TEST REPORT

KCTL KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

KCTL

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2020-08-05

2. Use of Report : Certification

3. Name of Product / Model : Wi-Fi / BT Transceiver / CCBQ730M

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

5. FCC ID : A3LCCBQ730M

6. IC Certificate No. : 649E-CCBQ730M

7. Date of Test : 2020-08-05 to 2020-10-23

8. Location of Test : ■ Permanent Testing Lab □ On Site Testing (Address: Address of testing location)

9. Test method used : FCC Part 15 Subpart E, 15.407
RSS-247 Issue 2 February 2017
RSS GEN Issue 5 March 2019

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

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

2020-11-04

KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2020-11-02	Originally issued	-
2020-11-04	Updated	9, 27, 29

Note. The report No. KR20-SRF0275 is superseded by the report No. KR20-SRF0275-A.

General remarks for test reports

Nothing significant to report.

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
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 Industry Canada Registration No. : 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Wi-Fi / BT Transceiver
Model	:	CCBQ730M
Modulation technique	:	Bluetooth(BDR/EDR)_ GFSK, π/4DQPSK, 8DPSK Bluetooth(BLE)_GFSK WIFI(802.11a/b/g/n/ac)_DSSS, OFDM
Number of channels	:	Bluetooth(BDR/EDR)_79 ch, Bluetooth(BLE)_40 ch 2.4 GHz band: 13 ch (20 ㎒), 9 ch (40 ㎒), 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 5.0 V
Antenna type	:	Metal Antenna
Antenna gain	:	BT/LE ANT 0: -4.60 dBi 2.4 ㎓ band ANT 1: 1.90 dBi, ANT 2: 1.10 dBi UNII-1 ANT 1: 1.80 dBi, ANT 2: 2.80 dBi UNII-2A ANT 1: 1.40 dBi, ANT 2: 2.80 dBi UNII-2C ANT 1: 0.40 dBi, ANT 2: 2.90 dBi UNII-3 ANT 1: 0.30 dBi, ANT 2: 2.90 dBi
Frequency range	:	2.4 ㎓ band: 2 402 ㎒ ~ 2 480 ㎒ (Bluetooth/BLE) 2.4 ㎓ band: 2 412 ㎒ ~ 2 472 ㎒ (802.11b/g/n_HT20) 2.4 ㎓ band: 2 422 ㎒ ~ 2 462 ㎒ (802.11n_HT40) UNII-1: 5 180 ㎒ ~ 5 240 ㎒ (802.11a/n/ac_HT20/VHT20) UNII-1: 5 190 ㎒ ~ 5 230 ㎒ (802.11n/ac_HT40/VHT40) UNII-1: 5 210 ㎒ (802.11ac_VHT80) UNII-2A: 5 260 ㎒ ~ 5 320 ㎒ (802.11a/n/ac_HT20/VHT20) UNII-2A: 5 270 ㎒ ~ 5 310 ㎒ (802.11n/ac_HT40/VHT40) UNII-2A: 5 290 ㎒ (802.11ac_VHT80) UNII-2C: 5 500 ㎒ ~ 5 720 ㎒ (802.11a/n/ac_HT20/VHT20) UNII-2C: 5 510 ㎒ ~ 5 710 ㎒ (802.11n/ac_HT40/VHT40) UNII-2C: 5 530 ㎒ ~ 5 690 ㎒ (802.11ac_VHT80) UNII-3: 5 745 ㎒ ~ 5 825 ㎒ (802.11a/n/ac_HT20/VHT20) UNII-3: 5 755 ㎒ ~ 5 795 ㎒ (802.11n/ac_HT40/VHT40) UNII-3: 5 775 ㎒ (802.11ac_VHT80)
Software version	:	1.0
Hardware version	:	1.0
Test device serial No.	:	Conducted(88571DEE66A0,88571DEE63B6) Radiated(88571DEE65C8)
Operation temperature	:	-20 ℃ ~ 50 ℃

2.1. Frequency/channel operations

This device contains the following capabilities:
WiFi (802.11a/b/g/n/ac), 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	5 580	157	5 785
48	5 240	64	5 320	140	5 700	165	5 825
				144	5 720		

Table 2.1.1. 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 2.1.2. 802.11n/ac_HT40/VHT40 mode

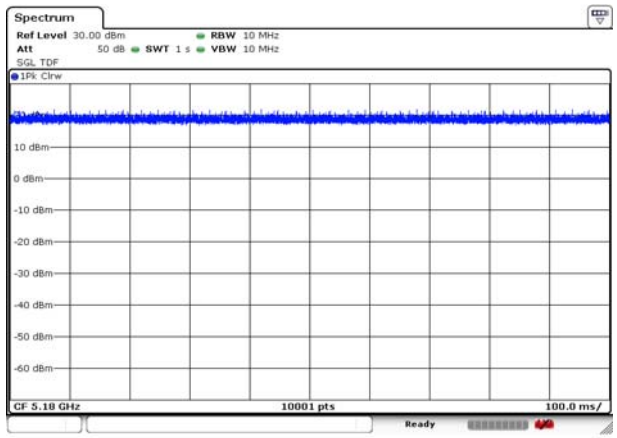
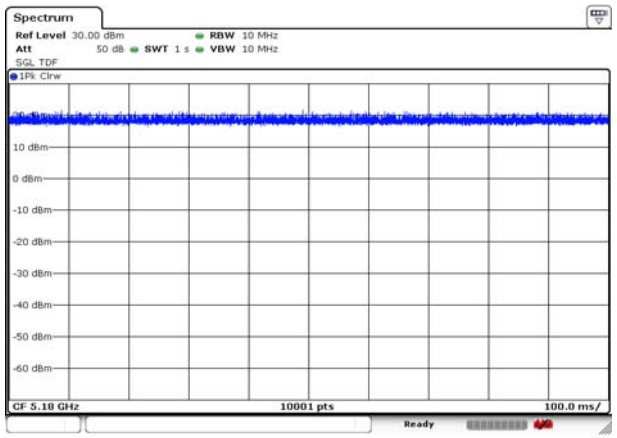
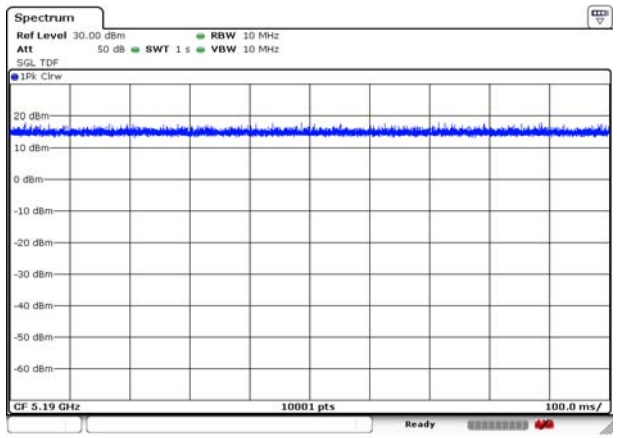
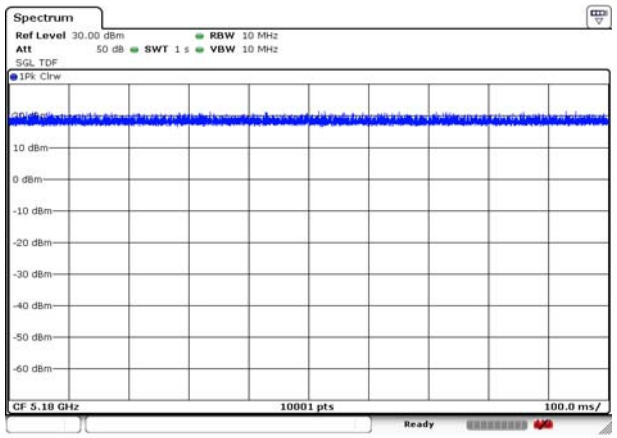
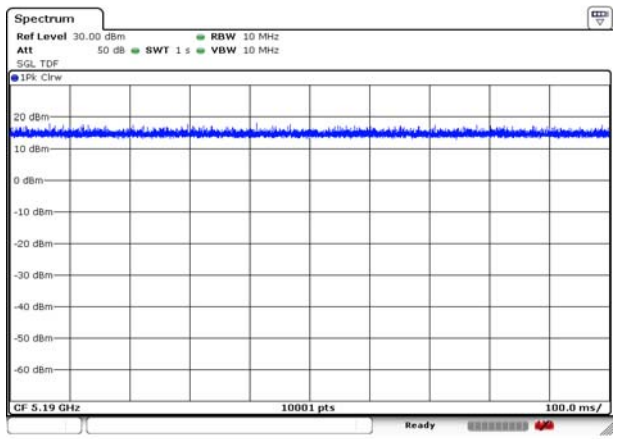
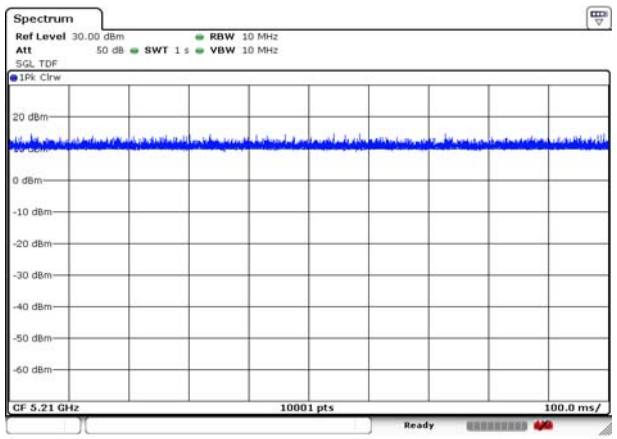
UNII-1		UNII-2A		UNII-2C		UNII-3	
Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)	Ch.	Frequency (㎒)
42	5 210	58	5 290	106	5 530	155	5 775
				122	5 610		
				138	5 690		

Table 2.1.3. 802.11ac_VHT80 mode

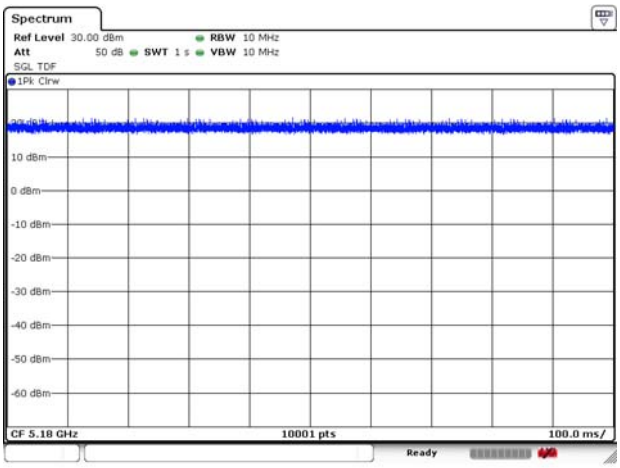
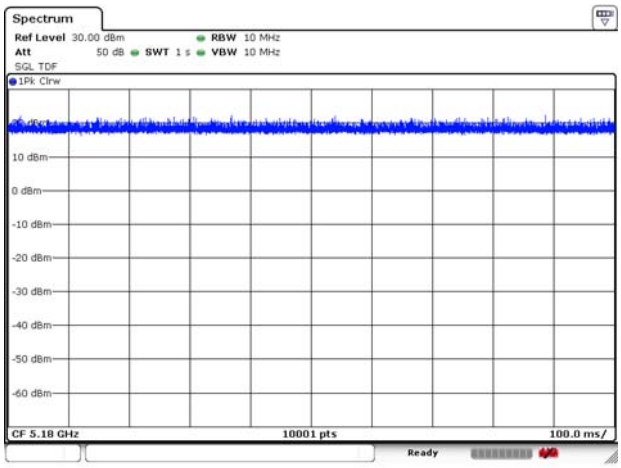
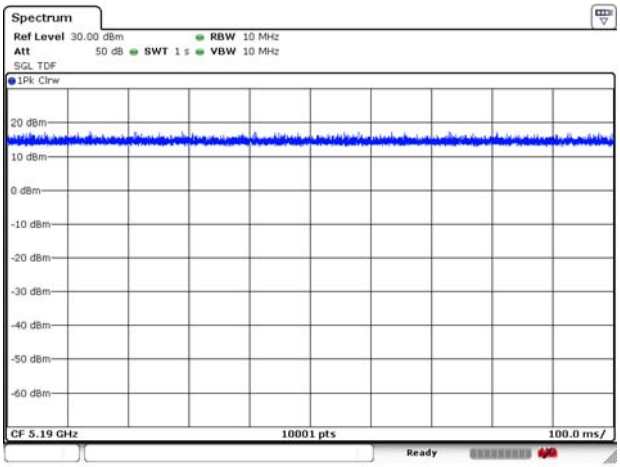
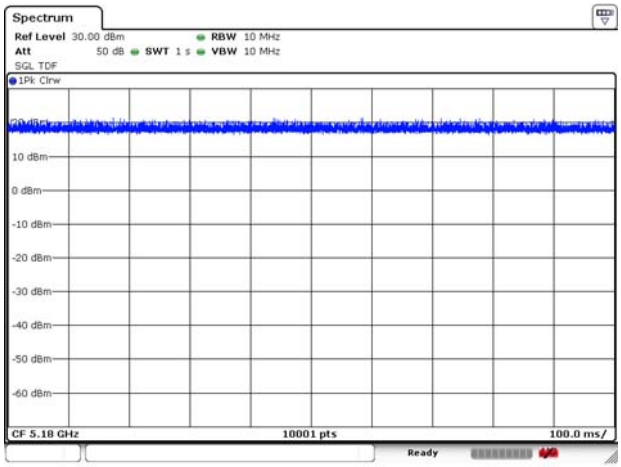
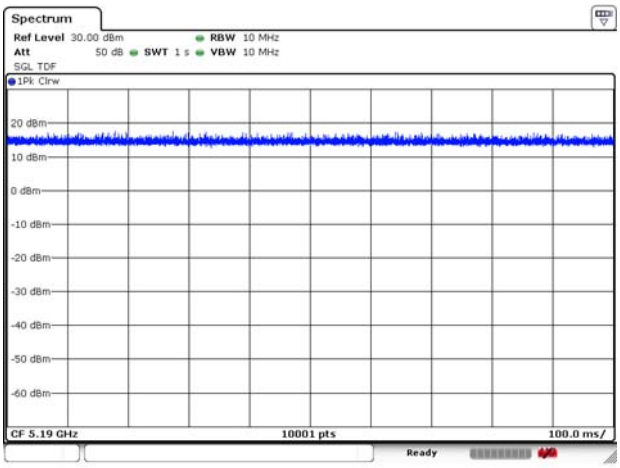
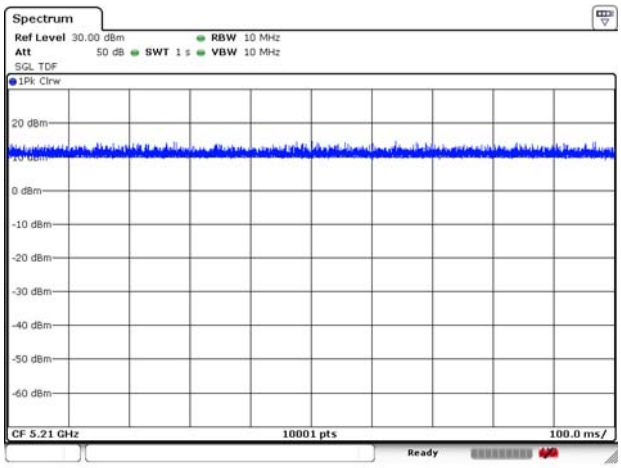
2.2. Duty Cycle Factor

DCF is not compensated to average result because duty cycle is 100%

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 on board.
- The E.U.T Complies with the requirement of §15.203, §15.247, §15.407.

3.1 Antenna information

Mode	SISO		CDD	SDM
	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
SISO = Single Input Single Output
SDM = Spatial Diversity Multiplexing – MIMO function
CDD = Cyclic Delay Diversity – 2TX Function

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.

Band	ANT 1 Gain (dBi)	ANT 2 Gain (dBi)	Power Directional Gain (dBi)
UNII 1	1.80	2.80	5.32
UNII 2A	1.40	2.80	5.14
UNII 2C	0.40	2.90	4.75
UNII 3	0.30	2.90	4.71

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. 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
5. Based on the baseline scan, the worst-case data rates were:
   802.11a mode: 6Mbps
   802.11n HT20 mode: MCS0
   802.11n HT40 mode: MCS0
   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	1.3 dB	
Conducted spurious emissions	1.3 dB	
Radiated spurious emissions	9 kHz ~ 30 MHz:	2.3 dB
	30 MHz ~ 300 MHz	5.4 dB
	300 MHz ~ 1 000 MHz	5.5 dB
	Above 1 GHz	6.7 dB
Conducted emissions	9 kHz ~ 150 kHz	3.7 dB
	150 kHz ~ 30 MHz	3.3 dB

6. 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.

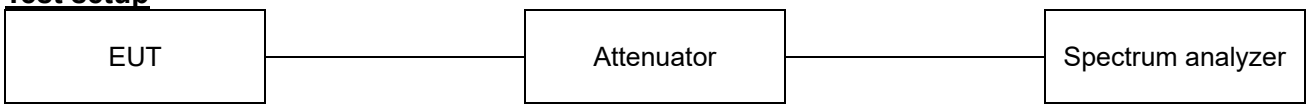
Frequency (㎒)	Factor(㏈)	Frequency (㎒)	Factor(㏈)
30	9.13	9 000	11.12
50	9.66	10 000	11.13
100	9.99	11 000	11.18
200	10.09	12 000	11.50
300	10.17	13 000	11.75
400	10.24	14 000	11.60
500	10.34	15 000	11.80
600	10.39	16 000	11.95
700	10.43	17 000	12.02
800	10.47	18 000	12.13
900	10.50	19 000	12.12
1 000	10.50	20 000	12.57
2 000	11.12	21 000	12.63
3 000	11.16	22 000	12.43
4 000	11.24	23 000	12.55
5 000	11.38	24 000	12.78
6 000	11.56	25 000	12.92
7 000	11.18	26 000	13.01
8 000	11.32	26 500	13.50

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

7. Test results

7.1. 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 dBm)
		Indoor access point	
		Fixed point-to-point access point	
	√	Client device	250 mW (23.98 dBm)
UNII-2A	√		250 mW or 11 dBm + 10logB[1)]
UNII-2C	√		250 mW or 11 dBm + 10logB[1)]
UNII-3	√		1 W (30 dBm)

IC

Band	Maximum e.i.r.p. limit
UNII-1	200 mW or 10 + 10 log10B[2)], dBm
UNII-2A	1 W or 17 dBm + 10logB[2)]
UNII-2C	1 W or 17 dBm + 10logB[2)]
UNII-3	1 W (30 dBm)

Note:

1) Conducted output power limit B is the 26 dB 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)
			Result (dBm)		
			ANT1	ANT2	
802.11a	UNII 1	5 180	11.82	11.41	24.00
		5 200	12.04	11.46	
		5 240	12.55	11.71	
	UNII 2A	5 260	15.93	13.53	24.00
		5 280	15.50	13.30	
		5 320	15.92	13.82	
	UNII 2C	5 500	15.72	13.26	24.00
		5 580	15.86	13.43	
		5 700	16.06	14.49	
	UNII 3	5 745	13.15	9.53	30.00
		5 785	13.29	9.87	
		5 825	13.31	10.17	
802.11n HT20	UNII 1	5 180	12.09	11.71	24.00
		5 200	12.14	11.59	
		5 240	12.42	12.03	
	UNII 2A	5 260	15.71	13.62	24.00
		5 280	15.34	13.23	
		5 320	15.66	14.02	
	UNII 2C	5 500	15.31	13.30	24.00
		5 580	15.93	13.24	
		5 700	16.05	14.29	
	UNII 3	5 745	13.06	9.55	30.00
		5 785	13.17	9.96	
		5 825	13.06	10.20	
802.11n HT40	UNII 1	5 190	13.85	13.61	24.00
		5 230	14.28	13.94	
	UNII 2A	5 270	14.44	14.83	24.00
		5 310	14.20	13.23	
	UNII 2C	5 510	14.49	14.22	24.00
		5 590	14.78	15.03	
		5 670	14.89	15.41	
	UNII 3	5 755	12.76	9.84	30.00
		5 795	12.96	9.97	

Test mode	Band	Frequency (㎒)	Measured output power		Limit (dBm)
			Result (dBm)		
			ANT1	ANT2	
802.11ac VHT20	UNII 1	5 180	11.84	11.70	24.00
		5 200	12.05	11.57	
		5 240	12.25	12.01	
	UNII 2A	5 260	15.66	13.62	24.00
		5 280	15.51	13.05	
		5 320	15.91	14.16	
	UNII 2C	5 500	15.49	13.28	24.00
		5 580	15.83	13.21	
		5 700	16.01	14.28	
	UNII 3	5 745	13.06	9.56	30.00
		5 785	13.39	9.96	
		5 825	13.43	10.17	
802.11ac VHT40	UNII 1	5 190	13.99	13.71	24.00
		5 230	14.40	14.06	
	UNII 2A	5 270	14.63	14.90	24.00
		5 310	14.65	13.34	
	UNII 2C	5 510	15.52	14.20	24.00
		5 590	15.02	15.07	
		5 670	15.23	15.40	
	UNII 3	5 755	12.91	9.82	30.00
		5 795	12.99	10.09	
802.11ac VHT80	UNII 1	5 210	13.25	13.25	24.00
	UNII 2A	5 290	12.16	12.19	24.00
	UNII 2C	5 530	11.97	12.13	24.00
		5 610	13.54	13.42	
	UNII 3	5 775	13.53	10.36	30.00

Note.
1. DCF is not compensated to average result because duty cycle is more than 98%

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	ANT1	ANT2
802.11a	UNII 1	5 180	11.82	11.41	1.80	2.80	13.62	14.21	22.17	22.16
		5 200	12.04	11.46			13.84	14.26	22.16	22.17
		5 240	12.55	11.71			14.35	14.51	22.17	22.16
	UNII 2A	5 260	15.93	13.53	1.40	2.80	17.33	16.33	29.16	29.17
		5 280	15.50	13.30			16.90	16.10	29.20	29.16
		5 320	15.92	13.82			17.32	16.62	29.20	29.17
	UNII 2C	5 500	15.72	13.26	0.40	2.90	16.12	16.16	29.20	29.17
		5 580	15.86	13.43			16.26	16.33	29.20	29.17
		5 700	16.06	14.49			16.46	17.39	29.18	29.16
	UNII 3	5 745	13.15	9.53	0.30	2.90	13.45	12.43	30.00	
		5 785	13.29	9.87			13.59	12.77		
		5 825	13.31	10.17			13.61	13.07		
802.11n HT20	UNII 1	5 180	12.09	11.71	1.80	2.80	13.89	14.51	22.45	22.45
		5 200	12.14	11.59			13.94	14.39	22.45	22.46
		5 240	12.42	12.03			14.22	14.83	22.46	22.46
	UNII 2A	5 260	15.71	13.62	1.40	2.80	17.11	16.42	29.46	29.46
		5 280	15.34	13.23			16.74	16.03	29.46	29.46
		5 320	15.66	14.02			17.06	16.82	29.47	29.45
	UNII 2C	5 500	15.31	13.30	0.40	2.90	15.71	16.20	29.47	29.46
		5 580	15.93	13.24			16.33	16.14	29.47	29.46
		5 700	16.05	14.29			16.45	17.19	29.46	29.48
	UNII 3	5 745	13.06	9.55	0.30	2.90	13.36	12.45	30.00	
		5 785	13.17	9.96			13.47	12.86		
		5 825	13.06	10.20			13.36	13.10		
802.11n HT40	UNII 1	5 190	13.85	13.61	1.80	2.80	15.65	16.41	23.01	
		5 230	14.28	13.94			16.08	16.74		
	UNII 2A	5 270	14.44	14.83	1.40	2.80	15.84	17.63	30.00	
		5 310	14.20	13.23			15.60	16.03		
	UNII 2C	5 510	14.49	14.22	0.40	2.90	14.89	17.12	30.00	
		5 590	14.78	15.03			15.18	17.93		
		5 670	14.89	15.41			15.29	18.31		
	UNII 3	5 755	12.76	9.84	0.30	2.90	13.06	12.74	30.00	
		5 795	12.96	9.97			13.26	12.87		

