

FCC PART 15.407

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: Original Report	Product Type: Wi-Fi Video Recorder
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Report Number:	RKS170417001-00C
Report Date:	2017-05-20
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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 type approval report is prepared on behalf of Hangzhou Ezviz Network Co., Ltd in accordance with Part 2-Subpart J, Part 15-Subparts A, B and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP and FCC Part 15.247 DTS and submission 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.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Kunshan).

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.

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

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

For 5150~5250 MHz band,

802.11a/802.11ac20/n20 mode Channel 36, 40, 48 were tested.

802.11n40/802.11ac40 mode Channel 38, 46 were tested.

802.11ac80 mode Channel 42 was tested.

For 5725~5850 MHz band,

802.11a/802.11ac20/n20 mode Channel 149, 157, 165 were tested.

802.11n40/802.11ac40 mode Channel 155, 159 were tested.

802.11ac80 mode Channel 155 was tested.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	...	...
38	5190	149	5745
40	5200	151	5755
42	5210	153	5765
44	5220	155	5775
46	5230	157	5785
48	5240	159	5795
...	...	161	5805
...	...	165	5825

EUT Exercise Software

RF test tool: Telnet.

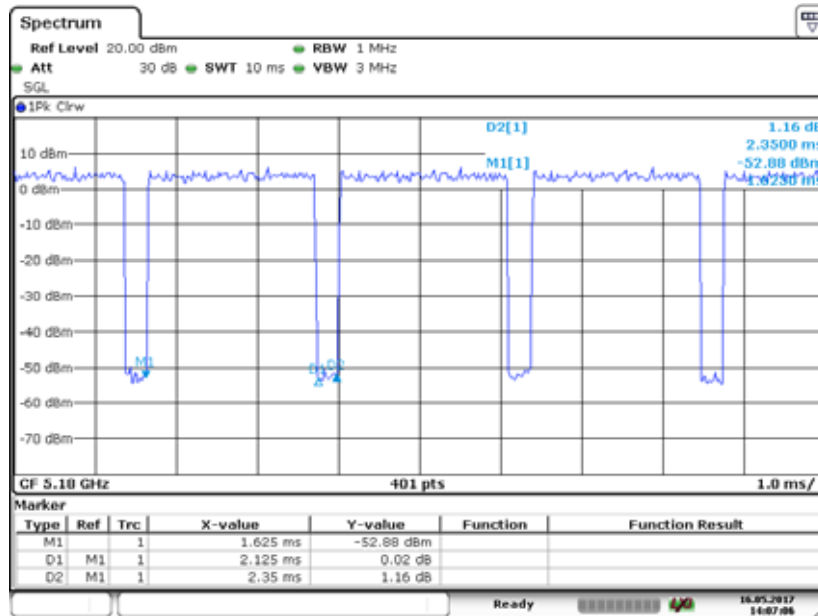
The worst case was performed under:

Mode	Data rate	Power level
802.11a	6 Mbps	15
802.11ac20	MCS0	15
802.11n-HT20	MCS0	14
802.11ac40	MCS0	13
802.11n-HT40	MCS0	13
802.11ac80	MCS0	13

Duty Cycle:

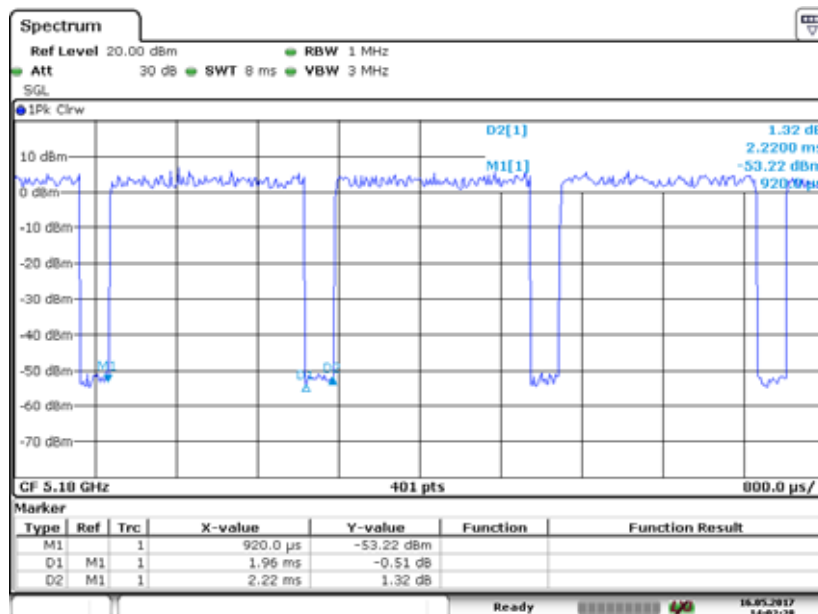
5150MHz-5250MHz Band:

Mode: 802.11a



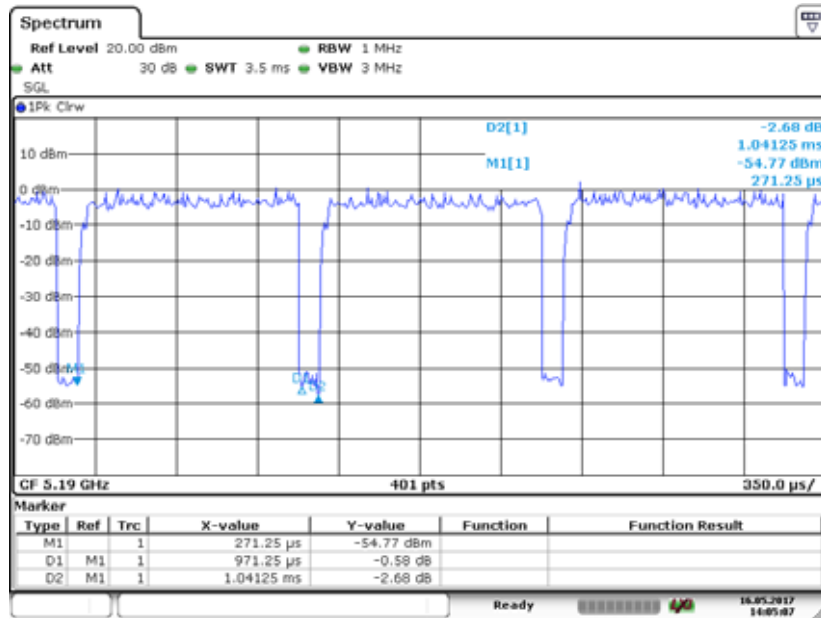
Date: 16 MAY 2017 14:07:07

Mode: 802.11n20



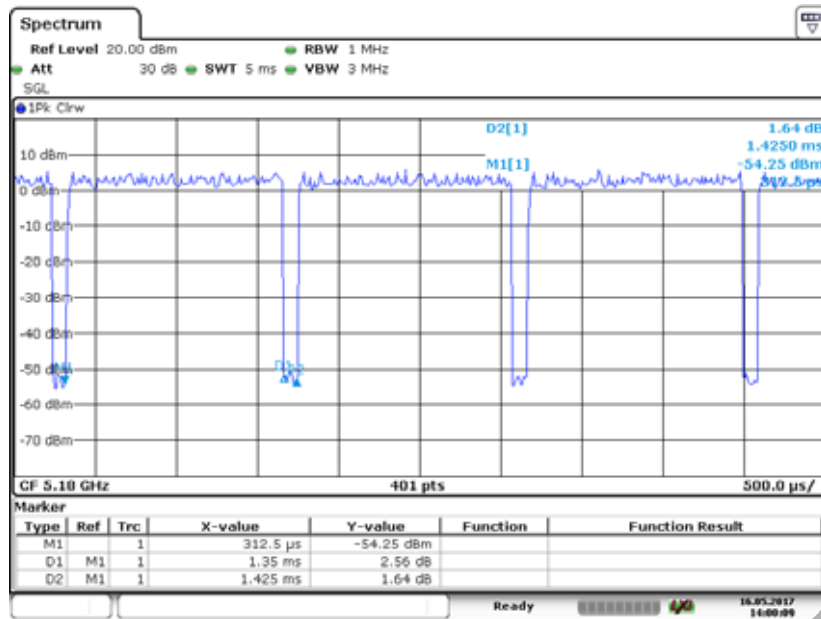
Date: 16 MAY 2017 14:02:28

Mode: 802.11n40



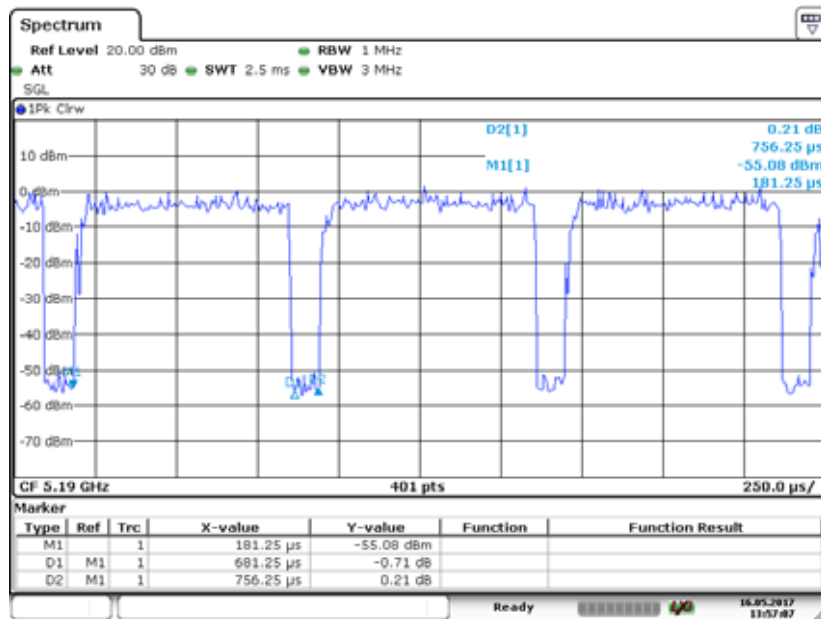
Date: 16.MAY.2017 14:05:07

Mode: 802.11ac20



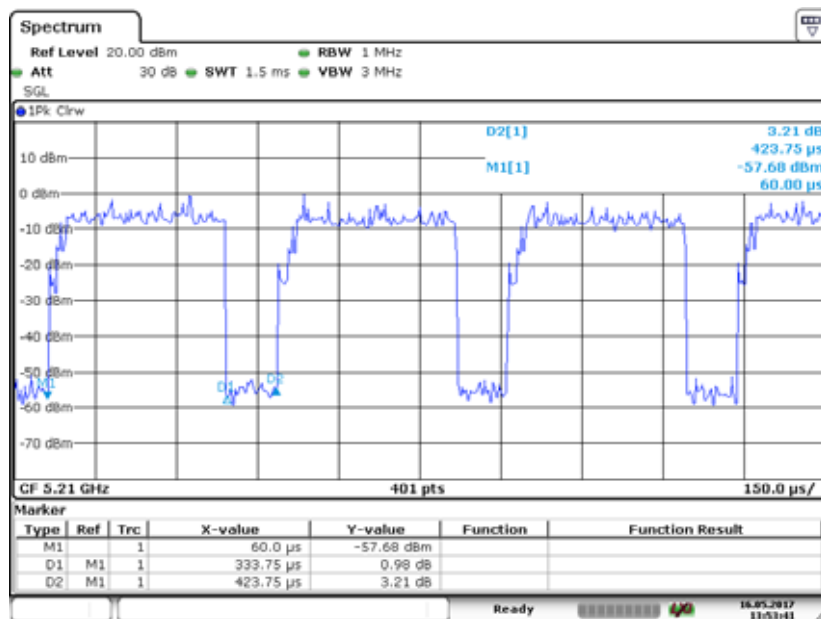
Date: 16.MAY.2017 14:00:10

Mode: 802.11ac40



Date: 16 MAY 2017 13:57:07

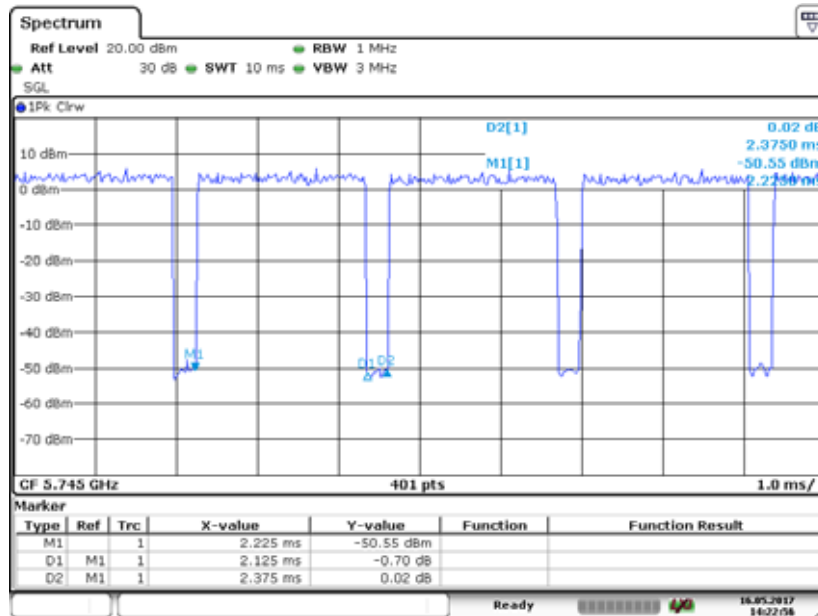
Mode: 802.11ac80



Date: 16 MAY 2017 13:53:41

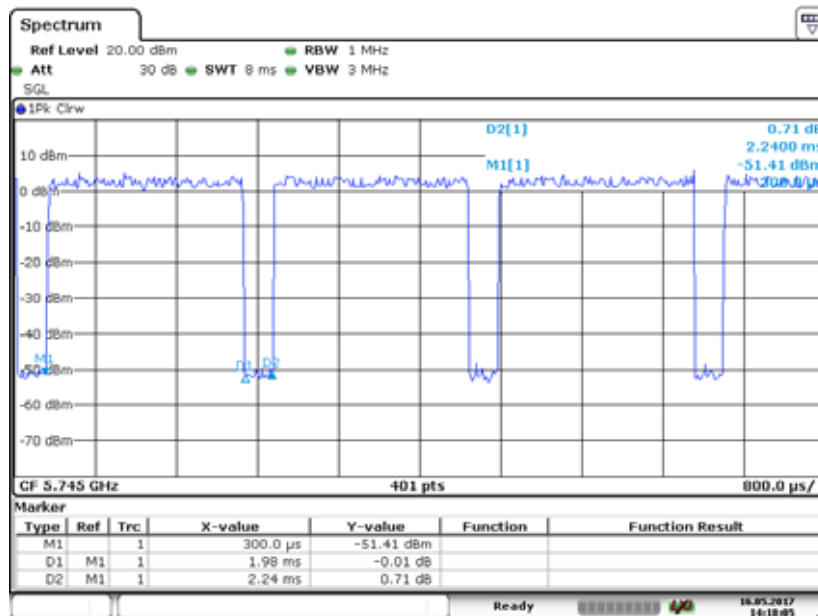
5725MHz-5850MHz Band:

Mode: 802.11a



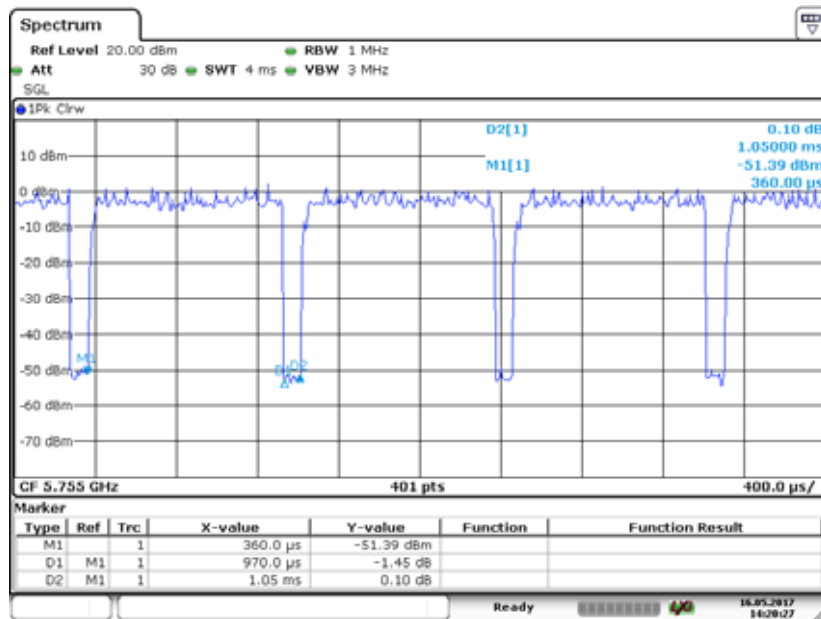
Date: 16 MAY 2017 14:22:56

Mode: 802.11n20



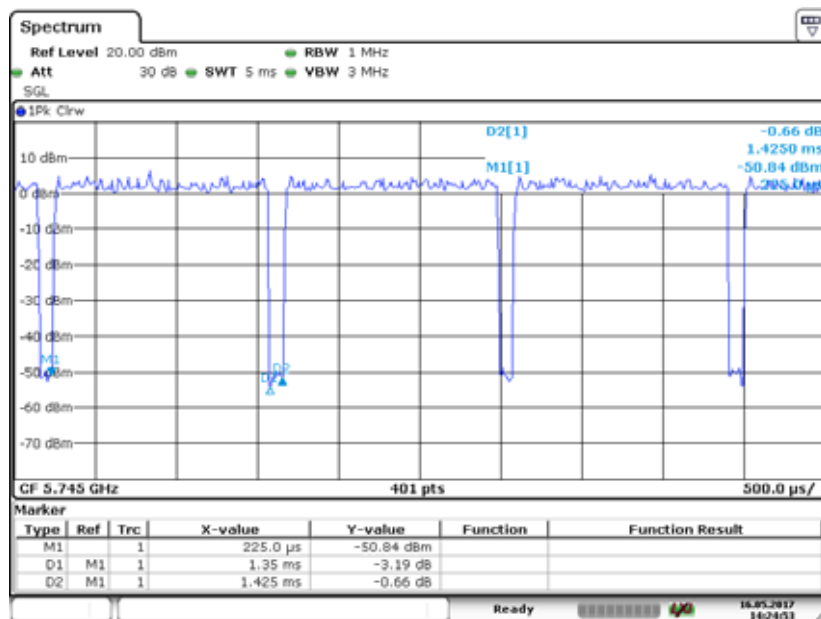
Date: 16 MAY 2017 14:18:06

Mode: 802.11n40



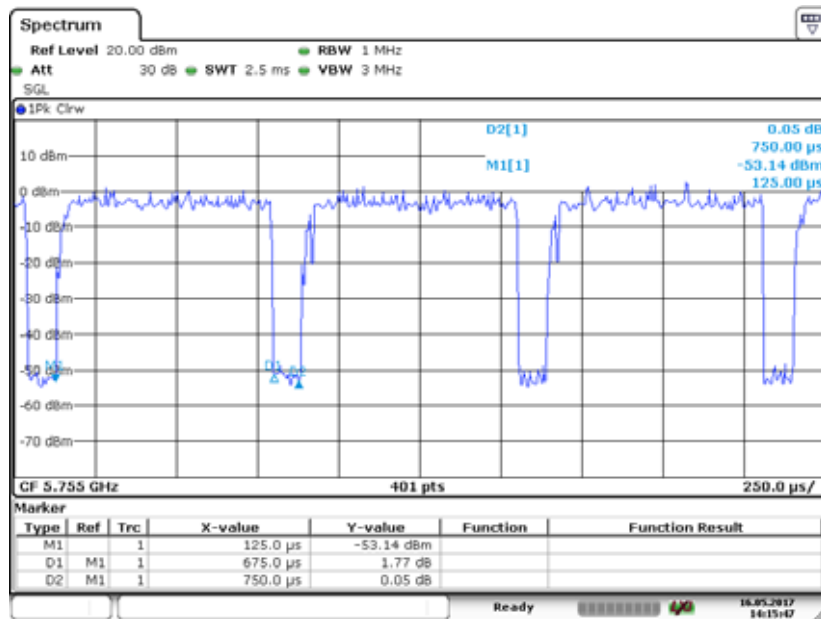
Date: 16.MAY.2017 14:20:27

Mode: 802.11ac20



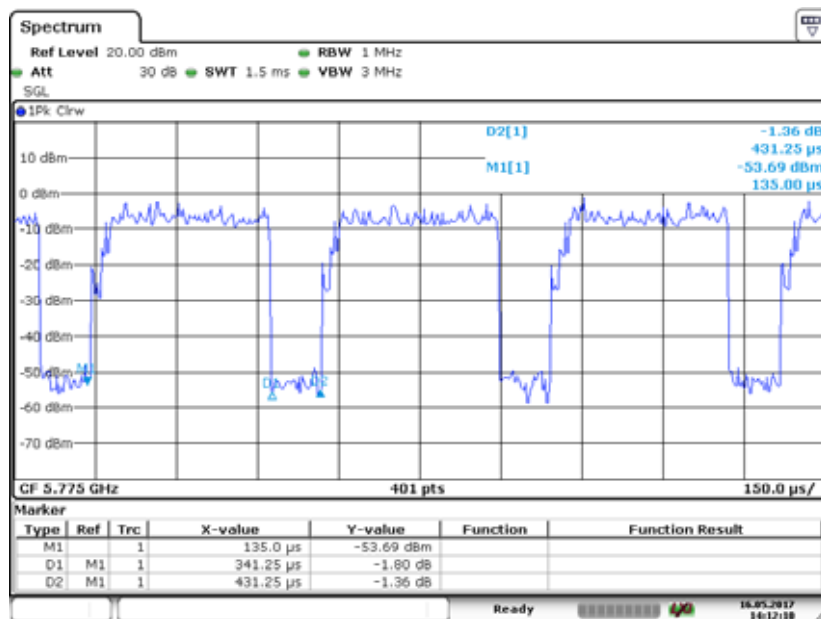
Date: 16.MAY.2017 14:24:53

Mode: 802.11ac40



Date: 16.MAY.2017 14:15:48

Mode: 802.11ac80



Date: 16.MAY.2017 14:12:11

5150MHz-5250MHz Band:

Mode	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	90.43	2.125	0.471	1kHz	0.437
802.11n-HT20	88.29	1.960	0.510	1kHz	0.541
802.11n-HT40	93.28	0.971	1.030	3kHz	0.302
802.11ac20	94.74	1.350	0.741	1kHz	0.235
802.11ac40	90.08	0.681	1.468	3kHz	0.454
802.11ac80	78.76	0.334	2.994	3kHz	1.037

5725MHz-5850MHz Band:

Mode	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	89.47	2.125	0.471	1kHz	0.483
802.11n-HT20	88.39	1.980	0.505	1kHz	0.536
802.11n-HT40	92.38	0.970	1.031	3kHz	0.344
802.11ac20	94.74	1.350	0.741	1kHz	0.235
802.11ac40	90.00	0.675	1.481	3kHz	0.458
802.11ac80	79.13	0.341	2.933	3kHz	1.017

Equipment Modifications

N/A.

Support Equipment List and Details

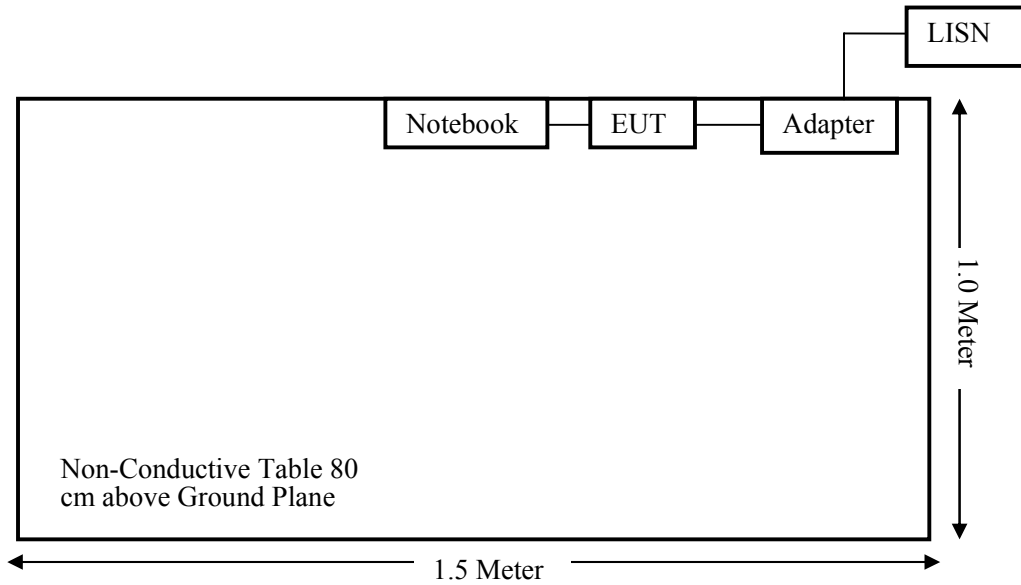
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152

External I/O Cable

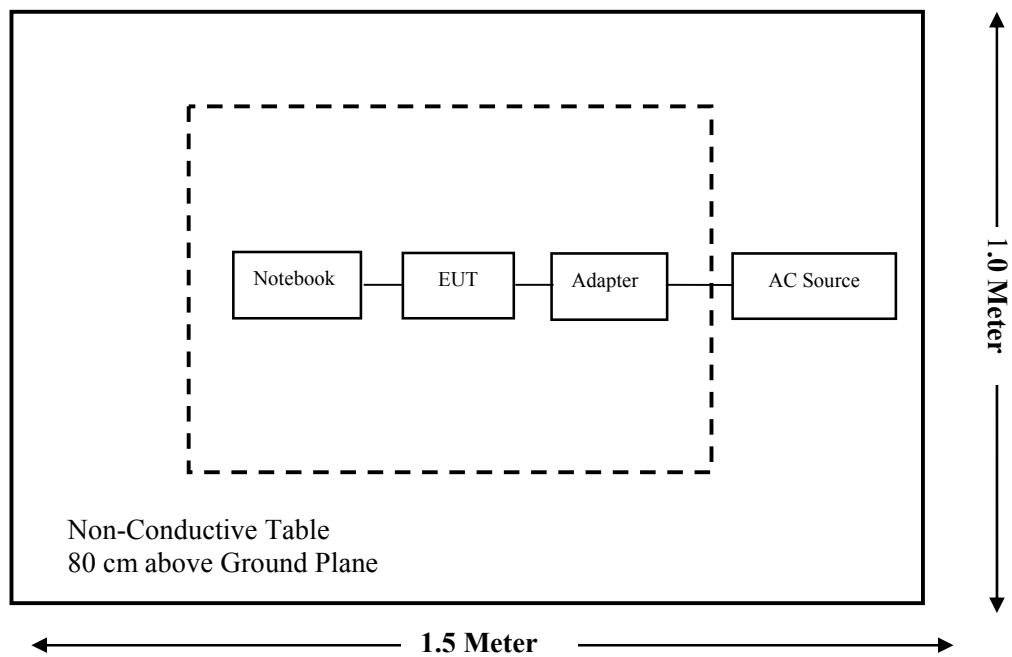
Cable Description	Shielding Type	Length (m)	From Port	To
RJ45 Cable	Un-shielding	1.0	Notebook	EUT

Block Diagram of Test Setup

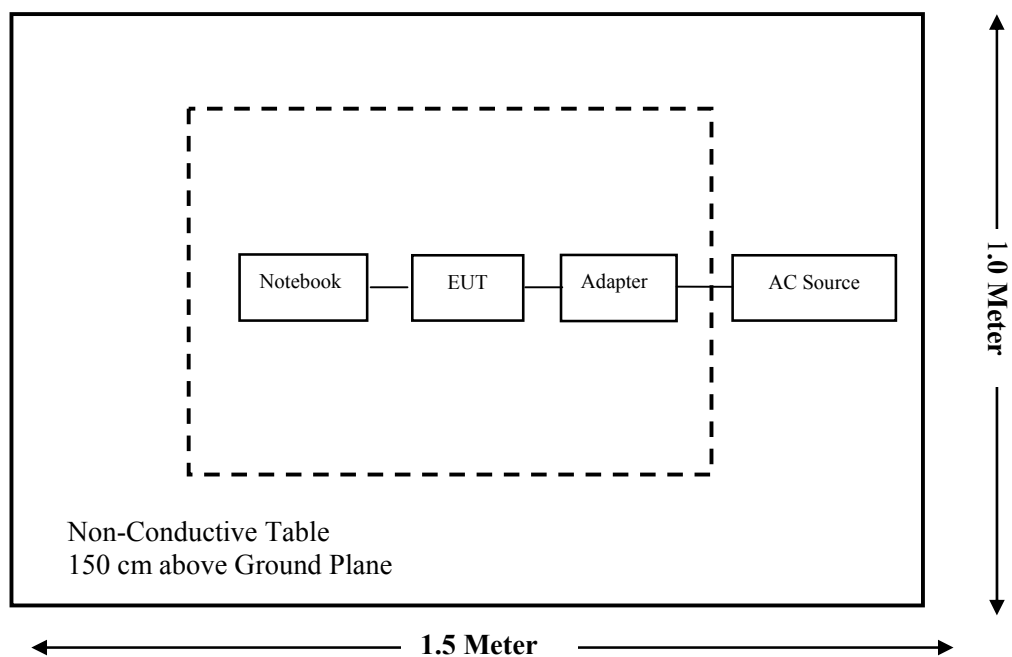
For Conducted Emissions:



For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407(f) & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
FCC §15.207 & §15.407(b) (6)	AC Power Line Conducted Emissions	Compliance
§15.205 & §15.209 & §15.407(b) (1),(6),(7)	Undesirable Emission & Restricted Bands	Compliance
§15.407(b) (1) (4)	Band Edge	Compliance
§15.407(a)(1) (5) & §15.407 (e)	Emission Bandwidth	Compliance
§15.407 (a)(1)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1) (3)	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
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-17
Sonoma Instrument	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
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	/	/
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	ESCI	100195	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

* **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 §15.407(f) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to §15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

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/cm²);

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

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

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

Calculated Data:

Mode	Frequency 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 15.407, 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 5G 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.

Chain	Manufacturer	Antenna Type	Max. Antenna Gain
0	Hangzhou Ezviz Network Co., Ltd	Monopole antenna	3.0 dBi
1	Hangzhou Ezviz Network Co., Ltd	Monopole antenna	3.0 dBi

Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) –AC Power Line Conducted Emissions

Applicable Standard

FCC §15.207, §15.407(b) (6)

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner :

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

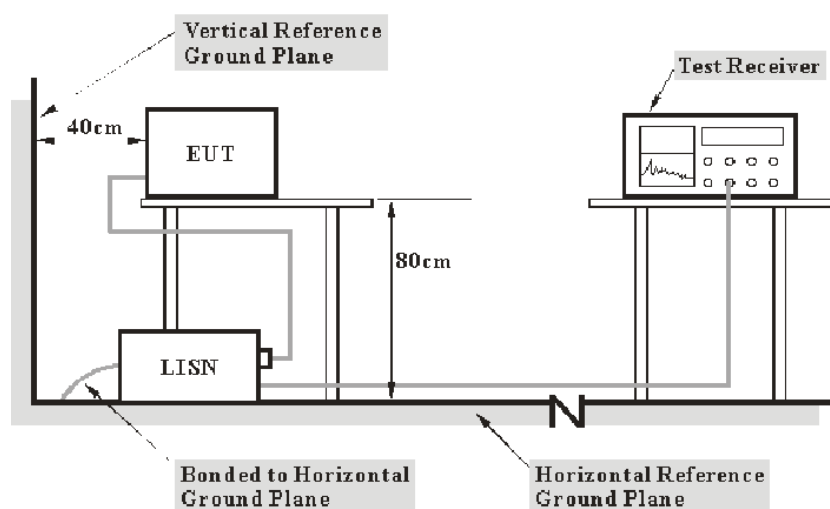
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Kunshan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

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 spacing between the peripherals was 10 cm.

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN

C_f : Correction Factor

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

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

Test Procedure

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

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

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data**Environmental Conditions**

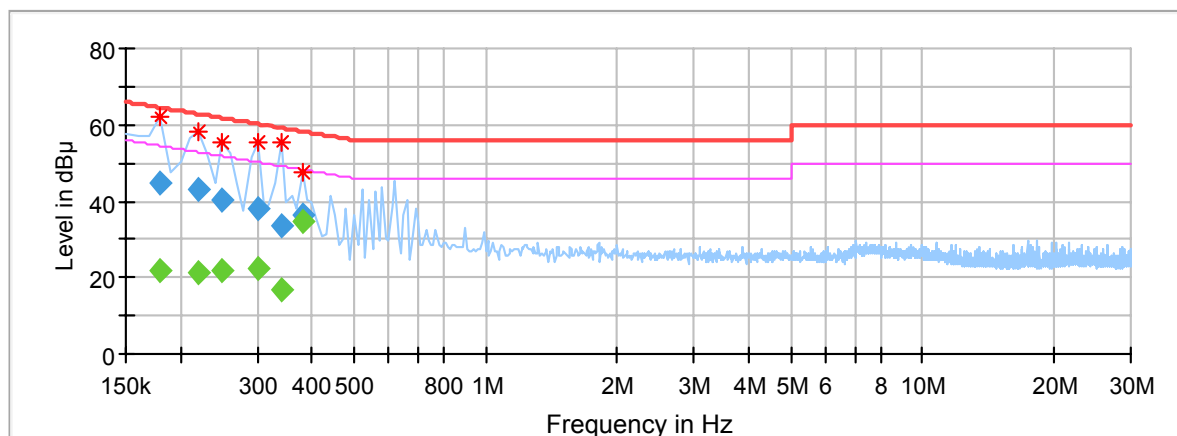
Temperature:	23.5 °C
Relative Humidity:	55 %
ATM Pressure:	100.3 kPa

The testing was performed by Chris Wang on 2017-05-03.

Test Mode: Transmitting in 802.11a(5150-5250) mode middle channel of chain 1(worst case)

AC 120V/60 Hz, Line

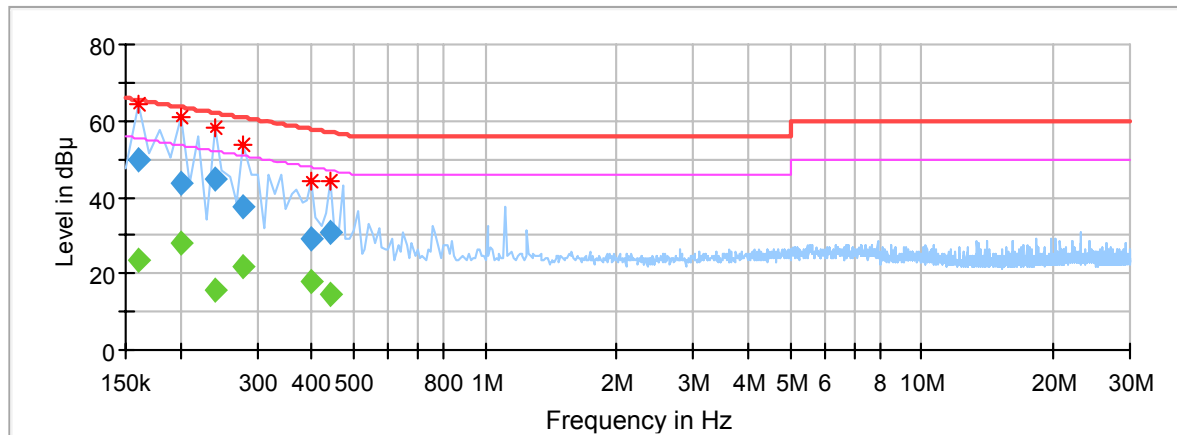
Full Spectrum



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.180000	---	22.01	9.000	L1	9.9	32.48	54.49	Compliance
0.180000	44.53	---	9.000	L1	9.9	19.96	64.49	Compliance
0.220000	---	20.99	9.000	L1	9.9	31.83	52.82	Compliance
0.220000	43.09	---	9.000	L1	9.9	19.73	62.82	Compliance
0.250000	---	22.01	9.000	L1	9.9	29.75	51.76	Compliance
0.250000	40.02	---	9.000	L1	9.9	21.74	61.76	Compliance
0.300000	---	22.18	9.000	L1	9.9	28.06	50.24	Compliance
0.300000	38.19	---	9.000	L1	9.9	22.05	60.24	Compliance
0.340000	---	16.96	9.000	L1	9.9	32.24	49.20	Compliance
0.340000	33.56	---	9.000	L1	9.9	25.64	59.20	Compliance
0.380000	---	34.64	9.000	L1	9.9	13.64	48.28	Compliance
0.380000	36.29	---	9.000	L1	9.9	21.99	58.28	Compliance

AC 120V/60 Hz, Neutral

Full Spectrum



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.160000	---	23.28	9.000	N	10.0	32.18	55.46	Compliance
0.160000	49.61	---	9.000	N	10.0	15.85	65.46	Compliance
0.200000	---	28.24	9.000	N	10.0	25.37	53.61	Compliance
0.200000	43.80	---	9.000	N	10.0	19.81	63.61	Compliance
0.240000	---	15.72	9.000	N	10.0	36.38	52.10	Compliance
0.240000	44.70	---	9.000	N	10.0	17.40	62.10	Compliance
0.280000	---	21.72	9.000	N	10.0	29.10	50.82	Compliance
0.280000	37.31	---	9.000	N	10.0	23.51	60.82	Compliance
0.400000	---	18.15	9.000	N	9.9	29.70	47.85	Compliance
0.400000	29.19	---	9.000	N	9.9	28.66	57.85	Compliance
0.440000	---	14.44	9.000	N	9.9	32.62	47.06	Compliance
0.440000	30.90	---	9.000	N	9.9	26.16	57.06	Compliance

Note:

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

§15.205 & §15.209 & §15.407(B) (1),(6),(7) – UNDESIRABLE EMISSION & RESTRICTED BANDS

Applicable Standard

FCC §15.407 (b) (1), (6), (7); §15.209; §15.205;

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27dBm/MHz

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000MHz shall be performed using a minimum resolution bandwidth of 1MHz.

According to KDB 789033 D02 General UNII Test Procedures New Rules v01, emission shall be computed as: $E [dB\mu V/m] = EIRP[dBm] + 95.2$, for $d = 3$ meters.

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner :

If U_{lab} is less than or equal to U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cisp} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Kunshan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

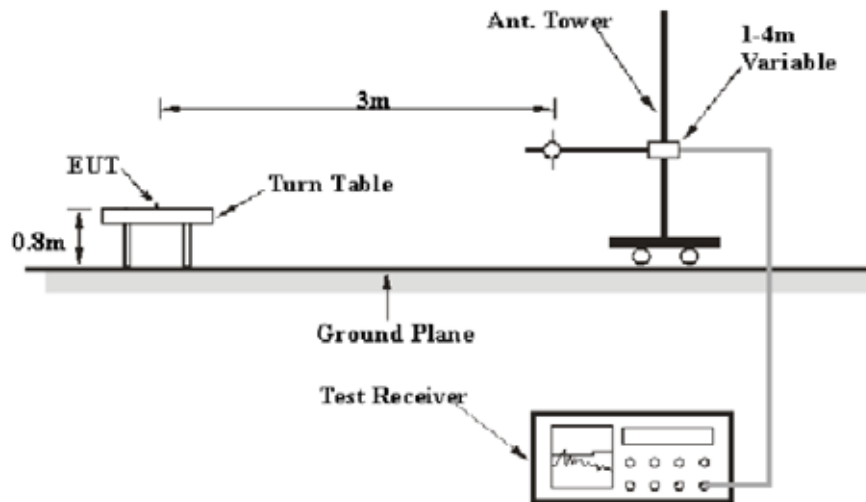
6G~18GHz: 5.23 dB

Table 1 – Values of U_{cisp}

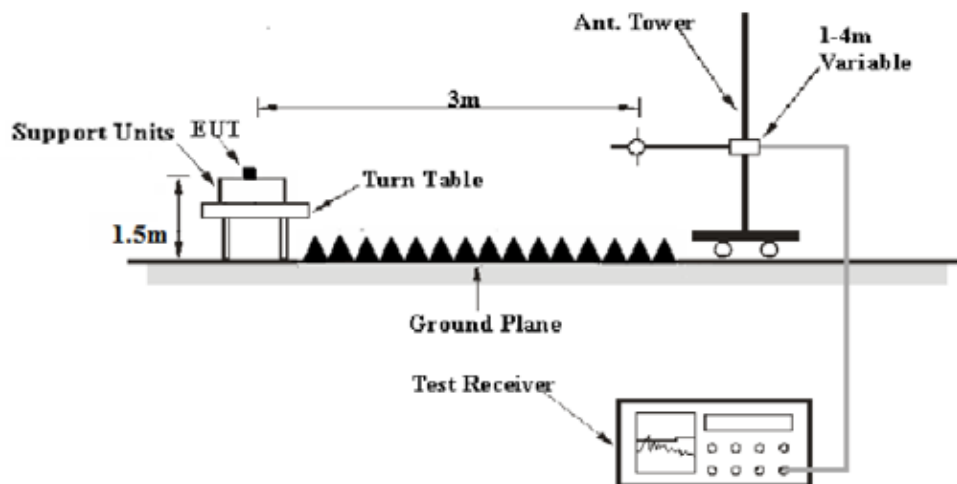
Measurement	U_{cisp}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 G:



Above 1 G:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

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

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 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

During the radiated emission test, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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-1GHz, peak and Average detection modes for frequencies above 1GHz.

The Radiated measurements was performed, The EIRP converted to field strength as follows:

According to C63.4, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m

Distance extrapolation factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1.5m]})$ dB

Extrapolation result = Corrected Amplitude (dB μ V/m) - distance extrapolation factor (6dB)

or Limit line = Specific limits(dB μ V) + distance extrapolation factor (6dB)

Corrected Amplitude & Margin Calculation

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

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

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

$$\text{Margin} = \text{Limit} - \text{Extrapolation result}$$

Test Data**Environmental Conditions**

Temperature:	23.5 °C
Relative Humidity:	60 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2017-05-02.

Mode: Transmitting

Note: For above 1GHz, the test distance is 1.5m.

