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-GL100A1704

Report Type:	Product Name:
Original Report	C2

Test Engineer:	*Kevin Hu*
Report Number:	RDG170226007C
Report Date:	2017-05-24
Reviewed By:	Henry Ding EMC Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Chengdu) No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, China Tel: 028-65523123, Fax: 028-65525125 www.baclcorp.com

Note: This test report was prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Chengdu). Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.This report was valid only with a valid digital signature.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***SZ DJI TECHNOLOGY CO., LTD***'s product, model number: ***GL100A (FCC ID: SS3-GL100A1704)*** (the "EUT") in this report was a ***C2,*** which was measured approximately: 15.7 cm (L) × 12.7 cm (W) × 9.5 cm (H), rated input voltage: DC3.7V from battery or DC5V charging from adapter.

Adapter information:
MODEL: A185-120150U-US1
INPUT: AC 100-240V~50/60HZ, 0.5A
OUTPUT: DC 5V/ 3A; DC9V/2A;DC12V/1.5A

**All measurement and test data in this report was gathered from final production sample, serial number: 170226007 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-02-26, 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, and E of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: SS3-GL100A1704.
Part of system submissions with FCC ID: SS3-MM1A1702.

Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”.

All of the measurements detailed in this Test Report were performed by Bay Area Compliance Laboratories Corp. (Chengdu).

The Bay Area Compliance Laboratories Corp. Chengdu’s measurement Uncertainties (calculated for a k=2 Coverage Factor corresponding to approximately 95% Coverage) were as follows:

-For all of the AC Line Conducted Emissions Tests reported herein: ±3.17 dB.
-For of all of the Direct Antenna Conducted Emissions Tests reported herein: ±0.56 dB.

-For of all of the direct Radiated Emissions Tests reported herein are:
30 MHz to 200 MHz: ±4.7 dB;
200 MHz to 1 GHz: ±6.0 dB;
1 GHz to 6 GHz: ±5.13dB; and,
6 GHz to 40 GHz: ±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 the No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, 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.

The device employed 802.11a/n ht20 and 5M modes in 5.8GHz band. For 802.11 a/n ht20 mode, the device only support 1T1R mode, for 5MHz mode, the device only support 2T2R mode.

For 5725~5850MHz band, 802.11a and n ht20 modes, 5 channels are provided for testing:

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

Channel 149, 157 and 165 were tested.

For 5 MHz modes, 17 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5745	7	5775	13	5805
2	5750	8	5780	14	5810
3	5755	9	5785	15	5815
4	5760	10	5790	16	5820
5	5765	11	5795	17	5825
6	5770	12	5800	/	/

Channel 1, 9 and 17 were tested.

EUT Exercise Software

For 802.11a/n modes, the software "Atheros Radio Test 2" 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.the maximum power was configured as below table, that provided by the manufacturer:

Test Mode	Test Software Version	Atheros Radio Test 2		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	13.5	12.5	11
802.11 ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	13	12	11

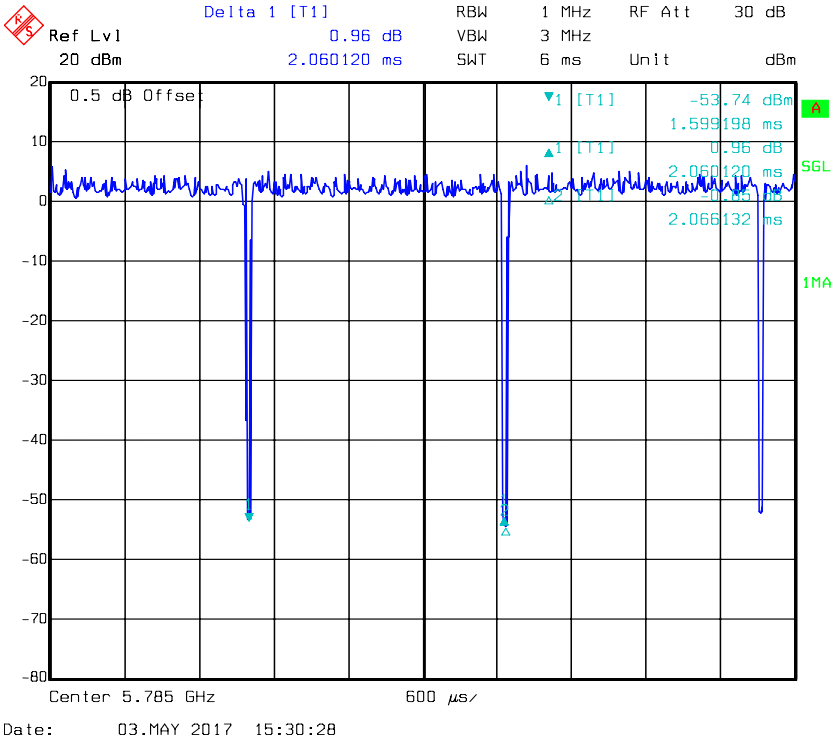
For 5MHz modes, the software "SecureCRTSecureFX_HH_x86_7.0.0.326" was used for testing, which was provided by manufacturer and the power setting as below:

Test Software Version	SecureCRTSecureFX_HH_x86_7.0.0.326		
Test Frequency	5745MHz	5785MHz	5825MHz
Power Level Setting	46	46	46

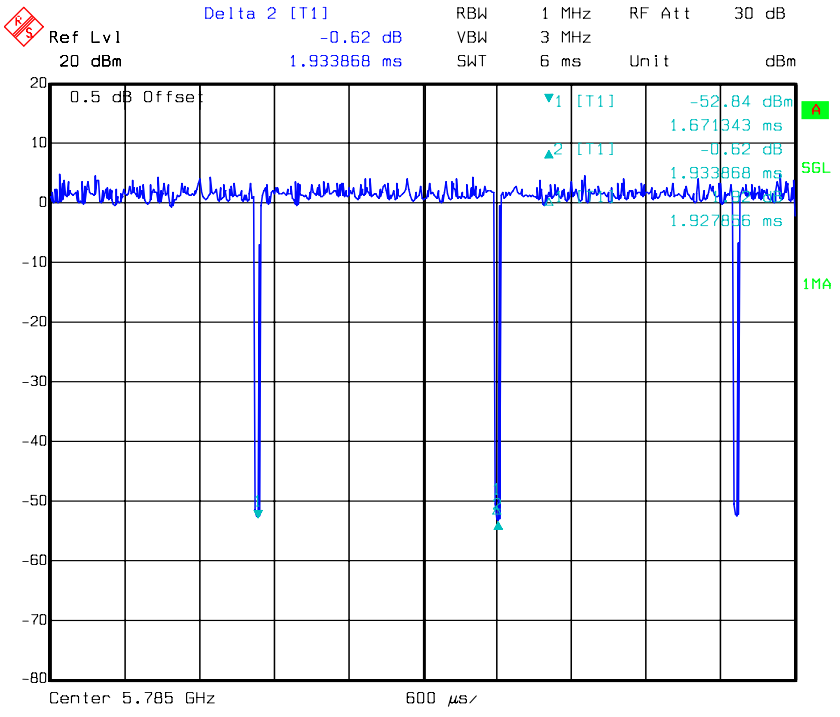
The software configured maximum duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)
802.11a	2.060	2.066	99.7
802.11n ht20	1.928	1.934	99.7
5MHz	1.723	1.743	98.9

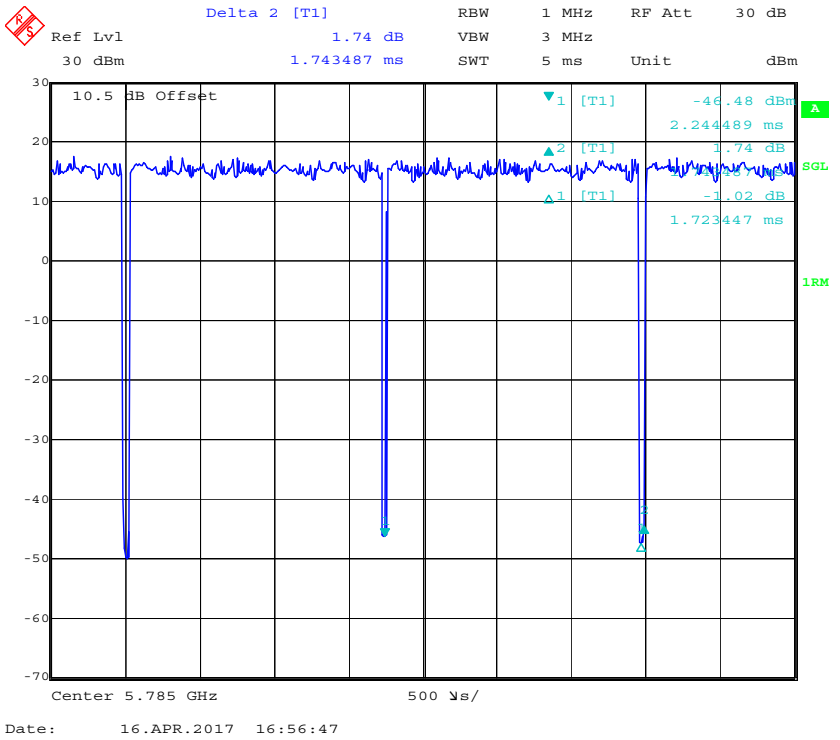
802.11a mode



802.11n ht20 mode



5MHz mode



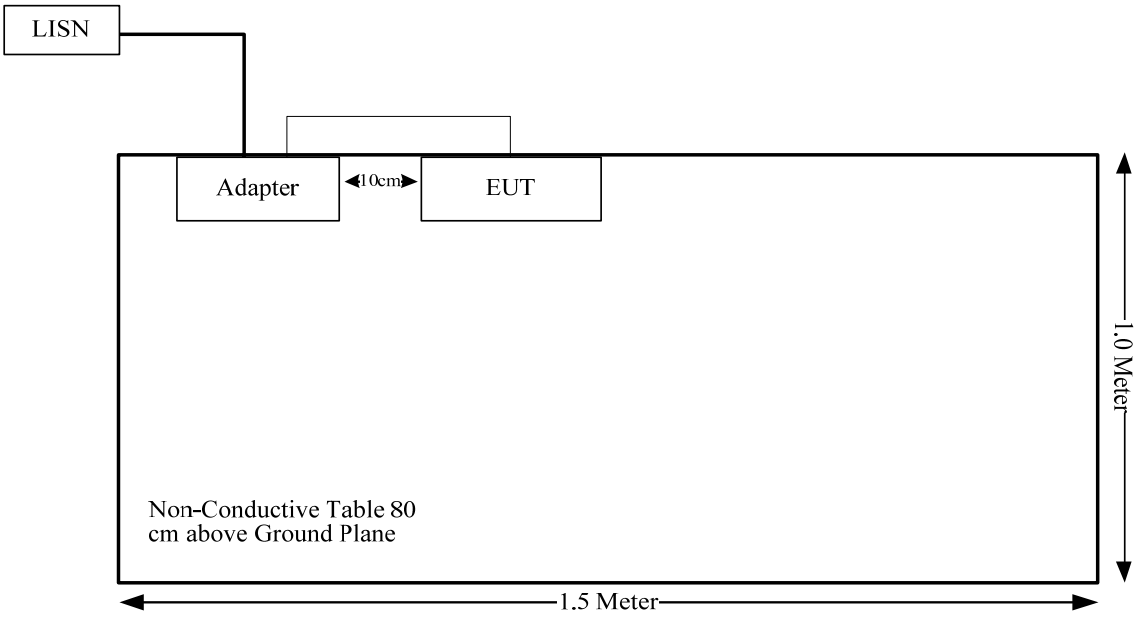
Equipment Modifications

No modification was made to the EUT.

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB Cable	yes	no	0.81	USB port of Adapter	EUT

Block Diagram of Test Setup



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)	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

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

Applicable Standard

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

According to KDB447498 D01 General RF Exposure Guidance v06

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Test Result

For Wi-Fi mode:

The max conducted power including tune-up tolerance is 6.0 dBm (3.98 mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
= 3.98/5*(√5.825) = 1.9< 3.0

So the stand-alone SAR evaluation for Wi-Fi mode is not necessary.

For 5MHz mode:

Please refer to the SAR report: RDG170226007-20A.

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 have two external antennas for 5MHz mode, which was permanently attached to the unit. For both antennas, the Maximum gain is 5.51dBi in 2.4GHz band, 3.74dBi in 5.8GHz band. The EUT have one internal antenna for Wi-Fi, the Maximum gain is 3.79dBi in 2.4GHz band, 6.47dBi in 5.8GHz band. All of the antennas compliance the requirements, Please refer to the EUT photos.

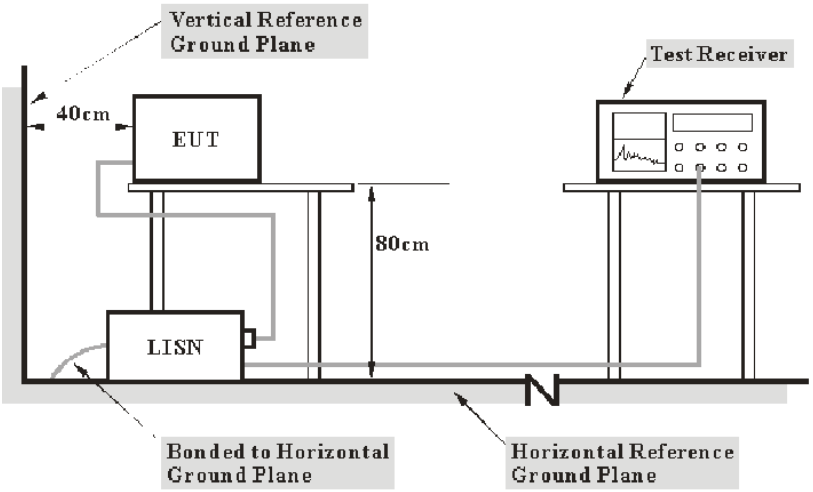
Result: Compliance.

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

Applicable Standard

FCC §15.207(a), §15.407(b) (6).

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

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

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$
$C_f = A_C + VDF$

Herein,
V_C (cord. Reading): corrected voltage amplitude
V_R: reading voltage amplitude
A_c: attenuation caused by cable loss
VDF: voltage division factor of AMN
C_f: Correction Factor

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the 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	L.I.S.N.	ENV216	100018	2016-12-02	2017-12-01
Rohde & Schwarz	PULSE LIMITER	ESH3Z2	DE14781	2016-10-31	2017-10-30
Unknown	Conducted Cable	Unknown	NO.5	2016-11-10	2017-11-09
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Procedure

During the conducted emission test, the adapter was connected to the first LISN.

