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	**Linksys LLC**
Applicant Address	121 Theory, Irvine CA 92617, United States
FCC ID	**Q87-EA7500**

Product Name	LINKSYS MAX-STREAM AC1900 MU-MIMO GIGABIT ROUTER
Brand Name	LINKSYS
Model No.	EA7500
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Aug. 14, 2015
Final Test Date	Sep. 01, 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.

Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR582115AA	Rev. 01	Initial issue of report	Oct. 16, 2015
FR582115AA	Rev. 02	Changing the model name of adapter 1 to HK-X142-A12S.	Oct. 30, 2015

1. VERIFICATION OF COMPLIANCE

Product Name	:	LINKSYS MAX-STREAM AC1900 MU-MIMO GIGABIT ROUTER
Brand Name	:	LINKSYS
Model No.	:	EA7500
Applicant	:	Linksys LLC
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Aug. 14, 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.

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	9.16 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	0.09 dB
4.3	15.247(e)	Power Spectral Density	Complies	2.11 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	3.23 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.27 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (3TX, 3RX)
Radio Type	Intentional Transceiver
Power Type	From power adapter
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)
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	For 2.4GHz Band: 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth For 5GHz Band: 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth 1 for 80MHz bandwidth
Channel Band Width (99%)	For 2.4GHz Band: For Non-beamforming mode IEEE 802.11b: 11.28 MHz For beamforming mode IEEE 802.11g: 16.68 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.88 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.20 MHz For 5GHz Band: For beamforming mode IEEE 802.11a: 16.80 MHz IEEE 802.11ac MCS0/Nss1 (VHT20): 17.88 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 36.40 MHz IEEE 802.11ac MCS0/Nss1 (VHT80): 76.00 MHz

Maximum Conducted Output Power	For 2.4GHz Band: For Non-beamforming mode IEEE 802.11b: 29.69 dBm For beamforming mode IEEE 802.11g: 28.34 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.60 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 24.16 dBm For 5GHz Band: For beamforming mode IEEE 802.11a: 29.46 dBm IEEE 802.11ac MCS0/Nss1 (VHT20): 29.47 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 29.51 dBm IEEE 802.11ac MCS0/Nss1 (VHT80): 29.07 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☒ With beamforming	☐ Without beamforming

Note:

802.11b supports non-beamforming function only.

802.11g/n/ac in 2.4GHz and 802.11a/n/ac in 5GHz support beamforming function only.

Antenna and Band width

Antenna		Three (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)	3	MCS0-23
	802.11n (HT40)	3	MCS0-23
	802.11ac (VHT20)	3	MCS 0-9/Nss1-3
	802.11ac (VHT40)	3	MCS 0-9/Nss1-3
5G	802.11n (HT20)	3	MCS0-23
	802.11n (HT40)	3	MCS0-23
	802.11ac (VHT20)	3	MCS 0-9/Nss1-3
	802.11ac (VHT40)	3	MCS 0-9/Nss1-3
	802.11ac (VHT80)	3	MCS 0-9/Nss1-3

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

Power	Brand	Model	Rating
Adapter 1 (Fixed plug)	LINKSYS	HK-X142-A12S	Input:100-240V, 50/60Hz 1.5A Output:12V, 3.5A
Adapter 2 (Fixed plug)	LINKSYS	KSAS0501200350HU	Input:100-240V, 50/60Hz 1.2A Output:12V, 3.5A
Adapter 3 (Interchangeable plug)	LINKSYS	KSAS0451200350D5	Input:100-240V, 50/60Hz 1.2A Output:12V, 3.5A
Adapter 4 (Fixed plug)	LINKSYS	HK-X142-A12	Input:100-240V, 50/60Hz 1.5A Output:12V, 0-3.5A
Others			
Plug*1 (For adapter 3 use)			
RJ-45 cable*1, non-shielded, 0.9m			

3.3. Table for Filed Antenna

Ant.	Brand	Model No.	Type	Connector	Antenna Cable	
					Brand	Model No.
1	Galtronics Electronics	02109140-05960	Dipole	Reversed-SMA	M.gear	C120-510456-A (SRF20151271)
2	Galtronics Electronics	02109140-05960	Dipole	Reversed-SMA	M.gear	C120-510457-A (SRF20151272)
3	Galtronics Electronics	02109140-05960	Dipole	Reversed-SMA	M.gear	C120-510458-A (SRF20151273)

Ant.	Band	Gain (dBi)	Cable Loss (dB)	True Gain (dBi)
1	2.4GHz	1.44	1	0.44
	5GHz Band 1	2.29	1.6	0.69
	5GHz Band 4	3.05	1.7	1.35
2	2.4GHz	1.44	0.9	0.54
	5GHz Band 1	2.29	1.6	0.69
	5GHz Band 4	3.05	1.7	1.35
3	2.4GHz	1.44	0.5	0.94
	5GHz Band 1	2.29	0.8	1.49
	5GHz Band 4	3.05	0.9	2.15

Note: The EUT has three antennas.

<For 2.4GHz Band>

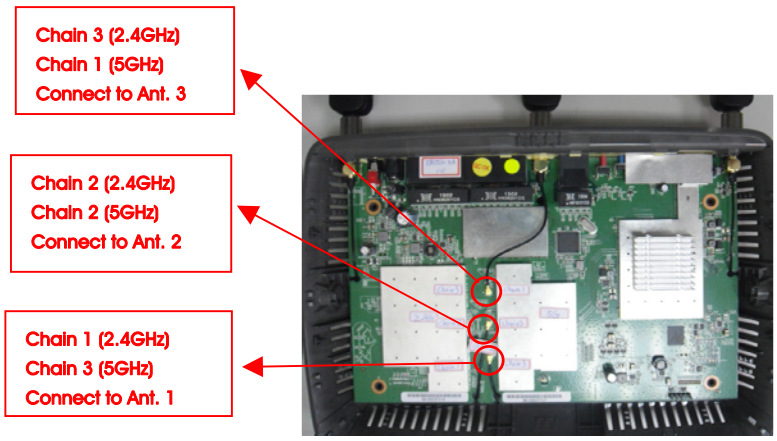
For IEEE 802.11b/g/n/ac mode (3TX/3RX)

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

<For 5GHz Band >

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

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



3.4. Table for Carrier Frequencies

For 2.4GHz Band:

There are two bandwidth systems.

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

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

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

For 5GHz Band:

There are three bandwidth systems.

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

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

For 80MHz bandwidth systems, use Channel 155.

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

3.5. Table for Test Modes

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

For 2.4GHz Band:

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

Band Edge Emissions	For non-beamforming mode			
	11b/CCK	1 Mbps	1/6/11	1+2+3
	For beamforming mode			
	11g/BPSK	6 Mbps	1/6/11	1+2+3
	11ac VHT20	MCS0/Nss1	1/6/11	1+2+3
	11ac VHT40	MCS0/Nss1	3/6/9	1+2+3

For 5GHz Band:

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

Note:

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.

The following test modes were performed for all tests:

For Conducted Emission test:

Mode 1. Normal Link – EUT + adapter 1

Mode 2. Normal Link – EUT + adapter 2

Mode 3. Normal Link – EUT + adapter 3

Mode 4. Normal Link – EUT + adapter 4

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

For Radiated Emission test below 1GHz:

Mode 1. Normal Link – Place EUT in Z axis + adapter 1

Mode 2. Normal Link – Place EUT in Y axis + adapter 1

Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 ~ 5 will follow this same test mode.

Mode 3. Normal Link – Place EUT in Z axis + adapter 2

Mode 4. Normal Link – Place EUT in Z axis + adapter 3

Mode 5. Normal Link – Place EUT in Z axis + adapter 4

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

For Radiated Emission test above 1GHz:

The EUT was performed at Z axis and Y axis position for Radiated emission above 1GHz test, and the worst case was found at Y axis. So the measurement will follow this same test configuration.

Mode 1. CTX – Place EUT in Y axis

For Band Edge Emissions test:

The EUT was performed at Z axis and Y axis position for Band Edge Emissions test, and the worst case was found at Z axis. So the measurement will follow this same test configuration.

Mode 1. CTX – Place EUT in Z axis

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

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA: 582115) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

3.6. Table for Testing Locations

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

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

3.7. Table for Supporting Units

For Test Site No: 03CH01-CB

(Radiated Emission below 1GHz test)

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E4300	DoC
Flash disk	Silicon Power	I-Series	DoC
Flash disk3.0	Silicon Power	B06	DoC

(Radiated Emission above 1GHz test) (For Non-beamforming mode)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

(Radiated Emission above 1GHz test) (For beamforming mode)

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Notebook	DELL	E4300	DoC
RX Device	Belkin	EA8500	N/A

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook*4	DELL	E6430	DoC
Flash disk	Silicon Power	I-Series	DoC
Flash disk3.0	ADATA	C103	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC

3.8. Table for Parameters of Test Software Setting

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

For non-beamforming mode

For 2.4GHz Band

Test Software Version	QCARCT 3.0.42.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11b	23	24	23	-	-	-

For beamforming mode

For 2.4GHz Band

Test Software Version	QCARCT 3.0.42.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11g	20	23	19	-	-	-
802.11ac MCS0/Nss1 VHT20	17	24.5	18	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	15	18	16

For 5GHz Band

Test Software Version	QCARCT 3.0.42.0					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		NCB: 80MHz
	5745 MHz	5785 MHz	5825 MHz	5755 MHz	5795 MHz	5775 MHz
802.11a	23.5	23.5	23.5	-	-	-
802.11ac MCS0/Nss1 VHT20	23.5	23.5	23.5	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	23.5	23	-
802.11ac MCS0/Nss1 VHT80	-	-	-	-	-	23.5

3.9. EUT Operation during Test

For non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

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

The program was executed as follows:

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

3.10. Duty Cycle

For non-beamforming mode:

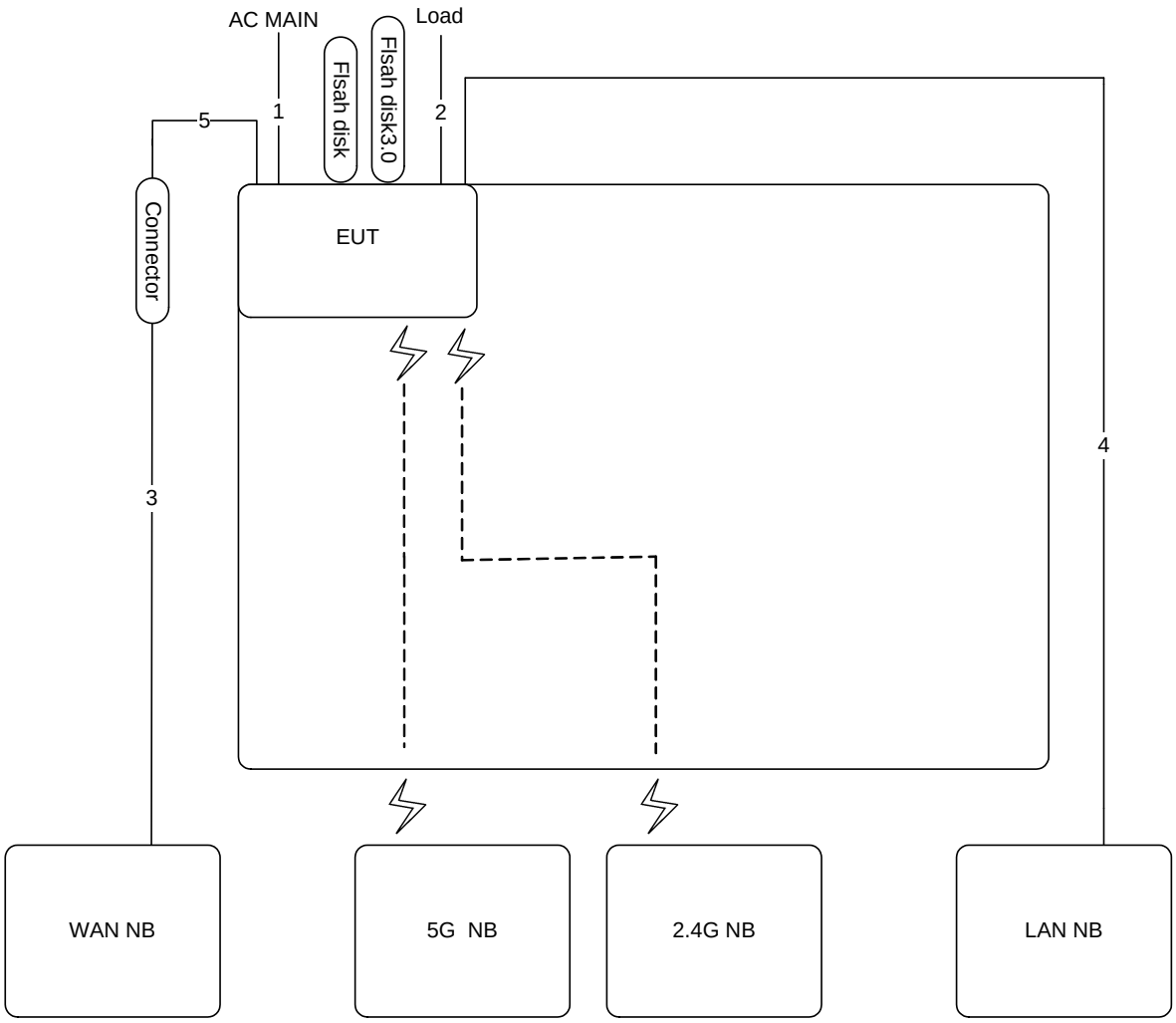
Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11b	1.000	1.000	100.00%	0.00	0.01

For beamforming mode:

Band	Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
2.4G	802.11g	1.452	2.034	71.39%	1.46	0.69
	802.11ac MCS0/Nss1 VHT20	1.223	1.514	80.78%	0.93	0.82
	802.11ac MCS0/Nss1 VHT40	1.764	2.055	85.84%	0.66	0.57
5G	802.11a	1.936	2.160	89.63%	0.48	0.52
	802.11ac MCS0/Nss1 VHT20	1.936	2.090	92.63%	0.33	0.52
	802.11ac MCS0/Nss1 VHT40	2.286	2.496	91.59%	0.38	0.44
	802.11ac MCS0/Nss1 VHT80	1.523	1.696	89.81%	0.47	0.66

3.11. Test Configurations

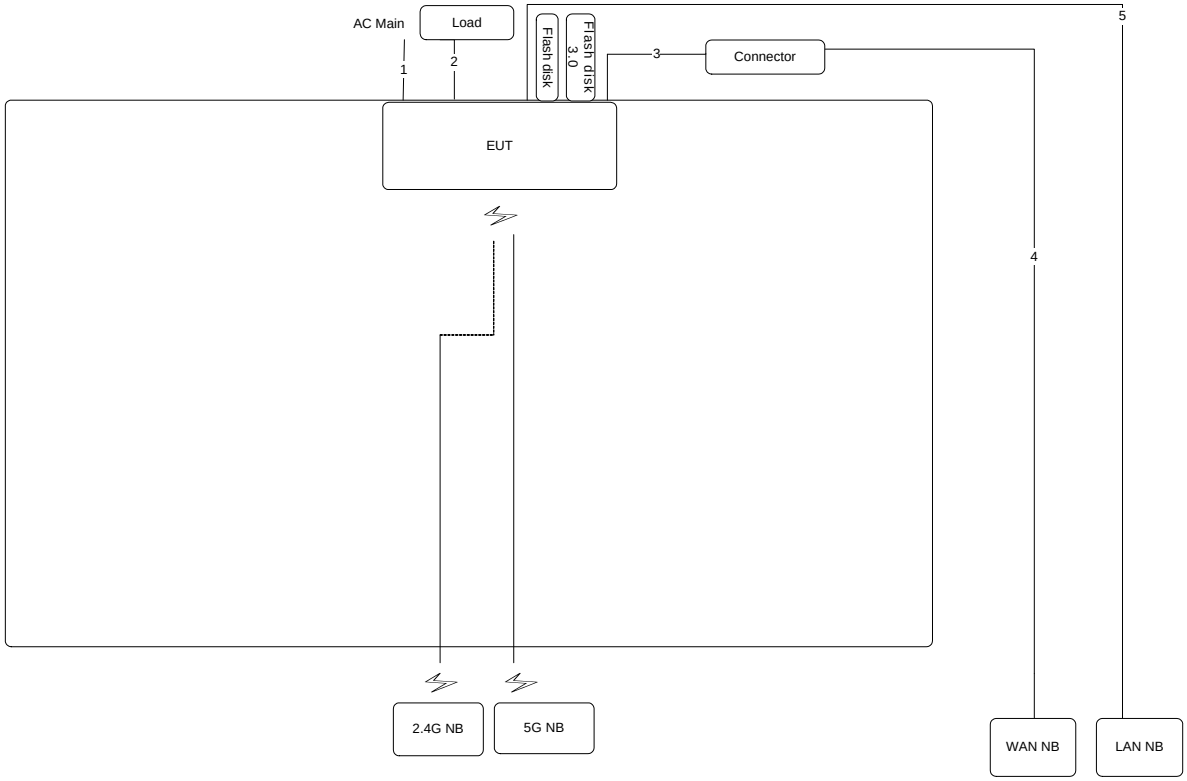
3.11.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	1.9m
2	RJ-45 cable*3	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	0.9m

3.11.2. Radiation Emissions Test Configuration

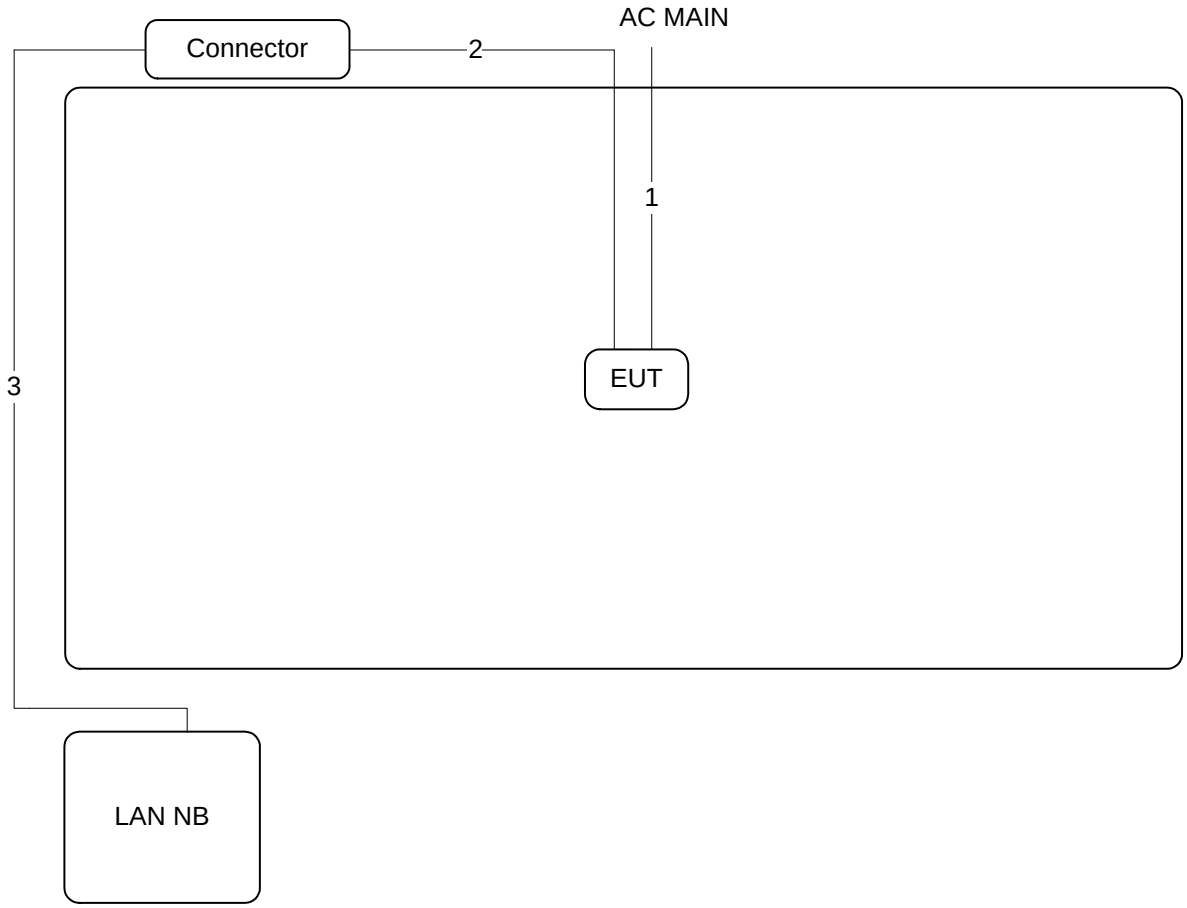
Test Configuration: 30MHz~1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable*3	No	1.5m
3	RJ-45 cable	No	0.9m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	10m

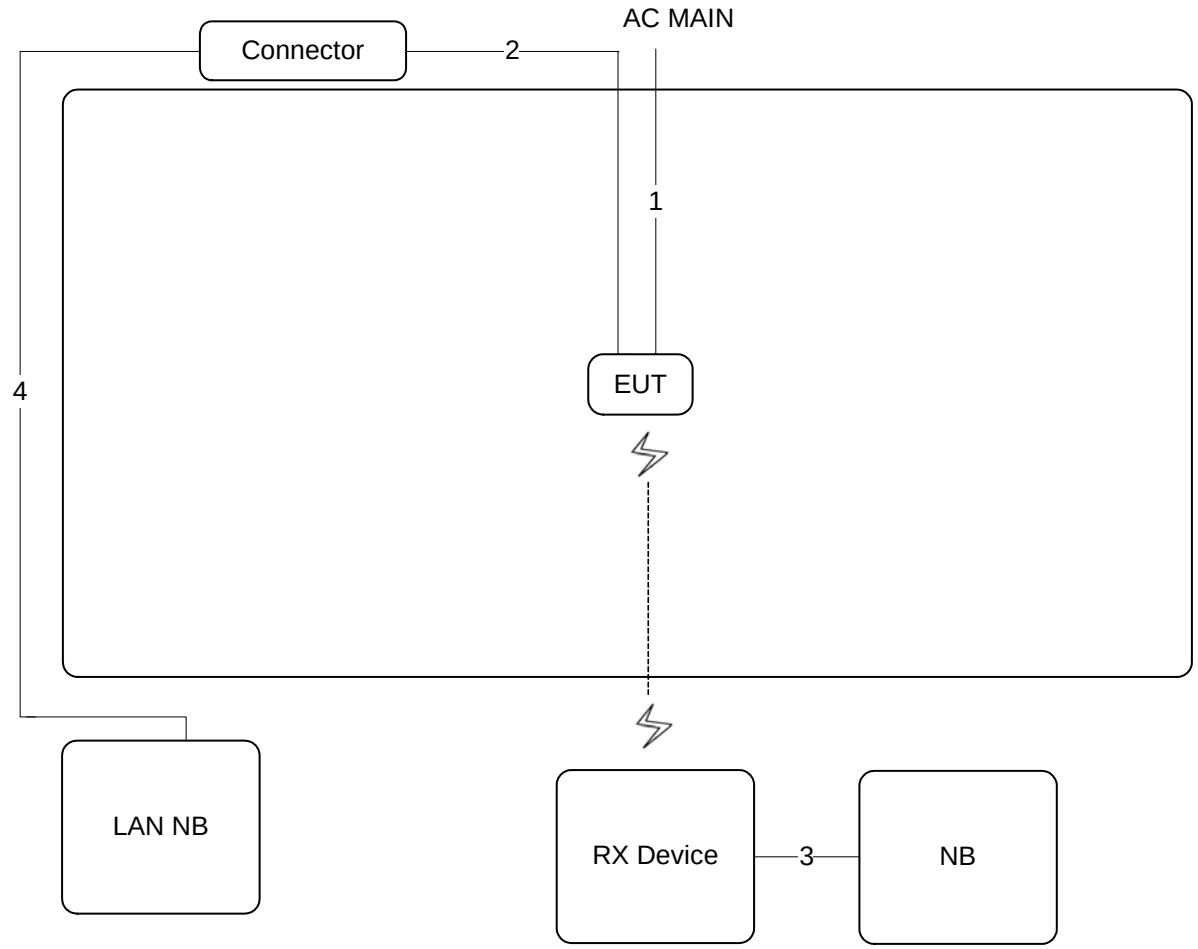
Test Configuration: above 1GHz

For non-beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	0.9m
3	RJ-45 cable	No	10m

For beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	0.9m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	10m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

