

FCC PART 15.247

TEST REPORT

For

Suga Electronics Limited

22/F, Tower B, Billion Centre, 1 Wang Kwong Road, Kowloon Bay, Kowloon, Hong Kong.

FCC ID: VZFSWP33MA0

Report Type: Original Report	Product Type: Wifi module 802.11 b/g/n with AP (Access Point) / Router function
Test Engineer: Jay Li <i>Jay Li</i>	
Report Number: RSZ150316003-00	
Report Date: 2015-05-15	
Jimmy Xiao <i>Jimmy Xiao</i>	
Reviewed By: RF Engineer	
Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION	6
EUT EXERCISE SOFTWARE	6
EQUIPMENT MODIFICATIONS	8
SUPPORT EQUIPMENT LIST AND DETAILS	8
EXTERNAL I/O CABLE.....	8
BLOCK DIAGRAM OF TEST SETUP	9
SUMMARY OF TEST RESULTS	10
FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	11
APPLICABLE STANDARD	11
FCC §15.203 - ANTENNA REQUIREMENT.....	12
APPLICABLE STANDARD	12
ANTENNA CONNECTOR CONSTRUCTION	12
FCC §15.207 (a) - CONDUCTED EMISSIONS	13
APPLICABLE STANDARD	13
MEASUREMENT UNCERTAINTY.....	13
EUT SETUP.....	13
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE	14
TEST EQUIPMENT LIST AND DETAILS.....	14
TEST RESULTS SUMMARY	15
TEST DATA	15
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	18
APPLICABLE STANDARD	18
MEASUREMENT UNCERTAINTY	18
EUT SETUP	18
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	19
TEST PROCEDURE	19
TEST EQUIPMENT LIST AND DETAILS.....	19
CORRECTED AMPLITUDE & MARGIN CALCULATION	20
TEST RESULTS SUMMARY	20
TEST DATA	20
FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING.....	33
APPLICABLE STANDARD	33
TEST PROCEDURE	33
TEST EQUIPMENT LIST AND DETAILS.....	33
TEST DATA	33
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER	47

APPLICABLE STANDARD	47
TEST PROCEDURE	47
TEST EQUIPMENT LIST AND DETAILS.....	47
TEST DATA	47
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE.....	49
APPLICABLE STANDARD	49
TEST PROCEDURE	49
TEST EQUIPMENT LIST AND DETAILS.....	49
TEST DATA	50
FCC §15.247(e) - POWER SPECTRAL DENSITY	59
APPLICABLE STANDARD	59
TEST PROCEDURE	59
TEST EQUIPMENT LIST AND DETAILS.....	59
TEST DATA	59

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Suga Electronics Limited*'s product, model number: *SWP33MA-0(FCC ID: VZFSWP33MA0)* or the "EUT" in this report was a *Wifi module 802.11 b/g/n with AP (Access Point) / Router function*, which was measured approximately: 5.8 cm (L) x 5.0 cm (W) x 2.0 cm (H), rated with input voltage: DC 3.3V (Typical).

**All measurement and test data in this report was gathered from production sample serial number: 1503142 (Assigned by applicant). The EUT supplied by the applicant was received on 2015-03-16.*

Objective

This Type approval report is prepared on behalf of *Suga Electronics Limited* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15-Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

N/A

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, Shihua Road, Futian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b, 802.11g mode and 802.11n-HT20, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT was tested with Channel 1, 6 and 11.

For 802.11n-HT40 mode, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2422	6	2447
2	2427	7	2452
3	2432	/	/
4	2437	/	/
5	2442	/	/

EUT was tested with Channel 1, 4 and 7.

EUT Exercise Software

MT7620.QA.exe

The test was performed under:

Data rate as below:

802.11b: 1 Mbps

802.11g: 6 Mbps

802.11n-HT20: MCS0

802.11n-HT40: MCS0

Power level as below:

Mode	Channel	Antenna 0	Antenna 1
802.11b	Low	OE	15
	Middle	16	16
	High	OF	16
802.11g	Low	07	06
	Middle	11	13
	High	00	06
802.11n-HT20	Low	02	02
	Middle	12	14
	High	00	04
802.11n-HT40	Low	00	01
	Middle	0A	09
	High	00	03

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

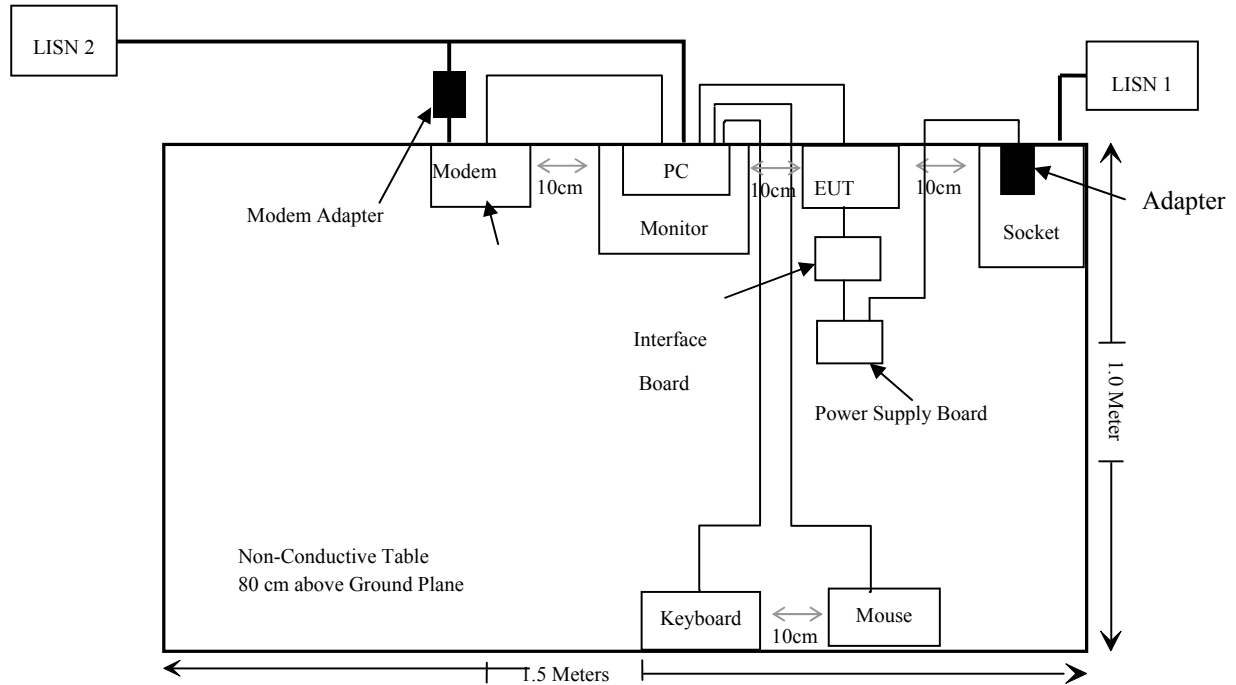
Manufacturer	Description	Model	Serial Number
DELL	PC	VOSTRO 220S	127BP2X
DELL	Monitor	E178WFPC	CN-OWY564-64180-7C4-2SQH
DELL	Keyboard	L100	CNORH656658907BL05DC
DELL	Mouse	MOC5UO	G1900NKD
SAST	Modem	AEM-2100	0293
Suga	Test fixture	/	/

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielding Detachable USB Cable	1.5	Host PC	Mouse
Shielding Detachable Serial Cable	1.2	Host PC	Modem
Shielding Detachable K/B Cable	1.5	Host PC	Keyboard
Shielding Detachable VGA Cable	1.5	Host PC	LCD Monitor
Un-shielding Detachable LAN Cable	2.1	EUT	PC
Un-shielding Un-detachable Adapter Cable	1.5	Adapter	Power Supply Board

Block Diagram of Test Setup

For Conducted Emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a),	Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i) & §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Prediction of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11n-HT20	2437	2.0	1.58	27.12	515.23	20	0.16	1.0

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, 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 a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

This product has two I-PEX antenna connectors which maximum antenna gain is 2.0 dBi, fulfill the requirement of this section, and please refer to the EUT photo.

Result: Compliance.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

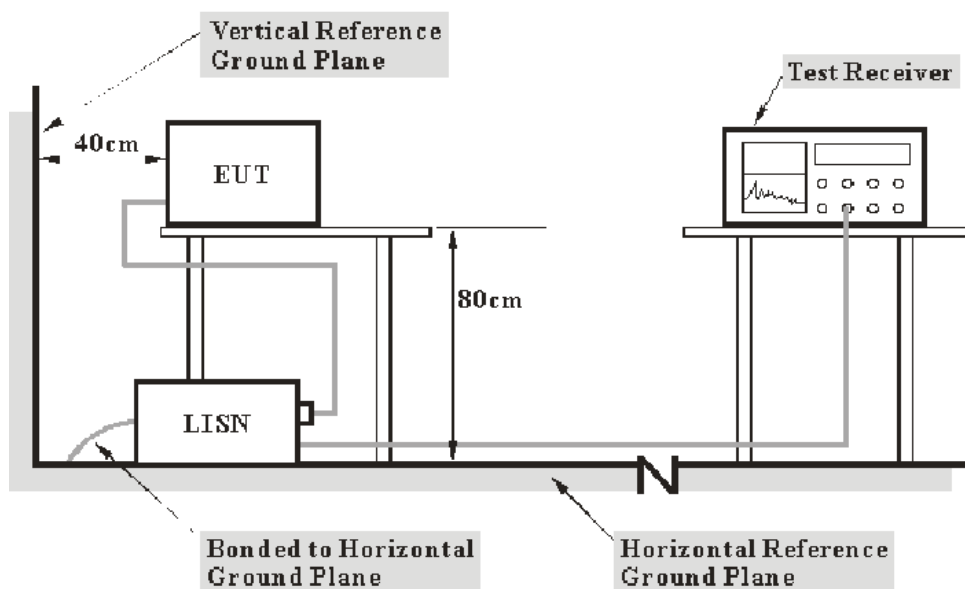
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Expanded Measurement uncertainty
AC Mains	3.26 dB (k=2, 95% level of confidence)
CAT 3	3.70 dB (k=2, 95% level of confidence)
CAT 5	3.86 dB (k=2, 95% level of confidence)
CAT 6	4.64 dB (k=2, 95% level of confidence)

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN, and the other relevant equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and Average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2014-06-03	2015-06-03
Rohde & Schwarz	LISN	ESH2-Z5	892107/021	2014-06-09	2015-06-09
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2014-06-09	2015-06-09
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2014-05-14	2015-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	--	--

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, the worst margin reading as below:

16.5 dB at 16.227510 MHz in the **Neutral** conductor mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In our lab., $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

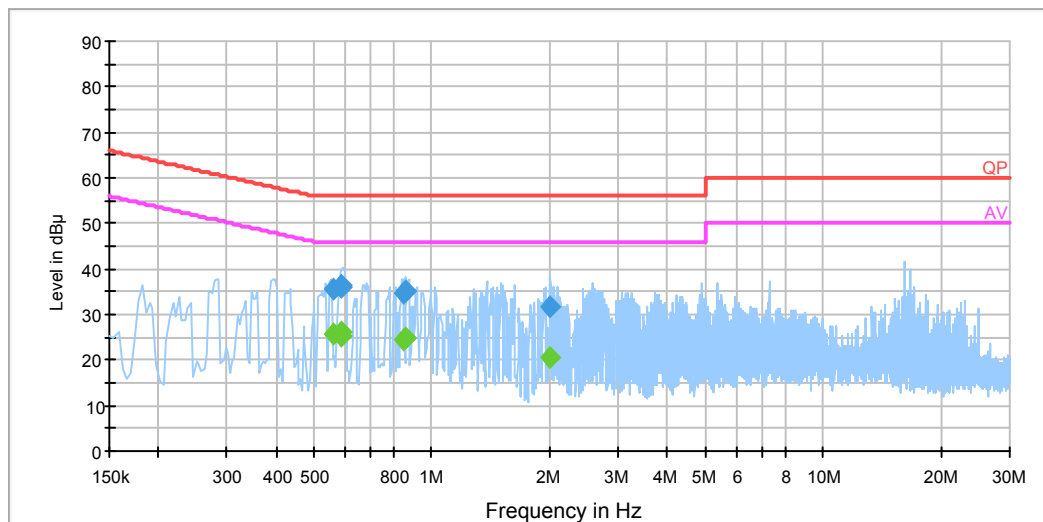
Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Jay Li on 2015-04-27.

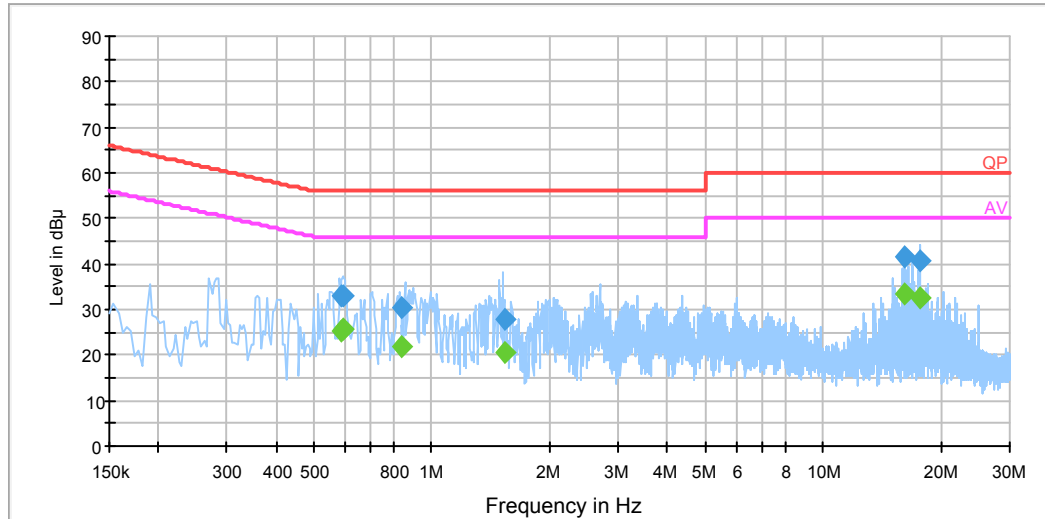
Test Mode: Transmitting

AC 120 V, 60 Hz, Line:**EMI Auto Test L**

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.557690	35.6	19.3	56.0	20.4	QP
0.557690	25.5	19.3	46.0	20.5	Ave.
0.585090	35.9	19.3	56.0	20.1	QP
0.585090	26.0	19.3	46.0	20.0	Ave.
0.589030	36.4	19.3	56.0	19.6	QP
0.589030	25.4	19.3	46.0	20.6	Ave.
0.849370	34.9	19.3	56.0	21.1	QP
0.849370	24.4	19.3	46.0	21.6	Ave.
0.857130	34.9	19.3	56.0	21.1	QP
0.857130	24.8	19.3	46.0	21.2	Ave.
2.003790	31.6	19.4	56.0	24.4	QP
2.003790	20.5	19.4	46.0	25.5	Ave.

AC 120V, 60 Hz, Neutral:

EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/QP/Ave.)
0.589090	32.9	19.3	56.0	23.1	QP
0.589090	25.2	19.3	46.0	20.8	Ave.
0.593030	33.2	19.3	56.0	22.8	QP
0.593030	25.9	19.3	46.0	20.1	Ave.
0.841190	30.6	19.3	56.0	25.4	QP
0.841190	22.0	19.3	46.0	24.0	Ave.
1.544830	27.8	19.4	56.0	28.2	QP
1.544830	20.5	19.4	46.0	25.5	Ave.
16.227510	41.6	19.7	60.0	18.4	QP
16.227510	33.5	19.7	50.0	16.5	Ave.
17.692590	40.6	19.7	60.0	19.4	QP
17.692590	32.8	19.7	50.0	17.2	Ave.

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss
- 3) Margin = Limit – Corrected Amplitude

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

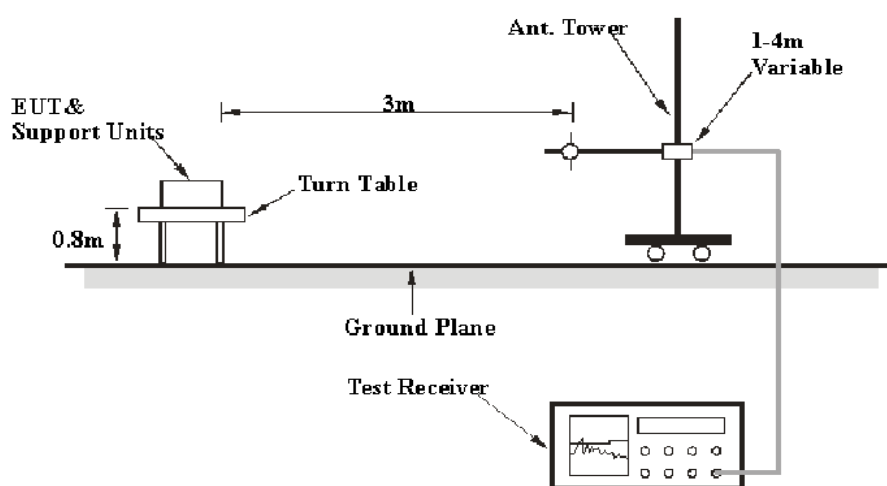
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (Ave. erage), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report

Frequency	Polarity	Measurement uncertainty
30MHz~200MHz	Horizontal	4.62 dB (k=2, 95% level of confidence)
	Vertical	4.54 dB (k=2, 95% level of confidence)
200MHz~1GHz	Horizontal	4.84 dB (k=2, 95% level of confidence)
	Vertical	5.91 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	Horizontal / Vertical	4.68 dB (k=2, 95% level of confidence)
Above 6 GHz	Horizontal / Vertical	4.92 dB (k=2, 95% level of confidence)

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

During the radiated emission test, the adapter was connected to the outlet of the first LISN, and the other relevant equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2014-05-06	2015-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2014-09-25	2015-09-25
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2012-11-28	2015-11-27
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
Sunol Sciences	Horn Antenna	DRH-118	A052304	2012-12-01	2015-11-30
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2014-11-12	2015-11-12
DUCOMMUN	Pre-amplifier	ALN-22093530-01	991373-01	2014-08-03	2015-08-03
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
TDK	Chamber	Chamber A	2#	2012-10-15	2015-10-15
TDK	Chamber	Chamber B	1#	2012-07-23	2015-07-23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, the worst margin reading as below:

0.87 dB at 2484.56 MHz in the Horizontal polarization for 802.11n-HT40 mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{lim} + U_{cispr}$$

In our lab., $U_{(L_m)}$ is less than $+ U_{cispr}$, if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Jay Li on 2015-04-27.

Test Mode: Transmitting

For 802.11b and 802.11g mode, the EUT is transmitting single with antenna 0 or antenna 1.

For 802.11n mode, the EUT is transmitting synchronously with antenna 0 and antenna 1.

30 MHz-25 GHz**802.11b mode :(Antenna 0)**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
387.36	53.77	QP	73	1.7	V	-10.70	43.07	46	2.93
2412.00	108.30	PK	211	1.6	H	4.27	112.57	/	/
2412.00	98.06	Ave.	211	1.6	H	4.27	102.33	/	/
2412.00	96.13	PK	146	1.8	V	4.17	100.30	/	/
2412.00	85.79	Ave.	146	1.8	V	4.17	89.96	/	/
2931.62	49.16	PK	229	2.4	H	8.96	58.12	74	15.88
2931.62	36.06	Ave.	229	2.4	H	8.96	45.02	54	8.98
2389.00	63.25	PK	52	2.3	H	4.27	67.52	74	6.48
2389.00	37.46	Ave.	52	2.3	H	4.27	41.73	54	12.27
2484.41	53.70	PK	57	1.5	H	7.99	61.69	74	12.31
2484.41	36.54	Ave.	57	1.5	H	7.99	44.53	54	9.47
4824.00	41.48	PK	140	2.3	H	14.21	55.69	74	18.31
4824.00	25.80	Ave.	140	2.3	H	14.21	40.01	54	13.99
7236.00	39.54	PK	126	1.8	H	20.60	60.14	74	13.86
7236.00	20.33	Ave.	126	1.8	H	20.60	40.93	54	13.07
9648.00	35.06	PK	354	1.2	V	24.84	59.90	74	14.10
9648.00	19.62	Ave.	354	1.2	V	24.84	44.46	54	9.54
Middle Channel (2437 MHz)									
387.36	52.16	QP	224	1.8	V	-10.70	41.46	46	4.54
2437.00	107.93	PK	348	1.1	H	4.27	112.20	/	/
2437.00	102.23	Ave.	348	1.1	H	4.27	106.50	/	/
2437.00	101.85	PK	180	1.6	V	4.17	106.02	/	/
2437.00	95.74	Ave.	180	1.6	V	4.17	99.91	/	/
2389.00	56.06	PK	151	1.4	H	4.27	60.33	74	13.67
2389.00	37.88	Ave.	151	1.4	H	4.27	42.15	54	11.85
2483.61	56.21	PK	180	1.7	H	7.99	64.20	74	9.80
2483.61	35.52	Ave.	180	1.7	H	7.99	43.51	54	10.49
2732.49	48.60	PK	5	1.1	H	8.31	56.91	74	17.09
2732.49	35.65	Ave.	5	1.1	H	8.31	43.96	54	10.04
4874.00	40.32	PK	63	1.7	H	14.79	55.11	74	18.89
4874.00	25.45	Ave.	63	1.7	H	14.79	40.24	54	13.76
7311.00	39.33	PK	271	2.3	H	20.92	60.25	74	13.75
7311.00	20.12	Ave.	271	2.3	H	20.92	41.04	54	12.96
9748.00	35.13	PK	264	1.7	V	24.84	59.97	74	14.03
9748.00	19.87	Ave.	264	1.7	V	24.84	44.71	54	9.29

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
387.36	53.42	QP	254	1.5	V	-10.70	42.72	46	3.28
2462.00	107.51	PK	342	1.3	H	7.99	115.50	/	/
2462.00	101.39	Ave.	342	1.3	H	7.99	109.38	/	/
2462.00	100.77	PK	139	2.0	V	7.59	108.36	/	/
2462.00	94.79	Ave.	139	2.0	V	7.59	102.38	/	/
2314.00	54.74	PK	53	1.1	H	3.93	58.67	74	15.33
2314.00	36.12	Ave.	53	1.1	H	3.93	40.05	54	13.95
2485.33	62.88	PK	287	2.2	H	7.99	70.87	74	3.13
2485.33	44.50	Ave.	287	2.2	H	7.99	52.49	54	1.51
2897.51	49.99	PK	324	1.3	H	8.96	58.95	74	15.05
2897.51	35.24	Ave.	324	1.3	H	8.96	44.20	54	9.80
4924.00	40.09	PK	67	1.5	H	14.79	54.88	74	19.12
4924.00	26.50	Ave.	67	1.5	H	14.79	41.29	54	12.71
7386.00	38.48	PK	308	1.4	V	21.21	59.69	74	14.31
7386.00	20.52	Ave.	308	1.4	V	21.21	41.73	54	12.27
9848.00	35.91	PK	300	2.3	H	25.90	61.81	74	12.19
9848.00	20.81	Ave.	300	2.3	H	25.90	46.71	54	7.29

