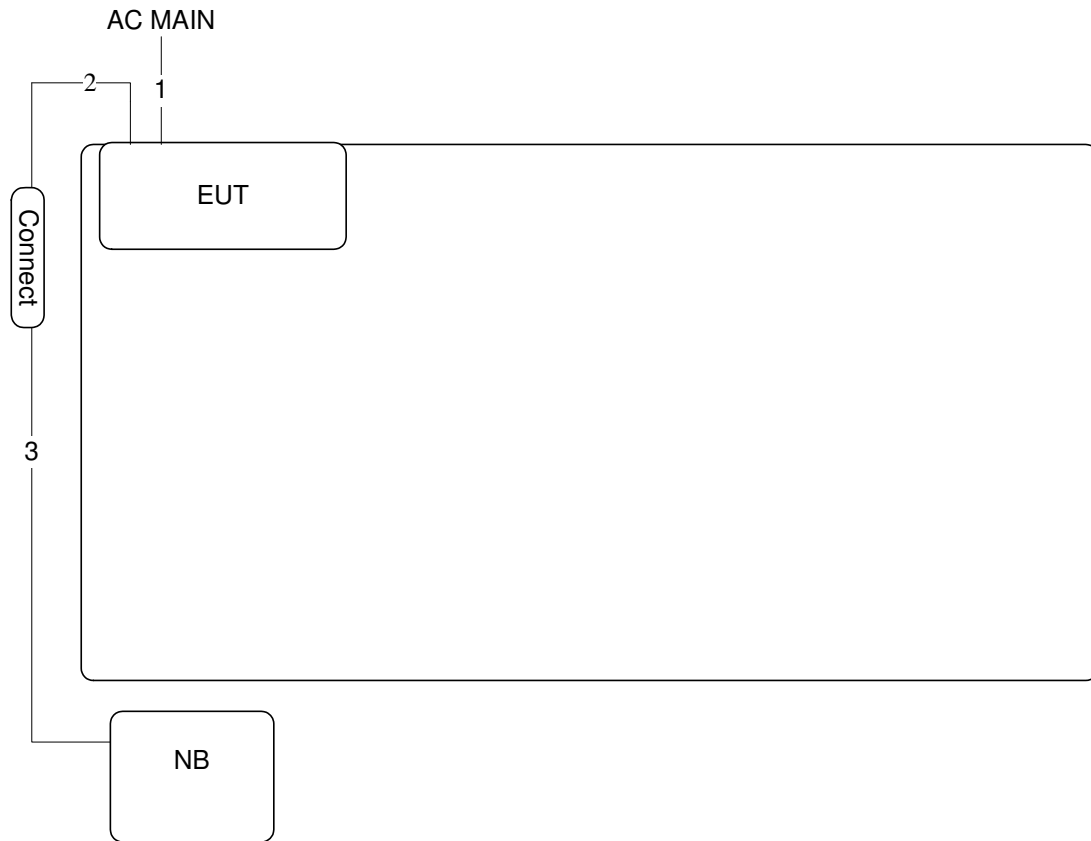
IEEE 802.11a



Date: 17.MAY.2014 07:18:40

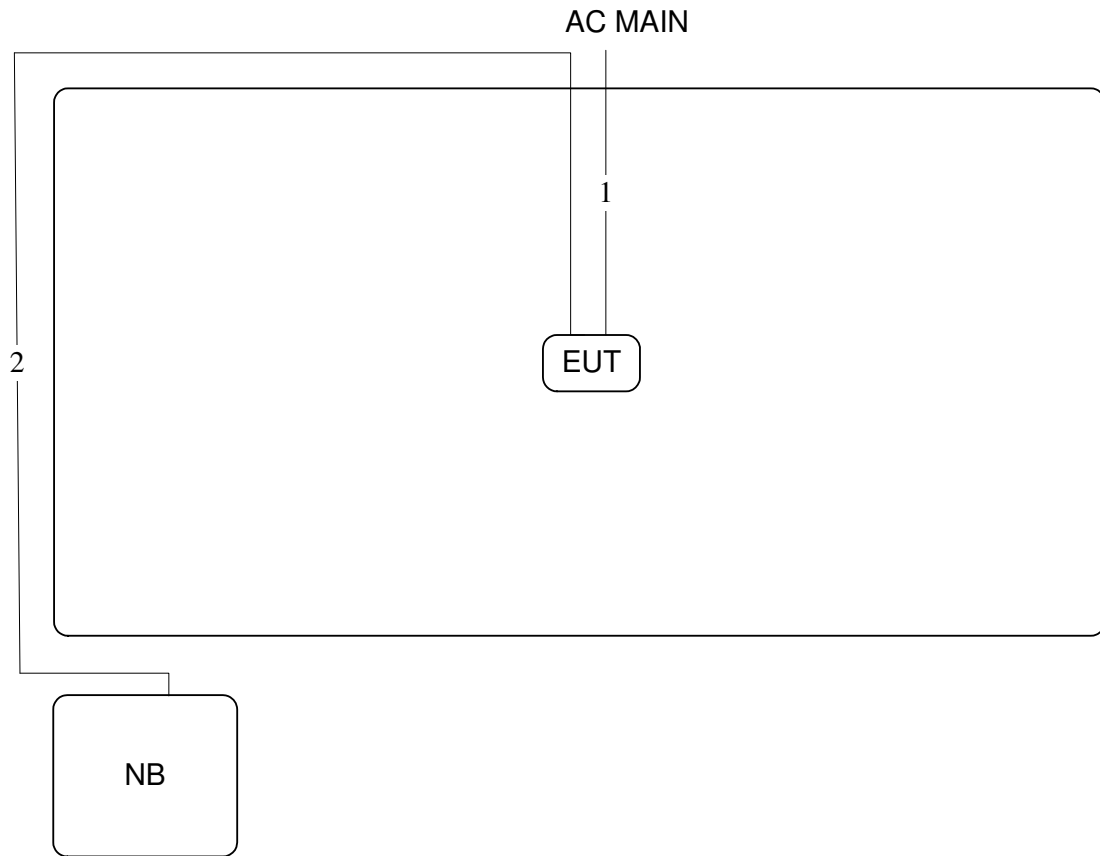
3.12. Test Configurations

3.12.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length(m)
1	Power cable	No	1.8m
2	RJ-45 cable	No	1.2m
3	RJ-45 cable	No	10m

3.12.2. Radiation Emissions Test Configuration



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

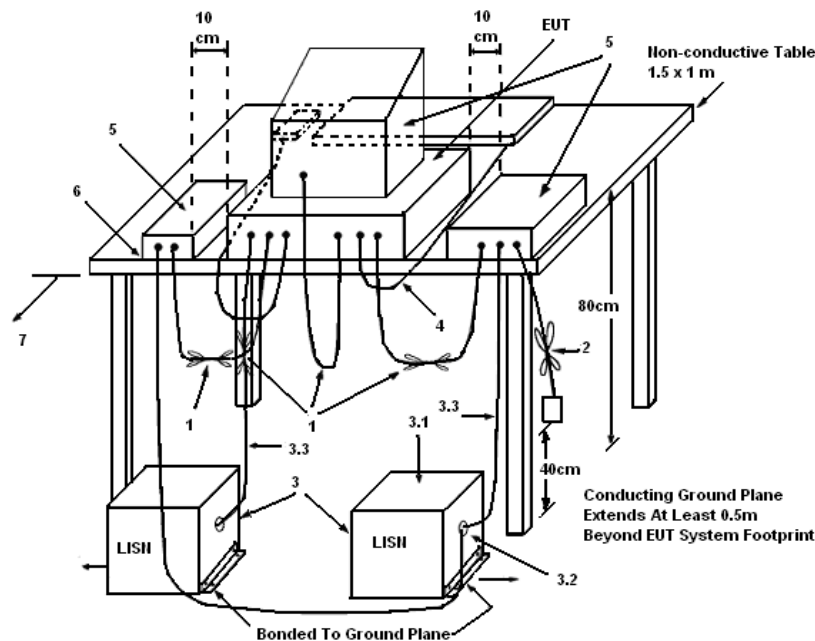
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

4.1.5. Test Deviation

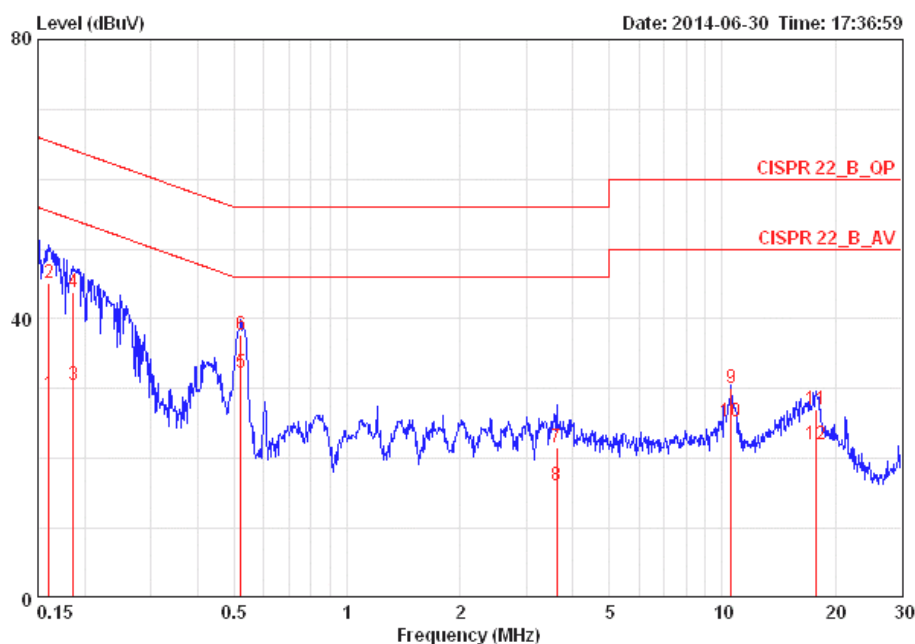
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

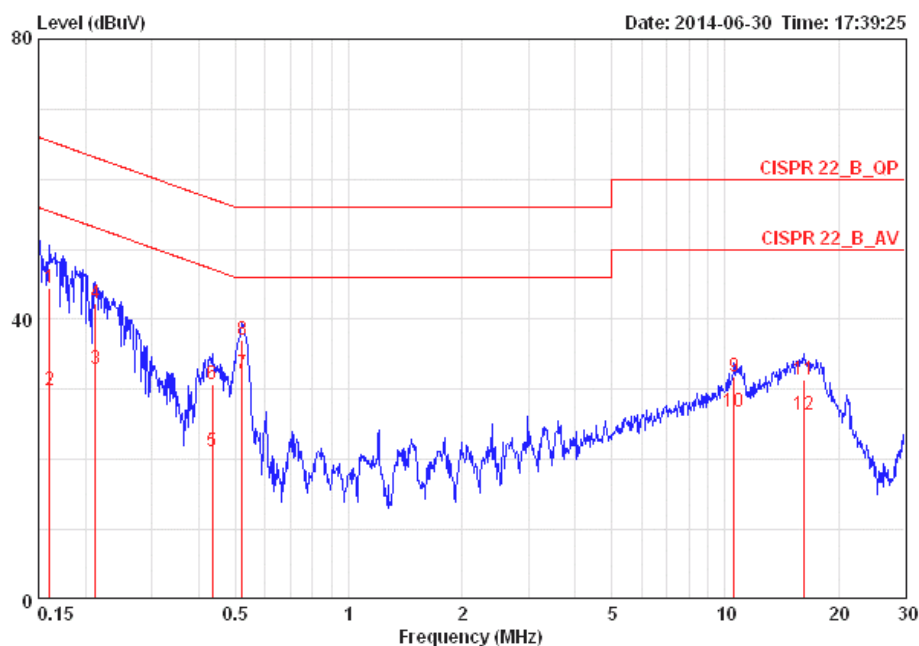
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	55%
Test Engineer	Hank Yang	Phase	Line
Configuration	CTX	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.16070	29.15	-26.28	55.43	0.08	28.91	0.16	LINE	AVERAGE
2	0.16070	45.15	-20.28	65.43	0.08	44.91	0.16	LINE	QP
3	0.18640	30.58	-23.61	54.20	0.08	30.34	0.16	LINE	AVERAGE
4	0.18640	43.81	-20.38	64.20	0.08	43.57	0.16	LINE	QP
5 B	0.52100	32.16	-13.84	46.00	0.08	31.89	0.19	LINE	AVERAGE
6	0.52100	37.70	-18.30	56.00	0.08	37.43	0.19	LINE	QP
7	3.623	21.60	-34.40	56.00	0.14	21.16	0.29	LINE	QP
8	3.623	16.23	-29.77	46.00	0.14	15.79	0.29	LINE	AVERAGE
9	10.564	30.13	-29.87	60.00	0.27	29.48	0.39	LINE	QP
10	10.564	25.26	-24.74	50.00	0.27	24.61	0.39	LINE	AVERAGE
11	17.755	27.04	-32.96	60.00	0.34	26.22	0.48	LINE	QP
12	17.755	22.02	-27.98	50.00	0.34	21.20	0.48	LINE	AVERAGE

Temperature	25°C	Humidity	55%
Test Engineer	Hank Yang	Phase	Neutral
Configuration	CTX	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	LISN Factor	Read Level	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dB	dBuV	dB		
1	0.16070	44.50	-20.93	65.43	0.08	44.26	0.16	NEUTRAL	QP
2	0.16070	29.88	-25.55	55.43	0.08	29.64	0.16	NEUTRAL	AVERAGE
3	0.21279	32.85	-20.25	53.10	0.08	32.60	0.17	NEUTRAL	AVERAGE
4	0.21279	42.34	-20.76	63.10	0.08	42.09	0.17	NEUTRAL	QP
5	0.43511	21.09	-26.06	47.15	0.09	20.82	0.18	NEUTRAL	AVERAGE
6	0.43511	30.73	-26.42	57.15	0.09	30.46	0.18	NEUTRAL	QP
7	0.52100	32.36	-13.64	46.00	0.09	32.08	0.19	NEUTRAL	AVERAGE
8	0.52100	37.02	-18.98	56.00	0.09	36.74	0.19	NEUTRAL	QP
9	10.564	31.80	-28.20	60.00	0.27	31.15	0.39	NEUTRAL	QP
10	10.564	26.91	-23.09	50.00	0.27	26.26	0.39	NEUTRAL	AVERAGE
11	16.140	31.37	-28.63	60.00	0.32	30.59	0.46	NEUTRAL	QP
12	16.140	26.43	-23.57	50.00	0.32	25.65	0.46	NEUTRAL	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Maximum Conducted Output Power Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

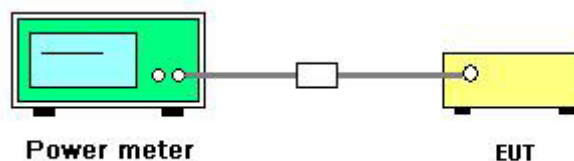
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

4.2.3. Test Procedures

1. Test was performed in accordance with KDB 558074 D01 v03r02 for Performing Compliance Measurements on Digital Transmission Systems (DTS) - section 9.2.3.2 Method AVGPM-G (Measurement using a gated RF average power meter).
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	62%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/ac
Test Date	May 17, 2014 ~ Jun. 27, 2014		

For 2.4GHz Band

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	17.50	16.90	18.40	22.42	30.00	Complies
6	2437 MHz	24.00	22.80	24.10	28.44	30.00	Complies
11	2462 MHz	15.43	13.60	16.60	20.15	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	13.60	13.40	14.10	18.48	30.00	Complies
6	2437 MHz	18.30	17.40	19.31	23.18	30.00	Complies
9	2452 MHz	13.30	11.20	14.00	17.76	30.00	Complies

For 5GHz Band

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	23.64	23.72	23.31	28.33	30.00	Complies
157	5785 MHz	23.06	23.81	23.22	28.15	30.00	Complies
165	5825 MHz	23.13	23.84	23.14	28.15	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	21.72	22.46	21.88	26.80	30.00	Complies
159	5795 MHz	22.22	22.93	22.45	27.31	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	20.09	20.68	19.62	24.92	30.00	Complies

Temperature	26°C	Humidity	62%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g
Test Date	May 17, 2014 ~ Jun. 27, 2014		

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	21.42	21.10	21.87	26.25	30.00	Complies
6	2437 MHz	24.22	22.60	24.03	28.45	30.00	Complies
11	2462 MHz	23.53	20.20	22.81	27.17	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	17.21	16.30	18.01	22.00	30.00	Complies
6	2437 MHz	23.26	22.00	23.60	27.78	30.00	Complies
11	2462 MHz	17.35	14.70	17.56	21.49	30.00	Complies

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

Channel	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	23.72	23.89	23.34	28.43	30.00	Complies
157	5785 MHz	23.33	24.17	23.29	28.39	30.00	Complies
165	5825 MHz	23.17	23.86	23.15	28.18	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

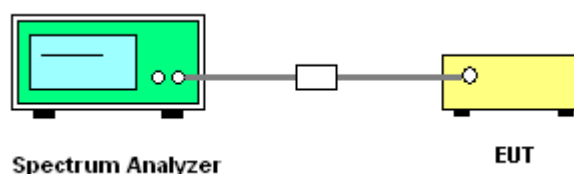
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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	62%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-7.32	-9.50	-7.72	-3.31	8.00	Complies
6	2437 MHz	-2.23	-3.39	-2.59	2.06	8.00	Complies
11	2462 MHz	-8.04	-12.10	-10.67	-5.17	8.00	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 5.81 \text{ dBi} < 6 \text{ dBi},$

so the limit doesn't reduce.

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
3	2422 MHz	-14.14	-15.71	-14.21	-9.86	8.00	Complies
6	2437 MHz	-9.62	-12.17	-10.43	-5.84	8.00	Complies
9	2452 MHz	-13.68	-16.94	-14.95	-10.22	8.00	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 5.81 \text{ dBi} < 6 \text{ dBi},$

so the limit doesn't reduce.

For 5GHz Band

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-2.15	-1.91	-2.08	2.73	7.33	Complies
157	5785 MHz	-2.15	-1.72	-2.05	2.80	7.33	Complies
165	5825 MHz	-1.91	-2.06	-2.26	2.70	7.33	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 6.67 \text{ dBi} > 6 \text{ dBi}, \text{ So Band4 limit}$

$$= 8 - (6.67 - 6) = 7.33 \text{ dBm/3kHz}$$

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
151	5755 MHz	-6.32	-5.28	-5.97	-1.06	7.33	Complies
159	5795 MHz	-5.09	-3.33	-4.86	0.42	7.33	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 6.67\text{dBi} > 6\text{dBi}$, So Band4 limit

$= 8 - (6.67 - 6) = 7.33\text{dBm/3kHz}$

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
155	5775 MHz	-9.58	-9.49	-9.73	-4.83	7.33	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 6.67\text{dBi} > 6\text{dBi}$, So Band4 limit

$= 8 - (6.67 - 6) = 7.33\text{dBm/3kHz}$

Temperature	26°C	Humidity	62%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-2.72	-3.35	-3.03	1.75	8.00	Complies
6	2437 MHz	-0.29	-1.63	-1.30	3.74	8.00	Complies
11	2462 MHz	-0.41	-3.30	-3.06	2.72	8.00	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 5.81 \text{ dBi} < 6 \text{ dBi},$

so the limit doesn't reduce.

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
1	2412 MHz	-7.36	-8.85	-7.13	-2.94	8.00	Complies
6	2437 MHz	-1.93	-3.89	-2.16	2.19	8.00	Complies
11	2462 MHz	-6.62	-9.98	-8.78	-3.46	8.00	Complies

Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 5.81 \text{ dBi} < 6 \text{ dBi},$

so the limit doesn't reduce.