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	11.84	11.70	1.80	2.80	13.64	14.50	22.45	22.46
		5 200	12.05	11.57			13.85	14.37	22.46	22.46
		5 240	12.25	12.01			14.05	14.81	22.45	22.46
	UNII 2A	5 260	15.66	13.62	1.40	2.80	17.06	16.42	29.46	29.45
		5 280	15.51	13.05			16.91	15.85	29.46	29.44
		5 320	15.91	14.16			17.31	16.96	29.47	29.45
	UNII 2C	5 500	15.49	13.28	0.40	2.90	15.89	16.18	29.47	29.46
		5 580	15.83	13.21			16.23	16.11	29.46	29.45
		5 700	16.01	14.28			16.41	17.18	29.46	29.45
	UNII 3	5 745	13.06	9.56	0.30	2.90	13.36	12.46	30.00	
		5 785	13.39	9.96			13.69	12.86		
		5 825	13.43	10.17			13.73	13.07		
802.11ac VHT40	UNII 1	5 190	13.99	13.71	1.80	2.80	15.79	16.51	23.01	
		5 230	14.40	14.06			16.20	16.86		
	UNII 2A	5 270	14.63	14.90	1.40	2.80	16.03	17.70	30.00	
		5 310	14.65	13.34			16.05	16.14		
	UNII 2C	5 510	15.52	14.20	0.40	2.90	15.92	17.10	30.00	
		5 590	15.02	15.07			15.42	17.97		
		5 670	15.23	15.40			15.63	18.30		
	UNII 3	5 755	12.91	9.82	0.30	2.90	13.21	12.72	30.00	
		5 795	12.99	10.09			13.29	12.99		
802.11ac VHT80	UNII 1	5 210	13.25	13.25	1.80	2.80	15.05	16.05	23.01	
	UNII 2A	5 290	12.16	12.19	1.40	2.80	13.56	14.99	30.00	
	UNII 2C	5 530	11.97	12.13	0.40	2.90	12.37	15.03	30.00	
		5 610	13.54	13.42			13.94	16.32		
	UNII 3	5 775	13.53	10.36	0.30	2.90	13.83	13.26	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	11.89	11.36	-	14.64	24.00
		5 200	11.97	11.78	-	14.89	
		5 240	12.26	12.07	-	15.18	
	UNII 2A	5 260	11.40	10.86	-	14.15	24.00
		5 280	10.98	10.55	-	13.78	
		5 320	11.26	10.85	-	14.07	
	UNII 2C	5 500	10.81	10.86	-	13.85	24.00
		5 580	11.61	10.75	-	14.21	
		5 700	11.37	11.17	-	14.28	
	UNII 3	5 745	8.39	7.48	-	10.97	30.00
		5 785	8.26	7.54	-	10.93	
		5 825	8.20	7.62	-	10.93	
802.11n HT20	UNII 1	5 180	12.04	11.82	-	14.94	24.00
		5 200	12.10	11.95	-	15.04	
		5 240	12.33	12.06	-	15.21	
	UNII 2A	5 260	11.43	10.48	-	13.99	24.00
		5 280	10.75	10.29	-	13.54	
		5 320	11.29	11.02	-	14.17	
	UNII 2C	5 500	11.36	10.62	-	14.02	24.00
		5 580	11.46	10.39	-	13.97	
		5 700	11.45	11.18	-	14.33	
	UNII 3	5 745	8.26	7.26	-	10.80	30.00
		5 785	8.37	7.38	-	10.91	
		5 825	8.12	7.90	-	11.02	
802.11n HT40	UNII 1	5 190	14.00	13.03	-	16.55	24.00
		5 230	14.37	13.65	-	17.04	
	UNII 2A	5 270	12.84	12.87	-	15.87	24.00
		5 310	13.02	12.45	-	15.75	
	UNII 2C	5 510	12.66	11.84	-	15.28	24.00
		5 590	12.83	12.57	-	15.71	
		5 670	13.16	13.29	-	16.24	
	UNII 3	5 755	7.92	7.41	-	10.68	30.00
		5 795	8.29	7.98	-	11.15	

Test mode	Band	Frequency (㎒)	Measured output power				Limit (dBm)
			Reading (dBm)		DCF (dB)	Result (dBm)	
			ANT1	ANT2			
802.11ac VHT20	UNII 1	5 180	11.67	11.59	-	14.64	24.00
		5 200	12.02	11.77	-	14.91	
		5 240	12.21	11.96	-	15.10	
	UNII 2A	5 260	11.27	10.95	-	14.12	24.00
		5 280	10.89	10.58	-	13.75	
		5 320	11.34	10.86	-	14.12	
	UNII 2C	5 500	11.43	10.71	-	14.10	24.00
		5 580	11.41	10.60	-	14.03	
		5 700	11.46	11.10	-	14.29	
	UNII 3	5 745	8.35	7.26	-	10.85	30.00
		5 785	8.36	7.34	-	10.89	
		5 825	8.18	8.19	-	11.20	
802.11ac VHT40	UNII 1	5 190	13.99	13.84	-	16.93	24.00
		5 230	14.50	13.99	-	17.26	
	UNII 2A	5 270	11.57	11.30	-	14.45	24.00
		5 310	11.68	11.16	-	14.44	
	UNII 2C	5 510	12.73	12.10	-	15.44	24.00
		5 590	12.98	12.22	-	15.63	
		5 670	13.21	13.47	-	16.35	
	UNII 3	5 755	8.08	7.59	-	10.85	30.00
		5 795	8.22	7.63	-	10.95	
802.11ac VHT80	UNII 1	5 210	13.43	12.96	-	16.21	24.00
	UNII 2A	5 290	11.61	11.38	-	14.51	24.00
	UNII 2C	5 530	11.64	10.78	-	14.24	24.00
		5 610	12.53	12.47	-	15.51	
	UNII 3	5 775	8.34	7.94	-	11.15	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	14.64	5.32	19.96	22.17
		5 200	14.89		20.21	22.17
		5 240	15.18		20.50	22.17
	UNII 2A	5 260	14.15	5.14	19.29	29.16
		5 280	13.78		18.92	29.16
		5 320	14.07		19.21	29.16
	UNII 2C	5 500	13.85	4.75	18.60	29.18
		5 580	14.21		18.96	29.17
		5 700	14.28		19.03	29.16
	UNII 3	5 745	10.97	4.71	15.68	30.00
		5 785	10.93		15.64	
		5 825	10.93		15.64	
802.11n HT20	UNII 1	5 180	14.94	5.32	20.26	22.45
		5 200	15.04		20.36	22.46
		5 240	15.21		20.53	22.46
	UNII 2A	5 260	13.99	5.14	19.13	29.46
		5 280	13.54		18.68	29.46
		5 320	14.17		19.31	29.46
	UNII 2C	5 500	14.02	4.75	18.77	29.46
		5 580	13.97		18.72	29.46
		5 700	14.33		19.08	29.46
	UNII 3	5 745	10.80	4.71	15.51	30.00
		5 785	10.91		15.62	
		5 825	11.02		15.73	
802.11n HT40	UNII 1	5 190	16.55	5.32	21.87	23.01
		5 230	17.04		22.36	
	UNII 2A	5 270	15.87	5.14	21.01	30.00
		5 310	15.75		20.89	
	UNII 2C	5 510	15.28	4.75	20.03	30.00
		5 590	15.71		20.46	
		5 670	16.24		20.99	
	UNII 3	5 755	10.68	4.71	15.39	30.00
		5 795	11.15		15.86	

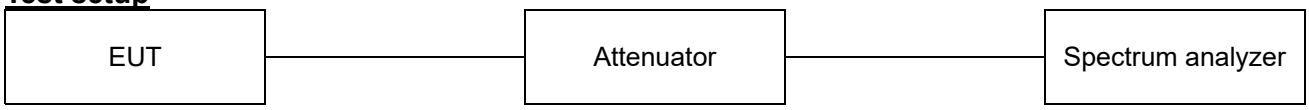
Test mode	Band	Frequency (㎒)	Measured output power			MAX e.i.r.p Limit (dBm)
			Conducted output Power (dBm)	ANT gain (dBi)	MAX e.i.r.p (dBm)	
802.11ac VHT20	UNII 1	5 180	11.67	5.32	16.99	22.46
		5 200	12.02		17.34	22.46
		5 240	12.21		17.53	22.46
	UNII 2A	5 260	11.27	5.14	16.41	29.45
		5 280	10.89		16.03	29.46
		5 320	11.34		16.48	29.44
	UNII 2C	5 500	11.43	4.75	16.18	29.44
		5 580	11.41		16.16	29.44
		5 700	11.46		16.21	29.46
	UNII 3	5 745	8.35	4.71	13.06	30.00
		5 785	8.36		13.07	
		5 825	8.18		12.89	
802.11ac VHT40	UNII 1	5 190	13.99	5.32	19.31	23.01
		5 230	14.50		19.82	
	UNII 2A	5 270	11.57	5.14	16.71	30.00
		5 310	11.68		16.82	
	UNII 2C	5 510	12.73	4.75	17.48	30.00
		5 590	12.98		17.73	
		5 670	13.21		17.96	
	UNII 3	5 755	8.08	4.71	12.79	30.00
		5 795	8.22		12.93	
802.11ac VHT80	UNII 1	5 210	13.43	5.32	18.75	23.01
	UNII 2A	5 290	11.61	5.14	16.75	30.00
	UNII 2C	5 530	11.64	4.75	16.39	30.00
		5 610	12.53		17.28	
	UNII 3	5 775	8.34	5.14	13.48	30.00

Notes:

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

7.2. 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 1 MHz 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.I.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	1.58	1.06	-	1.58	1.06	11
		5 200	1.93	1.35	-	1.93	1.35	
		5 240	2.58	1.53	-	2.58	1.53	
	UNII 2A	5 260	5.76	3.20	-	5.76	3.20	11
		5 280	5.27	3.15	-	5.27	3.15	
		5 320	6.00	3.77	-	6.00	3.77	
	UNII 2C	5 500	5.52	5.13	-	5.52	5.13	11
		5 580	5.86	3.27	-	5.86	3.27	
		5 700	5.73	4.36	-	5.73	4.36	
802.11n HT20	UNII 1	5 180	1.79	1.25	-	1.79	1.25	11
		5 200	1.82	1.22	-	1.82	1.22	
		5 240	2.19	1.72	-	2.19	1.72	
	UNII 2A	5 260	5.47	3.33	-	5.47	3.33	11
		5 280	4.91	2.90	-	4.91	2.90	
		5 320	5.34	3.80	-	5.34	3.80	
	UNII 2C	5 500	4.94	2.96	-	4.94	2.96	11
		5 580	5.75	3.14	-	5.75	3.14	
		5 700	5.90	3.98	-	5.90	3.98	
802.11n HT40	UNII 1	5 190	0.01	-0.15	-	0.01	-0.15	11
		5 230	0.52	0.07	-	0.52	0.07	
	UNII 2A	5 270	0.84	1.07	-	0.84	1.07	11
		5 310	0.55	-0.60	-	0.55	-0.60	
	UNII 2C	5 510	0.77	0.86	-	0.77	0.86	11
		5 590	1.07	1.32	-	1.07	1.32	
		5 670	0.98	1.58	-	0.98	1.58	
802.11ac VHT20	UNII 1	5 180	1.46	1.14	-	1.46	1.14	11
		5 200	1.68	1.52	-	1.68	1.52	
		5 240	1.92	1.58	-	1.92	1.58	
	UNII 2A	5 260	5.17	3.18	-	5.17	3.18	11
		5 280	5.07	2.89	-	5.07	2.89	
		5 320	5.66	3.79	-	5.66	3.79	
	UNII 2C	5 500	5.15	2.69	-	5.15	2.69	11
		5 580	5.68	3.01	-	5.68	3.01	
		5 700	5.71	3.83	-	5.71	3.83	

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	0.16	-0.08	-	0.16	-0.08	11
		5 230	0.86	0.33	-	0.86	0.33	
	UNII 2A	5 270	0.81	1.11	-	0.81	1.11	11
		5 310	0.90	-0.50	-	0.90	-0.50	
	UNII 2C	5 510	1.46	0.72	-	1.46	0.72	11
		5 590	1.37	1.37	-	1.37	1.37	
		5 670	1.60	1.87	-	1.60	1.87	
802.11ac VHT80	UNII 1	5 210	-4.10	-3.97	-	-4.10	-3.97	11
	UNII 2A	5 290	-5.22	-5.18	-	-5.22	-5.18	11
	UNII 2C	5 530	-5.22	-4.97	-	-5.22	-4.97	11
		5 610	-3.49	-3.71	-	-3.49	-3.71	

Test mode	Band	Frequency (㎒)	Measured PSD (dBm /500 ㎑)		DCF (dB)	Maximum PSD (dBm /500 ㎑)		Limit (dBm /500 ㎑)
			ANT1	ANT2		ANT1	ANT2	
802.11a	UNII 3	5 745	0.47	-3.33	-	0.47	-3.33	30
		5 785	0.53	-2.95	-	0.53	-2.95	
		5 825	0.95	-2.55	-	0.95	-2.55	
802.11n HT20		5 745	0.47	-3.62	-	0.47	-3.62	
		5 785	0.23	-3.12	-	0.23	-3.12	
		5 825	0.33	-2.90	-	0.33	-2.90	
802.11n HT40		5 755	-3.59	-6.80	-	-3.59	-6.80	
		5 795	-3.68	-6.63	-	-3.68	-6.63	
802.11ac VHT20		5 745	0.02	-3.32	-	0.02	-3.32	
		5 785	0.63	-3.04	-	0.63	-3.04	
		5 825	0.34	-2.75	-	0.34	-2.75	
802.11ac VHT40		5 755	-3.66	-6.69	-	-3.66	-6.69	
		5 795	-3.57	-6.48	-	-3.57	-6.48	
802.11ac VHT80		5 775	-6.44	-9.29	-	-6.44	-9.29	

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	1.51	0.83	-	4.19	11
		5 200	1.85	1.60	-	4.74	
		5 240	2.15	2.07	-	5.12	
	UNII 2A	5 260	1.21	0.82	-	4.03	11
		5 280	0.79	0.21	-	3.52	
		5 320	1.15	0.80	-	3.99	
	UNII 2C	5 500	0.66	0.87	-	3.78	11
		5 580	1.50	0.63	-	4.10	
		5 700	1.00	1.01	-	4.02	
802.11n HT20	UNII 1	5 180	1.75	1.59	-	4.68	11
		5 200	1.68	1.50	-	4.60	
		5 240	2.11	1.81	-	4.97	
	UNII 2A	5 260	1.40	0.15	-	3.83	11
		5 280	0.29	-0.21	-	3.06	
		5 320	0.90	0.91	-	3.92	
	UNII 2C	5 500	1.24	0.48	-	3.89	11
		5 580	1.09	0.16	-	3.66	
		5 700	0.91	0.98	-	3.96	
802.11n HT40	UNII 1	5 190	0.19	-0.37	-	2.93	11
		5 230	0.54	-0.04	-	3.27	
	UNII 2A	5 270	-0.76	-0.76	-	2.25	11
		5 310	-0.92	-1.19	-	1.96	
	UNII 2C	5 510	-0.93	-1.87	-	1.64	11
		5 590	-0.94	-0.96	-	2.06	
		5 670	-0.58	-0.02	-	2.72	
802.11ac VHT20	UNII 1	5 180	1.33	1.31	-	4.33	11
		5 200	1.72	1.38	-	4.56	
		5 240	1.97	1.59	-	4.79	
	UNII 2A	5 260	0.88	0.60	-	3.75	11
		5 280	0.52	0.12	-	3.33	
		5 320	1.12	0.75	-	3.95	
	UNII 2C	5 500	1.20	0.65	-	3.94	11
		5 580	1.07	0.47	-	3.79	
		5 700	1.03	0.76	-	3.91	

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dB m/㎒)	Limit (dBm/㎒)
			ANT1	ANT2			
802.11ac VHT40	UNII 1	5 190	0.13	0.02	-	3.09	11
		5 230	0.94	0.41	-	3.69	
	UNII 2A	5 270	-1.84	-2.25	-	0.97	11
		5 310	-2.00	-2.23	-	0.90	
	UNII 2C	5 510	-0.74	-1.44	-	1.93	11
		5 590	-0.81	-1.38	-	1.92	
		5 670	-0.47	-0.28	-	2.64	
802.11ac VHT80	UNII 1	5 210	-3.84	-4.36	-	-1.08	11
	UNII 2A	5 290	-5.65	-6.08	-	-2.85	11
	UNII 2C	5 530	-5.47	-6.36	-	-2.88	11
		5 610	-4.50	-4.59	-	-1.53	

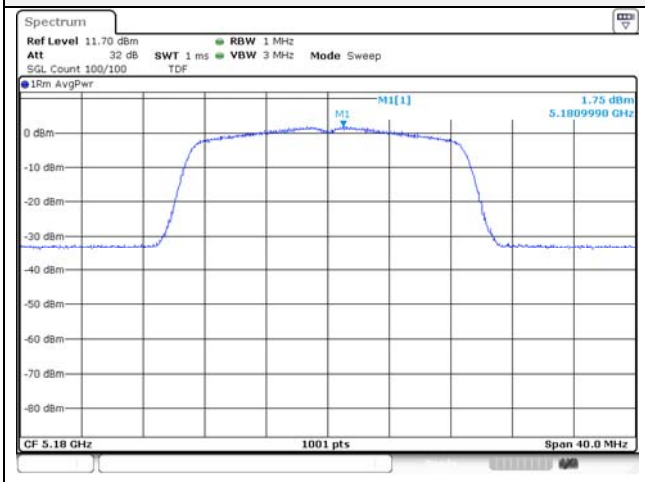
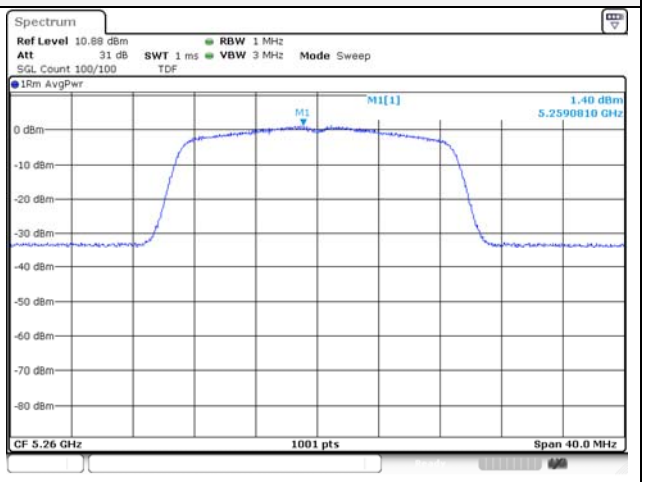
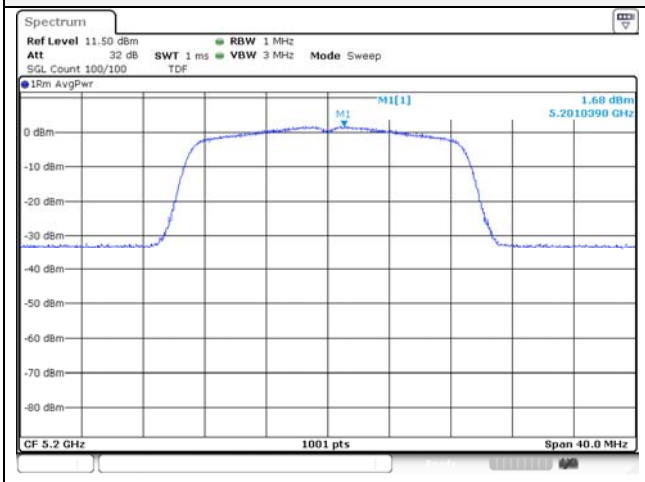
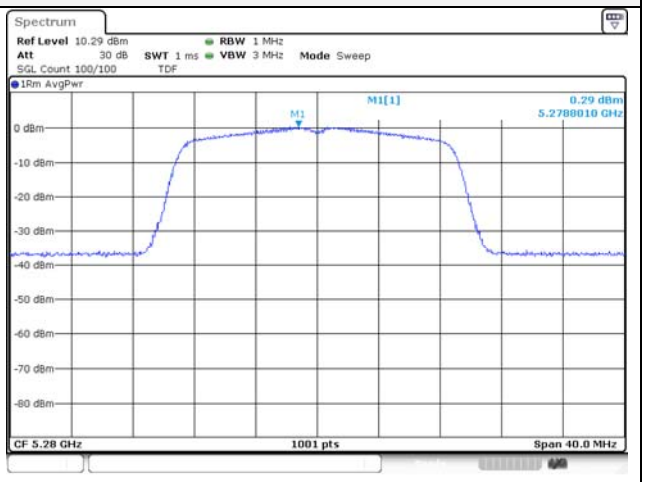
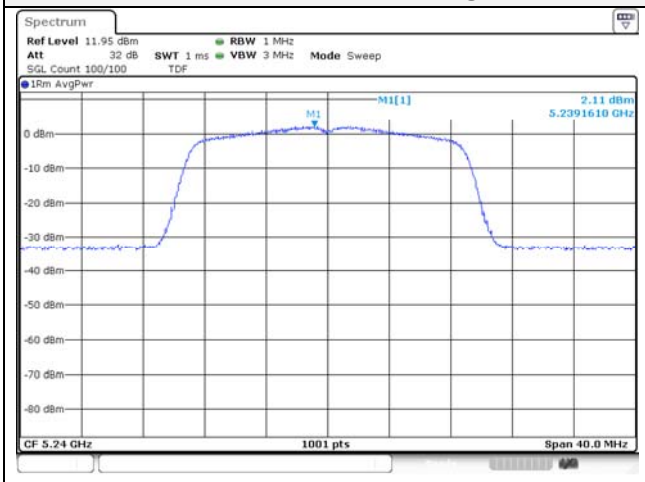
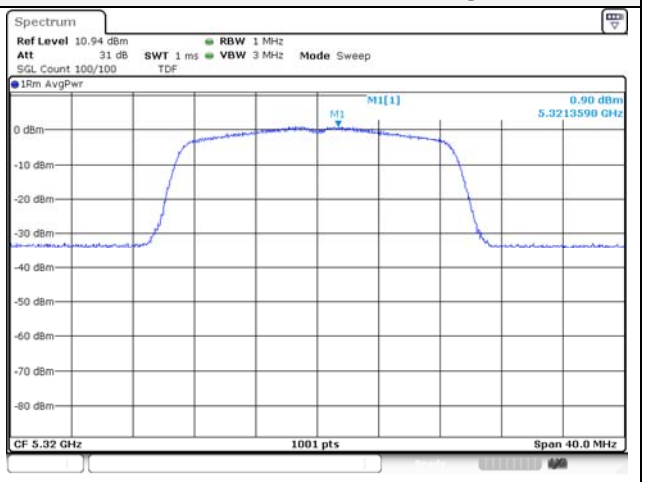
Test mode	Band	Frequency (㎒)	Measured PSD (dBm /500 ㎑)		DCF (dB)	Maximum PSD (dBm /500 ㎑)	Limit (dBm /500 ㎑)
			ANT1	ANT2			
802.11a	UNII 3	5 745	-4.56	-5.43	-	-1.96	30
		5 785	-4.72	-4.99	-	-1.84	
		5 825	-4.56	-5.36	-	-1.93	
802.11n HT20		5 745	-4.78	-5.90	-	-2.29	
		5 785	-4.57	-5.73	-	-2.10	
		5 825	-4.84	-5.07	-	-1.94	
802.11n HT40		5 755	-8.80	-9.02	-	-5.90	
		5 795	-8.18	-8.53	-	-5.34	
802.11ac VHT20		5 745	-4.67	-5.97	-	-2.26	
		5 785	-4.78	-5.83	-	-2.26	
		5 825	-4.98	-5.01	-	-1.98	
802.11ac VHT40		5 755	-8.30	-8.96	-	-5.61	
		5 795	-8.34	-8.92	-	-5.61	
802.11ac VHT80		5 775	-11.89	-11.98	-	-8.92	