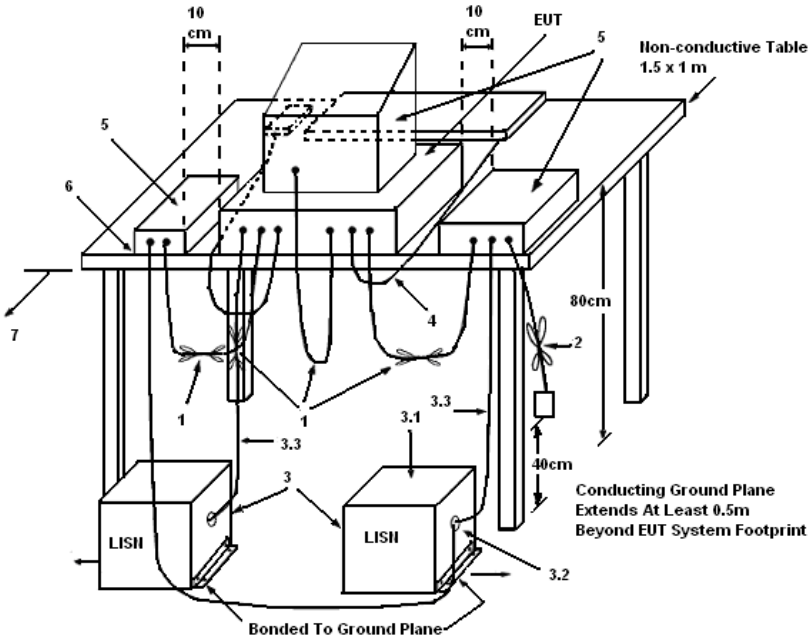
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

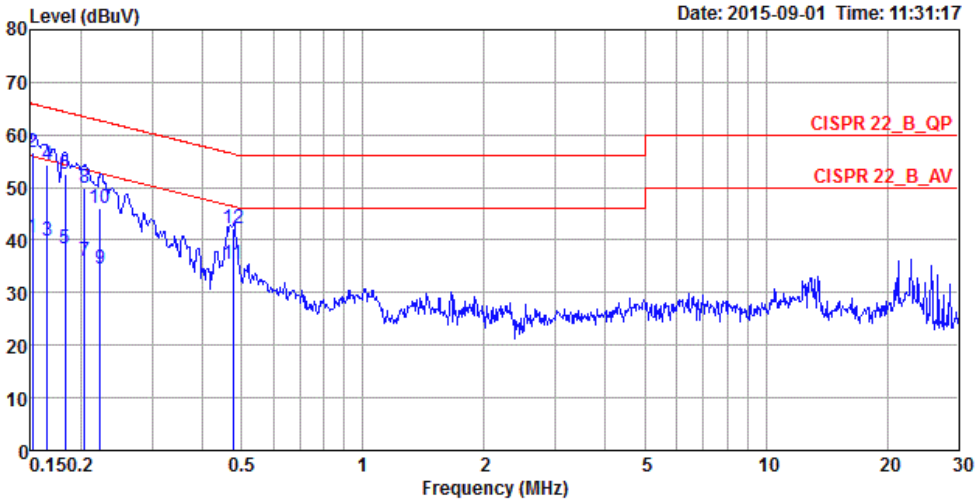
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

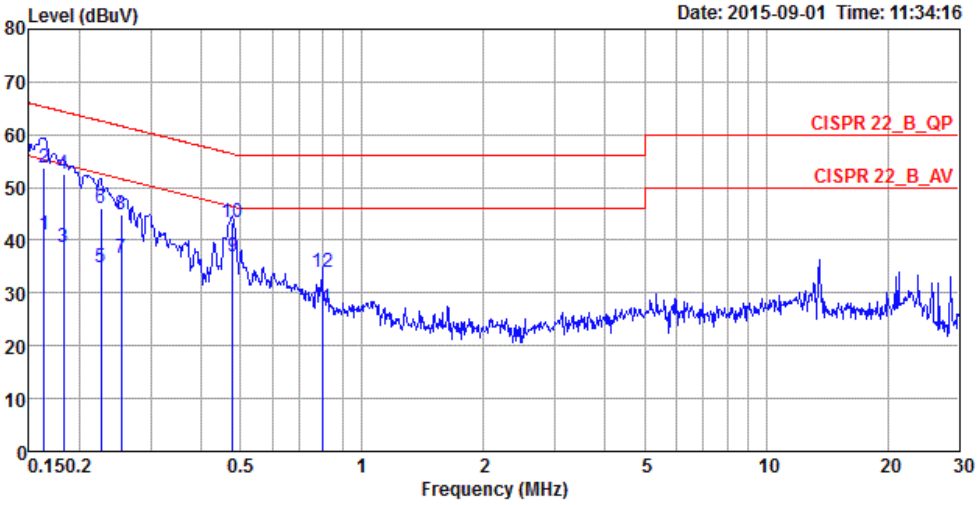
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	22°C	Humidity	52%
Test Engineer	Hank Yang & Da Deng & Edison Lin	Phase	Line
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1516	40.52	-15.39	55.91	30.35	10.00	0.17	LINE	Average
2	0.1516	56.75	-9.16	65.91	46.58	10.00	0.17	LINE	QP
3	0.1650	39.80	-15.41	55.21	29.63	10.00	0.17	LINE	Average
4	0.1650	54.40	-10.81	65.21	44.23	10.00	0.17	LINE	QP
5	0.1825	38.37	-16.00	54.37	28.17	10.01	0.19	LINE	Average
6	0.1825	52.48	-11.89	64.37	42.28	10.01	0.19	LINE	QP
7	0.2040	36.10	-17.35	53.45	25.90	10.01	0.19	LINE	Average
8	0.2040	49.77	-13.68	63.45	39.57	10.01	0.19	LINE	QP
9	0.2232	34.44	-18.26	52.70	24.24	10.01	0.19	LINE	Average
10	0.2232	45.99	-16.71	62.70	35.79	10.01	0.19	LINE	QP
11	0.4770	35.37	-11.02	46.39	25.15	10.02	0.20	LINE	Average
12	0.4770	42.28	-14.11	56.39	32.06	10.02	0.20	LINE	QP

Temperature	22°C	Humidity	52%
Test Engineer	Hank Yang & Da Deng & Edison Lin	Phase	Neutral
Configuration	Normal Link	Test Mode	Mode 1



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1633	40.91	-14.39	55.30	30.74	10.00	0.17	NEUTRAL	Average
2	0.1633	53.64	-11.66	65.30	43.47	10.00	0.17	NEUTRAL	QP
3	0.1825	38.76	-15.61	54.37	28.56	10.01	0.19	NEUTRAL	Average
4	0.1825	52.54	-11.83	64.37	42.34	10.01	0.19	NEUTRAL	QP
5	0.2256	34.88	-17.73	52.61	24.68	10.01	0.19	NEUTRAL	Average
6	0.2256	46.18	-16.43	62.61	35.98	10.01	0.19	NEUTRAL	QP
7	0.2535	36.64	-15.00	51.64	26.44	10.01	0.19	NEUTRAL	Average
8	0.2535	44.97	-16.67	61.64	34.77	10.01	0.19	NEUTRAL	QP
9	0.4785	36.99	-9.37	46.36	26.78	10.01	0.20	NEUTRAL	Average
10	0.4785	43.29	-13.07	56.36	33.08	10.01	0.20	NEUTRAL	QP
11	0.7960	27.03	-18.97	46.00	16.81	10.03	0.19	NEUTRAL	Average
12	0.7960	33.83	-22.17	56.00	23.61	10.03	0.19	NEUTRAL	QP

Note:

Level = Read Level + LISN Factor + 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

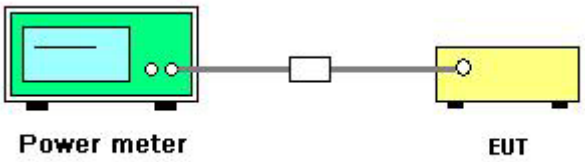
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li	Test Date	Aug. 19, 2015 ~ Aug. 31, 2015

For Non-beamforming mode

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11b	2412 MHz	23.18	24.75	24.49	28.96	30.00	Complies
	2437 MHz	24.48	25.06	25.19	29.69	30.00	Complies
	2462 MHz	23.48	24.92	24.67	29.17	30.00	Complies

For beamforming mode

For 2.4GHz Band

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11g	2412 MHz	19.56	21.16	20.82	25.34	30.00	Complies
	2437 MHz	22.89	23.86	23.88	28.34	30.00	Complies
	2462 MHz	18.86	20.17	19.88	24.44	30.00	Complies
802.11ac MCS0/Nss1 VHT20	2412 MHz	16.01	17.72	17.39	21.87	30.00	Complies
	2437 MHz	24.01	25.26	25.11	29.60	30.00	Complies
	2462 MHz	17.53	18.89	18.63	23.16	30.00	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	15.12	16.87	16.72	21.08	30.00	Complies
	2437 MHz	18.43	19.87	19.72	24.16	30.00	Complies
	2452 MHz	16.48	17.88	17.76	22.19	30.00	Complies

Note:

2.4GHz Band = $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.41dBi <6dBi, so the limit doesn't reduce.

For 5GHz Band

Mode	Frequency	Conducted Power (dBm)				Max. Limit (dBm)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11a	5745 MHz	24.49	24.74	24.77	29.44	29.60	Complies
	5785 MHz	24.71	24.55	24.58	29.39	29.60	Complies
	5825 MHz	24.82	24.59	24.64	29.46	29.60	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	24.37	24.49	24.81	29.33	29.60	Complies
	5785 MHz	24.56	24.68	24.85	29.47	29.60	Complies
	5825 MHz	24.48	24.52	24.79	29.37	29.60	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	25.09	24.74	24.35	29.51	29.60	Complies
	5795 MHz	24.49	24.47	24.69	29.32	29.60	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	24.11	24.21	24.57	29.07	29.60	Complies

Note:

5GHz Band = $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 6.40dBi, so limit=30-(6.40-6)=29.60 dBm

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

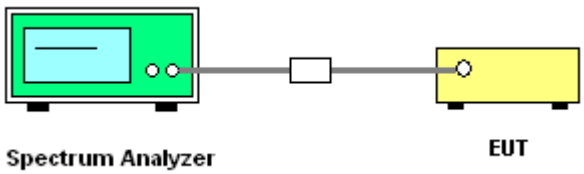
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS channel bandwidth.
RBW	3 kHz ≤ RBW ≤ 100kHz
VBW	≥ 3 x 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 ≥ 2 x span/RBW (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be ≤ 8 dBm.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li		

For Non-beamforming mode

For 2.4GHz Band

Mode	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11b	2412 MHz	-1.28	0.22	-1.22	4.07	8.00	Complies
	2437 MHz	0.52	2.14	0.48	5.89	8.00	Complies
	2462 MHz	-1.60	0.22	-0.23	4.30	8.00	Complies

Note:

2.4GHz Band = $DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$ =5.41dBi <6dBi, so the limit doesn't reduce.

For beamforming mode

For 2.4GHz Band

Mode	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11g	2412 MHz	-5.01	-5.88	-6.83	-1.07	8.00	Complies
	2437 MHz	-3.61	-3.04	-3.88	1.28	8.00	Complies
	2462 MHz	-7.39	-7.88	-8.04	-2.99	8.00	Complies
802.11ac MCS0/Nss1 VHT20	2412 MHz	-9.64	-9.76	-10.13	-5.07	8.00	Complies
	2437 MHz	-1.75	-2.90	-1.42	2.79	8.00	Complies
	2462 MHz	-8.63	-7.35	-7.74	-3.10	8.00	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	-13.10	-12.15	-12.69	-7.86	8.00	Complies
	2437 MHz	-10.10	-9.57	-9.71	-5.02	8.00	Complies
	2452 MHz	-12.25	-11.59	-11.70	-7.07	8.00	Complies

Note:

2.4GHz Band = $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{BS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =5.41dBi <6dBi, so the limit doesn't reduce.

For 5GHz Band

Mode	Frequency	Power Density (dBm/3kHz)				Power Density Limit (dBm/3kHz)	Result
		Ant. 1	Ant. 2	Ant. 3	Total		
802.11a	5745 MHz	-3.11	-3.64	-2.88	1.57	7.60	Complies
	5785 MHz	-2.73	-2.05	-2.79	2.26	7.60	Complies
	5825 MHz	-2.22	-2.23	-1.01	2.99	7.60	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	-3.39	-3.07	-3.08	1.59	7.60	Complies
	5785 MHz	-2.69	-2.86	-2.60	2.06	7.60	Complies
	5825 MHz	-2.96	-1.67	-1.98	2.60	7.60	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	-4.93	-5.11	-4.60	-0.10	7.60	Complies
	5795 MHz	-5.45	-4.58	-4.78	-0.15	7.60	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	-8.62	-8.23	-7.69	-3.39	7.60	Complies

Note:

5GHz Band = $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{BS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ = 6.40dBi, so limit=8-(6.40-6)=7.60 dBm/3kHz

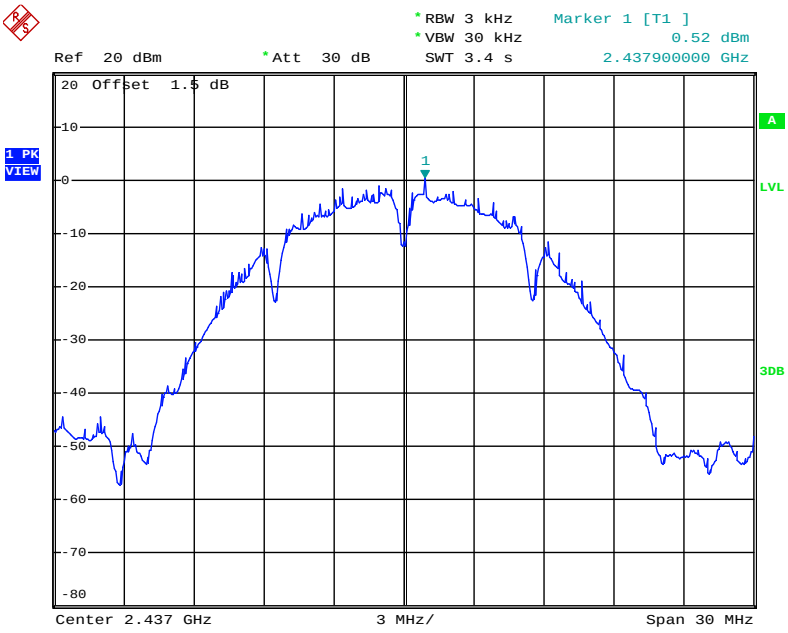
Note: All the test values were listed in the report.

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

For Non-beamforming mode

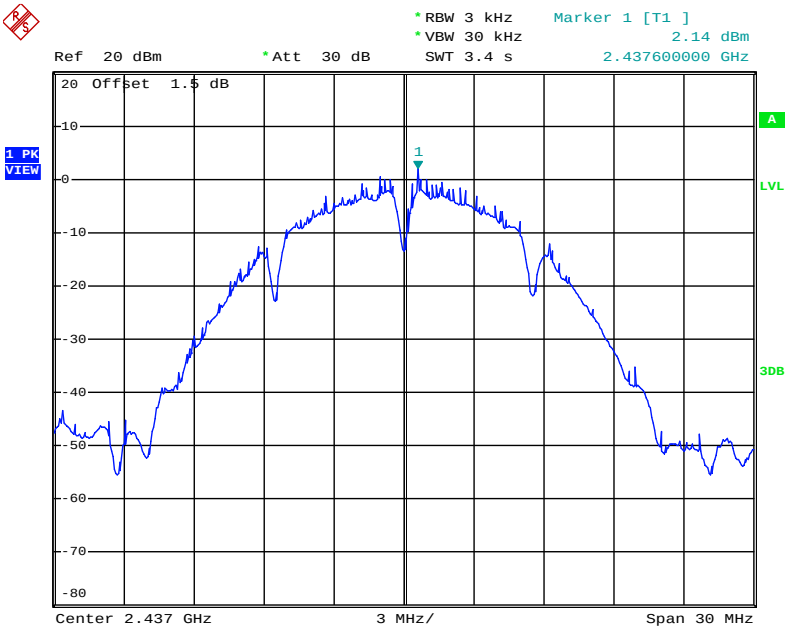
For 2.4GHz Band

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



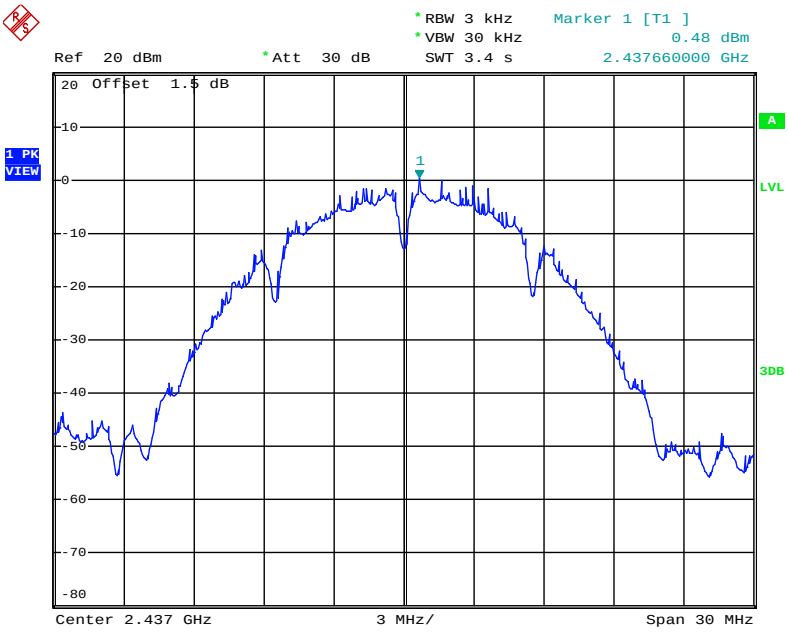
Date: 31.AUG.2015 18:00:53

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



Date: 31.AUG.2015 18:01:47

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz / Ant. 3

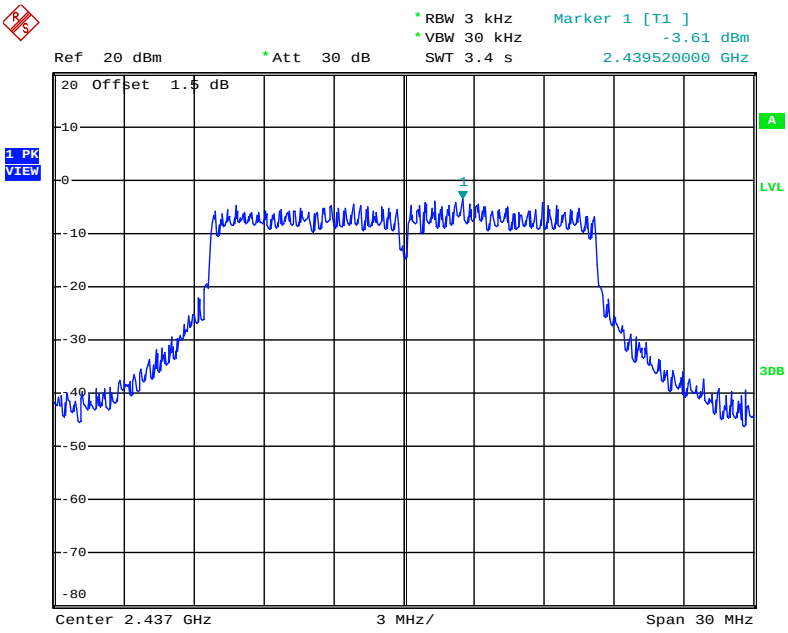


Date: 31.AUG.2015 18:02:38

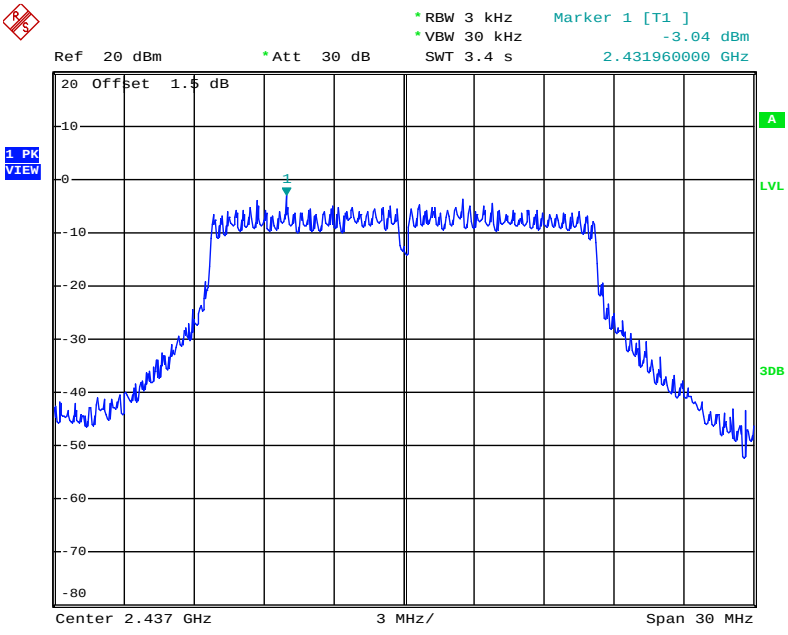
For beamforming mode

For 2.4GHz Band

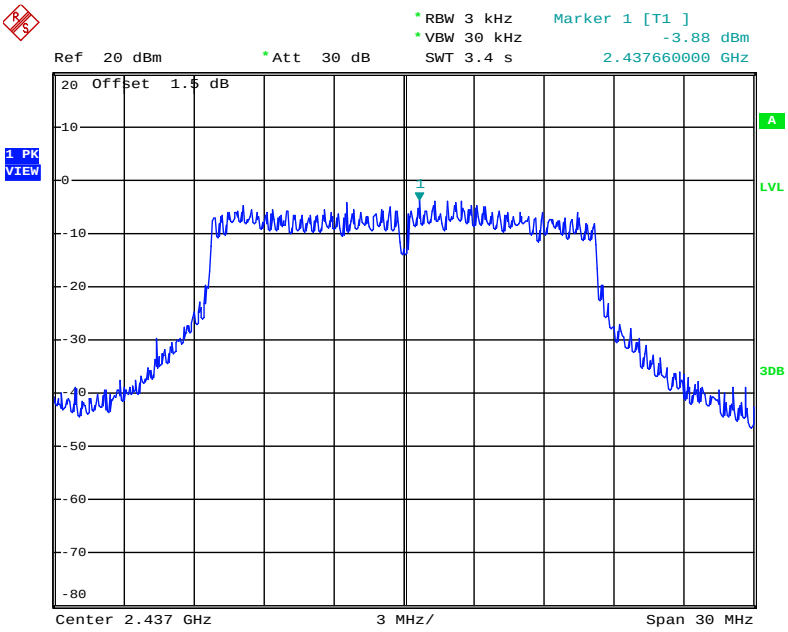
Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 1



