FCC PART 15.407

TEST REPORT

For

Group Sense Mobile-Tech Limited

Room 13-24, 2/F, Sino Industrial Plaza, 9 Kai Cheung Road, Kowloon Bay, Kowloon, Hong Kong

FCC ID: VRI-B231

Report Type:	Product Type:
Original Report	POS Terminal

Report Number:	RSZ170418017-00E
Report Date:	2017-08-30
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

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Group Sense Mobile-Tech Limited's* product, model number: *DT-10 (FCC ID: VRI-B231)* or the "EUT" in this report was a *POS Terminal,* which was measured approximately: 28.4 cm (L) × 19.3 cm (W) × 1.9 cm (H), rated with input voltage: DC 3.8 V battery or DC 5V from adapter.

Adapter Information:
Model: JK050300-S04US
Input: AC 100-240V, 50/60Hz, 0.5A
Output: DC 5V, 3000 mA

**All measurement and test data in this report was gathered from production sample serial number: 1700742 (Assigned by BACL, Shenzhen).The EUT supplied by the applicant was received on 2017-07-20.*

Objective

This type approval report is prepared on behalf of *Group Sense Mobile-Tech Limited* 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)

FCC Part 15.247 DSS&DTS, FCC Part 22H & 24E PCB, Part 15.225 DXX and Part 15B JBC submissions with FCC ID: VRI-B231.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

All emissions measurement was performed 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	±4.95dB
Temperature	±3℃
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.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS (Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP (Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was 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

Software: "Win8DutApp_x86_1.0.016"

The worst case was performed as below:

5150 MHz – 5250 MHz:

802.11a: Rate 6Mbps, Power level: 12
802.11n20: Rate MCS0, Power level: 10
802.11n40: Rate MCS0, Power level: 12

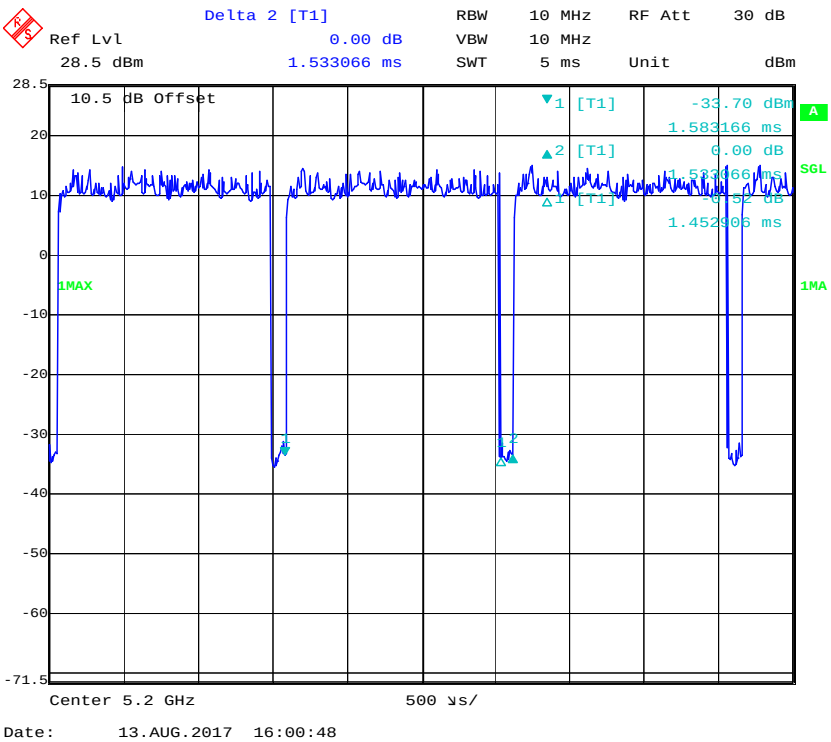
5725 MHz – 5850 MHz:

802.11a: Rate 6Mbps, Power level: 8
802.11n20: Rate MCS0, Power level: 9
802.11n40: Rate MCS0, Power level: 12

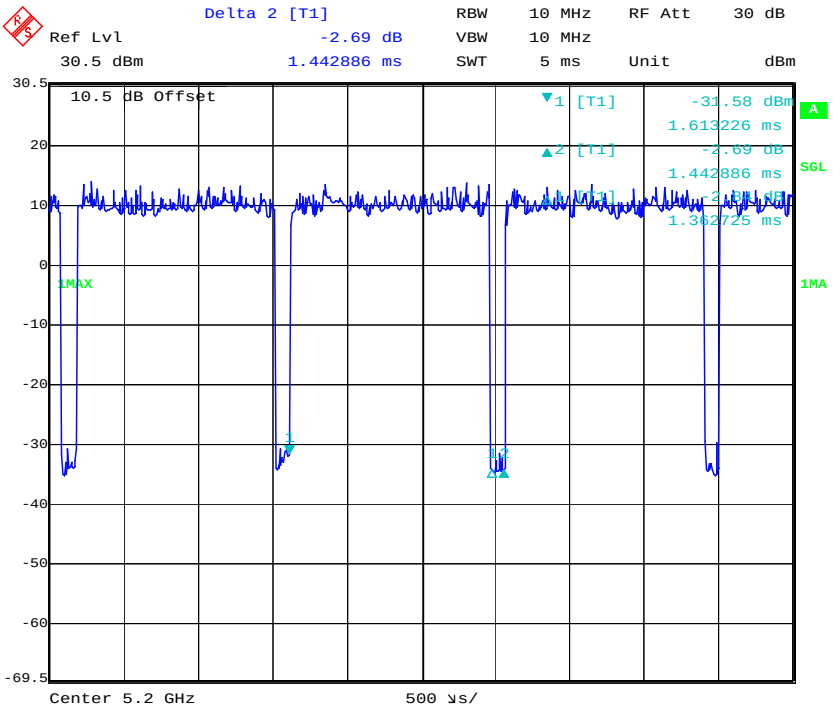
Duty cycle

5150MHz – 5250 MHz:

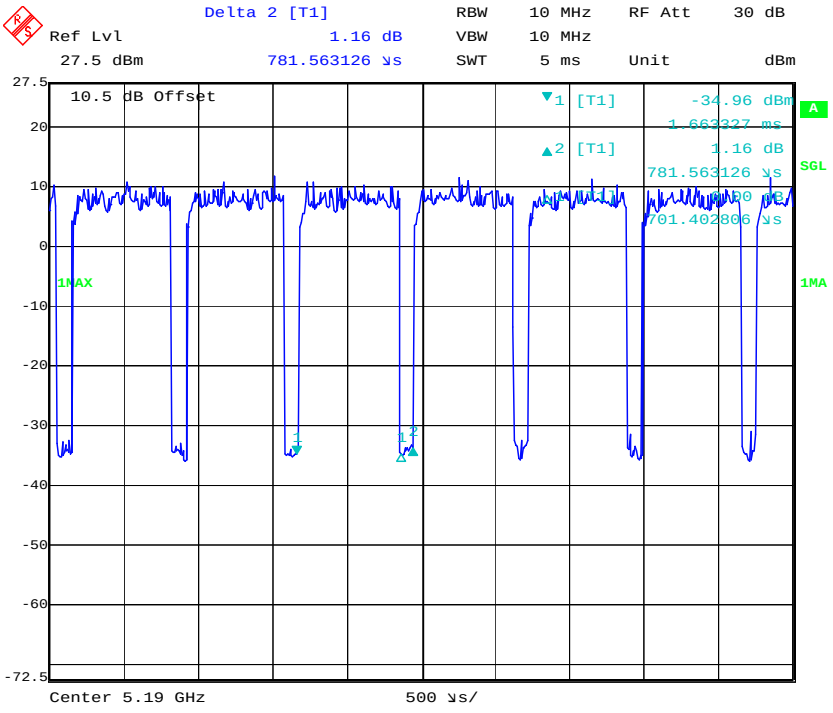
802.11a mode



802.11n20 mode



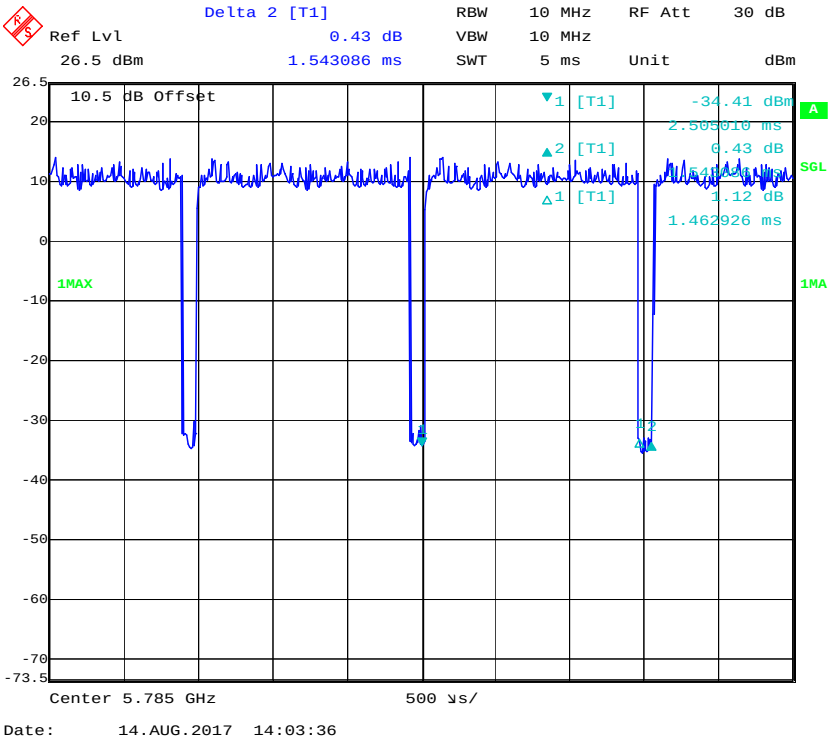
802.11n40 Mode



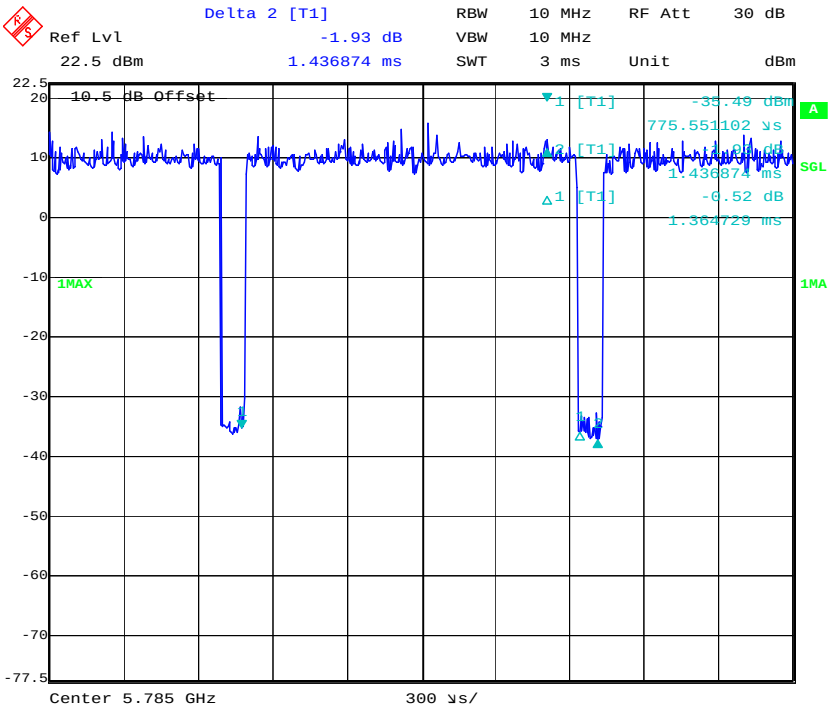
Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	10log(1/ Duty Cycle)
802.11a	95	1453	0.69	1kHz	0.22
802.11n20	94	1363	0.73	1kHz	0.27
802.11n40	90	701	1.43	3kHz	0.46

5725MHz – 5850 MHz:

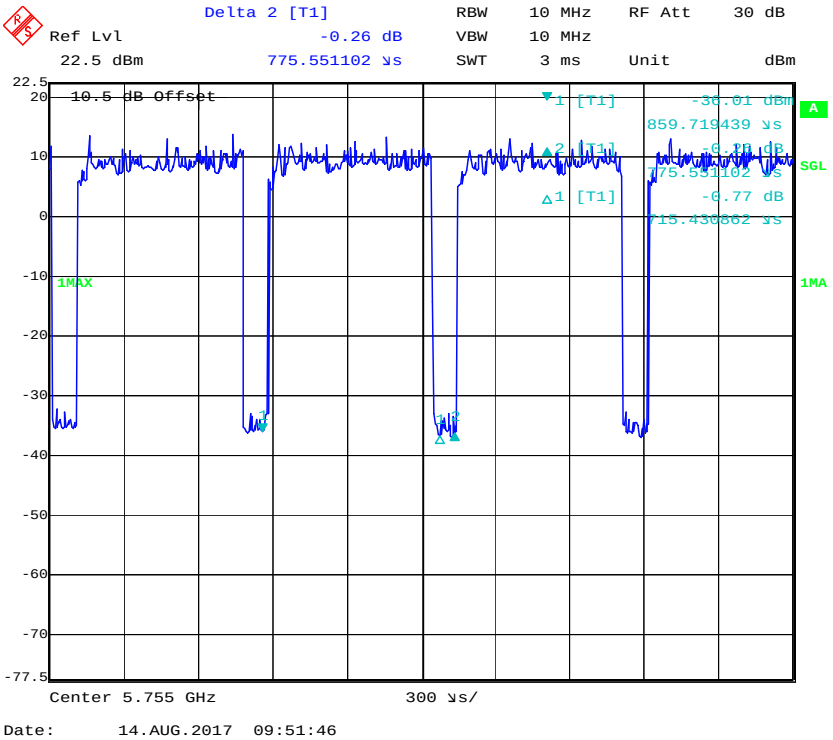
802.11a mode



802.11n20 mode



802.11n40 Mode



Band	Duty Cycle (%)	T(us)	1/T(kHz)	VBW Setting	10log(1/x)
802.11a	95	1463	0.68	1kHz	0.22
802.11n20	95	1365	0.73	1kHz	0.22
802.11n40	92	715	1.40	3kHz	0.36

Equipment Modifications

No modification was made to the EUT tested.

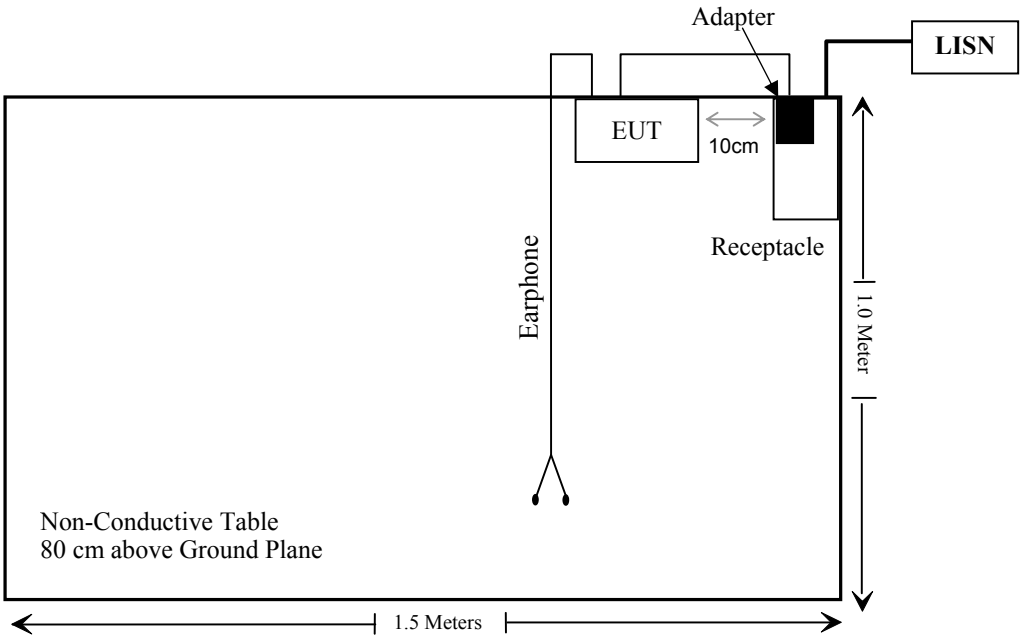
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
\	\	\	\

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307(b) & §2.1093	Rf Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.407(b)(6)& §15.207(a)	Conducted Emissions	Compliance
§15.205& §15.209 &§15.407(b) (1),(4),(7)	Undesirable Emission& Restricted Bands	Compliance
§15.407(b) (1),(4)	Out Of Band Emission	Compliance
§15.407(a) (1),(5),(e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliance
§15.407(g)	Frequency Stability	Compliance
§15.407(a)(1),(3)	Conducted Transmitter Output Power	Compliance
§15.407 (a)(1),(3)	Power Spectral Density	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2016-10-19	2017-10-19
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2016-12-07	2017-12-07
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2017-02-14	2017-08-15
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2017-05-12	2017-11-12
Radiation test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19
Anritsu	Signal Generator	68369B	004114	2016-12-05	2017-12-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2014-12-29	2017-12-28
Ducommun Technologies	Horn Antenna	ARH-4823-02	1007726-04	2014-12-29	2017-12-28
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	2016-11-22	2017-11-22
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	2016-11-18	2017-11-17
Agilent	Power Sensor	N1921A	MY54210024	2016-11-18	2017-11-17
Ducommun technologies	RF Cable	RG-214	3	2017-05-22	2017-11-22
WEINSCHEL	10dB Attenuator	5324	AU 3842	2017-05-23	2017-11-22

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

FCC §1.1307(b) & §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.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

For worst case:

Frequency (MHz)	Maximum couducted Tune-up power		Calculated Distance (mm)	Calculated value	Threshold (1-g SAR)	SAR Test Exclusion
	power (dBm)	power (mW)				
5240	7.7	5.89	5	2.70	3.0	**Yes**
5825	7.4	5.50	5	2.65	3.0	**Yes**

Result: No SAR test is required

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 integrated antenna with maximum gain 0 dBi which were permanently attached, fulfill the requirement of this section, and please refer to the EUT photo.

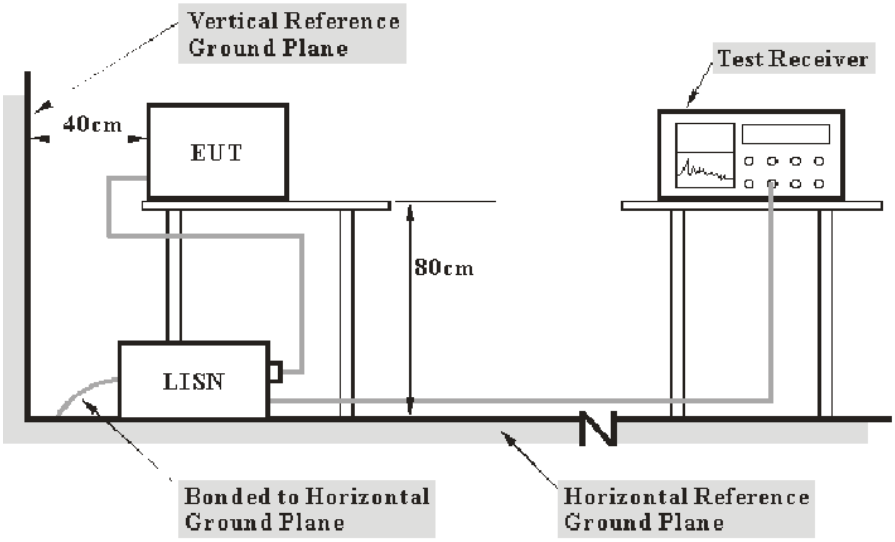
Result: Compliance.

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

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 C63.4-2014 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

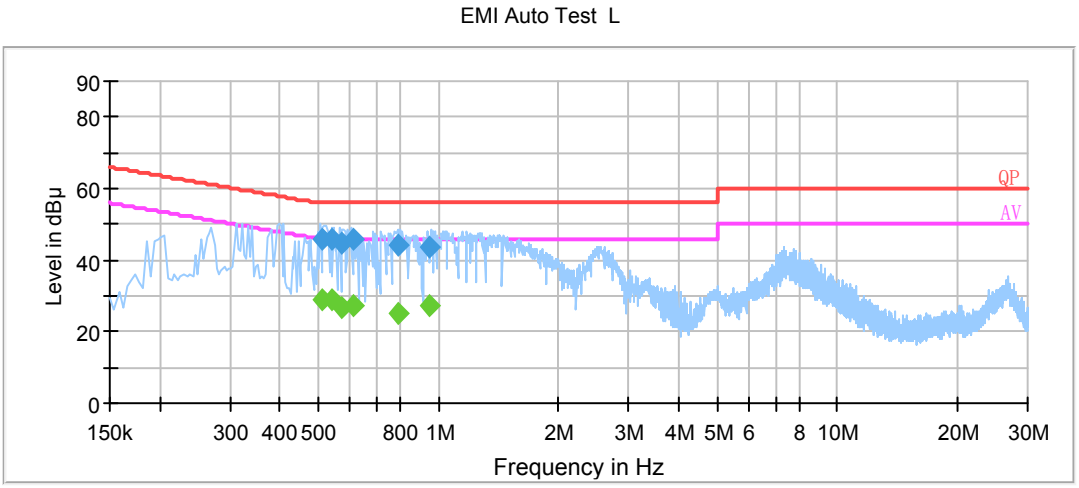
Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2017-08-11.