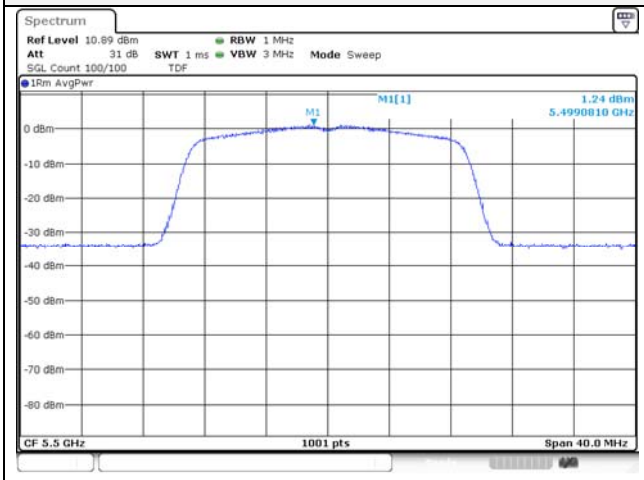
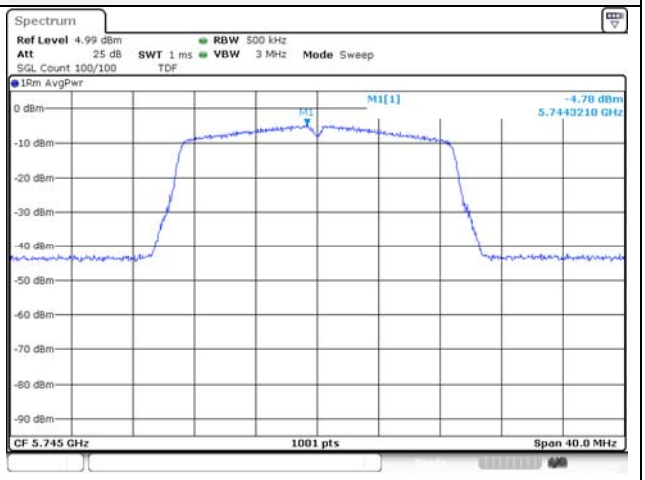
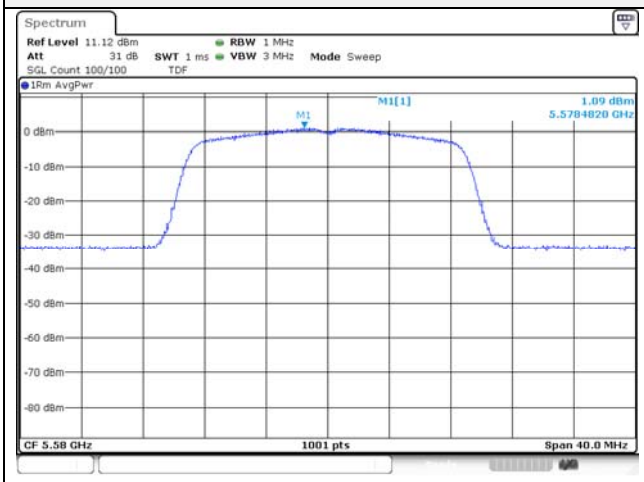
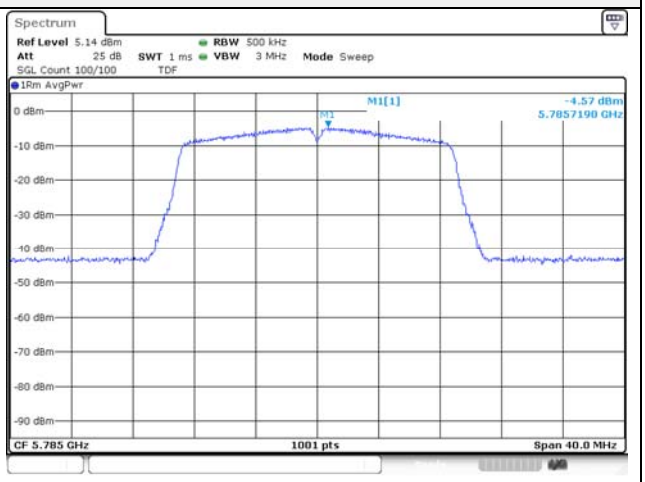
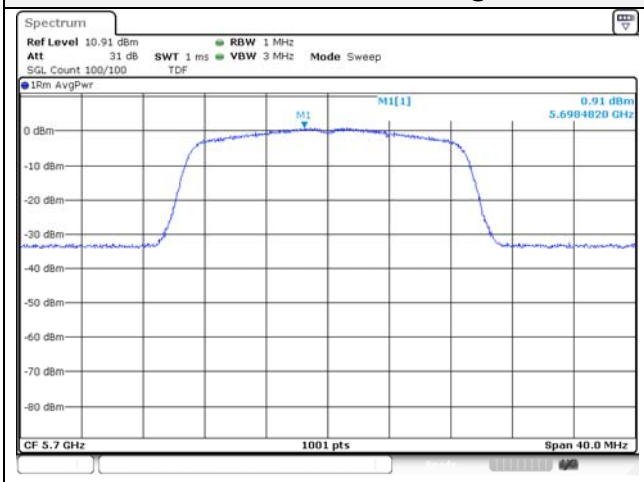
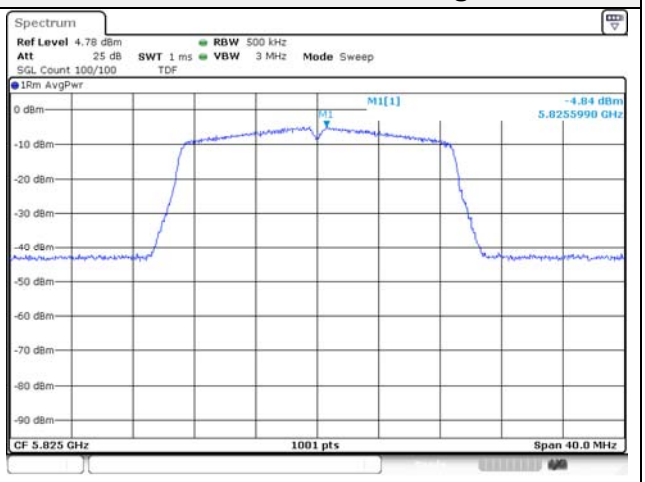
Notes:

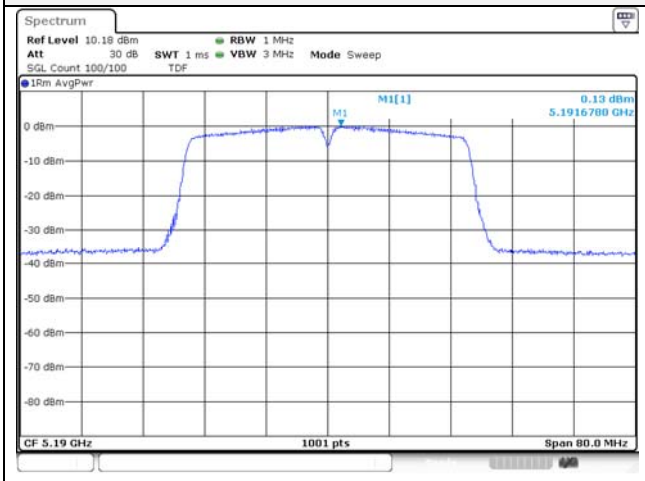
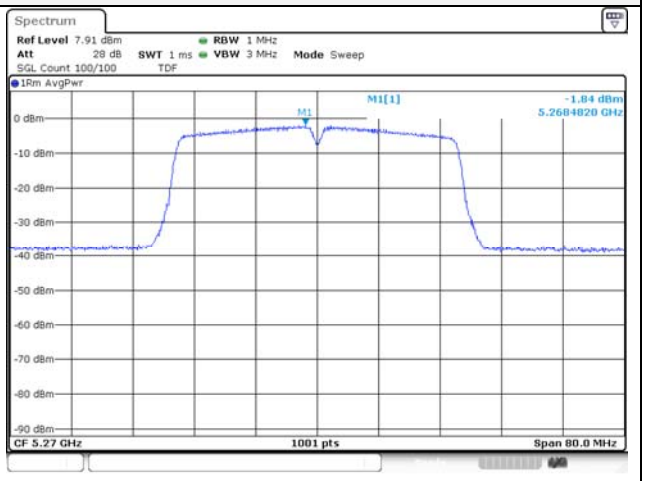
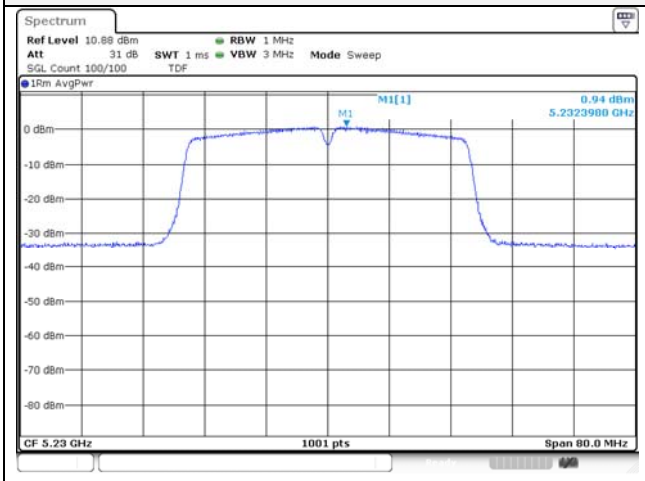
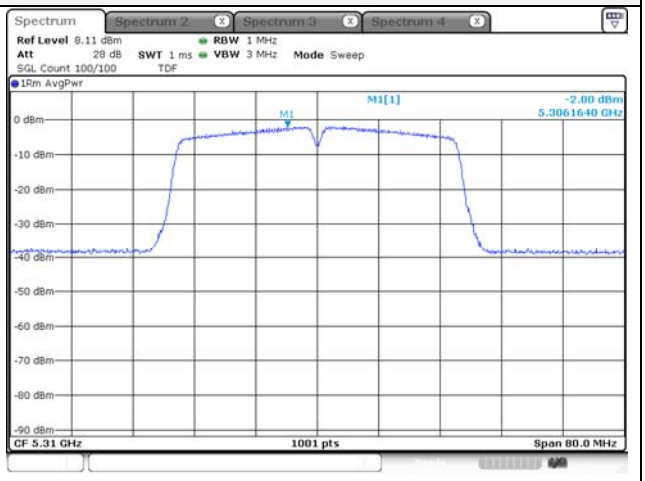
1. Maximum PSD calculation

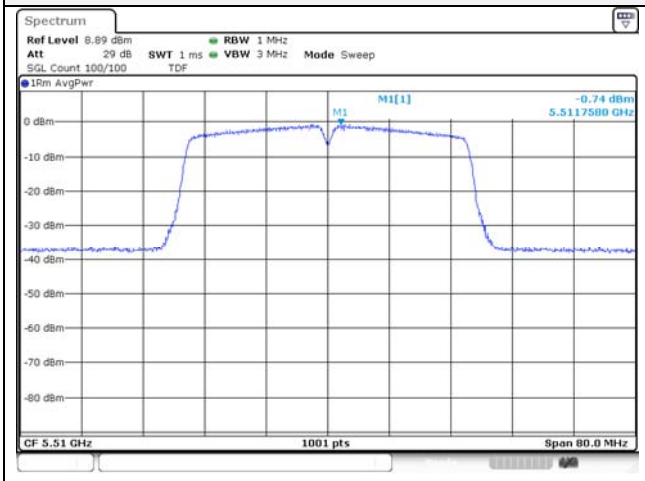
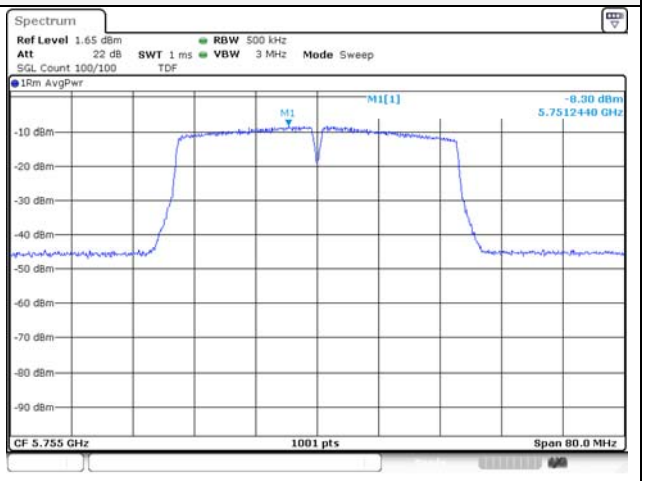
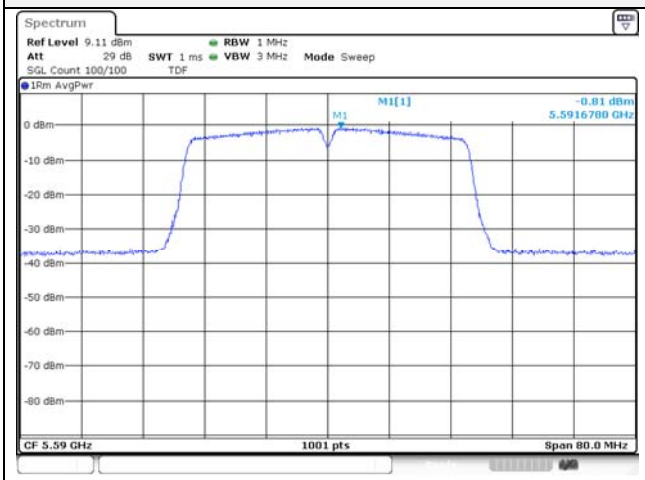
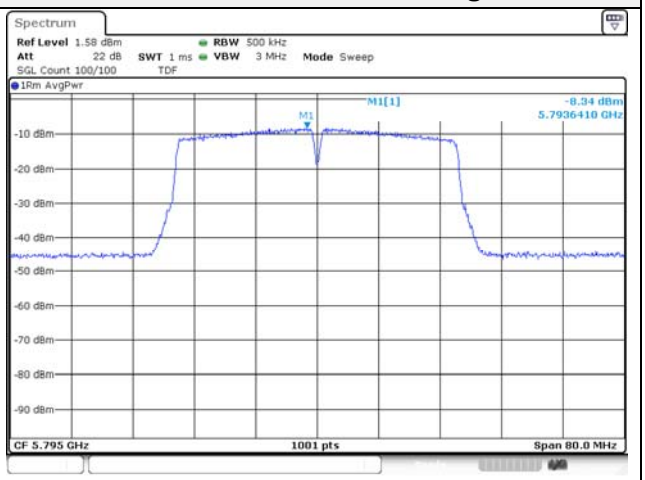
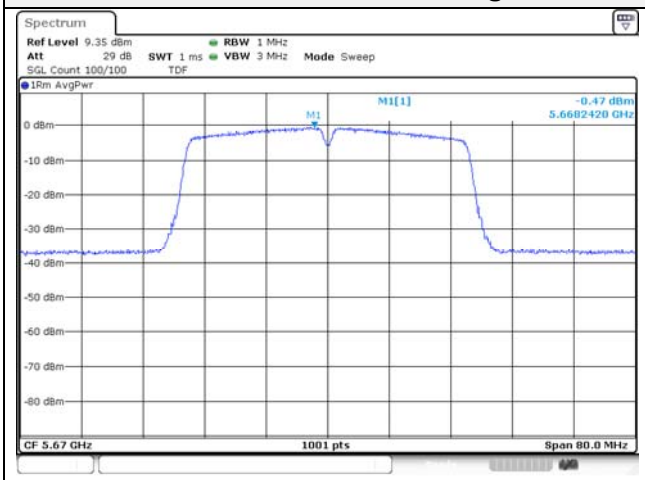
- Maximum PSD = Measured $10\log(10^{(ANT\ 1/10)} + 10^{(ANT\ 2/10)}) + D.C.F$

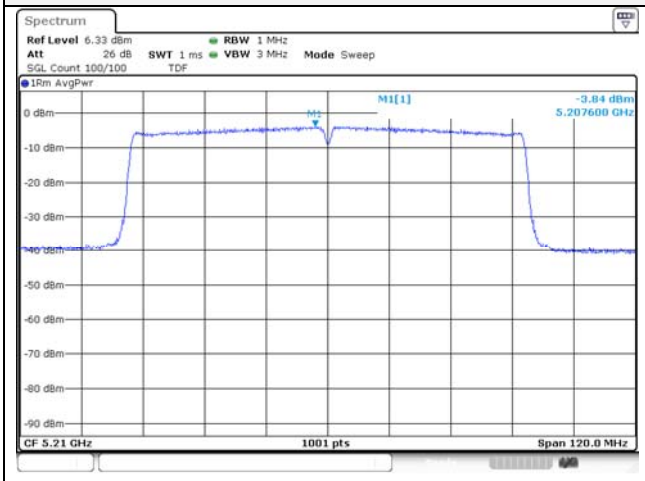
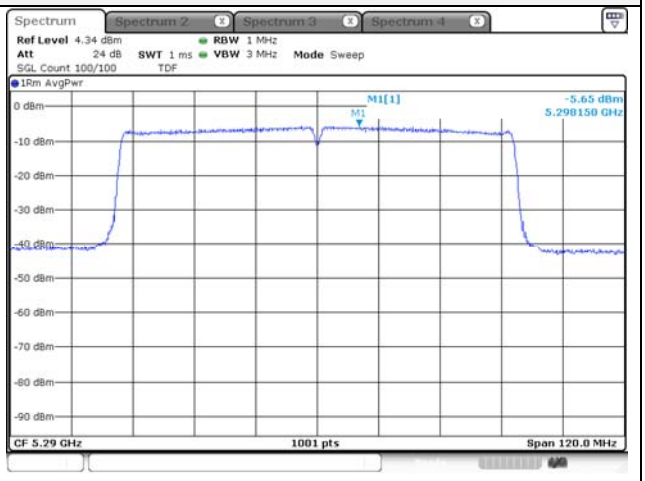
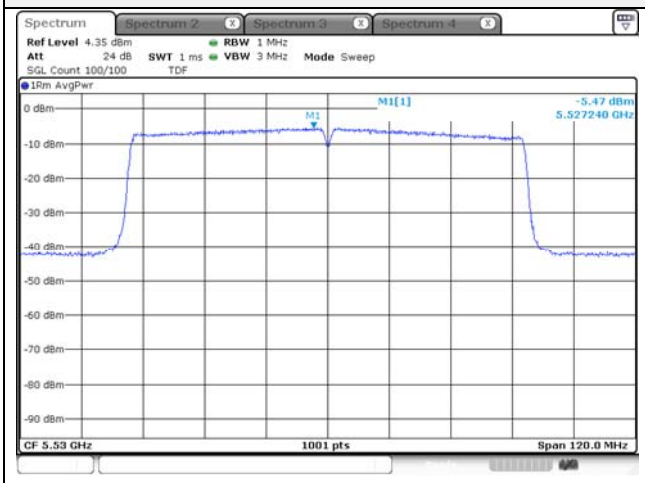
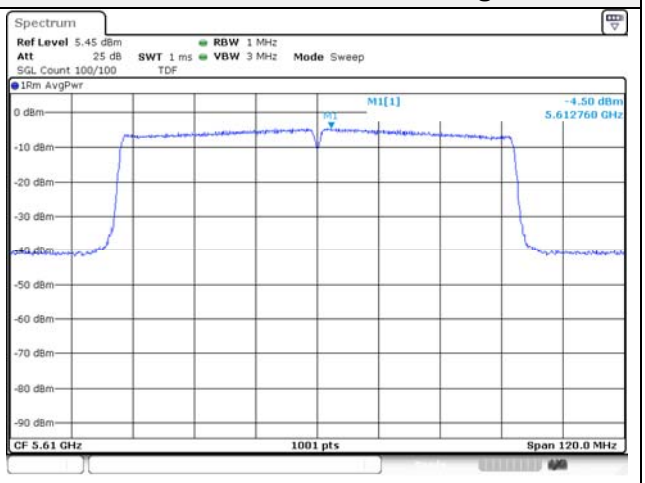
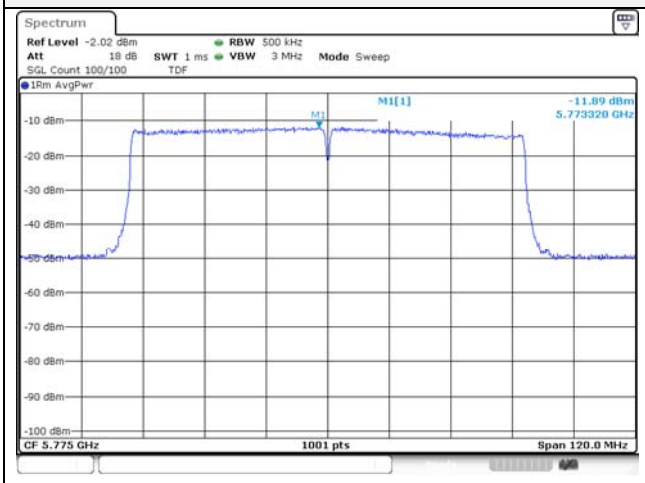
In order to simplify the report, attached plots were only MIMO (Worst bandwidth)
MIMO ANT 1

UNII-1 / 802.11n HT 20 / Low ch.	UNII-2A / 802.11n HT 20 / Low ch.
	
UNII-1 / 802.11n HT 20 / Mid ch.	**UNII-2A / 802.11n HT 20 / Mid ch.**
	
UNII-1 / 802.11n HT 20 / High ch.	**UNII-2A / 802.11n HT 20 / High ch.**
	

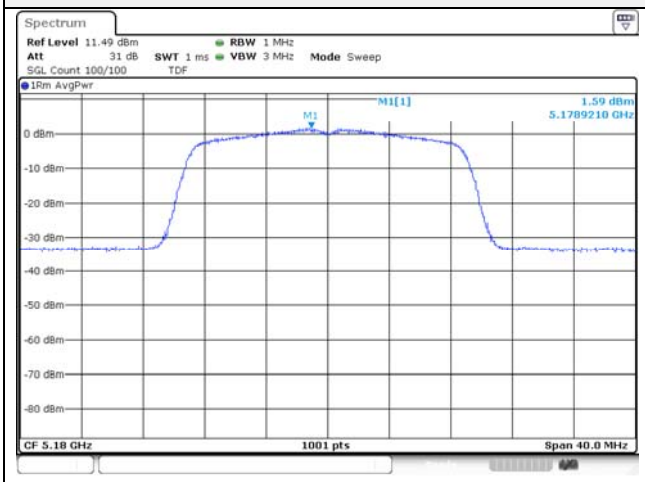
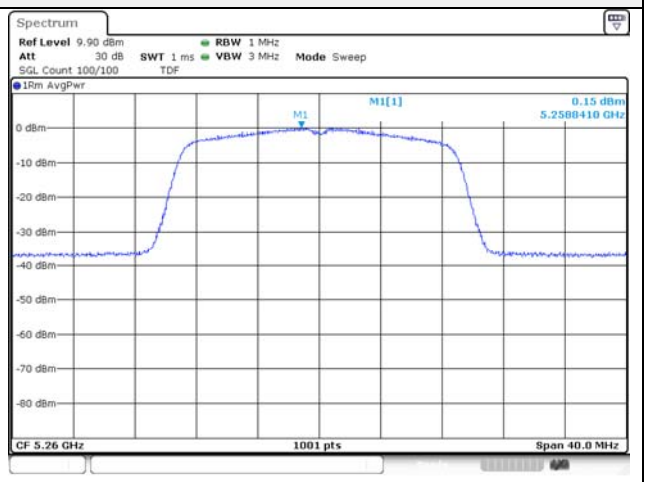
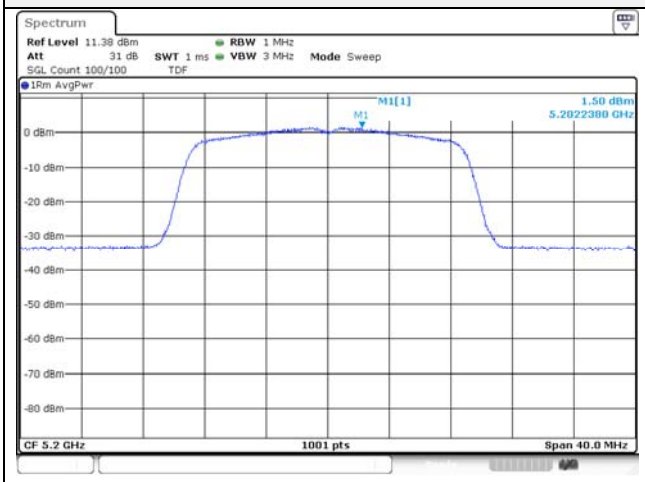
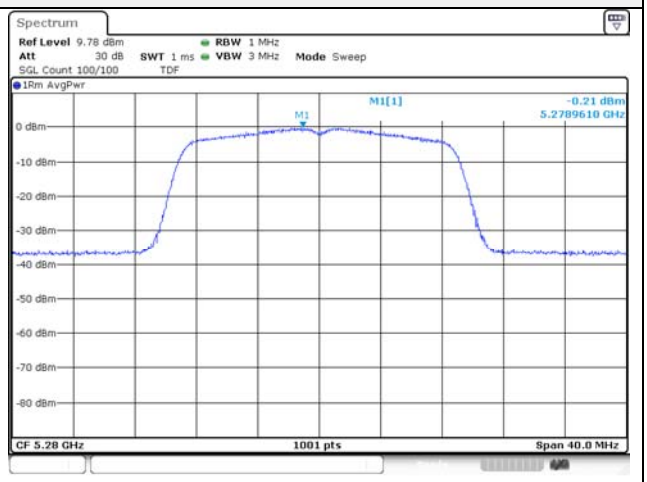
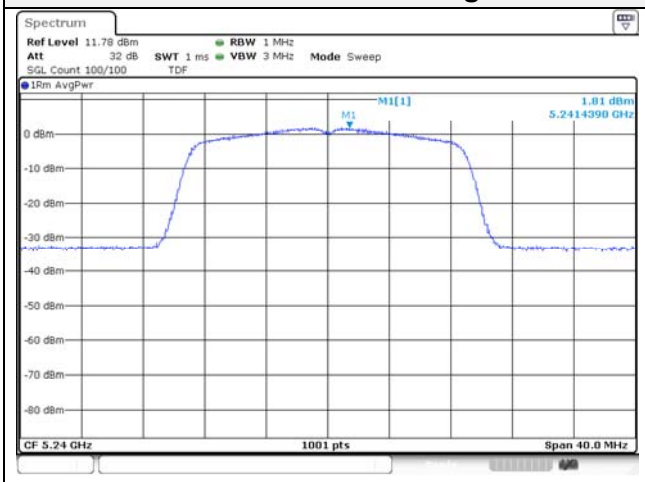
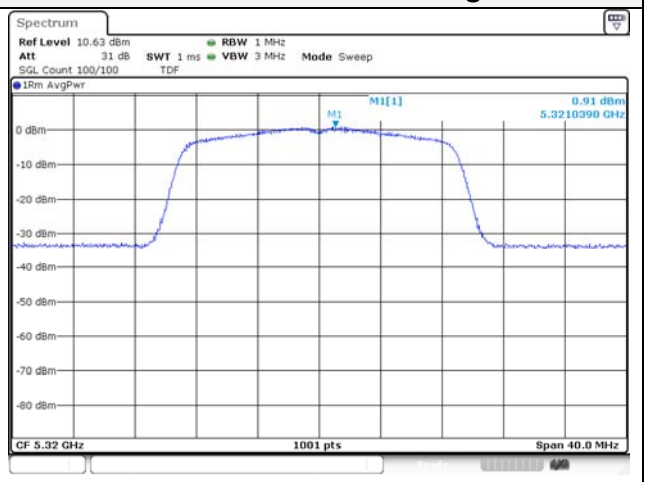
UNII-2C / 802.11n HT 20 / Low ch.	UNII-3 / 802.11n HT 20 / Low ch.
	
