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-DLG60A1701

Report Type:	Product Name:
Original Report	C1

Test Engineer:	*Kevin Hu*
Report Number:	RDG170108006C
Report Date:	2017-02-15
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) 5040, HuiLongWan Plaza, No. 1, ShaWan Road, JinNiu District, ChengDu, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***SZ DJI TECHNOLOGY CO., LTD***'s product, model number: ***DLG60A (FCC ID: SS3-DLG60A1701)*** (the "EUT") in this report was a ***C1,*** which was measured approximately: 16.3 cm (L) x16.6 cm (W) x 15.4 cm(H), rated input voltage: DC7.4V from lithium battery or DC 17.5V from adapter.

Adapter Information:
MODEL: PH4C100
INPUT: 100-240V~1.4A 50-60Hz
OUTPUT: DC17.5V 5.7A (Total)
DC17.5V 0~2A (Output 1)
DC17.5V 0~5.7A (Output 2)

**All measurement and test data in this report was gathered from final production sample, serial number: 170108006 (assigned by the BACL, Chengdu). It may have deviation from any other sample.The EUT supplied by the applicant was received on 2017-01-13, and EUT conformed to test requirement.*

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 15C DSS submissions with FCC ID: SS3-DLG60A1701.
FCC Part 15C DTS submissions with FCC ID: SS3-DLG60A1701.
Part of system submissions with FCC ID: SS3-AG4051701.

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. (Chengdu). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ±3.17 dB, the uncertainty of any radiation on emissions measurement is:

30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G~6GHz: ±5.13dB;
6G~25GHz: ±5.47dB;

And the uncertainty will not be taken into consideration for all test data recorded in the report.

Test Facility

The test site used by BACL to collect test data is located in the5040, HuiLongWan Plaza, No. 1, ShaWan Road,JinNiu District, ChengDu, China

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.:560332. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

For 5GHz band, the device employed 802.11a/n ht20 modes.

For 5150~5250 MHz band, 4 channels are emplyed:

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

The device test with channel 36, 40, 48.

For 5725~5850MHz band, 5 channels are emplyed:

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

The device test with channel 149, 157,165.

EUT Exercise Software

The software “DJI-RF Certification” 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 date rates bandwidths, and modulations.

For 802.11a/n ht20 mode, the maximum power was as below setting, the power setting was provided by the manufacturer:

5150-5250MHz:

Antenna 0&1				
Test Mode	Test Software Version	DJI-RF Certification		
	Test Frequency(MHz)	5180MHz	5200MHz	5240MHz
802.11a	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	10	10	10
802.11n ht20	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	10	10	10

5725-5850:

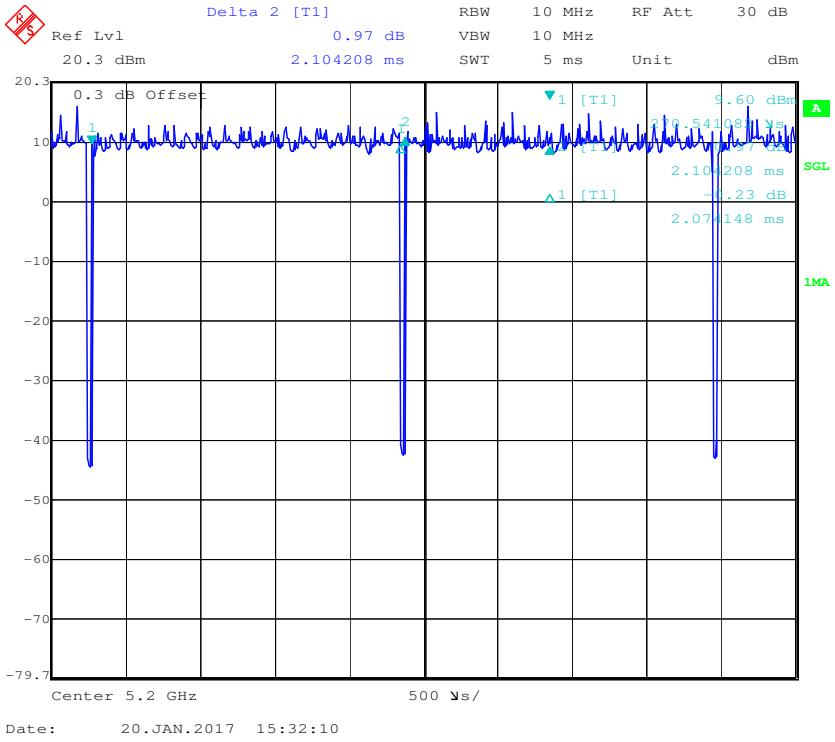
Antenna 0&1				
Test Mode	Test Software Version	DJI-RF Certification		
	Test Frequency(MHz)	5745	5785	5825
802.11a	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	10	10	10
802.11n ht20	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	10	10	10

The software configured maximum duty cycle as below:

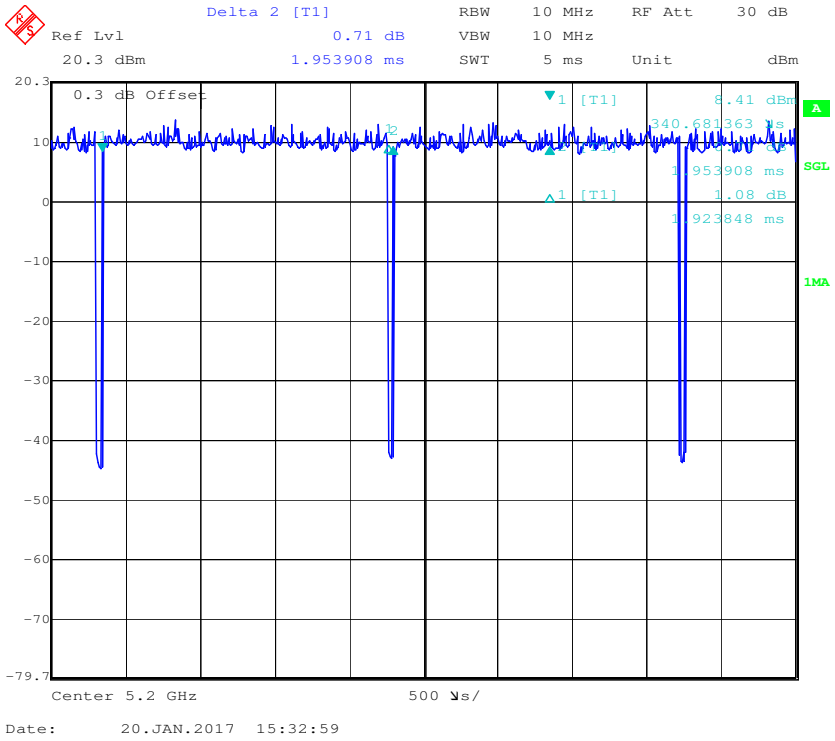
Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11a	2.07	2.10	98.57
802.11n ht20	1.92	1.95	98.46

The minimum transmission duration(T) is 2.07ms in 802.11a mode, 1.92ms in 802.11n ht20 mode.

802.11a mode



802.11n ht20 mode



Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

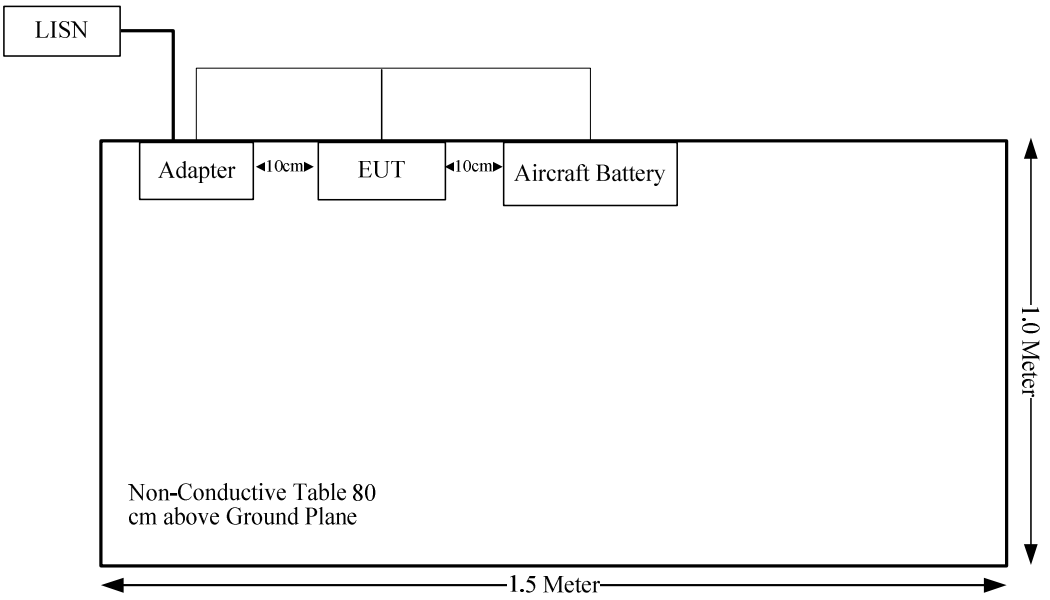
Manufacturer	Description	Model	Serial Number
DJI	Aircraft Battery	/	/

External Cable

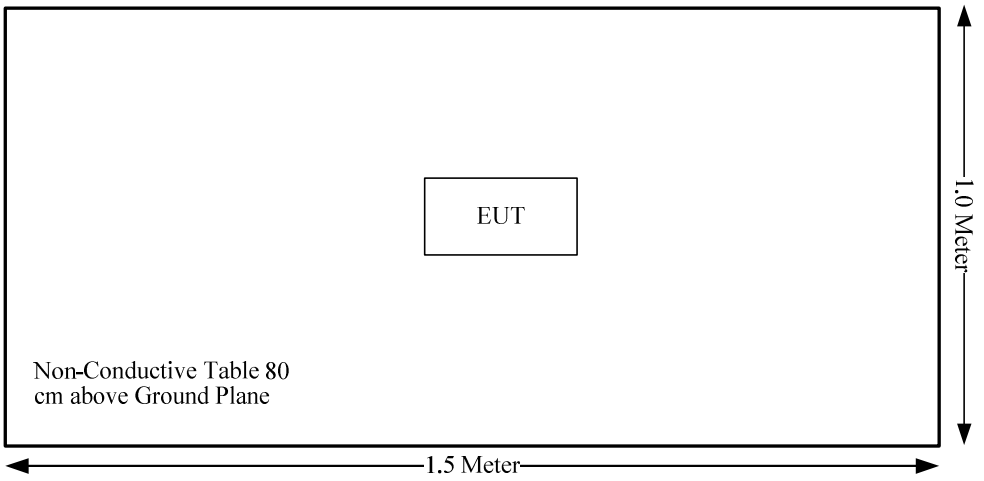
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC cable	Yes	Yes	1	Adapter	EUT or Battery

Block Diagram of Test Setup

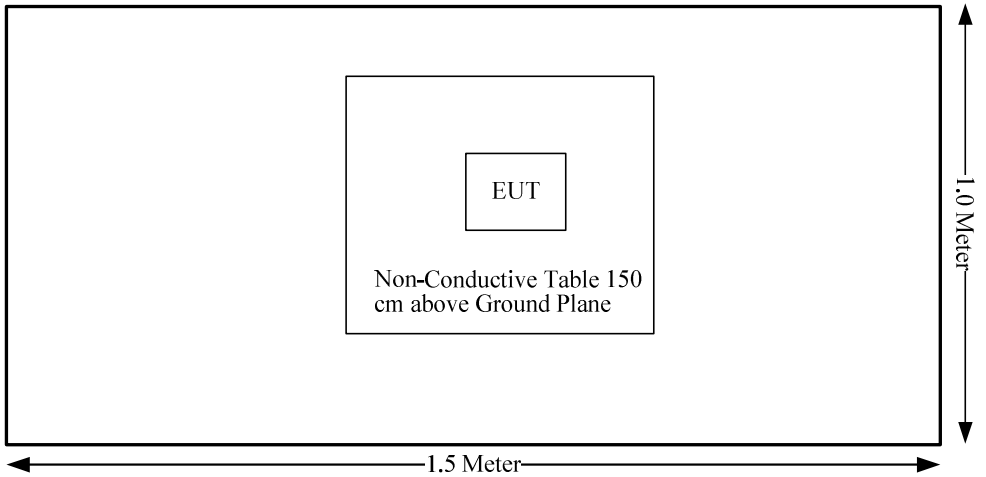
AC Line Conducted Test:



Radiation test below 1GHz:



Radiation test above 1GHz:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.407 (f) & §1.1310 & §2.1093	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)	6 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 & §2.1093- RF EXPOSURE

Applicable Standard

FCC §15.407(f), §1.1310, §2.1093 and KDB 447498.

Test Result

The device is designed for hand-held use.

The max tune up conducted output power on each chain is 12.3 dBm (16.98 mW).

[(max power of channel, mw)/(min test separation distance, mm)][√f(GHz)]
=[16.98/10][√5.825)]=4.1 < 7.5 (for 10 g extremity SAR)

Standalone SAR is not required for 5 GHz radio.

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 un-detachable external antennas arrangement for LB mode, the antenna gain are 3.3dBi@ 2.4GHz band, and 2 internal antennas for Wi-Fi, the antenna gain are 4.9dBi @ 2.4GHz band and 6.07 dBi @5GHz band, that 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:

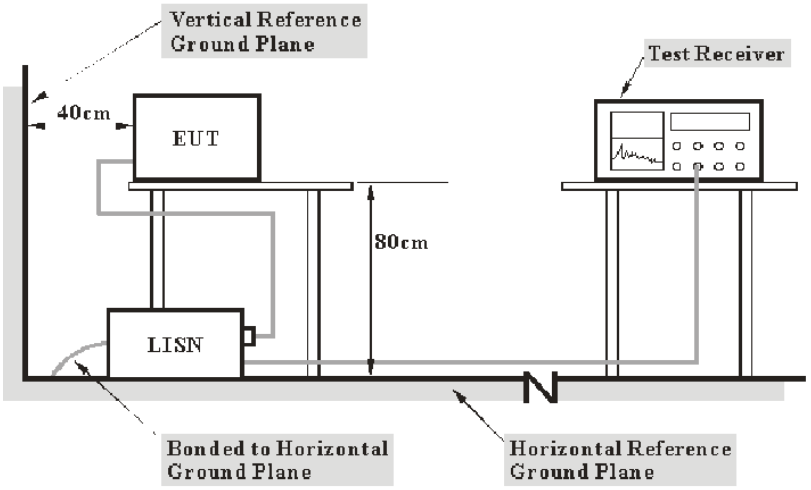
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of 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. (Chengdu) is ±3.17 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
Rohde & Schwarz	EMI Test Receiver	ESCS 30	836858/0016	2016-12-02	2017-12-01
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	357.8810.52	2016-10-31	2017-10-30
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6550.06	2016-12-02	2017-12-01
N/A	Conducted Cable	NO.5	N/A	2016-11-10	2017-11-09
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

*** Statement of Traceability:** BACL (Chengdu) attested 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

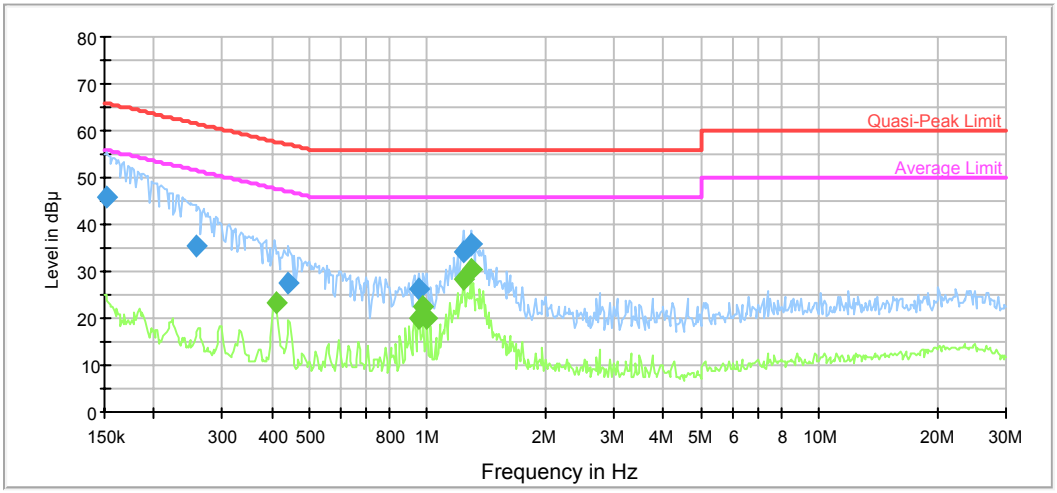
Temperature:	21.9 °C
Relative Humidity:	46 %
ATM Pressure:	97.6 kPa

The testing was performed by Kevin Hu on 2017-01-17.

