



# 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	ASUSTeK COMPUTER INC.
Applicant Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
FCC ID	MSQ-PCIE0U00
Manufacturer's company (1)	ASKEY TECHNOLOGY (JIANG SU) LTD
Manufacturer Address	NO1388, Jiao Tong Road, Wujiang Economic Technological Development Area Jiangsu Province 215200 China
Manufacturer's company (2)	Compal Networking (KunShan) Co., LTD.
Manufacturer Address	No. 520, Nabbang Rd., Economic & Technical Development Zone Kunshan, Jiangsu Province China

Product Name	Dual Band 4x4 802.11ac PCI-E adapter
Brand Name	ASUS
Model No.	PCE-AC88
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Nov. 05, 2015
Final Test Date	Nov. 14, 2015
Submission Type	Original Equipment

### Statement

**Test result included is only for the IEEE 802.11b/g, IEEE 802.11n 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 C63.10-2013, 47 CFR FCC Part 15 Subpart C, KDB558074 D01 v03r03, KDB 662911 D01 v02r01, KDB644545 D01 v01r02.**

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



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## History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5N0421AA	Rev. 01	Initial issue of report	Nov. 19, 2015



## 1. VERIFICATION OF COMPLIANCE

Product Name : Dual Band 4x4 802.11ac PCI-E adapter  
Brand Name : ASUS  
Model No. : PCE-AC88  
Applicant : ASUSTeK COMPUTER INC.  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 05, 2015 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.

A handwritten signature in blue ink, appearing to read 'Sam Chen', is written over a horizontal line.

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	13.27 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.02 dB
4.3	15.247(e)	Power Spectral Density	Complies	2.78 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	2.32 dB
4.6	15.247(d)	Band Edge Emissions	Complies	1.07 dB
4.7	15.203	Antenna Requirements	Complies	-

### 3. GENERAL INFORMATION

#### 3.1. Product Details

Items	Description
Product Type	WLAN (4TX, 4RX)
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	IEEE 802.11b: DSSS IEEE 802.11a/g: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11b: DSSS (BPSK / QPSK / CCK) IEEE 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM, 1024QAM)
Data Rate (Mbps)	IEEE 802.11b: DSSS (1/ 2/ 5.5/11) IEEE 802.11a/g: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
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> IEEE 802.11b: 10.59 MHz IEEE 802.11g: 15.37 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.90 MHz <u>For 5GHz Band:</u> IEEE 802.11a: 17.97 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 18.06 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.19 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.12 MHz

Maximum Conducted Output Power	<u>For 2.4GHz Band:</u> IEEE 802.11b: 29.65 dBm IEEE 802.11g: 29.96 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.76 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 25.78 dBm <u>For 5GHz Band:</u> IEEE 802.11a: 29.98 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.98 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 29.98 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 29.40 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	<input checked="" type="checkbox"/> With beamforming	<input type="checkbox"/> Without beamforming
The product has beamforming function for 802.11n/ac.		

#### Antenna and Band width

Antenna		Four (TX)		
Band width Mode		20 MHz	40 MHz	80 MHz
2.4G	IEEE 802.11b	V	X	X
	IEEE 802.11g	V	X	X
	IEEE 802.11n	V	V	X
	IEEE 802.11ac	V	V	X
5G	IEEE 802.11a	V	X	X
	IEEE 802.11n	V	V	X
	IEEE 802.11ac	V	V	V

**IEEE 802.11n/ac Spec.**

Protocol		Number of Transmit Chains (NTX)	Data Rate / MCS
2.4G	802.11n (HT20)	4	MCS0-31
	802.11n (HT40)	4	MCS0-31
	802.11ac (VHT20)	4	MCS 0-11/Nss1-4
	802.11ac (VHT40)	4	MCS 0-11/Nss1-4
5G	802.11n (HT20)	4	MCS0-31
	802.11n (HT40)	4	MCS0-31
	802.11ac (VHT20)	4	MCS 0-11/Nss1-4
	802.11ac (VHT40)	4	MCS 0-11/Nss1-4
	802.11ac (VHT80)	4	MCS 0-11/Nss1-4

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).  
Then EUT supports HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 in 2.4GHz and VHT20, VHT40, VHT80 in 5GHz.

Note 3: Modulation modes consist of below configuration:  
HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

**3.2. Accessories**

Description
Antenna connection pedestal*1

### 3.3. Table for Filed Antenna

Set	Brand	P/N	Type	Connector	Gain (dBi)		
					2.4GHz	5GHz Band 1	5GHz Band 4
1	WHA YU	C660-510336-A (SRF20141892)	Dipole	Reversed-SMA	1.86	1.97	1.95

Set	Loss of Cable (dB)			True Gain (dBi)		
	2.4GHz	5GHz Band 1	5GHz Band 4	2.4GHz	5GHz Band 1	5GHz Band 4
1	1.70	2.80	2.80	0.16	-0.83	-0.85

Note: The EUT has one set antenna, and each set contains four antennas.

Chain 1, Chain 2, Chain 3 and Chain 4 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	11b/CCK	1 Mbps	1/6/11	1+2+3+4
	11g/BPSK	6 Mbps	1/6/11	1+2+3+4
	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3+4
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3+4
Power Spectral Density	11b/CCK	1 Mbps	1/6/11	1+2+3+4
	11g/BPSK	6 Mbps	1/6/11	1+2+3+4
	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3+4
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3+4
6dB Spectrum Bandwidth	11b/CCK	1 Mbps	1/6/11	1+2+3+4
	11g/BPSK	6 Mbps	1/6/11	1+2+3+4
	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3+4
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3+4
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11b/CCK	1 Mbps	1/6/11	1+2+3+4
	11g/BPSK	6 Mbps	1/6/11	1+2+3+4
	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3+4
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3+4
Band Edge Emissions	11b/CCK	1 Mbps	1/6/11	1+2+3+4
	11g/BPSK	6 Mbps	1/6/11	1+2+3+4
	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3+4
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3+4

**For 5GHz Band:**

Test Items	Mode	Data Rate	Channel	Chain
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	11a/BPSK	6 Mbps	149/157/165	1+2+3+4
	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	MCS0/Nss1	155	1+2+3+4
Power Spectral Density	11a/BPSK	6 Mbps	149/157/165	1+2+3+4
	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	MCS0/Nss1	155	1+2+3+4
6dB Spectrum Bandwidth	11a/BPSK	6 Mbps	149/157/165	1+2+3+4
	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	MCS0/Nss1	155	1+2+3+4
Radiated Emissions Below 1GHz	CTX	-	-	-
Radiated Emissions Above 1GHz	11a/BPSK	6 Mbps	149/157/165	1+2+3+4
	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	MCS0/Nss1	155	1+2+3+4
Band Edge Emissions	11a/BPSK	6 Mbps	149/157/165	1+2+3+4
	11ac VHT20	MCS0/Nss1	149/157/165	1+2+3+4
	11ac VHT40	MCS0/Nss1	151/159	1+2+3+4
	11ac VHT80	MCS0/Nss1	155	1+2+3+4

Note: 1. The EUT can only be used at Z axis position.

2. VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

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

The following test modes were performed for all tests:

**For AC Power Line Conducted Emissions test:**

There are two modes of EUT, one is 2.4GHz WLAN function, and the other is 5GHz WLAN function.

2.4GHz WLAN function generated the worst test result for Radiated emission below 1GHz test, thus the measurement for AC Power Line Conducted Emissions test will follow this same test configuration.

Mode 1. 2.4GHz WLAN function

**For Radiated Emissions Below 1GHz test:**

Mode 1. 2.4GHz WLAN function

Mode 2. 5GHz WLAN function

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

### 3.6. Table for Testing Locations

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

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

### 3.7. Table for Supporting Units

For Test Site No: 03CH01-CB

For non-beamforming function:

Support Unit	Brand	Model	FCC ID
PC	ASUS	Vintage2-PH1	DoC
LCD Monitor	ASUS	VB171	DoC
Keyboard	ASUS	AS-KBA000	DoC
Mouse	ASUS	MOBTUO	DoC

For beamforming function:

Support Unit	Brand	Model	FCC ID
PC	ASUS	Vintage2-PH1	DoC
LCD Monitor	ASUS	VB171	DoC
Keyboard	ASUS	AS-KBA000	DoC
Mouse	ASUS	MOBTUO	DoC
Wireless ac AP	ASUS	RT-AC88U	DoC
Notebook	DELL	E4300	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
PC	DELL	T3400	DoC
LCD Monitor	DELL	1704FPT†	DoC
Keyboard	iCooky	SK068	DoC
Mouse	Logitech	M-U0026	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
PC	ASUS	Vintage2-PH1	DoC
LCD Monitor	ASUS	VB171	DoC
Keyboard	ASUS	AS-KBA000	DoC
Mouse	ASUS	MOBTUO	DoC

### 3.8. Table for Parameters of Test Software Setting

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

#### For 2.4GHz Band

Test Software Version	Mtool 2.0.2.8					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11b	99	99	96	-	-	-
802.11g	82	97	80	-	-	-
802.11ac MCS0/Nss1 VHT20	84	97	74	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	66	78	62

#### For 5GHz Band

Test Software Version	Mtool 2.0.2.8					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		NCB: 80MHz
	5745 MHz	5785 MHz	5825 MHz	5755 MHz	5795 MHz	5775 MHz
802.11a	97	97	97	-	-	-
802.11ac MCS0/Nss1 VHT20	96	96	96	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	95	96	-
802.11ac MCS0/Nss1 VHT80	-	-	-	-	-	94

### 3.9. EUT Operation during Test

#### For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

#### For beamforming function:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

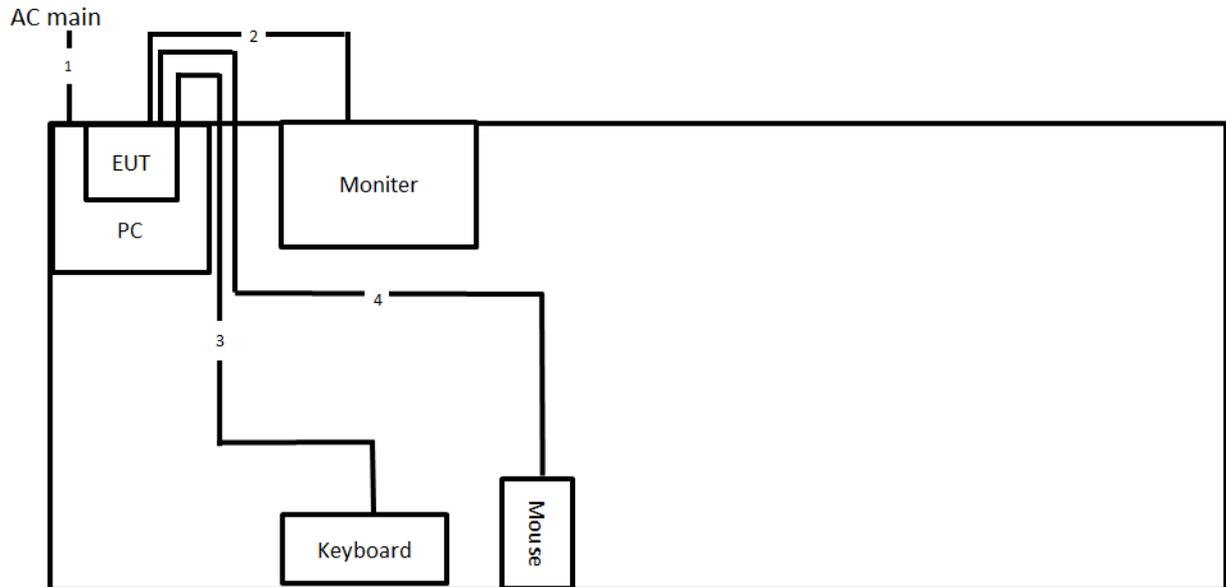
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe" to link with the remote workstation to receive and transmit packet by Wireless ac AP and transmit duty cycle no less 98%

### 3.10. Duty Cycle

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11b	100.000	100.000	100.00	0.00	0.01
	802.11g	2.043	2.083	98.08	0.08	0.01
	802.11ac MCS0/Nss1 VHT20	3.750	4.254	88.15	0.55	0.27
	802.11ac MCS0/Nss1 VHT40	1.872	2.160	86.67	0.62	0.53
5G	802.11a	2.035	2.067	98.45	0.07	0.01
	802.11ac MCS0/Nss1 VHT20	3.856	4.320	89.26	0.49	0.26
	802.11ac MCS0/Nss1 VHT40	1.870	2.170	86.18	0.65	0.53
	802.11ac MCS0/Nss1 VHT80	1.314	1.602	82.02	0.86	0.76

### 3.11. Test Configurations

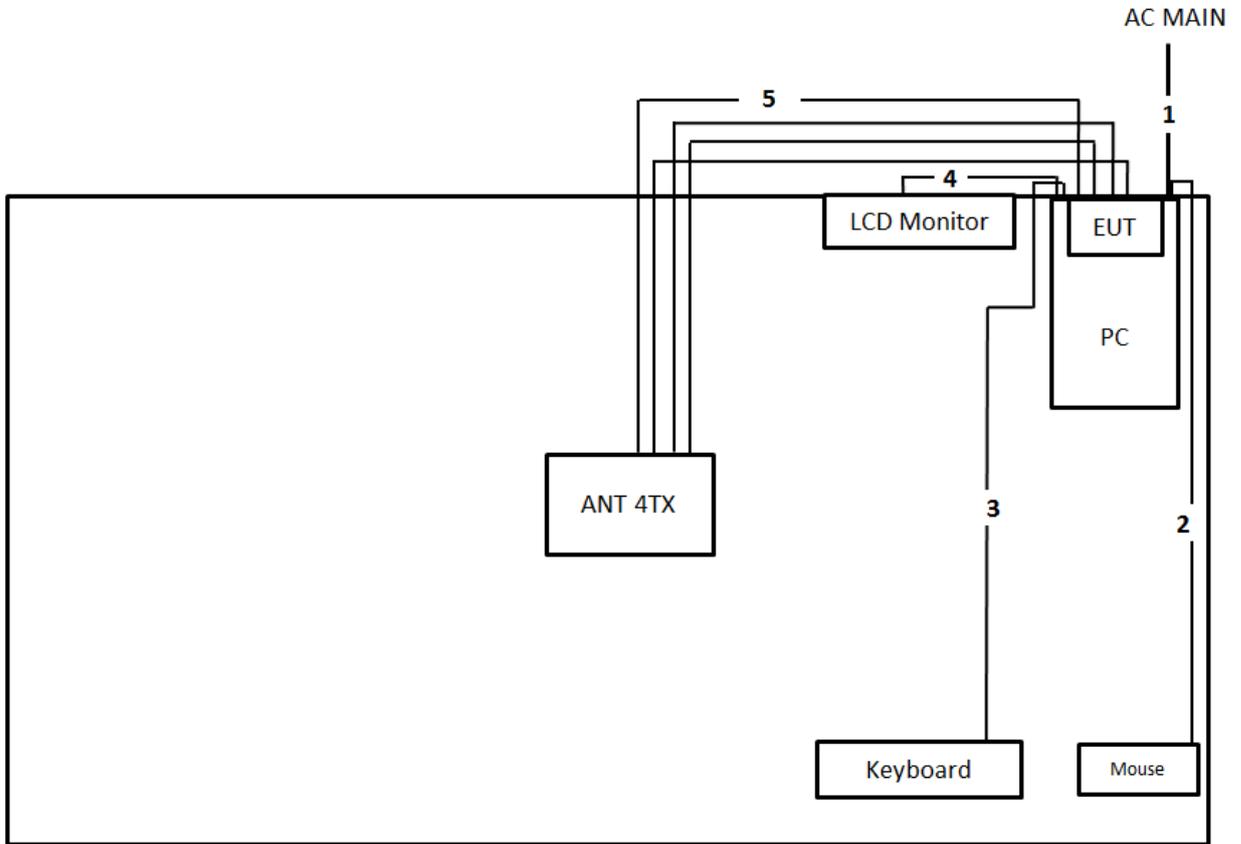
#### 3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	VGA cable	Yes	1.8m
3	USB cable	Yes	1.8m
4	USB cable	Yes	1.8m

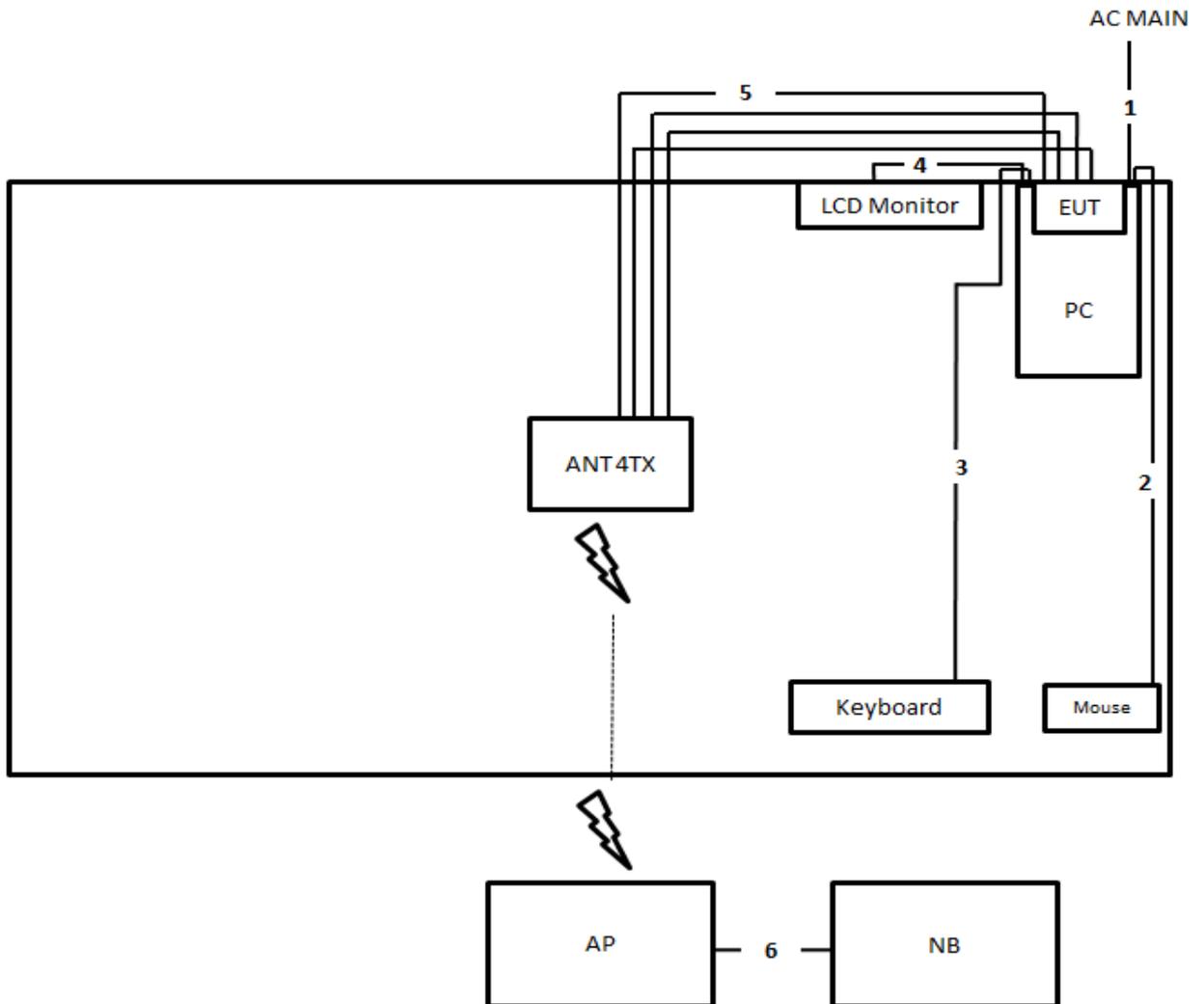
### 3.11.2. Radiation Emissions Test Configuration

For non-beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	USB cable	Yes	1.8m
3	USB cable	Yes	1.8m
4	VGA cable	Yes	1.8m
5	Ant. cable*4	Yes	1m

For beamforming function:



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	USB cable	Yes	1.8m
3	USB cable	Yes	1.8m
4	VGA cable	Yes	1.8m
5	Ant. cable*4	Yes	1m
6	RJ-45 cable	No	1.5m

## 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

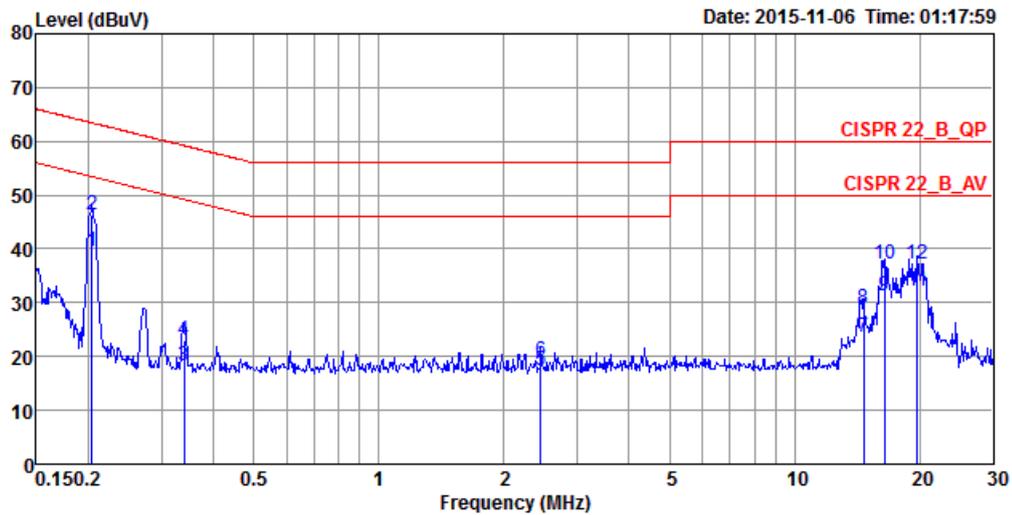
#### 4.1.3. Test Procedures

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.



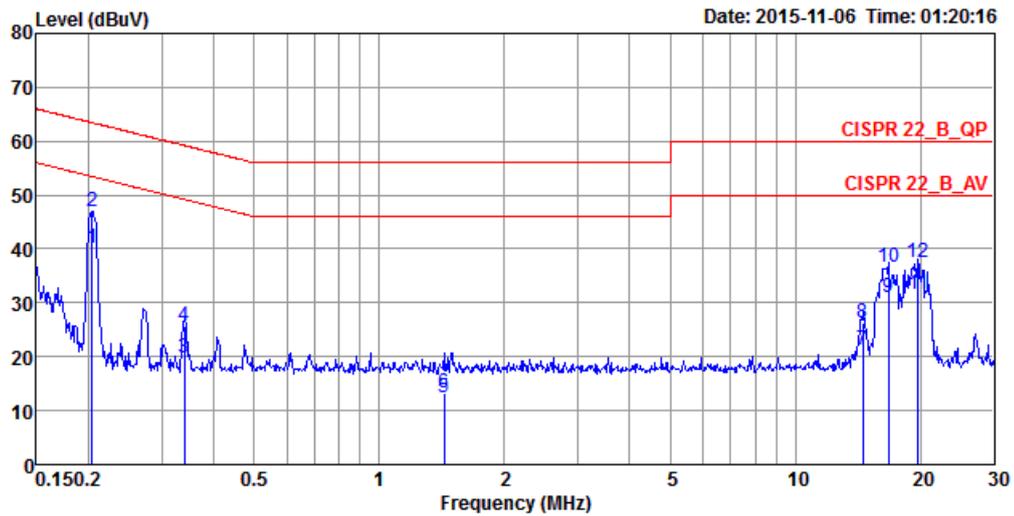
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23°C	Humidity	59%
Test Engineer	Da Deng	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2040	39.53	-13.92	53.45	29.55	9.96	0.02	LINE	Average
2	0.2040	46.42	-17.03	63.45	36.44	9.96	0.02	LINE	QP
3	0.3392	18.22	-31.00	49.22	8.21	9.97	0.04	LINE	Average
4	0.3392	23.11	-36.11	59.22	13.10	9.97	0.04	LINE	QP
5	2.4476	17.52	-28.48	46.00	7.50	9.97	0.05	LINE	Average
6	2.4476	19.06	-36.94	56.00	9.04	9.97	0.05	LINE	QP
7	14.6718	23.62	-26.38	50.00	13.17	10.19	0.26	LINE	Average
8	14.6718	28.92	-31.08	60.00	18.47	10.19	0.26	LINE	QP
9	16.4856	31.35	-18.65	50.00	20.87	10.22	0.26	LINE	Average
10	16.4856	37.05	-22.95	60.00	26.57	10.22	0.26	LINE	QP
11	19.7397	32.22	-17.78	50.00	21.70	10.26	0.26	LINE	Average
12	19.7397	37.32	-22.68	60.00	26.80	10.26	0.26	LINE	QP

Temperature	23°C	Humidity	59%
Test Engineer	Da Deng	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.2040	40.18	-13.27	53.45	30.20	9.96	0.02	NEUTRAL	Average
2	0.2040	46.82	-16.63	63.45	36.84	9.96	0.02	NEUTRAL	QP
3	0.3392	19.77	-29.45	49.22	9.76	9.97	0.04	NEUTRAL	Average
4	0.3392	25.63	-33.59	59.22	15.62	9.97	0.04	NEUTRAL	QP
5	1.4333	12.36	-33.64	46.00	2.34	9.96	0.06	NEUTRAL	Average
6	1.4333	13.43	-42.57	56.00	3.41	9.96	0.06	NEUTRAL	QP
7	14.5171	21.24	-28.76	50.00	10.78	10.20	0.26	NEUTRAL	Average
8	14.5171	26.41	-33.59	60.00	15.95	10.20	0.26	NEUTRAL	QP
9	16.7497	30.95	-19.05	50.00	20.46	10.23	0.26	NEUTRAL	Average
10	16.7497	36.55	-23.45	60.00	26.06	10.23	0.26	NEUTRAL	QP
11	19.7397	31.67	-18.33	50.00	21.13	10.28	0.26	NEUTRAL	Average
12	19.7397	37.48	-22.52	60.00	26.94	10.28	0.26	NEUTRAL	QP

Note:

$$\text{Level} = \text{Read Level} + \text{LISN Factor} + \text{Cable Loss}$$

## 4.2. Maximum Conducted Output Power Measurement

### 4.2.1. Limit

The limit for output power is 30dBm.

