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-GL300N1801

Report Type:	Product Name:
Original Report	C1

Report Number:	RDG180101012-00B
Report Date:	2018-02-09
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	C1
Equipment Type:	Remote Controller
EUT Model:	GL300N
FCC ID:	SS3-GL300N1801
Rated Input Voltage:	DC7.6V from battery
External Dimension:	16.7 cm(L)*20.0 cm(W)*20.0 cm(H)
Serial Number:	180101012
EUT Received Date:	2018.01.01

Objective

This type approval report is prepared on behalf of ***SZ DJI TECHNOLOGY CO., LTD*** in accordance with Part 2-Subpart J, Part 15-Subparts A, 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, 15.209 and 15.407 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS and Part 15B JBP submissions with FCC ID: SS3-GL300N1801.
Part of system submissions with FCC ID: SS3-MG1P1801.

Test Methodology

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

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~40GHz: 5.23 dB
Unwanted Emissions,conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Test Facility

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

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218,the FCC Designation No. : CN1220.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The device supports 1.4MHz mode, 10MHz mode and 802.11 a/n ht20 modes in 5.8GHz band. And the EUT has 2 antennas, for 1.4MHz mode and 10MHz mode, the system configure 1T1R depending on better performance by the system automatically recognizes. For 802.11a/n ht20 modes, the device supports SISO and MIMO modes.

For 1.4MHz mode, 60 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5728.5	31	5788.5
2	5730.5	…	…
…	…	…	…
…	…	59	5844.5
…	…	60	5846.5
30	5786.5	/	/

3 channels were tested: 5728.5MHz, 5786.5MHz and 5846.5MHz

For 10MHz mode, 115 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	5730.5	59	5788.5
2	5731.5	…	…
…	…	…	…
…	…	114	5843.5
…	…	115	5844.5
58	5787.5	/	/

3 channels were tested: 5730.5MHz, 5787.5MHz and 5844.5MHz

For 802.11a/n ht20, 5 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	159	5795
153	5765	165	5825
157	5785	/	/

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

EUT Exercise Software

The software "DjiRfCertConsole_V1.3.0.51" and "RF Certification.exe" were used for testing, which was provided by manufacturer.

For 1.4MHz and 10MHz mode, the maximum power with maximum duty cycle was configured as default setting, the test software was used for change channels and bandwdiths.

For 802.11a/n ht20 mode, the worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations. The power setting configured as below table, which was provided by manufacturer:

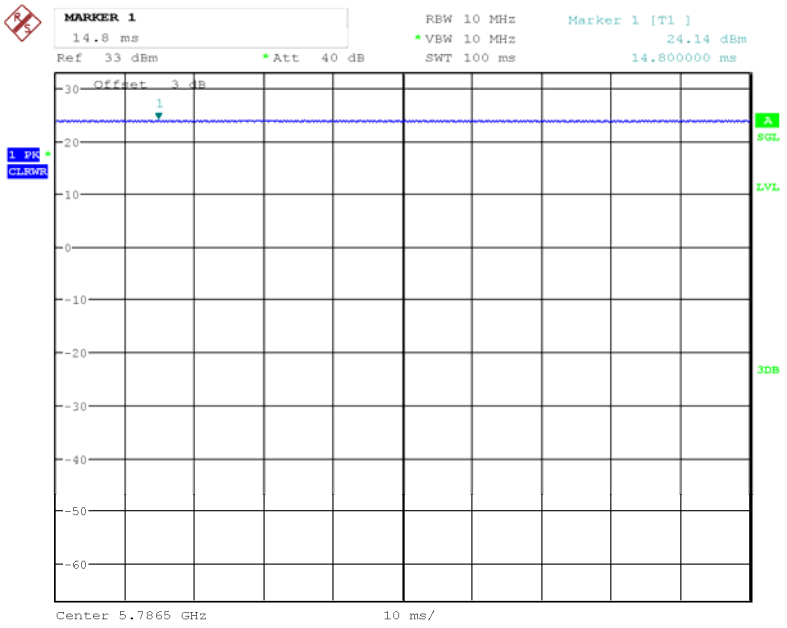
Test Mode	Test Software Version	RF Certification.exe		
802.11a	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting Chain0&1	12	12	12
802.11n ht20	Test Frequency	5745MHz	5785MHz	5825MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting Chain0&1	13	12	12

Pretest SISO and MIMO mode, the MIMO mode was the worst and reported.

The duty cycle as below:

Mode	**T_{on} (ms)**	**T_{on+off} (ms)**	**Duty Cycle(x) (%)**
1.4M	100	100	100
10M	100	100	100
802.11a	2.059	2.094	98
802.11n ht20	1.923	1.966	98

1.4M mode



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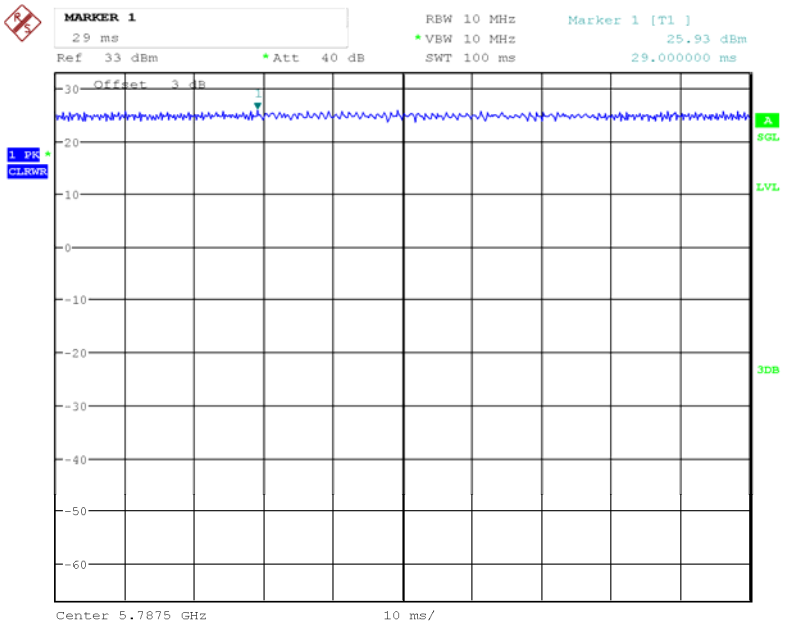
10M mode



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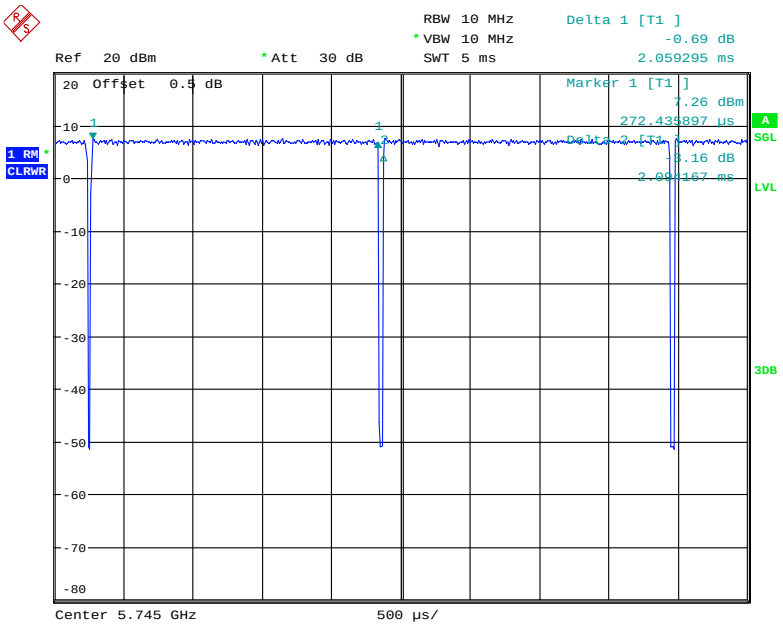
802.11a mode



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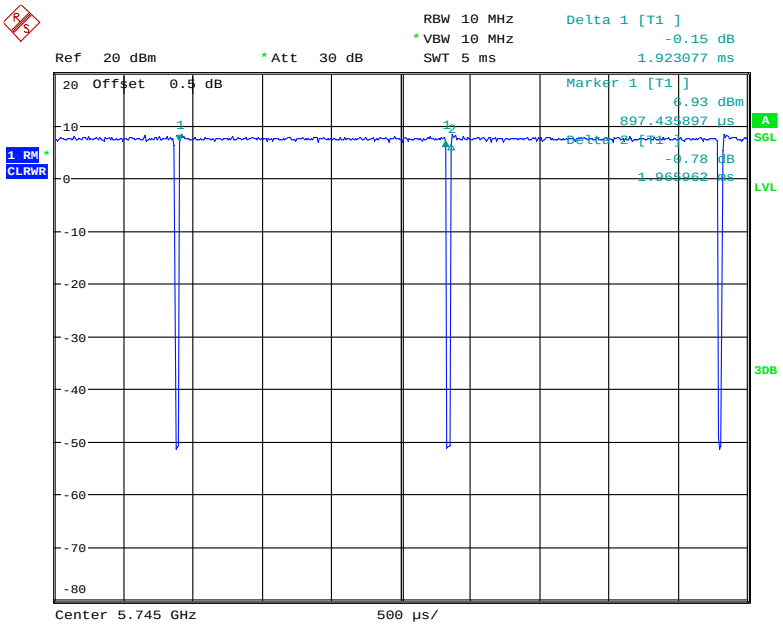
802.11n ht20 mode



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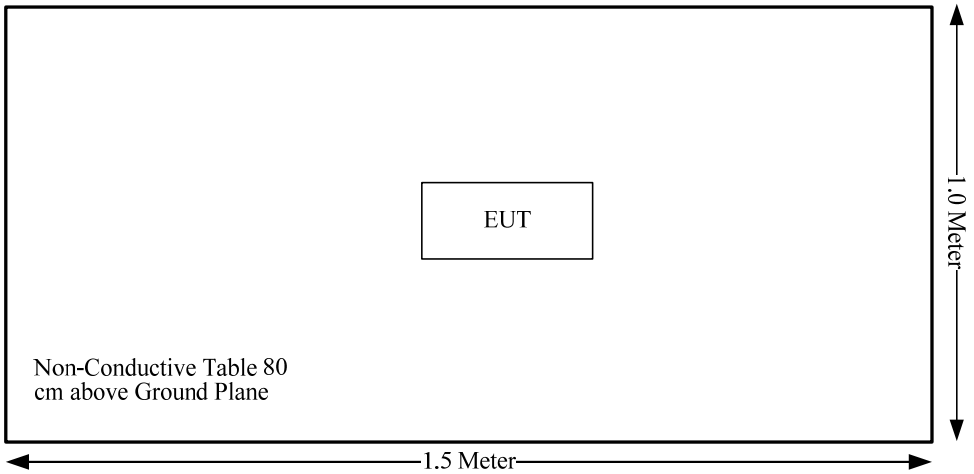
Equipment Modifications

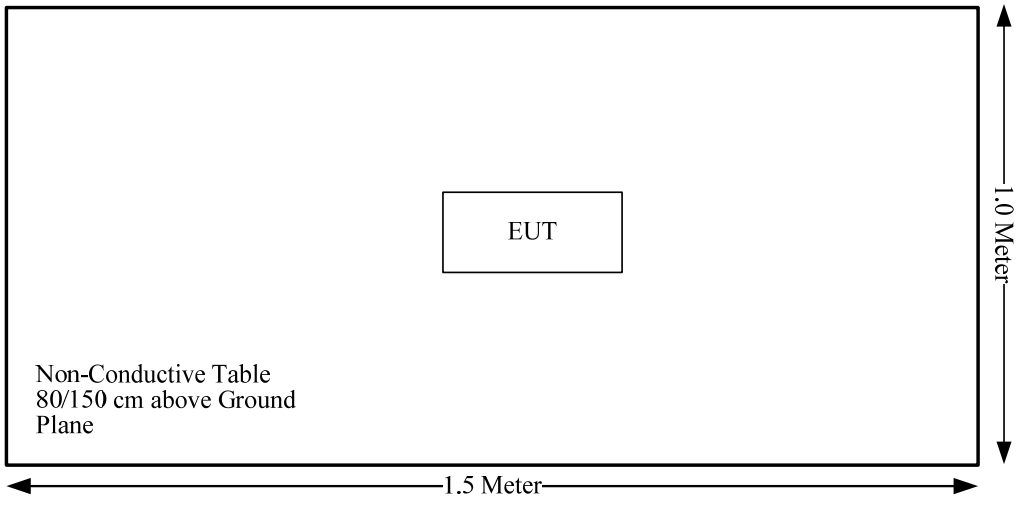
No modification was made to the EUT.

Block Diagram of Test Setup

Below 1G:



Above 1G:



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)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b)	Out Of Band Emissions	Compliance
§15.407(a) (e)	Emission Bandwidth	Compliance
§15.407(g)	Frequency Stability	Compliance
§15.407(a)	Conducted Transmitter Output Power	Compliance
§15.407 (a)	Power Spectral Density	Compliance

Note:
Not Applicable: the device was powered by battery.

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

Applicable Standard

According to§15.407(f) and §1.1310, U-NII devices are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091 and 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Result

The SAR data please refer to the SAR report, report No.:RDG180101012-20.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
And according to FCC 47 CFR section 15.407 (a)(1),if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has 2 un-detachable external antennas arrangement for 1.4MHz/10MHz mode, the antenna gain are 3.69dBi@ 2.4GHz band and 4.34dBi@5.8GHz, and 2 internal antennas for 802.11b/g/n ht20 mode, the antenna gain are 4.62dBi @ 2.4GHz band and5.96 dBi @5.8GHz band, that fulfill the requirement of the item. Please refer to the EUT photos.

Result: 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.

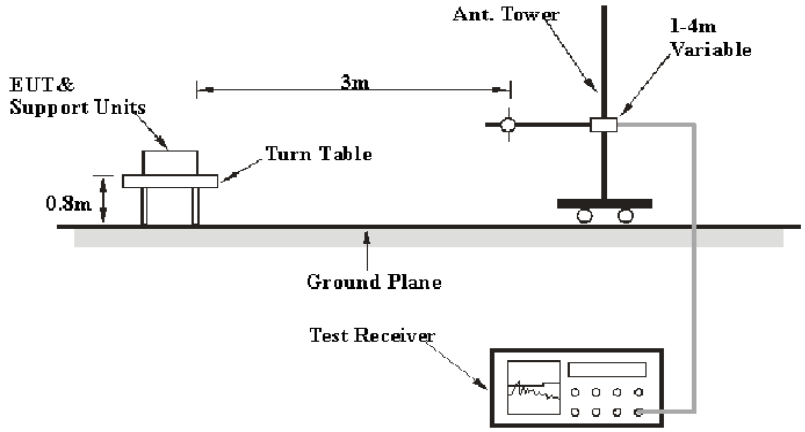
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(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.

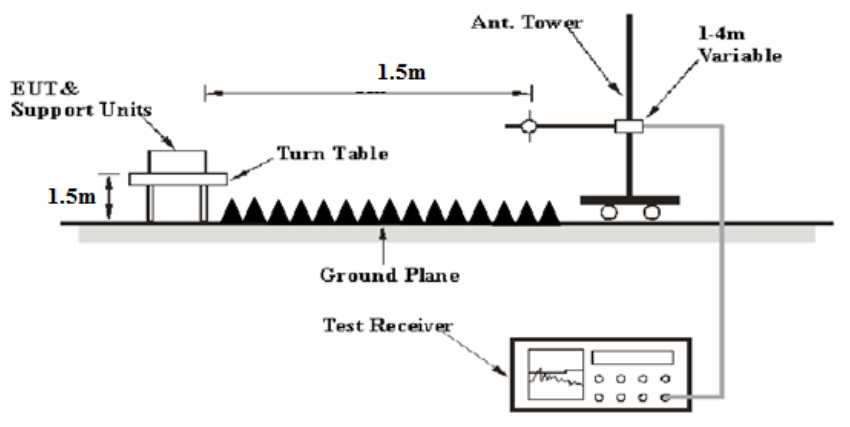
(7) The provisions of §15.205 apply to intentional radiators operating under this section.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

30-1000MHz:

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

1GHz- 40GHz:

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

Test Procedure

During the radiated emission test, the adapter was connected to the first 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 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= 6.02 dB

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

Corrected Amplitude & Margin Calculation

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

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

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

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

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

Margin = Corrected Amplitude -Limit

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2017-12-08	2018-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-2823-02	1007726-01 1302	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
N/A	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Chengdu OuLi	Bandrejector Filter	5725-5850	005	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

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

Test Data

Environmental Conditions

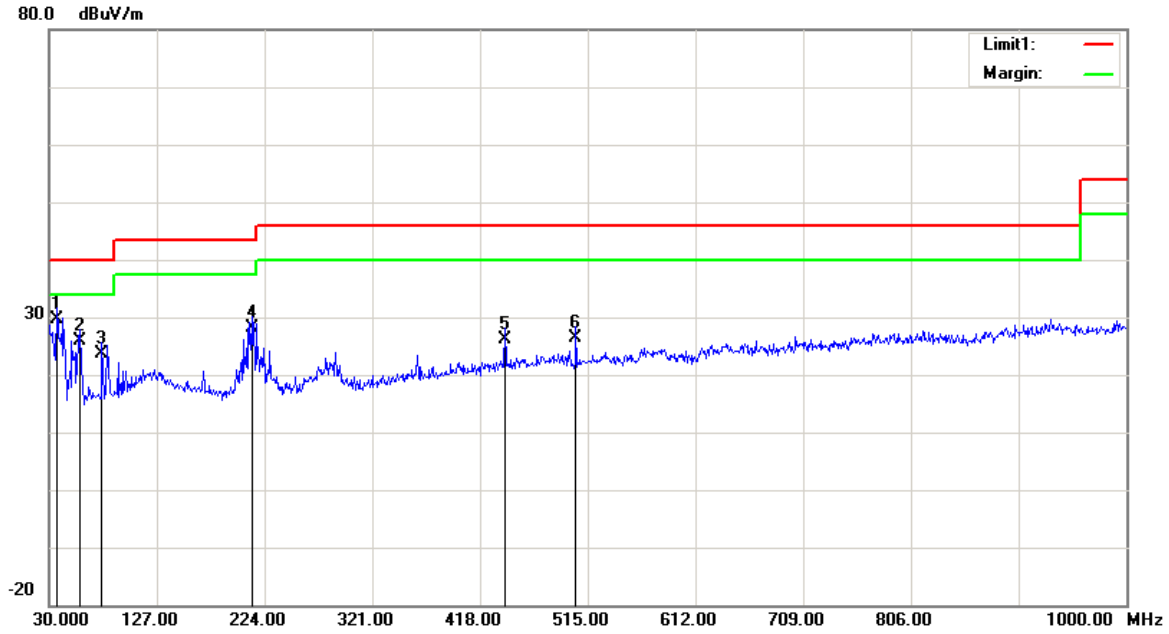
Temperature:	21.9~22.6 °C
Relative Humidity:	34~39 %
ATM Pressure:	101.3~101.8 kPa

** The testing was performed by Blake Yang & Steven Zuo from 2018-01-10 to 2018-01-14.*

Test Mode: Transmitting

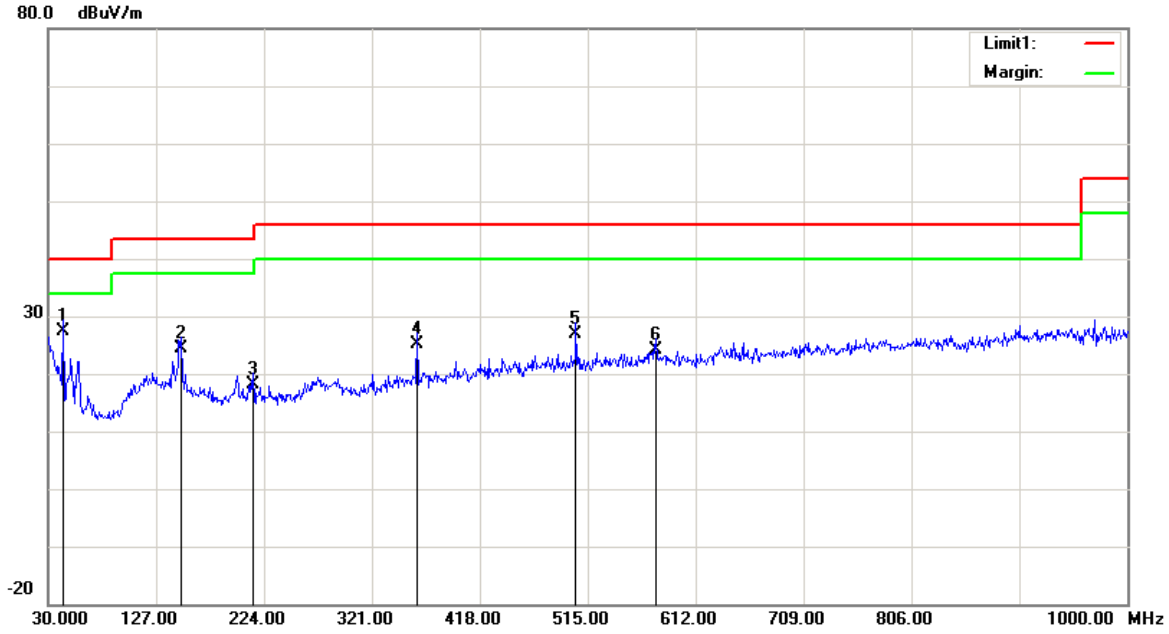
1) 30MHz-1GHz(2.4GHz 1.4MHz middle channel+ 5.8GHz a mode middle channel was the worst)

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
36.7900	34.07	QP	-4.47	29.60	40.00	10.40
57.1600	39.22	QP	-13.32	25.90	40.00	14.10
77.5300	35.67	QP	-12.07	23.60	40.00	16.40
212.3600	37.37	QP	-9.17	28.20	43.50	15.30
440.3100	30.40	QP	-4.30	26.10	46.00	19.90
504.3300	30.34	QP	-3.94	26.40	46.00	19.60

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
43.5800	36.88	QP	-9.48	27.40	40.00	12.60
149.3100	32.24	QP	-7.94	24.30	43.50	19.20
214.3000	27.25	QP	-9.05	18.20	43.50	25.30
361.7400	30.40	QP	-5.30	25.10	46.00	20.90
504.3300	30.74	QP	-3.94	26.80	46.00	19.20
576.1100	26.62	QP	-2.52	24.10	46.00	21.90

2) 1GHz-40GHz:

Antenna 0: 1.4MHz Mode :