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

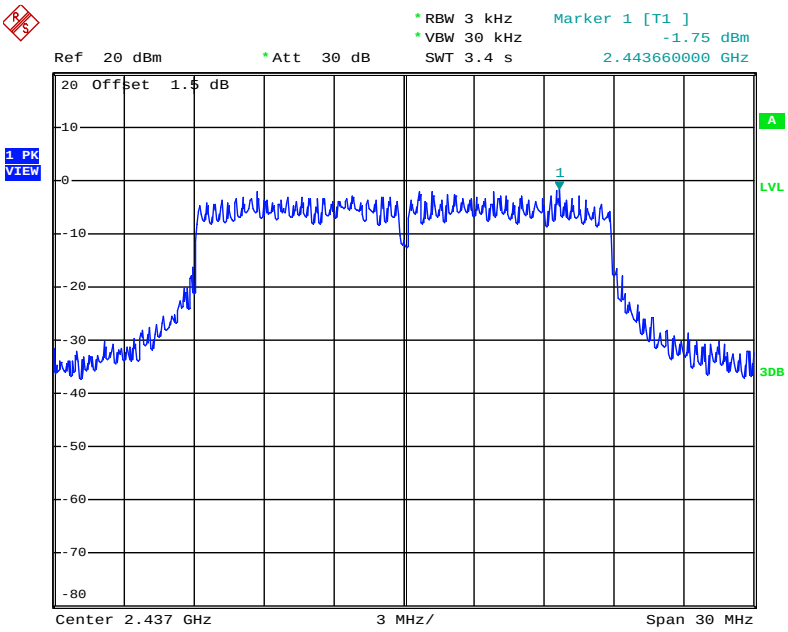


Power Density Plot on Configuration IEEE 802.11g / 2437 MHz / Ant. 3



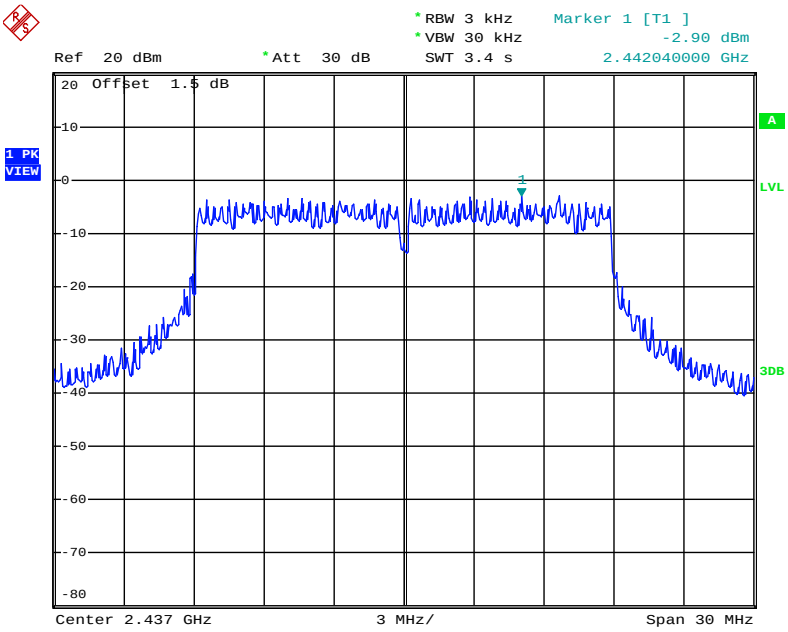
Date: 31.AUG.2015 18:08:43

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



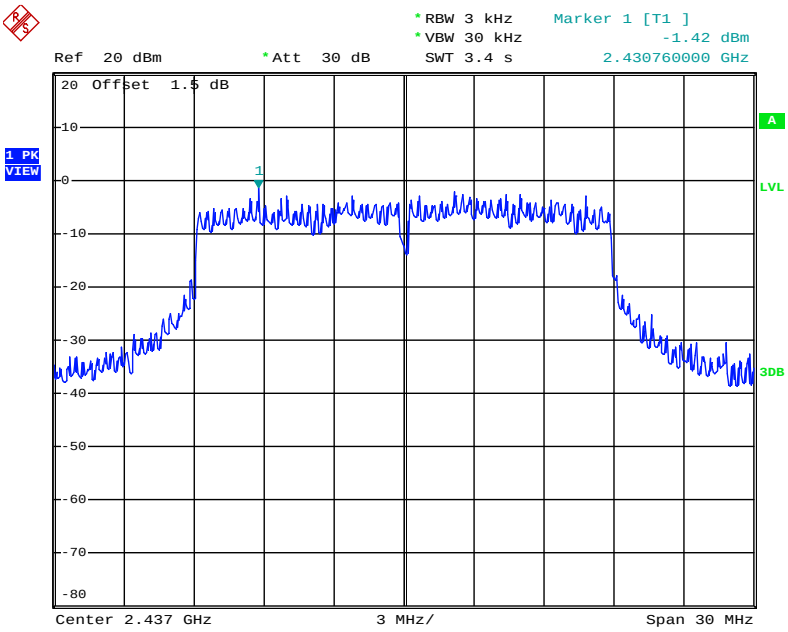
Date: 31.AUG.2015 18:23:52

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



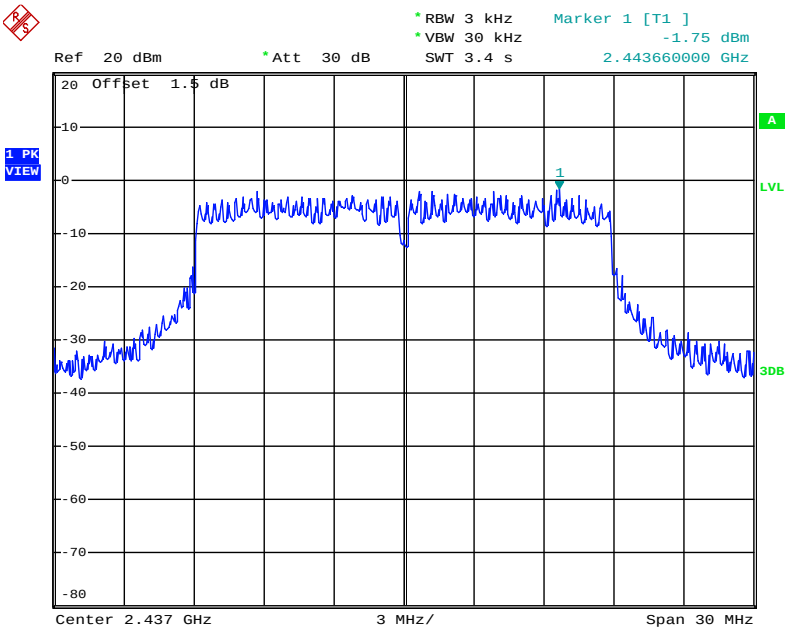
Date: 31.AUG.2015 18:22:42

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



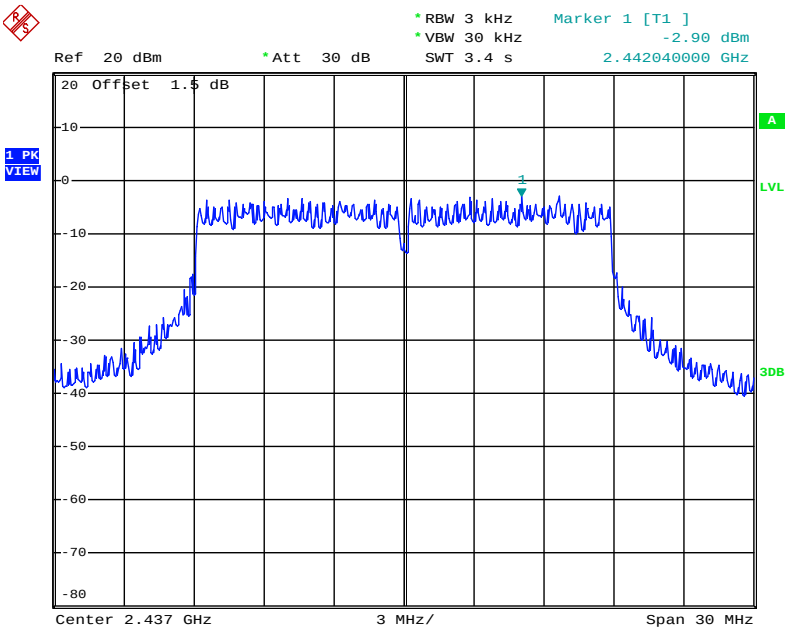
Date: 31.AUG.2015 18:24:45

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Ant. 1



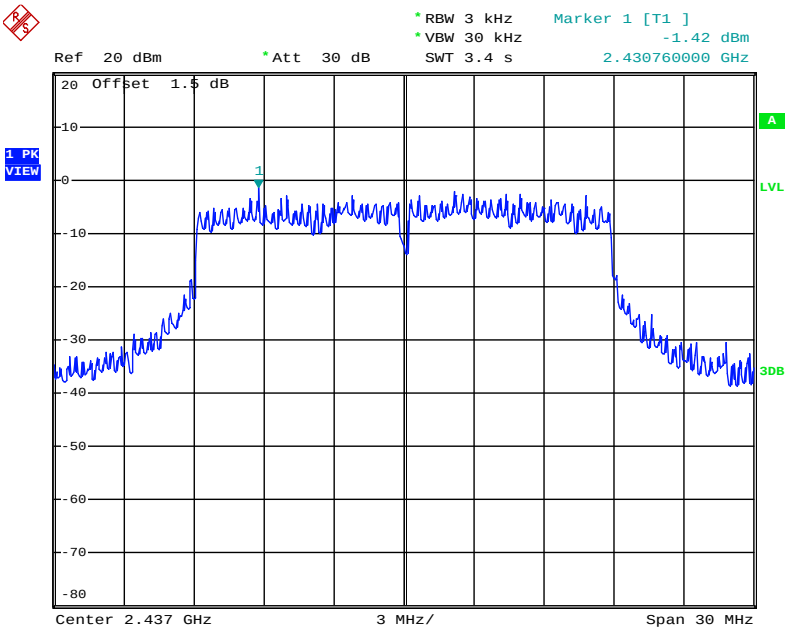
Date: 31.AUG.2015 18:23:52

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Ant. 2



Date: 31.AUG.2015 18:22:42

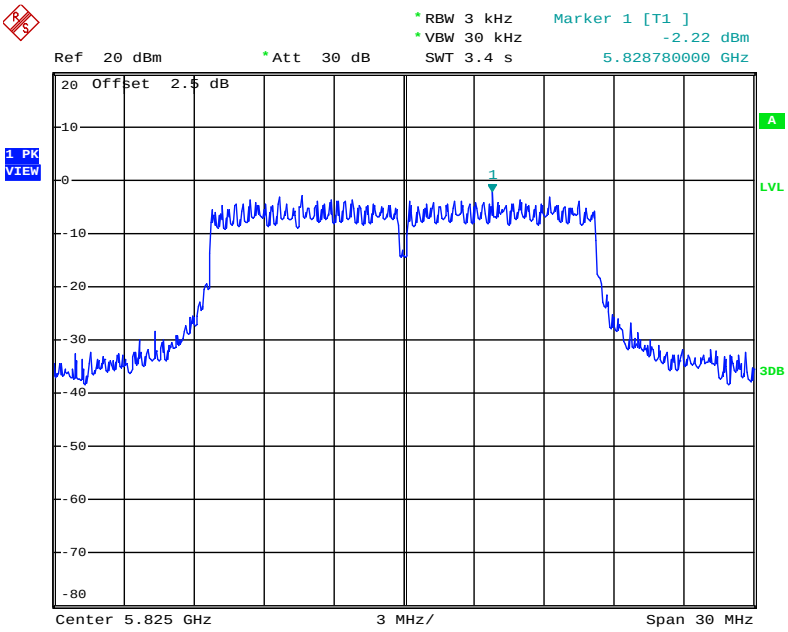
Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Ant. 3



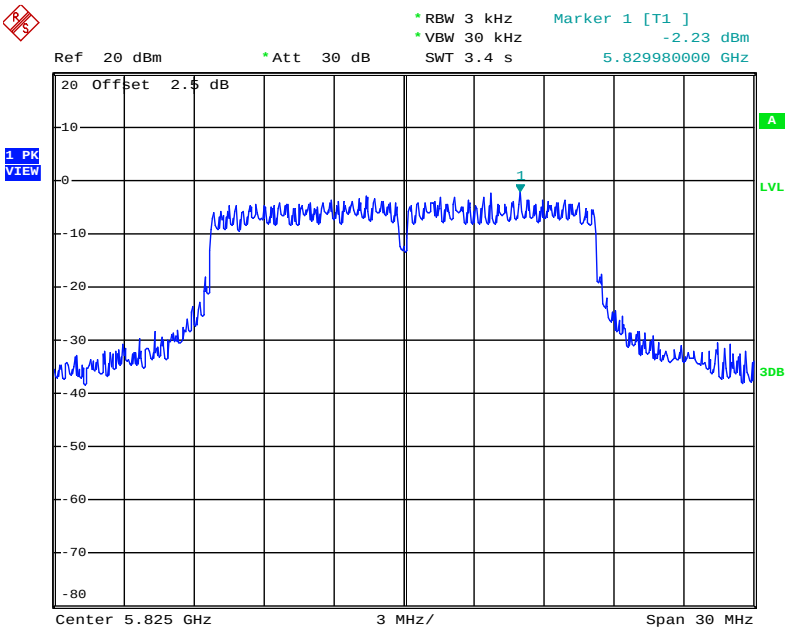
Date: 31.AUG.2015 18:24:45

For 5GHz Band

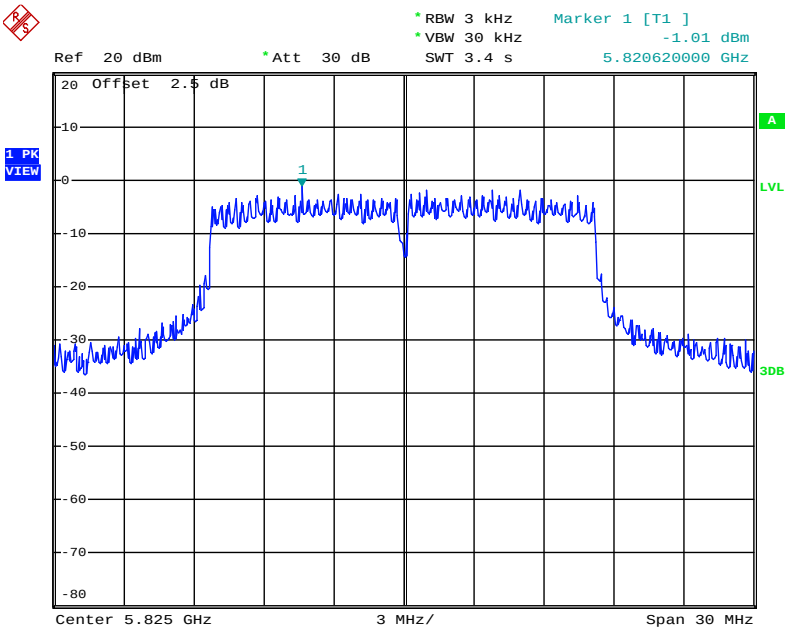
Power Density Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1



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

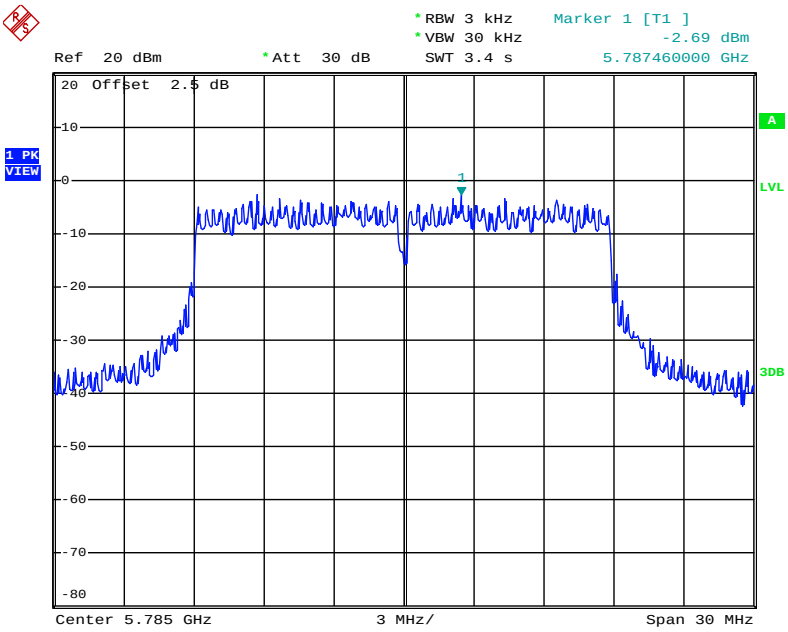


Power Density Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 3



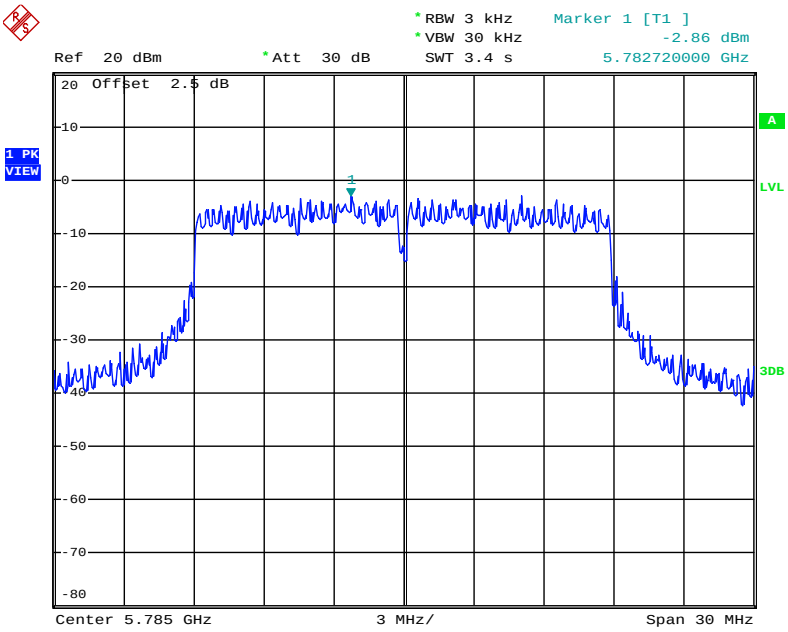
Date: 31.AUG.2015 17:03:56

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



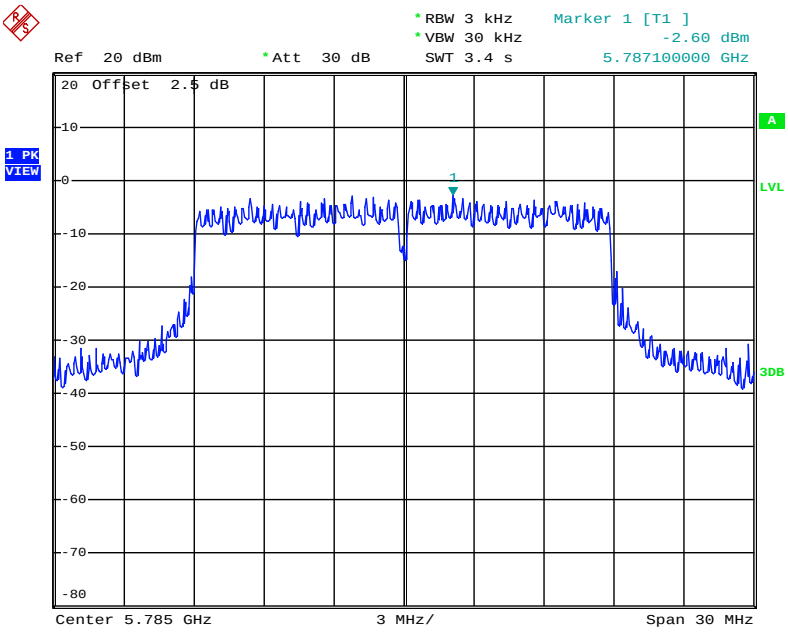
Date: 31.AUG.2015 17:09:56

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



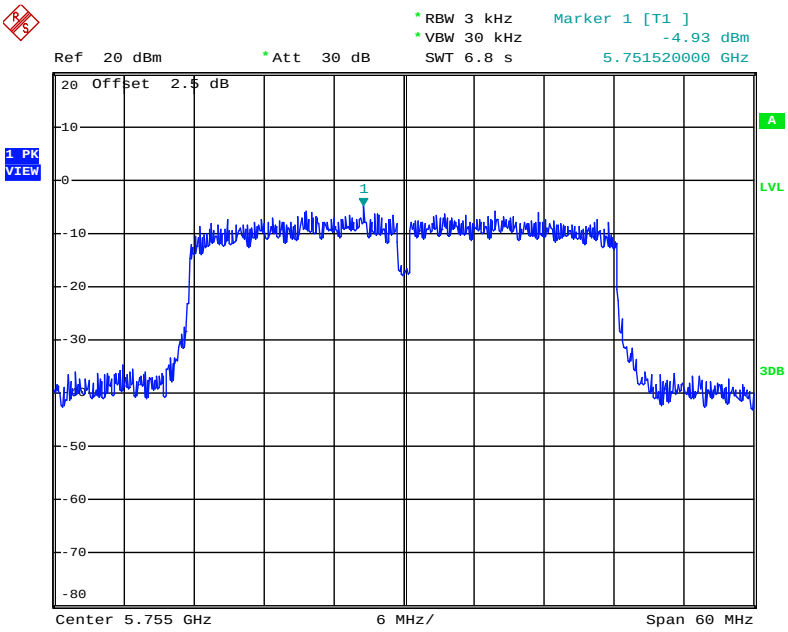
Date: 31.AUG.2015 17:09:14

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



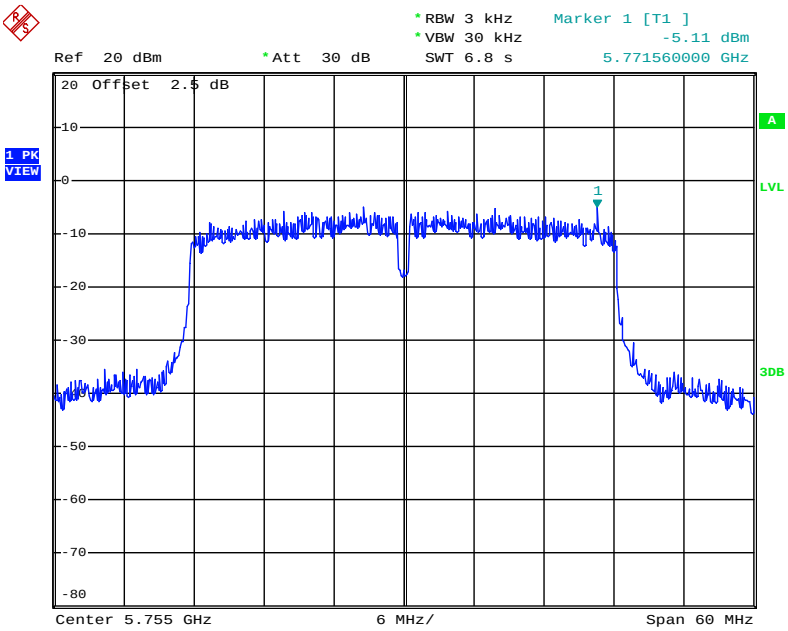
Date: 31.AUG.2015 17:08:25

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



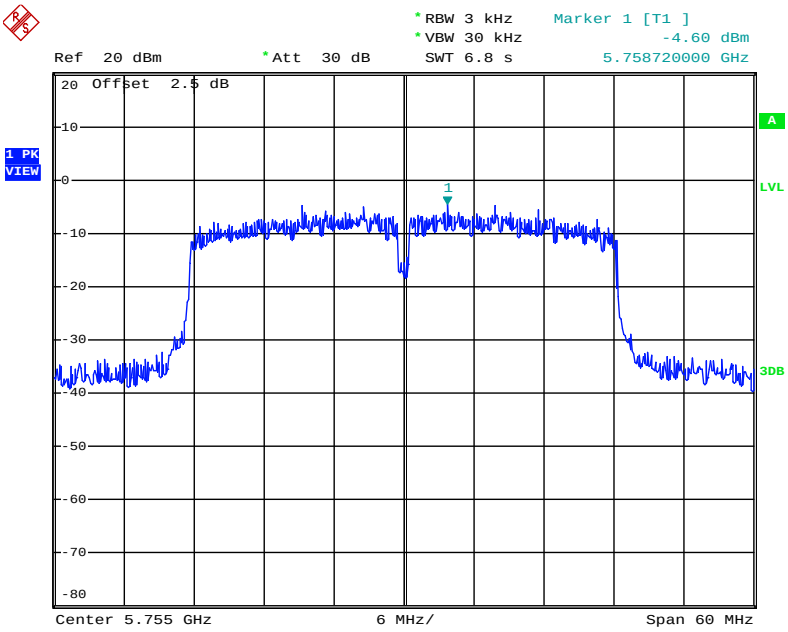
Date: 31.AUG.2015 17:14:59

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



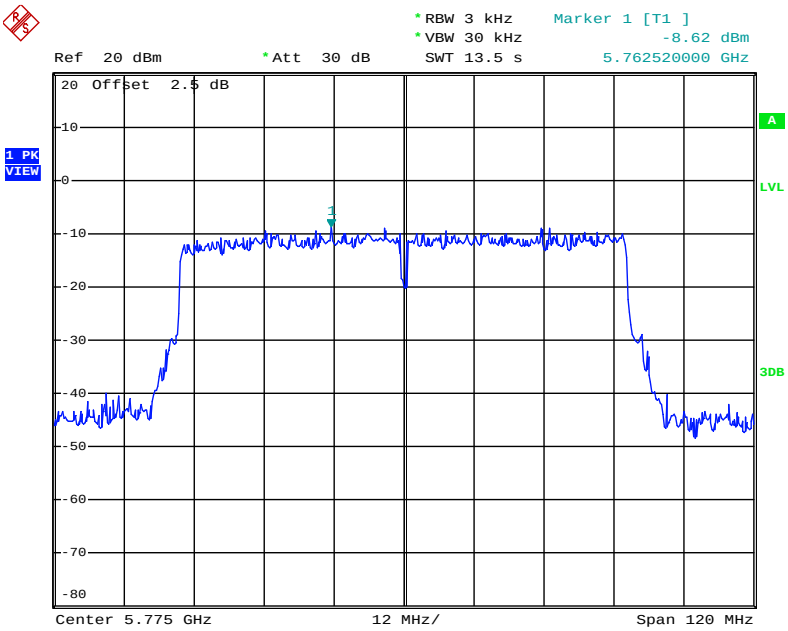
Date: 31.AUG.2015 17:14:11

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



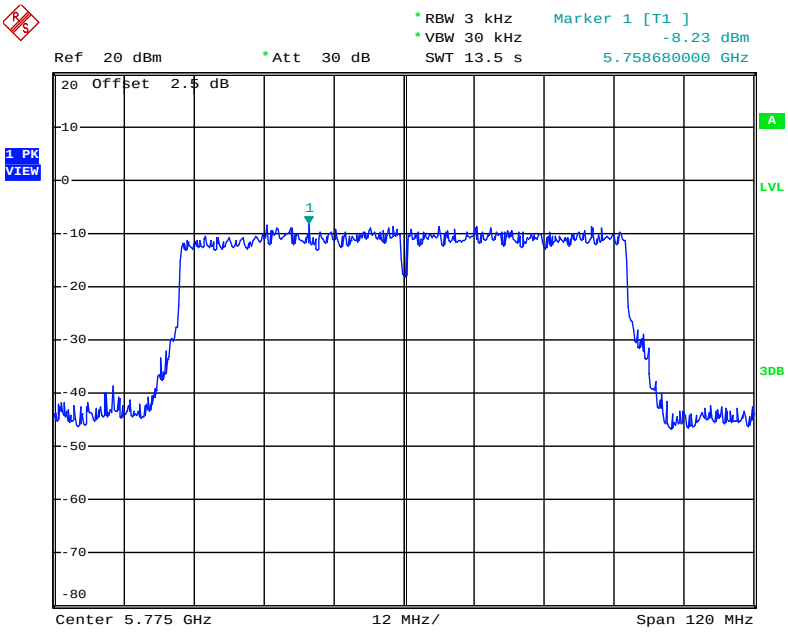
Date: 31.AUG.2015 17:13:26

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



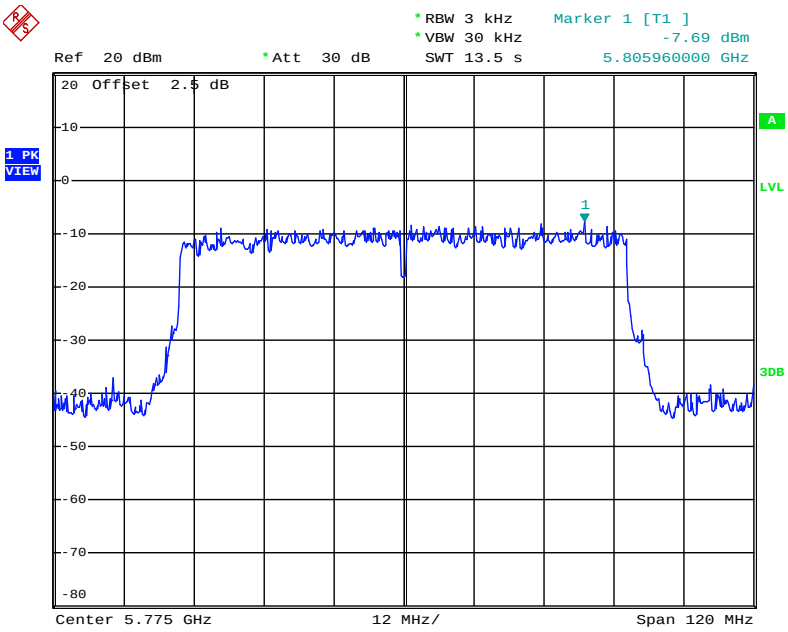
Date: 31.AUG.2015 17:21:54

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



Date: 31.AUG.2015 17:20:55

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



Date: 31.AUG.2015 17:20:00

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	≥ 3 x 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	≥ 3 x 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	25°C	Humidity	58%
Test Engineer	Jim Huang & Serway Li		