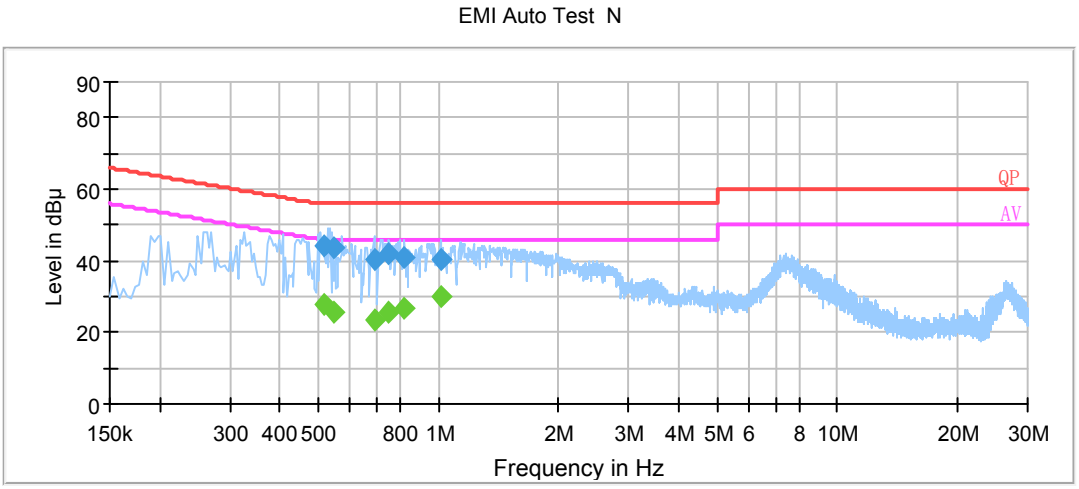
EUT operation mode: Transmitting

AC 120V/60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.510410	45.9	20.2	56.0	10.1	QP
0.541930	45.8	20.2	56.0	10.2	QP
0.569510	44.8	20.1	56.0	11.2	QP
0.611030	46.0	20.1	56.0	10.0	QP
0.794150	44.1	20.0	56.0	11.9	QP
0.951630	43.8	20.1	56.0	12.2	QP
0.510410	29.0	20.2	46.0	17.0	Ave.
0.541930	28.7	20.2	46.0	17.3	Ave.
0.569510	26.6	20.1	46.0	19.4	Ave.
0.611030	27.5	20.1	46.0	18.5	Ave.
0.794150	25.3	20.0	46.0	20.7	Ave.
0.951630	27.5	20.1	46.0	18.5	Ave.

AC120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.518110	44.4	20.2	56.0	11.6	QP
0.545870	43.5	20.2	56.0	12.5	QP
0.691650	40.6	20.0	56.0	15.4	QP
0.750750	41.9	20.0	56.0	14.1	QP
0.817670	41.0	20.0	56.0	15.0	QP
1.018850	40.5	20.1	56.0	15.5	QP
0.518110	27.9	20.2	46.0	18.1	Ave.
0.545870	25.8	20.2	46.0	20.2	Ave.
0.691650	23.3	20.0	46.0	22.7	Ave.
0.750750	25.9	20.0	46.0	20.1	Ave.
0.817670	26.5	20.0	46.0	19.5	Ave.
1.018850	29.8	20.1	46.0	16.2	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) (1),(4),(6),(7) – UNDESIRABLE EMISSION

Applicable Standard

FCC §15.407 (b) (1), (2), (4), (6), (7); §15.209; §15.205;

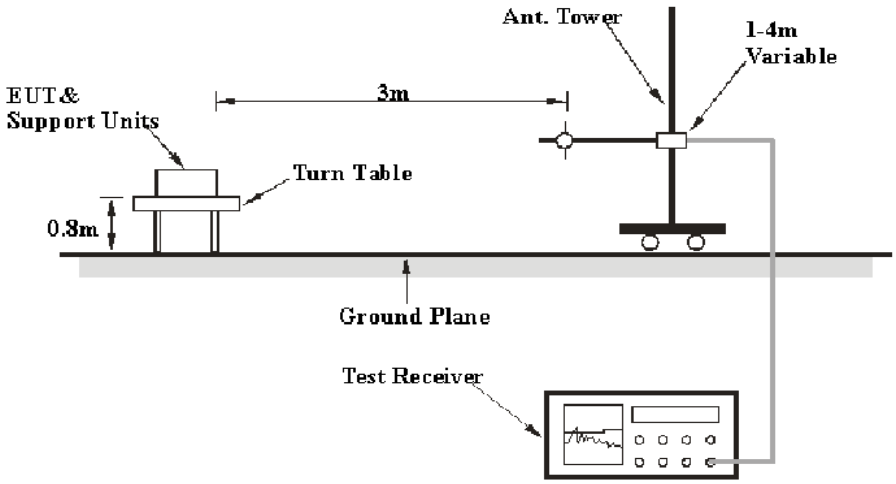
(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 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.
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

KDB 789033 D02 General UNII Test Procedures New Rulesv01r04, clause II.G 1 d),
(ii) E [dBμV/m] = EIRP [dBm] + 95.2, for d = 3 meters.

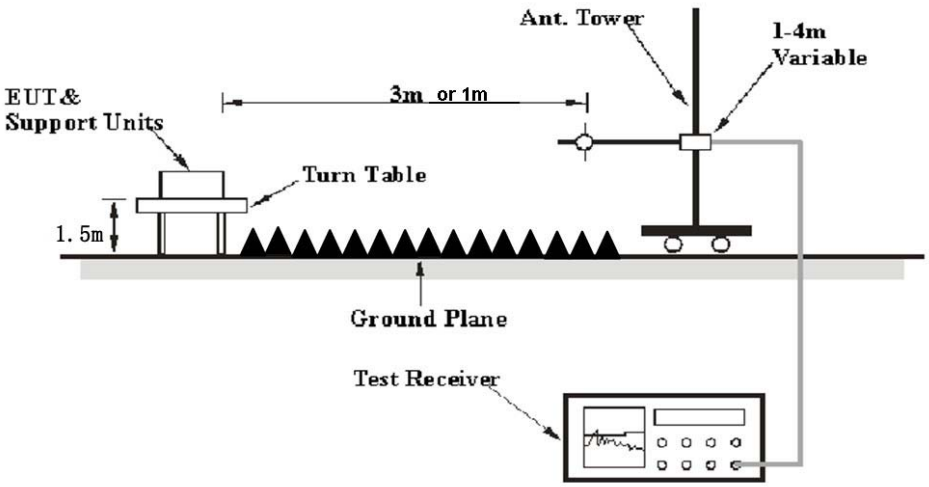
KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01 clause E.3)

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.

The adapter was connected to a 120 VAC/60 Hz power source,

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	PK
	1MHz	＞1/T Note 2	/	PK

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

Test Procedure

Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

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:	26 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li on 2017-08-18.

EUT operation mode: Transmitting

30 MHz ~ 40 GHz: (5180-5250 MHz & 5725-5825 MHz)

802.11a mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5180 MHz									
121.07	42.85	QP	185	1.7	H	-5.90	36.95	43.5	6.55
5180.00	60.65	PK	92	2.2	H	41.84	102.49	/	/
5180.00	54.19	Ave.	92	2.2	H	41.84	96.03	/	/
5180.00	55.4	PK	205	2.5	V	41.84	97.24	/	/
5180.00	49.48	Ave.	205	2.5	V	41.84	91.32	/	/
5150.00	18.03	PK	67	1.5	H	41.84	59.87	74	14.13
5150.00	4.79	Ave.	67	1.5	H	41.84	46.63	54	7.37
5350.00	18.67	PK	325	2.4	H	41.87	60.54	74	13.46
5350.00	4.88	Ave.	325	2.4	H	41.87	46.75	54	7.25
10360.00	31.99	PK	90	1.9	H	16.38	48.37	74	25.63
10360.00	16.36	Ave.	90	1.9	H	16.38	32.74	54	21.26
5200 MHz									
121.07	42.61	QP	104	1.9	H	-5.90	36.71	43.5	6.79
5200.00	61.01	PK	360	2.2	H	41.84	102.85	/	/
5200.00	55.7	Ave.	360	2.2	H	41.84	97.54	/	/
5200.00	55.54	PK	280	1.7	V	41.84	97.38	/	/
5200.00	49.58	Ave.	280	1.7	V	41.84	91.42	/	/
5150.00	17.82	PK	174	2.1	H	41.84	59.66	74	14.34
5150.00	4.28	Ave.	174	2.1	H	41.84	46.12	54	7.88
5350.00	18.82	PK	6	1.2	H	41.87	60.69	74	13.31
5350.00	4.69	Ave.	6	1.2	H	41.87	46.56	54	7.44
10400.00	30.46	PK	148	1.6	H	16.38	46.84	74	27.16
10400.00	16.44	Ave.	148	1.6	H	16.38	32.82	54	21.18
5240 MHz									
121.07	42.88	QP	213	1.5	H	-5.90	36.98	43.5	6.52
5240.00	60.9	PK	269	2.2	H	41.84	102.74	/	/
5240.00	54.79	Ave.	269	2.2	H	41.84	96.63	/	/
5240.00	53.71	PK	324	1.2	V	41.84	95.55	/	/
5240.00	47.61	Ave.	324	1.2	V	41.84	89.45	/	/
5150.00	19.49	PK	167	1.1	H	41.84	61.33	74	12.67
5150.00	4.31	Ave.	167	1.1	H	41.84	46.15	54	7.85
5350.00	19.21	PK	342	1.0	H	41.87	61.08	74	12.92
5350.00	4.93	Ave.	342	1.0	H	41.87	46.80	54	7.20
10480.00	30.37	PK	139	1.8	H	17.64	48.01	74	25.99
10480.00	16.7	Ave.	139	1.8	H	17.64	34.34	54	19.66

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5745 MHz									
121.07	42.11	QP	245	1.8	H	-5.90	36.21	43.5	7.29
5745.00	54.74	PK	151	1.3	H	42.19	96.93	/	/
5745.00	48.33	Ave.	151	1.3	H	42.19	90.52	/	/
5745.00	53.6	PK	168	1.8	V	42.19	95.79	/	/
5745.00	47.34	Ave.	168	1.8	V	42.19	89.53	/	/
5724.09	19.32	PK	200	2.4	H	42.19	61.51	120.13	58.62
5709.84	19.41	PK	200	2.4	H	42.19	61.60	107.96	46.36
5681.65	18.9	PK	49	1.6	H	42.19	61.09	91.62	30.53
5854.20	19.36	PK	49	1.6	H	42.59	61.95	112.62	50.67
11490.00	31.38	PK	222	2.4	H	17.6	48.98	74	25.02
11490.00	16.38	Ave.	222	2.4	H	17.6	33.98	54	20.02
5785 MHz									
121.07	41.90	QP	215	1.8	H	-5.90	36.00	43.5	7.50
5785.00	53.07	PK	222	1.4	H	42.12	95.19	/	/
5785.00	47.23	Ave.	222	1.4	H	42.12	89.35	/	/
5785.00	51.85	PK	73	1.3	V	42.12	93.97	/	/
5785.00	45.43	Ave.	73	1.3	V	42.12	87.55	/	/
5854.12	24.11	PK	28	1.0	H	42.59	66.70	112.81	46.11
5864.31	21.27	PK	28	1.0	H	42.59	63.86	108.19	44.33
5879.13	19.6	PK	151	2.5	H	42.59	62.19	102.14	39.95
5721.04	18.98	PK	151	2.5	H	42.19	61.17	113.17	52.00
11570.00	34.85	PK	132	1.7	H	17.65	52.50	74	21.50
11570.00	19.75	Ave.	132	1.7	H	17.65	37.40	54	16.60
5825 MHz									
121.07	41.75	QP	185	1.7	H	-5.90	35.85	43.5	7.65
5825.00	52.07	PK	234	2.0	H	42.12	94.19	/	/
5825.00	46.19	Ave.	234	2.0	H	42.12	88.31	/	/
5825.00	51.92	PK	85	1.4	V	42.12	94.04	/	/
5825.00	45.18	Ave.	85	1.4	V	42.12	87.30	/	/
5853.77	24.13	PK	244	1.4	H	42.59	66.72	113.6	46.88
5859.12	20.52	PK	244	1.4	H	42.59	63.11	109.65	46.54
5884.64	18.18	PK	156	1.4	H	42.59	60.77	98.07	37.30
5723.84	19.69	PK	156	1.4	H	42.19	61.88	119.56	57.68
11650.00	34.09	PK	227	1.9	H	17.65	51.74	74	22.26
11650.00	19.2	Ave.	227	1.9	H	17.65	36.85	54	17.15

802.11n20 mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5180 MHz									
121.07	42.24	QP	38	1.5	H	-5.90	36.34	43.5	7.16
5180.00	58.25	PK	54	1.5	H	41.84	100.09	/	/
5180.00	52.8	Ave.	54	1.5	H	41.84	94.64	/	/
5180.00	54	PK	102	1.8	V	41.84	95.84	/	/
5180.00	48.68	Ave.	102	1.8	V	41.84	90.52	/	/
5150.00	18.71	PK	139	1.8	H	41.84	60.55	74	13.45
5150.00	4.49	Ave.	139	1.8	H	41.84	46.33	54	7.67
5350.00	18.33	PK	306	1.4	H	41.87	60.20	74	13.80
5350.00	4.7	Ave.	306	1.4	H	41.87	46.57	54	7.43
10360.00	33.85	PK	341	2.3	H	16.38	50.23	74	23.77
10360.00	17.41	Ave.	341	2.3	H	16.38	33.79	54	20.21
5200 MHz									
121.07	42.76	QP	107	1.9	H	-5.90	36.86	43.5	6.64
5200.00	57.02	PK	119	1.6	H	41.84	98.86	/	/
5200.00	51.72	Ave.	119	1.6	H	41.84	93.56	/	/
5200.00	53.33	PK	226	1.7	V	41.84	95.17	/	/
5200.00	47.15	Ave.	226	1.7	V	41.84	88.99	/	/
5150.00	19.04	PK	209	2.4	H	41.84	60.88	74	13.12
5150.00	4.41	Ave.	209	2.4	H	41.84	46.25	54	7.75
5350.00	18.47	PK	247	1.3	H	41.87	60.34	74	13.66
5350.00	4.69	Ave.	247	1.3	H	41.87	46.56	54	7.44
10400.00	32.27	PK	17	1.4	H	16.38	48.65	74	25.35
10400.00	18.43	Ave.	17	1.4	H	16.38	34.81	54	19.19
5240 MHz									
121.07	42.55	QP	132	1.8	H	-5.90	36.65	43.5	6.85
5240.00	55.81	PK	95	1.9	H	41.84	97.65	/	/
5240.00	49.54	Ave.	95	1.9	H	41.84	91.38	/	/
5240.00	50.57	PK	108	1.3	V	41.84	92.41	/	/
5240.00	44.21	Ave.	108	1.3	V	41.84	86.05	/	/
5150.00	18.59	PK	337	1.6	H	41.84	60.43	74	13.57
5150.00	4.31	Ave.	337	1.6	H	41.84	46.15	54	7.85
5350.00	20.14	PK	191	1.9	H	41.87	62.01	74	11.99
5350.00	5.7	Ave.	191	1.9	H	41.87	47.57	54	6.43
10480.00	43.27	PK	89	1.4	H	17.28	60.55	74	13.45
10480.00	18.82	Ave.	89	1.4	H	17.28	36.10	54	17.90

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5745 MHz									
121.07	40.82	QP	83	1.5	H	-5.90	34.92	43.5	8.58
5745.00	54.63	PK	334	1.3	H	42.19	96.82	/	/
5745.00	48.27	Ave.	334	1.3	H	42.19	90.46	/	/
5745.00	53.98	PK	208	1.5	V	42.19	96.17	/	/
5745.00	48.42	Ave.	208	1.5	V	42.19	90.61	/	/
5723.69	20.74	PK	16	2.2	H	42.19	62.93	119.21	56.28
5703.44	19.2	PK	16	2.2	H	42.19	61.39	106.16	44.77
5697.31	19.32	PK	282	1.3	H	42.19	61.51	103.21	41.70
5854.62	18.83	PK	282	1.3	H	42.59	61.42	111.67	50.25
11490.00	31.8	PK	151	2.2	H	17.6	49.40	74	24.60
11490.00	18.32	Ave.	151	2.2	H	17.6	35.92	54	18.08
5785 MHz									
121.07	40.90	QP	146	1.5	H	-5.90	35.00	43.5	8.50
5785.00	54.24	PK	310	2.3	H	42.12	96.36	/	/
5785.00	48.58	Ave.	310	2.3	H	42.12	90.70	/	/
5785.00	52.14	PK	301	1.3	V	42.12	94.26	/	/
5785.00	46.1	Ave.	301	1.3	V	42.12	88.22	/	/
5724.64	21.73	PK	272	1.2	H	42.19	63.92	121.38	57.46
5704.11	18.99	PK	272	1.2	H	42.19	61.18	106.35	45.17
5683.75	18.17	PK	212	2.4	H	42.19	60.36	93.17	32.81
5853.67	18.4	PK	212	2.4	H	42.59	60.99	113.83	52.84
11570.00	35.33	PK	48	2.4	H	18.36	53.69	74	20.31
11570.00	23.42	Ave.	48	2.4	H	18.36	41.78	54	12.22
5825 MHz									
121.07	40.23	QP	183	1.6	H	-5.90	34.33	43.5	9.17
5825.00	54.85	PK	107	1.2	H	42.12	96.97	/	/
5825.00	48.5	Ave.	107	1.2	H	42.12	90.62	/	/
5825.00	53.44	PK	219	1.1	V	42.12	95.56	/	/
5825.00	47.06	Ave.	219	1.1	V	42.12	89.18	/	/
5852.69	21.73	PK	172	1.5	H	42.59	64.32	116.07	51.75
5861.37	18.99	PK	172	1.5	H	42.59	61.58	109.02	47.44
5893.11	18.17	PK	149	1.7	H	42.59	60.76	91.8	31.04
5722.52	18.4	PK	149	1.7	H	42.19	60.59	116.55	55.96
11650.00	31.73	PK	181	1.4	H	18.36	50.09	74	23.91
11650.00	20.37	Ave.	181	1.4	H	18.36	38.73	54	15.27

802.11n40 mode:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5190 MHz									
121.07	42.45	QP	114	1.5	H	-5.90	36.55	43.5	6.95
5190.00	55.98	PK	149	2.5	H	41.84	97.82	/	/
5190.00	50.47	Ave.	149	2.5	H	41.84	92.31	/	/
5190.00	52.38	PK	15	1.6	V	41.84	94.22	/	/
5190.00	46.15	Ave.	15	1.6	V	41.84	87.99	/	/
5150.00	19.18	PK	71	1.9	H	41.84	61.02	74	12.98
5150.00	4.39	Ave.	71	1.9	H	41.84	46.23	54	7.77
5350.00	19.39	PK	144	1.5	H	41.87	61.26	74	12.74
5350.00	4.7	Ave.	144	1.5	H	41.87	46.57	54	7.43
10380.00	32.08	PK	335	2.5	H	16.38	48.46	74	25.54
10380.00	19.21	Ave.	335	2.5	H	16.38	35.59	54	18.41
5230 MHz									
121.07	42.62	QP	132	1.8	H	-5.90	36.72	43.5	6.78
5230.00	55.36	PK	30	1.7	H	41.84	97.20	/	/
5230.00	49.2	Ave.	30	1.7	H	41.84	91.04	/	/
5230.00	53.02	PK	313	1.2	V	41.84	94.86	/	/
5230.00	47.25	Ave.	313	1.2	V	41.84	89.09	/	/
5150.00	19.18	PK	328	1.8	H	41.84	61.02	74	12.98
5150.00	4.39	Ave.	328	1.8	H	41.84	46.23	54	7.77
5350.00	20.66	PK	338	1.4	H	41.87	62.53	74	11.47
5350.00	5.27	Ave.	338	1.4	H	41.87	47.14	54	6.86
10460.00	31.73	PK	327	2.3	H	17.28	49.01	74	24.99
10460.00	19.81	Ave.	327	2.3	H	17.28	37.09	54	16.91

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H/V)			Limit (dBμV/m)	Margin (dB)
5755 MHz									
121.07	41.58	QP	113	1.9	H	-5.90	35.68	43.5	7.82
5755.00	55.06	PK	109	1.9	H	42.12	97.18	/	/
5755.00	49.1	Ave.	109	1.9	H	42.12	91.22	/	/
5755.00	54.09	PK	179	2.2	V	42.12	96.21	/	/
5755.00	48.81	Ave.	179	2.2	V	42.12	90.93	/	/
5723.79	20.39	PK	244	1.8	H	42.19	62.58	119.44	56.86
5714.65	18.85	PK	244	1.8	H	42.19	61.04	109.3	48.26
5698.25	18.98	PK	320	1.3	H	42.19	61.17	103.91	42.74
5853.28	18.71	PK	320	1.3	H	42.59	61.30	114.72	53.42
11510.00	31.8	PK	176	1.5	H	17.6	49.40	74	24.60
11510.00	18.59	Ave.	176	1.5	H	17.6	36.19	54	17.81
5795 MHz									
121.07	41.72	QP	206	1.8	H	-5.90	35.82	43.5	7.68
5795.00	52.73	PK	249	2.3	H	42.12	94.85	/	/
5795.00	46.47	Ave.	249	2.3	H	42.12	88.59	/	/
5795.00	51.06	PK	211	1.6	V	42.12	93.18	/	/
5795.00	45.51	Ave.	211	1.6	V	42.12	87.63	/	/
5854.31	23.82	PK	121	2.0	H	42.59	66.41	112.37	45.96
5857.22	19.2	PK	121	2.0	H	42.59	61.79	110.18	48.39
5890.37	19.07	PK	225	2.4	H	42.59	61.66	93.83	32.17
5721.43	18.59	PK	225	2.4	H	42.19	60.78	114.06	53.28
11590.00	32.4	PK	45	2.1	H	18.36	50.76	74	23.24
11590.00	19.03	Ave.	45	2.1	H	18.36	37.39	54	16.61

Note:
Corrected Amplitude = Corrected Factor + Reading
Margin = Limit- Corr. Amplitude
The bandedge was tested all polarization , and the worst polarization data was recorded.
Spurious emissions more than 20 dB below the limit were not reported.

