FCC PART 15.247

TEST REPORT

For

Hangzhou Ezviz Network Co., Ltd

Floor 7, Building 1,No. 700, Dongliu Road, Binjiang District, Hangzhou, China

FCC ID: 2ALZF-X3C-8E

Report Type:	Product Type:
Original Report	Wi-Fi Video Recorder

Test Engineer:	Chris Wang
Report Number:	RKS170417001-00B
Report Date:	2017-05-11
Reviewed By:	Oscar Ye RF Leader
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)

Applicant	Hangzhou Ezviz Network Co., Ltd
Tested Model	CS-X3C-8E
Series Model	CS-X3C-8E/1T,CS-X3C-8E/2T
Product Type	Wi-Fi Video Recorder
Dimension	64 mm(L)×256 mm(W)×241 mm(H)
Power Supply	DC 12.0V from adapter

Adapter Information:
Model: MSA-C2000IC12.0-24P-US
Input: AC 100-240V, 50/60 Hz, 0.7A MAX
Output: DC 12.0V, 2A

Note: The difference between tested model and series model was explained in the declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: 20170424003. (Assigned by BACL, Kunshan). The EUT was received on 2017-04-24.*

Objective

This report is prepared on behalf of Hangzhou Ezviz Network Co., Ltd 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 Part15.407 NII and Part15B JBP submissions with FCC ID: 2ALZF-X3C-8E.

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 v04.

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

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road,Kunshan,Jiangsu province,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 C63.4-2014.

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	/	/

For 802.11b, 802.11g, 802.11n-HT20 mode, 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)
3	2422	8	2447
4	2427	9	2452
5	2432	/	/
6	2437	/	/
7	2442	/	/

EUT was tested with Channel 3, 6 and 9.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

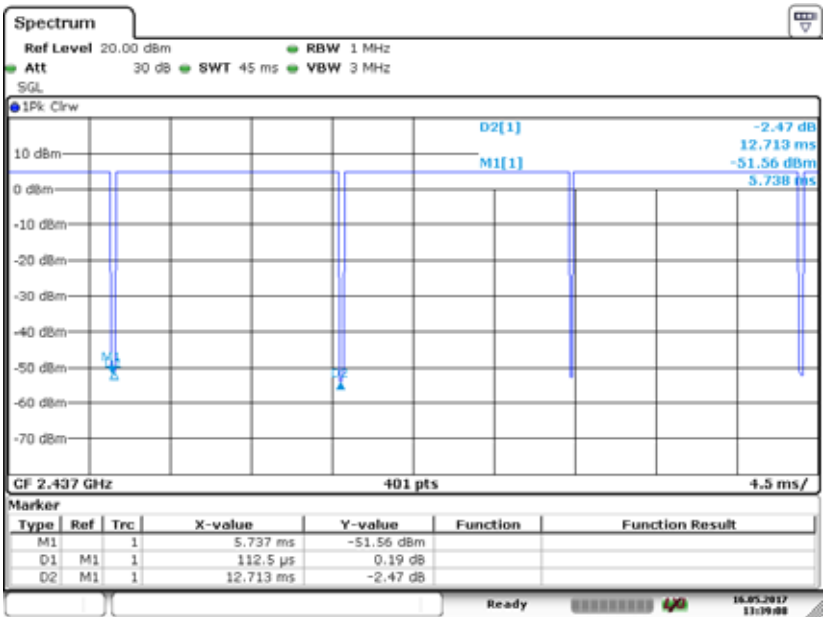
RF test tool : Telnet.

The device was tested with 99.12% duty cycle and the worst case was performed as below:

Mode	Data rate	Power level
802.11b	1 Mbps	21
802.11g	6 Mbps	18
802.11n-HT20	MCS0	18
802.11n-HT40	MCS0	18

Duty Cycle:

802.11b Mode Middle Channel Duty Cycle



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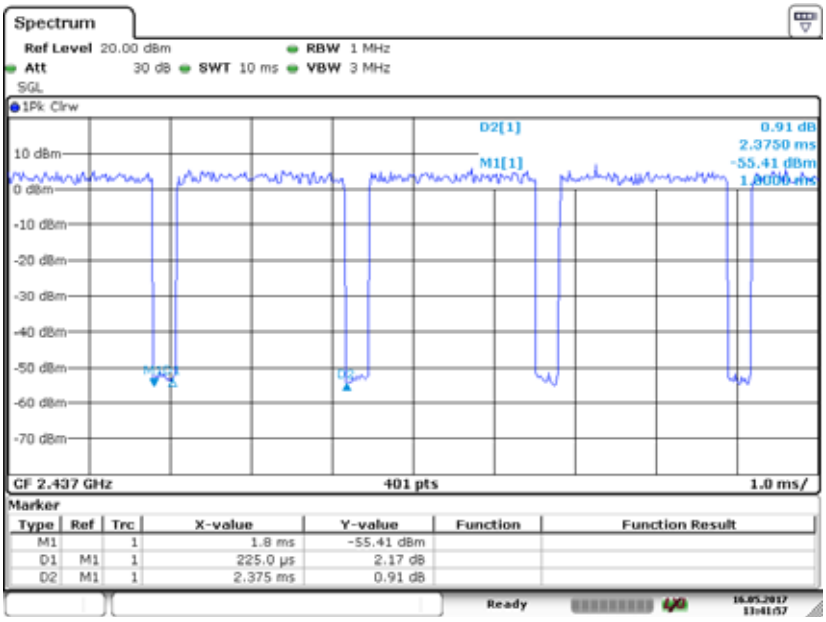
802.11g Mode Middle Channel Duty Cycle



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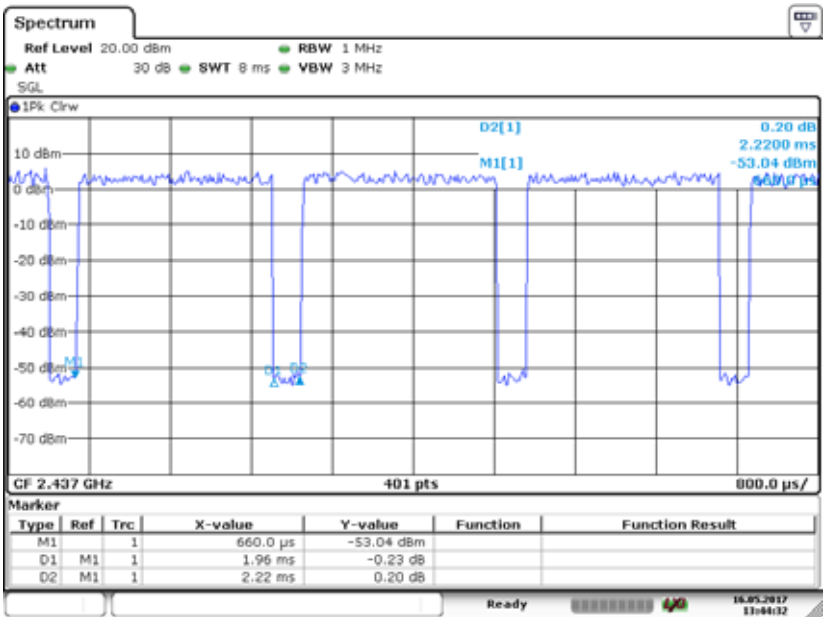
802.11n-HT20 Mode Middle Channel Duty Cycle



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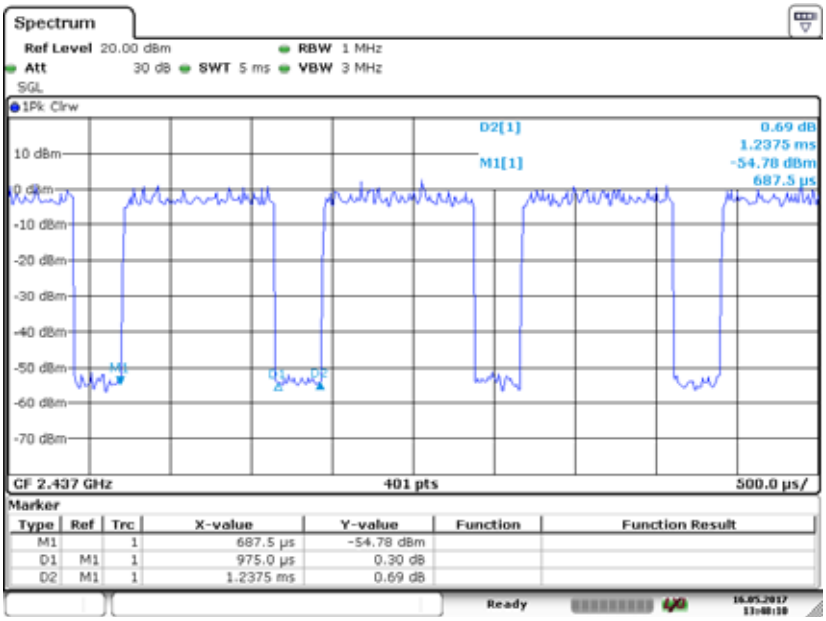
802.11n-HT40 Mode Middle Channel Duty Cycle



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Mode	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	10log(1/x)
802.11b	99.12	/	/	10Hz	0.04
802.11g	90.53	2150	0.47	1kHz	0.43
802.11n-HT20	88.29	1960	0.51	1kHz	0.54
802.11n-HT40	78.79	975	1.03	3kHz	1.04

Support Equipment List and Details

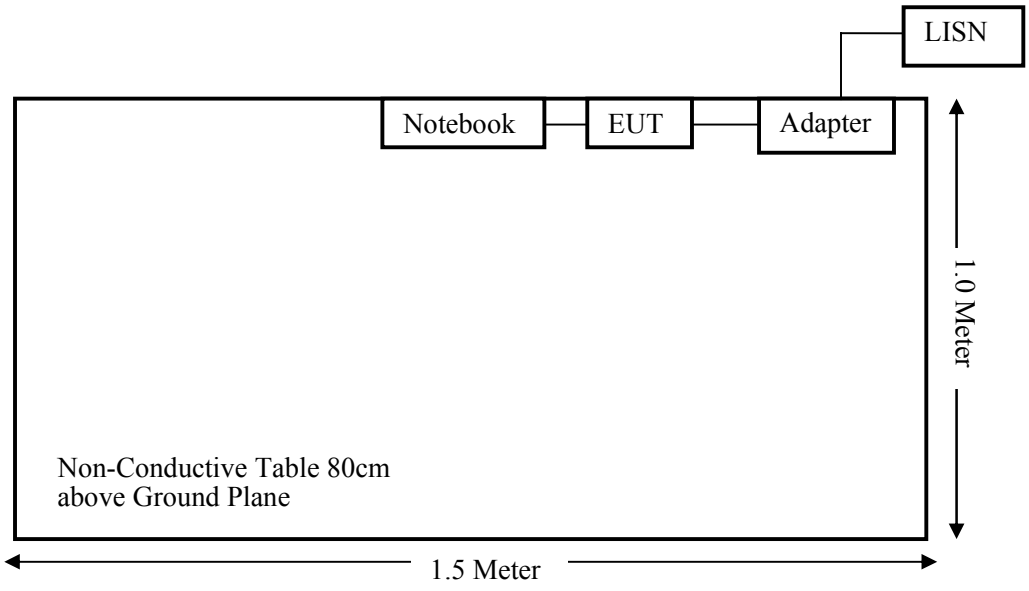
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152

External I/O Cable

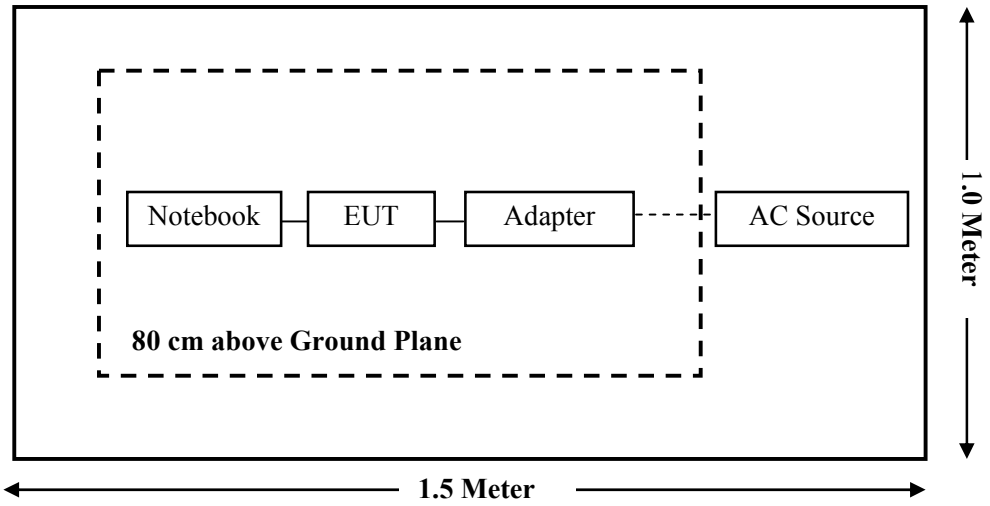
Cable Description	Shielding Type	Length (m)	From Port	To
RJ45 Cable	Un-shielding	1.0	Notebook	EUT

Block Diagram of Test Setup

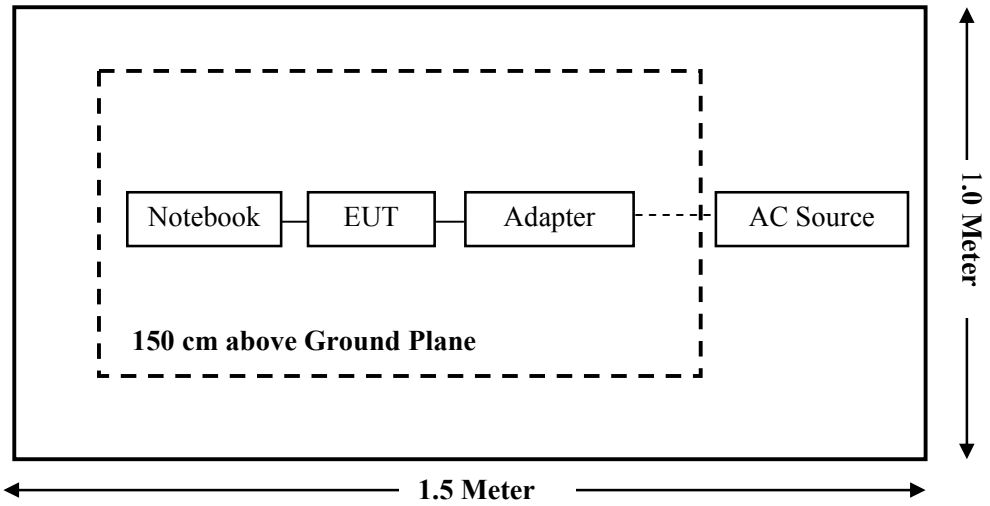
For Conducted Emissions:



For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 (b) (1)& §2.1091	RF Exposure	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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-24
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
ETS-LINDGREN	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Sonoma Instrunent	Amplifier	330	171377	2016-12-12	2017-12-11
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-12-12	2017-12-11
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
Haojintech	Coaxial Cable	Cable-1	001	2016-12-12	2017-12-11
Haojintech	Coaxial Cable	Cable-2	002	2016-12-12	2017-12-11
Haojintech	Coaxial Cable	Cable-3	003	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-12-12	2017-12-11
RF Conducted Test					
Rohde & Schwarz	FSV40 Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	/	/
Agilent	Power Meter	N1912A	MY5000492	2016-11-18	2017-11-17
Agilent	Power Sensor	N1921A	MY54210024	2016-11-18	2017-11-17
Hangzhou Ezviz	RF Cable	N/A	N/A	2017-03-09	2018-03-08
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	834115/007	2016-11-25	2017-11-24
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-09
Rohde & Schwarz	LISN	ENV216	3560655016	2016-11-25	2017-11-24
Rohde & Schwarz	CE Test software	EMC 32	100357	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2016-09-08	2017-09-07
HP	Current probe	11967A	636	2016-07-04	2017-07-03
FCC	ISN	FCC-TLISN-T8-02	20376	2016-07-04	2017-07-03

*** 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).

FCC§15.247 (i), §1.1310& §2.1091 –RF Exposure

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:

Mode	Frequency Range	Antenna Gain		Target Output Power	Output Power		Evaluation Distance	Power Density	MPE Limit
	(MHz)	(dBi)	(numeric)	(dBm)	(dBm)	(mW)	(cm)	(mW/cm^2)	(mW/cm^2)
802.11b	2412~2462	3.00	2.00	13±1	14.00	25.12	20	0.0100	1.0
802.11g		3.00	2.00	11.5±1	12.50	17.78	20	0.0071	1.0
802.11n-HT20		3.00	2.00	14.5±1	15.50	35.48	20	0.0141	1.0
802.11n-HT40	2422~2452	3.00	2.00	13±1	14.00	25.12	20	0.0100	1.0
802.11a	5150~5250	3.00	2.00	14±1	15.00	31.62	20	0.0126	1.0
802.11n-HT20		3.00	2.00	17.5±0.5	18.00	63.10	20	0.0250	1.0
802.11n-HT40		3.00	2.00	15.5±0.5	16.00	39.81	20	0.0158	1.0
802.11ac20		3.00	2.00	18±0.5	18.50	70.79	20	0.0281	1.0
802.11ac40		3.00	2.00	16±1	17.00	50.12	20	0.0199	1.0
802.11ac80		3.00	2.00	14.5±0.5	15.00	31.62	20	0.0126	1.0
802.11a	5725~5850	3.00	2.00	14±0.5	14.50	28.18	20	0.0112	1.0
802.11n-HT20		3.00	2.00	17.5±0.5	18.00	63.10	20	0.0250	1.0
802.11n-HT40		3.00	2.00	15.5±1	16.50	44.67	20	0.0177	1.0
802.11ac20		3.00	2.00	17±1.5	18.50	70.79	20	0.0281	1.0
802.11ac40		3.00	2.00	15.5±0.5	16.00	39.81	20	0.0158	1.0
802.11ac80		3.00	2.00	14.5±0.5	15.00	31.62	20	0.0126	1.0

Note:

1. For the above target output power are all declared by the manufacturer.
2. The EUT has the 2.4GHz Wi-Fi, 5GHz Wi-Fi functions, they can transmitting simultaneously. According to KDB 447498 D01 General RF Exposure Guidance v06 and test data, 802.11n-HT20 mode for 2.4G Wi-Fi, 802.11ac20 mode 5150-5250 band for 5GHz Wi-Fi is the worst case, their sum of MPE ratio is 0.0422, which is less than 1.0,so the collocation exposure exclusion applies.

Result: The device meet FCC MPE 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

This product used two monopole antennas arrangement for 2.4G Wi-Fi which were connected to the main board with I-PEX socket, each antenna maximum gain is 3.0dBi, which fulfill the requirement of this section, please refer to the EUT photos.

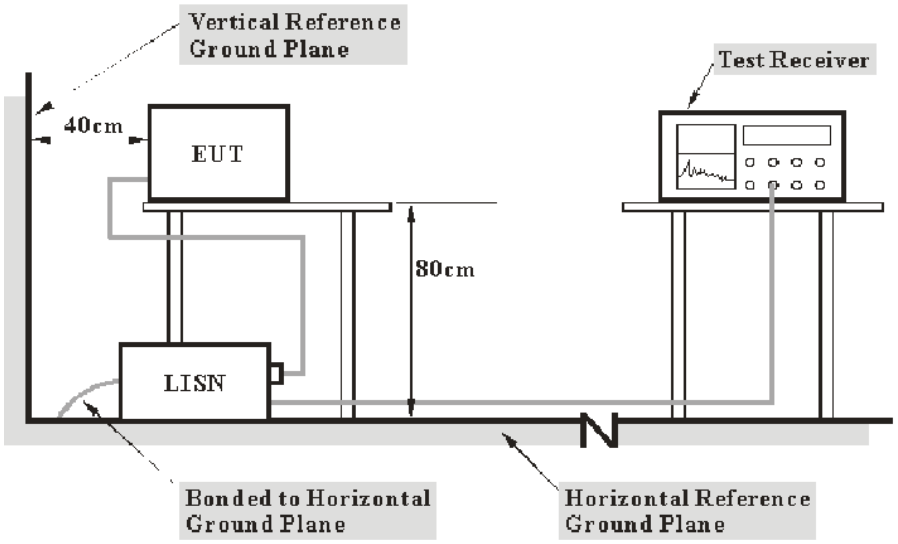
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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.

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.

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.

Test Data

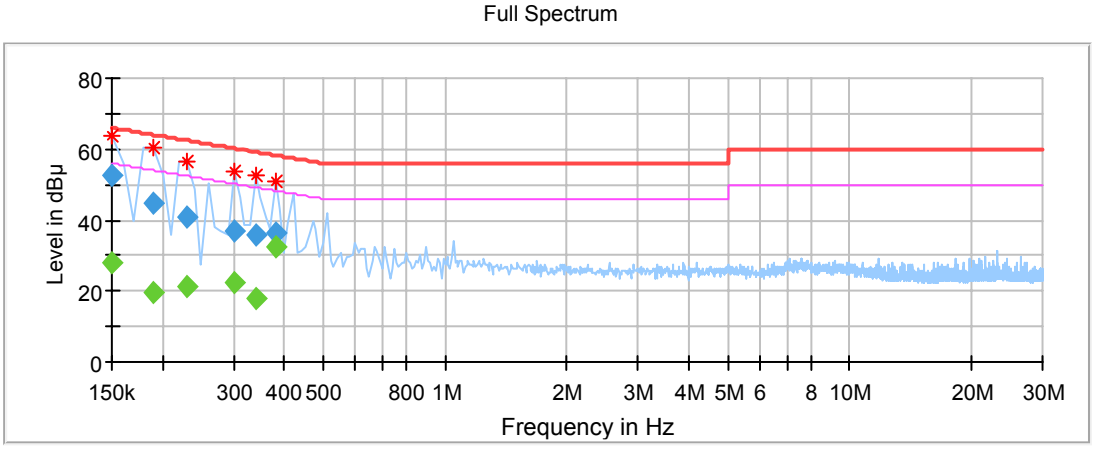
Environmental Conditions

Temperature:	24.5 ℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2017-03-09.

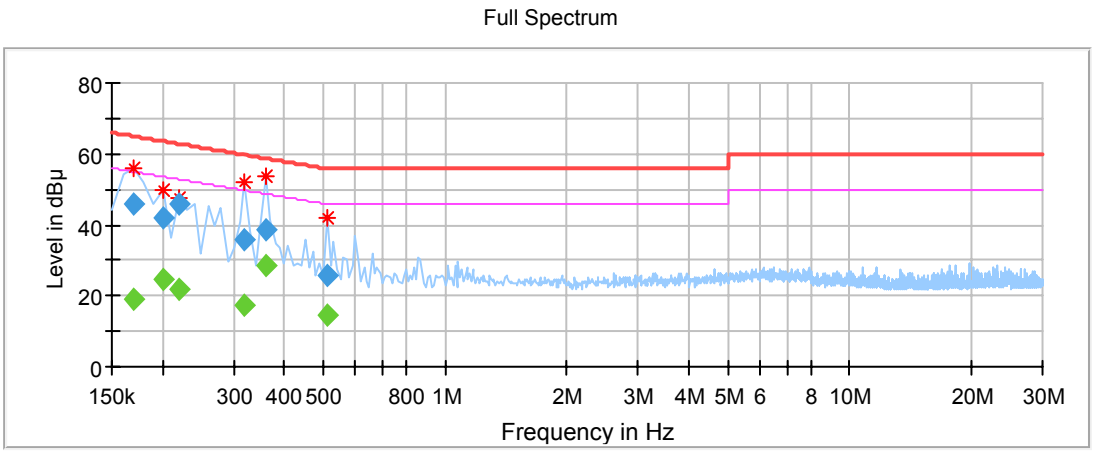
EUT operation mode: Transmitting in 802.11b mode high channel of chain 0.(worst case)

AC 120V/60 Hz, Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dB µ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	---	27.76	9.000	L1	10.1	28.24	56.00	Compliance
0.150000	52.66	---	9.000	L1	10.1	13.34	66.00	Compliance
0.190000	---	19.70	9.000	L1	10.0	34.34	54.04	Compliance
0.190000	44.69	---	9.000	L1	10.0	19.35	64.04	Compliance
0.230000	---	21.14	9.000	L1	10.0	31.31	52.45	Compliance
0.230000	40.85	---	9.000	L1	10.0	21.60	62.45	Compliance
0.300000	---	22.60	9.000	L1	10.0	27.64	50.24	Compliance
0.300000	37.16	---	9.000	L1	10.0	23.08	60.24	Compliance
0.340000	---	17.69	9.000	L1	10.0	31.51	49.20	Compliance
0.340000	35.78	---	9.000	L1	10.0	23.42	59.20	Compliance
0.380000	---	32.42	9.000	L1	10.0	15.86	48.28	Compliance
0.380000	36.27	---	9.000	L1	10.0	22.01	58.28	Compliance

AC 120V/60 Hz, Neutral



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170000	---	18.98	9.000	N	10.1	35.98	54.96	Compliance
0.170000	45.66	---	9.000	N	10.1	19.30	64.96	Compliance
0.200000	---	24.69	9.000	N	10.1	28.92	53.61	Compliance
0.200000	41.69	---	9.000	N	10.1	21.92	63.61	Compliance
0.220000	---	21.69	9.000	N	10.1	31.13	52.82	Compliance
0.220000	46.07	---	9.000	N	10.1	16.75	62.82	Compliance
0.320000	---	17.21	9.000	N	10.1	32.50	49.71	Compliance
0.320000	36.06	---	9.000	N	10.1	23.65	59.71	Compliance
0.360000	---	28.77	9.000	N	10.1	19.96	48.73	Compliance
0.360000	38.48	---	9.000	N	10.1	20.25	58.73	Compliance
0.510000	---	14.59	9.000	N	10.1	31.41	46.00	Compliance
0.510000	25.64	---	9.000	N	10.1	30.36	56.00	Compliance

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

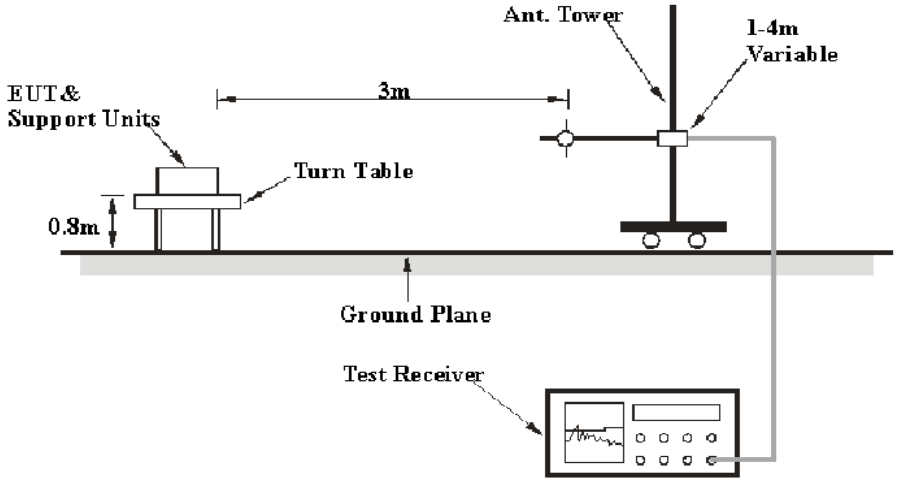
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

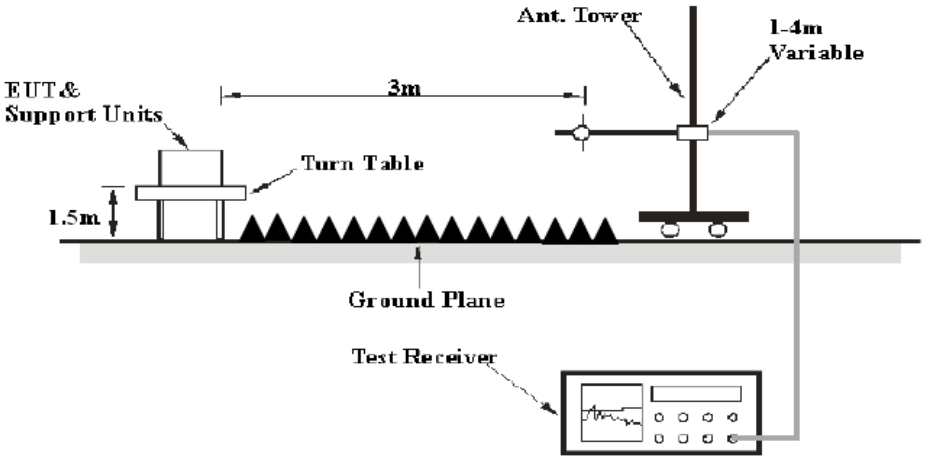
FCC §15.247 (d); §15.209; §15.205;

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.