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

Test Mode: Charging and transmitting

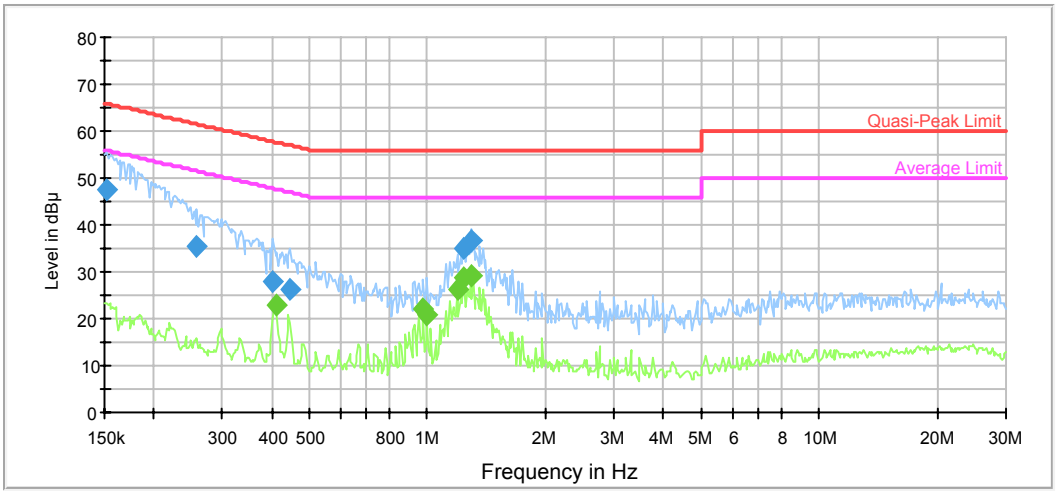
AC120V, 60Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.152410	45.9	9.000	L1	19.7	20.0	65.9	Compliance
0.255827	35.2	9.000	L1	19.7	26.4	61.6	Compliance
0.443327	27.5	9.000	L1	19.7	29.5	57.0	Compliance
0.952654	26.3	9.000	L1	19.7	29.7	56.0	Compliance
1.239175	34.2	9.000	L1	19.7	21.8	56.0	Compliance
1.289541	36.0	9.000	L1	19.7	20.0	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.409372	23.2	9.000	L1	19.8	24.5	47.7	Compliance
0.952654	20.1	9.000	L1	19.7	25.9	46.0	Compliance
0.975701	22.3	9.000	L1	19.7	23.7	46.0	Compliance
0.999305	20.0	9.000	L1	19.7	26.0	46.0	Compliance
1.239175	28.2	9.000	L1	19.7	17.8	46.0	Compliance
1.289541	30.3	9.000	L1	19.7	15.7	46.0	Compliance

AC120V, 60Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.151200	47.5	9.000	N	19.7	18.4	65.9	Compliance
0.257874	35.3	9.000	N	19.6	26.2	61.5	Compliance
0.402900	27.7	9.000	N	19.6	30.1	57.8	Compliance
0.446873	26.4	9.000	N	19.6	30.5	56.9	Compliance
1.239175	35.1	9.000	N	19.6	20.9	56.0	Compliance
1.289541	36.5	9.000	N	19.6	19.5	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.409372	22.9	9.000	N	19.6	24.8	47.7	Compliance
0.975701	22.2	9.000	N	19.7	23.8	46.0	Compliance
0.999305	20.7	9.000	N	19.7	25.3	46.0	Compliance
1.190776	26.2	9.000	N	19.6	19.8	46.0	Compliance
1.239175	28.7	9.000	N	19.6	17.3	46.0	Compliance
1.289541	29.2	9.000	N	19.6	16.8	46.0	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 2, 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 2, 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.

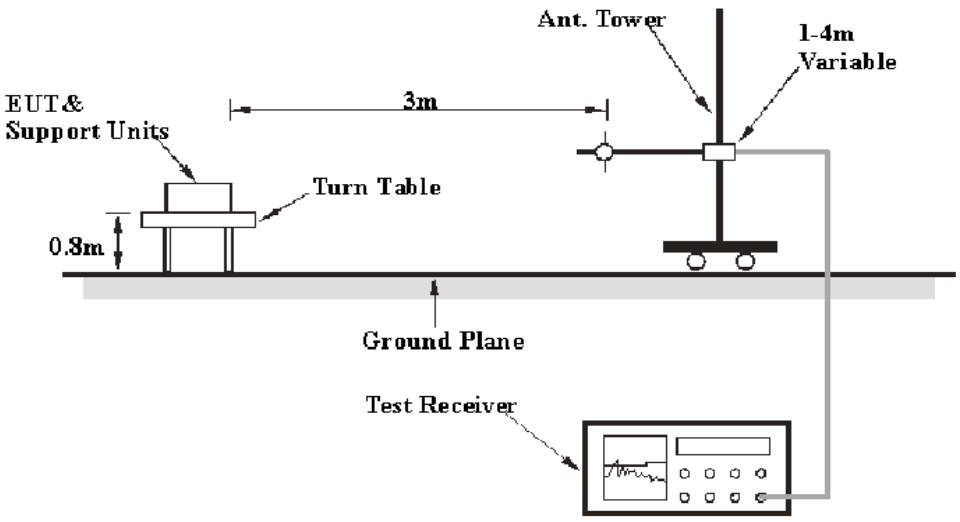
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G~6GHz: ±5.13dB;
6G~25GHz: ±5.47 dB;

Table 2 – Values of U_{cispr}

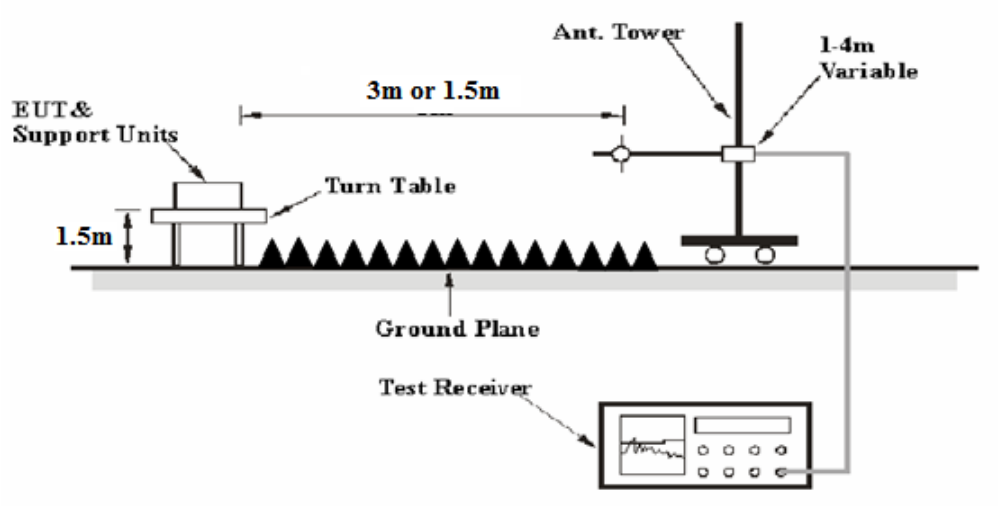
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 v01r03, 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
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A101808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2016-05-20	2017-05-19
EMCT	Semi-Anechoic Chamber	966	N/A	2015-04-24	2018-04-23
N/A	RF Cable (below 1GHz)	NO.1	N/A	2016-11-10	2017-11-09
N/A	RF Cable (below 1GHz)	NO.4	N/A	2016-11-10	2017-11-09
N/A	RF Cable (above 1GHz)	NO.2	N/A	2016-11-10	2017-11-09
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1312	2016-08-18	2017-08-18
Quinstar	Amplifier	QLW-18405536-JO	15964001032	2016-08-18	2017-08-18
Agilent	Spectrum Analyzer	8564E	5943A01752	2016-08-18	2017-08-18

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	22.3~23.1 °C
Relative Humidity:	51~56 %
ATM Pressure:	95.8~96.7 kPa

The testing was performed by Kevin Hu from 2017-01-18 to 2017-01-20.

Test Mode: Transmitting

30MHz-40GHz(For above 1GHz,test performed at 1.5m distance EUT to antenna)

5150-5250MHz:
802.11a mode(2TX mode 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 (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5180 MHz										
5180	70.06	PK	H	31.72	5.21	0.00	106.99	100.99	N/A	N/A
5180	59.69	AV	H	31.72	5.21	0.00	96.62	90.62	N/A	N/A
5180	72.61	PK	V	31.72	5.21	0.00	109.54	103.54	N/A	N/A
5180	61.55	AV	V	31.72	5.21	0.00	98.48	92.48	N/A	N/A
5150	32.59	PK	V	31.67	5.18	0.00	69.44	63.44	74	10.56
5150	16.48	AV	V	31.67	5.18	0.00	53.33	47.33	54	6.67
10360	34.26	PK	V	37.37	7.76	26.37	53.02	47.02	74	26.98
10360	22.71	AV	V	37.37	7.76	26.37	41.47	35.47	54	18.53
15540	34.72	PK	V	39.41	10.22	25.32	59.03	53.03	74	20.97
15540	24.28	AV	V	39.41	10.22	25.32	48.59	42.59	54	11.41
1556	34.07	PK	V	24.19	2.71	26.38	34.59	28.59	74	45.41
1556	23.40	AV	V	24.19	2.71	26.38	23.92	17.92	54	36.08
3655	36.75	PK	V	27.62	4.41	26.58	42.2	36.2	74	37.8
3655	25.44	AV	V	27.62	4.41	26.58	30.89	24.89	54	29.11
44.55	49.25	QP	H	11.82	0.34	28.51	32.90	32.90	40.00	7.10
60.07	53.02	QP	H	7.50	0.49	28.43	32.58	32.58	40.00	7.42
Middle Channel:5200 MHz										
5200	71.43	PK	H	31.76	5.23	0.00	108.42	102.42	N/A	N/A
5200	60.96	AV	H	31.76	5.23	0.00	97.95	91.95	N/A	N/A
5200	74.52	PK	V	31.76	5.23	0.00	111.51	105.51	N/A	N/A
5200	62.70	AV	V	31.76	5.23	0.00	99.69	93.69	N/A	N/A
10400	33.63	PK	V	37.38	7.79	26.36	52.44	46.44	74	27.56
10400	22.58	AV	V	37.38	7.79	26.36	41.39	35.39	54	18.61
15600	34.13	PK	V	39.42	10.22	25.31	58.46	52.46	74	21.54
15600	23.42	AV	V	39.42	10.22	25.31	47.75	41.75	54	12.25
1612	35.08	PK	V	24.28	2.76	26.44	35.68	29.68	74	44.32
1612	23.91	AV	V	24.28	2.76	26.44	24.51	18.51	54	35.49
3689	37.20	PK	V	27.76	4.46	26.57	42.85	36.85	74	37.15
3689	26.04	AV	V	27.76	4.46	26.57	31.69	25.69	54	28.31
44.55	49.52	QP	H	11.82	0.34	28.51	33.17	33.17	40.00	6.83
60.07	53.16	QP	H	7.50	0.49	28.43	32.72	32.72	40.00	7.28
High Channel:5240 MHz										
5240	71.44	PK	H	31.83	5.27	0.00	108.54	102.54	N/A	N/A
5240	60.35	AV	H	31.83	5.27	0.00	97.45	91.45	N/A	N/A
5240	73.51	PK	V	31.83	5.27	0.00	110.61	104.61	N/A	N/A
5240	62.10	AV	V	31.83	5.27	0.00	99.2	93.2	N/A	N/A
5350	28.44	PK	V	32.03	5.37	0.00	65.84	59.84	74	14.16
5350	14.39	AV	V	32.03	5.37	0.00	51.79	45.79	54	8.21
10480	33.15	PK	V	37.40	7.84	26.35	52.04	46.04	74	27.96
10480	21.80	AV	V	37.40	7.84	26.35	40.69	34.69	54	19.31
15720	33.35	PK	V	39.44	10.24	25.30	57.73	51.73	74	22.27
15720	22.56	AV	V	39.44	10.24	25.30	46.94	40.94	54	13.06
1678	34.96	PK	V	24.38	2.81	26.50	35.65	29.65	74	44.35
1678	23.69	AV	V	24.38	2.81	26.50	24.38	18.38	54	35.62
3743	36.33	PK	V	27.97	4.54	26.57	42.27	36.27	74	37.73
3743	24.98	AV	V	27.97	4.54	26.57	30.92	24.92	54	29.08
44.55	50.36	QP	H	11.82	0.34	28.51	34.01	34.01	40.00	5.99
60.07	53.58	QP	H	7.50	0.49	28.43	33.14	33.14	40.00	6.86

802.11n ht20 mode(2TX mode 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 (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5180 MHz										
5180	72.44	PK	H	31.72	5.21	0.00	109.37	103.37	N/A	N/A
5180	61.68	AV	H	31.72	5.21	0.00	98.61	92.61	N/A	N/A
5180	74.37	PK	V	31.72	5.21	0.00	111.3	105.3	N/A	N/A
5180	63.11	AV	V	31.72	5.21	0.00	100.04	94.04	N/A	N/A
5150	34.98	PK	V	31.67	5.18	0.00	71.83	65.83	74	8.17
5150	18.44	AV	V	31.67	5.18	0.00	55.29	49.29	54	4.71
10360	33.47	PK	V	37.37	7.76	26.37	52.23	46.23	74	27.77
10360	22.32	AV	V	37.37	7.76	26.37	41.08	35.08	54	18.92
15540	34.96	PK	V	39.41	10.22	25.32	59.27	53.27	74	20.73
15540	24.02	AV	V	39.41	10.22	25.32	48.33	42.33	54	11.67
1556	34.12	PK	V	24.19	2.71	26.38	34.64	28.64	74	45.36
1556	22.47	AV	V	24.19	2.71	26.38	22.99	16.99	54	37.01
3655	36.68	PK	V	27.62	4.41	26.58	42.13	36.13	74	37.87
3655	24.36	AV	V	27.62	4.41	26.58	29.81	23.81	54	30.19
44.55	49.89	QP	H	11.82	0.34	28.51	33.54	33.54	40.00	6.46
60.07	54.02	QP	H	7.50	0.49	28.43	33.58	33.58	40.00	6.42
Middle Channel:5200 MHz										
5200	71.25	PK	H	31.76	5.23	0.00	108.24	102.24	N/A	N/A
5200	60.02	AV	H	31.76	5.23	0.00	97.01	91.01	N/A	N/A
5200	72.68	PK	V	31.76	5.23	0.00	109.67	103.67	N/A	N/A
5200	61.31	AV	V	31.76	5.23	0.00	98.3	92.3	N/A	N/A
10400	33.88	PK	V	37.38	7.79	26.36	52.69	46.69	74	21.31
10400	22.72	AV	V	37.38	7.79	26.36	41.53	35.53	54	12.47
15600	35.20	PK	V	39.42	10.22	25.31	59.53	53.53	74	14.47
15600	24.64	AV	V	39.42	10.22	25.31	48.97	42.97	54	5.03
1612	33.88	PK	V	24.28	2.76	26.44	34.48	28.48	74	39.52
1612	22.56	AV	V	24.28	2.76	26.44	23.16	17.16	54	30.84
3689	36.49	PK	V	27.76	4.46	26.57	42.14	36.14	74	31.86
3689	24.30	AV	V	27.76	4.46	26.57	29.95	23.95	54	24.05
44.55	49.42	QP	H	11.82	0.34	28.51	33.07	33.07	40.00	6.93
60.07	54.46	QP	H	7.50	0.49	28.43	34.02	34.02	40.00	5.98
High Channel:5240 MHz										
5240	71.72	PK	H	31.83	5.27	0.00	108.82	102.82	N/A	N/A
5240	60.10	AV	H	31.83	5.27	0.00	97.2	91.2	N/A	N/A
5240	73.67	PK	V	31.83	5.27	0.00	110.77	104.77	N/A	N/A
5240	62.33	AV	V	31.83	5.27	0.00	99.43	93.43	N/A	N/A
5350	27.24	PK	V	32.03	5.37	0.00	64.64	58.64	74	15.36
5350	13.85	AV	V	32.03	5.37	0.00	51.25	45.25	54	8.75
10480	33.22	PK	V	37.40	7.84	26.35	52.11	46.11	74	27.89
10480	21.85	AV	V	37.40	7.84	26.35	40.74	34.74	54	19.26
15720	33.64	PK	V	39.44	10.24	25.30	58.02	52.02	74	21.98
15720	22.47	AV	V	39.44	10.24	25.30	46.85	40.85	54	13.15
1678	34.76	PK	V	24.38	2.81	26.50	35.45	29.45	74	44.55
1678	23.59	AV	V	24.38	2.81	26.50	24.28	18.28	54	35.72
3743	36.30	PK	V	27.97	4.54	26.57	42.24	36.24	74	37.76
3743	25.27	AV	V	27.97	4.54	26.57	31.21	25.21	54	28.79
44.55	49.01	QP	H	11.82	0.34	28.51	32.66	32.66	40.00	7.34
60.07	52.69	QP	H	7.50	0.49	28.43	32.25	32.25	40.00	7.75