§15.407(B) (1),(4) –OUT OF BAND EMISSION

Applicable Standard

FCC §15.407 (b) (1), (4);

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 EIRP of –27dBm/MHz.

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:	24~25 ℃
Relative Humidity:	53~58 %
ATM Pressure:	100.9~110.0 kPa

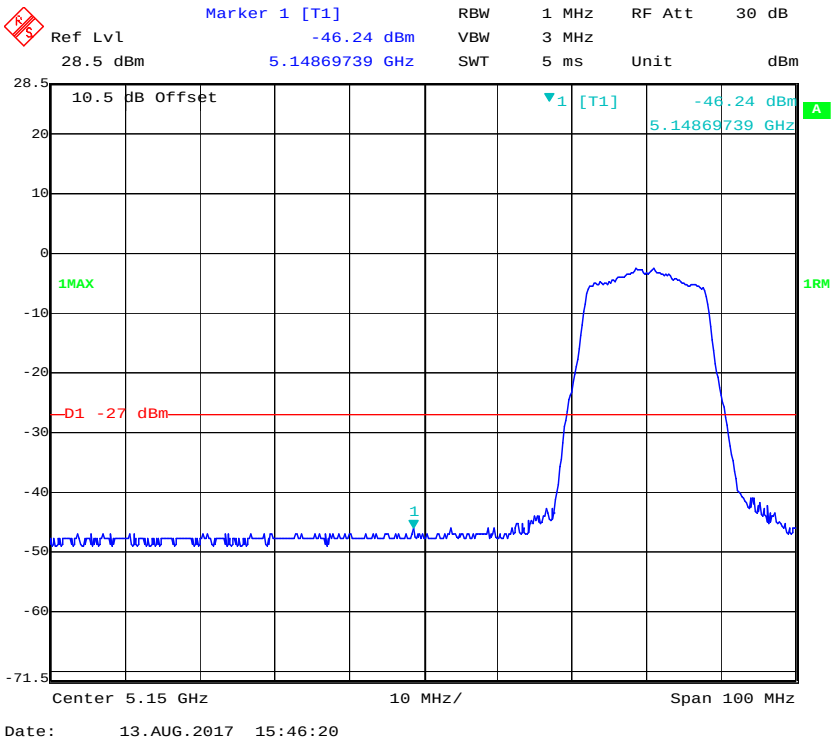
The testing was performed by Haiguo Li on 2017-08-13 and 2017-08-14.

EUT operation mode: Transmitting

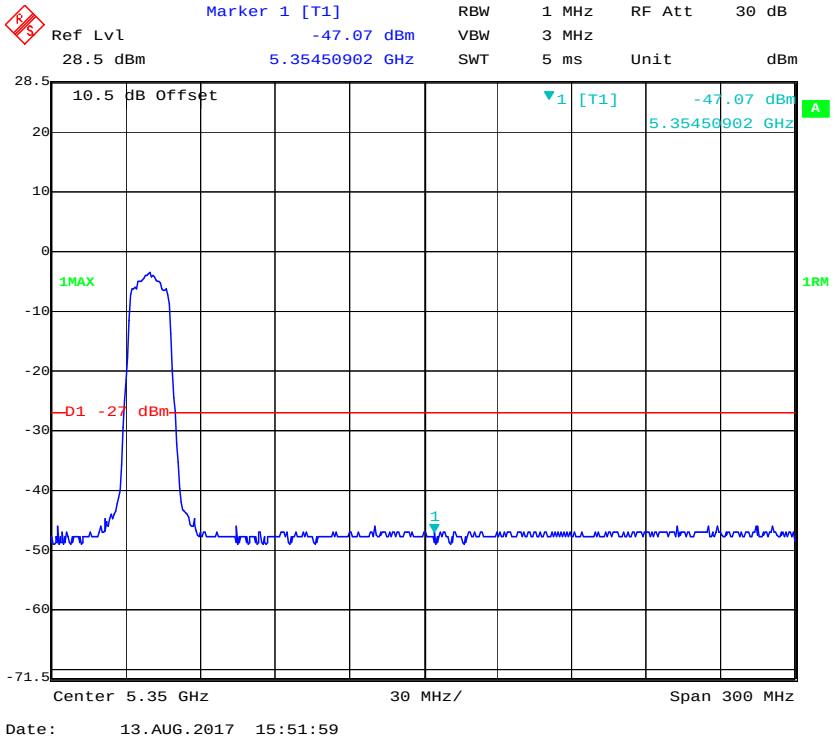
Note: The antenna gain had been offset in the plot, the limit is EIRP.

5150 – 5250 MHz:

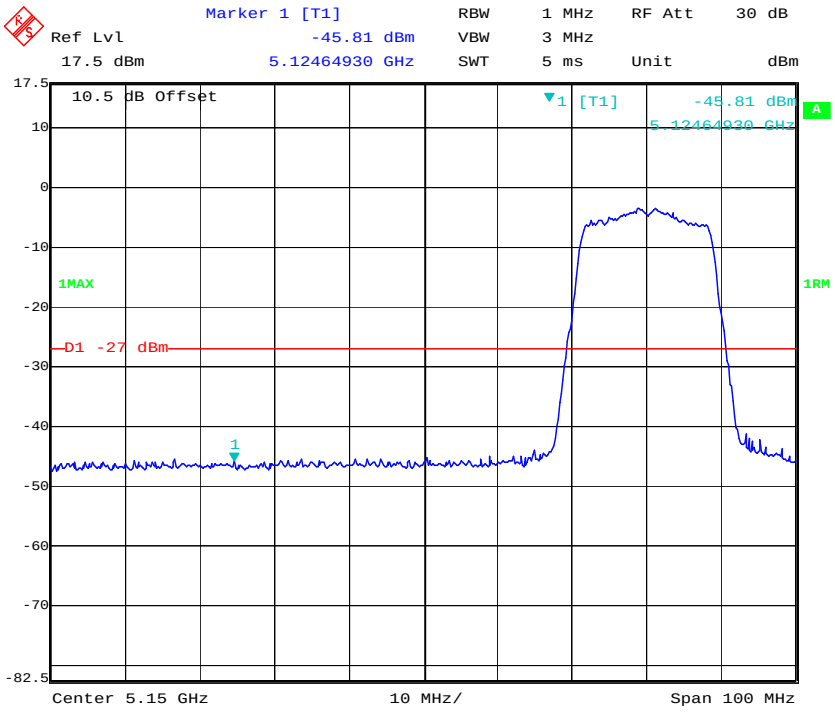
802.11a mode, Band Edge, Left Side



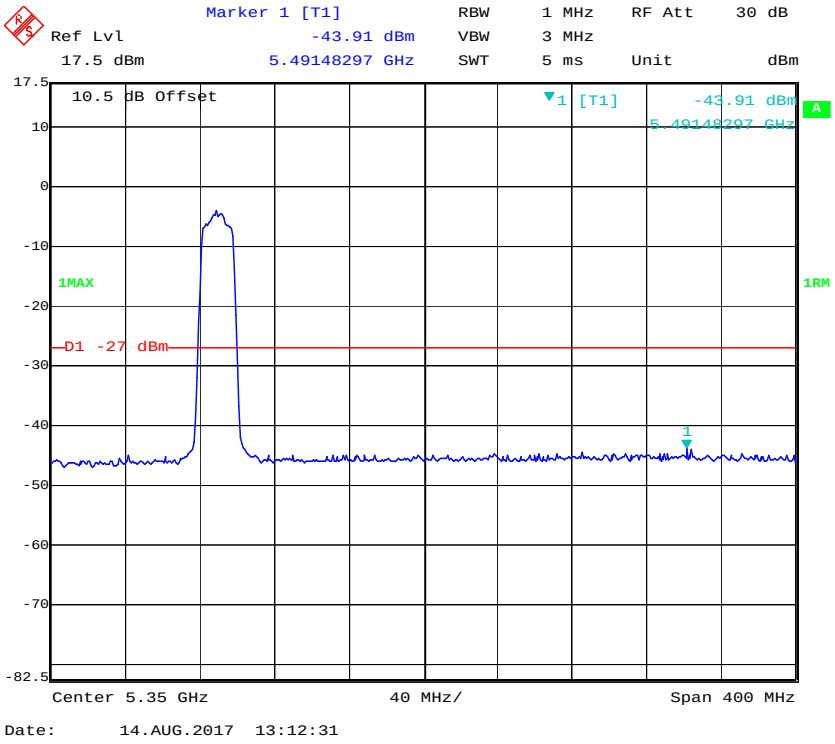
802.11a mode, Band Edge, Right Side



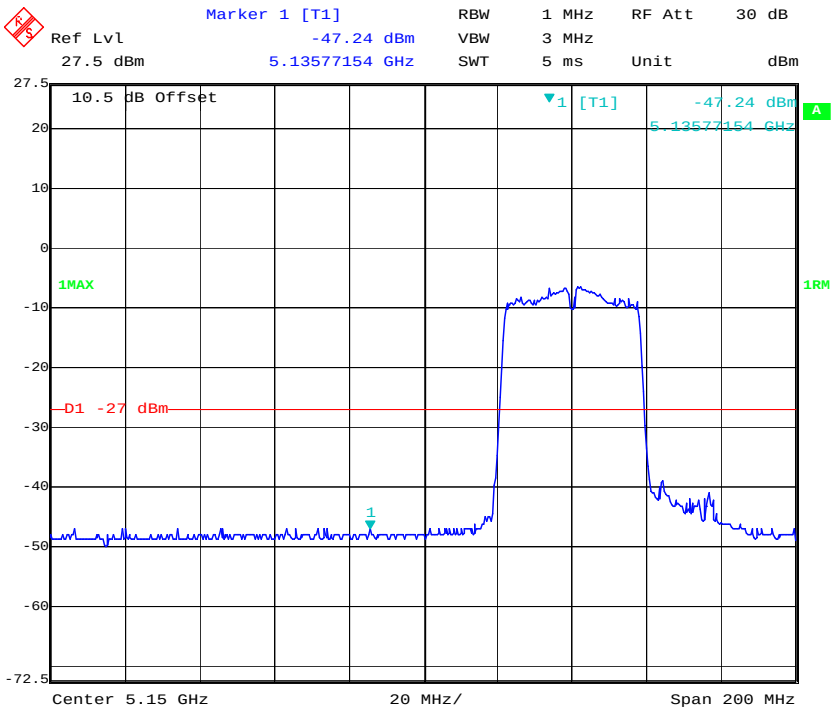
802.11n20 mode, Band Edge, Left Side



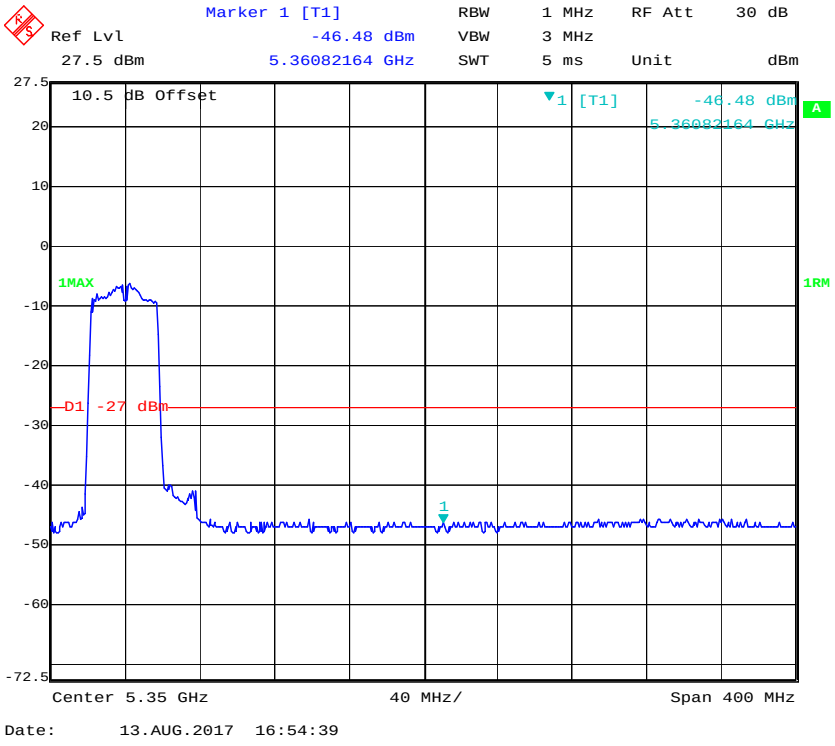
802.11n20 mode, Band Edge, Right Side



802.11n40 mode, Band Edge, Left Side

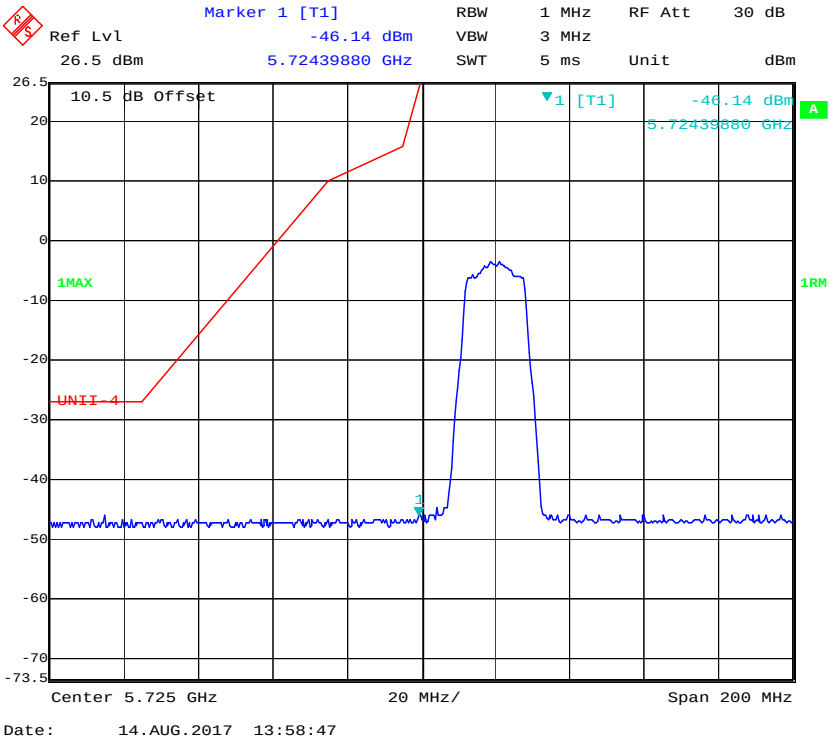


802.11n40 mode, Band Edge, Right Side

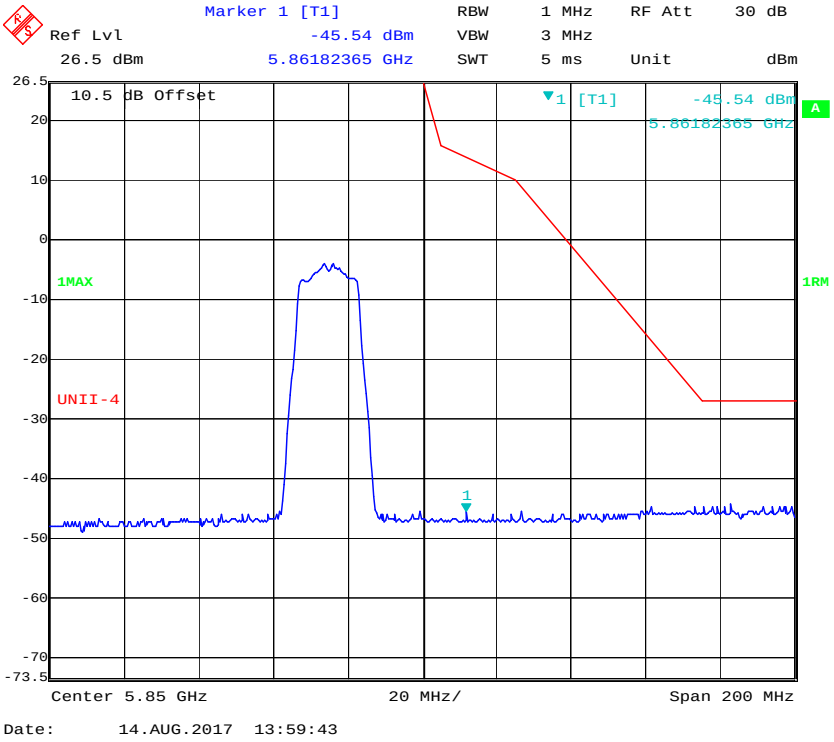


5725 – 5850 MHz:

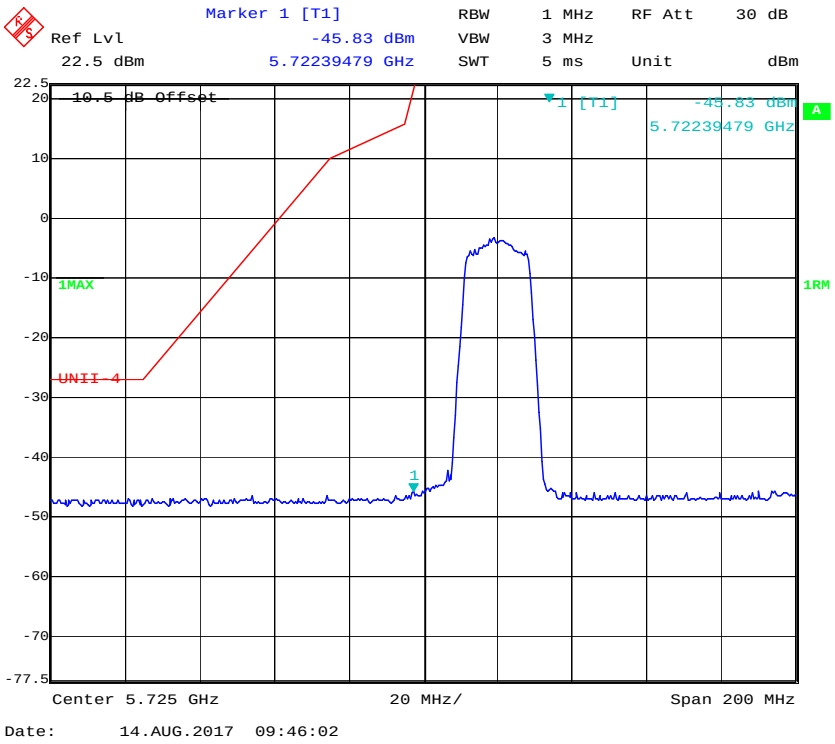
802.11a mode, Band Edge, Left Side



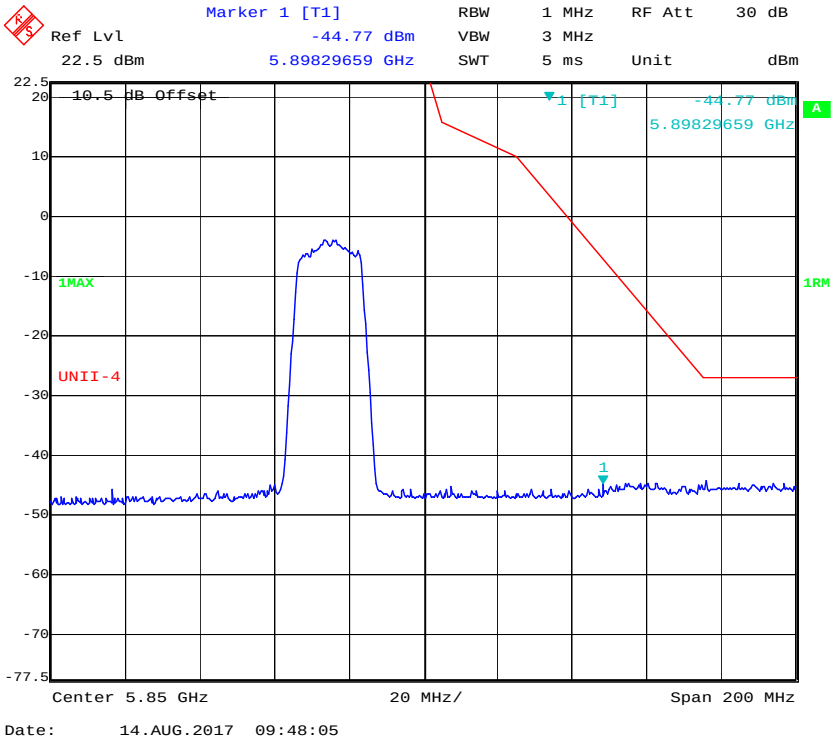
802.11a mode, Band Edge, Right Side



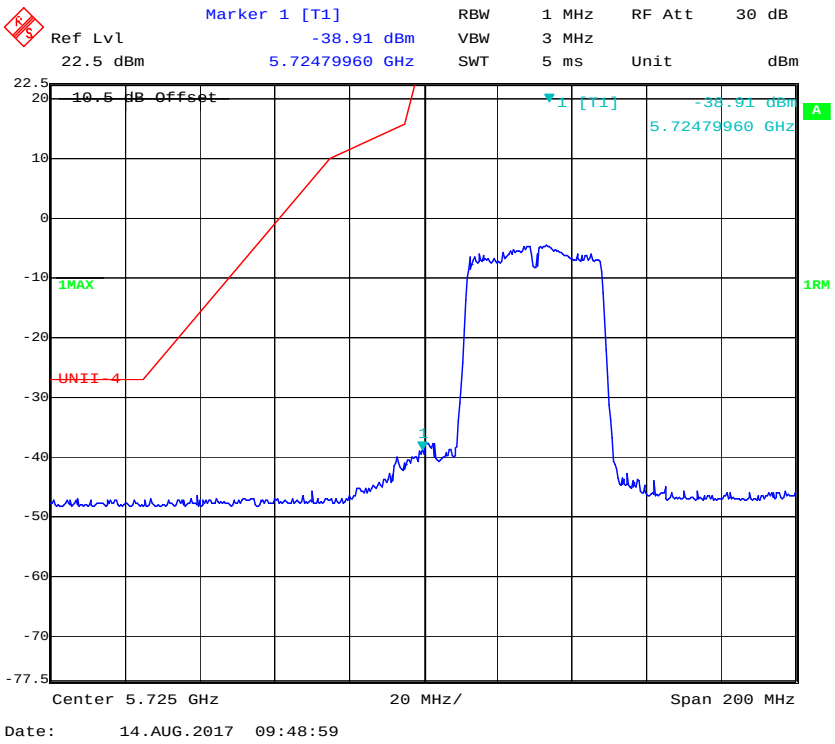
802.11n20 mode, Band Edge, Left Side



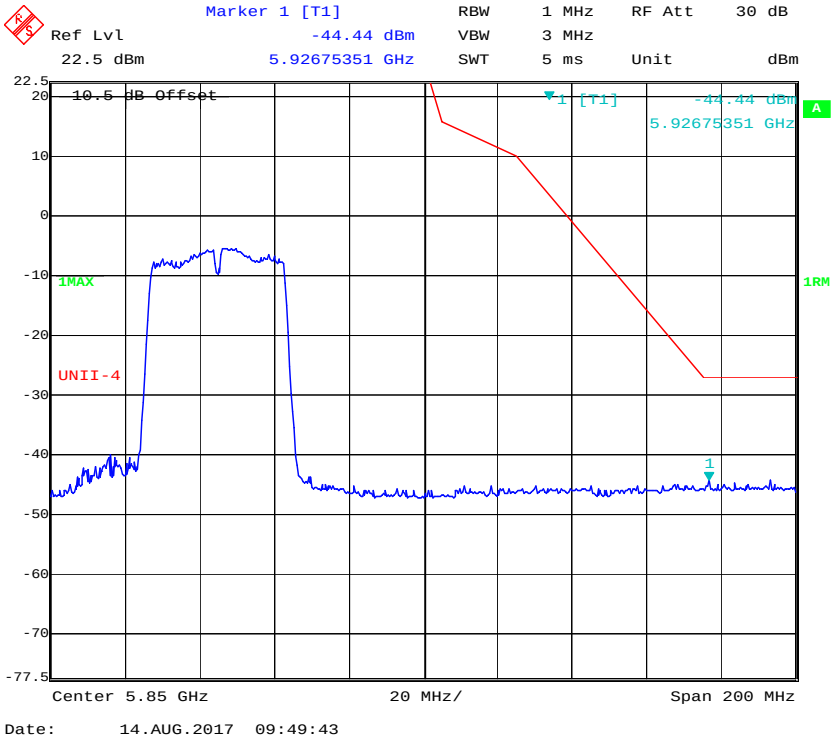
802.11n20 mode, Band Edge, Right Side



802.11n40 mode, Band Edge, Left Side



802.11n40 mode, Band Edge, Right Side



FCC §15.407(a) (1) – 26 dB & 6dB EMISSION BANDWIDTH

Applicable Standard

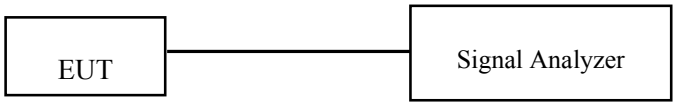
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

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. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. **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 5.715-5.85 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:	24~25 ℃
Relative Humidity:	53~58 %
ATM Pressure:	100.9~110.0 kPa

The testing was performed by Haiguo Li on 2017-08-13 and 2017-08-14.

