FCC PART 15.407

TEST REPORT

For

SZ DJI TECHNOLOGY CO., LTD

14th floor, West Wing, Skyworth Semiconductor Design Building NO.18 Gaoxin South 4th Ave, Nanshan, Shenzhen, Guangdong, China

FCC ID: SS3-M1S1607

Report Type:	Product Type:
Original Report	Mavic

Test Engineer:	Emily Wang
Report Number:	RDG160806008-00B
Report Date:	2016-09-23
Reviewed By:	Ivan Cao Assistant Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *SZ DJI TECHNOLOGY CO., LTD*'s product, model number: *M1S (FCC ID: SS3-M1S1607)* (the "EUT") in this report was a *Mavic,* which was measured approximately: 303.3mm (L) x 249.5mm (W) x 75.2mm(H), rated input voltage: DC 11.4V from lithium battery, the battery can remove from the EUT and charged by adapter.

Adapter 1 information:
Manufacturer: AcTel Electronic (Dong guan) Co., Ltd./China
Model: F1C50
Input: AC 100-240V, 1.4A, 50-60Hz
Total Output Power: 50W Max;
Output: DC13.05V, 3.83A(Main); DC5.0V, 2.0A Total(USB)

Adapter 2 information:
Manufacturer: Shenzhen Huntkey Electronics Co., Ltd.
Model: F1C50
Input: AC 100-240V, 1.4A, 50-60Hz
Total Output Power: 50W Max;
Output: DC13.05V, 3.83A(Main); DC5.0V, 2.0A Total(USB)

Battery 1 information:
Manufacturer: Sunwoda Electronic Co., LTD.
Model: FB1-3830 mAh-11.4V
Max Charge Voltage: 13.05V
Nominal Voltage:11.4V
Rated Capacity: 3830mAh

Battery 2 information:
Manufacturer: Dongguan Amperex Technology Limited
Model: FB1-3830 mAh-11.4V
Max Charge Voltage: 13.05V
Nominal Voltage:11.4V
Rated Capacity: 3830mAh, 43.6Wh

** All measurement and test data in this report was gathered from production sample serial number: 160806008 (Assigned by BACL Dongguan). The EUT was received on 2016-08-01.*

Objective

This type approval report is prepared on behalf of *SZ DJI TECHNOLOGY CO., LTD* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and E of the Federal Communications Commission's 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 15.247 DTS submissions with FCC ID: SS3-M1S1607.
FCC Part 15B JBP submissions with FCC ID: SS3-M1S1607.
Part of system submissions with FCC ID: SS3-GL200A1606

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. (Dongguan).

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 Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications 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 February 06, 2015.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. 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.

The system support 802.11a/n ht20 @5150-5250MHz band and 5725-5850MHz band. 802.11a and n ht20 support SISO and MIMO modes. 1.4/10/20MHz modes can`t transmission simultaneously with Wi-Fi.

For 5150~5250 MHz band, 4 channels are provided to test:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

For 802.11a, 802.11n ht20, Channel 36, 40 and 48 were tested

For 5725~5850MHz band, 5 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785	/	/

For 802.11a, 802.11n ht20, Channel 149, 157 and 165 was tested.

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.

EUT Exercise Software

The test software: ' DJI-RF Certification ' was used in testing, which was provided by manufacturer, and configured maximum power (100% dutycycle) as following table:

5150-5250

Antenna 0&1				
Test Mode	Test Software Version	DJI-RF Certification		
802.11a	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	17	21	17
802.11n ht20	Test Frequency	5180MHz	5200MHz	5240MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	16	21	16

5725-5850

Antenna 0&1				
Test Mode	Test Software Version	DJI-RF Certification		
802.11A	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	20	20	20
802.11n ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	20	20	20

Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

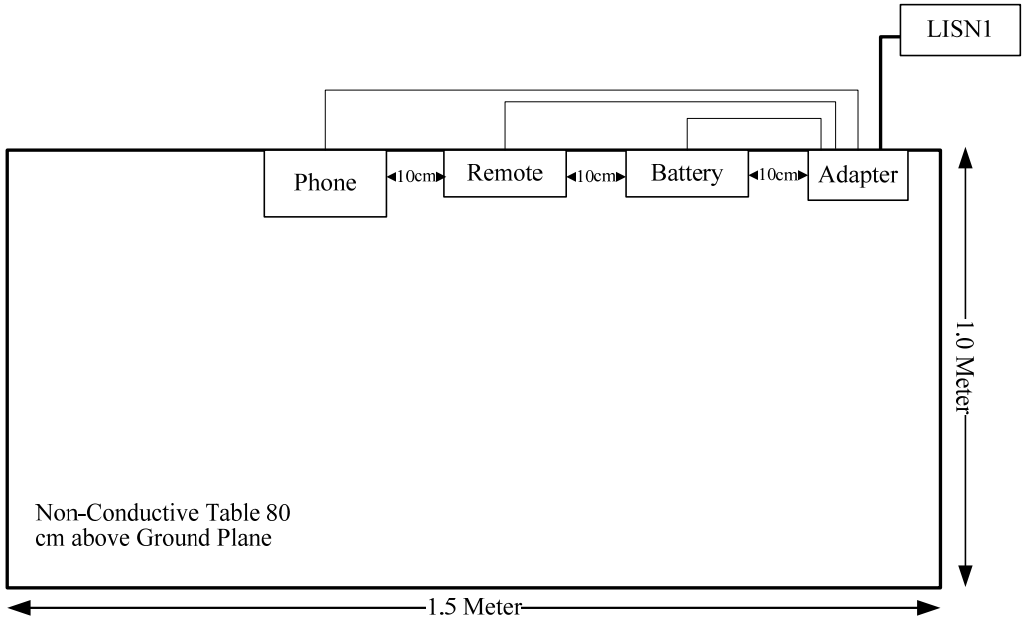
Manufacturer	Description	Model	Serial Number
DJI	Remote	GL200A	/
Apple	iPhone	A1524	X3CY0TCP17CCCTY

External Cable

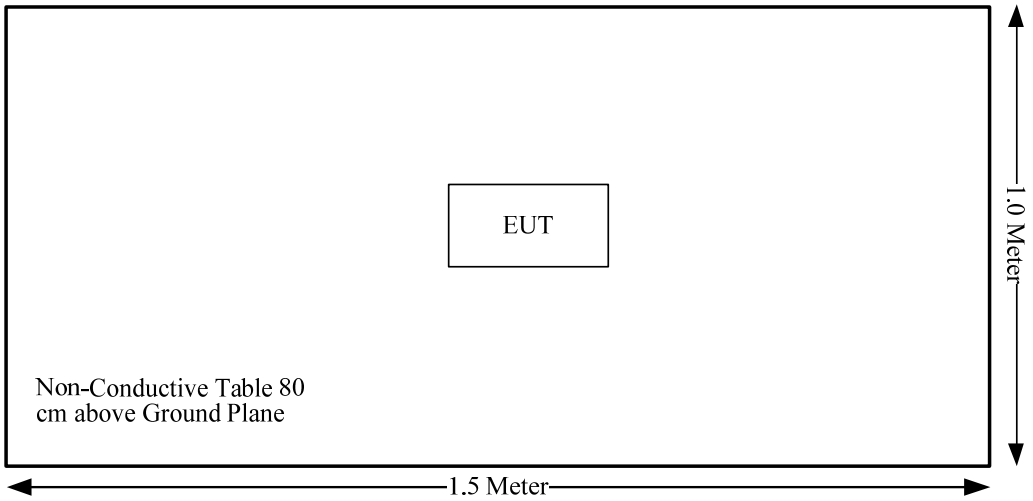
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Adapter 1 DC cable	yes	No	1.98	Adapter	Battery& Remote
Adapter 2 DC cable	yes	No	1.98	Adapter	Battery& Remote
USB Cable	Yes	No	1.0	Adapter	iPhone

Block Diagram of Test Setup

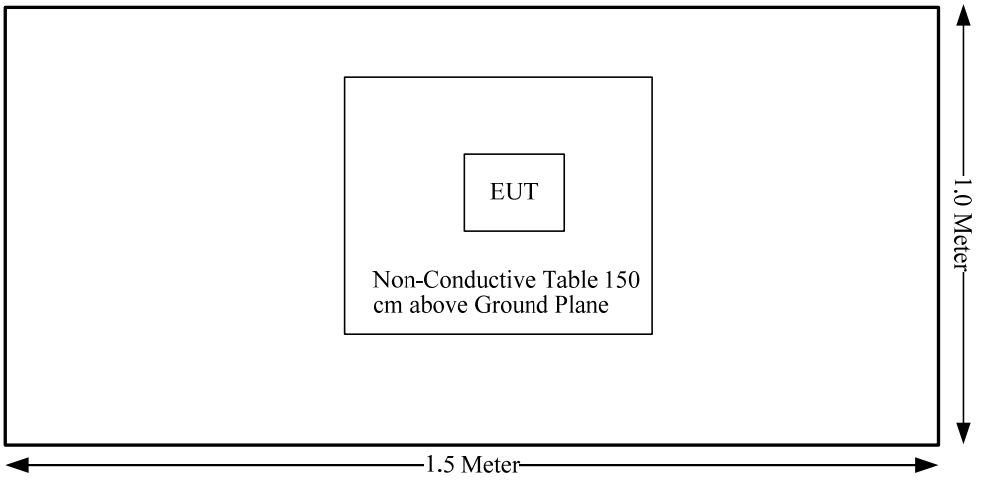
AC Line Conducted Test：



Radiation test below 1GHz:



Radiation test above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.407 (f) & §1.1310 & §2.1091	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1),(2),(3),(4)	Out Of Band Emissions	Compliance
§15.407(a) (1)	26 dB Bandwidth	Compliance
§15.407(a)(1),	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(5)	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/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

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

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

Calculated Formulary:

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

Calculated Data:

Frequency (MHz)	**Antenna Gain**		**Maximum Tune-up Power including Tolerance**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
	(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
5180-5240	5.05	3.20	16	39.81	20.00	0.0253	1.0
5745-5825	5.05	3.20	16	39.81	20.00	0.0253	1.0

Note: The Maximum Power Including Tolerance was declared by manufacturer. 1.4/10/20MHz modes can`t transmission simultaneously with Wi-Fi.

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 use of a standard antenna jack or electrical connector is prohibited.
And according to FCC 47 CFR section 15.407 (a)(1),if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has 2 internal antennas arrangement, and the antennas gain are 3.93dBi@2.4GHz, 5.05dBi@5GHz, fulfill the requirement of the item. Please refer to the internal photos.

Result: Compliance.

§15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

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.

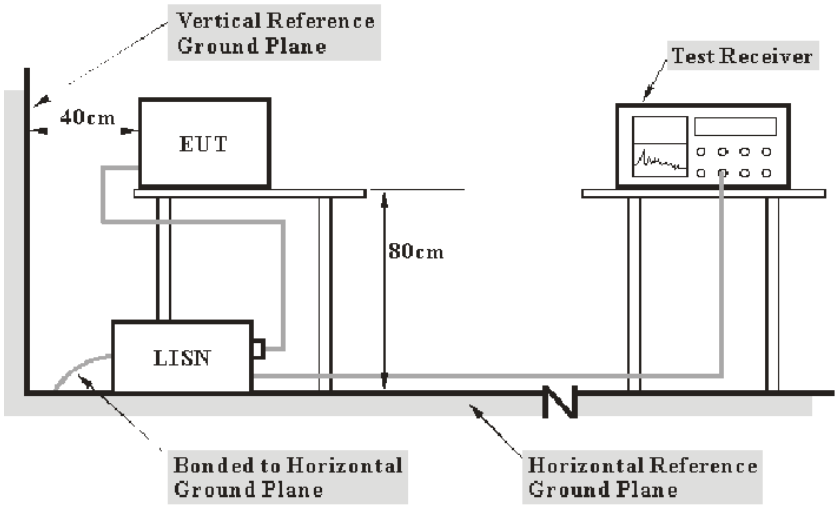
If U_{lab} is greater than U_{cispr} of Table 1, then:
- compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
- non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), 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. (Dongguan) is 3.12 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.

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

EMI Test Receiver Setup

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

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

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

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:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2015-12-10	2016-12-09
R&S	L.I.S.N	ESH2-Z5	892107/021	2016-07-16	2017-07-15
R&S	Two-line V-network	ENV 216	3560.6550.12	2015-11-26	2016-11-25
N/A	Coaxial Cable	1.8m	N/A	2016-05-06	2017-05-06
R&S	Test Software	EMC32	Version8.53.0	N/A	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

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

Environmental Conditions

Temperature:	29 °C
Relative Humidity:	55 %
ATM Pressure:	100 kPa

The testing was performed by Emilly Wang on 2016-08-10.

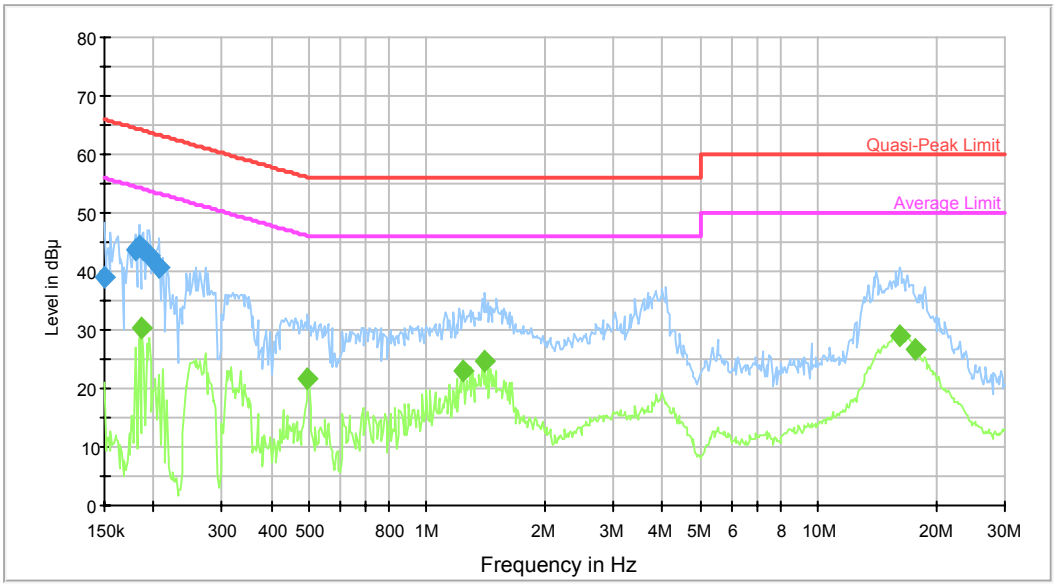
Test Mode: Transmitting,

Test Result: Compliance, please refer to the below data and plots.

