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FCC RADIO TEST REPORT

Applicant's company	**Xirrus, Inc.**
Applicant Address	2101 Corporate Center Drive, Thousand Oaks, CA 91320 USA
FCC ID	**SK6-XD2240**
Manufacturer's company	**Lite-On Network Communication (Dongguan) Limited**
Manufacturer Address	30#Keji Rd.,Yin Hu Industrial Area, Qingxi Town, DongGuan City, Guangdong, China

Product Name	Wireless Access Point
Brand Name	XIRRUS, AVAYA
Model No.	XD2240, WAP9144
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Aug. 17, 2015
Final Test Date	Jan. 26, 2016
Submission Type	Class II Change

Statement

Test result included in this report is for the IEEE 802.11n/ac and IEEE 802.11b/g 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 v03r04** and **KDB 662911 D01 v02r01**.

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

TAF
Testing Laboratory
1190

Table of Contents

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR582537-01AA	Rev. 01	Initial issue of report	Feb. 03, 2016

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless Access Point
Brand Name	:	XIRRUS, AVAYA
Model No.	:	XD2240, WAP9144
Applicant	:	Xirrus, Inc.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Aug. 17, 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	15.247(b)(3)	Maximum Conducted Output Power	Complies	4.75 dB
4.2	15.247(e)	Power Spectral Density	Complies	8.57 dB
4.3	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.4	15.247(d)	Radiated Emissions	Complies	19.19 dB
4.5	15.247(d)	Band Edge Emissions	Complies	0.30 dB
4.6	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (4TX, 4RX)
Radio Type	Intentional Transceiver
Power Type	From PoE
Modulation	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11b: DSSS (BPSK / QPSK / CCK) IEEE 802.11g/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 802.11g: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	IEEE 802.11ac MCS0/Nss1 (VHT20): 19.45 MHz IEEE 802.11ac MCS0/Nss1 (VHT40): 37.19 MHz
Maximum Conducted Output Power	IEEE 802.11ac MCS0/Nss1 (VHT20): 24.23 dBm IEEE 802.11ac MCS0/Nss1 (VHT40): 21.20 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☒ With beamforming for 802.11n/ac in 2.4GHz/5GHz	☐ Without beamforming

Antenna and Band width

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

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	4	MCS 0-31
802.11n (HT40)	4	MCS 0-31
802.11ac (VHT20)	4	MCS0-9/Nss1-4
802.11ac (VHT40)	4	MCS0-9/Nss1-4

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

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

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

3.2. Accessories

Others
Wall-mounted rack*1

3.3. Table for Filed Antenna

<For Radio 1>

Ant.	Brand	Model Name	Antenna Type	Connector
1	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
3	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
5	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
7	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX

Ant.	Frequency (MHz) / (dBi)		
	2412, 2422	2437	2452, 2462
1	2.07	1.35	1.84
3	4.67	3.82	4.52
5	3.68	3.64	3.04
7	4.23	4.10	3.51

Ant.	5GHz Band / (dBi)	
	Band 1	Band 4
1	0.23	3.09
3	4.19	4.29
5	4.93	4.86
7	4.65	3.94

Frequency Band (MHz)	Correlated Composite Gain / (dBi) (4TX, 1S)	Uncorrelated Composite Gain / (dBi) (4TX, 4S)
2412, 2422	6.99	1.40
2437	7.02	1.36
2452, 2462	7.22	1.68
5150 ~ 5250 (Band 1)	6.10	0.78
5725 ~ 5850 (Band 4)	7.29	1.56

<For Radio 2>

Ant.	Brand	Model Name	Antenna Type	Connector
2	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
4	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
6	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX
8	Liteon	WP8868-E-XS	PIFA Ant.	I-PEX

Ant.	Frequency (MHz) / (dBi)		
	2412, 2422	2437	2452, 2462
2	1.79	1.19	1.08
4	3.96	3.51	3.06
6	2.93	2.93	3.38
8	2.10	2.49	1.79

Ant.	5GHz Band / (dBi)	
	Band 1	Band 4
2	1.64	4.60
4	3.02	3.45
6	3.48	4.78
8	3.93	3.69

Frequency Band (MHz)	Correlated Composite Gain / (dBi) (4TX, 1S)	Uncorrelated Composite Gain / (dBi) (4TX, 4S)
2412, 2422	6.01	0.65
2437	5.86	0.22
2452, 2462	5.33	-0.26
5150 ~ 5250 (Band 1)	4.88	-0.30
5725 ~ 5850 (Band 4)	6.98	1.68

Note: The EUT has eight antennas.

For Conducted Test:

Radio 1 and Radio 2 are the same radios, radio 2 has been evaluated to be the worst case so it's chosen to conduct tests.

Radio 1 and Radio 2 equipped the same type antennas, Radio 1 has the higher gain than radio 2 so it's chosen to conduct the gain test.

For Radiated Test:

Radio 1 and Radio 2 are the same radios; radio 1 has been evaluated to be the worst case so it's chosen to radiate tests.

<For 2.4GHz and 5GHz Band>

For IEEE 802.11a/b/g/n/ac mode (4TX/4RX)

For Radio 1

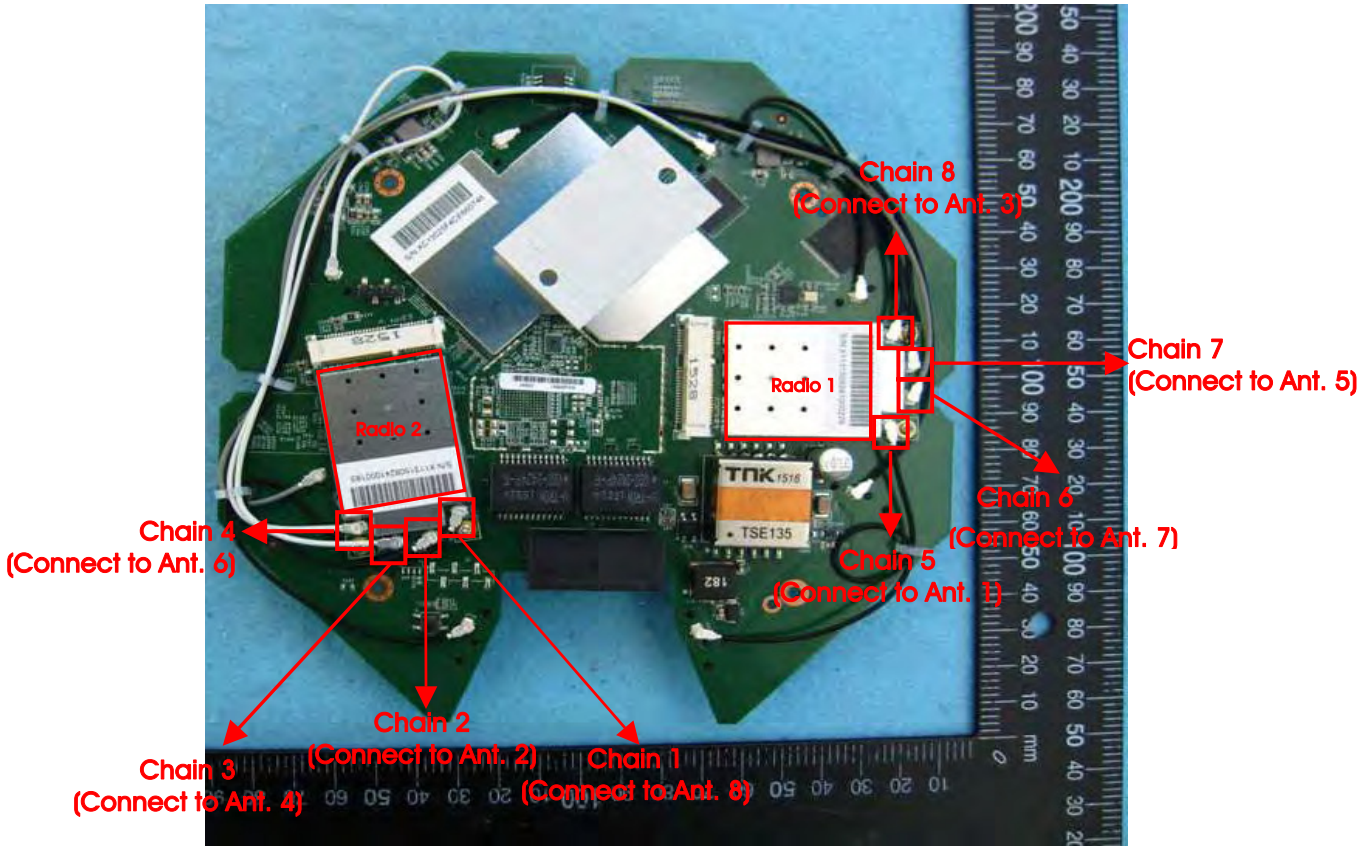
Chain 5, Chain 6, Chain 7 and Chain 8 can be used as transmitting/receiving antenna.

Chain 5, Chain 6, Chain 7 and Chain 8 could transmit/receive simultaneously.

For Radio 2

Chain 1, Chain 2, Chain 3 and Chain 4 can be used as transmitting/receiving antenna.

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

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	-	-

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.

