TEST REPORT

KCTL Inc.
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Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
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1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2021-06-28

2. Use of Report : Certification

3. Name of Product / Model : Tablet PC / SM-T733

4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. FCC ID (Model) : A3LSMT733

6. IC Certificate No. (Model) : 649E-SMT733

7. Date of Test : 2021-07-05 to 2021-07-28

8. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

9. Test method used : FCC Part 15 Subpart E, 15.407
RSS-247 Issue 2 February 2017
RSS GEN Issue 5 April 2018

10. Test Result : Refer to the test result in the test report

Affirmation	Tested by Name : Taeyoung Kim (Signature)	Technical Manager Name : Seungyong Kim (Signature)

2021-08-02

KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2021-08-02	Originally issued	-

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information

Client	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Factory	:	Samsung Electronics Vietnam Thai Nguyen Co., Ltd
Address	:	Yen binh Industrial Park, Dong Tien Ward, Pho Yen Town Thai Nguyen Province Vietnam
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 CAB Identifier: KR0040 ISED Number: 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Tablet PC
Model	:	SM-T733
Modulation technique	:	Bluetooth(BDR/EDR)_ GFSK, π/4DQPSK, 8DPSK Bluetooth(BLE)_GFSK WIFI(802.11a/b/g/n/ac/ax)_DSSS, OFDM, OFDMA
Number of channels	:	Bluetooth(BDR/EDR)_79 ch / Bluetooth(BLE)_40 ch 802.11b/g/n/ax_HT20/HE20 : 13 ch UNII-1: 4 ch (20 ㎒), 2 ch (40 ㎒), 1 ch (80 ㎒) UNII-2A: 4 ch (20 ㎒), 2 ch (40 ㎒), 1 ch (80 ㎒) UNII-2C: 12 ch (20 ㎒), 6 ch (40 ㎒), 3 ch (80 ㎒) UNII-3: 5 ch (20 ㎒), 2 ch (40 ㎒), 1 ch (80 ㎒)
Power source	:	DC 3.86 Ⅴ
Antenna specification	:	WIFI/Bluetooth(BDR/EDR/BLE)_Metal Antenna
Antenna gain	:	WIFI/Bluetooth(BDR/EDR/BLE)_ ANT 1: -1.71 ㏈i, ANT 2 : -3.31 ㏈i UNII-1 ANT 1: -3.68 ㏈i, ANT 2: -4.57 ㏈i UNII-2A ANT 1: -1.64 ㏈i, ANT 2: -4.02 ㏈i UNII-2C ANT 1: -1.67 ㏈i, ANT 2: -5.55 ㏈i UNII-3 ANT 1: -1.51 ㏈i, ANT 2: -5.17 ㏈i

Frequency range	:	Bluetooth(BDR/EDR/BLE)_2 402 ㎒ ~ 2 480 ㎒ 2 412 ㎒ ~ 2 472 ㎒ (802.11b/g/n/ax_HT20/HE20) UNII-1: 5 180 ㎒ ~ 5 240 ㎒ (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-1: 5 190 ㎒ ~ 5 230 ㎒ (802.11n/ac/ax_HT40/VHT40/HE40) UNII-1: 5 210 ㎒ (802.11ac/ax_VHT80/HE80) UNII-2A: 5 260 ㎒ ~ 5 320 ㎒ (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-2A: 5 270 ㎒ ~ 5 310 ㎒ (802.11n/ac/ax_HT40/VHT40/HE40) UNII-2A: 5 290 ㎒ (802.11ac/ax_VHT80/HE80) UNII-2C: 5 500 ㎒ ~ 5 720 ㎒ (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-2C: 5 510 ㎒ ~ 5 710 ㎒ (802.11n/ac/ax_HT40/VHT40/HE40) UNII-2C: 5 530 ㎒ ~ 5 690 ㎒ (802.11ac/ax_VHT80/HE80) UNII-3: 5 745 ㎒ ~ 5 825 ㎒ (802.11a/n/ac/ax_HT20/VHT20/HE20) UNII-3: 5 755 ㎒ ~ 5 795 ㎒ (802.11n/ac/ax_HT40/VHT40/HE40) UNII-3: 5 775 ㎒ (802.11ac/ax_VHT80/HE80)
Software version	:	T733.001
Hardware version	:	REV1.0
Test device serial No.	:	Conducted(55c51ad802257ece, 5432974d5b1c7ece, 5432974d411c7, 55c51ad801257ece) Radiated(RL32R6001HLL, 5432974d581c7ece)
Operation temperature	:	0 ℃ ~ 50 ℃

2.1. Frequency/channel operations

This device contains the following capabilities:
WiFi (802.11a/b/g/n/ac/ax), Bluetooth (BDR/EDR/BLE)

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)
36	5 180	52	5 260	100	5 500	149	5 745
40	5 200	56	5 280	120	5 600	157	5 785
48	5 240	64	5 320	140	5 700	165	5 825
				144	5 720		

Table 2.2-1. 802.11a/n/ac_HT20/VHT20 mode

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)
38	5 190	54	5 270	102	5 510	151	5 755
46	5 230	62	5 310	118	5 590	159	5 795
				134	5 670		
				142	5 710		

Table 2.2-2. 802.11n/ac_HT40/VHT40 mode

UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)
42	5 210	58	5 290	106	5 530	155	5 775
				122	5 610		
				138	5 690		

Table 2.2-3. 802.11ac_VHT80 mode

2.2. Simultaneous Tx Condition

For Simultaneous mode (Bluetooth, WLAN), please refer to
Test report #KR21-SRF0163_04072_Samsung Electronics_SM-T733_WiFi(P15.407)_ax.

2.3. Duty Cycle Factor

SISO

Test mode	Period (ms)	T_{on} time (ms)	Duty cycle		Duty cycle factor (dB)
			(Linear)	(%)	
802.11a	1.555	1.457	0.937 0	93.70	0.28
802.11n_HT20	1.343	1.245	0.927 2	92.70	0.33
802.11n_HT40	0.717	0.620	0.864 7	86.47	0.63
802.11ac_VHT20	1.346	1.249	0.927 9	92.79	0.32
802.11ac_VHT40	0.721	0.624	0.865 5	86.55	0.63
802.11ac_VHT80	0.408	0.311	0.762 3	76.23	1.18

MIMO

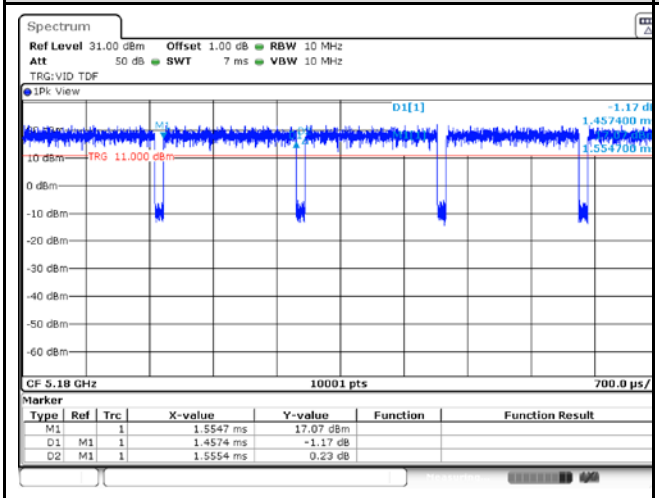
Test mode	Period (ms)	T_{on} time (ms)	Duty cycle		Duty cycle factor (dB)
			(Linear)	(%)	
802.11a	1.555	1.457	0.937 0	93.70	0.28
802.11n_HT20	0.746	0.648	0.868 6	86.86	0.61
802.11n_HT40	0.429	0.332	0.773 9	77.39	1.11
802.11ac_VHT20	0.750	0.652	0.869 3	86.93	0.61
802.11ac_VHT40	0.433	0.336	0.776 0	77.60	1.10
802.11ac_VHT80	0.276	0.180	0.652 2	65.22	1.86

Notes.

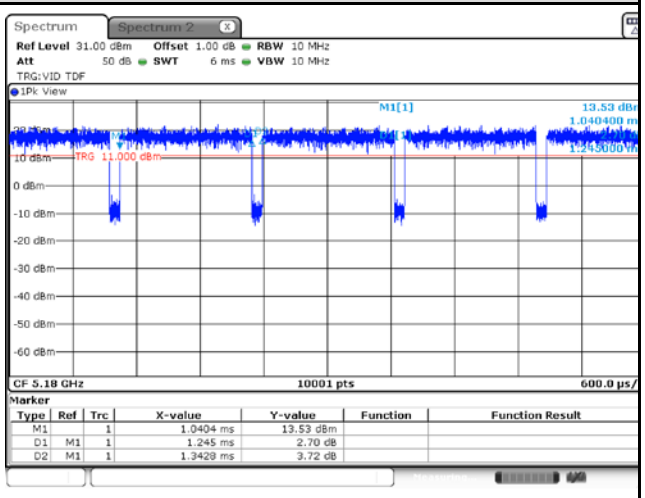
1. Duty cycle (Linear) = T_{on} time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not compensated to average result if duty cycle is more than 98%

SISO

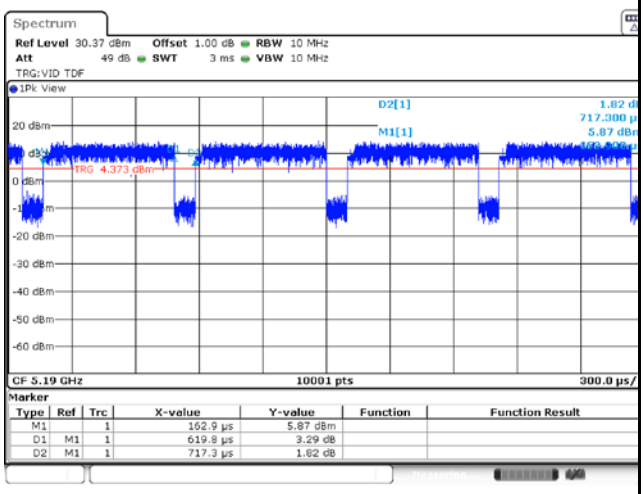
802.11a



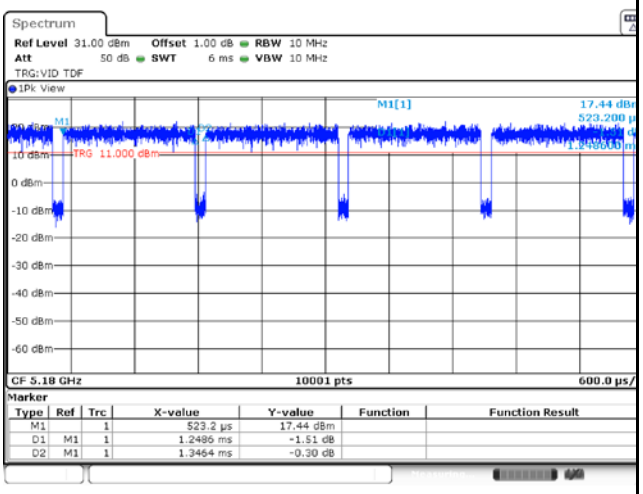
802.11n_HT20



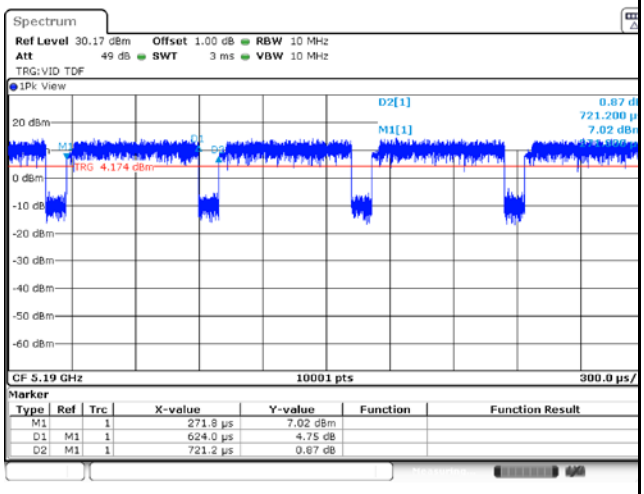
802.11n_HT40



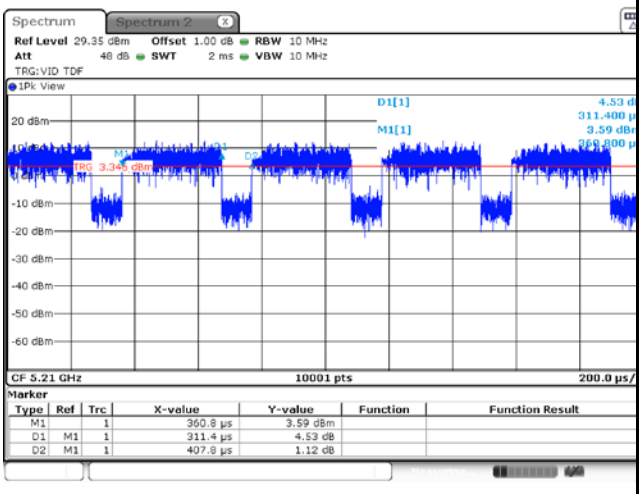
802.11ac_VHT20



802.11ac_VHT40

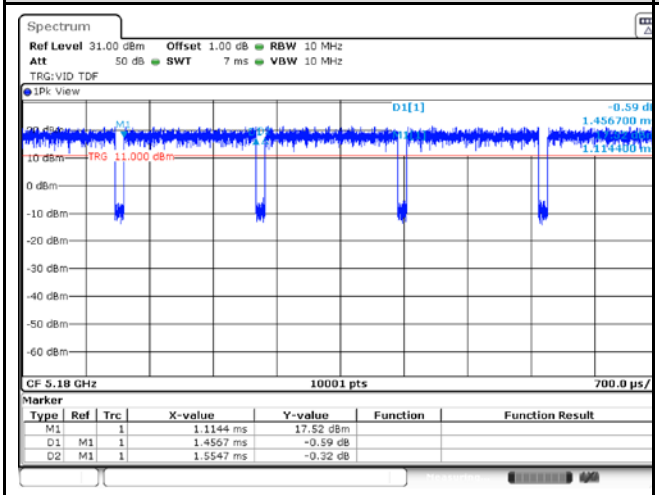


802.11ac_VHT80

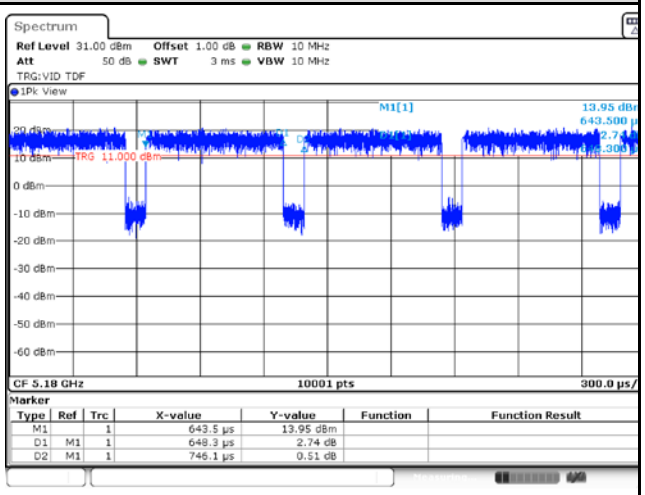


MIMO

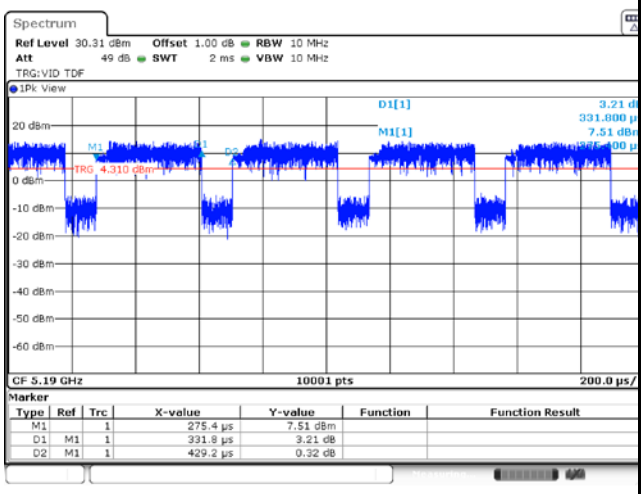
802.11a



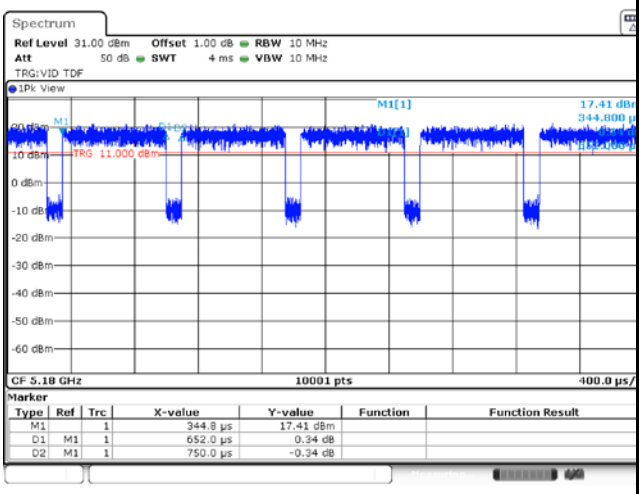
802.11n_HT20



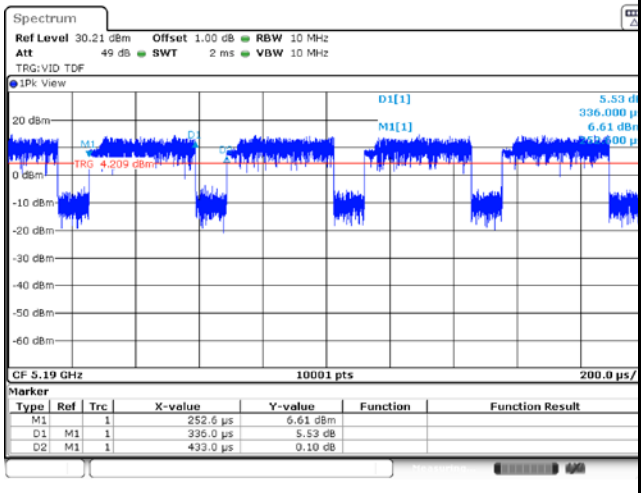
802.11n_HT40



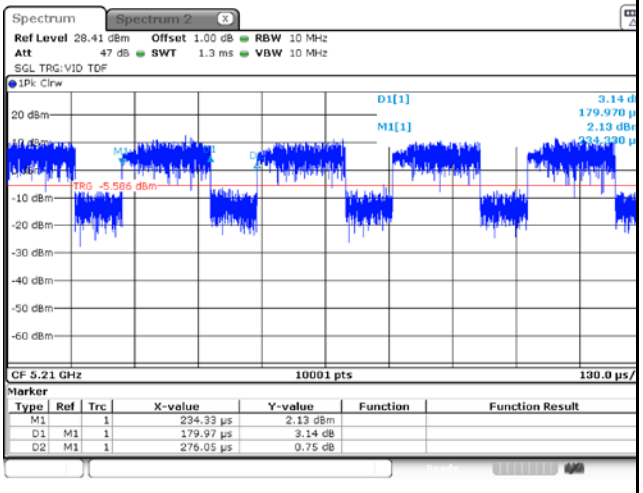
802.11ac_VHT20



802.11ac_VHT40



802.11ac_VHT80



3. Antenna requirement

Requirement of FCC part section 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.

Requirement of RSS-Gen Section 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types which can be used with the transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna type.

- The transmitter has permanently attached Metal Antenna (Internal antenna) on board.
- The E.U.T Complies with the requirement of §15.203, §15.247, §15.407.

3.1 Antenna information

Mode	SISO		CDD	MIMO
	ANT 1	ANT 2	ANT 1 + 2	ANT 1 + 2
802.11a	√	√	√	X
802.11n HT20	√	√	√	√
802.11n HT40	√	√	√	√
802.11ac VHT20	√	√	√	√
802.11ac VHT40	√	√	√	√
802.11ac VHT80	√	√	√	√

√ = Support, ✕ = Not support

3.2 Directional Gain Calculations

According to clause F), 2), d), (i) of KDB 662911 D01 Multiple Transmitter Output, Directional gain may be calculated by using the formulas as below.