5725-5850MHz:
802.11a mode(2TX mode 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 (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5745 MHz										
5745	75.83	PK	H	32.59	5.74	0.00	114.16	108.16	N/A	N/A
5745	64.59	AV	H	32.59	5.74	0.00	102.92	96.92	N/A	N/A
5745	74.52	PK	V	32.59	5.74	0.00	112.85	106.85	N/A	N/A
5745	63.88	AV	V	32.59	5.74	0.00	102.21	96.21	N/A	N/A
5725	50.62	PK	H	32.57	5.72	0.00	88.91	82.91	122.2	39.29
5720	41.28	PK	H	32.56	5.71	0.00	79.55	73.55	110.8	37.25
5700	31.46	PK	H	32.54	5.70	0.00	69.7	63.7	105.2	41.5
5650	29.38	PK	H	32.48	5.65	0.00	67.51	61.51	68.2	6.69
11490	31.95	PK	H	37.99	8.22	26.02	52.14	46.14	74	27.86
11490	21.26	AV	H	37.99	8.22	26.02	41.45	35.45	54	18.55
17235	33.03	PK	H	42.98	10.82	25.99	60.84	54.84	74	19.16
17235	21.54	AV	H	42.98	10.82	25.99	49.35	43.35	54	10.65
3387	37.00	PK	H	26.37	4.01	26.55	40.83	34.83	74	39.17
3387	25.74	AV	H	26.37	4.01	26.55	29.57	23.57	54	30.43
44.55	49.28	QP	H	11.82	0.34	28.51	32.93	32.93	40.00	7.07
60.07	52.83	QP	H	7.50	0.49	28.43	32.39	32.39	40.00	7.61
Middle Channel:5785 MHz										
5785	74.79	PK	H	32.64	5.77	0.00	113.2	107.2	N/A	N/A
5785	64.27	AV	H	32.64	5.77	0.00	102.68	96.68	N/A	N/A
5785	73.36	PK	V	32.64	5.77	0.00	111.77	105.77	N/A	N/A
5785	62.90	AV	V	32.64	5.77	0.00	101.31	95.31	N/A	N/A
11570	32.33	PK	H	38.03	8.21	26.00	52.57	46.57	74	27.43
11570	22.22	AV	H	38.03	8.21	26.00	42.46	36.46	54	17.54
17355	32.16	PK	H	43.53	11.03	26.16	60.56	54.56	74	19.44
17355	21.49	AV	H	43.53	11.03	26.16	49.89	43.89	54	10.11
3425	37.90	PK	H	26.58	4.07	26.56	41.99	35.99	74	38.01
3425	27.38	AV	H	26.58	4.07	26.56	31.47	25.47	54	28.53
44.55	50.12	QP	H	11.82	0.34	28.51	33.77	33.77	40.00	6.23
60.07	53.25	QP	H	7.50	0.49	28.43	32.81	32.81	40.00	7.19
High Channel:5825 MHz										
5825	75.47	PK	H	32.69	5.81	0.00	113.97	107.97	N/A	N/A
5825	64.29	AV	H	32.69	5.81	0.00	102.79	96.79	N/A	N/A
5825	74.76	PK	V	32.69	5.81	0.00	113.26	107.26	N/A	N/A
5825	64.11	AV	V	32.69	5.81	0.00	102.61	96.61	N/A	N/A
5850	38.57	PK	H	32.72	5.83	0.00	77.12	71.12	122.2	51.08
5855	32.97	PK	H	32.73	5.83	0.00	71.53	65.53	110.8	45.27
5875	29.64	PK	H	32.75	5.85	0.00	68.24	62.24	105.2	42.96
5925	29.39	PK	H	32.81	5.89	0.00	68.09	62.09	68.2	6.11
11650	32.69	PK	H	38.06	8.20	25.98	52.97	46.97	74	27.03
11650	22.63	AV	H	38.06	8.20	25.98	42.91	36.91	54	17.09
17475	31.53	PK	H	44.09	11.23	26.33	60.52	54.52	74	19.48
17475	20.41	AV	H	44.09	11.23	26.33	49.4	43.4	54	10.6
3472	37.23	PK	H	26.84	4.14	26.58	41.63	35.63	74	38.37
3472	26.48	AV	H	26.84	4.14	26.58	30.88	24.88	54	29.12
44.55	49.65	QP	H	11.82	0.34	28.51	33.30	33.30	40.00	6.70
60.07	53.69	QP	H	7.50	0.49	28.43	33.25	33.25	40.00	6.75

802.11n ht20 mode(2TX mode 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 (PK/QP/AV)	Polar (H/V)	Factor (dB)						
Low Channel:5745 MHz										
5745	75.01	PK	H	32.59	5.74	0.00	113.34	107.34	N/A	N/A
5745	64.14	AV	H	32.59	5.74	0.00	102.47	96.47	N/A	N/A
5745	73.58	PK	V	32.59	5.74	0.00	111.91	105.91	N/A	N/A
5745	62.89	AV	V	32.59	5.74	0.00	101.22	95.22	N/A	N/A
5725	52.81	PK	H	32.57	5.72	0.00	91.1	85.1	122.2	37.1
5720	44.89	PK	H	32.56	5.71	0.00	83.16	77.16	110.8	33.64
5700	30.41	PK	H	32.54	5.70	0.00	68.65	62.65	105.2	42.55
5650	28.73	PK	H	32.48	5.65	0.00	66.86	60.86	68.2	7.34
11490	32.67	PK	H	37.99	8.22	26.02	52.86	46.86	74	27.14
11490	21.76	AV	H	37.99	8.22	26.02	41.95	35.95	54	18.05
17235	32.69	PK	H	42.98	10.82	25.99	60.5	54.5	74	19.5
17235	21.84	AV	H	42.98	10.82	25.99	49.65	43.65	54	10.35
3387	37.61	PK	H	26.37	4.01	26.55	41.44	35.44	74	38.56
3387	27.23	AV	H	26.37	4.01	26.55	31.06	25.06	54	28.94
44.55	49.18	QP	H	11.82	0.34	28.51	32.83	32.83	40.00	7.17
60.07	54.13	QP	H	7.50	0.49	28.43	33.69	33.69	40.00	6.31
Middle Channel:5785 MHz										
5785	74.79	PK	H	32.64	5.77	0.00	113.2	107.2	N/A	N/A
5785	64.27	AV	H	32.64	5.77	0.00	102.68	96.68	N/A	N/A
5785	73.36	PK	V	32.64	5.77	0.00	111.77	105.77	N/A	N/A
5785	62.90	AV	V	32.64	5.77	0.00	101.31	95.31	N/A	N/A
11570	32.95	PK	H	38.03	8.21	26.00	53.19	47.19	74	26.81
11570	22.46	AV	H	38.03	8.21	26.00	42.7	36.7	54	17.3
17355	32.26	PK	H	43.53	11.03	26.16	60.66	54.66	74	19.34
17355	22.33	AV	H	43.53	11.03	26.16	50.73	44.73	54	9.27
3425	37.84	PK	H	26.58	4.07	26.56	41.93	35.93	74	38.07
3425	26.50	AV	H	26.58	4.07	26.56	30.59	24.59	54	29.41
44.55	48.75	QP	H	11.82	0.34	28.51	32.40	32.40	40.00	7.60
60.07	53.02	QP	H	7.50	0.49	28.43	32.58	32.58	40.00	7.42
High Channel:5825 MHz										
5825	74.71	PK	H	32.69	5.81	0.00	113.21	107.21	N/A	N/A
5825	64.14	AV	H	32.69	5.81	0.00	102.64	96.64	N/A	N/A
5825	72.82	PK	V	32.69	5.81	0.00	111.32	105.32	N/A	N/A
5825	61.55	AV	V	32.69	5.81	0.00	100.05	94.05	N/A	N/A
5850	42.61	PK	H	32.72	5.83	0.00	81.16	75.16	122.2	47.04
5855	36.22	PK	H	32.73	5.83	0.00	74.78	68.78	110.8	42.02
5875	30.46	PK	H	32.75	5.85	0.00	69.06	63.06	105.2	42.14
5925	29.08	PK	H	32.81	5.89	0.00	67.78	61.78	68.2	6.42
11650	33.69	PK	H	38.06	8.20	25.98	53.97	47.97	74	26.03
11650	22.83	AV	H	38.06	8.20	25.98	43.11	37.11	54	16.89
17475	31.78	PK	H	44.09	11.23	26.33	60.77	54.77	74	19.23
17475	21.03	AV	H	44.09	11.23	26.33	50.02	44.02	54	9.98
3472	37.93	PK	H	26.84	4.14	26.58	42.33	36.33	74	37.67
3472	26.51	AV	H	26.84	4.14	26.58	30.91	24.91	54	29.09
44.55	49.02	QP	H	11.82	0.34	28.51	32.67	32.67	40.00	7.33
60.07	53.16	QP	H	7.50	0.49	28.43	32.72	32.72	40.00	7.28

FCC §15.407(a) –EMISSION BANDWIDTH

Applicable Standard

15.407(a)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested 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 v01r03

Test Data

Environmental Conditions

Temperature:	24.2~24.8 °C
Relative Humidity:	50~52 %
ATM Pressure:	96.7~96.8 kPa

The testing was performed by Kevin Hu from 2017-01-20 to 2017-02-15.

Test Result: Pass.

Please refer to the following tables and plots.

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

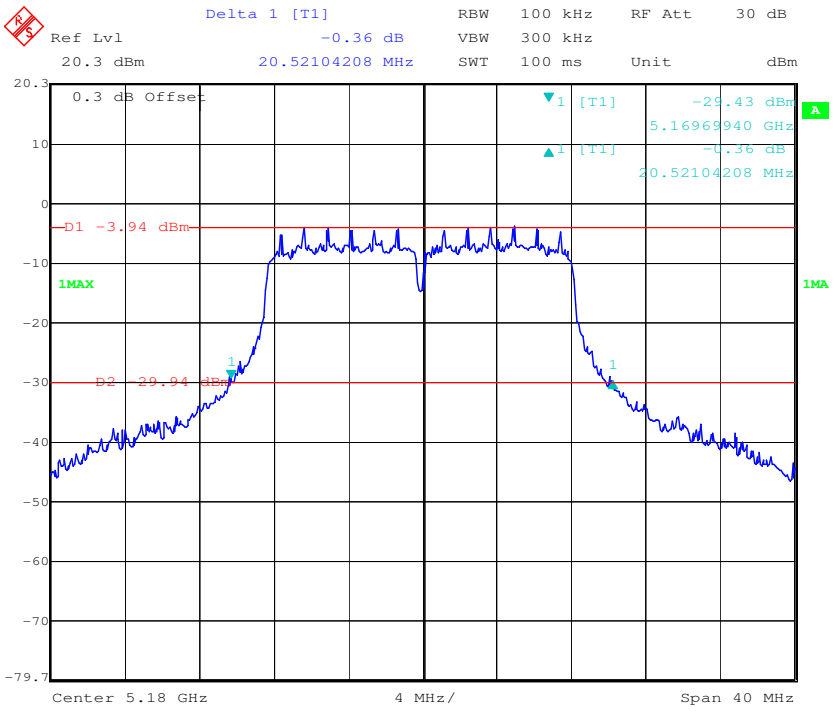
UNII Band	Mode	Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)
5150-5250MHz	802.11 a	Low	5180	20.52
		Middle	5200	20.00
		High	5240	20.12
	802.11 n20	Low	5180	20.92
		Middle	5200	20.64
		High	5240	20.52
5725-5850MHz	802.11 a	Low	5745	25.25
		Middle	5785	25.57
		High	5825	27.49
	802.11 n20	Low	5745	25.97
		Middle	5785	29.58
		High	5825	29.66

Note: the 26dB bandwith have not fall into the the frequency 5250-5350MHz and 5470-5725MHz band, 26dB Bandwidth for 5725-5850MHz band only for reporting.

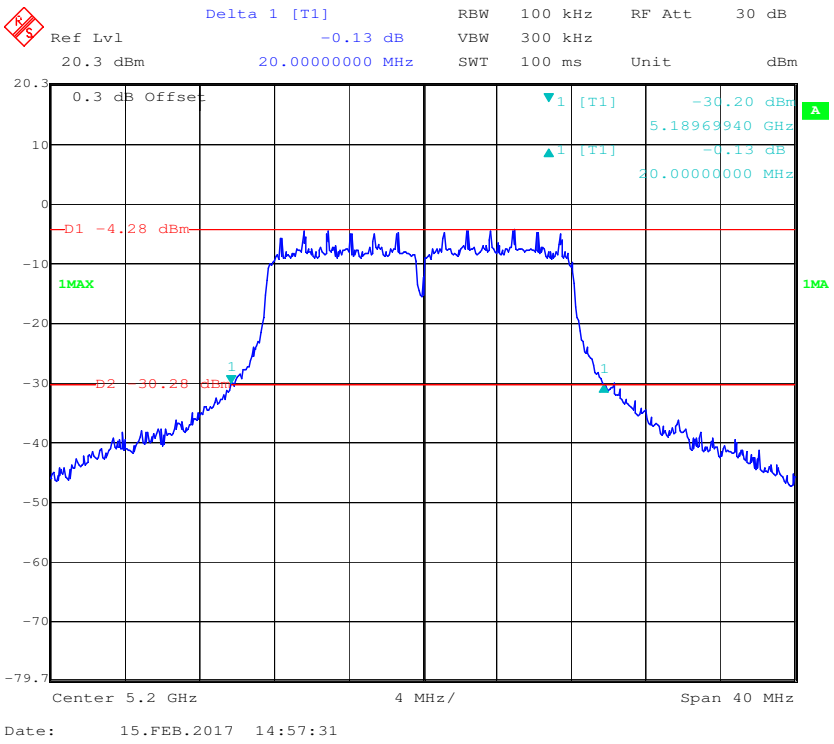
UNII Band	Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limits (MHz)
5725-5850MHz	802.11 a	Low	5745	16.11	≥0.5
		Middle	5785	16.35	≥0.5
		High	5825	16.35	≥0.5
	802.11 n20	Low	5745	17.07	≥0.5
		Middle	5785	16.99	≥0.5
		High	5825	16.99	≥0.5

5150-5250MHz:

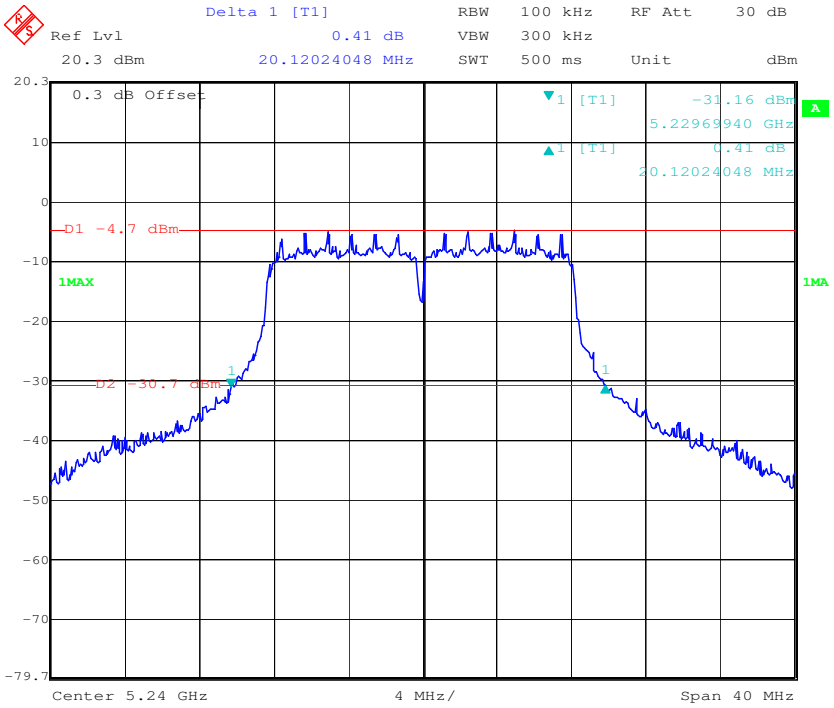
802.11a Low Channel



802.11a Middle Channel

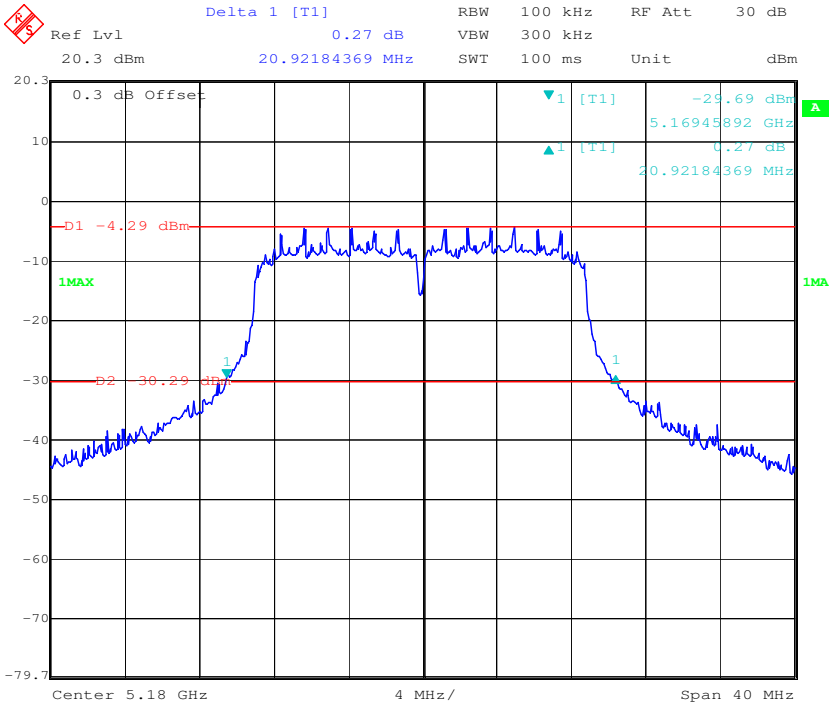


802.11a High Channel



Date: 15.FEB.2017 15:27:01

802.11n ht20 Low Channel



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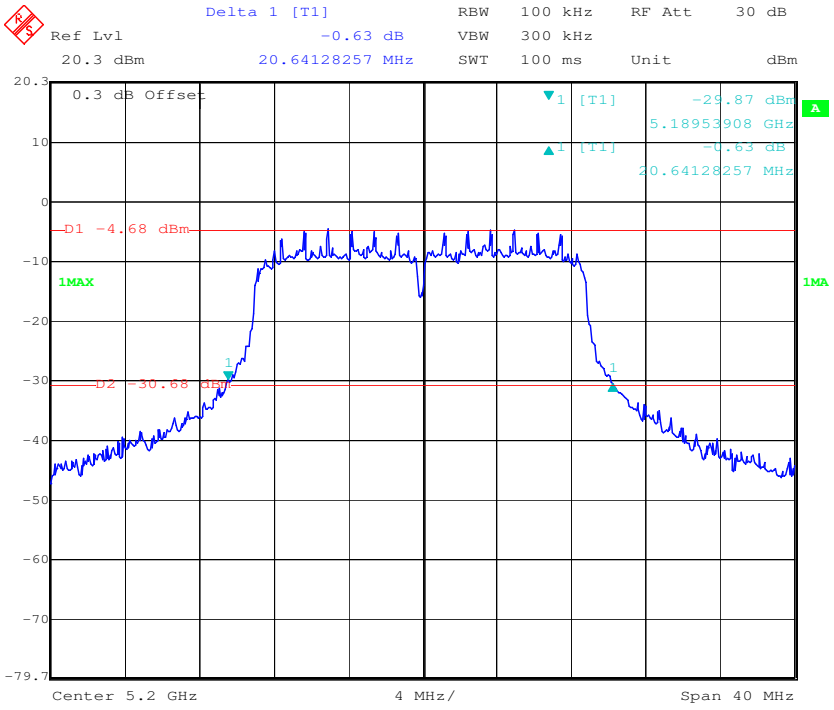
802.11n ht20 Middle Channel



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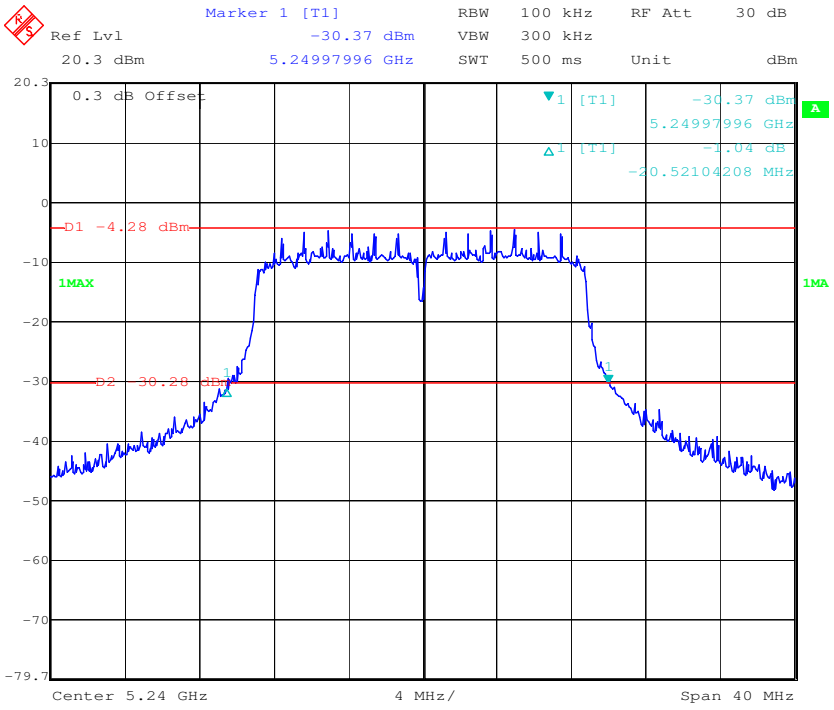
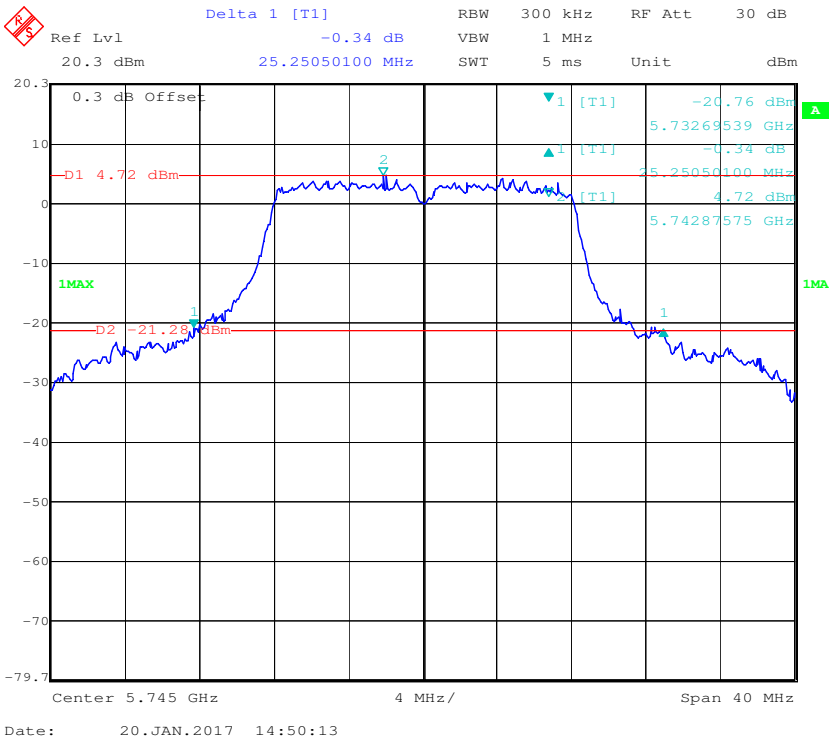


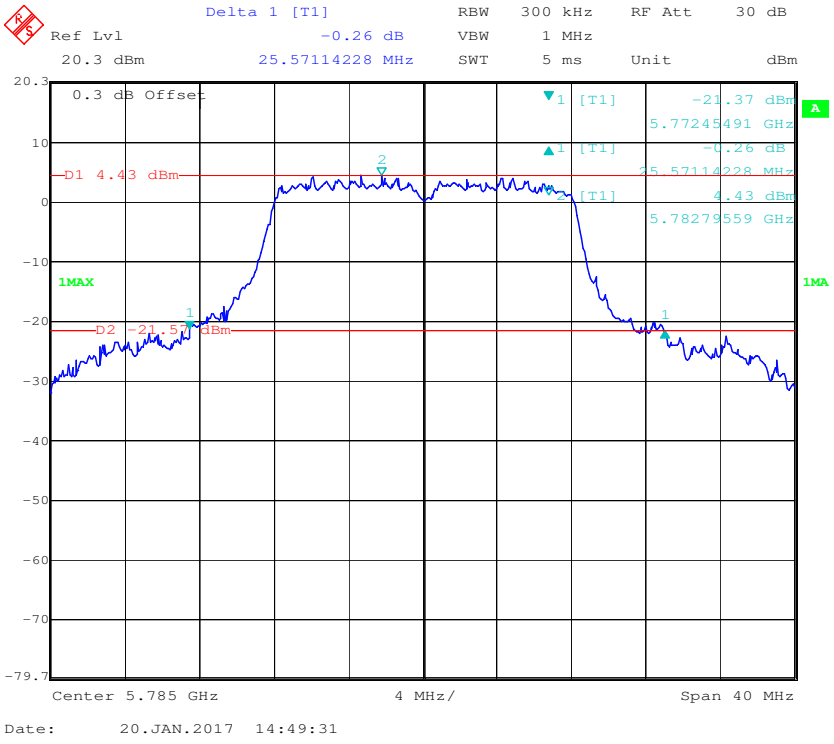
Date: 15.FEB.2017 15:19:12

5725-5850MHz:

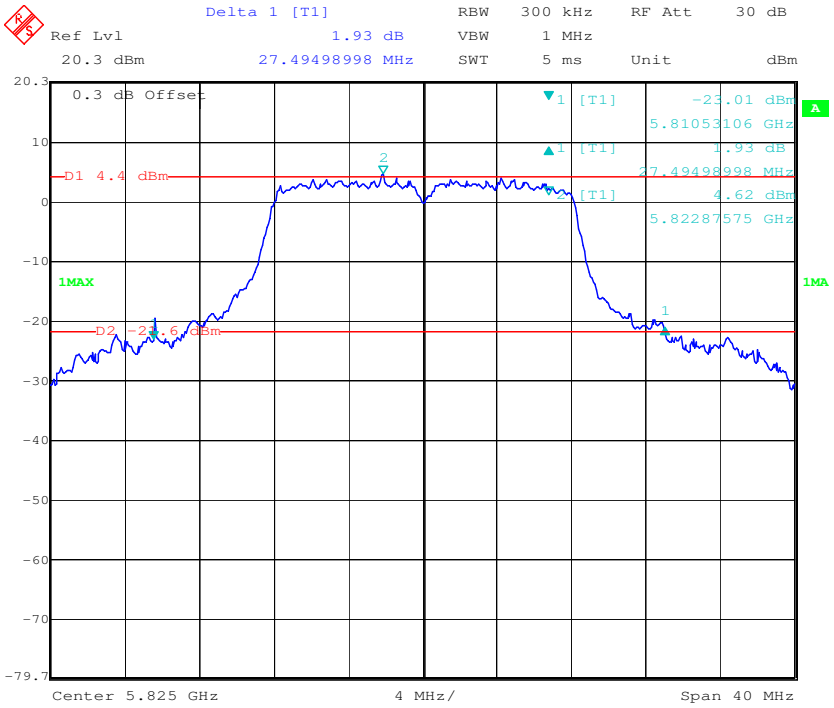
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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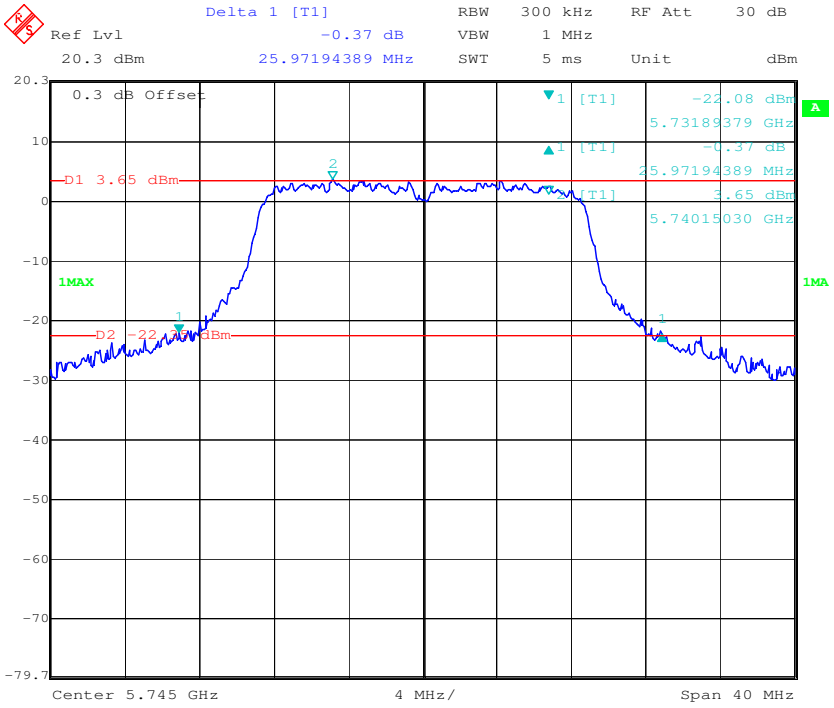

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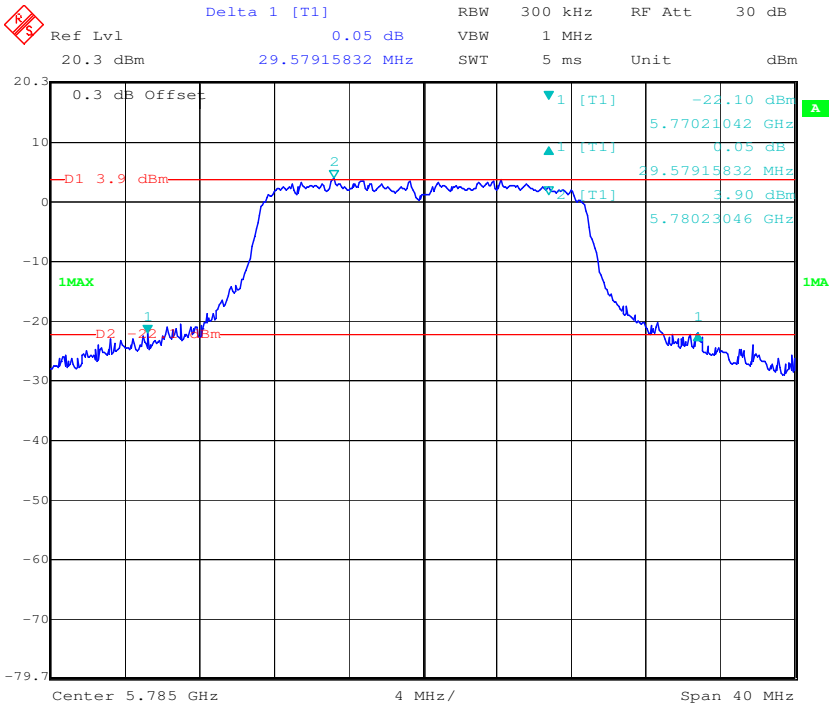