Test Items	Mode	Data Rate	Channel	Chain
Maximum Conducted Output Power	11n VHT20	MCS0/Nss1	1/6/11	5+6+7+8
	11n VHT40	MCS0/Nss1	3/6/9	5+6+7+8
Power Spectral Density	11n VHT20	MCS0/Nss1	1/6/11	5+6+7+8
	11n VHT40	MCS0/Nss1	3/6/9	5+6+7+8
6dB Spectrum Bandwidth	11n VHT20	MCS0/Nss1	1/6/11	5+6+7+8
	11n VHT40	MCS0/Nss1	3/6/9	5+6+7+8
Radiated Emissions 1GHz~10th Harmonic	11n VHT20	MCS0/Nss1	1/6/11	5+6+7+8
	11n VHT40	MCS0/Nss1	3/6/9	5+6+7+8
Band Edge Emissions	11n VHT20	MCS0/Nss1	1/6/11	5+6+7+8
	11n VHT40	MCS0/Nss1	3/6/9	5+6+7+8

Note 1: 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.

2. The PoE below are for measurement only, would not be marketed.

Power	Brand	Model No.	FCC ID
PoE	H3C	EWPAM1NPoE	N/A

The following test modes were performed for all tests:

For Radiated Emission test<Above 1GHz>:

The EUT can be placed at Y-axis and Z-axis and it has radio 1 and radio 2 supporting WLAN 2.4GHz and WLAN 5GHz functions. After evaluating, the EUT at Y-axis with WLAN 2.4GHz_radio 1 and EUT as Z-axis with WLAN 5GHz_radio 1 functions was the worst case. Consequently, measurement for Radiated Emissions will follow this same test mode.

For Co-location MPE Test:

Mode 1. Radio 1 (2.4GHz WLAN) + Radio 2 (2.4GHz WLAN) Mode

Mode 2. Radio 1 (2.4GHz WLAN) + Radio 2 (5GHz WLAN) Mode

Mode 3. Radio 1 (5GHz WLAN) + Radio 2 (2.4GHz WLAN) Mode

Mode 4. Radio 1 (5GHz WLAN) + Radio 2 (5GHz WLAN) Mode

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA582537-01) tests is 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
TH01-CB	OVEN Room	Hsin Chu	-	-

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

3.7. Table for Multiple List

The brand name and model numbers in the following table are all refer to the identical product.

Brand Name	Model Name	Description
XIRRUS	XD2240	All the design is the same, just for different marketing use.
AVAYA	WAP9144	

From the above models, model: XD2240 was selected as representative model for the test and its data was recorded in this report.

3.8. Class II Change

This product is an extension of original one reported under Sporton project number: FR582537AA
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding beam-forming function for 2.4GHz.	1. Maximum Conducted Output Power 2. Power Spectral Density 3. 6dB Spectrum Bandwidth 4. Radiated Emissions<Above 1GHz> 5. Emissions Measurement
2. Adding a model name: WAP9144 3. Adding a trade name: AVAYA	After evaluating, it is not necessary to re-test all test items.

3.9. Table for Supporting Units

For Test Site No: 03CH01-CB

Support Unit	Brand	Model	FCC ID
NB*2	DELL	E4300	DoC
PoE	H3C	EWPAM1NPOE	N/A
RX Client	BCM	BCM58535EAP	DoC

For Test Site No: TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
PoE	H3C	EWPAM1NPOE	N/A

3.10. 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.

Test Software Version	Xircon v1.0.2.25					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11ac MCS0/Nss1 VHT20	58	88	66	-	-	-
802.11ac MCS0/Nss1 VHT40	-	-	-	55	64	56

3.11. EUT Operation during Test

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.

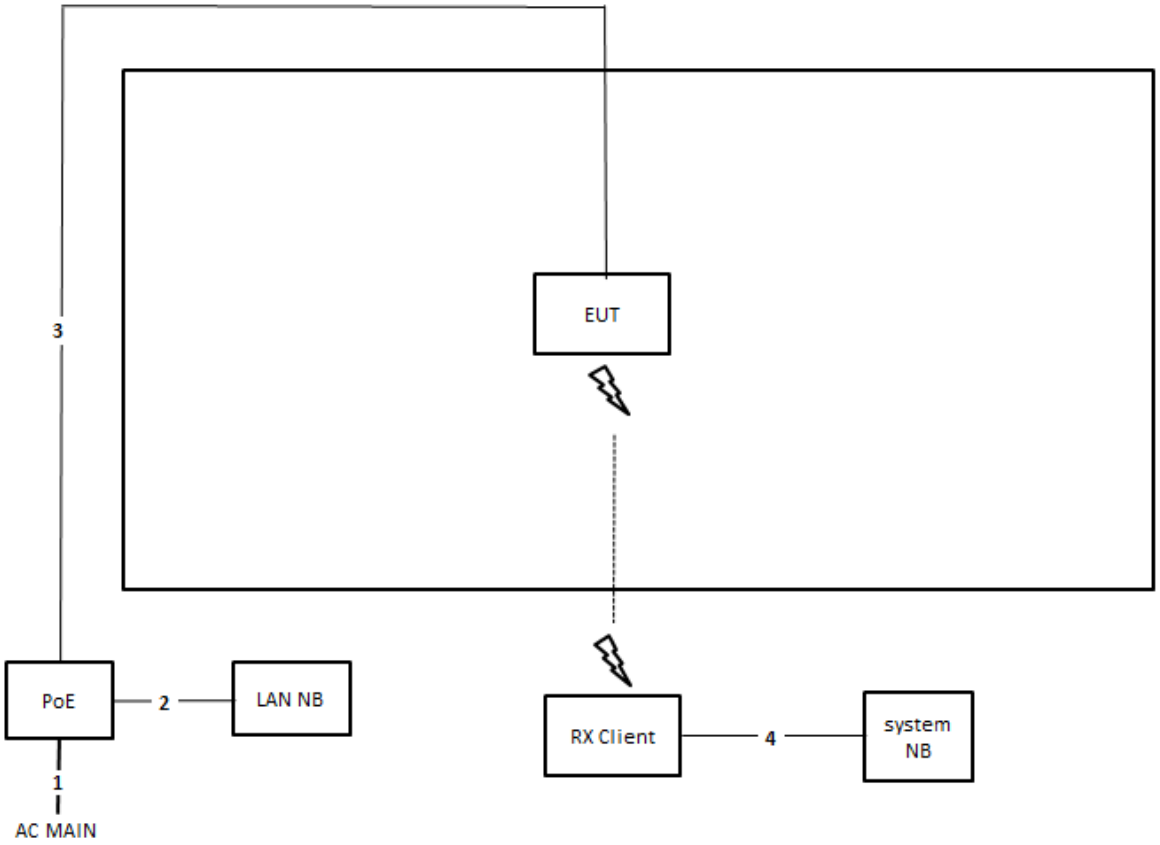
The program was executed as follows:

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 Client and transmit duty cycle no less 98%

3.12. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11ac MCS0/Nss1 VHT20	3.818	4.188	91.17%	0.40	0.26
802.11ac MCS0/Nss1 VHT40	3.668	4.008	91.52%	0.38	0.27

3.13. Test Configurations



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

4. TEST RESULT

4.1. Maximum Conducted Output Power Measurement

4.1.1. Limit

The limit for output power is 30dBm.

4.1.2. Measuring Instruments and Setting

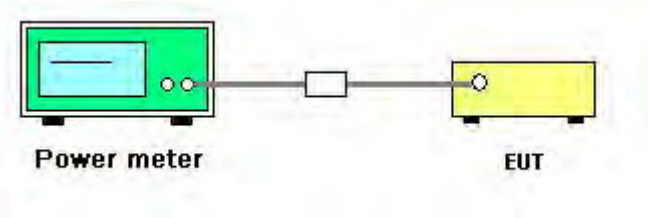
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Average

4.1.3. Test Procedures

1. Test procedures refer KDB558074 D01 v03r04 section 9.2.3.2 Measurement using a power meter (PM).
2. Multiple antenna systems 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.

4.1.4. Test Setup Layout



4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of Maximum Conducted Output Power

Temperature	24°C	Humidity	54%
Test Engineer	Clemens Fang	Test Date	Jan. 19, 2016~Jan. 26, 2016

Mode	Frequency	Conducted Power (dBm)					Max. Limit (dBm)	Result
		Chain 5	Chain 6	Chain 7	Chain 8	Total		
802.11ac MCS0/Nss1 VHT20	2412 MHz	15.17	15.74	14.79	15.22	21.26	29.01	Complies
	2437 MHz	18.12	18.63	18.06	18.01	24.23	28.98	Complies
	2462 MHz	16.55	17.35	16.59	17.06	22.92	28.78	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	14.23	14.27	13.92	14.57	20.27	29.01	Complies
	2437 MHz	15.33	15.72	14.43	15.14	21.20	28.98	Complies
	2452 MHz	14.34	14.46	13.68	14.73	20.34	28.78	Complies

Note:

802.11ac MCS0/Nss1 VHT20 2412 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =6.99dBi, so limit =30-(6.99-6)=29.01 dBm

802.11ac MCS0/Nss1 VHT20 2437 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.02dBi, so limit =30-(7.02-6)=28.98 dBm

802.11ac MCS0/Nss1 VHT20 2462 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.22dBi, so limit =30-(7.22-6)=28.78 dBm

802.11ac MCS0/Nss1 VHT40 2422 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =6.99dBi, so limit =30-(6.99-6)=29.01 dBm

802.11ac MCS0/Nss1 VHT40 2437 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.02dBi, so limit =30-(7.02-6)=28.98 dBm

802.11ac MCS0/Nss1 VHT40 2452 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.22dBi, so limit =30-(7.22-6)=28.78 dBm

4.2. Power Spectral Density Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

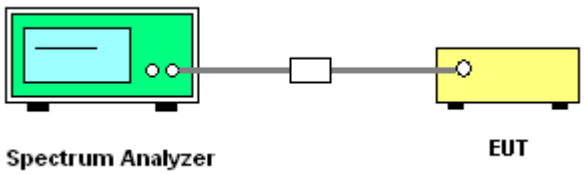
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.2.3. Test Procedures