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

Channel	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Total		
149	5745 MHz	-1.58	-1.12	-1.79	3.28	7.33	Complies
157	5785 MHz	-1.77	-1.35	-1.91	3.10	7.33	Complies
165	5825 MHz	-1.40	-0.99	-1.82	3.38	7.33	Complies

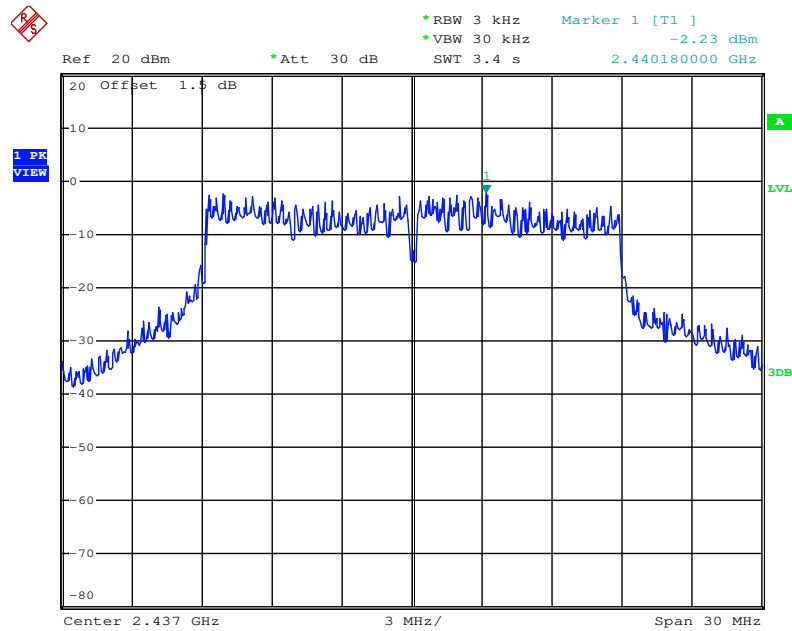
Note: $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \frac{\sum_{k=1}^{N_{ANT}} g_{j,k}}{N_{ANT}} \right\}^2}{N_{ANT}} \right] = 6.67 \text{ dBi} > 6 \text{ dBi}, \text{ So Band4 limit}$

$$= 8 - (6.67 - 6) = 7.33 \text{ dBm/3kHz}$$

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

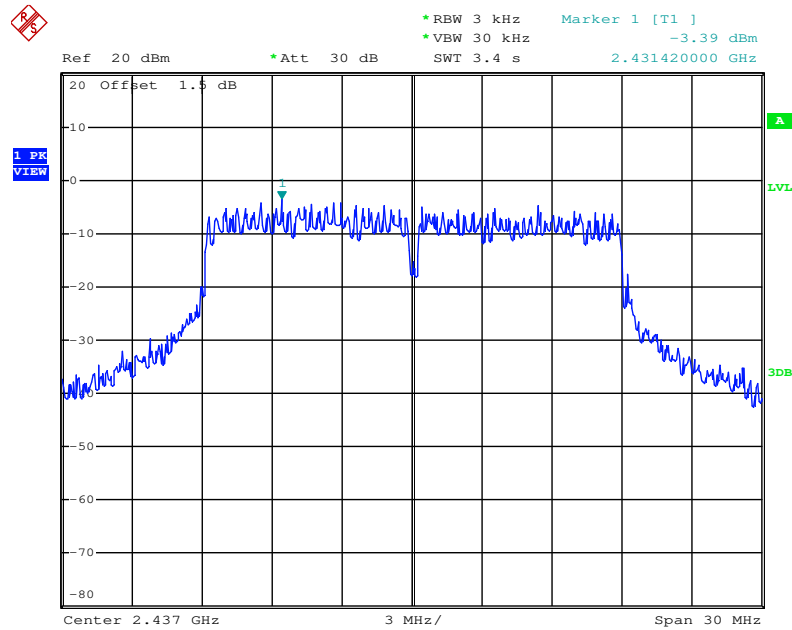
For plots, only the channel with worse result was shown.