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

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

Test Results Summary

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

Test Data

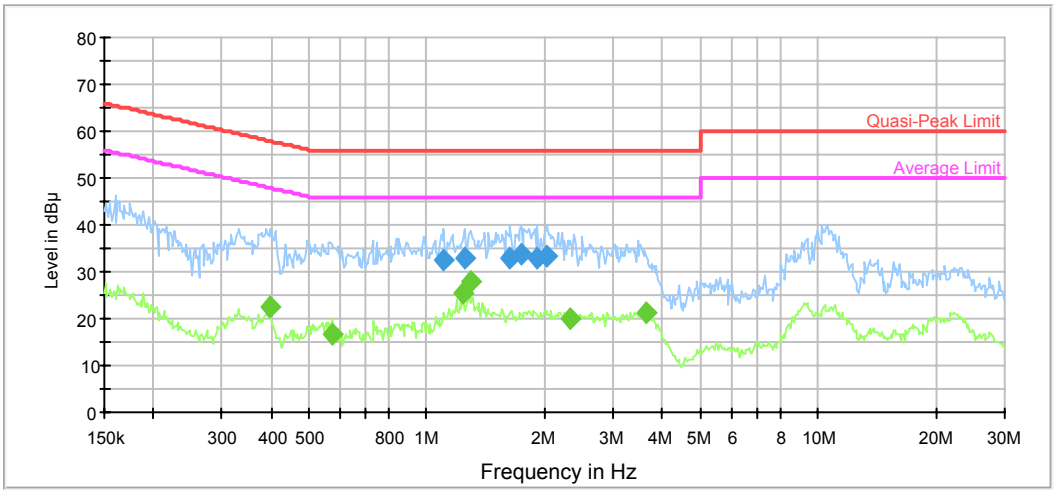
Environmental Conditions

Temperature:	19 °C
Relative Humidity:	56 %
ATM Pressure:	95.6 kPa

The testing was performed by Kevin Hu on 2017-04-18.

Test Mode: Charging

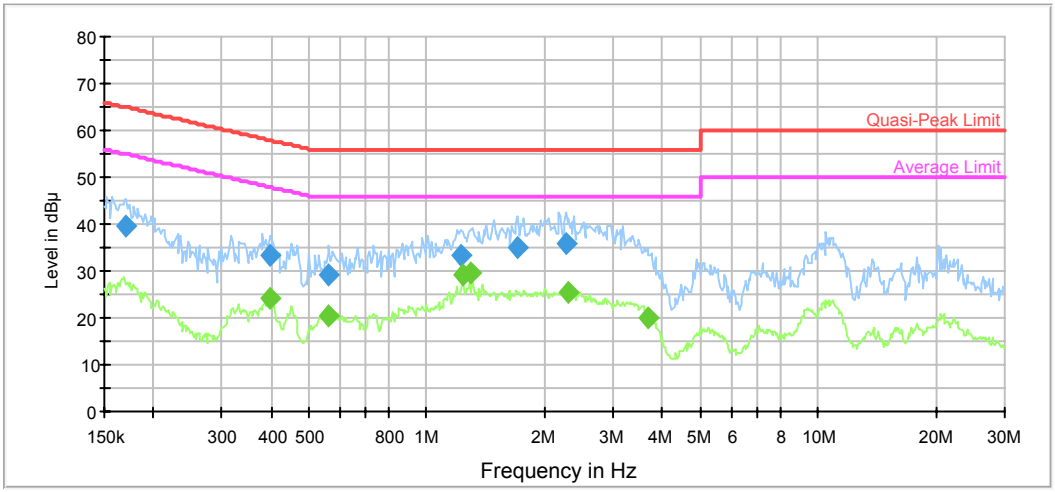
AC120 V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.108371	32.3	9.000	L1	19.7	23.7	56.0	Compliance
1.249088	32.8	9.000	L1	19.7	23.2	56.0	Compliance
1.637763	33.1	9.000	L1	19.7	22.9	56.0	Compliance
1.745563	33.7	9.000	L1	19.7	22.3	56.0	Compliance
1.920710	33.1	9.000	L1	19.8	22.9	56.0	Compliance
2.030886	33.4	9.000	L1	19.8	22.6	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.396530	22.7	9.000	L1	19.8	25.2	47.9	Compliance
0.572086	16.8	9.000	L1	19.7	29.2	46.0	Compliance
1.239175	25.5	9.000	L1	19.7	20.5	46.0	Compliance
1.289541	27.8	9.000	L1	19.7	18.2	46.0	Compliance
2.325491	20.2	9.000	L1	19.7	25.8	46.0	Compliance
3.633326	21.2	9.000	L1	19.7	24.8	46.0	Compliance

AC120 V, 60 Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.170396	39.4	9.000	N	19.7	25.5	64.9	Compliance
0.399703	33.2	9.000	N	19.6	24.7	57.9	Compliance
0.563041	29.1	9.000	N	19.6	26.9	56.0	Compliance
1.219583	33.4	9.000	N	19.6	22.6	56.0	Compliance
1.704331	35.0	9.000	N	19.7	21.0	56.0	Compliance
2.270560	35.9	9.000	N	19.7	20.1	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.396530	24.3	9.000	N	19.6	23.6	47.9	Compliance
0.558572	20.3	9.000	N	19.6	25.7	46.0	Compliance
1.239175	29.0	9.000	N	19.6	17.0	46.0	Compliance
1.289541	29.5	9.000	N	19.6	16.5	46.0	Compliance
2.307034	25.3	9.000	N	19.7	20.7	46.0	Compliance
3.691692	19.9	9.000	N	19.7	26.1	46.0	Compliance

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

Applicable Standard

FCC §15.407; §15.209; §15.205;

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

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

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

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

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

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

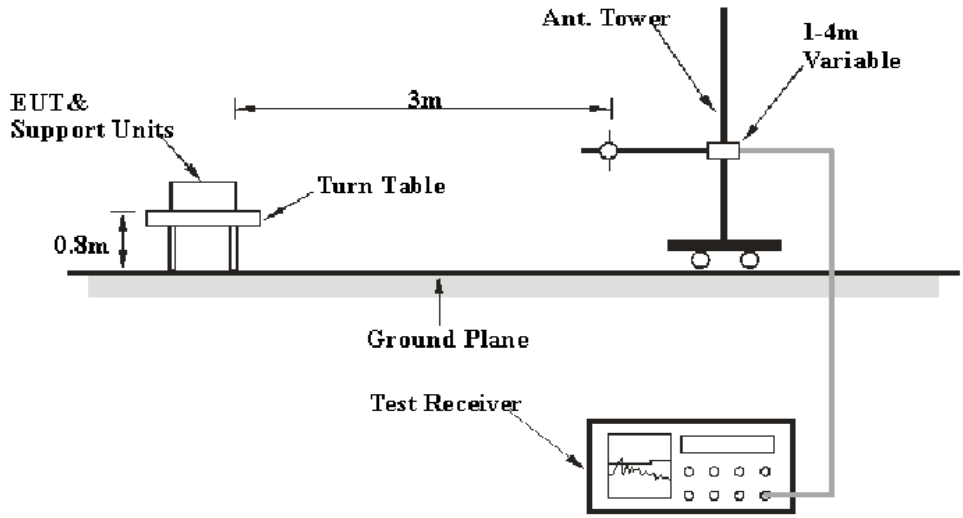
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

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

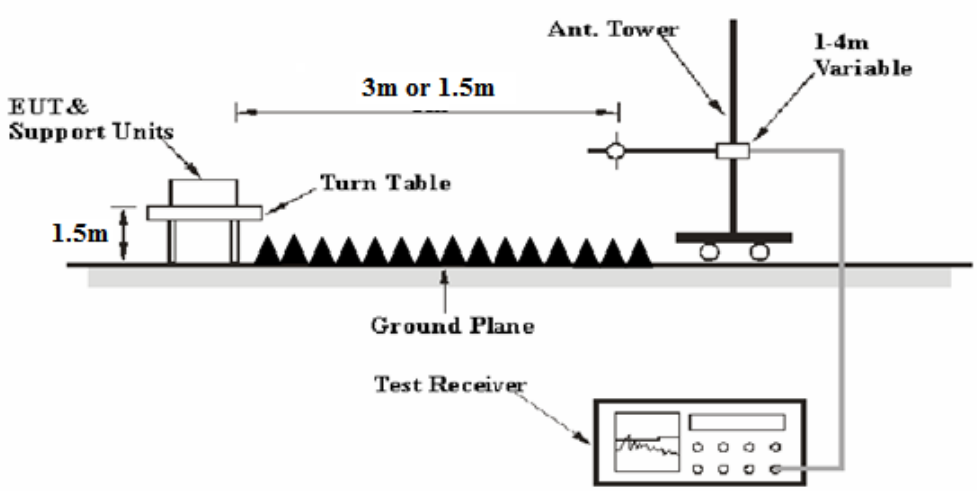
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

Below 1 GHz:



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

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	A121808	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	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (above 1GHz)	Unknown	NO.2	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) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	56 %
ATM Pressure:	95.4 kPa

The testing was performed by Kevin Hu on 2017-04-14.

Test Mode: Transmitting

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

802.11a mode

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	71.06	PK	H	32.59	5.74	0.00	109.39	103.39	N/A	N/A
5745	60.81	AV	H	32.59	5.74	0.00	99.14	93.14	N/A	N/A
5745	65.95	PK	V	32.59	5.74	0.00	104.28	98.28	N/A	N/A
5745	55.39	AV	V	32.59	5.74	0.00	93.72	87.72	N/A	N/A
5725	42.05	PK	H	32.57	5.72	0.00	80.34	74.34	122.20	47.86
5720	34.89	PK	H	32.56	5.71	0.00	73.16	67.16	110.80	43.64
5700	27.29	PK	H	32.54	5.70	0.00	65.53	59.53	105.20	45.67
5650	26.25	PK	H	32.48	5.65	0.00	64.38	58.38	68.20	9.82
11490	37.21	PK	H	37.99	8.22	26.02	57.40	51.40	74.00	22.60
11490	26.36	AV	H	37.99	8.22	26.02	46.55	40.55	54.00	13.45
17235	28.79	PK	H	42.98	10.82	25.99	56.60	50.60	74.00	23.40
17235	18.07	AV	H	42.98	10.82	25.99	45.88	39.88	54.00	14.12
2118	33.95	PK	H	24.50	3.04	26.84	34.65	28.65	74.00	45.35
2118	22.59	AV	H	24.50	3.04	26.84	23.29	17.29	54.00	36.71
3586	34.75	PK	H	27.34	4.31	26.58	39.82	33.82	74.00	40.18
3586	23.34	AV	H	27.34	4.31	26.58	28.41	22.41	54.00	31.59
222.06	48.4	QP	H	11.66	1.05	27.65	33.46	33.46	46.00	12.54
481.05	40.5	QP	H	18.19	1.65	28.70	31.64	31.64	46.00	14.36
Middle Channel:5785 MHz										
5785	69.8	PK	H	32.64	5.77	0.00	108.21	102.21	N/A	N/A
5785	59.28	AV	H	32.64	5.77	0.00	97.69	91.69	N/A	N/A
5785	64.95	PK	V	32.64	5.77	0.00	103.36	97.36	N/A	N/A
5785	54.22	AV	V	32.64	5.77	0.00	92.63	86.63	N/A	N/A
11570	36.92	PK	H	38.03	8.21	26.00	57.16	51.16	74.00	22.84
11570	26.14	AV	H	38.03	8.21	26.00	46.38	40.38	54.00	13.62
17355	28.23	PK	H	43.53	11.03	26.16	56.63	50.63	74.00	23.37
17355	17.89	AV	H	43.53	11.03	26.16	46.29	40.29	54.00	13.71
2152	34.2	PK	H	24.38	3.03	26.84	34.77	28.77	74.00	45.23
2152	22.84	AV	H	24.38	3.03	26.84	23.41	17.41	54.00	36.59
3613	34.94	PK	H	27.45	4.35	26.58	40.16	34.16	74.00	39.84
3613	24.11	AV	H	27.45	4.35	26.58	29.33	23.33	54.00	30.67
222.06	48.6	QP	H	11.66	1.05	27.65	33.66	33.66	46.00	12.34
481.05	40.4	QP	H	18.19	1.65	28.70	31.54	31.54	46.00	14.46

High Channel:5825 MHz										
5825	67.94	PK	H	32.69	5.81	0.00	106.44	100.44	N/A	N/A
5825	57.67	AV	H	32.69	5.81	0.00	96.17	90.17	N/A	N/A
5825	62.08	PK	V	32.69	5.81	0.00	100.58	94.58	N/A	N/A
5825	51.81	AV	V	32.69	5.81	0.00	90.31	84.31	N/A	N/A
5850	31.94	PK	H	32.72	5.83	0.00	70.49	64.49	122.20	57.71
5855	29.01	PK	H	32.73	5.83	0.00	67.57	61.57	110.80	49.23
5875	26.28	PK	H	32.75	5.85	0.00	64.88	58.88	105.20	46.32
5925	25.91	PK	H	32.81	5.89	0.00	64.61	58.61	68.20	9.59
11650	37.46	PK	H	38.06	8.20	25.98	57.74	51.74	74.00	22.26
11650	26.21	AV	H	38.06	8.20	25.98	46.49	40.49	54.00	13.51
17475	28.52	PK	H	44.09	11.23	26.33	57.51	51.51	74.00	22.49
17475	17.73	AV	H	44.09	11.23	26.33	46.72	40.72	54.00	13.28
2198	34.45	PK	H	24.23	3.03	26.85	34.86	28.86	74.00	45.14
2198	22.88	AV	H	24.23	3.03	26.85	23.29	17.29	54.00	36.71
3645	35.26	PK	H	27.58	4.39	26.58	40.65	34.65	74.00	39.35
3645	23.5	AV	H	27.58	4.39	26.58	28.89	22.89	54.00	31.11
222.06	48.4	QP	H	11.66	1.05	27.65	33.46	33.46	46.00	12.54
481.05	40.5	QP	H	18.19	1.65	28.70	31.64	31.64	46.00	14.36