30MHz~40GHz(5150-5250 MHz & 5725-5850 MHz)

802.11a Mode: Chain1 (Worst Case)

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5180 MHz										
51.38	45.32	QP	322	161	V	-11.14	34.18	/	40.00	5.82
268.84	46.93	QP	310	178	H	-5.83	41.10	/	46.00	4.90
5180.00	113.35	PK	125	128	V	2.26	115.61	109.61	/	/
5180.00	105.08	AV	125	128	V	2.26	107.34	101.34	/	/
5180.00	107.80	PK	141	213	H	2.26	110.06	104.06	/	/
5180.00	99.38	AV	141	213	H	2.26	101.64	95.64	/	/
5150.00	60.35	PK	172	203	V	2.23	62.58	56.58	74.00	17.42
5150.00	45.52	AV	172	203	V	2.23	47.75	41.75	54.00	12.25
10360.00	56.16	PK	314	241	H	13.52	69.68	63.68	74.00	10.32
10360.00	40.52	AV	314	241	H	13.52	54.04	48.04	54.00	5.96
15540.00	39.40	PK	308	118	V	12.47	51.87	45.87	74.00	28.13
15540.00	26.90	AV	308	118	V	12.47	39.37	36.37	54.00	20.63
6963.00	43.82	PK	49	180	H	7.23	51.05	45.05	74.00	28.95
6963.00	29.63	AV	49	180	H	7.23	36.86	30.86	54.00	23.14
5150-5250 MHz band-Middle Channel:5200MHz										
51.38	45.45	QP	131	158	V	-11.14	34.31	/	40.00	5.69
268.84	46.85	QP	249	120	H	-5.83	41.02	/	46.00	4.98
5200.00	113.56	PK	83	213	V	2.28	115.84	109.84	/	/
5200.00	105.50	AV	83	213	V	2.28	107.78	101.78	/	/
5200.00	108.21	PK	177	243	H	2.28	110.49	104.49	/	/
5200.00	100.89	AV	177	243	H	2.28	103.17	97.17	/	/
10400.00	56.03	PK	266	142	V	13.67	69.70	63.70	74.00	10.30
10400.00	40.23	AV	266	142	V	13.67	53.90	47.90	54.00	6.10
15600.00	39.36	PK	171	183	V	12.72	52.08	46.08	74.00	27.92
15600.00	23.84	AV	171	183	V	12.72	36.56	30.56	54.00	23.44
2399.00	50.01	PK	289	176	H	-6.20	43.81	37.81	74.00	36.19
2399.00	35.18	AV	289	176	H	-6.20	28.98	22.98	54.00	31.02
6963.00	43.56	PK	301	208	V	7.23	50.79	44.79	74.00	29.21
6963.00	28.75	AV	301	208	V	7.23	35.98	29.98	54.00	24.02
5150-5250 MHz band-High Channel:5240MHz										
51.38	45.38	QP	71	119	V	-11.14	34.24	/	40.00	5.76
268.84	46.82	QP	226	199	H	-5.83	40.99	/	46.00	5.01
5240.00	113.32	PK	97	105	V	2.32	115.64	109.64	/	/
5240.00	105.26	AV	97	105	V	2.32	107.58	101.58	/	/
5240.00	107.81	PK	221	164	H	2.32	110.13	104.13	/	/
5240.00	99.46	AV	221	164	H	2.32	101.78	95.78	/	/
5350.00	43.30	PK	310	219	H	2.45	45.75	39.75	74.00	34.25
5350.00	27.89	AV	310	219	H	2.45	30.34	24.34	54.00	29.66
10480.00	56.31	PK	25	216	H	13.98	70.29	64.29	74.00	9.71
10480.00	40.21	AV	25	216	H	13.98	54.19	48.19	54.00	5.81
15720.00	39.58	PK	287	102	V	13.22	52.80	46.80	74.00	27.20
15720.00	23.51	AV	287	102	V	13.22	36.73	30.73	54.00	23.27
6963.00	43.79	PK	338	217	V	7.23	51.02	45.02	74.00	28.98
6963.00	28.99	AV	338	217	V	7.23	36.22	30.22	54.00	23.78

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5745 MHz										
51.38	45.35	QP	293	170	V	-11.14	34.21	/	40	5.79
268.84	46.95	QP	199	111	H	-5.83	41.12	/	46	4.88
5745.00	113.21	PK	348	113	V	3.33	116.54	110.54	/	/
5745.00	105.45	AV	348	113	V	3.33	108.78	102.78	/	/
5745.00	106.98	PK	155	116	H	3.33	110.31	104.31	/	/
5745.00	97.16	AV	155	116	H	3.33	100.49	97.49	/	/
5725.00	61.56	PK	101	116	V	3.27	64.83	58.83	74	15.17
5725.00	43.51	AV	101	116	V	3.27	46.78	40.78	54	13.22
11490.00	55.35	PK	354	173	H	15.13	70.48	64.48	74	9.52
11490.00	39.21	AV	354	173	H	15.13	54.34	48.34	54	5.66
17235.00	39.56	PK	110	119	H	19.45	59.01	53.01	74	20.99
17235.00	23.42	AV	110	119	H	19.45	42.87	36.87	54	17.13
6962.00	44.00	PK	103	224	V	7.23	51.23	45.23	74	28.77
6962.00	29.32	AV	103	224	V	7.23	36.55	30.55	54	23.45
5725-5850 MHz band-Middle Channel:5785MHz										
51.38	45.01	QP	87	141	V	-11.14	33.87	/	40	6.13
268.84	46.46	QP	313	183	H	-5.83	40.63	/	46	5.37
5785.00	113.42	PK	230	179	V	3.44	116.86	110.86	/	/
5785.00	105.67	AV	230	179	V	3.44	108.11	102.11	/	/
5785.00	107.15	PK	49	201	H	3.44	110.59	104.59	/	/
5785.00	98.37	AV	49	201	H	3.44	101.81	95.81	/	/
11570.00	55.38	PK	289	228	V	14.88	70.26	64.26	74	9.74
11570.00	39.24	AV	289	228	V	14.88	54.12	48.12	54	5.88
17355.00	39.67	PK	209	157	H	20.03	59.70	53.70	74	20.30
17355.00	23.53	AV	209	157	H	20.03	43.56	37.56	54	16.44
2394.00	38.81	PK	30	132	H	-6.21	32.60	26.60	74	47.40
2394.00	25.21	AV	30	132	H	-6.21	19.00	13.00	54	41.00
6962.00	42.90	PK	136	183	V	7.23	50.13	44.13	74	29.87
6962.00	29.41	AV	136	183	V	7.23	36.64	30.64	54	23.36
5725-5850 MHz band-High Channel:5825MHz										
51.38	45.42	QP	337	201	V	-11.14	34.28	/	40	5.72
268.84	46.00	QP	280	159	H	-5.83	40.17	/	46	5.83
5825.00	113.17	PK	338	240	V	3.56	116.73	110.73	/	/
5825.00	105.43	AV	338	240	V	3.56	108.99	102.99	/	/
5825.00	107.15	PK	96	209	H	3.56	110.71	104.71	/	/
5825.00	99.21	AV	96	209	H	3.56	102.77	96.77	/	/
5850.00	56.84	PK	124	246	V	3.63	60.47	54.47	74	19.53
5850.00	40.59	AV	124	246	V	3.63	44.22	38.22	54	15.78
11650.00	55.54	PK	336	249	H	14.57	70.11	64.11	74	9.89
11650.00	39.55	AV	336	249	H	14.57	54.12	48.12	54	5.88
17475.00	39.63	PK	321	176	H	20.60	60.23	54.23	74	19.77
17475.00	23.02	AV	321	176	H	20.60	43.62	37.62	54	16.38
6962.00	43.51	PK	332	186	V	7.23	50.74	44.74	74	29.26
6962.00	28.64	AV	332	186	V	7.23	35.87	29.87	54	24.13

802.11n ht20 Mode: Chain0+Chian1:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5180 MHz										
51.38	45.23	QP	167	187	V	-11.14	34.09	/	40	5.91
268.84	46.89	QP	118	108	H	-5.83	41.06	/	46	4.94
5180.00	113.05	PK	66	142	V	2.26	115.31	109.31	/	/
5180.00	105.45	AV	66	142	V	2.26	107.71	101.71	/	/
5180.00	107.63	PK	315	208	H	2.26	109.89	103.89	/	/
5180.00	99.56	AV	315	208	H	2.26	101.82	95.82	/	/
5150.00	54.36	PK	266	116	V	2.23	56.59	50.59	74	23.41
5150.00	39.55	AV	266	116	V	2.23	41.78	35.78	54	18.22
10360.00	54.54	PK	3	216	H	13.52	68.06	62.06	74	11.94
10360.00	39.61	AV	3	216	H	13.52	53.13	47.13	54	6.87
15540.00	39.51	PK	259	209	V	12.47	51.98	45.98	74	28.02
15540.00	24.02	AV	259	209	V	12.47	36.49	30.49	54	23.51
6963.00	43.86	PK	272	123	H	7.23	51.09	45.09	74	28.91
6963.00	29.68	AV	272	123	H	7.23	36.91	30.91	54	23.09
5150-5250 MHz band-Middle Channel:5200MHz										
51.38	45.83	QP	295	153	V	-11.14	34.69	/	40	5.31
268.84	46.06	QP	16	144	H	-5.83	40.23	/	46	5.77
5200.00	113.74	PK	344	186	V	2.28	116.02	110.02	/	/
5200.00	105.02	AV	344	186	V	2.28	107.30	102.30	/	/
5200.00	108.45	PK	221	105	H	2.28	110.73	104.73	/	/
5200.00	100.13	AV	221	105	H	2.28	102.41	96.41	/	/
10400.00	54.25	PK	19	186	V	13.67	67.92	61.92	74	12.08
10400.00	39.55	AV	19	186	V	13.67	53.22	47.22	54	6.78
15600.00	39.66	PK	137	129	V	12.72	52.38	46.38	74	27.62
15600.00	24.07	AV	137	129	V	12.72	36.79	30.79	54	23.21
2399.00	50.35	PK	71	198	H	-6.20	44.15	38.15	74	35.85
2399.00	35.59	AV	71	198	H	-6.20	29.39	23.39	54	30.61
6963.00	43.51	PK	66	123	V	7.23	50.74	44.74	74	29.26
6963.00	28.41	AV	66	123	V	7.23	35.64	29.64	54	24.36
5150-5250 MHz band-High Channel:5240MHz										
51.38	45.47	QP	316	218	V	-11.14	34.33	/	40	5.67
268.84	46.42	QP	183	195	H	-5.83	40.59	/	46	5.41
5240.00	113.45	PK	238	155	V	2.32	115.77	109.77	/	/
5240.00	105.86	AV	238	155	V	2.32	107.18	101.18	/	/
5240.00	108.08	PK	199	173	H	2.32	110.40	104.40	/	/
5240.00	100.57	AV	199	173	H	2.32	102.89	96.89	/	/
5350.00	43.26	PK	148	121	H	2.45	45.71	39.71	74	34.29
5350.00	27.92	AV	148	121	H	2.45	30.37	24.37	54	29.63
10480.00	54.50	PK	9	164	H	13.98	68.48	62.48	74	11.52
10480.00	39.07	AV	9	164	H	13.98	53.05	47.05	54	6.95
15720.00	39.46	PK	307	153	V	13.22	52.68	46.68	74	27.32
15720.00	24.72	AV	307	153	V	13.22	37.94	31.94	54	22.06
6963.00	44.18	PK	51	175	V	7.23	51.41	45.41	74	28.59
6963.00	29.12	AV	51	175	V	7.23	36.35	30.35	54	23.65

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5745 MHz										
51.38	45.81	QP	264	177	V	-11.14	34.67	/	40	5.33
268.84	46.46	QP	67	165	H	-5.83	40.63	/	46	5.37
5745.00	113.21	PK	315	145	V	3.33	116.54	110.54	/	/
5745.00	105.52	AV	315	145	V	3.33	108.85	102.85	/	/
5745.00	107.84	PK	212	214	H	3.33	111.17	105.17	/	/
5745.00	99.36	AV	212	214	H	3.33	102.69	96.69	/	/
5725.00	62.01	PK	92	155	V	3.27	65.28	59.28	74	14.72
5725.00	43.02	AV	92	155	V	3.27	46.29	40.29	54	13.71
11490.00	54.13	PK	121	156	H	15.13	69.26	63.26	74	10.74
11490.00	39.52	AV	121	156	H	15.13	54.65	48.65	54	5.35
17235.00	39.45	PK	187	160	H	19.45	58.90	52.90	74	21.10
17235.00	23.91	AV	187	160	H	19.45	43.36	37.36	54	16.64
6962.00	44.05	PK	160	107	V	7.23	51.28	45.28	74	28.72
6962.00	29.03	AV	160	107	V	7.23	36.26	30.26	54	23.74
5725-5850 MHz band-Middle Channel:5785MHz										
51.38	45.66	QP	348	173	V	-11.14	34.52	/	40	5.48
268.84	46.38	QP	42	138	H	-5.83	40.55	/	46	5.45
5785.00	113.59	PK	222	143	V	3.44	117.03	111.03	/	/
5785.00	105.78	AV	222	143	V	3.44	109.22	103.22	/	/
5785.00	107.92	PK	29	198	H	3.44	111.36	105.36	/	/
5785.00	99.40	AV	29	198	H	3.44	102.84	96.84	/	/
11570.00	54.85	PK	219	240	V	14.88	69.73	63.73	74	10.27
11570.00	39.97	AV	219	240	V	14.88	54.85	48.85	54	5.15
17355.00	39.42	PK	336	206	H	20.03	59.45	53.45	74	20.55
17355.00	23.88	AV	336	206	H	20.03	43.91	37.91	54	16.09
2394.00	38.99	PK	89	116	H	-6.21	32.78	26.78	74	47.22
2394.00	25.21	AV	89	116	H	-6.21	19.00	13.00	54	41.00
6962.00	42.79	PK	192	169	V	7.23	50.02	44.02	74	29.98
6962.00	29.38	AV	192	169	V	7.23	36.61	30.61	54	23.39
5725-5850 MHz band-High Channel:5825MHz										
51.38	45.32	QP	121	126	V	-11.14	34.18	/	40	5.82
268.84	46.61	QP	138	103	H	-5.83	40.78	/	46	5.22
5825.00	113.27	PK	62	221	V	3.56	116.83	110.83	/	/
5825.00	105.55	AV	62	221	V	3.56	108.11	102.11	/	/
5825.00	107.88	PK	243	183	H	3.56	111.44	105.44	/	/
5825.00	99.37	AV	243	183	H	3.56	102.93	96.93	/	/
5850.00	56.34	PK	89	156	V	3.63	59.97	53.97	74	20.03
5850.00	40.78	AV	89	156	V	3.63	44.41	38.41	54	15.59
11650.00	54.16	PK	232	173	H	14.57	68.73	62.73	74	11.27
11650.00	39.54	AV	232	173	H	14.57	54.11	48.11	54	5.89
17475.00	39.45	PK	126	226	H	20.60	60.05	54.05	74	19.95
17475.00	23.93	AV	126	226	H	20.60	44.53	38.53	54	15.47
6962.00	43.52	PK	184	156	V	7.23	50.75	44.75	74	29.25
6962.00	28.75	AV	184	156	V	7.23	35.98	29.98	54	24.02

802.11n ht40 Mode: Chain0+Chian1:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5190 MHz										
51.38	45.28	QP	44	104	V	-11.14	34.14	/	40	5.86
268.84	46.83	QP	346	169	H	-5.83	41.00	/	46	5.00
5190.00	108.56	PK	249	112	V	2.27	110.83	104.83	/	/
5190.00	100.61	AV	249	112	V	2.27	102.88	96.88	/	/
5190.00	101.76	PK	301	122	H	2.27	104.03	98.03	/	/
5190.00	93.75	AV	301	122	H	2.27	96.02	90.02	/	/
5150.00	63.94	PK	238	156	H	2.23	66.17	60.17	74	13.83
5150.00	44.31	AV	238	156	H	2.23	46.54	40.54	54	13.46
10380.00	52.73	PK	251	124	V	13.60	66.33	60.33	74	13.67
10380.00	39.52	AV	251	124	V	13.60	53.12	47.12	54	6.88
15570.00	36.14	PK	353	164	H	12.59	48.73	42.73	74	31.27
15570.00	23.02	AV	353	164	H	12.59	35.61	29.61	54	24.39
6957.00	40.87	PK	68	248	V	7.22	48.09	42.09	74	31.91
6957.00	27.85	AV	68	248	V	7.22	35.07	29.07	54	24.93
5150-5250 MHz band-High Channel:5230MHz										
51.38	45.08	QP	225	207	V	-11.14	33.94	/	40	6.06
268.84	46.39	QP	286	210	H	-5.83	40.56	/	46	5.44
5230.00	108.61	PK	63	230	V	2.31	110.92	104.92	/	/
5230.00	100.70	AV	63	230	V	2.31	102.01	96.01	/	/
5230.00	101.75	PK	179	232	H	2.31	104.06	98.06	/	/
5230.00	93.78	AV	179	232	H	2.31	95.09	90.09	/	/
5350.00	45.84	PK	102	239	V	2.45	48.29	42.29	74	31.71
5350.00	31.26	AV	102	239	V	2.45	33.71	27.71	54	26.29
10460.00	35.15	PK	326	111	H	13.91	49.06	43.06	74	30.94
10460.00	21.65	AV	326	111	H	13.91	35.56	29.56	54	24.44
15690.00	33.16	PK	178	131	V	13.09	46.25	40.25	74	33.75
15690.00	19.29	AV	178	131	V	13.09	32.38	26.38	54	27.62
6957.00	40.42	PK	147	122	V	7.22	47.64	41.64	74	32.36
6957.00	28.11	AV	147	122	V	7.22	35.33	29.33	54	24.67

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5755 MHz										
51.38	45.06	QP	14	201	V	-11.14	33.92	/	40	6.08
268.84	46.34	QP	137	205	H	-5.83	40.51	/	46	5.49
5755.00	108.60	PK	245	131	V	3.35	111.95	105.95	/	/
5755.00	100.65	AV	245	131	V	3.35	103.00	97.00	/	/
5755.00	101.82	PK	298	151	H	3.35	105.17	99.17	/	/
5755.00	93.81	AV	298	151	H	3.35	97.16	91.16	/	/
5725.00	63.96	PK	46	222	H	3.27	67.23	61.23	74	12.77
5725.00	44.33	AV	46	222	H	3.27	47.60	41.60	54	12.40
11510.00	52.73	PK	59	190	V	15.11	67.84	61.84	74	12.16
11510.00	39.52	AV	59	190	V	15.11	54.63	48.63	54	5.37
17265.00	36.14	PK	26	249	H	19.60	55.74	49.74	74	24.26
17265.00	23.02	AV	26	249	H	19.60	42.62	36.62	54	17.38
6655.00	41.65	PK	212	212	V	6.35	48.00	42.00	74	32.00
6655.00	27.57	AV	212	212	V	6.35	33.92	27.92	54	26.08
5725-5850 MHz band-High Channel:5795MHz										
51.38	45.03	QP	178	193	V	-11.14	33.89	/	40	6.11
268.84	46.73	QP	39	148	H	-5.83	40.90	/	46	5.10
5795.00	104.93	PK	218	207	V	3.47	108.40	102.40	/	/
5795.00	95.13	AV	218	207	V	3.47	98.60	92.60	/	/
5795.00	105.32	PK	113	156	H	3.47	108.79	102.79	/	/
5795.00	96.26	AV	113	156	H	3.47	99.73	93.73	/	/
5850.00	62.95	PK	174	157	V	3.63	66.58	60.58	74	13.42
5850.00	45.44	AV	174	157	V	3.63	49.07	43.07	54	10.93
11590.00	52.80	PK	64	140	V	14.80	67.60	61.60	74	12.40
11590.00	39.61	AV	64	140	V	14.80	54.41	48.41	54	5.59
17385.00	36.17	PK	29	238	H	20.17	56.34	50.34	74	23.66
17385.00	23.16	AV	29	238	H	20.17	43.33	37.33	54	16.67
6655.00	41.67	PK	316	121	V	6.35	48.02	42.02	74	31.98
6655.00	27.01	AV	316	121	V	6.35	33.36	27.36	54	26.64

802.11ac20 mode: Chain0+Chain1:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5180 MHz										
51.38	45.23	QP	187	130	V	-11.14	34.09	/	40	5.91
268.84	46.34	QP	184	124	H	-5.83	40.51	/	46	5.49
5180.00	112.48	PK	100	236	V	2.26	114.74	108.74	/	/
5180.00	105.47	AV	100	236	V	2.26	107.73	101.73	/	/
5180.00	106.96	PK	236	115	H	2.26	109.22	103.22	/	/
5180.00	99.14	AV	236	115	H	2.26	101.40	95.40	/	/
5150.00	56.21	PK	313	123	V	2.23	58.44	52.44	74	21.56
5150.00	43.02	AV	313	123	V	2.23	45.25	39.25	54	14.75
10360.00	54.01	PK	210	223	H	13.52	67.53	61.53	74	12.47
10360.00	39.59	AV	210	223	H	13.52	53.11	47.11	54	6.89
15540.00	40.85	PK	252	182	V	12.47	53.32	47.32	74	26.68
15540.00	27.69	AV	252	182	V	12.47	40.16	34.16	54	19.84
6963.00	43.60	PK	113	112	H	7.23	50.83	44.83	74	29.17
6963.00	29.97	AV	113	112	H	7.23	37.20	31.20	54	22.80
5150-5250 MHz band-Middle Channel:5200MHz										
51.38	45.92	QP	106	129	V	-11.14	34.78	/	40	5.22
268.84	46.79	QP	75	177	H	-5.83	40.96	/	46	5.04
5200.00	112.49	PK	322	187	V	2.28	114.77	108.77	/	/
5200.00	103.45	AV	322	187	V	2.28	105.73	99.73	/	/
5200.00	106.95	PK	341	219	H	2.28	109.23	103.23	/	/
5200.00	98.15	AV	341	219	H	2.28	100.43	94.43	/	/
10400.00	55.35	PK	275	175	V	13.67	69.02	63.02	74	10.98
10400.00	39.48	AV	275	175	V	13.67	53.15	47.15	54	6.85
15600.00	40.92	PK	133	167	V	12.72	53.64	47.64	74	26.36
15600.00	27.75	AV	133	167	V	12.72	40.47	34.47	54	19.53
2399.00	50.50	PK	333	233	H	-6.20	44.30	38.30	74	35.70
2399.00	35.08	AV	333	233	H	-6.20	28.88	22.88	54	31.12
6963.00	43.50	PK	296	192	V	7.23	50.73	44.73	74	29.27
6963.00	28.65	AV	296	192	V	7.23	35.88	29.88	54	24.12
5150-5250 MHz band-High Channel:5240MHz										
51.38	45.13	QP	165	138	V	-11.14	33.99	/	40	6.01
268.84	46.35	QP	86	111	H	-5.83	40.52	/	46	5.48
5240.00	112.42	PK	80	194	V	2.32	114.74	108.74	/	/
5240.00	103.39	AV	80	194	V	2.32	105.71	99.71	/	/
5240.00	106.94	PK	199	213	H	2.32	109.26	103.26	/	/
5240.00	98.12	AV	199	213	H	2.32	100.44	94.44	/	/
5350.00	42.87	PK	185	140	H	2.45	45.32	39.32	74	34.68
5350.00	27.72	AV	185	140	H	2.45	30.17	24.17	54	29.83
10480.00	55.36	PK	333	246	H	13.98	69.34	63.34	74	10.66
10480.00	39.46	AV	333	246	H	13.98	53.44	47.44	54	6.56
15720.00	40.94	PK	72	242	V	13.22	54.16	48.16	74	25.84
15720.00	27.72	AV	72	242	V	13.22	40.94	34.94	54	19.06
6963.00	43.52	PK	96	244	V	7.23	50.75	44.75	74	29.25
6963.00	29.30	AV	96	244	V	7.23	36.53	30.53	54	23.47

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation Result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5745 MHz										
51.38	45.61	QP	45	113	V	-11.14	34.47	/	40	5.53
268.84	46.04	QP	353	161	H	-5.83	40.21	/	46	5.79
5745.00	112.65	PK	27	172	V	3.33	115.98	109.98	/	/
5745.00	103.56	AV	27	172	V	3.33	106.89	100.89	/	/
5745.00	106.98	PK	112	126	H	3.33	110.31	104.31	/	/
5745.00	98.15	AV	112	126	H	3.33	101.48	95.48	/	/
5725.00	61.78	PK	111	129	V	3.27	65.05	59.05	74	14.95
5725.00	43.43	AV	111	129	V	3.27	46.70	40.70	54	13.30
11490.00	54.11	PK	159	125	H	15.13	69.24	63.24	74	10.76
11490.00	39.58	AV	159	125	H	15.13	54.71	48.71	54	5.29
17235.00	40.85	PK	118	119	H	19.45	60.30	54.30	74	19.70
17235.00	27.72	AV	118	119	H	19.45	47.17	41.17	54	12.83
6962.00	43.65	PK	158	234	V	7.23	50.88	44.88	74	29.12
6962.00	29.48	AV	158	234	V	7.23	36.71	30.71	54	23.29
5725-5850 MHz band-Middle Channel:5785MHz										
51.38	45.74	QP	212	120	V	-11.14	34.60	/	40	5.40
268.84	46.67	QP	41	143	H	-5.83	40.84	/	46	5.16
5785.00	112.79	PK	348	155	V	3.44	116.23	110.23	/	/
5785.00	103.85	AV	348	155	V	3.44	106.29	100.29	/	/
5785.00	107.58	PK	316	250	H	3.44	111.02	105.02	/	/
5785.00	99.42	AV	316	250	H	3.44	102.86	96.86	/	/
11570.00	54.42	PK	90	153	V	14.88	69.30	63.30	74	10.70
11570.00	39.80	AV	90	153	V	14.88	54.68	48.68	54	5.32
17355.00	40.45	PK	213	245	H	20.03	60.48	54.48	74	19.52
17355.00	27.63	AV	213	245	H	20.03	47.66	41.66	54	12.34
2394.00	39.06	PK	160	136	H	-6.21	32.85	26.85	74	47.15
2394.00	24.99	AV	160	136	H	-6.21	18.78	12.78	54	41.22
6962.00	43.26	PK	253	224	V	7.23	50.49	44.49	74	29.51
6962.00	29.22	AV	253	224	V	7.23	36.45	30.45	54	23.55
5725-5850 MHz band-High Channel:5825MHz										
51.38	45.92	QP	181	197	V	-11.14	34.78	/	40	5.22
268.84	46.47	QP	354	154	H	-5.83	40.64	/	46	5.36
5825.00	112.26	PK	280	203	V	3.56	115.82	109.82	/	/
5825.00	103.58	AV	280	203	V	3.56	105.14	99.14	/	/
5825.00	107.74	PK	221	116	H	3.56	111.30	105.30	/	/
5825.00	99.54	AV	221	116	H	3.56	103.10	97.10	/	/
5850.00	57.23	PK	26	157	V	3.63	60.86	54.86	74	19.14
5850.00	40.36	AV	26	157	V	3.63	43.99	37.99	54	16.01
11650.00	54.26	PK	152	107	H	14.57	68.83	62.83	74	11.17
11650.00	39.55	AV	152	107	H	14.57	54.12	48.12	54	5.88
17475.00	40.56	PK	360	160	H	20.60	61.16	55.16	74	18.84
17475.00	27.64	AV	360	160	H	20.60	48.24	42.24	54	11.76
6962.00	43.87	PK	237	203	V	7.23	51.10	45.10	74	28.90
6962.00	28.33	AV	237	203	V	7.23	35.56	29.56	54	24.44

802.11ac40 mode: Chain0+Chain1:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5190 MHz										
51.38	45.78	QP	205	195	V	-11.14	34.64	/	40	5.36
268.84	46.71	QP	138	250	H	-5.83	40.88	/	46	5.12
5190.00	108.60	PK	26	242	V	2.27	110.87	104.87	/	/
5190.00	100.68	AV	26	242	V	2.27	102.95	96.95	/	/
5190.00	101.80	PK	281	208	H	2.27	104.07	98.07	/	/
5190.00	93.80	AV	281	208	H	2.27	96.07	90.07	/	/
5150.00	63.66	PK	342	162	H	2.23	65.89	59.89	74	14.11
5150.00	44.36	AV	342	162	H	2.23	46.59	40.59	54	13.41
10380.00	52.77	PK	87	138	V	13.60	66.37	60.37	74	13.63
10380.00	39.54	AV	87	138	V	13.60	53.14	47.14	54	6.86
15570.00	36.15	PK	205	129	H	12.59	48.74	42.74	74	31.26
15570.00	23.03	AV	205	129	H	12.59	35.62	29.62	54	24.38
6957.00	41.03	PK	196	215	V	7.22	48.25	42.25	74	31.75
6957.00	27.55	AV	196	215	V	7.22	34.77	28.77	54	25.23
5150-5250 MHz band-High Channel:5230MHz										
51.38	45.71	QP	170	132	V	-11.14	34.57	/	40	5.43
268.84	46.99	QP	194	177	H	-5.83	41.16	/	46	4.84
5230.00	108.67	PK	328	240	V	2.31	110.98	104.98	/	/
5230.00	100.65	AV	328	240	V	2.31	102.96	96.96	/	/
5230.00	101.76	PK	71	143	H	2.31	104.07	98.07	/	/
5230.00	93.84	AV	71	143	H	2.31	96.15	90.15	/	/
5350.00	46.10	PK	3	211	V	2.45	48.55	42.55	74	31.45
5350.00	31.46	AV	3	211	V	2.45	33.91	27.91	54	26.09
10460.00	52.84	PK	143	169	H	13.91	66.75	60.75	74	13.25
10460.00	39.86	AV	143	169	H	13.91	53.77	47.77	54	6.23
15690.00	36.58	PK	334	106	V	13.09	49.67	43.67	74	30.33
15690.00	23.25	AV	334	106	V	13.09	36.34	30.34	54	23.66
6957.00	41.06	PK	20	106	V	7.22	48.28	42.28	74	31.72
6957.00	28.16	AV	20	106	V	7.22	35.38	29.38	54	24.62

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5725-5850 MHz band-Low Channel:5755 MHz										
51.38	45.82	QP	10	147	V	-11.14	34.68	/	40	5.32
268.84	46.56	QP	89	210	H	-5.83	40.73	/	46	5.27
5755.00	108.75	PK	321	154	V	3.35	112.10	106.10	/	/
5755.00	100.45	AV	321	154	V	3.35	104.80	98.80	/	/
5755.00	101.71	PK	224	147	H	3.35	105.06	99.06	/	/
5755.00	93.69	AV	224	147	H	3.35	97.04	91.04	/	/
5725.00	63.99	PK	153	170	H	3.27	67.26	61.26	74	12.74
5725.00	44.58	AV	153	170	H	3.27	47.85	41.85	54	12.15
11510.00	52.56	PK	339	108	V	15.11	67.67	61.67	74	12.33
11510.00	39.25	AV	339	108	V	15.11	54.36	48.36	54	5.64
17265.00	36.21	PK	29	159	H	19.60	55.81	49.81	74	24.19
17265.00	23.27	AV	29	159	H	19.60	42.87	36.87	54	17.13
6655.00	40.72	PK	298	232	V	6.35	47.07	41.07	74	32.93
6655.00	27.12	AV	298	232	V	6.35	33.47	27.47	54	26.53
5725-5850 MHz band-High Channel:5795MHz										
51.38	45.23	QP	245	191	V	-11.14	34.09	/	40	5.91
268.84	46.30	QP	308	164	H	-5.83	40.47	/	46	5.53
5795.00	108.85	PK	246	178	V	3.47	112.32	106.32	/	/
5795.00	100.52	AV	246	178	V	3.47	103.99	97.99	/	/
5795.00	101.86	PK	115	218	H	3.47	105.33	99.33	/	/
5795.00	93.82	AV	115	218	H	3.47	97.29	91.29	/	/
5850.00	62.21	PK	254	218	V	3.63	65.84	59.84	74	14.16
5850.00	44.97	AV	254	218	V	3.63	48.60	42.60	54	11.40
11590.00	52.47	PK	323	130	V	14.80	67.27	61.27	74	12.73
11590.00	39.15	AV	323	130	V	14.80	53.95	47.95	54	6.05
17385.00	36.81	PK	131	193	H	20.17	56.98	50.98	74	23.02
17385.00	23.54	AV	131	193	H	20.17	43.71	37.71	54	16.29
6655.00	41.17	PK	353	154	V	6.35	47.52	41.52	74	32.48
6655.00	27.33	AV	353	154	V	6.35	33.68	27.68	54	26.32

802.11ac80 mode: Chain0+Chain1:

Frequency	Receiver		Turntable Degree	Rx Antenna		Corrected Factor	Corrected Amplitude	Extrapolation result	Limit	Margin
	Reading	Detector		Height	Polar					
(MHz)	(dBμV)	(PK/QP/AV)		(cm)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
5150-5250 MHz band-Low Channel:5210 MHz										
51.38	45.06	QP	213	221	V	-11.14	33.92	/	40	6.08
268.84	46.87	QP	1	195	H	-5.83	41.04	/	46	4.96
5210.00	106.73	PK	178	237	V	2.29	109.02	103.02	/	/
5210.00	98.76	AV	178	237	V	2.29	101.05	95.05	/	/
5210.00	100.72	PK	217	217	H	2.29	103.01	97.01	/	/
5210.00	92.70	AV	217	217	H	2.29	94.99	88.99	/	/
5150.00	67.48	PK	261	185	H	2.23	69.71	63.71	74	10.29
5150.00	45.59	AV	261	185	H	2.23	47.82	41.82	54	12.18
10420.00	49.16	PK	263	228	H	13.75	62.91	56.91	74	17.09
10420.00	37.39	AV	263	228	H	13.75	51.14	45.14	54	8.86
15630.00	35.45	PK	58	149	H	12.84	48.29	42.29	74	31.71
15630.00	22.56	AV	58	149	H	12.84	35.40	29.40	54	24.60
6928.00	40.72	PK	220	165	V	7.13	47.85	41.85	74	32.15
6928.00	27.53	AV	220	165	V	7.13	34.66	28.66	54	25.34
5725-5850 MHz band-High Channel:5775MHz										
51.38	45.95	QP	149	226	V	-11.14	34.81	/	40	5.19
268.84	46.13	QP	302	162	H	-5.83	40.30	/	46	5.70
5775.00	106.76	PK	73	141	V	3.41	110.17	104.17	/	/
5775.00	98.79	AV	73	141	V	3.41	102.20	96.20	/	/
5775.00	100.85	PK	56	136	H	3.41	104.26	98.26	/	/
5775.00	92.78	AV	56	136	H	3.41	96.19	90.19	/	/
5725.00	49.08	PK	314	211	V	3.27	52.35	46.35	74	27.65
5725.00	34.06	AV	314	211	V	3.27	37.33	31.33	54	22.67
5850.00	60.11	PK	224	213	V	3.63	63.74	57.74	74	16.26
5850.00	42.03	AV	224	213	V	3.63	45.66	39.66	54	14.34
11550.00	49.21	PK	72	155	H	14.96	64.17	58.17	74	15.83
11550.00	37.23	AV	72	155	H	14.96	52.19	46.19	54	7.81
17325.00	35.26	PK	201	237	H	19.88	55.14	49.14	74	24.86
17325.00	22.62	AV	201	237	H	19.88	42.50	36.50	54	17.50
6928.00	40.32	PK	60	144	V	7.13	47.45	41.45	74	32.55
6928.00	27.36	AV	60	144	V	7.13	34.49	28.49	54	25.51

FCC §15.407(b) (1) (4) –BAND EDGE

Applicable Standard

FCC §15.407 (b) (1), (4);

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz

For transmitters operating in the 5.725–5.850 GHz band: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibration 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 1 MHz and VBW to 3MHz of spectrum analyzer. Offset the antenna gain and cable loss.
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:	23.5 °C
Relative Humidity:	60 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2017-05-02.

Please refer to the following tables and plots.

Test mode	Chain	Band (MHz)	BAND EDGE	Reading Level (dBm/MHz)	E.I.R.P (dBm/MHz)	Limits (dBm/MHz)	Result
5150-5250	Chain 0	802.11a	left	-44.21	-41.21	-27	PASS
			right	-51.57	-48.57	-27	PASS
		802.11n20	left	-44.54	-41.54	-27	PASS
			right	-51.82	-48.82	-27	PASS
		802.11n40	left	-41.77	-38.77	-27	PASS
			right	-51.90	-48.90	-27	PASS
		802.11ac20	left	-38.98	-35.98	-27	PASS
			right	-48.79	-45.79	-27	PASS
		802.11ac40	left	-41.54	-38.54	-27	PASS
			right	-50.58	-47.58	-27	PASS
		802.11ac80	left	-43.32	-40.32	-27	PASS
			right	-50.83	-47.83	-27	PASS
	Chain 1	802.11a	left	-44.40	-41.40	-27	PASS
			right	-50.77	-47.77	-27	PASS
		802.11n20	left	-42.96	-39.96	-27	PASS
			right	-51.76	-48.76	-27	PASS
		802.11n40	left	-42.09	-39.09	-27	PASS
			right	-51.20	-48.20	-27	PASS
		802.11ac20	left	-39.20	-36.20	-27	PASS
			right	-49.11	-46.11	-27	PASS
		802.11ac40	left	-41.68	-38.68	-27	PASS
			right	-50.54	-47.54	-27	PASS
		802.11ac80	left	-43.43	-40.43	-27	PASS
			right	-49.74	-46.74	-27	PASS

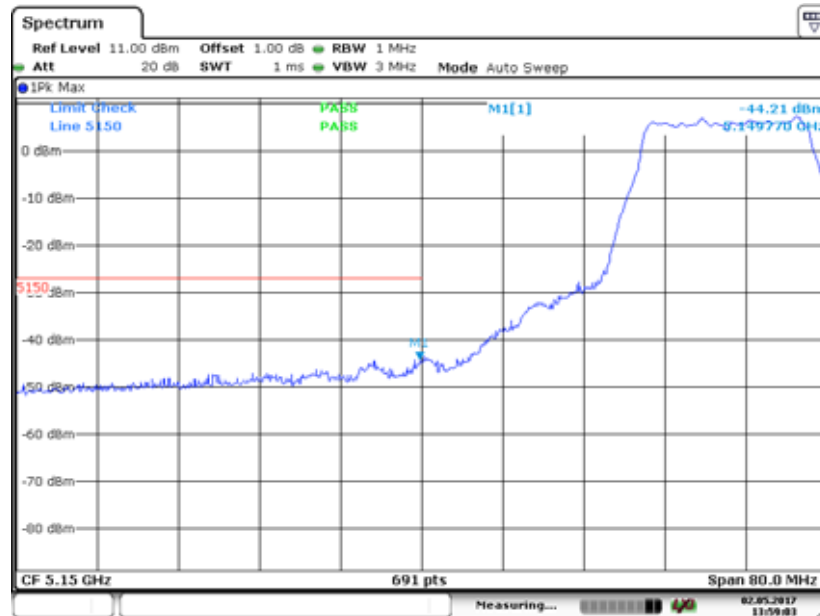
Note: The antenna gain is 3.0 dBi.

Test mode	Chain	Band (MHz)	BAND EDGE	Reading Level (dBm/MHz)	E.I.R.P (dBm/MHz)	Margin (dB)	Result
5725-5850	Chain 0	802.11a	left	-32.80	-29.80	>10dB	PASS
			right	-34.47	-31.47	>10dB	PASS
		802.11n20	left	-32.49	-29.49	>10dB	PASS
			right	-30.39	-27.39	>10dB	PASS
		802.11n40	left	-38.73	-35.73	>10dB	PASS
			right	-42.99	-39.99	>10dB	PASS
		802.11ac20	left	-34.63	-31.63	>10dB	PASS
			right	-38.26	-35.26	>10dB	PASS
		802.11ac40	left	-39.59	-36.59	>10dB	PASS
			right	-43.76	-40.76	>10dB	PASS
		802.11ac80	left	-38.33	-35.33	>10dB	PASS
			right	-41.48	-38.48	>10dB	PASS
	Chain 1	802.11a	left	-32.68	-29.68	>10dB	PASS
			right	-34.86	-31.86	>10dB	PASS
		802.11n20	left	-31.57	-28.57	>10dB	PASS
			right	-32.07	-29.07	>10dB	PASS
		802.11n40	left	-38.99	-35.99	>10dB	PASS
			right	-42.69	-39.69	>10dB	PASS
		802.11ac20	left	-34.03	-31.03	>10dB	PASS
			right	-38.99	-35.99	>10dB	PASS
		802.11ac40	left	-38.85	-35.85	>10dB	PASS
			right	-43.37	-40.37	>10dB	PASS
		802.11ac80	left	-37.89	-34.89	>10dB	PASS
			right	-41.79	-38.79	>10dB	PASS

Note: The antenna gain is 3.0 dBi.

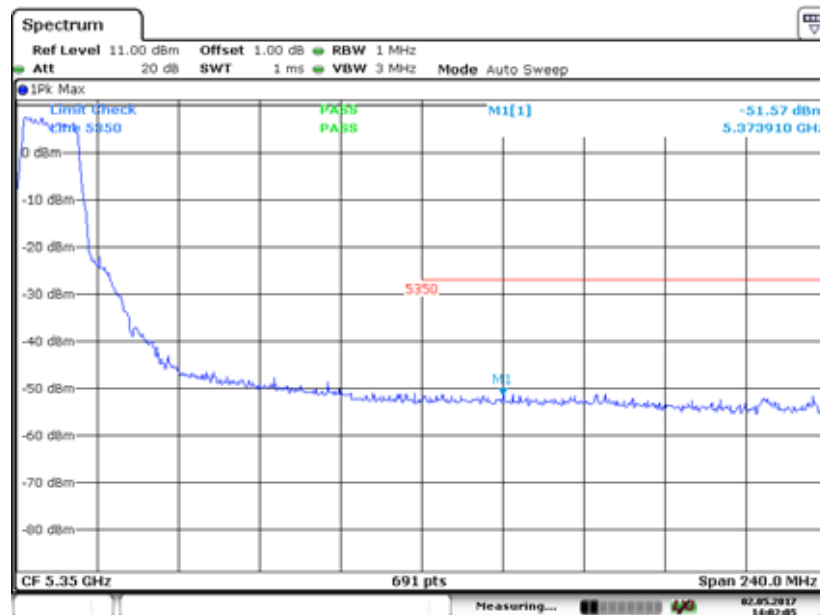
5150-5250 MHz Band:

802.11a Chain0 Band Edge, Left Side



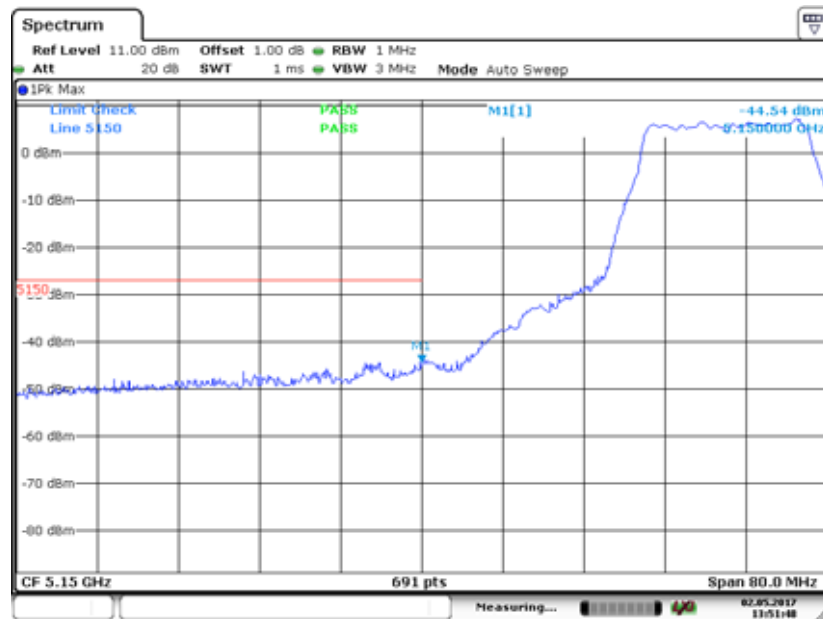
Date: 2 MAY 2017 13:59:04

802.11a Chain0 Band Edge, Right Side



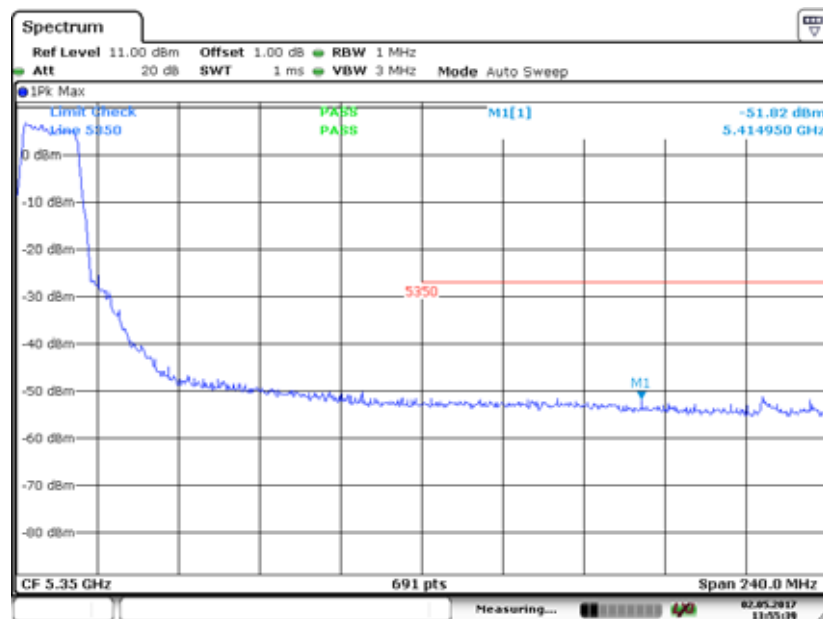
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802.11n ht20 Chain0 Band Edge, Left Side



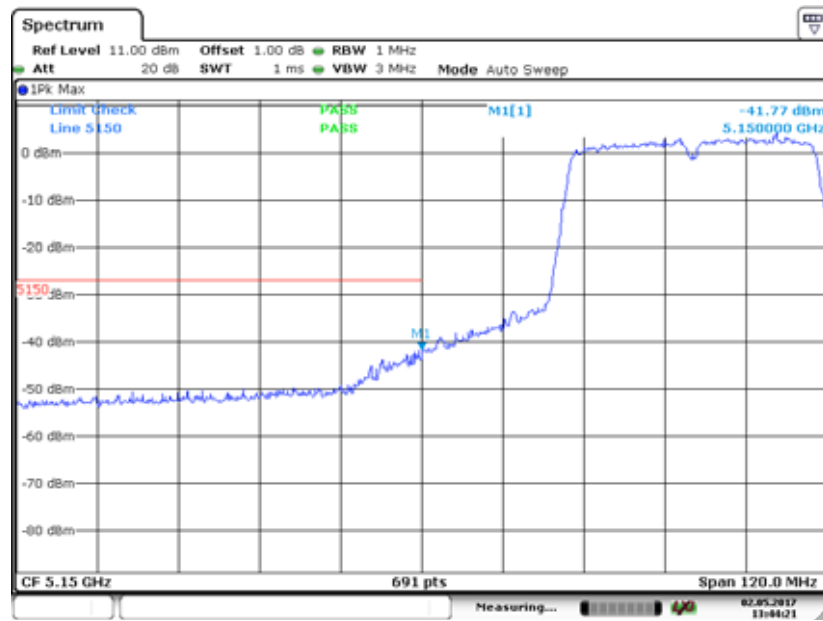
Date: 2 MAY 2017 13:51:49

802.11n ht20 Chain0 Band Edge, Right Side



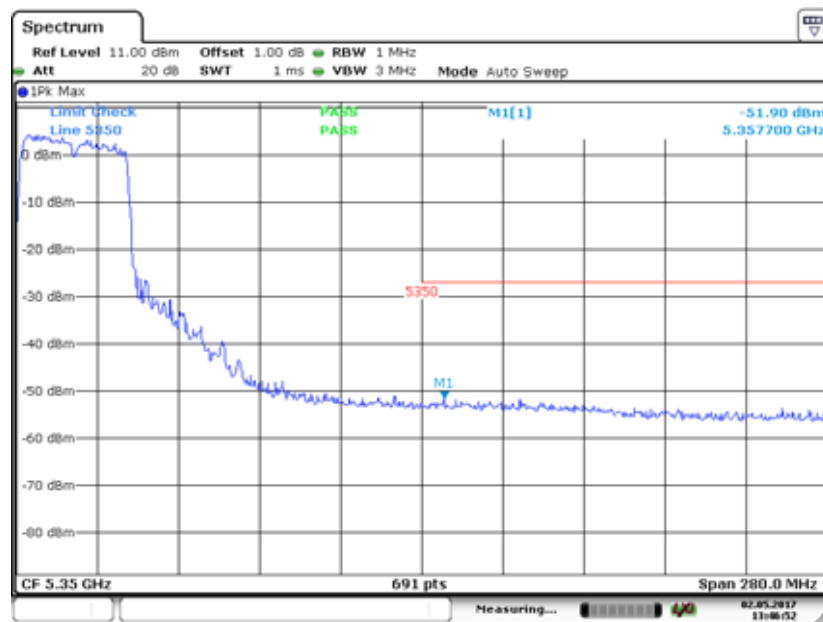
Date: 2 MAY 2017 13:55:38

802.11n ht40 Chain0 Band Edge, Left Side



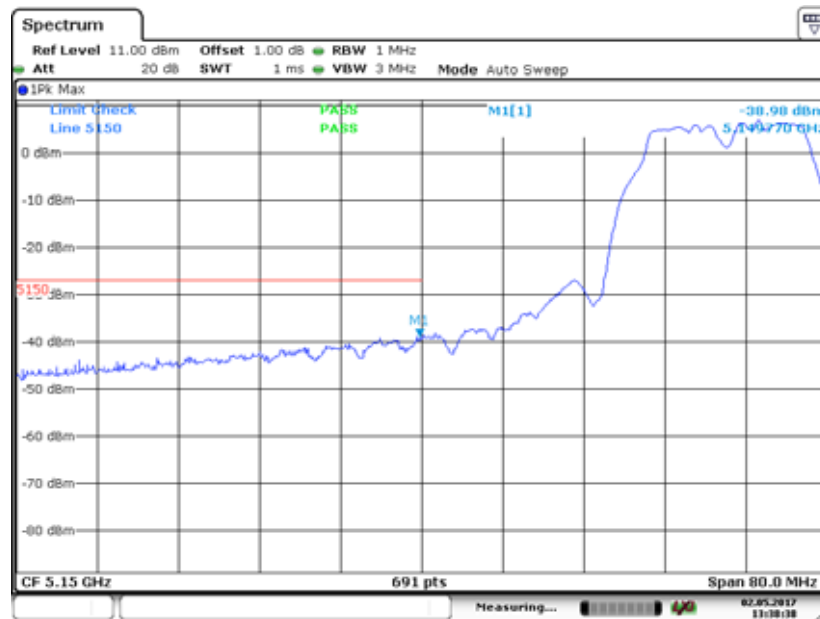
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802.11n ht40 Chain0 Band Edge, Right Side



