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FCC RADIO TEST REPORT

Applicant's company	**XAVi Technologies Corporation**
Applicant Address	22F., No. 69, Sec. 2, Guangfu Rd., Sanchong Dist., New Taipei City 24158, Taiwan
FCC ID	**RYU-W224Z0**
Manufacturer's company	**XAVi Technologies Corporation**
Manufacturer Address	22F., No. 69, Sec. 2, Guangfu Rd., Sanchong Dist., New Taipei City 24158, Taiwan

Product Name	Wireless module
Brand Name	XAVi
Model No.	W224Z0YYYYY(Y=0~9, a~z, A~Z, blank, "-" or "+", for marketing purpose.)
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Nov. 05, 2015
Final Test Date	Dec. 31, 2015
Submission Type	Original Equipment

Statement

Test result included in this report is for the IEEE 802.11n 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 v04** and **KDB 662911 D01 v02r01**.

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

Testing Laboratory
1190

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR5N0423-02	Rev. 01	Initial issue of report	May 03, 2017
FR5N0423-02	Rev. 02	1. Updating the CLOSE-UP of photos 2. Updating the external of photos	May 05, 2017

1. VERIFICATION OF COMPLIANCE

Product Name	:	Wireless module
Brand Name	:	XAVi
Model No.	:	W224Z0YYYYY(Y=0~9, a~z, A~Z, blank, "-" or "+", for marketing purpose.)
Applicant	:	XAVi Technologies Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 05, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Cliff Chang
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	1.71 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	4.83 dB
4.3	15.247(e)	Power Spectral Density	Complies	4.39 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.23 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.06 dB
4.7	15.203	Antenna Requirements	Complies	-

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: see the below table
Data Modulation	IEEE 802.11b: DSSS (BPSK / QPSK / CCK) IEEE 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)
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: see the below table
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	IEEE 802.11b: 14.85 MHz IEEE 802.11g: 22.58 MHz IEEE 802.11n MCS0 (HT20): 21.01 MHz IEEE 802.11n MCS0 (HT40): 36.47 MHz
Maximum Conducted Output Power	IEEE 802.11b: 20.45 dBm IEEE 802.11g: 25.17 dBm IEEE 802.11n MCS0 (HT20): 24.88 dBm IEEE 802.11n MCS0 (HT40): 18.00 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description	
Beamforming Function	☐ With beamforming	☒ Without beamforming

Antenna and Band width

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

Note: The MIMO transmission mode is correlated.

IEEE 11n Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	2	MCS 0-15
802.11n (HT40)	2	MCS 0-15
Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n		

3.2. Accessories

N/A

3.3. Table for Filed Antenna

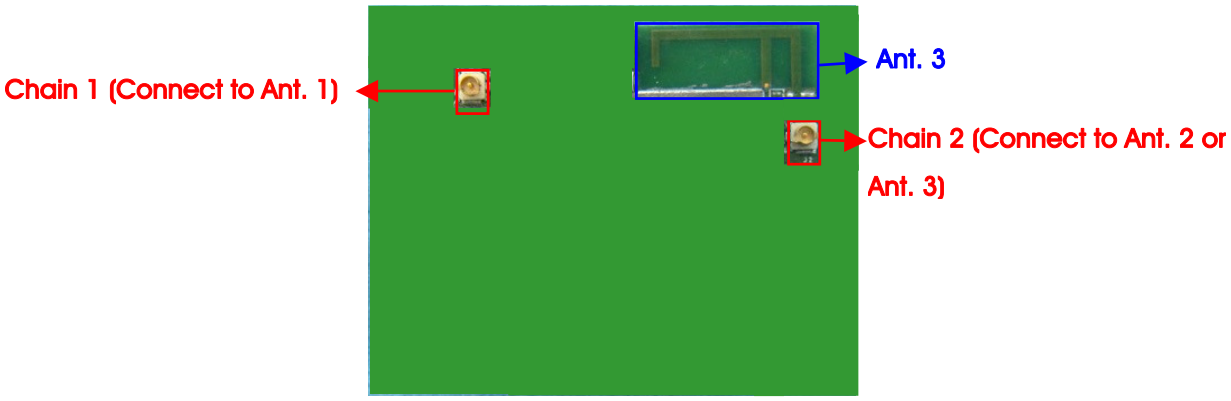
Ant.	Brand	Part No.	Antenna Type	Connector	Gain (dBi)	Loss of Cable (dB)	True Gain (dBi)
1	TONGDA	T-543-2020003-2	Dipole Antenna	Reversed SMA	5.00	0.70	4.30
2	TONGDA	T-543-2020003-2	Dipole Antenna	Reversed SMA	5.00	0.70	4.30
3	-	-	Printed Antenna	N/A	4.32	-	4.32

Note: The EUT has three antennas (2TX, 2RX).

Chain 1 (Connect to Ant. 1)

Chain 2 (Connect to Ant. 2 or Ant. 3), only the higher gain antenna "Ant. 3" was tested and recorded in the report.

Chain 1 and Chain 2 could both 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
AC Power Line Conducted Emissions	CTX	-	-	-
Maximum Conducted Output Power	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
Power Spectral Density	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
6dB Spectrum Bandwidth	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
Radiated Emissions 9kHz~1GHz	CTX	-	-	-
Radiated Emissions 1GHz~10th Harmonic	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2
Band Edge Emissions	11b/CCK	1 Mbps	1/6/11	1+2
	11g/BPSK	6 Mbps	1/6/11	1+2
	11n HT20	MCS0	1/6/11	1+2
	11n HT40	MCS0	3/6/9	1+2

Note: All the specification of test configurations and test modes were based on customer's request.
The following test modes were performed for all tests:

For Radiated Emission test:

The EUT can be placed in X axis, Y axis and Z axis. After evaluating, the worst case was found at Z axis, so it's recorded in this report.

For AC Power Line Conducted Emissions and Radiated Emissions 9kHz~1GHz test:

EUT use Ant. 1 + Ant. 3 for measurement.

For Other tests:

EUT use Ant. 3 for measurement, only the higher gain antenna was tested and recorded in the report.

3.6. Table for Testing Locations

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

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

3.7. Table for Multiple Listing

The difference for each model is shown as below:

Model Name	Description
W224Z0YYYYY	(Y=0~9, a~z, A~Z, blank, "-" or "+", for marketing purpose.)

Note: W224Z0 was selected as representative model for the test and its data was recorded in this report.

3.8. Table for Supporting Units

For Test Site No: 03CH01-CB and TH01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E4300	DoC
Fixture	Qualcomm	Y9350	MB-CUS531
Adapter	PSE	MU12AF050200-A1	N/A

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
NB	DELL	E6430	DoC
Fixture	Qualcomm	Y9350	MB-CUS531
Adapter	PSE	MU12AF050200-A1	N/A

3.9. Table for Parameters of Test Software Setting

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

Test Software Version	ART2-GUI 2.3					
Mode	Test Frequency (MHz)					
	NCB: 20MHz			NCB: 40MHz		
	2412 MHz	2437 MHz	2462 MHz	2422 MHz	2437 MHz	2452 MHz
802.11b	15	15.5	16	-	-	-
802.11g	13	20	14	-	-	-
802.11n MCS0 HT20	12	20	13	-	-	-
802.11n MCS0 HT40	-	-	-	9	13	10.5

3.10. EUT Operation during Test

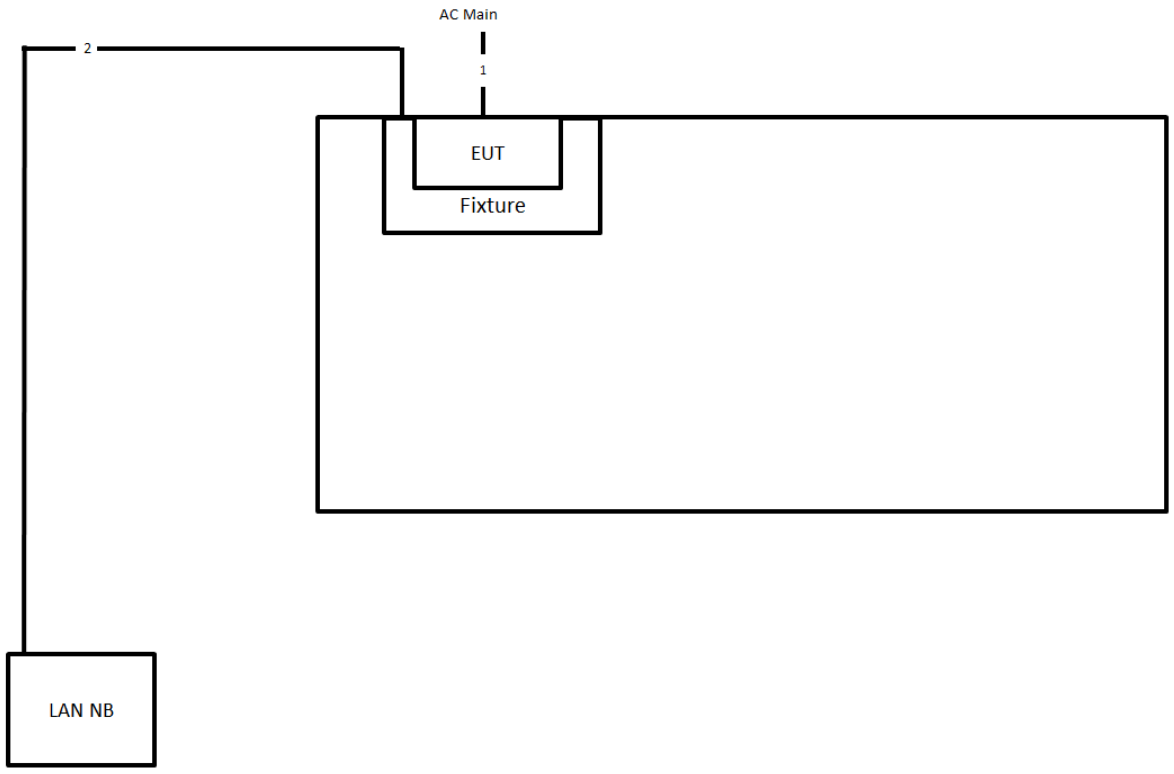
The EUT was programmed to be in continuously transmitting mode.

3.11. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
802.11b	1.000	1.000	100.00	0.00	0.01
802.11g	2.014	2.072	97.20	0.12	0.50
802.11n MCS0 HT20	1.877	1.942	96.64	0.15	0.53
802.11n MCS0 HT40	0.928	0.968	95.80	0.19	1.08

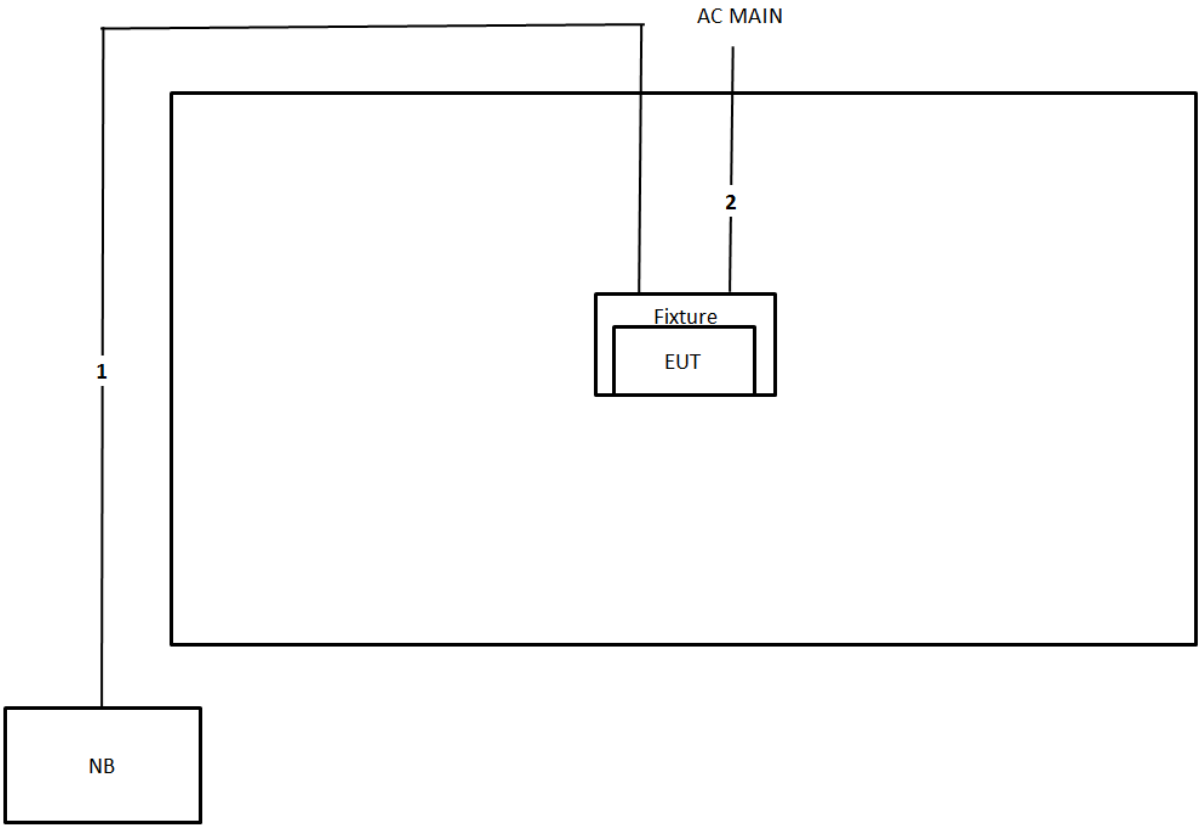
3.12. Test Configurations

3.12.1. AC Power Line Conduction Emissions Test Configuration



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

3.12.2. Radiation Emissions Test Configuration



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

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

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

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

4.1.2. Measuring Instruments and Setting

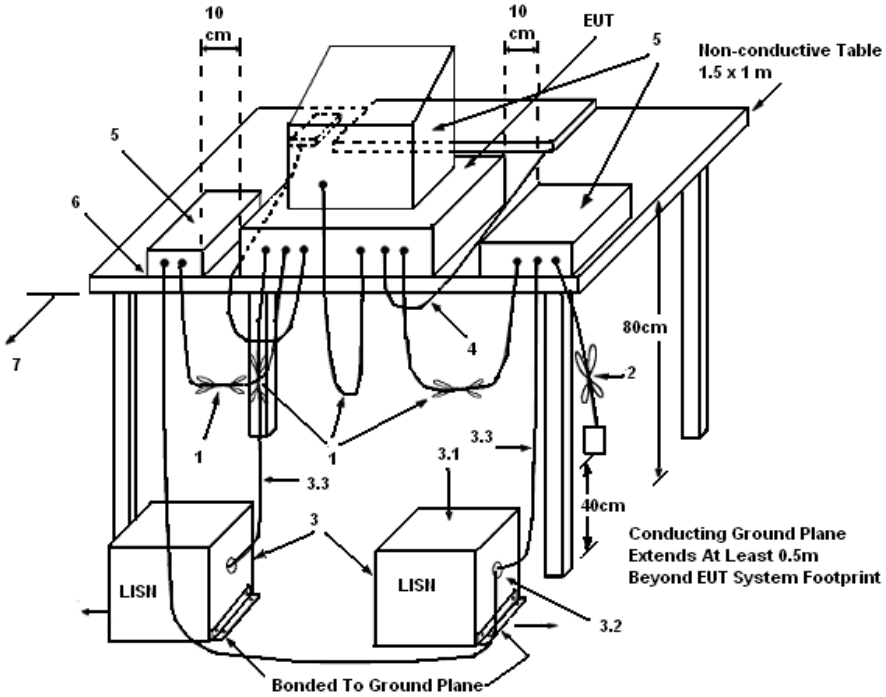
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

4.1.3. Test Procedures

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

4.1.4. Test Setup Layout



LEGEND:

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

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

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

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

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

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

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

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

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

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

4.1.5. Test Deviation

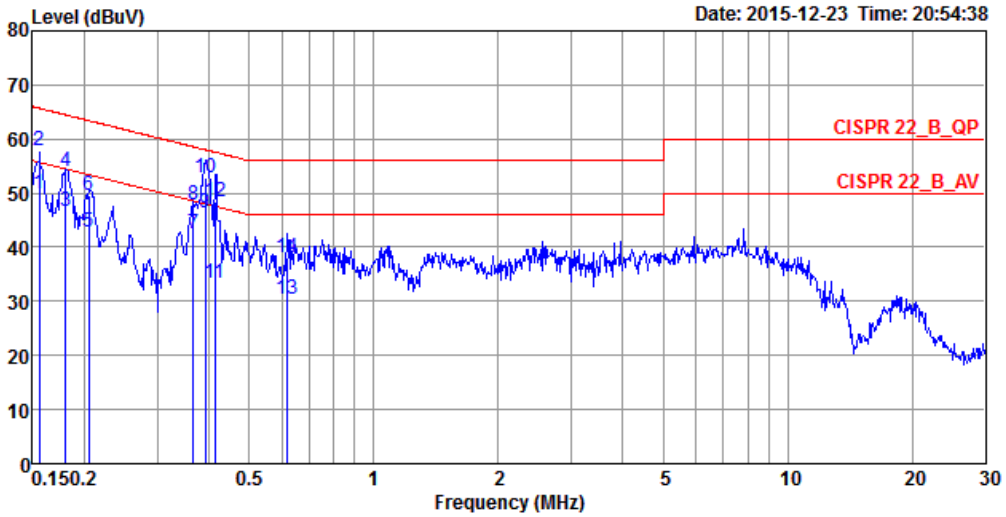
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

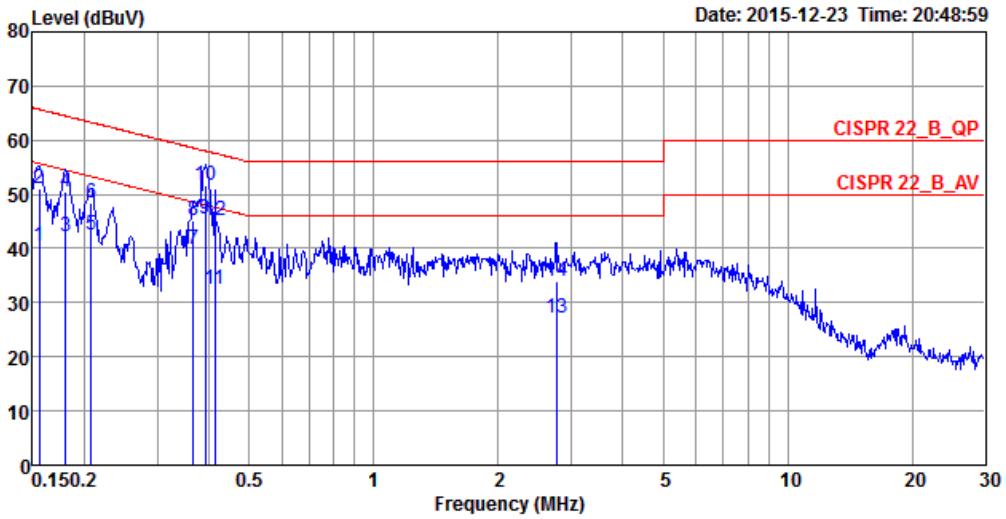
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	62%
Test Engineer	Deven Huang	Phase	Line
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	49.92	-5.77	55.69	39.97	9.93	0.02	LINE	Average
2	0.1557	57.92	-7.77	65.69	47.97	9.93	0.02	LINE	QP
3	0.1806	46.56	-7.90	54.46	36.61	9.93	0.02	LINE	Average
4	0.1806	53.89	-10.57	64.46	43.94	9.93	0.02	LINE	QP
5	0.2050	42.82	-10.58	53.40	32.87	9.93	0.02	LINE	Average
6	0.2050	49.47	-13.93	63.40	39.52	9.93	0.02	LINE	QP
7	0.3673	42.55	-6.01	48.56	32.58	9.93	0.04	LINE	Average
8	0.3673	47.81	-10.75	58.56	37.84	9.93	0.04	LINE	QP
9	0.3914	46.32	-1.71	48.03	36.35	9.93	0.04	LINE	Average
10	0.3914	52.83	-5.20	58.03	42.86	9.93	0.04	LINE	QP
11	0.4127	33.48	-14.11	47.59	23.51	9.93	0.04	LINE	Average
12	0.4127	48.47	-9.12	57.59	38.50	9.93	0.04	LINE	QP
13	0.6173	30.27	-15.73	46.00	20.29	9.94	0.04	LINE	Average
14	0.6173	38.06	-17.94	56.00	28.08	9.94	0.04	LINE	QP

Temperature	25°C	Humidity	62%
Test Engineer	Deven Huang	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Pol/Phase	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.1557	40.51	-15.18	55.69	30.71	9.78	0.02	NEUTRAL	Average
2	0.1557	51.13	-14.56	65.69	41.33	9.78	0.02	NEUTRAL	QP
3	0.1806	42.24	-12.22	54.46	32.43	9.79	0.02	NEUTRAL	Average
4	0.1806	50.44	-14.02	64.46	40.63	9.79	0.02	NEUTRAL	QP
5	0.2072	42.50	-10.82	53.32	32.69	9.79	0.02	NEUTRAL	Average
6	0.2072	48.40	-14.92	63.32	38.59	9.79	0.02	NEUTRAL	QP
7	0.3673	39.71	-8.85	48.56	29.88	9.79	0.04	NEUTRAL	Average
8	0.3673	45.31	-13.25	58.56	35.48	9.79	0.04	NEUTRAL	QP
9	0.3914	45.56	-2.47	48.03	35.73	9.79	0.04	NEUTRAL	Average
10	0.3914	51.72	-6.31	58.03	41.89	9.79	0.04	NEUTRAL	QP
11	0.4127	32.46	-15.13	47.59	22.63	9.79	0.04	NEUTRAL	Average
12	0.4127	45.16	-12.43	57.59	35.33	9.79	0.04	NEUTRAL	QP
13	2.7648	27.17	-18.83	46.00	17.27	9.85	0.05	NEUTRAL	Average
14	2.7648	34.09	-21.91	56.00	24.19	9.85	0.05	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

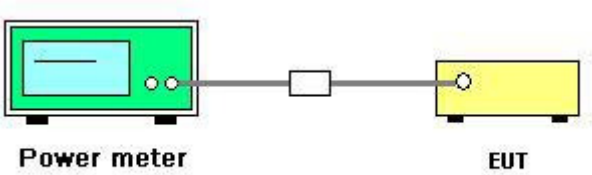
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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

4.2.3. Test Procedures

1. Test procedures refer KDB558074 D01 v04 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.

4.2.4. 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	24°C	Humidity	60%
Test Engineer	Clemens Fang	Test Date	Dec. 08, 2015

Mode	Frequency	Conducted Power (dBm)			Max. Limit (dBm)	Result
		Chain 1	Chain 2	Total		
802.11b	2412 MHz	17.19	17.36	20.29	30.00	Complies
	2437 MHz	17.49	17.23	20.37	30.00	Complies
	2462 MHz	17.51	17.37	20.45	30.00	Complies
802.11g	2412 MHz	15.31	15.63	18.48	30.00	Complies
	2437 MHz	21.64	22.62	25.17	30.00	Complies
	2462 MHz	16.65	16.42	19.55	30.00	Complies
802.11n MCS0 HT20	2412 MHz	14.14	14.46	17.31	30.00	Complies
	2437 MHz	21.59	22.14	24.88	30.00	Complies
	2462 MHz	15.58	15.16	18.39	30.00	Complies
802.11n MCS0 HT40	2422 MHz	10.63	10.75	13.70	30.00	Complies
	2437 MHz	14.83	15.15	18.00	30.00	Complies
	2452 MHz	12.22	12.59	15.42	30.00	Complies

4.3. Power Spectral Density Measurement

4.3.1. Limit

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

4.3.2. Measuring Instruments and Setting

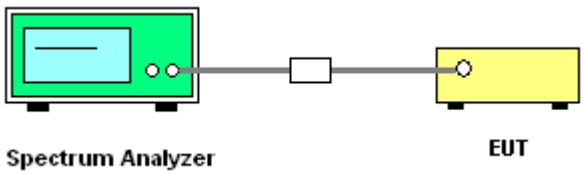
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 v04 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	24°C	Humidity	60%
Test Engineer	Clemens Fang		

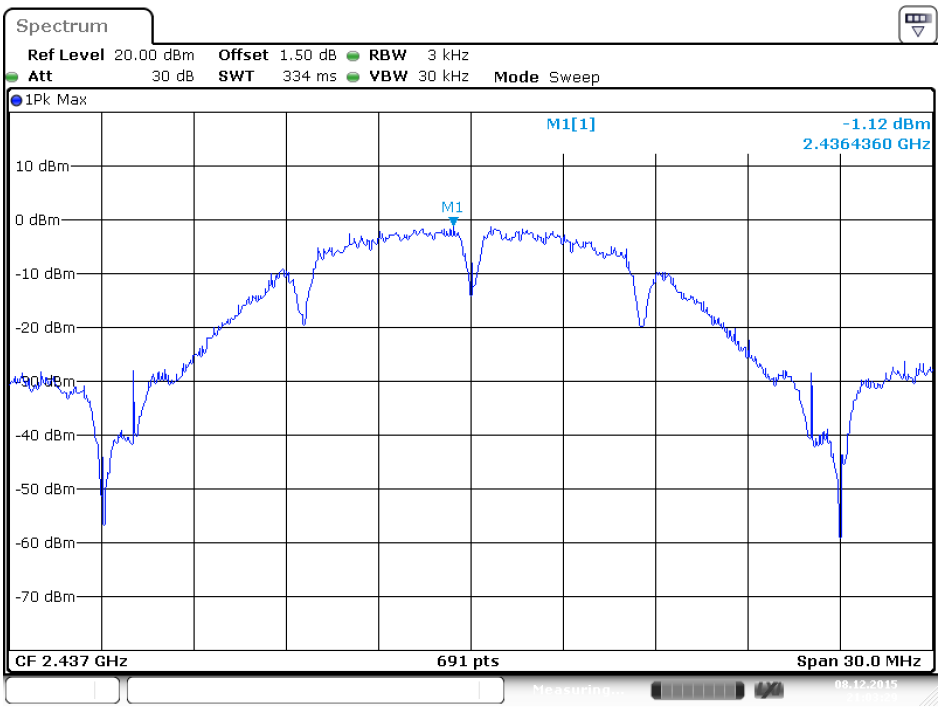
Mode	Frequency	Power Density (dBm/3kHz)			Power Density Limit (dBm/3kHz)	Result
		Chain 1	Chain 2	Total		
802.11b	2412 MHz	-4.41	-5.07	-1.72	6.67	Complies
	2437 MHz	-1.12	-0.38	2.28	6.67	Complies
	2462 MHz	-4.05	-3.81	-0.92	6.67	Complies
802.11g	2412 MHz	-9.03	-8.71	-5.86	6.67	Complies
	2437 MHz	-2.65	-1.23	1.13	6.67	Complies
	2462 MHz	-6.74	-7.68	-4.17	6.67	Complies
802.11n MCS0 HT20	2412 MHz	-10.78	-9.27	-6.95	6.67	Complies
	2437 MHz	-1.02	-1.21	1.90	6.67	Complies
	2462 MHz	-9.66	-8.92	-6.26	6.67	Complies
802.11n MCS0 HT40	2422 MHz	-16.26	-16.54	-13.39	6.67	Complies
	2437 MHz	-11.80	-11.02	-8.38	6.67	Complies
	2452 MHz	-13.93	-14.12	-11.01	6.67	Complies

Note: $Directional\,Gain = 10\log\left[\frac{\sum_{j=1}^{Nss}\left\{\sum_{K=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =7.33dBi >6dBi, so limit=8 – (7.33 – 6)=6.67dBm/3kHz.

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

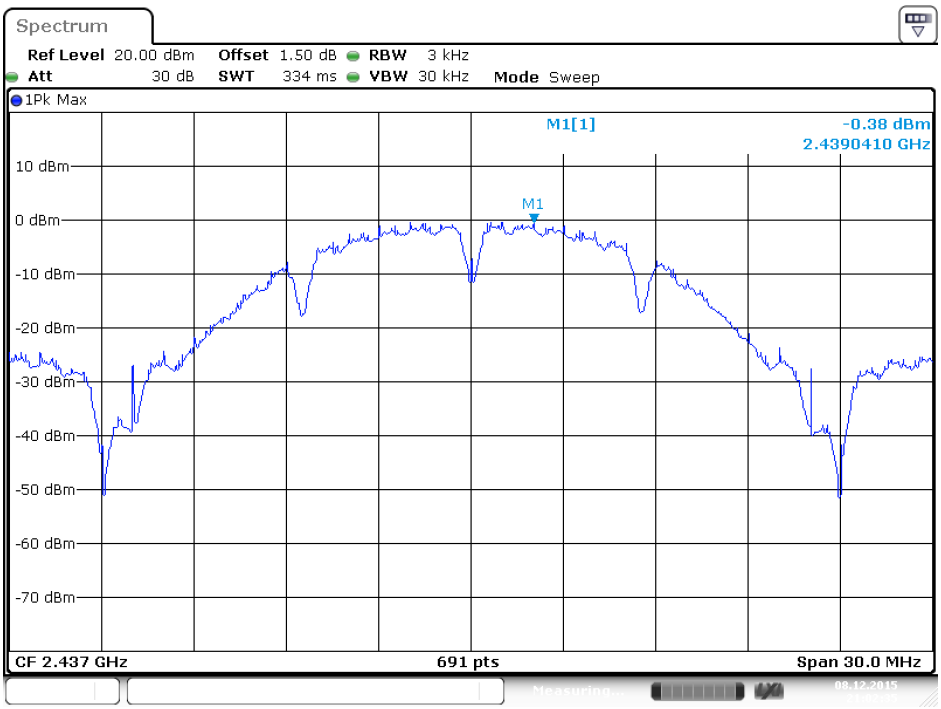
For plots, only the channel with worse result was shown.