### 4.2.2. Measuring Instruments and Setting

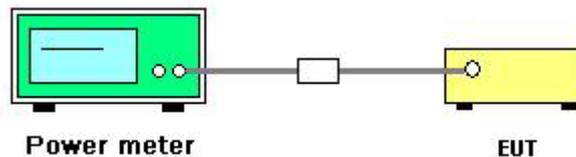
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Detector	Average

### 4.2.3. Test Procedures

1. Test procedures refer KDB558074 D01 v03r03 section 9.2.3.2 Measurement using a power meter (PM).
2. Multiple antenna system was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. This procedure provides an alternative for determining the RMS output power using a broadband RF average power meter with a thermocouple detector.

### 4.2.4. Test Setup Layout



### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.2.7. Test Result of Maximum Conducted Output Power

Temperature	26°C	Humidity	45%
Test Engineer	Eddie Weng	Test Date	Nov. 12, 2015

##### For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11b	2412 MHz	23.64	23.53	23.58	23.71	29.64	30.00	Complies
	2437 MHz	23.65	23.55	23.66	23.67	29.65	30.00	Complies
	2462 MHz	22.83	22.99	22.89	23.09	28.97	30.00	Complies
802.11g	2412 MHz	20.48	20.59	20.46	20.68	26.57	30.00	Complies
	2437 MHz	24.02	23.75	23.86	24.12	29.96	30.00	Complies
	2462 MHz	20.35	20.21	19.84	20.24	26.18	30.00	Complies
802.11ac MCS0/Nss1 VHT20	2412 MHz	20.92	20.69	20.55	20.82	26.77	29.82	Complies
	2437 MHz	23.88	23.62	23.70	23.75	29.76	29.82	Complies
	2462 MHz	18.42	18.55	18.11	18.41	24.40	29.82	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	16.48	16.46	16.56	16.68	22.57	29.82	Complies
	2437 MHz	19.67	19.62	19.51	20.21	25.78	29.82	Complies
	2452 MHz	15.91	15.53	15.56	15.78	21.72	29.82	Complies

Note: For 802.11ac MCS0/Nss1 VHT20, 802.11ac MCS0/Nss1 VHT40:

$$\text{Directional Gain} = 10 \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left( \sum_{K=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right] = 6.18 \text{dBi} > 6 \text{dBi}, \text{ so limit} = 30 - (6.18 - 6) = 29.82 \text{dBm}.$$

## For 5GHz Band

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11a	5745 MHz	23.21	23.42	23.35	24.19	29.58	30.00	Complies
	5785 MHz	23.71	23.98	23.54	24.54	29.98	30.00	Complies
	5825 MHz	23.69	23.91	23.51	24.61	29.97	30.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	23.86	23.87	23.55	24.49	29.98	30.00	Complies
	5785 MHz	23.62	23.69	23.34	24.16	29.73	30.00	Complies
	5825 MHz	23.65	23.71	23.25	24.42	29.80	30.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	23.31	23.82	23.57	24.94	29.98	30.00	Complies
	5795 MHz	23.42	23.79	23.13	24.65	29.81	30.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	23.14	23.07	22.96	24.21	29.40	30.00	Complies

Note: For 802.11ac MCS0/Nss1 VHT20, 802.11ac MCS0/Nss1 VHT40, 802.11ac MCS0/Nss1 VHT80:

$$\text{Directional Gain} = 10 \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left( \sum_{K=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right] = 5.17 \text{dBi} < 6 \text{dBi}, \text{ so the limit doesn't reduce.}$$

### 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

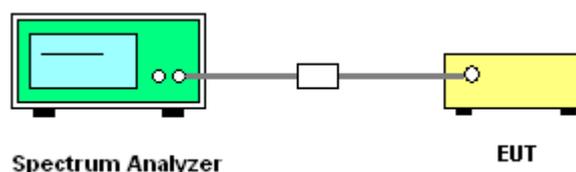
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 KDB558074 D01 v03r03 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  $\geq 2 \times \text{span}/\text{RBW}$  (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	45%
Test Engineer	Eddie Weng		

##### For 2.4GHz Band

Mode	Frequency	Power Density (dBm/3kHz)					Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11b	2412 MHz	-8.71	-8.46	-8.75	-8.73	-2.64	7.82	Complies
	2437 MHz	-8.43	-8.56	-8.52	-8.37	-2.45	7.82	Complies
	2462 MHz	-8.94	-8.97	-9.18	-8.93	-2.98	7.82	Complies
802.11g	2412 MHz	-4.32	-3.94	-5.11	-3.99	1.71	7.82	Complies
	2437 MHz	-1.47	-0.80	-1.94	-0.62	4.84	7.82	Complies
	2462 MHz	-5.50	-4.29	-4.56	-4.62	1.30	7.82	Complies
802.11ac MCS0/Nss1 VHT20	2412 MHz	-3.83	-3.92	-4.08	-3.49	2.20	7.82	Complies
	2437 MHz	-0.85	-1.07	-0.72	-1.32	5.04	7.82	Complies
	2462 MHz	-6.89	-7.20	-6.31	-5.97	-0.55	7.82	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	-11.93	-11.36	-11.62	-12.02	-5.70	7.82	Complies
	2437 MHz	-9.40	-8.57	-9.21	-10.07	-3.26	7.82	Complies
	2452 MHz	-12.81	-12.67	-13.15	-11.86	-6.58	7.82	Complies

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

## For 5GHz Band

Mode	Frequency	Power Density (dBm/3kHz)					Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
802.11a	5745 MHz	-1.15	-1.98	-1.17	-0.55	4.84	8.00	Complies
	5785 MHz	-1.10	-0.42	-1.99	-1.14	4.89	8.00	Complies
	5825 MHz	-1.05	-1.24	-1.15	-1.92	4.69	8.00	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	-2.54	-0.66	-1.61	-1.12	4.59	8.00	Complies
	5785 MHz	-1.68	-1.56	-3.01	0.25	4.68	8.00	Complies
	5825 MHz	-2.97	-2.16	-2.43	-2.41	3.54	8.00	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	-4.93	-4.06	-5.18	-4.37	1.41	8.00	Complies
	5795 MHz	-4.44	-4.53	-5.03	-4.83	1.32	8.00	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	-8.31	-8.70	-8.59	-8.06	-2.39	8.00	Complies

Note:  $Directional\ Gain = 10 \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left( \sum_{K=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right] = 5.17\text{dBi} < 6\text{dBi}$ , so the limit doesn't reduce.

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

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

For 2.4GHz Band

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



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



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



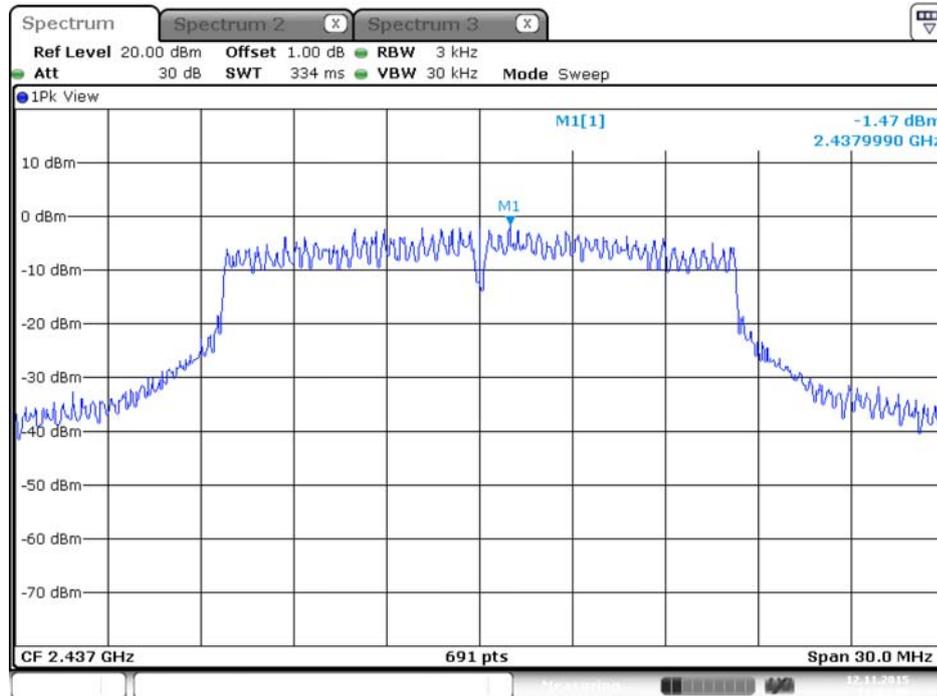
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**Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 4**

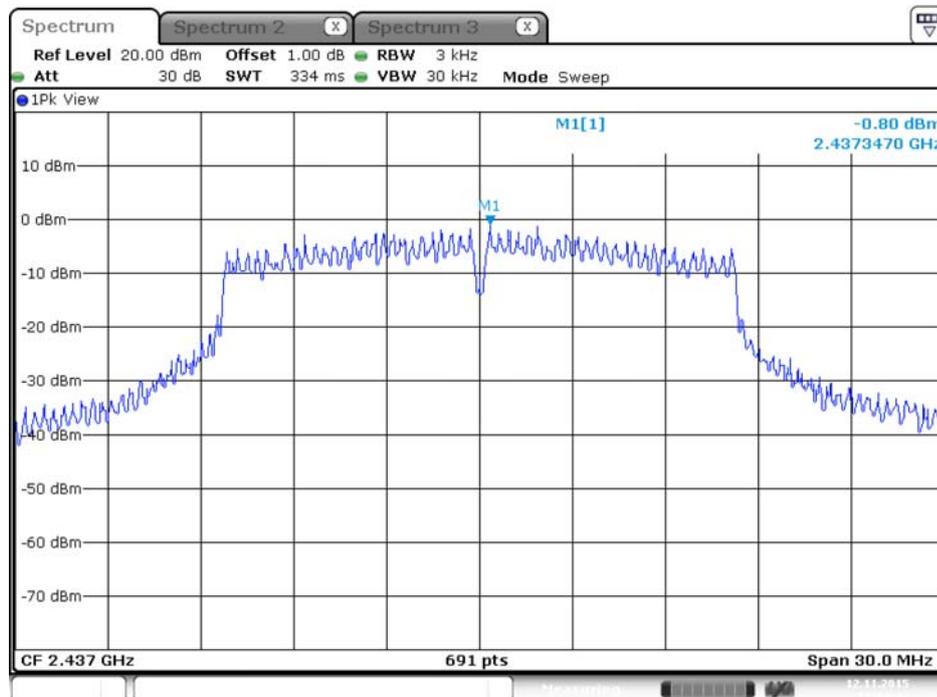


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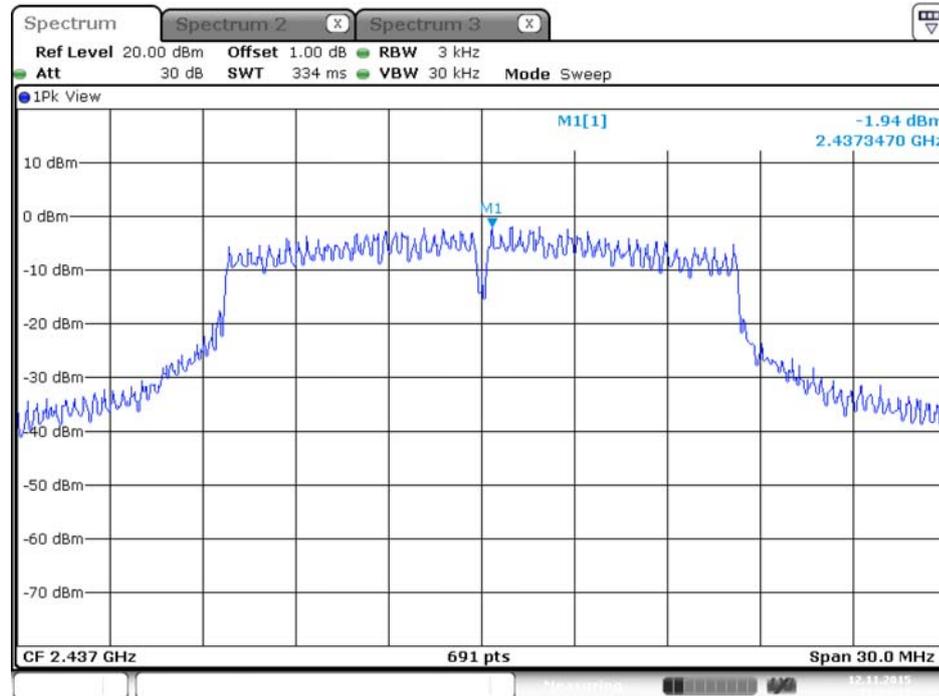
**Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1**



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

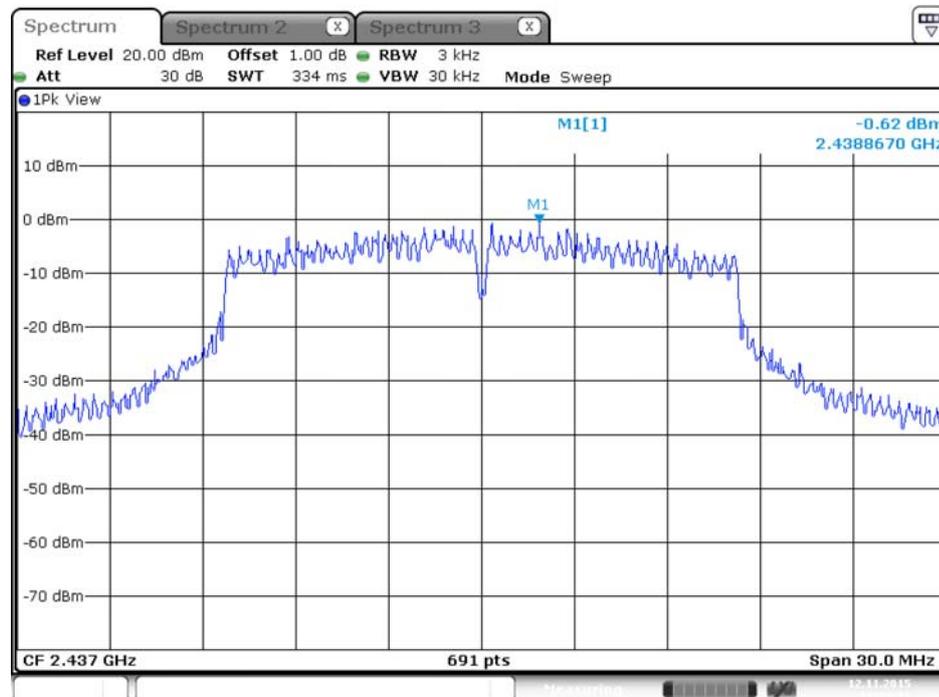


### Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 3



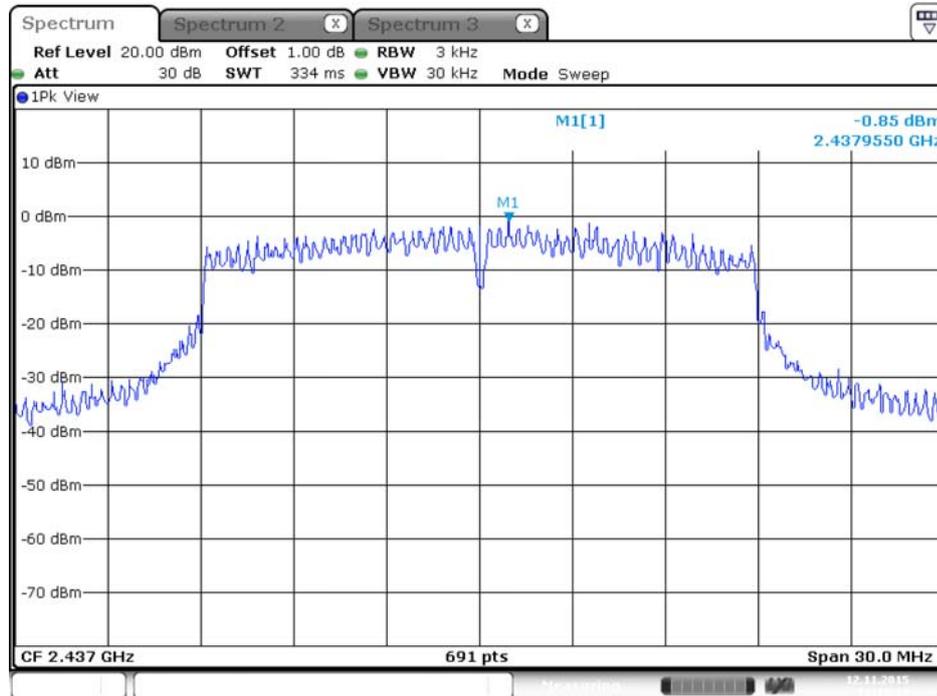
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### Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 4

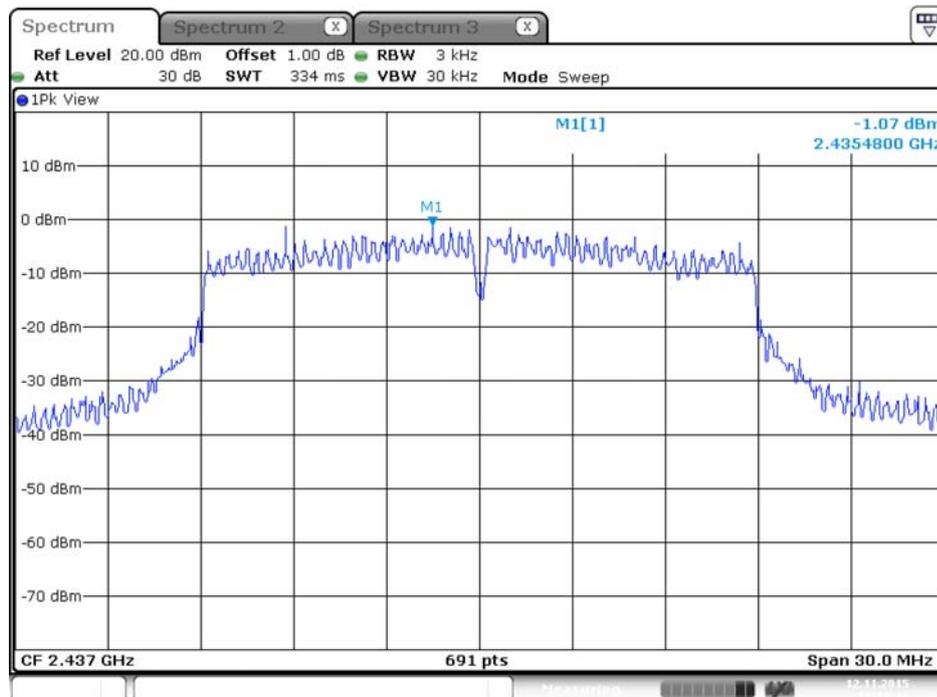


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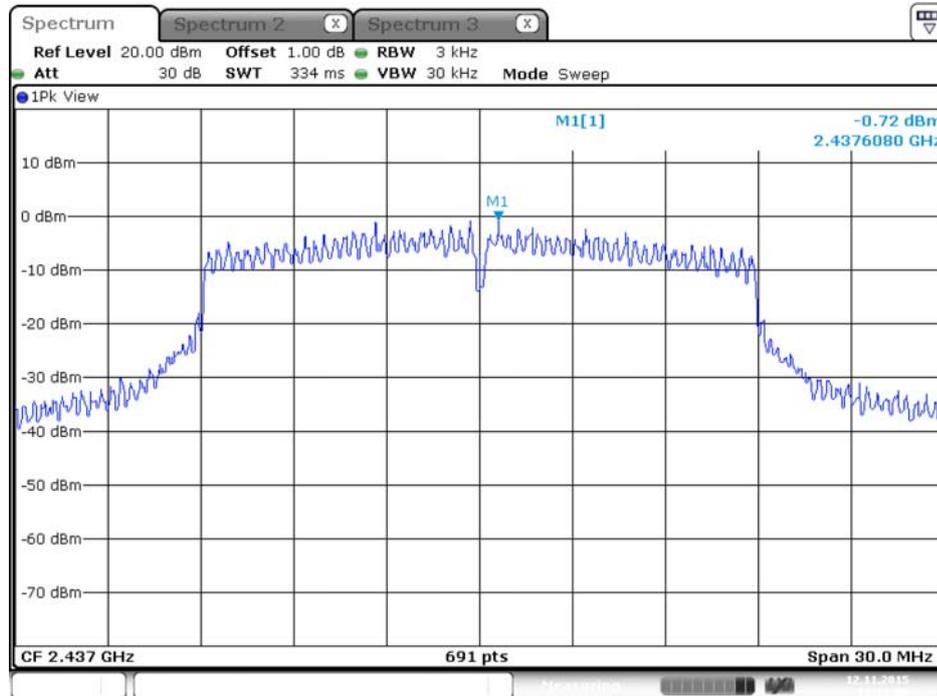
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 1



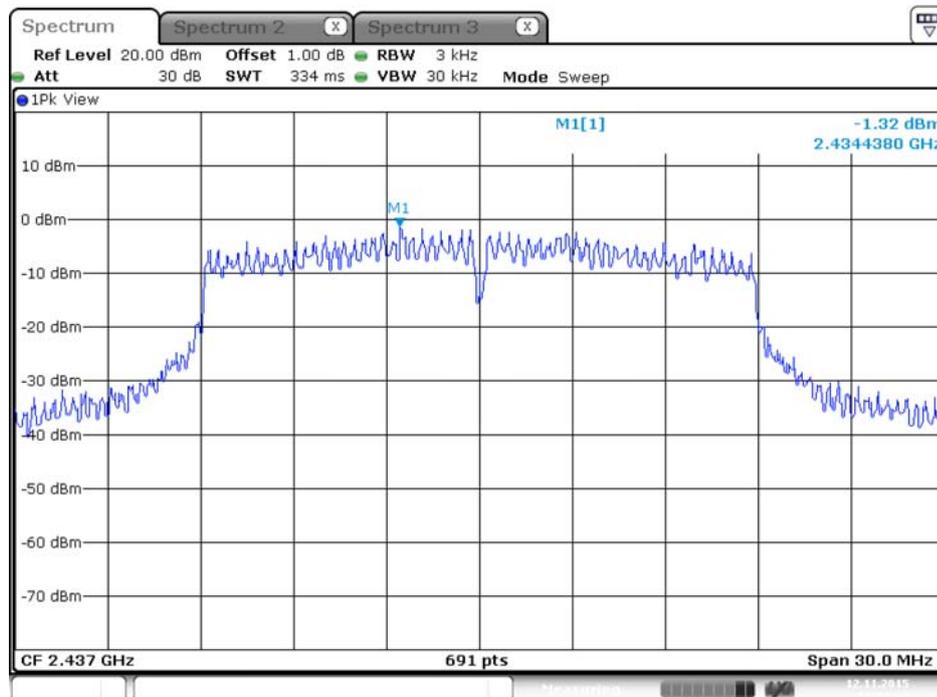
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 2



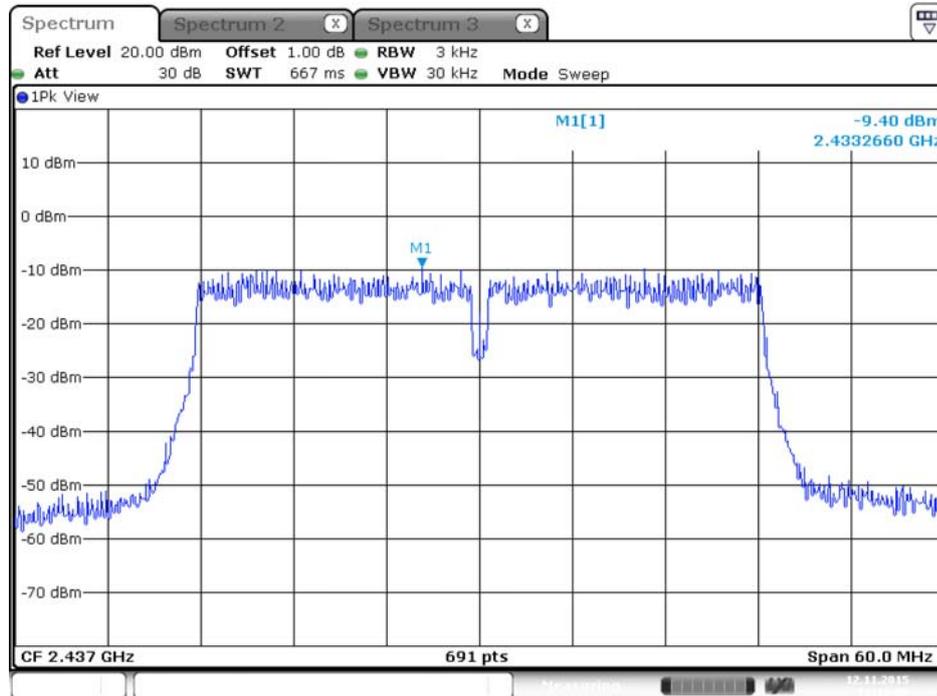
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 3**