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



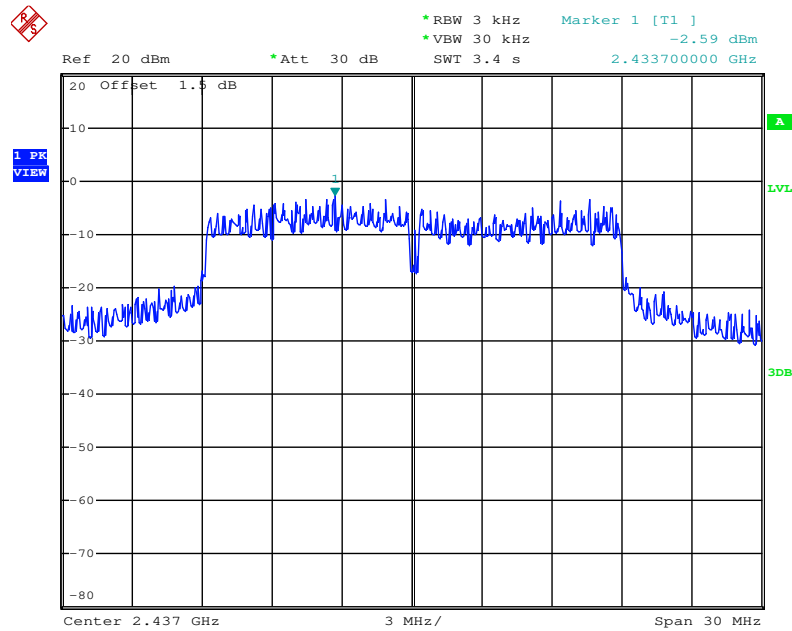
Date: 27.JUN.2014 13:36:18

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



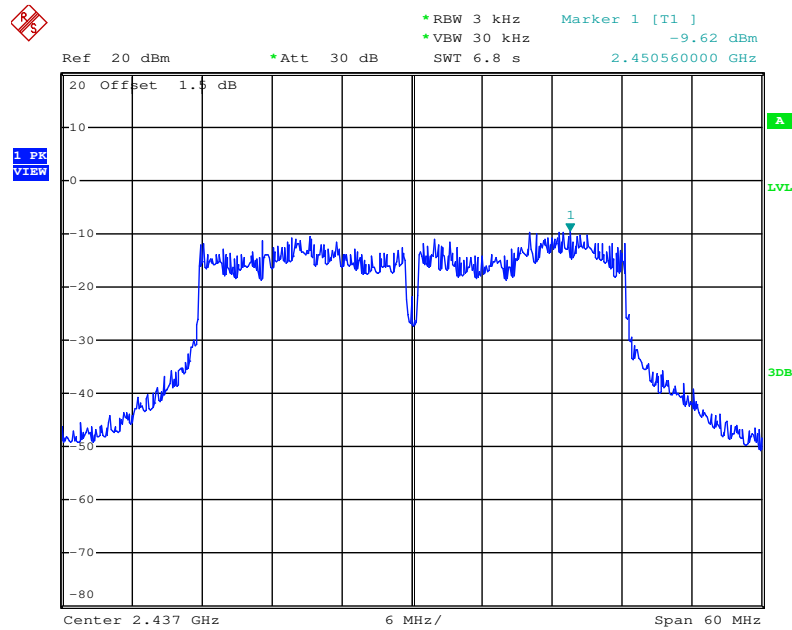
Date: 27.JUN.2014 13:36:52

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



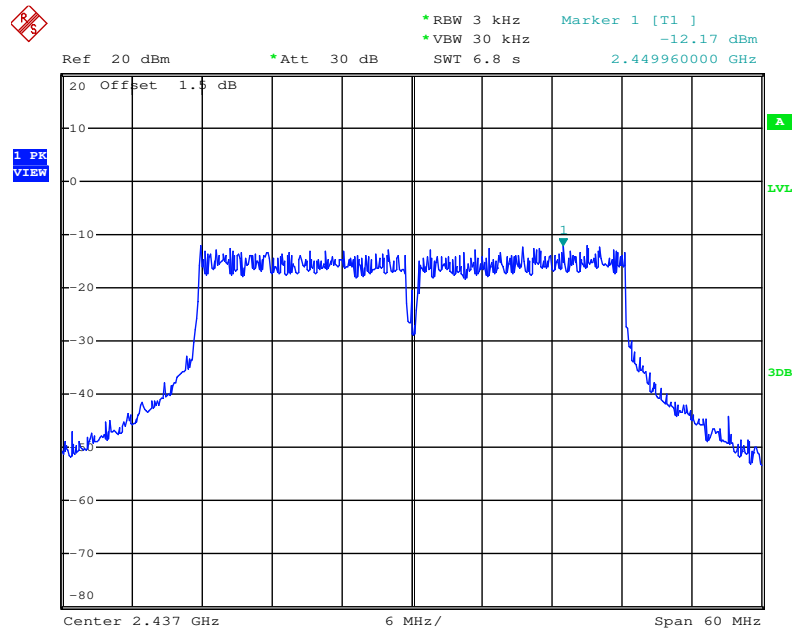
Date: 27.JUN.2014 13:37:28

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



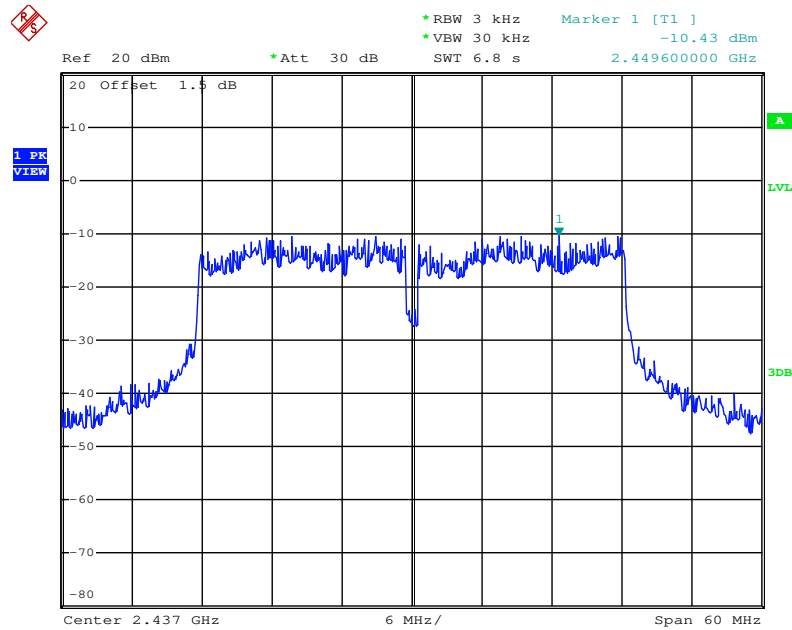
Date: 27.JUN.2014 13:47:07

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



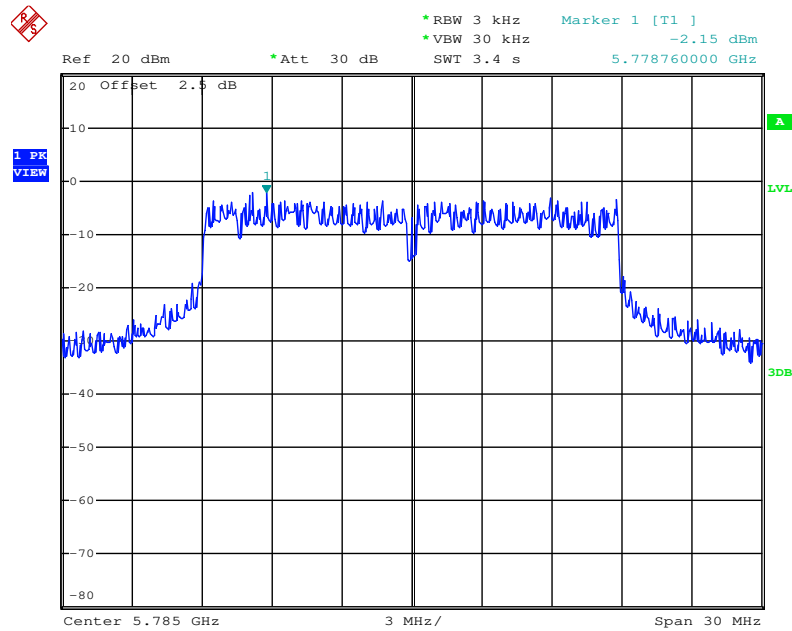
Date: 27.JUN.2014 13:46:23

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



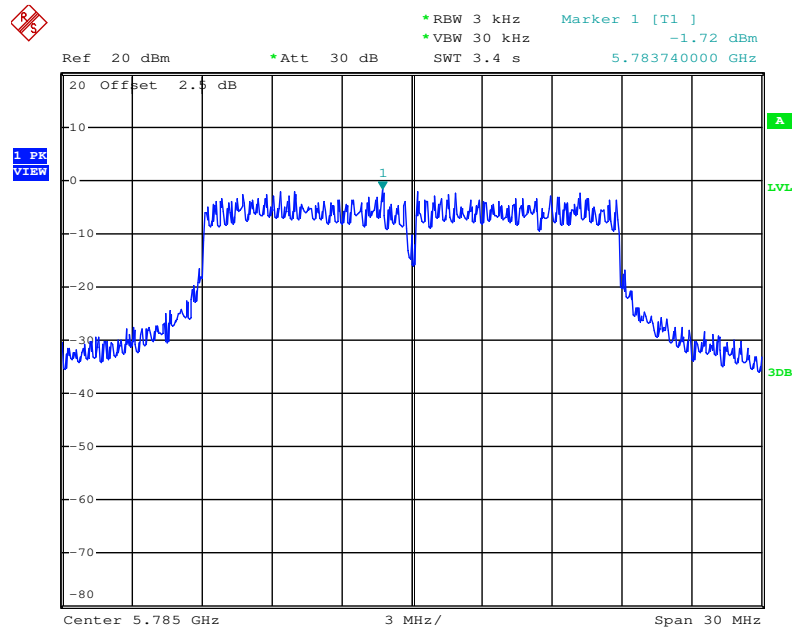
Date: 27.JUN.2014 13:45:38

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 1



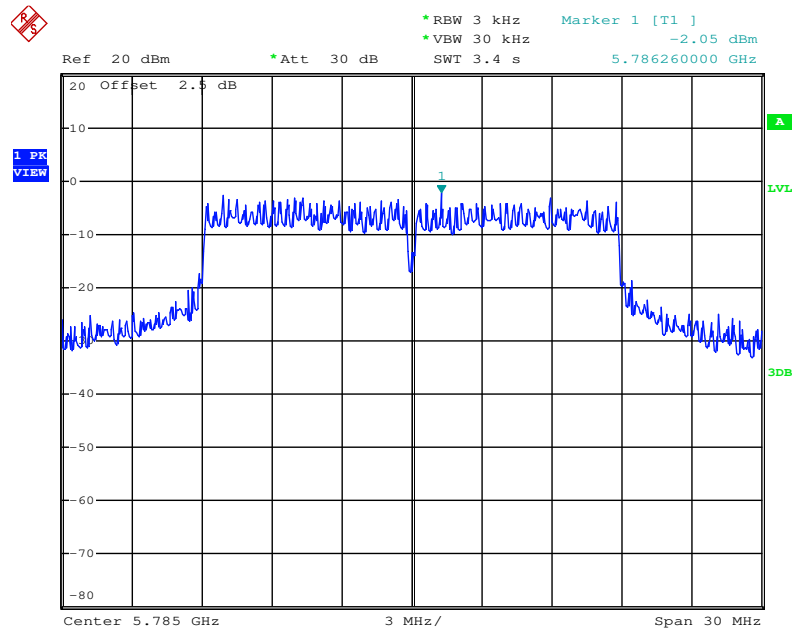
Date: 27.JUN.2014 14:14:13

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 2



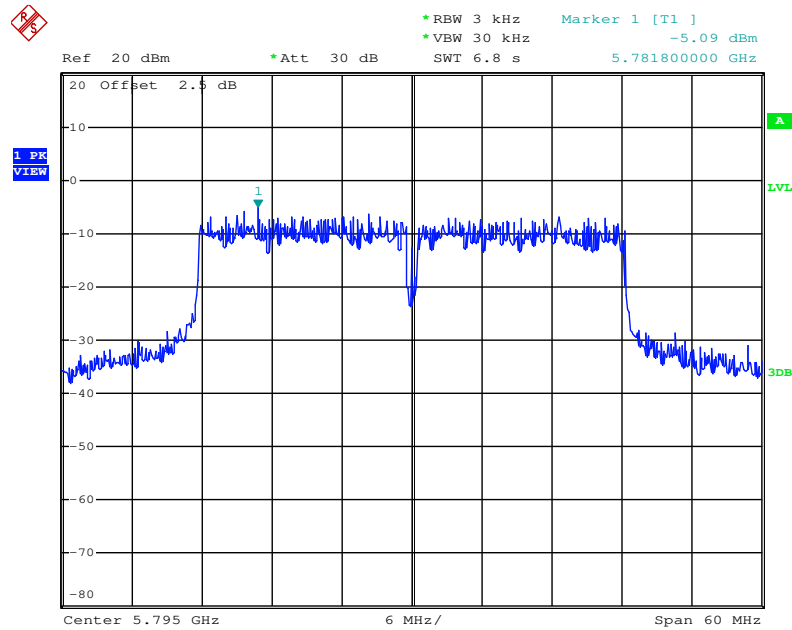
Date: 27.JUN.2014 14:14:45

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 3



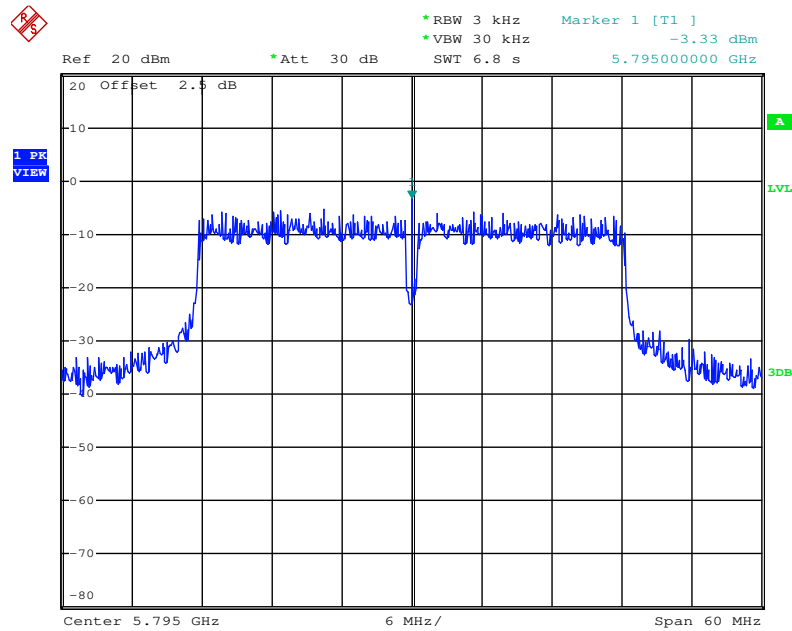
Date: 27.JUN.2014 14:15:24

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



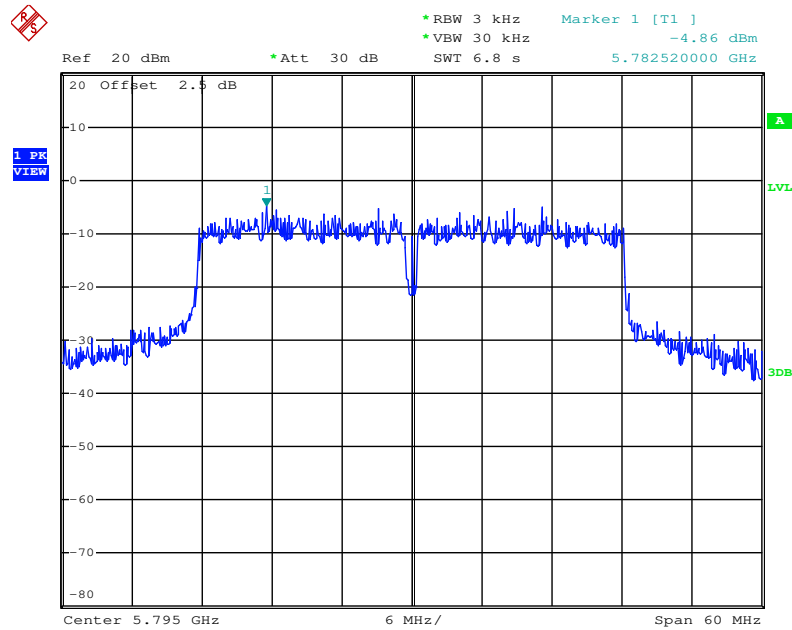
Date: 27.JUN.2014 14:22:48

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



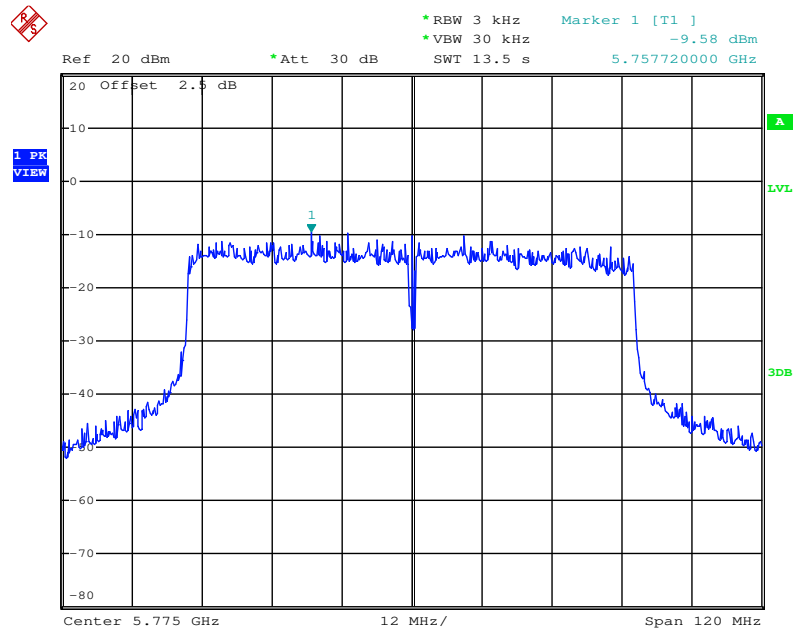
Date: 27.JUN.2014 14:22:19

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



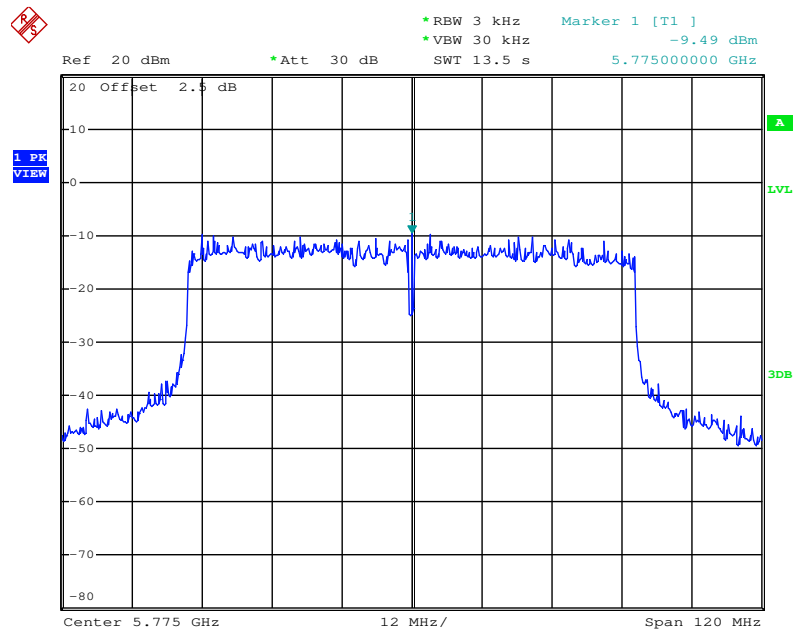
Date: 27.JUN.2014 14:21:28

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



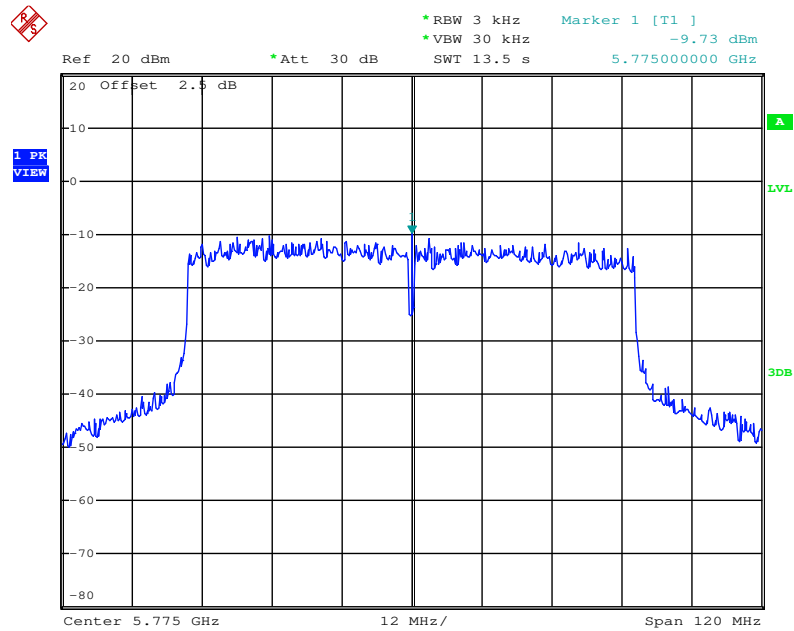
Date: 27.JUN.2014 14:25:34

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



Date: 27.JUN.2014 14:26:11

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



Date: 27.JUN.2014 14:26:41



Ref 20 dBm * Att 30 dB * RBW 3 kHz * VBW 30 kHz Marker 1 [T1] -0.29 dBm
SWT 3.4 s 2.437900000 GHz

20 Offset 1.5 dB

1 PR VIEW

1

Center 2.437 GHz 3 MHz/ Span 30 MHz

20 Offset 1.5 dB

1 PK VIEW

2.436460000 GHz

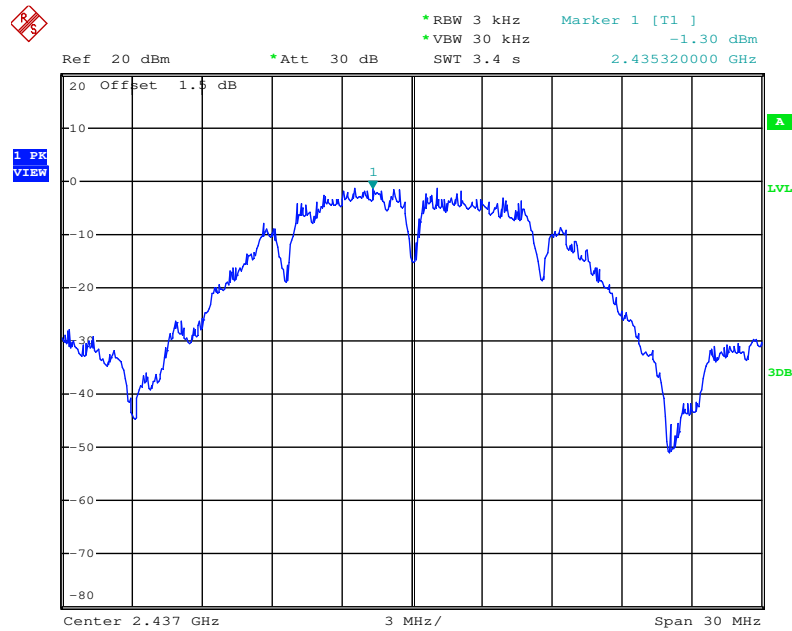
-1.63 dBm

3 MHz/

Span 30 MHz

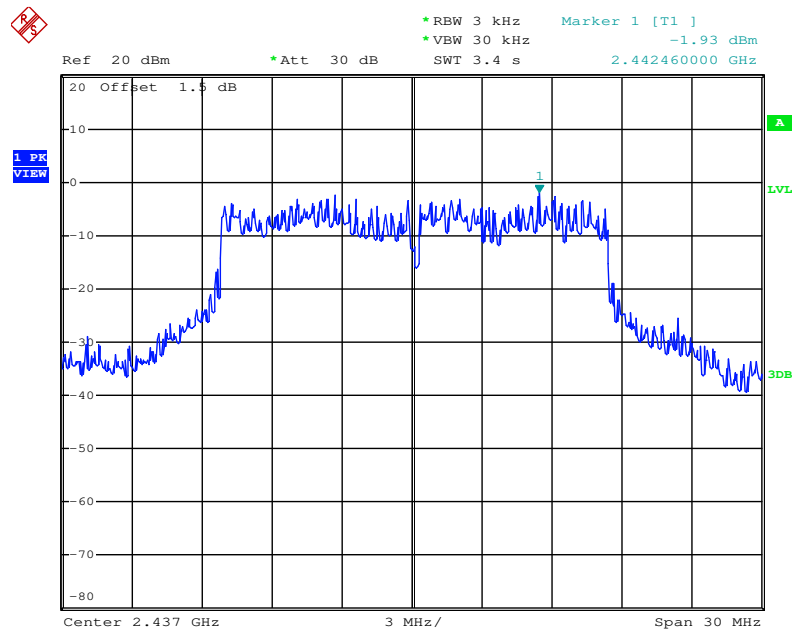
Issued Date : Jul. 07, 2014

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



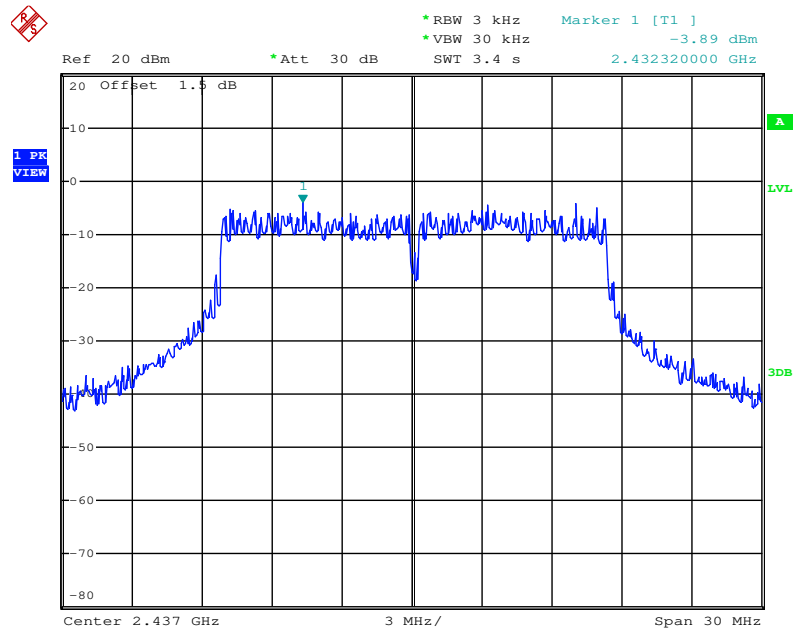
Date: 27.JUN.2014 13:06:16

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



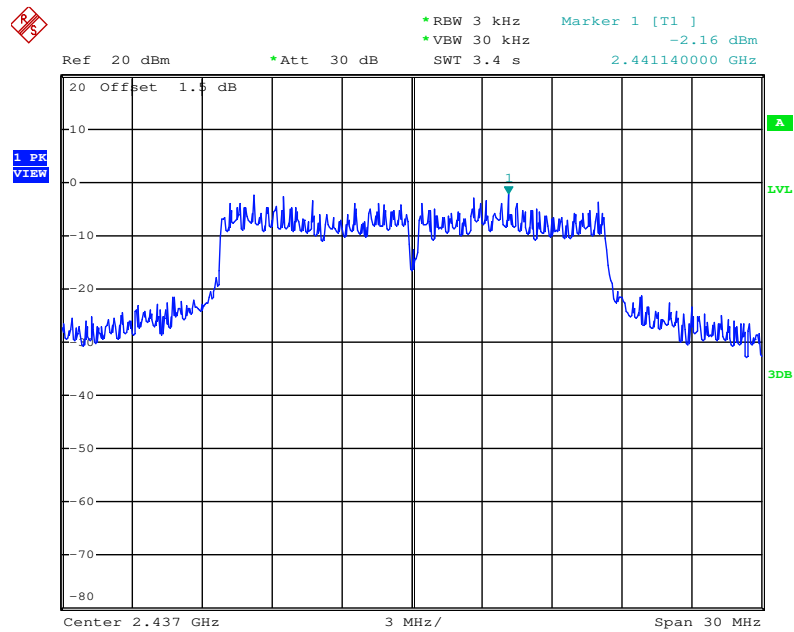
Date: 27.JUN.2014 13:21:30

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



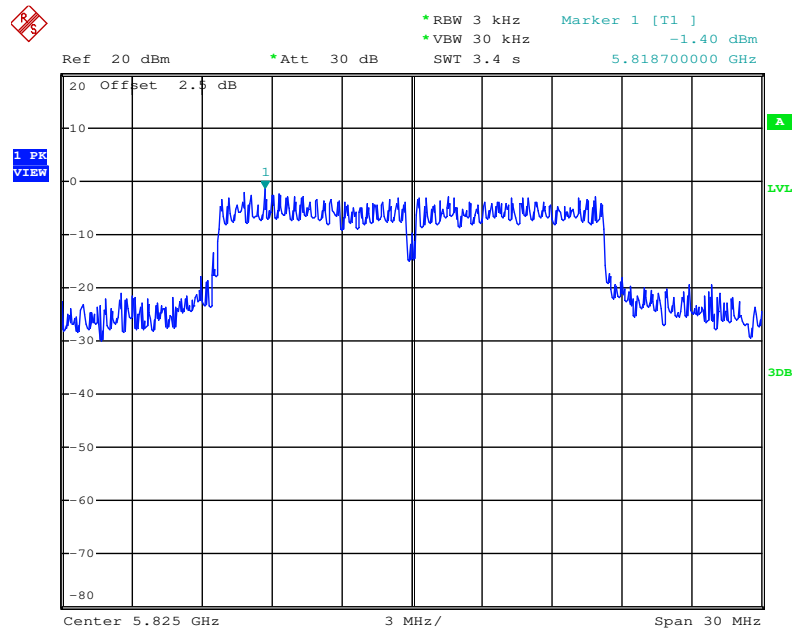
Date: 27.JUN.2014 13:20:51

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



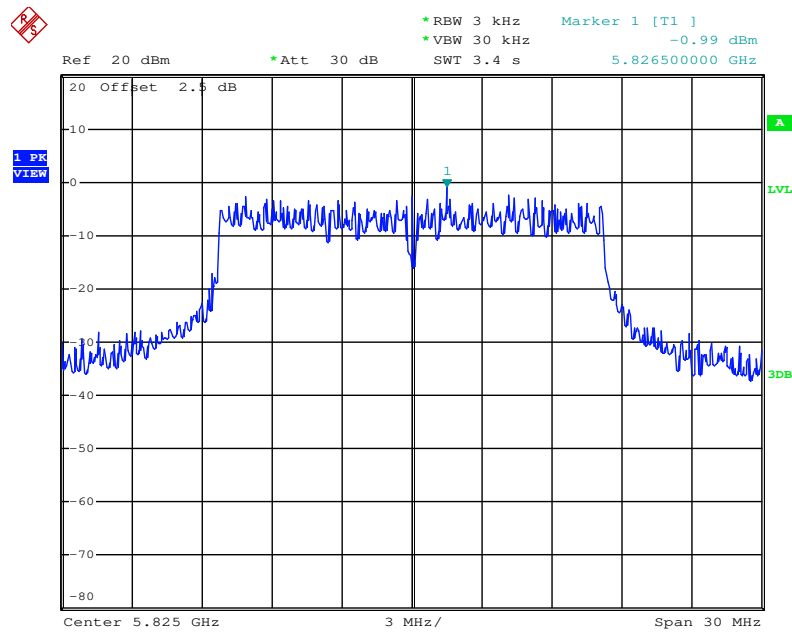
Date: 27.JUN.2014 13:19:53

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



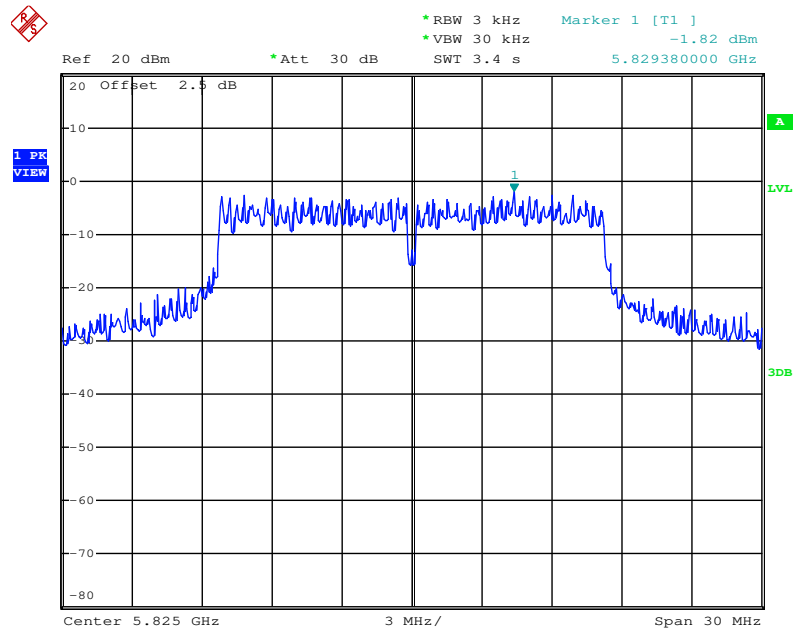
Date: 27.JUN.2014 14:08:23

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



Date: 27.JUN.2014 14:09:09

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



Date: 27.JUN.2014 14:10:15

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	62%
Test Engineer	Benson Peng	Configurations	IEEE 802.11n/ac

For 2.4GHz Band

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.40	17.68	500	Complies
6	2437 MHz	16.32	19.28	500	Complies
11	2462 MHz	16.24	17.68	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	34.40	36.16	500	Complies
6	2437 MHz	33.28	36.00	500	Complies
9	2452 MHz	35.68	36.32	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	16.40	19.68	500	Complies
157	5785 MHz	16.32	19.60	500	Complies
165	5825 MHz	16.32	20.00	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
151	5755 MHz	32.00	35.84	500	Complies
159	5795 MHz	34.88	36.64	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	69.44	73.92	500	Complies

Temperature	26°C	Humidity	62%
Test Engineer	Benson Peng	Configurations	IEEE 802.11a/b/g

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	6.56	13.76	500	Complies
6	2437 MHz	6.08	13.84	500	Complies
11	2462 MHz	6.96	12.48	500	Complies

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

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.60	16.48	500	Complies
6	2437 MHz	15.76	17.12	500	Complies
11	2462 MHz	15.12	16.40	500	Complies

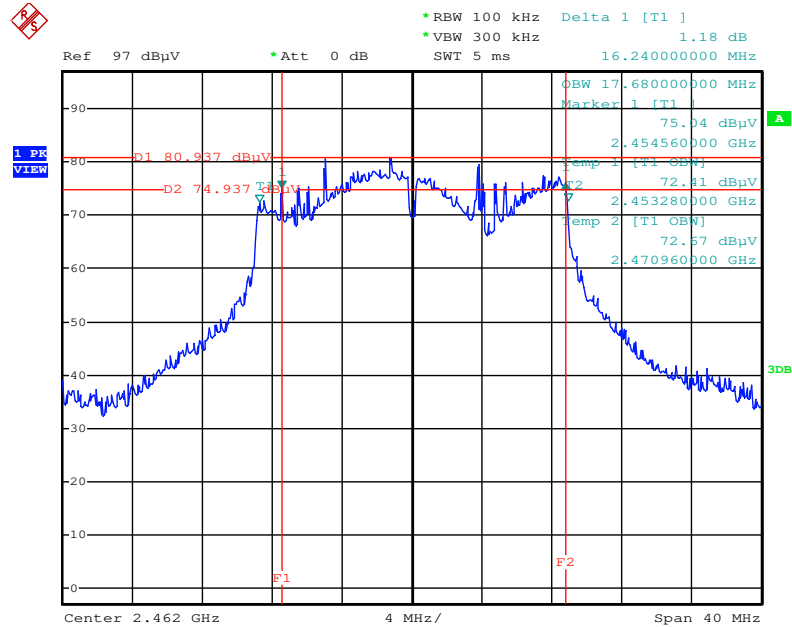
Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	14.40	19.28	500	Complies
157	5785 MHz	13.20	19.84	500	Complies
165	5825 MHz	12.80	23.28	500	Complies

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

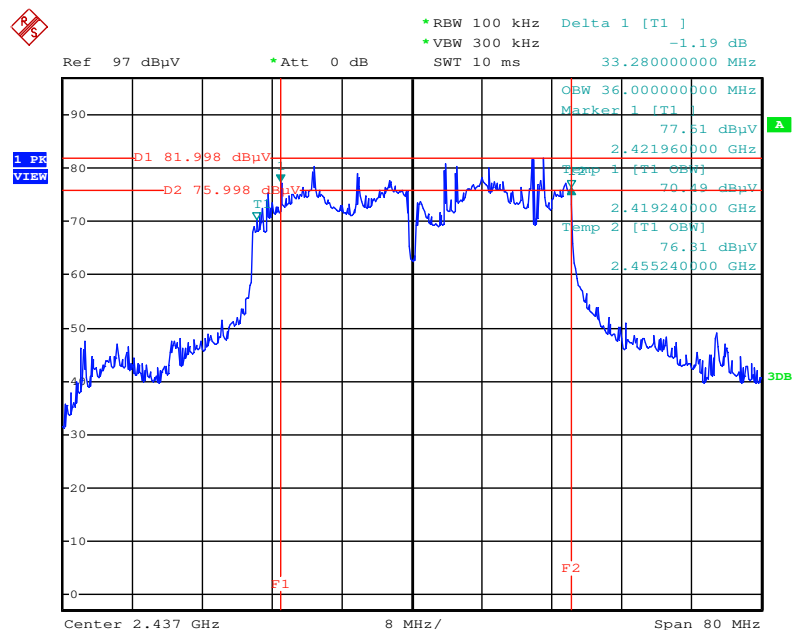
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.JUN.2014 12:22:52

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2437 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.JUN.2014 12:24:35

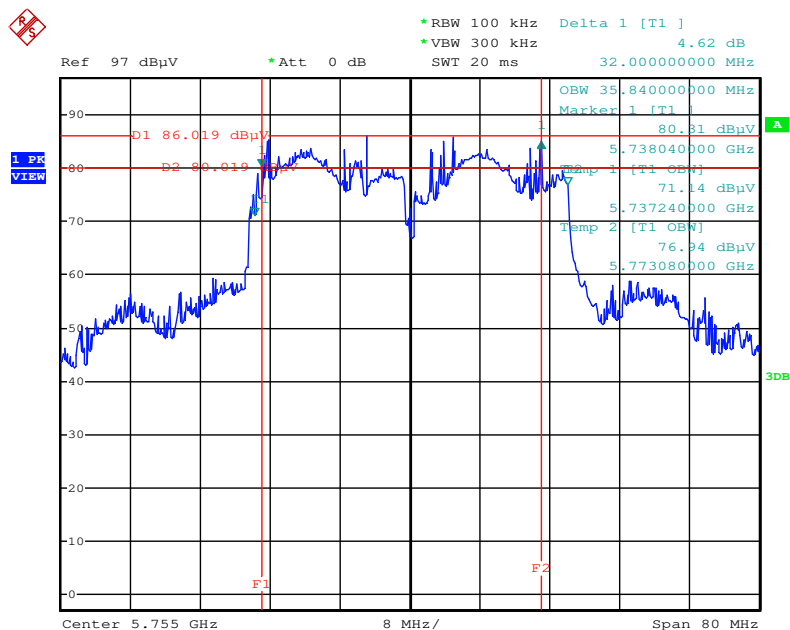


Ref 97 dBuV *Att 0 dB *RBW 100 kHz Delta 1 [T1] -3.26 dB
 SWT 20 ms 16.320000000 MHz