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 5728.5 MHz									
5728.50	85.21	PK	H	34.19	3.69	0.00	117.07	N/A	N/A
5728.50	77.53	AV	H	34.19	3.69	0.00	109.39	N/A	N/A
5728.50	87.74	PK	V	34.19	3.69	0.00	119.60	N/A	N/A
5728.50	80.55	AV	V	34.19	3.69	0.00	112.41	N/A	N/A
5725.00	51.62	PK	V	34.19	3.69	0.00	83.48	122.20	38.72
5720.00	35.68	PK	V	34.19	3.69	0.00	67.54	110.80	43.26
5700.00	32.02	PK	V	34.18	3.68	0.00	63.86	105.20	41.34
5650.00	28.68	PK	V	34.16	3.63	0.00	60.45	68.20	7.75
11457.00	62.06	PK	V	38.96	6.59	37.33	64.26	74.00	9.74
11457.00	47.04	AV	V	38.96	6.59	37.33	49.24	54.00	4.76
17185.50	48.82	PK	V	41.28	8.77	38.64	54.21	74.00	19.79
17185.50	35.63	AV	V	41.28	8.77	38.64	41.02	54.00	12.98
Middle Channel: 5786.5 MHz									
5786.50	85.08	PK	H	34.21	3.71	0.00	116.98	N/A	N/A
5786.50	77.37	AV	H	34.21	3.71	0.00	109.27	N/A	N/A
5786.50	88.11	PK	V	34.21	3.71	0.00	120.01	N/A	N/A
5786.50	80.39	AV	V	34.21	3.71	0.00	112.29	N/A	N/A
11573.00	61.64	PK	V	39.00	6.61	37.44	63.79	74.00	10.21
11573.00	46.33	AV	V	39.00	6.61	37.44	48.48	54.00	5.52
17359.50	48.39	PK	V	42.29	8.81	38.52	54.95	74.00	19.05
17359.50	35.48	AV	V	42.29	8.81	38.52	42.04	54.00	11.96
High Channel: 5846.5 MHz									
5846.50	85.64	PK	H	34.24	3.75	0.00	117.61	N/A	N/A
5846.50	78.67	AV	H	34.24	3.75	0.00	110.64	N/A	N/A
5846.50	88.23	PK	V	34.24	3.75	0.00	120.20	N/A	N/A
5846.50	80.86	AV	V	34.24	3.75	0.00	112.83	N/A	N/A
5850.00	44.98	PK	V	34.24	3.75	0.00	76.95	122.20	45.25
5855.00	35.82	PK	V	34.24	3.75	0.00	67.79	110.80	43.01
5875.00	31.38	PK	V	34.25	3.77	0.00	63.38	105.20	41.82
5925.00	26.96	PK	V	34.27	3.80	0.00	59.01	68.20	9.19
11693.00	59.69	PK	V	39.00	6.65	37.58	61.74	74.00	12.26
11693.00	45.52	AV	V	39.00	6.65	37.58	47.57	54.00	6.43
17539.50	48.65	PK	V	43.34	8.85	38.38	56.44	74.00	17.56
17539.50	34.77	AV	V	43.34	8.85	38.38	42.56	54.00	11.44

Antenna 1: 1.4MHz Mode :

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 5728.5 MHz									
5728.50	85.21	PK	H	34.19	3.69	0.00	117.07	N/A	N/A
5728.50	77.97	AV	H	34.19	3.69	0.00	109.83	N/A	N/A
5728.50	87.11	PK	V	34.19	3.69	0.00	118.97	N/A	N/A
5728.50	80.20	AV	V	34.19	3.69	0.00	112.06	N/A	N/A
5725.00	52.00	PK	V	34.19	3.69	0.00	83.86	122.20	38.34
5720.00	35.98	PK	V	34.19	3.69	0.00	67.84	110.80	42.96
5700.00	32.26	PK	V	34.18	3.68	0.00	64.10	105.20	41.10
5650.00	28.81	PK	V	34.16	3.63	0.00	60.58	68.20	7.62
11457.00	58.99	PK	V	38.96	6.59	37.33	61.19	74.00	12.81
11457.00	44.94	AV	V	38.96	6.59	37.33	47.14	54.00	6.86
17185.50	49.20	PK	V	41.28	8.77	38.64	54.59	74.00	19.41
17185.50	35.40	AV	V	41.28	8.77	38.64	40.79	54.00	13.21
Middle Channel: 5786.5 MHz									
5786.50	84.90	PK	H	34.21	3.71	0.00	116.80	N/A	N/A
5786.50	77.12	AV	H	34.21	3.71	0.00	109.02	N/A	N/A
5786.50	87.26	PK	V	34.21	3.71	0.00	119.16	N/A	N/A
5786.50	79.16	AV	V	34.21	3.71	0.00	111.06	N/A	N/A
11573.00	61.04	PK	V	39.00	6.61	37.44	63.19	74.00	10.81
11573.00	44.62	AV	V	39.00	6.61	37.44	46.77	54.00	7.23
17359.50	48.01	PK	V	42.29	8.81	38.52	54.57	74.00	19.43
17359.50	33.92	AV	V	42.29	8.81	38.52	40.48	54.00	13.52
High Channel: 5846.5 MHz									
5846.50	84.28	PK	H	34.24	3.75	0.00	116.25	N/A	N/A
5846.50	77.90	AV	H	34.24	3.75	0.00	109.87	N/A	N/A
5846.50	86.57	PK	V	34.24	3.75	0.00	118.54	N/A	N/A
5846.50	81.14	AV	V	34.24	3.75	0.00	113.11	N/A	N/A
5850.00	44.15	PK	V	34.24	3.75	0.00	76.12	122.20	46.08
5855.00	35.67	PK	V	34.24	3.75	0.00	67.64	110.80	43.16
5875.00	30.66	PK	V	34.25	3.77	0.00	62.66	105.20	42.54
5925.00	26.15	PK	V	34.27	3.80	0.00	58.20	68.20	10.00
11693.00	54.96	PK	V	39.00	6.65	37.58	57.01	74.00	16.99
11693.00	44.65	AV	V	39.00	6.65	37.58	46.70	54.00	7.30
17539.50	48.63	PK	V	43.34	8.85	38.38	56.42	74.00	17.58
17539.50	34.46	AV	V	43.34	8.85	38.38	42.25	54.00	11.75

Antenna 0 - 10MHz Mode:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 5730.5 MHz									
5730.50	83.67	PK	H	34.19	3.69	0.00	115.53	N/A	N/A
5730.50	72.68	AV	H	34.19	3.69	0.00	104.54	N/A	N/A
5730.50	85.97	PK	V	34.19	3.69	0.00	117.83	N/A	N/A
5730.50	76.54	AV	V	34.19	3.69	0.00	108.40	N/A	N/A
5725.00	56.38	PK	V	34.19	3.69	0.00	88.24	122.20	33.96
5720.00	32.48	PK	V	34.19	3.69	0.00	64.34	110.80	46.46
5700.00	28.46	PK	V	34.18	3.68	0.00	60.30	105.20	44.90
5650.00	27.31	PK	V	34.16	3.63	0.00	59.08	68.20	9.12
11461.00	59.38	PK	V	38.96	6.59	37.34	61.57	74.00	12.43
11461.00	47.67	AV	V	38.96	6.59	37.34	49.86	54.00	4.14
17191.50	46.97	PK	V	41.31	8.77	38.64	52.39	74.00	21.61
17191.50	37.88	AV	V	41.31	8.77	38.64	43.30	54.00	10.70
Middle Channel: 5787.5 MHz									
5787.50	82.53	PK	H	34.22	3.71	0.00	114.44	N/A	N/A
5787.50	72.26	AV	H	34.22	3.71	0.00	104.17	N/A	N/A
5787.50	85.11	PK	V	34.22	3.71	0.00	117.02	N/A	N/A
5787.50	74.63	AV	V	34.22	3.71	0.00	106.54	N/A	N/A
11575.00	58.76	PK	V	39.00	6.61	37.45	60.90	74.00	13.10
11575.00	46.89	AV	V	39.00	6.61	37.45	49.03	54.00	4.97
17362.50	48.75	PK	V	42.30	8.81	38.52	55.32	74.00	18.68
17362.50	38.38	AV	V	42.30	8.81	38.52	44.95	54.00	9.05
High Channel: 5844.5 MHz									
5844.50	80.92	PK	H	34.24	3.75	0.00	112.89	N/A	N/A
5844.50	70.68	AV	H	34.24	3.75	0.00	102.65	N/A	N/A
5844.50	84.27	PK	V	34.24	3.75	0.00	116.24	N/A	N/A
5844.50	73.65	AV	V	34.24	3.75	0.00	105.62	N/A	N/A
5850.00	64.58	PK	V	34.24	3.75	0.00	96.55	122.20	25.65
5855.00	52.34	PK	V	34.24	3.75	0.00	84.31	110.80	26.49
5875.00	32.46	PK	V	34.25	3.77	0.00	64.46	105.20	40.74
5925.00	28.72	PK	V	34.27	3.80	0.00	60.77	68.20	7.43
11689.00	61.84	PK	V	39.00	6.65	37.58	63.89	74.00	10.11
11689.00	48.67	AV	V	39.00	6.65	37.58	50.72	54.00	3.28
17533.50	47.87	PK	V	43.31	8.85	38.39	55.62	74.00	18.38
17533.50	38.79	AV	V	43.31	8.85	38.39	46.54	54.00	7.46

Antenna 1 - 10MHz Mode:

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 5730.5 MHz									
5730.50	83.66	PK	H	34.19	3.69	0.00	115.52	N/A	N/A
5730.50	72.72	AV	H	34.19	3.69	0.00	104.58	N/A	N/A
5730.50	85.78	PK	V	34.19	3.69	0.00	117.64	N/A	N/A
5730.50	76.39	AV	V	34.19	3.69	0.00	108.25	N/A	N/A
5725.00	56.24	PK	V	34.19	3.69	0.00	88.10	122.20	34.10
5720.00	32.43	PK	V	34.19	3.69	0.00	64.29	110.80	46.51
5700.00	28.34	PK	V	34.18	3.68	0.00	60.18	105.20	45.02
5650.00	27.35	PK	V	34.16	3.63	0.00	59.12	68.20	9.08
11461.00	59.52	PK	V	38.96	6.59	37.34	61.71	74.00	12.29
11461.00	47.54	AV	V	38.96	6.59	37.34	49.73	54.00	4.27
17191.50	46.83	PK	V	41.31	8.77	38.64	52.25	74.00	21.75
17191.50	37.97	AV	V	41.31	8.77	38.64	43.39	54.00	10.61
Middle Channel: 5787.5 MHz									
5787.50	82.42	PK	H	34.22	3.71	0.00	114.33	N/A	N/A
5787.50	72.15	AV	H	34.22	3.71	0.00	104.06	N/A	N/A
5787.50	85.20	PK	V	34.22	3.71	0.00	117.11	N/A	N/A
5787.50	74.82	AV	V	34.22	3.71	0.00	106.73	N/A	N/A
11575.00	58.92	PK	V	39.00	6.61	37.45	61.06	74.00	12.94
11575.00	47.06	AV	V	39.00	6.61	37.45	49.20	54.00	4.80
17362.50	48.83	PK	V	42.30	8.81	38.52	55.40	74.00	18.60
17362.50	38.40	AV	V	42.30	8.81	38.52	44.97	54.00	9.03
High Channel: 5844.5 MHz									
5844.50	80.98	PK	H	34.24	3.75	0.00	112.95	N/A	N/A
5844.50	70.88	AV	H	34.24	3.75	0.00	102.85	N/A	N/A
5844.50	84.25	PK	V	34.24	3.75	0.00	116.22	N/A	N/A
5844.50	73.45	AV	V	34.24	3.75	0.00	105.42	N/A	N/A
5850.00	64.70	PK	V	34.24	3.75	0.00	96.67	122.20	25.53
5855.00	52.17	PK	V	34.24	3.75	0.00	84.14	110.80	26.66
5875.00	32.34	PK	V	34.25	3.77	0.00	64.34	105.20	40.86
5925.00	28.58	PK	V	34.27	3.80	0.00	60.63	68.20	7.57
11689.00	61.80	PK	V	39.00	6.65	37.58	63.85	74.00	10.15
11689.00	48.52	AV	V	39.00	6.65	37.58	50.57	54.00	3.43
17533.50	47.85	PK	V	43.31	8.85	38.39	55.60	74.00	18.40
17533.50	38.61	AV	V	43.31	8.85	38.39	46.36	54.00	7.64

5.8G 802.11a Mode(MIMO mode was the worst):

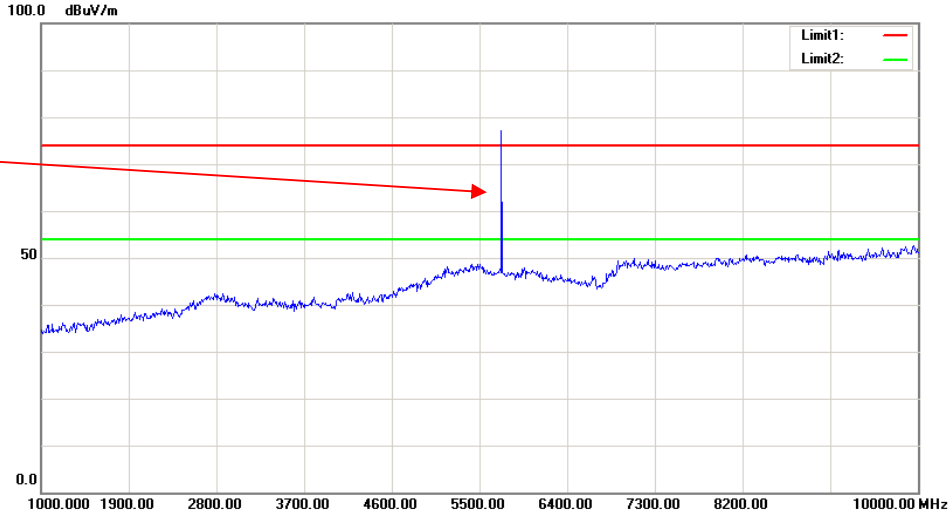
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 5745 MHz									
5745.00	83.16	PK	H	34.20	3.69	0.00	115.03	N/A	N/A
5745.00	74.00	AV	H	34.20	3.69	0.00	105.87	N/A	N/A
5745.00	1.00	PK	V	34.20	3.69	0.00	32.87	N/A	N/A
5745.00	85.79	AV	V	34.20	3.69	0.00	117.66	N/A	N/A
5725.00	61.34	PK	H	34.19	3.69	0.00	93.20	122.20	29.00
5720.00	53.47	PK	H	34.19	3.69	0.00	85.33	110.80	25.47
5700.00	35.46	PK	H	34.18	3.68	0.00	67.30	105.20	37.90
5650.00	28.97	PK	H	34.16	3.63	0.00	60.74	68.20	7.46
11490.00	58.30	PK	H	38.99	6.59	37.35	60.51	74.00	13.49
11490.00	46.20	AV	H	38.99	6.59	37.35	48.41	54.00	5.59
17235.00	48.55	PK	H	41.56	8.78	38.61	54.26	74.00	19.74
17235.00	38.34	AV	H	41.56	8.78	38.61	44.05	54.00	9.95
Middle Channel: 5785 MHz									
5785.00	82.15	PK	H	34.21	3.71	0.00	114.05	N/A	N/A
5785.00	72.65	AV	H	34.21	3.71	0.00	104.55	N/A	N/A
5785.00	85.69	PK	V	34.21	3.71	0.00	117.59	N/A	N/A
5785.00	75.48	AV	V	34.21	3.71	0.00	107.38	N/A	N/A
11570.00	56.78	PK	H	39.00	6.61	37.44	58.93	74.00	15.07
11570.00	47.25	AV	H	39.00	6.61	37.44	49.40	54.00	4.60
17355.00	48.36	PK	H	42.26	8.81	38.52	54.89	74.00	19.11
17355.00	37.87	AV	H	42.26	8.81	38.52	44.40	54.00	9.60
High Channel: 5825 MHz									
5825.00	82.21	PK	H	34.23	3.73	0.00	114.15	N/A	N/A
5825.00	72.64	AV	H	34.23	3.73	0.00	104.58	N/A	N/A
5825.00	85.93	PK	V	34.23	3.73	0.00	117.87	N/A	N/A
5825.00	76.77	AV	V	34.23	3.73	0.00	108.71	N/A	N/A
5850.00	43.84	PK	H	34.24	3.75	0.00	75.81	122.20	46.39
5855.00	39.66	PK	H	34.24	3.75	0.00	71.63	110.80	39.17
5875.00	32.16	PK	H	34.25	3.77	0.00	64.16	105.20	41.04
5925.00	27.61	PK	H	34.27	3.80	0.00	59.66	68.20	8.54
11650.00	56.45	PK	H	39.00	6.64	37.53	58.54	74.00	15.46
11650.00	47.67	AV	H	39.00	6.64	37.53	49.76	54.00	4.24
17475.00	48.67	PK	H	42.96	8.84	38.44	56.01	74.00	17.99
17475.00	38.69	AV	H	42.96	8.84	38.44	46.03	54.00	7.97

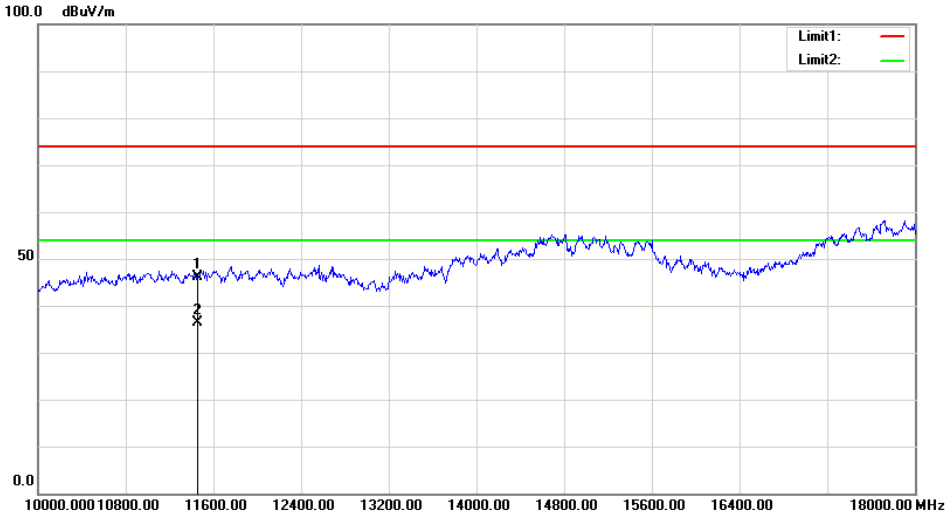
802.11n ht20 Mode(MIMO mode was the worst):

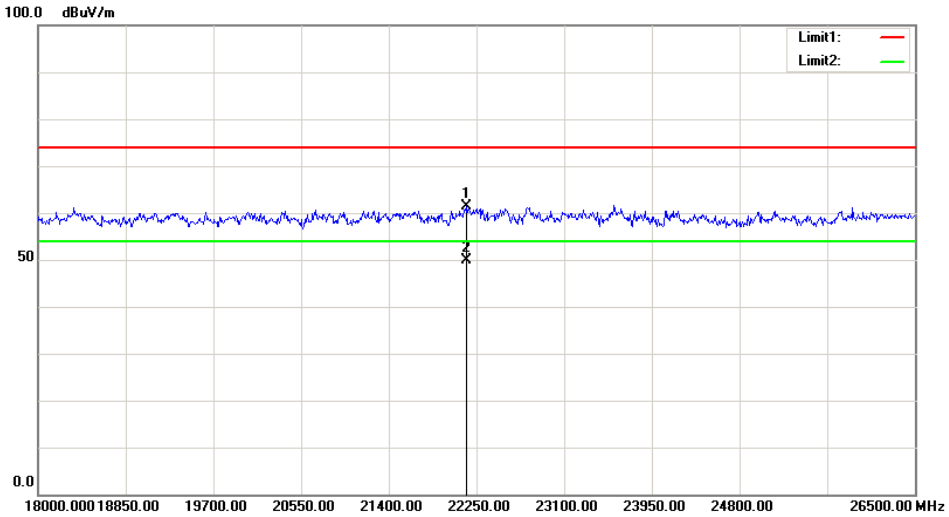
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 5745 MHz									
5745.00	83.40	PK	H	34.20	3.69	0.00	115.27	N/A	N/A
5745.00	72.98	AV	H	34.20	3.69	0.00	104.85	N/A	N/A
5745.00	87.27	PK	V	34.20	3.69	0.00	119.14	N/A	N/A
5745.00	77.77	AV	V	34.20	3.69	0.00	109.64	N/A	N/A
5725.00	62.66	PK	V	34.19	3.69	0.00	94.52	122.20	27.68
5720.00	52.73	PK	V	34.19	3.69	0.00	84.59	110.80	26.21
5700.00	33.48	PK	V	34.18	3.68	0.00	65.32	105.20	39.88
5650.00	29.67	PK	V	34.16	3.63	0.00	61.44	68.20	6.76
11490.00	59.84	PK	V	38.99	6.59	37.35	62.05	74.00	11.95
11490.00	48.15	AV	V	38.99	6.59	37.35	50.36	54.00	3.64
17235.00	48.97	PK	V	41.56	8.78	38.61	54.68	74.00	19.32
17235.00	38.26	AV	V	41.56	8.78	38.61	43.97	54.00	10.03
Middle Channel: 5785 MHz									
5785.00	81.74	PK	H	34.21	3.71	0.00	113.64	N/A	N/A
5785.00	71.36	AV	H	34.21	3.71	0.00	103.26	N/A	N/A
5785.00	86.25	PK	V	34.21	3.71	0.00	118.15	N/A	N/A
5785.00	76.88	AV	V	34.21	3.71	0.00	108.78	N/A	N/A
11570.00	57.18	PK	V	39.00	6.61	37.44	59.33	74.00	14.67
11570.00	46.66	AV	V	39.00	6.61	37.44	48.81	54.00	5.19
17355.00	48.32	PK	V	42.26	8.81	38.52	54.85	74.00	19.15
17355.00	37.52	AV	V	42.26	8.81	38.52	44.05	54.00	9.95
High Channel: 5825 MHz									
5825.00	82.74	PK	H	34.23	3.73	0.00	114.68	N/A	N/A
5825.00	73.23	AV	H	34.23	3.73	0.00	105.17	N/A	N/A
5825.00	85.46	PK	V	34.23	3.73	0.00	117.40	N/A	N/A
5825.00	74.98	AV	V	34.23	3.73	0.00	106.92	N/A	N/A
5850.00	45.37	PK	V	34.24	3.75	0.00	77.34	122.20	44.86
5855.00	28.96	PK	V	34.24	3.75	0.00	60.93	110.80	49.87
5875.00	35.46	PK	V	34.25	3.77	0.00	67.46	105.20	37.74
5925.00	29.87	PK	V	34.27	3.80	0.00	61.92	68.20	6.28
11650.00	58.84	PK	V	39.00	6.64	37.53	60.93	74.00	13.07
11650.00	48.67	AV	V	39.00	6.64	37.53	50.76	54.00	3.24
17475.00	49.26	PK	V	42.96	8.84	38.44	56.60	74.00	17.40
17475.00	39.44	AV	V	42.96	8.84	38.44	46.78	54.00	7.22

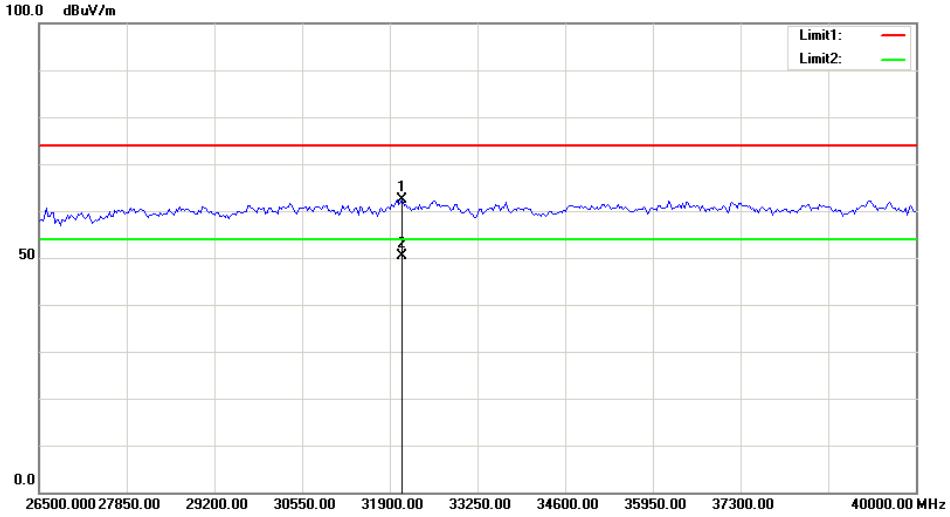
Test Plots
For 1.4MHz/10MHz mode(1.4MHz Mode Middle channel was the worst)
Horizontal