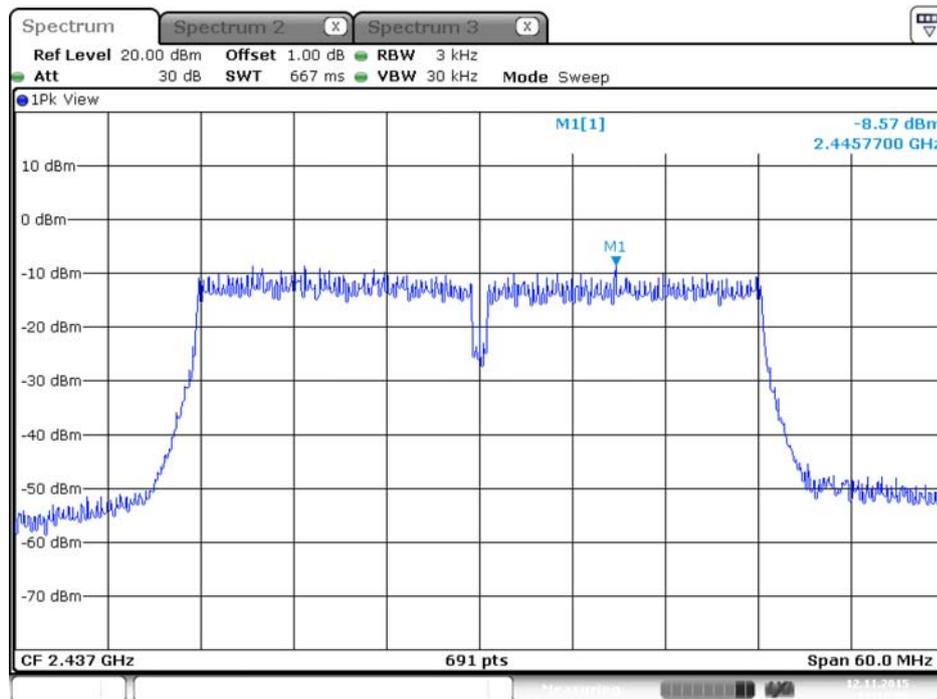
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 4**



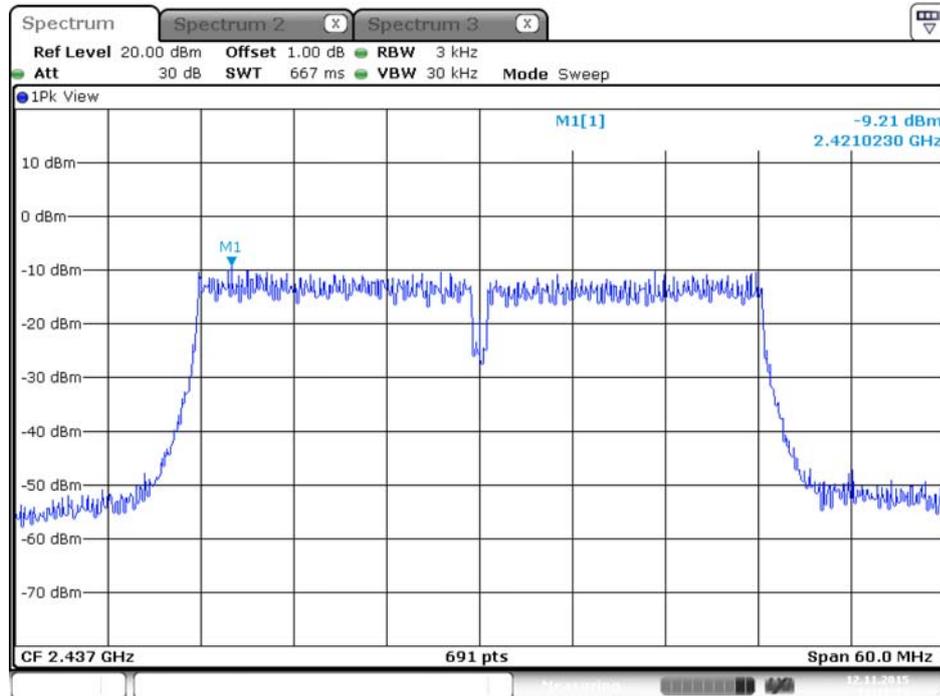
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 1**



**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 2**

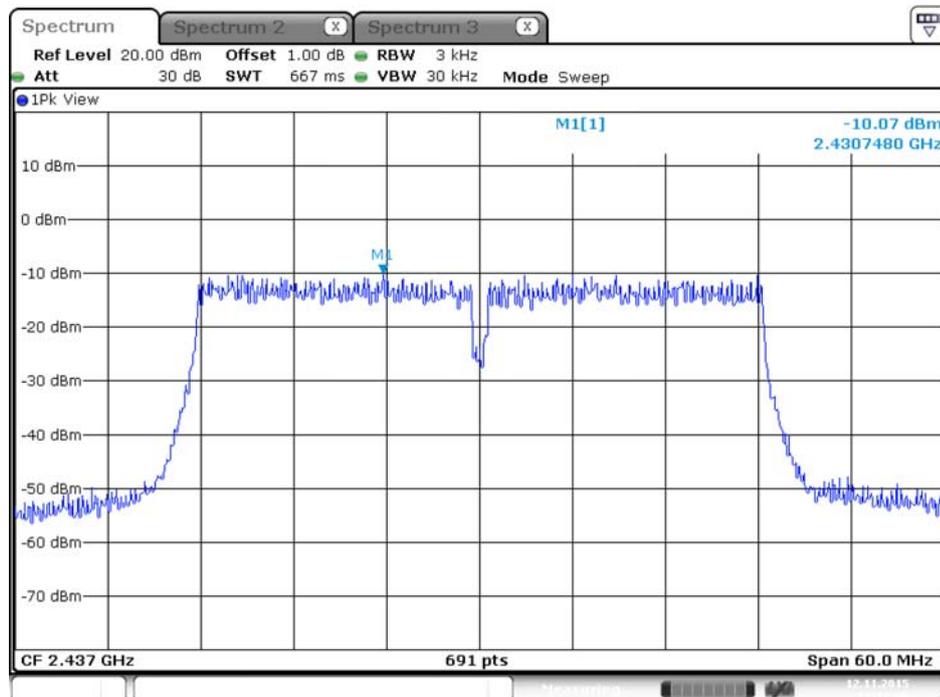


## Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 3



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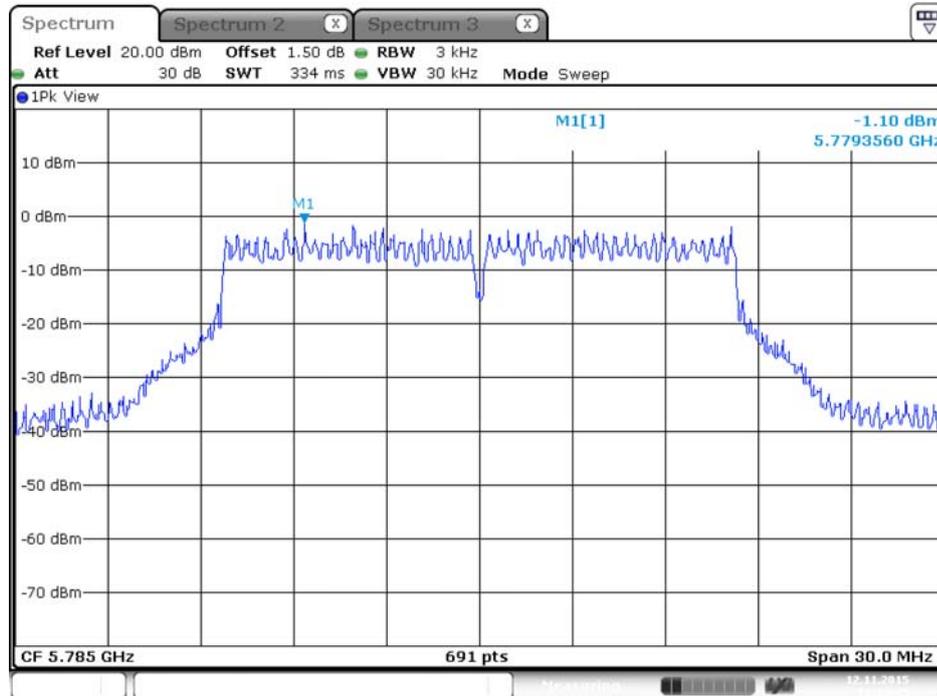
## Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 4



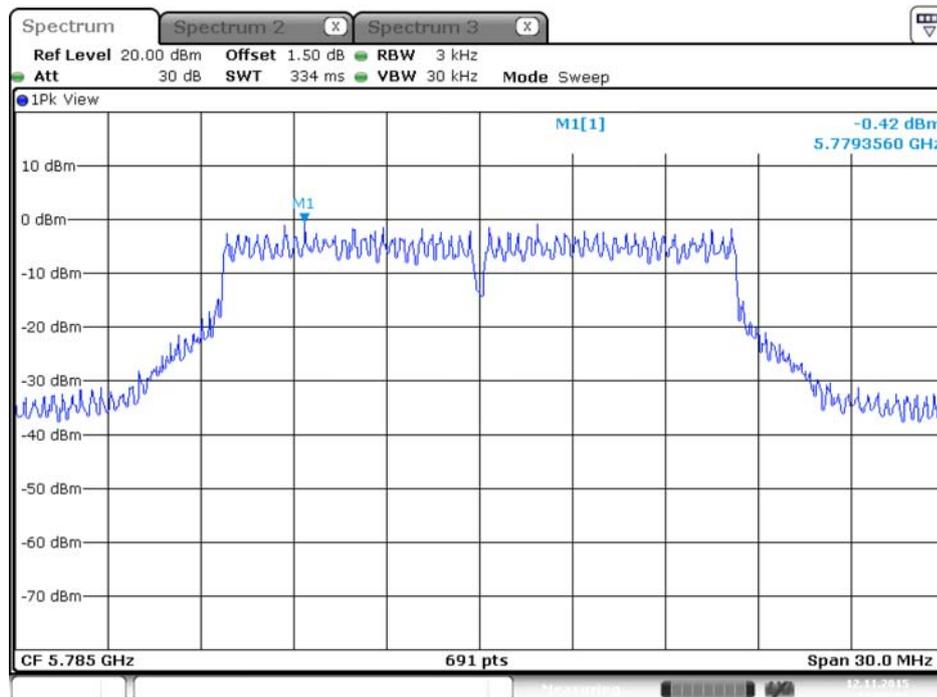
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For 5GHz Band

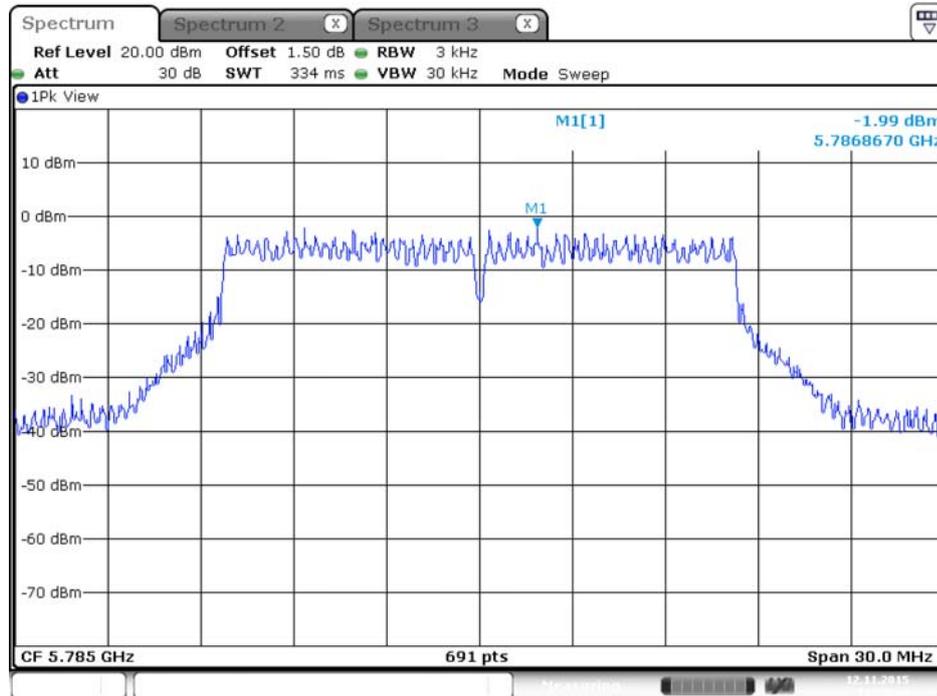
Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 1



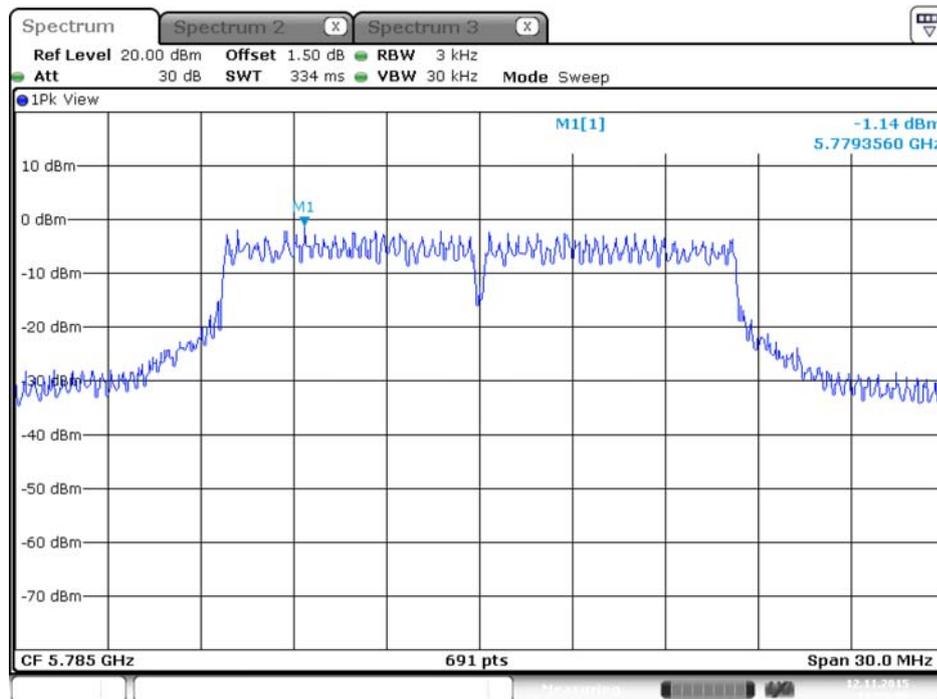
Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 2



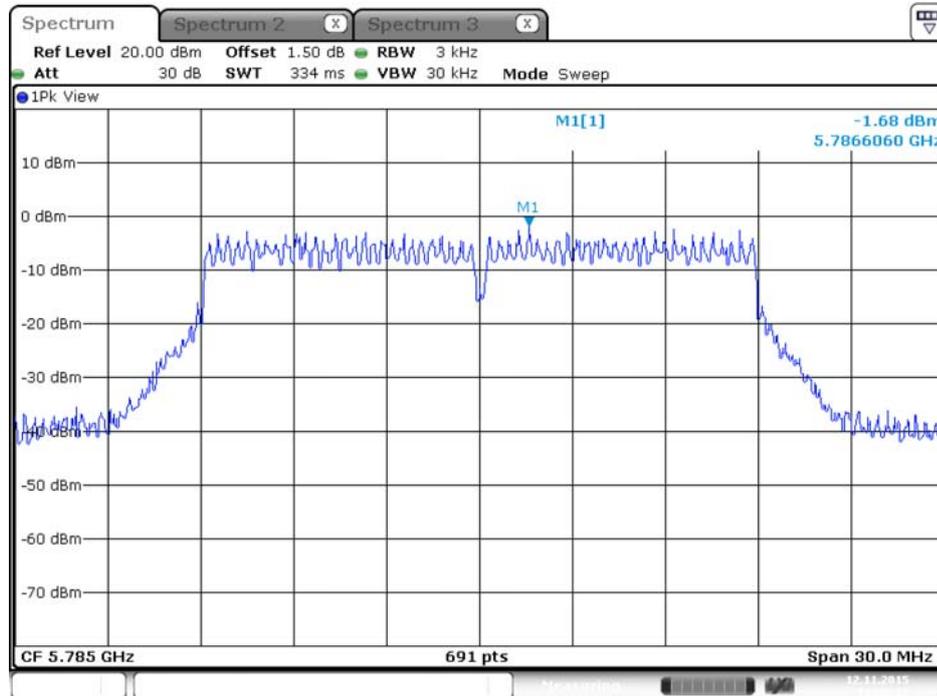
**Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 3**



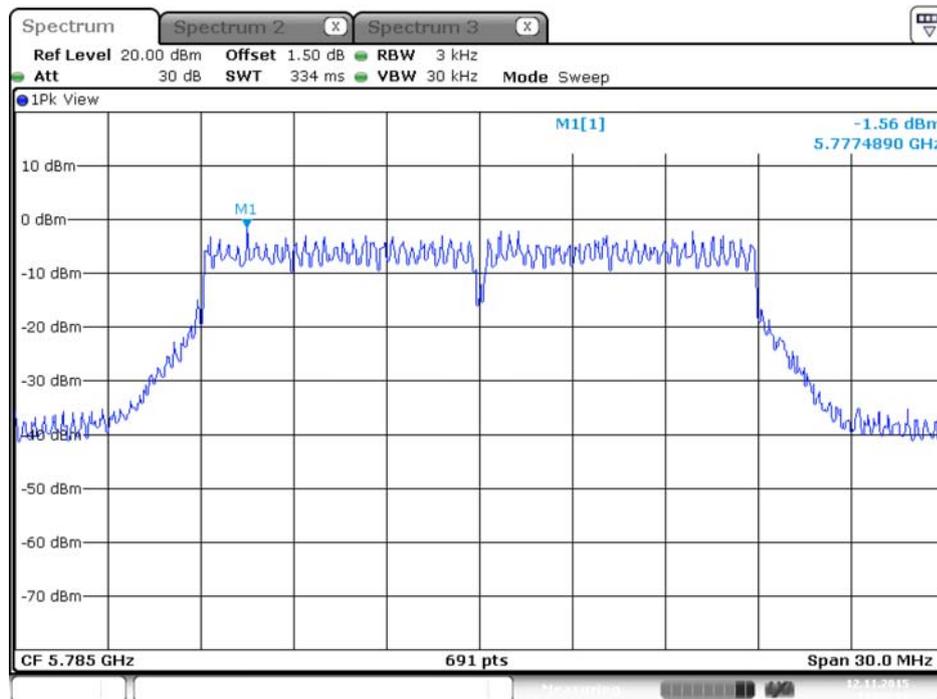
**Power Density Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 4**



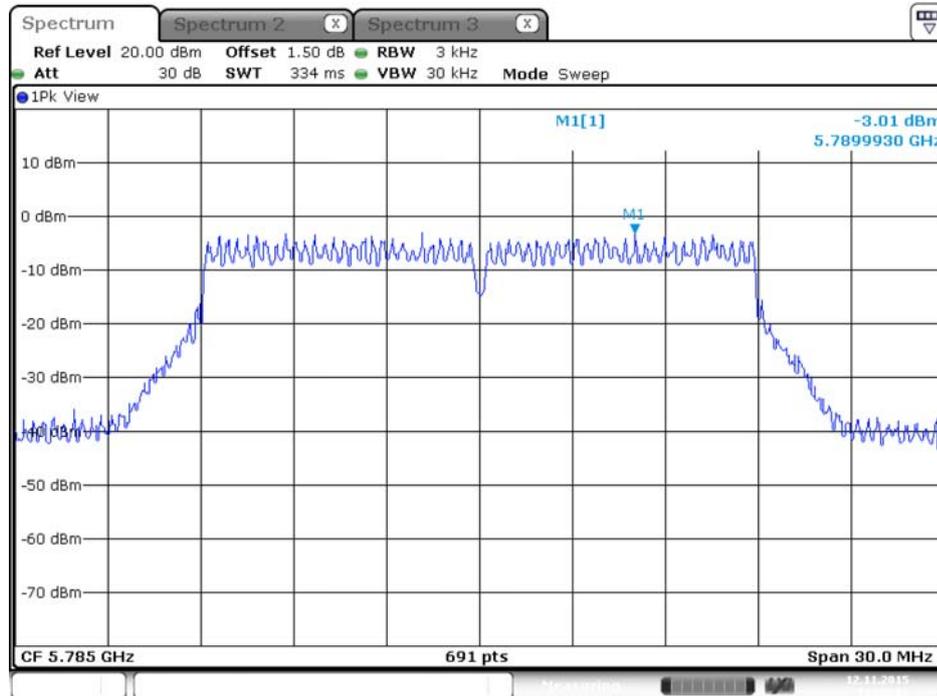
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 1



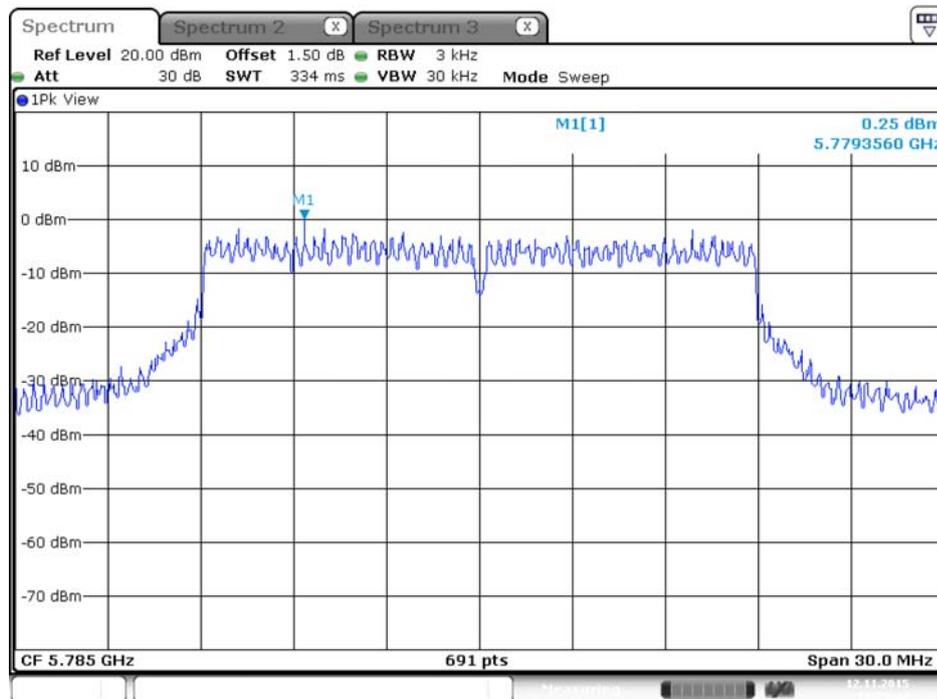
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 2



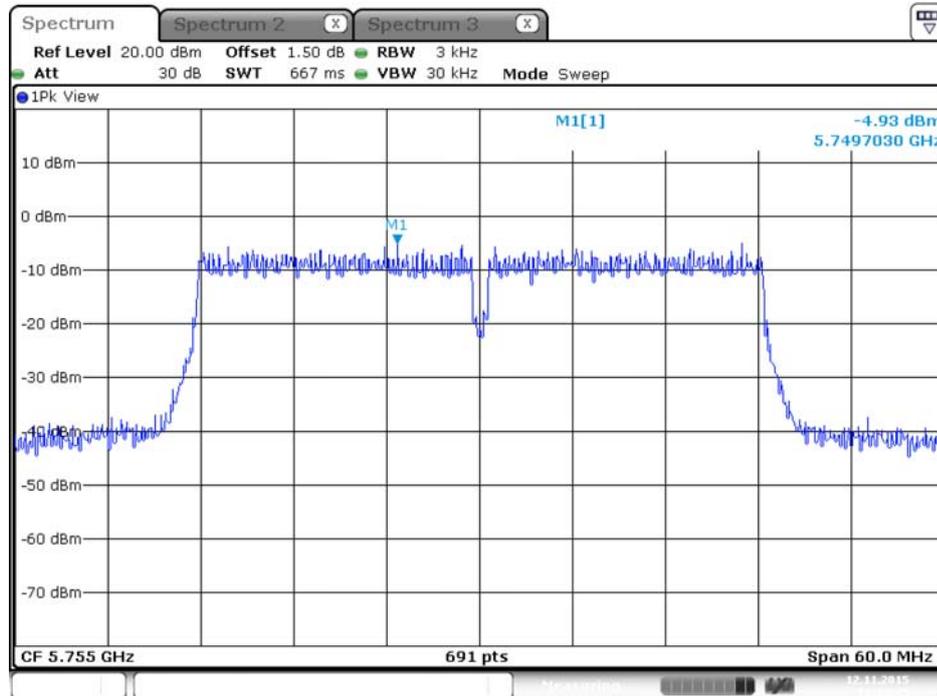
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 3**



