FCC PART 15.407

TEST REPORT

For

Prodrone Technology (Shenzhen) Co., Ltd

11th floor, Tower 1, Novel Park, 4078 Dongbin Road, Nanshan District, Shenzhen, China

FCC ID: 2AKIE-PD-RC03-WF

Report Type:	**Product Type:**
Original Report	GDU Remote controller

Report Number:	RSZ180109811-00
Report Date:	2018-02-28
Reviewed By:	Rocky Kang RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Prodrone Technology (Shenzhen) Co., Ltd's* product, model number: *CME03-O2 WF (FCC ID:2AKIE-PD-RC03-WF)* in this report was a *GDU Remote controller,* which was measured approximately: 185 mm (L) × 10 mm (W) × 55 mm (H) , rated with input voltage: DC 7.6 V battery or DC 13.05V from adapter.

Adapter Information:
Model: CPD-BC03
Input: AC 100-240V, 50/60Hz, 1.5A
Output: DC 13.05V, 3.0 A

**All measurement and test data in this report was gathered from production sample serial number: 180109811 (Assigned by BACL, shenzhen).The EUT supplied by the applicant was received on 2018-01-09.*

Objective

This type approval report is prepared on behalf of *Prodrone Technology (Shenzhen) Co., Ltd* in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

Submittal with the plane control unit of a system with FCC ID: 2AKIE-PD-O2-WF.

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 UNII Test Procedures New Rules v02r01

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter	uncertainty
Occupied Channel Bandwidth	±5%
RF Output Power with Power meter	±0.5dB
RF conducted test with spectrum	±1.5dB
AC Power Lines Conducted Emissions	±1.95dB
All emissions, radiated	±4.88dB
Temperature	-30~60 ℃
Humidity	±6%
Supply voltages	±0.4%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, 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. : 382179,the FCC Designation No. : CN5001.

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

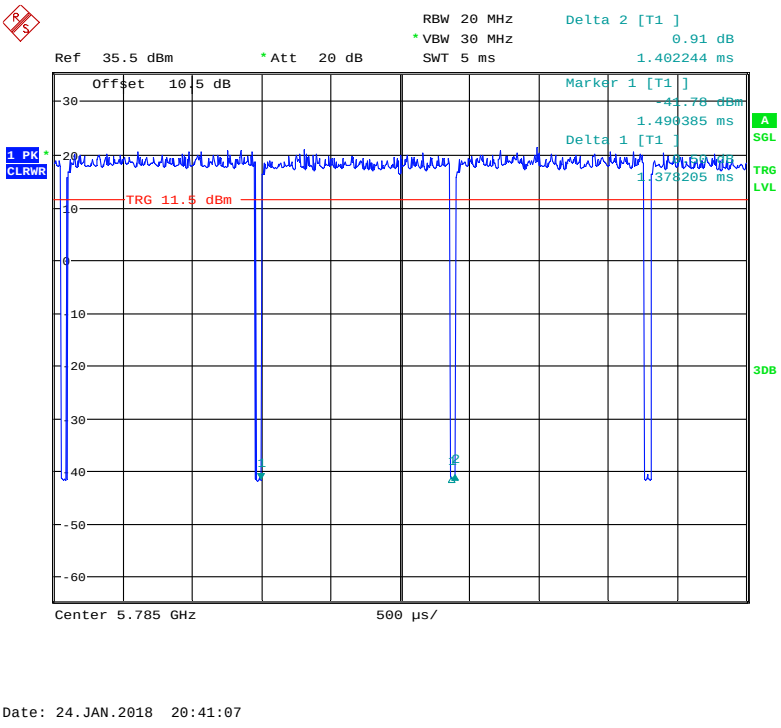
EUT Exercise Software

“ART.GUI” software was used for wifi testing.

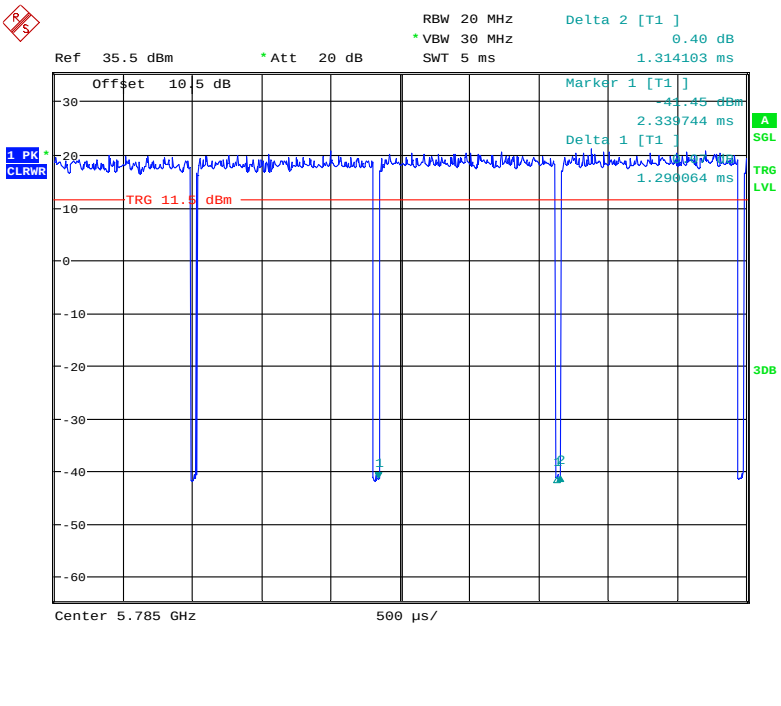
Mode	Data rate	Power level		
		Low channel	Middle channel	High channel
802.11a	6 Mbps	20	20	20
802.11n20	MCS 0	20	20	20

Duty cycle

802.11a Mode



802.11n20 mode



Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting	10log(1/ Duty Cycle)
802.11a	98	-	-	10Hz	-
802.11n20	98	-	-	10Hz	-

Equipment Modifications

No modification was made to the EUT tested.

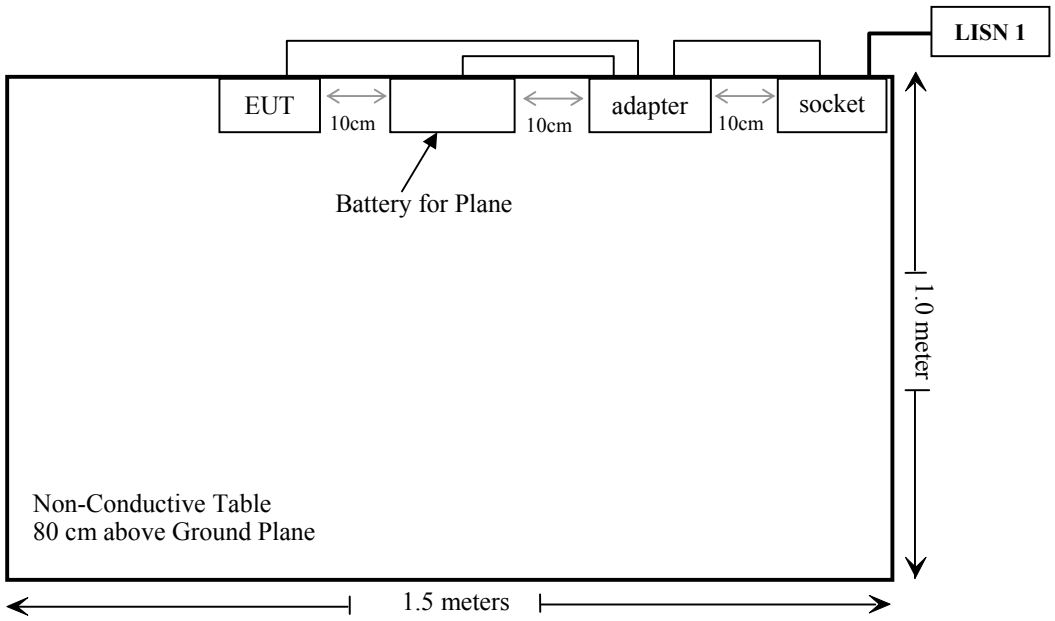
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Prodrone	Battery for Plane	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielding Un-Detachable DC Cable	1.0	EUT	Adapter
Un-Shielding Un-Detachable AC Cable	0.5	Socket	Adapter
Un-Shielding Un-Detachable DC Cable	0.8	Battery	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §1.1307 (b) (1) & §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) (4),(6),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (4)	Out Of Band Emission	Compliance
§15.407(e)	6dB Bandwidth	Compliance
§15.407(a) (3)	Conducted Transmitter Output Power	Compliance
§15.407 (a) (3)	Power Spectral Density	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2017-08-04	2018-08-04
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-07	2018-12-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2017-11-19	2018-05-21
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2017-11-12	2018-05-12
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-29	2020-12-28
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2017-12-17	2020-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-11-19	2018-05-21
Anritsu	Signal Generator	68369B	004114	2017-12-05	2018-12-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2017-12-07	2018-12-07
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	104PEA	218124002	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	1	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	2	2017-11-22	2018-05-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-04	2017-12-29	2020-12-28
Ducommun Technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2017-04-24	2018-04-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2017-11-22	2018-11-22
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2017-12-05	2018-12-05
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2017-04-09	2018-04-09
Agilent	Power Meter	N1912A	MY5000492	2017-11-18	2018-11-17
Agilent	Power Sensor	N1921A	MY54210024	2017-11-18	2018-11-17
Ducommun technologies	RF Cable	RG-214	3	2017-11-22	2018-05-22
WEINSCHEL	10dB Attenuator	5324	AU 3842	2017-11-22	2018-05-23

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

FCC§15.247 (i), §1.1307 (b) (1) & §2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), 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.

Measurement Result

Please refer to SAR test report: RSZ180109811-20.

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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

This product has two external wifi antenna which was permanently attached with maximum gain 2.0 dBi, fulfill the requirement of this section, and please refer to the EUT photo.

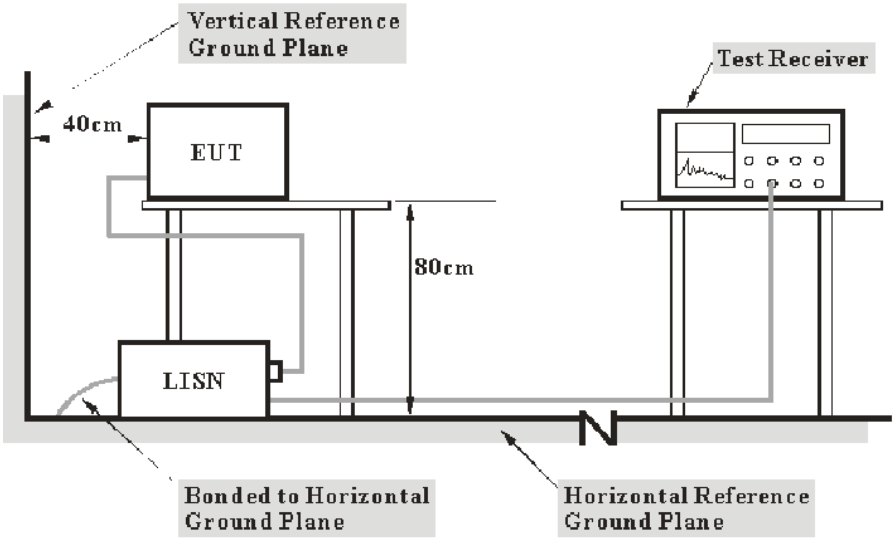
Result: Compliance.

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

Applicable Standard

FCC §15.207, §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 VAC/60 Hz power source.

EMI Test Receiver Setup

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

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

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

Test Procedure

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

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

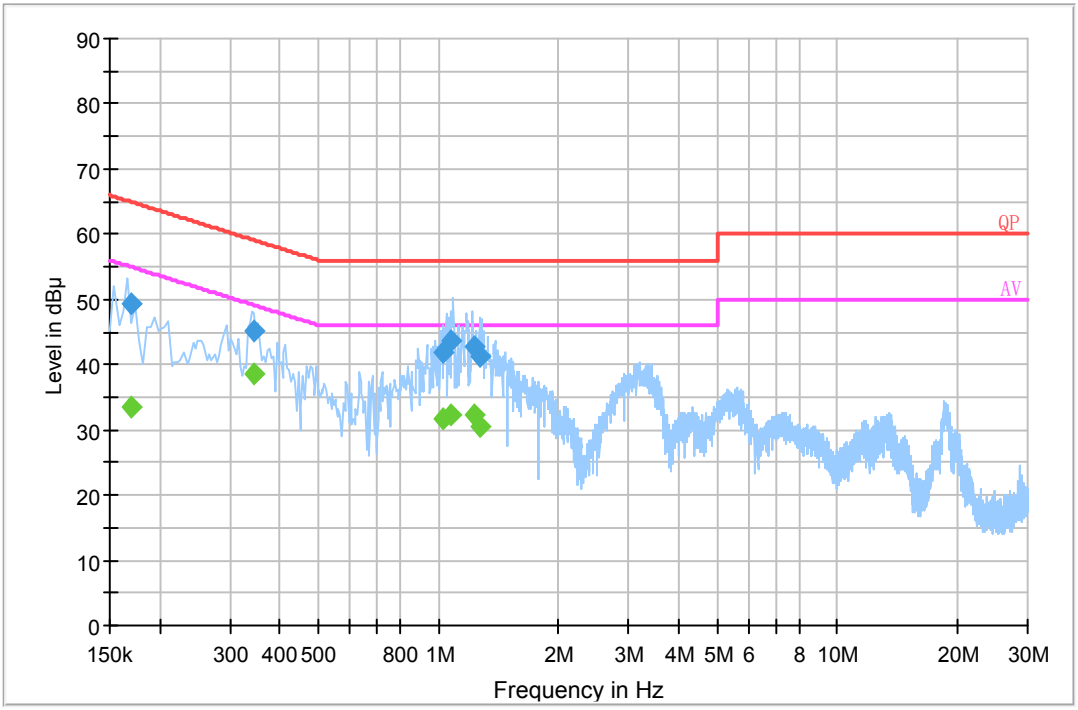
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Dylan Li on 2018-01-26.