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



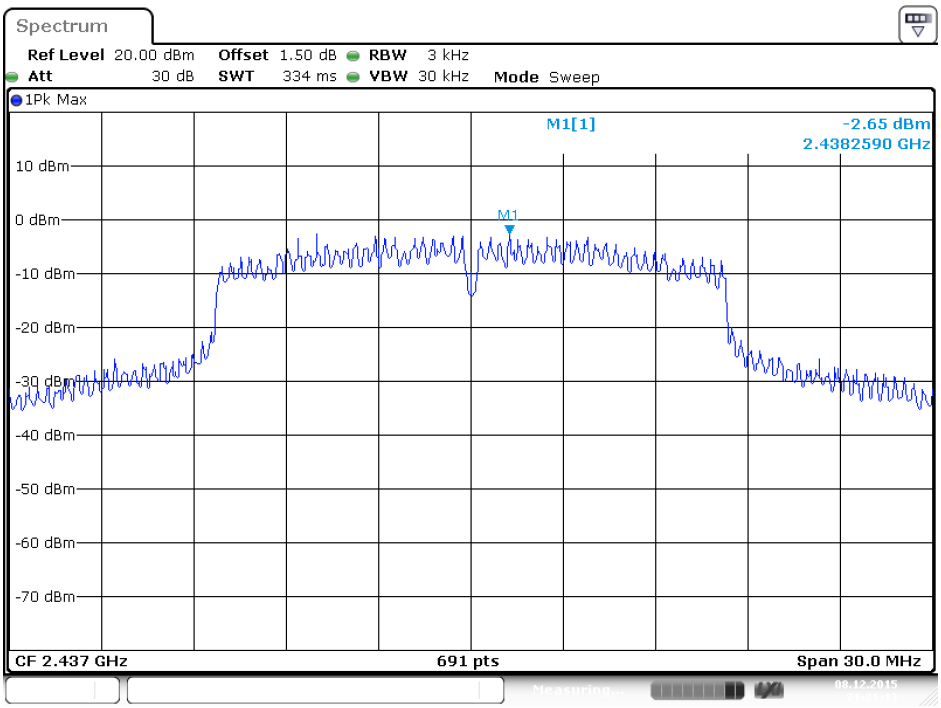
Date: 8.DEC.2015 21:03:29

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



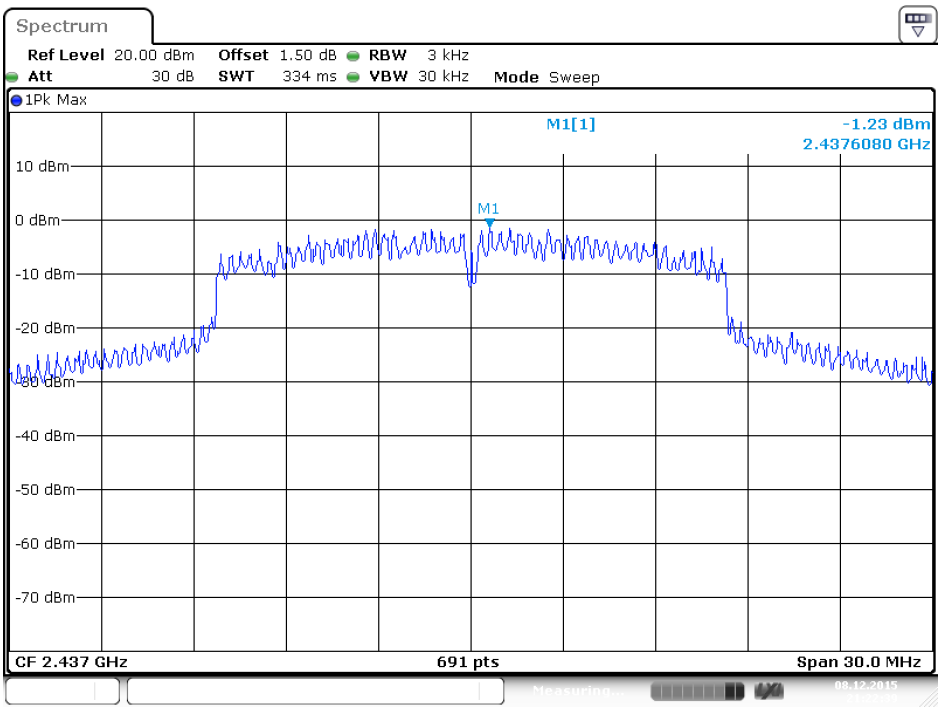
Date: 8.DEC.2015 21:02:35

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



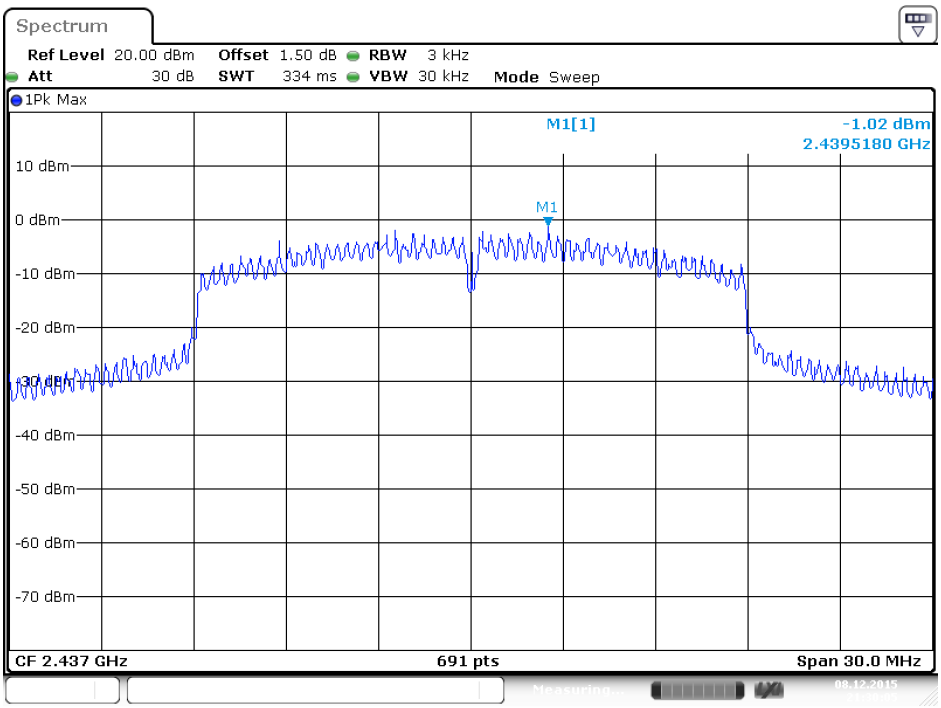
Date: 8.DEC.2015 21:21:13

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



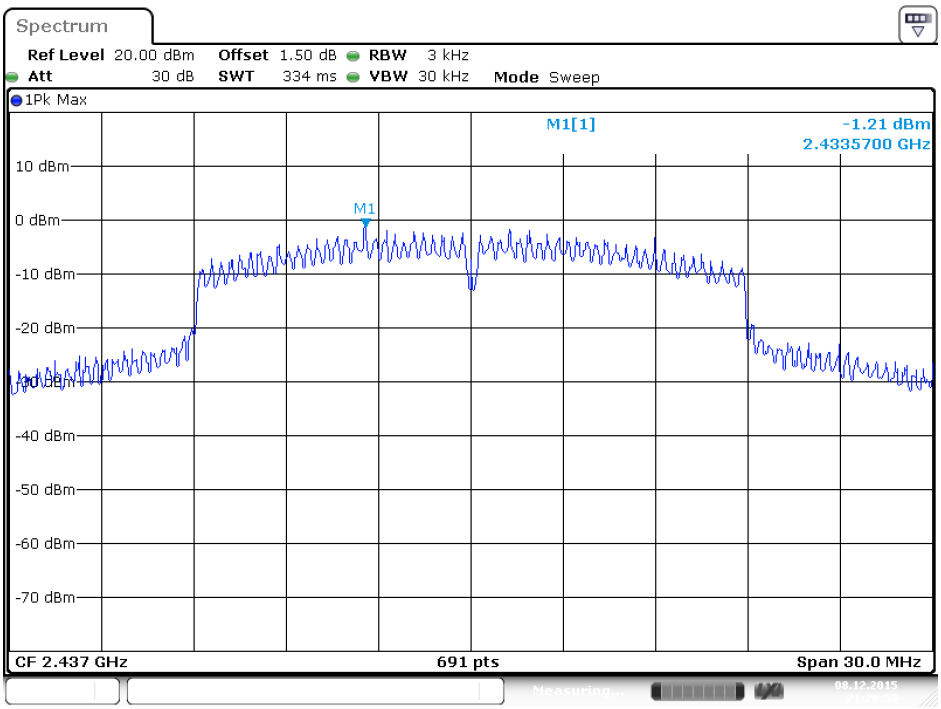
Date: 8.DEC.2015 21:22:38

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



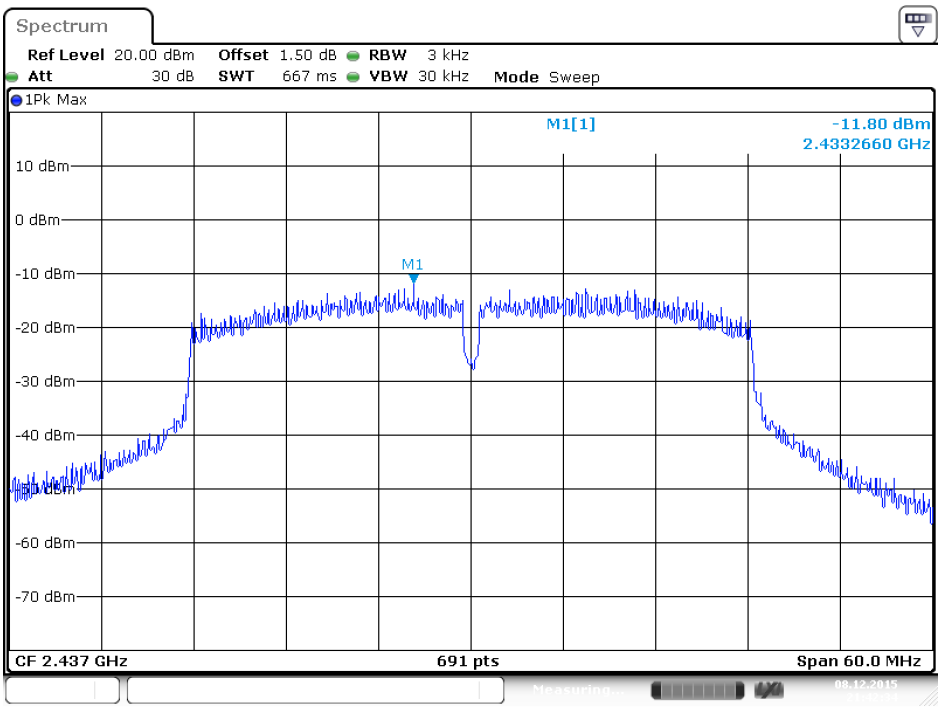
Date: 8.DEC.2015 21:30:06

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



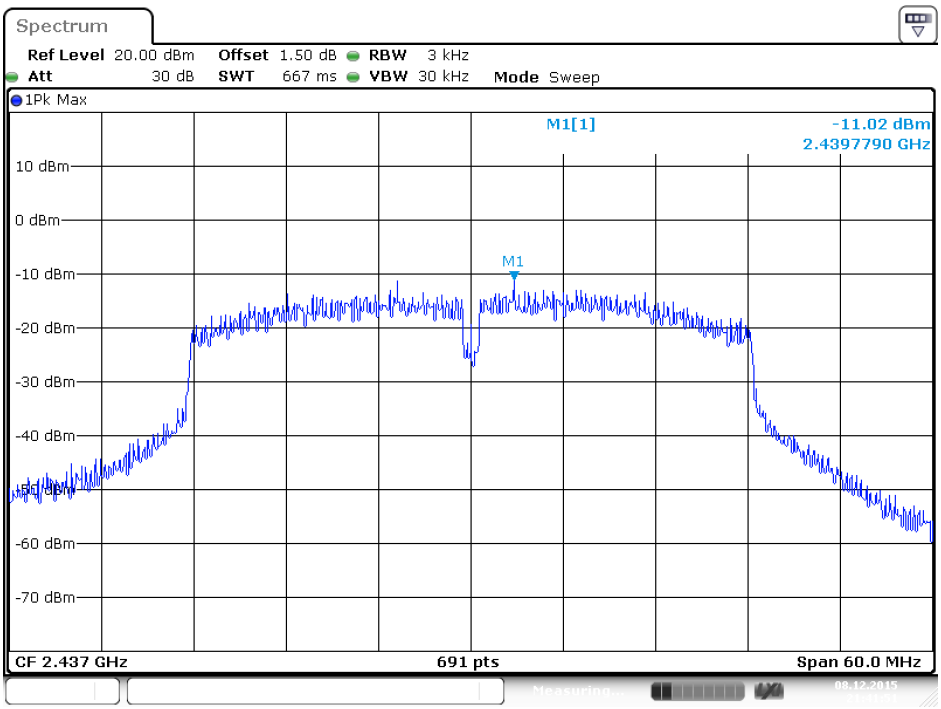
Date: 8.DEC.2015 21:28:55

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



Date: 8.DEC.2015 21:42:35

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



Date: 8.DEC.2015 21:41:51

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6 dB 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 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

4.4.3. Test Procedures

1. The transmitter was conducted to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB558074 D01 v04 for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.0 DTS 6-dB signal bandwidth 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. Measurement perform conducted of each port.
5. Measured the spectrum width with power higher than 6dB below carrier.

4.4.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.3.4.

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

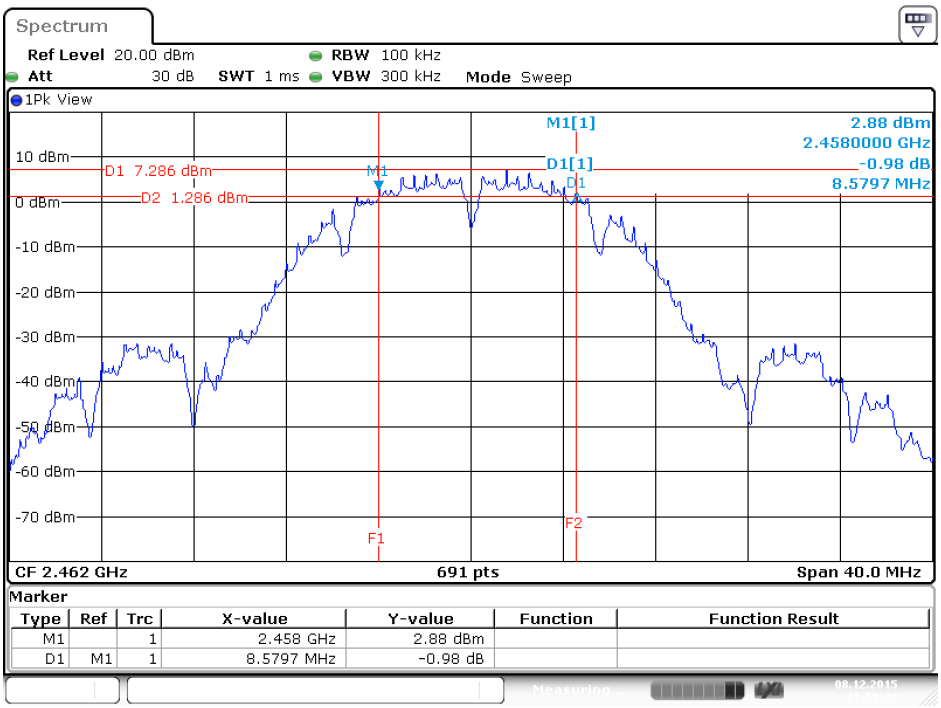
Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

Mode	Frequency	6dB Bandwidth (MHz)		99% Occupied Bandwidth (MHz)		Min. Limit (kHz)	Test Result
		Chain 1	Chain 2	Chain 1	Chain 2		
802.11b	2412 MHz	9.57	9.80	13.46	13.37	500	Complies
	2437 MHz	9.57	9.57	14.50	14.85	500	Complies
	2462 MHz	8.58	9.10	13.72	13.46	500	Complies
802.11g	2412 MHz	15.13	14.49	16.24	16.24	500	Complies
	2437 MHz	13.80	14.49	17.45	22.58	500	Complies
	2462 MHz	12.99	14.20	16.24	16.24	500	Complies
802.11n MCS0 HT20	2412 MHz	15.01	15.13	17.28	17.28	500	Complies
	2437 MHz	14.72	15.01	18.23	21.01	500	Complies
	2462 MHz	15.88	14.43	17.28	17.37	500	Complies
802.11n MCS0 HT40	2422 MHz	33.86	32.46	36.03	36.03	500	Complies
	2437 MHz	33.86	31.30	36.03	35.75	500	Complies
	2452 MHz	32.58	33.97	36.03	36.47	500	Complies

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

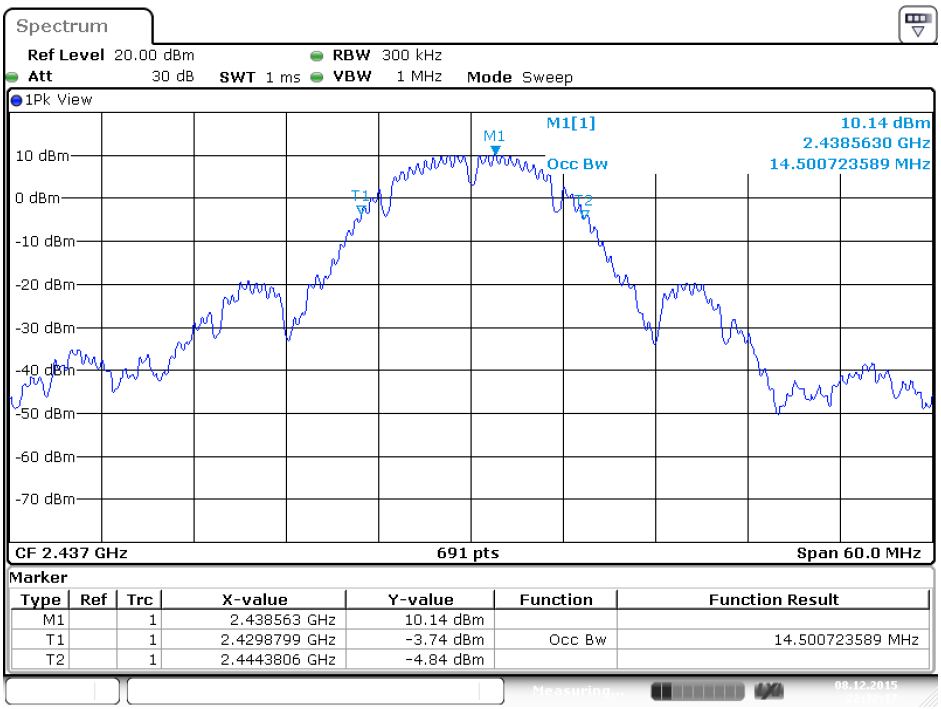
For plots, only the channel with worse result was shown.