802.11b mode:(Antenna 1)

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
387.36	53.71	QP	96	1.6	V	-10.70	43.01	46	2.99
2412.00	106.68	PK	355	2.2	H	4.27	110.95	/	/
2412.00	101.09	Ave.	355	2.2	H	4.27	105.36	/	/
2412.00	99.90	PK	166	2.4	V	4.17	104.07	/	/
2412.00	95.65	Ave.	166	2.4	V	4.17	99.82	/	/
2388.00	62.40	PK	167	1.3	H	4.27	66.67	74	7.33
2388.00	44.69	Ave.	167	1.3	H	4.27	48.96	54	5.04
2489.94	51.54	PK	256	2.1	H	7.99	59.53	74	14.47
2489.94	36.49	Ave.	256	2.1	H	7.99	44.48	54	9.52
2986.02	46.61	PK	302	2.4	H	11.28	57.89	74	16.11
2986.02	35.44	Ave.	302	2.4	H	11.28	46.72	54	7.28
4824.00	40.09	PK	60	2.2	H	14.21	54.30	74	19.70
4824.00	25.16	Ave.	60	2.2	H	14.21	39.37	54	14.63
7236.00	39.58	PK	163	2.5	H	20.60	60.18	74	13.82
7236.00	20.81	Ave.	163	2.5	H	20.60	41.41	54	12.59
9648.00	34.79	PK	48	1.6	V	24.84	59.63	74	14.37
9648.00	19.21	Ave.	48	1.6	V	24.84	44.05	54	9.95
Middle Channel (2437 MHz)									
387.36	53.23	QP	267	2.3	V	-10.70	42.53	46	3.47
2437.00	104.73	PK	125	2.4	H	7.99	112.72	/	/
2437.00	98.49	Ave.	125	2.4	H	7.99	106.48	/	/
2437.00	99.44	PK	212	1.1	V	4.27	103.71	/	/
2437.00	92.50	Ave.	212	1.1	V	4.27	96.77	/	/
2310.39	52.70	PK	278	1.9	H	3.93	56.63	74	17.37
2310.39	36.03	Ave.	278	1.9	H	3.93	39.96	54	14.04
2491.75	51.98	PK	236	1.5	H	7.99	59.97	74	14.03
2491.75	36.85	Ave.	236	1.5	H	7.99	44.84	54	9.16
2810.61	49.68	PK	275	2.3	H	8.41	58.09	74	15.91
2810.61	36.82	Ave.	275	2.3	H	8.41	45.23	54	8.77
4874.00	41.11	PK	346	1.4	H	14.79	55.90	74	18.10
4874.00	26.09	Ave.	346	1.4	H	14.79	40.88	54	13.12
7311.00	38.30	PK	334	1.8	H	20.92	59.22	74	14.78
7311.00	21.23	Ave.	334	1.8	H	20.92	42.15	54	11.85
9748.00	34.21	PK	240	2.4	V	24.84	59.05	74	14.95
9748.00	19.88	Ave.	240	2.4	V	24.84	44.72	54	9.28

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
387.36	52.41	QP	337	1.3	V	-10.70	41.71	46	4.29
2462.00	103.95	PK	213	2.3	H	7.99	111.94	/	/
2462.00	98.08	Ave.	213	2.3	H	7.99	106.07	/	/
2462.00	98.62	PK	17	1.6	V	7.99	106.61	/	/
2462.00	92.98	Ave.	17	1.6	V	7.99	100.97	/	/
2336.23	53.38	PK	284	2.4	H	3.93	57.31	74	16.69
2336.23	35.60	Ave.	284	2.4	H	3.93	39.53	54	14.47
2483.63	57.16	PK	183	1.6	H	7.99	65.15	74	8.85
2483.63	38.67	Ave.	183	1.6	H	7.99	46.66	54	7.34
2754.37	49.19	PK	297	2.0	H	8.41	57.60	74	16.40
2754.37	36.24	Ave.	297	2.0	H	8.41	44.65	54	9.35
4924.00	41.07	PK	193	2.3	H	14.79	55.86	74	18.14
4924.00	26.04	Ave.	193	2.3	H	14.79	40.83	54	13.17
7386.00	38.41	PK	143	2.4	V	21.21	59.62	74	14.38
7386.00	20.09	Ave.	143	2.4	V	21.21	41.30	54	12.70
9848.00	34.36	PK	333	1.3	H	25.90	60.26	74	13.74
9848.00	19.27	Ave.	333	1.3	H	25.90	45.17	54	8.83

802.11g Mode:(Antenna 0)

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
387.36	52.12	QP	321	2.4	V	-10.70	41.42	46	4.58
2412.00	107.39	PK	357	2.3	H	4.27	111.66	/	/
2412.00	95.26	Ave.	357	2.3	H	4.27	99.53	/	/
2412.00	99.77	PK	190	2.4	V	4.17	103.94	/	/
2412.00	89.99	Ave.	190	2.4	V	4.17	94.16	/	/
2356.37	65.09	PK	311	1.7	H	4.27	69.36	74	4.64
2356.37	47.14	Ave.	311	1.7	H	4.27	51.41	54	2.59
2499.16	51.74	PK	177	1.8	H	7.99	59.73	74	14.27
2499.16	35.92	Ave.	177	1.8	H	7.99	43.91	54	10.09
2931.64	48.63	PK	30	2.0	H	8.96	57.59	74	16.41
2931.64	36.36	Ave.	30	2.0	H	8.96	45.32	54	8.68
4824.00	40.59	PK	261	1.0	H	14.21	54.80	74	19.20
4824.00	25.34	Ave.	261	1.0	H	14.21	39.55	54	14.45
7236.00	38.23	PK	356	1.9	V	20.60	58.83	74	15.17
7236.00	20.60	Ave.	356	1.9	V	20.60	41.20	54	12.80
9648.00	34.17	PK	108	1.2	H	24.84	59.01	74	14.99
9648.00	20.72	Ave.	108	1.2	H	24.84	45.56	54	8.44
Middle Channel (2437 MHz)									
387.36	53.46	QP	91	1.6	V	-10.70	42.76	46	3.24
2437.00	109.75	PK	147	2.2	H	4.27	114.02	/	/
2437.00	102.46	Ave.	147	2.2	H	4.27	106.73	/	/
2437.00	99.06	PK	254	1.0	V	4.17	103.23	/	/
2437.00	89.23	Ave.	254	1.0	V	4.17	93.40	/	/
2368.41	53.14	PK	299	2.3	H	4.27	57.41	74	16.59
2368.41	36.12	Ave.	299	2.3	H	4.27	40.39	54	13.61
2496.35	50.21	PK	95	2.2	H	7.99	58.20	74	15.80
2496.35	35.26	Ave.	95	2.2	H	7.99	43.25	54	10.75
2997.87	48.70	PK	158	1.1	H	11.28	59.98	74	14.02
2997.87	35.33	Ave.	158	1.1	H	11.28	46.61	54	7.39
4874.00	40.50	PK	55	2.3	H	14.79	55.29	74	18.71
4874.00	26.49	Ave.	55	2.3	H	14.79	41.28	54	12.72
7311.00	38.92	PK	72	2.4	H	20.92	59.84	74	14.16
7311.00	20.48	Ave.	72	2.4	H	20.92	41.40	54	12.60
9748.00	34.23	PK	60	1.9	V	24.84	59.07	74	14.93
9748.00	20.34	Ave.	60	1.9	V	24.84	45.18	54	8.82

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
387.36	53.66	QP	141	1.9	V	-10.70	42.96	46	3.04
2462.00	103.68	PK	301	1.8	H	7.99	111.67	/	/
2462.00	96.62	Ave.	301	1.8	H	7.99	104.61	/	/
2462.00	99.78	PK	145	2.4	V	7.59	107.37	/	/
2462.00	95.54	Ave.	145	2.4	V	7.59	103.13	/	/
2333.85	53.74	PK	188	2.3	H	3.93	57.67	74	16.33
2333.85	35.88	Ave.	188	2.3	H	3.93	39.81	54	14.19
2485.19	62.66	PK	155	1.6	H	7.99	70.65	74	3.35
2485.19	42.80	Ave.	155	1.6	H	7.99	50.79	54	3.21
2995.91	49.05	PK	315	2.2	H	11.28	60.33	74	13.67
2995.91	35.52	Ave.	315	2.2	H	11.28	46.80	54	7.20
4924.00	40.15	PK	354	2.2	H	14.79	54.94	74	19.06
4924.00	25.33	Ave.	354	2.2	H	14.79	40.12	54	13.88
7386.00	39.01	PK	243	2.4	H	21.21	60.22	74	13.78
7386.00	21.88	Ave.	243	2.4	H	21.21	43.09	54	10.91
9848.00	34.81	PK	118	2.1	H	25.90	60.71	74	13.29
9848.00	20.43	Ave.	118	2.1	H	25.90	46.33	54	7.67

802.11g Mode:(Antenna 1)

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
387.36	52.13	QP	187	2.3	V	-10.70	41.43	46	4.57
2412.00	104.27	PK	272	1.1	H	4.27	108.54	/	/
2412.00	92.42	Ave.	272	1.1	H	4.27	96.69	/	/
2412.00	98.67	PK	351	2.1	V	4.27	102.94	/	/
2412.00	89.52	Ave.	351	2.1	V	4.27	93.79	/	/
2348.40	65.91	PK	69	2.4	H	4.27	70.18	74	3.82
2348.40	46.55	Ave.	69	2.4	H	4.27	50.82	54	3.18
2486.72	51.67	PK	120	1.2	H	7.99	59.66	74	14.34
2486.72	36.84	Ave.	120	1.2	H	7.99	44.83	54	9.17
2767.43	48.62	PK	312	1.9	H	8.41	57.03	74	16.97
2767.43	35.65	Ave.	312	1.9	H	8.41	44.06	54	9.94
4824.00	40.91	PK	154	1.2	H	14.21	55.12	74	18.88
4824.00	26.09	Ave.	154	1.2	H	14.21	40.30	54	13.70
7236.00	38.62	PK	93	2.3	H	20.60	59.22	74	14.78
7236.00	20.58	Ave.	93	2.3	H	20.60	41.18	54	12.82
9648.00	34.82	PK	172	2.3	V	24.84	59.66	74	14.34
9648.00	19.14	Ave.	172	2.3	V	24.84	43.98	54	10.02
Middle Channel (2437 MHz)									
387.36	53.55	QP	148	1.0	V	-10.70	42.85	46	3.15
2437.00	106.32	PK	295	1.5	H	4.27	110.59	/	/
2437.00	94.11	Ave.	295	1.5	H	4.27	98.38	/	/
2437.00	99.81	PK	80	1.7	V	4.27	104.08	/	/
2437.00	87.23	Ave.	80	1.7	V	4.27	91.50	/	/
2359.39	52.08	PK	212	1.7	H	4.27	56.35	74	17.65
2359.39	36.44	Ave.	212	1.7	H	4.27	40.71	54	13.29
2496.49	51.71	PK	260	1.2	H	7.99	59.70	74	14.30
2496.49	35.66	Ave.	260	1.2	H	7.99	43.65	54	10.35
2988.08	48.36	PK	42	2.3	H	11.28	59.64	74	14.36
2988.08	35.96	Ave.	42	2.3	H	11.28	47.24	54	6.76
4874.00	40.93	PK	148	2.0	H	14.79	55.72	74	18.28
4874.00	25.32	Ave.	148	2.0	H	14.79	40.11	54	13.89
7311.00	39.85	PK	300	1.3	H	20.92	60.77	74	13.23
7311.00	21.78	Ave.	300	1.3	H	20.92	42.70	54	11.30
9748.00	35.38	PK	286	2.0	H	24.84	60.22	74	13.78
9748.00	19.20	Ave.	286	2.0	H	24.84	44.04	54	9.96

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
387.36	52.40	QP	127	2.5	V	-10.70	41.70	46	4.30
2462.00	100.91	PK	102	1.5	H	7.99	108.90	/	/
2462.00	88.57	Ave.	102	1.5	H	7.99	96.56	/	/
2462.00	99.15	PK	166	1.3	V	7.99	107.14	/	/
2462.00	86.03	Ave.	166	1.3	V	7.99	94.02	/	/
2334.20	52.97	PK	108	2.0	H	3.93	56.90	74	17.10
2334.20	35.59	Ave.	108	2.0	H	3.93	39.52	54	14.48
2484.27	57.61	PK	90	1.8	H	7.99	65.60	74	8.40
2484.27	38.67	Ave.	90	1.8	H	7.99	46.66	54	7.34
2936.24	49.38	PK	313	1.6	H	8.96	58.34	74	15.66
2936.24	36.69	Ave.	313	1.6	H	8.96	45.65	54	8.35
4924.00	40.95	PK	240	2.1	H	14.79	55.74	74	18.26
4924.00	25.82	Ave.	240	2.1	H	14.79	40.61	54	13.39
7386.00	39.41	PK	119	1.3	H	21.21	60.62	74	13.38
7386.00	21.66	Ave.	119	1.3	H	21.21	42.87	54	11.13
9848.00	35.48	PK	21	1.7	H	25.90	61.38	74	12.62
9848.00	19.24	Ave.	21	1.7	H	25.90	45.14	54	8.86

802.11n-HT20 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
387.36	53.88	QP	145	2.2	V	-10.70	43.18	46	2.82
2412.00	107.87	PK	1	1.3	H	4.27	112.14	/	/
2412.00	94.25	Ave.	1	1.3	H	4.27	98.52	/	/
2412.00	98.65	PK	327	2.4	V	4.27	102.92	/	/
2412.00	87.13	Ave.	327	2.4	V	4.27	91.40	/	/
2378.92	66.73	PK	56	1.3	H	4.27	71.00	74	3.00
2378.92	45.94	Ave.	56	1.3	H	4.27	50.21	54	3.79
2491.20	51.39	PK	140	1.2	H	7.99	59.38	74	14.62
2491.20	36.16	Ave.	140	1.2	H	7.99	44.15	54	9.85
2837.91	48.74	PK	162	2.2	H	8.41	57.15	74	16.85
2837.91	35.92	Ave.	162	2.2	H	8.41	44.33	54	9.67
4824.00	40.94	PK	49	1.8	H	14.21	55.15	74	18.85
4824.00	25.12	Ave.	49	1.8	H	14.21	39.33	54	14.67
7236.00	38.31	PK	356	1.2	H	20.60	58.91	74	15.09
7236.00	20.48	Ave.	356	1.2	H	20.60	41.08	54	12.92
9648.00	34.98	PK	81	2.1	V	24.84	59.82	74	14.18
9648.00	19.98	Ave.	81	2.1	V	24.84	44.82	54	9.18
Middle Channel (2437 MHz)									
387.36	53.40	QP	71	1.2	V	-10.70	42.70	46	3.30
2437.00	105.12	PK	236	2.2	H	4.27	109.39	/	/
2437.00	94.93	Ave.	236	2.2	H	4.27	99.20	/	/
2437.00	98.21	PK	194	2.3	V	4.27	102.48	/	/
2437.00	86.62	Ave.	194	2.3	V	4.27	90.89	/	/
2377.82	52.11	PK	349	1.2	H	4.27	56.38	74	17.62
2377.82	36.80	Ave.	349	1.2	H	4.27	41.07	54	12.93
2484.65	51.63	PK	133	2.1	H	7.99	59.62	74	14.38
2484.65	35.75	Ave.	133	2.1	H	7.99	43.74	54	10.26
2874.83	49.73	PK	315	1.2	H	8.96	58.69	74	15.31
2874.83	36.28	Ave.	315	1.2	H	8.96	45.24	54	8.76
4874.00	40.26	PK	290	1.1	H	14.79	55.05	74	18.95
4874.00	26.55	Ave.	290	1.1	H	14.79	41.34	54	12.66
7311.00	39.53	PK	323	1.9	H	20.92	60.45	74	13.55
7311.00	21.85	Ave.	323	1.9	H	20.92	42.77	54	11.23
9748.00	34.95	PK	181	2.1	V	24.84	59.79	74	14.21
9748.00	20.04	Ave.	181	2.1	V	24.84	44.88	54	9.12

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
387.36	52.66	QP	163	1.3	V	-10.70	41.96	46	4.04
2462.00	105.59	PK	160	2.3	H	7.99	113.58	/	/
2462.00	91.39	Ave.	160	2.3	H	7.99	99.38	/	/
2462.00	98.35	PK	137	1.8	V	7.59	105.94	/	/
2462.00	95.22	Ave.	137	1.8	V	7.59	102.81	/	/
2484.73	64.64	PK	146	1.1	H	7.99	72.63	74	1.37
2484.73	44.30	Ave.	146	1.1	H	7.99	52.29	54	1.71
2318.44	53.39	PK	328	1.4	H	3.93	57.32	74	16.68
2318.44	35.93	Ave.	328	1.4	H	3.93	39.86	54	14.14
2990.11	48.26	PK	251	1.9	H	11.28	59.54	74	14.46
2990.11	35.91	Ave.	251	1.9	H	11.28	47.19	54	6.81
4924.00	41.58	PK	174	2.1	H	14.79	56.37	74	17.63
4924.00	26.06	Ave.	174	2.1	H	14.79	40.85	54	13.15
7386.00	38.85	PK	231	2.4	V	21.21	60.06	74	13.94
7386.00	20.20	Ave.	231	2.4	V	21.21	41.41	54	12.59
9848.00	34.41	PK	169	2.1	H	25.90	60.31	74	13.69
9848.00	19.38	Ave.	169	2.1	H	25.90	45.28	54	8.72

802.11n-HT40 Mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel(2422MHz)									
387.36	52.84	QP	136	1.0	V	-10.70	42.14	46	3.86
2422.00	103.40	PK	36	1.3	H	4.27	107.67	/	/
2422.00	88.78	Ave.	36	1.3	H	4.27	93.05	/	/
2422.00	98.76	PK	235	1.4	V	4.17	102.93	/	/
2422.00	88.81	Ave.	235	1.4	V	4.17	92.98	/	/
2369.34	66.75	PK	68	1.9	H	4.27	71.02	74	2.98
2369.34	46.42	Ave.	68	1.9	H	4.27	50.69	54	3.31
2497.09	51.44	PK	239	2.2	H	7.99	59.43	74	14.57
2497.09	36.36	Ave.	239	2.2	H	7.99	44.35	54	9.65
2832.68	48.40	PK	281	1.7	H	8.41	56.81	74	17.19
2832.68	35.23	Ave.	281	1.7	H	8.41	43.64	54	10.36
4844.00	41.76	PK	286	1.6	H	14.21	55.97	74	18.03
4844.00	25.68	Ave.	286	1.6	H	14.21	39.89	54	14.11
7266.00	39.66	PK	20	1.5	H	20.92	60.58	74	13.42
7266.00	20.54	Ave.	20	1.5	H	20.92	41.46	54	12.54
9688.00	34.26	PK	214	1.9	H	24.84	59.10	74	14.90
9688.00	19.88	Ave.	214	1.9	H	24.84	44.72	54	9.28
Middle Channel(2437MHz)									
387.36	53.01	QP	178	1.9	V	-10.70	42.31	46	3.69
2437.00	106.49	PK	211	2.2	H	4.27	110.76	/	/
2437.00	90.67	Ave.	211	2.2	H	4.27	94.94	/	/
2437.00	98.18	PK	256	1.9	V	4.17	102.35	/	/
2437.00	88.87	Ave.	256	1.9	V	4.17	93.04	/	/
2367.68	53.10	PK	8	1.6	H	4.27	57.37	74	16.63
2367.68	36.12	Ave.	8	1.6	H	4.27	40.39	54	13.61
2495.84	50.51	PK	15	2.0	H	7.99	58.50	74	15.50
2495.84	35.20	Ave.	15	2.0	H	7.99	43.19	54	10.81
2787.30	48.04	PK	108	2.1	H	8.41	56.45	74	17.55
2787.30	36.91	Ave.	108	2.1	H	8.41	45.32	54	8.68
4874.00	41.18	PK	285	1.3	H	14.79	55.97	74	18.03
4874.00	25.93	Ave.	285	1.3	H	14.79	40.72	54	13.28
7311.00	38.03	PK	357	1.7	V	20.92	58.95	74	15.05
7311.00	21.22	Ave.	357	1.7	V	20.92	42.14	54	11.86
9748.00	34.80	PK	276	1.3	V	24.84	59.64	74	14.36
9748.00	20.65	Ave.	276	1.3	V	24.84	45.49	54	8.51

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel(2452 MHz)									
387.36	52.53	QP	350	1.1	V	-10.70	41.83	46	4.17
2452.00	101.33	PK	354	1.4	H	7.99	109.32	/	/
2452.00	86.12	Ave.	354	1.4	H	7.99	94.11	/	/
2452.00	99.81	PK	71	2.0	V	7.59	107.40	/	/
2452.00	88.93	Ave.	71	2.0	V	7.59	96.52	/	/
2484.56	65.14	PK	50	1.5	H	7.99	73.13	74	0.87
2484.56	45.06	Ave.	50	1.5	H	7.99	53.05	54	0.95
2372.63	53.30	PK	270	1.8	H	4.27	57.57	74	16.43
2372.63	36.63	Ave.	270	1.8	H	4.27	40.90	54	13.10
2846.33	48.18	PK	119	1.4	H	8.41	56.59	74	17.41
2846.33	35.73	Ave.	119	1.4	H	8.41	44.14	54	9.86
4904.00	40.17	PK	305	2.0	H	14.79	54.96	74	19.04
4904.00	25.49	Ave.	305	2.0	H	14.79	40.28	54	13.72
7356.00	38.99	PK	269	1.9	H	21.21	60.20	74	13.80
7356.00	20.34	Ave.	269	1.9	H	21.21	41.55	54	12.45
9808.00	34.96	PK	3	1.0	V	25.90	60.86	74	13.14
9808.00	19.55	Ave.	3	1.0	V	25.90	45.45	54	8.55

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) + Cable loss – Amplifier Factor

Margin = Limit - Corrected Amplitude

FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING

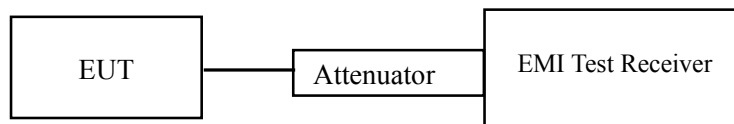
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r02

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24-26 °C
Relative Humidity:	52-56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jay Li from 2015-04-28 to 2015-05-04.