For Non-beamforming mode

For 2.4GHz Band

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11b	2412 MHz	7.04	11.04	500	Complies
	2437 MHz	7.04	11.28	500	Complies
	2462 MHz	7.04	11.16	500	Complies

For beamforming mode

For 2.4GHz Band

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11g	2412 MHz	16.32	16.44	500	Complies
	2437 MHz	16.32	16.44	500	Complies
	2462 MHz	16.40	16.68	500	Complies
802.11ac MCS0/Nss1 VHT20	2412 MHz	17.68	17.88	500	Complies
	2437 MHz	17.60	17.88	500	Complies
	2462 MHz	17.12	17.88	500	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	35.20	36.20	500	Complies
	2437 MHz	35.36	36.20	500	Complies
	2452 MHz	35.04	36.20	500	Complies

For 5GHz Band

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11a	5745 MHz	16.32	16.68	500	Complies
	5785 MHz	16.32	16.80	500	Complies
	5825 MHz	16.32	16.80	500	Complies
802.11ac MCS0/Nss1 VHT20	5745 MHz	17.68	17.76	500	Complies
	5785 MHz	17.60	17.76	500	Complies
	5825 MHz	17.60	17.88	500	Complies
802.11ac MCS0/Nss1 VHT40	5755 MHz	33.44	36.40	500	Complies
	5795 MHz	34.08	36.40	500	Complies
802.11ac MCS0/Nss1 VHT80	5775 MHz	76.00	76.00	500	Complies

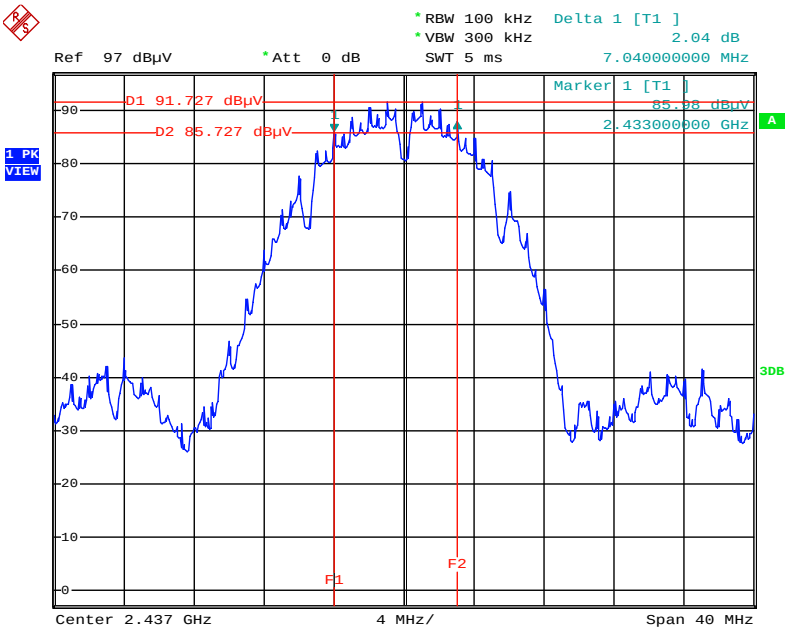
Note: All the test values were listed in the report.

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

For Non-beamforming mode

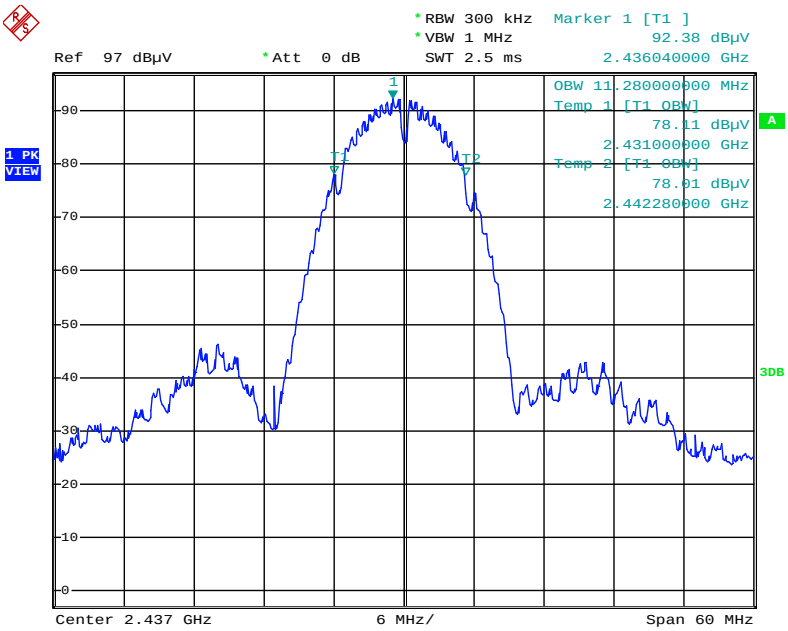
For 2.4GHz Band

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



Date: 31.AUG.2015 20:08:21

99% Occupied Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Ant. 1 + Ant. 2 + Ant. 3

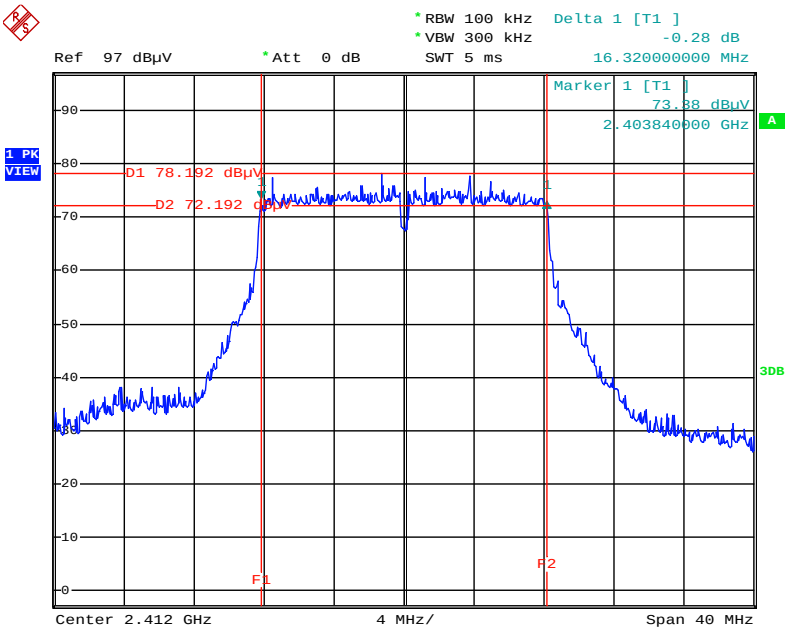


Date: 31.AUG.2015 20:14:53

For beamforming mode

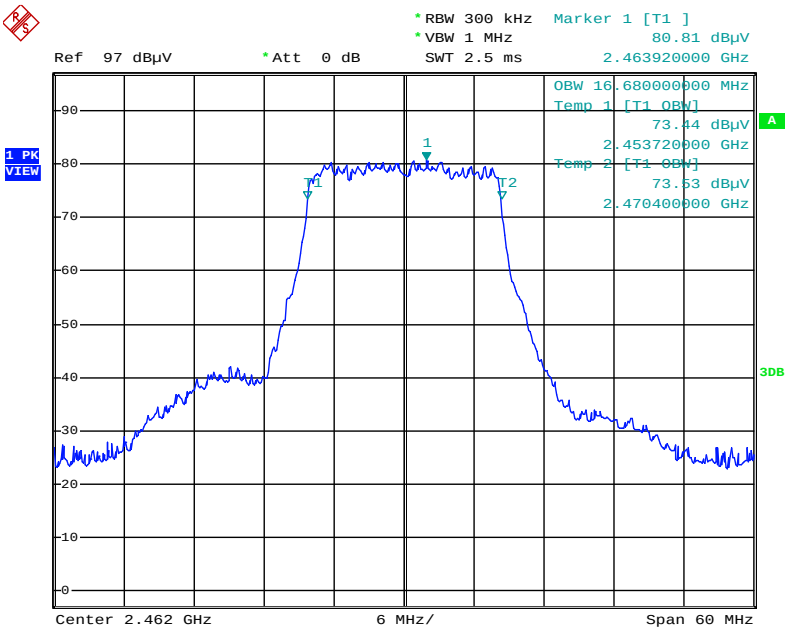
For 2.4GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz / Ant. 1 + Ant. 2 + Ant. 3



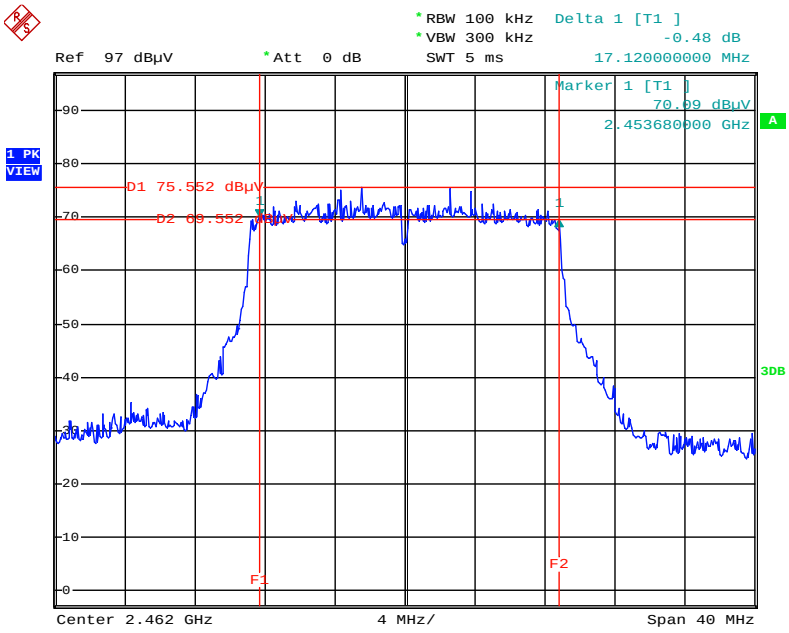
Date: 31.AUG.2015 19:53:03

99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2462 MHz / Ant. 1 + Ant. 2 + Ant. 3



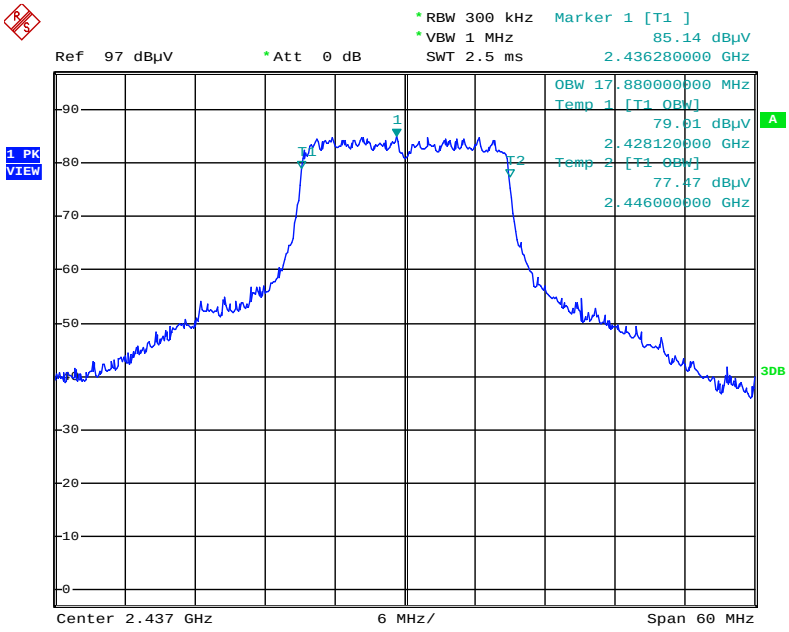
Date: 31.AUG.2015 20:21:48

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



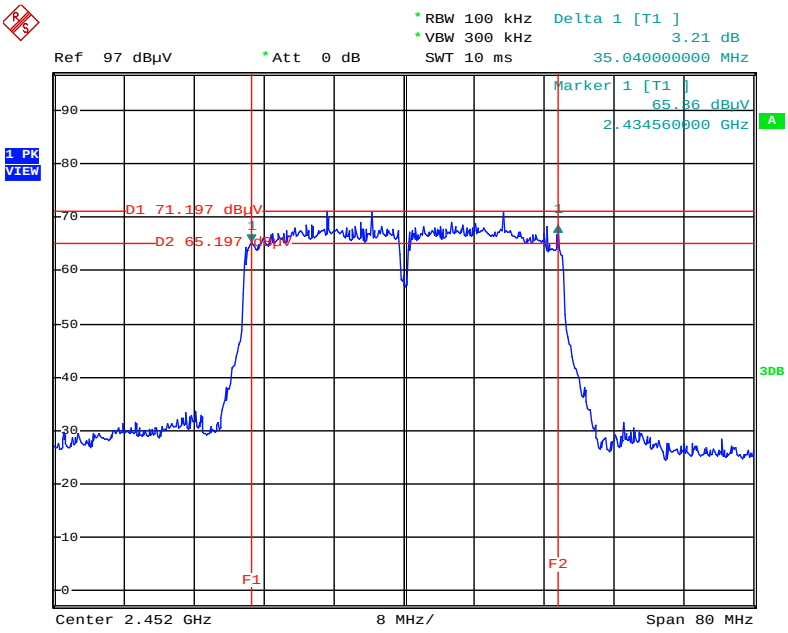
Date: 31.AUG.2015 19:59:05

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



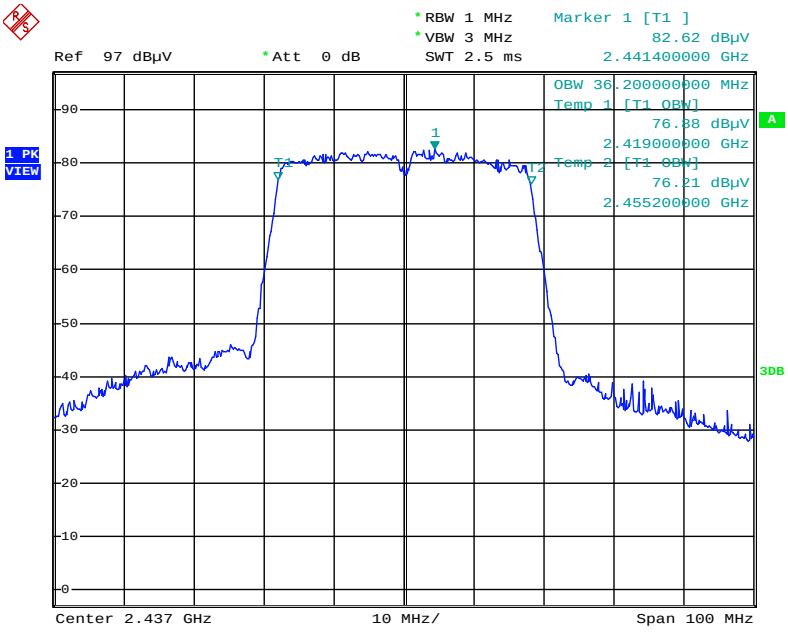
Date: 31.AUG.2015 20:24:18

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2452 MHz / Ant. 1 + Ant. 2 + Ant. 3



Date: 31.AUG.2015 19:42:55

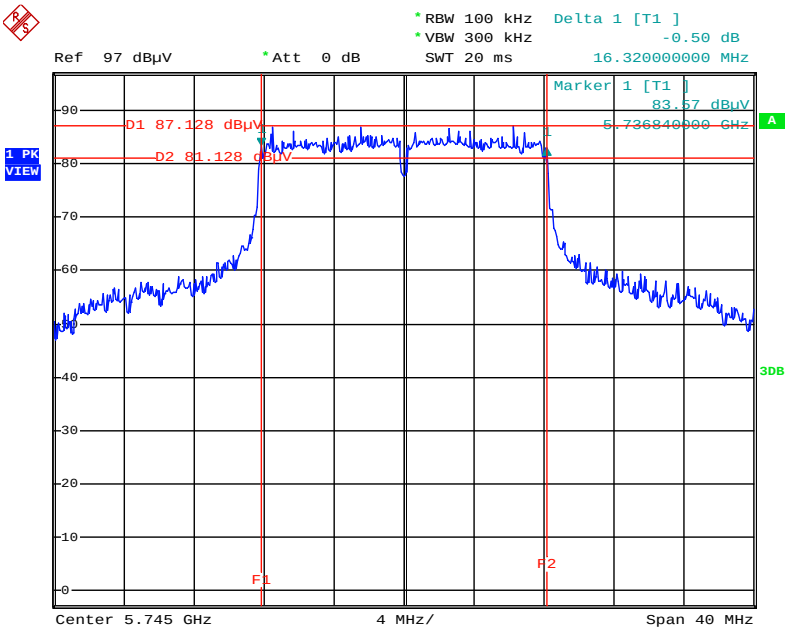
99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Ant. 1 + Ant. 2 + Ant. 3



Date: 31.AUG.2015 20:29:28

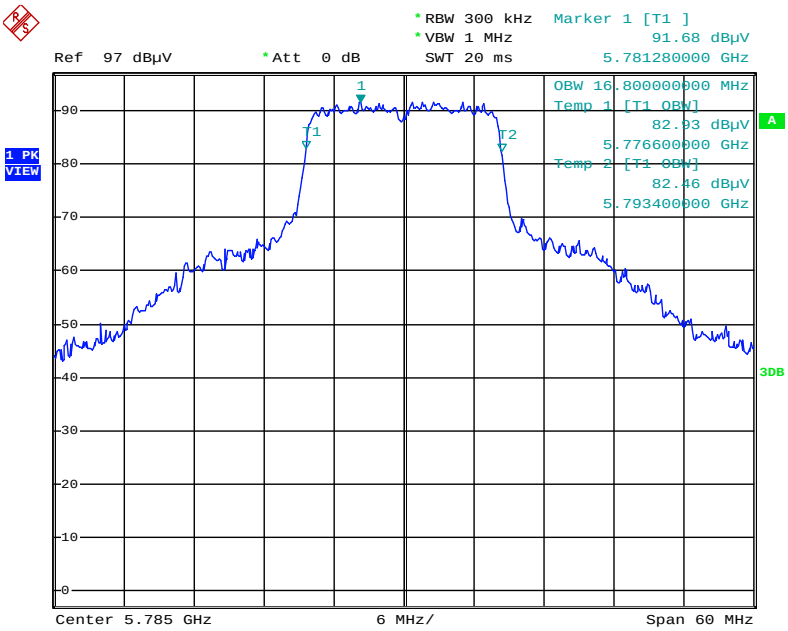
For 5GHz Band

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 1 + Ant. 2 + Ant. 3



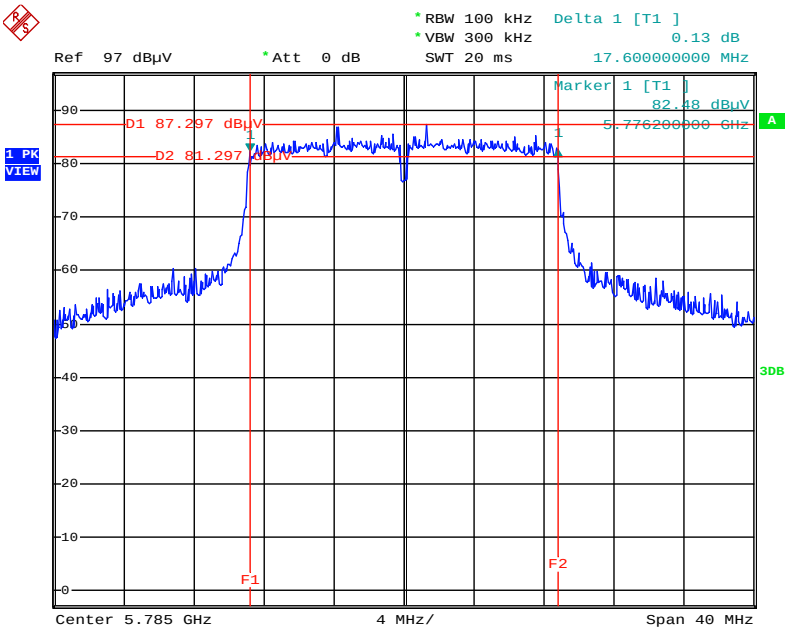
Date: 31.AUG.2015 17:25:26

99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 1 + Ant. 2 + Ant. 3



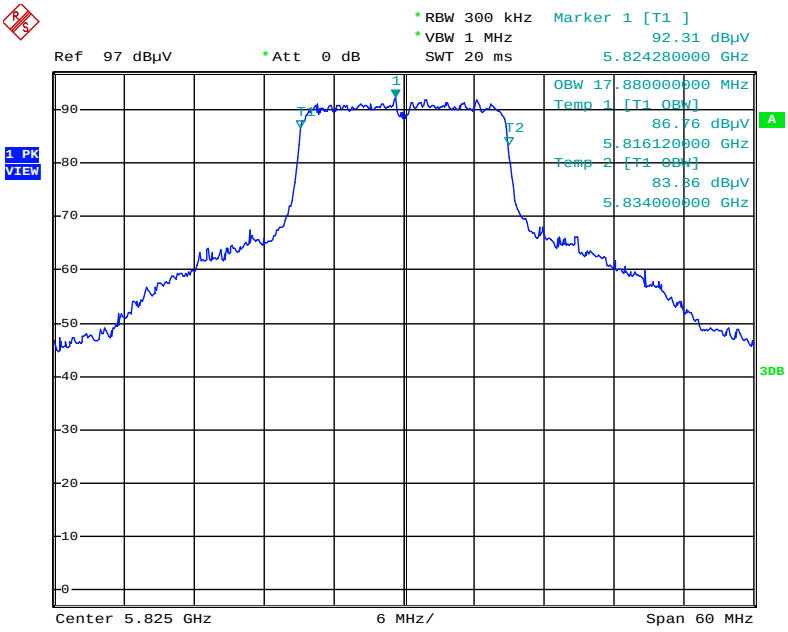
Date: 31.AUG.2015 17:34:29

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5785 MHz / Ant. 1 + Ant. 2 + Ant. 3