1. Test was performed in accordance with KDB558074 D01 v03r04 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.

4.2.4. 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 Power Spectral Density

Temperature	24°C	Humidity	54%
Test Engineer	Clemens Fang		

Mode	Frequency	Power Density (dBm/3kHz)					Power Density Limit (dBm/3kHz)	Result
		Chain 5	Chain 6	Chain 7	Chain 8	Total		
802.11ac MCS0/Nss1 VHT20	2412 MHz	-13.59	-11.70	-12.08	-12.87	-6.48	7.01	Complies
	2437 MHz	-7.67	-7.77	-7.63	-7.40	-1.59	6.98	Complies
	2462 MHz	-9.97	-10.00	-9.64	-9.63	-3.79	6.78	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	-15.39	-15.57	-14.89	-14.41	-9.02	7.01	Complies
	2437 MHz	-11.98	-12.32	-11.53	-12.37	-6.02	6.98	Complies
	2452 MHz	-15.05	-14.78	-13.78	-14.19	-8.40	6.78	Complies

Note:

802.11ac MCS0/Nss1 VHT20 2412 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =6.99dBi, so limit =8-(6.99-6)=7.01 dBm/3kHz

802.11ac MCS0/Nss1 VHT20 2437 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.02dBi, so limit =8-(7.02-6)=6.98 dBm/3kHz

802.11ac MCS0/Nss1 VHT20 2462 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.22dBi, so limit =8-(7.22-6)=6.78 dBm/3kHz

802.11ac MCS0/Nss1 VHT40 2422 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =6.99dBi, so limit =8-(6.99-6)=7.01 dBm/3kHz

802.11ac MCS0/Nss1 VHT40 2437 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.02dBi, so limit =8-(7.02-6)=6.98 dBm/3kHz

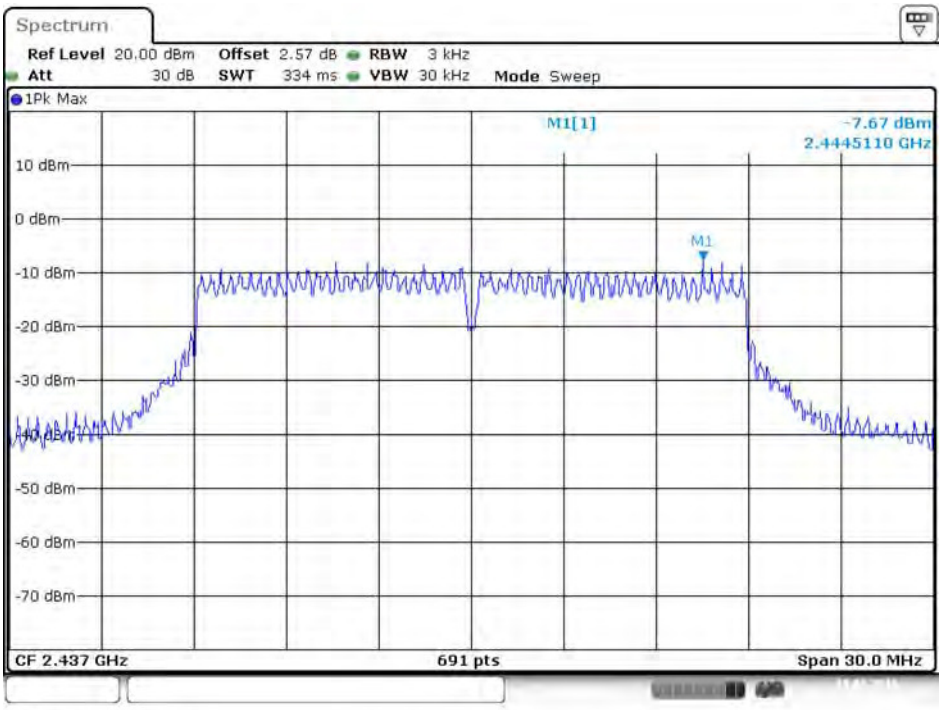
802.11ac MCS0/Nss1 VHT40 2452 MHz

$$Directional\ Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$$ =7.22dBi, so limit =8-(7.22-6)=6.78 dBm/3kHz

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

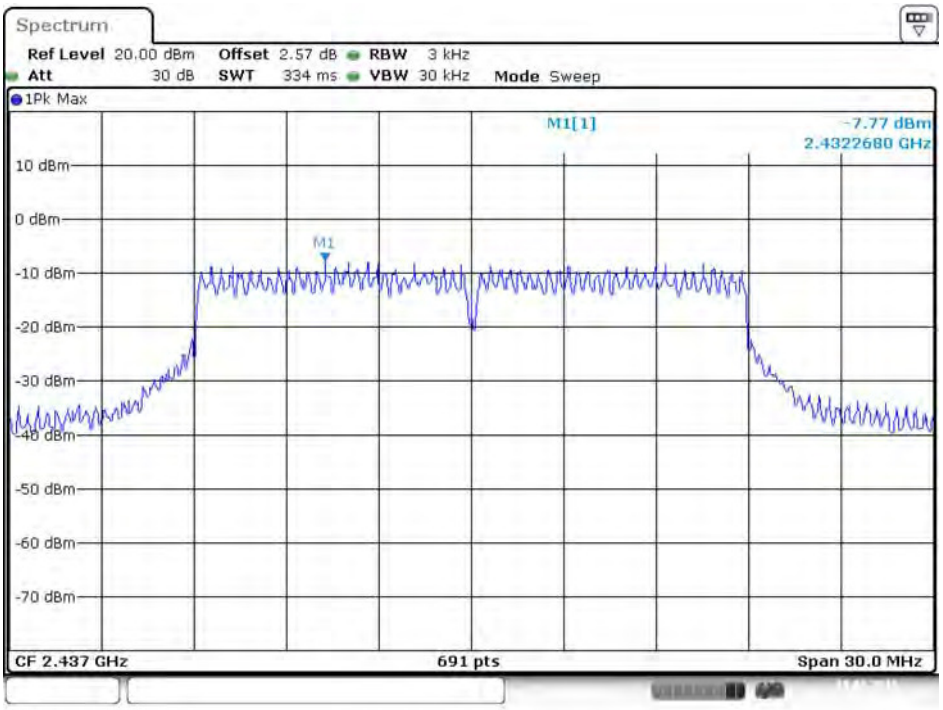
For plots, only the channel with worse result was shown.