Test Mode: Charging

Adapter #1&Battery 1

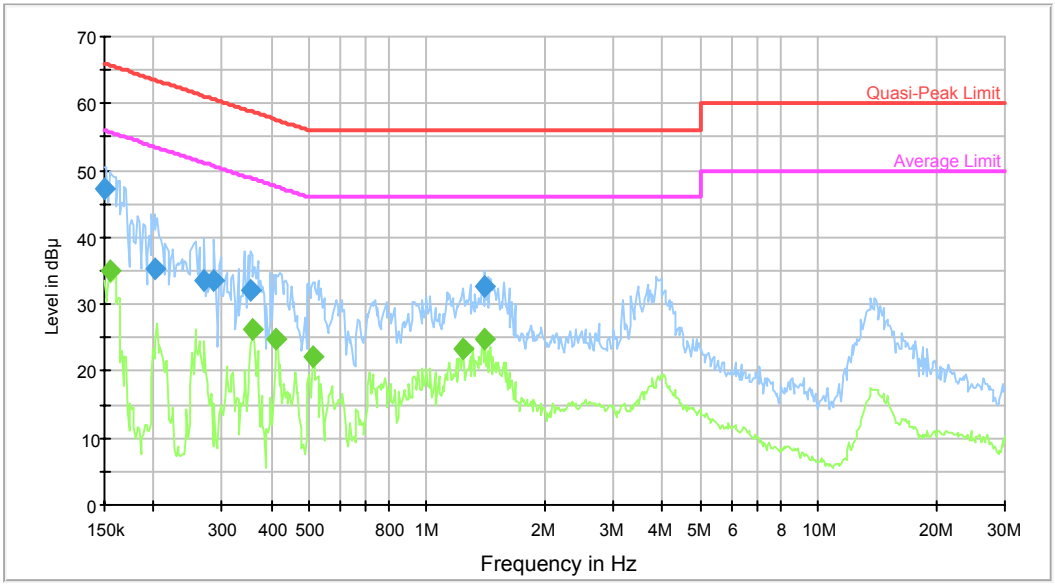
AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	39.0	9.000	L1	10.2	27.0	66.0	Compliance
0.180171	43.6	9.000	L1	10.2	20.9	64.5	Compliance
0.184529	44.3	9.000	L1	10.2	20.0	64.3	Compliance
0.188994	43.5	9.000	L1	10.2	20.6	64.1	Compliance
0.195114	42.8	9.000	L1	10.2	21.0	63.8	Compliance
0.207957	40.8	9.000	L1	10.2	22.5	63.3	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)	Comment
0.187494	30.3	9.000	L1	10.2	23.8	54.1	Compliance
0.495646	21.8	9.000	L1	10.1	24.3	46.1	Compliance
1.239175	23.2	9.000	L1	10.4	22.8	46.0	Compliance
1.407671	24.5	9.000	L1	10.4	21.5	46.0	Compliance
16.122185	29.0	9.000	L1	10.7	21.0	50.0	Compliance
17.739864	26.7	9.000	L1	10.8	23.3	50.0	Compliance

AC120V, 60Hz, Neutral:

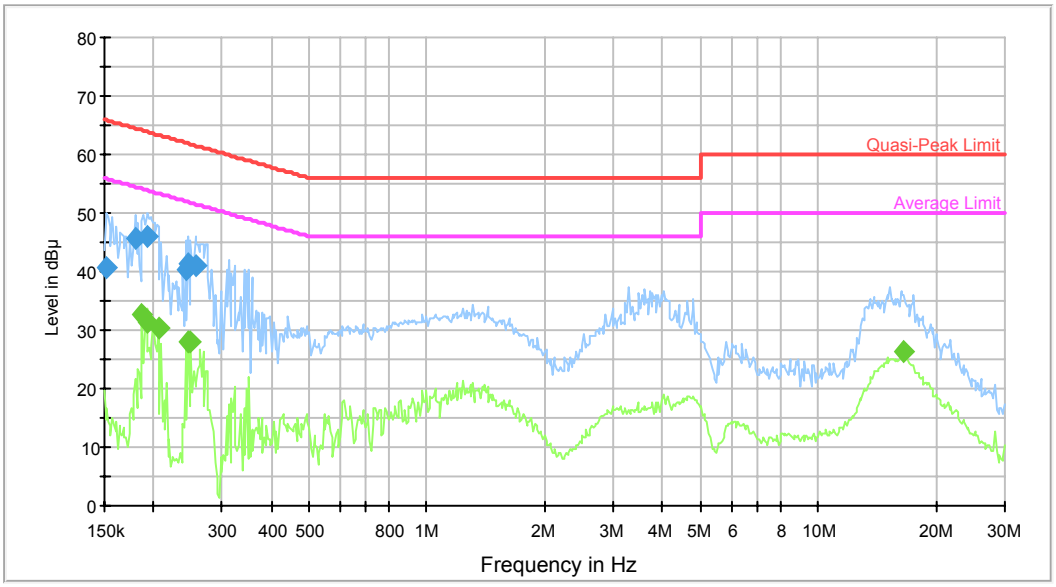


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	47.2	9.000	N	10.2	18.8	66.0	Compliance
0.201433	35.2	9.000	N	10.2	28.4	63.6	Compliance
0.270502	33.6	9.000	N	10.2	27.5	61.1	Compliance
0.286019	33.4	9.000	N	10.2	27.2	60.6	Compliance
0.354674	32.0	9.000	N	10.3	26.9	58.9	Compliance
1.407671	32.6	9.000	N	10.4	23.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.154858	35.0	9.000	N	10.2	20.7	55.7	Compliance
0.360371	26.3	9.000	N	10.3	22.4	48.7	Compliance
0.412647	24.8	9.000	N	10.2	22.8	47.6	Compliance
0.511698	22.1	9.000	N	10.1	23.9	46.0	Compliance
1.239175	23.2	9.000	N	10.4	22.8	46.0	Compliance
1.407671	24.7	9.000	N	10.4	21.3	46.0	Compliance

Adapter #1&Battery 2

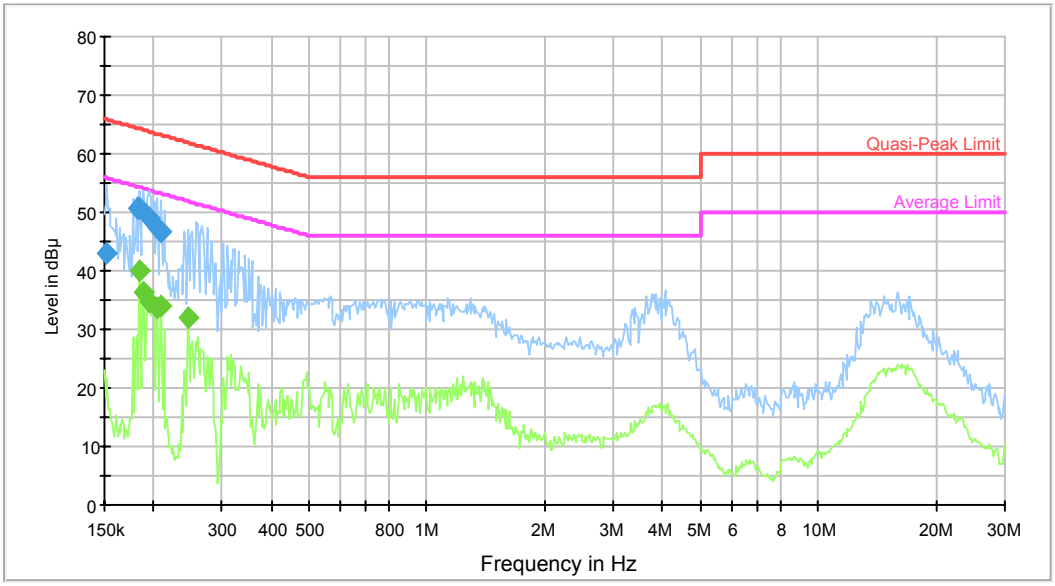
AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	40.7	9.000	L1	10.2	25.2	65.9	Compliance
0.180171	45.6	9.000	L1	10.2	18.9	64.5	Compliance
0.193566	45.9	9.000	L1	10.2	18.0	63.9	Compliance
0.241949	40.4	9.000	L1	10.2	21.6	62.0	Compliance
0.245835	41.3	9.000	L1	10.2	20.6	61.9	Compliance
0.255827	40.9	9.000	L1	10.2	20.7	61.6	Compliance

Frequency (MHz)	Average ((dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.187494	32.7	9.000	L1	10.2	21.4	54.1	Compliance
0.192030	31.3	9.000	L1	10.2	22.6	53.9	Compliance
0.206306	30.4	9.000	L1	10.2	23.0	53.4	Compliance
0.245835	28.1	9.000	L1	10.2	23.8	51.9	Compliance
0.249785	27.9	9.000	L1	10.2	23.9	51.8	Compliance
16.512221	26.2	9.000	L1	10.7	23.8	50.0	Compliance

AC120V, 60Hz, Neutral:

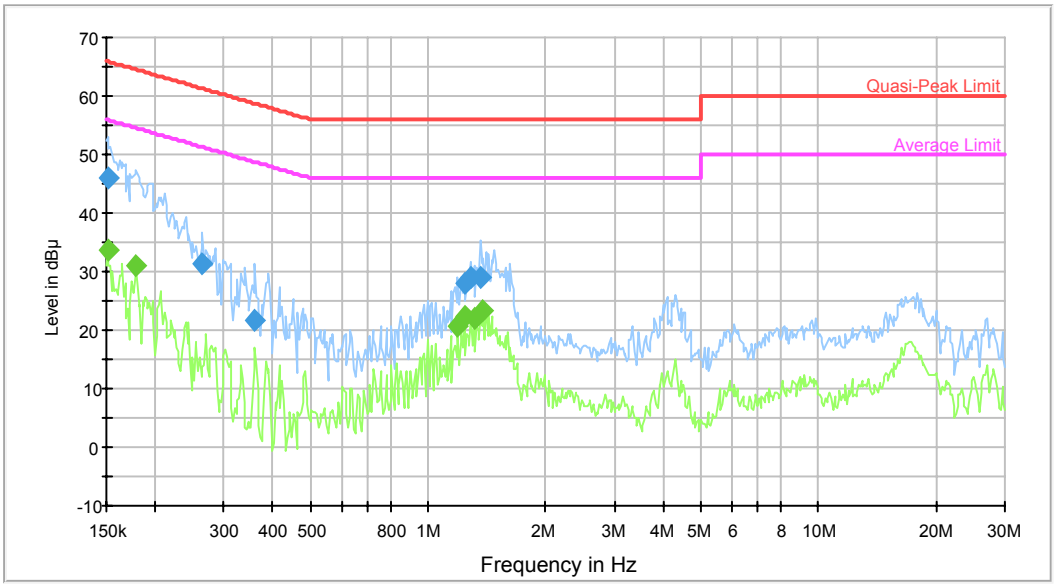


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	43.0	9.000	N	10.2	22.9	65.9	Compliance
0.181612	50.6	9.000	N	10.1	13.8	64.4	Compliance
0.184529	50.6	9.000	N	10.1	13.7	64.3	Compliance
0.195114	49.0	9.000	N	10.2	14.8	63.8	Compliance
0.204669	47.4	9.000	N	10.2	16.0	63.4	Compliance
0.209621	46.6	9.000	N	10.2	16.6	63.2	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.184529	39.8	9.000	N	10.1	14.5	54.3	Compliance
0.188994	36.2	9.000	N	10.2	17.9	54.1	Compliance
0.195114	34.7	9.000	N	10.2	19.1	53.8	Compliance
0.204669	33.5	9.000	N	10.2	19.9	53.4	Compliance
0.209621	34.0	9.000	N	10.2	19.2	53.2	Compliance
0.245835	31.9	9.000	N	10.2	20.0	51.9	Compliance

Adapter #2&Battery 1

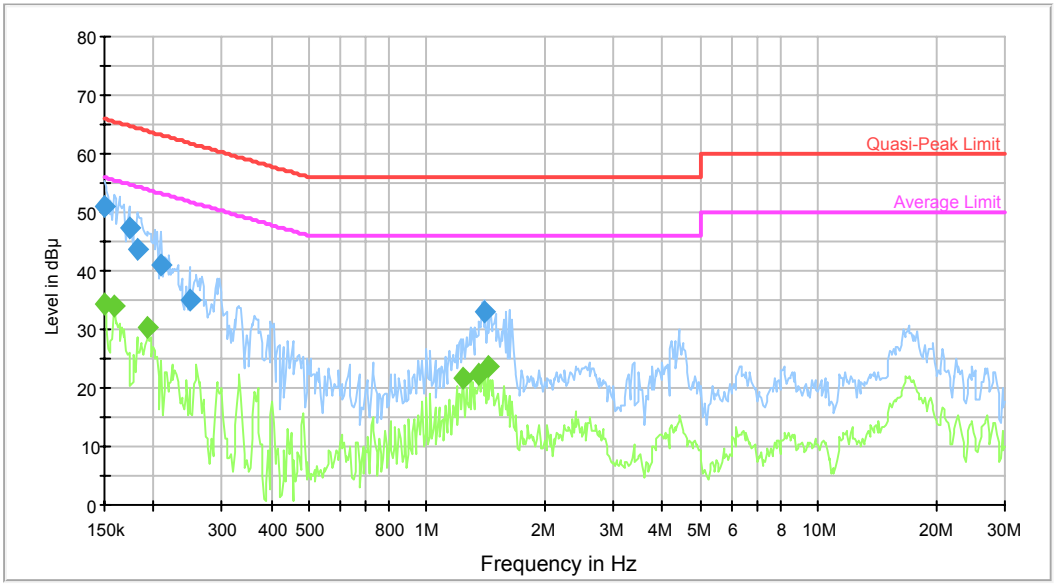
AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.151200	46.0	9.000	L1	10.2	19.9	65.9	Compliance
0.264113	31.5	9.000	L1	10.2	29.8	61.3	Compliance
0.360371	21.8	9.000	L1	10.3	36.9	58.7	Compliance
1.239175	27.9	9.000	L1	10.4	28.1	56.0	Compliance
1.289541	29.0	9.000	L1	10.4	27.0	56.0	Compliance
1.363512	29.1	9.000	L1	10.4	26.9	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.151200	33.8	9.000	L1	10.2	22.1	55.9	Compliance
0.178741	30.8	9.000	L1	10.1	23.7	54.5	Compliance
1.190776	20.7	9.000	L1	10.4	25.3	46.0	Compliance
1.239175	22.5	9.000	L1	10.4	23.5	46.0	Compliance
1.310256	21.9	9.000	L1	10.4	24.1	46.0	Compliance
1.385415	23.3	9.000	L1	10.4	22.7	46.0	Compliance

AC120V, 60Hz, Neutral:

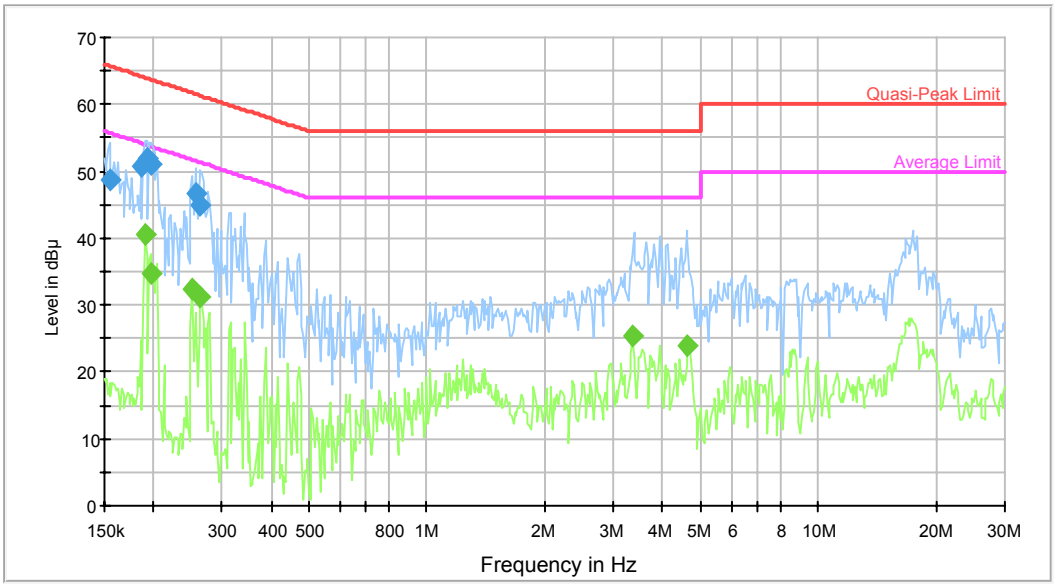


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	51.0	9.000	N	10.2	15.0	66.0	Compliance
0.173134	47.2	9.000	N	10.1	17.6	64.8	Compliance
0.181612	43.5	9.000	N	10.1	20.9	64.4	Compliance
0.209621	40.9	9.000	N	10.2	22.3	63.2	Compliance
0.247802	35.0	9.000	N	10.2	26.8	61.8	Compliance
1.407671	32.9	9.000	N	10.4	23.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.150000	34.4	9.000	N	10.2	21.6	56.0	Compliance
0.158604	34.0	9.000	N	10.1	21.5	55.5	Compliance
0.193566	30.5	9.000	N	10.2	23.4	53.9	Compliance
1.239175	21.8	9.000	N	10.4	24.2	46.0	Compliance
1.363512	22.2	9.000	N	10.4	23.8	46.0	Compliance
1.430284	23.6	9.000	N	10.4	22.4	46.0	Compliance