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	120 kHz	300 kHz	120 kHz	QP

Frequency Range	RBW	Video B/W	Duty cycle	Detector
1GHz – 25GHz	1MHz	3 MHz	Any	PK
	1MHz	10 Hz	>98%	Ave.
	1MHz	1/T	<98%	

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.

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.

Test Data

Environmental Conditions

Temperature:	24.8 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2017-05-09.

EUT operation mode: Transmitting(Scan with X-Axis, Y-Axis and Z-Axis position, the worst case was recorded)

30MHz-25GHz

802.11b Mode(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)									
99.98	37.74	QP	26	221	H	-11.18	26.56	43.50	16.94
2412.00	112.97	PK	324	141	V	-6.17	106.80	/	/
2412.00	107.15	Ave	324	141	V	-6.17	100.98	/	/
2412.00	107.06	PK	198	112	H	-6.17	100.89	/	/
2412.00	102.55	Ave	198	112	H	-6.17	96.38	/	/
2390.00	44.52	PK	158	162	H	-6.22	38.30	74.00	35.70
2390.00	31.20	Ave	158	162	H	-6.22	24.98	54.00	29.02
2400.00	65.11	PK	330	142	V	-6.19	58.92	74.00	15.08
2400.00	48.75	Ave	330	142	V	-6.19	42.56	54.00	11.44
1535.32	45.31	PK	38	156	V	-9.29	36.02	74.00	37.98
1535.32	31.68	Ave	38	156	V	-9.29	22.39	54.00	31.61
4824.00	55.36	PK	335	177	H	1.66	57.02	74.00	16.98
4824.00	39.95	Ave	335	177	H	1.66	41.61	54.00	12.39
7236.00	39.06	PK	28	236	H	7.58	46.64	74.00	27.36
7236.00	25.89	Ave	28	236	H	7.58	33.47	54.00	20.53

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)									
99.98	37.68	QP	120	154	H	-11.18	26.50	43.50	17.00
2437.00	113.13	PK	53	220	V	-6.11	107.02	/	/
2437.00	108.00	Ave	53	220	V	-6.11	101.89	/	/
2437.00	107.79	PK	350	126	H	-6.11	101.68	/	/
2437.00	102.48	Ave	350	126	H	-6.11	96.37	/	/
1535.32	45.85	PK	27	141	V	-9.29	36.56	74.00	37.44
1535.32	32.53	Ave	27	141	V	-9.29	23.24	54.00	30.76
3330.91	44.59	PK	187	236	H	-2.38	42.21	74.00	31.79
3330.91	31.55	Ave	187	236	H	-2.38	29.17	54.00	24.83
4874.00	54.92	PK	217	171	H	1.77	56.69	74.00	17.31
4874.00	39.87	Ave	217	171	H	1.77	41.64	54.00	12.36
6679.74	43.52	PK	154	209	H	6.42	49.94	74.00	24.06
6679.74	29.97	Ave	154	209	H	6.42	36.39	54.00	17.61
7311.00	39.25	PK	73	164	H	7.66	46.91	74.00	27.09
7311.00	25.56	Ave	73	164	H	7.66	33.22	54.00	20.78
High Channel (2462 MHz)									
99.98	37.62	QP	144	109	H	-11.18	26.44	43.50	17.06
2462.00	112.86	PK	268	227	V	-6.06	106.80	/	/
2462.00	107.95	Ave	268	227	V	-6.06	101.89	/	/
2462.00	107.81	PK	25	156	H	-6.06	101.75	/	/
2462.00	102.59	Ave	25	156	H	-6.06	96.53	/	/
2483.50	54.26	PK	110	229	V	-6.01	48.25	74.00	25.75
2483.50	45.34	Ave	110	229	V	-6.01	39.33	54.00	14.67
1535.32	44.50	PK	32	249	V	-9.29	35.21	74.00	38.79
1535.32	32.09	Ave	32	249	V	-9.29	22.80	54.00	31.20
4924.00	50.54	PK	224	101	V	1.89	52.43	74.00	21.57
4924.00	35.72	Ave	224	101	V	1.89	37.61	54.00	16.39
6679.74	42.87	PK	310	103	V	6.42	49.29	74.00	24.71
6679.74	29.57	Ave	310	103	V	6.42	35.99	54.00	18.01
7386.00	43.94	PK	122	232	H	7.73	51.67	74.00	22.33
7386.00	29.76	Ave	122	232	H	7.73	37.49	54.00	16.51

802.11g Mode(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)									
99.98	37.78	QP	350	173	H	-11.18	26.60	43.50	16.90
2412.00	108.95	PK	301	105	V	-6.17	102.78	/	/
2412.00	100.46	Ave	301	105	V	-6.17	94.29	/	/
2412.00	102.40	PK	333	244	H	-6.17	96.23	/	/
2412.00	93.57	Ave	333	244	H	-6.17	87.40	/	/
2390.00	60.85	PK	7	145	V	-6.22	54.63	74.00	19.37
2390.00	51.83	Ave	7	145	V	-6.22	45.61	54.00	8.39
2400.00	66.39	PK	354	190	V	-6.19	60.20	74.00	13.80
2400.00	53.64	Ave	354	190	V	-6.19	47.45	54.00	6.55
1476.95	44.43	PK	224	211	V	-9.60	34.83	74.00	39.17
1476.95	31.60	Ave	224	211	V	-9.60	22.00	54.00	32.00
4824.00	44.04	PK	227	169	V	1.66	45.70	74.00	28.30
4824.00	31.08	Ave	227	169	V	1.66	32.74	54.00	21.26
7236.00	39.32	PK	190	169	V	7.58	46.90	74.00	27.10
7236.00	25.92	Ave	190	169	V	7.58	33.50	54.00	20.50
Middle Channel (2437 MHz)									
99.98	37.69	QP	203	155	H	-11.18	26.51	43.50	16.99
2437.00	109.26	PK	224	166	V	-6.11	103.15	/	/
2437.00	101.14	Ave	224	166	V	-6.11	95.03	/	/
2437.00	102.58	PK	251	230	H	-6.11	96.47	/	/
2437.00	94.15	Ave	251	230	H	-6.11	88.04	/	/
1476.95	44.25	PK	115	112	V	-9.60	34.65	74.00	39.35
1476.95	31.74	Ave	115	112	V	-9.60	22.14	54.00	31.86
3327.03	43.40	PK	342	152	H	-2.39	41.01	74.00	32.99
3327.03	30.21	Ave	342	152	H	-2.39	27.82	54.00	26.18
4874.00	44.45	PK	266	175	H	1.77	46.22	74.00	27.78
4874.00	32.37	Ave	266	175	H	1.77	34.14	54.00	19.86
6300.98	42.31	PK	290	122	V	5.18	47.49	74.00	26.51
6300.98	29.26	Ave	290	122	V	5.18	34.44	54.00	19.56
7311.00	39.15	PK	250	175	H	7.66	46.81	74.00	27.19
7311.00	25.40	Ave	250	175	H	7.66	33.06	54.00	20.94

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)									
99.98	37.65	QP	301	117	H	-11.18	26.47	43.50	17.03
2462.00	108.79	PK	313	200	V	-6.06	102.73	/	/
2462.00	100.96	Ave	313	200	V	-6.06	94.90	/	/
2462.00	102.46	PK	278	117	H	-6.06	96.40	/	/
2462.00	95.17	Ave	278	117	H	-6.06	89.11	/	/
2483.50	64.91	PK	217	143	V	-6.01	58.90	74.00	15.10
2483.50	50.10	Ave	217	143	V	-6.01	44.09	54.00	9.91
1476.95	44.67	PK	351	107	V	-9.60	35.07	74.00	38.93
1476.95	31.88	Ave	351	107	V	-9.60	22.28	54.00	31.72
4924.00	45.22	PK	224	243	V	1.89	47.11	74.00	26.89
4924.00	31.48	Ave	224	243	V	1.89	33.37	54.00	20.63
6300.98	42.34	PK	345	187	V	5.18	47.52	74.00	26.48
6300.98	29.26	Ave	345	187	V	5.18	34.44	54.00	19.56
7386.00	38.73	PK	124	146	H	7.73	46.46	74.00	27.54
7386.00	25.26	Ave	124	146	H	7.73	32.99	54.00	21.01

802.11n-HT20 Mode(Chain0+Chain1):

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)									
99.98	37.82	QP	240	111	H	-11.18	26.64	43.50	16.86
2412.00	107.18	PK	146	169	V	-6.17	101.01	/	/
2412.00	99.84	Ave	146	169	V	-6.17	93.67	/	/
2412.00	101.56	PK	186	201	H	-6.17	95.39	/	/
2412.00	93.18	Ave	186	201	H	-6.17	87.01	/	/
2390.00	65.51	PK	251	141	H	-6.22	59.29	74.00	14.71
2390.00	51.44	Ave	251	141	H	-6.22	45.22	54.00	8.78
2400.00	67.05	PK	191	210	V	-6.19	60.86	74.00	13.14
2400.00	53.46	Ave	191	210	V	-6.19	47.27	54.00	6.73
1120.59	44.43	PK	128	136	H	-11.73	32.70	74.00	41.30
1120.59	31.11	Ave	128	136	H	-11.73	19.38	54.00	34.62
4824.00	44.47	PK	68	210	V	1.66	46.13	74.00	27.87
4824.00	31.12	Ave	68	210	V	1.66	32.78	54.00	21.22
7236.00	38.97	PK	61	161	H	7.58	46.55	74.00	27.45
7236.00	25.58	Ave	61	161	H	7.58	33.16	54.00	20.84

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)									
99.98	37.79	QP	98	108	H	-11.18	26.61	43.50	16.89
2437.00	107.14	PK	61	212	V	-6.11	101.03	/	/
2437.00	99.88	Ave	61	212	V	-6.11	93.77	/	/
2437.00	101.49	PK	9	193	H	-6.11	95.38	/	/
2437.00	93.27	Ave	9	193	H	-6.11	87.16	/	/
1120.59	44.48	PK	289	246	H	-11.73	32.75	74.00	41.25
1120.59	31.79	Ave	289	246	H	-11.73	20.06	54.00	33.94
3327.03	43.47	PK	137	113	V	-2.39	41.08	74.00	32.92
3327.03	31.08	Ave	137	113	V	-2.39	28.69	54.00	25.31
4874.00	44.30	PK	85	154	V	1.77	46.07	74.00	27.93
4874.00	32.14	Ave	85	154	V	1.77	33.91	54.00	20.09
6300.98	42.26	PK	316	218	V	5.18	47.44	74.00	26.56
6300.98	28.94	Ave	316	218	V	5.18	34.12	54.00	19.88
7311.00	38.87	PK	49	226	H	7.66	46.53	74.00	27.47
7311.00	25.58	Ave	49	226	H	7.66	33.24	54.00	20.76
High Channel (2462 MHz)									
99.98	37.64	QP	89	163	H	-11.18	26.46	43.50	17.04
2462.00	107.44	PK	110	194	V	-6.06	101.38	/	/
2462.00	98.63	Ave	110	194	V	-6.06	92.57	/	/
2462.00	102.24	PK	159	109	H	-6.06	96.18	/	/
2462.00	93.17	Ave	159	109	H	-6.06	87.11	/	/
2483.50	67.09	PK	164	101	V	-6.01	61.08	74.00	12.92
2483.50	50.25	Ave	164	101	V	-6.01	44.24	54.00	9.76
1120.59	44.15	PK	238	210	H	-11.73	32.42	74.00	41.58
1120.59	31.91	Ave	238	210	H	-11.73	20.18	54.00	33.82
4924.00	45.42	PK	109	231	V	1.89	47.31	74.00	26.69
4924.00	31.26	Ave	109	231	V	1.89	33.15	54.00	20.85
6300.98	43.64	PK	346	140	V	5.18	48.82	74.00	25.18
6300.98	28.79	Ave	346	140	V	5.18	33.97	54.00	20.03
7386.00	38.38	PK	244	237	H	7.73	46.11	74.00	27.89
7386.00	25.35	Ave	244	237	H	7.73	33.08	54.00	20.92

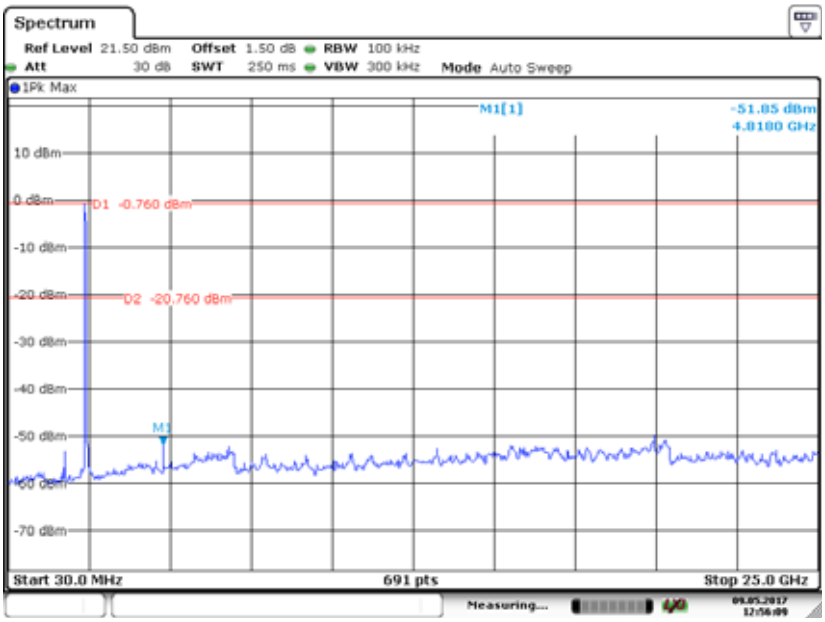
802.11n-HT40 Mode(Chain0+Chain1):

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)									
99.98	37.80	QP	115	132	H	-11.18	26.62	43.50	16.88
2422.00	106.75	PK	323	208	V	-6.14	100.61	/	/
2422.00	95.57	Ave	323	208	V	-6.14	89.43	/	/
2422.00	98.76	PK	61	243	H	-6.14	92.62	/	/
2422.00	86.25	Ave	61	243	H	-6.14	80.11	/	/
2390.00	58.05	PK	221	120	H	-6.22	51.83	74.00	22.17
2390.00	40.24	Ave	221	120	H	-6.22	34.02	54.00	19.98
2400.00	59.99	PK	272	108	V	-6.19	53.80	74.00	20.20
2400.00	44.64	Ave	272	108	V	-6.19	38.45	54.00	15.55
1142.54	44.30	PK	37	183	H	-11.60	32.70	74.00	41.30
1142.54	31.02	Ave	37	183	H	-11.60	19.42	54.00	34.58
4844.00	44.16	PK	220	161	H	1.70	45.86	74.00	28.14
4844.00	30.54	Ave	220	161	H	1.70	32.24	54.00	21.76
7266.00	38.37	PK	30	228	H	7.61	45.98	74.00	28.02
7266.00	25.40	Ave	30	228	H	7.61	33.01	54.00	20.99
Middle Channel (2437 MHz)									
99.98	37.75	QP	188	104	H	-11.18	26.57	43.50	16.93
2437.00	106.19	PK	347	154	V	-6.11	100.08	/	/
2437.00	95.59	Ave	347	154	V	-6.11	89.48	/	/
2437.00	98.48	PK	263	107	H	-6.11	92.37	/	/
2437.00	86.02	Ave	263	107	H	-6.11	79.91	/	/
1142.54	44.46	PK	290	213	V	-11.60	32.86	74.00	41.14
1142.54	32.05	Ave	290	213	V	-11.60	20.45	54.00	33.55
3341.06	44.80	PK	203	211	H	-2.35	42.45	74.00	31.55
3341.06	30.94	Ave	203	211	H	-2.35	28.59	54.00	25.41
4874.00	43.10	PK	330	111	H	1.77	44.87	74.00	29.13
4874.00	31.15	Ave	330	111	H	1.77	32.92	54.00	21.08
6679.74	42.76	PK	348	104	V	6.42	49.18	74.00	24.82
6679.74	29.58	Ave	348	104	V	6.42	36.00	54.00	18.00
7311.00	38.15	PK	271	111	H	7.66	45.81	74.00	28.19
7311.00	25.24	Ave	271	111	H	7.66	32.90	54.00	21.10

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)									
99.98	37.66	QP	113	164	H	-11.18	26.48	43.50	17.02
2452.00	106.53	PK	225	149	V	-6.08	100.45	/	/
2452.00	95.51	Ave	225	149	V	-6.08	89.43	/	/
2452.00	97.81	PK	6	187	H	-6.08	91.73	/	/
2452.00	85.91	Ave	6	187	H	-6.08	79.83	/	/
2483.50	59.04	PK	39	189	V	-6.01	53.03	74.00	20.97
2483.50	45.28	Ave	39	189	V	-6.01	39.27	54.00	14.73
1294.59	45.18	PK	186	179	V	-10.69	34.49	74.00	39.51
1294.59	31.96	Ave	186	179	V	-10.69	21.27	54.00	32.73
4904.00	42.49	PK	248	175	V	1.84	44.33	74.00	29.67
4904.00	29.86	Ave	248	175	V	1.84	31.70	54.00	22.30
6679.74	42.67	PK	121	195	H	6.42	49.09	74.00	24.91
6679.74	29.79	Ave	121	195	H	6.42	36.21	54.00	17.79
7356.00	38.37	PK	61	140	H	7.70	46.07	74.00	27.93
7356.00	25.32	Ave	61	140	H	7.70	33.02	54.00	20.98

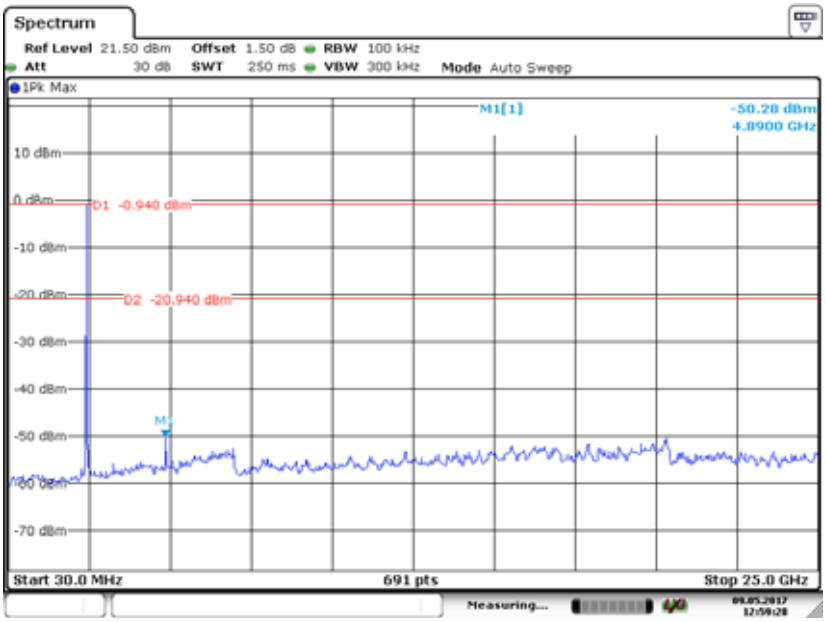
Conducted Spurious Emissions at Antenna Port