802.11n ht20 mode

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	71.03	PK	H	32.59	5.74	0.00	109.36	103.36	N/A	N/A
5745	61.32	AV	H	32.59	5.74	0.00	99.65	93.65	N/A	N/A
5745	66.08	PK	V	32.59	5.74	0.00	104.41	98.41	N/A	N/A
5745	56.02	AV	V	32.59	5.74	0.00	94.35	88.35	N/A	N/A
5725	41.86	PK	H	32.57	5.72	0.00	80.15	74.15	122.20	48.05
5720	35.44	PK	H	32.56	5.71	0.00	73.71	67.71	110.80	43.09
5700	27.06	PK	H	32.54	5.70	0.00	65.30	59.30	105.20	45.90
5650	26.25	PK	H	32.48	5.65	0.00	64.38	58.38	68.20	9.82
11490	37.57	PK	H	37.99	8.22	26.02	57.76	51.76	74.00	22.24
11490	26.58	AV	H	37.99	8.22	26.02	46.77	40.77	54.00	13.23
17235	29.29	PK	H	42.98	10.82	25.99	57.10	51.10	74.00	22.90
17235	18.52	AV	H	42.98	10.82	25.99	46.33	40.33	54.00	13.67
2118	33.96	PK	H	24.50	3.04	26.84	34.66	28.66	74.00	45.34
2118	22.87	AV	H	24.50	3.04	26.84	23.57	17.57	54.00	36.43
3586	34.92	PK	H	27.34	4.31	26.58	39.99	33.99	74.00	40.01
3586	23.73	AV	H	27.34	4.31	26.58	28.80	22.80	54.00	31.20
222.06	48.7	QP	H	11.66	1.05	27.65	33.76	33.76	46.00	12.24
481.05	40.8	QP	H	18.19	1.65	28.70	31.94	31.94	46.00	14.06
Middle Channel:5785 MHz										
5785	70.38	PK	H	32.64	5.77	0.00	108.79	102.79	N/A	N/A
5785	59.66	AV	H	32.64	5.77	0.00	98.07	92.07	N/A	N/A
5785	65.57	PK	V	32.64	5.77	0.00	103.98	97.98	N/A	N/A
5785	53.89	AV	V	32.64	5.77	0.00	92.30	86.30	N/A	N/A
11570	37.22	PK	H	38.03	8.21	26.00	57.46	51.46	74.00	22.54
11570	25.91	AV	H	38.03	8.21	26.00	46.15	40.15	54.00	13.85
17355	28.67	PK	H	43.53	11.03	26.16	57.07	51.07	74.00	22.93
17355	18.07	AV	H	43.53	11.03	26.16	46.47	40.47	54.00	13.53
2152	34.24	PK	H	24.38	3.03	26.84	34.81	28.81	74.00	45.19
2152	22.73	AV	H	24.38	3.03	26.84	23.30	17.30	54.00	36.70
3613	35.57	PK	H	27.45	4.35	26.58	40.79	34.79	74.00	39.21
3613	24.34	AV	H	27.45	4.35	26.58	29.56	23.56	54.00	30.44
222.06	48.6	QP	H	11.66	1.05	27.65	33.66	33.66	46.00	12.34
481.05	40.7	QP	H	18.19	1.65	28.70	31.84	31.84	46.00	14.16

High Channel:5825 MHz										
5825	67.93	PK	H	32.69	5.81	0.00	106.43	100.43	N/A	N/A
5825	58.25	AV	H	32.69	5.81	0.00	96.75	90.75	N/A	N/A
5825	62.2	PK	V	32.69	5.81	0.00	100.70	94.70	N/A	N/A
5825	51.49	AV	V	32.69	5.81	0.00	89.99	83.99	N/A	N/A
5850	31.54	PK	H	32.72	5.83	0.00	70.09	64.09	122.20	58.11
5855	29.28	PK	H	32.73	5.83	0.00	67.84	61.84	110.80	48.96
5875	26.73	PK	H	32.75	5.85	0.00	65.33	59.33	105.20	45.87
5925	25.85	PK	H	32.81	5.89	0.00	64.55	58.55	68.20	9.65
11650	37.42	PK	H	38.06	8.20	25.98	57.70	51.70	74.00	22.30
11650	26.5	AV	H	38.06	8.20	25.98	46.78	40.78	54.00	13.22
17475	28.33	PK	H	44.09	11.23	26.33	57.32	51.32	74.00	22.68
17475	17.47	AV	H	44.09	11.23	26.33	46.46	40.46	54.00	13.54
2198	34.23	PK	H	24.23	3.03	26.85	34.64	28.64	74.00	45.36
2198	22.96	AV	H	24.23	3.03	26.85	23.37	17.37	54.00	36.63
3645	35.95	PK	H	27.58	4.39	26.58	41.34	35.34	74.00	38.66
3645	23.57	AV	H	27.58	4.39	26.58	28.96	22.96	54.00	31.04
222.06	48.5	QP	H	11.66	1.05	27.65	33.56	33.56	46.00	12.44
481.05	40.7	QP	H	18.19	1.65	28.70	31.84	31.84	46.00	14.16

5M(2TX):

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	79.68	PK	H	32.59	5.74	0.00	118.01	112.01	N/A	N/A
5745	69.24	AV	H	32.59	5.74	0.00	107.57	101.57	N/A	N/A
5745	89.79	PK	V	32.59	5.74	0.00	128.12	122.12	N/A	N/A
5745	79.43	AV	V	32.59	5.74	0.00	117.76	111.76	N/A	N/A
5725	30.11	PK	V	32.57	5.72	0.00	68.40	62.40	122.20	59.80
5720	29.17	PK	V	32.56	5.71	0.00	67.44	61.44	110.80	49.36
5700	27.68	PK	V	32.54	5.70	0.00	65.92	59.92	105.20	45.28
5650	26.19	PK	V	32.48	5.65	0.00	64.32	58.32	68.20	9.88
11490	44.76	PK	V	37.99	8.22	26.02	64.95	58.95	74.00	15.05
11490	34.49	AV	V	37.99	8.22	26.02	54.68	48.68	54.00	5.32
17235	29.32	PK	V	42.98	10.82	25.99	57.13	51.13	74.00	22.87
17235	18.87	AV	V	42.98	10.82	25.99	46.68	40.68	54.00	13.32
1535	32.86	PK	V	24.16	2.70	26.36	33.36	27.36	74.00	46.64
1535	21.77	AV	V	24.16	2.70	26.36	22.27	16.27	54.00	37.73
4126	34.03	PK	V	29.20	5.01	26.63	41.61	35.61	74.00	38.39
4126	22.84	AV	V	29.20	5.01	26.63	30.42	24.42	54.00	29.58
214.3	41.1	QP	V	11.43	0.96	27.71	25.78	25.78	43.50	17.72
530.52	35.7	QP	V	18.41	1.68	28.83	26.96	26.96	46.00	19.04
\Middle Channel:5785 MHz										
5785	80.2	PK	H	32.64	5.77	0.00	118.61	112.61	N/A	N/A
5785	69.85	AV	H	32.64	5.77	0.00	108.26	102.26	N/A	N/A
5785	90.17	PK	V	32.64	5.77	0.00	128.58	122.58	N/A	N/A
5785	79.69	AV	V	32.64	5.77	0.00	118.10	112.10	N/A	N/A
11570	44.31	PK	V	38.03	8.21	26.00	64.55	58.55	74.00	15.45
11570	34.67	AV	V	38.03	8.21	26.00	54.91	48.91	54.00	5.09
17355	28.73	PK	V	43.53	11.03	26.16	57.13	51.13	74.00	22.87
17355	18.35	AV	V	43.53	11.03	26.16	46.75	40.75	54.00	13.25
1576	33.58	PK	V	24.22	2.73	26.40	34.13	28.13	74.00	45.87
1576	22.59	AV	V	24.22	2.73	26.40	23.14	17.14	54.00	36.86
4157	33.56	PK	V	29.25	5.03	26.64	41.20	35.20	74.00	38.80
4157	22.34	AV	V	29.25	5.03	26.64	29.98	23.98	54.00	30.02
214.3	41.2	QP	V	11.43	0.96	27.71	25.88	25.88	43.50	17.62
530.52	35.7	QP	V	18.41	1.68	28.83	26.96	26.96	46.00	19.04
High Channel:5825 MHz										
5825	80.04	PK	H	32.69	5.81	0.00	118.54	112.54	N/A	N/A
5825	69.37	AV	H	32.69	5.81	0.00	107.87	101.87	N/A	N/A
5825	90.21	PK	V	32.69	5.81	0.00	128.71	122.71	N/A	N/A
5825	79.02	AV	V	32.69	5.81	0.00	117.52	111.52	N/A	N/A
5850	30.16	PK	V	32.72	5.83	0.00	68.71	62.71	122.20	59.49
5855	28.95	PK	V	32.73	5.83	0.00	67.51	61.51	110.80	49.29
5875	27.23	PK	V	32.75	5.85	0.00	65.83	59.83	105.20	45.37
5925	25.35	PK	V	32.81	5.89	0.00	64.05	58.05	68.20	10.15
11650	45.16	PK	V	38.06	8.20	25.98	65.44	59.44	74.00	14.56
11650	34.77	AV	V	38.06	8.20	25.98	55.05	49.05	54.00	4.95
17475	28.81	PK	V	44.09	11.23	26.33	57.80	51.80	74.00	22.20
17475	18.46	AV	V	44.09	11.23	26.33	47.45	41.45	54.00	12.55
1603	33.46	PK	V	24.26	2.75	26.43	34.04	28.04	74.00	45.96
1603	22	AV	V	24.26	2.75	26.43	22.58	16.58	54.00	37.42
4189	34.28	PK	V	29.30	5.05	26.66	41.97	35.97	74.00	38.03
4189	21.67	AV	V	29.30	5.05	26.66	29.36	23.36	54.00	30.64
214.3	40.8	QP	V	11.43	0.96	27.71	25.48	25.48	43.50	18.02
530.52	35.5	QP	V	18.41	1.68	28.83	26.76	26.76	46.00	19.24

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
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

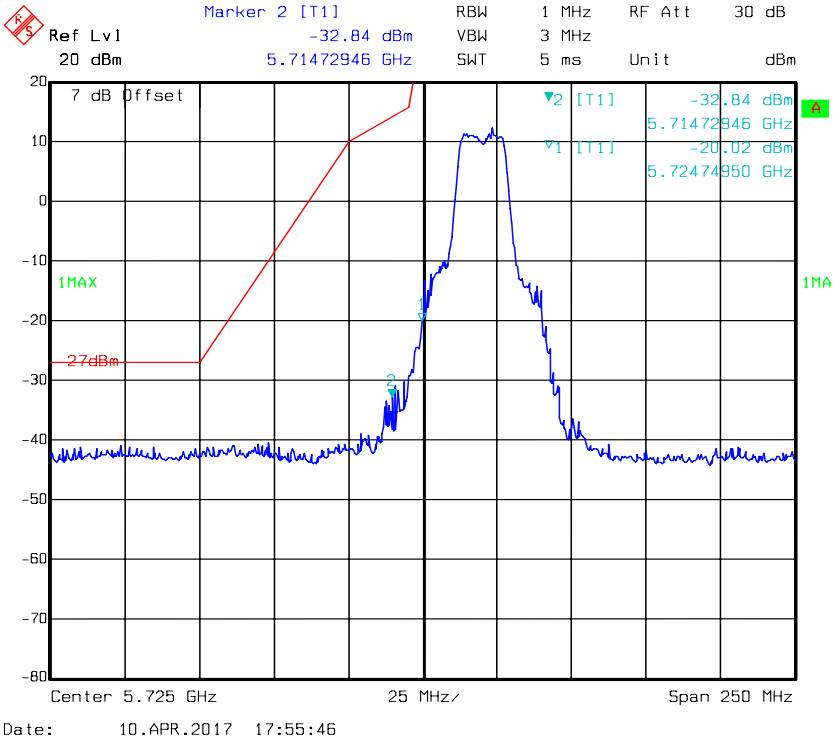
Environmental Conditions

Temperature:	18~18.5 °C
Relative Humidity:	52~54 %
ATM Pressure:	96.2~96.5 kPa

The testing was performed by Kevin Hu from 2017-04-10 to 2017-05-24.

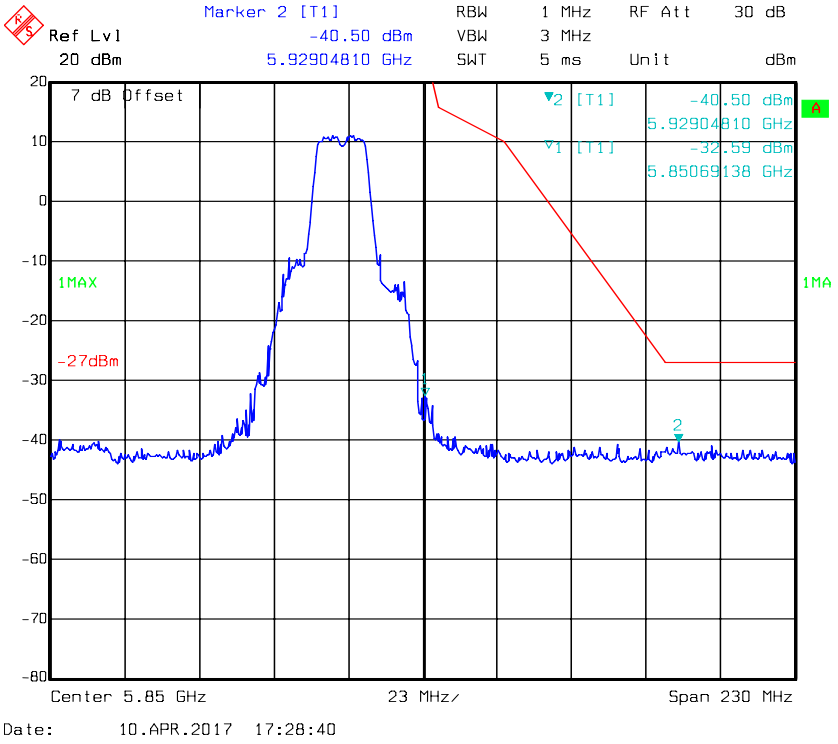
Test Result: Pass.
Note: test was performed at RF output port, the cable loss plus antenna gain was offset to the plots. Please refer to the following tables and plots.