Adapter #2&Battery 2

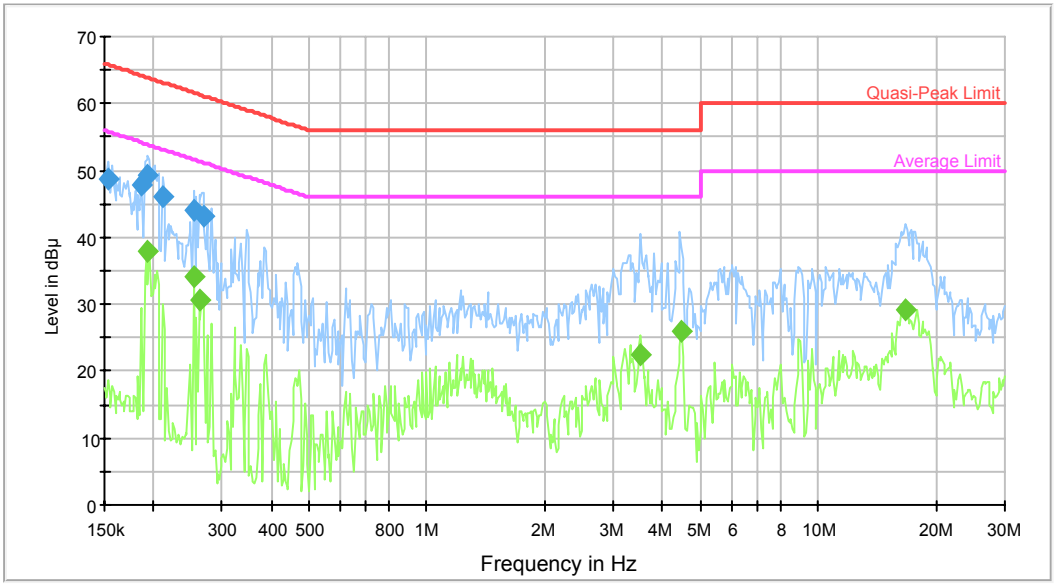
AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.154858	48.6	9.000	L1	10.2	17.1	65.7	Compliance
0.186006	50.8	9.000	L1	10.2	13.4	64.2	Compliance
0.192030	52.0	9.000	L1	10.2	12.0	64.0	Compliance
0.196675	51.0	9.000	L1	10.2	12.7	63.7	Compliance
0.255827	46.8	9.000	L1	10.2	14.8	61.6	Compliance
0.264113	44.9	9.000	L1	10.2	16.4	61.3	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.190505	40.6	9.000	L1	10.2	13.4	54.0	Compliance
0.196675	34.7	9.000	L1	10.2	19.0	53.7	Compliance
0.251783	32.5	9.000	L1	10.2	19.2	51.7	Compliance
0.264113	31.3	9.000	L1	10.2	20.0	51.3	Compliance
3.355051	25.3	9.000	L1	10.6	20.7	46.0	Compliance
4.651370	23.9	9.000	L1	10.7	22.1	46.0	Compliance

AC120V, 60Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.153629	48.6	9.000	N	10.2	17.2	65.8	Compliance
0.186006	47.8	9.000	N	10.2	16.4	64.2	Compliance
0.193566	49.4	9.000	N	10.2	14.5	63.9	Compliance
0.211298	46.0	9.000	N	10.2	17.2	63.2	Compliance
0.253797	43.9	9.000	N	10.2	17.7	61.6	Compliance
0.268355	43.3	9.000	N	10.2	17.9	61.2	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.192030	37.8	9.000	N	10.2	16.1	53.9	Compliance
0.253797	34.2	9.000	N	10.2	17.4	51.6	Compliance
0.262017	30.6	9.000	N	10.2	20.8	51.4	Compliance
3.519348	22.6	9.000	N	10.6	23.4	46.0	Compliance
4.469698	26.0	9.000	N	10.7	20.0	46.0	Compliance
16.777473	29.0	9.000	N	10.7	21.0	50.0	Compliance

FCC §15.209, §15.205 & §15.407(b) (1) (6) (7) –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.

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.

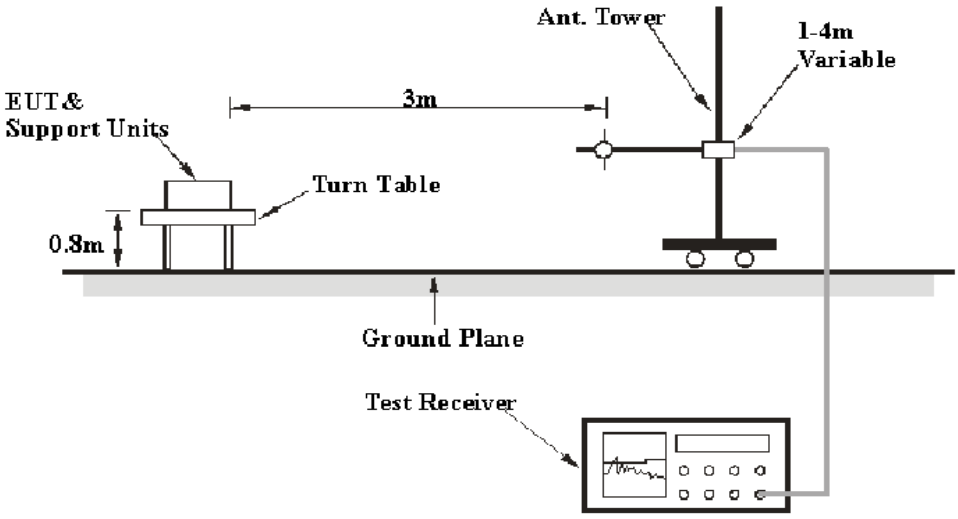
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB.

Table 1 – Values of U_{cispr}

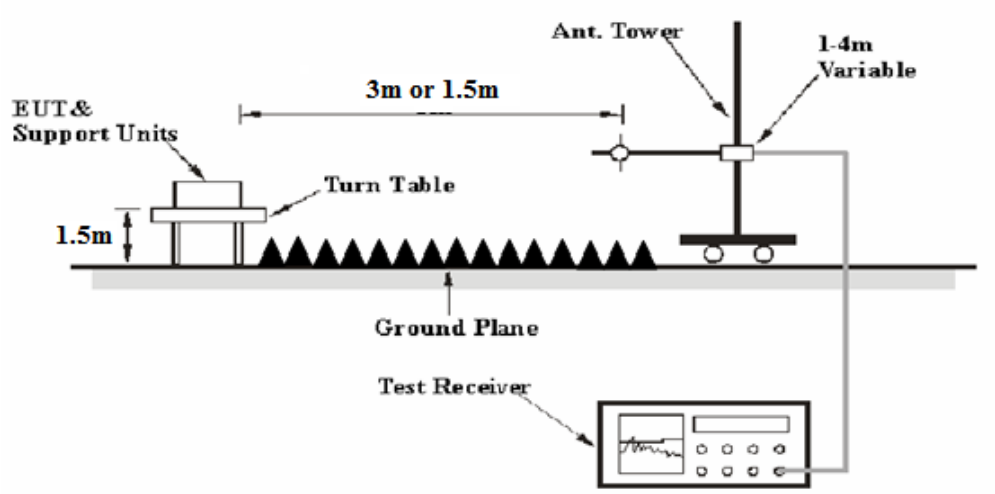
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters chamber, 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:

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

Test Procedure

During the radiated emission test, the adapter was connected to the 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.

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r02, 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
Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB
Extrapolation result = Corrected Amplitude (dBμV/m) - 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:

Corrected Amplitude = Meter Reading + Antenna Loss + 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 –Extrapolation result

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2016-08-03	2017-08-02
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2015-09-01	2016-09-01
Agilent	Spectrum Analyzer	E4440A	SG43360054	2015-11-23	2016-11-22
N/A	Coaxial Cable	14m	N/A	2016-05-06	2017-05-06
N/A	Coaxial Cable	8m	N/A	2016-05-06	2017-05-06
Sinoscite	Bandstop Filters	BSF5150-5850MN-0899-003	N/A	2016-05-06	2017-05-06
ETS-Lindgren	Horn Antenna	3115	9808-5557	2015-09-06	2018-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2016-02-19	2017-02-19
Agilent	Spectrum Analyzer	8564E	3943A01781	2016-05-08	2017-05-08
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2015-09-06	2016-09-06

*** 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

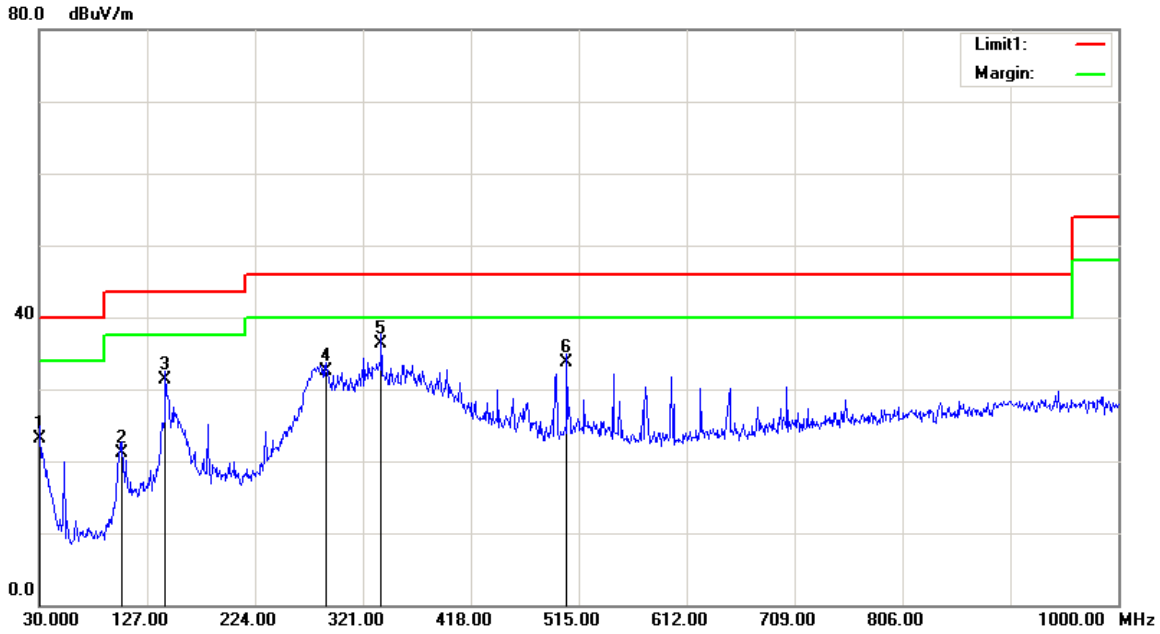
Temperature:	26.8 °C
Relative Humidity:	65 %
ATM Pressure:	100 kPa

The testing was performed by Emily Wang on 2016-08-10.

Test Mode: Transmitting

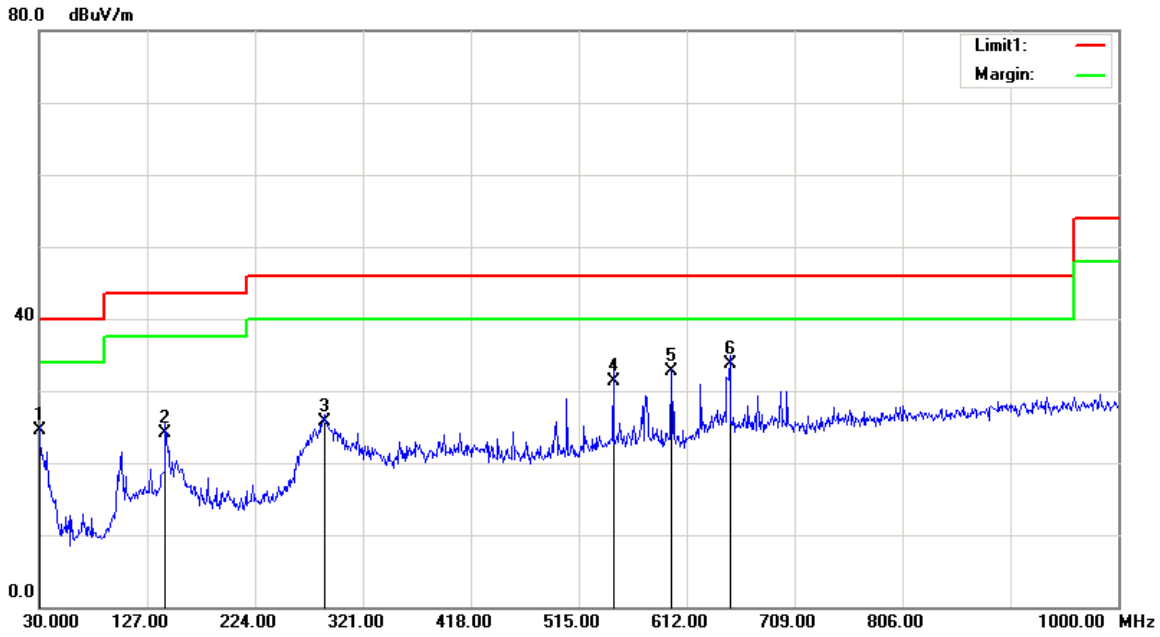
1) Below 1GHz

Horizontal:



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	22.15	QP	0.95	23.10	40.00	16.90
103.7200	29.80	QP	-8.60	21.20	43.50	22.30
143.4900	38.32	QP	-6.92	31.40	43.50	12.10
288.0200	38.40	QP	-5.90	32.50	46.00	13.50
337.4900	41.54	QP	-5.14	36.40	46.00	9.60
504.3300	35.07	QP	-1.37	33.70	46.00	12.30

Vertical:



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	23.65	QP	0.95	24.60	40.00	15.40
143.4900	31.02	QP	-6.92	24.10	43.50	19.40
287.0500	31.71	QP	-5.91	25.80	46.00	20.20
546.0400	32.52	QP	-1.22	31.30	46.00	14.70
598.4200	33.39	QP	-0.69	32.70	46.00	13.30
650.8000	33.40	QP	0.40	33.80	46.00	12.20

2) 1GHz-40GHz(Test performed at 1.5m distance EUT to antenna)

5150MHz-5250MHz:

802.11a mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5180 MHz										
5180	66.12	PK	H	31.46	5.40	0.00	102.98	96.98	N/A	N/A
5180	55.96	AV	H	31.46	5.40	0.00	92.82	86.82	N/A	N/A
5180	75.76	PK	V	31.46	5.40	0.00	112.62	106.62	N/A	N/A
5180	65.22	AV	V	31.46	5.40	0.00	102.08	96.08	N/A	N/A
5150	33.94	PK	V	31.40	5.26	0.00	70.60	64.60	74.00	9.40
5150	17.50	AV	V	31.40	5.26	0.00	54.16	48.16	54.00	5.84
10360	44.63	PK	V	36.97	8.36	25.52	64.44	58.44	74.00	15.56
10360	32.70	AV	V	36.97	8.36	25.52	52.51	46.51	54.00	7.49
15540	34.61	PK	V	37.43	14.94	24.98	62.00	56.00	74.00	18.00
15540	22.14	AV	V	37.43	14.94	24.98	49.53	43.53	54.00	10.47
6903	35.28	PK	V	33.35	6.33	26.45	48.51	42.51	74.00	31.49
6903	22.95	AV	V	33.35	6.33	26.45	36.18	30.18	54.00	23.82
4936	35.47	PK	V	30.93	5.35	27.43	44.32	38.32	74.00	35.68
4936	22.61	AV	V	30.93	5.35	27.43	31.46	25.46	54.00	28.54
	Middle Channel:5200 MHz									
5200	70.26	PK	H	31.50	5.49	0.00	107.25	101.25	N/A	N/A
5200	60.06	AV	H	31.50	5.49	0.00	97.05	91.05	N/A	N/A
5200	79.42	PK	V	31.50	5.49	0.00	116.41	110.41	N/A	N/A
5200	68.71	AV	V	31.50	5.49	0.00	105.70	99.70	N/A	N/A
5150	33.68	PK	V	31.40	5.26	0.00	70.34	64.34	74.00	9.66
5150	18.44	AV	V	31.40	5.26	0.00	55.10	49.10	54.00	4.90
10400	48.57	PK	V	36.98	8.32	25.50	68.37	62.37	74.00	11.63
10400	37.56	AV	V	36.98	8.32	25.50	57.36	51.36	54.00	2.64
15600	34.53	PK	V	37.32	14.69	24.69	61.85	55.85	74.00	18.15
15600	23.79	AV	V	37.32	14.69	24.69	51.11	45.11	54.00	8.89
6933	35.63	PK	V	33.43	6.34	26.38	49.02	43.02	74.00	30.98
6933	23.28	AV	V	33.43	6.34	26.38	36.67	30.67	54.00	23.33
4521	35.81	PK	V	29.85	5.02	27.16	43.52	37.52	74.00	36.48
4521	23.00	AV	V	29.85	5.02	27.16	30.71	24.71	54.00	29.29
	High Channel:5240 MHz									
5240	65.88	PK	H	31.58	5.28	0.00	102.74	96.74	N/A	N/A
5240	55.71	AV	H	31.58	5.28	0.00	92.57	86.57	N/A	N/A
5240	75.11	PK	V	31.58	5.28	0.00	111.97	105.97	N/A	N/A
5240	64.79	AV	V	31.58	5.28	0.00	101.65	95.65	N/A	N/A
5350	26.12	PK	V	31.80	5.61	0.00	63.53	57.53	74.00	16.47
5350	14.86	AV	V	31.80	5.61	0.00	52.27	46.27	54.00	7.73
10480	44.51	PK	V	37.00	8.23	26.01	63.73	57.73	74.00	16.27
10480	32.58	AV	V	37.00	8.23	26.01	51.80	45.80	54.00	8.20
15720	34.47	PK	V	37.10	14.20	24.92	60.85	54.85	74.00	19.15
15720	21.97	AV	V	37.10	14.20	24.92	48.35	42.35	54.00	11.65
6984	35.11	PK	V	33.56	6.36	26.27	48.76	42.76	74.00	31.24
6984	22.84	AV	V	33.56	6.36	26.27	36.49	30.49	54.00	23.51
4201	35.29	PK	V	29.86	4.98	27.07	43.06	37.06	74.00	36.94
4201	22.47	AV	V	29.86	4.98	27.07	30.24	24.24	54.00	29.76