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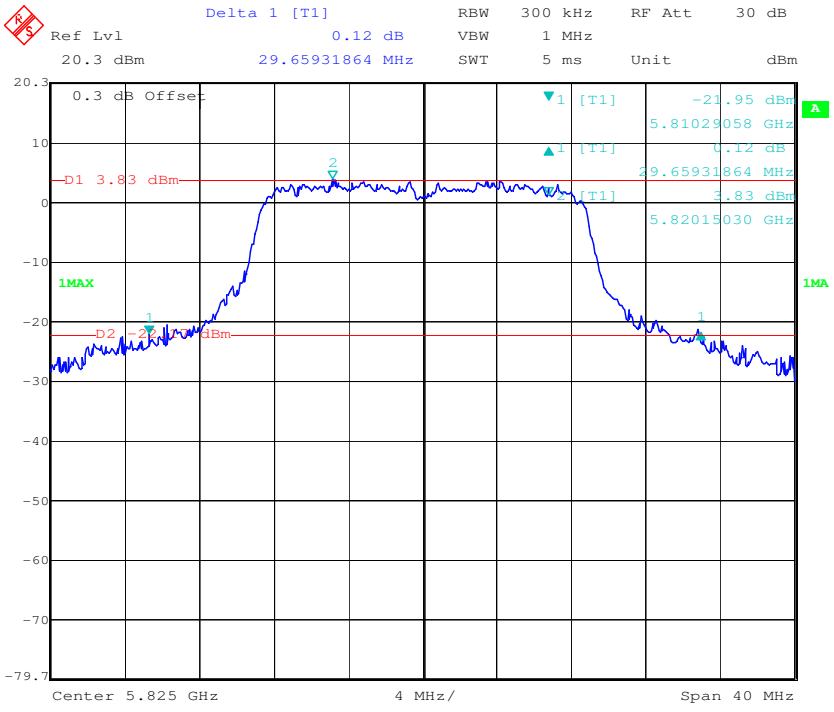
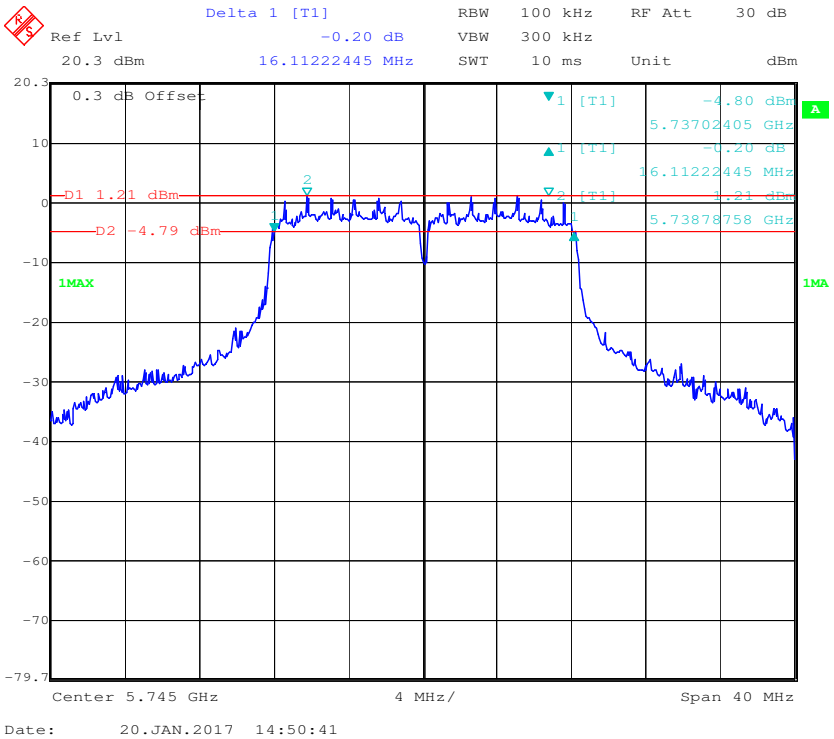
802.11n ht20 High Channel



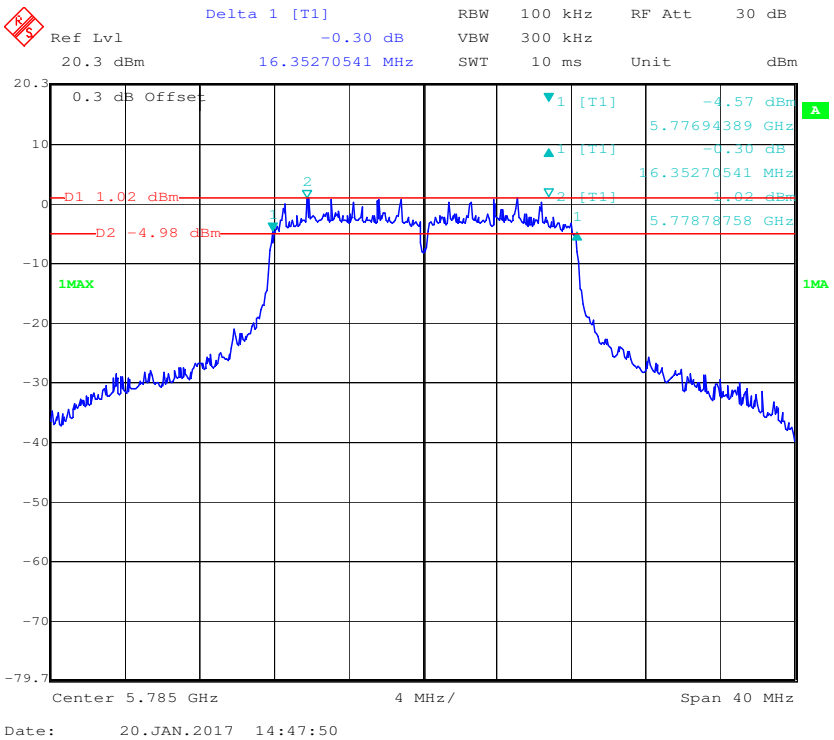
Date: 20.JAN.2017 14:38:20

6dB Bandwidth:
5725-5850MHz

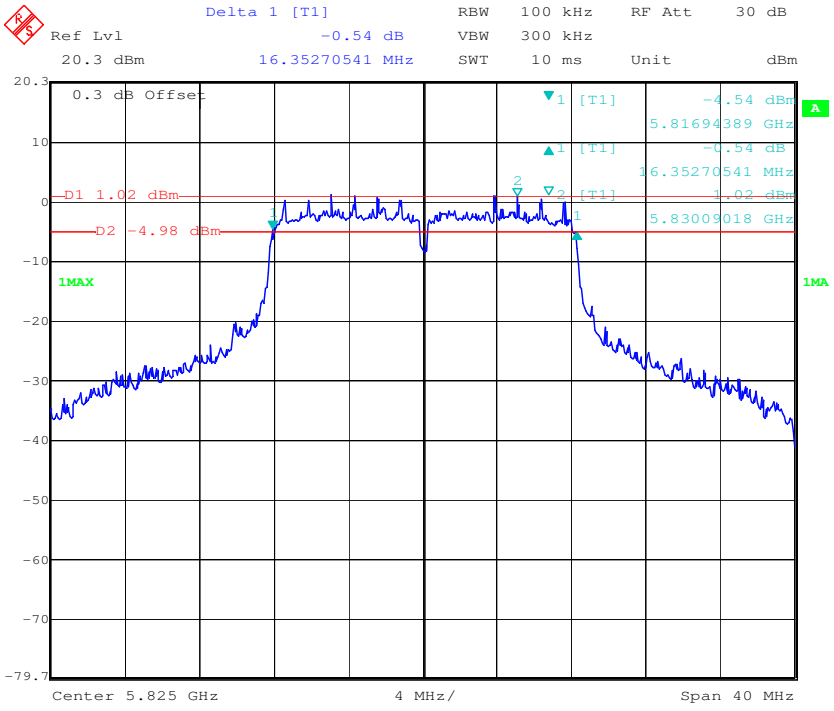
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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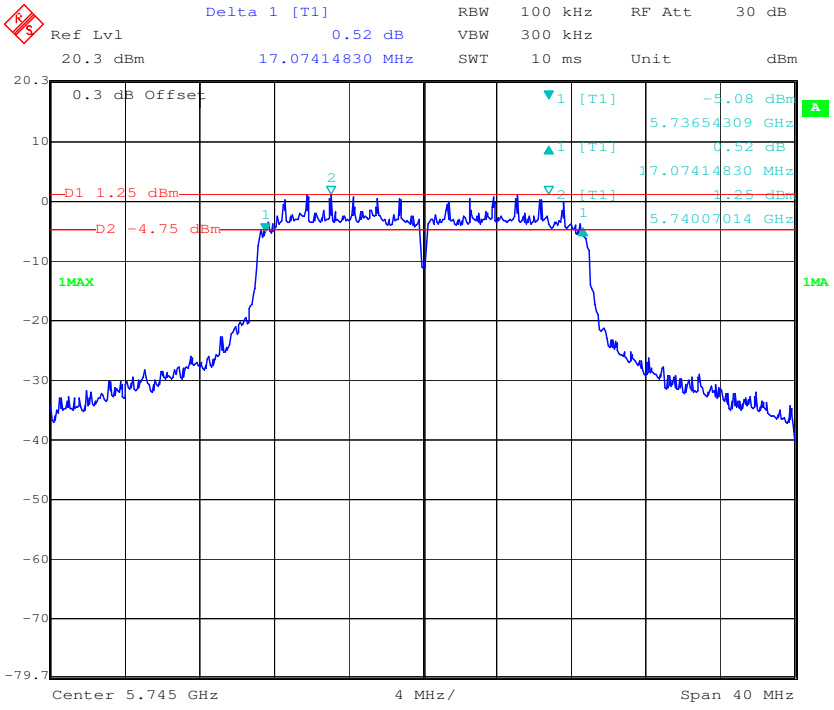
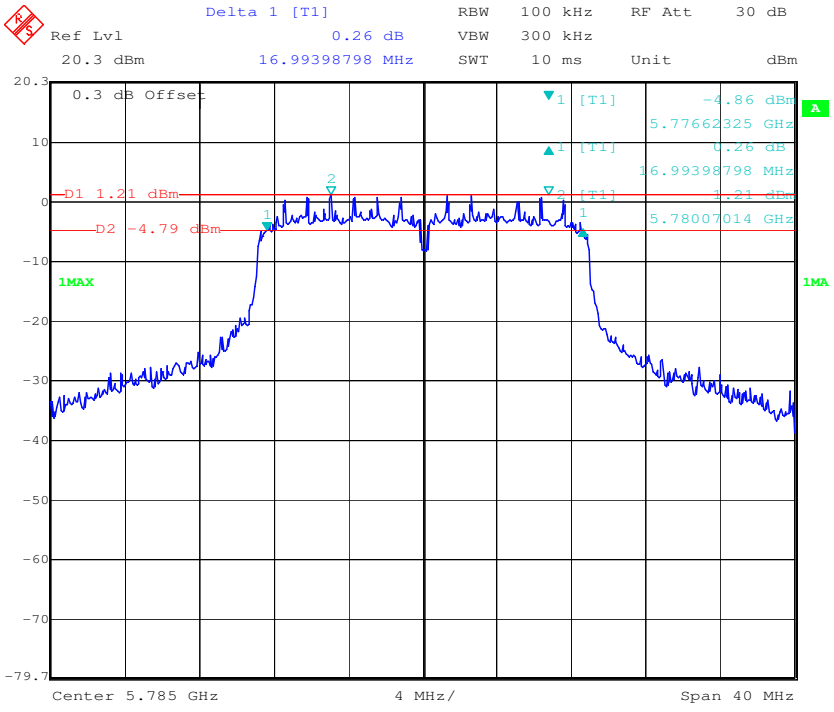
802.11n ht20 Low Channel



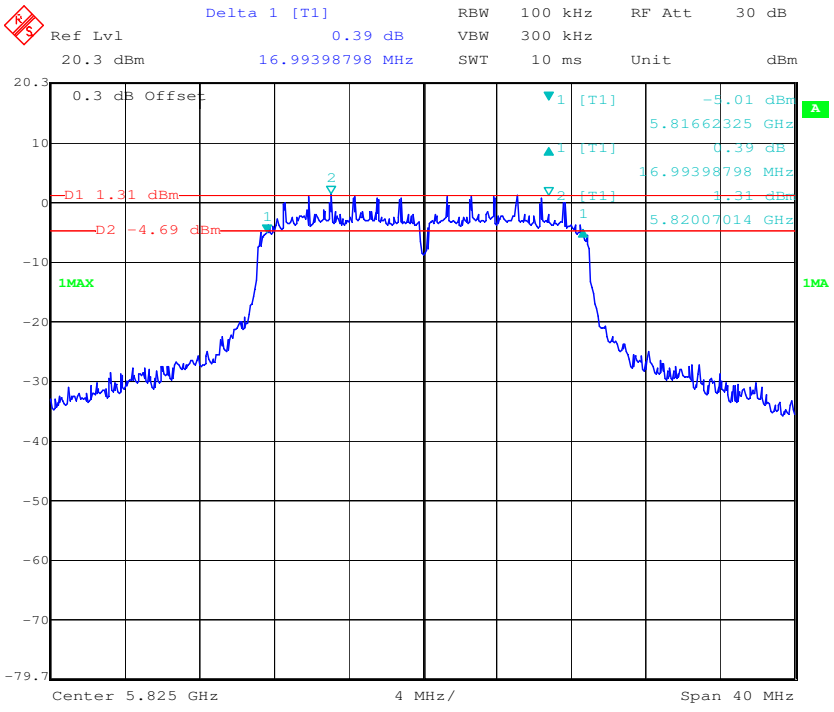
Date: 20.JAN.2017 14:32:40

802.11n ht20 Middle Channel



Date: 20.JAN.2017 14:36:29

802.11n ht20 High Channel



Date: 20.JAN.2017 14:38:45

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	MY54170074	2017-01-03	2018-01-03
Agilent	P-Series Power Meter	N1912A	MY5000798	2017-01-03	2018-01-03
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested 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 v01r03

Test Data

Environmental Conditions

Temperature:	28.9 °C
Relative Humidity:	39 %
ATM Pressure:	100.9kPa

The testing was performed by Kevin Hu on 2017-01-16.

Test Mode: Transmitting

UNII Band	Mode	Frequency (MHz)	RMS Channel Power (dBm)		Total (dBm)	Limits (dBm)	Result
			Chain 0	Chain 1			
5150-5250MHz	802.11a	5180	9.01	9.38	12.21	23.93	PASS
		5200	8.67	9.86	12.32	23.93	PASS
		5240	9.07	10.86	13.07	23.93	PASS
	802.11n20	5180	8.94	9.56	12.27	23.93	PASS
		5200	8.43	9.75	12.15	23.93	PASS
		5240	8.89	10.98	13.07	23.93	PASS
5725-5850MHz	802.11a	5745	12.14	10.92	14.58	29.93	PASS
		5785	12.09	11.04	14.61	29.93	PASS
		5825	11.95	10.82	14.43	29.93	PASS
	802.11n20	5745	11.98	10.82	14.45	29.93	PASS
		5785	11.94	10.88	14.45	29.93	PASS
		5825	11.64	10.63	14.17	29.93	PASS

Note: For 802.11a/n mode, the device employed Cyclic Delay Diversity (CDD) for 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 = 6.07dBi > 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 v01r03

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
N/A	RF Cable	N/A	N/A	Each Time	/

*** Statement of Traceability:** BACL (Chengdu) attested that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	24.2 °C
Relative Humidity:	52 %
ATM Pressure:	96.7 kPa

The testing was performed by Kevin Hu on 2017-01-20.