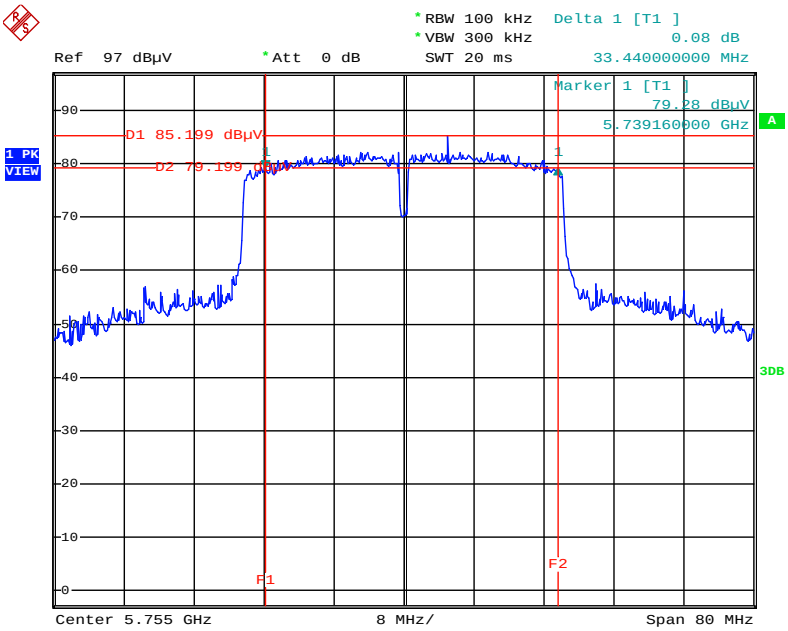
Date: 31.AUG.2015 17:28:37

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 5825 MHz / Ant. 1 + Ant. 2 + Ant. 3



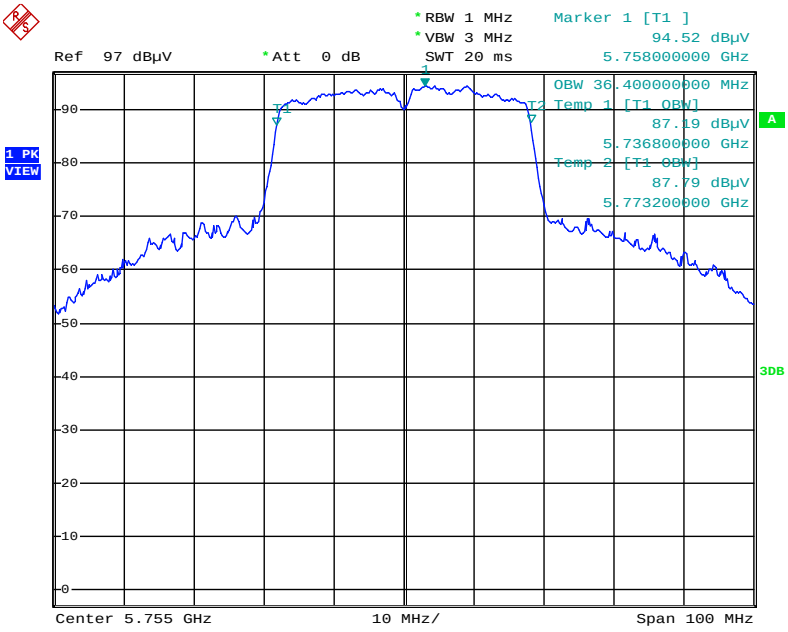
Date: 31.AUG.2015 17:36:24

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



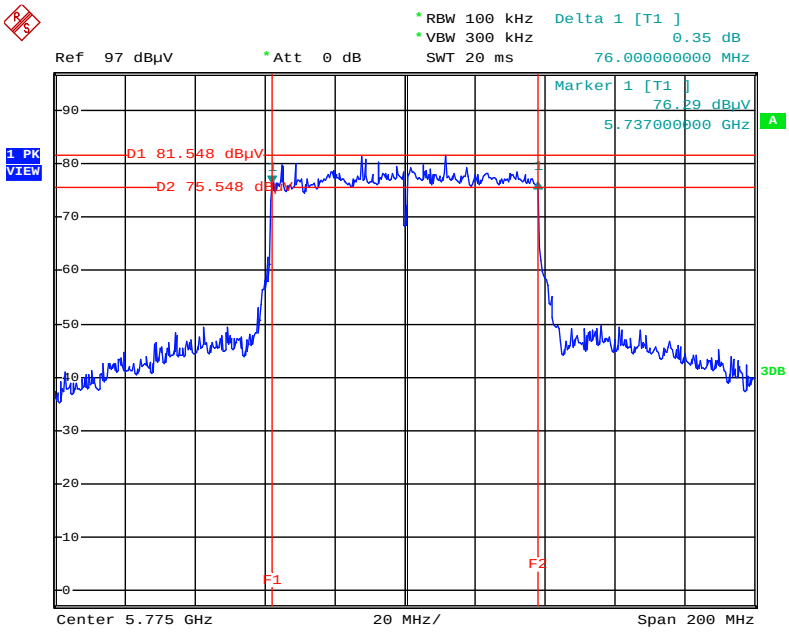
Date: 31.AUG.2015 17:30:03

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



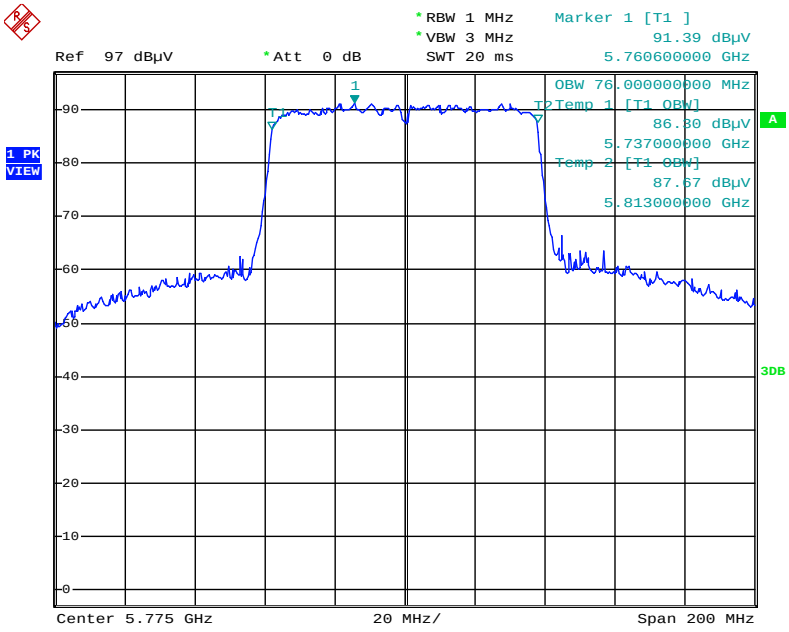
Date: 31.AUG.2015 17:37:16

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



Date: 31.AUG.2015 17:24:35

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



Date: 31.AUG.2015 17:38:33

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

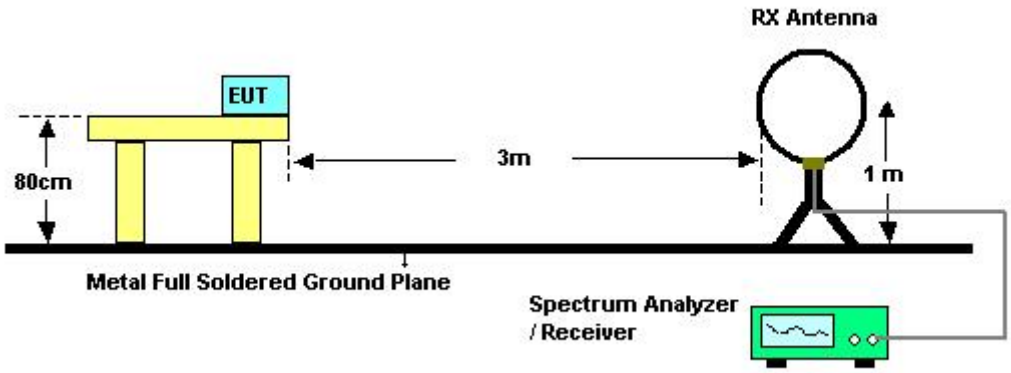
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1GHz / RBW 120kHz for QP

4.5.3. Test Procedures

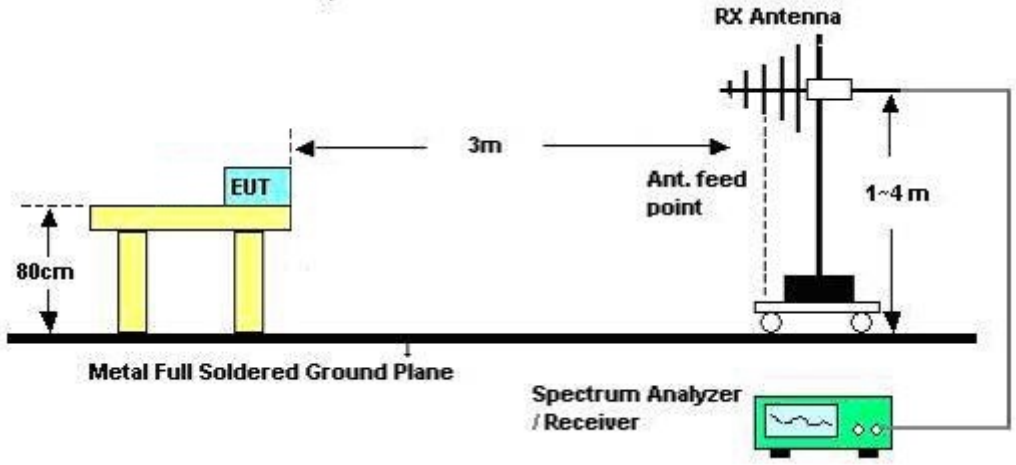
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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

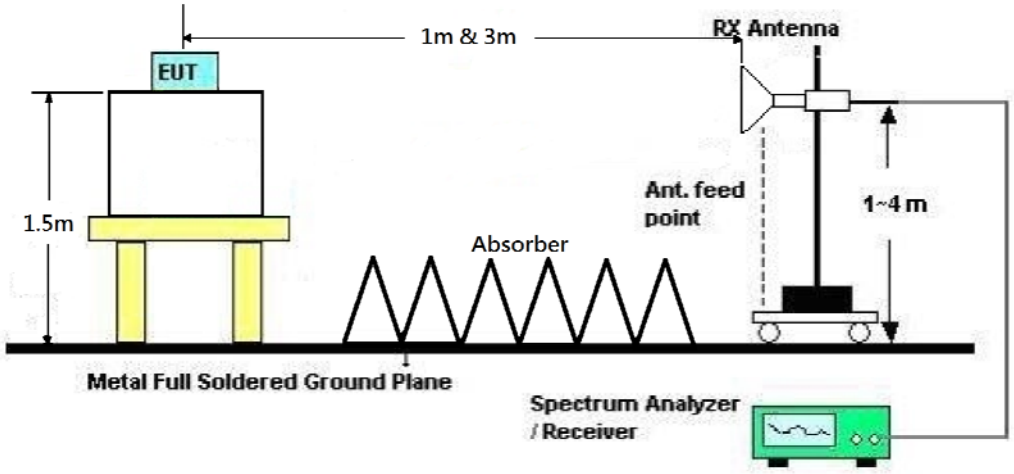
For Radiated Emissions: 9kHz ~30MHz



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 mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

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

Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	Normal Link
Test Date	Aug. 18, 2015	Test Mode	Mode 3

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

Note:

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

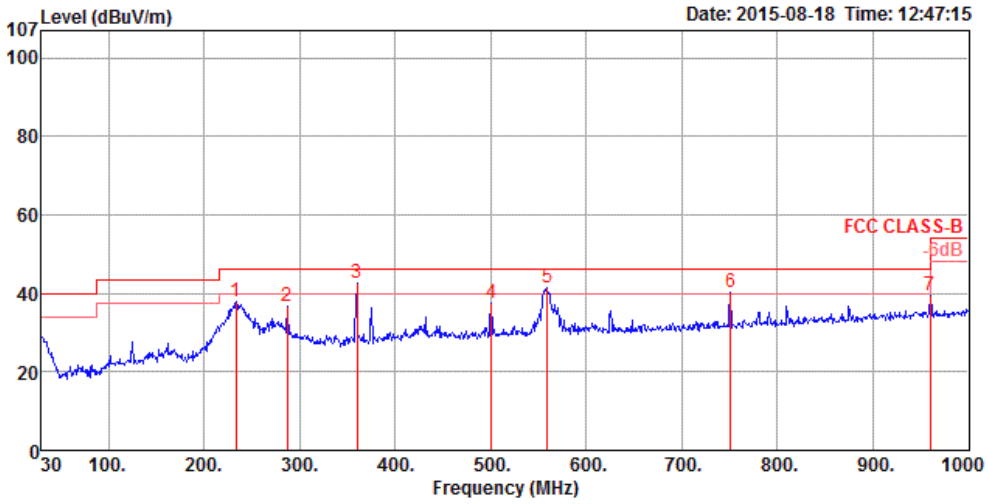
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

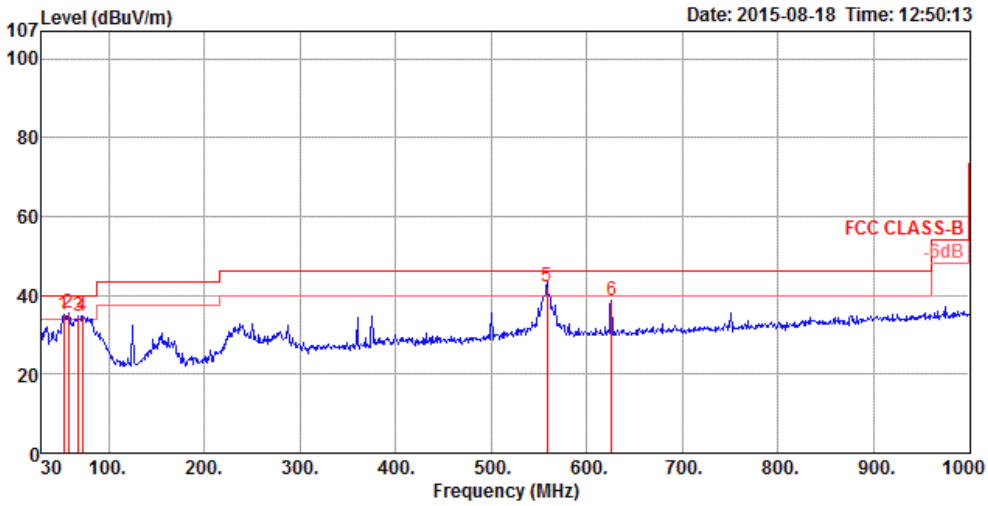
Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	Normal Link
Test Mode	Mode 3		

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	233.70	37.75	46.00	-8.25	57.17	1.52	32.54	11.60	HORIZONTAL	150	231	Peak
2	287.05	36.90	46.00	-9.10	54.10	1.68	32.52	13.64	HORIZONTAL	150	38	Peak
3	359.80	42.71	46.00	-3.29	57.83	1.89	32.53	15.52	HORIZONTAL	100	111	QP
4	500.45	37.33	46.00	-8.67	49.90	2.21	32.61	17.83	HORIZONTAL	100	101	Peak
5	559.62	41.48	46.00	-4.52	53.14	2.33	32.66	18.67	HORIZONTAL	200	149	QP
6	750.71	40.21	46.00	-5.79	49.79	2.71	32.49	20.20	HORIZONTAL	150	105	QP
7	960.00	39.29	46.00	-6.71	45.55	3.08	31.30	21.96	HORIZONTAL	100	87	Peak

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	Pol/Phase	T/Pos	A/Pos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m		deg	cm	
1	53.28	35.29	40.00	-4.71	58.92	0.75	32.62	8.24	VERTICAL	18	125	QP
2	58.13	35.51	40.00	-4.49	60.18	0.77	32.62	7.18	VERTICAL	29	150	QP
3	68.80	34.63	40.00	-5.37	59.59	0.84	32.60	6.80	VERTICAL	308	150	QP
4	72.68	34.70	40.00	-5.30	59.43	0.86	32.60	7.01	VERTICAL	216	150	QP
5	558.65	42.31	46.00	-3.69	53.97	2.33	32.66	18.67	VERTICAL	324	100	QP
6	625.58	38.54	46.00	-7.46	49.49	2.46	32.67	19.26	VERTICAL	127	100	Peak

Note:

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

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

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

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

For Non-beamforming mode

Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11b CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 19, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4824.00	45.92	74.00	-28.08	42.38	5.38	32.55	34.39	162	282	HORIZONTAL	Peak
2	4824.04	38.08	54.00	-15.92	34.54	5.38	32.55	34.39	162	282	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4824.00	34.93	54.00	-19.07	31.39	5.38	32.55	34.39	160	6	VERTICAL	Average
2	4824.12	45.57	74.00	-28.43	42.03	5.38	32.55	34.39	160	6	VERTICAL	Peak

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11b CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4874.00	49.52	74.00	-24.48	47.12	4.13	32.78	34.51	290	155	Peak	HORIZONTAL
2	4874.00	45.18	54.00	-8.82	42.78	4.13	32.78	34.51	290	155	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4873.92	48.04	74.00	-25.96	45.64	4.13	32.78	34.51	15	170	Peak	VERTICAL
2	4874.08	42.84	54.00	-11.16	40.44	4.13	32.78	34.51	15	170	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11b CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 19, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4924.02	44.82	74.00	-29.18	41.01	5.42	32.76	34.37	162	279	HORIZONTAL	Peak
2	4924.04	35.83	54.00	-18.17	32.02	5.42	32.76	34.37	162	279	HORIZONTAL	Average

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	A/Pos	T/Pos	Pol/Phase	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg		
1	4921.92	44.51	74.00	-29.49	40.72	5.42	32.74	34.37	158	340	VERTICAL	Peak
2	4924.04	32.03	54.00	-21.97	28.22	5.42	32.76	34.37	158	340	VERTICAL	Average

For beamforming mode

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11g CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4820.08	46.52	74.00	-27.48	44.25	4.10	32.69	34.52	138	214	Peak	HORIZONTAL
2	4823.94	34.42	54.00	-19.58	32.15	4.10	32.69	34.52	138	214	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4821.24	45.22	74.00	-28.78	42.95	4.10	32.69	34.52	230	126	Peak	VERTICAL
2	4824.04	38.92	54.00	-15.08	36.65	4.10	32.69	34.52	230	126	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11g CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4871.12	51.86	74.00	-22.14	49.46	4.13	32.78	34.51	305	209	Peak	HORIZONTAL
2	4874.00	48.29	54.00	-5.71	45.89	4.13	32.78	34.51	305	209	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4874.00	43.65	54.00	-10.35	41.25	4.13	32.78	34.51	339	155	Average	VERTICAL
2	4874.86	50.23	74.00	-23.77	47.83	4.13	32.78	34.51	339	155	Peak	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11g CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4923.10	36.48	54.00	-17.52	33.94	4.15	32.88	34.49	277	113	Average	HORIZONTAL
2	4925.00	53.00	74.00	-21.00	50.46	4.15	32.88	34.49	277	113	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4919.26	49.98	74.00	-24.02	47.44	4.15	32.88	34.49	309	133	Peak	VERTICAL
2	4925.90	34.92	54.00	-19.08	32.38	4.15	32.88	34.49	309	133	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4819.28	46.59	74.00	-27.41	44.32	4.10	32.69	34.52	7	100	Peak	HORIZONTAL
2	4824.16	36.87	54.00	-17.13	34.60	4.10	32.69	34.52	7	100	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4824.00	38.48	54.00	-15.52	36.21	4.10	32.69	34.52	360	150	Average	VERTICAL
2	4829.00	46.79	74.00	-27.21	44.52	4.10	32.69	34.52	360	150	Peak	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4872.92	48.00	74.00	-26.00	45.60	4.13	32.78	34.51	187	176	Peak	HORIZONTAL
2	4877.04	33.89	54.00	-20.11	31.49	4.13	32.78	34.51	187	176	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4865.92	49.73	74.00	-24.27	47.37	4.12	32.75	34.51	209	184	Peak	VERTICAL
2	4874.92	38.58	54.00	-15.42	36.18	4.13	32.78	34.51	209	184	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4922.92	46.59	74.00	-27.41	44.05	4.15	32.88	34.49	204	154	Peak	HORIZONTAL
2	4924.48	33.10	54.00	-20.90	30.56	4.15	32.88	34.49	204	154	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4932.64	46.12	74.00	-27.88	43.58	4.15	32.88	34.49	166	125	Peak	VERTICAL
2	4932.64	33.12	54.00	-20.88	30.58	4.15	32.88	34.49	166	125	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4827.52	45.78	74.00	-28.22	43.51	4.10	32.69	34.52	197	110	Peak	HORIZONTAL
2	4843.04	32.08	54.00	-21.92	29.76	4.11	32.72	34.51	197	110	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4843.20	46.42	74.00	-27.58	44.10	4.11	32.72	34.51	130	133	Peak	VERTICAL
2	4846.24	31.72	54.00	-22.28	29.40	4.11	32.72	34.51	130	133	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 6 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4870.24	46.21	74.00	-27.79	43.81	4.13	32.78	34.51	217	175	Peak	HORIZONTAL
2	4894.00	32.96	54.00	-21.04	30.52	4.13	32.81	34.50	217	175	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4855.44	46.09	74.00	-27.91	43.73	4.12	32.75	34.51	129	151	Peak	VERTICAL
2	4871.28	32.06	54.00	-21.94	29.66	4.13	32.78	34.51	129	151	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 9 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4904.48	44.54	74.00	-29.46	42.06	4.14	32.84	34.50	47	172	Peak	HORIZONTAL
2	4904.87	31.73	54.00	-22.27	29.25	4.14	32.84	34.50	47	172	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	4903.22	44.66	74.00	-29.34	42.18	4.14	32.84	34.50	86	131	Peak	VERTICAL
2	4903.83	30.97	54.00	-23.03	28.49	4.14	32.84	34.50	86	131	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 149 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015 ~ Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	3830.02	44.83	74.00	-29.17	44.30	3.61	31.39	34.47	112	161	Peak	HORIZONTAL
2	3830.02	37.25	54.00	-16.75	36.72	3.61	31.39	34.47	112	161	Average	HORIZONTAL
3	7660.00	52.19	74.00	-21.81	44.39	5.22	37.43	34.85	15	172	Peak	HORIZONTAL
4	7660.02	44.92	54.00	-9.08	37.12	5.22	37.43	34.85	15	172	Average	HORIZONTAL
5	11492.90	46.70	54.00	-7.30	36.09	6.53	38.70	34.62	291	184	Average	HORIZONTAL
6	11497.50	59.00	74.00	-15.00	48.38	6.54	38.70	34.62	291	184	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	3839.28	48.22	74.00	-25.78	47.64	3.62	31.43	34.47	273	156	Peak	VERTICAL
2	3839.28	36.60	54.00	-17.40	36.02	3.62	31.43	34.47	273	156	Average	VERTICAL
3	7650.00	50.59	74.00	-23.41	42.78	5.22	37.44	34.85	243	160	Peak	VERTICAL
4	7650.00	42.70	54.00	-11.30	34.89	5.22	37.44	34.85	243	160	Average	VERTICAL
5	11480.00	52.31	74.00	-21.69	41.70	6.53	38.70	34.62	182	127	Peak	VERTICAL
6	11480.00	42.44	54.00	-11.56	31.83	6.53	38.70	34.62	182	127	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 157 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	7713.32	50.32	74.00	-23.68	42.53	5.25	37.41	34.87	150	180	Peak	HORIZONTAL
2	7713.32	41.80	54.00	-12.20	34.01	5.25	37.41	34.87	150	180	Average	HORIZONTAL
3	11560.00	51.12	74.00	-22.88	40.50	6.55	38.71	34.64	122	164	Peak	HORIZONTAL
4	11560.00	40.67	54.00	-13.33	30.05	6.55	38.71	34.64	122	164	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	7713.32	52.54	74.00	-21.46	44.75	5.25	37.41	34.87	152	167	Peak	VERTICAL
2	7713.32	46.45	54.00	-7.55	38.66	5.25	37.41	34.87	152	167	Average	VERTICAL
3	11568.80	51.21	74.00	-22.79	40.59	6.55	38.71	34.64	104	177	Peak	VERTICAL
4	11568.80	40.76	54.00	-13.24	30.14	6.55	38.71	34.64	104	177	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11a CH 165 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	3883.18	46.61	74.00	-27.39	45.88	3.64	31.55	34.46	219	142	Peak	HORIZONTAL
2	3883.26	38.98	54.00	-15.02	38.25	3.64	31.55	34.46	219	142	Average	HORIZONTAL
3	11653.10	62.56	74.00	-11.44	51.95	6.56	38.73	34.68	53	194	Peak	HORIZONTAL
4	11653.60	50.33	54.00	-3.67	39.72	6.56	38.73	34.68	53	194	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	3883.22	52.61	74.00	-21.39	51.88	3.64	31.55	34.46	198	215	Peak	VERTICAL
2	3883.38	45.75	54.00	-8.25	45.02	3.64	31.55	34.46	198	215	Average	VERTICAL
3	11651.30	56.03	74.00	-17.97	45.42	6.56	38.73	34.68	360	239	Peak	VERTICAL
4	11651.60	41.69	54.00	-12.31	31.08	6.56	38.73	34.68	360	239	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 28, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	7659.46	50.27	74.00	-23.73	41.41	7.28	36.90	35.32	Peak	153	263	HORIZONTAL
2	7659.95	38.59	54.00	-15.41	29.73	7.28	36.90	35.32	Average	153	263	HORIZONTAL
3	11488.10	38.93	54.00	-15.07	25.41	9.24	39.08	34.80	Average	146	223	HORIZONTAL
4	11488.10	51.93	74.00	-22.07	38.41	9.24	39.08	34.80	Peak	146	223	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	7659.98	53.27	74.00	-20.73	44.41	7.28	36.90	35.32	Peak	192	139	VERTICAL
2	7660.04	50.77	54.00	-3.23	41.91	7.28	36.90	35.32	Average	192	139	VERTICAL
3	11488.30	40.43	54.00	-13.57	26.91	9.24	39.08	34.80	Average	202	144	VERTICAL
4	11488.30	51.43	74.00	-22.57	37.91	9.24	39.08	34.80	Peak	202	144	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 28, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	7713.30	39.07	54.00	-14.93	30.16	7.30	36.93	35.32	Average	146	327	HORIZONTAL
2	7723.30	49.06	74.00	-24.94	40.16	7.30	36.93	35.33	Peak	146	327	HORIZONTAL
3	11568.70	45.89	54.00	-8.11	32.30	9.26	39.14	34.81	Average	124	224	HORIZONTAL
4	11569.70	57.89	74.00	-16.11	44.30	9.26	39.14	34.81	Peak	124	224	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	7713.30	48.07	54.00	-5.93	39.16	7.30	36.93	35.32	Average	146	327	VERTICAL
2	7723.30	54.06	74.00	-19.94	45.16	7.30	36.93	35.33	Peak	146	327	VERTICAL
3	11568.70	38.89	54.00	-15.11	25.30	9.26	39.14	34.81	Average	124	224	VERTICAL
4	11569.70	50.89	74.00	-23.11	37.30	9.26	39.14	34.81	Peak	124	224	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11645.00	51.64	74.00	-22.36	41.02	6.56	38.73	34.67	140	136	Peak	HORIZONTAL
2	11645.00	40.71	54.00	-13.29	30.09	6.56	38.73	34.67	140	136	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11645.00	56.41	74.00	-17.59	45.79	6.56	38.73	34.67	176	178	Peak	VERTICAL
2	11645.00	43.14	54.00	-10.86	32.52	6.56	38.73	34.67	176	178	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11491.92	57.54	74.00	-16.46	46.93	6.53	38.70	34.62	65	183	Peak	HORIZONTAL
2	11491.92	44.98	54.00	-9.02	34.37	6.53	38.70	34.62	65	183	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11530.00	50.63	74.00	-23.37	40.02	6.54	38.70	34.63	213	126	Peak	VERTICAL
2	11530.00	39.93	54.00	-14.07	29.32	6.54	38.70	34.63	213	126	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11591.92	60.48	74.00	-13.52	49.86	6.55	38.72	34.65	302	175	Peak	HORIZONTAL
2	11591.92	49.12	54.00	-4.88	38.50	6.55	38.72	34.65	302	175	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11590.72	50.57	74.00	-23.43	39.95	6.55	38.72	34.65	157	151	Peak	VERTICAL
2	11590.72	41.60	54.00	-12.40	30.98	6.55	38.72	34.65	157	151	Average	VERTICAL