802.11n ht20 mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5180 MHz										
5180	64.00	PK	H	31.46	5.40	0.00	100.86	94.86	N/A	N/A
5180	53.11	AV	H	31.46	5.40	0.00	89.97	83.97	N/A	N/A
5180	73.53	PK	V	31.46	5.40	0.00	110.39	104.39	N/A	N/A
5180	62.37	AV	V	31.46	5.40	0.00	99.23	93.23	N/A	N/A
5150	29.15	PK	V	31.40	5.26	0.00	65.81	59.81	74.00	14.19
5150	15.52	AV	V	31.40	5.26	0.00	52.18	46.18	54.00	7.82
10360	41.73	PK	V	36.97	8.36	25.52	61.54	55.54	74.00	18.46
10360	28.27	AV	V	36.97	8.36	25.52	48.08	42.08	54.00	11.92
15540	34.12	PK	V	37.43	14.94	24.98	61.51	55.51	74.00	18.49
15540	21.58	AV	V	37.43	14.94	24.98	48.97	42.97	54.00	11.03
6873	34.34	PK	V	33.27	6.31	26.51	47.41	41.41	74.00	32.59
6873	21.47	AV	V	33.27	6.31	26.51	34.54	28.54	54.00	25.46
4803	34.85	PK	V	30.59	5.06	27.41	43.09	37.09	74.00	36.91
4936	22.39	AV	V	30.93	5.35	27.43	31.24	25.24	54.00	28.76
Middle Channel:5200 MHz										
5200	69.59	PK	H	31.50	5.49	0.00	106.58	100.58	N/A	N/A
5200	59.36	AV	H	31.50	5.49	0.00	96.35	90.35	N/A	N/A
5200	79.24	PK	V	31.50	5.49	0.00	116.23	110.23	N/A	N/A
5200	68.50	AV	V	31.50	5.49	0.00	105.49	99.49	N/A	N/A
5150	33.69	PK	V	31.40	5.26	0.00	70.35	64.35	74.00	9.65
5150	17.48	AV	V	31.40	5.26	0.00	54.14	48.14	54.00	5.86
10400	49.05	PK	V	36.98	8.32	25.50	68.85	62.85	74.00	11.15
10400	37.06	AV	V	36.98	8.32	25.50	56.86	50.86	54.00	3.14
15600	34.50	PK	V	37.32	14.69	24.69	61.82	55.82	74.00	18.18
15600	21.91	AV	V	37.32	14.69	24.69	49.23	43.23	54.00	10.77
6957	34.70	PK	V	33.49	6.35	26.33	48.21	42.21	74.00	31.79
6957	21.82	AV	V	33.49	6.35	26.33	35.33	29.33	54.00	24.67
4109	35.22	PK	V	29.88	4.95	27.13	42.92	36.92	74.00	37.08
4109	22.77	AV	V	29.88	4.95	27.13	30.47	24.47	54.00	29.53
High Channel:5240 MHz										
5240	64.12	PK	H	31.58	5.28	0.00	100.98	94.98	N/A	N/A
5240	53.76	AV	H	31.58	5.28	0.00	90.62	84.62	N/A	N/A
5240	73.94	PK	V	31.58	5.28	0.00	110.80	104.80	N/A	N/A
5240	62.94	AV	V	31.58	5.28	0.00	99.80	93.80	N/A	N/A
5350	26.41	PK	V	31.80	5.61	0.00	63.82	57.82	74.00	16.18
5350	14.85	AV	V	31.80	5.61	0.00	52.26	46.26	54.00	7.74
10480	41.58	PK	V	37.00	8.23	26.01	60.80	54.80	74.00	19.20
10480	28.14	AV	V	37.00	8.23	26.01	47.36	41.36	54.00	12.64
15720	33.97	PK	V	37.10	14.20	24.92	60.35	54.35	74.00	19.65
15720	21.45	AV	V	37.10	14.20	24.92	47.83	41.83	54.00	12.17
6584	34.23	PK	V	32.52	6.18	26.57	46.36	40.36	74.00	33.64
6584	21.30	AV	V	32.52	6.18	26.57	33.43	27.43	54.00	26.57
4235	34.68	PK	V	29.85	5.09	27.04	42.58	36.58	74.00	37.42
4235	22.28	AV	V	29.85	5.09	27.04	30.18	24.18	54.00	29.82

5725MHz-5850MHz:

802.11a mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5745 MHz										
5745	69.78	PK	H	32.15	5.53	0.00	107.46	101.46	N/A	N/A
5745	59.38	AV	H	32.15	5.53	0.00	97.06	91.06	N/A	N/A
5745	77.63	PK	V	32.15	5.53	0.00	115.31	109.31	N/A	N/A
5745	67.22	AV	V	32.15	5.53	0.00	104.90	98.90	N/A	N/A
5725	43.95	PK	V	32.15	5.60	0.00	81.70	75.70	122.20	46.50
5720	39.02	PK	V	32.14	5.61	0.00	76.77	70.77	110.80	40.03
5700	31.33	PK	V	32.14	5.68	0.00	69.15	63.15	105.20	42.05
5650	27.09	PK	V	32.13	5.28	0.00	64.50	58.50	68.20	9.70
11490	34.69	PK	V	37.89	8.94	26.14	55.38	49.38	74.00	24.62
11490	24.11	AV	V	37.89	8.94	26.14	44.80	38.80	54.00	15.20
17235	35.84	PK	V	40.91	13.69	25.63	64.81	58.81	74.00	15.19
17235	24.55	AV	V	40.91	13.69	25.63	53.52	47.52	54.00	6.48
4658	34.61	PK	V	30.21	4.83	27.35	42.30	36.30	74.00	37.70
4658	21.99	AV	V	30.21	4.83	27.35	29.68	23.68	54.00	30.32
6529	33.66	PK	V	32.38	6.15	26.53	45.66	39.66	74.00	34.34
6529	22.82	AV	V	32.38	6.15	26.53	34.82	28.82	54.00	25.18
Middle Channel:5785 MHz										
5785	69.79	PK	H	32.16	5.47	0.00	107.42	101.42	N/A	N/A
5785	59.03	AV	H	32.16	5.47	0.00	96.66	90.66	N/A	N/A
5785	77.92	PK	V	32.16	5.47	0.00	115.55	109.55	N/A	N/A
5785	67.84	AV	V	32.16	5.47	0.00	105.47	99.47	N/A	N/A
11570	34.71	PK	V	37.90	8.92	26.07	55.46	49.46	74.00	24.54
11570	24.16	AV	V	37.90	8.92	26.07	44.91	38.91	54.00	15.09
17355	35.86	PK	V	41.63	12.99	25.63	64.85	58.85	74.00	15.15
17355	24.57	AV	V	41.63	12.99	25.63	53.56	47.56	54.00	6.44
4623	34.67	PK	V	30.12	5.25	27.34	42.70	36.70	74.00	37.30
4623	22.03	AV	V	30.12	5.25	27.34	30.06	24.06	54.00	29.94
6358	33.68	PK	V	32.27	6.06	26.50	45.51	39.51	74.00	34.49
6358	22.92	AV	V	32.27	6.06	26.50	34.75	28.75	54.00	25.25
High Channel:5825 MHz										
5825	70.81	PK	H	32.17	5.75	0.00	108.73	102.73	N/A	N/A
5825	59.03	AV	H	32.17	5.75	0.00	96.95	90.95	N/A	N/A
5825	79.93	PK	V	32.17	5.75	0.00	117.85	111.85	N/A	N/A
5825	68.67	AV	V	32.17	5.75	0.00	106.59	100.59	N/A	N/A
5850	43.26	PK	V	32.17	6.05	0.00	81.48	75.48	122.20	46.72
5855	37.29	PK	V	32.17	6.03	0.00	75.49	69.49	110.80	41.31
5875	28.31	PK	V	32.18	5.97	0.00	66.46	60.46	105.20	44.74
5925	25.83	PK	V	32.19	5.96	0.00	63.98	57.98	68.20	10.22
11650	34.77	PK	V	37.90	8.90	25.75	55.82	49.82	74.00	24.18
11650	24.18	AV	V	37.90	8.90	25.75	45.23	39.23	54.00	14.77
17475	35.94	PK	V	42.35	12.30	25.39	65.20	59.20	74.00	14.80
17475	24.61	AV	V	42.35	12.30	25.39	53.87	47.87	54.00	6.13
4867	34.74	PK	V	30.75	5.09	27.42	43.16	37.16	74.00	36.84
4867	22.08	AV	V	30.75	5.09	27.42	30.50	24.50	54.00	29.50
6050	33.75	PK	V	32.21	5.90	27.01	44.85	38.85	74.00	35.15
6050	22.97	AV	V	32.21	5.90	27.01	34.07	28.07	54.00	25.93

802.11n ht20 mode:

Frequency	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Extrapolation result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
(MHz)	Reading (dBμV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5745 MHz										
5745	69.91	PK	H	32.15	5.53	0.00	107.59	101.59	N/A	N/A
5745	59.22	AV	H	32.15	5.53	0.00	96.90	90.90	N/A	N/A
5745	77.42	PK	V	32.15	5.53	0.00	115.10	109.10	N/A	N/A
5745	66.75	AV	V	32.15	5.53	0.00	104.43	98.43	N/A	N/A
5725	44.21	PK	V	32.15	5.60	0.00	81.96	75.96	122.20	46.24
5720	36.39	PK	V	32.14	5.61	0.00	74.14	68.14	110.80	42.66
5700	35.27	PK	V	32.14	5.68	0.00	73.09	67.09	105.20	38.11
5650	27.54	PK	V	32.13	5.28	0.00	64.95	58.95	68.20	9.25
11490	35.21	PK	V	37.89	8.94	26.14	55.90	49.90	74.00	24.10
11490	24.82	AV	V	37.89	8.94	26.14	45.51	39.51	54.00	14.49
17235	34.72	PK	V	40.91	13.69	25.63	63.69	57.69	74.00	16.31
17235	23.38	AV	V	40.91	13.69	25.63	52.35	46.35	54.00	7.65
4867	36.24	PK	V	30.75	5.09	27.42	44.66	38.66	74.00	35.34
4867	24.24	AV	V	30.75	5.09	27.42	32.66	26.66	54.00	27.34
6187	33.78	PK	V	32.24	5.97	26.78	45.21	39.21	74.00	34.79
6187	21.08	AV	V	32.24	5.97	26.78	32.51	26.51	54.00	27.49
Middle Channel:5785 MHz										
5785	69.68	PK	H	32.16	5.47	0.00	107.31	101.31	N/A	N/A
5785	58.18	AV	H	32.16	5.47	0.00	95.81	89.81	N/A	N/A
5785	78.21	PK	V	32.16	5.47	0.00	115.84	109.84	N/A	N/A
5785	67.36	AV	V	32.16	5.47	0.00	104.99	98.99	N/A	N/A
11570	35.26	PK	V	37.90	8.92	26.07	56.01	50.01	74.00	23.99
11570	24.89	AV	V	37.90	8.92	26.07	45.64	39.64	54.00	14.36
17355	34.76	PK	V	41.63	12.99	25.63	63.75	57.75	74.00	16.25
17355	23.41	AV	V	41.63	12.99	25.63	52.40	46.40	54.00	7.60
4792	36.28	PK	V	30.56	5.14	27.41	44.57	38.57	74.00	35.43
4792	24.32	AV	V	30.56	5.14	27.41	32.61	26.61	54.00	27.39
6292	33.85	PK	V	32.26	6.03	26.61	45.53	39.53	74.00	34.47
6292	21.09	AV	V	32.26	6.03	26.61	32.77	26.77	54.00	27.23
High Channel:5825 MHz										
5825	69.80	PK	H	32.17	5.75	0.00	107.72	101.72	N/A	N/A
5825	58.69	AV	H	32.17	5.75	0.00	96.61	90.61	N/A	N/A
5825	79.71	PK	V	32.17	5.75	0.00	117.63	111.63	N/A	N/A
5825	68.53	AV	V	32.17	5.75	0.00	106.45	100.45	N/A	N/A
5850	43.02	PK	V	32.17	6.05	0.00	81.24	75.24	122.20	46.96
5855	36.25	PK	V	32.17	6.03	0.00	74.45	68.45	110.80	42.35
5875	30.59	PK	V	32.18	5.97	0.00	68.74	62.74	105.20	42.46
5925	27.31	PK	V	32.19	5.96	0.00	65.46	59.46	68.20	8.74
11650	35.52	PK	V	37.90	8.90	25.75	56.57	50.57	74.00	23.43
11650	25.11	AV	V	37.90	8.90	25.75	46.16	40.16	54.00	13.84
17475	35.01	PK	V	42.35	12.30	25.39	64.27	58.27	74.00	15.73
17475	23.70	AV	V	42.35	12.30	25.39	52.96	46.96	54.00	7.04
4867	36.52	PK	V	30.75	5.09	27.42	44.94	38.94	74.00	35.06
4867	24.56	AV	V	30.75	5.09	27.42	32.98	26.98	54.00	27.02
6187	34.11	PK	V	32.24	5.97	26.78	45.54	39.54	74.00	34.46
6187	21.36	AV	V	32.24	5.97	26.78	32.79	26.79	54.00	27.21

FCC §15.407(a) –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
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
R&S	Test Receiver	ESPI	100120	2015-12-10	2016-12-09
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

*** 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 v01r02

Test Data

Environmental Conditions

Temperature:	30.2 °C
Relative Humidity:	48 %
ATM Pressure:	99.7 kPa

The testing was performed by Emily Wang on 2016-09-23.

Test Result: Pass.

Please refer to the following tables and plots.

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

5150-5250MHz:

Mode	Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	Result
802.11a	Low	5180	19.9	PASS
	Middle	5200	19.9	PASS
	High	5240	20.3	PASS
802.11n20	Low	5180	20.5	PASS
	Middle	5200	20.5	PASS
	High	5240	20.6	PASS

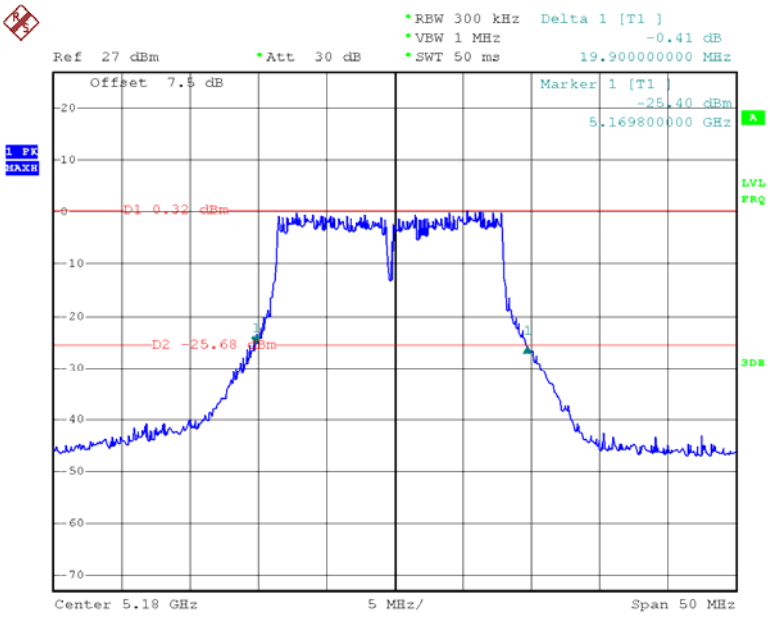
The 26dBc bandwidth is in the range 5150-5250MHz, please refer to the below plots.