3.2.1. Directional Antenna Gain

Band	ANT 1 Gain (dBi)	ANT 2 Gain (dBi)	Power Directional Gain (dBi)
UNII 1	-3.68	-4.57	-1.10
UNII 2A	-1.64	-4.02	0.26
UNII 2C	-1.67	-5.55	-0.38
UNII 3	-1.51	-5.17	-0.14

Note.

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

4. Summary of tests

FCC Part section(s)	IC Rule Reference	Parameter	Test Condition	Test results
15.407(a)	RSS-247 Issue 2, 6.2	Maximum conducted output power	Conducted	Pass
15.407(a)	RSS-247 Issue 2, 6.2	Maximum power spectral density		Pass
15.407(a)	RSS-Gen Issue 5, 6.7	26 dB Channel Bandwidth		Pass
15.407(e)	RSS-247 Issue 2, 6.2.4	6 dB Channel Bandwidth		Pass
-	RSS-Gen Issue 5, 6.7	Occupied Bandwidth		Pass
15.207(a)	RSS-Gen Issue 5, 8.8	AC Conducted Emissions		Pass
15.407(b), 15.205(a), 15.209(a)	RSS-Gen Issue 5, 8.9, 8.10 RSS-247 Issue 2, 6.2,	Spurious emission	Radiated	Pass
		Band-edge, restricted band		Pass

Notes:

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. According to exploratory test no any obvious emission were detected from 9 ㎑ to 30 ㎒. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
3. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z. It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation.
4. All the radiated tests have been performed several case.
   (Stand-alone, with accessories (S-pen, keyboard cover, TA etc.))
   Worst case: stand-alone
5. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.10-2013
   - KDB 662911 D01 v02r01
   - KDB 789033 D02 v02r01
6. Based on the baseline scan, the worst-case data rates were:
   802.11a mode: 6Mbps
   802.11n HT20 mode: MCS0, MCS8
   802.11n HT40 mode: MCS0, MCS8
   802.11ac VHT20 mode: MCS0
   802.11ac VHT40 mode: MCS0
   802.11ac VHT80 mode: MCS0

5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded uncertainty (±)	
Conducted RF power	0.9 dB	
Conducted spurious emissions	1.6 dB	
Radiated spurious emissions	9 kHz ~ 30 MHz	2.3 dB
	30 MHz ~ 1 000 MHz	2.2 dB
	Above 1 GHz	5.6 dB
Conducted emissions	9 kHz ~ 150 kHz	3.7 dB
	150 kHz ~ 30 MHz	3.3 dB

7. Measurement results explanation example

The offset level is set in the spectrum analyzer to compensate the RF cable loss factor between EUT conducted output port and spectrum analyzer.
With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

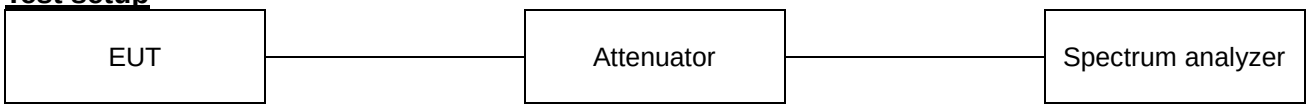
Frequency (㎒)	Factor(㏈)	Frequency (㎒)	Factor(㏈)
30	10.03	9 000	12.98
50	10.04	10 000	13.26
100	10.16	11 000	13.64
200	10.30	12 000	12.74
300	10.39	13 000	12.46
400	10.48	14 000	12.70
500	10.60	15 000	12.99
600	10.66	16 000	13.00
700	10.73	17 000	13.03
800	10.74	18 000	13.08
900	10.76	19 000	13.09
1 000	10.69	20 000	13.42
2 000	11.18	21 000	13.78
3 000	11.52	22 000	13.84
4 000	11.64	23 000	13.86
5 000	12.09	24 000	14.19
6 000	12.23	25 000	14.24
7 000	12.75	26 000	14.37
8 000	12.80	26 500	14.47

Notes:
Offset(㏈) = RF cable loss(㏈) + Attenuator(㏈)

8. Test results

8.1. Maximum conducted output power

Test setup



Limit

According to §15.407(a), RSS-247(6.2)

FCC

Band	EUT category		Conducted output power limit
UNII-1		Outdoor access point	1 W (30 ㏈m)
		Indoor access point	
		Fixed point-to-point access point	
	√	Client device	250 ㎽ (23.98 ㏈m)
UNII-2A	√		250 ㎽ or 11 ㏈m + 10logB[1)]
UNII-2C	√		250 ㎽ or 11 ㏈m + 10logB[1)]
UNII-3	√		1 W (30 ㏈m)

IC

Band	Maximum e.i.r.p. limit
UNII-1	200 ㎽ or 10 + 10 logB[2)], ㏈m
UNII-2A	1 W or 17 ㏈m + 10logB[2)]
UNII-2C	1 W or 17 ㏈m + 10logB[2)]
UNII-3	1 W (30 ㏈m)

Note:

1) Conducted output power limit B is the 26 ㏈ emission bandwidth.
2) Maximum e.i.r.p. limit B is the 99% emission bandwidth.

Test procedure

ANSI C63.10-2013-Section 12.3.3.2 and 14.2
KDB 789033 D02 v02r01 - Section E.2.d) or e)
KDB 662911 D01 v02r01 – Section E).1)

Test settings

◆ **KDB 789033 D02 v02r01**

Section E.2.d)
Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction):

(i) Measure the duty cycle, x, of the transmitter output signal as described in II.B..
(ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(iii) Set RBW = 1 ㎒
(iv) Set RBW ≥ 3 ㎒
(v) Number of points in sweep ≥ 2×span/RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(vi) Sweep time = auto.
(vii) Detector = power averaging (rms), if available. Otherwise use sample detector mode.
(viii) Do not use sweep triggering. Allow the sweep to “free run.”
(ix) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
(x) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 ㎒ intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(xi) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log(1/0,25) = 6 ㏈ if the duty cycle is 25%.

Section E.2.e)
Method SA-2 Alternative (power averaging(rms) detection with slow sweep with each spectrum bin averaging across on and off times of the EUT transmissions, followed by duty cycle correction):

(i) Measure the duty cycle, x, of the transmitter output signal as described in II.B..
(ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(iii) Set RBW = 1 ㎒
(iv) Set RBW ≥ 3 ㎒
(v) Number of points in sweep ≥ 2×span/RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(vi) Manually set sweep time ≥ 10 × (number of points in sweep) × (total on/off period of the transmitted signal).
(vii) Set detector = power averaging (rms)
(viii) Perform a single sweep.
(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power

units) at 1 ㎒ intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

(x) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log(1/0,25) = 6 ㏈ if the duty cycle is 25%.

Section E.3.a)
Method PM (Measurement using an RF average power meter):

(xi) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

- The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five

(xii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in Ⅱ

(xiii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(xiv) Adjust the measurement in ㏈m by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25%).

Section E.3.b)
Method PM-G (Measurement using a gated RF average power meter):

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Test results

SISO_Conducted Output Power

Test mode	Band	Frequency (㎒)	Measured output power					Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)		
			ANT1	ANT2		ANT1	ANT2	
802.11a	UNII 1	5 180	15.73	15.50	0.28	16.01	15.78	23.98
		5 200	15.61	15.63	0.28	15.89	15.91	
		5 240	15.89	15.74	0.28	16.17	16.02	
	UNII 2A	5 260	16.04	16.11	0.28	16.32	16.39	23.87
		5 280	16.01	16.16	0.28	16.29	16.44	
		5 320	15.68	15.72	0.28	15.96	16.00	
	UNII 2C	5 500	15.69	15.63	0.28	15.97	15.91	23.97
		5 600	15.39	15.76	0.28	15.67	16.04	
		5 700	15.84	16.16	0.28	16.12	16.44	
	UNII 3	5 745	15.54	16.34	0.28	15.82	16.62	30.00
		5 785	15.38	16.12	0.28	15.66	16.40	
		5 825	15.13	15.38	0.28	15.41	15.66	
802.11n HT20	UNII 1	5 180	15.54	15.75	0.33	15.87	16.08	23.98
		5 200	15.53	15.73	0.33	15.86	16.06	
		5 240	15.76	16.03	0.33	16.09	16.36	
	UNII 2A	5 260	15.91	16.24	0.33	16.24	16.57	23.98
		5 280	15.92	16.32	0.33	16.25	16.65	
		5 320	15.59	15.91	0.33	15.92	16.24	
	UNII 2C	5 500	15.75	15.76	0.33	16.08	16.09	23.98
		5 600	15.50	15.86	0.33	15.83	16.19	
		5 700	15.83	16.24	0.33	16.16	16.57	
	UNII 3	5 745	15.92	15.85	0.33	16.25	16.18	30.00
		5 785	15.74	15.72	0.33	16.07	16.05	
		5 825	15.40	15.99	0.33	15.73	16.32	
802.11n HT40	UNII 1	5 190	12.12	12.40	0.63	12.75	13.03	23.98
		5 230	12.27	12.66	0.63	12.90	13.29	
	UNII 2A	5 270	12.38	12.77	0.63	13.01	13.40	23.98
		5 310	12.03	12.45	0.63	12.66	13.08	
	UNII 2C	5 510	12.29	12.61	0.63	12.92	13.24	23.98
		5 590	12.16	12.48	0.63	12.79	13.11	
		5 670	12.39	12.65	0.63	13.02	13.28	
	UNII 3	5 755	12.65	12.85	0.63	13.28	13.48	30.00
		5 795	12.51	12.56	0.63	13.14	13.19	

Test mode	Band	Frequency (㎒)	Measured output power					Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)		
			ANT1	ANT2		ANT1	ANT2	
802.11ac VHT20	UNII 1	5 180	15.49	15.74	0.32	15.81	16.06	23.98
		5 200	15.42	15.77	0.32	15.74	16.09	
		5 240	15.69	16.11	0.32	16.01	16.43	
	UNII 2A	5 260	15.85	16.32	0.32	16.17	16.64	23.98
		5 280	15.89	16.39	0.32	16.21	16.71	
		5 320	15.60	15.91	0.32	15.92	16.23	
	UNII 2C	5 500	15.78	15.72	0.32	16.10	16.04	23.98
		5 600	15.46	15.88	0.32	15.78	16.20	
		5 700	15.79	16.17	0.32	16.11	16.49	
	UNII 3	5 745	15.81	15.86	0.32	16.13	16.18	30.00
		5 785	15.72	15.72	0.32	16.04	16.04	
		5 825	15.39	15.94	0.32	15.71	16.26	
802.11ac VHT40	UNII 1	5 190	12.04	12.29	0.63	12.67	12.92	23.98
		5 230	12.26	12.63	0.63	12.89	13.26	
	UNII 2A	5 270	12.35	12.79	0.63	12.98	13.42	23.98
		5 310	11.97	12.38	0.63	12.60	13.01	
	UNII 2C	5 510	12.26	12.65	0.63	12.89	13.28	23.98
		5 590	12.21	12.52	0.63	12.84	13.15	
		5 670	12.35	12.70	0.63	12.98	13.33	
	UNII 3	5 755	12.69	12.70	0.63	13.32	13.33	30.00
		5 795	12.47	12.50	0.63	13.10	13.13	
802.11ac VHT80	UNII 1	5 210	10.56	10.99	1.18	11.74	12.17	23.98
	UNII 2A	5 290	10.92	10.96	1.18	12.10	12.14	23.98
	UNII 2C	5 530	10.49	10.92	1.18	11.67	12.10	23.98
		5 610	10.71	10.86	1.18	11.89	12.04	
	UNII 3	5 775	10.89	11.07	1.18	12.07	12.25	30.00

Note.
1. Result(dBm) = Reading Power + D.C.F

SISO_e.i.r.p.

Test mode	Band	Frequency (㎒)	Measured output power						MAX e.i.r.p Limit (dBm)
			Conducted output power (dBm)		ANT gain (dBi)		MAX e.i.r.p (dBm)		
			ANT1	ANT2	ANT1	ANT2	ANT1	ANT2	
802.11a	UNII 1	5 180	16.01	16.06	-3.68	-4.57	12.33	11.49	22.13
		5 200	15.89	16.19			12.21	11.62	
		5 240	16.17	16.30			12.49	11.73	
	UNII 2A	5 260	16.32	16.67	-1.64	-4.02	14.68	12.65	29.13
		5 280	16.29	16.72			14.65	12.70	
		5 320	15.96	16.28			14.32	12.26	
	UNII 2C	5 500	15.97	16.19	-1.67	-5.55	14.30	10.64	29.14
		5 600	15.67	16.32			14.00	10.77	
		5 700	16.12	16.72			14.45	11.17	
	UNII 3	5 745	15.82	16.62	-1.51	-5.17	14.31	11.45	30.00
		5 785	15.66	16.40			14.15	11.23	
		5 825	15.41	15.66			13.90	10.49	
802.11n HT20	UNII 1	5 180	15.87	16.08	-3.68	-4.57	12.19	11.51	22.45
		5 200	15.86	16.06			12.18	11.49	
		5 240	16.09	16.36			12.41	11.79	
	UNII 2A	5 260	16.24	16.57	-1.64	-4.02	14.60	12.55	29.45
		5 280	16.25	16.65			14.61	12.63	
		5 320	15.92	16.24			14.28	12.22	
	UNII 2C	5 500	16.08	16.09	-1.67	-5.55	14.41	10.54	29.45
		5 600	15.83	16.19			14.16	10.64	
		5 700	16.16	16.57			14.49	11.02	
	UNII 3	5 745	16.25	16.18	-1.51	-5.17	14.74	11.01	30.00
		5 785	16.07	16.05			14.56	10.88	
		5 825	15.73	16.32			14.22	11.15	
802.11n HT40	UNII 1	5 190	12.75	13.03	-3.68	-4.57	9.07	8.46	23.01
		5 230	12.90	13.29			9.22	8.72	
	UNII 2A	5 270	13.01	13.40	-1.64	-4.02	11.37	9.38	30.00
		5 310	12.66	13.08			11.02	9.06	
	UNII 2C	5 510	12.92	13.24	-1.67	-5.55	11.25	7.69	30.00
		5 590	12.79	13.11			11.12	7.56	
		5 670	13.02	13.28			11.35	7.73	
	UNII 3	5 755	13.28	13.48	-1.51	-5.17	11.77	8.31	30.00
		5 795	13.14	13.19			11.63	8.02	

Test mode	Band	Frequency (㎒)	Measured output power						MAX e.i.r.p Limit (dBm)	
			Reading (dBm)		ANT gain (dBi)		MAX e.i.r.p (dBm)			
			ANT1	ANT1	ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
802.11ac VHT20	UNII 1	5 180	15.81	16.06	-3.68	-4.57	12.13	11.49	22.45	
		5 200	15.74	16.09			12.06	11.52		
		5 240	16.01	16.43			12.33	11.86		
	UNII 2A	5 260	16.17	16.64	-1.64	-4.02	14.53	12.62	29.45	
		5 280	16.21	16.71			14.57	12.69		
		5 320	15.92	16.23			14.28	12.21		
	UNII 2C	5 500	16.10	16.04	-1.67	-5.55	14.43	10.49	29.45	
		5 600	15.78	16.20			14.11	10.65		
		5 700	16.11	16.49			14.44	10.94		
	UNII 3	5 745	16.13	16.18	-1.51	-5.17	14.62	11.01	30.00	
		5 785	16.04	16.04			14.53	10.87		
		5 825	15.71	16.26			14.20	11.09		
802.11ac VHT40	UNII 1	5 190	12.67	12.92	-3.68	-4.57	8.99	8.35	23.01	
		5 230	12.89	13.26			9.21	8.69		
	UNII 2A	5 270	12.98	13.42	-1.64	-4.02	11.34	9.40	30.00	
		5 310	12.60	13.01			10.96	8.99		
	UNII 2C	5 510	12.89	13.28	-1.67	-5.55	11.22	7.73	30.00	
		5 590	12.84	13.15			11.17	7.60		
		5 670	12.98	13.33			11.31	7.78		
	UNII 3	5 755	13.32	13.33	-1.51	-5.17	11.81	8.16	30.00	
		5 795	13.10	13.13			11.59	7.96		
802.11ac VHT80	UNII 1	5 210	11.74	12.17	-3.68	-4.57	8.06	7.60	23.01	
	UNII 2A	5 290	12.10	12.14	-1.64	-4.02	10.46	8.12	30.00	
	UNII 2C	5 530	11.67	12.10	-1.67	-5.55	10.00	6.55	30.00	
		5 610	11.89	12.04			10.22	6.49		
	UNII 3	5 775	12.07	12.25	-1.51	-5.17	10.56	7.08	30.00	

Notes:

1. e.i.r.p. Calculation: e.i.r.p. (dBm) = Conducted output power (dBm) + Antenna gain (dBi)

MIMO Conducted Output Power

Test mode	Band	Frequency (㎒)	Measured output power				Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)	
			ANT1	ANT2			
802.11a	UNII 1	5 180	15.41	15.57	0.28	18.78	24.00
		5 200	15.32	15.66	0.28	18.78	
		5 240	15.45	15.75	0.28	18.89	
	UNII 2A	5 260	15.65	16.07	0.28	19.16	24.00
		5 280	15.61	16.14	0.28	19.17	
		5 320	15.44	15.84	0.28	18.93	
	UNII 2C	5 500	15.62	15.57	0.28	18.89	24.00
		5 600	15.48	15.63	0.28	18.85	
		5 700	15.70	15.93	0.28	19.11	
	UNII 3	5 745	15.16	16.25	0.28	19.03	30.00
		5 785	14.64	16.05	0.28	18.69	
		5 825	14.64	15.23	0.28	18.24	
802.11n HT20	UNII 1	5 180	15.10	15.46	0.61	18.90	24.00
		5 200	15.01	15.54	0.61	18.90	
		5 240	15.50	15.80	0.61	19.27	
	UNII 2A	5 260	15.59	16.05	0.61	19.45	24.00
		5 280	15.61	16.15	0.61	19.51	
		5 320	15.32	15.73	0.61	19.15	
	UNII 2C	5 500	15.79	15.69	0.61	19.36	24.00
		5 600	15.68	15.71	0.61	19.32	
		5 700	15.87	15.98	0.61	19.55	
	UNII 3	5 745	14.57	16.09	0.61	19.02	30.00
		5 785	14.84	16.02	0.61	19.09	
		5 825	15.07	15.65	0.61	18.99	
802.11n HT40	UNII 1	5 190	11.45	11.95	1.11	15.83	24.00
		5 230	11.63	12.23	1.11	16.06	
	UNII 2A	5 270	11.51	12.31	1.11	16.05	24.00
		5 310	11.37	11.95	1.11	15.79	
	UNII 2C	5 510	11.48	12.09	1.11	15.92	24.00
		5 590	11.53	11.96	1.11	15.87	
		5 670	11.79	12.11	1.11	16.07	
	UNII 3	5 755	11.07	12.17	1.11	15.78	30.00
		5 795	11.28	12.48	1.11	16.04	

Test mode	Band	Frequency (㎒)	Measured output power				Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)	
			ANT1	ANT2			
802.11ac VHT20	UNII 1	5 180	15.26	15.37	0.61	18.94	24.00
		5 200	15.23	15.37	0.61	18.92	
		5 240	15.36	15.70	0.61	19.15	
	UNII 2A	5 260	15.43	15.91	0.61	19.30	24.00
		5 280	15.52	16.08	0.61	19.43	
		5 320	15.28	15.57	0.61	19.05	
	UNII 2C	5 500	15.45	15.49	0.61	19.09	24.00
		5 600	15.44	15.36	0.61	19.02	
		5 700	15.85	15.83	0.61	19.46	
	UNII 3	5 745	14.68	15.96	0.61	18.99	30.00
		5 785	14.37	15.86	0.61	18.80	
		5 825	14.76	15.73	0.61	18.89	
802.11ac VHT40	UNII 1	5 190	11.44	11.91	1.10	15.79	24.00
		5 230	11.55	12.13	1.10	15.96	
	UNII 2A	5 270	11.72	12.24	1.10	16.10	24.00
		5 310	11.31	11.86	1.10	15.70	
	UNII 2C	5 510	11.46	11.96	1.10	15.83	24.00
		5 590	11.45	11.73	1.10	15.70	
		5 670	11.66	12.01	1.10	15.95	
	UNII 3	5 755	11.23	12.67	1.10	16.12	30.00
		5 795	11.08	12.28	1.10	15.83	
802.11ac VHT80	UNII 1	5 210	10.03	10.48	1.86	15.13	24.00
	UNII 2A	5 290	10.21	10.55	1.86	15.25	24.00
	UNII 2C	5 530	9.94	10.44	1.86	15.07	24.00
		5 610	10.10	10.35	1.86	15.10	
	UNII 3	5 775	9.78	11.03	1.86	15.32	30.00

Note.
1. Result(dBm) = $10\log(10^{(ANT\ 1/10)} + 10^{(ANT\ 2/10)})$ + D.C.F

MIMO e.i.r.p.