Test Mode: Transmitting

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

5150-5250MHz:

Mode	Channel	Frequency MHz	PSD (dBm/MHz)		Total (dBm/MHz)	Limit (dBm/MHz)
			Chain 0	Chain 1		
802.11a	Low	5180	0.13	2.08	3.14	7.93
	Middle	5200	-1.18	1.28	3.23	7.93
	High	5240	-0.55	1.63	3.69	7.93
802.11n20	Low	5180	0.12	0.95	3.57	7.93
	Middle	5200	-0.42	1.35	3.56	7.93
	High	5240	-0.88	1.03	3.19	7.93

Note: the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO modes, 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 = 6.07+10*log(2) =9.07 dBi
The Power density Limits was reduce 3.07dB

5725-5850MHz:

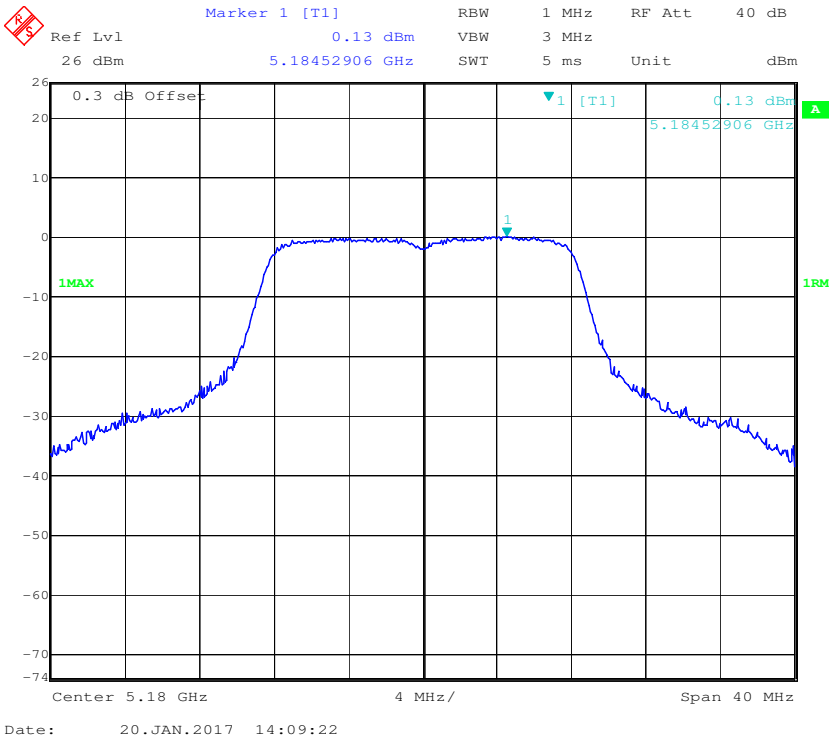
Mode	Channel	Frequency MHz	PSD (dBm/300kHz)		Total (dBm/500kHz)	Limit (dBm/500kHz)
			Chain 0	Chain 1		
802.11a	Low	5745	-0.05	-1.52	4.49	26.93
	Middle	5785	0.19	-1.49	4.64	26.93
	High	5825	-0.21	-1.07	4.59	26.93
802.11n20	Low	5745	0.34	-1.22	4.84	26.93
	Middle	5785	0.47	-0.74	5.12	26.93
	High	5825	0.37	-1.27	4.84	26.93

Note: the device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO modes, 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 = 6.07+10*log(2) =9.07 dBi
The Power density Limits was reduce 3.07dB

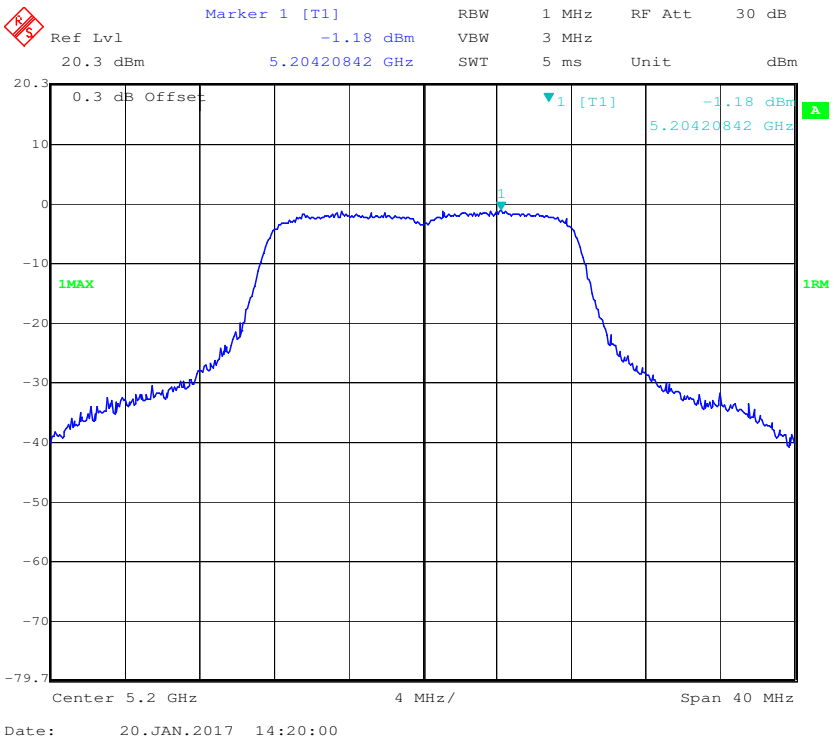
The measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

5150MHz-5250MHz:
Chain 0:

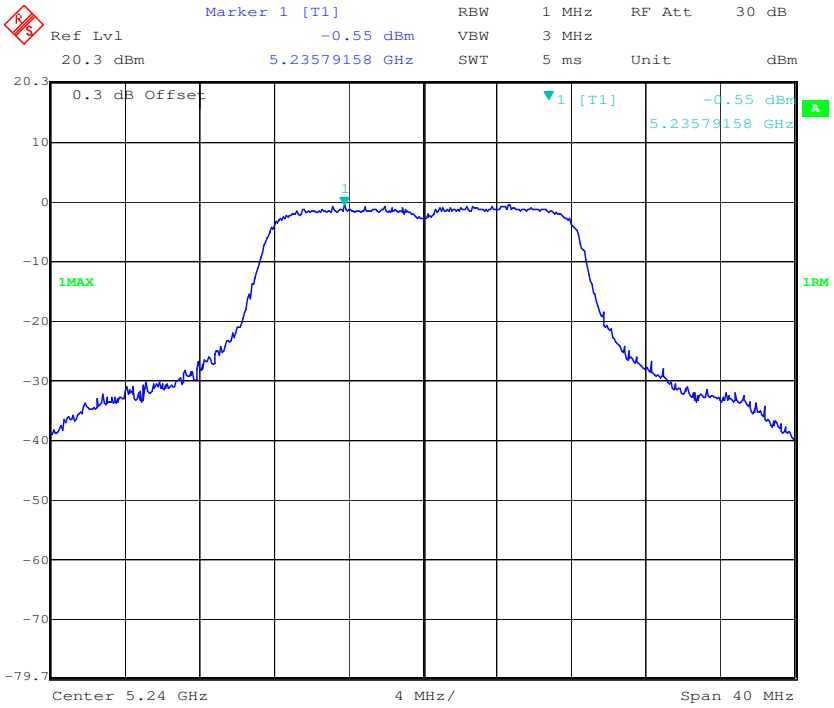
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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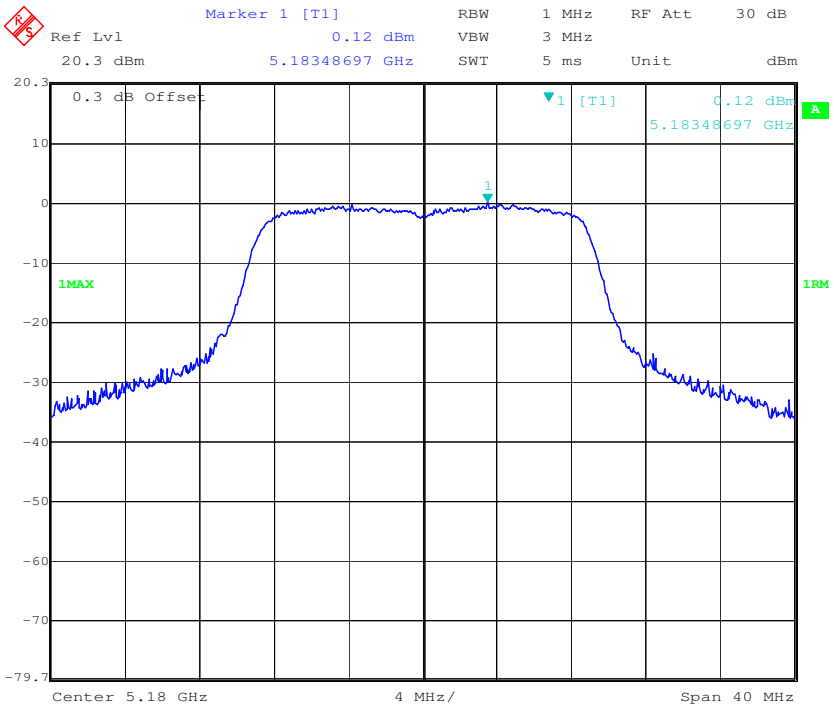
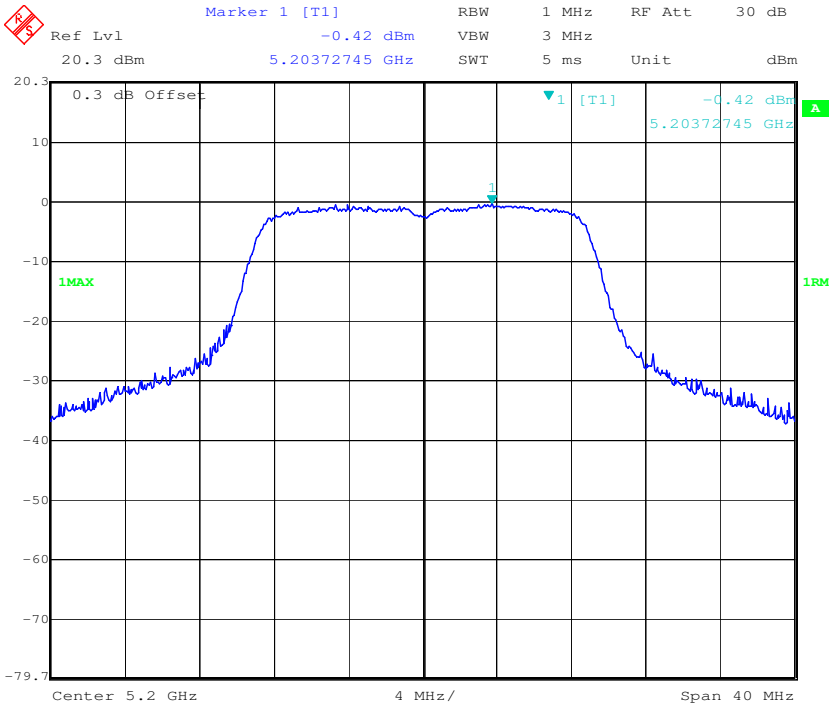
802.11n ht20 Low Channel



Date: 20.JAN.2017 14:29:35

802.11n ht20 Middle Channel



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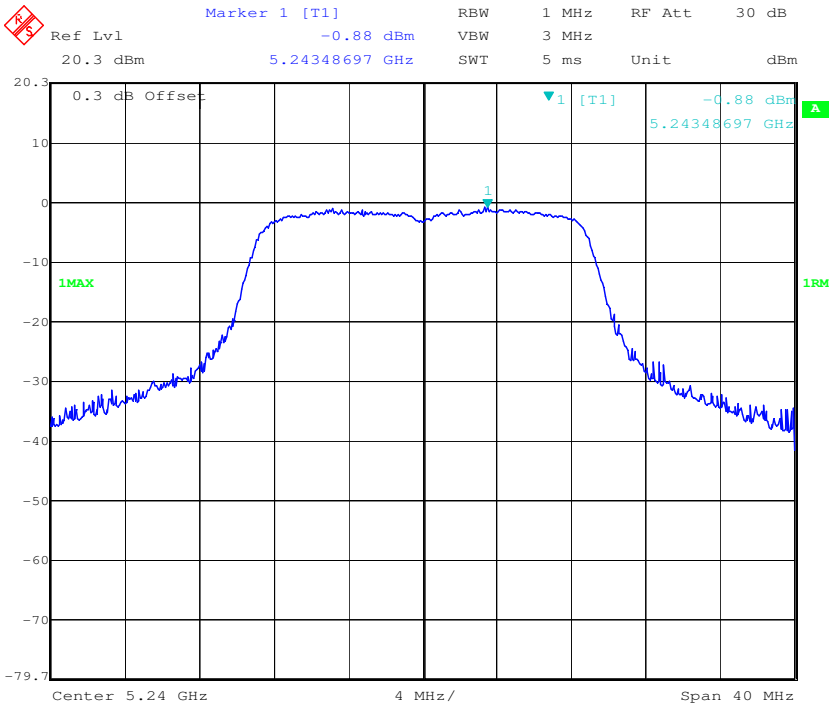
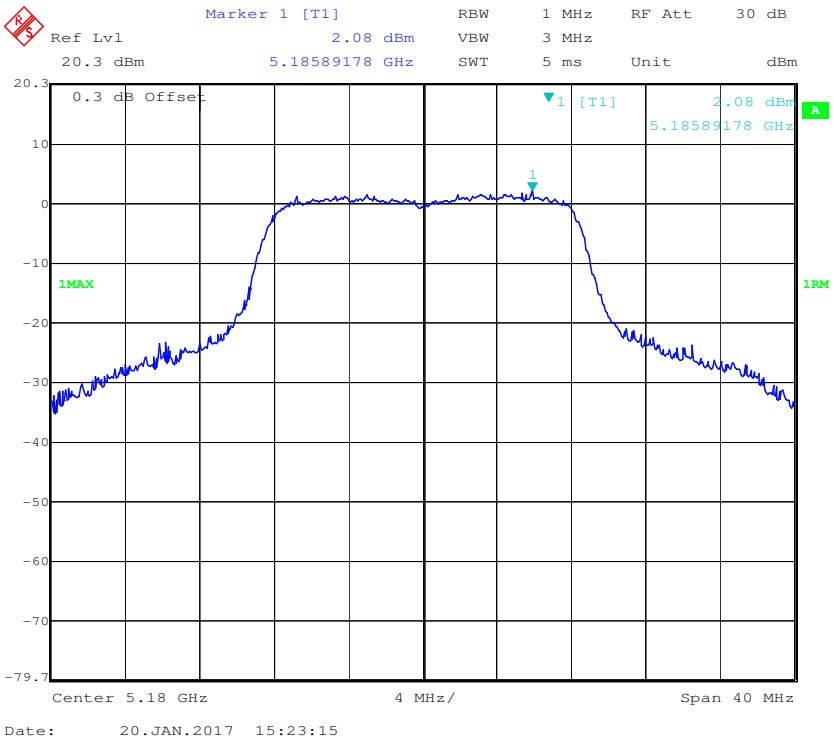