Chain0: 802.11b Low Channel



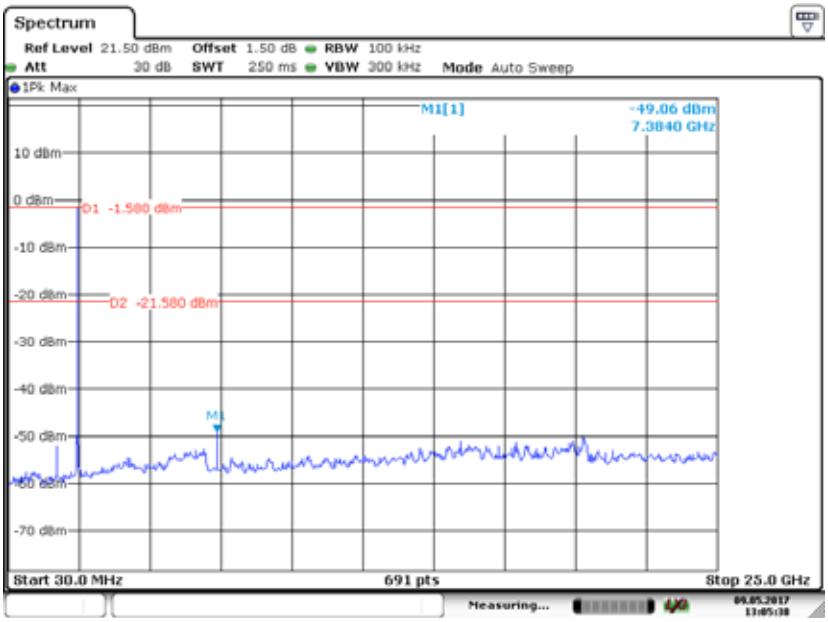
Date: 9.MAY.2017 12:56:10

Chain0: 802.11b Middle Channel



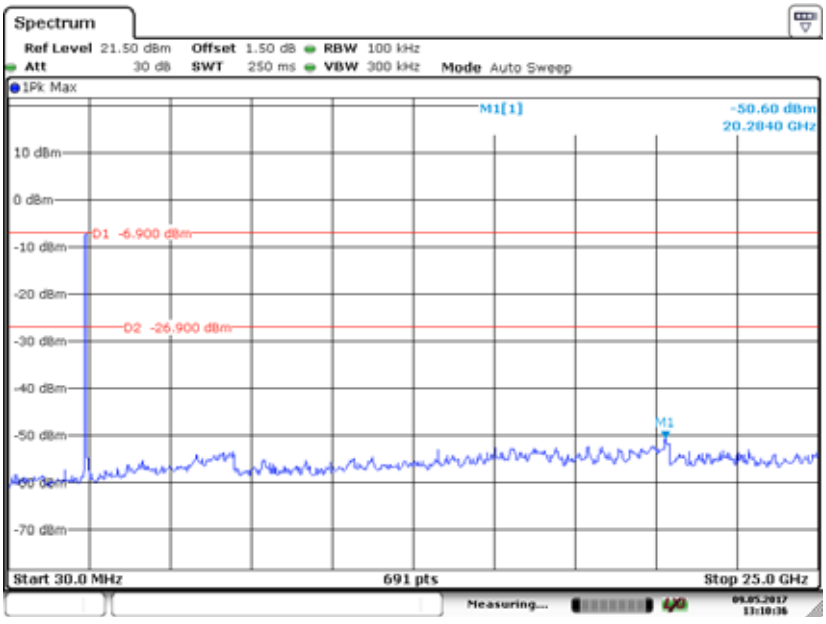
Date: 9.MAY.2017 12:59:29

Chain0: 802.11b High Channel



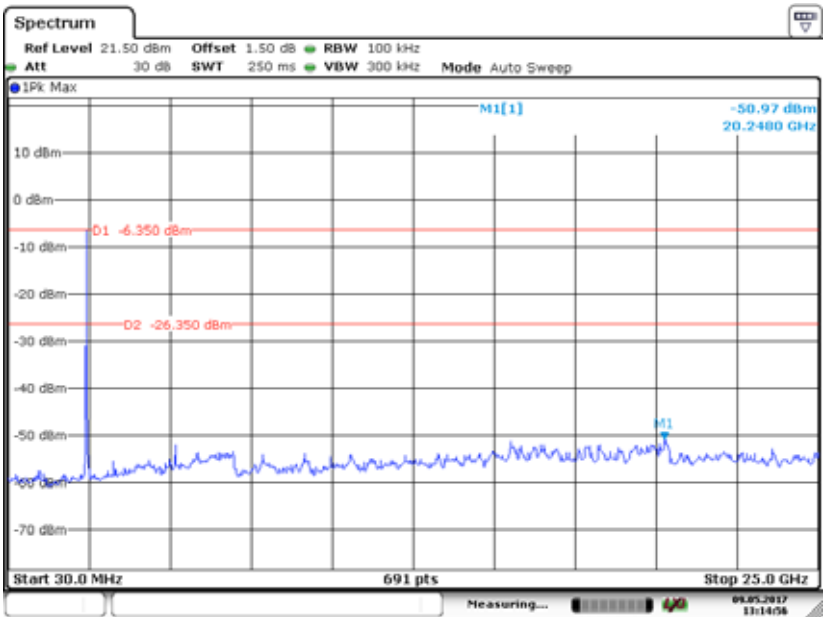
Date: 9.MAY.2017 13:05:39

Chain0: 802.11g Low Channel



Date: 9.MAY.2017 13:10:37

Chain0: 802.11g Middle Channel



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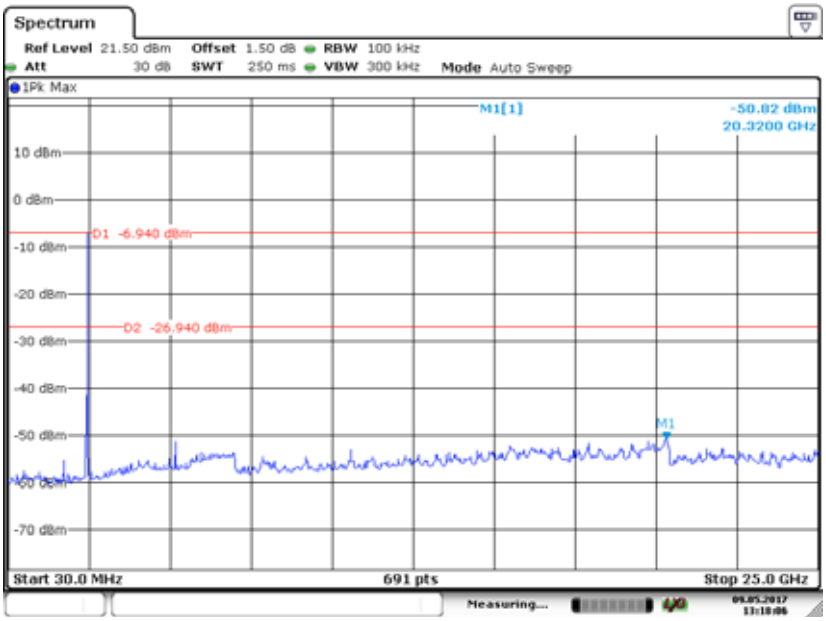
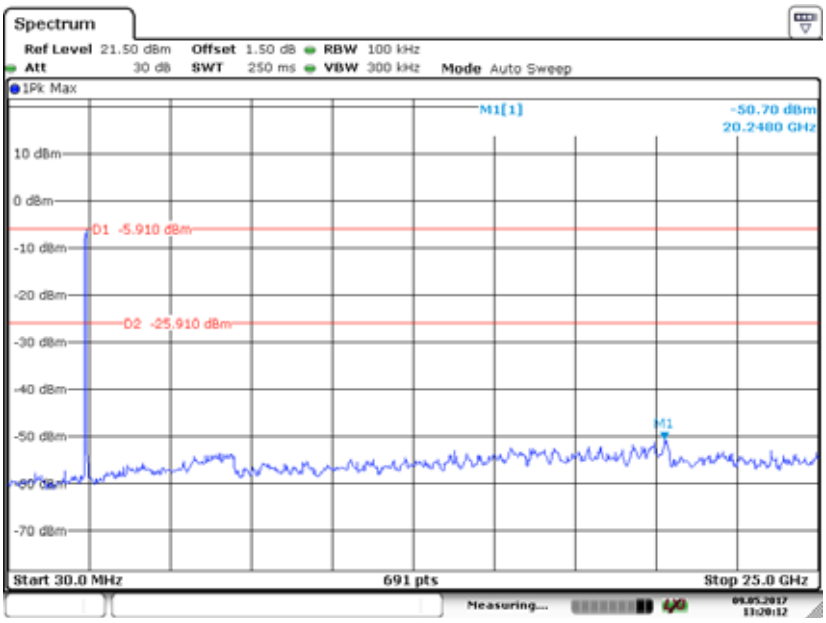
Chain0: 802.11g High Channel