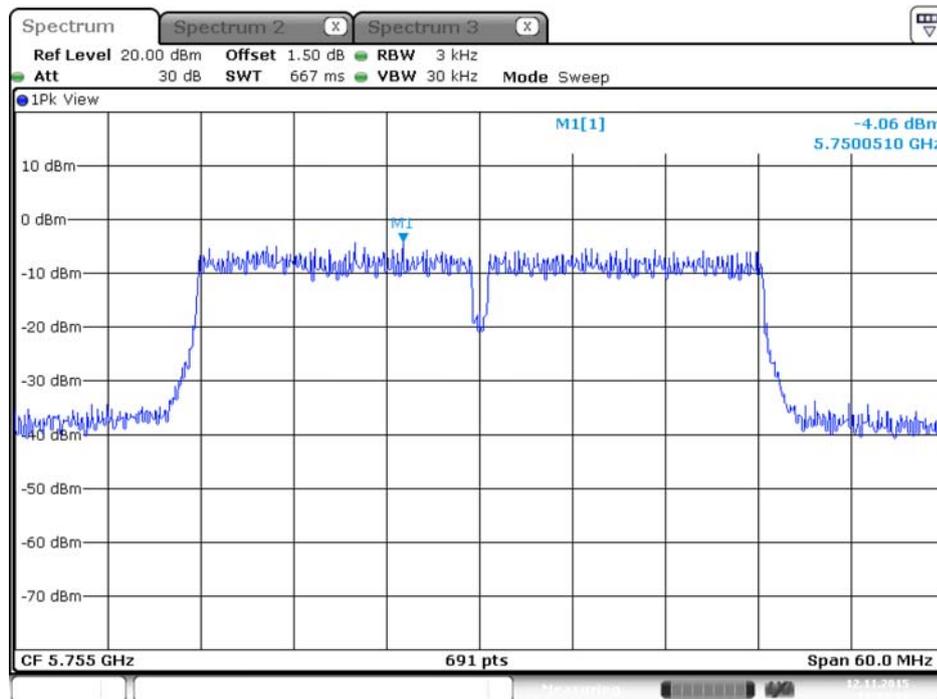
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Chain 4**



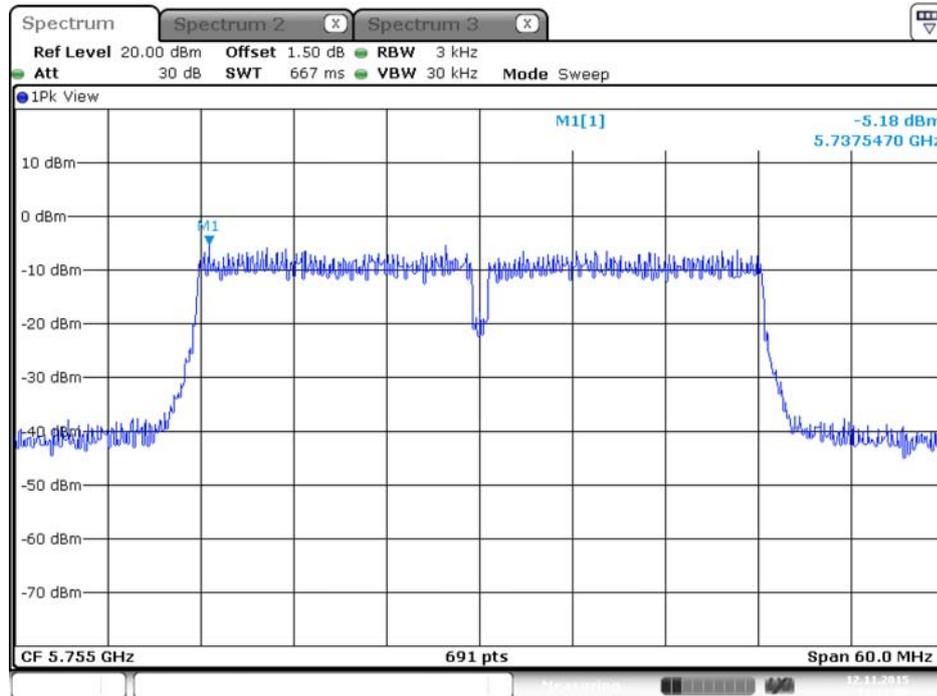
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 1



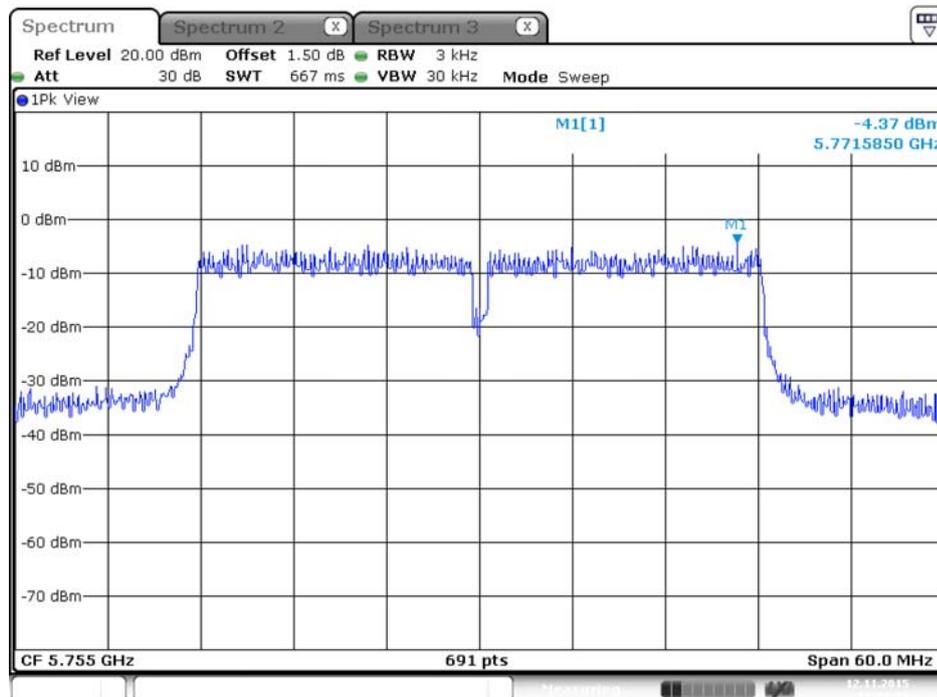
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 2



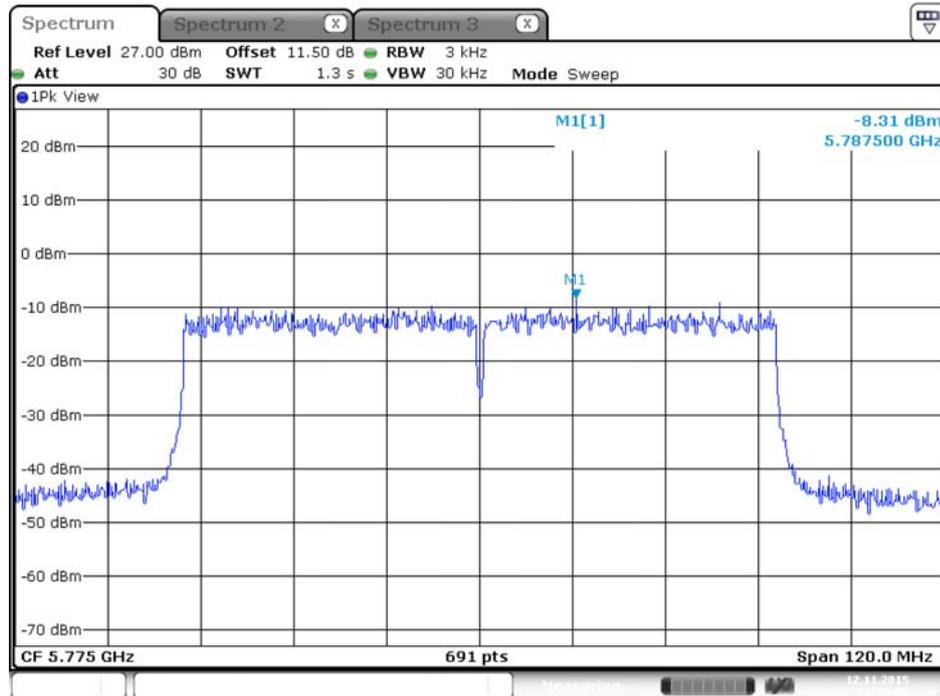
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 3



Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 4

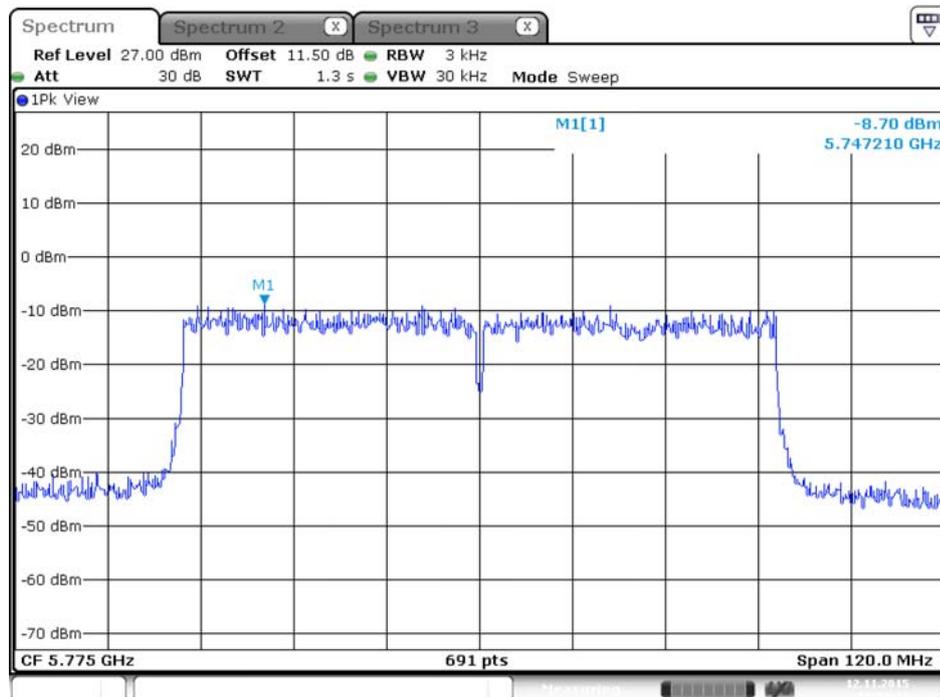


## Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1



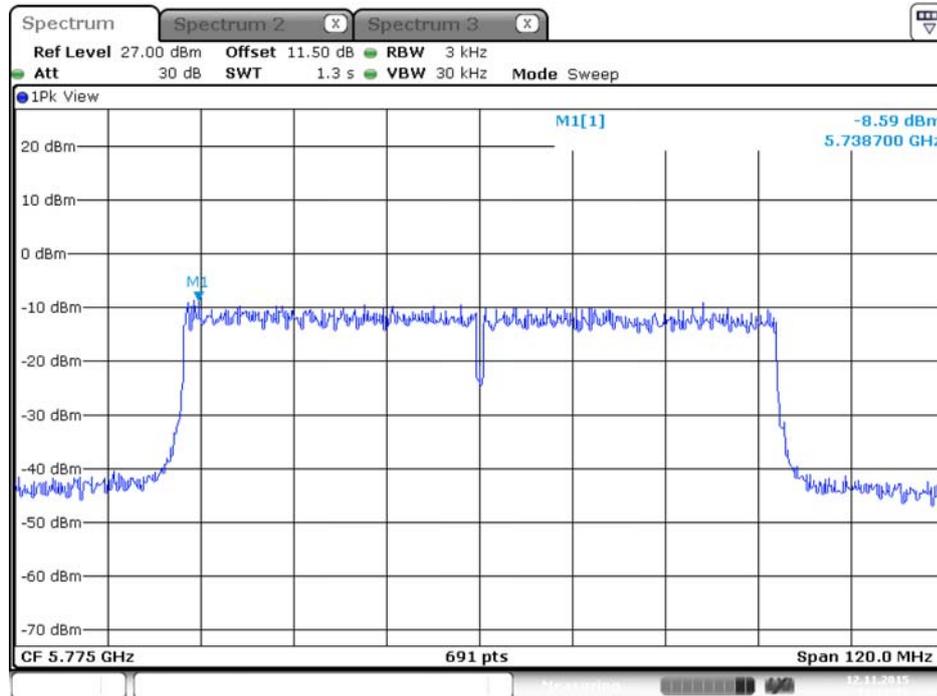
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## Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 2

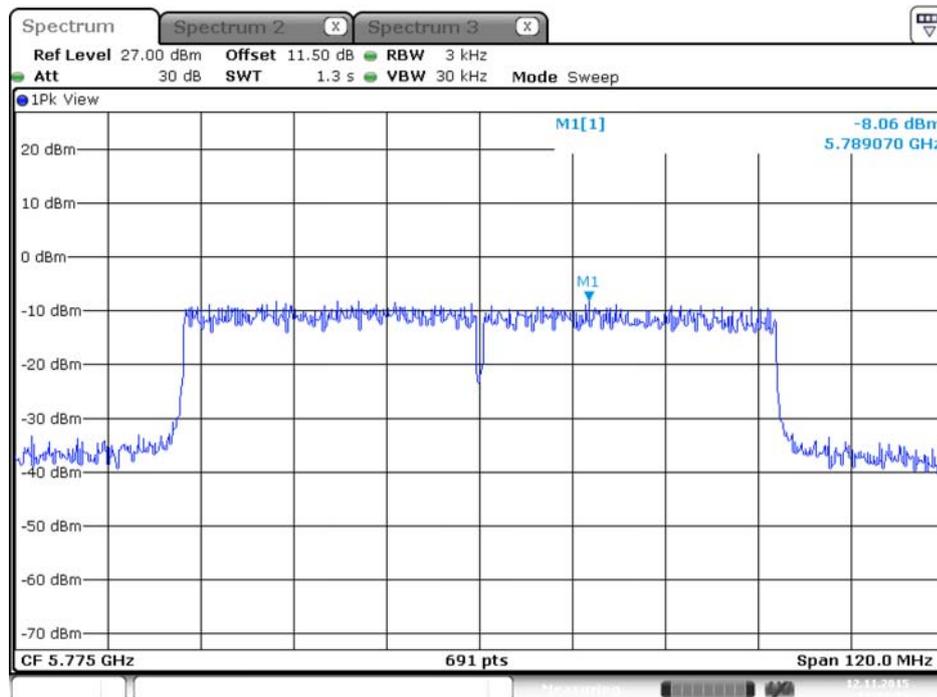


Date: 12.NOV.2015 11:39:17

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



**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 4**



## 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.

6dB Spectrum Bandwidth	
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
99% Occupied Bandwidth	
Spectrum Parameters	Setting
Span	1.5 times to 5.0 times the OBW
RBW	1 % to 5 % of the OBW
VBW	$\geq 3 \times \text{RBW}$
Detector	Peak
Trace	Max Hold

### 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 KDB558074 D01 v03r03 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	45%
Test Engineer	Eddie Weng		

##### For 2.4GHz Band

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11b	2412 MHz	7.54	10.42	500	Complies
	2437 MHz	8.12	10.59	500	Complies
	2462 MHz	7.54	10.42	500	Complies
802.11g	2412 MHz	6.03	15.37	500	Complies
	2437 MHz	5.45	15.02	500	Complies
	2462 MHz	5.68	14.85	500	Complies
802.11ac MCS0/Nss1 VHT20	2412 MHz	16.58	17.63	500	Complies
	2437 MHz	12.87	17.80	500	Complies
	2462 MHz	12.81	17.63	500	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	35.71	36.76	500	Complies
	2437 MHz	35.71	36.90	500	Complies
	2452 MHz	36.06	36.90	500	Complies

##### For 5GHz Band

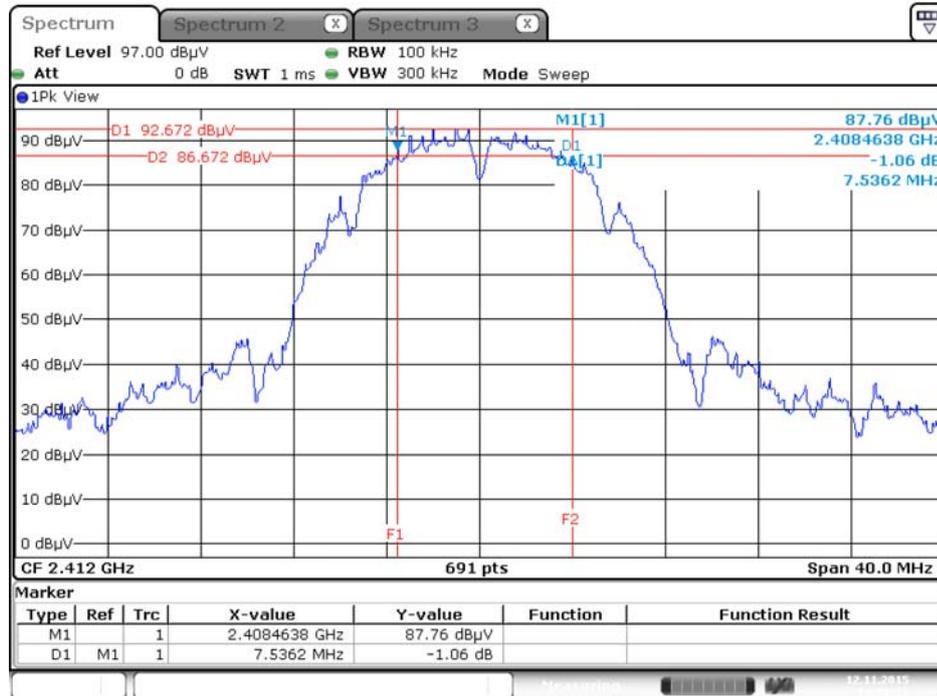
Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.41	17.97	500	Complies
	5785 MHz	14.73	17.71	500	Complies
	5825 MHz	16.46	17.71	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.57	18.06	500	Complies
	5785 MHz	17.62	18.06	500	Complies
	5825 MHz	17.62	17.97	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	36.29	37.19	500	Complies
	5795 MHz	36.06	36.90	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	75.36	76.12	500	Complies

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

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

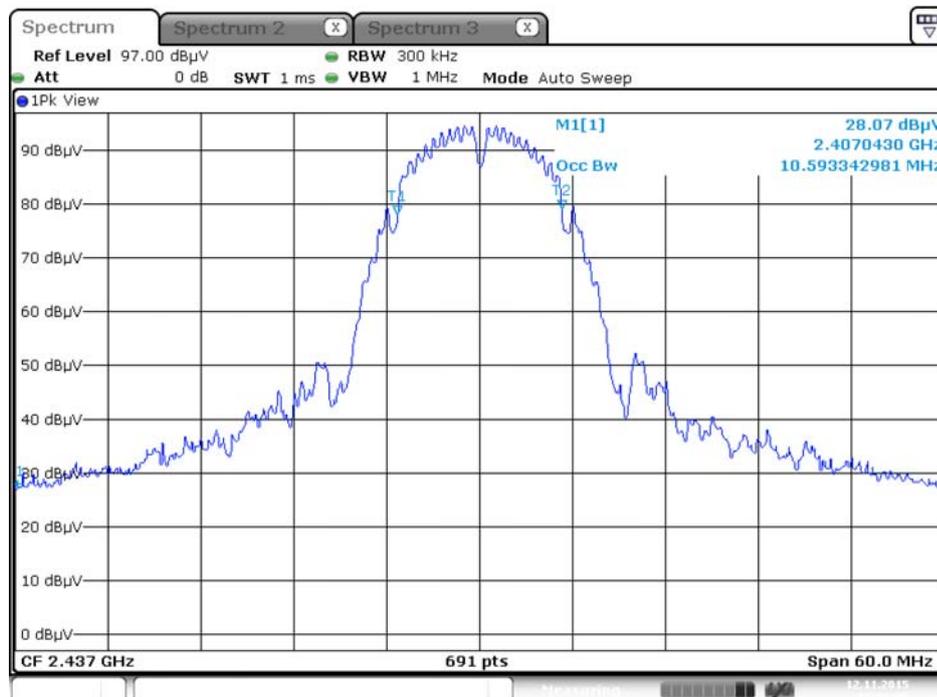
**For 2.4GHz Band**

**6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2412 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4**



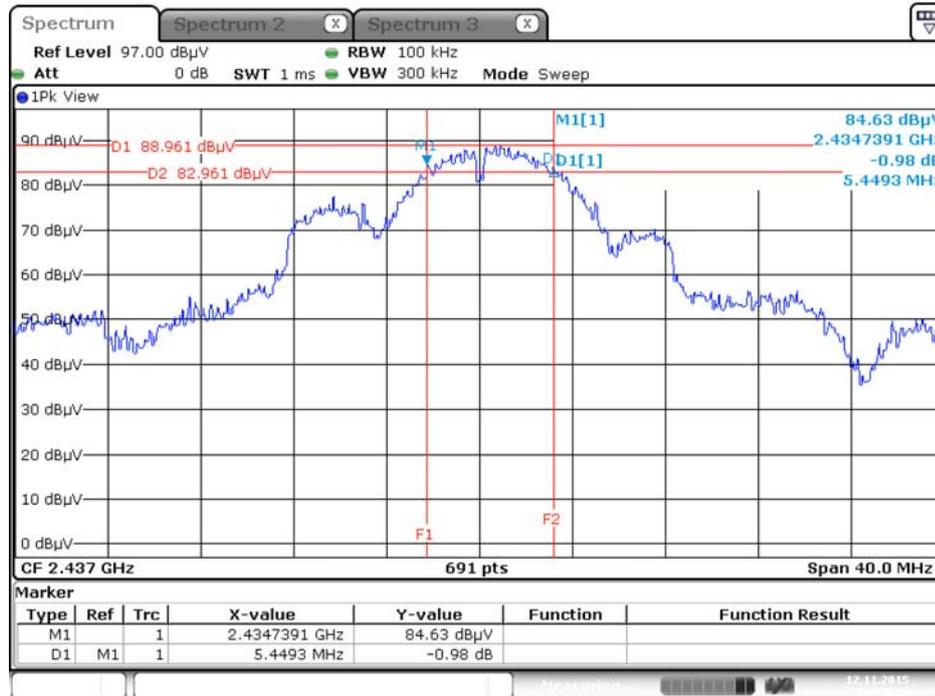
Date: 12.NOV.2015 14:52:21

**99% Occupied Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4**



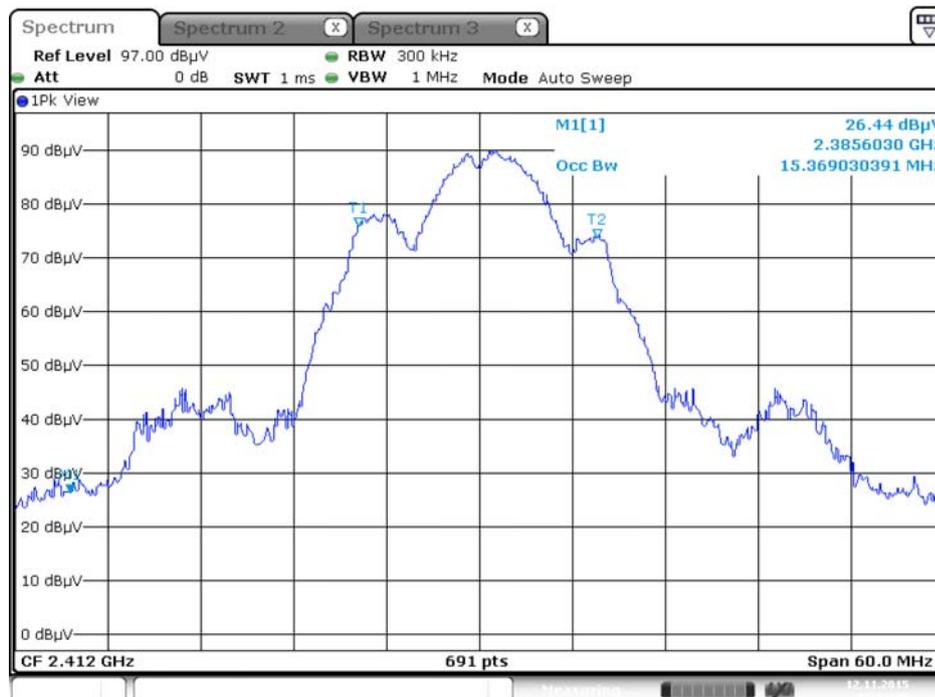
Date: 12.NOV.2015 15:01:56

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



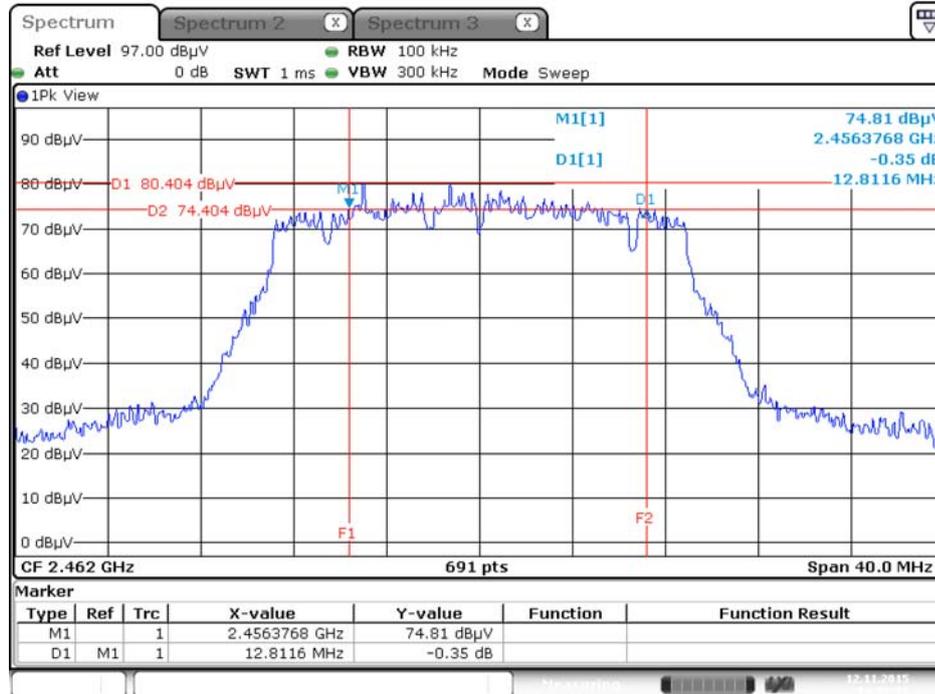
Date: 12.NOV.2015 14:55:24

99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



Date: 12.NOV.2015 15:03:58

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2462 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