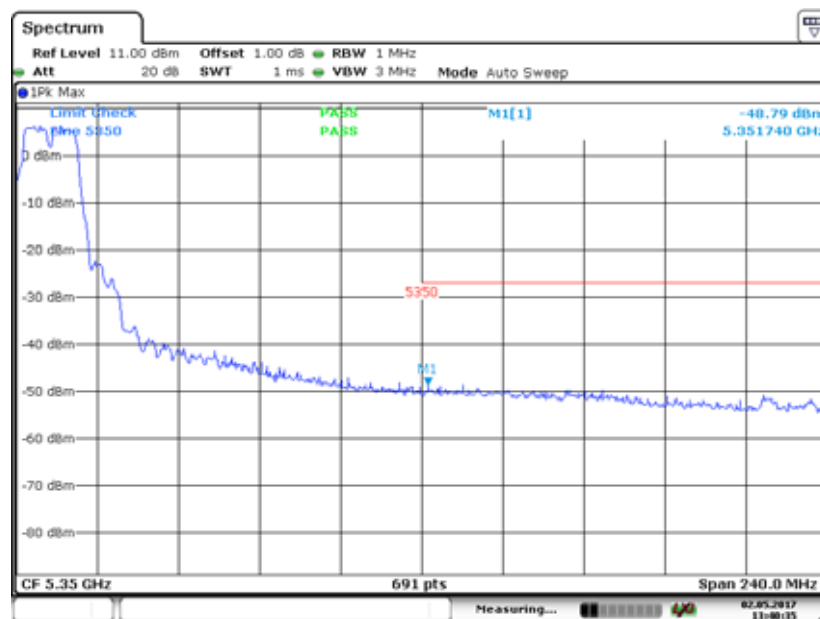
Date: 2 MAY 2017 13:46:53

802.11ac20 Chain0 Band Edge, Left Side



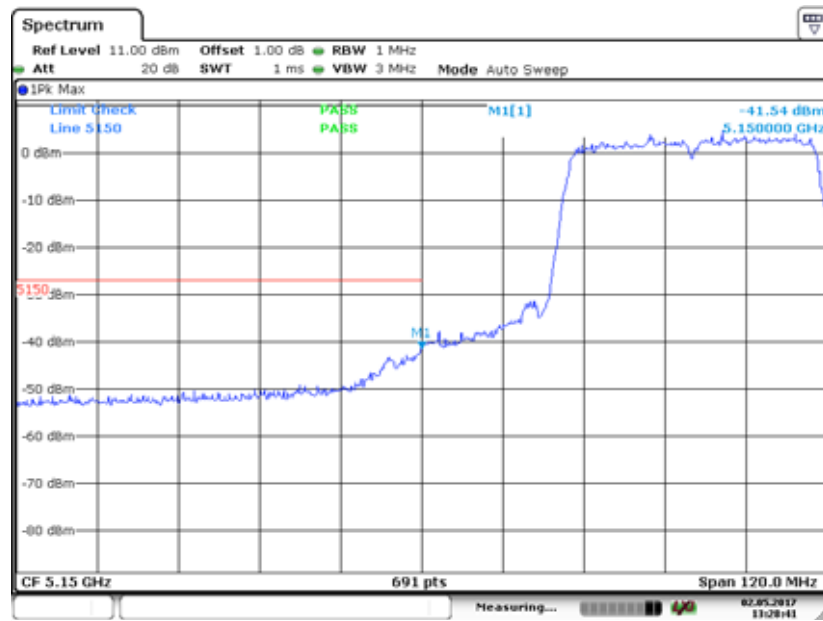
Date: 2 MAY 2017 13:38:39

802.11ac20 Chain0 Band Edge, Right Side



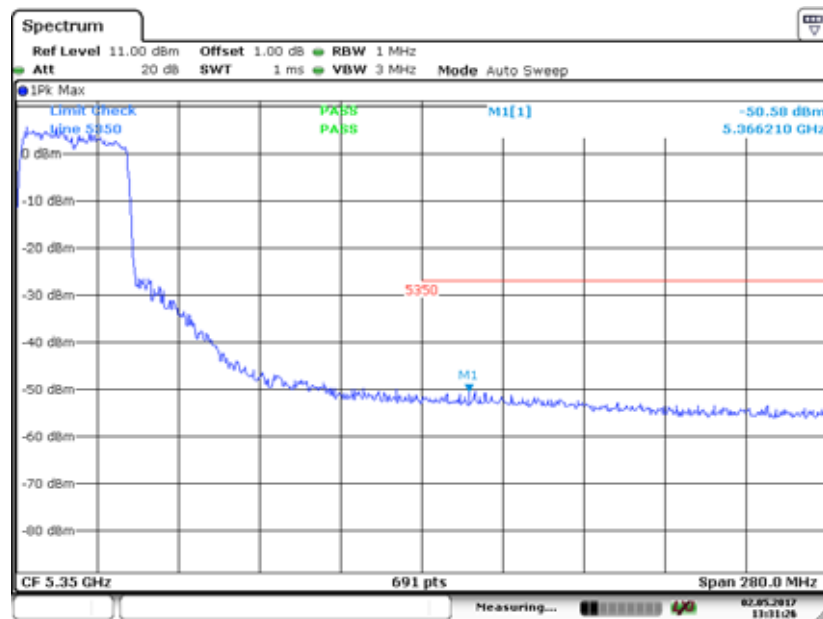
Date: 2 MAY 2017 13:40:35

802.11ac40 Chain0 Band Edge, Left Side



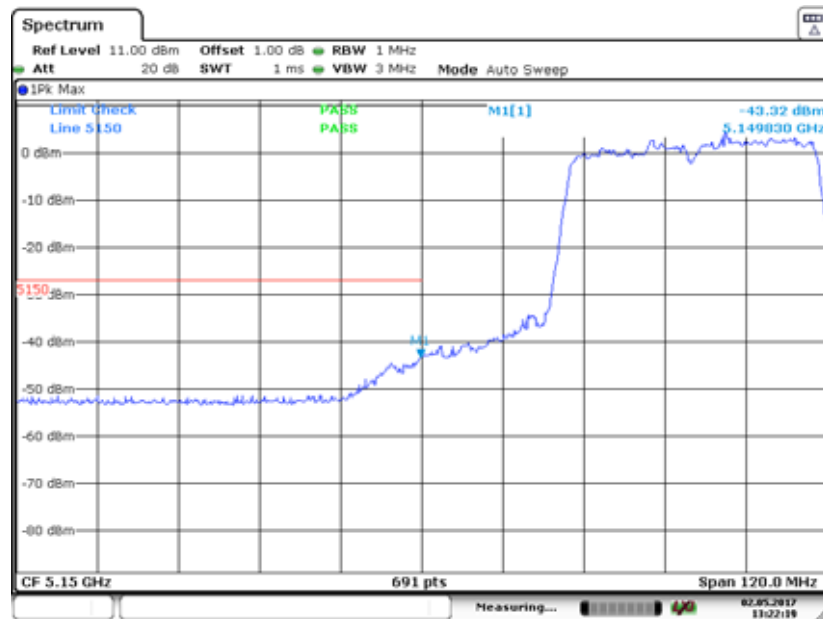
Date: 2 MAY 2017 13:28:41

802.11ac40 Chain0 Band Edge, Right Side

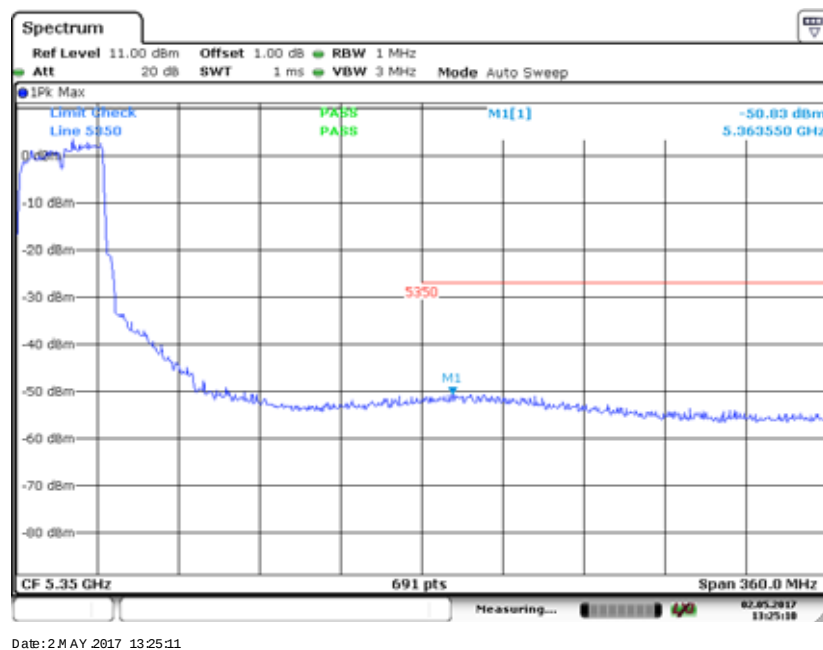


Date: 2 MAY 2017 13:31:26

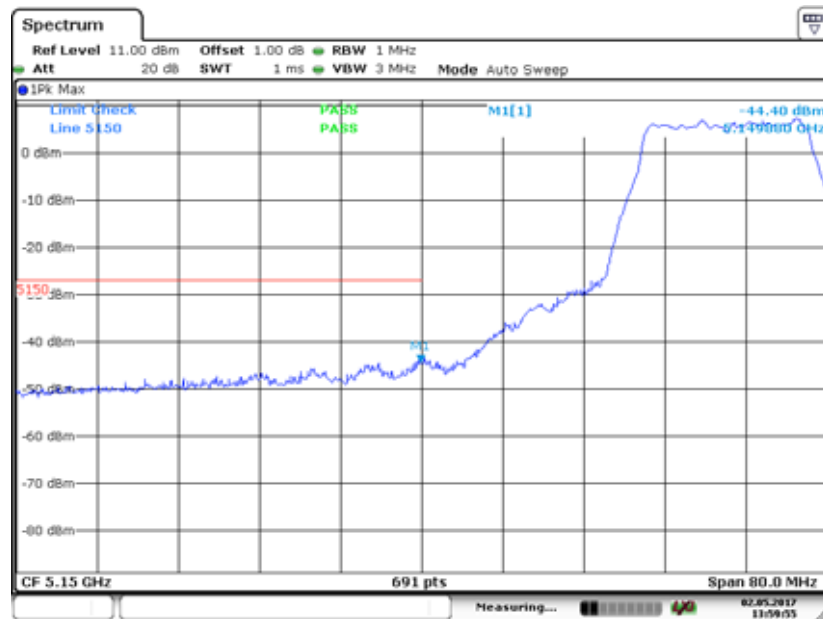
802.11ac80 Chain0 Band Edge, Left Side



802.11ac80 Chain0 Band Edge, Right Side

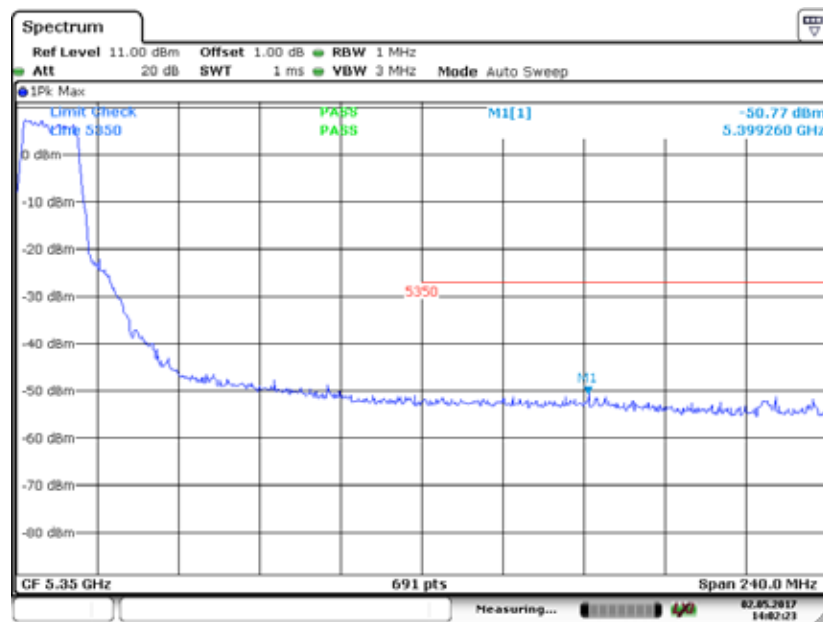


802.11a Chain1 Band Edge, Left Side



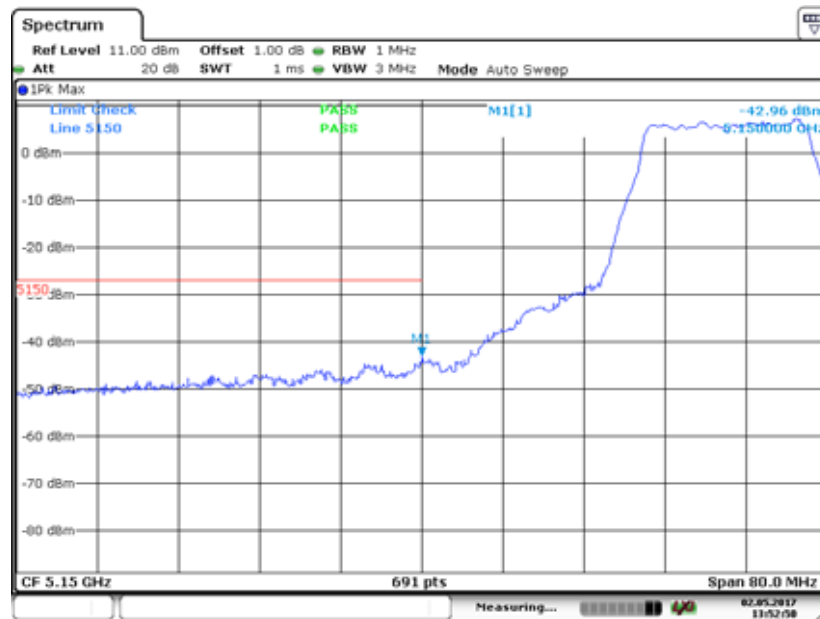
Date: 2 MAY 2017 13:59:55

802.11a Chain1 Band Edge, Right Side



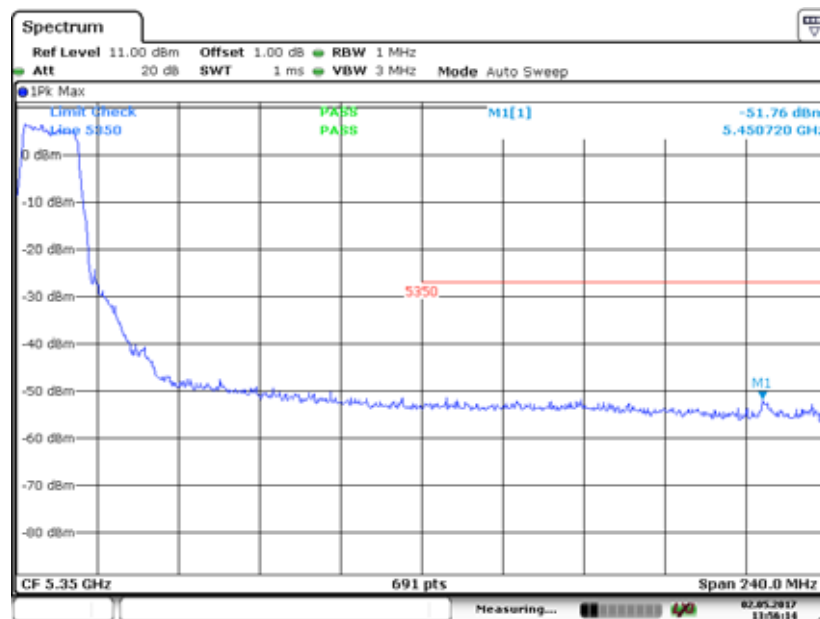
Date: 2 MAY 2017 14:02:23

802.11n ht20 Chain1 Band Edge, Left Side



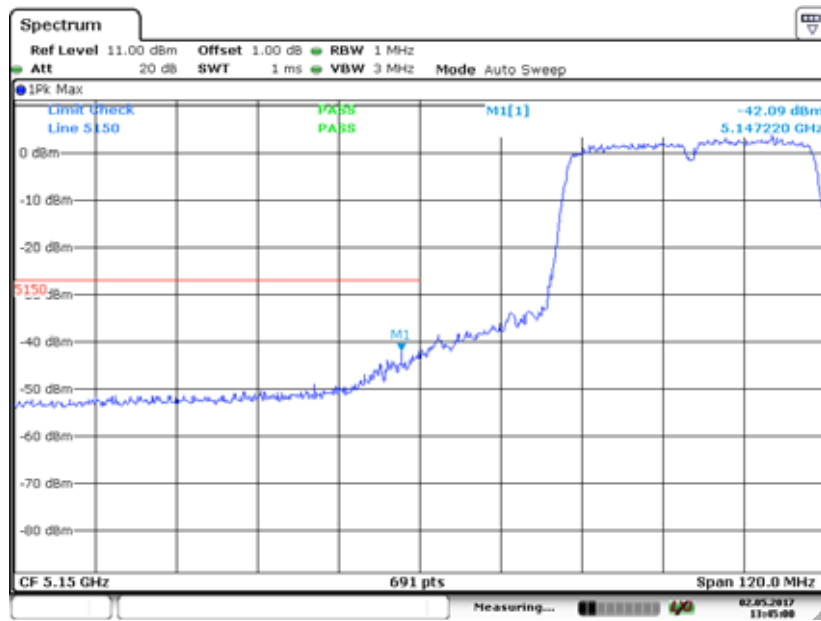
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802.11n ht20 Chain1 Band Edge, Right Side



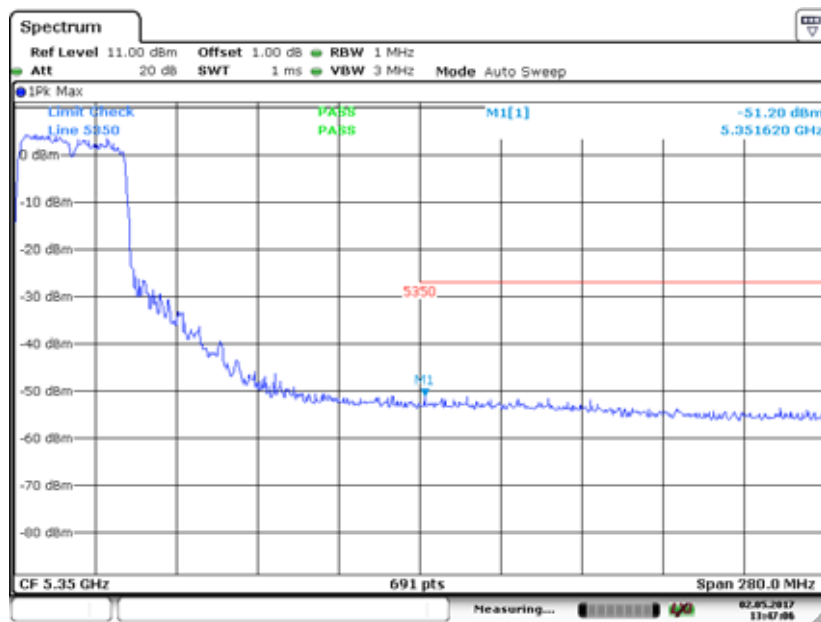
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802.11n ht40 Chain1 Band Edge, Left Side



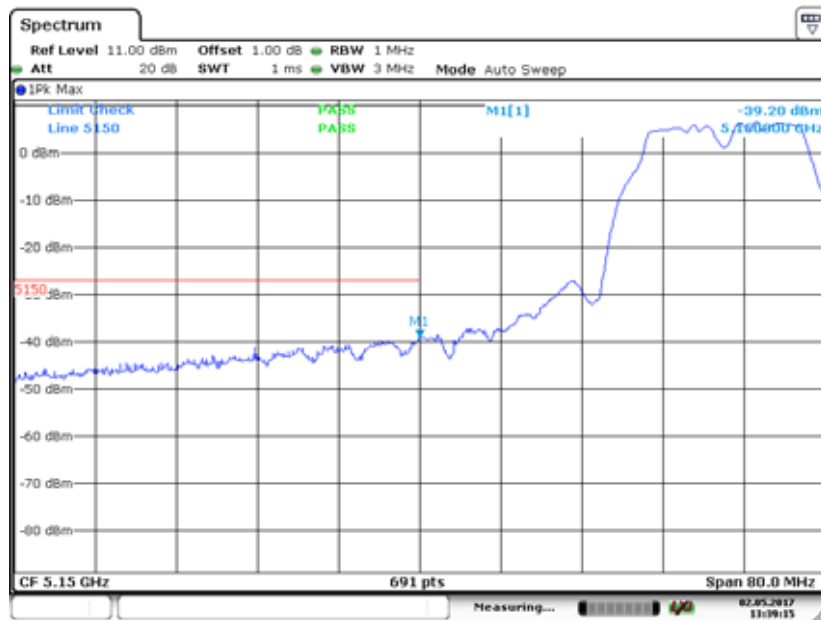
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802.11n ht40 Chain1 Band Edge, Right Side

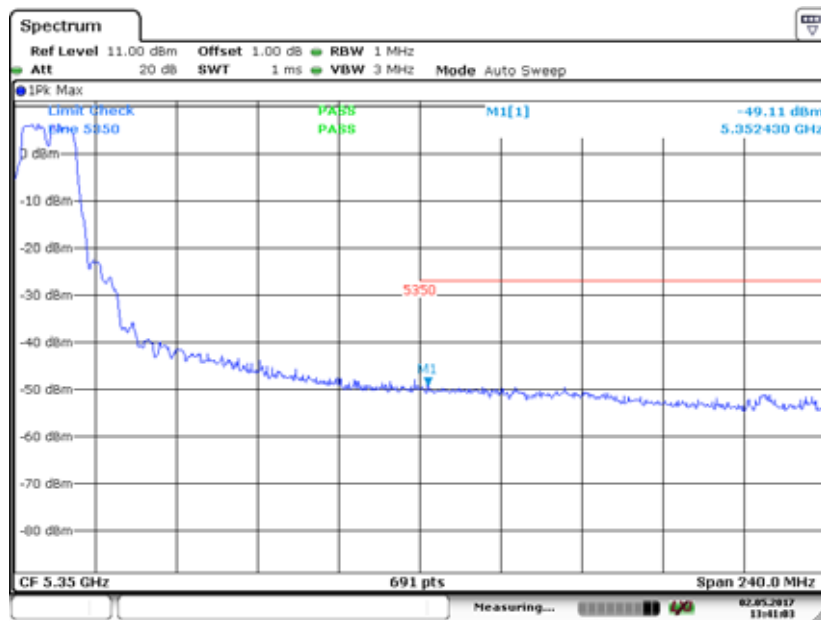


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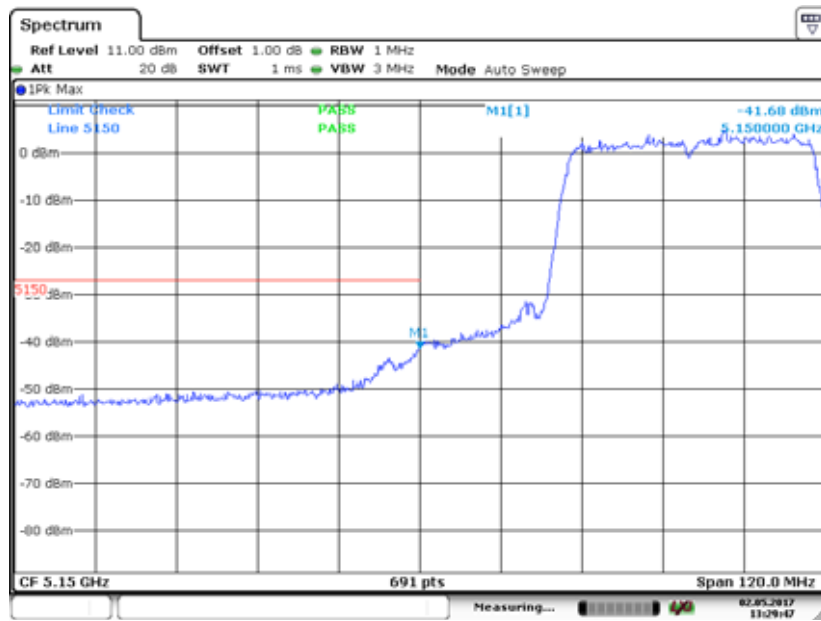
802.11ac20 Chain1 Band Edge, Left Side



802.11ac20 Chain1 Band Edge, Right Side

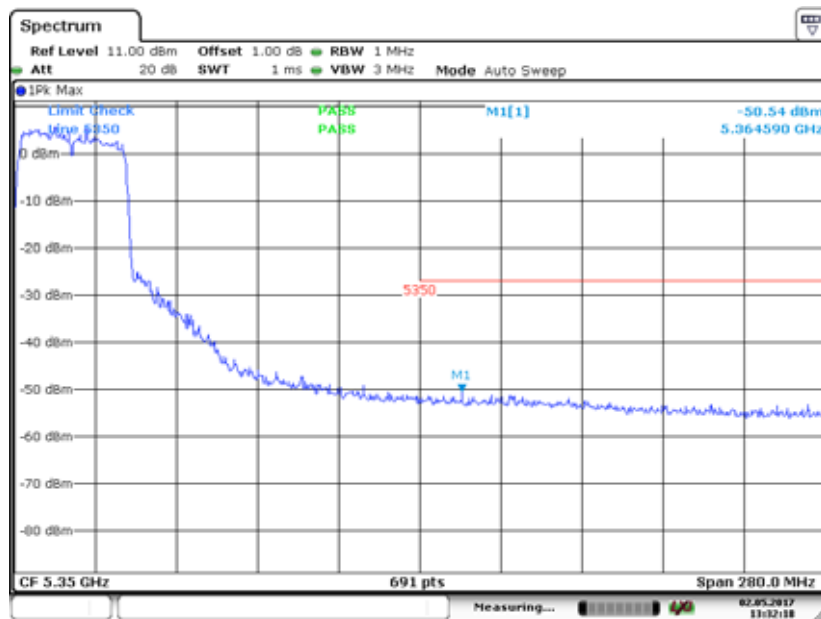


802.11ac40 Chain1 Band Edge, Left Side



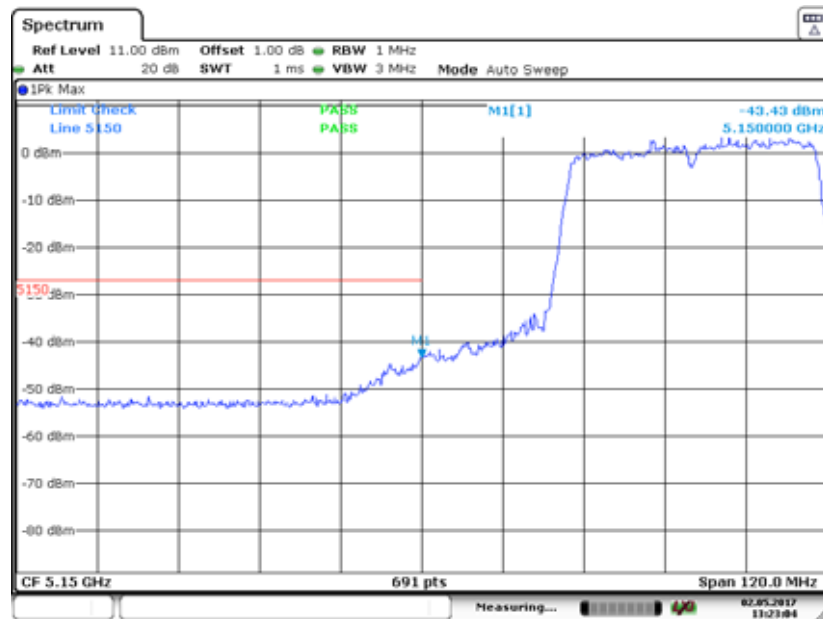
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802.11ac40 Chain1 Band Edge, Right Side



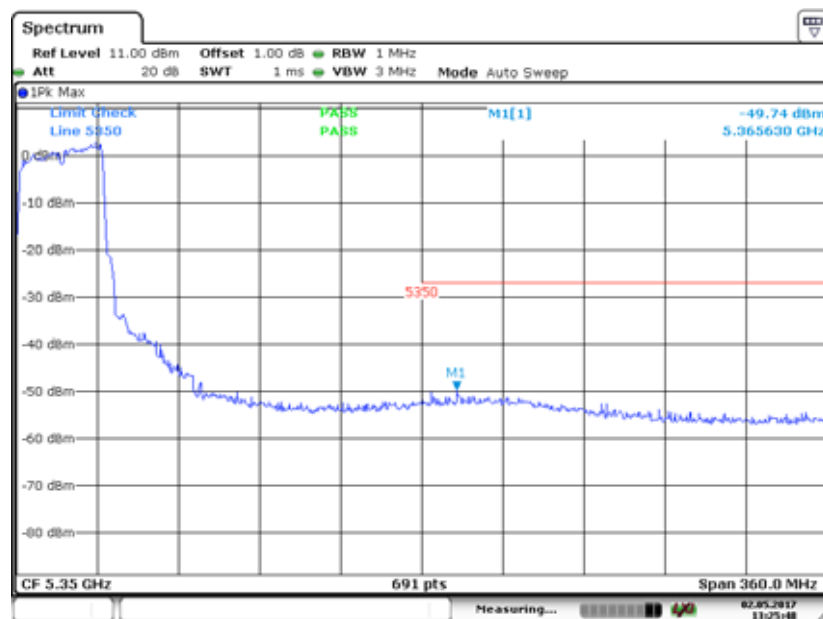
Date: 2 MAY 2017 13:32:18

802.11ac80 Chain1 Band Edge, Left Side



Date: 2 MAY 2017 13:23:03

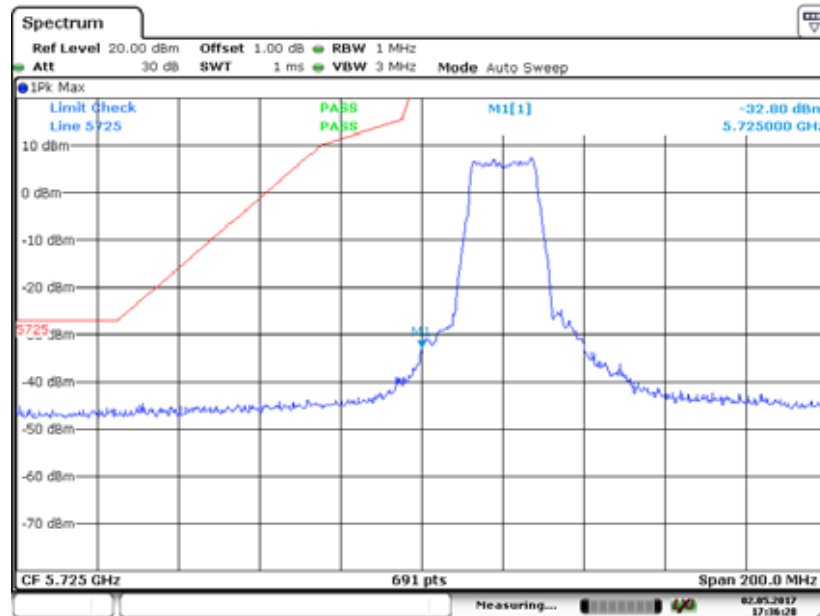
802.11ac80 Chain1 Band Edge, Right Side



Date: 2 MAY 2017 13:25:48

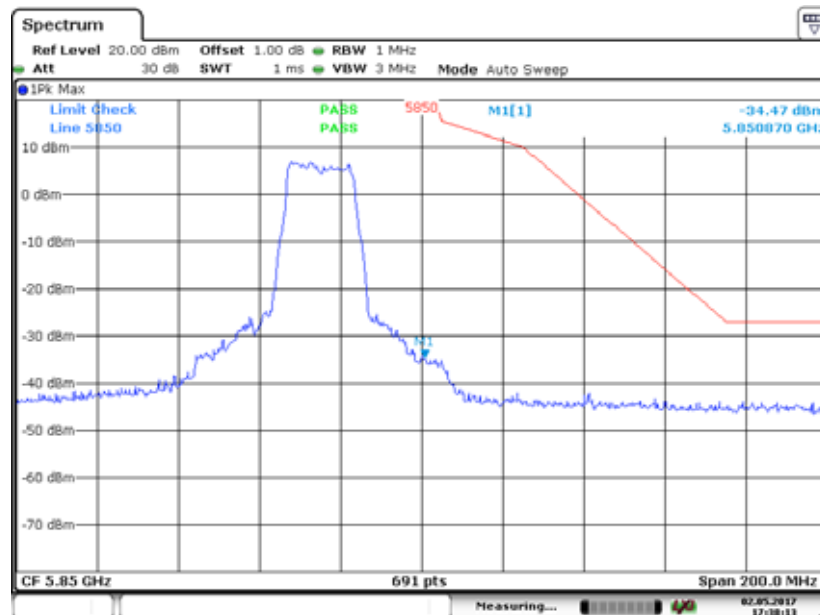
5725-5850 MHz Band:

802.11a Chain0 Band Edge, Left Side



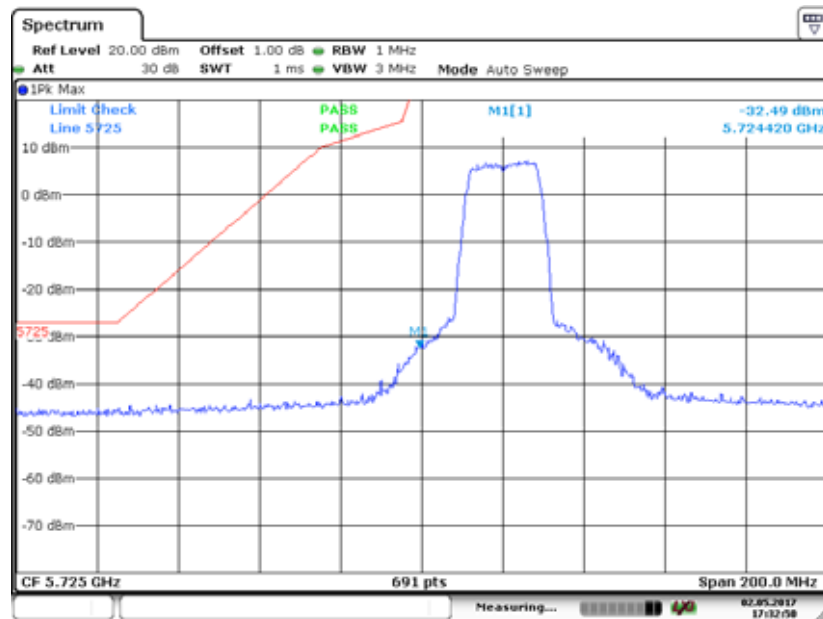
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802.11a Chain0 Band Edge, Right Side



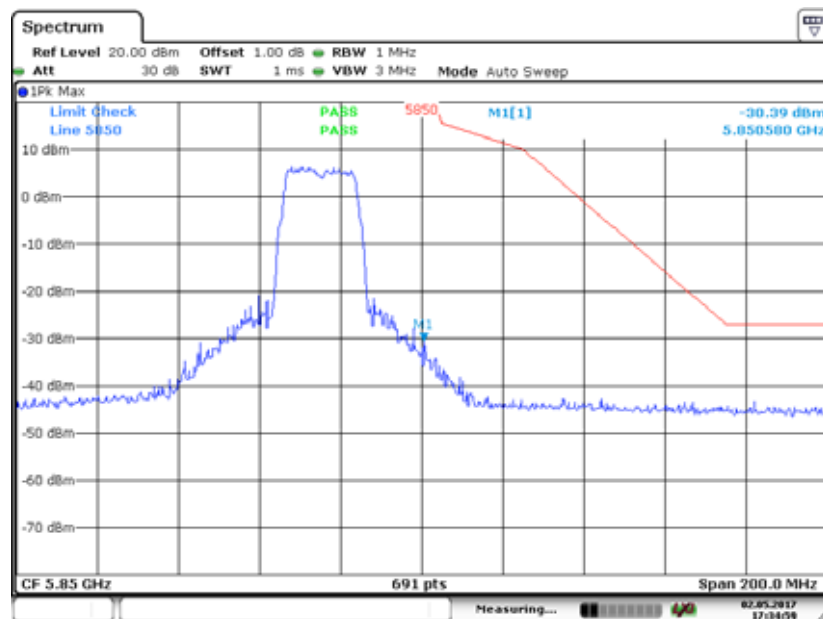
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802.11n Chain0 ht20 Band Edge, Left Side



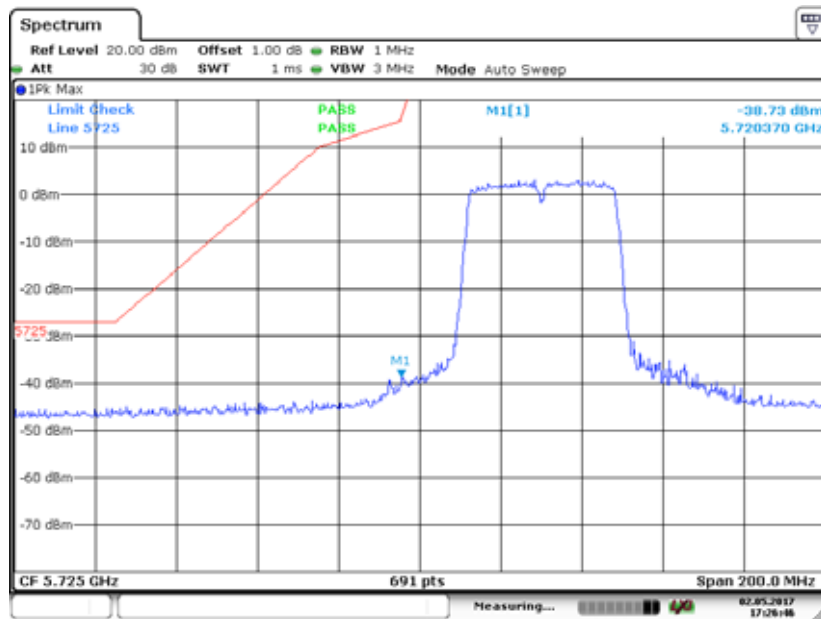
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802.11n Chain0 ht20 Band Edge, Right Side



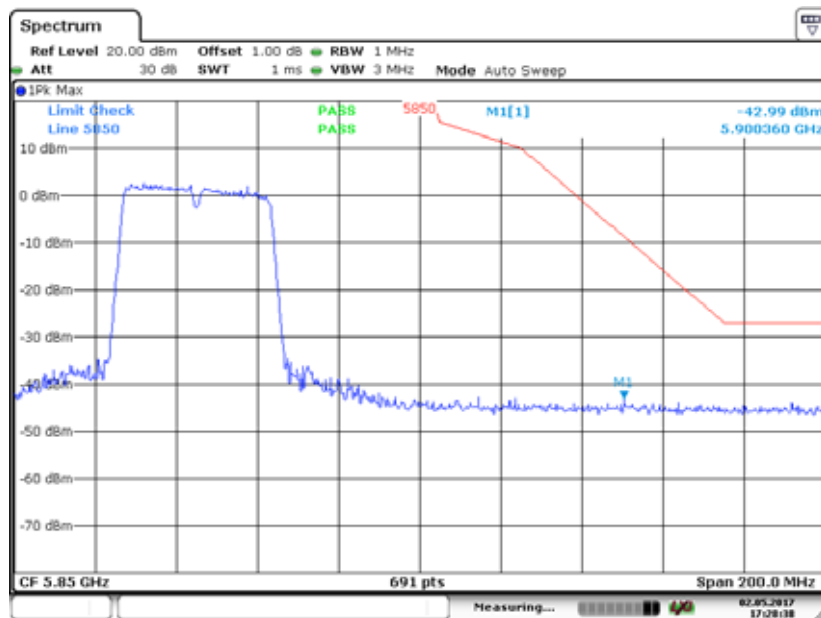
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802.11n Chain0 ht40 Band Edge, Left Side



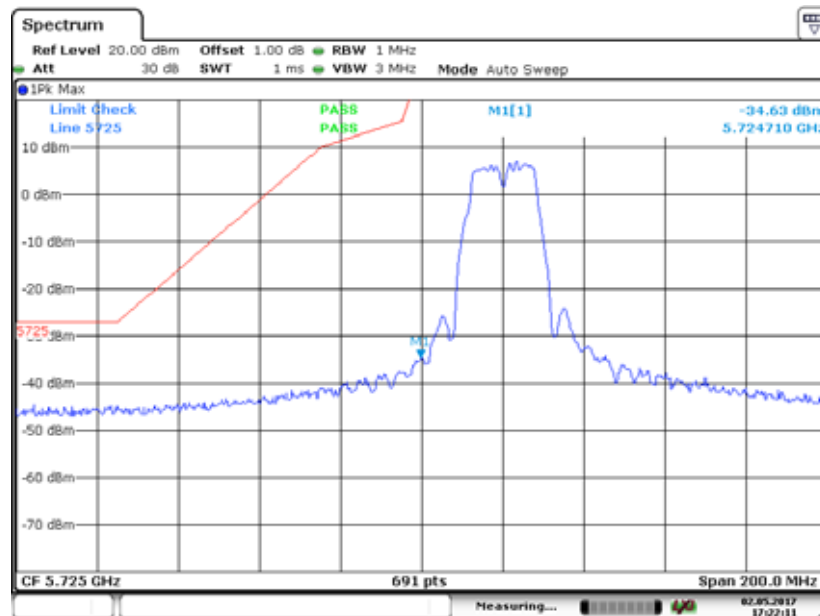
Date: 2 MAY 2017 17:26:46

802.11n Chain0 ht40 Band Edge, Right Side



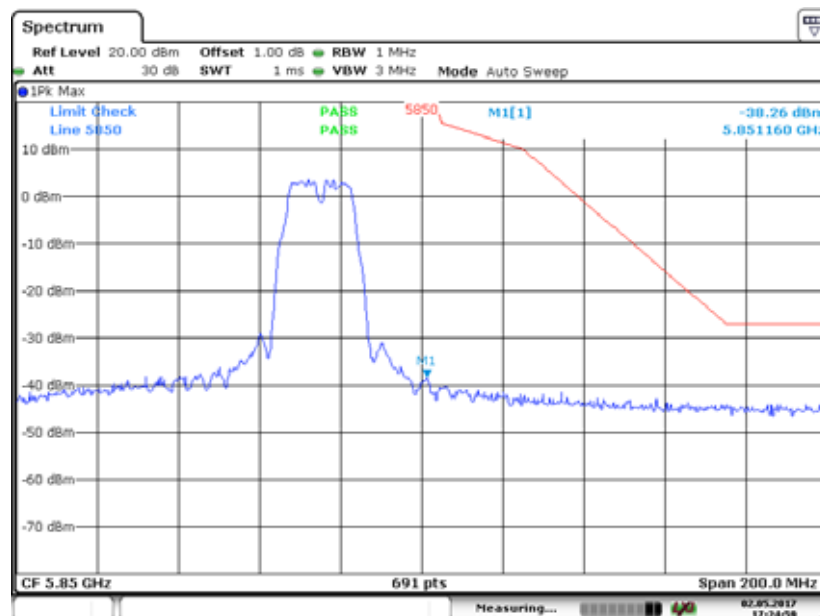
Date: 2 MAY 2017 17:28:38

802.11ac20 Chain0 Band Edge, Left Side



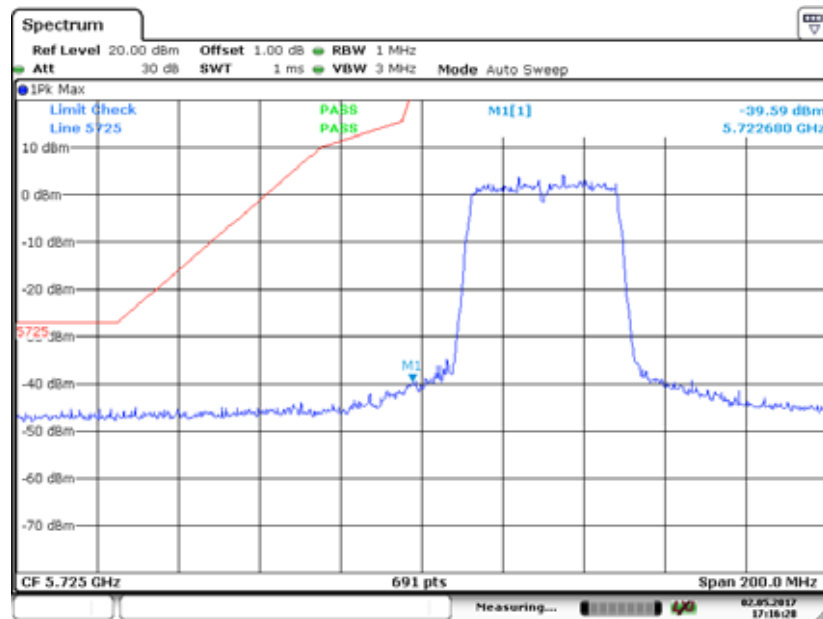
Date: 2 MAY 2017 17:22:11

802.11ac20 Chain0 Band Edge, Right Side



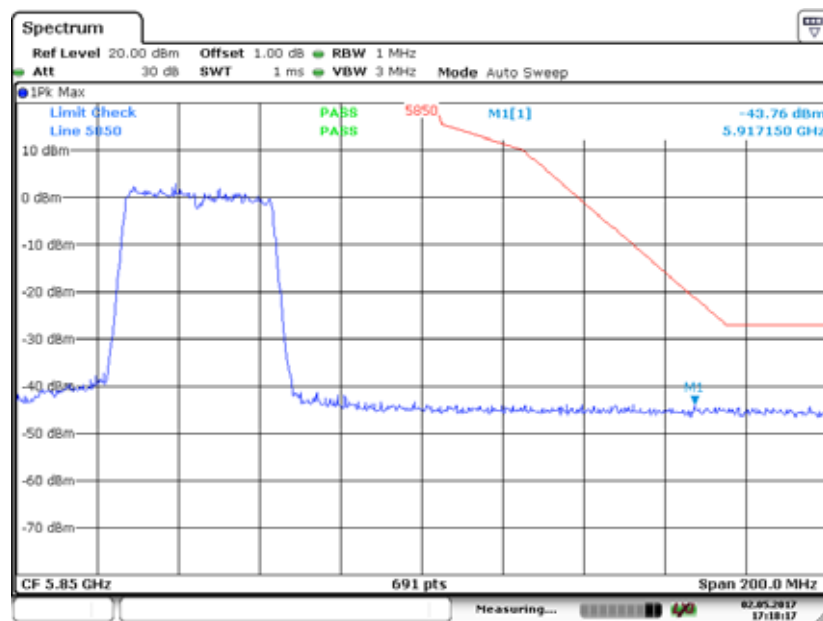
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802.11ac40 Chain0 Band Edge, Left Side



