FCC PART 15.247

TEST REPORT

For

CommSky Technologies Corporation

4677 Old Ironsides Drive, Suite 400, Santa Clara, California, United States

FCC ID: 2AJUSCST-AP4600

Report Type:	**Product Type:**
Original Report	Indoor WLAN Access Point

Test Engineer:	Chris Wang
Report Number:	RKS160612006-00A
Report Date:	2016-08-30
Reviewed By:	Jesse Huang EMC Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The CommSky Technologies Corporation's product, model number: AP4600 (FCC ID: 2AJUSCST-AP4600) or the "EUT" in this report was a Indoor WLAN Access Point, which was measured approximately: 233.4mm (L) x216.5mm (W)) x60mm (H), rated input voltage: DC 48 V From Adapter.

Adapter information:
Manufacturer: FSP GROUP INC.
AC INPUT: 100-240V, 0.7A,50-60Hz
DC OUTPUT: 48V, 0.52A MAX

Manufacture information:
CommSky Technologies Corporation /4677 Old Ironsides Drive, Suite 400, Santa Clara, California, United States

**All measurement and test data in this report was gathered from production sample serial number: 20160603001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2016-06-03)*

Antenna information

Chain	Manufacturer	Antenna Type	Max. Antenna Gain
0	CommSky Technologies Corporation	Smart antenna	3.0dBi
1	CommSky Technologies Corporation	Smart antenna	3.0dBi

Objective

This report is prepared on behalf of CommSky Technologies Corporation 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)

FCC Part 15B JBP and FCC Part 15.407 NII submission with FCC ID: 2AJUSCST-AP4600.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB558074 D01 DTS Meas Guidance v03r05.

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

Measurement uncertainty with RF radiated emission is 5.91 dB for 30MHz-1GHz.and 4.92 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Lake Road, Kunshan Development Zone No.248,Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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 and 802.11n-HT20 mode, 11 channels are provided to testing:

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

EUT was tested with Channel 1, 6 and 11.
For 802.11n-HT40 mode, 9 channels are provided to testing, EUT was tested with Channel 3, 6 and 9.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

Labtool

We have pretested all of the date rate, The worst condition(maximum power with 100% duty cycle) was performed under:
802.11b: Data rate:1 Mbps, Power level: 17
802.11g: Data rate: 6 Mbps, Power level: 16
802.11n-HT20: Data rate: MCS0, Power level: 16
802.11n-HT40: Data rate: MCS0, Power level: 15

Support Equipment List and Details

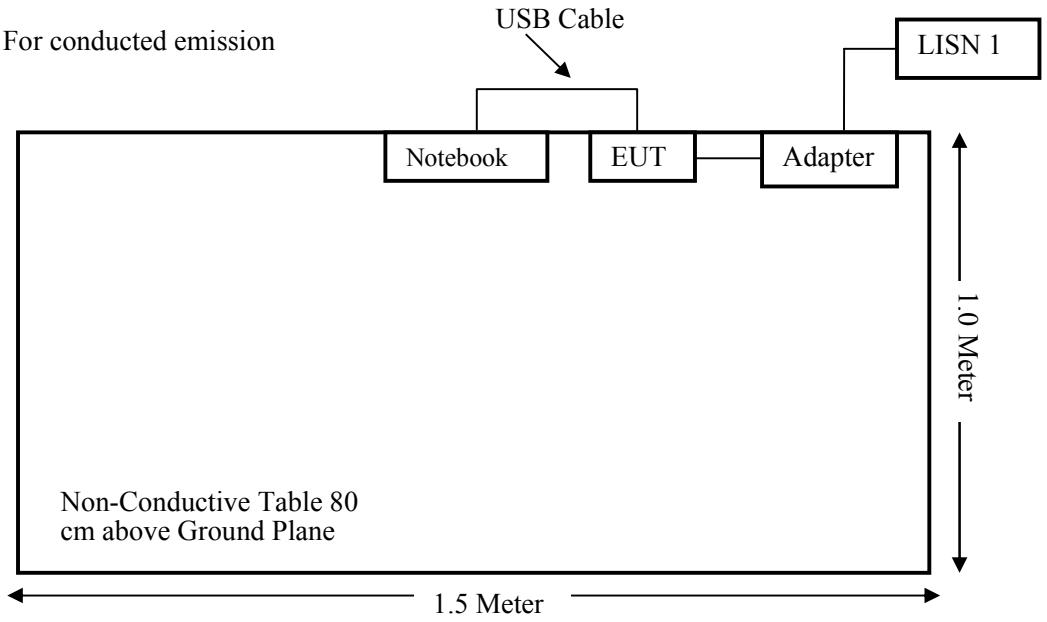
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152

External I/O Cable

Cable Description	Shielding Type	Length (m)	From Port	To
USB Cable	Un-shielding	0.9	EUT	Notebook
AC Line	Un-shielding	1.0	LISN	Adapter
DC Line	Un-shielding	0.8	Adapter	EUT

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)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Conducted 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), §1.1310& §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i)and subpart §1.1310, 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:
Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
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:

2412-2462 MHz

Mode	Frequency (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2462	6.0	3.981	17.41	55.08	20	0.044	1.0
802.11g	2462	6.0	3.981	17.46	55.72	20	0.044	1.0
802.11n HT20	2462	6.0	3.981	15.43	34.91	20	0.028	1.0
802.11n HT40	2422	6.0	3.981	10.74	11.86	20	0.009	1.0

5150-5250 MHz

Mode	Frequency (MHz)	Antenna Gain		Conducted output power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5150-5250	6.0	3.99	19.87	97.05	20	0.0771	1.0
802.11n HT20		6.0	3.99	19.94	98.63	20	0.0783	1.0
802.11n HT40		6.0	3.99	19.19	82.99	20	0.0659	1.0
802.11ac20		6.0	3.99	20.21	104.95	20	0.0834	1.0
802.11ac40		6.0	3.99	19.16	82.41	20	0.0655	1.0
802.11ac80		6.0	3.99	18.05	63.83	20	0.0507	1.0

5725-5850 MHz

Mode	Frequency (MHz)	Antenna Gain		Conducted output power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11a	5725-5850	6.0	3.99	20.13	103.04	20	0.0818	1.0
802.11n HT20		6.0	3.99	19.95	98.86	20	0.0785	1.0
802.11n HT40		6.0	3.99	18.56	71.78	20	0.0570	1.0
802.11ac20		6.0	3.99	19.96	99.08	20	0.0787	1.0
802.11ac40		6.0	3.99	19.11	81.47	20	0.0647	1.0
802.11ac80		6.0	3.99	18.00	63.10	20	0.0501	1.0

So the Max MPE ratio at 20 cm distance is 0.044 +0.0834 = 0.1274 < 1.0

The device meets FCC MPE limit at 20 cm distance.

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 6dBi 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

The EUT has two IPEX connectors to attach the two Passive antennas (chain 0,chain 1)arrangement for wifi, which the antenna gain are 3.0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

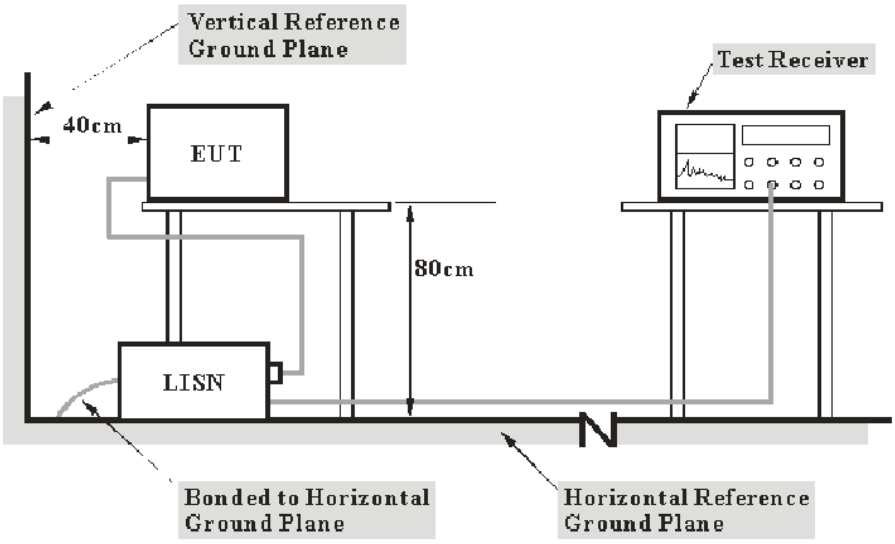
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe 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 expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Kunshan) 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 C63.10-2013 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 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	934115/007	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2015-11-12	2016-11-11
Rohde & Schwarz	LISN	ESH3-Z5	892239/018	2016-07-04	2017-07-03
Rohde & Schwarz	Pulse limiter	ESH3-Z2	879940/0058	2016-06-19	2017-06-18
HP	Current probe	8710-1744	636	2016-07-04	2017-07-03
FCC	ISN	FCC-TLISN-T8-02	20376	2016-06-23	2017-06-22
MICRO-COAX	Coaxial line	UFB-293B-1-0480-50X50	97F0173	2015-10-01	2016-10-01
Rohde & Schwarz	CE Test software	EMC 32	V 09.10.0	--	--

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

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss

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

Margin = Limit – Corrected Amplitude

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:

6.91 dB at **0.345000 MHz** in the **Line** conducted 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 BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

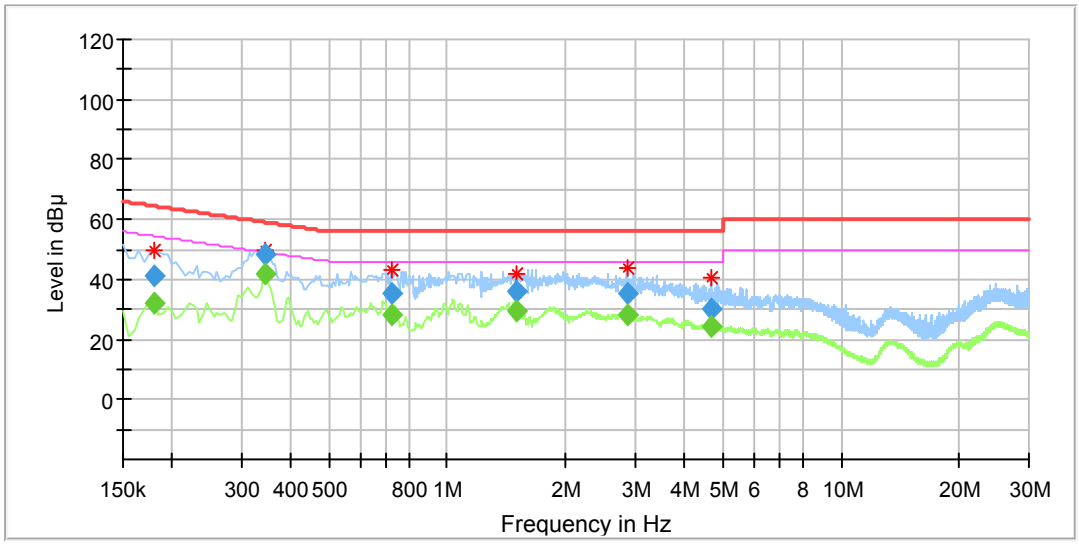
Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-08-17.

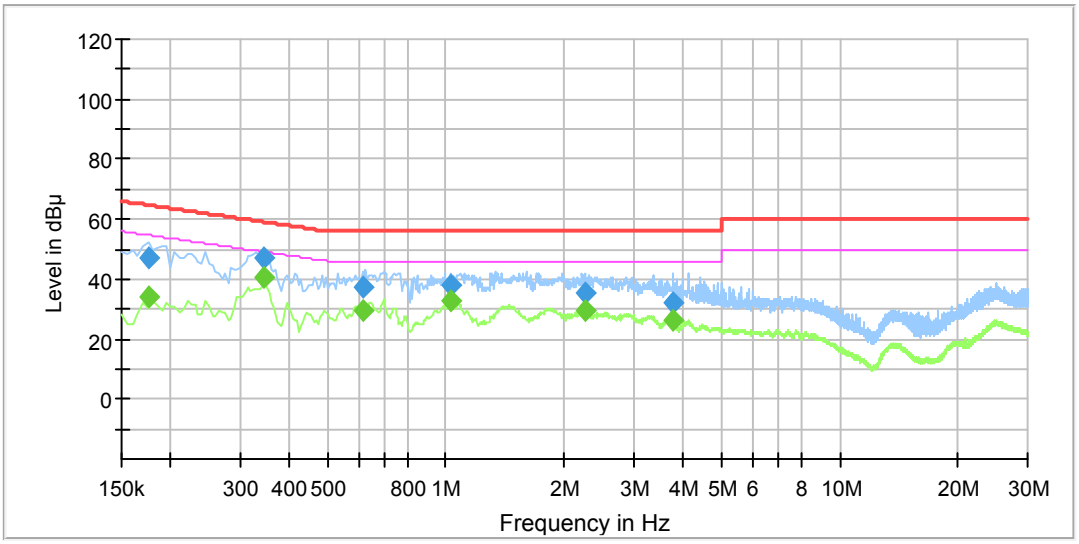
EUT operation mode: Transmitting with adapter
Note: The worst case (802.11b middle channel) was recorded.

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.180000	---	32.36	9.000	L1	11.0	22.13	54.49	Compliance
0.180000	41.34	---	9.000	L1	11.0	23.15	64.49	Compliance
0.345000	---	42.17	9.000	L1	11.0	6.91	49.08	Compliance
0.345000	48.22	---	9.000	L1	11.0	10.86	59.08	Compliance
0.720000	---	28.08	9.000	L1	11.1	17.92	46.00	Compliance
0.720000	35.57	---	9.000	L1	11.1	20.43	56.00	Compliance
1.500000	---	29.49	9.000	L1	11.1	16.51	46.00	Compliance
1.500000	36.24	---	9.000	L1	11.1	19.76	56.00	Compliance
2.855000	---	27.93	9.000	L1	11.2	18.07	46.00	Compliance
2.855000	35.08	---	9.000	L1	11.2	20.92	56.00	Compliance
4.670000	---	24.29	9.000	L1	11.3	21.71	46.00	Compliance
4.670000	29.90	---	9.000	L1	11.3	26.10	56.00	Compliance

AC 120V/60 Hz, Neutral

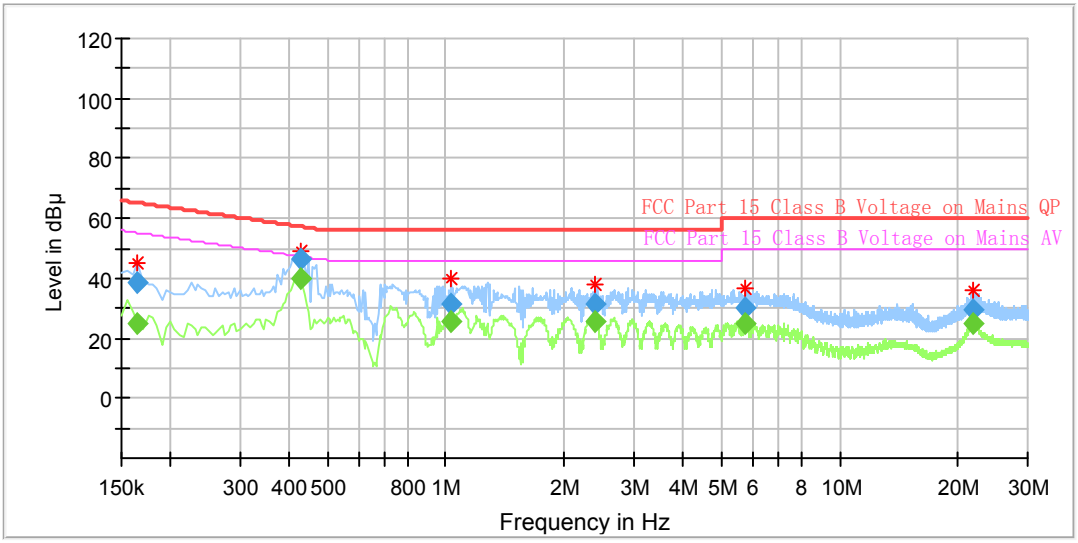


Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	33.79	9.000	N	11.0	20.93	54.72	Compliance
0.175000	46.75	---	9.000	N	11.0	17.97	64.72	Compliance
0.345000	---	40.43	9.000	N	11.0	8.65	49.08	Compliance
0.345000	47.29	---	9.000	N	11.0	11.79	59.08	Compliance
0.615000	---	29.77	9.000	N	11.1	16.23	46.00	Compliance
0.615000	36.98	---	9.000	N	11.1	19.02	56.00	Compliance
1.025000	---	32.73	9.000	N	11.1	13.27	46.00	Compliance
1.025000	37.83	---	9.000	N	11.1	18.17	56.00	Compliance
2.250000	---	29.60	9.000	N	11.3	16.40	46.00	Compliance
2.250000	35.30	---	9.000	N	11.3	20.70	56.00	Compliance
3.755000	---	26.39	9.000	N	11.3	19.61	46.00	Compliance
3.755000	32.36	---	9.000	N	11.3	23.64	56.00	Compliance

Note:
1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
2) Corrected Amplitude = Reading + Corr.
3) Margin = Limit –Corrected Amplitude

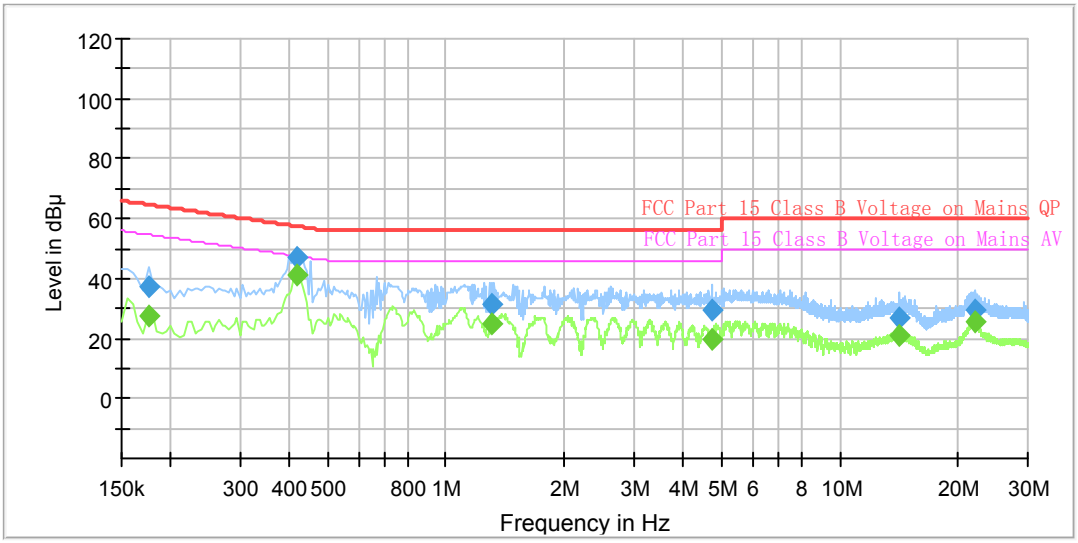
EUT operation mode: Transmitting with POE
Note: The worst case (802.11b middle channel) was recorded.

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.165000	---	25.18	9.000	L1	10.3	30.03	55.21	Compliance
0.165000	38.76	---	9.000	L1	10.3	26.45	65.21	Compliance
0.430000	---	40.16	9.000	L1	10.3	7.09	47.25	Compliance
0.430000	46.35	---	9.000	L1	10.3	10.90	57.25	Compliance
1.030000	---	25.78	9.000	L1	10.3	20.22	46.00	Compliance
1.030000	31.32	---	9.000	L1	10.3	24.68	56.00	Compliance
2.400000	---	25.53	9.000	L1	10.4	20.47	46.00	Compliance
2.400000	31.38	---	9.000	L1	10.4	24.62	56.00	Compliance
5.770000	---	24.71	9.000	L1	10.5	25.29	50.00	Compliance
5.770000	30.38	---	9.000	L1	10.5	29.62	60.00	Compliance
21.865000	---	24.76	9.000	L1	10.5	25.24	50.00	Compliance
21.865000	29.24	---	9.000	L1	10.5	30.76	60.00	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.175000	---	27.31	9.000	N	10.3	27.41	54.72	Compliance
0.175000	37.35	---	9.000	N	10.3	27.37	64.72	Compliance
0.420000	---	41.09	9.000	N	10.3	6.36	47.45	Compliance
0.420000	47.27	---	9.000	N	10.3	10.18	57.45	Compliance
1.310000	---	25.24	9.000	N	10.3	20.76	46.00	Compliance
1.310000	31.61	---	9.000	N	10.3	24.39	56.00	Compliance
4.715000	---	19.44	9.000	N	10.6	26.56	46.00	Compliance
4.715000	29.20	---	9.000	N	10.6	26.80	56.00	Compliance
14.190000	---	20.90	9.000	N	10.5	29.10	50.00	Compliance
14.190000	26.60	---	9.000	N	10.5	33.40	60.00	Compliance
21.955000	---	25.28	9.000	N	10.5	24.72	50.00	Compliance
21.955000	29.60	---	9.000	N	10.5	30.40	60.00	Compliance

Note:
1) Corr.=LISN VDF (Voltage Division Factor) + Cable Loss
2) Corrected Amplitude = Reading + Corr.
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;

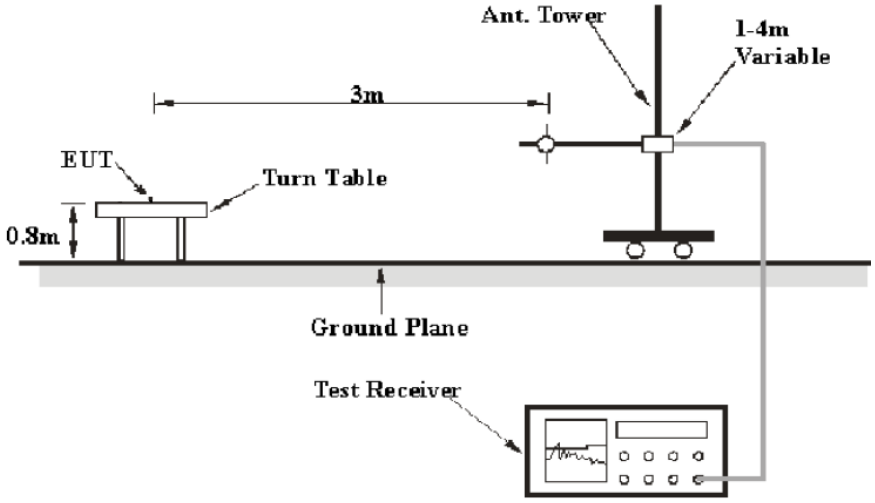
Measurement Uncertainty

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 (average), and system repeatability.

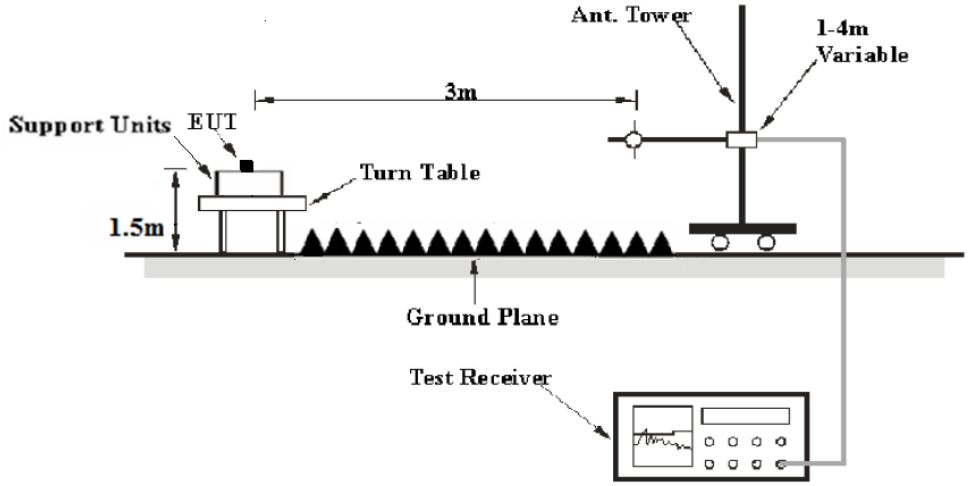
Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Kunshan) is 5.91 dB for 30MHz-1GHz and 4.92 dB for above 1GHz, 1.95dB for conducted measurement at antenna port. And the uncertainty will not be taken into consideration for the test data recorded in the report

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

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

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, 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
Sonoma Instrunent	Amplifier	330	171377	2015-09-16	2016-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	SIGNALANALYZER	FSV40	101116	2016-07-04	2017-07-03
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Mini	Pre-amplifier	ZVA-183-S+	857001418	2015-09-16	2016-09-16
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2015-09-16	2016-09-16
champrotek	Chamber	Chamber A	1#	2015-09-17	2016-09-17
R&S	Auto test Software	EMC32	V 09.10.0	-	-
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2015-12-16	2016-12-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – 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.