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



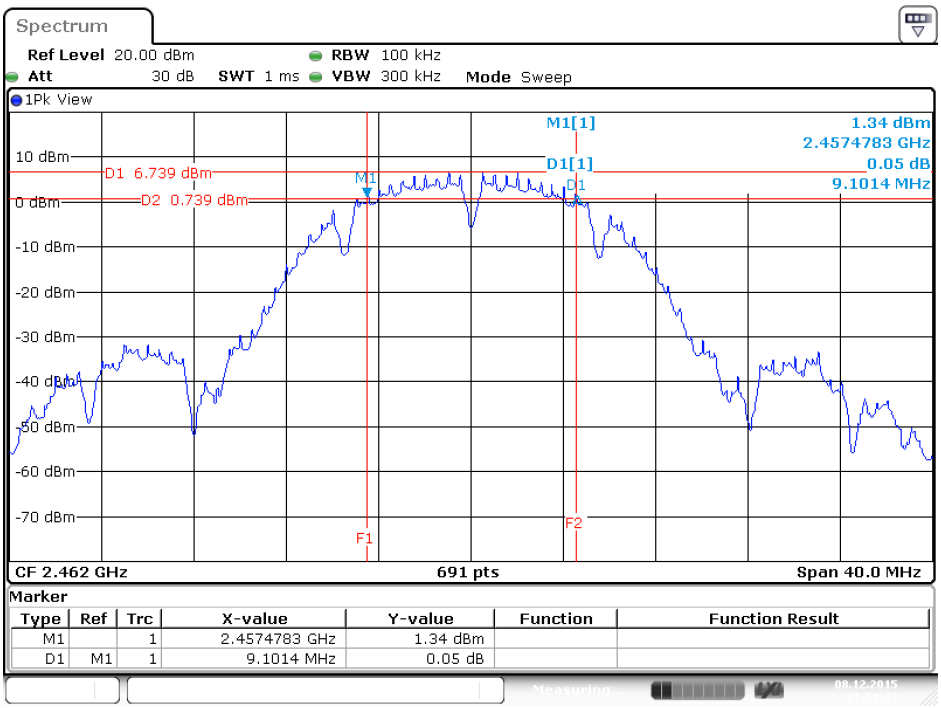
Date: 8.DEC.2015 21:58:21

99% Occupied Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 1



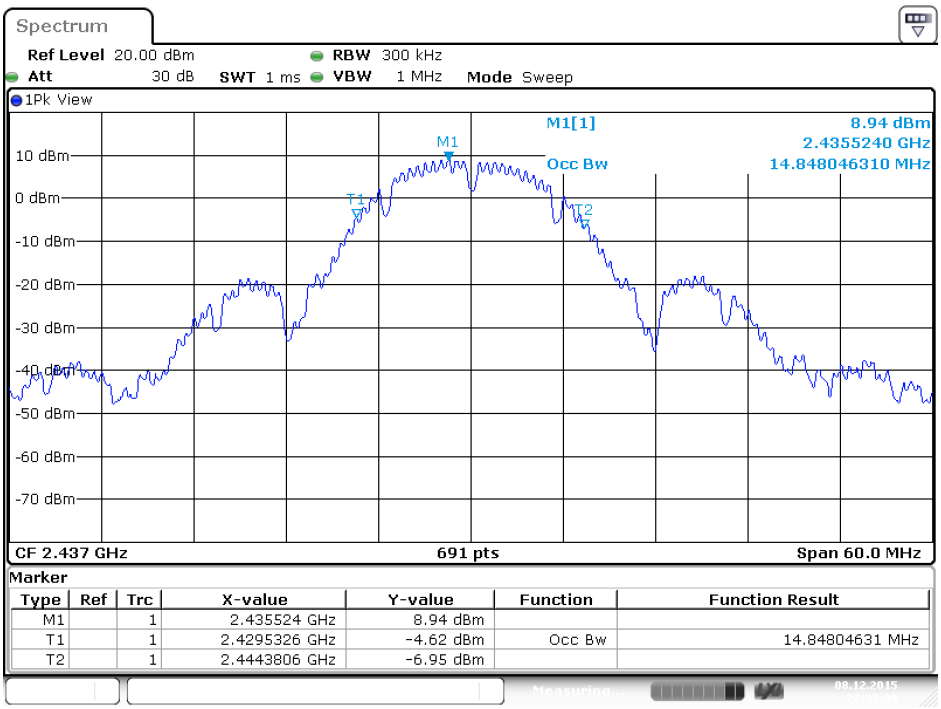
Date: 8.DEC.2015 22:32:16

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2462 MHz / Chain 2



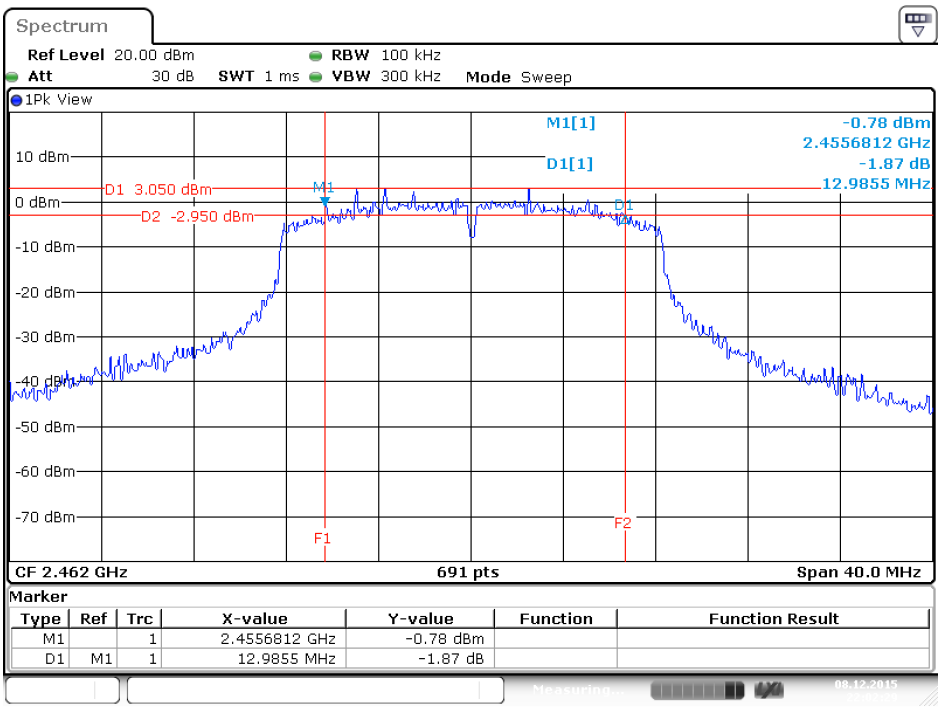
Date: 8.DEC.2015 21:58:43

99% Occupied Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz / Chain 2



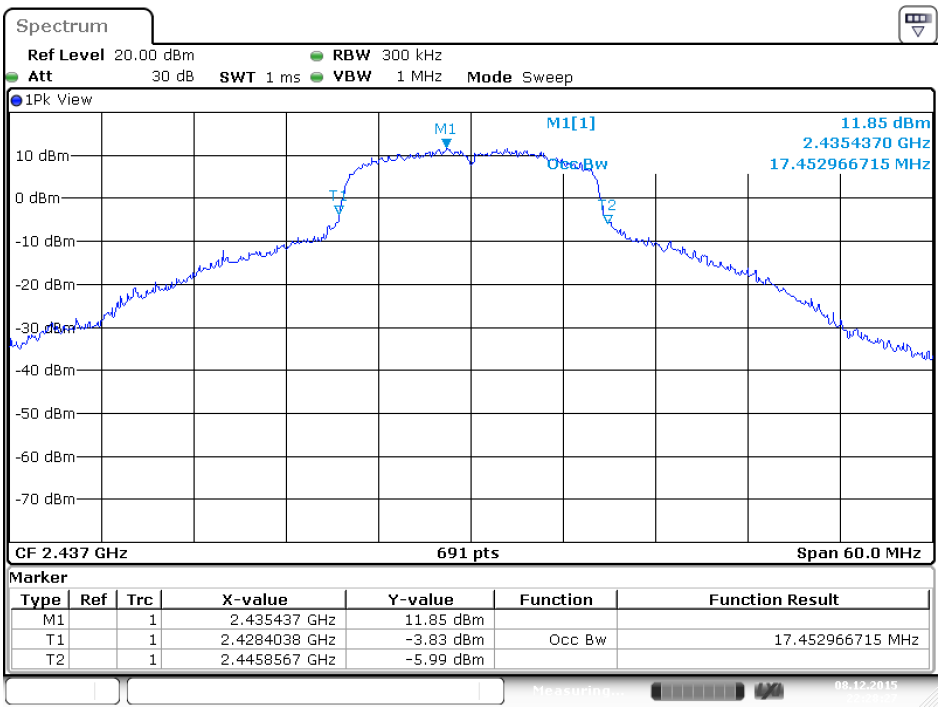
Date: 8.DEC.2015 22:32:00

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



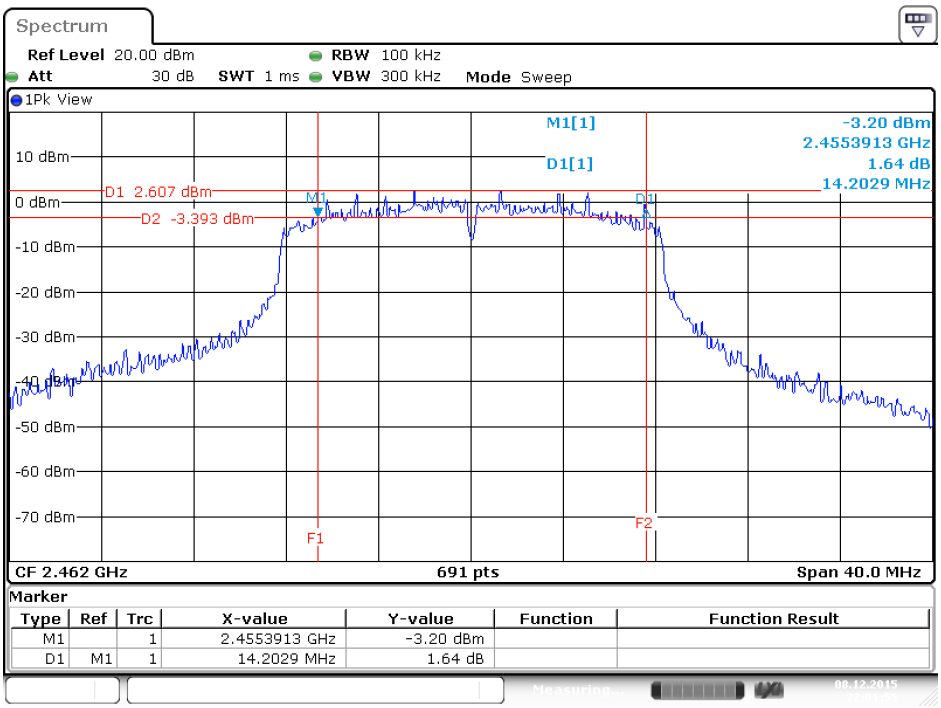
Date: 8.DEC.2015 22:02:29

99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 1



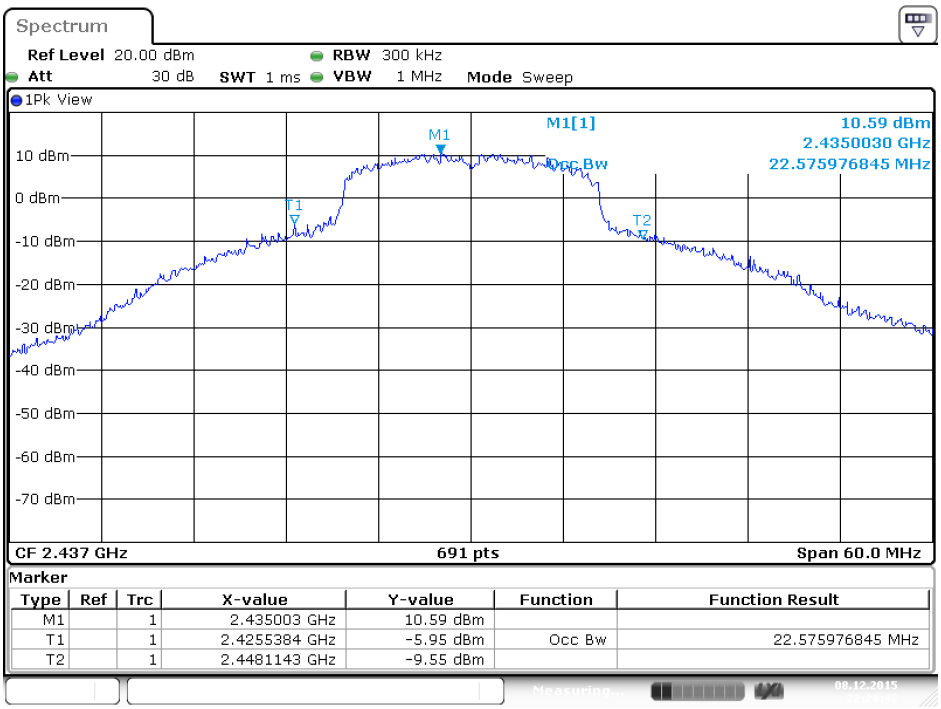
Date: 8.DEC.2015 22:28:28

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



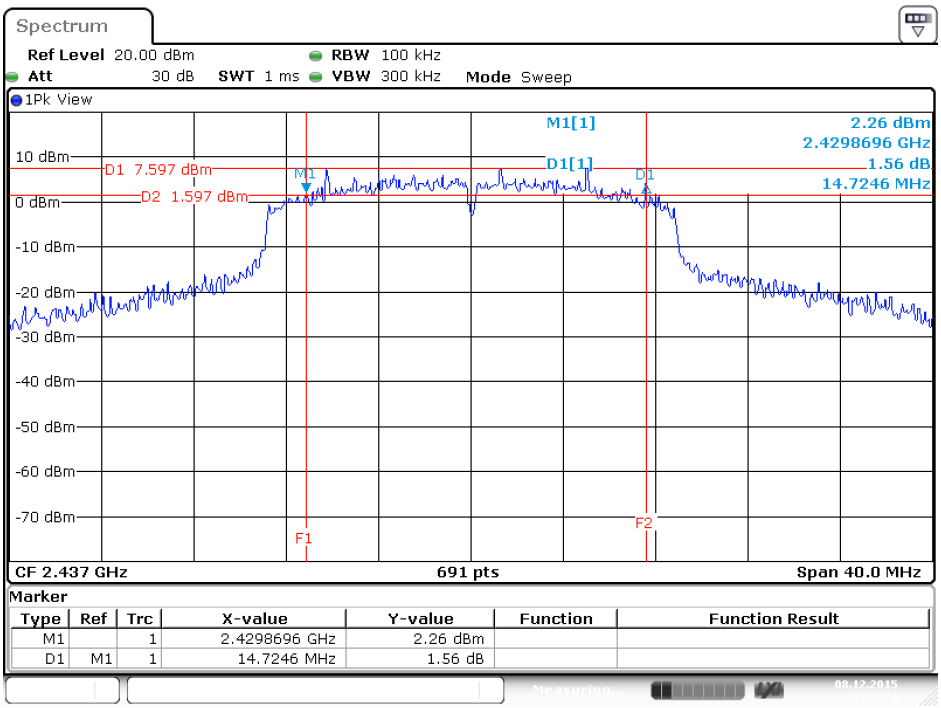
Date: 8.DEC.2015 22:01:56

99% Occupied Bandwidth Plot on Configuration IEEE 802.11g / 2437 MHz / Chain 2



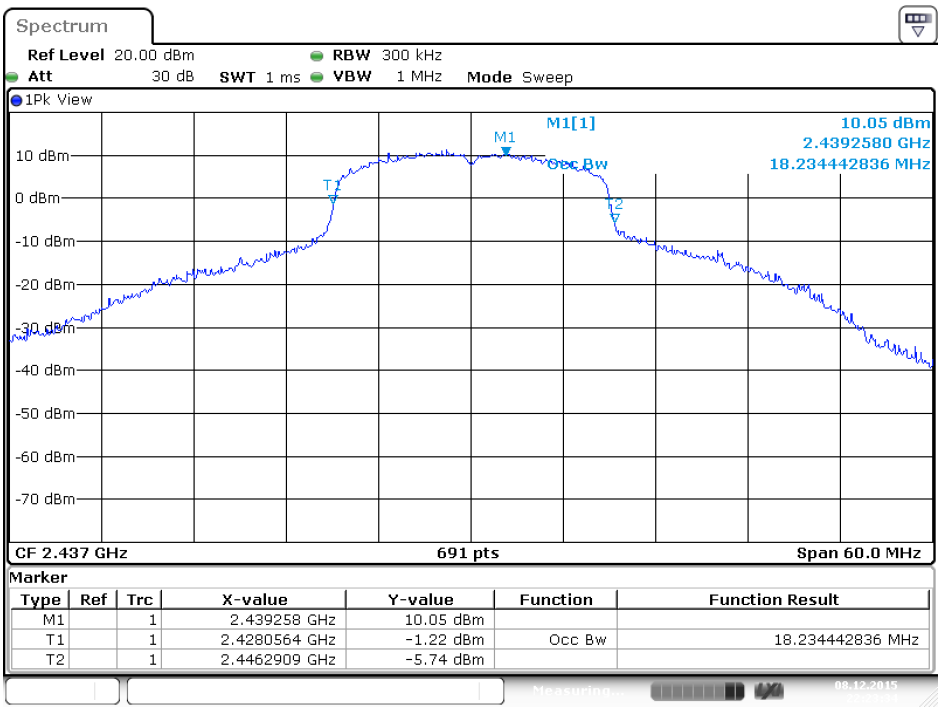
Date: 8.DEC.2015 22:28:41

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 1



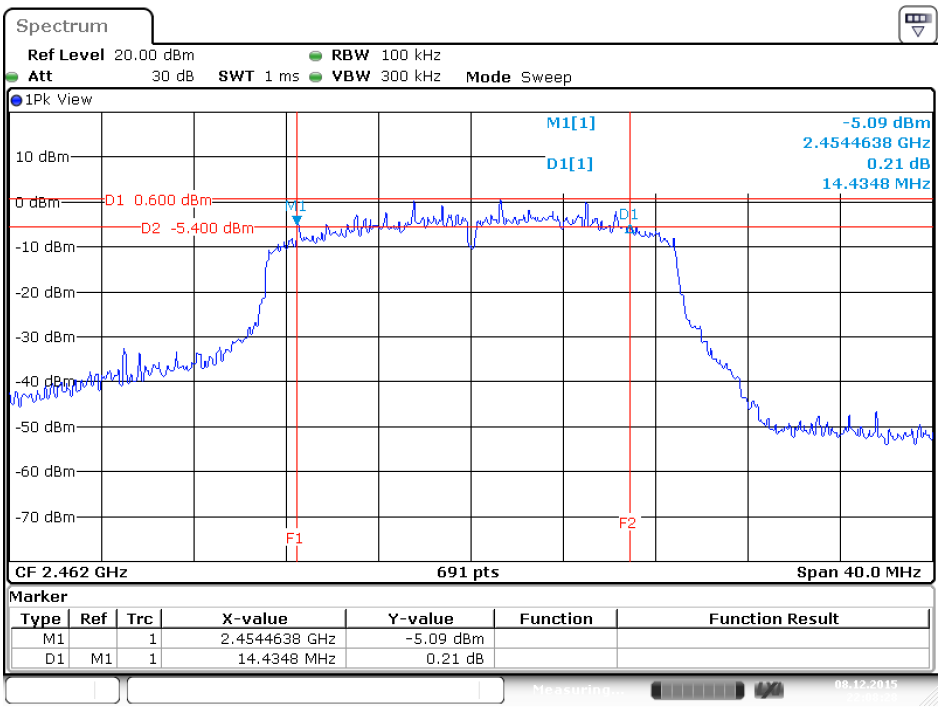
Date: 8.DEC.2015 22:06:29

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 1



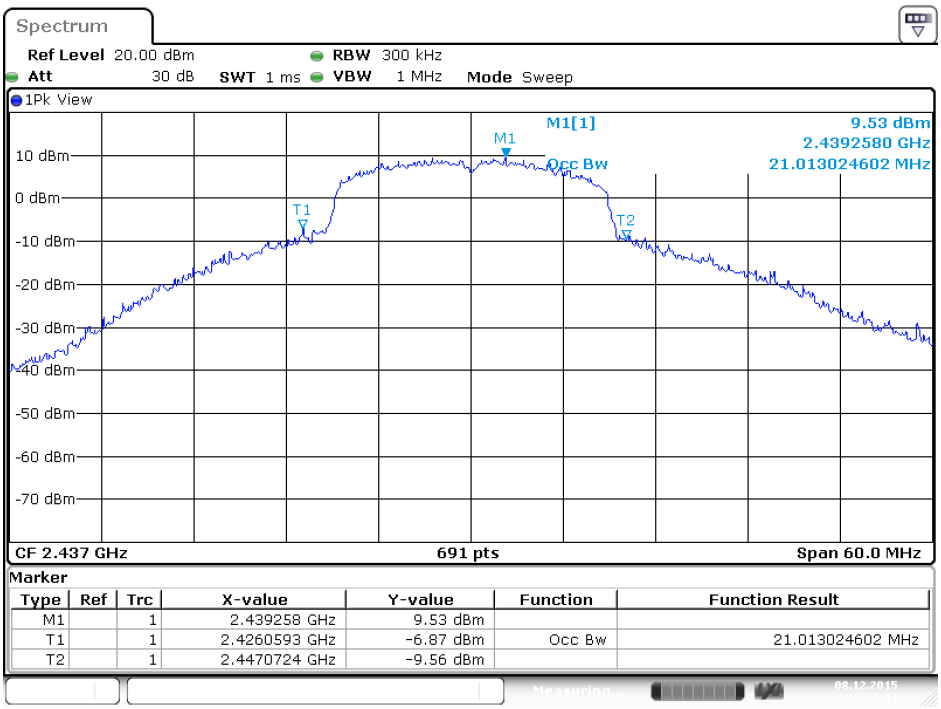
Date: 8.DEC.2015 22:23:34

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



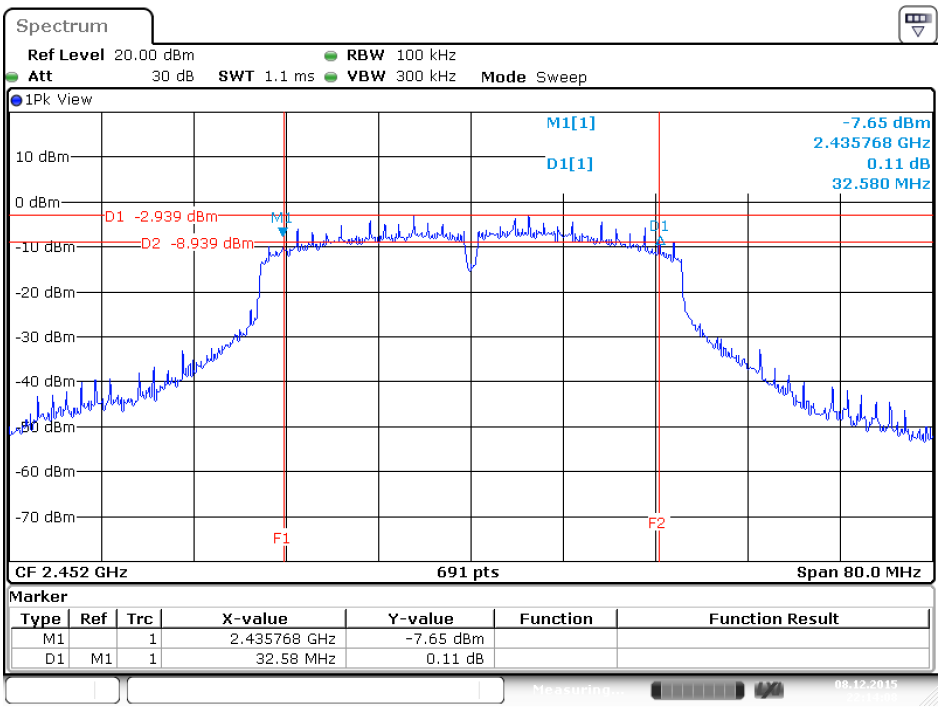
Date: 8.DEC.2015 22:08:28

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / 2437 MHz / Chain 2



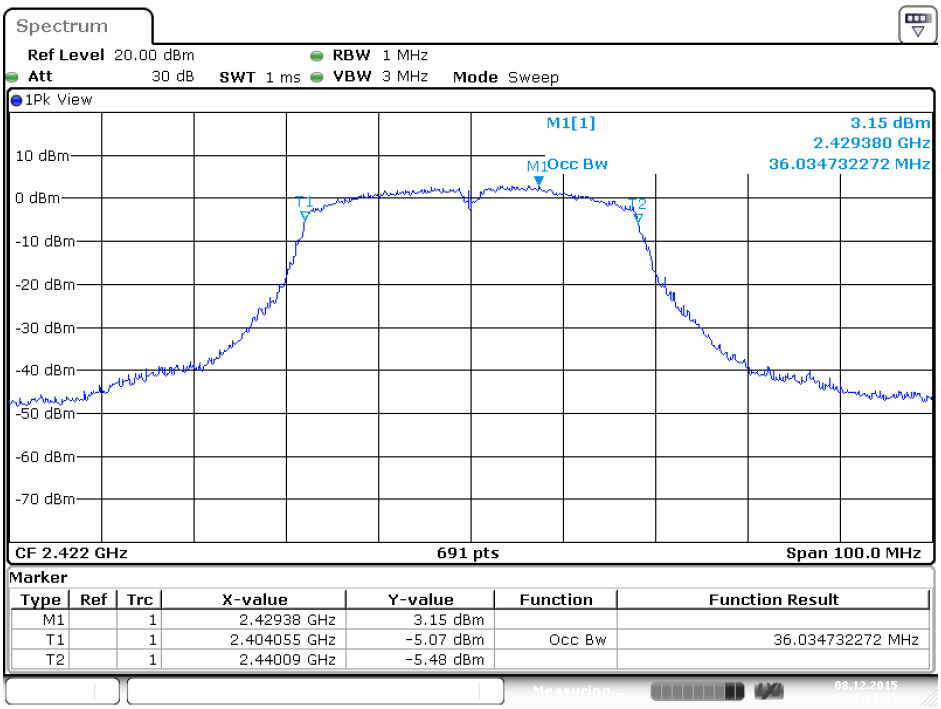
Date: 8.DEC.2015 22:22:54

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Chain 1



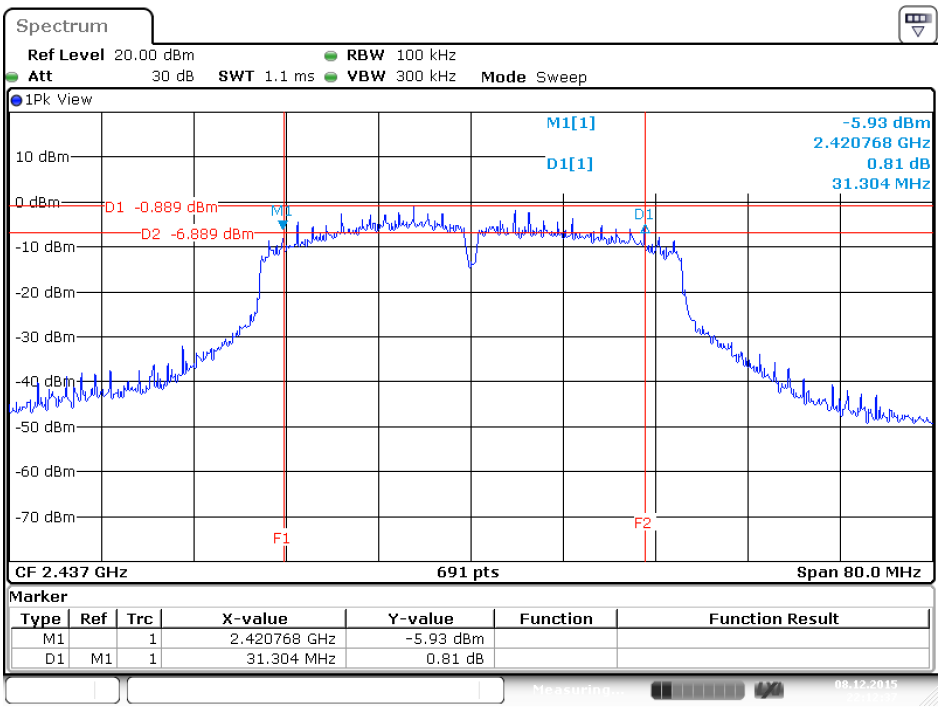
Date: 8.DEC.2015 22:14:09

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2422 MHz / Chain 1



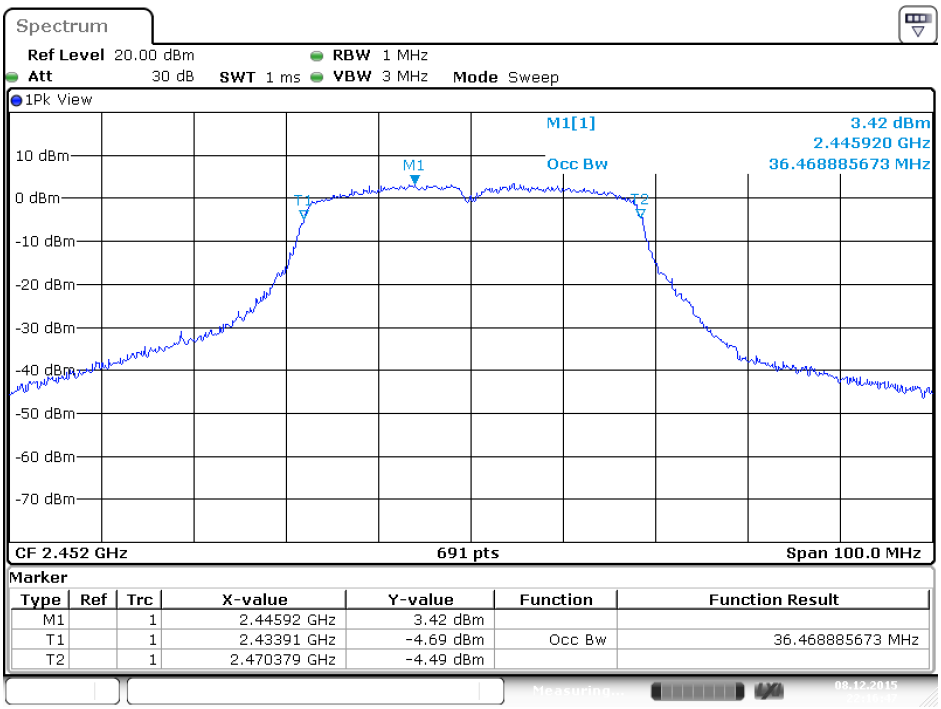
Date: 8.DEC.2015 22:18:36

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



Date: 8.DEC.2015 22:12:37

99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Chain 2



Date: 8.DEC.2015 22:16:47

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~1000MHz / RBW 120kHz for QP

4.5.3. Test Procedures

For Radiated measurement:

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.

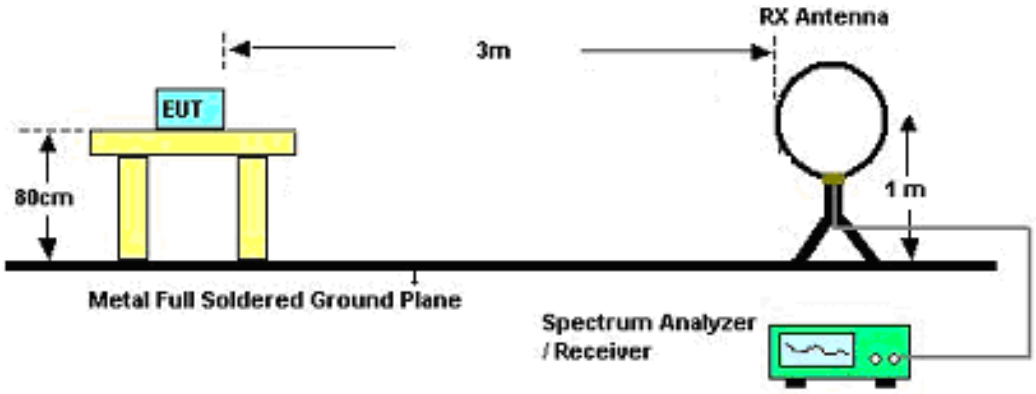
For Conducted measurement:

1. Configure the EUT according to KDB558074 D01 v04. The EUT was perform conducted measurement and measurement level added antenna gain shall be comply to section 4.5.1.

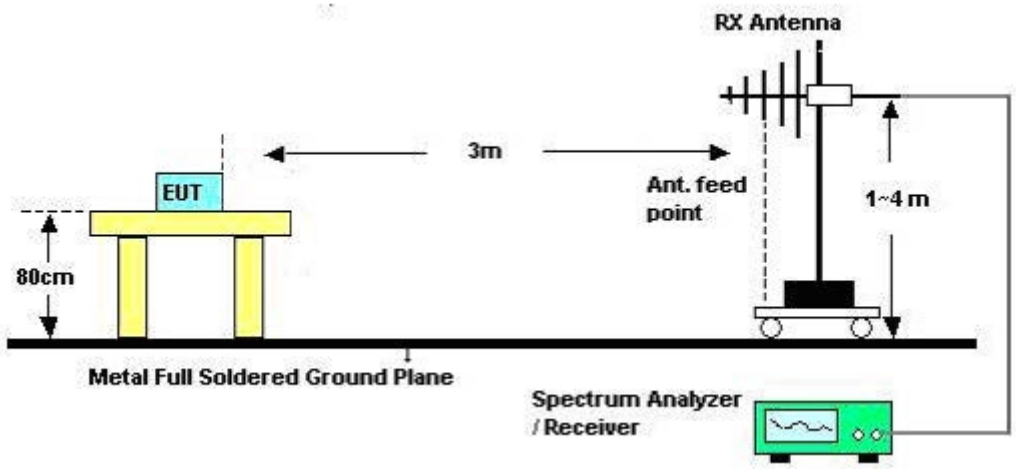
4.5.4. Test Setup Layout

For Radiated measurement:

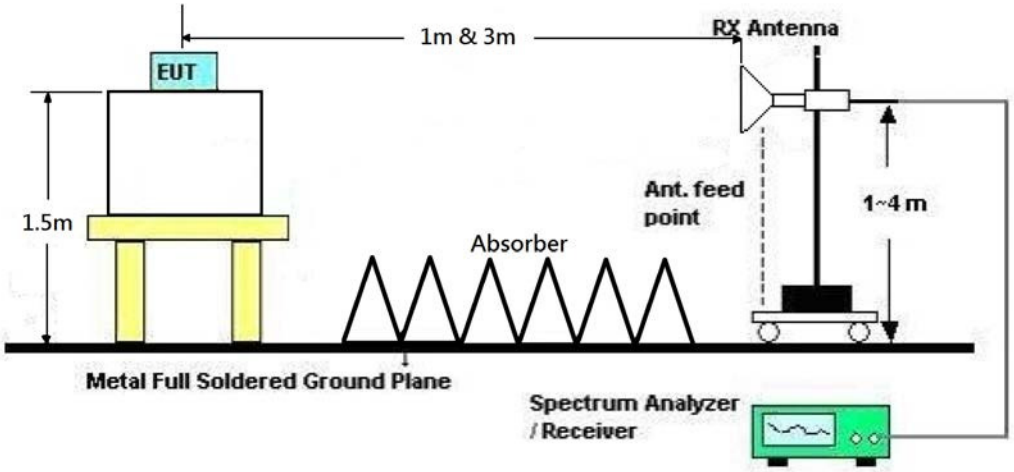
For 9kHz ~30MHz:



For 30MHz~1GHz:

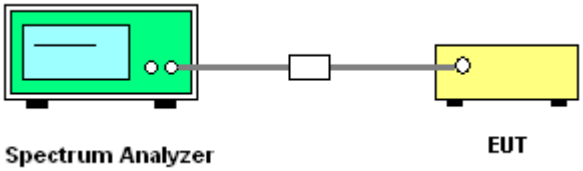


For Above 1GHz:



For Conducted measurement:

For Above 1GHz only:



4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Temperature	24.3°C	Humidity	45%
Test Engineer	Andy Tsai	Configurations	CTX
Test Date	Dec. 31, 2015		

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

Note:

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

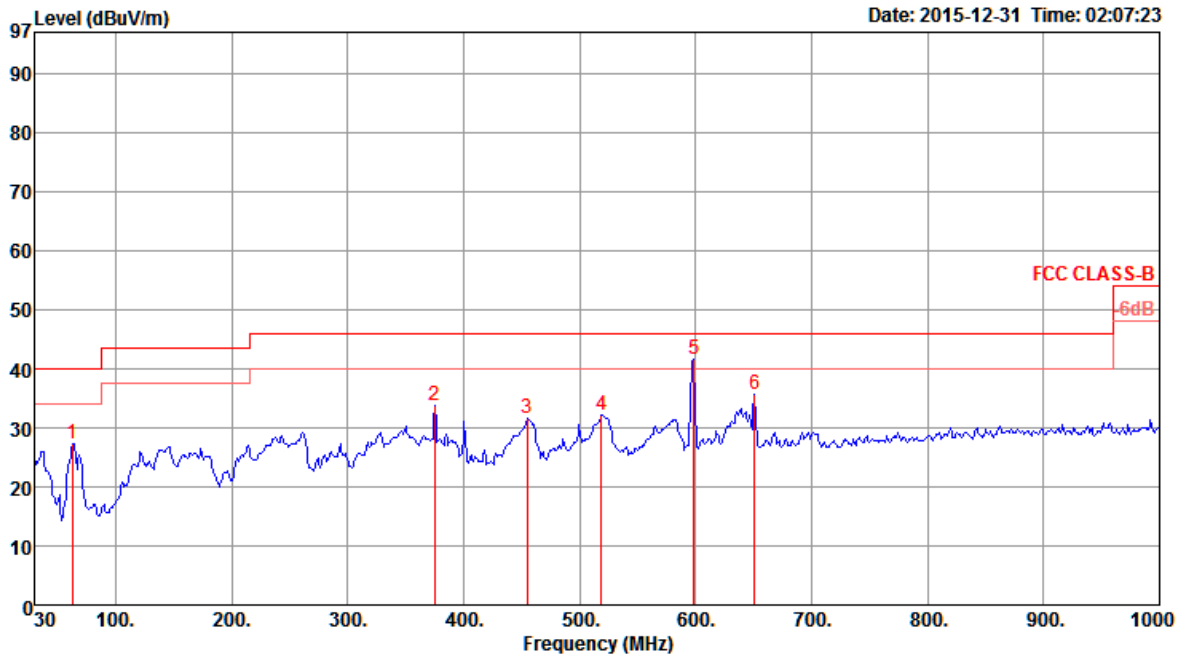
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

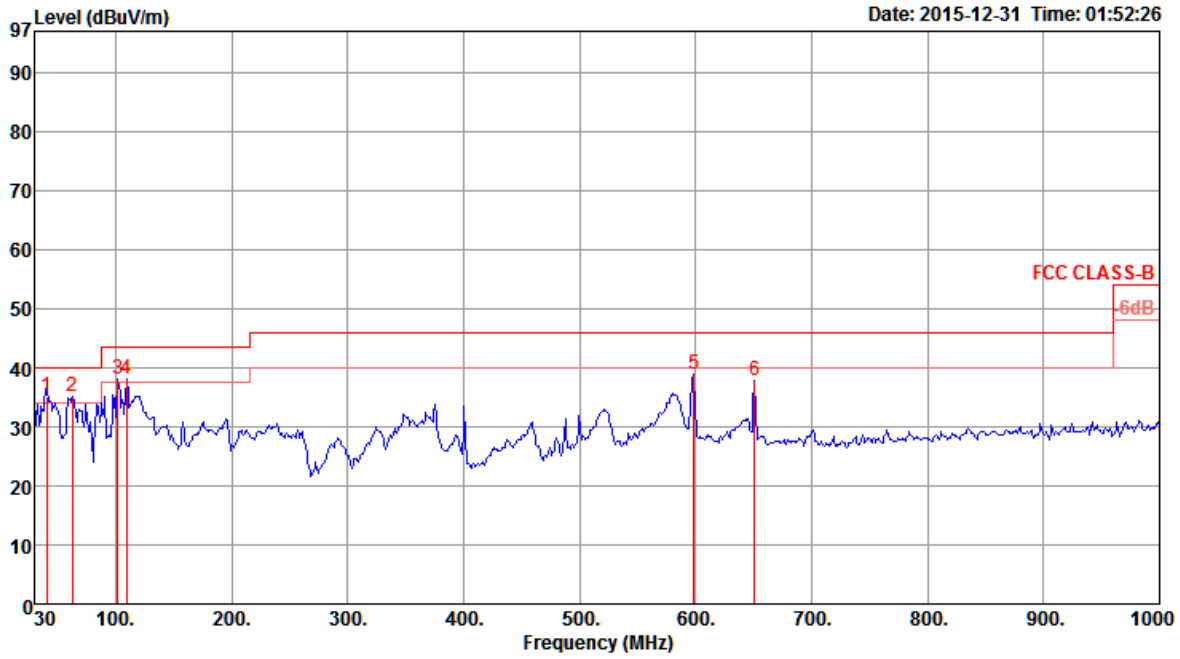
Temperature	24.3°C	Humidity	45%
Test Engineer	Andy Tsai	Configurations	CTX

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	62.98	27.41	40.00	-12.59	44.08	0.46	12.27	29.40	360	100	Peak	HORIZONTAL
2	375.32	33.88	46.00	-12.12	39.30	1.73	21.74	28.89	360	100	Peak	HORIZONTAL
3	454.86	31.51	46.00	-14.49	35.64	1.93	23.18	29.24	360	100	Peak	HORIZONTAL
4	518.88	32.13	46.00	-13.87	35.22	2.09	24.17	29.35	360	100	Peak	HORIZONTAL
5	598.42	41.65	46.00	-4.35	43.55	2.28	25.00	29.18	360	100	Peak	HORIZONTAL
6	650.80	35.79	46.00	-10.21	36.99	2.43	25.41	29.04	360	100	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	40.67	35.07	40.00	-4.93	45.16	0.29	19.09	29.47	0	100	QP	VERTICAL
2	62.98	35.18	40.00	-4.82	51.85	0.46	12.27	29.40	0	400	Peak	VERTICAL
3	101.78	38.00	43.50	-5.50	49.46	0.70	17.10	29.26	0	400	Peak	VERTICAL
4	109.54	38.02	43.50	-5.48	48.56	0.75	17.92	29.21	0	400	Peak	VERTICAL
5	598.42	38.92	46.00	-7.08	40.82	2.28	25.00	29.18	0	400	Peak	VERTICAL
6	650.80	37.85	46.00	-8.15	39.05	2.43	25.41	29.04	0	400	Peak	VERTICAL

Note:

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

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

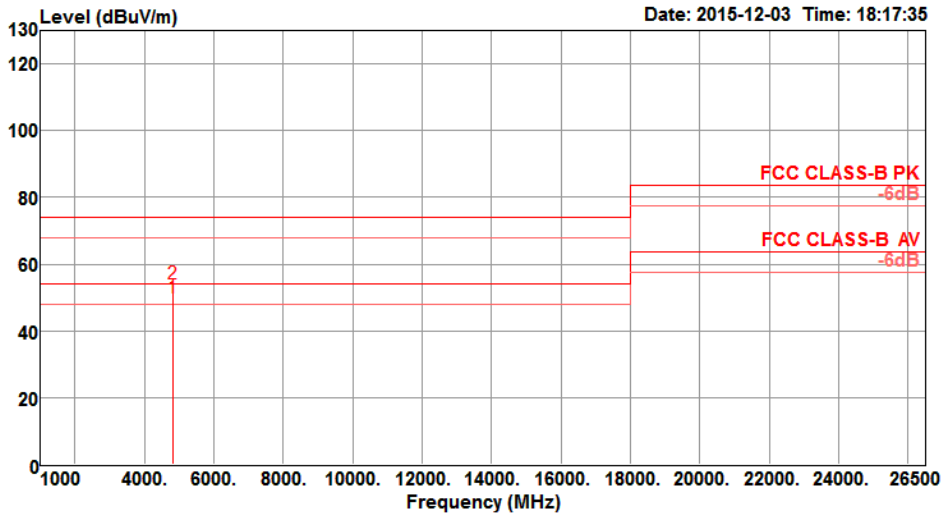
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

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

For Radiated measurement: EUT (without antenna) with 50Ω load

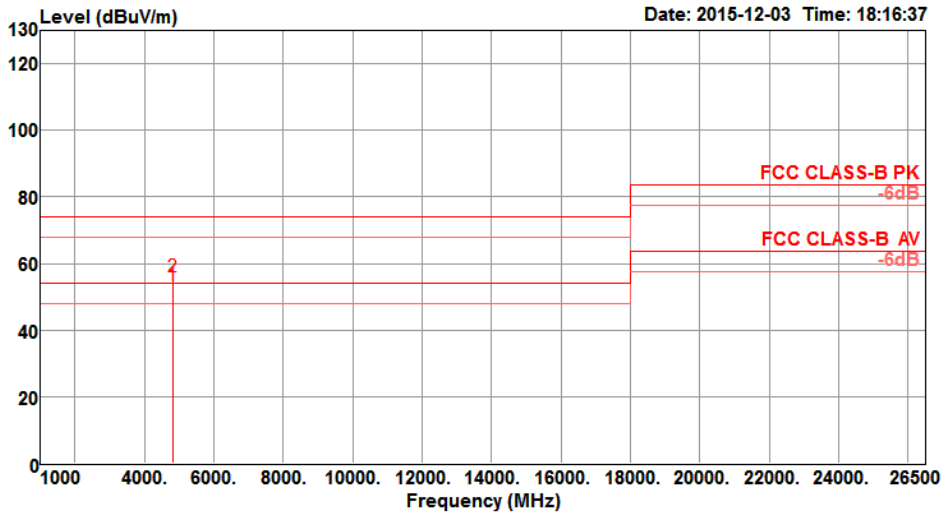
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11b CH 1 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4824.06	49.97	54.00	-4.03	45.28	6.29	33.41	35.01	Average	255	156	HORIZONTAL
2	4824.10	54.08	74.00	-19.92	49.39	6.29	33.41	35.01	Peak	255	156	HORIZONTAL

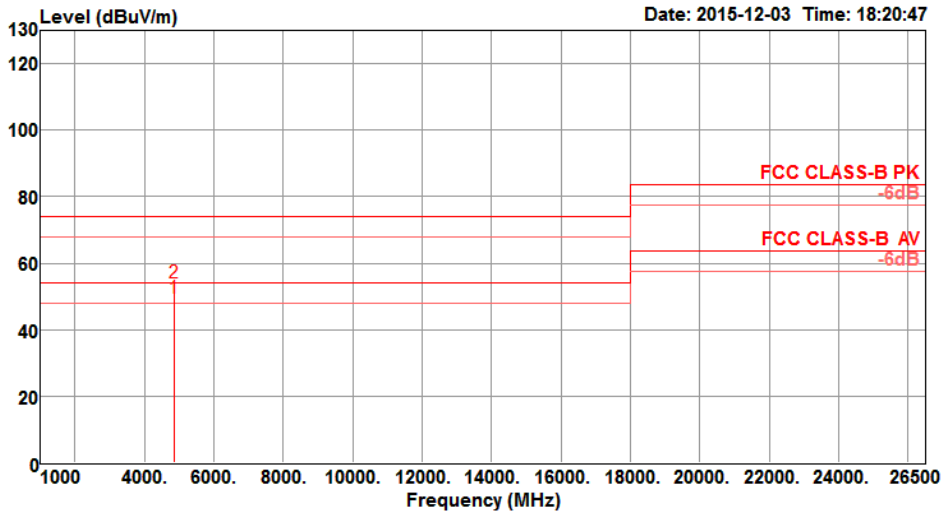
Vertical



	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	4824.02	53.41	54.00	-0.59	48.72	6.29	33.41	35.01	Average	235	131	VERTICAL
2	4824.09	56.15	74.00	-17.85	51.46	6.29	33.41	35.01	Peak	235	131	VERTICAL

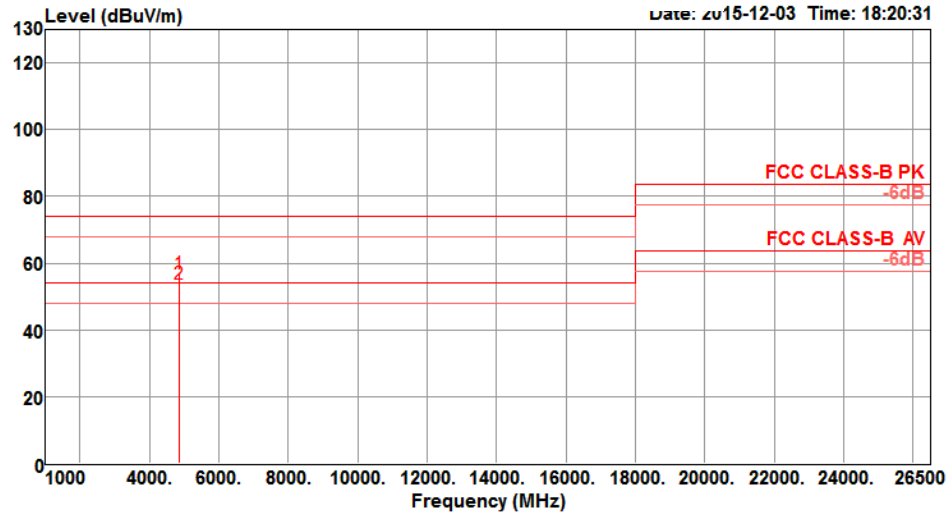
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11b CH 6 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4874.04	49.65	54.00	-4.35	44.78	6.35	33.53	35.01	Average	270	194	HORIZONTAL
2	4874.09	54.06	74.00	-19.94	49.19	6.35	33.53	35.01	Peak	270	194	HORIZONTAL

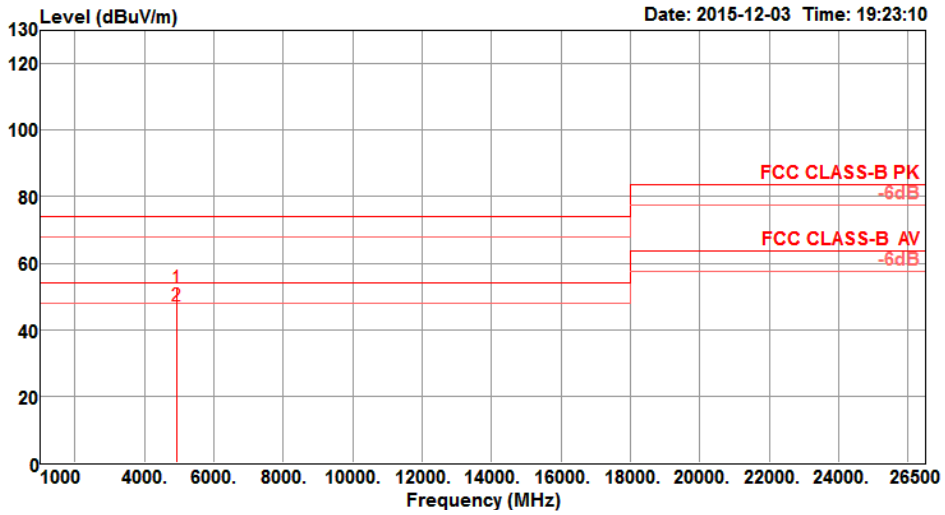
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4874.02	56.63	74.00	-17.37	51.76	6.35	33.53	35.01	Peak	219	134	VERTICAL
2	4874.03	53.65	54.00	-0.35	48.78	6.35	33.53	35.01	Average	219	134	VERTICAL

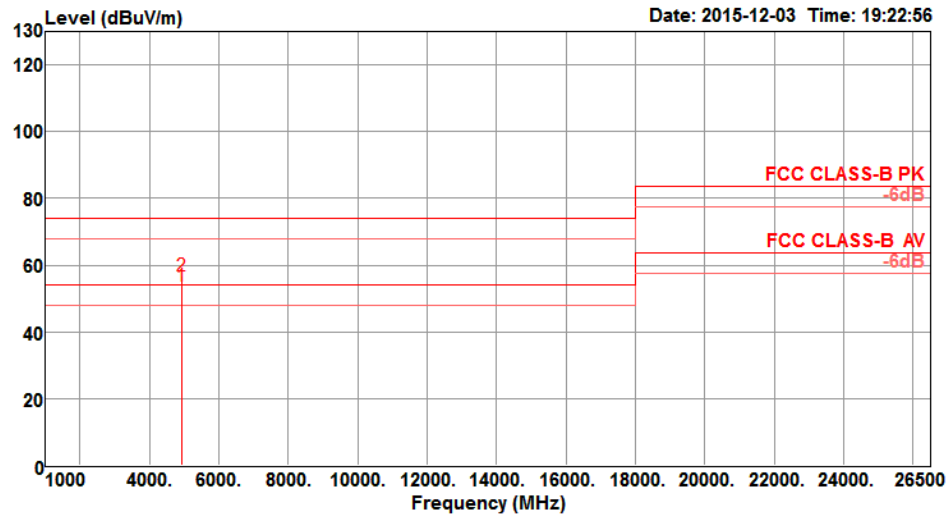
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11b CH 11 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4923.96	52.69	74.00	-21.31	47.64	6.41	33.65	35.01	Peak	264	197	HORIZONTAL
2	4924.04	47.26	54.00	-6.74	42.21	6.41	33.65	35.01	Average	264	197	HORIZONTAL

