TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.407

TEST REPORT

For

Tether Tools

2202 East McDowell Road,PHOENIX,AZ,United States

FCC ID:2AUJL-TTAD7

Report Type:	**Product Name:**
Original Report	AIR DIRECT

Report Number: RBJ190827053-00B

Report Date: 2019-10-18

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	AIR DIRECT
EUT Model:	AD7
Operation Frequency:	802.11a/n ht20/ac vht20:5745-5825MHz 802.11n ht40/ac vht40: 5755-5795 MHz 802.11ac vht80: 5775 MHz
Conducted Aerage Output Power:	13.45dBm
Modulation Type:	OFDM
Rated Input Voltage:	DC 7.4V from battery or DC 5V from DC port
External Dimension:	92.8mm(L)*69.5mm(W)*38.2mm(H)
Serial Number:	190827053
EUT Received Date:	2019/8/30

Objective

This type approval report is prepared on behalf of ***Tether Tools*** in accordance with Part 2-Subpart J, Part 15-Subparts A, and E of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB,200M~1GHz: 5.92 dB,1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Unwanted Emissions,conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device supports 802.11a, 802.11n ht20 and ht40, 802.11ac vht 20, vht40 and vht80 modes, the 802.11ac vht20 and vht40 were reducted since the idental parameters with 802.11n ht20 and ht40.

For 5725~5850MHz band, 8 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
155	5775	165	5825

For 802.11a, 802.11n ht20 Channel 149, 157 and 165 was tested, for 802.11n ht40 Channel 151, 159 were tested. For 802.11ac vht80 channel 155 was tested.

The device supports SISO and MIMO at 802.11n and ac modes, per pre-test, MIMO 2TX mode was the worst and reported.

EUT Exercise Software

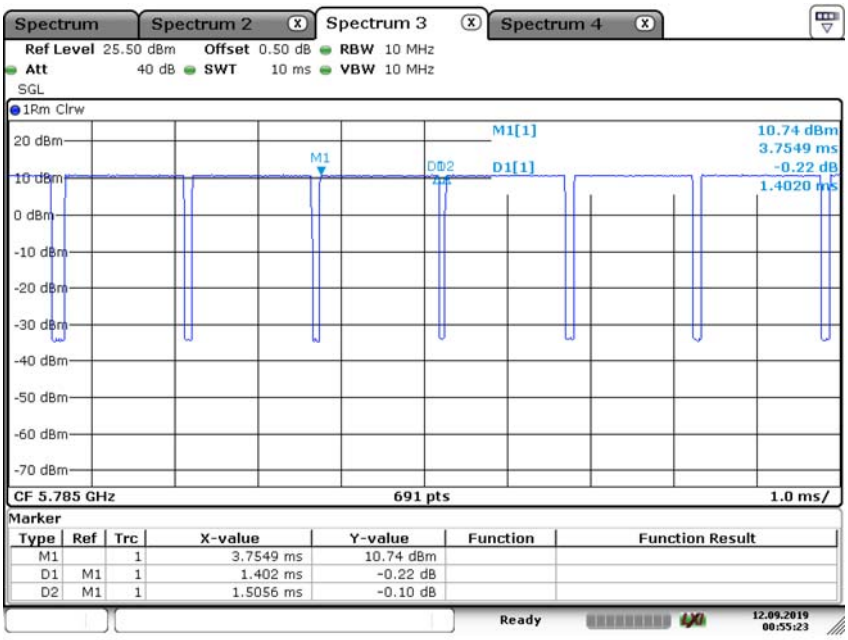
The software "T7662QA UI V:1.0.3.13" was used for testing, which was provided by manufacturer. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations. The maximum power was configured as below table, that provided by the manufacturer:

Mode	Frequency (MHz)	Data rate	Power level Setting	
			Chain 0	Chain 1
802.11 a	5745	6 Mbps	19	16
	5785	6 Mbps	19	16
	5825	6 Mbps	19	16
802.11n ht20	5745	MCS8	13	13
	5785	MCS8	13	13
	5825	MCS8	13	13
802.11n ht40	5755	MCS8	12	12
	5795	MCS8	12	12
802.11ac vht80	5775	MCS8	20	20

The duty cycle as below:

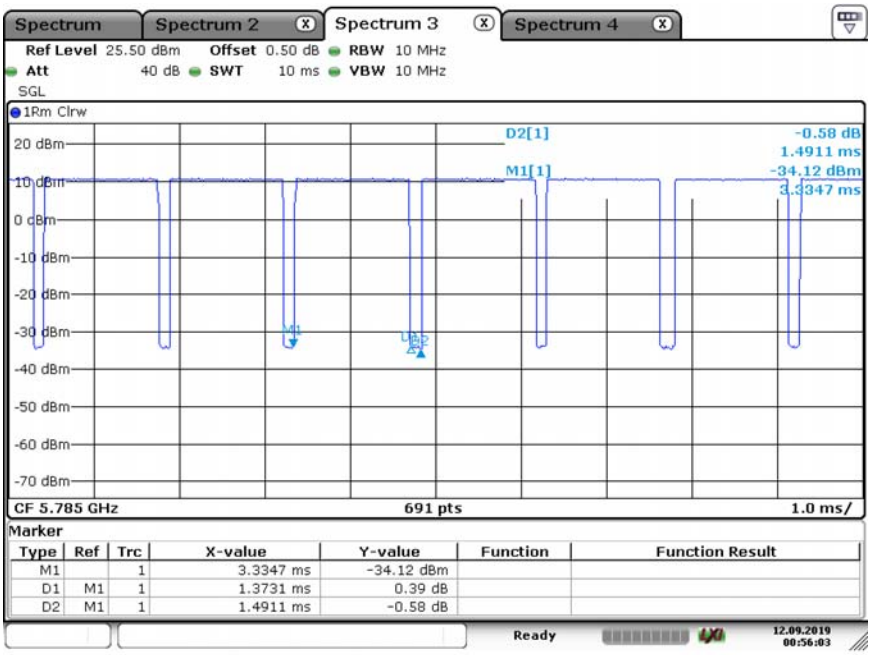
Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle(x) (%)
802.11 a	1.402	1.506	93.09
802.11n ht20	1.373	1.491	92.09
802.11n ht40	0.359	0.533	67.35
802.11ac vht80	0.072	0.132	54.55

802.11a



Date: 12.SEP.2019 00:55:23

802.11n ht20



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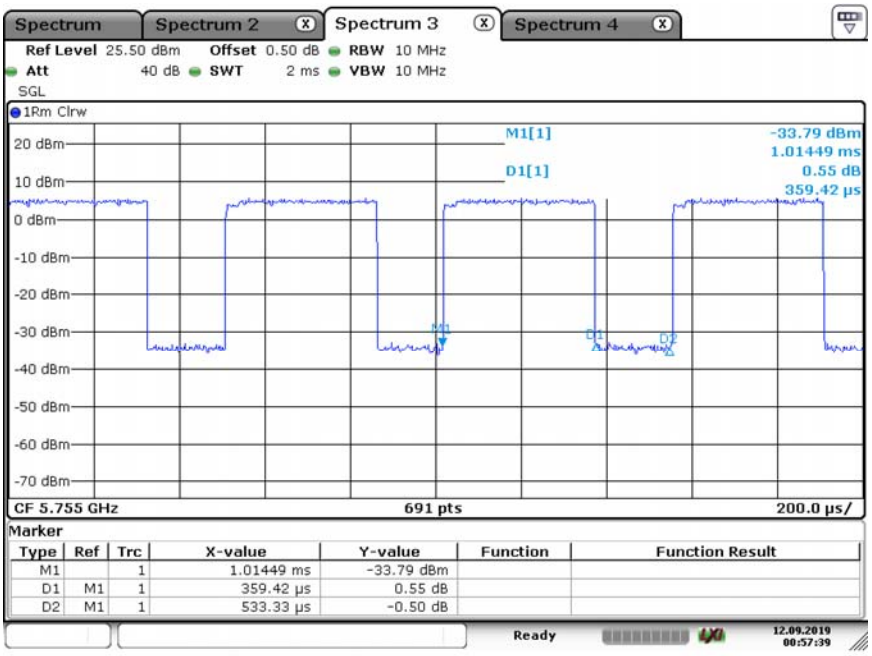
802.11n ht40



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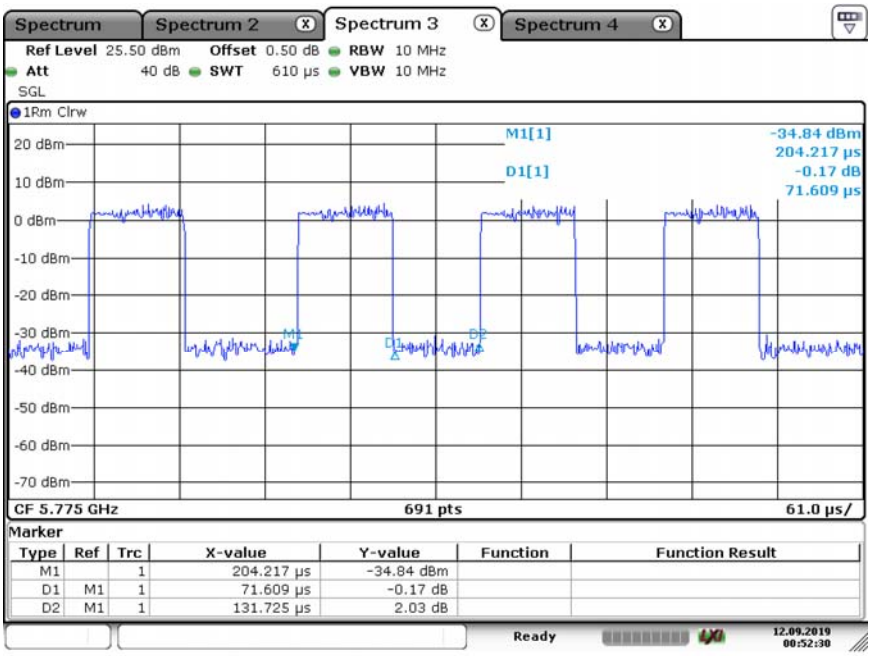
802.11ac vht80



Date: 12.SEP.2019 00:52:30

Equipment Modifications

No modification was made to the EUT.

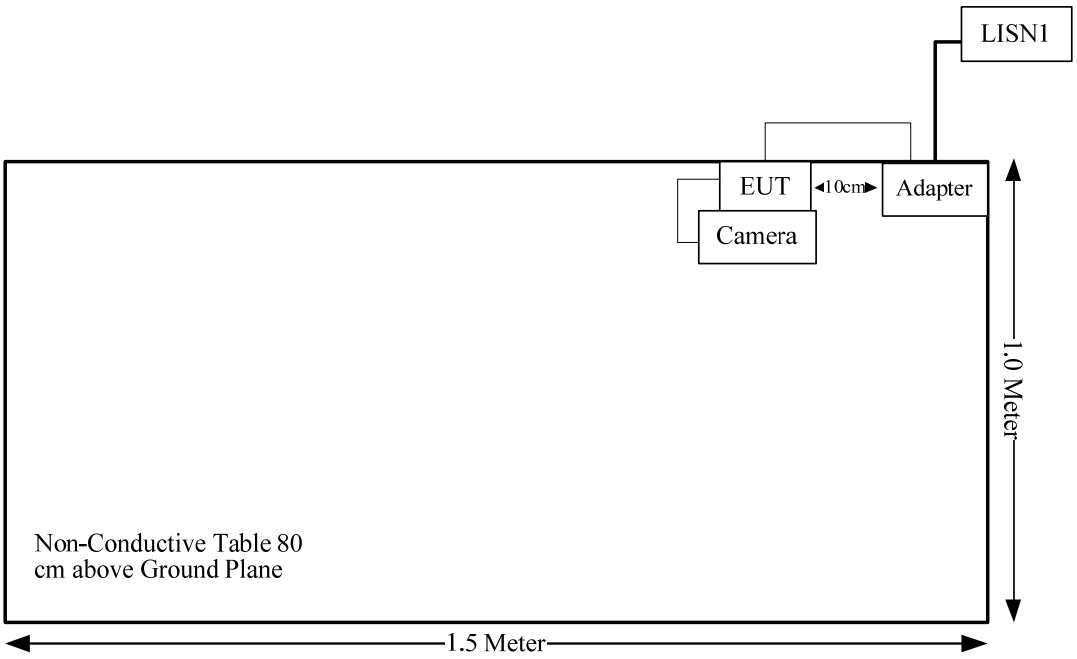
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
TRAVEL CHARGER	adapter	TPA-46050100VU	Unknown
Canon	Camera	450D	Unknown

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Power Cable	No	No	0.8	Adapter	EUT
USB Cable	Yes	No	0.4	EUT	Camera

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407 (f) & §1.1310 & §2.1091	Maximum Permissable Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b)	Undesirable Emission& Restricted Bands	Compliance
§15.407(a)(e)	Emission Bandwidth	Compliance
§15.407(a)	Conducted Transmitter Output Power	Compliance
§15.407 (a)	Power Spectral Density	Compliance

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

Applicable Standard

According to subpart 15.407(f)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

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

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	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.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Conducted output power including Tune-up Tolerance**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
2412-2462	3	2.00	14	25	20.00	0.01	1.0
5745-5825	3	2.00	14	25	20.00	0.01	1.0

The WLAN 2.4G and 5G can`t transmit simultaneously

Result: Compliance, The device meets MPE requirement for Devices Used by the General Public (Uncontrolled Environment) at distance ≥20 cm.

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 use of a standard antenna jack or electrical connector is prohibited.

Antenna Connector Construction

The EUT has two internal FPC antenna attached to the unit for 5.8GHz wifi, fulfill the requirement of this section. Please refer to the EUT photos.

Antenna Type	input impedance (Ohm)	Antenna Gain /Frequency Range
FPC	50	3.0 dBi/5725~5850MHz

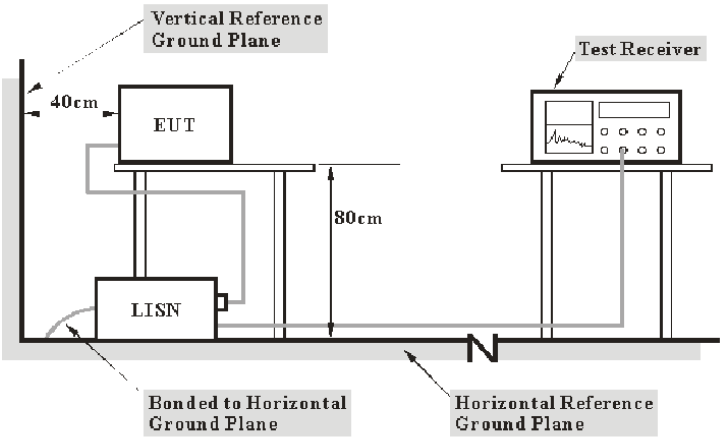
Result: Compliance.

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a), §15.407(b) (6)

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.

The adapter was connected to the main lisn with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

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

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

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

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 limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2019-09-05	2020-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10
R&S	EMI Test Receiver	ESCI	101121	2019-05-09	2020-05-09

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

Test Procedure

During the conducted emission test, the adapter was connected to the first 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 Data

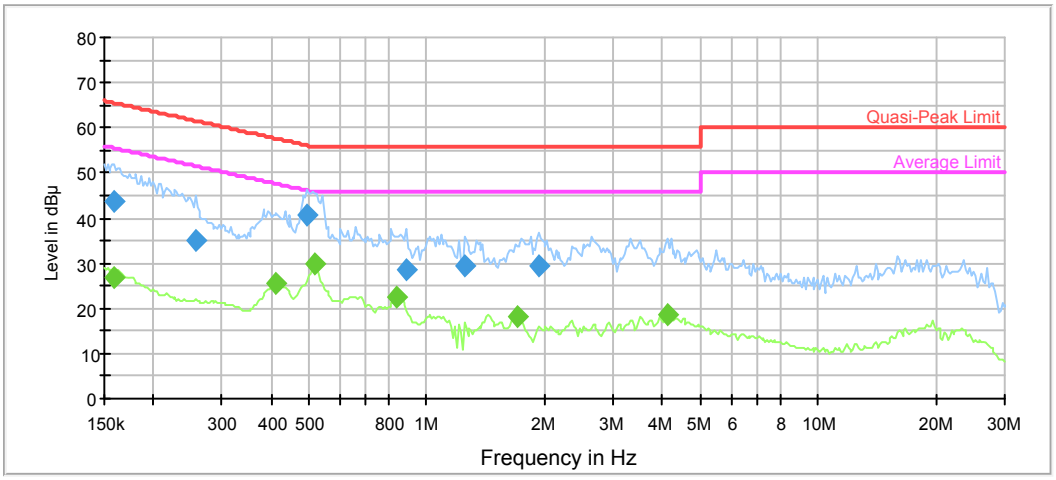
Environmental Conditions

Temperature:	27.2 °C
Relative Humidity:	64%
ATM Pressure:	100.1 kPa

The testing was performed by Sem Xiang on 2019-09-10.