8.25 dB at **599.996250 MHz** in the **Vertical** polarization

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 BACL, $U_{(Lm)}$ 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

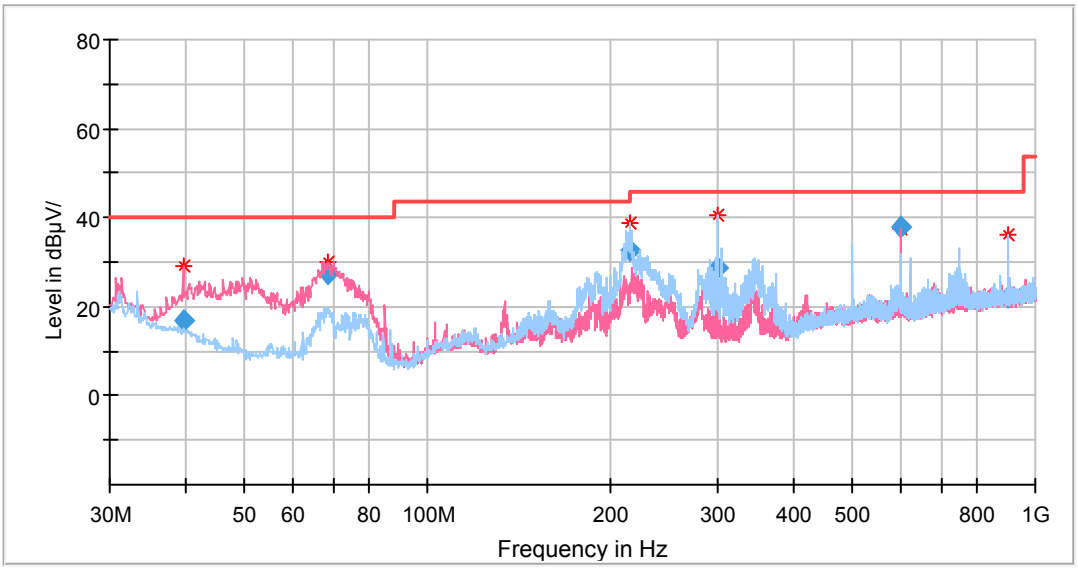
Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-06-29 & .2016-07-01.

30 MHz-1 GHz:

EUT operation mode: Transmitting

Chain 0+Chain 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 (cm)	Polar (H/V)			Limit (dB µ V/m)	Margin (dB)
39.578750	26.94	QP	246.0	200.0	V	-10.1	16.84	40.00	23.16
68.800000	44.30	QP	107.0	200.0	V	-17.1	27.20	40.00	12.80
215.997500	44.98	QP	168.0	200.0	H	-12.5	32.48	43.50	11.02
300.023750	39.20	QP	207.0	100.0	H	-10.4	28.80	46.00	17.20
599.996250	42.95	QP	190.0	100.0	V	-5.2	37.75	46.00	8.25
900.090000	23.11	QP	178.0	100.0	H	-0.9	22.21	46.00	23.79

1GHz-25GHz

EUT operation mode: Transmitting

802.11b Mode, Chain 0（worst case）:

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 (cm)	Polar (H/V)			Limit (dB μ V/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	100.89	PK	93	110	V	3.0	103.89	/	/
2412.0	96.23	Ave	93	110	V	3.0	99.23	/	/
2412.0	97.58	PK	236	141	H	3.0	100.58	/	/
2412.0	92.65	Ave	236	141	H	3.0	95.65	/	/
2390.0	42.64	PK	317	164	V	2.9	45.54	74	28.46
2390.0	30.77	Ave	317	164	V	2.9	33.67	54	20.33
2400.0	46.93	PK	104	235	V	2.9	49.83	74	24.17
2400.0	34.73	Ave	104	235	V	2.9	37.63	54	16.37
4824.0	34.13	PK	19	198	H	13.8	47.93	74	26.07
4824.0	28.37	Ave	19	198	H	13.8	42.17	54	11.83
6620.0	29.54	PK	258	111	V	18.8	48.34	74	25.66
6620.0	22.81	Ave	258	111	V	18.8	41.61	54	12.39
7236.0	26.56	PK	348	208	H	18.8	45.36	74	28.64
7236.0	20.76	Ave	348	208	H	18.8	39.56	54	14.44

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437.0	100.73	PK	123	165	V	3.0	103.73	/	/
2437.0	96.24	Ave	123	165	V	3.0	99.24	/	/
2437.0	95.26	PK	9	232	H	3.0	98.26	/	/
2437.0	90.98	Ave	9	232	H	3.0	93.98	/	/
1477.0	43.87	PK	275	224	V	0.0	43.87	74	30.13
1477.0	32.96	Ave	275	224	V	0.0	32.96	54	21.04
1696.0	43.28	PK	190	116	H	0.7	43.98	74	30.02
1696.0	35.30	Ave	190	116	H	0.7	36.00	54	18.00
4874.0	34.40	PK	150	211	V	13.9	48.30	74	25.70
4874.0	29.28	Ave	150	211	V	13.9	43.18	54	10.82
6677.0	31.24	PK	130	188	H	18.8	50.04	74	23.96
6677.0	21.58	Ave	130	188	H	18.8	40.38	54	13.62
7311.0	27.54	PK	275	142	H	18.9	46.44	74	27.56
7311.0	23.36	Ave	275	142	H	18.9	42.26	54	11.74

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	100.63	PK	11	181	V	3.0	103.63	/	/
2462.0	96.02	Ave	11	181	V	3.0	99.02	/	/
2462.0	95.92	PK	280	202	H	3.0	98.92	/	/
2462.0	91.55	Ave	280	202	H	3.0	94.55	/	/
2483.5	44.84	PK	311	106	V	3.2	48.04	74	25.96
2483.5	32.99	Ave	311	106	V	3.2	36.19	54	17.81
2563.0	43.77	PK	225	114	V	4.2	47.97	74	26.03
2563.0	35.79	Ave	225	114	V	4.2	39.99	54	14.01
4924.0	33.31	PK	138	126	H	14.0	47.31	74	26.69
4924.0	27.42	Ave	138	126	H	14.0	41.42	54	12.58
6681.0	30.65	PK	249	141	H	18.8	49.45	74	24.55
6681.0	23.93	Ave	249	141	H	18.8	42.73	54	11.27
7386.0	28.86	PK	63	180	H	19.8	48.66	74	25.34
7386.0	23.19	Ave	63	180	H	19.8	42.99	54	11.01

802.11g Mode, Chain 0（worst case）:

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	99.37	PK	125	163	V	3.0	102.37	/	/
2412.0	94.00	Ave	125	163	V	3.0	97.00	/	/
2412.0	94.21	PK	182	236	H	3.0	97.21	/	/
2412.0	88.88	Ave	182	236	H	3.0	91.88	/	/
2390.0	42.97	PK	185	152	V	2.9	45.87	74	28.13
2390.0	31.37	Ave	185	152	V	2.9	34.27	54	19.73
2400.0	44.05	PK	39	119	V	2.9	46.95	74	27.05
2400.0	36.98	Ave	39	119	V	2.9	39.88	54	14.12
4824.0	34.13	PK	291	131	H	13.8	47.93	74	26.07
4824.0	28.62	Ave	291	131	H	13.8	42.42	54	11.58
6620.0	31.62	PK	40	185	V	18.8	50.42	74	23.58
6620.0	22.98	Ave	40	185	V	18.8	41.78	54	12.22
7236.0	28.24	PK	181	179	H	18.8	47.04	74	26.96
7236.0	21.36	Ave	181	179	H	18.8	40.16	54	13.84

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437.0	98.65	PK	252	204	V	3.0	101.65	/	/
2437.0	93.62	Ave	252	204	V	3.0	96.62	/	/
2437.0	95.30	PK	309	191	H	3.0	98.30	/	/
2437.0	89.64	Ave	309	191	H	3.0	92.64	/	/
1477.0	44.56	PK	1	237	V	0.0	44.56	74	29.44
1477.0	31.63	Ave	1	237	V	0.0	31.63	54	22.37
1696.0	42.55	PK	92	220	H	0.7	43.25	74	30.75
1696.0	36.10	Ave	92	220	H	0.7	36.80	54	17.20
4874.0	33.76	PK	266	149	V	13.9	47.66	74	26.34
4874.0	28.58	Ave	266	149	V	13.9	42.48	54	11.52
6677.0	30.06	PK	130	250	H	18.8	48.86	74	25.14
6677.0	22.85	Ave	130	250	H	18.8	41.65	54	12.35
7311.0	26.09	PK	108	118	H	18.9	44.99	74	29.01
7311.0	21.07	Ave	108	118	H	18.9	39.97	54	14.03

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	98.49	PK	212	196	V	3.0	101.49	/	/
2462.0	92.86	Ave	212	196	V	3.0	95.86	/	/
2462.0	93.15	PK	26	110	H	3.0	96.15	/	/
2462.0	87.76	Ave	26	110	H	3.0	90.76	/	/
2483.5	45.68	PK	36	188	V	3.2	48.88	74	25.12
2483.5	32.78	Ave	36	188	V	3.2	35.98	54	18.02
2563.0	43.23	PK	140	228	V	4.2	47.43	74	26.57
2563.0	35.50	Ave	140	228	V	4.2	39.70	54	14.30
4924.0	33.50	PK	332	215	H	14.0	47.50	74	26.50
4924.0	27.41	Ave	332	215	H	14.0	41.41	54	12.59
6681.0	31.16	PK	184	171	H	18.8	49.96	74	24.04
6681.0	22.14	Ave	184	171	H	18.8	40.94	54	13.06
7386.0	28.18	PK	275	233	H	19.8	47.98	74	26.02
7386.0	23.05	Ave	275	233	H	19.8	42.85	54	11.15

802.11n-HT40 Mode, Chain 0 + Chain 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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2422 MHz)									
2422.0	94.88	PK	278	227	V	3.0	97.88	/	/
2422.0	88.33	Ave	278	227	V	3.0	91.33	/	/
2422.0	89.43	PK	260	204	H	3.0	92.43	/	/
2422.0	83.01	Ave	260	204	H	3.0	86.01	/	/
2390.0	45.45	PK	78	167	V	2.9	48.35	74	25.65
2390.0	33.79	Ave	78	167	V	2.9	36.69	54	17.31
2400.0	46.19	PK	337	241	V	2.9	49.09	74	24.91
2400.0	35.35	Ave	337	241	V	2.9	38.25	54	15.75
4844.0	34.92	PK	250	212	H	13.8	48.72	74	25.28
4844.0	28.63	Ave	250	212	H	13.8	42.43	54	11.57
6620.0	30.01	PK	211	176	V	18.8	48.81	74	25.19
6620.0	22.27	Ave	211	176	V	18.8	41.07	54	12.93
7266.0	28.90	PK	89	201	H	18.8	47.70	74	26.30
7266.0	21.34	Ave	89	201	H	18.8	40.14	54	13.86

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437.0	94.19	PK	64	221	V	3.0	97.19	/	/
2437.0	87.49	Ave	64	221	V	3.0	90.49	/	/
2437.0	88.54	PK	168	198	H	3.0	91.54	/	/
2437.0	82.22	Ave	168	198	H	3.0	85.22	/	/
1477.0	42.69	PK	70	209	V	0.0	42.69	74	31.31
1477.0	31.39	Ave	70	209	V	0.0	31.39	54	22.61
1696.0	42.43	PK	116	220	H	0.7	43.13	74	30.87
1696.0	34.54	Ave	116	220	H	0.7	35.24	54	18.76
4874.0	32.15	PK	337	231	V	13.9	46.05	74	27.95
4874.0	24.16	Ave	337	231	V	13.9	38.06	54	15.94
6677.0	30.71	PK	173	228	H	18.8	49.51	74	24.49
6677.0	23.46	Ave	173	228	H	18.8	42.26	54	11.74
7311.0	28.58	PK	130	173	H	18.9	47.48	74	26.52
7311.0	22.26	Ave	130	173	H	18.9	41.16	54	12.84

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2452 MHz)									
2452.0	94.19	PK	127	195	V	3.0	97.19	/	/
2452.0	88.19	Ave	127	195	V	3.0	91.19	/	/
2452.0	88.45	PK	287	227	H	3.0	91.45	/	/
2452.0	81.71	Ave	287	227	H	3.0	84.71	/	/
2483.5	46.00	PK	355	152	V	3.2	49.20	74	24.80
2483.5	33.03	Ave	355	152	V	3.2	36.23	54	17.77
2563.0	46.99	PK	276	211	V	4.2	51.19	74	22.81
2563.0	35.38	Ave	276	211	V	4.2	39.58	54	14.42
4904.0	32.96	PK	174	166	H	14.0	46.96	74	27.04
4904.0	25.01	Ave	174	166	H	14.0	39.01	54	14.99
6681.0	31.88	PK	233	157	H	18.8	50.68	74	23.32
6681.0	21.90	Ave	233	157	H	18.8	40.70	54	13.30
7356.0	27.87	PK	277	248	H	19.8	47.67	74	26.33
7356.0	21.56	Ave	277	248	H	19.8	41.36	54	12.64

802.11n-HT20 Mode, Chain 0 + Chain 1:

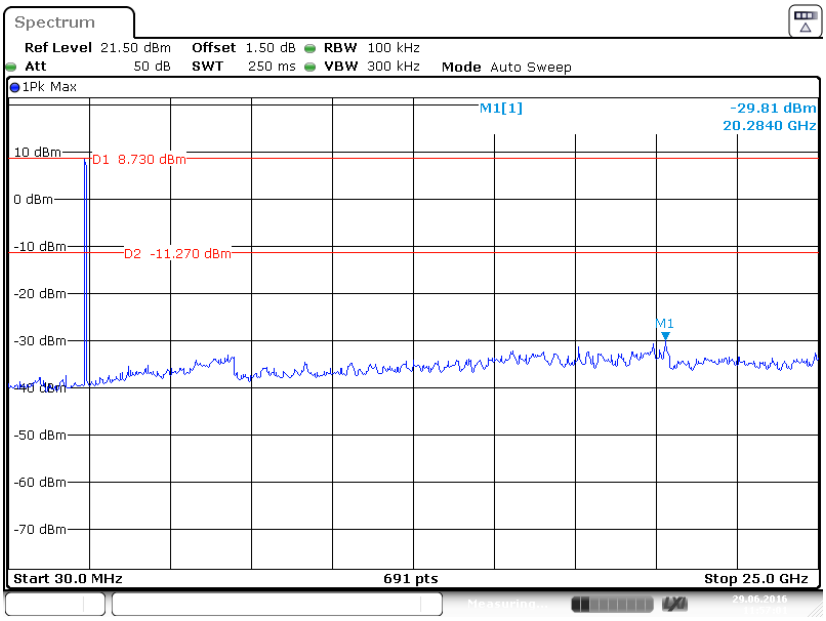
Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.247/205/209	
	Reading (dBμV)	Detector (PK/QP/Ave.)		Height (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Low Channel (2412 MHz)									
2412.0	97.98	PK	231	125	V	3.0	100.98	/	/
2412.0	92.10	Ave	231	125	V	3.0	95.10	/	/
2412.0	94.84	PK	159	135	H	3.0	97.84	/	/
2412.0	89.63	Ave	159	135	H	3.0	92.63	/	/
2390.0	43.93	PK	115	200	V	2.9	46.83	74	27.17
2390.0	32.28	Ave	115	200	V	2.9	35.18	54	18.82
2400.0	43.01	PK	300	233	V	2.9	45.91	74	28.09
2400.0	37.71	Ave	300	233	V	2.9	40.61	54	13.39
4824.0	33.97	PK	61	234	H	13.8	47.77	74	26.23
4824.0	27.96	Ave	61	234	H	13.8	41.76	54	12.24
6620.0	30.54	PK	116	240	V	18.8	49.34	74	24.66
6620.0	21.55	Ave	116	240	V	18.8	40.35	54	13.65
7236.0	27.18	PK	247	202	H	18.8	45.98	74	28.02
7236.0	22.15	Ave	247	202	H	18.8	40.95	54	13.05

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
Middle Channel (2437 MHz)									
2437.0	97.76	PK	313	152	V	3.0	100.76	/	/
2437.0	91.94	Ave	313	152	V	3.0	94.94	/	/
2437.0	92.21	PK	244	119	H	3.0	95.21	/	/
2437.0	86.65	Ave	244	119	H	3.0	89.65	/	/
1477.0	43.96	PK	342	174	V	0.0	43.96	74	30.04
1477.0	32.86	Ave	342	174	V	0.0	32.86	54	21.14
1696.0	42.64	PK	31	219	H	0.7	43.34	74	30.66
1696.0	35.50	Ave	31	219	H	0.7	36.20	54	17.80
4874.0	34.66	PK	61	194	V	13.9	48.56	74	25.44
4874.0	29.18	Ave	61	194	V	13.9	43.08	54	10.92
6677.0	31.74	PK	231	239	H	18.8	50.54	74	23.46
6677.0	23.36	Ave	231	239	H	18.8	42.16	54	11.84
7311.0	26.23	PK	339	131	H	18.9	45.13	74	28.87
7311.0	19.56	Ave	339	131	H	18.9	38.46	54	15.54

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 (cm)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
High Channel (2462 MHz)									
2462.0	98.47	PK	339	151	V	3.0	101.47	/	/
2462.0	93.07	Ave	339	151	V	3.0	96.07	/	/
2462.0	93.06	PK	282	218	H	3.0	96.06	/	/
2462.0	87.14	Ave	282	218	H	3.0	90.14	/	/
2483.5	43.94	PK	331	112	V	3.2	47.14	74	26.86
2483.5	30.23	Ave	331	112	V	3.2	33.43	54	20.57
2563.0	46.33	PK	101	182	V	4.2	50.53	74	23.47
2563.0	34.22	Ave	101	182	V	4.2	38.42	54	15.58
4924.0	33.07	PK	191	177	H	14.0	47.07	74	26.93
4924.0	27.12	Ave	191	177	H	14.0	41.12	54	12.88
6681.0	31.21	PK	206	241	H	18.8	50.01	74	23.99
6681.0	22.45	Ave	206	241	H	18.8	41.25	54	12.75
7386.0	28.12	PK	133	107	H	19.8	47.92	74	26.08
7386.0	21.23	Ave	133	107	H	19.8	41.03	54	12.97

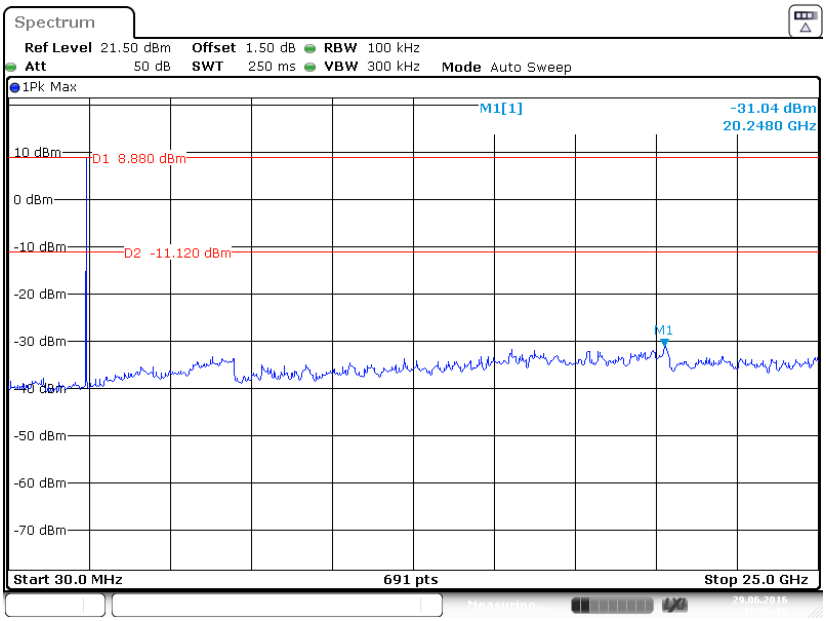
Conducted Spurious Emissions at Antenna Port