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 26, 2015		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11536.24	50.70	74.00	-23.30	40.08	6.54	38.71	34.63	308	162	Peak	HORIZONTAL
2	11536.24	40.32	54.00	-13.68	29.70	6.54	38.71	34.63	308	162	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	11536.24	52.46	74.00	-21.54	41.84	6.54	38.71	34.63	176	158	Peak	VERTICAL
2	11536.24	40.73	54.00	-13.27	30.11	6.54	38.71	34.63	176	158	Average	VERTICAL

Note:

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

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

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

4.6. Emissions Measurement

4.6.1. Limit

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

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

4.6.2. Measuring Instruments and Setting

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

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

4.6.3. Test Procedures

For Radiated band edges Measurement:

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 mode:

The EUT was programmed to be in continuously transmitting mode.

For beamforming mode:

The EUT was programmed to be in beamforming transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

For Non-beamforming mode

Temperature	23°C	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	2387.00	60.42	74.00	-13.58	29.42	2.86	28.14	0.00	265	168	Peak	VERTICAL
2	2388.60	51.32	54.00	-2.68	20.32	2.86	28.14	0.00	265	168	Average	VERTICAL
3	2411.00	122.73			91.74	2.87	28.12	0.00	265	168	Peak	VERTICAL
4	2411.00	120.37			89.38	2.87	28.12	0.00	265	168	Average	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.20	61.19	74.00	-12.81	30.19	2.86	28.14	0.00	183	172	Peak	VERTICAL
2	2389.60	53.57	54.00	-0.43	22.57	2.86	28.14	0.00	183	172	Average	VERTICAL
3	2437.80	122.42			91.46	2.89	28.07	0.00	183	172	Average	VERTICAL
4	2438.20	124.94			93.98	2.89	28.07	0.00	183	172	Peak	VERTICAL
5	2483.50	60.58	74.00	-13.42	29.65	2.91	28.02	0.00	183	172	Peak	VERTICAL
6	2483.90	51.49	54.00	-2.51	20.56	2.91	28.02	0.00	183	172	Average	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2463.20	120.43			89.48	2.90	28.05	0.00	265	158	Peak	VERTICAL
2	2463.20	116.37			85.42	2.90	28.05	0.00	265	158	Average	VERTICAL
3	2484.80	52.56	54.00	-1.44	21.63	2.91	28.02	0.00	265	158	Average	VERTICAL
4	2486.00	62.43	74.00	-11.57	31.50	2.91	28.02	0.00	265	158	Peak	VERTICAL

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

For beamforming mode

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	2389.60	64.56	74.00	-9.44	33.56	2.86	28.14	0.00	189	168	Peak	VERTICAL
2	2390.00	52.56	54.00	-1.44	21.56	2.86	28.14	0.00	189	168	Average	VERTICAL
3	2411.20	115.82			84.83	2.87	28.12	0.00	189	168	Average	VERTICAL
4	2414.40	121.65			90.66	2.87	28.12	0.00	189	168	Peak	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2384.00	49.17	54.00	-4.83	18.15	2.85	28.17	0.00	155	175	Average	VERTICAL
2	2390.00	72.61	74.00	-1.39	41.61	2.86	28.14	0.00	155	175	Peak	VERTICAL
3	2434.20	114.43			83.45	2.88	28.10	0.00	155	175	Average	VERTICAL
4	2444.20	124.90			93.94	2.89	28.07	0.00	155	175	Peak	VERTICAL
5	2483.50	73.56	74.00	-0.44	42.63	2.91	28.02	0.00	155	175	Peak	VERTICAL
6	2484.30	53.08	54.00	-0.92	22.15	2.91	28.02	0.00	155	175	Average	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2462.80	120.46			89.51	2.90	28.05	0.00	184	173	Peak	VERTICAL
2	2463.20	116.38			85.43	2.90	28.05	0.00	184	173	Average	VERTICAL
3	2483.50	65.09	74.00	-8.91	34.16	2.91	28.02	0.00	184	173	Peak	VERTICAL
4	2483.50	52.89	54.00	-1.11	21.96	2.91	28.02	0.00	184	173	Average	VERTICAL

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

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1, 6, 11 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	2388.40	63.31	74.00	-10.69	32.31	2.86	28.14	0.00	174	182	Peak	VERTICAL
2	2390.00	53.06	54.00	-0.94	22.06	2.86	28.14	0.00	174	182	Average	VERTICAL
3	2410.80	112.66			81.67	2.87	28.12	0.00	174	182	Average	VERTICAL
4	2413.20	118.93			87.94	2.87	28.12	0.00	174	182	Peak	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2390.00	61.92	74.00	-12.08	30.92	2.86	28.14	0.00	175	100	Peak	VERTICAL
2	2390.00	51.42	54.00	-2.58	20.42	2.86	28.14	0.00	175	100	Average	VERTICAL
3	2438.20	125.24			94.28	2.89	28.07	0.00	175	100	Peak	VERTICAL
4	2439.00	121.37			90.41	2.89	28.07	0.00	175	100	Average	VERTICAL
5	2483.50	64.29	74.00	-9.71	33.36	2.91	28.02	0.00	175	100	Peak	VERTICAL
6	2483.50	53.54	54.00	-0.46	22.61	2.91	28.02	0.00	175	100	Average	VERTICAL

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

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2458.80	120.35			89.40	2.90	28.05	0.00	113	177	Peak	VERTICAL
2	2465.20	111.12			80.17	2.90	28.05	0.00	113	177	Average	VERTICAL
3	2483.50	64.94	74.00	-9.06	34.01	2.91	28.02	0.00	113	177	Peak	VERTICAL
4	2483.50	53.71	54.00	-0.29	22.78	2.91	28.02	0.00	113	177	Average	VERTICAL

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

Temperature	23℃	Humidity	56%
Test Engineer	JC Yang	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3, 6, 9 / Ant. 1 + Ant. 2 + Ant. 3
Test Date	Aug. 14, 2015		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable 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	2390.00	64.66	74.00	-9.34	33.66	2.86	28.14	0.00	274	172	Peak	VERTICAL
2	2390.00	53.52	54.00	-0.48	22.52	2.86	28.14	0.00	274	172	Average	VERTICAL
3	2409.20	108.82			77.83	2.87	28.12	0.00	274	172	Average	VERTICAL
4	2411.20	114.47			83.48	2.87	28.12	0.00	274	172	Peak	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.20	66.28	74.00	-7.72	35.28	2.86	28.14	0.00	188	169	Peak	VERTICAL
2	2390.00	53.73	54.00	-0.27	22.73	2.86	28.14	0.00	188	169	Average	VERTICAL
3	2427.00	118.92			87.94	2.88	28.10	0.00	188	169	Peak	VERTICAL
4	2445.00	112.17			81.21	2.89	28.07	0.00	188	169	Average	VERTICAL
5	2483.50	61.89	74.00	-12.11	30.96	2.91	28.02	0.00	188	169	Peak	VERTICAL
6	2483.50	49.72	54.00	-4.28	18.79	2.91	28.02	0.00	188	169	Average	VERTICAL

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

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2447.20	115.51			84.55	2.89	28.07	0.00	143	175	Peak	VERTICAL
2	2465.20	106.97			76.02	2.90	28.05	0.00	143	175	Average	VERTICAL
3	2483.50	63.41	74.00	-10.59	32.48	2.91	28.02	0.00	143	175	Peak	VERTICAL
4	2483.50	52.53	54.00	-1.47	21.60	2.91	28.02	0.00	143	175	Average	VERTICAL

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

Note:

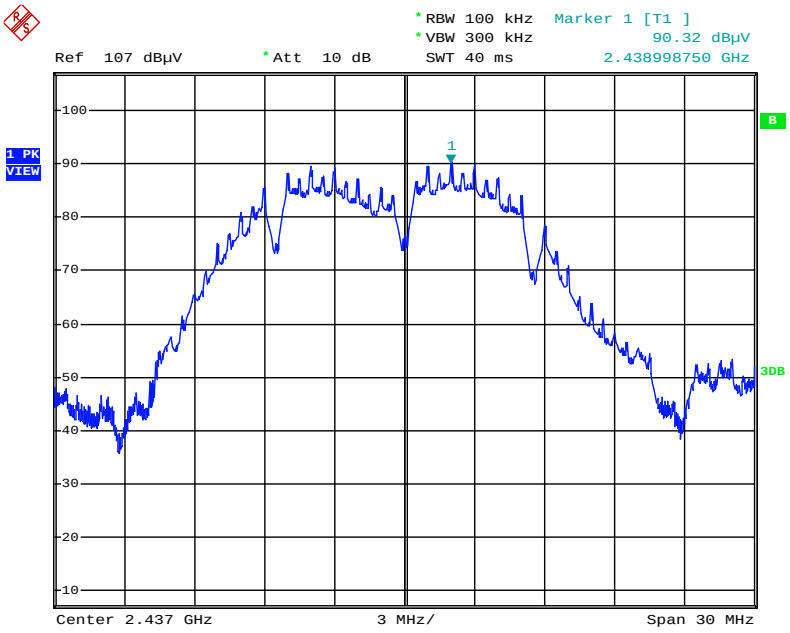
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

For Emission not in Restricted Band

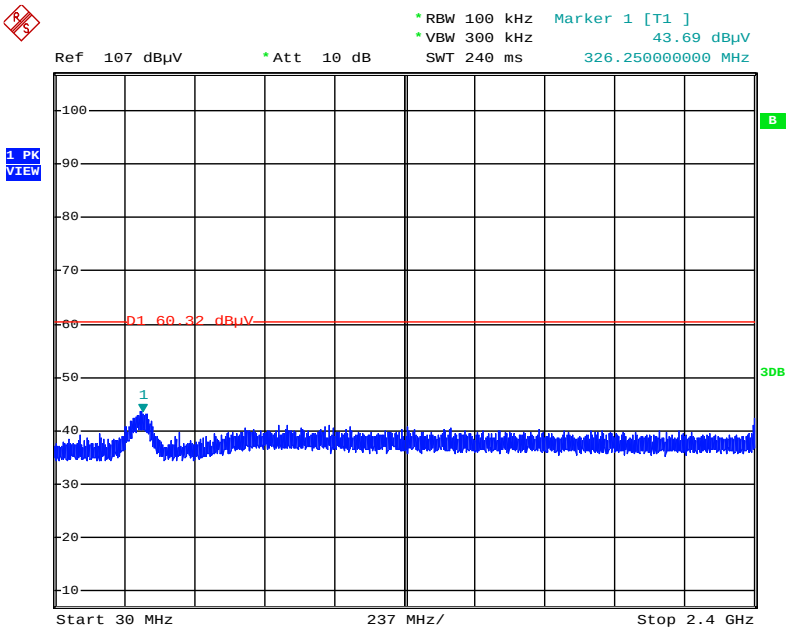
For Non-beamforming mode

Plot on Configuration IEEE 802.11b / Reference Level



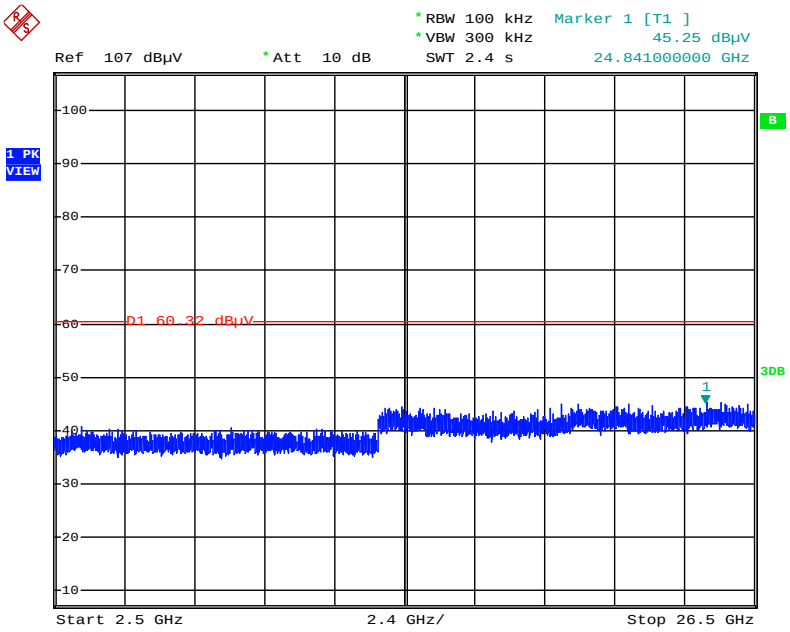
Date: 26.AUG.2015 20:02:35

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



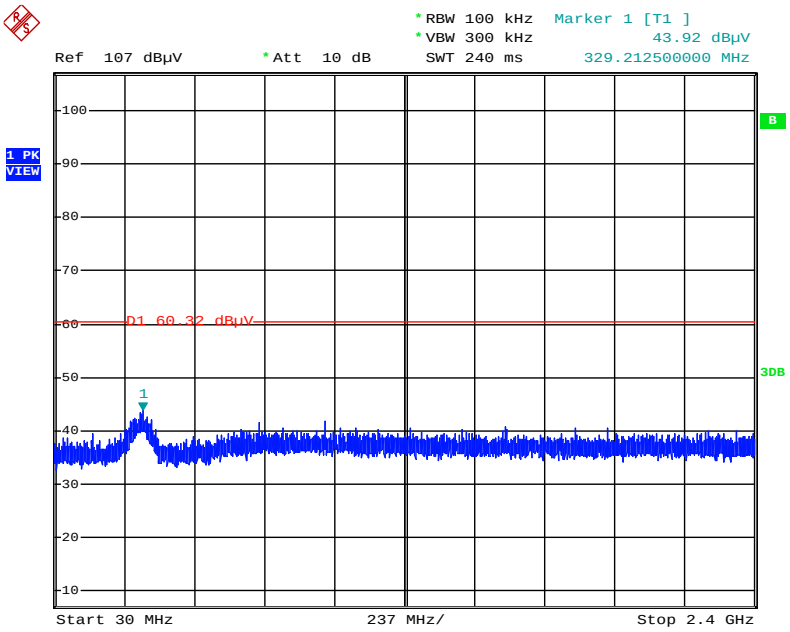
Date: 26.AUG.2015 20:04:03

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



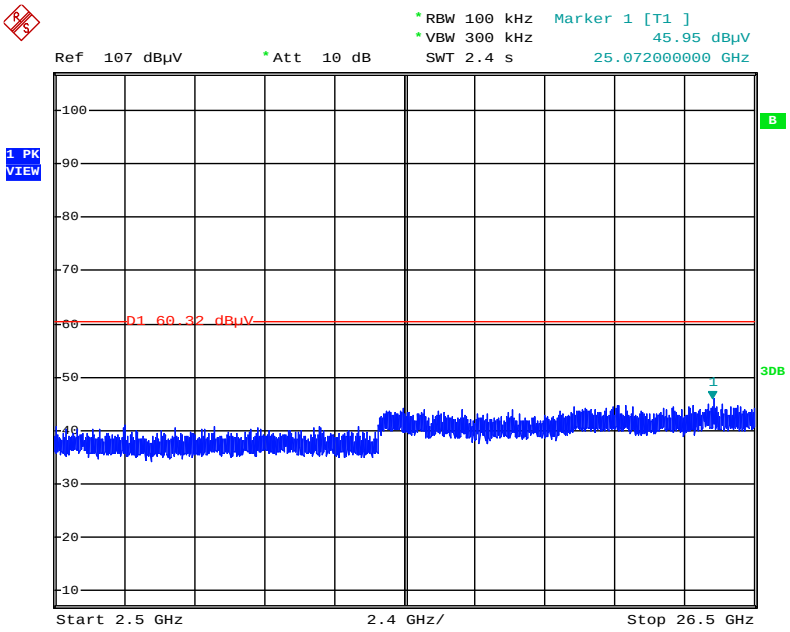
Date: 26.AUG.2015 20:04:47

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



Date: 26.AUG.2015 20:05:38

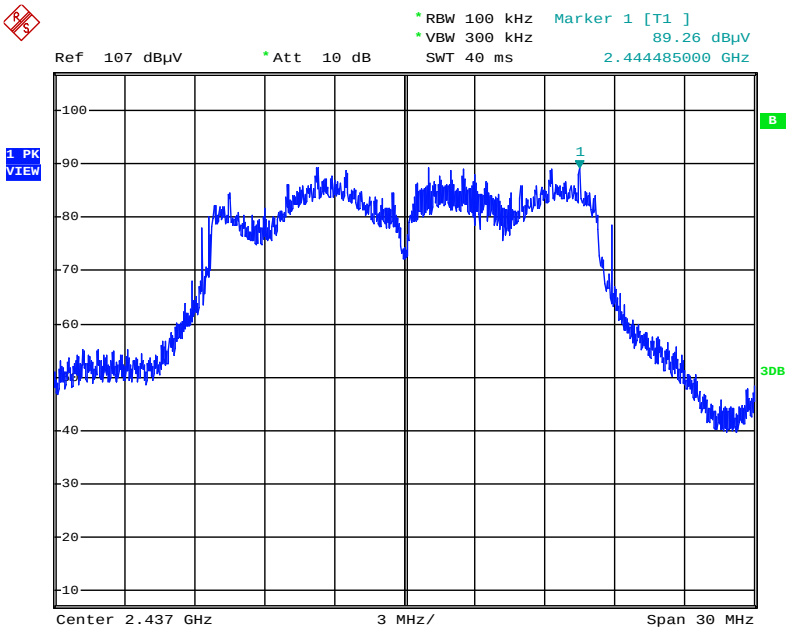
Plot on Configuration IEEE 802.11b / CH 11 / 2500MHz~26500MHz (down 30dBc)