Test Mode: Transmitting (802.11a 5745MHz chain 0 was the worst)

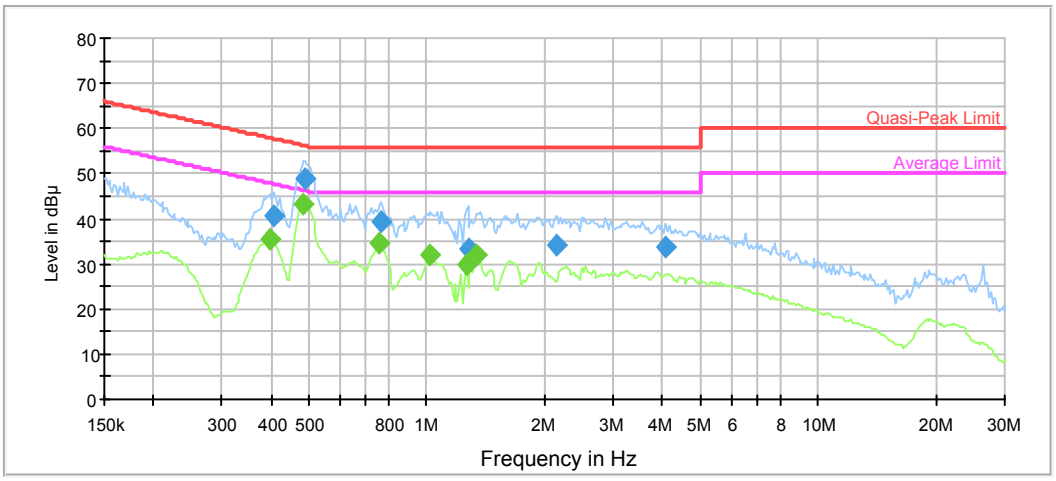
AC120 V, 50 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.159228	43.5	9.000	L1	11.1	22.0	65.5	Compliance
0.256712	35.1	9.000	L1	10.3	26.4	61.5	Compliance
0.495058	40.6	9.000	L1	9.9	15.5	56.1	Compliance
0.890466	28.3	9.000	L1	9.8	27.7	56.0	Compliance
1.248947	29.4	9.000	L1	9.8	26.6	56.0	Compliance
1.935016	29.4	9.000	L1	9.7	26.6	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.159228	26.7	9.000	L1	11.1	28.8	55.5	Compliance
0.413877	25.4	9.000	L1	9.9	22.2	47.6	Compliance
0.515160	29.9	9.000	L1	9.9	16.1	46.0	Compliance
0.838859	22.5	9.000	L1	9.8	23.5	46.0	Compliance
1.700226	18.2	9.000	L1	9.7	27.8	46.0	Compliance
4.122010	18.7	9.000	L1	9.8	27.3	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.405722	40.7	9.000	N	10.0	17.0	57.7	Compliance
0.490157	48.9	9.000	N	9.9	7.3	56.2	Compliance
0.767003	39.3	9.000	N	9.8	16.7	56.0	Compliance
1.274051	33.3	9.000	N	9.8	22.7	56.0	Compliance
2.137462	34.1	9.000	N	9.8	21.9	56.0	Compliance
4.081198	33.6	9.000	N	9.8	22.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.397728	35.4	9.000	N	10.0	12.5	47.9	Compliance
0.485304	43.1	9.000	N	9.9	3.1	46.2	Compliance
0.759409	34.4	9.000	N	9.8	11.6	46.0	Compliance
1.023568	31.9	9.000	N	9.8	14.1	46.0	Compliance
1.261437	30.0	9.000	N	9.8	16.0	46.0	Compliance
1.339041	32.1	9.000	N	9.8	13.9	46.0	Compliance

FCC §15.209, §15.205 & §15.407(b) –UNWANTED EMISSION

Applicable Standard

FCC §15.407; §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) 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 e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

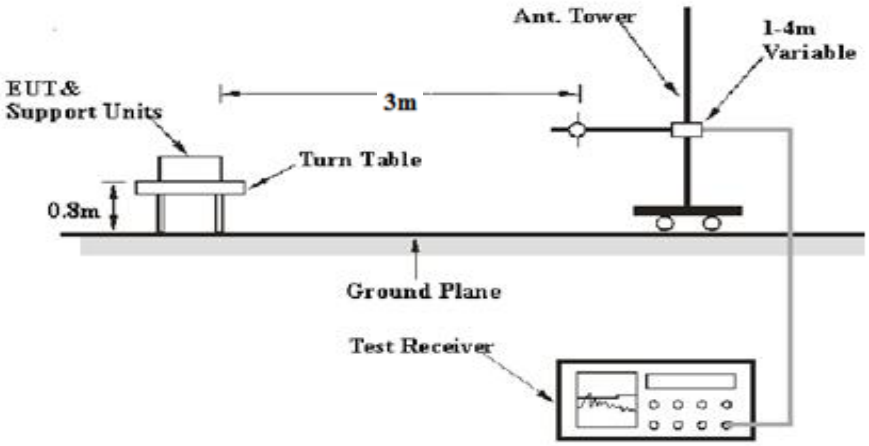
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

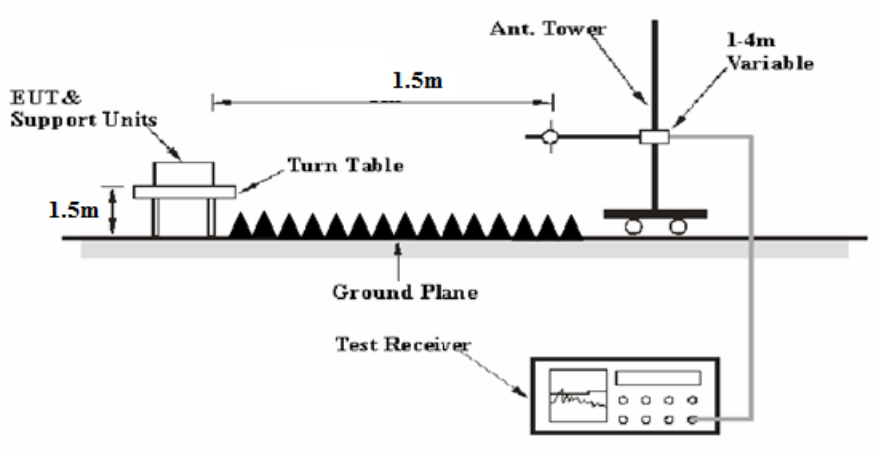
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

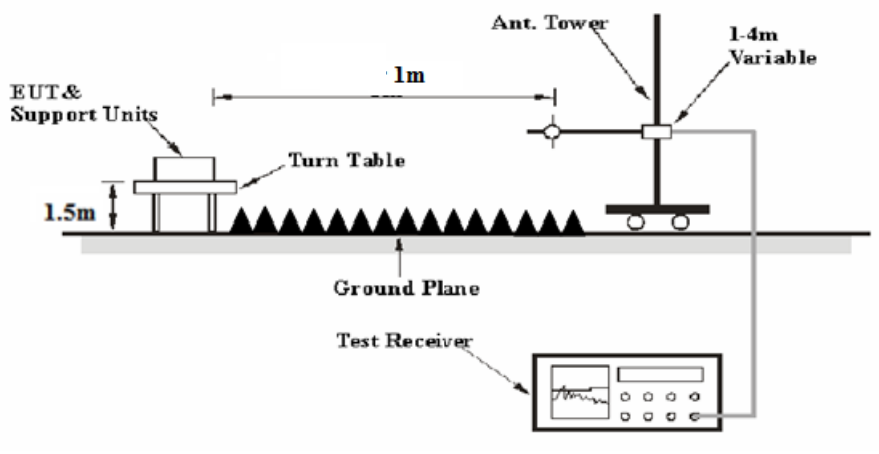
Below 1 GHz:



1-26.5 GHz:



26.5-40 GHz:



The radiated emission Below 1GHz tests were performed in the 3 meters chamber test site A, above 1GHz tests were performed in the 3 meters chamber test site B, using the setup accordance with the ANSI C63.10-2013. The specification used was 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:

30-1000MHz:

Measurement	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 40GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet.

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

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: E [dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m or 1m
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB
or
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1m]) dB= 9.54 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

Corrected Amplitude & Margin Calculation

For the range 30MHz-1GHz, the Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

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

Margin = Limit - Corrected Amplitude

For the range 1GHz-40GHz, Test performed at 1.5m or 1m, the Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading and the Distance extrapolation factor. The basic equation is as follows:

Corrected Amplitude
= Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain-Distance extrapolation factor

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

Margin = Limit- Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2019-06-27	2020-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2019-09-05	2020-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	0899003	2019-05-06	2020-05-06
Mini Circuits	High Pass Filter	VHF-6010+	31118	2019-06-16	2020-06-16

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

Test Data

Environmental Conditions

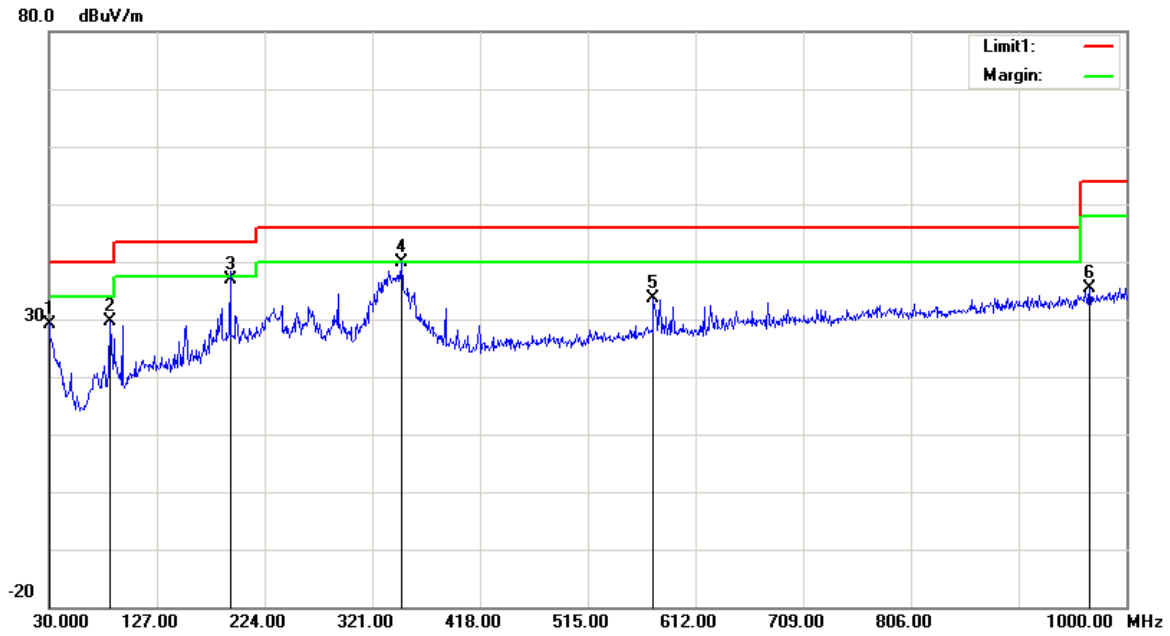
Temperature:	27°C
Relative Humidity:	56 %
ATM Pressure:	100.1kPa

** The testing was performed by Neil Liao from 2019-09-06*

Test Mode: Transmitting

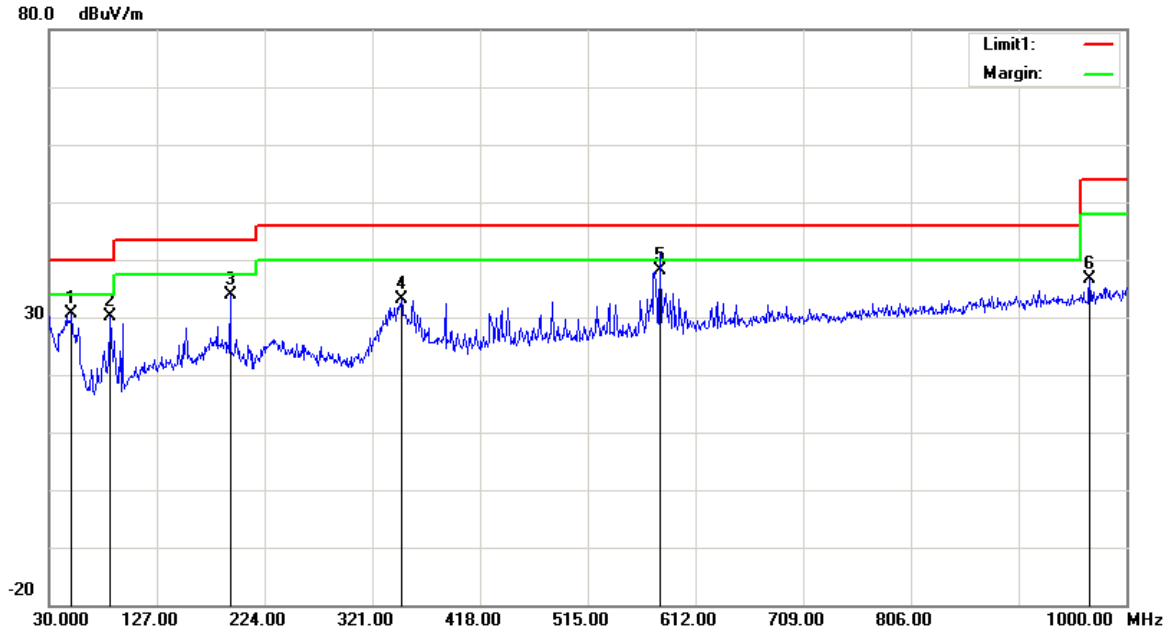
Below 1GHz (*802.11a chain 0 5825MHz* was the worst):

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	27.53	peak	1.72	29.25	40.00	10.75
84.3200	41.01	peak	-11.38	29.63	40.00	10.37
192.9600	43.65	QP	-6.89	36.76	43.50	6.74
347.1900	42.92	peak	-3.15	39.77	46.00	6.23
574.1700	32.50	peak	1.07	33.57	46.00	12.43
967.0200	34.37	peak	1.10	35.47	54.00	18.53

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
50.3700	41.80	peak	-11.27	30.53	40.00	9.47
85.2900	41.47	peak	-11.41	30.06	40.00	9.94
192.9600	40.74	peak	-6.89	33.85	43.50	9.65
347.1900	36.28	peak	-3.15	33.13	46.00	12.87
579.9900	36.97	QP	1.10	38.07	46.00	7.93
967.0200	35.48	peak	1.10	36.58	54.00	17.42