Chain 0 802.11b Low Channel



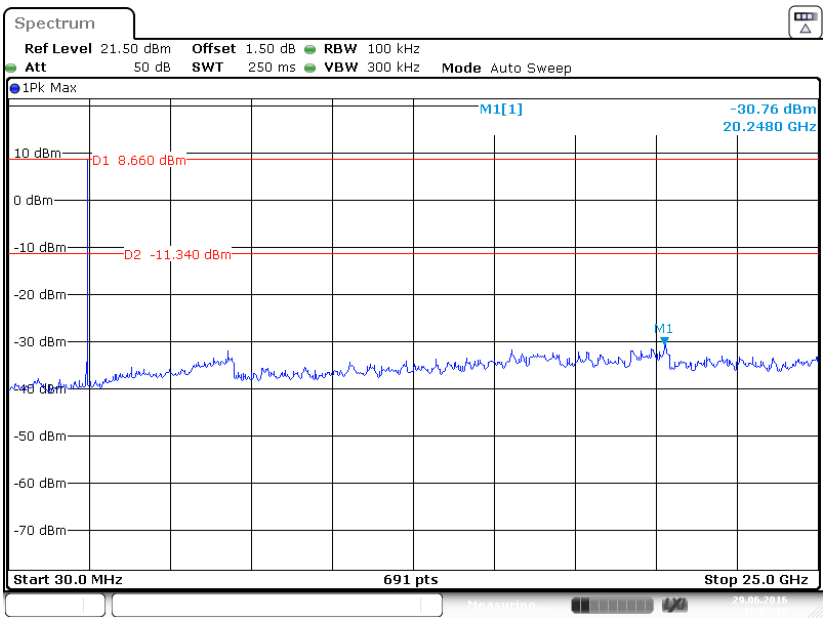
Date: 29.JUN.2016 11:57:02

Chain 0 802.11b Middle Channel



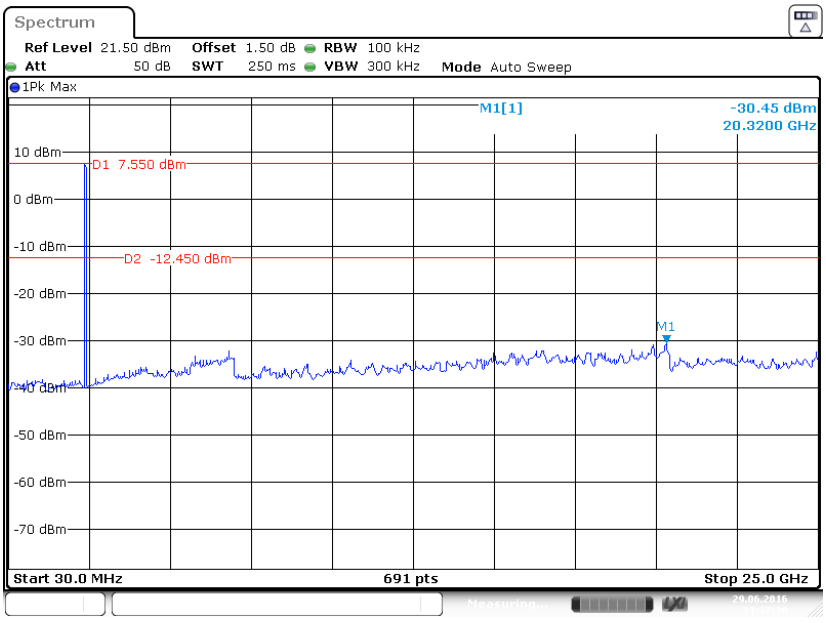
Date: 29.JUN.2016 12:06:37

Chain 0 802.11b High Channel



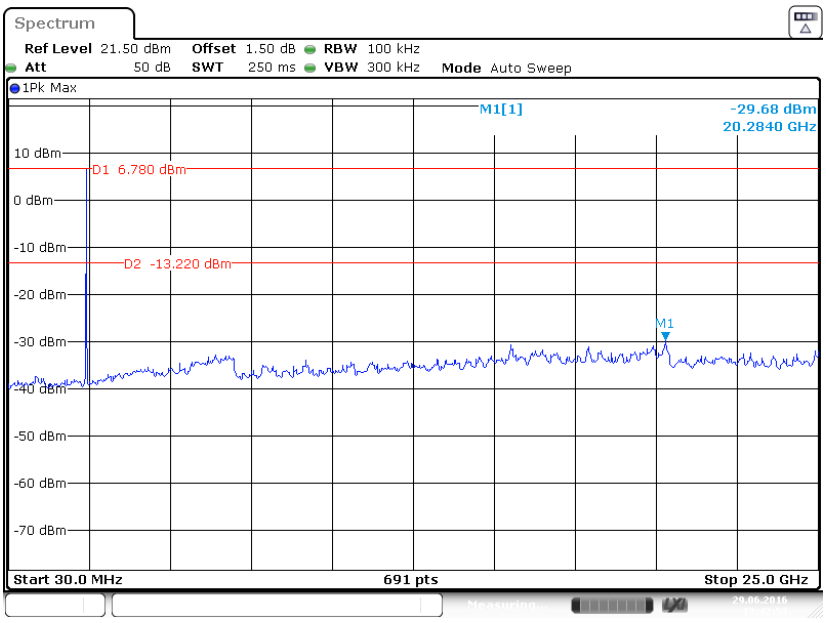
Date: 29.JUN.2016 12:03:20

Chain 0 802.11g Low Channel



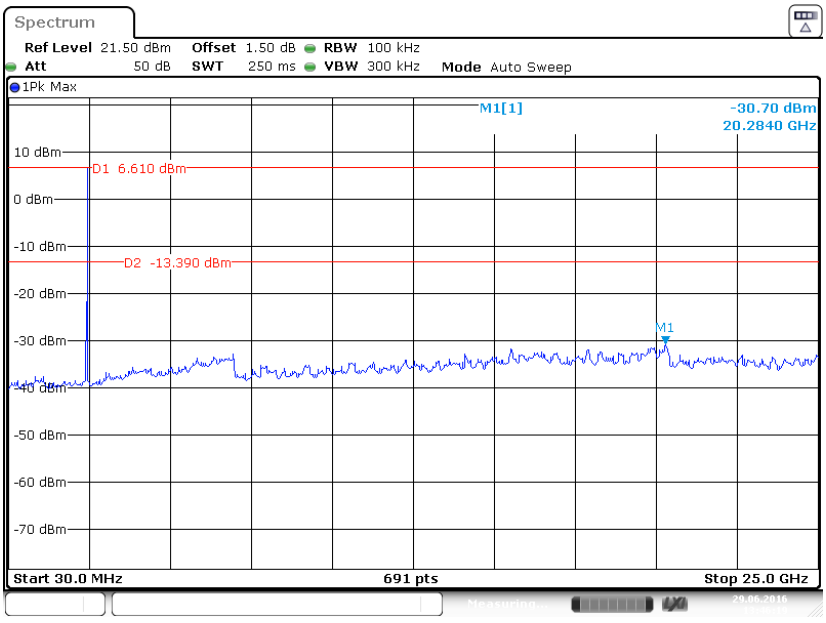
Date: 29.JUN.2016 13:37:30

Chain 0 802.11g Middle Channel



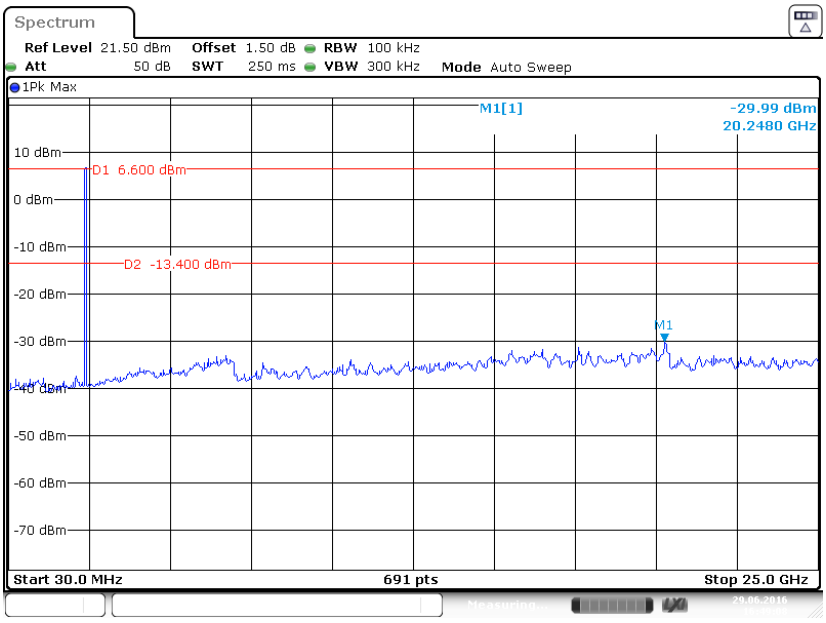
Date: 29.JUN.2016 13:42:53

Chain 0 802.11g High Channel



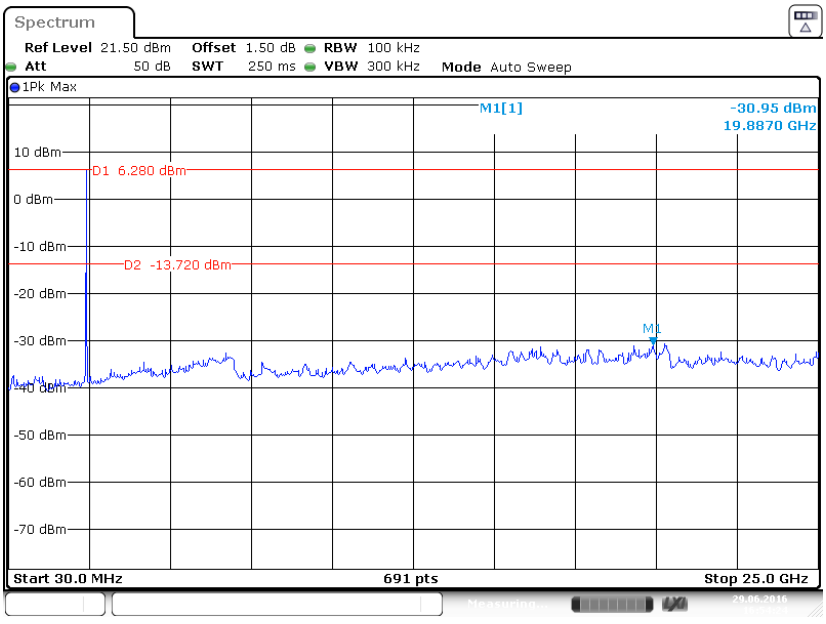
Date: 29.JUN.2016 13:46:20

Chain 0 802.11n-HT20 Low Channel



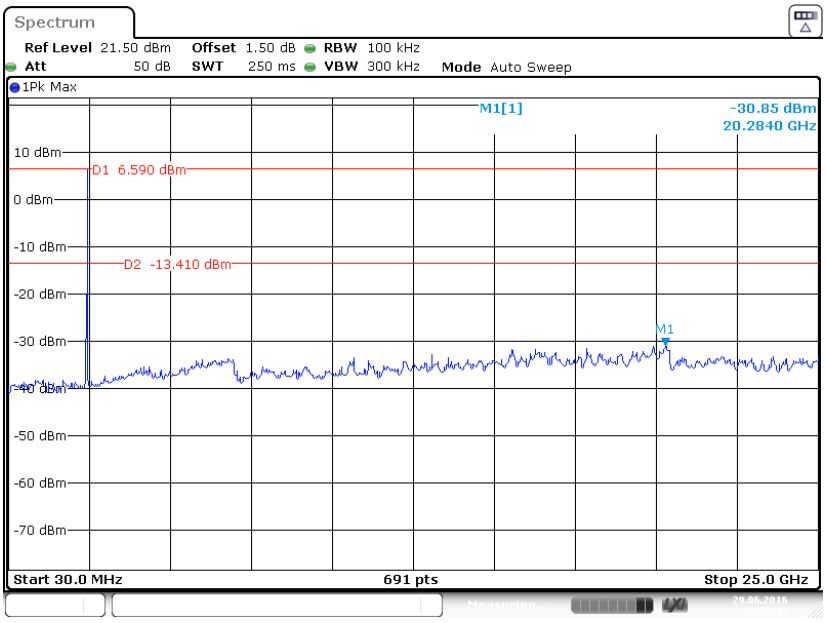
Date: 29.JUN.2016 16:49:09

Chain 0 802.11n-HT20 Middle Channel



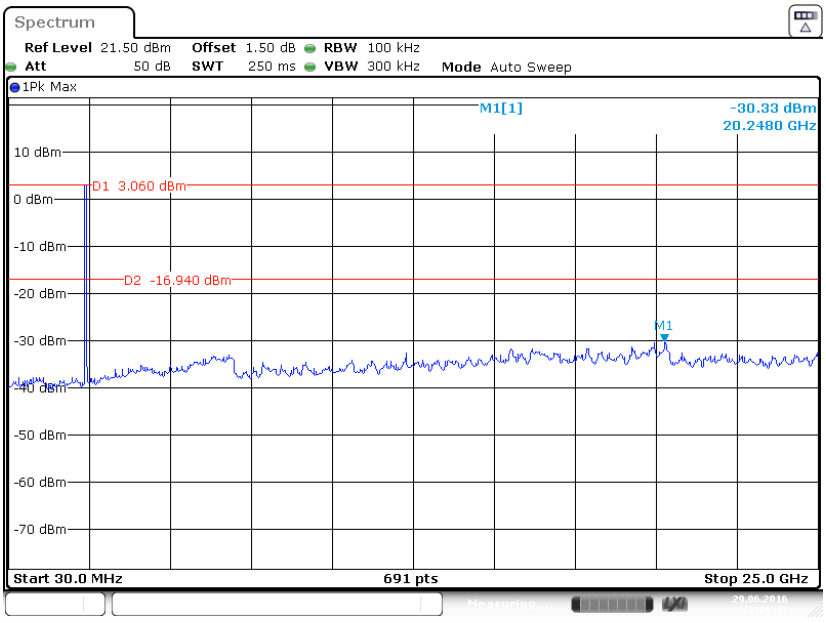
Date: 29.JUN.2016 16:54:25

Chain 0 802.11n-HT20 High Channel



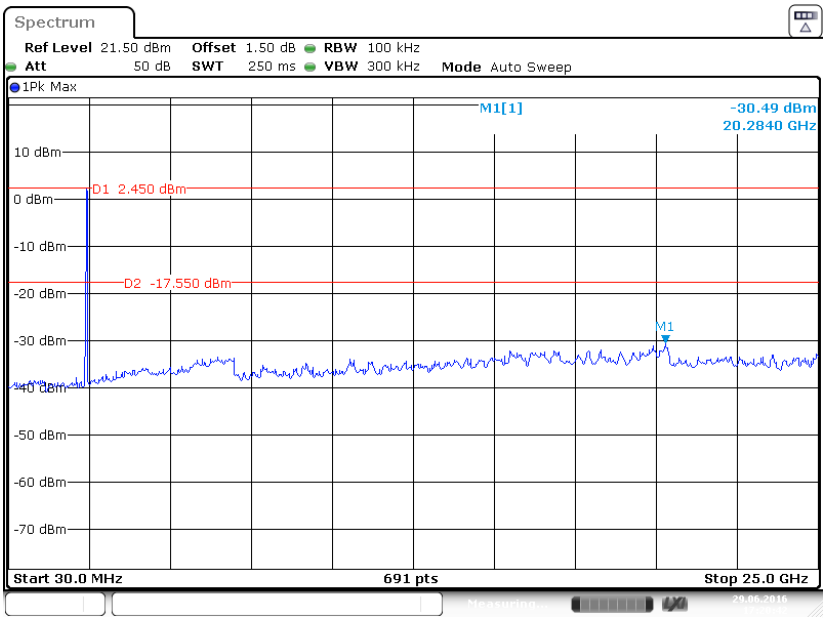
Date: 29.JUN.2016 16:56:42

Chain 0 802.11n-HT40 Low Channel



Date: 29.JUN.2016 17:09:46

Chain 0 802.11n-HT40 Middle Channel



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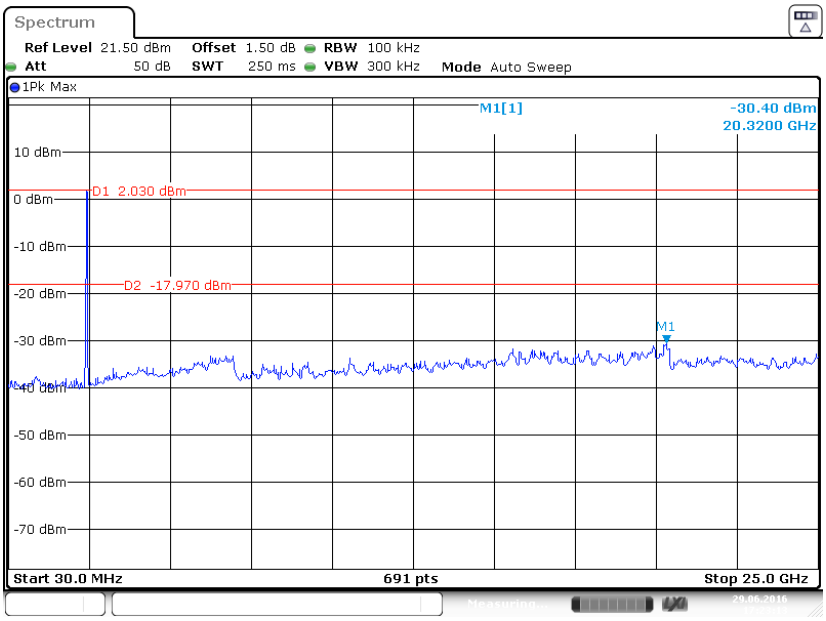
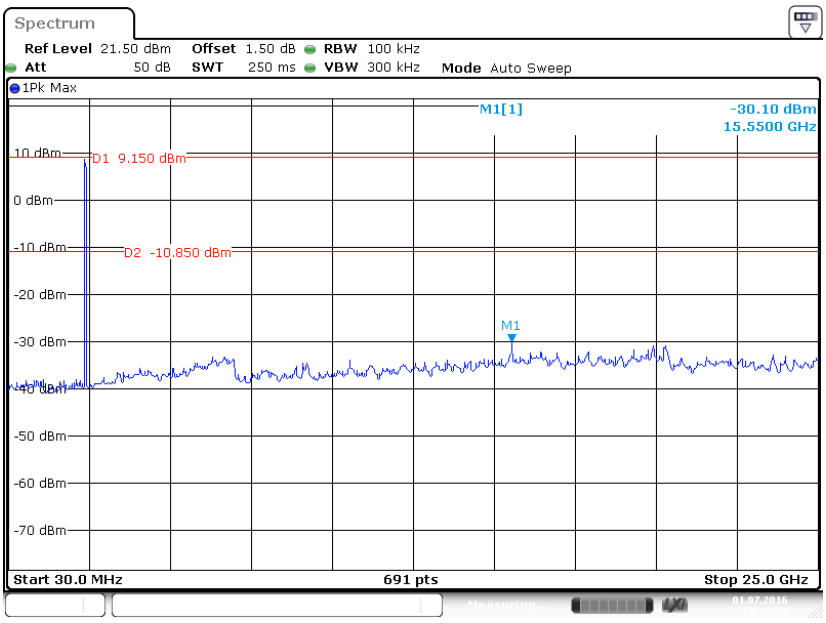
Chain 0 802.11n-HT40 High Channel