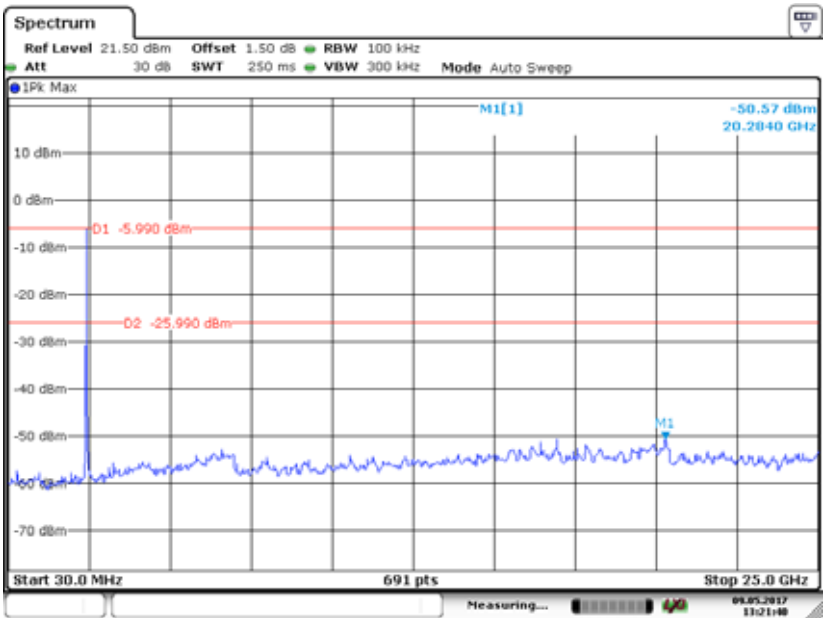
Date: 9.MAY.2017 13:18:07

Chain0: 802.11n-HT20 Low Channel



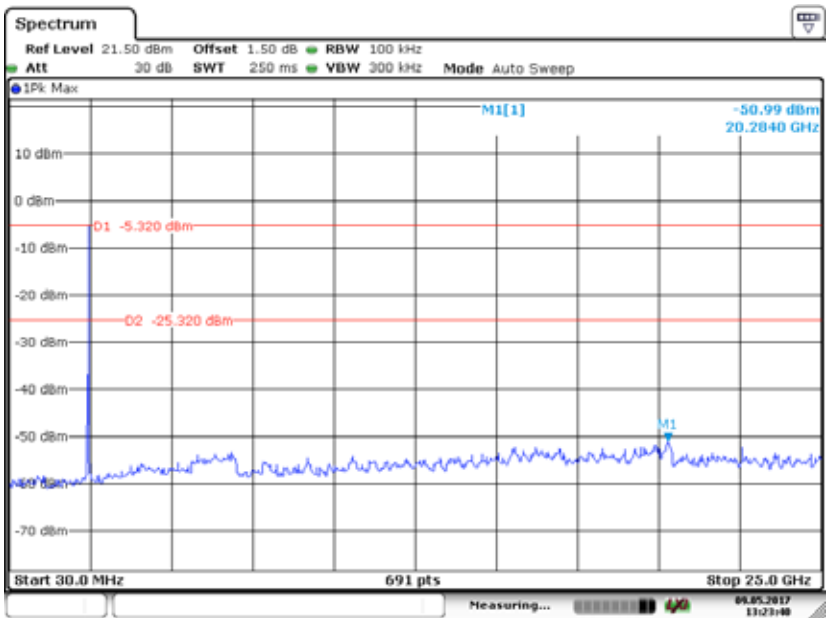
Date: 9.MAY.2017 13:20:13

Chain0: 802.11n-HT20 Middle Channel



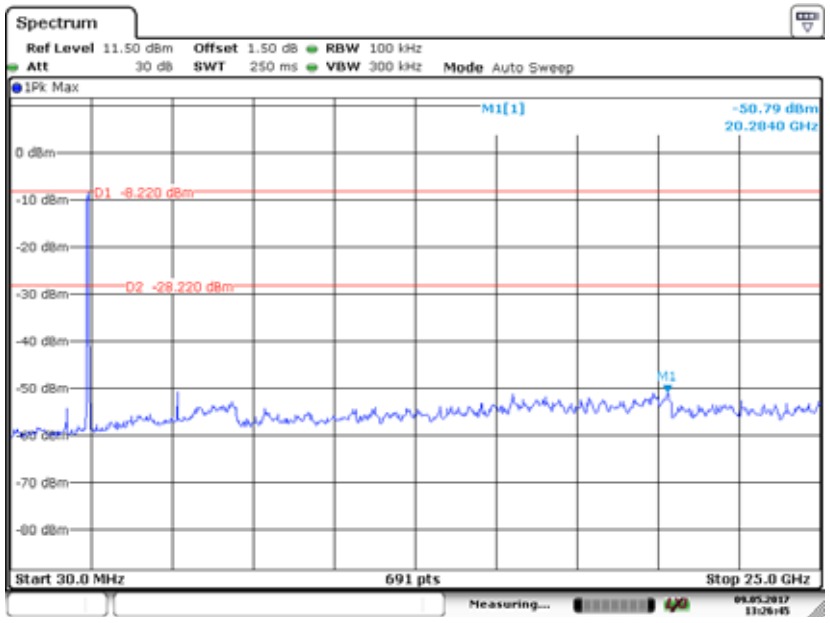
Date: 9.MAY.2017 13:21:41

Chain0: 802.11n-HT20 High Channel



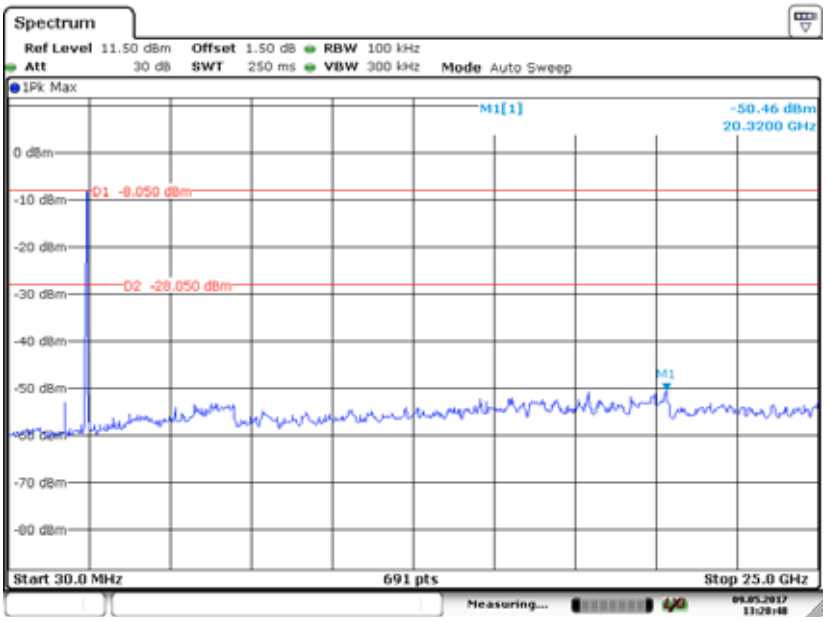
Date: 9.MAY.2017 13:23:40

Chain0: 802.11n-HT40 Low Channel



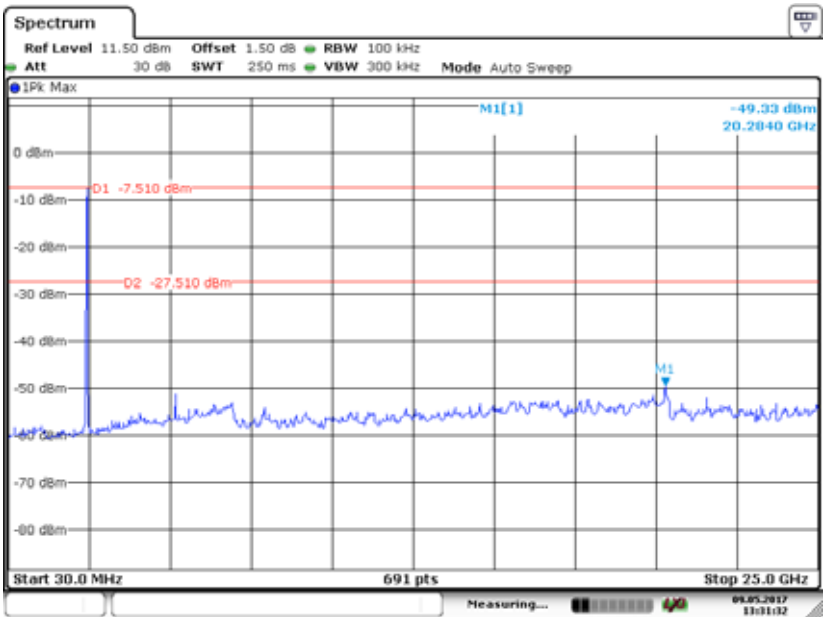
Date: 9.MAY.2017 13:26:45

Chain0: 802.11n-HT40 Middle Channel



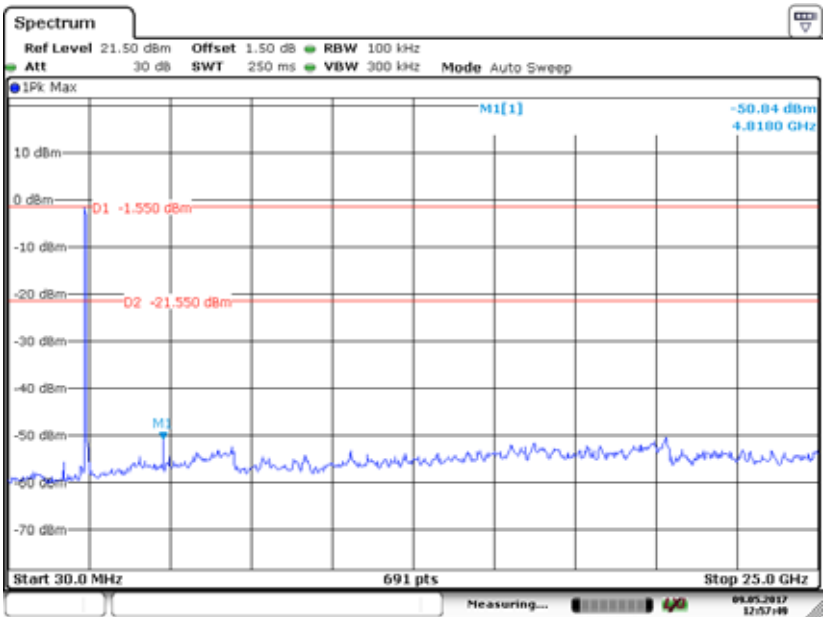
Date: 9.MAY.2017 13:28:48

Chain0: 802.11n-HT40 High Channel



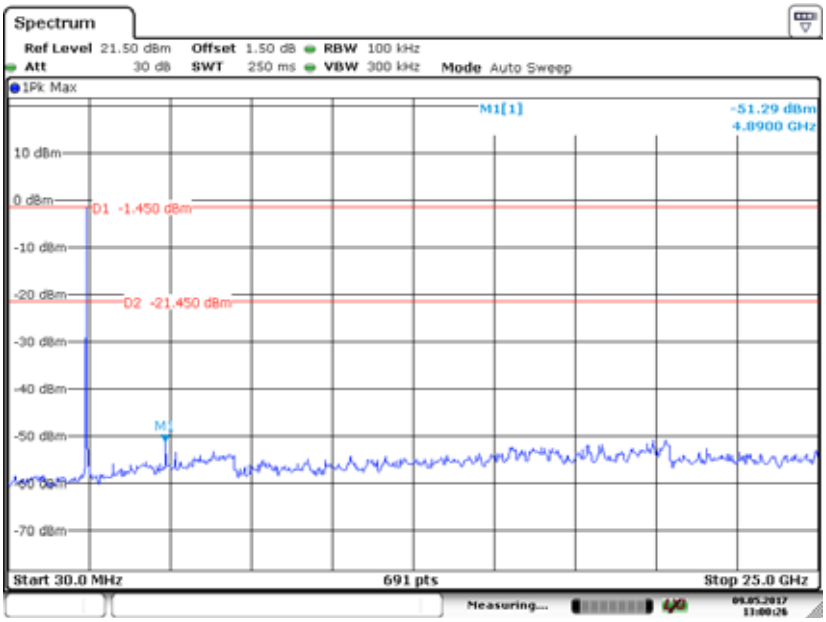
Date: 9.MAY.2017 13:31:32

Chain1: 802.11b Low Channel



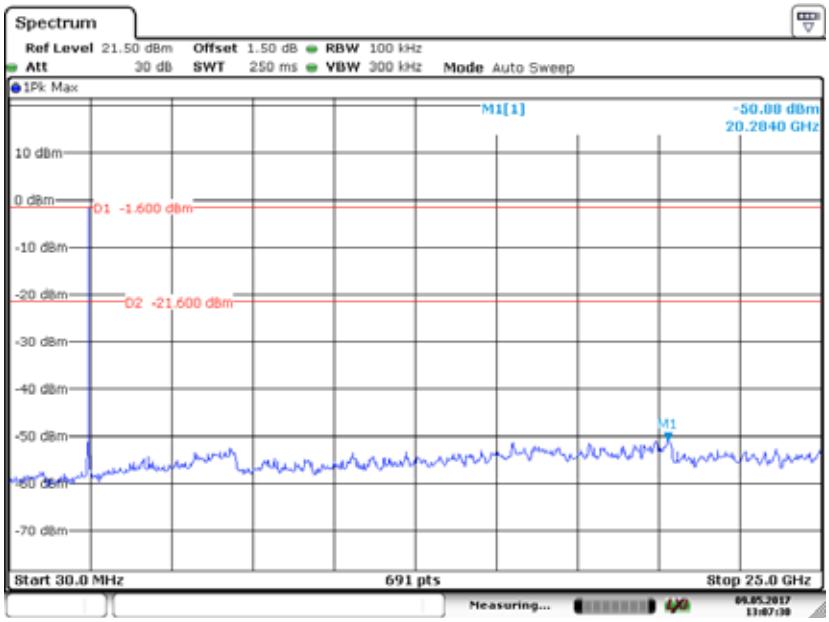
Date: 9.MAY.2017 12:57:49

Chain1: 802.11b Middle Channel



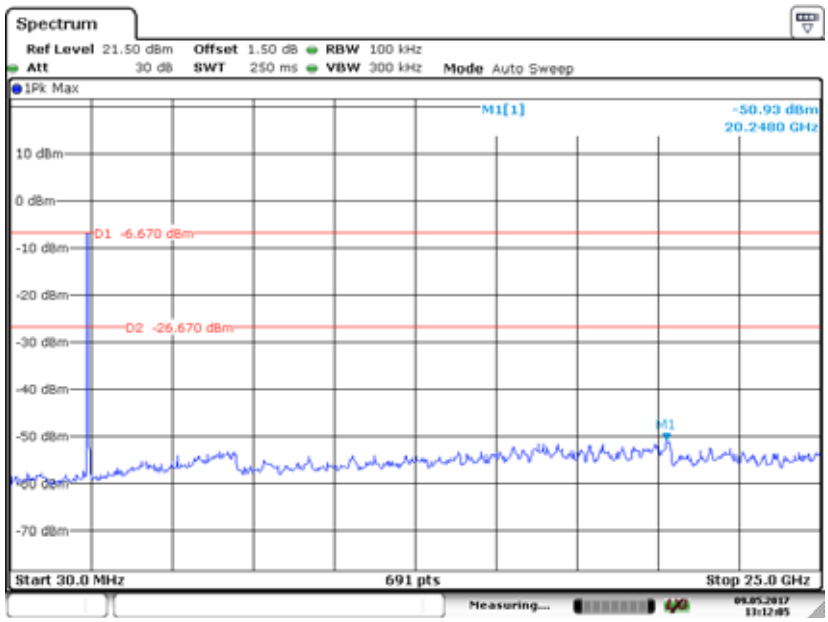
Date: 9.MAY.2017 13:00:26

Chain1: 802.11b High Channel



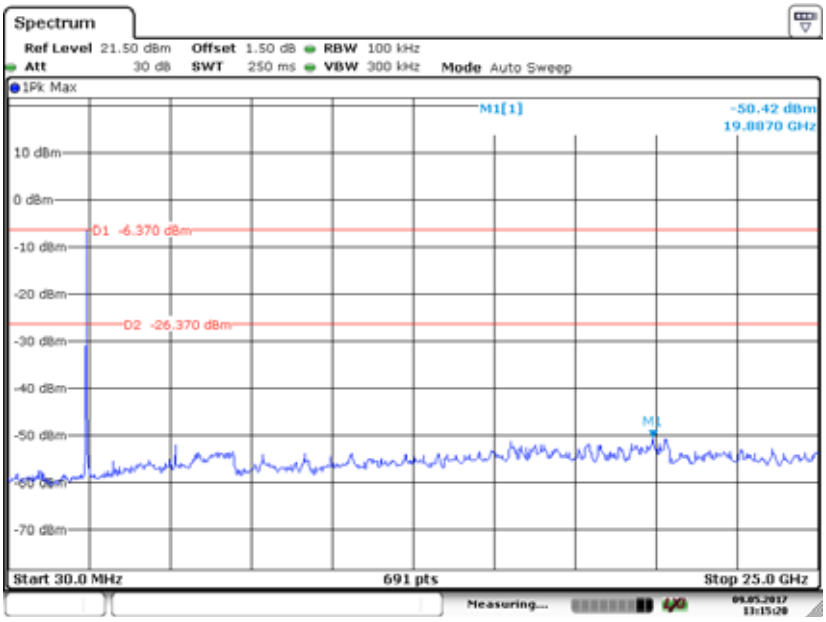
Date: 9.MAY.2017 13:07:30

Chain1: 802.11g Low Channel



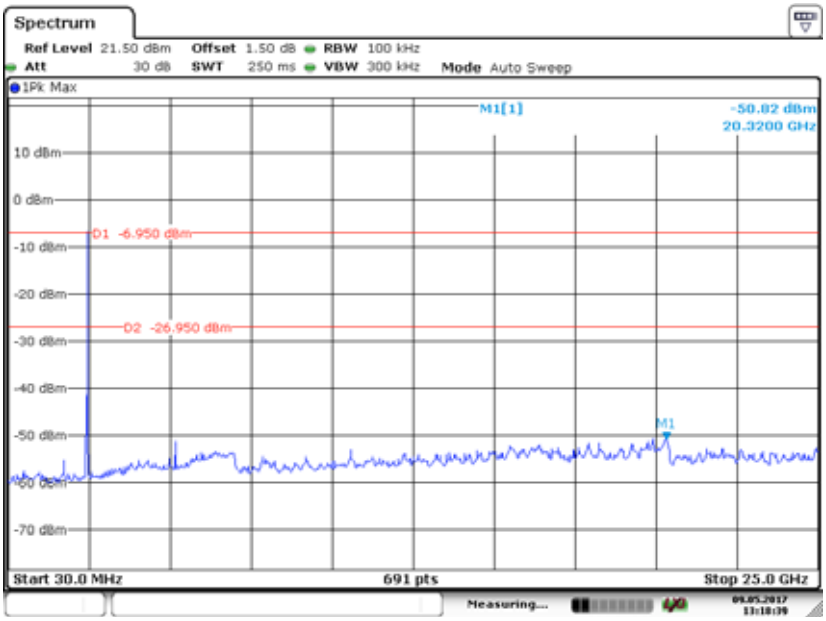
Date: 9.MAY.2017 13:12:05

Chain1: 802.11g Middle Channel



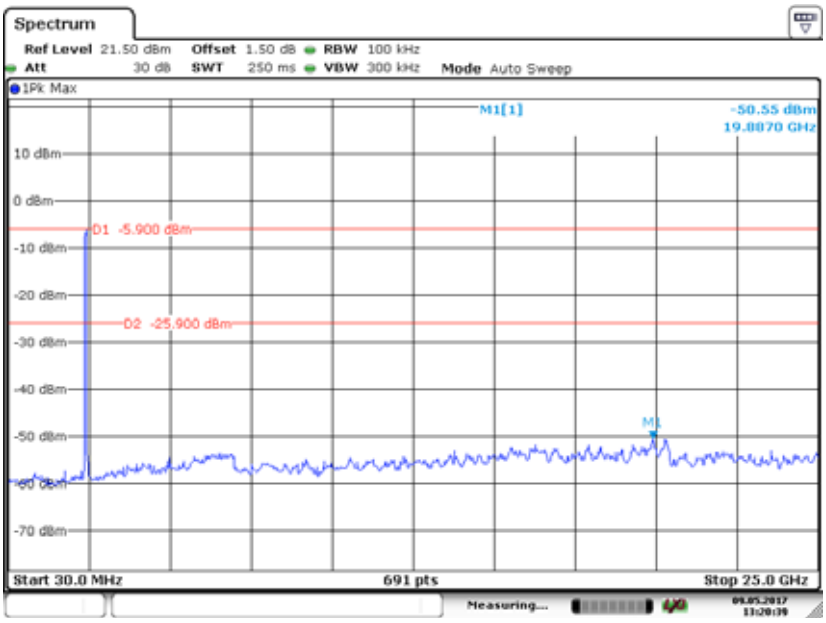
Date: 9.MAY.2017 13:15:21

Chain1: 802.11g High Channel



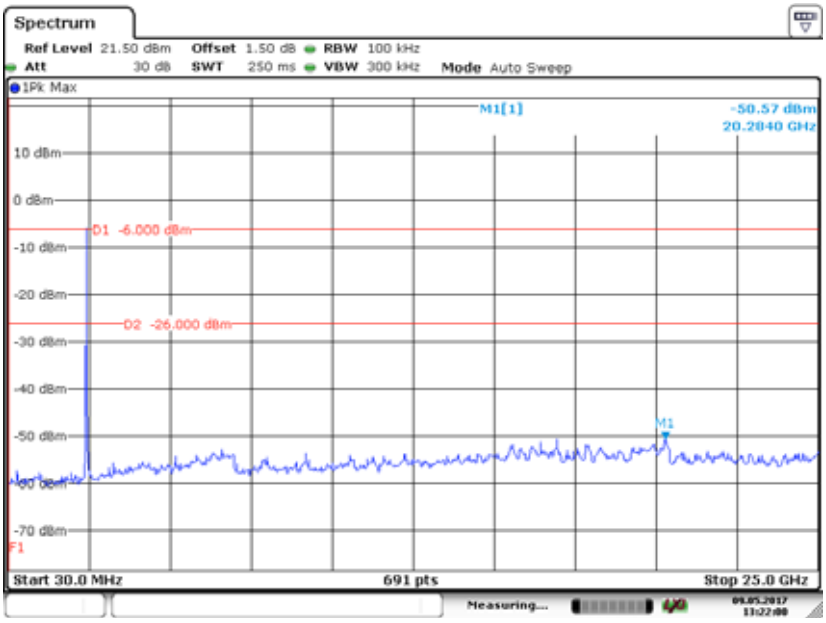
Date: 9.MAY.2017 13:18:39

Chain1: 802.11n-HT20 Low Channel



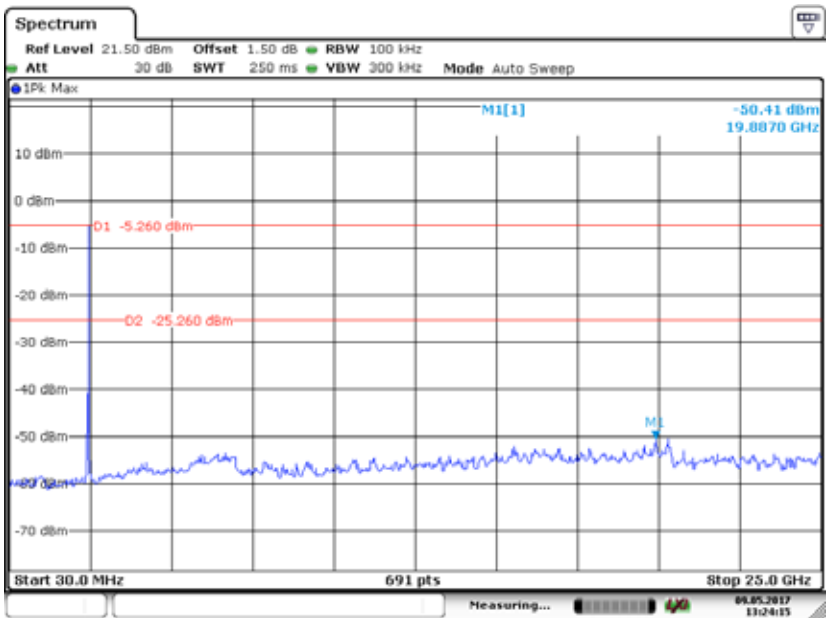
Date: 9.MAY.2017 13:20:39

Chain1: 802.11n-HT20 Middle Channel



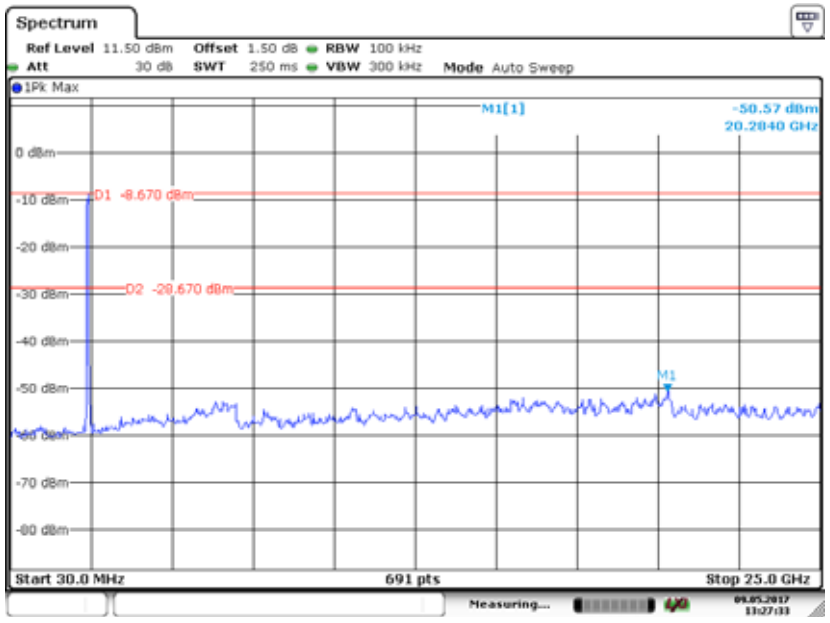
Date: 9.MAY.2017 13:22:00

Chain1: 802.11n-HT20 High Channel



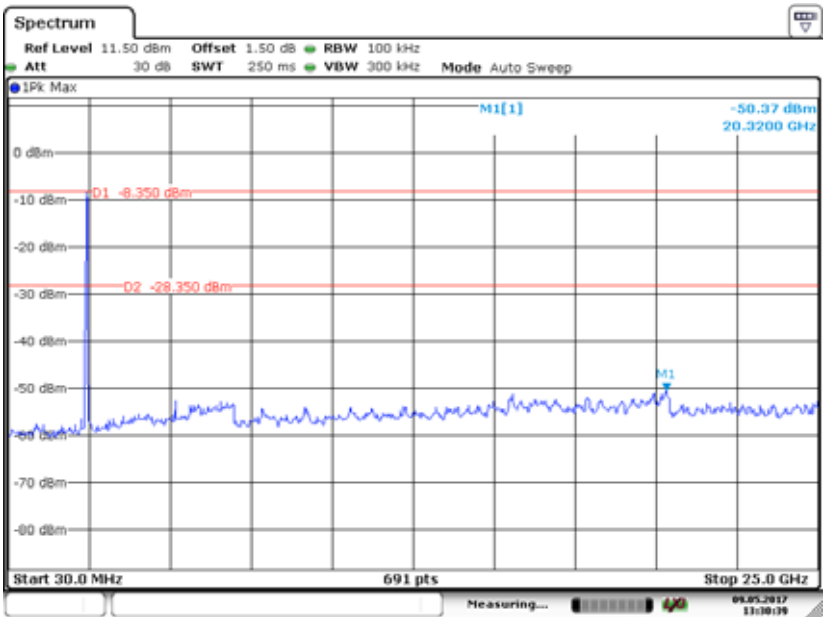
Date: 9.MAY.2017 13:24:14

Chain1: 802.11n-HT40 Low Channel



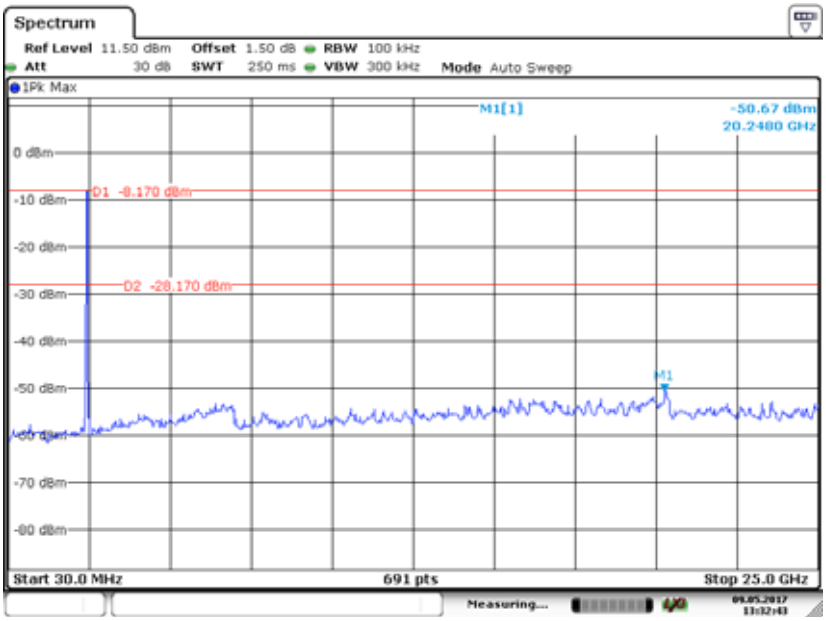
Date: 9.MAY.2017 13:27:33

Chain1: 802.11n-HT40 Middle Channel



Date: 9.MAY.2017 13:30:39

Chain1: 802.11n-HT40 High Channel



Date: 9.MAY.2017 13:32:43

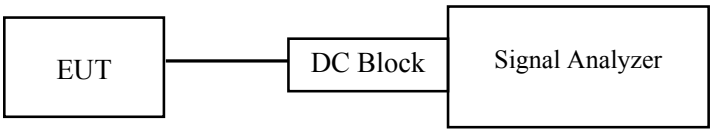
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

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 Data

Environmental Conditions

Temperature:	24.8 ℃
Relative Humidity:	51 %
ATM Pressure:	101.1 kPa

The testing was performed by Chris Wang on 2017-04-29.

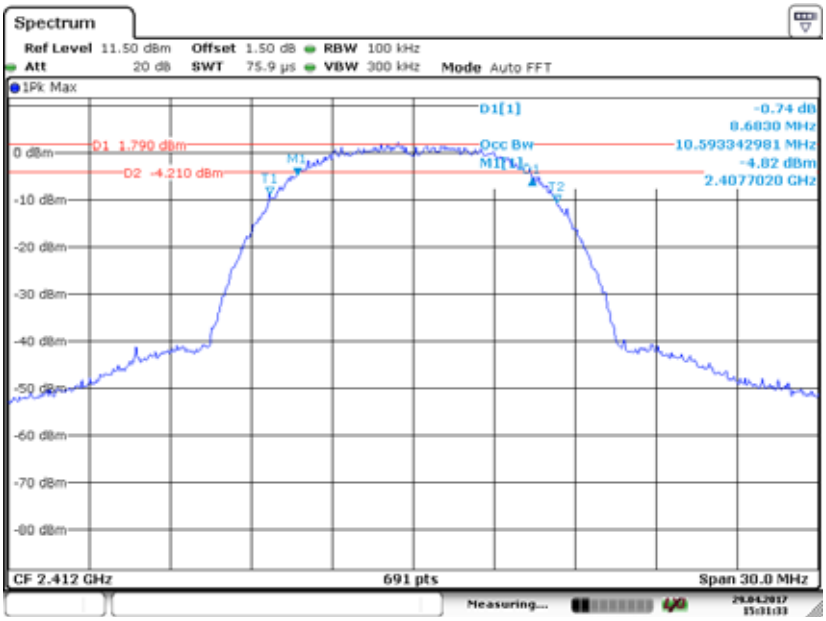
Test Result: Pass.

Please refer to the following tables and plots.

EUT operation mode: Transmitting

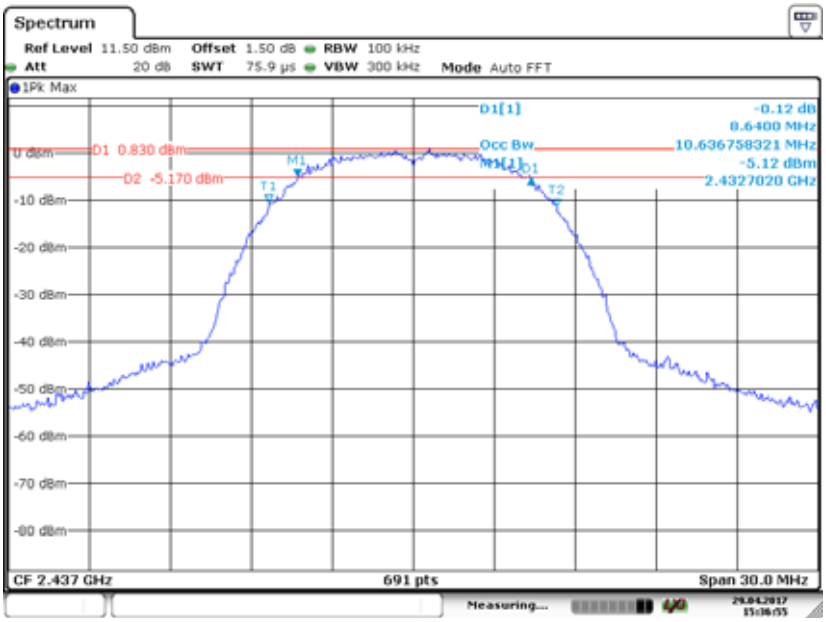
Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)		Limit (kHz)
		Chain0	Chain1	
802.11b mode				
Low	2412	8.68	8.55	≥500
Middle	2437	8.64	8.38	≥500
High	2462	8.38	8.38	≥500
802.11g mode				
Low	2412	16.54	16.54	≥500
Middle	2437	16.54	16.54	≥500
High	2462	16.54	16.54	≥500
802.11n-HT20 mode				
Low	2412	17.76	17.76	≥500
Middle	2437	17.76	17.76	≥500
High	2462	17.76	17.76	≥500
802.11n-HT40 mode				
Low	2422	36.38	36.38	≥500
Middle	2437	36.40	36.40	≥500
High	2452	36.47	36.47	≥500