Test mode	Band	Frequency (㎒)	Measured output power			MAX e.i.r.p Limit (dBm)
			Conducted output Power (dBm)	ANT gain (dBi)	MAX e.i.r.p (dBm)	
802.11a	UNII 1	5 180	18.78	-1.10	17.68	22.14
		5 200	18.78		17.68	
		5 240	18.89		17.79	
	UNII 2A	5 260	19.16	0.26	19.42	29.14
		5 280	19.17		19.43	
		5 320	18.93		19.19	
	UNII 2C	5 500	18.89	-0.38	18.51	29.10
		5 600	18.85		18.47	
		5 700	19.11		18.73	
	UNII 3	5 745	19.03	-0.14	18.89	30.00
		5 785	18.69		18.55	
		5 825	18.24		18.10	
802.11n HT20	UNII 1	5 180	18.90	-1.10	17.80	22.45
		5 200	18.90		17.80	
		5 240	19.27		18.17	
	UNII 2A	5 260	19.45	0.26	19.71	29.45
		5 280	19.51		19.77	
		5 320	19.15		19.41	
	UNII 2C	5 500	19.36	-0.38	18.98	29.45
		5 600	19.32		18.94	
		5 700	19.55		19.17	
	UNII 3	5 745	19.02	-0.14	18.88	30.00
		5 785	19.09		18.95	
		5 825	18.99		18.85	
802.11n HT40	UNII 1	5 190	15.83	-1.10	14.73	23.01
		5 230	16.06		14.96	
	UNII 2A	5 270	16.05	-0.26	16.31	30.00
		5 310	15.79		16.05	
	UNII 2C	5 510	15.92	-0.38	15.54	30.00
		5 590	15.87		15.49	
		5 670	16.07		15.69	
	UNII 3	5 755	15.78	-0.14	15.64	30.00
		5 795	16.04		15.90	

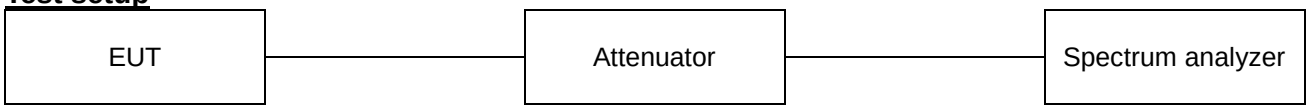
Test mode	Band	Frequency (㎒)	Measured output power			MAX e.i.r.p Limit (dBm)
			Conducted output Power (dBm)	ANT gain (dBi)	MAX e.i.r.p (dBm)	
802.11ac VHT20	UNII 1	5 180	18.94	-1.10	17.84	23.98
		5 200	18.92		17.82	
		5 240	19.15		18.05	
	UNII 2A	5 260	19.30	0.26	19.56	23.98
		5 280	19.43		19.69	
		5 320	19.05		19.31	
	UNII 2C	5 500	19.09	-0.38	18.71	23.94
		5 600	19.02		18.64	
		5 700	19.46		19.08	
	UNII 3	5 745	18.99	-0.14	18.85	30.00
		5 785	18.80		18.66	
		5 825	18.89		18.75	
802.11ac VHT40	UNII 1	5 190	15.79	-1.10	14.69	23.01
		5 230	15.96		14.86	
	UNII 2A	5 270	16.10	-0.26	16.36	30.00
		5 310	15.70		15.96	
	UNII 2C	5 510	15.83	-0.38	15.45	30.00
		5 590	15.70		15.32	
		5 670	15.95		15.57	
	UNII 3	5 755	16.12	-0.14	15.98	30.00
		5 795	15.83		15.69	
802.11ac VHT80	UNII 1	5 210	15.13	-1.10	14.03	23.01
	UNII 2A	5 290	15.25	-0.26	15.51	30.00
	UNII 2C	5 530	15.07	-0.38	14.69	30.00
		5 610	15.10		14.72	
	UNII 3	5 775	15.32	-0.14	15.18	30.00

Notes:

1. e.i.r.p. Calculation: e.i.r.p. (dBm) = Conducted output power (dBm) + Antenna gain (dBi)

8.2. Maximum Power Spectral Density

Test setup



Limit

According to §15.407(a), RSS-247(6.2)

Band	EUT category		Limit
UNII-1		Outdoor access point	17dBm/MHz
		Indoor access point	
		Fixed point-to-point access point	
	√	Client device	11 dBm /MHz
UNII-2A	√		11 dBm /MHz
UNII-2C	√		11 dBm /MHz
UNII-3	√		30 dBm /500 kHz

Notes:

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power And the peak power spectral density shall be reduced by the amount in dB that the directional gain if the antenna exceed 6 dBi

Test procedure

ANSI C63.10-2013 Section 12.3.2.2, 14.3.2.2
KDB 789033 D02 v02r01 - Section F
KDB 662911 D01 v02r01 - Section E). 2)

Test settings

Section F

The rules requires “maximum power spectral density” measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission. Refer to III.A for additional guidance for devices that use channel aggregation.

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled,
   “Compute power….” (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Search function on the instrument to find the peak of the spectrum and record its value.
3. Adjustments to the peak value of the spectrum, if applicable:

   a) If Method SA-2 or SA-2 Alternative was used, add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum.
   b) If Method SA-3 Alternative was used and the linear mode was used in II.E.2.g) (viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1MHz reference bandwidth
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the

preceding procedures make use of 1 ㎒ RBW to satisfy directly the 1 ㎒ reference bandwidth specified in Section 15.407(a)(5). For devices operating in the band 5.725-5.85 ㎓, the rules specify a measurement bandwidth of 500 ㎑. Many spectrum analyzers do not have 500 ㎑ RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1㎒, or 500 ㎑, "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 ㎒, or 500 ㎑). If measurements are performed using a reduced resolution bandwidth (< 1 ㎒, or < 500 ㎑) and integrated over 1 ㎒, or 500 ㎑ bandwidth, the following adjustments to the procedures apply:

a) Set RBW≥1/T, where T is defined in II.B.l.a).
b) Set VBW≥3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 ㎑, add 10 log (500 ㎑ /RBW) to the measured result, whereas RBW (<500 ㎑) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 ㎒, add 10 log (1㎒/RBW) to the measured result, whereas RBW (< 1 ㎒) 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.

Note: As a practical matter, it is recommended to use reduced RBW of 100 ㎑ for the II.F.5.c) and II.F.5.d), since RBW=100 ㎑ is available on nearly all spectrum analyzers.

Test results

SISO

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dB m/㎒)		Limit (dBm/㎒)
			ANT1	ANT2		ANT1	ANT2	
802.11a	UNII 1	5 180	4.74	4.49	0.28	5.02	4.77	11
		5 200	4.43	4.61	0.28	4.71	4.89	
		5 240	4.77	4.85	0.28	5.05	5.13	
	UNII 2A	5 260	4.79	5.01	0.28	5.07	5.29	11
		5 280	4.89	5.15	0.28	5.17	5.43	
		5 320	4.65	4.79	0.28	4.93	5.07	
	UNII 2C	5 500	4.63	4.57	0.28	4.91	4.85	11
		5 600	4.28	4.55	0.28	4.56	4.83	
		5 700	4.60	5.08	0.28	4.88	5.36	
802.11n HT20	UNII 1	5 180	4.32	4.39	0.33	4.65	4.72	11
		5 200	4.17	4.40	0.33	4.50	4.73	
		5 240	4.37	4.62	0.33	4.70	4.95	
	UNII 2A	5 260	4.53	4.93	0.33	4.86	5.26	11
		5 280	4.55	4.99	0.33	4.88	5.32	
		5 320	4.39	4.51	0.33	4.72	4.84	
	UNII 2C	5 500	4.40	4.40	0.33	4.73	4.73	11
		5 600	4.26	4.54	0.33	4.59	4.87	
		5 700	4.49	4.86	0.33	4.82	5.19	
802.11n HT40	UNII 1	5 190	-2.52	-2.17	0.63	-1.89	-1.54	11
		5 230	-2.08	-1.92	0.63	-1.45	-1.29	
	UNII 2A	5 270	-2.10	-1.74	0.63	-1.47	-1.11	11
		5 310	-2.30	-1.66	0.63	-1.67	-1.03	
	UNII 2C	5 510	-2.12	-1.94	0.63	-1.49	-1.31	11
		5 590	-1.98	-1.81	0.63	-1.35	-1.18	
		5 670	-1.89	-1.80	0.63	-1.26	-1.17	
802.11ac VHT20	UNII 1	5 180	4.27	4.49	0.32	4.59	4.81	11
		5 200	4.15	4.41	0.32	4.47	4.73	
		5 240	4.33	4.76	0.32	4.65	5.08	
	UNII 2A	5 260	4.43	5.04	0.32	4.75	5.36	11
		5 280	4.47	4.92	0.32	4.79	5.24	
		5 320	4.49	4.69	0.32	4.81	5.01	
	UNII 2C	5 500	4.38	4.54	0.32	4.70	4.86	11
		5 600	4.42	4.49	0.32	4.74	4.81	
		5 700	4.42	4.78	0.32	4.74	5.10	

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dBm/㎒)		Limit (dBm/㎒)
			ANT1	ANT2		ANT1	ANT2	
802.11ac VHT40	UNII 1	5 190	-2.48	-2.17	0.63	-1.85	-1.54	11
		5 230	-2.27	-1.92	0.63	-1.64	-1.29	
	UNII 2A	5 270	-1.90	-1.66	0.63	-1.27	-1.03	11
		5 310	-2.46	-2.15	0.63	-1.83	-1.52	
	UNII 2C	5 510	-2.08	-1.72	0.63	-1.45	-1.09	11
		5 590	-2.45	-1.83	0.63	-1.82	-1.20	
		5 670	-1.85	-1.90	0.63	-1.22	-1.27	
802.11ac VHT80	UNII 1	5 210	-6.59	-6.43	1.18	-5.41	-5.25	11
	UNII 2A	5 290	-6.42	-6.24	1.18	-5.24	-5.06	11
	UNII 2C	5 530	-6.70	-6.23	1.18	-5.52	-5.05	11
		5 610	-6.63	-6.39	1.18	-5.45	-5.21	

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dBm /500 ㎑)		Limit (dBm /500 ㎑)
			ANT1	ANT2		ANT1	ANT2	
802.11a	UNII 3	5 745	1.61	2.34	0.28	1.89	2.62	30
		5 785	1.49	2.31	0.28	1.77	2.59	
		5 825	1.34	1.55	0.28	1.62	1.83	
802.11n HT20		5 745	1.61	2.34	0.33	2.26	2.77	
		5 785	1.49	2.31	0.33	2.05	1.89	
		5 825	1.34	1.55	0.33	1.85	2.43	
802.11n HT40		5 755	-4.47	-4.40	0.63	-3.84	-3.77	
		5 795	-4.82	-4.58	0.63	-4.19	-3.95	
802.11ac VHT20		5 745	1.89	2.01	0.32	2.21	2.33	
		5 785	1.71	1.83	0.32	2.03	2.15	
		5 825	1.20	1.99	0.32	1.52	2.31	
802.11ac VHT40		5 755	-4.47	-4.35	0.63	-3.84	-3.72	
		5 795	-4.53	-4.76	0.63	-3.90	-4.13	
802.11ac VHT80		5 775	-9.26	-8.64	1.18	-8.08	-7.46	

Notes:
1. Maximum PSD calculation
- Maximum PSD = Measured PSD + D.C.F

MIMO

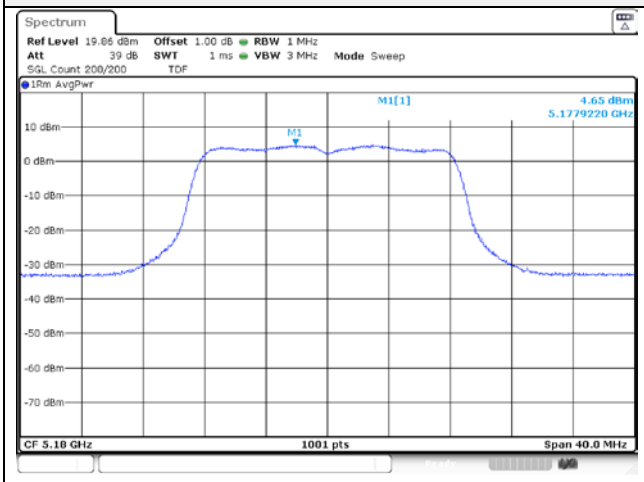
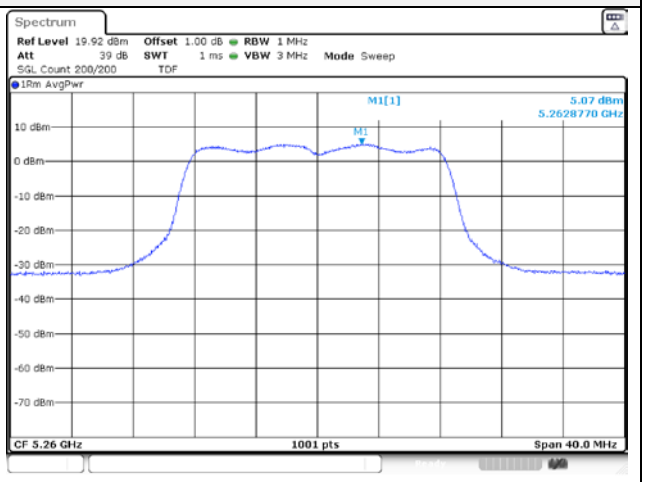
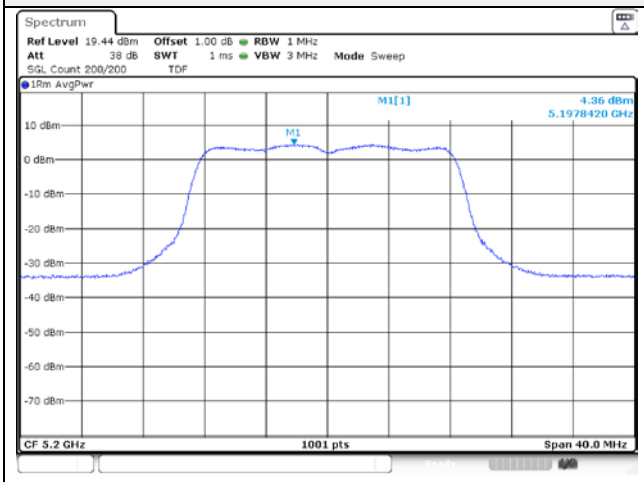
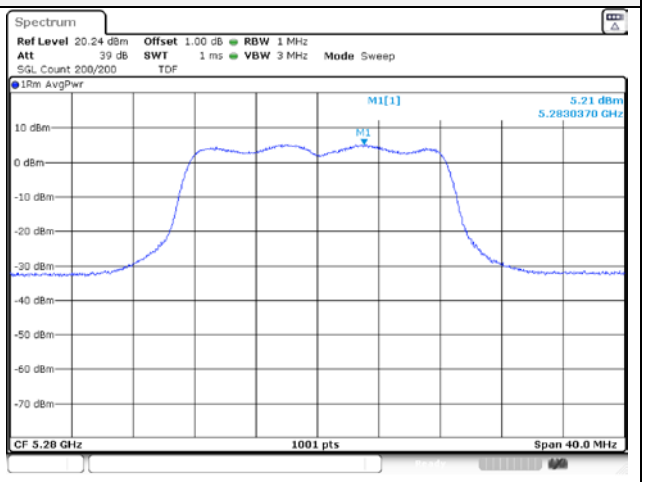
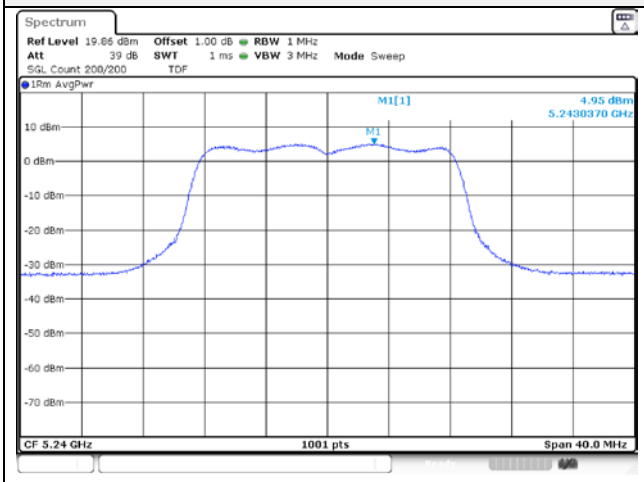
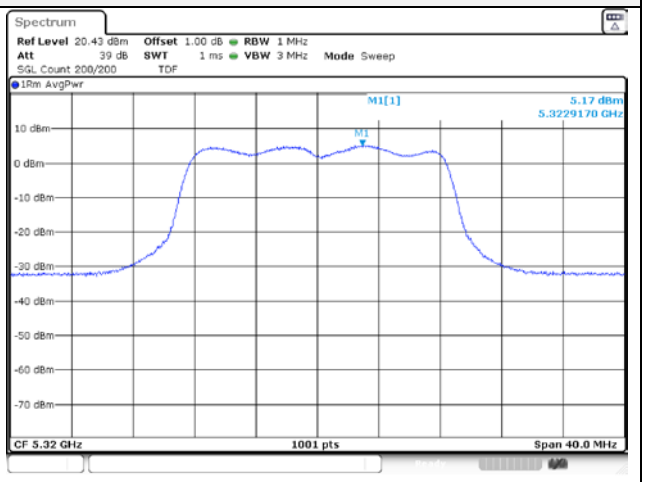
Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dB m/㎒)	Limit (dBm/㎒)
			ANT1	ANT2			
802.11a	UNII 1	5 180	4.65	4.70	0.28	7.97	11
		5 200	4.36	4.72	0.28	7.83	
		5 240	4.95	4.83	0.28	8.18	
	UNII 2A	5 260	5.70	5.09	0.28	8.70	11
		5 280	5.80	5.12	0.28	8.76	
		5 320	6.10	4.63	0.28	8.72	
	UNII 2C	5 500	5.70	4.59	0.28	8.47	11
		5 600	5.80	4.56	0.28	8.51	
		5 700	6.10	4.77	0.28	8.78	
802.11n HT20	UNII 1	5 180	3.78	4.32	0.61	7.68	11
		5 200	3.62	4.17	0.61	7.52	
		5 240	4.17	4.60	0.61	8.01	
	UNII 2A	5 260	4.34	4.64	0.61	8.11	11
		5 280	4.40	4.89	0.61	8.27	
		5 320	4.11	4.37	0.61	7.86	
	UNII 2C	5 500	4.48	4.44	0.61	8.08	11
		5 600	4.36	4.41	0.61	8.01	
		5 700	4.41	4.59	0.61	8.12	
802.11n HT40	UNII 1	5 190	-2.96	-2.31	1.11	1.50	11
		5 230	-2.66	-2.07	1.11	1.77	
	UNII 2A	5 270	-2.88	-2.07	1.11	1.66	11
		5 310	-3.05	-2.44	1.11	1.39	
	UNII 2C	5 510	-2.59	-2.14	1.11	1.76	11
		5 590	-2.85	-2.40	1.11	1.50	
		5 670	-2.60	-1.98	1.11	1.84	
802.11ac VHT20	UNII 1	5 180	3.93	4.09	0.61	7.63	11
		5 200	3.87	3.93	0.61	7.52	
		5 240	4.03	4.32	0.61	7.80	
	UNII 2A	5 260	4.21	4.72	0.61	8.09	11
		5 280	4.35	4.77	0.61	8.19	
		5 320	4.03	4.54	0.61	7.91	
	UNII 2C	5 500	4.37	4.11	0.61	7.86	11
		5 600	4.19	4.10	0.61	7.77	
		5 700	4.76	4.68	0.61	8.34	