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 5



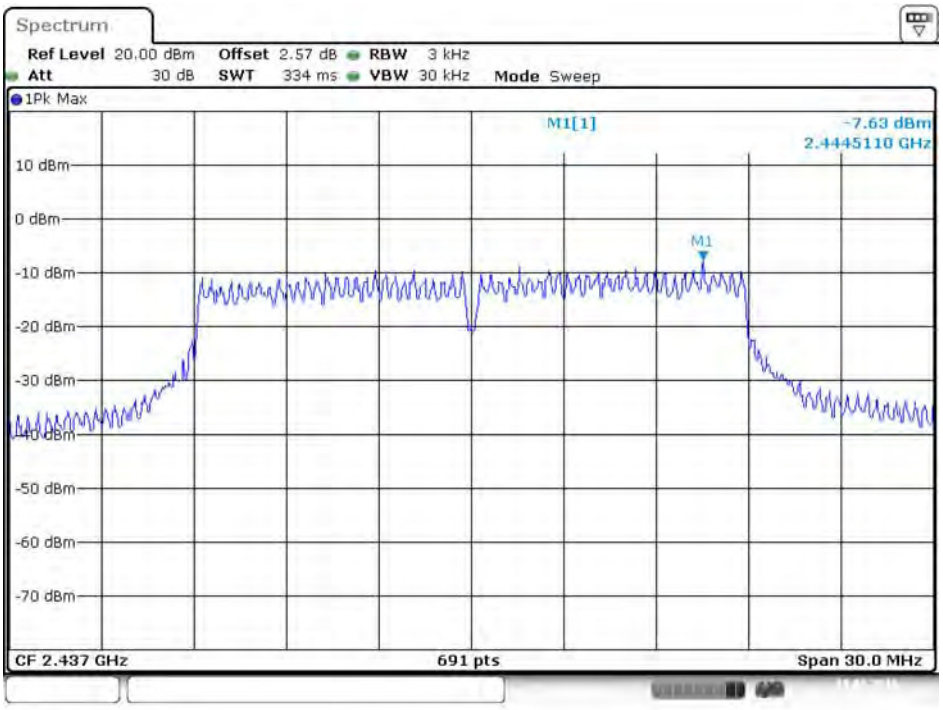
Date: 19.JAN.2016 17:05:37

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 6



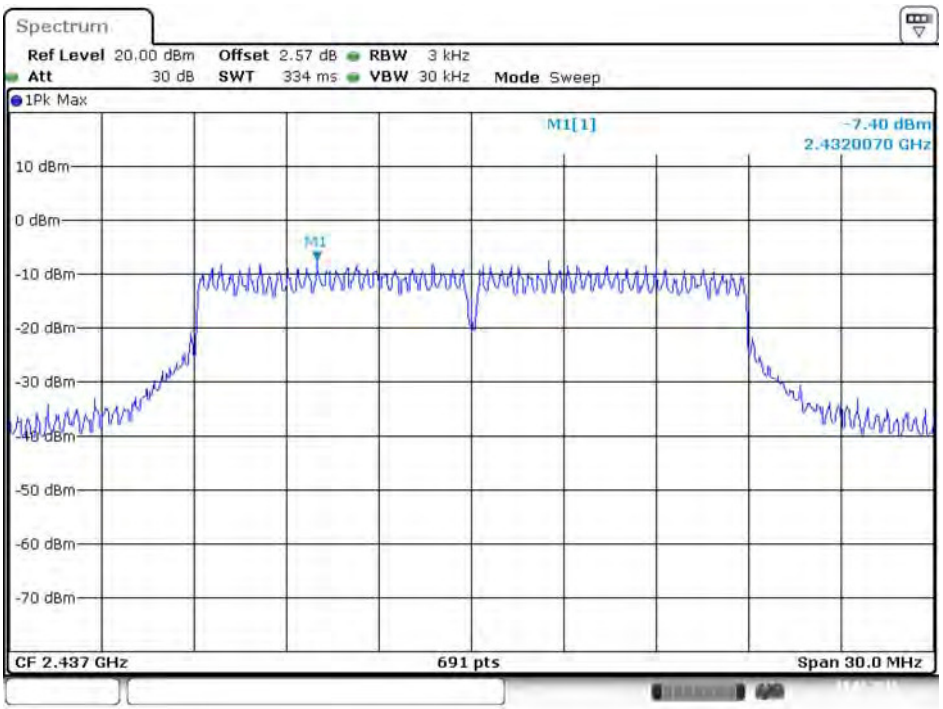
Date: 19.JAN.2016 17:09:02

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 7



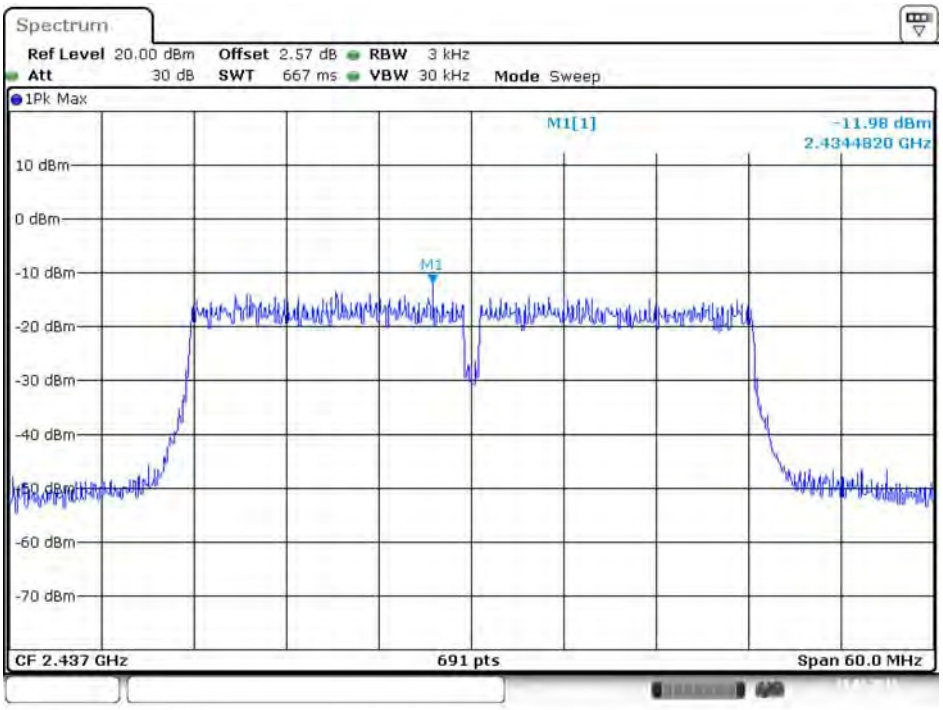
Date: 19.JAN.2016 17:07:13

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 8



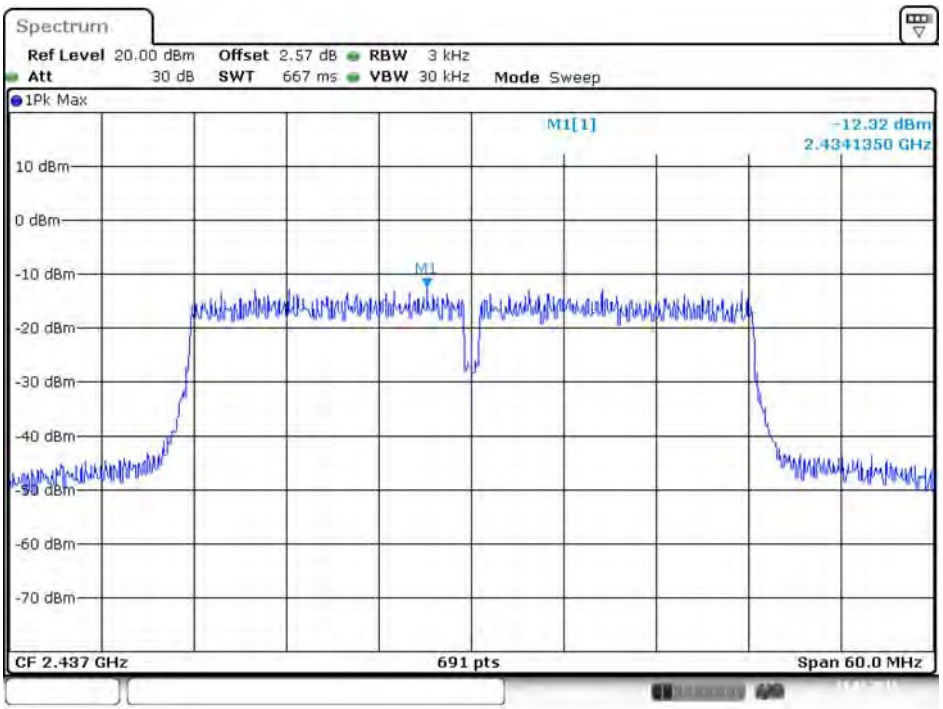
Date: 19.JAN.2016 17:07:57

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 5



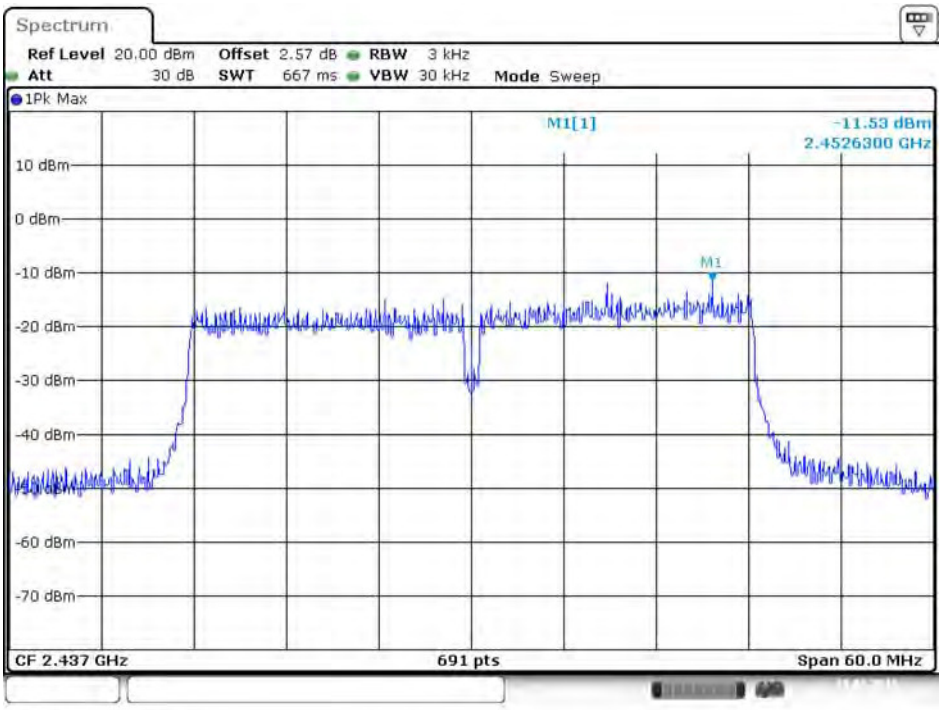
Date: 19.JAN.2016 17:22:49

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 6



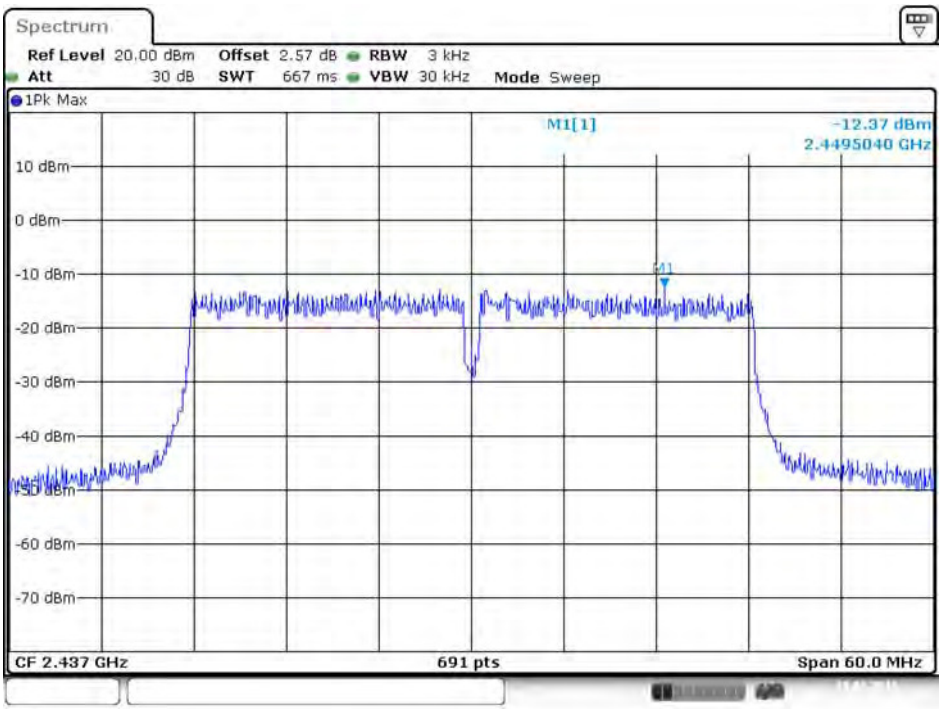
Date: 19.JAN.2016 17:20:22

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 7



Date: 19.JAN.2016 17:21:00

Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 8



Date: 19.JAN.2016 17:22:19

4.3. 6dB Spectrum Bandwidth Measurement

4.3.1. Limit

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

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.