Date: 26.AUG.2015 20:06:14

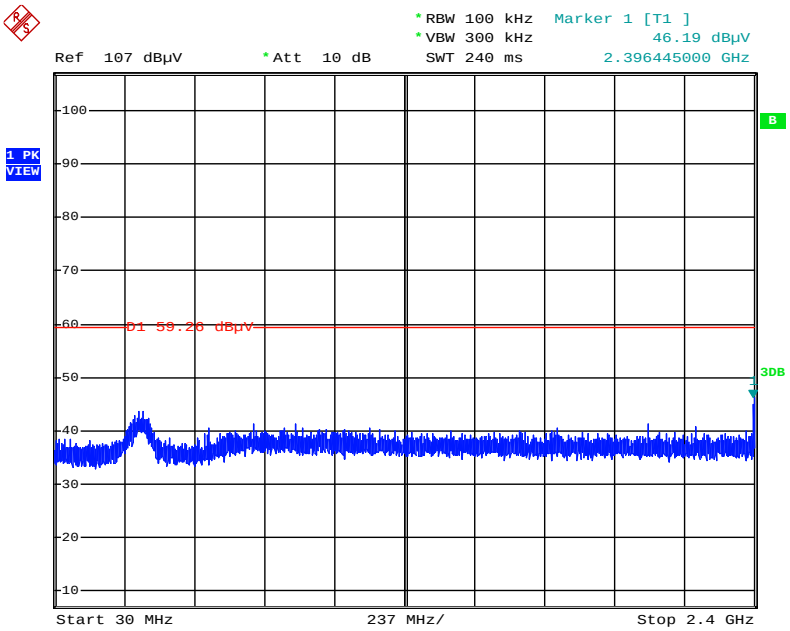
For beamforming mode

Plot on Configuration IEEE 802.11g / Reference Level



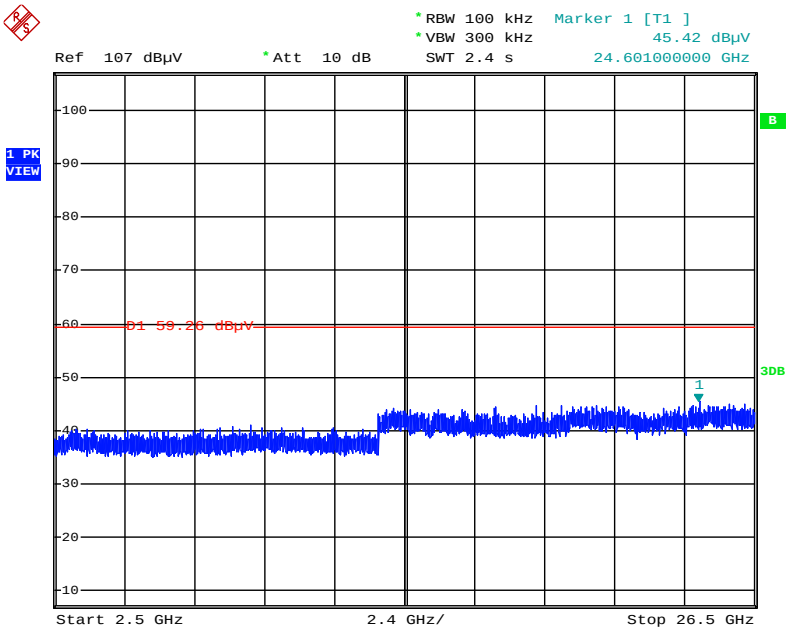
Date: 26.AUG.2015 19:28:21

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



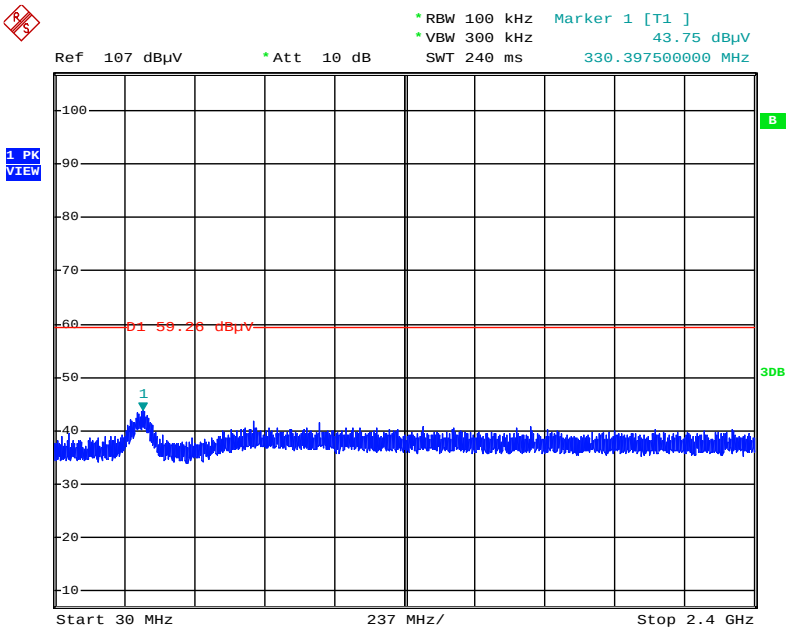
Date: 26.AUG.2015 19:34:44

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



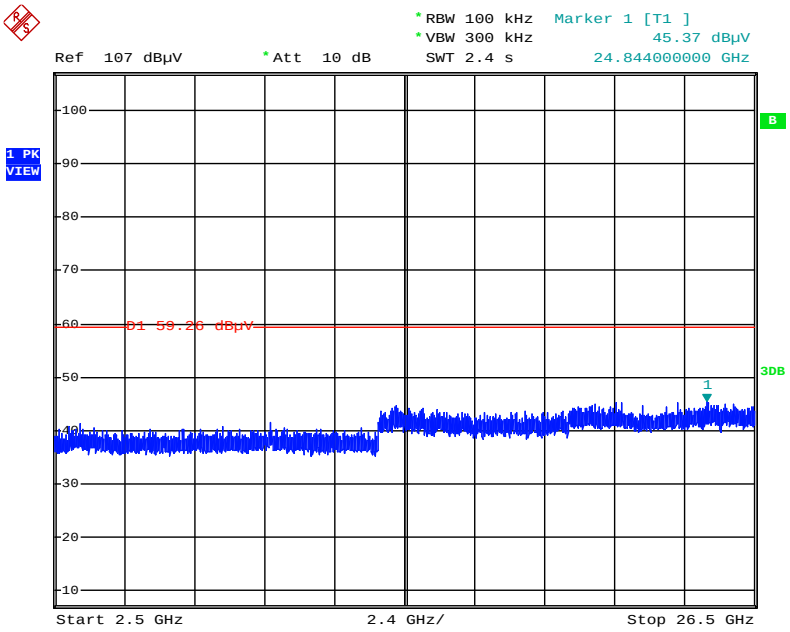
Date: 26.AUG.2015 19:36:11

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



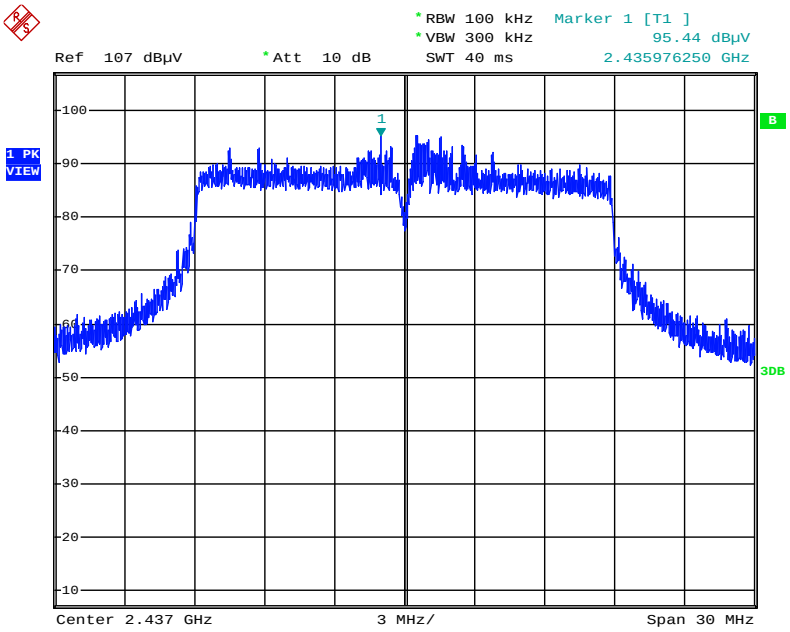
Date: 26.AUG.2015 19:43:51

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



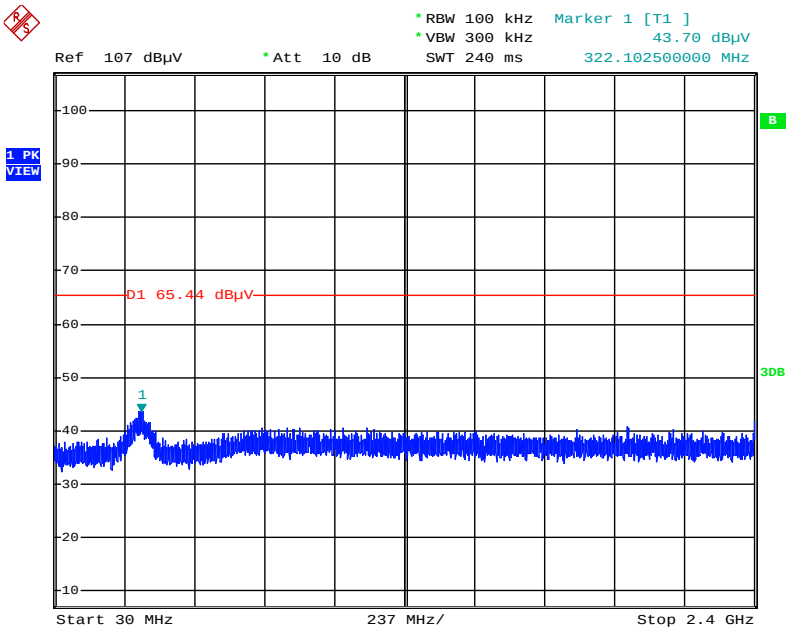
Date: 26.AUG.2015 19:44:45

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



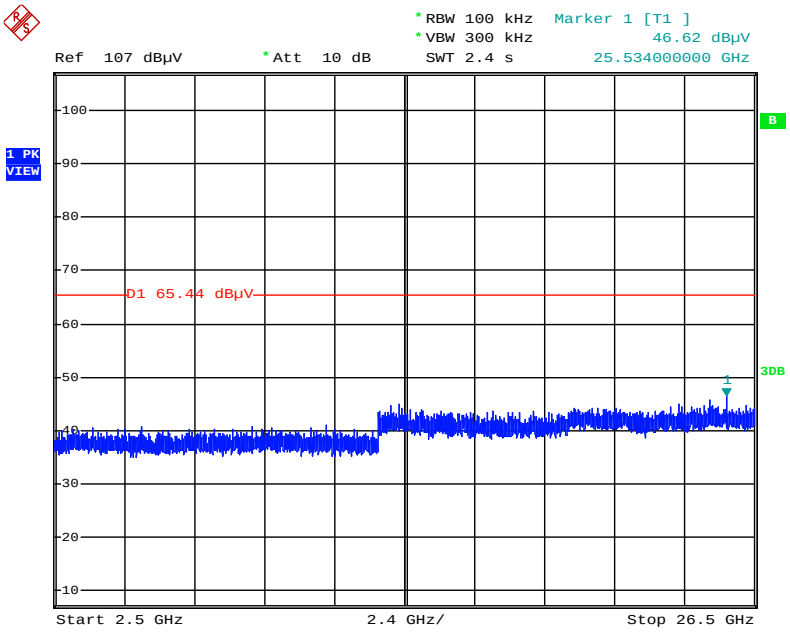
Date: 26.AUG.2015 17:46:17

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



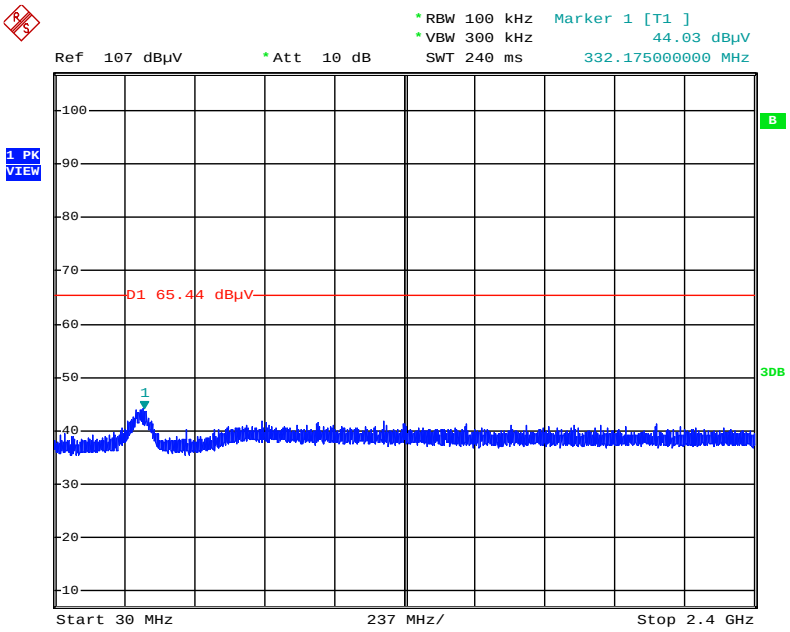
Date: 26.AUG.2015 17:56:30

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



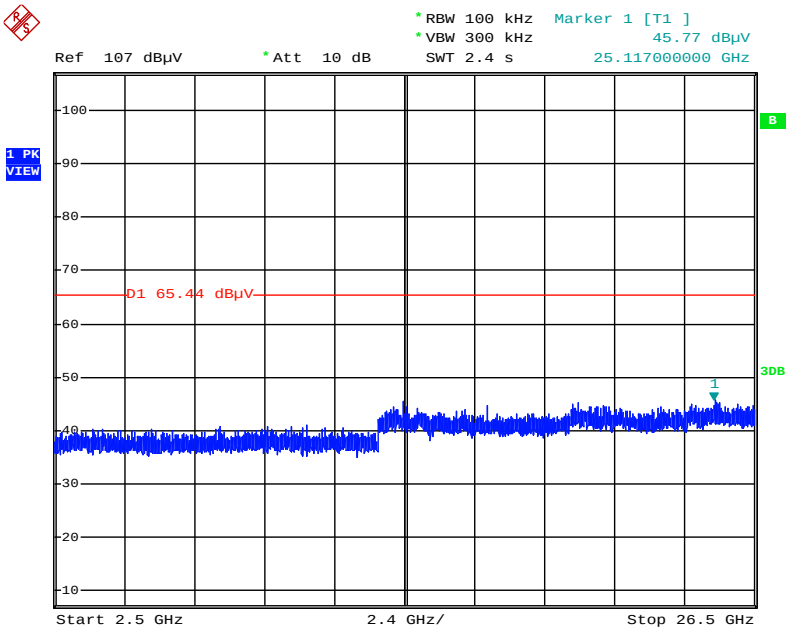
Date: 26.AUG.2015 17:57:17

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



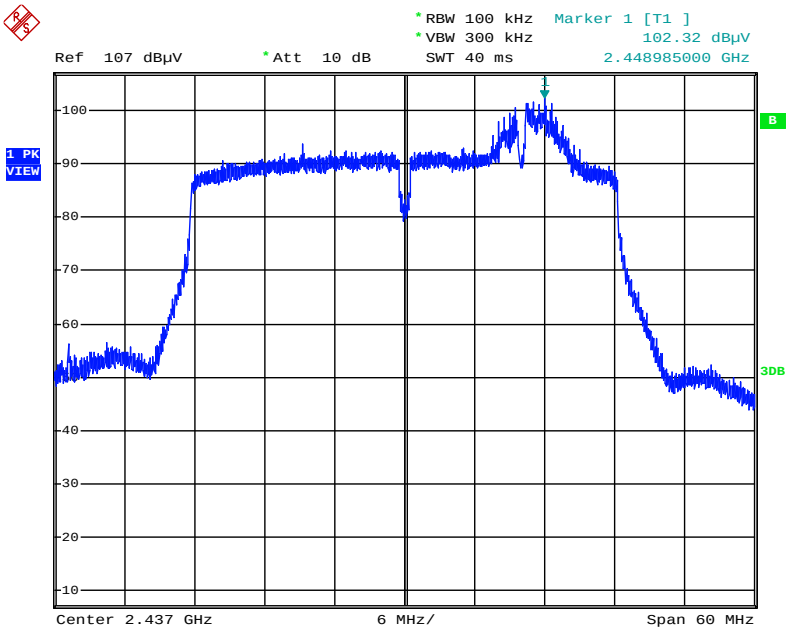
Date: 26.AUG.2015 19:12:10

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



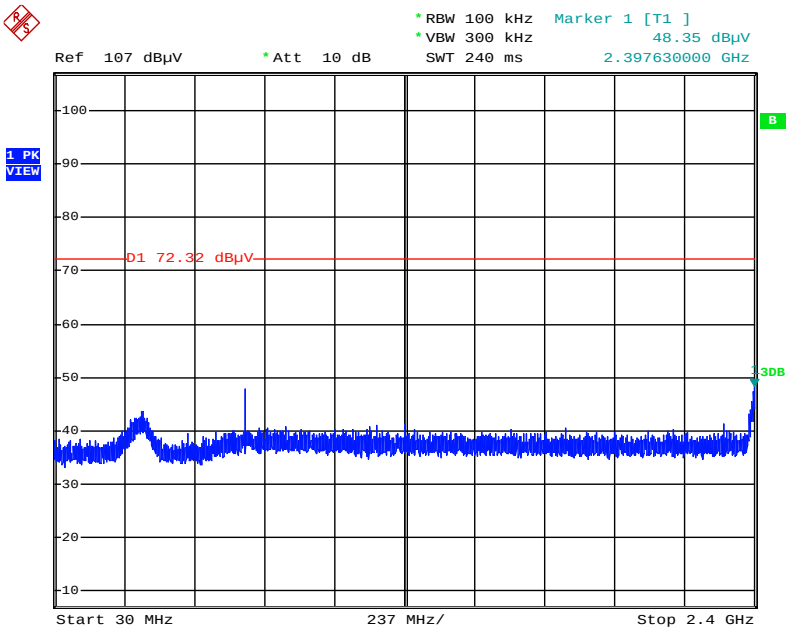
Date: 26.AUG.2015 19:13:39

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



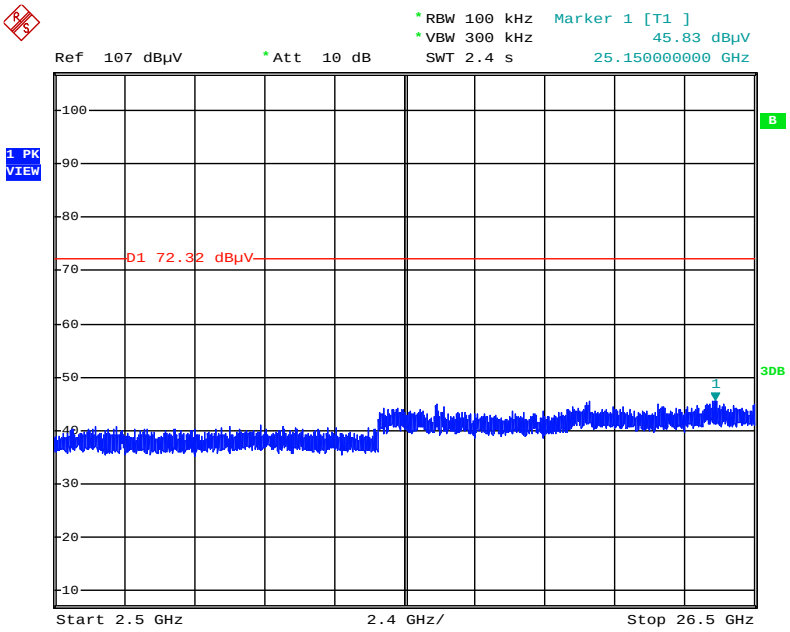
Date: 26.AUG.2015 17:10:20

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



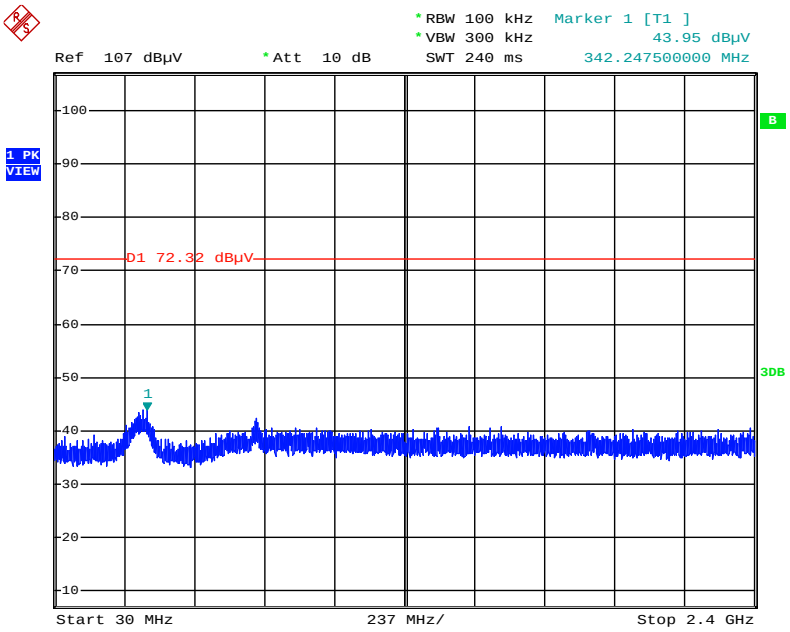
Date: 26.AUG.2015 17:18:46

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



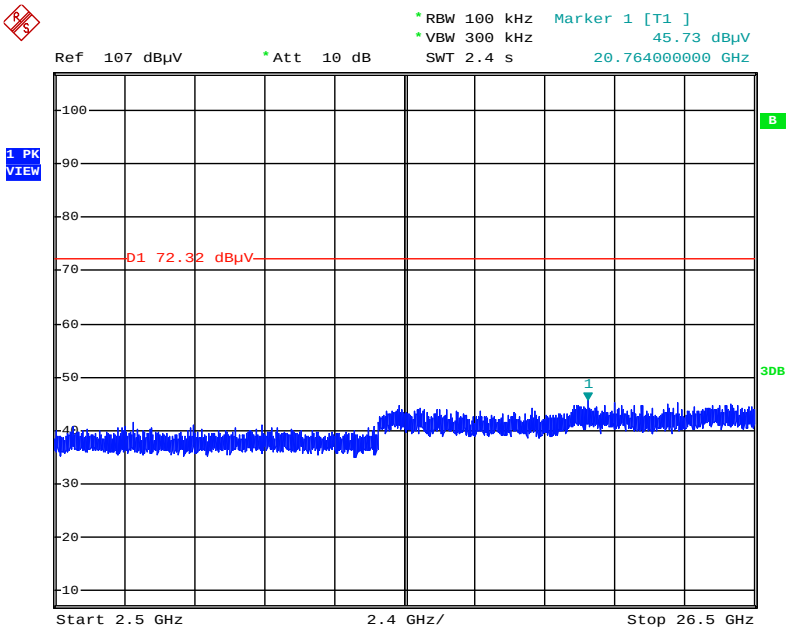
Date: 26.AUG.2015 17:20:08

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



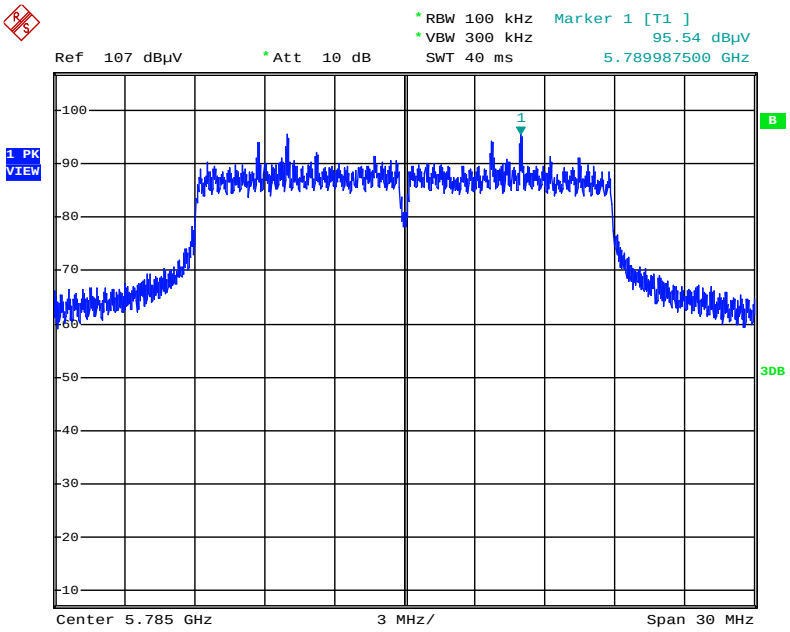
Date: 26.AUG.2015 17:23:30

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



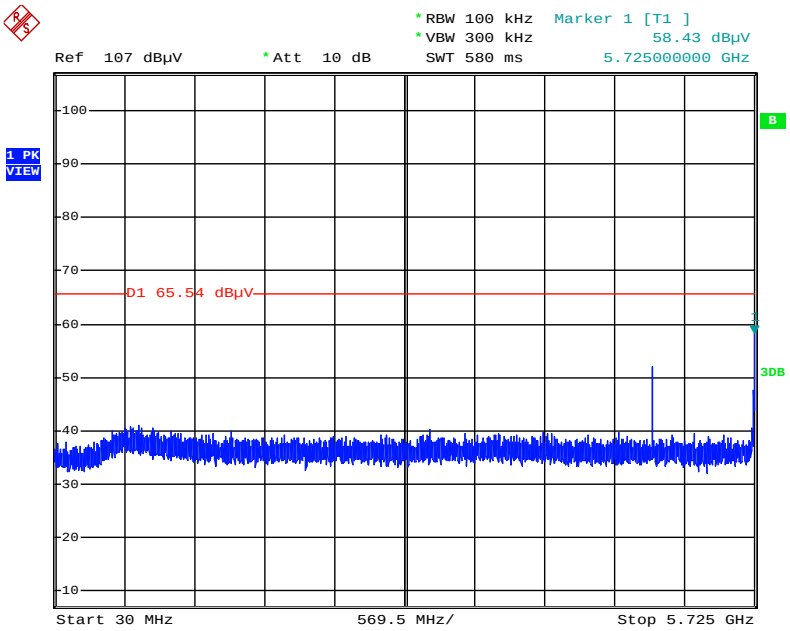
Date: 26.AUG.2015 17:22:49

Plot on Configuration IEEE 802.11a / Reference Level



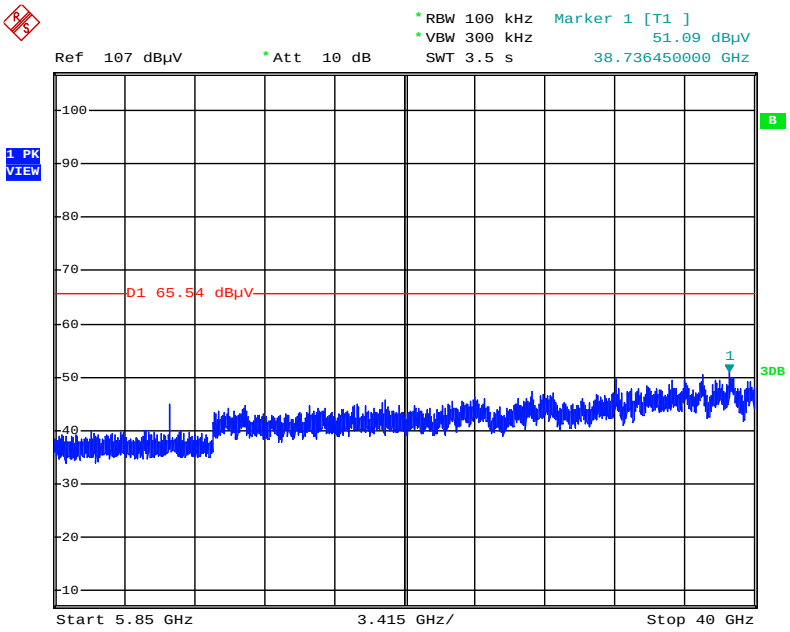
Date: 18.AUG.2015 21:31:43

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



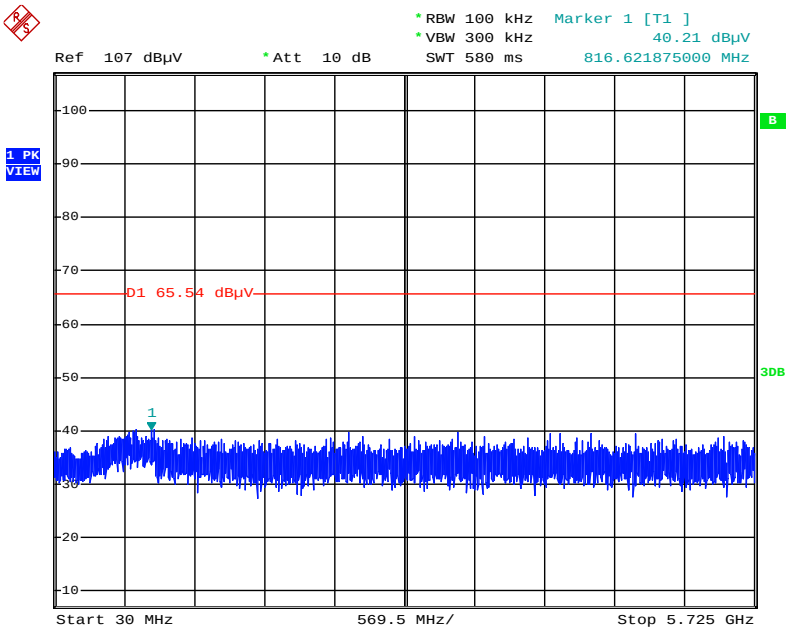
Date: 18.AUG.2015 21:37:47

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



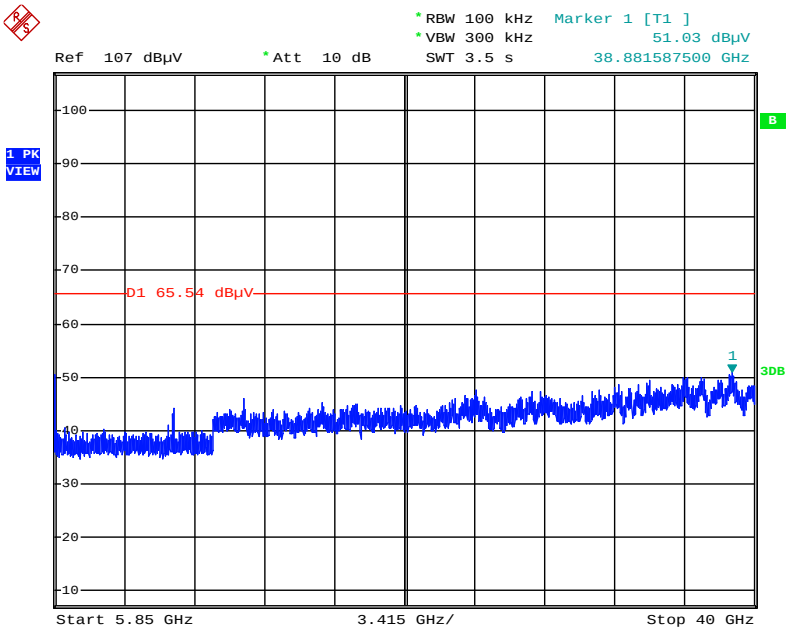
Date: 18.AUG.2015 21:38:35

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



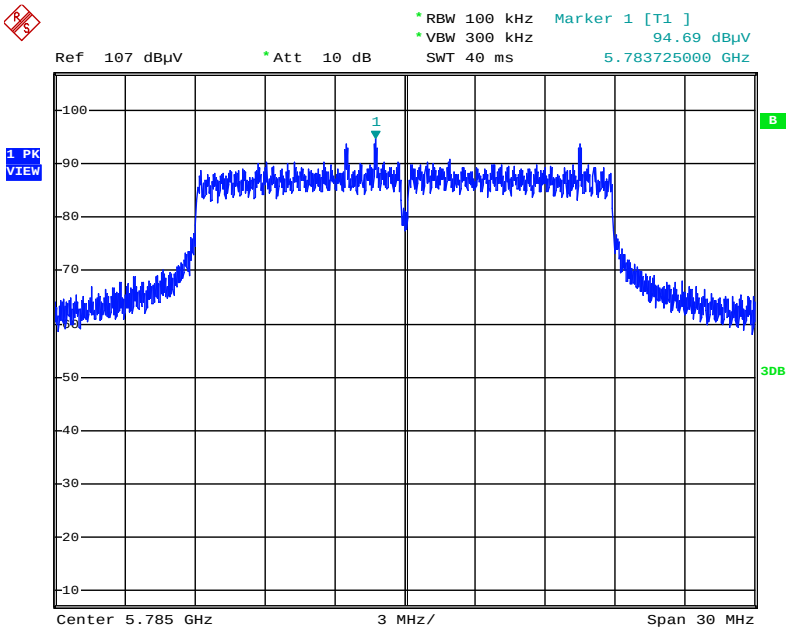
Date: 18.AUG.2015 21:41:00

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



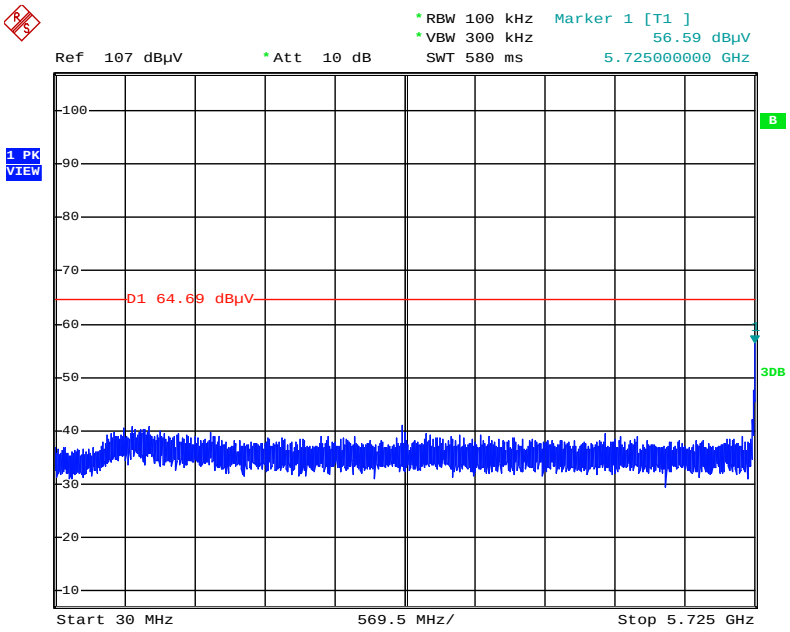
Date: 18.AUG.2015 21:41:40