Chain0: 802.11b Low Channel



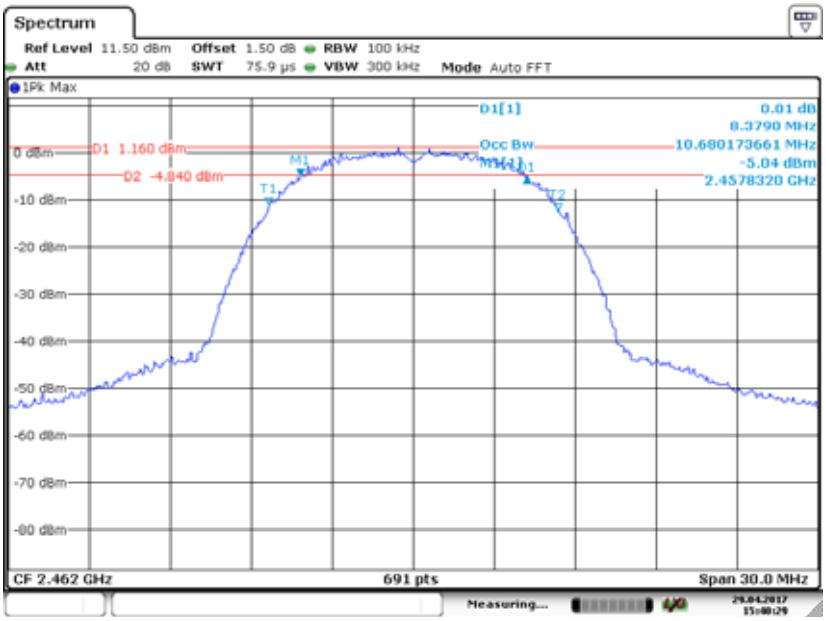
Date: 29.APR.2017 15:31:33

Chain0: 802.11b Middle Channel



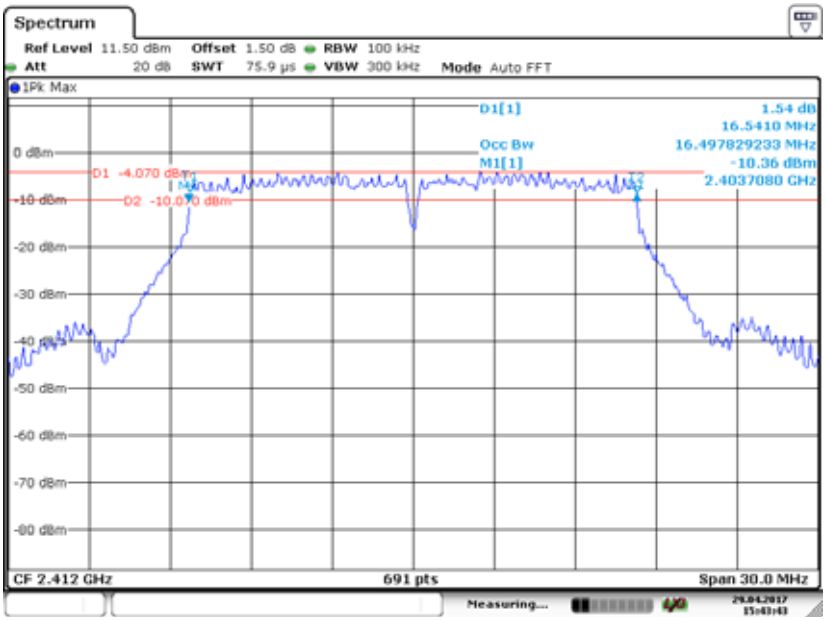
Date: 29.APR.2017 15:36:55

Chain0: 802.11b High Channel



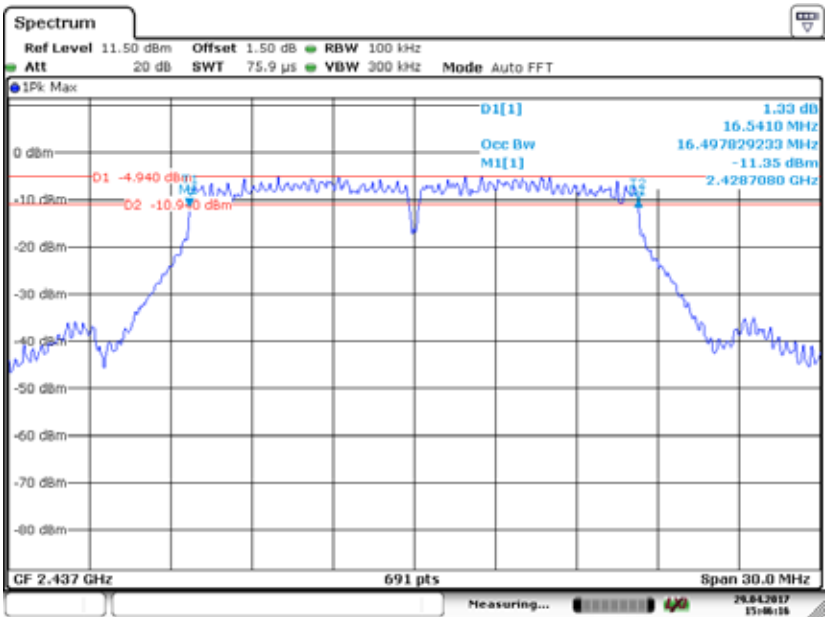
Date: 29.APR.2017 15:40:30

Chain0: 802.11g Low Channel



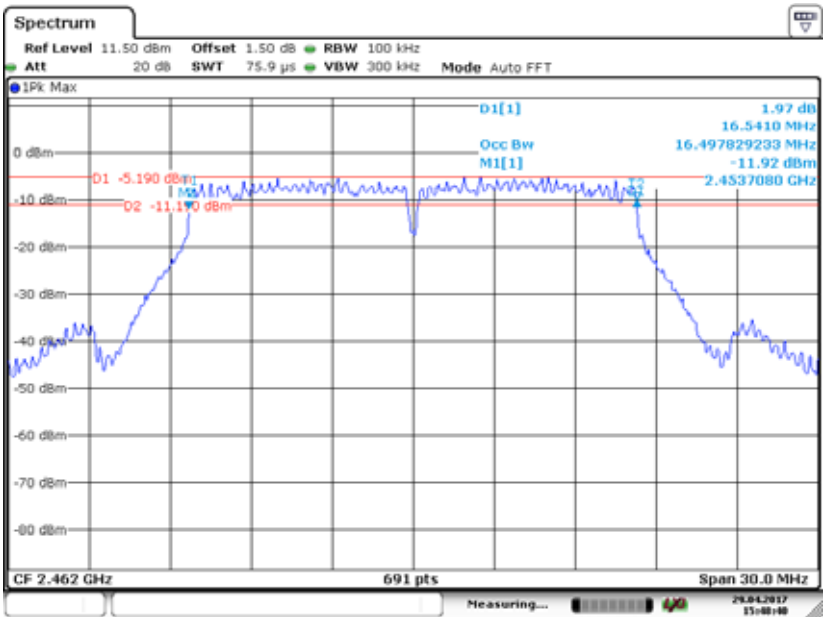
Date: 29.APR.2017 15:43:43

Chain0: 802.11g Middle Channel



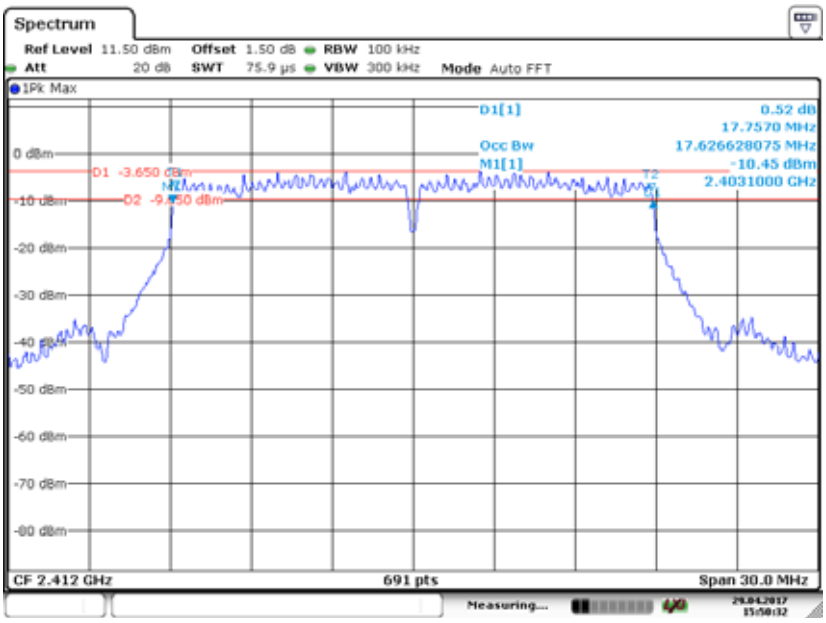
Date: 29.APR.2017 15:46:16

Chain0: 802.11g High Channel



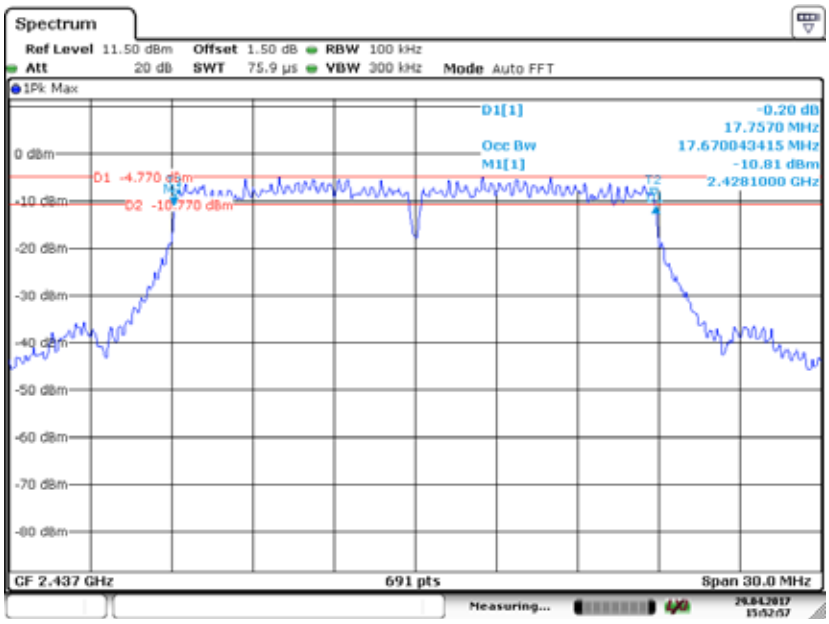
Date: 29.APR.2017 15:48:41

Chain0: 802.11n-HT20 Low Channel



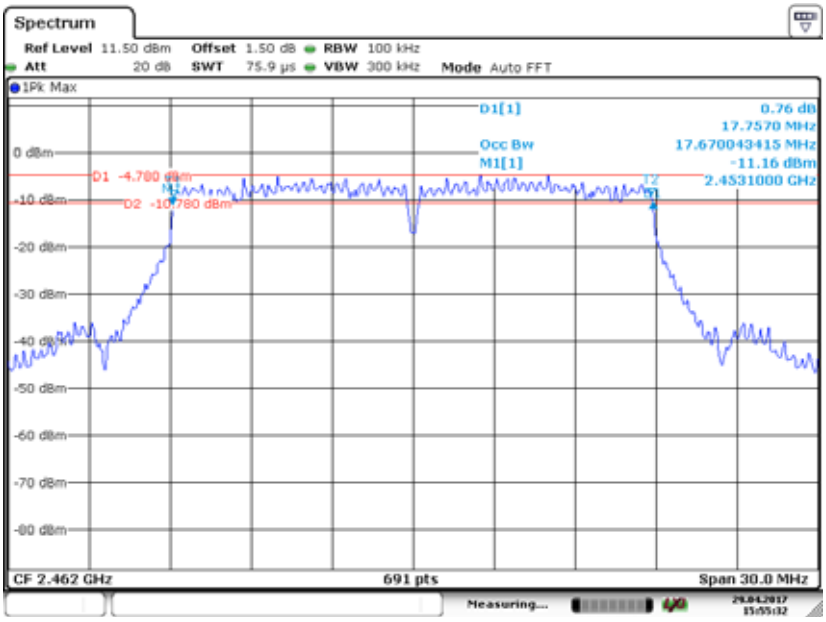
Date: 29.APR.2017 15:50:32

Chain0: 802.11n-HT20 Middle Channel



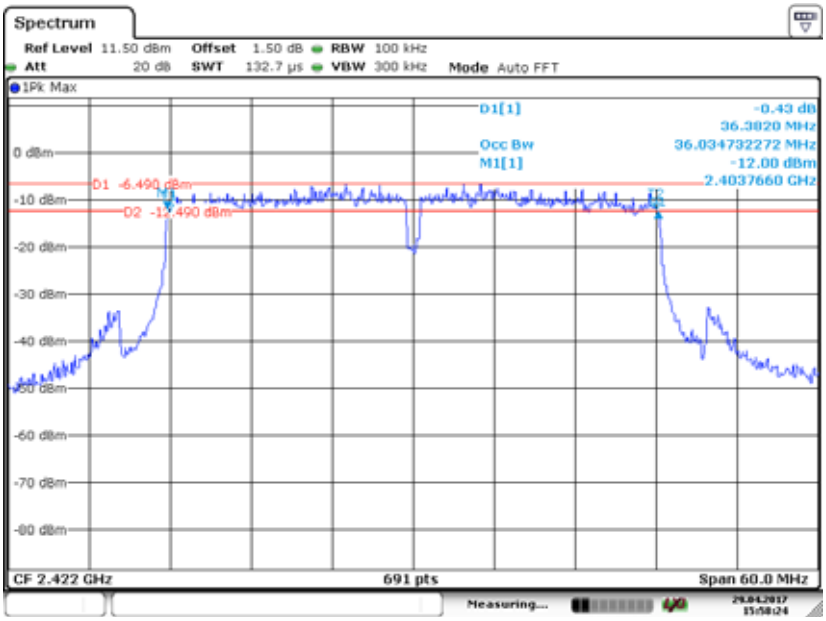
Date: 29.APR.2017 15:52:57

Chain0: 802.11n-HT20 High Channel



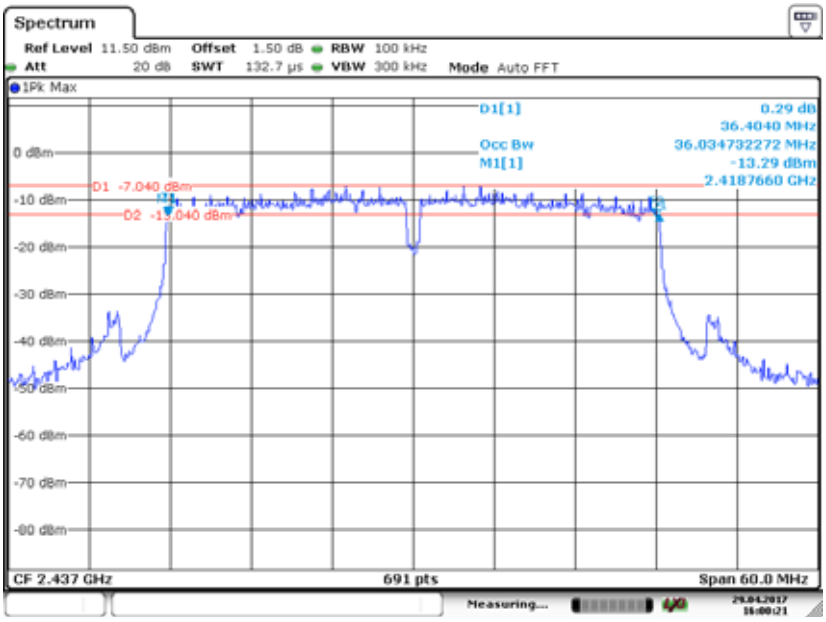
Date: 29.APR.2017 15:55:32

Chain0: 802.11n-HT40 Low Channel



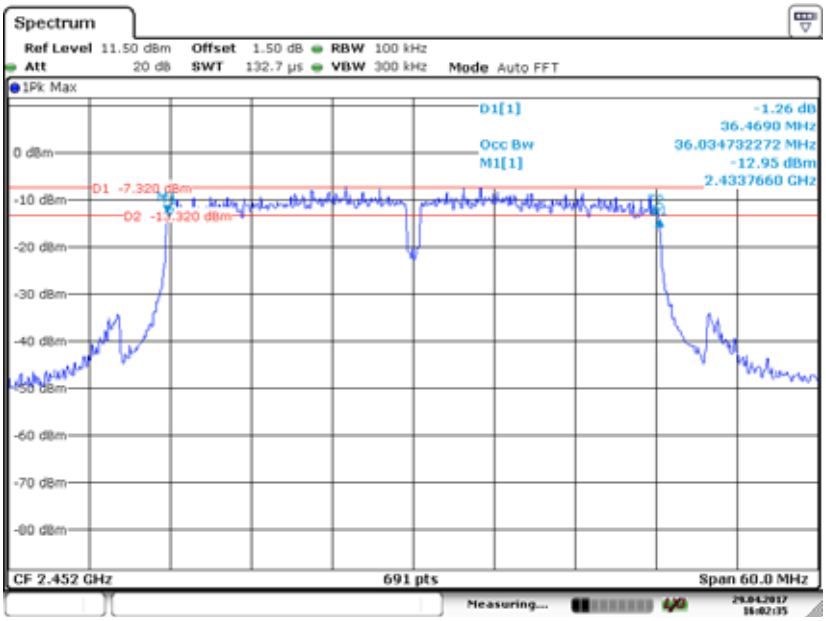
Date: 29.APR.2017 15:58:25

Chain0: 802.11n-HT40 Middle Channel



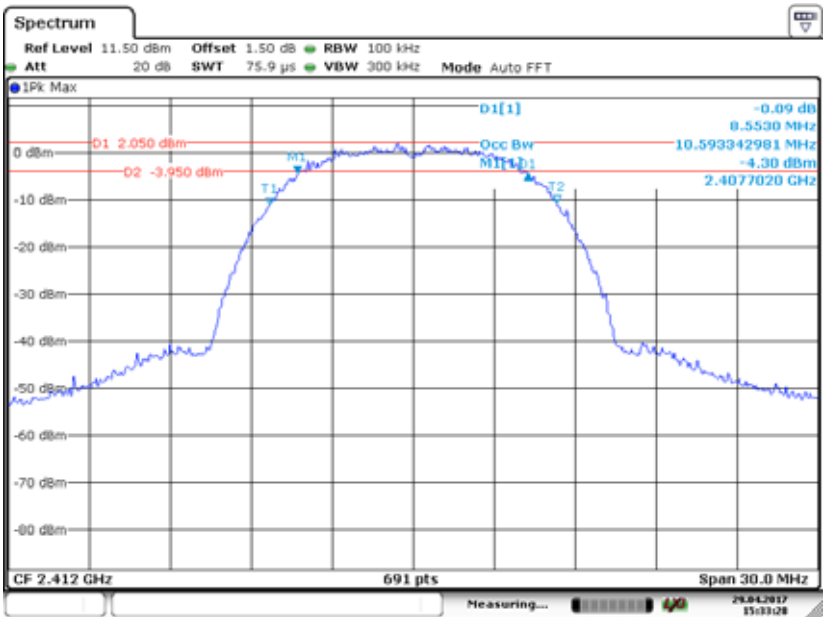
Date: 29.APR.2017 16:00:21

Chain0: 802.11n-HT40 High Channel



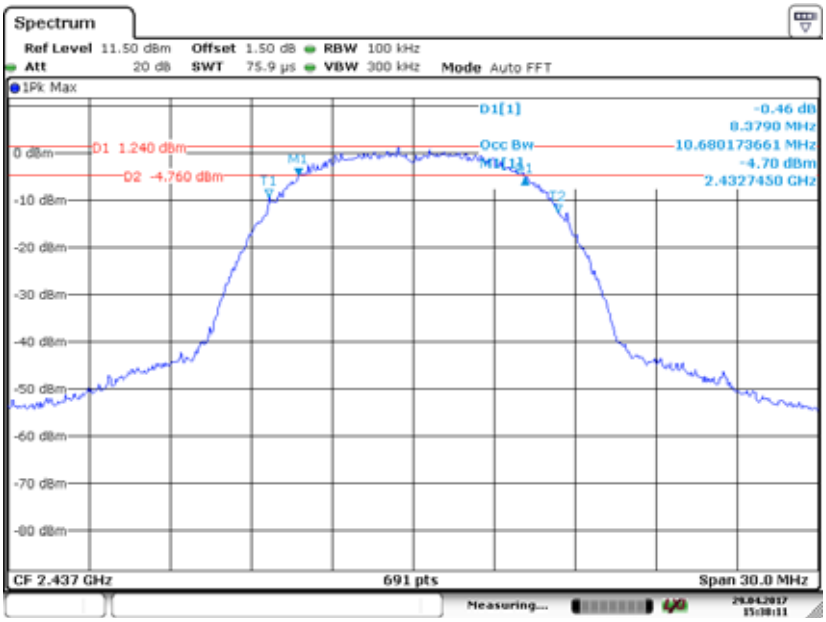
Date: 29.APR.2017 16:02:35

Chain1: 802.11b Low Channel



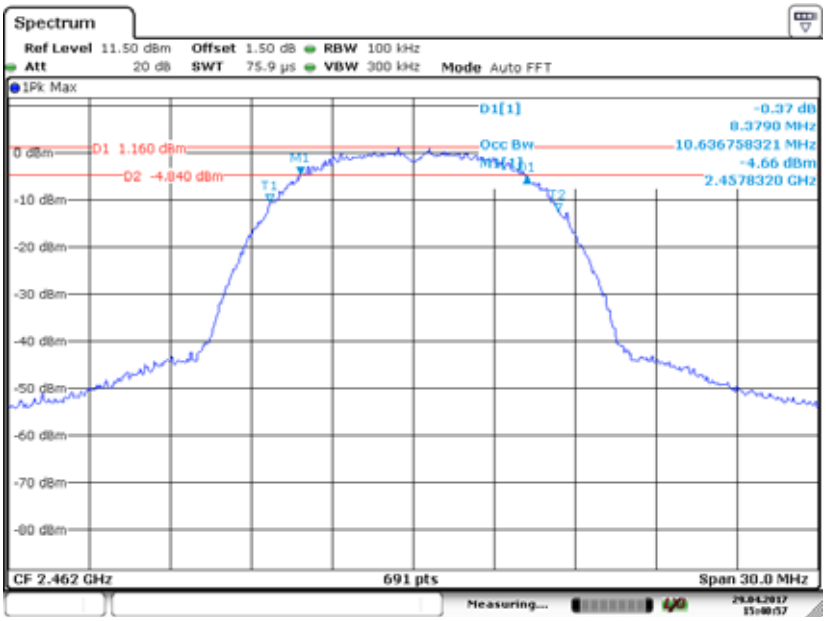
Date: 29.APR.2017 15:33:29

Chain1: 802.11b Middle Channel



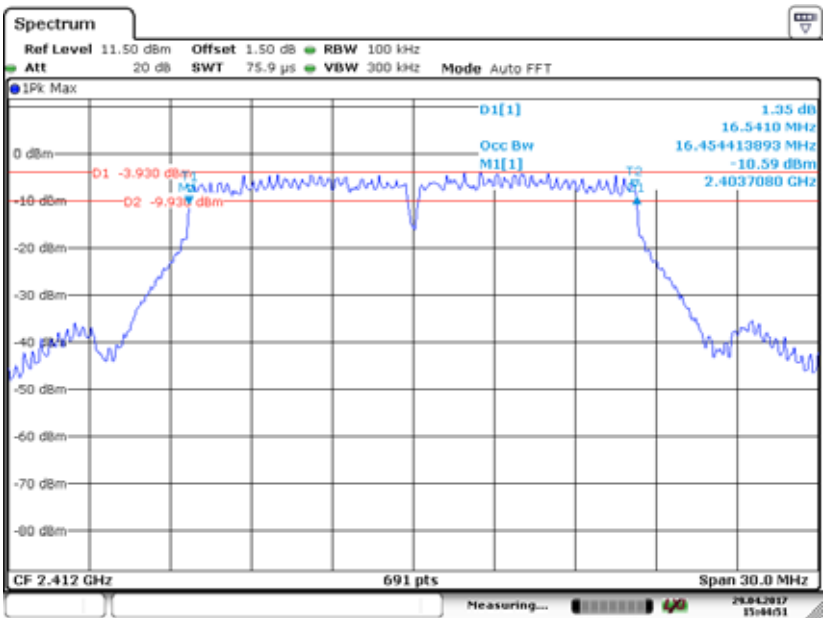
Date: 29.APR.2017 15:38:11

Chain1: 802.11b High Channel



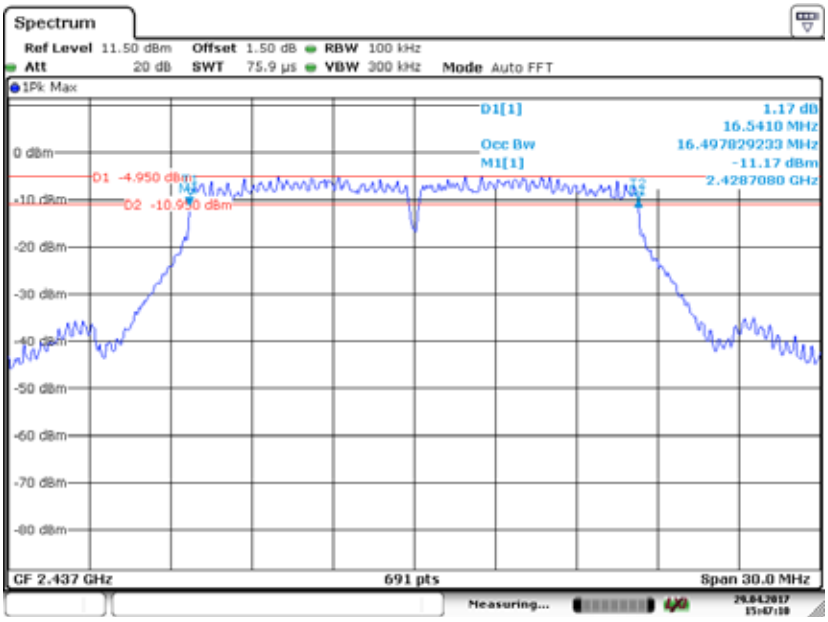
Date: 29.APR.2017 15:40:57

Chain1: 802.11g Low Channel



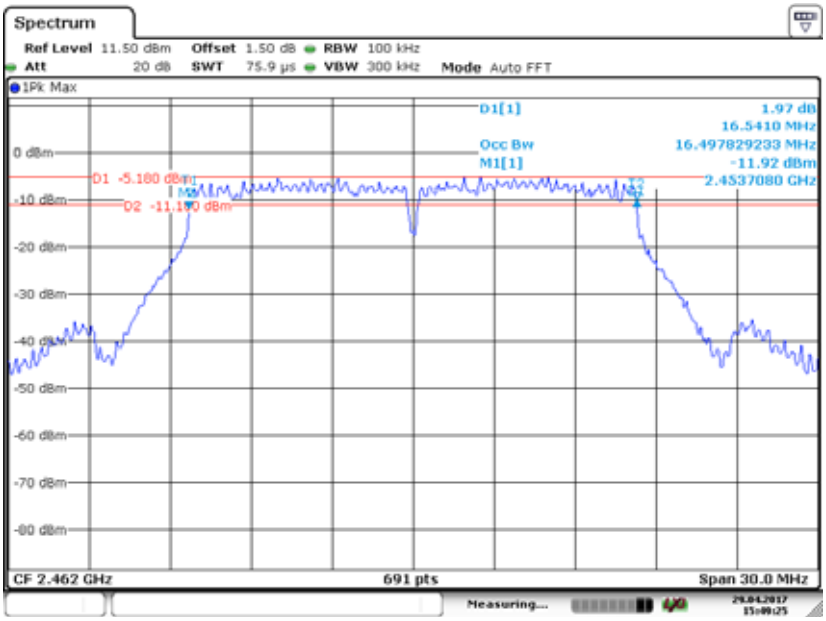
Date: 29.APR.2017 15:44:51

Chain1: 802.11g Middle Channel



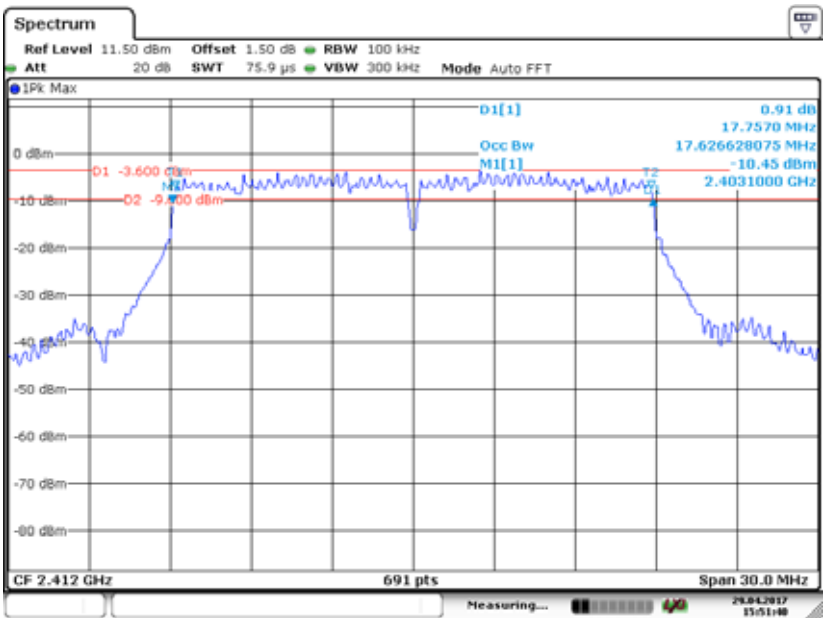
Date: 29 APR 2017 15:47:10

Chain1: 802.11g High Channel



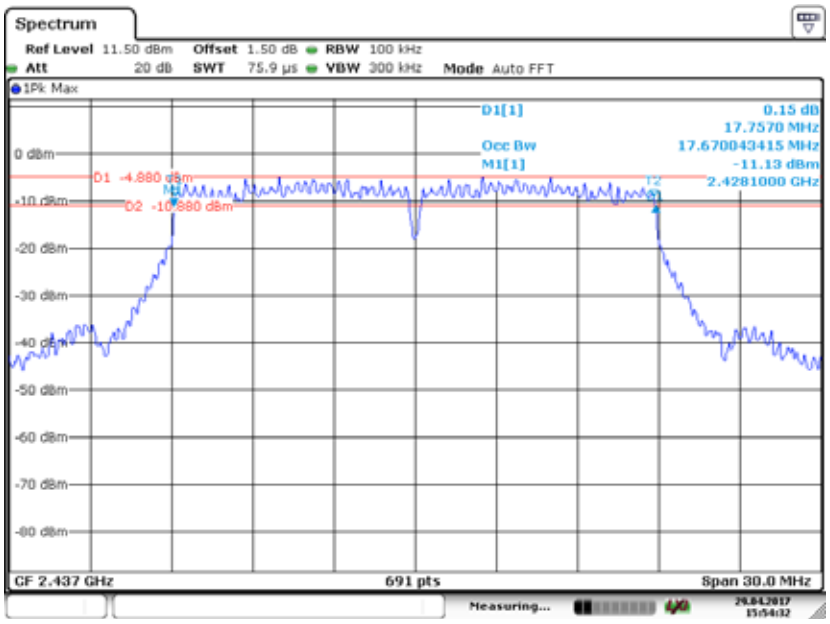
Date: 29 APR 2017 15:49:25

Chain1: 802.11n-HT20 Low Channel



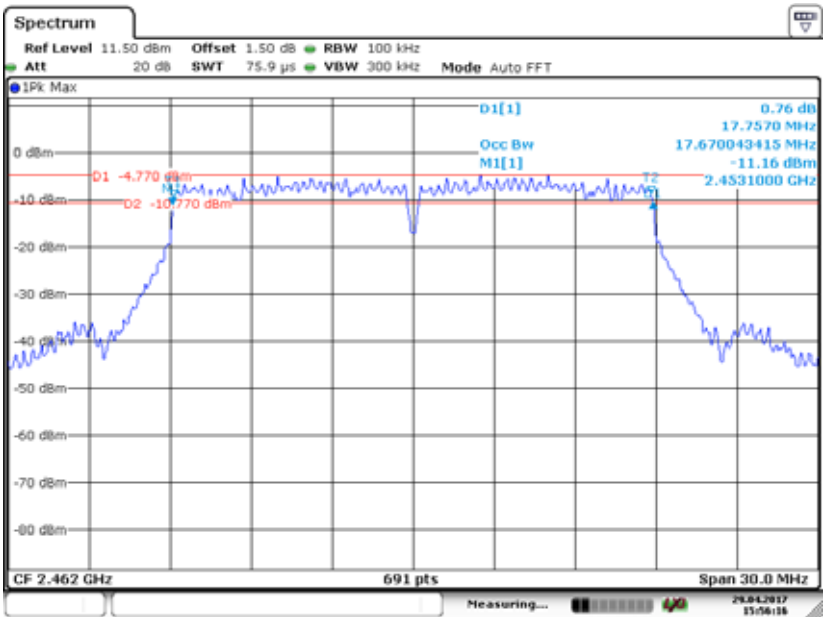
Date: 29.APR.2017 15:51:41

Chain1: 802.11n-HT20 Middle Channel



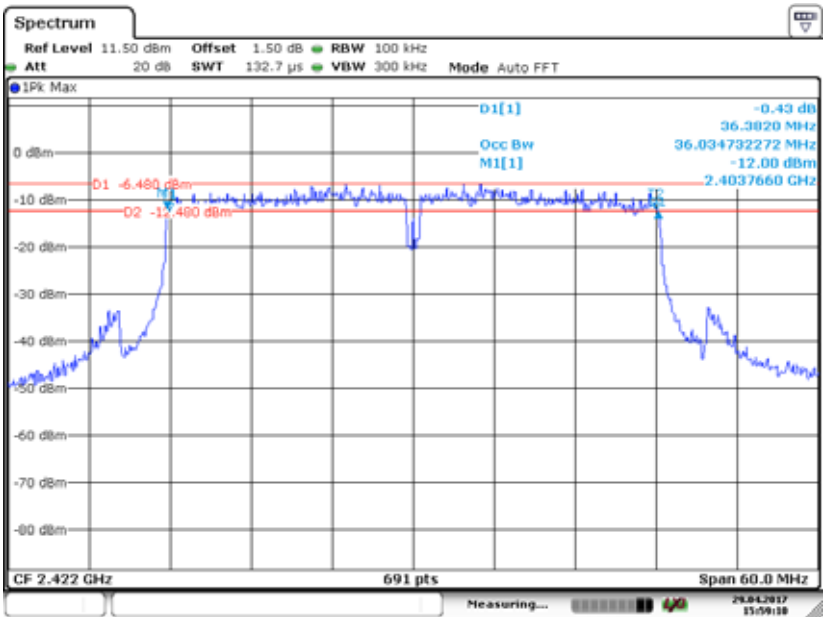
Date: 29.APR.2017 15:54:32

Chain1: 802.11n-HT20 High Channel



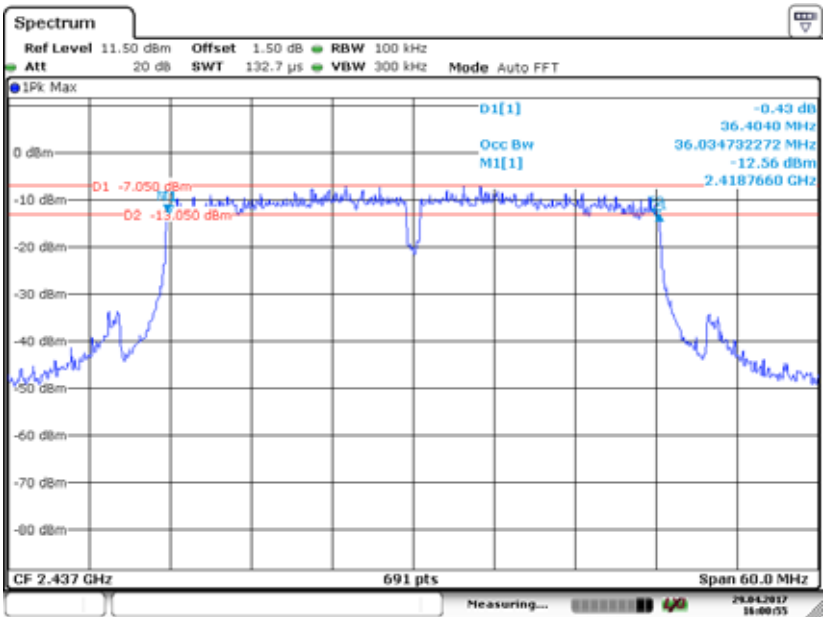
Date: 29.APR.2017 15:56:17

Chain1: 802.11n-HT40 Low Channel



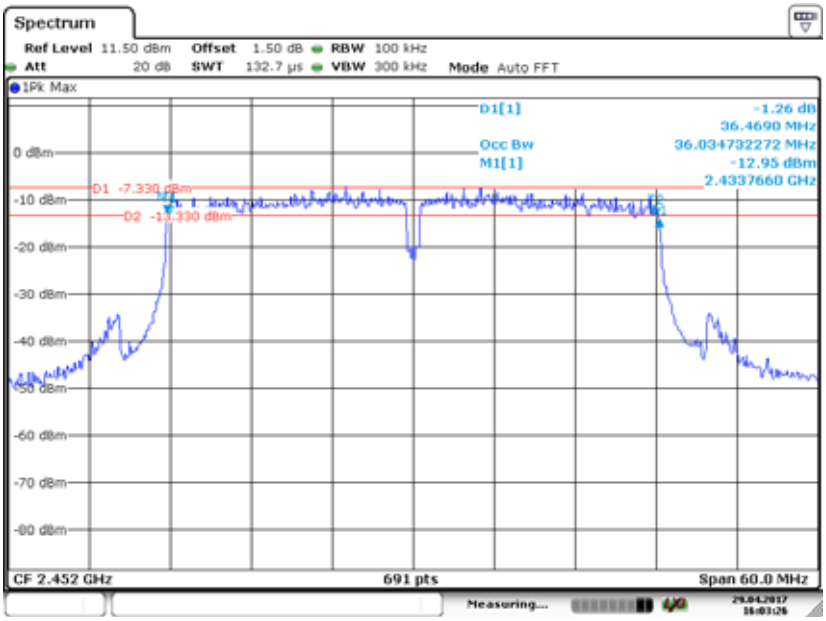
Date: 29.APR.2017 15:59:10

Chain1: 802.11n-HT40 Middle Channel



Date: 29.APR.2017 16:00:55

Chain1: 802.11n-HT40 High Channel



Date: 29.APR.2017 16:03:26

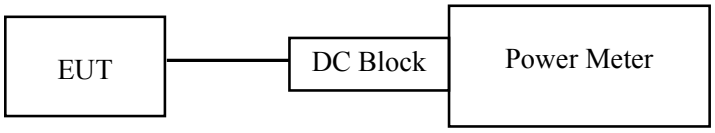
FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

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 Data

Environmental Conditions

Temperature:	24.5 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2017-03-15&2017-03-16.

