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-CS7851702

Report Type:	Product Name:
Original Report	CrystalSky(7.85 inch)

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Report Number:	RDG170212002C
Report Date:	2017-02-28
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TABLE OF CONTENTS

GENERAL INFORMATION **4**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 4
OBJECTIVE 4
RELATED SUBMITTAL(S)/GRANT(S) 4
TEST METHODOLOGY 4
MEASUREMENT UNCERTAINTY 5
TEST FACILITY 5
SYSTEM TEST CONFIGURATION **6**
DESCRIPTION OF TEST CONFIGURATION 6
EUT EXERCISE SOFTWARE 6
EQUIPMENT MODIFICATIONS 8
BLOCK DIAGRAM OF TEST SETUP 9
SUMMARY OF TEST RESULTS **10**
FCC §15.407 (f) & §1.1310 & §2.1093- RF EXPOSURE **11**
APPLICABLE STANDARD 11
TEST RESULT 11
FCC §15.203 – ANTENNA REQUIREMENT **12**
APPLICABLE STANDARD 12
ANTENNA CONNECTOR CONSTRUCTION 12
FCC §15.209, §15.205 & §15.407(b) (1) (6) (7) –UNWANTED EMISSION **13**
APPLICABLE STANDARD 13
MEASUREMENT UNCERTAINTY 14
EUT SETUP 14
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP 15
TEST PROCEDURE 15
CORRECTED AMPLITUDE & MARGIN CALCULATION 16
TEST EQUIPMENT LIST AND DETAILS 16
TEST DATA 17
FCC §15.407(b)–OUT- OF-BAND EMISSIONS **24**
APPLICABLE STANDARD 24
TEST PROCEDURE 24
TEST EQUIPMENT LIST AND DETAILS 25
TEST DATA 25
FCC §15.407(a) –EMISSION BANDWIDTH **34**
APPLICABLE STANDARD 34
TEST EQUIPMENT LIST AND DETAILS 34
TEST PROCEDURE 34
TEST DATA 34
FCC §15.407(g)–FREQUENCY STABILITY **48**
APPLICABLE STANDARD 48
TEST PROCEDURE 48
TEST EQUIPMENT LIST AND DETAILS 48
TEST DATA 48
FCC §15.407(a) –MAXIMUM CONDUCTED OUTPUT POWER **50**

APPLICABLE STANDARD 50
TEST EQUIPMENT LIST AND DETAILS 51
TEST PROCEDURE 51
TEST DATA 51

FCC §15.407(a) - POWER SPECTRAL DENSITY 53

APPLICABLE STANDARD 53
TEST PROCEDURE 54
TEST EQUIPMENT LIST AND DETAILS 54
TEST DATA 54

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***SZ DJI TECHNOLOGY CO., LTD***'s product, model number: ***CS785 (FCC ID: SS3-CS7851702)*** (the "EUT") in this report was a ***CrystalSky(7.85 inch)***, which was measured approximately: 20.8 cm (L) x14.8 cm (W) x 3.5 cm(H), rated input voltage: DC7.6V from battery. The battery can remove from the EUT and charged by charger base.

**All measurement and test data in this report was gathered from final production sample, serial number: 170212002 (assigned by the BACL, Chengdu). It may have deviation from any other sample.The EUT supplied by the applicant was received on 2017-02-12, 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 15B JBP submissions with FCC ID: SS3-CS7851702.
FCC Part 15C DTS submissions with FCC ID: SS3-CS7851702.

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.

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.62dB
Power Spectral Density, conducted	±0.62 dB
Unwanted Emissions, radiated	30M~200MHz: 4.7 dB for Horizontal, 4.7 dB for Vertical 200M~1GHz:6.0 dB for Horizontal, 6.0 for Vertical 1G~6GHz: 5.13 dB, 6G~18GHz: 5.47 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.17 dB (150 kHz to 30 MHz)

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	5180MHz	5200MHz	5240MHz
	Power Level Setting	MCS0	MCS0	MCS0
	Power Level Setting	10	10	10

5725-5850MHz:

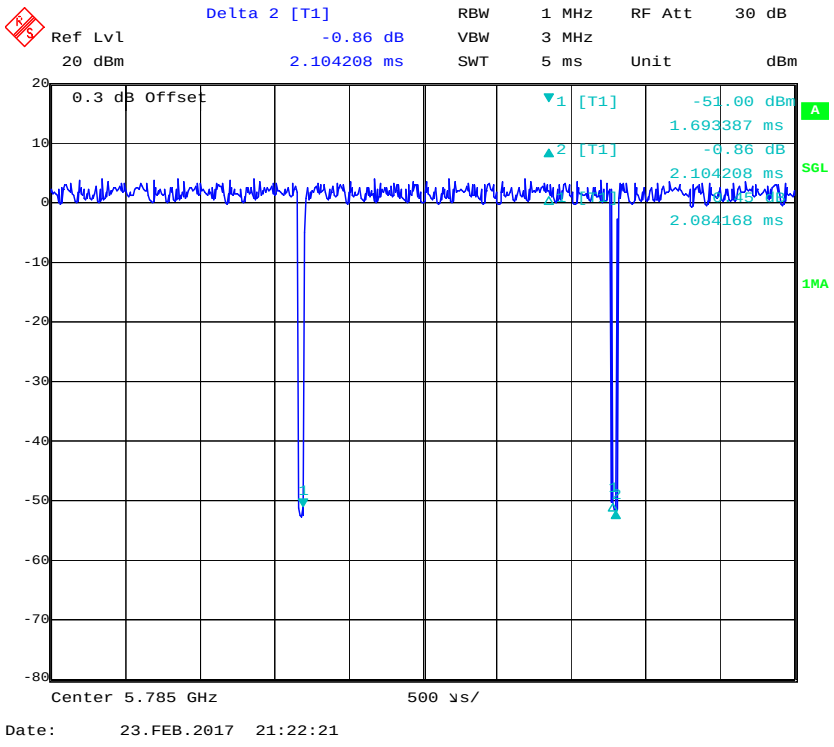
Antenna 0&1				
Test Mode	Test Software Version	DJI-RF Certification		
	Test Frequency(MHz)	5745	5785	5825
802.11a	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	7	7	7
802.11n ht20	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	6	6	6

The software configured maximum duty cycle as below:

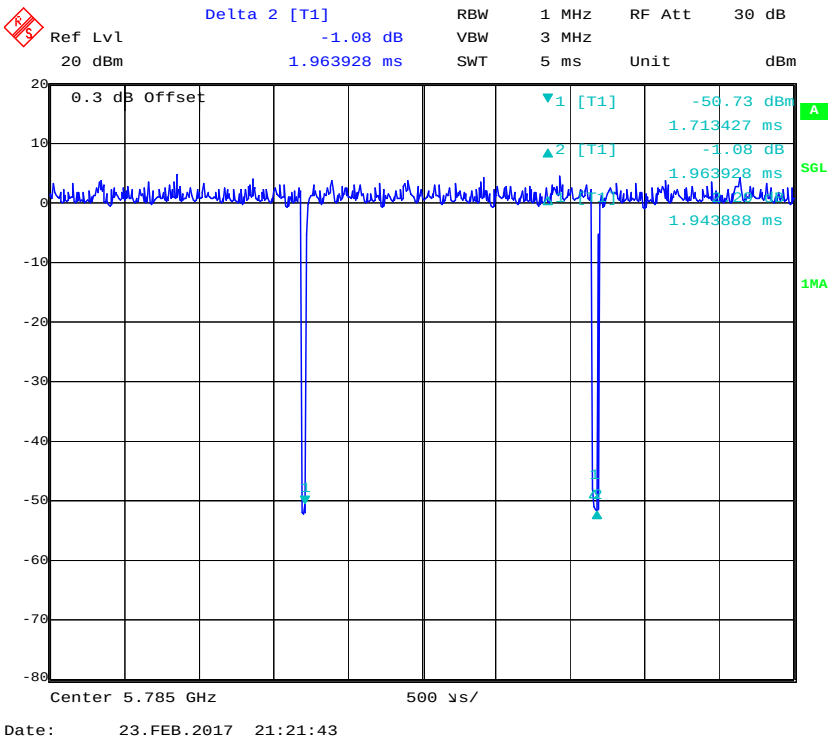
Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11a	2.08	2.10	99
802.11n ht20	1.94	1.96	99

The minimum transmission duration(T) is 2.08ms in 802.11a mode, 1.94ms in 802.11n ht20 mode.

802.11a mode



802.11n ht20 mode

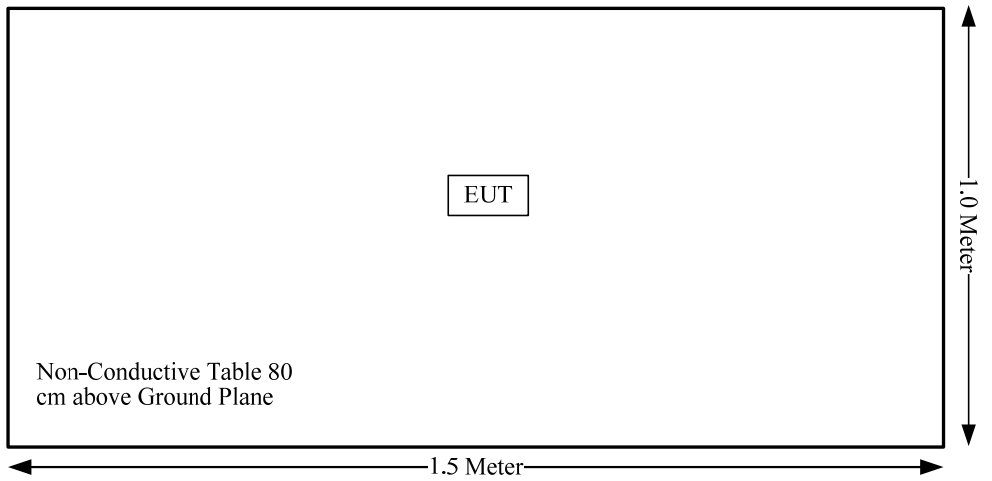


Equipment Modifications

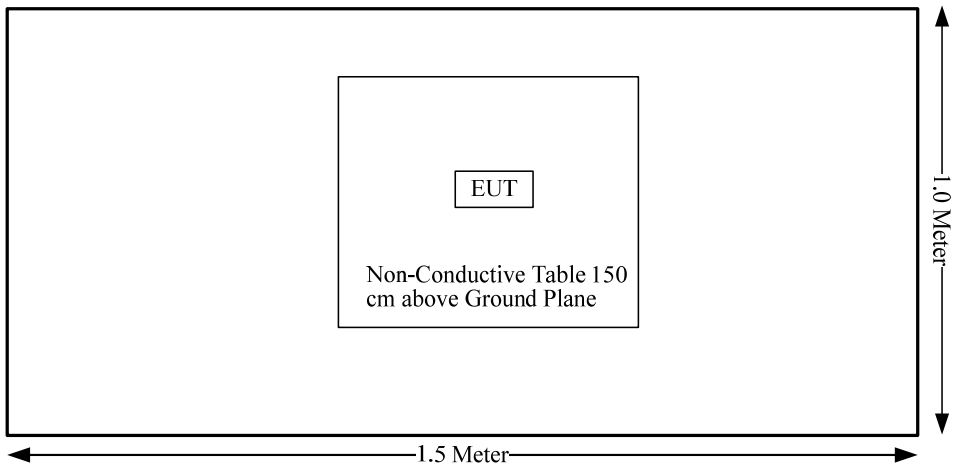
No modification was made to the EUT.

Block Diagram of Test Setup

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	Not Applicable
§15.205& §15.209 &§15.407(b) (1),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b)	Out Of Band Emissions	Compliance
§15.407(a)	6 dB Bandwidth	Compliance
§15.407(g)	Frequency Stability	Compliance
§15.407(a)(1),	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(5)	Power Spectral Density	Compliance

Not Applicable: the EUT was powered by battery.

FCC §15.407 (f) & §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

According to subpart 15.407(f), §1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RDG170212002-20A.

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, the antenna gain of chain 0 are 1.12 dBi in 2.4GHz band, 1.27dBi in the 5150-5250MHz Band, 5.47 dBi in 5725-5850MHz band, the antenna gain of chain 1 are 2.17 dBi in 2.4GHz band, 2.53dBi in the 5150-5250MHz Band, 2.26 dBi in 5725-5850MHz band, that fulfill the requirement of the item. Please refer to the internal photos.

Result: 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.

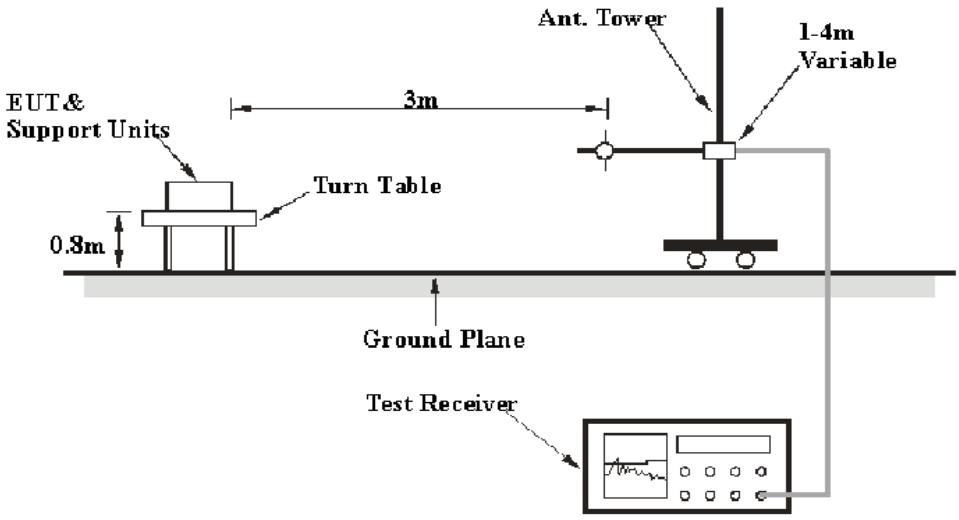
Based on CISPR 16-4-2-2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Chengdu) is:
30M~200MHz: ±4.7 dB;
200M~1GHz: ±6.0 dB;
1G~6GHz: ±5.13dB;
6G~25GHz: ±5.47 dB;

Table 1 – Values of U_{cispr}

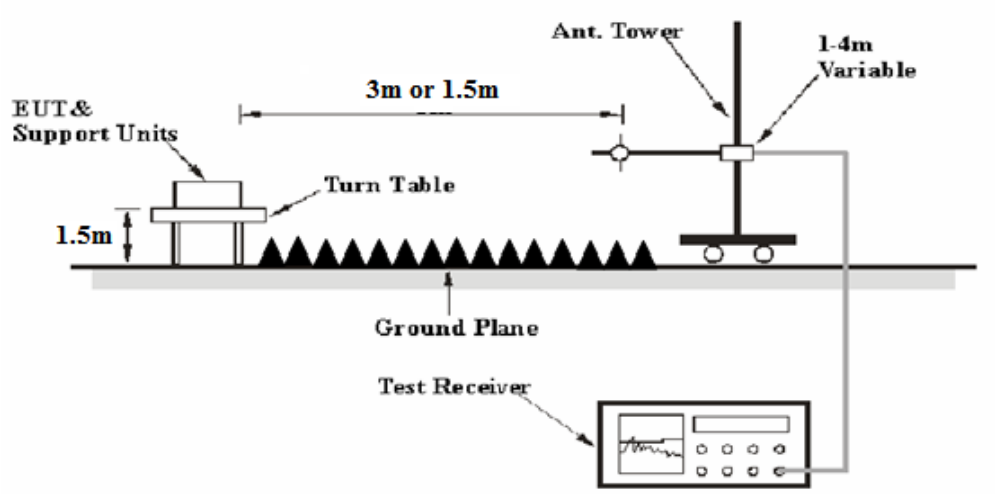
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 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:	29.3 °C
Relative Humidity:	53 %
ATM Pressure:	97.6 kPa

The testing was performed by Kevin Hu on 2017-02-17.

Test Mode: Transmitting

30MHz-40GHz (For above 1GHz,test performed at 1.5m distance from 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	70.32	PK	H	31.72	5.21	0.00	107.25	101.25	N/A	N/A
5180	59.56	AV	H	31.72	5.21	0.00	96.49	90.49	N/A	N/A
5180	64.5	PK	V	31.72	5.21	0.00	101.43	95.43	N/A	N/A
5180	53.17	AV	V	31.72	5.21	0.00	90.10	84.10	N/A	N/A
5150	26.3	PK	H	31.67	5.18	0.00	63.15	57.15	74.00	16.85
5150	14.63	AV	H	31.67	5.18	0.00	51.48	45.48	54.00	8.52
10360	33.7	PK	H	37.37	7.76	26.37	52.46	46.46	74.00	27.54
10360	22.52	AV	H	37.37	7.76	26.37	41.28	35.28	54.00	18.72
15540	34.81	PK	H	39.41	10.22	25.32	59.12	53.12	74.00	20.88
15540	23.33	AV	H	39.41	10.22	25.32	47.64	41.64	54.00	12.36
1604	33.25	PK	H	24.27	2.75	26.43	33.84	27.84	74.00	46.16
1604	21.86	AV	H	24.27	2.75	26.43	22.45	16.45	54.00	37.55
4032	33.13	PK	H	29.05	4.94	26.57	40.55	34.55	74.00	39.45
4032	21.51	AV	H	29.05	4.94	26.57	28.93	22.93	54.00	31.07
75.59	33.66	QP	H	7.78	0.47	28.41	13.50	13.50	40.00	26.50
464.56	39.73	QP	H	17.58	1.50	28.61	30.20	30.20	46.00	15.80
Middle Channel:5200 MHz										
5200	70.54	PK	H	31.76	5.23	0.00	107.53	101.53	N/A	N/A
5200	59.78	AV	H	31.76	5.23	0.00	96.77	90.77	N/A	N/A
5200	65.82	PK	V	31.76	5.23	0.00	102.81	96.81	N/A	N/A
5200	54.39	AV	V	31.76	5.23	0.00	91.38	85.38	N/A	N/A
10400	34.12	PK	H	37.38	7.79	26.36	52.93	46.93	74.00	27.07
10400	22.47	AV	H	37.38	7.79	26.36	41.28	35.28	54.00	18.72
15600	35.41	PK	H	39.42	10.22	25.31	59.74	53.74	74.00	20.26
15600	22.94	AV	H	39.42	10.22	25.31	47.27	41.27	54.00	12.73
1637	33.98	PK	H	24.32	2.77	26.46	34.61	28.61	74.00	45.39
1637	21.74	AV	H	24.32	2.77	26.46	22.37	16.37	54.00	37.63
4078	33.67	PK	H	29.12	4.97	26.60	41.16	35.16	74.00	38.84
4078	21.1	AV	H	29.12	4.97	26.60	28.59	22.59	54.00	31.41
75.59	33.63	QP	H	7.78	0.47	28.41	13.47	13.47	40.00	26.53
464.56	39.44	QP	H	17.58	1.50	28.61	29.91	29.91	46.00	16.09
High Channel:5240 MHz										
5240	69.52	PK	H	31.83	5.27	0.00	106.62	100.62	N/A	N/A
5240	58.38	AV	H	31.83	5.27	0.00	95.48	89.48	N/A	N/A
5240	65.19	PK	V	31.83	5.27	0.00	102.29	96.29	N/A	N/A
5240	54.51	AV	V	31.83	5.27	0.00	91.61	85.61	N/A	N/A
5350	26.7	PK	H	32.03	5.37	0.00	64.10	58.10	74.00	15.90
5350	14.37	AV	H	32.03	5.37	0.00	51.77	45.77	54.00	8.23
10480	33.18	PK	H	37.40	7.84	26.35	52.07	46.07	74.00	27.93
10480	22.3	AV	H	37.40	7.84	26.35	41.19	35.19	54.00	18.81
15720	33.77	PK	H	39.44	10.24	25.30	58.15	52.15	74.00	21.85
15720	22.22	AV	H	39.44	10.24	25.30	46.60	40.60	54.00	13.40
1697	34.21	PK	H	24.42	2.82	26.52	34.93	28.93	74.00	45.07
1697	22.68	AV	H	24.42	2.82	26.52	23.40	17.40	54.00	36.60
4112	33.46	PK	H	29.18	5.00	26.62	41.02	35.02	74.00	38.98
4112	21.56	AV	H	29.18	5.00	26.62	29.12	23.12	54.00	30.88
75.59	33.44	QP	H	7.78	0.47	28.41	13.28	13.28	40.00	26.72
464.56	39.85	QP	H	17.58	1.50	28.61	30.32	30.32	46.00	15.68