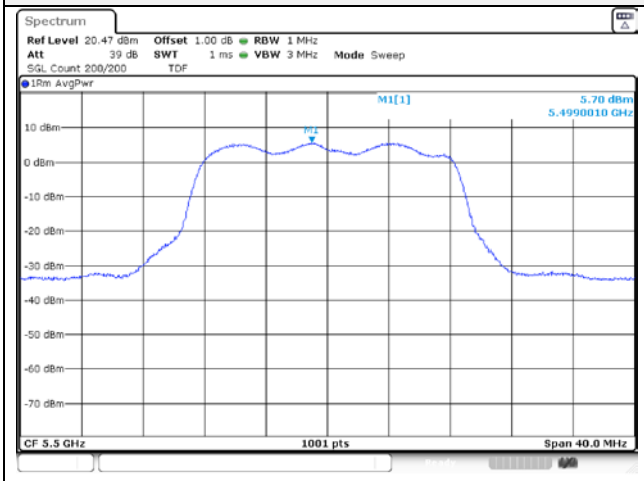
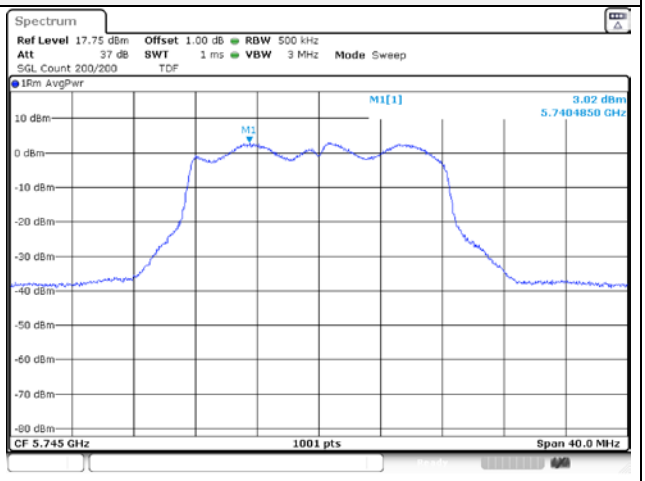
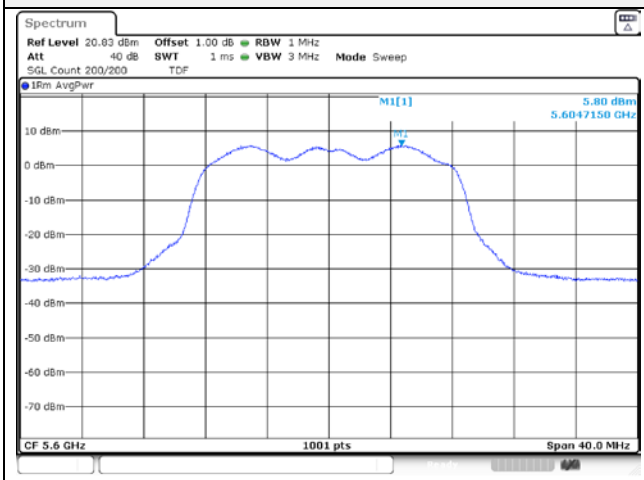
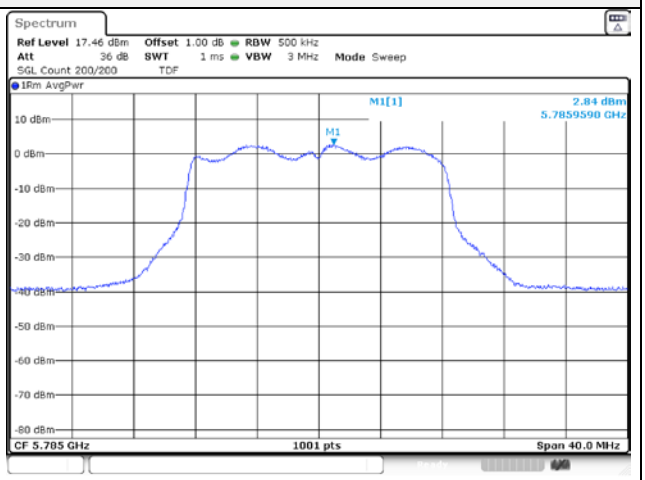
Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dB m/㎒)	Limit (dBm/㎒)
			ANT1	ANT2			
802.11ac VHT40	UNII 1	5 190	-2.86	-2.54	1.10	1.41	11
		5 230	-2.80	-2.20	1.10	1.62	
	UNII 2A	5 270	-2.71	-2.10	1.10	1.72	11
		5 310	-2.93	-2.38	1.10	1.46	
	UNII 2C	5 510	-2.68	-2.34	1.10	1.60	11
		5 590	-2.31	-2.69	1.10	1.61	
		5 670	-2.35	-2.29	1.10	1.79	
802.11ac VHT80	UNII 1	5 210	-6.93	-6.38	1.86	-1.78	11
	UNII 2A	5 290	-6.23	-6.45	1.86	-1.47	11
	UNII 2C	5 530	-6.80	-6.31	1.86	-1.68	11
		5 610	-6.67	-6.66	1.86	-1.79	

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dBm /500 ㎑)	Limit (dBm /500 ㎑)
			ANT1	ANT2			
802.11a	UNII 3	5 745	3.02	2.26	0.28	5.95	30
		5 785	2.84	2.22	0.28	5.83	
		5 825	2.09	1.62	0.28	5.15	
802.11n HT20		5 745	1.31	2.08	0.61	5.33	
		5 785	1.13	1.87	0.61	5.14	
		5 825	1.40	1.78	0.61	5.21	
802.11n HT40		5 755	1.31	2.08	1.11	5.83	
		5 795	1.13	1.87	1.11	5.64	
802.11ac VHT20		5 745	1.53	2.20	0.61	5.50	
		5 785	1.10	1.86	0.61	5.12	
		5 825	1.25	1.75	0.61	5.13	
802.11ac VHT40		5 755	-5.52	-4.35	1.10	-0.79	
		5 795	-5.80	-4.89	1.10	-1.21	
802.11ac VHT80		5 775	-9.35	-8.43	1.86	-4.00	

Notes:
1. Maximum PSD calculation
- Maximum PSD = Measured 10log($10^{(ANT\ 1/10)}$ + $10^{(ANT\ 2/10)}$) + D.C.F

In order to simplify the report, attached plots were only MIMO (Worst bandwidth)
MIMO ANT 1

UNII-1 / 802.11a / Low ch.	UNII-2A / 802.11a / Low ch.
	
UNII-1 / 802.11a / Mid ch.	**UNII-2A / 802.11a / Mid ch.**
	
UNII-1 / 802.11a / High ch.	**UNII-2A / 802.11a / High ch.**
	

UNII-2C / 802.11a / Low ch.	UNII-3 / 802.11a / Low ch.
	
UNII-2C / 802.11a / Mid ch.	**UNII-3 / 802.11a / Mid ch.**
	
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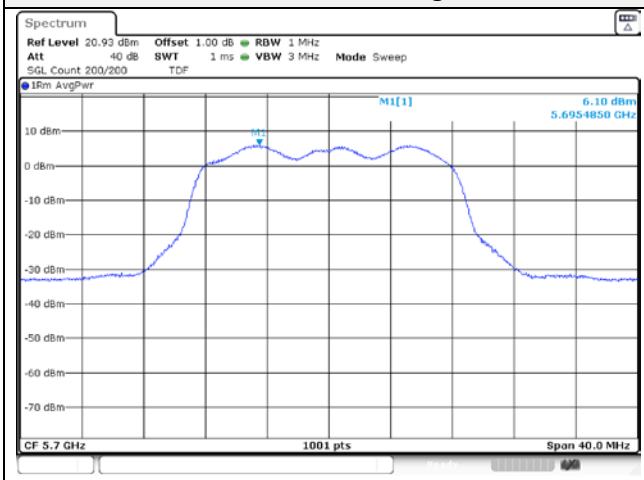	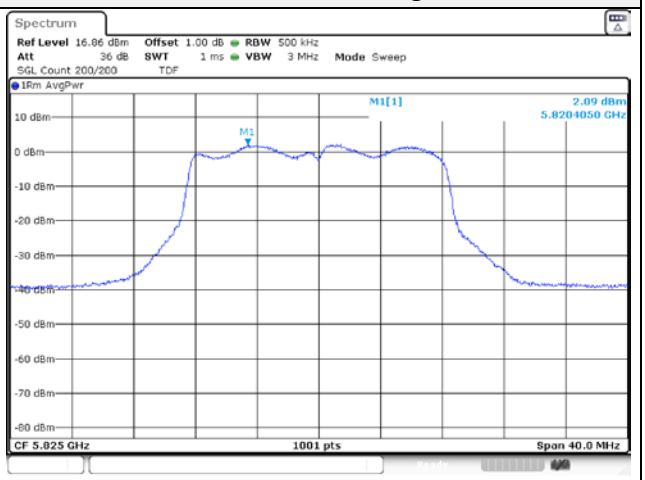

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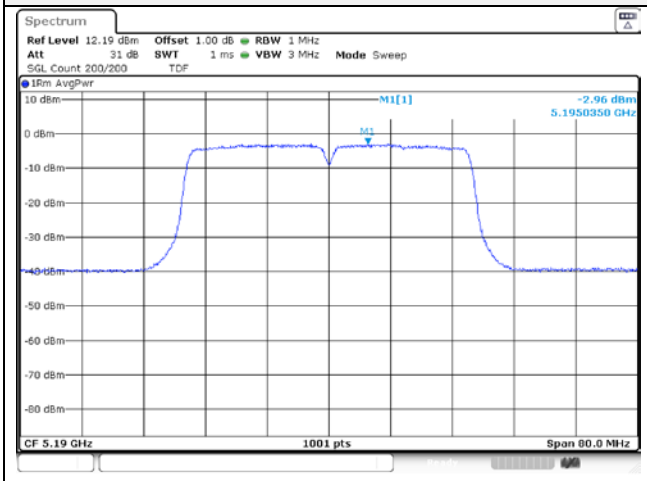
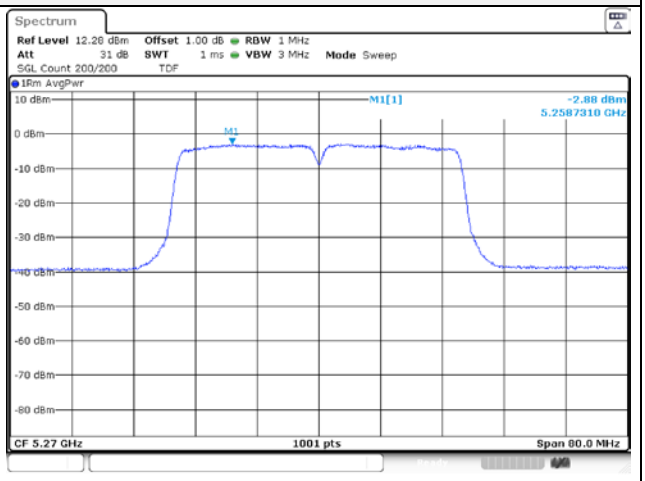
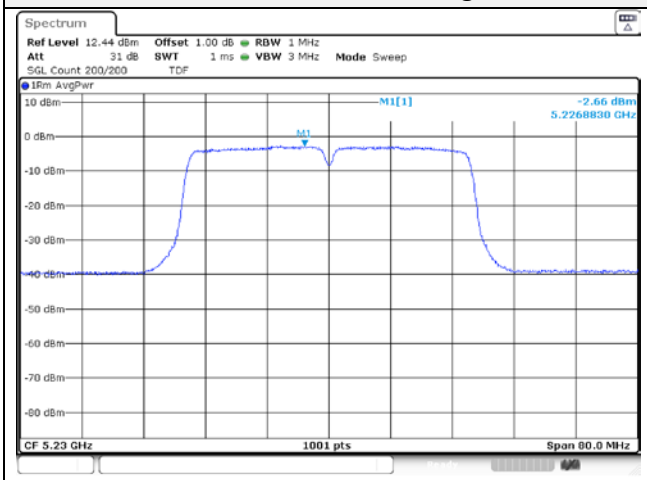
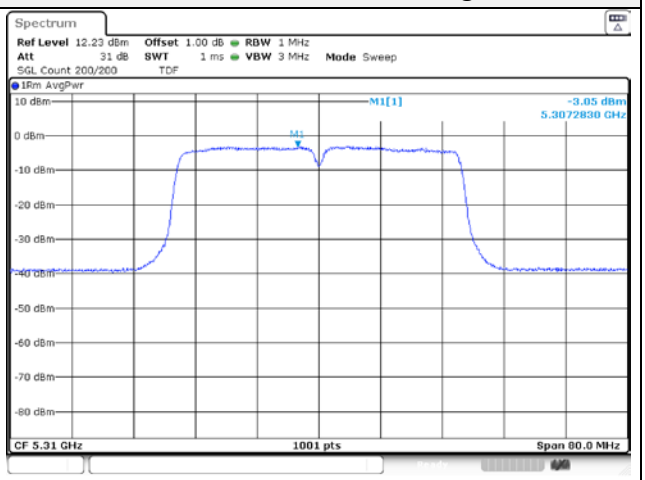
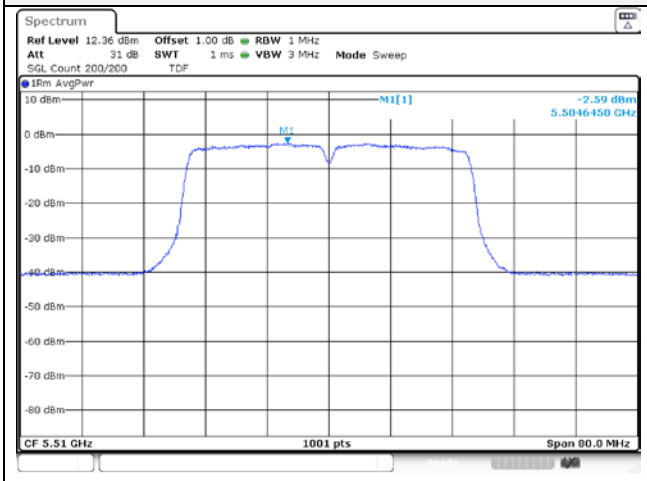
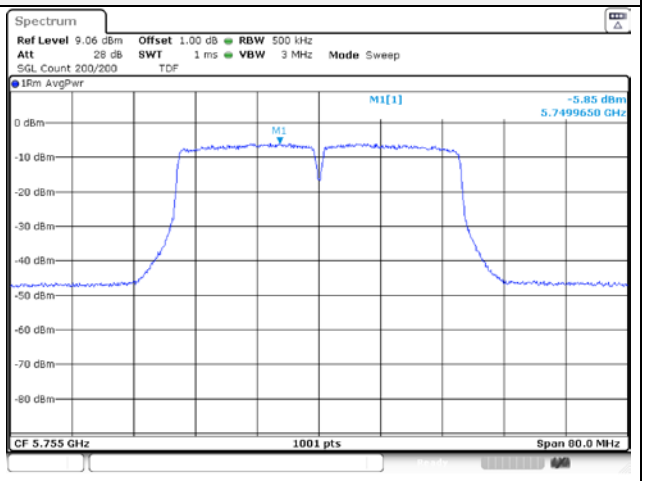
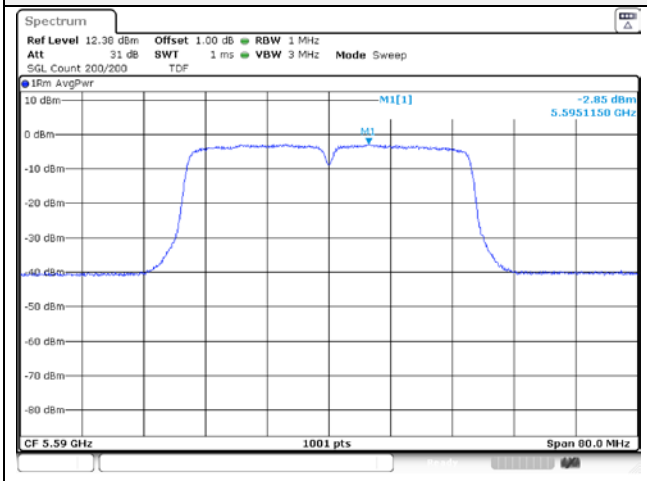
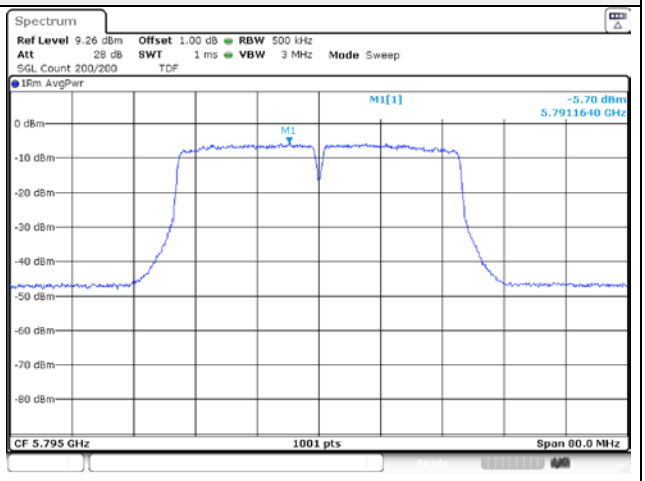
	
UNII-1 / 802.11n HT40 / High ch.	**UNII-2A / 802.11n HT40 / High ch.**
	

UNII-2C / 802.11n HT40 / Low ch.	UNII-3 / 802.11n HT40 / Low ch.
	