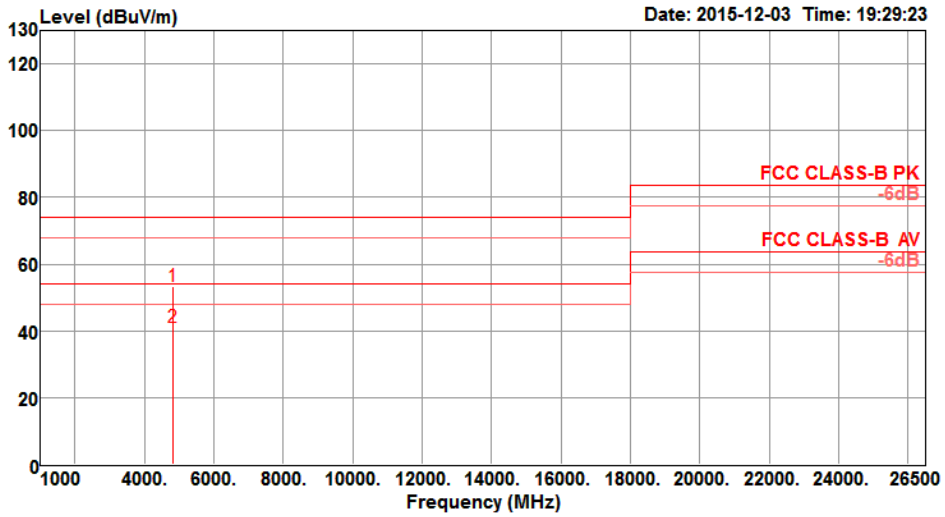
Vertical



	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	4924.03	53.77	54.00	-0.23	48.72	6.41	33.65	35.01	Average	228	137	VERTICAL
2	4924.06	56.82	74.00	-17.18	51.77	6.41	33.65	35.01	Peak	228	137	VERTICAL

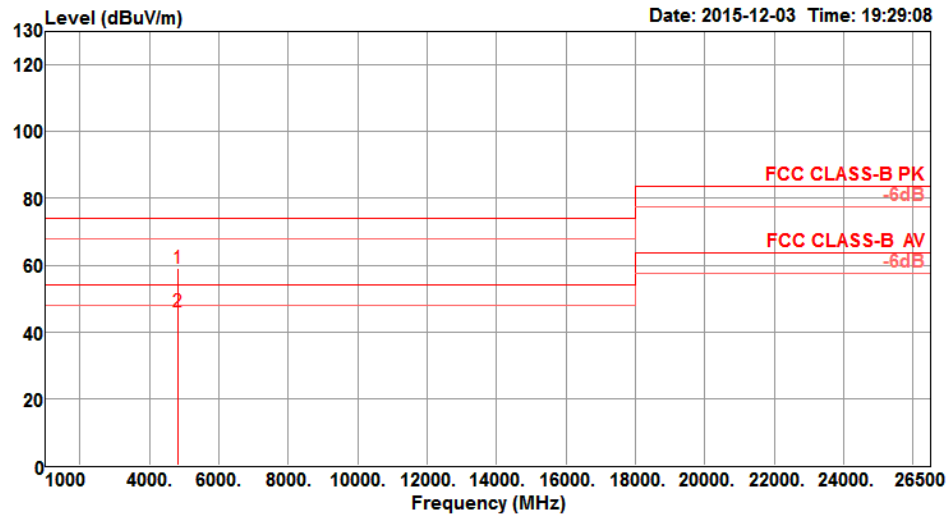
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11g CH 1 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4827.00	53.36	74.00	-20.64	48.63	6.30	33.44	35.01	Peak	251	340	HORIZONTAL
2	4831.20	41.23	54.00	-12.77	36.50	6.30	33.44	35.01	Average	251	340	HORIZONTAL

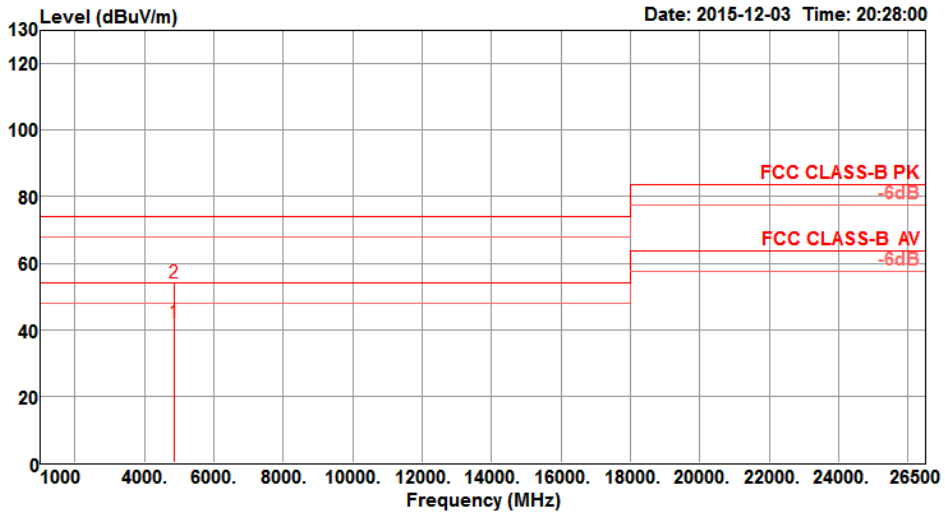
Vertical



	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	4818.96	59.01	74.00	-14.99	54.32	6.29	33.41	35.01	Peak	274	122	VERTICAL
2	4819.84	46.10	54.00	-7.90	41.41	6.29	33.41	35.01	Average	274	122	VERTICAL

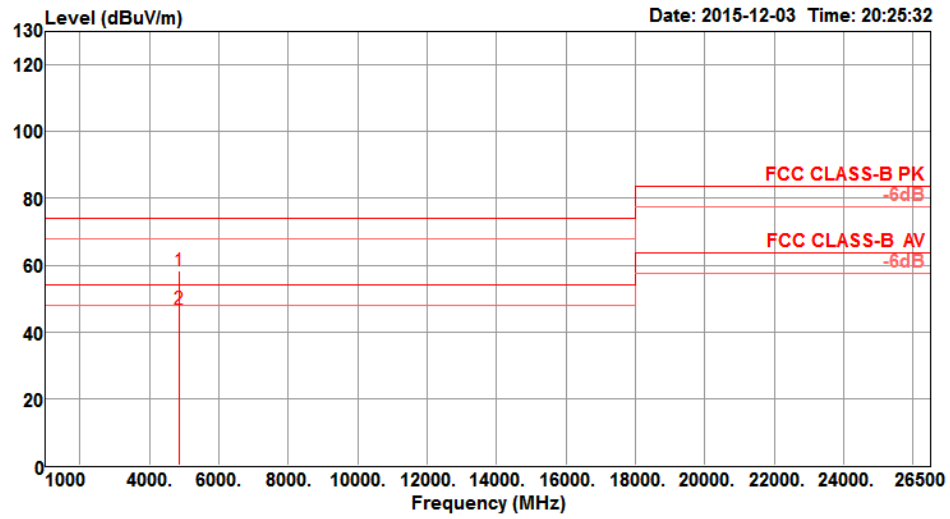
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11g CH 6 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4874.60	42.07	54.00	-11.93	37.20	6.35	33.53	35.01	Average	265	190	HORIZONTAL
2	4879.00	54.13	74.00	-19.87	49.26	6.35	33.53	35.01	Peak	265	190	HORIZONTAL

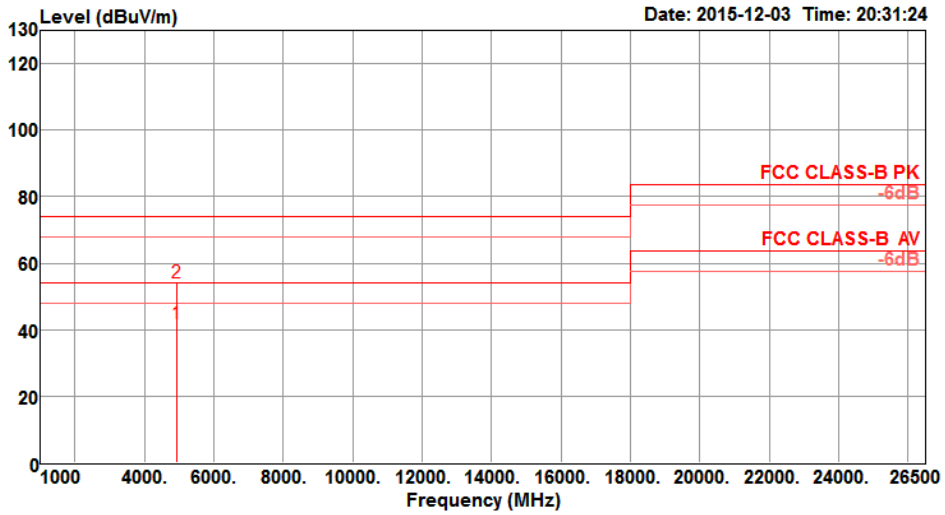
Vertical



	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	4873.70	58.43	74.00	-15.57	53.56	6.35	33.53	35.01	Peak	241	116	VERTICAL
2	4873.80	46.87	54.00	-7.13	42.00	6.35	33.53	35.01	Average	241	116	VERTICAL

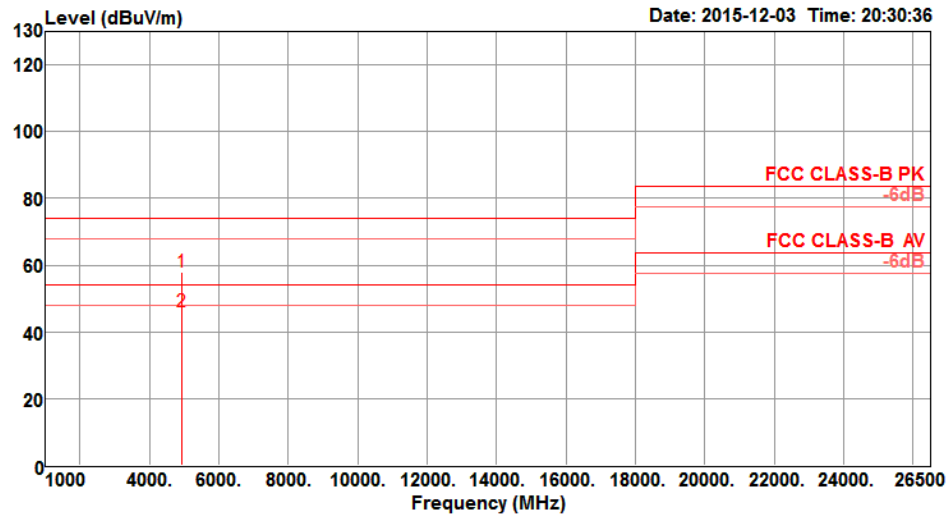
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11g CH 11 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4923.50	41.88	54.00	-12.12	36.87	6.40	33.62	35.01	Average	265	200	HORIZONTAL
2	4928.80	53.95	74.00	-20.05	48.90	6.41	33.65	35.01	Peak	265	200	HORIZONTAL

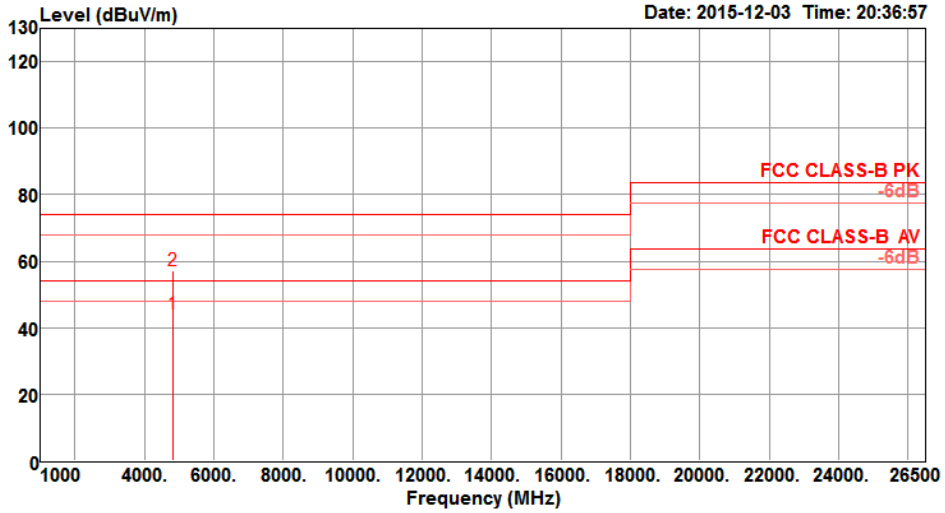
Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4917.90	58.08	74.00	-15.92	53.07	6.40	33.62	35.01	Peak	263	114	VERTICAL
2	4922.80	45.95	54.00	-8.05	40.94	6.40	33.62	35.01	Average	263	114	VERTICAL

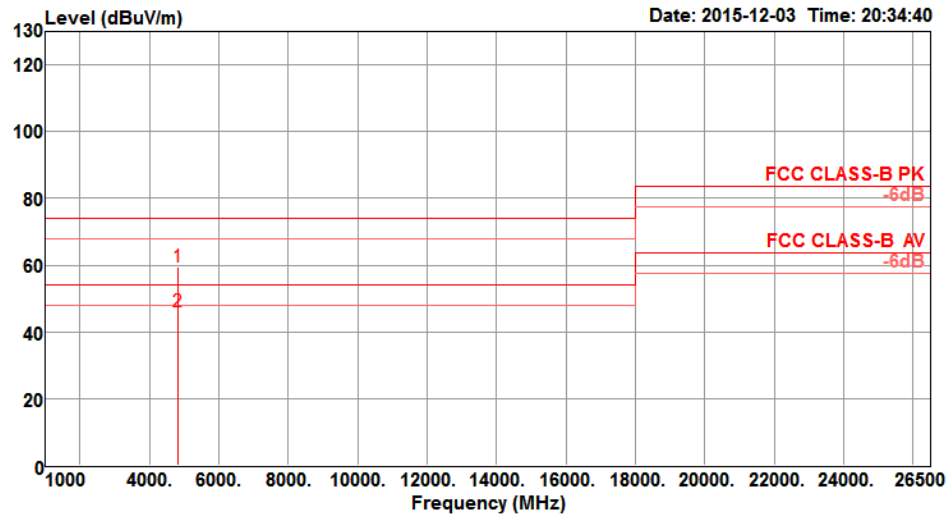
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11n MCS0 HT20 CH 1 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4824.90	44.05	54.00	-9.95	39.36	6.29	33.41	35.01	Average	285	153	HORIZONTAL
2	4826.40	57.32	74.00	-16.68	52.59	6.30	33.44	35.01	Peak	285	153	HORIZONTAL

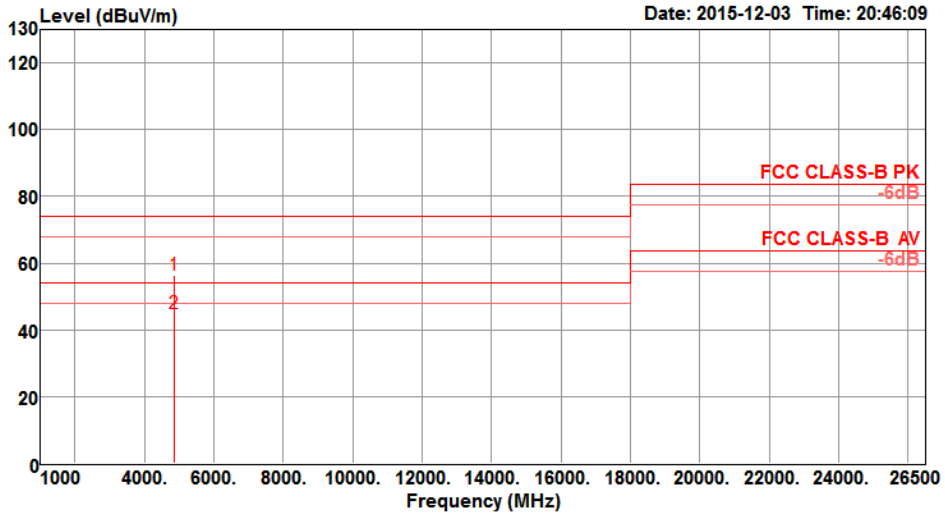
Vertical



	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	4824.60	59.45	74.00	-14.55	54.76	6.29	33.41	35.01	Peak	257	124	VERTICAL
2	4824.80	45.97	54.00	-8.03	41.28	6.29	33.41	35.01	Average	257	124	VERTICAL

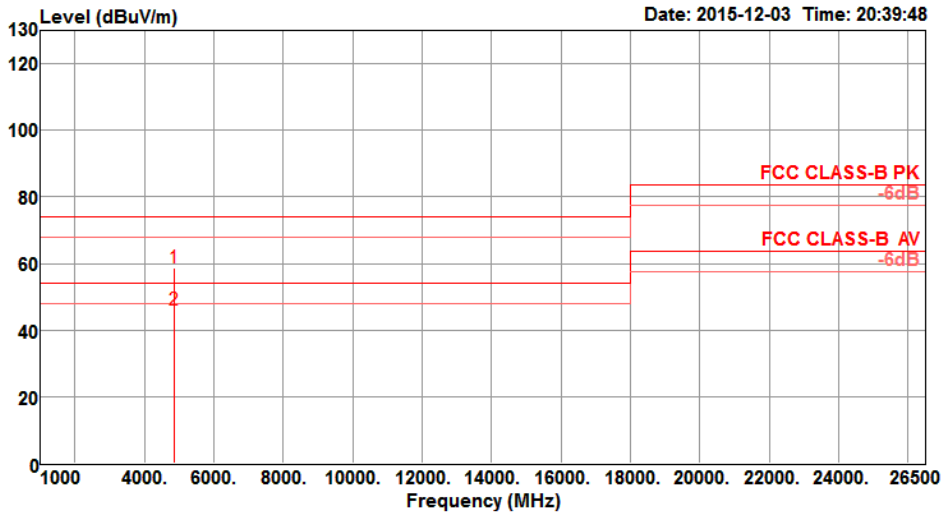
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11n MCS0 HT20 CH 6 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4849.30	56.45	74.00	-17.55	51.67	6.32	33.47	35.01	Peak	285	160	HORIZONTAL
2	4871.40	44.93	54.00	-9.07	40.06	6.35	33.53	35.01	Average	285	160	HORIZONTAL

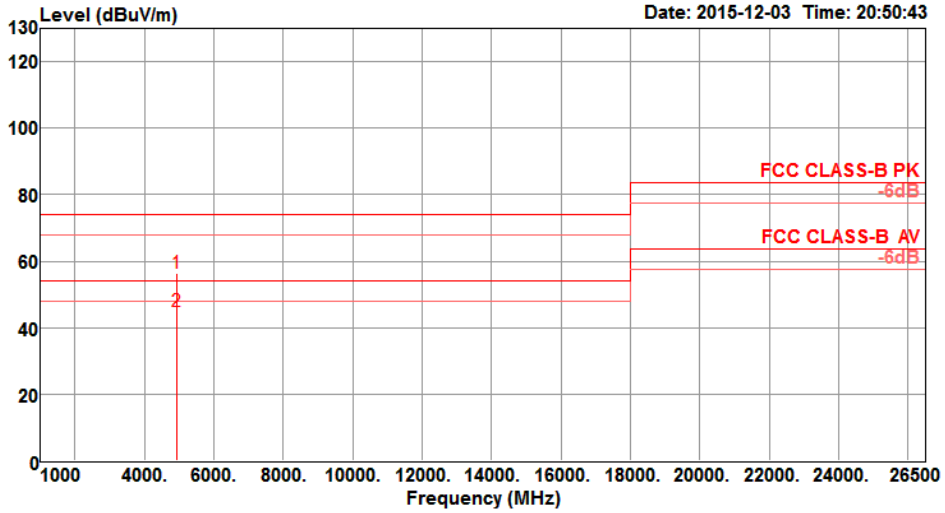
Vertical



	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	4872.30	58.62	74.00	-15.38	53.75	6.35	33.53	35.01	Peak	241	116	VERTICAL
2	4873.10	46.04	54.00	-7.96	41.17	6.35	33.53	35.01	Average	241	116	VERTICAL

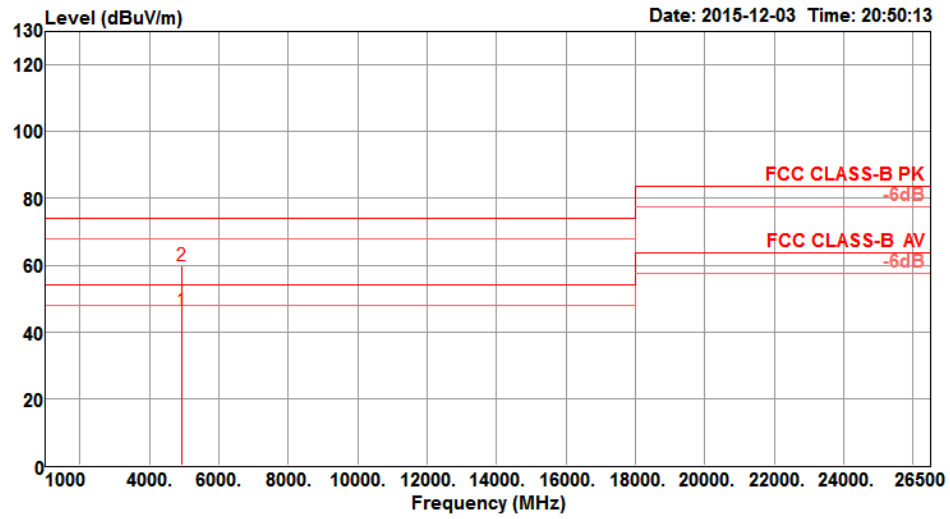
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11n MCS0 HT20 CH 11 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4924.90	56.29	74.00	-17.71	51.24	6.41	33.65	35.01	Peak	285	258	HORIZONTAL
2	4927.40	44.92	54.00	-9.08	39.87	6.41	33.65	35.01	Average	285	258	HORIZONTAL

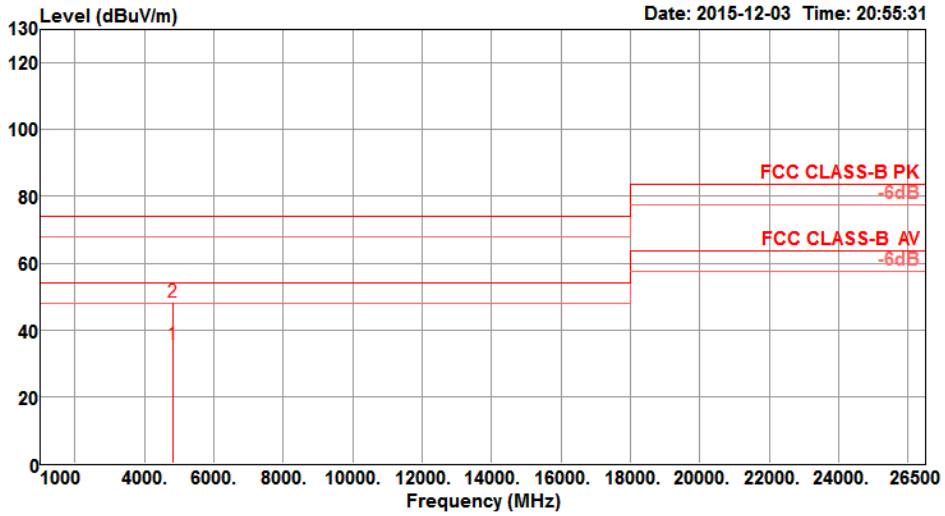
Vertical



	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	4926.10	46.45	54.00	-7.55	41.40	6.41	33.65	35.01	Average	245	121	VERTICAL
2	4926.30	59.93	74.00	-14.07	54.88	6.41	33.65	35.01	Peak	245	121	VERTICAL

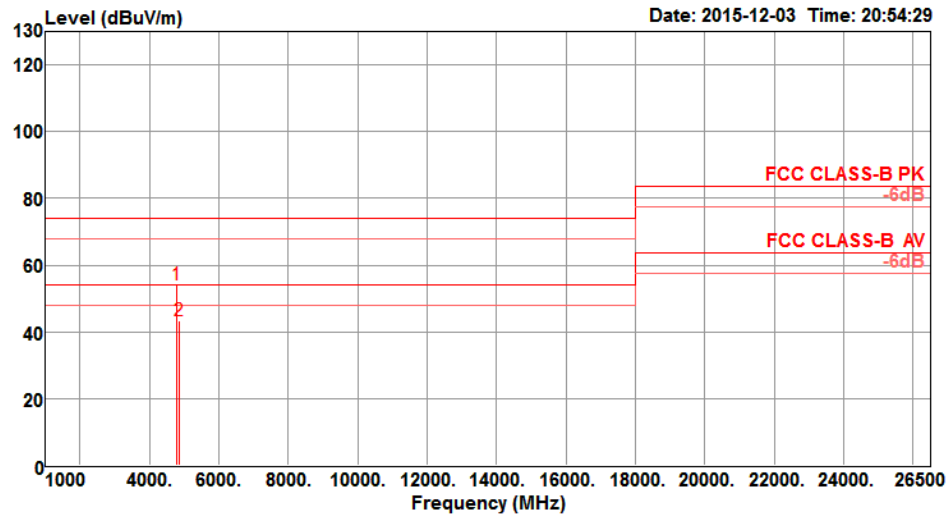
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11n MCS0 HT40 CH 3 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4823.70	35.65	54.00	-18.35	30.96	6.29	33.41	35.01	Average	277	213	HORIZONTAL
2	4827.40	48.38	74.00	-25.62	43.65	6.30	33.44	35.01	Peak	277	213	HORIZONTAL

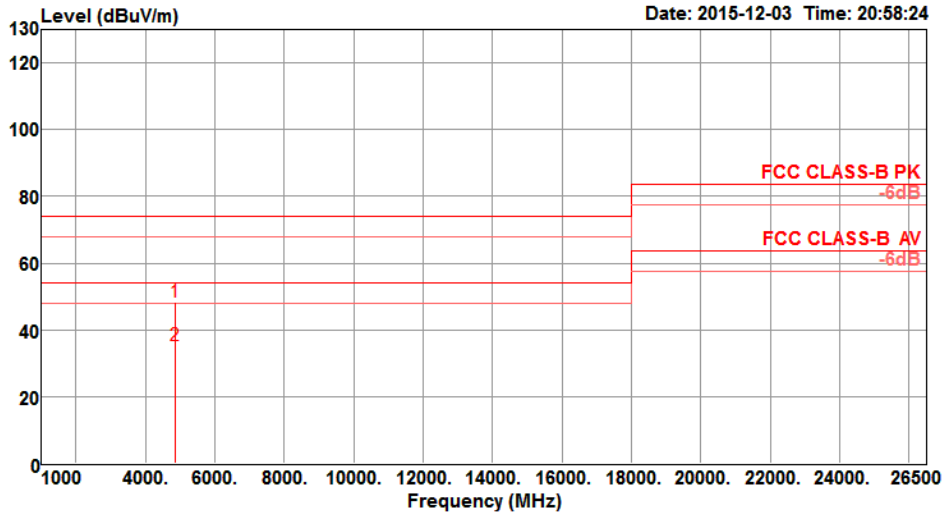
Vertical



	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	4796.40	54.01	74.00	-19.99	49.40	6.27	33.35	35.01	Peak	257	116	VERTICAL
2	4844.40	43.49	54.00	-10.51	38.71	6.32	33.47	35.01	Average	257	116	VERTICAL

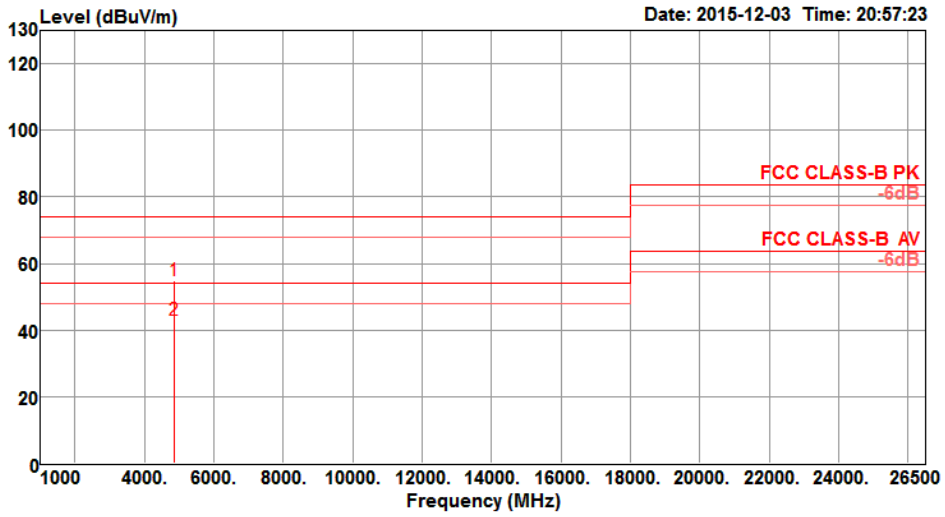
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11n MCS0 HT40 CH 6 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4869.80	48.32	74.00	-25.68	43.45	6.35	33.53	35.01	Peak	252	250	HORIZONTAL
2	4875.20	35.39	54.00	-18.61	30.52	6.35	33.53	35.01	Average	252	250	HORIZONTAL

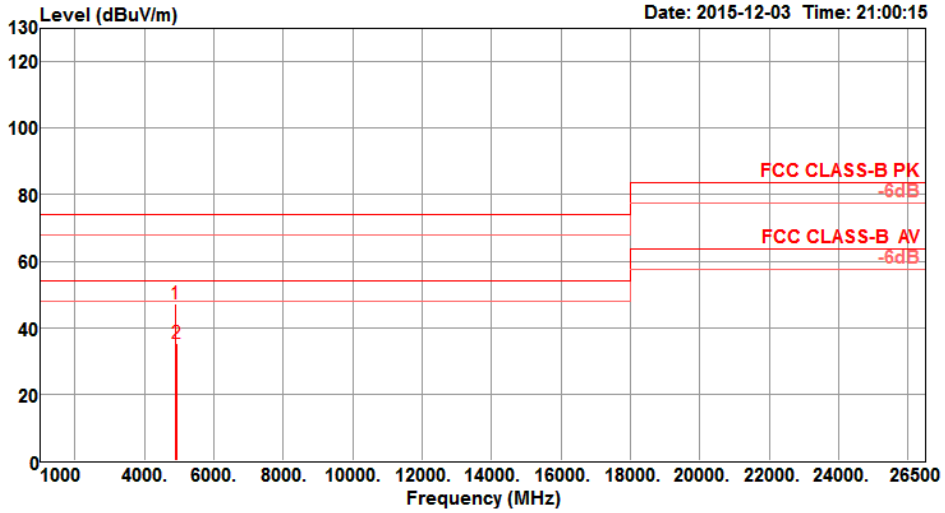
Vertical



	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	4870.30	54.71	74.00	-19.29	49.84	6.35	33.53	35.01	Peak	250	284	VERTICAL
2	4874.30	43.06	54.00	-10.94	38.19	6.35	33.53	35.01	Average	250	284	VERTICAL

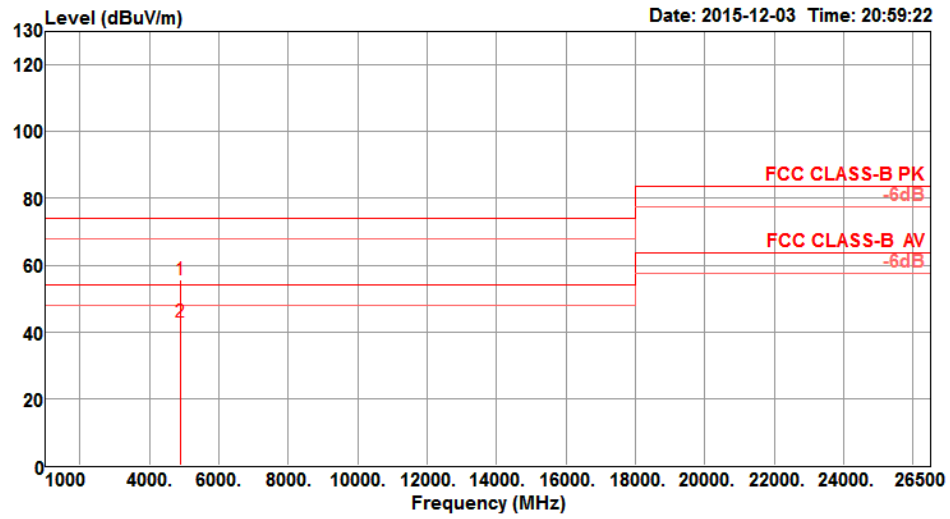
Temperature	24.3℃	Humidity	45%
Test Engineer	Andy Tsai	Configurations	IEEE 802.11n MCS0 HT40 CH 9 / Chain 1+Chain 2
Test Date	Dec. 03, 2015		

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	4886.24	47.19	74.00	-26.81	42.28	6.36	33.56	35.01	Peak	273	311	HORIZONTAL
2	4918.56	35.29	54.00	-18.71	30.28	6.40	33.62	35.01	Average	273	311	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	Remark	A/Pos	T/Pos	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB		cm	deg	
1	4899.28	55.54	74.00	-18.46	50.58	6.38	33.59	35.01	Peak	251	221	VERTICAL
2	4902.00	43.13	54.00	-10.87	38.17	6.38	33.59	35.01	Average	251	221	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.