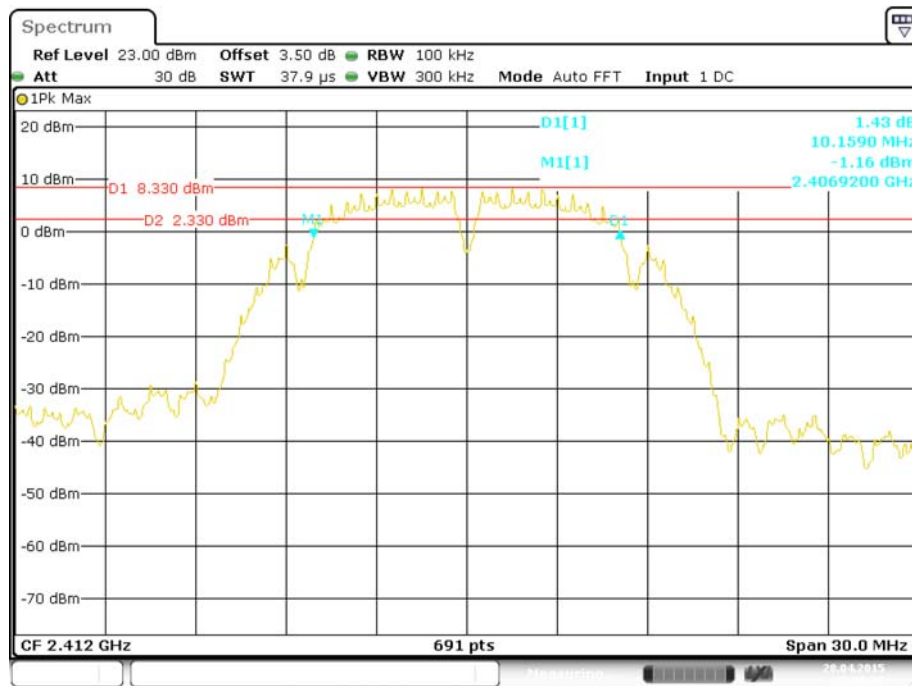
Test Mode: Transmitting

Test Result: Pass.

Please refer to the following tables and plots.

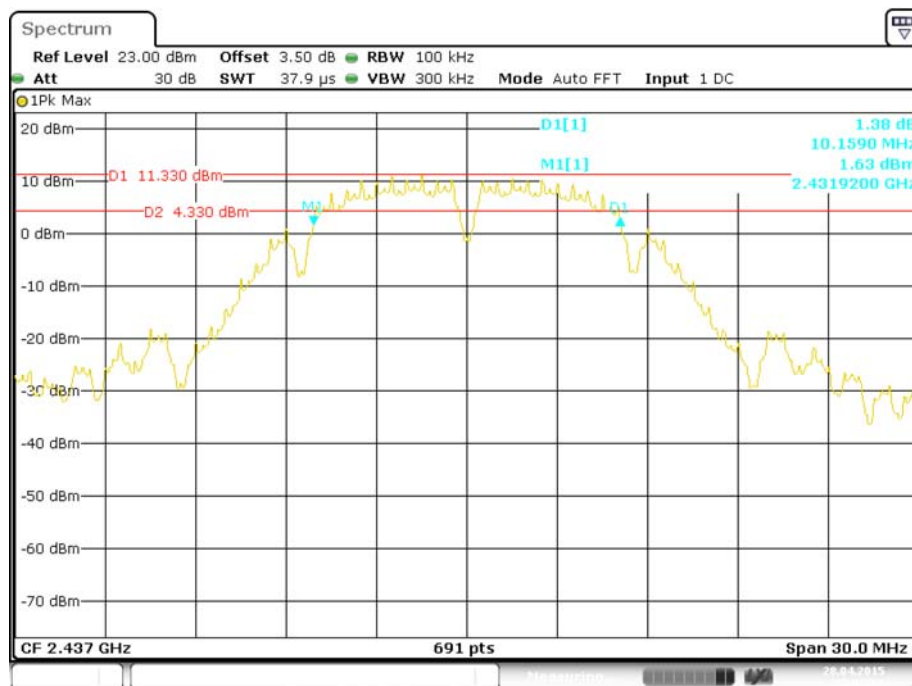
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)		Limit (kHz)	Result
		Antenna 0	Antenna 1		
802.11b mode					
Low	2412	10.16	10.16	≥500	Pass
Middle	2437	10.16	10.16	≥500	Pass
High	2462	10.16	10.16	≥500	Pass
802.11g mode					
Low	2412	16.41	16.41	≥500	Pass
Middle	2437	16.45	16.46	≥500	Pass
High	2462	16.41	16.41	≥500	Pass
802.11n-HT20 mode					
Low	2412	17.41	17.41	≥500	Pass
Middle	2437	17.41	17.54	≥500	Pass
High	2462	17.37	17.41	≥500	Pass
802.11n-HT40 mode					
Low	2422	36.27	36.16	≥500	Pass
Middle	2437	36.20	36.27	≥500	Pass
High	2452	36.16	36.27	≥500	Pass

802.11b Low Channel, Antenna 0



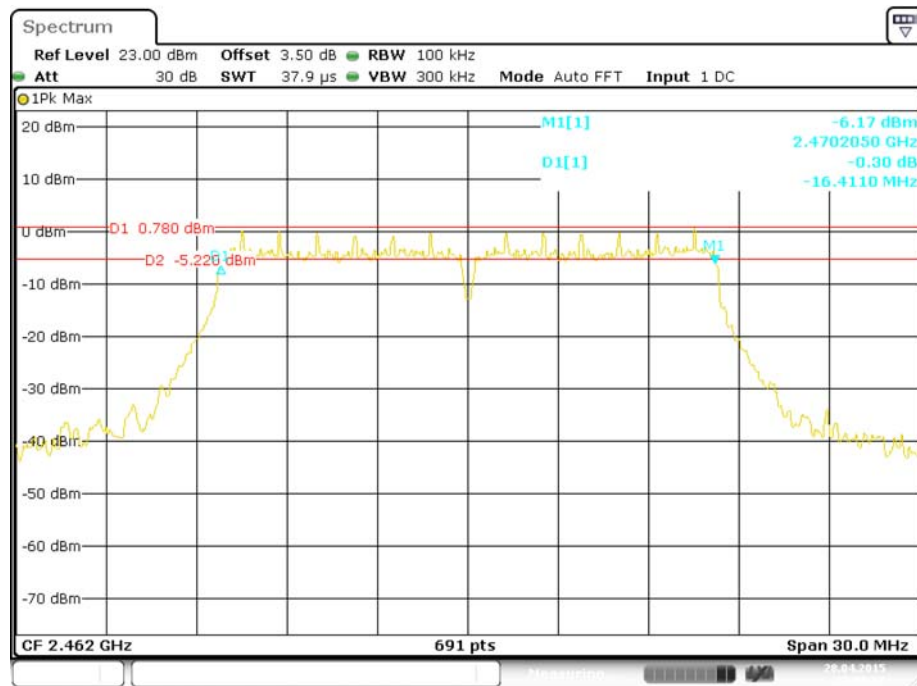
Date: 28.APR.2015 22:40:39

802.11b Middle Channel, Antenna 0



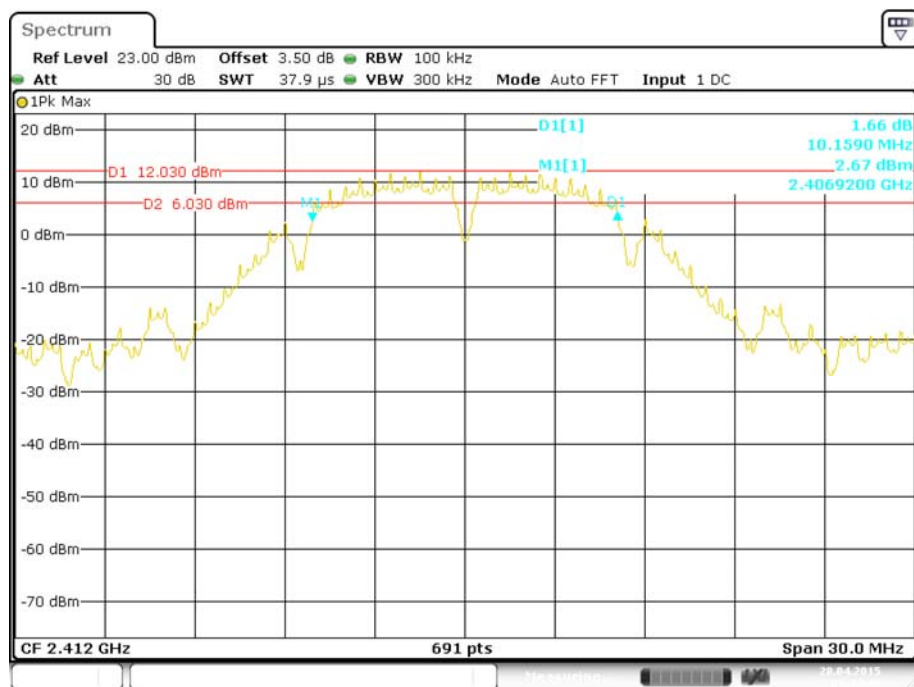
Date: 28.APR.2015 22:43:59

802.11b High Channel, Antenna 0

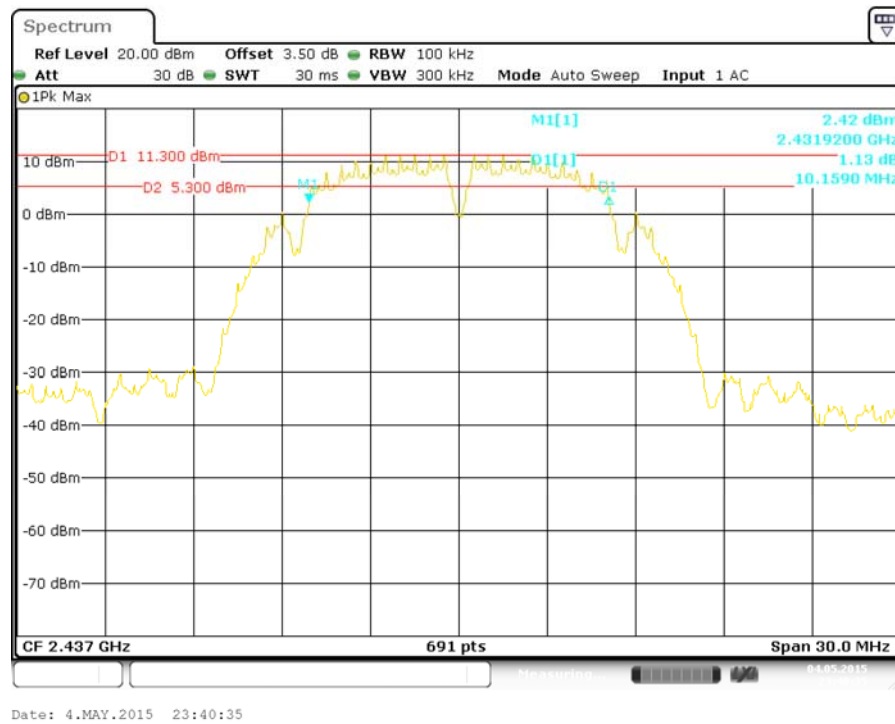
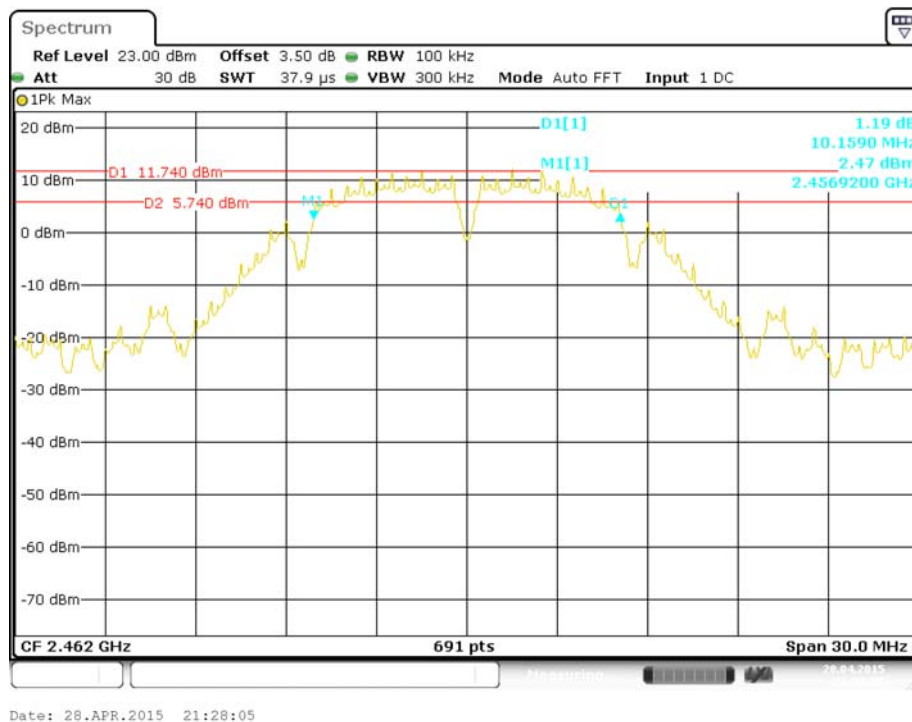


Date: 28.APR.2015 23:09:08

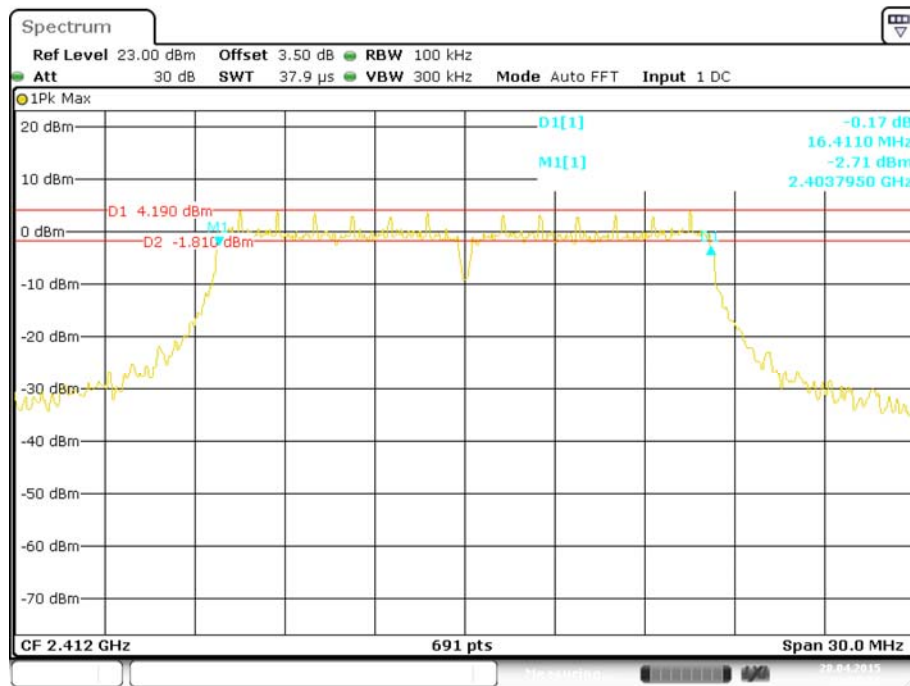
802.11b Low Channel, Antenna 1



Date: 28.APR.2015 21:14:41

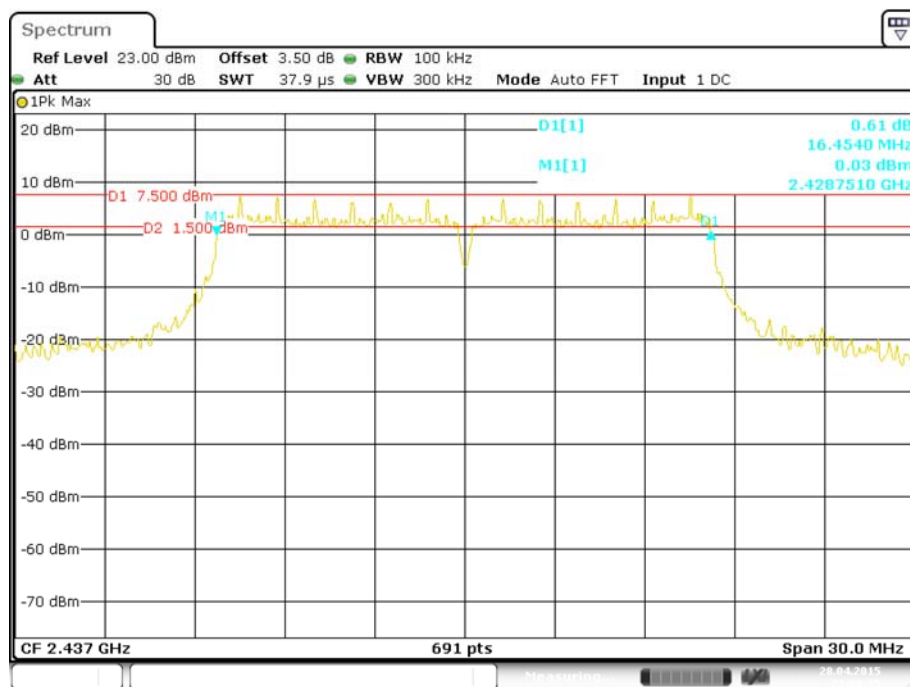
802.11b Middle Channel, Antenna 1**802.11b High Channel, Antenna 1**

802.11g Low Channel, Antenna 0



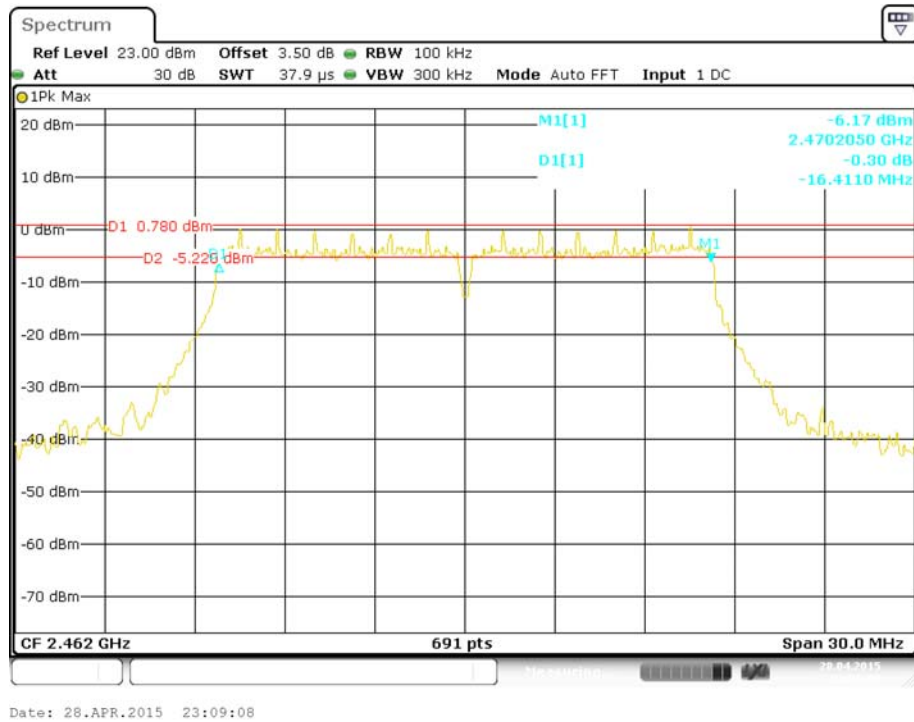
Date: 28.APR.2015 23:05:22

802.11g Middle Channel, Antenna 0

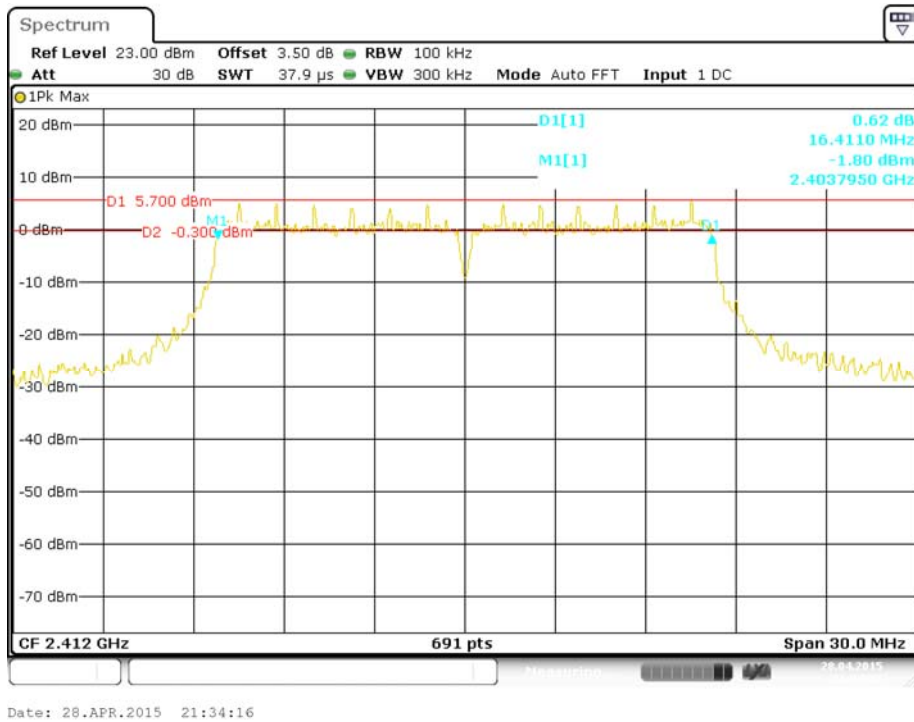


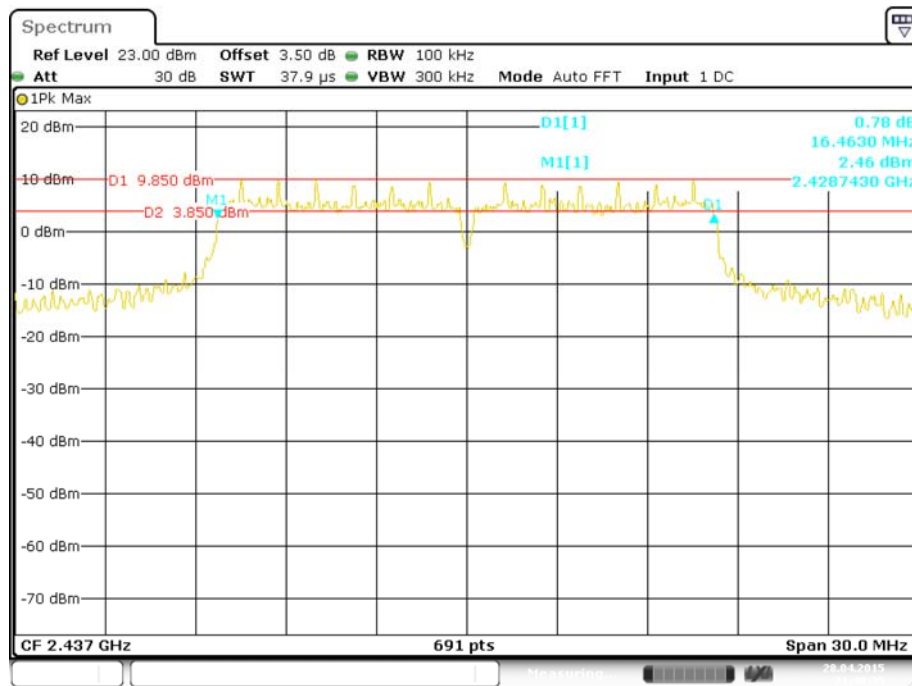
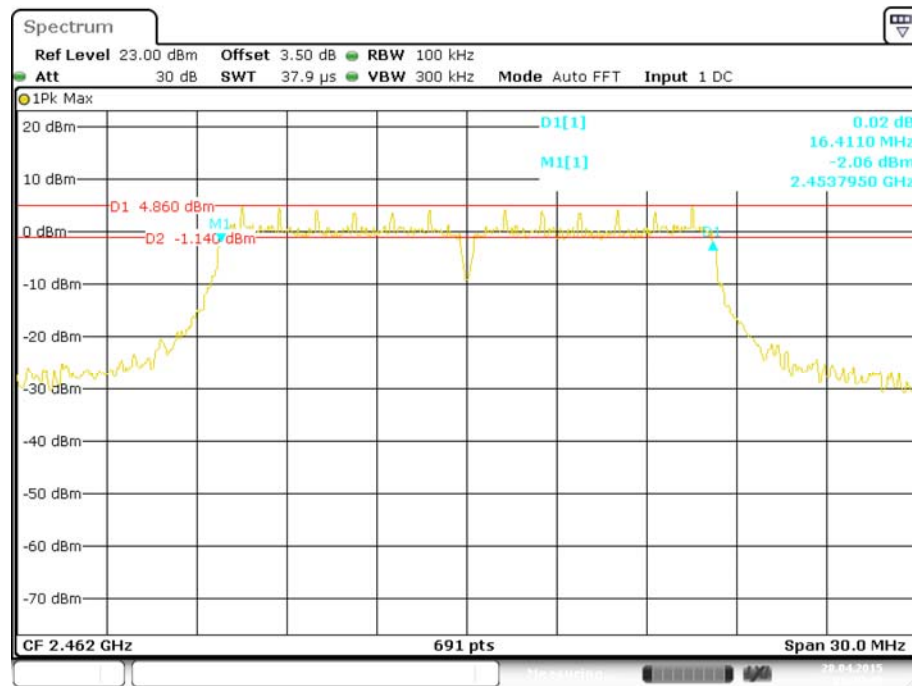
Date: 28.APR.2015 23:00:36