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	69.56	PK	H	31.72	5.21	0.00	106.49	100.49	N/A	N/A
5180	58.18	AV	H	31.72	5.21	0.00	95.11	89.11	N/A	N/A
5180	65.44	PK	V	31.72	5.21	0.00	102.37	96.37	N/A	N/A
5180	54.69	AV	V	31.72	5.21	0.00	91.62	85.62	N/A	N/A
5150	26.69	PK	H	31.67	5.18	0.00	63.54	57.54	74.00	16.46
5150	14.54	AV	H	31.67	5.18	0.00	51.39	45.39	54.00	8.61
10360	34.35	PK	H	37.37	7.76	26.37	53.11	47.11	74.00	26.89
10360	23.13	AV	H	37.37	7.76	26.37	41.89	35.89	54.00	18.11
15540	34.67	PK	H	39.41	10.22	25.32	58.98	52.98	74.00	21.02
15540	23.34	AV	H	39.41	10.22	25.32	47.65	41.65	54.00	12.35
1604	32.87	PK	H	24.27	2.75	26.43	33.46	27.46	74.00	46.54
1604	21.46	AV	H	24.27	2.75	26.43	22.05	16.05	54.00	37.95
4032	33.32	PK	H	29.05	4.94	26.57	40.74	34.74	74.00	39.26
4032	21.68	AV	H	29.05	4.94	26.57	29.10	23.10	54.00	30.90
75.59	33.94	QP	H	7.78	0.47	28.41	13.78	13.78	40.00	26.22
464.56	39.67	QP	H	17.58	1.50	28.61	30.14	30.14	46.00	15.86
Middle Channel:5200 MHz										
5200	70.56	PK	H	31.76	5.23	0.00	107.55	101.55	N/A	N/A
5200	59.47	AV	H	31.76	5.23	0.00	96.46	90.46	N/A	N/A
5200	66.82	PK	V	31.76	5.23	0.00	103.81	97.81	N/A	N/A
5200	55.34	AV	V	31.76	5.23	0.00	92.33	86.33	N/A	N/A
10400	34.04	PK	H	37.38	7.79	26.36	52.85	46.85	74.00	27.15
10400	22.7	AV	H	37.38	7.79	26.36	41.51	35.51	54.00	18.49
15600	34.44	PK	H	39.42	10.22	25.31	58.77	52.77	74.00	21.23
15600	23.13	AV	H	39.42	10.22	25.31	47.46	41.46	54.00	12.54
1637	33.59	PK	H	24.32	2.77	26.46	34.22	28.22	74.00	45.78
1637	21.87	AV	H	24.32	2.77	26.46	22.50	16.50	54.00	37.50
4078	33.73	PK	H	29.12	4.97	26.60	41.22	35.22	74.00	38.78
4078	21.19	AV	H	29.12	4.97	26.60	28.68	22.68	54.00	31.32
75.59	33.81	QP	H	7.78	0.47	28.41	13.65	13.65	40.00	26.35
464.56	39.57	QP	H	17.58	1.50	28.61	30.04	30.04	46.00	15.96
High Channel:5240 MHz										
5240	69.21	PK	H	31.83	5.27	0.00	106.31	100.31	N/A	N/A
5240	58.13	AV	H	31.83	5.27	0.00	95.23	89.23	N/A	N/A
5240	65.77	PK	V	31.83	5.27	0.00	102.87	96.87	N/A	N/A
5240	55.28	AV	V	31.83	5.27	0.00	92.38	86.38	N/A	N/A
5350	26.75	PK	H	32.03	5.37	0.00	64.15	58.15	74.00	15.85
5350	14.66	AV	H	32.03	5.37	0.00	52.06	46.06	54.00	7.94
10480	33.48	PK	H	37.40	7.84	26.35	52.37	46.37	74.00	27.63
10480	21.99	AV	H	37.40	7.84	26.35	40.88	34.88	54.00	19.12
15720	34.38	PK	H	39.44	10.24	25.30	58.76	52.76	74.00	21.24
15720	22.64	AV	H	39.44	10.24	25.30	47.02	41.02	54.00	12.98
1697	33.67	PK	H	24.42	2.82	26.52	34.39	28.39	74.00	45.61
1697	22.62	AV	H	24.42	2.82	26.52	23.34	17.34	54.00	36.66
4112	33.61	PK	H	29.18	5.00	26.62	41.17	35.17	74.00	38.83
4112	21.93	AV	H	29.18	5.00	26.62	29.49	23.49	54.00	30.51
75.59	33.95	QP	H	7.78	0.47	28.41	13.79	13.79	40.00	26.21
464.56	39.62	QP	H	17.58	1.50	28.61	30.09	30.09	46.00	15.91

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	73.89	PK	H	32.59	5.74	0.00	112.22	106.22	N/A	N/A
5745	62.51	AV	H	32.59	5.74	0.00	100.84	94.84	N/A	N/A
5745	71.42	PK	V	32.59	5.74	0.00	109.75	103.75	N/A	N/A
5745	60.88	AV	V	32.59	5.74	0.00	99.21	93.21	N/A	N/A
5725	43.26	PK	H	32.57	5.72	0.00	81.55	75.55	122.20	46.65
5720	32.46	PK	H	32.56	5.71	0.00	70.73	64.73	110.80	46.07
5700	26.13	PK	H	32.54	5.70	0.00	64.37	58.37	105.20	46.83
5650	26.25	PK	H	32.48	5.65	0.00	64.38	58.38	68.20	9.82
11490	33.6	PK	H	37.99	8.22	26.02	53.79	47.79	74.00	26.21
11490	22.42	AV	H	37.99	8.22	26.02	42.61	36.61	54.00	17.39
17235	32.61	PK	H	42.98	10.82	25.99	60.42	54.42	74.00	19.58
17235	21.23	AV	H	42.98	10.82	25.99	49.04	43.04	54.00	10.96
2042	35.37	PK	H	24.76	3.04	26.83	36.34	30.34	74.00	43.66
2042	23.22	AV	H	24.76	3.04	26.83	24.19	18.19	54.00	35.81
4118	33.58	PK	H	29.19	5.00	26.62	41.15	35.15	74.00	38.85
4118	21.73	AV	H	29.19	5.00	26.62	29.30	23.30	54.00	30.70
75.59	32.95	QP	H	7.78	0.47	28.41	12.79	12.79	40.00	27.21
464.56	39.36	QP	H	17.58	1.50	28.61	29.83	29.83	46.00	16.17
Middle Channel:5785 MHz										
5785	73.31	PK	H	32.64	5.77	0.00	111.72	105.72	N/A	N/A
5785	62.02	AV	H	32.64	5.77	0.00	100.43	94.43	N/A	N/A
5785	71.69	PK	V	32.64	5.77	0.00	110.10	104.10	N/A	N/A
5785	60.47	AV	V	32.64	5.77	0.00	98.88	92.88	N/A	N/A
11570	32.72	PK	H	38.03	8.21	26.00	52.96	46.96	74.00	27.04
11570	22.1	AV	H	38.03	8.21	26.00	42.34	36.34	54.00	17.66
17355	32.66	PK	H	43.53	11.03	26.16	61.06	55.06	74.00	18.94
17355	21.28	AV	H	43.53	11.03	26.16	49.68	43.68	54.00	10.32
2089	35.76	PK	H	24.60	3.04	26.83	36.57	30.57	74.00	43.43
2089	23.31	AV	H	24.60	3.04	26.83	24.12	18.12	54.00	35.88
4164	33.75	PK	H	29.26	5.03	26.65	41.39	35.39	74.00	38.61
4164	21.61	AV	H	29.26	5.03	26.65	29.25	23.25	54.00	30.75
75.59	33.1	QP	H	7.78	0.47	28.41	12.94	12.94	40.00	27.06
464.56	39.53	QP	H	17.58	1.50	28.61	30.00	30.00	46.00	16.00

High Channel:5825 MHz										
5825	74.05	PK	H	32.69	5.81	0.00	112.55	106.55	N/A	N/A
5825	62.7	AV	H	32.69	5.81	0.00	101.20	95.20	N/A	N/A
5825	71.47	PK	V	32.69	5.81	0.00	109.97	103.97	N/A	N/A
5825	60.76	AV	V	32.69	5.81	0.00	99.26	93.26	N/A	N/A
5850	32.58	PK	H	32.72	5.83	0.00	71.13	65.13	122.20	57.07
5855	27.6	PK	H	32.73	5.83	0.00	66.16	60.16	110.80	50.64
5875	25.62	PK	H	32.75	5.85	0.00	64.22	58.22	105.20	46.98
5925	26.51	PK	H	32.81	5.89	0.00	65.21	59.21	68.20	8.99
11650	33.9	PK	H	38.06	8.20	25.98	54.18	48.18	74.00	25.82
11650	22.69	AV	H	38.06	8.20	25.98	42.97	36.97	54.00	17.03
17475	32.63	PK	H	44.09	11.23	26.33	61.62	55.62	74.00	18.38
17475	21.36	AV	H	44.09	11.23	26.33	50.35	44.35	54.00	9.65
2157	35.14	PK	H	24.37	3.03	26.84	35.70	29.70	74.00	44.30
2157	23.33	AV	H	24.37	3.03	26.84	23.89	17.89	54.00	36.11
4226	32.84	PK	H	29.36	5.08	26.69	40.59	34.59	74.00	39.41
4226	21.2	AV	H	29.36	5.08	26.69	28.95	22.95	54.00	31.05
75.59	32.7	QP	H	7.78	0.47	28.41	12.54	12.54	40.00	27.46
464.56	39.41	QP	H	17.58	1.50	28.61	29.88	29.88	46.00	16.12

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	73.36	PK	H	32.59	5.74	0.00	111.69	105.69	N/A	N/A
5745	62.6	AV	H	32.59	5.74	0.00	100.93	94.93	N/A	N/A
5745	70.98	PK	V	32.59	5.74	0.00	109.31	103.31	N/A	N/A
5745	60.19	AV	V	32.59	5.74	0.00	98.52	92.52	N/A	N/A
5725	44.85	PK	H	32.57	5.72	0.00	83.14	77.14	122.20	45.06
5720	37.26	PK	H	32.56	5.71	0.00	75.53	69.53	110.80	41.27
5700	26.44	PK	H	32.54	5.70	0.00	64.68	58.68	105.20	46.52
5650	25.69	PK	H	32.48	5.65	0.00	63.82	57.82	68.20	10.38
11490	33.22	PK	H	37.99	8.22	26.02	53.41	47.41	74.00	26.59
11490	21.68	AV	H	37.99	8.22	26.02	41.87	35.87	54.00	18.13
17235	32.8	PK	H	42.98	10.82	25.99	60.61	54.61	74.00	19.39
17235	21.69	AV	H	42.98	10.82	25.99	49.50	43.50	54.00	10.50
2042	34.43	PK	H	24.76	3.04	26.83	35.40	29.40	74.00	44.60
2042	23.37	AV	H	24.76	3.04	26.83	24.34	18.34	54.00	35.66
4118	33.32	PK	H	29.19	5.00	26.62	40.89	34.89	74.00	39.11
4118	22.19	AV	H	29.19	5.00	26.62	29.76	23.76	54.00	30.24
75.59	32.78	QP	H	7.78	0.47	28.41	12.62	12.62	40.00	27.38
464.56	39.46	QP	H	17.58	1.50	28.61	29.93	29.93	46.00	16.07
Middle Channel:5785 MHz										
5785	73.18	PK	H	32.64	5.77	0.00	111.59	105.59	N/A	N/A
5785	62.37	AV	H	32.64	5.77	0.00	100.78	94.78	N/A	N/A
5785	70.53	PK	V	32.64	5.77	0.00	108.94	102.94	N/A	N/A
5785	59.89	AV	V	32.64	5.77	0.00	98.30	92.30	N/A	N/A
11570	32.67	PK	H	38.03	8.21	26.00	52.91	46.91	74.00	27.09
11570	22.09	AV	H	38.03	8.21	26.00	42.33	36.33	54.00	17.67
17355	32.96	PK	H	43.53	11.03	26.16	61.36	55.36	74.00	18.64
17355	22.4	AV	H	43.53	11.03	26.16	50.80	44.80	54.00	9.20
2089	35.87	PK	H	24.60	3.04	26.83	36.68	30.68	74.00	43.32
2089	23.65	AV	H	24.60	3.04	26.83	24.46	18.46	54.00	35.54
4164	33.31	PK	H	29.26	5.03	26.65	40.95	34.95	74.00	39.05
4164	21.69	AV	H	29.26	5.03	26.65	29.33	23.33	54.00	30.67
75.59	32.87	QP	H	7.78	0.47	28.41	12.71	12.71	40.00	27.29
464.56	39.21	QP	H	17.58	1.50	28.61	29.68	29.68	46.00	16.32

High Channel:5825 MHz										
5825	72.38	PK	H	32.69	5.81	0.00	110.88	104.88	N/A	N/A
5825	60.76	AV	H	32.69	5.81	0.00	99.26	93.26	N/A	N/A
5825	69.62	PK	V	32.69	5.81	0.00	108.12	102.12	N/A	N/A
5825	59.17	AV	V	32.69	5.81	0.00	97.67	91.67	N/A	N/A
5850	33.7	PK	H	32.72	5.83	0.00	72.25	66.25	122.20	55.95
5855	28.17	PK	H	32.73	5.83	0.00	66.73	60.73	110.80	50.07
5875	25.21	PK	H	32.75	5.85	0.00	63.81	57.81	105.20	47.39
5925	25.81	PK	H	32.81	5.89	0.00	64.51	58.51	68.20	9.69
11650	33.39	PK	H	38.06	8.20	25.98	53.67	47.67	74.00	26.33
11650	21.91	AV	H	38.06	8.20	25.98	42.19	36.19	54.00	17.81
17475	31.52	PK	H	44.09	11.23	26.33	60.51	54.51	74.00	19.49
17475	20.84	AV	H	44.09	11.23	26.33	49.83	43.83	54.00	10.17
2157	35.78	PK	H	24.37	3.03	26.84	36.34	30.34	74.00	43.66
2157	24.46	AV	H	24.37	3.03	26.84	25.02	19.02	54.00	34.98
4226	32.96	PK	H	29.36	5.08	26.69	40.71	34.71	74.00	39.29
4226	21.3	AV	H	29.36	5.08	26.69	29.05	23.05	54.00	30.95
75.59	32.74	QP	H	7.78	0.47	28.41	12.58	12.58	40.00	27.42
464.56	39.06	QP	H	17.58	1.50	28.61	29.53	29.53	46.00	16.47

FCC §15.407(b)–OUT- OF-BAND EMISSIONS

Applicable Standard

FCC §15.407

(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.

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:	26.3 °C
Relative Humidity:	39 %
ATM Pressure:	95.5 kPa

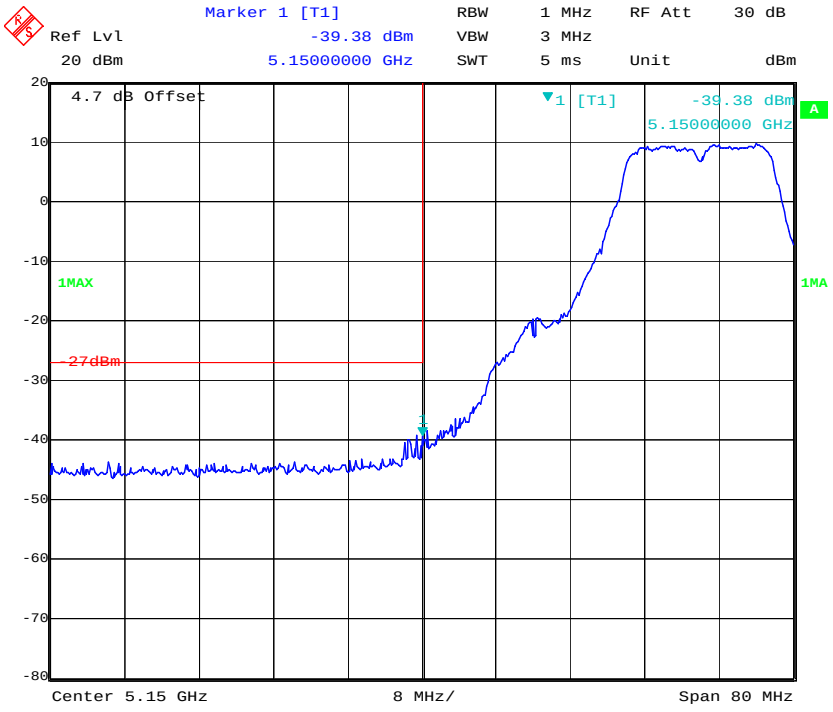
The testing was performed by Kevin Hu on 2017-02-21.

Test Result: Pass. (All emission under limit more than 3dB, the maximum antenna gain was offset in the display)

Please refer to the following tables and plots.

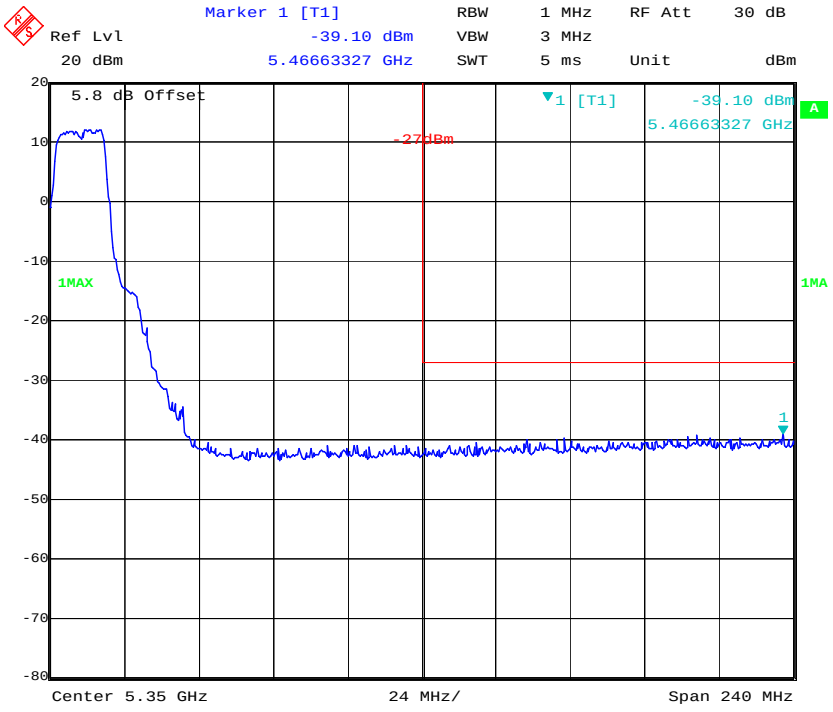
5150-5250MHz Chain 0:

802.11a Low Channel



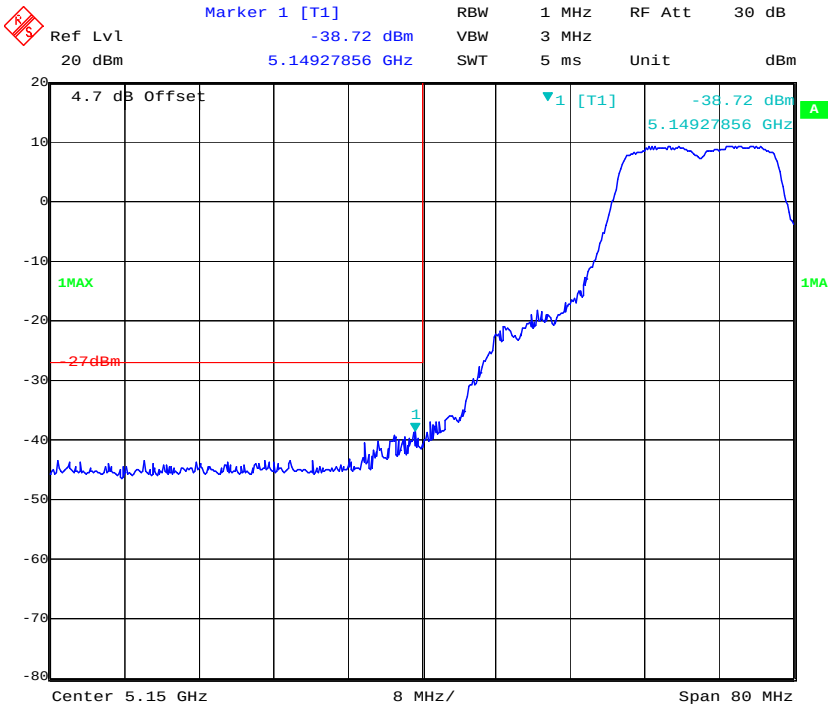
Date: 22.FEB.2017 23:02:58

802.11a High Channel



Date: 21.FEB.2017 22:17:17

802.11n ht20 Low Channel



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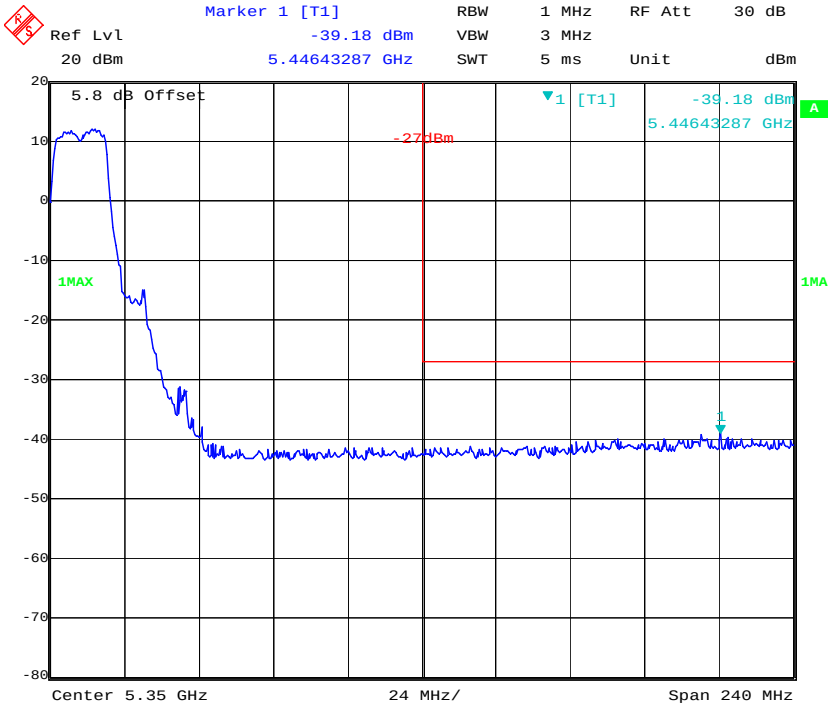
802.11n ht20 High Channel