For Conducted measurement:

Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

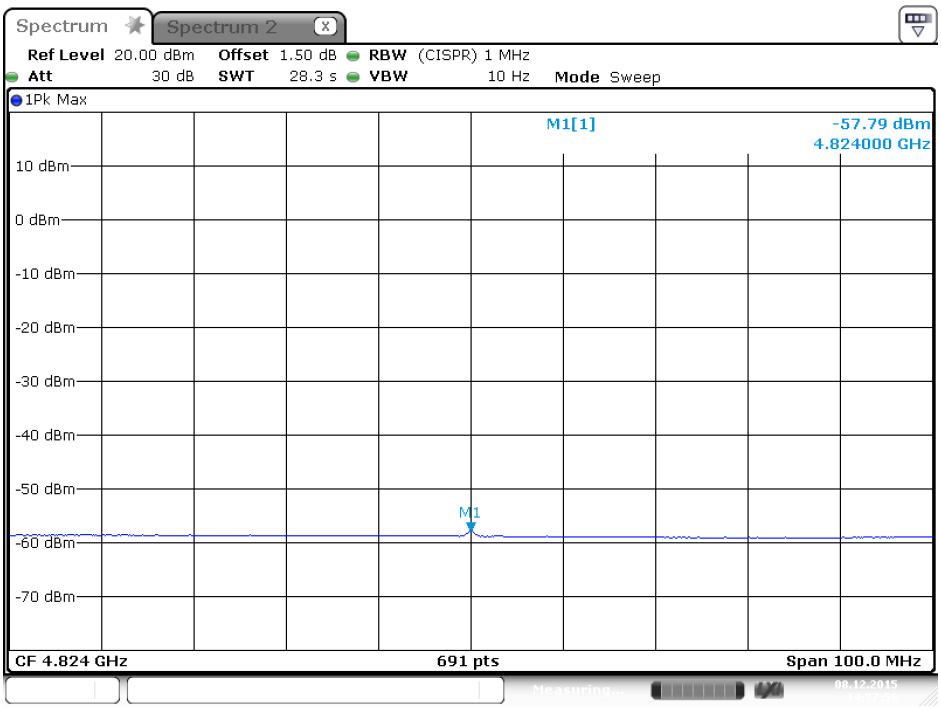
Average

Mode	Frequency	Antenna Gain (dBi)	Spurious Level (dBm)			Limit (dBm)	Margin (dB)
			Chain 1	Chain 2	Total		
802.11b	2412 MHz	4.32	-57.79	-53.48	-47.79	-41.20	6.59
	2437 MHz	4.32	-50.22	-48.72	-42.08	-41.20	0.88
	2462 MHz	4.32	-53.84	-53.45	-46.31	-41.20	5.11
802.11g	2412 MHz	4.32	-57.90	-57.80	-50.52	-41.20	9.32
	2437 MHz	4.32	-56.67	-57.16	-49.58	-41.20	8.38
	2462 MHz	4.32	-57.64	-57.59	-50.28	-41.20	9.08
802.11n MCS0 HT20	2412 MHz	4.32	-57.76	-57.75	-50.42	-41.20	9.22
	2437 MHz	4.32	-57.16	-57.18	-49.84	-41.20	8.64
	2462 MHz	4.32	-57.55	-57.62	-50.25	-41.20	9.05
802.11n MCS0 HT40	2422 MHz	4.32	-57.37	-57.68	-50.19	-41.20	8.99
	2437 MHz	4.32	-57.46	-57.55	-50.17	-41.20	8.97
	2452 MHz	4.32	-57.52	-57.39	-50.12	-41.20	8.92

Peak

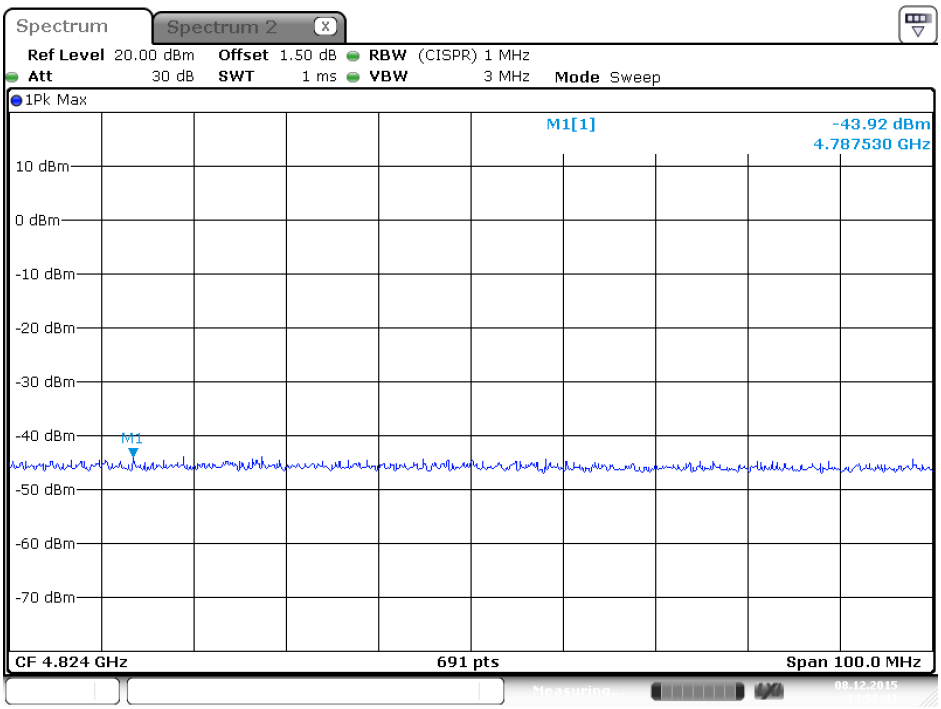
Mode	Frequency	Antenna Gain (dBi)	Spurious Level (dBm)			Limit (dBm)	Margin (dB)
			Chain 1	Chain 2	Total		
802.11b	2412 MHz	4.32	-43.92	-43.47	-36.36	-21.20	15.16
	2437 MHz	4.32	-41.53	-41.32	-34.09	-21.20	12.89
	2462 MHz	4.32	-43.20	-42.54	-35.53	-21.20	14.33
802.11g	2412 MHz	4.32	-43.59	-43.47	-36.20	-21.20	15.00
	2437 MHz	4.32	-43.21	-43.27	-35.91	-21.20	14.71
	2462 MHz	4.32	-42.92	-43.95	-36.07	-21.20	14.87
802.11n MCS0 HT20	2412 MHz	4.32	-43.55	-43.87	-36.38	-21.20	15.18
	2437 MHz	4.32	-43.51	-43.47	-36.16	-21.20	14.96
	2462 MHz	4.32	-43.30	-43.55	-36.09	-21.20	14.89
802.11n MCS0 HT40	2422 MHz	4.32	-42.53	-43.70	-35.75	-21.20	14.55
	2437 MHz	4.32	-43.38	-43.71	-36.21	-21.20	15.01
	2452 MHz	4.32	-43.50	-43.45	-36.14	-21.20	14.94