OBW 19.600000000 MHz
 Marker 1 [T1] 87.09 dBuV
 5.777480000 GHz
 Amp 1 [T1 OBW] 66.76 dBuV
 T2 5.774680000 GHz
 Amp 2 [T1 OBW] 72.21 dBuV
 5.794280000 GHz

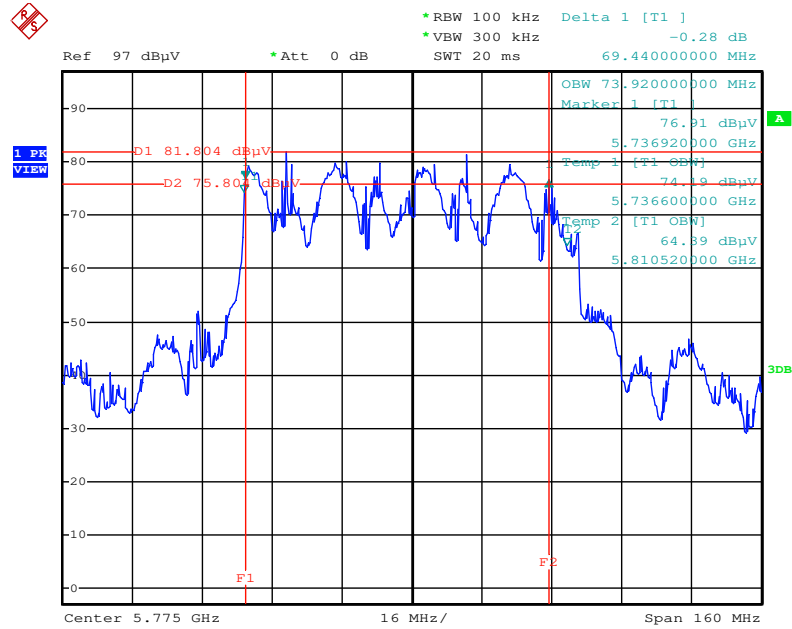
Center 5.785 GHz 4 MHz/ Span 40 MHz

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



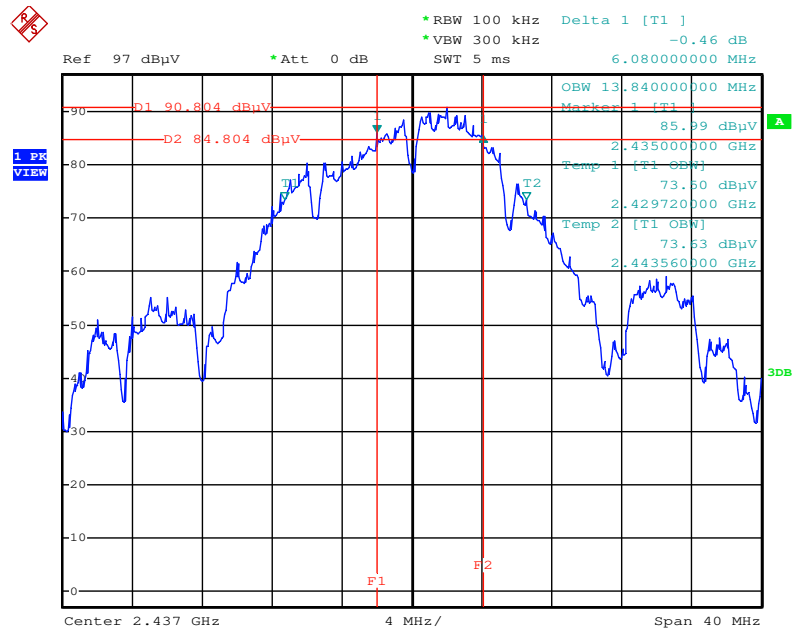
Issued Date : Jul. 07, 2014

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



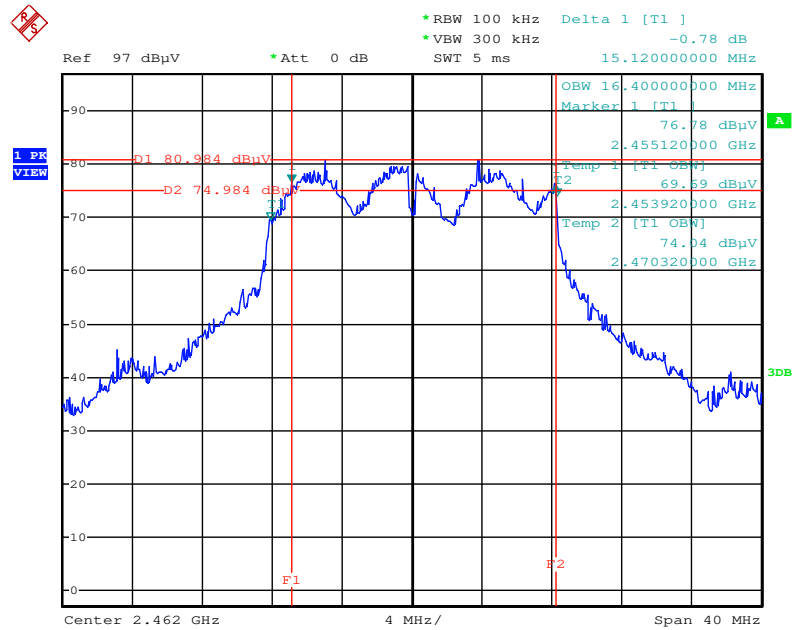
Date: 27.JUN.2014 14:29:22

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



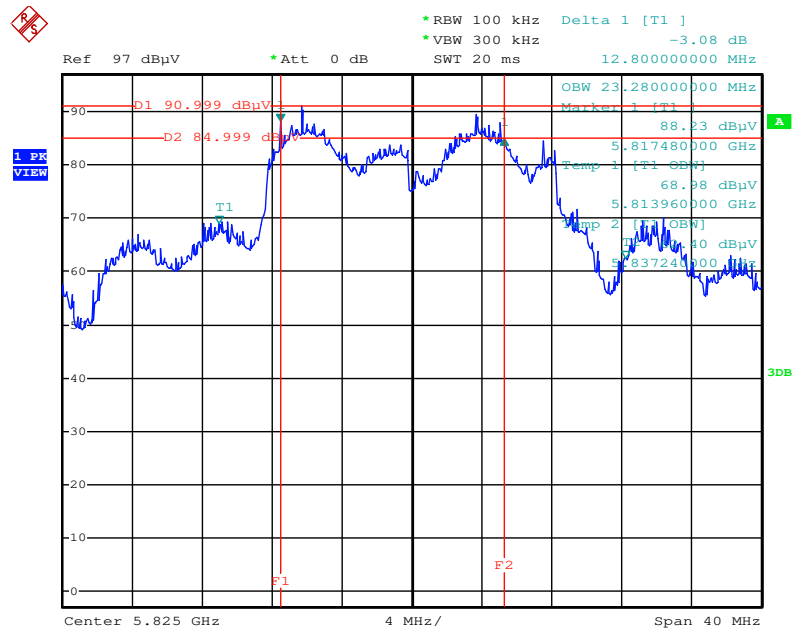
Date: 27.JUN.2014 12:16:45

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2462 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.JUN.2014 12:18:40

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Chain 1 + Chain 2 + Chain 3



Date: 27.JUN.2014 14:44:04

4.5. Radiated Emissions Measurement

4.5.1. Limit

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

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

4.5.2. Measuring Instruments and Setting

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

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

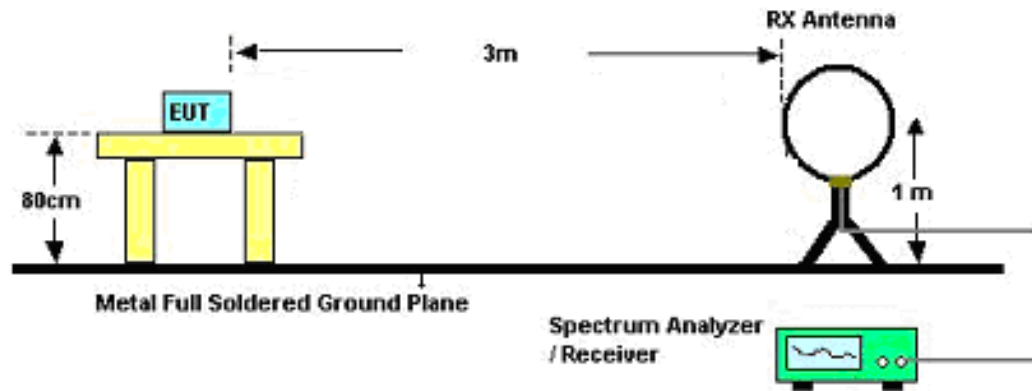
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

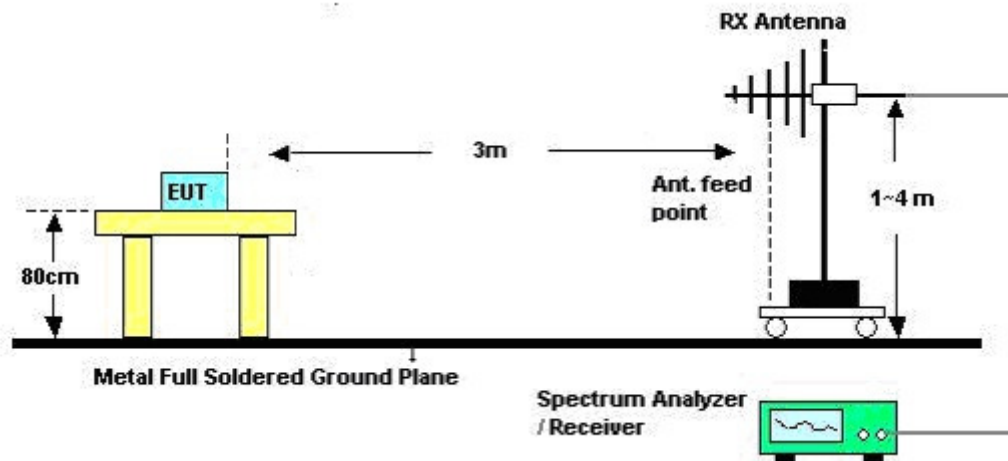
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. 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

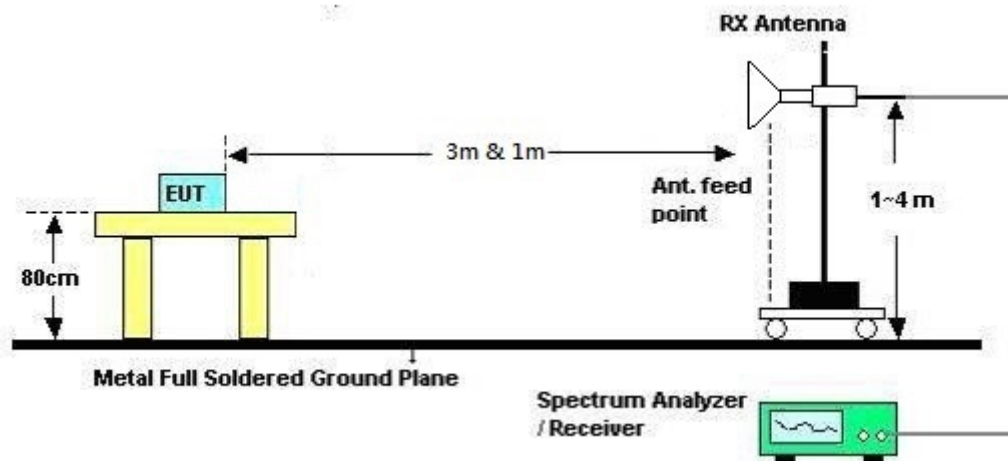
For Radiated Emissions: 9kHz ~30MHz



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

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	CTX
Test Date	Jun. 30, 2014	Test Mode	Mode 1

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

Note:

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

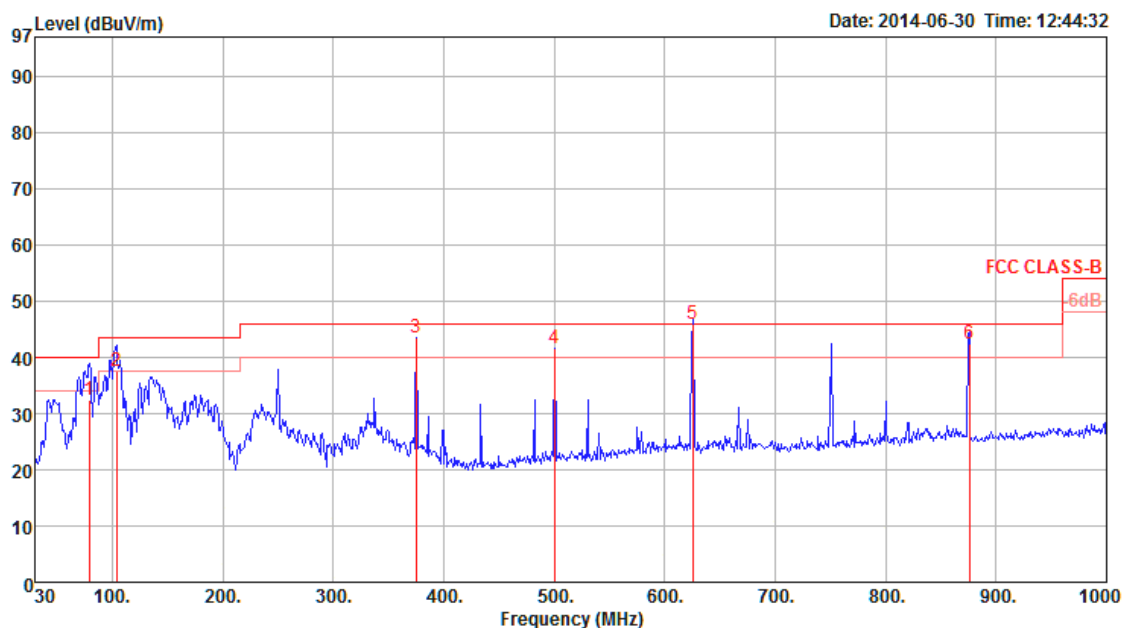
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

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

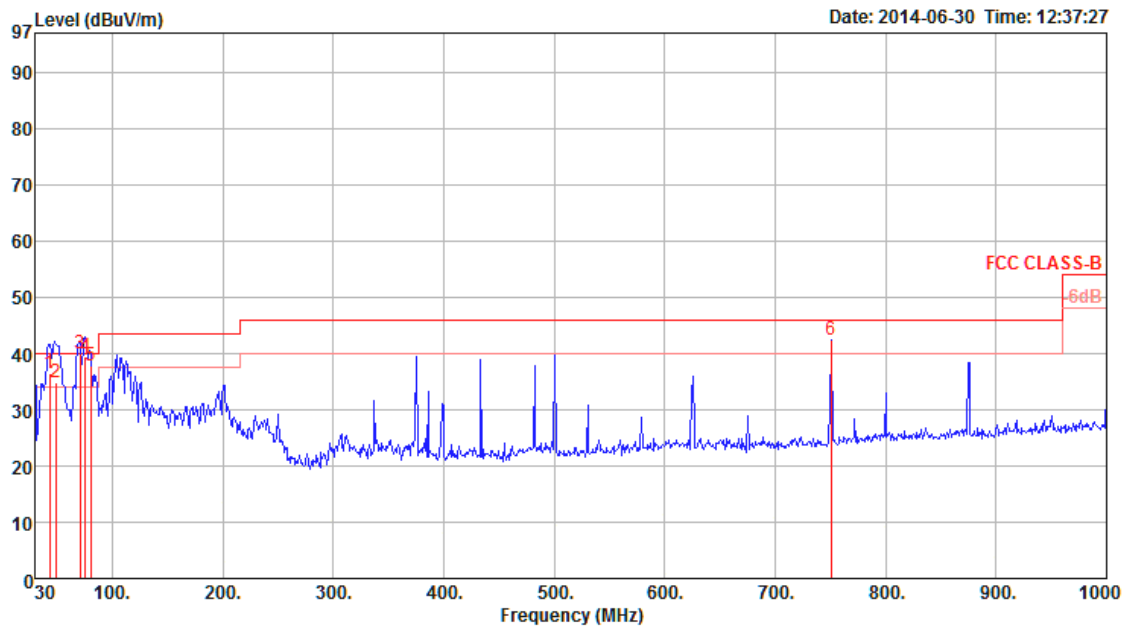
Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	CTX
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	Remark	T/Pos	A/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		deg	cm	
1	79.47	32.29	40.00	-7.71	51.90	0.76	7.53	27.90	QP	94	200	HORIZONTAL
2	103.72	37.51	43.50	-5.99	52.56	0.85	11.88	27.78	QP	45	100	HORIZONTAL
3	375.32	43.42	46.00	-2.58	52.83	1.79	16.06	27.26	Peak	0	100	HORIZONTAL
4	500.45	41.61	46.00	-4.39	49.64	2.10	17.80	27.93	Peak	0	100	HORIZONTAL
5	625.58	45.80	46.00	-0.20	51.16	2.42	19.80	27.58	QP	296	125	HORIZONTAL
6	875.84	42.51	46.00	-3.49	44.72	2.89	21.76	26.86	QP	160	100	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	43.24	36.47	40.00	-3.53	52.33	0.53	11.56	27.95	QP	162	100	VERTICAL
2	49.21	34.96	40.00	-5.04	53.16	0.55	9.17	27.92	QP	83	100	VERTICAL
3	70.62	39.95	40.00	-0.05	60.34	0.68	6.87	27.94	QP	180	100	VERTICAL
4	75.62	39.36	40.00	-0.64	59.32	0.72	7.24	27.92	QP	126	100	VERTICAL
5	80.64	37.70	40.00	-2.30	57.24	0.76	7.60	27.90	QP	183	100	VERTICAL
6	750.71	42.50	46.00	-3.50	46.35	2.66	20.61	27.12	Peak	0	400	VERTICAL

Note:

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

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

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

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

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT20 CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4820.67	46.49	74.00	-27.51	42.43	5.87	33.39	35.20	Peak	100	58	HORIZONTAL
2	4822.65	34.09	54.00	-19.91	30.03	5.87	33.39	35.20	Average	100	58	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4816.12	44.84	74.00	-29.16	40.83	5.85	33.36	35.20	Peak	100	196	VERTICAL
2	4825.80	33.18	54.00	-20.82	29.12	5.87	33.39	35.20	Average	100	196	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT20 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4872.14	34.77	54.00	-19.23	30.57	5.92	33.48	35.20	Average	114	122	HORIZONTAL
2	4872.49	49.16	74.00	-24.84	44.96	5.92	33.48	35.20	Peak	114	122	HORIZONTAL
3	7309.62	48.66	74.00	-25.34	40.45	7.13	36.51	35.43	Peak	100	173	HORIZONTAL
4	7320.97	36.87	54.00	-17.13	28.65	7.14	36.51	35.43	Average	100	173	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4870.80	35.79	54.00	-18.21	31.59	5.92	33.48	35.20	Average	123	108	VERTICAL
2	4873.58	48.33	74.00	-25.67	44.13	5.92	33.48	35.20	Peak	123	108	VERTICAL
3	7306.26	52.85	74.00	-21.15	44.66	7.13	36.48	35.42	Peak	103	100	VERTICAL
4	7306.96	40.32	54.00	-13.68	32.14	7.13	36.48	35.43	Average	103	100	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT20 CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 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	4922.56	31.90	54.00	-22.10	27.55	5.97	33.58	35.20 Average	113	27	HORIZONTAL
2	4930.57	44.29	74.00	-29.71	39.94	5.97	33.58	35.20 Peak	113	27	HORIZONTAL
3	7385.20	49.16	74.00	-24.84	40.84	7.17	36.61	35.46 Peak	100	176	HORIZONTAL
4	7386.83	36.35	54.00	-17.65	28.03	7.17	36.61	35.46 Average	100	176	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	4918.71	32.11	54.00	-21.89	27.80	5.97	33.54	35.20 Average	100	99	VERTICAL
2	4921.72	45.62	74.00	-28.38	41.31	5.97	33.54	35.20 Peak	100	99	VERTICAL
3	7376.00	36.29	54.00	-17.71	27.97	7.16	36.61	35.45 Average	100	228	VERTICAL
4	7383.18	49.01	74.00	-24.99	40.69	7.16	36.61	35.45 Peak	100	228	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT40 CH 3 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4838.65	31.47	54.00	-22.53	27.37	5.88	33.42	35.20	Average	100	303	HORIZONTAL
2	4843.39	44.86	74.00	-29.14	40.76	5.88	33.42	35.20	Peak	100	303	HORIZONTAL
3	7263.08	49.21	74.00	-24.79	41.09	7.10	36.43	35.41	Peak	100	143	HORIZONTAL
4	7272.25	36.18	54.00	-17.82	28.05	7.11	36.43	35.41	Average	100	143	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4840.73	31.53	54.00	-22.47	27.43	5.88	33.42	35.20	Average	100	126	VERTICAL
2	4847.62	43.97	74.00	-30.03	39.87	5.88	33.42	35.20	Peak	100	126	VERTICAL
3	7257.86	48.92	74.00	-25.08	40.80	7.10	36.43	35.41	Peak	100	8	VERTICAL
4	7259.46	36.29	54.00	-17.71	28.17	7.10	36.43	35.41	Average	100	8	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT40 CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4864.58	44.11	74.00	-29.89	39.96	5.90	33.45	35.20	Peak	100	257	HORIZONTAL
2	4865.44	31.23	54.00	-22.77	27.08	5.90	33.45	35.20	Average	100	257	HORIZONTAL
3	7306.71	49.14	74.00	-24.86	40.96	7.13	36.48	35.43	Peak	100	101	HORIZONTAL
4	7320.14	36.32	54.00	-17.68	28.10	7.14	36.51	35.43	Average	100	101	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4871.44	31.50	54.00	-22.50	27.30	5.92	33.48	35.20	Average	100	132	VERTICAL
2	4881.28	43.94	74.00	-30.06	39.74	5.92	33.48	35.20	Peak	100	132	VERTICAL
3	7304.59	49.32	74.00	-24.68	41.13	7.13	36.48	35.42	Peak	100	39	VERTICAL
4	7317.96	36.47	54.00	-17.53	28.25	7.14	36.51	35.43	Average	100	39	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT40 CH 9 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg
1	4911.34	45.22	74.00	-28.78	40.93	5.95	33.54	35.20	Peak	100	125 HORIZONTAL
2	4911.37	31.78	54.00	-22.22	27.49	5.95	33.54	35.20	Average	102	125 HORIZONTAL
3	7349.21	36.28	54.00	-17.72	28.01	7.15	36.56	35.44	Average	102	241 HORIZONTAL
4	7351.32	49.25	74.00	-24.75	40.97	7.16	36.56	35.44	Peak	102	241 HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg
1	4909.77	44.07	74.00	-29.93	39.78	5.95	33.54	35.20	Peak	100	118 VERTICAL
2	4912.17	31.61	54.00	-22.39	27.32	5.95	33.54	35.20	Average	100	118 VERTICAL
3	7349.01	36.32	54.00	-17.68	28.05	7.15	36.56	35.44	Average	105	57 VERTICAL
4	7351.87	49.12	74.00	-24.88	40.84	7.16	36.56	35.44	Peak	105	57 VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11478.43	65.26	74.00	-8.74	51.61	9.23	39.50	35.08	Peak	153	110	HORIZONTAL
2	11478.73	50.21	54.00	-3.79	36.56	9.23	39.50	35.08	Average	153	110	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11488.85	57.18	74.00	-16.82	43.52	9.24	39.50	35.08	Peak	100	52	VERTICAL
2	11490.34	44.14	54.00	-9.86	30.48	9.24	39.50	35.08	Average	100	52	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11560.23	65.73	74.00	-8.27	52.08	9.26	39.48	35.09	Peak	154	123	HORIZONTAL
2	11560.37	51.14	54.00	-2.86	37.49	9.26	39.48	35.09	Average	154	123	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	11573.93	45.59	54.00	-8.41	31.94	9.26	39.47	35.08	Average	100	266	VERTICAL
2	11574.19	59.34	74.00	-14.66	45.69	9.26	39.47	35.08	Peak	100	266	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11638.44	67.09	74.00	-6.91	53.44	9.28	39.44	35.07	Peak	150	116	HORIZONTAL
2	11657.95	51.41	54.00	-2.59	37.76	9.28	39.44	35.07	Average	150	116	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	11643.76	47.06	54.00	-6.94	33.41	9.28	39.44	35.07	Average	100	298	VERTICAL
2	11646.30	60.35	74.00	-13.65	46.70	9.28	39.44	35.07	Peak	100	298	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11499.36	51.62	54.00	-2.38	37.97	9.25	39.50	35.10	Average	153	114	HORIZONTAL
2	11501.01	65.90	74.00	-8.10	52.25	9.25	39.50	35.10	Peak	153	114	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	11504.30	58.77	74.00	-15.23	45.12	9.25	39.50	35.10	Peak	100	298	VERTICAL
2	11505.17	44.98	54.00	-9.02	31.33	9.25	39.50	35.10	Average	100	298	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11579.59	64.16	74.00	-9.84	50.51	9.26	39.47	35.08	Peak	152	112	HORIZONTAL
2	11596.94	51.09	54.00	-2.91	37.43	9.27	39.47	35.08	Average	152	112	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	11585.50	45.22	54.00	-8.78	31.56	9.27	39.47	35.08	Average	100	53	VERTICAL
2	11585.55	57.99	74.00	-16.01	44.33	9.27	39.47	35.08	Peak	100	53	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11578.22	56.36	74.00	-17.64	42.71	9.26	39.47	35.08	Peak	100	200	HORIZONTAL
2	11595.69	43.72	54.00	-10.28	30.06	9.27	39.47	35.08	Average	7725	200	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	11571.24	56.60	74.00	-17.40	42.96	9.26	39.47	35.09	Peak	100	92	VERTICAL
2	11594.42	43.13	54.00	-10.87	29.47	9.27	39.47	35.08	Average	100	92	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 06, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4824.14	51.52	74.00	-22.48	47.46	5.87	33.39	35.20	Peak	100	267	HORIZONTAL
2	4824.18	46.89	54.00	-7.11	42.83	5.87	33.39	35.20	Average	100	267	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4824.14	44.01	54.00	-9.99	39.95	5.87	33.39	35.20	Average	140	273	VERTICAL
2	4824.20	49.80	74.00	-24.20	45.74	5.87	33.39	35.20	Peak	140	273	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 06, 2014		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.21	44.93	54.00	-9.07	40.73	5.92	33.48	35.20	Average	100	271	HORIZONTAL
2	4874.37	55.37	74.00	-18.63	51.17	5.92	33.48	35.20	Peak	100	271	HORIZONTAL
3	7313.08	37.78	54.00	-16.22	29.57	7.13	36.51	35.43	Average	100	278	HORIZONTAL
4	7313.14	49.62	74.00	-24.38	41.41	7.13	36.51	35.43	Peak	100	278	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.24	45.32	54.00	-8.68	41.12	5.92	33.48	35.20	Average	116	296	VERTICAL
2	4874.41	54.08	74.00	-19.92	49.88	5.92	33.48	35.20	Peak	116	296	VERTICAL
3	7312.22	51.95	74.00	-22.05	43.74	7.13	36.51	35.43	Peak	188	268	VERTICAL
4	7313.08	43.42	54.00	-10.58	35.21	7.13	36.51	35.43	Average	188	268	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 06, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark		Pol/Phase
			dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg
1	4924.22	42.36	54.00	-11.64	38.01	5.97	33.58	35.20	Average	100	216 HORIZONTAL
2	4924.25	48.63	74.00	-25.37	44.28	5.97	33.58	35.20	Peak	100	216 HORIZONTAL
3	7382.58	49.09	74.00	-24.91	40.77	7.16	36.61	35.45	Peak	100	114 HORIZONTAL
4	7383.52	36.97	54.00	-17.03	28.65	7.17	36.61	35.46	Average	100	114 HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark		Pol/Phase
			dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg
1	4924.21	40.61	54.00	-13.39	36.26	5.97	33.58	35.20	Average	100	290 VERTICAL
2	4924.21	50.02	74.00	-23.98	45.67	5.97	33.58	35.20	Peak	100	290 VERTICAL
3	7385.96	48.80	74.00	-25.20	40.48	7.17	36.61	35.46	Peak	100	78 VERTICAL
4	7386.97	37.81	54.00	-16.19	29.49	7.17	36.61	35.46	Average	100	78 VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 1 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4824.34	32.83	54.00	-21.17	28.77	5.87	33.39	35.20	Average	100	120	HORIZONTAL
2	4827.90	46.92	74.00	-27.08	42.86	5.87	33.39	35.20	Peak	100	120	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	Line	Limit	Level	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4821.64	33.36	54.00	-20.64	29.30	5.87	33.39	35.20	Average	100	263	VERTICAL
2	4828.82	44.60	74.00	-29.40	40.54	5.87	33.39	35.20	Peak	100	263	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 6 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4872.88	35.93	54.00	-18.07	31.73	5.92	33.48	35.20	Average	128	110	HORIZONTAL
2	4873.74	49.20	74.00	-24.80	45.00	5.92	33.48	35.20	Peak	128	110	HORIZONTAL
3	7306.90	36.68	54.00	-17.32	28.50	7.13	36.48	35.43	Average	127	169	HORIZONTAL
4	7310.96	50.11	74.00	-23.89	41.90	7.13	36.51	35.43	Peak	100	169	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	Pol/Phase
1	4872.18	36.52	54.00	-17.48	32.32	5.92	33.48	35.20	Average	100	89	VERTICAL
2	4872.26	49.91	74.00	-24.09	45.71	5.92	33.48	35.20	Peak	100	89	VERTICAL
3	7307.28	38.45	54.00	-15.55	30.27	7.13	36.48	35.43	Average	132	110	VERTICAL
4	7309.94	51.22	74.00	-22.78	43.01	7.13	36.51	35.43	Peak	132	110	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 11 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 09, 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	4925.38	45.86	74.00	-28.14	41.51	5.97	33.58	35.20	Peak	100	357	HORIZONTAL
2	4927.04	33.23	54.00	-20.77	28.88	5.97	33.58	35.20	Average	100	357	HORIZONTAL
3	7384.54	36.15	54.00	-17.85	27.83	7.17	36.61	35.46	Average	100	249	HORIZONTAL
4	7384.68	48.66	74.00	-25.34	40.34	7.17	36.61	35.46	Peak	100	249	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	4920.84	46.65	74.00	-27.35	42.34	5.97	33.54	35.20	Peak	100	50	VERTICAL
2	4921.68	33.86	54.00	-20.14	29.55	5.97	33.54	35.20	Average	100	50	VERTICAL
3	7382.82	49.79	74.00	-24.21	41.47	7.16	36.61	35.45	Peak	100	172	VERTICAL
4	7383.98	36.15	54.00	-17.85	27.83	7.17	36.61	35.46	Average	100	172	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11484.56	51.33	54.00	-2.67	37.67	9.24	39.50	35.08	Average	153	109	HORIZONTAL
2	11484.90	65.06	74.00	-8.94	51.40	9.24	39.50	35.08	Peak	153	109	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	11487.15	44.20	54.00	-9.80	30.54	9.24	39.50	35.08	Average	100	138	VERTICAL
2	11495.99	56.90	74.00	-17.10	43.26	9.24	39.50	35.10	Peak	100	138	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 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	11564.90	52.78	54.00	-1.22	39.13	9.26	39.48	35.09	Average	152	116	HORIZONTAL
2	11575.32	67.60	74.00	-6.40	53.95	9.26	39.47	35.08	Peak	152	116	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	11568.01	48.18	54.00	-5.82	34.54	9.26	39.47	35.09	Average	110	295	VERTICAL
2	11576.83	60.36	74.00	-13.64	46.71	9.26	39.47	35.08	Peak	110	295	VERTICAL

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3
Test Date	Jun. 13, 2014		

Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	11644.80	67.94	74.00	-6.06	54.29	9.28	39.44	35.07	Peak	152	122	HORIZONTAL
2	11644.95	52.50	54.00	-1.50	38.85	9.28	39.44	35.07	Average	152	122	HORIZONTAL

Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp		A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	Remark	cm	deg	
1	11646.81	61.69	74.00	-12.31	48.04	9.28	39.44	35.07	Peak	100	270	VERTICAL
2	11647.10	48.26	54.00	-5.74	34.61	9.28	39.44	35.07	Average	100	270	VERTICAL

Note:

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

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

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

4.6. Emissions Measurement

4.6.1. Limit

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT20 CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test date	Jun. 06, 2014		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2389.60	69.95	74.00	-4.05	37.81	4.09	28.05	0.00	Peak	111	150	VERTICAL
2	2390.00	53.48	54.00	-0.52	21.34	4.09	28.05	0.00	Average	111	150	VERTICAL
3	2414.80	101.56			69.36	4.11	28.09	0.00	Average	111	150	VERTICAL
4	2415.20	112.68			80.48	4.11	28.09	0.00	Peak	111	150	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2390.00	51.89	54.00	-2.11	19.75	4.09	28.05	0.00	Average	137	237	VERTICAL
2	2390.00	70.48	74.00	-3.52	38.34	4.09	28.05	0.00	Peak	137	237	VERTICAL
3	2444.20	108.46			76.15	4.13	28.18	0.00	Average	137	237	VERTICAL
4	2444.60	119.63			87.32	4.13	28.18	0.00	Average	137	237	VERTICAL
5	2483.50	51.55	54.00	-2.45	19.13	4.16	28.26	0.00	Average	137	237	VERTICAL
6	2485.10	70.88	74.00	-3.12	38.42	4.16	28.30	0.00	Peak	137	237	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2460.40	100.39			68.03	4.14	28.22	0.00	Average	100	246	VERTICAL
2	2460.80	111.32			78.96	4.14	28.22	0.00	Peak	100	246	VERTICAL
3	2483.50	53.29	54.00	-0.71	20.87	4.16	28.26	0.00	Average	100	246	VERTICAL
4	2483.50	70.82	74.00	-3.18	38.40	4.16	28.26	0.00	Peak	100	246	VERTICAL

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

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11n MCS0 HT40 CH 3, 6, 9 / Chain 1 + Chain 2 + Chain 3
Test date	Jun. 06, 2014		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2389.20	53.65	54.00	-0.35	21.51	4.09	28.05	0.00 Average	139	241	VERTICAL
2	2389.60	70.52	74.00	-3.48	38.38	4.09	28.05	0.00 Peak	139	241	VERTICAL
3	2429.20	95.48			63.23	4.12	28.13	0.00 Average	139	241	VERTICAL
4	2430.40	107.26			75.01	4.12	28.13	0.00 Peak	139	241	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2389.20	68.27	74.00	-5.73	36.13	4.09	28.05	0.00 Peak	110	278	VERTICAL
2	2390.00	51.55	54.00	-2.45	19.41	4.09	28.05	0.00 Average	110	278	VERTICAL
3	2438.20	109.90			77.59	4.13	28.18	0.00 Peak	110	278	VERTICAL
4	2438.60	98.09			65.78	4.13	28.18	0.00 Average	110	278	VERTICAL
5	2483.50	52.68	54.00	-1.32	20.26	4.16	28.26	0.00 Average	110	278	VERTICAL
6	2487.10	70.59	74.00	-3.41	38.13	4.16	28.30	0.00 Peak	110	278	VERTICAL

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

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	2469.20	95.27			62.87	4.14	28.26	0.00 Average	133	240	VERTICAL
2	2469.20	106.01			73.61	4.14	28.26	0.00 Peak	133	240	VERTICAL
3	2483.50	71.85	74.00	-2.15	39.43	4.16	28.26	0.00 Peak	133	240	VERTICAL
4	2483.90	53.63	54.00	-0.37	21.21	4.16	28.26	0.00 Average	133	240	VERTICAL

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

Note:

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

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

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11b CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test date	Jun. 06, 2014		

Channel 1

	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	2385.60	51.42	54.00	-2.58	19.28	4.09	28.05	0.00	Average	140	234	HORIZONTAL
2	2387.20	64.46	74.00	-9.54	32.32	4.09	28.05	0.00	Peak	140	234	HORIZONTAL
3	2414.80	111.13			78.93	4.11	28.09	0.00	Average	140	234	HORIZONTAL
4	2414.80	115.14			82.94	4.11	28.09	0.00	Peak	140	234	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2412 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	2359.60	48.96	54.00	-5.04	16.92	4.07	27.97	0.00	Average	121	274	HORIZONTAL
2	2388.40	61.46	74.00	-12.54	29.32	4.09	28.05	0.00	Peak	121	274	HORIZONTAL
3	2435.40	111.89			79.59	4.12	28.18	0.00	Average	121	274	HORIZONTAL
4	2436.20	116.08			83.78	4.12	28.18	0.00	Peak	121	274	HORIZONTAL
5	2493.50	59.96	74.00	-14.04	27.49	4.17	28.30	0.00	Peak	121	274	HORIZONTAL
6	2496.30	47.44	54.00	-6.56	14.97	4.17	28.30	0.00	Average	121	274	HORIZONTAL

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

Channel 11

	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	2383.60	49.45	54.00	-4.55	17.32	4.08	28.05	0.00	Average	144	253	HORIZONTAL
2	2383.60	57.45	74.00	-16.55	25.32	4.08	28.05	0.00	Peak	144	253	HORIZONTAL
3	2461.20	109.60			77.24	4.14	28.22	0.00	Average	144	253	HORIZONTAL
4	2463.20	113.88			81.52	4.14	28.22	0.00	Peak	144	253	HORIZONTAL
5	2487.90	50.20	54.00	-3.80	17.73	4.17	28.30	0.00	Average	144	253	HORIZONTAL
6	2488.30	61.06	74.00	-12.94	28.59	4.17	28.30	0.00	Peak	144	253	HORIZONTAL

Item 3, 4 are the fundamental frequency at 2462 MHz.

Temperature	22°C	Humidity	60%
Test Engineer	Magic Lai	Configurations	IEEE 802.11g CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3
Test date	Jun. 06, 2014 ~ Jun. 09, 2014		

Channel 1

	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	2390.00	53.68	54.00	-0.32	21.54	4.09	28.05	0.00	Average	135	234	VERTICAL
2	2390.00	71.72	74.00	-2.28	39.58	4.09	28.05	0.00	Peak	135	234	VERTICAL
3	2414.80	102.72			70.52	4.11	28.09	0.00	Average	135	234	VERTICAL
4	2416.00	113.37			81.17	4.11	28.09	0.00	Peak	135	234	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2387.60	63.69	74.00	-10.31	31.55	4.09	28.05	0.00	Peak	138	62	VERTICAL
2	2388.00	50.88	54.00	-3.12	18.74	4.09	28.05	0.00	Average	138	62	VERTICAL
3	2441.40	109.81			77.50	4.13	28.18	0.00	Average	138	62	VERTICAL
4	2441.40	121.77			89.46	4.13	28.18	0.00	Peak	138	62	VERTICAL
5	2485.10	52.95	54.00	-1.05	20.49	4.16	28.30	0.00	Average	138	62	VERTICAL
6	2485.10	66.61	74.00	-7.39	34.15	4.16	28.30	0.00	Peak	138	62	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamplifier Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	2466.00	102.67			70.31	4.14	28.22	0.00	Average	131	240	VERTICAL
2	2466.00	113.17			80.81	4.14	28.22	0.00	Peak	131	240	VERTICAL
3	2466.00	114.49			82.13	4.14	28.22	0.00	Peak	131	240	VERTICAL
4	2483.50	53.58	54.00	-0.42	21.16	4.16	28.26	0.00	Average	131	240	VERTICAL
5	2483.50	69.70	74.00	-4.30	37.28	4.16	28.26	0.00	Peak	131	240	VERTICAL

Item 1, 2, 3 are the fundamental frequency at 2462 MHz.