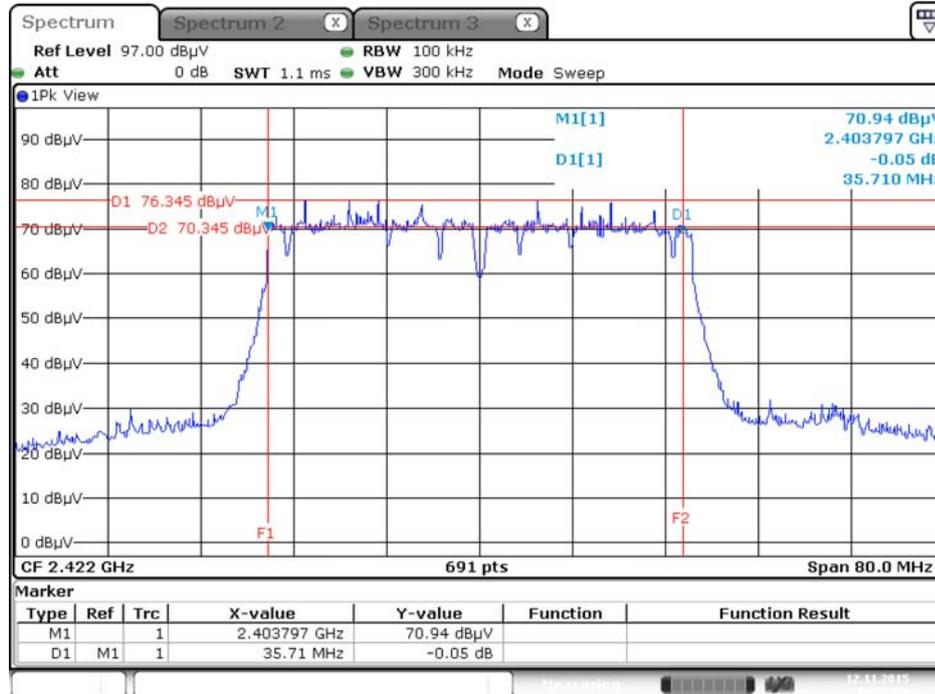
Date: 12.NOV.2015 14:57:30

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



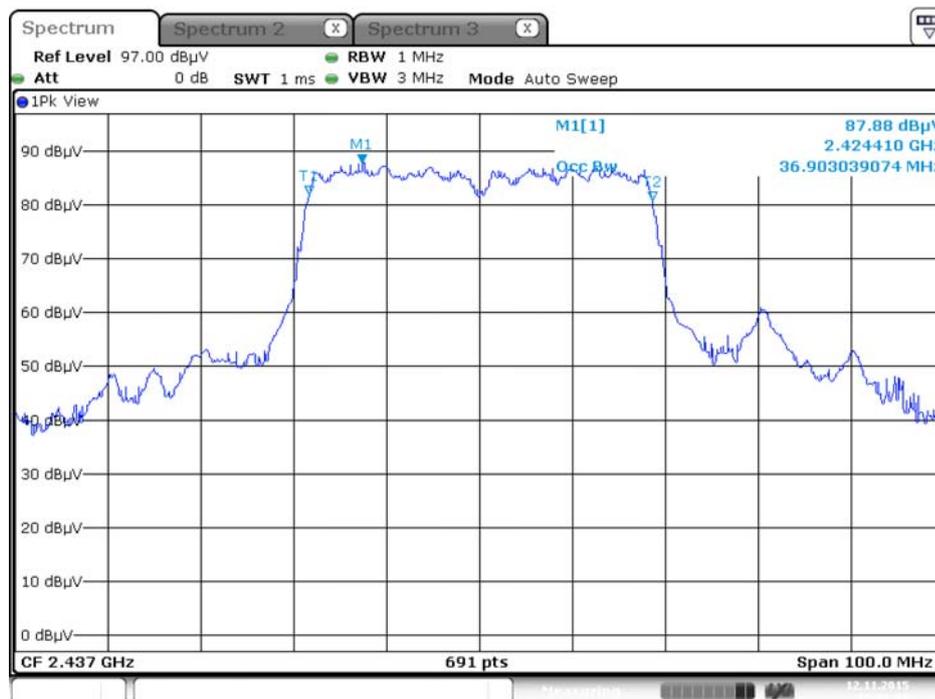
Date: 12.NOV.2015 15:06:34

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2422 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



Date: 12.NOV.2015 14:58:09

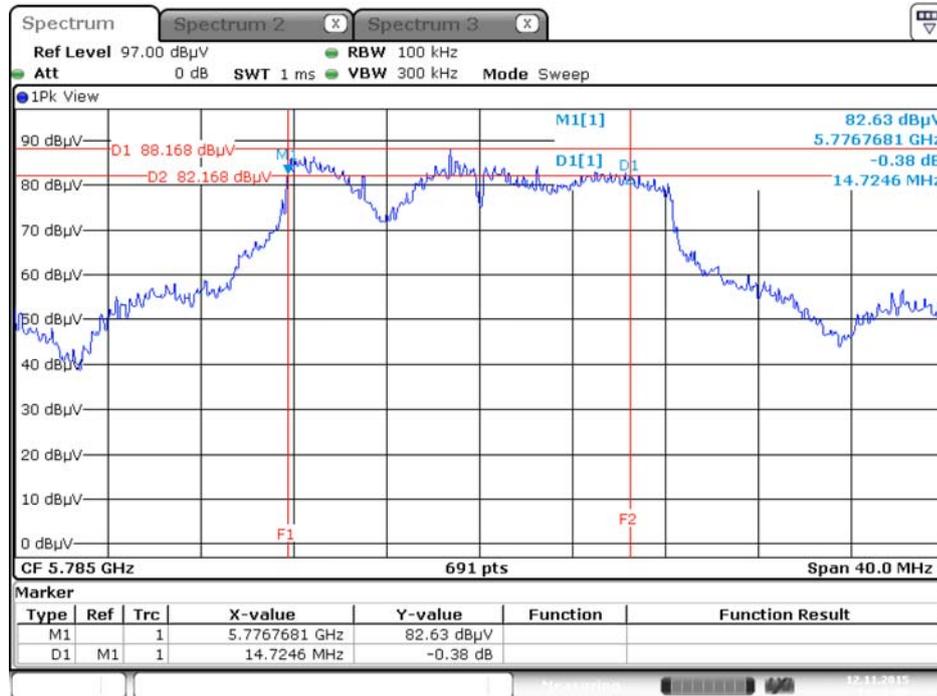
99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



Date: 12.NOV.2015 15:08:38

**For 5GHz Band**

**6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4**



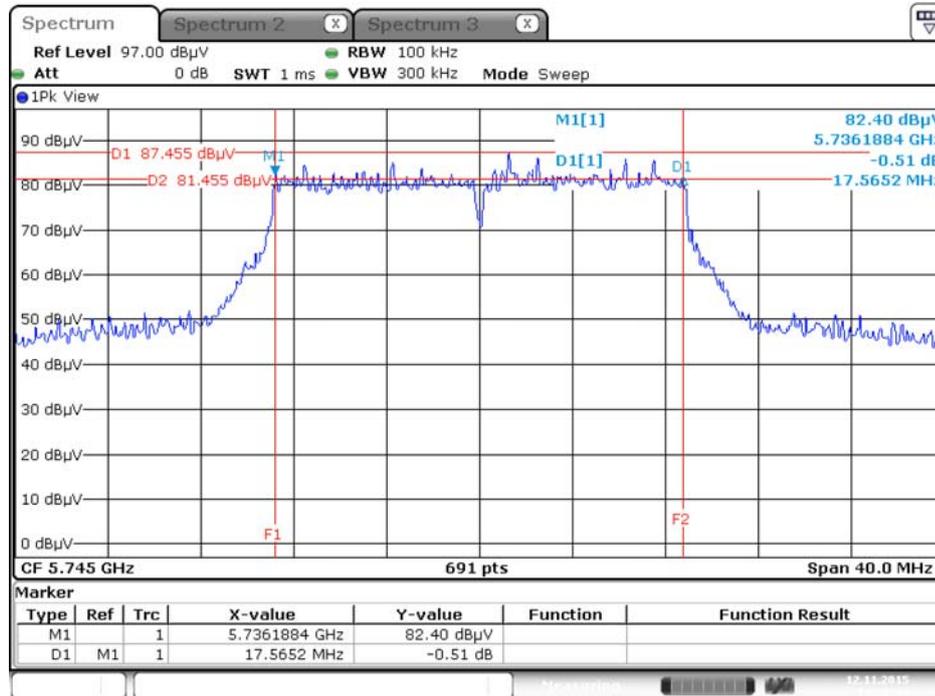
Date: 12.NOV.2015 14:26:19

**99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4**



Date: 12.NOV.2015 14:39:33

**6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5745 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4**



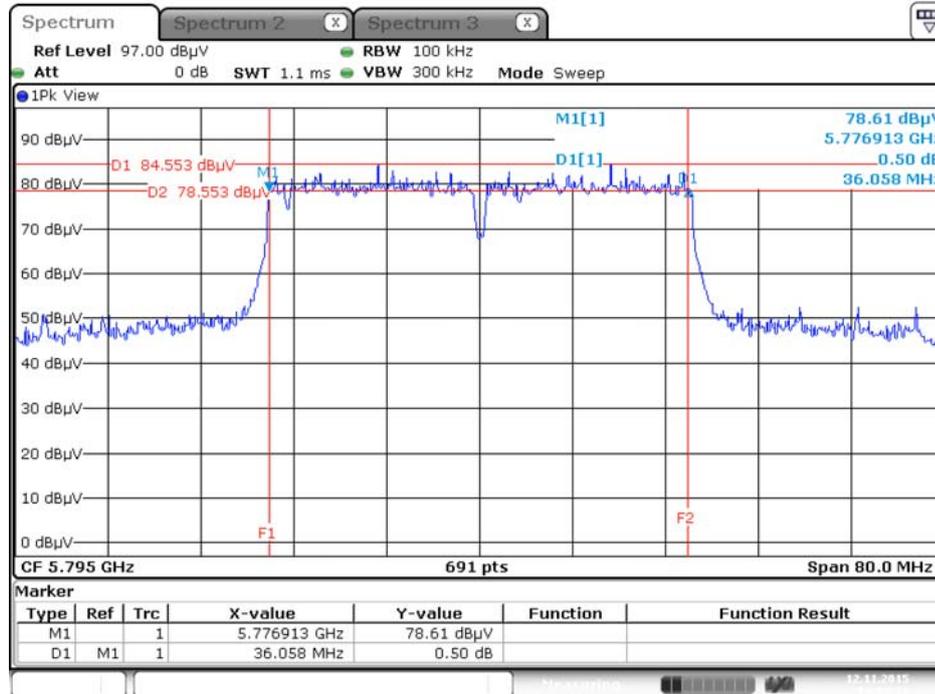
Date: 12.NOV.2015 14:28:43

**99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5745 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4**



Date: 12.NOV.2015 14:43:15

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5795 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



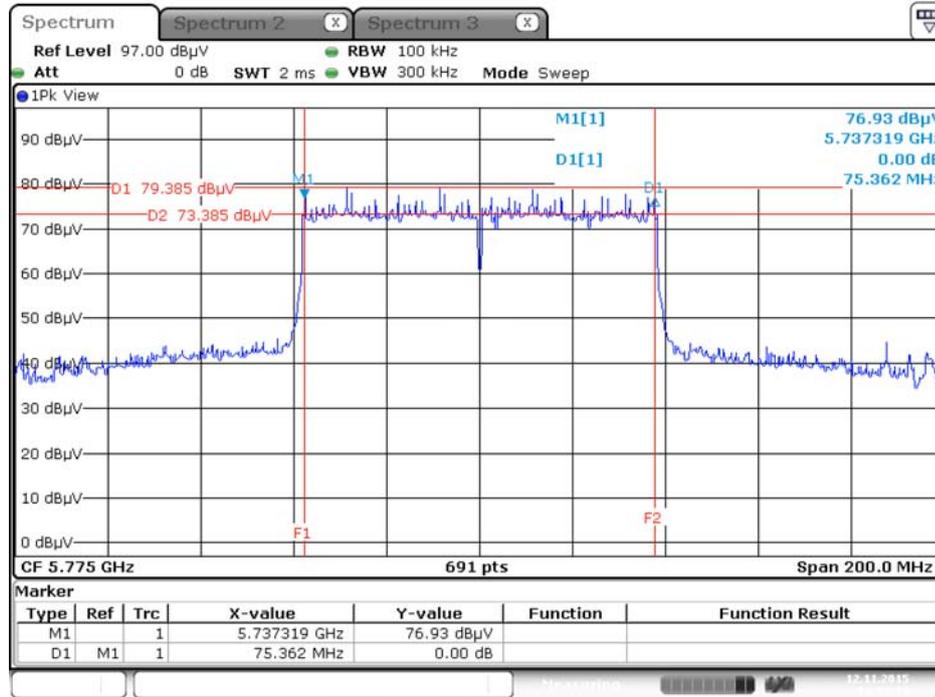
Date: 12.NOV.2015 14:33:12

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 5755 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



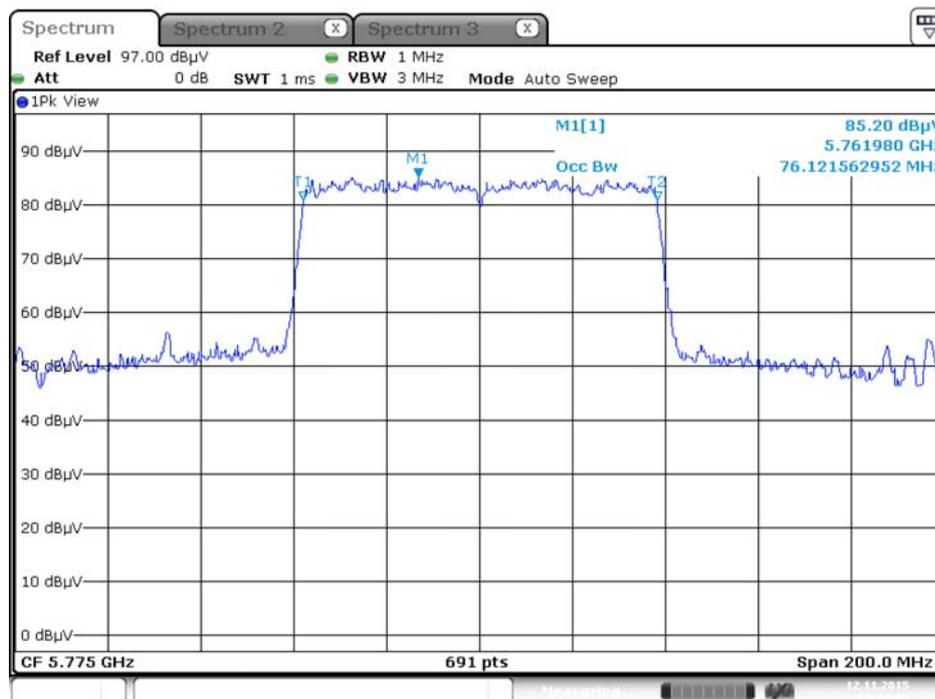
Date: 12.NOV.2015 14:47:05

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



Date: 12.NOV.2015 14:35:13

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / 5775 MHz / Chain 1 + Chain 2 + Chain 3 + Chain 4



Date: 12.NOV.2015 14:49:03

## 4.5. Radiated Emissions Measurement

### 4.5.1. Limit

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

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

### 4.5.2. Measuring Instruments and Setting

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

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

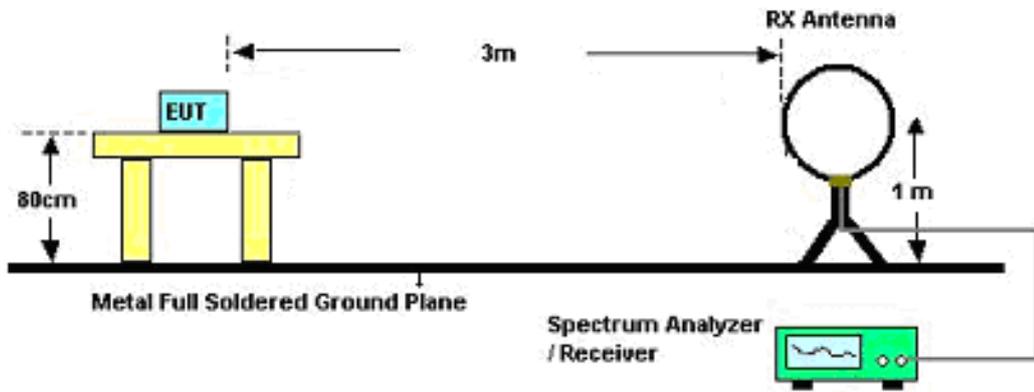
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

#### 4.5.3. Test Procedures

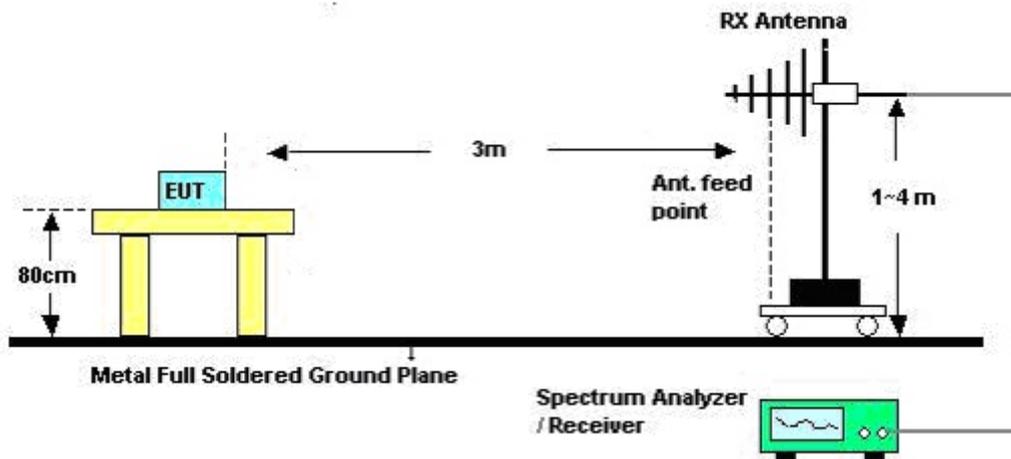
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

#### 4.5.4. Test Setup Layout

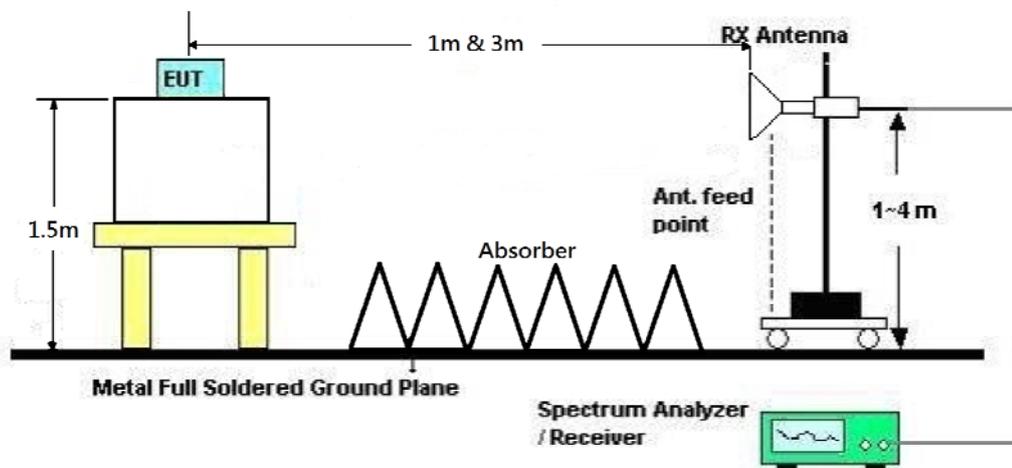
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



#### 4.5.5. Test Deviation

There is no deviation with the original standard.