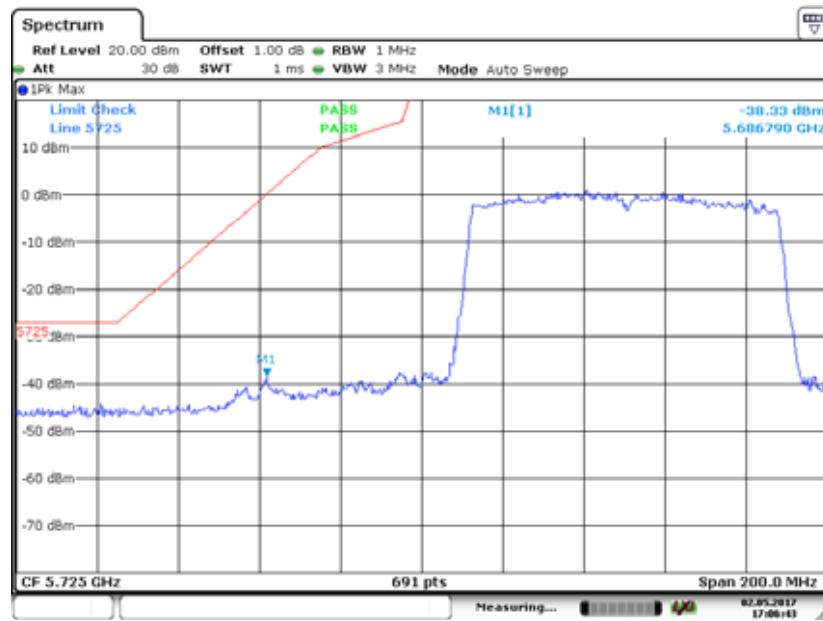
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802.11ac40 Chain0 Band Edge, Right Side

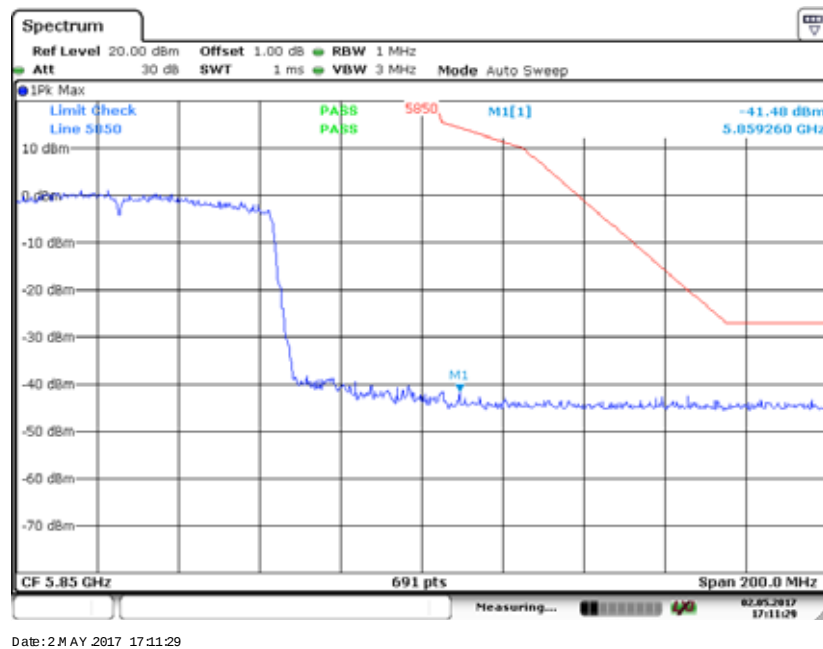


Date: 2 MAY 2017 17:18:16

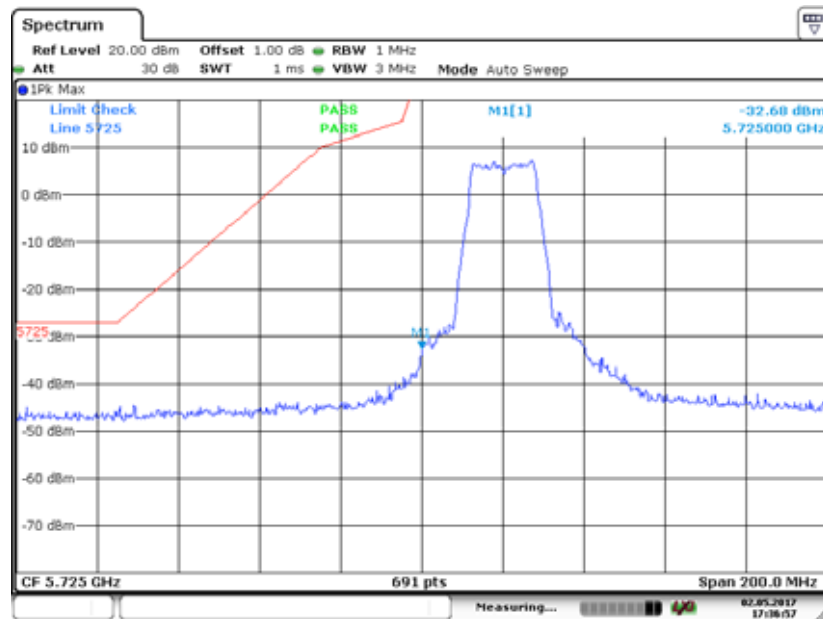
802.11ac80 Chain0 Band Edge, Left Side



802.11ac80 Chain0 Band Edge, Right Side

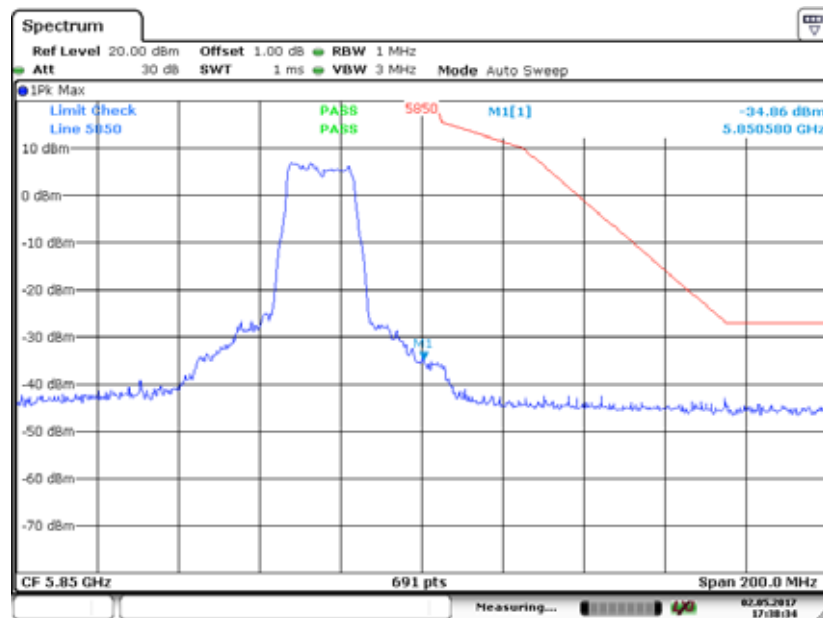


802.11a Chain1 Band Edge, Left Side



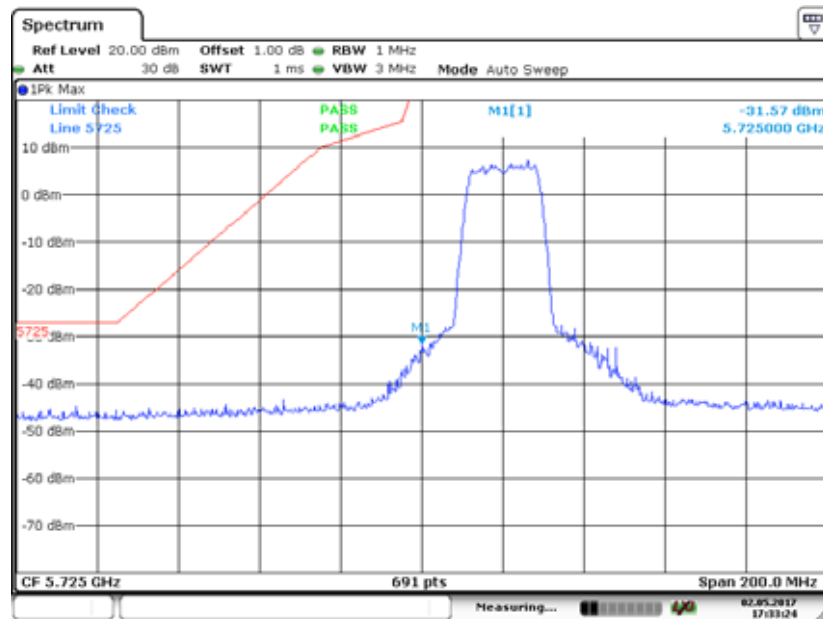
Date: 2 MAY 2017 17:36:58

802.11a Chain1 Band Edge, Right Side



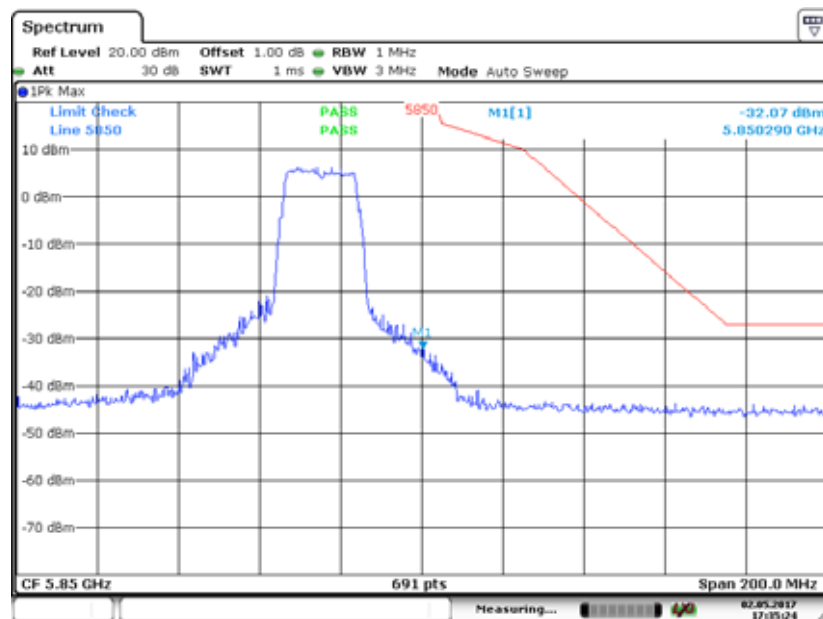
Date: 2 MAY 2017 17:38:34

802.11n ht20 Chain1 Band Edge, Left Side



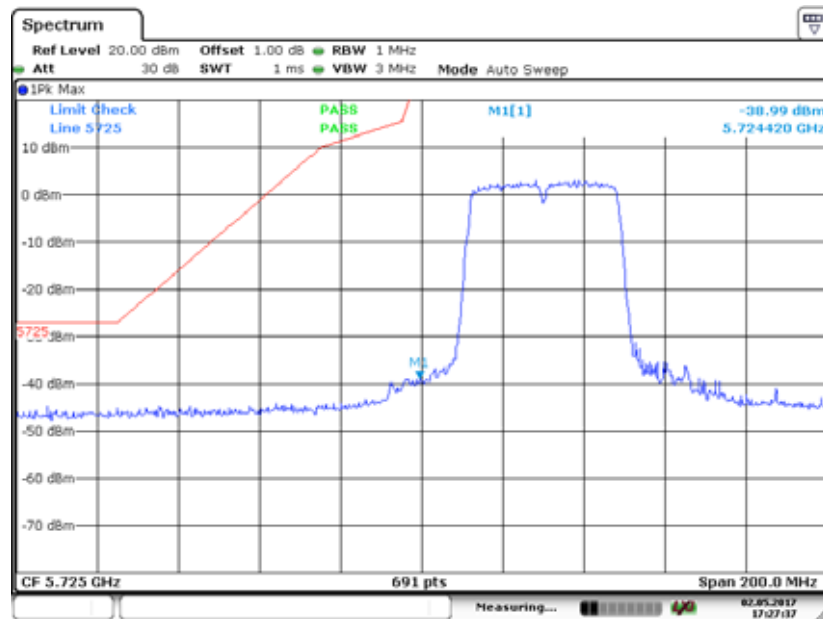
Date: 2 MAY 2017 17:33:25

802.11n ht20 Chain1 Band Edge, Right Side



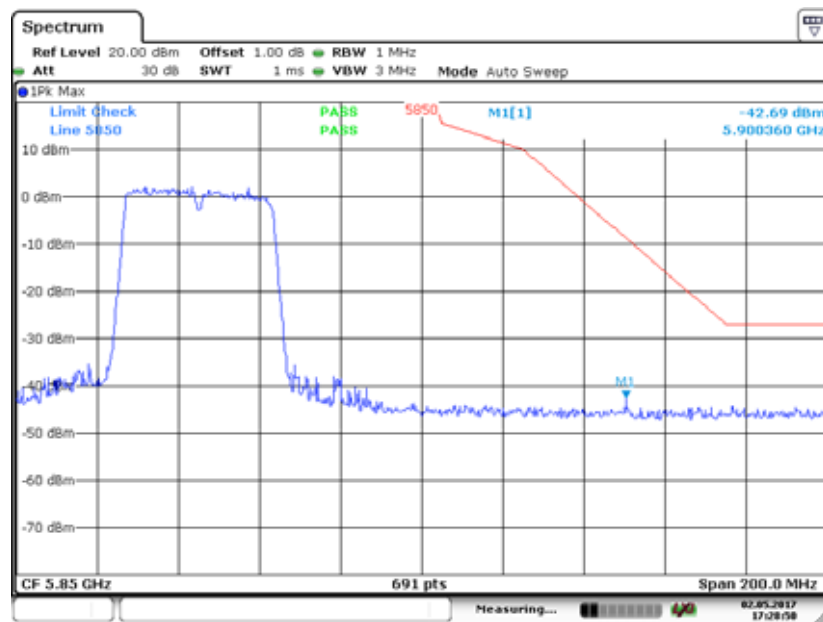
Date: 2 MAY 2017 17:35:24

802.11n ht40 Chain1 Band Edge, Left Side



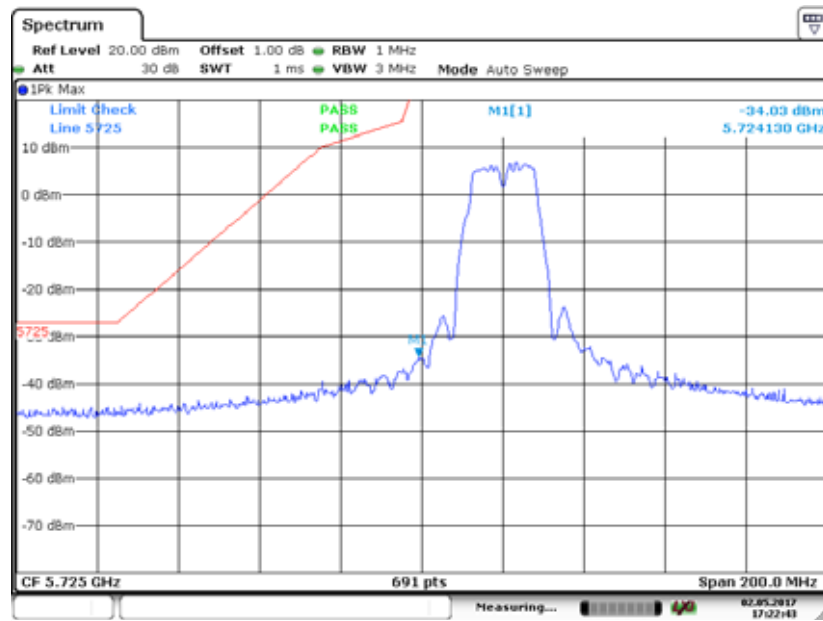
Date: 2 MAY 2017 17:27:37

802.11n ht40 Chain1 Band Edge, Right Side



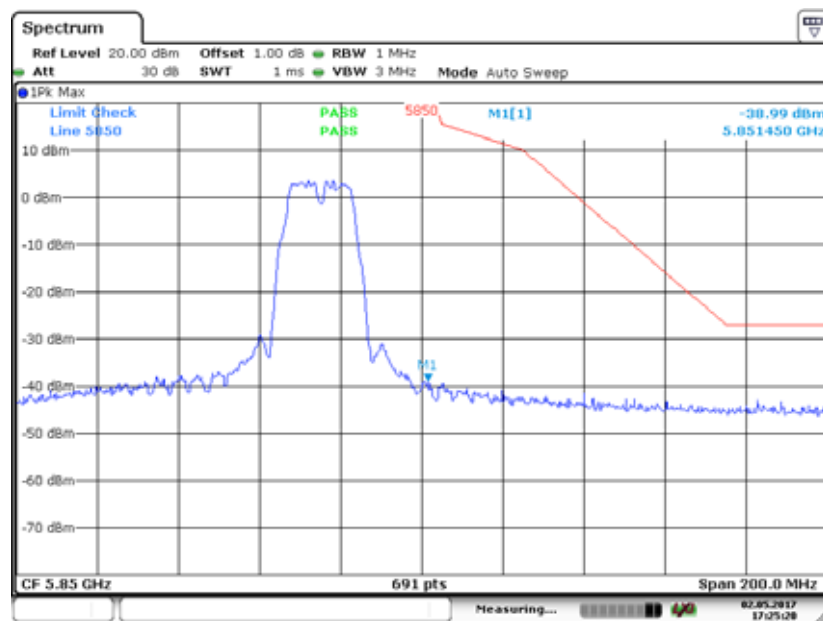
Date: 2 MAY 2017 17:28:51

802.11ac20 Chain1 Band Edge, Left Side



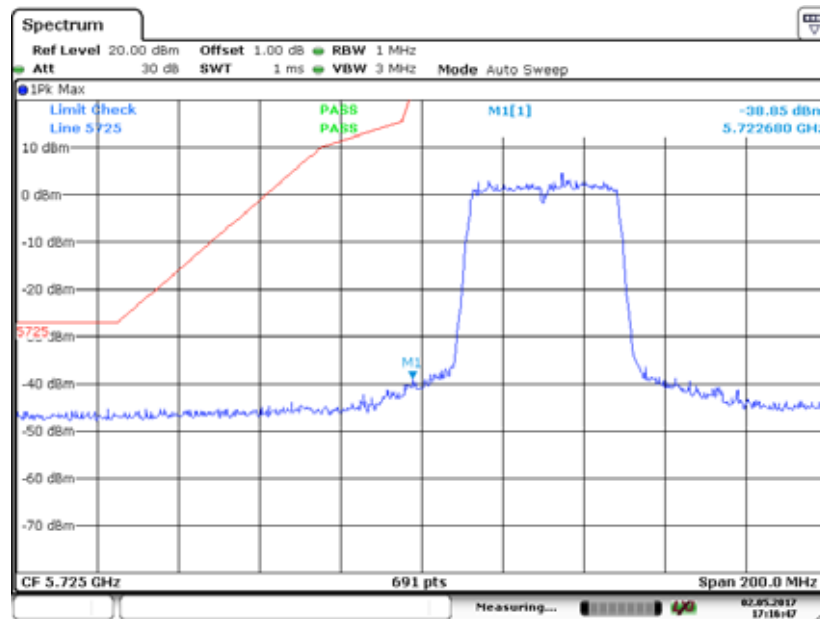
Date: 2 MAY 2017 17:22:43

802.11ac20 Chain1 Band Edge, Right Side



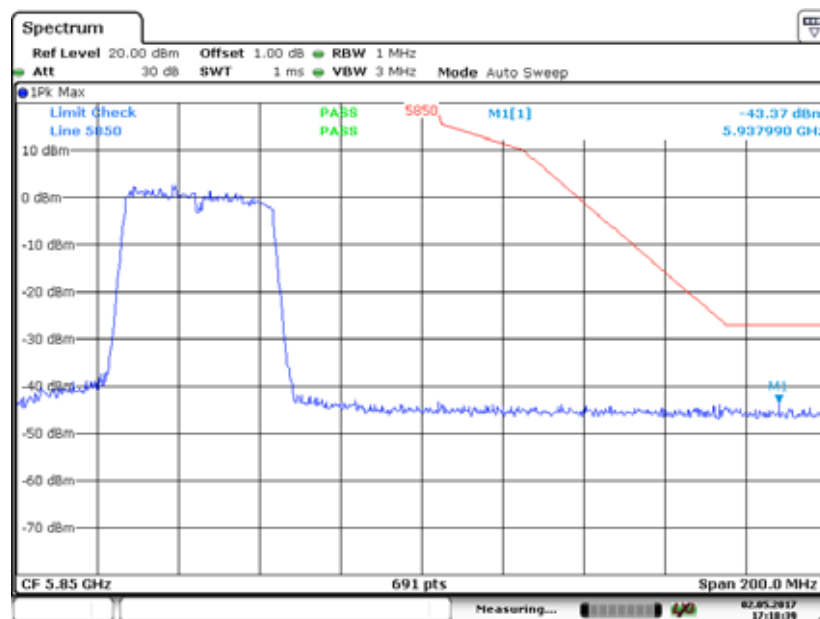
Date: 2 MAY 2017 17:25:20

802.11ac40 Chain1 Band Edge, Left Side



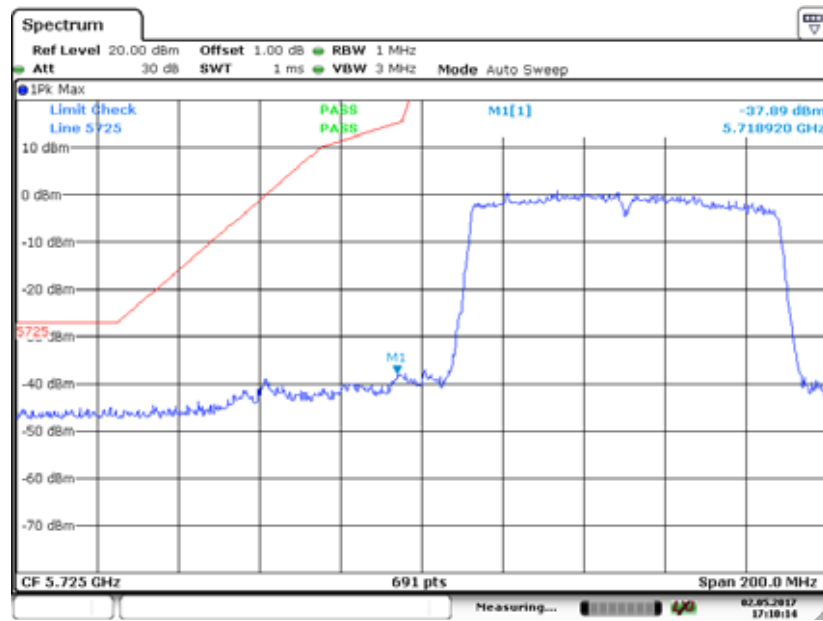
Date: 2 MAY 2017 17:16:47

802.11ac40 Chain1 Band Edge, Right Side



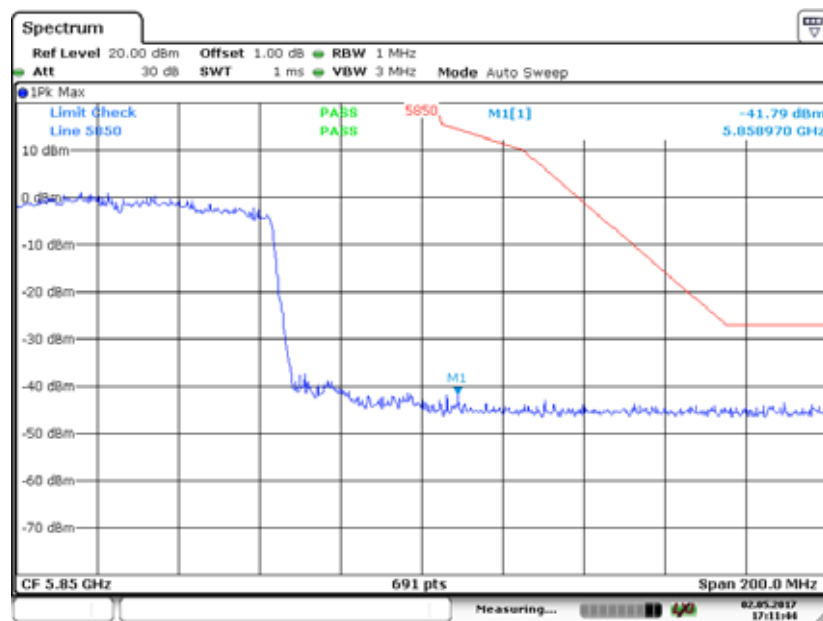
Date: 2 MAY 2017 17:18:39

802.11ac80 Chain1 Band Edge, Left Side



Date: 2 MAY 2017 17:10:14

802.11ac80 Chain1 Band Edge, Right Side



Date: 2 MAY 2017 17:11:44

FCC §15.407(a) & §15.407(e) – EMISSION BANDWIDTH

Applicable Standard

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz is made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

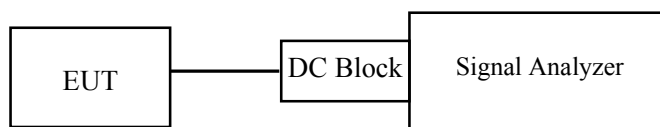
1. Emission Bandwidth (EBW)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	23.5 °C
Relative Humidity:	60 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2017-05-02.

Test Result: Pass.

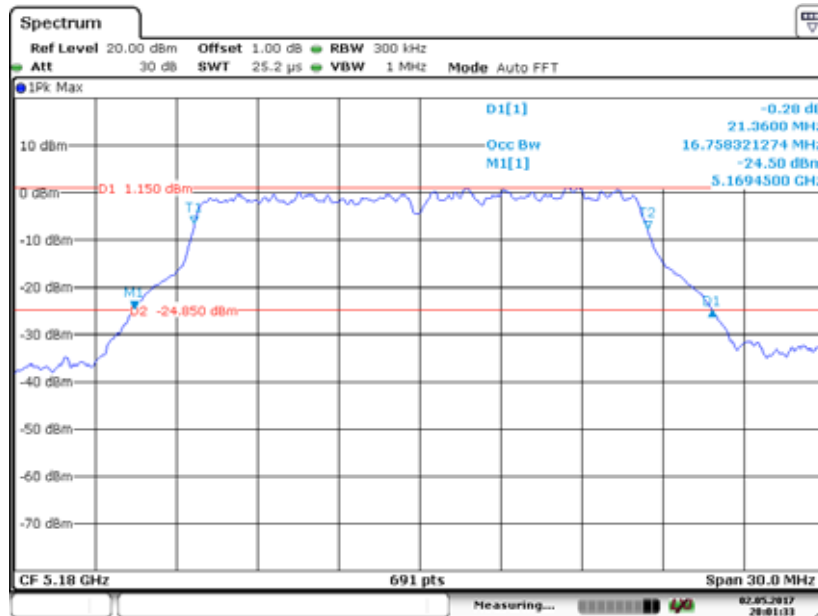
Please refer to the following tables and plots.

5150-5250 MHz:

Test mode	Band	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
				Chain0	Chain1
802.11a	5150-5250 MHz	Low	5180	21.36	21.36
		Middle	5200	21.40	21.36
		High	5240	21.58	21.71
802.11n ht20		Low	5180	21.66	21.75
		Middle	5200	21.59	21.68
		High	5240	21.80	21.84
802.11n ht40		Low	5190	39.92	39.92
		High	5230	40.04	40.04
802.11ac20		Low	5180	20.75	20.75
		Middle	5200	20.67	20.67
		High	5240	20.58	20.58
802.11ac40		Low	2190	40.09	40.12
		High	5230	40.15	40.15
802.11ac80		/	5210	80.93	80.75

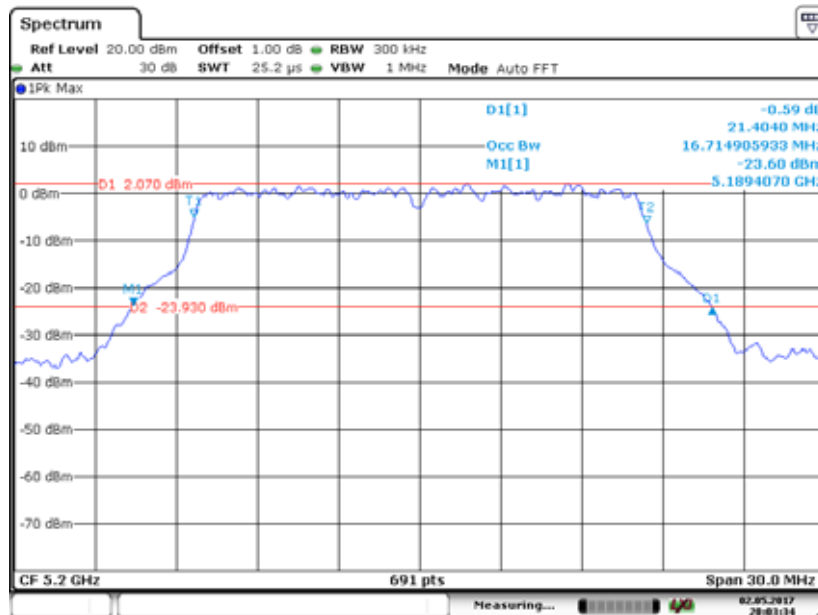
5150-5250 MHz Band:

802.11a mode, Chain 0: 26 Bandwidth-5180MHz



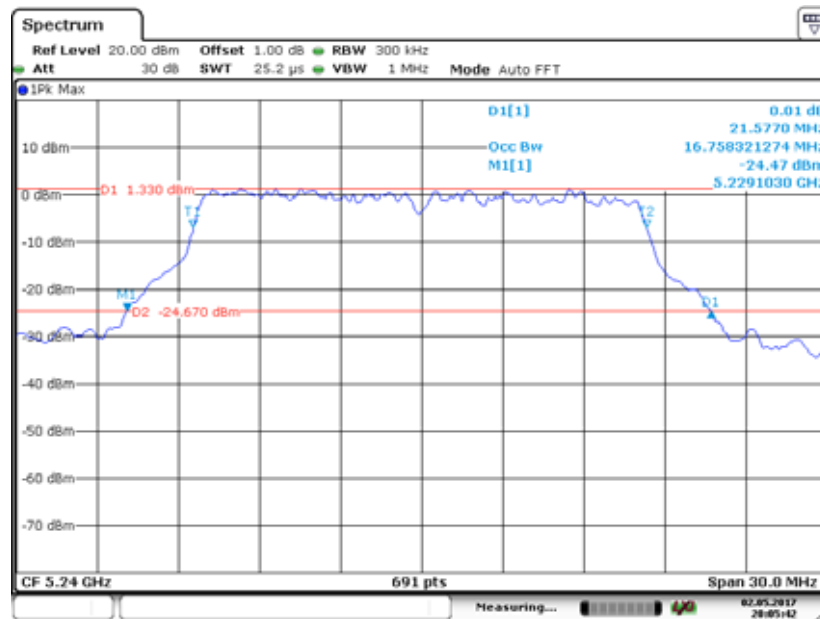
Date: 2 MAY 2017 20:01:33

802.11a mode, Chain 0: 26 Bandwidth-5200MHz



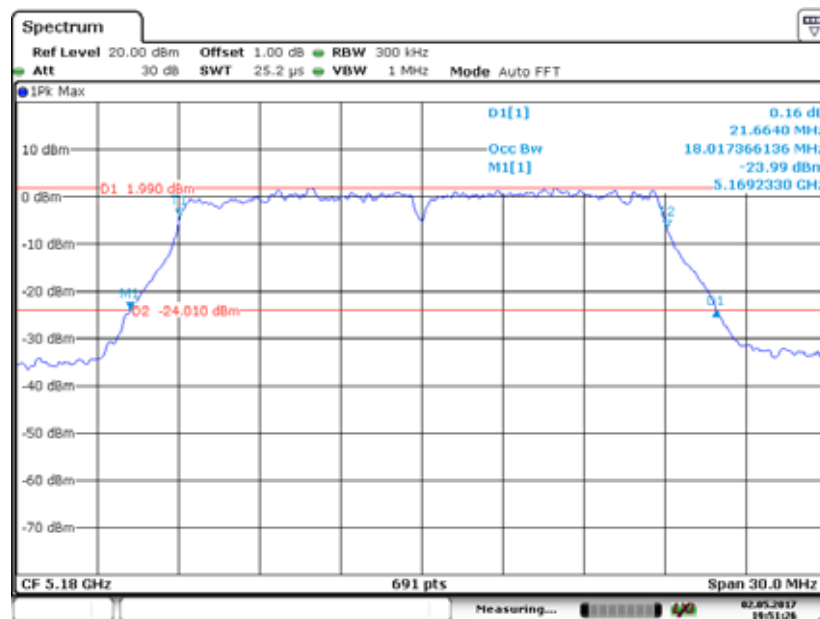
Date: 2 MAY 2017 20:01:34

802.11a mode, Chain 0: 26 Bandwidth-5240MHz



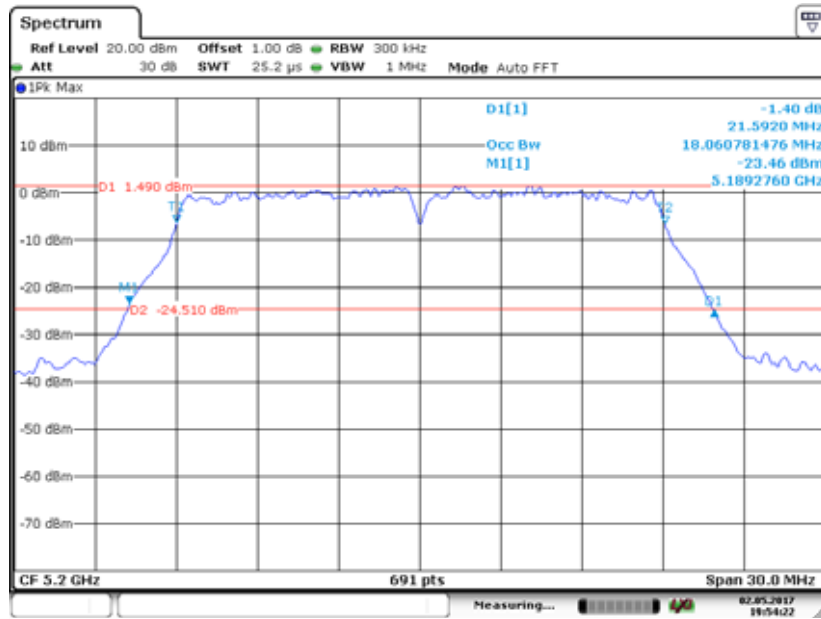
Date: 2 MAY 2017 20:05:42

802.11n ht20 mode, Chain 0: 26 Bandwidth-5180MHz



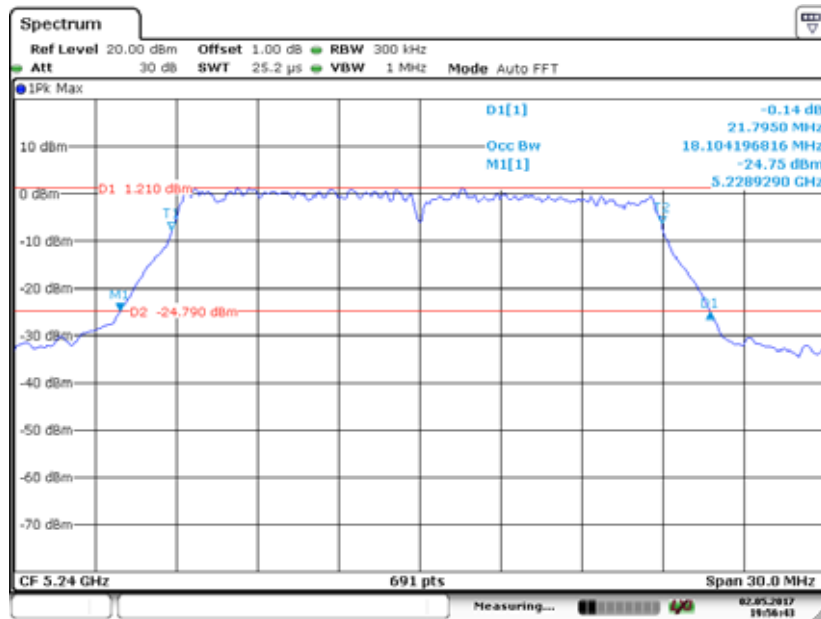
Date: 2 MAY 2017 19:51:27

802.11n ht20 mode, Chain 0: 26 Bandwidth-5200MHz



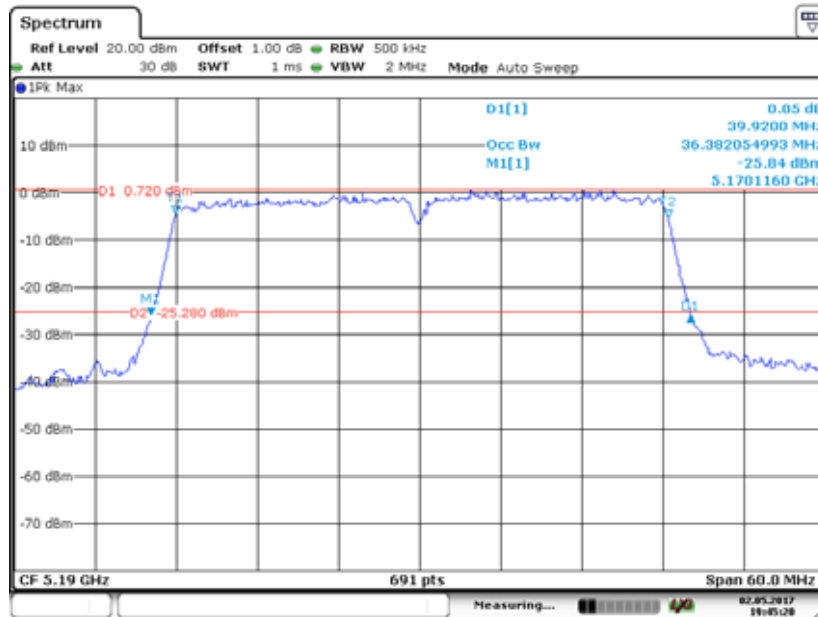
Date: 2 MAY 2017 19:54:22

802.11n ht20 mode, Chain 0: 26 Bandwidth-5240MHz



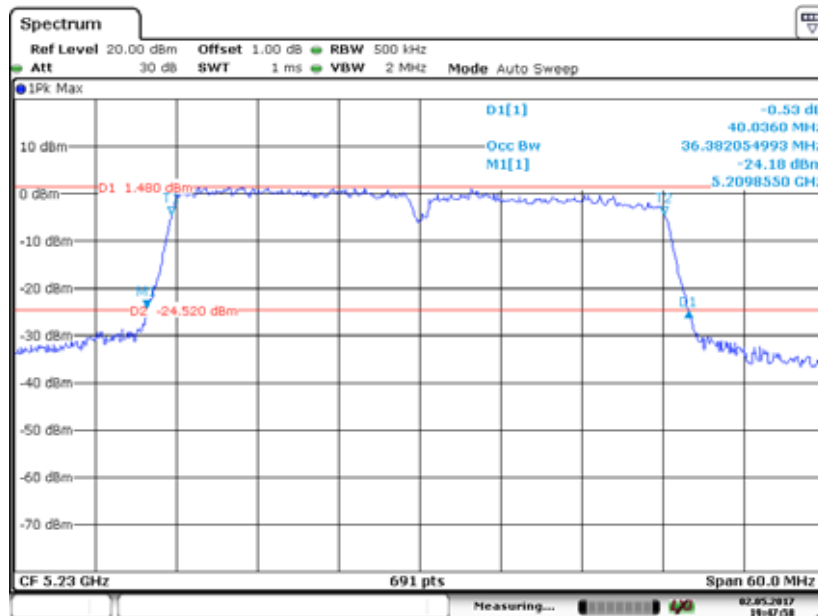
Date: 2 MAY 2017 19:56:43

802.11n ht40 mode, Chain 0: 26 Bandwidth-5190MHz



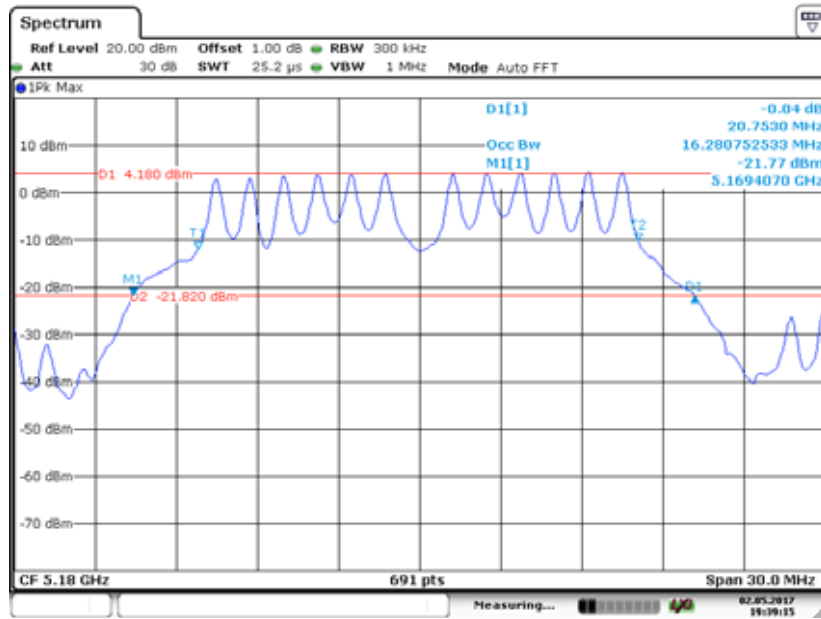
Date: 2 MAY 2017 19:45:28

802.11n ht40 mode, Chain 0: 26 Bandwidth-5230MHz



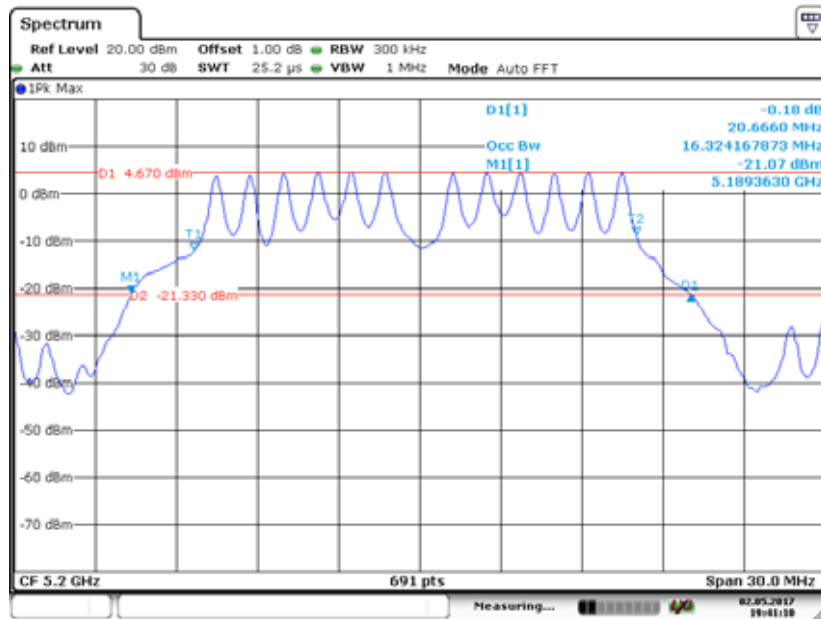
Date: 2 MAY 2017 19:47:58

802.11ac20 mode, Chain 0: 26 Bandwidth-5180MHz



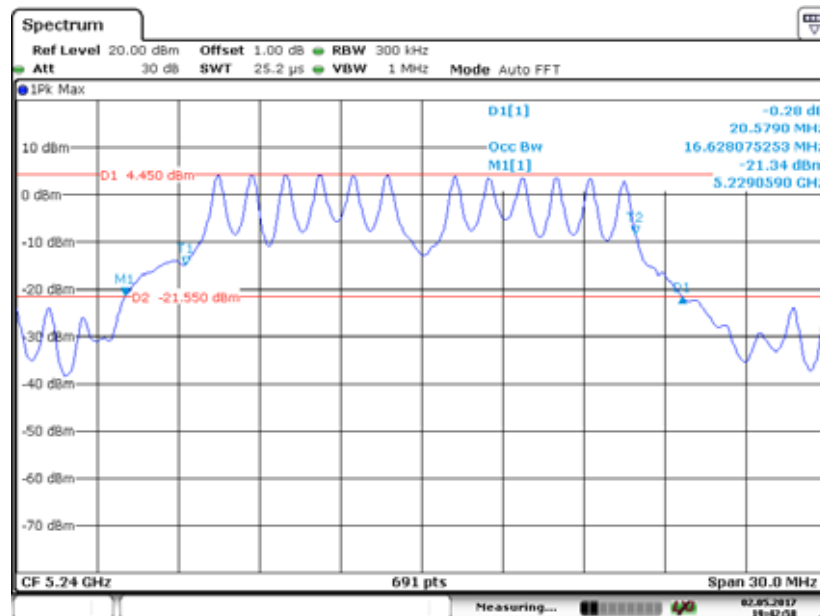
Date: 2 MAY 2017 19:39:15

802.11ac20 mode, Chain 0: 26 Bandwidth-5200MHz



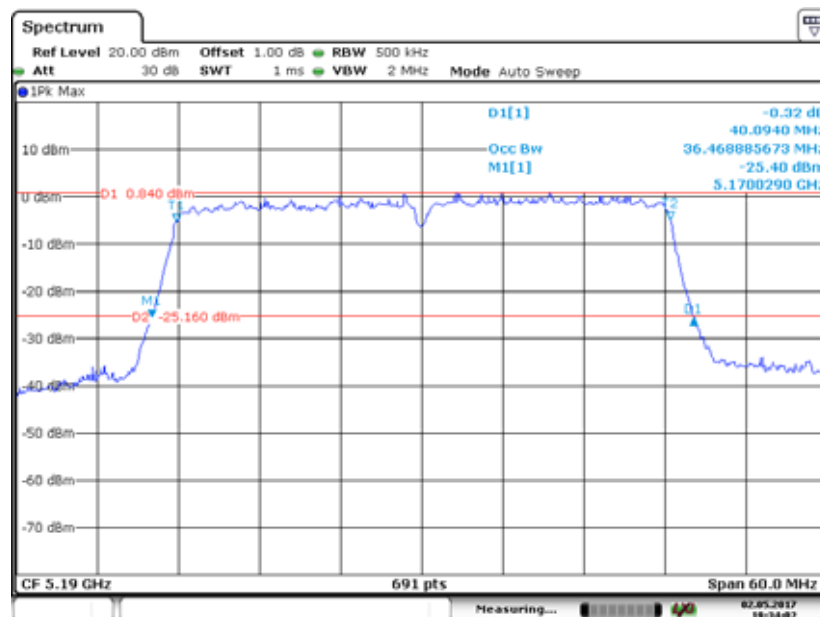
Date: 2 MAY 2017 19:41:10

802.11ac20 mode, Chain 0: 26 Bandwidth-5240MHz



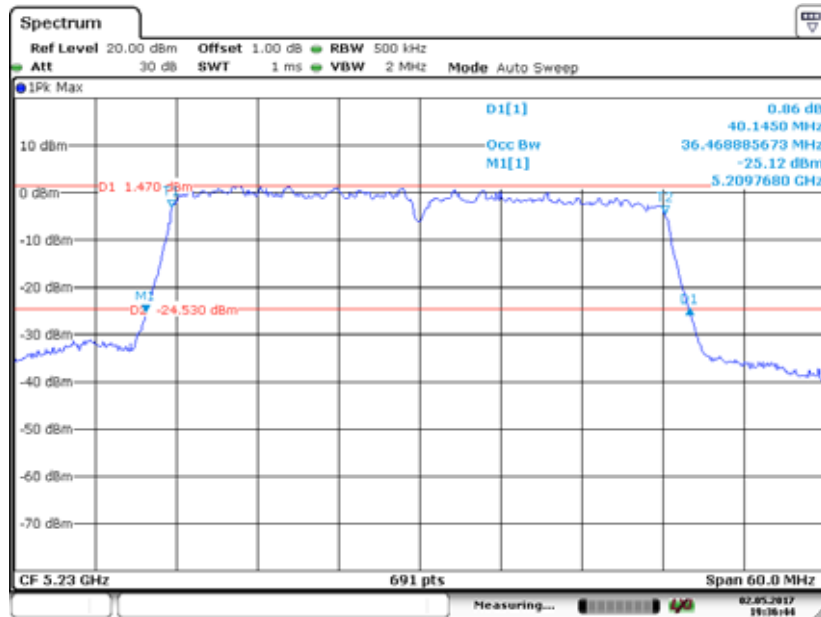
Date: 2 MAY 2017 19:42:59

802.11ac40 mode, Chain 0: 26 Bandwidth-5190MHz



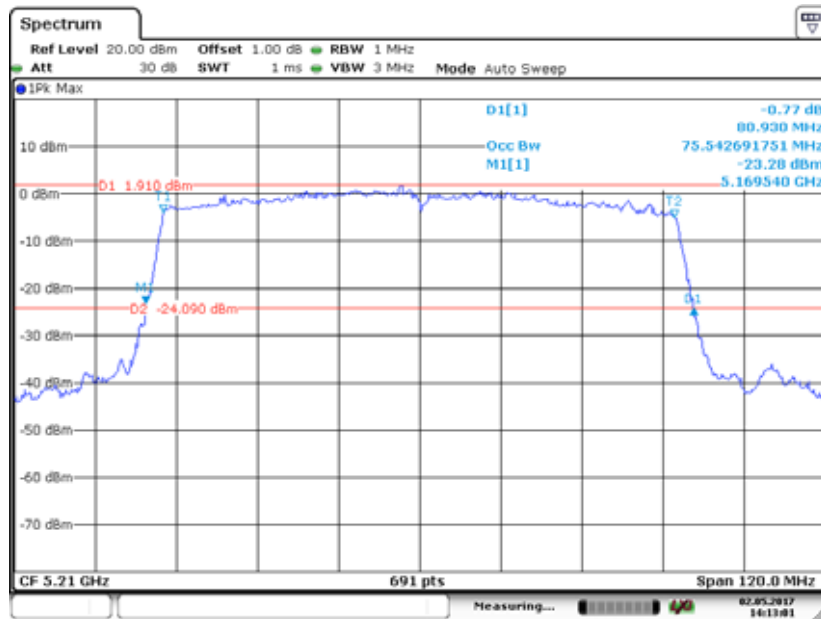
Date: 2 MAY 2017 19:34:02

802.11ac40 mode, Chain 0: 26 Bandwidth-5230MHz



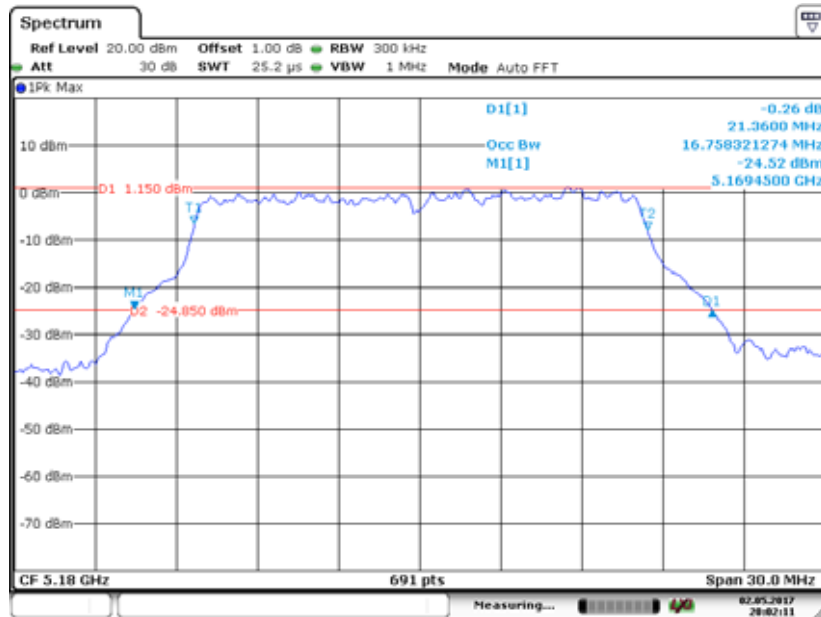
Date: 2 MAY 2017 19:36:45

802.11ac80 mode, Chain 0: 26 Bandwidth-5210MHz



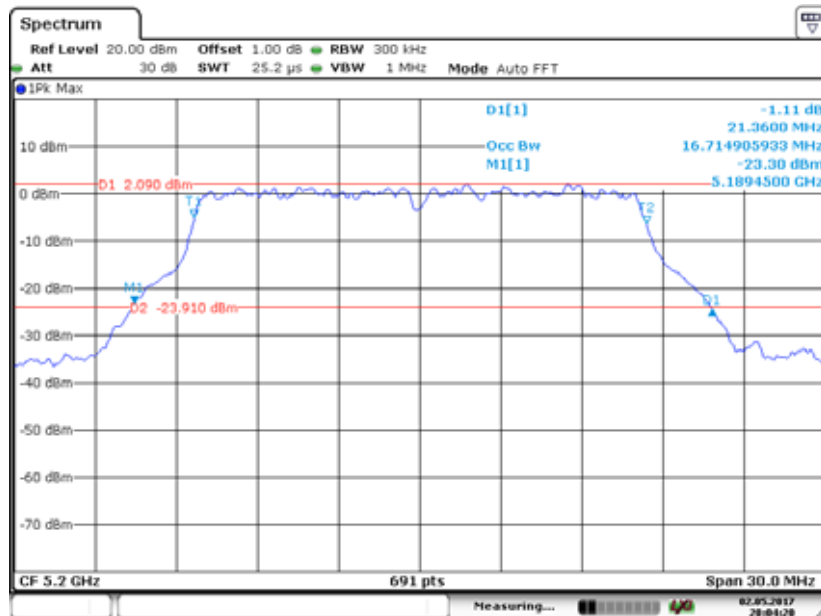
Date: 2 MAY 2017 14:13:01

802.11a mode, Chain 1: 26 Bandwidth-5180MHz



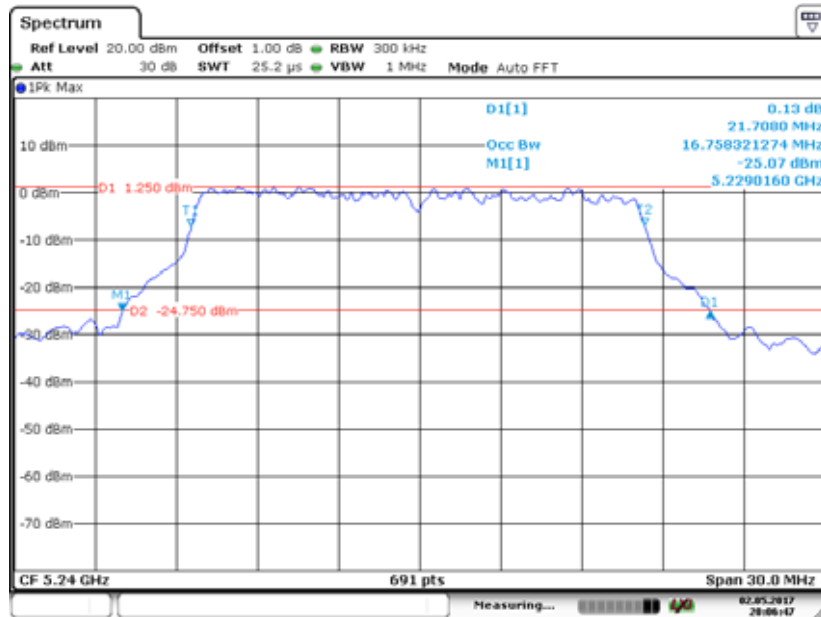
Date: 2 MAY 2017 20:02:11

802.11a mode, Chain 1: 26 Bandwidth-5200MHz



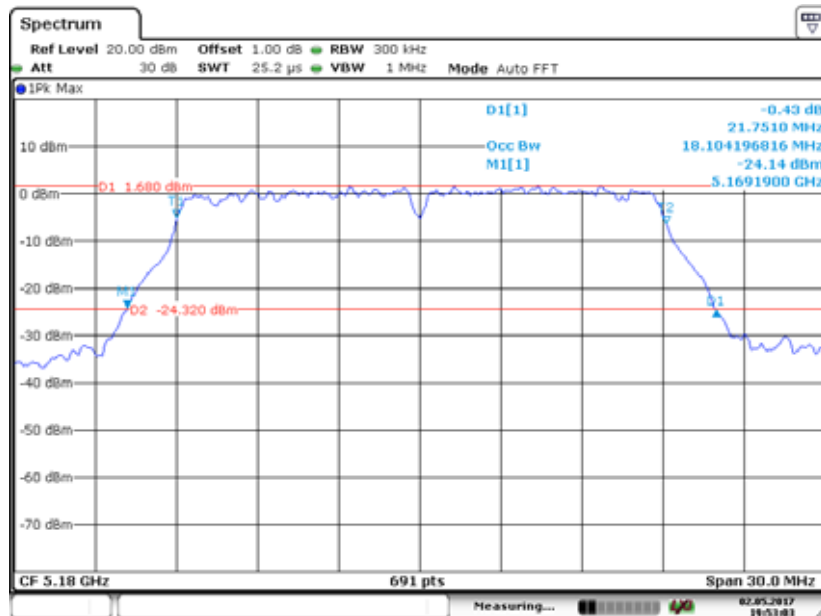
Date: 2 MAY 2017 20:04:21

802.11a mode, Chain 1: 26 Bandwidth-5240MHz



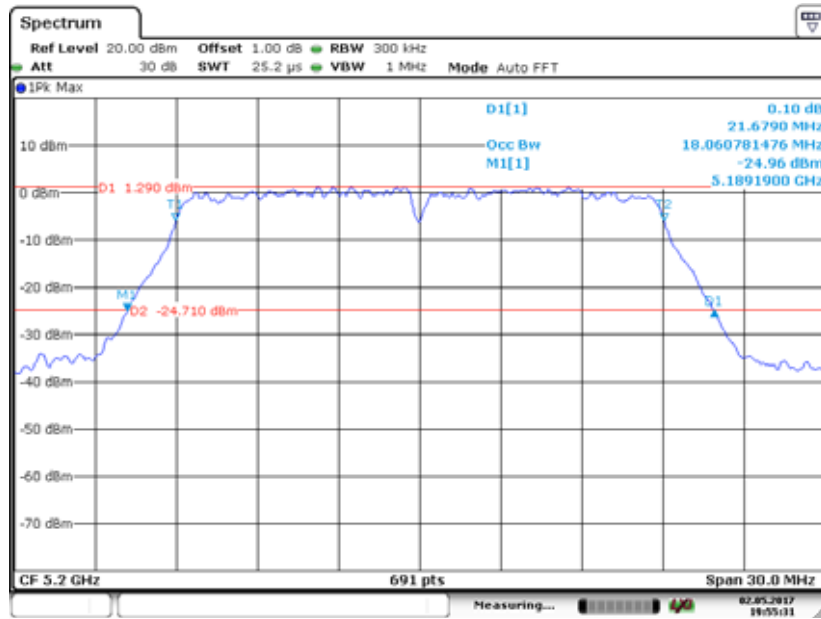
Date: 2 MAY 2017 20:06:47

802.11n ht20 mode, Chain 1: 26 Bandwidth-5180MHz



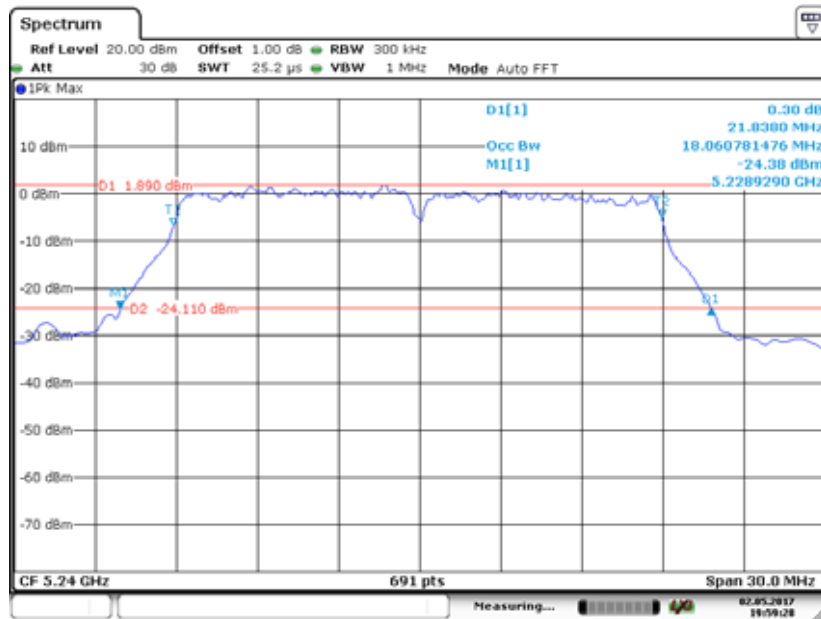
Date: 2 MAY 2017 19:53:03

802.11n ht20 mode, Chain 1: 26 Bandwidth-5200MHz



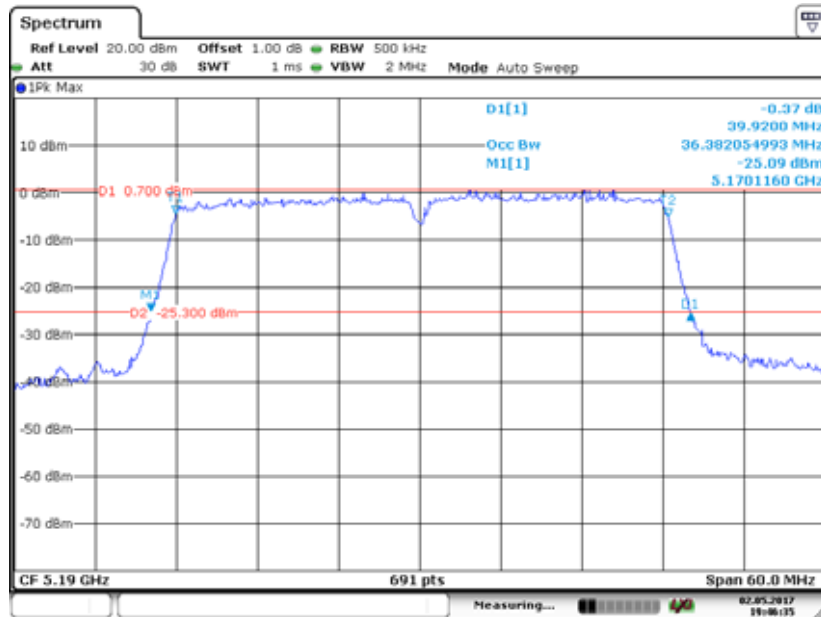
Date: 2 MAY 2017 19:55:31

802.11n ht20 mode, Chain 1: 26 Bandwidth-5240MHz



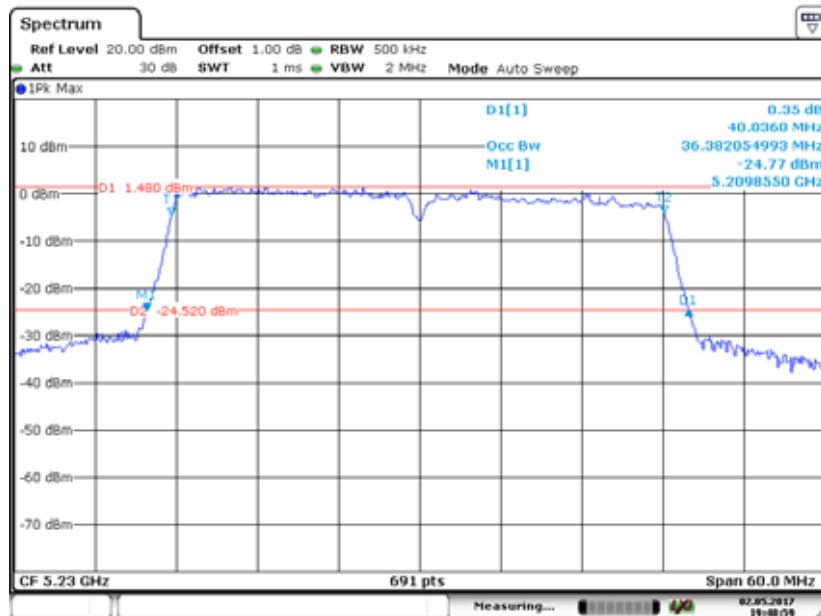
Date: 2 MAY 2017 19:59:28

802.11n ht40 mode, Chain 1: 26 Bandwidth-5190MHz



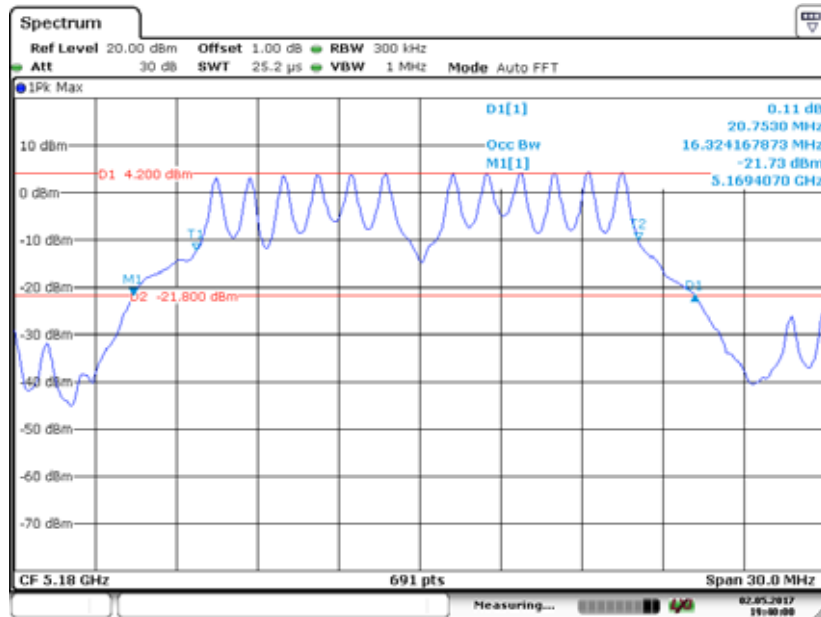
Date: 2 MAY 2017 19:46:35

802.11n ht40 mode, Chain 1: 26 Bandwidth-5230MHz



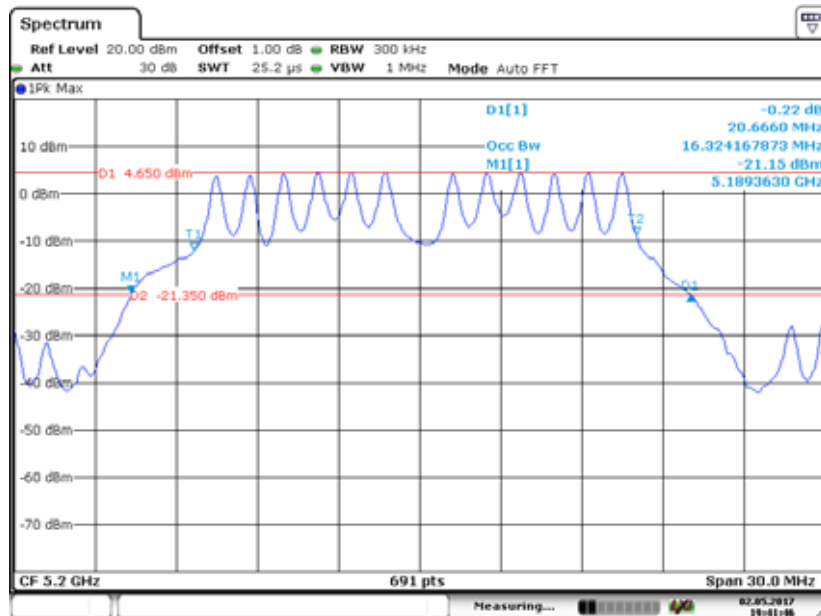
Date: 2 MAY 2017 19:48:59

802.11ac20 mode, Chain 1: 26 Bandwidth-5180MHz



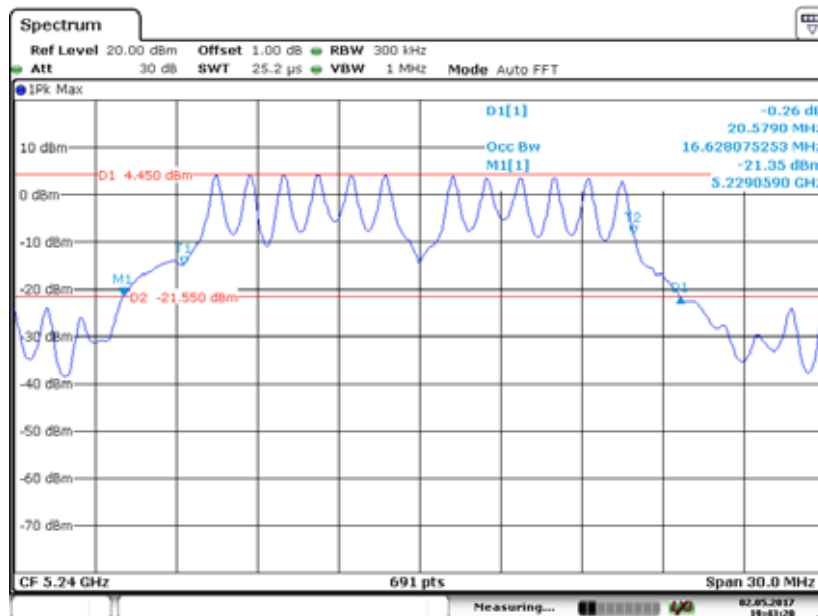
Date: 2 MAY 2017 19:40:00

802.11ac20 mode, Chain 1: 26 Bandwidth-5200MHz



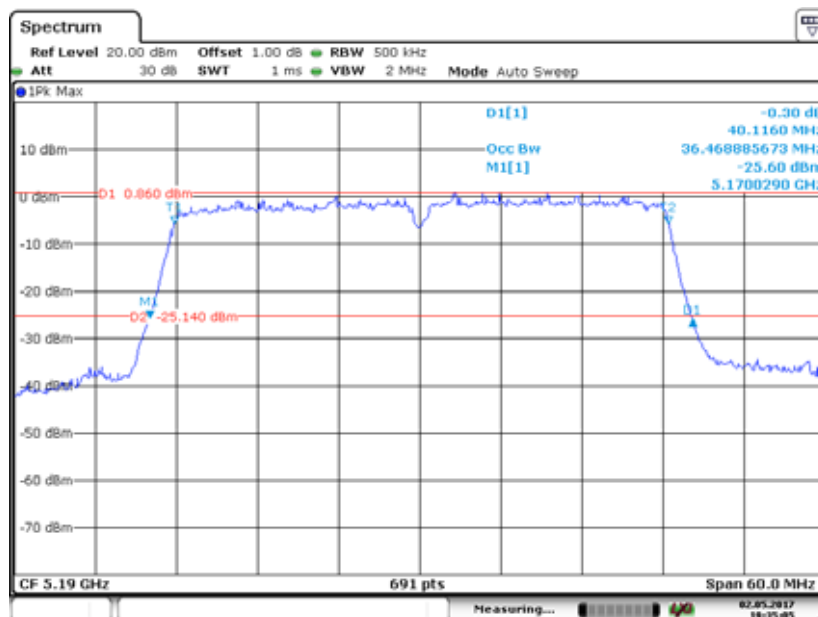
Date: 2 MAY 2017 19:41:47

802.11ac20 mode, Chain 1: 26 Bandwidth-5240MHz



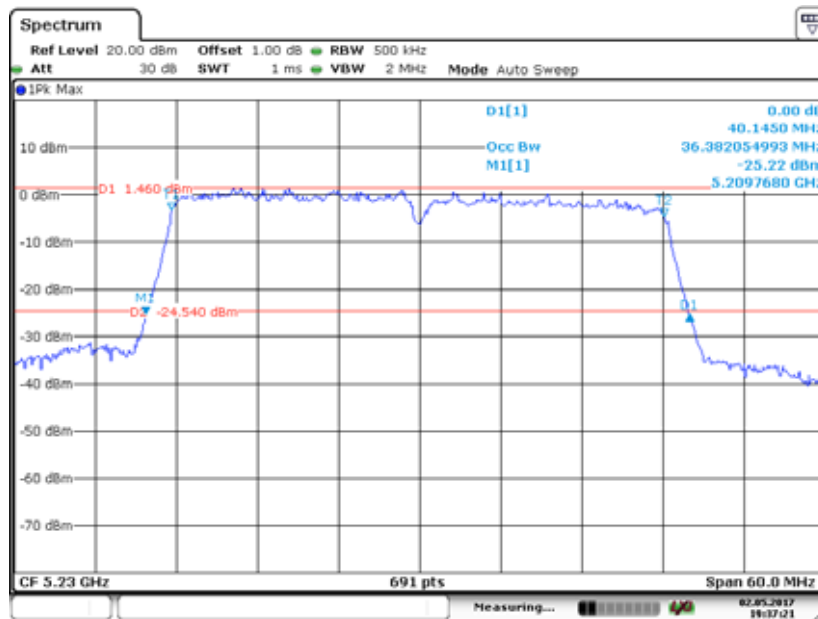
Date: 2 MAY 2017 19:43:20

802.11ac40 mode, Chain 1: 26 Bandwidth-5190MHz



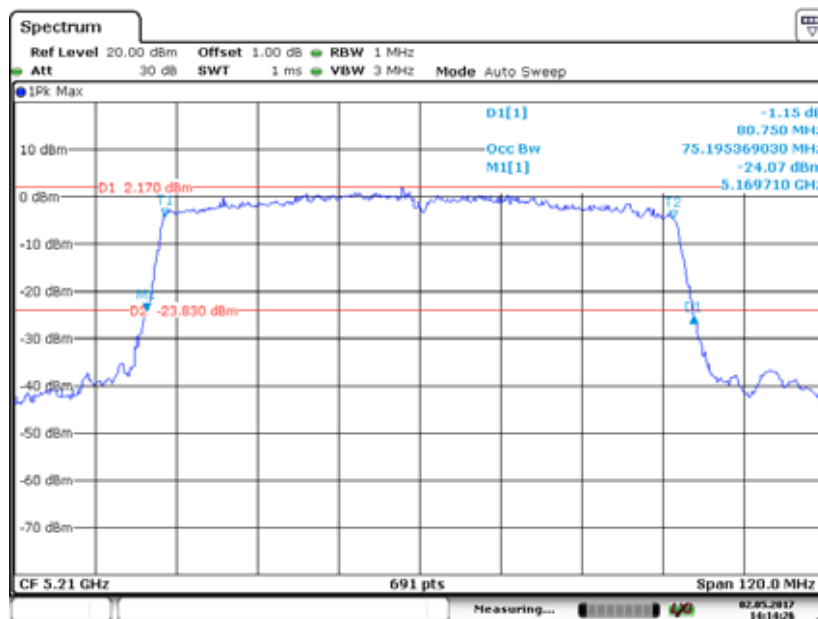
Date: 2 MAY 2017 19:45:05

802.11ac40 mode, Chain 1: 26 Bandwidth-5230MHz



Date: 2 MAY 2017 19:37:21

802.11ac80 mode, Chain 1: 26 Bandwidth-5200MHz



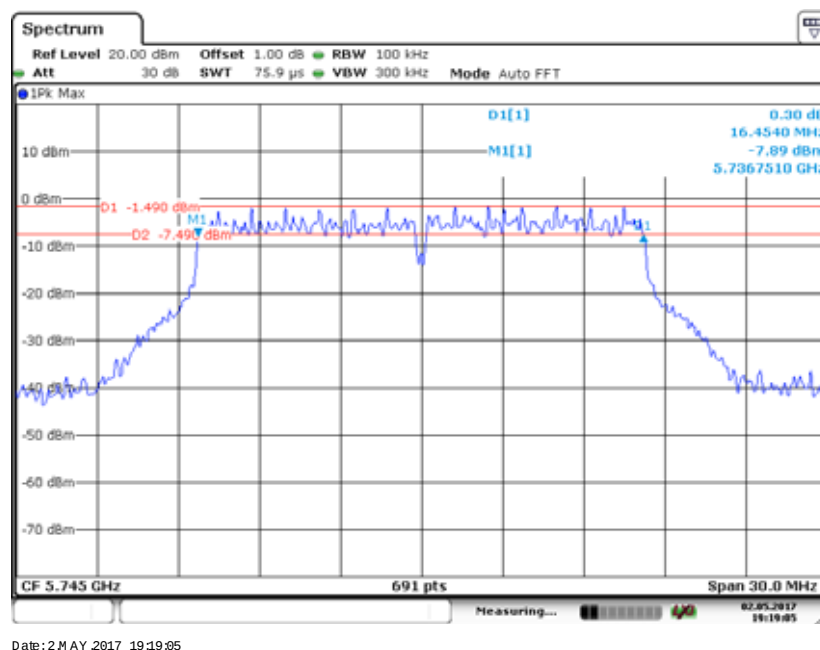
Date: 2 MAY 2017 14:14:26

5725-5850MHz:

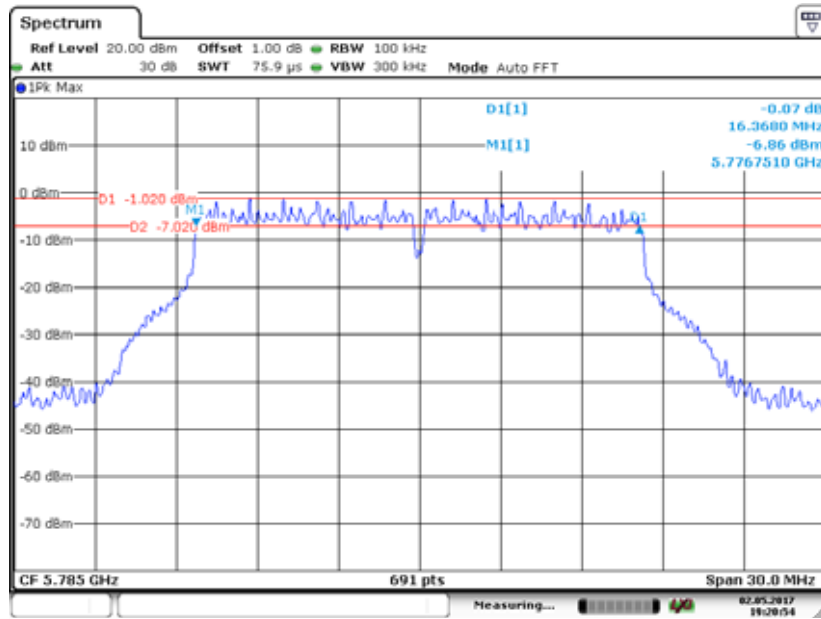
Test mode	Band	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)
				Chain0	Chain1	
802.11a	5725-5850 MHz	Low	5745	17.77	17.83	≥ 0.5
		Middle	5785	17.77	17.83	≥ 0.5
		High	5825	17.77	17.77	≥ 0.5
802.11n ht20		Low	5745	17.77	17.77	≥ 0.5
		Middle	5785	17.77	17.77	≥ 0.5
		High	5825	17.77	17.77	≥ 0.5
802.11n ht40		Low	5755	36.24	36.35	≥ 0.5
		High	5795	35.89	36.35	≥ 0.5
802.11ac20		Low	5745	17.77	17.77	≥ 0.5
		Middle	5785	17.77	17.77	≥ 0.5
		High	5825	17.77	17.77	≥ 0.5
802.11ac40		Low	5755	36.24	36.47	≥ 0.5
		High	5795	35.89	36.24	≥ 0.5
802.11ac80		/	5775	75.25	75.48	≥ 0.5

5725-5850 MHz Band:

802.11a mode, Chain 0: 6 Bandwidth-5745MHz

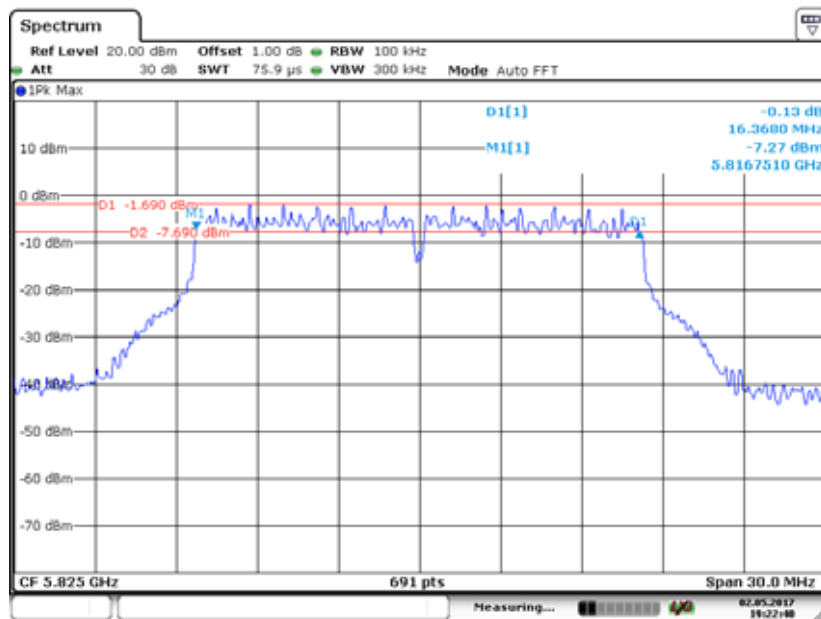


802.11a mode, Chain 0: 6 Bandwidth-5785MHz



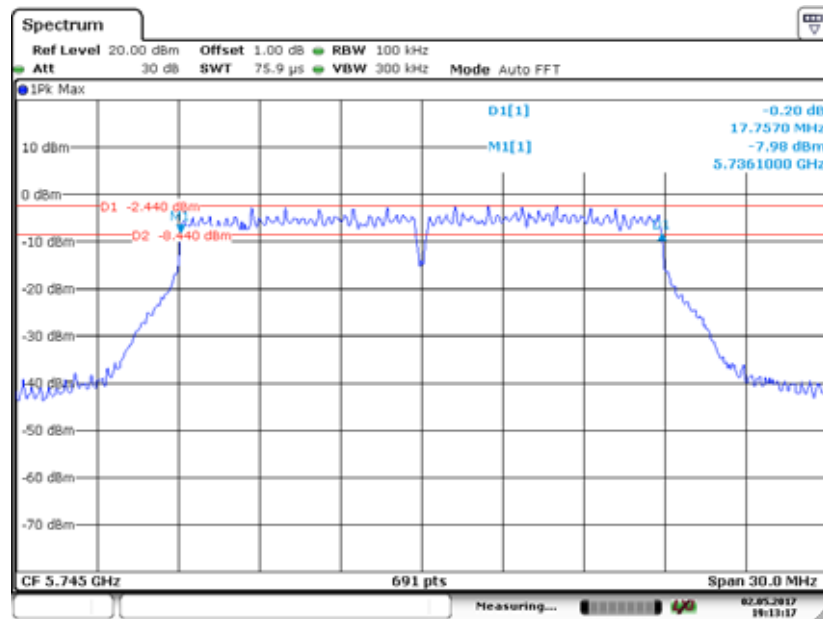
Date: 2 MAY 2017 19:20:55

802.11a mode, Chain 0: 6 Bandwidth-5825MHz



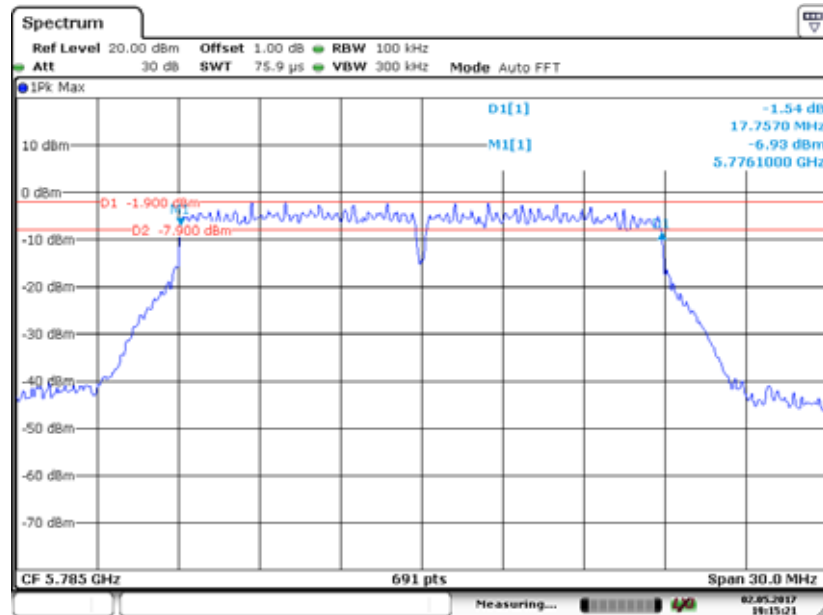
Date: 2 MAY 2017 19:22:39

802.11n ht20 mode, Chain 0: 6 Bandwidth-5745MHz



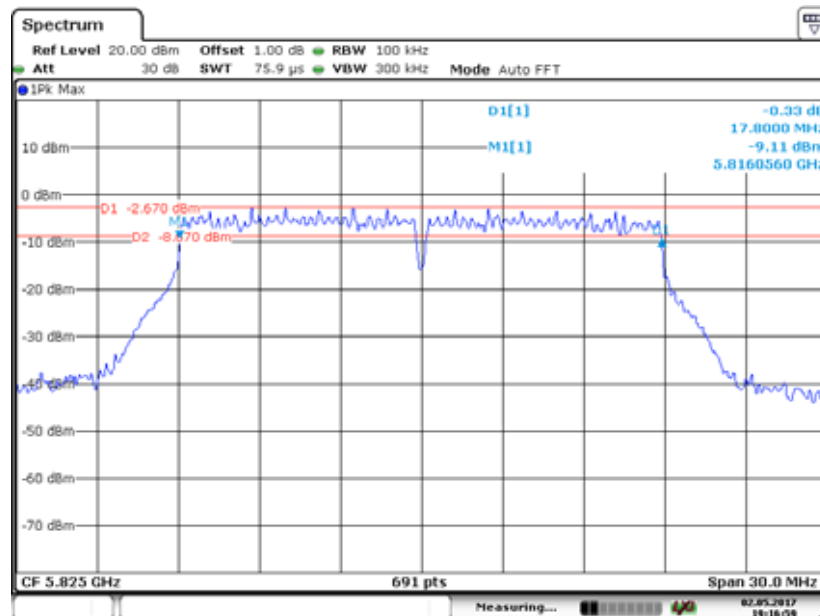
Date: 2 MAY 2017 19:13:17

802.11n ht20 mode, Chain 0: 6 Bandwidth-5785MHz



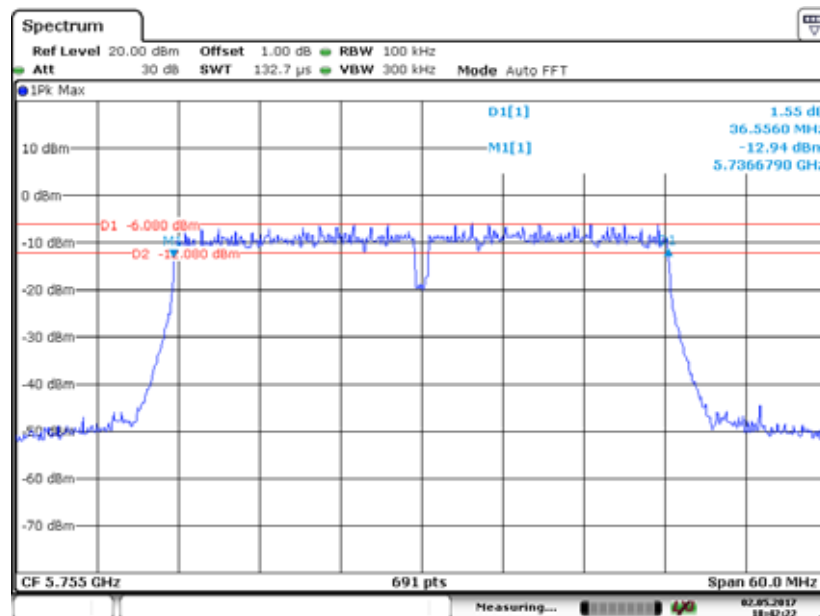
Date: 2 MAY 2017 19:15:20

802.11n ht20 mode, Chain 0: 6 Bandwidth-5825MHz

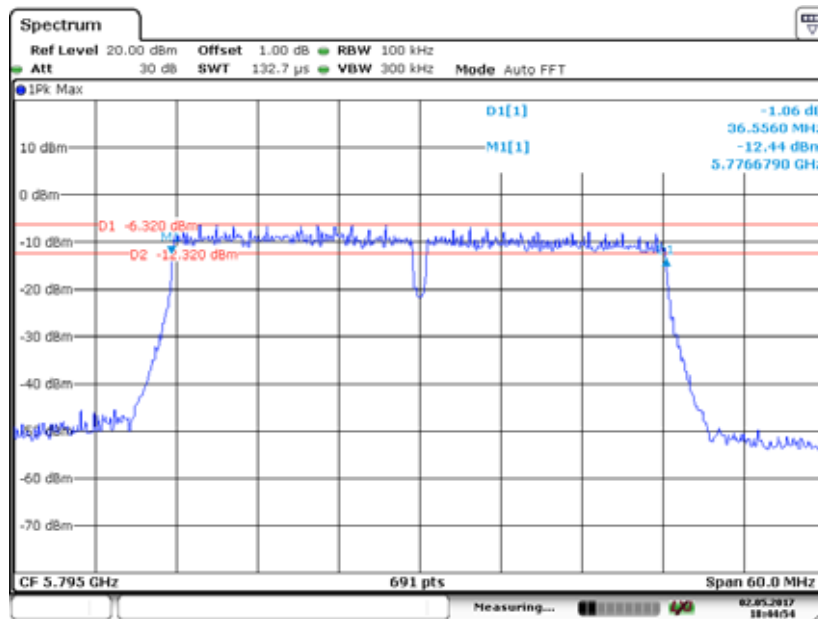


Date: 2 MAY 2017 19:16:59

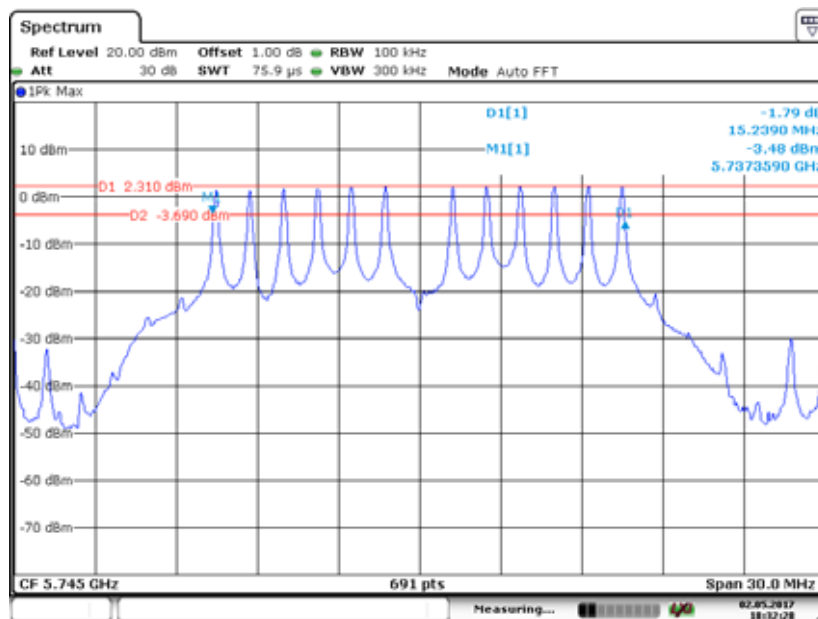
802.11n ht40 mode, Chain 0: 6 Bandwidth-5755MHz