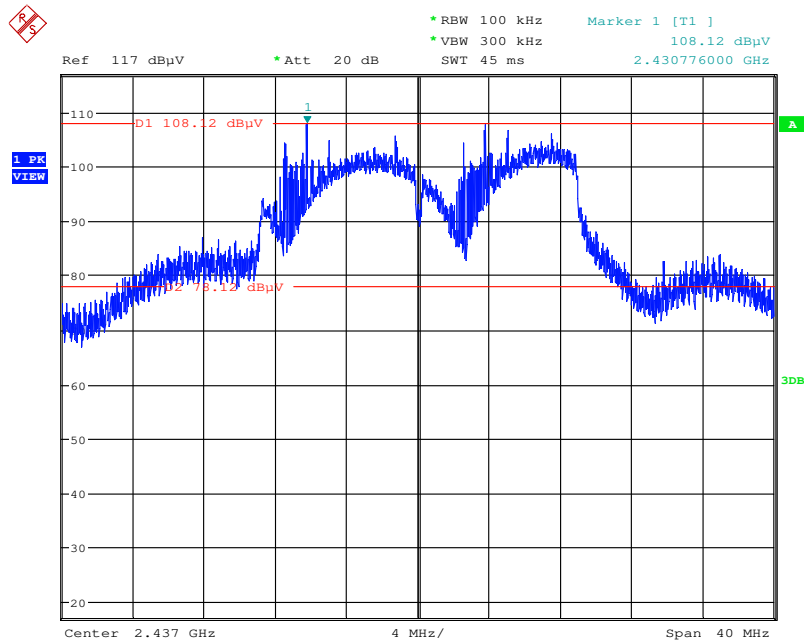
Note:

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

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

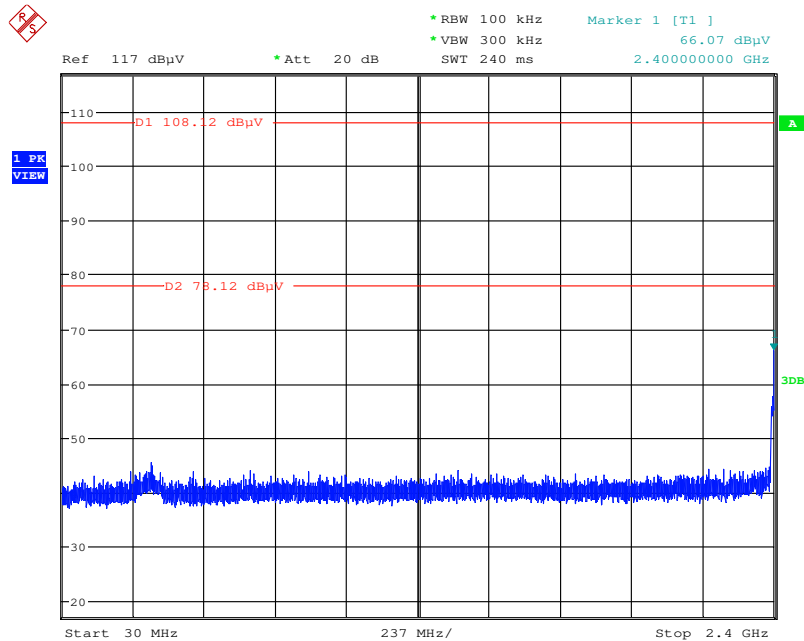
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11n MCS0 HT20 / Reference Level