UNII-2C / 802.11n HT40 / Mid ch.	**UNII-3 / 802.11n HT40 / High ch.**
	
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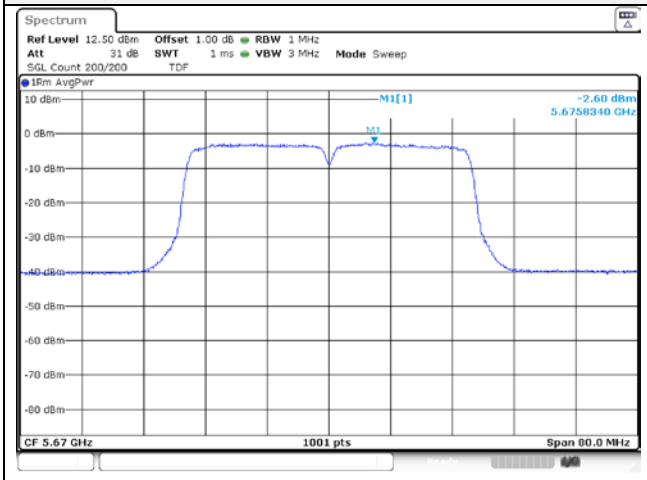	Blank

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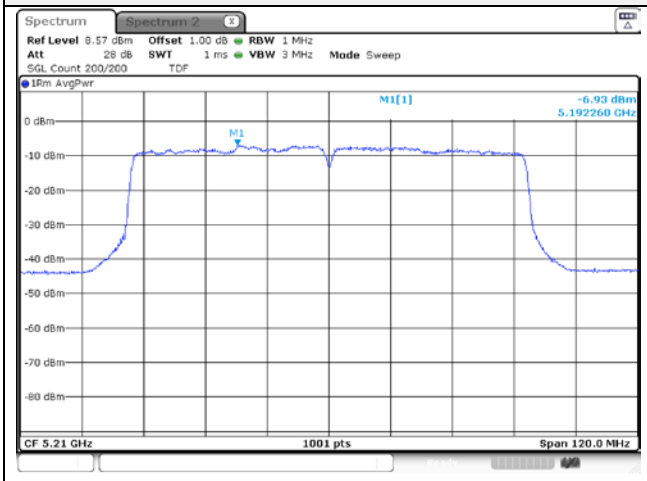
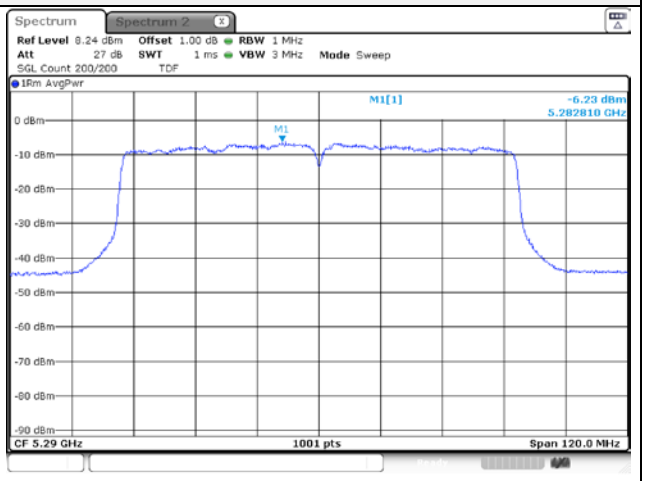
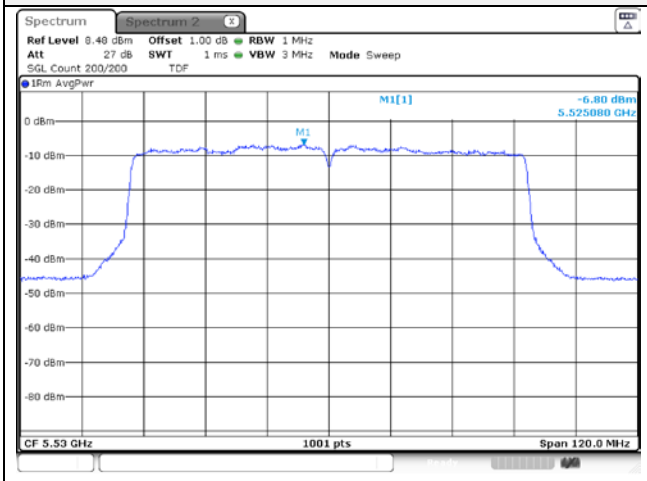
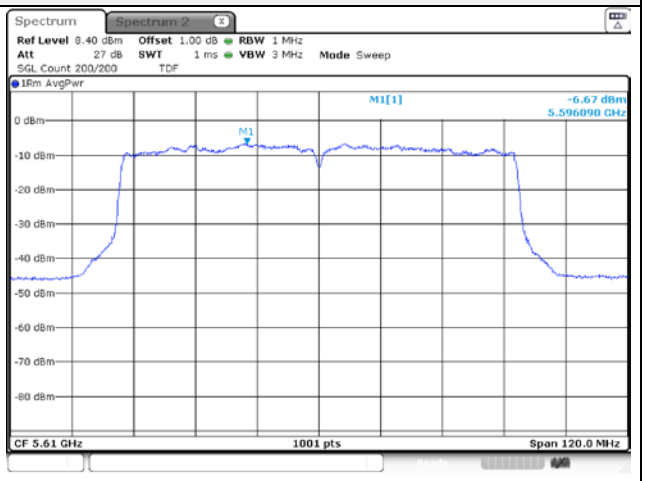
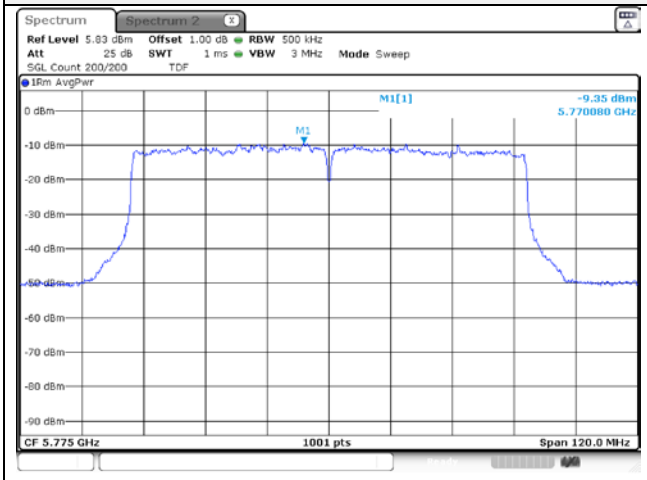
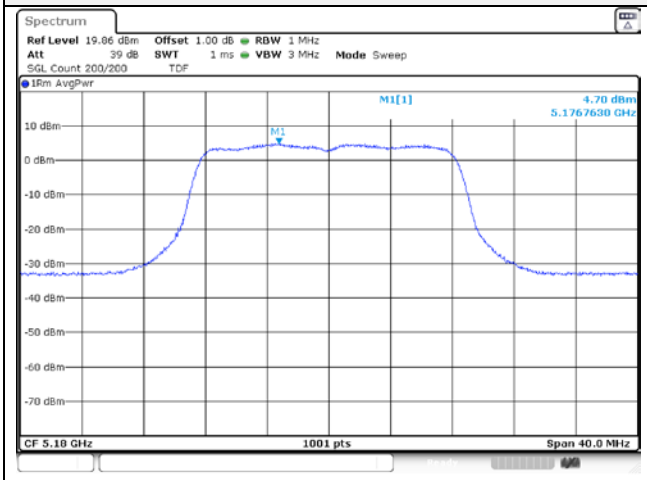
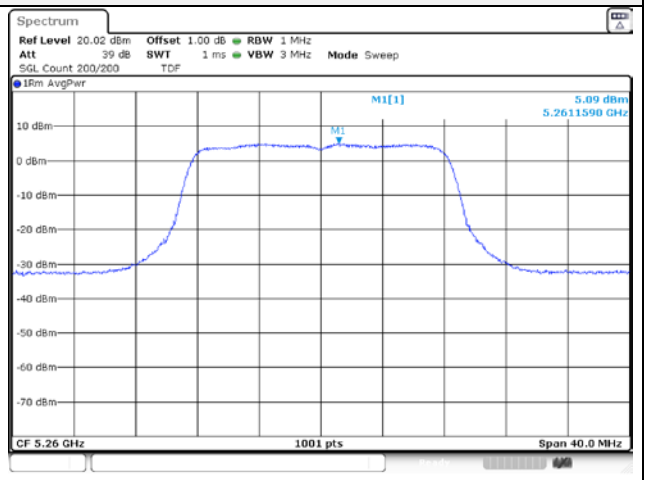
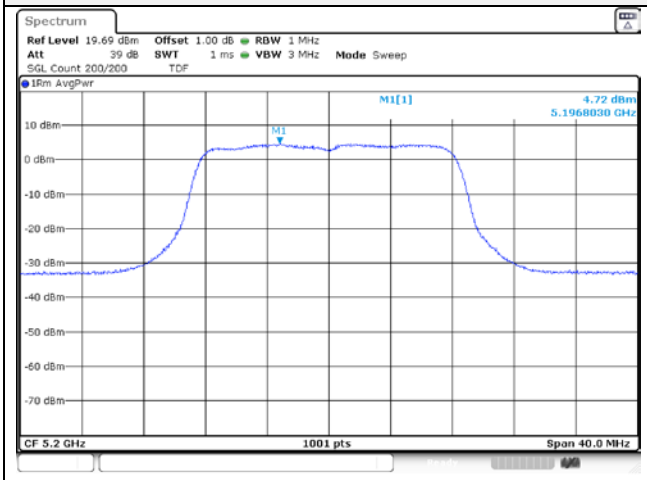
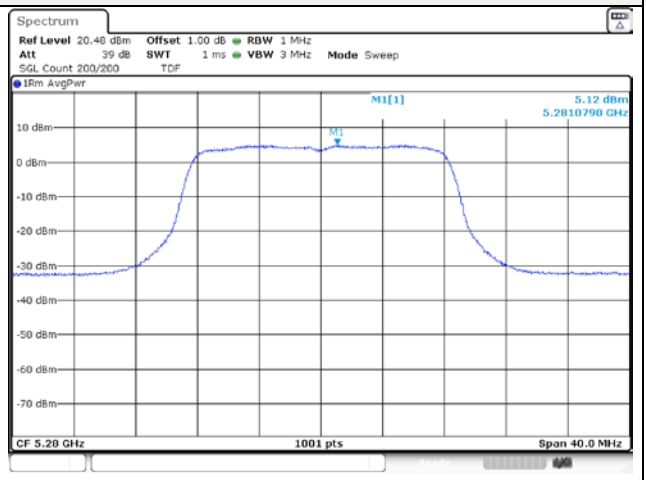
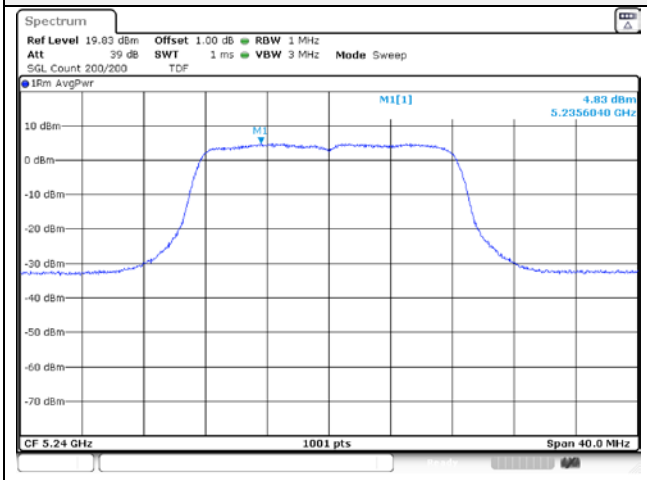
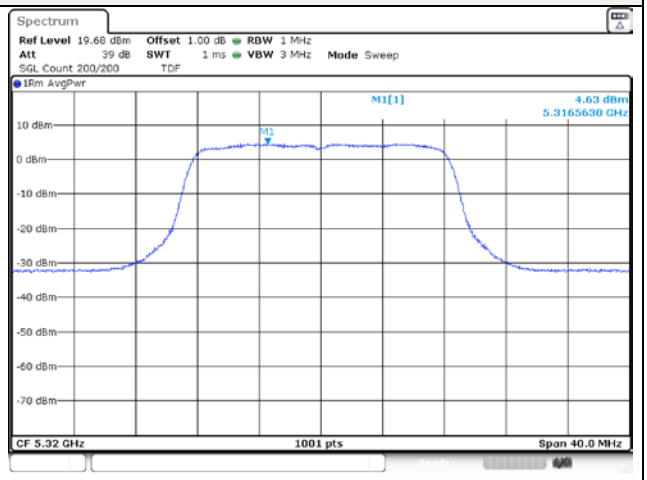
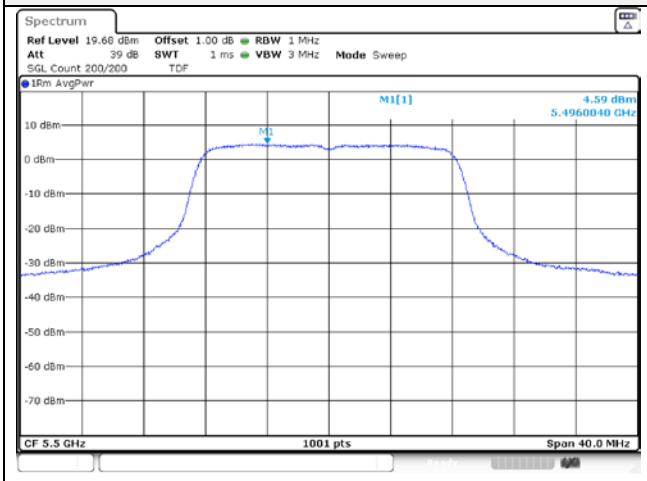
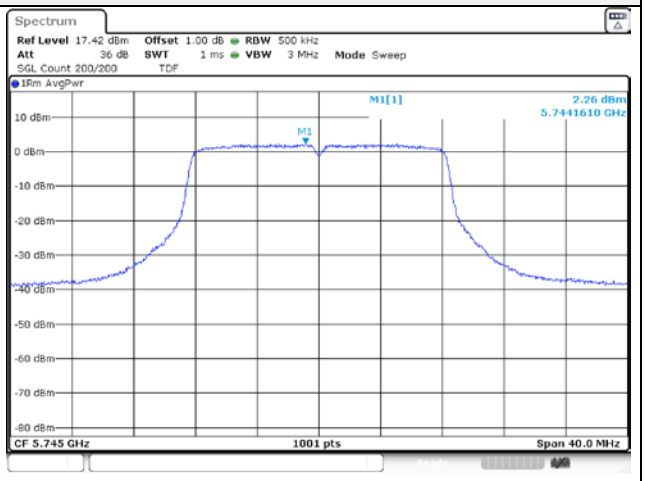
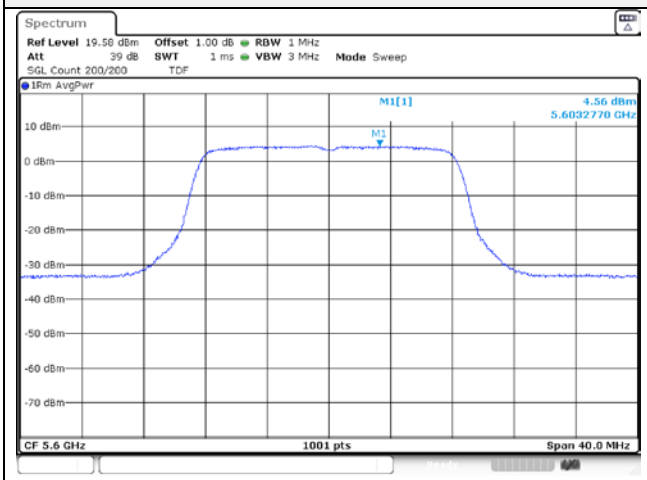
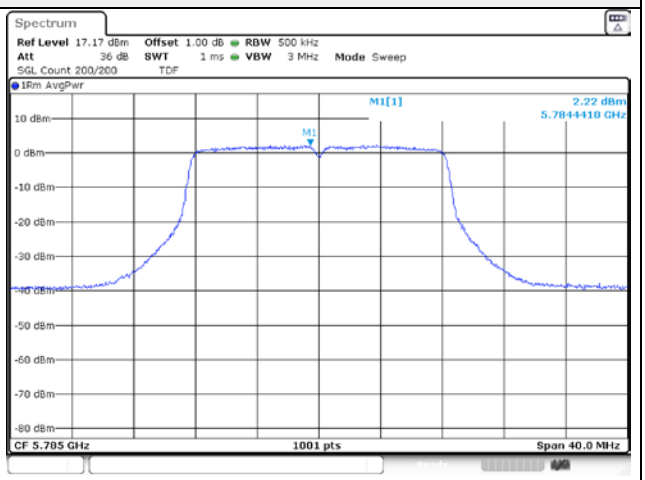
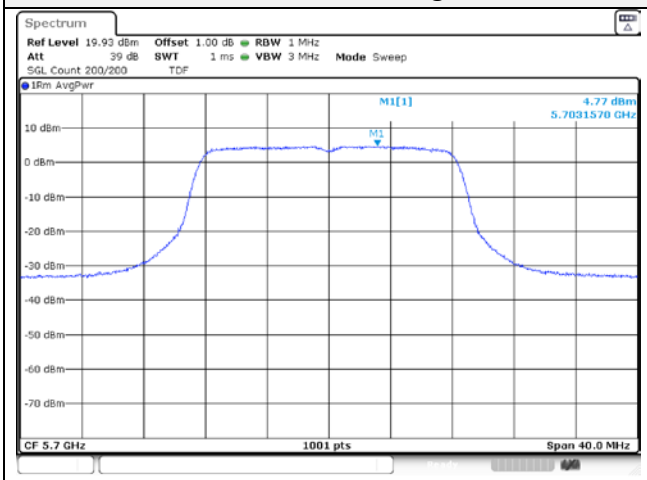
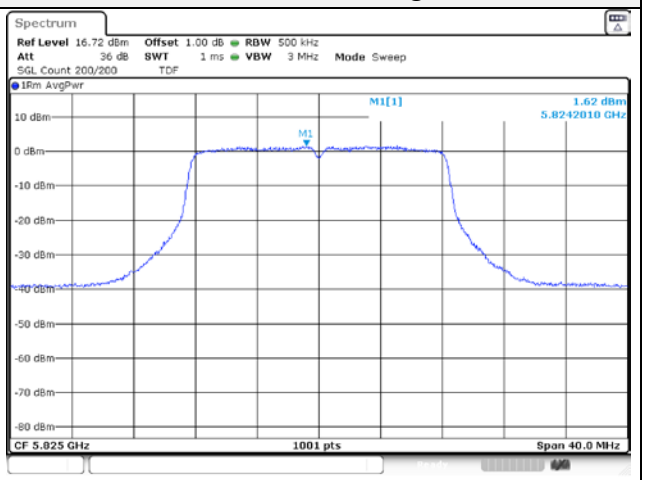
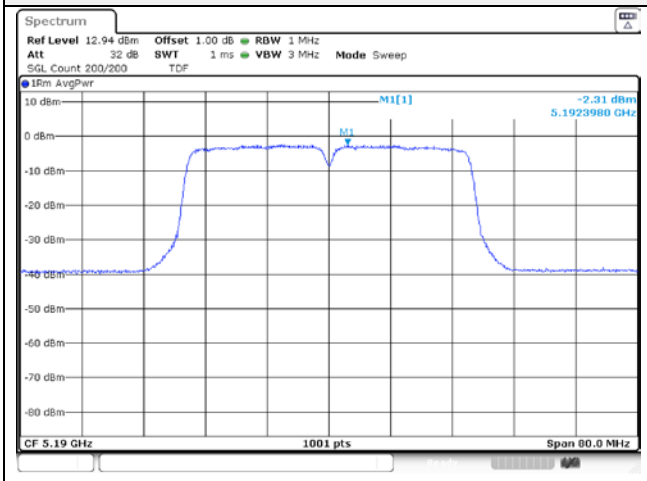
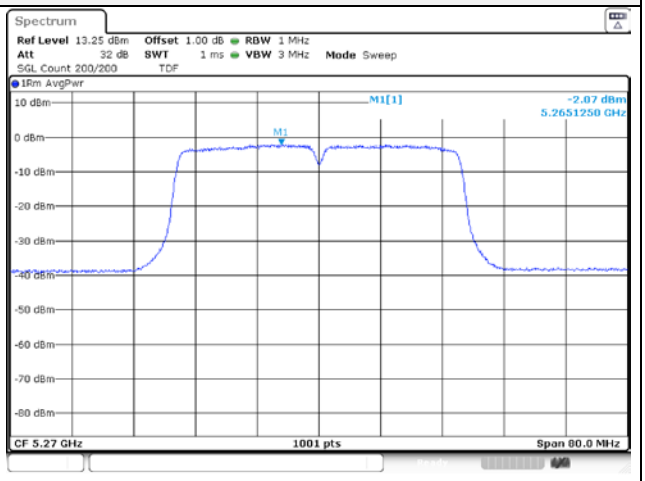
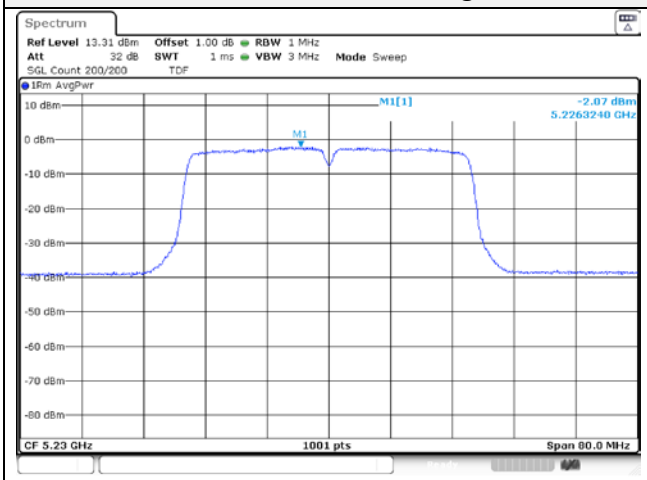
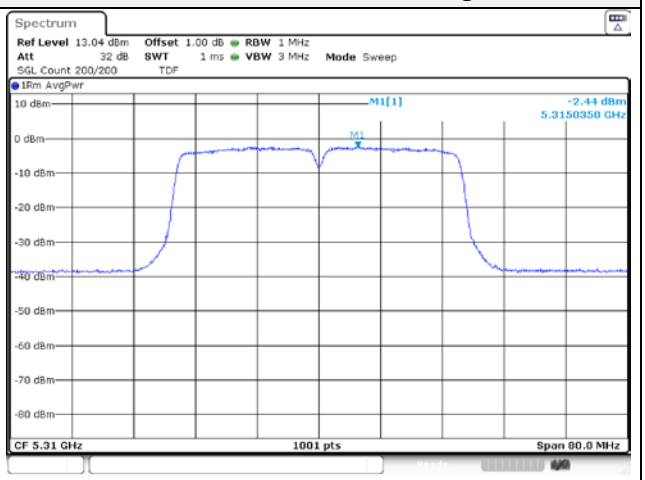
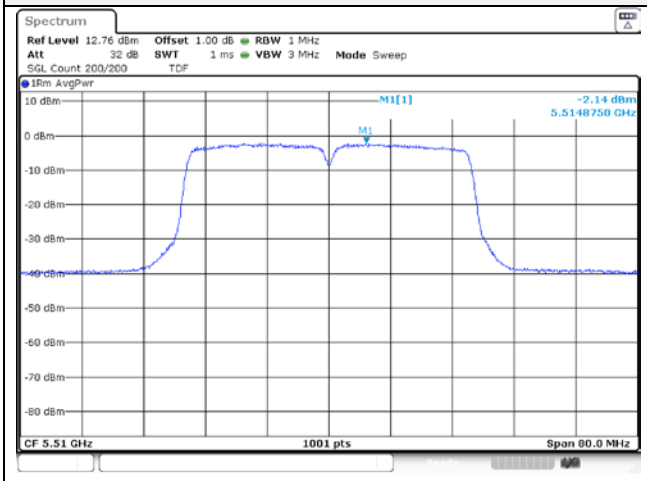
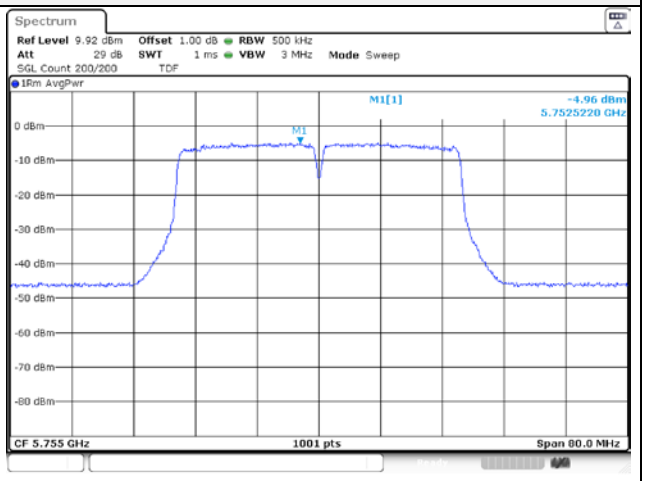
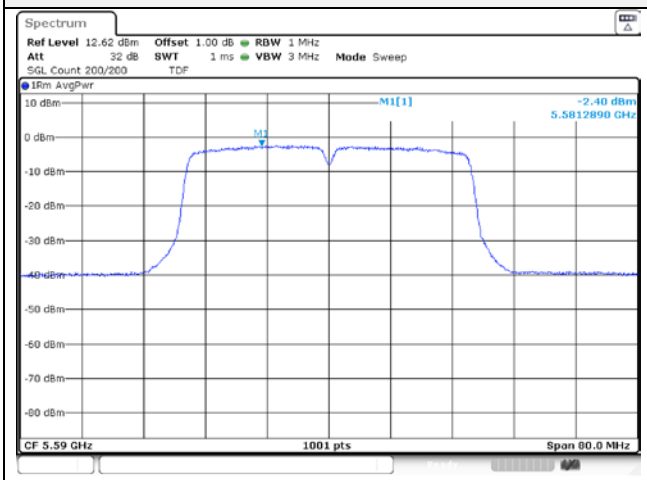
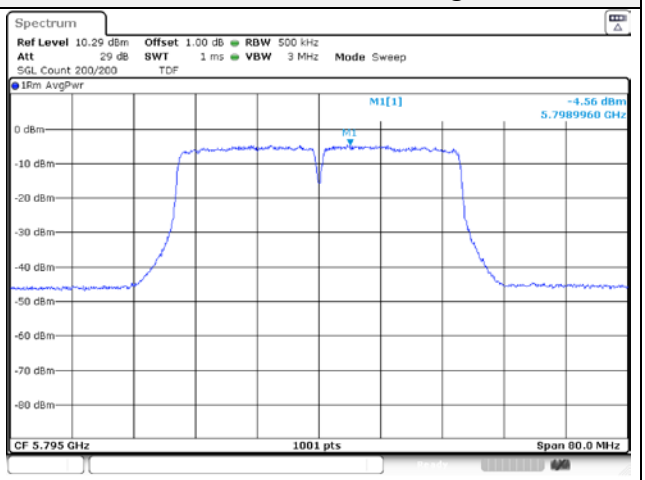
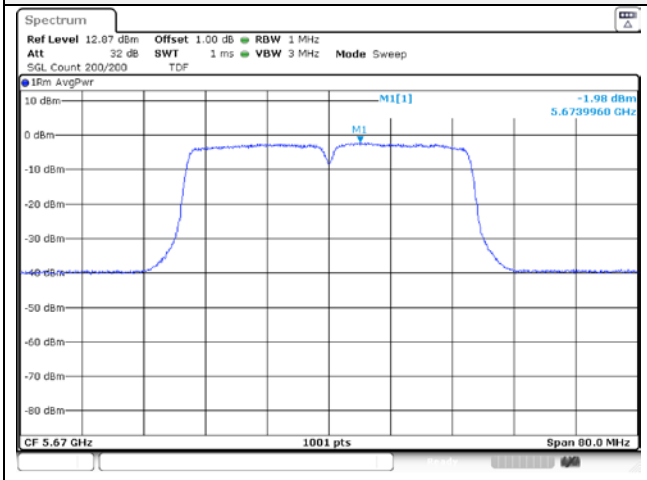
	