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

4.3.3. 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 v03r04 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.

4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.4.4.

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 6dB Spectrum Bandwidth

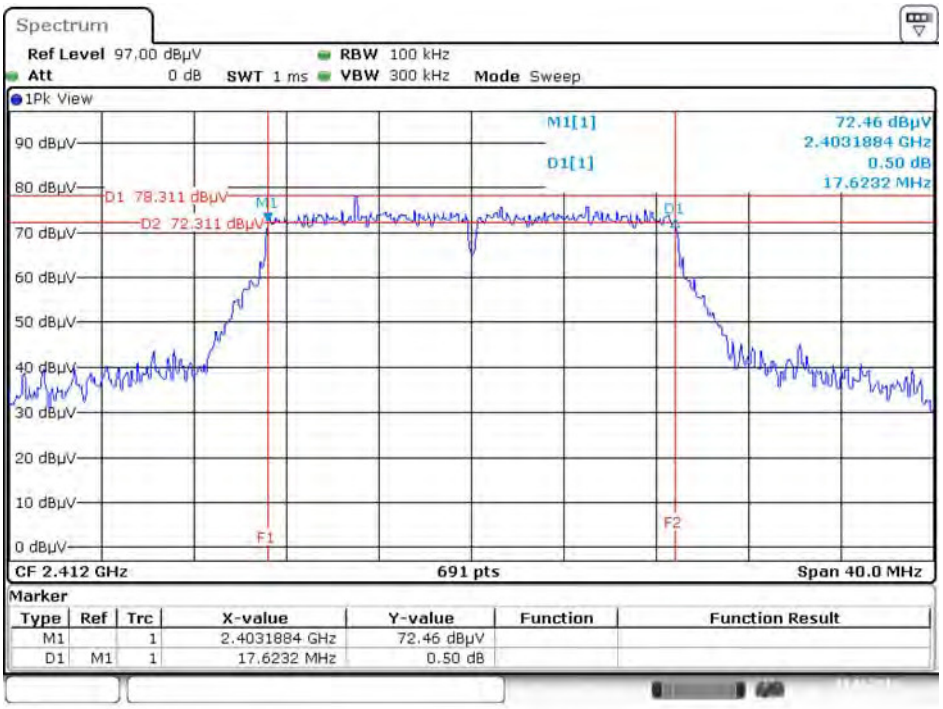
Temperature	24°C	Humidity	54%
Test Engineer	Clemens Fang		

Mode	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
802.11ac MCS0/Nss1 VHT20	2412 MHz	17.62	18.23	500	Complies
	2437 MHz	17.62	19.45	500	Complies
	2462 MHz	17.62	18.49	500	Complies
802.11ac MCS0/Nss1 VHT40	2422 MHz	36.29	37.05	500	Complies
	2437 MHz	36.29	37.19	500	Complies
	2452 MHz	36.29	37.05	500	Complies

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

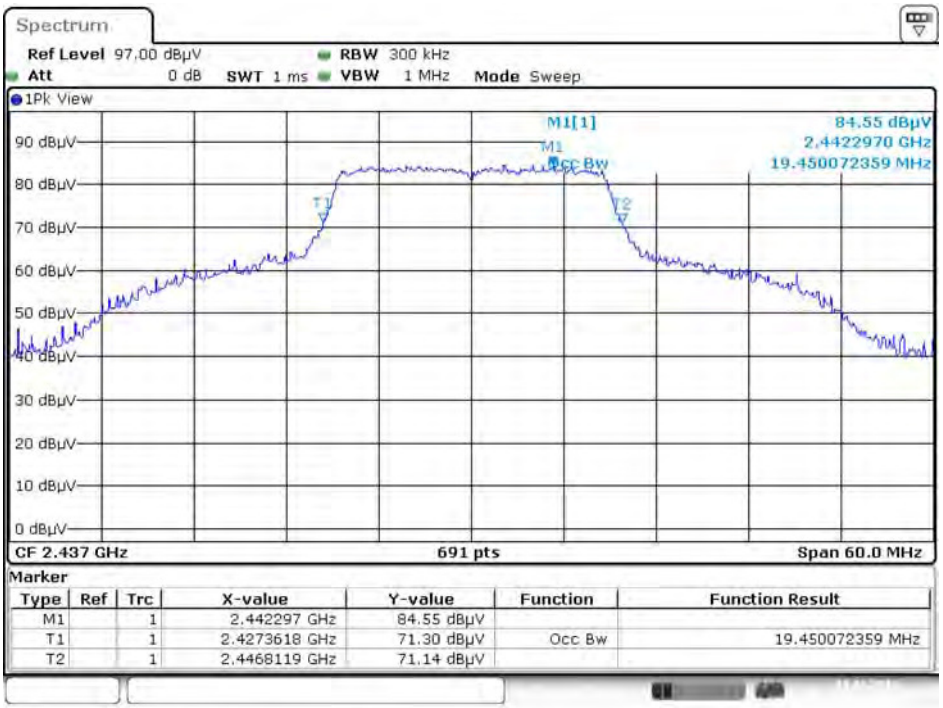
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2412 MHz / Chain 5 + Chain 6 + Chain 7 + Chain 8



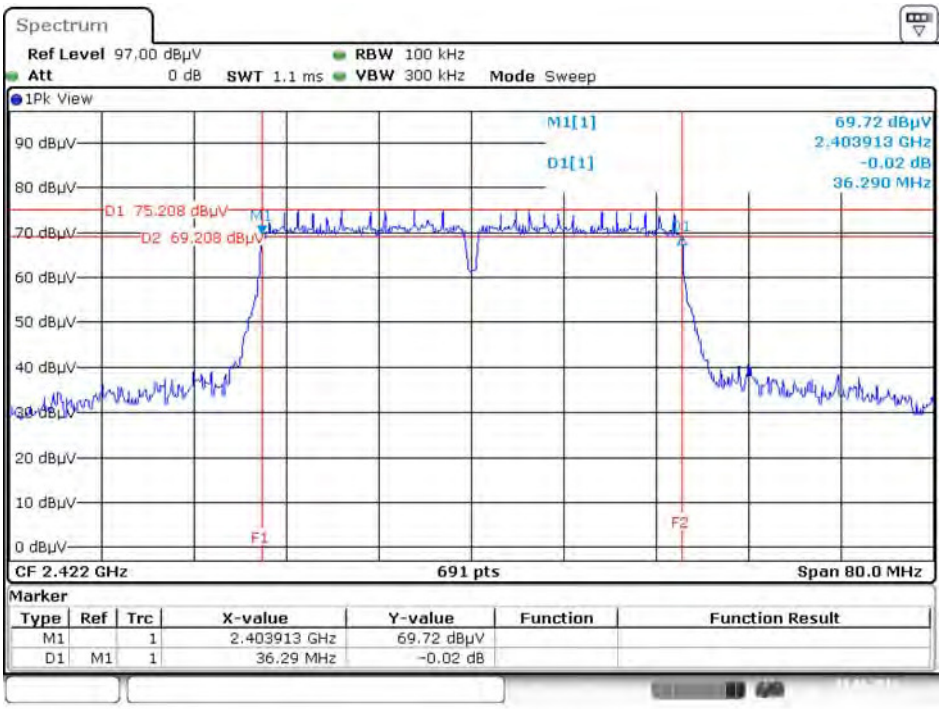
Date: 19.JAN.2016 19:18:15

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / 2437 MHz / Chain 5 + Chain 6 + Chain 7 + Chain 8



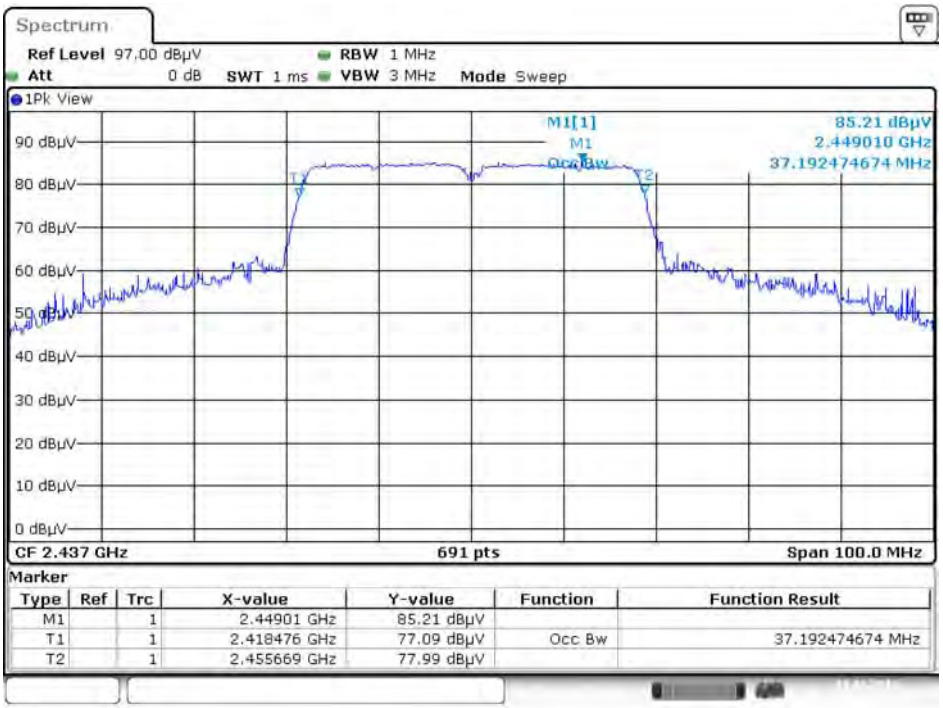
Date: 19.JAN.2016 19:36:02

6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2422 MHz / Chain 5 + Chain 6 + Chain 7 + Chain 8