Date: 2 MAY 2017 19:42:22

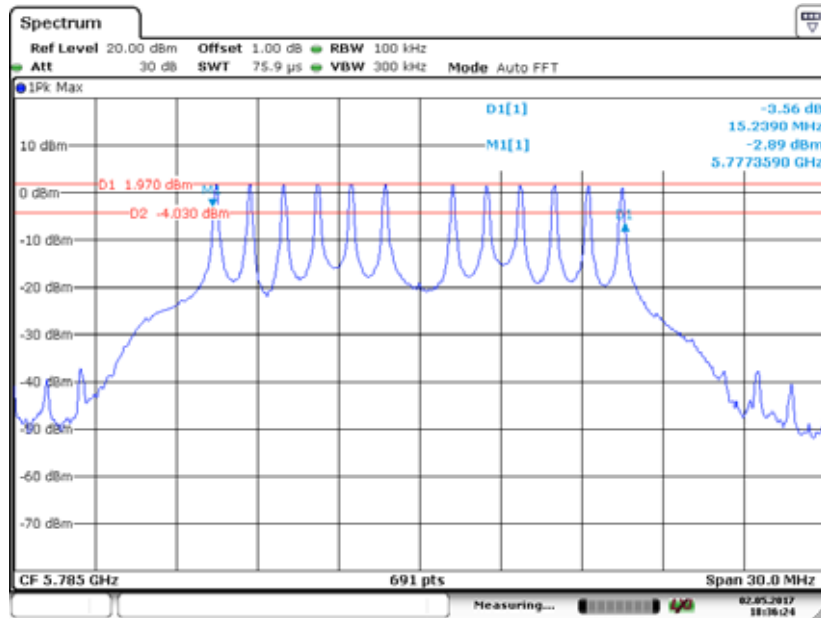
802.11n ht40 mode, Chain 0: 6 Bandwidth-5795MHz

Date: 2 MAY 2017 18:44:54

802.11ac20 mode, Chain 0: 6 Bandwidth-5745MHz

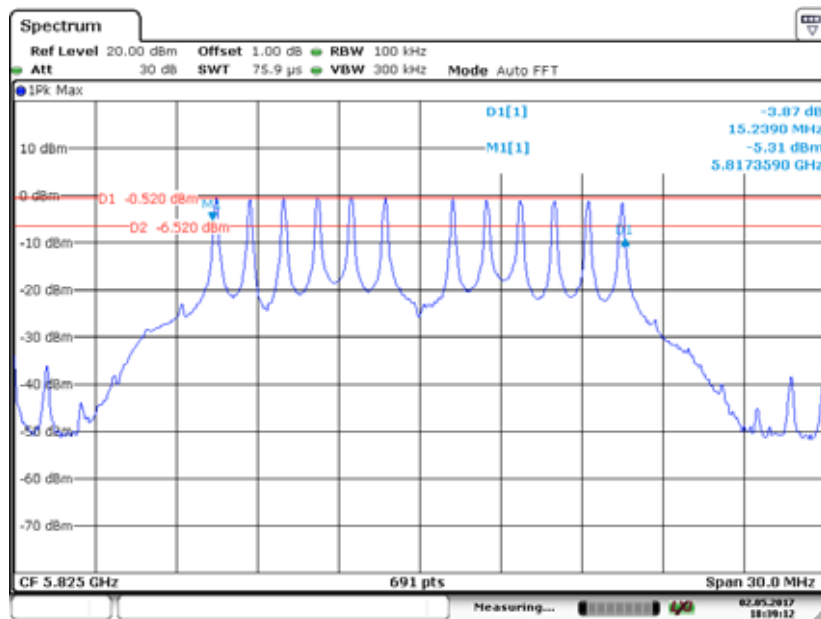
Date: 2 MAY 2017 18:32:29

802.11ac20 mode, Chain 0: 6 Bandwidth-5785MHz



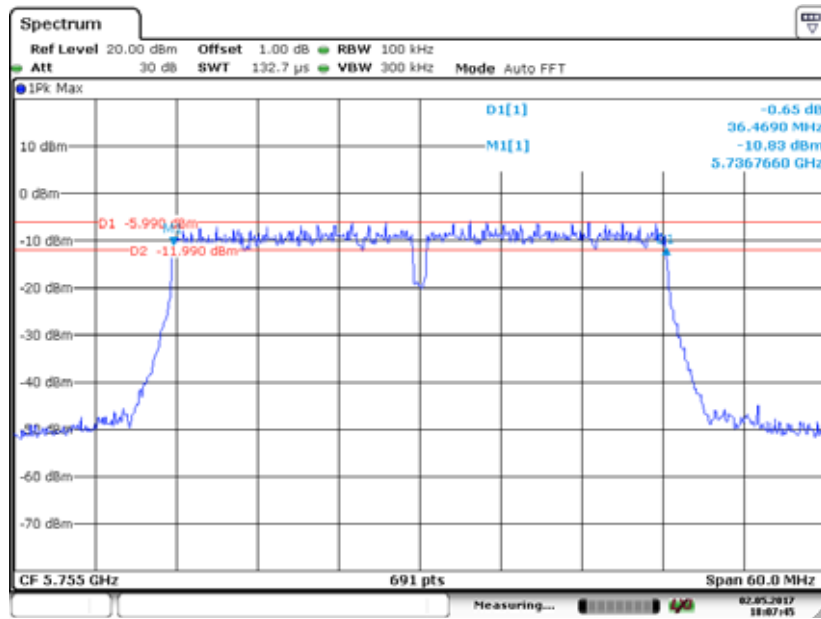
Date: 2 MAY 2017 18:36:24

802.11ac20 mode, Chain 0: 6 Bandwidth-5825MHz



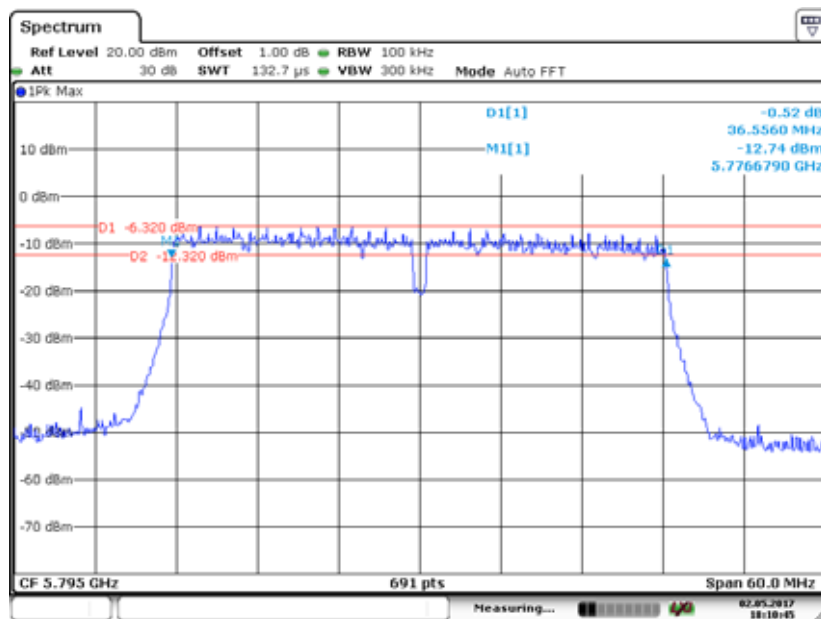
Date: 2 MAY 2017 18:39:12

802.11ac40 mode, Chain 0: 6 Bandwidth-5755MHz



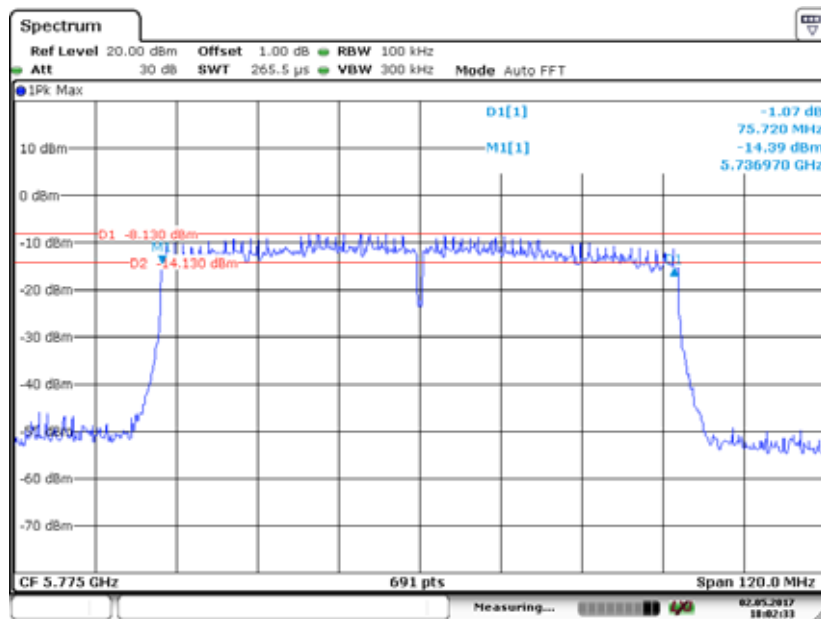
Date: 2 MAY 2017 18:07:44

802.11ac40 mode, Chain 0: 6 Bandwidth-5795MHz



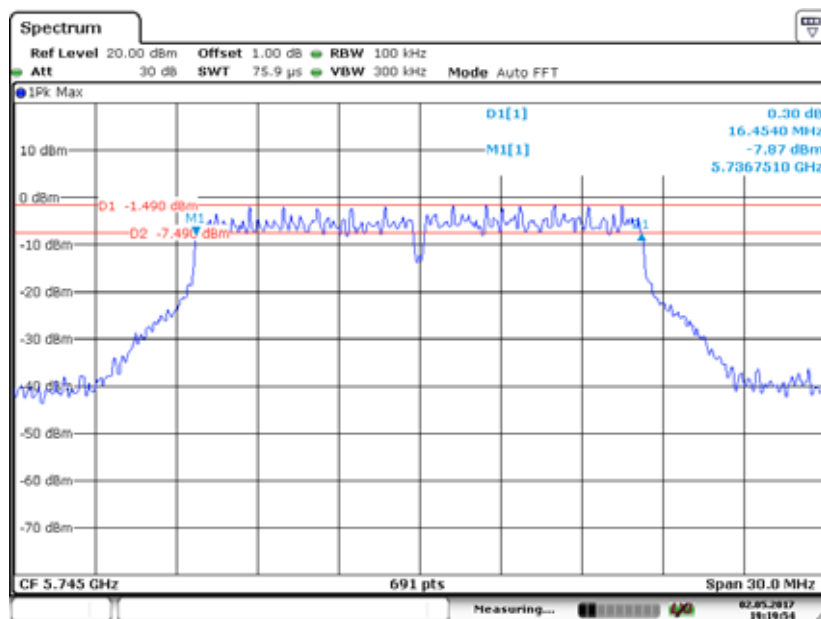
Date: 2 MAY 2017 18:10:45

802.11ac80 mode, Chain 0: 6 Bandwidth-5775MHz



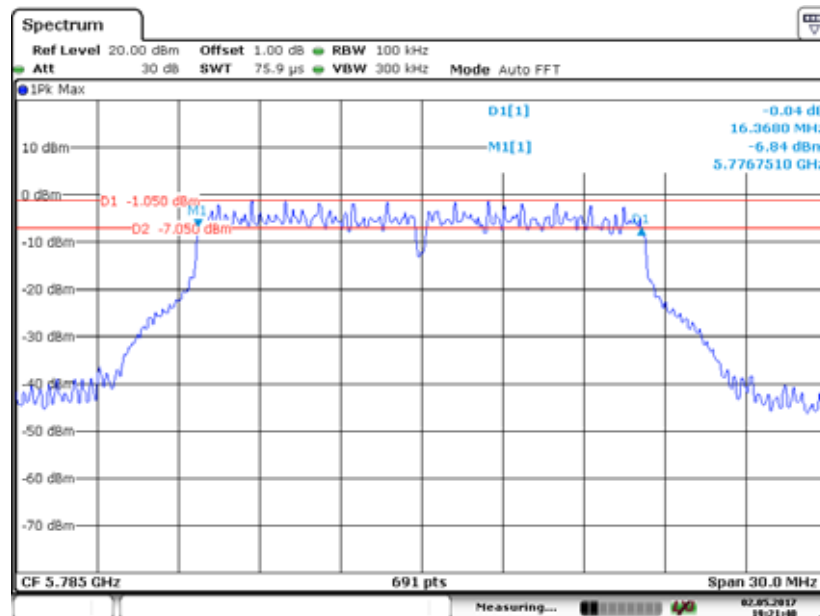
Date: 2 MAY 2017 18:02:33

802.11a mode, Chain 1: 6 Bandwidth-5745MHz



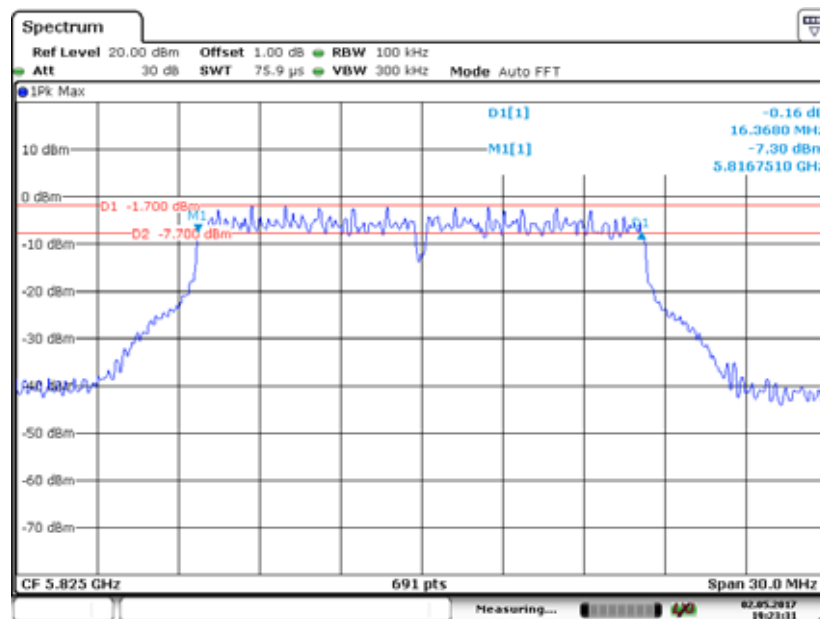
Date: 2 MAY 2017 19:19:54

802.11a mode, Chain 1: 6 Bandwidth-5785MHz



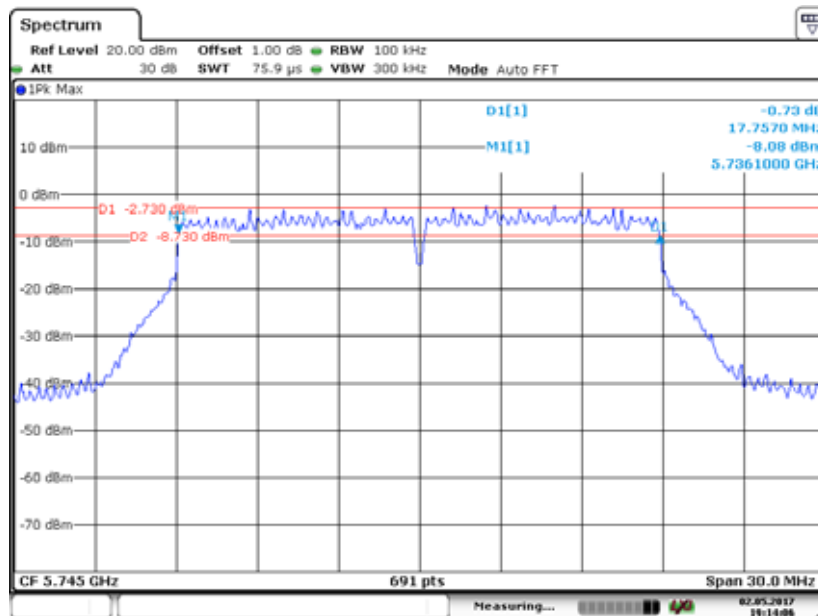
Date: 2 MAY 2017 19:21:40

802.11a mode, Chain 1: 6 Bandwidth-5825MHz



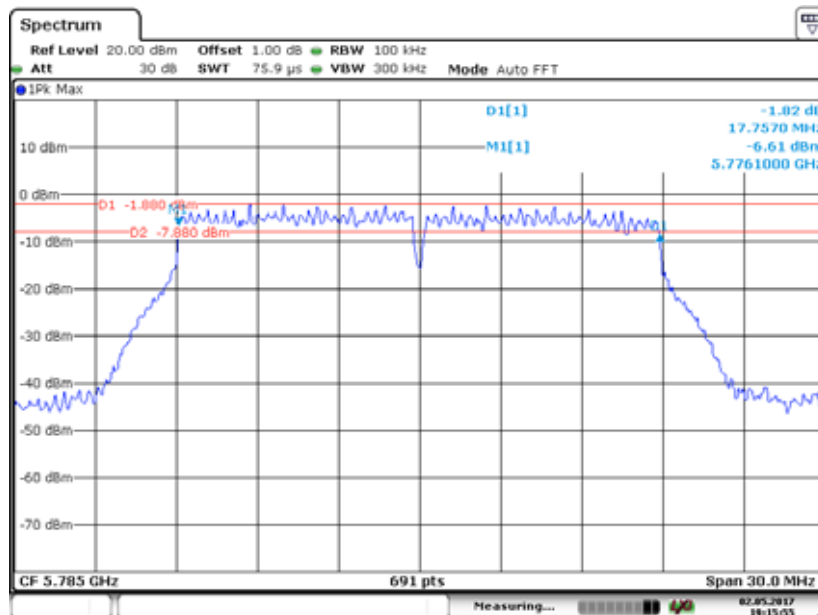
Date: 2 MAY 2017 19:23:31

802.11n ht20 mode, Chain 1: 6 Bandwidth-5745MHz

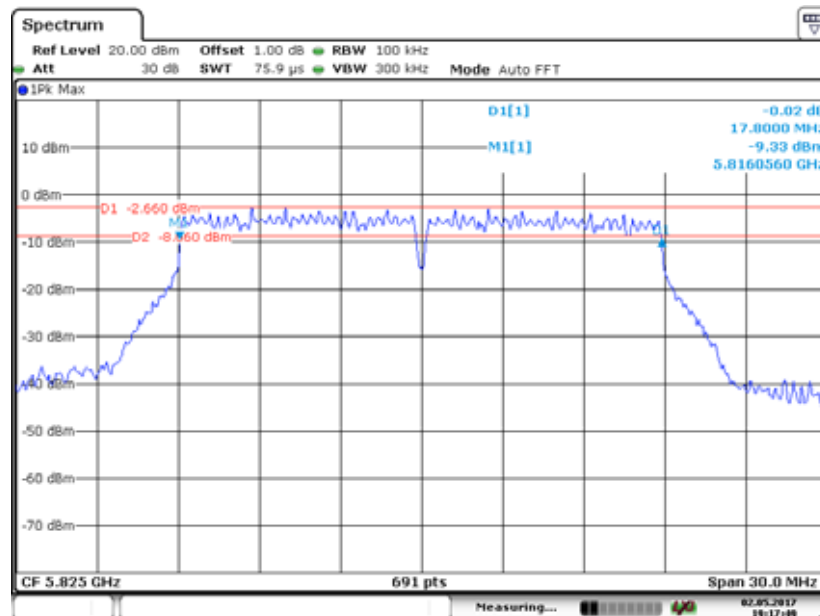


Date: 2 MAY 2017 19:14:06

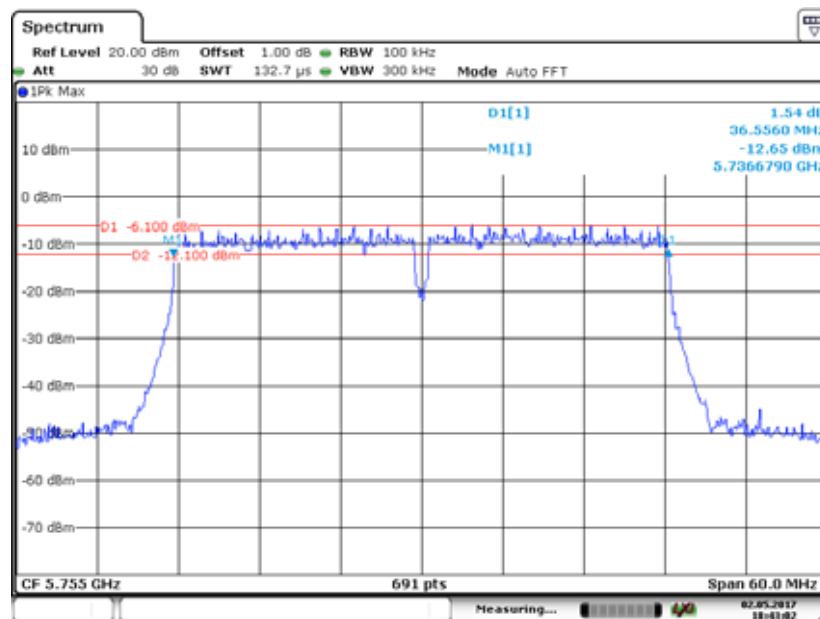
802.11n ht20 mode, Chain 1: 6 Bandwidth-5785MHz



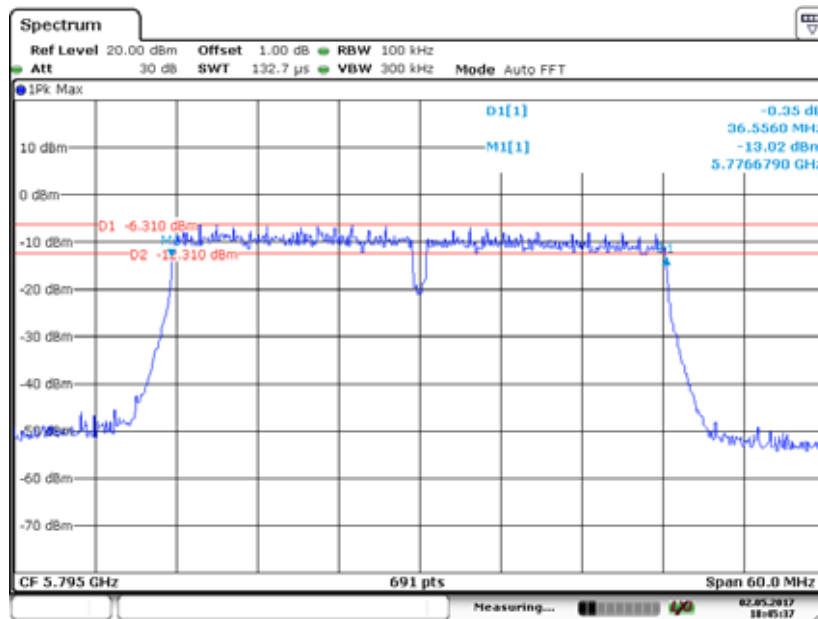
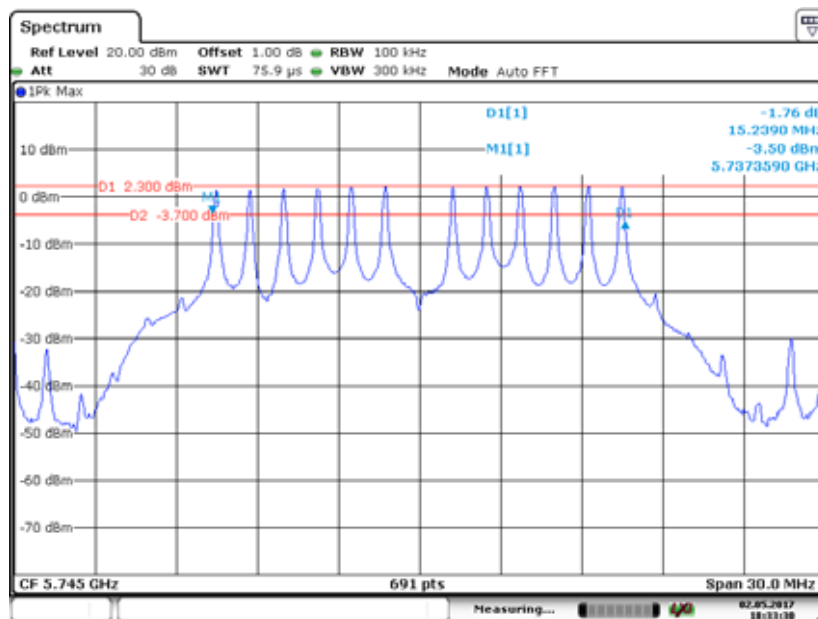
Date: 2 MAY 2017 19:15:55

802.11n ht20 mode, Chain 1: 6 Bandwidth-5825MHz

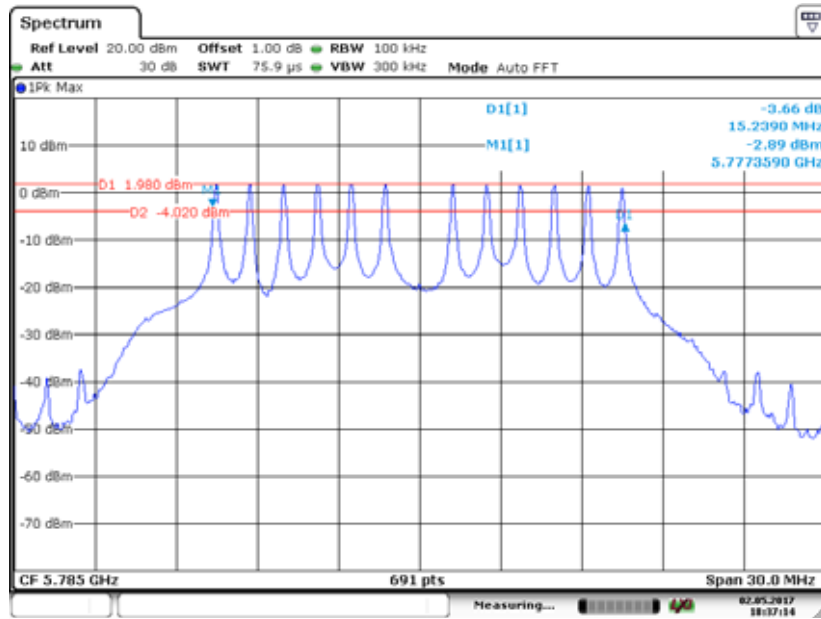
Date: 2 MAY 2017 19:17:49

802.11n ht40 mode, Chain 1: 6 Bandwidth-5755MHz

Date: 2 MAY 2017 18:43:02

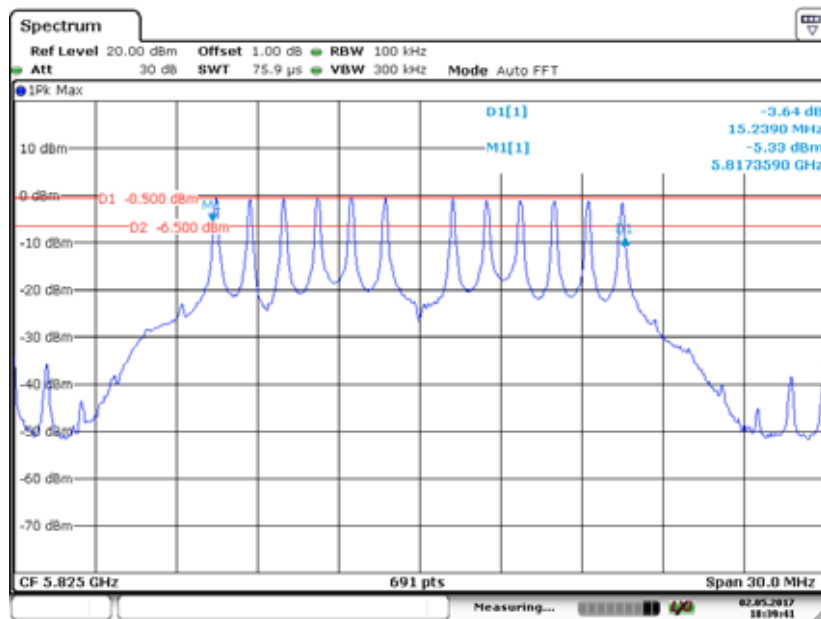
802.11n ht40 mode, Chain 1: 6 Bandwidth-5795MHz**802.11ac20 mode, Chain 1: 6 Bandwidth-5745MHz**

802.11ac20 mode, Chain 1: 6 Bandwidth-5785MHz



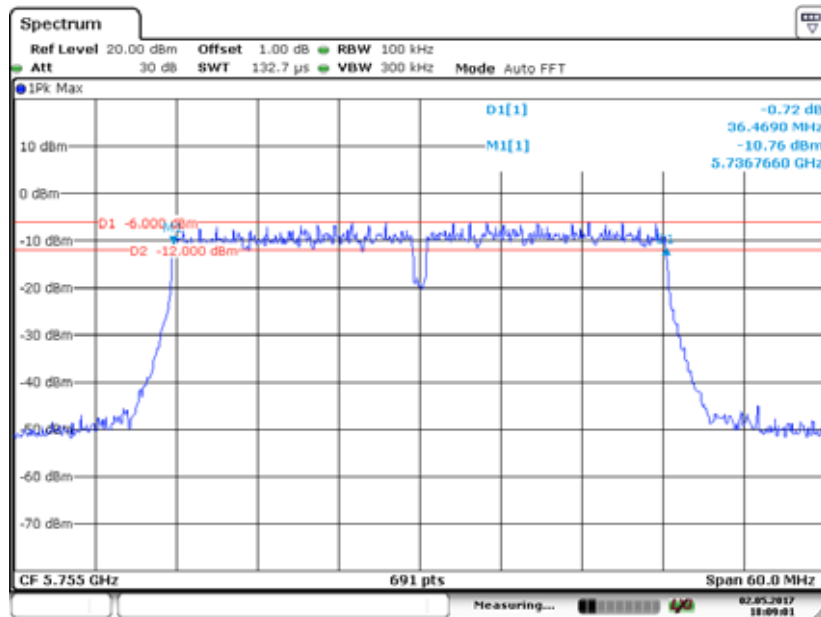
Date: 2 MAY 2017 18:37:14

802.11ac20 mode, Chain 1: 6 Bandwidth-5825MHz



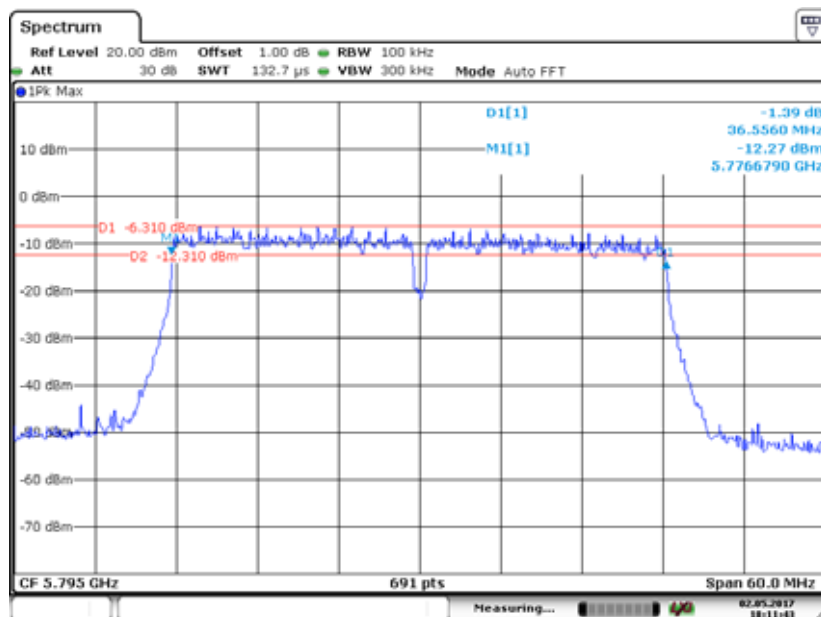
Date: 2 MAY 2017 18:39:41

802.11ac40 mode, Chain 1: 6 Bandwidth-5755MHz



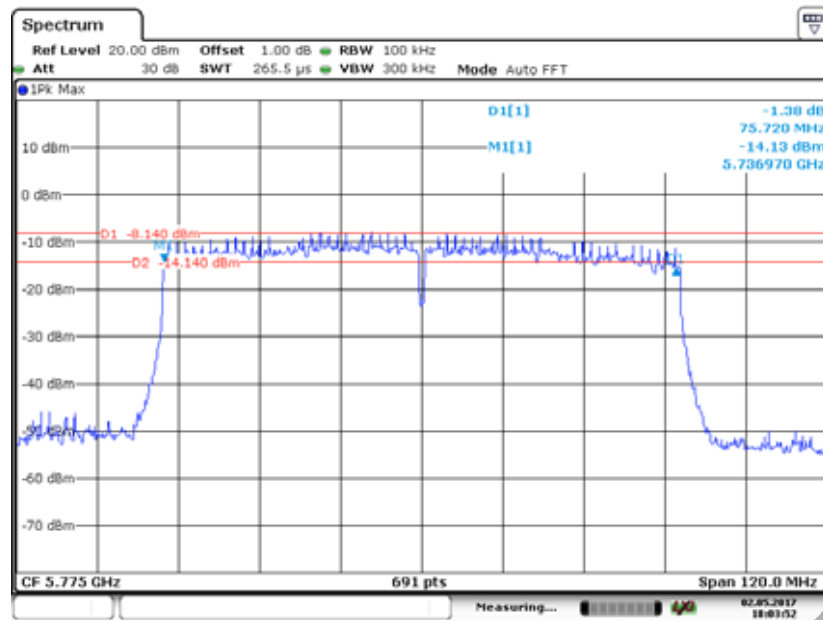
Date: 2 MAY 2017 18:09:01

802.11ac40 mode, Chain 1: 6 Bandwidth-5795MHz



Date: 2 MAY 2017 18:11:43

802.11ac80 mode, Chain 1: 6 Bandwidth-5785MHz



Date: 2 MAY 2017 18:03:53

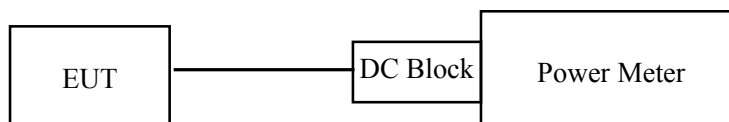
FCC §15.407(a) (1) – CONDUCTED TRANSMITTER OUTPUT POWER**Applicable Standard**

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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:	23.5 °C
Relative Humidity:	60 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2017-05-02.

Test Mode: Transmitting

Test mode	Band	Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)			Limit (dBm)	Result
				Chain0	Chain1	Total		
802.11a	5150-5250 MHz	Low	5180	17.56	17.54	/	30	PASS
		Middle	5200	18.43	18.48	/	30	PASS
		High	5240	17.89	17.89	/	30	PASS
	5725-5850 MHz	Low	5745	18.25	18.25	/	30	PASS
		Middle	5785	18.25	18.24	/	30	PASS
		High	5825	17.72	17.71	/	30	PASS
802.11n ht20	5150-5250 MHz	Low	5180	18.23	18.16	21.21	30	PASS
		Middle	5200	18.18	18.12	21.16	30	PASS
		High	5240	18.05	18.05	21.06	30	PASS
	5725-5850 MHz	Low	5745	18.05	18.11	21.09	30	PASS
		Middle	5785	18.37	18.40	21.40	30	PASS
		High	5825	18.30	18.19	21.26	30	PASS
802.11n ht40	5150-5250 MHz	Low	5190	16.99	17.04	20.03	30	PASS
		High	5230	17.30	17.22	20.27	30	PASS
	5725-5850 MHz	Low	5755	17.35	17.33	20.35	30	PASS
		High	5795	16.73	16.71	19.73	30	PASS
802.11ac20	5150-5250 MHz	Low	5180	17.17	16.94	20.07	30	PASS
		Middle	5200	17.47	17.46	20.48	30	PASS
		High	5240	16.85	16.76	19.82	30	PASS
	5725-5850 MHz	Low	5745	17.14	17.08	20.12	30	PASS
		Middle	5785	16.53	16.57	19.56	30	PASS
		High	5825	14.13	14.10	17.13	30	PASS
802.11ac40	5150-5250 MHz	Low	5190	17.48	17.52	20.51	30	PASS
		High	5230	18.15	18.29	21.23	30	PASS
	5725-5850 MHz	Low	5755	17.26	17.48	20.38	30	PASS
		High	5795	16.98	17.14	20.07	30	PASS
802.11ac80	5150-5250 MHz	/	5210	17.09	17.34	20.23	30	PASS
	5725-5850 MHz	/	5775	17.40	17.31	20.37	30	PASS

Test mode	Band	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)			Limit (dBm)	Result
				Chain0	Chain1	Total		
802.11a	5150-5250 MHz	Low	5180	13.82	13.81	/	30	PASS
		Middle	5200	14.90	14.93	/	30	PASS
		High	5240	14.29	14.31	/	30	PASS
	5725-5850 MHz	Low	5745	14.44	14.42	/	30	PASS
		Middle	5785	14.50	14.48	/	30	PASS
		High	5825	13.90	13.87	/	30	PASS
802.11n ht20	5150-5250 MHz	Low	5180	14.57	14.55	17.57	30	PASS
		Middle	5200	14.58	14.66	17.63	30	PASS
		High	5240	14.43	14.43	17.44	30	PASS
	5725-5850 MHz	Low	5745	14.50	14.49	17.51	30	PASS
		Middle	5785	14.63	14.57	17.61	30	PASS
		High	5825	14.37	14.39	17.39	30	PASS
802.11n ht40	5150-5250 MHz	Low	5190	12.24	12.22	15.24	30	PASS
		High	5230	12.83	12.77	15.81	30	PASS
	5725-5850 MHz	Low	5755	12.99	13.09	16.05	30	PASS
		High	5795	12.30	12.31	15.32	30	PASS
802.11ac20	5150-5250 MHz	Low	5180	14.80	14.76	17.79	30	PASS
		Middle	5200	15.31	15.30	18.32	30	PASS
		High	5240	14.63	14.59	17.62	30	PASS
	5725-5850 MHz	Low	5745	15.18	15.19	18.20	30	PASS
		Middle	5785	14.60	14.57	17.60	30	PASS
		High	5825	12.55	12.59	15.58	30	PASS
802.11ac40	5150-5250 MHz	Low	5190	12.30	12.30	15.31	30	PASS
		High	5230	13.49	13.60	16.56	30	PASS
	5725-5850 MHz	Low	5755	12.71	12.86	15.80	30	PASS
		High	5795	12.45	12.46	15.47	30	PASS
802.11ac80	5150-5250 MHz	/	5210	11.85	11.97	14.92	30	PASS
	5725-5850 MHz	/	5775	11.87	11.85	14.87	30	PASS

Note: The total output power= $10\log_{10}(10^{(Chain\ 0/10)}+10^{(Chain\ 1/10)})$

FCC §15.407(a) (1) (5) - POWER SPECTRAL DENSITY

Applicable Standard

According to §15.407(a)(1)

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

According to §15.407(a)(3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

The measurements are based on FCC KDB 789033 D02 General UNII Test Procedures New Rules v01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices section F: Maximum power spectral density (PPSD)

Test Data**Environmental Conditions**

Temperature:	23.5 °C
Relative Humidity:	60 %
ATM Pressure:	101.2 kPa

The testing was performed by Chris Wang on 2017-05-17.