802.11a Low Channel



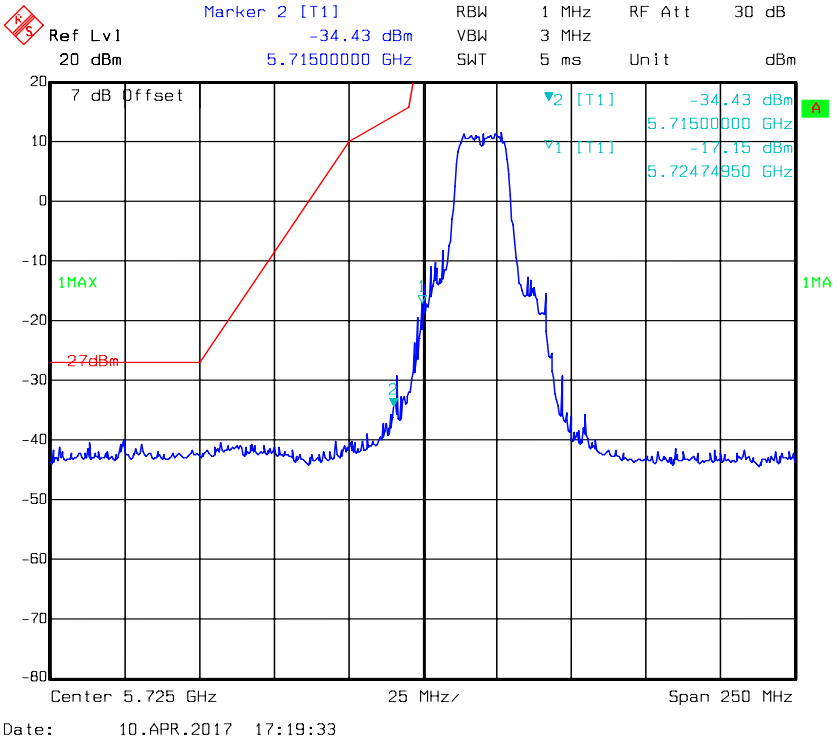
Date: 10.APR.2017 17:55:46

802.11a High Channel



Date: 10.APR.2017 17:28:40

802.11n ht20 Low Channel



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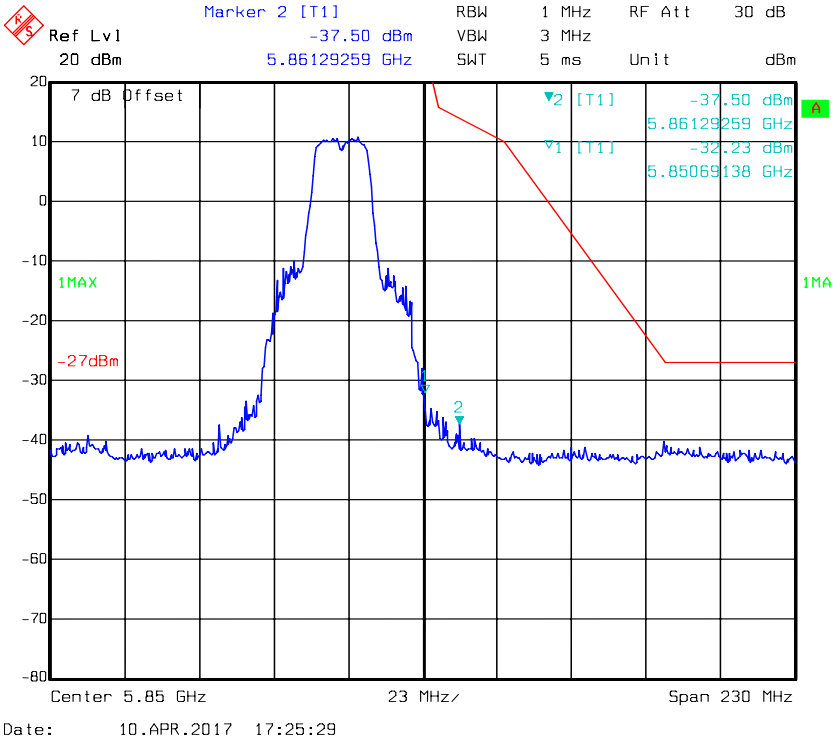
802.11n ht20 High Channel



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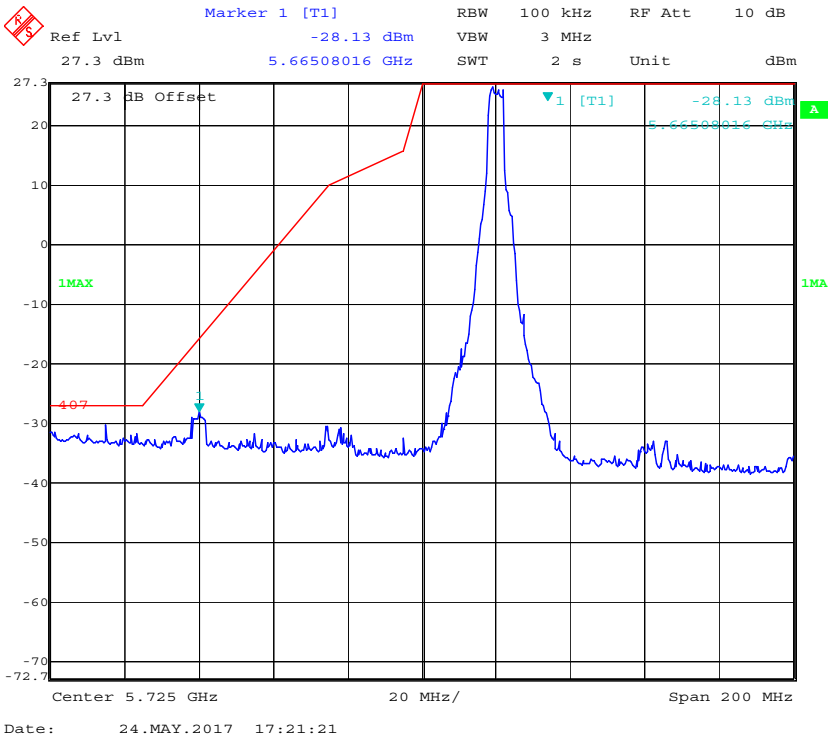
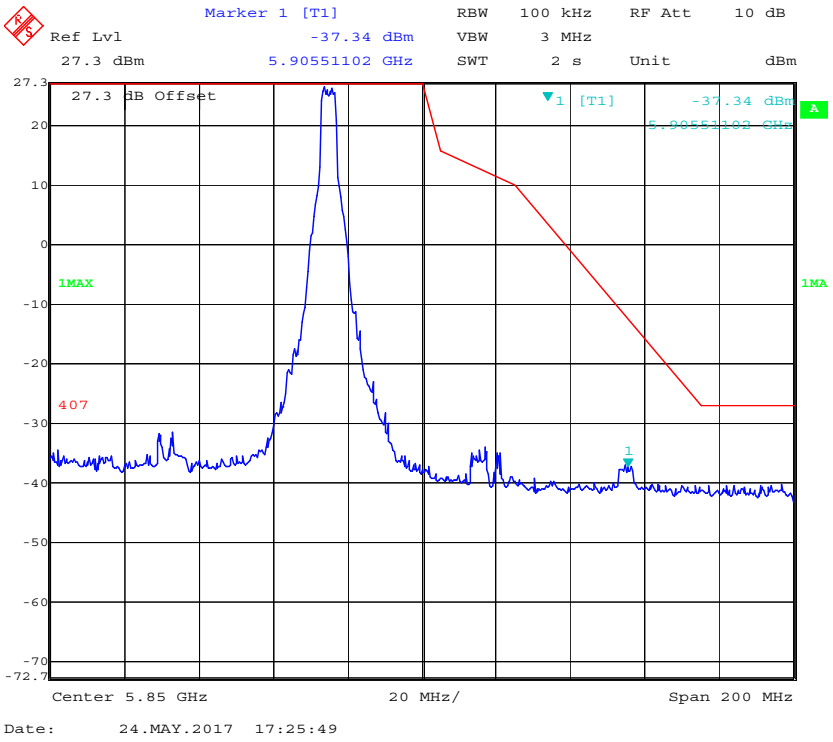
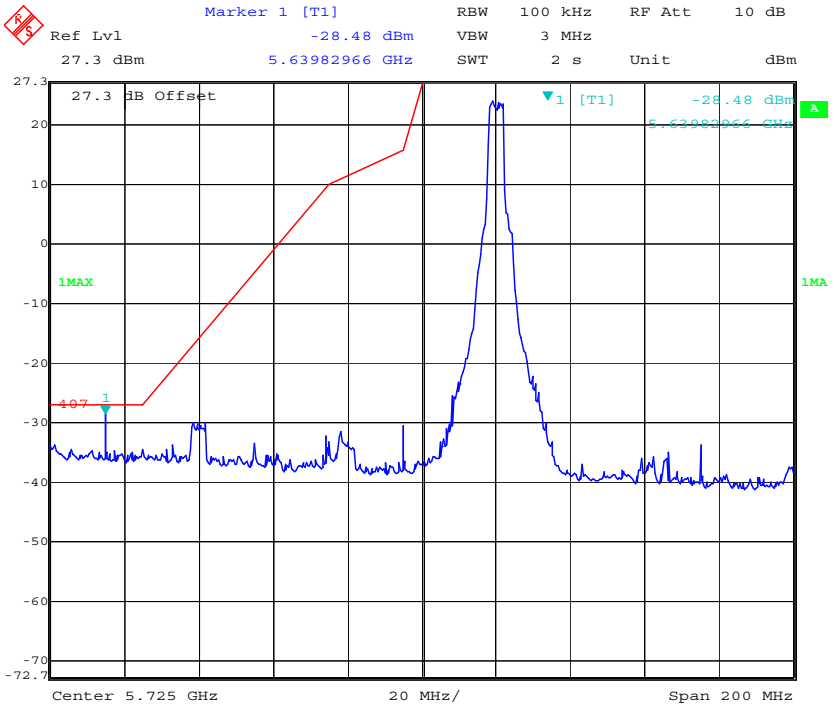
5MHz mode Low Channel Antenna 1



5MHz mode High Channel Antenna 1

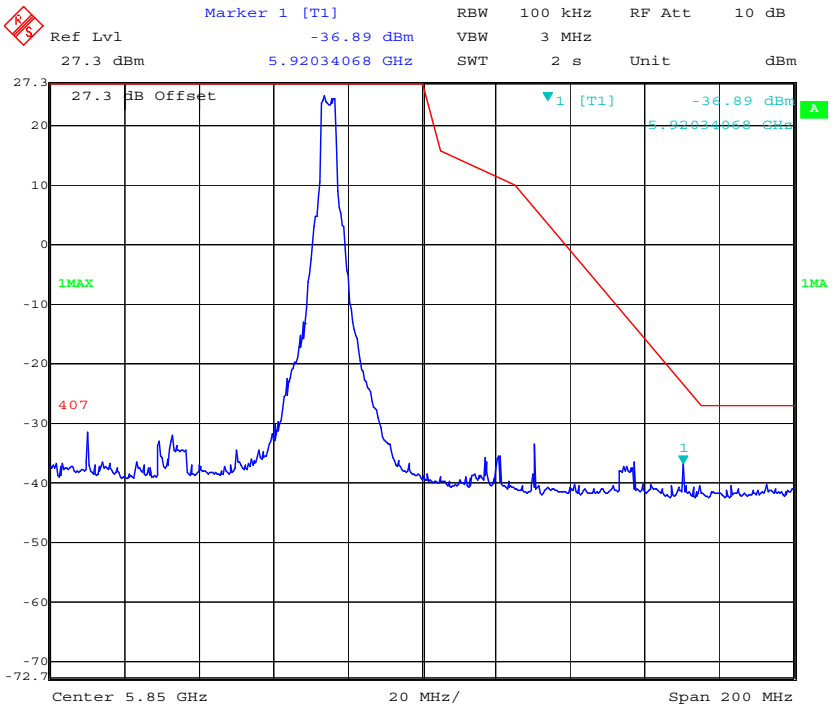


5MHz mode Low Channel Antenna 2



Date: 24.MAY.2017 17:22:40

5MHz mode High Channel Antenna 2



Date: 24.MAY.2017 17:24:24

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
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/
Unknown	RF Attenuator	10dB	10dB-1	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r03

Test Data

Environmental Conditions

Temperature:	18~19.5 °C
Relative Humidity:	52~54 %
ATM Pressure:	96.2~97.5 kPa

The testing was performed by Kevin Hu from 2017-04-10 to 2017-04-16.

Test Result: Pass.

Please refer to the following tables and plots.

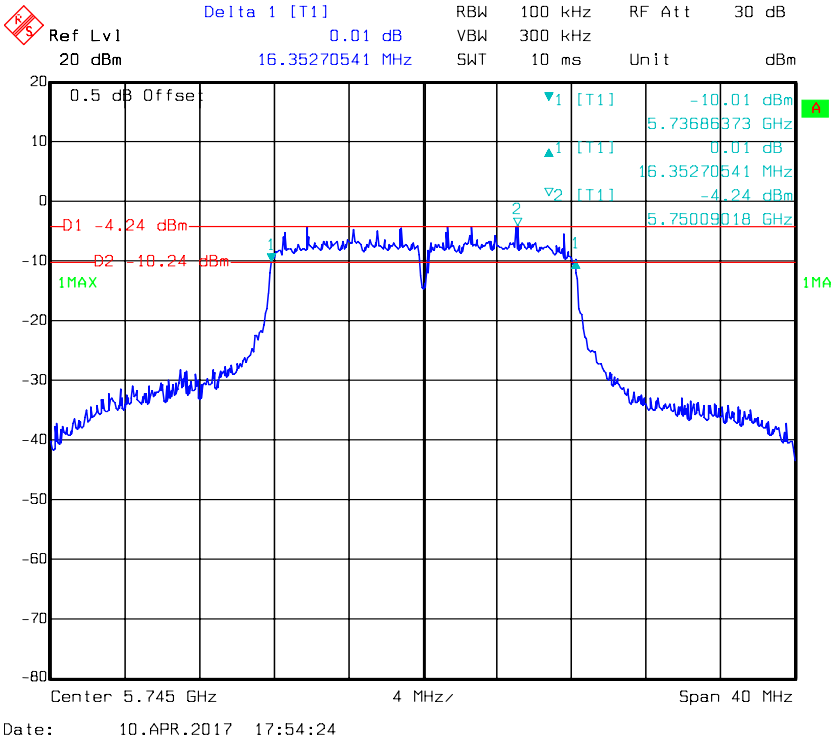
Test mode: Transmitting (For 5MHz mode, test performed at antenna 1)

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	16.35	17.15	≥0.5
		Middle	5785	16.19	17.47	≥0.5
		High	5825	16.35	17.23	≥0.5
	802.11 n ht20	Low	5745	17.15	18.12	≥0.5
		Middle	5785	17.23	18.2	≥0.5
		High	5825	17.31	18.28	≥0.5
	5M	Low	5745	4.228	5.23	≥0.5
		Middle	5785	4.208	4.99	≥0.5
		High	5825	4.389	5.291	≥0.5

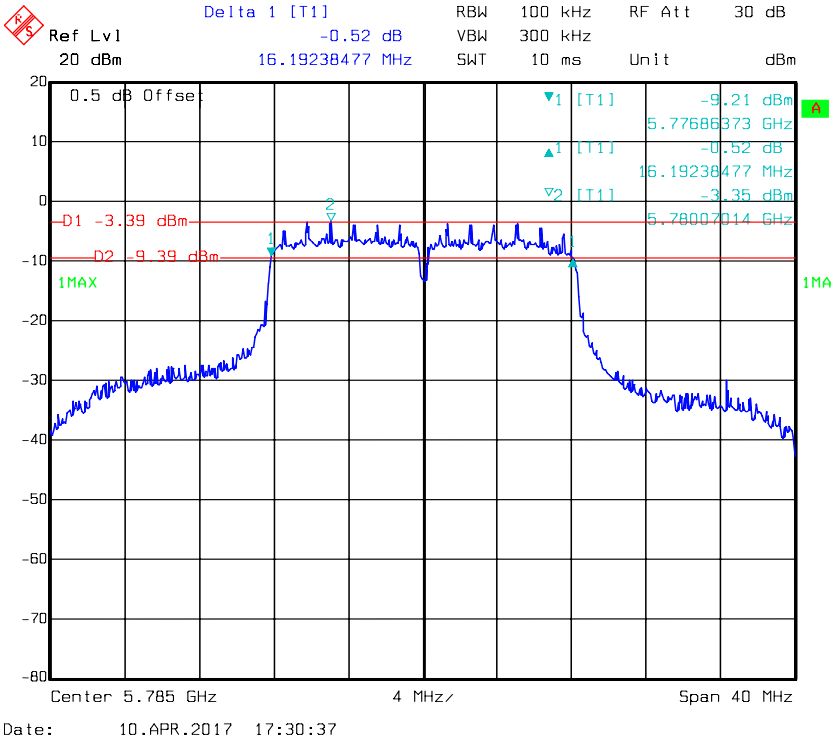
Note: the 99% Occupied Bandwidth have not fall into 5470-5725MHz, please refer to the test plots of 99% Occupied Bandwidth.