Fundamental Test with Band Rejection Filter



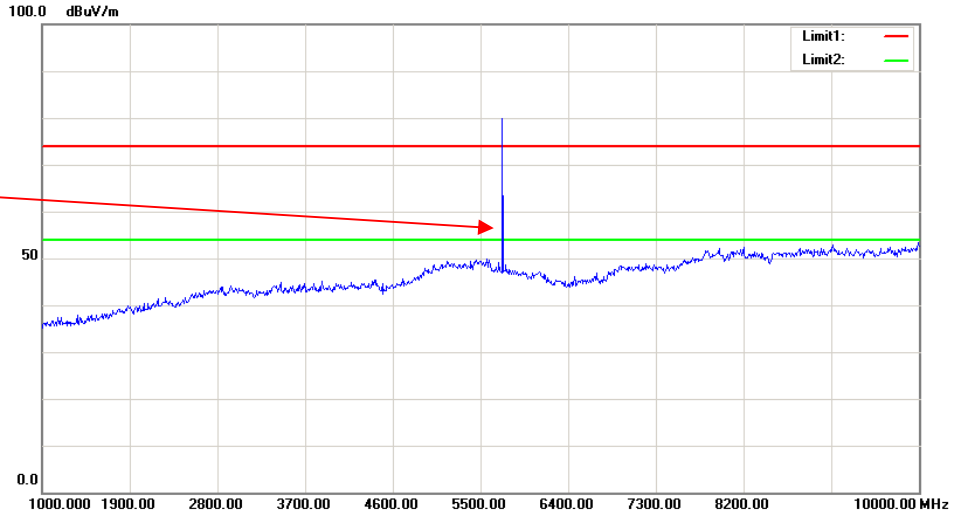


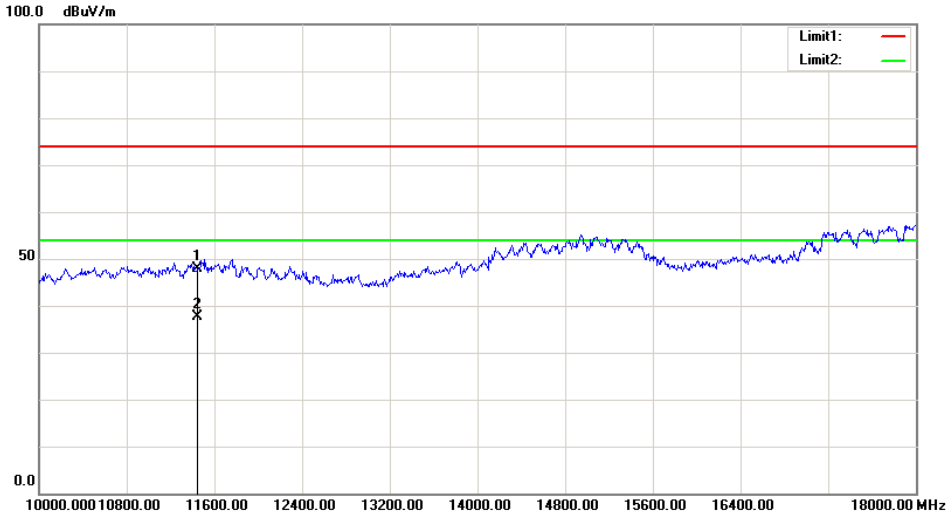


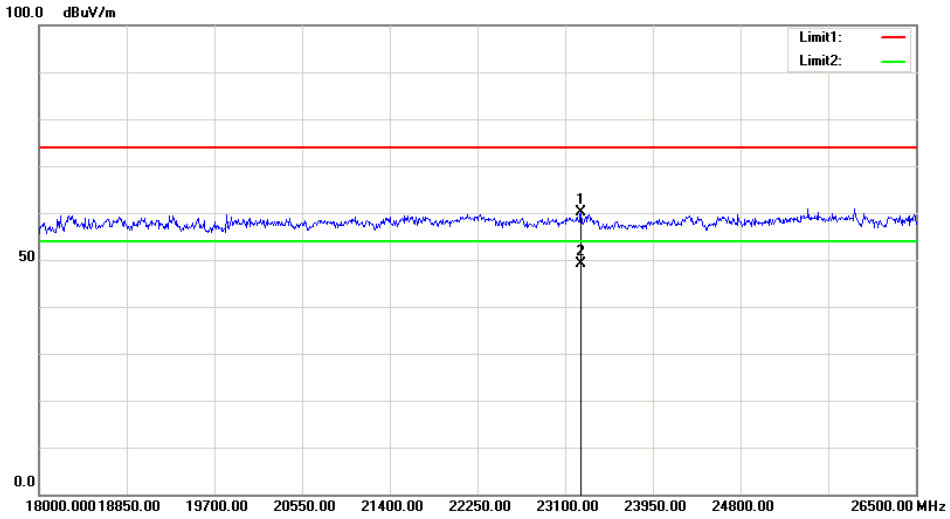


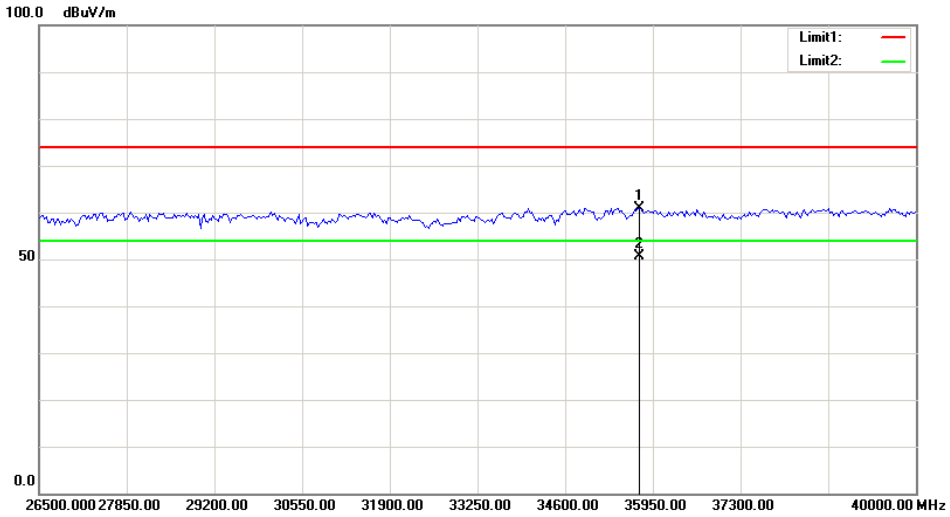
Vertical

Fundamental Test with Band Rejection Filter





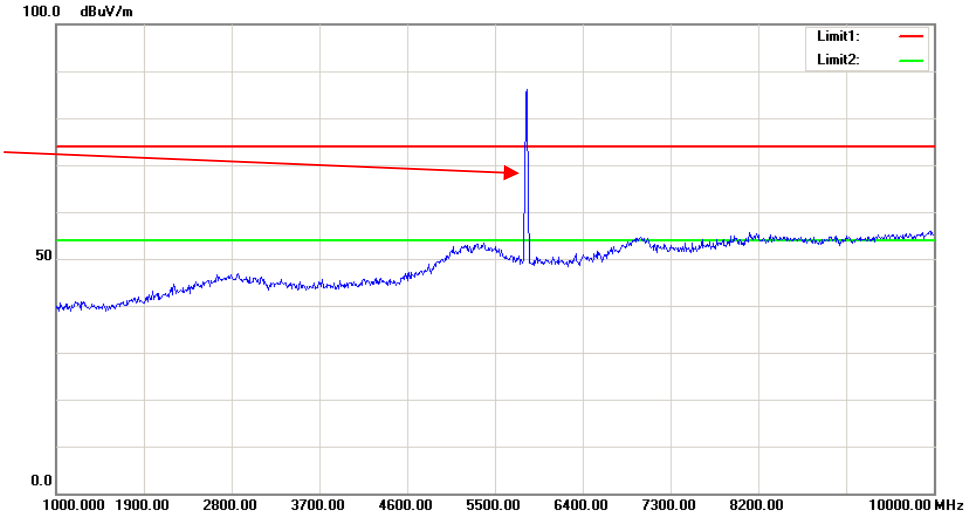

100.0 dBuV/m
Limit1:
Limit2:
1
2
50
0.0
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz

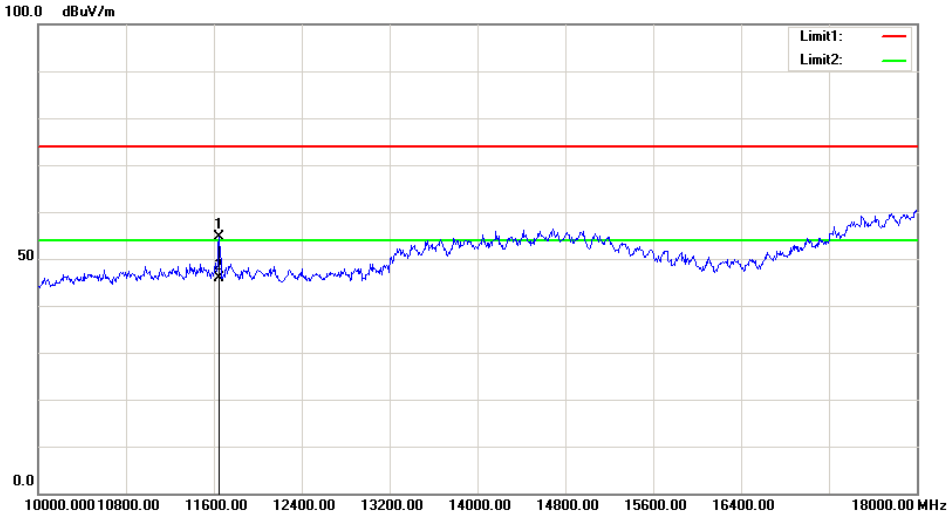

100.0 dBuV/m
Limit1:
Limit2:
1
2
50
0.0
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

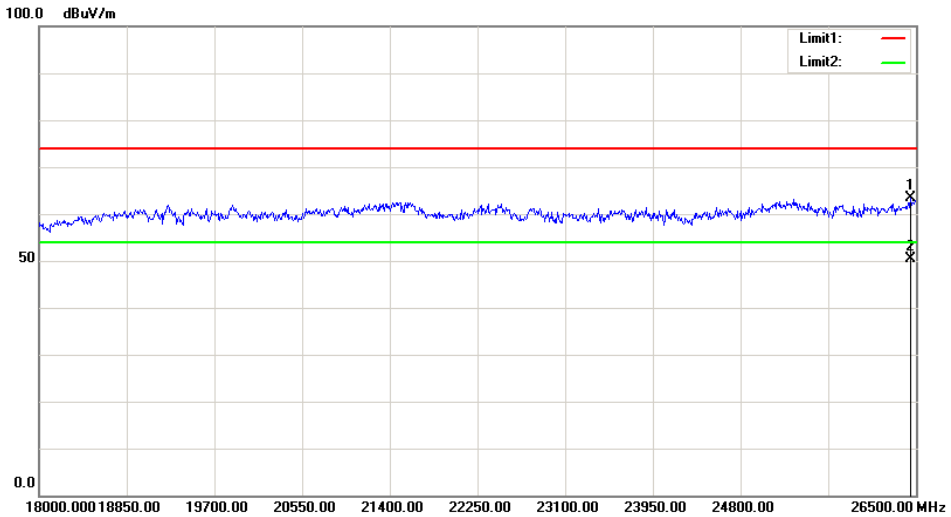
For802.11a/n ht20 mode (802.11a mode middle channel was the worst case)

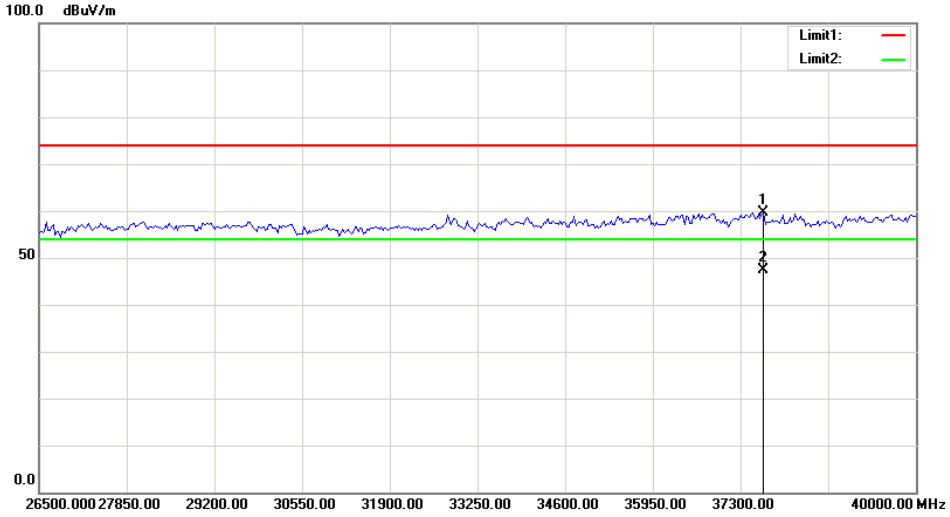
Horizontal

Fundamental Test with Band Rejection Filter



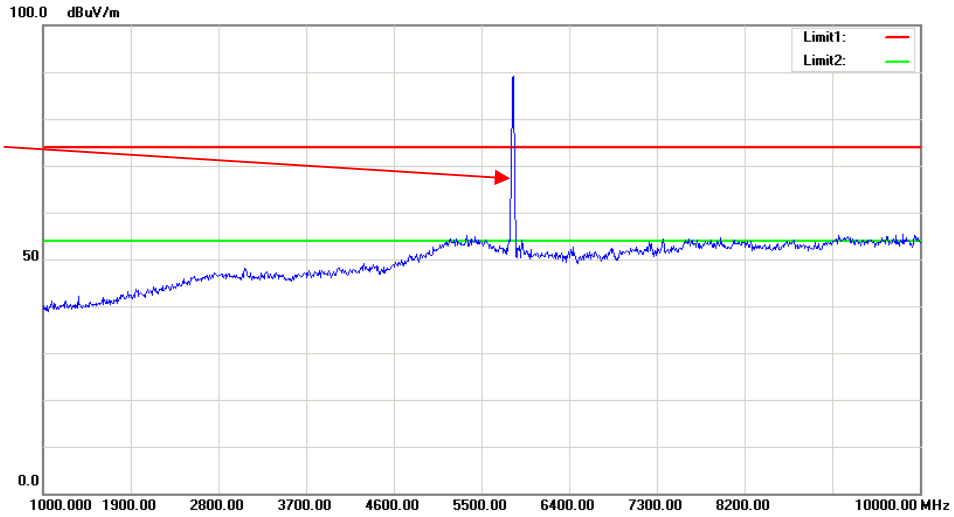


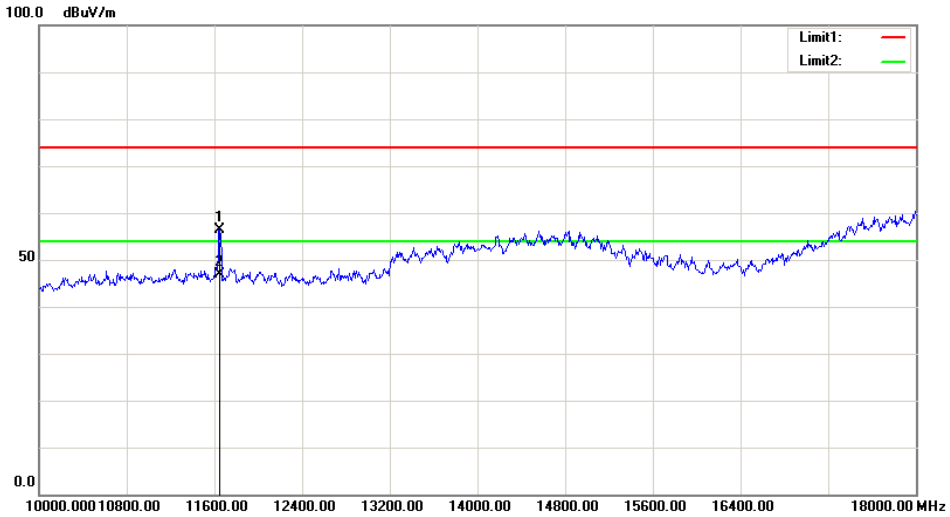


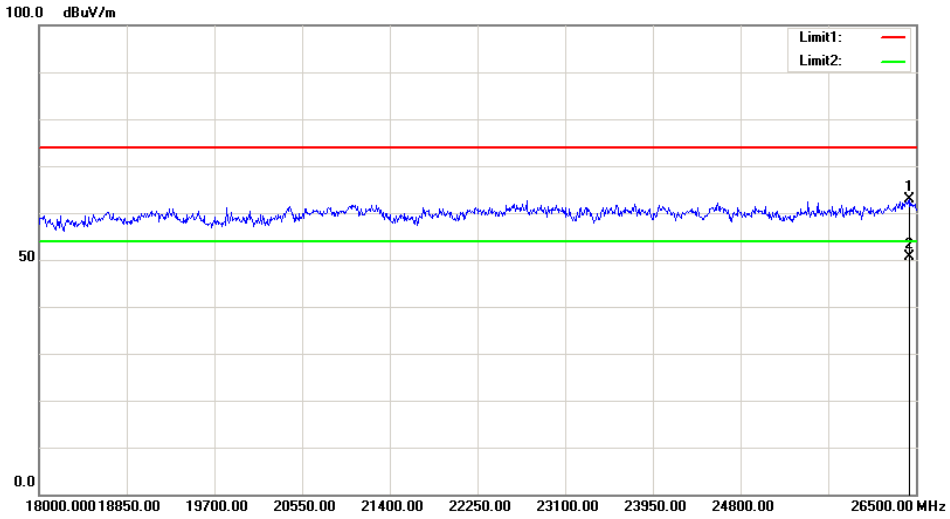


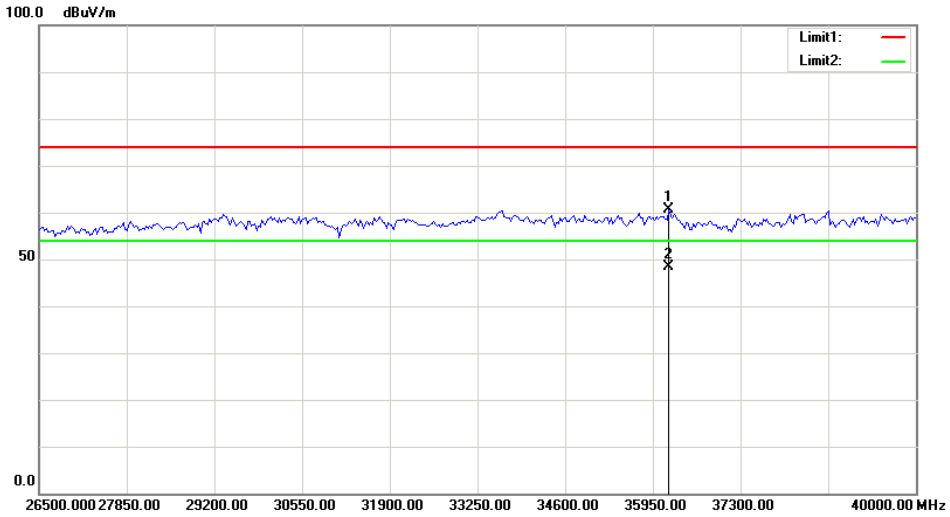
Vertical

Fundamental Test with Band Rejection Filter






100.0 dBuV/m
Limit1:
Limit2:
1
2
50
0.0
18000.000 18850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00 26500.00 MHz


100.0 dBuV/m
Limit1:
Limit2:
1
2
50
0.0
26500.000 27850.00 29200.00 30550.00 31900.00 33250.00 34600.00 35950.00 37300.00 40000.00 MHz

FCC §15.407(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 v02r01.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	22.8~26.3°C
Relative Humidity:	37~44 %
ATM Pressure:	101.2~101.5kPa

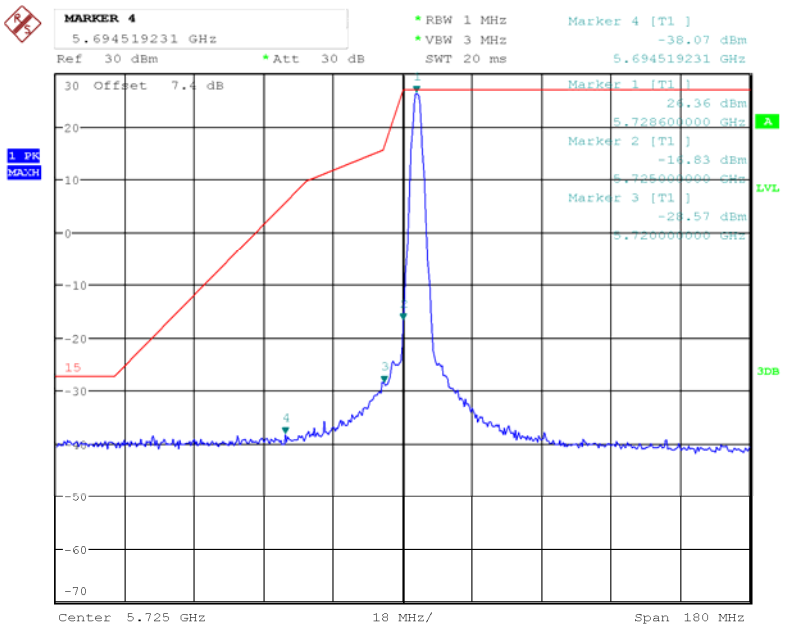
The testing was performed by Nami Quan from 2018-01-07 to 2018-01-15.

Test Result: Pass.

For 802.11a/n the emission under limit more than 3dB, combined two chain compliance the requirement, please refer to the following plots.