1GHz-40GHz:
802.11a (Chain 0 was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	64.74	PK	H	34.20	3.69	0.00	102.63	96.61	N/A	N/A
5745.00	56.78	AV	H	34.20	3.69	0.00	94.67	88.65	N/A	N/A
5745.00	69.49	PK	V	34.20	3.69	0.00	107.38	101.36	N/A	N/A
5745.00	59.76	AV	V	34.20	3.69	0.00	97.65	91.63	N/A	N/A
5725.00	27.24	PK	V	34.19	3.69	0.00	65.12	59.1	122.20	63.10
5720.00	27.20	PK	V	34.19	3.69	0.00	65.08	59.06	110.80	51.74
5700.00	27.83	PK	V	34.18	3.68	0.00	65.69	59.67	105.20	45.53
5650.00	27.63	PK	V	34.16	3.63	0.00	65.42	59.4	68.20	8.80
11490.00	54.27	PK	V	38.99	6.59	37.35	62.50	56.48	74.00	17.52
11490.00	41.91	AV	V	38.99	6.59	37.35	50.14	44.12	54.00	9.88
17235.00	46.17	PK	V	41.56	8.78	38.61	57.90	51.88	68.20	16.32
Middle Channel: 5785 MHz										
5785.00	65.12	PK	H	34.21	3.71	0.00	103.04	97.02	N/A	N/A
5785.00	55.26	AV	H	34.21	3.71	0.00	93.18	87.16	N/A	N/A
5785.00	70.36	PK	V	34.21	3.71	0.00	108.28	102.26	N/A	N/A
5785.00	60.84	AV	V	34.21	3.71	0.00	98.76	92.74	N/A	N/A
11570.00	57.34	PK	V	39.00	6.61	37.44	65.51	59.49	74.00	14.51
11570.00	44.07	AV	V	39.00	6.61	37.44	52.24	46.22	54.00	7.78
17355.00	46.22	PK	V	42.26	8.81	38.52	58.77	52.75	68.20	15.45
High Channel: 5825 MHz										
5825.00	66.54	PK	H	34.23	3.73	0.00	104.50	98.48	N/A	N/A
5825.00	56.91	AV	H	34.23	3.73	0.00	94.87	88.85	N/A	N/A
5825.00	71.82	PK	V	34.23	3.73	0.00	109.78	103.76	N/A	N/A
5825.00	62.31	AV	V	34.23	3.73	0.00	100.27	94.25	N/A	N/A
5850.00	29.21	PK	V	34.24	3.75	0.00	67.20	61.18	122.20	61.02
5855.00	28.54	PK	V	34.24	3.75	0.00	66.53	60.51	110.80	50.29
5875.00	28.12	PK	V	34.25	3.77	0.00	66.14	60.12	105.20	45.08
5925.00	28.04	PK	V	34.27	3.80	0.00	66.11	60.09	68.20	8.11
11650.00	60.88	PK	V	39.00	6.64	37.53	68.99	62.97	74.00	11.03
11650.00	47.83	AV	V	39.00	6.64	37.53	55.94	49.92	54.00	4.08
17475.00	52.37	PK	V	42.96	8.84	38.44	65.73	59.71	68.20	8.49

802.11n ht20(2Tx was the worst)

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5745 MHz										
5745.00	68.54	PK	H	34.20	3.69	0.00	106.43	100.41	N/A	N/A
5745.00	58.86	AV	H	34.20	3.69	0.00	96.75	90.73	N/A	N/A
5745.00	75.47	PK	V	34.20	3.69	0.00	113.36	107.34	N/A	N/A
5745.00	65.83	AV	V	34.20	3.69	0.00	103.72	97.7	N/A	N/A
5725.00	34.24	PK	V	34.19	3.69	0.00	72.12	66.1	122.20	56.10
5720.00	29.45	PK	V	34.19	3.69	0.00	67.33	61.31	110.80	49.49
5700.00	28.77	PK	V	34.18	3.68	0.00	66.63	60.61	105.20	44.59
5650.00	27.53	PK	V	34.16	3.63	0.00	65.32	59.3	68.20	8.90
11490.00	56.37	PK	V	38.99	6.59	37.35	64.60	58.58	74.00	15.42
11490.00	43.13	AV	V	38.99	6.59	37.35	51.36	45.34	54.00	8.66
17235.00	46.61	PK	V	41.56	8.78	38.61	58.34	52.32	68.20	15.88
Middle Channel: 5785 MHz										
5785.00	65.91	PK	H	34.21	3.71	0.00	103.83	97.81	N/A	N/A
5785.00	56.12	AV	H	34.21	3.71	0.00	94.04	88.02	N/A	N/A
5785.00	72.51	PK	V	34.21	3.71	0.00	110.43	104.41	N/A	N/A
5785.00	62.84	AV	V	34.21	3.71	0.00	100.76	94.74	N/A	N/A
11570.00	57.92	PK	V	39.00	6.61	37.44	66.09	60.07	74.00	13.93
11570.00	44.08	AV	V	39.00	6.61	37.44	52.25	46.23	54.00	7.77
17355.00	46.85	PK	V	42.26	8.81	38.52	59.40	53.38	68.20	14.82
High Channel: 5825 MHz										
5825.00	66.37	PK	H	34.23	3.73	0.00	104.33	98.31	N/A	N/A
5825.00	56.42	AV	H	34.23	3.73	0.00	94.38	88.36	N/A	N/A
5825.00	73.03	PK	V	34.23	3.73	0.00	110.99	104.97	N/A	N/A
5825.00	63.91	AV	V	34.23	3.73	0.00	101.87	95.85	N/A	N/A
5850.00	29.59	PK	V	34.24	3.75	0.00	67.58	61.56	122.20	60.64
5855.00	28.30	PK	V	34.24	3.75	0.00	66.29	60.27	110.80	50.53
5875.00	28.38	PK	V	34.25	3.77	0.00	66.40	60.38	105.20	44.82
5925.00	27.82	PK	V	34.27	3.80	0.00	65.89	59.87	68.20	8.33
11650.00	59.37	PK	V	39.00	6.64	37.53	67.48	61.46	74.00	12.54
11650.00	45.42	AV	V	39.00	6.64	37.53	53.53	47.51	54.00	6.49
17475.00	46.62	PK	V	42.96	8.84	38.44	59.98	53.961	68.20	14.24

802.11n ht40(2Tx was the worst)

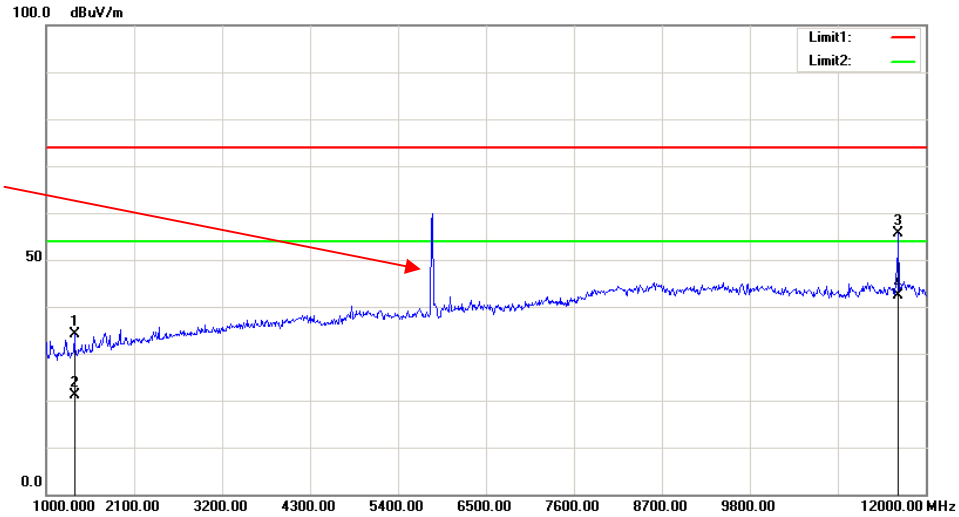
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Low Channel: 5755 MHz										
5755.00	66.40	PK	H	34.20	3.70	0.00	104.30	98.28	N/A	N/A
5755.00	56.18	AV	H	34.20	3.70	0.00	94.08	88.06	N/A	N/A
5755.00	68.56	PK	V	34.20	3.70	0.00	106.46	100.44	N/A	N/A
5755.00	59.39	AV	V	34.20	3.70	0.00	97.29	91.27	N/A	N/A
5725.00	31.85	PK	V	34.19	3.69	0.00	69.73	63.71	122.20	58.49
5720.00	34.37	PK	V	34.19	3.69	0.00	72.25	66.23	110.80	44.57
5700.00	27.71	PK	V	34.18	3.68	0.00	65.57	59.55	105.20	45.65
5650.00	27.41	PK	V	34.16	3.63	0.00	65.20	59.18	68.20	9.02
11510.00	54.23	PK	V	39.00	6.59	37.37	62.45	56.43	74.00	17.57
11510.00	41.93	AV	V	39.00	6.59	37.37	50.15	44.13	54.00	9.87
17265.00	46.29	PK	V	41.74	8.79	38.58	58.24	52.22	68.20	15.98
High Channel: 5795 MHz										
5795.00	67.54	PK	H	34.22	3.71	0.00	105.47	99.45	N/A	N/A
5795.00	57.91	AV	H	34.22	3.71	0.00	95.84	89.82	N/A	N/A
5795.00	70.89	PK	V	34.22	3.71	0.00	108.82	102.8	N/A	N/A
5795.00	60.40	AV	V	34.22	3.71	0.00	98.33	92.308	N/A	N/A
5850.00	27.99	PK	V	34.24	3.75	0.00	65.98	59.96	122.20	62.24
5855.00	27.94	PK	V	34.24	3.75	0.00	65.93	59.91	110.80	50.89
5875.00	28.36	PK	V	34.25	3.77	0.00	66.38	60.36	105.20	44.84
5925.00	28.07	PK	V	34.27	3.80	0.00	66.14	60.12	68.20	8.08
11590.00	55.42	PK	V	39.00	6.62	37.46	63.58	57.56	74.00	16.44
11590.00	42.74	AV	V	39.00	6.62	37.46	50.90	44.88	54.00	9.12
17385.00	46.59	PK	V	42.43	8.82	38.50	59.34	53.32	68.20	14.88

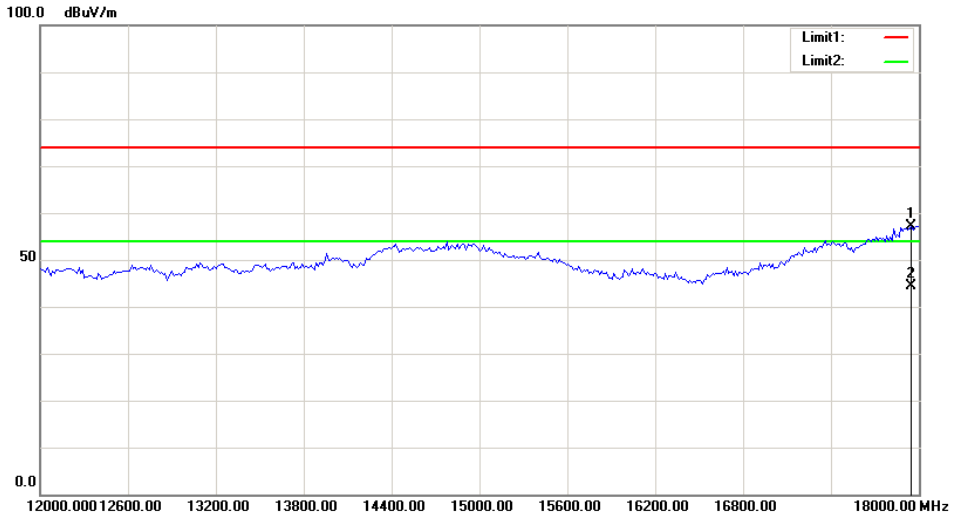
802.11ac80

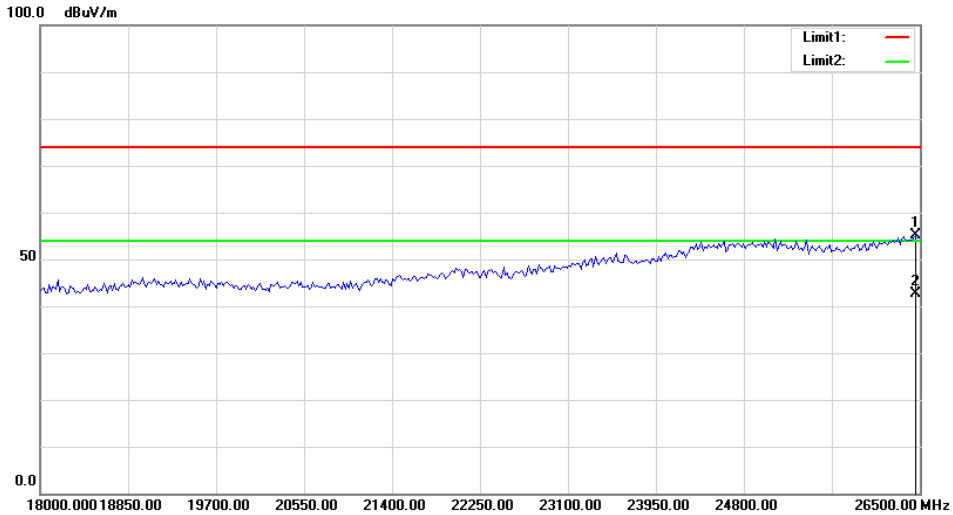
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)						
Middle Channel: 5775 MHz										
5775.00	61.98	PK	H	34.21	3.70	0.00	99.89	93.87	N/A	N/A
5775.00	52.12	AV	H	34.21	3.70	0.00	90.03	84.01	N/A	N/A
5775.00	67.99	PK	V	34.21	3.70	0.00	105.90	99.88	N/A	N/A
5775.00	57.31	AV	V	34.21	3.70	0.00	95.22	89.2	N/A	N/A
5725.00	39.20	PK	V	34.19	3.69	0.00	77.08	71.06	122.20	51.14
5720.00	37.54	PK	V	34.19	3.69	0.00	75.42	69.4	110.80	41.40
5700.00	36.45	PK	V	34.18	3.68	0.00	74.31	68.29	105.20	36.91
5650.00	28.39	PK	V	34.16	3.63	0.00	66.18	60.16	68.20	8.04
5850.00	34.90	PK	V	34.24	3.75	0.00	72.89	66.87	122.20	55.33
5855.00	35.99	PK	V	34.24	3.75	0.00	73.98	67.96	110.80	42.84
5875.00	32.03	PK	V	34.25	3.77	0.00	70.05	64.03	105.20	41.17
5925.00	27.65	PK	V	34.27	3.80	0.00	65.72	59.7	68.20	8.50
11550.00	55.58	PK	V	39.00	6.61	37.42	63.77	57.75	74.00	16.25
11550.00	45.83	AV	V	39.00	6.61	37.42	54.02	48	54.00	6.00
17325.00	46.28	PK	V	42.09	8.80	38.54	58.63	52.61	68.20	15.59

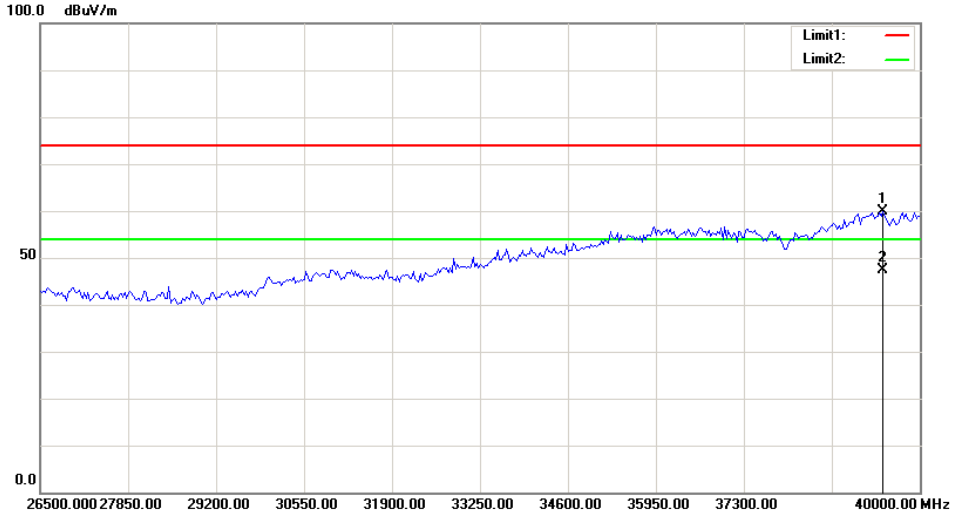
Test Plots(For worst mode 802.11a chain 0 5825MHz)
Horizontal