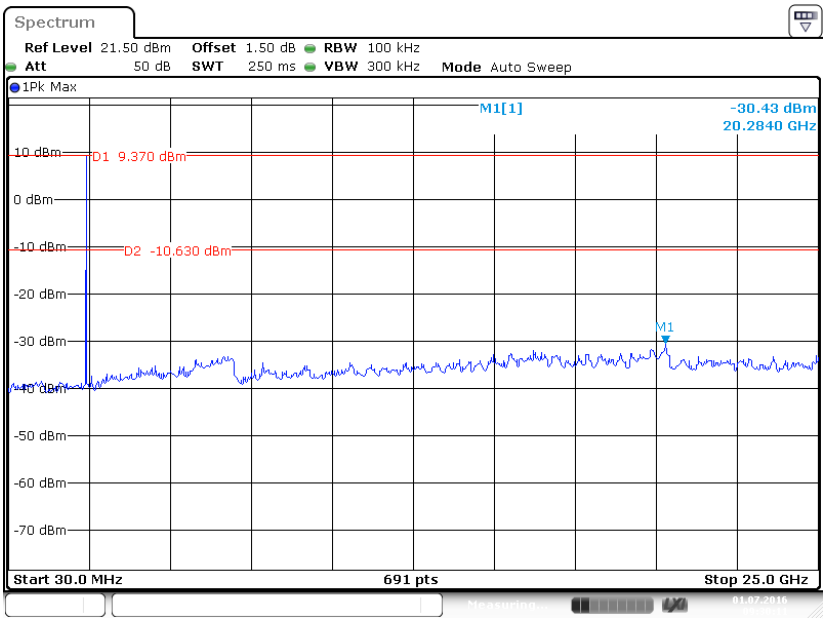
Date: 29.JUN.2016 17:23:13

Chain 1 802.11b Low Channel



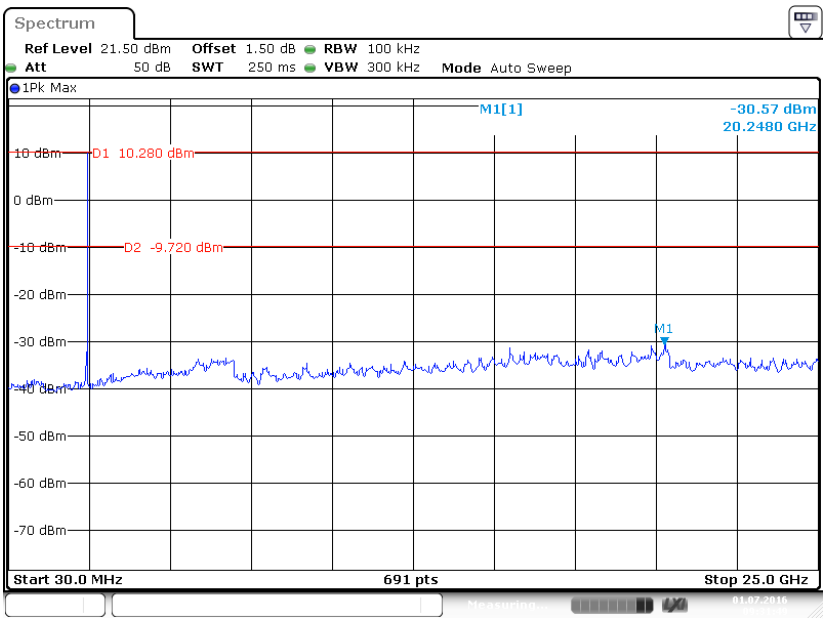
Date:1.JUL.2016 09:13:48

Chain 1 802.11b Middle Channel



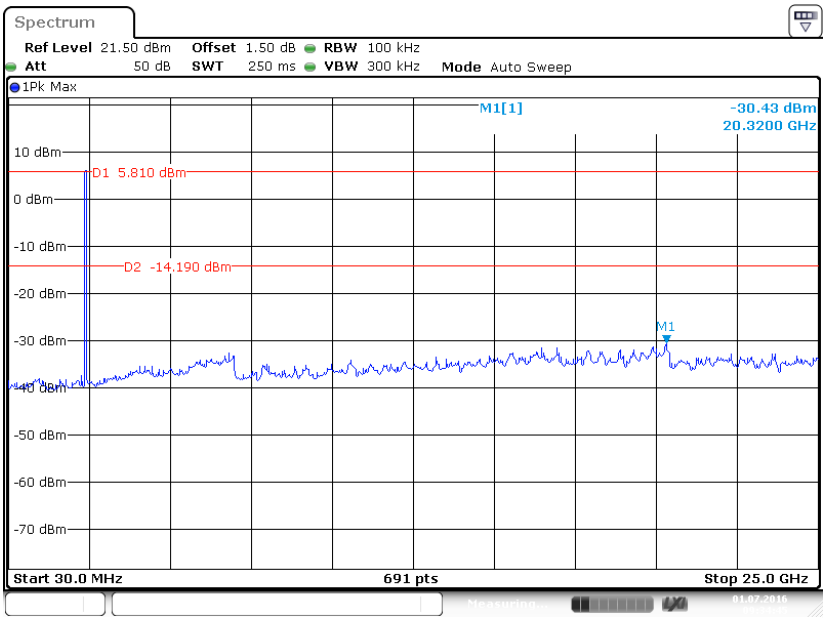
Date:1.JUL.2016 09:30:11

Chain 1 802.11b High Channel



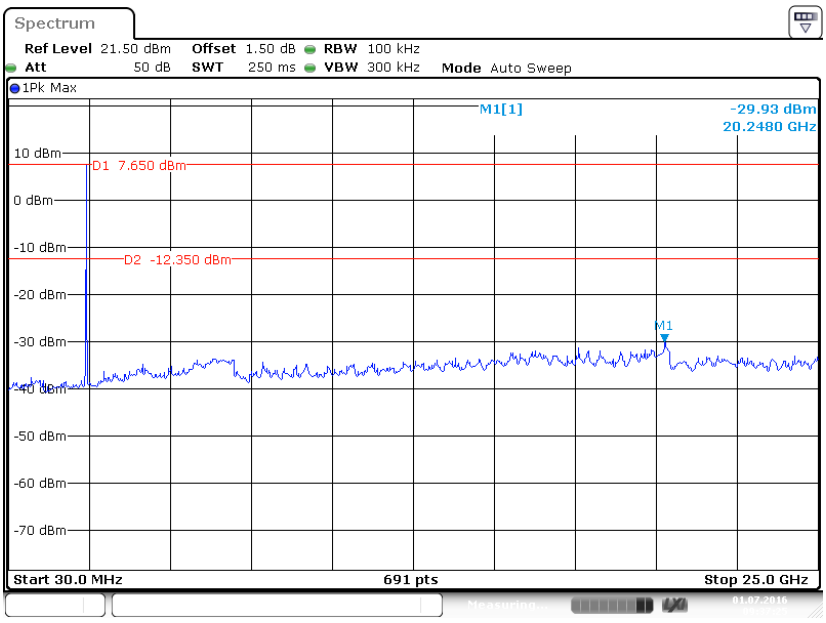
Date: 1.JUL.2016 09:31:48

Chain 1 802.11g Low Channel



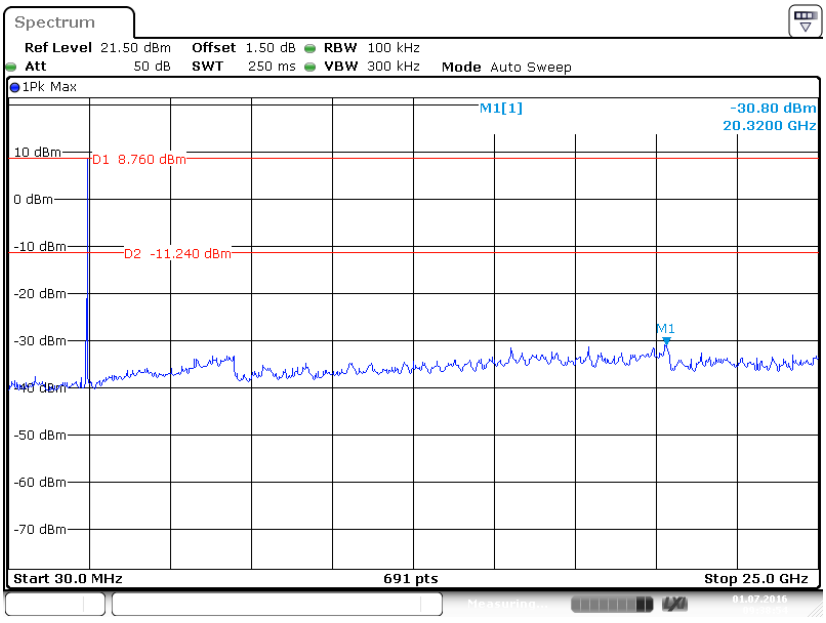
Date: 1.JUL.2016 09:34:45

Chain 1 802.11g Middle Channel



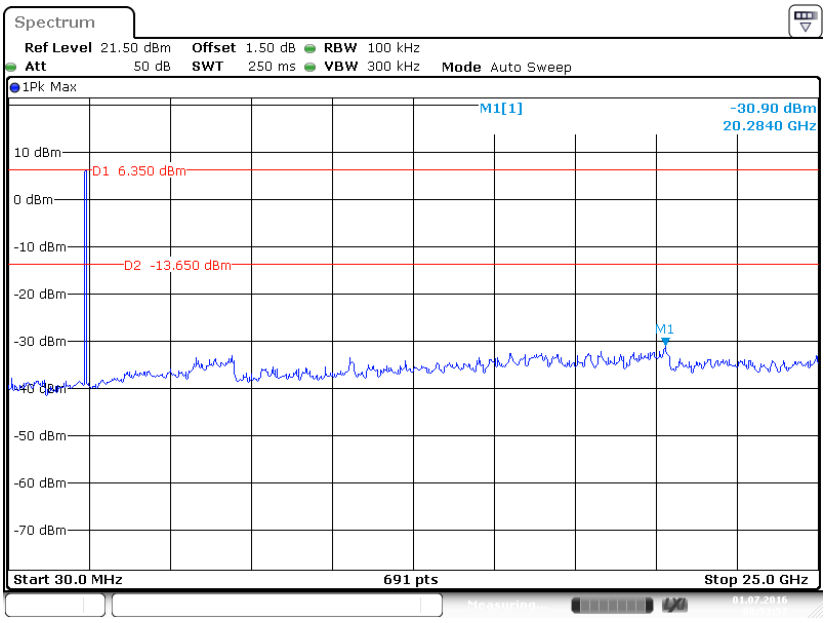
Date: 1.JUL.2016 09:37:25

Chain 1 802.11g High Channel



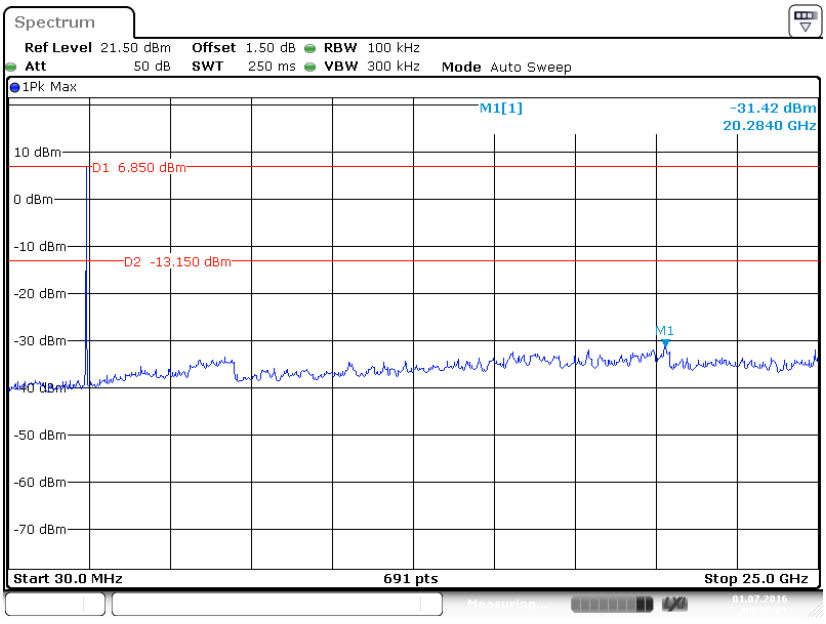
Date: 1.JUL.2016 09:38:55

Chain 1 802.11n-HT20 Low Channel



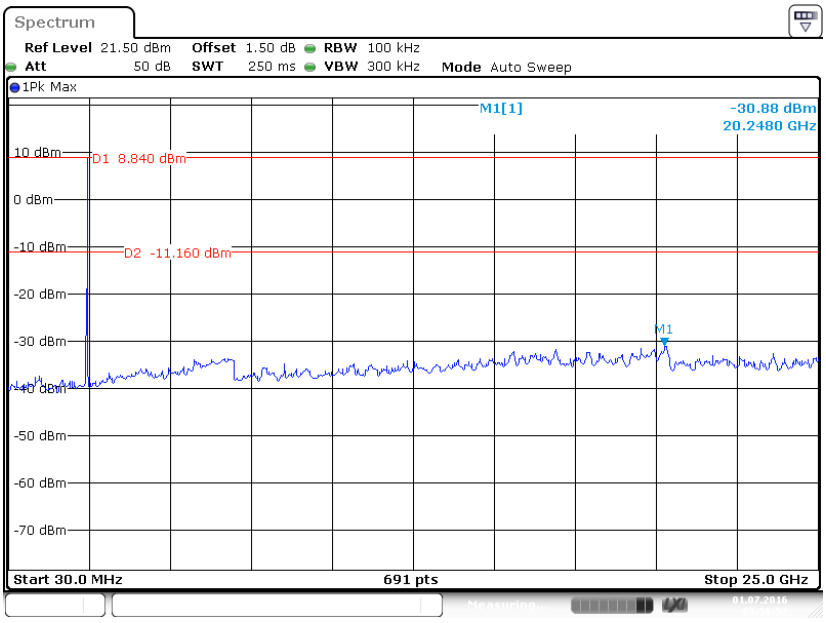
Date: 1.JUL.2016 09:53:58

Chain 1 802.11n-HT20 Middle Channel



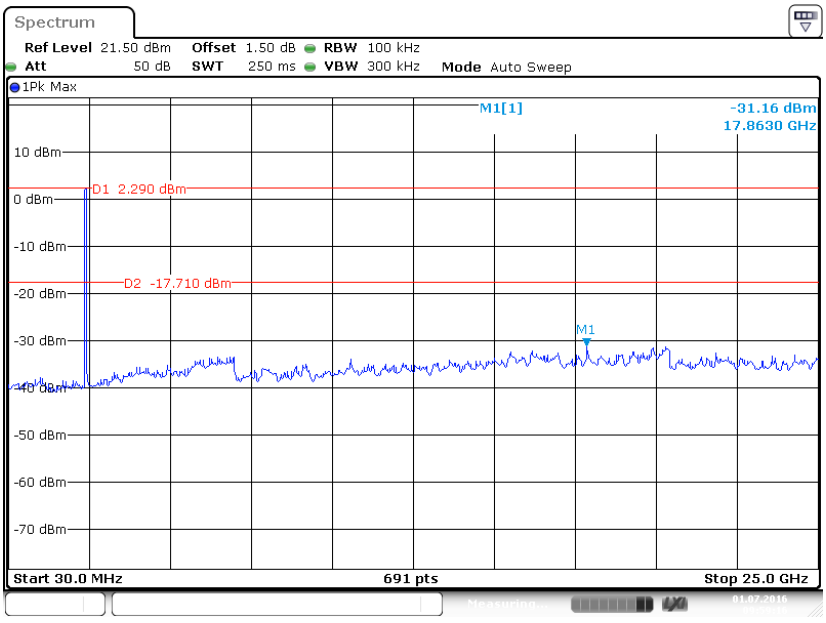
Date: 1.JUL.2016 09:55:01

Chain 1 802.11n-HT20 High Channel



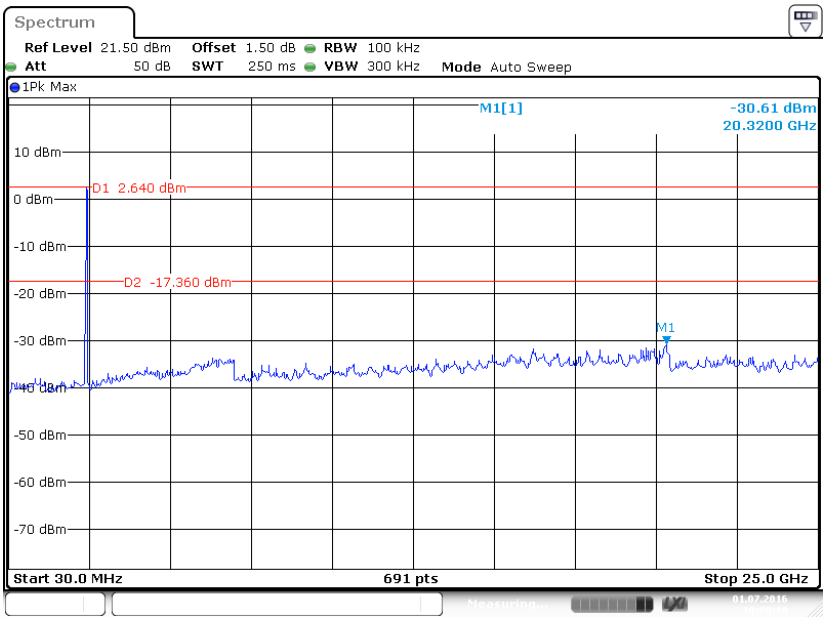
Date:1.JUL.2016 09:56:52

Chain 1 802.11n-HT40 Low Channel



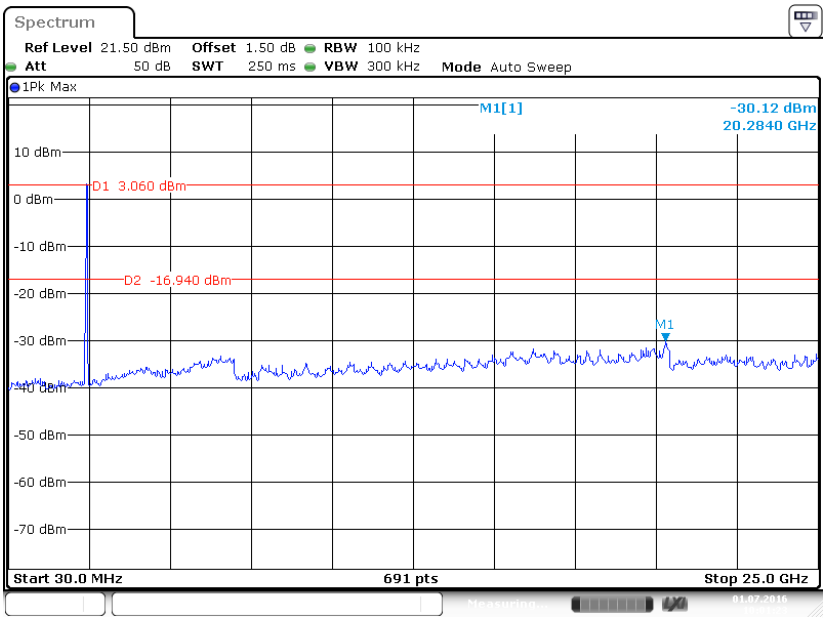
Date:1.JUL.2016 09:59:17

Chain 1 802.11n-HT40 Middle Channel



Date:1.JUL.2016 10:00:20

Chain 1 802.11n-HT40 High Channel



Date:1.JUL.2016 10:01:23

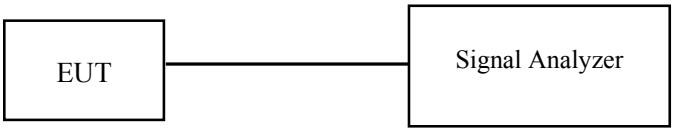
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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

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	SIGNALANALYZER	FSV40	101116	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-06-29&2016-06-30.

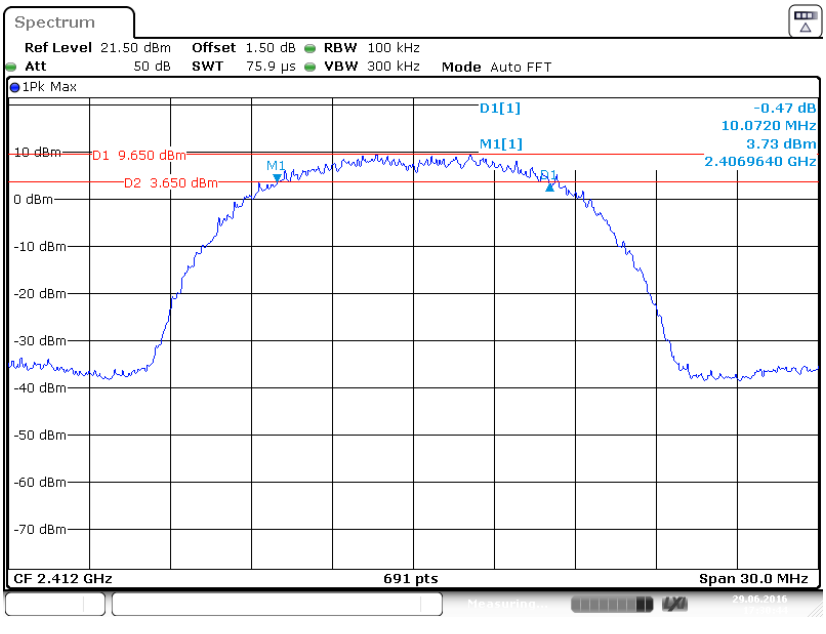
Test Result: Pass.

Please refer to the following tables and plots.

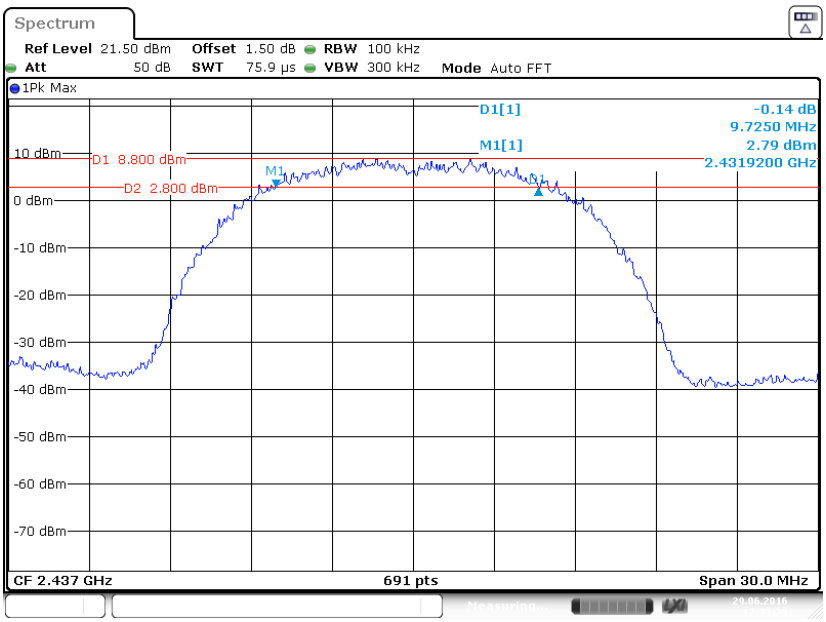
EUT operation mode: Transmitting

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)		Limit (kHz)
		Chain 0	Chain 1	
802.11b mode				
Low	2412	10.07	10.33	≥500
Middle	2437	9.73	9.73	≥500
High	2462	10.12	9.73	≥500
802.11g mode				
Low	2412	16.59	16.54	≥500
Middle	2437	16.54	16.54	≥500
High	2462	16.54	16.54	≥500
802.11n-HT20 mode				
Low	2412	17.80	17.80	≥500
Middle	2437	17.76	17.76	≥500
High	2462	17.76	17.76	≥500
802.11n-HT40 mode				
Low	2422	36.56	36.47	≥500
Middle	2437	36.56	36.47	≥500
High	2452	36.56	36.56	≥500