UNII-2C / 802.11ac VHT80 / Low ch.	**UNII-2C / 802.11ac VHT80 / High ch.**
	
UNII-3 / 802.11ac VHT80 / Low ch.	
	Blank

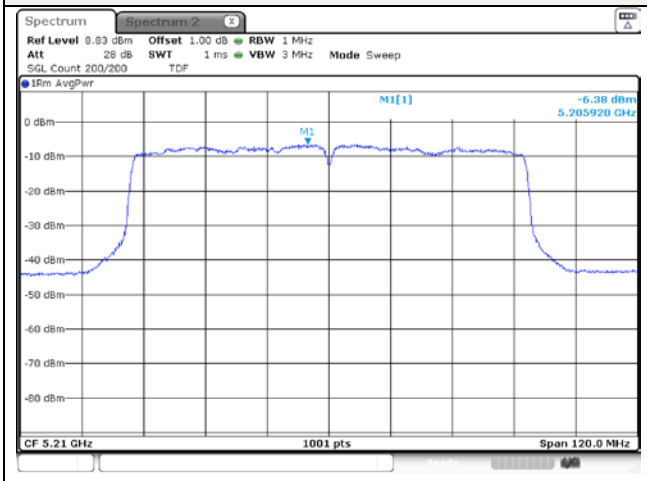
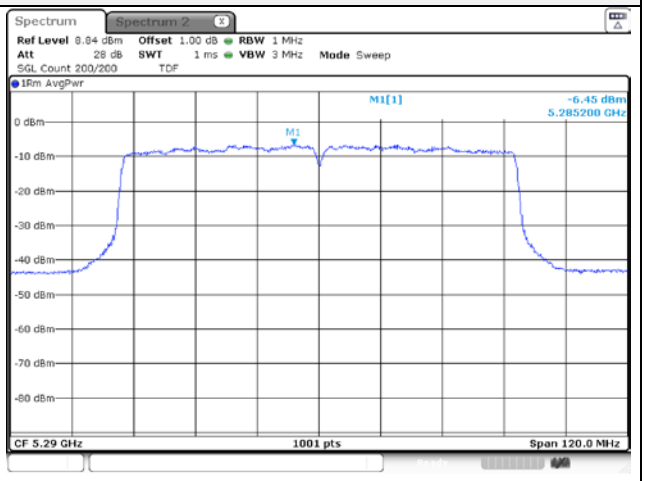
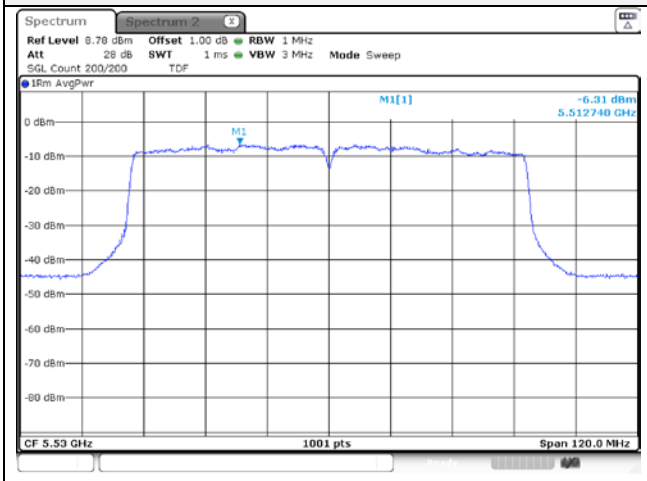
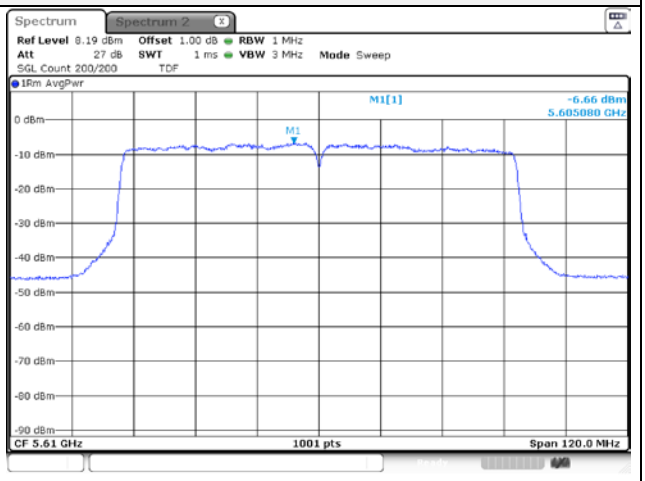
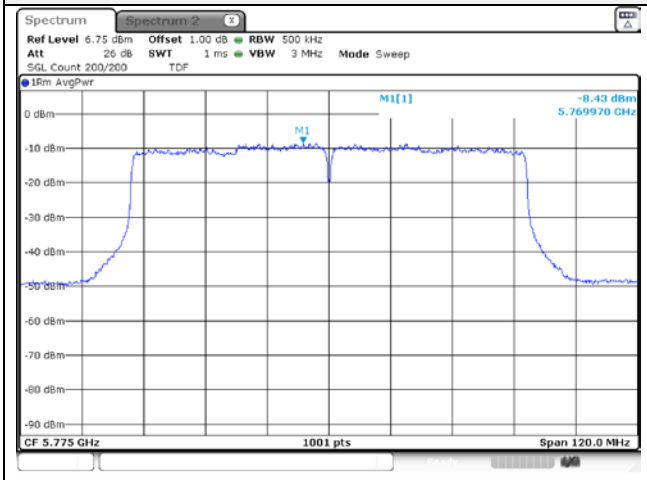
MIMO ANT 2

UNII-1 / 802.11a / Low ch.	UNII-2A / 802.11a / Low ch.
	
UNII-1 / 802.11a / Mid ch.	**UNII-2A / 802.11a / Mid ch.**
	
UNII-1 / 802.11a / High ch.	**UNII-2A / 802.11a / High ch.**
	

UNII-2C / 802.11a / Low ch.	UNII-3 / 802.11a / Low ch.
	
UNII-2C / 802.11a / Mid ch.	**UNII-3 / 802.11a / Mid ch.**
	
UNII-2C / 802.11a / High ch.	**UNII-3 / 802.11a / High ch.**
	

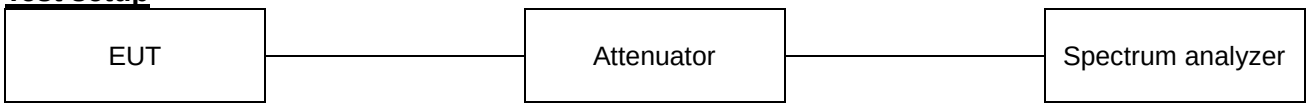
UNII-1 / 802.11n HT40 / Low ch.	UNII-2A / 802.11n HT40 / Low ch.
	
UNII-1 / 802.11n HT40 / High ch.	**UNII-2A / 802.11n HT40 / High ch.**
	

UNII-2C / 802.11n HT40 / Low ch.	UNII-3 / 802.11n HT40 / Low ch.
	
UNII-2C / 802.11n HT40 / Mid ch.	**UNII-3 / 802.11n HT40 / High ch.**
	
UNII-2C / 802.11n HT40 / High ch.	
	Blank

UNII-1 / 802.11ac VHT80 / Low ch.	UNII-2A / 802.11ac VHT80 / Low ch.
	
UNII-2C / 802.11ac VHT80 / Low ch.	**UNII-2C / 802.11ac VHT80 / High ch.**
	
UNII-3 / 802.11ac VHT80 / Low ch.	
	Blank

8.3. 26 dB Bandwidth & 99% Bandwidth

Test setup



Limit

N/A

Test procedure

ANSI C63.10-2013 Section 12.4
KDB 789033 D02 v02r01 - Section C.1 (26dB bandwidth)
KDB 789033 D02 v02r01 - Section D (99% bandwidth)

Test settings

1. 26 dB Bandwidth

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. 99% Occupied Bandwidth

a. Set center frequency to the nominal EUT channel center frequency.
b. Set span = 1.5 times to 5.0 times the OBW.
c. Set RBW = 1% to 5% of the OBW
d. Set VBW ≥ 3 x RBW
e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f. Use the 99% power bandwidth function of the instrument (if available).
g. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

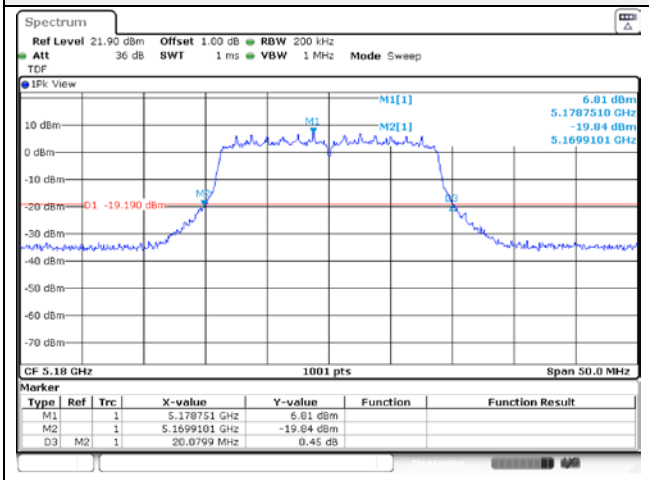
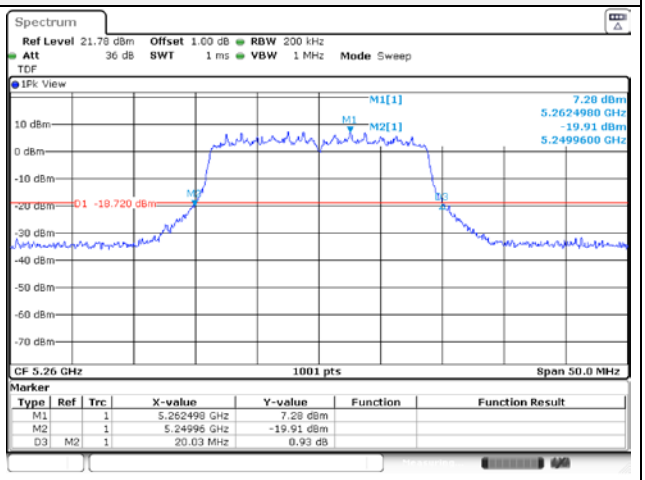
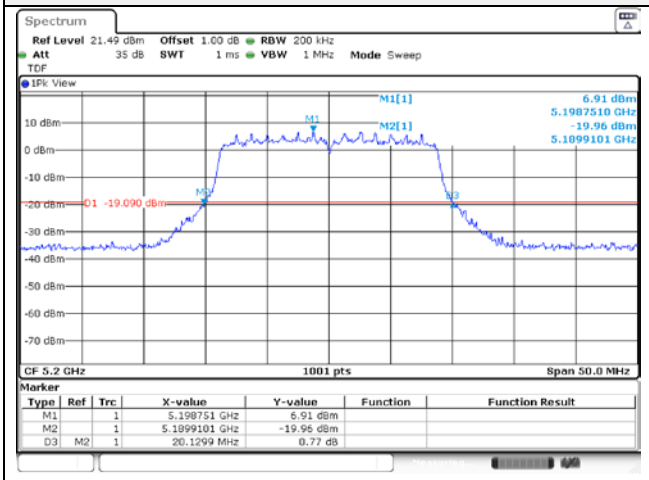
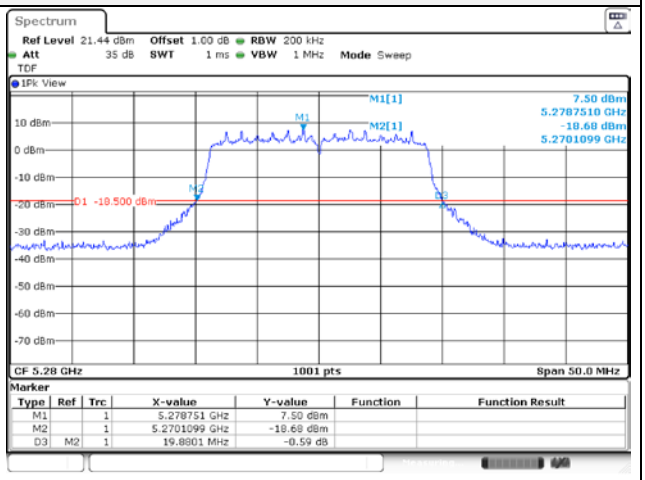
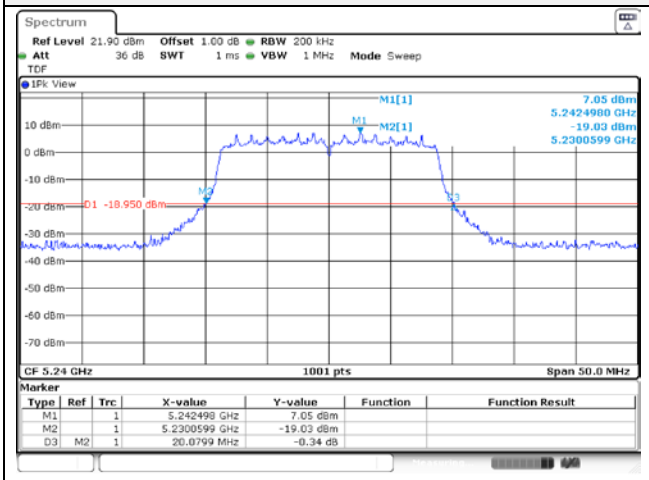
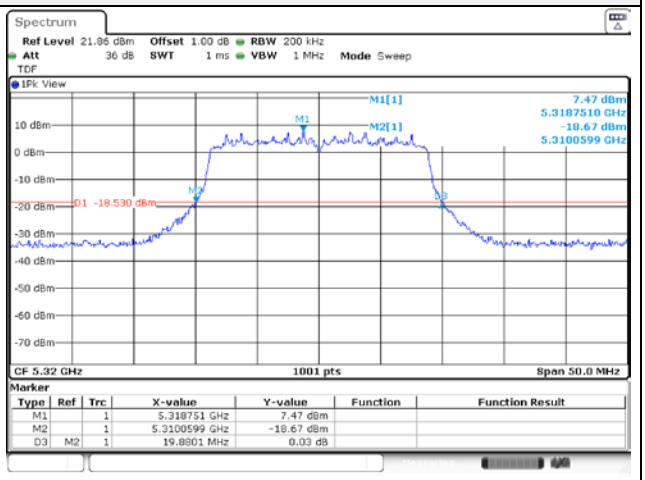
Test results