Fundamental Test with Band Rejection Filter



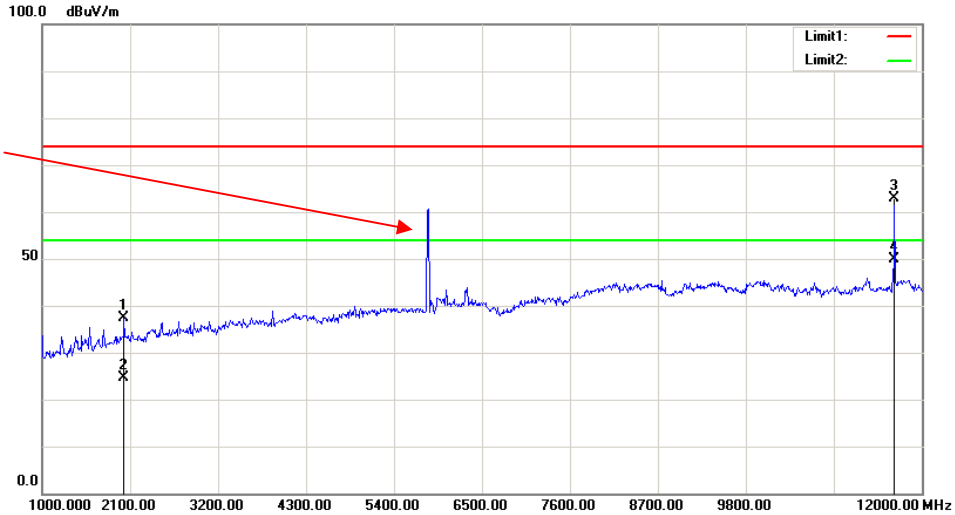


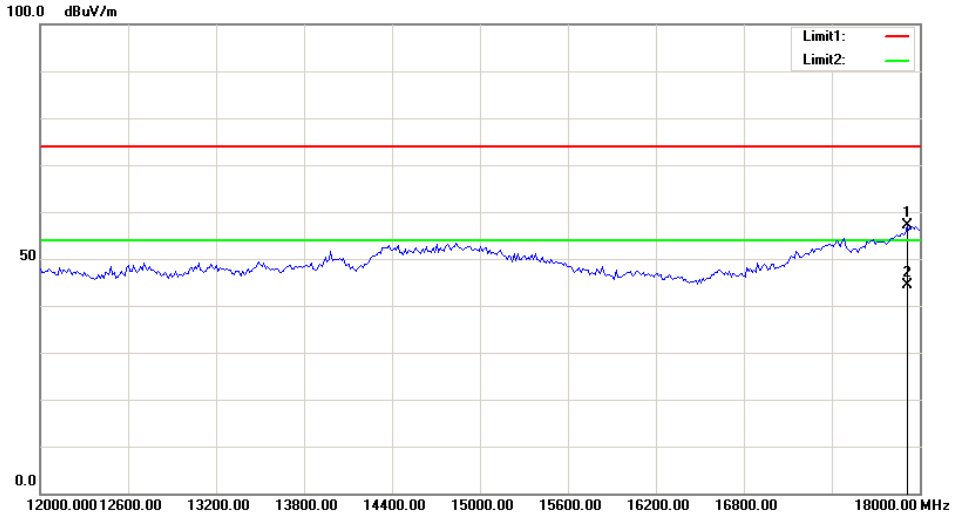


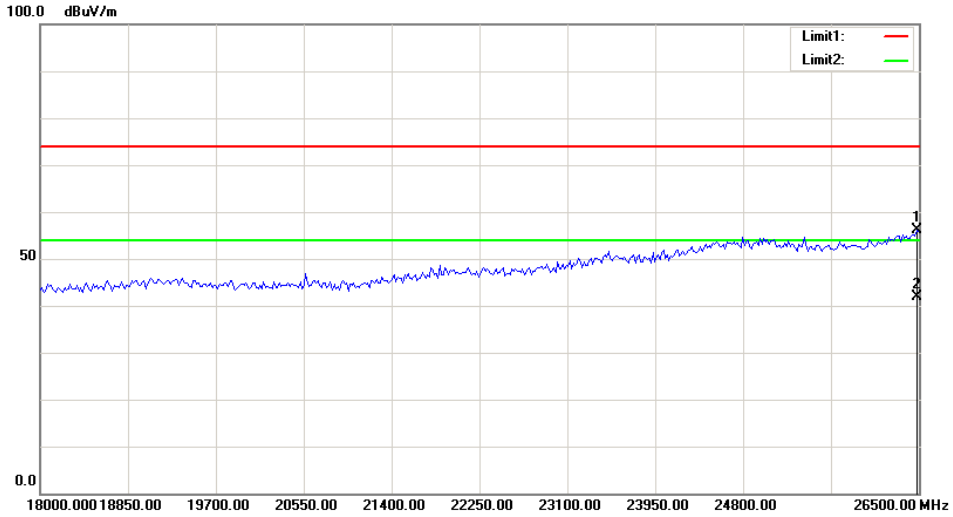


Vertical

Fundamental Test with Band Rejection Filter



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Limit2:
50
0.0
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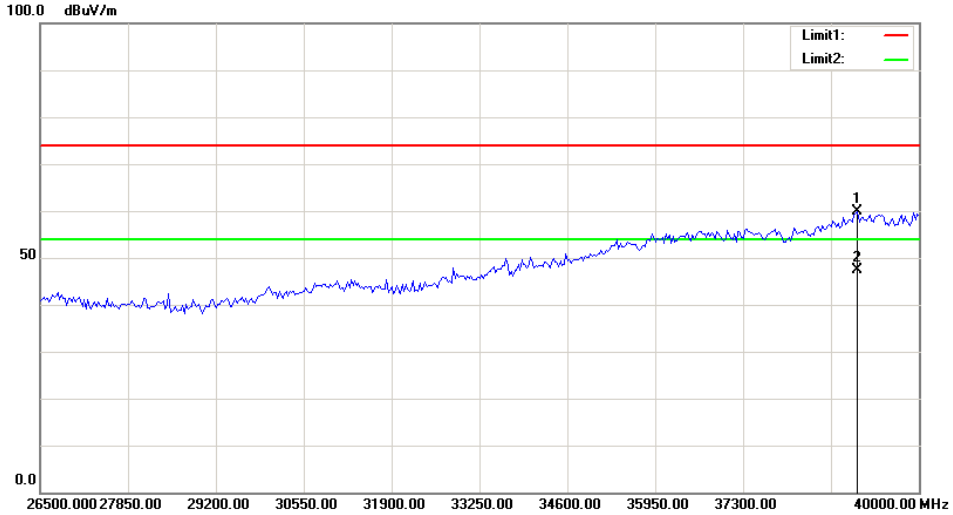

100.0 dBuV/m
Limit1:
Limit2:
50
0.0
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

FCC §15.407(a)(e)–EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
conducted emission	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Data

Environmental Conditions

Temperature:	29.1°C
Relative Humidity:	59 %
ATM Pressure:	100.5 kPa

The testing was performed by Vern Shen on 2019-09-13.

Test Result: Pass.

Please refer to the following tables and plots.

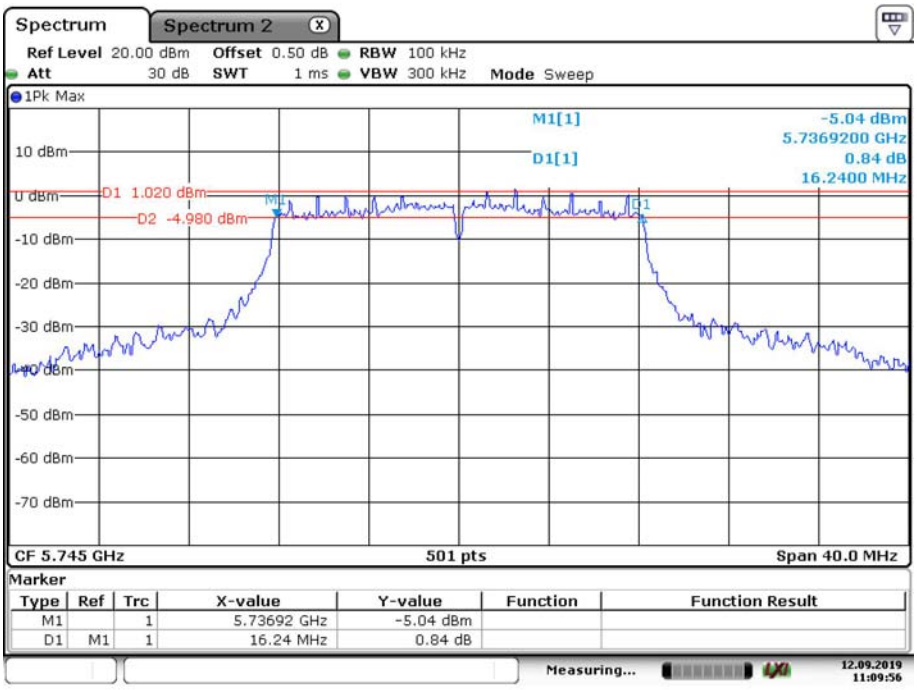
Test mode: Transmitting (test was only performed at chain 0)

Mode	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11 a	5745	16.240	17.086
	5785	16.320	17.166
	5825	16.320	17.166
802.11n ht20	5745	17.040	17.725
	5785	17.040	17.725
	5825	16.960	17.725
802.11n ht40	5755	35.520	36.248
	5795	35.520	36.567
802.11ac vht80	5775	75.200	75.050

Note: the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

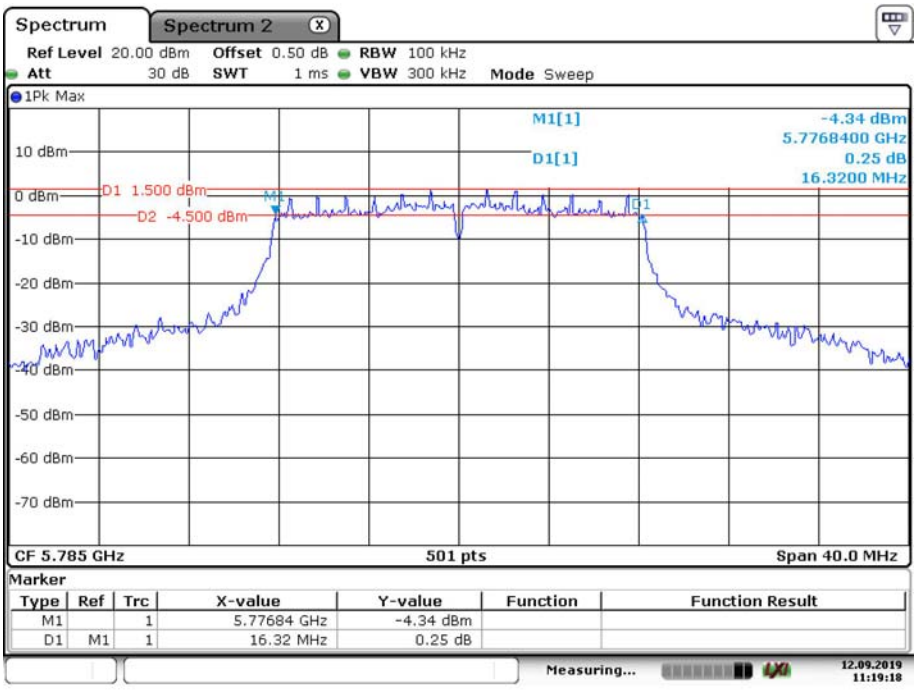
6dB Emission Bandwidth:

802.11a Low Channel



Date: 12.SEP.2019 11:09:56

802.11a Middle Channel



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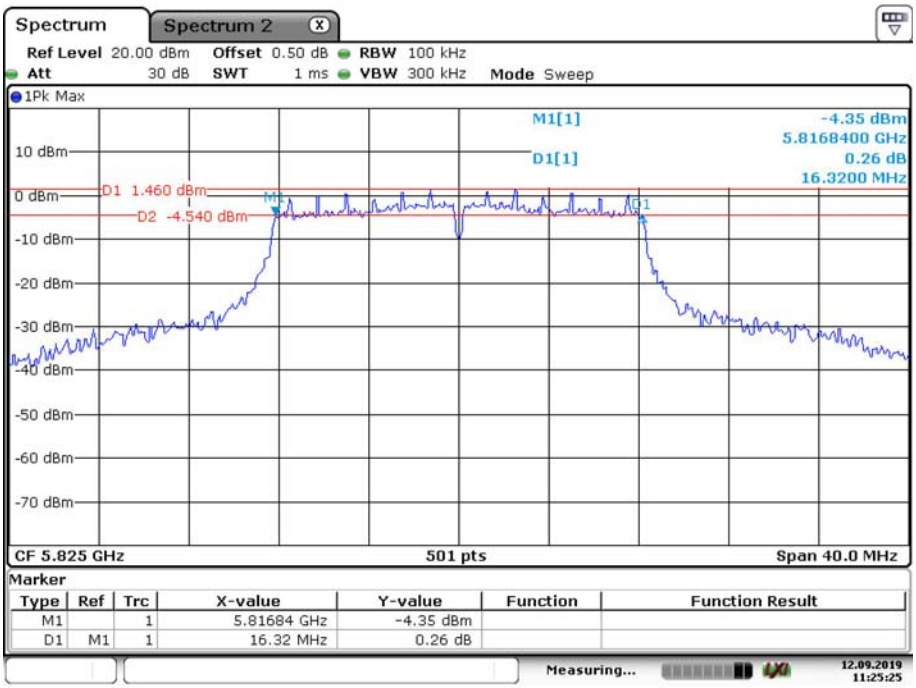
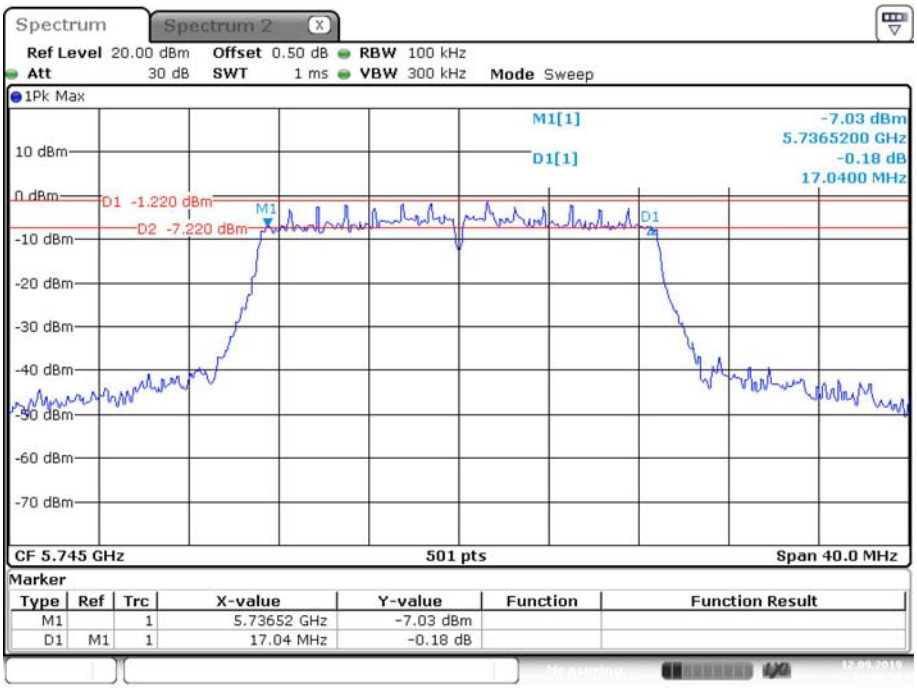
802.11a High Channel