802.11g High Channel, Antenna 0

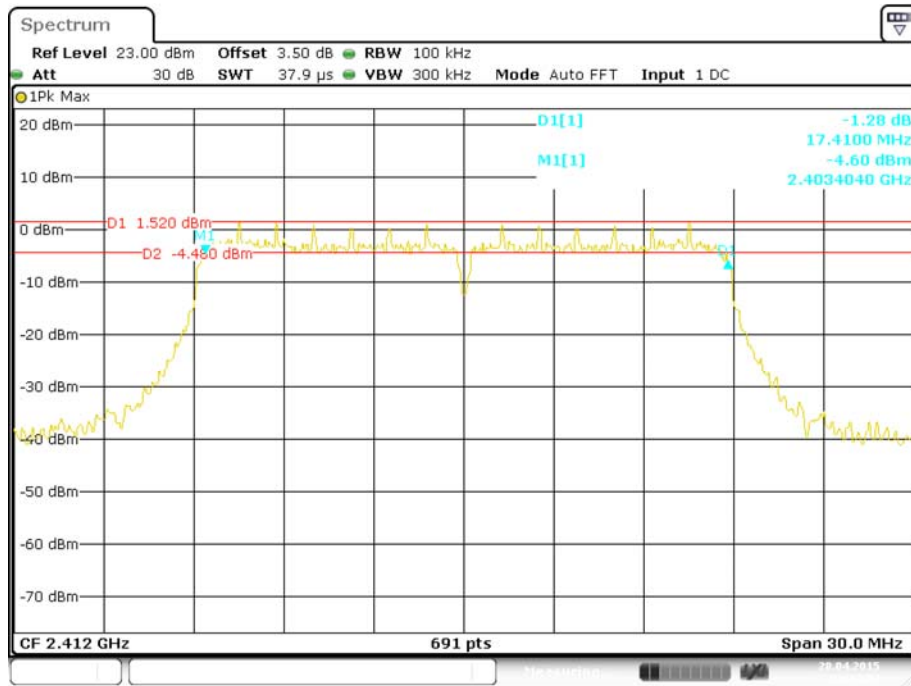


802.11g Low Channel, Antenna 1

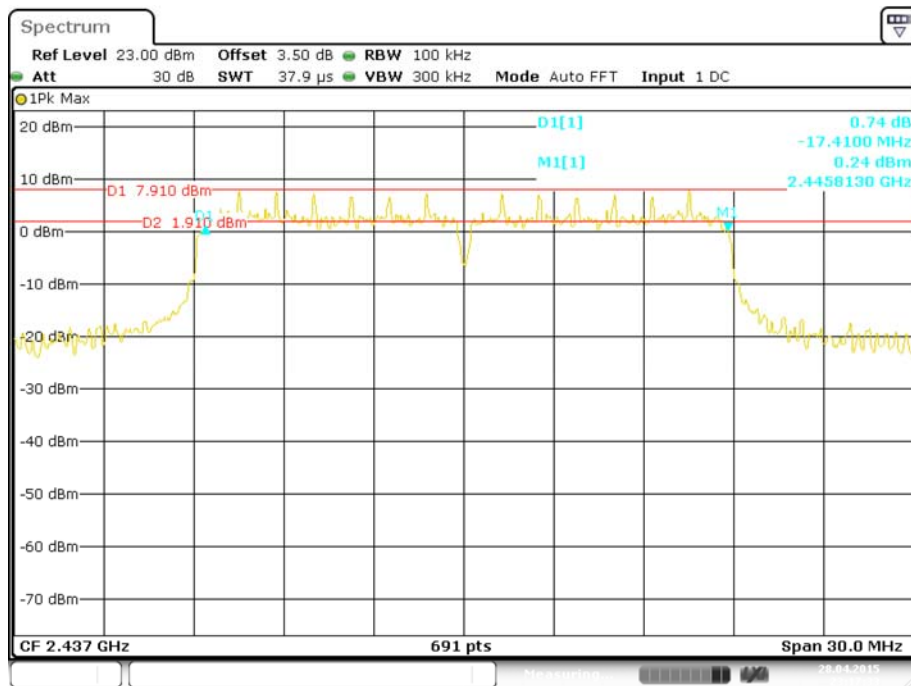


802.11g Middle Channel, Antenna 1**802.11g High Channel, Antenna 1**

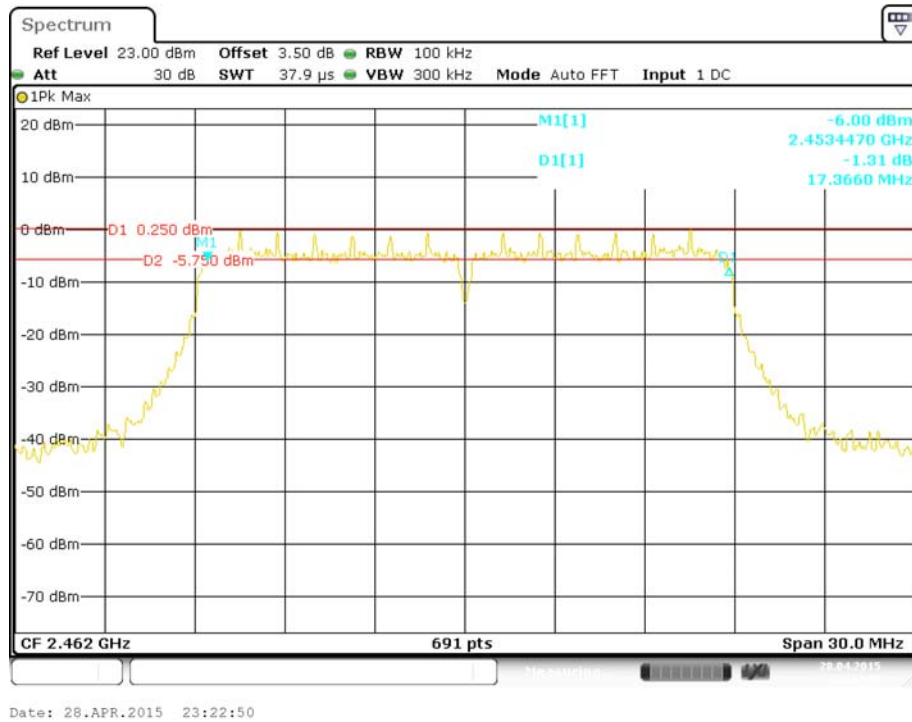
802.11n-HT20 Low Channel, Antenna 0



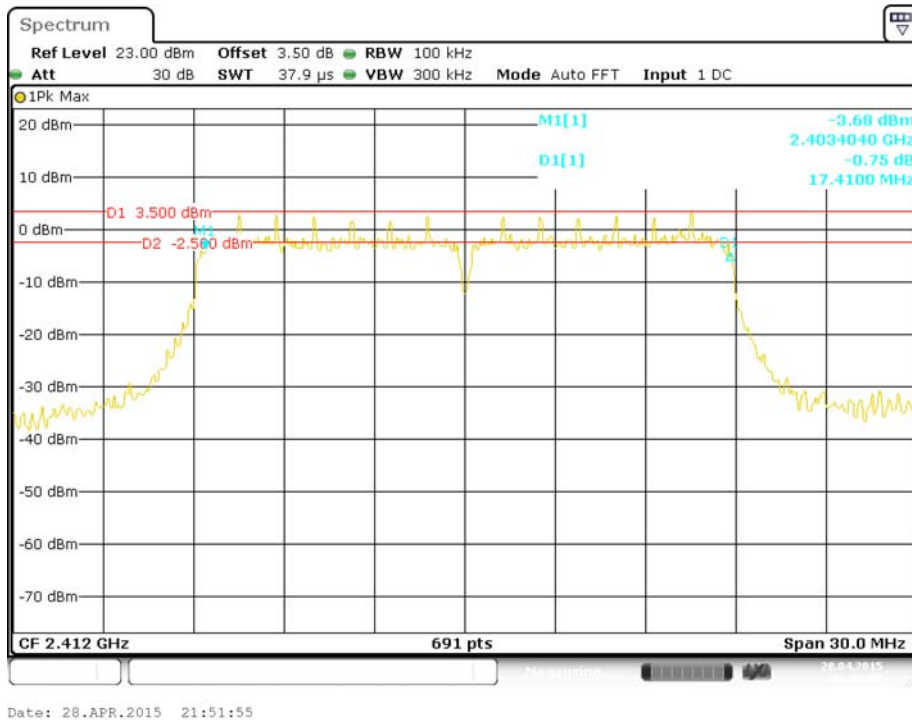
802.11n-HT20 Middle Channel, Antenna 0



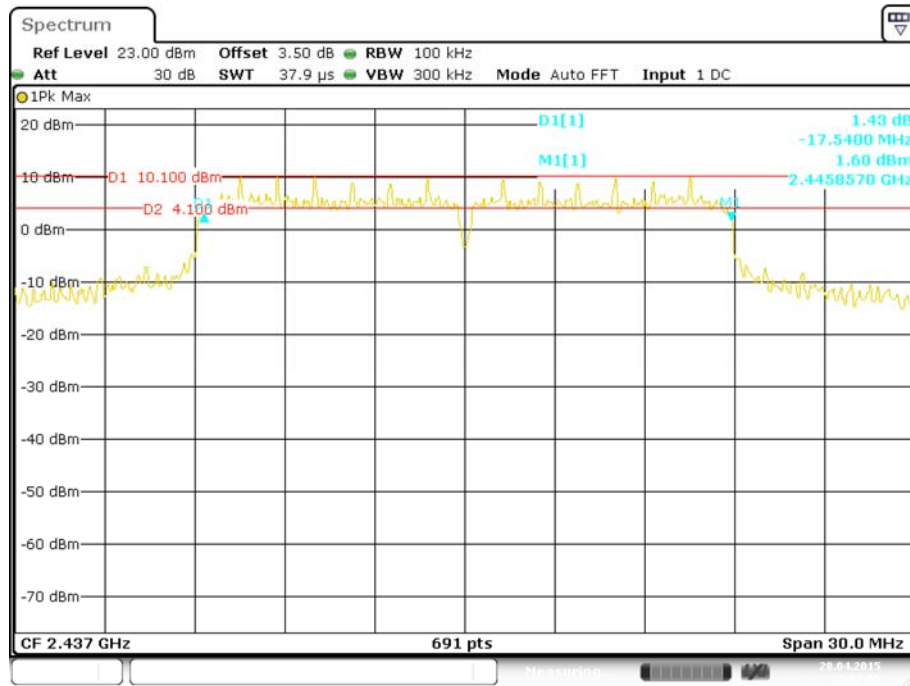
802.11n-HT20 High Channel, Antenna 0



802.11n-HT20 Low Channel, Antenna 1

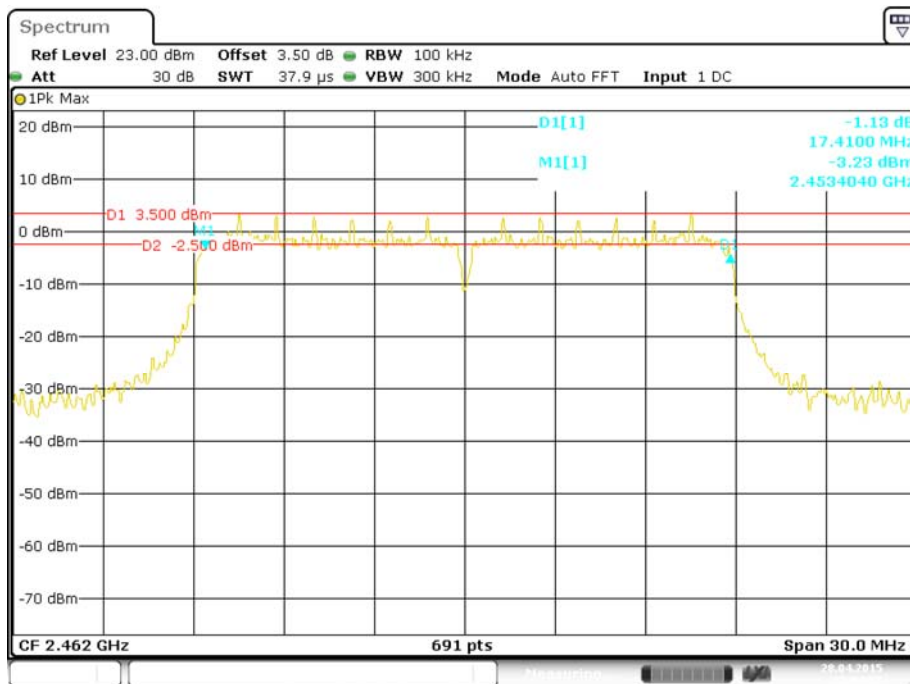


802.11n-HT20 Middle Channel, Antenna 1



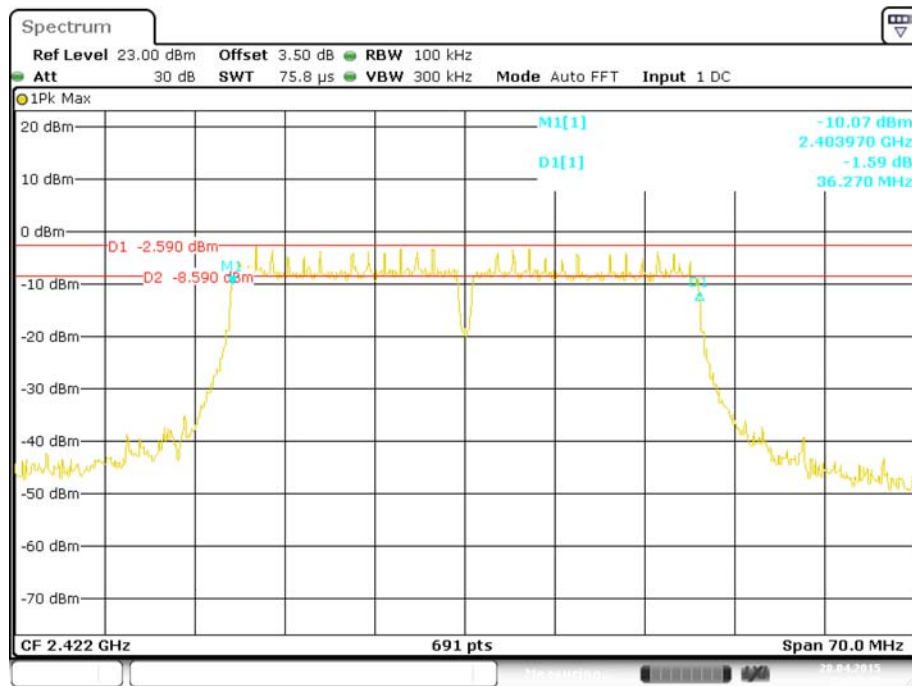
Date: 28.APR.2015 22:02:05

802.11n-HT20 High Channel, Antenna 1



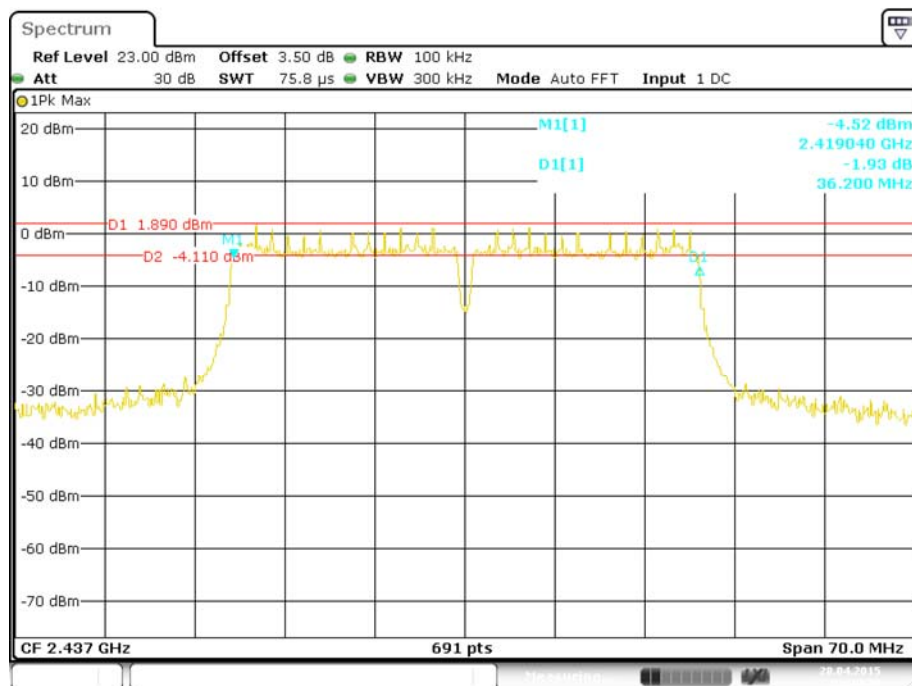
Date: 28.APR.2015 22:04:55

802.11n-HT40 Low Channel, Antenna 0



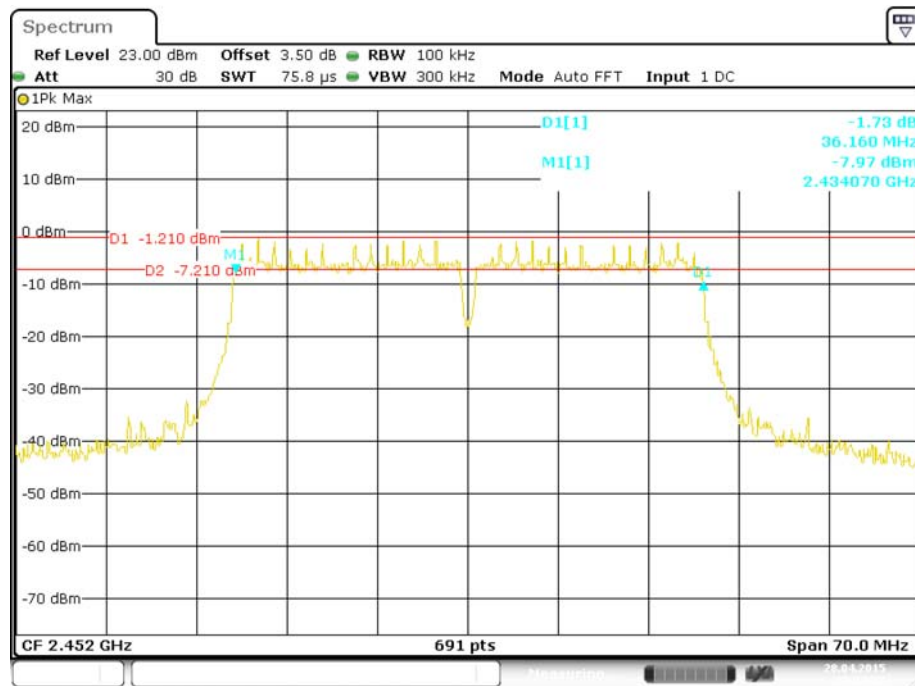
Date: 28.APR.2015 23:38:48

802.11n-HT40 Middle Channel, Antenna 0

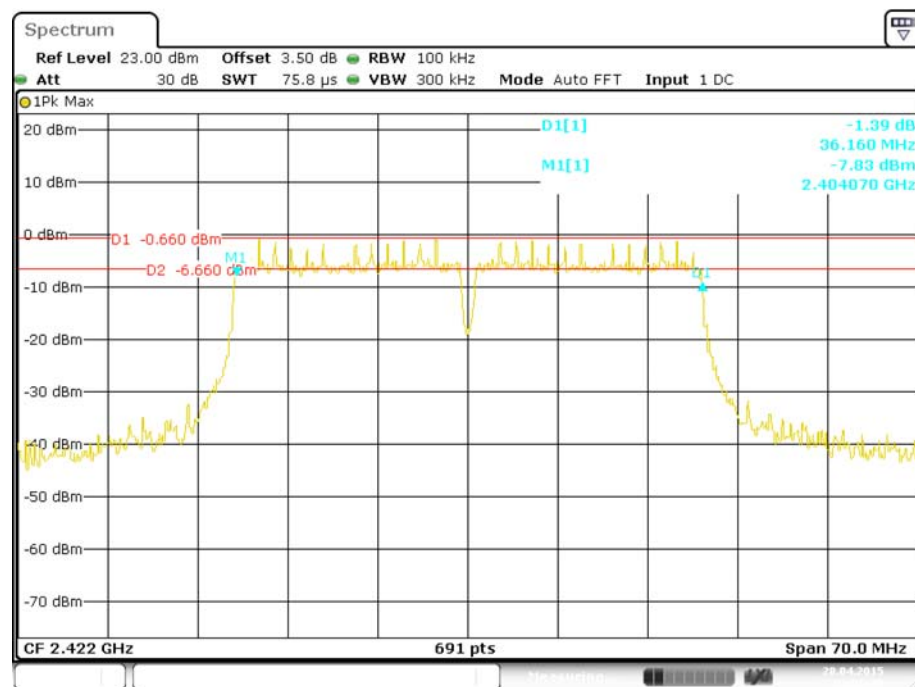


Date: 28.APR.2015 23:33:39

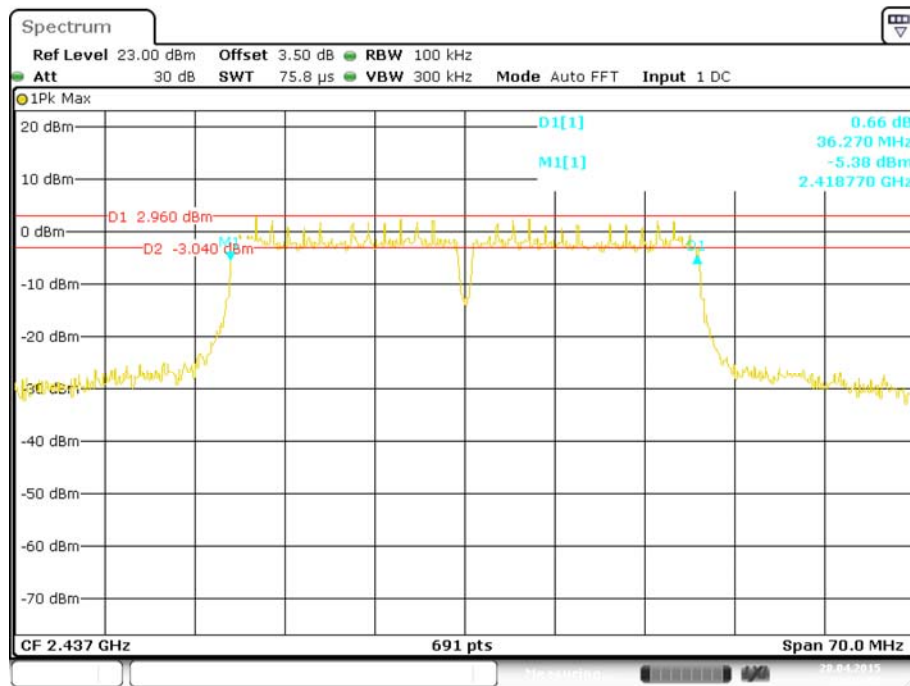
802.11n-HT40 High Channel, Antenna 0



802.11n-HT40 Low Channel, Antenna 1

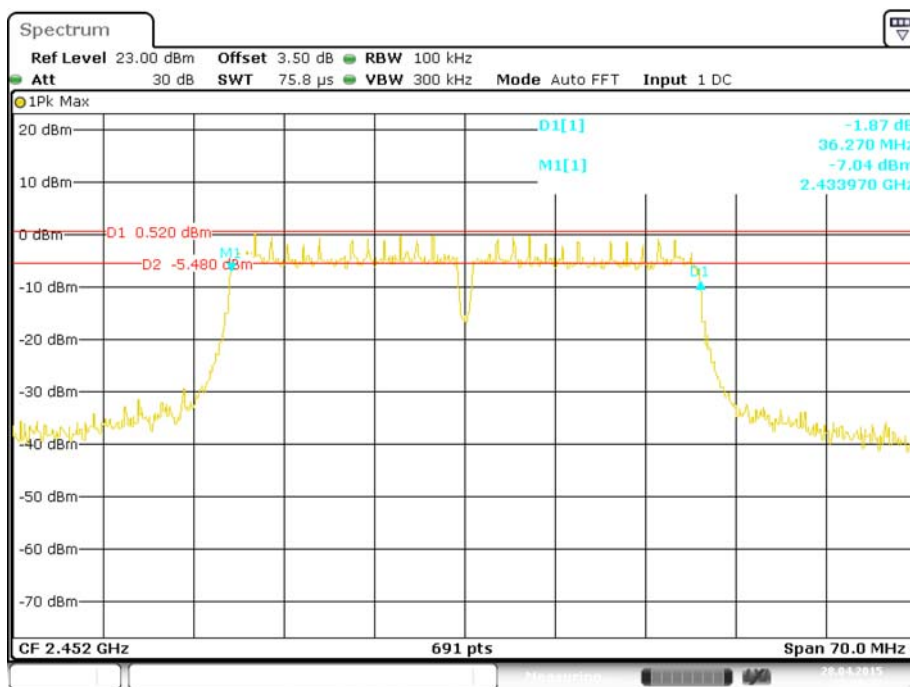


802.11n-HT40 Middle Channel, Antenna 1



Date: 28.APR.2015 22:23:06

802.11n-HT40 High Channel, Antenna 1



Date: 28.APR.2015 22:26:43

FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

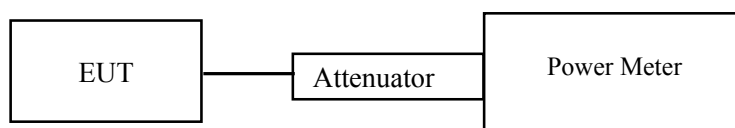
Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements Averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The Average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r02

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Power Meter	EPM-441A	GB37481494	2014-11-24	2015-11-24