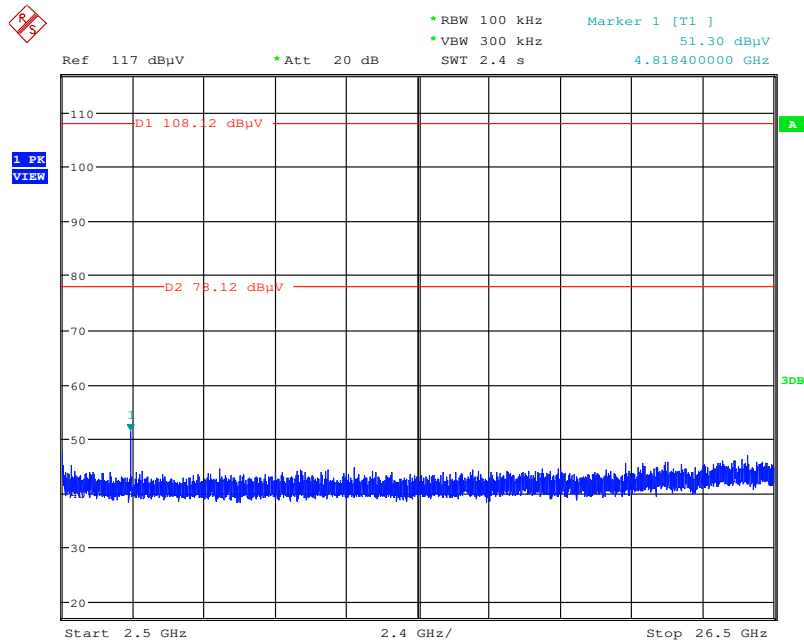
Date: 9.JUN.2014 22:09:00

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



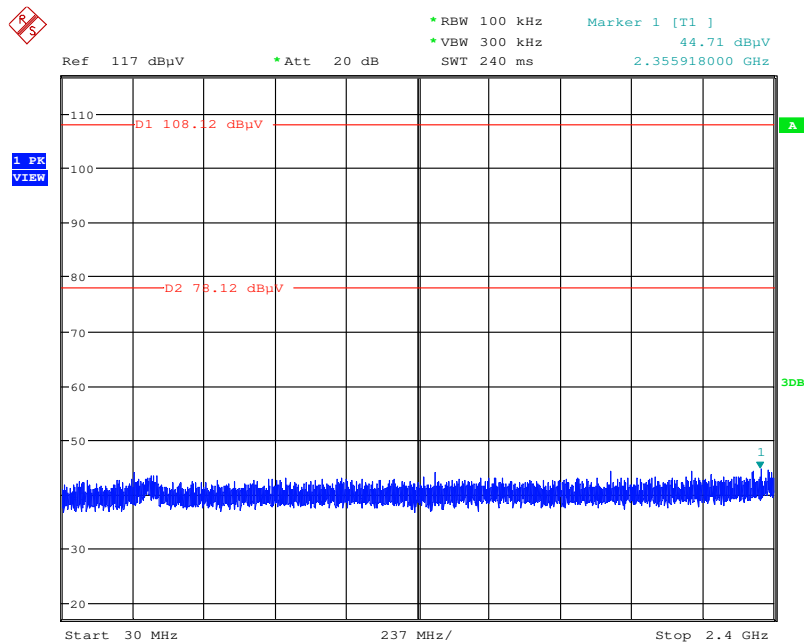
Date: 9.JUN.2014 22:09:52

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



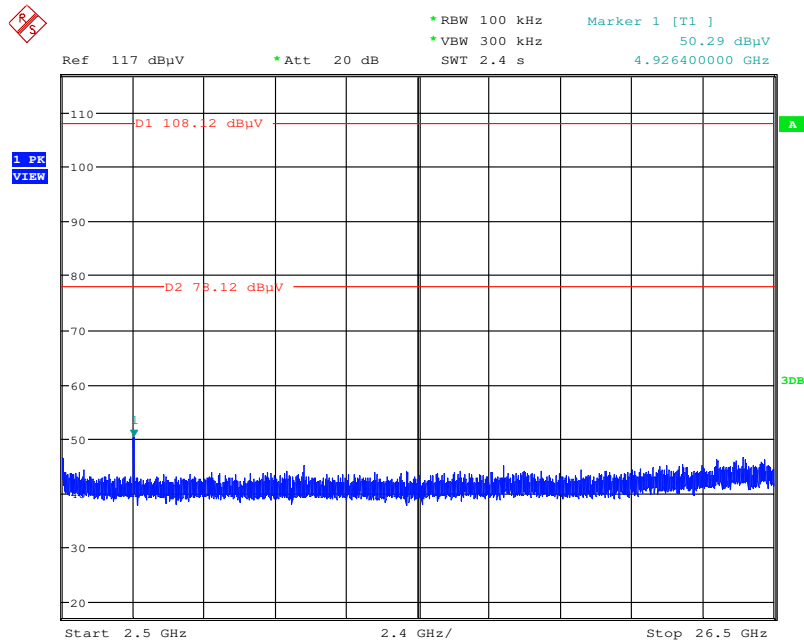
Date: 9.JUN.2014 22:11:17

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



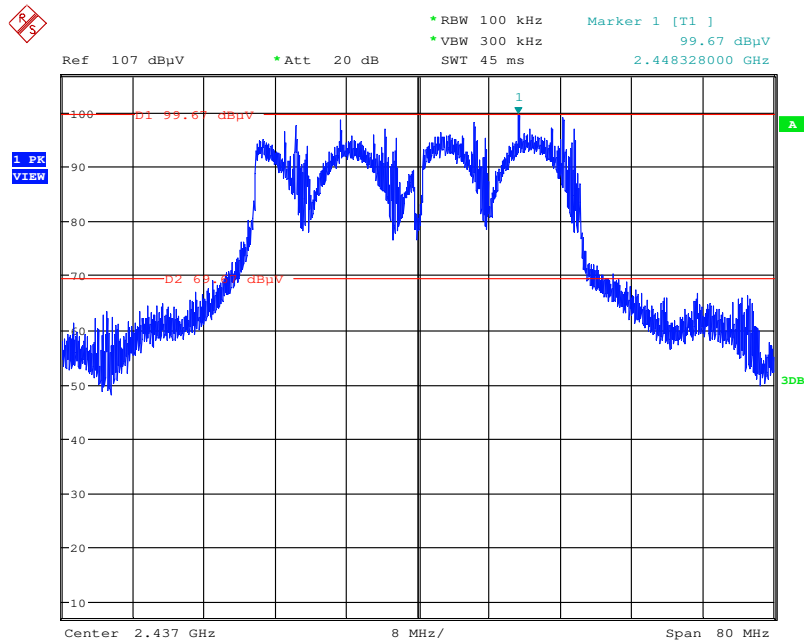
Date: 9.JUN.2014 22:12:39

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



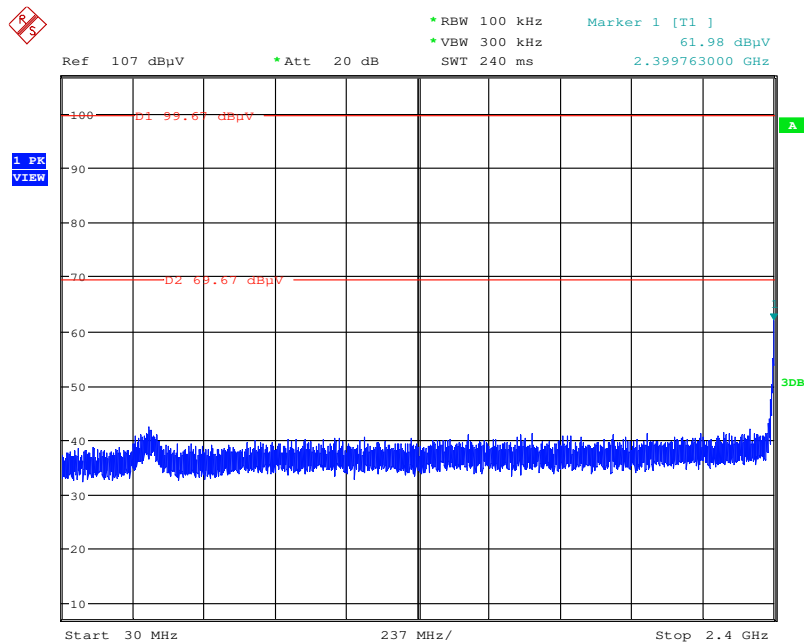
Date: 9.JUN.2014 22:11:59

Plot on Configuration IEEE 802.11n MCS0 HT40 / Reference Level



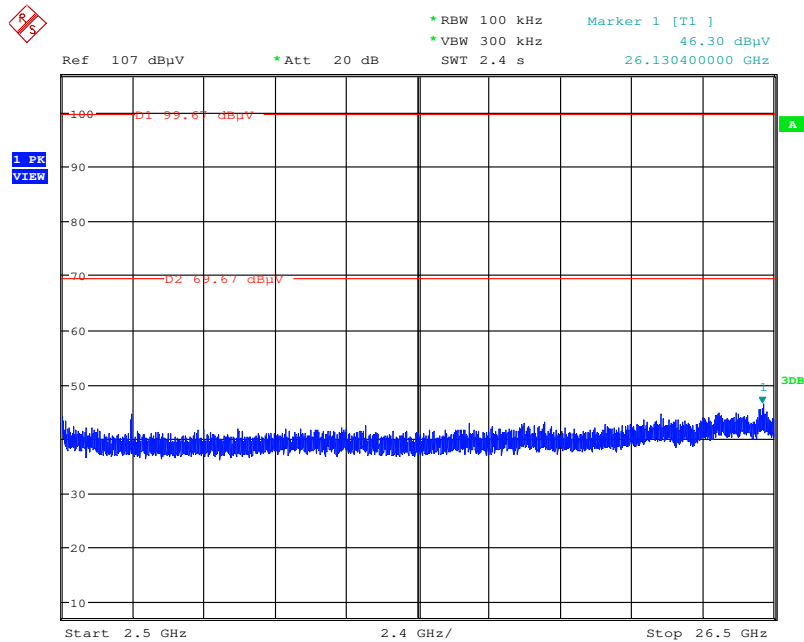
Date: 9.JUN.2014 22:04:04

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



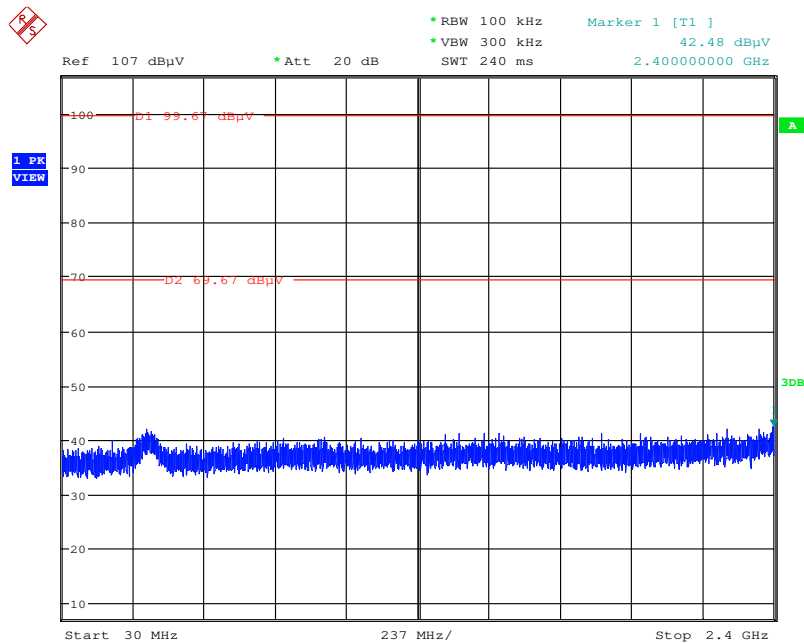
Date: 9.JUN.2014 22:05:56

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



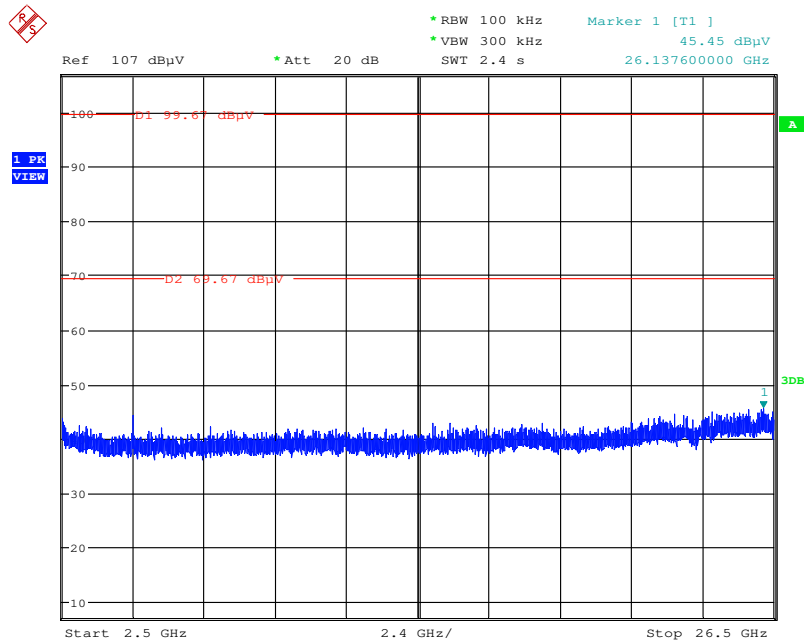
Date: 9.JUN.2014 22:06:42

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



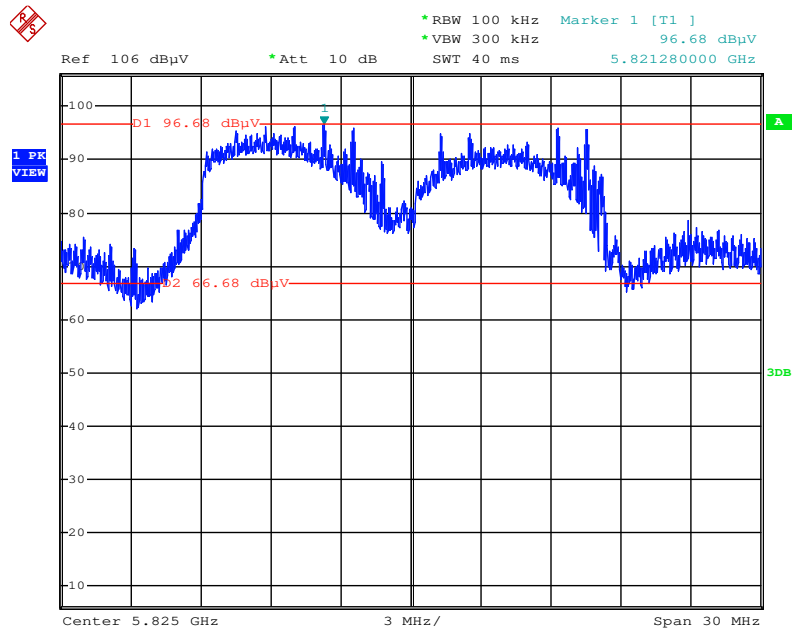
Date: 9.JUN.2014 22:07:49

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



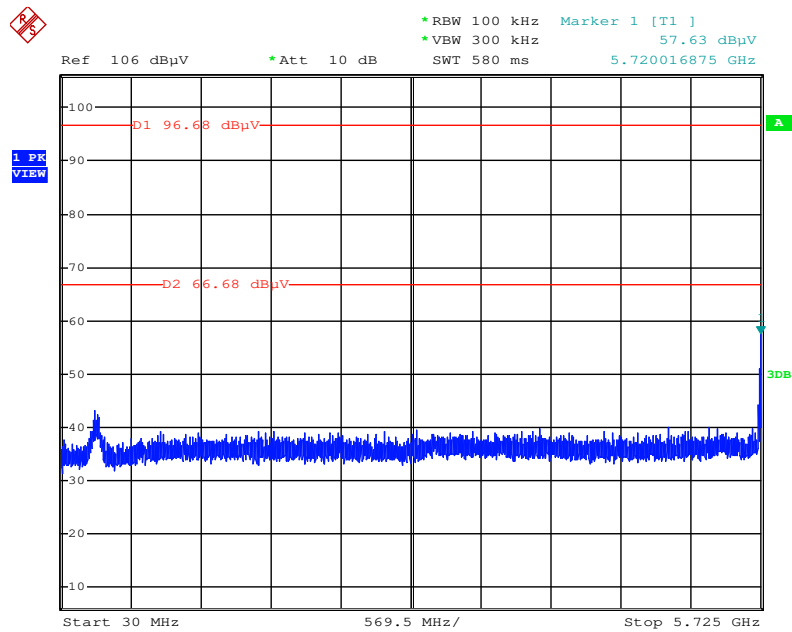
Date: 9.JUN.2014 22:07:25

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



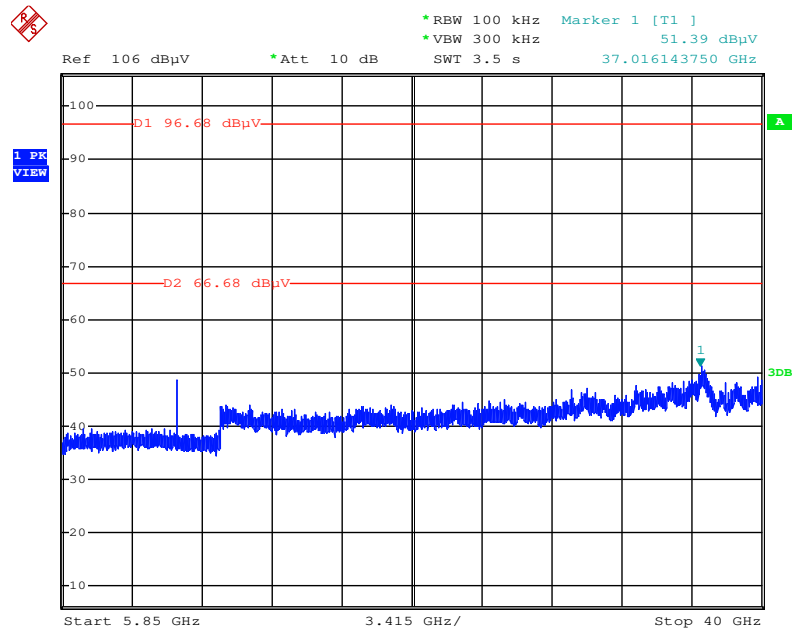
Date: 13.JUN.2014 02:59:50

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



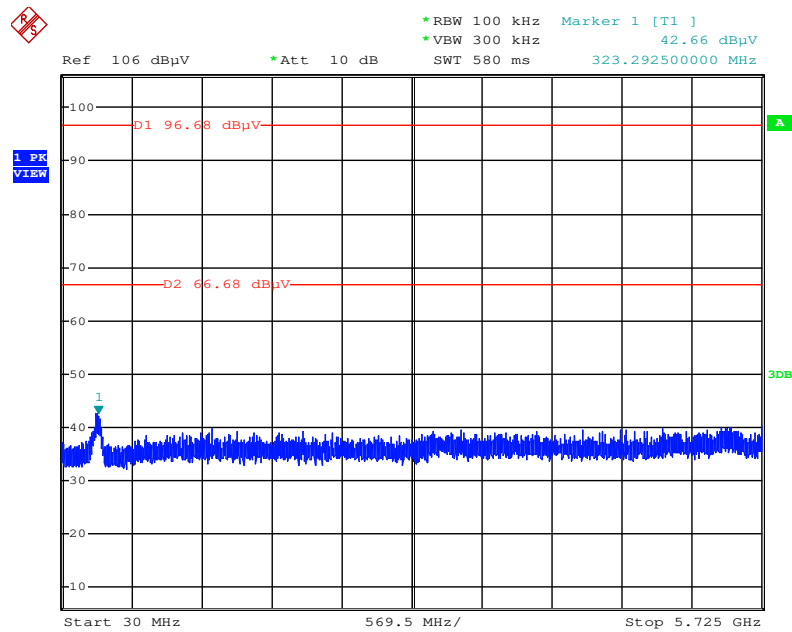
Date: 13.JUN.2014 03:01:13

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



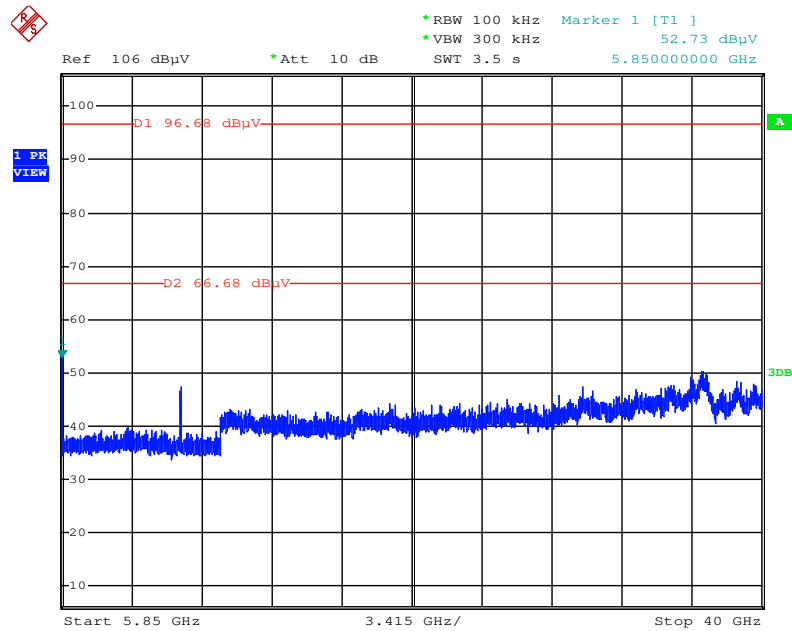
Date: 13.JUN.2014 03:01:57

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



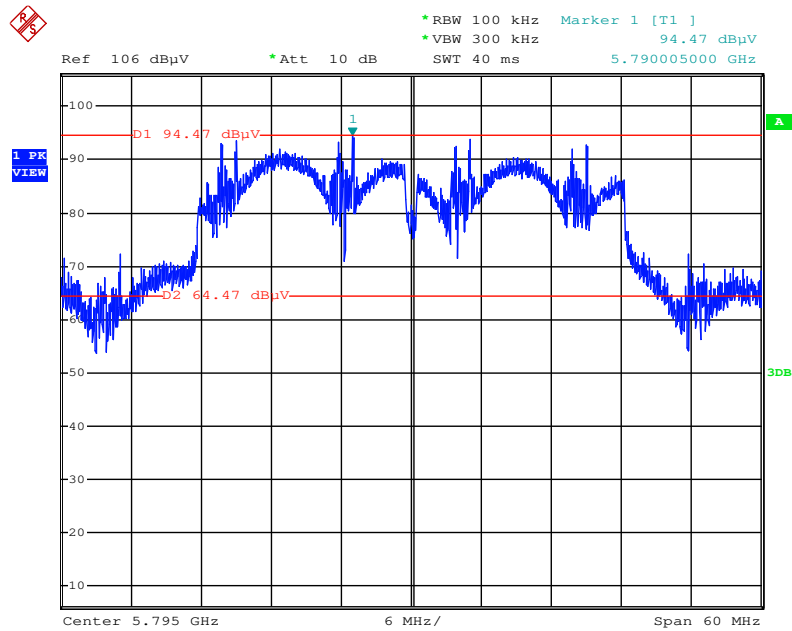
Date: 13.JUN.2014 03:00:15

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



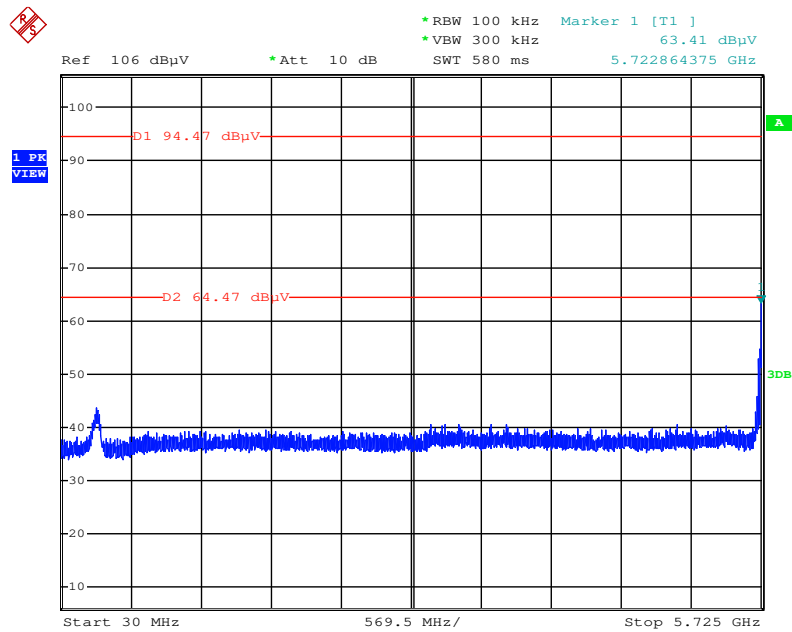
Date: 13.JUN.2014 03:00:40

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



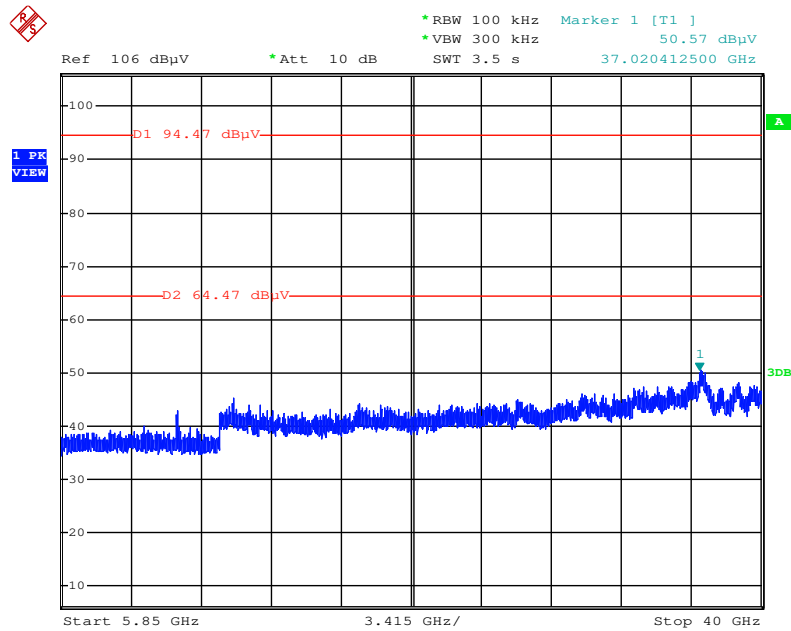
Date: 13.JUN.2014 03:05:46

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



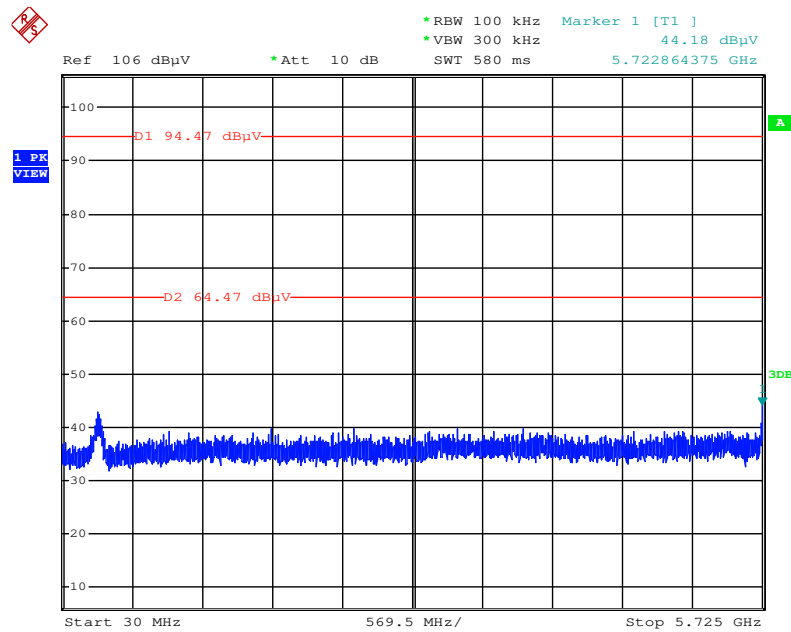
Date: 13.JUN.2014 03:08:50

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



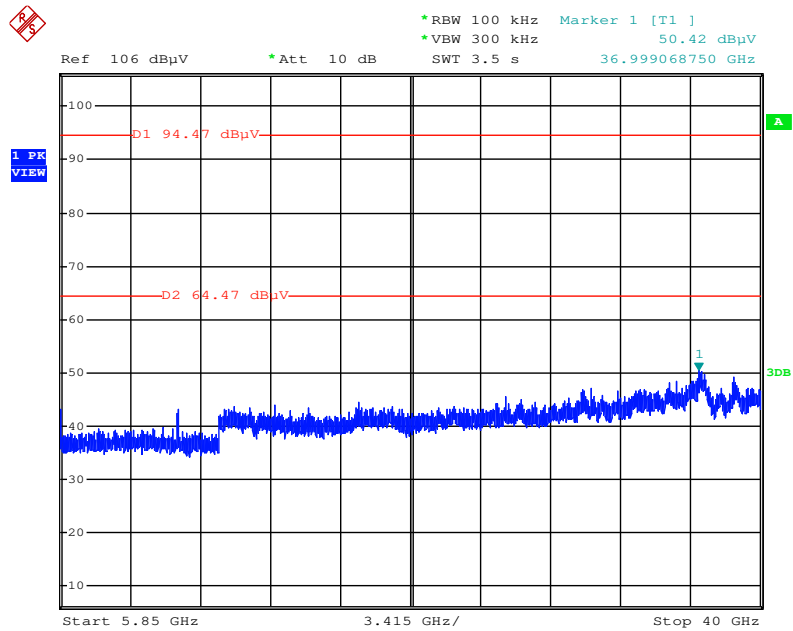
Date: 13.JUN.2014 03:09:29

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



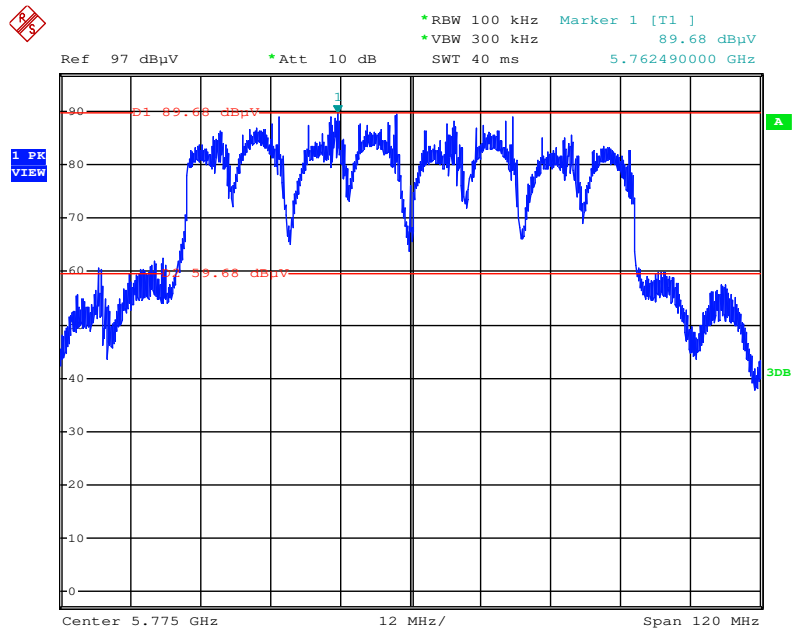
Date: 13.JUN.2014 03:06:10

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



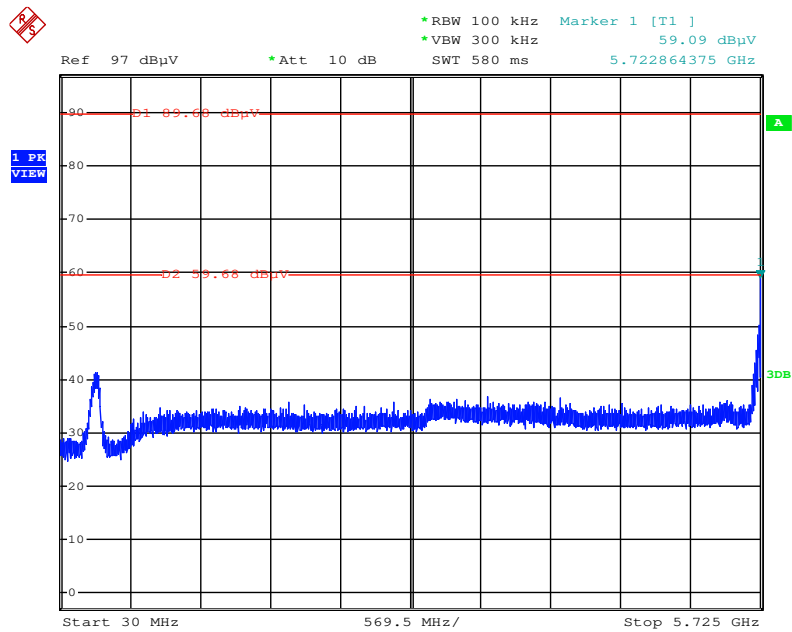
Date: 13.JUN.2014 03:06:41

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



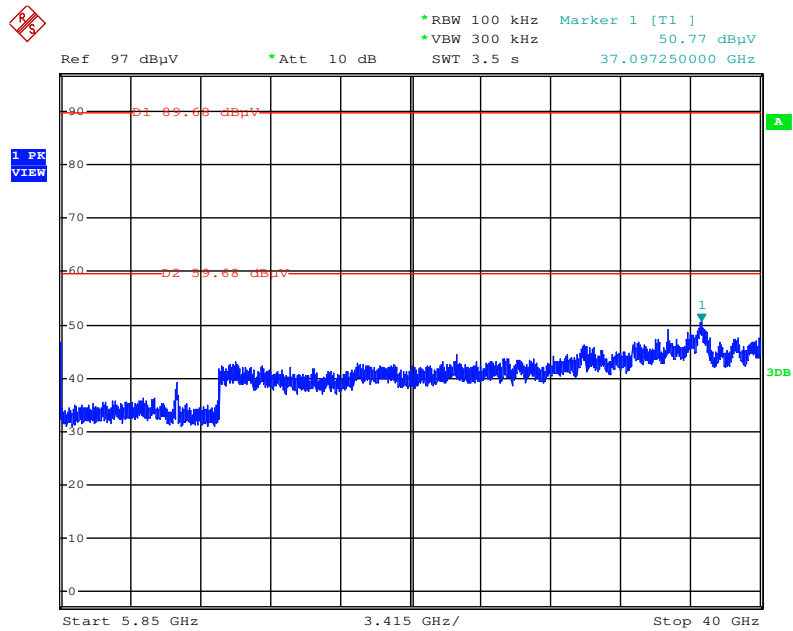
Date: 13.JUN.2014 01:50:40

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



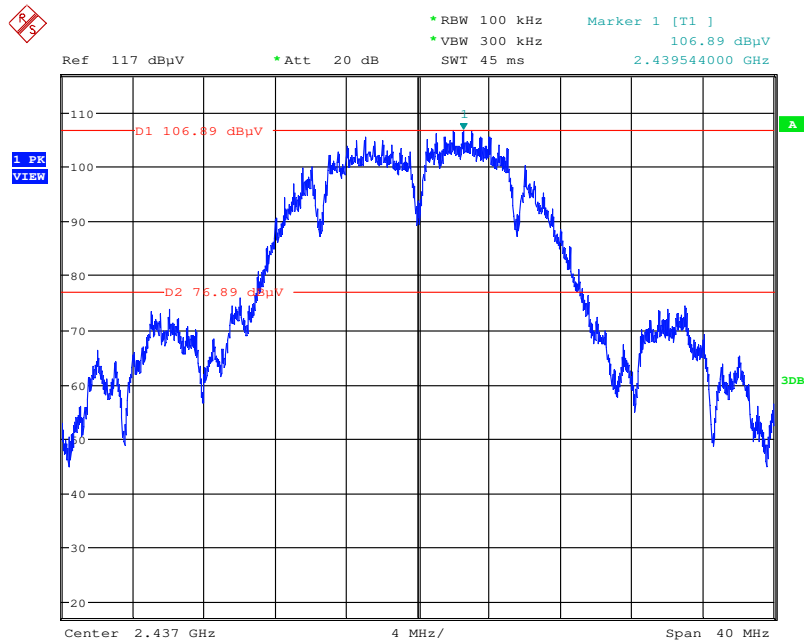
Date: 13.JUN.2014 01:52:27

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



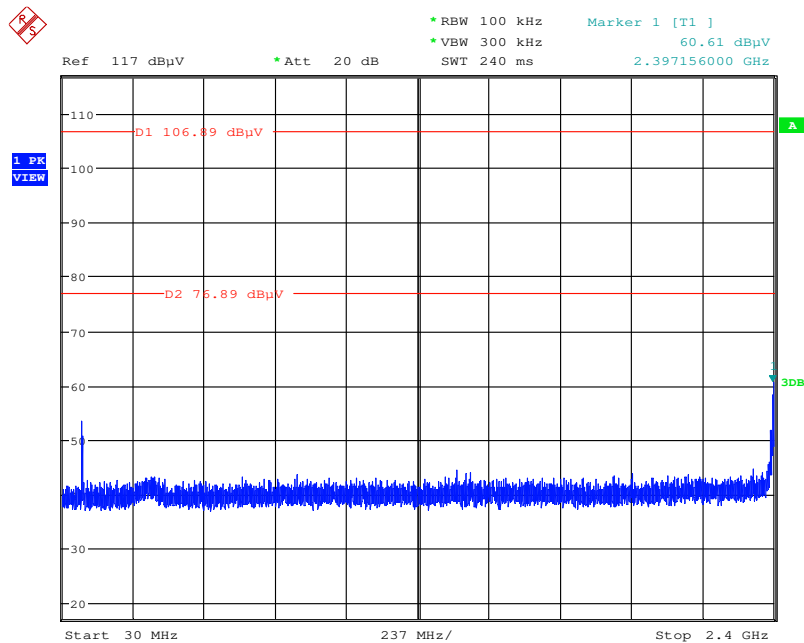
Date: 13.JUN.2014 01:53:47

Plot on Configuration IEEE 802.11b / Reference Level



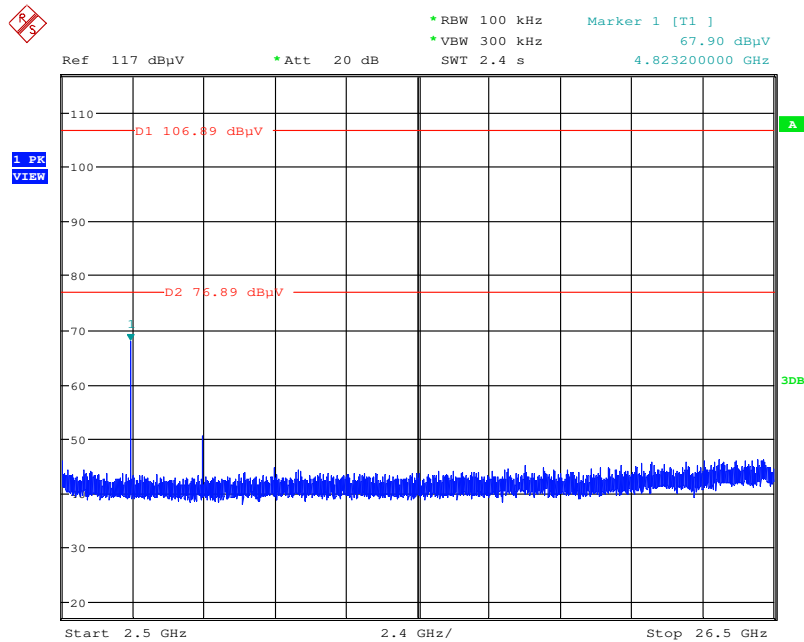
Date: 9.JUN.2014 22:18:36

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



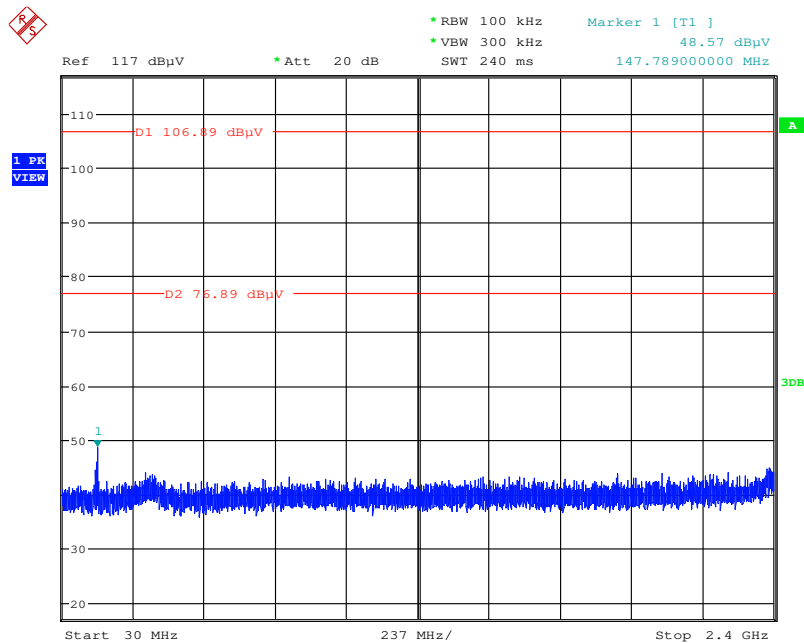