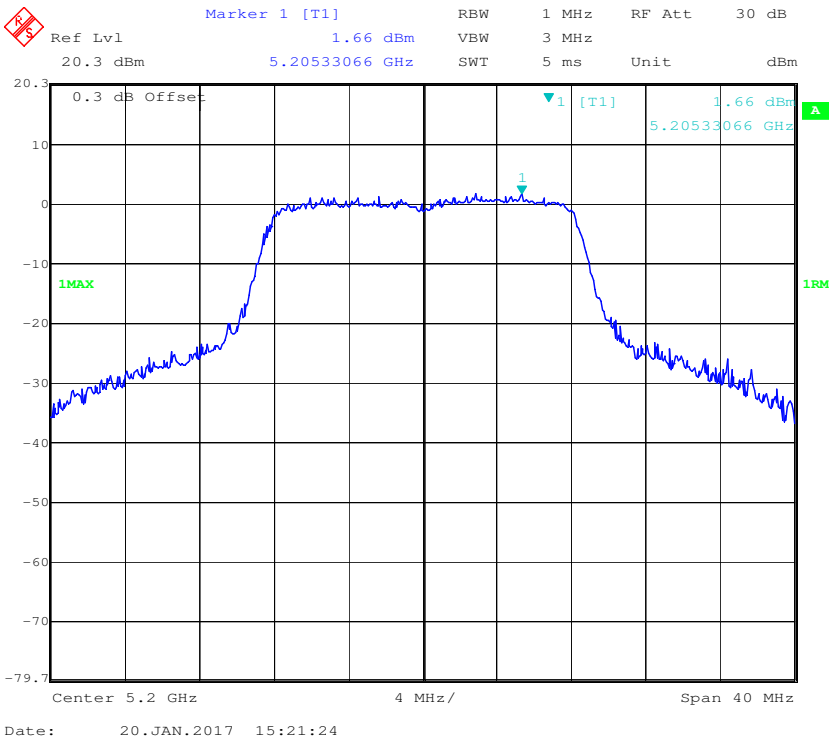
Date: 20.JAN.2017 14:24:41

Chain 1:

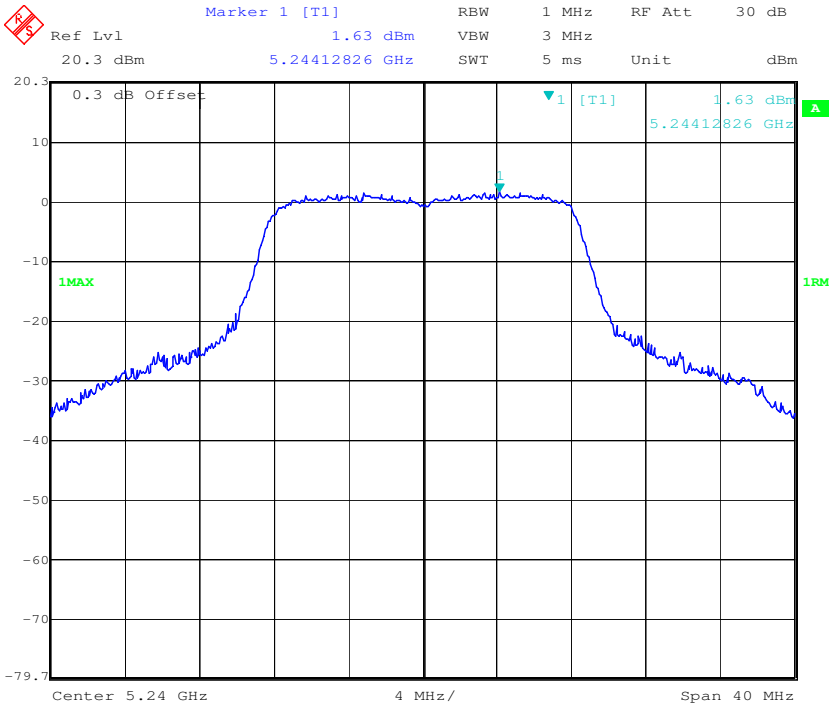
802.11a Low Channel



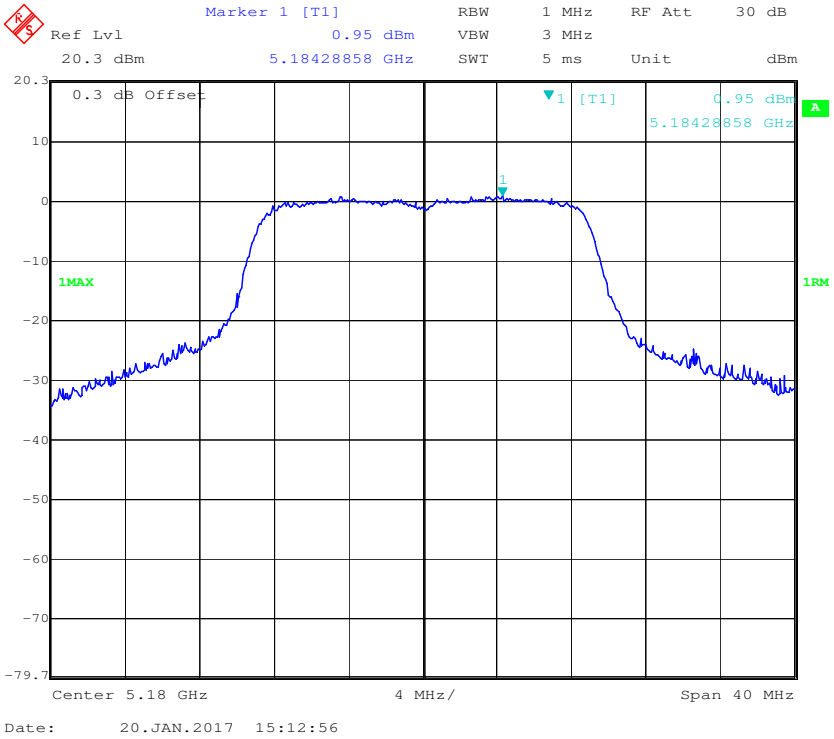
802.11a Middle Channel



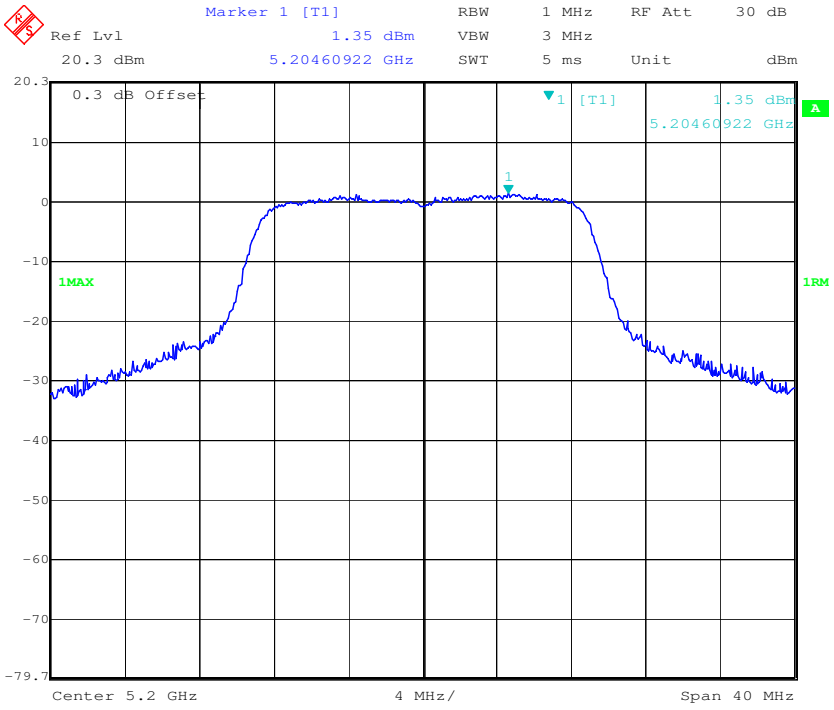
802.11a High Channel



802.11n ht20 Low Channel



802.11n ht20 Middle Channel



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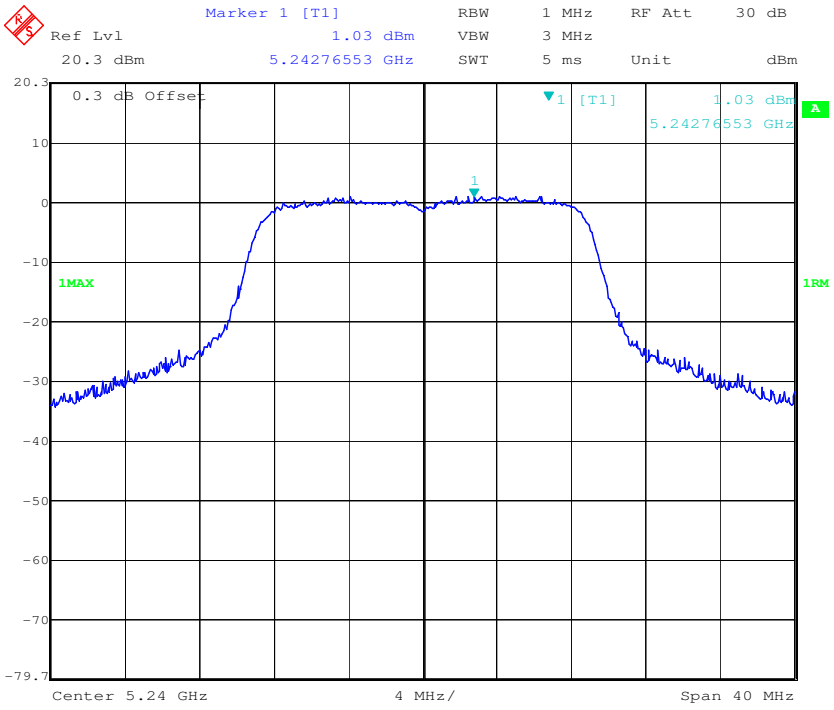
802.11n ht20 High Channel



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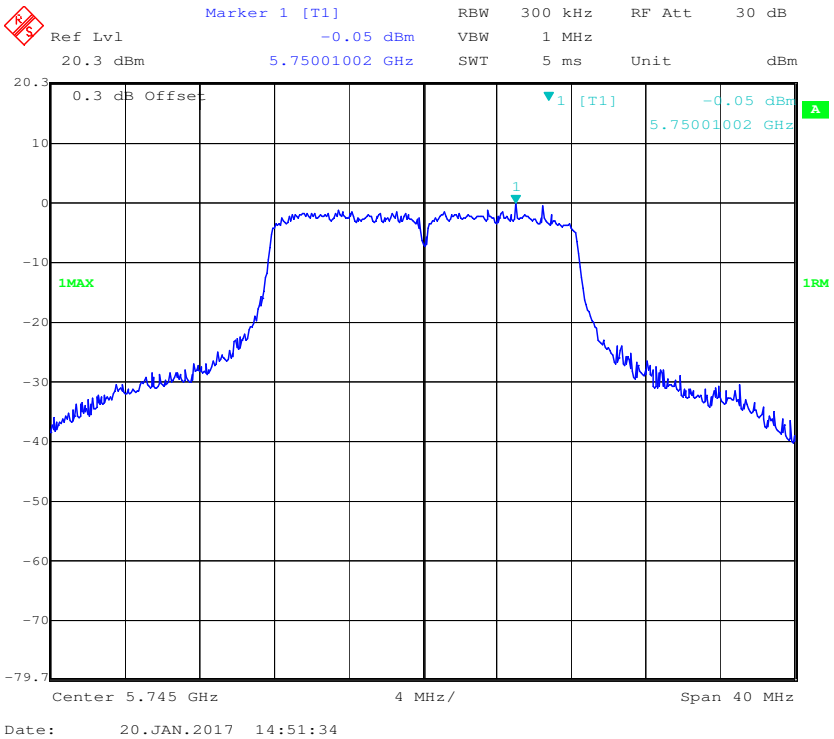
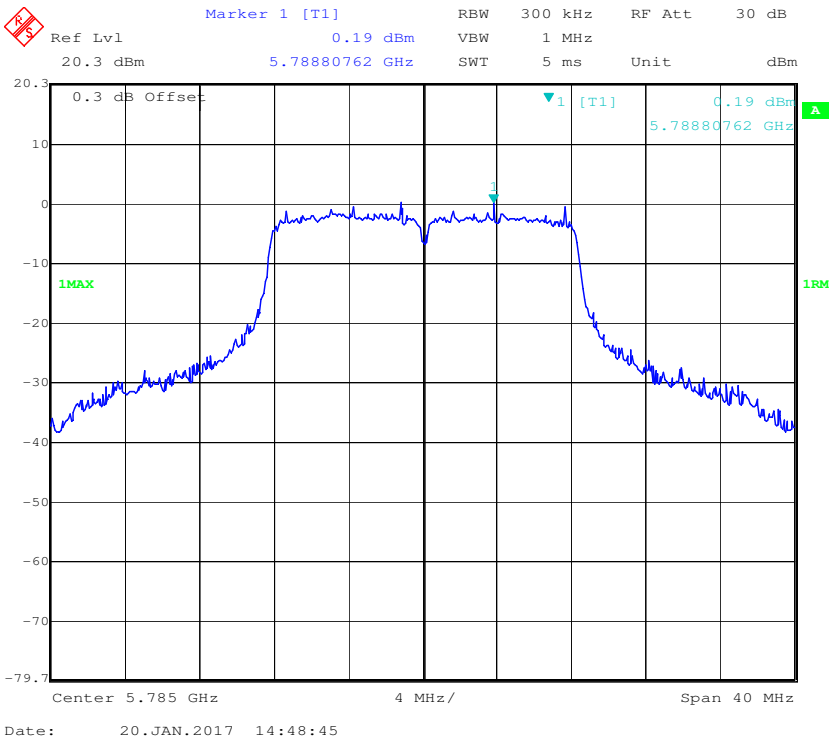
5725MHz-5850MHz:
Chain 0:

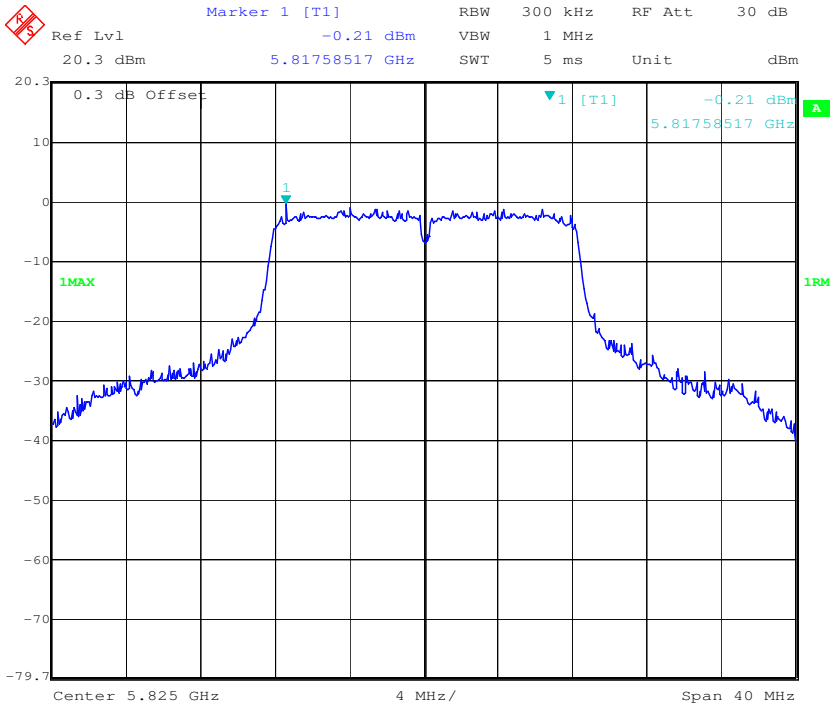
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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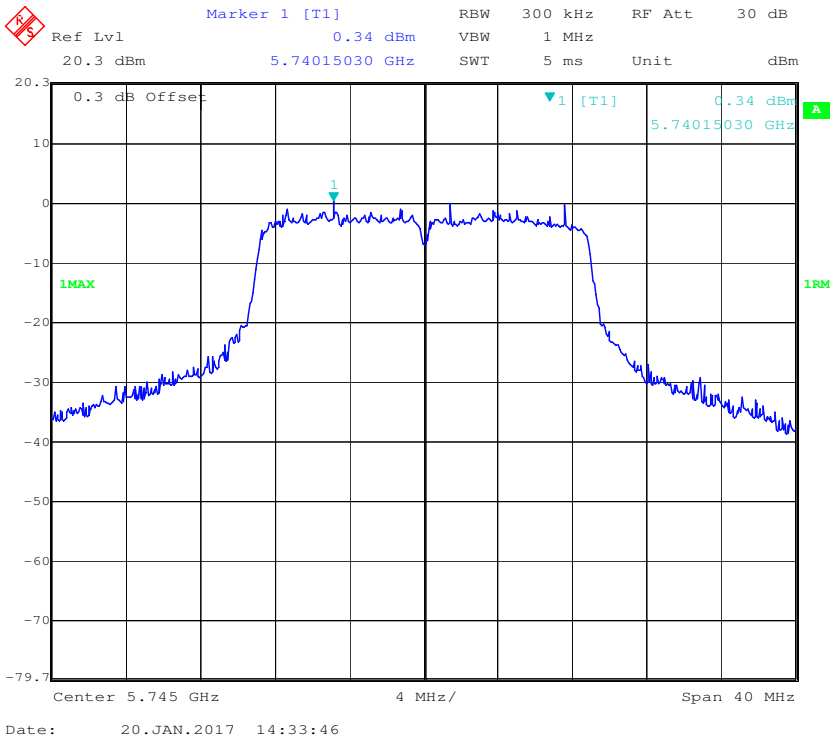
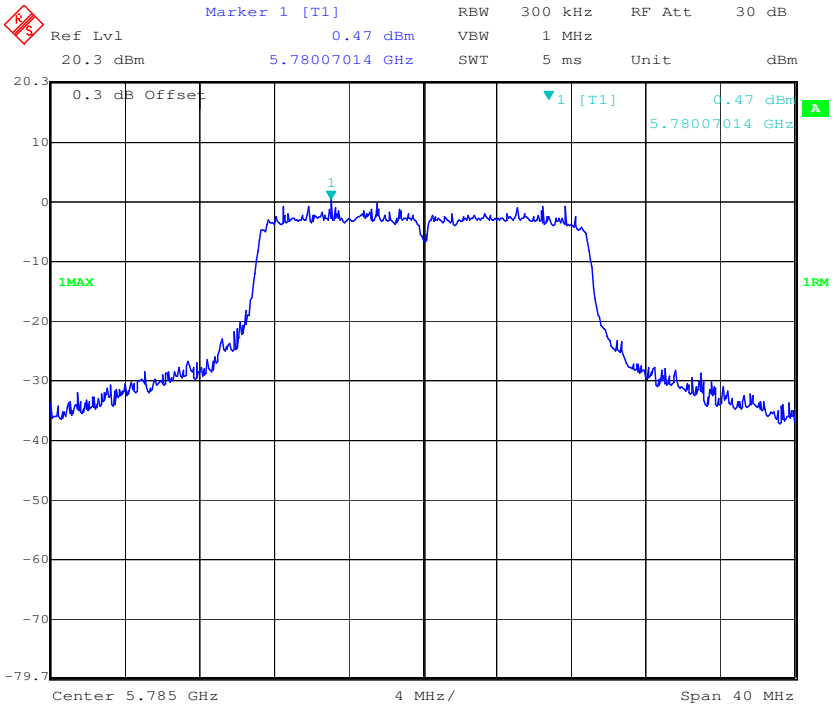