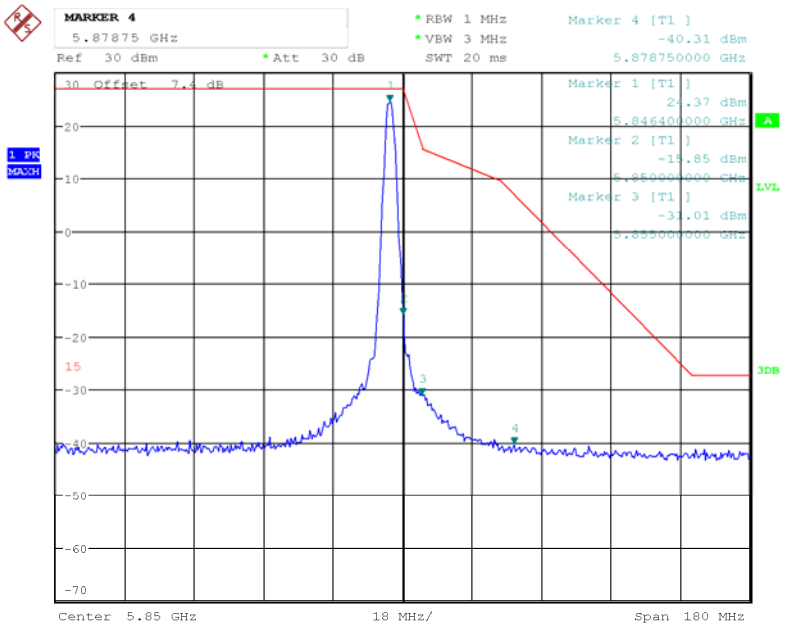
1.4MHz,

Chain 0:Low Channel



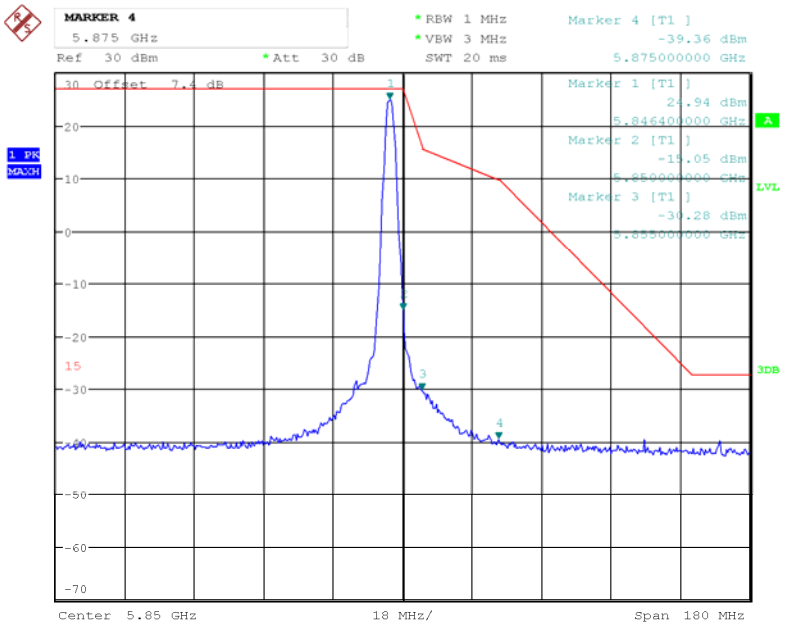
Date: 7.JAN.2018 16:22:17

Chain 0:High Channel



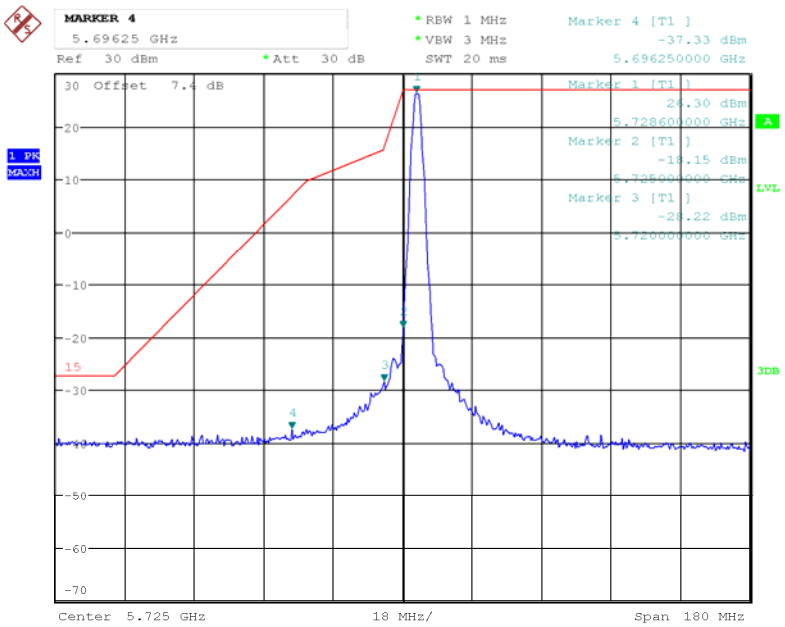
Date: 7.JAN.2018 16:23:08

Chain 1: Low Channel



Date: 7.JAN.2018 15:50:50

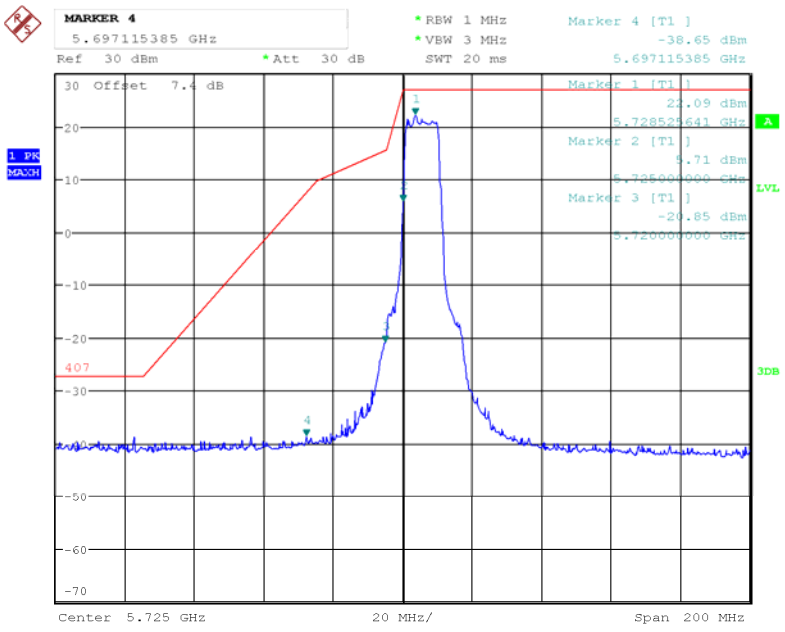
Chain 1:High Channel



Date: 7.JAN.2018 15:51:58

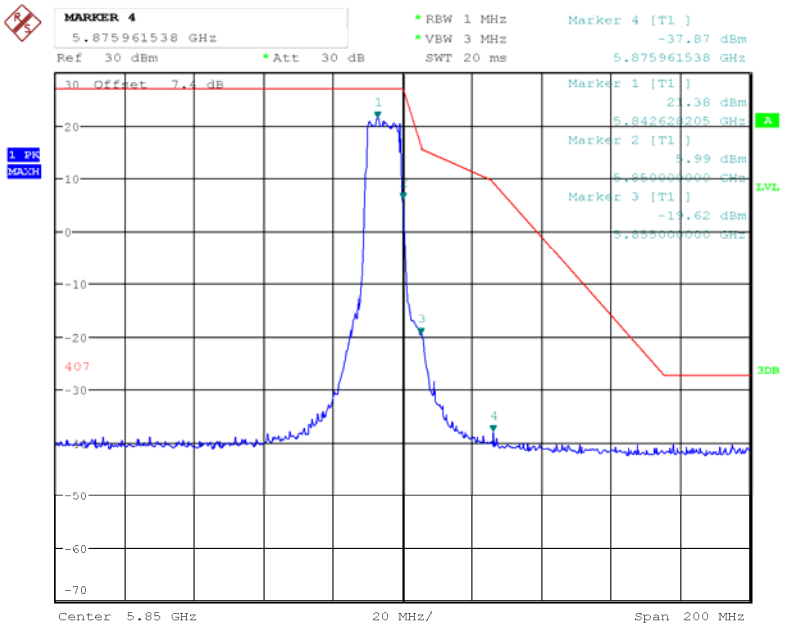
10MHz Mode:

Chain 0,Low Channel



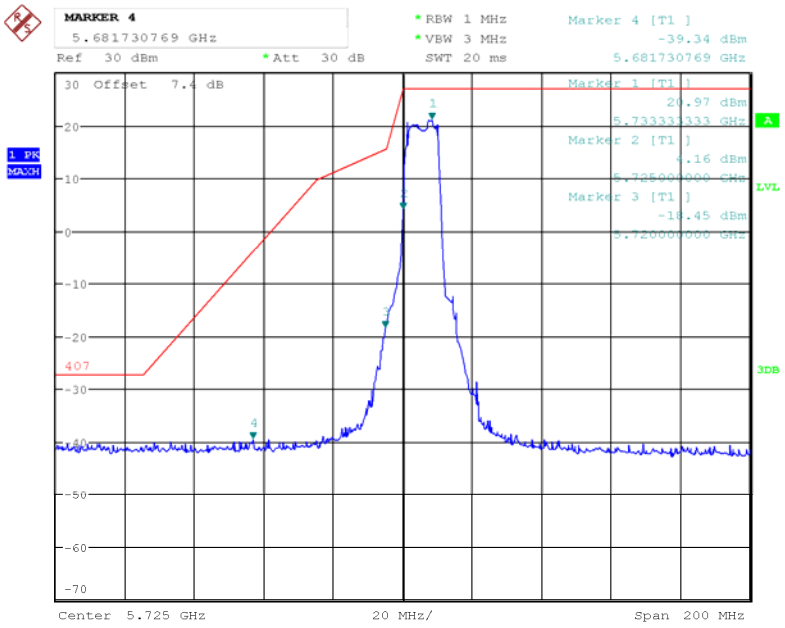
Date: 9.JAN.2018 09:45:49

Chain 0,High Channel



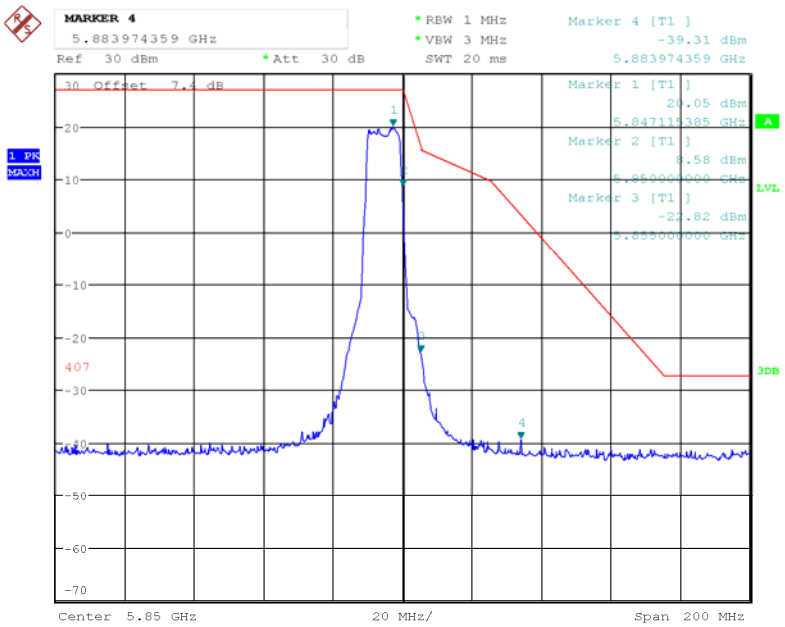
Date: 9.JAN.2018 09:47:18

Chain 1, Low Channel



Date: 9.JAN.2018 09:51:03

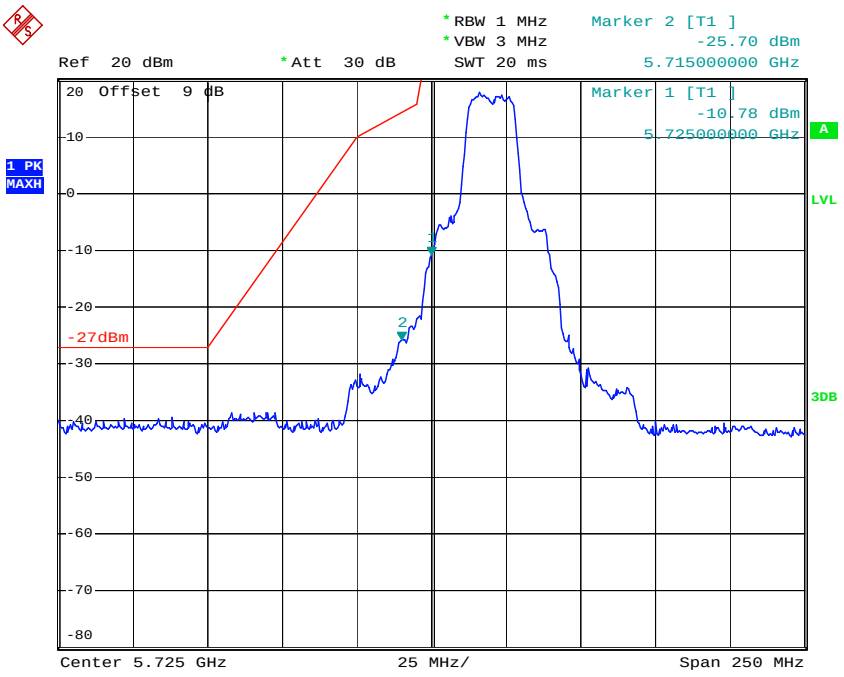
Chain 1,High Channel



Date: 9.JAN.2018 09:50:13

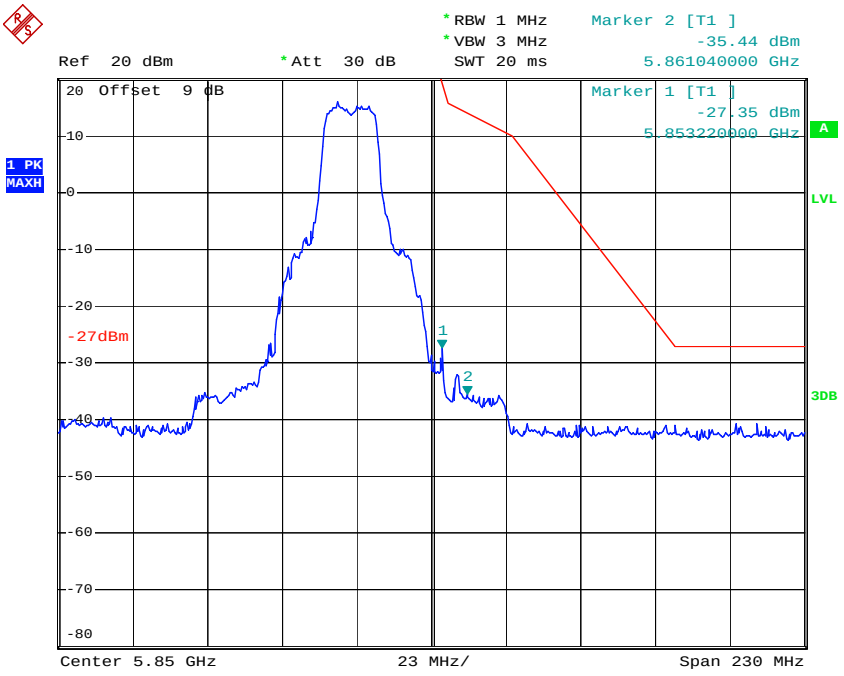
802.11a,

Chain 0,Low Channel



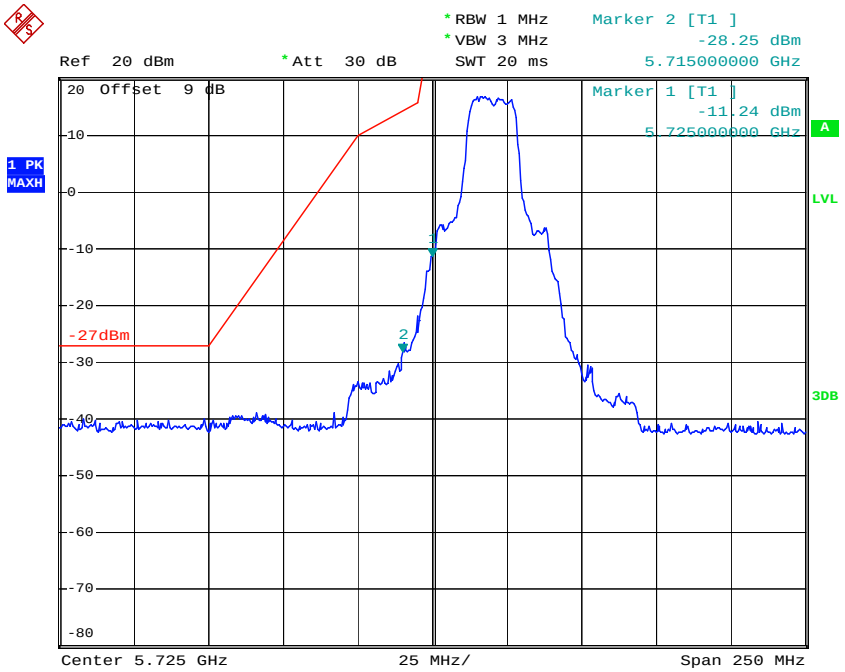
Date: 15.JAN.2018 09:35:23

Chain 0, High Channel



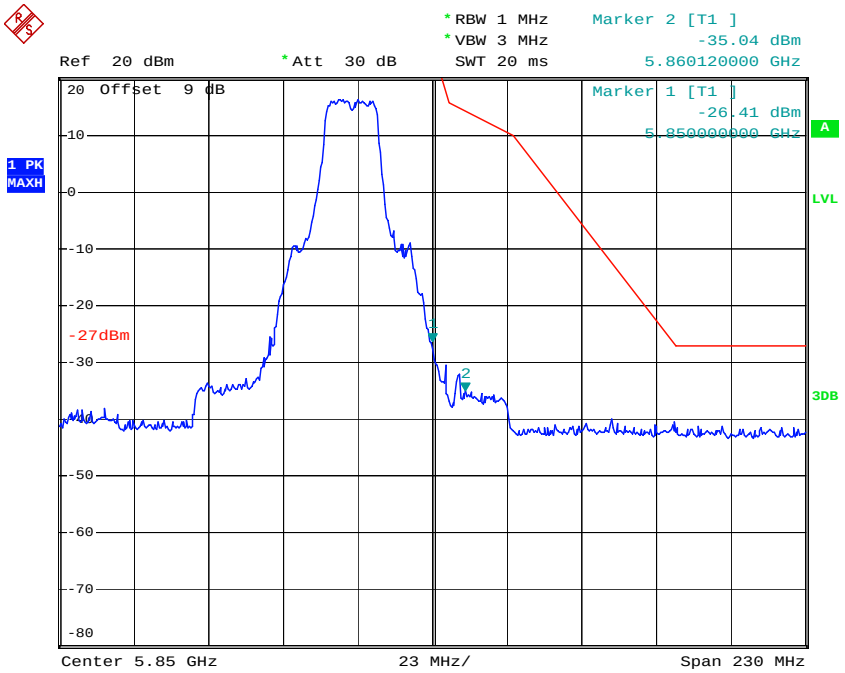
Date: 15.JAN.2018 09:49:06

Chain 1, Low Channel



Date: 15.JAN.2018 09:40:16

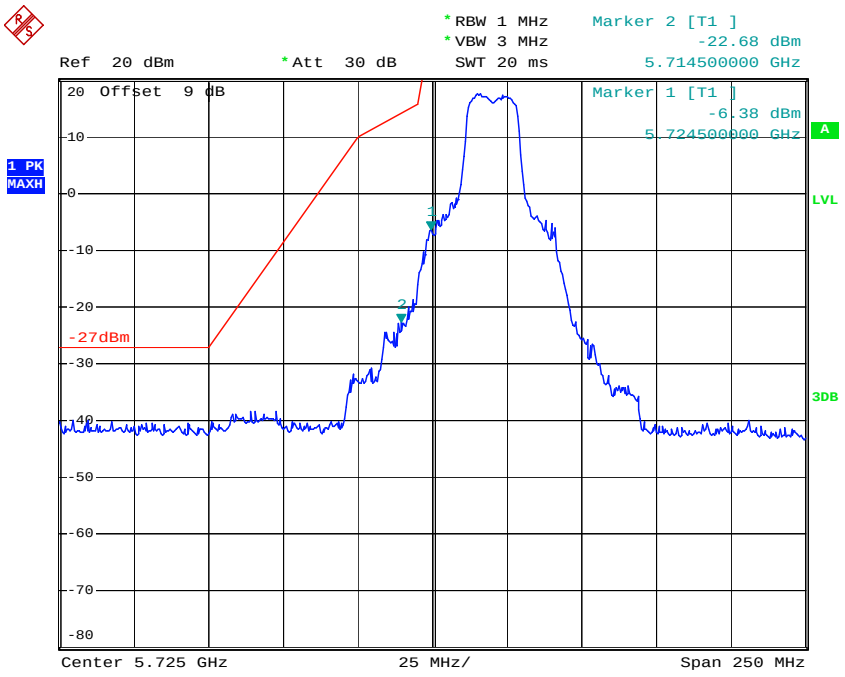
Chain 1, High Channel



Date: 15.JAN.2018 09:51:18

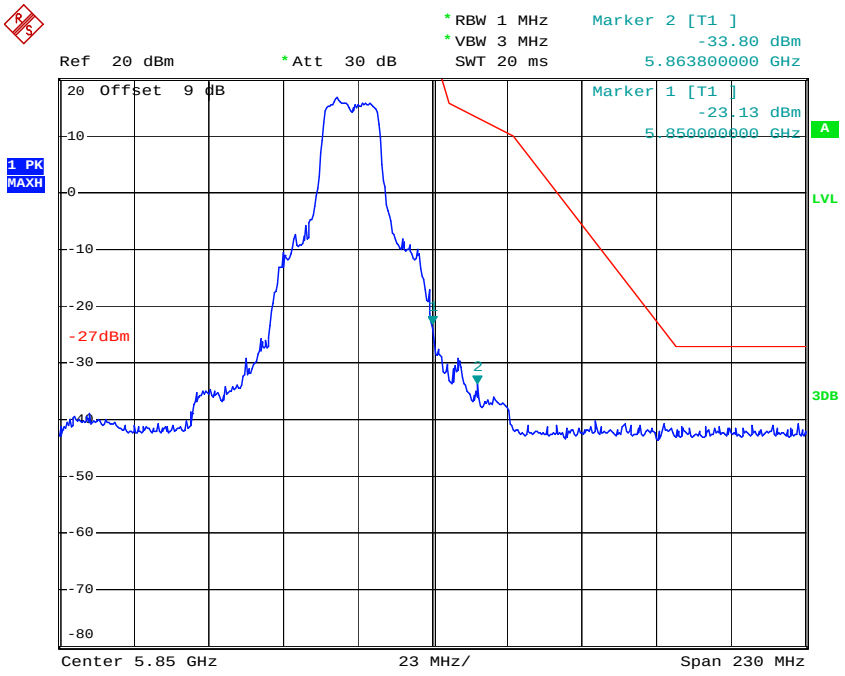
802.11n ht20,

Chain 0,Low Channel



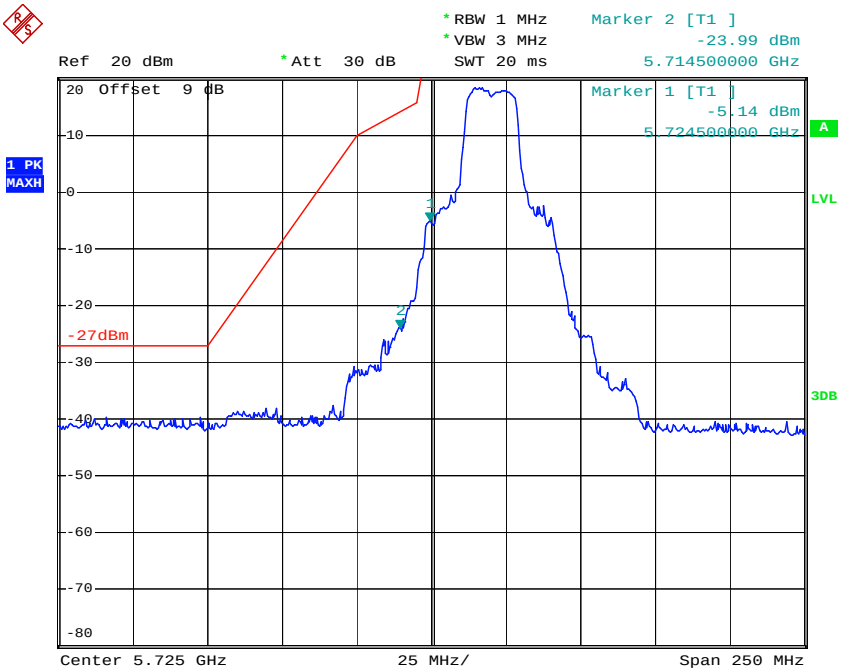
Date: 15.JAN.2018 10:15:12

Chain 0,High Channel



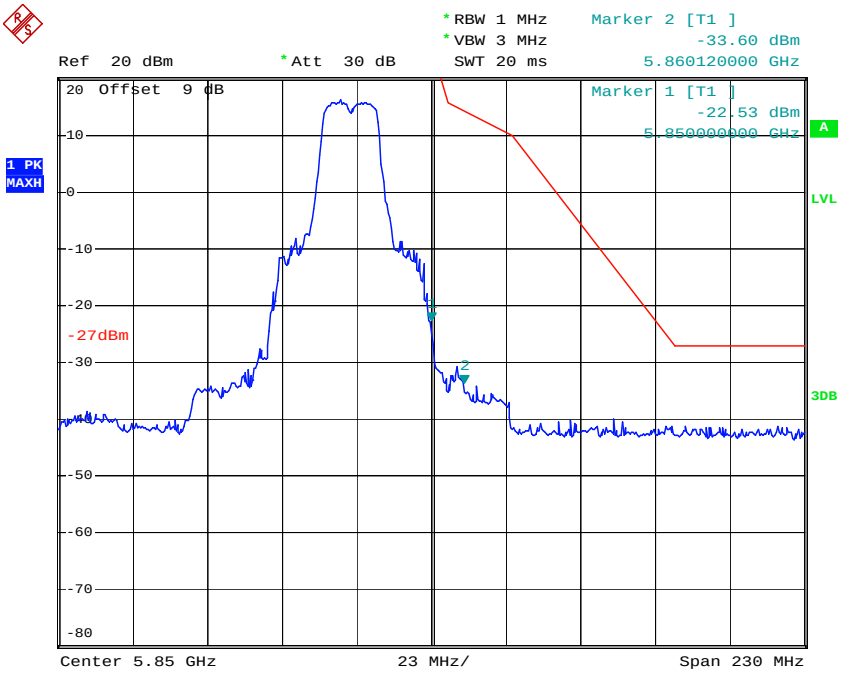
Date: 15.JAN.2018 10:18:07

Chain 1, Low Channel



Date: 15.JAN.2018 10:13:38

Chain 1,High Channel



Date: 15.JAN.2018 10:11:54

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

Applicable Standard

15.407(a) (e)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	22.4~22.8°C
Relative Humidity:	37~40 %
ATM Pressure:	101.5~102kPa

The testing was performed by Nami Quan from 2018-01-09 to 2018-02-02.