6dB Bandwidth:

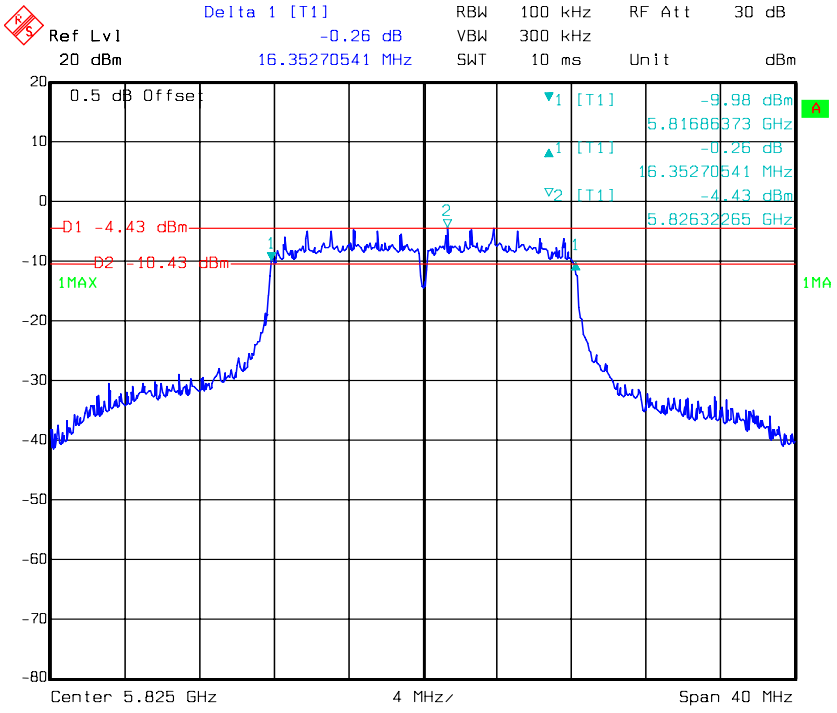
802.11a Low Channel



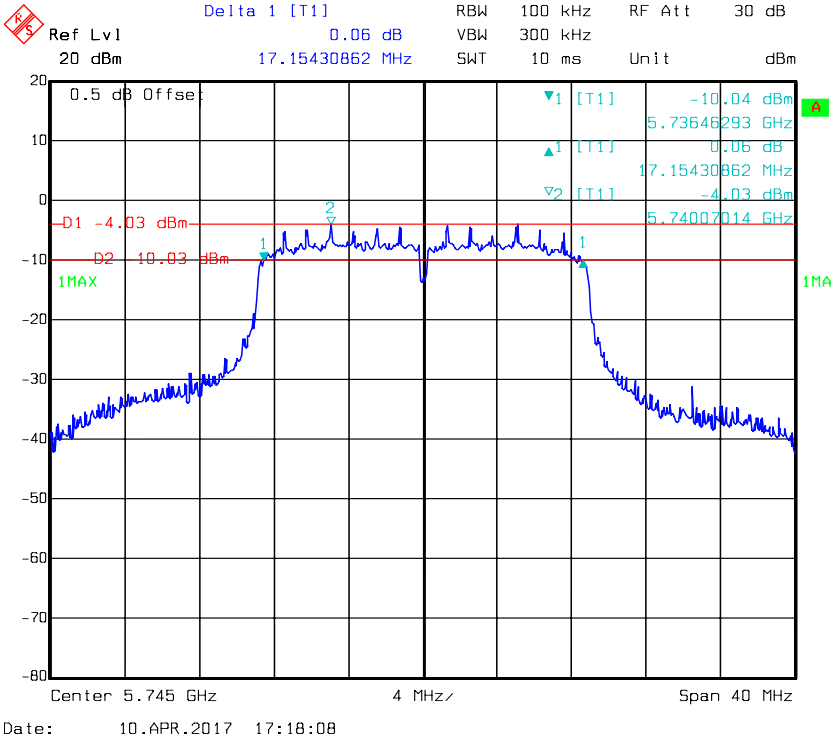
802.11a Middle Channel



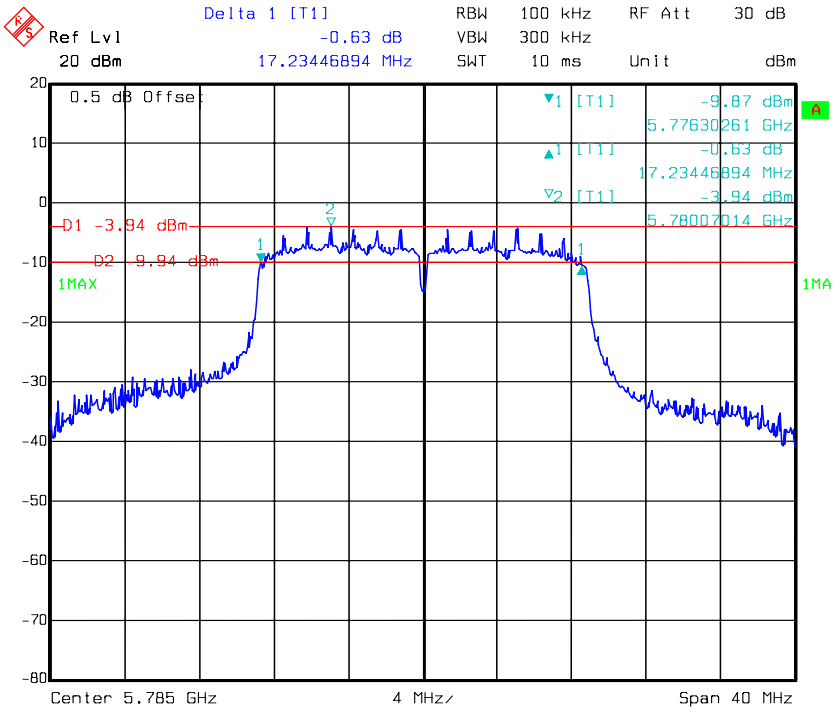
802.11a High Channel



802.11n ht20 Low Channel

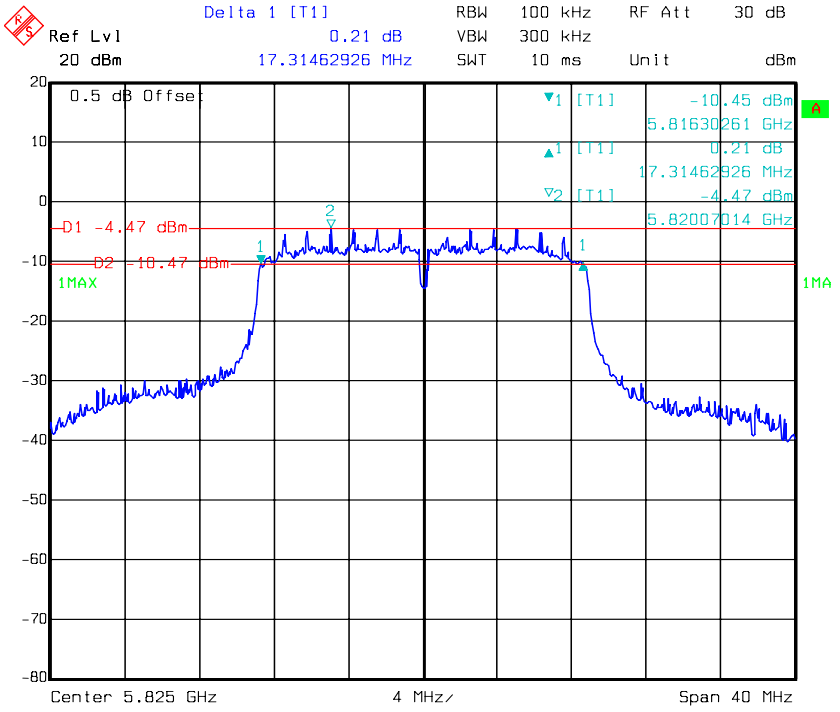


802.11n ht20 Middle Channel



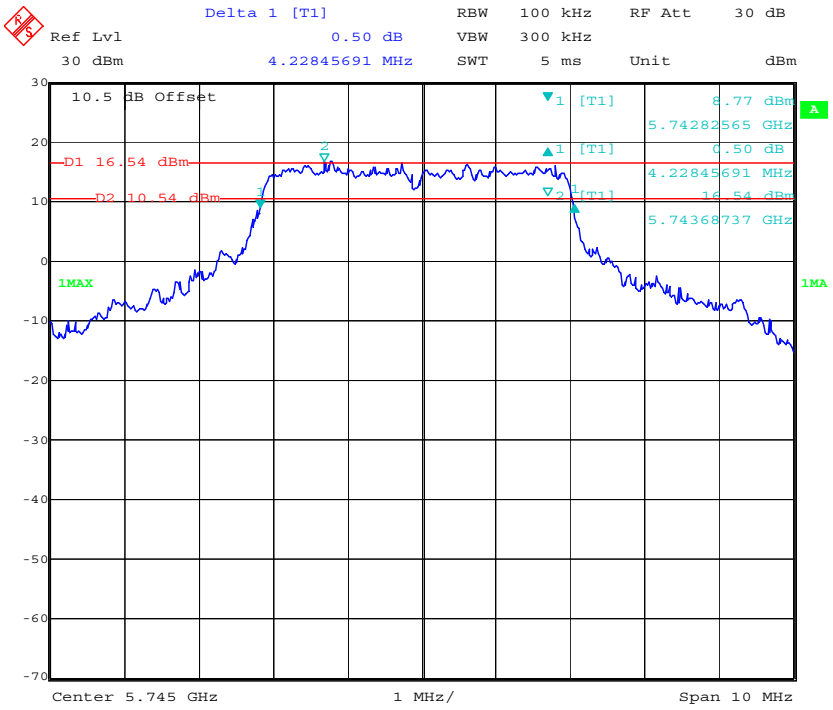
Date: 10.APR.2017 17:21:43

802.11n ht20 High Channel



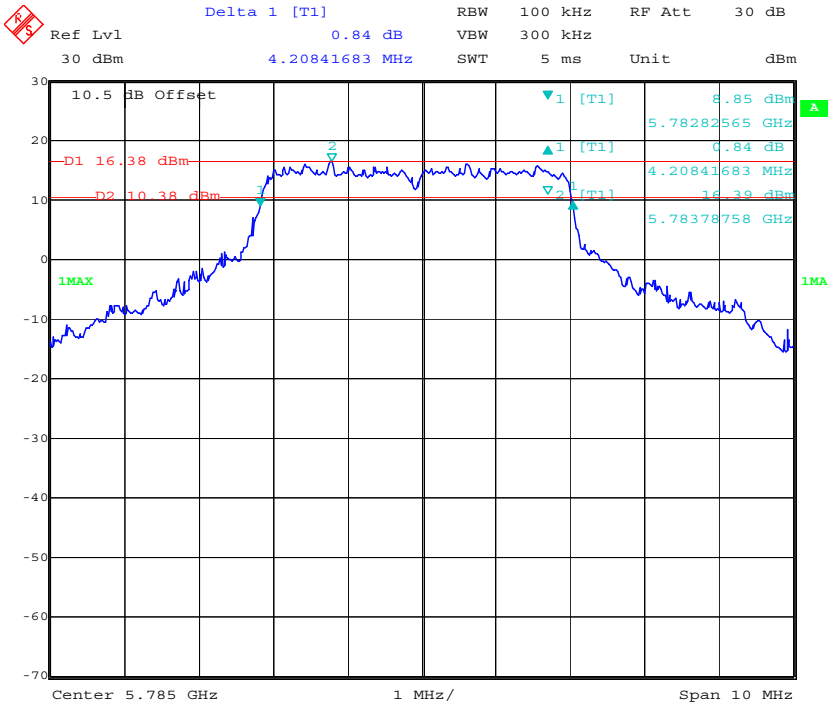
Date: 10.APR.2017 17:24:10

5M Low Channel



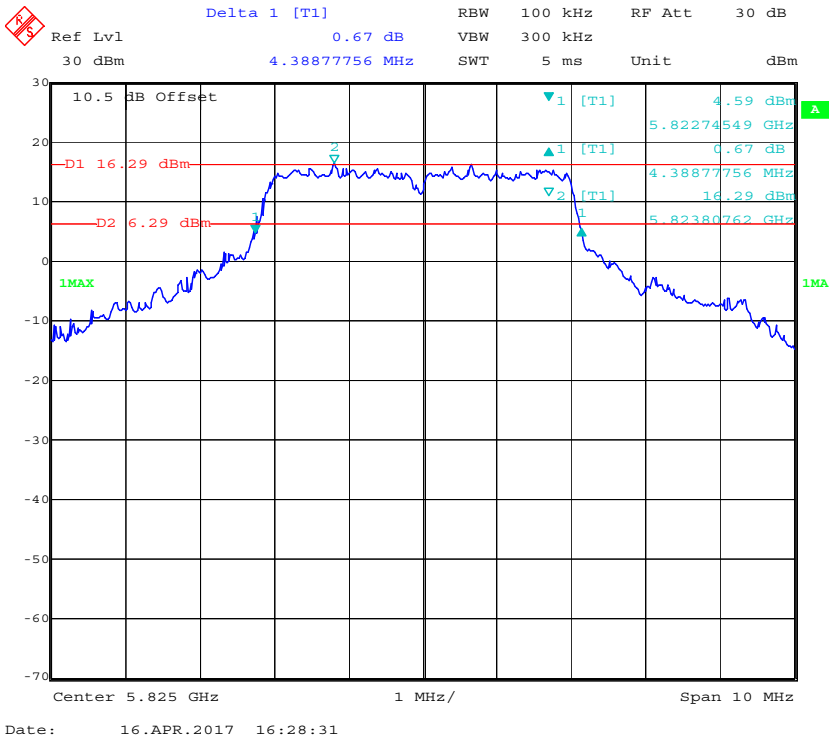
Date: 16.APR.2017 15:51:27

5M Middle Channel



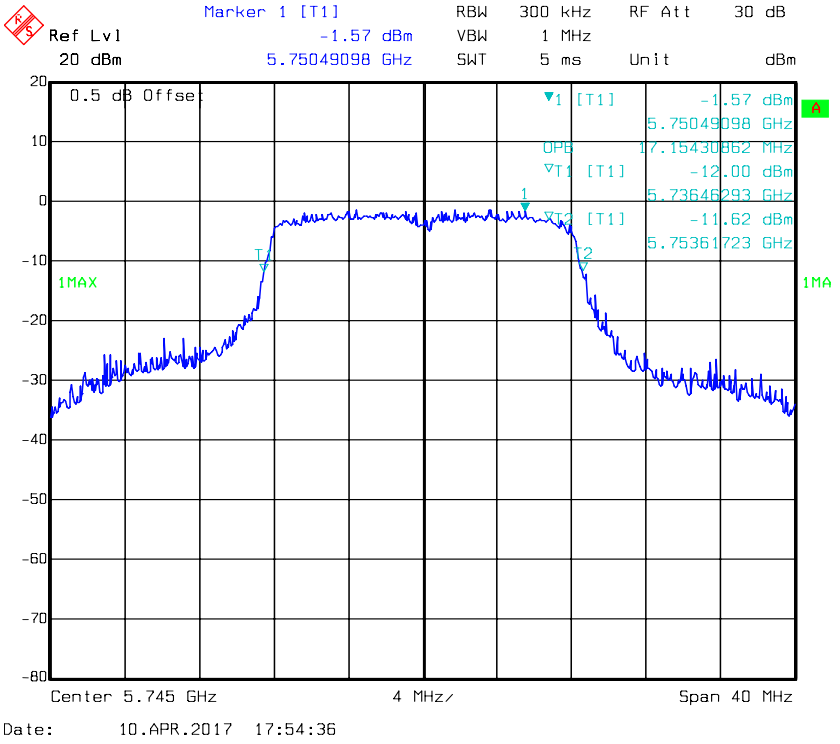
Date: 16.APR.2017 16:09:38

5M High Channel