HP	Power Sensor	EPM-441A	GB37481494	2014-11-24	2015-11-24

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Jay Li on 2015-04-28

Test Mode: Transmitting

Channel	Frequency (MHz)	Max Peak Conducted Output Power (dBm)			Limit (dBm)
		Antenna 0	Antenna 1	Antenna 0 +Antenna 1	
802.11b mode					
Low	2412	18.19	20.45	\	30
Middle	2437	21.28	20.47	\	30
High	2462	19.28	20.66	\	30
802.11g mode					
Low	2412	20.36	19.73	\	30
Middle	2437	24.26	24.66	\	30
High	2462	18.19	19.91	\	30
802.11n-HT20 mode					
Low	2412	20.03	20.43	23.24	30
Middle	2437	24.13	24.09	27.12	30
High	2462	19.54	21.33	23.54	30
802.11n-HT40 mode					
Low	2422	19.77	20.77	23.31	30
Middle	2437	21.48	23.84	25.83	30
High	2452	19.77	20.55	23.19	30

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

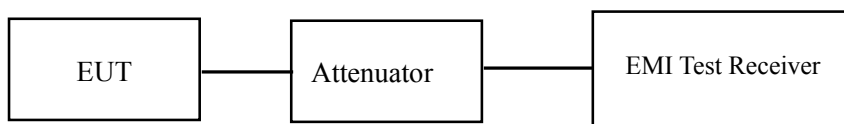
Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS Averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r02

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

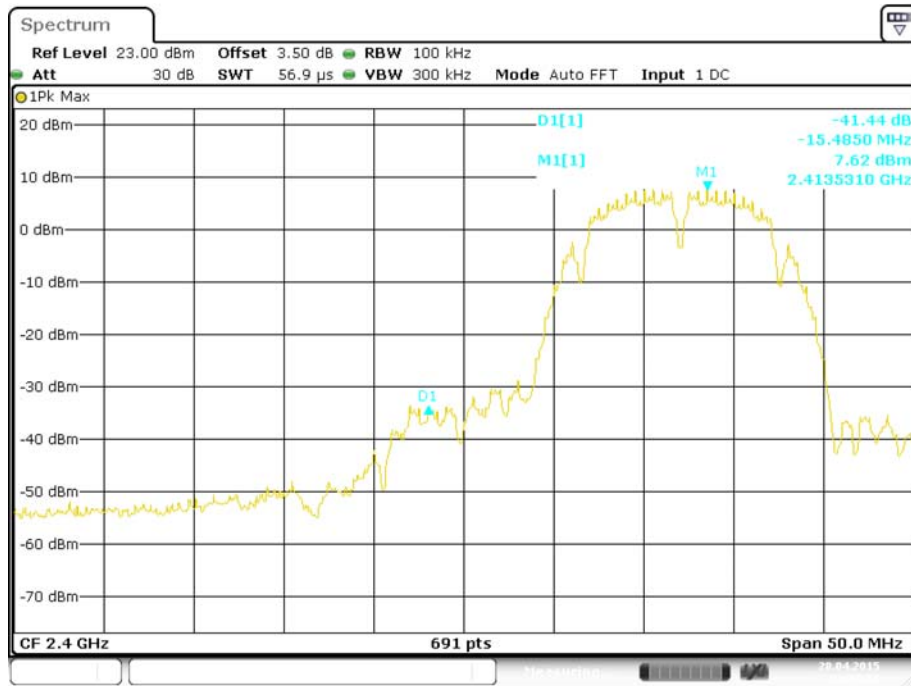
The testing was performed by Jay Li on 2015-04-28

Test Mode: Transmitting

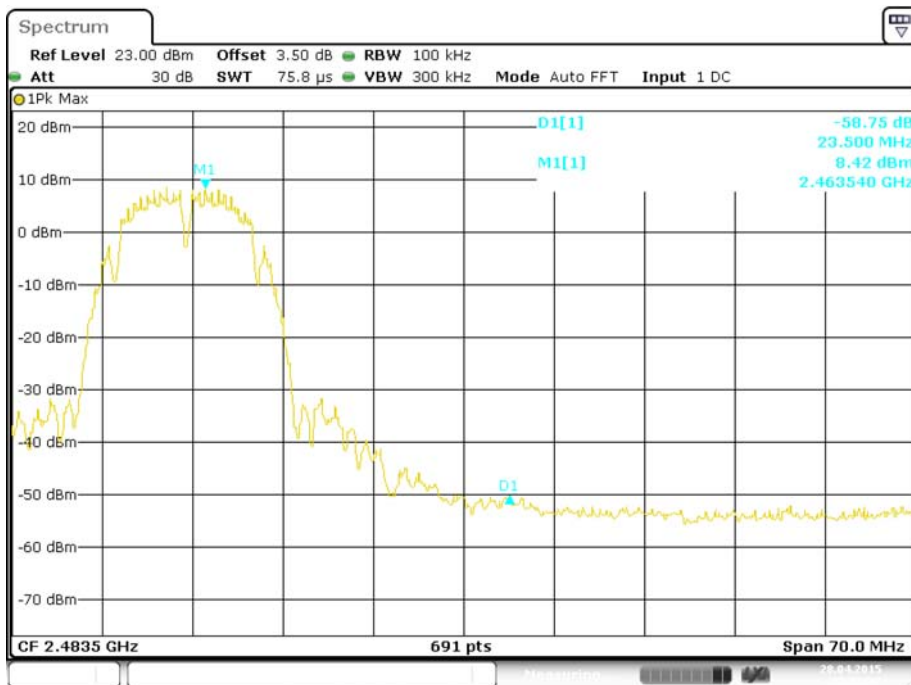
Test Result: Compliance

Mode	Band edges	Delta Peak to band emission(dBc)		Limit(dBc)
		Antenna 0	Antenna 1	
802.11b	Left Side	-41.44	-31.22	20
	Right Side	-58.75	-52.25	20
802.11g	Left Side	-33.39	-31.53	20
	Right Side	-51.25	-43.14	20
802.11n-HT20	Left Side	-38.30	-35.41	20
	Right Side	-48.30	-42.46	20
802.11n-HT40	Left Side	-34.59	-33.53	20
	Right Side	-45.39	-36.31	20

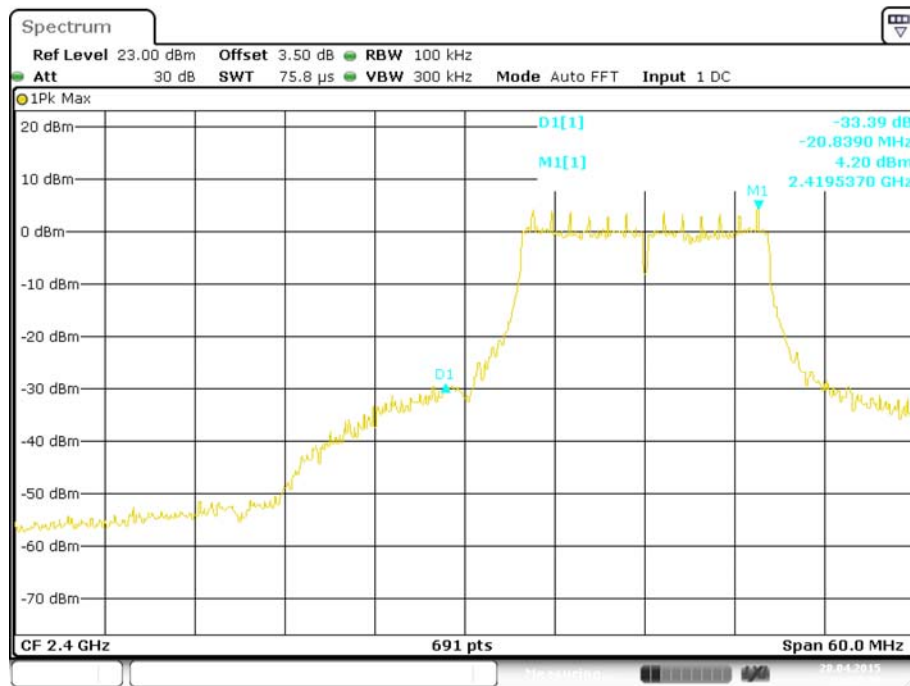
802.11b: Band Edge, Left Side, Antenna 0