Test Result: Pass.

Please refer to the following tables and plots.

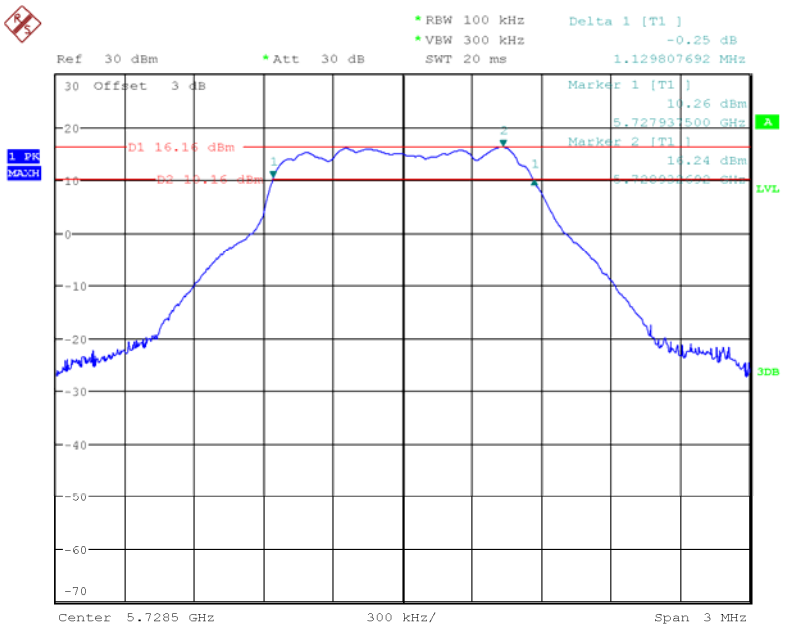
Test mode: Transmitting (Test only performed at main chain in SISO mode)

Mode	Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
1.4M	Low	5728.5	1.13	1.13
	Middle	5786.5	1.12	1.13
	High	5846.5	1.13	1.13
10M	Low	5730.5	9.04	8.94
	Middle	5787.5	9.07	8.94
	High	5844.5	9.04	8.94
802.11 a	Low	5745	16.08	17.44
	Middle	5785	16.08	17.52
	High	5825	16.08	17.04
802.11n ht20	Low	5745	15.84	19.52
	Middle	5785	16.56	18.56
	High	5825	16.96	18.16

Note: For 5725-5850MHz band, the 99% Occupied Bandwidth have not fall into the band 5470-5725MHz.

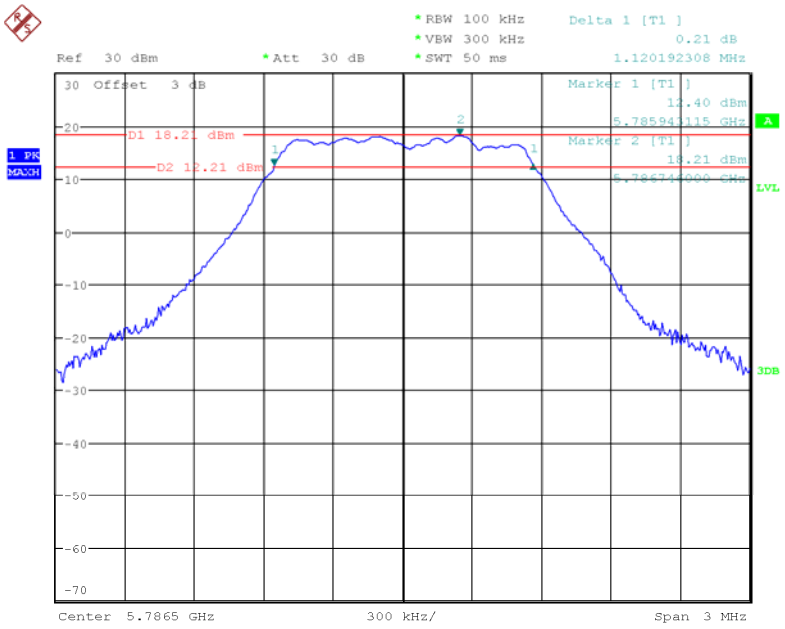
6dB Minimum Emission Bandwidth:

1.4M Low Channel



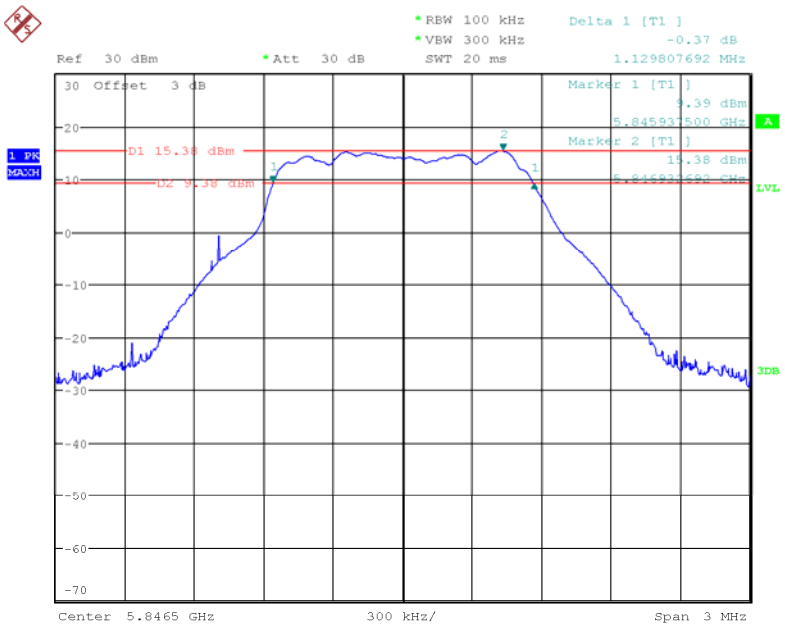
Date: 9.JAN.2018 08:42:59

1.4M Middle Channel



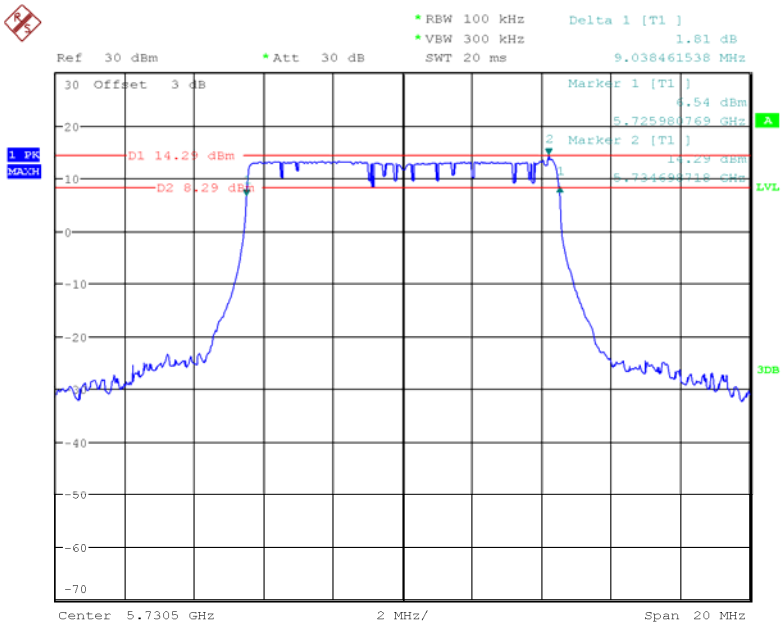
Date: 2.FEB.2018 17:21:18

1.4M High Channel



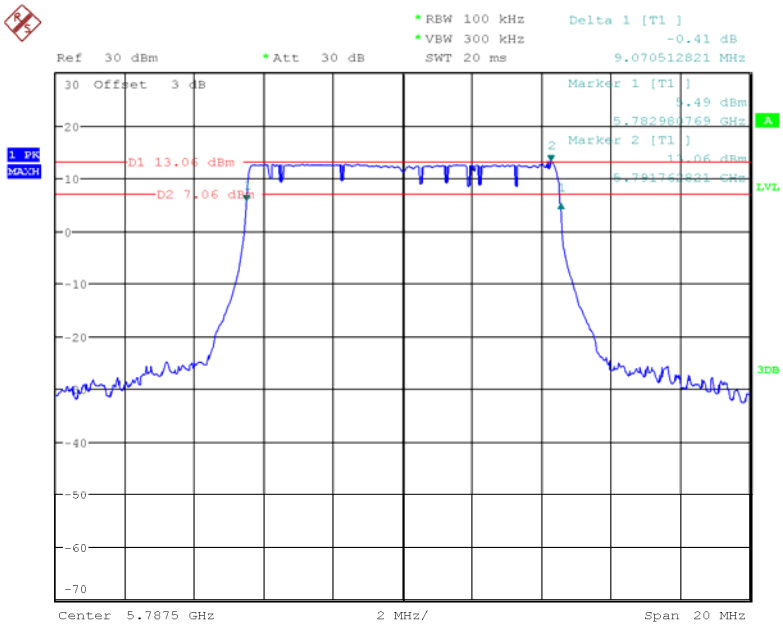
Date: 9.JAN.2018 08:44:39

10M Low Channel



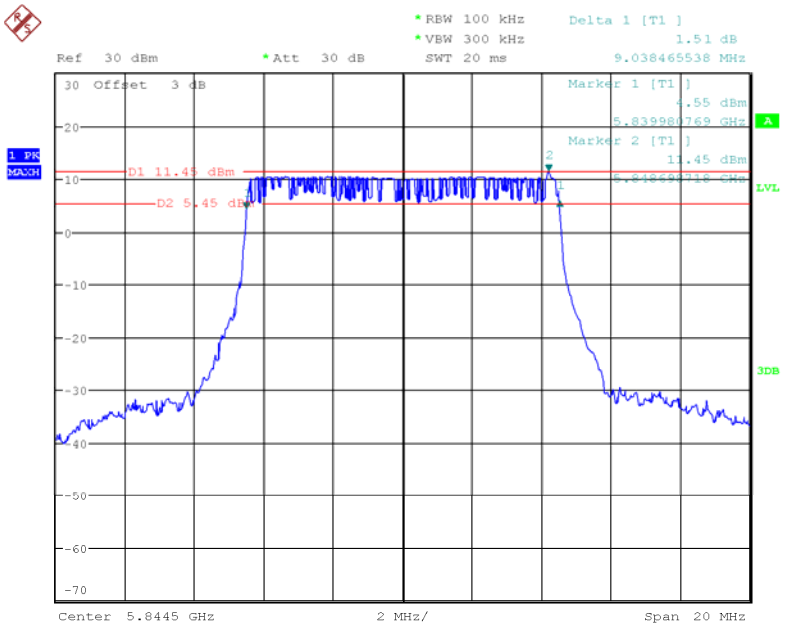
Date: 9.JAN.2018 09:00:47

10M Middle Channel



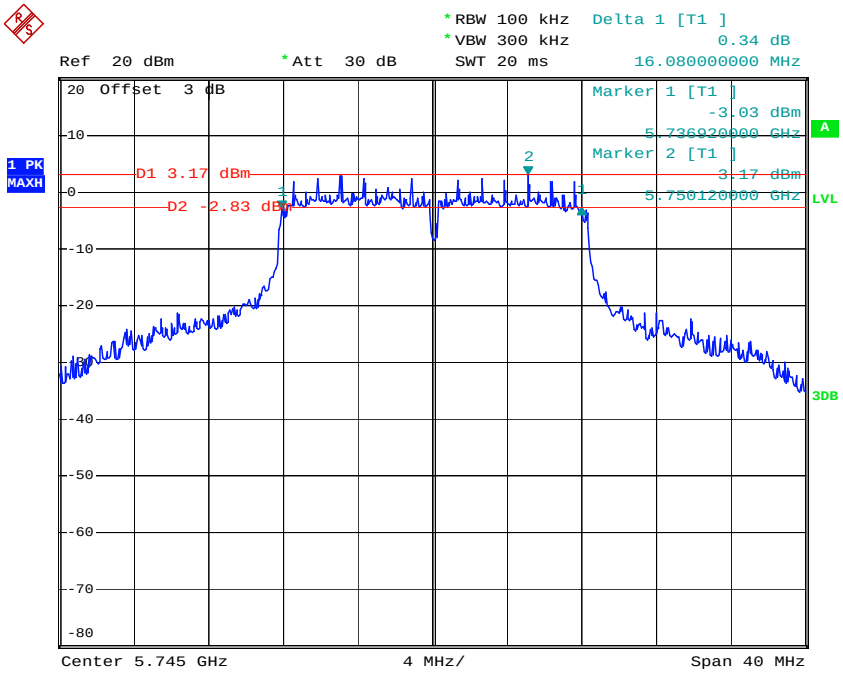
Date: 9.JAN.2018 09:02:07

10M High Channel



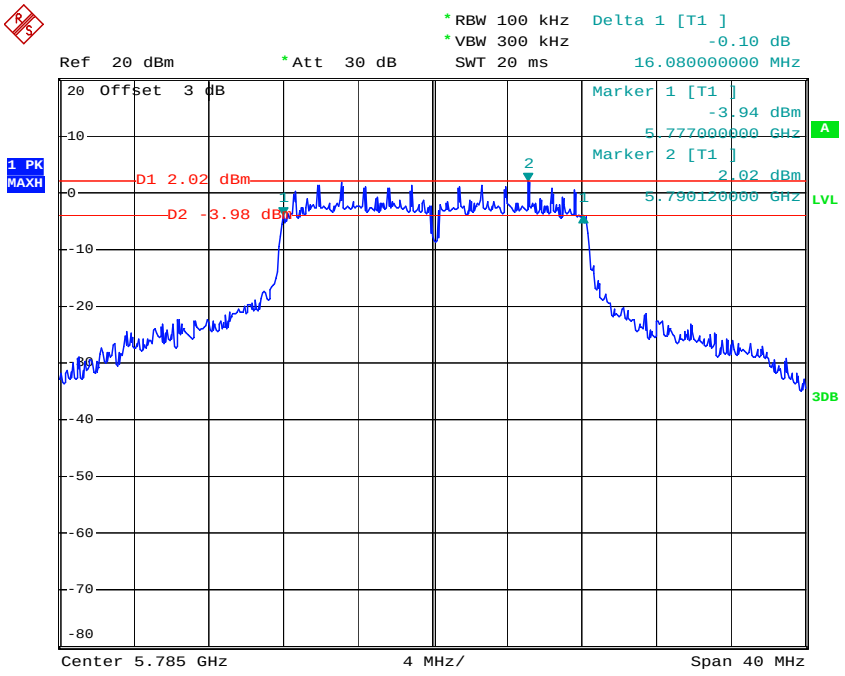
Date: 9.JAN.2018 09:03:22

802.11a Low Channel



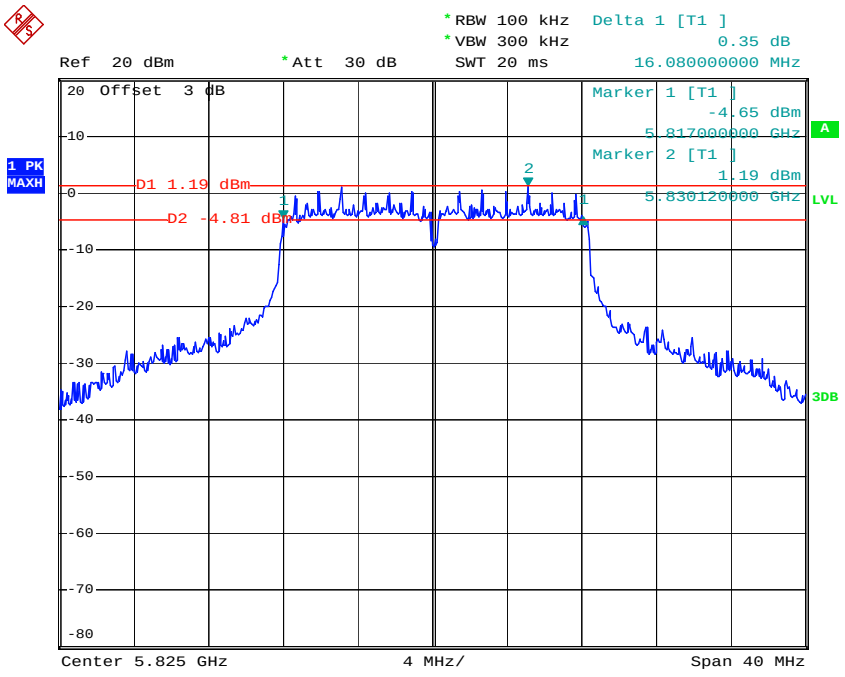
Date: 15.JAN.2018 09:34:24

802.11a Middle Channel



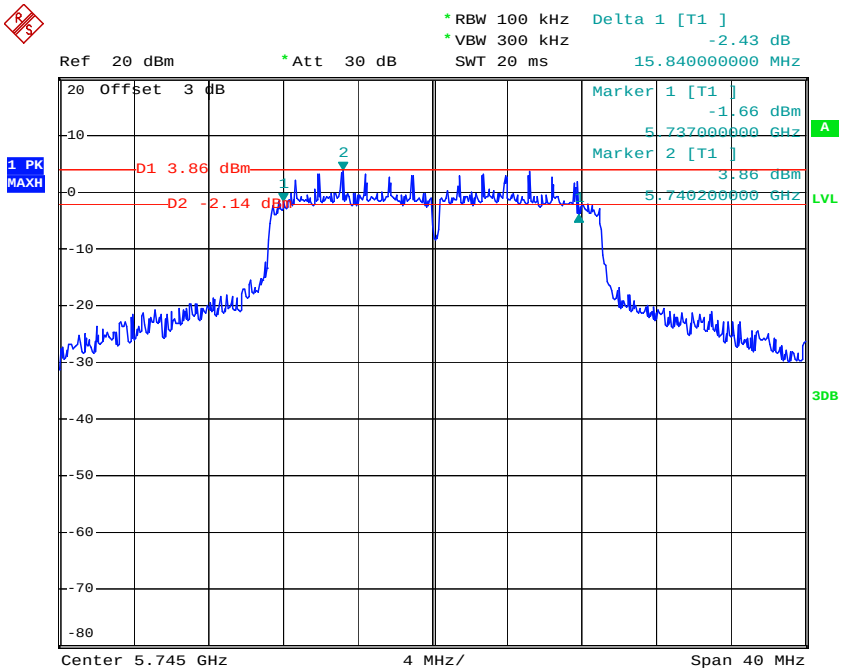
Date: 15.JAN.2018 09:45:37

802.11a High Channel



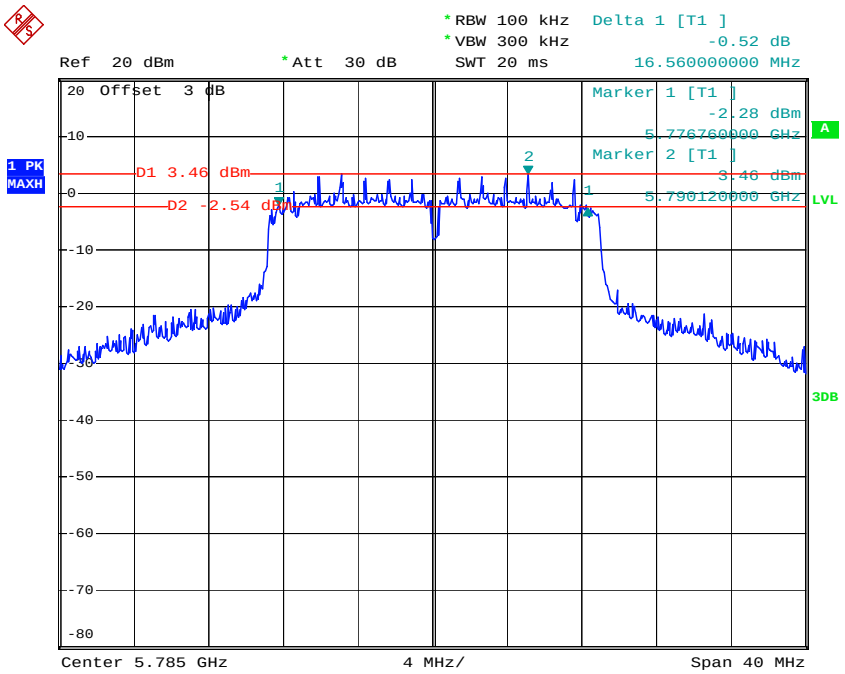
Date: 15.JAN.2018 09:48:08

802.11n ht20 Low Channel



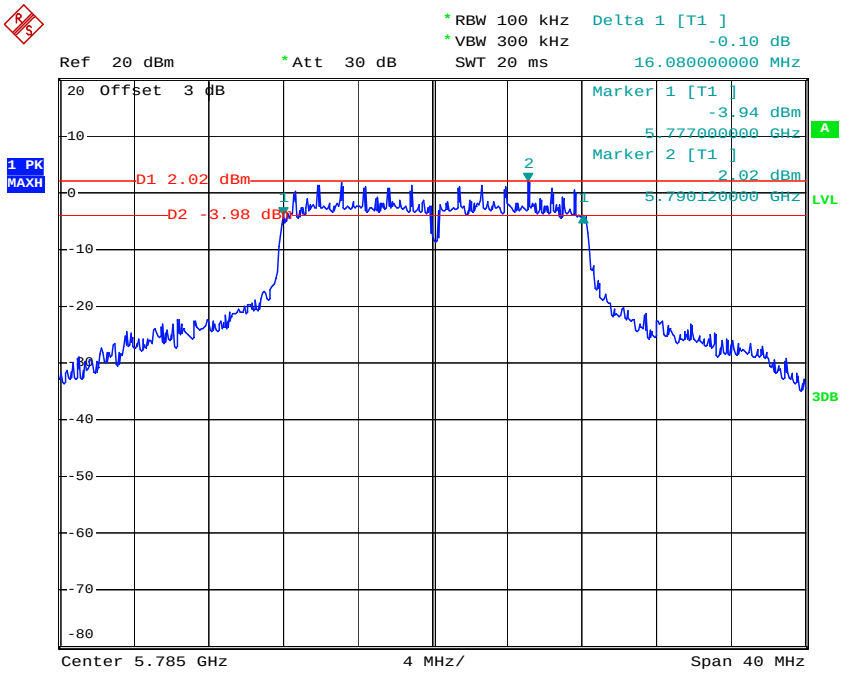
Date: 15.JAN.2018 10:14:19

802.11n ht20 Middle Channel



Date: 15.JAN.2018 10:15:59

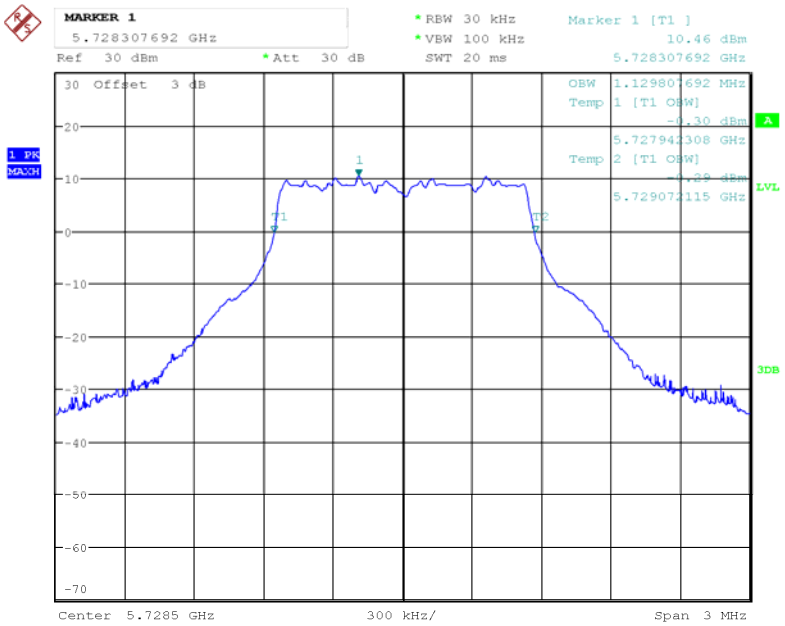
802.11n ht20 High Channel



Date: 15.JAN.2018 09:45:37

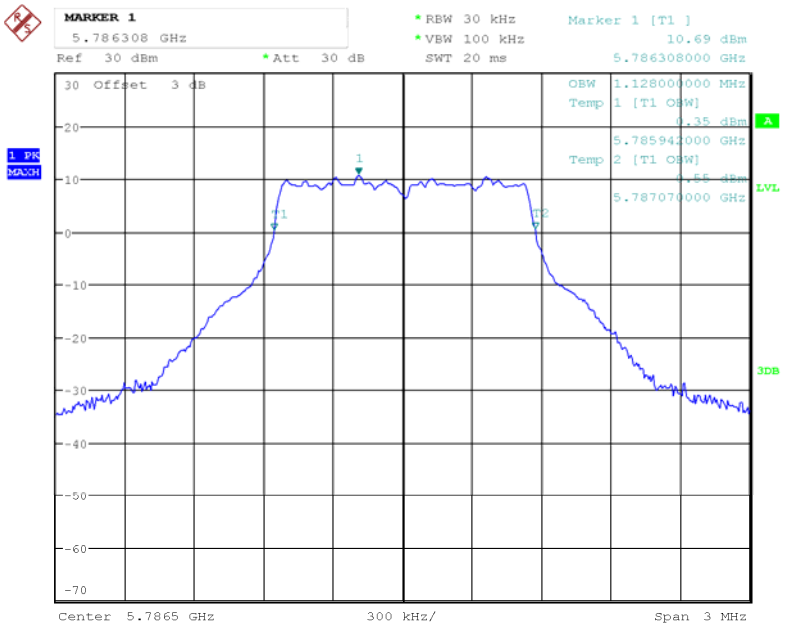
99% Occupied Bandwidth:

1.4M Low Channel



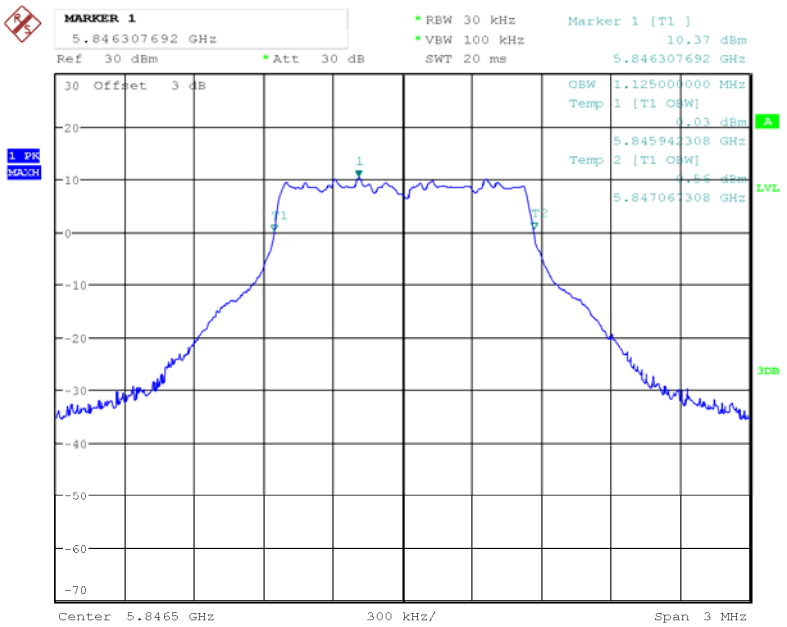
Date: 9.JAN.2018 08:48:54

1.4M Middle Channel



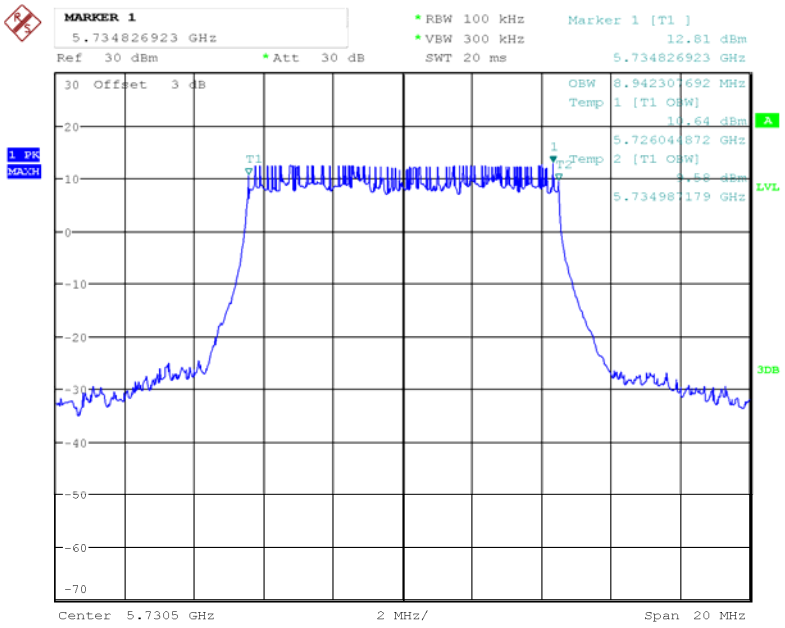
Date: 2.FEB.2018 17:58:14

1.4M High Channel



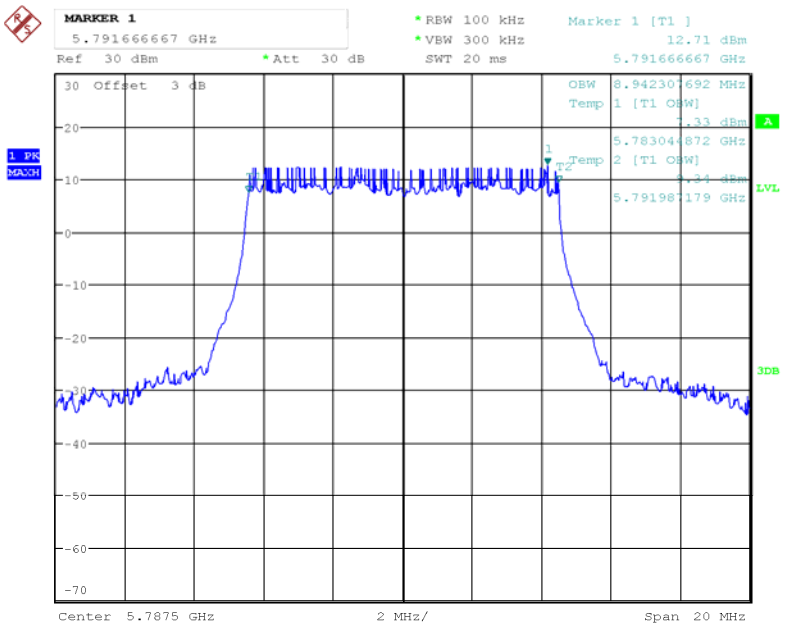
Date: 9.JAN.2018 08:49:56

10M Low Channel



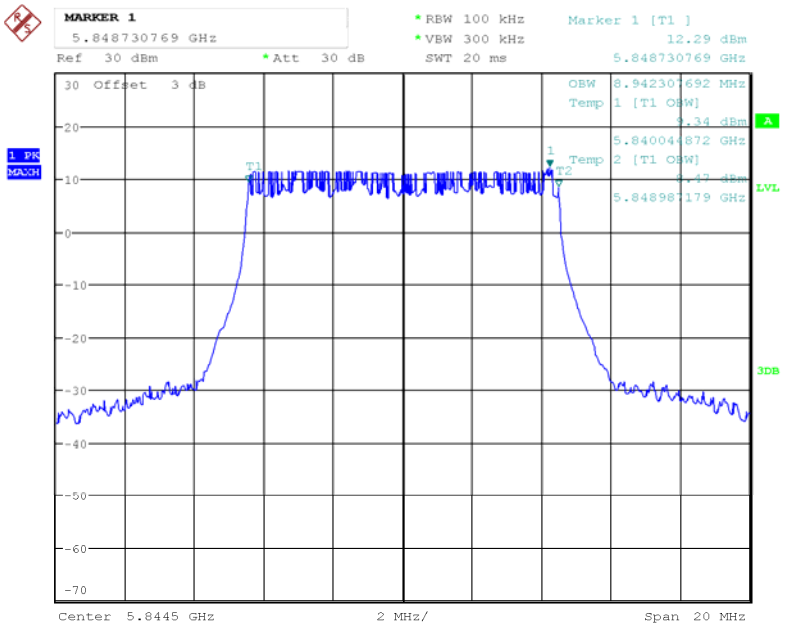
Date: 9.JAN.2018 09:10:00

10M Middle Channel



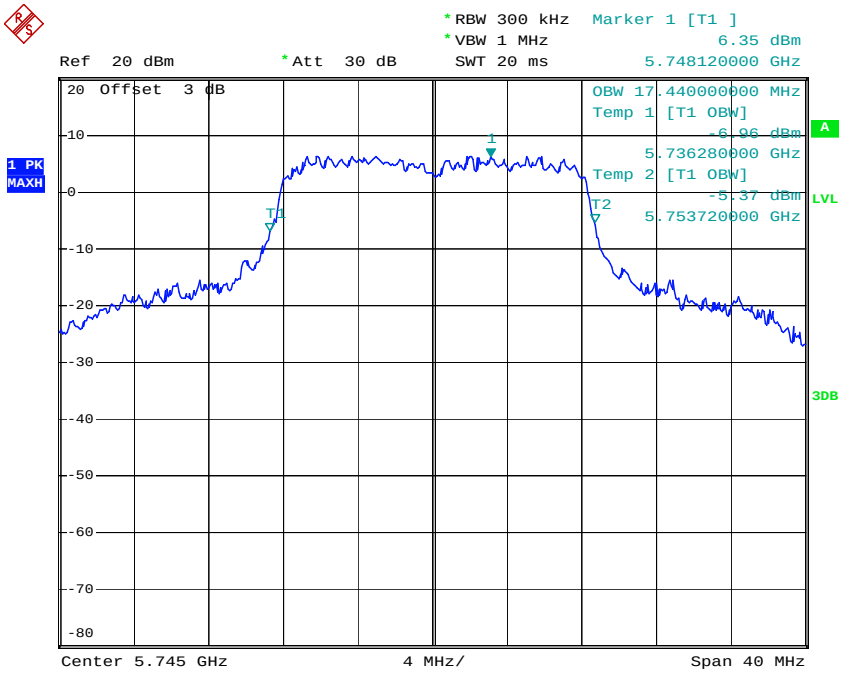
Date: 9.JAN.2018 09:09:42

10M High Channel



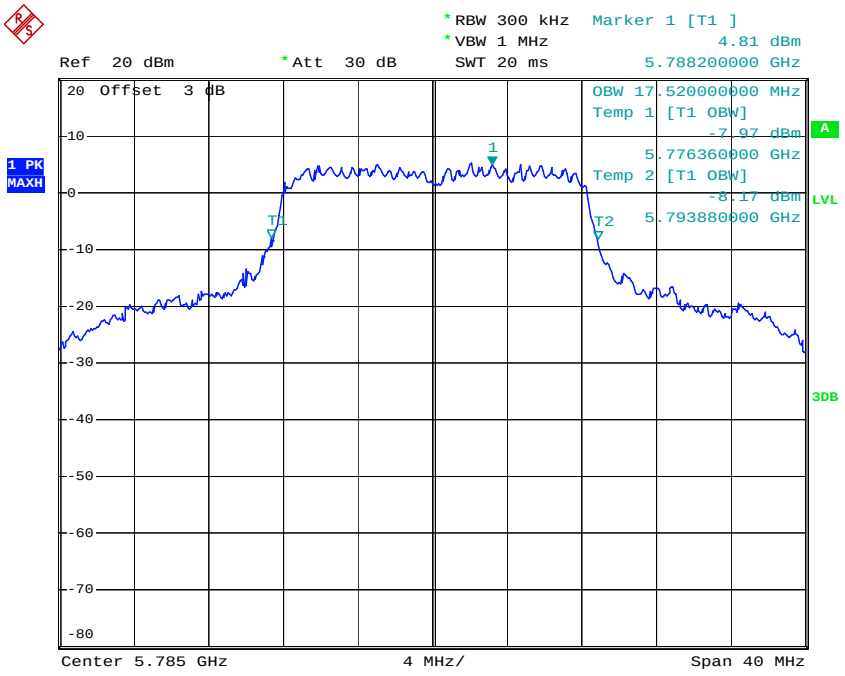
Date: 9.JAN.2018 09:09:20

802.11a Low Channel



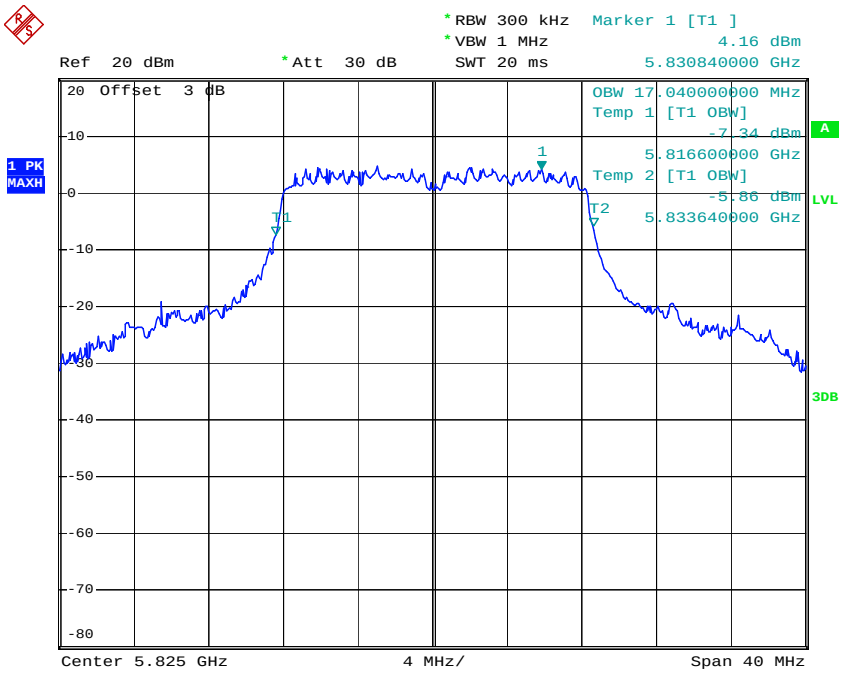
Date: 15.JAN.2018 09:34:36

802.11a Middle Channel



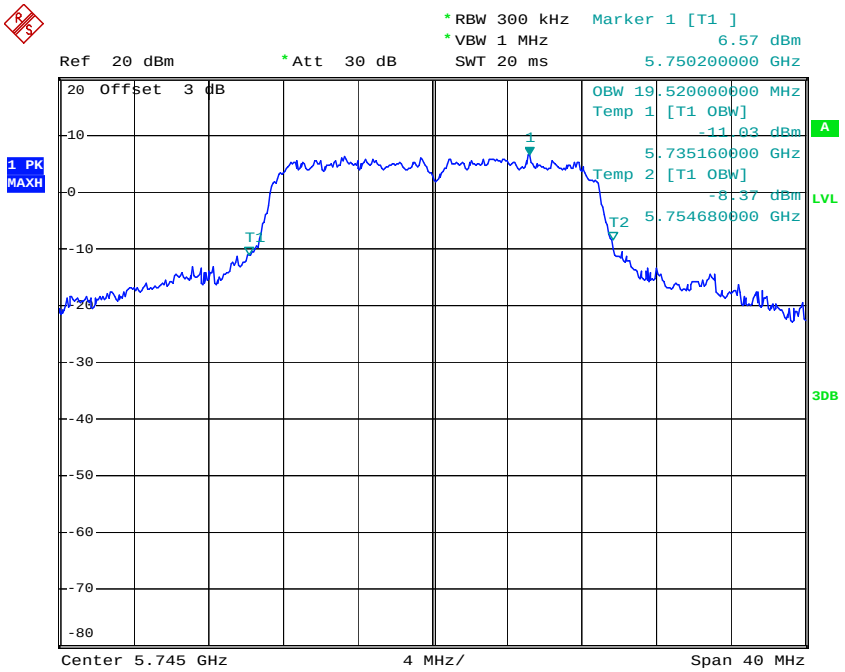
Date: 15.JAN.2018 09:45:49

802.11a High Channel



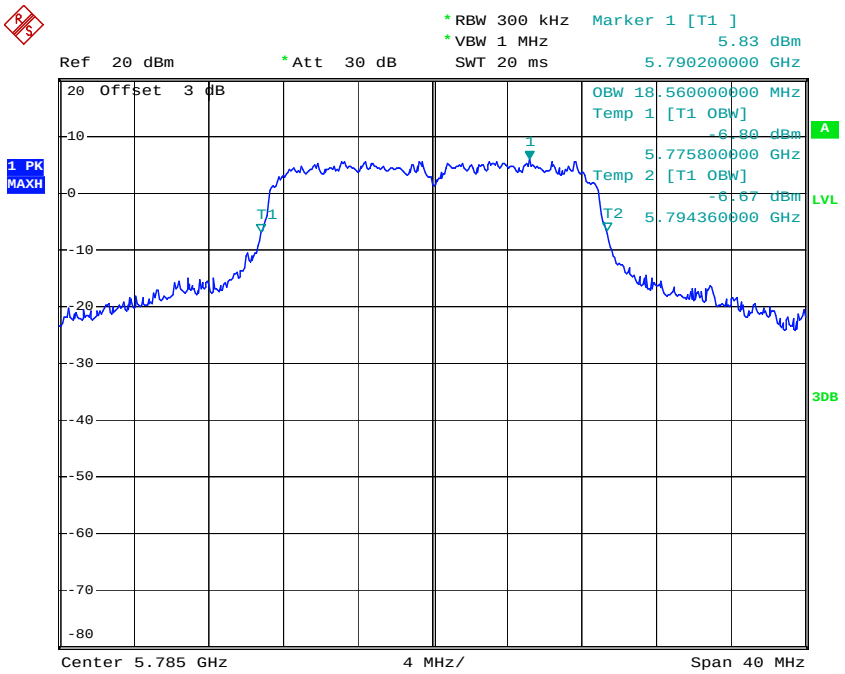
Date: 15.JAN.2018 09:48:21

802.11ht20 Low Channel



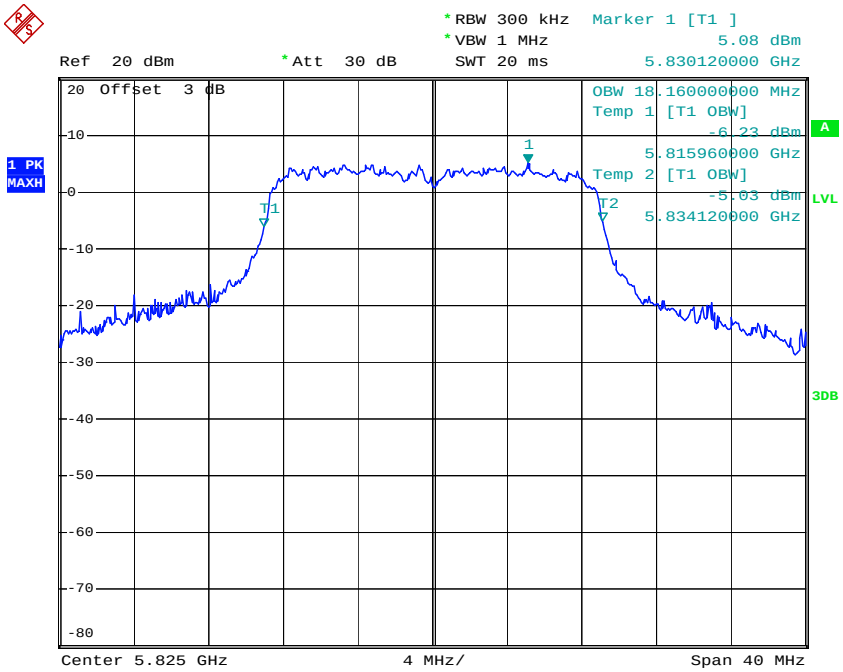
Date: 15.JAN.2018 10:14:33

802.11ht20 Middle Channel



Date: 15.JAN.2018 10:16:12

802.11ht20 High Channel



Date: 15.JAN.2018 10:17:21

FCC §15.407(g)–FREQUENCY STABILITY

Applicable Standard

FCC §15.407(g)

(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 ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices".

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/
UNI-T	Multimeter	UT39A	M130199938	2017-05-09	2018-05-09
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-08-28	2018-08-28

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

Test Data

Environmental Conditions

Temperature:	25.4°C
Relative Humidity:	43%
ATM Pressure:	100.8kPa

The testing was performed by Nami Quan on 2018-01-08.

Test Mode: Transmitting(Test was performed at Chain 0)

Test Result: Pass.

1.4MHz:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{dc}	(MHz)	(MHz)	
0	7.6	5727.94	5847.06	f_L and f_H Within 5725-5850MHz range
10		5727.92	5847.07	
20		5727.94	5847.07	
30		5727.94	5847.07	
40		5727.93	5847.07	
25	6.4	5727.94	5847.08	
25	8.4	5727.95	5847.07	

10MHz:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{dc}	(MHz)	(MHz)	
0	7.6	5726.047	5848.987	f_L and f_H Within 5725-5850MHz range
10		5726.046	5848.987	
20		5726.045	5848.987	
30		5726.046	5848.987	
40		5726.046	5848.987	
25	6.4	5726.045	5848.988	
25	8.4	5726.045	5848.988	

802.11a:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{dc}	(MHz)	(MHz)	
0	7.6	5736.27	5833.64	f_L and f_H Within 5725-5850MHz range
10		5736.29	5833.65	
20		5736.28	5833.64	
30		5736.27	5833.64	
40		5736.28	5833.65	
25	6.4	5736.29	5833.63	
25	8.4	5736.29	5833.64	

802.11n ht20:

Temperature	Voltage	f_L at Low Test Channel	F_H at High Test Channel	Limit
℃	V_{dc}	(MHz)	(MHz)	
0	7.6	5735.16	5834.12	f_L and f_H Within 5725-5850MHz range
10		5735.16	5834.12	
20		5735.16	5834.12	
30		5735.16	5834.11	
40		5735.17	5834.12	
25	6.4	5735.15	5834.13	
25	8.4	5735.16	5834.12	

Note: the f_L and f_H determined by 99% Occupied 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	USB Wideband Power Sensor	U2022XA	MY5417006	2017-12-11	2018-12-11
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/

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

Test Procedure

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

Test Data

Environmental Conditions

Temperature:	25.4°C
Relative Humidity:	43%
ATM Pressure:	100.8kPa

The testing was performed by Nami Quan on 2018-01-08.

