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TEST REPORT

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1. Client

- Name : KAON Media Co.,Ltd.
- Address : Kaonmedia Building, 884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
- Date of Receipt : 2019-02-21

2. Use of Report : -

3. Name of Product and Model : Docsis Wifi Gateway / CG2200

4. Manufacturer and Country of Origin : KAON Media Co., Ltd. / Indonesia

5. FCC ID : WQT-CG2200

6. Date of Test : 2019-03-14 to 2019-03-29

7. Test Standards : FCC Part 15 Subpart E, 15.407

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

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

2019-04-29

KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

Report revision history

Date	Revision	Page No
2019-04-10	Initial report	-
2019-04-23	Updated basic model, removed derived model and etc.	4~5, 10, 15~17, 36~37, 50~53, 74~75, 78
2019-04-25	Updated HT40 and VHT40 modes for 99%	37, 52, 54
2019-04-29	Updated test plot and test result for AC conducted emission	78, 137

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CONTENTS

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1. General information

Client	:	KAON Media Co.,Ltd.
Address	:	Kaonmedia Building, 884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
Manufacturer	:	KAON Media Co.,Ltd.
Address	:	Kaonmedia Building, 884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, 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-3327, G-198, C-3706, T-1849
		Industry Canada Registration No. : 8035A-2
		KOLAS No.: KT231

2. Device information

Equipment under test	:	Docsis Wifi Gateway
Model	:	CG2200
Frequency range	:	2 412 ㎒ ~ 2 462 ㎒ (802.11b/g/n HT20)
		2 422 ㎒ ~ 2 452 ㎒ (802.11n HT40)
		5 180 ㎒ ~ 5 240 ㎒ (802.11a/n HT20 /ac VHT20)
		5 190 ㎒ ~ 5 230 ㎒ (802.11n HT40 /ac VHT40)
		5 210 ㎒ (802.11ac VHT80)
		5 745 ㎒ ~ 5 825 ㎒ (802.11a/n HT20 /ac VHT20)
		5 755 ㎒ ~ 5 795 ㎒ (802.11n HT40 /ac VHT40)
		5 775 ㎒ (802.11ac VHT80)
Modulation technique	:	DSSS, OFDM
Number of channels	:	2.4 ㎓: 11 ch (802.11b/g/n HT20), 7 ch (802.11n HT40)
		5.2 ㎓ (UNII 1): 4 ch (802.11a/n HT20 /ac VHT20)
		2 ch (802.11n HT40 /ac VHT40)
		1 ch (802.11ac VHT80)
		5.8 ㎓ (UNII 3): 5 ch (802.11a/n HT20 /ac VHT20)
		2 ch (802.11n HT40 /ac VHT40)
		1 ch (802.11ac VHT80)
Power source	:	DC 12 V
Antenna specification	:	PCB Pattern antenna
Software version	:	1.0
Hardware version	:	1.1.4
Operation temperature	:	23 ℃

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2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

2.2. Frequency/channel operations

This device contains the following capabilities:
WIFI(802.11a/n(HT20 / HT40) /ac(VHT20 / VHT40 / VHT80)

U-NII-1 (5 150 ㎒ – 5 250 ㎒)			
Mode	Lowest frequency	Middle frequency	Highest frequency
802.11a/n HT20/ac VHT20	5 180 ㎒	5 200 ㎒	5 240 ㎒
802.11n HT40/ac VHT40	5 190 ㎒	-	5 230 ㎒
802.11ac VHT80	5 210 ㎒		
U-NII-3 (5 725 ㎒ – 5 850 ㎒)			
802.11a/n HT20/ac VHT20	5 745 ㎒	5 785 ㎒	5 825 ㎒
802.11n HT40/ac VHT40	5 755 ㎒	-	5 795 ㎒
802.11ac VHT80	5 775 ㎒		

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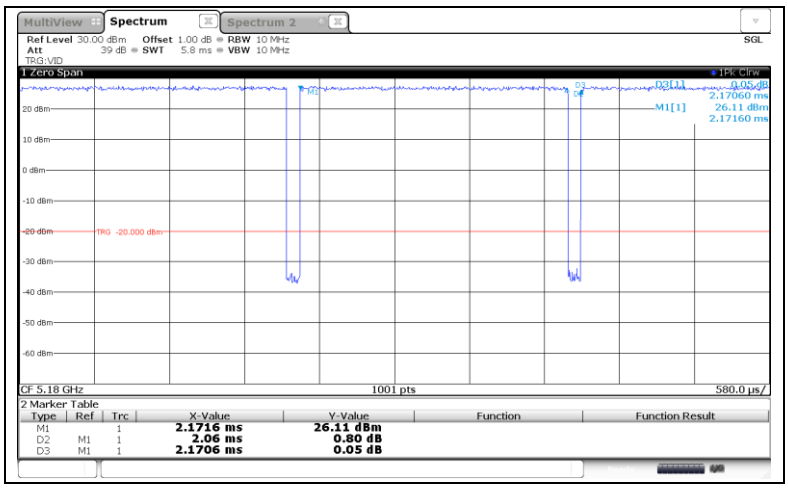
2.3. Duty Cycle Correction Factor