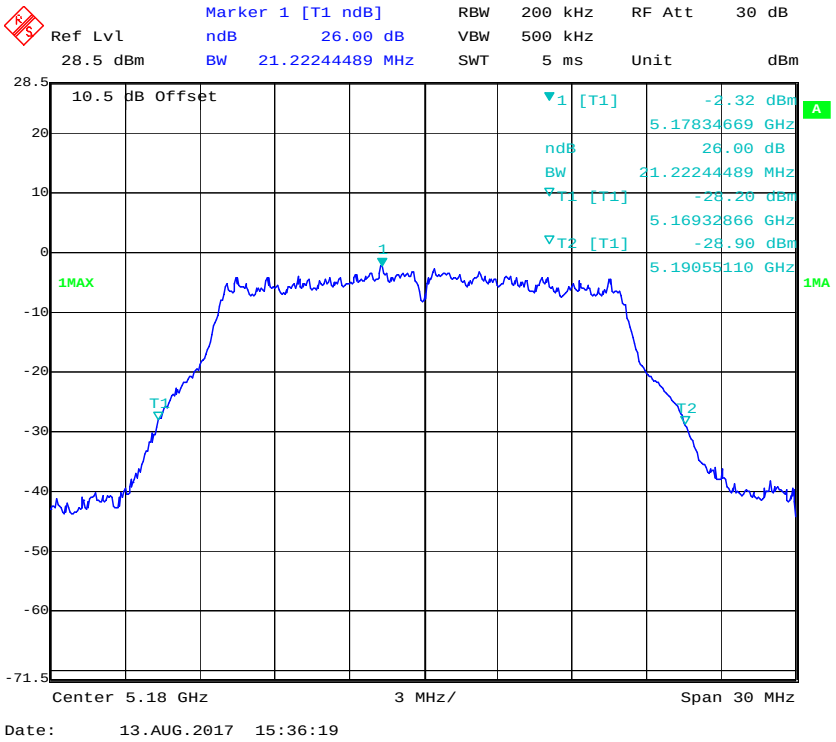
EUT operation mode: Transmitting

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

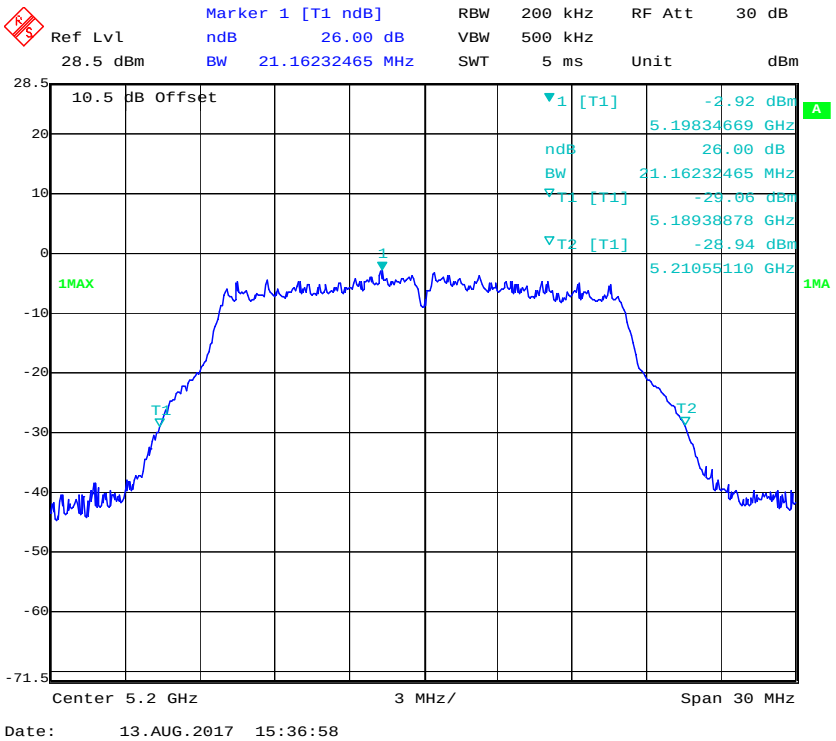
5180 MHz – 5250 MHz:

Frequency (MHz)	Remark	99% dB Bandwidth (MHz)	
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2A band
5180	21.22	16.71	
5200	21.16	16.71	
5240	21.16	16.77	
802.11n20			
5180	21.34	17.80	
5200	21.40	17.80	
5240	21.46	17.80	
802.11n40			
5190	39.32	36.19	
5230	39.20	36.31	

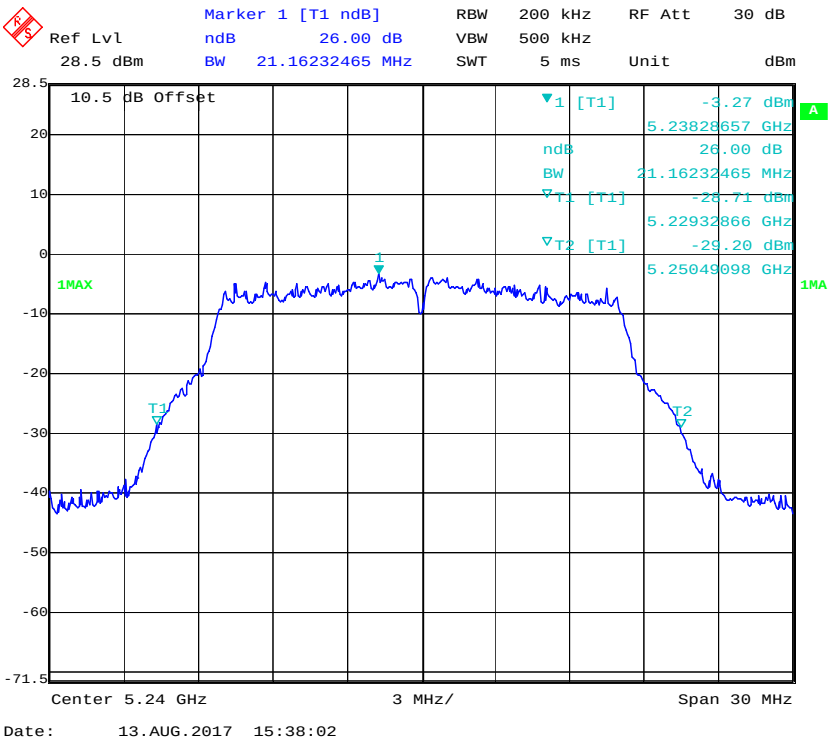
802.11a mode, 26dB Emission Bandwidth, 5180 MHz



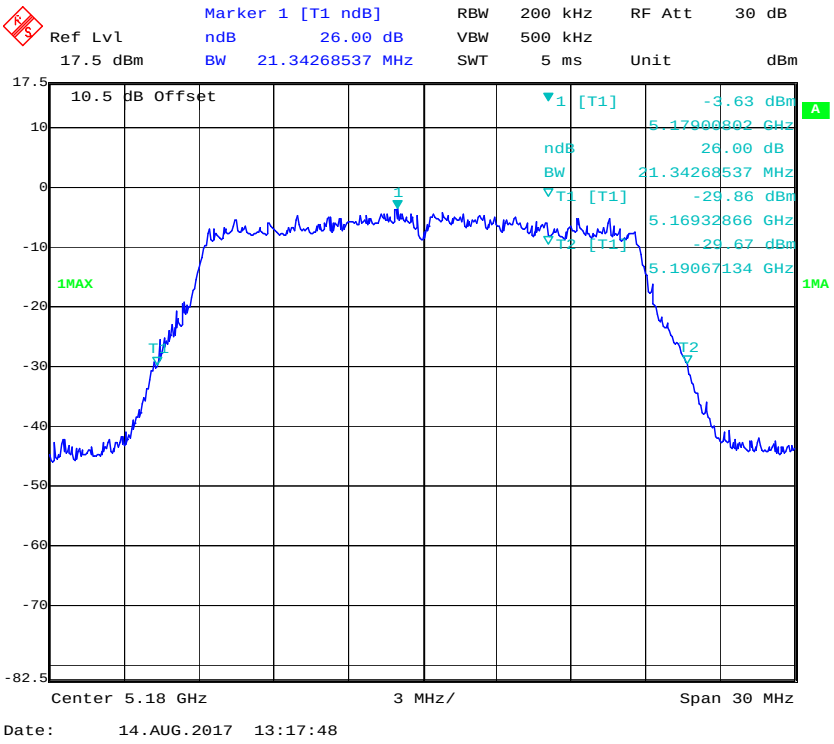
802.11a mode, 26dB Emission Bandwidth, 5200 MHz



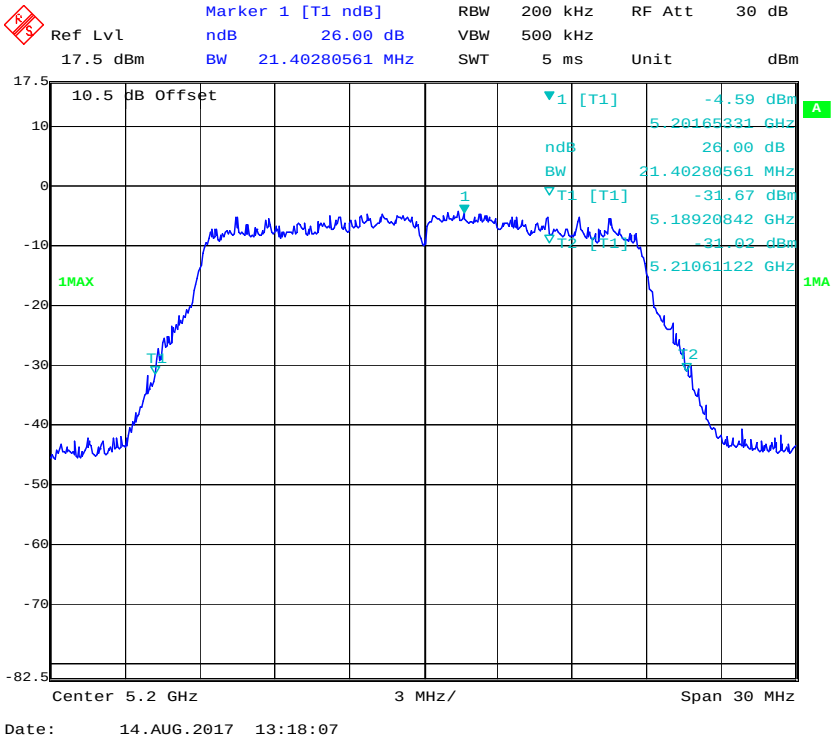
802.11a mode, 26dB Emission Bandwidth, 5240 MHz



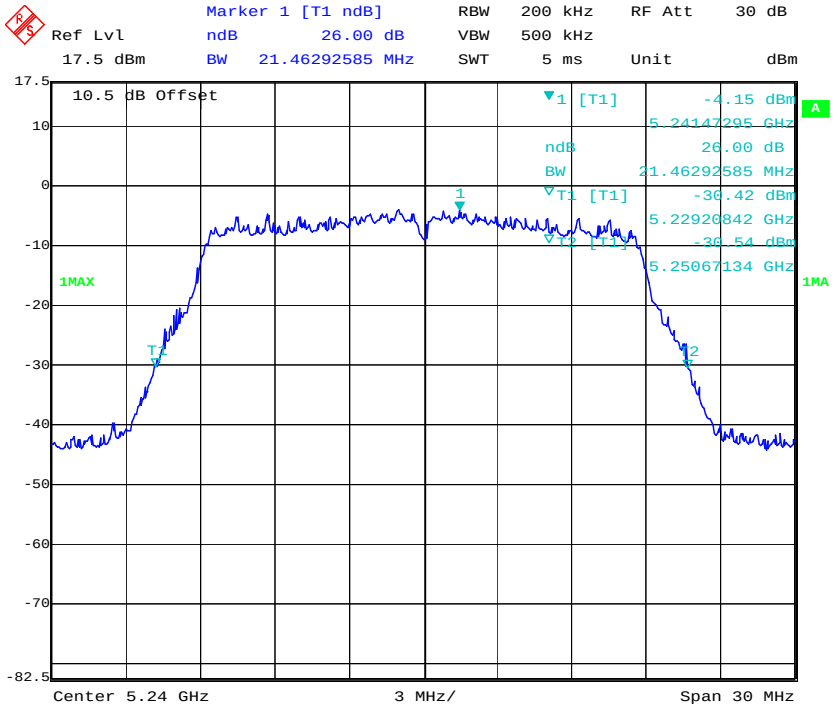
802.11n20 mode, 26dB Emission Bandwidth, 5180 MHz



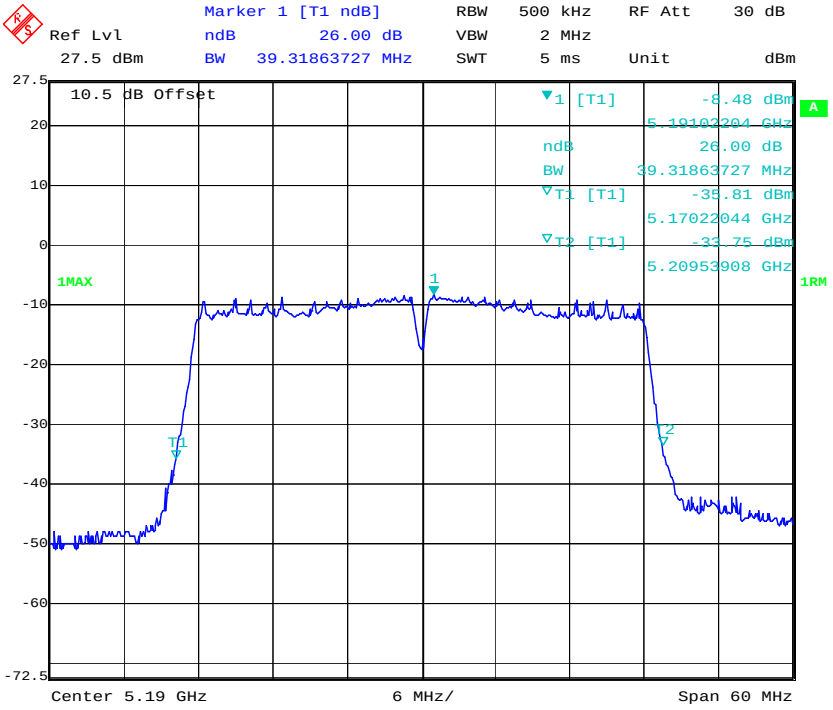
802.11n20 mode, 26dB Emission Bandwidth, 5200 MHz



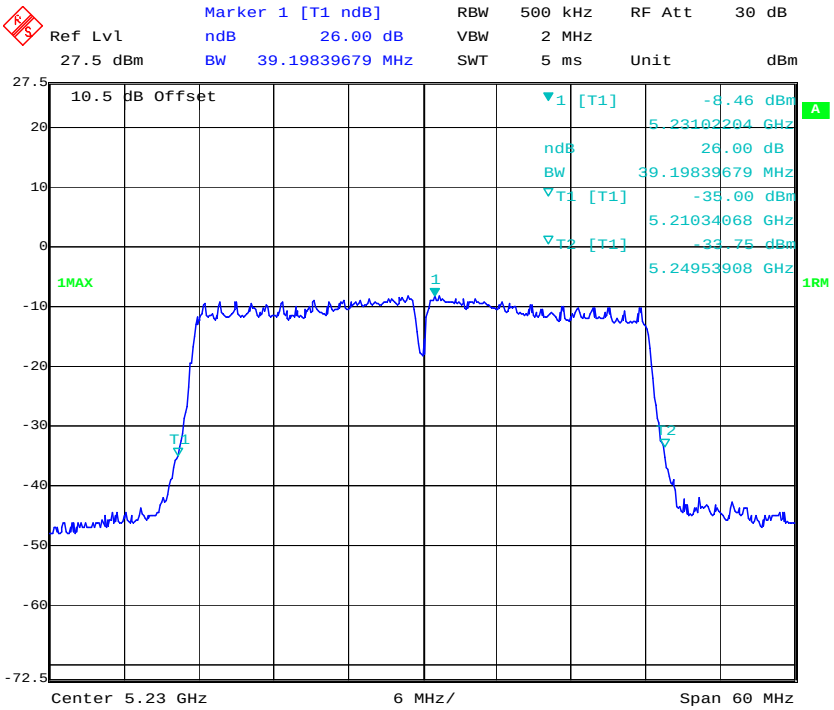
802.11n20 mode, 26dB Emission Bandwidth, 5240 MHz



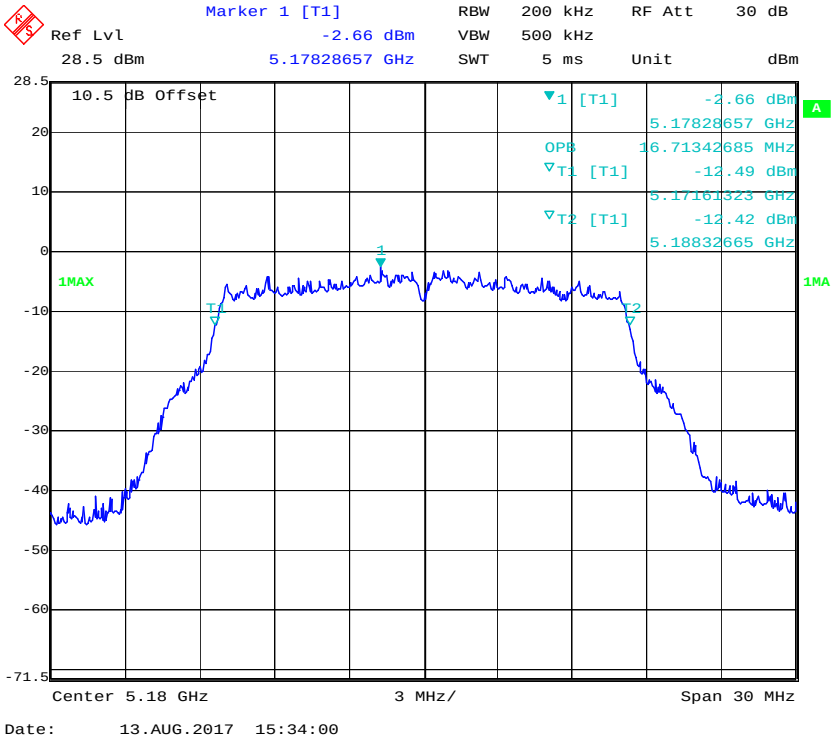
802.11n40 mode, 26dB Emission Bandwidth, 5190 MHz