5725MHz-5850MHz:

Mode	Channel	Frequency (MHz)	6dB Emission Bandwidth (MHz)	Limits (MHz)	Result
802.11a	Low	5745	15.76	0.5	PASS
	Middle	5785	15.52	0.5	PASS
	High	5825	15.28	0.5	PASS
802.11n20	Low	5745	16.16	0.5	PASS
	Middle	5785	16.00	0.5	PASS
	High	5825	16.48	0.5	PASS

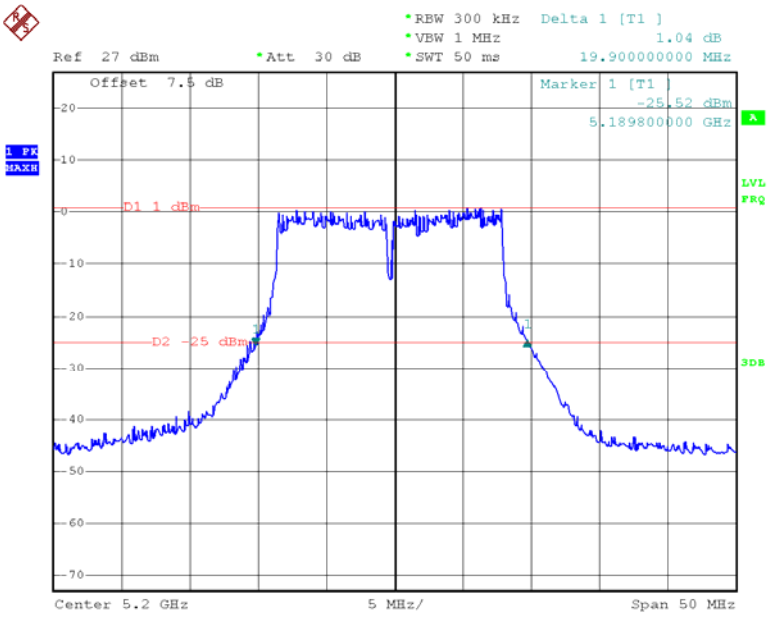
5150MHz-5250MHz: **26dB Bandwidth**

802.11a Low Channel



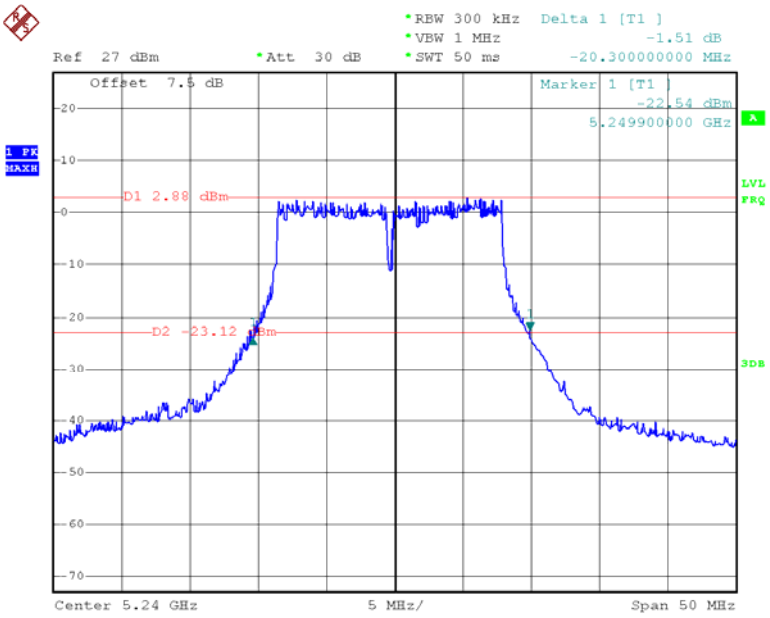
Date: 23.SEP.2016 13:06:40

802.11a Middle Channel



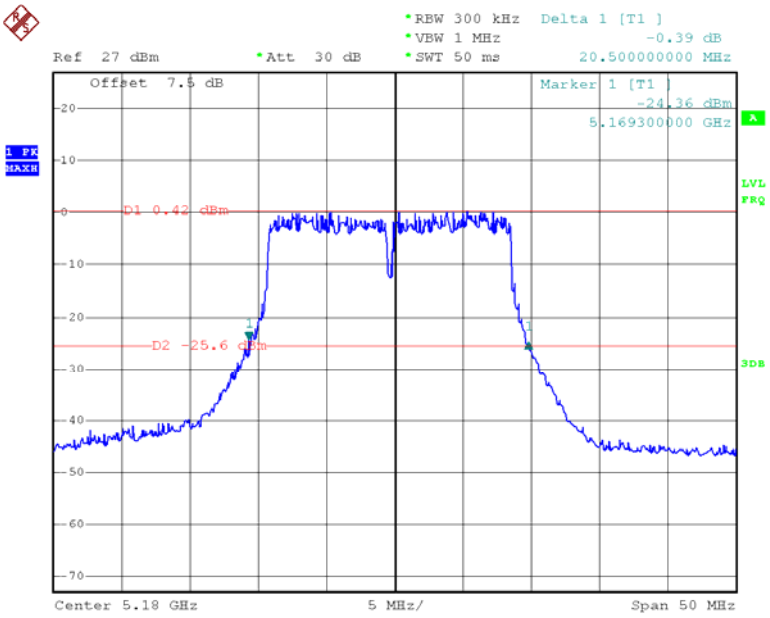
Date: 23.SEP.2016 13:07:43

802.11a High Channel



Date: 23.SEP.2016 13:03:32

802.11n ht20 Low Channel



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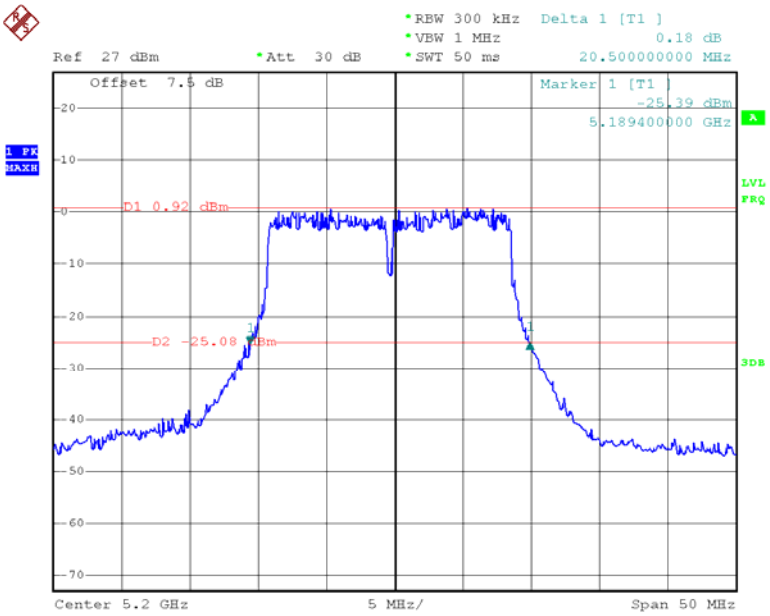
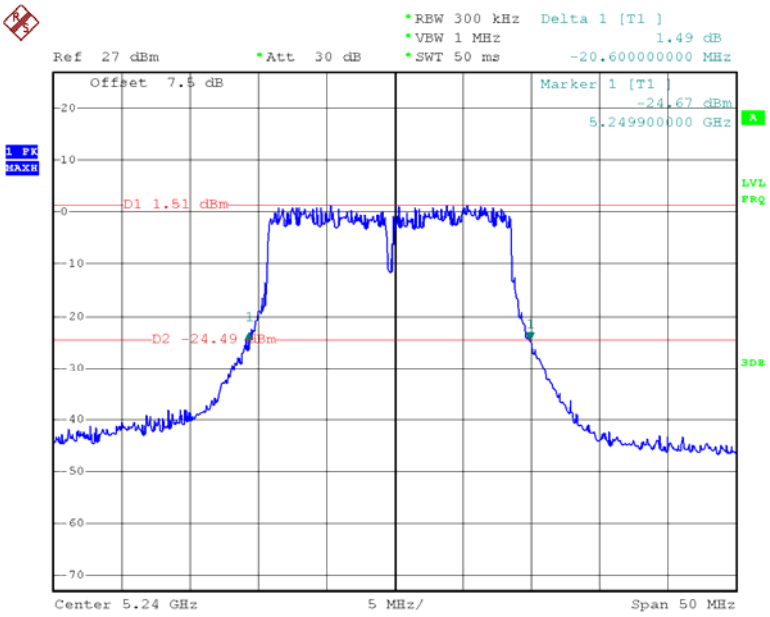
802.11n ht20 Middle Channel



Date: 23.SEP.2016 13:08:41

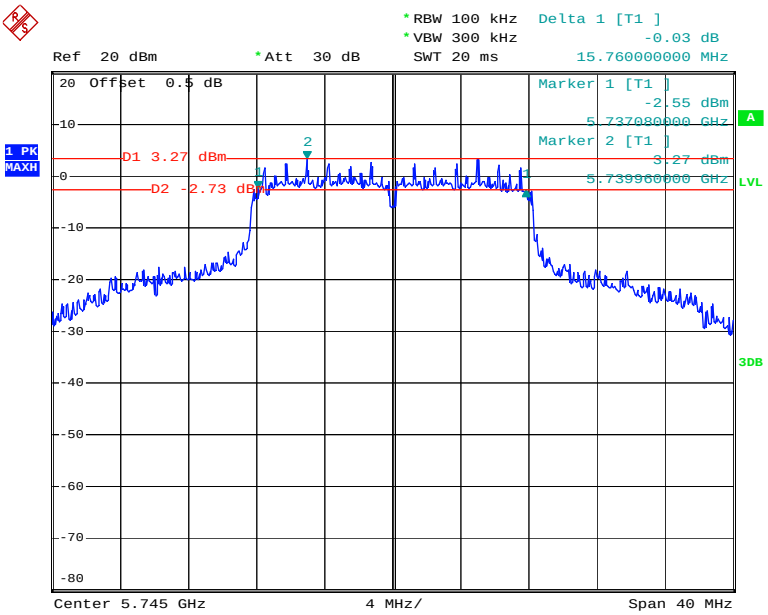
802.11n ht20 High Channel



Date: 23.SEP.2016 13:11:51

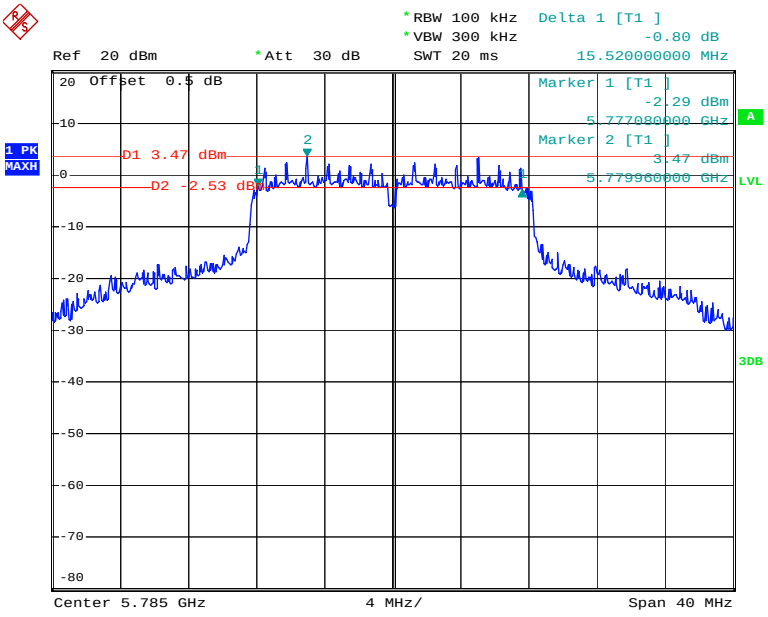
5725MHz-5850MHz: **6dB Emission Bandwidth**

802.11a Low Channel



Date: 23.SEP.2016 11:33:36

802.11a Middle Channel



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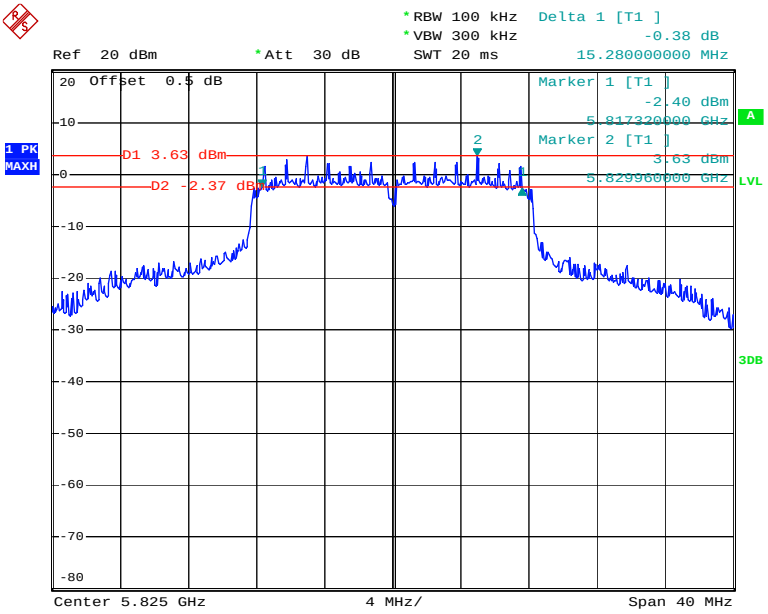
802.11a High Channel



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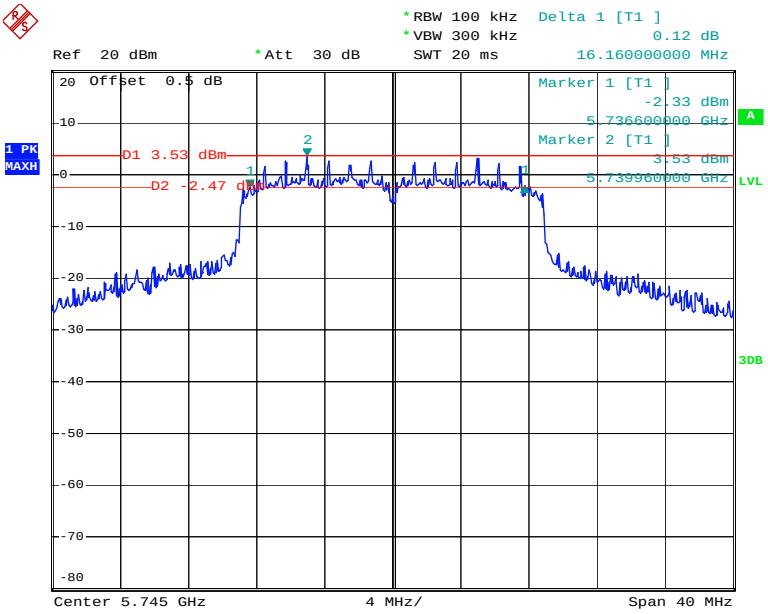
802.11n ht20 Low Channel



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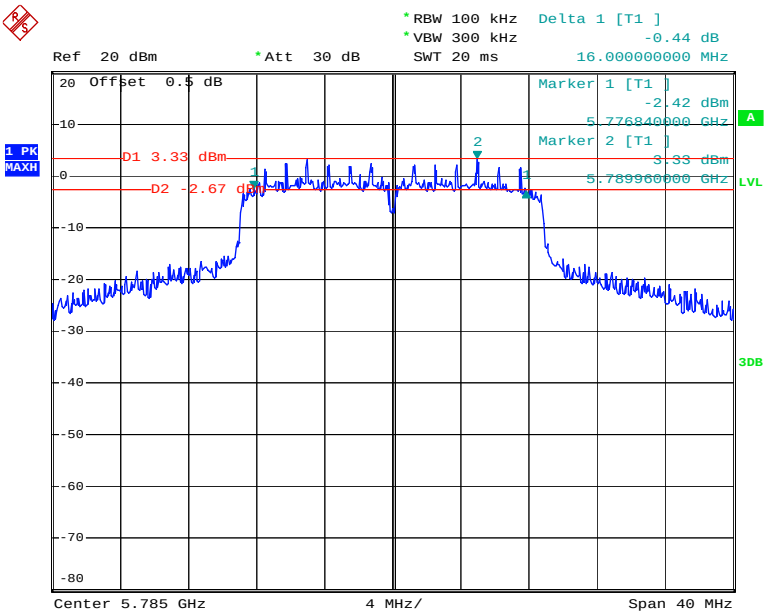
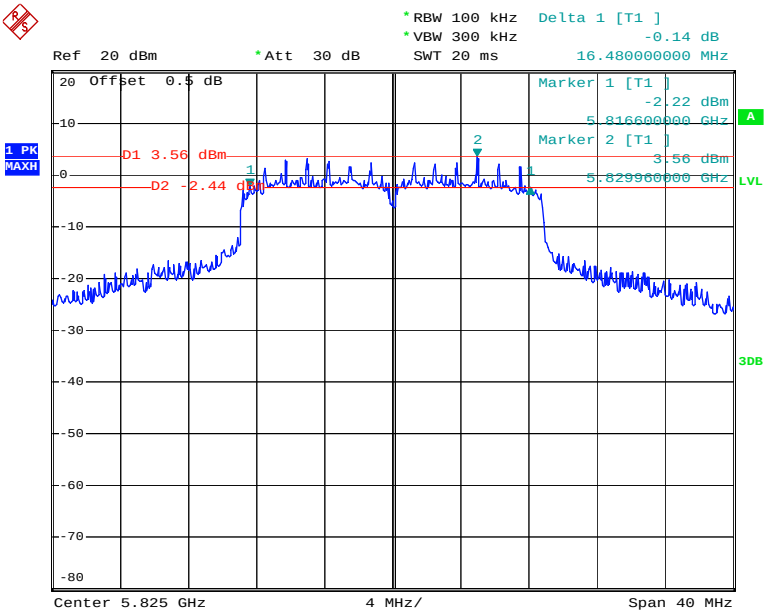
802.11n ht20 Middle Channel



Date: 23.SEP.2016 11:40:09

802.11n ht20 High Channel



Date: 23.SEP.2016 11:38:16

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	Wideband Power Sensor	N1921A	MY54210016	2015-11-03	2016-11-03
Agilent	Wideband Power Sensor	N1921A	MY54170013	2015-11-03	2016-11-03
Agilent	P-Series Power Meter	N1912A	MY5000448	2015-11-03	2016-11-03
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

*** 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 v01r02

Test Data

Environmental Conditions

Temperature:	30.2 °C
Relative Humidity:	48 %
ATM Pressure:	99.7 kPa

The testing was performed by Emily Wang on 2016-08-08.