UNII-2C / 802.11n HT 20 / Mid ch.	**UNII-3 / 802.11n HT 20 / Mid ch.**
	
UNII-2C / 802.11n HT 20/ High ch.	**UNII-3 / 802.11n HT 20 / High ch.**
	

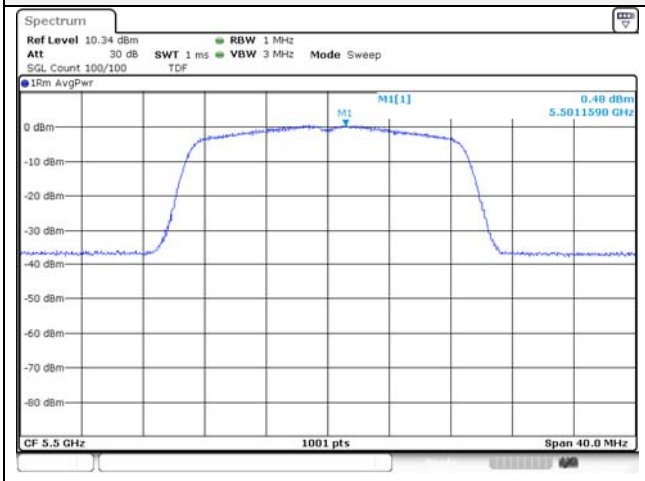
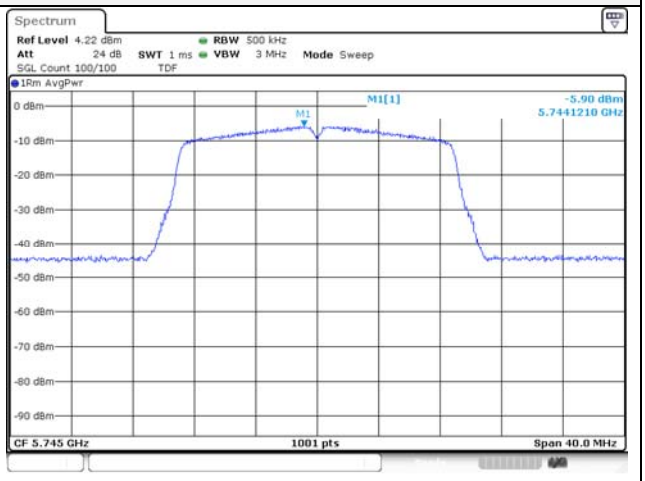
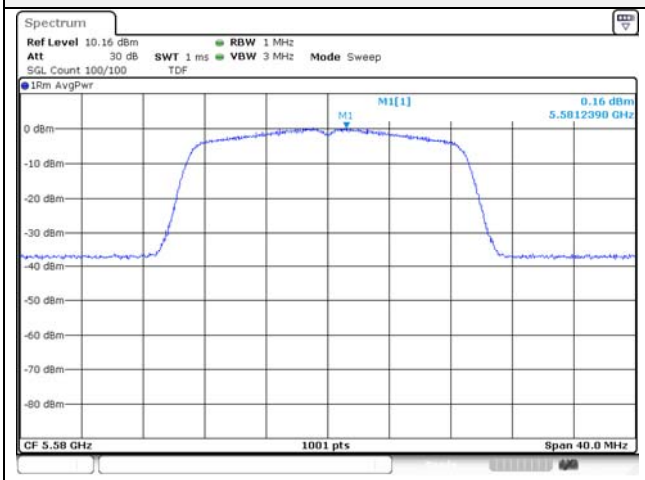
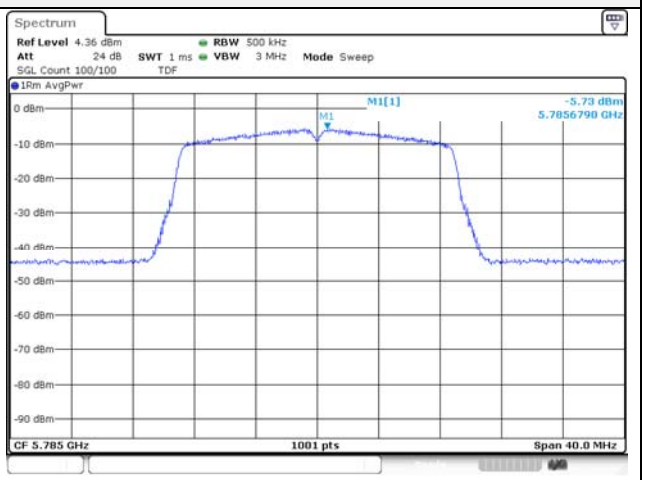
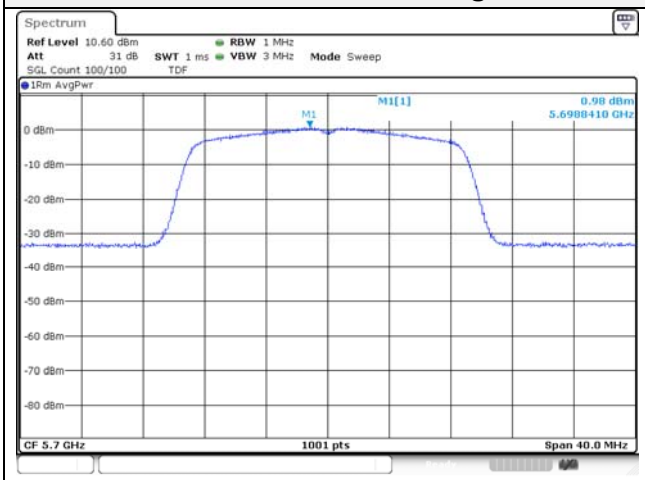
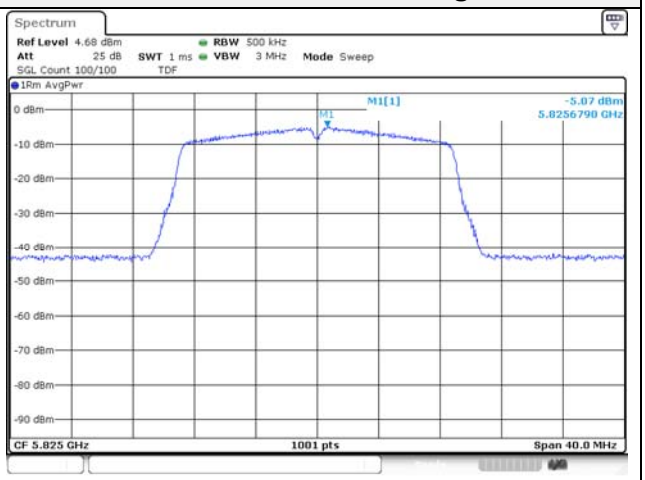
UNII-1 / 802.11ac VHT40 / Low ch.	UNII-2A / 802.11ac VHT40 / Low ch.
	
UNII-1 / 802.11ac VHT40 / High ch.	**UNII-2A 802.11ac VHT40 / High ch.**
	

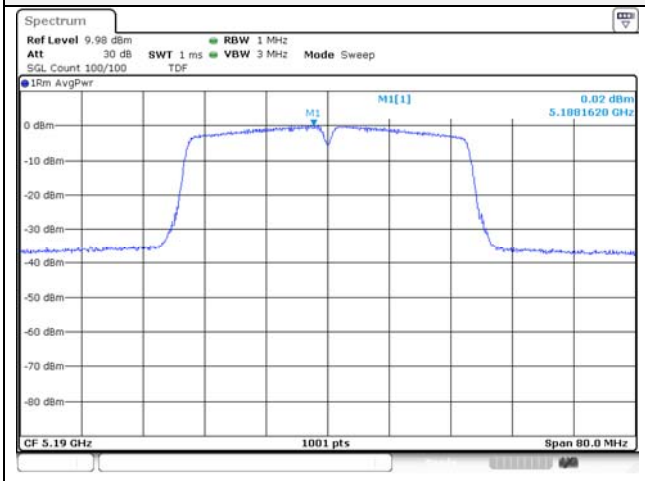
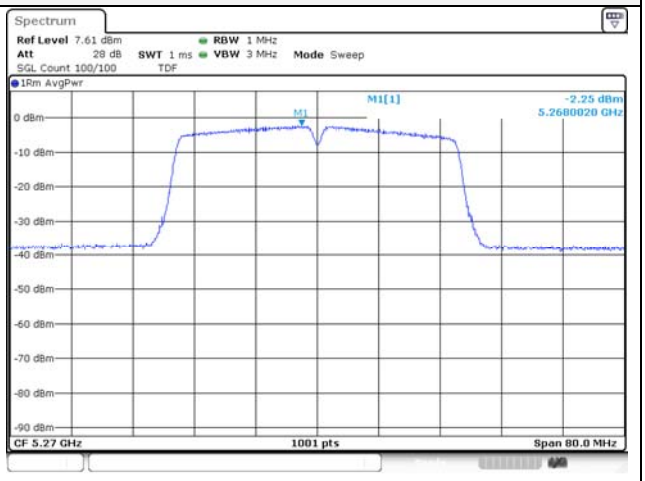
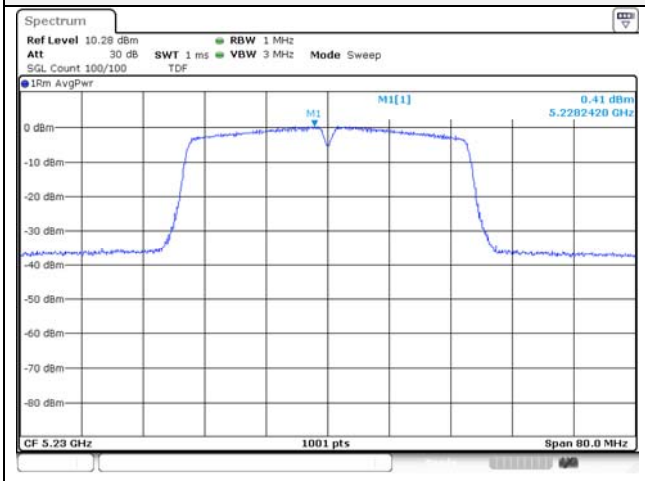
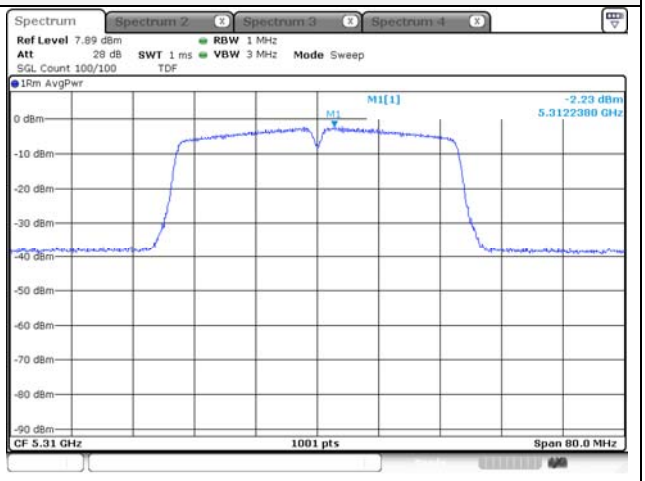
UNII-2C / 802.11ac VHT40 / Low ch.	UNII-3 / 802.11ac VHT40 / Low ch.
	
UNII-2C / 802.11ac VHT40 / Mid ch.	**UNII-3 / 802.11ac VHT40 / High ch.**
	
UNII-2C / 802.11ac VHT40 / High ch.	
	Blank

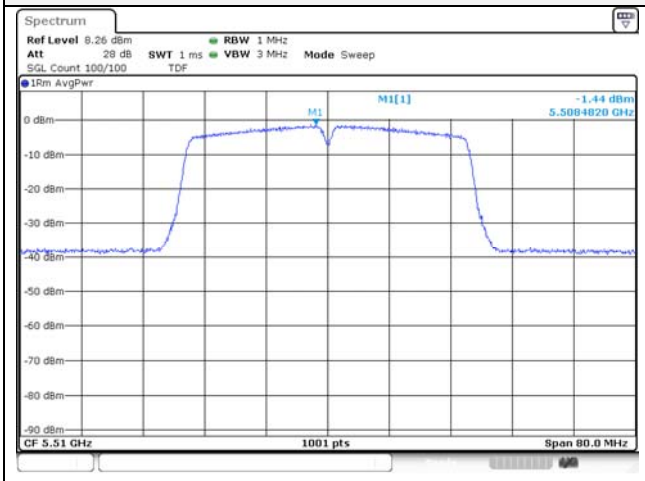
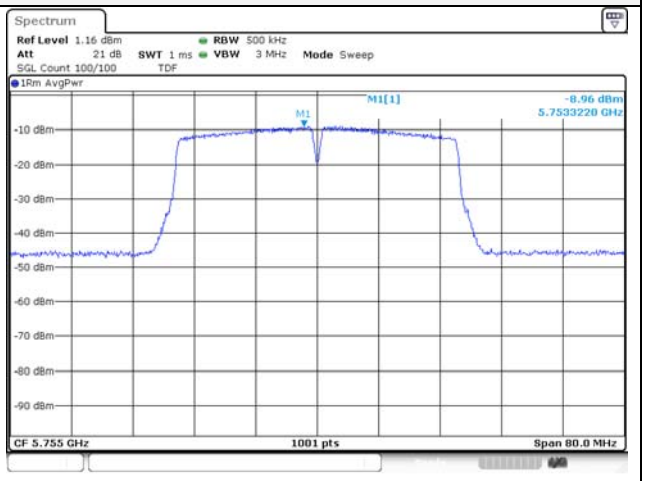
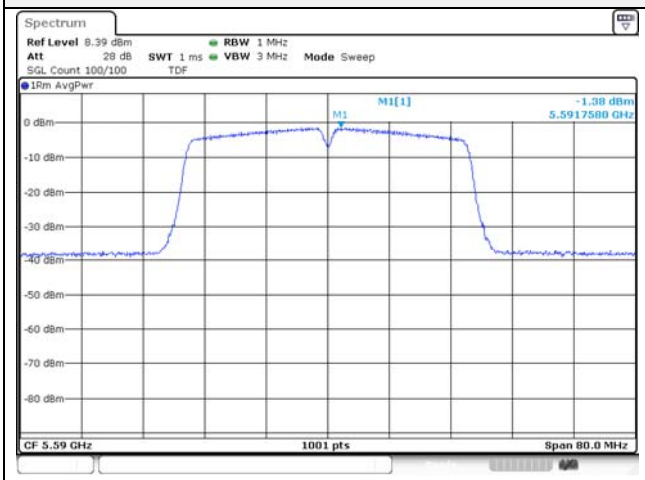
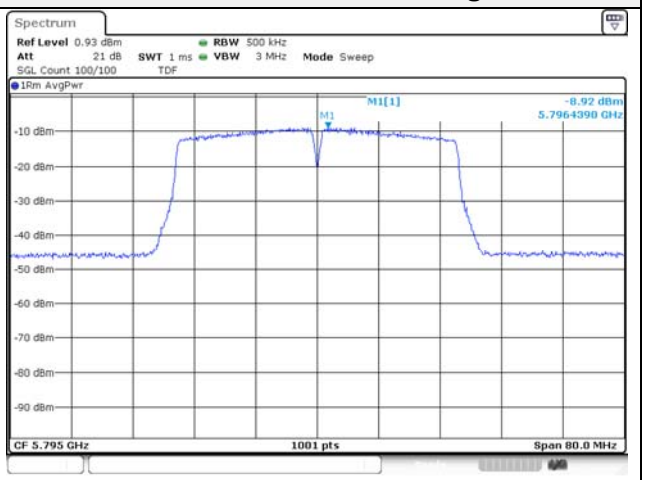
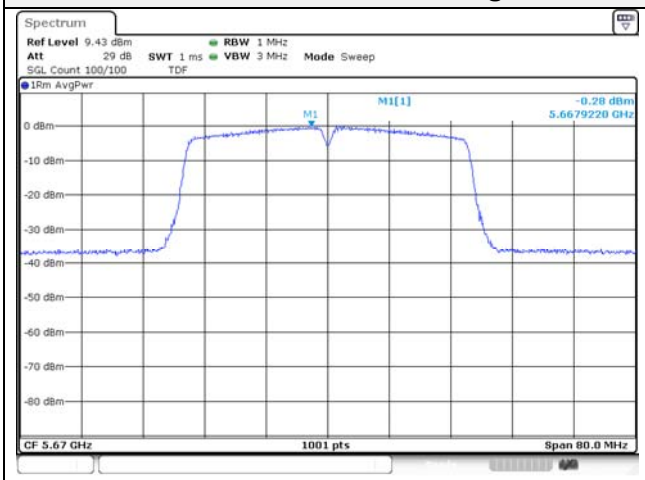
UNII-1 / 802.11ac VHT80 / Low ch.	UNII-2A / 802.11ac VHT80 / Low ch.
	
UNII-2C / 802.11ac VHT80 / Low ch.	**UNII-2C / 802.11ac VHT80 / High ch.**
	
UNII-3 / 802.11ac VHT80 / Low ch.	
	Blank

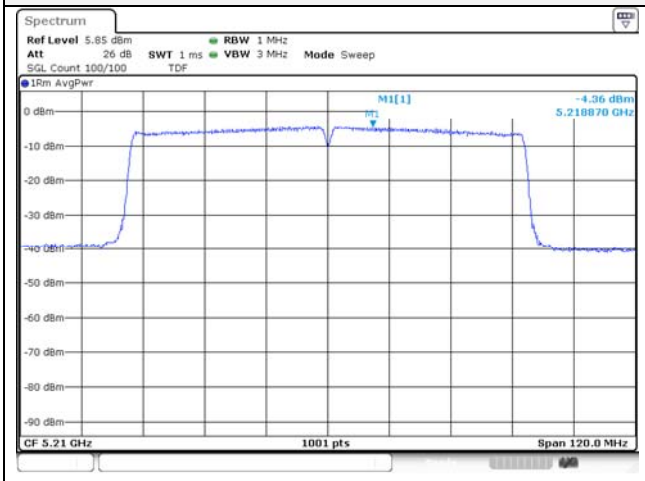
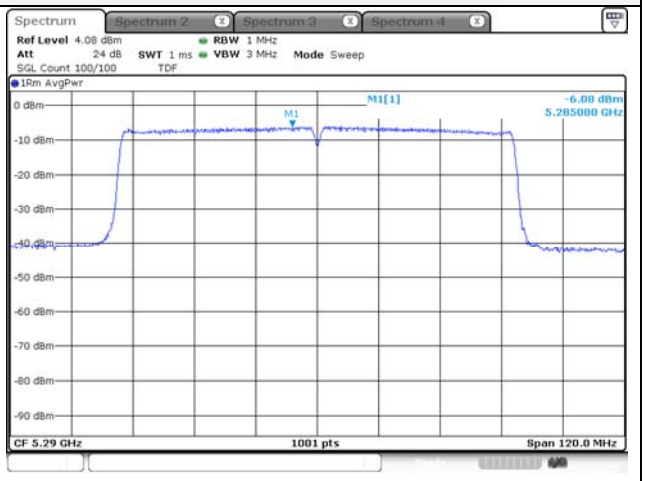
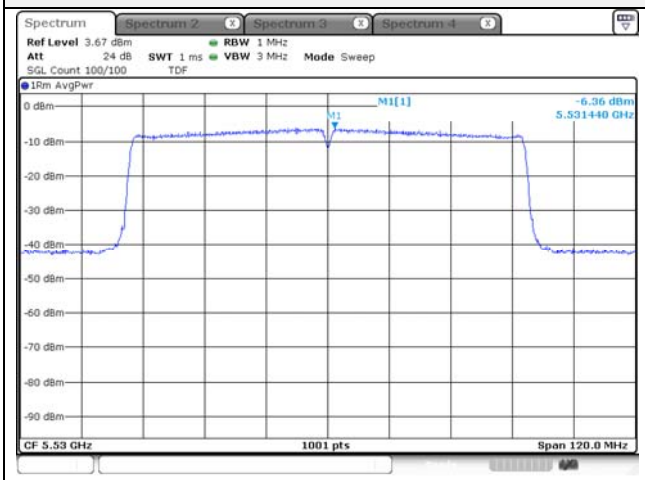
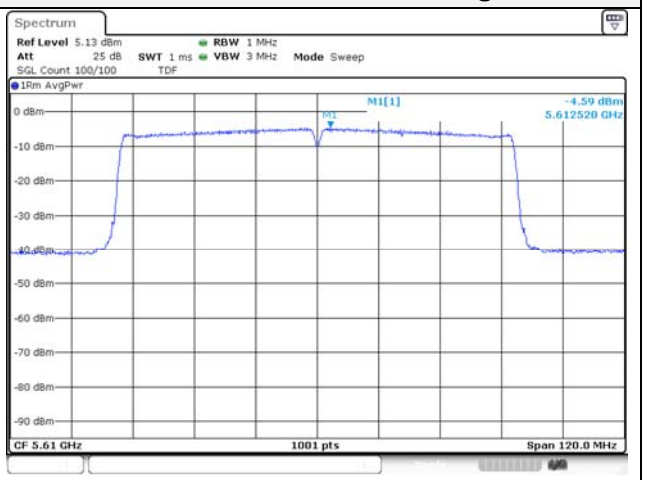
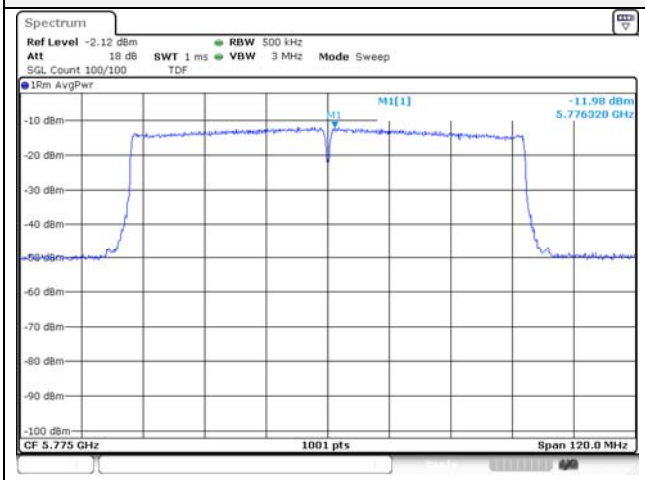
MIMO ANT 2

UNII-1 / 802.11n HT 20 / Low ch.	UNII-2A / 802.11n HT 20 / Low ch.
	
UNII-1 / 802.11n HT 20 / Mid ch.	**UNII-2A / 802.11n HT 20 / Mid ch.**
	
UNII-1 / 802.11n HT 20 / High ch.	**UNII-2A / 802.11n HT 20 / High ch.**
	

UNII-2C / 802.11n HT 20 / Low ch.	UNII-3 / 802.11n HT 20 / Low ch.
	
UNII-2C / 802.11n HT 20 / Mid ch.	**UNII-3 / 802.11n HT 20 / Mid ch.**
	
UNII-2C / 802.11n HT 20/ High ch.	**UNII-3 / 802.11n HT 20 / High ch.**
	

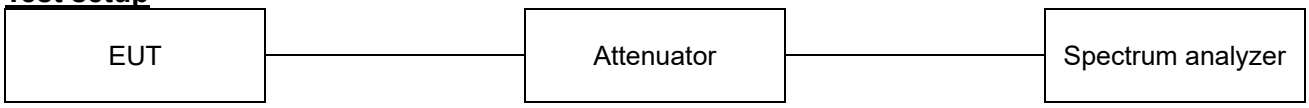
UNII-1 / 802.11ac VHT40 / Low ch.	UNII-2A / 802.11ac VHT40 / Low ch.
	