802.11b: Band Edge, Right Side, Antenna 0

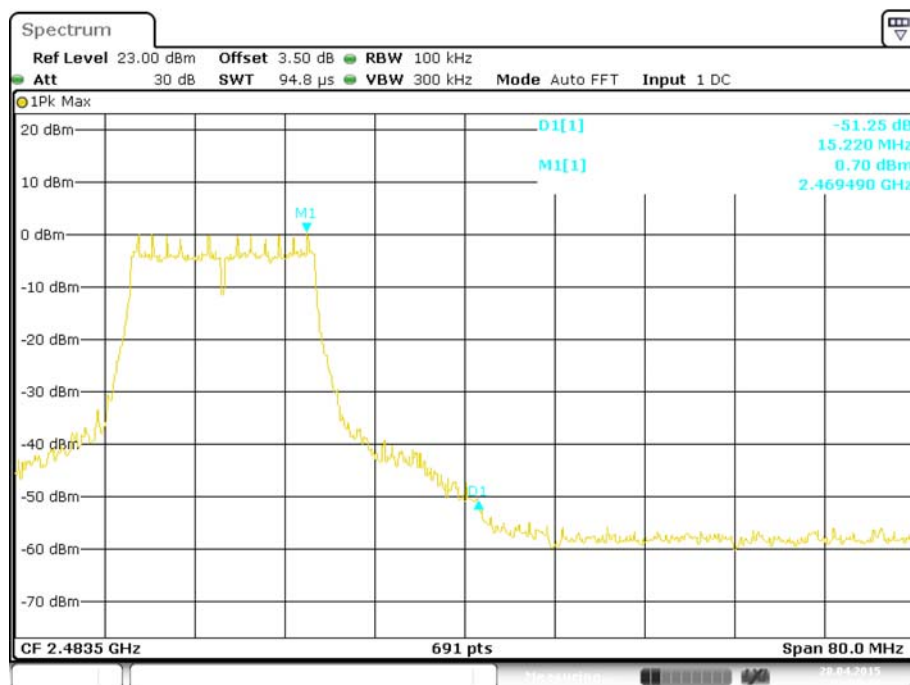


802.11g: Band Edge, Left Side, Antenna 0



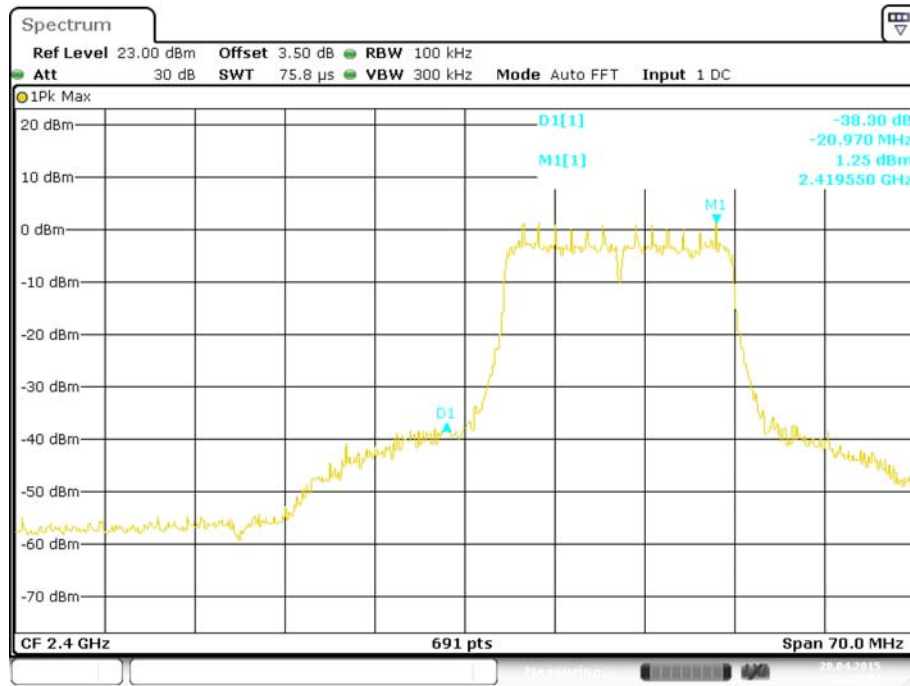
Date: 28.APR.2015 22:57:31

802.11g: Band Edge, Right Side, Antenna 0



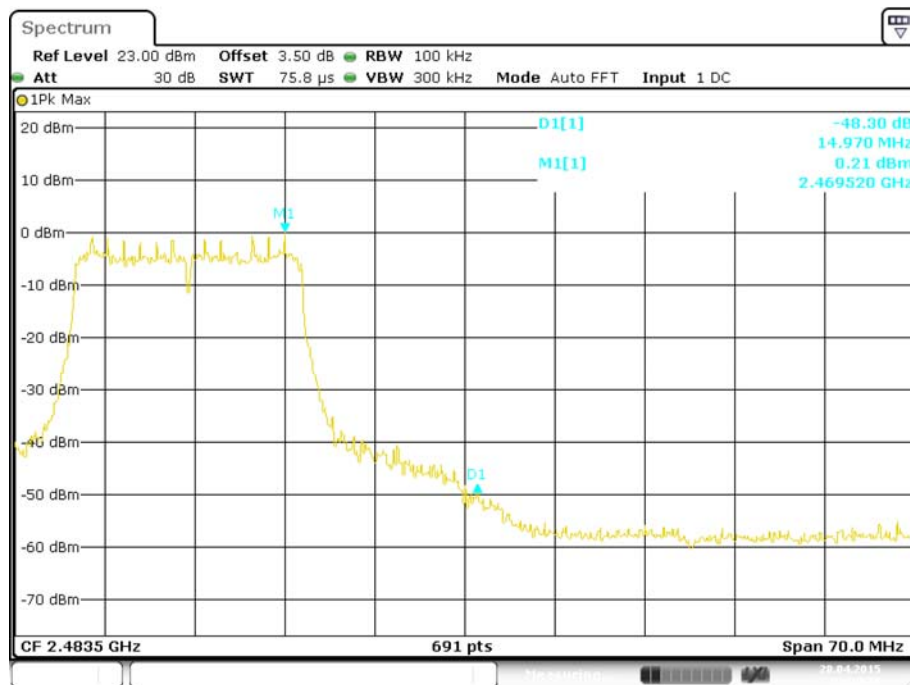
Date: 28.APR.2015 23:09:46

802.11n-HT20: Band Edge, Left Side, Antenna 0



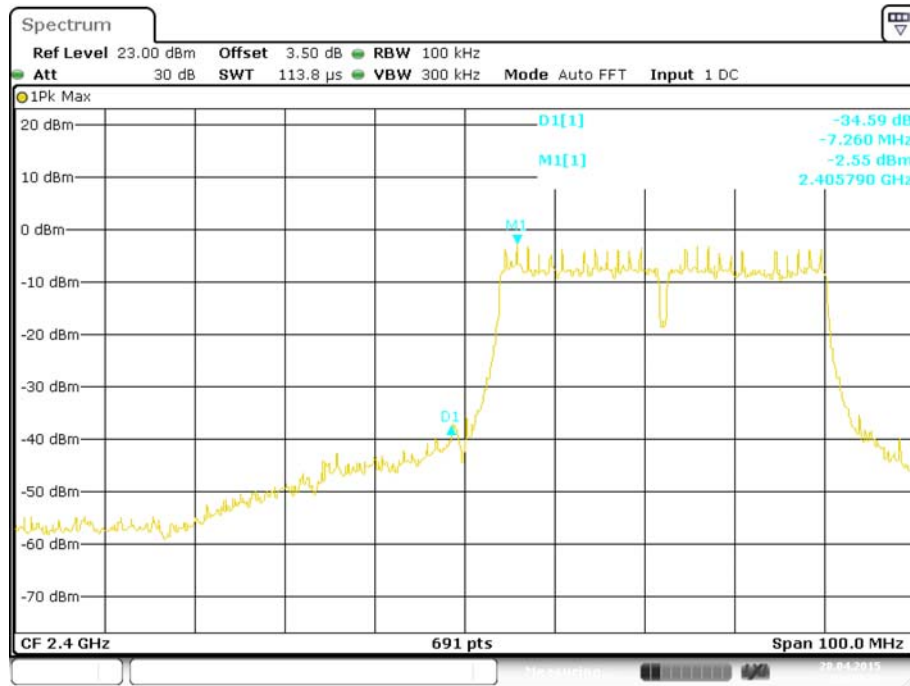
Date: 28.APR.2015 23:15:35

802.11n-HT20: Band Edge, Right Side, Antenna 0



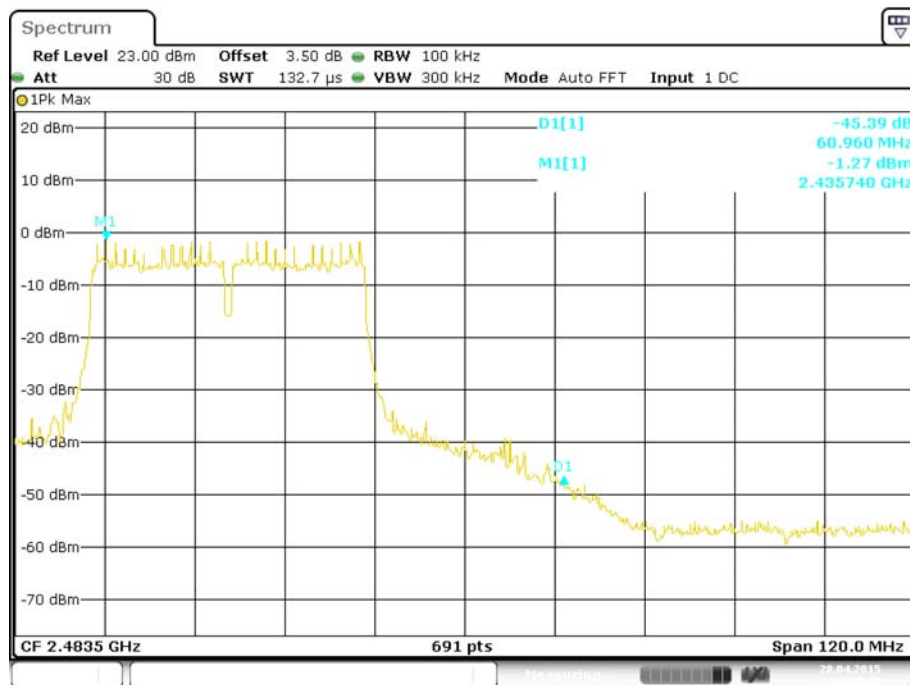
Date: 28.APR.2015 23:23:36

802.11n-HT40: Band Edge, Left Side, Antenna 0



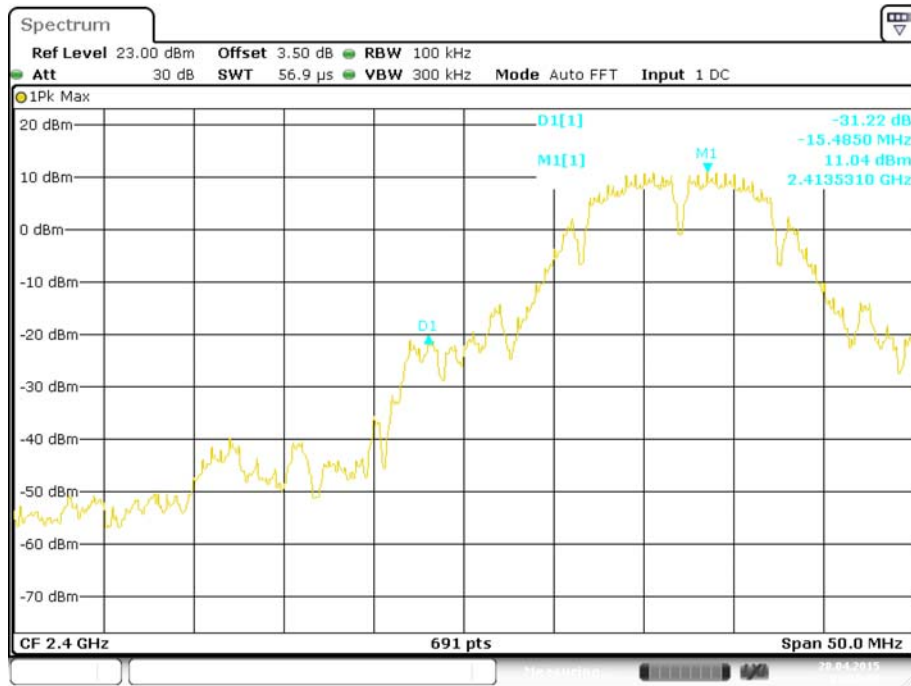
Date: 28.APR.2015 23:40:33

802.11n-HT40: Band Edge, Right Side, Antenna 0



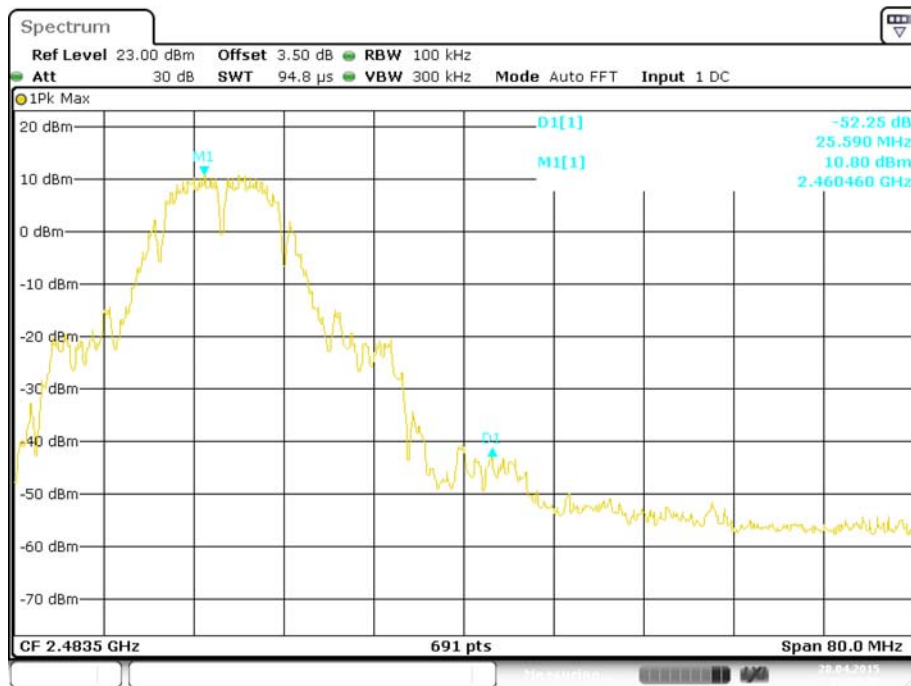
Date: 28.APR.2015 23:25:20

802.11b: Band Edge, Left Side, Antenna 1



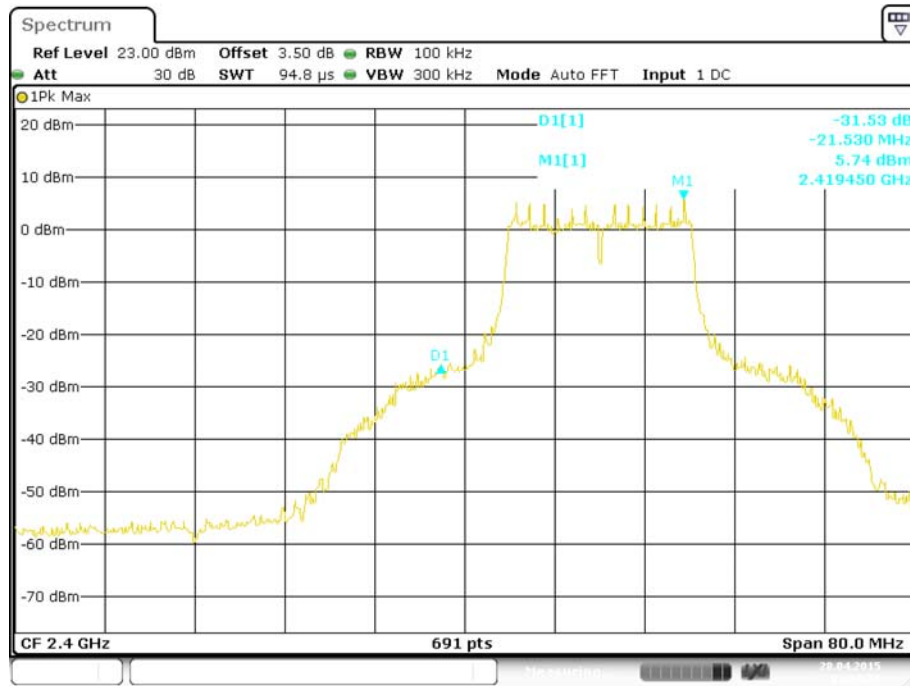
Date: 28.APR.2015 21:21:41

802.11b: Band Edge, Right Side, Antenna 1



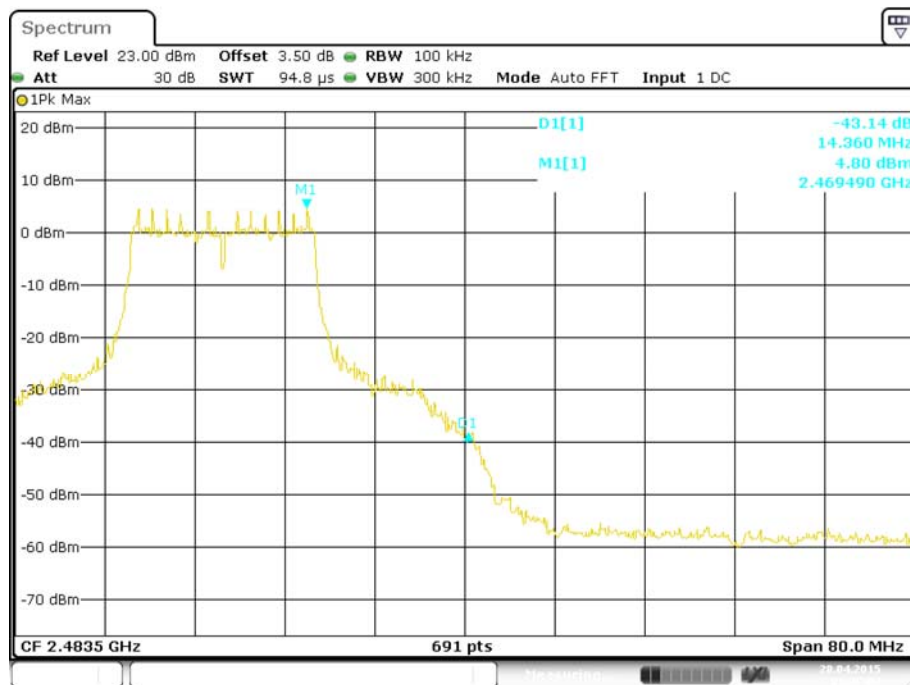
Date: 28.APR.2015 21:29:39

802.11g: Band Edge, Left Side, Antenna 1



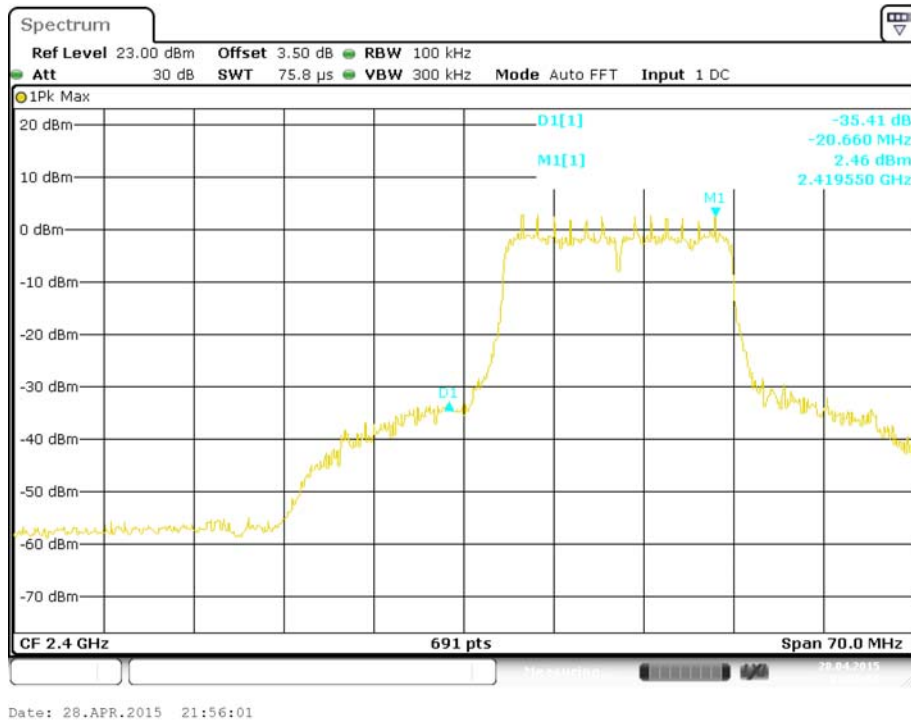
Date: 28.APR.2015 21:31:27

802.11g: Band Edge, Right Side, Antenna 1

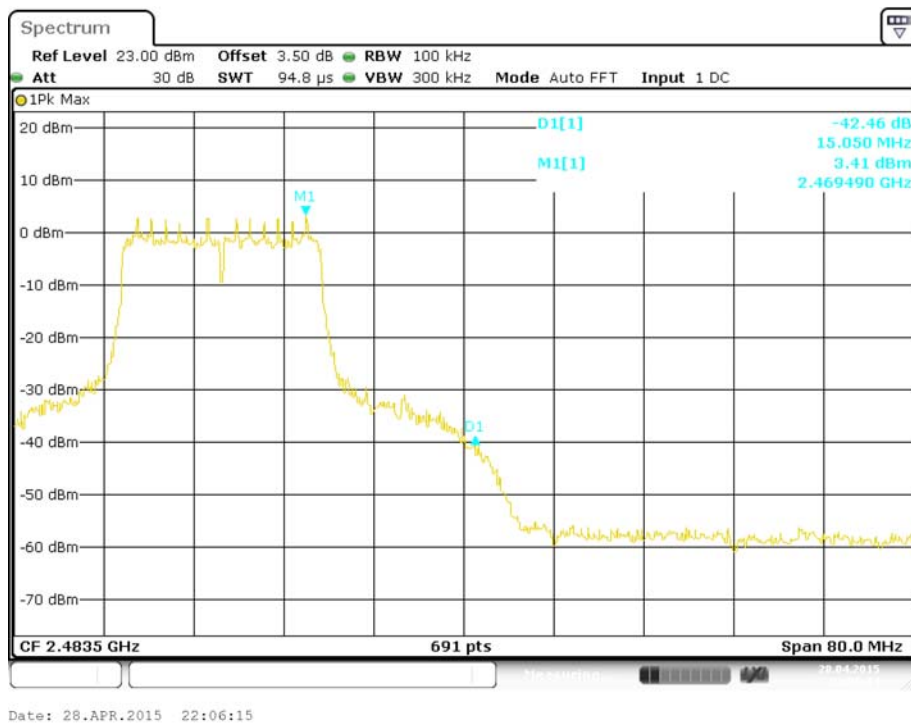


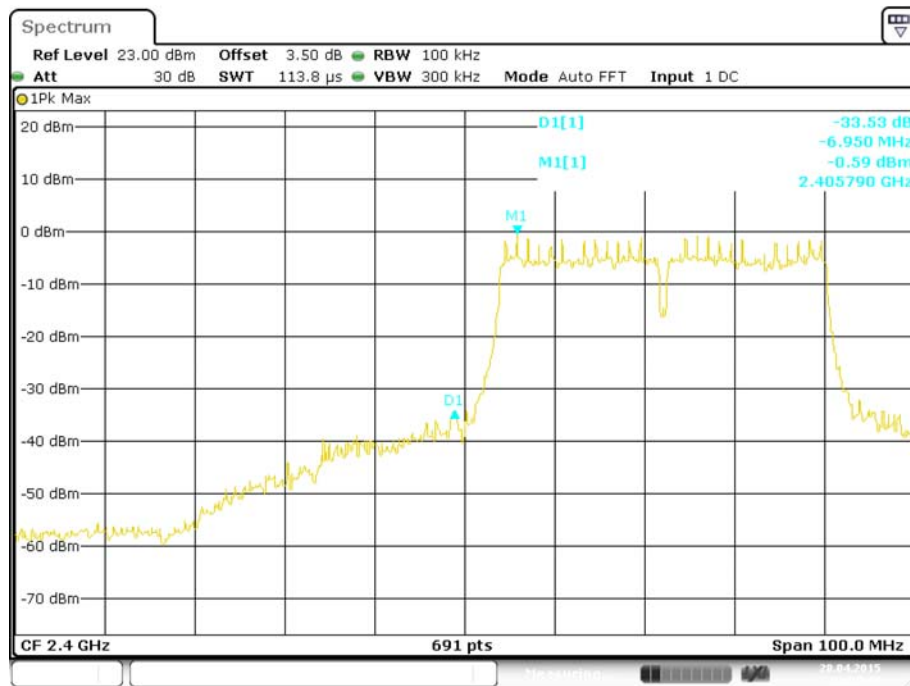
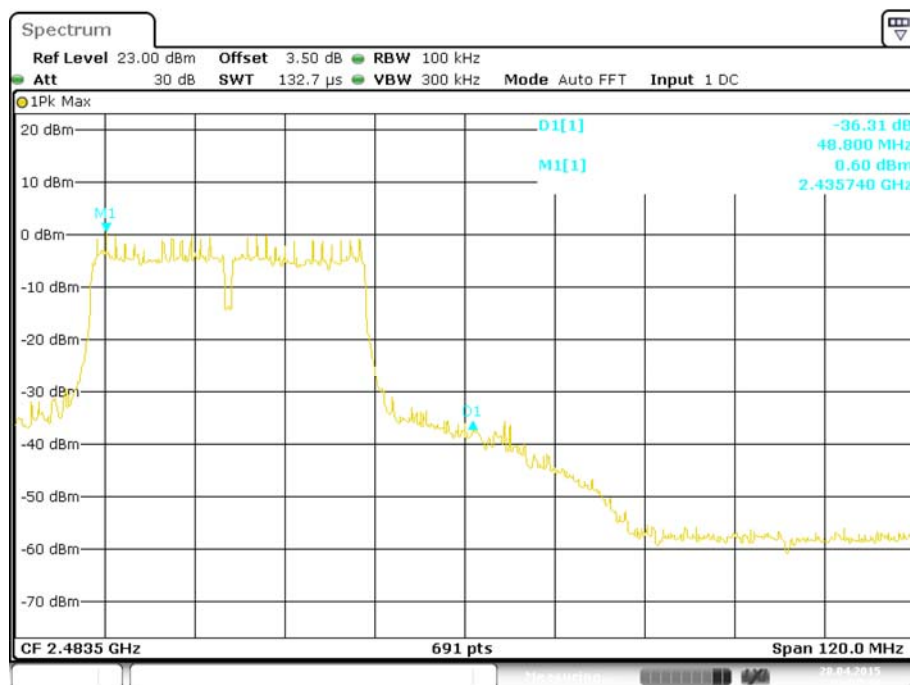
Date: 28.APR.2015 21:47:04

802.11n-HT20: Band Edge, Left Side, Antenna 1



802.11n-HT20: Band Edge, Right Side, Antenna 1



802.11n-HT40: Band Edge, Left Side, Antenna 1**802.11n-HT40: Band Edge, Right Side, Antenna 1**

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to KDB558074 D01 DTS Meas Guidance v03r02 sub-clause 10.2

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$.
3. Set the VBW $\geq 3 \times \text{RBW}$.
4. Set the span to 1.5 times the DTS bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2014-06-13	2015-06-13

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

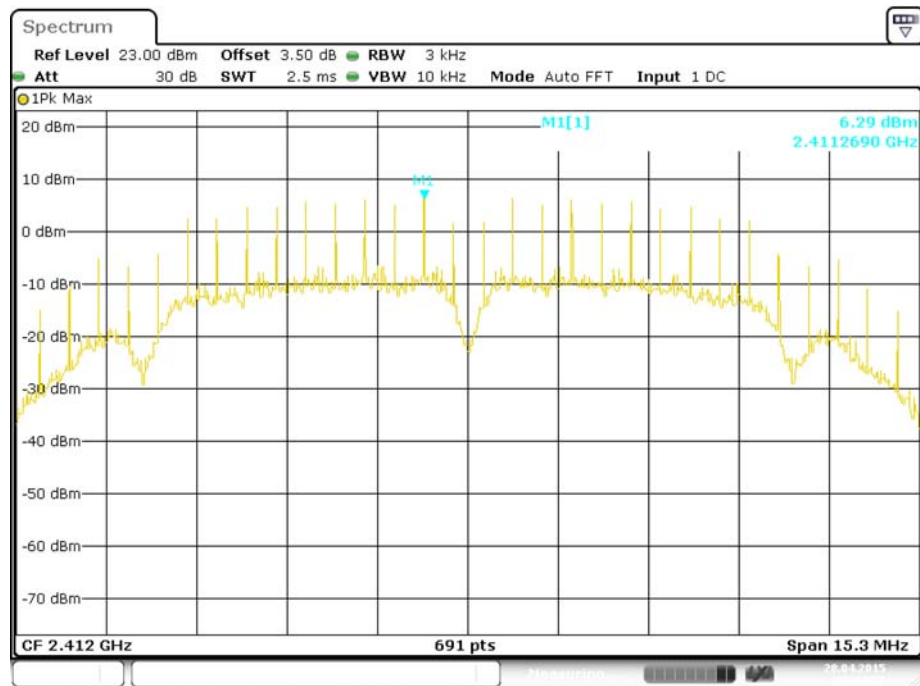
Environmental Conditions

Temperature:	24~26 °C
Relative Humidity:	54~56 %
ATM Pressure:	101.0 kPa

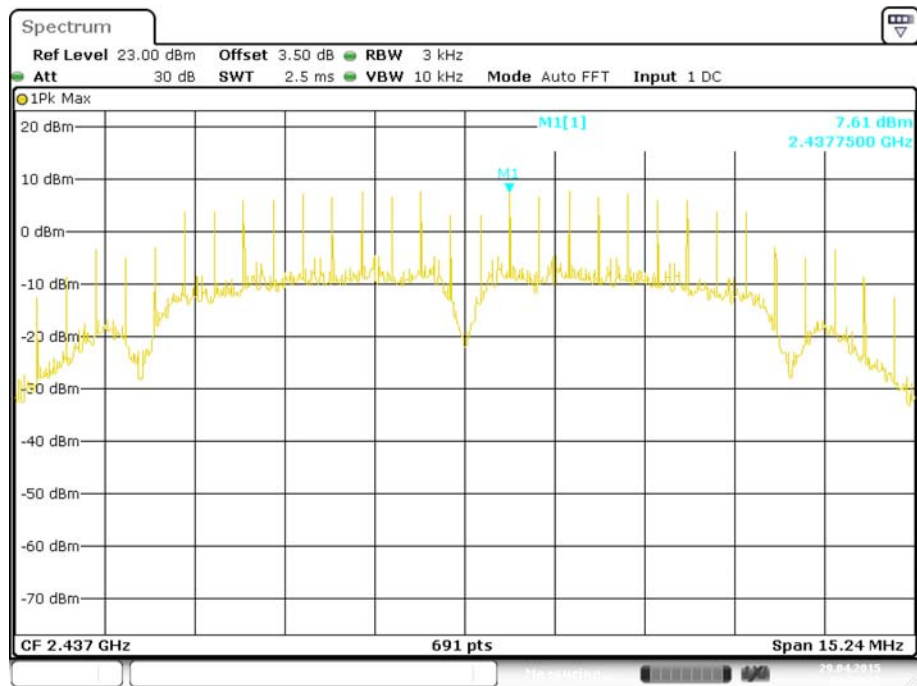
The testing was performed by Jay Li from 2015-04-28 to 2015-04-29