Date: 9.JUN.2014 22:19:25

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



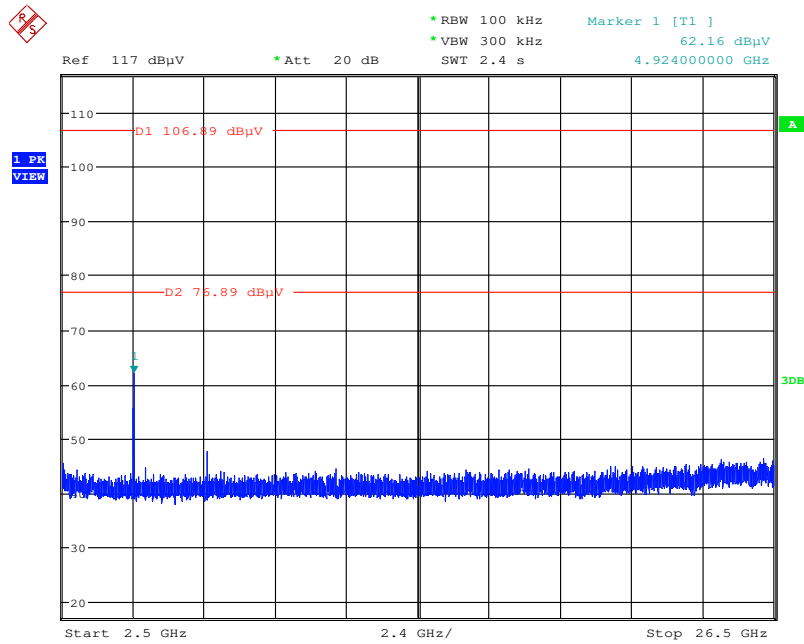
Date: 9.JUN.2014 22:19:58

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



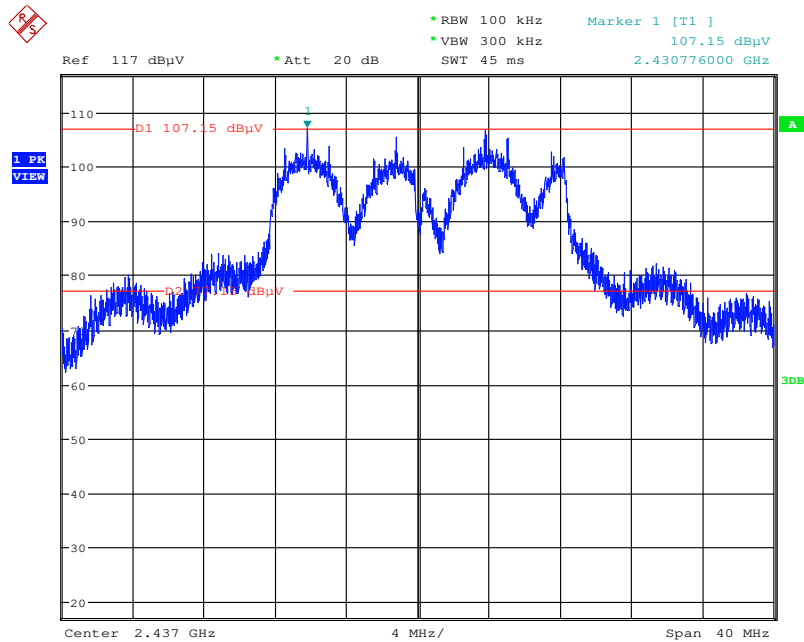
Date: 9.JUN.2014 22:21:23

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



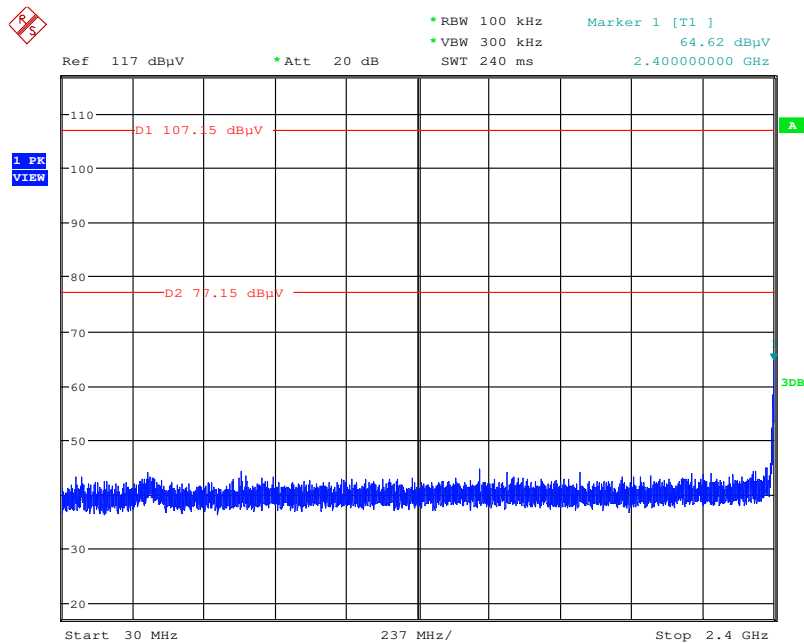
Date: 9.JUN.2014 22:20:51

Plot on Configuration IEEE 802.11g / Reference Level



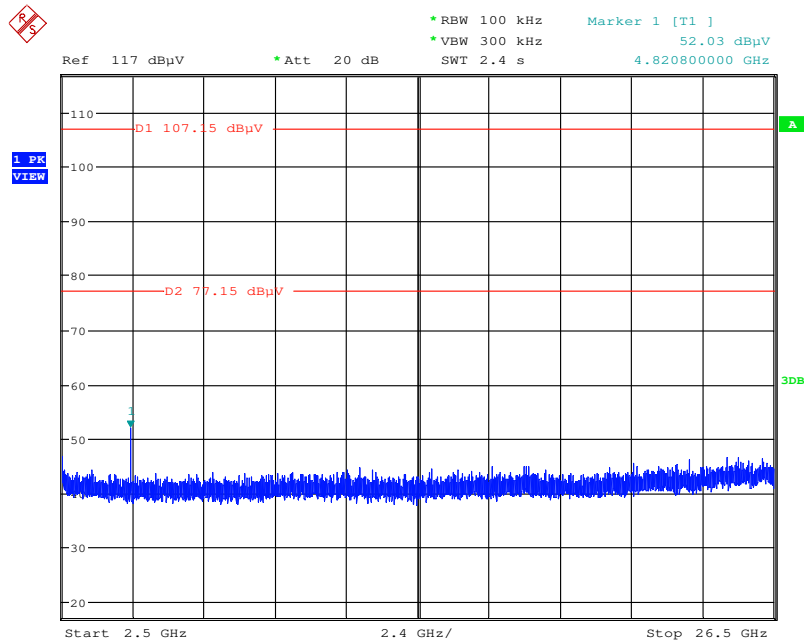
Date: 9.JUN.2014 22:14:05

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



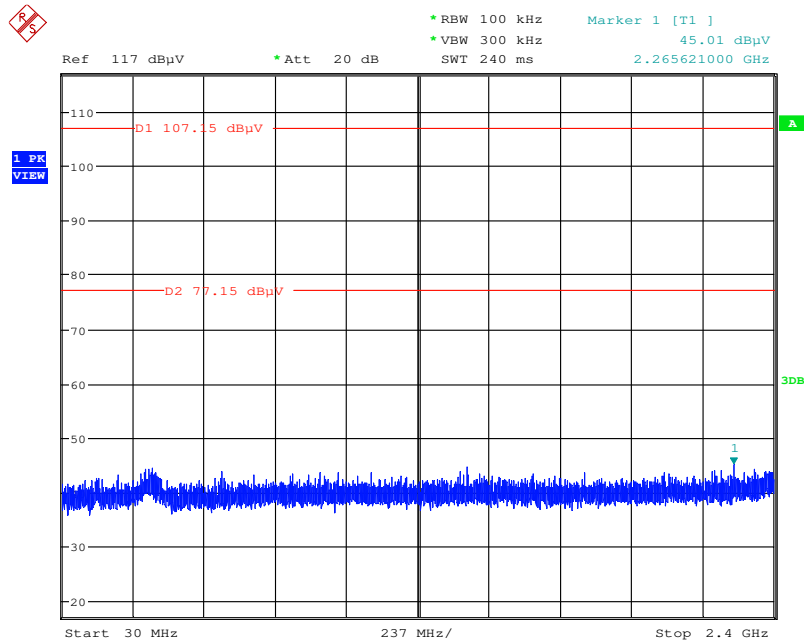
Date: 9.JUN.2014 22:14:57

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



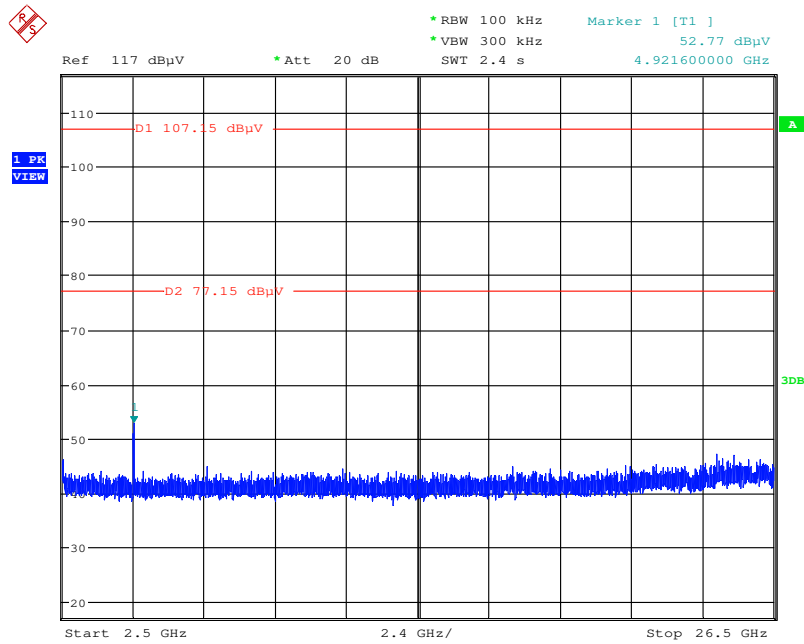
Date: 9.JUN.2014 22:15:33

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



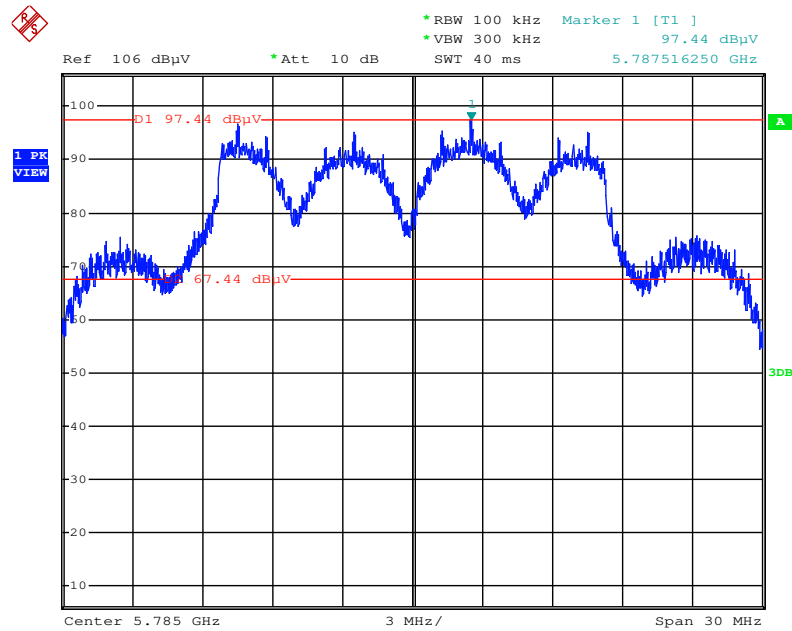
Date: 9.JUN.2014 22:16:37

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



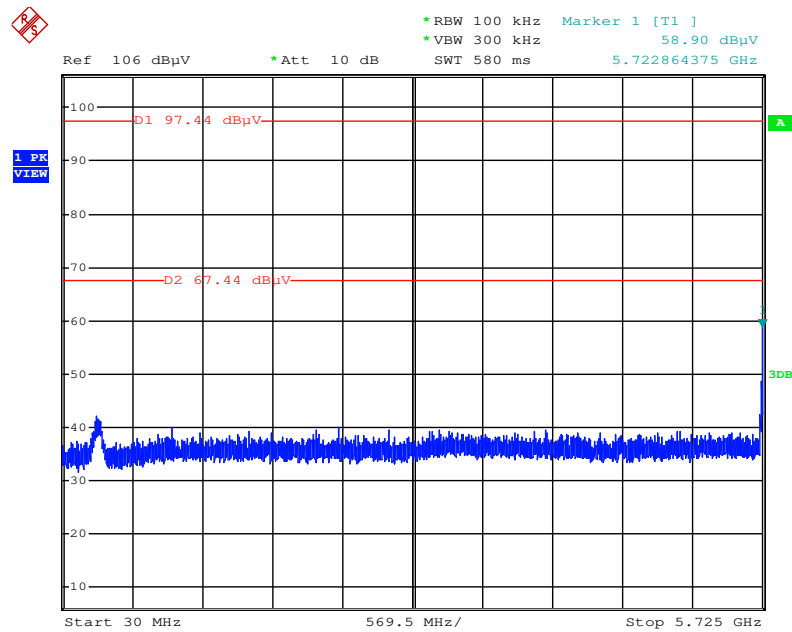
Date: 9.JUN.2014 22:16:11

Plot on Configuration IEEE 802.11a / Reference Level



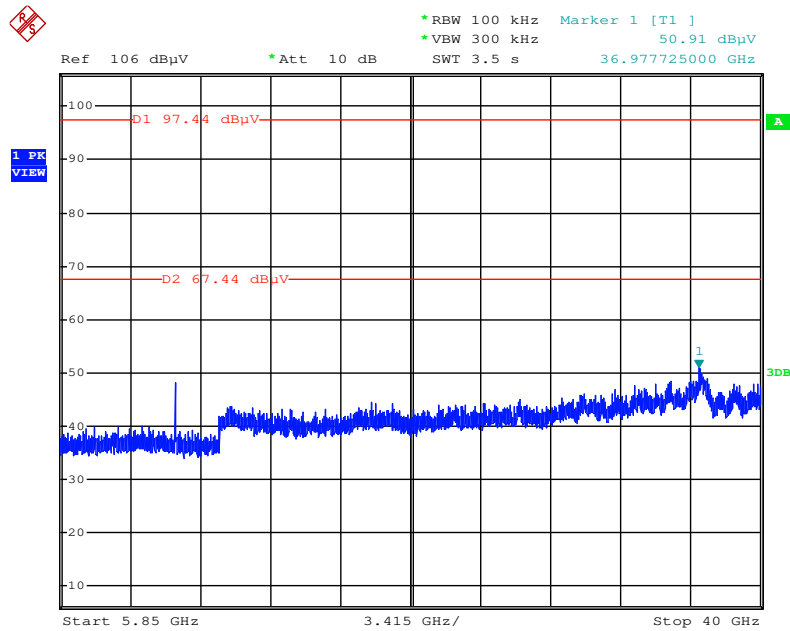
Date: 13.JUN.2014 02:53:41

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



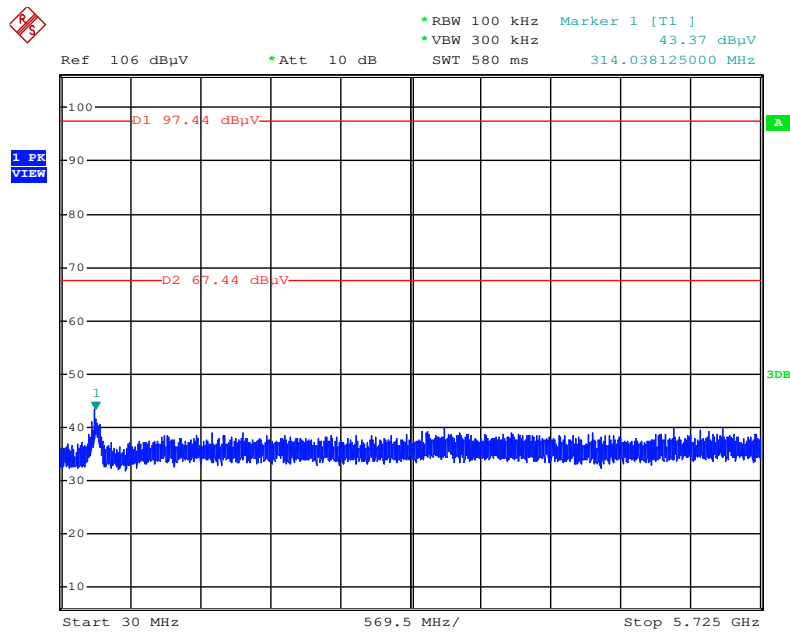
Date: 13.JUN.2014 02:54:19

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



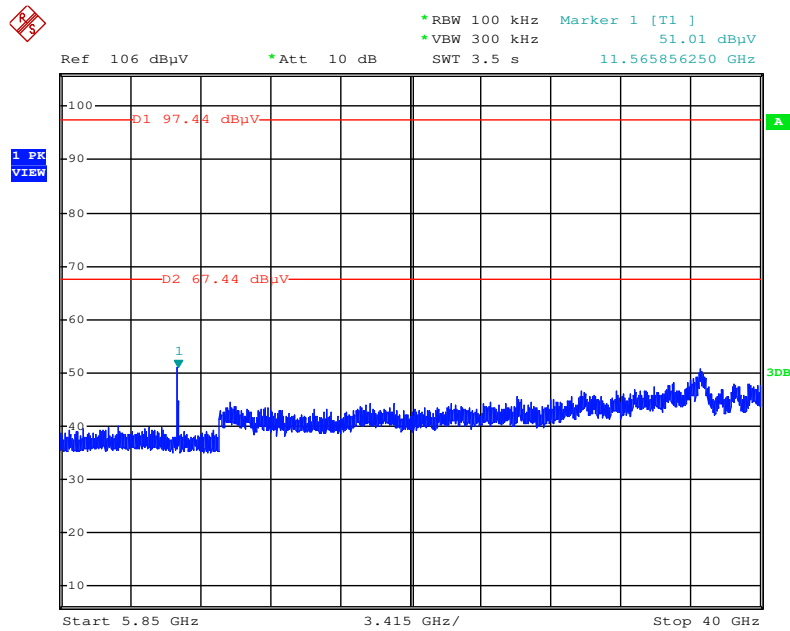
Date: 13.JUN.2014 02:54:48

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



Date: 13.JUN.2014 02:55:33

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



Date: 13.JUN.2014 02:56:15

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)
BILOG ANTENNA	Schaffner	CBL6112B	2928	30MHz ~ 2GHz	Dec. 27, 2013	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Nov. 05, 2012*	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 01, 2013	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Dec. 17, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 12, 2013	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Dec. 16, 2013	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Oct. 23, 2013	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100019	9kHz~40GHz	Dec. 02, 2013	Radiation (03CH01-CB)
EMI Test Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8GHz	Dec. 12, 2013	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N.C.R.	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N.C.R.	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2013	Radiation (03CH01-CB)
Signal analyzer	R&S	FSV40	100979	9kHz~40GHz	Nov. 29, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 04, 2013	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	Jun. 03, 2014	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)

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

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

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

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

6. MEASUREMENT UNCERTAINTY

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 dBv	Confidence levels of 95%