UNII-1 / 802.11ac VHT40 / High ch.	**UNII-2A / 802.11ac VHT40 / High ch.**
	

UNII-2C / 802.11ac VHT40 / Low ch.	UNII-3 / 802.11ac VHT40 / Low ch.
	
UNII-2C / 802.11ac VHT40 / Mid ch.	**UNII-3 / 802.11ac VHT40 / High 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.**
	
UNII-3 / 802.11ac VHT80 / Low ch.	
	Blank

7.3. 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.

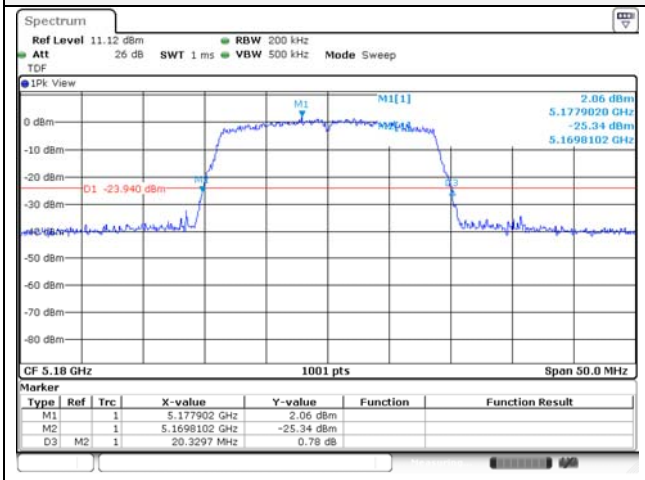
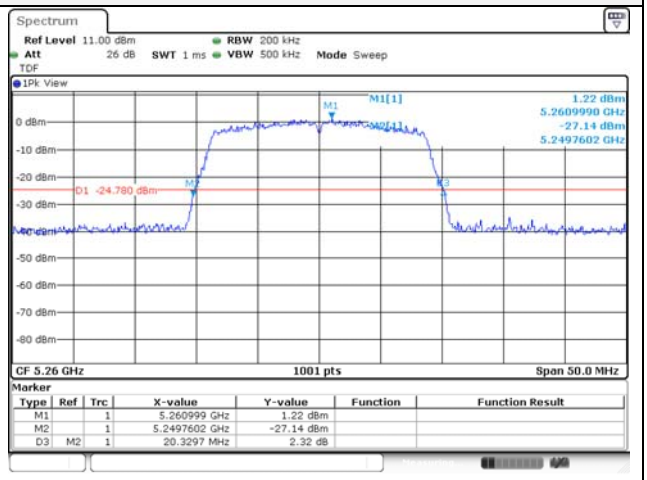
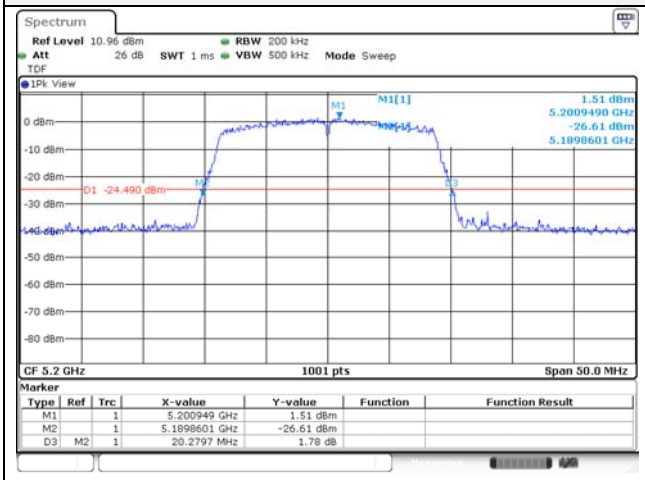
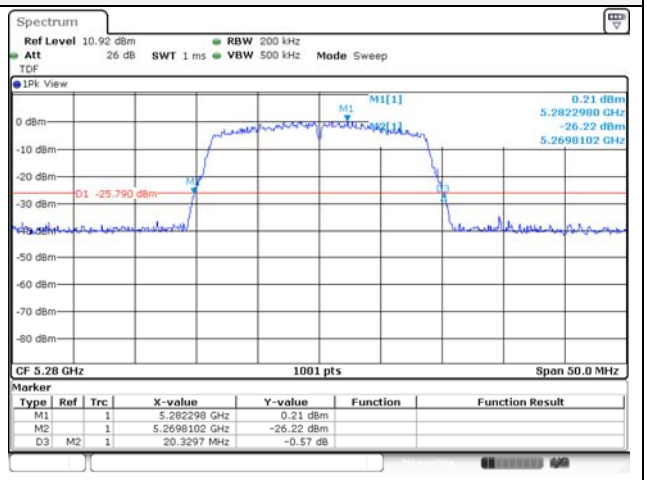
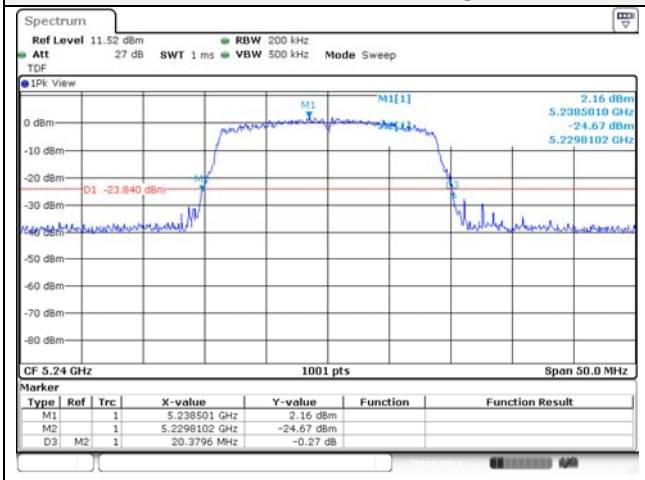
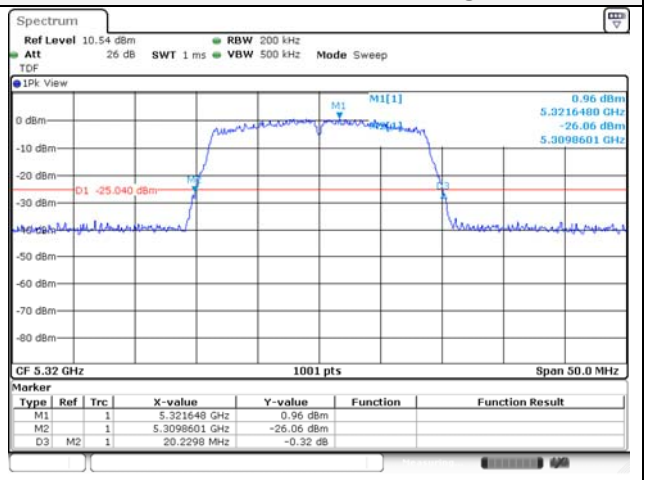
Test results

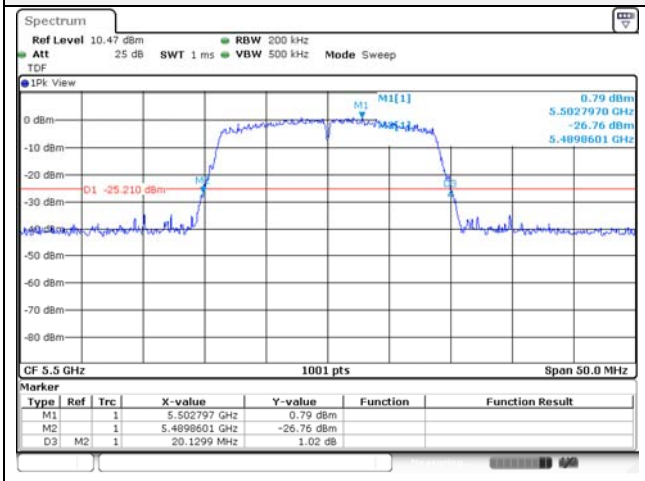
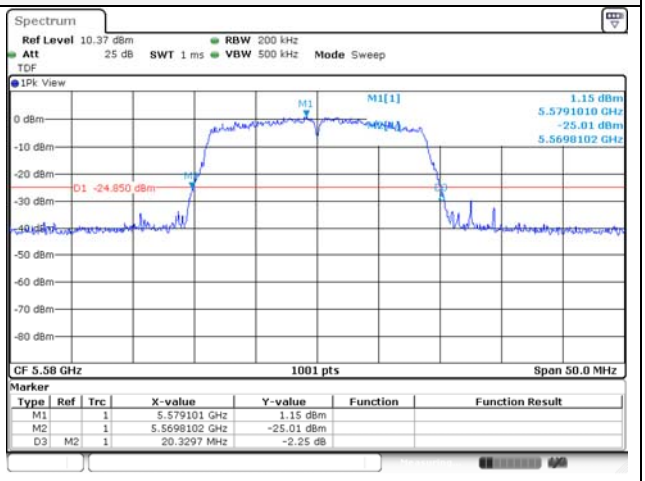
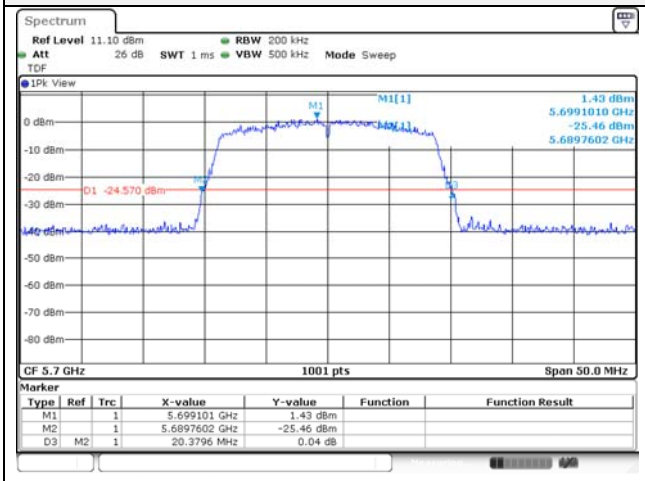
Test mode	Band	Frequency(㎒)	26 dB bandwidth (㎒)		99% bandwidth (㎒)	
			ANT1	ANT2	ANT1	ANT2
802.11a	UNII-1	5 180	19.88	19.78	16.48	16.43
		5 200	19.98	19.93	16.48	16.43
		5 240	19.93	19.78	16.48	16.43
	UNII-2A	5 260	19.98	19.88	16.43	16.43
		5 280	19.88	19.78	16.43	16.43
		5 320	19.93	19.83	16.43	16.43
	UNII-2C	5 500	20.03	19.88	16.53	16.43
		5 580	19.83	19.88	16.48	16.43
		5 700	20.08	19.73	16.43	16.43
802.11n HT20	UNII-1	5 180	20.33	19.98	17.58	17.58
		5 200	20.28	20.13	17.63	17.63
		5 240	20.38	20.23	17.63	17.63
	UNII-2A	5 260	20.33	20.23	17.63	17.63
		5 280	20.33	20.03	17.63	17.63
		5 320	20.23	20.08	17.63	17.58
	UNII-2C	5 500	20.13	20.23	17.63	17.63
		5 580	20.33	20.18	17.63	17.63
		5 700	20.38	20.23	17.63	17.58
802.11n HT40	UNII-1	5 190	41.36	40.66	36.56	36.36
		5 230	41.06	40.76	36.36	36.26
	UNII-2A	5 270	41.16	40.66	36.46	36.46
		5 310	40.96	40.36	36.36	36.26
	UNII-2C	5 510	41.36	40.76	36.36	36.26
		5 590	41.06	40.76	36.56	36.36
		5 670	41.16	40.76	36.46	36.26

Test mode	Band	Frequency(㎒)	26 dB bandwidth (㎒)		99% bandwidth (㎒)	
			ANT1	ANT2	ANT1	ANT2
802.11ac VHT20	UNII-1	5 180	20.08	20.18	17.63	17.63
		5 200	19.98	20.18	17.63	17.63
		5 240	20.13	20.23	17.63	17.63
	UNII-2A	5 260	20.13	19.98	17.58	17.63
		5 280	20.33	19.83	17.63	17.63
		5 320	20.18	20.33	17.53	17.58
	UNII-2C	5 500	20.18	20.23	17.53	17.63
		5 580	20.18	20.18	17.53	17.58
		5 700	20.18	20.23	17.63	17.68
802.11ac VHT40	UNII-1	5 190	40.86	41.46	36.56	36.56
		5 230	40.86	40.76	36.46	36.36
	UNII-2A	5 270	41.06	41.36	36.46	36.46
		5 310	41.06	41.06	36.26	36.36
	UNII-2C	5 510	41.06	40.86	36.46	36.36
		5 590	40.96	41.36	36.36	36.36
		5 670	41.16	40.96	36.36	36.56
802.11ac VHT80	UNII-1	5 210	81.88	81.52	75.76	75.76
	UNII-2A	5 290	81.52	81.76	75.76	75.88
	UNII-2C	5 530	81.64	81.28	75.76	75.76
		5 610	82.24	82.00	75.88	75.64

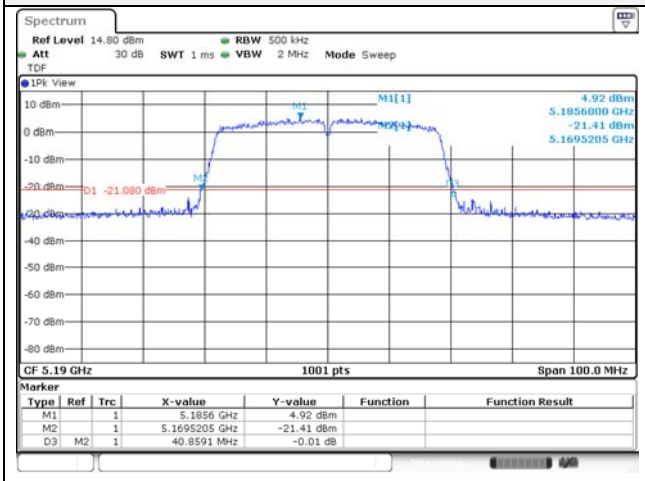
In order to simplify the report, attached plots were only MIMO ANT 1 (Per bandwidth)

26 dB bandwidth

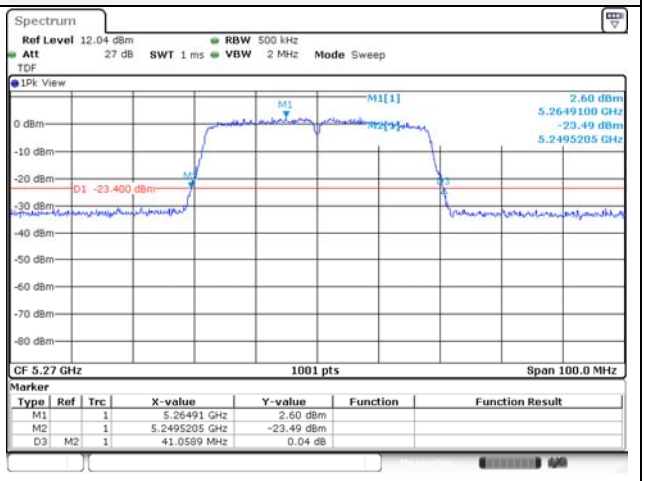
UNII-1 / 802.11n HT20 / Low ch.	UNII-2A / 802.11n HT20 / Low ch.
	
UNII-1 / 802.11n HT20 / Mid ch.	**UNII-2A / 802.11n HT20 / Mid ch.**
	
UNII-1 / 802.11n HT20 / High ch.	**UNII-2A / 802.11n HT20 / High ch.**
	

UNII-2C / 802.11n HT20 / Low ch.	UNII-2C / 802.11n HT20 / Mid ch.
	
UNII-2C / 802.11n HT20 / High ch.	
	Blank

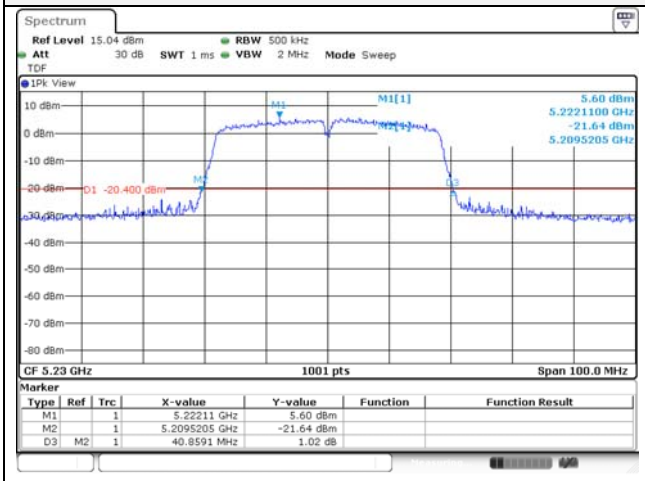
UNII-1 / 802.11ac VHT40 / Low ch.



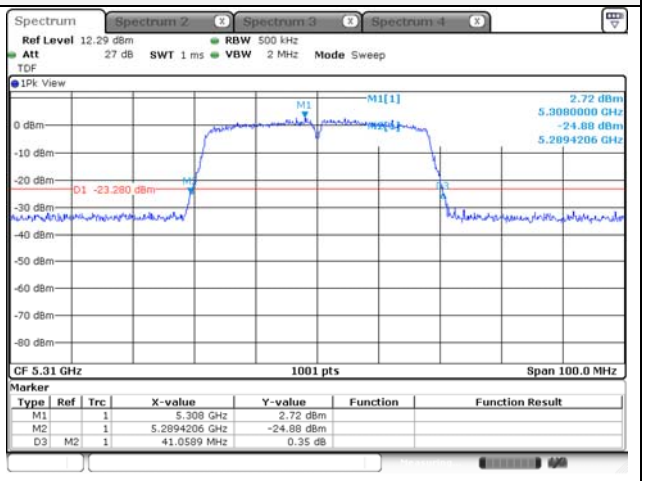
UNII-2A / 802.11ac VHT40 / Low ch.

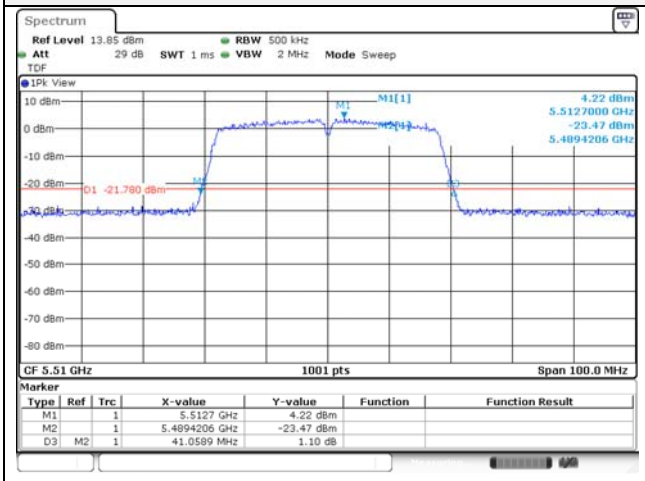
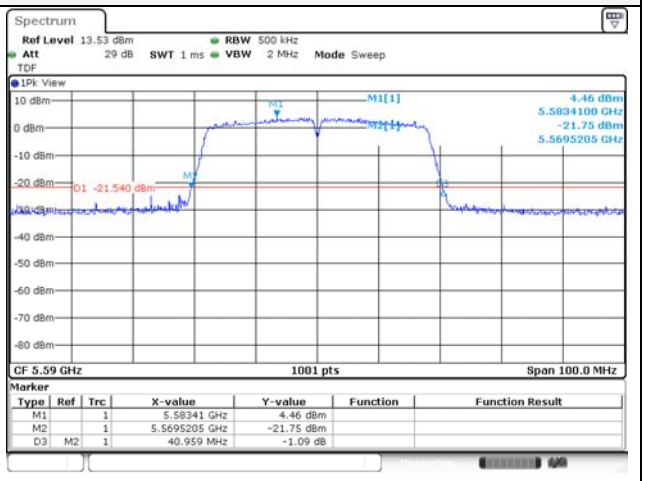
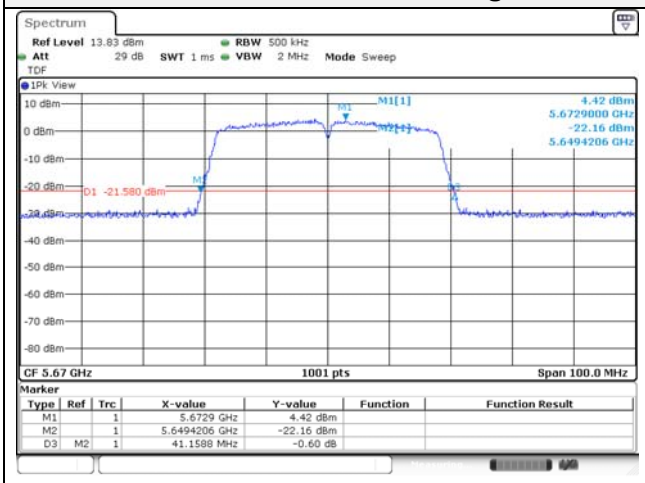


UNII-1 / 802.11ac VHT40 / High ch.

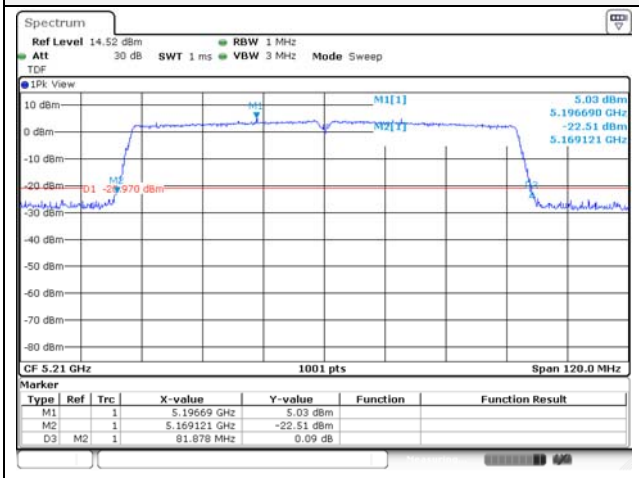


UNII-2A / 802.11ac VHT40 / High ch.

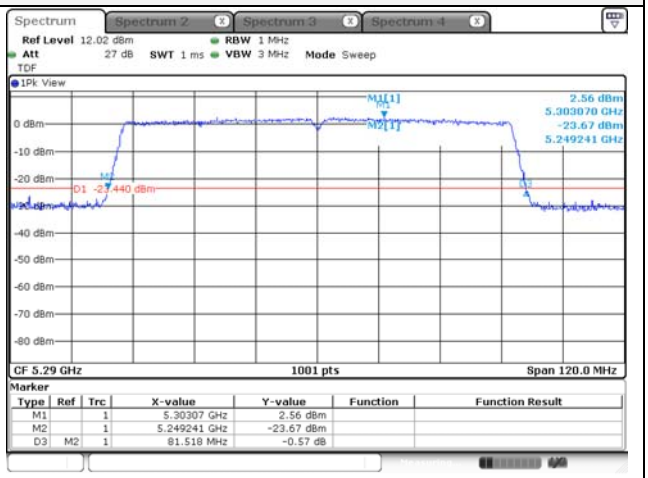


UNII-2C / 802.11ac VHT40 / Low ch.	UNII-2C / 802.11ac VHT40 / Mid ch.
	
UNII-2C / 802.11ac VHT40 / High ch.	
	Blank

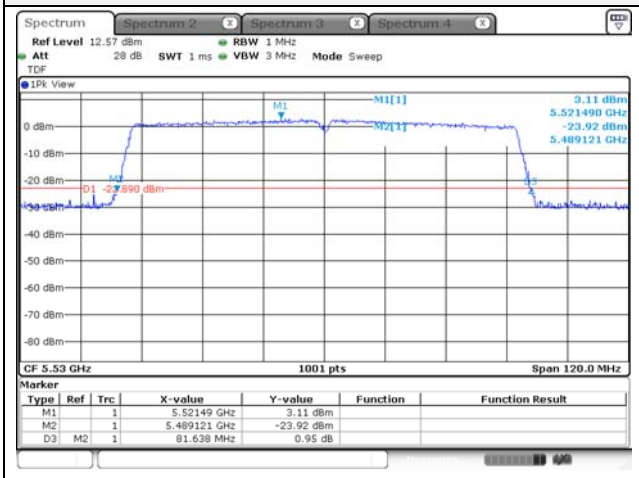
UNII-1 / 802.11ac VHT80 / Low ch.