#### 4.5.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

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

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	CTX
<b>Test Date</b>	Nov. 14, 2015	<b>Test Mode</b>	Mode 1

<b>Freq. (MHz)</b>	<b>Level (dBuV)</b>	<b>Over Limit (dB)</b>	<b>Limit Line (dBuV)</b>	<b>Remark</b>
-	-	-	-	See Note

Note:

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

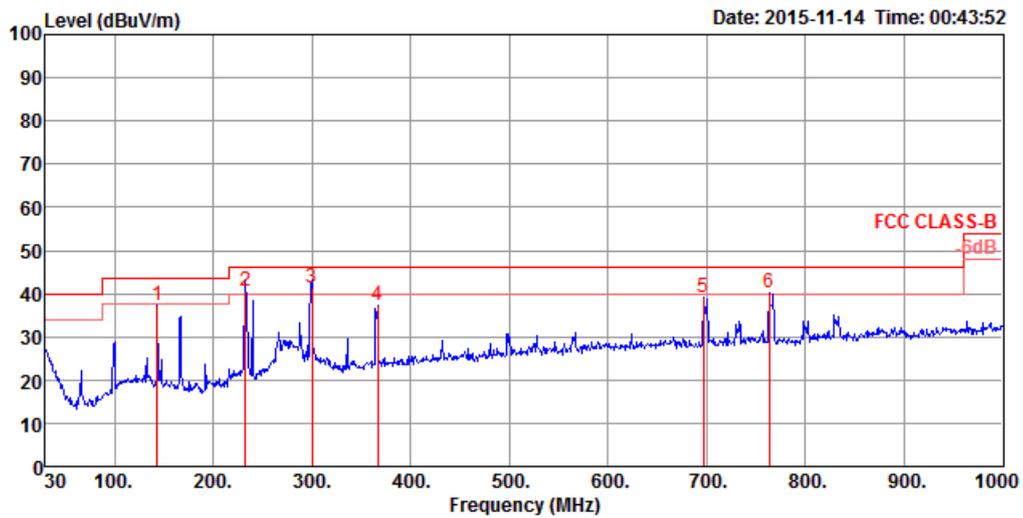
Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

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

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

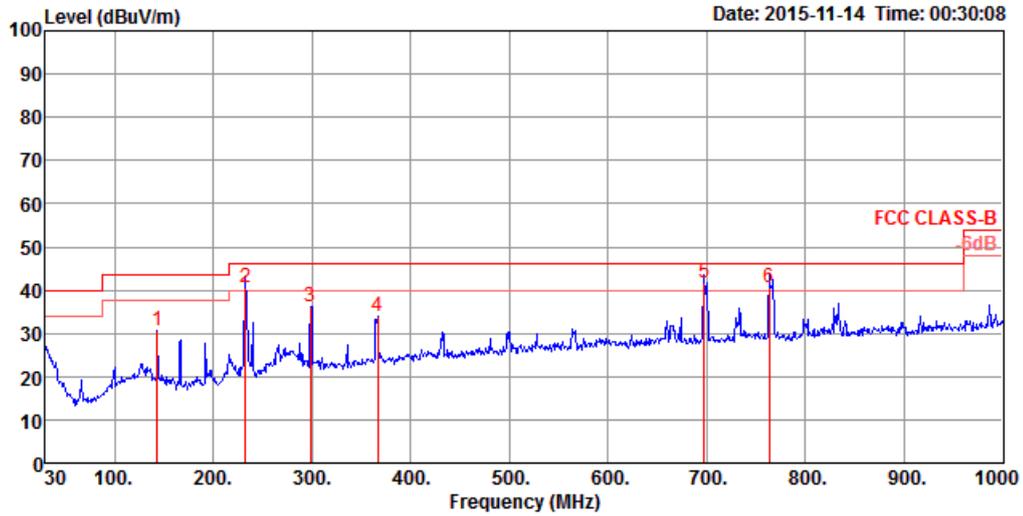
Temperature	25°C	Humidity	60%
Test Engineer	Peter Wu	Configurations	CTX
Test Mode	Mode 1		

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	143.49	37.36	43.50	-6.14	56.86	1.08	11.78	32.36	200	222	Peak	HORIZONTAL
2	232.73	40.65	46.00	-5.35	60.10	1.34	11.52	32.31	150	297	QP	HORIZONTAL
3	299.66	41.19	46.00	-4.81	58.10	1.49	13.88	32.28	100	3	QP	HORIZONTAL
4	366.59	37.40	46.00	-8.60	52.34	1.66	15.71	32.31	100	336	Peak	HORIZONTAL
5	696.39	39.26	46.00	-6.74	49.78	2.14	19.70	32.36	150	183	Peak	HORIZONTAL
6	763.32	40.25	46.00	-5.75	49.79	2.24	20.51	32.29	150	318	Peak	HORIZONTAL

**Vertical**



	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Preamp Factor	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	143.49	30.46	43.50	-13.04	49.96	1.08	11.78	32.36	100	24 Peak	VERTICAL
2	232.73	40.65	46.00	-5.35	60.10	1.34	11.52	32.31	100	265 QP	VERTICAL
3	298.69	36.22	46.00	-9.78	53.15	1.49	13.86	32.28	150	189 Peak	VERTICAL
4	366.59	33.81	46.00	-12.19	48.75	1.66	15.71	32.31	100	184 Peak	VERTICAL
5	697.36	41.57	46.00	-4.43	52.09	2.14	19.70	32.36	100	30 QP	VERTICAL
6	763.32	40.67	46.00	-5.33	50.21	2.24	20.51	32.29	100	12 QP	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~10<sup>th</sup> Harmonic)**

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11b CH 1 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 10, 2015		

**Horizontal**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4824.04	41.17	54.00	-12.83	37.40	5.60	32.69	34.52	131	100	Average	HORIZONTAL
2	4824.15	48.54	74.00	-25.46	44.77	5.60	32.69	34.52	131	100	Peak	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.95	55.14	74.00	-18.86	51.37	5.60	32.69	34.52	140	180	Peak	VERTICAL
2	4824.05	51.68	54.00	-2.32	47.91	5.60	32.69	34.52	140	180	Average	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11b CH 6 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4874.04	48.09	74.00	-25.91	44.12	5.70	32.78	34.51	140	101	Peak	HORIZONTAL
2	4874.07	40.49	54.00	-13.51	36.52	5.70	32.78	34.51	140	101	Average	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4873.97	50.56	74.00	-23.44	46.59	5.70	32.78	34.51	142	177	Peak	VERTICAL
2	4874.03	45.41	54.00	-8.59	41.44	5.70	32.78	34.51	142	177	Average	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11b CH 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4923.93	49.00	74.00	-25.00	44.82	5.79	32.88	34.49	224	115	Peak	HORIZONTAL
2	4924.04	41.64	54.00	-12.36	37.46	5.79	32.88	34.49	224	115	Average	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4924.04	45.47	54.00	-8.53	41.29	5.79	32.88	34.49	137	175	Average	VERTICAL
2	4924.12	50.95	74.00	-23.05	46.77	5.79	32.88	34.49	137	175	Peak	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11g CH 1 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.65	32.14	54.00	-21.86	28.37	5.60	32.69	34.52	182	152	Average	HORIZONTAL
2	4823.92	45.29	74.00	-28.71	41.52	5.60	32.69	34.52	182	152	Peak	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.04	44.81	74.00	-29.19	41.04	5.60	32.69	34.52	196	155	Peak	VERTICAL
2	4823.66	32.25	54.00	-21.75	28.48	5.60	32.69	34.52	196	155	Average	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11g CH 6 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	4874.68	45.59	74.00	-28.41	41.62	5.70	32.78	205	158	Peak	HORIZONTAL
2	4874.83	32.53	54.00	-21.47	28.56	5.70	32.78	205	158	Average	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	4874.31	44.95	74.00	-29.05	40.98	5.70	32.78	214	172	Peak	VERTICAL
2	4874.95	32.12	54.00	-21.88	28.15	5.70	32.78	214	172	Average	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11g CH 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4923.37	33.10	54.00	-20.90	28.92	5.79	32.88	34.49	236	147	Average	HORIZONTAL
2	4924.63	46.94	74.00	-27.06	42.76	5.79	32.88	34.49	236	147	Peak	HORIZONTAL

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4923.88	32.60	54.00	-21.40	28.42	5.79	32.88	34.49	211	154	Average	VERTICAL
2	4924.00	45.45	74.00	-28.55	41.27	5.79	32.88	34.49	211	154	Peak	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 06, 2015		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4823.88	44.30	74.00	-29.70	40.03	6.11	32.55	34.39	157	147	HORIZONTAL Peak
2	4824.93	30.81	54.00	-23.19	26.54	6.11	32.55	34.39	157	147	HORIZONTAL Average

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4823.47	44.82	74.00	-29.18	40.55	6.11	32.55	34.39	151	163	VERTICAL Peak
2	4823.56	31.86	54.00	-22.14	27.59	6.11	32.55	34.39	151	163	VERTICAL Average

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 6 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 06, 2015		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	4873.79	43.76	74.00	-30.24	39.34	6.14	32.66	34.38	154	244	HORIZONTAL Peak
2	4874.88	31.34	54.00	-22.66	26.92	6.14	32.66	34.38	154	244	HORIZONTAL Average

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	4873.02	32.38	54.00	-21.62	27.98	6.12	32.66	34.38	160	24	VERTICAL Average
2	4874.22	45.20	74.00	-28.80	40.78	6.14	32.66	34.38	160	24	VERTICAL Peak

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 06, 2015		

#### Horizontal

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	4923.49	30.83	54.00	-23.17	26.30	6.16	32.74	34.37	167	290	HORIZONTAL	Average
2	4923.97	44.65	74.00	-29.35	40.10	6.16	32.76	34.37	167	290	HORIZONTAL	Peak

#### Vertical

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg		
1	4923.74	30.87	54.00	-23.13	26.32	6.16	32.76	34.37	158	141	VERTICAL	Average
2	4924.20	43.84	74.00	-30.16	39.29	6.16	32.76	34.37	158	141	VERTICAL	Peak

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 06, 2015		

#### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	4843.01	30.35	54.00	-23.65	26.03	6.11	32.60	34.39	151	129	HORIZONTAL Average
2	4844.82	43.01	74.00	-30.99	38.69	6.11	32.60	34.39	151	129	HORIZONTAL Peak

#### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	4843.00	30.19	54.00	-23.81	25.87	6.11	32.60	34.39	165	65	VERTICAL Average
2	4844.35	43.60	74.00	-30.40	39.28	6.11	32.60	34.39	165	65	VERTICAL Peak

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT40 CH 6 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 06, 2015		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4873.12	44.36	74.00	-29.64	39.96	6.12	32.66	34.38	161	145	HORIZONTAL Peak
2	4874.17	31.26	54.00	-22.74	26.84	6.14	32.66	34.38	161	145	HORIZONTAL Average

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	4874.03	44.85	74.00	-29.15	40.43	6.14	32.66	34.38	117	281	VERTICAL Peak
2	4874.57	31.36	54.00	-22.64	26.94	6.14	32.66	34.38	117	281	VERTICAL Average

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT40 CH 9 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 06, 2015		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	4903.54	31.39	54.00	-22.61	26.90	6.16	32.71	34.38	158	178	HORIZONTAL Average
2	4904.78	44.18	74.00	-29.82	39.69	6.16	32.71	34.38	158	178	HORIZONTAL Peak

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	Loss	Factor	Factor	cm	deg	
1	4903.81	31.51	54.00	-22.49	27.02	6.16	32.71	34.38	154	340	VERTICAL Average
2	4904.66	44.21	74.00	-29.79	39.72	6.16	32.71	34.38	154	340	VERTICAL Peak

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

**Horizontal**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11489.86	54.33	74.00	-19.67	42.91	7.34	38.70	34.62	267	181	Peak	HORIZONTAL
2	11491.54	40.69	54.00	-13.31	29.27	7.34	38.70	34.62	267	181	Average	HORIZONTAL

**Vertical**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11490.92	40.82	54.00	-13.18	29.40	7.34	38.70	34.62	274	186	Average	VERTICAL
2	11492.09	53.97	74.00	-20.03	42.55	7.34	38.70	34.62	274	186	Peak	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

### Horizontal

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11568.13	54.17	74.00	-19.83	42.69	7.41	38.71	34.64	240	159	Peak	HORIZONTAL
2	11569.44	40.37	54.00	-13.63	28.89	7.41	38.71	34.64	240	159	Average	HORIZONTAL

### Vertical

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11568.25	40.44	54.00	-13.56	28.96	7.41	38.71	34.64	258	177	Average	VERTICAL
2	11571.79	53.24	74.00	-20.76	41.77	7.41	38.71	34.65	258	177	Peak	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11648.68	40.47	54.00	-13.53	28.92	7.50	38.73	34.68	224	150	Average	HORIZONTAL
2	11649.01	54.10	74.00	-19.90	42.55	7.50	38.73	34.68	224	150	Peak	HORIZONTAL

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11650.34	40.31	54.00	-13.69	28.76	7.50	38.73	34.68	234	154	Average	VERTICAL
2	11652.29	53.67	74.00	-20.33	42.10	7.52	38.73	34.68	234	154	Peak	VERTICAL

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 09, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11483.00	44.90	54.00	-9.10	28.75	11.46	35.23	39.92	HORIZONTAL	143	324	Average
2	11486.04	57.83	74.00	-16.17	41.69	11.47	35.23	39.90	HORIZONTAL	143	324	Peak

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11482.92	58.30	74.00	-15.70	42.15	11.46	35.23	39.92	VERTICAL	138	223	Peak
2	11492.72	44.81	54.00	-9.19	28.67	11.47	35.23	39.90	VERTICAL	138	223	Average

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 09, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11561.28	57.93	74.00	-16.07	41.85	11.54	35.23	39.77	HORIZONTAL	160	145	Peak
2	11571.40	45.16	54.00	-8.84	29.08	11.54	35.23	39.77	HORIZONTAL	160	145	Average

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11572.44	44.96	54.00	-9.04	28.88	11.54	35.23	39.77	VERTICAL	143	7	Average
2	11574.52	57.93	74.00	-16.07	41.85	11.54	35.23	39.77	VERTICAL	143	7	Peak



<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 09, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11640.72	58.36	74.00	-15.64	42.34	11.61	35.22	39.63	HORIZONTAL	129	125	Peak
2	11646.72	46.36	54.00	-7.64	30.34	11.61	35.22	39.63	HORIZONTAL	129	125	Average

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11640.12	58.24	74.00	-15.76	42.22	11.61	35.22	39.63	VERTICAL	145	165	Peak
2	11648.32	45.36	54.00	-8.64	29.33	11.62	35.22	39.63	VERTICAL	145	165	Average

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 09, 2015		

**Horizontal**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11502.56	58.01	74.00	-15.99	41.87	11.47	35.23	39.90	HORIZONTAL	145	264	Peak
2	11507.84	44.42	54.00	-9.58	28.26	11.49	35.23	39.90	HORIZONTAL	145	264	Average

**Vertical**

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11502.20	44.43	54.00	-9.57	28.29	11.47	35.23	39.90	VERTICAL	160	143	Average
2	11512.40	57.12	74.00	-16.88	40.96	11.49	35.23	39.90	VERTICAL	160	143	Peak

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 09, 2015		

### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11590.16	57.39	74.00	-16.61	41.35	11.56	35.22	39.70	HORIZONTAL	165	154	Peak
2	11591.96	44.88	54.00	-9.12	28.84	11.56	35.22	39.70	HORIZONTAL	165	154	Average

### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11592.48	57.26	74.00	-16.74	41.22	11.56	35.22	39.70	VERTICAL	155	325	Peak
2	11597.76	44.97	54.00	-9.03	28.92	11.57	35.22	39.70	VERTICAL	155	325	Average

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 09, 2015		

#### Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11552.12	57.67	74.00	-16.33	41.61	11.52	35.23	39.77	HORIZONTAL	146	321	Peak
2	11560.00	44.49	54.00	-9.51	28.41	11.54	35.23	39.77	HORIZONTAL	146	321	Average

#### Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		cm	deg	
1	11556.36	57.65	74.00	-16.35	41.59	11.52	35.23	39.77	VERTICAL	165	187	Peak
2	11559.32	44.62	54.00	-9.38	28.54	11.54	35.23	39.77	VERTICAL	165	187	Average

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

### 4.6.2. 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)	1 MHz / 3 MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (30dBc in any 100 kHz bandwidth emission)	100 kHz / 300 kHz for Peak

### 4.6.3. Test Procedures

For Radiated band edges Measurement:

1. The test procedure is the same as section 4.5.3.

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB558074 D01 v03r03 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

#### 4.6.4. Test Setup Layout

For Radiated band edges Measurement:

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

For Radiated Out of Band Emission Measurement:

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

#### 4.6.5. Test Deviation

There is no deviation with the original standard.

#### 4.6.6. EUT Operation during Test

For non-beamforming function:

The EUT was programmed to be in continuously transmitting mode.

For beamforming function:

The EUT was programmed to be in beamforming transmitting mode.

#### 4.6.7. Test Result of Band Edge and Fundamental Emissions

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11b CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 10, 2015		

##### Channel 1

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2390.00	65.09	74.00	-8.91	33.20	3.75	28.14	0.00	183	271	Peak	VERTICAL
2	2390.00	52.47	54.00	-1.53	20.58	3.75	28.14	0.00	183	271	Average	VERTICAL
3	2411.36	119.49			87.61	3.76	28.12	0.00	183	271	Average	VERTICAL
4	2412.96	123.33			91.45	3.76	28.12	0.00	183	271	Peak	VERTICAL

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

##### Channel 6

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2461.20	122.08			90.23	3.80	28.05	0.00	181	260	Peak	VERTICAL
2	2461.36	118.12			86.27	3.80	28.05	0.00	181	260	Average	VERTICAL
3	2483.50	64.33	74.00	-9.67	32.49	3.82	28.02	0.00	181	260	Peak	VERTICAL
4	2483.50	52.82	54.00	-1.18	20.98	3.82	28.02	0.00	181	260	Average	VERTICAL

Item 1, 2 are the fundamental frequency at 2437 MHz.

##### Channel 11

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2386.36	58.97	74.00	-15.03	27.08	3.75	28.14	0.00	183	266	Peak	VERTICAL
2	2390.00	47.45	54.00	-6.55	15.56	3.75	28.14	0.00	183	266	Average	VERTICAL
3	2436.04	123.85			91.98	3.77	28.10	0.00	183	266	Peak	VERTICAL
4	2436.36	119.72			87.85	3.77	28.10	0.00	183	266	Average	VERTICAL
5	2500.00	60.74	74.00	-13.26	28.91	3.83	28.00	0.00	183	266	Peak	VERTICAL
6	2500.00	50.88	54.00	-3.12	19.05	3.83	28.00	0.00	183	266	Average	VERTICAL

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

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11g CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 11, 2015		

**Channel 1**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	2390.00	70.92	74.00	-3.08	39.03	3.75	28.14	0.00	185	270	Peak	VERTICAL
2	2390.00	52.45	54.00	-1.55	20.56	3.75	28.14	0.00	185	270	Average	VERTICAL
3	2411.36	119.74			87.86	3.76	28.12	0.00	185	270	Peak	VERTICAL
4	2411.36	110.46			78.58	3.76	28.12	0.00	185	270	Average	VERTICAL

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

**Channel 6**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	2390.00	60.28	74.00	-13.72	28.39	3.75	28.14	0.00	183	265	Peak	VERTICAL
2	2390.00	48.71	54.00	-5.29	16.82	3.75	28.14	0.00	183	265	Average	VERTICAL
3	2435.72	125.66			93.79	3.77	28.10	0.00	183	265	Peak	VERTICAL
4	2436.36	115.13			83.26	3.77	28.10	0.00	183	265	Average	VERTICAL
5	2488.28	64.97	74.00	-9.03	33.14	3.83	28.00	0.00	183	265	Peak	VERTICAL
6	2499.82	50.43	54.00	-3.57	18.60	3.83	28.00	0.00	183	265	Average	VERTICAL

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

**Channel 11**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase	
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm			
1	2461.04	119.94			88.09	3.80	28.05	0.00	182	261	Peak	VERTICAL
2	2461.36	109.55			77.70	3.80	28.05	0.00	182	261	Average	VERTICAL
3	2483.50	72.62	74.00	-1.38	40.78	3.82	28.02	0.00	182	261	Peak	VERTICAL
4	2483.50	52.93	54.00	-1.07	21.09	3.82	28.02	0.00	182	261	Average	VERTICAL

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

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1, 6, 11 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 10, 2015		

**Channel 1**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	2389.89	66.26	74.00	-7.74	34.37	3.75	28.14	0.00	77	228 Peak	VERTICAL
2	2390.00	52.65	54.00	-1.35	20.76	3.75	28.14	0.00	77	228 Average	VERTICAL
3	2411.04	120.04			88.16	3.76	28.12	0.00	77	228 Peak	VERTICAL
4	2413.44	110.37			78.49	3.76	28.12	0.00	77	228 Average	VERTICAL

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

**Channel 6**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	2382.83	60.15	74.00	-13.85	28.25	3.73	28.17	0.00	237	227 Peak	VERTICAL
2	2389.24	49.35	54.00	-4.65	17.46	3.75	28.14	0.00	237	227 Average	VERTICAL
3	2434.76	125.39			93.52	3.77	28.10	0.00	237	227 Peak	VERTICAL
4	2435.40	115.32			83.45	3.77	28.10	0.00	237	227 Average	VERTICAL
5	2483.50	48.42	54.00	-5.58	16.58	3.82	28.02	0.00	237	227 Average	VERTICAL
6	2484.44	61.03	74.00	-12.97	29.19	3.82	28.02	0.00	237	227 Peak	VERTICAL

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

**Channel 11**

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	2459.28	119.28			87.43	3.80	28.05	0.00	76	250 Peak	VERTICAL
2	2460.72	108.47			76.62	3.80	28.05	0.00	76	250 Average	VERTICAL
3	2483.50	52.71	54.00	-1.29	20.87	3.82	28.02	0.00	76	250 Average	VERTICAL
4	2483.96	65.62	74.00	-8.38	33.78	3.82	28.02	0.00	76	250 Peak	VERTICAL

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

<b>Temperature</b>	25°C	<b>Humidity</b>	60%
<b>Test Engineer</b>	Peter Wu	<b>Configurations</b>	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3, 6, 9 / Chain 1 + Chain 2 + Chain 3 + Chain 4
<b>Test Date</b>	Nov. 10, 2015		

### Channel 3

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	2388.99	64.33	74.00	-9.67	32.44	3.75	28.14	0.00	183	234 Peak	VERTICAL
2	2389.63	52.88	54.00	-1.12	20.99	3.75	28.14	0.00	183	234 Average	VERTICAL
3	2415.91	102.79			70.91	3.76	28.12	0.00	183	234 Average	VERTICAL
4	2420.08	112.76			80.89	3.77	28.10	0.00	183	234 Peak	VERTICAL
5	2500.21	51.43	54.00	-2.57	19.60	3.83	28.00	0.00	183	234 Average	VERTICAL
6	2500.53	60.71	74.00	-13.29	28.88	3.83	28.00	0.00	183	234 Peak	VERTICAL

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

### Channel 6

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	2386.36	64.58	74.00	-9.42	32.69	3.75	28.14	0.00	236	212 Peak	VERTICAL
2	2386.68	52.77	54.00	-1.23	20.88	3.75	28.14	0.00	236	212 Average	VERTICAL
3	2433.47	105.90			74.03	3.77	28.10	0.00	236	212 Average	VERTICAL
4	2434.44	115.30			83.43	3.77	28.10	0.00	236	212 Peak	VERTICAL
5	2483.50	51.16	54.00	-2.84	19.32	3.82	28.02	0.00	236	212 Average	VERTICAL
6	2484.12	64.68	74.00	-9.32	32.84	3.82	28.02	0.00	236	212 Peak	VERTICAL

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

### Channel 9

	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	2388.86	60.69	74.00	-13.31	28.80	3.75	28.14	0.00	251	229 Peak	VERTICAL
2	2390.00	47.55	54.00	-6.45	15.66	3.75	28.14	0.00	251	229 Average	VERTICAL
3	2435.97	112.04			80.17	3.77	28.10	0.00	251	229 Peak	VERTICAL
4	2437.26	102.08			70.22	3.79	28.07	0.00	251	229 Average	VERTICAL
5	2483.73	52.75	54.00	-1.25	20.91	3.82	28.02	0.00	251	229 Average	VERTICAL
6	2485.33	65.14	74.00	-8.86	33.30	3.82	28.02	0.00	251	229 Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2452 MHz.