Date: 12.SEP.2019 11:25:25

802.11n ht20 Low Channel



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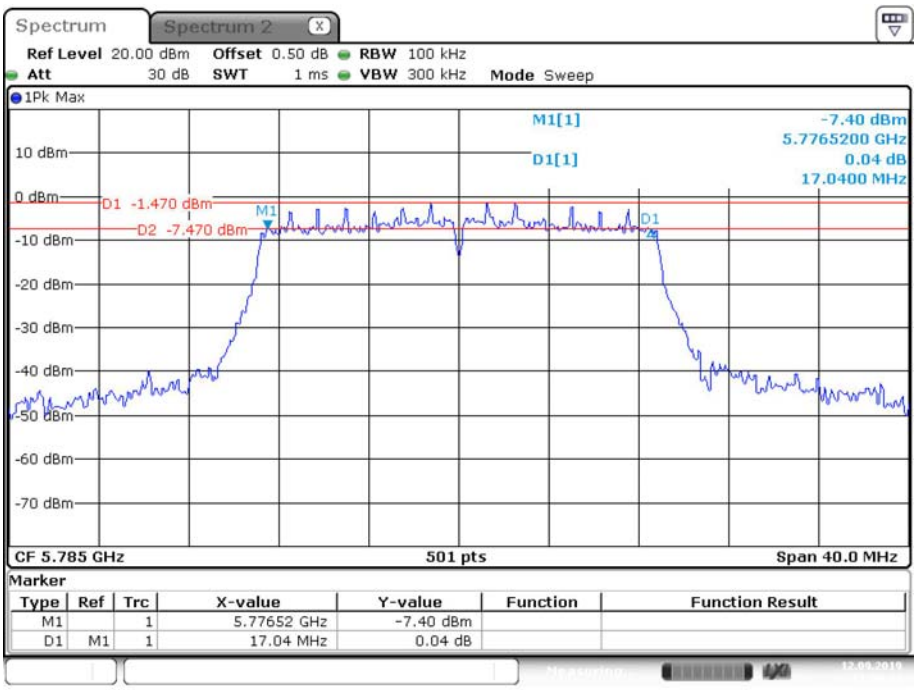
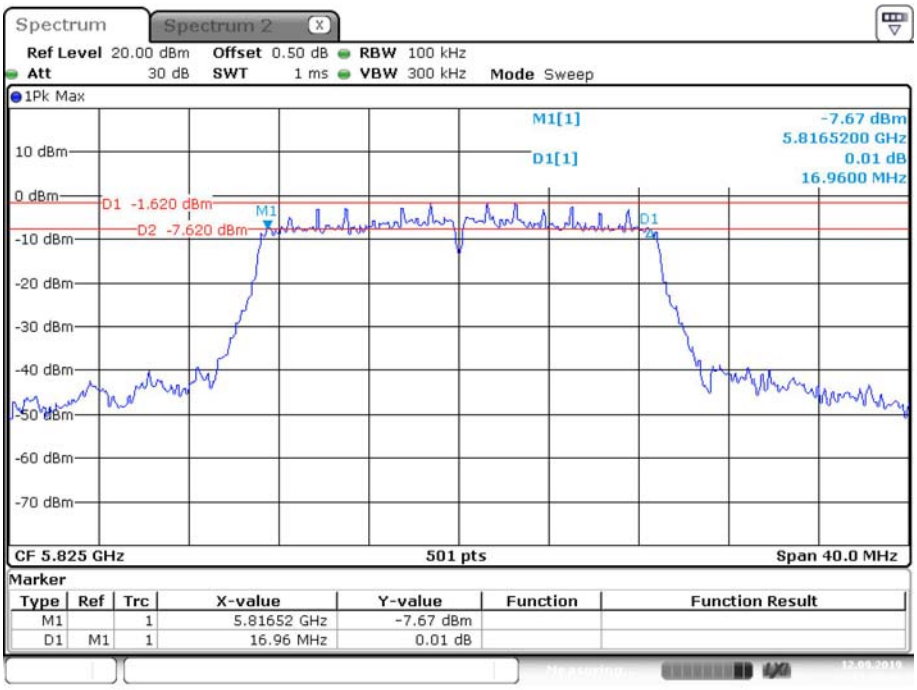
802.11n ht20 Middle Channel



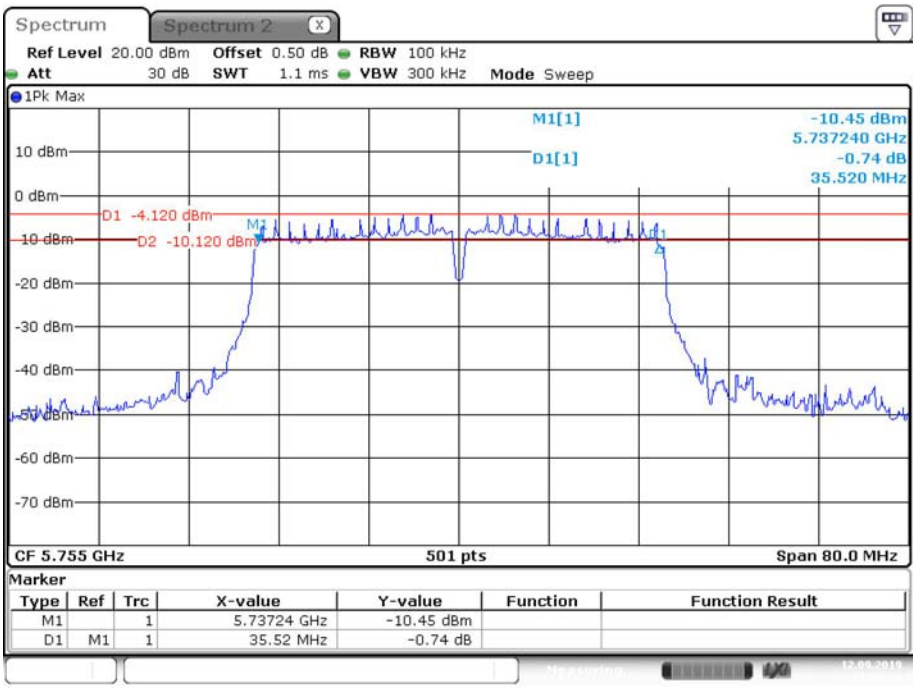
Date: 12.SEP.2019 11:34:33

802.11n ht20 High Channel



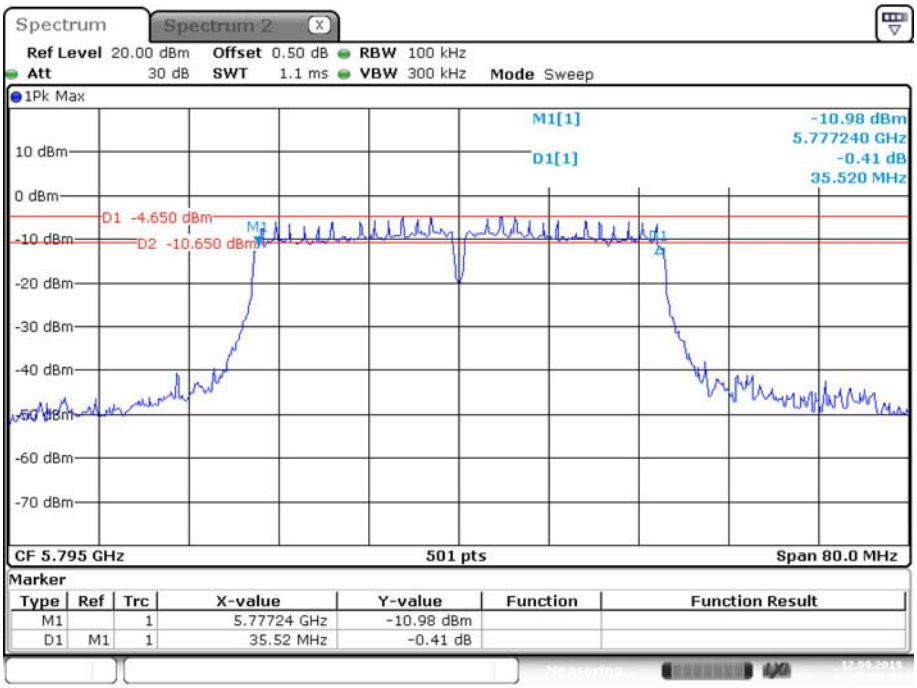
Date: 12.SEP.2019 11:28:47

802.11n ht40 Low Channel



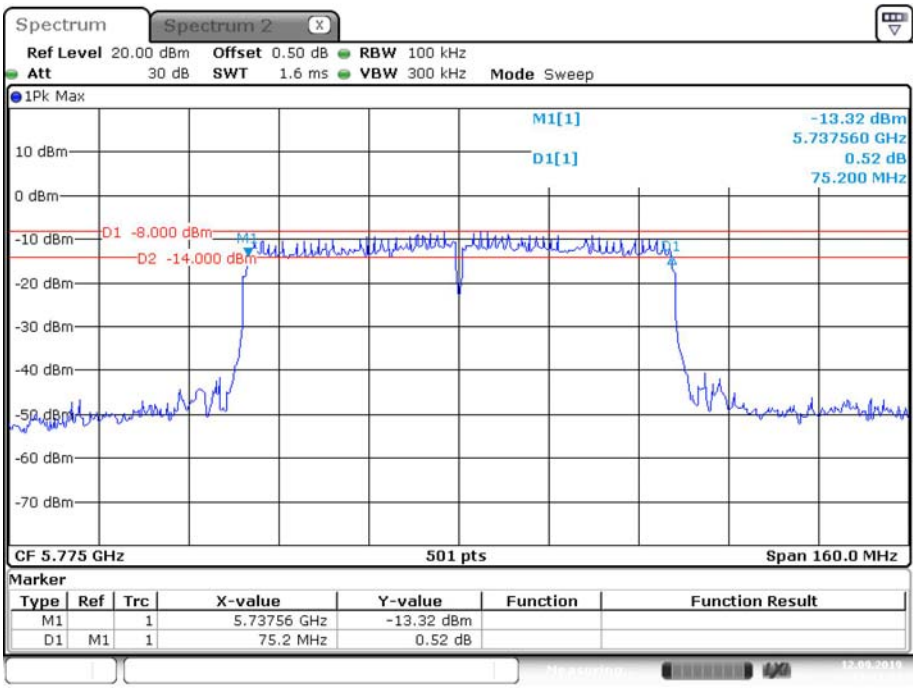
Date: 12.SEP.2019 11:38:30

802.11n ht40 High Channel



Date: 12.SEP.2019 11:39:32

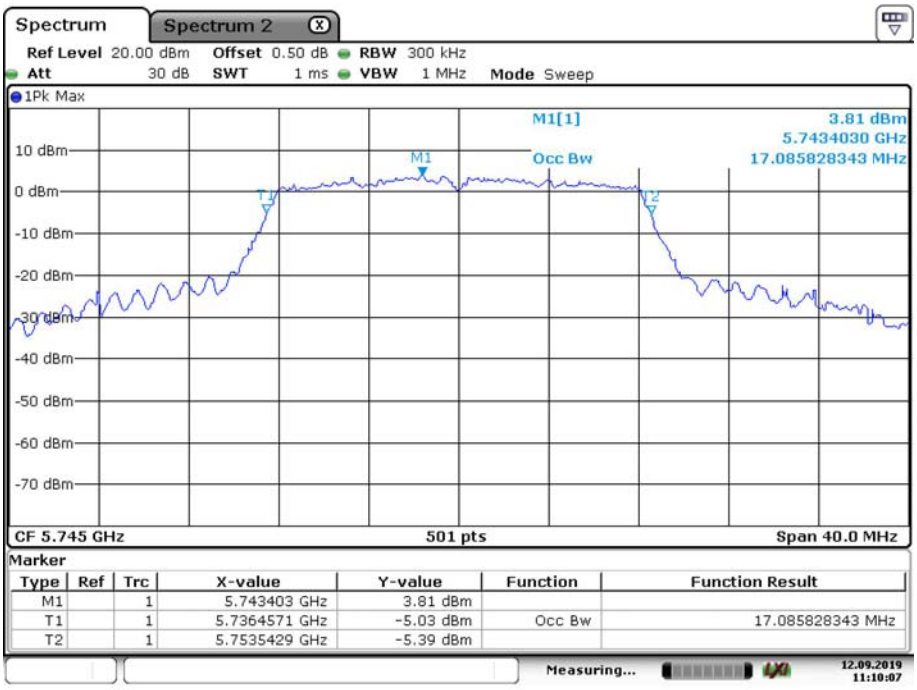
802.11n ac80 Middle Channel



Date: 12.SEP.2019 11:41:21

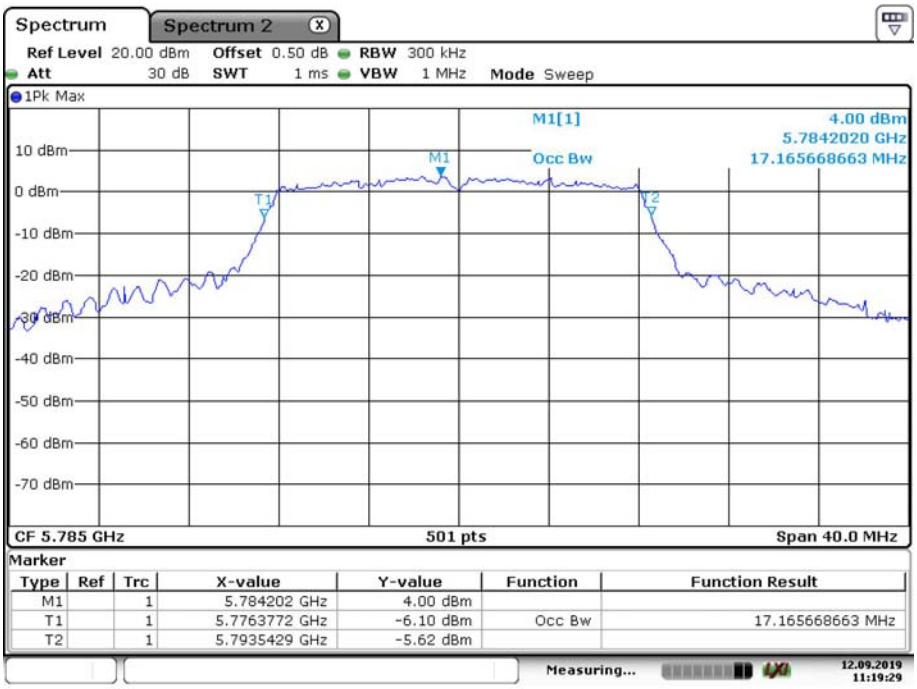
99% Occupied Bandwidth:

802.11a Low Channel



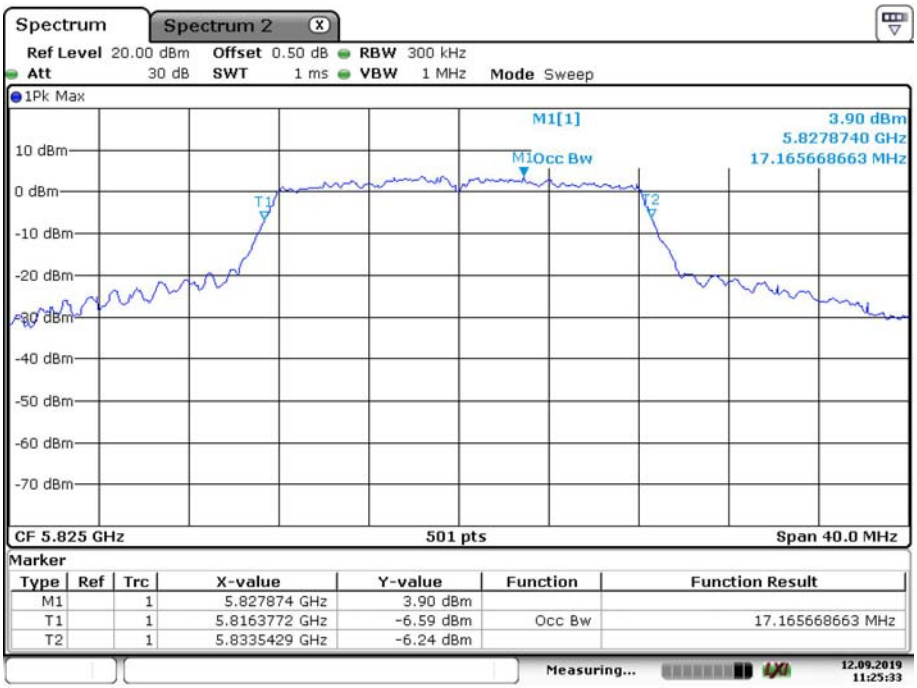
Date: 12.SEP.2019 11:10:07

802.11a Middle Channel



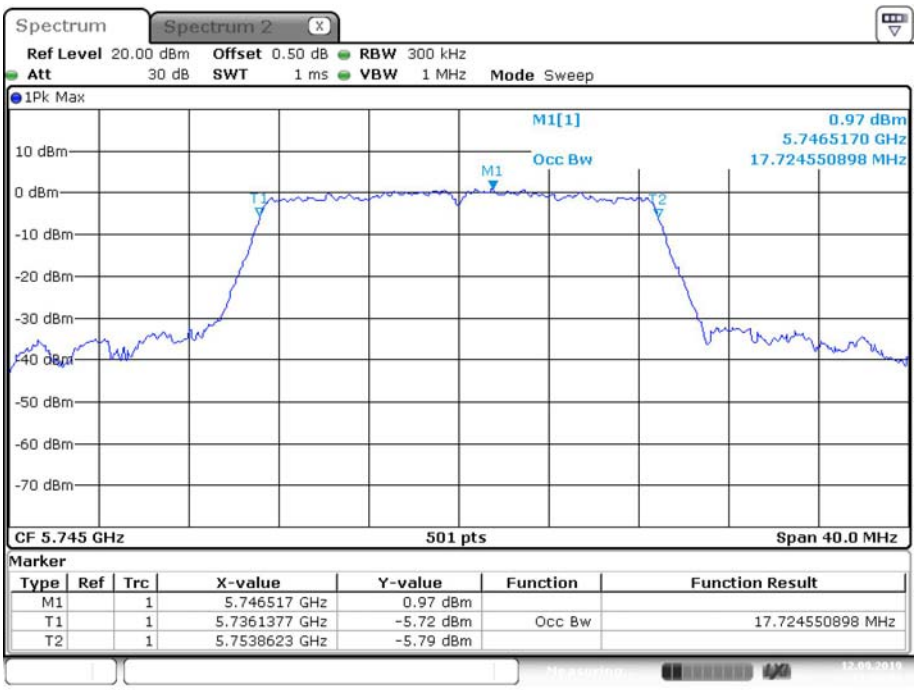
Date: 12.SEP.2019 11:19:29

802.11a High Channel



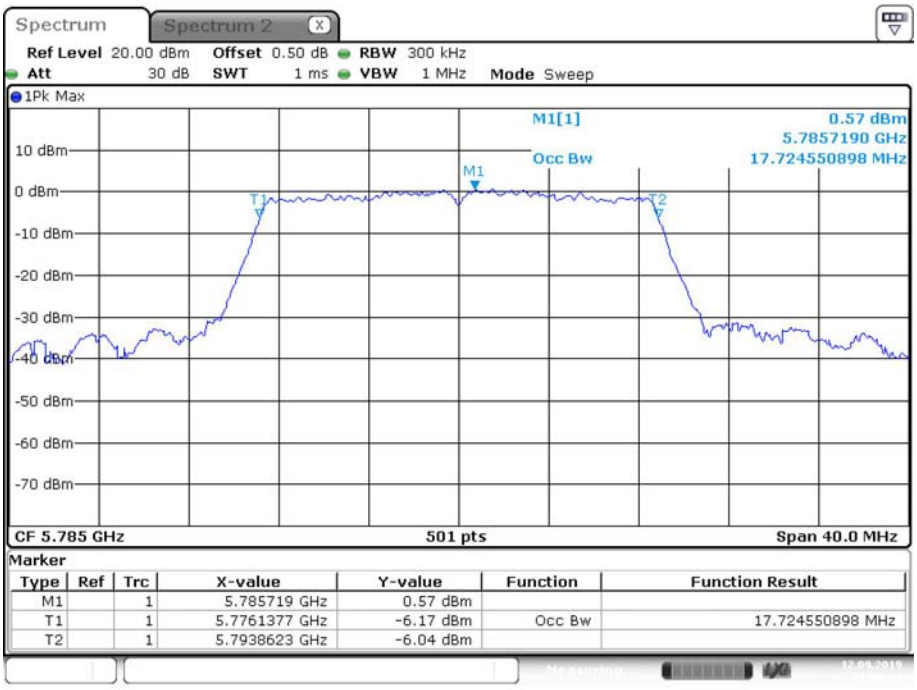
Date: 12.SEP.2019 11:25:33

802.11n ht20 Low Channel



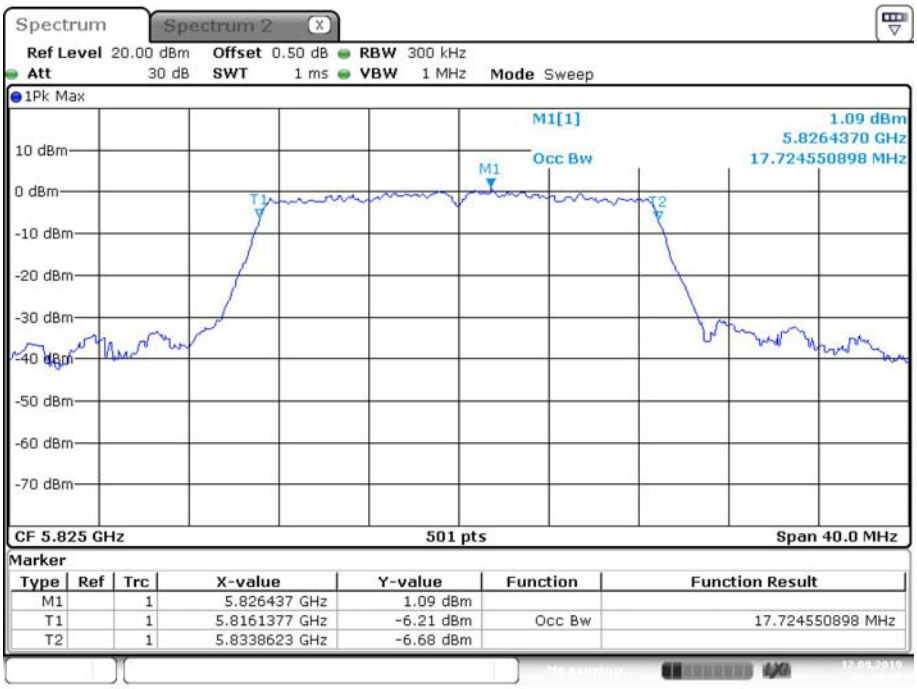
Date: 12.SEP.2019 11:36:00

802.11n ht20 Middle Channel



Date: 12.SEP.2019 11:34:44

802.11n ht20 High Channel



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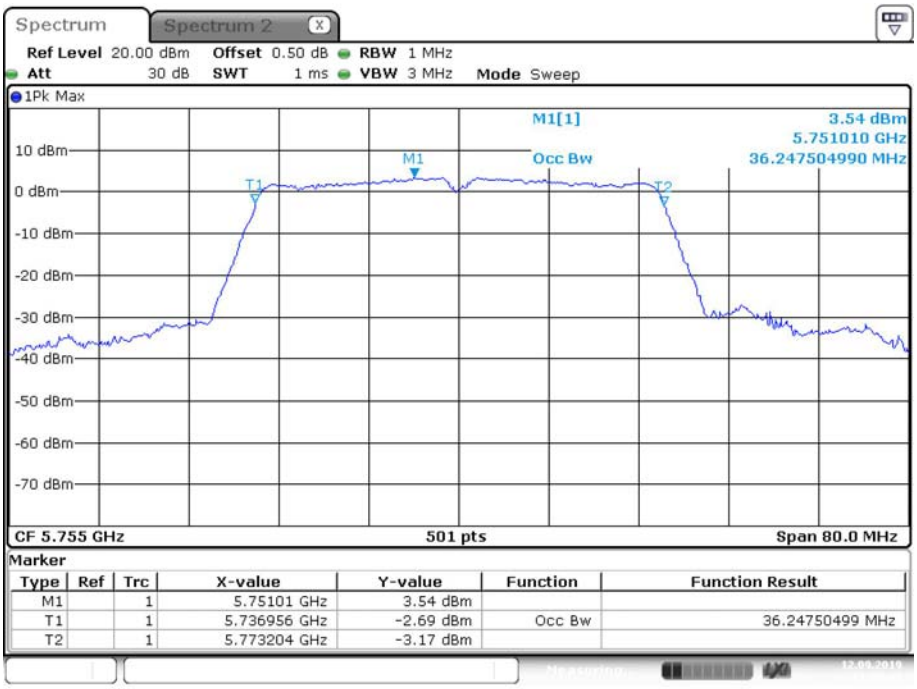
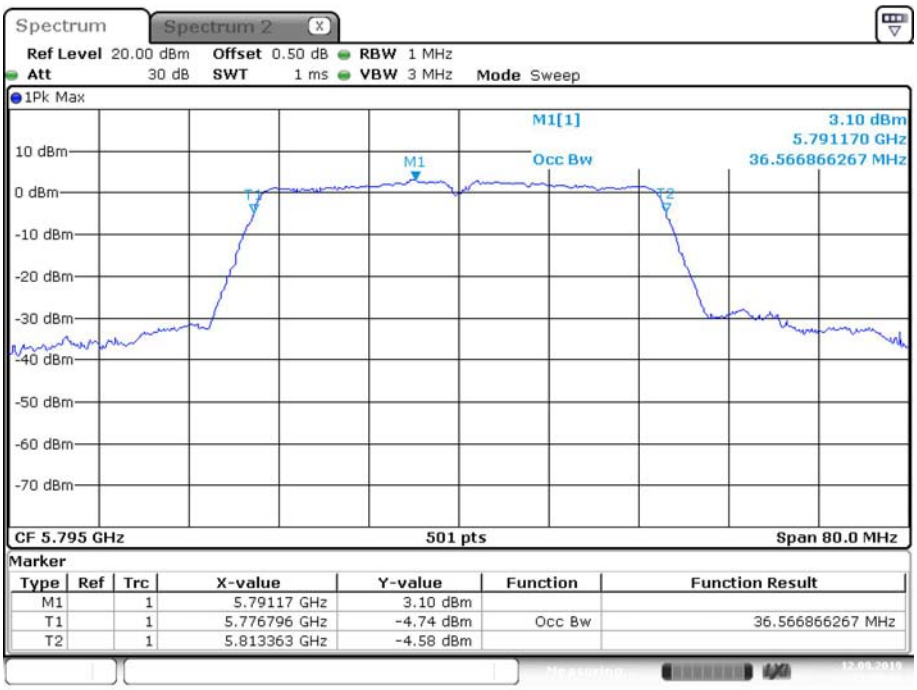
802.11n ht40 Low Channel



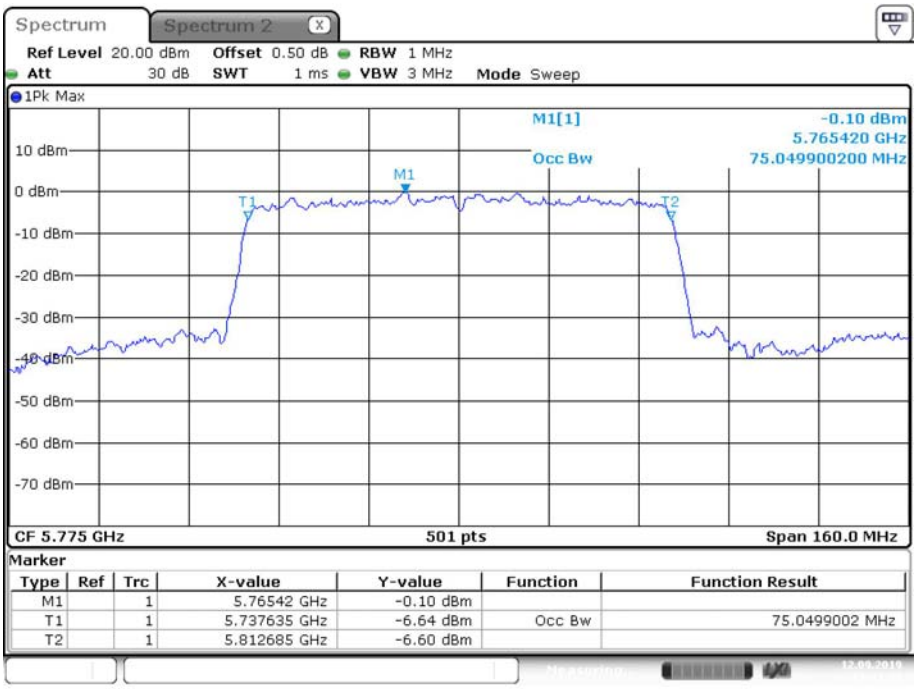
Date: 12.SEP.2019 11:38:42

802.11n ht40 High Channel



Date: 12.SEP.2019 11:39:43

802.11n ac80 Middle Channel



Date: 12.SEP.2019 11:41:32

FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(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. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

(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.

(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Data

Environmental Conditions

Temperature:	29.1°C
Relative Humidity:	59 %
ATM Pressure:	100.5 kPa

The testing was performed by Vern Shen on 2019-09-13.

Test Mode: Transmitting

Mode	Frequency (MHz)	Conducted Average Output Power (dBm)			Limit (dBm)
		Chain 0	Chain 1	Total	
802.11 a	5745	11.61	11.98	/	30
	5785	12.14	12.11	/	30
	5825	12.07	12.36	/	30
802.11n ht20	5745	8.64	11.02	13.00	30
	5785	8.99	10.90	13.06	30
	5825	8.83	11.15	13.15	30
802.11n ht40	5755	8.39	10.24	12.42	30
	5795	8.81	10.24	12.59	30
802.11ac vht80	5775	9.62	11.13	13.45	30

Note:
The duty cycle factor has been calculated into the test data.
The maximum antenna gain is 3dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

So:

Directional gain = G_{ANT} + Array Gain = 3dBi

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(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. 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 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.

(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

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2019-01-09	2020-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

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

Test Data

Environmental Conditions

Temperature:	29.1°C
Relative Humidity:	59 %
ATM Pressure:	100.5 kPa

The testing was performed by Vern Shen on 2019-09-13.

Test Mode: Transmitting

Test Result:Compliance.Please refer to the following table and plot.