*Test Mode: Transmitting***Test Result: Pass**

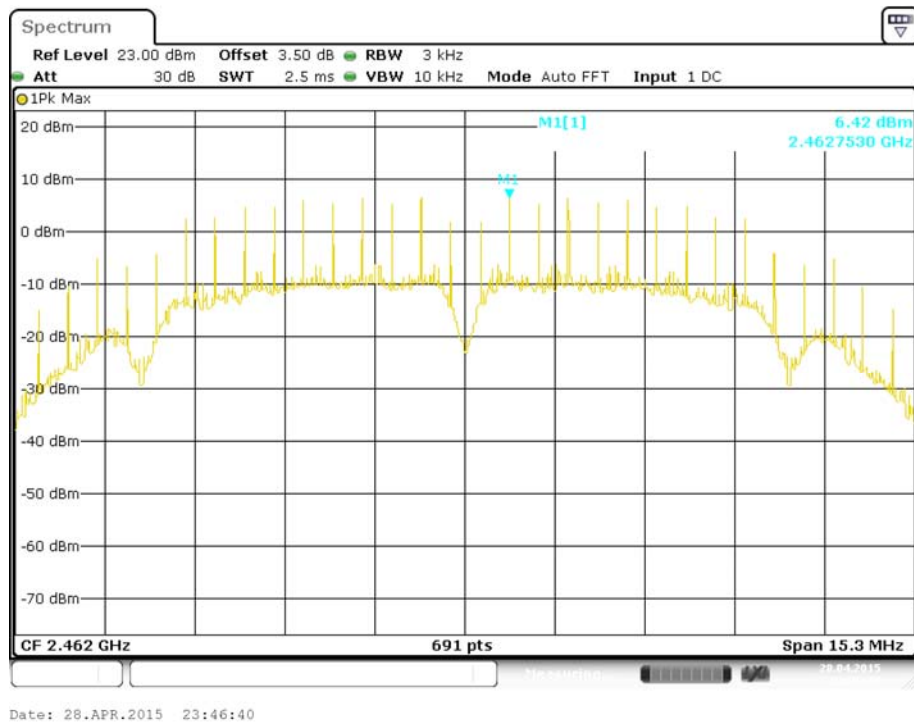
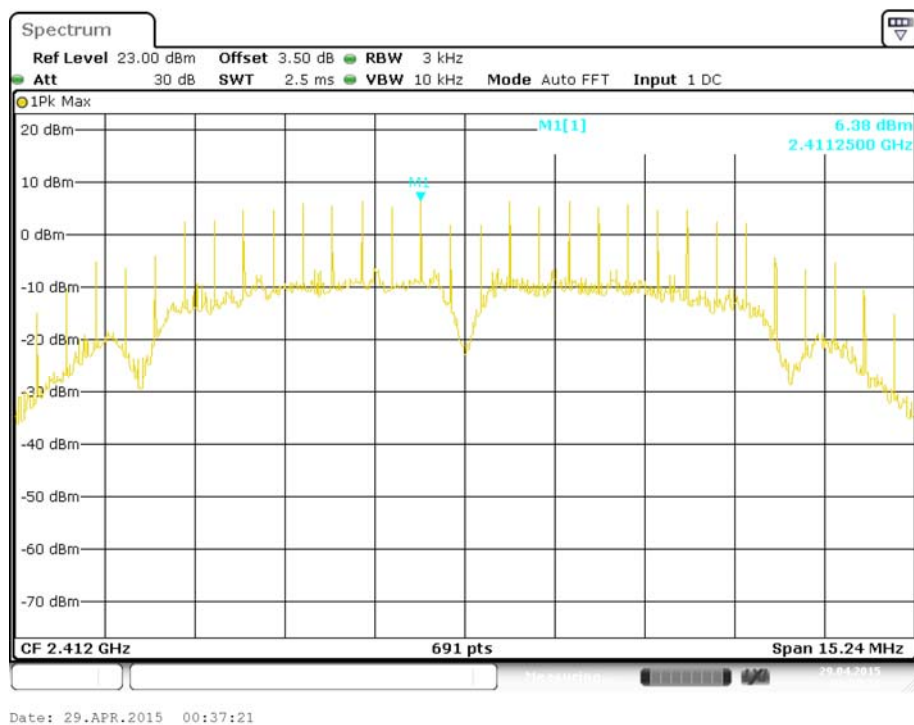
Channel	Frequency (MHz)	PSD (dBm/3kHz)			Limit (dBm/3kHz)
		Antenna 0	Antenna 1	Antenna 0 +Antenna 1	
802.11b mode					
Low	2412	6.29	6.38	\	≤8
Middle	2437	7.61	7.24	\	≤8
High	2462	6.42	6.48	\	≤8
802.11g mode					
Low	2412	-12.79	-10.79	\	≤8
Middle	2437	-11.14	-5.96	\	≤8
High	2462	-14.78	-13.02	\	≤8
802.11n-HT20 mode					
Low	2412	-13.08	-11.08	-8.96	≤8
Middle	2437	-7.50	-4.94	-3.02	≤8
High	2462	-15.89	-11.34	10.03	≤8
802.11n-HT40 mode					
Low	2422	-18.78	-15.94	-14.12	≤8
Middle	2437	-14.11	-12.28	-10.09	≤8
High	2452	-16.11	-19.18	-14.37	≤8

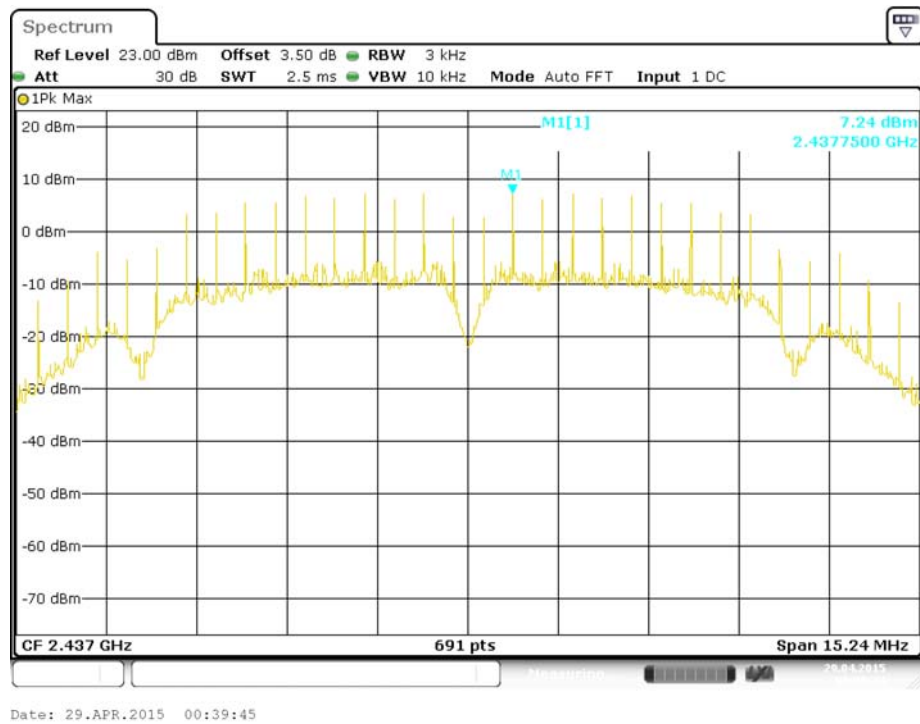
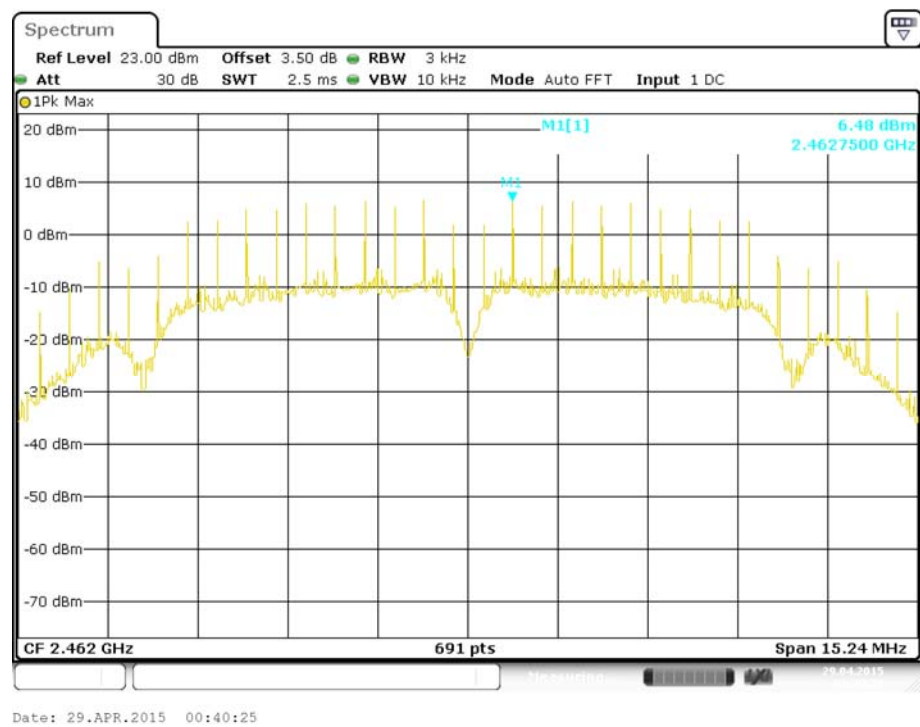
Power Spectral Density, 802.11b Low Channel, Antenna 0

Date: 28.APR.2015 23:44:54

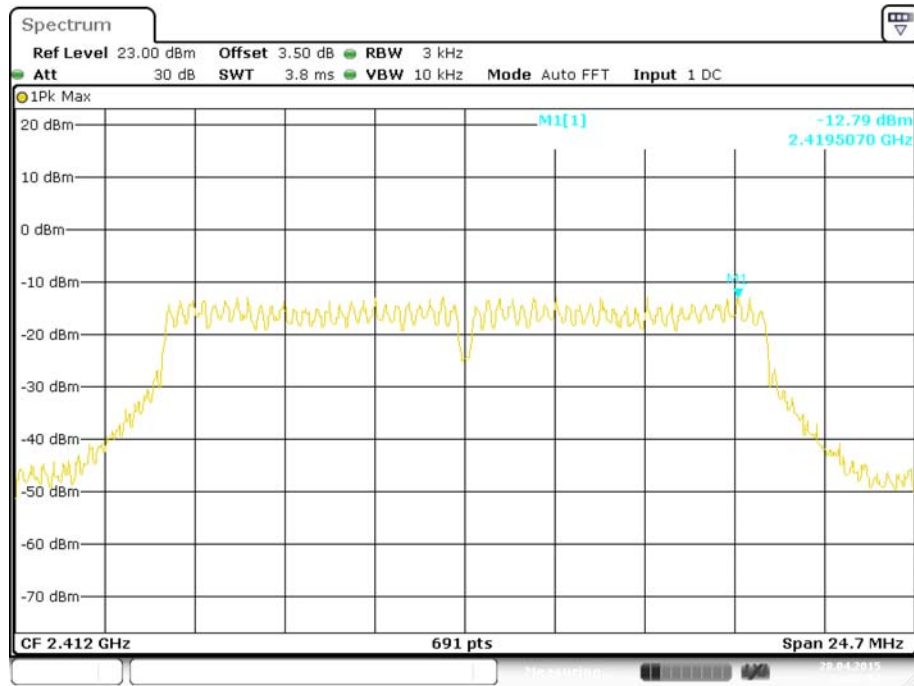
Power Spectral Density, 802.11b Middle Channel, Antenna 0

Date: 29.APR.2015 00:39:14

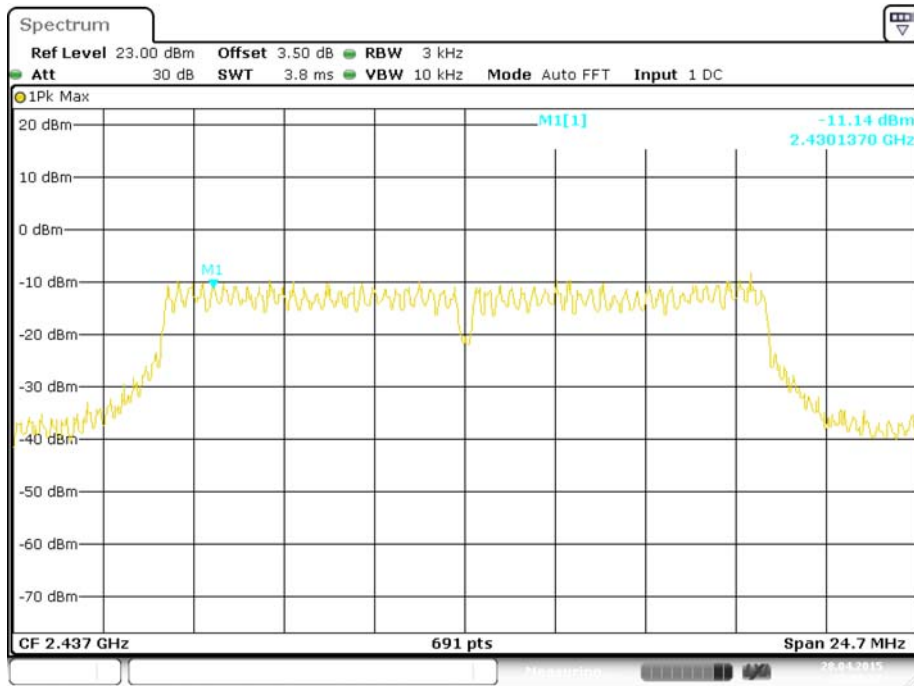
Power Spectral Density, 802.11b High Channel, Antenna 0**Power Spectral Density, 802.11b Low Channel, Antenna 1**

Power Spectral Density, 802.11b Middle Channel, Antenna 1**Power Spectral Density, 802.11b High Channel, Antenna 1**

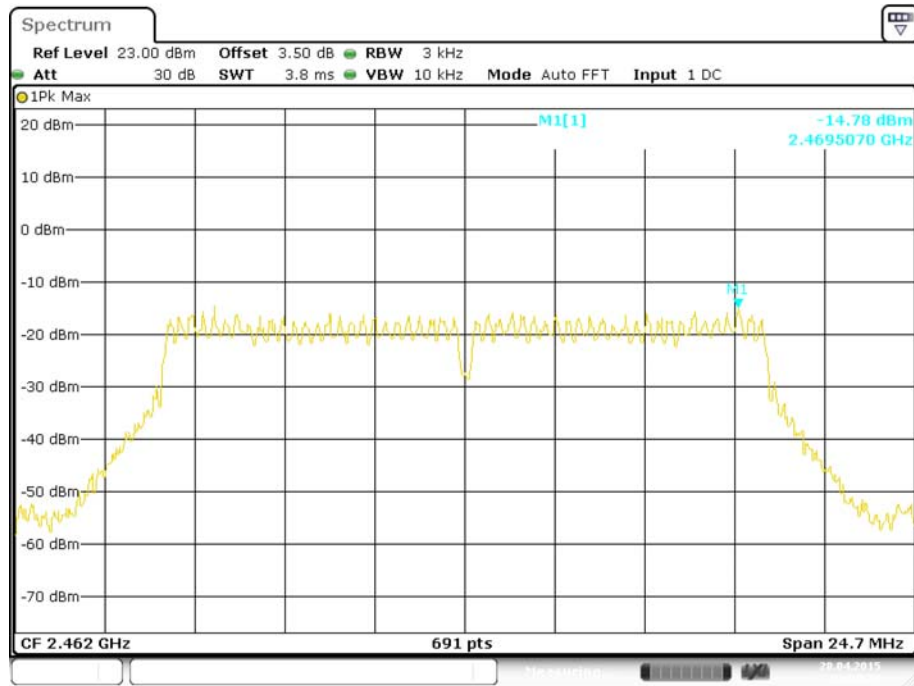
Power Spectral Density, 802.11g Low Channel, Antenna 0



Power Spectral Density, 802.11g Middle Channel, Antenna 0

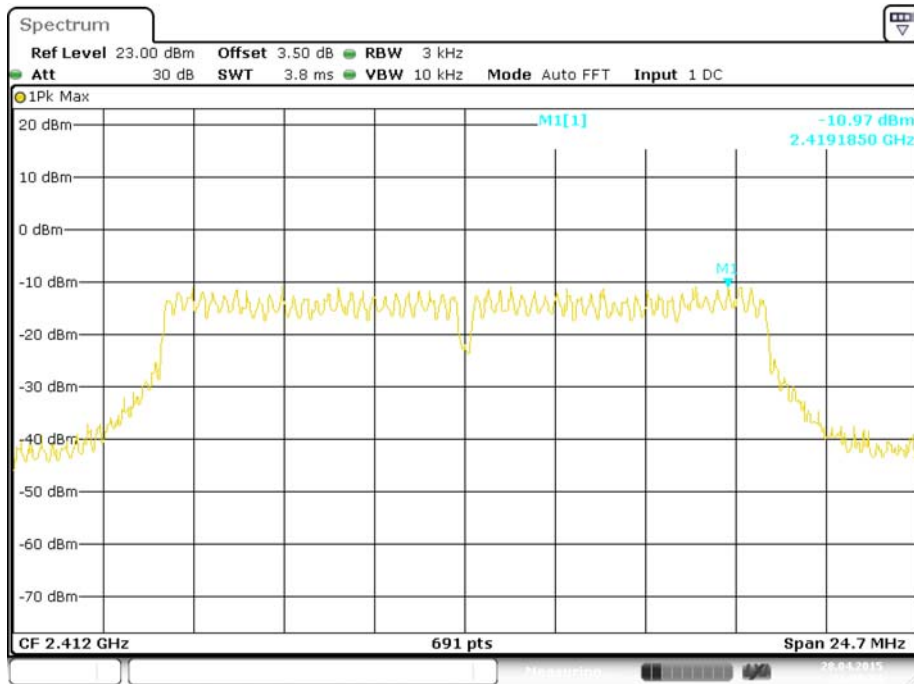


Power Spectral Density, 802.11g High Channel, Antenna 0

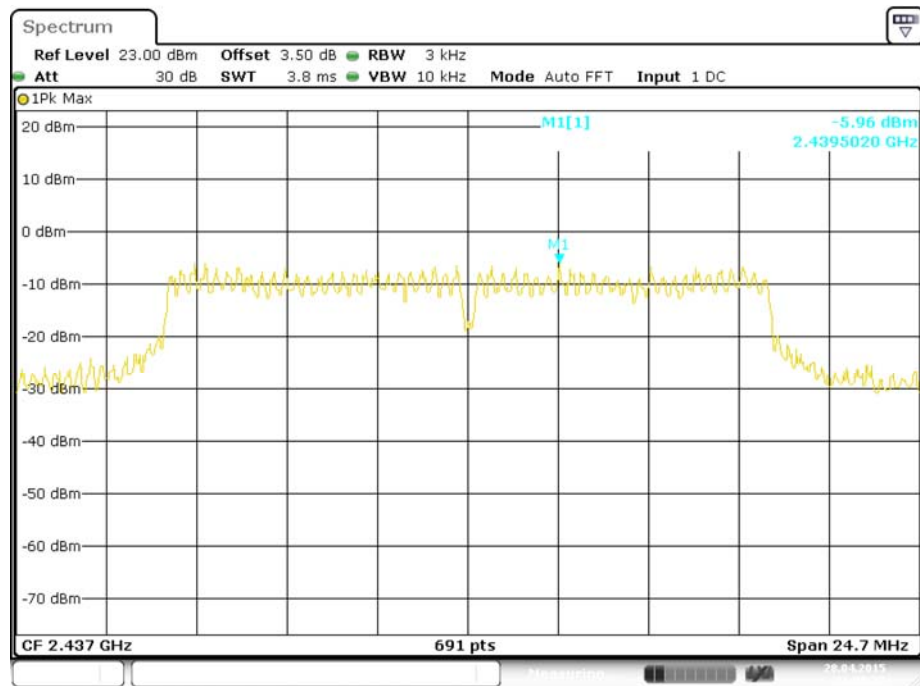
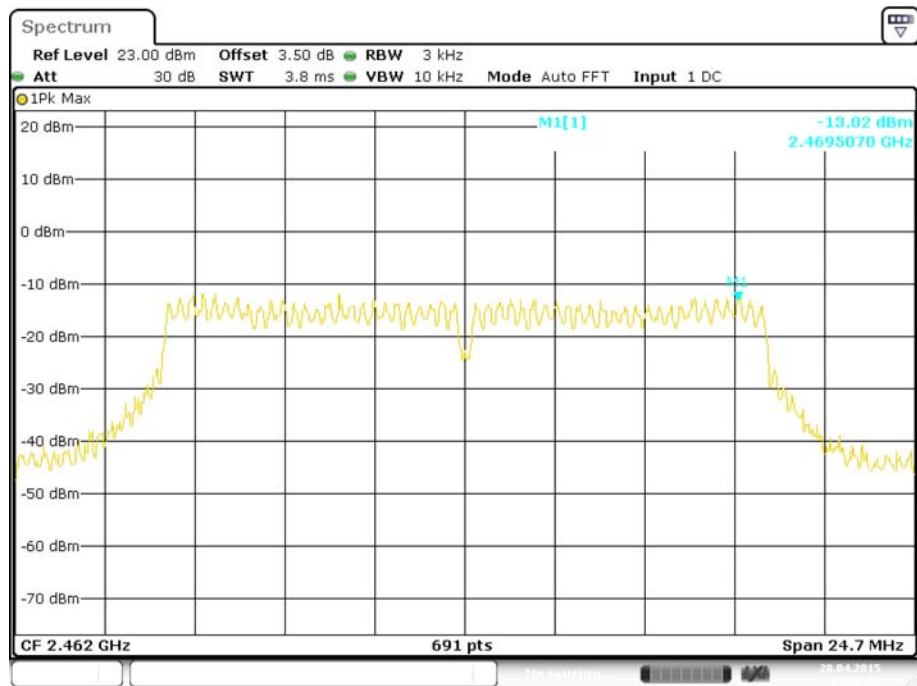


Date: 28.APR.2015 23:10:28

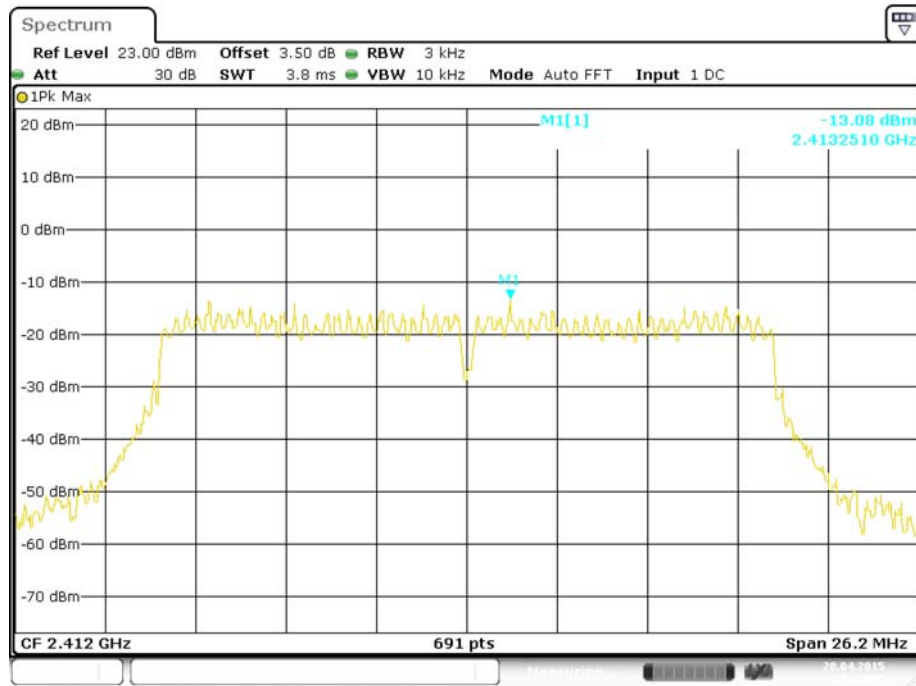
Power Spectral Density, 802.11g Low Channel, Antenna 1