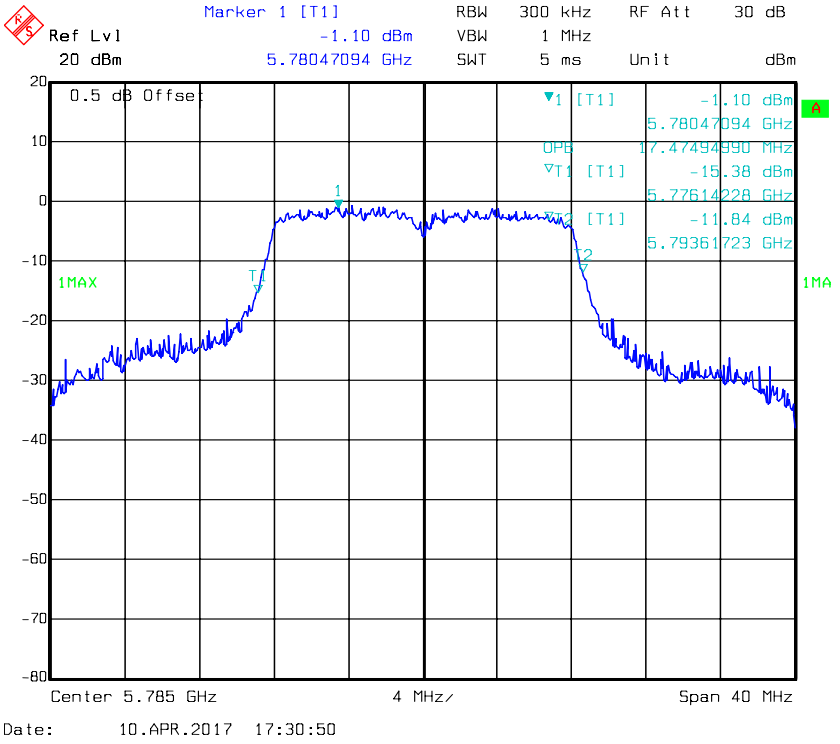


99% Occupied Bandwidth:

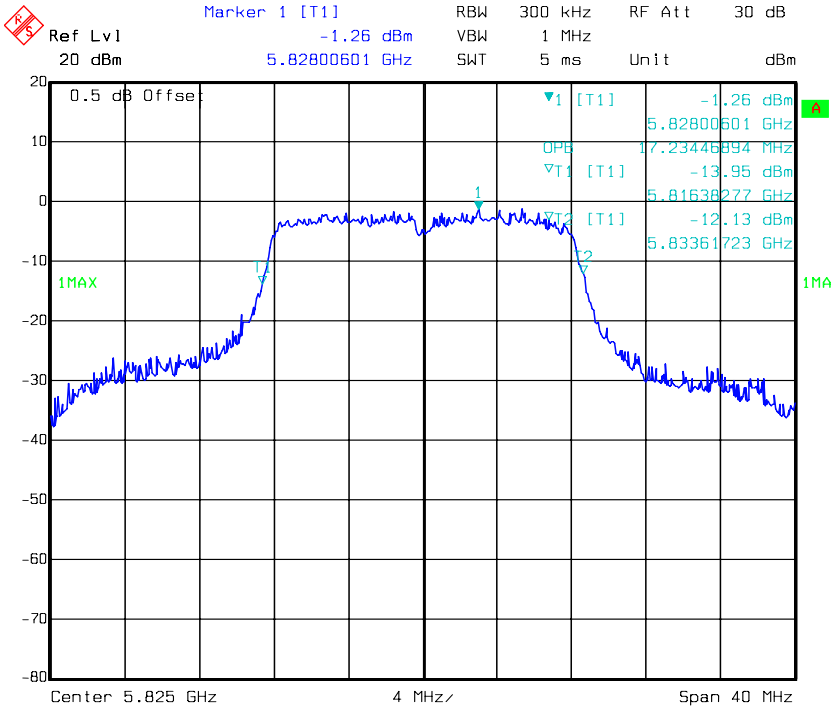
802.11a Low Channel



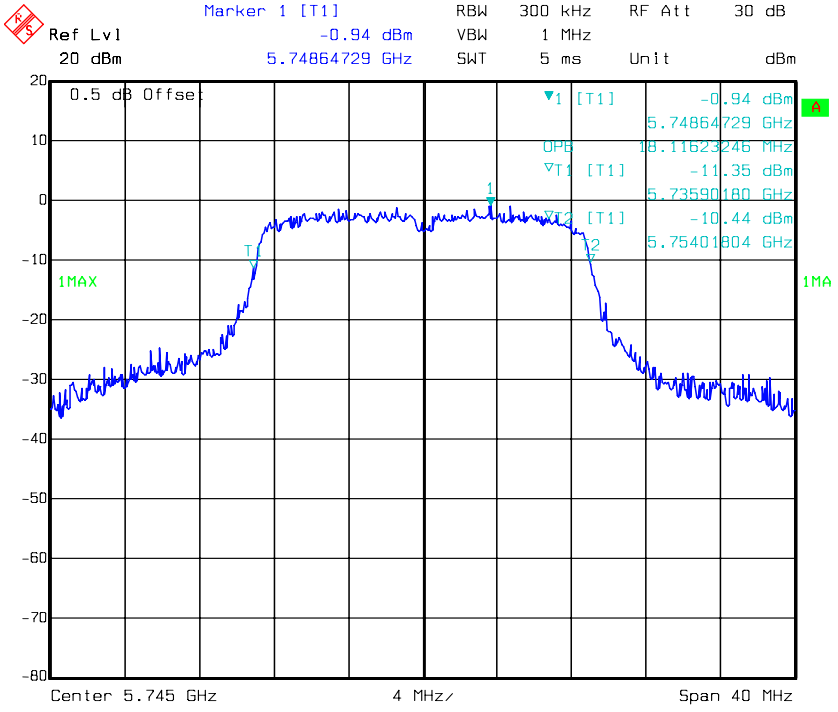
802.11a Middle Channel



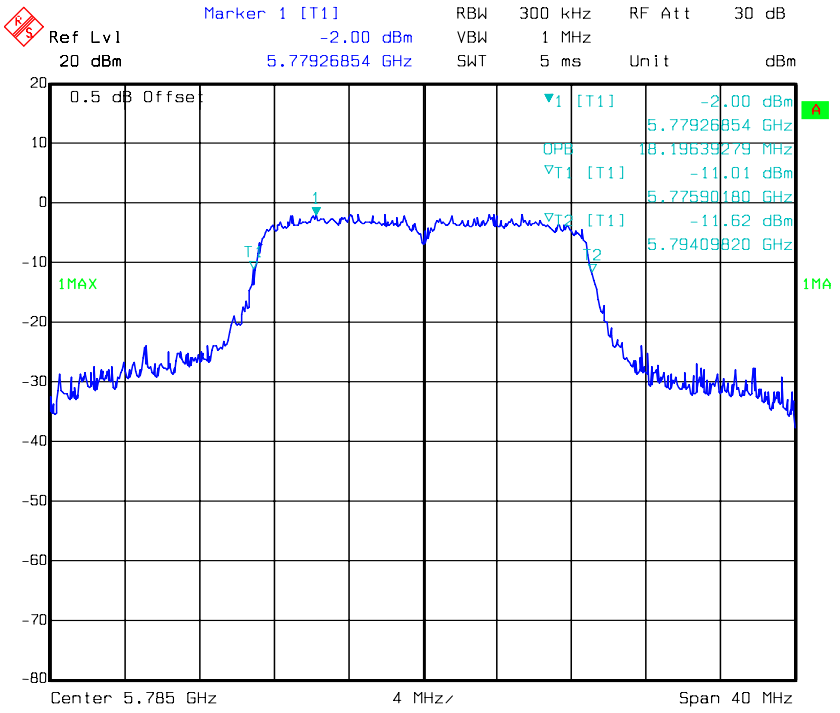
802.11a High Channel



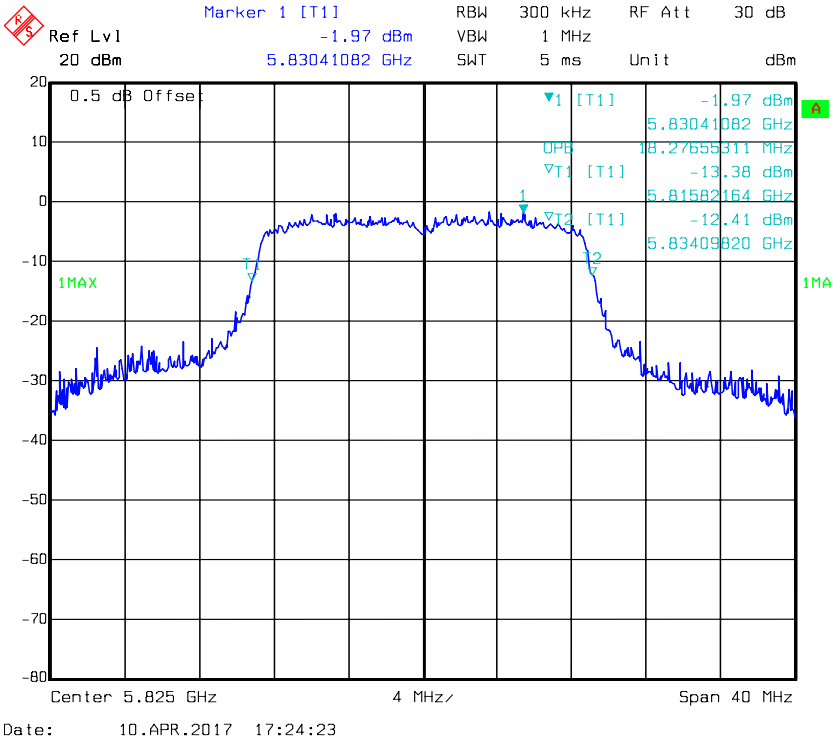
802.11n ht20 Low Channel



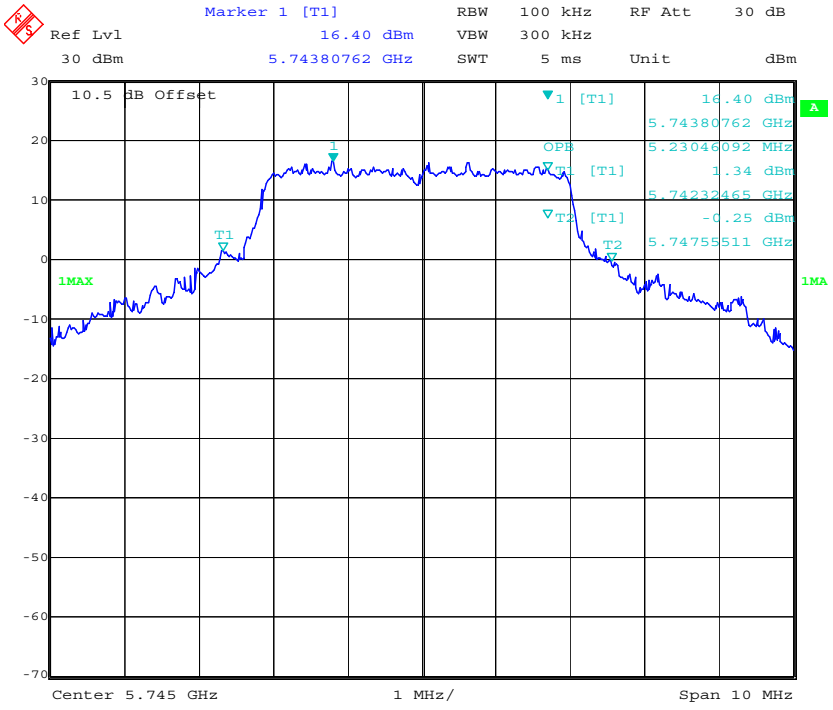
802.11n ht20 Middle Channel



802.11n ht20 High Channel

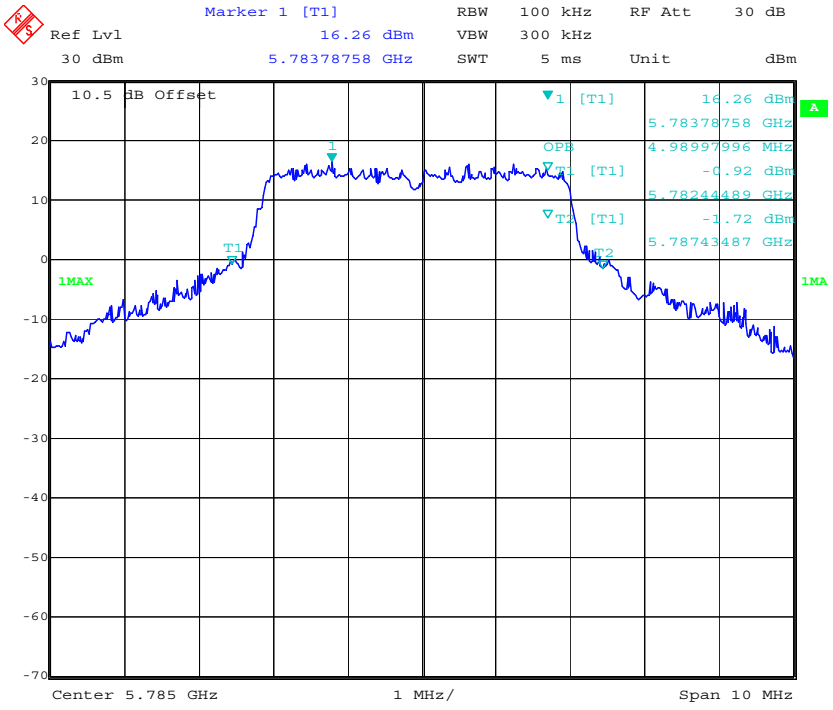


5M Low Channel



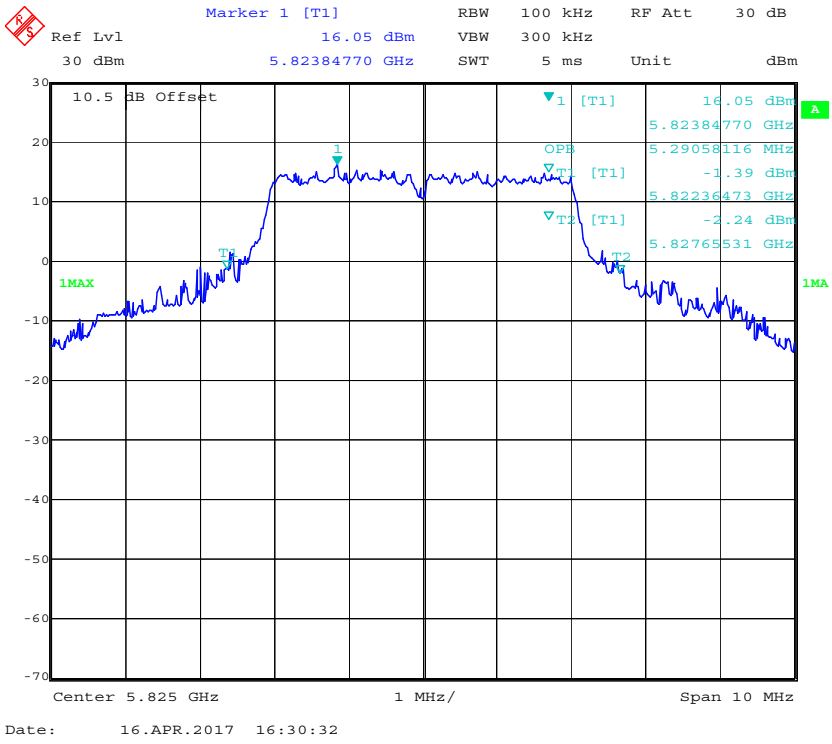
Date: 16.APR.2017 15:48:50

5M Middle Channel



Date: 16.APR.2017 16:12:08

5M 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 C63.10-2013 clause 6.8.