- 802.11a

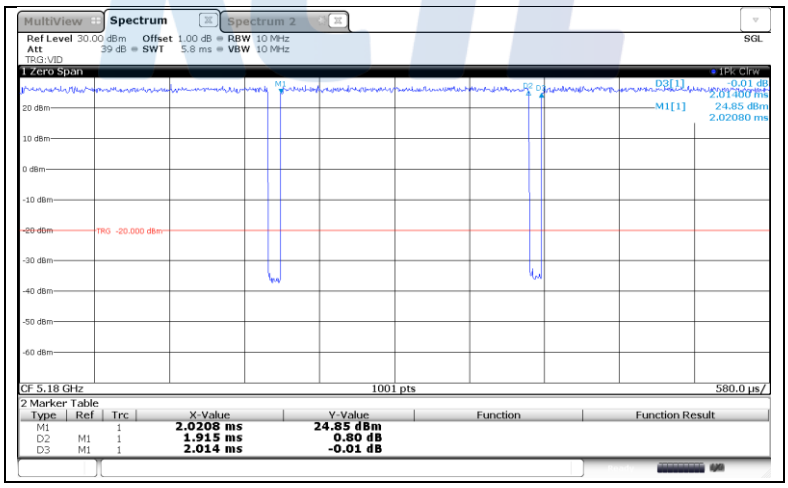


Note$_{1)}$: period : 2.17 ㎳, On time : 2.06 ㎳

Note$_{2)}$: DCCF = 10 log(1 / x) = 10 log(1/0.949) = 0.23 ㏈, x = 2.06/2.17 = 0.949 (94.9 %)

Note$_{3)}$: 802.11a is a non-continuous transmission (duty cycle < 98 %)

- 802.11n HT20



Note$_{1)}$: period : 2.01 ㎳, On time : 1.92 ㎳

Note$_{2)}$: DCCF = 10 log(1 / x) = 10 log(1/0.955) = 0.20 ㏈, x = 1.92/2.01 = 0.955 (95.5 %)

Note$_{3)}$: 802.11n HT20 is a non-continuous transmission (duty cycle < 98 %)

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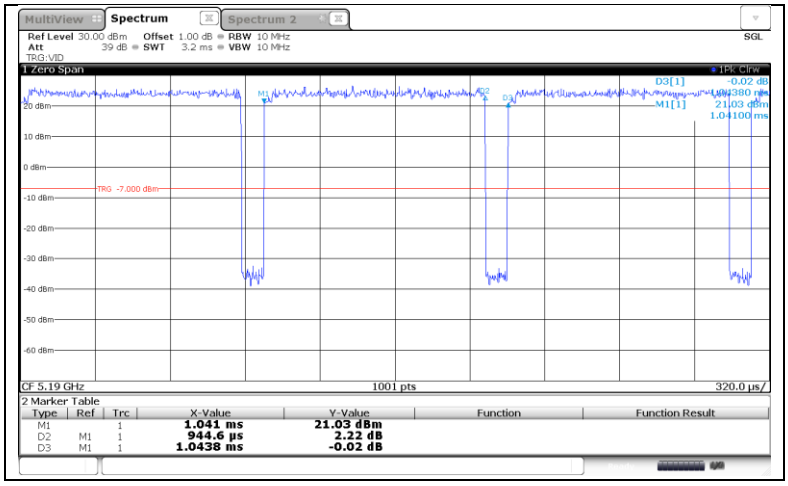
- 802.11n HT40

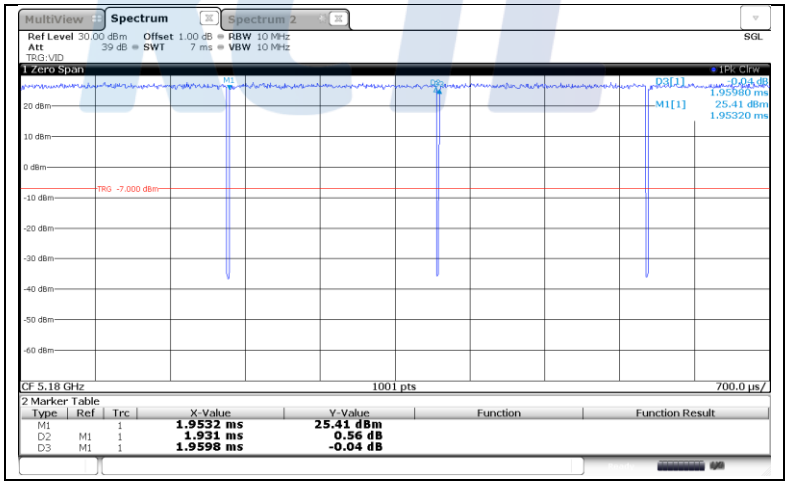


Note1) : period : 1.04 ㎳, On time : 0.94 ㎳

Note2) : DCCF = 10 log(1 / x) = 10 log(1/0.904) = 0.44 ㏈, x = 0.94/1.04 = 0.904 (90.4 %)

Note3) : 802.11n HT40 is a non-continuous transmission (duty cycle < 98 %)