Plot on Configuration IEEE 802.11b / 2412 MHz / Average / Chain 1



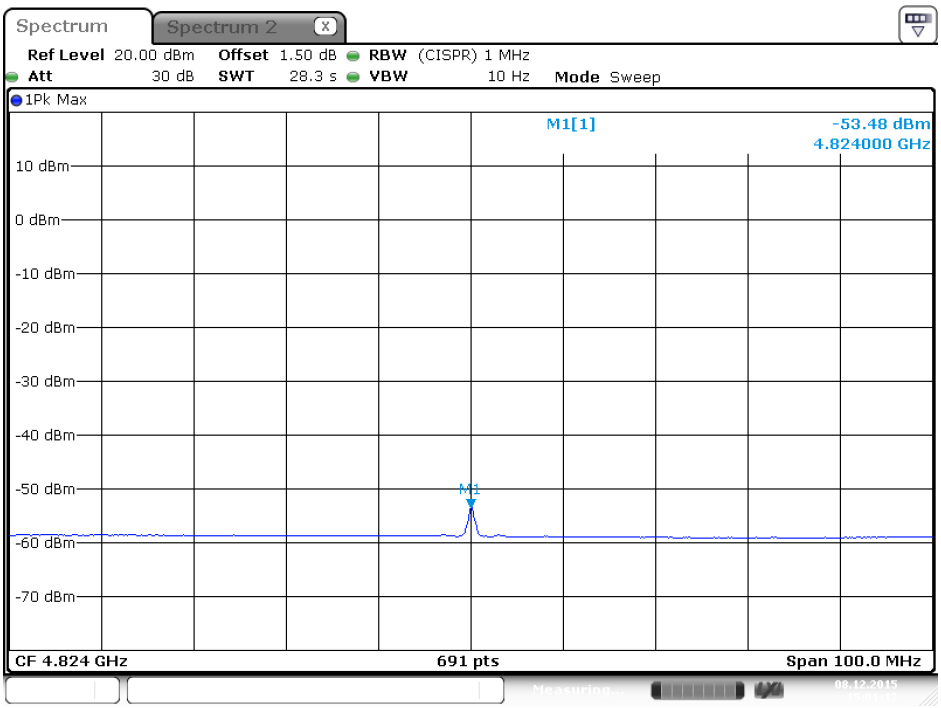
Date: 8.DEC.2015 14:57:56

Plot on Configuration IEEE 802.11b / 2412 MHz / Peak / Chain 1



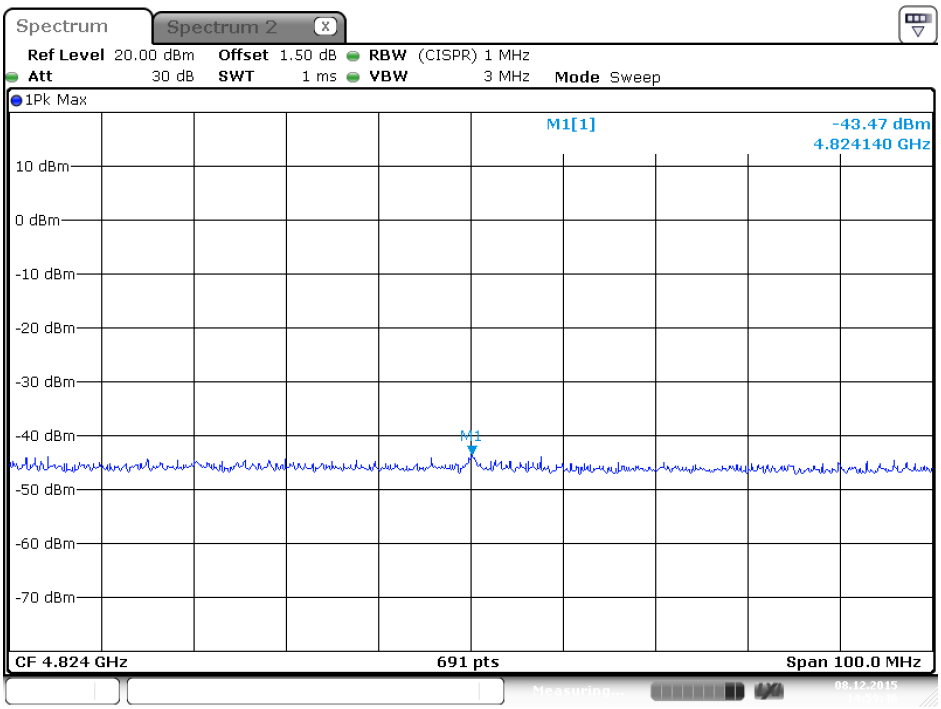
Date: 8.DEC.2015 14:58:41

Plot on Configuration IEEE 802.11b / 2412 MHz / Average / Chain 2



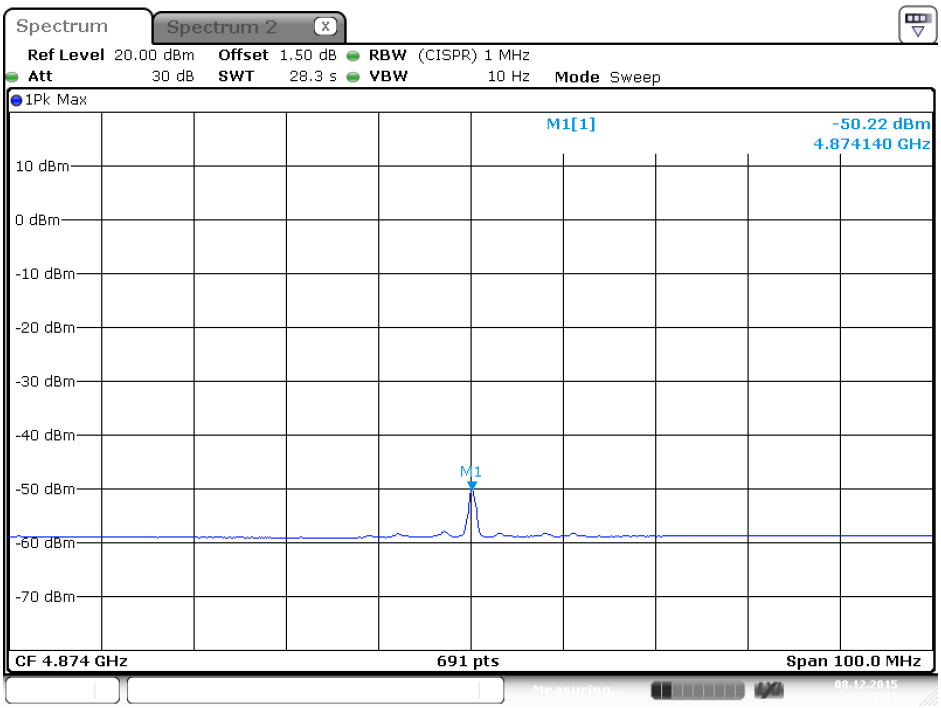
Date: 8.DEC.2015 15:01:11

Plot on Configuration IEEE 802.11b / 2412 MHz / Peak / Chain 2



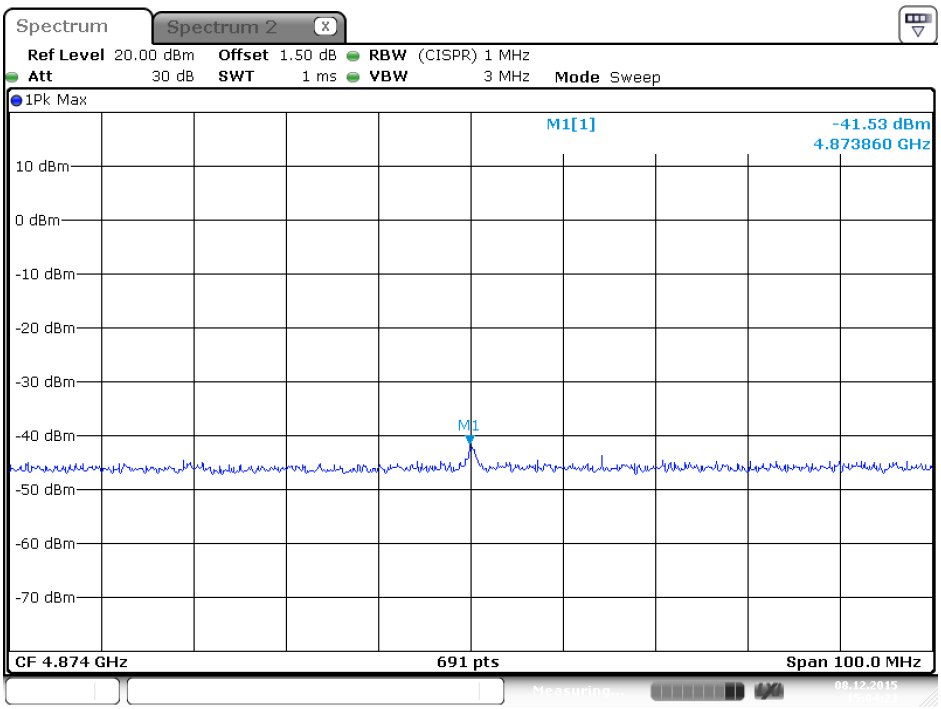
Date: 8.DEC.2015 14:59:47

Plot on Configuration IEEE 802.11b / 2437 MHz / Average / Chain 1



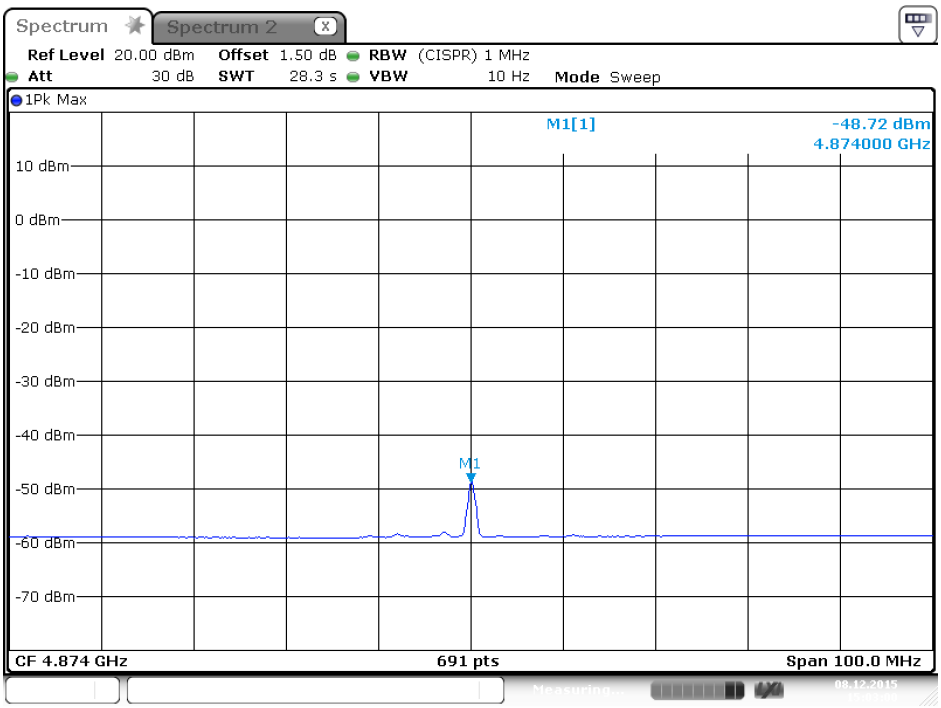
Date: 8.DEC.2015 15:05:54

Plot on Configuration IEEE 802.11b / 2437 MHz / Peak / Chain 1



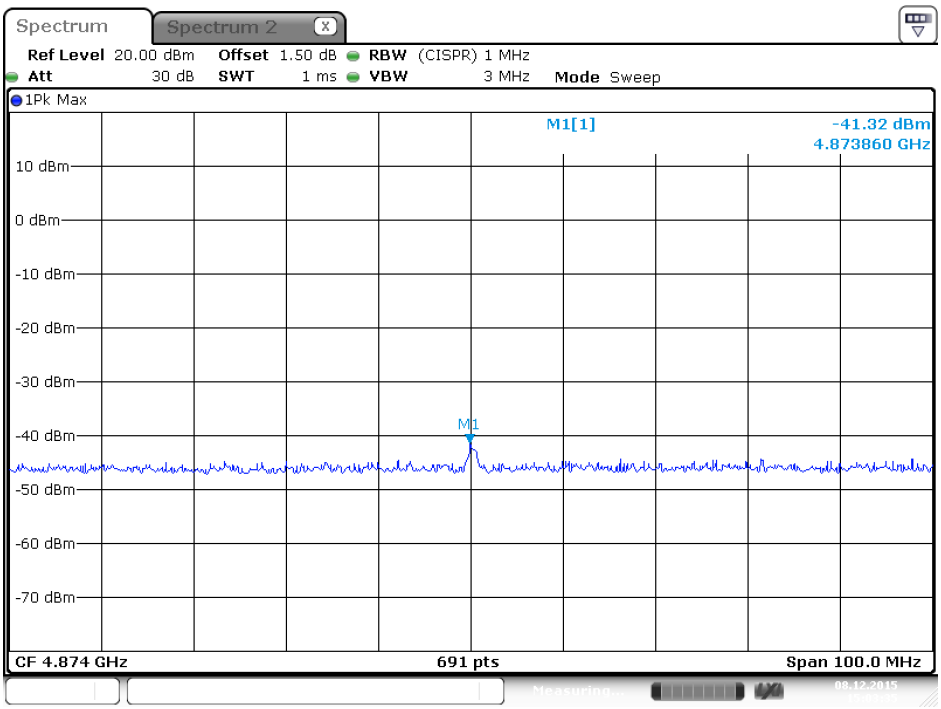
Date: 8.DEC.2015 15:04:24

Plot on Configuration IEEE 802.11b / 2437 MHz / Average / Chain 2



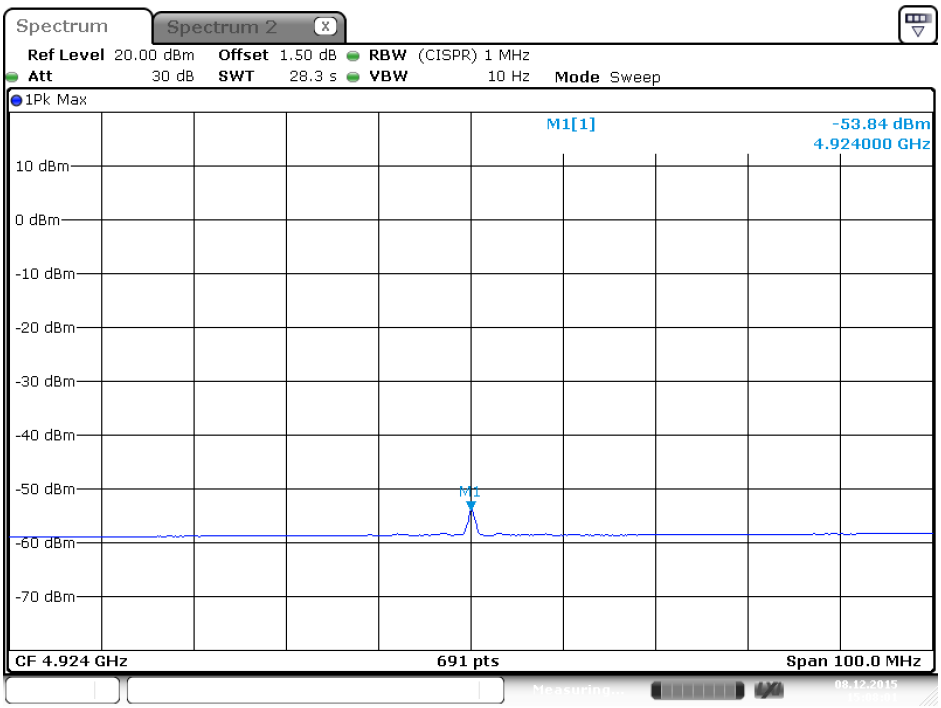
Date: 8.DEC.2015 15:03:00

Plot on Configuration IEEE 802.11b / 2437 MHz / Peak / Chain 2



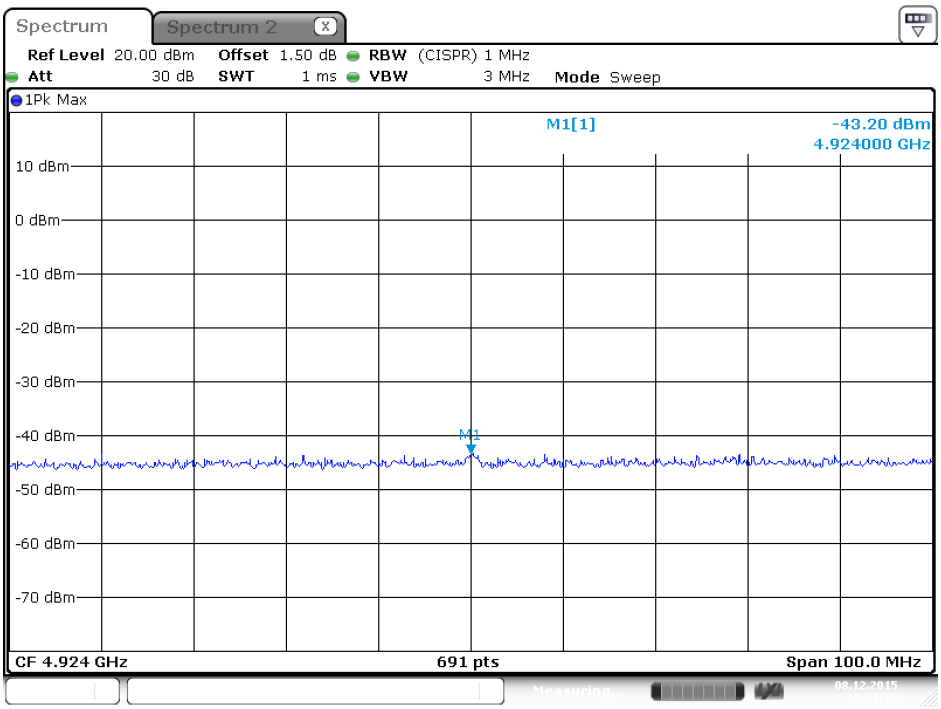
Date: 8.DEC.2015 15:03:35

Plot on Configuration IEEE 802.11b / 2462 MHz / Average / Chain 1



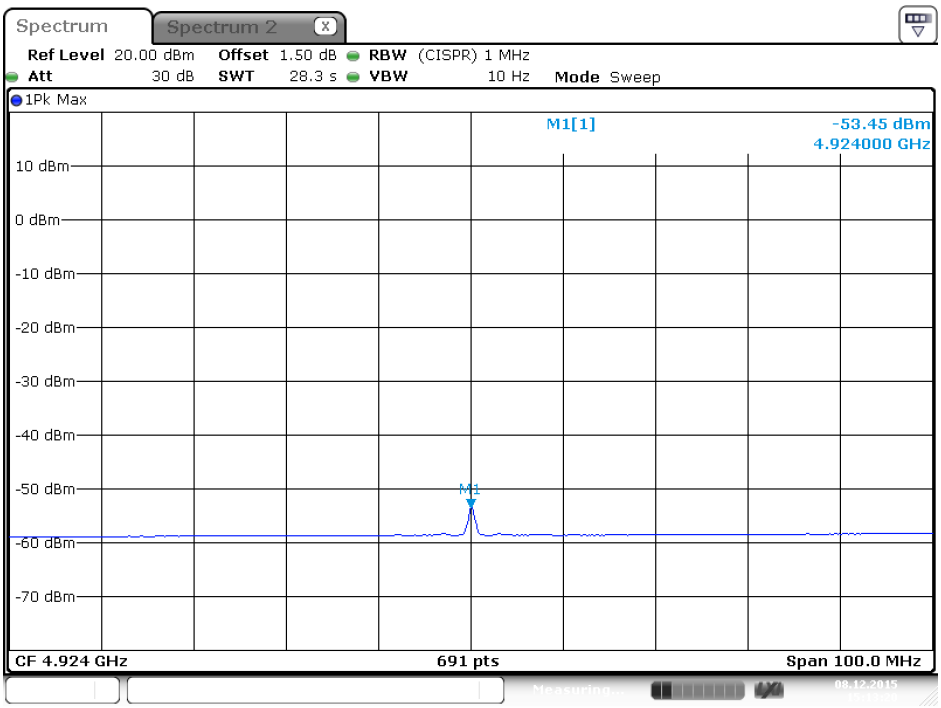
Date: 8.DEC.2015 15:08:01

Plot on Configuration IEEE 802.11b / 2462 MHz / Peak / Chain 1



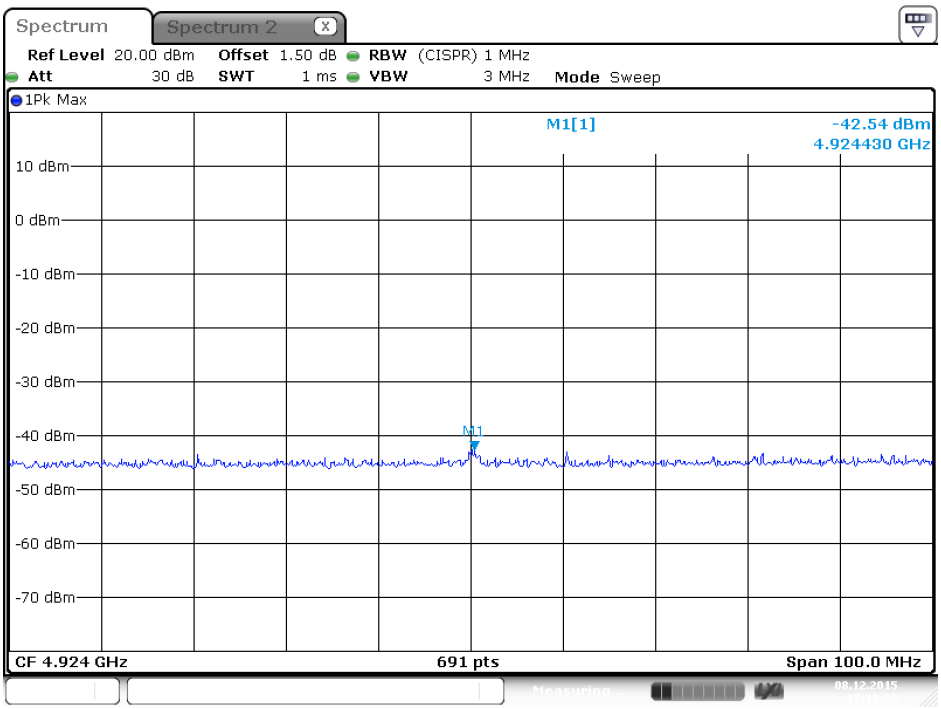
Date: 8.DEC.2015 15:09:15

Plot on Configuration IEEE 802.11b / 2462 MHz / Average / Chain 2



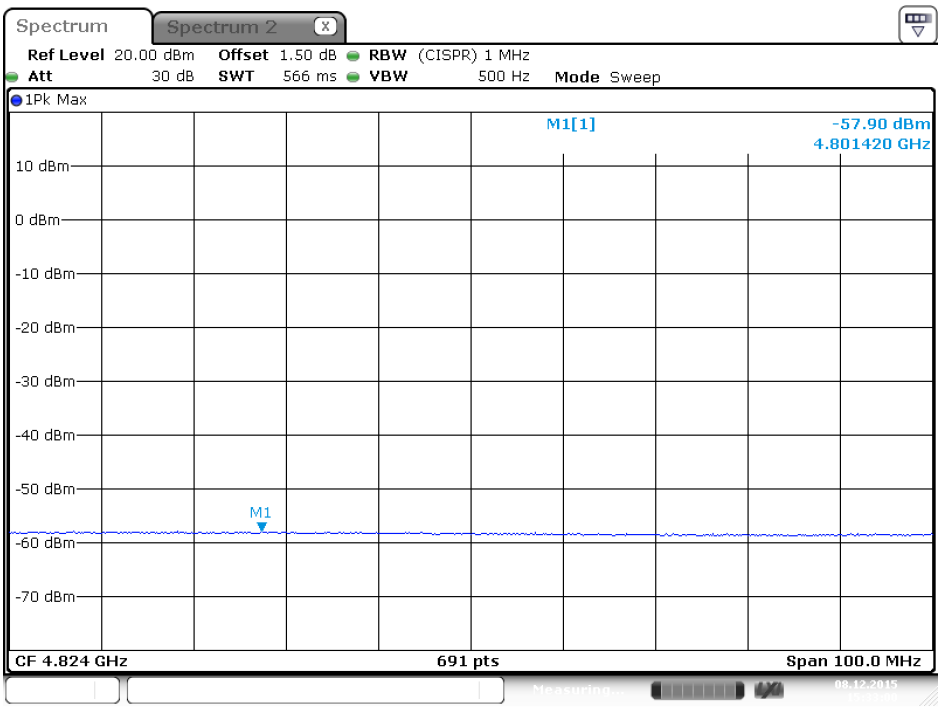
Date: 8.DEC.2015 15:13:19

Plot on Configuration IEEE 802.11b / 2462 MHz / Peak / Chain 2



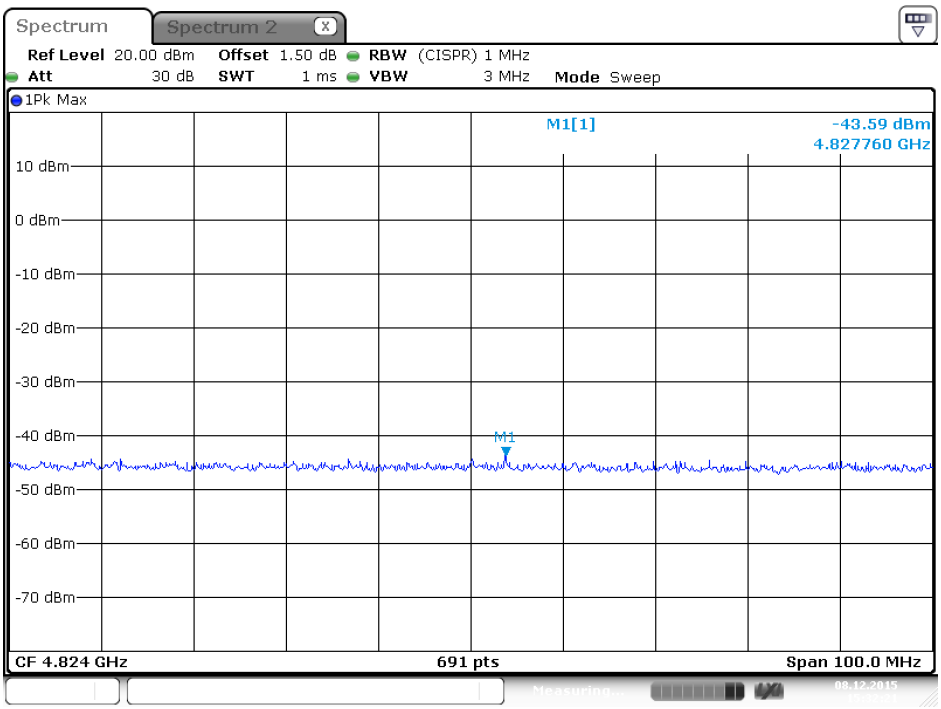
Date: 8.DEC.2015 15:10:49

Plot on Configuration IEEE 802.11g / 2412 MHz / Average / Chain 1



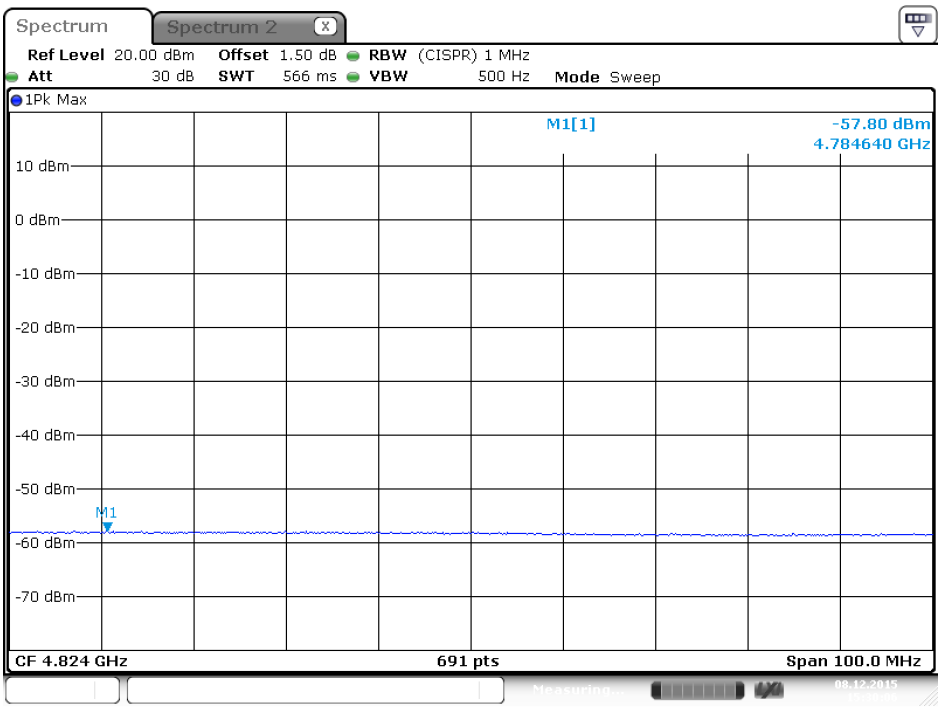
Date: 8.DEC.2015 15:33:00

Plot on Configuration IEEE 802.11g / 2412 MHz / Peak / Chain 1



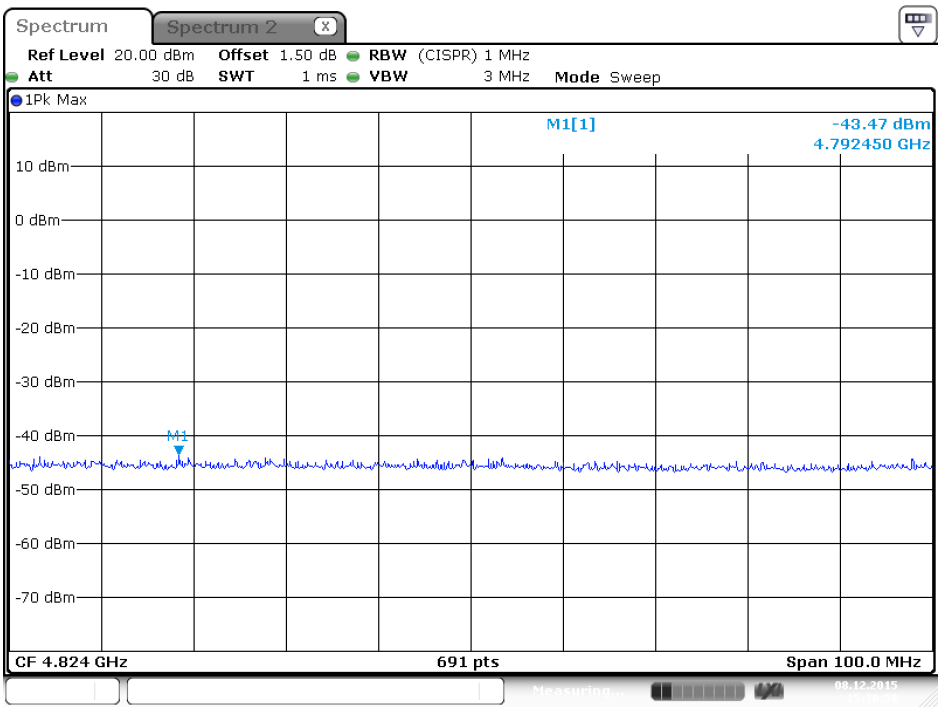
Date: 8.DEC.2015 15:32:22

Plot on Configuration IEEE 802.11g / 2412 MHz / Average / Chain 2



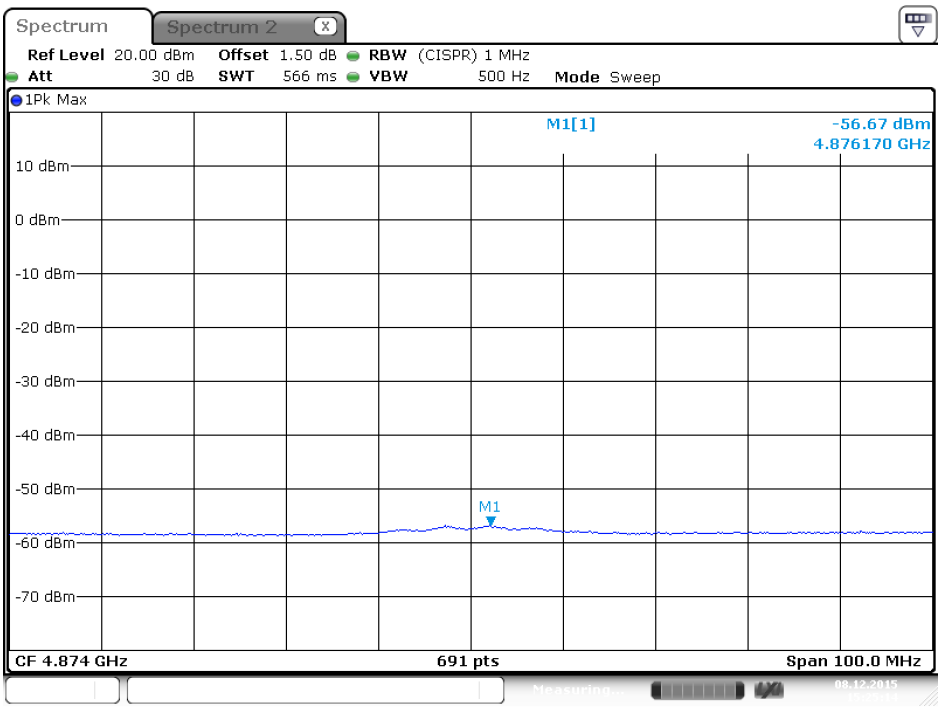
Date: 8.DEC.2015 15:30:06

Plot on Configuration IEEE 802.11g / 2412 MHz / Peak / Chain 2



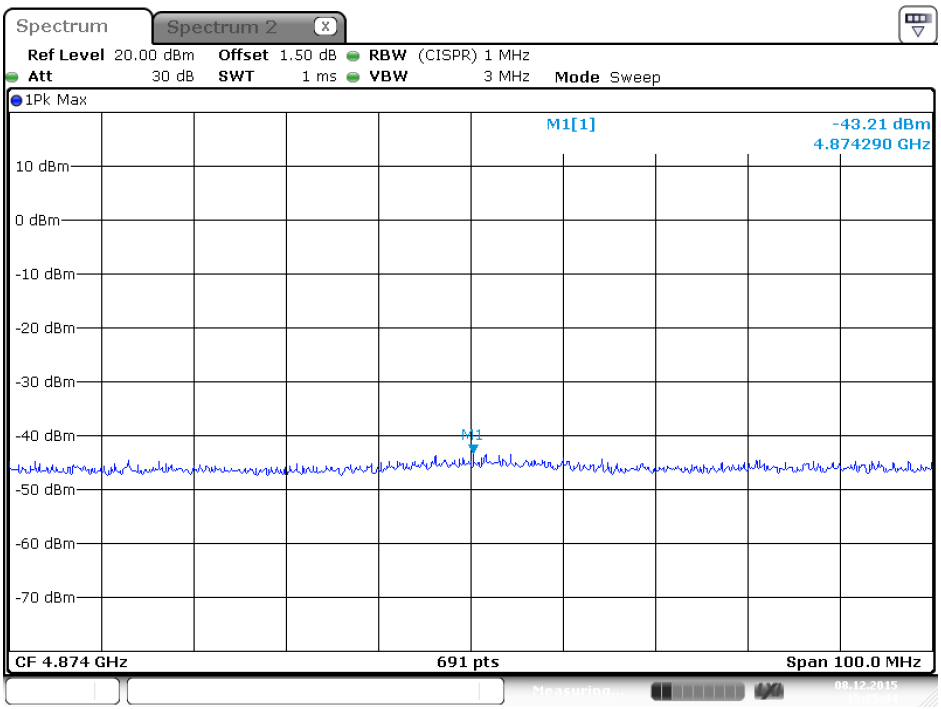
Date: 8.DEC.2015 15:30:58

Plot on Configuration IEEE 802.11g / 2437 MHz / Average / Chain 1



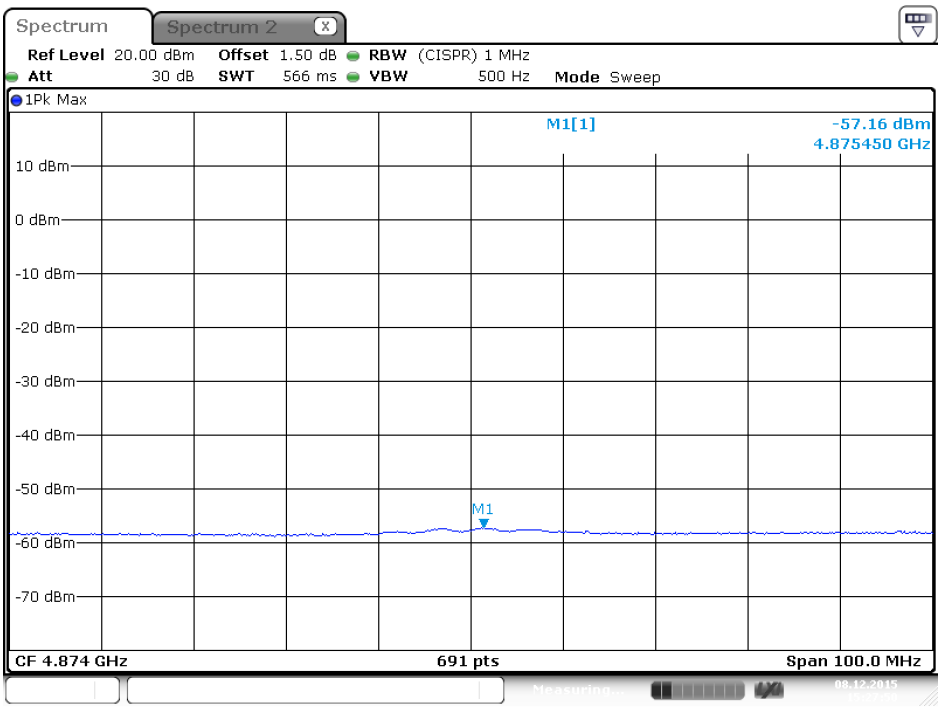
Date: 8.DEC.2015 15:25:14

Plot on Configuration IEEE 802.11g / 2437 MHz / Peak / Chain 1



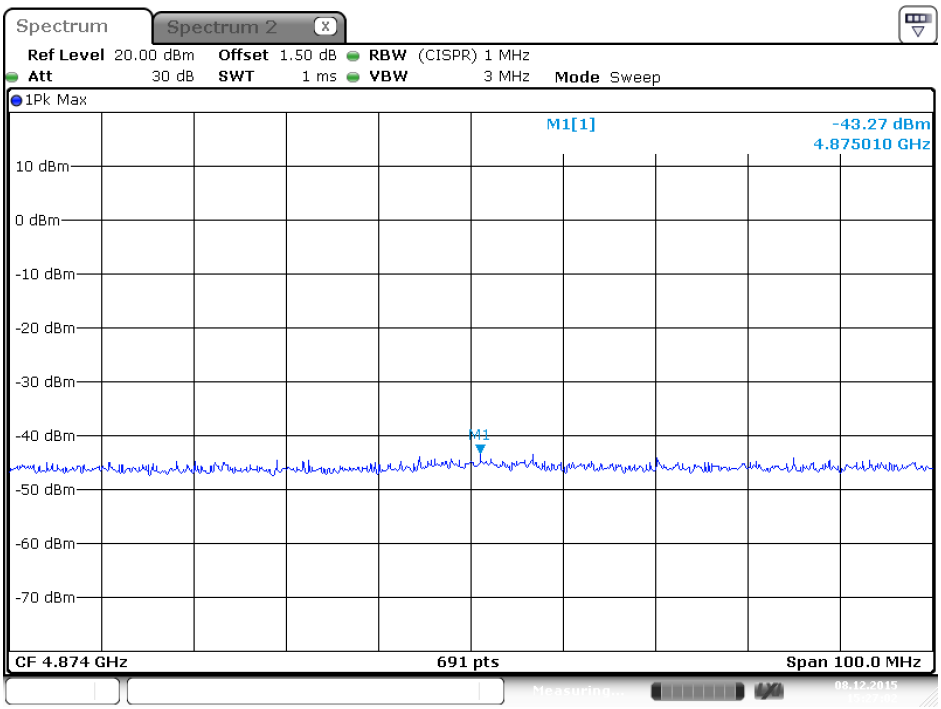
Date: 8.DEC.2015 15:25:44

Plot on Configuration IEEE 802.11g / 2437 MHz / Average / Chain 2



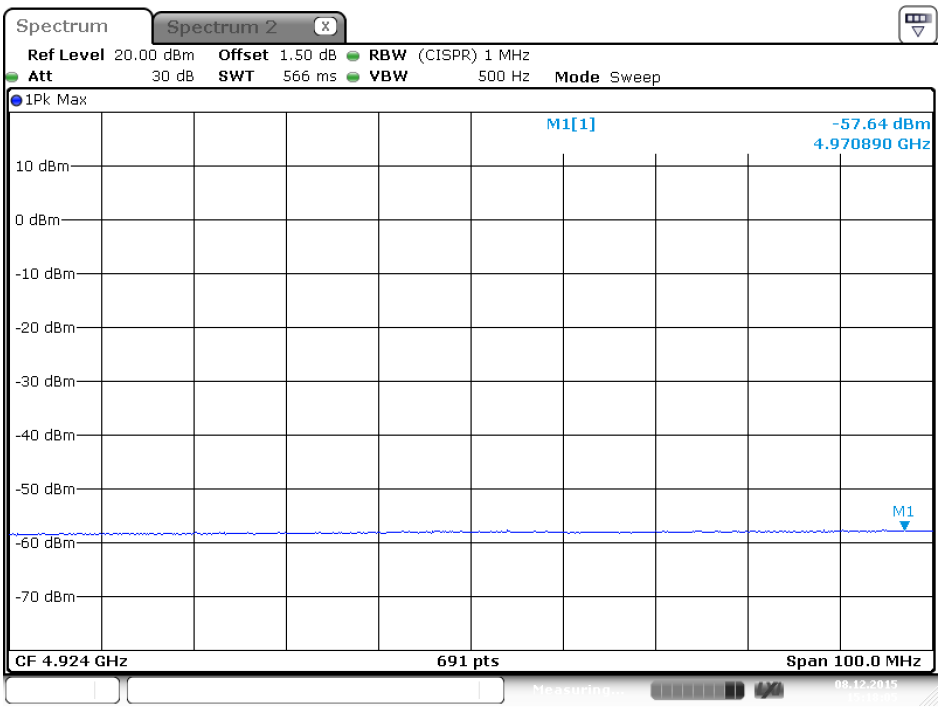
Date: 8.DEC.2015 15:27:50

Plot on Configuration IEEE 802.11g / 2437 MHz / Peak / Chain 2



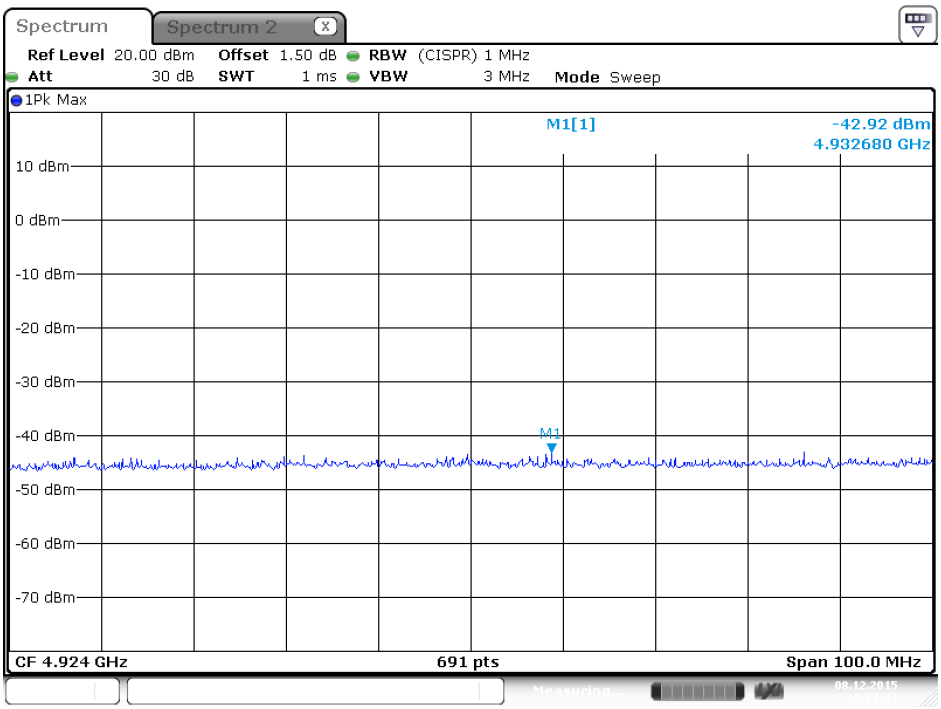
Date: 8.DEC.2015 15:27:02

Plot on Configuration IEEE 802.11g / 2462 MHz / Average / Chain 1



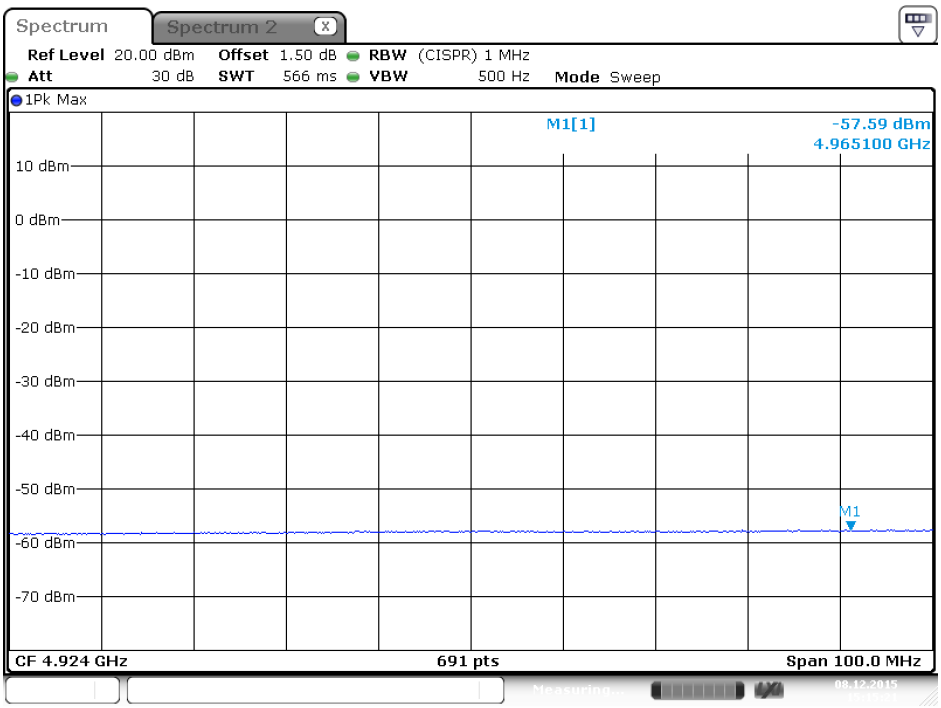
Date: 8.DEC.2015 15:18:05

Plot on Configuration IEEE 802.11g / 2462 MHz / Peak / Chain 1



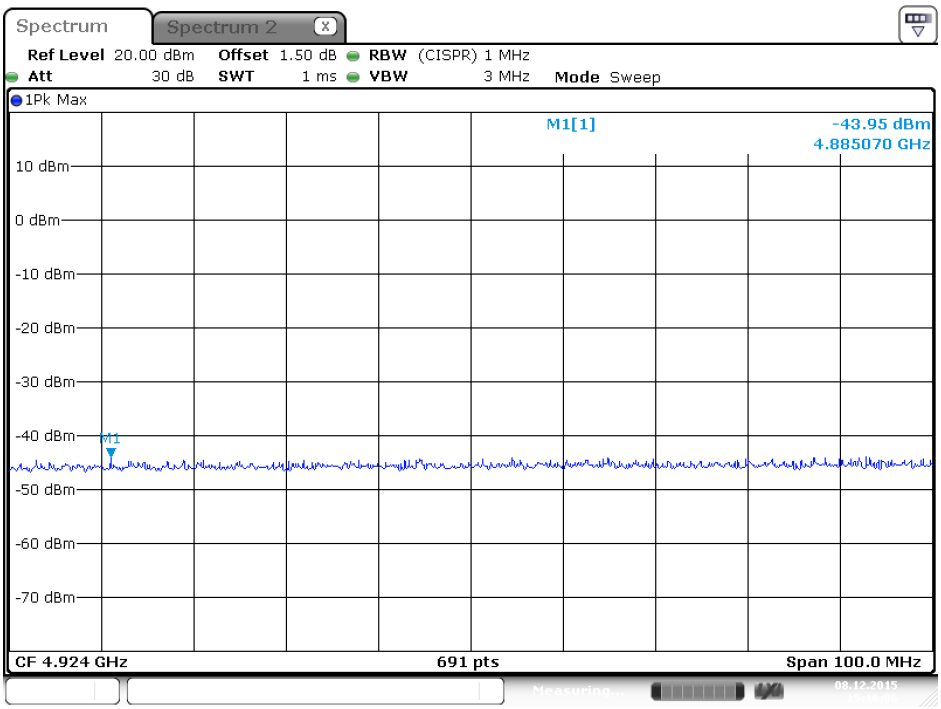
Date: 8.DEC.2015 15:17:34

Plot on Configuration IEEE 802.11g / 2462 MHz / Average / Chain 2



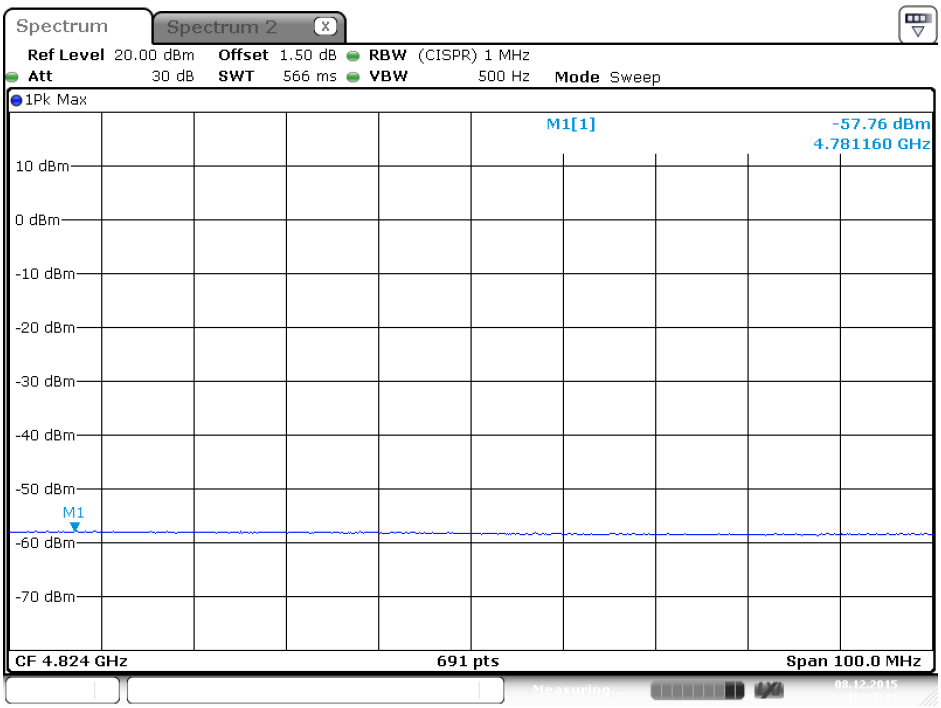
Date: 8.DEC.2015 15:15:21

Plot on Configuration IEEE 802.11g / 2462 MHz / Peak / Chain 2



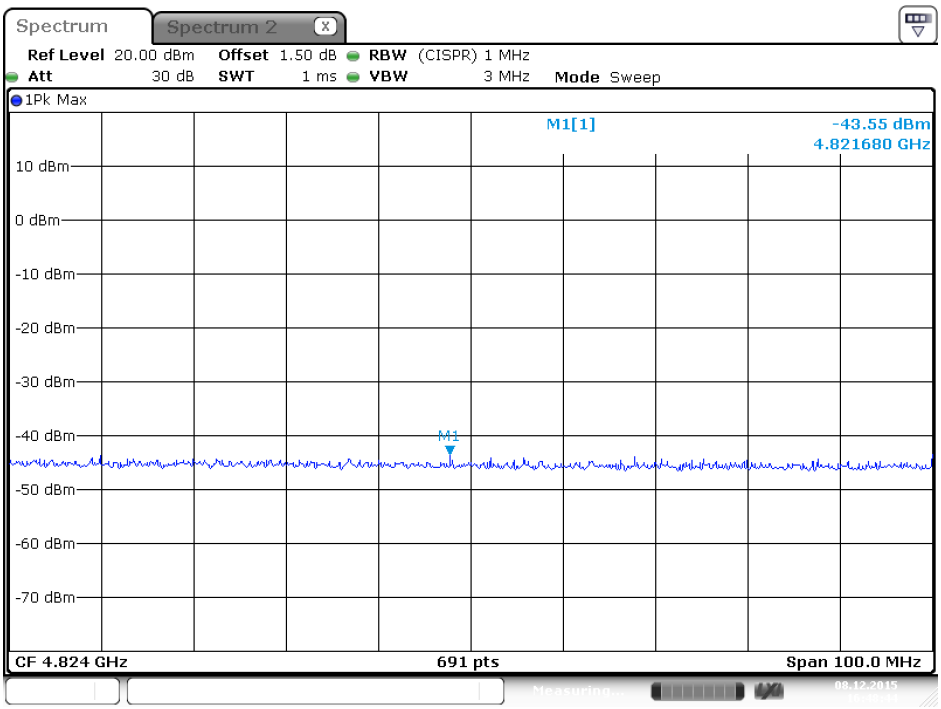
Date: 8.DEC.2015 15:16:06

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2412 MHz / Average / Chain 1



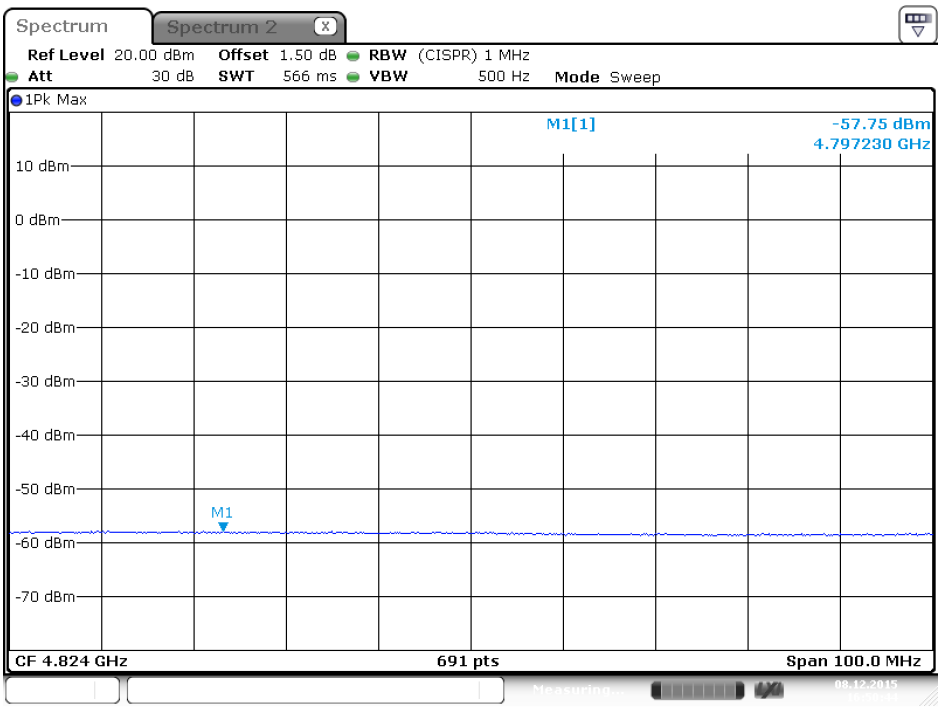
Date: 8.DEC.2015 16:47:12

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2412 MHz / Peak / Chain 1



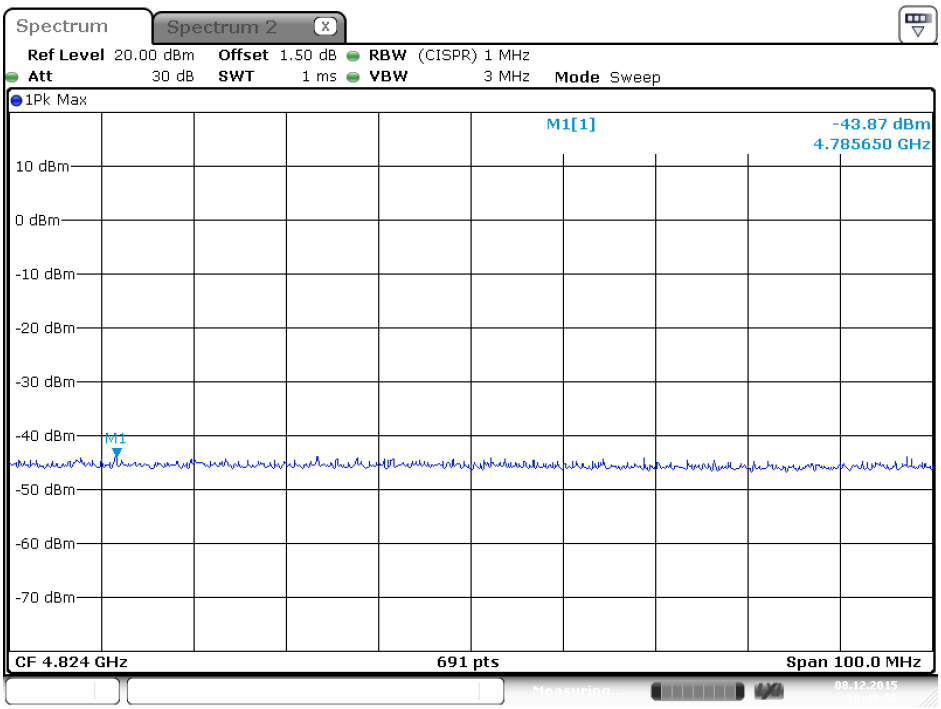
Date: 8.DEC.2015 16:48:44

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2412 MHz / Average / Chain 2