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
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	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) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	19.5 °C
Relative Humidity:	54 %
ATM Pressure:	97.5 kPa

The testing was performed by Kevin Hu on 2017-05-23.

Test Result: Pass.

5M Mode(test performed at antenna 1):

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{DC}	MHz	MHz	
0	3.7	5742.3346	5827.6553	f_L and f_H Within 5725~5850MHz range
10		5742.3334	5827.6545	
20		5742.3339	5827.6547	
30		5742.3345	5827.6545	
40		5742.3339	5827.6552	
25	3.5	5742.3344	5827.6559	
25	4.2	5742.3345	5827.6551	

Note: the f_L and f_H determined by 99% bandwidth low edge at Low test channel and High edge at High test channel.

802.11a mode:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{DC}	MHz	MHz	
0	7.6	5736.6293	5836.1723	f_L and f_H Within 5725~5850MHz range
10		5736.6298	5836.1732	
20		5736.6291	5836.1737	
30		5736.6296	5836.1738	
40		5736.6294	5836.1734	
25	7.2	5736.6298	5836.1731	
25	8.4	5736.6291	5836.1729	

Note: the f_L and f_H determined by 99% bandwidth low edge at Low test channel and High edge at High test channel.

802.11n ht20 mode:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{DC}	MHz	MHz	
0	7.6	5735.9018	5834.0992	f_L and f_H Within 5725~5850MHz range
10		5735.9011	5834.0989	
20		5735.9017	5834.0987	
30		5735.9012	5834.0978	
40		5735.9010	5834.0989	
25	7.2	5735.9012	5834.0991	
25	8.4	5735.9014	5834.0990	

Note: the f_L and f_H determined by 99% bandwidth low edge at Low test channel and High edge at High test channel.

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
Unknown	RF Cable	Unknown	C-3	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01r03

Test Data

Environmental Conditions

Temperature:	18°C
Relative Humidity:	52 %
ATM Pressure:	96.2 kPa

The testing was performed by Kevin Hu on 2017-04-10.

Test Mode: Transmitting

Wi-Fi mode:

Mode	Frequency (MHz)	Conducted Average Output Power (dBm)	Limits (dBm)	Result
802.11a	5745	5.7	≤29.53	PASS
	5785	5.98	≤29.53	PASS
	5825	5.91	≤29.53	PASS
802.11n ht20	5745	5.91	≤29.53	PASS
	5785	5.82	≤29.53	PASS
	5825	5.74	≤29.53	PASS

Note: the antenna gain for Wi-Fi in 5725-5850MH is 6.47dBi.

5MHz Mode:

Frequency (MHz)	Conducted Average Output Power (dBm)		Total (dBm)	Limits (dBm)	Result
	Antenna 1	Antenna 2			
5745	20.14	18.91	22.58	≤30	PASS
5785	19.45	18.81	22.15	≤30	PASS
5825	18.54	18.7	21.63	≤30	PASS

Note: the 2 antenna maximum atenna gains are 3.74 dBi, and employed Cyclic Delay Diversity (CDD) for 5MHz mode transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements:

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

So:

Directional gain = GANT + Array Gain = 3.74 dBi < 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
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
Unknown	RF Cable	Unknown	C-3	Each Time	/
Unknown	RF Attenuator	10dB	10dB-1	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B “Implementation of traceability policy in accredited laboratories”.

Test Data

Environmental Conditions

Temperature:	18~19.5 °C
Relative Humidity:	52~54 %
ATM Pressure:	96.2~97.5 kPa

The testing was performed by Kevin Hu from 2017-04-10 to 2017-04-16.
Test Mode: Transmitting

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

Wi-Fi Mode:

Mode	Channel	Frequency MHz	PSD (dBm/300kHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)
802.11a	Low	5745	-4.53	-2.33	≤29.53
	Middle	5785	-5.06	-2.86	≤29.53
	High	5825	-5.51	-3.31	≤29.53
802.11n ht20	Low	5745	-4.59	-2.39	≤29.53
	Middle	5785	-5.52	-3.32	≤29.53
	High	5825	-5.51	-3.31	≤29.53

Note: the antenna gain for Wi-Fi in 5725-5850MH is 6.47dBi.

5MHz Mode:

Channel	Frequency MHz	PSD (dBm/300kHz)		Total (dBm/500kHz)	Limit (dBm/500kHz)
		Antenna 1	Antenna 2		
Low	5745	15.53	13.85	19.98	≤29.26
Middle	5785	15.54	13.63	19.90	≤29.26
High	5825	15.51	14.07	20.06	≤29.26

Note: For 5MHz 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,

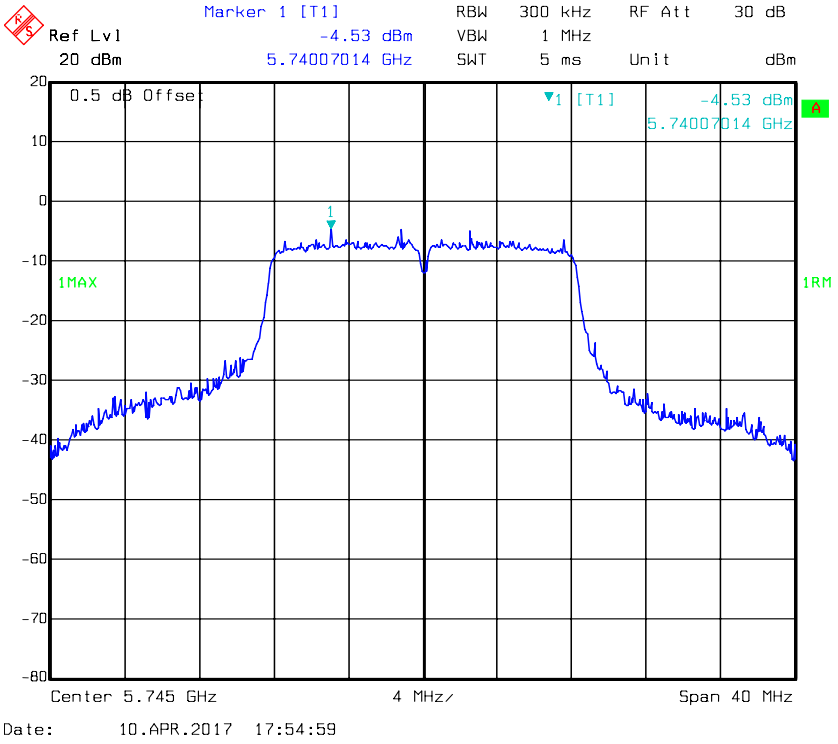
Array Gain = 10 log(NANT/NSS) dB.

So:

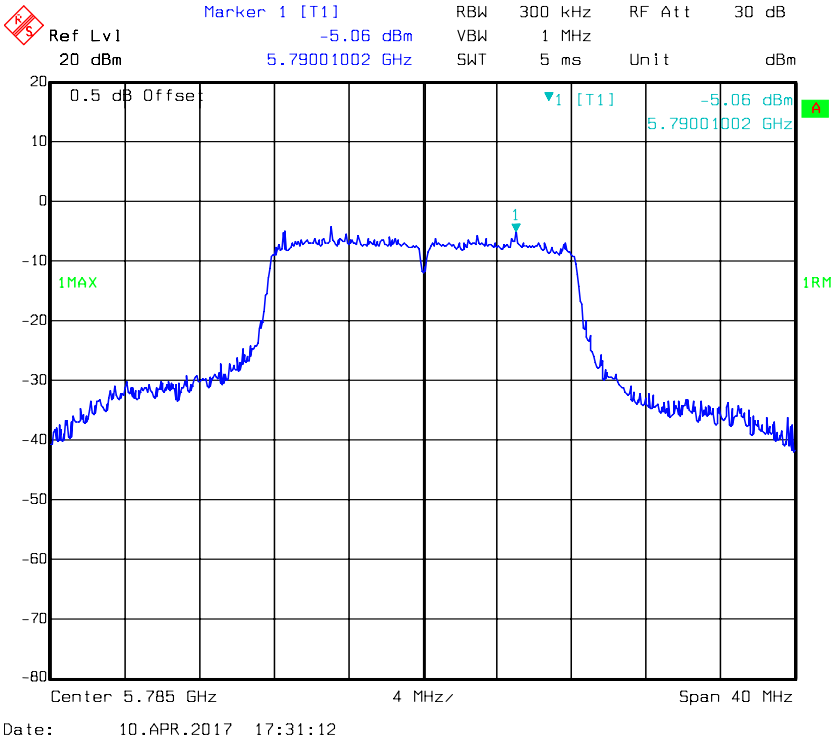
Directional gain = GANT + Array Gain = 3.74+10*log(2) =6.74 dBi

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.