EUT operation mode: Transmitting

Test mode	Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)			Limit (dBm)	Result
			Chain0	Chain1	Total		
802.11b	Low	2412	17.07	17.19	/	30	Pass
	Middle	2437	16.17	16.20	/	30	Pass
	High	2462	17.35	17.27	/	30	Pass
802.11g	Low	2412	17.23	17.37	/	30	Pass
	Middle	2437	16.32	16.22	/	30	Pass
	High	2462	16.19	16.10	/	30	Pass
802.11n-HT20	Low	2412	17.28	17.29	20.30	30	Pass
	Middle	2437	16.13	16.10	19.13	30	Pass
	High	2462	16.11	16.11	19.12	30	Pass
802.11n-HT40	Low	2422	16.81	16.76	19.80	30	Pass
	Middle	2437	16.15	16.24	19.21	30	Pass
	High	2452	15.79	15.81	18.81	30	Pass

Test mode	Channel	Frequency (MHz)	Conducted Average Output Power Reading (dBm)			Limit (dBm)	Result
			Chain0	Chain1	Total		
802.11b	Low	2412	13.52	13.66	/	30	Pass
	Middle	2437	12.65	12.70	/	30	Pass
	High	2462	13.86	13.76	/	30	Pass
802.11g	Low	2412	12.24	12.36	/	30	Pass
	Middle	2437	11.31	11.21	/	30	Pass
	High	2462	11.20	11.11	/	30	Pass
802.11n-HT20	Low	2412	12.29	12.30	15.31	30	Pass
	Middle	2437	11.14	11.10	14.13	30	Pass
	High	2462	11.10	11.12	14.12	30	Pass
802.11n-HT40	Low	2422	10.82	10.76	13.80	30	Pass
	Middle	2437	10.16	10.25	13.22	30	Pass
	High	2452	9.80	9.81	12.82	30	Pass

Note: The total output power=10Log10(10^(Chain 0/10)+10^(Chain 1/10))

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 Data

Environmental Conditions

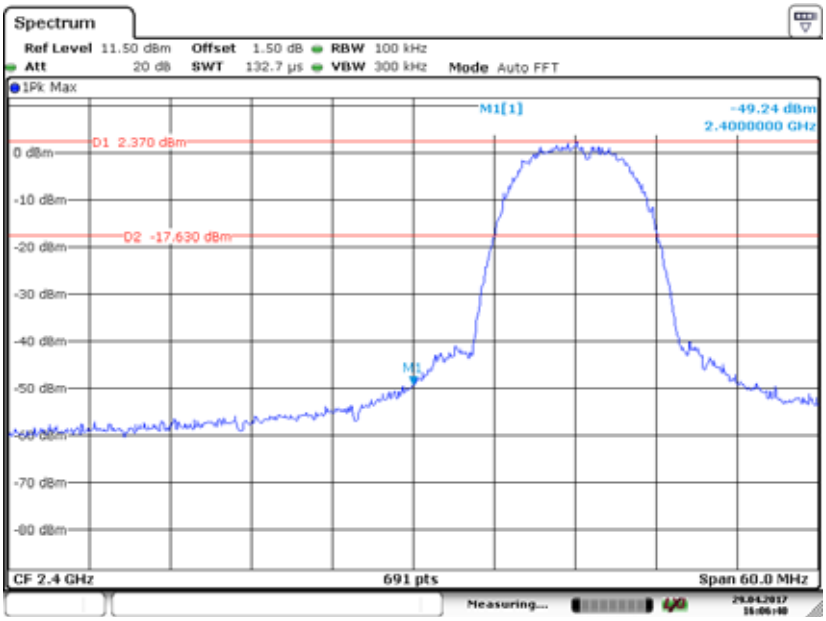
Temperature:	24.5 ℃
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2017-04-29.

Test Result: *Compliance*

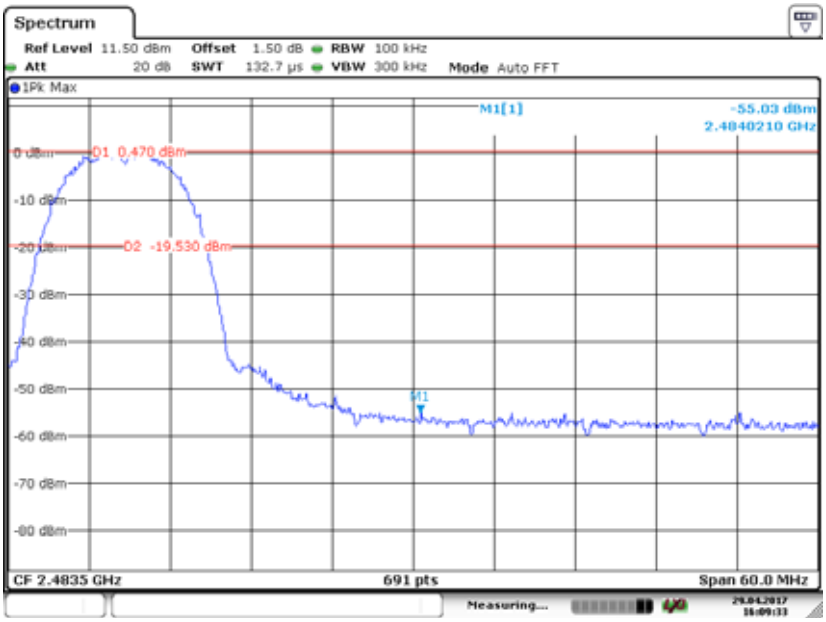
Please refer to the following table and plots.

Chain0: 802.11b Mode Band Edge, Left Side



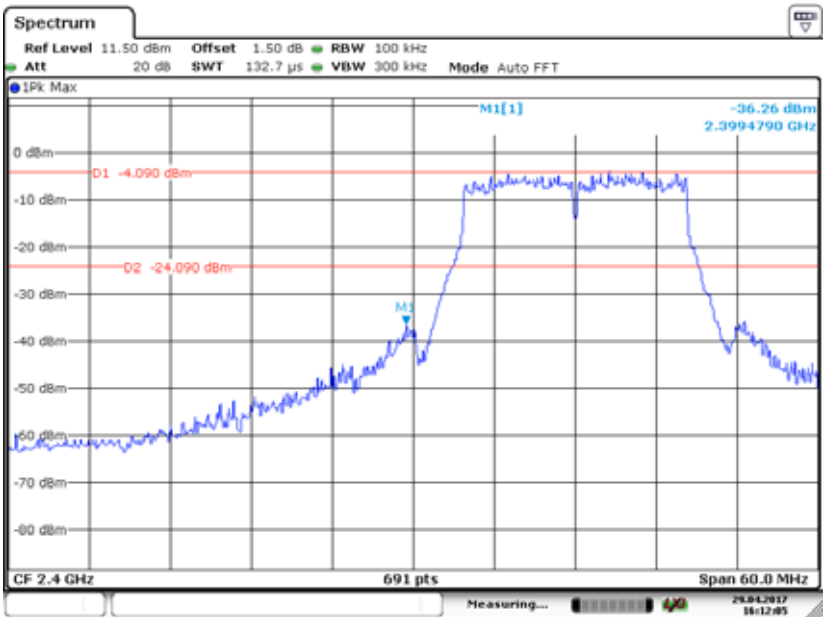
Date: 29.APR.2017 16:06:40

Chain0: 802.11b Mode Band Edge, Right Side



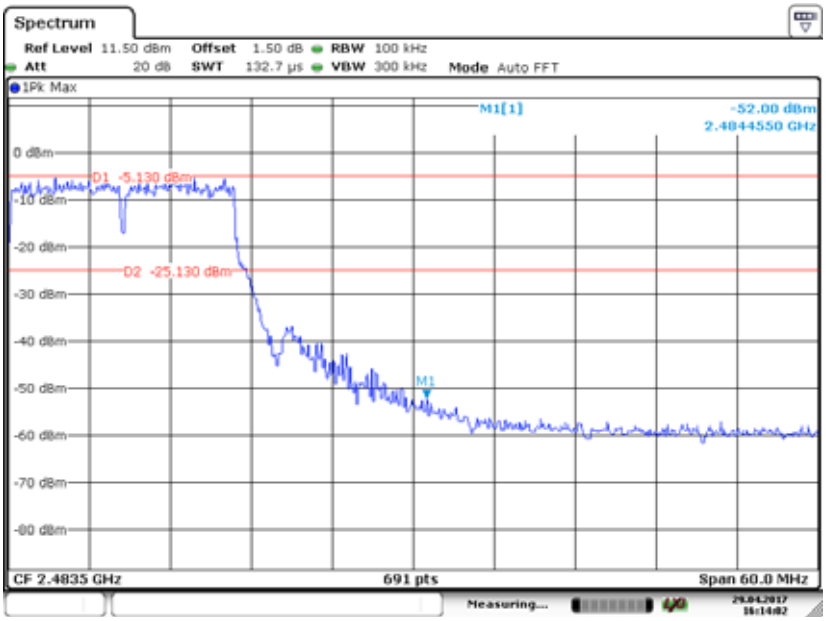
Date: 29.APR.2017 16:09:33

Chain0: 802.11g Mode Band Edge, Left Side



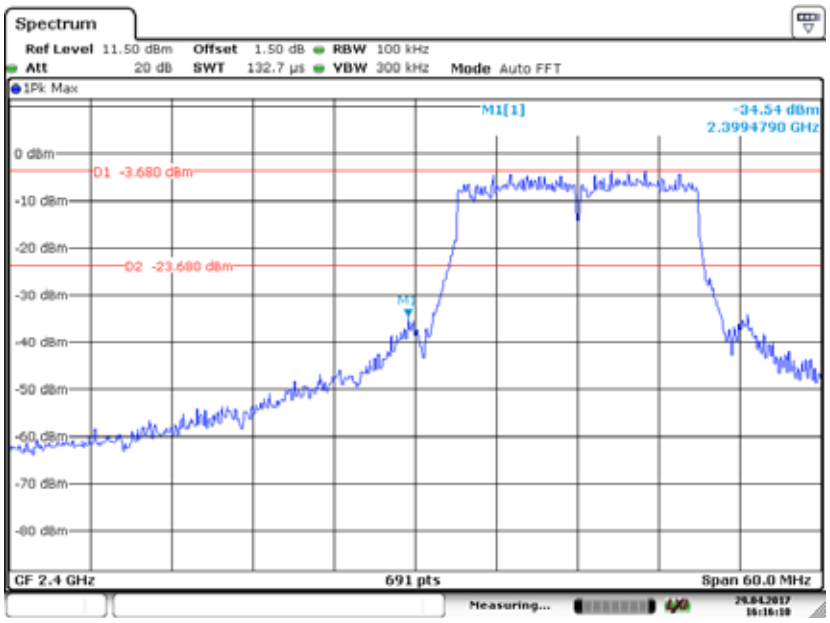
Date: 29.APR.2017 16:12:05

Chain0: 802.11g Mode Band Edge, Right Side

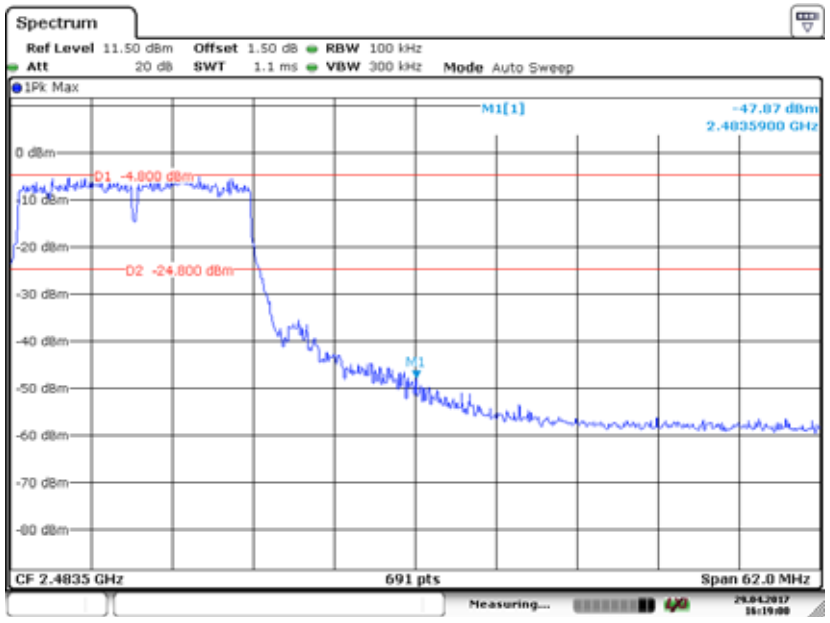


Date: 29.APR.2017 16:14:02

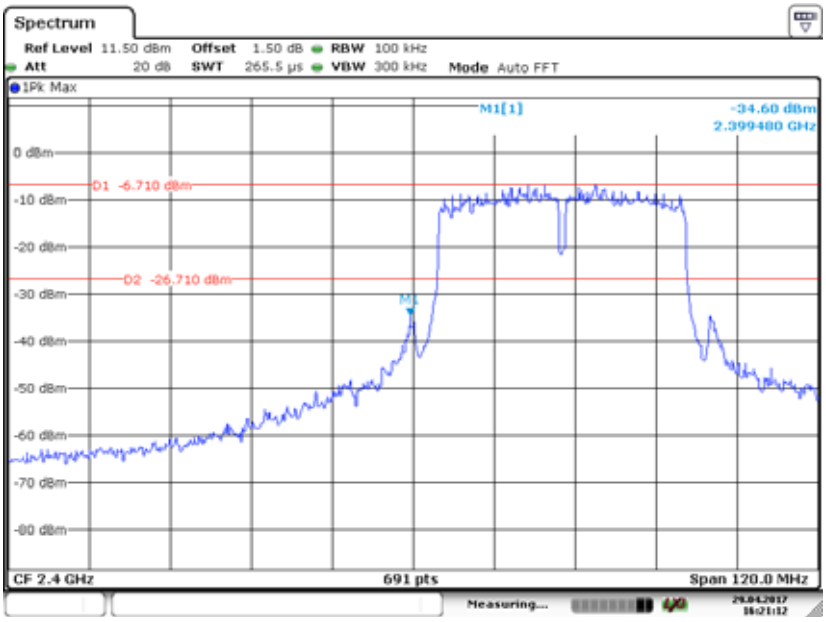
Chain0: 802.11n-HT20 Mode Band Edge, Left Side