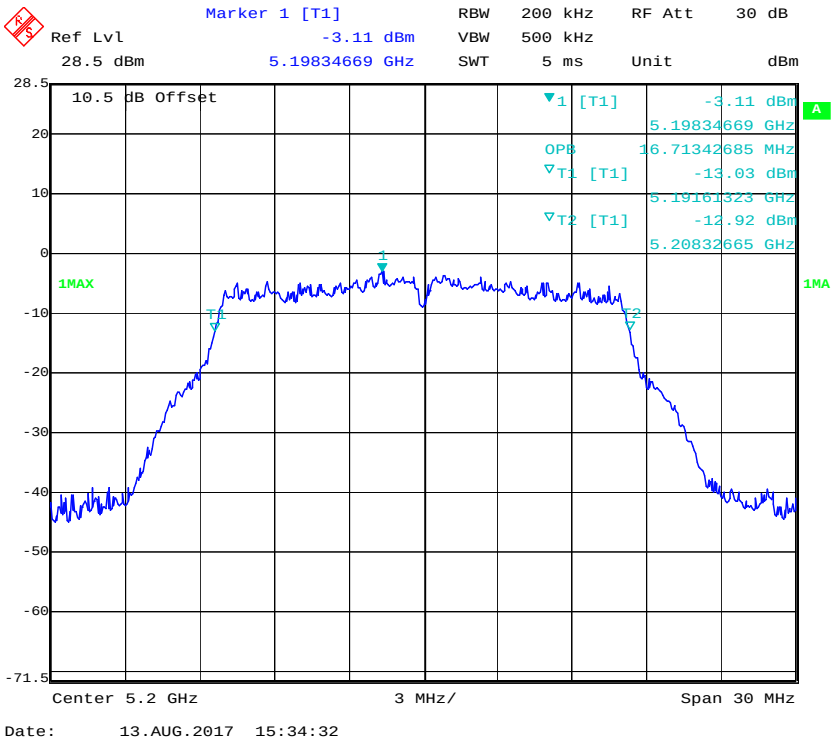
802.11n40 mode, 26dB Emission Bandwidth, 5230 MHz



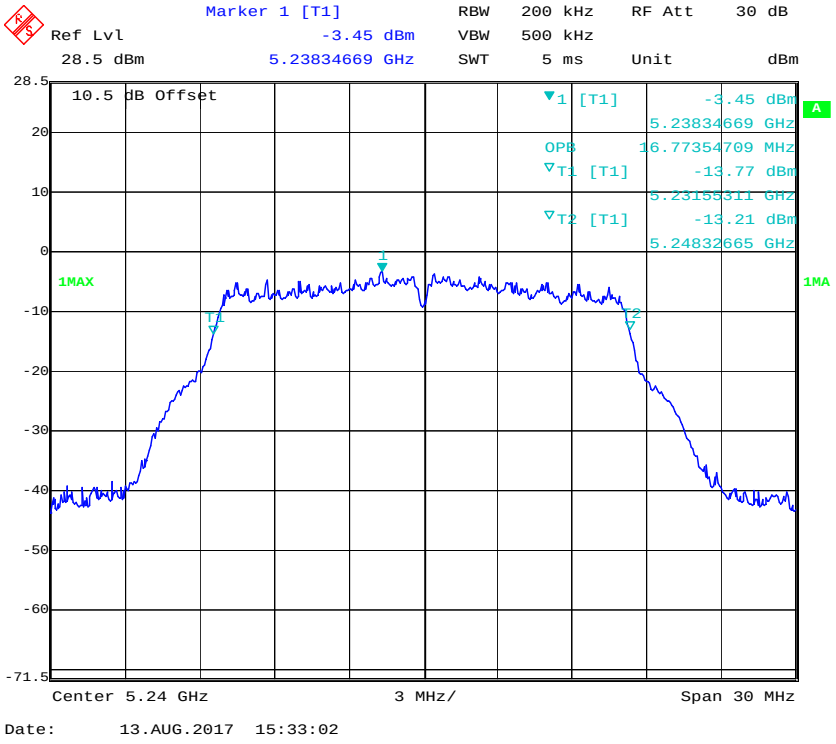
802.11a mode, 99% Occupied Bandwidth, 5180 MHz



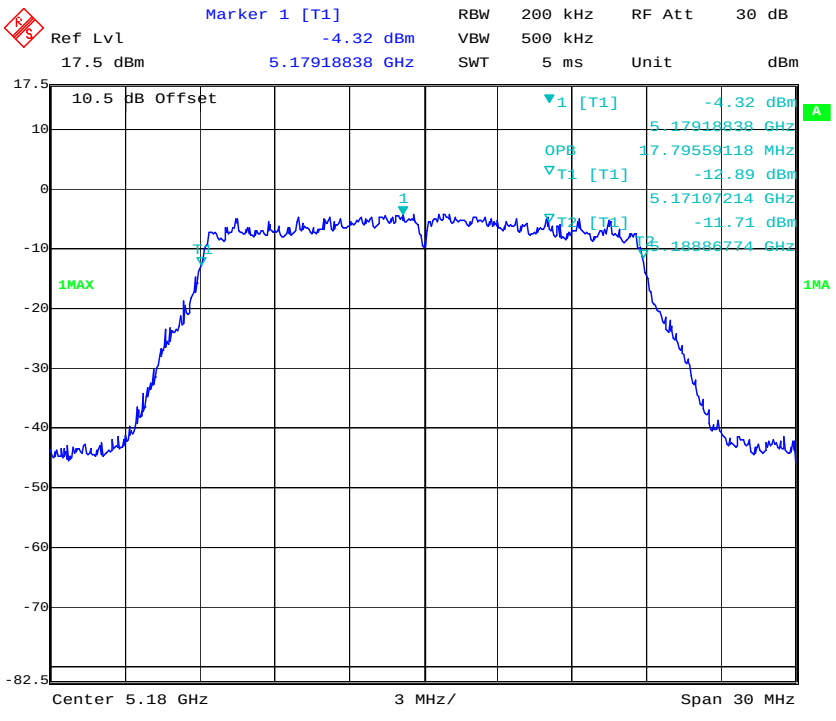
802.11a mode, 99% Occupied Bandwidth, 5200MHz



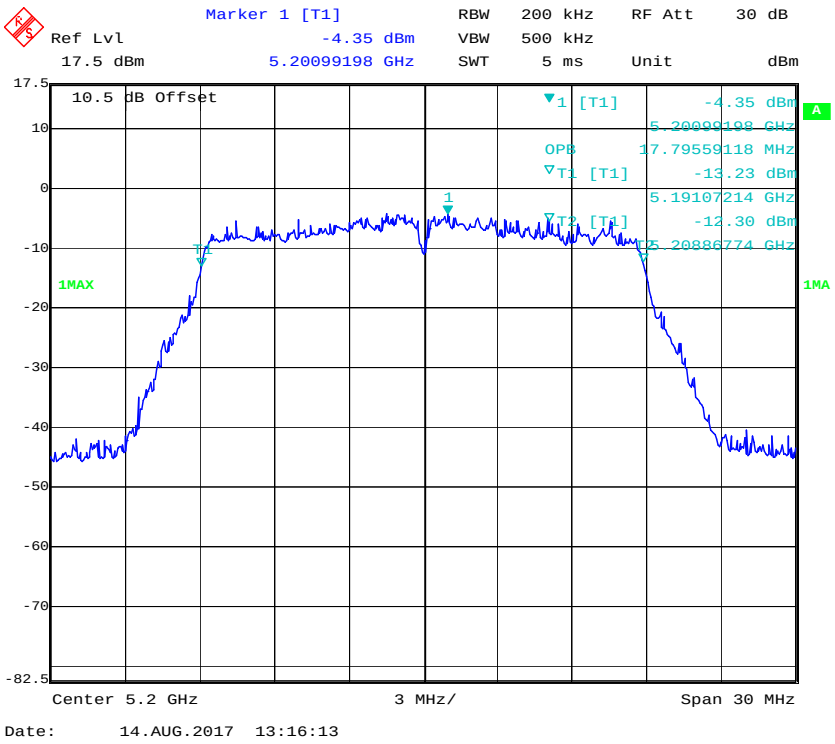
802.11a mode, 99% Occupied Bandwidth, 5240 MHz



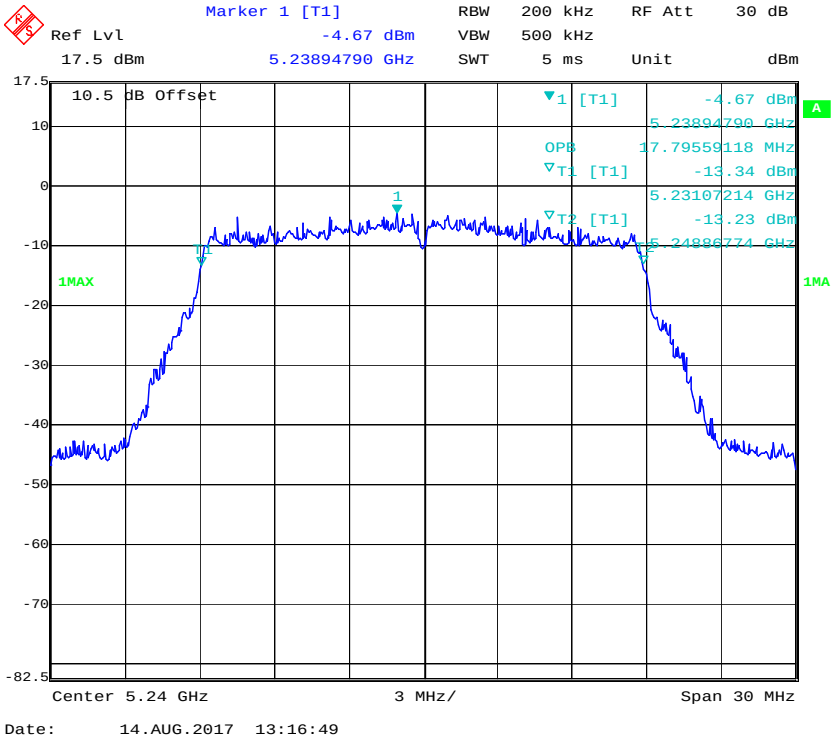
802.11n20 mode, 99% Occupied Bandwidth, 5180 MHz



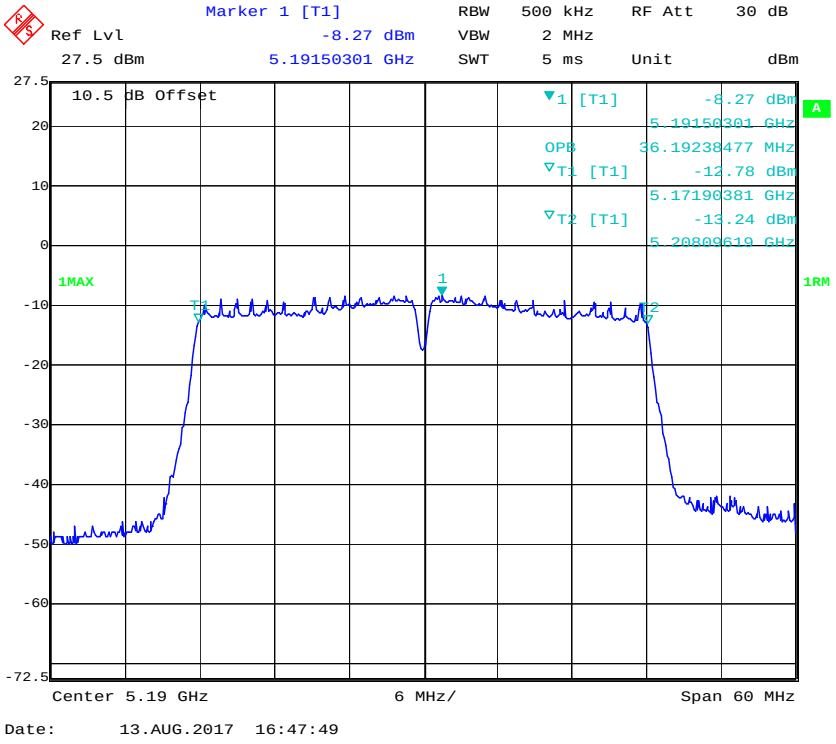
802.11n20 mode, 99% Occupied Bandwidth, 5200 MHz



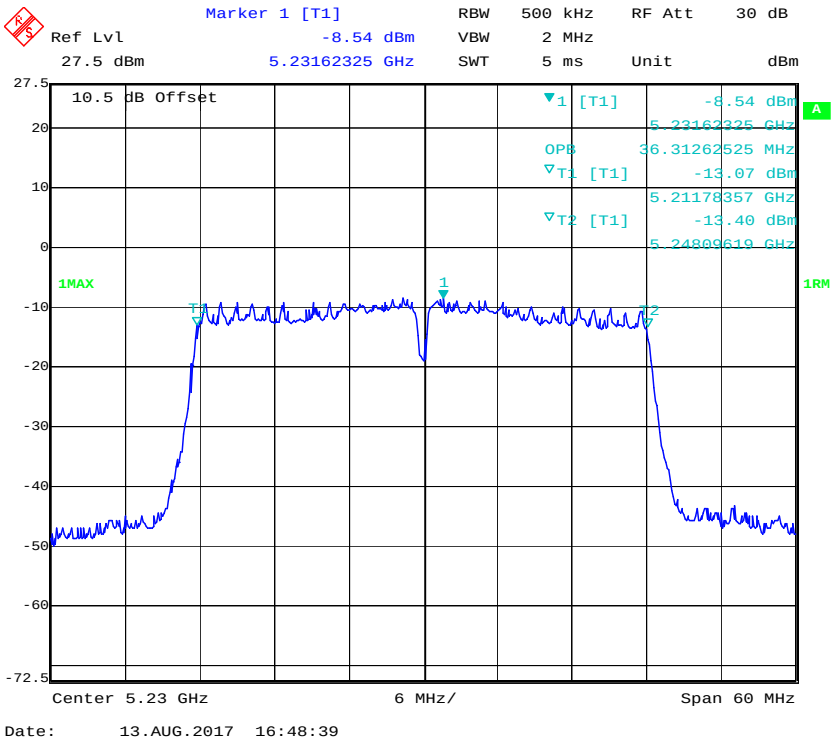
802.11n20 mode, 99% Occupied Bandwidth, 5240 MHz



802.11n40 mode, 99% Occupied Bandwidth, 5190 MHz



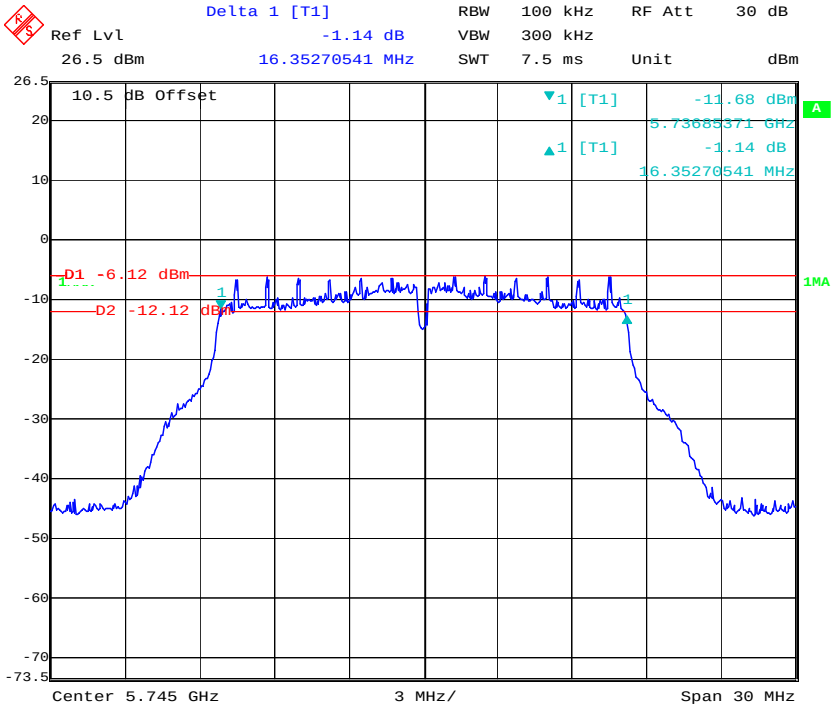
802.11n40 mode, 99% Occupied Bandwidth, 5230 MHz



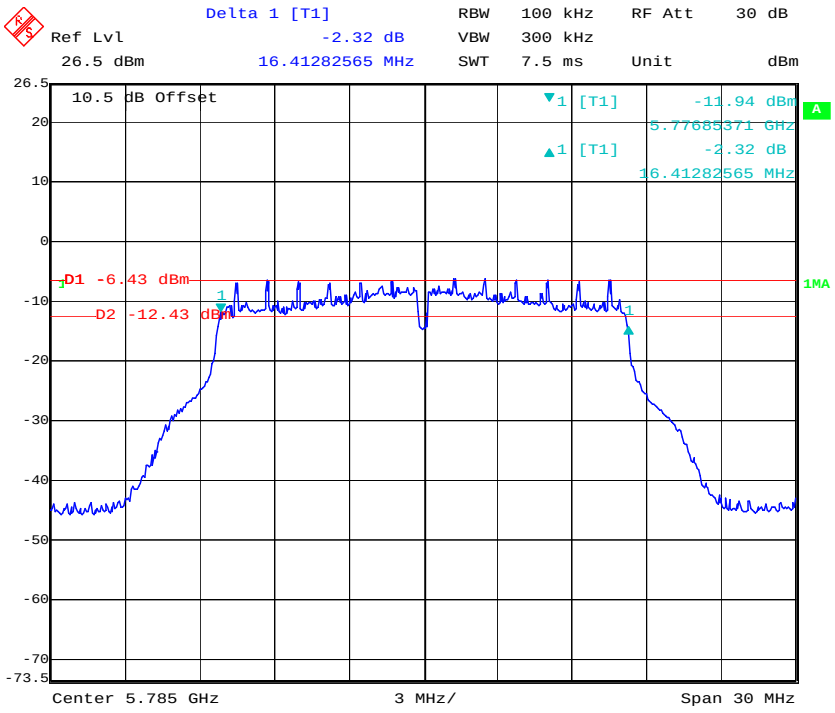
5725 MHz – 5825 MHz:

Frequency (MHz)	6dB Emission Bandwidth (MHz)	99% dB Bandwidth (MHz)
802.11a		
5745	16.35	16.53
5785	16.41	16.53
5825	16.41	16.53
802.11n20		
5745	17.49	17.68
5785	17.49	17.68
5825	17.43	17.74
802.11n40		
5755	36.31	36.19
5795	36.31	36.19

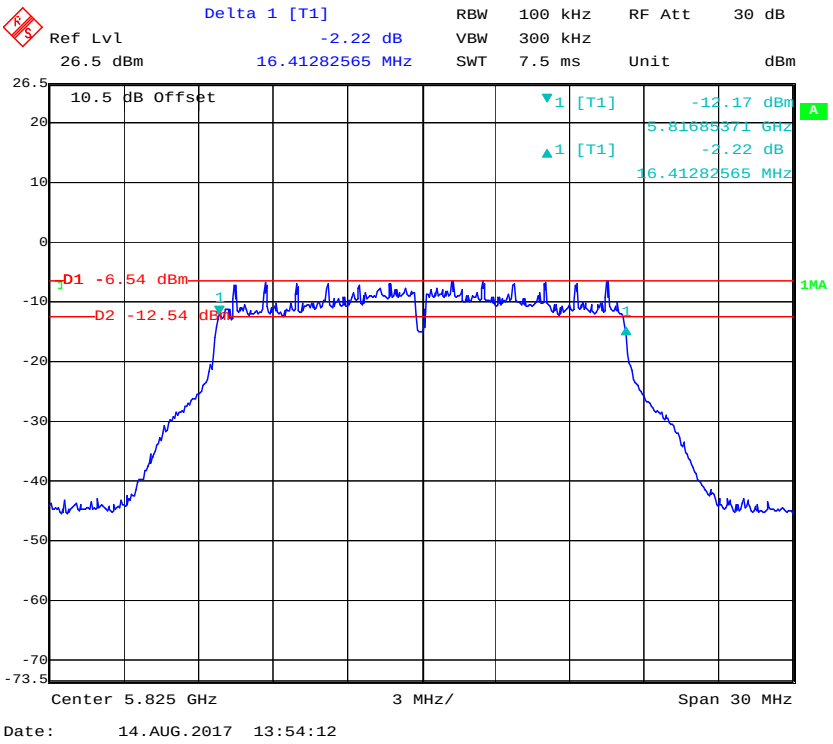
802.11a mode, 6dB Emission Bandwidth, 5745 MHz



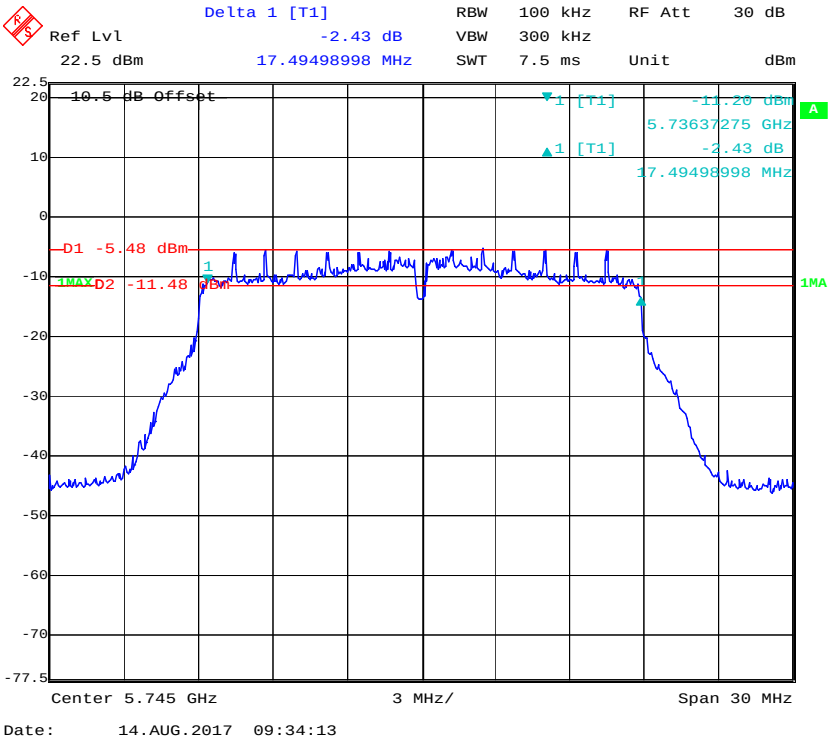
802.11a mode, 6dB Emission Bandwidth, 5785 MHz