Date: 28.APR.2015 21:36:04

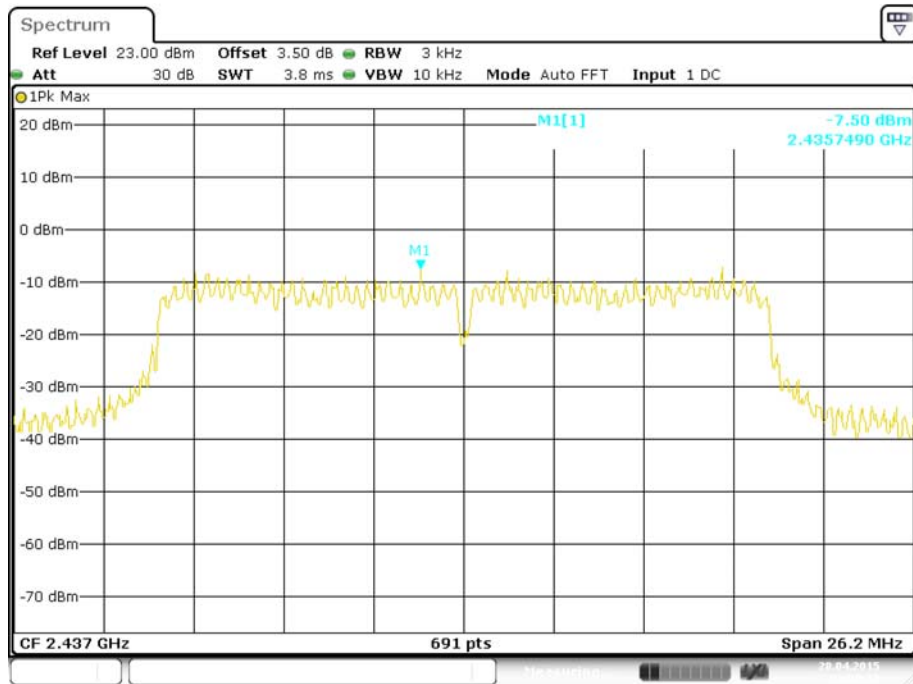
Power Spectral Density, 802.11g Middle Channel, Antenna 1**Power Spectral Density, 802.11g High Channel, Antenna 1**

Power Spectral Density, 802.11n-HT20 Low Channel, Antenna 0



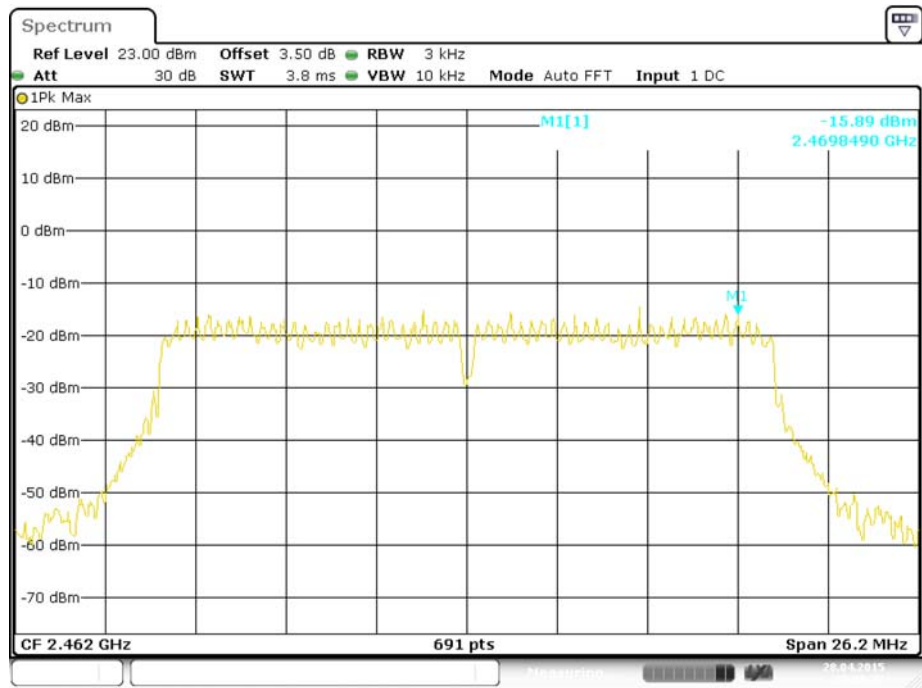
Date: 28.APR.2015 23:12:00

Power Spectral Density, 802.11n-HT20 Middle Channel, Antenna 0



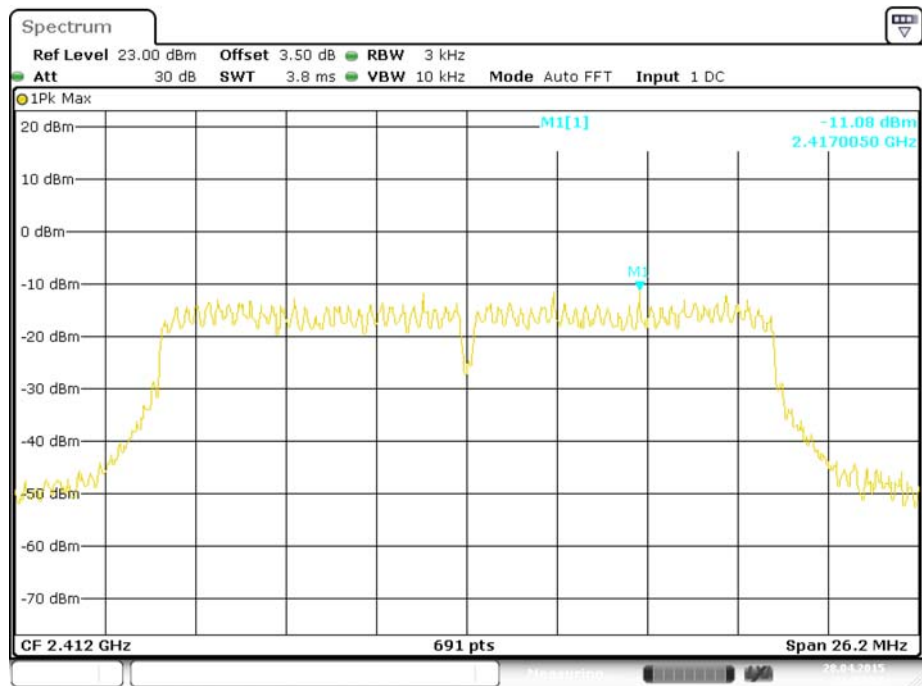
Date: 28.APR.2015 23:18:13

Power Spectral Density, 802.11n-HT20 High Channel, Antenna 0



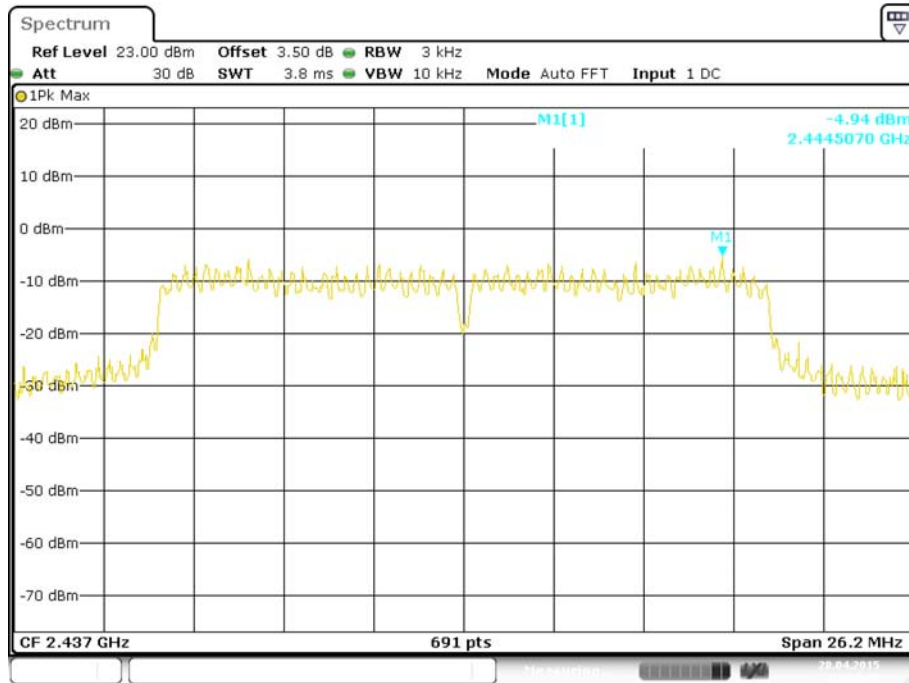
Date: 28.APR.2015 23:20:43

Power Spectral Density, 802.11n-HT20 Low Channel, Antenna 1

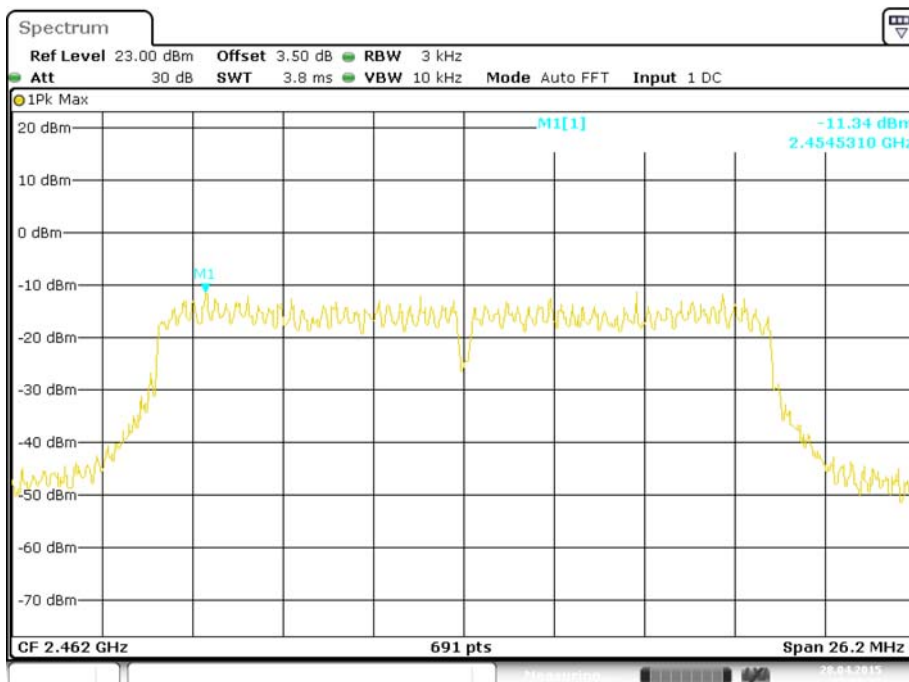


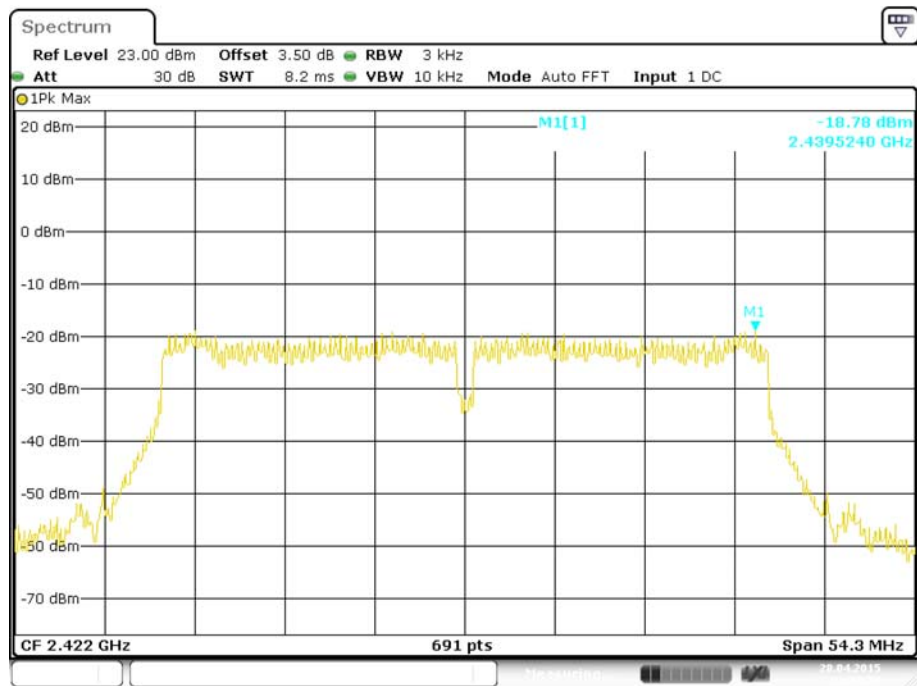
Date: 28.APR.2015 21:57:51

Power Spectral Density, 802.11n-HT20 Middle Channel, Antenna 1

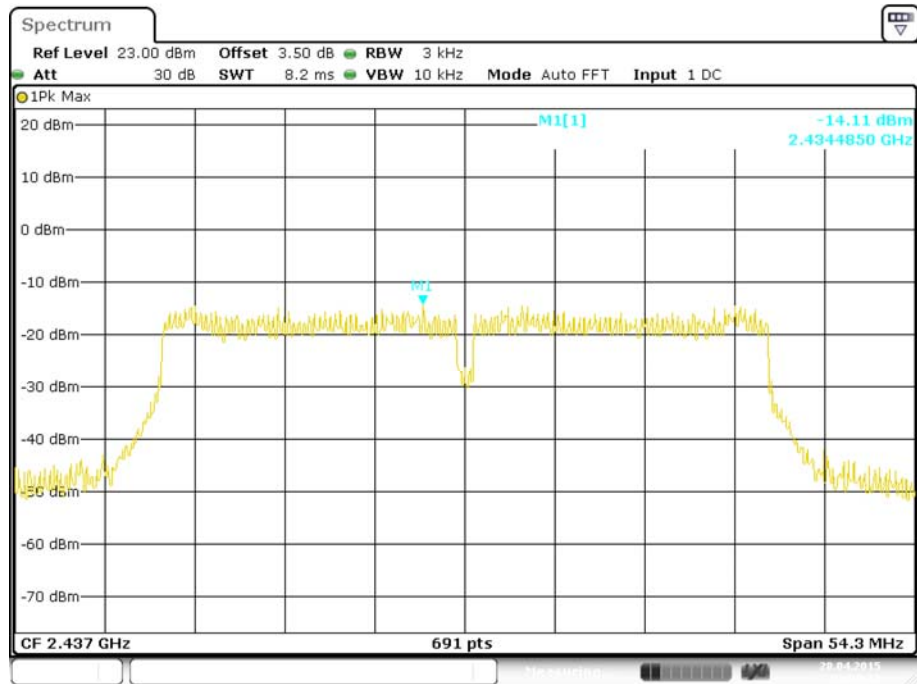


Power Spectral Density, 802.11n-HT20 High Channel, Antenna 1



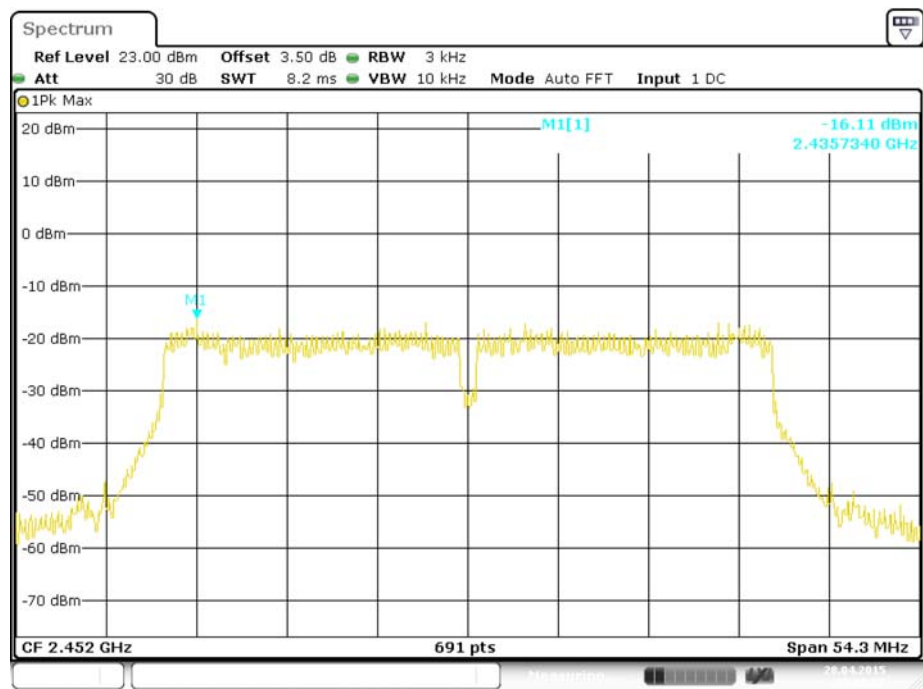
Power Spectral Density, 802.11n-HT40 Low Channel, Antenna 0

Date: 28.APR.2015 23:41:28

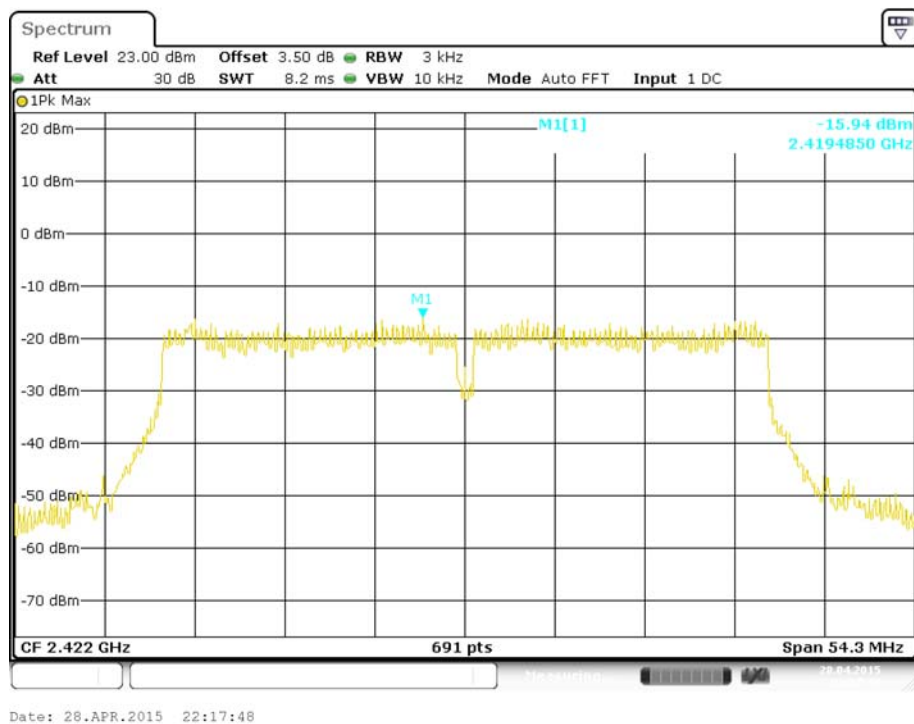
Power Spectral Density, 802.11n-HT40 Middle Channel, Antenna 0

Date: 28.APR.2015 23:30:12

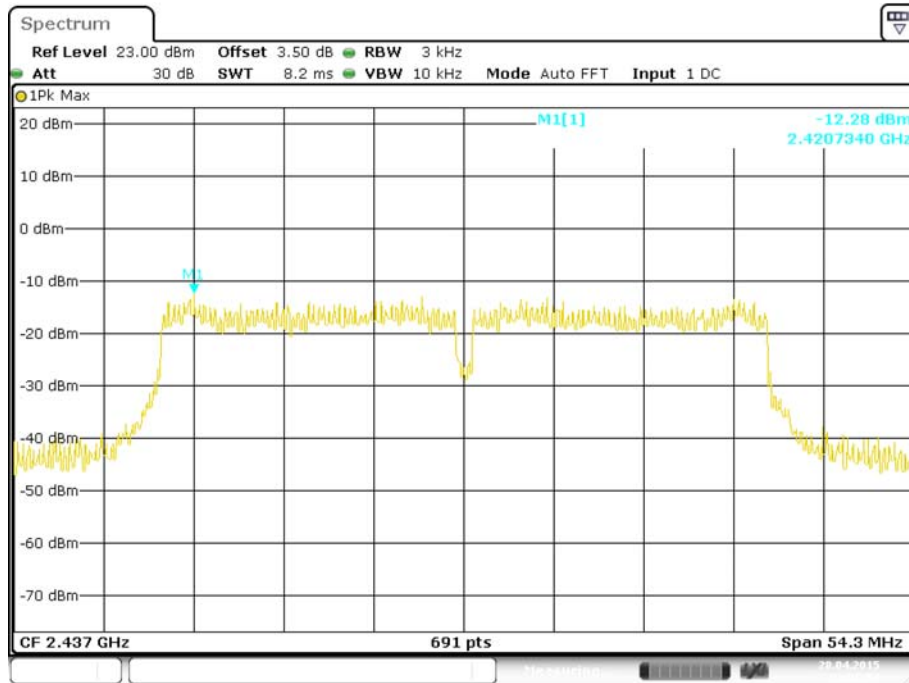
Power Spectral Density, 802.11n-HT40 High Channel, Antenna 0



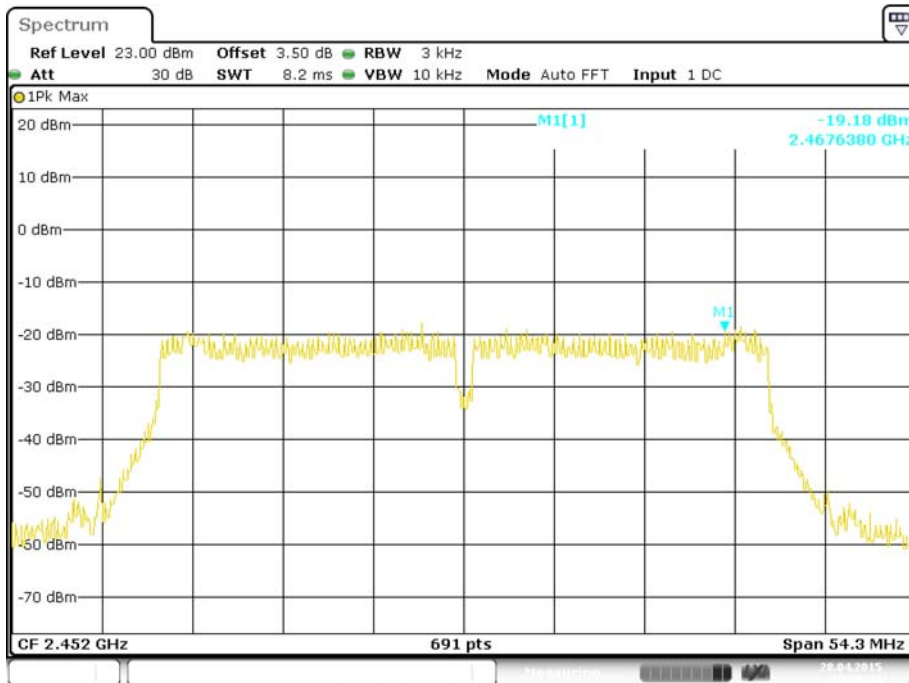
Power Spectral Density, 802.11n-HT40 Low Channel, Antenna 1



Power Spectral Density, 802.11n-HT40 Middle Channel, Antenna 1



Power Spectral Density, 802.11n-HT40 High Channel, Antenna 1



**** END OF REPORT ****