Test Mode: Transmitting

UNII Band	Mode	Channel	Frequency (MHz)	Maximum Conducted Output Power (dBm)		Total (dBm)	Limits (dBm)	Result
				Chain 0	Chain 1			
5150-5250MHz	802.11a	Low	5180	9.95	10.95	13.49	30	PASS
		Middle	5200	12.51	13.87	16.25	30	PASS
		High	5240	9.6	10.96	13.34	30	PASS
	802.11n20	Low	5180	7.98	9.45	11.79	30	PASS
		Middle	5200	12.5	13.82	16.22	30	PASS
		High	5240	7.87	7.55	10.72	30	PASS
5725-5850MHz	802.11a	Low	5745	14.07	13.85	16.97	30	PASS
		Middle	5785	13.16	13.56	16.37	30	PASS
		High	5825	12.36	12.54	15.46	30	PASS
	802.11n20	Low	5745	14.23	13.89	17.07	30	PASS
		Middle	5785	13.25	13.38	16.33	30	PASS
		High	5825	12.37	12.64	15.52	30	PASS

Note: 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 NANT ≤ 4;

So:

Directional gain = GANT + Array Gain = 5.05dBi < 6dBi

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 v01r02

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2015-11-23	2016-11-22
N/A	Coaxial Cable	0.1m	N/A	2016-05-06	2017-05-06
E-Microwave	DC Blocking	EMDCB-00036	0E01201047	2016-05-06	2017-05-06

*** 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:	30.2 °C
Relative Humidity:	48 %
ATM Pressure:	99.7 kPa

The testing was performed by Emily Wang on 2016-08-08.

Test Mode: Transmitting

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

UNII Band	Mode	Channel	Frequency MHz	PSD (dBm/MHz)		Total (dBm/MHz)	Limit (dBm/MHz)
				Chain 0	Chain 1		
5150MHz-5250MHz	802.11a	Low	5180	-1.1	0.2	2.61	14.95
		Middle	5200	1.4	1.46	4.44	14.95
		High	5240	-1.52	-0.22	2.19	14.95
	802.11n20	Low	5180	-3.21	-1.77	0.58	14.95
		Middle	5200	1.52	1.23	4.39	14.95
		High	5240	-3.47	-3.59	-0.52	14.95

Note: 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(NANT/NSS) dB.

So:

Directional gain = GANT + Array Gain = 5.05+10*log(2) =8.05 dBi

The Power density Limits was reduce 2.05dB

UNII Band	Mode	Channel	Frequency MHz	PSD (dBm/300kHz)		Total (dBm/ 500kHz)	Limit (dBm/ 500kHz)
				Chain 0	Chain 1		
5725MHz-5850MHz	802.11a	Low	5745	0.47	-0.39	5.29	27.95
		Middle	5785	-0.94	-0.76	4.38	27.95
		High	5825	-2.09	-2.53	2.92	27.95
	802.11n20	Low	5745	0.21	-0.13	5.27	27.95
		Middle	5785	-0.11	-0.87	4.76	27.95
		High	5825	-1.36	-2.11	3.51	27.95

Note: 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(NANT/NSS) dB.

So:

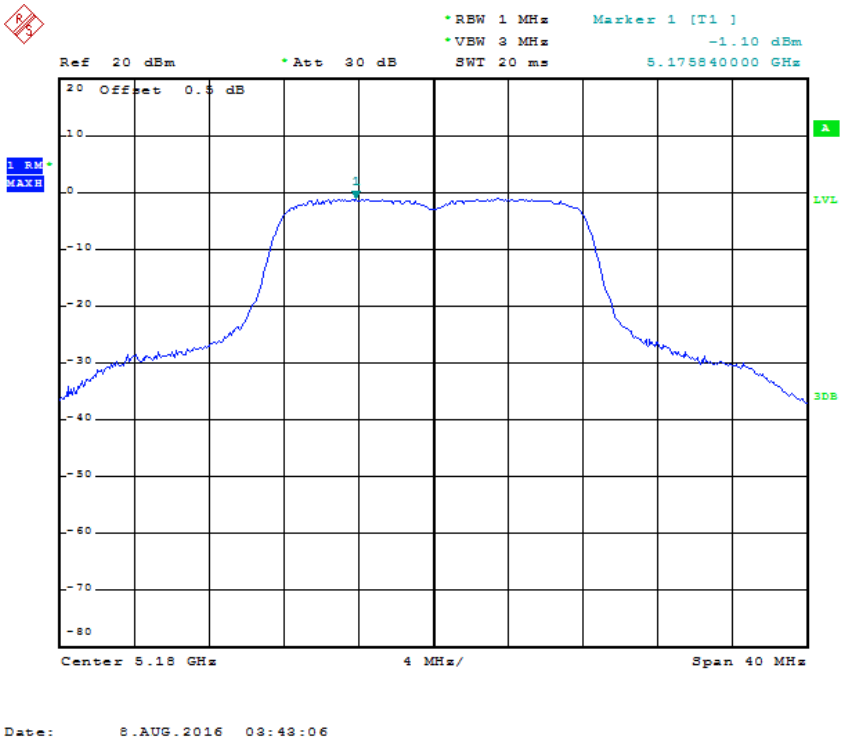
Directional gain = GANT + Array Gain = 5.05+10*log(2) =8.05 dBi

The Power density Limits was reduce 2.05dB

The 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.

5150MHz-5250MHz:
Chain 0:

802.11a Low Channel



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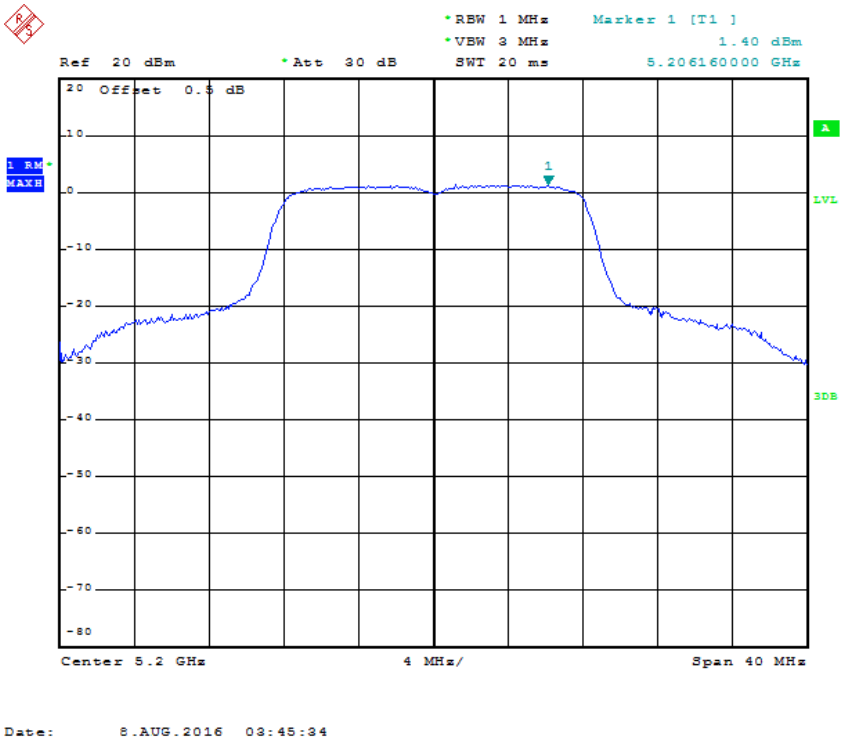
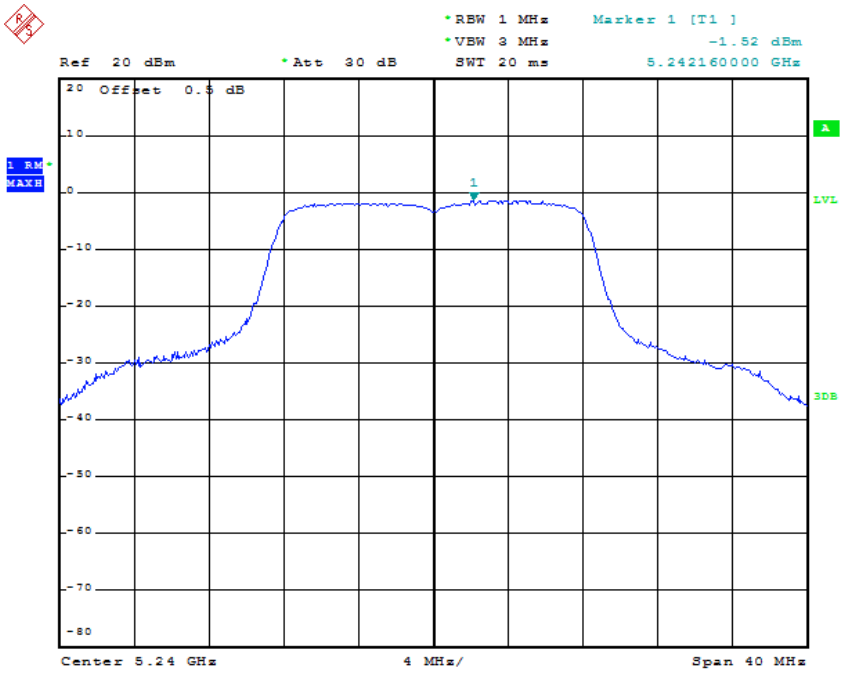
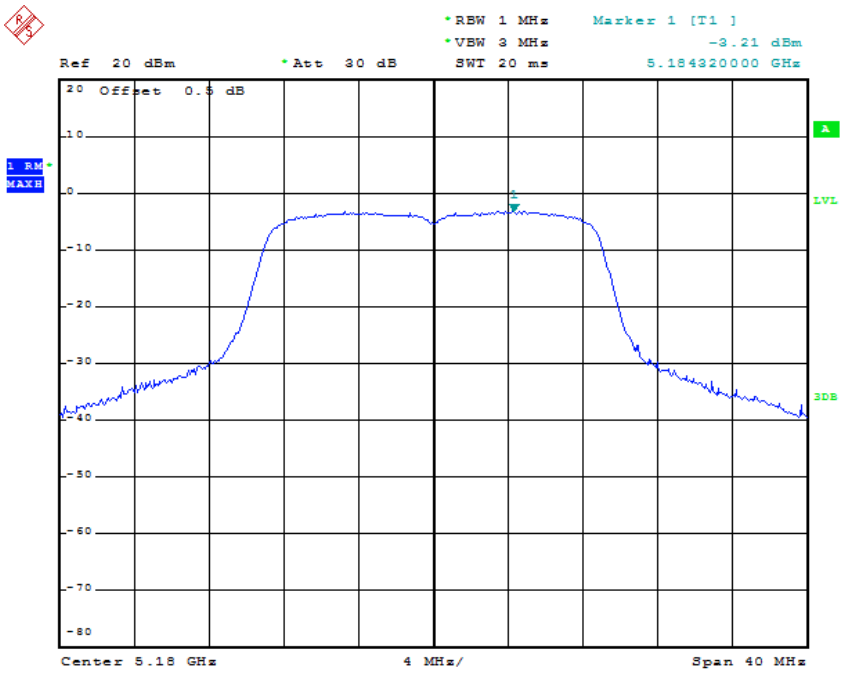


802.11a High Channel



802.11n ht20 Low Channel



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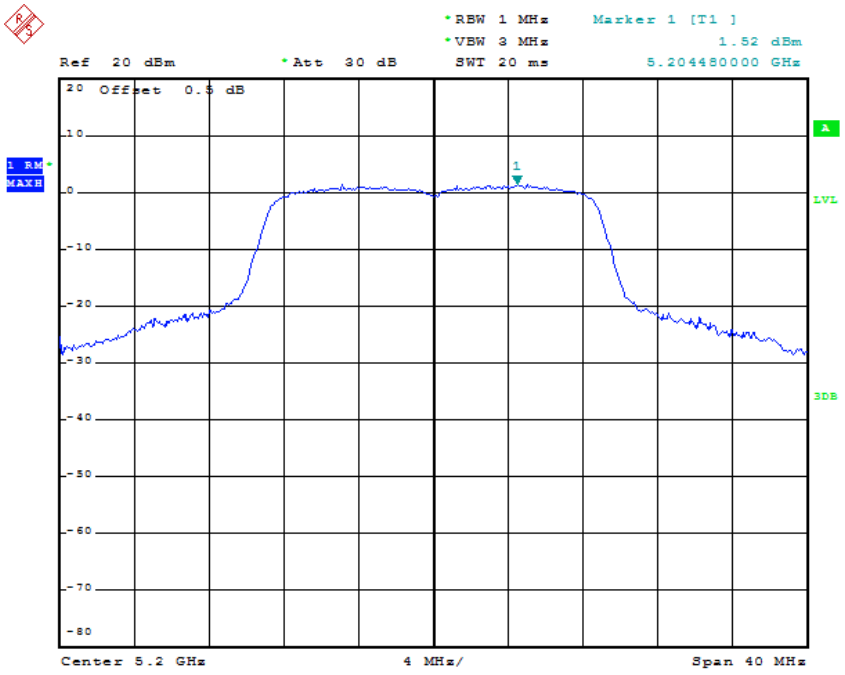

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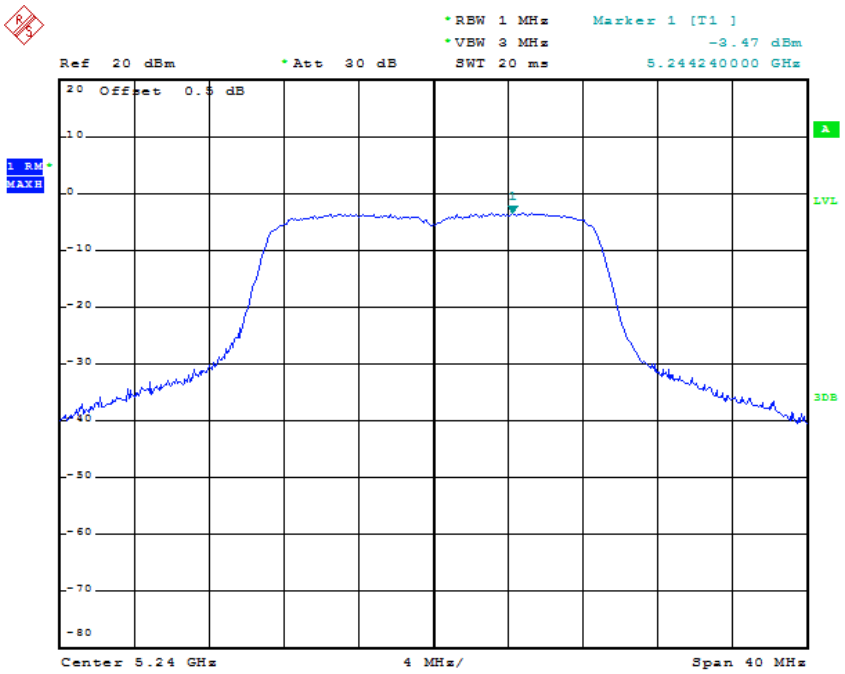

Chain 1:

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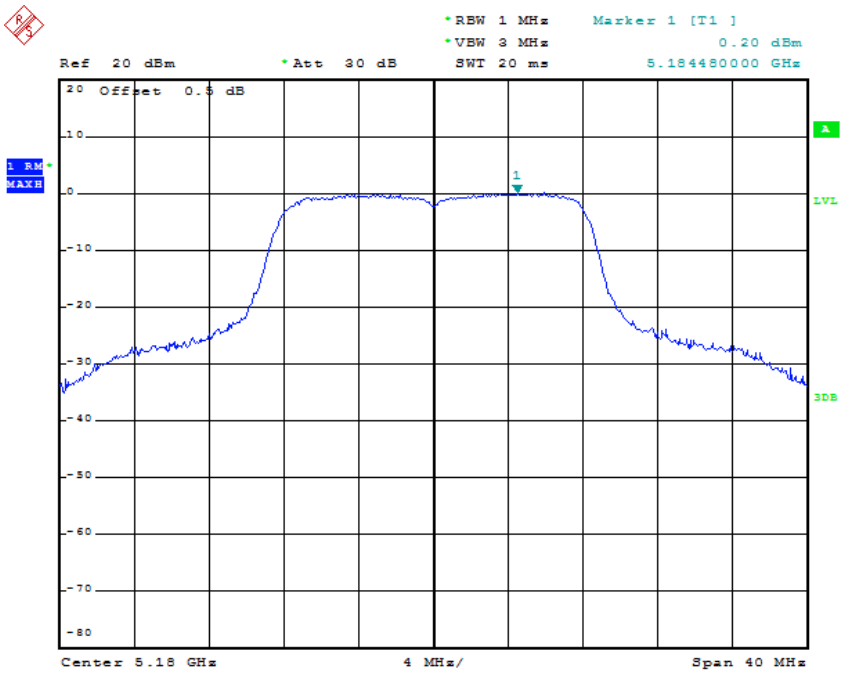

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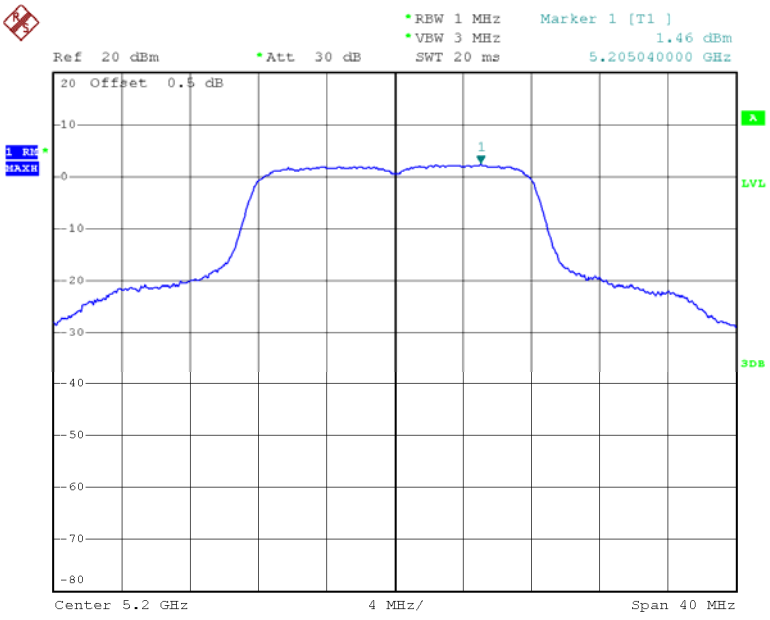

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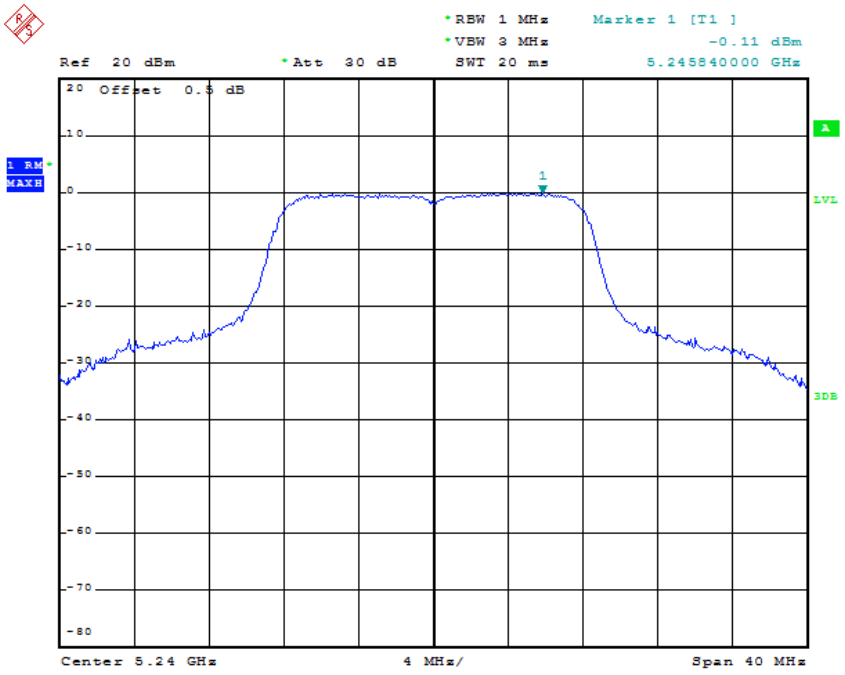

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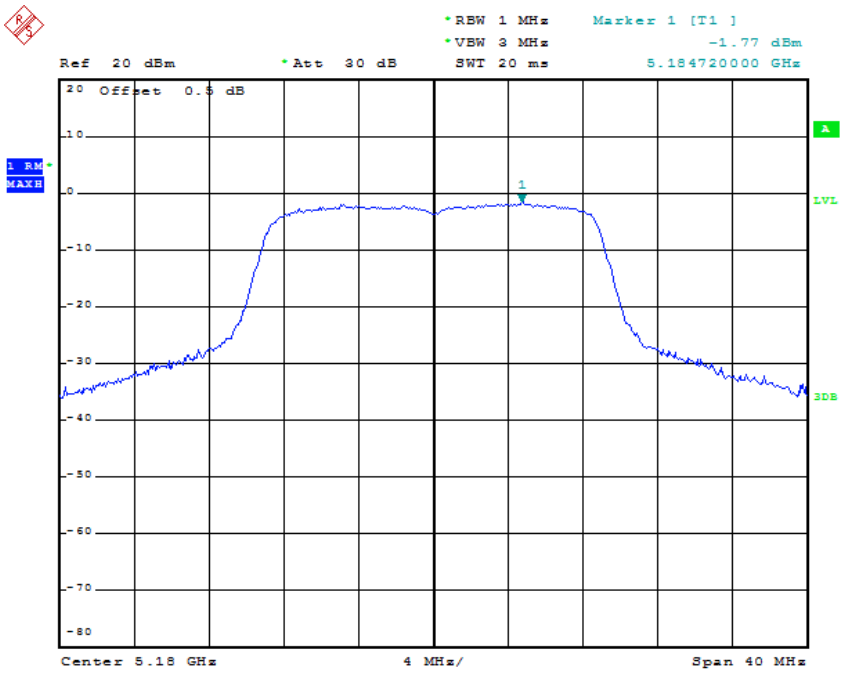

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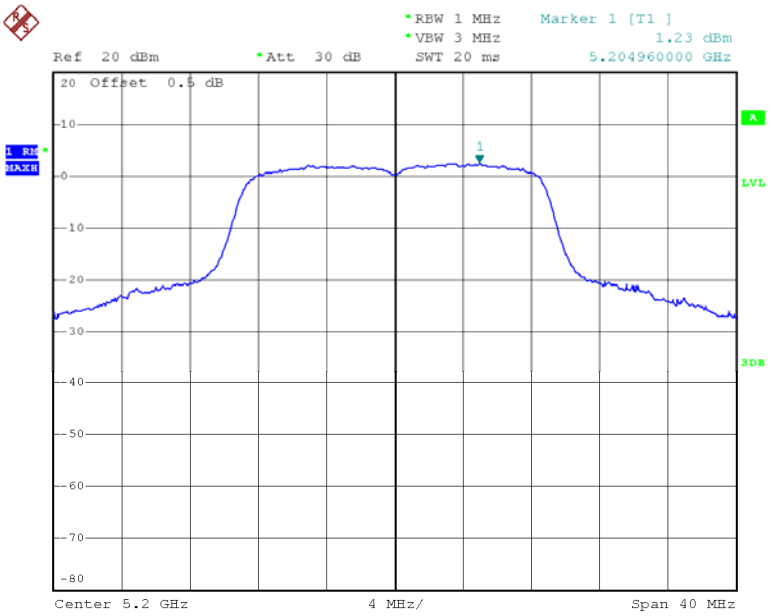

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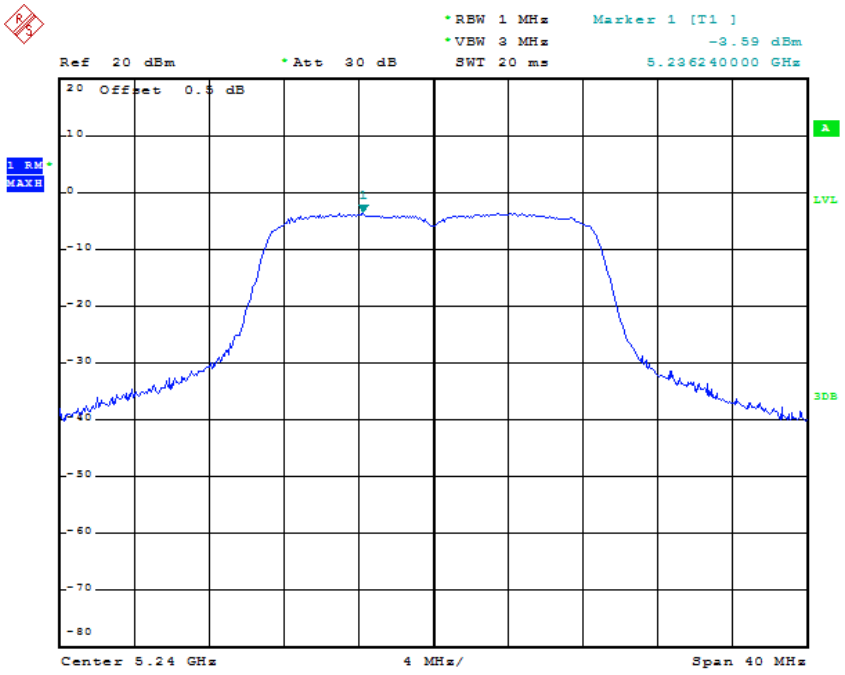

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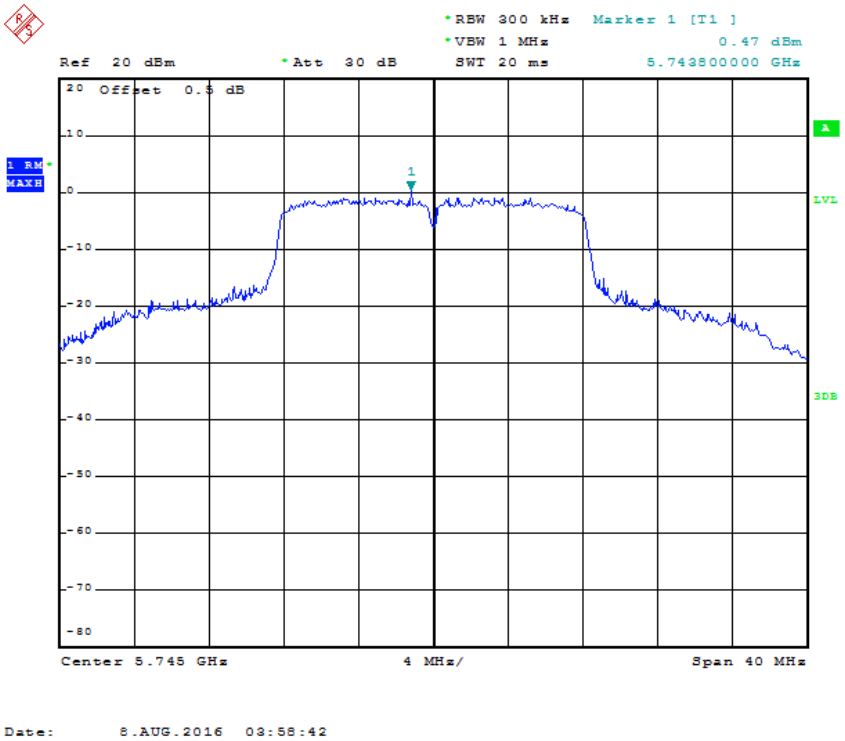
5725MHz-5850MHz:
Chain 0:

802.11a Low Channel



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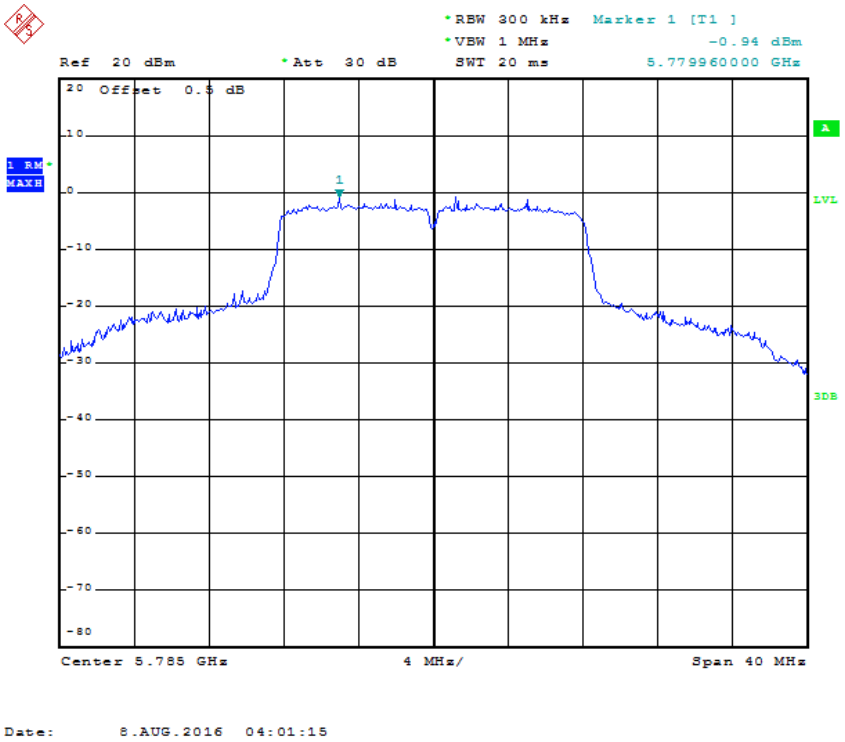
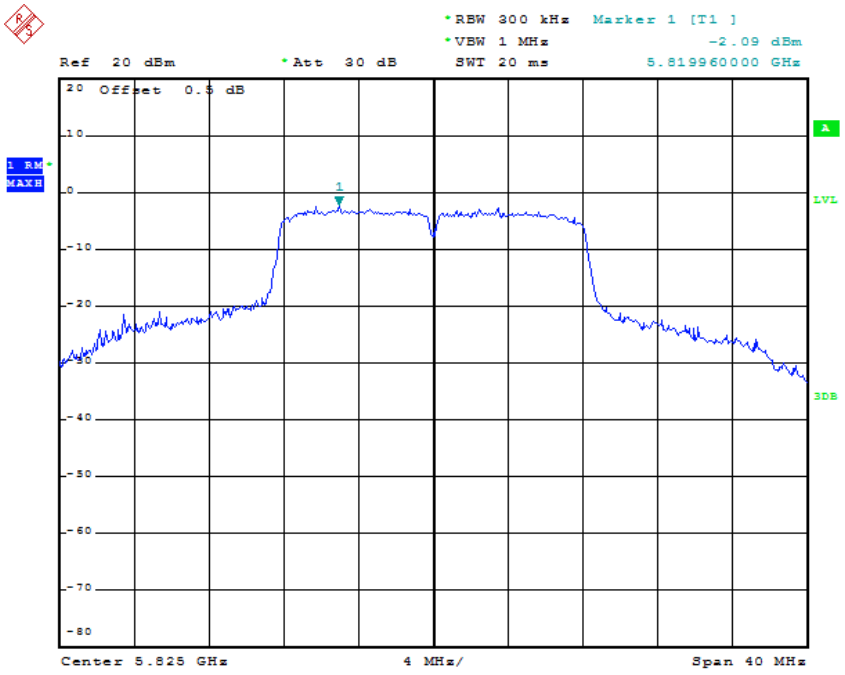