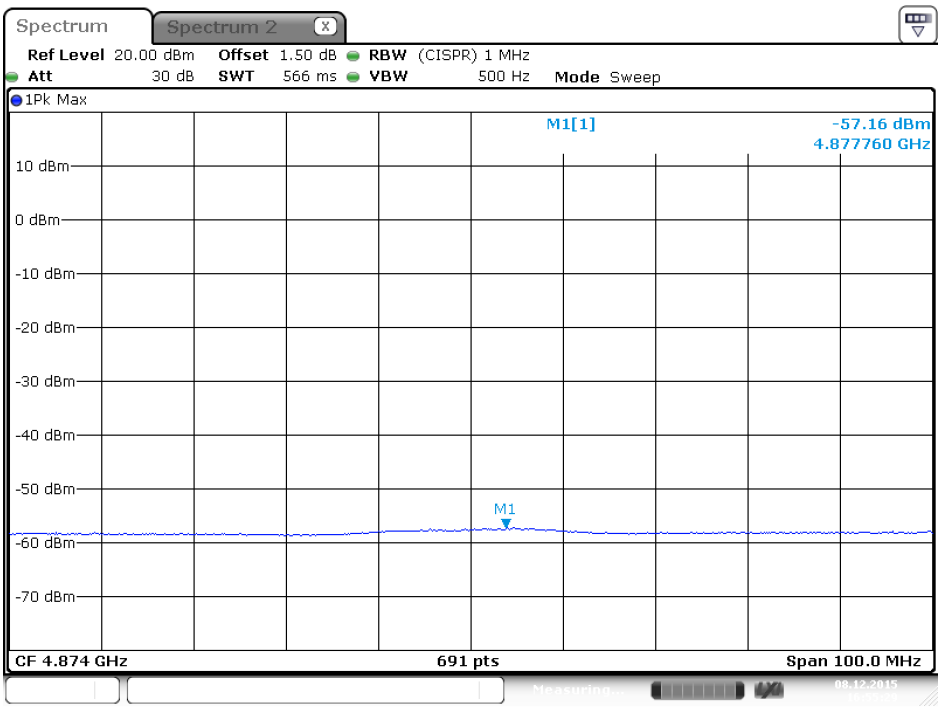
Date: 8.DEC.2015 16:50:44

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2412 MHz / Peak / Chain 2



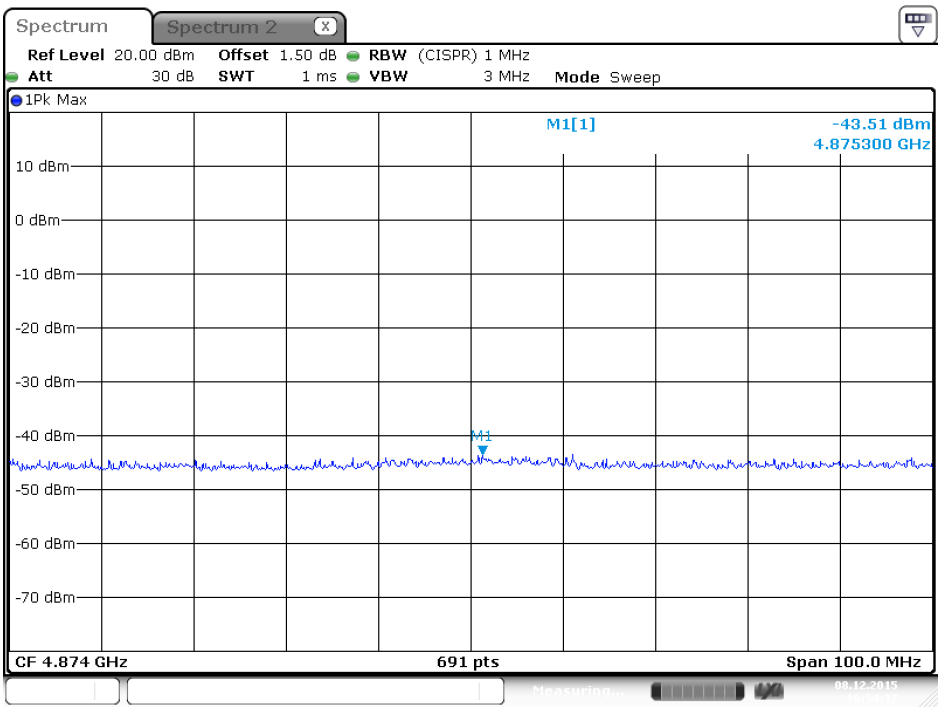
Date: 8.DEC.2015 16:49:56

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



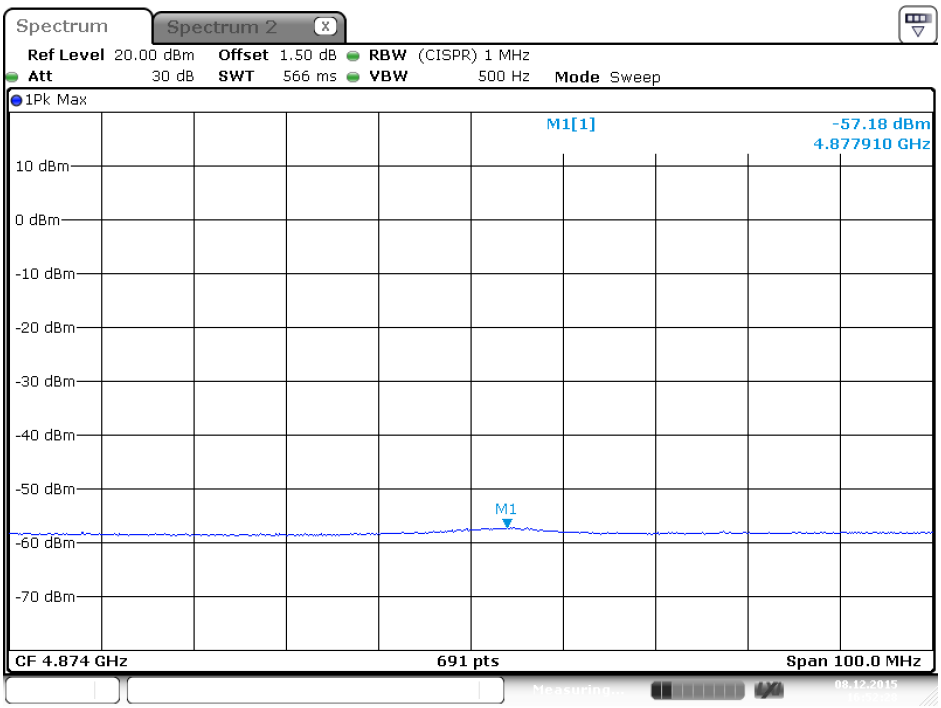
Date: 8.DEC.2015 16:55:29

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



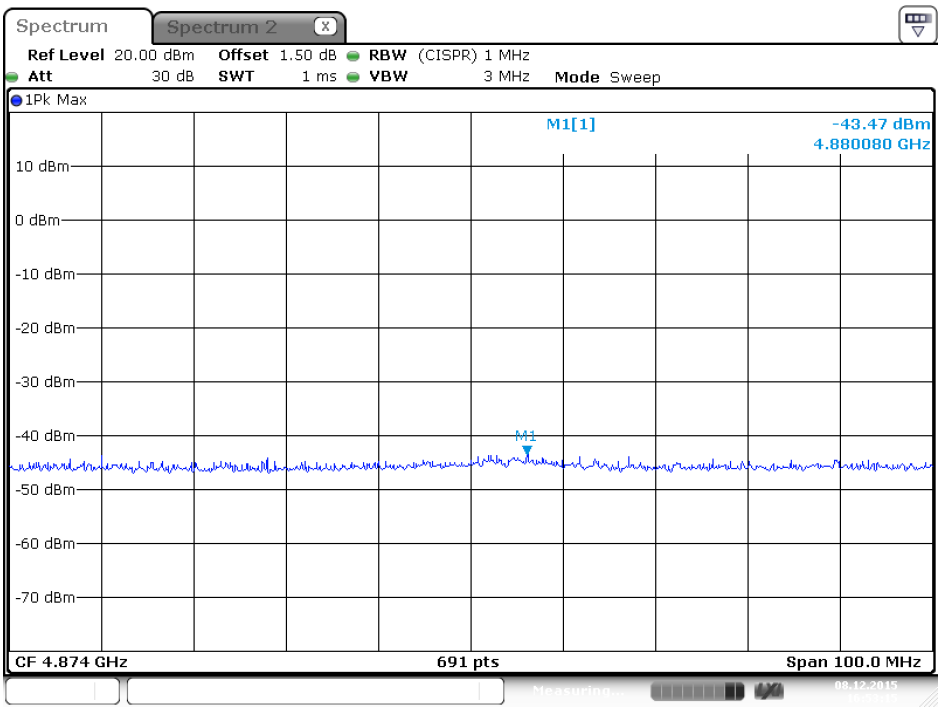
Date: 8.DEC.2015 16:54:36

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



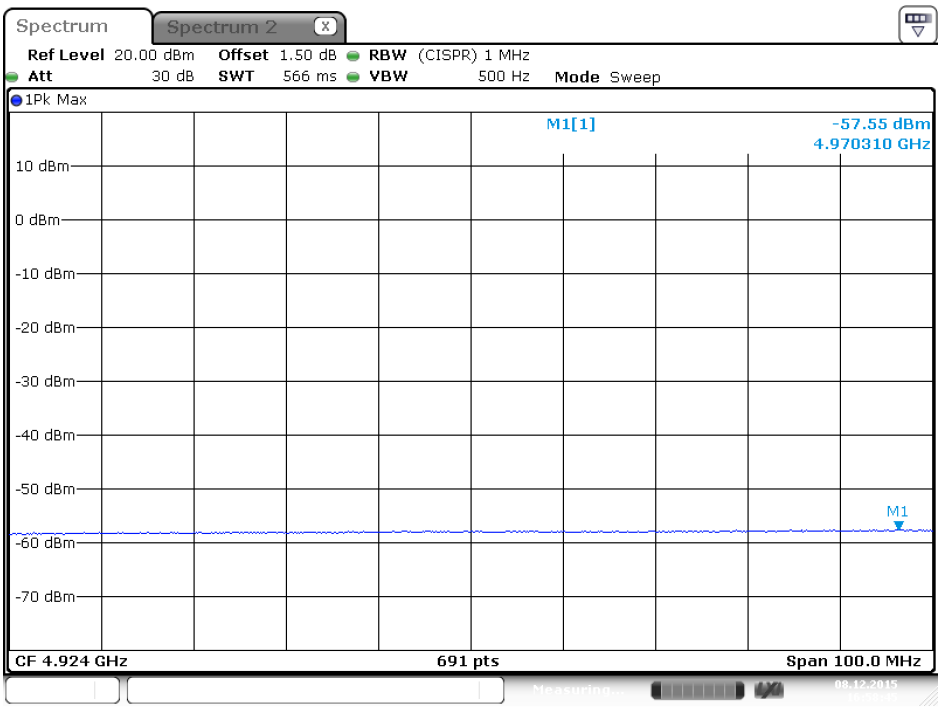
Date: 8.DEC.2015 16:52:28

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



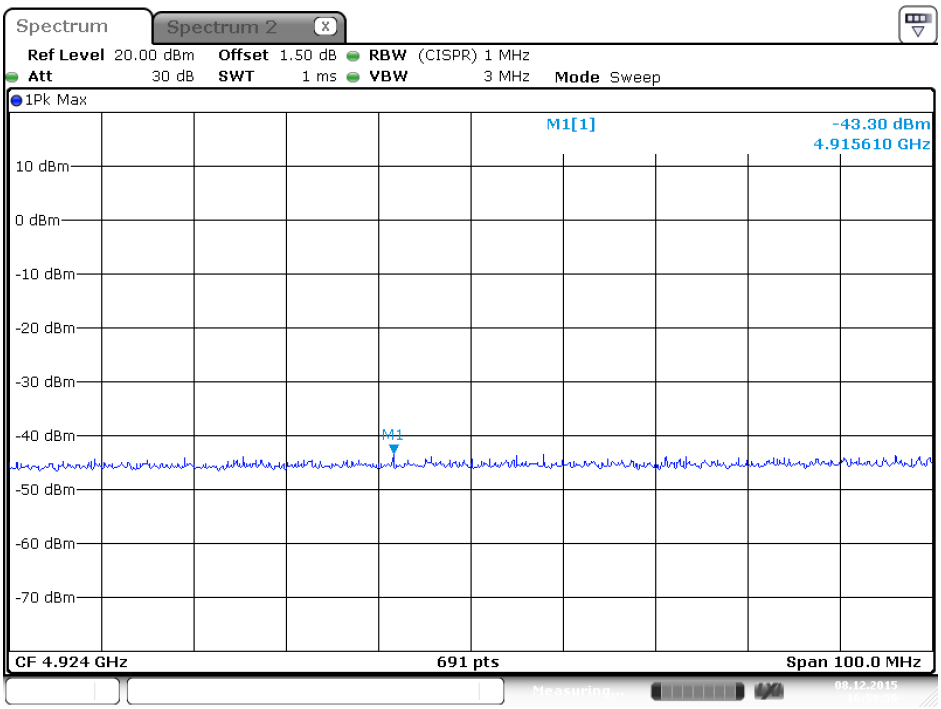
Date: 8.DEC.2015 16:53:16

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Average / Chain 1



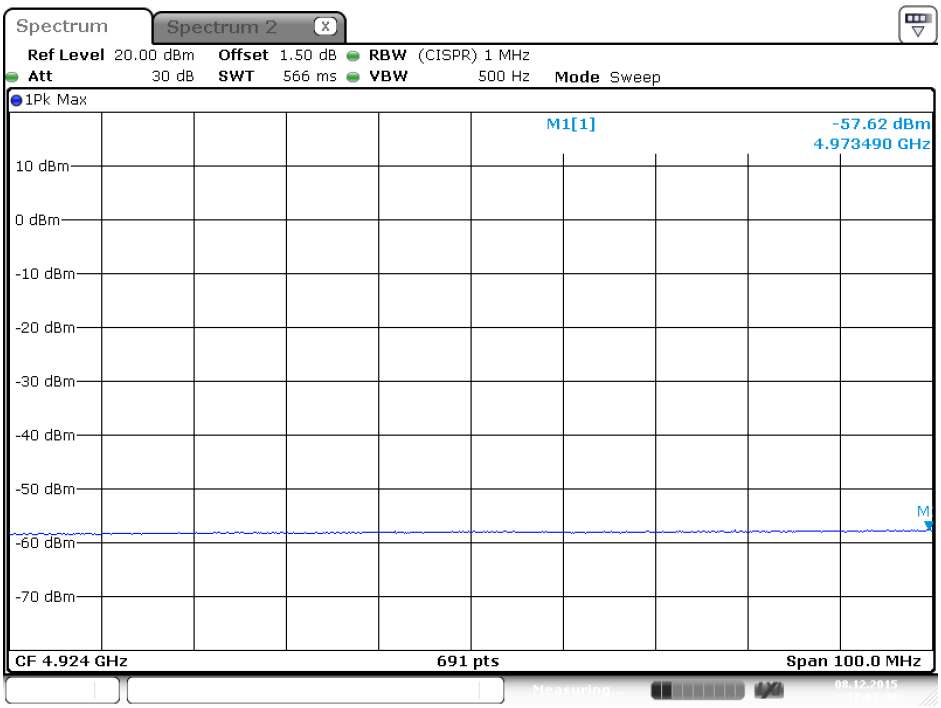
Date: 8.DEC.2015 16:58:46

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Peak / Chain 1



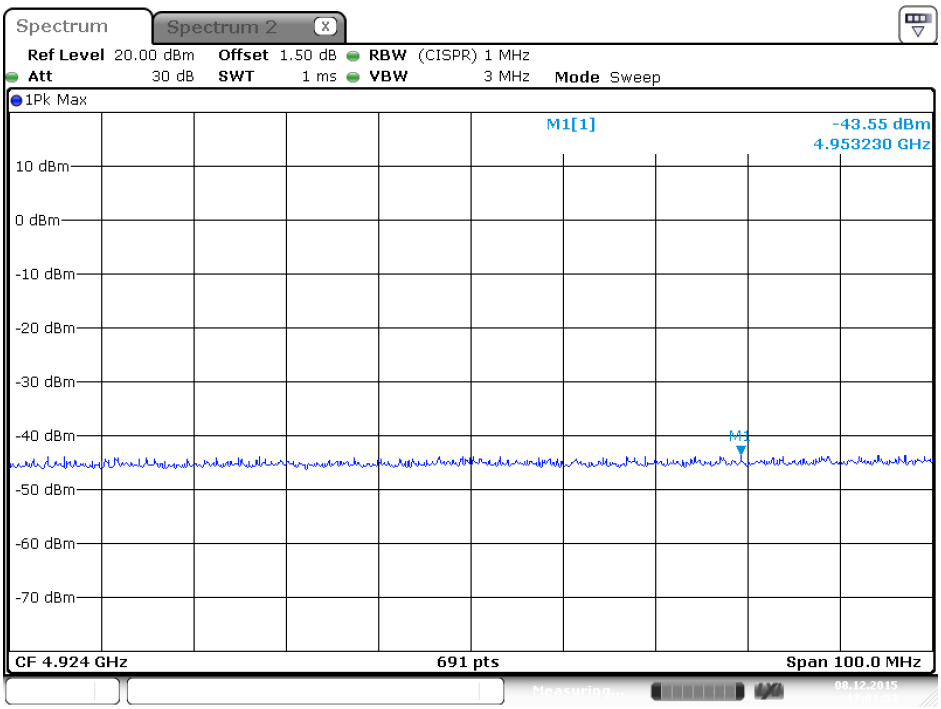
Date: 8.DEC.2015 16:59:56

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Average / Chain 2



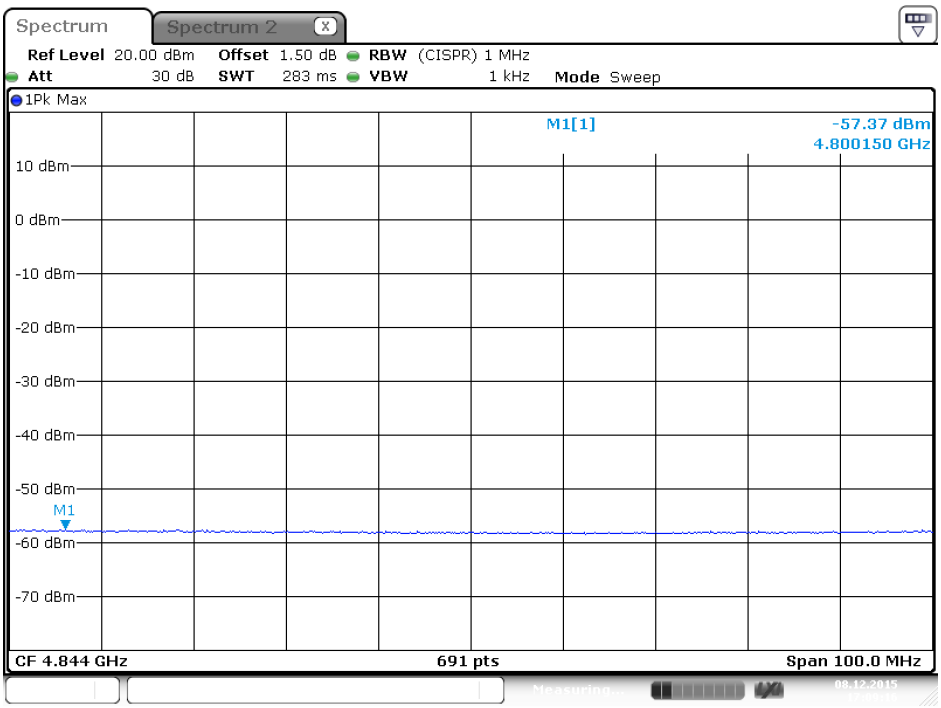
Date: 8.DEC.2015 17:02:59

Plot on Configuration IEEE 802.11n MCS0 HT20 / 2462 MHz / Peak / Chain 2



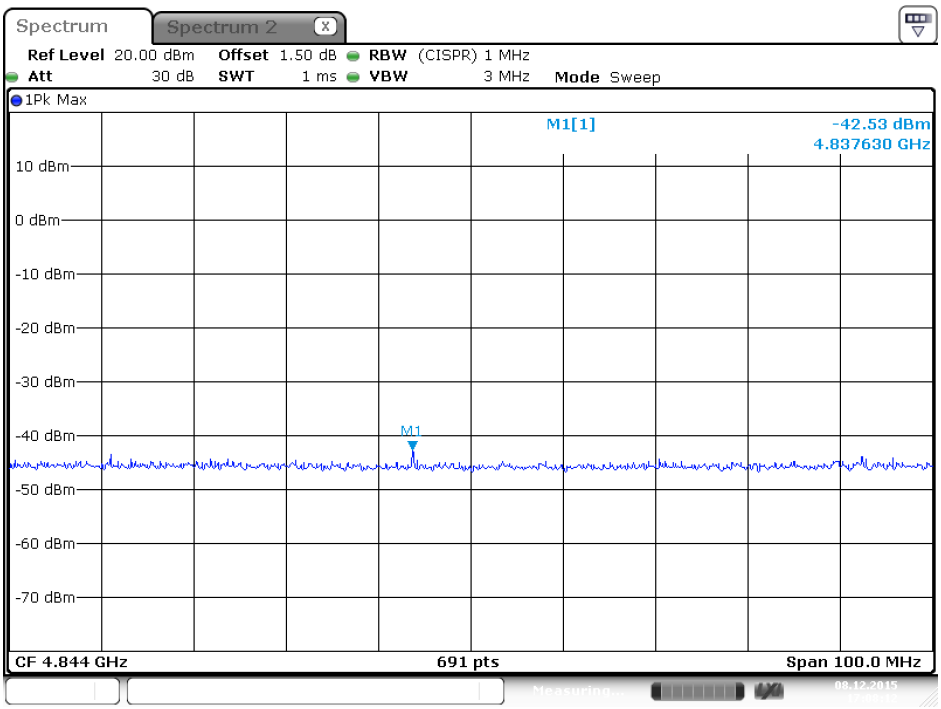
Date: 8.DEC.2015 17:01:53

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2422 MHz / Average / Chain 1



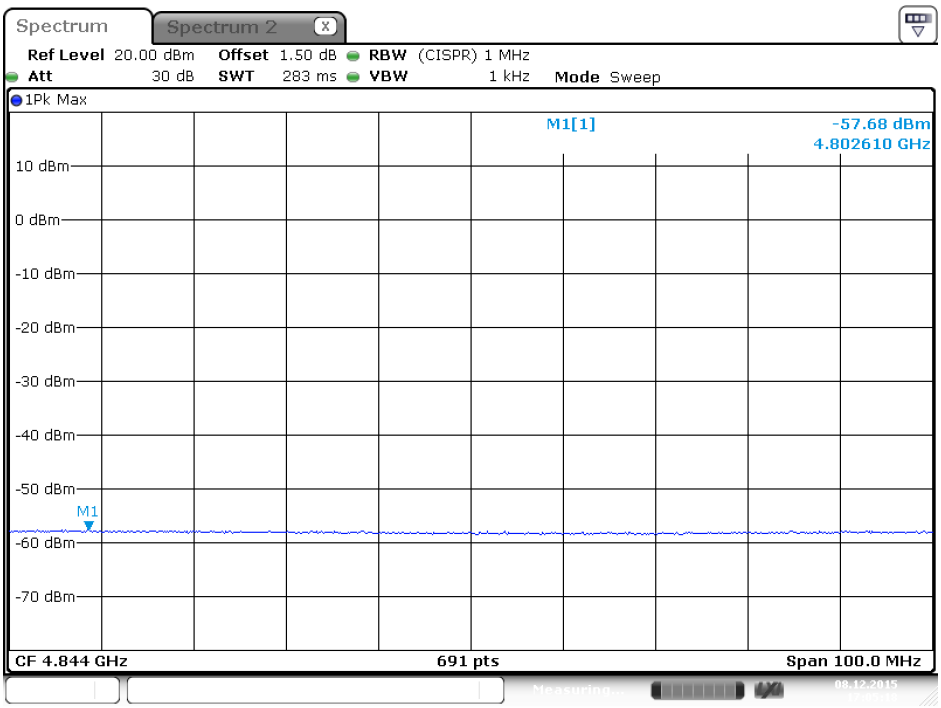
Date: 8.DEC.2015 17:09:16

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2422 MHz / Peak / Chain 1



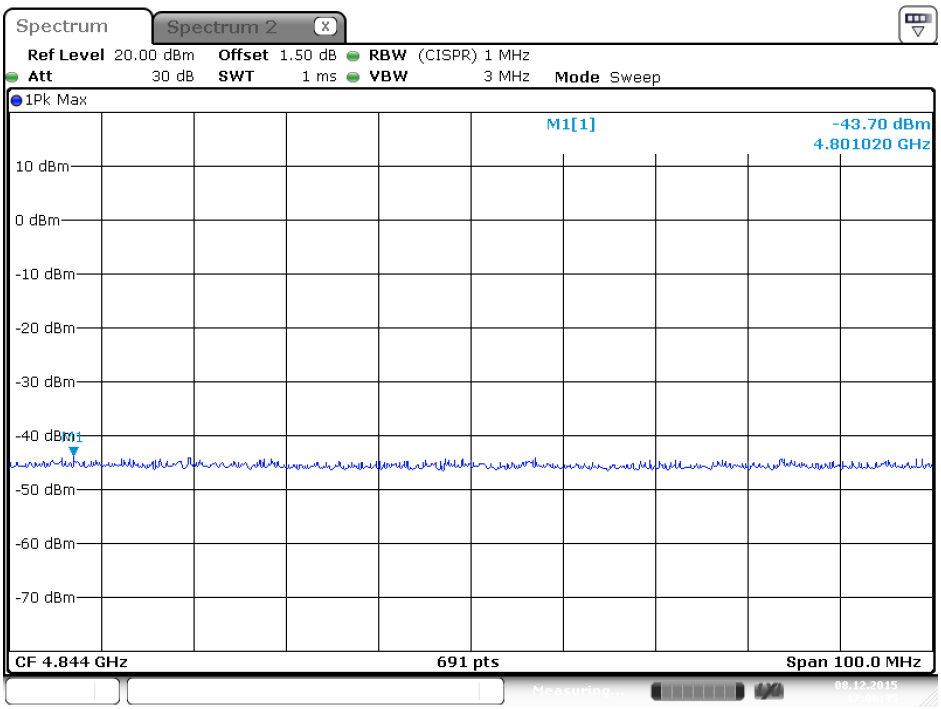
Date: 8.DEC.2015 17:08:12

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2422 MHz / Average / Chain 2