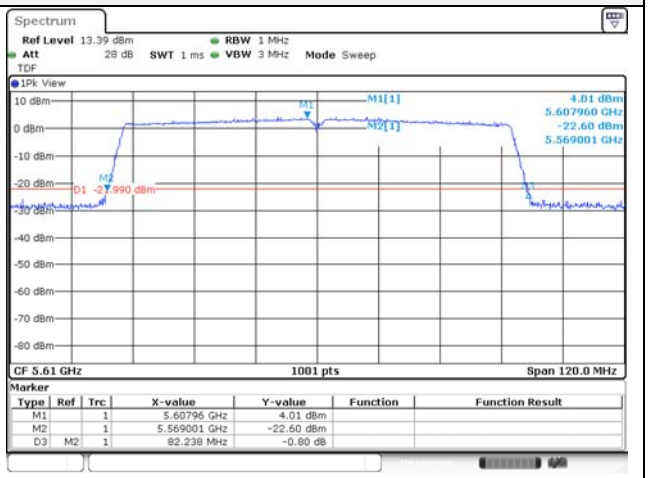
UNII-2A / 802.11ac VHT80 / Low ch.



UNII-2C / 802.11ac VHT80 / Low ch.

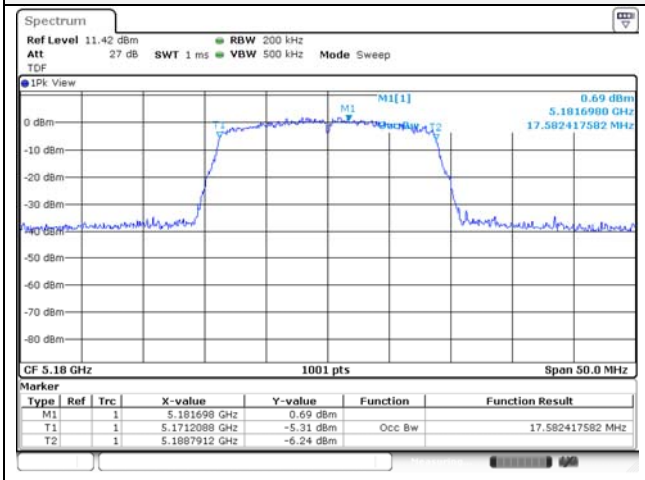


UNII-2C / 802.11ac VHT80 / High ch.

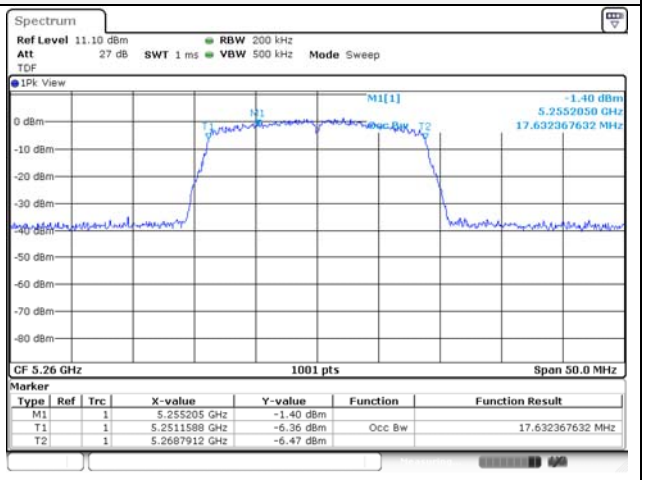


99% bandwidth

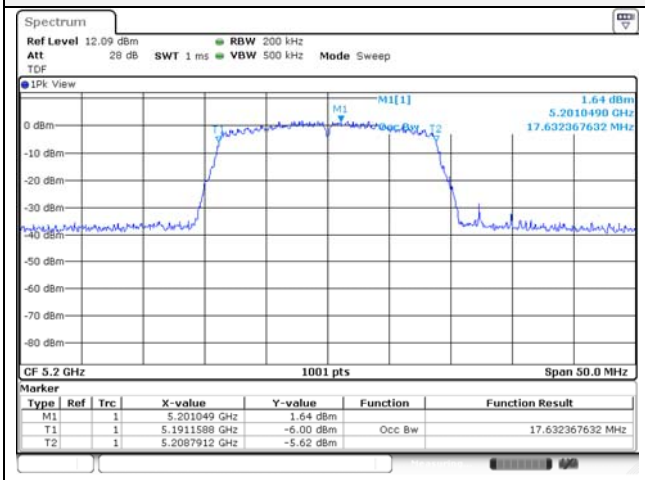
UNII-1 / 802.11n HT20 / Low ch.



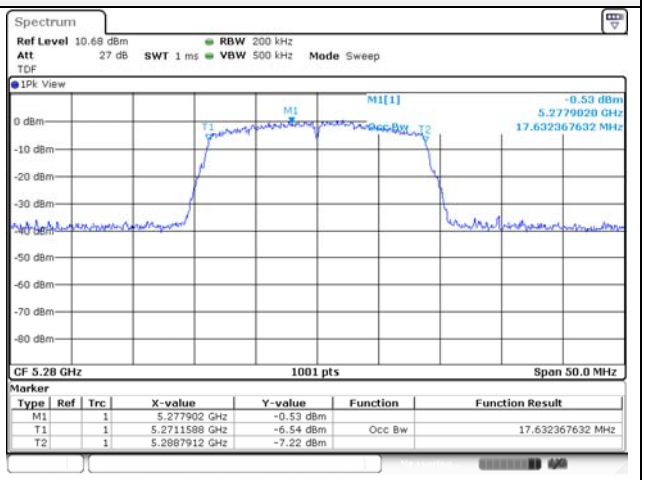
UNII-2A / 802.11n HT20 / Low ch.



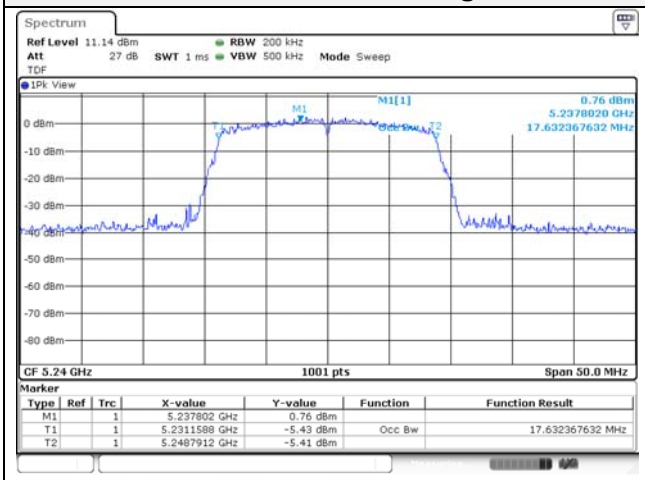
UNII-1 / 802.11n HT20 / Mid ch.



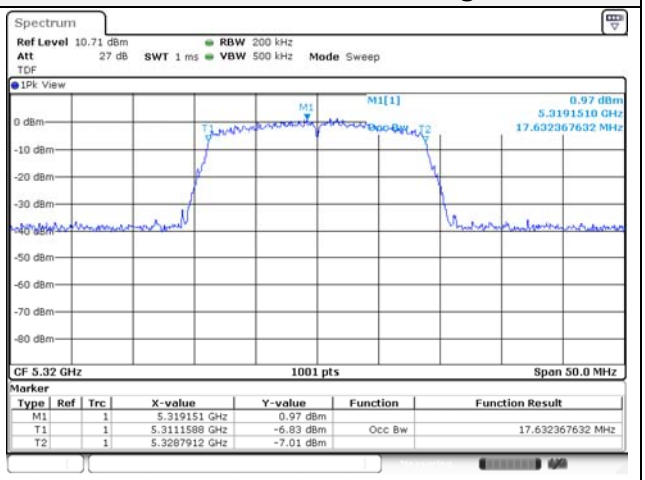
UNII-2A / 802.11n HT20 / Mid ch.

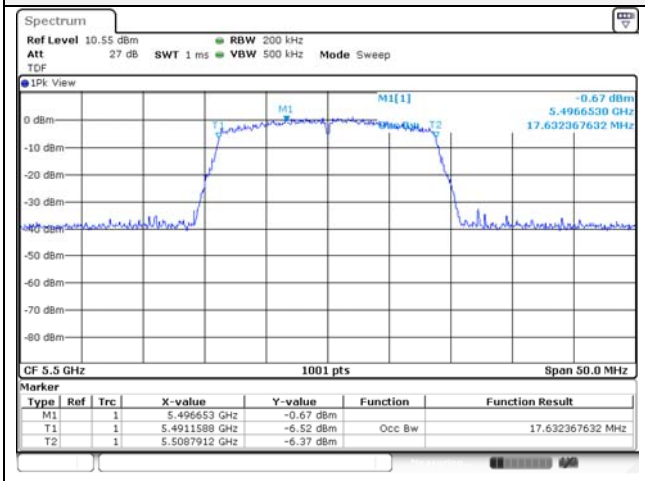
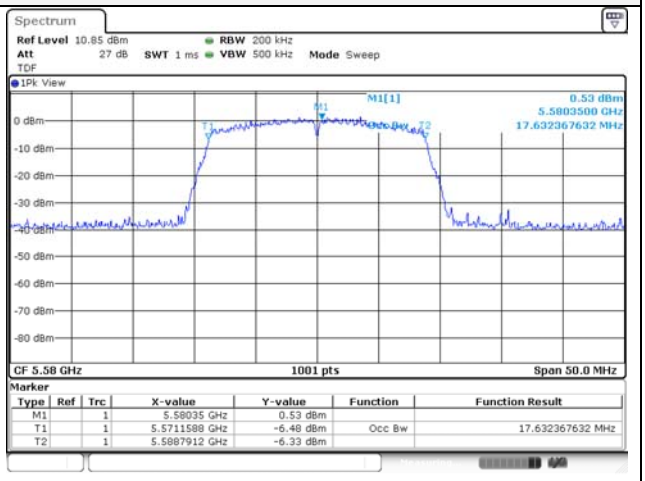
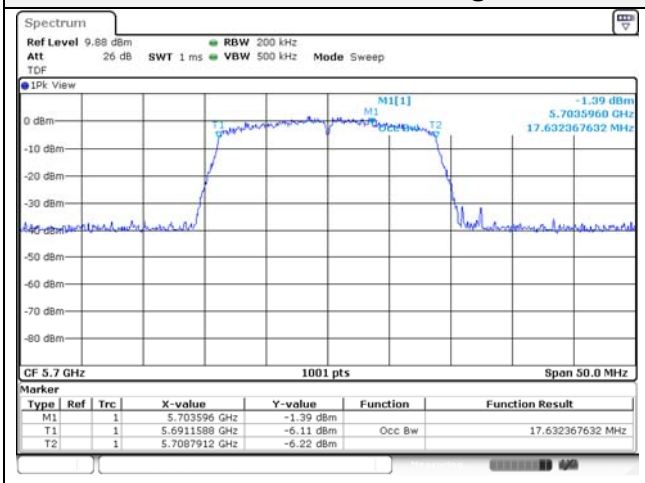


UNII-1 / 802.11n HT20 / High ch.

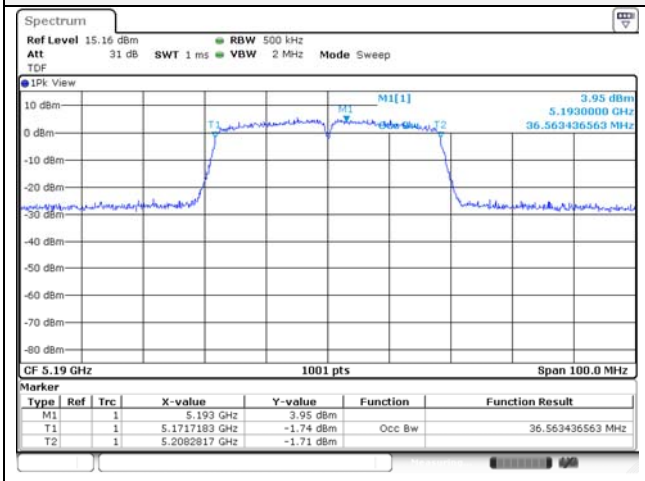


UNII-2A / 802.11n HT20 / High ch.

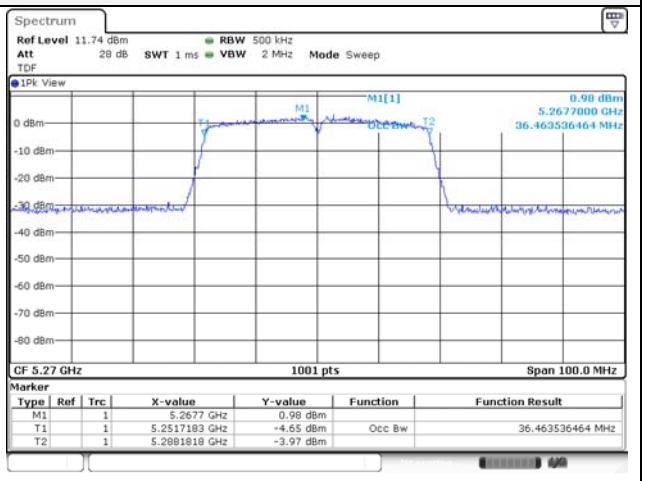


UNII-2C / 802.11n HT20 / Low ch.	UNII-2C / 802.11n HT20 / Mid ch.
	
UNII-2C / 802.11n HT20 / High ch.	
	Blank

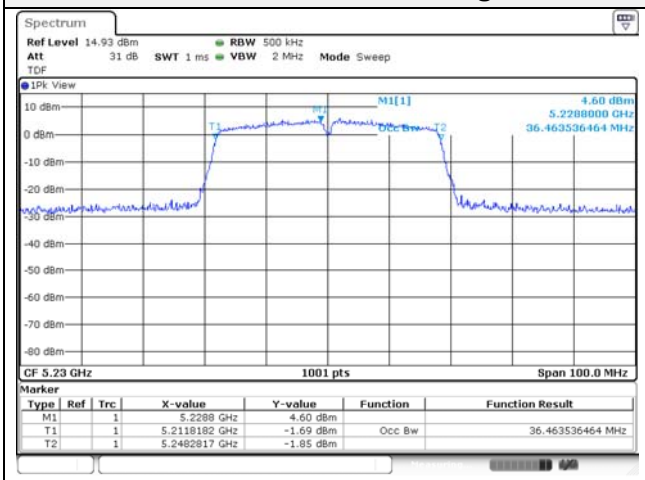
UNII-1 / 802.11ac VHT40 / Low ch.



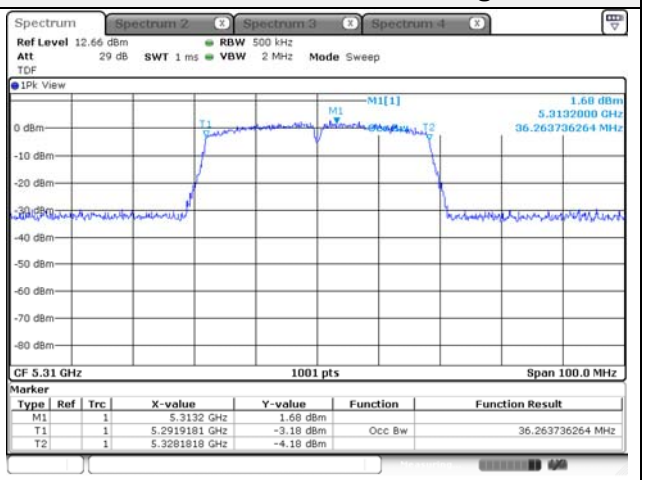
UNII-2A / 802.11ac VHT40 / Low ch.



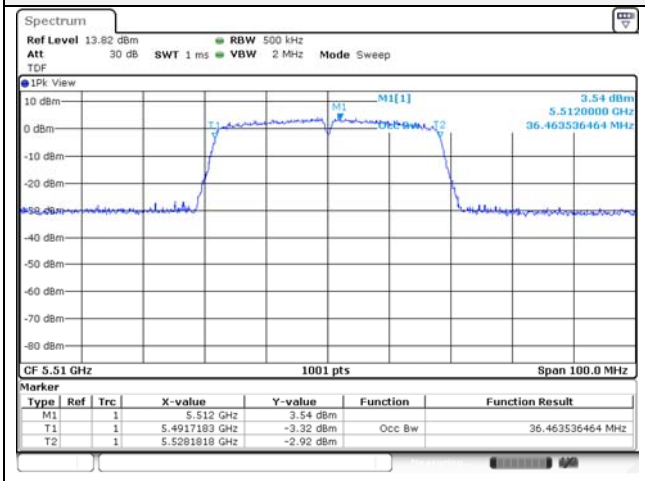
UNII-1 / 802.11ac VHT40 / High ch.



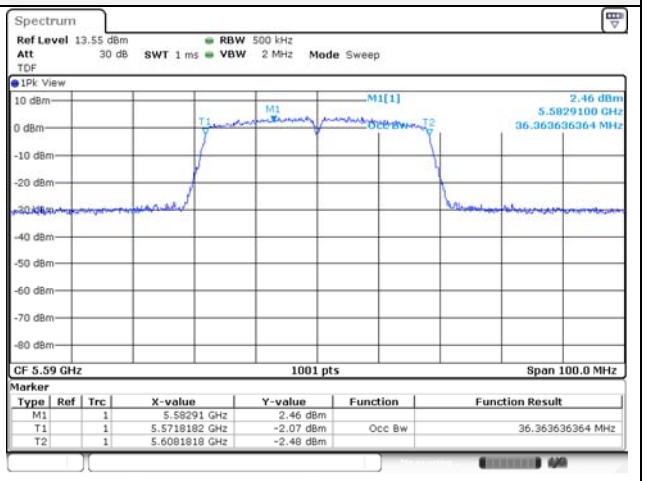
UNII-2A / 802.11ac VHT40 / High ch.



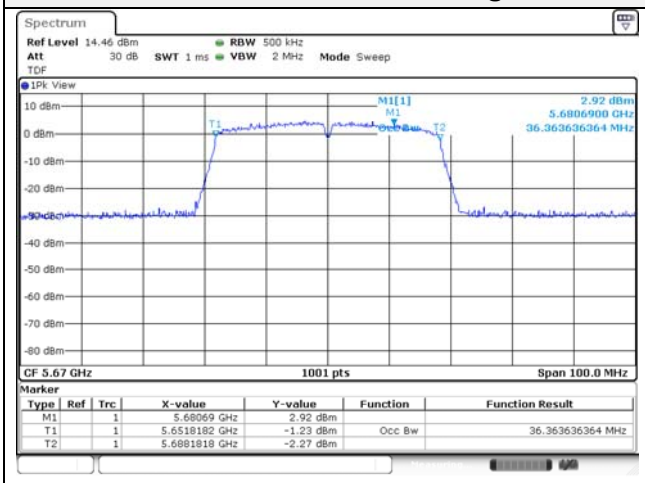
UNII-2C / 802.11ac VHT40 / Low ch.



UNII-2C / 802.11ac VHT40 / Mid ch.



UNII-2C / 802.11ac VHT40 / High ch.



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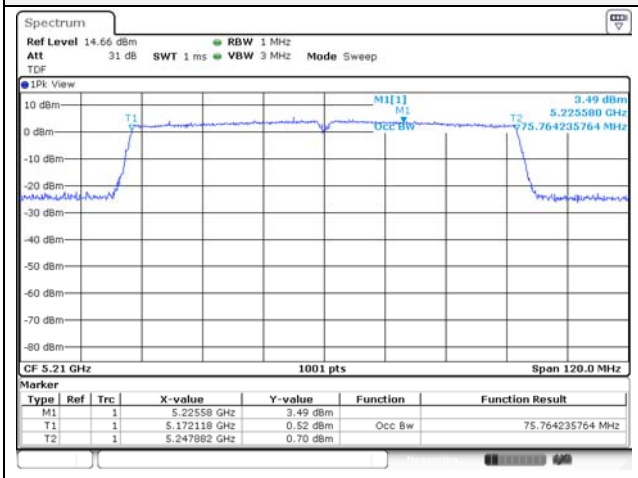
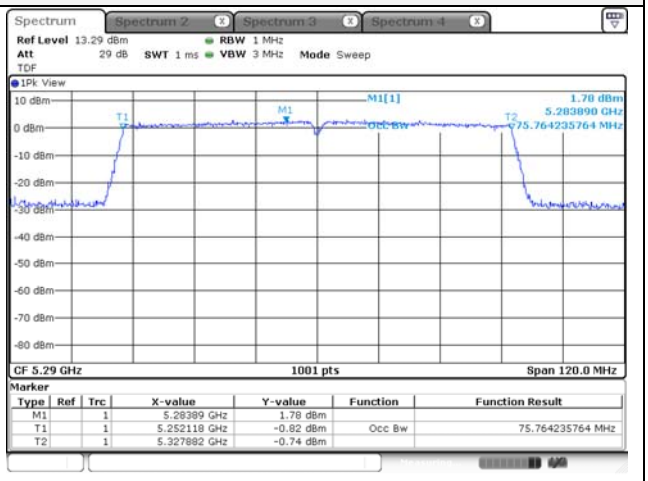
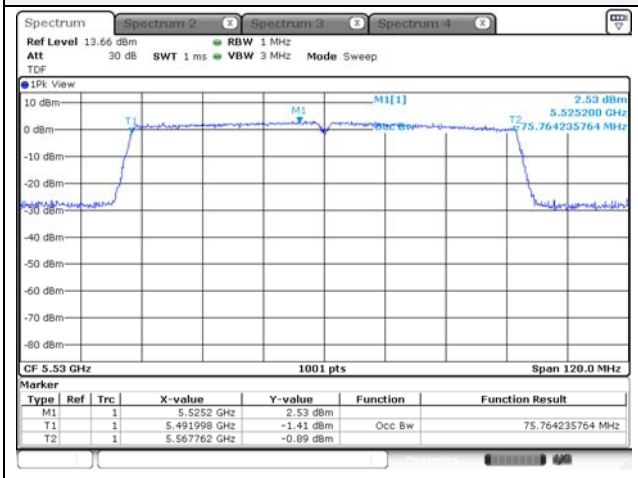
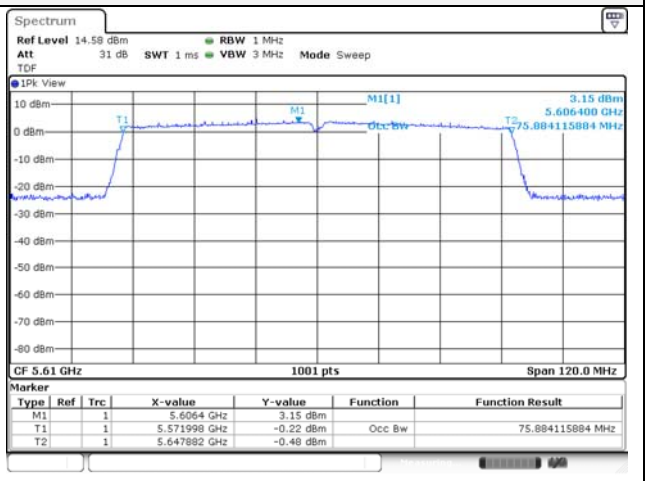
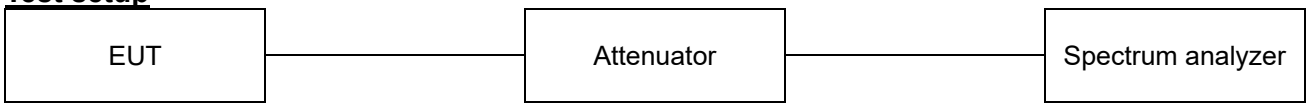
UNII-1 / 802.11ac VHT80 / Low ch.	UNII-2A / 802.11ac VHT80 / Low ch.
	