Date: 19.JAN.2016 19:25:12

99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / 2437 MHz / Chain 5 + Chain 6 + Chain 7 + Chain 8



Date: 19.JAN.2016 19:31:51

4.4. Radiated Emissions Measurement

4.4.1. 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

4.4.2. Measuring Instruments and Setting

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

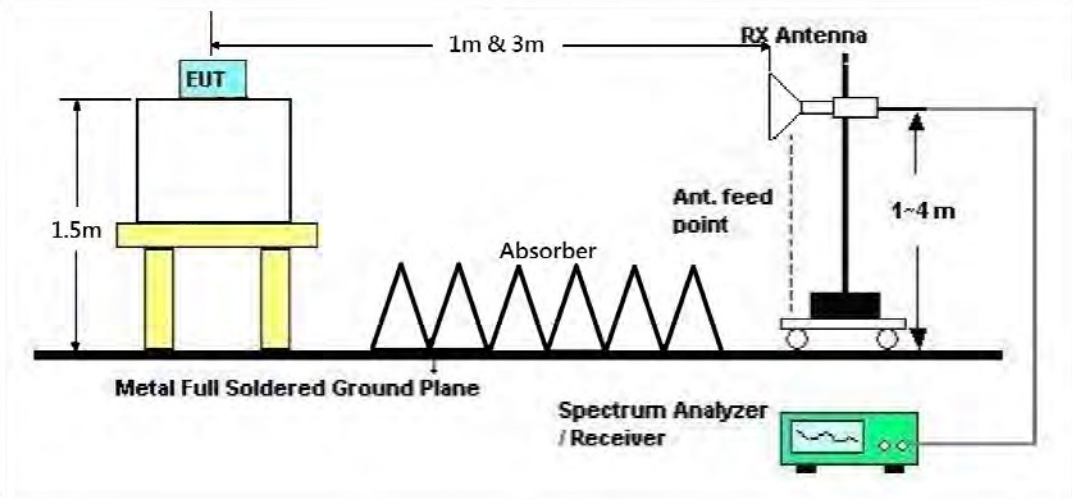
Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	100kHz / 300kHz for peak

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~1000MHz / RBW 120kHz for QP

4.4.3. 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.

4.4.4. Test Setup Layout



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 beamforming transmitting mode.

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

Temperature	25°C	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Horizontal

	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	4821.02	34.68	54.00	-19.32	29.09	7.50	33.03	31.12	HORIZONTAL	111	125	Average
2	4825.52	47.45	74.00	-26.55	41.82	7.52	33.03	31.14	HORIZONTAL	111	125	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	4823.34	47.96	74.00	-26.04	42.37	7.50	33.03	31.12	VERTICAL	163	114	Peak
2	4825.46	34.49	54.00	-19.51	28.86	7.52	33.03	31.14	VERTICAL	163	114	Average

Temperature	25°C	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 6 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Horizontal

	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	4869.28	34.45	54.00	-19.55	28.66	7.59	33.01	31.21	HORIZONTAL	17	140	Average
2	4878.84	47.43	74.00	-26.57	41.63	7.59	33.00	31.21	HORIZONTAL	17	140	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	4873.60	34.40	54.00	-19.60	28.61	7.59	33.01	31.21	VERTICAL	172	158	Average
2	4877.04	46.78	74.00	-27.22	40.98	7.59	33.00	31.21	VERTICAL	172	158	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 11 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Horizontal

	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	4919.70	34.82	54.00	-19.18	28.89	7.65	32.99	31.27	HORIZONTAL	356	124	Average
2	4922.34	49.82	74.00	-24.18	43.89	7.65	32.99	31.27	HORIZONTAL	356	124	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	4920.08	34.74	54.00	-19.26	28.81	7.65	32.99	31.27	VERTICAL	236	143	Average
2	4926.78	47.96	74.00	-26.04	41.98	7.67	32.98	31.29	VERTICAL	236	143	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Horizontal

	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	4839.92	34.59	54.00	-19.41	28.91	7.54	33.02	31.16	HORIZONTAL	190	152	Average
2	4840.72	50.46	74.00	-23.54	44.78	7.54	33.02	31.16	HORIZONTAL	190	152	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	4840.30	34.72	54.00	-19.28	29.04	7.54	33.02	31.16	VERTICAL	165	121	Average
2	4848.14	52.10	74.00	-21.90	46.41	7.54	33.01	31.16	VERTICAL	165	121	Peak

Temperature	25°C	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 6 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Horizontal

	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	4883.08	47.85	74.00	-26.15	42.01	7.61	33.00	31.23	HORIZONTAL	284	152	Peak
2	4883.96	34.84	54.00	-19.16	29.00	7.61	33.00	31.23	HORIZONTAL	284	152	Average

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	4875.80	49.09	74.00	-24.91	43.30	7.59	33.01	31.21	VERTICAL	203	118	Peak
2	4878.48	34.82	54.00	-19.18	29.02	7.59	33.00	31.21	VERTICAL	203	118	Average

Temperature	25℃	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 9 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Horizontal

	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	4895.52	35.07	54.00	-18.93	29.18	7.63	32.99	31.25	HORIZONTAL	300	128	Average
2	4912.00	50.12	74.00	-23.88	44.19	7.65	32.99	31.27	HORIZONTAL	300	128	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	4898.32	48.47	74.00	-25.53	42.58	7.63	32.99	31.25	VERTICAL	330	100	Peak
2	4907.96	34.81	54.00	-19.19	28.92	7.63	32.99	31.25	VERTICAL	330	100	Average

Note:

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

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

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

4.5. 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 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

4.5.3. Test Procedures

For Radiated band edges Measurement:

1. The test procedure is the same as section 4.4.3.

For Radiated Out of Band Emission Measurement:

1. Test was performed in accordance with KDB558074 D01 v03r04 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.

4.5.4. Test Setup Layout

For Radiated band edges Measurement:

This test setup layout is the same as that shown in section 4.4.4.

For Radiated Out of Band Emission Measurement:

This test setup layout is the same as that shown in section 4.4.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in beamforming transmitting mode.

4.5.7. Test Result of Band Edge and Fundamental Emissions

Temperature	25°C	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT20 CH 1, 6, 11 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Channel 1

	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	2390.00	53.70	54.00	-0.30	21.42	5.23	0.00	27.05	HORIZONTAL	52	182	Average
2	2390.00	72.11	74.00	-1.89	39.83	5.23	0.00	27.05	HORIZONTAL	52	182	Peak
3	2409.20	113.48			81.12	5.26	0.00	27.10	HORIZONTAL	52	182	Peak
4	2410.80	103.83			71.47	5.26	0.00	27.10	HORIZONTAL	52	182	Average

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

Channel 6

	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	2390.00	45.42	54.00	-8.58	13.14	5.23	0.00	27.05	HORIZONTAL	57	204	Average
2	2390.00	55.98	74.00	-18.02	23.70	5.23	0.00	27.05	HORIZONTAL	57	204	Peak
3	2435.40	106.78			74.34	5.28	0.00	27.16	HORIZONTAL	57	204	Average
4	2438.20	116.48			84.04	5.28	0.00	27.16	HORIZONTAL	57	204	Peak
5	2483.50	45.68	54.00	-8.32	13.08	5.33	0.00	27.27	HORIZONTAL	57	204	Average
6	2484.20	59.07	74.00	-14.93	26.47	5.33	0.00	27.27	HORIZONTAL	57	204	Peak

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

Channel 11

	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	2463.60	103.73			71.20	5.31	0.00	27.22	HORIZONTAL	53	200	Average
2	2464.80	112.98			80.45	5.31	0.00	27.22	HORIZONTAL	53	200	Peak
3	2483.50	53.29	54.00	-0.71	20.69	5.33	0.00	27.27	HORIZONTAL	53	200	Average
4	2483.50	69.08	74.00	-4.92	36.48	5.33	0.00	27.27	HORIZONTAL	53	200	Peak

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

Temperature	25℃	Humidity	56%
Test Engineer	Peter Wu	Configurations	IEEE 802.11ac MCS0/Nss1 VHT40 CH 3, 6, 9 / Chain 5 + Chain 6 + Chain 7 + Chain 8
Test Date	Dec. 28, 2015		

Channel 3

	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	2389.20	71.28	74.00	-2.72	39.00	5.23	0.00	27.05	HORIZONTAL	46	201	Peak
2	2390.00	53.47	54.00	-0.53	21.19	5.23	0.00	27.05	HORIZONTAL	46	201	Average
3	2407.60	109.26			76.90	5.26	0.00	27.10	HORIZONTAL	46	201	Peak
4	2413.60	98.51			66.14	5.26	0.00	27.11	HORIZONTAL	46	201	Average