802.11a High Channel



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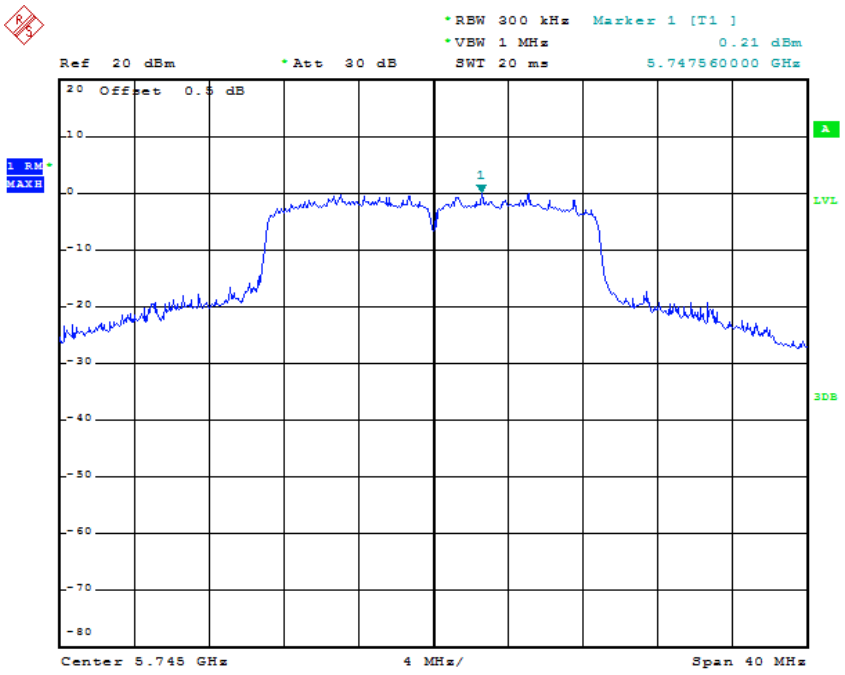

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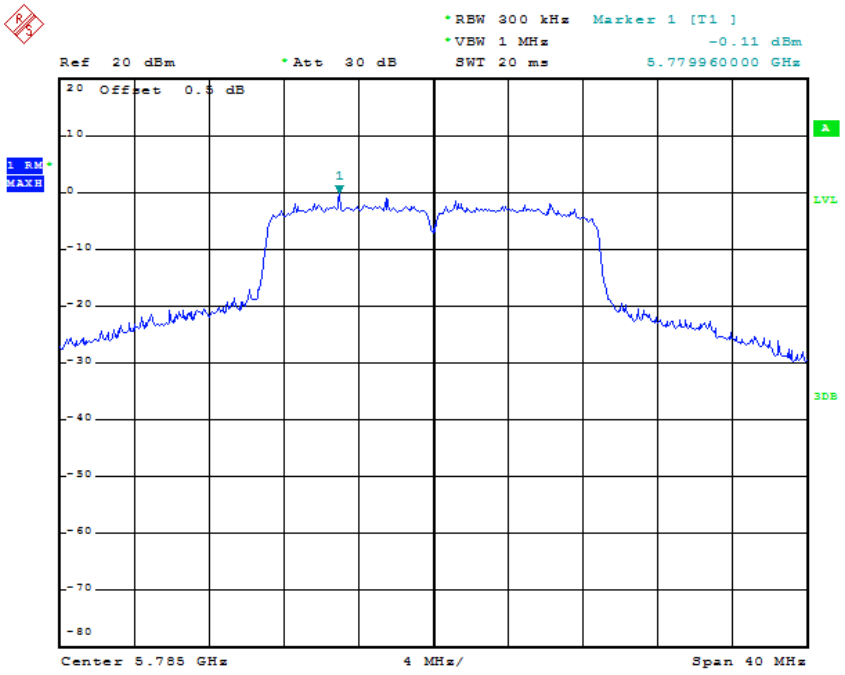

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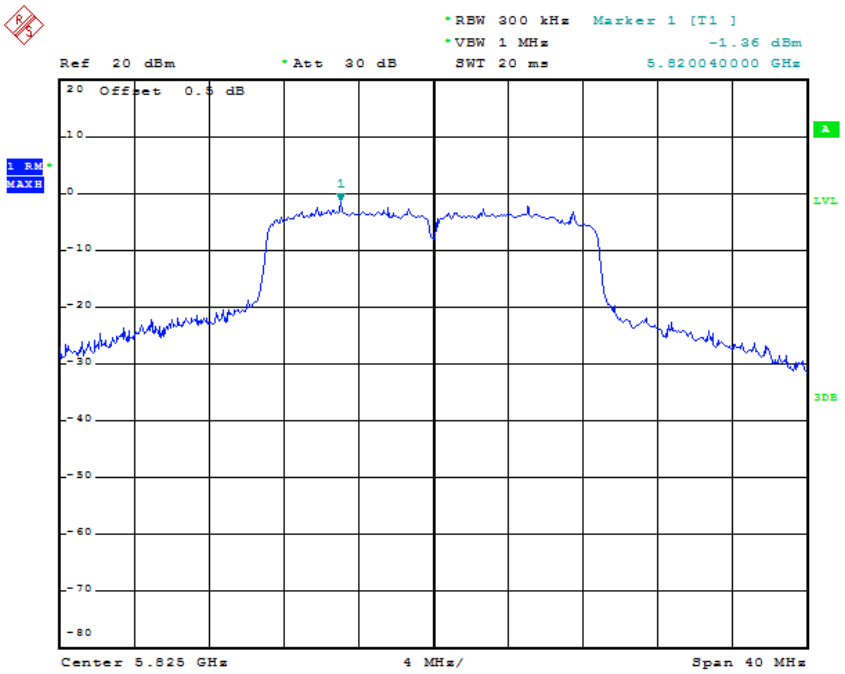
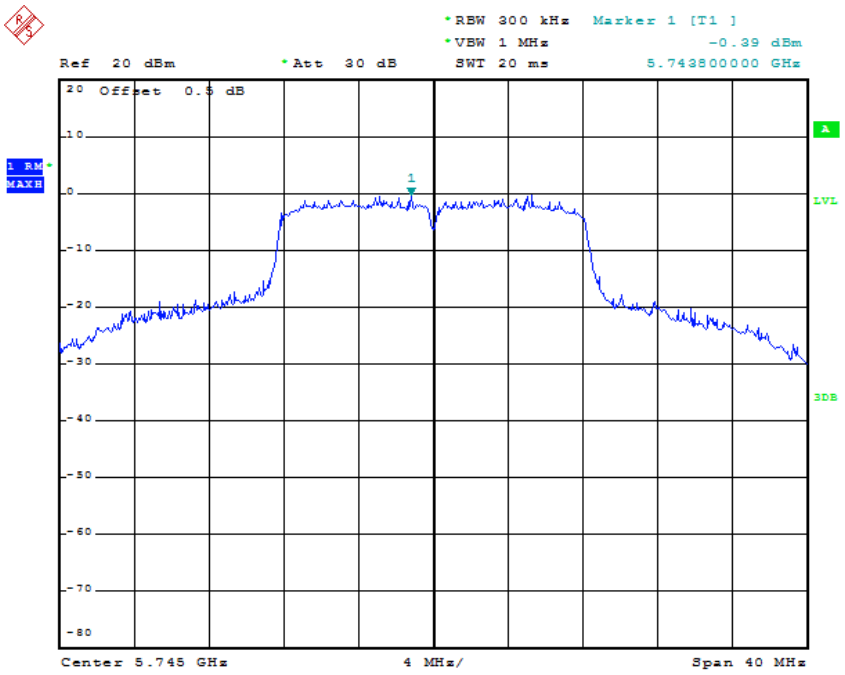
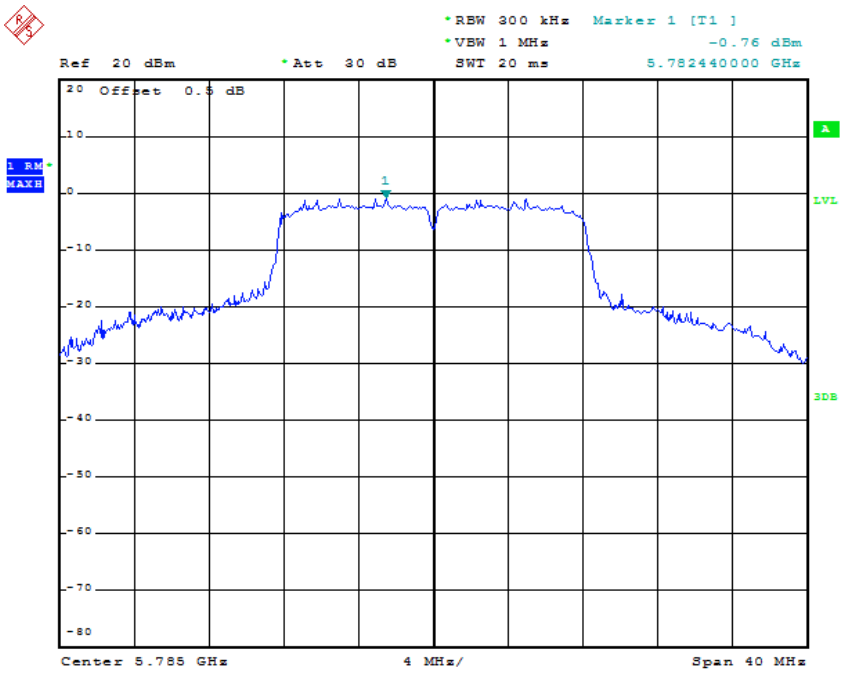


Chain 1:

802.11a Low Channel



802.11a Middle Channel



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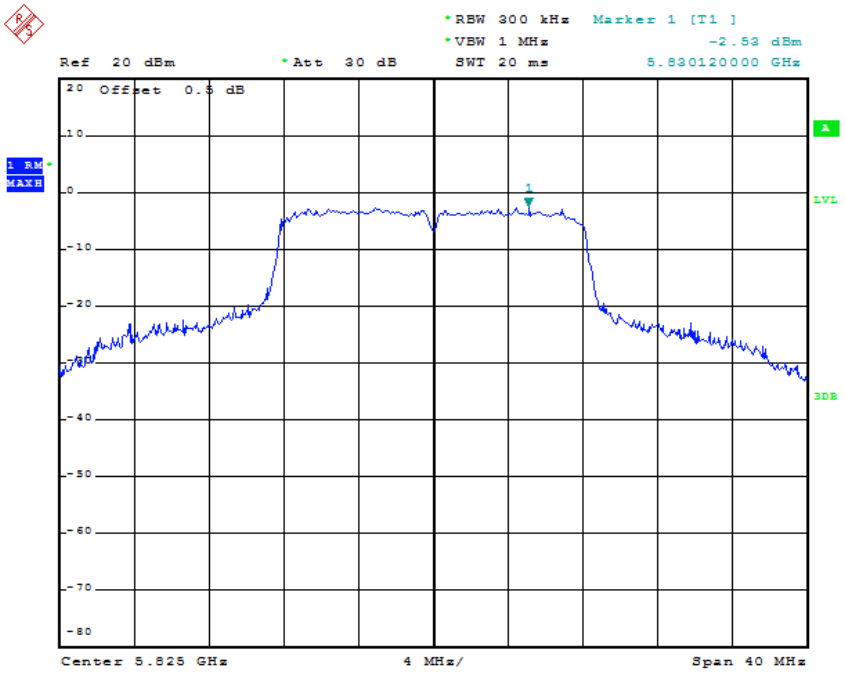

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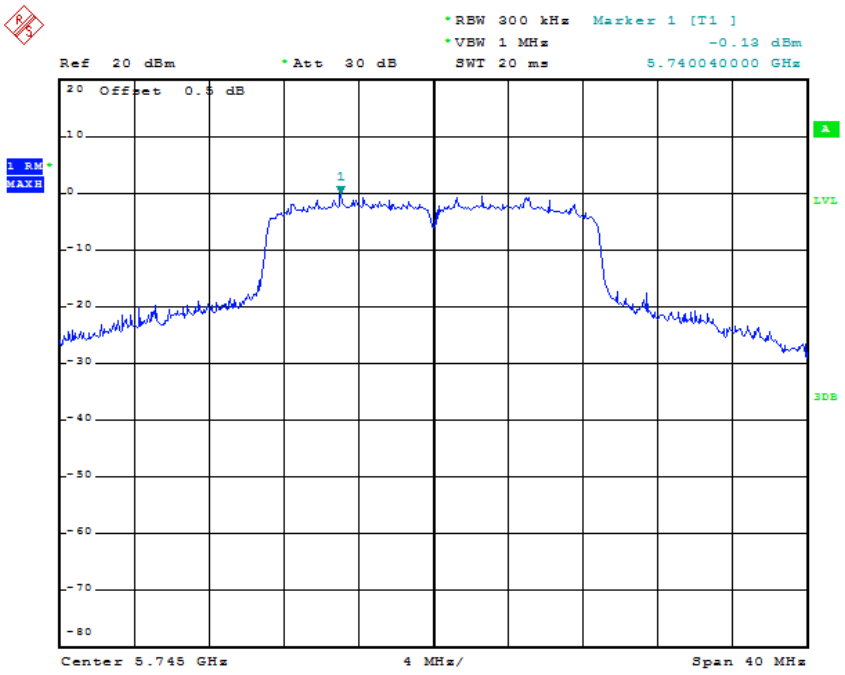

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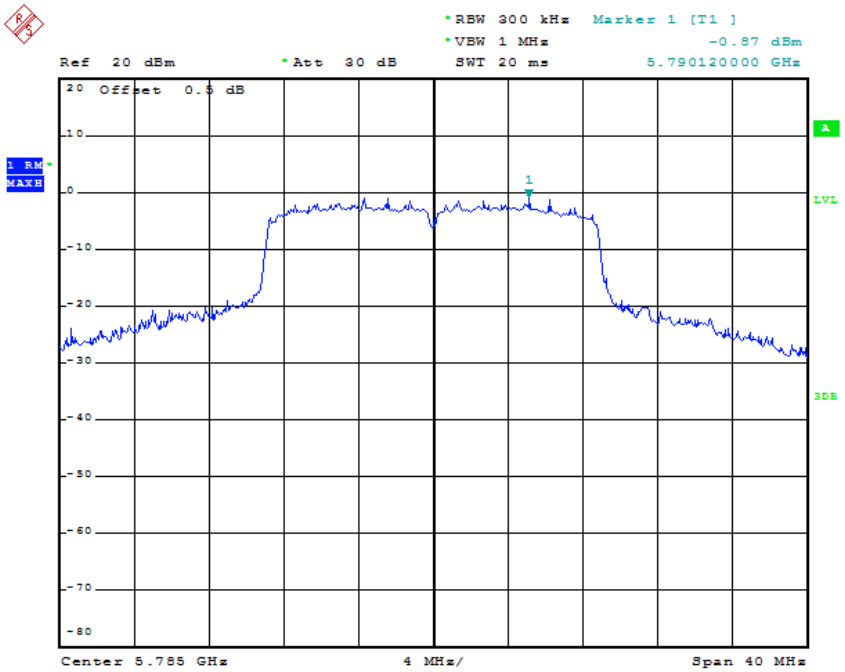

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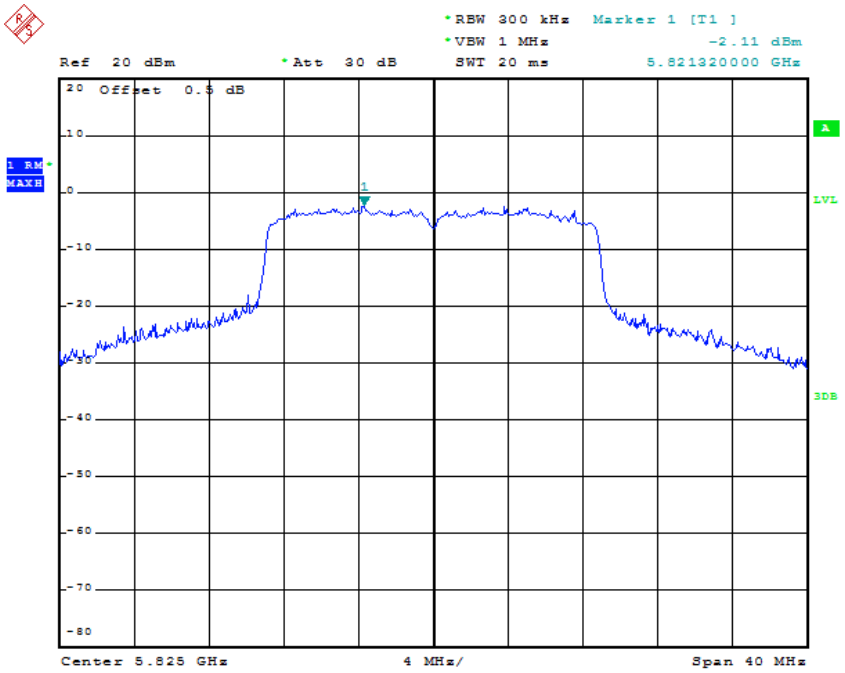

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