UNII-2C / 802.11ac VHT80 / Low ch.	**UNII-2C / 802.11ac VHT80 / High ch.**
	

7.4. 6 dB Bandwidth & 99% Bandwidth

Test setup



Limit

According to §15.407(e), RSS-247(6.2.4) Within the 5.725-5.85 ㎓ band, the minimum 6 ㏈ bandwidth if U-NII devices shall be at least 500㎑

Test procedure

ANSI C63.10-2013 Section 6.9.2
KDB 789033 D02 v02r01 - Section C.2

Test settings

Minimum Emission Bandwidth for the band 5.725−5.85 ㎓

Section 15.407(e) specifies the minimum 6 ㏈ emission bandwidth of at least 500 ㎑ for the band 5.725−5.85 ㎓. The following procedure shall be used for measuring this bandwidth:

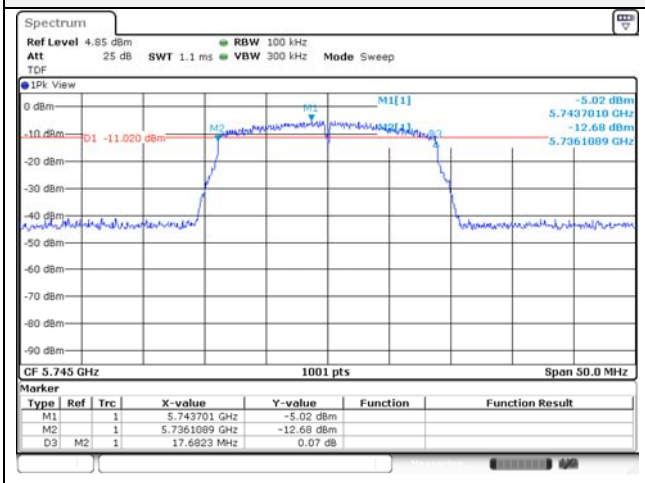
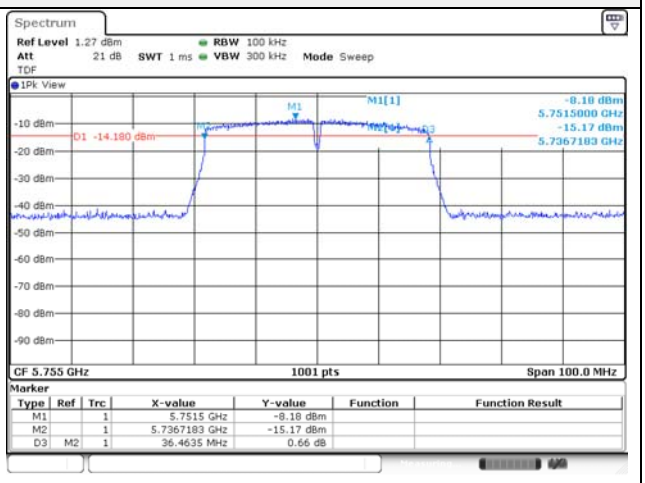
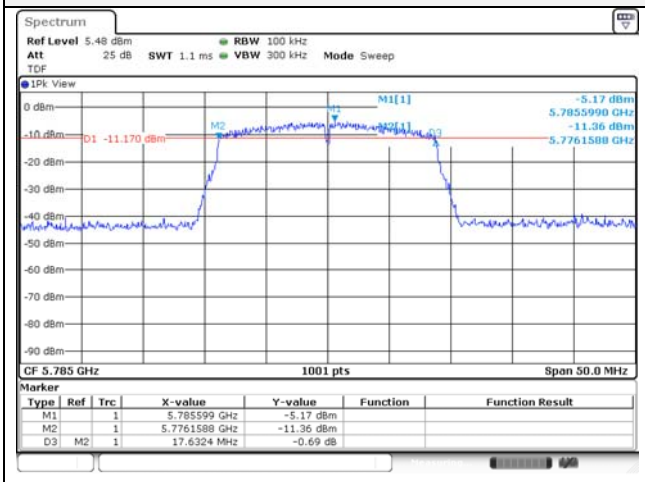
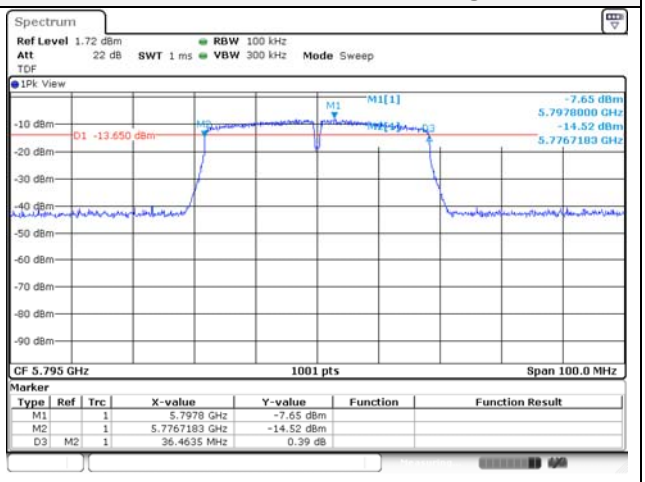
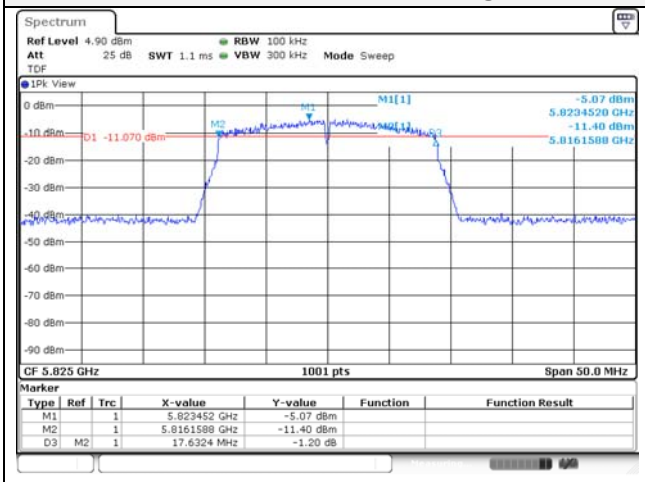
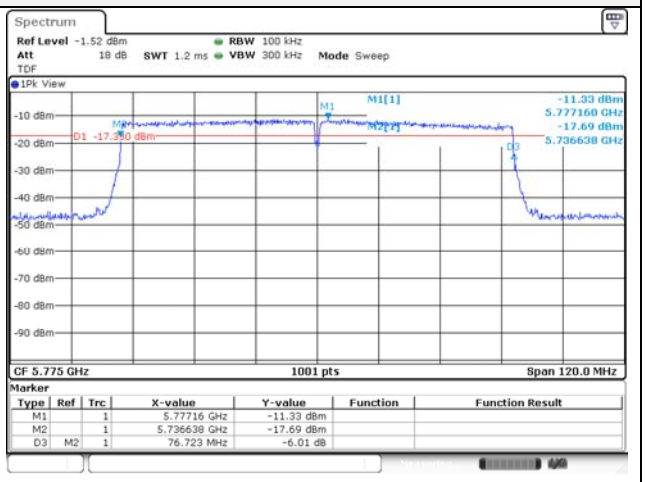
1. Set RBW = 100 ㎑.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 ㏈ relative to the maximum level measured in the fundamental emission.

Test results

Test mode	Band	Frequency (㎒)	6㏈ bandwidth (㎒)		Limit (㎒)	99% bandwidth (㎒)	
			ANT1	ANT2		ANT1	ANT2
802.11a	UNII-3	5 745	16.38	16.38	0.50	16.53	16.43
		5 785	16.43	16.43	0.50	16.53	16.43
		5 825	16.43	16.38	0.50	16.48	16.43
802.11n HT20	UNII-3	5 745	16.38	16.38	0.50	17.63	17.63
		5 785	16.43	16.43	0.50	17.58	17.58
		5 825	16.43	16.38	0.50	17.63	17.58
802.11n HT40	UNII-3	5 755	36.46	36.46	0.50	36.46	36.26
		5 795	36.46	36.46	0.50	36.36	36.26
802.11ac VHT20	UNII-3	5 745	17.68	17.68	0.50	17.58	17.63
		5 785	17.63	17.63	0.50	17.58	17.63
		5 825	17.63	17.63	0.50	17.63	17.63
802.11ac VHT40	UNII-3	5 755	36.46	36.46	0.50	36.66	36.36
		5 795	36.46	36.46	0.50	36.46	36.46
802.11ac VHT80	UNII-3	5 775	76.72	76.60	0.50	75.88	75.76

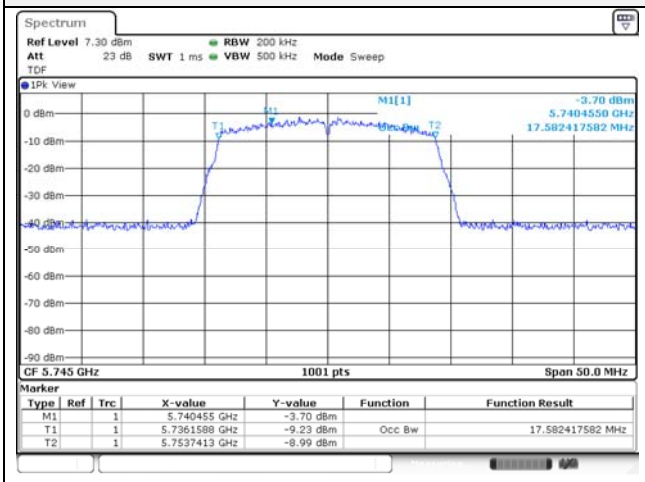
In order to simplify the report, attached plots were only MIMO ANT 1 (Per bandwidth)

6 dB bandwidth

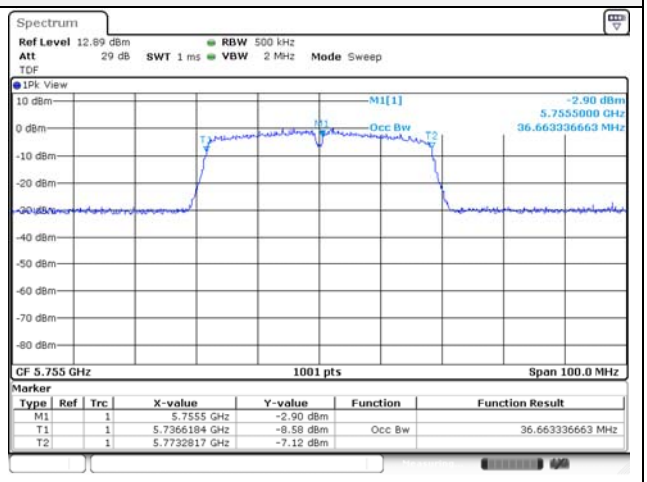
UNII-3 / 802.11ac VHT 20 / Low ch.	UNII-3 / 802.11ac VHT40 / Low ch.
	
UNII-3 / 802.11ac VHT 20 / Mid ch.	**UNII-3 / 802.11ac VHT40 / High ch.**
	
UNII-3 / 802.11ac VHT 20 / High ch.	**UNII-3 / 802.11ac VHT80 / Low ch.**
	

99% bandwidth

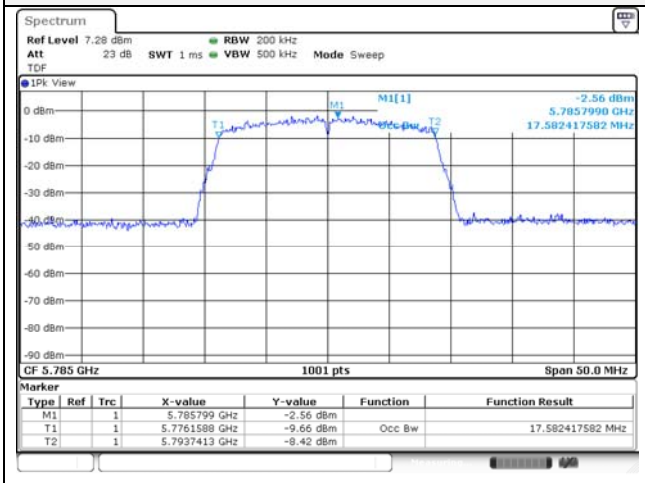
UNII-3 / 802.11ac VHT 20 / Low ch.



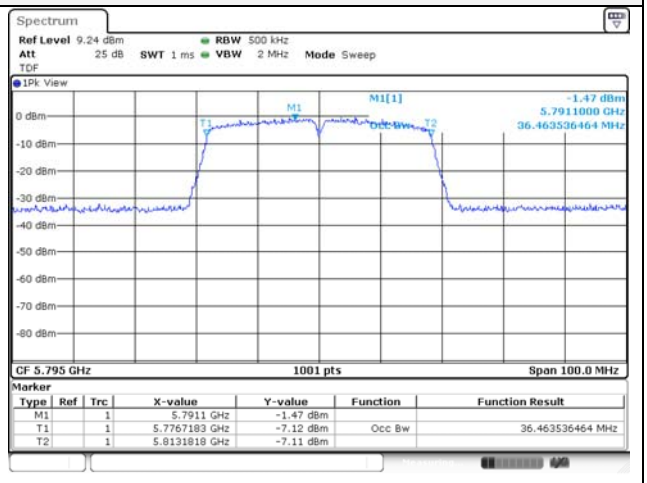
UNII-3 / 802.11ac VHT40 / Low ch.



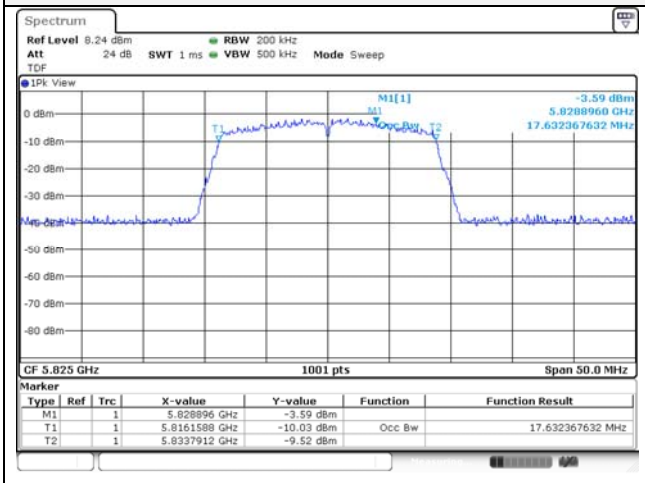
UNII-3 / 802.11ac VHT 20 / Mid ch.



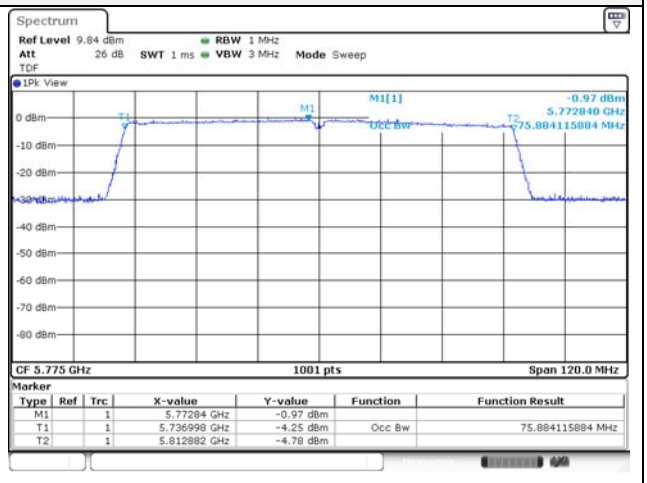
UNII-3 / 802.11ac VHT40 / High ch.



UNII-3 / 802.11ac VHT 20 / High ch.



UNII-3 / 802.11ac VHT80 / Low ch.



7.5. Straddle channel

26dB bandwidth & 99% Bandwidth

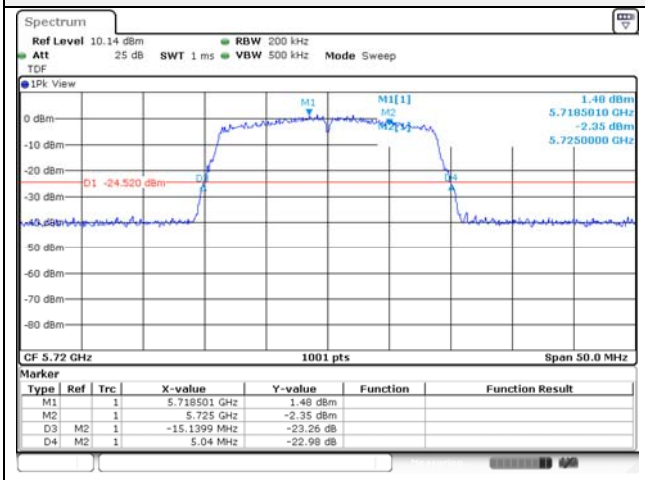
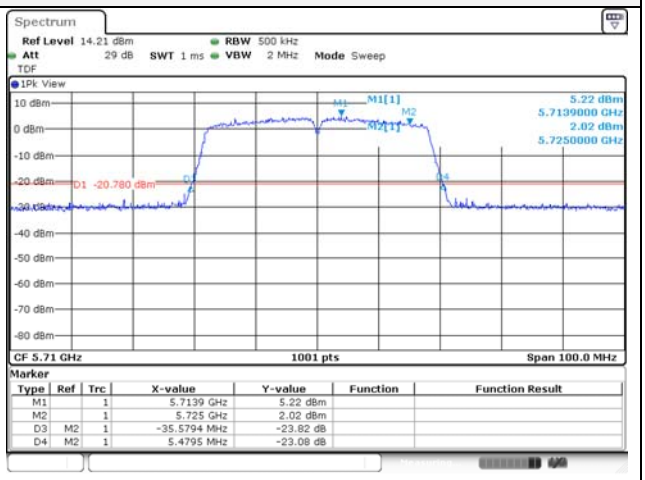
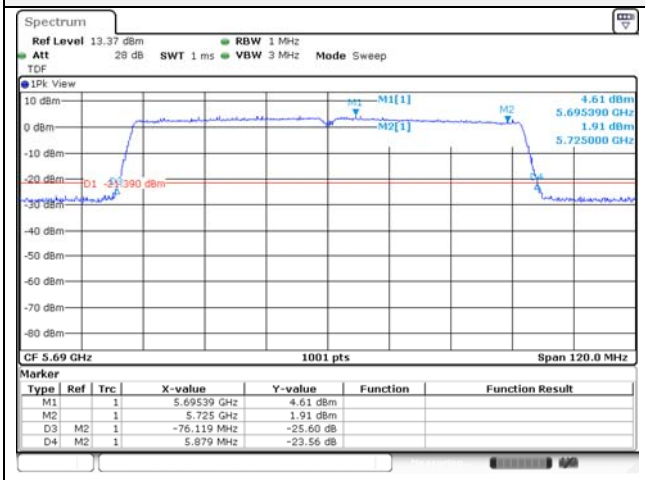
Test mode	Band	Frequency (㎒)	26dB Bandwidth (㎒)		99% Bandwidth (㎒)	
			ANT1	ANT2	ANT1	ANT2
802.11a	UNII-2C	5 720	14.99	14.94	13.29	13.24
802.11n HT20			15.14	15.09	13.84	13.84
802.11ac VHT20			15.14	15.09	13.79	13.84
802.11a	UNII-3	5 720	5.04	4.94	3.19	3.19
802.11n HT20			5.04	5.04	3.79	3.79
802.11ac VHT20			5.04	5.04	3.74	3.79
802.11n HT40	UNII-2C	5 710	35.58	35.58	33.28	33.18
802.11ac VHT40			35.58	35.68	33.18	33.28
802.11n HT40	UNII-3	5 710	5.58	5.48	3.28	3.18
802.11ac VHT40			5.48	5.58	3.18	3.28
802.11ac VHT80	UNII-2C	5 690	76.12	76.00	73.00	73.00
	UNII-3	5 690	5.88	5.76	2.88	2.88

Notes:

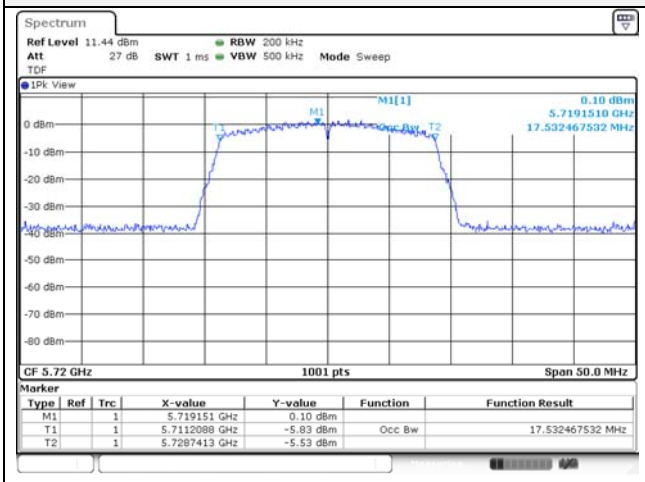
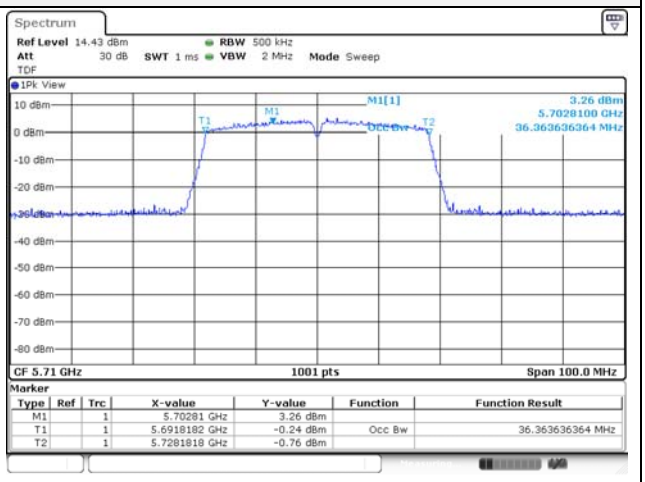
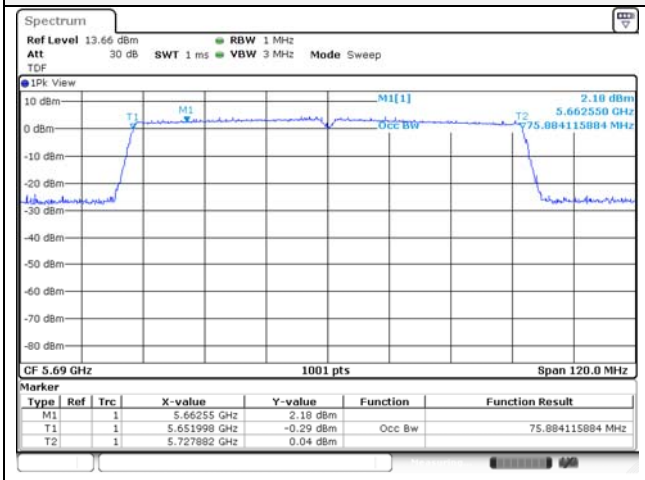
1. [UNII-C] 26dB Bandwidth & 99% Bandwidth = 5 725㎒ – Measured Frequency[㎒]
2. [UNII-3] 26dB Bandwidth & 99% Bandwidth = Measured Frequency[㎒] – 5 725㎒

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

26dB bandwidth

802.11ac VHT20	802.11ac VHT40
	
802.11ac VHT80	
	Blank

99% bandwidth

802.11ac VHT20	802.11ac VHT40
	
802.11ac VHT80	
	Blank

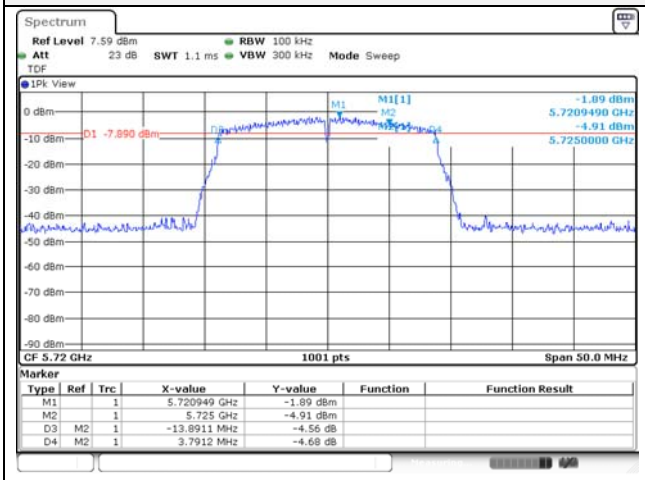
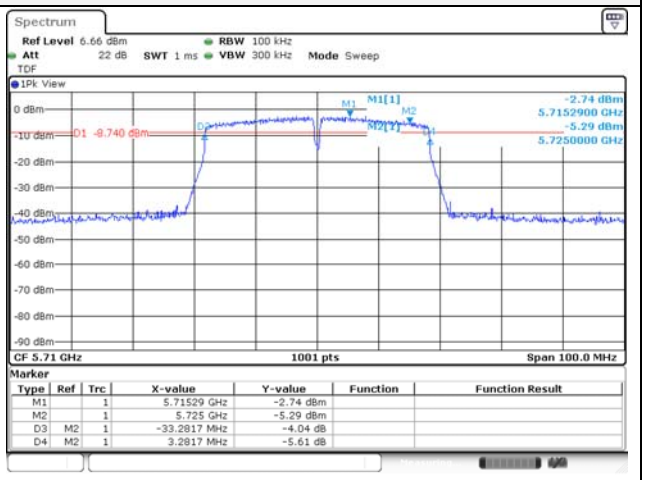
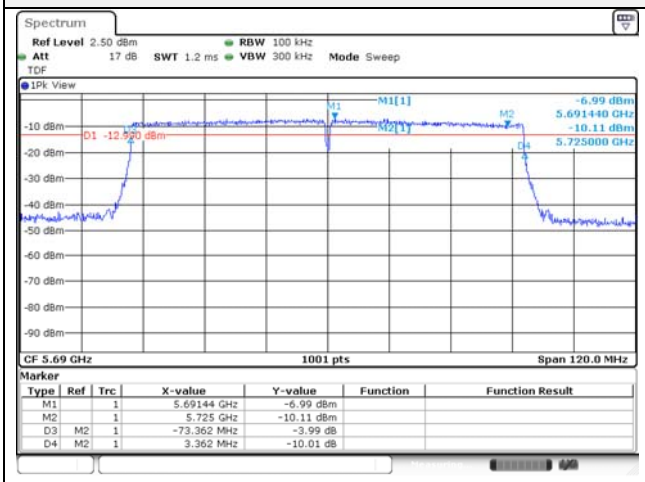
6dB bandwidth

Test mode	Band	Frequency (㎒)	6dB Bandwidth (㎒)		Limit (㎒)
			ANT1	ANT2	
802.11a	UNII-3	5 720	3.19	3.19	0.5
802.11n HT20			3.79	3.79	0.5
802.11ac VHT20			3.79	3.79	0.5
802.11n HT40	UNII-3	5 710	3.28	3.18	0.5
802.11ac VHT40			3.18	3.18	0.5
802.11ac VHT80	UNII-3	5 690	3.36	3.24	0.5

Notes:

1. 6dB Bandwidth = Measured Frequency[㎒] – 5 725㎒

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

802.11n HT 20	802.11n HT40
	
802.11ac VHT80	
	Blank

Output Power

-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-2C	5 720	16.06	13.66	-	16.06	13.66	24.00
802.11n HT20			15.80	13.43	-	15.80	13.43	
802.11ac VHT20			15.81	13.43	-	15.81	13.43	
802.11a	UNII-3	5 720	8.45	6.02	-	8.45	6.02	30.00
802.11n HT20			8.65	6.27	-	8.65	6.27	
802.11ac VHT20			8.68	6.25	-	8.68	6.25	
802.11n HT40	UNII-2C	5 710	15.29	15.83	-	15.29	15.83	24.00
802.11ac VHT40			15.85	15.68	-	15.85	15.68	
802.11n HT40	UNII-3	5 710	3.79	4.08	-	3.79	4.08	30.00
802.11ac VHT40			4.32	3.91	-	4.32	3.91	
802.11ac VHT80	UNII-2C	5 690	13.89	14.31	-	13.89	14.31	24.00
	UNII-3	5 690	-0.36	-0.36	-	-0.36	-0.36	30.00

Notes.