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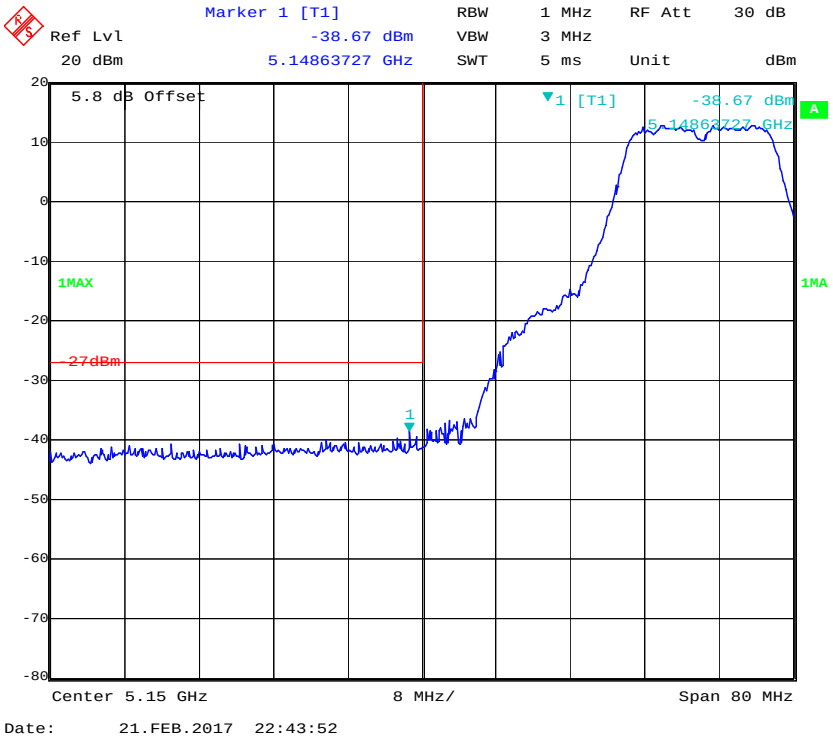
5150-5250MHz Chain 1:

802.11a Low Channel



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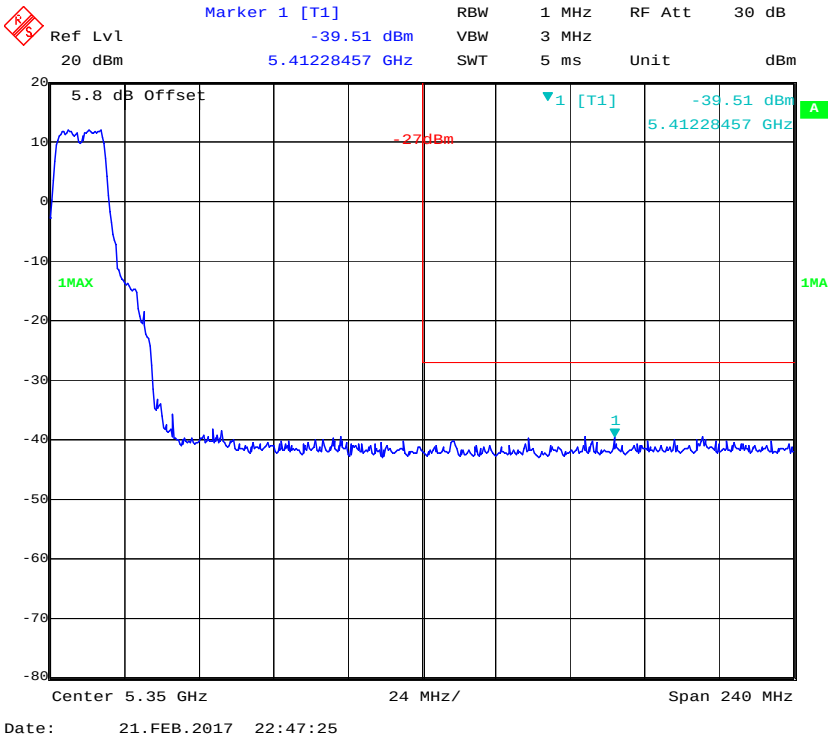
802.11a High Channel



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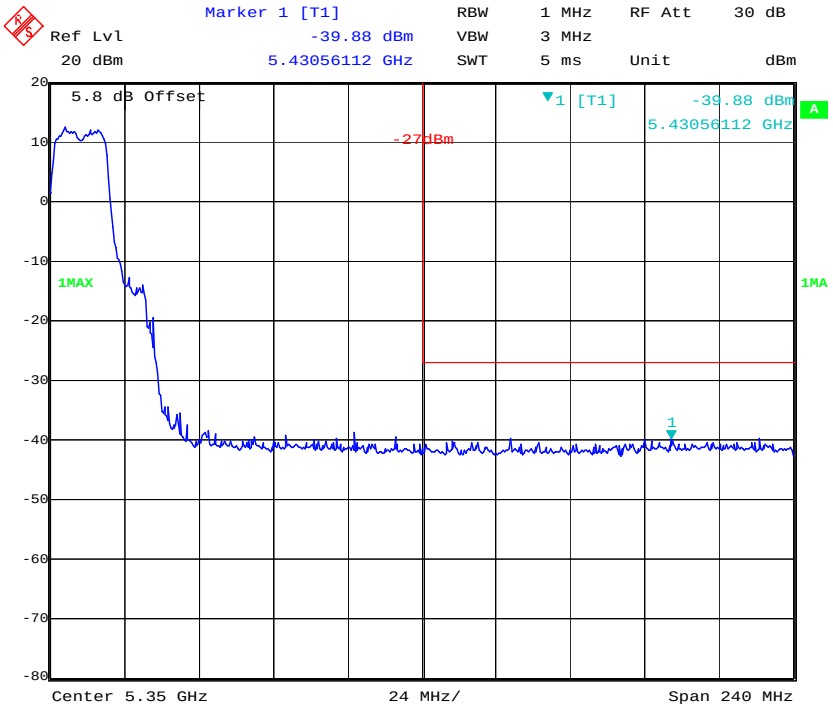
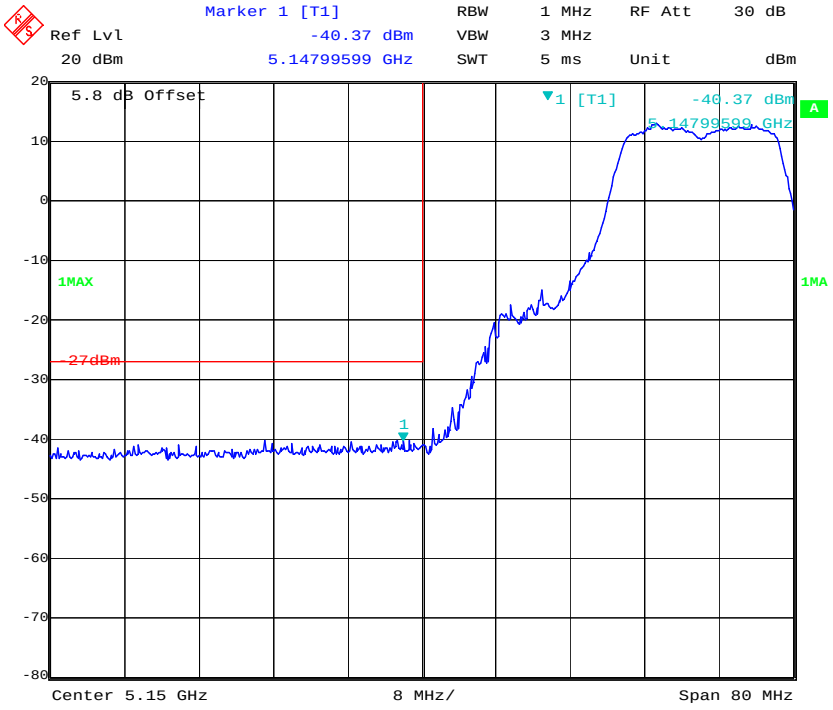
802.11n ht20 Low Channel



Date: 21.FEB.2017 23:07:27

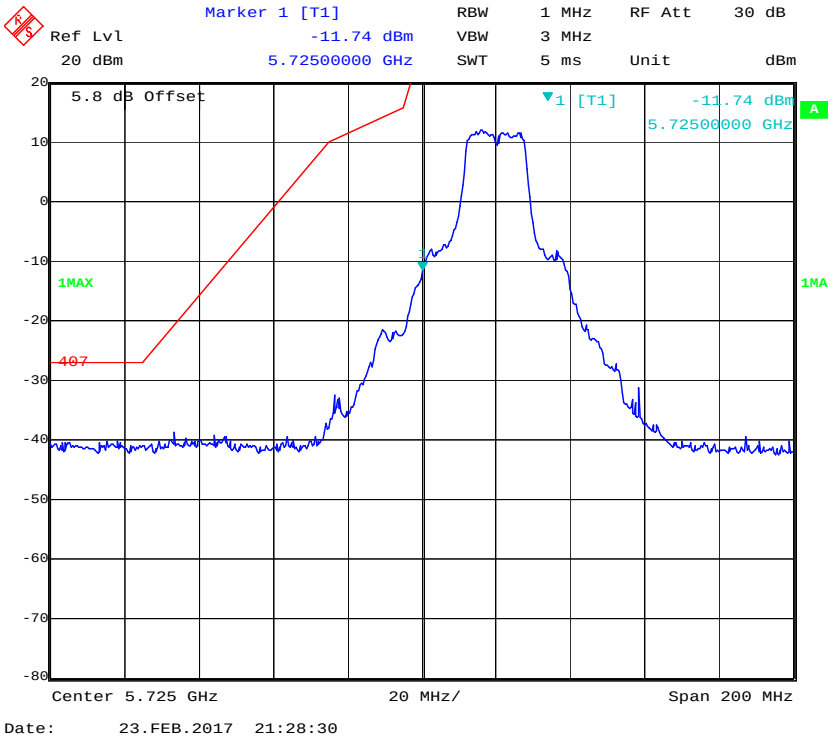
802.11n ht20 High Channel



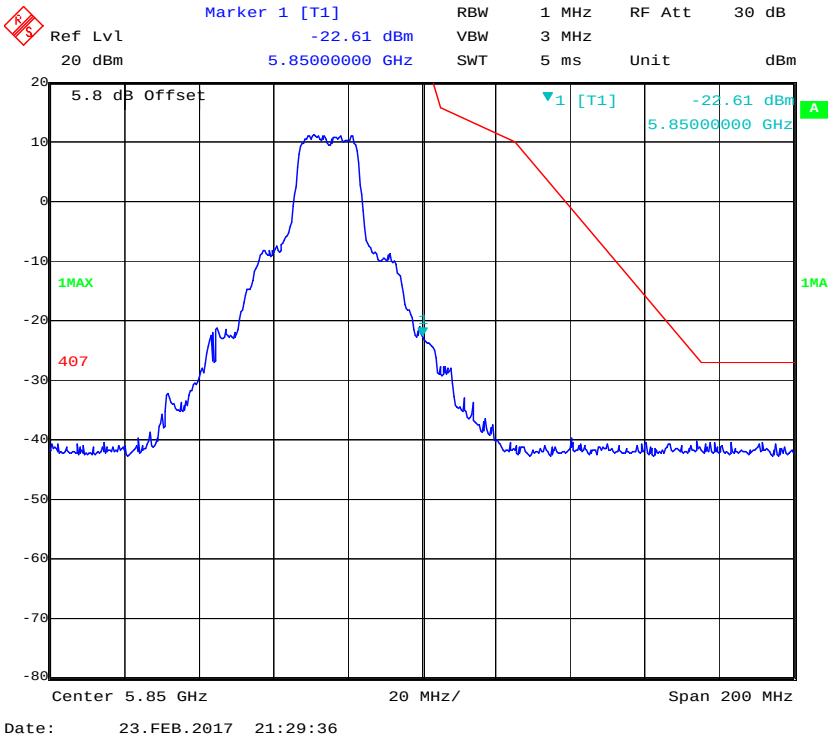
Date: 21.FEB.2017 23:03:22

5725-5850MHz Chain 0:

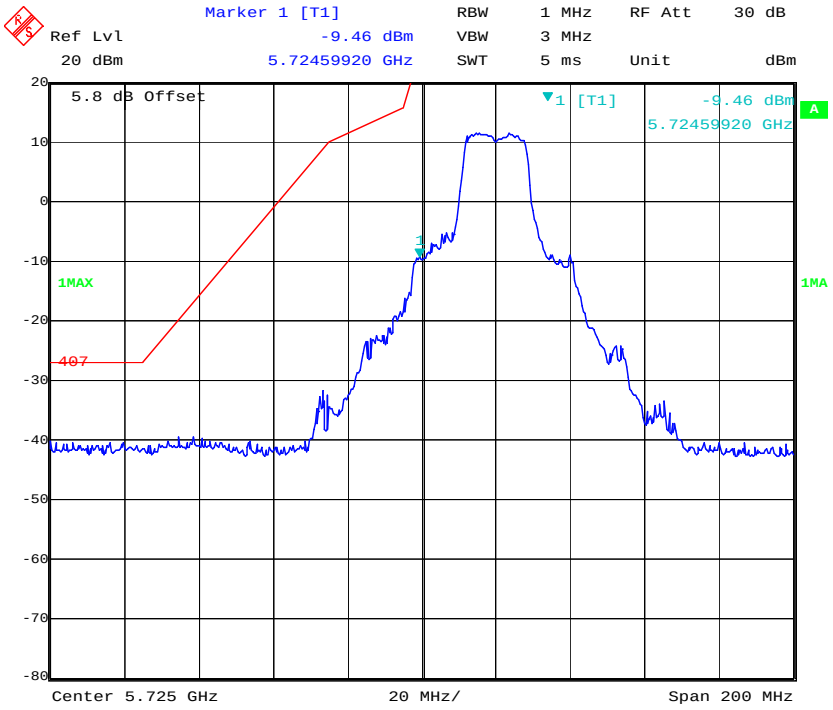
802.11a Low Channel



802.11a High Channel

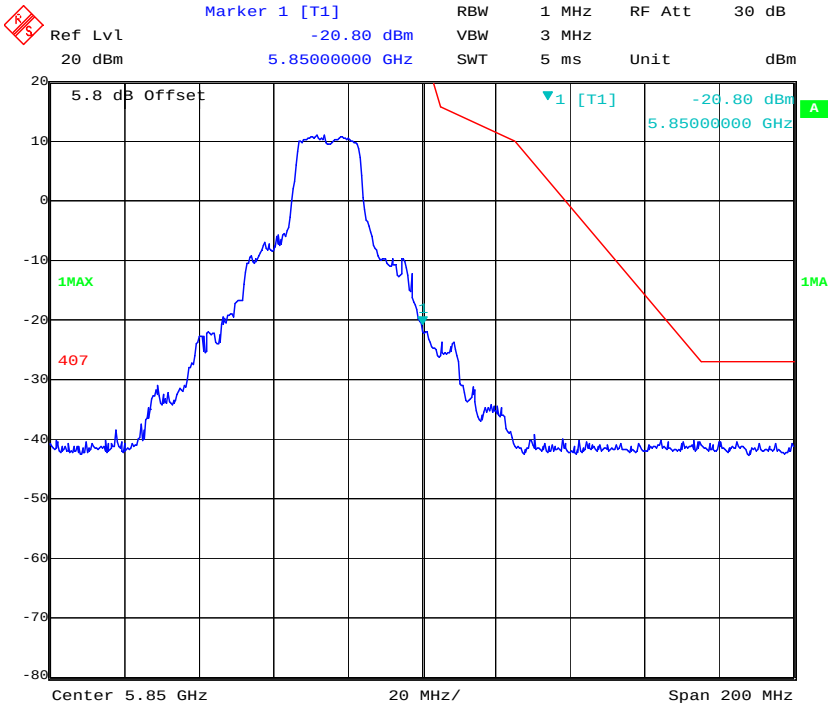


802.11n ht20 Low Channel



Date: 23.FEB.2017 21:31:25

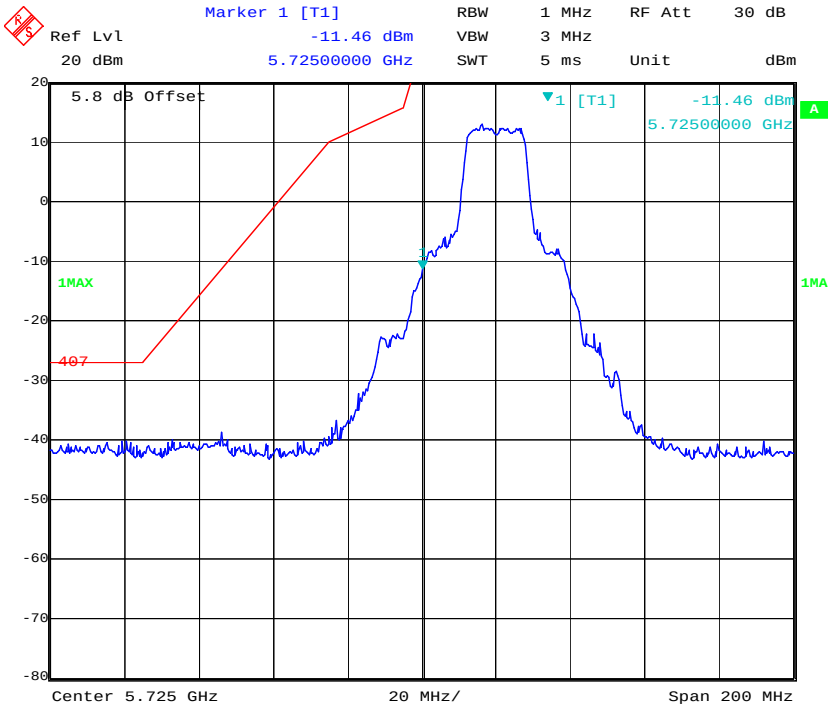
802.11n ht20 High Channel



Date: 23.FEB.2017 21:30:36

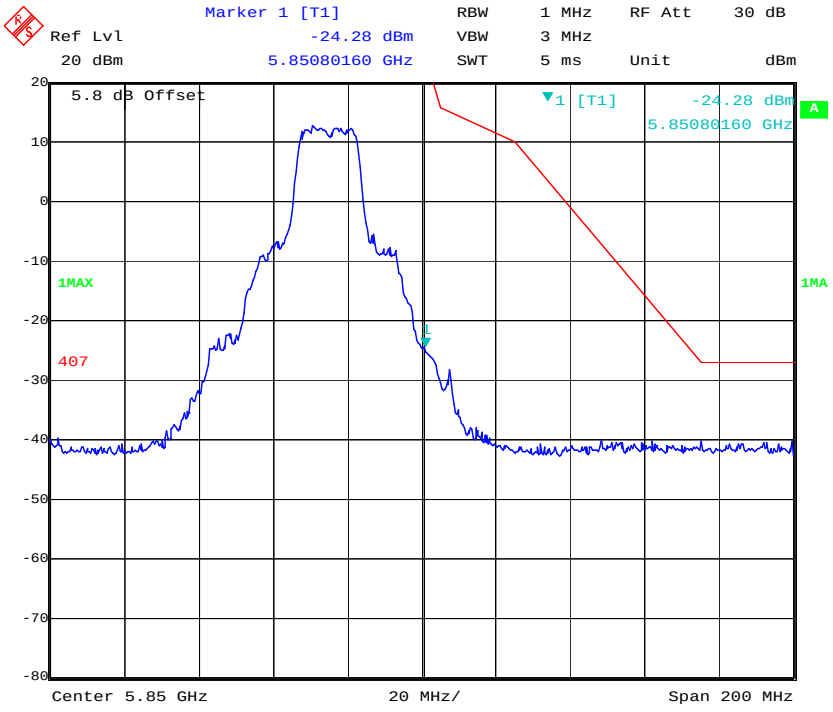
5725-5850MHz Chain 1:

802.11a Low Channel



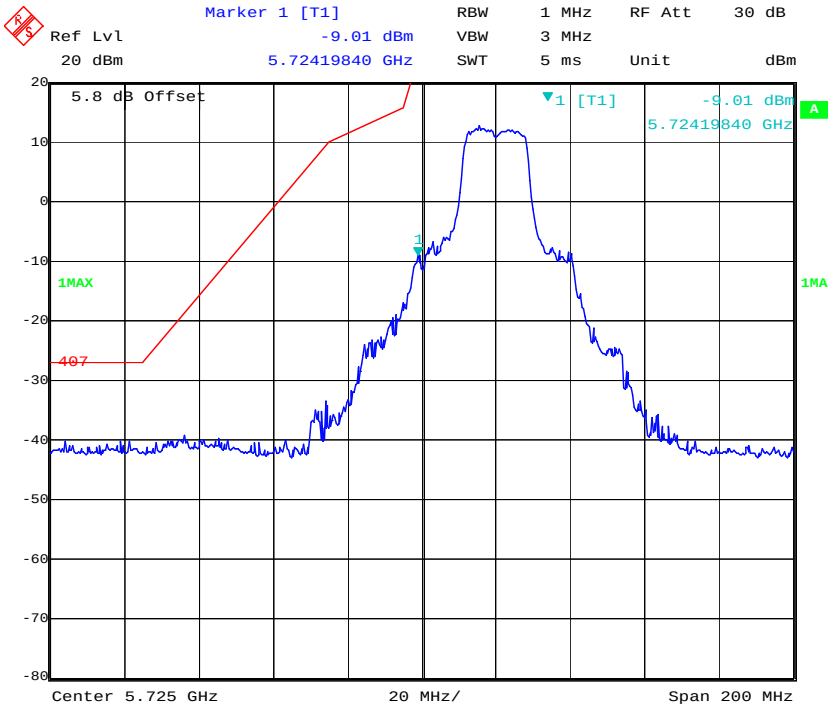
Date: 23.FEB.2017 21:36:20

802.11a High Channel



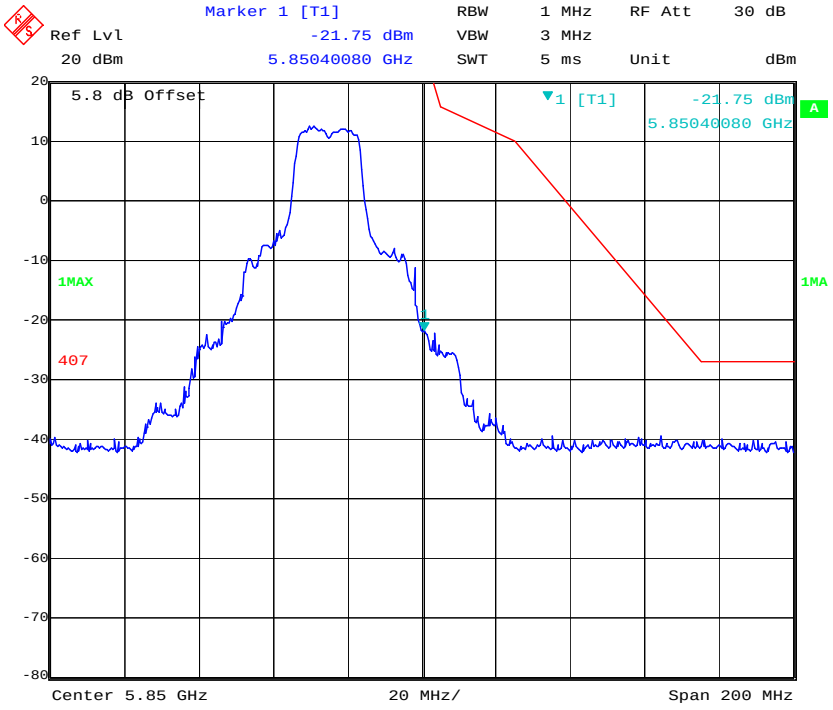
Date: 23.FEB.2017 21:35:19

802.11n ht20 Low Channel



Date: 23.FEB.2017 21:32:31

802.11n ht20 High Channel



Date: 23.FEB.2017 21:33:57

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:	26.3 °C
Relative Humidity:	39 %
ATM Pressure:	95.5 kPa

The testing was performed by Kevin Hu on 2017-02-21.

Test Result: Pass.

Please refer to the following tables and plots.

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

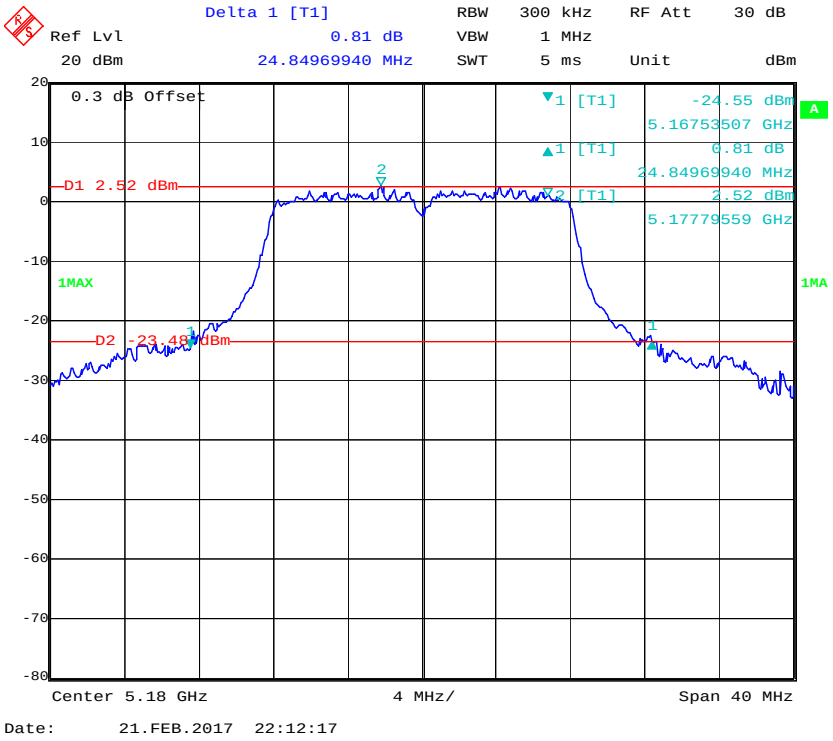
UNII Band	Mode	Channel	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth
5150-5250MHz	802.11 a	Low	5180	24.85	17.07
		Middle	5200	25.17	16.99
		High	5240	25.73	16.99
	802.11 n ht20	Low	5180	28.3	18.20
		Middle	5200	28.38	18.12
		High	5240	25.57	18.12

UNII Band	Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	6 dB Emission Bandwidth Limits (MHz)
5725-5850MHz	802.11 a	Low	5745	16.03	20.60	≥0.5
		Middle	5785	15.71	21.72	≥0.5
		High	5825	15.79	20.28	≥0.5
	802.11 n ht20	Low	5745	16.83	20.60	≥0.5
		Middle	5785	16.83	21.88	≥0.5
		High	5825	16.91	20.92	≥0.5

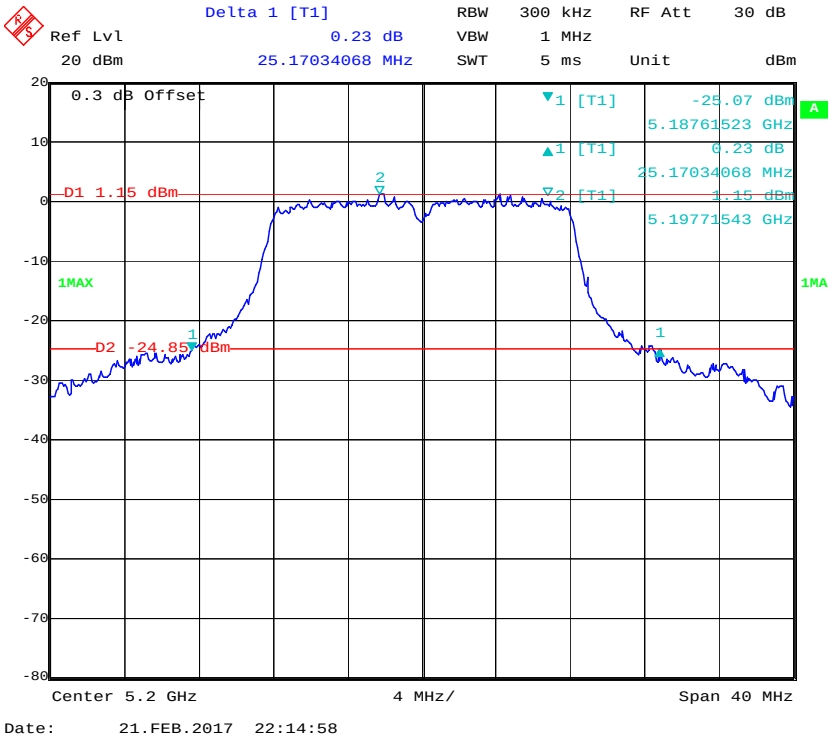
Note: the 99% Occupied Bandwidth have not fall into the band 5250-5350MHz and 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

5150-5250MHz, 26dB Emission Bandwidth:

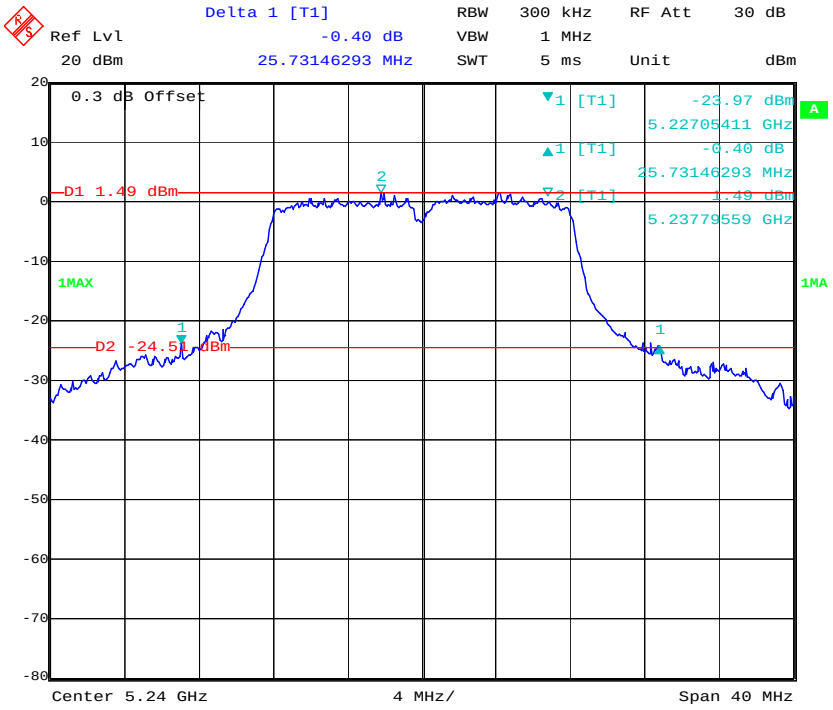
802.11a Low Channel



802.11a Middle Channel

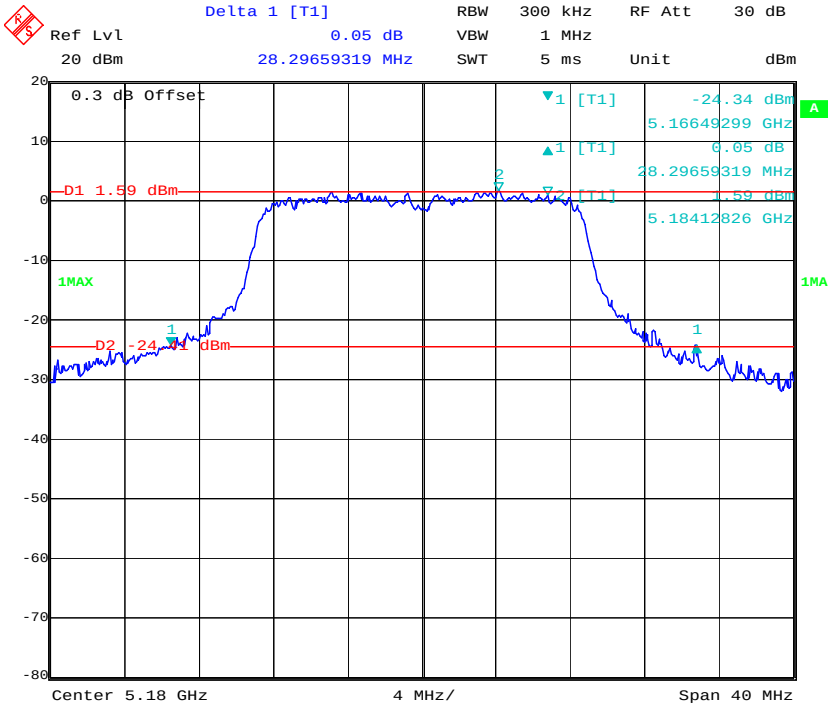


802.11a High Channel



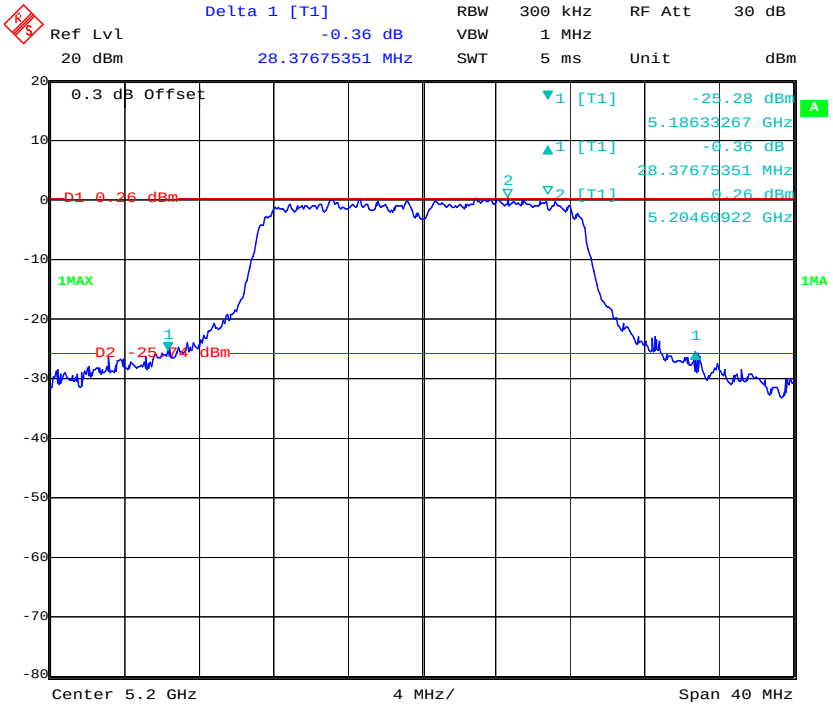
Date: 21.FEB.2017 22:16:22

802.11n ht20 Low Channel



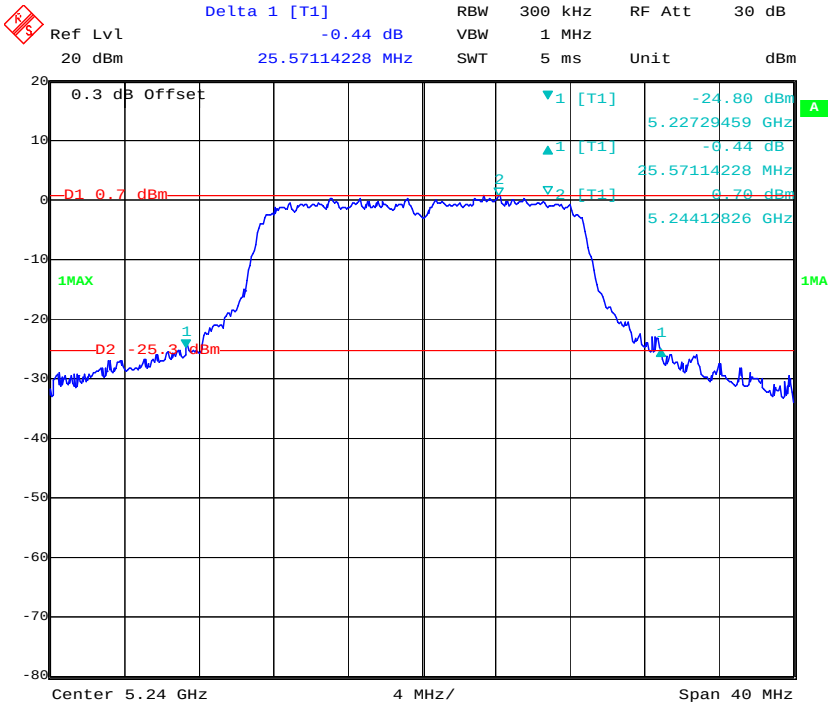
Date: 21.FEB.2017 22:30:40

802.11n ht20 Middle Channel



Date: 21.FEB.2017 22:32:15

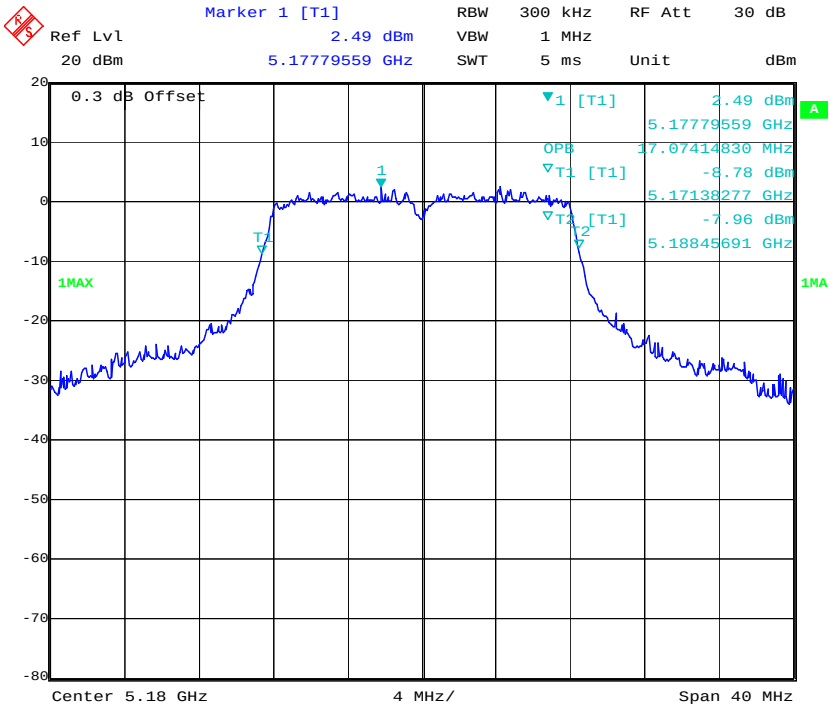
802.11n ht20 High Channel



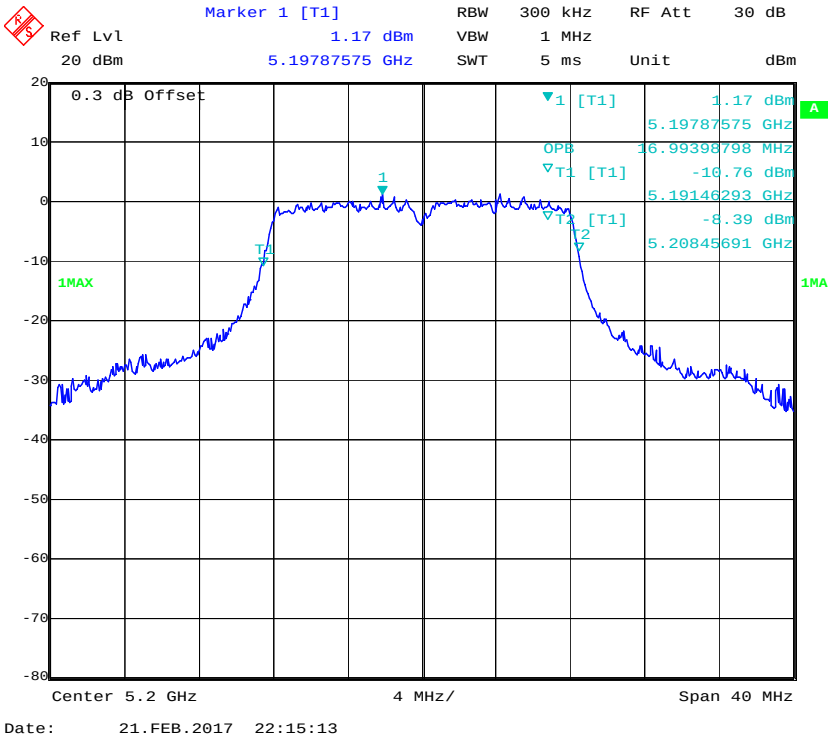
Date: 21.FEB.2017 22:33:35

99% Occupied Bandwidth:

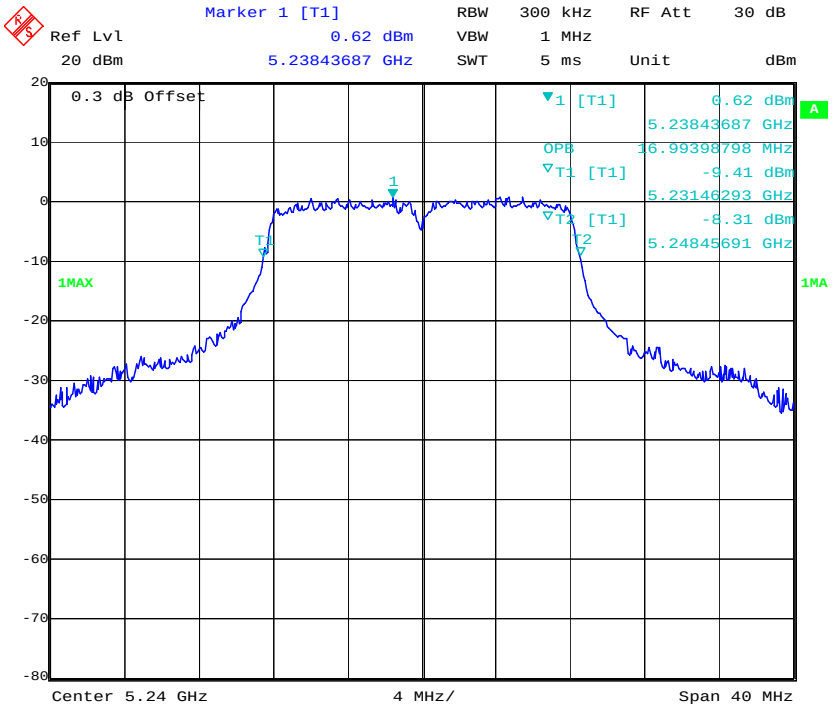
802.11a Low Channel



802.11a Middle Channel

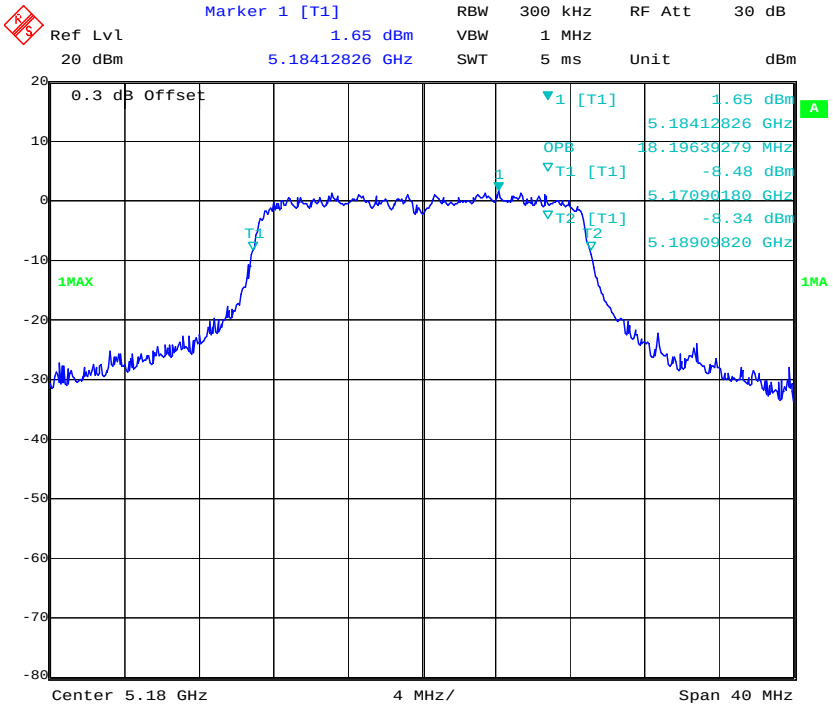


802.11a High Channel



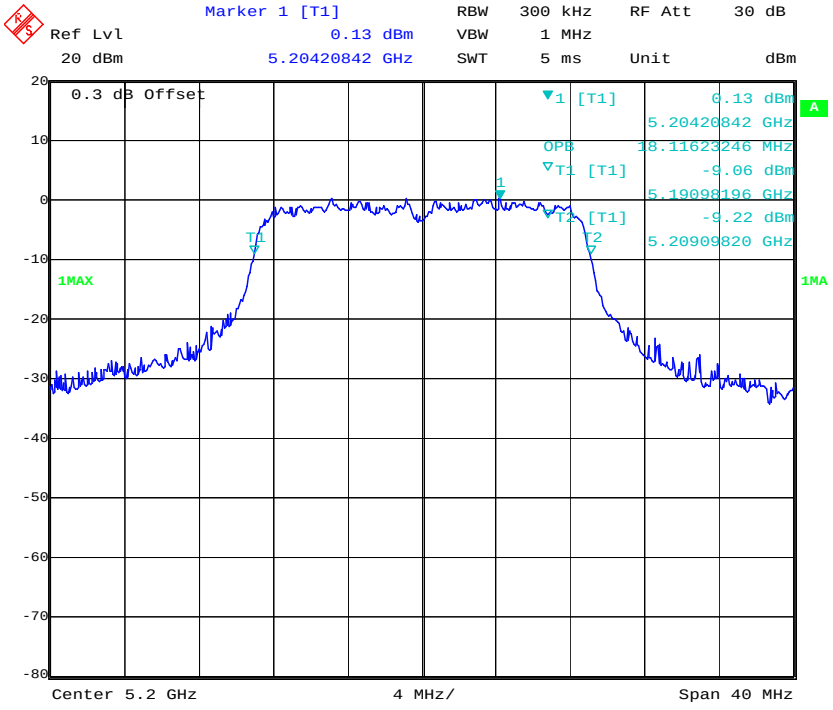
Date: 21.FEB.2017 22:16:37

802.11n ht20 Low Channel



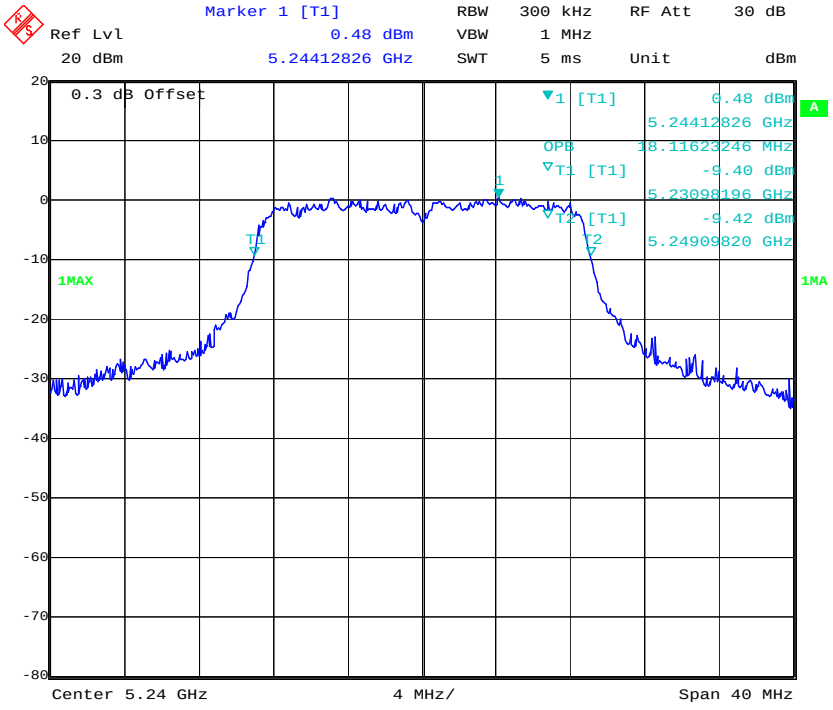
Date: 21.FEB.2017 22:30:56

802.11n ht20 Middle Channel



Date: 21.FEB.2017 22:32:29

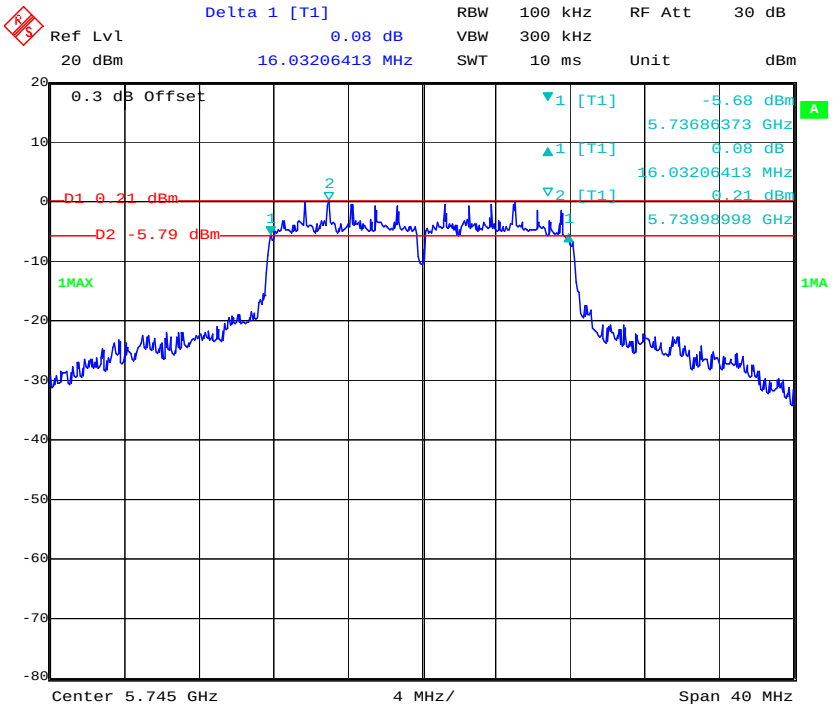
802.11n ht20 High Channel



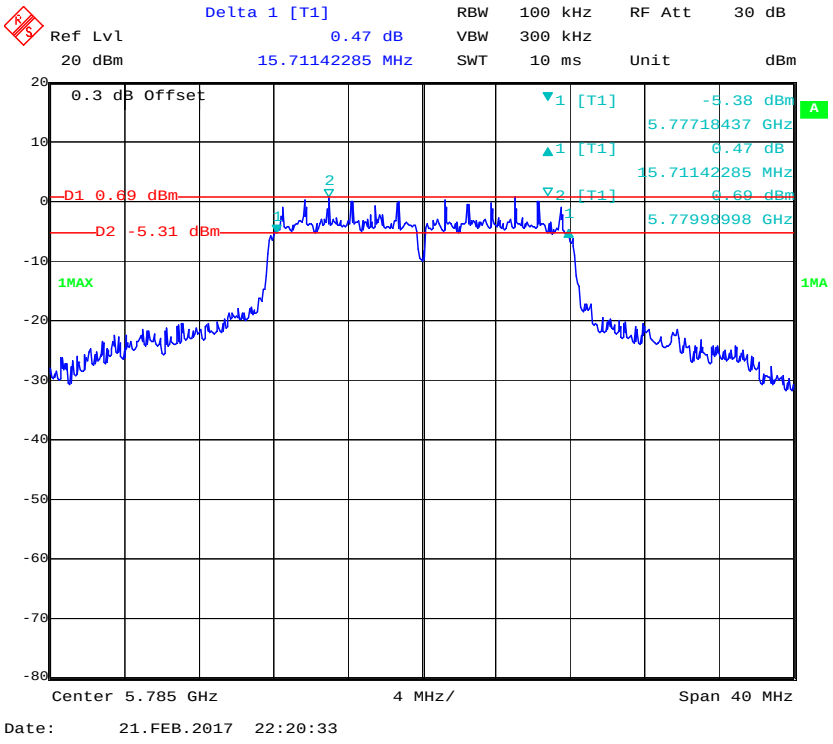
Date: 21.FEB.2017 22:33:50

5725-5850MHz, 6dB Bandwidth:

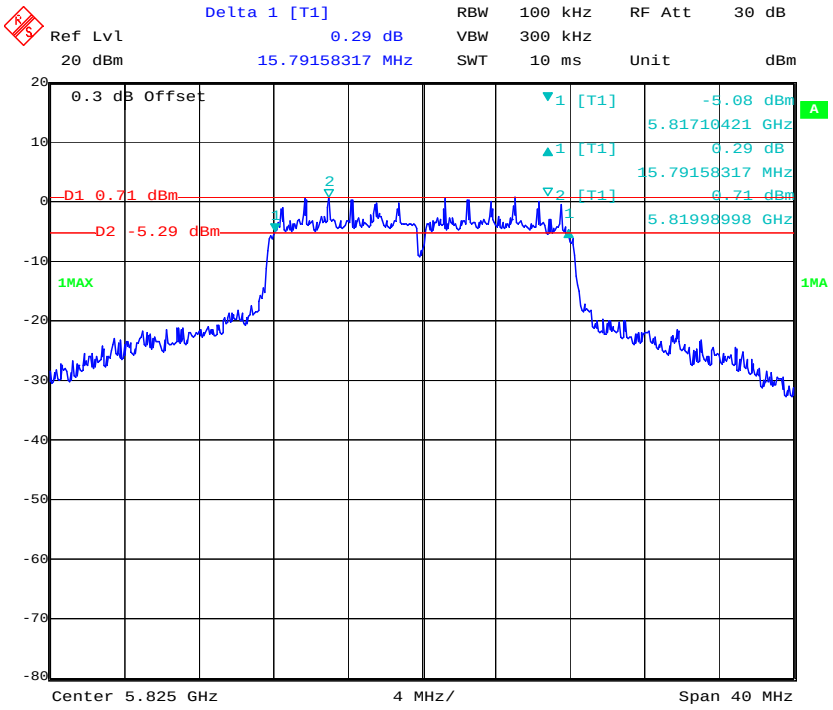
802.11a Low Channel



802.11a Middle Channel

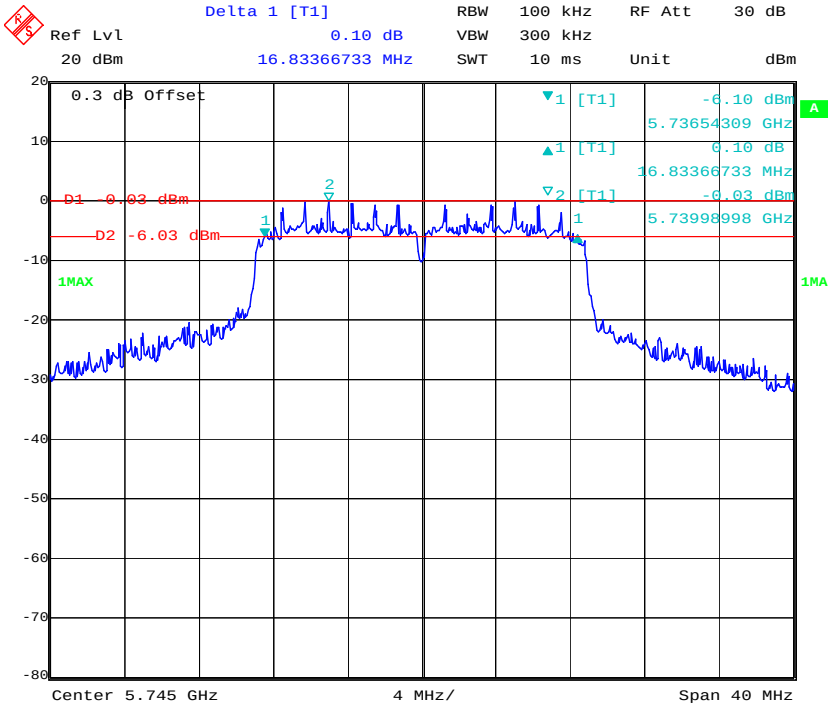


802.11a High Channel



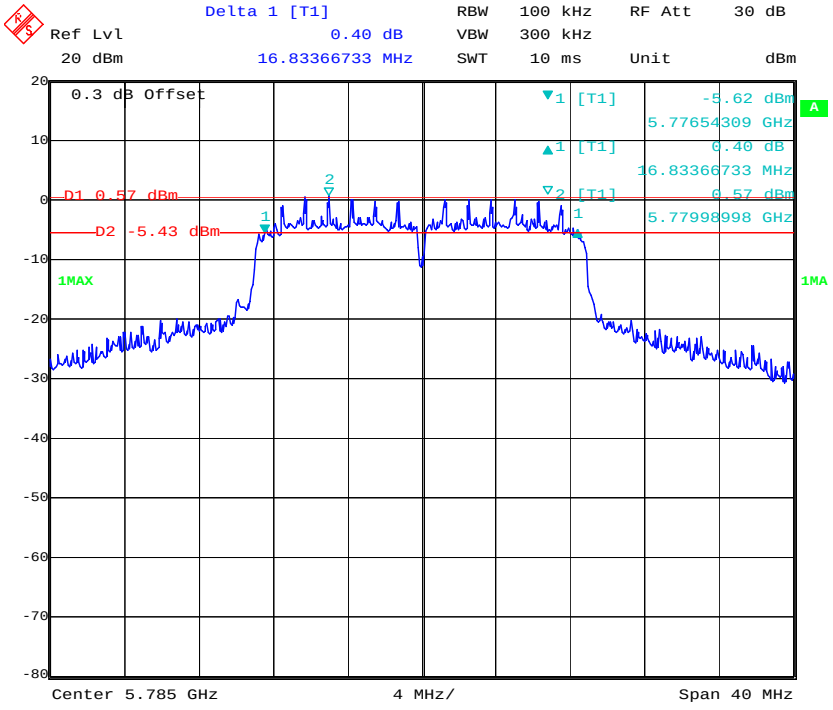
Date: 21.FEB.2017 22:22:43

802.11n ht20 Low Channel

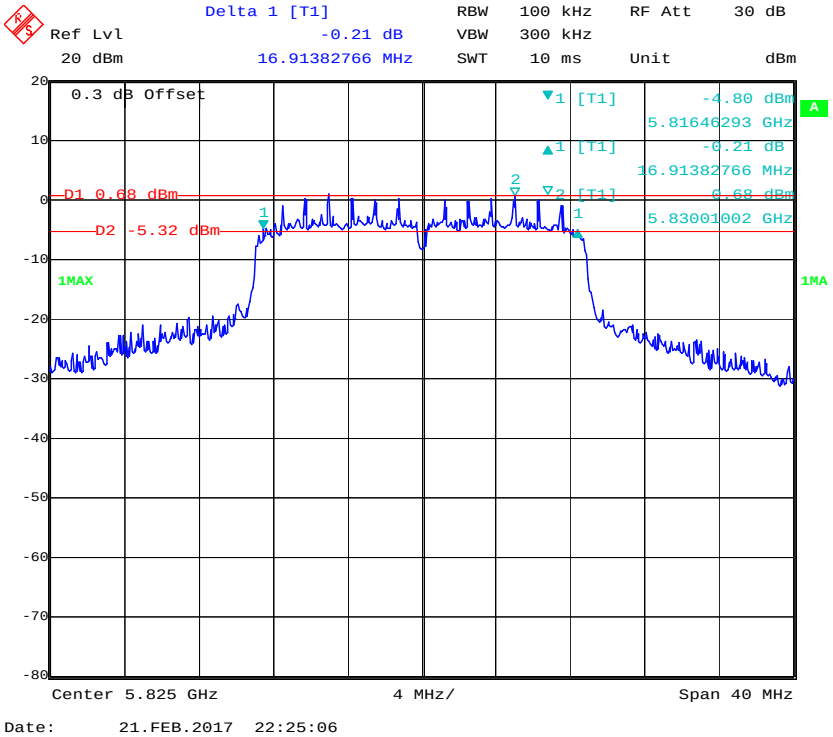


Date: 21.FEB.2017 22:28:46

802.11n ht20 Middle Channel

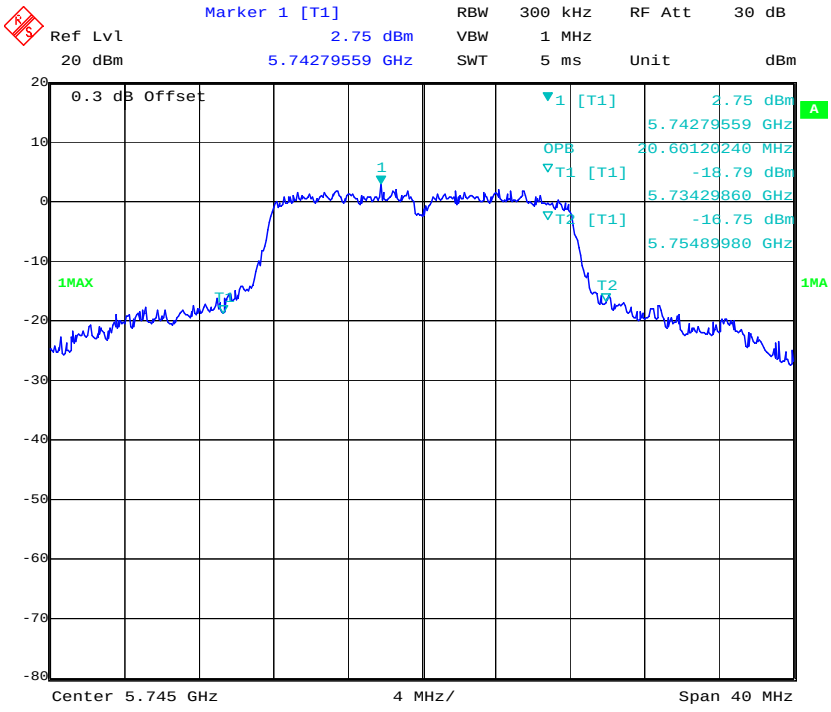


802.11n ht20 High Channel

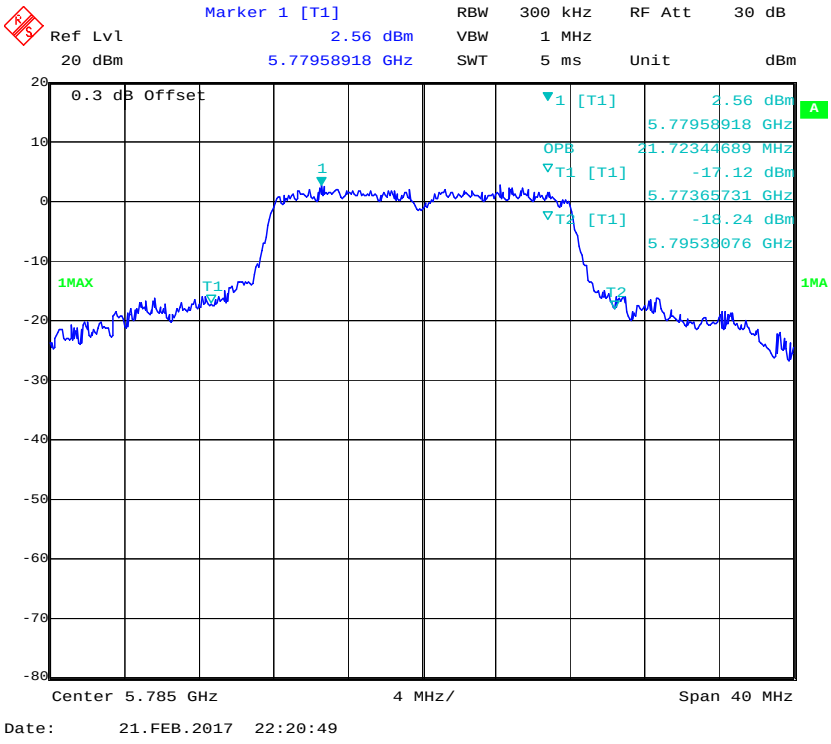


99% Occupied Bandwidth:

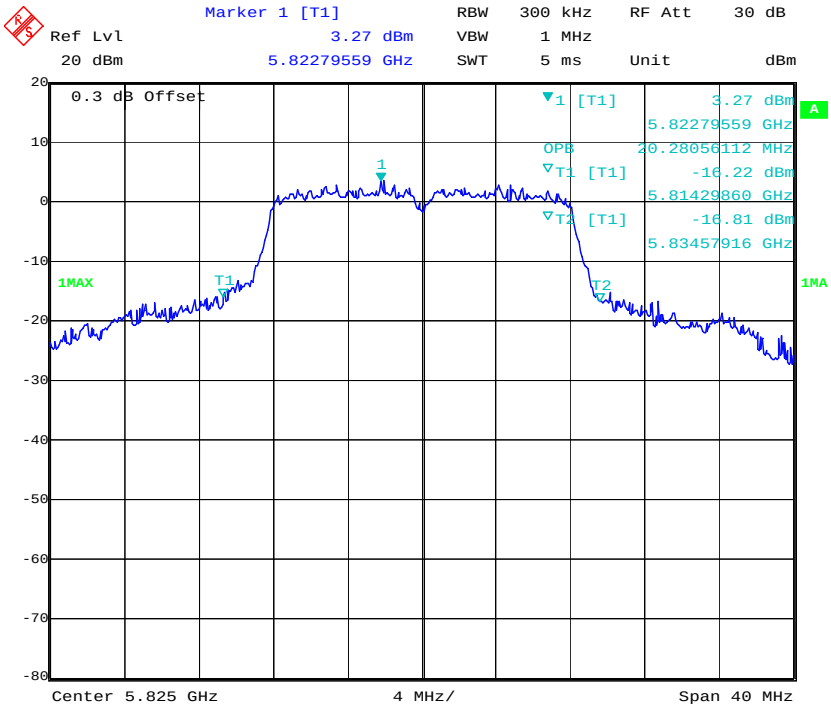
802.11a Low Channel



802.11a Middle Channel

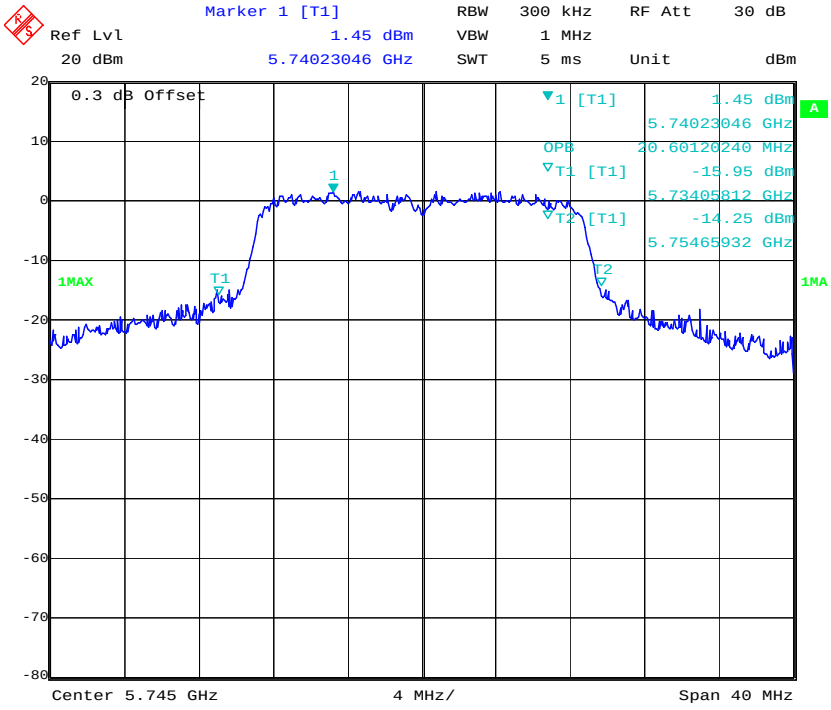


802.11a High Channel



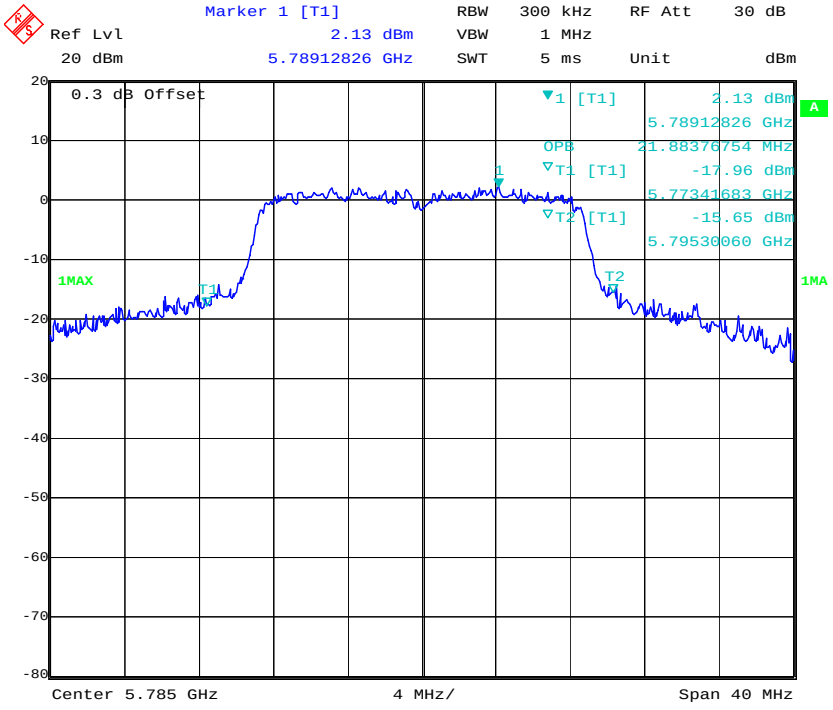
Date: 21.FEB.2017 22:22:59

802.11n ht20 Low Channel

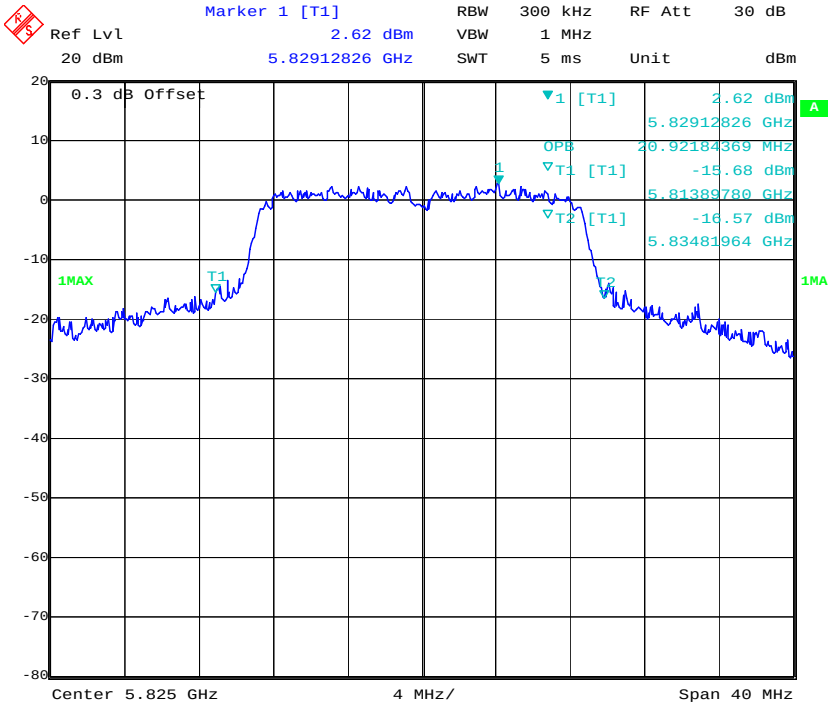


Date: 21.FEB.2017 22:29:02

802.11n ht20 Middle Channel



802.11n ht20 High Channel



FCC §15.407(g)–FREQUENCY STABILITY

Applicable Standard

FCC §15.407

(g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

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	/
FLUKE	Multimeter	1587	27870099	2016-12-30	2017-12-29
BACL	High Temperature Test Chamber	BTH-150	30024	2016-12-02	2017-12-01

*** 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:	26.3 °C
Relative Humidity:	39 %
ATM Pressure:	95.5 kPa

The testing was performed by Kevin Hu on 2017-02-21.

Test Result: Pass.

Un-modulation, channel 5180MHz			
Temperature	**Voltage**	**Measured Frequency**	**Result**
℃	**V_{DC}**	**MHz**	
-20	7.6	5180.006	Pass
-10		5180.008	
10		5180.002	
20		5180.012	
30		5180.006	
40		5180.004	
25	6.84	5180.002	
25	8.36	5180.006	

Un-modulation, channel 5745MHz			
Temperature	**Voltage**	**Measured Frequency**	**Result**
℃	**V_{DC}**	**MHz**	
-20	7.6	5745.008	Pass
-10		5745.006	
10		5745.012	
20		5745.004	
30		5745.012	
40		5745.010	
25	6.84	5745.004	
25	8.36	5745.002	

Note: the frequency stability range plus the operation bandwidth edge within the operation band.

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:	26.3 °C
Relative Humidity:	39 %
ATM Pressure:	95.5 kPa

The testing was performed by Kevin Hu on 2017-02-21.

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	10.44	9.87	13.17	24	PASS
		5200	9.25	9.55	12.41	24	PASS
		5240	9.77	9.54	12.67	24	PASS
	802.11n ht20	5180	10.37	9.81	13.11	24	PASS
		5200	9.12	9.48	12.31	24	PASS
		5240	9.68	9.53	12.62	24	PASS
5725-5850MHz	802.11a	5745	7.97	8.08	11.04	30	PASS
		5785	8.16	8.14	11.16	30	PASS
		5825	6.95	7.82	10.42	30	PASS
	802.11n ht20	5745	8.06	8.12	11.1	30	PASS
		5785	8.14	8.15	11.16	30	PASS
		5825	7.74	7.81	10.79	30	PASS

Note: For 802.11a/n mode, the device employed Cyclic Delay Diversity (CDD) for MIMO transmitting, per C63.10-2013 clause 14.4.3.2.5 b, for power measurements on IEEE 802.11 devices:

Directional gain = $G_{Highest}$ = 2.53dBi < 6dBi in 5150-5250 MHz Band

Directional gain = $G_{Highest}$ = 5.47dBi < 6dBi in 5725-5850 MHz Band

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:	26.3 °C
Relative Humidity:	39 %
ATM Pressure:	95.5 kPa

The testing was performed by Kevin Hu on 2017-02-21.

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	0.49	0.48	3.5	11
	Middle	5200	-0.49	0.1	2.83	11
	High	5240	-0.31	-0.33	2.69	11
802.11n ht20	Low	5180	0.52	0.03	3.29	11
	Middle	5200	-1.01	-0.38	2.33	11
	High	5240	-0.73	-0.3	2.5	11

Note: For 802.11a/n mode, the device employed Cyclic Delay Diversity (CDD) for MIMO transmitting, per C63.10-2013 clause 14.4.3.2.5 b, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

For power density measurements on IEEE 802.11 devices,

Array Gain = 10 log(NANT/NSS) dB.

So:

Directional gain = GANT + Array Gain = 2.53+10*log(2) =5.53 dBi<6dBi

5725-5850MHz:

Mode	Channel	Frequency MHz	PSD (dBm/300kHz)		Total (dBm/500kHz)	Limit (dBm/500kHz)
			Chain 0	Chain 1		
802.11a	Low	5745	-1.18	0.15	4.76	27.53
	Middle	5785	-0.59	0.82	5.4	27.53
	High	5825	0.12	1.3	5.98	27.53
802.11n ht20	Low	5745	-1.46	-1.17	3.92	27.53
	Middle	5785	-0.17	1.45	5.94	27.53
	High	5825	-0.58	1.28	5.68	27.53

Note: For 802.11a/n mode, the device employed Cyclic Delay Diversity (CDD) for MIMO transmitting, per C63.10-2013 clause 14.4.3.2.5 b, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

For power density measurements on IEEE 802.11 devices,

Array Gain = 10 log(NANT/NSS) dB.

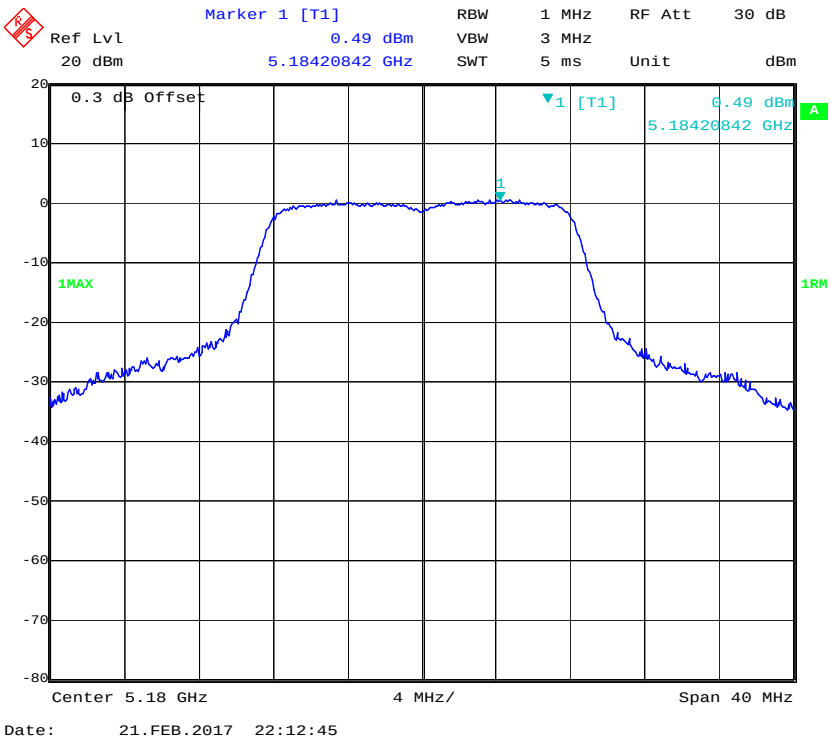
So:

Directional gain = GANT + Array Gain = 5.47+10*log(2) =8.47 dBi

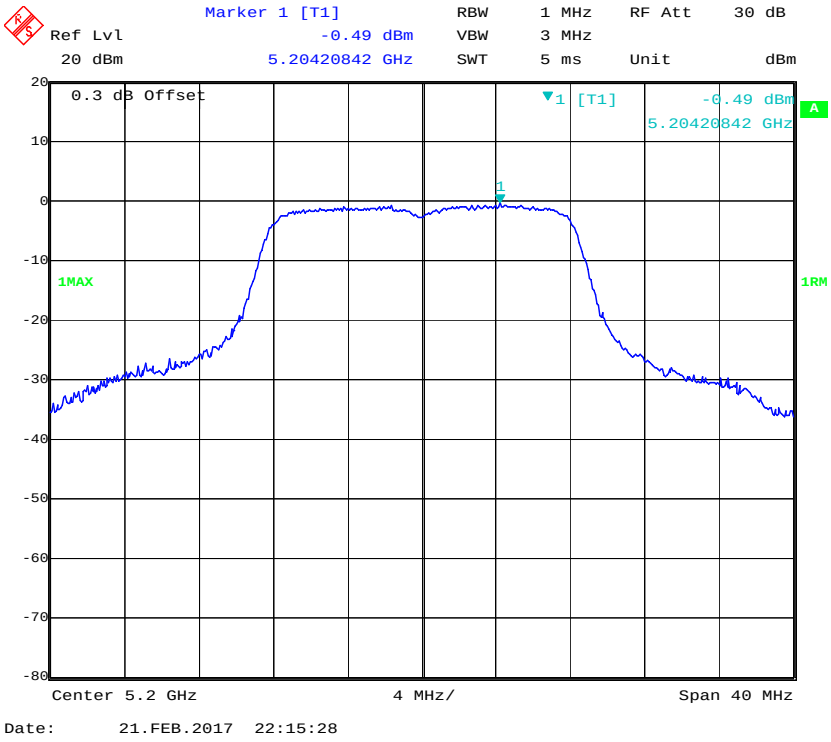
The measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

5150MHz-5250MHz:
Chain 0:

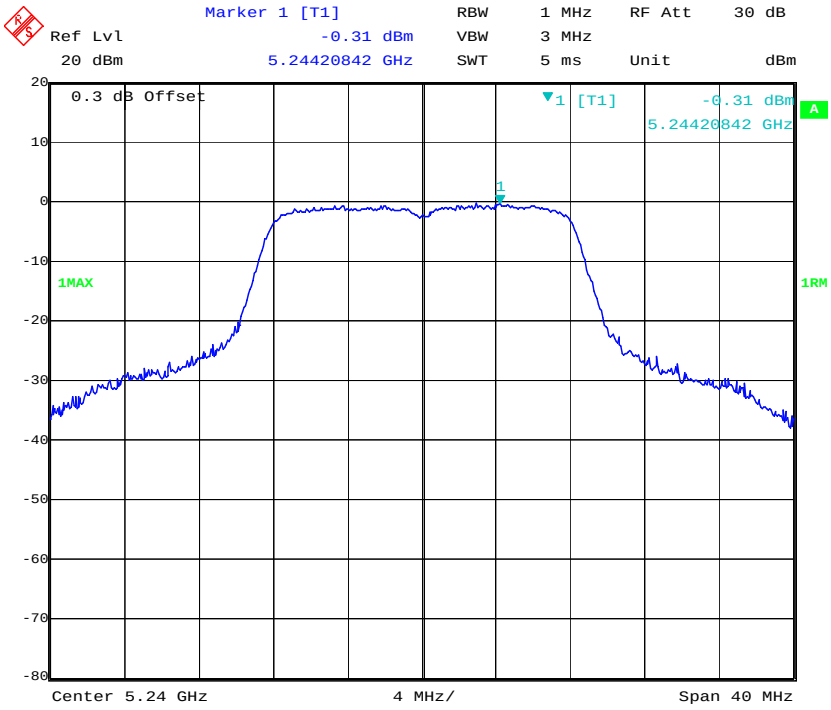
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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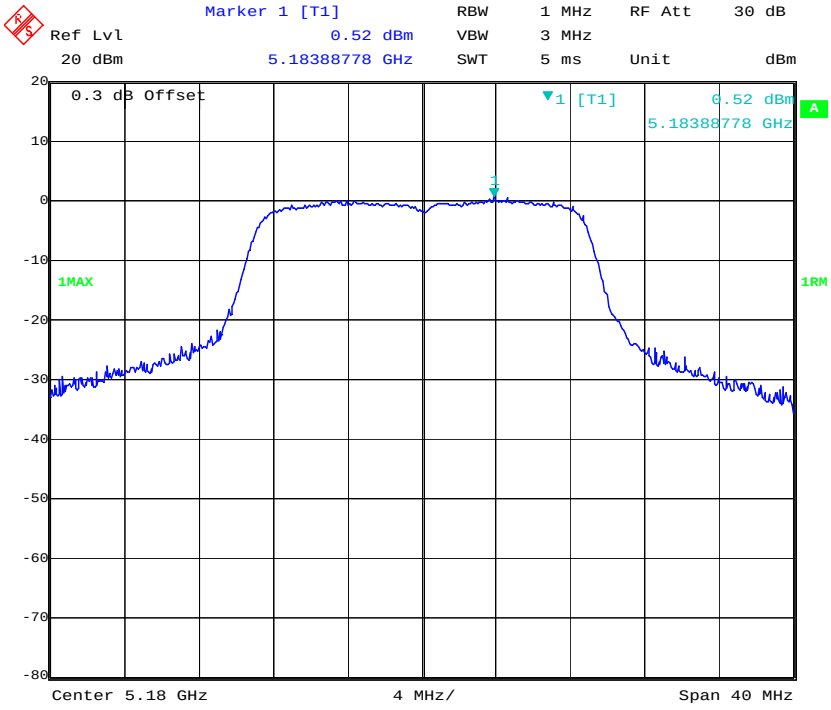
802.11n ht20 Low Channel



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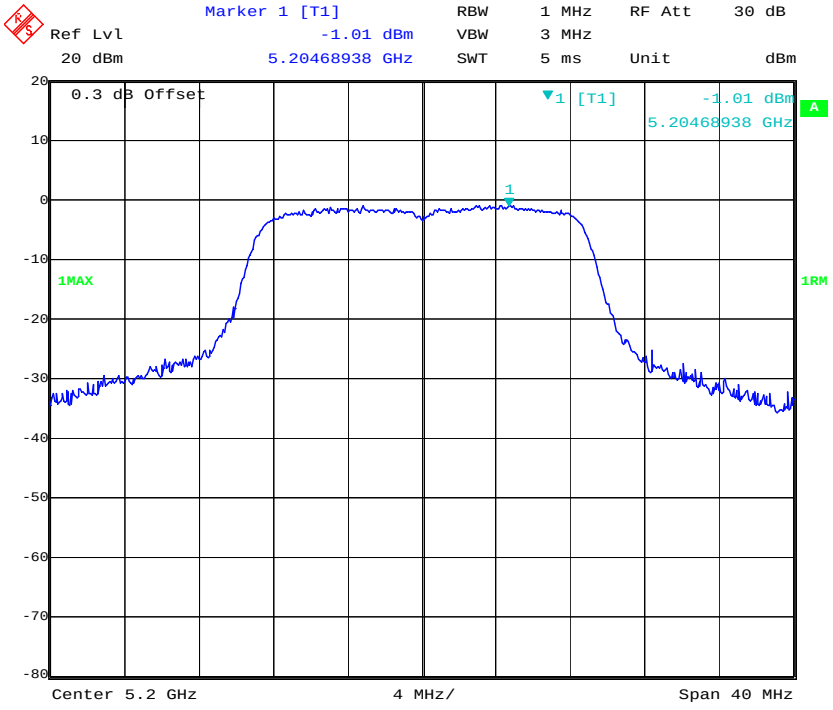

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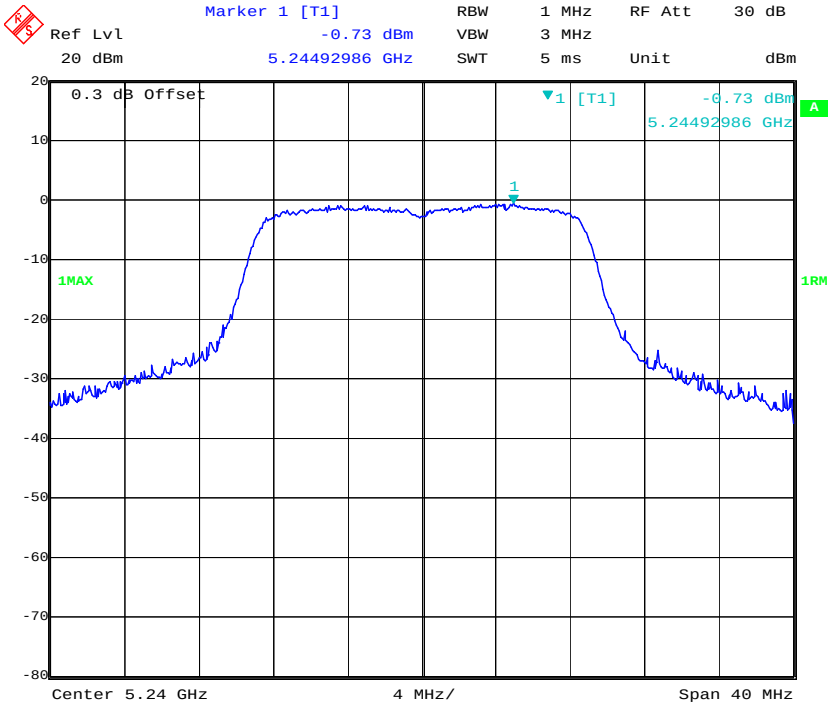

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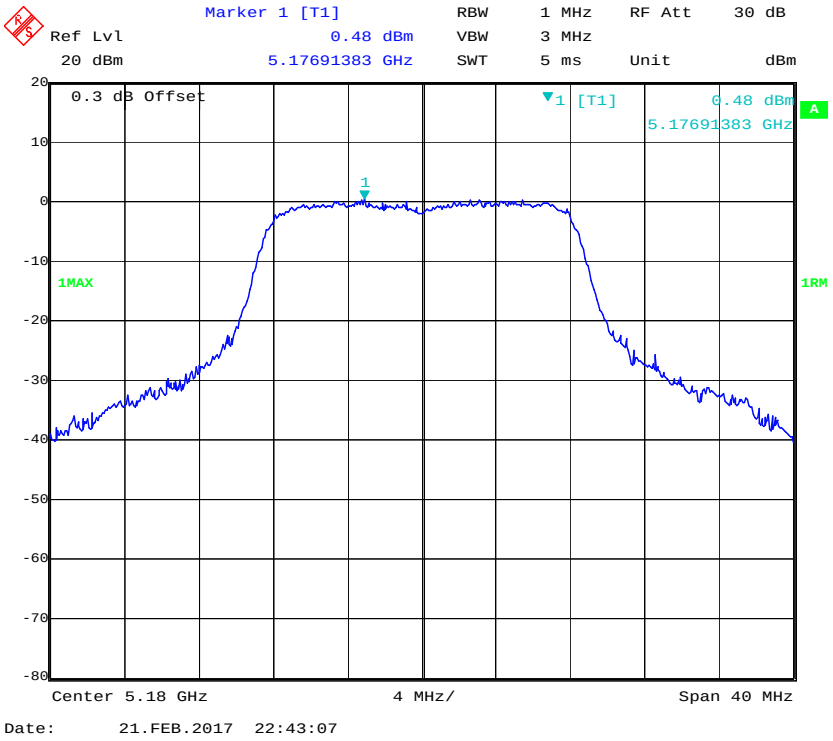
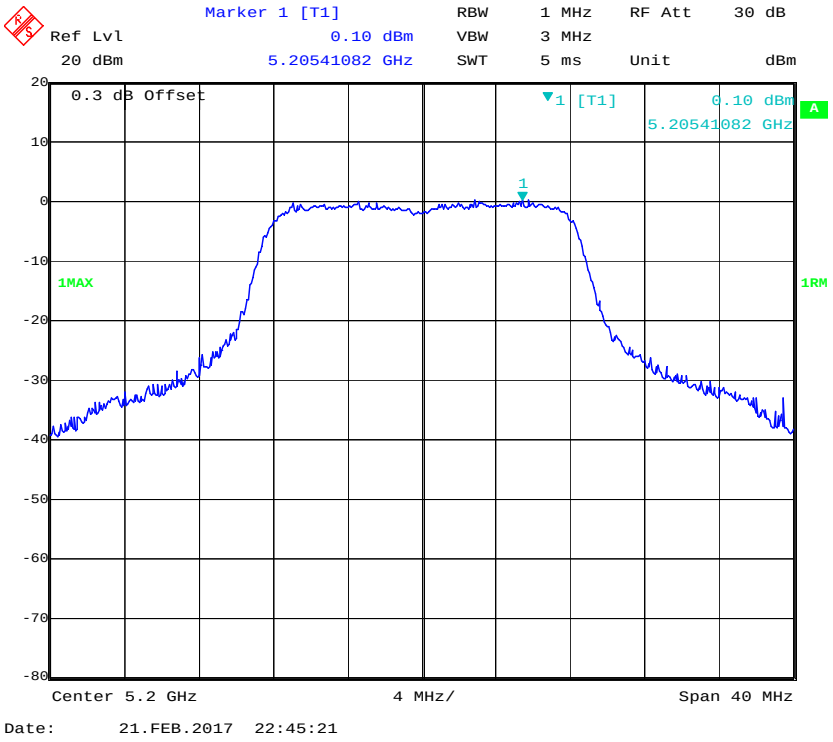
Chain 1:

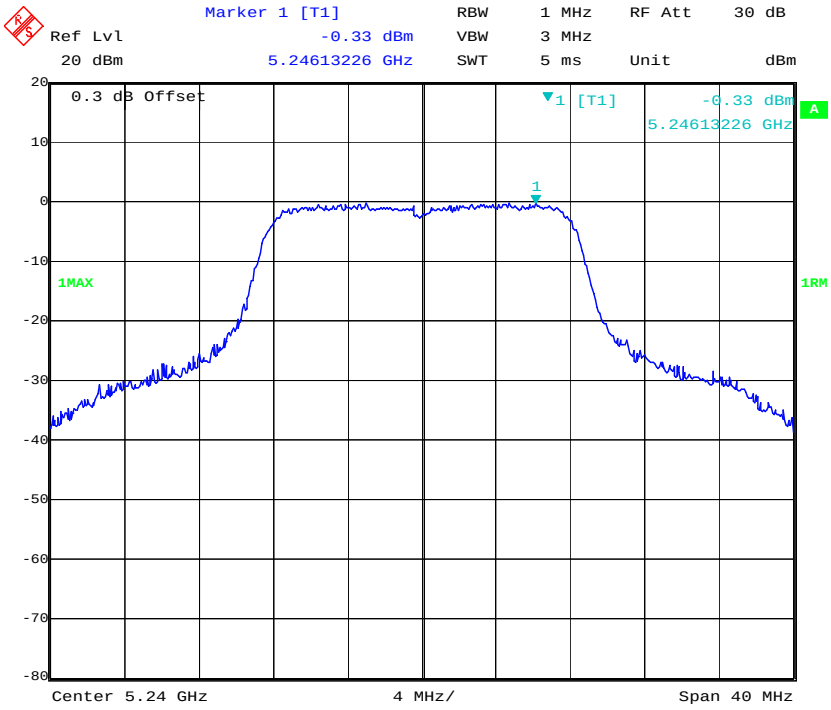
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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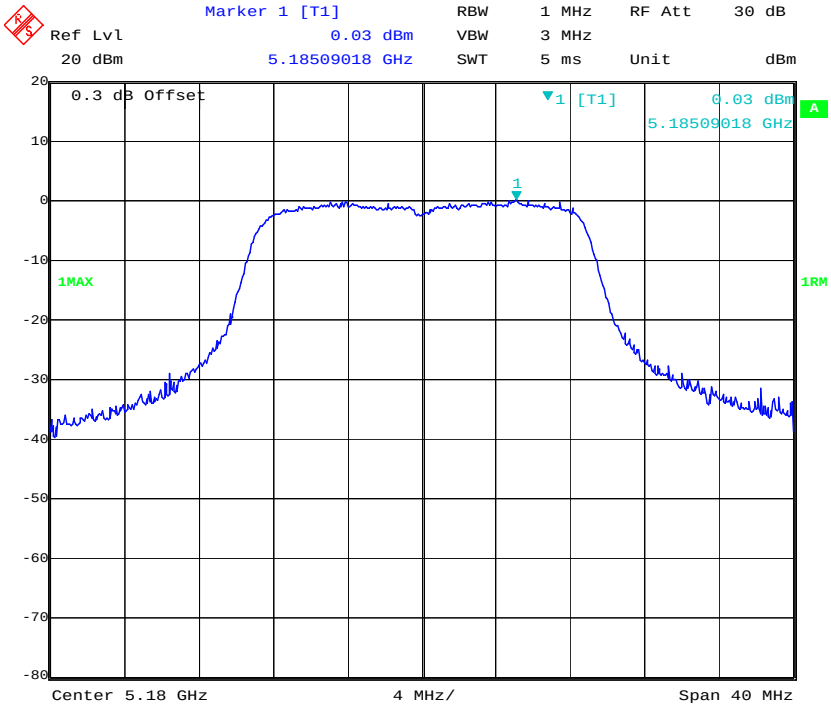

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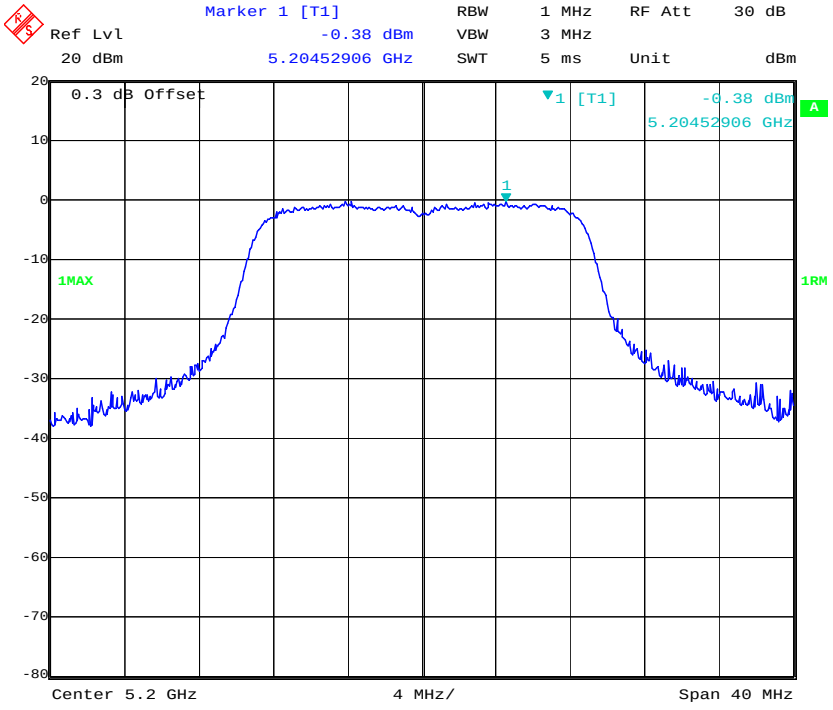
802.11n ht20 Middle Channel



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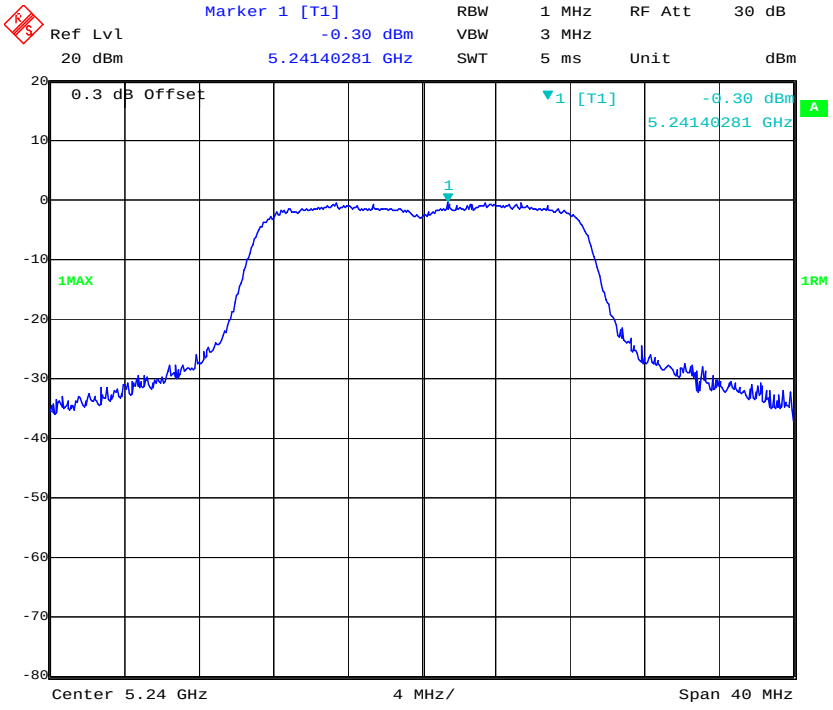
802.11n ht20 High Channel



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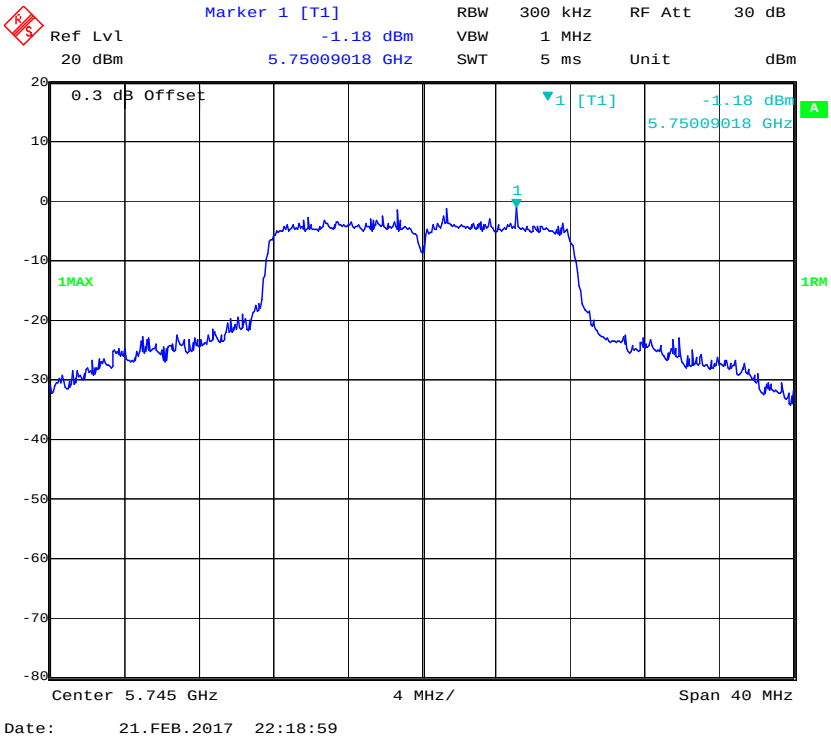
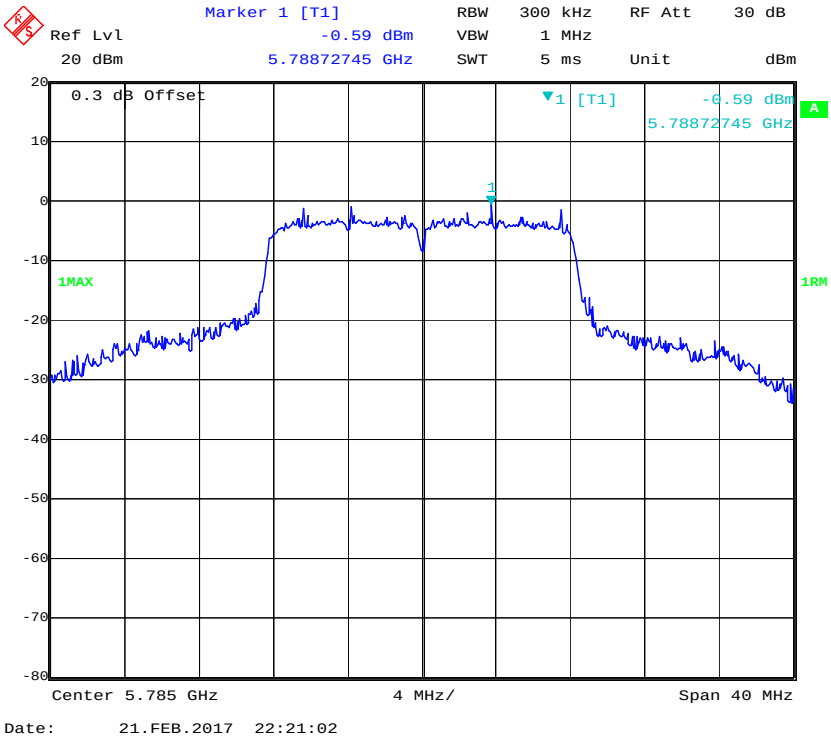
5725MHz-5850MHz:
Chain 0:

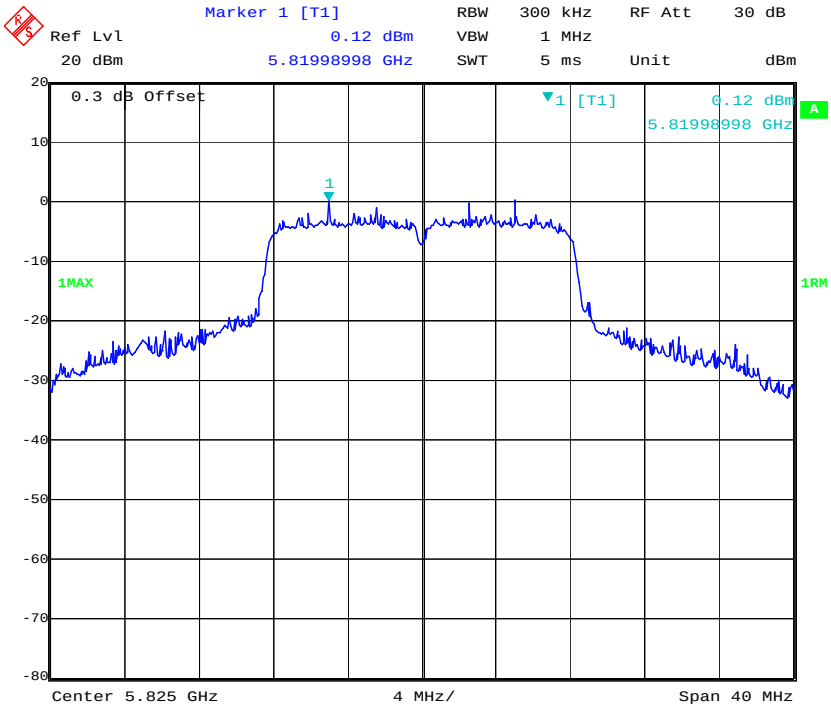
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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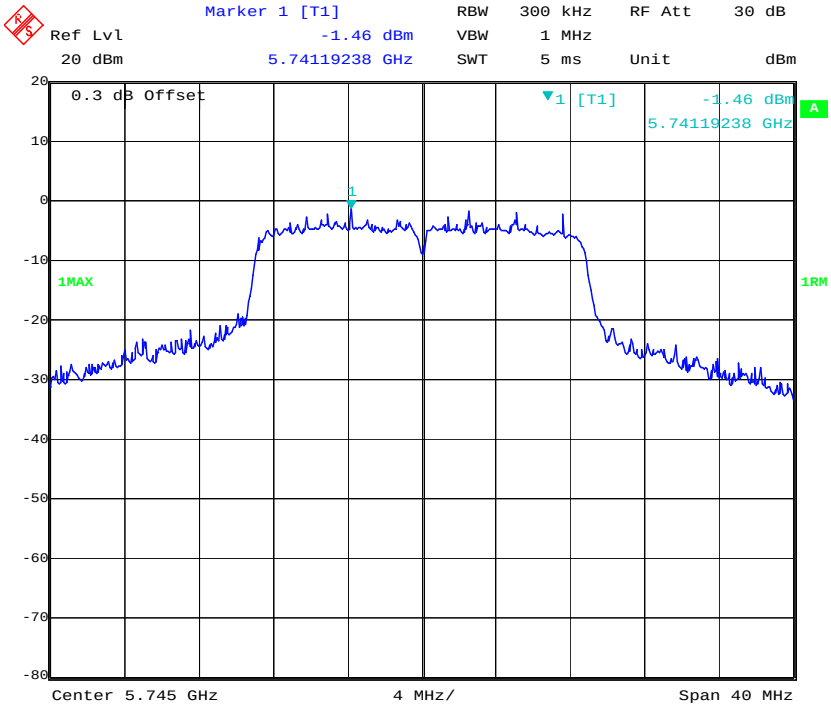

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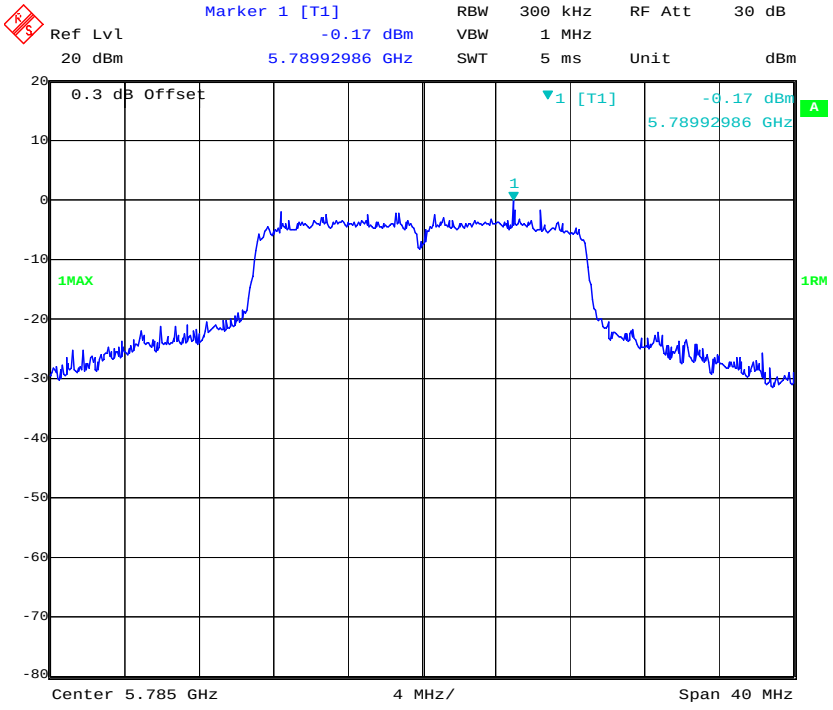
802.11n ht20 Middle Channel



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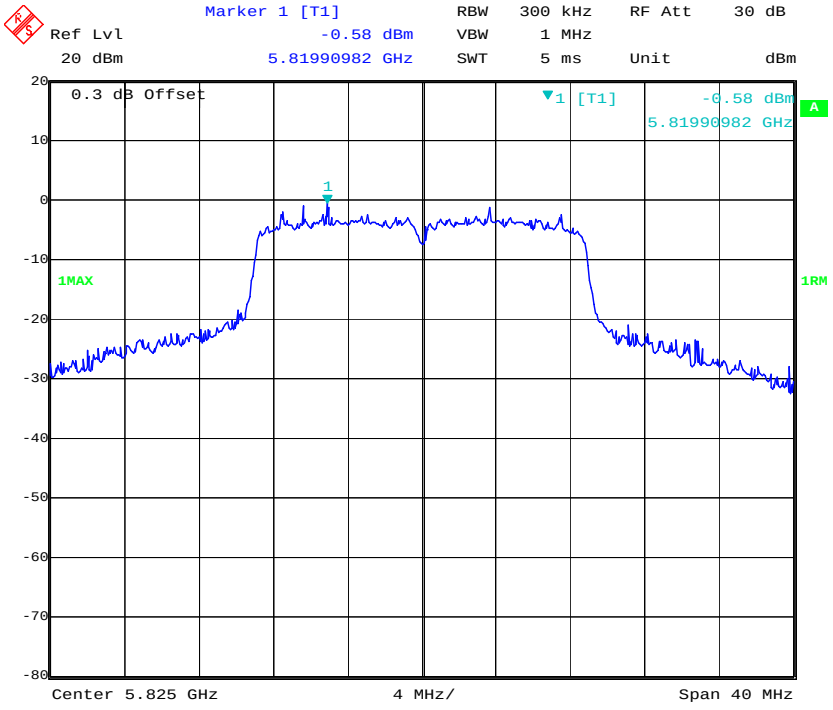
802.11n ht20 High Channel



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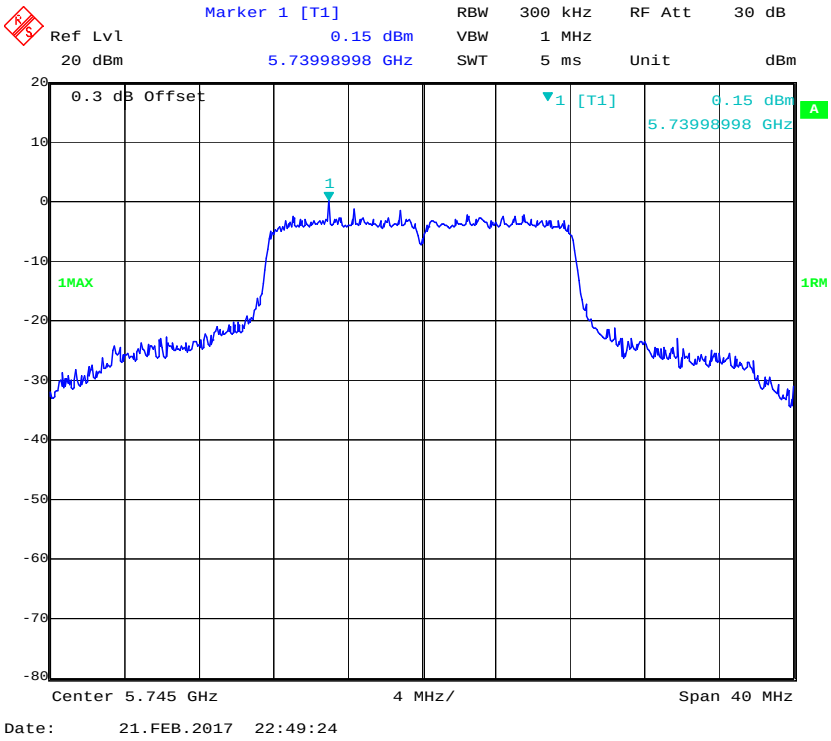
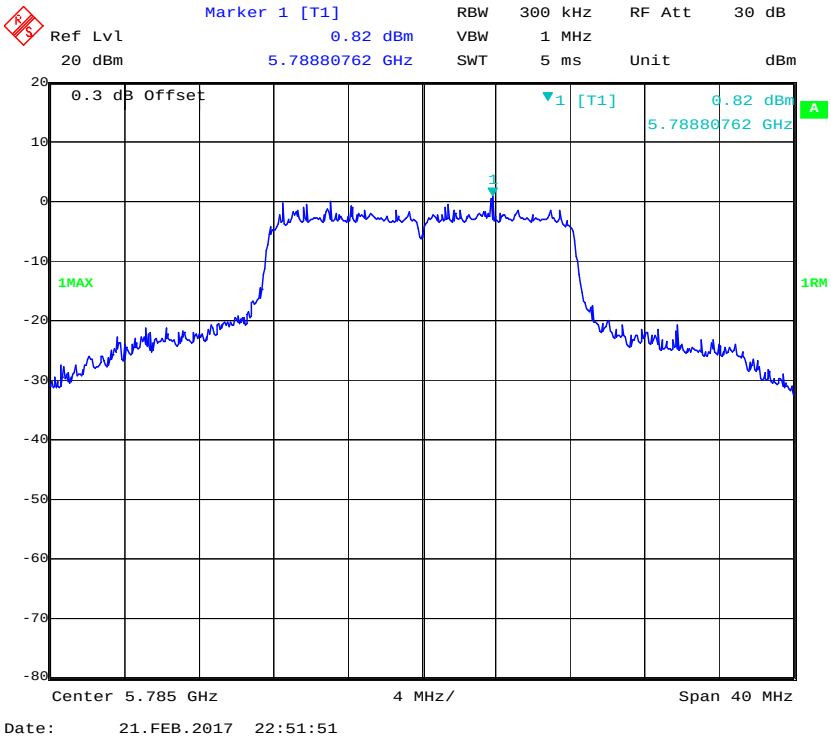
Chain 1:

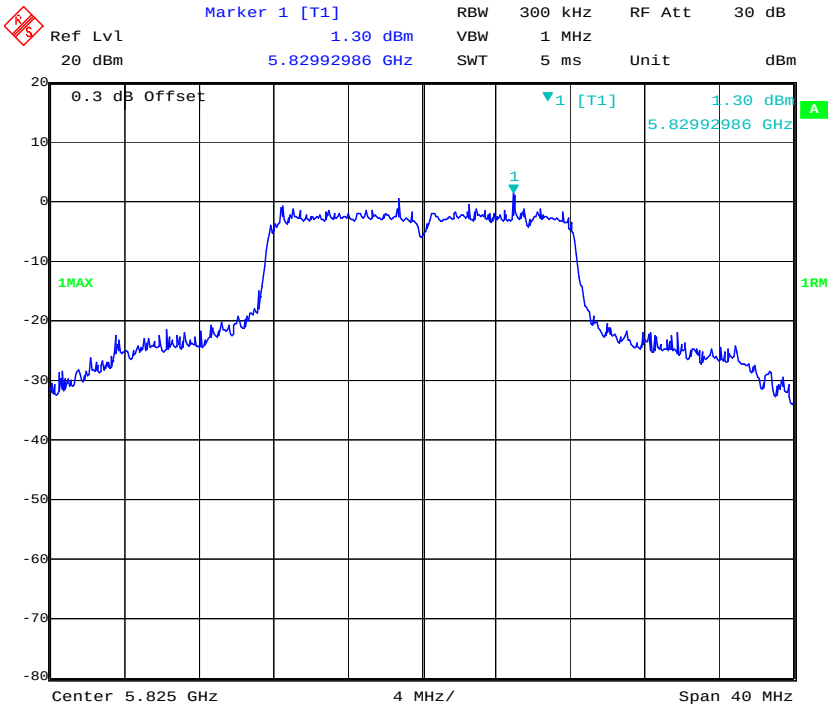
802.11a Low Channel



802.11a Middle Channel



802.11a High Channel



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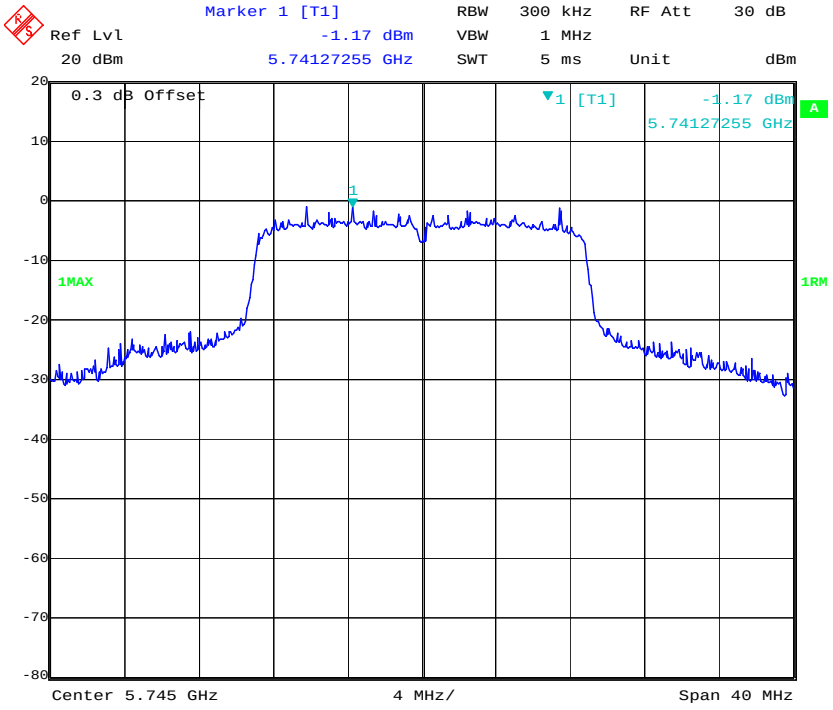
802.11n ht20 Low Channel



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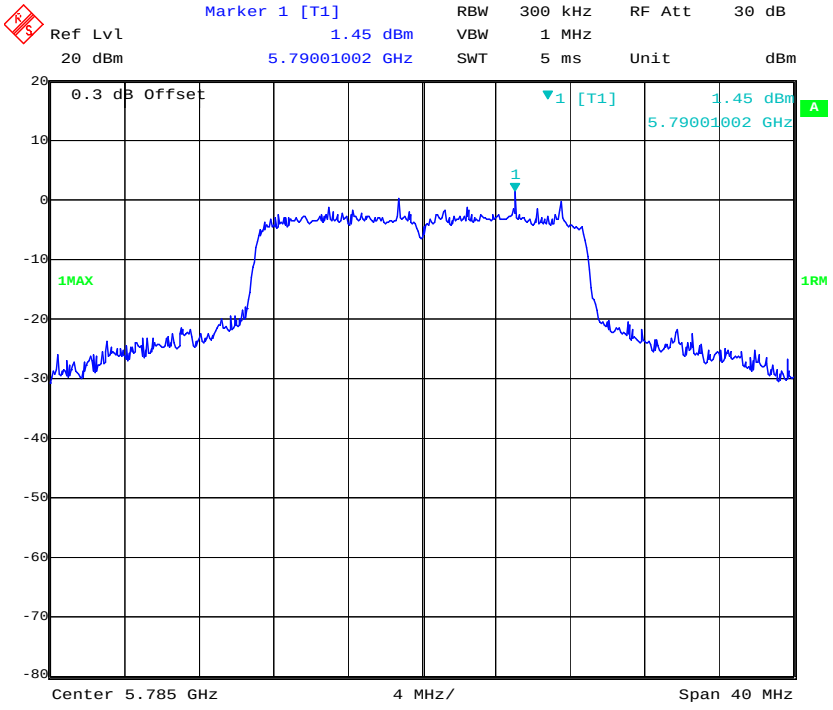
802.11n ht20 Middle Channel



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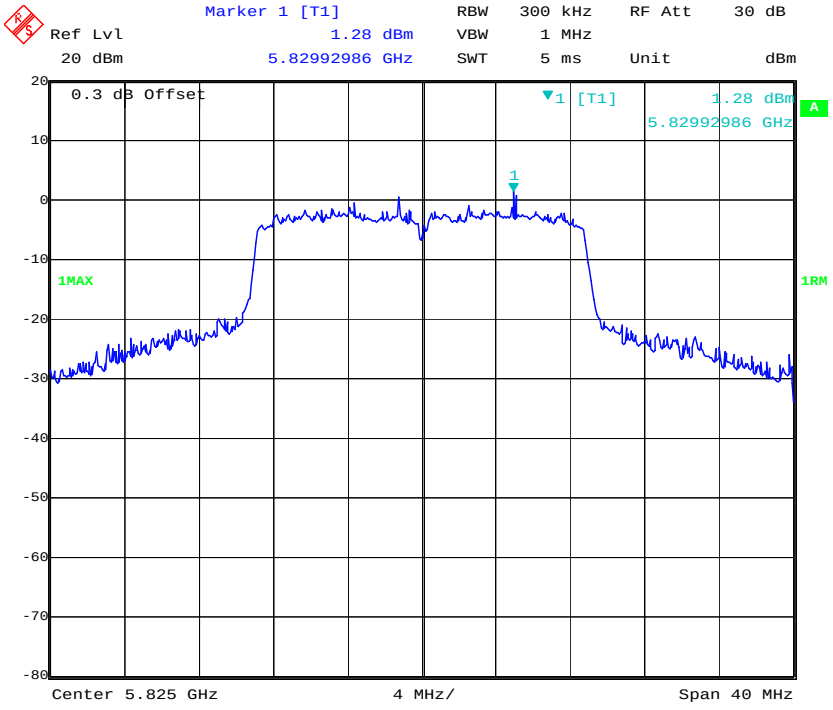
802.11n ht20 High Channel



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