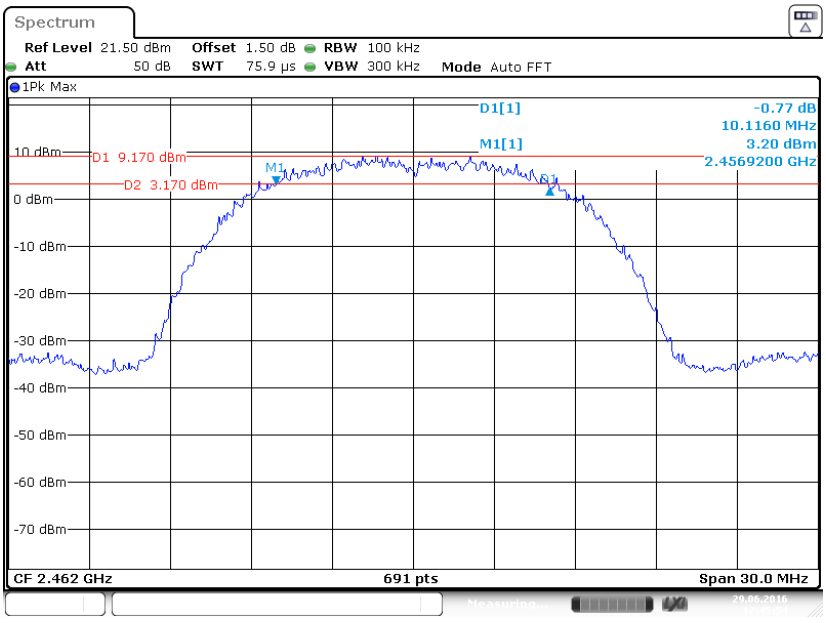
Chain 0 802.11b Low Channel



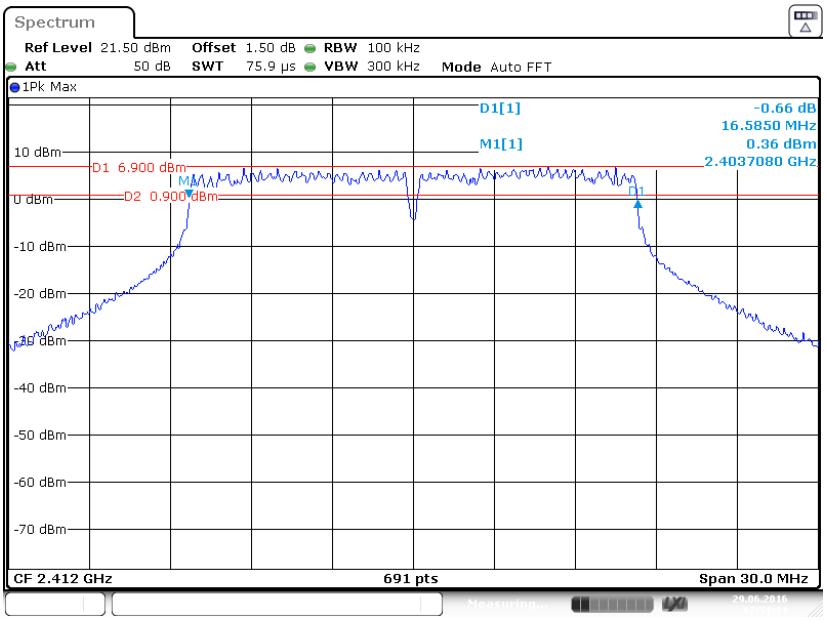
Chain 0 802.11b Middle Channel



Chain 0 802.11b High Channel

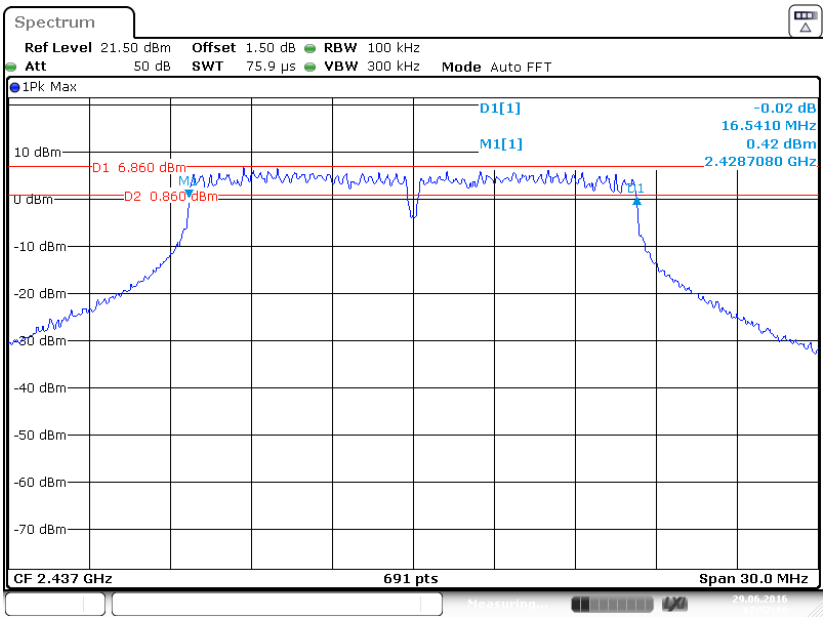


Chain 0 802.11g Low Channel



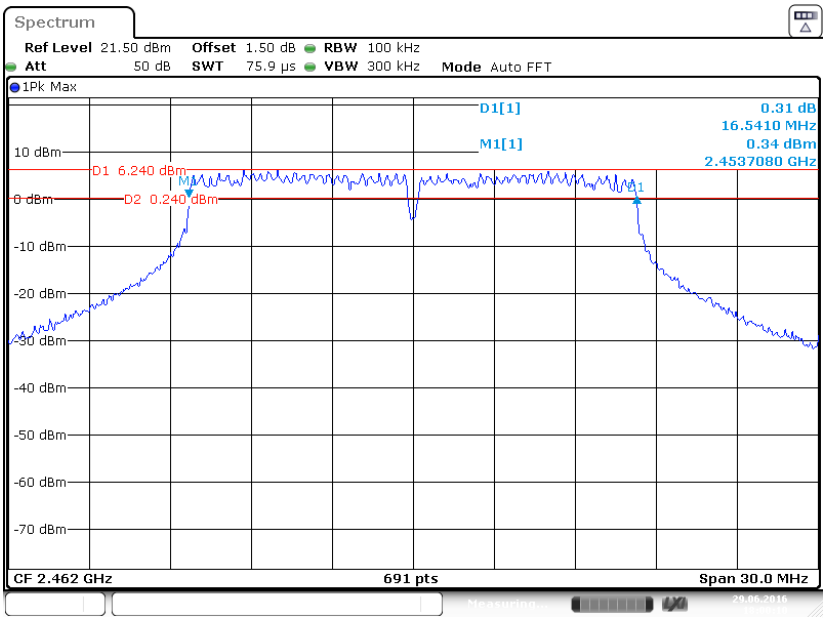
Date: 29.JUN.2016 17:51:11

Chain 0 802.11g Middle Channel



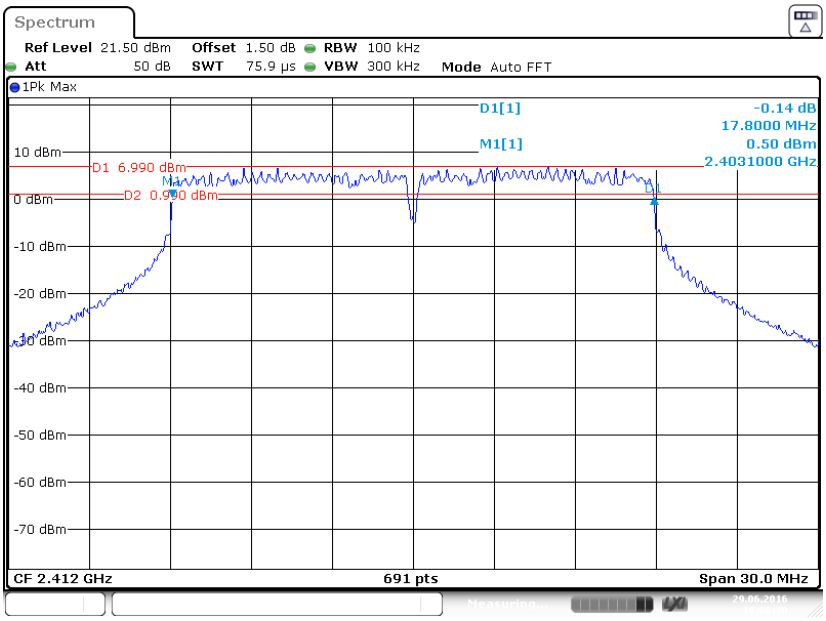
Date: 29.JUN.2016 17:57:17

Chain 0 802.11g High Channel



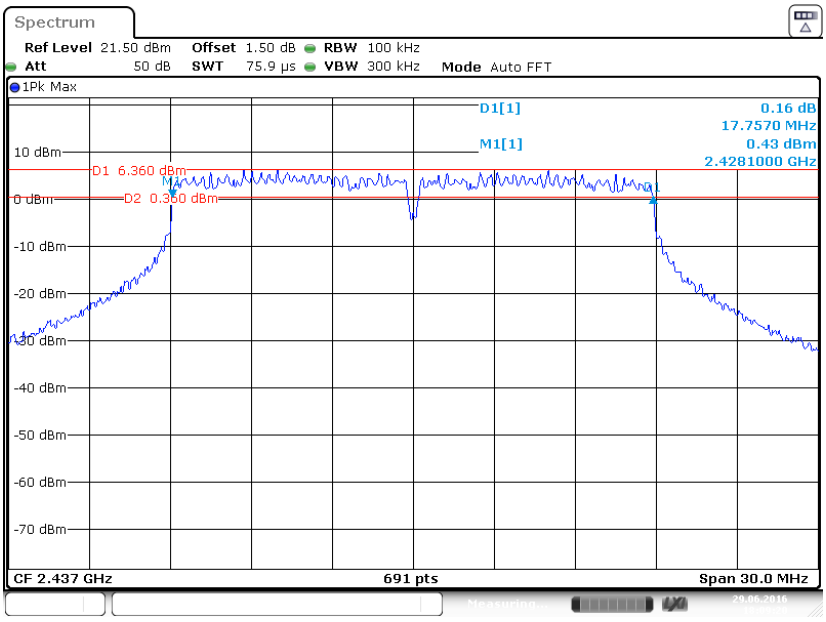
Date: 29.JUN.2016 18:00:11

Chain 0 802.11n-HT20 Low Channel



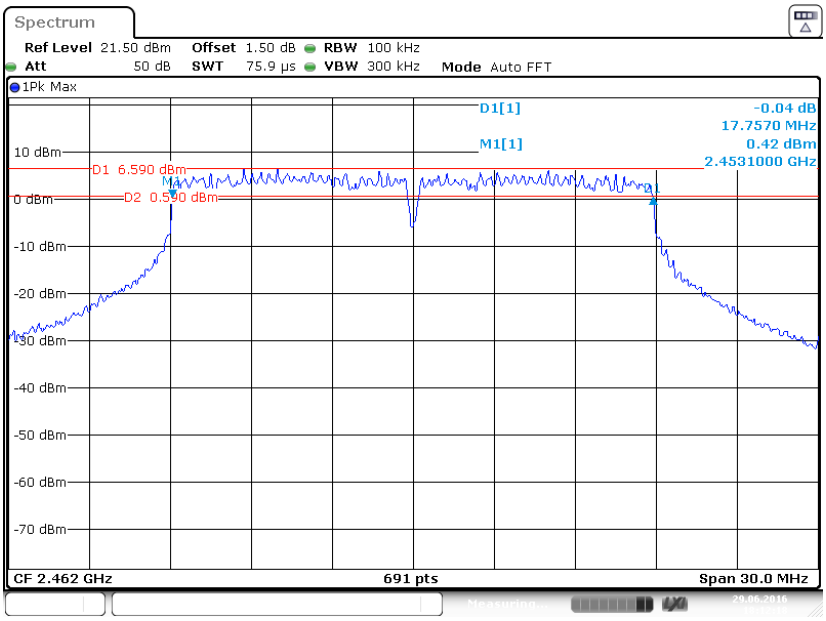
Date: 29.JUN.2016 18:06:30

Chain 0 802.11n-HT20 Middle Channel



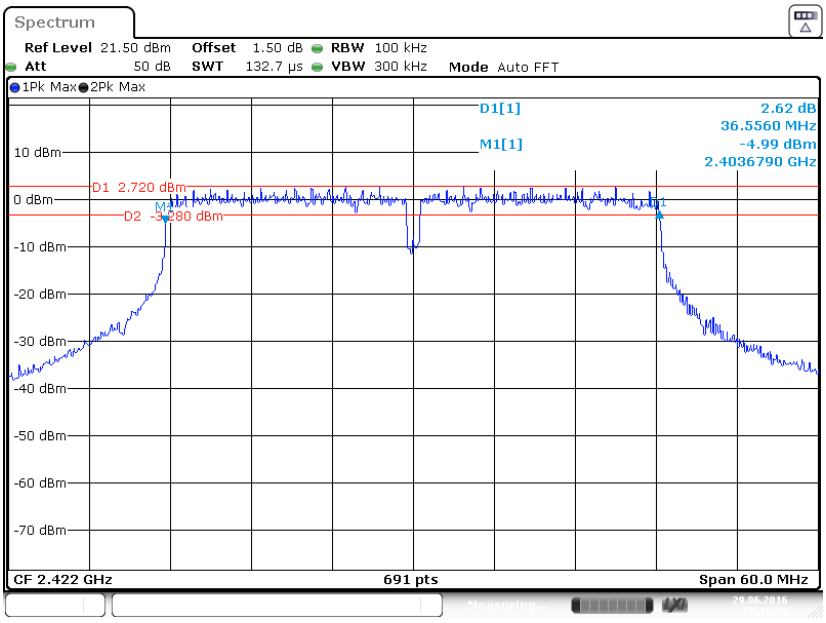
Date: 29.JUN.2016 18:09:20

Chain 0 802.11n-HT20 High Channel



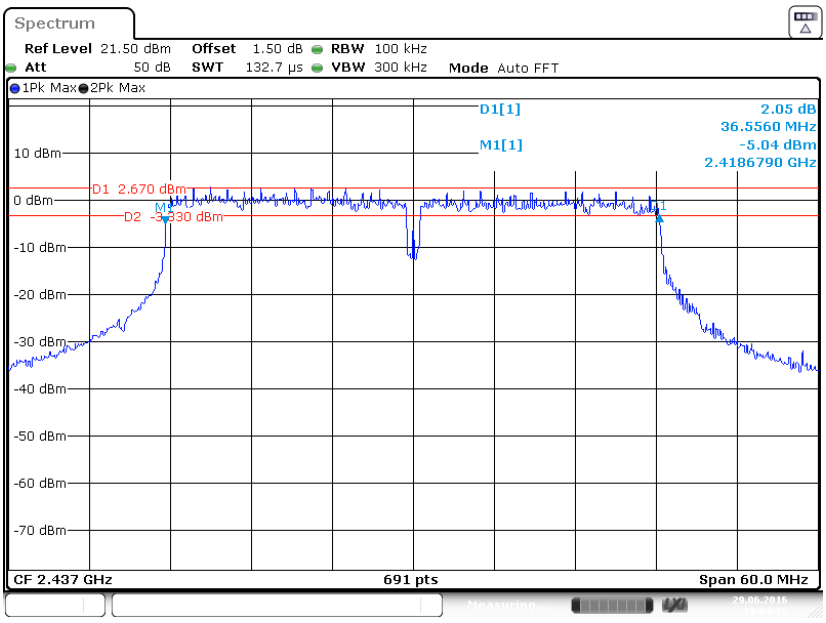
Date: 29.JUN.2016 18:12:19

Chain 0 802.11n-HT40 Low Channel



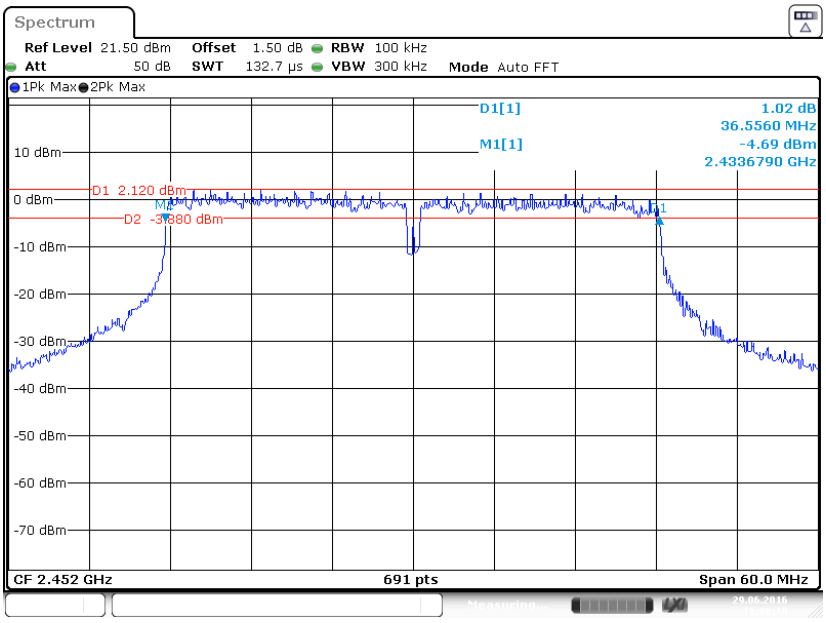
Date: 29.JUN.2016 19:11:58

Chain 0 802.11n-HT40 Middle Channel



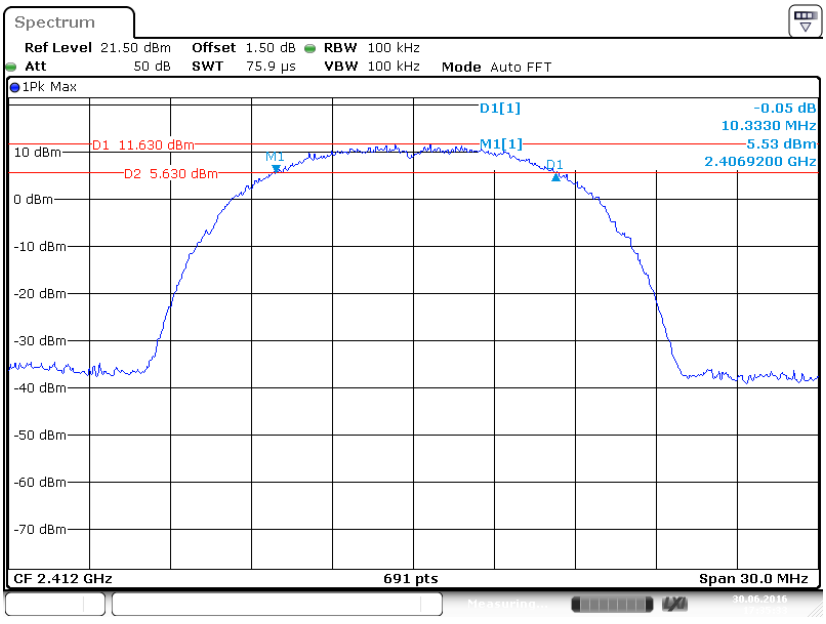
Date: 29.JUN.2016 19:04:36

Chain 0 802.11n-HT40 High Channel



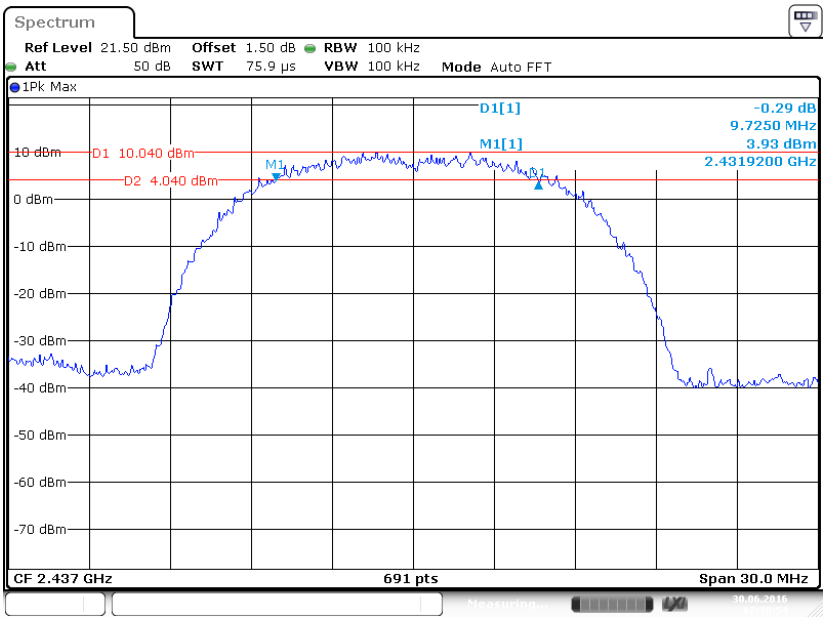
Date: 29.JUN.2016 19:08:10

Chain 1 802.11b Low Channel



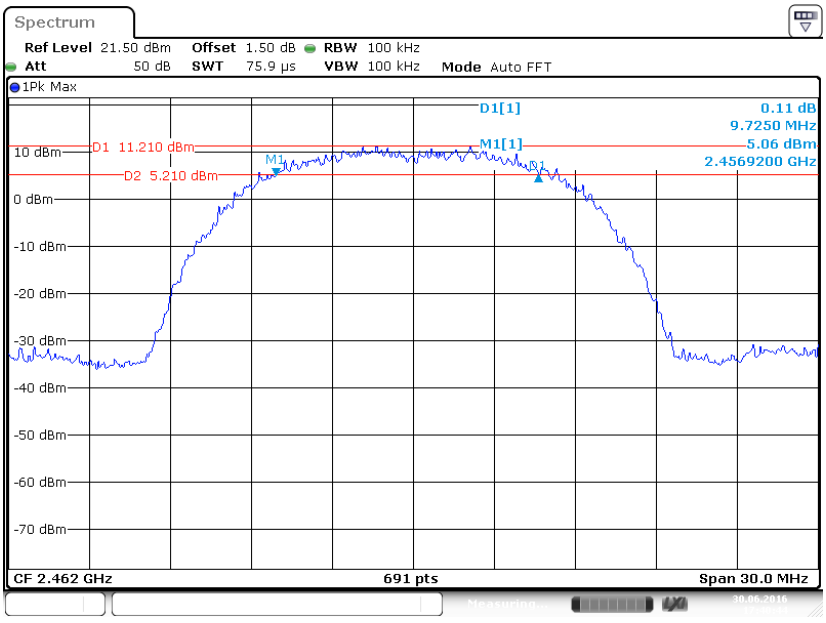
Date: 30.JUN.2016 17:35:33

Chain 1 802.11b Middle Channel



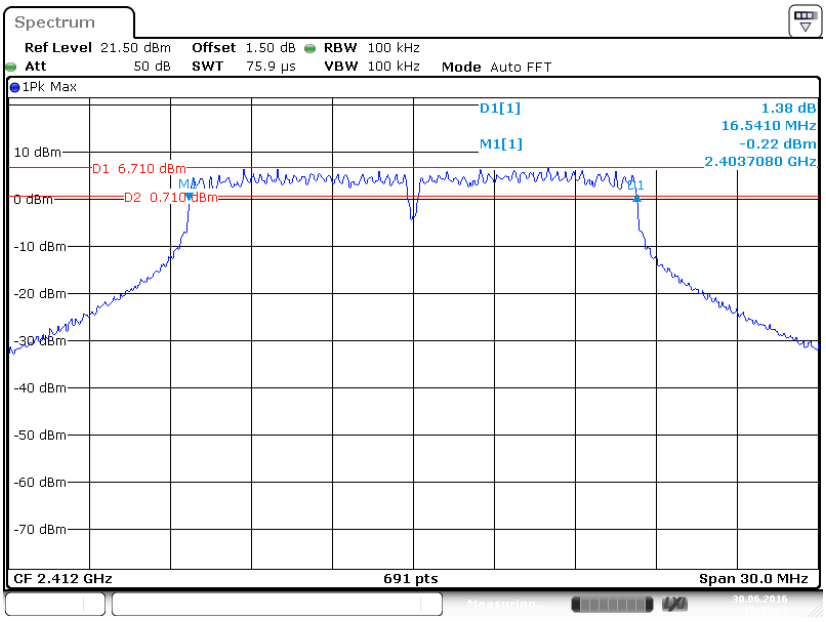
Date: 30.JUN.2016 17:38:54

Chain 1 802.11b High Channel



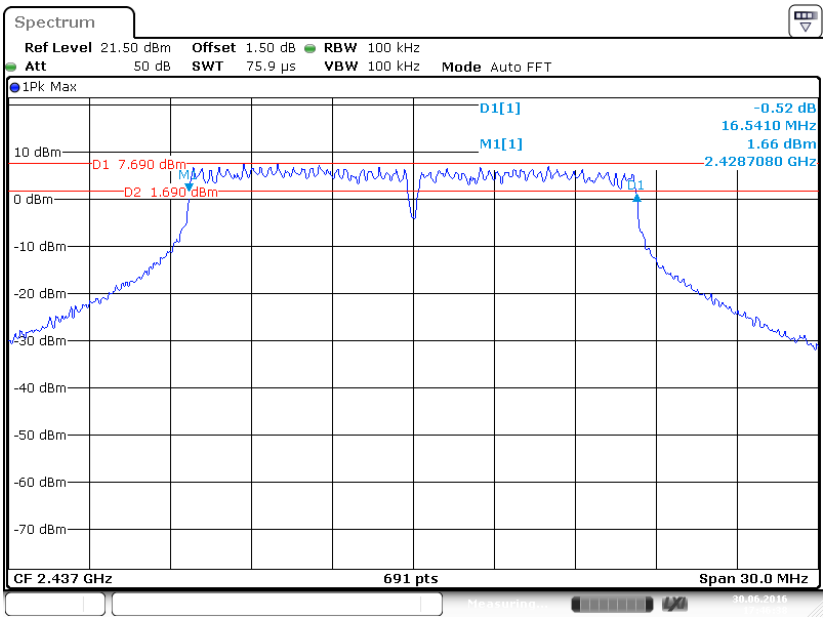
Date: 30.JUN.2016 17:40:44

Chain 1 802.11g Low Channel



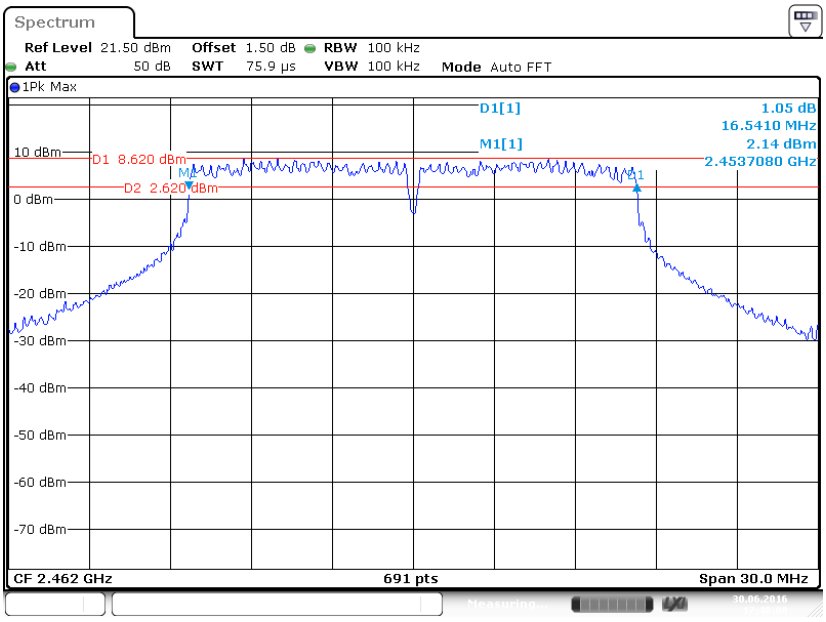
Date: 30.JUN.2016 17:45:02

Chain 1 802.11g Middle Channel



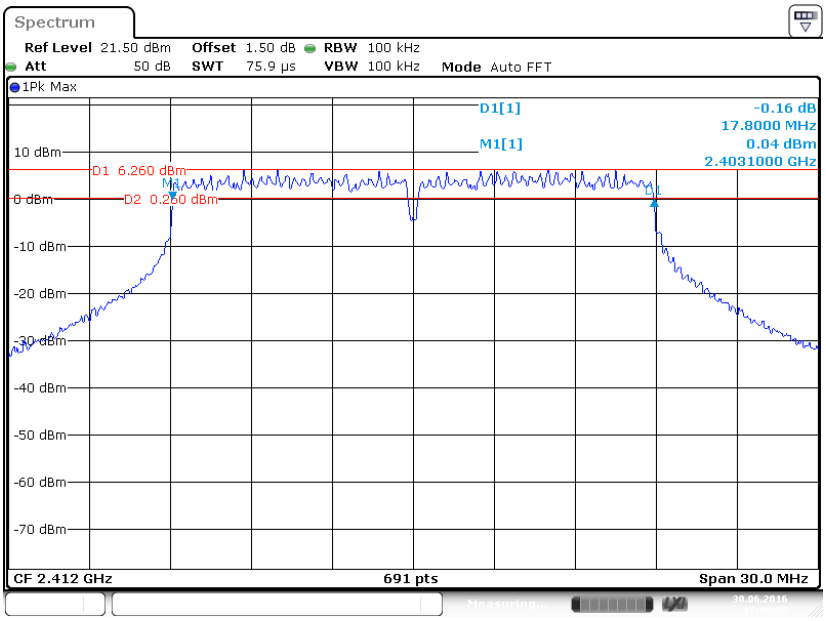
Date: 30.JUN.2016 17:46:38

Chain 1 802.11g High Channel



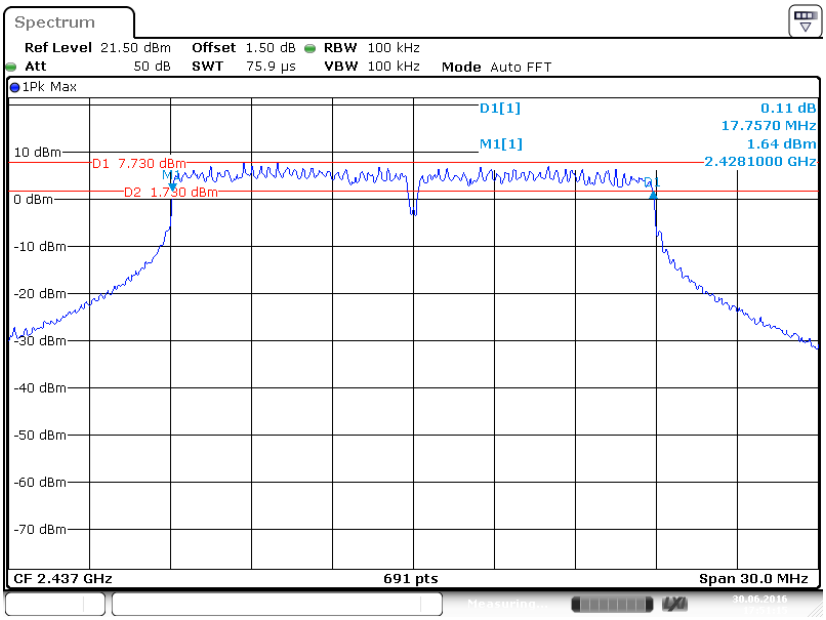
Date: 30.JUN.2016 17:48:08

Chain 1 802.11n-HT20 Low Channel



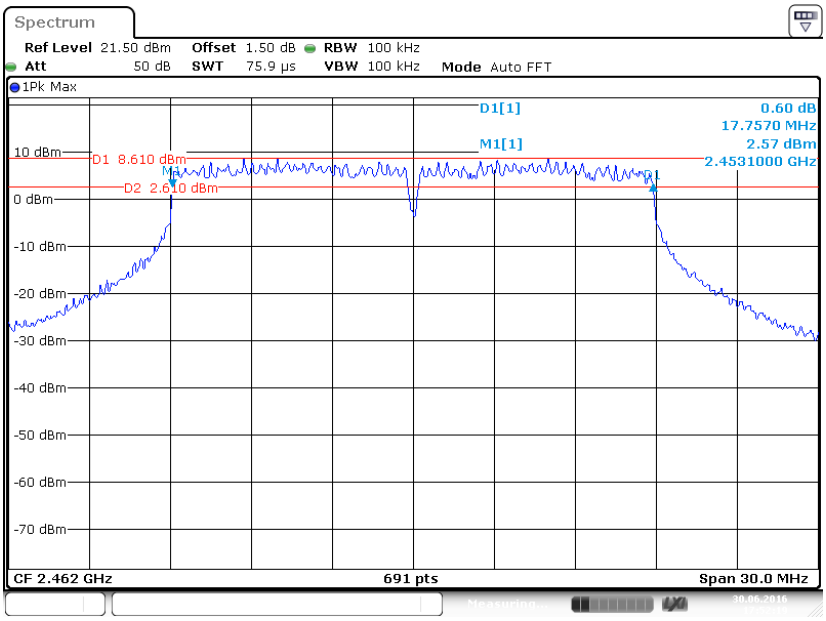
Date: 30.JUN.2016 17:49:59

Chain 1 802.11n-HT20 Middle Channel



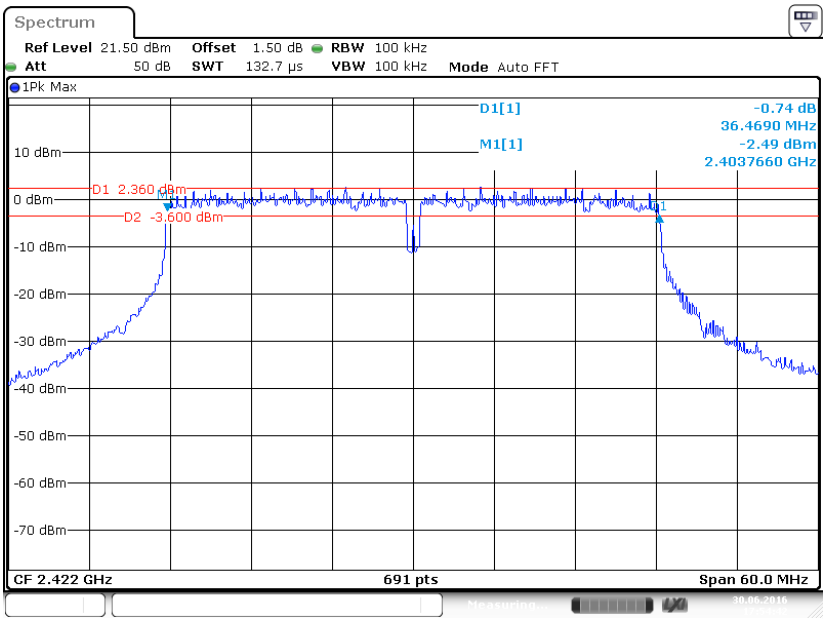
Date: 30.JUN.2016 17:51:15

Chain 1 802.11n-HT20 High Channel



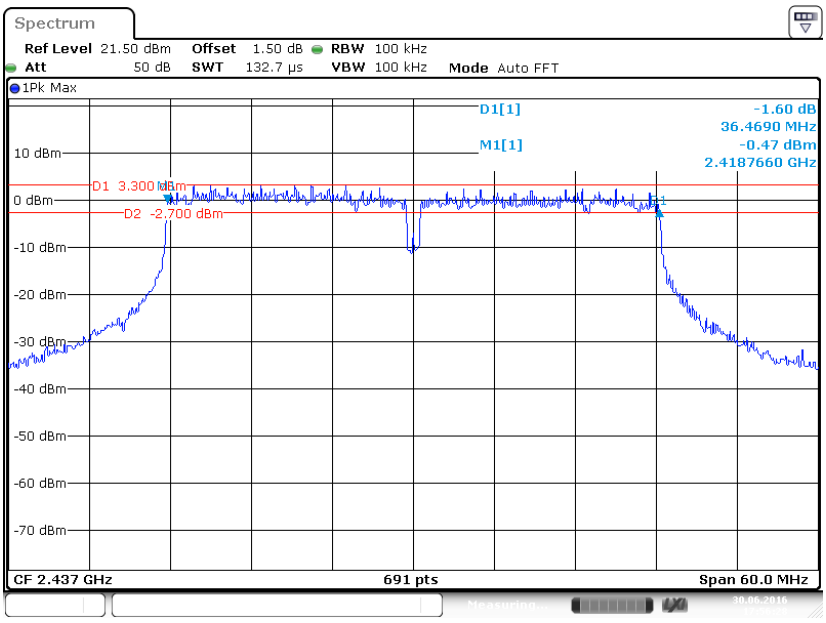
Date: 30.JUN.2016 17:52:19

Chain 1 802.11n-HT40 Low Channel



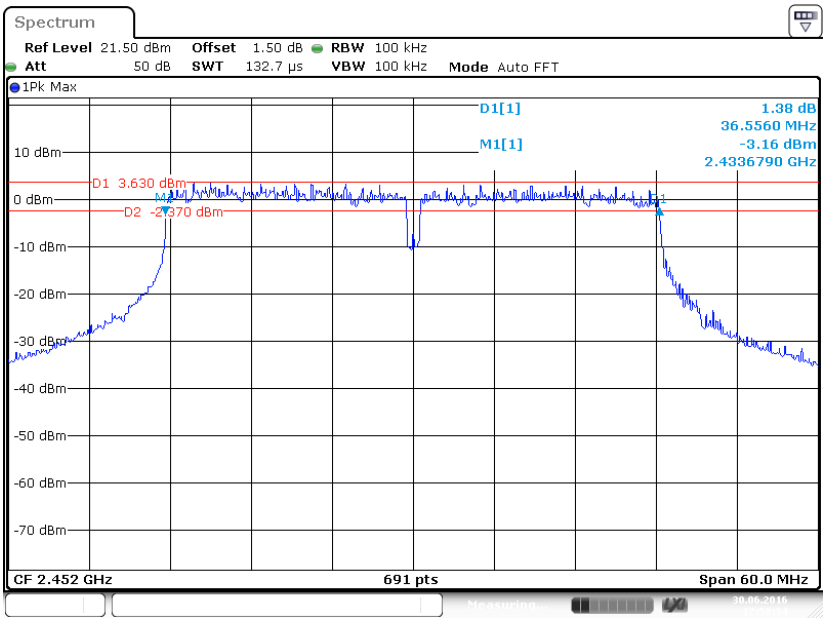
Date: 30.JUN.2016 17:54:43

Chain 1 802.11n-HT40 Middle Channel



Date: 30.JUN.2016 17:56:28

Chain 1 802.11n-HT40 High Channel



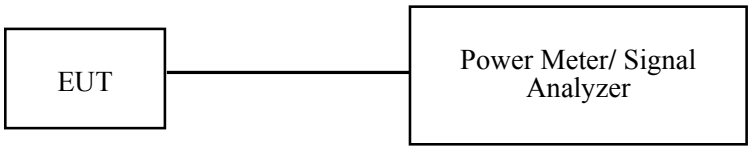
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

According to FCC §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

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 one test equipment.
3. Add a correction factor to the display.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2016-07-04	2017-07-03
Rohde & Schwarz	Power Sensor	NRP-Z91	200014	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-08-17.