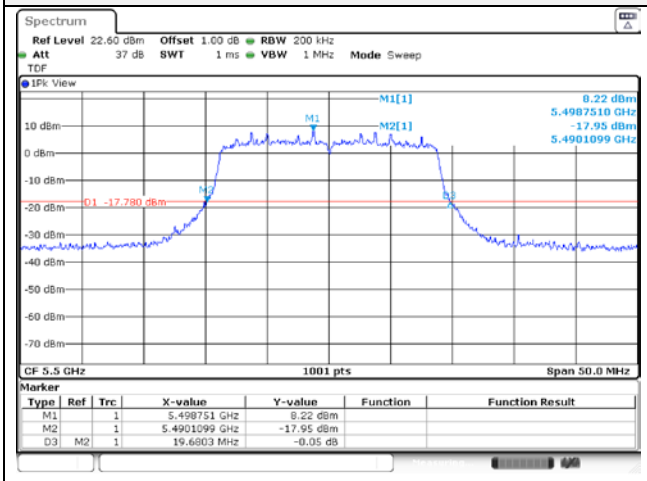
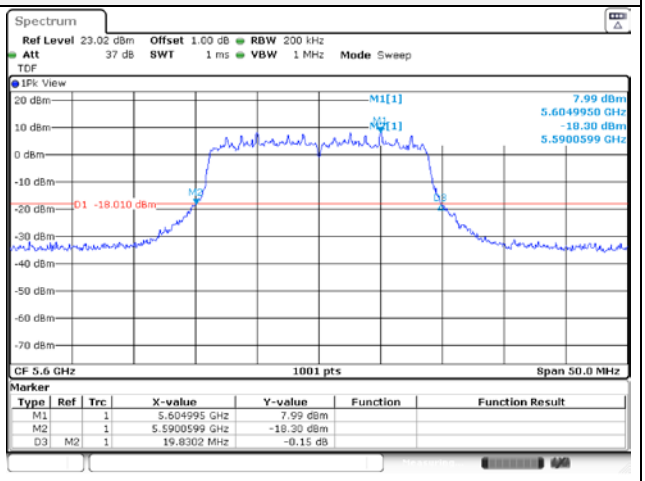
Test mode	Band	Frequency(㎒)	26 ㏈ bandwidth (㎒)		99% bandwidth (㎒)	
			ANT1	ANT2	ANT1	ANT2
802.11a	UNII-1	5 180	19.13	19.78	16.38	16.38
		5 200	19.83	19.98	16.38	16.38
		5 240	19.33	19.68	16.38	16.38
	UNII-2A	5 260	19.08	19.53	16.38	16.38
		5 280	19.33	20.23	16.38	16.38
		5 320	19.08	19.38	16.38	16.38
	UNII-2C	5 500	19.63	20.83	16.28	16.38
		5 600	19.58	19.43	16.23	16.38
		5 700	20.48	20.43	16.23	16.38
802.11n HT20	UNII-1	5 180	19.98	19.98	17.58	17.58
		5 200	20.08	20.23	17.58	17.58
		5 240	20.18	20.13	17.58	17.58
	UNII-2A	5 260	20.13	20.13	17.58	17.58
		5 280	19.88	19.93	17.58	17.58
		5 320	20.13	19.88	17.58	17.58
	UNII-2C	5 500	19.78	20.88	17.58	17.58
		5 600	20.03	19.88	17.58	17.58
		5 700	19.73	20.28	17.58	17.58
802.11n HT40	UNII-1	5 190	40.66	40.26	36.16	36.16
		5 230	40.36	40.06	36.16	36.16
	UNII-2A	5 270	40.76	39.86	36.06	36.16
		5 310	40.36	40.16	36.16	36.16
	UNII-2C	5 510	40.56	40.46	36.16	36.16
		5 590	40.46	40.16	36.06	36.16
		5 670	40.56	40.46	36.06	36.16

Test mode	Band	Frequency(㎒)	26 ㏈ bandwidth (㎒)		99% bandwidth (㎒)	
			ANT1	ANT2	ANT1	ANT2
802.11ac VHT20	UNII-1	5 180	20.08	20.28	17.58	17.58
		5 200	20.13	20.38	17.58	17.58
		5 240	20.08	19.88	17.58	17.58
	UNII-2A	5 260	20.03	20.03	17.58	17.58
		5 280	19.88	20.33	17.58	17.58
		5 320	19.88	20.03	17.58	17.58
	UNII-2C	5 500	20.03	20.03	17.53	17.58
		5 600	19.88	20.33	17.58	17.58
		5 700	19.88	20.03	17.58	17.58
802.11ac VHT40	UNII-1	5 190	40.56	39.96	36.16	36.16
		5 230	40.56	40.06	36.06	36.16
	UNII-2A	5 270	40.66	40.06	36.06	36.06
		5 310	40.36	39.76	36.06	36.06
	UNII-2C	5 510	40.26	40.46	36.16	36.06
		5 590	40.66	40.46	36.16	36.06
		5 670	40.56	40.06	36.06	36.16
802.11ac VHT80	UNII-1	5 210	82.72	83.08	75.52	75.52
	UNII-2A	5 290	83.44	82.84	75.52	75.40
	UNII-2C	5 530	82.84	82.84	75.52	75.40
		5 610	84.16	82.48	75.52	75.40

In order to simplify the report, attached plots were only MIMO ANT 1

26 dB bandwidth

UNII-1 / 802.11ac VHT20 / Low ch.	UNII-2A / 802.11ac VHT20 / Low ch.
	
UNII-1 / 802.11ac VHT20 / Mid ch.	**UNII-2A / 802.11ac VHT20 / Mid ch.**
	
UNII-1 / 802.11ac VHT20 / High ch.	**UNII-2A / 802.11ac VHT20 / High ch.**
	

UNII-2C / 802.11ac VHT20 / Low ch.	UNII-2C / 802.11ac VHT20 / Mid ch.
	
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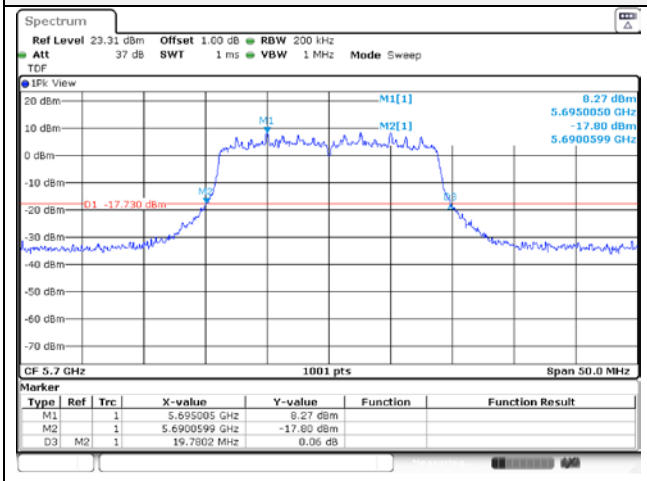
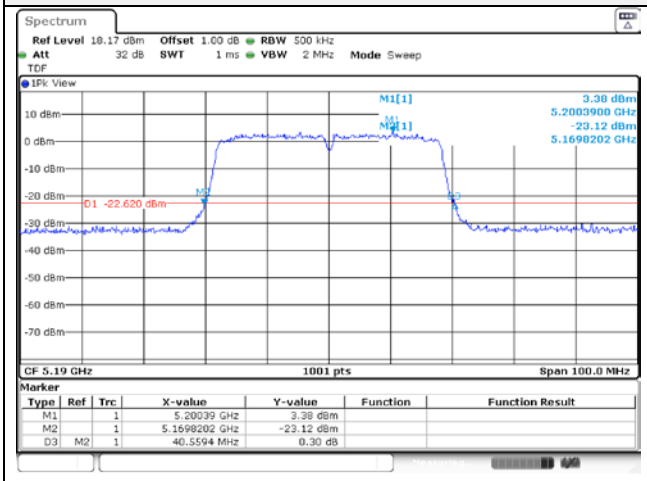
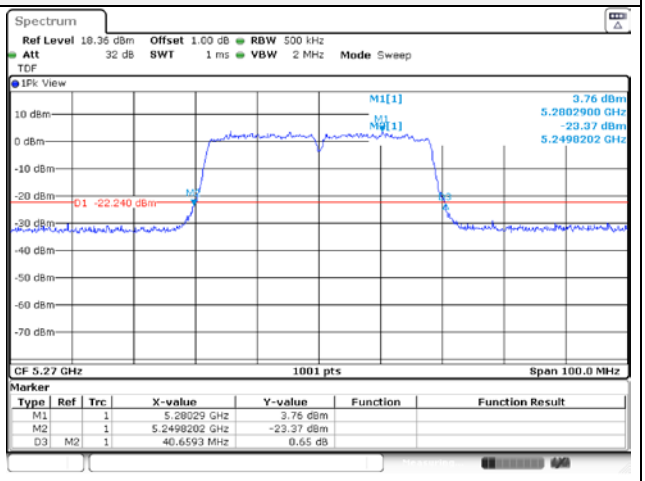
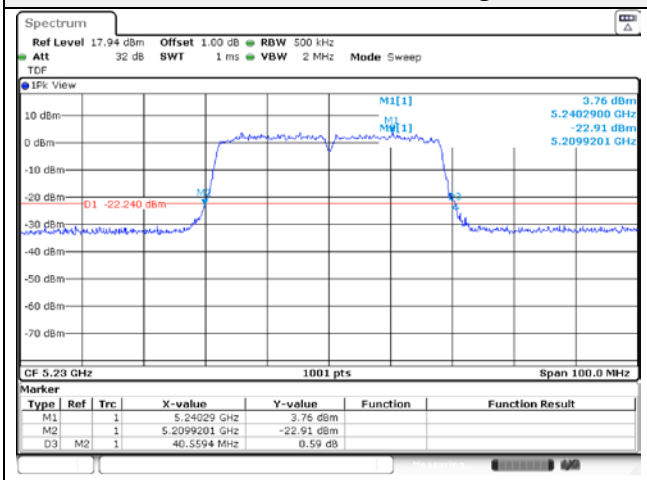
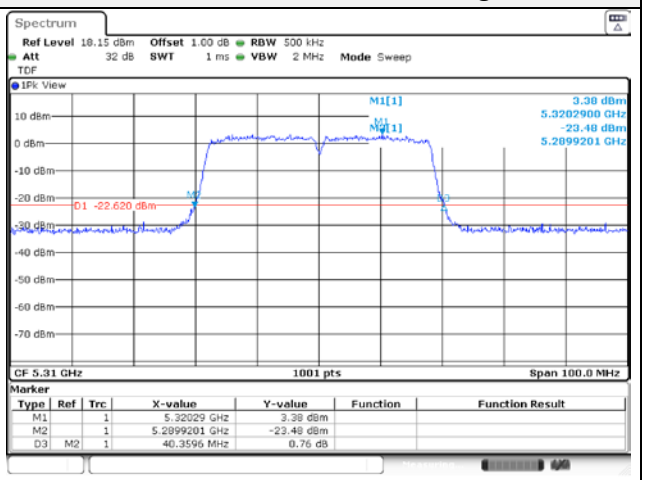
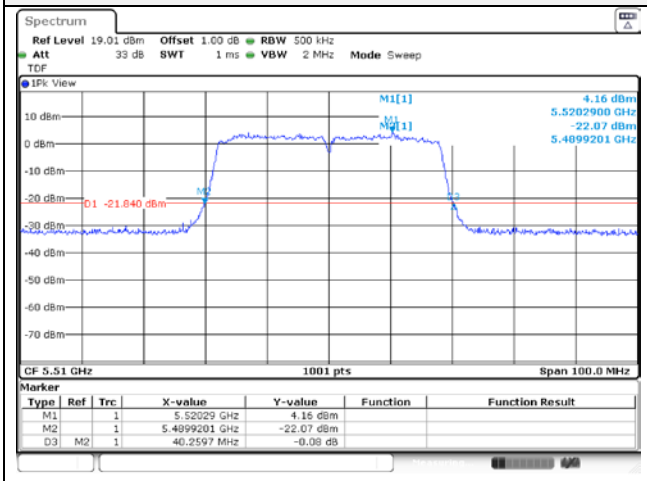
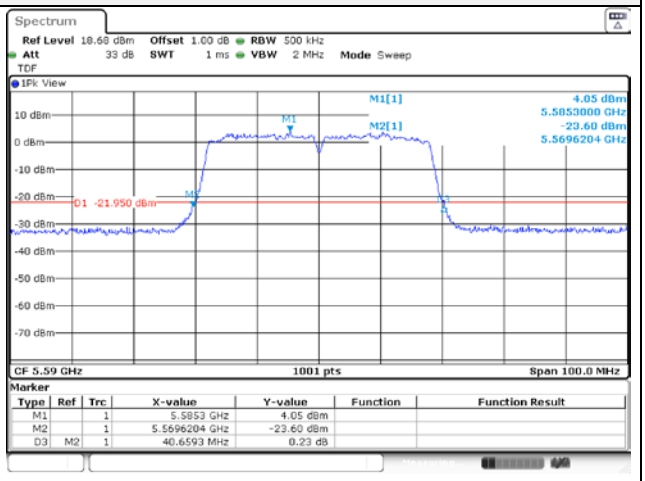
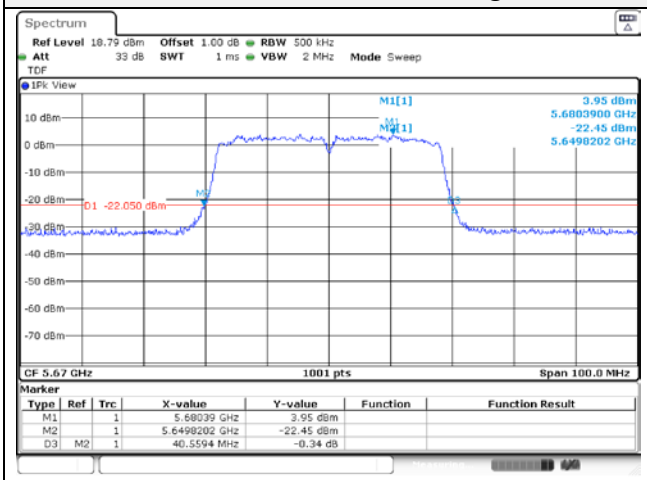
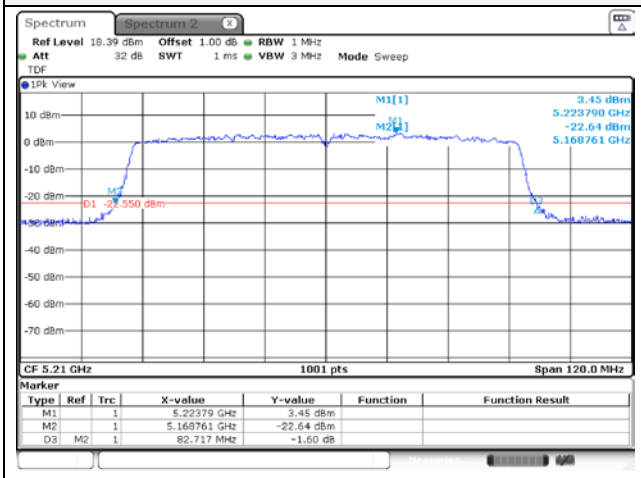
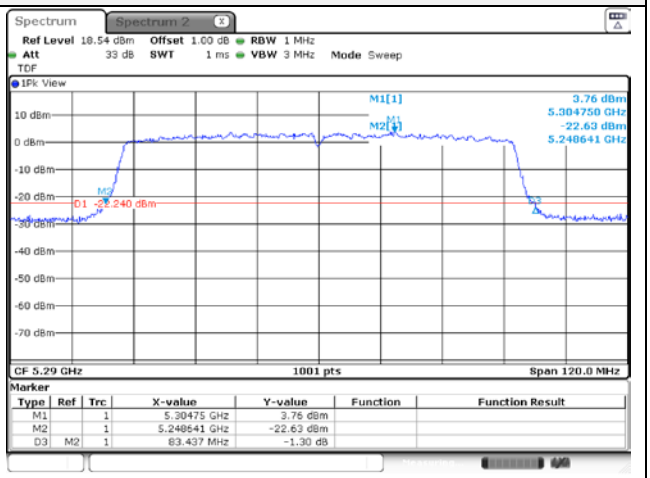
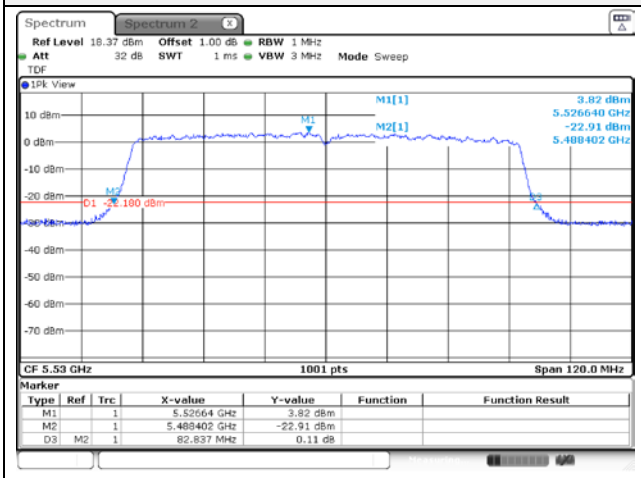
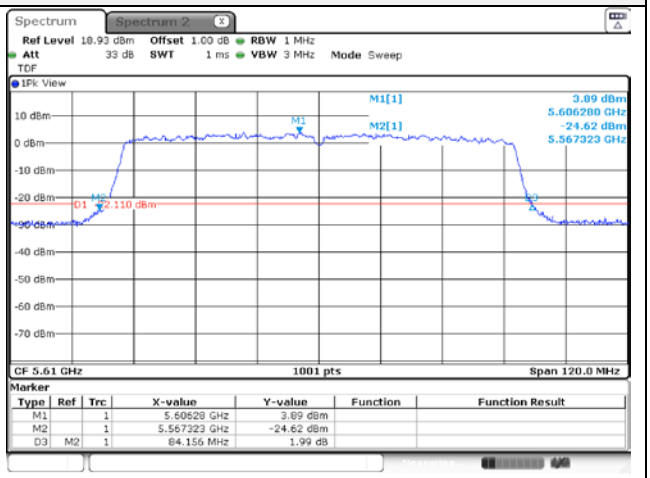
	Blank

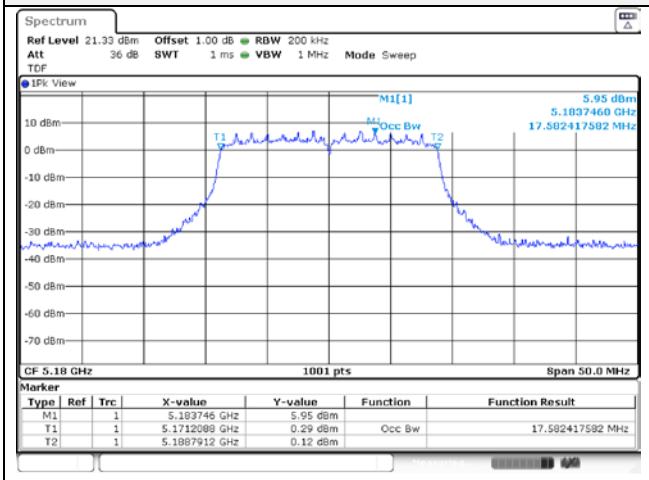
UNII-1 / 802.11ac VHT40 / Low ch.	UNII-2A / 802.11ac VHT40 / Low ch.
	