Test Mode: Transmitting

1.4MHz/10MHz Mode:

Mode	Frequency (MHz)	Maximum Conducted Average Output Power (dBm)		Limit (dBm)
		Chain 0	Chain 1	
1.4MHz	5728.5	19.01	18.64	30
	5786.5	19.4	18.71	30
	5846.5	17.79	17.21	30
10MHz	5730.5	19.28	19.1	30
	5787.5	19.3	18.72	30
	5844.5	18.59	17.88	30

802.11a/n ht20:

Mode	Frequency (MHz)	Maximum Conducted Average Output Power (dBm)			Limit (dBm)
		Chain 0	Chain 1	Total	
802.11 a	5745	12.84	12.53	15.7	30
	5785	12.9	12.58	15.75	30
	5825	12.66	12.37	15.53	30
802.11n ht20	5745	13.03	12.77	15.91	30
	5785	12.64	12.42	15.54	30
	5825	12.61	12.22	15.43	30

Note: the 2 antenna maximum atenna gains are 5.96 dBi, and employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:

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

So:

Directional gain = GANT + Array Gain = 5.96dBi < 6dBi

The power limit need reduce 0dB.

FCC §15.407(a) - POWER SPECTRAL DENSITY

Applicable Standard

(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output

power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
N/A	Coaxial Cable	C-SJ00-0010	C0010/04	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	22.4~22.8°C
Relative Humidity:	37~40 %
ATM Pressure:	101.5~102kPa

The testing was performed by Nami Quan from 2018-01-09 to 2018-02-02.

Test Result:Compliance.

Test Mode: Transmitting

Note: per output power test, the SISO mode was the worst,so only SISO mode was test for this item,and used to evaluate MIMO mode compliance.

1.4MHz/10MHz mode:

Mode	Frequency (MHz)	Reading (dBm/300kHz)		PSD (dBm/500kHz)		Limit (dBm/ 500kHz)
		Chain 0	Chain 1	Chain 0	Chain 1	
1.4MHz	5728.5	14.28	14.6	16.5	16.82	30.0
	5786.5	14.98	14.76	17.2	16.98	30.0
	5846.5	13.47	13.52	15.69	15.74	30.0
10MHz	5730.5	9.25	9.64	11.47	11.86	30.0
	5787.5	9.56	9.07	11.78	11.29	30.0
	5844.5	8.72	8.19	10.94	10.41	30.0

802.11a/n ht20 mode:

Mode	Frequency (MHz)	Reading (dBm/300kHz)		Total (dBm/ 500kHz)	Limit (dBm/ 500kHz)
		Chain 0	Chain 1		
802.11 a	5745	0.33	-0.16	5.32	27.04
	5785	-2.04	-1.57	3.43	27.04
	5825	-2.57	-1.24	3.37	27.04
802.11n ht20	5745	0.66	1.59	6.38	27.04
	5785	0.37	-0.46	5.2	27.04
	5825	-1.22	-0.58	4.34	27.04

Note 1: According to KDB789033 D02 General U-NII Test Procedures New Rules v02r01, the test value for 5725-5850 MHz should add 10*log(500kHz/RBW) to the measured result.

Note 2: Note: the 2 antenna maximum atenna gain are 5.96dBi, and employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

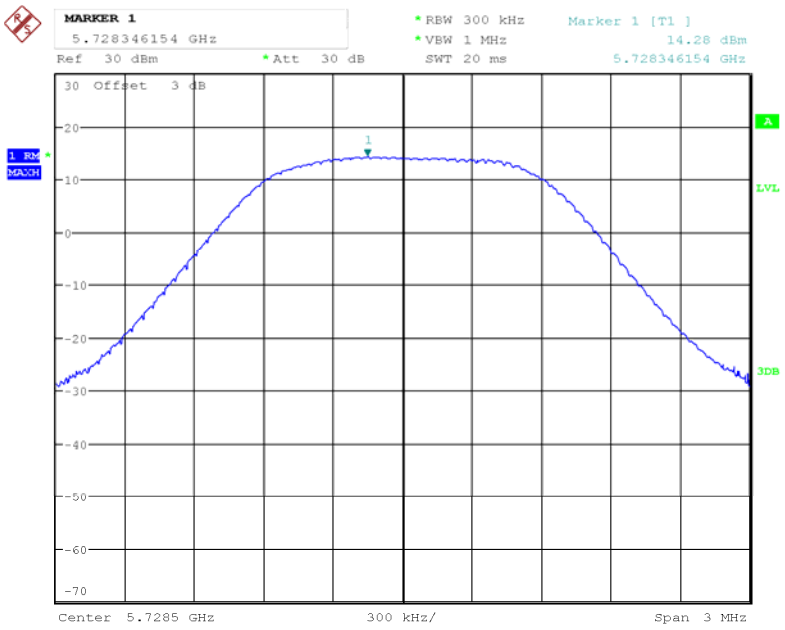
Array Gain = 10 log(NANT/NSS) dB.

So:

Directional gain = GANT + Array Gain = 5.96+10*log(2) =8.96 dBi

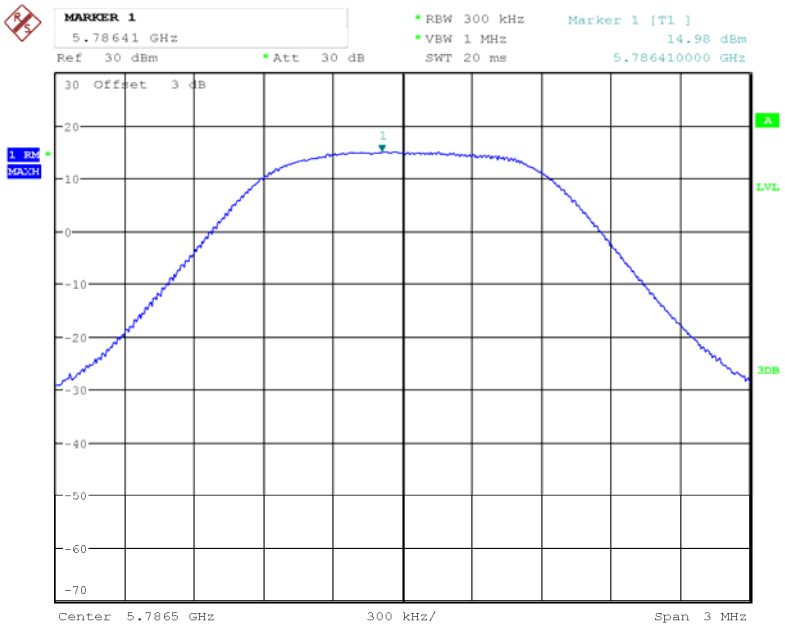
1.4MHz

Chain 0,Low Channel



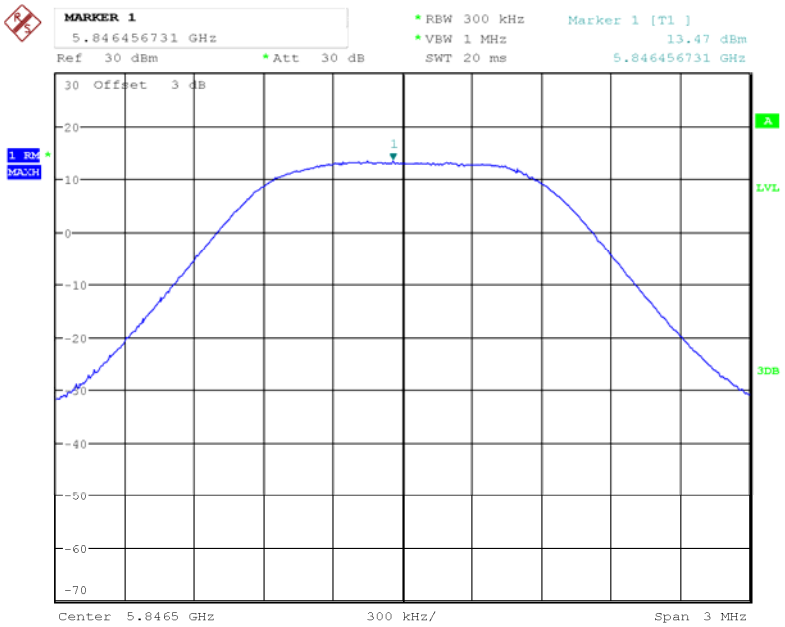
Date: 9.JAN.2018 09:34:22

Chain 0,Middle Channel



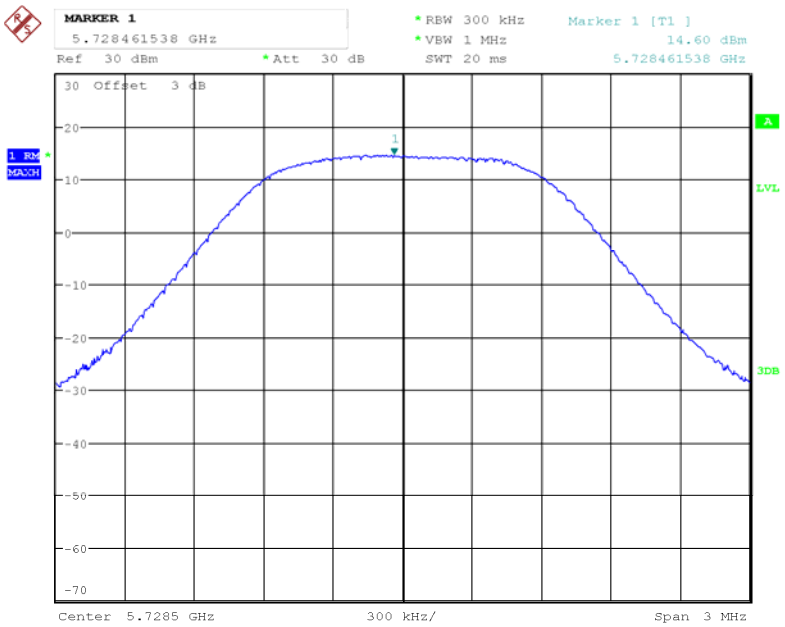
Date: 2.FEB.2018 17:44:47

Chain 0,High Channel



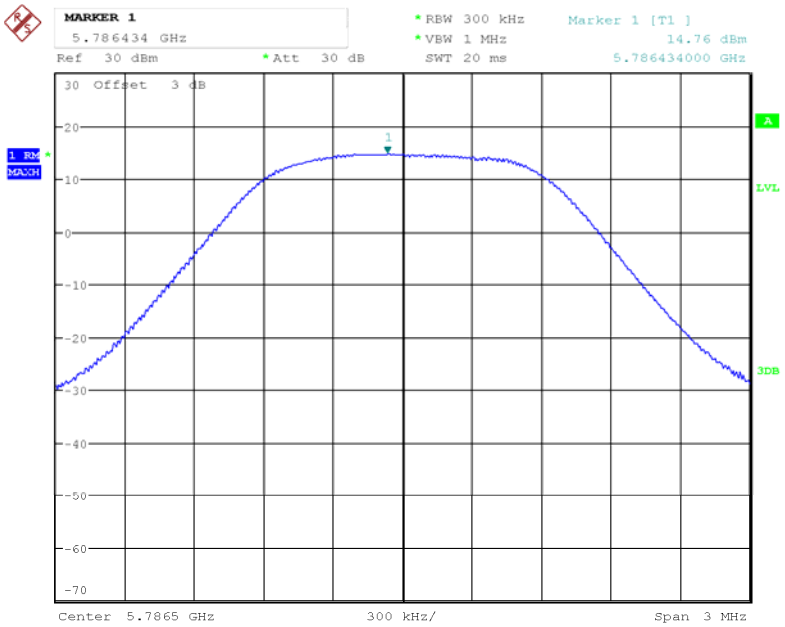
Date: 9.JAN.2018 09:34:55

Chain 1,Low Channel

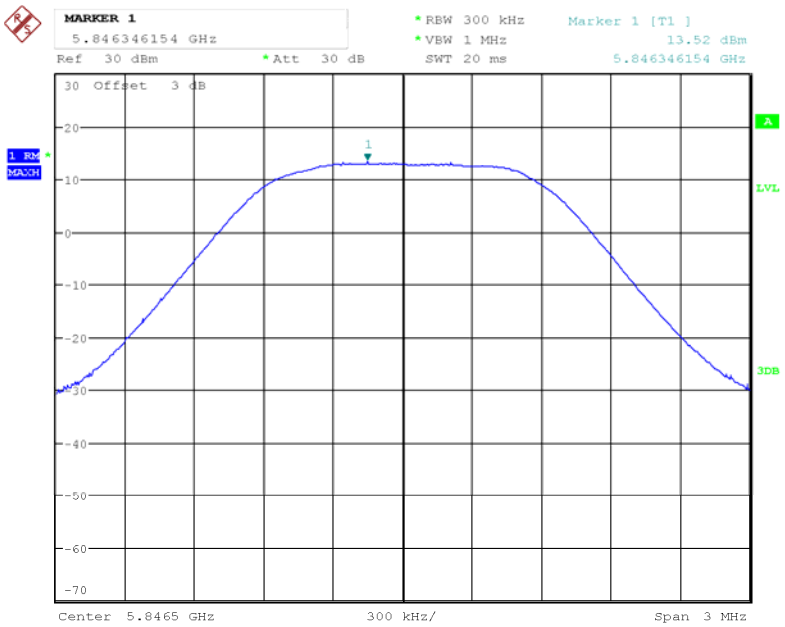


Date: 9.JAN.2018 09:35:56

Chain 1,Middle Channel

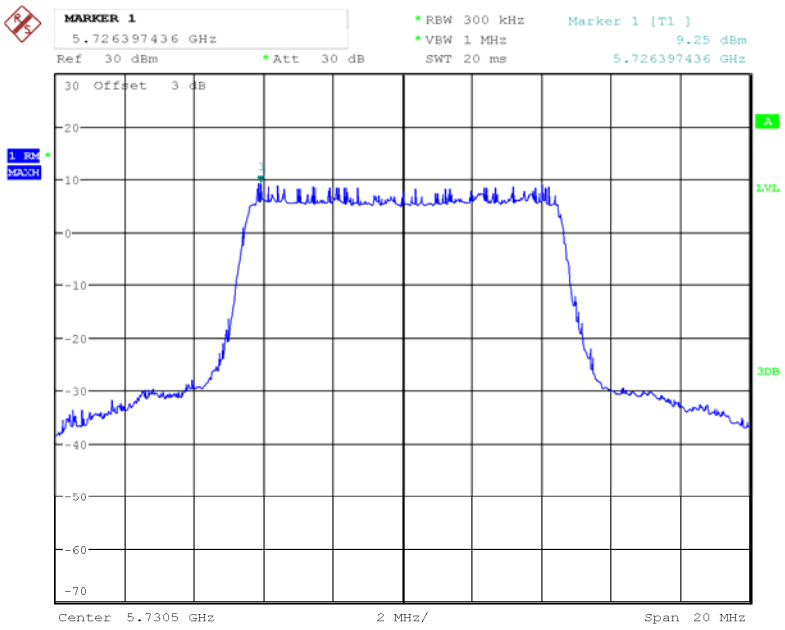


Chain 1,High Channel



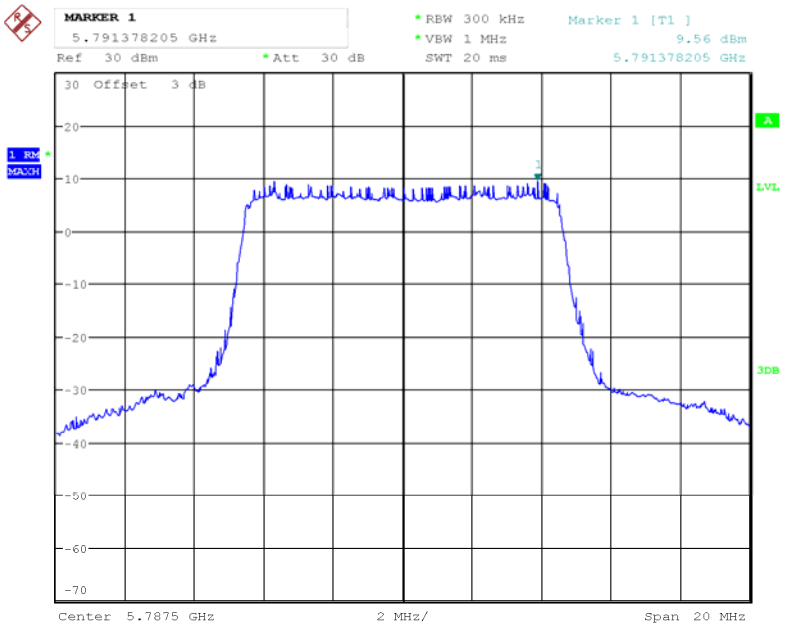
10MHz

Chain 0,Low Channel



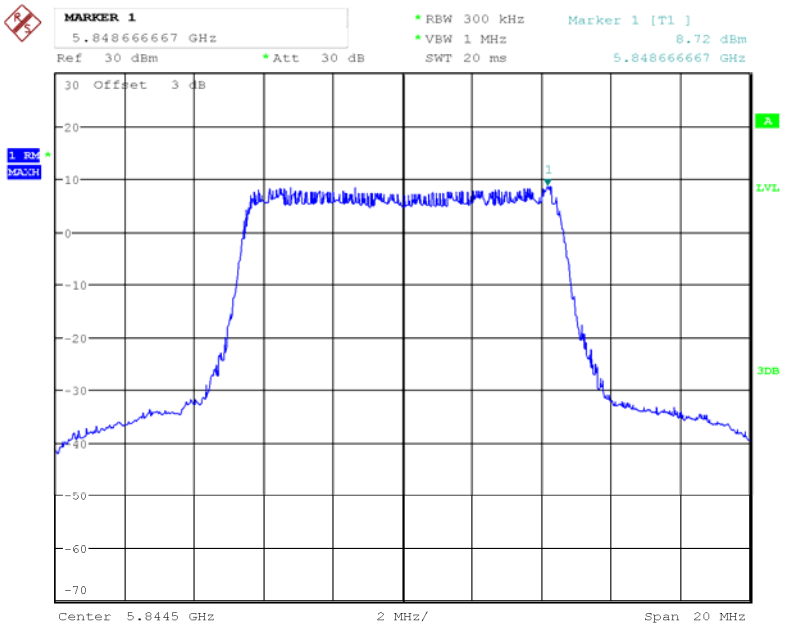
Date: 9.JAN.2018 09:40:40

Chain 0,Middle Channel



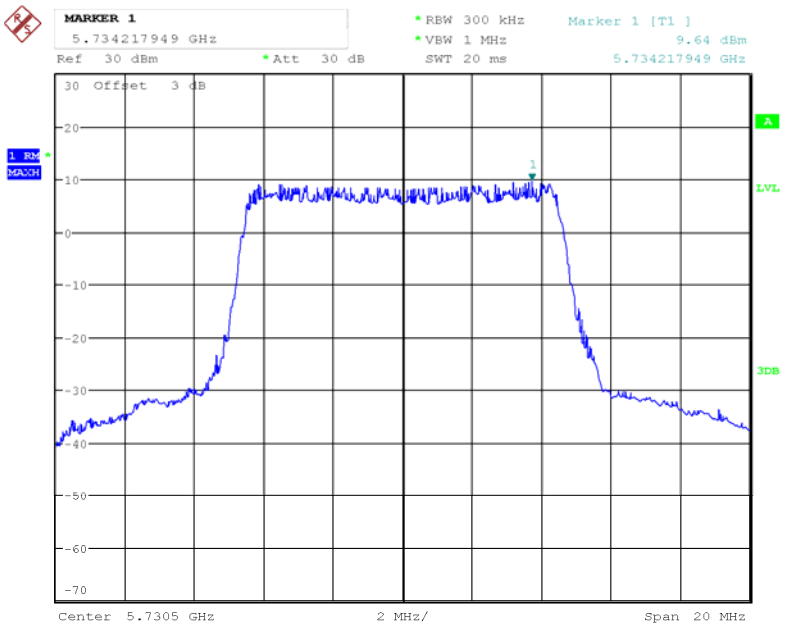
Date: 9.JAN.2018 09:40:25

Chain 0,High Channel



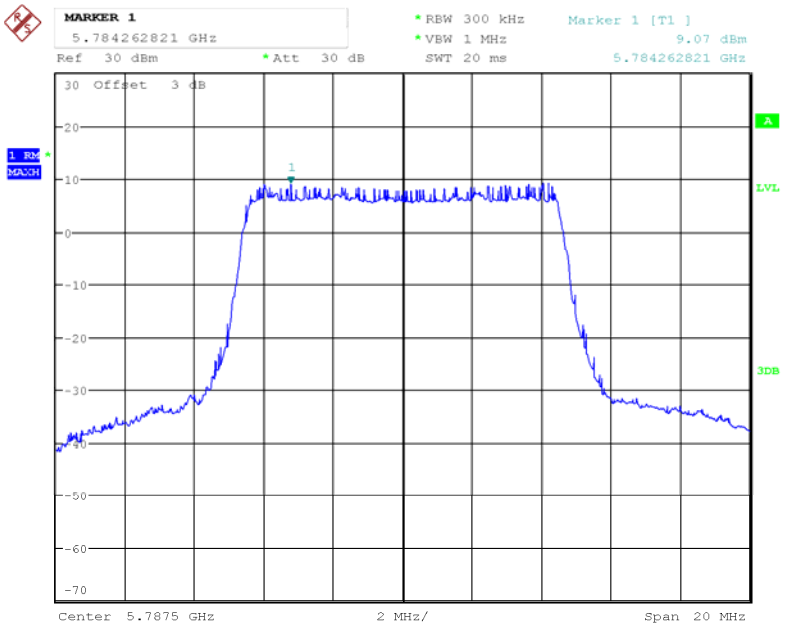
Date: 9.JAN.2018 09:40:05

Chain 1,Low Channel



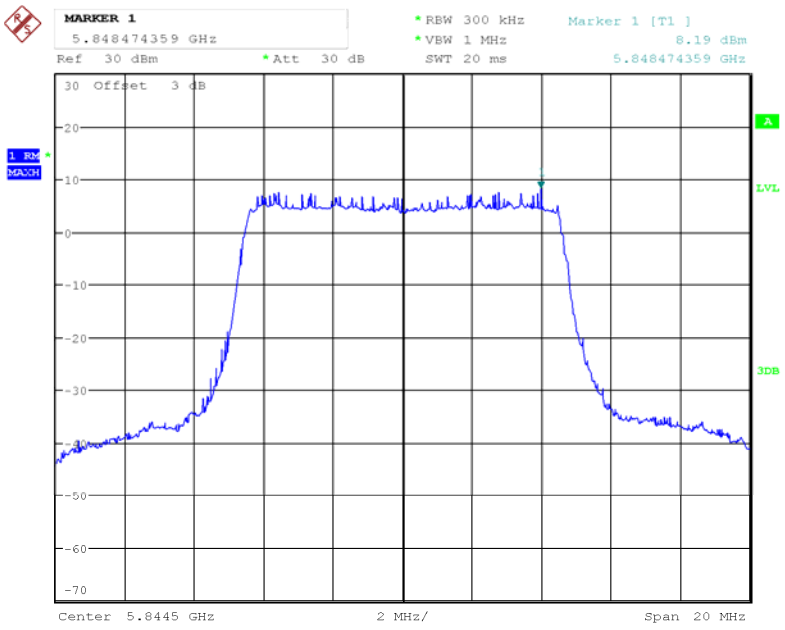
Date: 9.JAN.2018 09:38:53

Chain 1,Middle Channel



Date: 9.JAN.2018 09:43:03

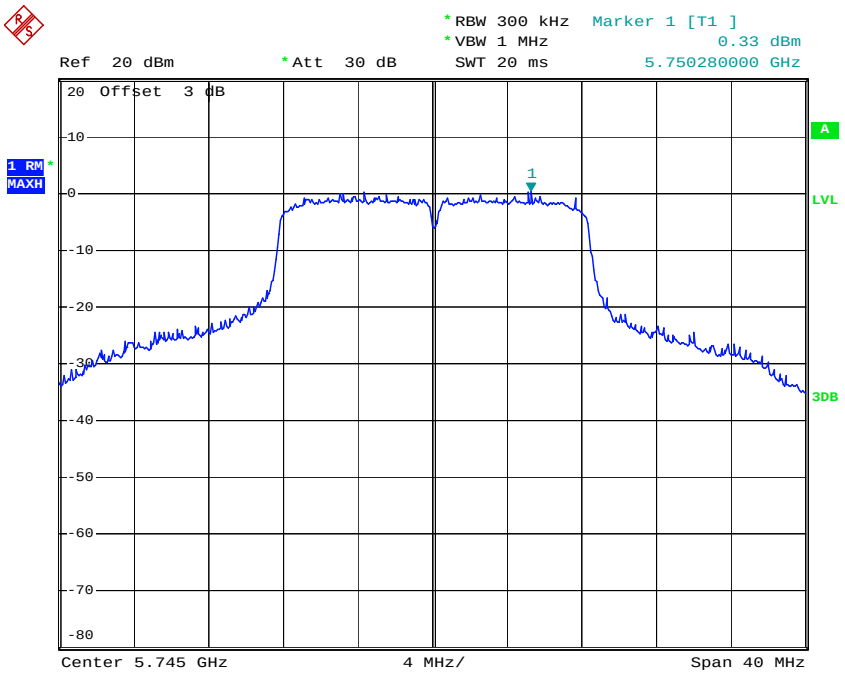
Chain 1,High Channel



Date: 9.JAN.2018 09:39:25

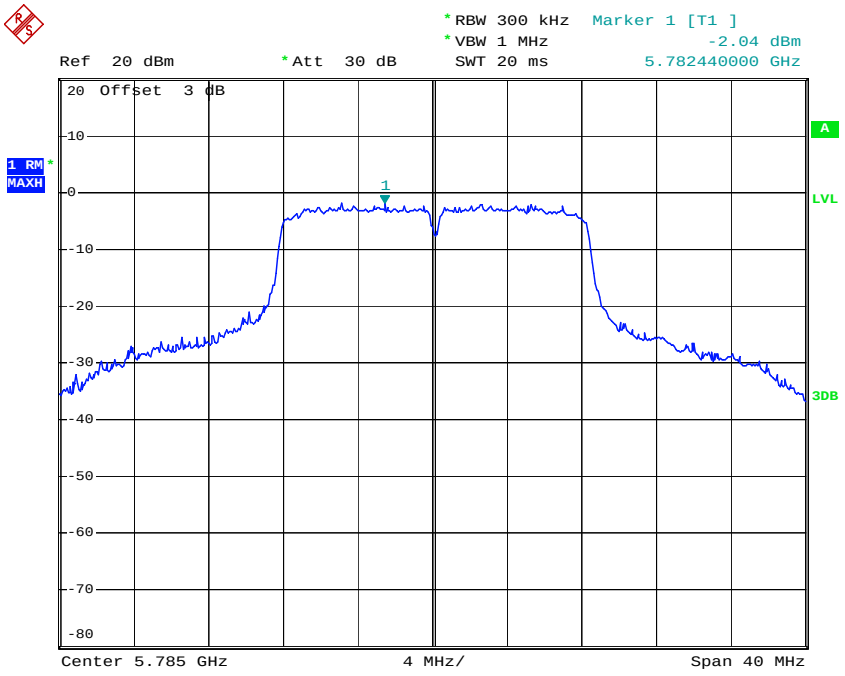
802.11a,

Chain 0,Low Channel



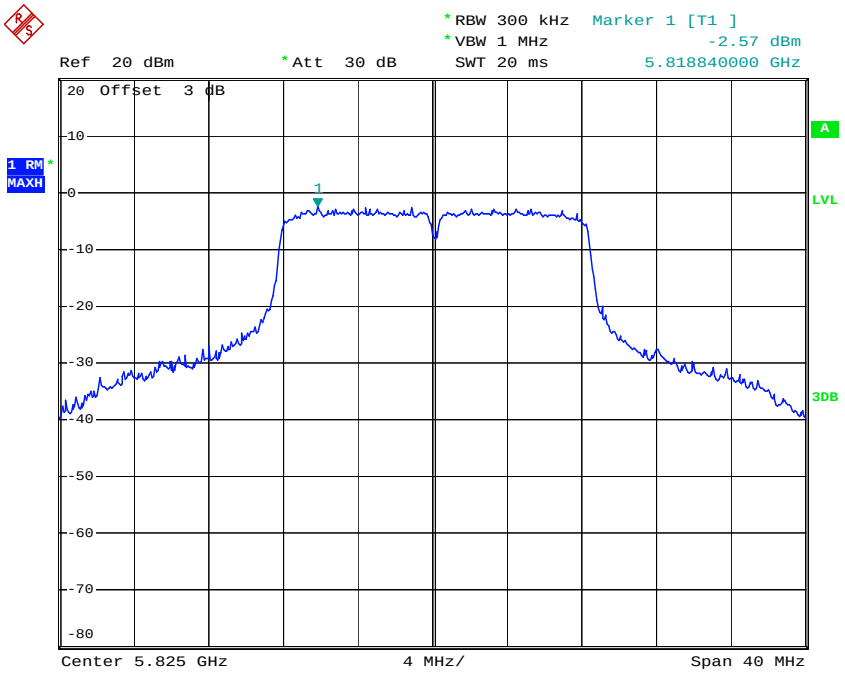
Date: 15.JAN.2018 09:34:58

Chain 0,Middle Channel



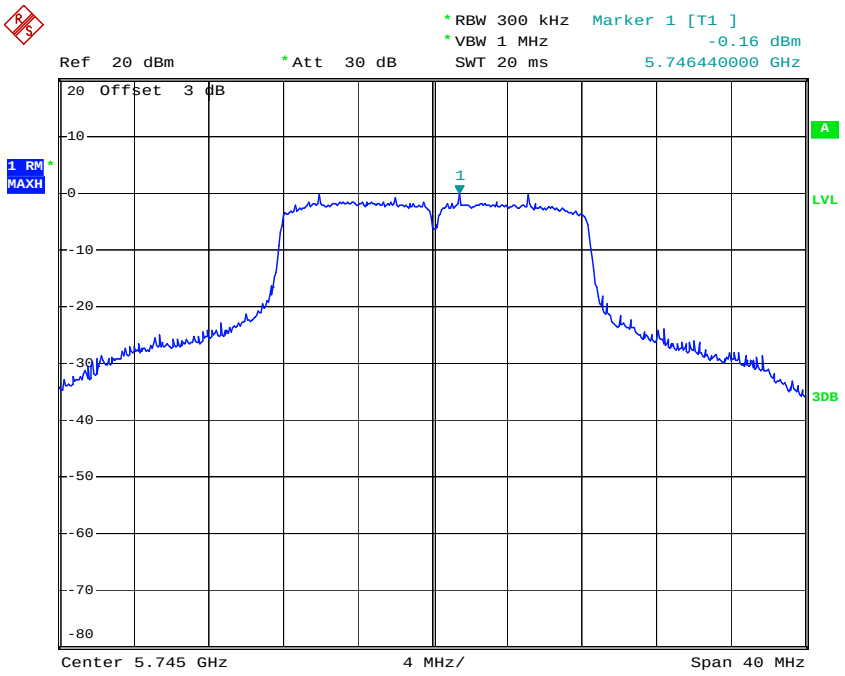
Date: 15.JAN.2018 09:46:11

Chain 0,High Channel



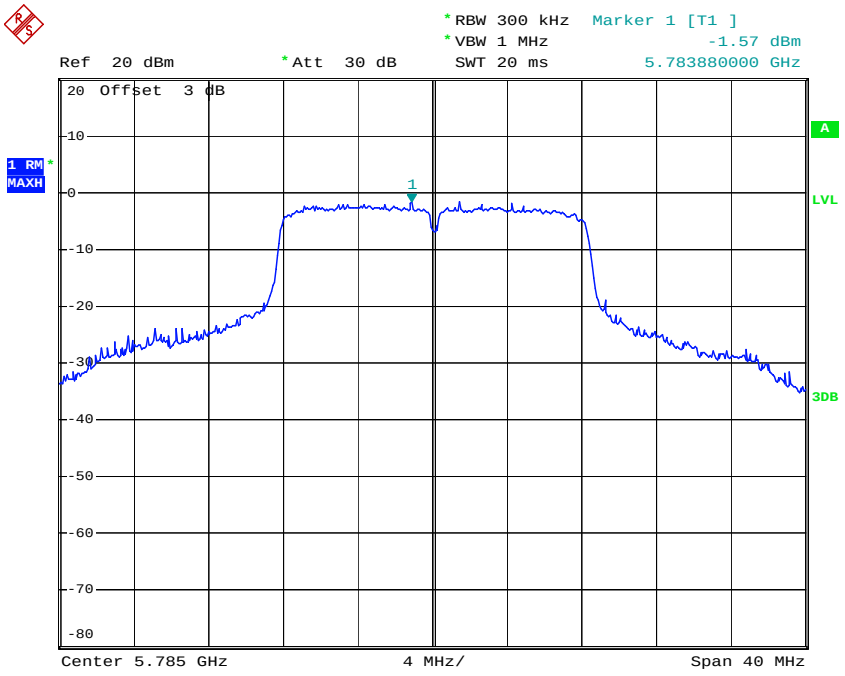
Date: 15.JAN.2018 09:48:49

Chain 1,Low Channel



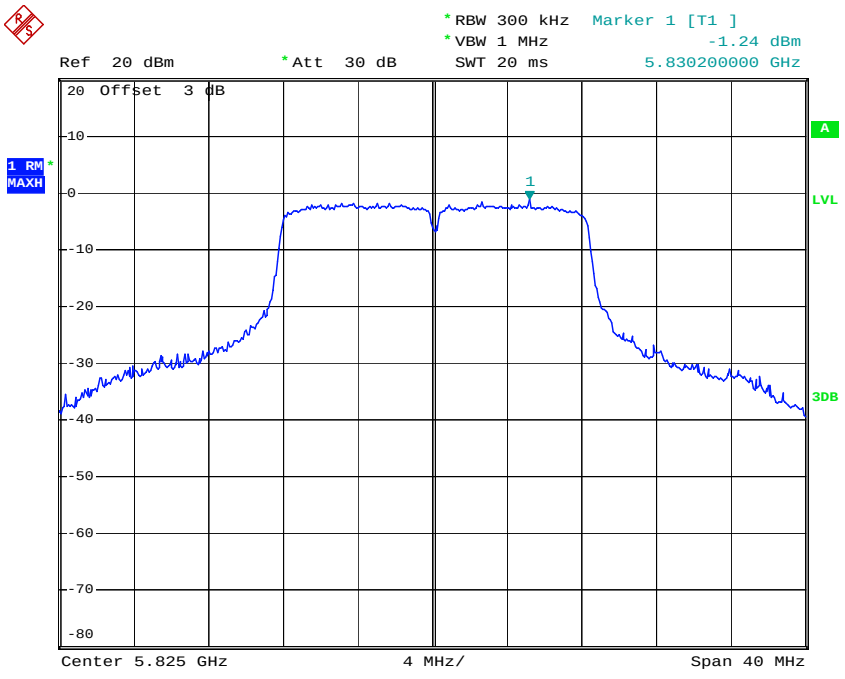
Date: 15.JAN.2018 09:39:52

Chain 1,Middle Channel



Date: 15.JAN.2018 09:43:51

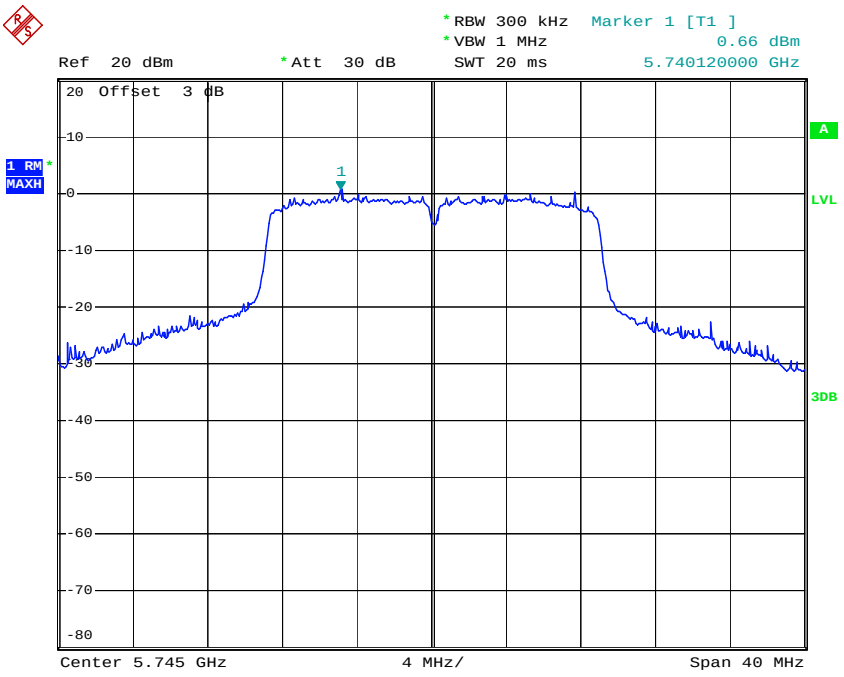
Chain 1,High Channel



Date: 15.JAN.2018 09:51:00

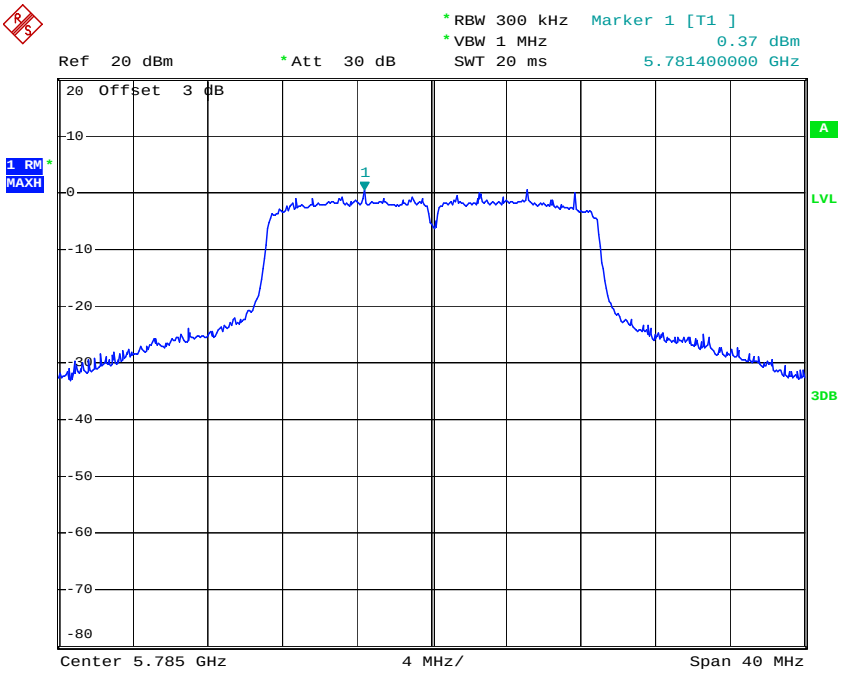
802.11n ht20

Chain 0,Low Channel



Date: 15.JAN.2018 10:14:54

Chain 0,Middle Channel



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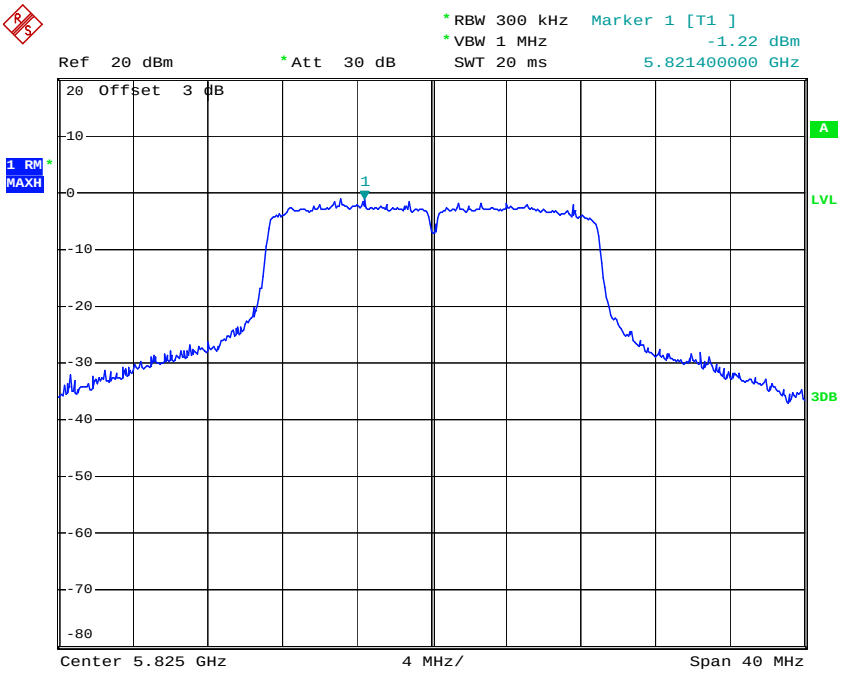
Chain 0,High Channel



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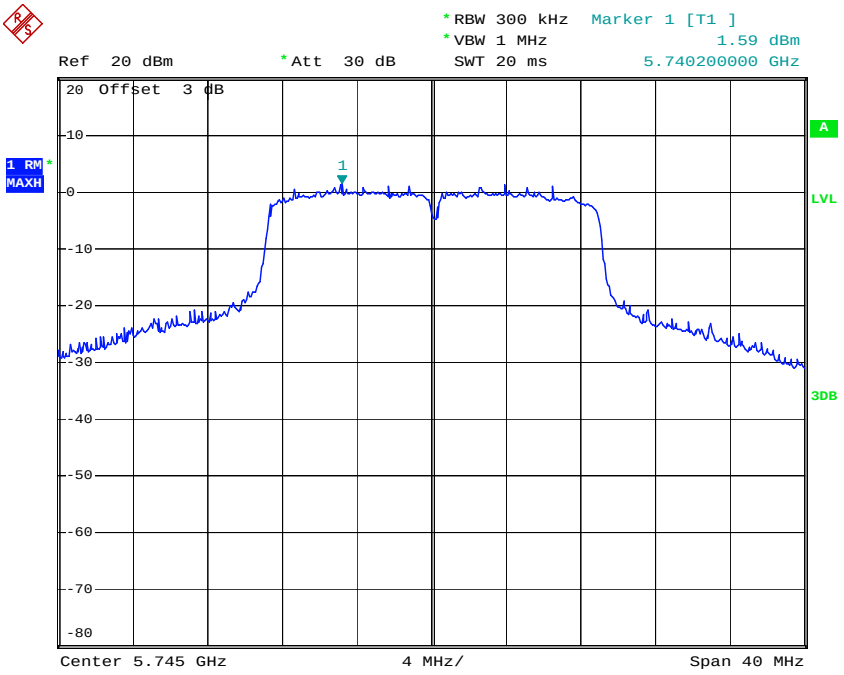
Chain 1,Low Channel



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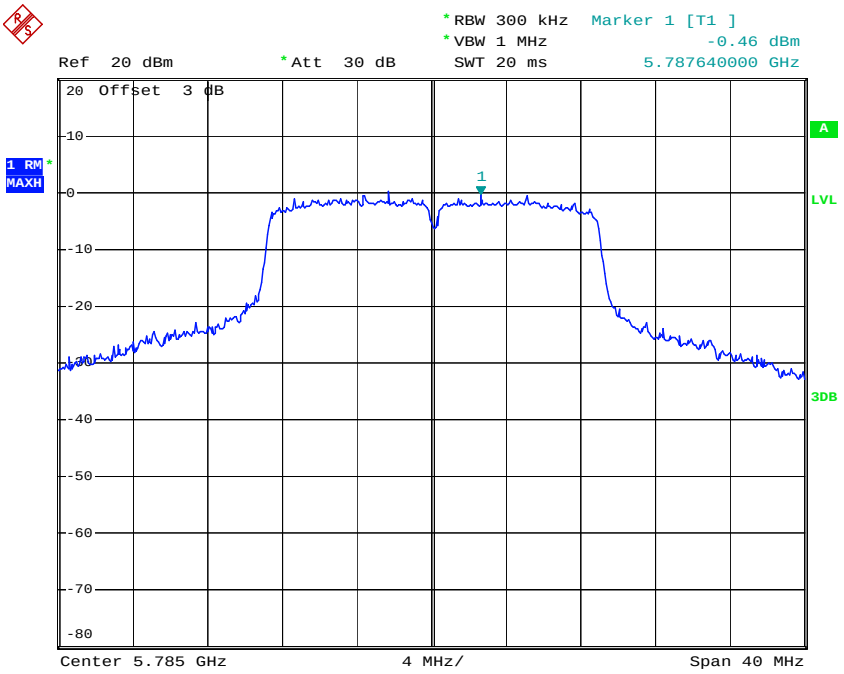
Chain 1,Middle Channel



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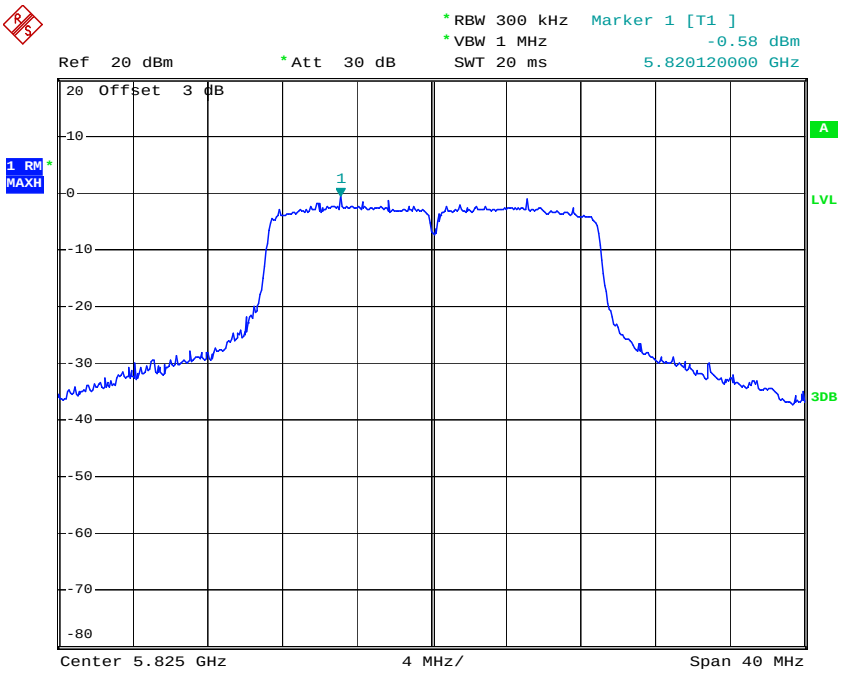
Chain 1,High Channel



Date: 15.JAN.2018 10:11:35

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