EUT operation mode: Transmitting

Channel	Frequency (MHz)	Max Conducted Average Output Power (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Total		
802.11b						
Low	2412	13.89	14.64	17.29	30	Pass
Middle	2437	12.56	14.72	16.78	30	Pass
High	2462	12.55	15.70	17.41	30	Pass
802.11g						
Low	2412	12.57	14.03	16.37	30	Pass
Middle	2437	12.39	14.72	16.72	30	Pass
High	2462	11.89	16.05	17.46	30	Pass
802.11n-HT20						
Low	2412	10.76	11.70	14.27	30	Pass
Middle	2437	10.21	12.81	14.71	30	Pass
High	2462	9.54	14.13	15.43	30	Pass
802.11n-HT40						
Low	2422	8.23	7.17	10.74	30	Pass
Middle	2437	7.38	7.86	10.64	30	Pass
High	2452	6.03	8.31	10.33	30	Pass

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Total		
802.11b						
Low	2412	19.73	19.77	22.76	30	Pass
Middle	2437	18.07	20.19	22.27	30	Pass
High	2462	17.86	21.44	23.02	30	Pass
802.11g						
Low	2412	18.24	19.60	21.98	30	Pass
Middle	2437	17.58	20.71	22.43	30	Pass
High	2462	17.23	22.00	23.25	30	Pass
802.11n-HT20						
Low	2412	18.33	19.48	21.95	30	Pass
Middle	2437	17.26	20.56	22.23	30	Pass
High	2462	17.30	21.56	22.94	30	Pass
802.11n-HT40						
Low	2422	16.01	14.79	18.45	30	Pass
Middle	2437	14.75	15.07	17.92	30	Pass
High	2452	14.02	15.48	17.82	30	Pass

Note：The total gain=10Log10(10^(Chain 0/10)+10^(Chain 1/10))=6.0dBi
Chain 0 gain=3.0dBi, Chain 1 gain =3.0dBi

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

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	SIGNALANALYZER	FSV40	101116	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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

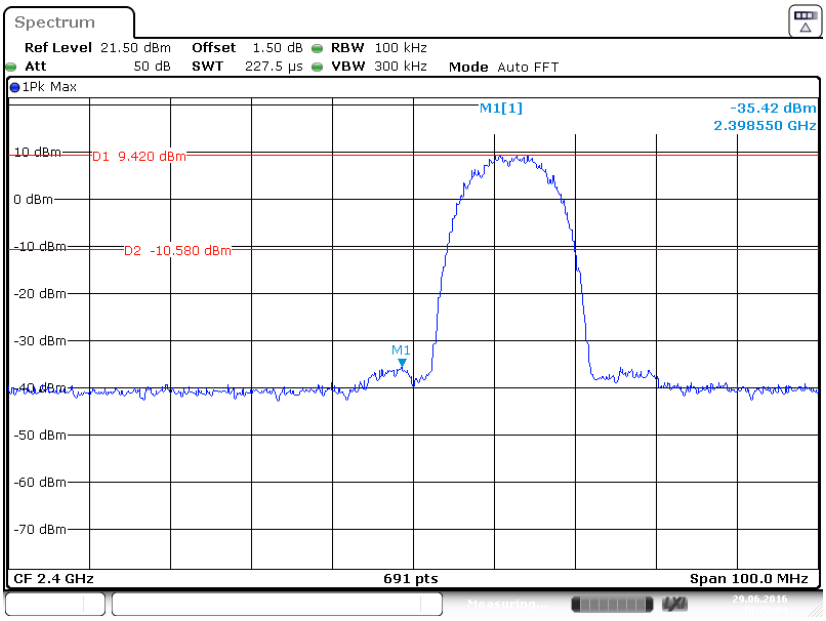
Temperature:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-06-29& 2016-06-30.

Test Result: *Compliance*

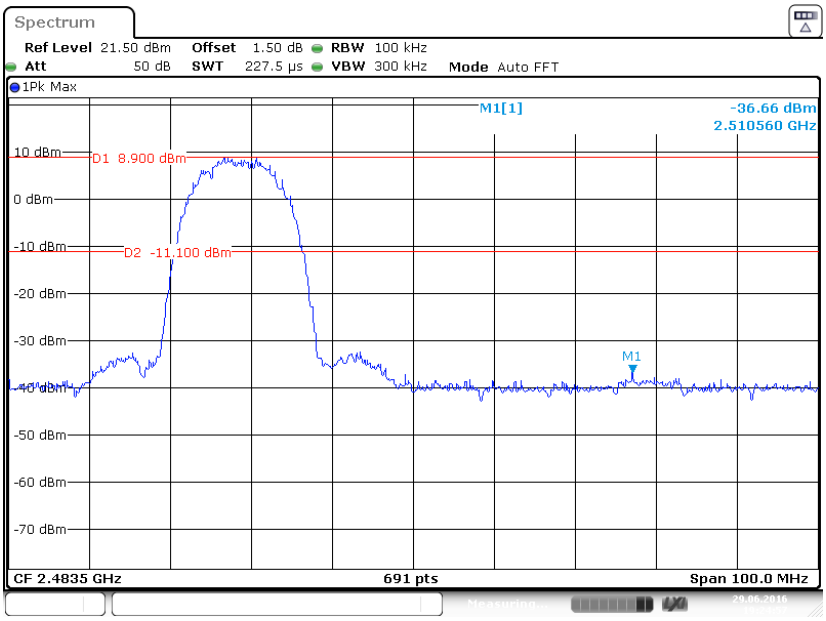
Please refer to the following table and plots.