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



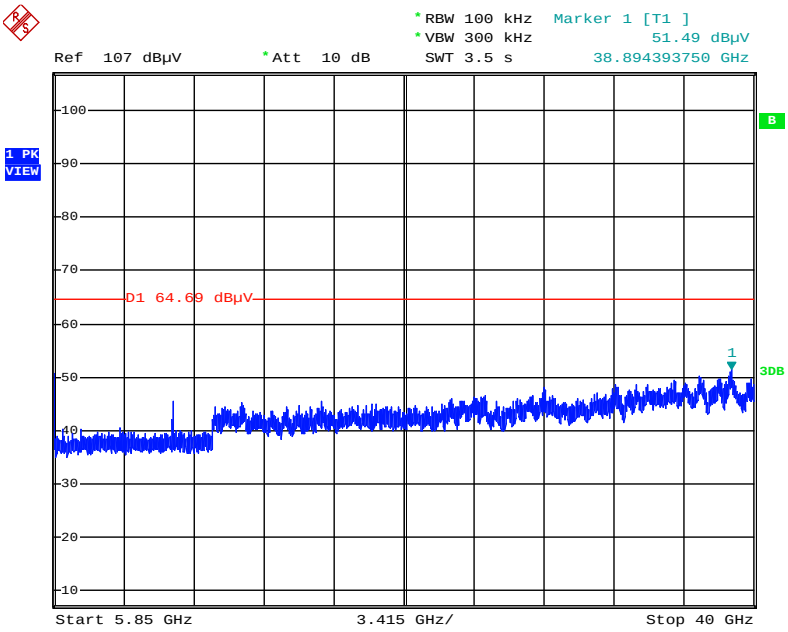
Date: 18.AUG.2015 21:49:45

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



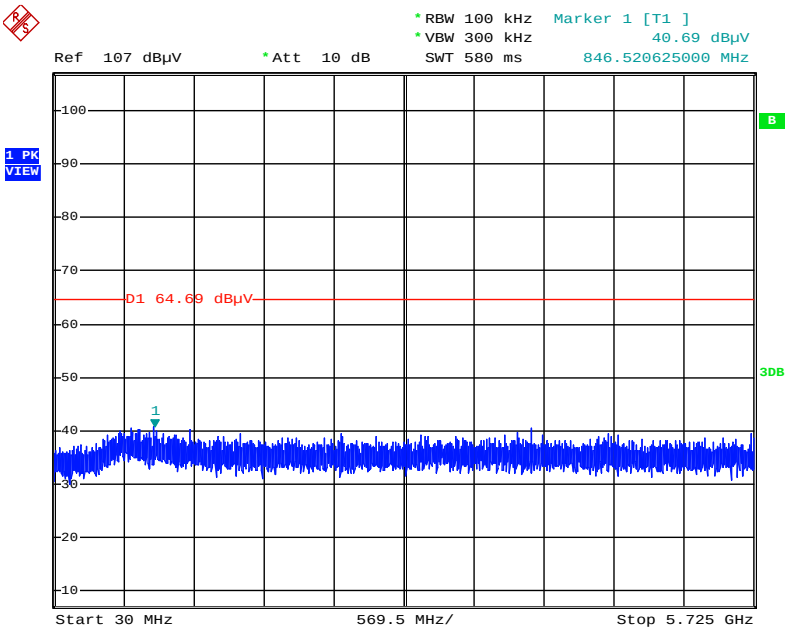
Date: 18.AUG.2015 21:55:53

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



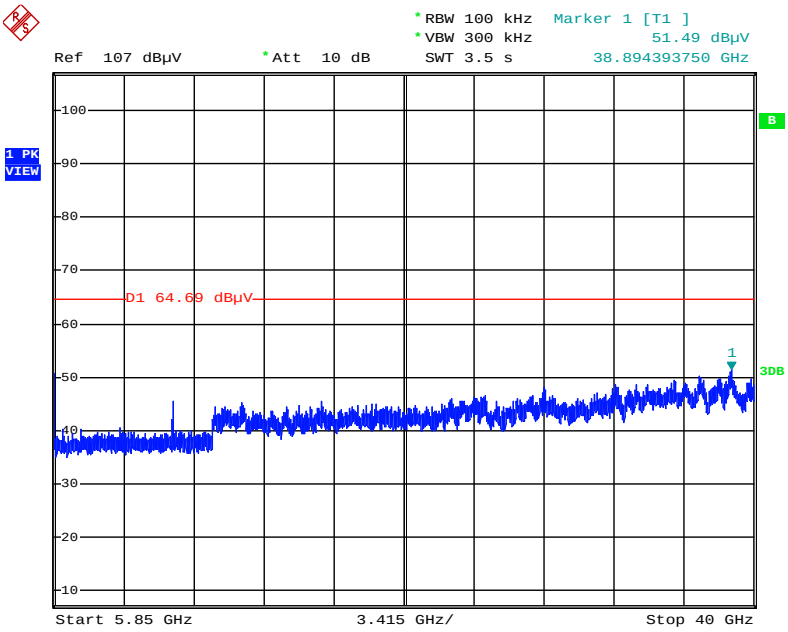
Date: 18.AUG.2015 22:02:26

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



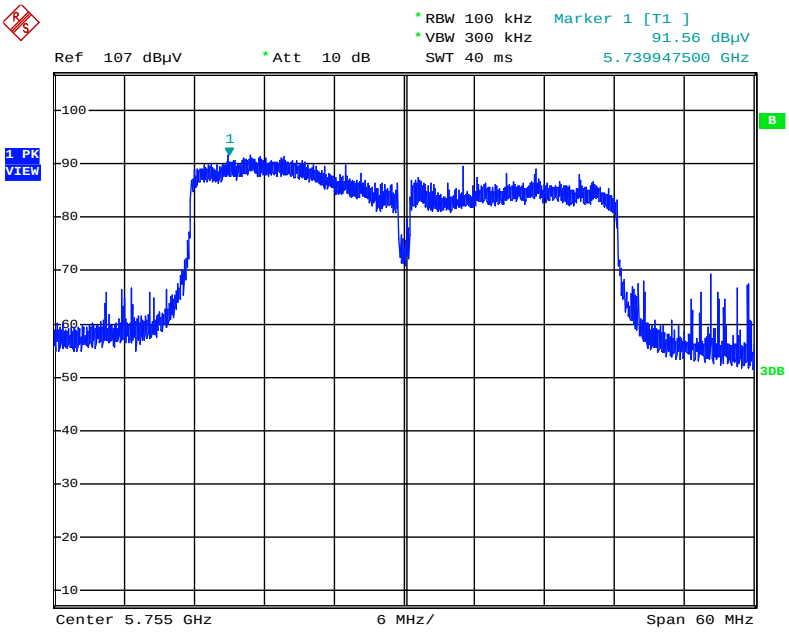
Date: 18.AUG.2015 22:01:16

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



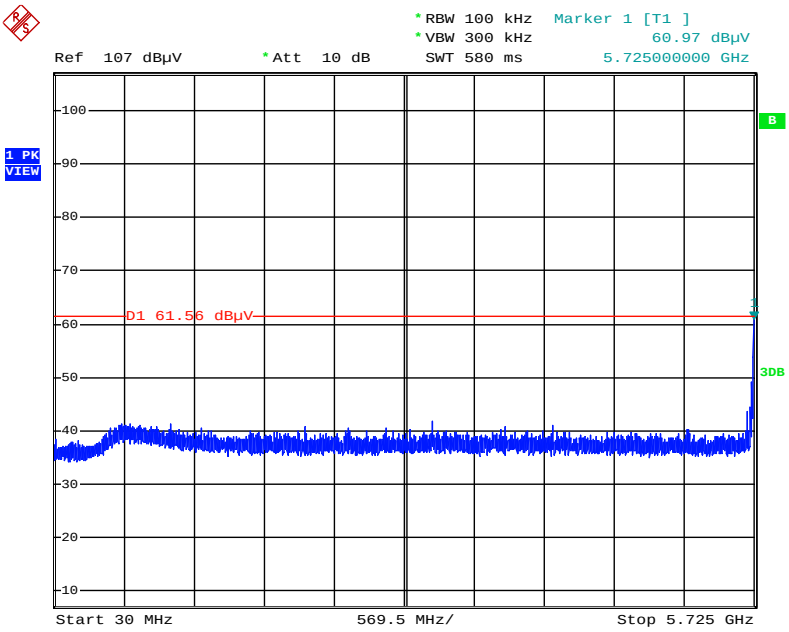
Date: 18.AUG.2015 22:02:26

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



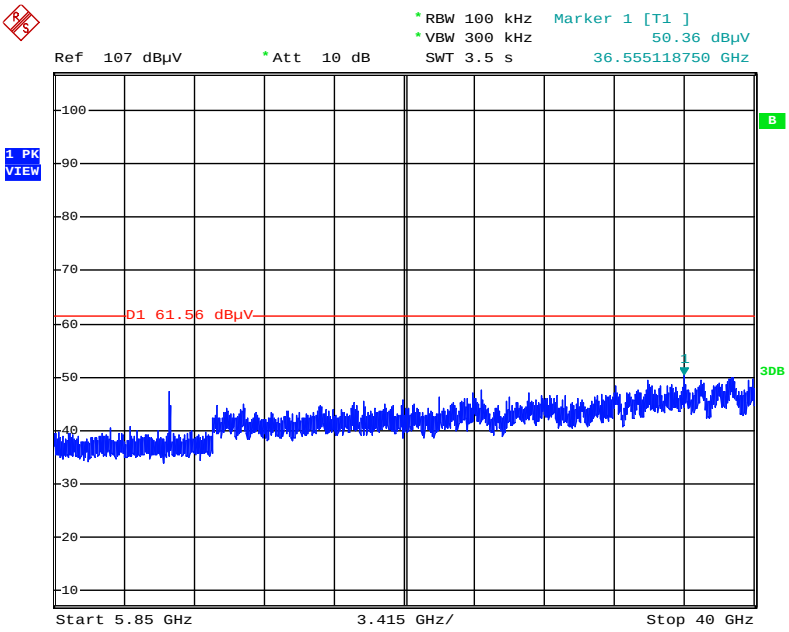
Date: 18.AUG.2015 21:11:14

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



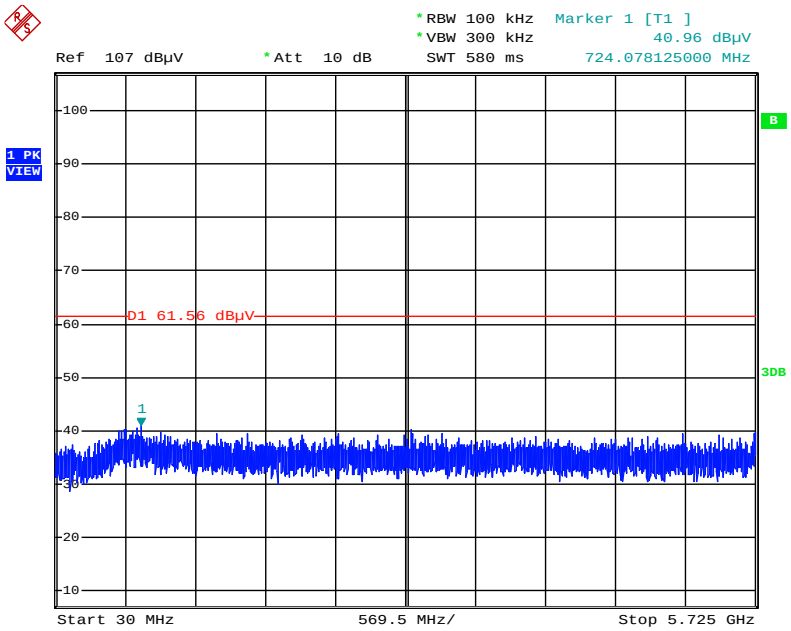
Date: 18.AUG.2015 21:16:49

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



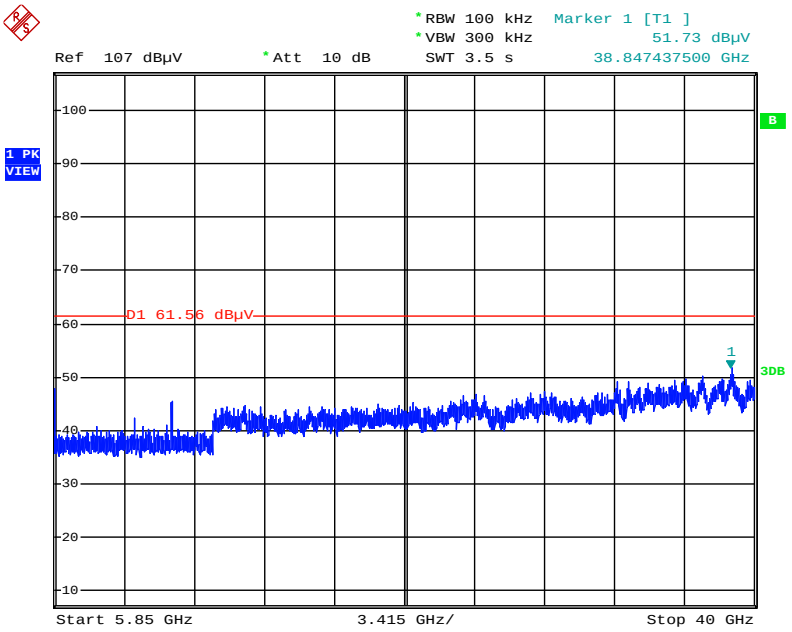
Date: 18.AUG.2015 21:17:51

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



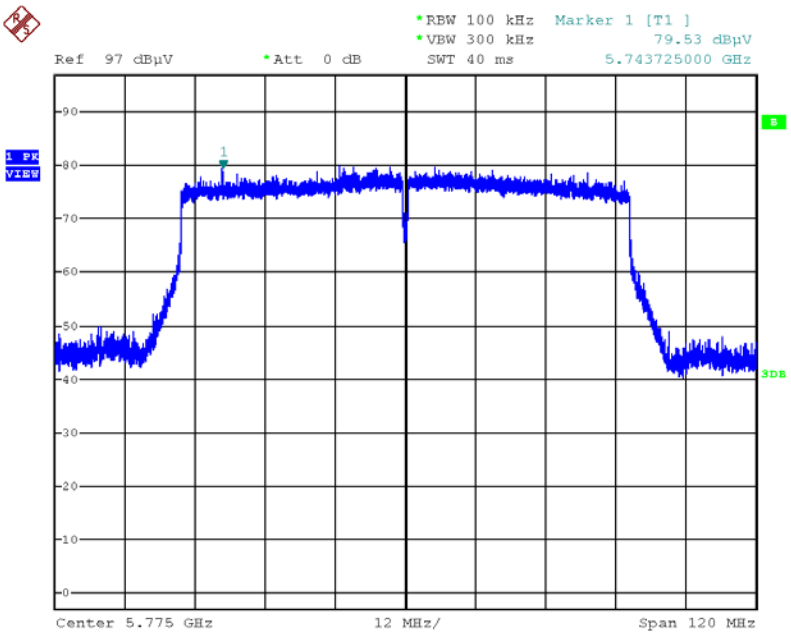
Date: 18.AUG.2015 21:21:43

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



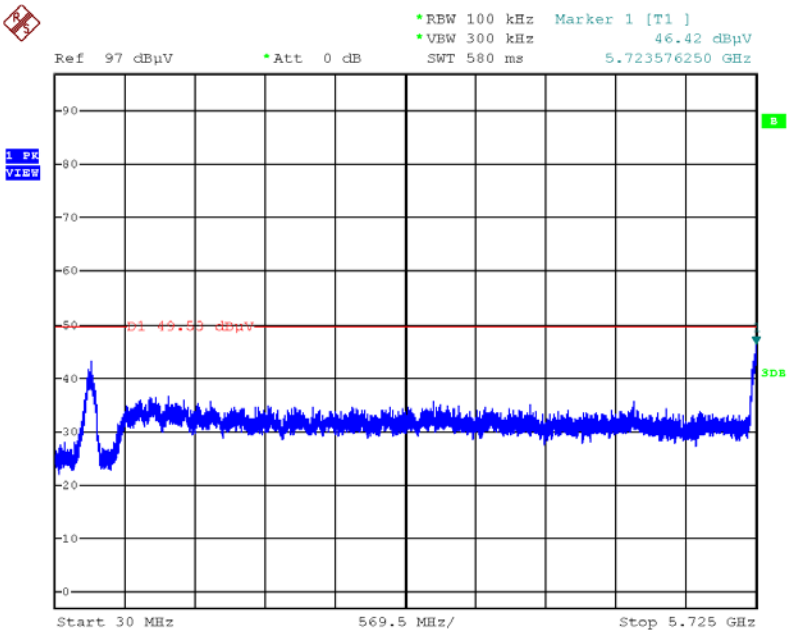
Date: 18.AUG.2015 21:23:00

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



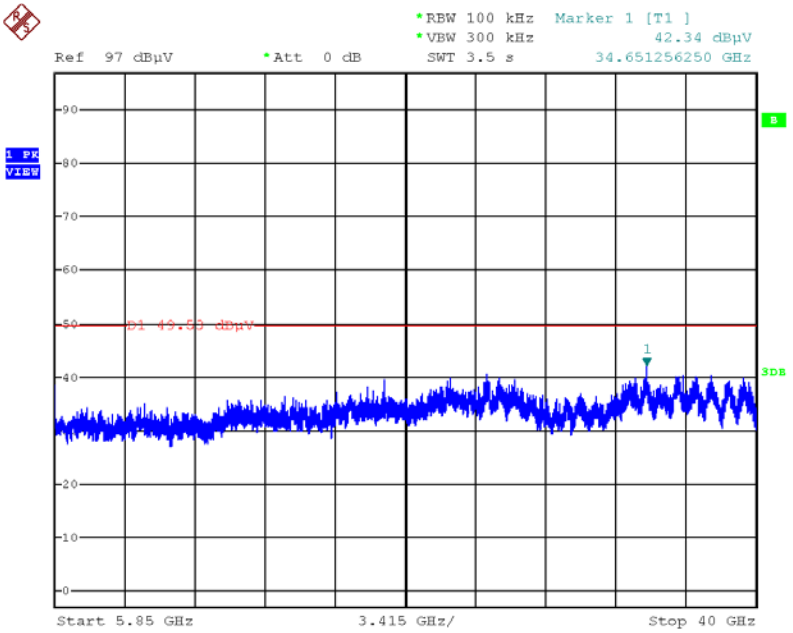
Date: 14.AUG.2015 15:02:55

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



Date: 14.AUG.2015 15:03:36

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



Date: 14.AUG.2015 15:03:55

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	5.410e	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	May 06, 2015	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 28, 2014	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Feb. 24, 2015	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 12, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Nov. 25, 2014	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 06, 2014	Radiation (03CH01-CB)
EMI Receiver	Agilent	N9038A	MY52260123	9kHz ~ 8.4GHz	Jan. 21, 2015	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz ~ 1 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 12, 2015*	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	1 GHz ~ 40 GHz	Nov. 15, 2014	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP40	100979	9kHz~40GHz	Dec. 12, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)

RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 15, 2014	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 03, 2014	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%