802.11n ht20 Middle Channel



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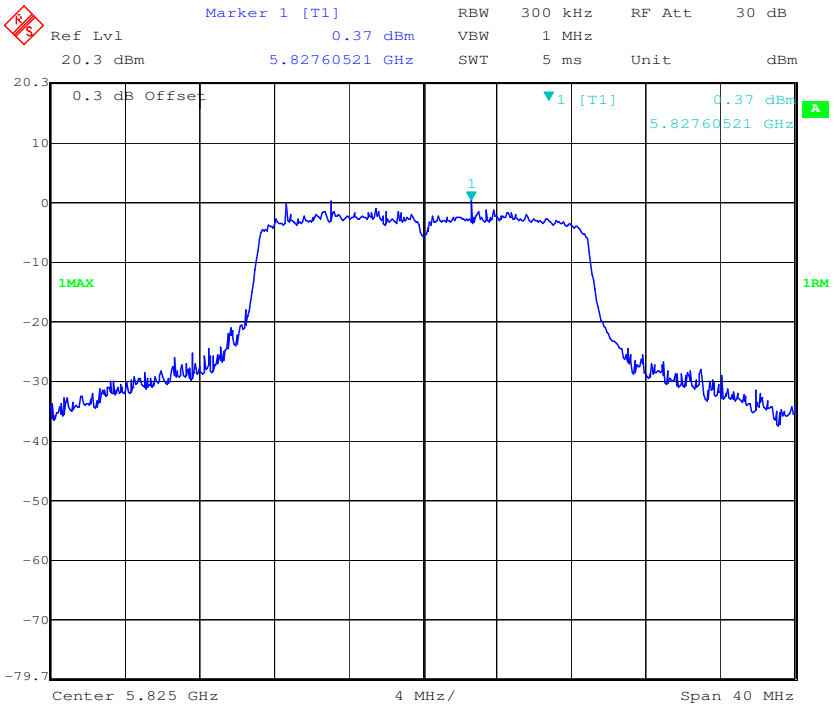

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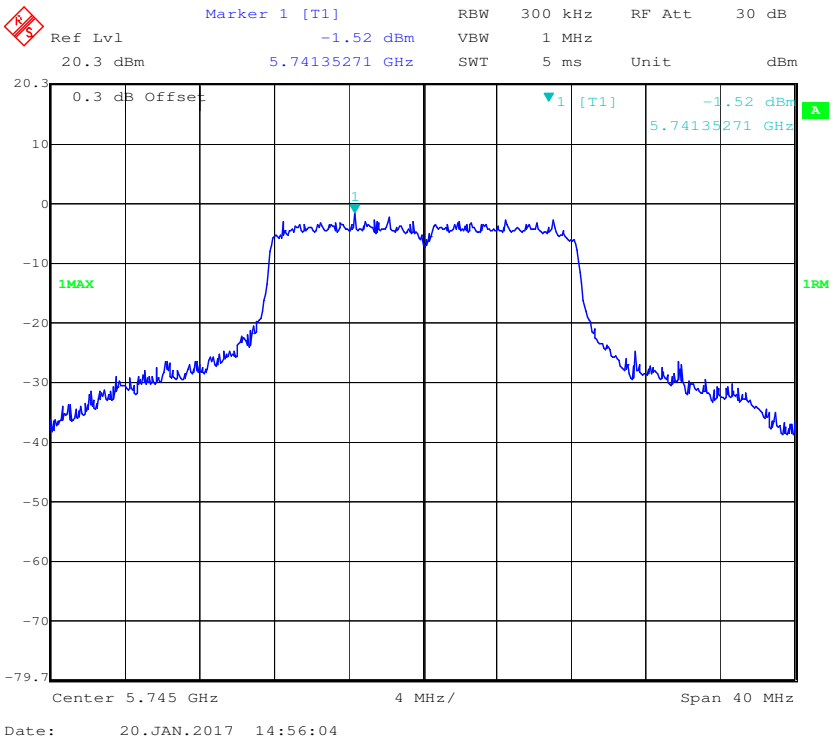
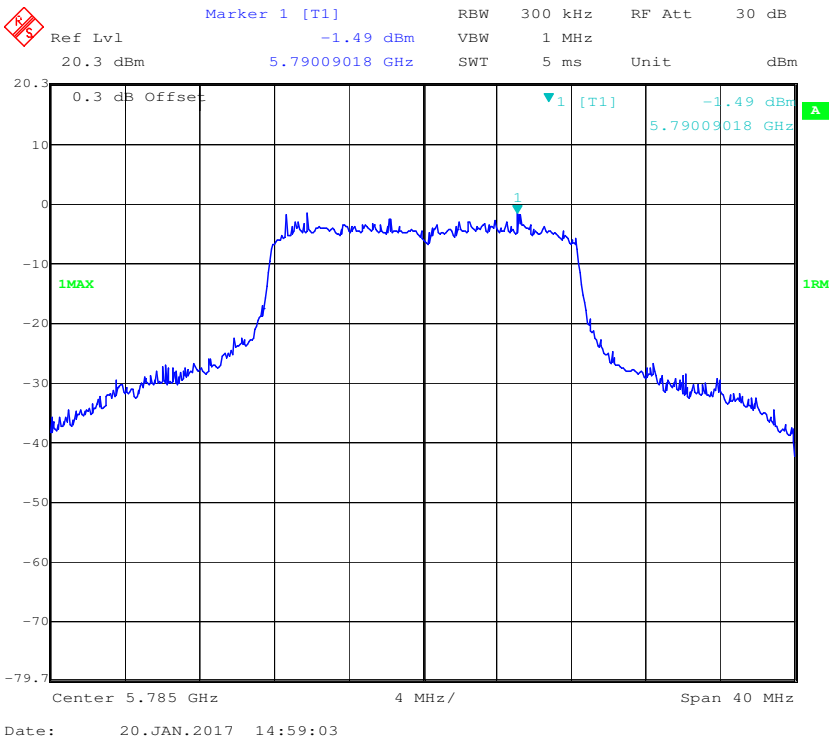
Chain 1:

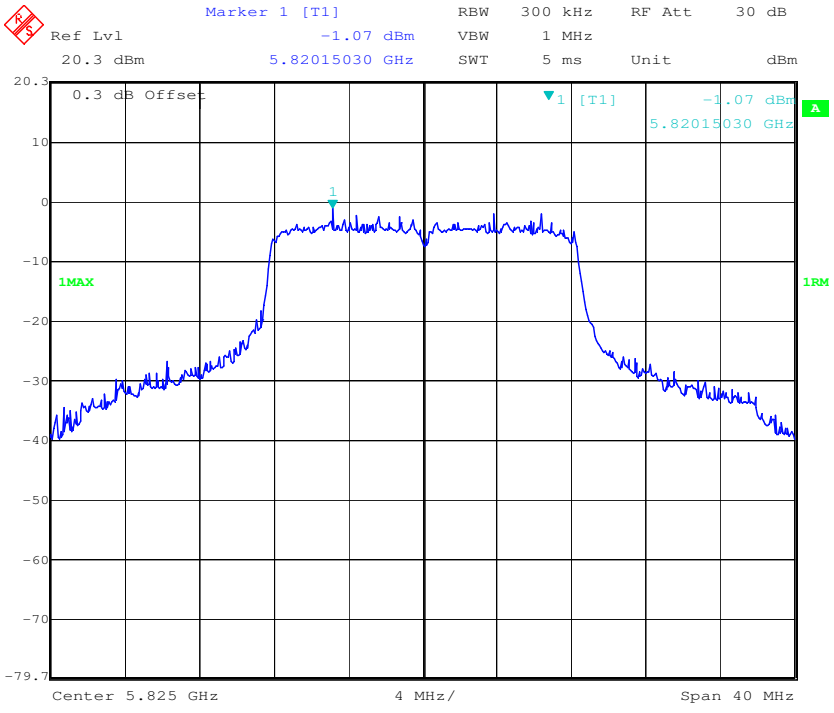
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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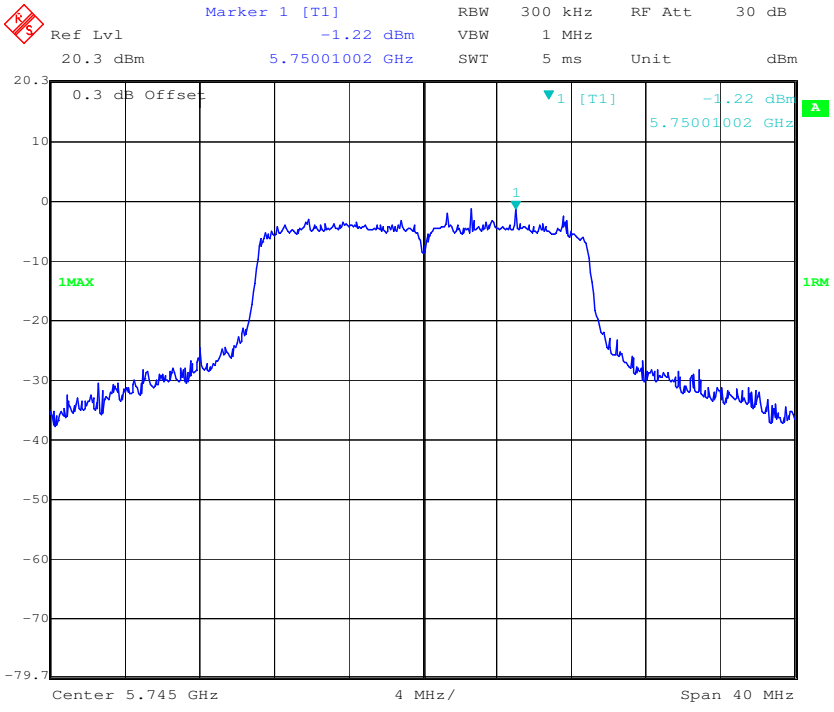
802.11n ht20 Low Channel



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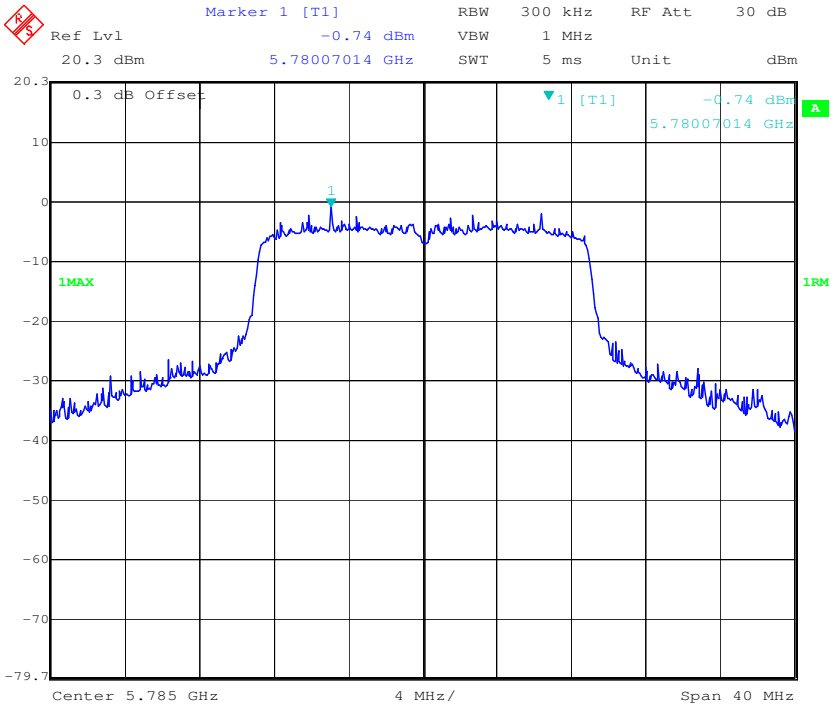
802.11n ht20 Middle Channel



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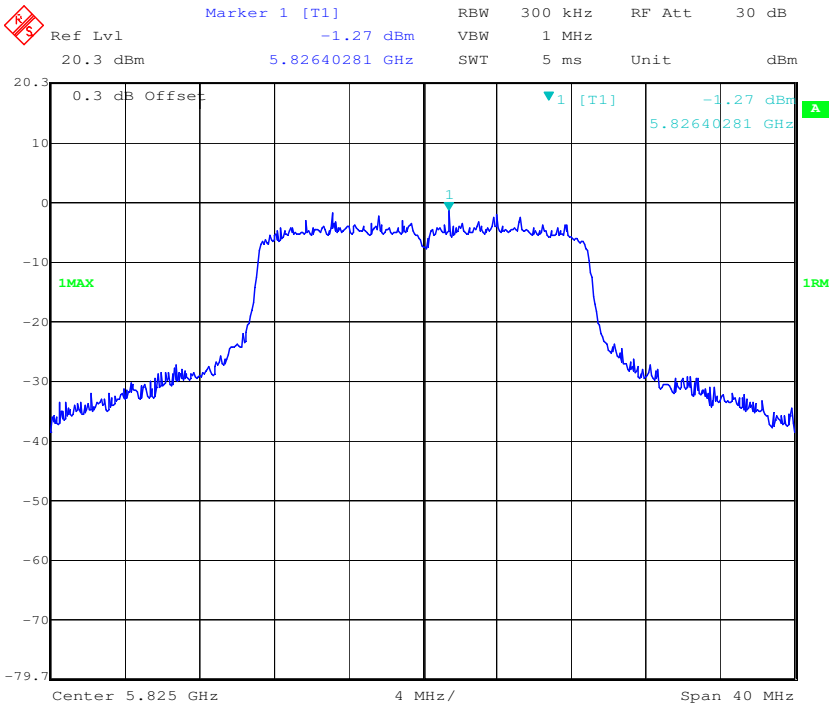
802.11n ht20 High Channel



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