Chain 0 802.11b: Band Edge, Left Side



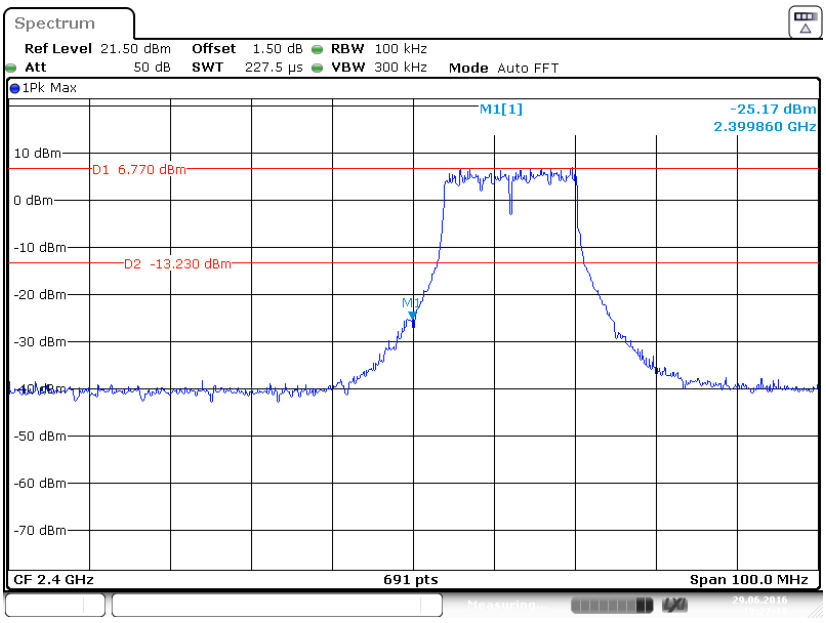
Date: 29.JUN.2016 19:22:04

Chain 0 802.11b: Band Edge, Right Side



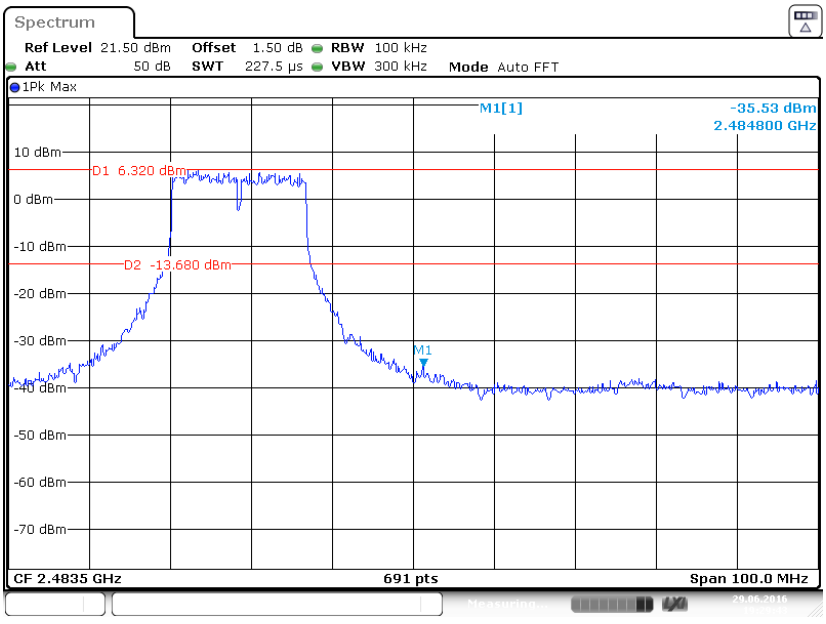
Date: 29.JUN.2016 19:24:57

Chain 0 802.11g: Band Edge, Left Side



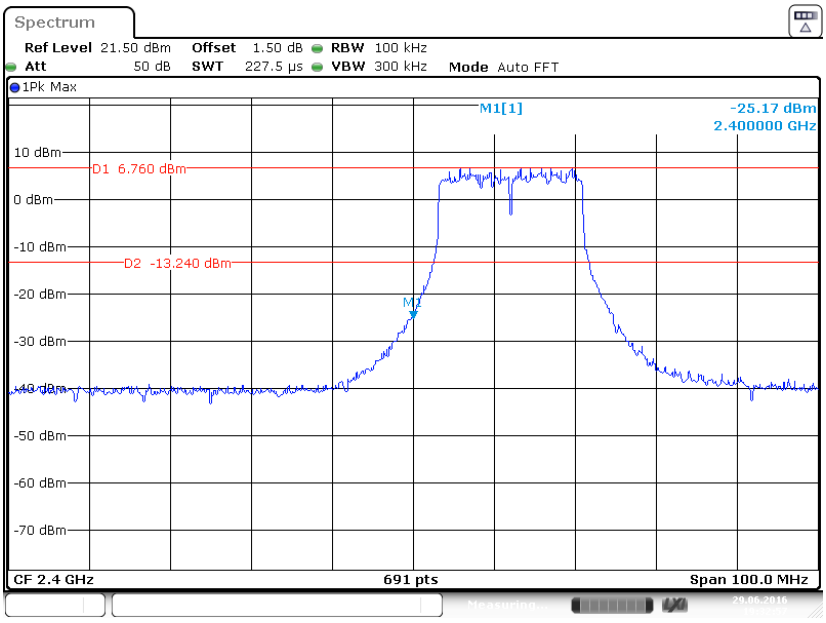
Date: 29.JUN.2016 19:27:18

Chain 0 802.11g: Band Edge, Right Side



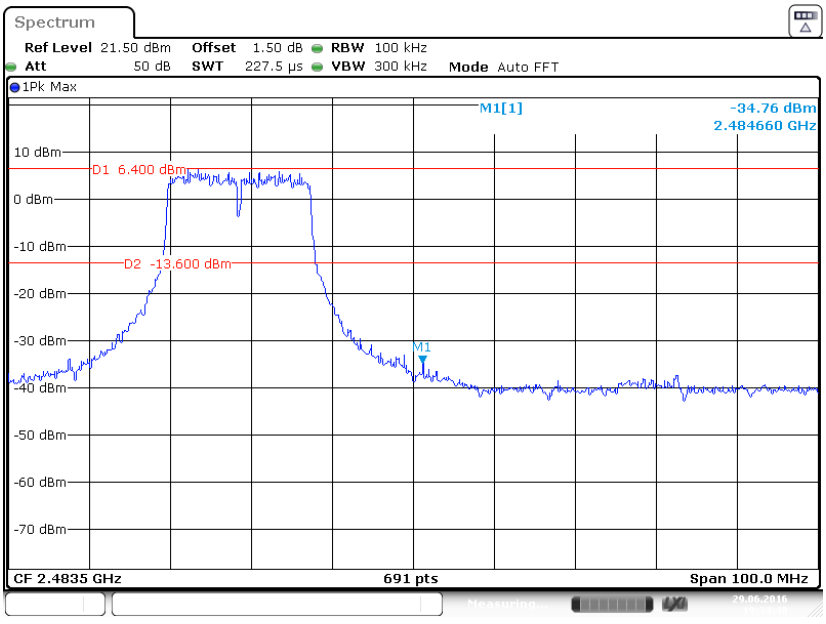
Date: 29.JUN.2016 19:29:43

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



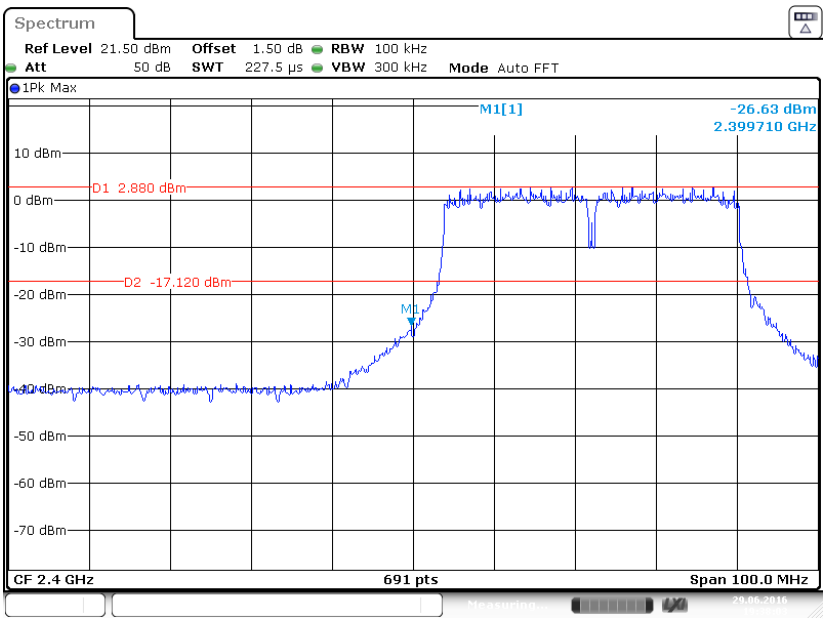
Date: 29.JUN.2016 19:32:58

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



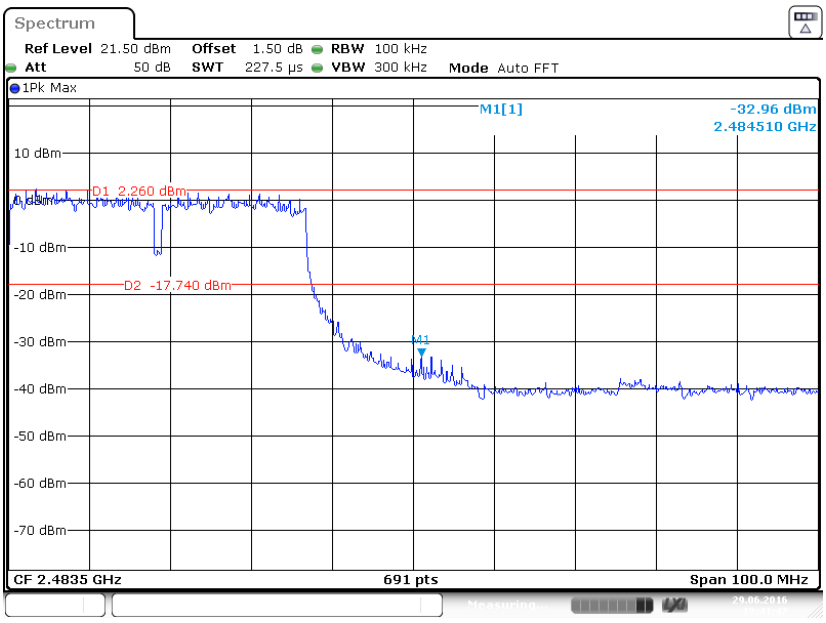
Date: 29.JUN.2016 19:34:48

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



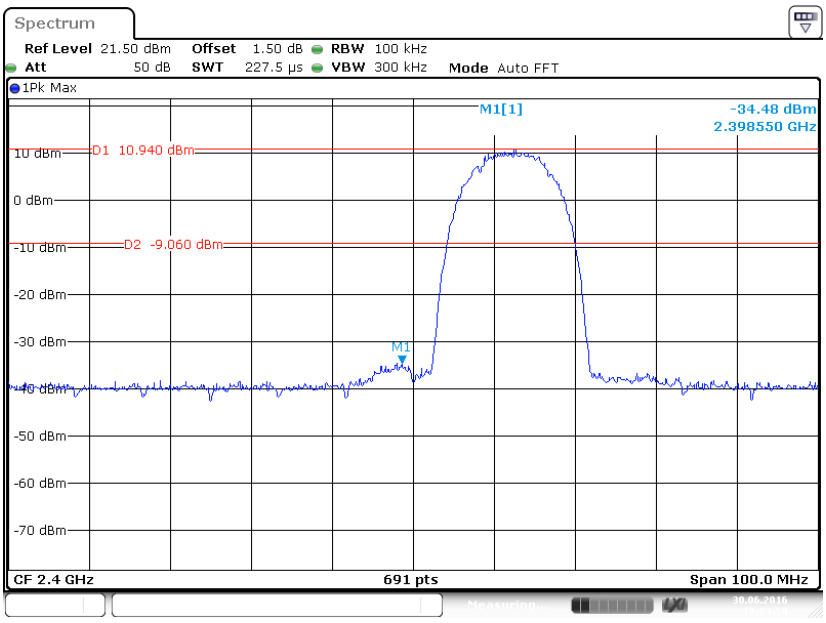
Date: 29.JUN.2016 19:38:04

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



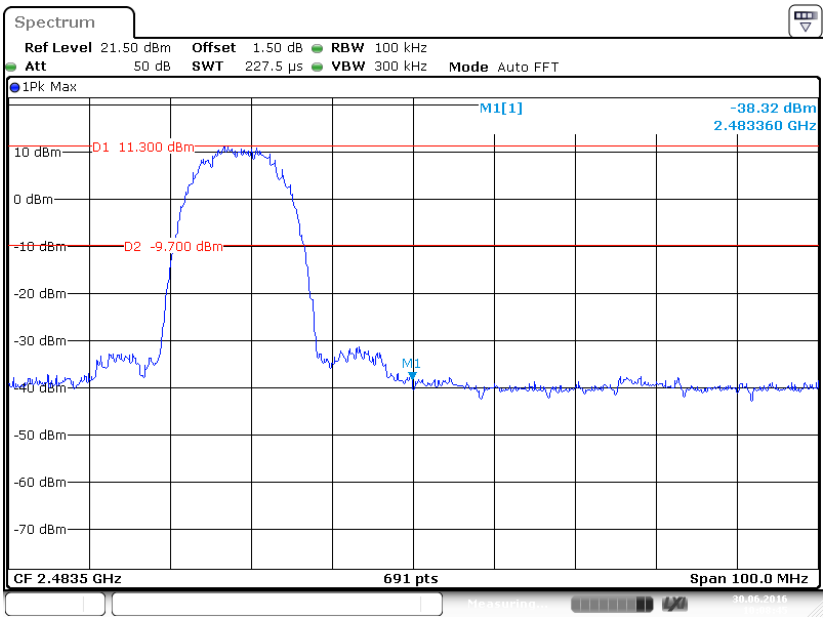
Date: 29.JUN.2016 19:41:47

Chain 1 802.11b: Band Edge, Left Side



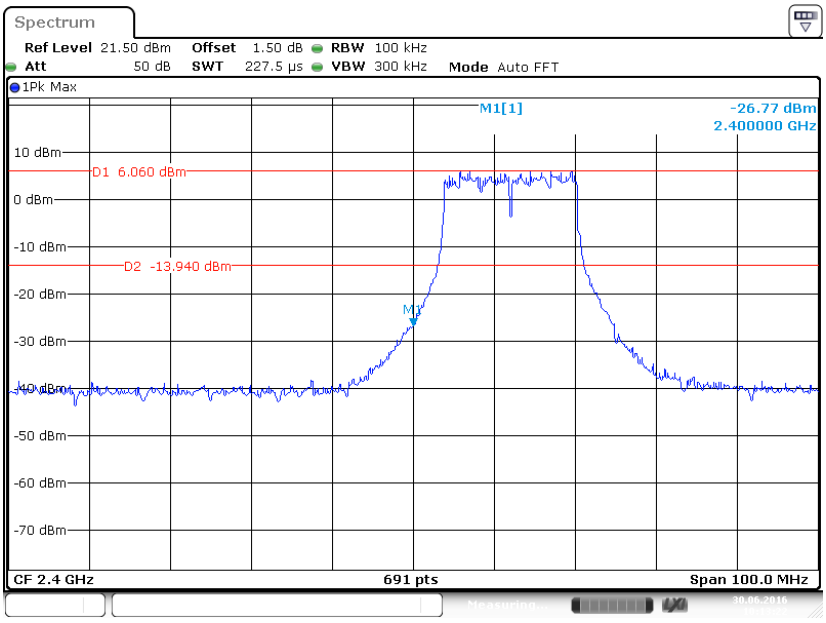
Date: 30.JUN.2016 10:03:50

Chain 1 802.11b: Band Edge, Right Side



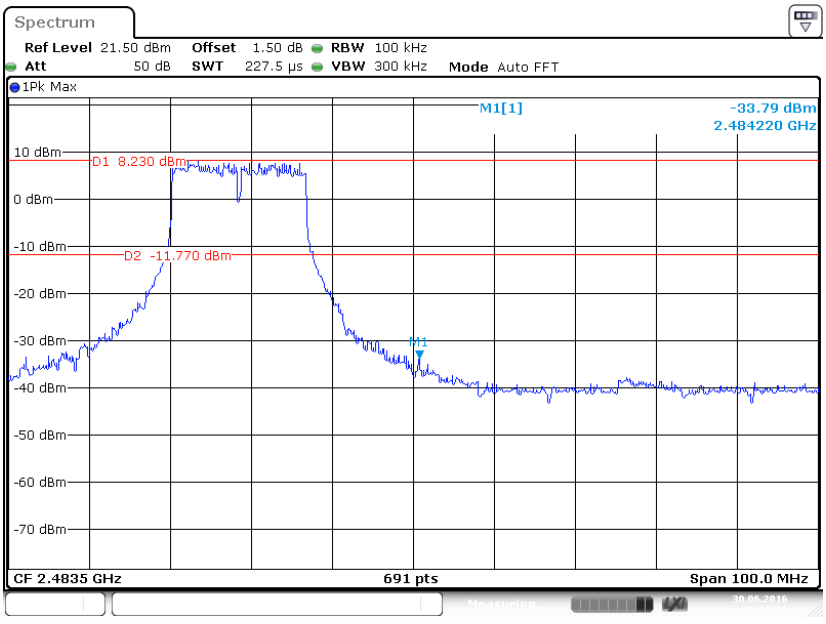
Date: 30.JUN.2016 10:08:46

Chain 1 802.11g: Band Edge, Left Side



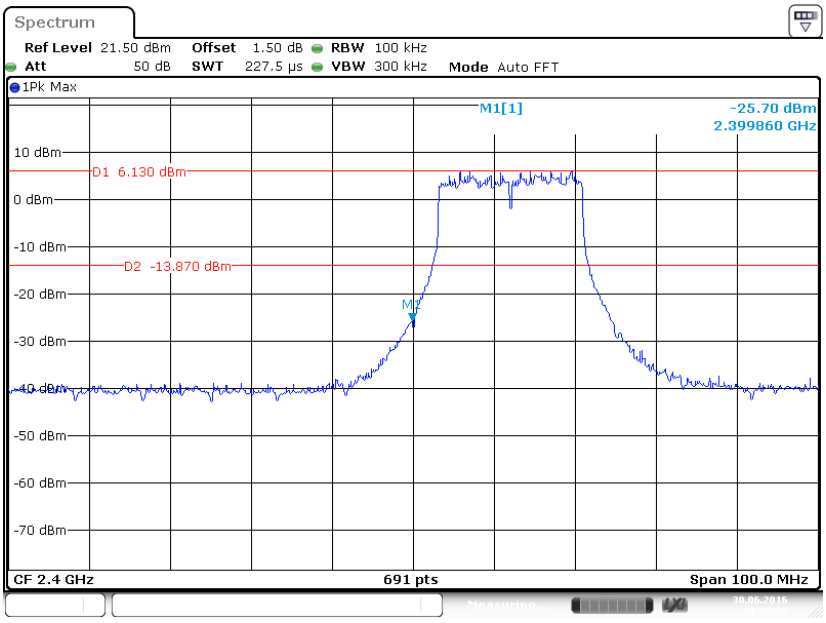
Date: 30.JUN.2016 10:13:23

Chain 1 802.11g: Band Edge, Right Side



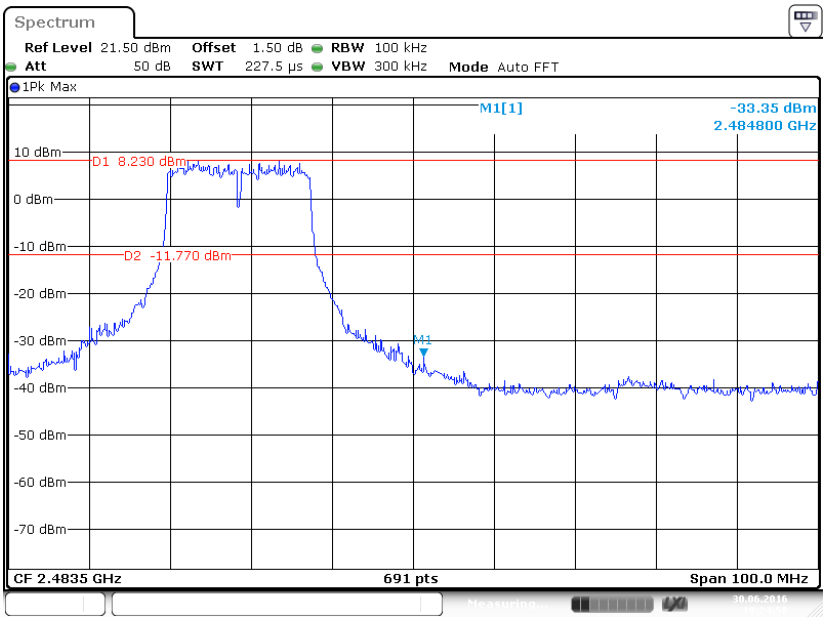
Date: 30.JUN.2016 10:15:22

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



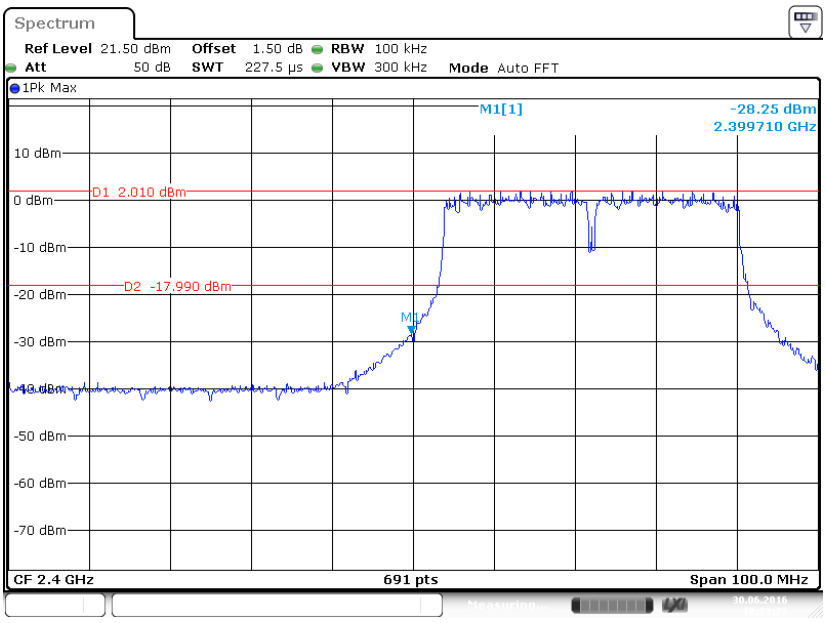
Date: 30.JUN.2016 10:22:34

Chain1 802.11n-HT20: Band Edge, Right Side



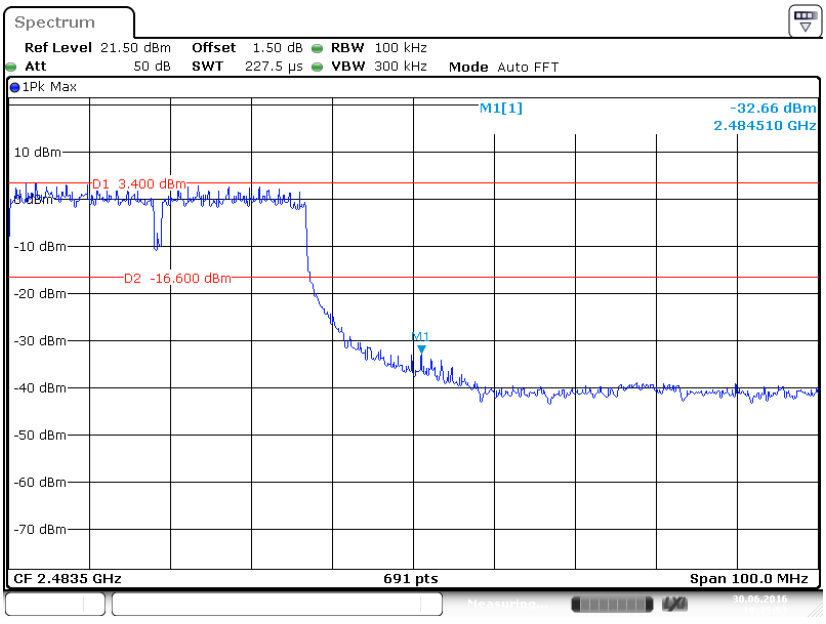
Date: 30.JUN.2016 10:24:58

Chain 1 802.11n-HT40: Band Edge, Left Side



Date: 30.JUN.2016 10:33:23

Chain 1 802.11n-HT40: Band Edge, Right Side



Date: 30.JUN.2016 10:35:53

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 v03r05 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: 3kHz≤ RBW≤100 kHz.
3. Set the VBW ≥ 3×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	SIGNALANALYZER	FSV40	101116	2016-07-04	2017-07-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) 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:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

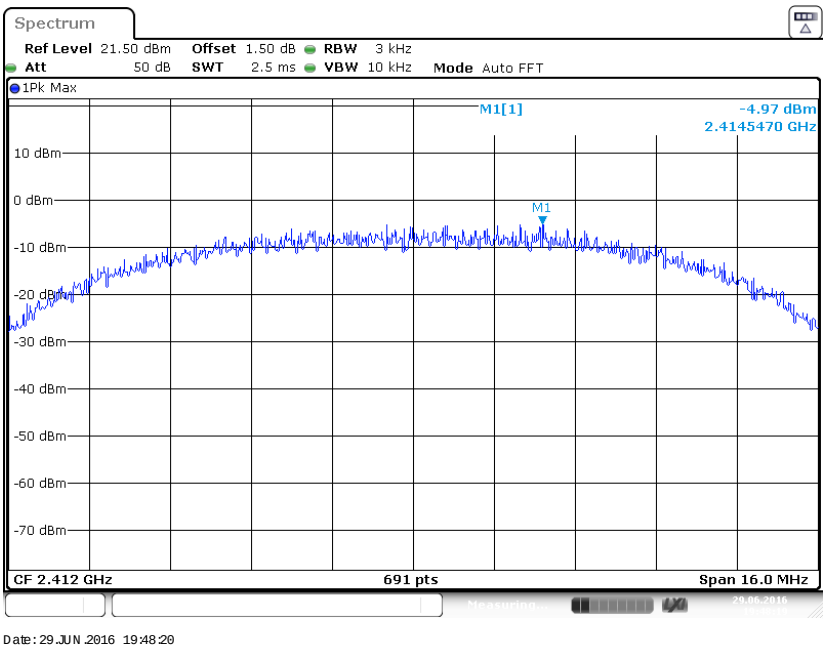
The testing was performed by Chris Wang on 2016-06-29&2016-07-01.

EUT operation mode: Transmitting

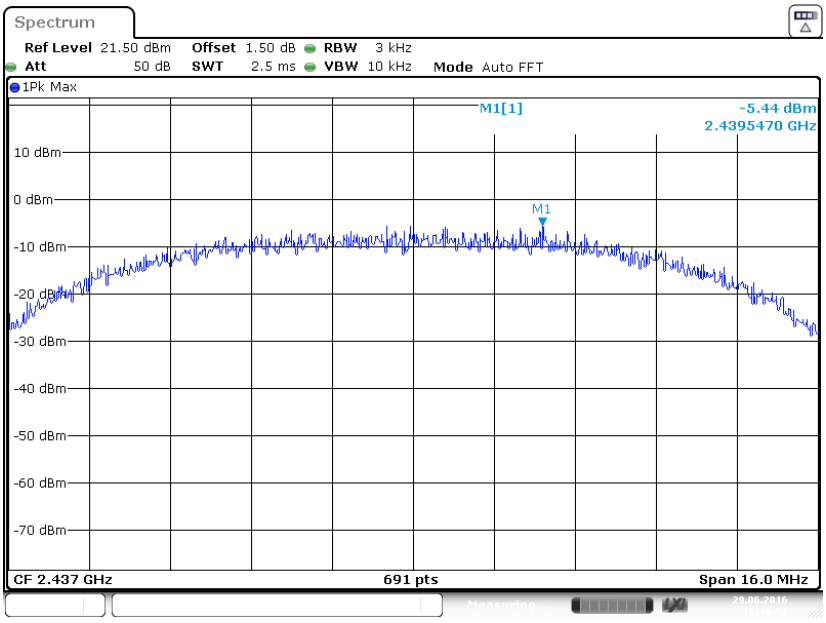
Test Result: Pass

Channel	Frequency (MHz)	PSD (dBm/3kHz)			Limit (dBm/3kHz)
		Chain 0	Chain 1	Total	
802.11b mode					
Low	2412	-4.97	-5.20	-2.07	≤8
Middle	2437	-5.44	-4.61	-1.99	≤8
High	2462	-5.48	-3.28	-1.23	≤8
802.11g mode					
Low	2412	-6.22	-6.78	-3.48	≤8
Middle	2437	-6.49	-6.00	-3.23	≤8
High	2462	-6.82	-4.79	-2.68	≤8
802.11n-HT20 mode					
Low	2412	-6.73	-7.19	-3.94	≤8
Middle	2437	-6.68	-6.03	-3.33	≤8
High	2462	-6.71	-4.89	-2.70	≤8
802.11n-HT40 mode					
Low	2422	-10.30	-10.61	-7.44	≤8
Middle	2437	-9.51	-10.06	-6.77	≤8
High	2452	-10.82	-9.76	-7.25	≤8