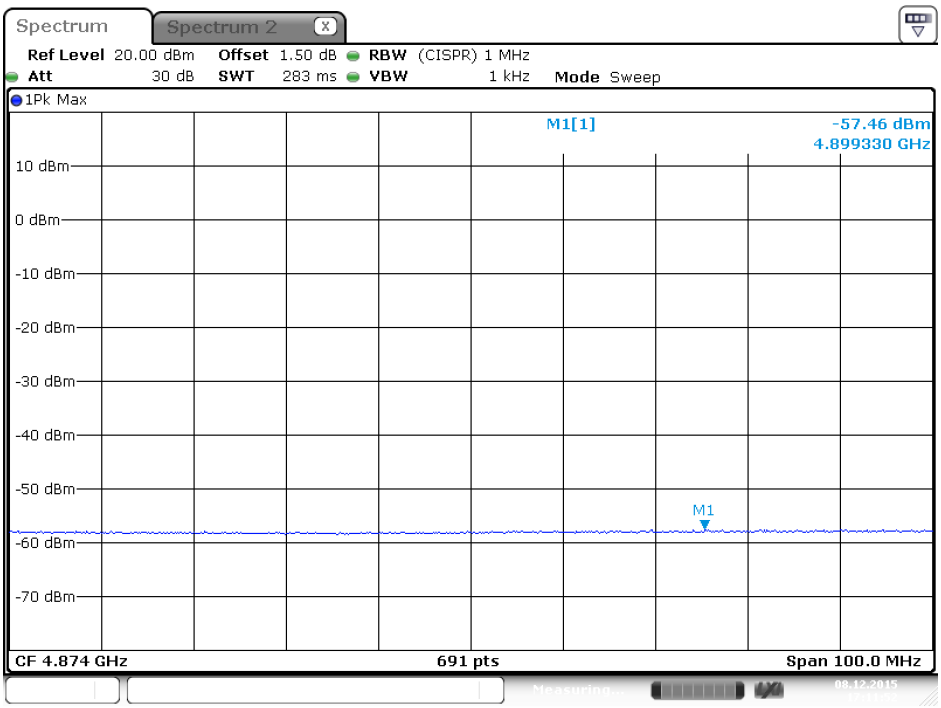
Date: 8.DEC.2015 17:05:19

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2422 MHz / Peak / Chain 2



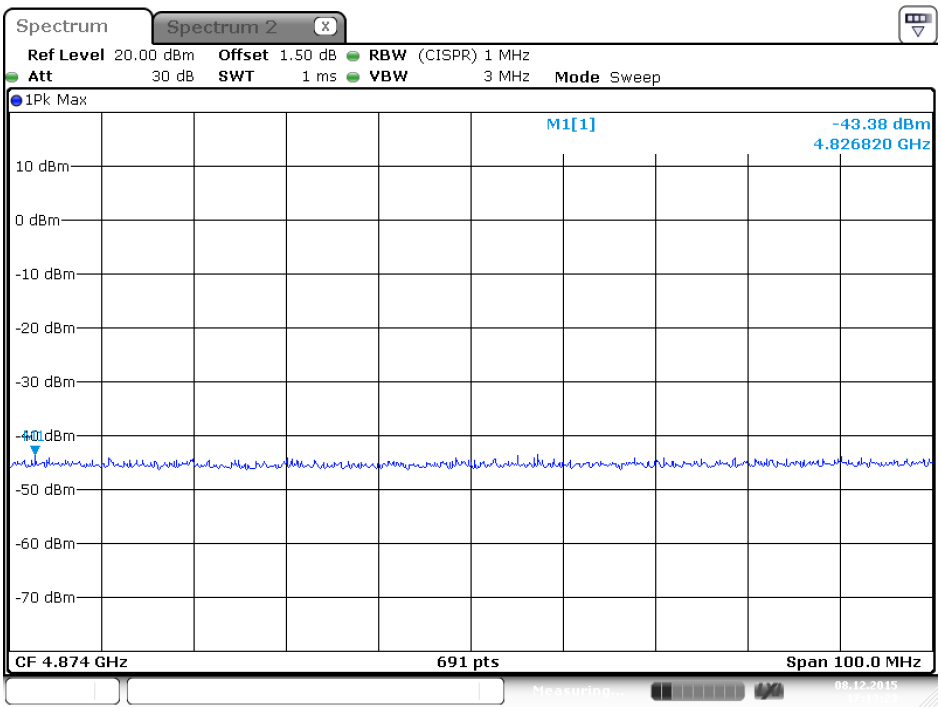
Date: 8.DEC.2015 17:06:45

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



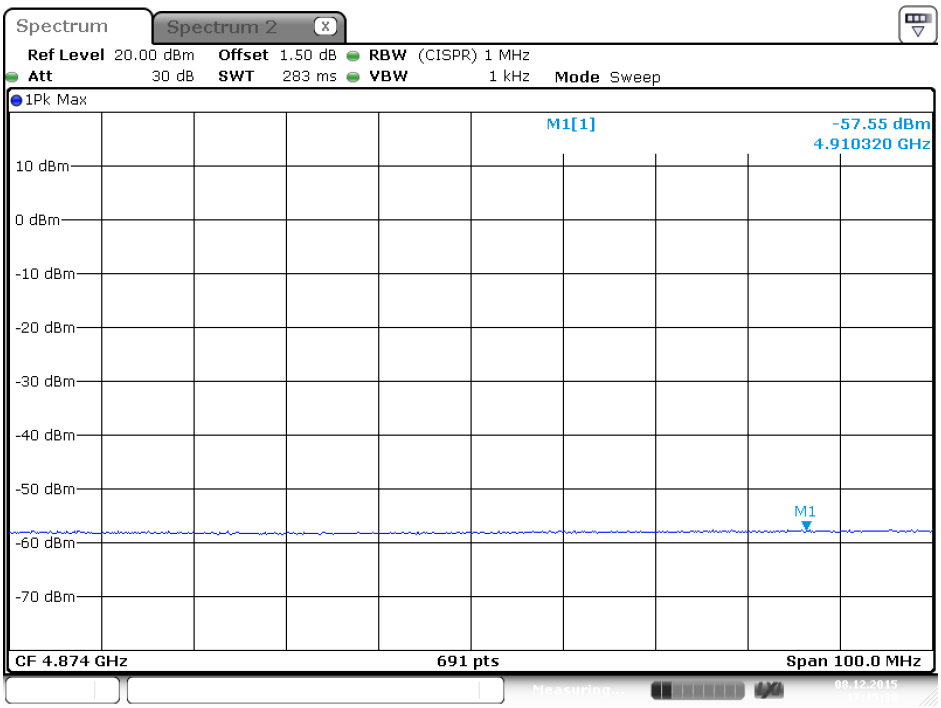
Date: 8.DEC.2015 17:11:52

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



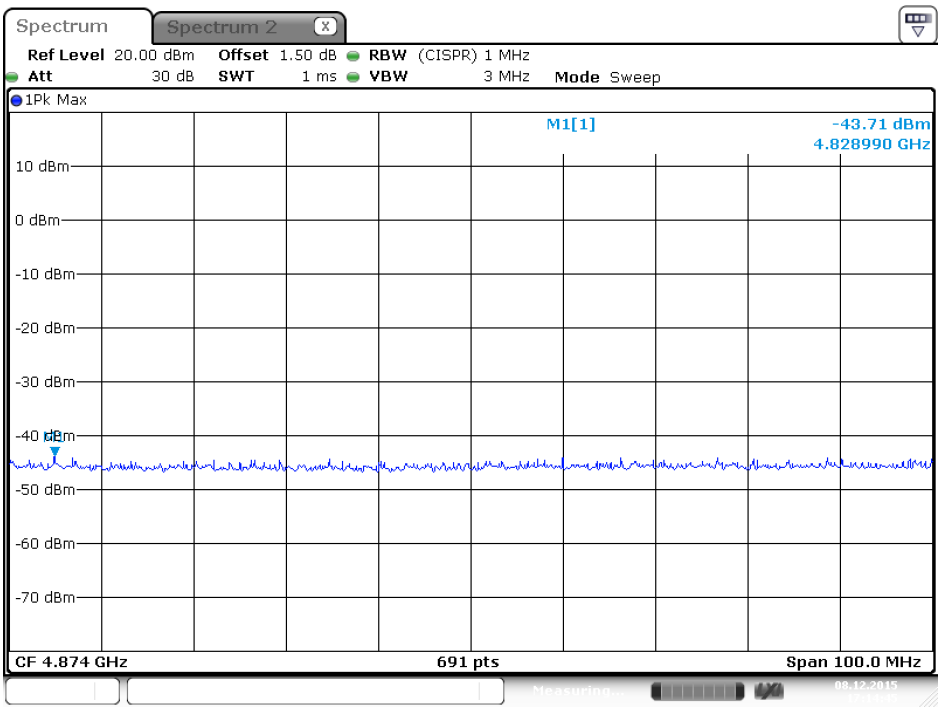
Date: 8.DEC.2015 17:13:23

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



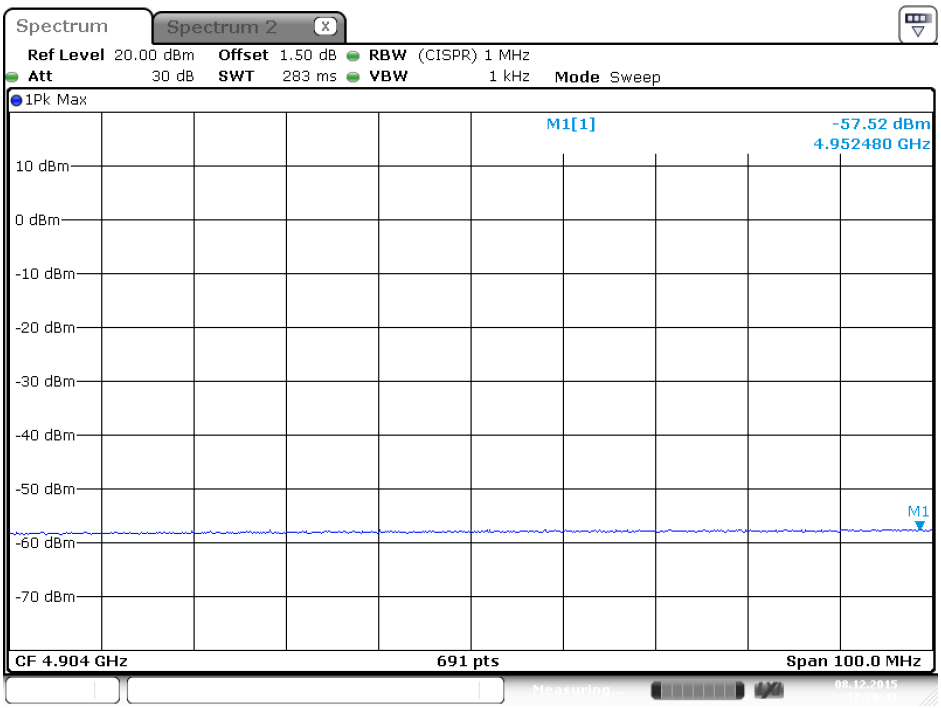
Date: 8.DEC.2015 17:15:38

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



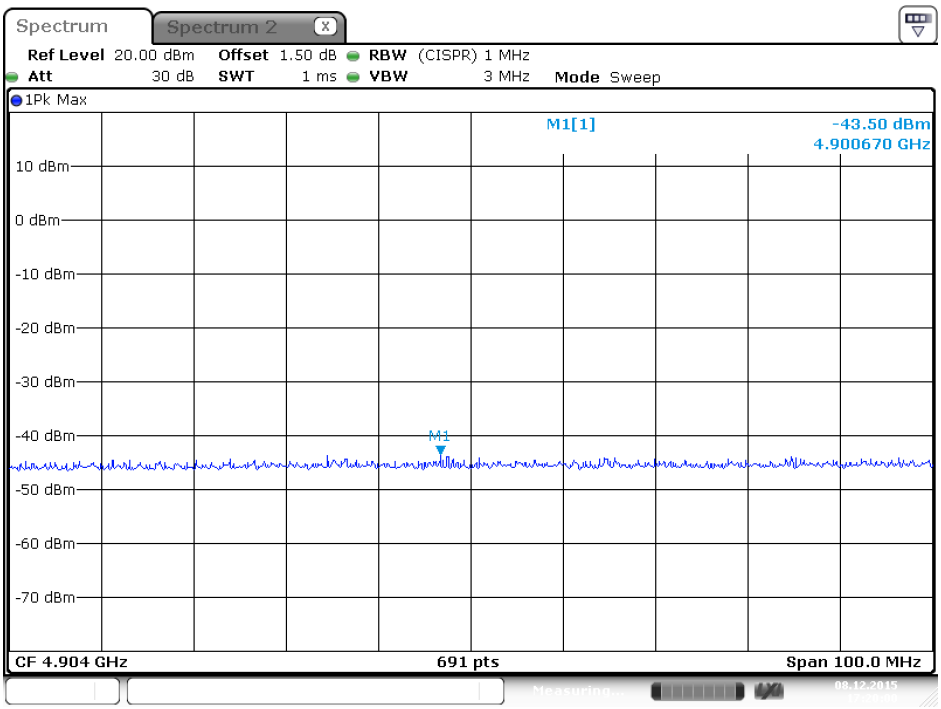
Date: 8.DEC.2015 17:14:46

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Average / Chain 1



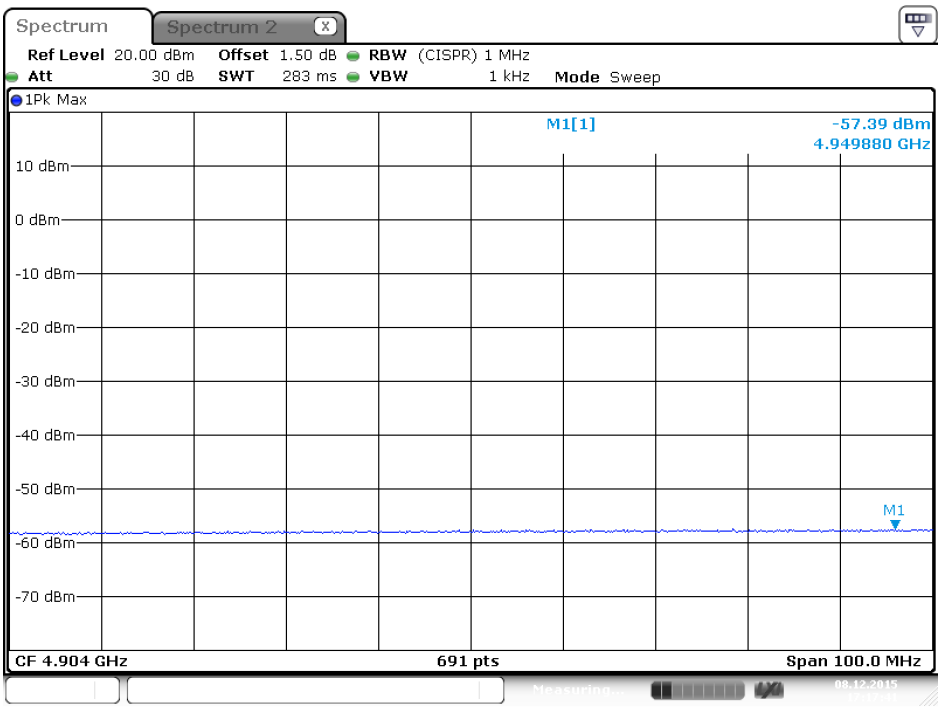
Date: 8.DEC.2015 17:20:41

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Peak / Chain 1



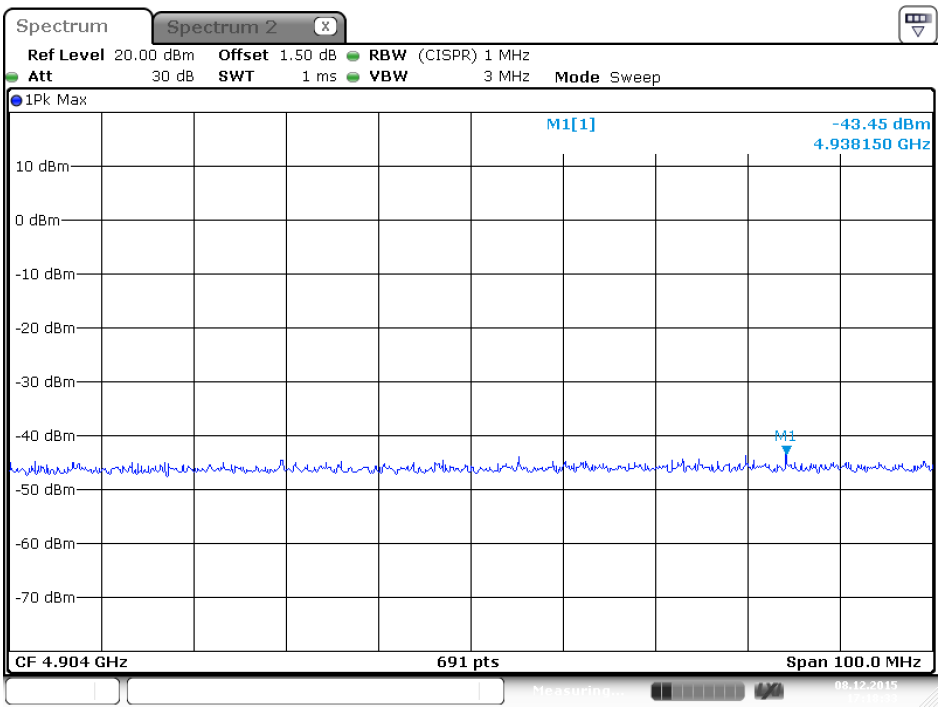
Date: 8.DEC.2015 17:19:59

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Average / Chain 2



Date: 8.DEC.2015 17:17:41

Plot on Configuration IEEE 802.11n MCS0 HT40 / 2452 MHz / Peak / Chain 2



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4.6. Band Edge 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

Configure the EUT according to KDB558074 D01 v04. The EUT was perform conducted measurement and measurement level added antenna gain shall be comply to section 4.5.1.

4.6.4. Test Setup Layout

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

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24°C	Humidity	60%
Test Engineer	Clemens Fang		

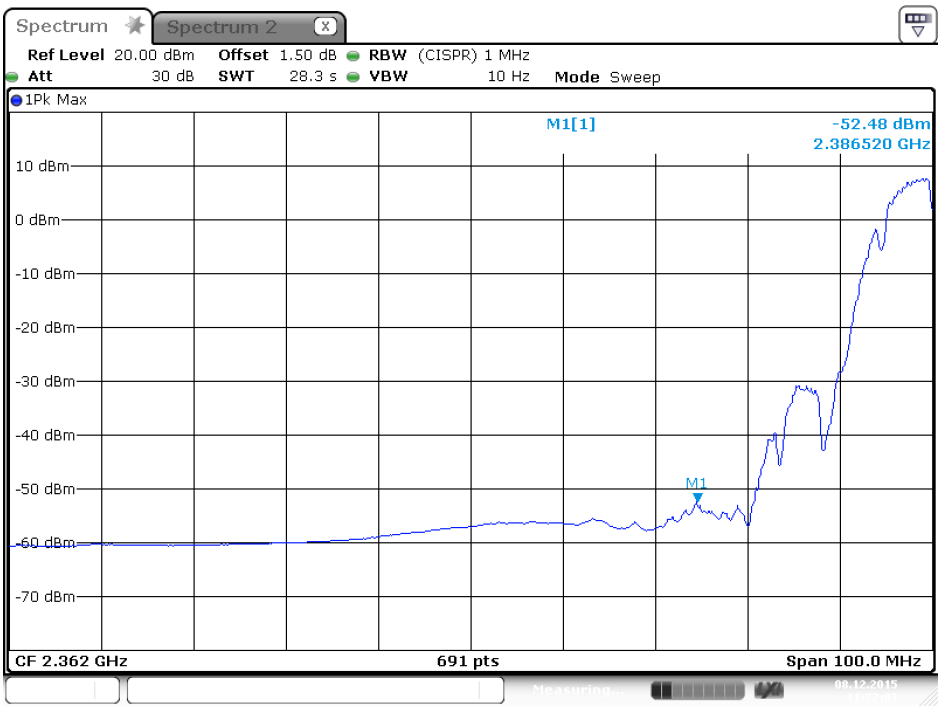
Average

Mode	Frequency	Antenna Gain (dBi)	Bandedge Level (dBm)			Limit (dBm)	Margin (dB)
			Chain 1	Chain 2	Total		
802.11b	2412 MHz	4.32	-52.48	-47.25	-41.79	-41.20	0.59
	2437 MHz	4.32	-52.08	-47.76	-42.07	-41.20	0.87
	2462 MHz	4.32	-48.58	-48.70	-41.31	-41.20	0.11
802.11g	2412 MHz	4.32	-49.23	-48.03	-41.26	-41.20	0.06
	2437 MHz	4.32	-50.11	-47.75	-41.44	-41.20	0.24
	2462 MHz	4.32	-48.25	-49.15	-41.35	-41.20	0.15
802.11n MCS0 HT20	2412 MHz	4.32	-50.41	-48.58	-42.07	-41.20	0.87
	2437 MHz	4.32	-50.19	-47.66	-41.41	-41.20	0.21
	2462 MHz	4.32	-47.72	-51.55	-41.90	-41.20	0.70
802.11n MCS0 HT40	2422 MHz	4.32	-50.75	-47.74	-41.66	-41.20	0.46
	2437 MHz	4.32	-51.44	-48.24	-42.22	-41.20	1.02
	2452 MHz	4.32	-48.42	-48.80	-41.28	-41.20	0.08

Peak

Mode	Frequency	Antenna Gain (dBi)	Bandedge Level (dBm)			Limit (dBm)	Margin (dB)
			Chain 1	Chain 2	Total		
802.11b	2412 MHz	4.32	-41.84	-40.03	-33.51	-21.20	12.31
	2437 MHz	4.32	-40.00	-40.73	-33.02	-21.20	11.82
	2462 MHz	4.32	-39.61	-40.42	-32.67	-21.20	11.47
802.11g	2412 MHz	4.32	-32.67	-32.18	-25.09	-21.20	3.89
	2437 MHz	4.32	-36.24	-32.27	-26.49	-21.20	5.29
	2462 MHz	4.32	-32.09	-36.50	-26.43	-21.20	5.23
802.11n MCS0 HT20	2412 MHz	4.32	-35.46	-34.26	-27.49	-21.20	6.29
	2437 MHz	4.32	-36.21	-31.56	-25.96	-21.20	4.76
	2462 MHz	4.32	-32.70	-37.99	-27.25	-21.20	6.05
802.11n MCS0 HT40	2422 MHz	4.32	-35.90	-35.75	-28.49	-21.20	7.29
	2437 MHz	4.32	-37.28	-33.30	-27.52	-21.20	6.32
	2452 MHz	4.32	-33.52	-35.29	-26.99	-21.20	5.79

Plot on Configuration IEEE 802.11b / 2412 MHz / Average / Chain 1



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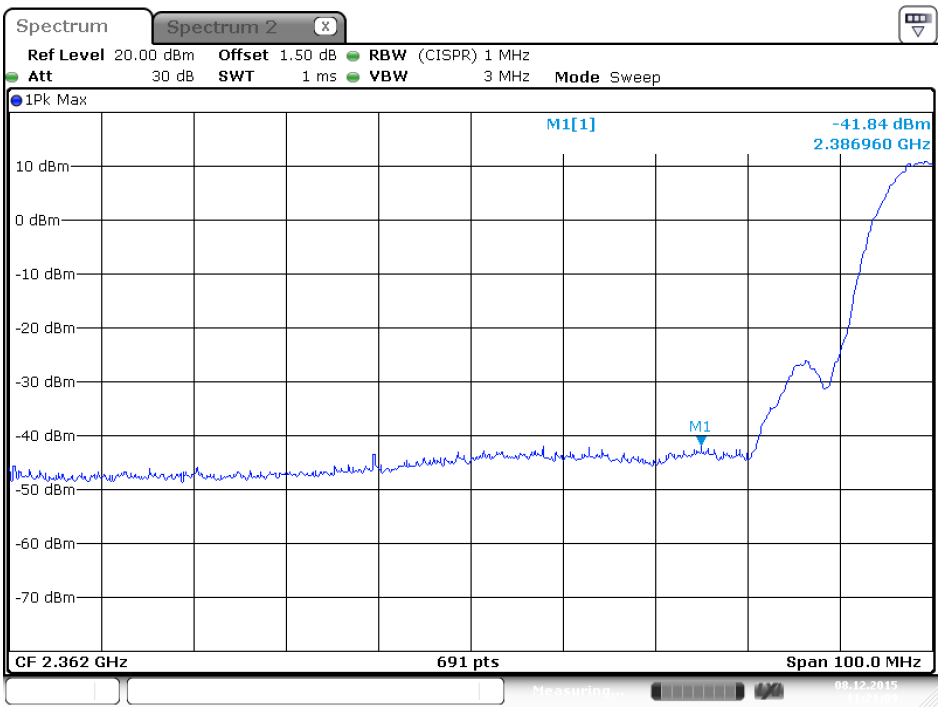
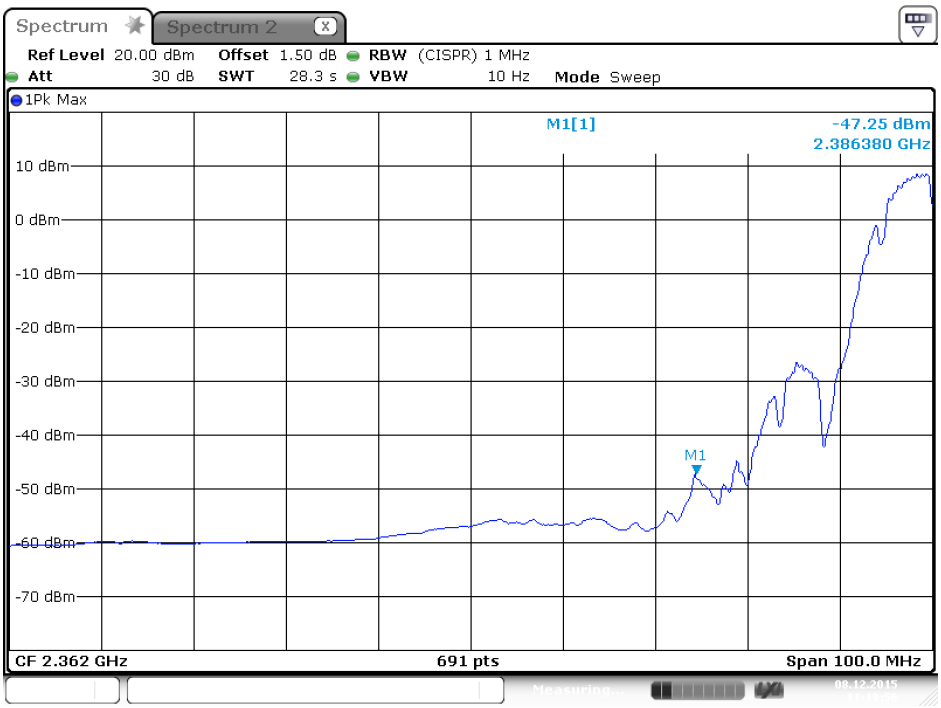
Plot on Configuration IEEE 802.11b / 2412 MHz / Peak / Chain 1



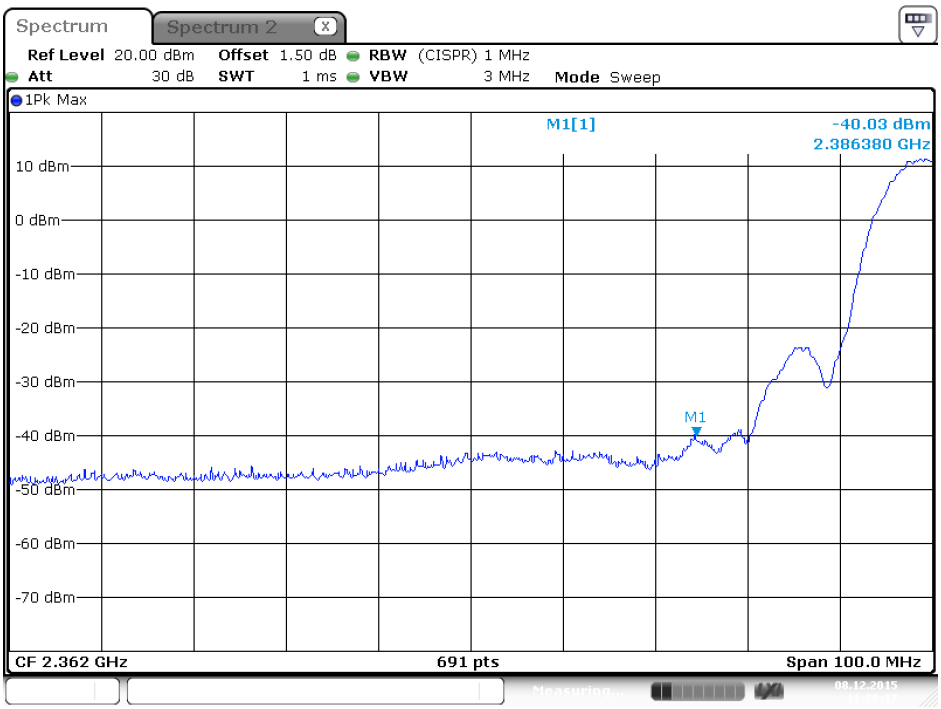
Date: 8.DEC.2015 11:21:09

Plot on Configuration IEEE 802.11b / 2412 MHz / Average / Chain 2



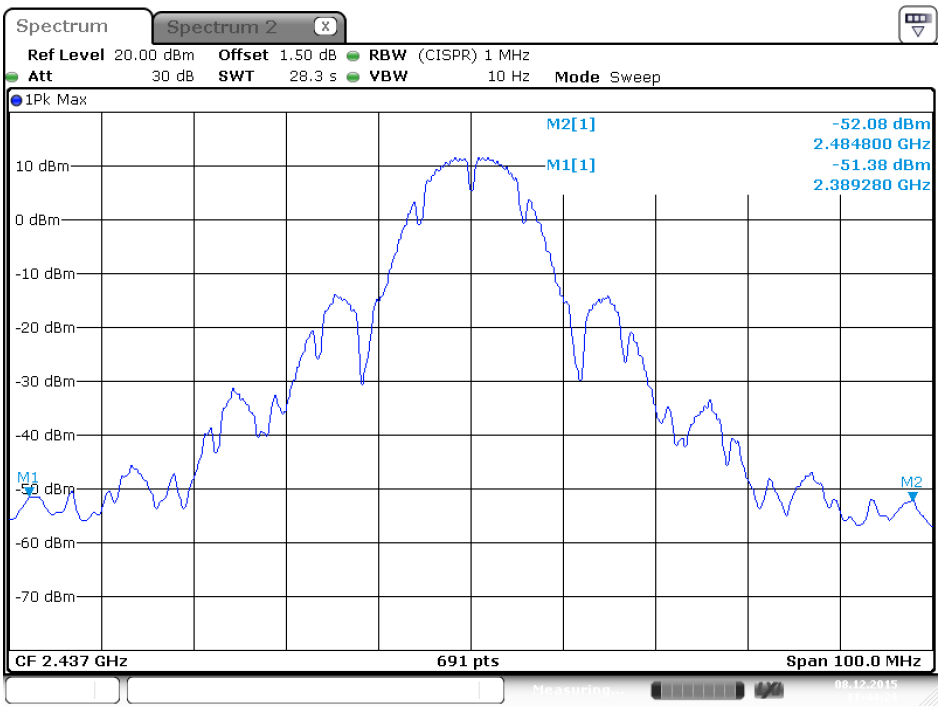
Date: 8.DEC.2015 11:19:56

Plot on Configuration IEEE 802.11b / 2412 MHz / Peak / Chain 2



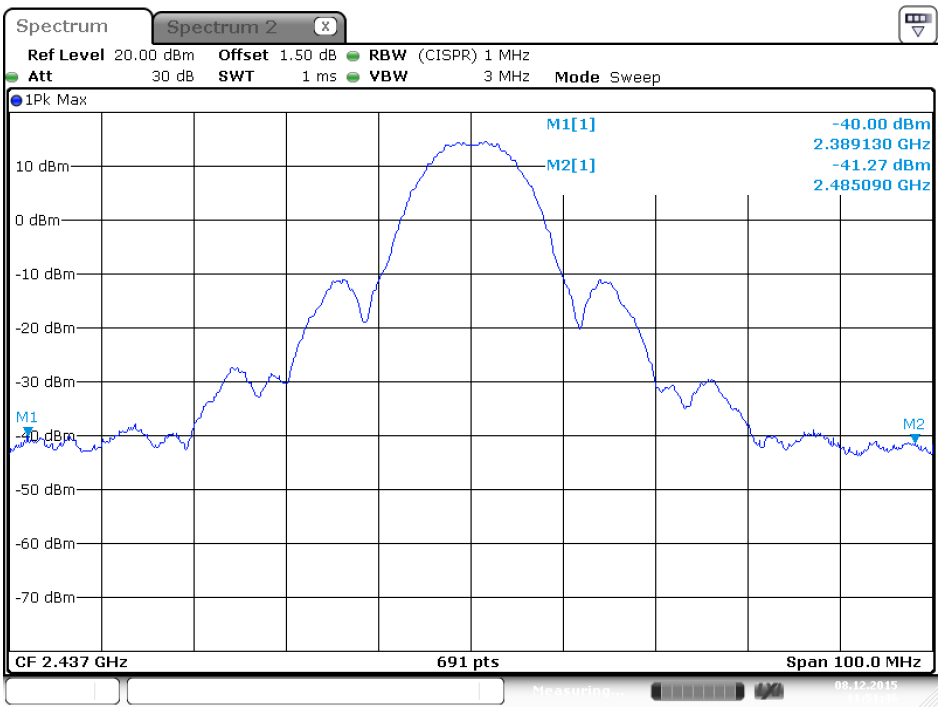
Date: 8.DEC.2015 11:20:17

Plot on Configuration IEEE 802.11b / 2437 MHz / Average / Chain 1



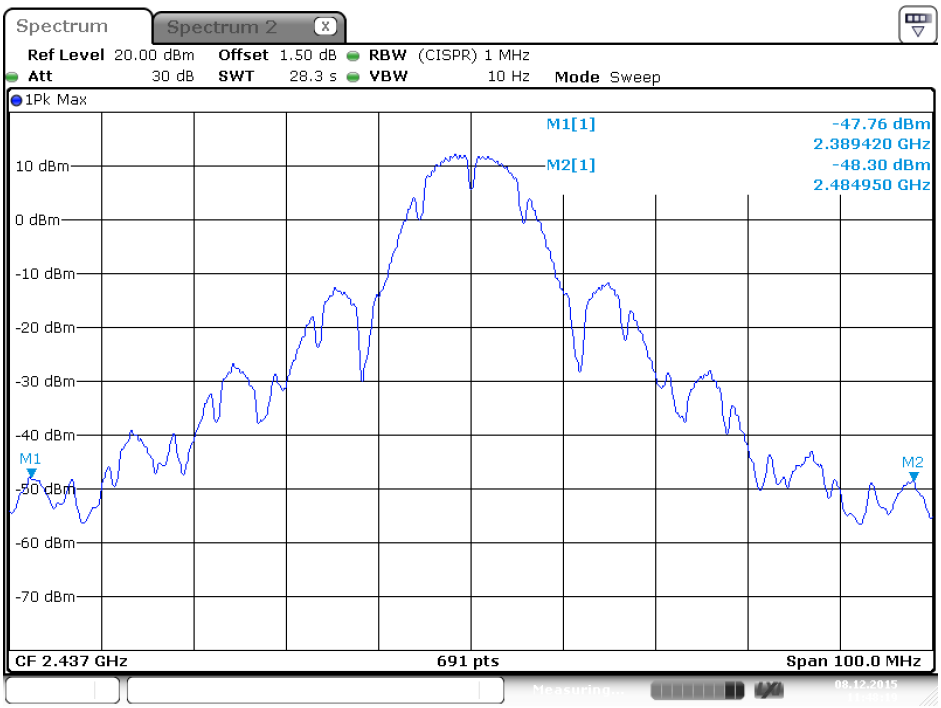
Date: 8.DEC.2015 11:44:28

Plot on Configuration IEEE 802.11b / 2437 MHz / Peak / Chain 1



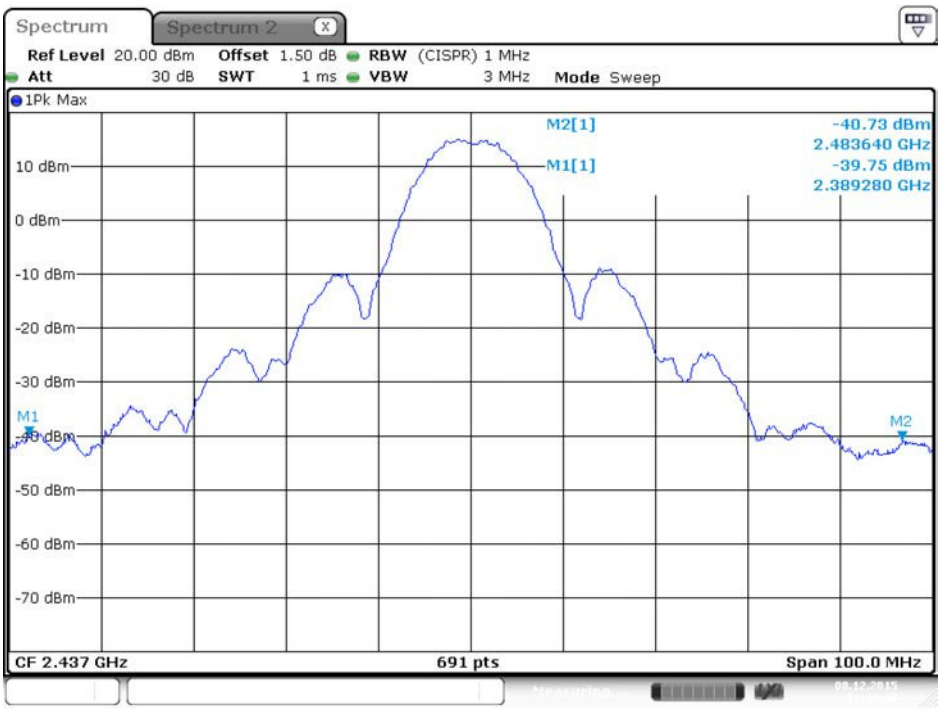
Date: 8.DEC.2015 11:51:46

Plot on Configuration IEEE 802.11b / 2437 MHz / Average / Chain 2



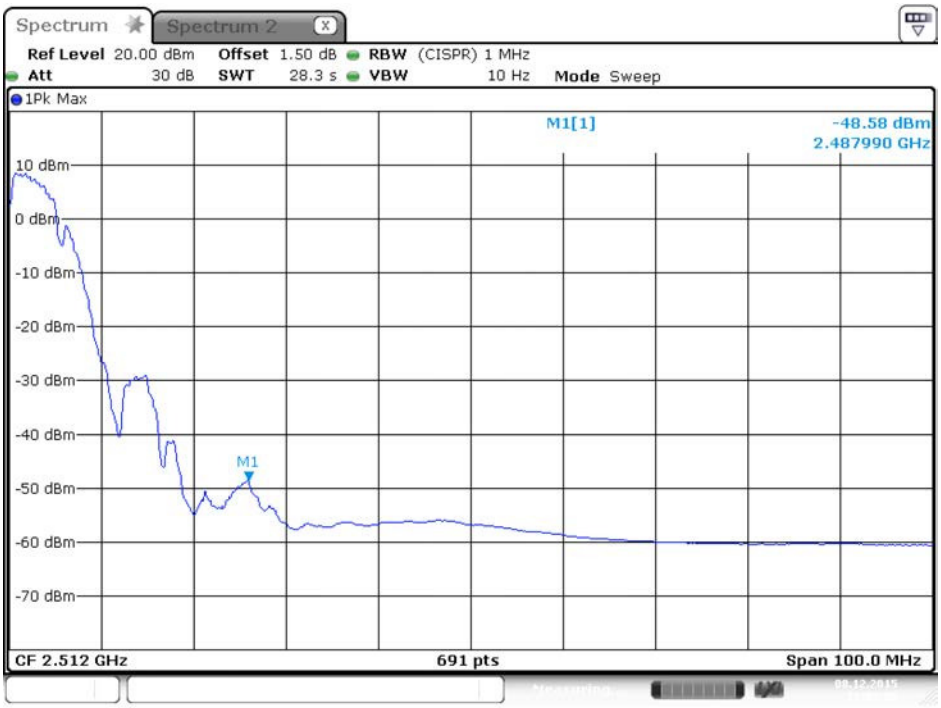
Date: 8.DEC.2015 11:48:19

Plot on Configuration IEEE 802.11b / 2437 MHz / Peak / Chain 2



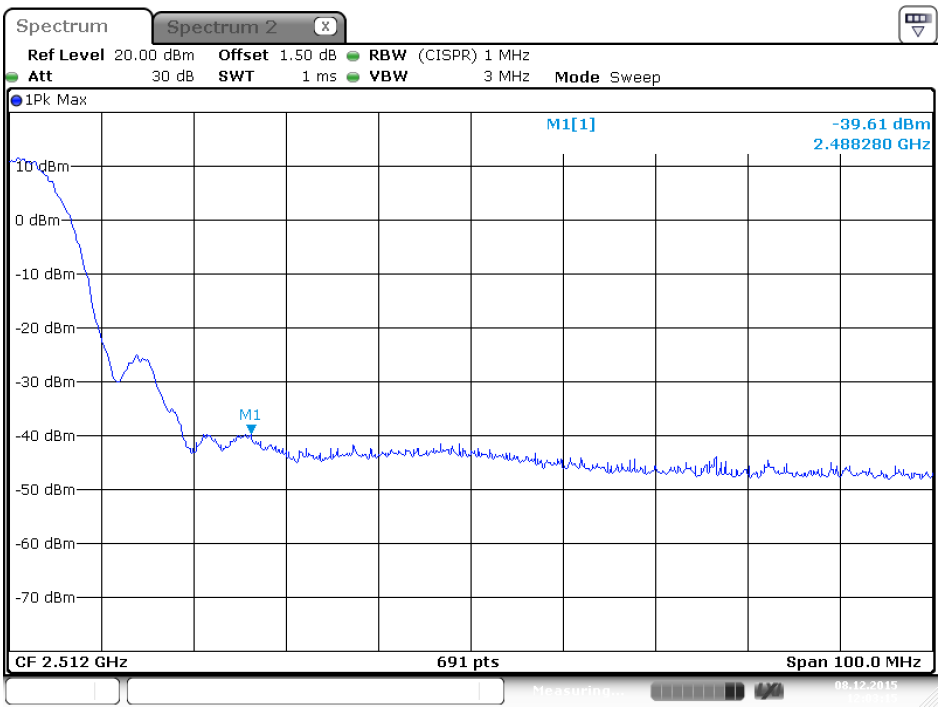
Date: 8.DEC.2015 11:49:48

Plot on Configuration IEEE 802.11b / 2462 MHz / Average / Chain 1



Date: 8.DEC.2015 12:05:06

Plot on Configuration IEEE 802.11b / 2462 MHz / Peak / Chain 1



Date: 8.DEC.2015 12:03:15