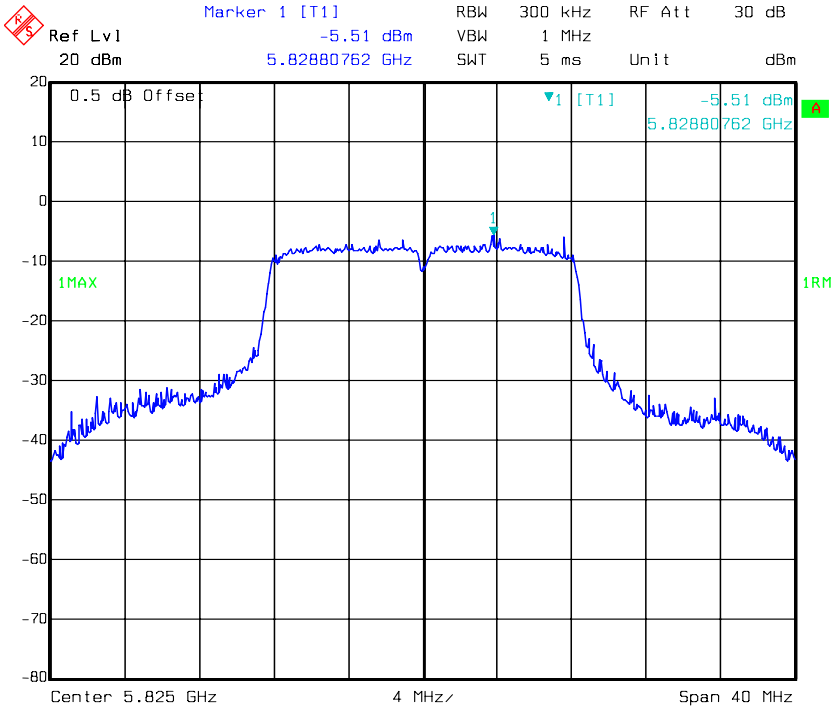
802.11a Low Channel



802.11a Middle Channel

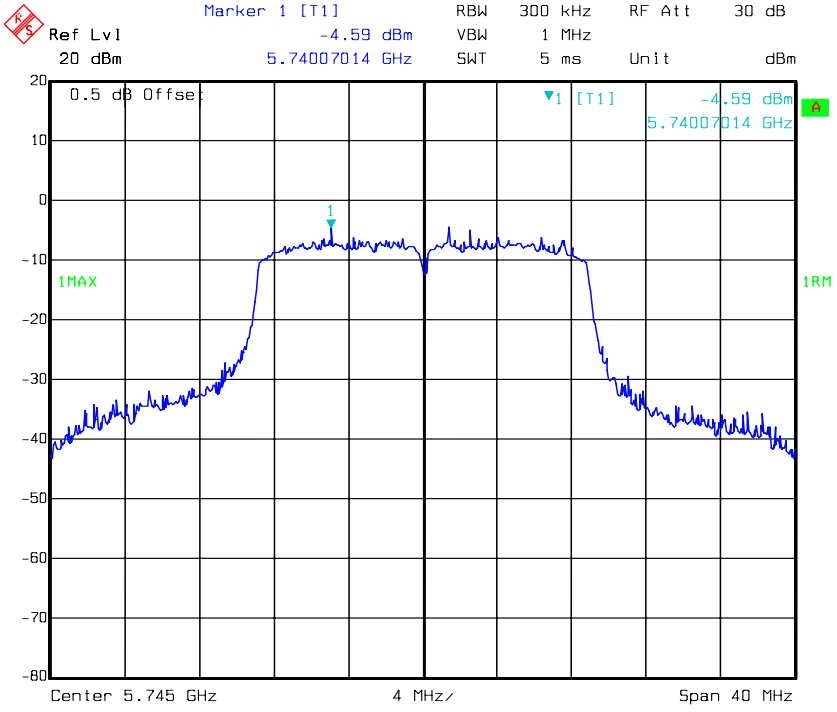


802.11a High Channel



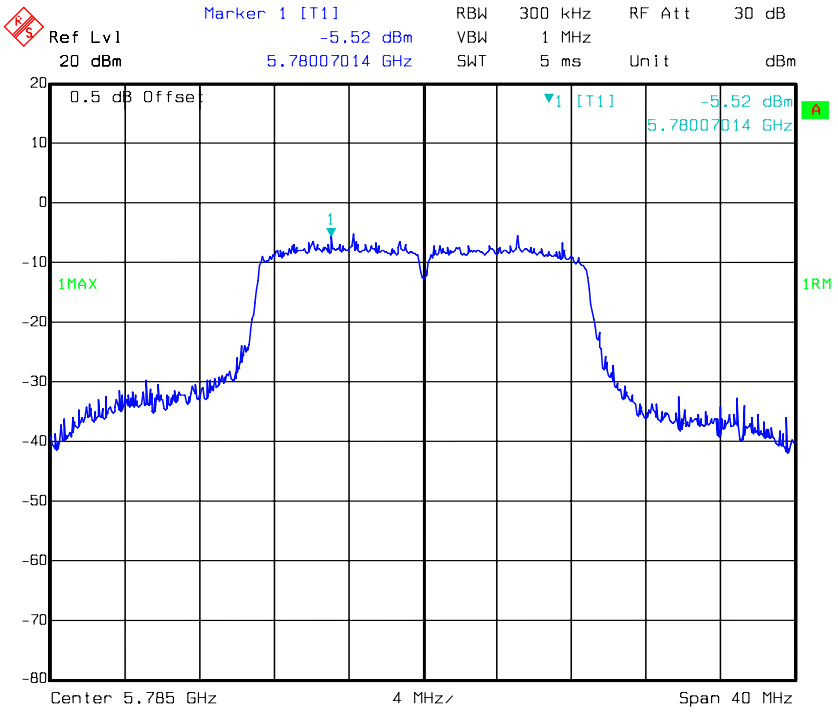
Date: 10.APR.2017 17:27:55

802.11n ht20 Low Channel



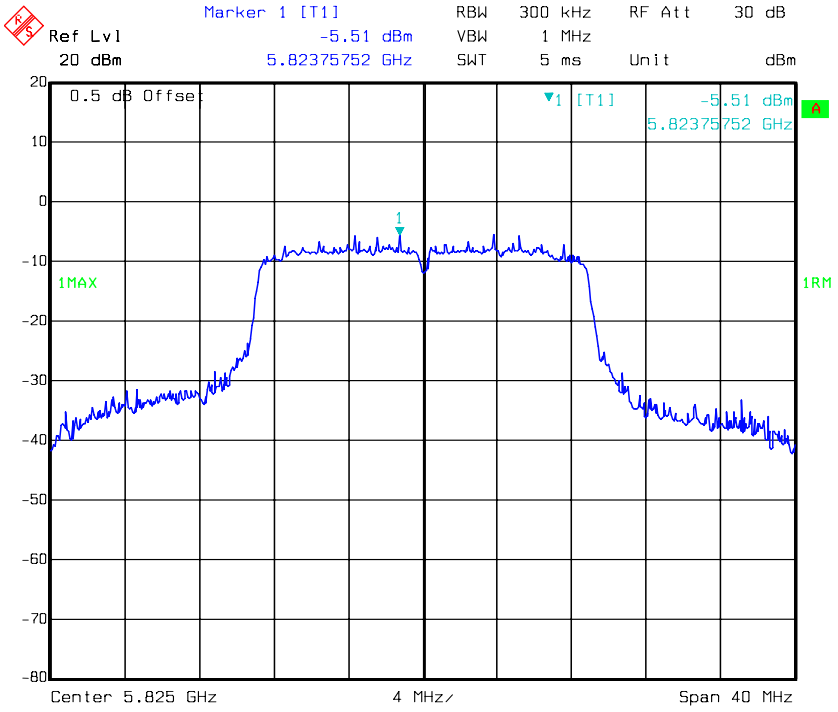
Date: 10.APR.2017 17:18:45

802.11n ht20 Middle Channel



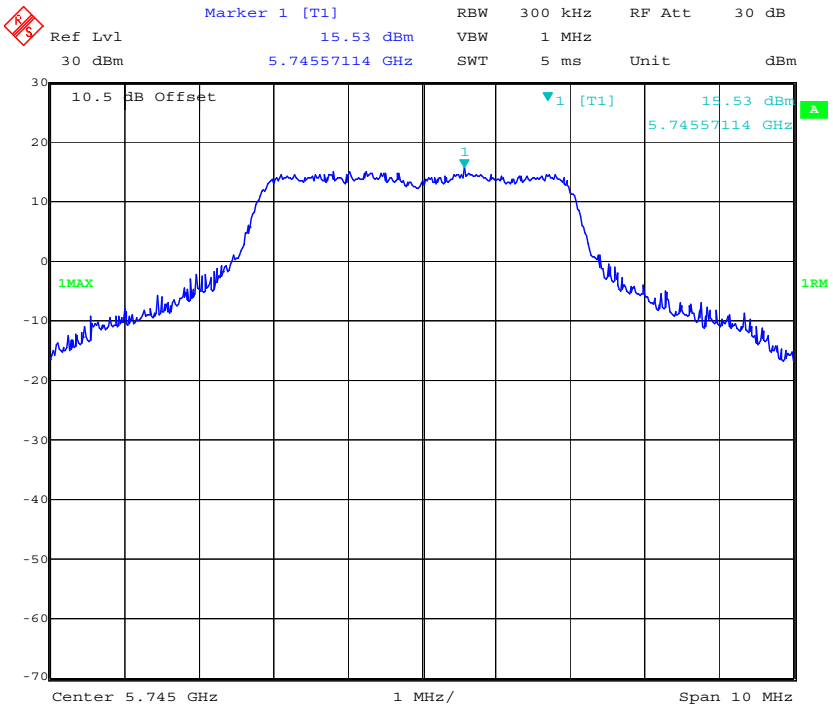
Date: 10.APR.2017 17:22:18

802.11n ht20 High Channel



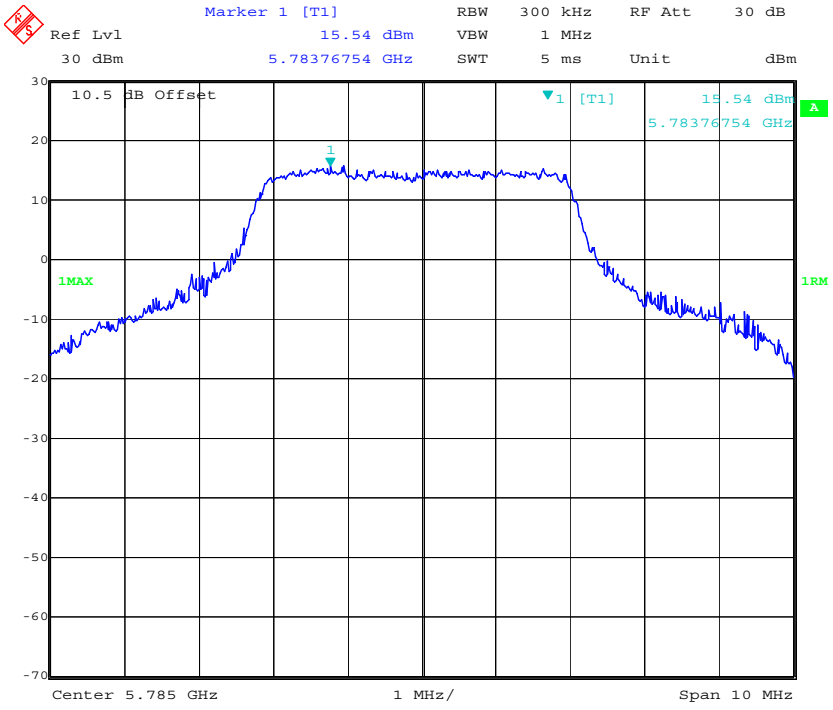
Date: 10.APR.2017 17:24:46

Antenna 1,5M Low Channel



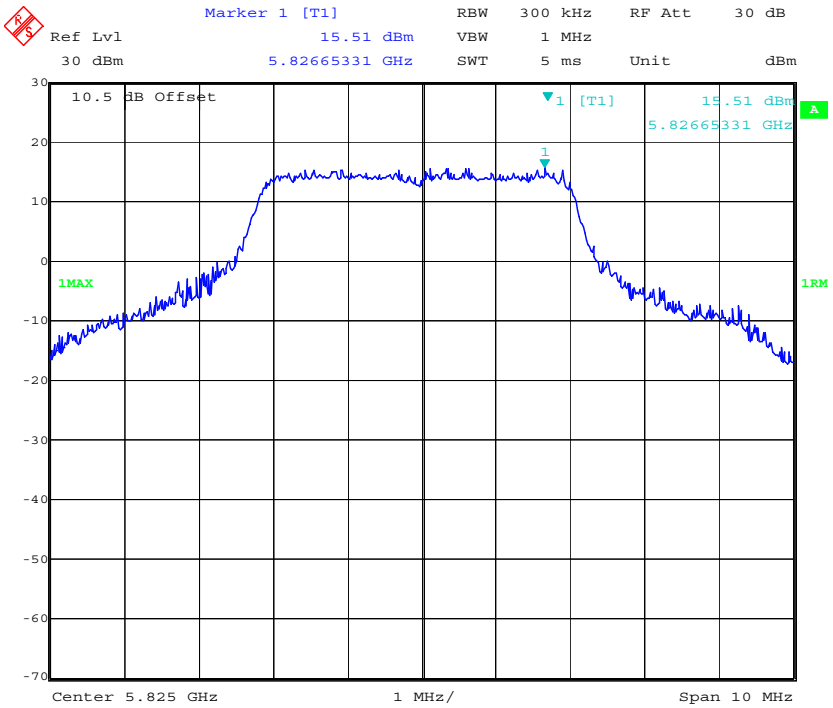
Date: 16.APR.2017 16:54:38

Antenna 1,5m Middle Channel

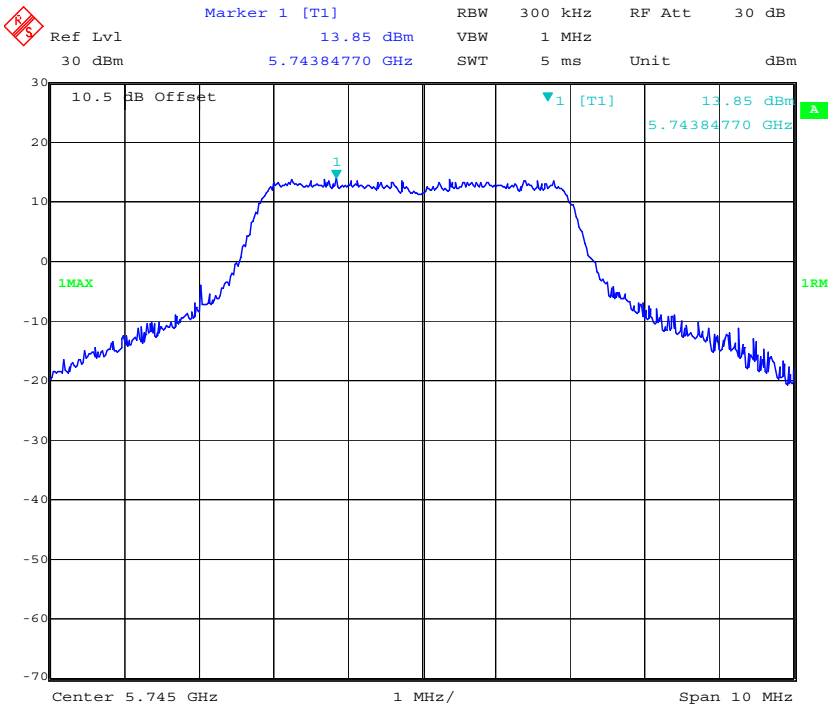


Date: 16.APR.2017 16:07:25

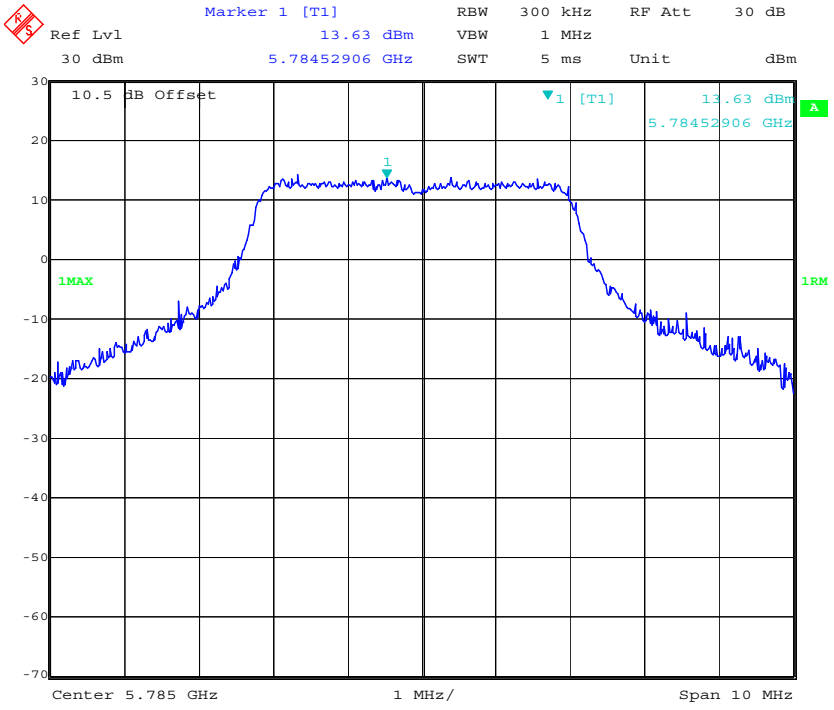
Antenna 1,5M High Channel



Antenna 2,5M Low Channel



Antenna 2,5M Middle Channel



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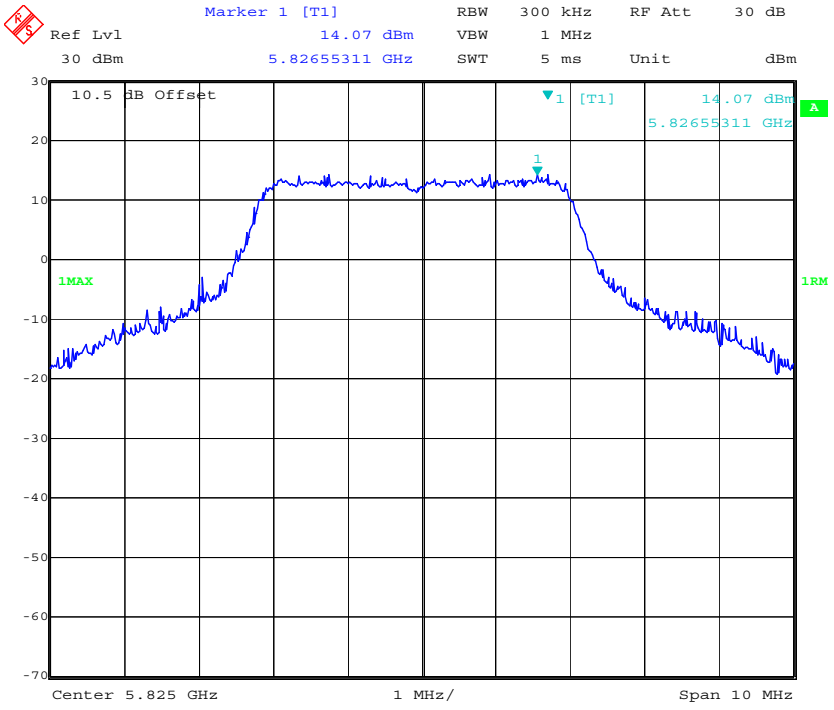
Antenna 2,5M High Channel



Date: 16.APR.2017 16:43:53

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