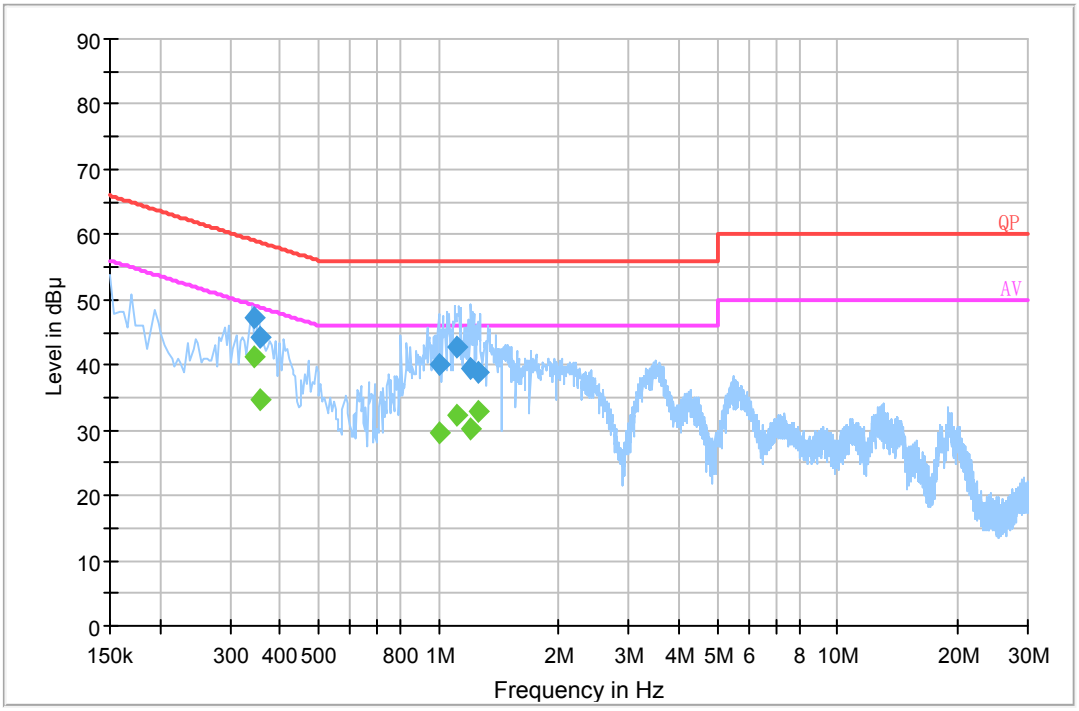
EUT operation mode: Transmitting

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.169500	49.4	20.2	65.0	15.6	QP
0.344810	45.2	20.2	59.1	13.9	QP
1.022850	41.7	20.1	56.0	14.3	QP
1.073650	43.7	20.1	56.0	12.3	QP
1.223730	42.7	20.1	56.0	13.3	QP
1.274830	41.3	20.1	56.0	14.7	QP
0.169500	33.6	20.2	55.0	21.4	Ave.
0.344810	38.6	20.2	49.1	10.5	Ave.
1.022850	31.7	20.1	46.0	14.3	Ave.
1.073650	32.3	20.1	46.0	13.7	Ave.
1.223730	32.4	20.1	46.0	13.6	Ave.
1.274830	30.5	20.1	46.0	15.5	Ave.

AC120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.344870	47.3	20.2	59.1	11.8	QP
0.356690	44.2	20.2	58.8	14.6	QP
1.006970	40.0	20.1	56.0	16.0	QP
1.113530	42.9	20.1	56.0	13.1	QP
1.199910	39.6	20.1	56.0	16.4	QP
1.250950	38.8	20.1	56.0	17.2	QP
0.344870	41.4	20.2	49.1	7.7	Ave.
0.356690	34.7	20.2	48.8	14.1	Ave.
1.006970	29.6	20.1	46.0	16.4	Ave.
1.113530	32.4	20.1	46.0	13.6	Ave.
1.199910	30.2	20.1	46.0	15.8	Ave.
1.250950	32.9	20.1	46.0	13.1	Ave.

Note:
1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
2) Corrected Amplitude = Reading + Correction Factor
3) Margin = Limit – Corrected Amplitude

§15.205 & §15.209 & §15.407(B) (4),(6),(7) – UNDESIRABLE EMISSION

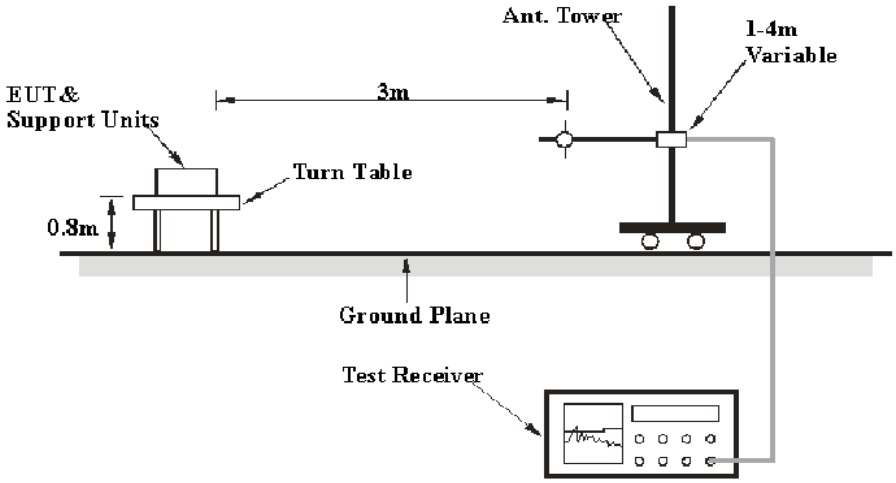
Applicable Standard

FCC §15.407 (b) (4), (6), (7); §15.209; §15.205;

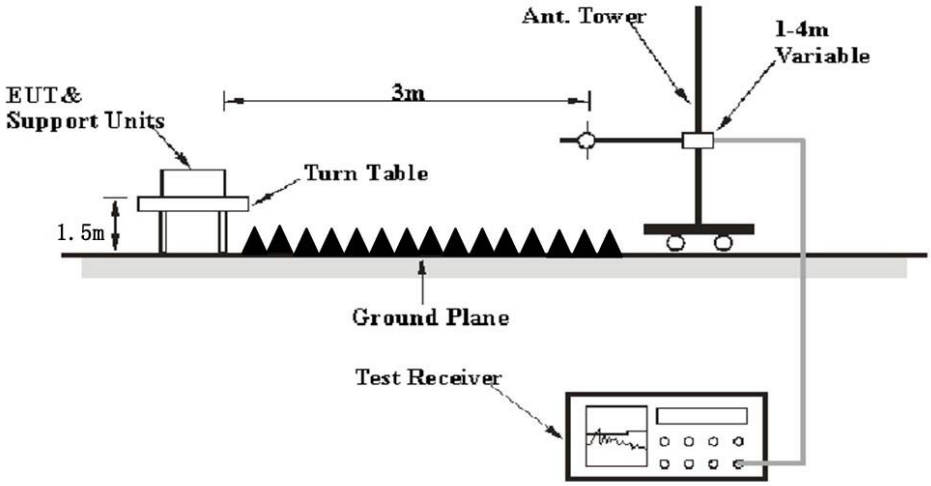
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited 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.
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with 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.

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	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Ave.
	1MHz	＞1/T Note 2	/	Ave.

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

Radiated Spurious Emission

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the 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.

Corrected Amplitude & Margin Calculation

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

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 – Corrected Amplitude

Test Results Summary

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

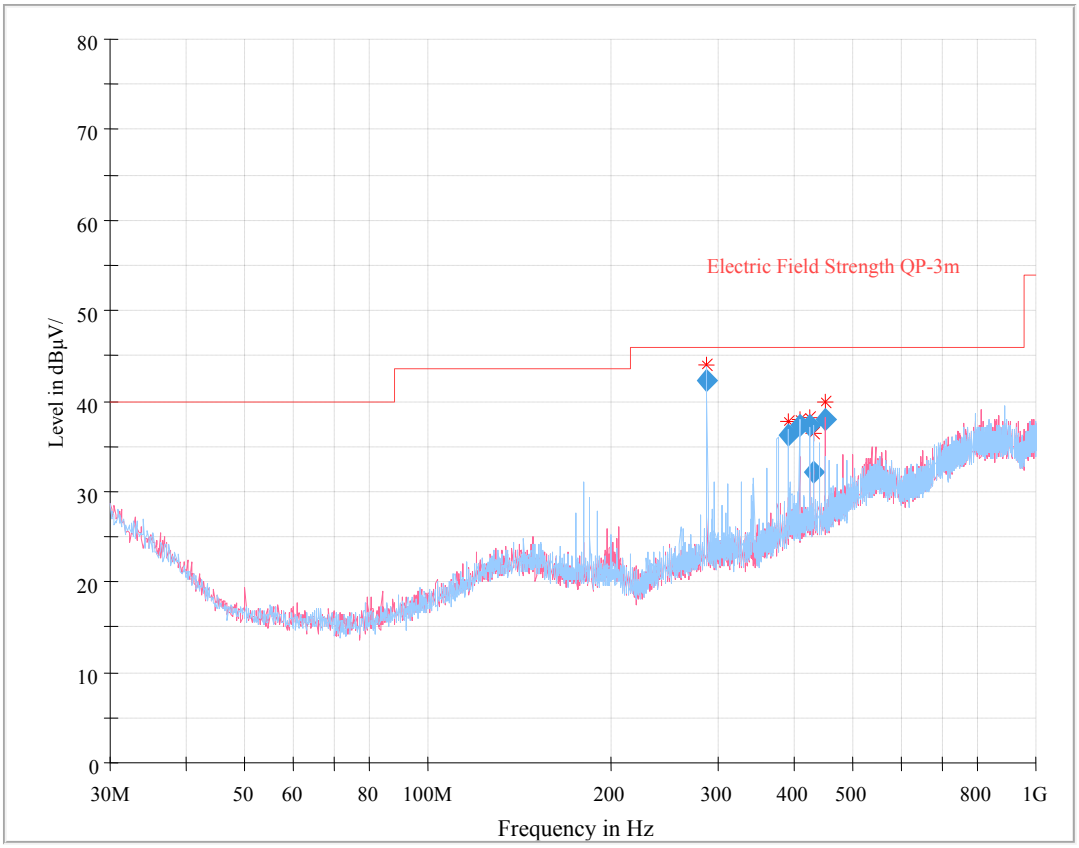
Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Dylan Li on 2018-01-23.

EUT operation mode: Transmitting

30 MHz~1 GHz: (Worst case is 5825MHz in 802.11n20 mode)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
288.026000	42.35	104.0	H	41.0	-3.1	46.00	3.65
391.988375	36.15	102.0	H	17.0	-0.3	46.00	9.85
408.008250	37.35	106.0	H	31.0	0.1	46.00	8.65
423.989625	37.34	101.0	H	327.0	0.2	46.00	8.66
432.082000	32.14	108.0	H	321.0	0.2	46.00	13.86
450.010625	37.90	128.0	V	305.0	0.2	46.00	8.10

1000 MHz ~ 40 GHz: (5725-5850 MHz)

802.11a mode:

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	(PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5745 MHz									
5745.00	75.73	PK	60	1.1	H	42.15	117.88	/	/
5745.00	62.78	Ave.	60	1.1	H	42.15	104.93	/	/
5745.00	70.63	PK	295	1.9	V	42.15	112.78	/	/
5745.00	58.33	Ave.	295	1.9	V	42.15	100.48	/	/
5694.78	27.81	PK	182	1.1	H	42.15	69.96	101.34	31.38
5712.78	30.57	PK	182	1.1	H	42.15	72.72	108.78	36.06
5723.86	40.06	PK	41	2.0	H	42.15	82.21	119.6	37.39
11490.00	40.25	PK	316	2.0	H	17.56	57.81	74	16.19
11490.00	26.37	Ave.	316	2.0	H	17.56	43.93	54	10.07
5785 MHz									
5785.00	74.23	PK	316	1.7	H	42.08	116.31	/	/
5785.00	59.93	Ave.	316	1.7	H	42.08	102.01	/	/
5785.00	70.06	PK	317	2.0	V	42.08	112.14	/	/
5785.00	56.78	Ave.	317	2.0	V	42.08	98.86	/	/
11570.00	41.35	PK	289	2.3	H	18.32	59.67	74	14.33
11570.00	26.51	Ave.	289	2.3	H	18.32	44.83	54	9.17
5825 MHz									
5825.00	74.06	PK	259	1.6	H	42.08	116.14	/	/
5825.00	61.04	Ave.	259	1.6	H	42.08	103.12	/	/
5825.00	69.14	PK	284	2.1	V	42.08	111.22	/	/
5825.00	56.98	Ave.	284	2.1	V	42.08	99.06	/	/
5851.45	28.69	PK	2	1.2	H	42.55	71.24	118.89	47.65
5857.93	27.59	PK	130	1.5	H	42.55	70.14	109.98	39.84
5881.32	27.81	PK	105	2.3	H	42.55	70.36	100.52	30.16
11650.00	41.26	PK	100	1.7	H	18.32	59.58	74	14.42
11650.00	26.13	Ave.	100	1.7	H	18.32	44.45	54	9.55

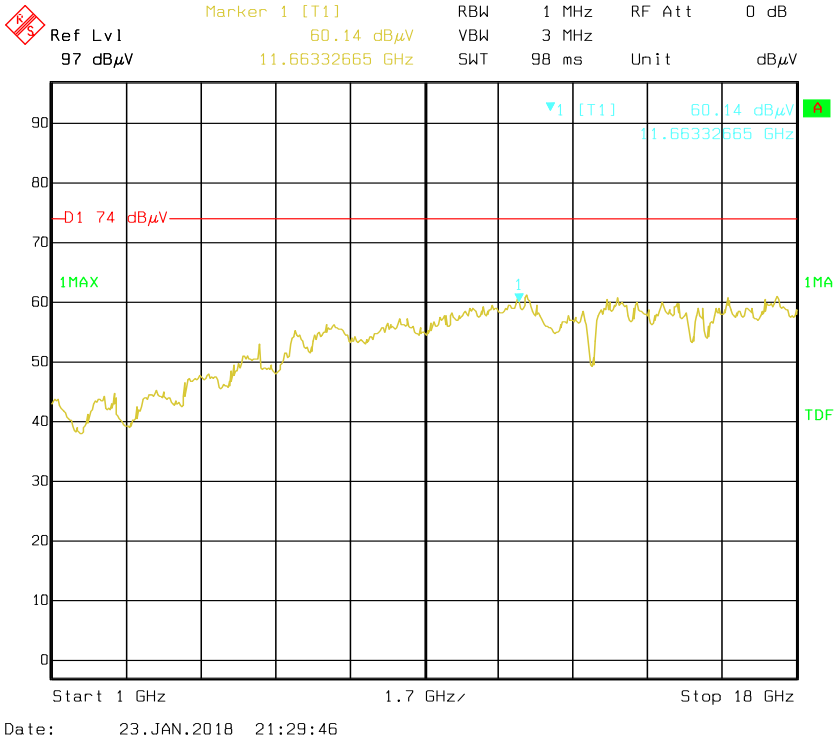
802.11n20 mode:

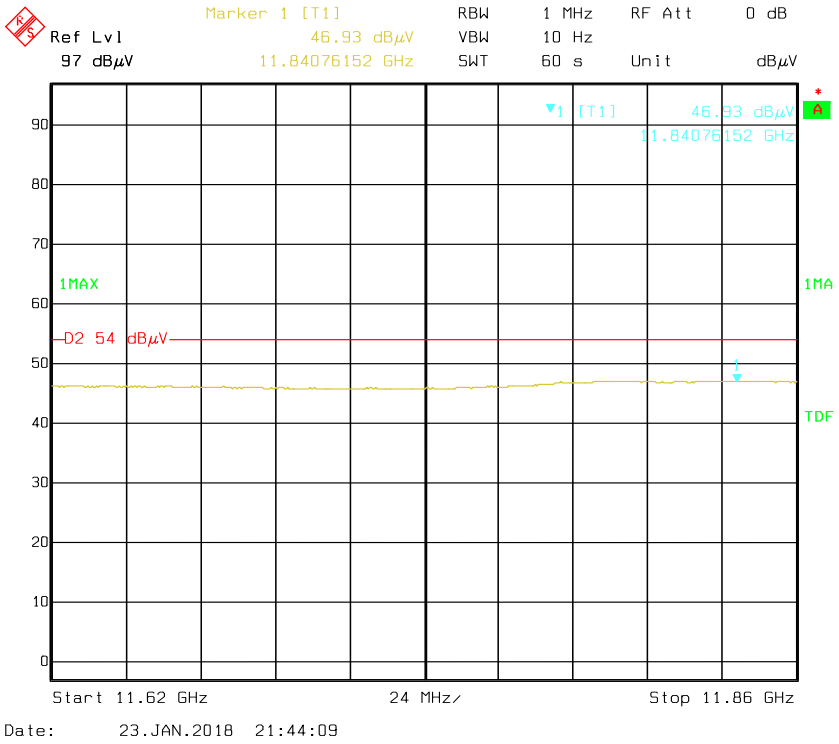
Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407/205/209	
	Reading (dBμV)	(PK/QP/Ave.)		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5745 MHz									
5745.00	74.81	PK	14	2.1	H	42.15	116.96	/	/
5745.00	60.47	Ave.	14	2.1	H	42.15	102.62	/	/
5745.00	70.05	PK	93	1.9	V	42.15	112.20	/	/
5745.00	56.52	Ave.	93	1.9	V	42.15	98.67	/	/
5723.34	44.37	PK	87	1.8	H	42.15	86.52	118.42	31.90
5717.63	32.19	PK	289	1.8	H	42.15	74.34	110.14	35.80
5689.69	28.13	PK	47	1.3	H	42.15	70.28	97.57	27.29
11490.00	41.07	PK	113	1.2	H	17.56	58.63	74	15.37
11490.00	26.62	Ave.	113	1.2	H	17.56	44.18	54	9.82
5785 MHz									
5785.00	72.28	PK	328	1.5	H	42.08	114.36	/	/
5785.00	60.29	Ave.	328	1.5	H	42.08	102.37	/	/
5785.00	69.42	PK	67	1.6	V	42.08	111.50	/	/
5785.00	57.64	Ave.	67	1.6	V	42.08	99.72	/	/
11570.00	40.73	PK	84	1.0	H	18.32	59.05	74	14.95
11570.00	26.59	Ave.	84	1.0	H	18.32	44.91	54	9.09
5825 MHz									
5825.00	73.54	PK	229	2.1	H	42.08	115.62	/	/
5825.00	60.13	Ave.	229	2.1	H	42.08	102.21	/	/
5825.00	68.51	PK	182	1.9	V	42.08	110.59	/	/
5825.00	56.34	Ave.	182	1.9	V	42.08	98.42	/	/
5850.15	29.87	PK	250	2.0	H	42.55	72.42	121.86	49.44
5856.38	27.98	PK	89	2.0	H	42.55	70.53	110.41	39.88
5877.49	27.36	PK	210	1.5	H	42.55	69.91	103.36	33.45
11650.00	41.44	PK	50	1.5	H	18.32	59.76	74	14.24
11650.00	28.51	Ave.	50	1.5	H	18.32	46.83	54	7.17

Note:
Corrected Amplitude = Corrected Factor + Reading
Corrected Factor=Antenna factor (RX) + Cable Loss – Amplifier Factor
Margin = Limit- Corr. Amplitude
Spurious emissions more than 20 dB below the limit were not reported.

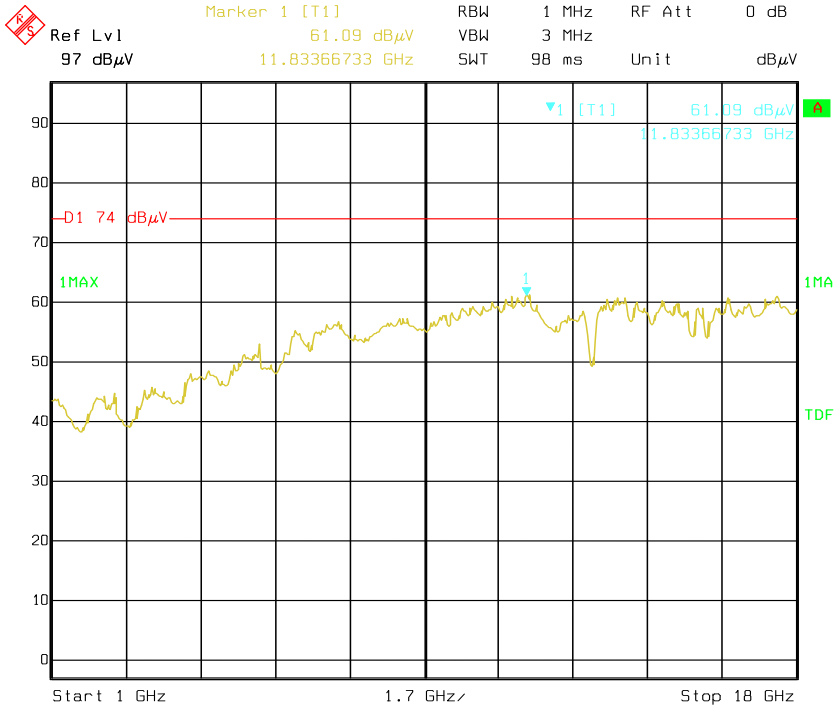
802.11n20 mode

Pre-scan for 1~18 GHz, H

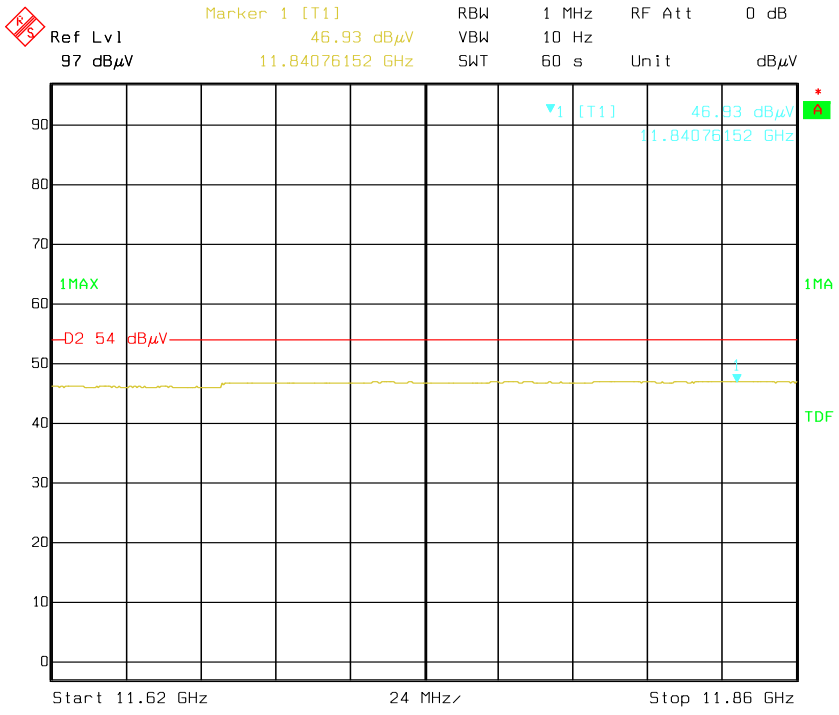




Pre-scan for 1~18 GHz, V

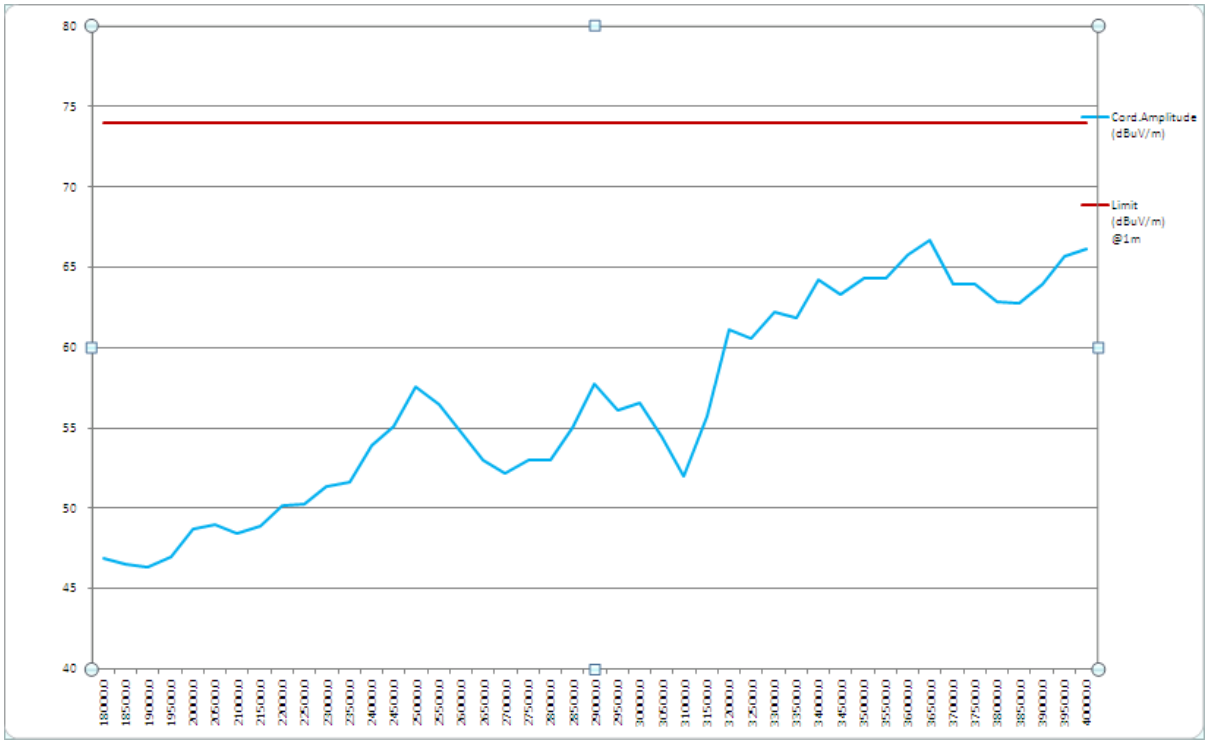


Date: 23.JAN.2018 21:35:40

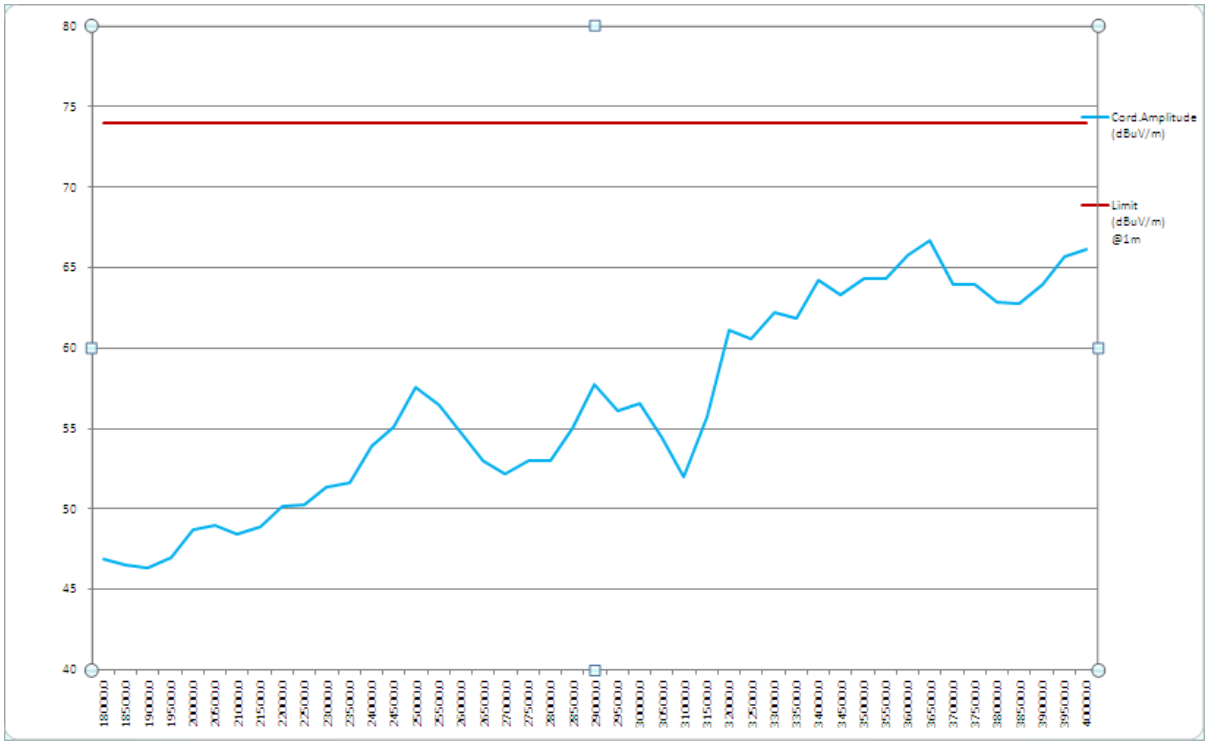


Date: 23.JAN.2018 21:37:00

Pre-scan for Above 18 GHz, H



Pre-scan for Above 18 GHz, V



§15.407(B)(4) –OUT OF BAND EMISSION

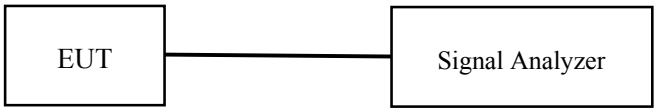
Applicable Standard

FCC §15.407 (b) (4);

For transmitters operating in the 5.725–5.825 GHz band: 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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. The Resolution bandwidth is set to 1MHz, The Video bandwidth is set to ≥ 1MHz, report the peak value out of the oprating band.
3. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

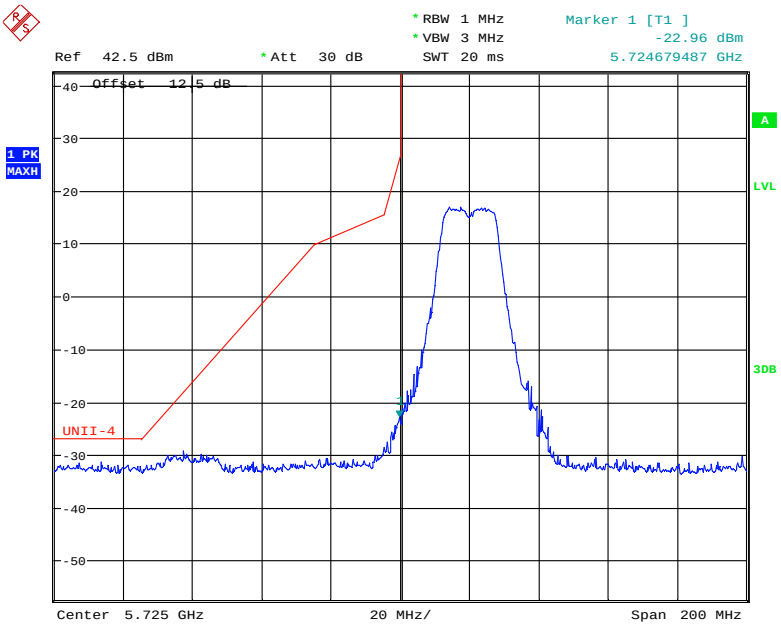
The testing was performed by Dylan Li on 2018-01-24.