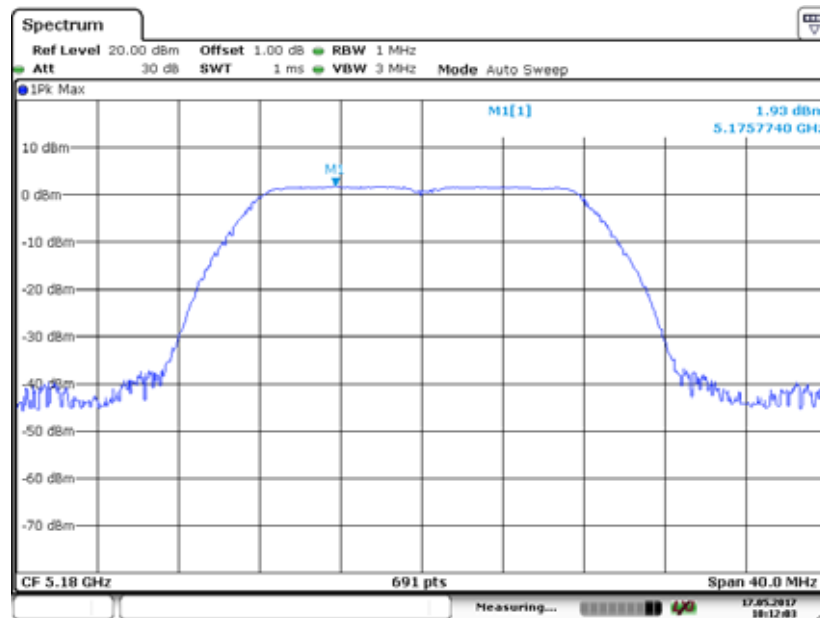
Test Mode: Transmitting

5150MHz-5250MHz:

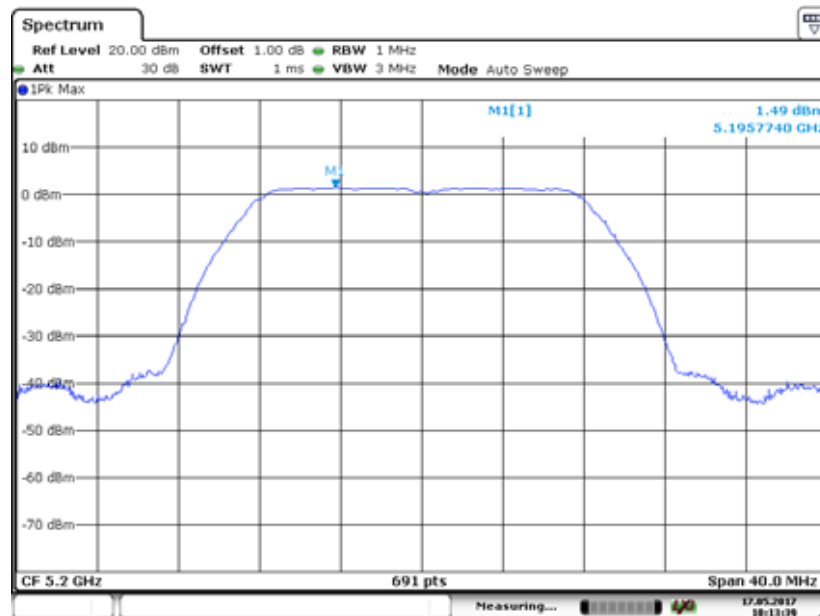
Mode	Channel	Frequency (MHz)	PSD (dBm/MHz)			Limit (dBm/MHz)	Result
			Chain0	Chain1	Total		
802.11a	Low	5180	1.93	1.94	/	17	PASS
	Middle	5200	1.49	1.46	/	17	PASS
	High	5240	0.99	0.94	/	17	PASS
802.11n20	Low	5180	2.47	2.58	5.54	17	PASS
	Middle	5200	3.23	3.23	6.24	17	PASS
	High	5240	2.84	2.17	5.53	17	PASS
802.11n40	Low	5190	0.30	0.42	3.37	17	PASS
	High	5230	0.21	-0.21	3.02	17	PASS
802.11ac20	Low	5180	2.33	2.80	5.58	17	PASS
	Middle	5200	2.09	2.49	5.30	17	PASS
	High	5240	1.85	1.98	4.93	17	PASS
802.11ac40	Low	5190	-0.03	0.07	3.03	17	PASS
	High	5230	-0.62	-0.16	2.63	17	PASS
802.11ac80	/	5210	-2.56	-2.73	0.37	17	PASS

Note: The total PSD = $10\log_{10}(10^{\text{Chain 0}/10} + 10^{\text{Chain 1}/10})$

5150MHz-5250MHz Band:

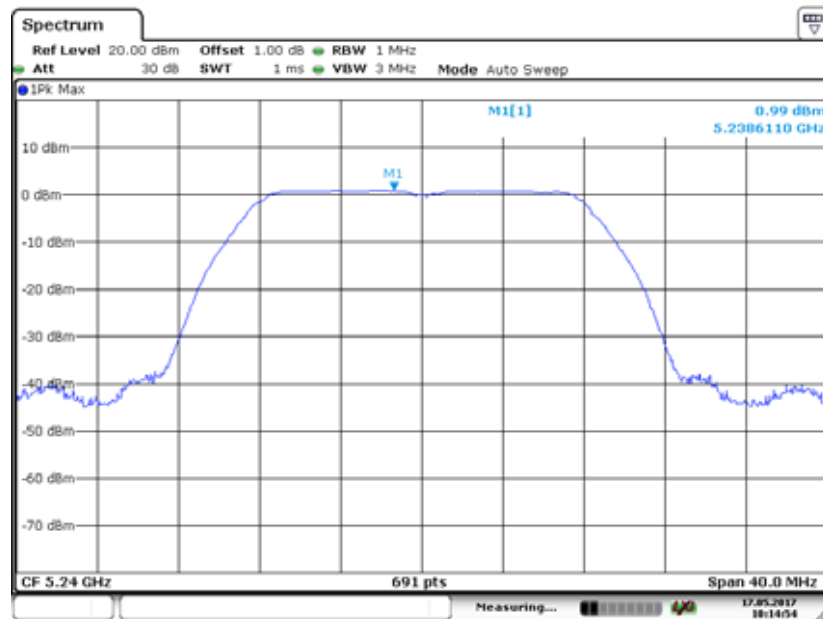
802.11a mode, Chain 0: Power spectral density-5180MHz

Date: 17 MAY 2017 10:12:03

802.11a mode, Chain 0: Power spectral density-5200MHz

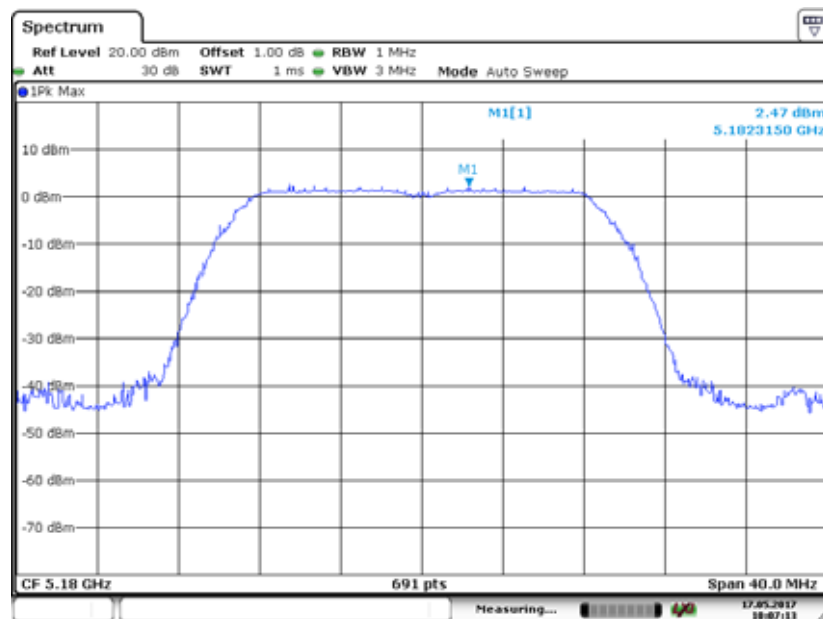
Date: 17 MAY 2017 10:13:40

802.11a mode, Chain 0: Power spectral density-5240MHz



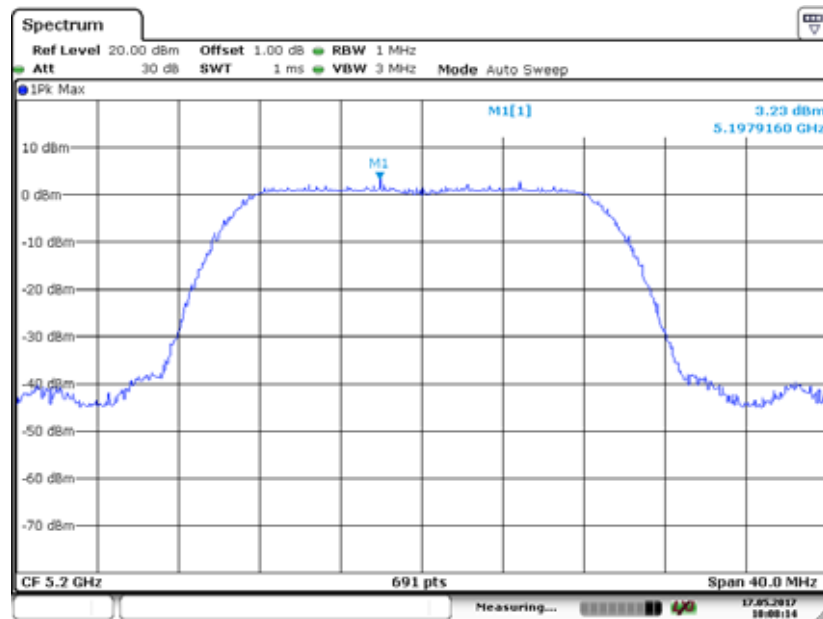
Date: 17.MAY.2017 10:14:54

802.11n ht20 mode, Chain 0: Power spectral density-5180MHz



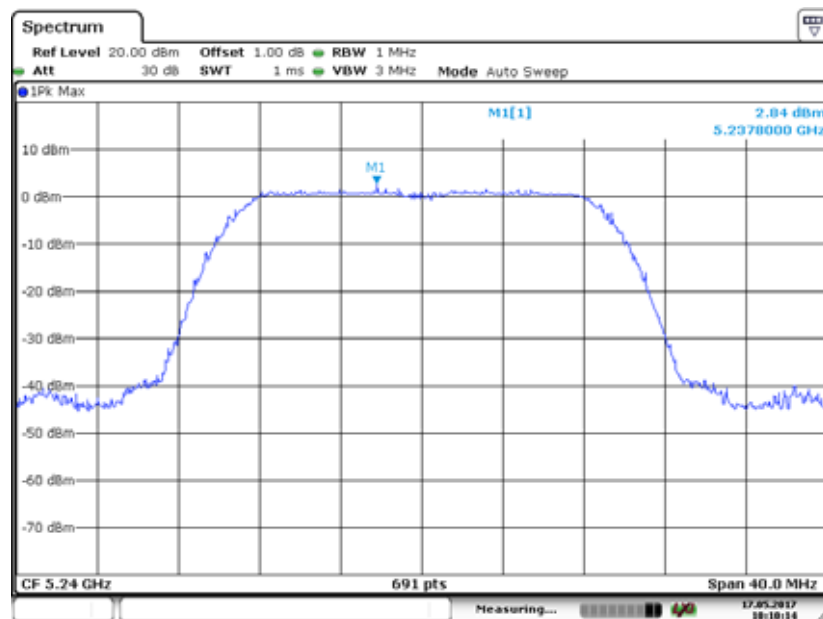
Date: 17.MAY.2017 10:07:13

802.11n ht20 mode, Chain 0: Power spectral density-5200MHz

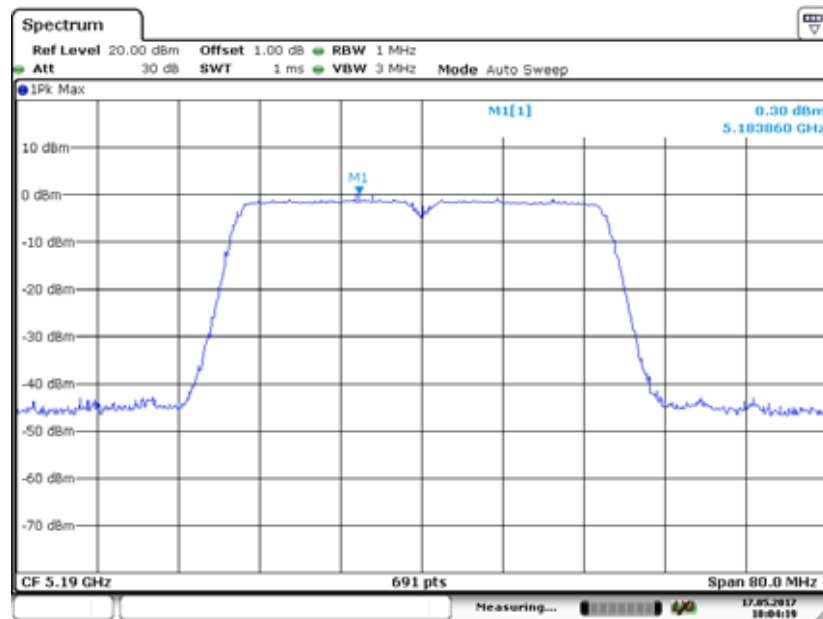


Date: 17 MAY 2017 10:08:14

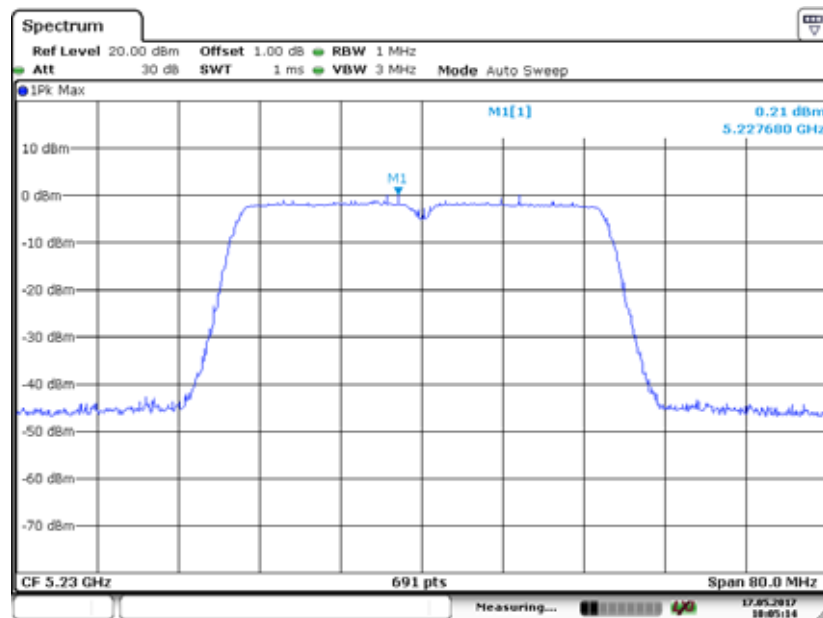
802.11n ht20 mode, Chain 0: Power spectral density-5240MHz



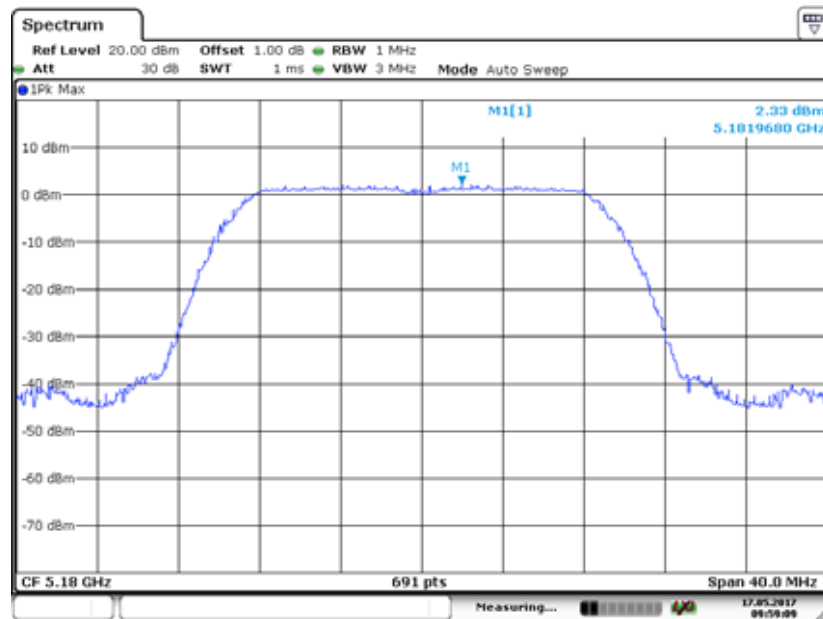
Date: 17 MAY 2017 10:10:14

802.11n ht40 mode, Chain 0: Power spectral density-5190MHz

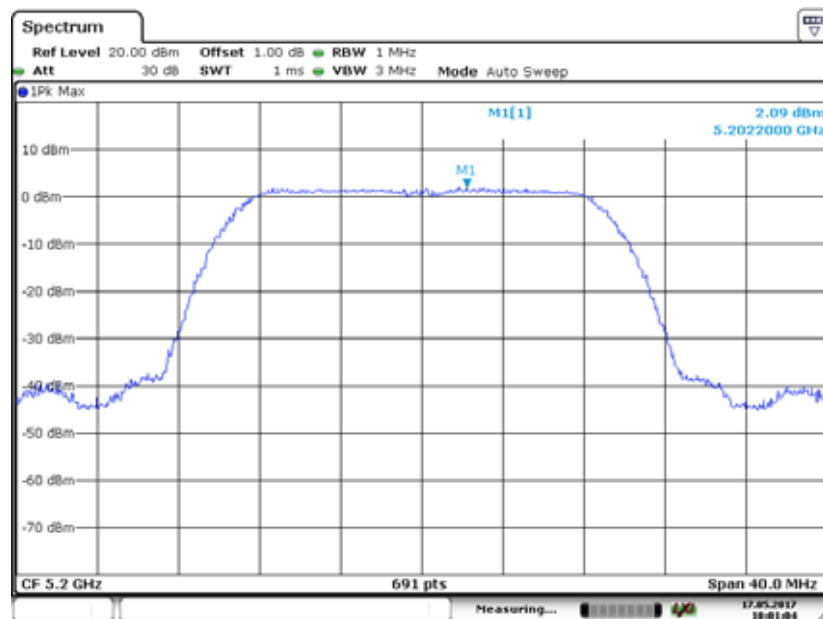
Date: 17.MAY.2017 10:04:19

802.11n ht40 mode, Chain 0: Power spectral density-5230MHz

Date: 17.MAY.2017 10:05:14

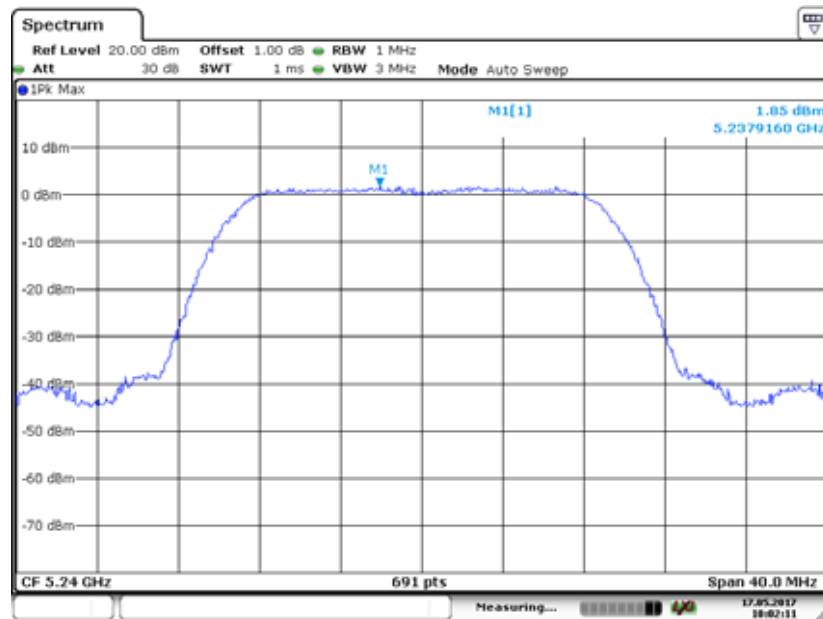
802.11ac20 mode, Chain 0: Power spectral density-5180MHz

Date:17.MAY.2017 09:59:10

802.11ac20 mode, Chain 0: Power spectral density-5200MHz

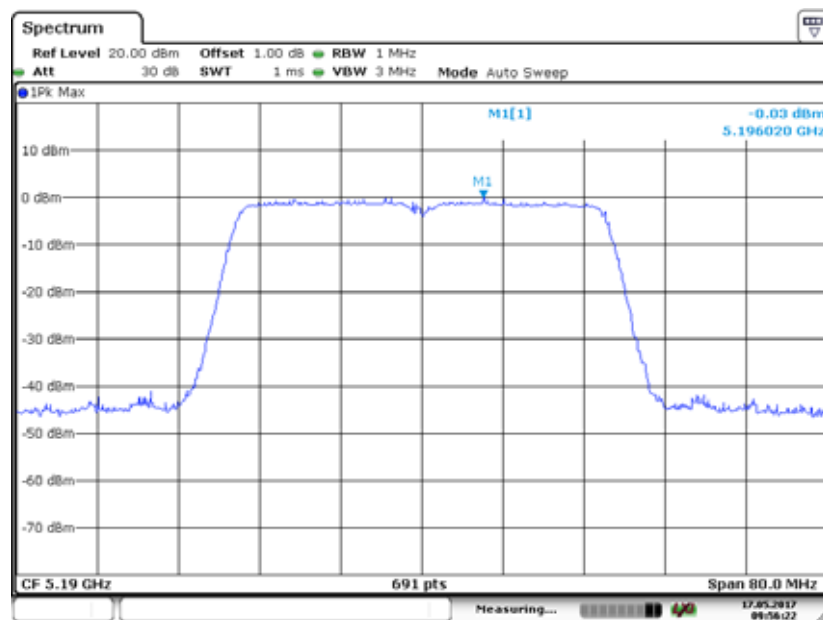
Date:17.MAY.2017 10:01:04

802.11ac20 mode, Chain 0: Power spectral density-5240MHz



Date: 17.MAY.2017 10:02:11

802.11ac40 mode, Chain 0: Power spectral density-5190MHz



Date: 17.MAY.2017 09:56:22

Spectrum

Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz
 Att 30 dB SWT 1 ms VBW 3 MHz Mode Auto Sweep

1Pk Max

M1[1] -0.62 dBm
 5.235900 GHz

M1

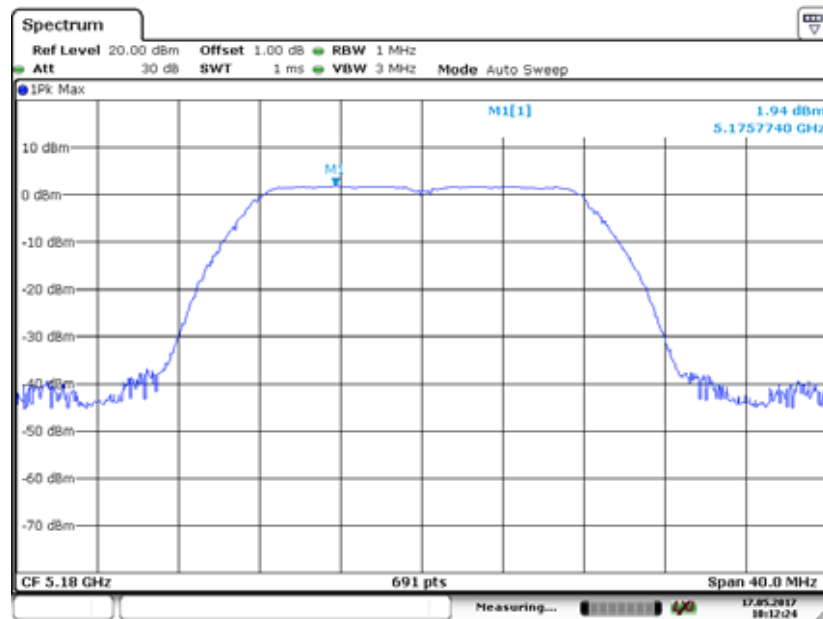
CF 5.23 GHz 691 pts Span 80.0 MHz

Measuring... 17.05.2012 09:57:28

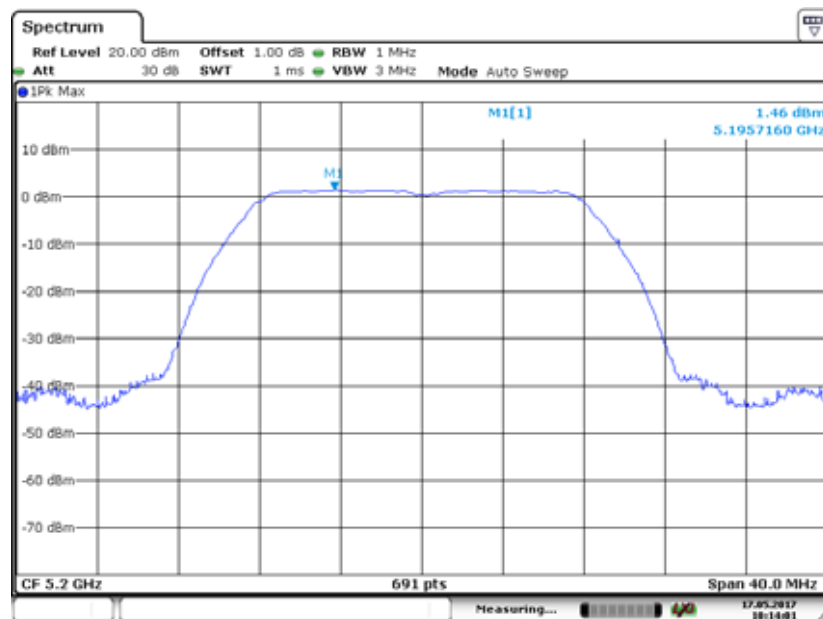
Date: 17 MAY 2017 09:57:28

The screenshot displays a Spectrum Analyzer interface. The top panel shows the following settings: **Ref Level** 20.00 dBm, **Offset** 1.00 dB, **RBW** 1 MHz, **Att** 30 dB, **SWT** 1 ms, **VBW** 3 MHz, and **Mode** Auto Sweep. The main display area shows a spectrum plot with a blue trace. A peak is labeled **M1** at **5.180820 GHz** with a level of **-2.56 dBm**. The x-axis is labeled **CF 5.21 GHz** and **Span 160.0 MHz**. The y-axis is labeled **1Pk Max** and ranges from -70 dBm to 10 dBm. The bottom status bar shows **Measuring...** and **17.65.2017 08:03:03**.

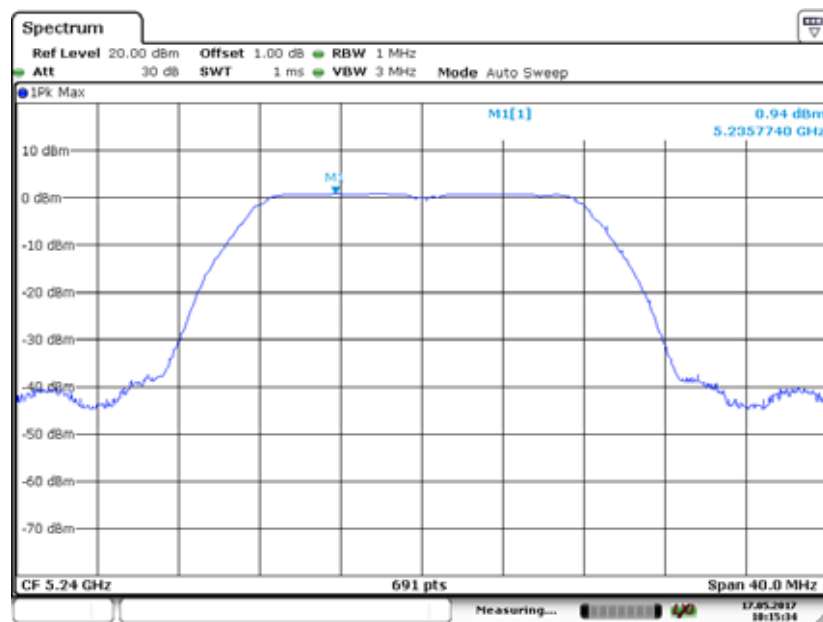
Date: 17 MAY 2017 09:53:23

802.11a mode, Chain 1: Power spectral density-5180MHz

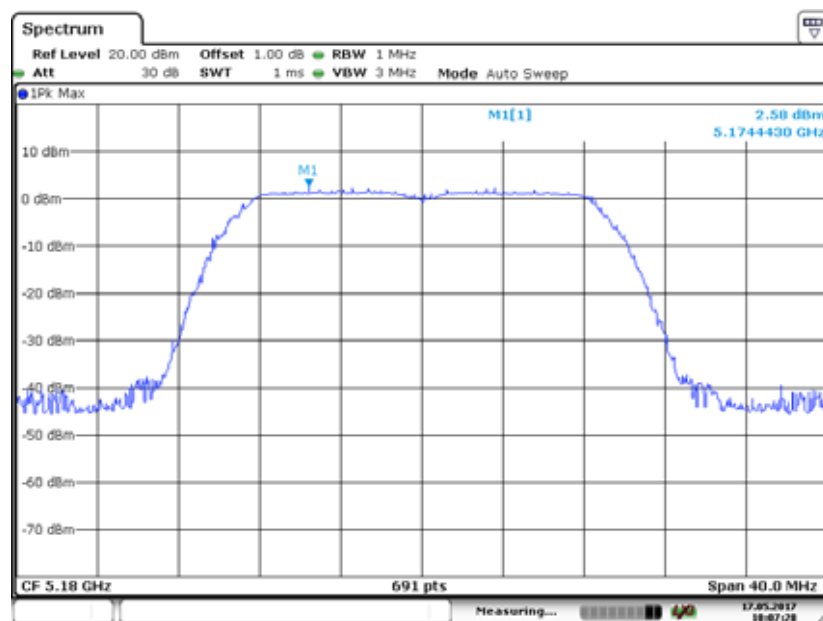
Date:17.MAY.2017 10:12:24

802.11a mode, Chain 1: Power spectral density-5200MHz

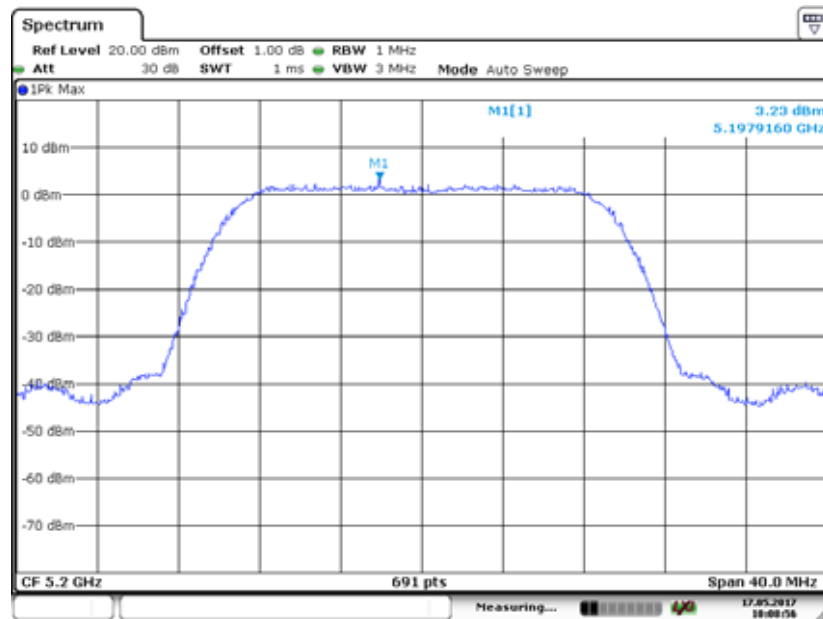
Date:17.MAY.2017 10:14:01

802.11a mode, Chain 1: Power spectral density-5240MHz

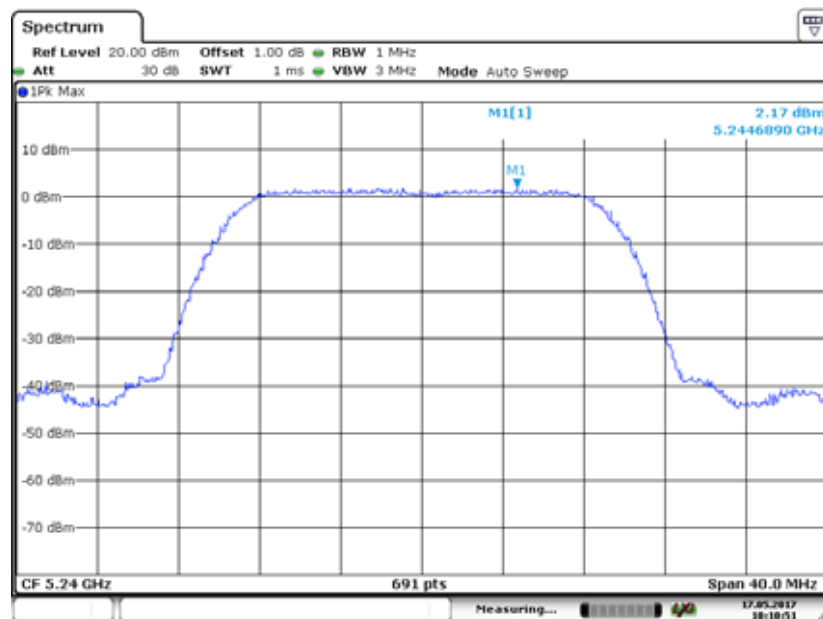
Date: 17 MAY 2017 10:15:35

802.11n ht20 mode, Chain 1: Power spectral density-5180MHz

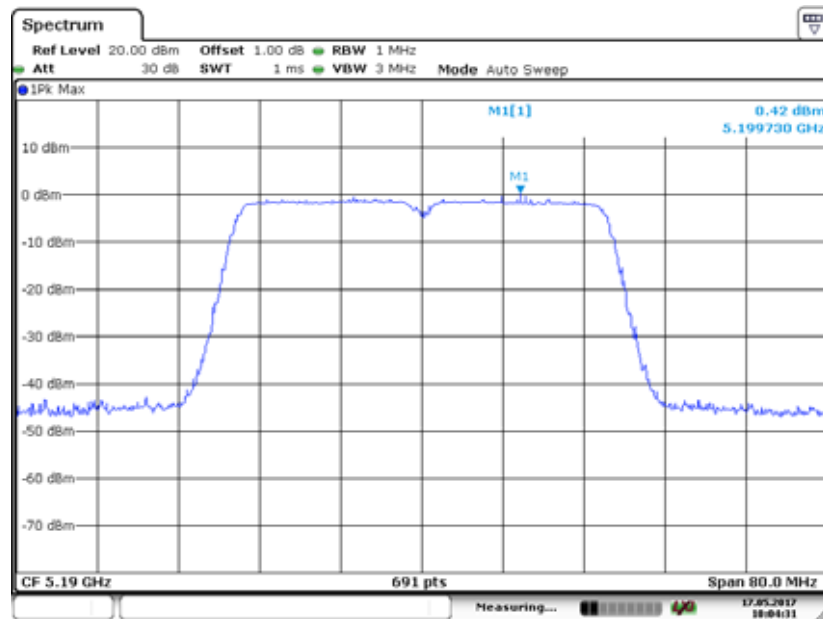
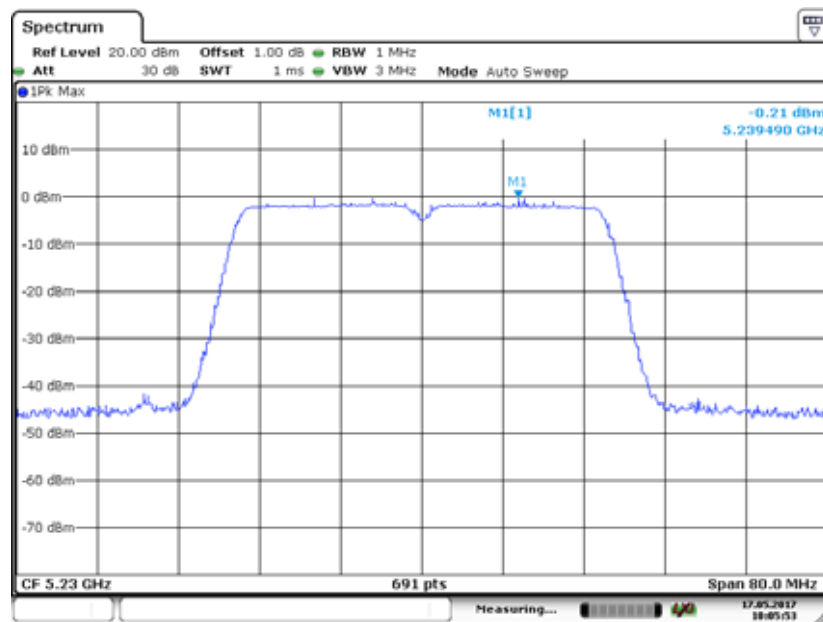
Date: 17 MAY 2017 10:07:28

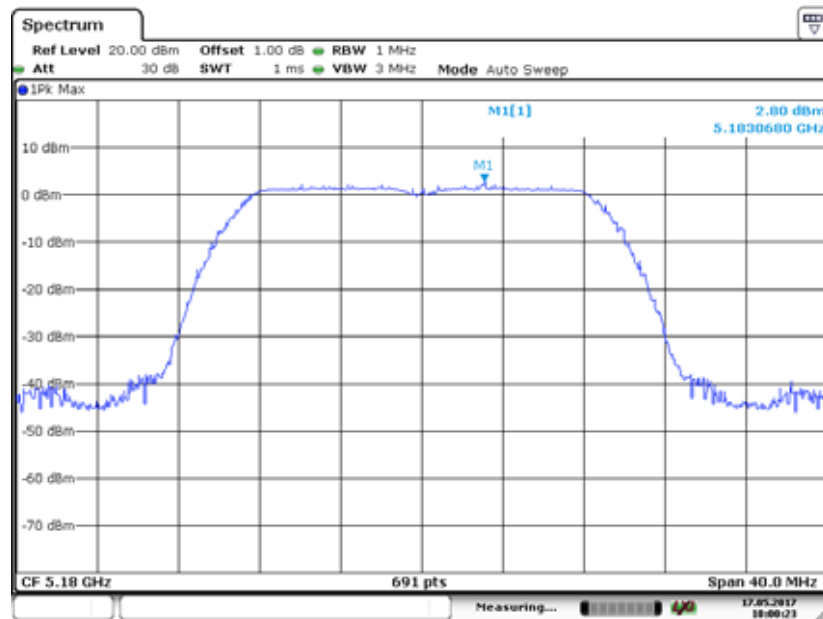
802.11n ht20 mode, Chain 1: Power spectral density-5200MHz

Date: 17 MAY 2017 10:08:56

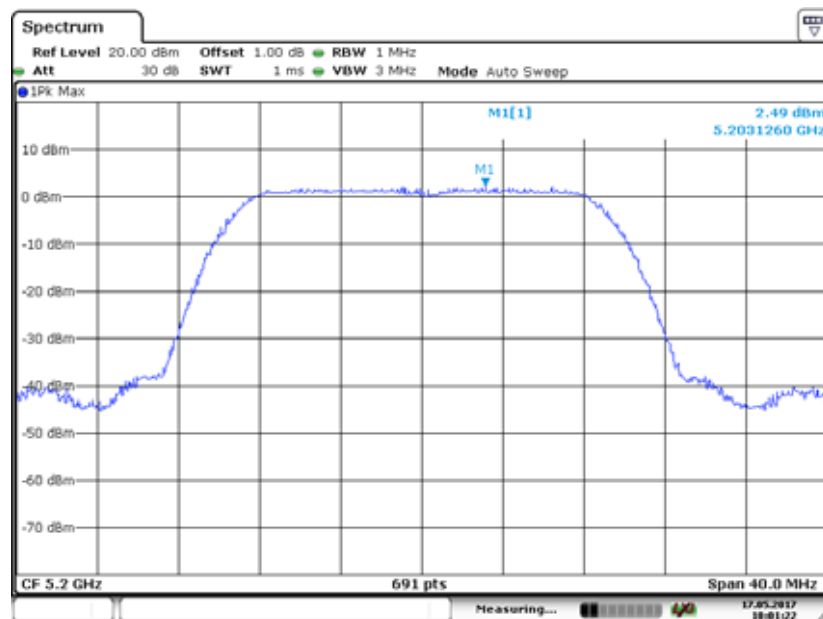
802.11n ht20 mode, Chain 1: Power spectral density-5240MHz

Date: 17 MAY 2017 10:10:52

802.11n ht40 mode, Chain 1: Power spectral density-5190MHz**802.11n ht40 mode, Chain 1: Power spectral density-5230MHz**

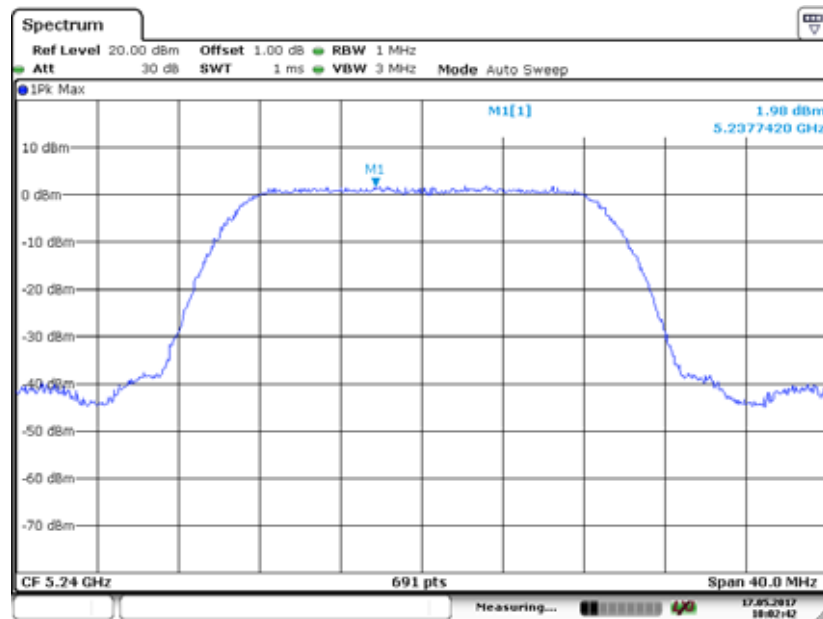
802.11ac20 mode, Chain 1: Power spectral density-5180MHz

Date:17.MAY.2017 10:00:24

802.11ac20 mode, Chain 1: Power spectral density-5200MHz

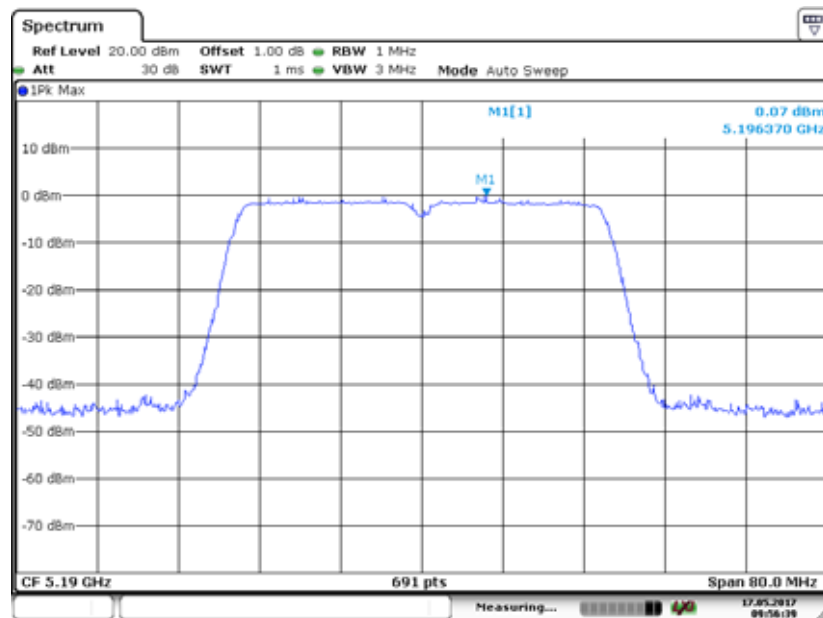
Date:17.MAY.2017 10:01:23

802.11ac20 mode, Chain 1: Power spectral density-5240MHz

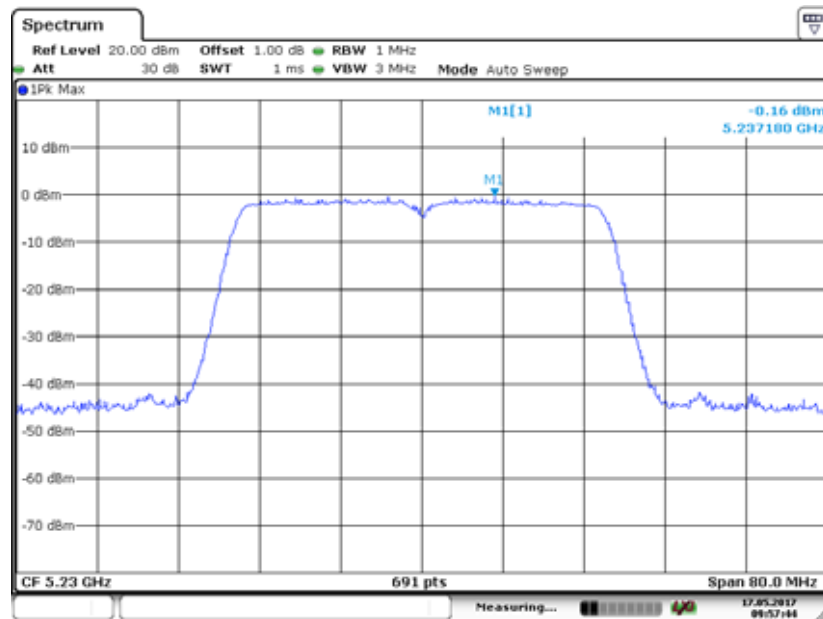


Date: 17 MAY 2017 10:02:43

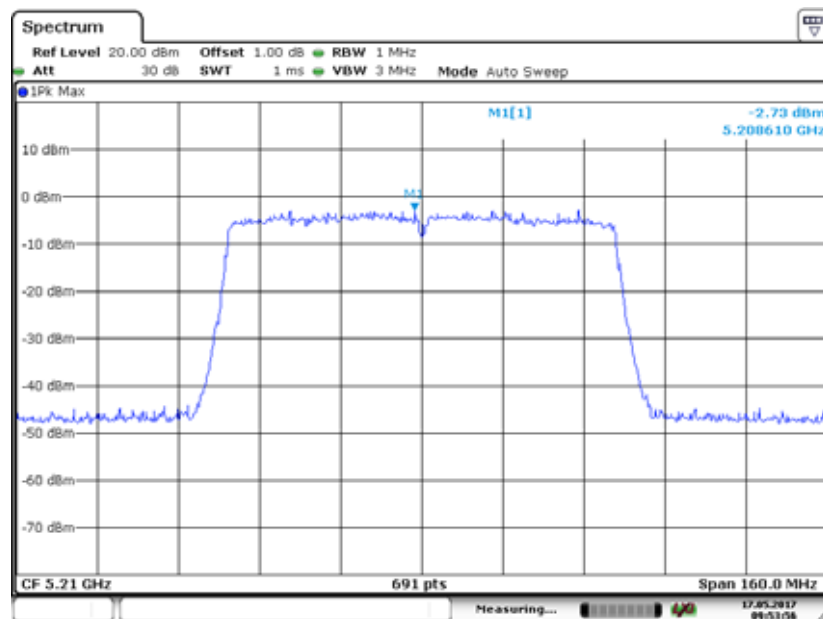
802.11ac40 mode, Chain 1: Power spectral density-5190MHz



Date: 17 MAY 2017 09:56:40

802.11ac40 mode, Chain 1: Power spectral density-5230MHz

Date: 17 MAY 2017 09:57:44

802.11ac80 mode, Chain 1: Power spectral density-5210MHz

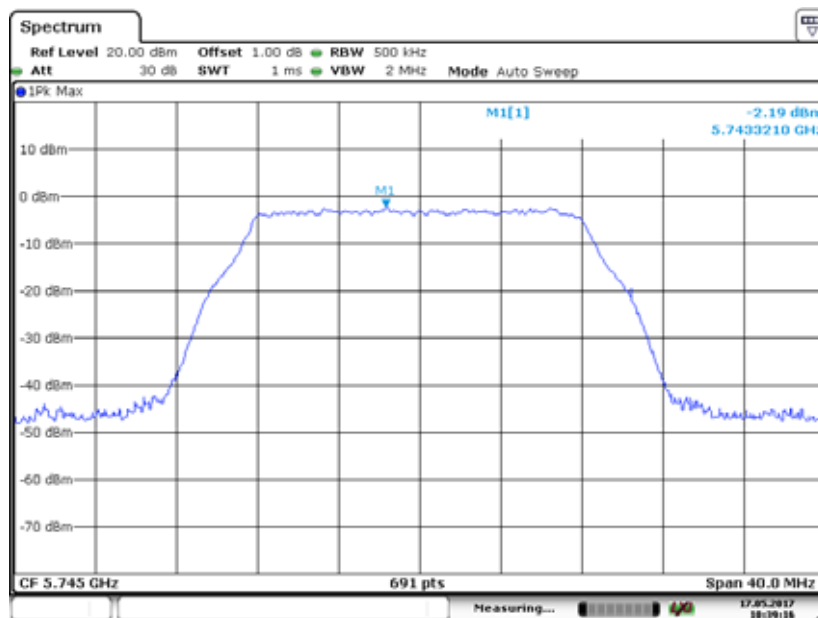
Date: 17 MAY 2017 09:53:56

5725MHz-5850MHz:

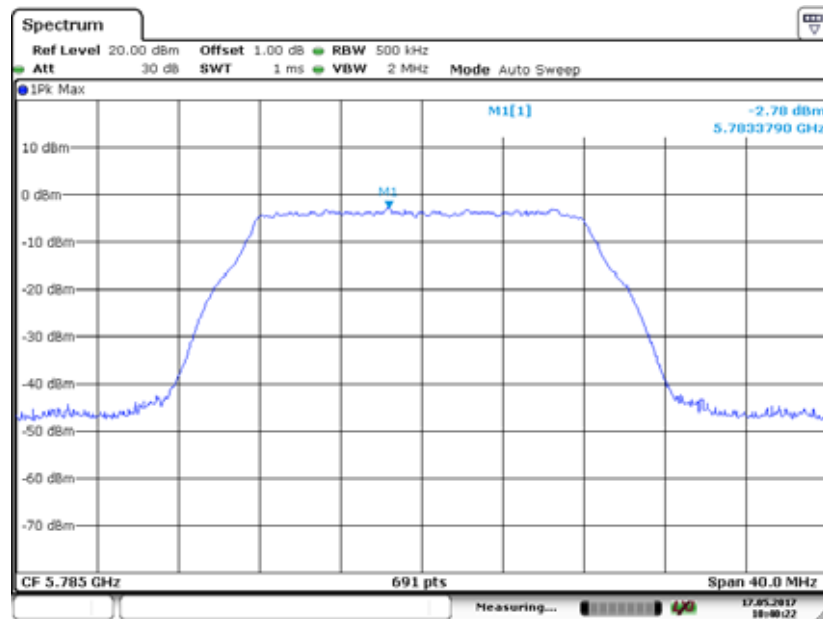
Mode	Channel	Frequency MHz	PSD (dBm/500kHz)			Limit (dBm/500kHz)	Result
			Chain0	Chain1	Total		
802.11a	Low	5745	-2.19	-2.18	/	30	PASS
	Middle	5785	-2.78	-2.76	/	30	PASS
	High	5825	-3.00	-3.02	/	30	PASS
802.11n20	Low	5745	-1.86	-2.19	0.99	30	PASS
	Middle	5785	-2.42	-1.71	0.96	30	PASS
	High	5825	-2.51	-2.37	0.57	30	PASS
802.11n40	Low	5755	-2.80	-2.76	0.23	30	PASS
	High	5795	-2.90	-2.95	0.09	30	PASS
802.11ac20	Low	5745	-1.42	-1.66	1.47	30	PASS
	Middle	5785	-1.66	-1.93	1.22	30	PASS
	High	5825	-1.87	-1.84	1.16	30	PASS
802.11ac40	Low	5755	-2.36	-2.88	0.40	30	PASS
	High	5795	-2.99	-3.15	-0.06	30	PASS
802.11ac80	/	5775	-5.53	-5.37	-2.44	30	PASS

Note: The total PSD = $10 \log_{10}(10^{\text{Chain 0}/10} + 10^{\text{Chain 1}/10})$