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

Channel 6

	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	2390.00	50.21	54.00	-3.79	17.93	5.23	0.00	27.05	HORIZONTAL	66	201	Average
2	2390.00	63.91	74.00	-10.09	31.63	5.23	0.00	27.05	HORIZONTAL	66	201	Peak
3	2421.40	108.29			75.89	5.27	0.00	27.13	HORIZONTAL	66	201	Peak
4	2428.60	99.56			67.14	5.28	0.00	27.14	HORIZONTAL	66	201	Average
5	2483.50	49.85	54.00	-4.15	17.25	5.33	0.00	27.27	HORIZONTAL	66	201	Average
6	2483.50	67.36	74.00	-6.64	34.76	5.33	0.00	27.27	HORIZONTAL	66	201	Peak

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

Channel 9

	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	2443.60	99.19			66.72	5.29	0.00	27.18	HORIZONTAL	64	194	Average
2	2462.80	107.38			74.85	5.31	0.00	27.22	HORIZONTAL	64	194	Peak
3	2483.50	53.29	54.00	-0.71	20.69	5.33	0.00	27.27	HORIZONTAL	64	194	Average
4	2489.20	72.62	74.00	-1.38	40.00	5.34	0.00	27.28	HORIZONTAL	64	194	Peak

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

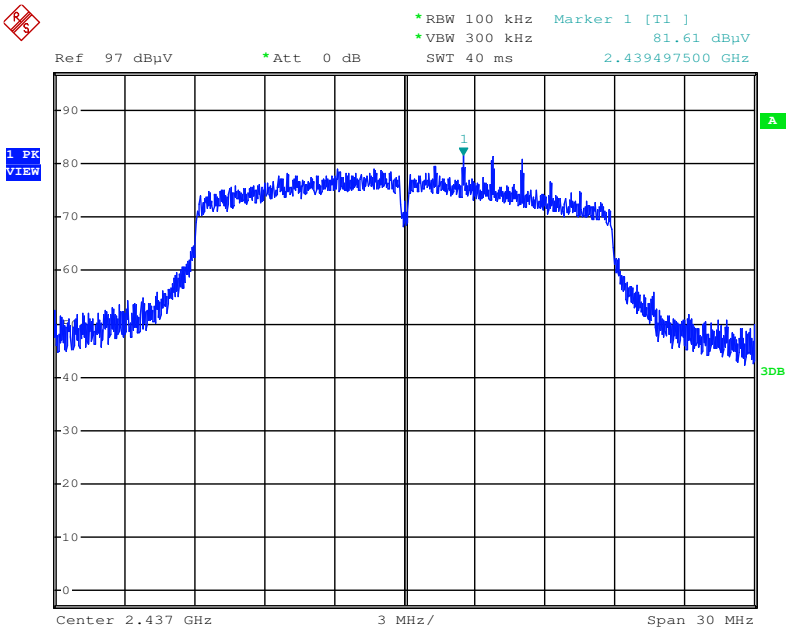
Note:

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

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

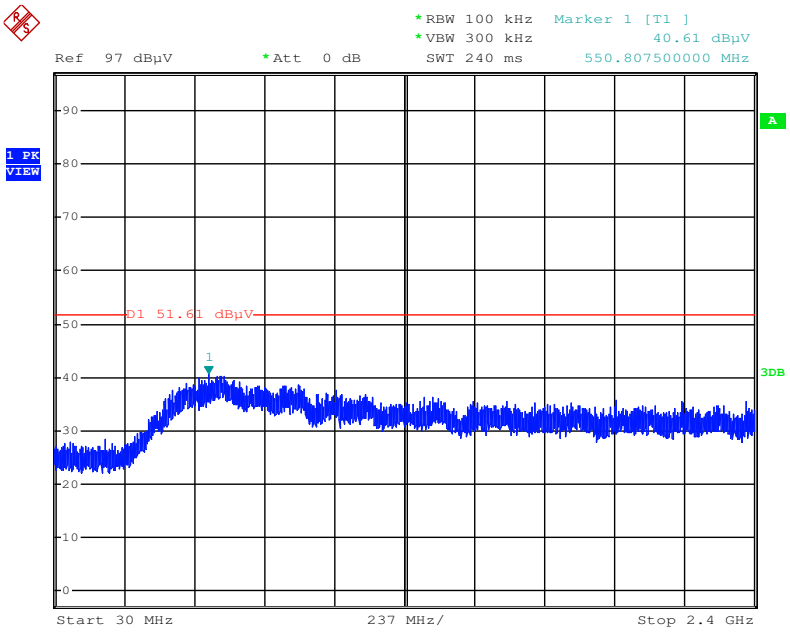
For Emission not in Restricted Band

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



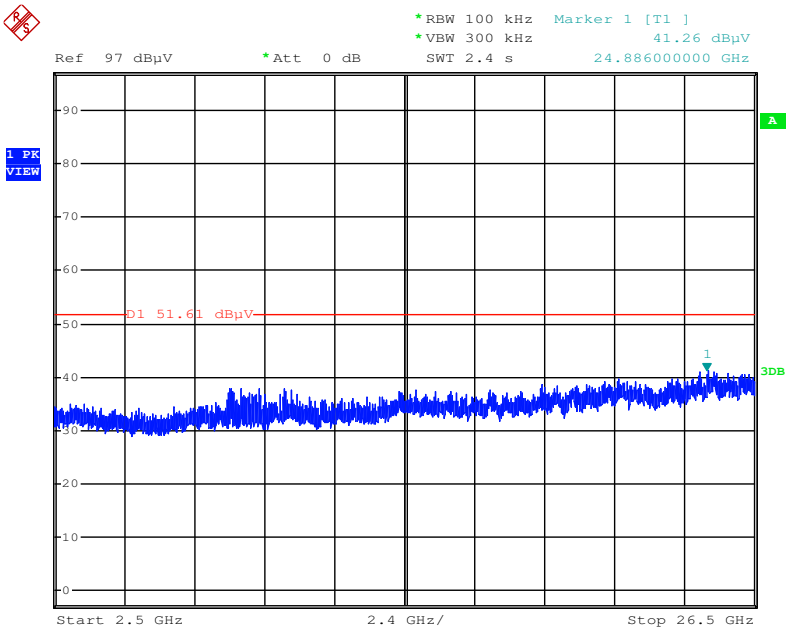
Date: 28.DEC.2015 21:01:01

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



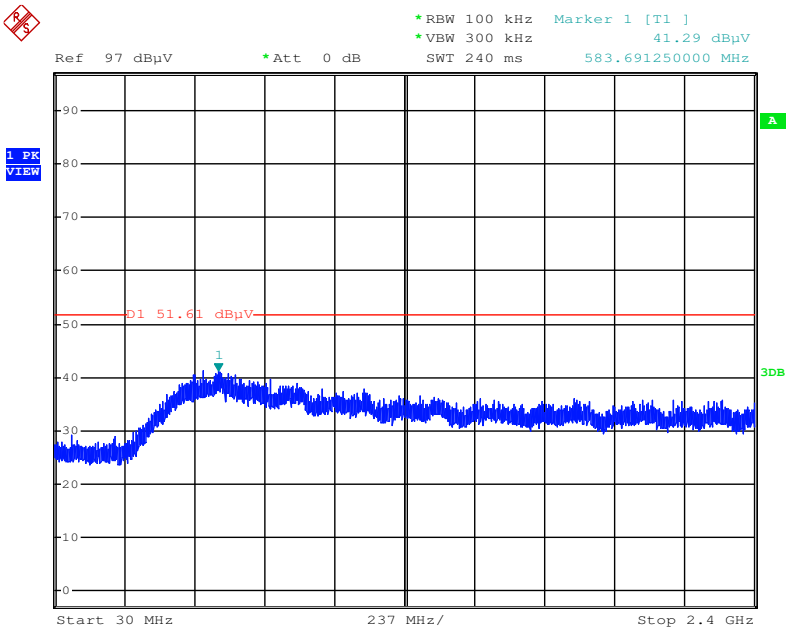
Date: 28.DEC.2015 21:03:54

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



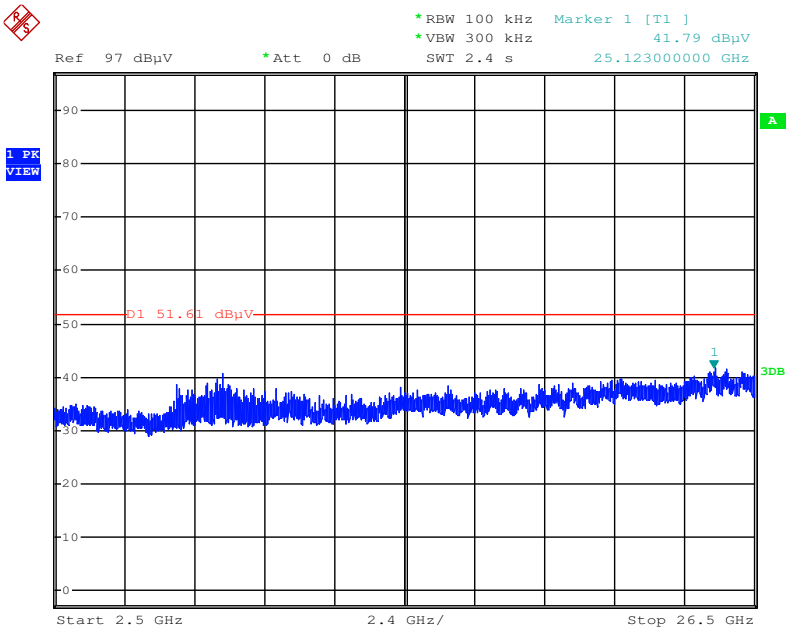
Date: 28.DEC.2015 21:07:18

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



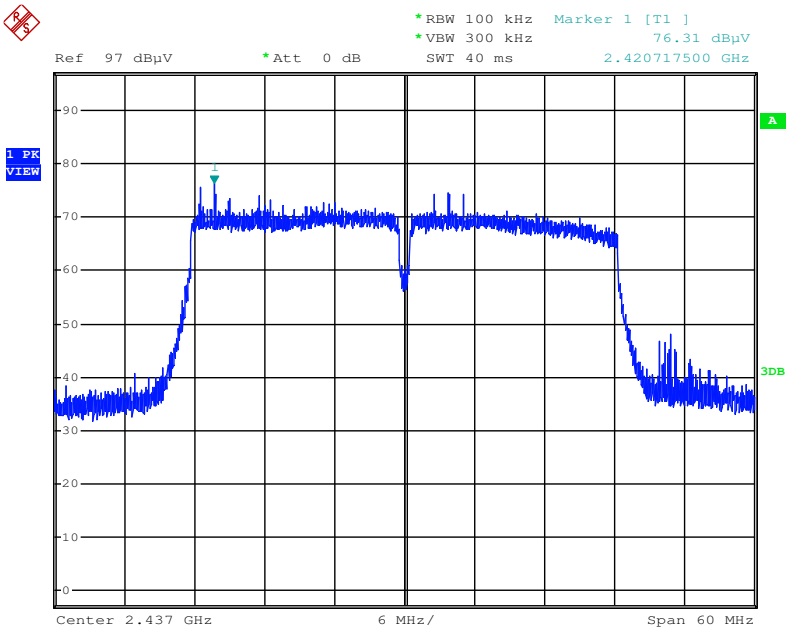
Date: 28.DEC.2015 21:09:38

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



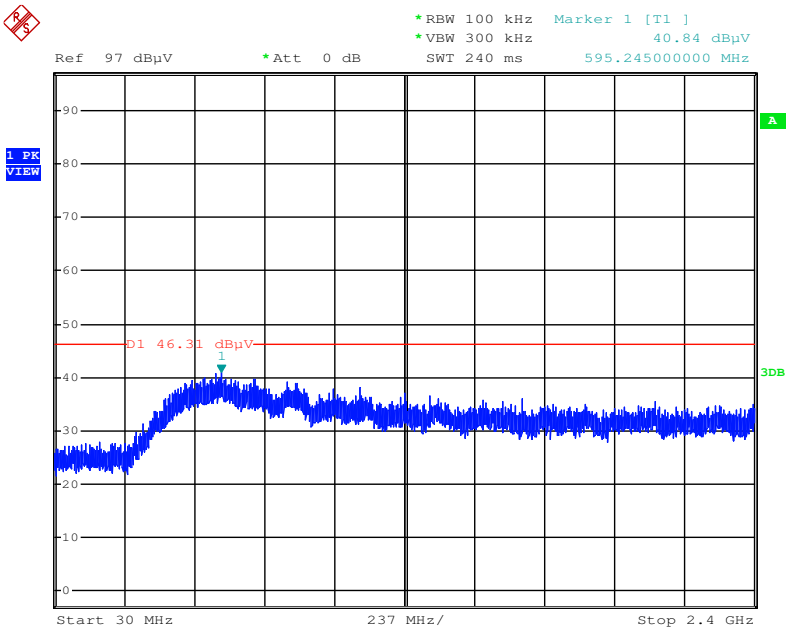
Date: 28.DEC.2015 21:10:51

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



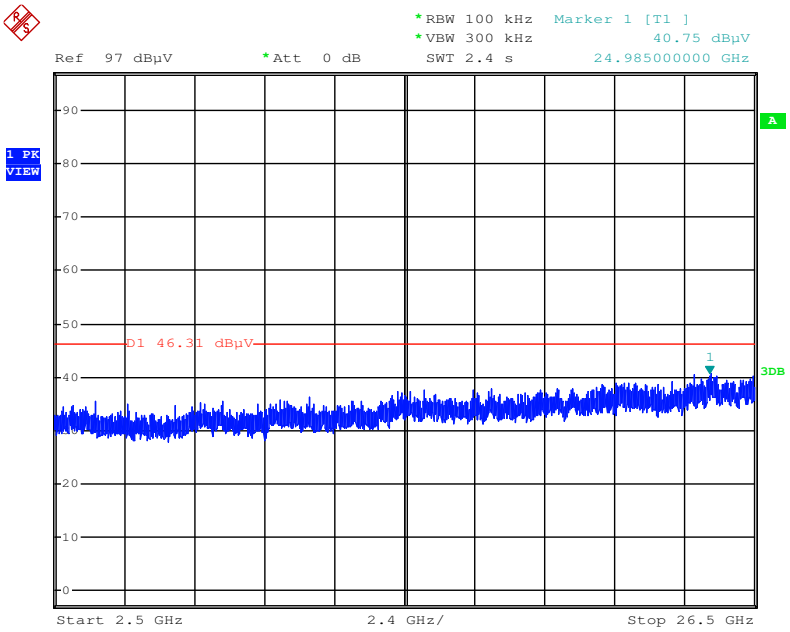
Date: 28.DEC.2015 22:20:37

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



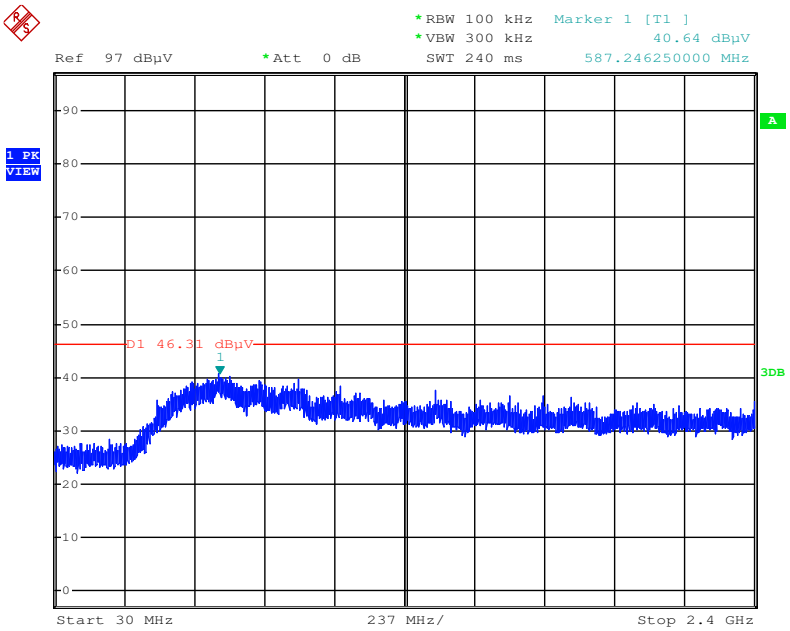
Date: 28.DEC.2015 22:40:35

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



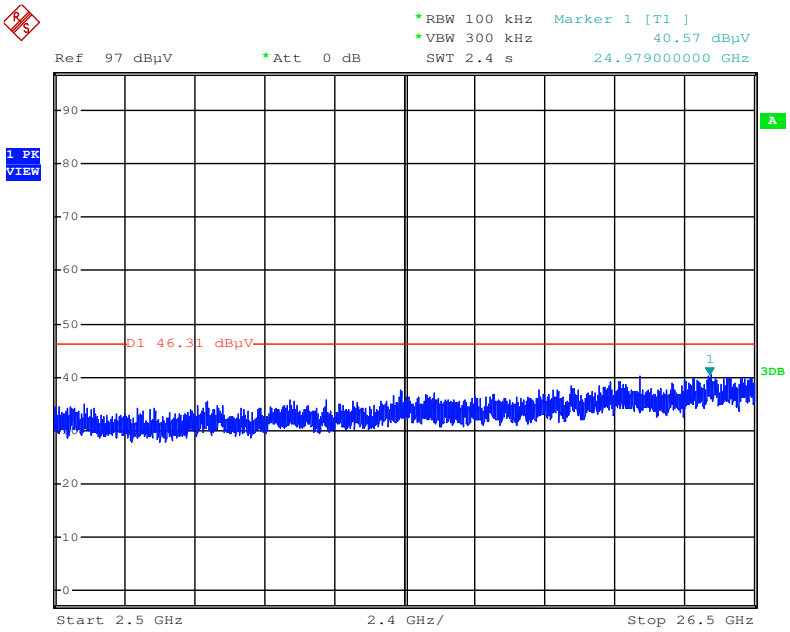
Date: 28.DEC.2015 22:41:06

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



Date: 28.DEC.2015 23:13:32

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



Date: 28.DEC.2015 23:14:13

4.6. Antenna Requirements

4.6.1. 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.

4.6.2. 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
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Oct. 22, 2015	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2015	Radiation (03CH01-CB)
Amplifier	Agilent	8449B	3008A02660	1GHz ~ 26.5GHz	May 25, 2015	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26GHz ~ 40GHz	Feb.10, 2015	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Oct. 27, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-17	N/A	1 GHz ~ 18 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-1	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G-2	N/A	18GHz ~ 40 GHz	Nov. 02, 2015	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-I0-7	N/A	N/A	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 09, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz – 26.5 GHz	Nov. 02, 2015	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 02, 2015	Conducted (TH01-CB)

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

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
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%