EUT operation mode: Transmitting

Note: The antenna gain had been offset in the plots, the limit is EIRP.

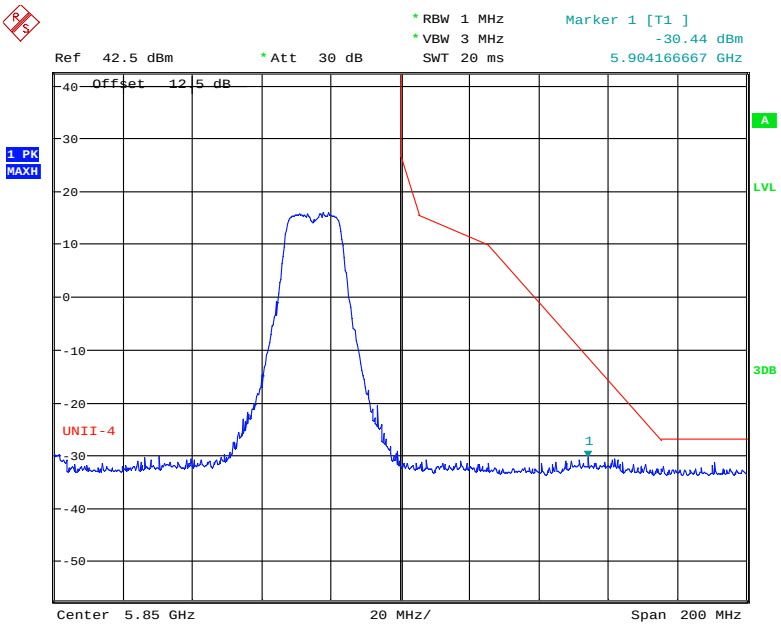
Antenna 0:

802.11a mode, Band Edge, Left Side



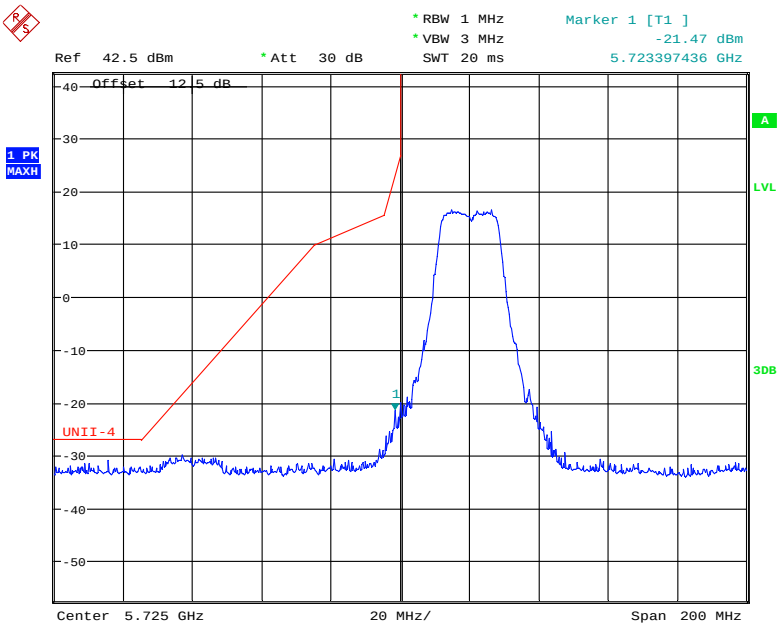
Date: 24.JAN.2018 19:15:15

802.11a mode, Band Edge, Right Side



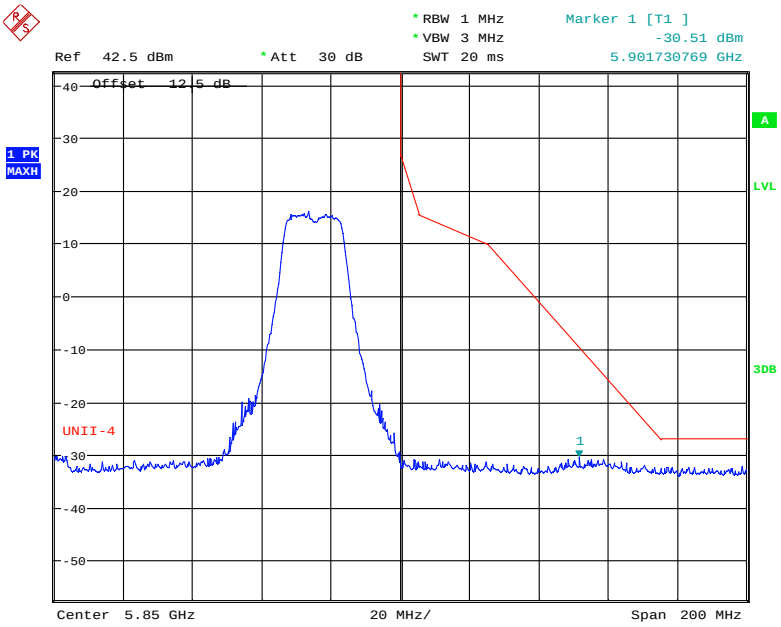
Date: 24.JAN.2018 19:16:53

802.11n20 mode, Band Edge, Left Side



Date: 24.JAN.2018 19:13:47

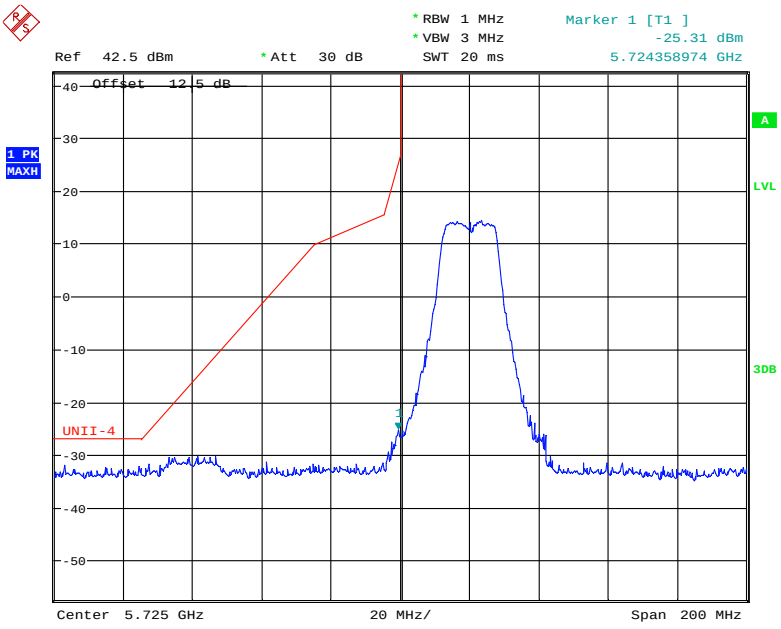
802.11n20 mode, Band Edge, Right Side



Date: 24.JAN.2018 19:12:55

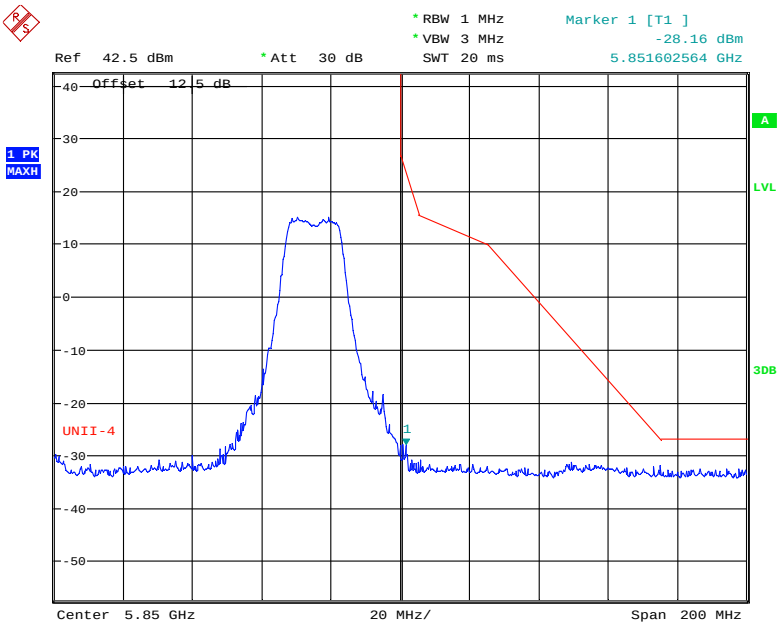
Antenna 1:

802.11a mode, Band Edge, Left Side



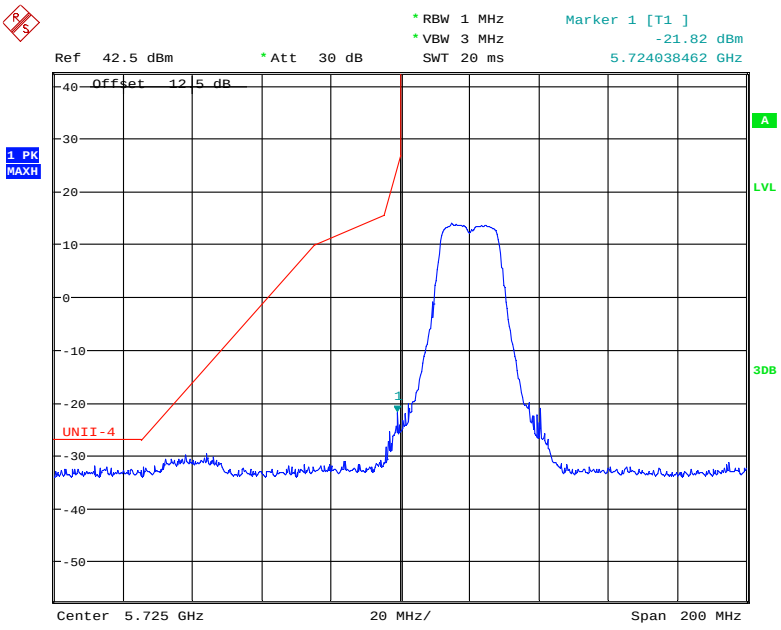
Date: 24.JAN.2018 20:10:37

802.11a mode, Band Edge, Right Side



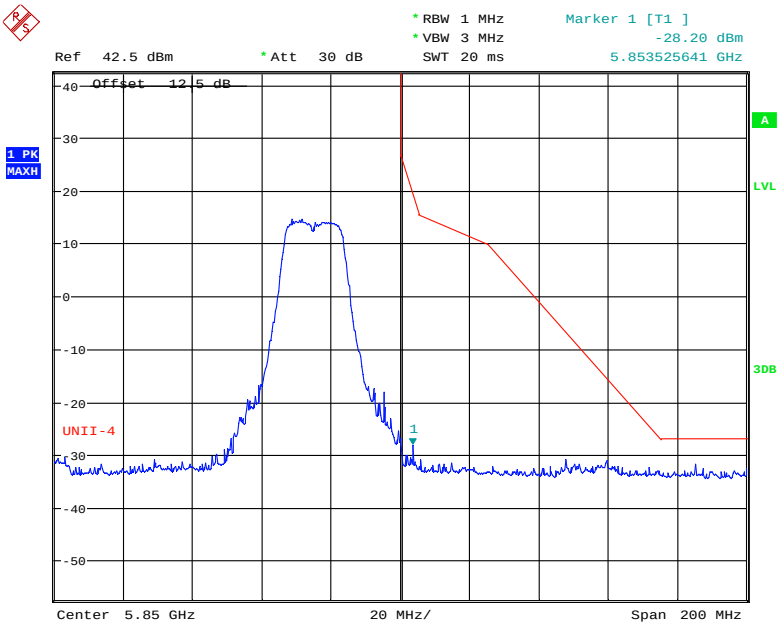
Date: 24.JAN.2018 20:09:43

802.11n20 mode, Band Edge, Left Side



Date: 24.JAN.2018 20:12:06

802.11n20 mode, Band Edge, Right Side



Date: 24.JAN.2018 20:14:00

Note：According the testing data, all the emissions was below the limit 3dB, so the two antennas transmit simultaneously result was pass.

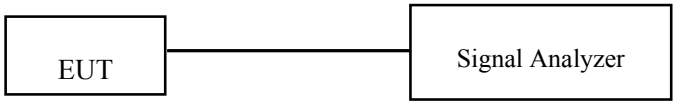
FCC §15.407(e) –6dB EMISSION BANDWIDTH

Applicable Standard

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Minimum Emission Bandwidth for the band 5.725-5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Dylan Li on 2018-01-24.

EUT operation mode: Transmitting

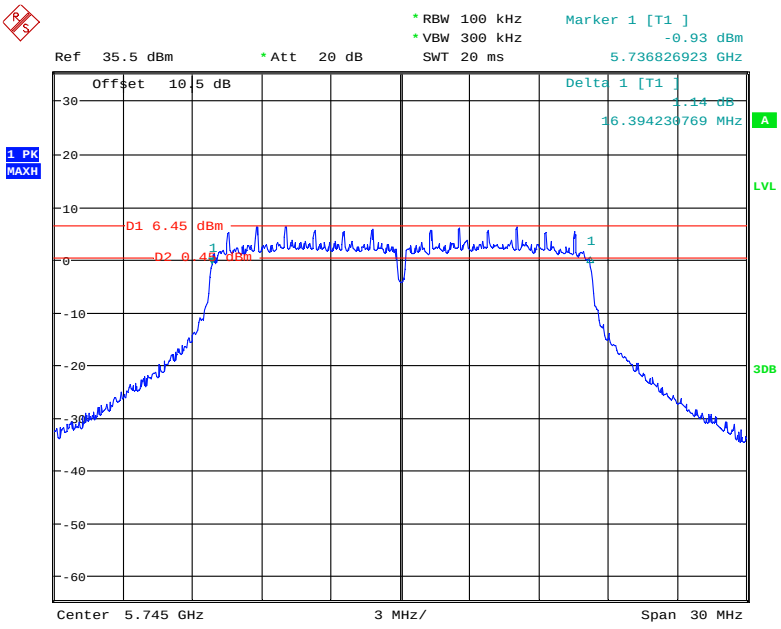
Test Result: Pass; please refer to the following tables and plots.