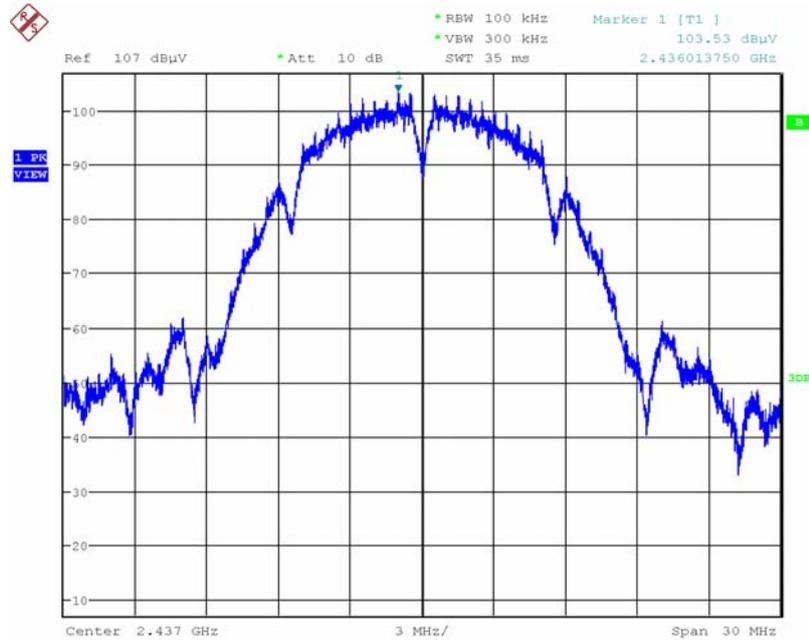
Note:

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

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

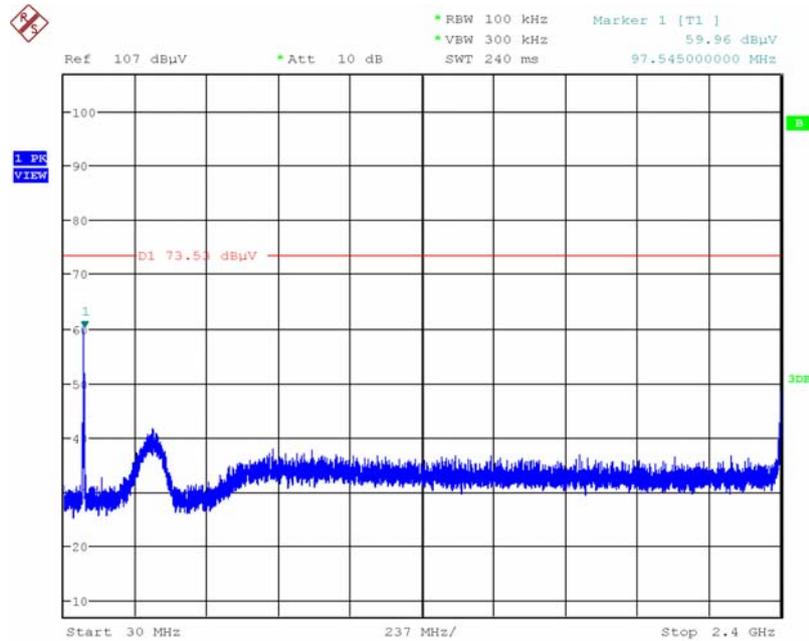
For Emission not in Restricted Band

Plot on Configuration IEEE 802.11b / Reference Level



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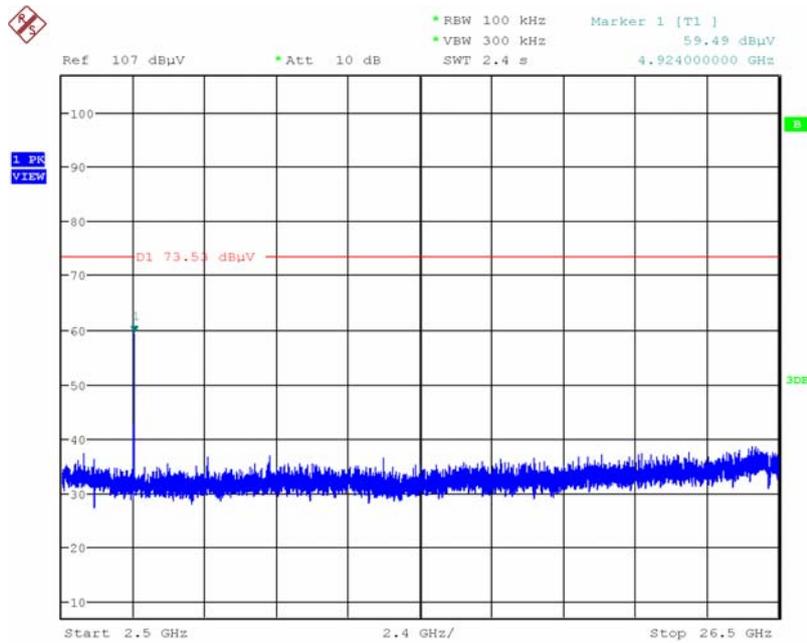
Plot on Configuration IEEE 802.11b / CH 1 / 30MHz~2400MHz (down 30dBc)



Date: 11.NOV.2015 00:02:57

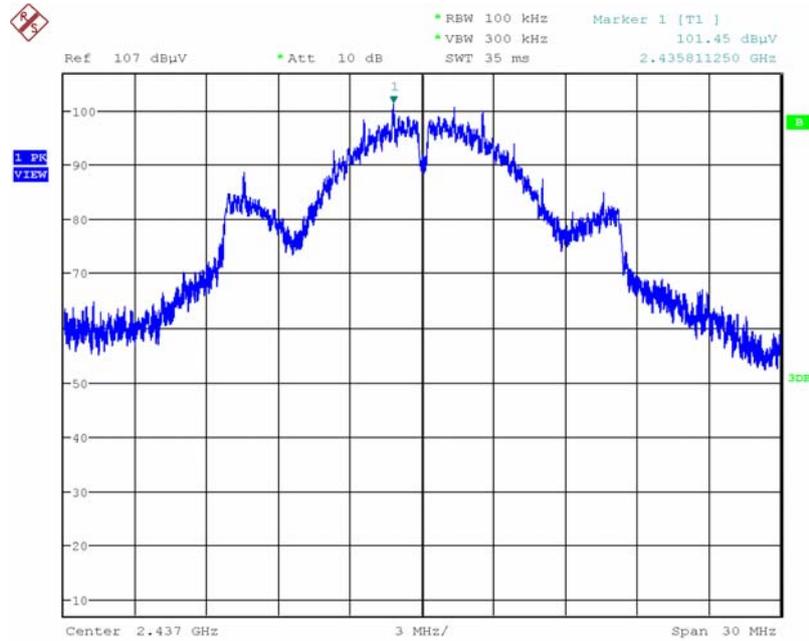


Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



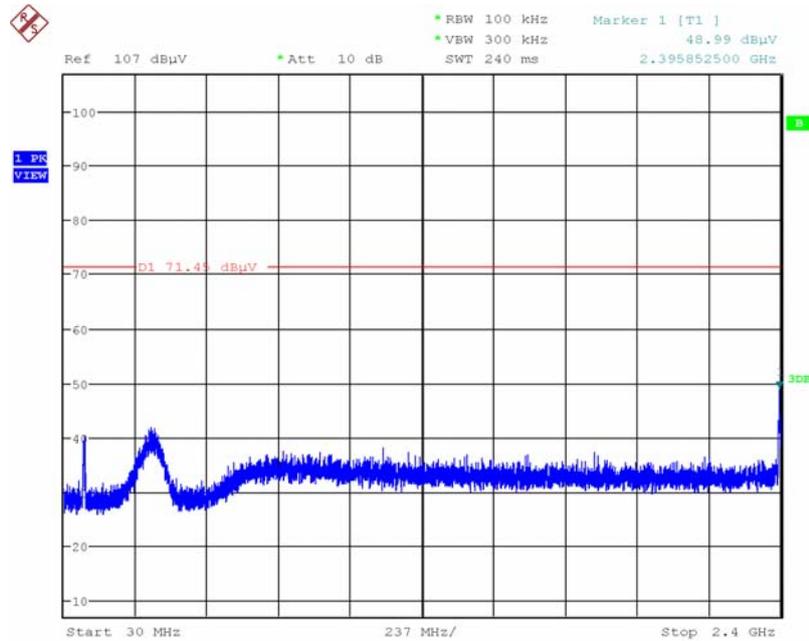
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Plot on Configuration IEEE 802.11g / Reference Level



Date: 10.NOV.2015 23:55:57

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

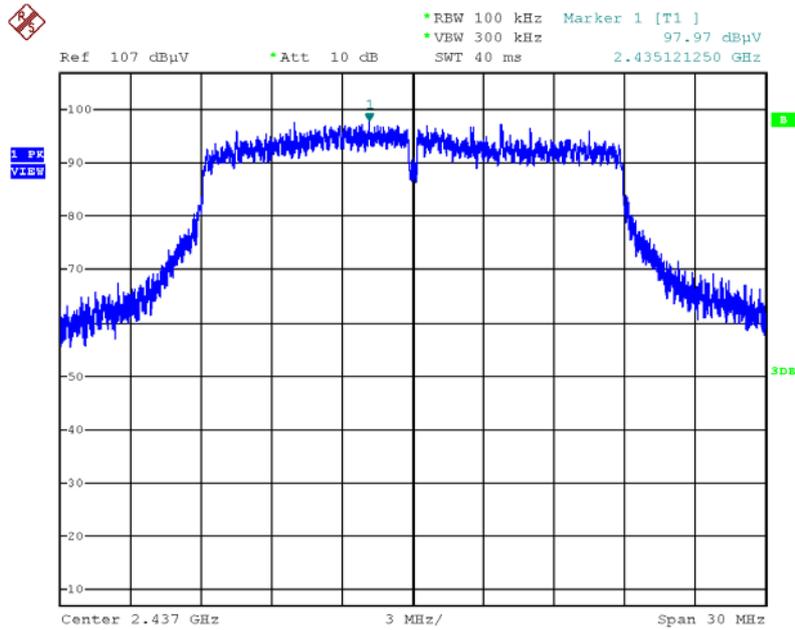


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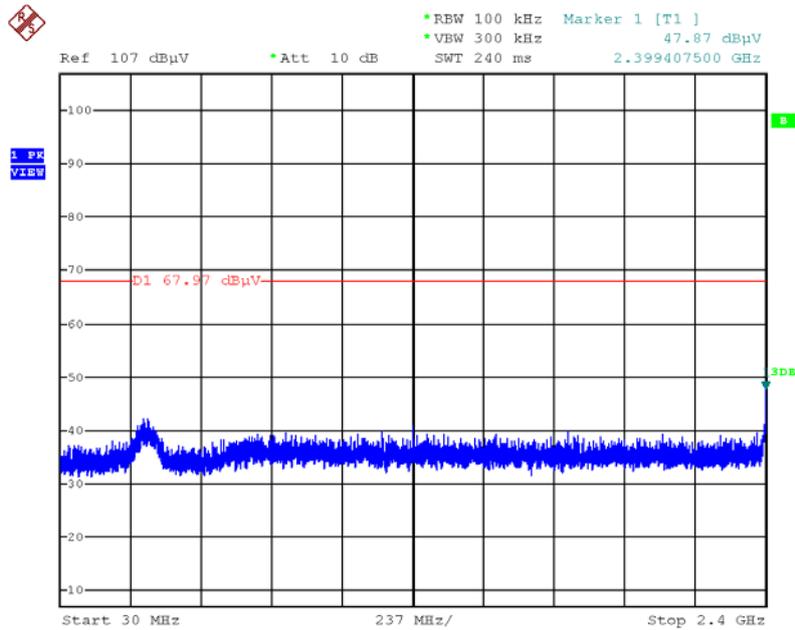


Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Reference Level



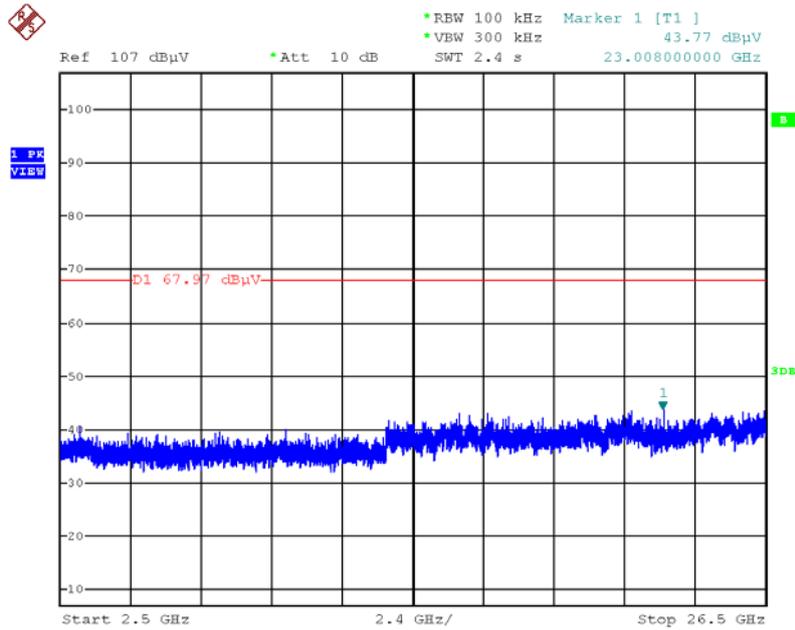
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 1 / 30MHz~2400MHz (down 30dBc)



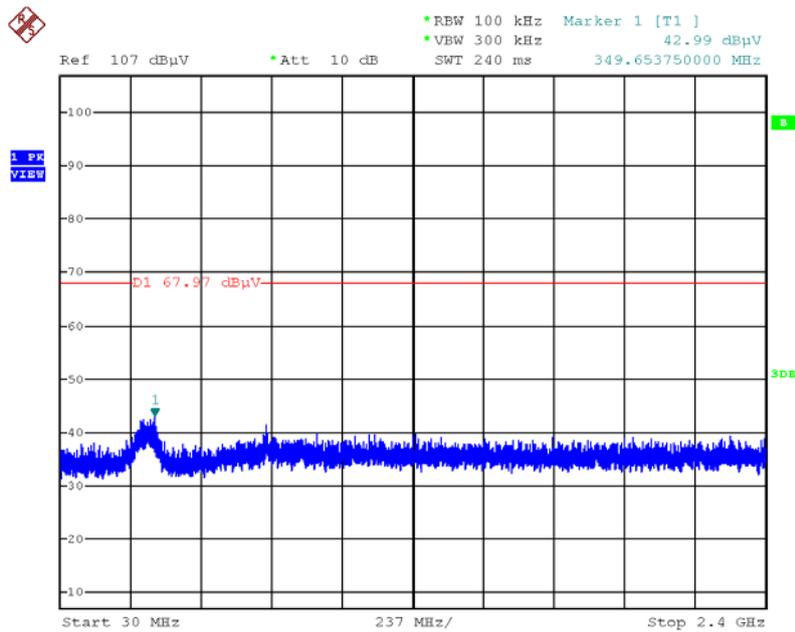
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 1 / 2500MHz~26500MHz (down 30dBc)



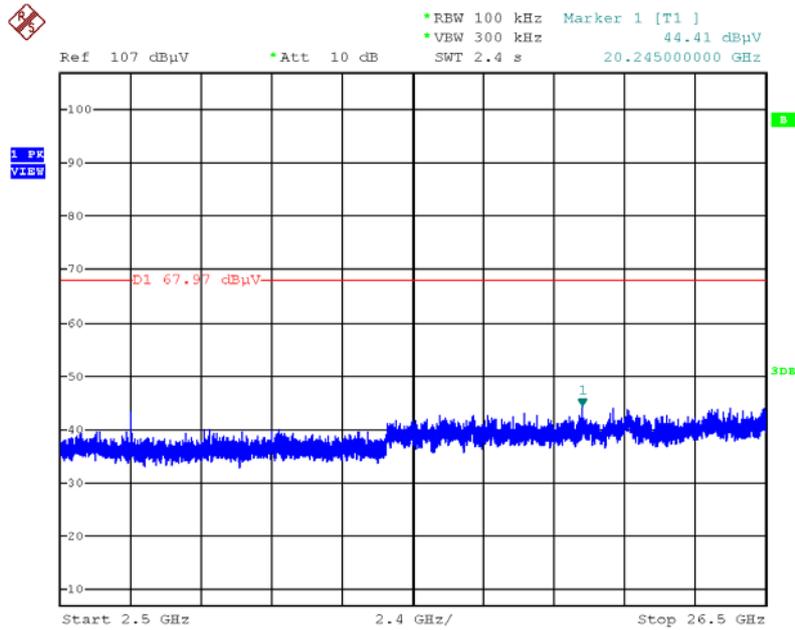
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 11 / 30MHz~2400MHz (down 30dBc)



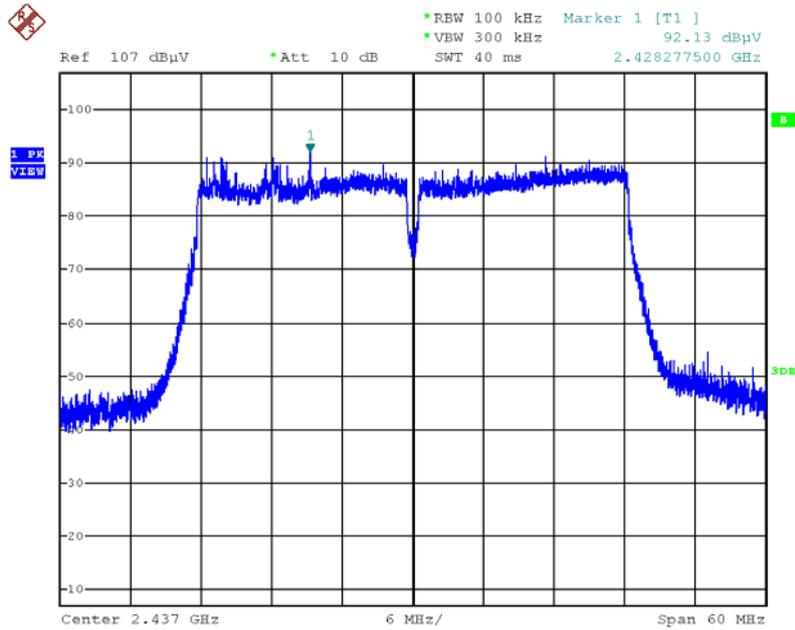
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 11 / 2500MHz~26500MHz (down 30dBc)



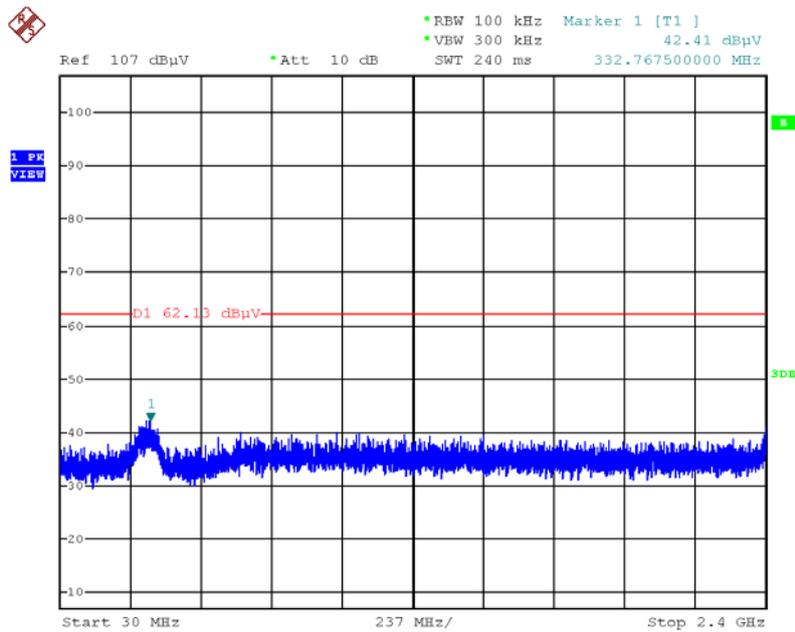
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Reference Level



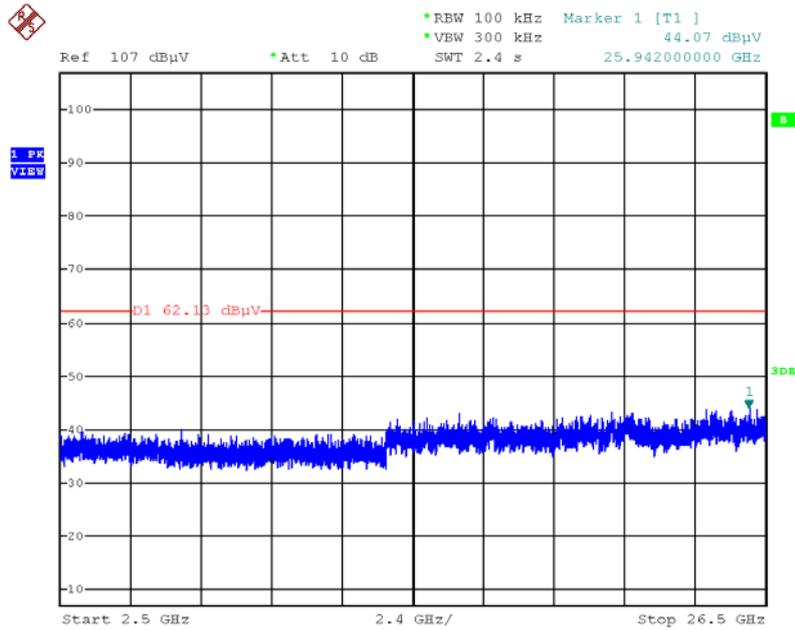
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 3 / 30MHz~2400MHz (down 30dBc)



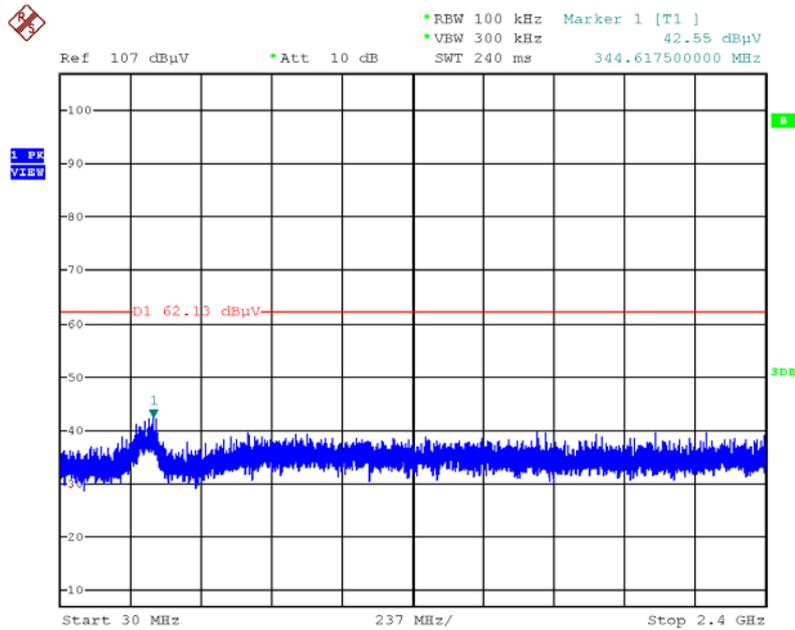
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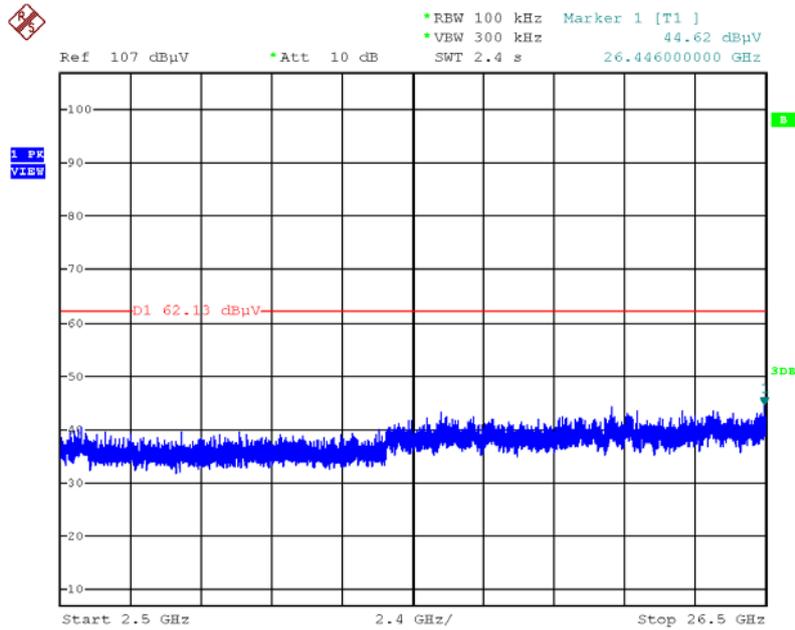
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 9 / 30MHz~2400MHz (down 30dBc)



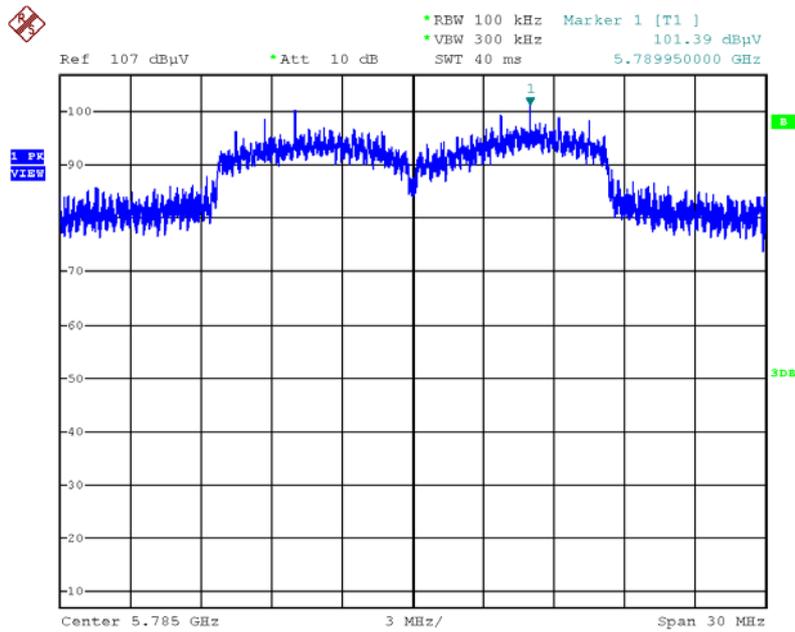
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 9 / 2500MHz~26500MHz (down 30dBc)



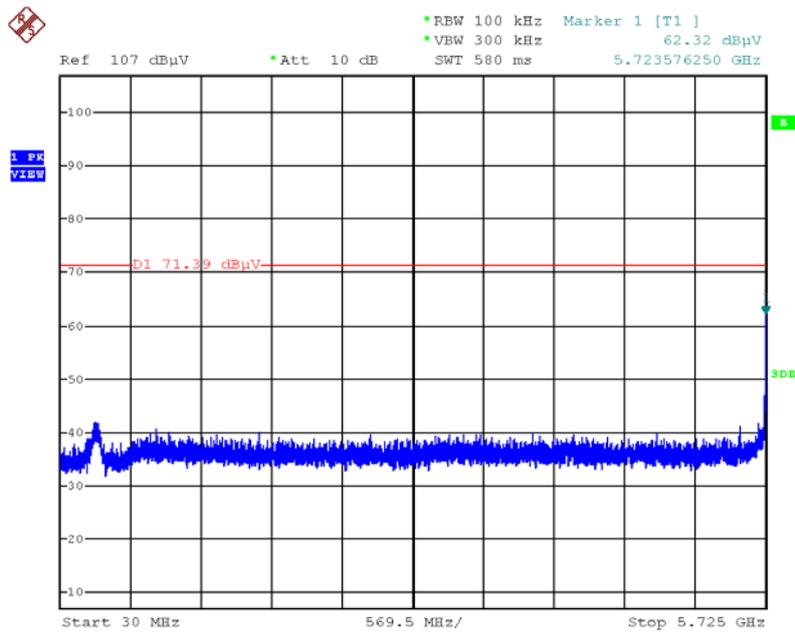
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Plot on Configuration IEEE 802.11a / Reference Level