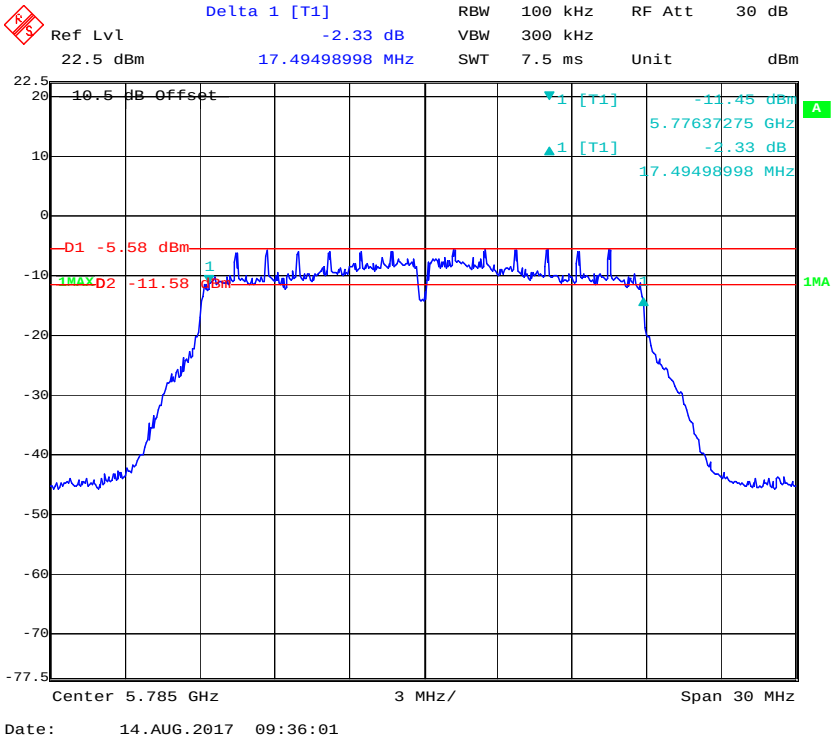
802.11a mode, 6dB Emission Bandwidth, 5825 MHz



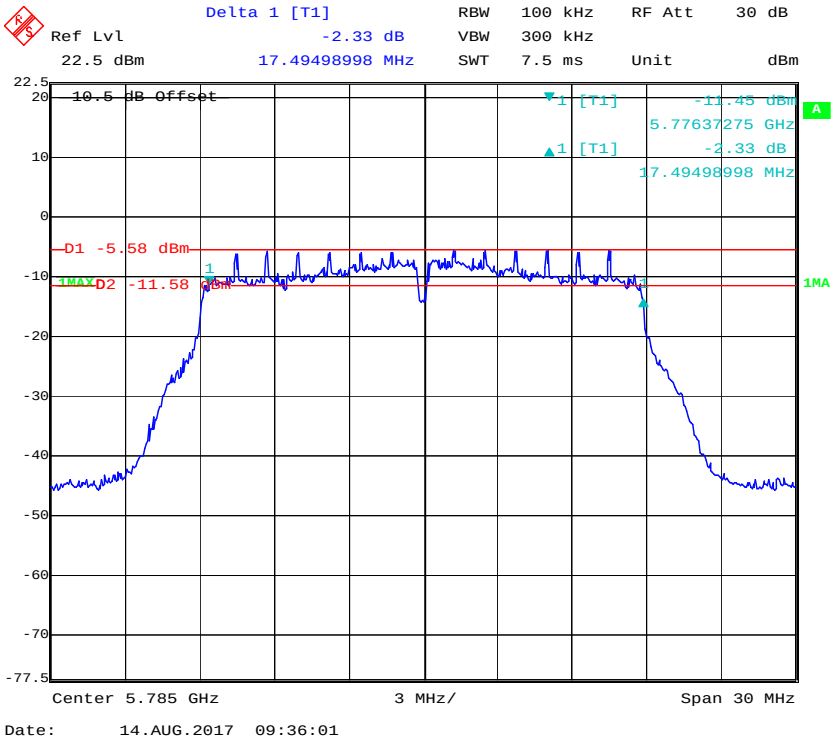
802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



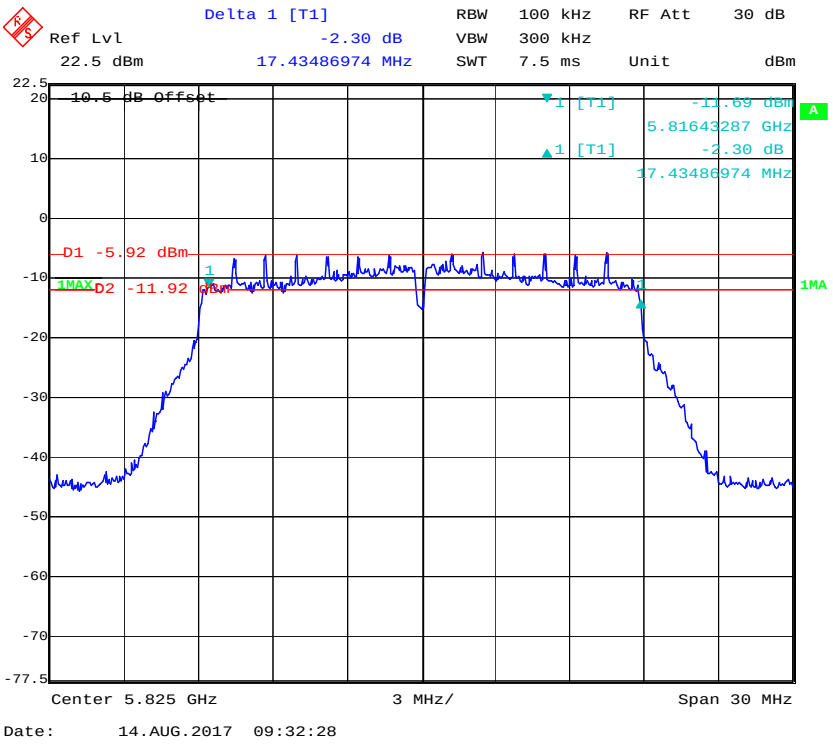
802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



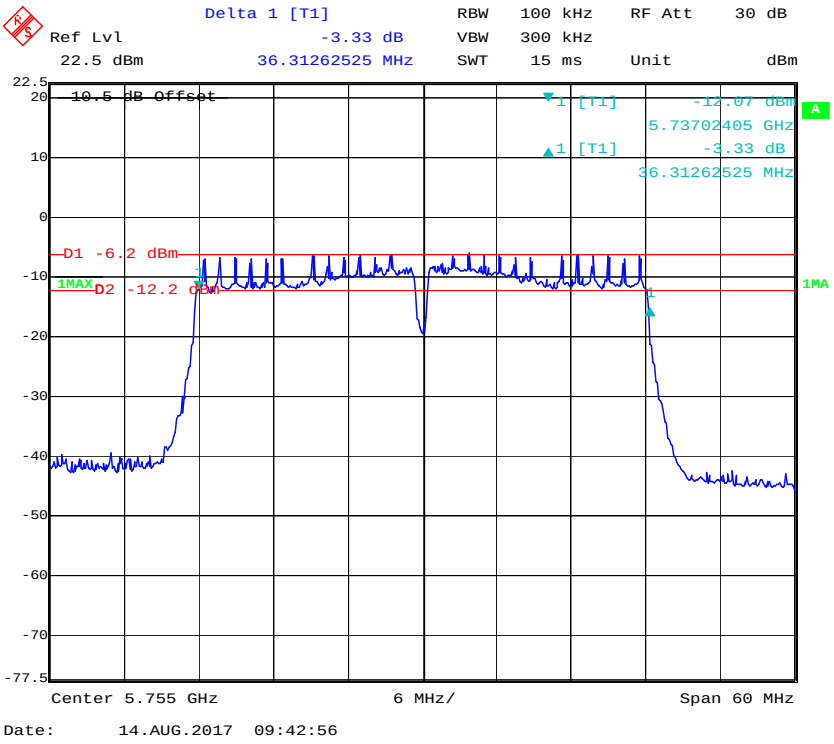
802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



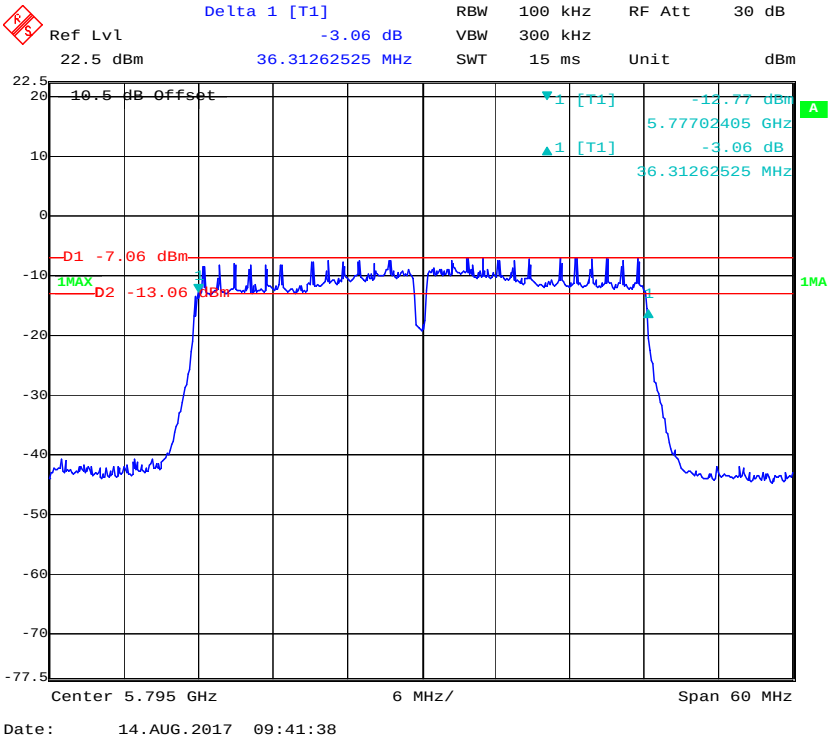
802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



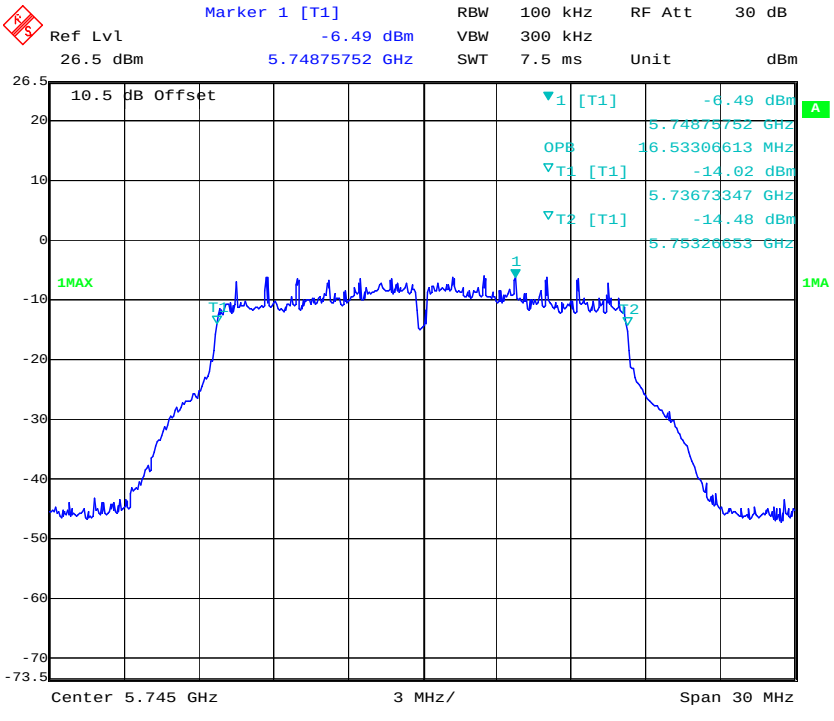
802.11n40 mode, 6dB Emission Bandwidth, 5755 MHz



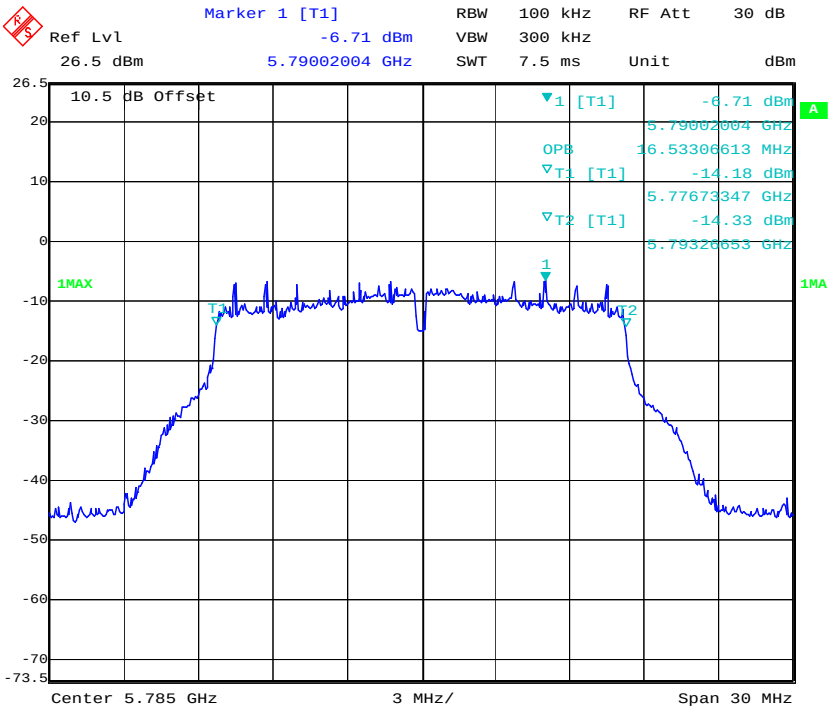
802.11n40 mode, 6dB Emission Bandwidth, 5795 MHz



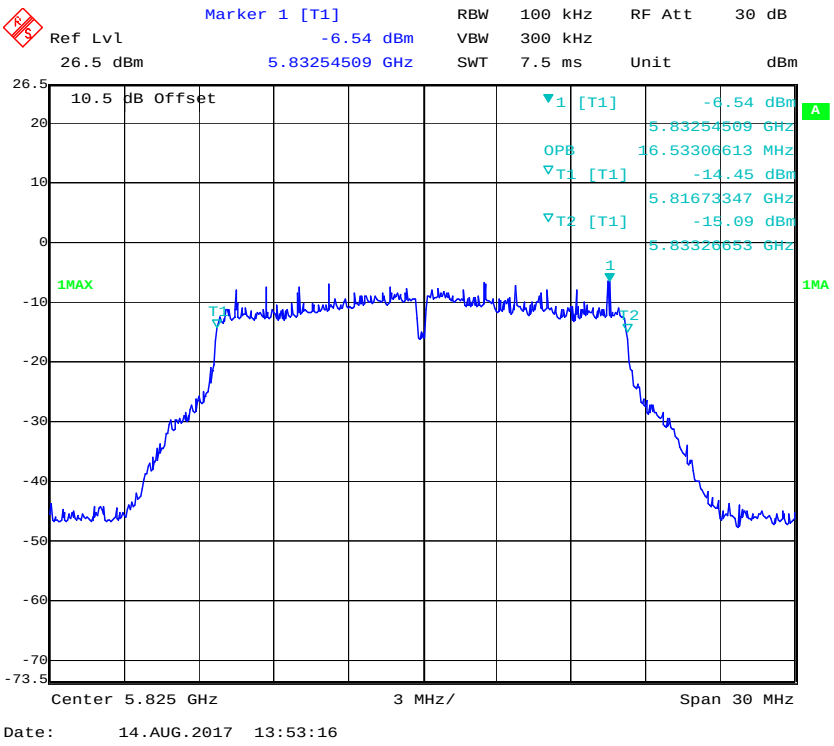
802.11a mode, 99% Occupied Bandwidth, 5745 MHz



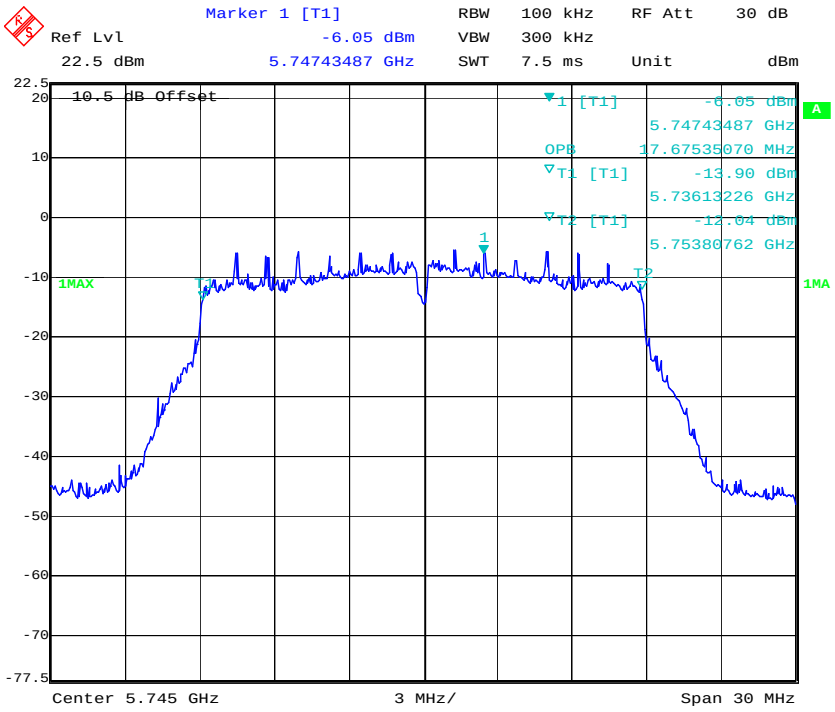
802.11a mode, 99% Occupied Bandwidth, 5785 MHz



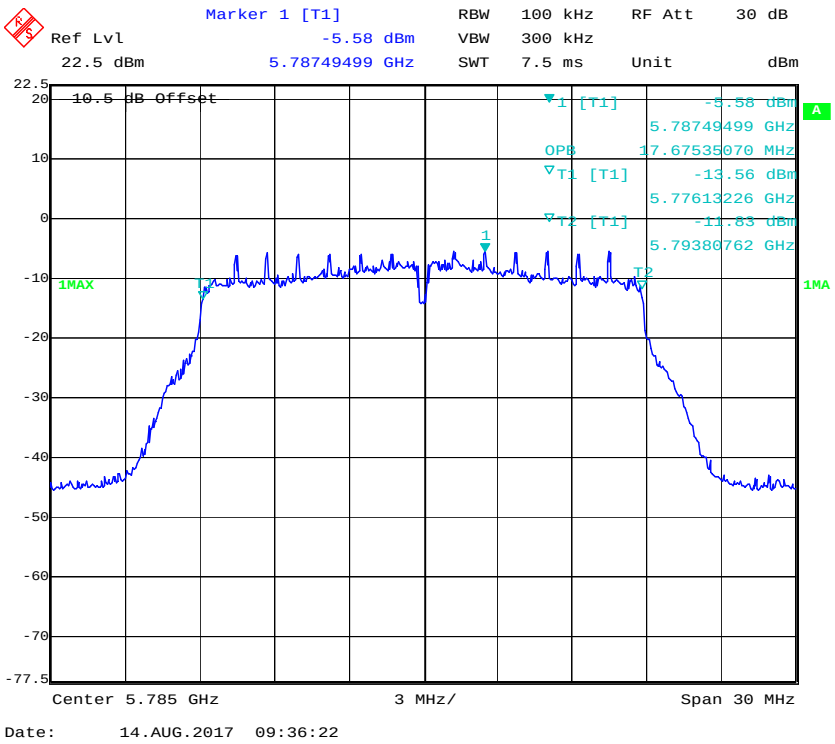
802.11a mode, 99% Occupied Bandwidth, 5825 MHz



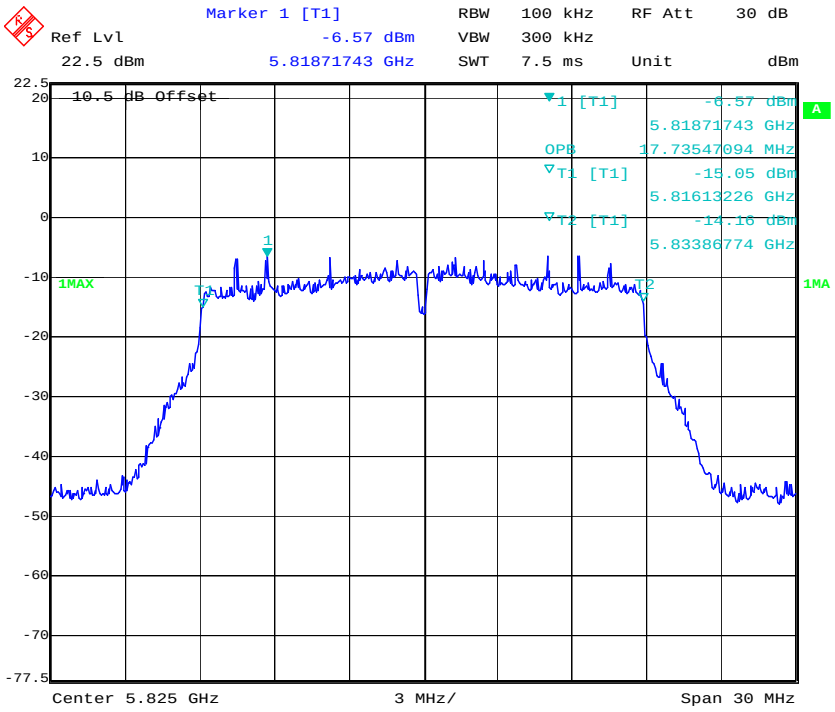
802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz



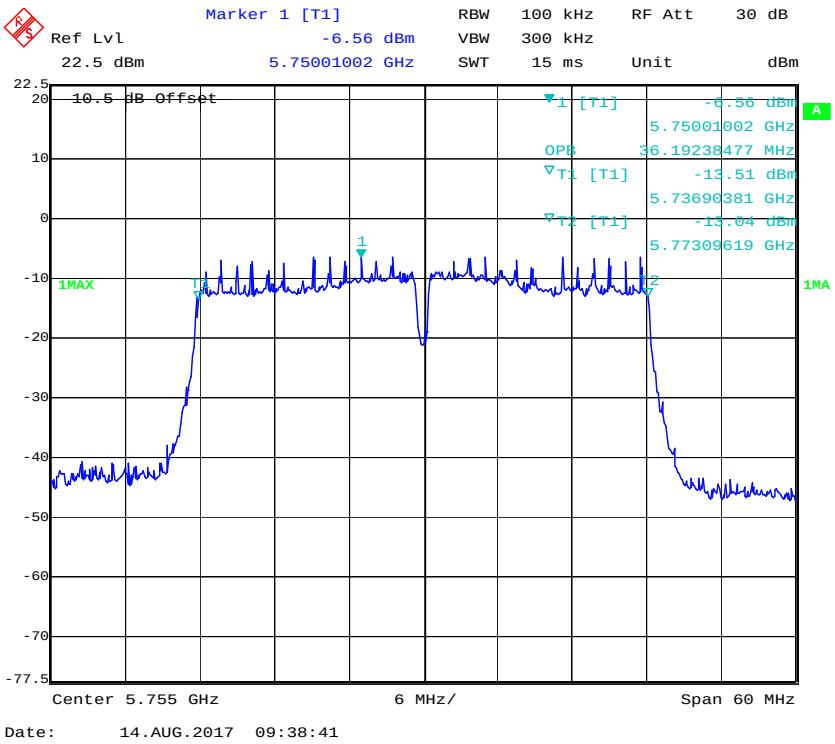
802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



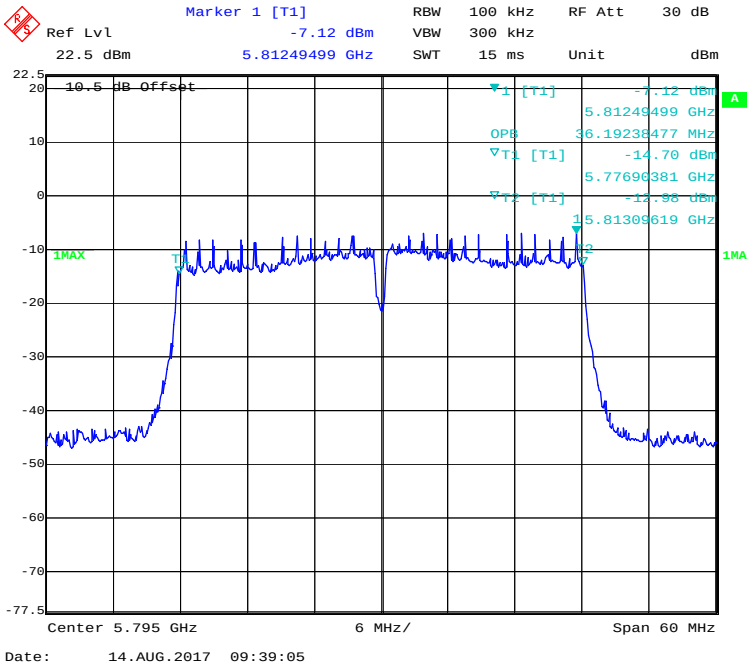
802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



802.11n40 mode, 99% Occupied Bandwidth, 5755 MHz



802.11n40 mode, 99% Occupied Bandwidth, 5795 MHz



FCC §15.407(g) – FREQUENCY STABILITY

Applicable Standard

FCC §15.407(G)

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

Test Procedure

According to ANSI C63.10-2013 §6.8

Some unlicensed wireless device requirements specify frequency stability tests with variation of supply voltage and temperature; the requirements can be found in the regulatory specifications for each type of unlicensed wireless device. The procedures listed in 6.8.1 and 6.8.2 shall be used for frequency stability tests.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	58 %
ATM Pressure:	110.0 kPa

The testing was performed by Haiguo Li on 2017-08-13.

EUT operation mode: Transmitting

Test Result: Pass

802.11 a:

Test Condition		Frequency (MHz)			
Temperature (℃)	Voltage (V_{DC})	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
5150-5250					
-20	3.8	5172.67712	5206.22354	5150	5250
-10		5172.67371	5206.22732	5150	5250
0		5172.67735	5206.24442	5150	5250
10		5172.67341	5206.25614	5150	5250
20		5172.67624	5206.24417	5150	5250
30		5172.67145	5206.25452	5150	5250
40		5172.67736	5206.23941	5150	5250
50		5172.67624	5206.24542	5150	5250
20	3.5	5172.67371	5206.22732	5150	5250
	4.3	5172.67542	5206.37148	5150	5250
5725-5850					
-20	3.8	5735.89552	5830.78424	5725	5850
-10		5735.88457	5830.72425	5725	5850
0		5735.89148	.5830.74835	5725	5850
10		5735.89571	5830.72641	5725	5850
20		5735.89454	5830.79452	5725	5850
30		5735.89301	5830.78242	5725	5850
40		5735.84012	5830.73765	5725	5850
50		5735.86523	5830.75756	5725	5850
20	3.5	5735.89552	5830.78424	5725	5850
	4.3	5735.88513	5830.77824	5725	5850

802.11 n20:

Test Condition		Frequency (MHz)			
Temperature (℃)	Voltage (V_{DC})	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
5150-5250					
-20	3.8	5171.62741	5208.25304	5150	5250
-10		5171.62371	5208.25714	5150	5250
0		5171.62724	5208.26412	5150	5250
10		5171.62341	5208.25632	5150	5250
20		5171.62652	5208.23445	5150	5250
30		5171.62141	5208.23441	5150	5250
40		5171.62741	5208.25941	5150	5250
50		5171.62674	5208.25574	5150	5250
20	3.5	5171.62724	5208.26412	5150	5250
	4.3	5171.62545	5208.30157	5150	5250
5725-5850					
-20	3.8	5735.66543	5830.21474	5725	5850
-10		5735.66252	5830.21447	5725	5850
0		5735.66632	.583021852	5725	5850
10		5735.66342	5830.21632	5725	5850
20		5735.66425	5830.21923	5725	5850
30		5735.66423	5830.21621	5725	5850
40		5735.66041	5830.21717	5725	5850
50		5735.66551	5830.21723	5725	5850
20	3.5	5735.66252	5830.21447	5725	5850
	4.3	5735.66526	5830.21804	5725	5850

802.11 N40:

Test Condition		Frequency (MHz)			
Temperature (℃)	Voltage (V_{DC})	f_L at Low Channel	f_H at High Channel	f_L Limit	f_H Limit
5150-5250					
-20	3.8	5173.32705	5208.29324	5150	5250
-10		5173.52376	5208.22727	5150	5250
0		5173.72782	5208.23424	5150	5250
10		5173.42374	5208.29634	5150	5250
20		5173.52615	5208.24435	5150	5250
30		5173.42124	5208.25441	5150	5250
40		5173.52734	5208.26947	5150	5250
50		5173.42646	5208.27557	5150	5250
20	3.5	5173.52376	5208.22727	5150	5250
	4.3	5173.62542	5208.38115	5150	5250
5725-5850					
-20	3.8	5733.69513	5829.28443	5725	5850
-10		5733.68252	5829.26424	5725	5850
0		5733.69642	.582927871	5725	5850
10		5733.69375	5829.28682	5725	5850
20		5733.69476	5829.29963	5725	5850
30		5733.69472	5829.28642	5725	5850
40		5733.69059	5829.27742	5725	5850
50		5733.69548	5829.26752	5725	5850
20	3.5	5733.68585	5829.27885	5725	5850
	4.3	5733.68585	5829.27885	5725	5850

Note: F_L is the mark of low channel's OBW left edge, and F_H is the mark of high channel's OBW right edge.

FCC §15.407(a) (1) (3)– CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

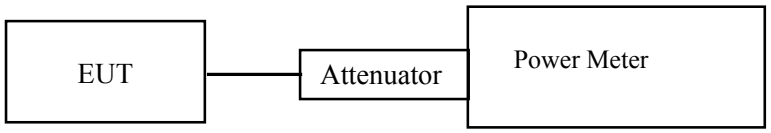
For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz 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.

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.

For 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.

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:	24~25 ℃
Relative Humidity:	53~58 %
ATM Pressure:	100.9~110.0 kPa

The testing was performed by Haiguo Li on 2017-08-13 and 2017-08-14.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

5150 MHz – 5250 MHz:

Frequency (MHz)	Reading output power (dBm)	10*log(1/duty cycle)	Average Output Power (dBm)	Limit (dBm)
802.11a				
5180	7.46	0.22	7.68	24
5200	7.01	0.22	7.23	
5240	6.55	0.22	6.77	
802.11n20				
5180	7.24	0.27	7.51	24
5200	6.87	0.27	7.14	
5240	6.27	0.27	6.54	
802.11n40				
5190	7.07	0.46	7.53	24
5230	7.02	0.46	7.48	

EUT is a client device.

5725 MHz – 5825 MHz:

Frequency (MHz)	Reading output power (dBm)	10*log(1/duty cycle)	Average Output Power (dBm)	Limit (dBm)
802.11a				
5745	6.79	0.22	7.01	30
5785	6.04	0.22	6.26	
5825	6.02	0.22	6.24	
802.11n20				
5745	7.09	0.27	7.36	30
5785	6.68	0.27	6.95	
5825	6.58	0.27	6.85	
802.11n40				
5755	6.75	0.46	7.21	30
5795	6.06	0.46	6.52	

FCC §15.407(a) (1) (5) - POWER SPECTRAL DENSITY

Applicable Standard

(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.

(iv) For 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

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 bands 5.15-5.25 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). 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:	24~25 ℃
Relative Humidity:	53~58 %
ATM Pressure:	100.9~110.0 kPa

The testing was performed by Haiguo Li on 2017-08-13 and 2017-08-14.

EUT operation mode: Transmitting

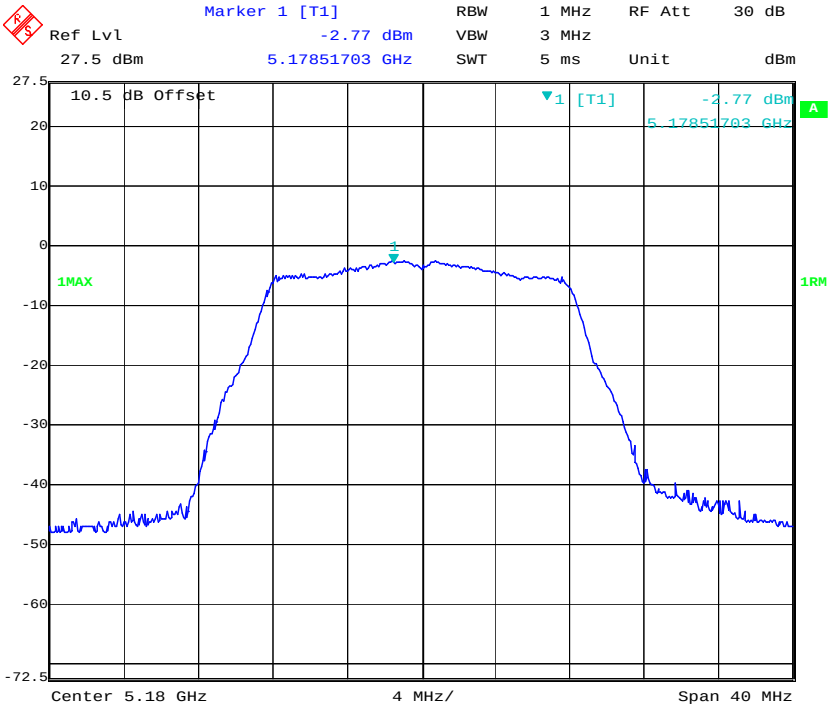
Test Result: Pass

Please refer to the following tables and plots.

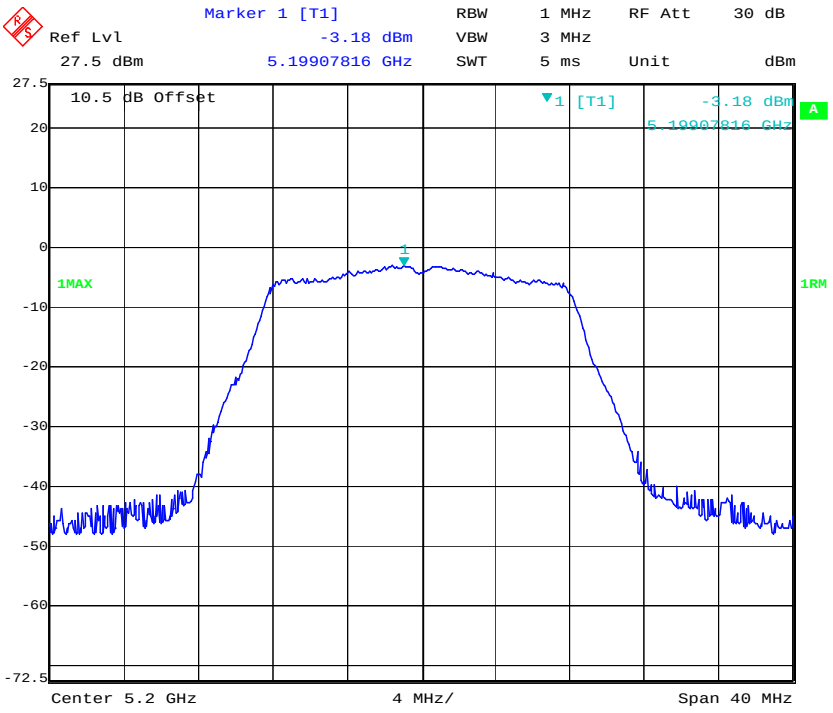
5150 MHz – 5250 MHz:

Frequency (MHz)	Reading (dBm/MHz)	10*log(1/duty cycle)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a				
5180	-2.77	0.22	-2.55	11
5200	-3.18	0.22	-2.96	
5240	-3.53	0.22	-3.31	
802.11n20				
5180	-3.45	0.27	-3.18	11
5200	-4.28	0.27	-4.01	
5240	-4.51	0.27	-4.24	
802.11n40				
5190	-5.92	0.46	-5.46	11
5230	-6.11	0.46	-5.65	

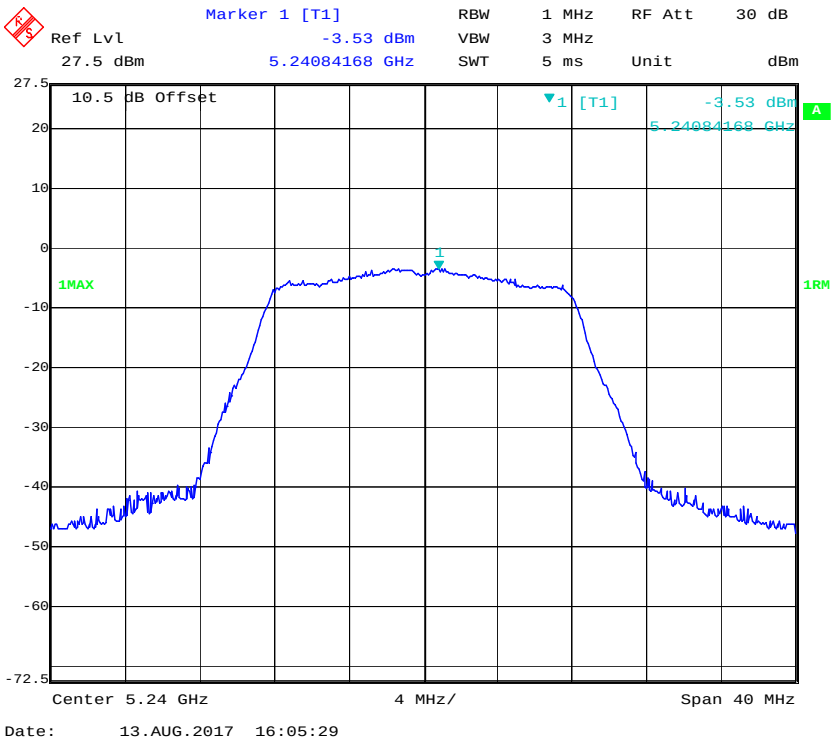
802.11a mode, Power Spectral Density, 5180 MHz



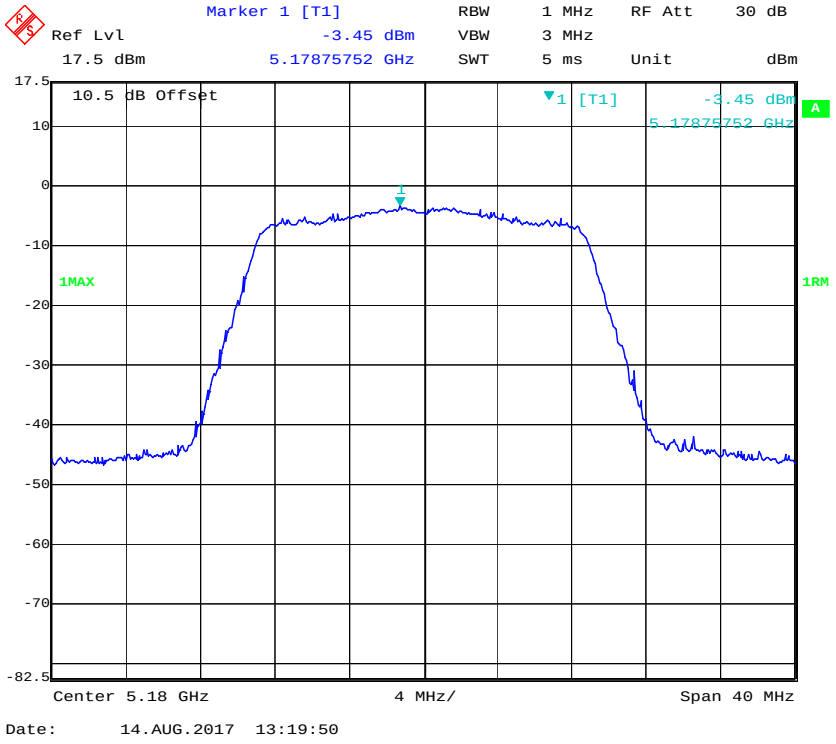
802.11a mode, Power Spectral Density, 5200 MHz



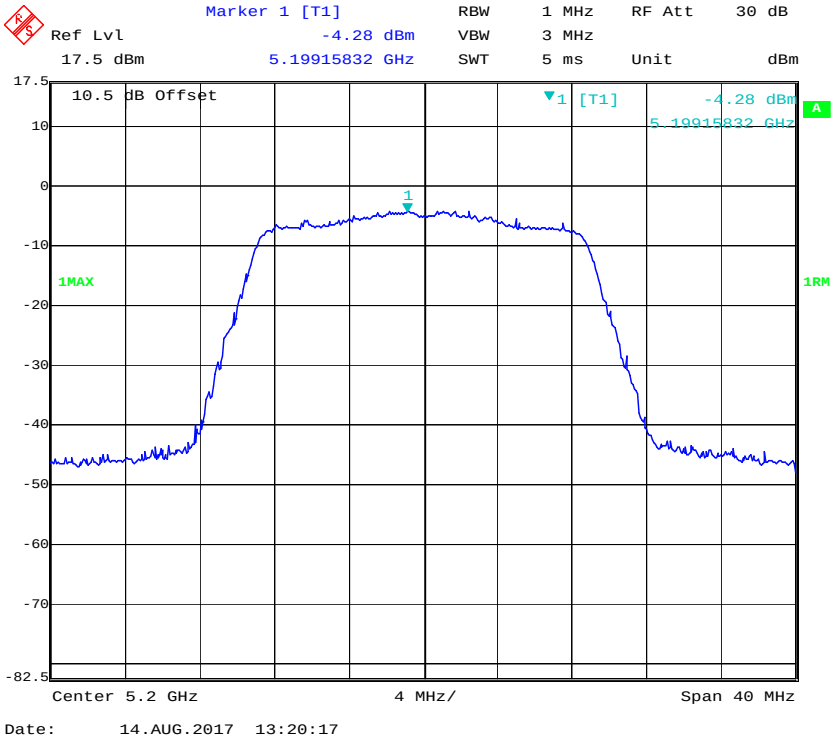
802.11a mode, Power Spectral Density, 5240 MHz