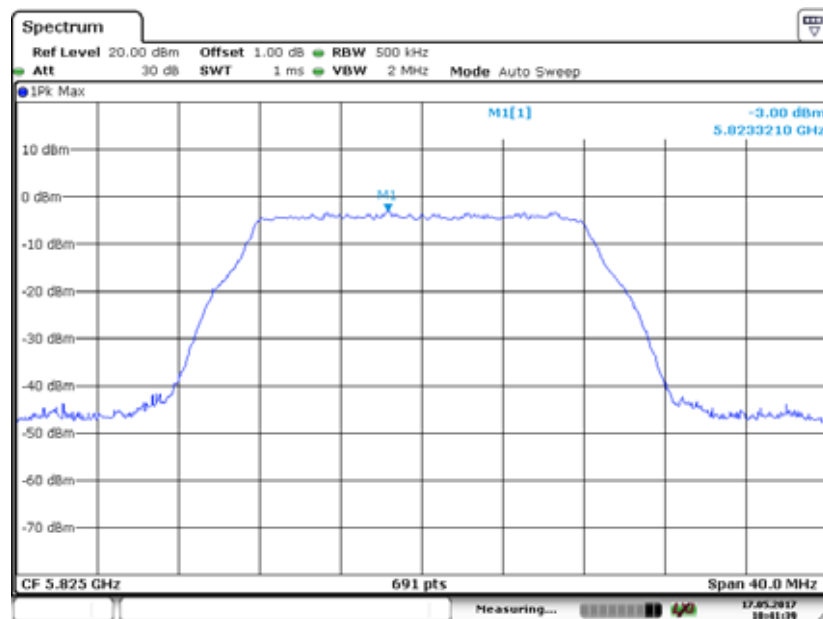
5725-5850 MHz:

802.11a mode, Chain 0: Power spectral density-5745MHz

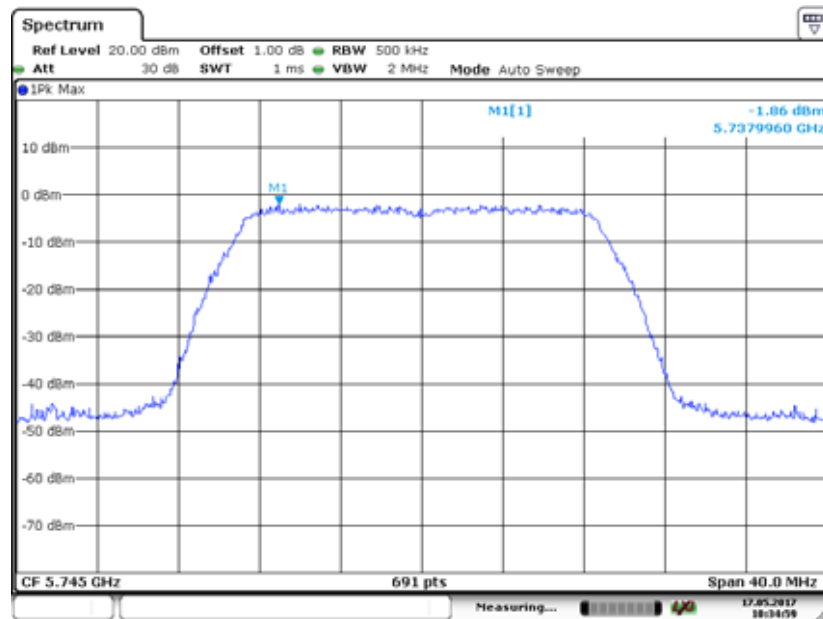
Date: 17 MAY 2017 10:39:16

802.11a mode, Chain 0: Power spectral density-5785MHz

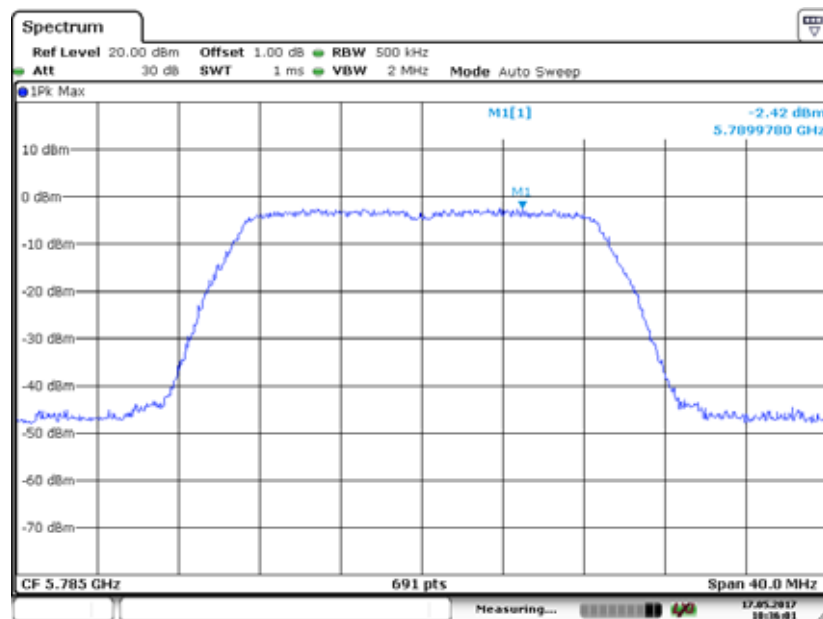
Date: 17 MAY 2017 10:40:22

802.11a mode, Chain 0: Power spectral density-5825MHz

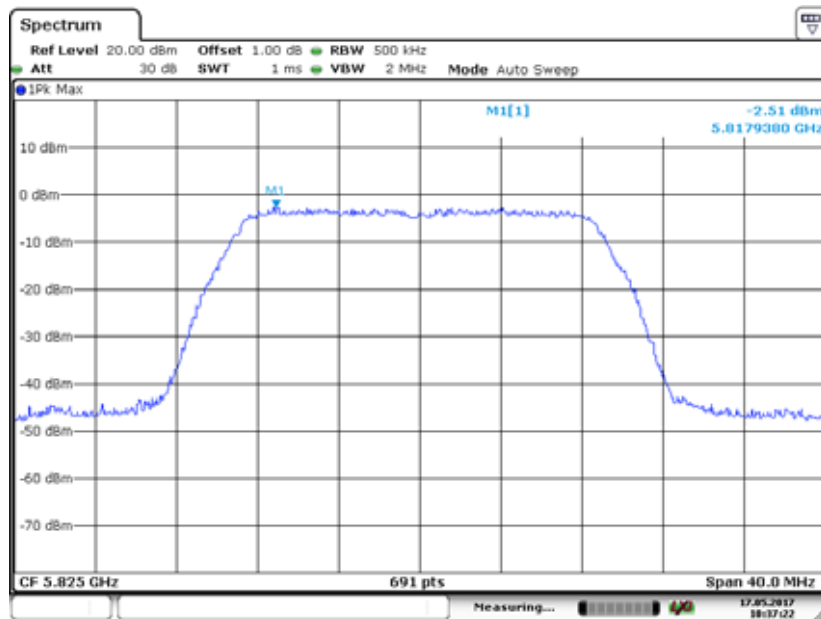
Date: 17 MAY 2017 10:41:39

802.11n ht20 mode, Chain 0: Power spectral density-5745MHz

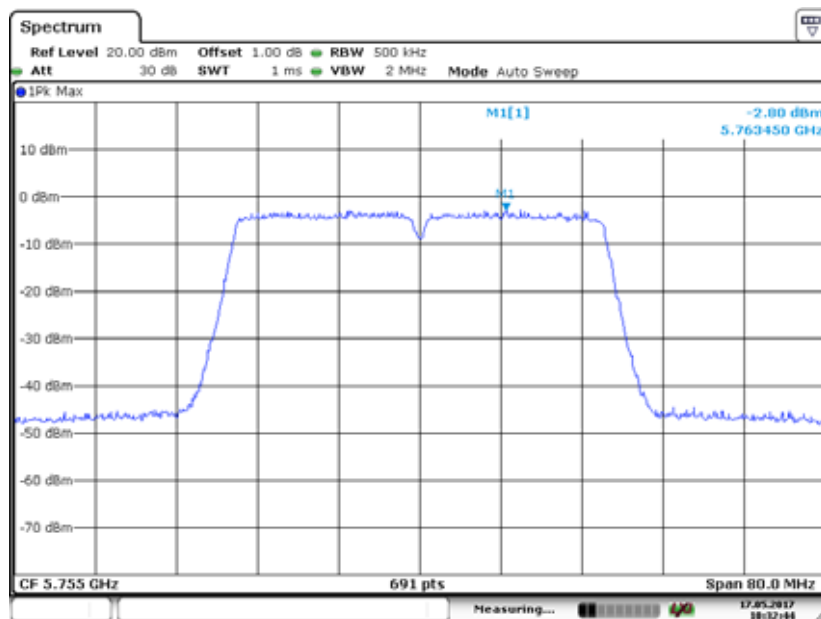
Date: 17 MAY 2017 10:35:00

802.11n ht20 mode, Chain 0: Power spectral density-5785MHz

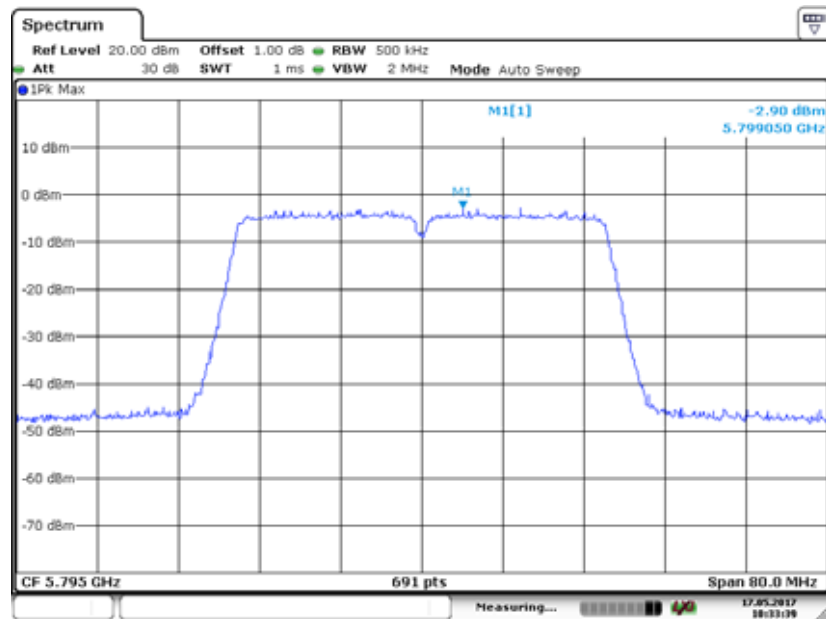
Date: 17 MAY 2017 10:36:02

802.11n ht20 mode, Chain 0: Power spectral density-5825MHz

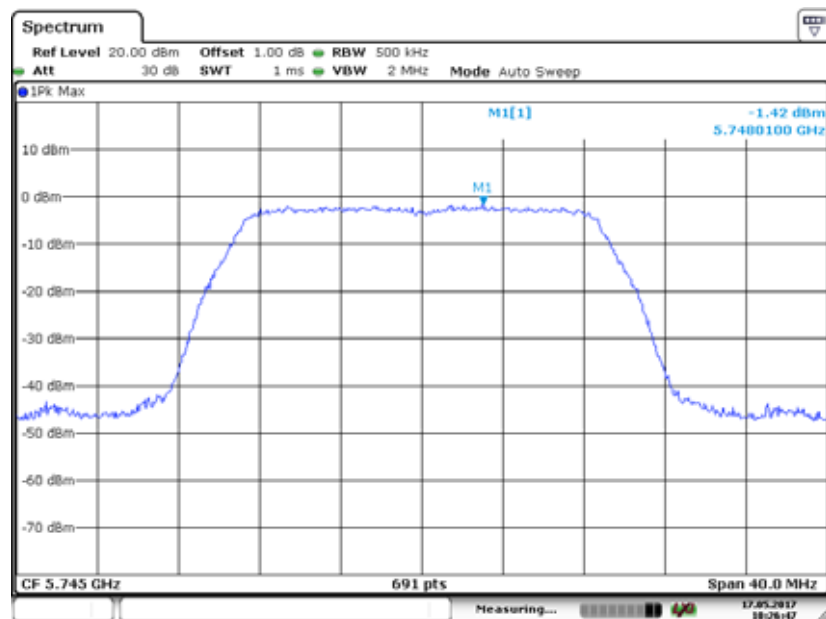
Date: 17.MAY.2017 10:37:23

802.11n ht40 mode, Chain 0: Power spectral density-5755MHz

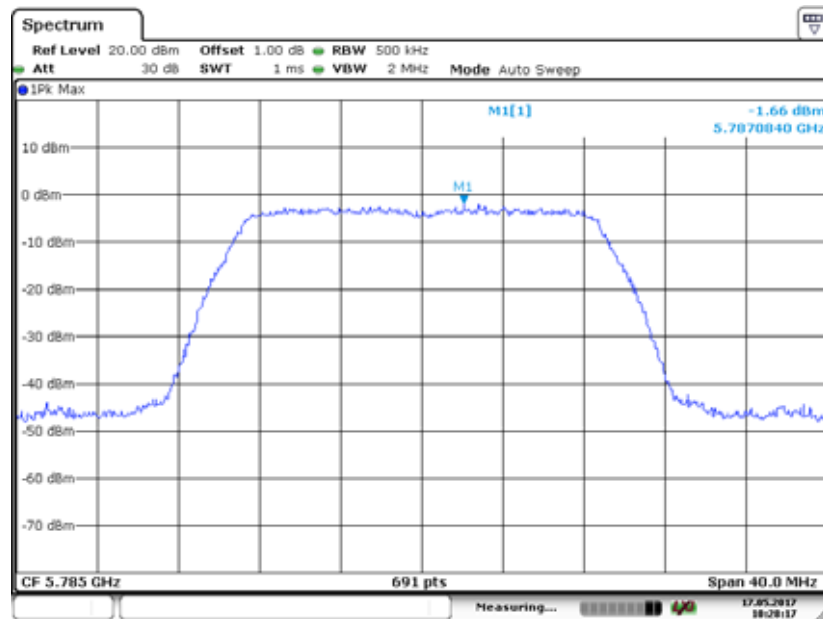
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802.11n ht40 mode, Chain 0: Power spectral density-5795MHz

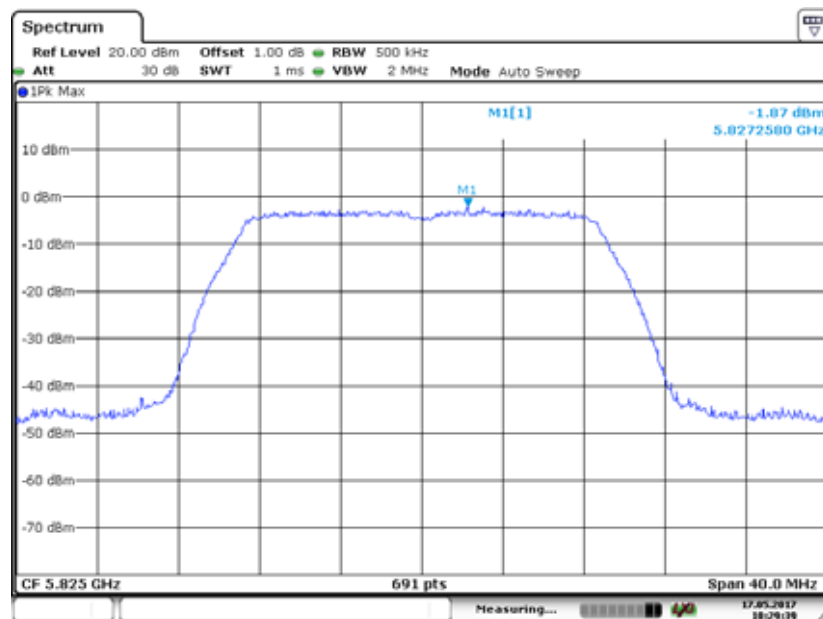
Date: 17 MAY 2017 10:33:40

802.11ac20 mode, Chain 0: Power spectral density-5745MHz

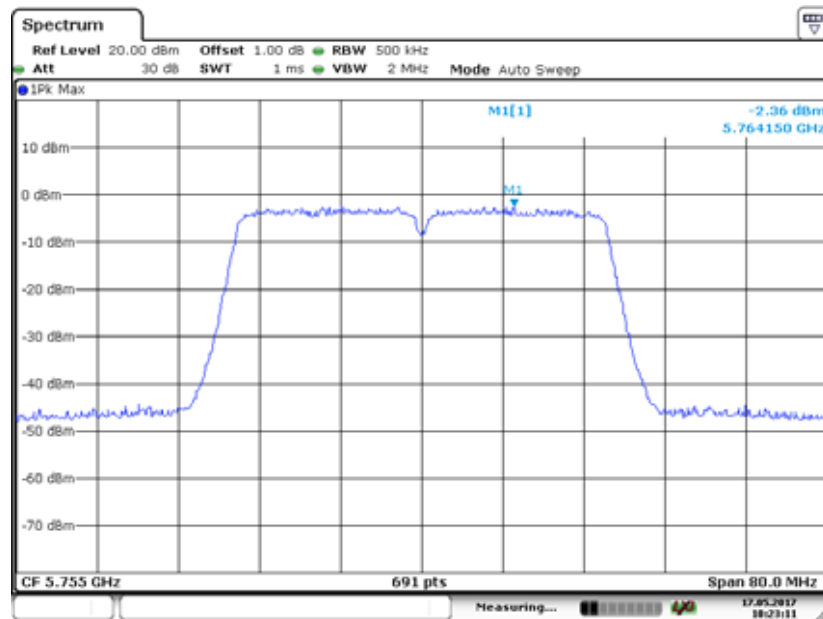
Date: 17 MAY 2017 10:26:47

802.11ac20 mode, Chain 0: Power spectral density-5785MHz

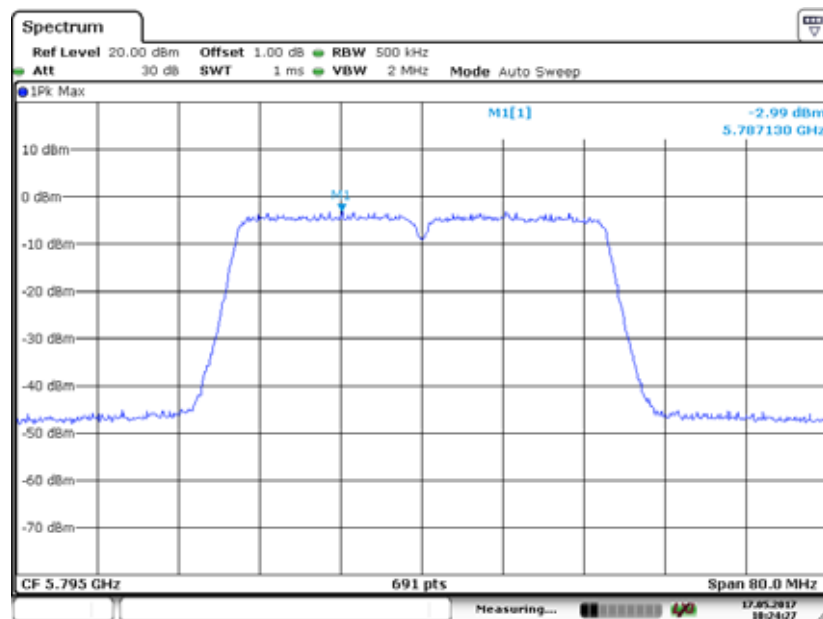
Date: 17.MAY.2017 10:28:17

802.11ac20 mode, Chain 0: Power spectral density-5825MHz

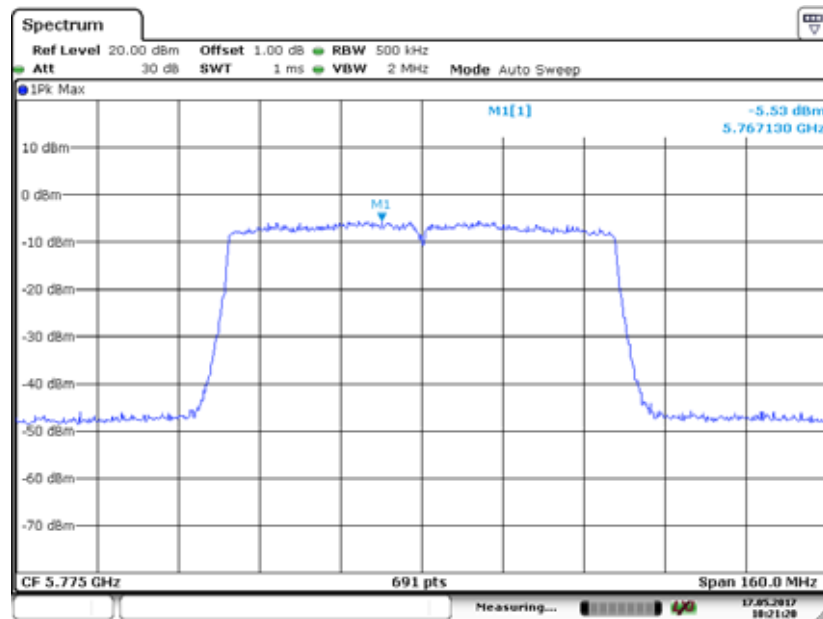
Date: 17.MAY.2017 10:29:39

802.11ac40 mode, Chain 0: Power spectral density-5755MHz

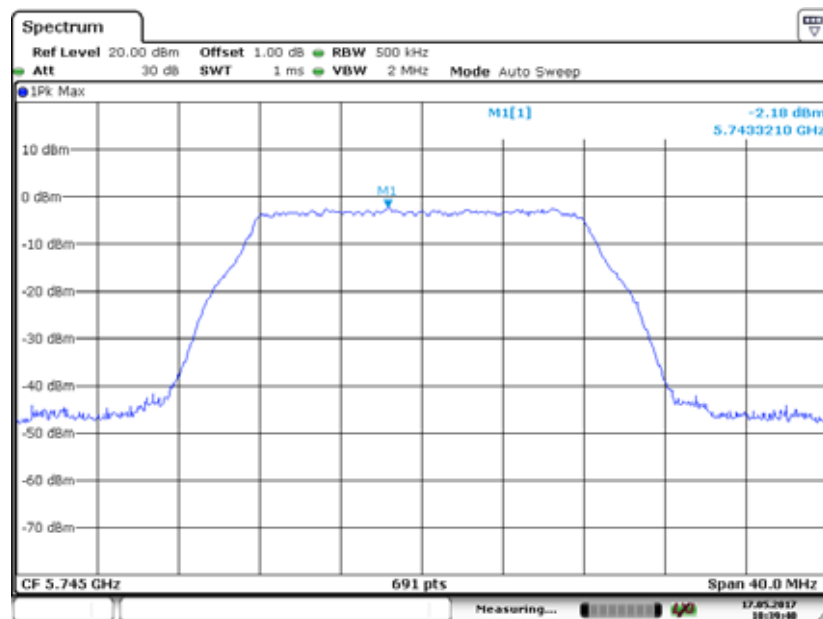
Date: 17 MAY 2017 10:23:11

802.11ac40 mode, Chain 0: Power spectral density-5795MHz

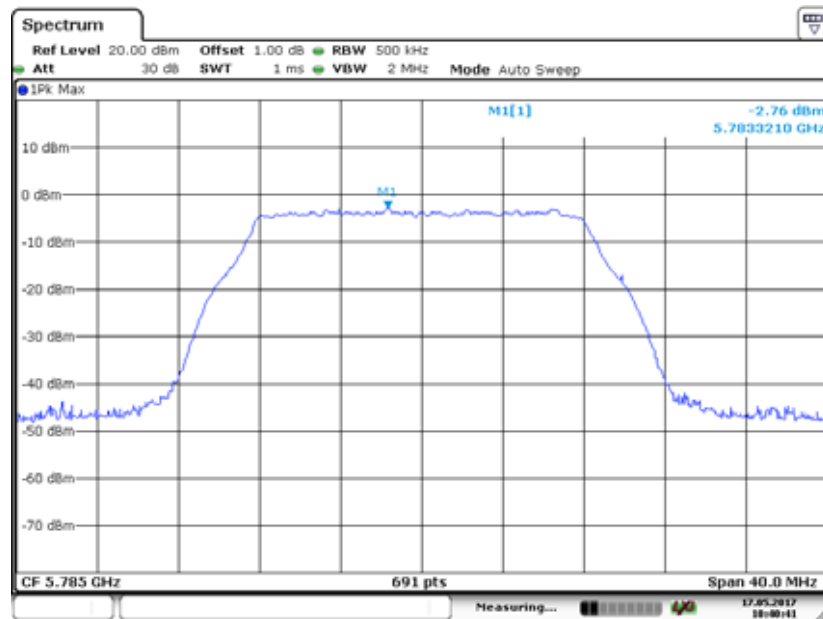
Date: 17 MAY 2017 10:24:28

802.11ac80 mode, Chain 0: Power spectral density-5775MHz

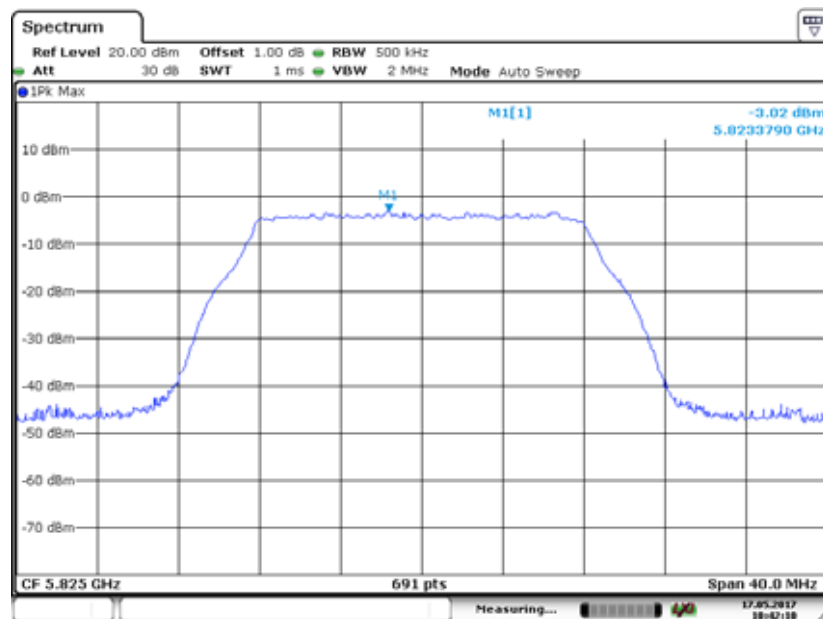
Date: 17 MAY 2017 10:21:20

802.11a mode, Chain 1: Power spectral density-5745MHz

Date: 17 MAY 2017 10:39:40

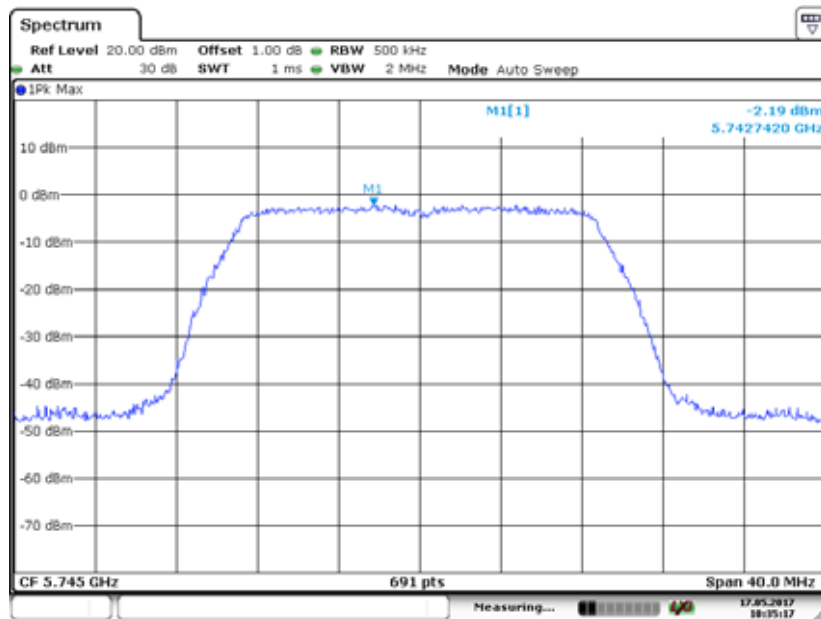
802.11a mode, Chain 1: Power spectral density-5785MHz

Date: 17 MAY 2017 10:40:42

802.11a mode, Chain 1: Power spectral density-5825MHz

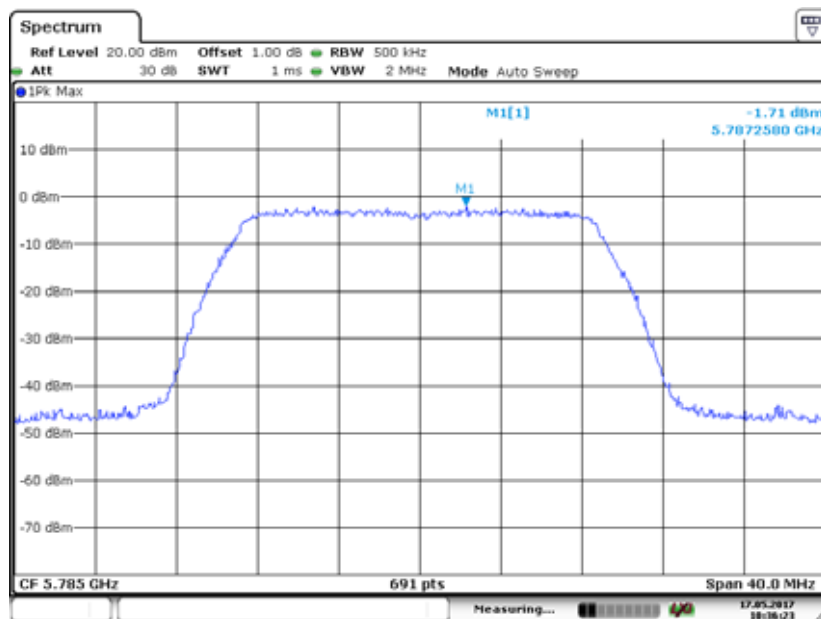
Date: 17 MAY 2017 10:42:10

802.11n ht20 mode, Chain 1: Power spectral density-5745MHz



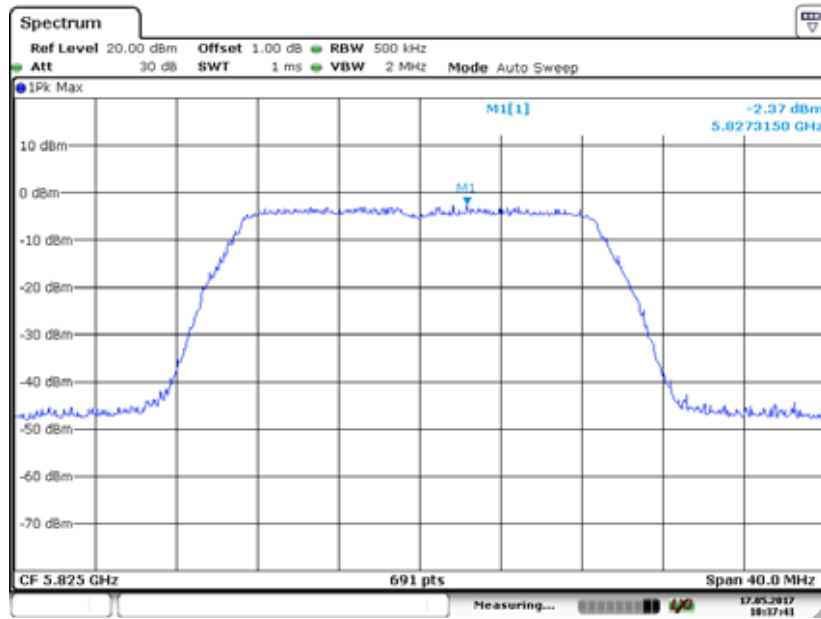
Date: 17 MAY 2017 10:35:17

802.11n ht20 mode, Chain 1: Power spectral density-5785MHz



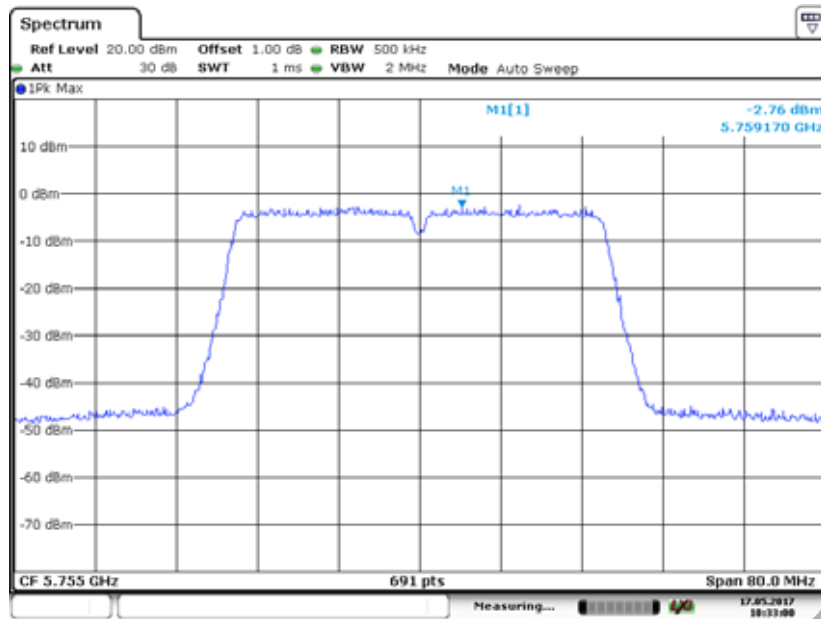
Date: 17 MAY 2017 10:36:23

802.11n ht20 mode, Chain 1: Power spectral density-5825MHz

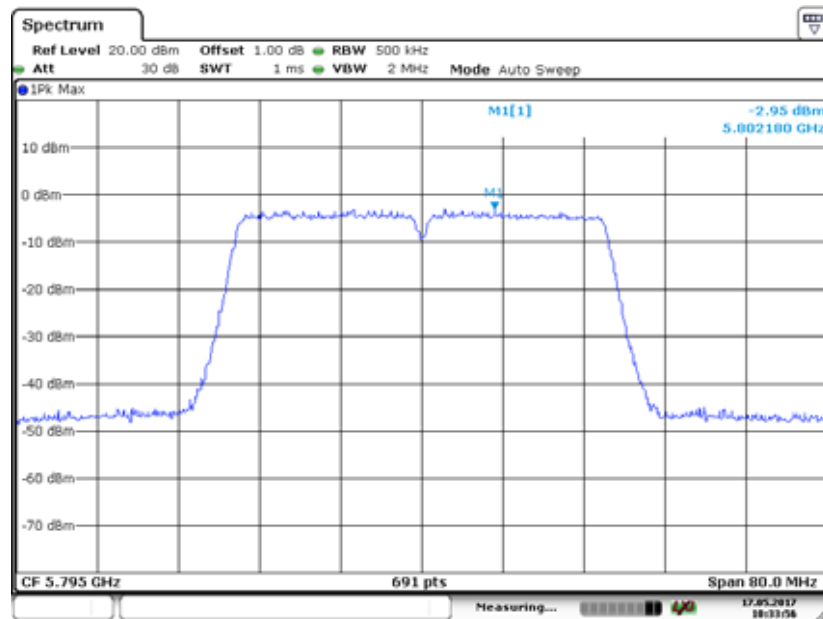


Date: 17 MAY 2017 10:37:42

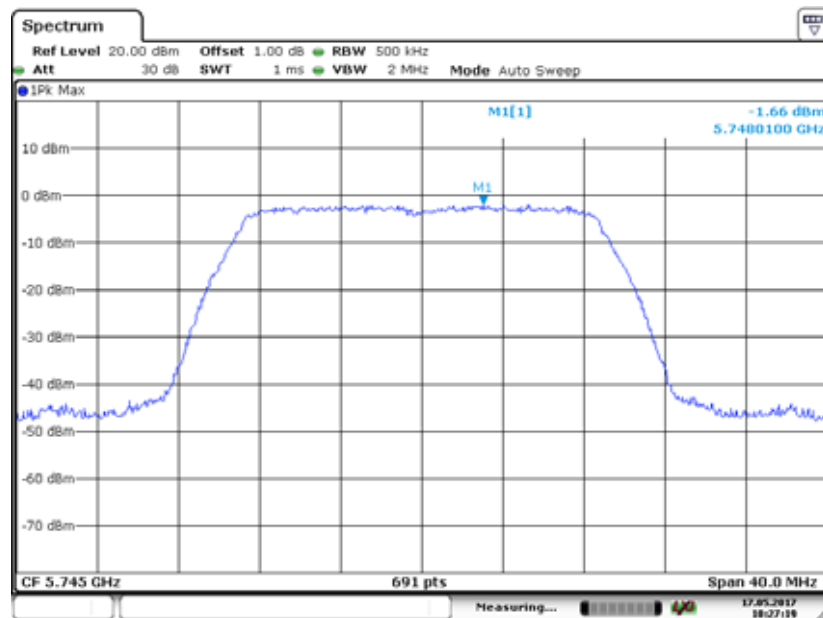
802.11n ht40 mode, Chain 1: Power spectral density-5755MHz



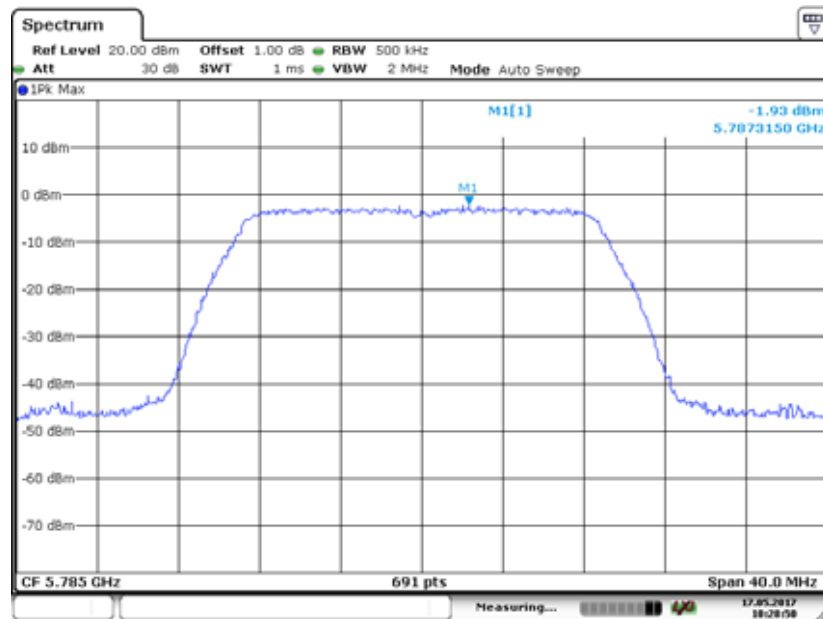
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802.11n ht40 mode, Chain 1: Power spectral density-5795MHz

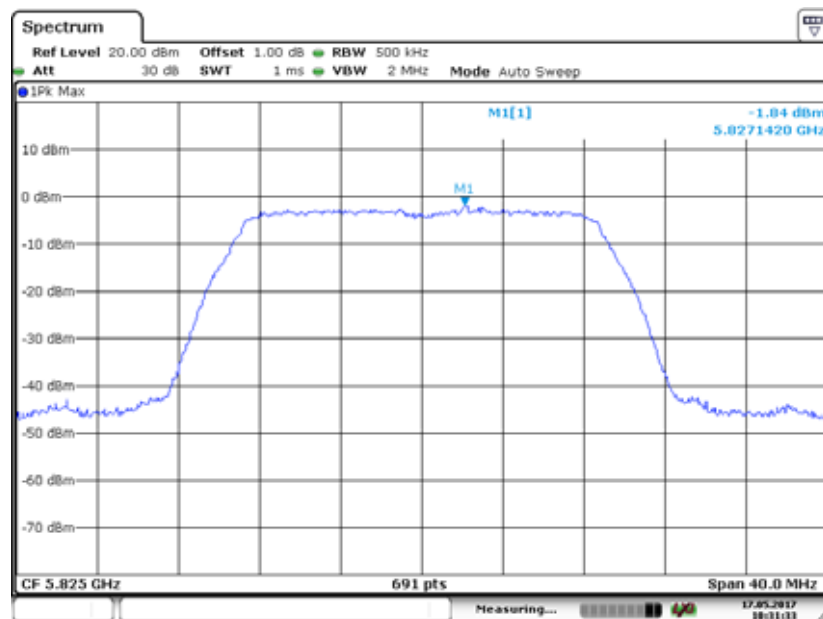
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802.11ac20 mode, Chain 1: Power spectral density-5745MHz

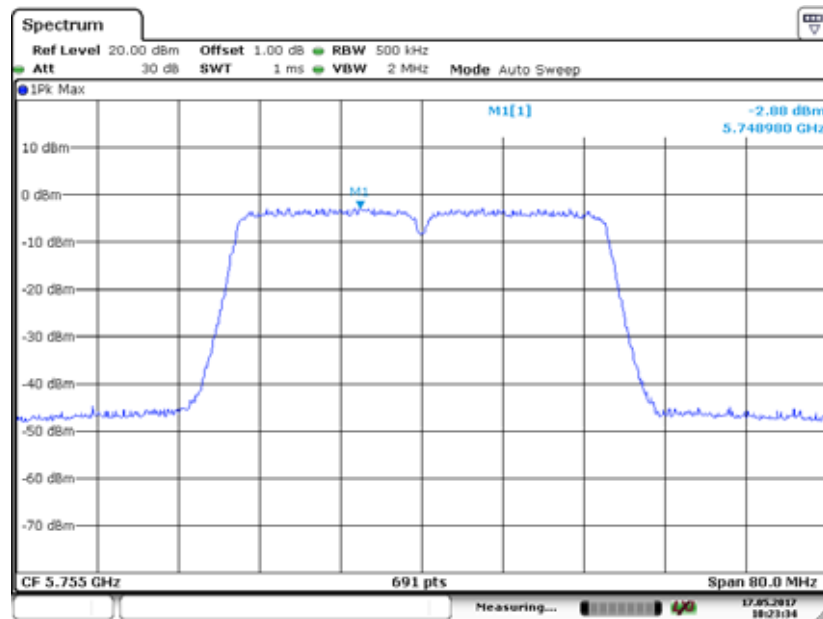
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802.11ac20 mode, Chain 1: Power spectral density-5785MHz

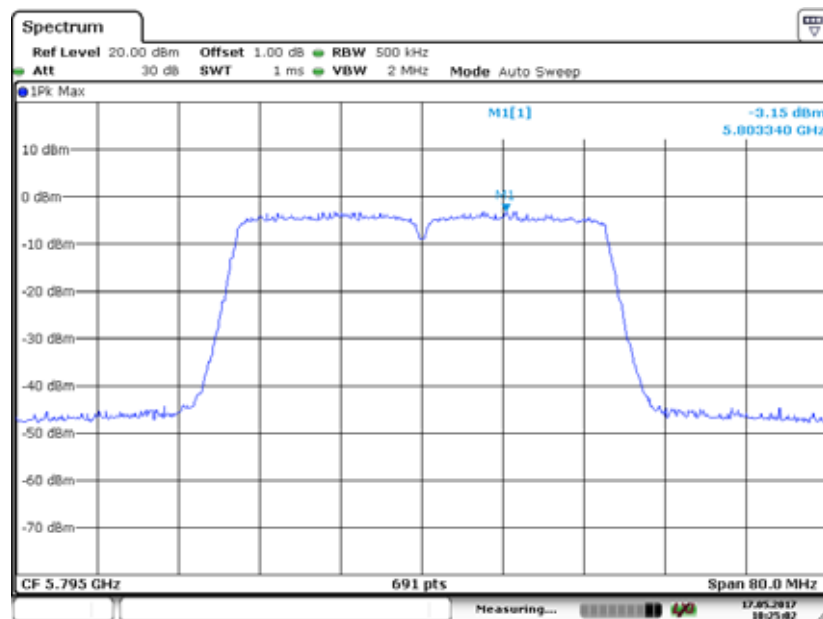
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802.11ac20 mode, Chain 1: Power spectral density-5825MHz

Date: 17.MAY.2017 10:31:33

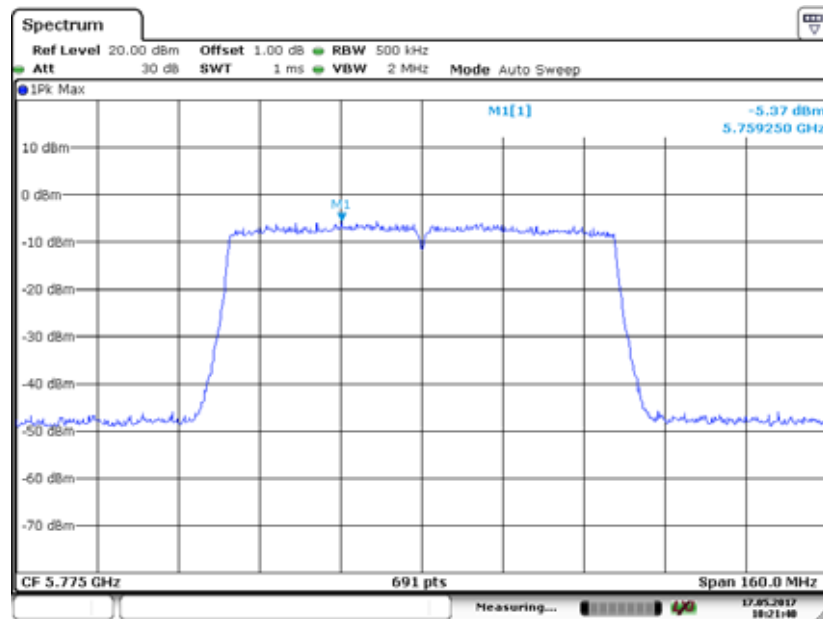
802.11ac40 mode, Chain 1: Power spectral density-5755MHz

Date:17.MAY.2017 10:23:34

802.11ac40 mode, Chain 1: Power spectral density-5795MHz

Date:17.MAY.2017 10:25:02

802.11ac80 mode, Chain 1: Power spectral density-5775MHz



Date: 17.MAY.2017 10:21:40

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