Chain0: 802.11n-HT20 Mode Band Edge, Right Side

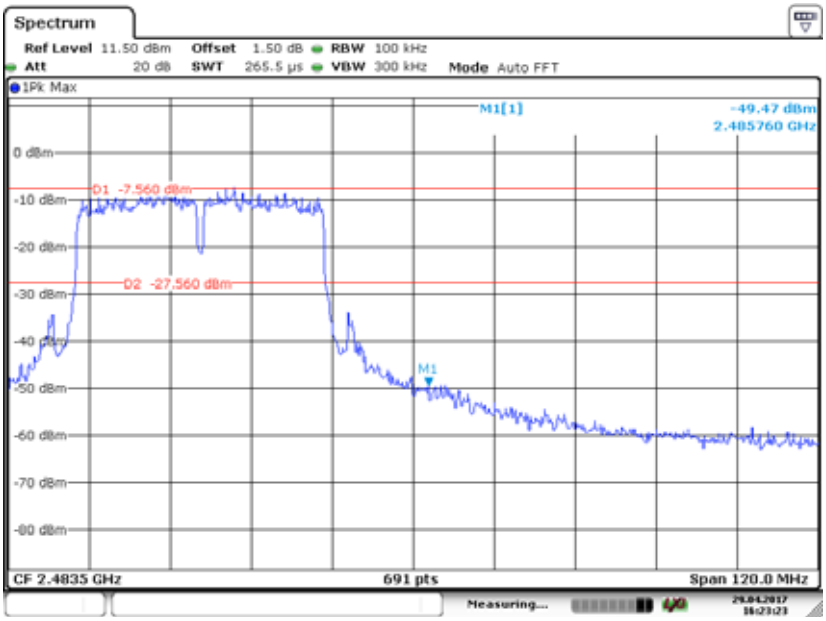


Chain0: 802.11n-HT40 Mode Band Edge, Left Side



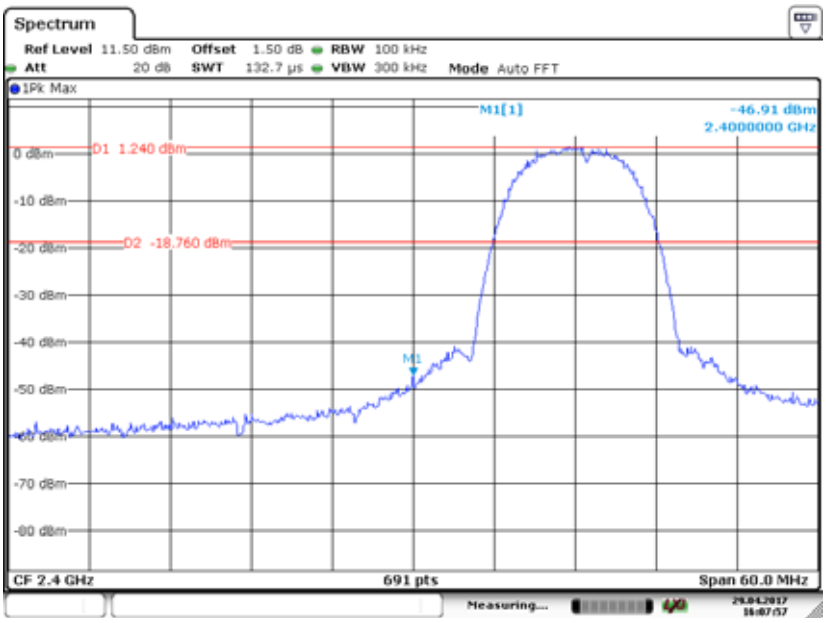
Date: 29.APR.2017 16:21:12

Chain0: 802.11n-HT40 Mode Band Edge, Right Side



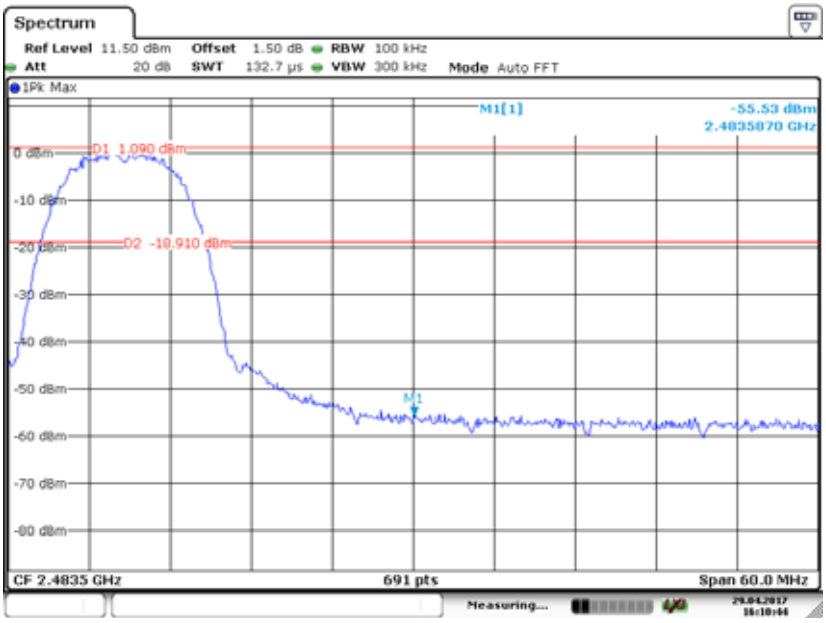
Date: 29.APR.2017 16:23:23

Chain1: 802.11b Mode Band Edge, Left Side



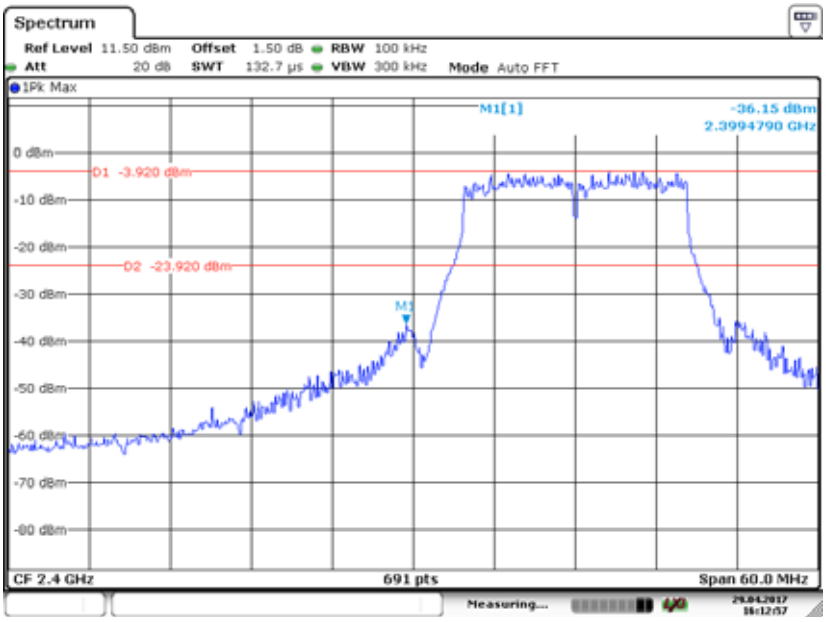
Date: 29.APR.2017 16:07:57

Chain1: 802.11b Mode Band Edge, Right Side



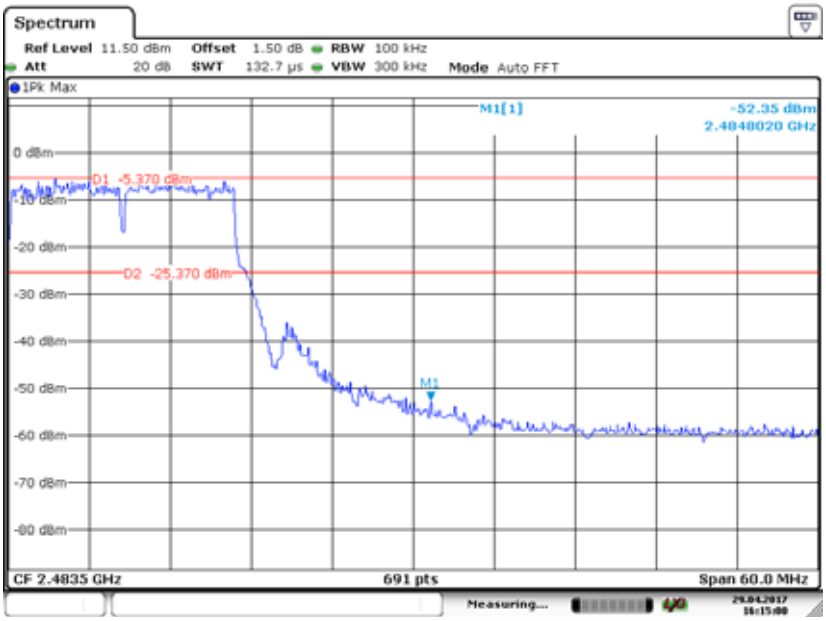
Date: 29.APR.2017 16:10:44

Chain1: 802.11g Mode Band Edge, Left Side



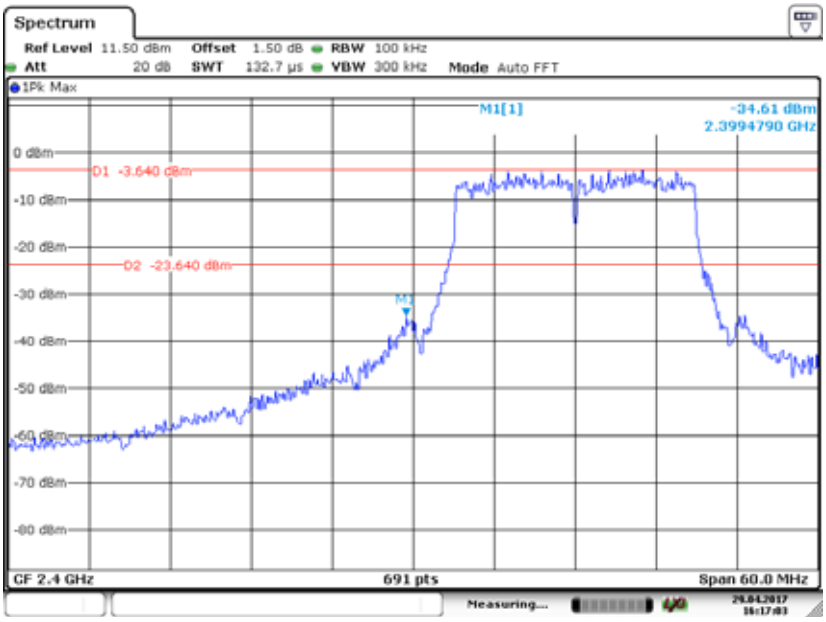
Date: 29.APR.2017 16:12:57

Chain1: 802.11g Mode Band Edge, Right Side

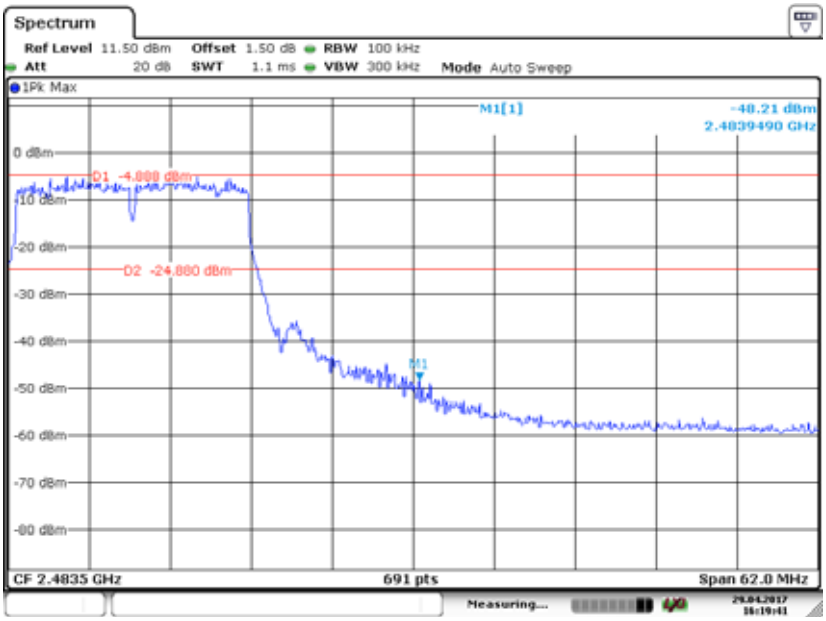


Date: 29.APR.2017 16:15:00

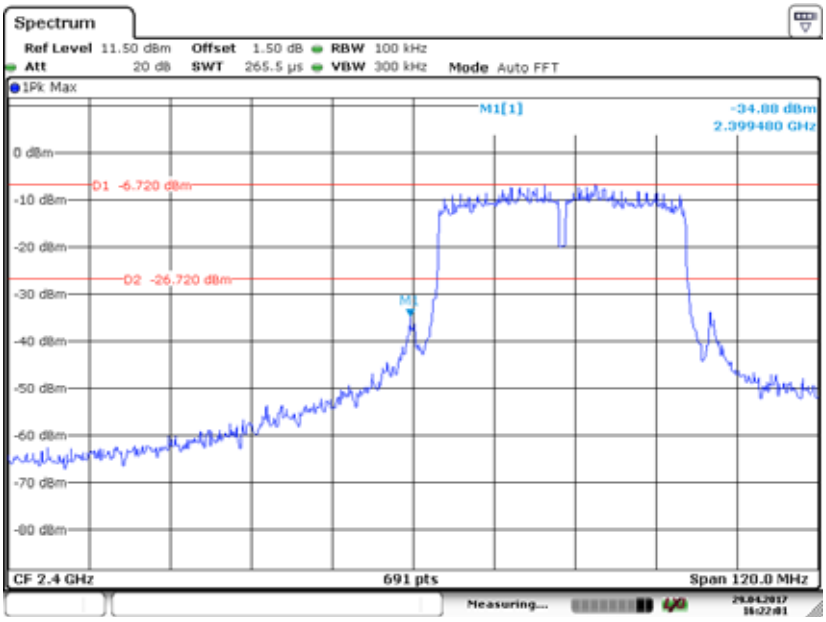
Chain1: 802.11n-HT20 Mode Band Edge, Left Side



Chain1: 802.11n-HT20 Mode Band Edge, Right Side

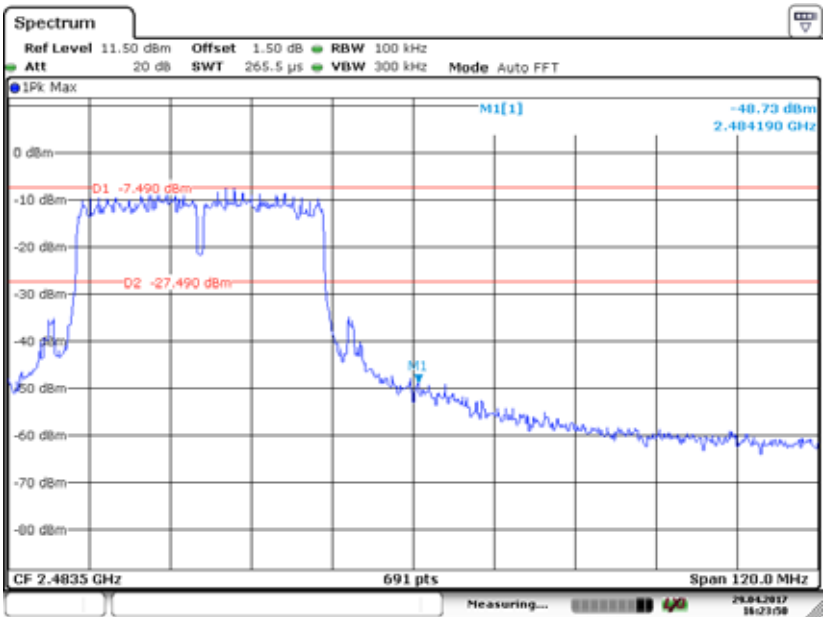


Chain1: 802.11n-HT40 Mode Band Edge, Left Side



Date: 29.APR.2017 16:22:01

Chain1: 802.11n-HT40 Mode Band Edge, Right Side



Date: 29.APR.2017 16:23:50

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 v04. 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 Data

Environmental Conditions

Temperature:	24.6℃
Relative Humidity:	51 %
ATM Pressure:	101.1 kPa

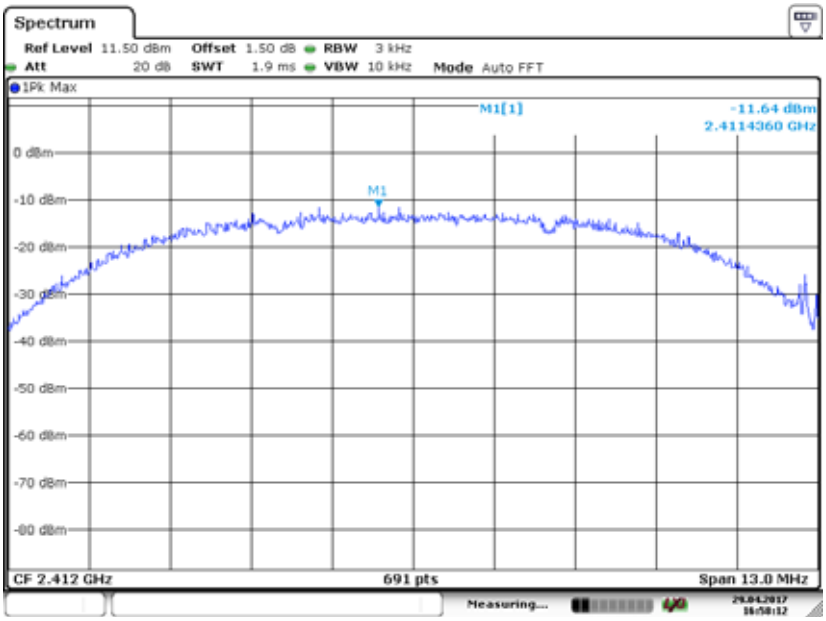
The testing was performed by Chris Wang on 2017-04-29.

EUT operation mode: Transmitting

Test Result: Pass

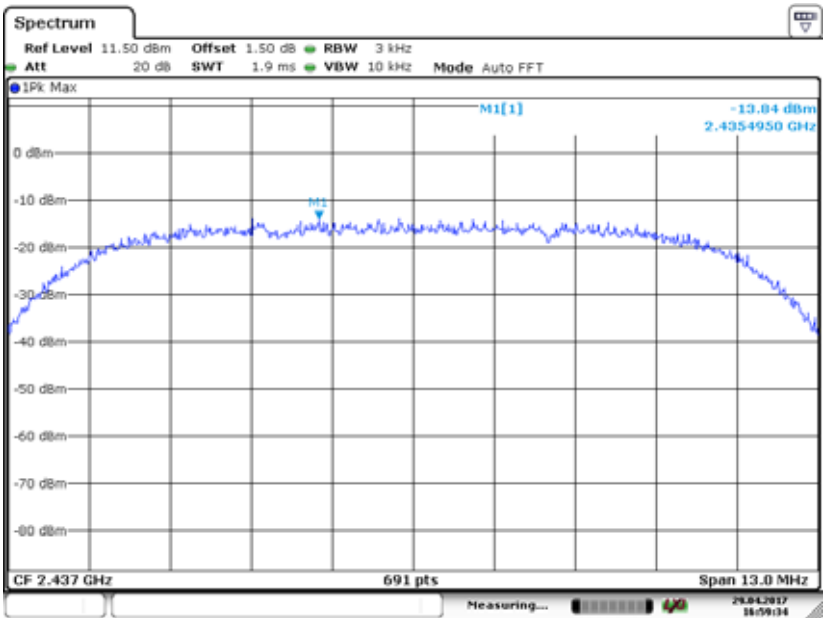
Channel	Frequency (MHz)	PSD (dBm/3kHz)			Limit (dBm/3kHz)
		Chain0	Chain1	Total	
802.11b mode					
Low	2412	-11.64	-11.51	/	≤8
Middle	2437	-13.84	-13.79	/	≤8
High	2462	-13.49	-13.04	/	≤8
802.11g mode					
Low	2412	-17.85	-17.81	/	≤8
Middle	2437	-19.08	-19.00	/	≤8
High	2462	-19.14	-19.12	/	≤8
802.11n-HT20 mode					
Low	2412	-17.77	-17.43	-14.59	≤8
Middle	2437	-18.83	-18.78	-15.79	≤8
High	2462	-18.80	-18.90	-15.84	≤8
802.11n-HT40 mode					
Low	2422	-22.24	-22.24	-19.23	≤8
Middle	2437	-22.72	-22.66	-19.68	≤8
High	2452	-22.92	-22.87	-19.88	≤8