1. Result(dB m) = 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 (dB)		MAX e.i.r.p (dBm)			
			ANT1	ANT2	ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
802.11a	UNII-2C	5 720	16.06	13.66	0.40	2.90	16.46	16.56	28.24	28.24
802.11n HT20			15.80	13.43			16.20	16.33	28.41	28.40
802.11ac VHT20			15.81	13.43			16.21	16.33	28.41	28.40
802.11a	UNII-3	5 720	8.45	6.02	0.30	2.90	8.75	8.92	30.00	30.00
802.11n HT20			8.65	6.27			8.95	9.17		
802.11ac VHT20			8.68	6.25			8.98	9.15		
802.11n HT40	UNII-2C	5 710	15.29	15.83	0.40	2.90	15.69	18.73	30.00	30.00
802.11ac VHT40			15.85	15.68			16.25	18.58		
802.11n HT40	UNII-3	5 710	3.79	4.08	0.30	2.90	4.09	6.98	30.00	30.00
802.11ac VHT40			4.32	3.91			4.62	6.81		
802.11ac VHT80	UNII-2C	5 690	13.89	14.31	0.40	2.90	14.29	17.21	30.00	30.00
	UNII-3	5 690	-0.36	-0.36	0.30	2.90	-0.06	2.54	30.00	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-2C	5 720	10.81	10.30	-	13.57	24.00
802.11n HT20			10.66	10.13	-	13.41	
802.11ac VHT20			10.76	10.07	-	13.44	
802.11a	UNII-3	5 720	3.23	2.64	-	5.96	30.00
802.11n HT20			3.50	2.95	-	6.24	
802.11ac VHT20			3.50	2.89	-	6.22	
802.11n HT40	UNII-2C	5 710	13.42	13.00	-	16.23	24.00
802.11ac VHT40			13.34	12.93	-	16.15	
802.11n HT40	UNII-3	5 710	1.87	1.22	-	4.57	30.00
802.11ac VHT40			1.78	1.12	-	4.47	
802.11ac VHT80	UNII-2C	5 690	12.57	12.46	-	15.53	24.00
	UNII-3	5 690	-1.80	-2.23	-	1.00	30.00

Notes:

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

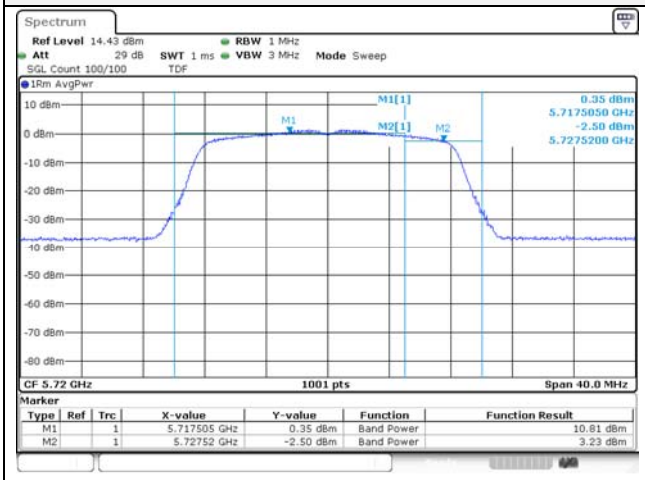
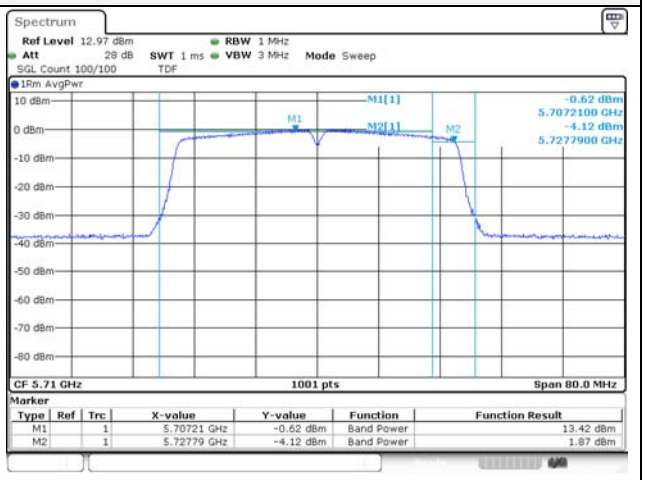
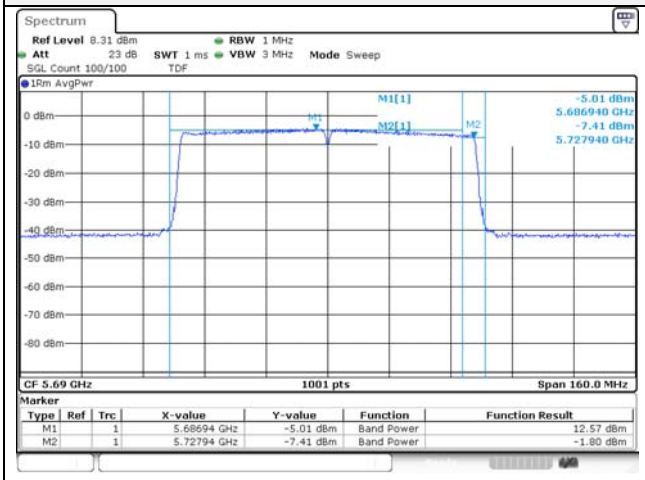
-MIMO e.i.r.p.

Test mode	Band	Frequency (㎒)	Measured output power			Limit (dBm)
			Conducted output Power (dBm)	ANT gain (dBi)	MAX e.i.r.p (dBm)	
802.11a	UNII-2C	5 720	13.57	4.75	18.32	28.22
802.11n HT20			13.41		18.16	28.41
802.11ac VHT20			13.44		18.19	28.40
802.11a	UNII-3	5 720	5.96	4.71	10.67	30.00
802.11n HT20			6.24		10.95	
802.11ac VHT20			6.22		10.93	
802.11n HT40	UNII-2C	5 710	16.23	4.75	20.98	30.00
802.11ac VHT40			16.15		20.90	
802.11n HT40	UNII-3	5 710	4.57	4.71	9.28	30.00
802.11ac VHT40			4.47		9.18	
802.11ac VHT80	UNII-2C	5 690	15.53	4.75	20.28	30.00
	UNII-3	5 690	1.00	4.71	5.71	30.00

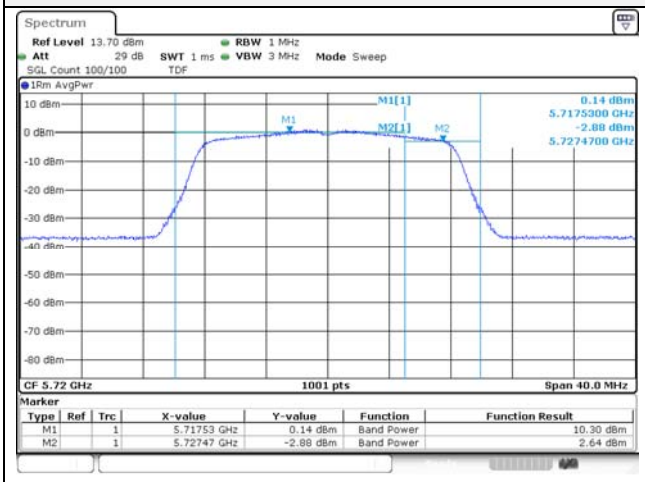
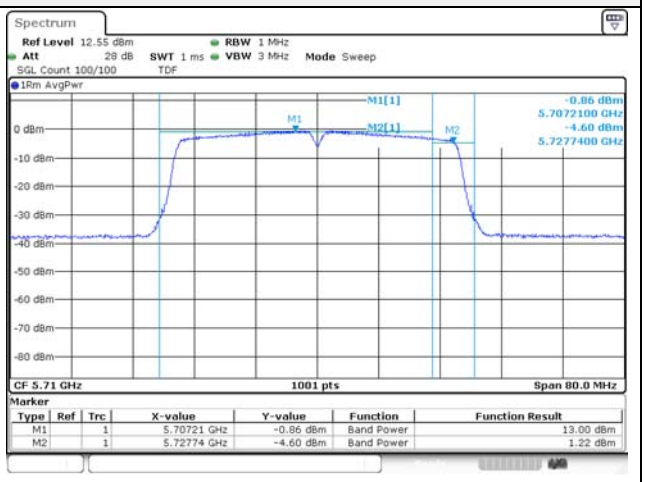
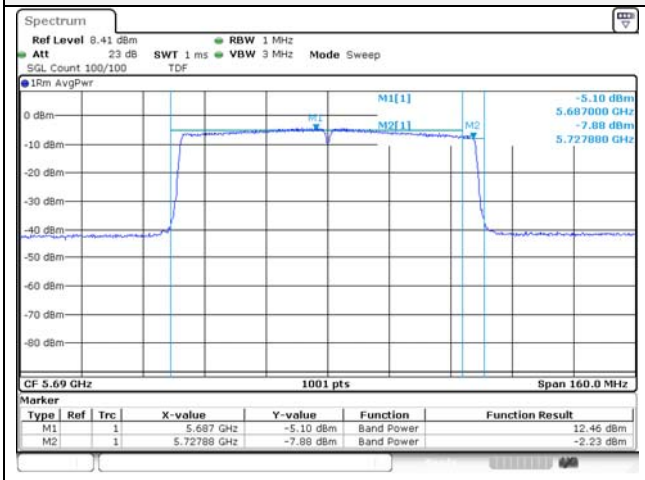
Notes:

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

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

802.11a	802.11n HT40
	
802.11ac VHT80	
	Blank

ANT2

802.11a	802.11n HT40
	
802.11ac VHT80	
	Blank

Power Spectral Density

-SISO

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/㎒)		DCF (dB)	Maximum PSD (dB m/㎒)		Limit (dBm/㎒)
			ANT1	ANT2		ANT1	ANT2	
802.11a	UNII-2C	5 720	6.73	4.29	-	6.73	4.29	11.00
802.11n HT20			6.35	4.02	-	6.35	4.02	
802.11ac VHT20			6.33	3.96	-	6.33	3.96	
802.11n HT40	UNII-2C	5 710	1.92	2.34	-	1.92	2.34	
802.11ac VHT40			2.30	2.25	-	2.30	2.25	
802.11ac VHT80	UNII-2C	5 690	-3.20	-2.60	-	-3.20	-2.60	

Test mode	Band	Frequency (㎒)	Measured PSD (dBm/ 500 ㎑)		DCF (dB)	Maximum PSD (dBm/ 500 ㎑)		Limit (dBm /500 ㎑)
			ANT1	ANT2		ANT1	ANT2	
802.11a	UNII-3	5 720	1.80	-0.51	-	1.80	-0.51	30.00
802.11n HT20			1.36	-0.87	-	1.36	-0.87	
802.11ac VHT20			1.46	-0.73	-	1.46	-0.73	
802.11n HT40		5 710	-3.37	-3.08	-	-3.37	-3.08	
802.11ac VHT40			-2.75	-2.95	-	-2.75	-2.95	
802.11ac VHT80		5 690	-7.61	-7.55	-	-7.61	-7.55	

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-2C	5 720	1.27	0.89	-	4.09	11.00
802.11n HT20			1.28	0.81	-	4.06	
802.11ac VHT20			1.15	0.37	-	3.79	
802.11n HT40	UNII-2C	5 710	0.13	-0.43	-	2.87	
802.11ac VHT40			0.08	-0.50	-	2.81	
802.11ac VHT80	UNII-2C	5 690	-4.46	-4.38	-	-1.41	

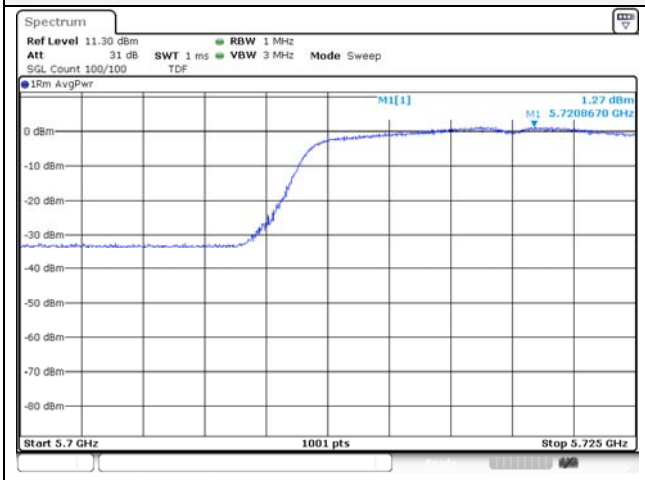
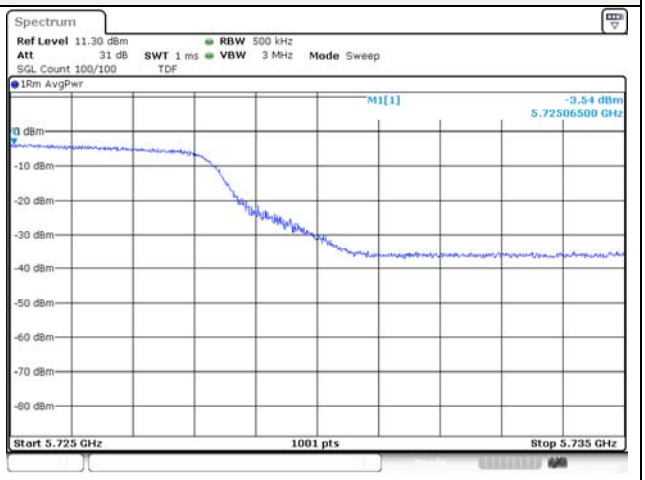
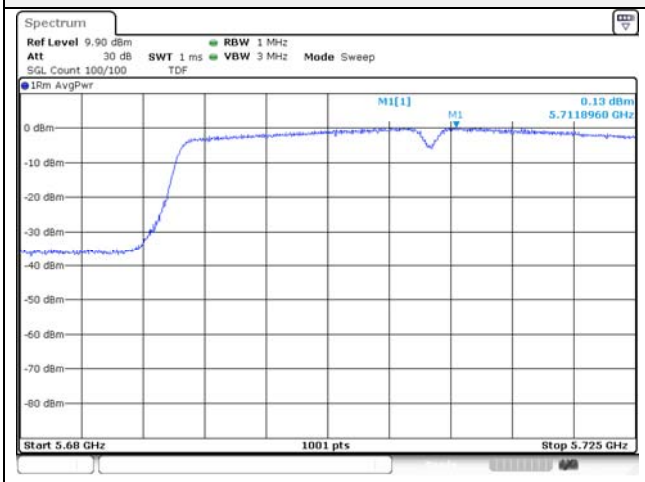
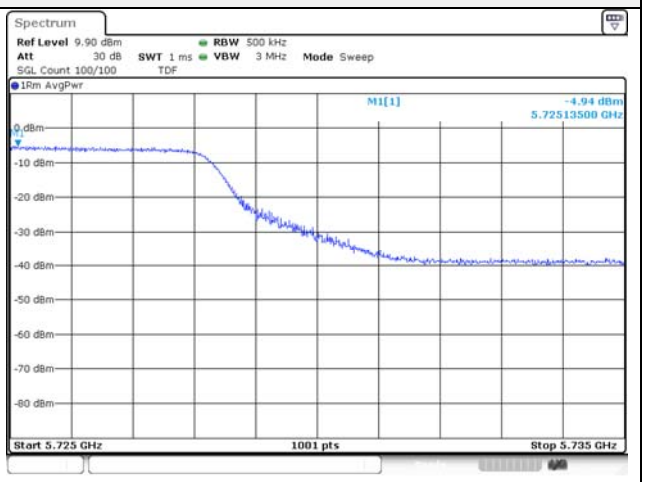
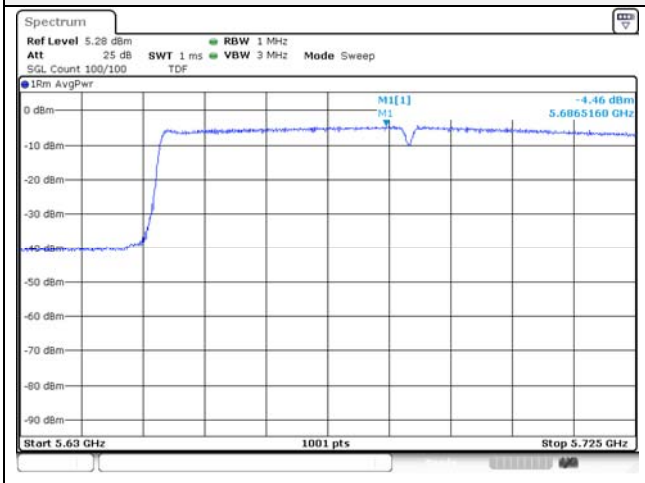
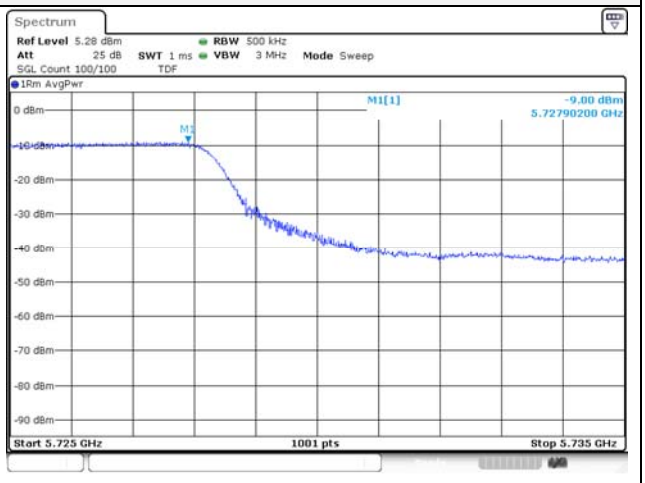
Test mode	Band	Frequency (㎒)	Measured PSD (dBm/ 500 ㎑)		DCF (dB)	Maximum PSD (dBm / 500 ㎑)	Limit (dBm / 500 ㎑)
			ANT1	ANT2			
802.11a	UNII-3	5 720	-3.54	-4.17	-	-0.83	30.00
802.11n HT20			-3.75	-4.12	-	-0.92	
802.11ac VHT20			-3.74	-4.27	-	-0.99	
802.11n HT40		5 710	-4.94	-5.76	-	-2.32	
802.11ac VHT40			-5.11	-5.74	-	-2.40	
802.11ac VHT80		5 690	-9.00	-9.47	-	-6.22	

Notes:

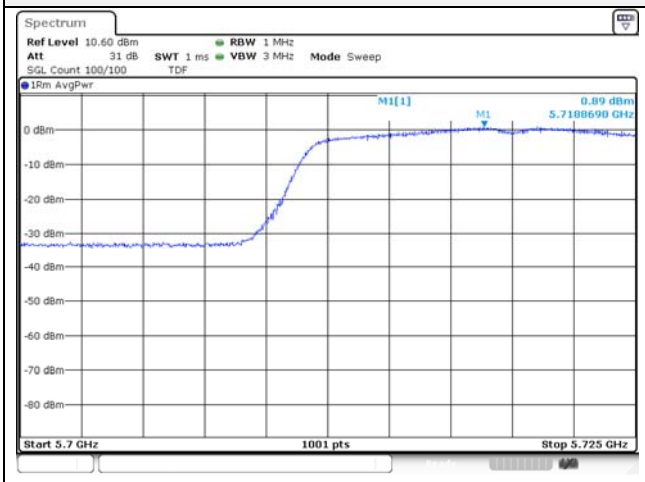
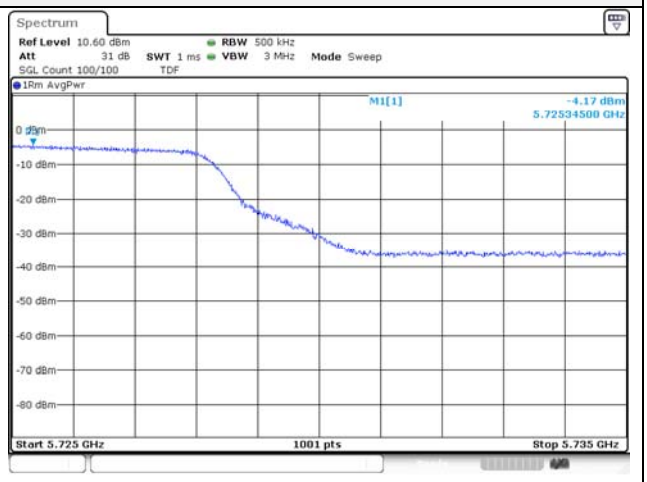
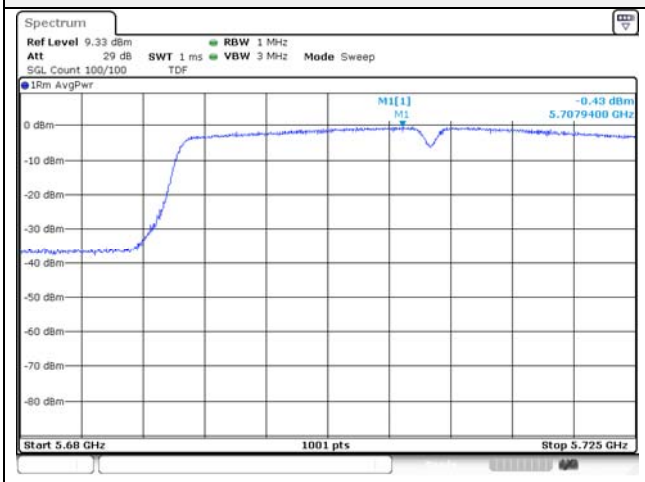
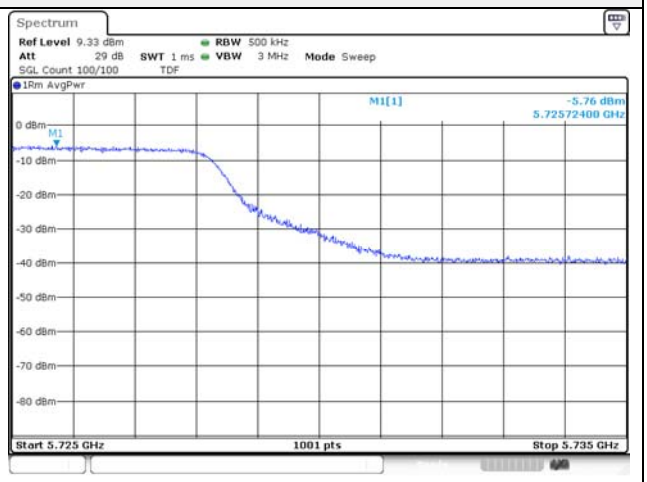
1. Maximum PSD calculation

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

In order to simplify the report, attached plots were only MIMO ANT1

UNII-2C / 802.11a	UNII-3 / 802.11a
	
UNII-2C / 802.11n HT40	**UNII-3 / 802.11n HT40**
	
UNII-2C / 802.11ac VHT80	**UNII-3 / 802.11ac VHT80**
	

MIMO ANT2

UNII-2C / 802.11a	UNII-3 / 802.11a
	
UNII-2C / 802.11n HT40	**UNII-3 / 802.11n HT40**
	
UNII-2C / 802.11ac VHT80	**UNII-3 / 802.11ac VHT80**