5725 MHz – 5850 MHz:

Frequency (MHz)	Antenna Port	6dB Bandwidth (MHz)	99% bandwidth (MHz)
802.11a			
5745	0	16.39	17.05
	1	16.39	17.12
5785	0	16.39	17.05
	1	16.44	17.12
5825	0	16.39	17.12
	1	16.39	16.99
802.11n20			
5745	0	17.12	18.14
	1	17.16	18.08
5785	0	17.16	18.14
	1	17.40	18.14
5825	0	17.21	18.14
	1	17.16	18.14

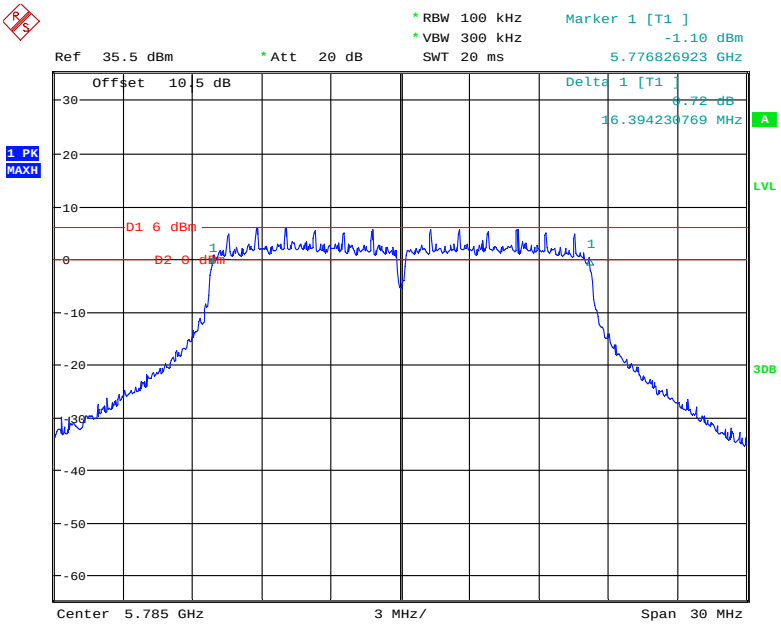
Antenna 0:

802.11a mode, 6dB Emission Bandwidth, 5745 MHz



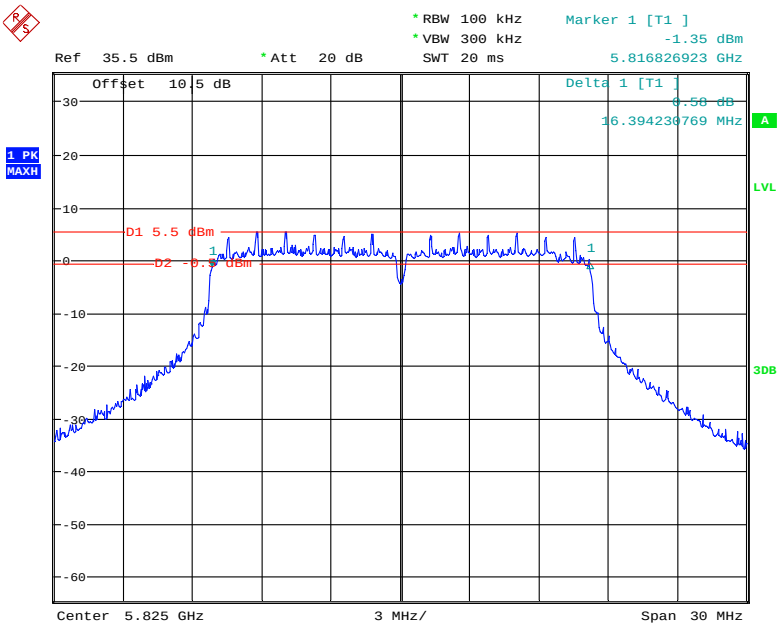
Date: 24.JAN.2018 19:36:54

802.11a mode, 6dB Emission Bandwidth, 5785 MHz



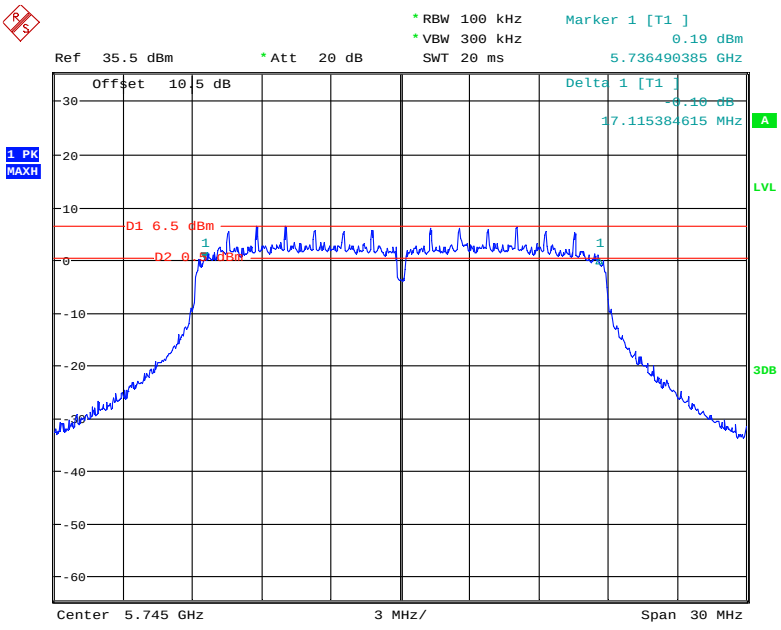
Date: 24.JAN.2018 19:38:42

802.11a mode, 6dB Emission Bandwidth, 5825 MHz



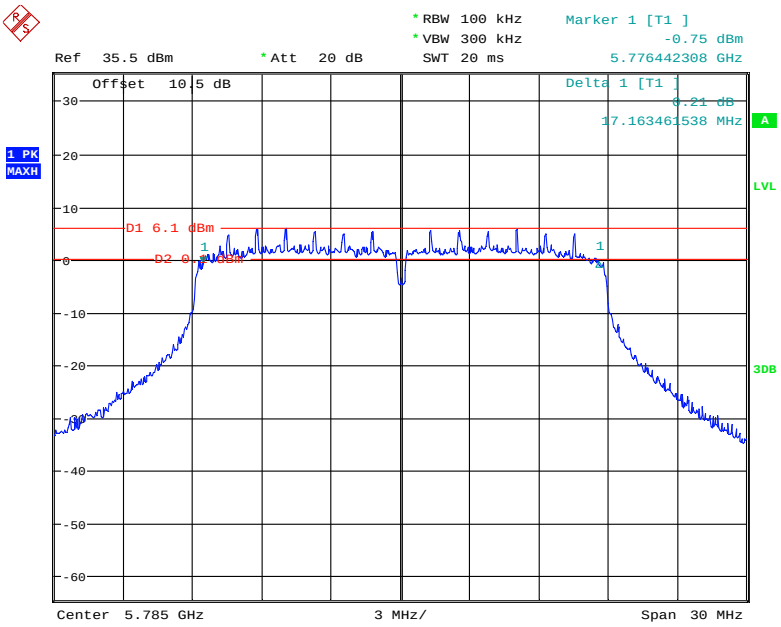
Date: 24.JAN.2018 19:40:28

802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



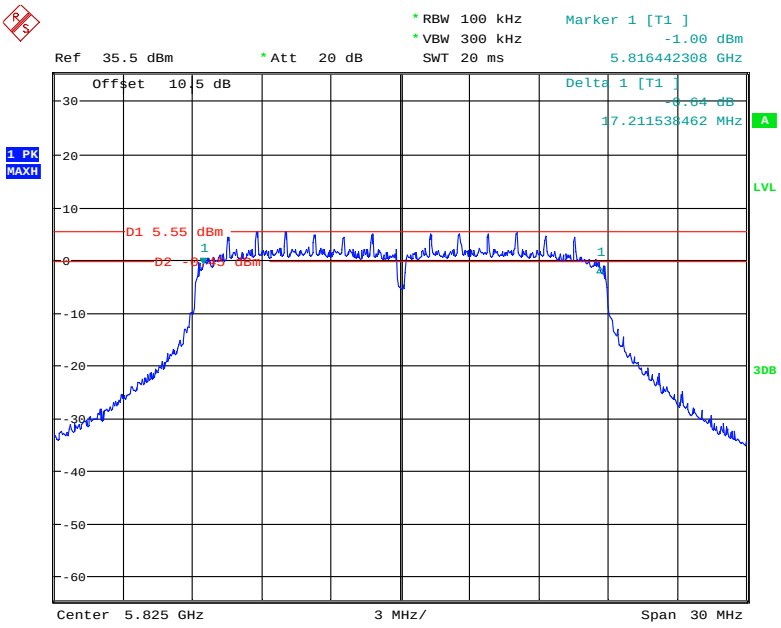
Date: 24.JAN.2018 19:34:27

802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



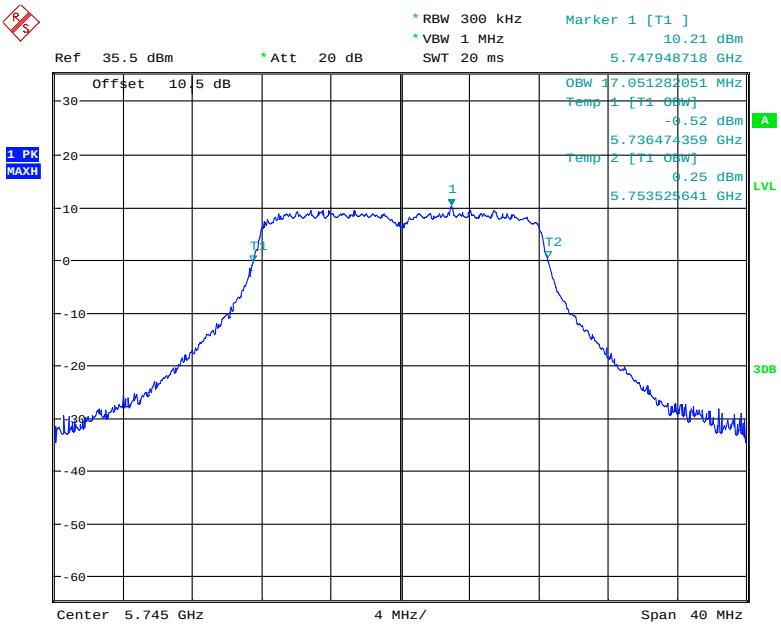
Date: 24.JAN.2018 19:32:05

802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



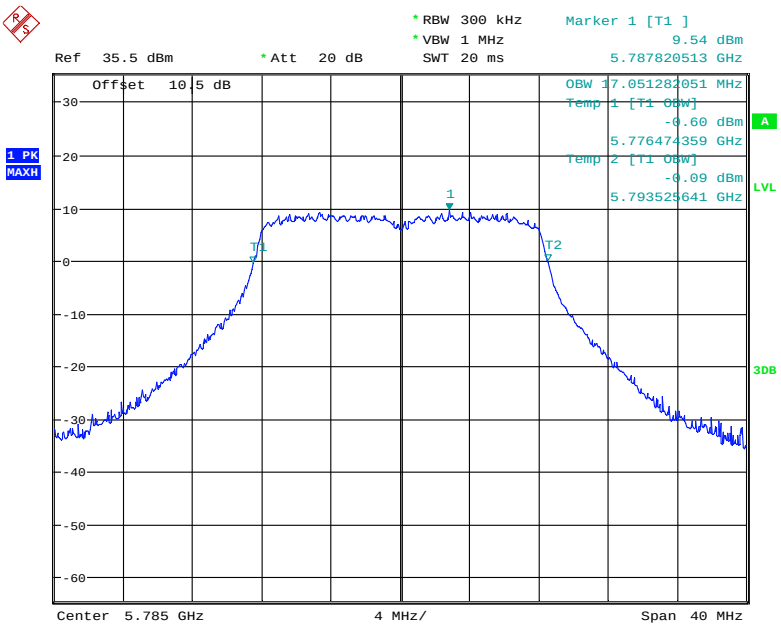
Date: 24.JAN.2018 19:27:38

802.11a mode, 99% Occupied Bandwidth, 5745 MHz



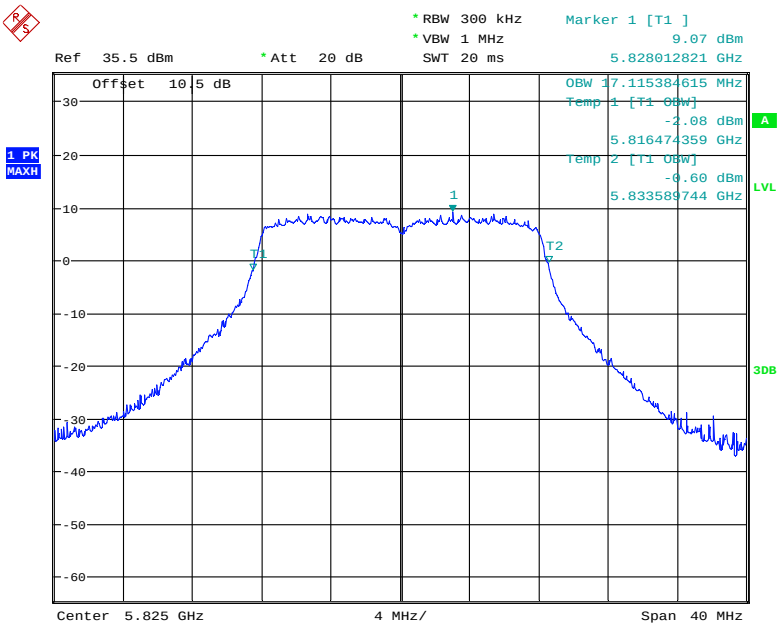
Date: 24.JAN.2018 19:22:20

802.11a mode, 99% Occupied Bandwidth, 5785 MHz



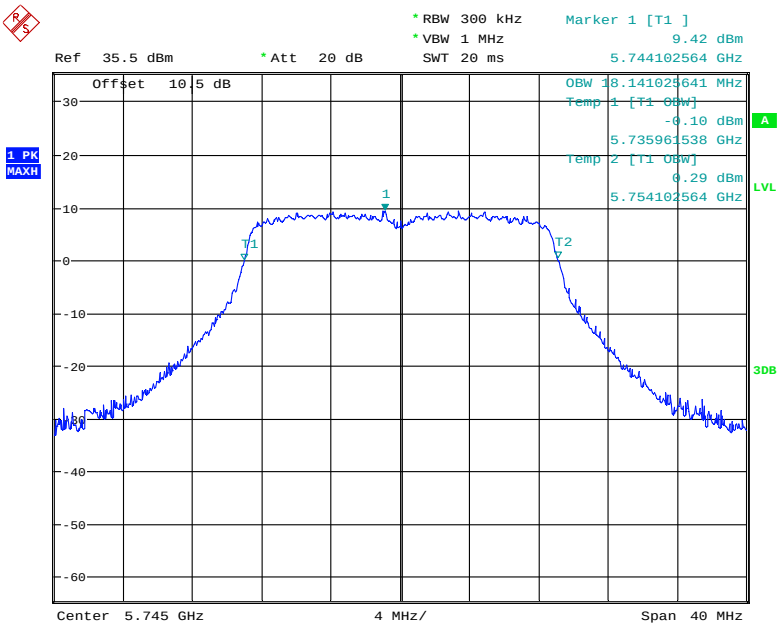
Date: 24.JAN.2018 19:21:30

802.11a mode, 99% Occupied Bandwidth, 5825 MHz



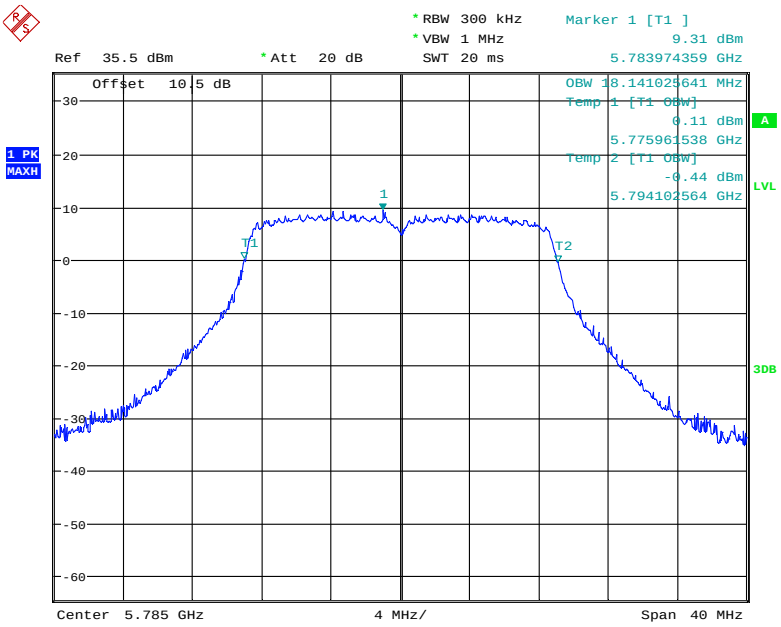
Date: 24.JAN.2018 19:20:01

802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



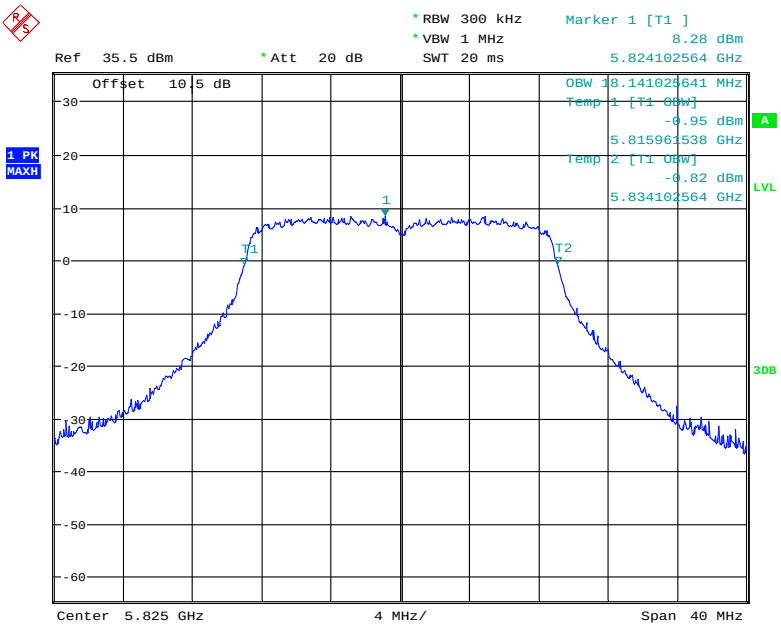
Date: 24.JAN.2018 19:23:31

802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



Date: 24.JAN.2018 19:24:30

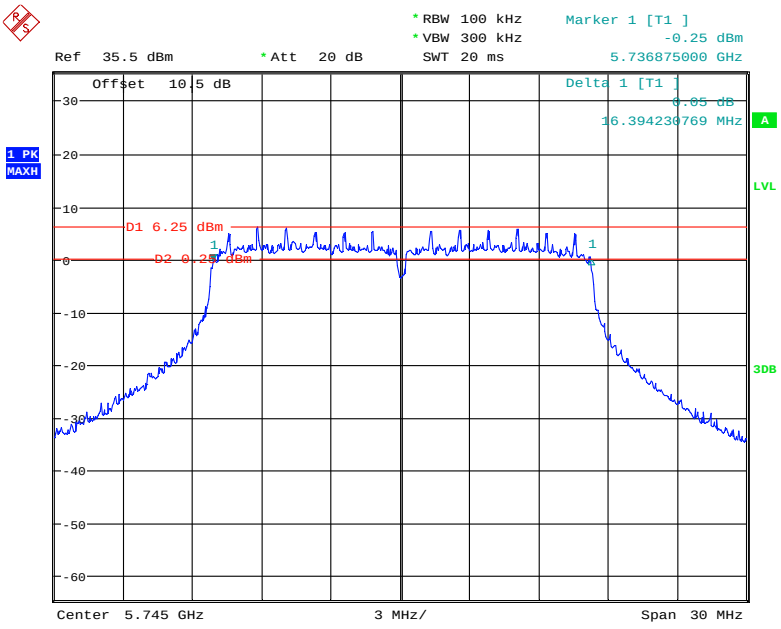
802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



Date: 24.JAN.2018 19:25:30

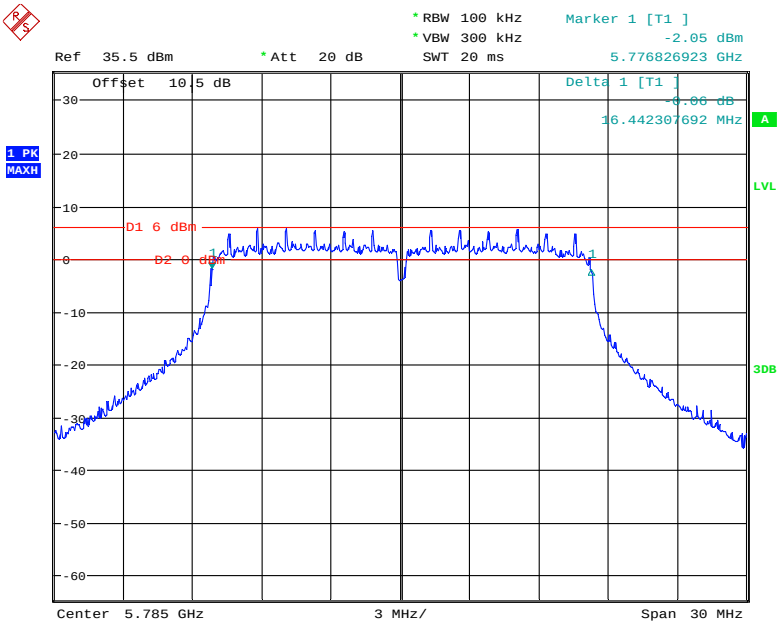
Antenna 1:

802.11a mode, 6dB Emission Bandwidth, 5745 MHz



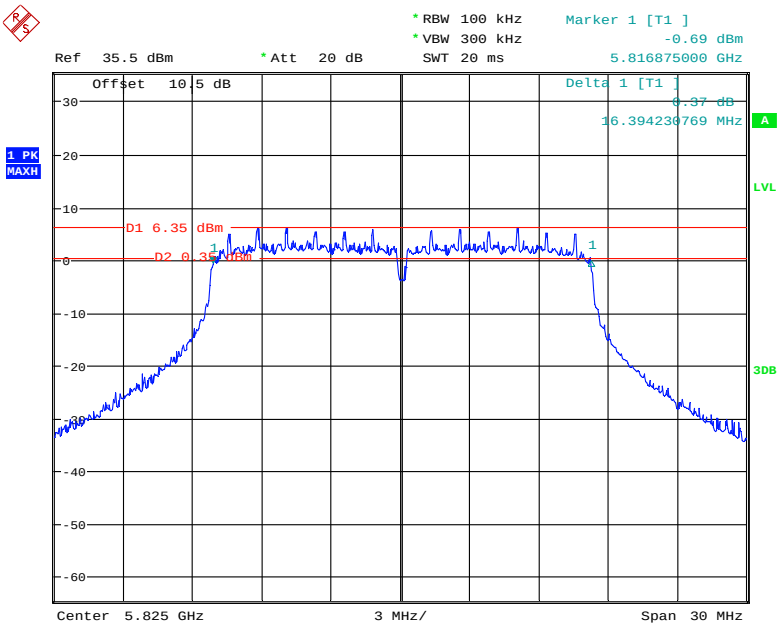
Date: 24.JAN.2018 19:52:04

802.11a mode, 6dB Emission Bandwidth, 5785 MHz



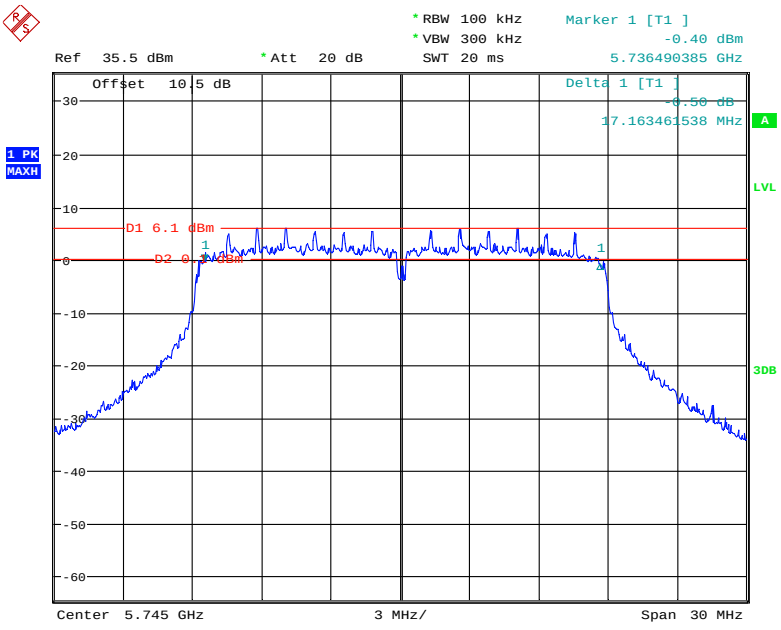
Date: 24.JAN.2018 19:50:20

802.11a mode, 6dB Emission Bandwidth, 5825 MHz



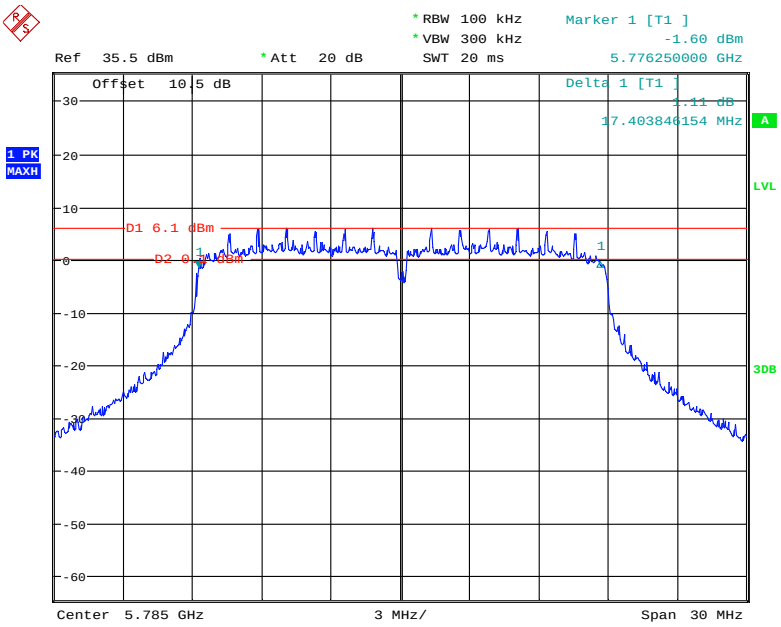
Date: 24.JAN.2018 19:48:55

802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



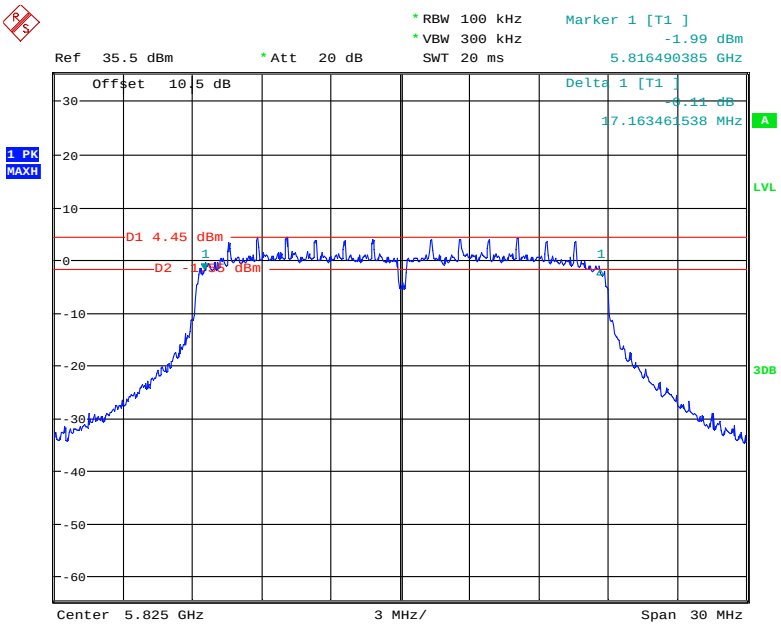
Date: 24.JAN.2018 19:53:51

802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



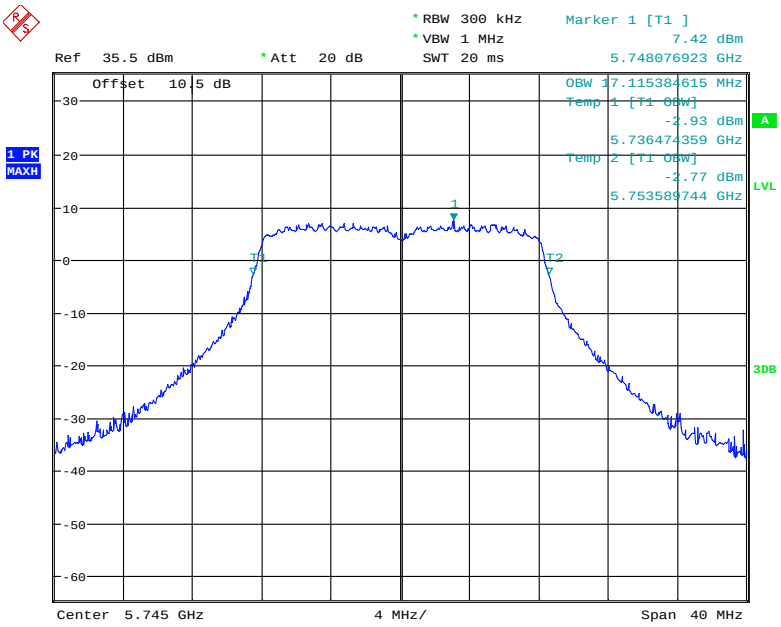
Date: 24.JAN.2018 19:57:17

802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



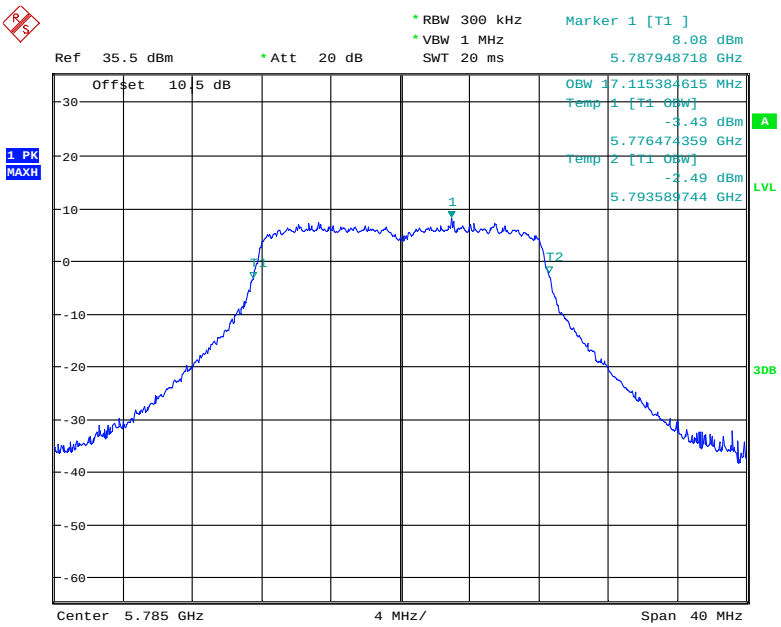
Date: 24.JAN.2018 20:00:18

802.11a mode, 99% Occupied Bandwidth, 5745 MHz



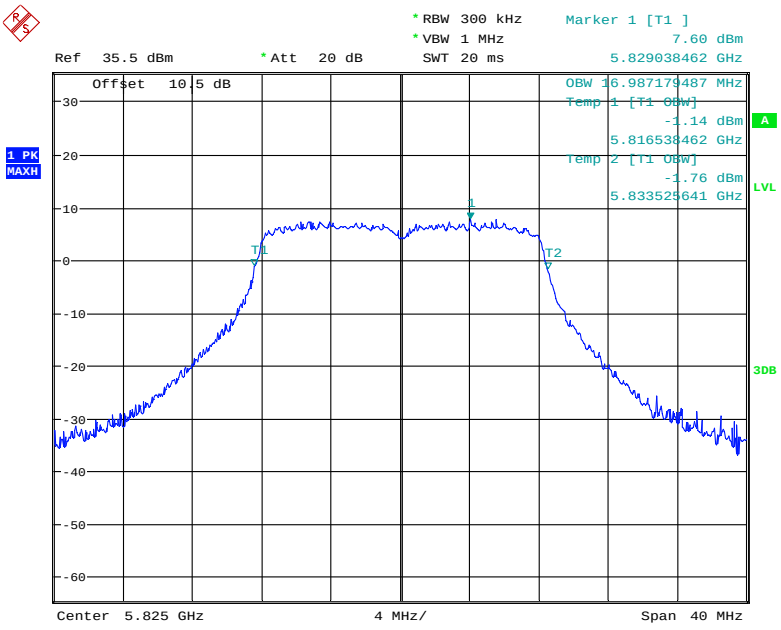
Date: 24.JAN.2018 20:05:49

802.11a mode, 99% Occupied Bandwidth, 5785 MHz



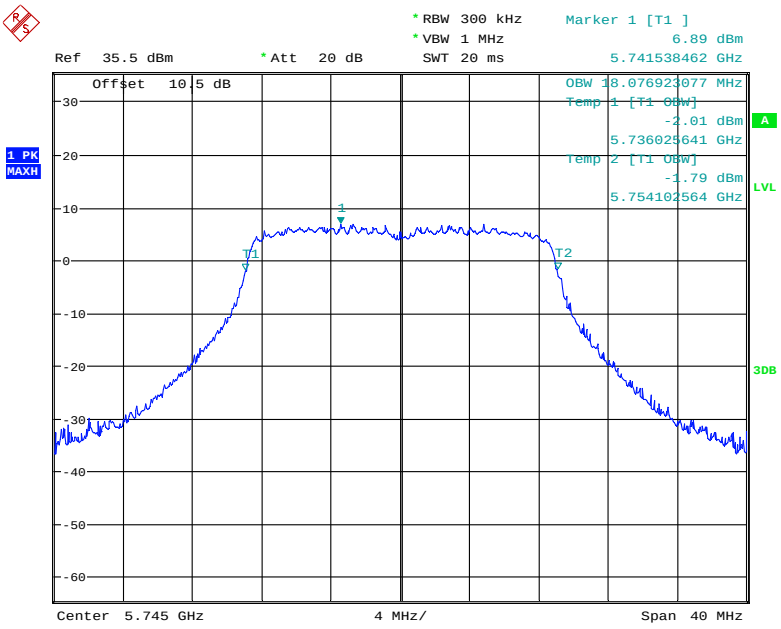
Date: 24.JAN.2018 20:06:49

802.11a mode, 99% Occupied Bandwidth, 5825 MHz



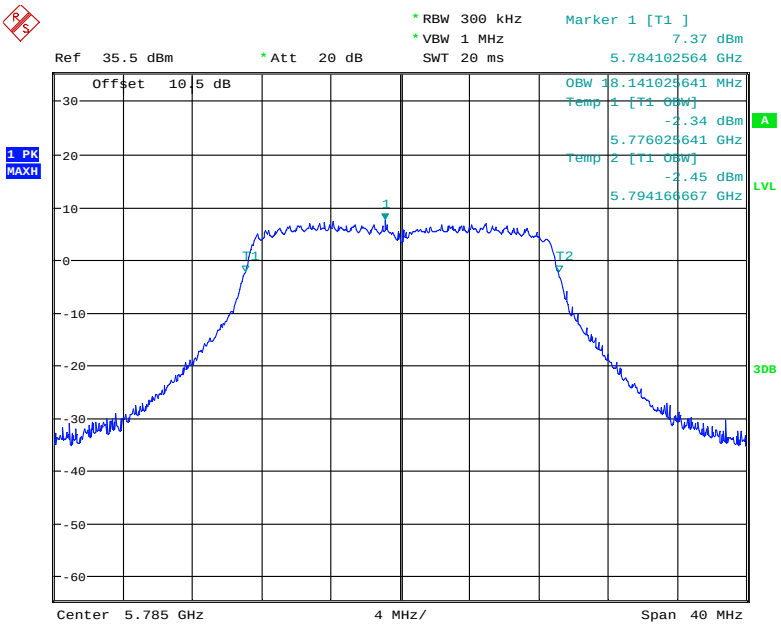
Date: 24.JAN.2018 20:07:48

802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



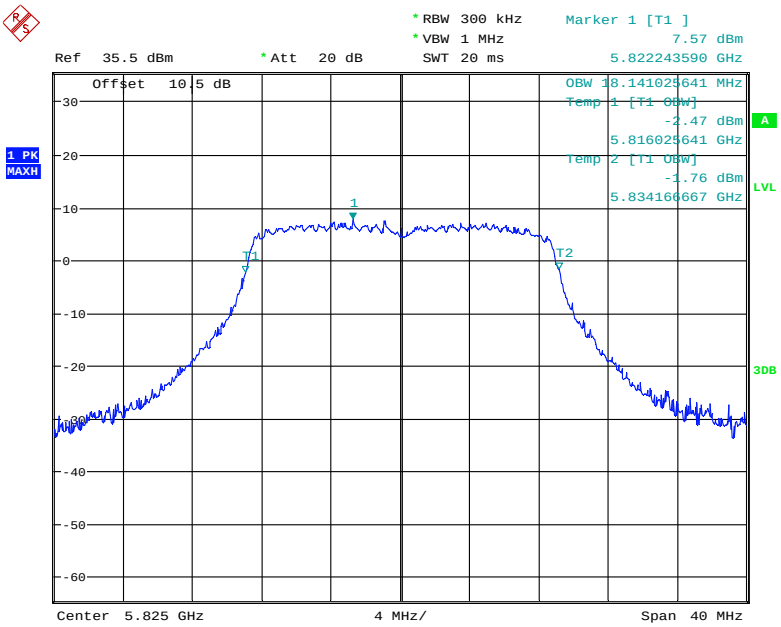
Date: 24.JAN.2018 20:04:50

802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



Date: 24.JAN.2018 20:03:12

802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



Date: 24.JAN.2018 20:01:59

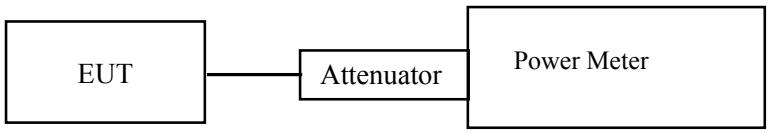
FCC §15.407(a) (3)– CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

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

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Dylan Li on 2018-01-24.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Frequency (MHz)	Antenna Port	Average Output Power (dBm)	Total Output Power (dBm)	Limit (dBm)
	802.11a			
5745	0	16.84	20.20	30
	1	17.51		
5785	0	16.53	19.96	
	1	17.33		
5825	0	16.42	19.92	
	1	17.35		
	802.11n20			
5745	0	16.89	20.12	30
	1	17.31		
5785	0	16.51	20.02	
	1	17.45		
5825	0	16.37	19.91	
	1	17.38		

Note: This Device Emploies Cyclic Delay Diversity.
When determining reductions in conducted power limits, array gain is calculated as follows: As to this device, NANT ≤ 4, Array Gain = 0 dB.
Total directional gain (dBi) = gain of individual transmit antennas (dBi) + 0 (dB) =2dBi.

FCC §15.407(a) (3) - POWER SPECTRAL DENSITY

Applicable Standard

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

For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW $\geqslant$ 1/T, where T is defined in section II.B.l.a).
b) Set VBW $\geqslant$ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Dylan Li from 2018-01-24 to 2018-02-02.

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EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

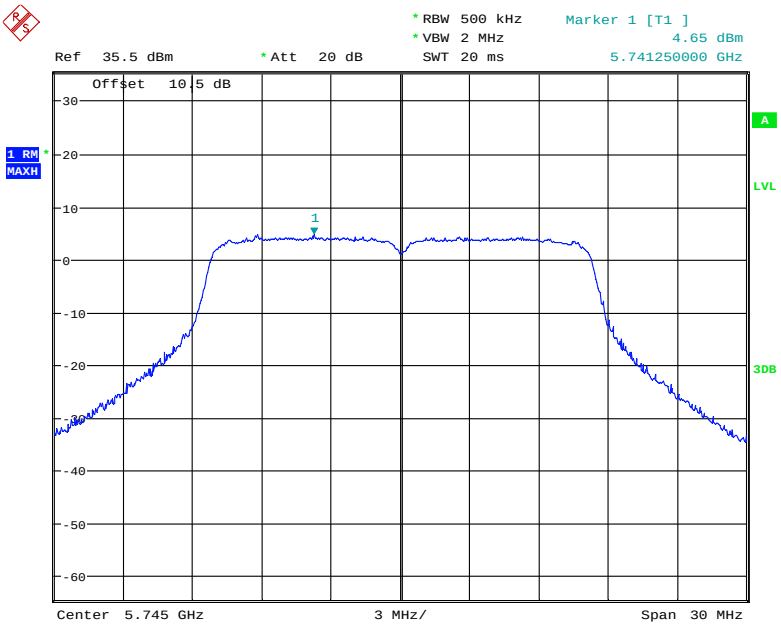
5725 MHz – 5850 MHz:

Frequency (MHz)	Antenna Port	Power Spectral Density (dBm/500kHz)	Total Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11a				
5745	0	4.65	7.51	30
	1	4.34		
5785	0	4.32	7.55	
	1	4.74		
5825	0	3.58	6.80	
	1	3.99		
802.11n20				
5745	0	4.58	7.67	30
	1	4.73		
5785	0	4.06	7.45	
	1	4.79		
5825	0	3.85	6.92	
	1	3.96		

Note: This Device Emploies Cyclic Delay Diversity.
When determining reductions in conducted power limits, array gain is calculated as follows: Array gain = 10 log (NANT), where NANT is the number of transmit antennas.
Total directional gain (dBi) = gain of individual transmit antennas (dBi) +Array gain (dBi) =2dBi+3dBi=5dBi.

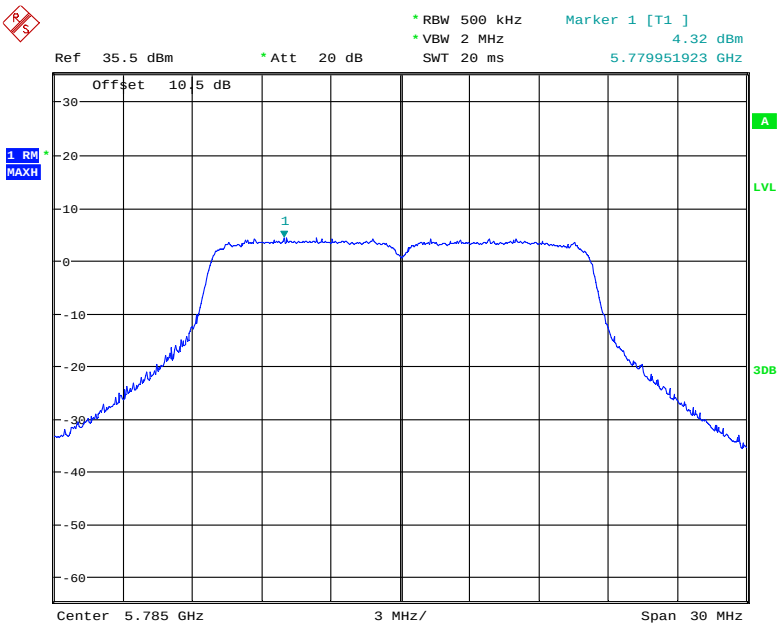
Antenna 0:

802.11a mode, Power Spectral Density, 5745 MHz



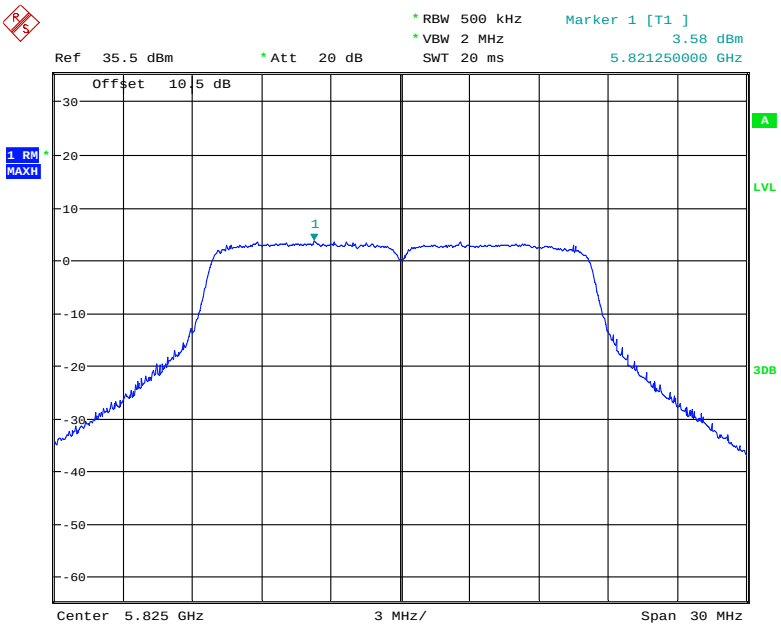
Date: 24.JAN.2018 19:04:55

802.11a mode, Power Spectral Density, 5785 MHz



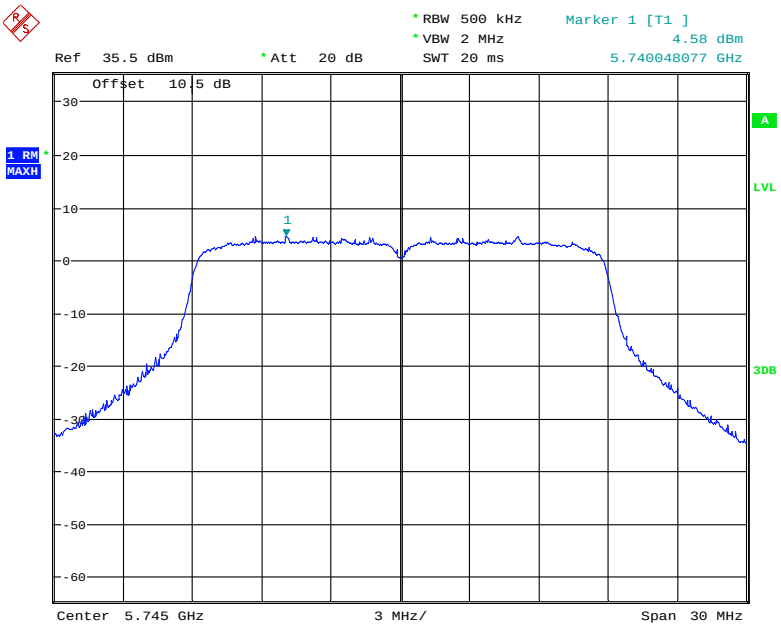
Date: 24.JAN.2018 19:06:11

802.11a mode, Power Spectral Density, 5825 MHz



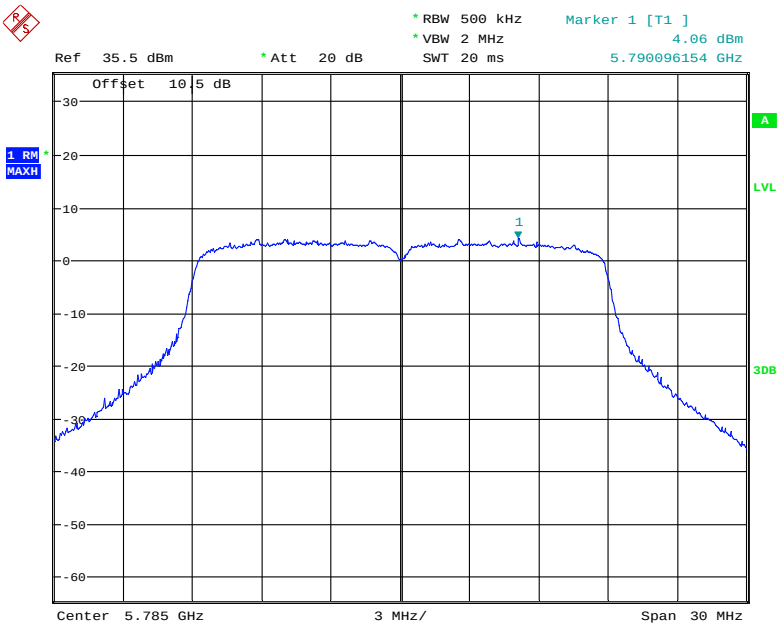
Date: 24.JAN.2018 19:06:56

802.11n20 mode, Power Spectral Density, 5745 MHz



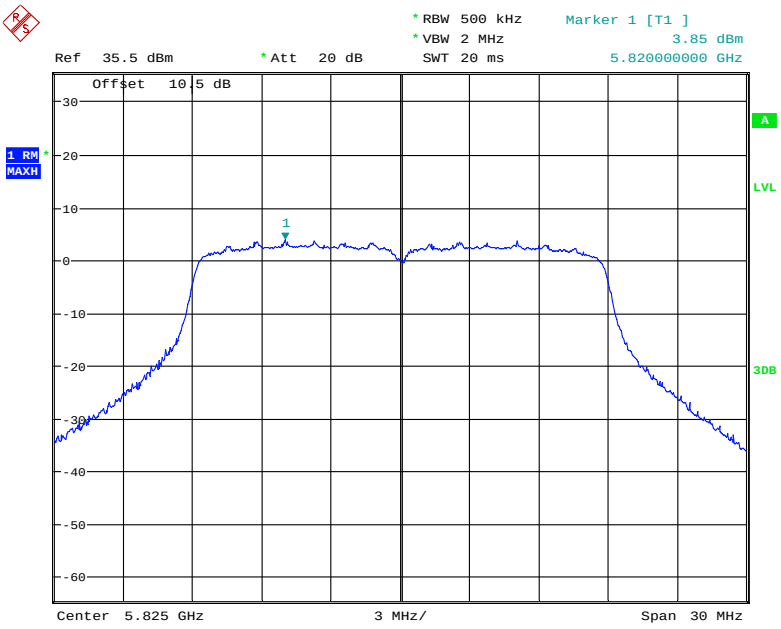
Date: 24.JAN.2018 19:08:18

802.11n20 mode, Power Spectral Density, 5785 MHz



Date: 24.JAN.2018 19:08:59

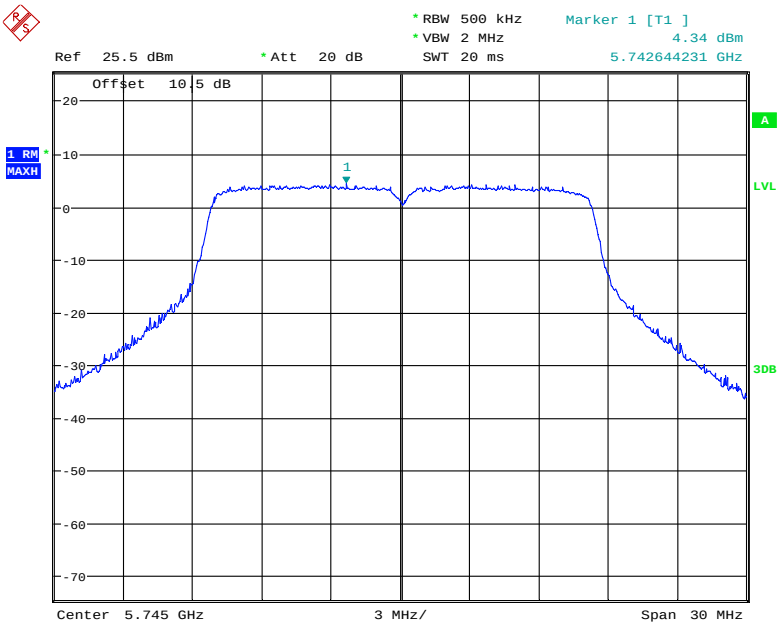
802.11n20 mode, Power Spectral Density, 5825 MHz



Date: 24.JAN.2018 19:09:40

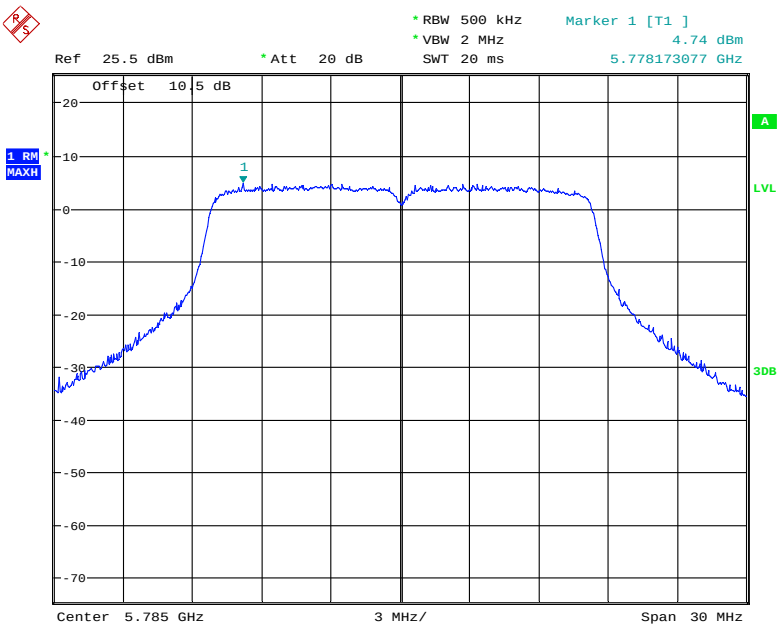
Antenna 1:

802.11a mode, Power Spectral Density, 5745 MHz



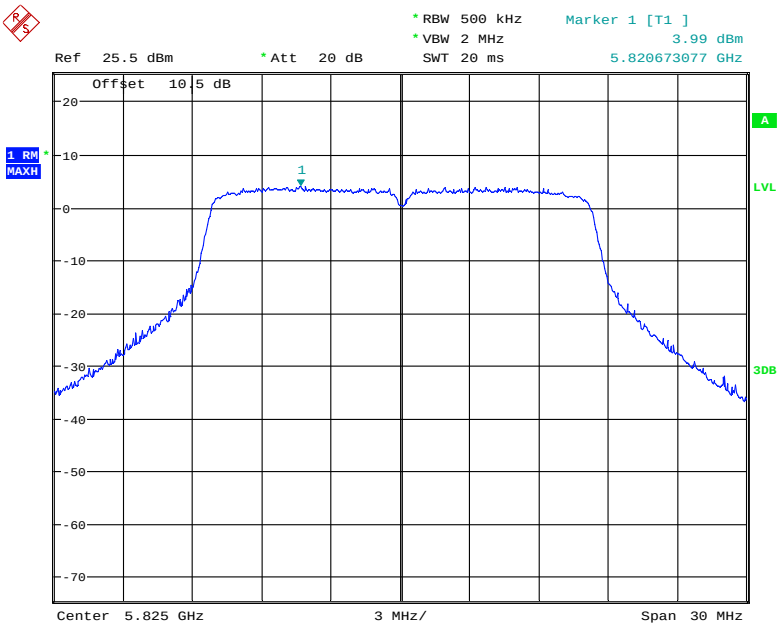
Date: 24.JAN.2018 20:21:35

802.11a mode, Power Spectral Density, 5785 MHz



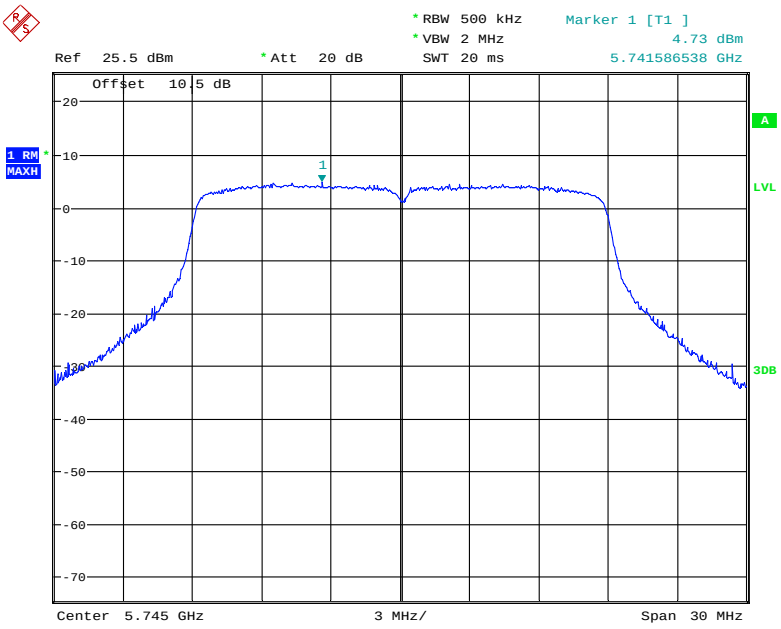
Date: 24.JAN.2018 20:21:01

802.11a mode, Power Spectral Density, 5825 MHz



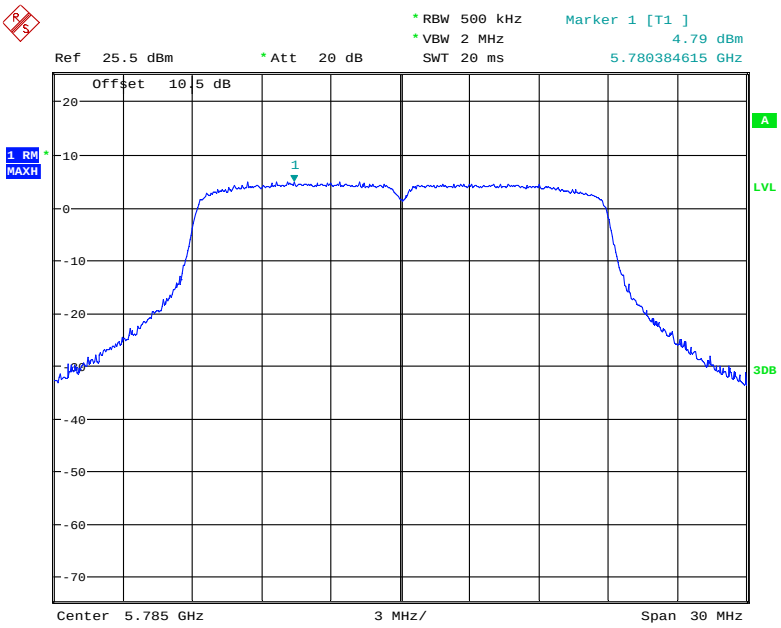
Date: 24.JAN.2018 20:22:26

802.11n20 mode, Power Spectral Density, 5745 MHz



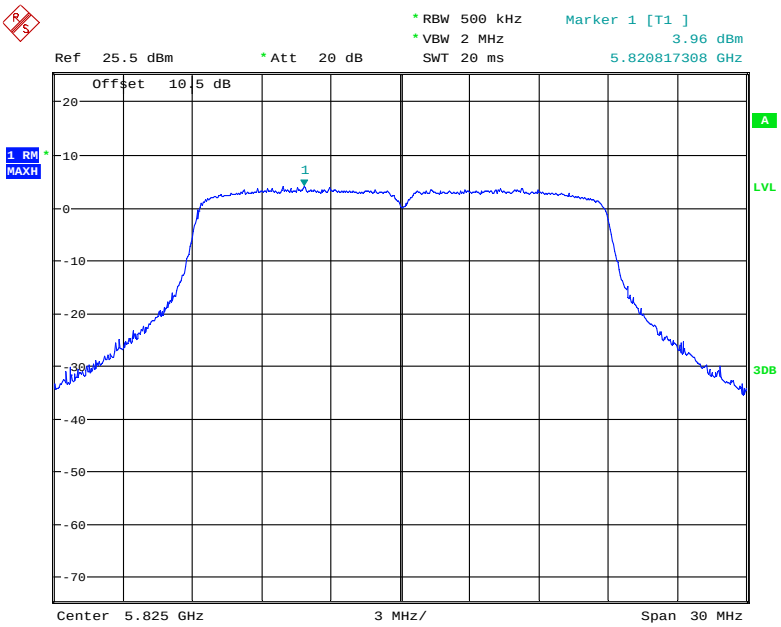
Date: 24.JAN.2018 20:25:27

802.11n20 mode, Power Spectral Density, 5785 MHz



Date: 24.JAN.2018 20:24:48

802.11n20 mode, Power Spectral Density, 5825 MHz



Date: 24.JAN.2018 20:23:59

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