Chain0: Power Spectral Density, 802.11b Low Channel



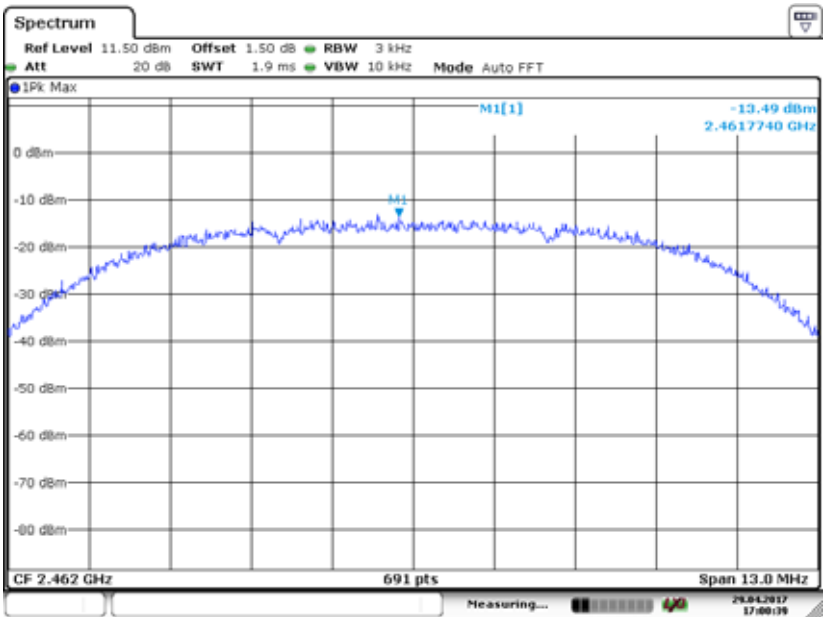
Date: 29.APR.2017 16:58:12

Chain0: Power Spectral Density, 802.11b Middle Channel



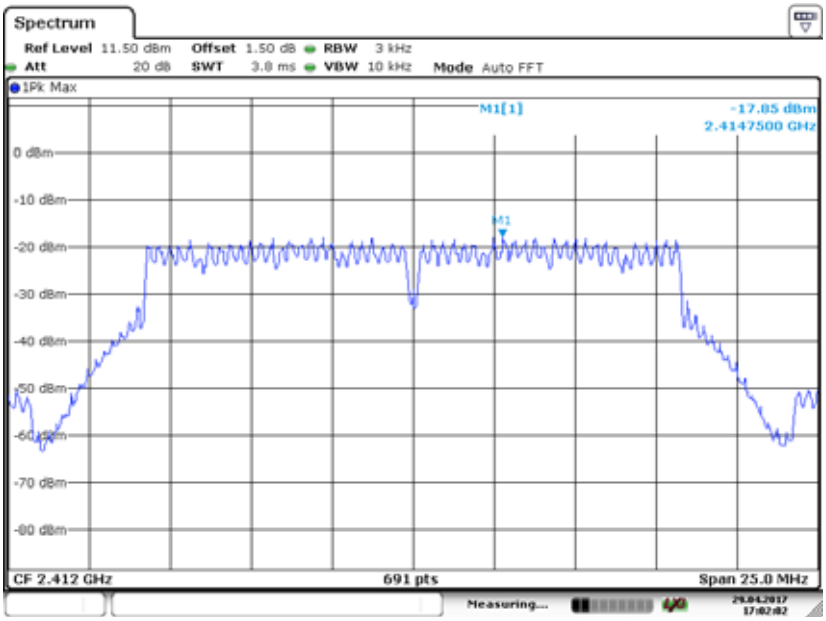
Date: 29.APR.2017 16:59:34

Chain0: Power Spectral Density, 802.11b High Channel



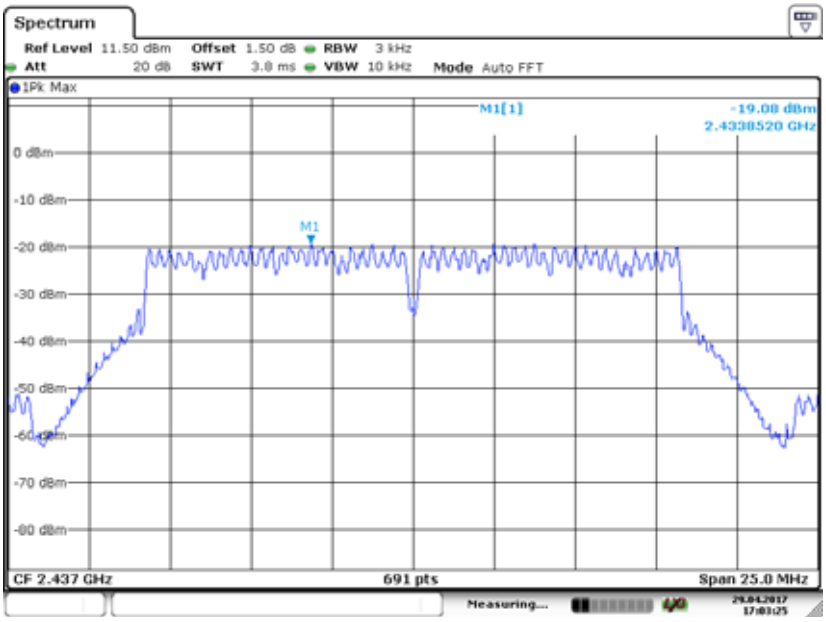
Date: 29.APR.2017 17:00:38

Chain0: Power Spectral Density, 802.11g Low Channel



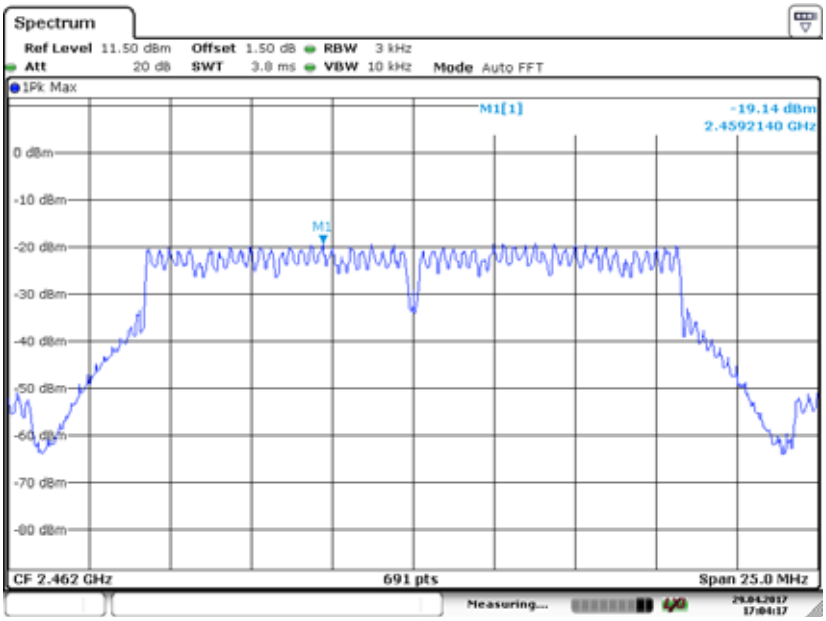
Date: 29.APR.2017 17:02:02

Chain0: Power Spectral Density, 802.11g Middle Channel



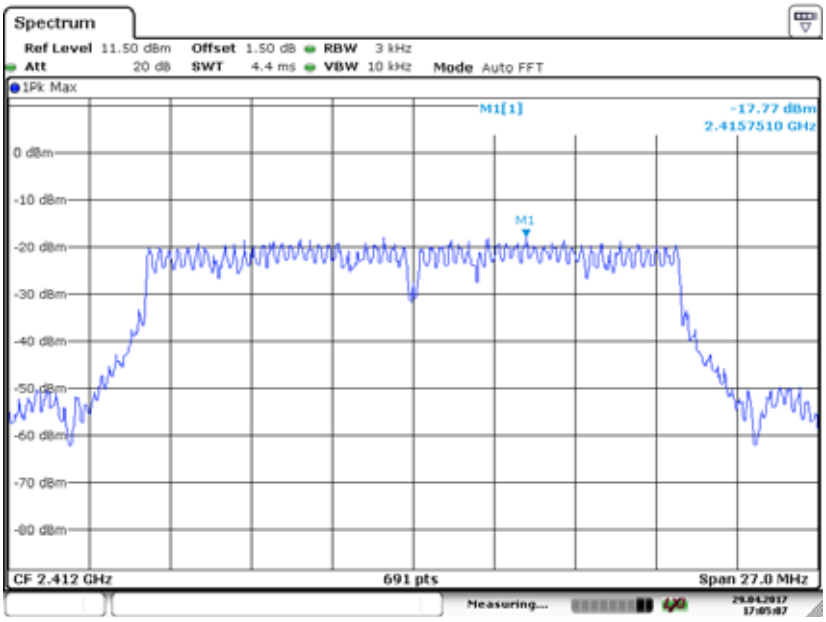
Date: 29.APR.2017 17:03:25

Chain0: Power Spectral Density, 802.11g High Channel



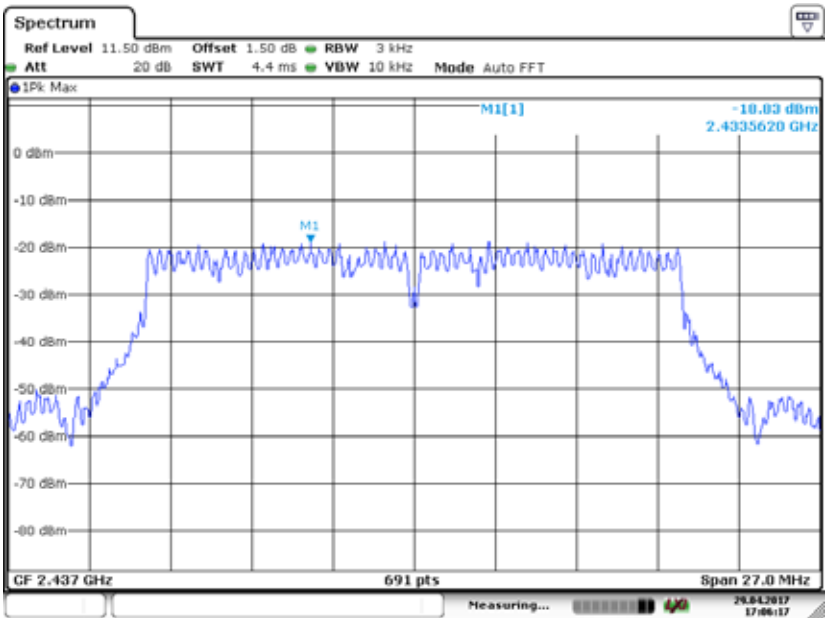
Date: 29.APR.2017 17:04:17

Chain0: Power Spectral Density, 802.11n-HT20 Low Channel



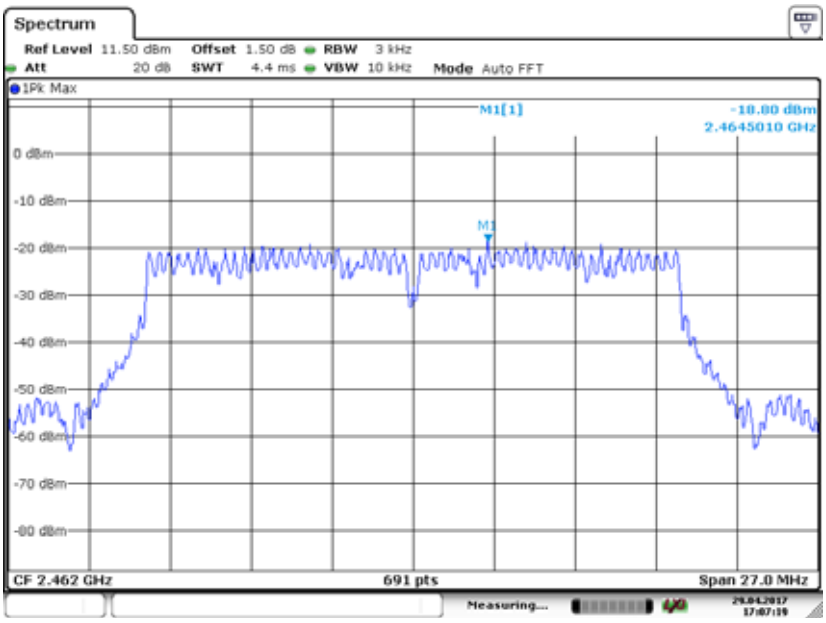
Date: 29.APR.2017 17:05:08

Chain0: Power Spectral Density, 802.11n-HT20 Middle Channel



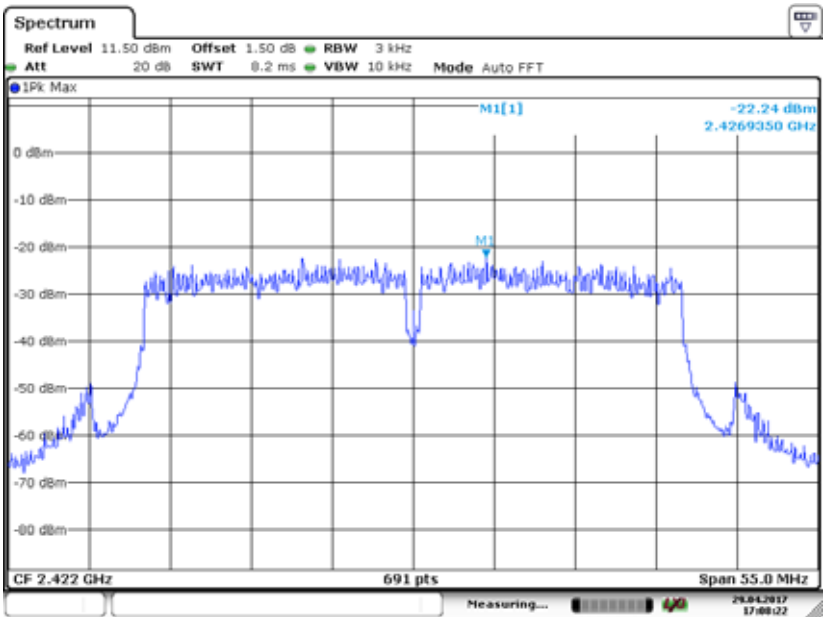
Date: 29.APR.2017 17:06:17

Chain0: Power Spectral Density, 802.11n-HT20 High Channel



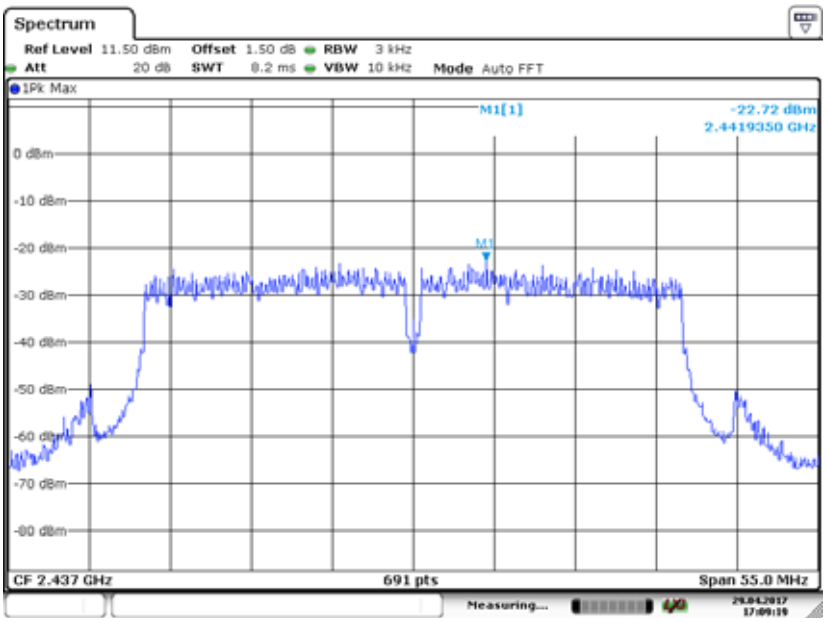
Date: 29.APR.2017 17:07:20

Chain0: Power Spectral Density, 802.11n-HT40 Low Channel



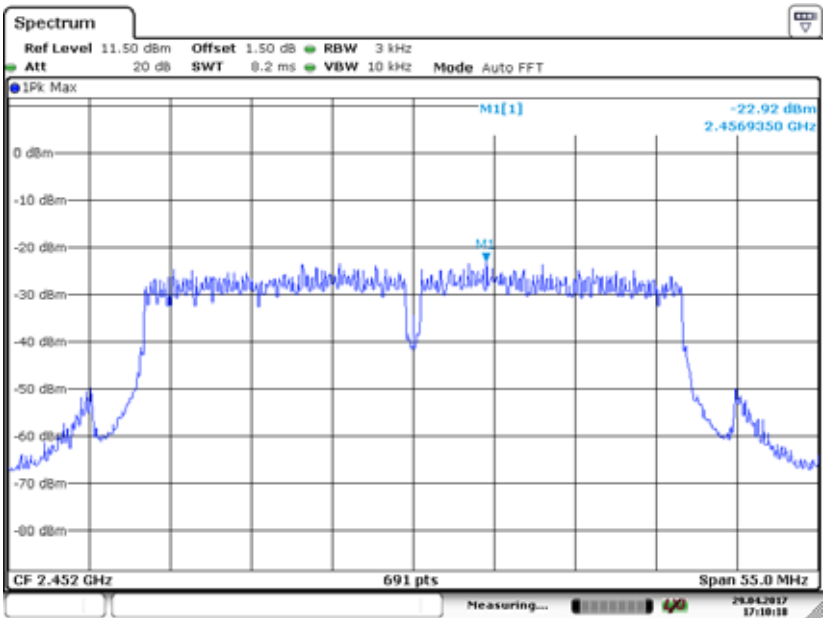
Date: 29.APR.2017 17:08:22

Chain0: Power Spectral Density, 802.11n-HT40 Middle Channel



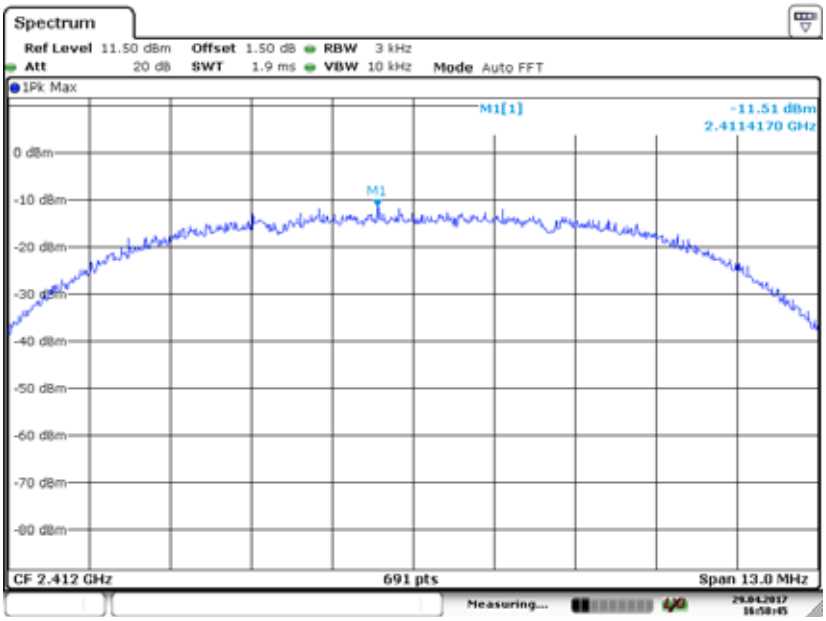
Date: 29.APR.2017 17:09:19

Chain0: Power Spectral Density, 802.11n-HT40 High Channel



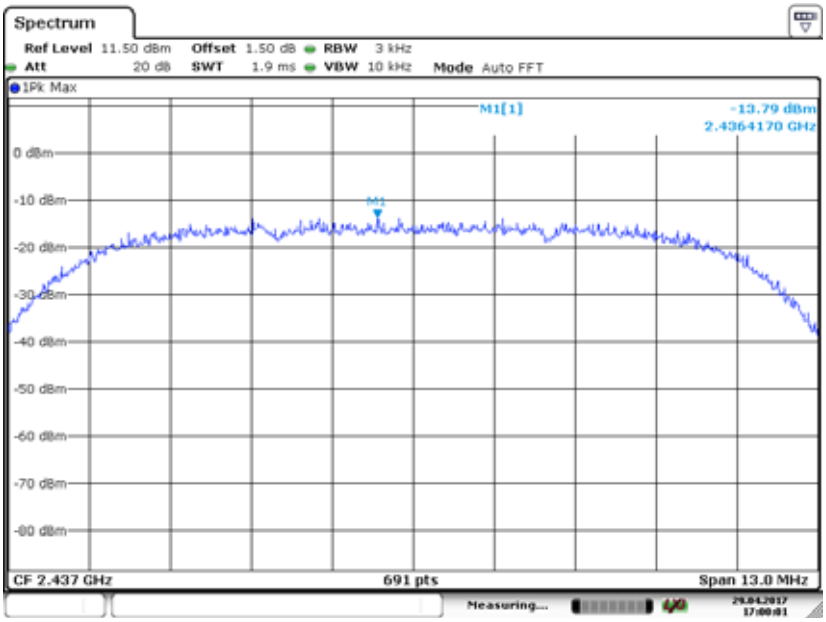
Date: 29.APR.2017 17:10:18

Chain1: Power Spectral Density, 802.11b Low Channel



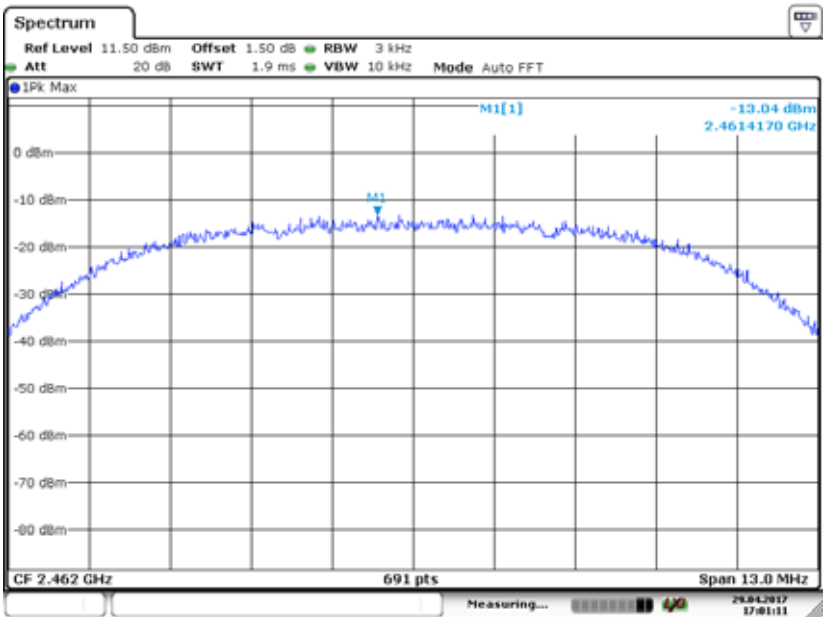
Date: 29.APR.2017 16:58:45

Chain1: Power Spectral Density, 802.11b Middle Channel



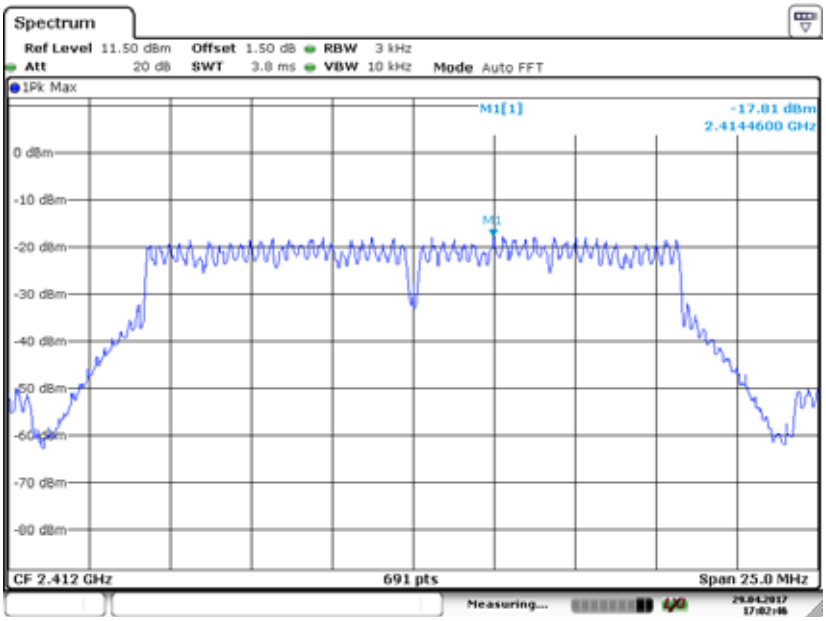
Date: 29.APR.2017 17:00:01

Chain1: Power Spectral Density, 802.11b High Channel



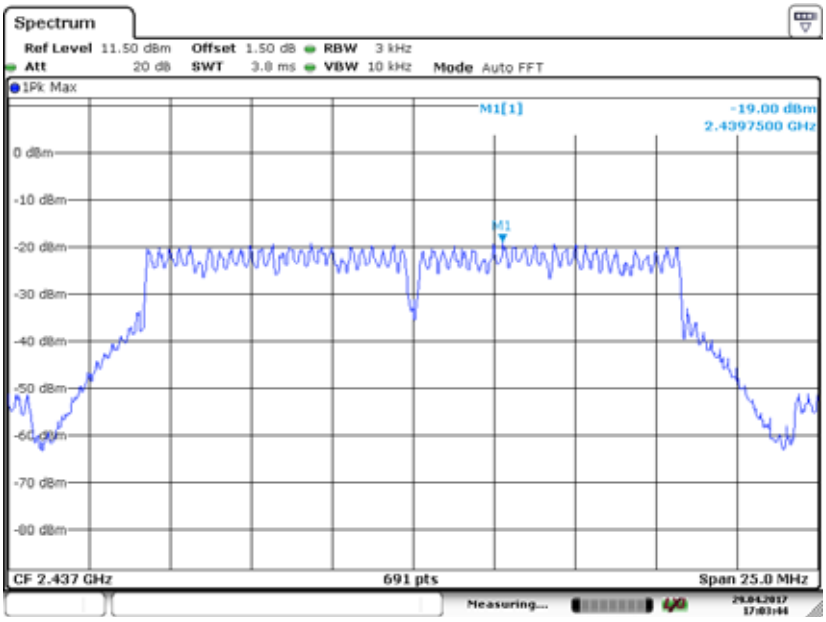
Date: 29.APR.2017 17:01:11

Chain1: Power Spectral Density, 802.11g Low Channel



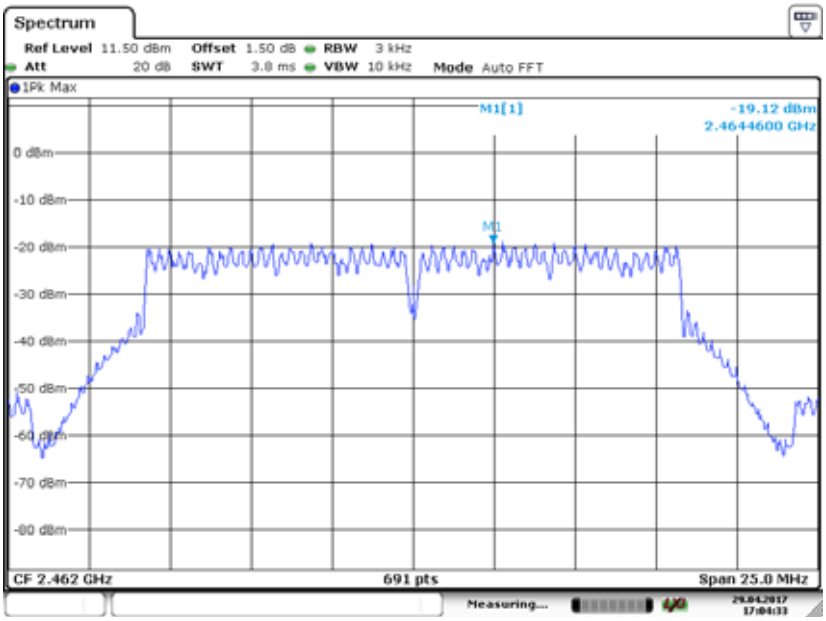
Date: 29.APR.2017 17:02:47

Chain1: Power Spectral Density, 802.11g Middle Channel



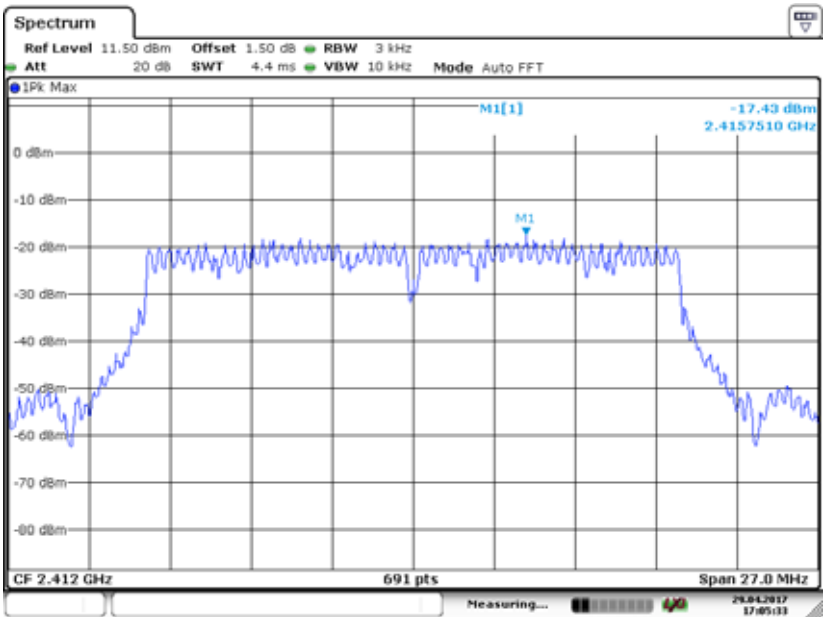
Date: 29.APR.2017 17:03:45

Chain1: Power Spectral Density, 802.11g High Channel



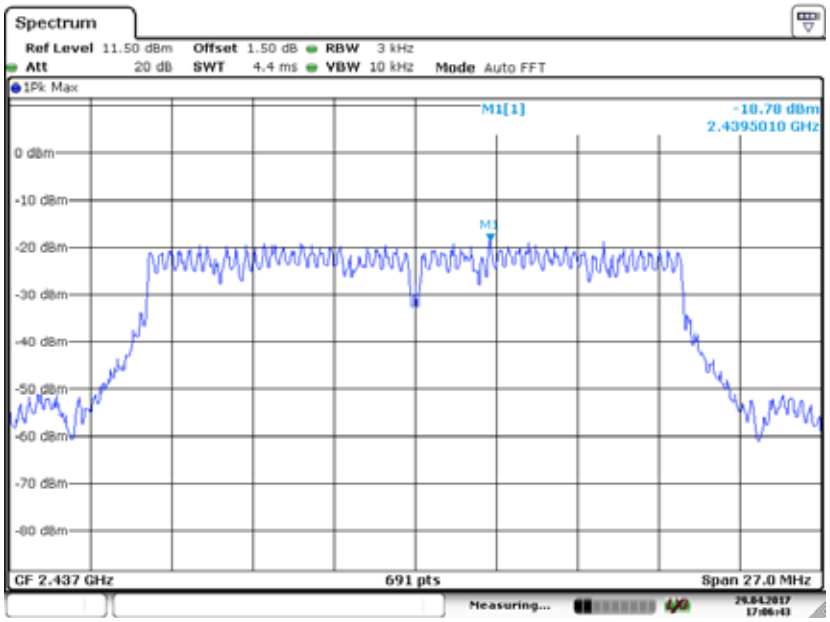
Date: 29.APR.2017 17:04:33

Chain1: Power Spectral Density, 802.11n-HT20 Low Channel



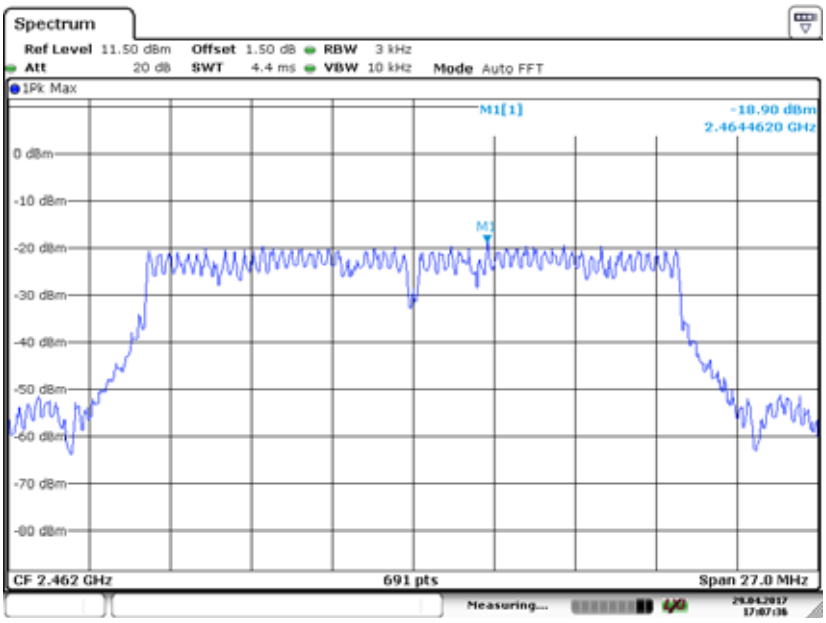
Date: 29.APR.2017 17:05:33

Chain1: Power Spectral Density, 802.11n-HT20 Middle Channel



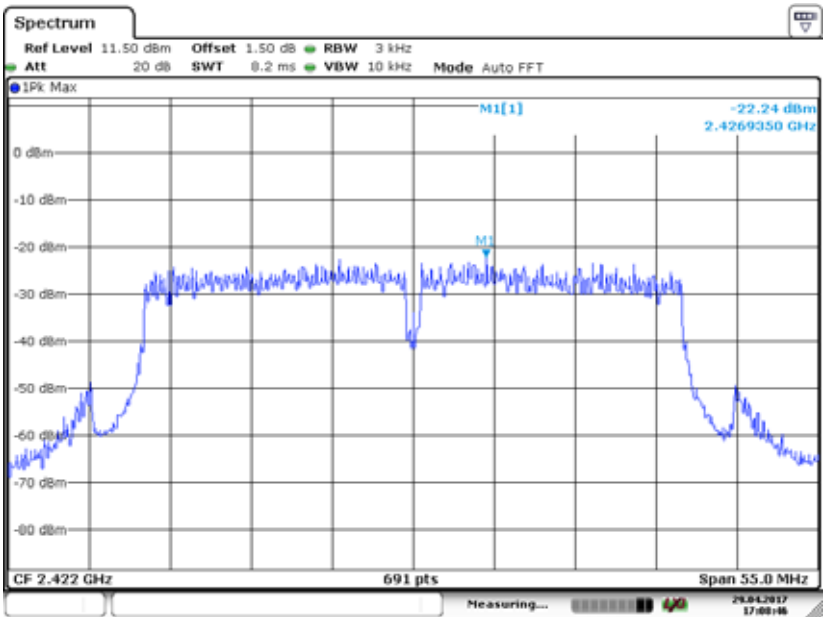
Date: 29.APR.2017 17:06:43

Chain1: Power Spectral Density, 802.11n-HT20 High Channel



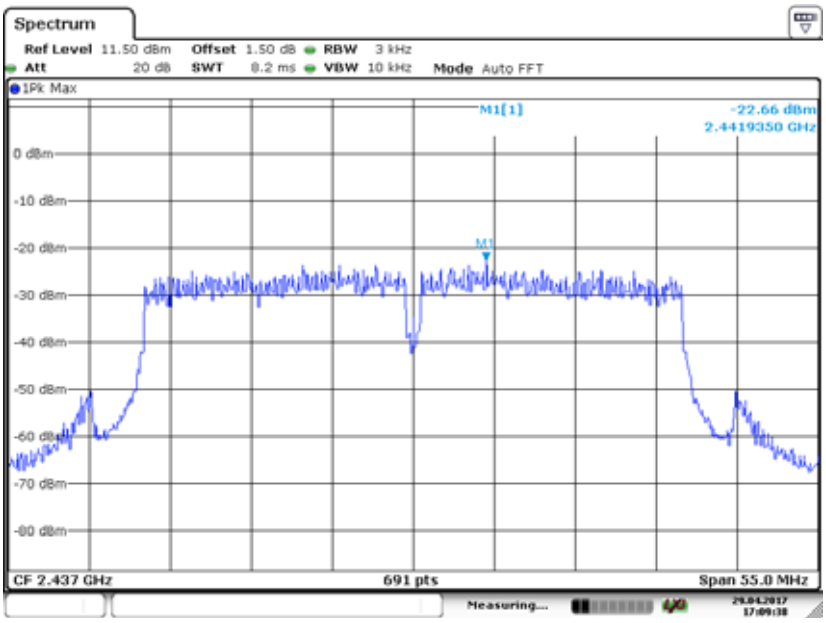
Date: 29.APR.2017 17:07:37

Chain1: Power Spectral Density, 802.11n-HT40 Low Channel



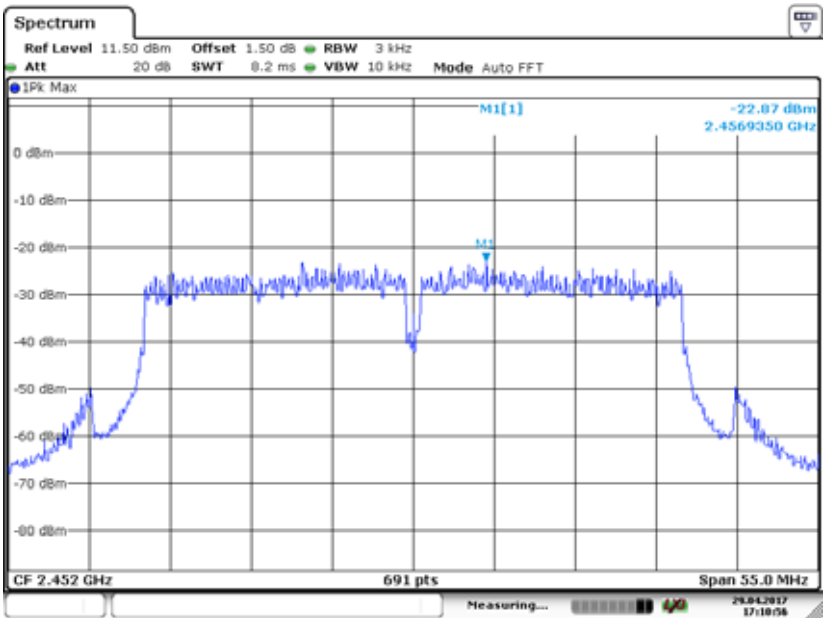
Date: 29.APR.2017 17:08:46

Chain1: Power Spectral Density, 802.11n-HT40 Middle Channel



Date: 29.APR.2017 17:09:39

Chain1: Power Spectral Density, 802.11n-HT40 High Channel



Date: 29.APR.2017 17:10:57

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