Chain 0 Power Spectral Density, 802.11b Low Channel

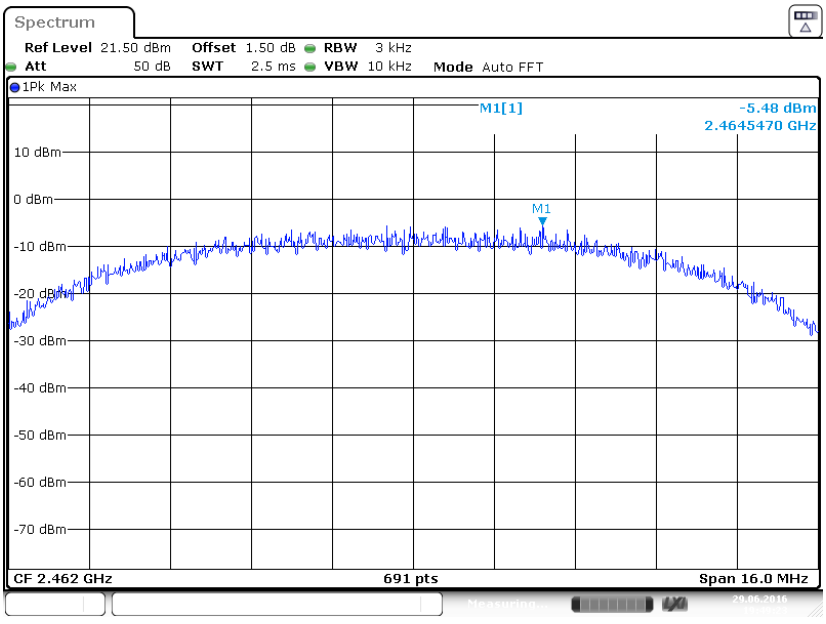


Chain 0 Power Spectral Density, 802.11b Middle Channel



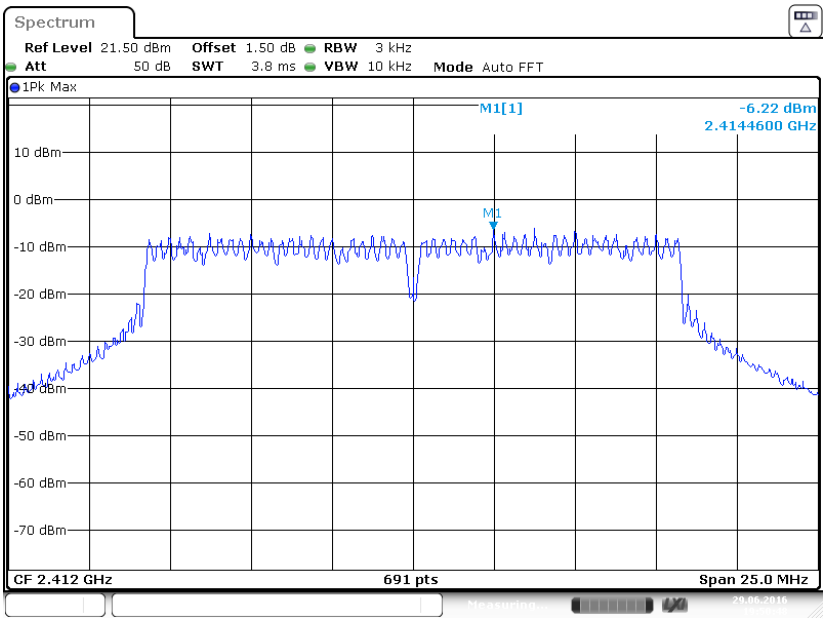
Date: 29.JUN.2016 19:48:53

Chain 0 Power Spectral Density, 802.11b High Channel



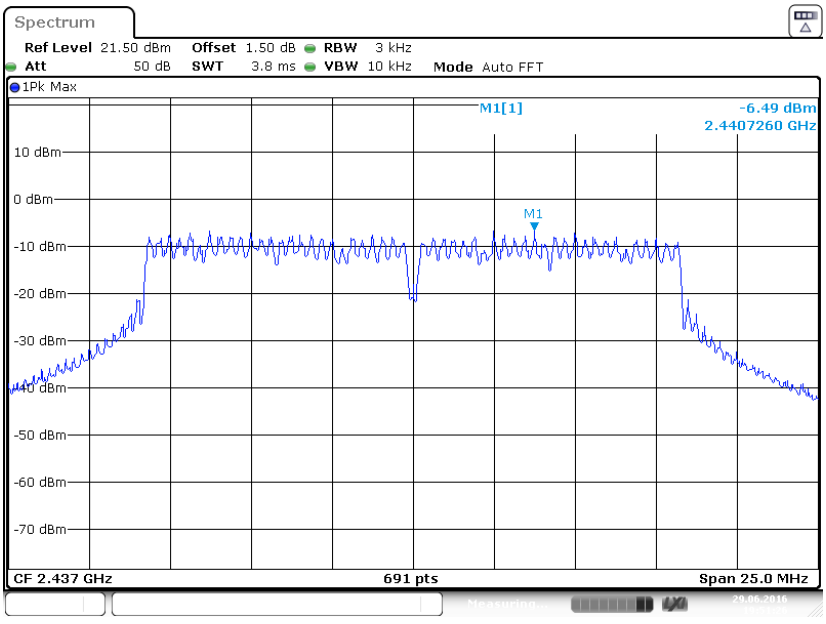
Date: 29.JUN.2016 19:49:24

Chain 0 Power Spectral Density, 802.11g Low Channel



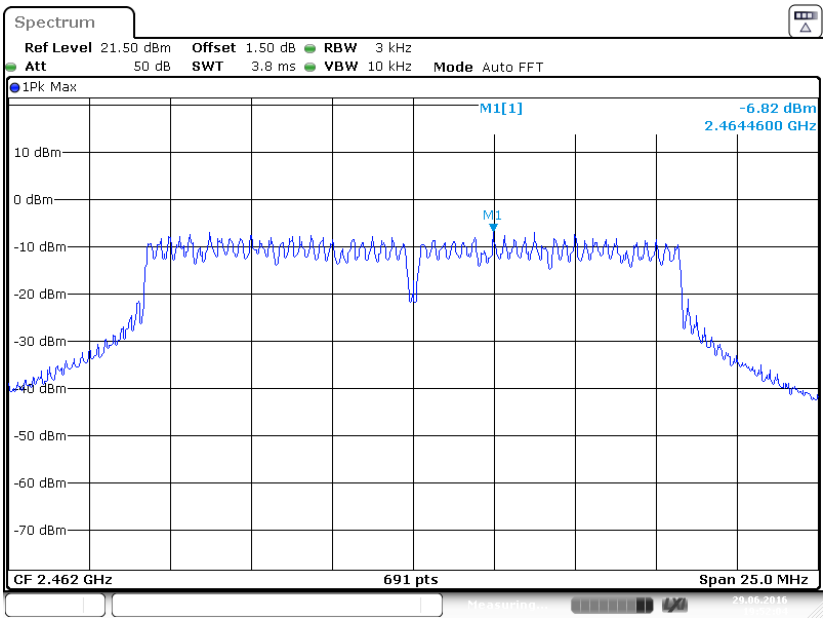
Date: 29.JUN.2016 19:50:48

Chain 0 Power Spectral Density, 802.11g Middle Channel



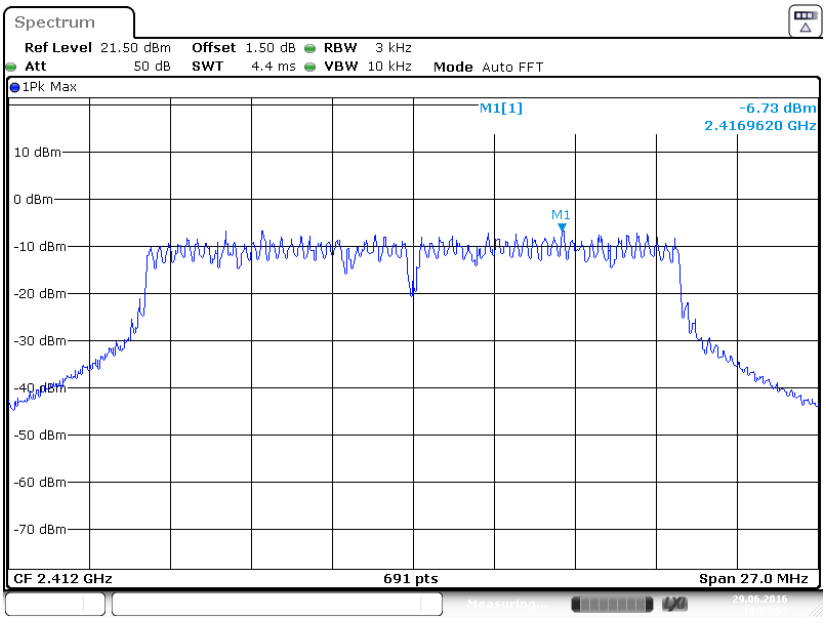
Date: 29.JUN.2016 19:51:26

Chain 0 Power Spectral Density, 802.11g High Channel



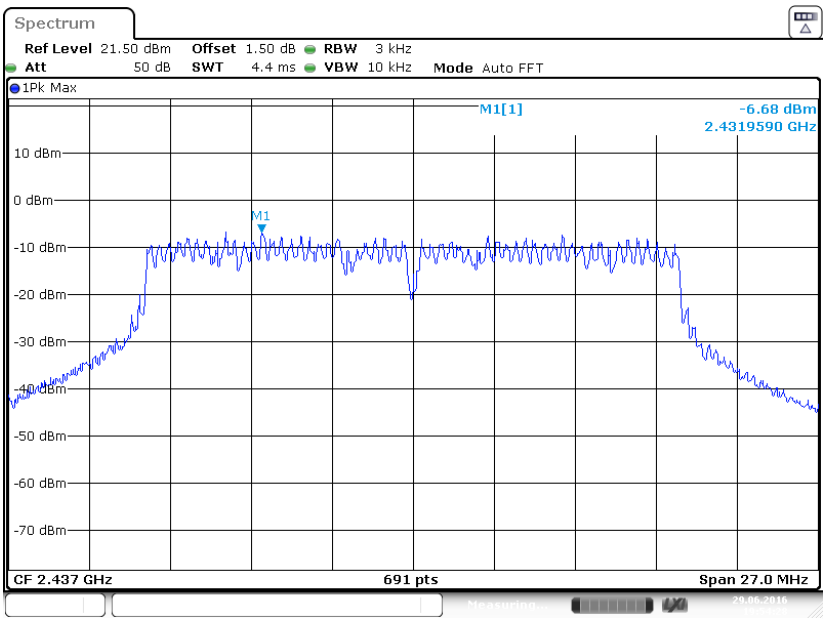
Date: 29.JUN.2016 19:52:04

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



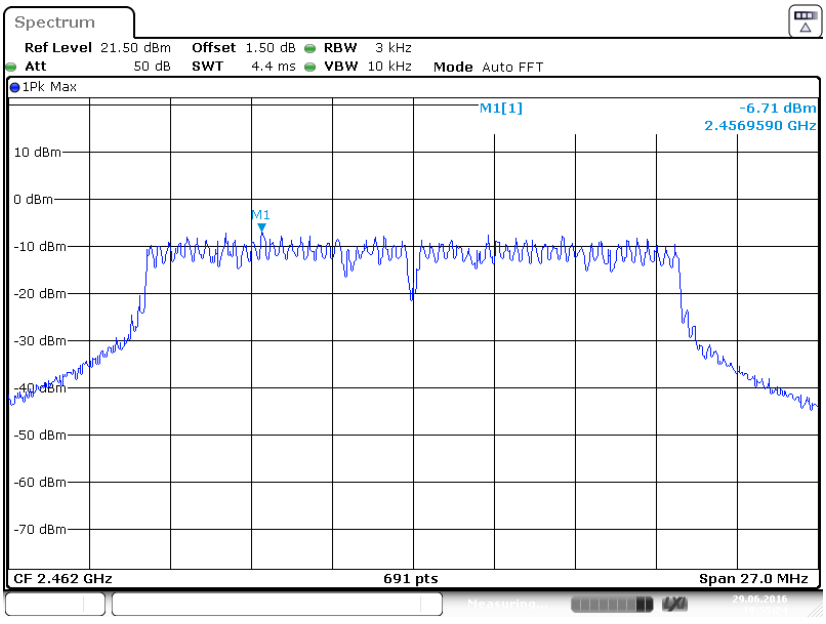
Date: 29.JUN.2016 19:53:52

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



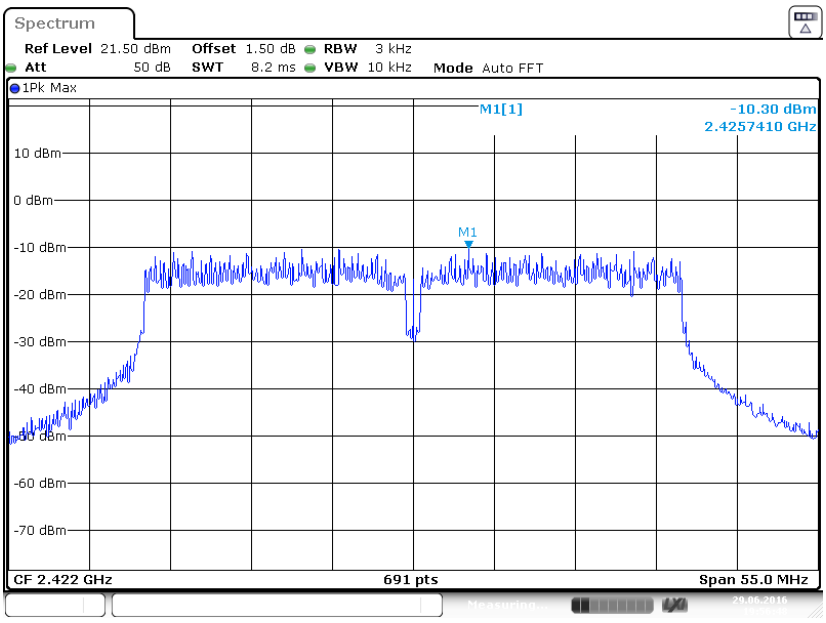
Date: 29.JUN.2016 19:54:28

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



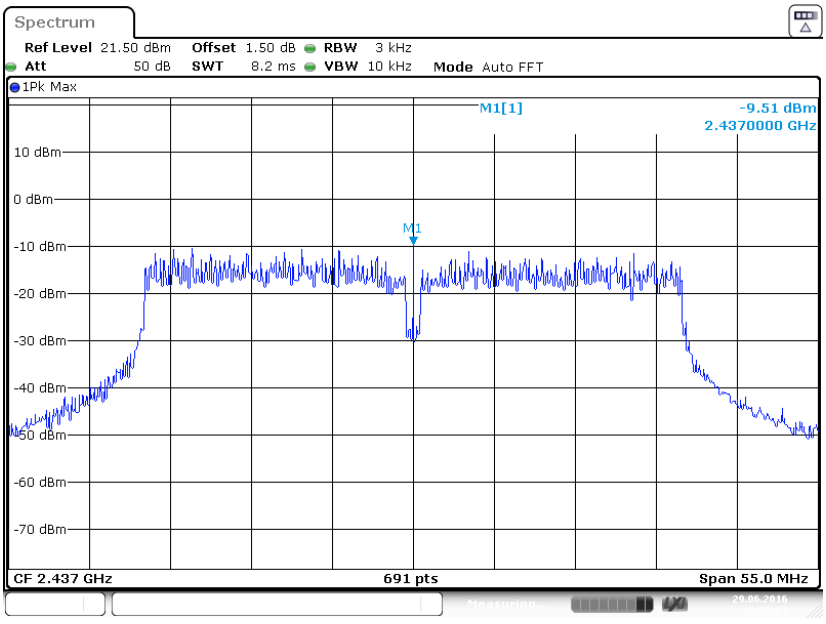
Date: 29.JUN.2016 19:55:24

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



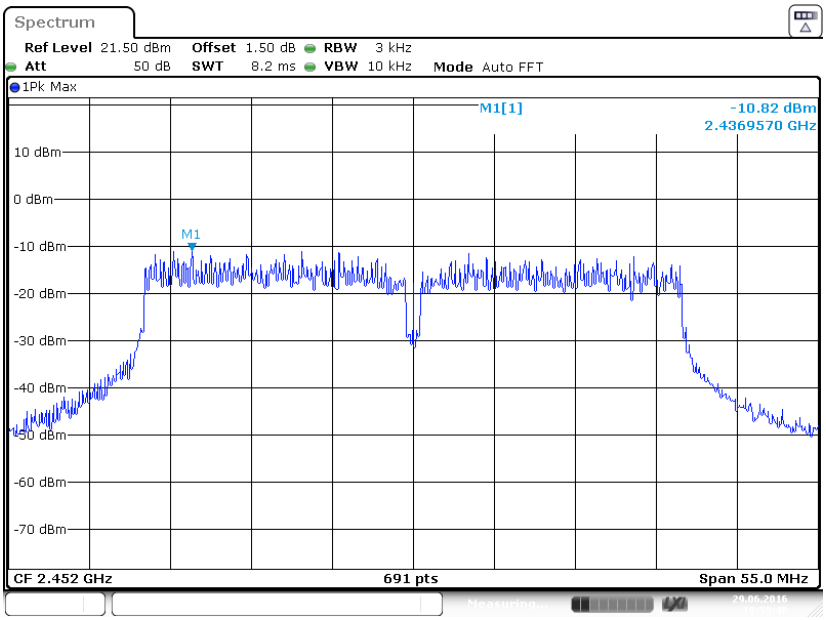
Date: 29.JUN.2016 19:56:48

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



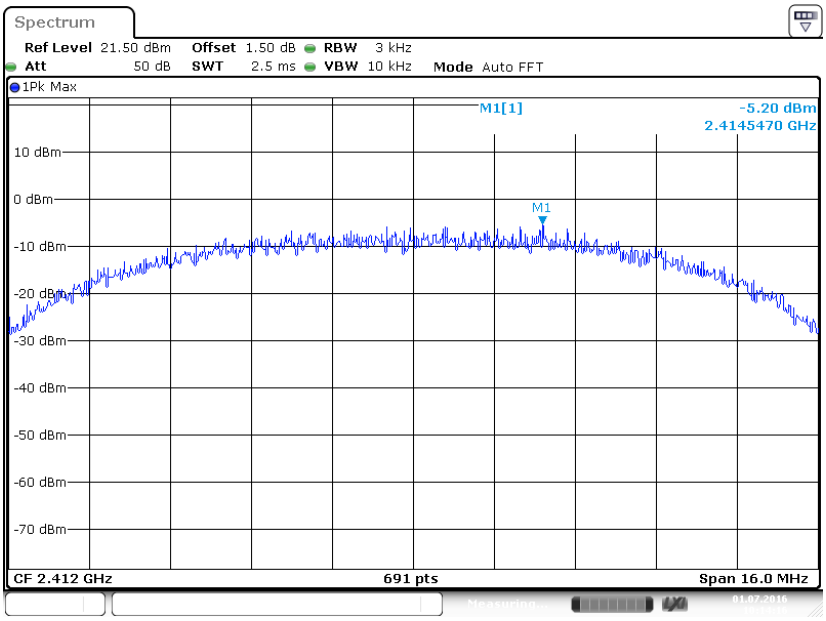
Date: 29.JUN.2016 19:58:03

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



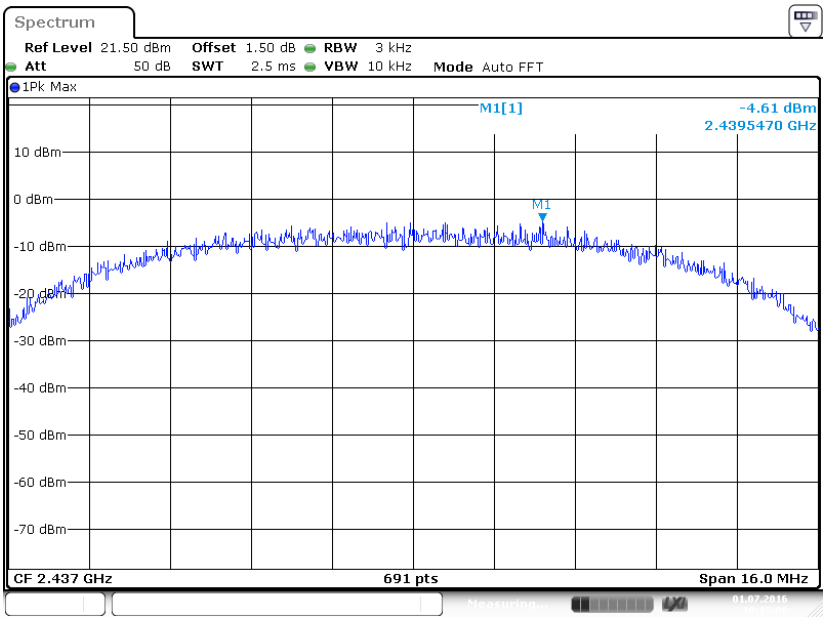
Date: 29.JUN.2016 19:58:48

Chain 1 Power Spectral Density, 802.11b Low Channel



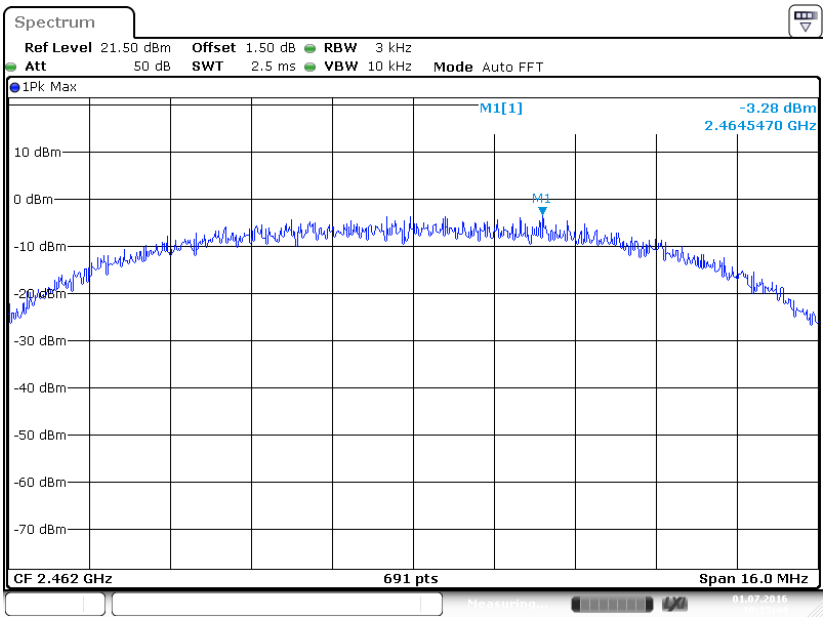
Date: 1.JUL.2016 10:14:16

Chain 1 Power Spectral Density, 802.11b Middle Channel



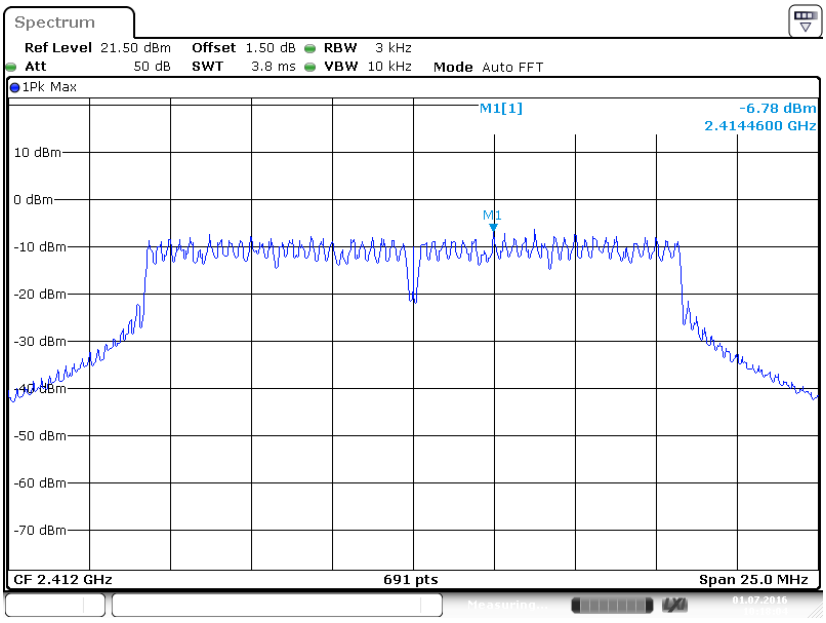
Date:1.JUL.2016 10:15:06

Chain 1 Power Spectral Density, 802.11b High Channel



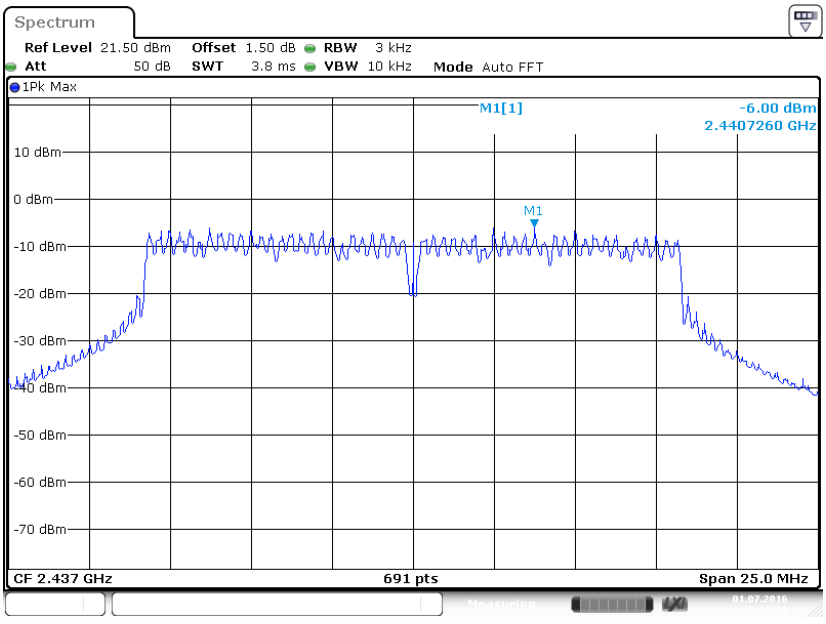
Date:1.JUL.2016 10:15:44

Chain 1 Power Spectral Density, 802.11g Low Channel



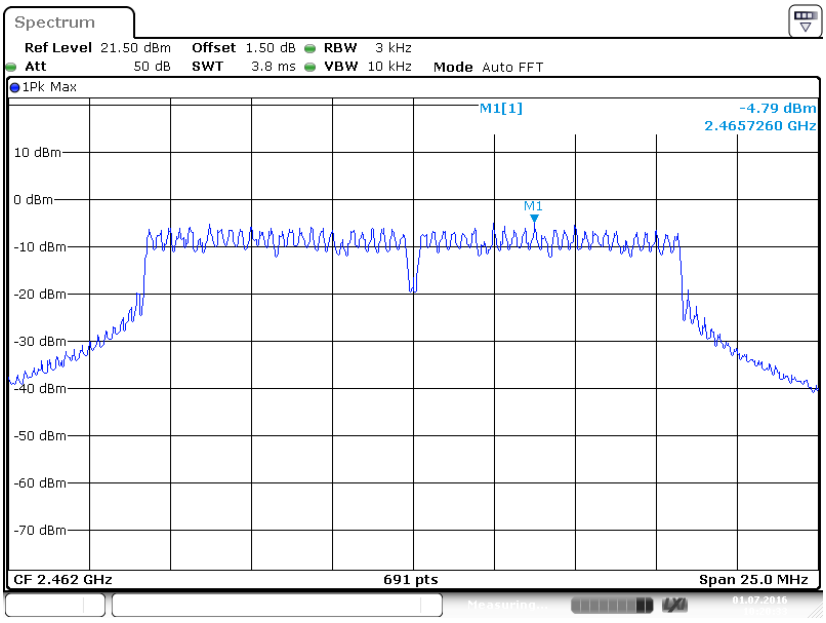
Date:1.JUL.2016 10:18:05

Chain 1 Power Spectral Density, 802.11g Middle Channel



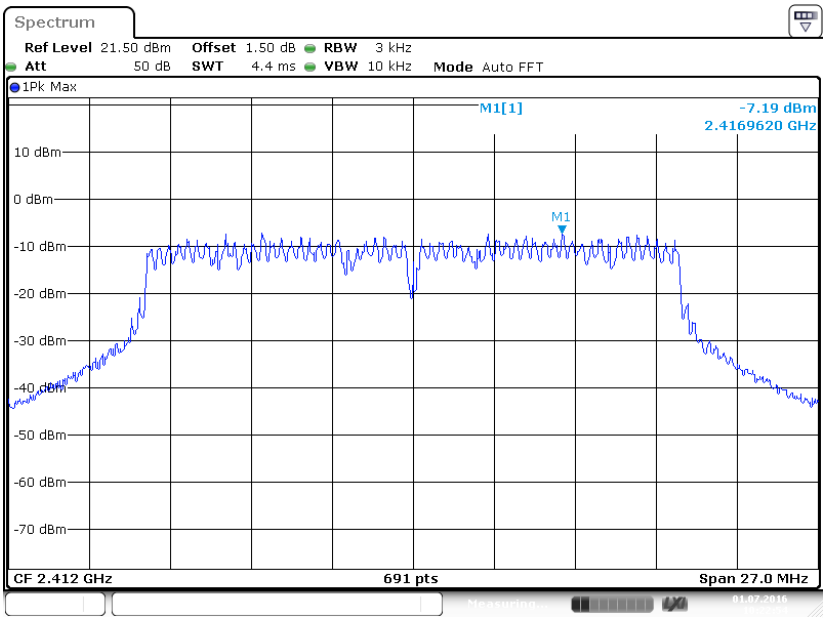
Date:1.JUL.2016 10:19:34

Chain 1 Power Spectral Density, 802.11g High Channel



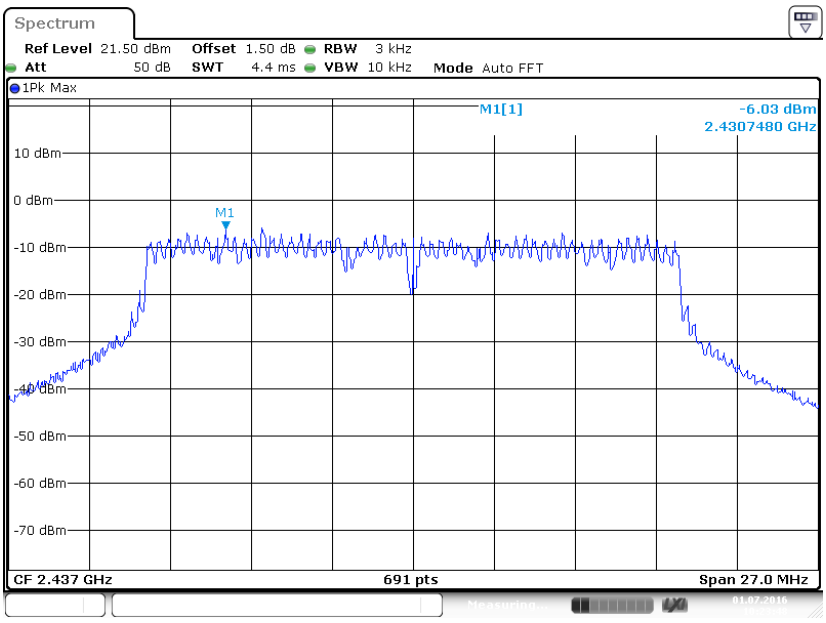
Date:1.JUL.2016 10:20:33

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



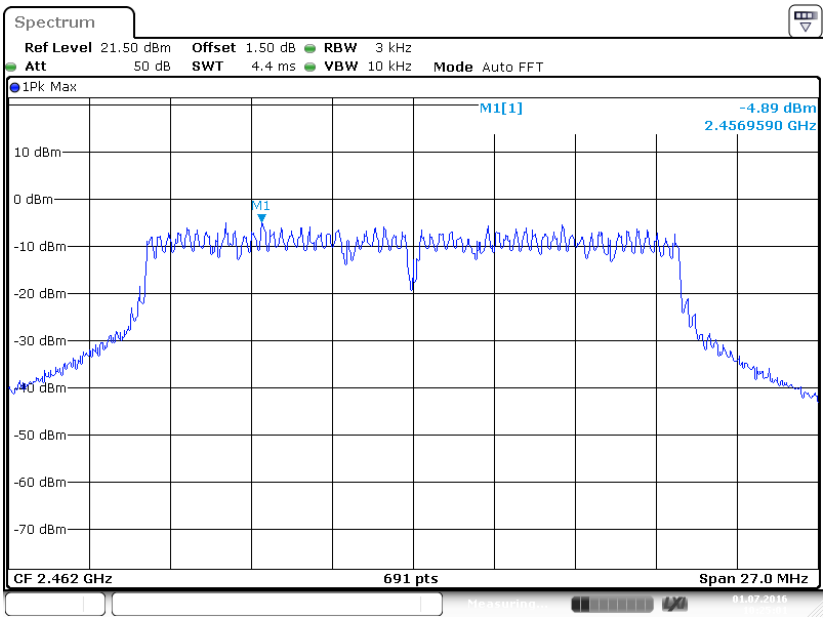
Date:1.JUL.2016 10:22:54

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



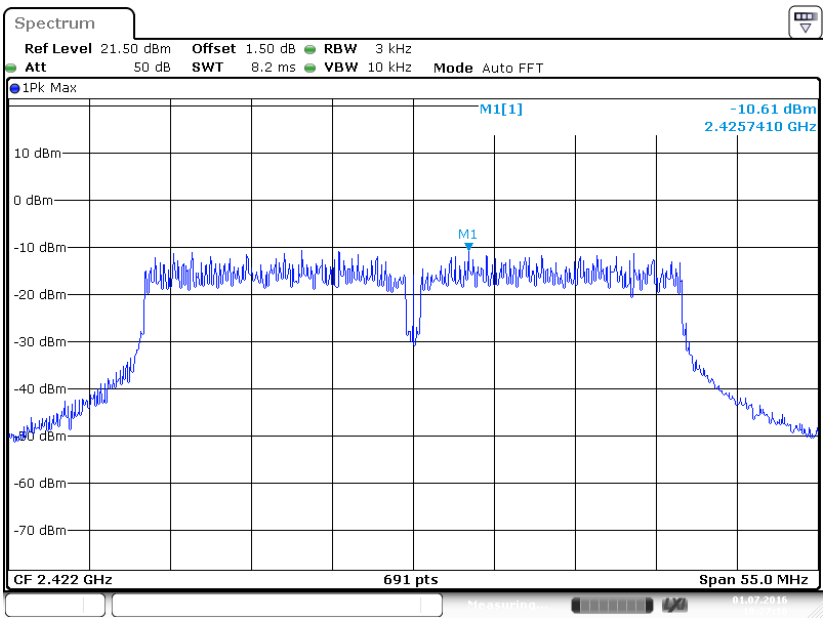
Date: 1.JUL.2016 10:23:48

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



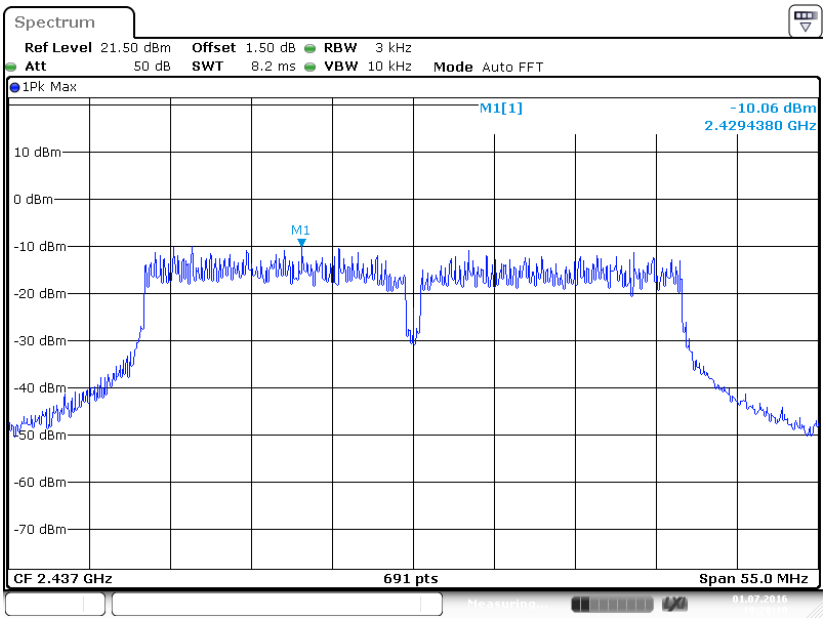
Date: 1.JUL.2016 10:25:01

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



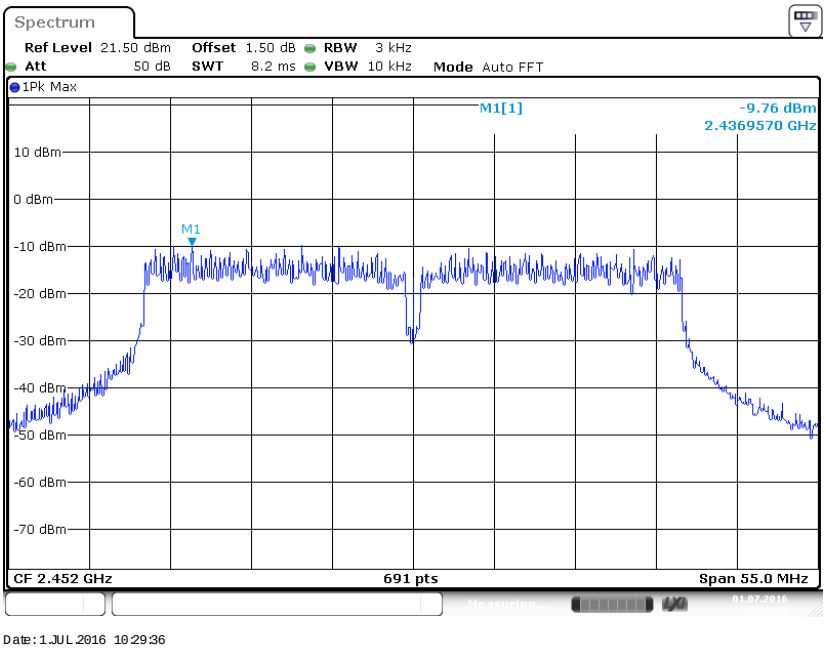
Date:1.JUL.2016 10:27:16

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



Date:1.JUL.2016 10:28:11

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



******* END OF REPORT *******