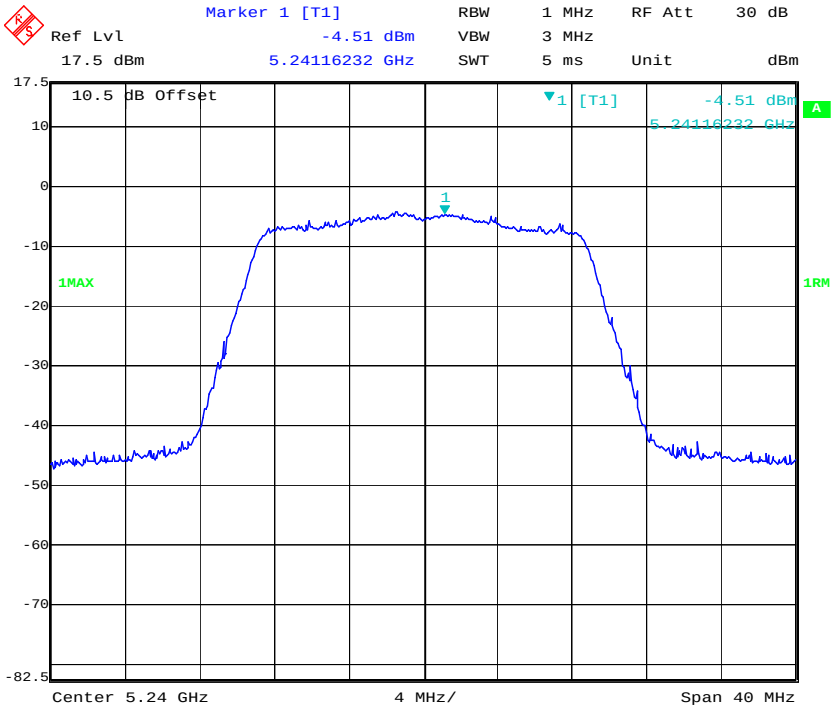
802.11n20 mode, Power Spectral Density, 5180 MHz



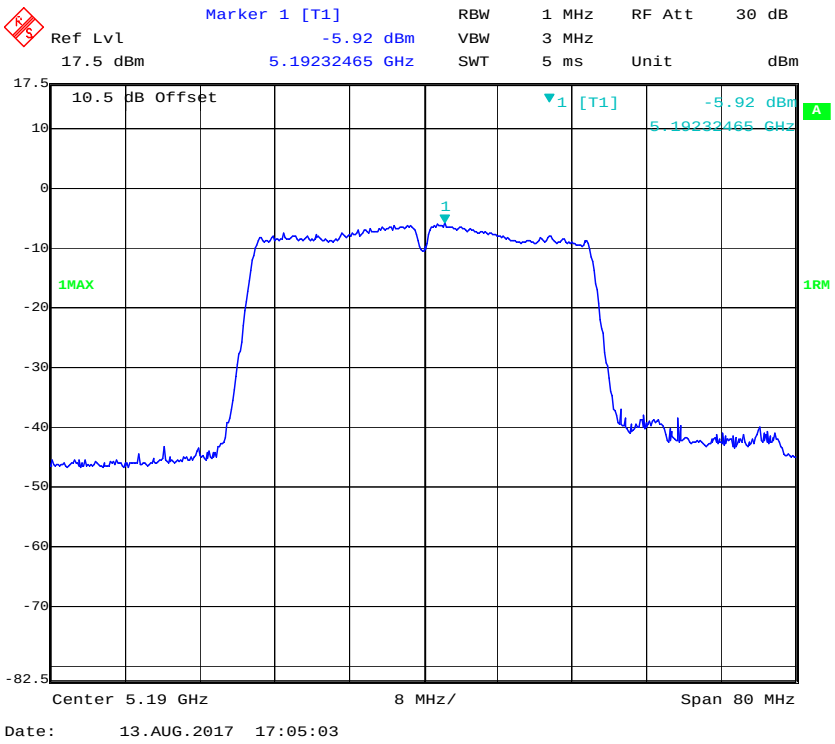
802.11n20 mode, Power Spectral Density, 5200 MHz



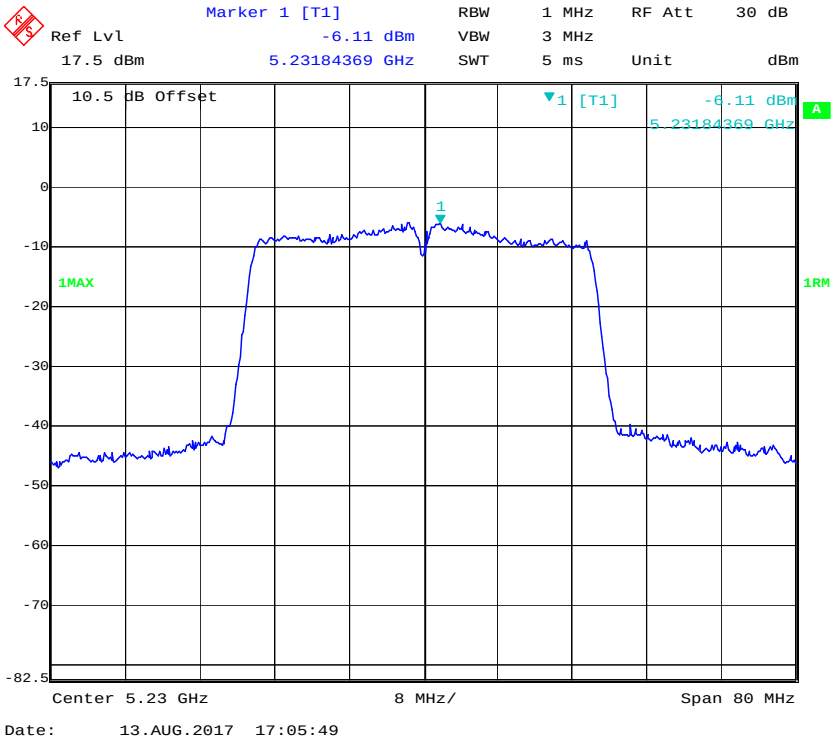
802.11n20 mode, Power Spectral Density, 5240 MHz



802.11n40 mode, Power Spectral Density, 5190 MHz



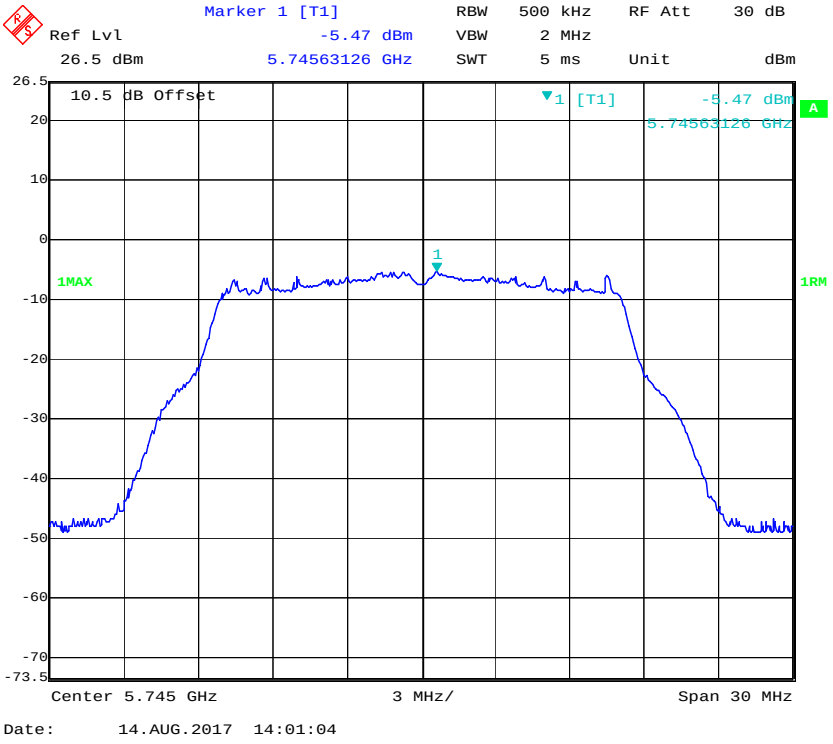
802.11n40 mode, Power Spectral Density, 5230 MHz



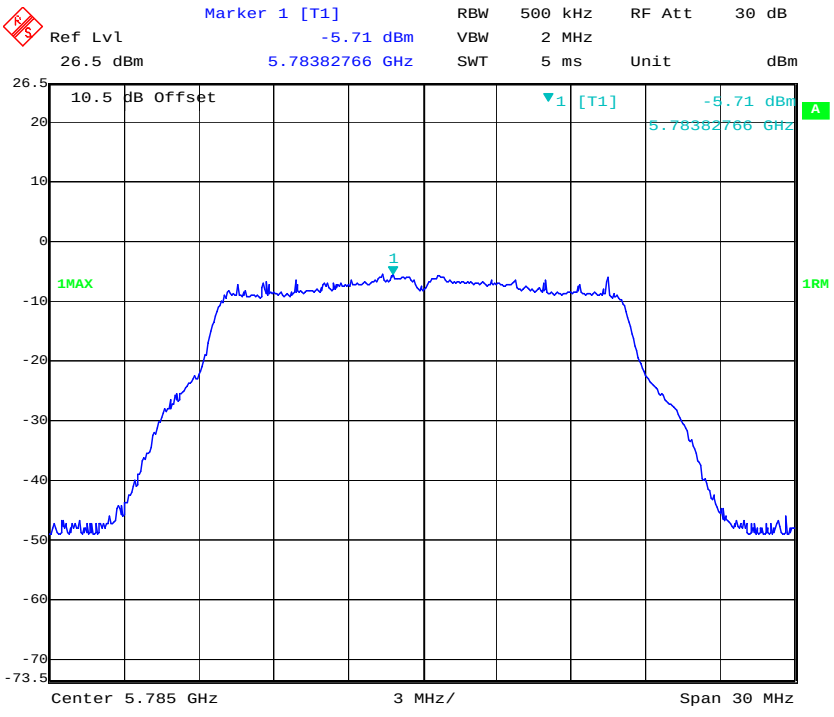
5725 MHz – 5825 MHz:

Frequency (MHz)	Reading (dBm/500kHz)	10*log(1/duty cycle)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11a				
5745	-5.47	0.22	-5.25	30
5785	-5.71	0.22	-5.49	
5825	-5.83	0.22	-5.61	
802.11n20				
5745	-5.15	0.27	-4.88	30
5785	-6.02	0.27	-5.75	
5825	-5.79	0.27	-5.52	
802.11n40				
5755	-6.65	0.46	-6.19	30
5795	-7.33	0.46	-6.87	

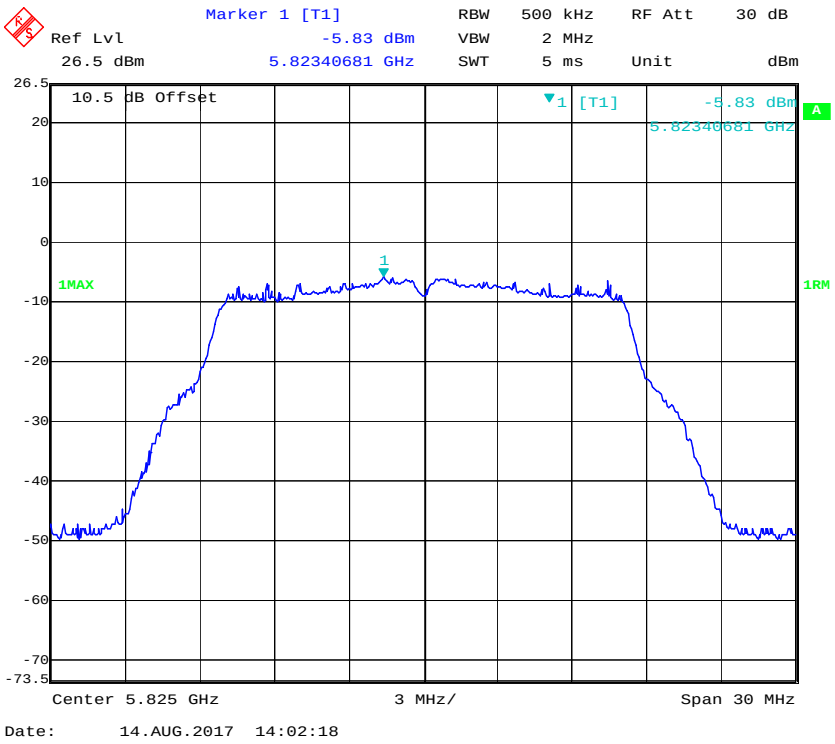
802.11a mode, Power Spectral Density, 5745 MHz



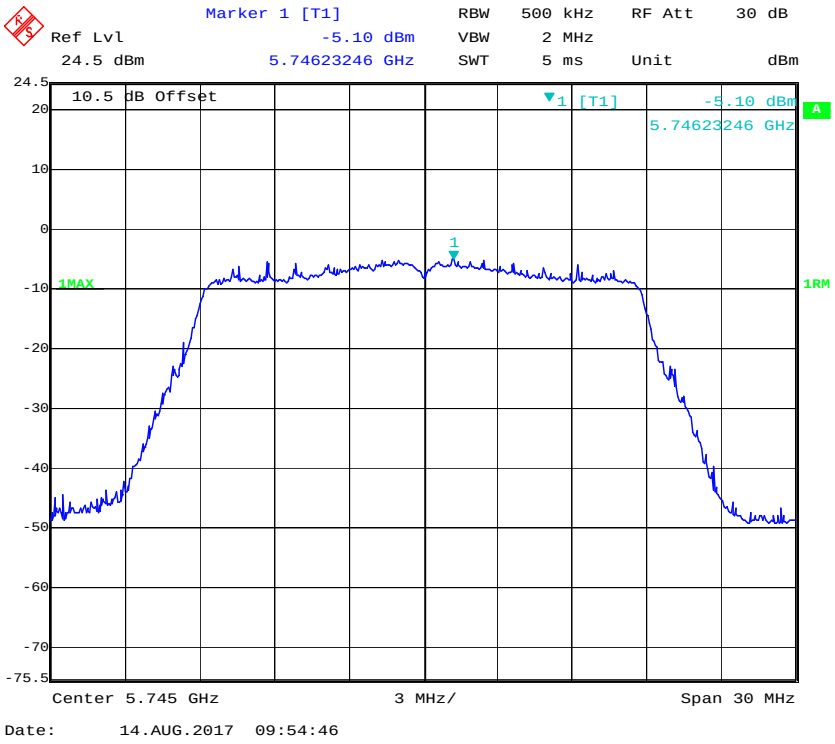
802.11a mode, Power Spectral Density, 5785 MHz



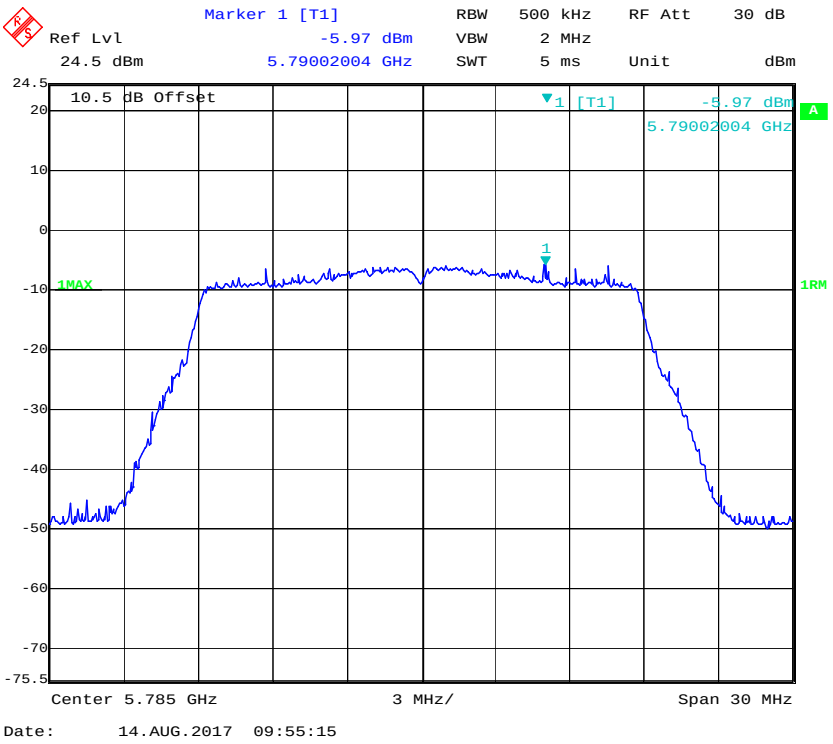
802.11a mode, Power Spectral Density, 5825 MHz



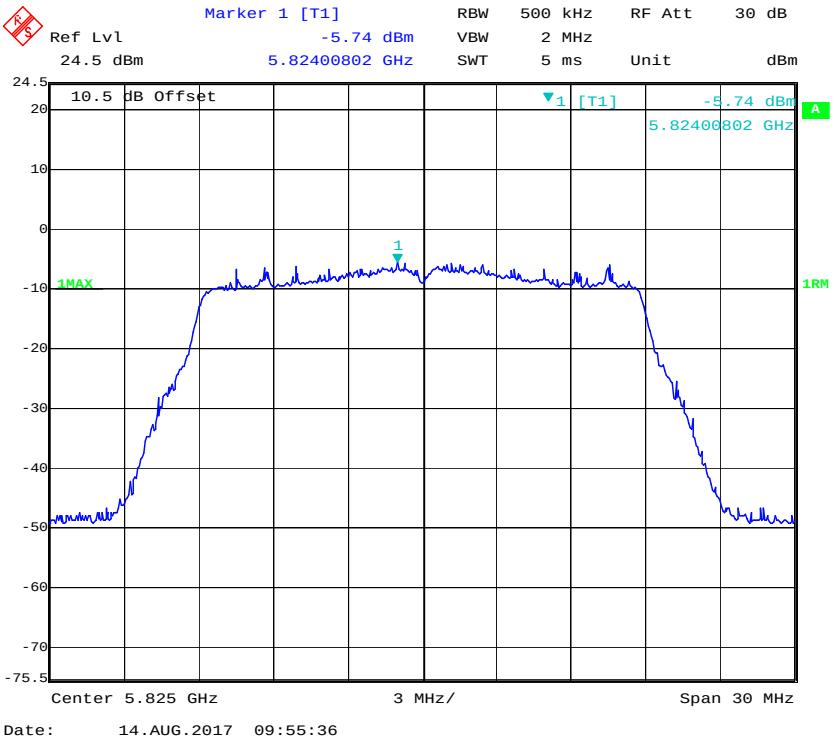
802.11n20 mode, Power Spectral Density, 5745 MHz



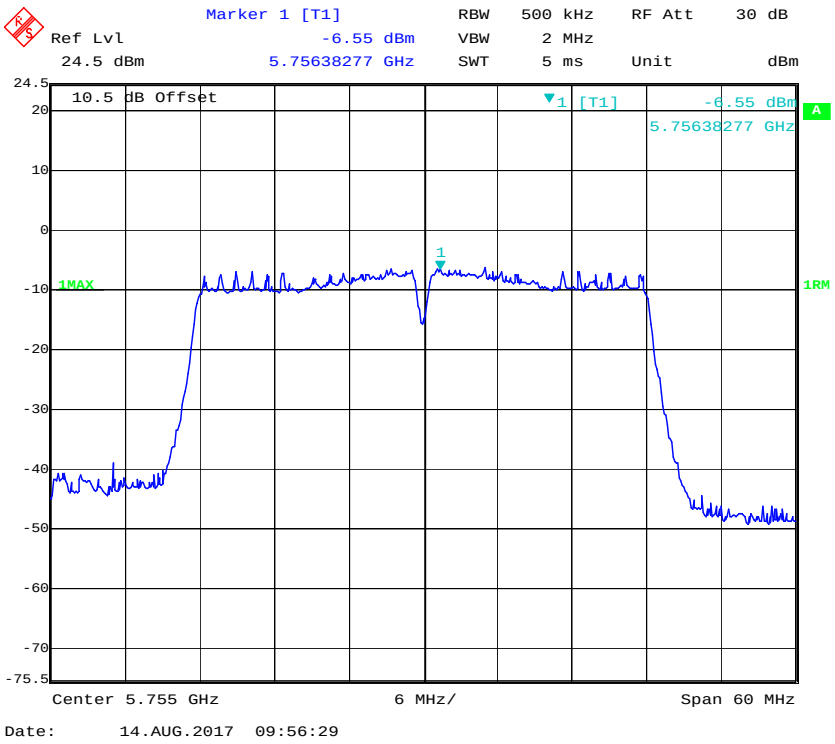
802.11n20 mode, Power Spectral Density, 5785 MHz



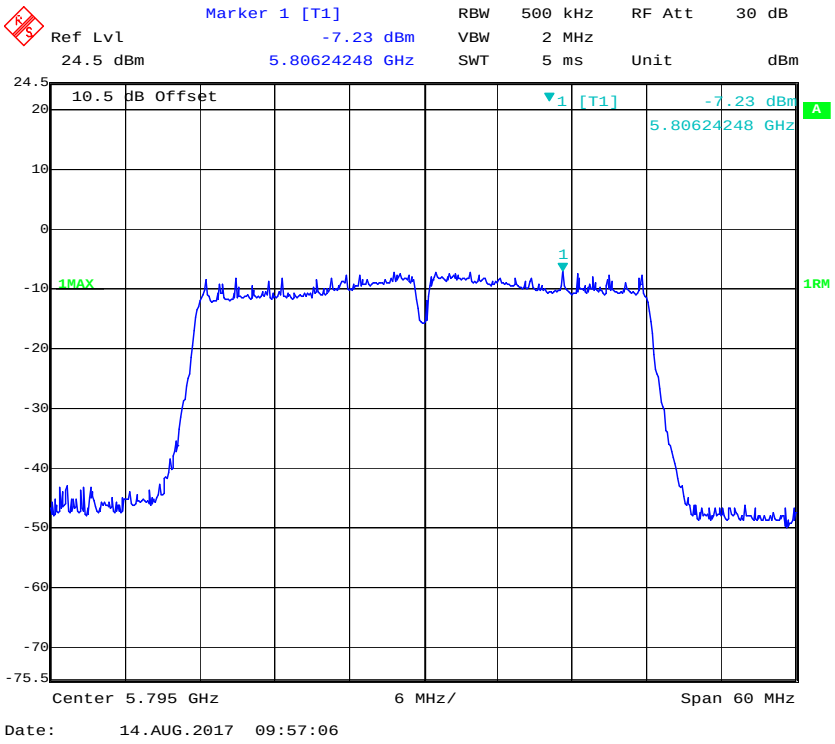
802.11n20 mode, Power Spectral Density, 5825 MHz



802.11n40 mode, Power Spectral Density, 5755 MHz



802.11n40 mode, Power Spectral Density, 5795 MHz



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