Mode	Frequency (MHz)	Result (dBm/500kHz)			Limit (dBm/500kHz)
		Chain 0	Chain 1	Total	
802.11a	5745	5.45	4.44	/	30
	5785	4.31	4.21	/	30
	5825	4.48	4.83	/	30
802.11n ht20	5745	1.27	3.23	5.37	30
	5785	1.12	2.92	5.12	30
	5825	0.91	2.92	5.04	30
802.11n ht40	5755	-1.82	0.78	2.68	30
	5795	-1.66	-0.54	1.95	30
802.11 ac vht80	5775	-1.72	-0.24	2.09	30

Note:
The maximum antenna gain is 3dBi in 5GHz band. The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

So:

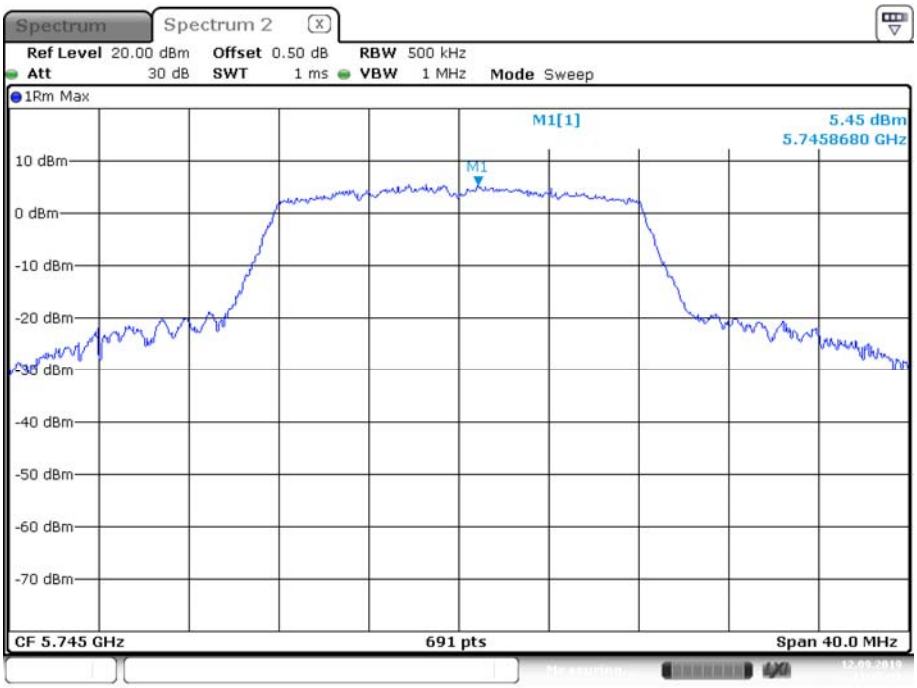
Directional gain = G_{ANT} + Array Gain = 3dBi+10*log(2/1)=6dBi

For 5.8GHz band, If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

Note 3: Method SA-3 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01was used for PSD test.

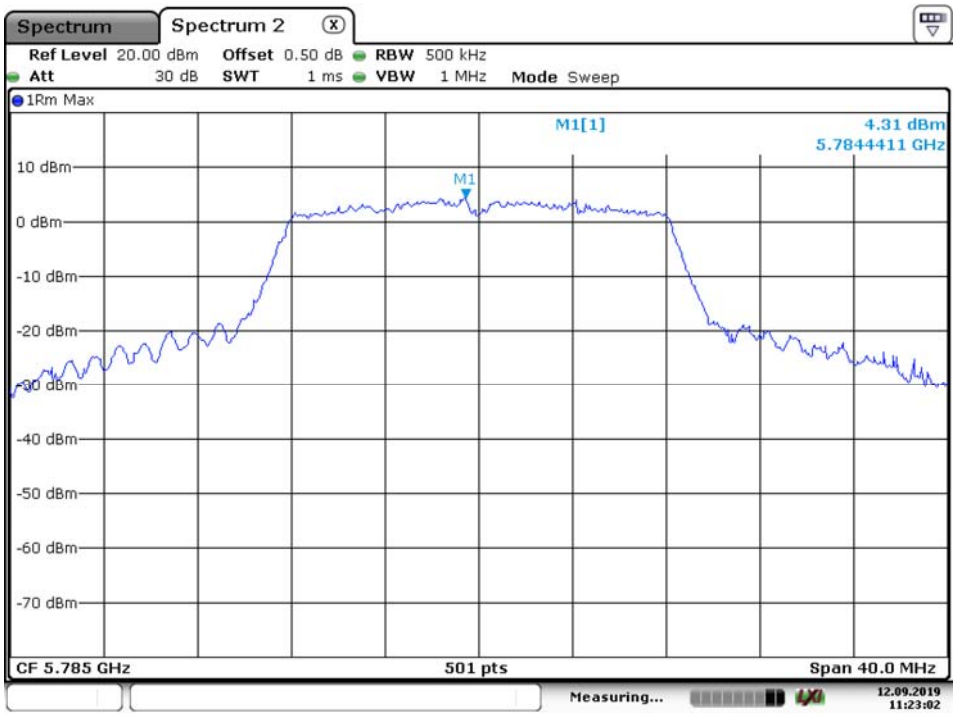
Chain 0:

802.11a Low Channel



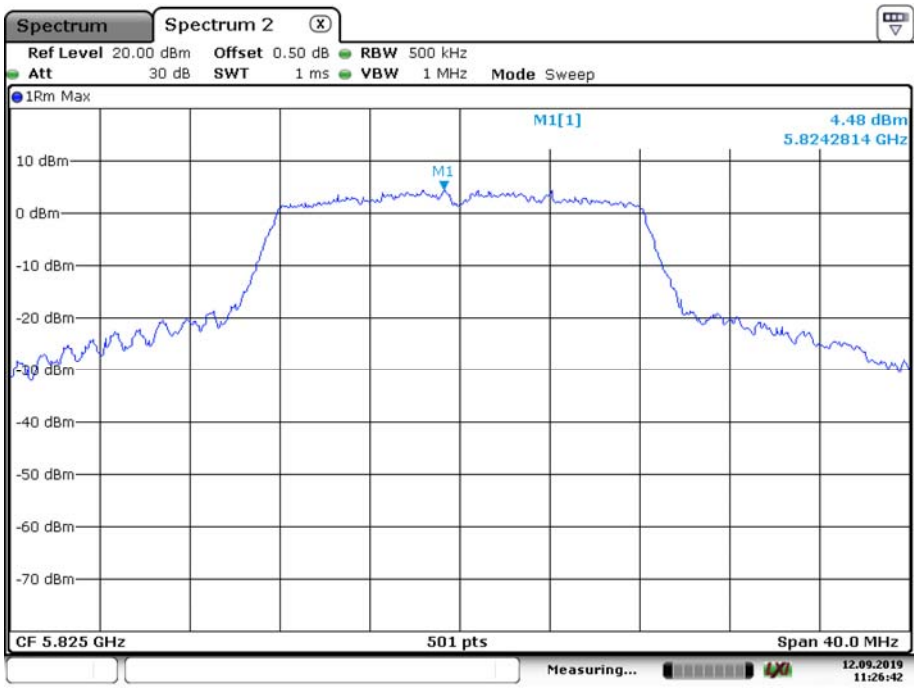
Date: 12.SEP.2019 11:15:23

802.11a Middle Channel



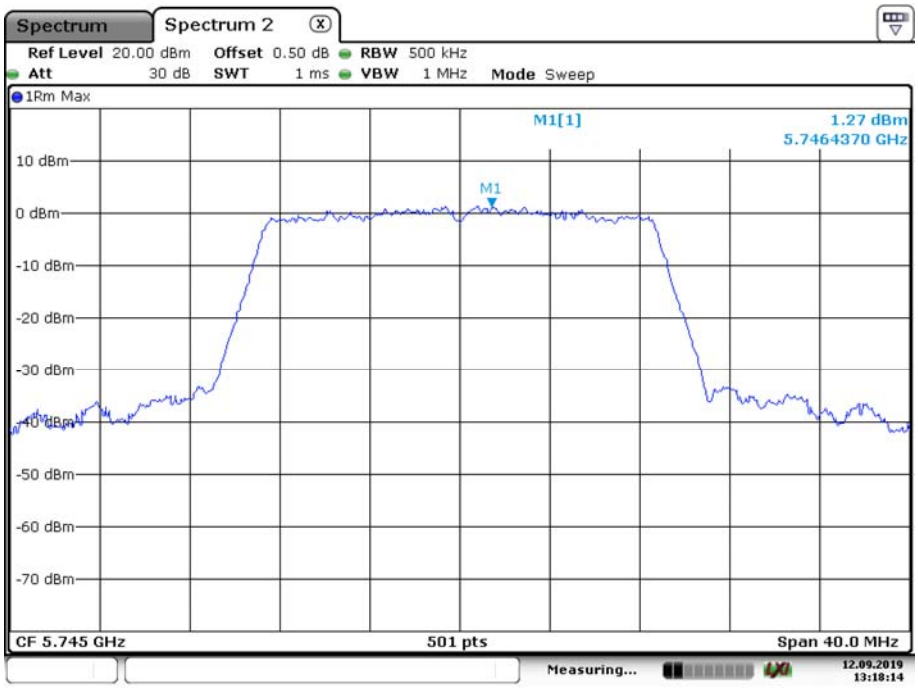
Date: 12.SEP.2019 11:23:02

802.11a High Channel



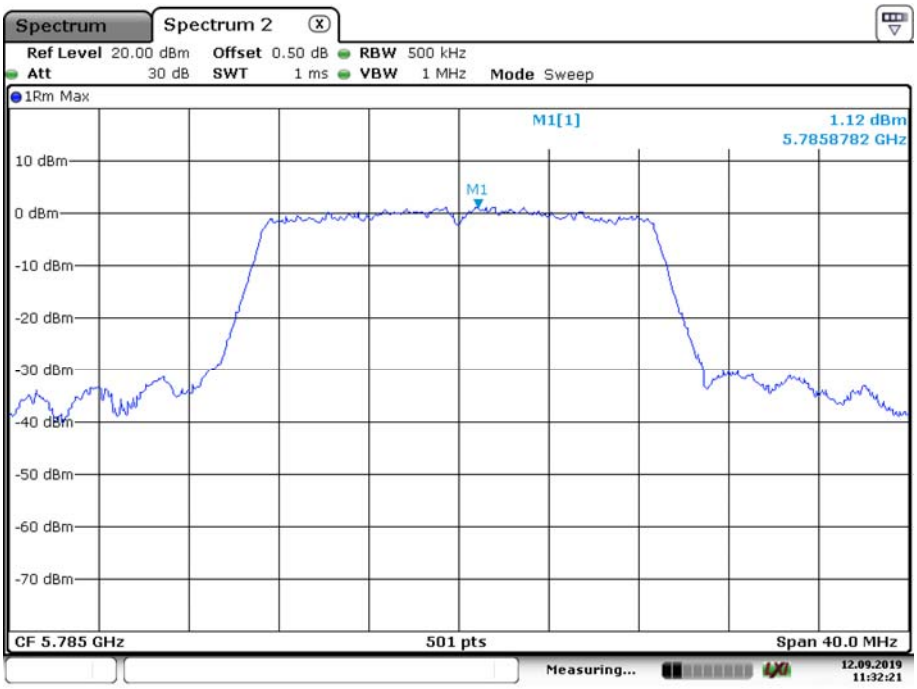
Date: 12.SEP.2019 11:26:42

802.11n ht20 Low Channel



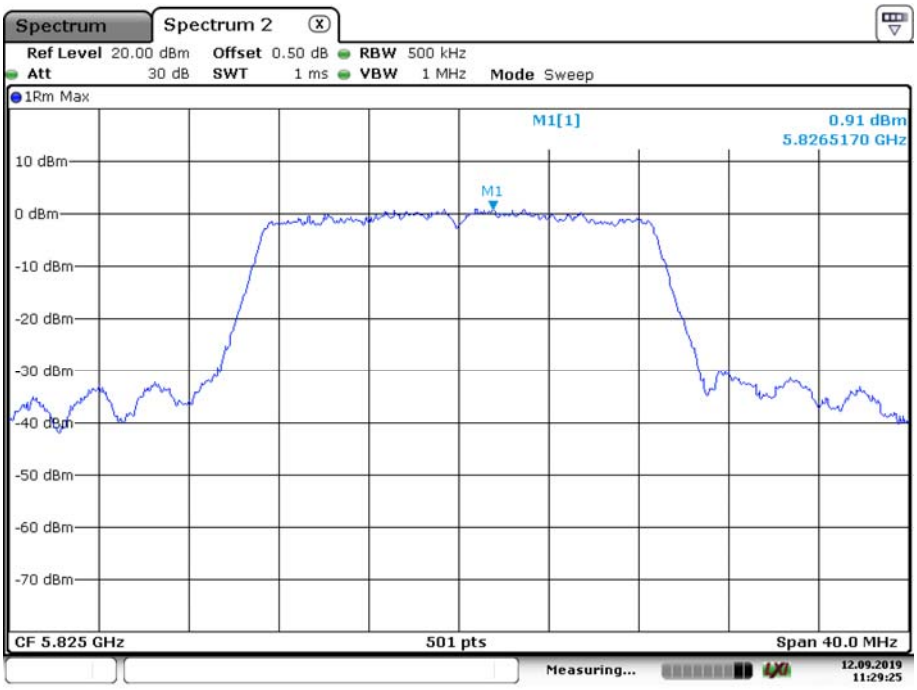
Date: 12.SEP.2019 13:18:15

802.11n ht20 Middle Channel



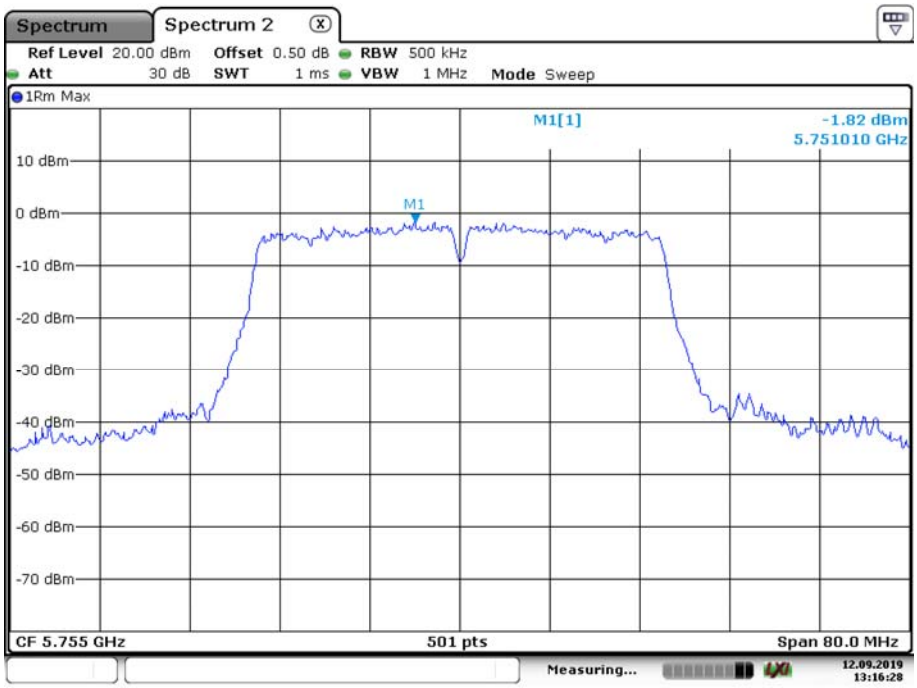
Date: 12.SEP.2019 11:32:21

802.11n ht20 High Channel



Date: 12.SEP.2019 11:29:25

802.11n ht40 Low Channel

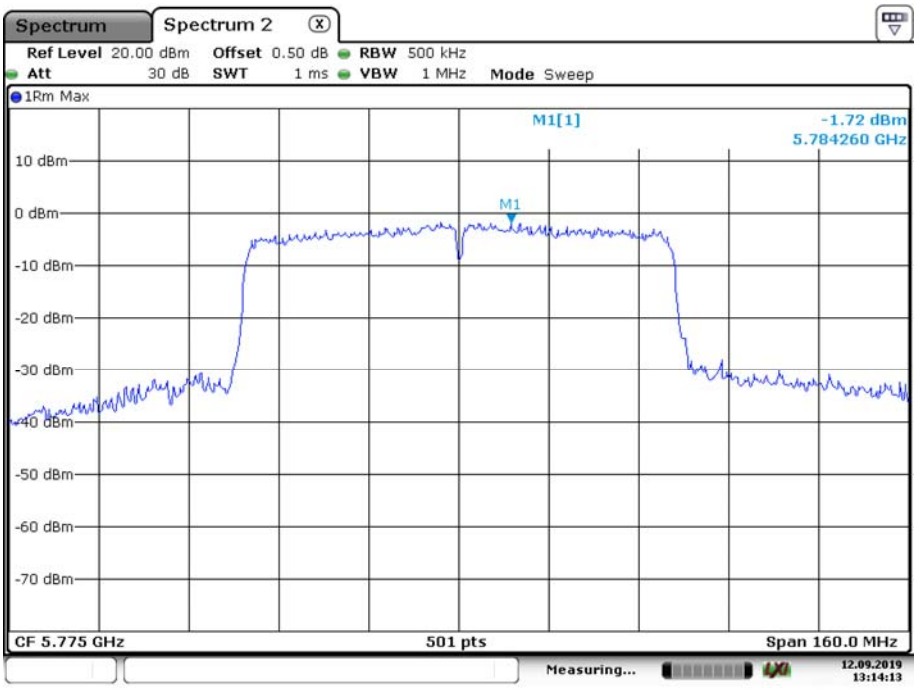


Date: 12.SEP.2019 13:16:29

802.11n ht40 High Channel

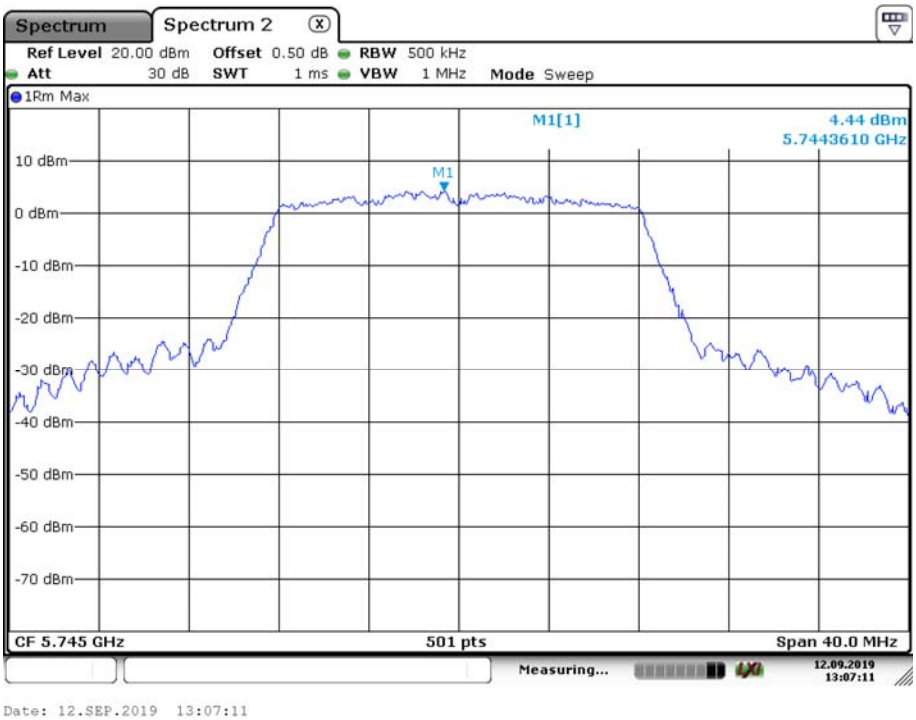
Date: 12.SEP.2019 13:15:38

802.11n ac80 Middle Channel

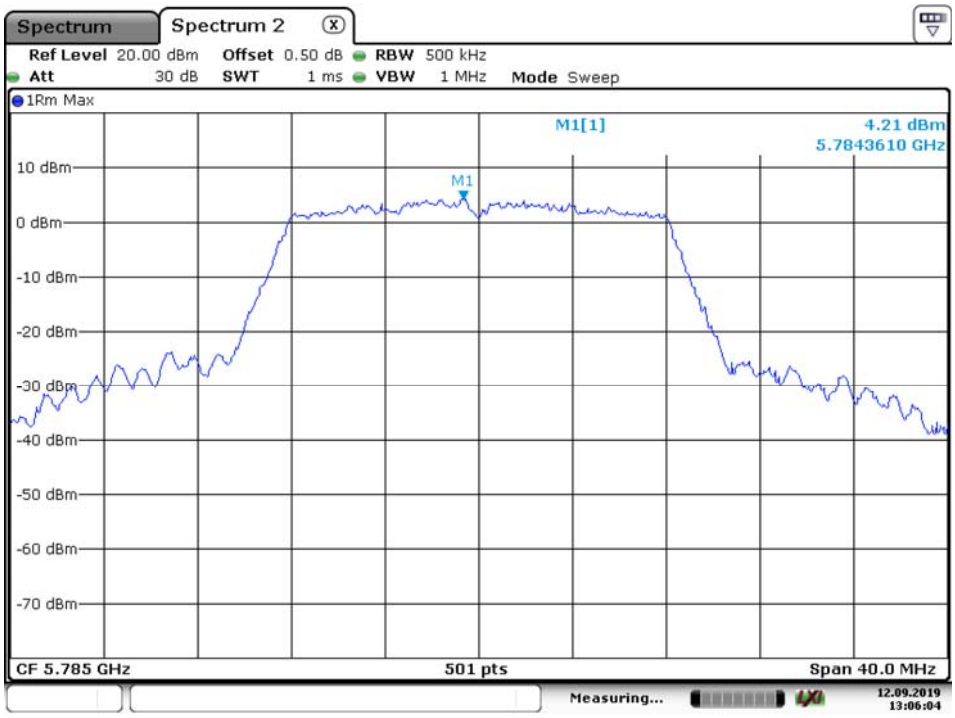


Chain 1:

802.11a Low Channel

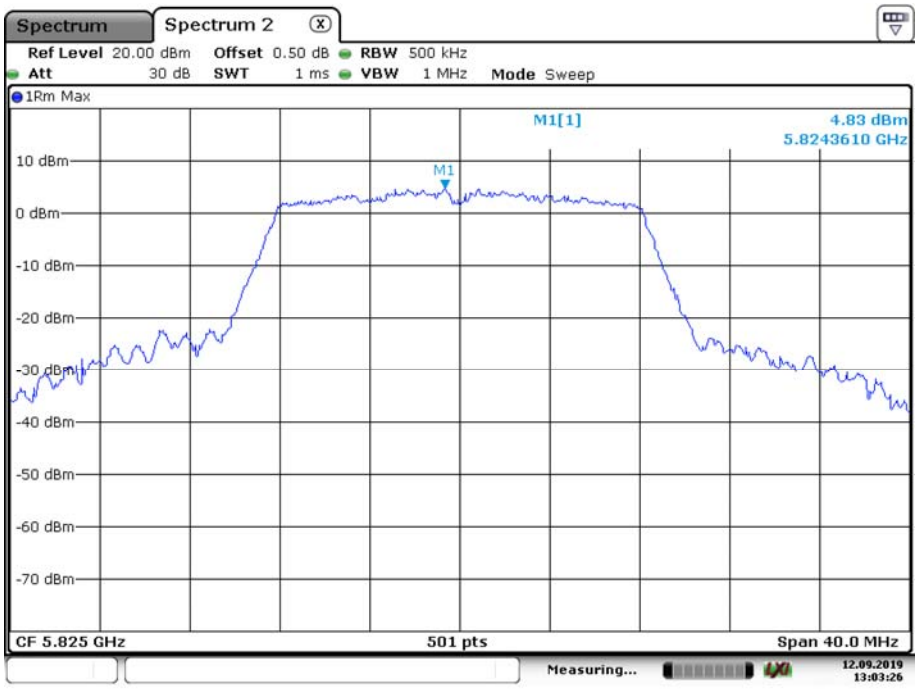


802.11a Middle Channel



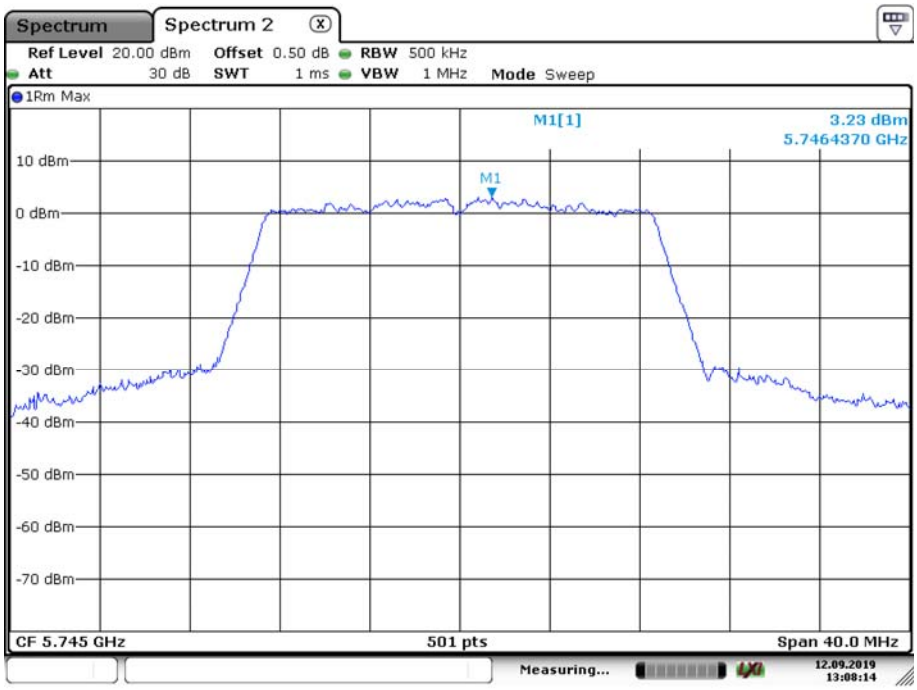
Date: 12.SEP.2019 13:06:04

802.11a High Channel



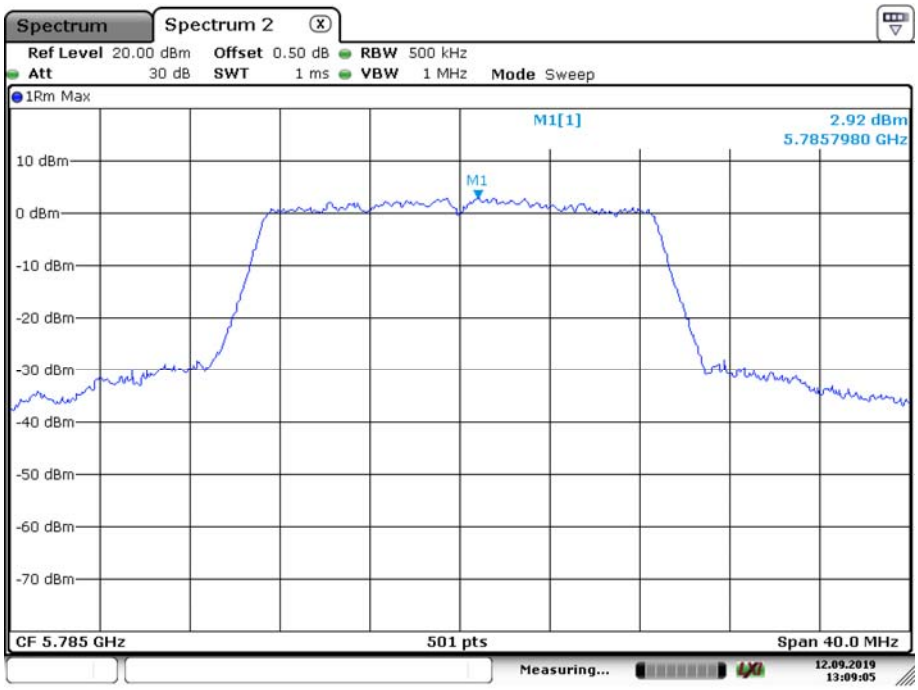
Date: 12.SEP.2019 13:03:27

802.11n ht20 Low Channel



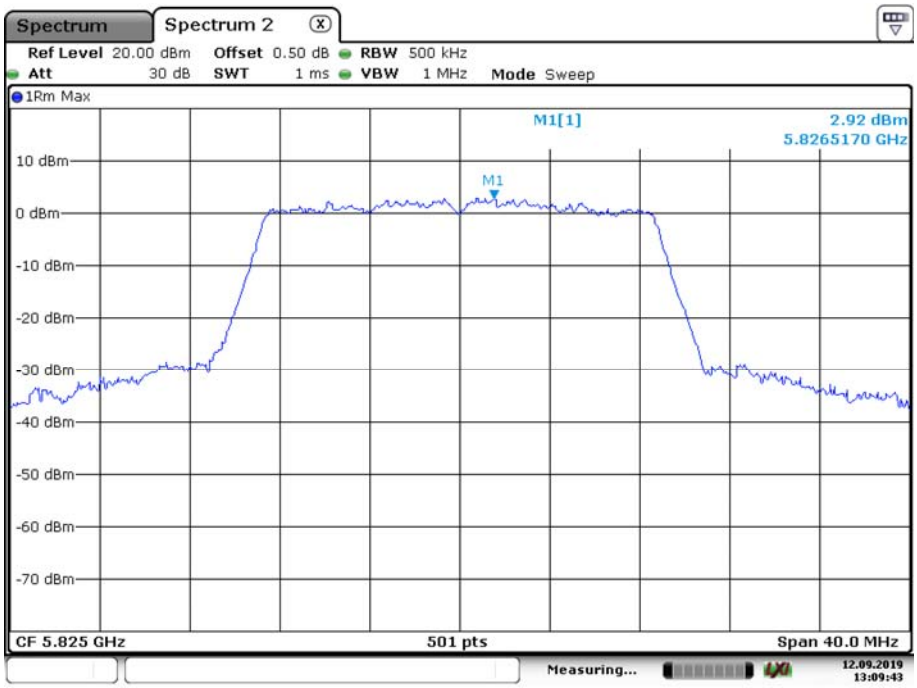
Date: 12.SEP.2019 13:08:15

802.11n ht20 Middle Channel



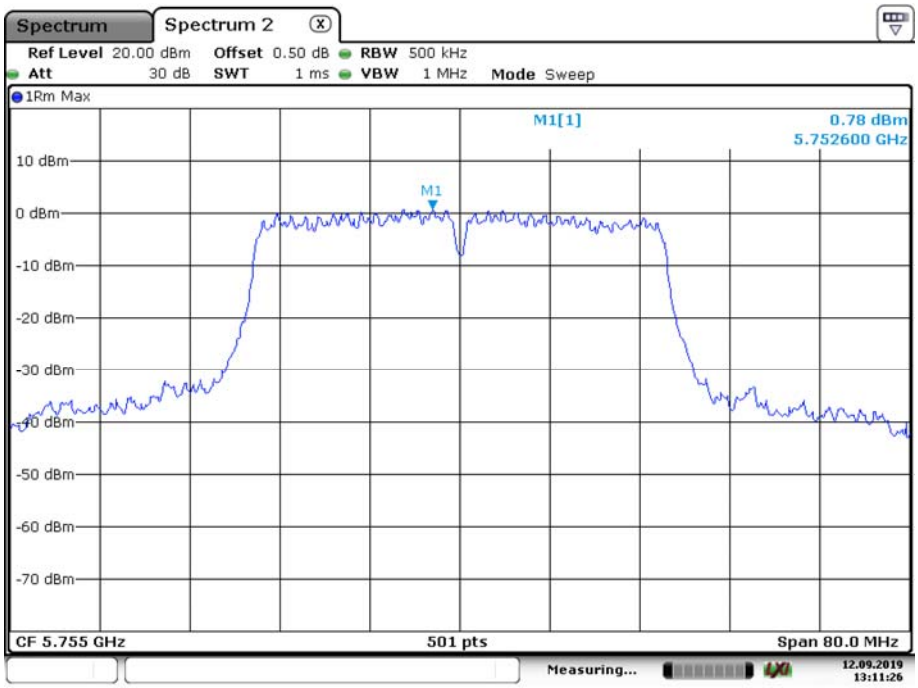
Date: 12.SEP.2019 13:09:06

802.11n ht20 High Channel



Date: 12.SEP.2019 13:09:44

802.11n ht40 Low Channel



Date: 12.SEP.2019 13:11:26

802.11n ht40 High Channel

Date: 12.SEP.2019 13:10:32

802.11n ac80 Middle Channel

Date: 12.SEP.2019 13:13:11

Directions

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