UNII-1 / 802.11ac VHT40 / High ch.	**UNII-2A / 802.11ac VHT40 / High ch.**
	

UNII-2C / 802.11ac VHT40 / Low ch.	UNII-2C / 802.11ac VHT40 / Mid ch.
	
UNII-2C / 802.11ac VHT40 / High ch.	
	Blank

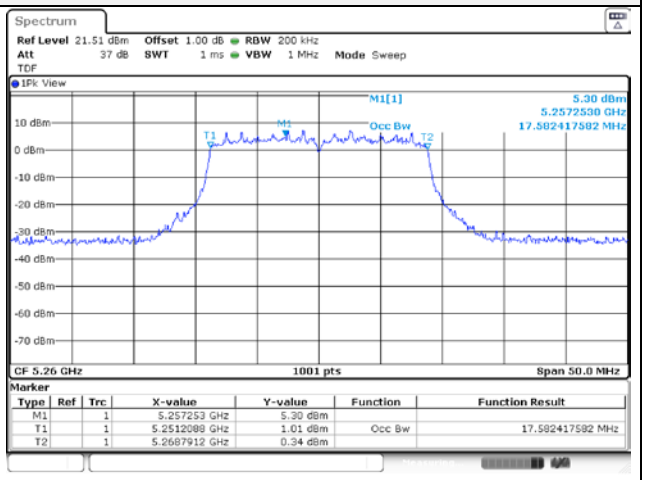
UNII-1 / 802.11ac VHT80 / Low ch.	UNII-2A / 802.11ac VHT80 / Low ch.
	
UNII-2C / 802.11ac VHT80 / Low ch.	**UNII-2C / 802.11ac VHT80 / High ch.**
	

In order to simplify the report, attached plots were only MIMO ANT 1
99% bandwidth

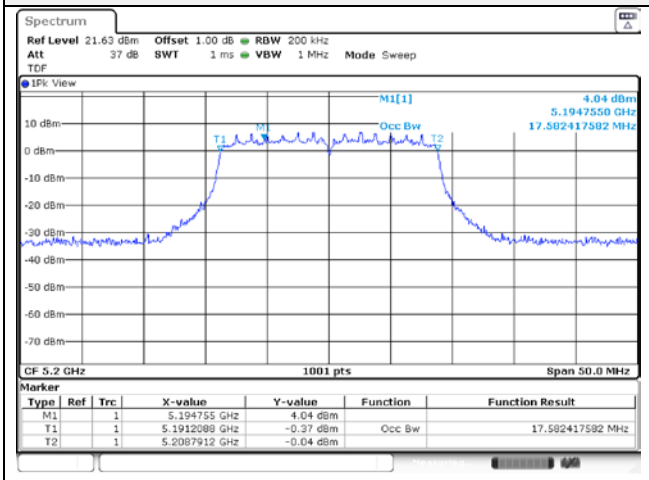
UNII-1 / 802.11ac VHT20 / Low ch.



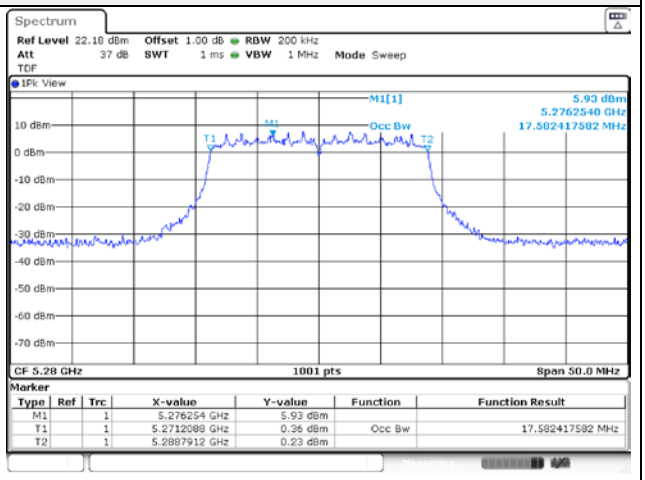
UNII-2A / 802.11ac VHT20 / Low ch.



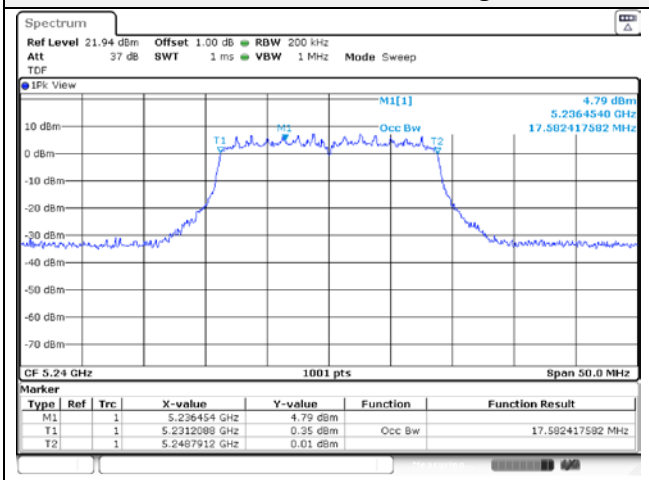
UNII-1 / 802.11ac VHT20 / Mid ch.



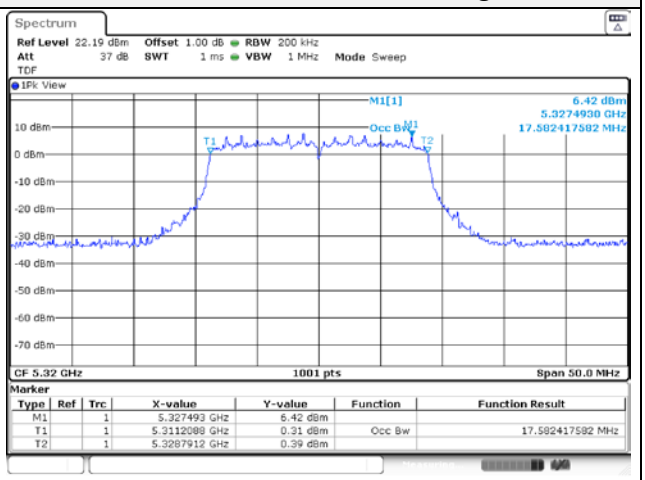
UNII-2A / 802.11ac VHT20 / Mid ch.

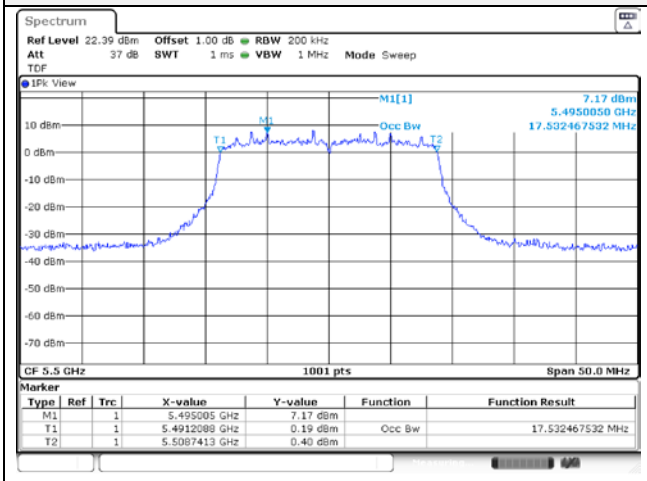
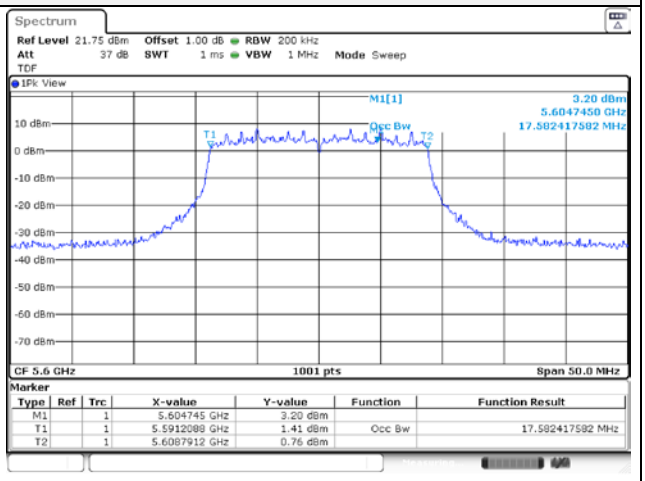
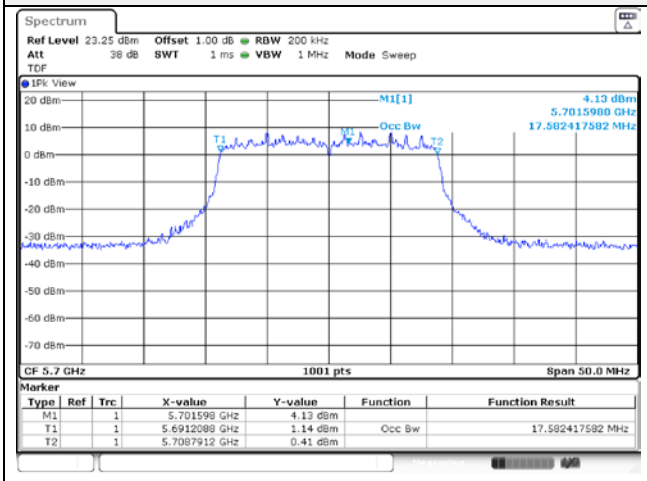


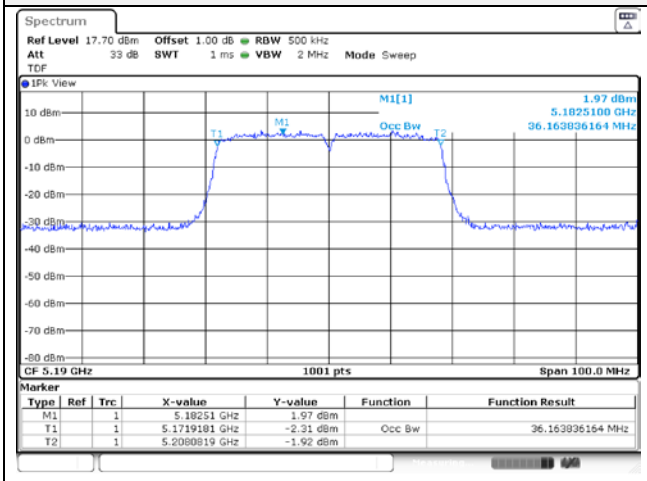
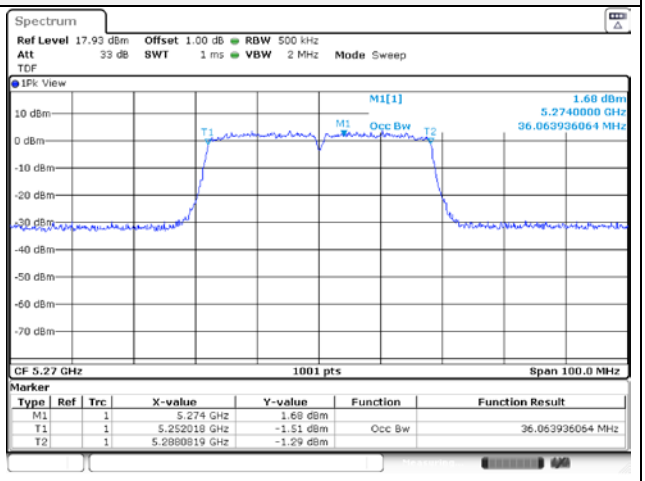
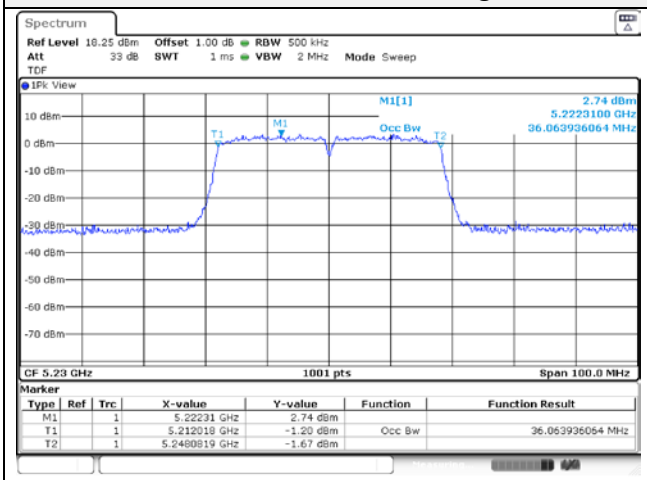
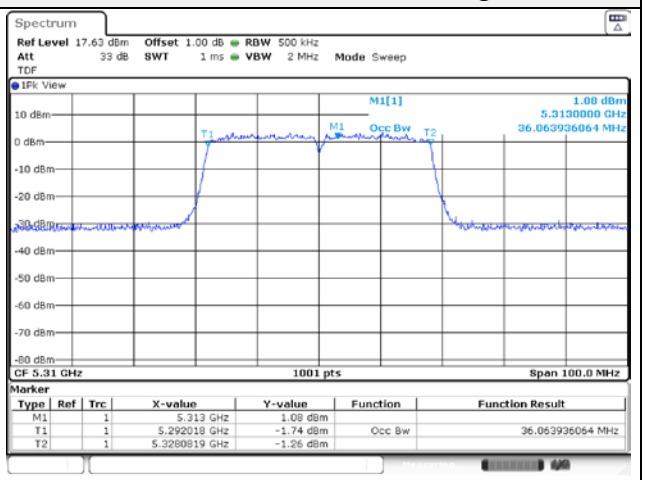
UNII-1 / 802.11ac VHT20 / High ch.

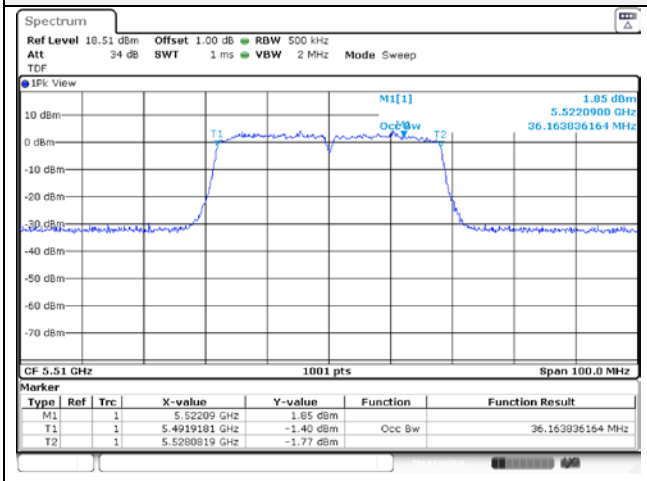
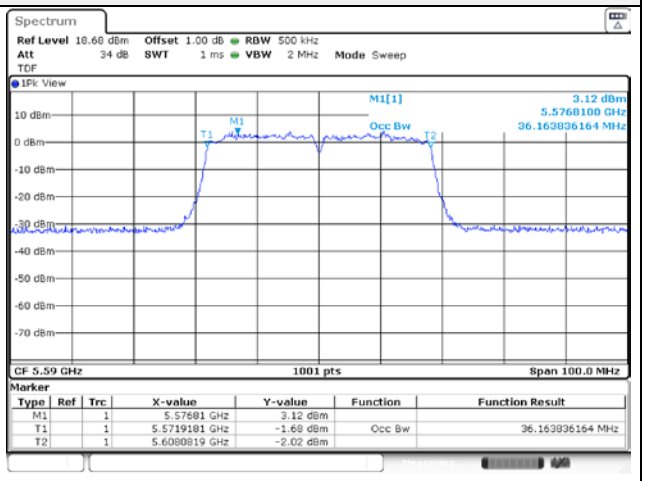
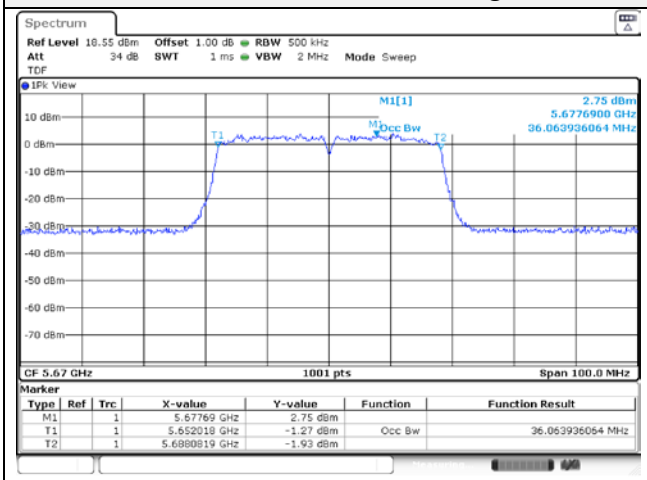


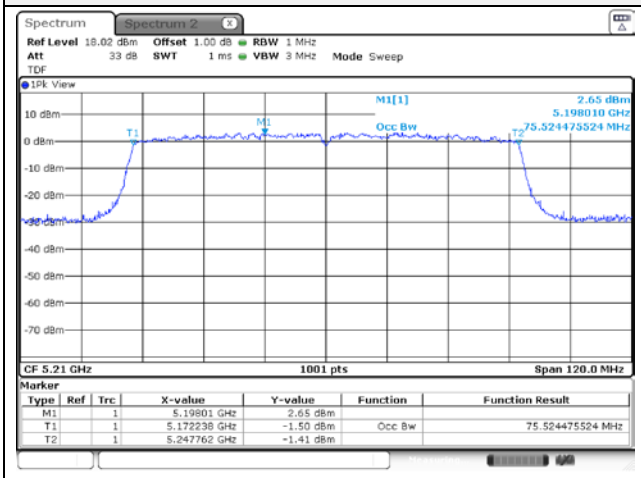
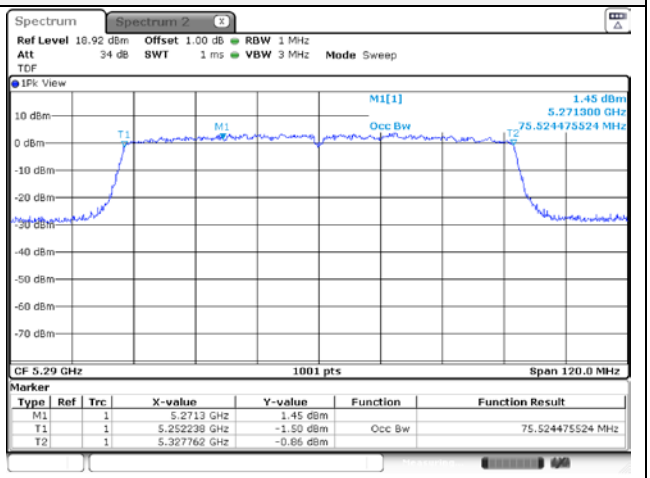
UNII-2A / 802.11ac VHT20 / High ch.



UNII-2C / 802.11ac VHT20 / Low ch.	UNII-2C / 802.11ac VHT20 / Mid ch.
	
UNII-2C / 802.11ac VHT20 / High ch.	
	Blank

UNII-1 / 802.11ac VHT40 / Low ch.	UNII-2A / 802.11ac VHT40 / Low ch.
	
UNII-1 / 802.11ac VHT40 / High ch.	**UNII-2A / 802.11ac VHT40 / High ch.**
	

UNII-2C / 802.11ac VHT40 / Low ch.	UNII-2C / 802.11ac VHT40 / Mid ch.
	
UNII-2C / 802.11ac VHT40 / High ch.	
	Blank

UNII-1 / 802.11ac VHT80 / Low ch.	UNII-2A / 802.11ac VHT80 / Low ch.
	
UNII-2C / 802.11ac VHT80 / Low ch.	**UNII-2C / 802.11ac VHT80 / High ch.**