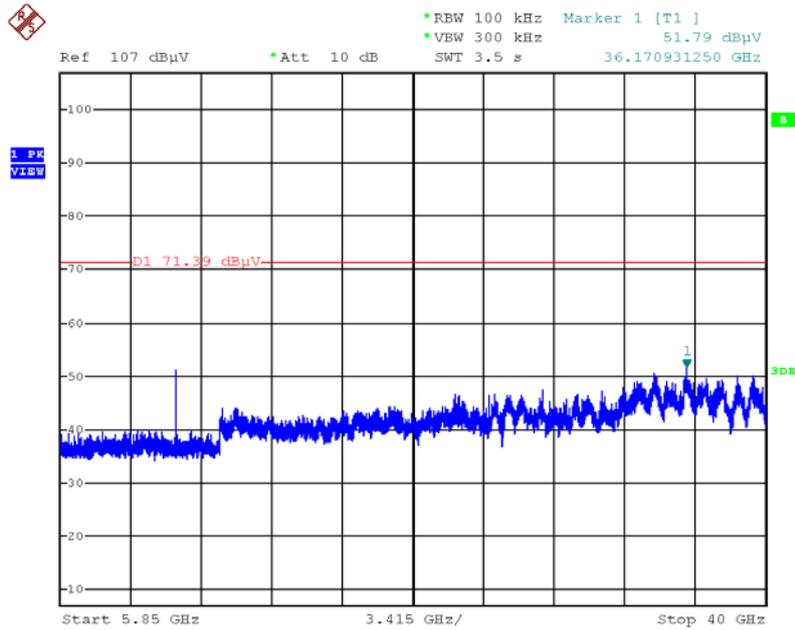
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Plot on Configuration IEEE 802.11a / CH 149 / 30MHz~5725MHz (down 30dBc)



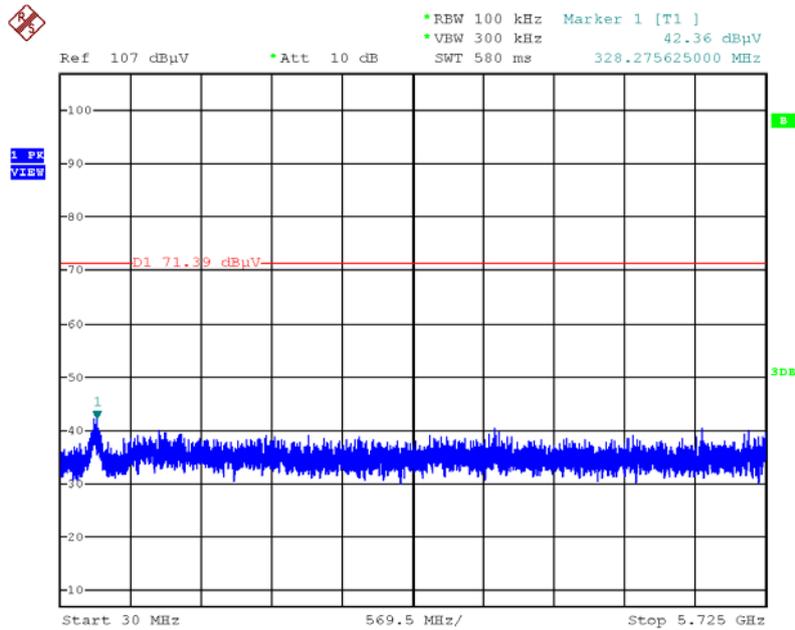
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Plot on Configuration IEEE 802.11a / CH 149 / 5850MHz~40000MHz (down 30dBc)



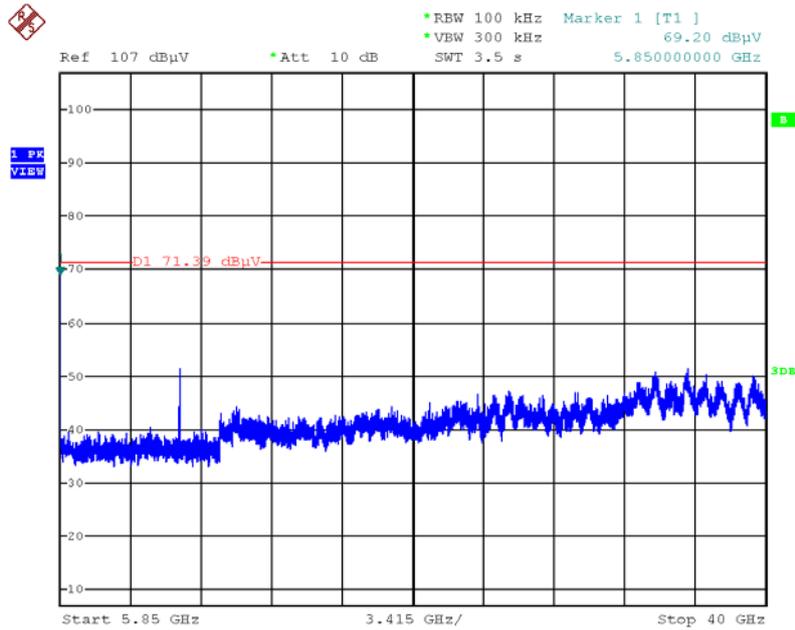
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Plot on Configuration IEEE 802.11a / CH 165 / 30MHz~5725MHz (down 30dBc)



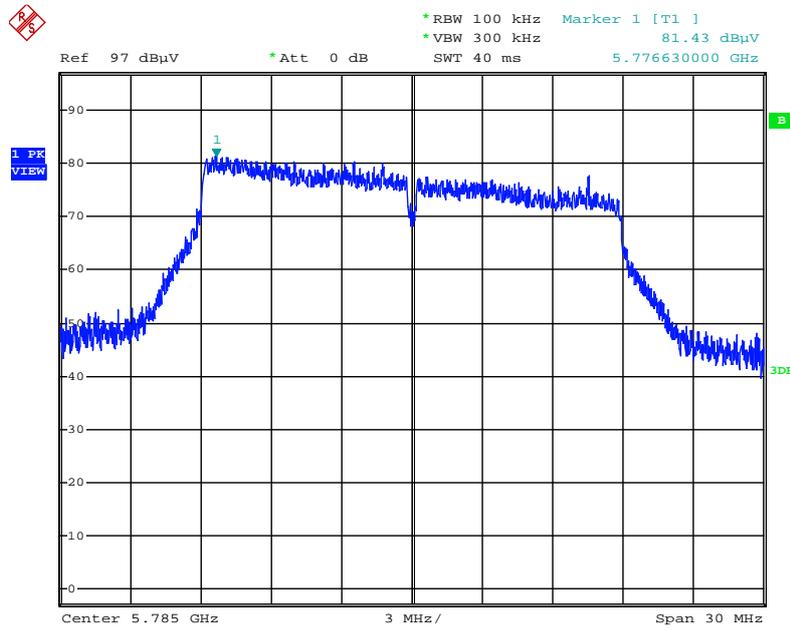
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Plot on Configuration IEEE 802.11a / CH 165 / 5850MHz~4000MHz (down 30dBc)



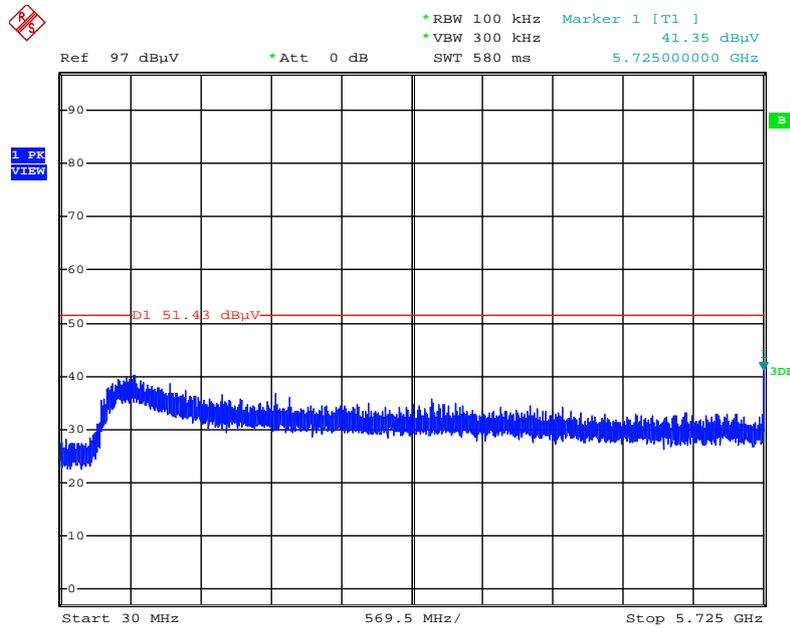
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Reference Level



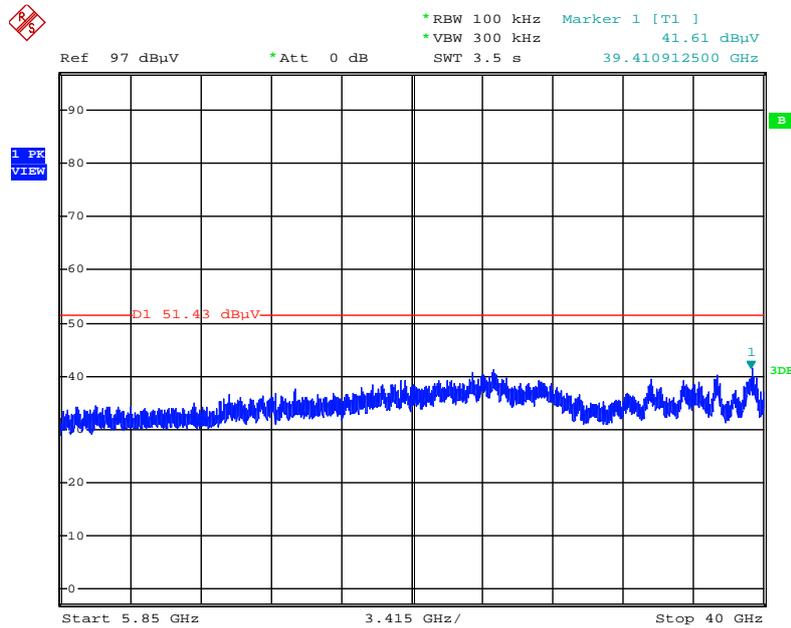
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / CH 149 / 30MHz~5725MHz (down 30dBc)



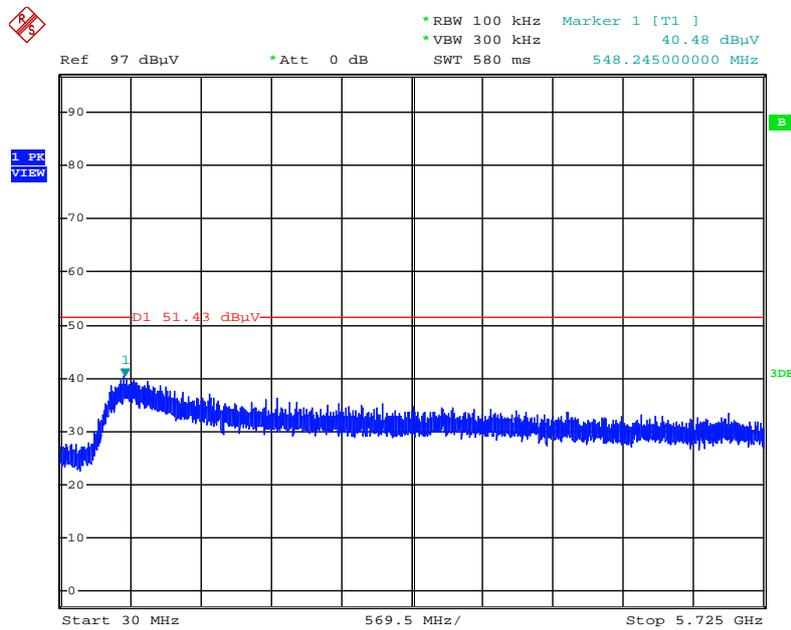
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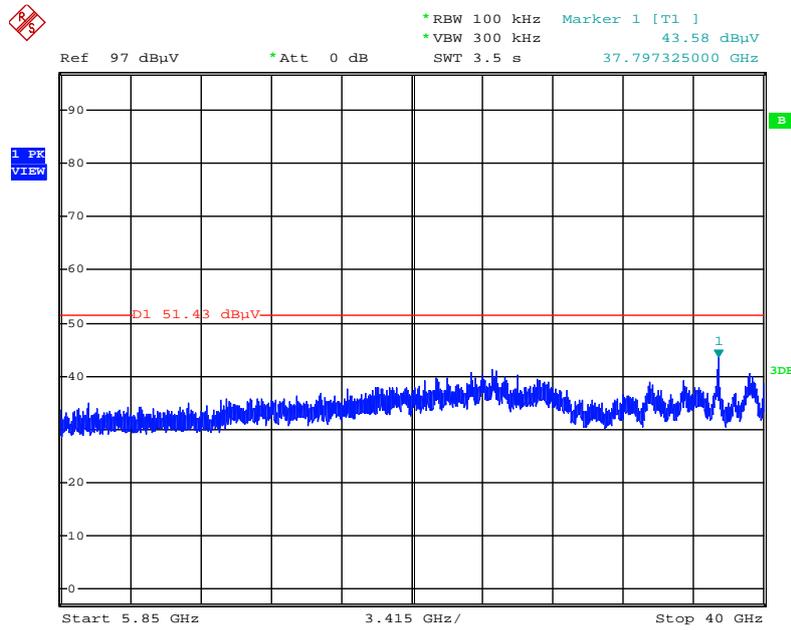
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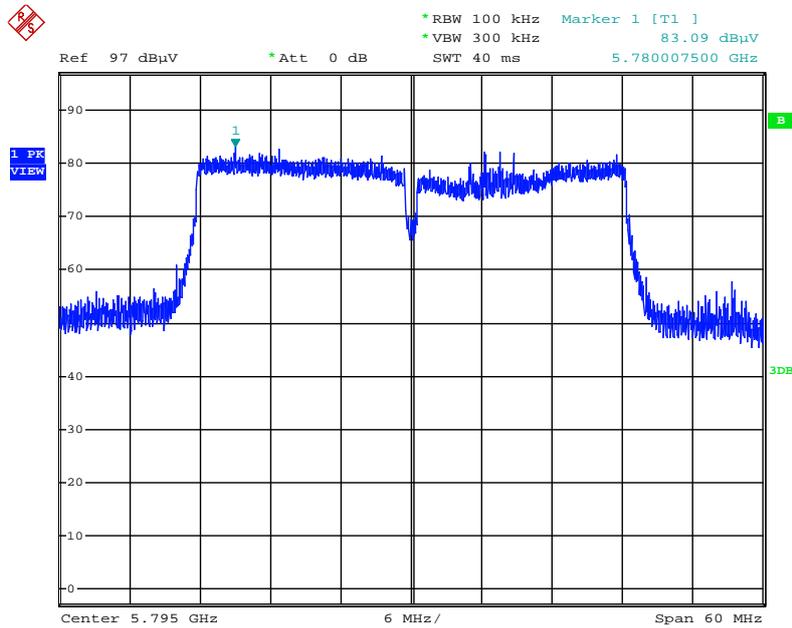
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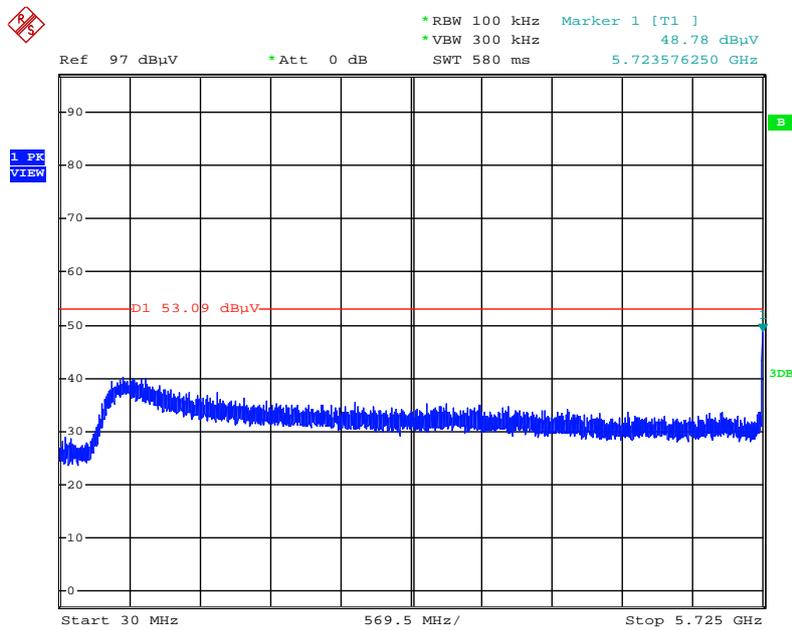
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Reference Level



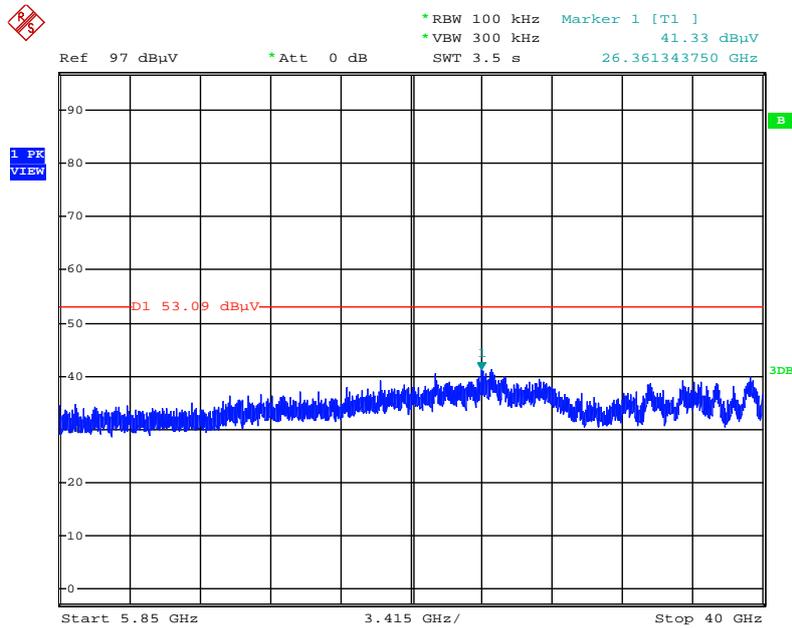
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 151 / 30MHz~5725MHz (down 30dBc)



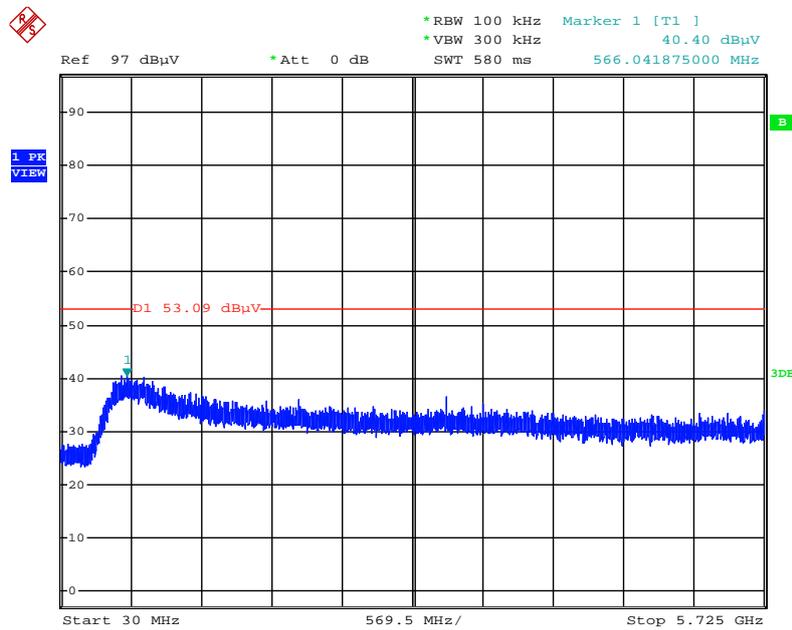
Date: 9.NOV.2015 16:25:51

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



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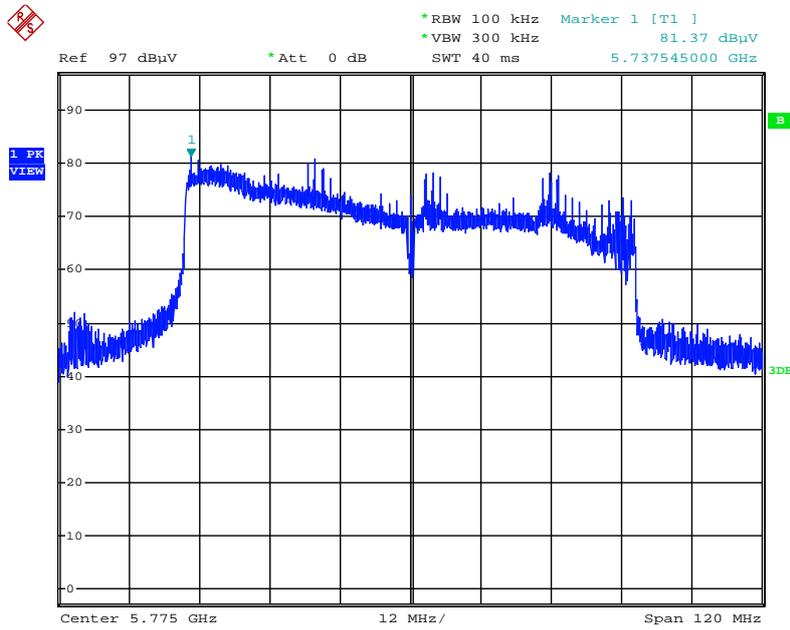
Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / CH 159 / 30MHz~5725MHz (down 30dBc)



Date: 9.NOV.2015 16:21:49

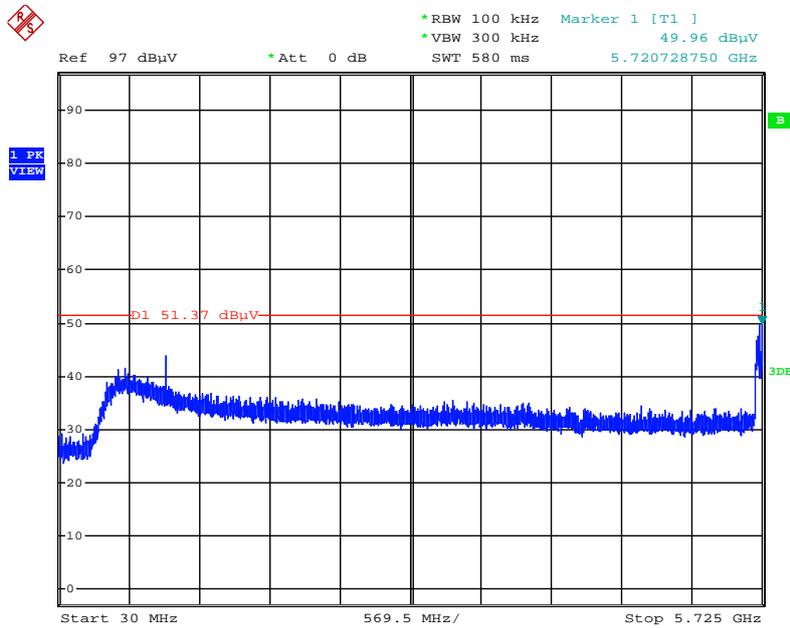


Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Reference Level



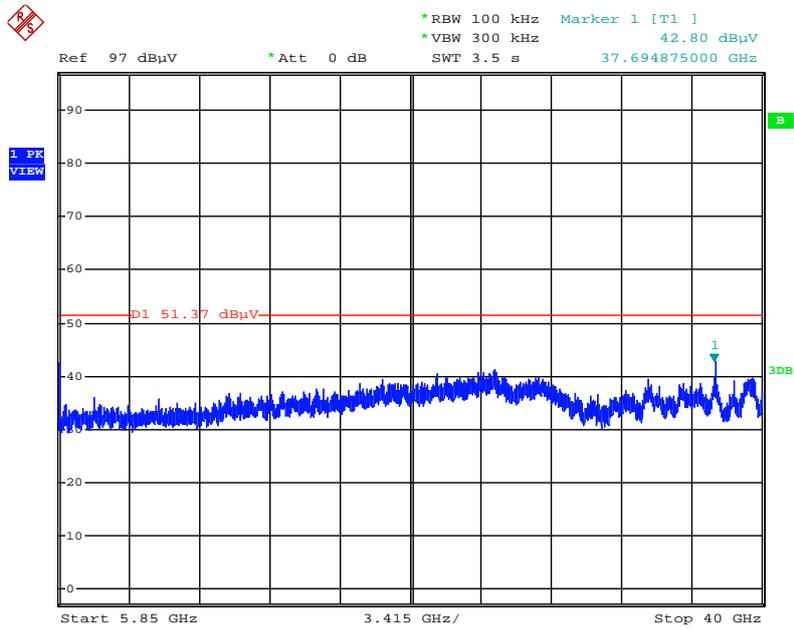
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Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / CH 155 / 30MHz~5725MHz (down 30dBc)



Date: 9.NOV.2015 16:07:50

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



Date: 9.NOV.2015 16:09:27

## 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	9kHz ~ 2.75GHz	Apr. 22, 2015	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 02, 2014	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 02, 2014	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	Dec. 03, 2014	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (O3CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (O3CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (O3CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (O3CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (O3CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (O3CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (O3CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (O3CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 02, 2015	Radiation (O3CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 02, 2015	Radiation (O3CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 02, 2015	Radiation (O3CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (O3CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%