- 802.11ac VHT20



Note1) : period : 1.96 ㎳, On time : 1.93 ㎳

Note2) : DCCF = 10 log(1 / x) = 10 log(1/0.985) = 0.06 ㏈, x = 1.93/1.96 = 0.985 (98.5 %)

Note3) : 802.11ac mode is a continuous transmission (duty cycle > 98 %)

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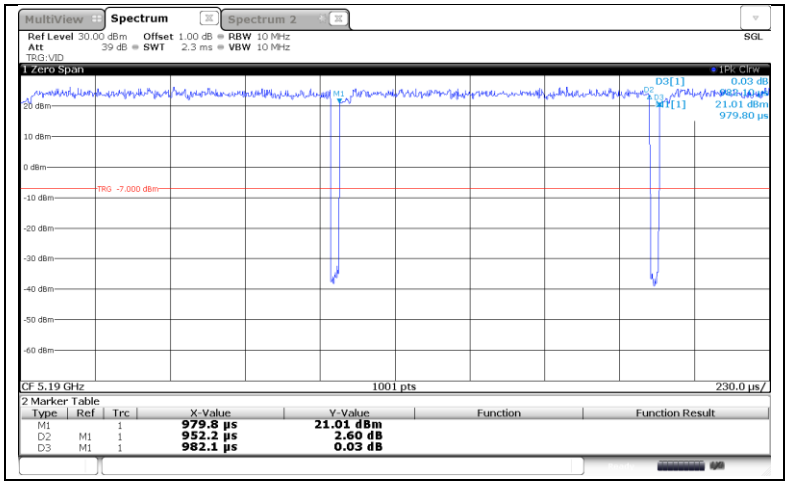
- 802.11ac VHT40

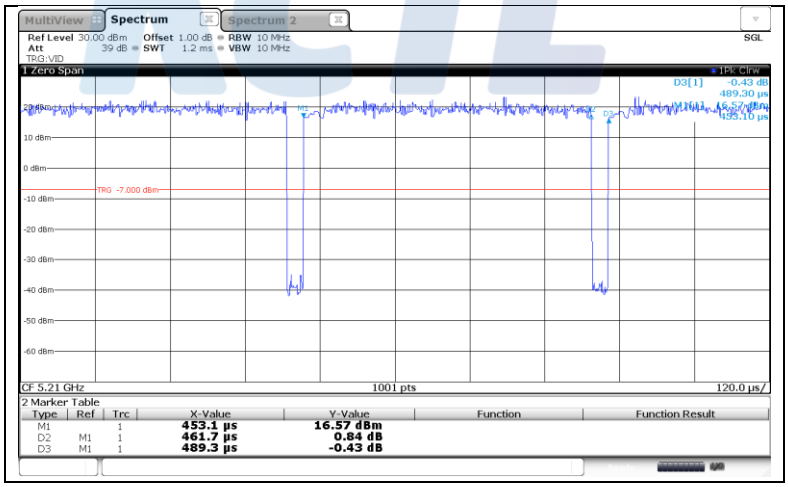


Note$_{1)}$: period : 0.98 ㎳, On time : 0.95 ㎳

Note$_{2)}$: DCCF = 10 log(1 / x) = 10 log(1/0.969) = 0.14 ㏈, x = 0.95/0.98 = 0.969 (96.9 %)

Note$_{3)}$: 802.11ac mode is a non-continuous transmission (duty cycle < 98 %)

- 802.11ac VHT80



Note$_{1)}$: period : 0.49 ㎳, On time : 0.46 ㎳

Note$_{2)}$: DCCF = 10 log(1 / x) = 10 log(1/0.939) = 0.27 ㏈, x = 0.46/0.49 = 0.939

Note$_{3)}$: 802.11ac mode is a non-continuous transmission (duty cycle < 98 %)

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3. Antenna requirement

According to §15.203, §15.407
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The transmitter has permanently attached UFL type PCB Pattern Antenna.
- The E.U.T Complies with the requirement of §15.203, §15.407

3.1 Directional Gain Calculations

According to clause F), 2), f), (ii) of KDB 662911 D01 Multiple Transmitter Output, Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain.

- Directional Antenna Gain

Band	ANT0 Gain (dBi)	ANT1 Gain (dBi)	ANT2 Gain (dBi)	Combined Gain (dBi)
2.4 GHz	1.89	1.88	1.82	6.66
UNII 1	1.63	1.60	1.94	6.71
UNII 3	1.75	1.72	1.96	6.73

- Formula = G_{ANT} + 10 log (N_{ANT}) dBi

4. Summary of tests

FCC Part section(s)	Parameter	Test results
15.407(a)	Maximum conducted output power	Pass
15.407(a)	Maximum power spectral density	Pass
15.407(a)	26 dB bandwidth & 99% Occupied bandwidth	Pass
15.407(e)	6 dB bandwidth	Pass
15.407(g)	Frequency stability	Pass
15.407(d), 15.205(a), 15.209(a)	Spurious emission	Pass
	Band-edge, restricted band	Pass
15.207(a)	Conducted emissions	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 Y orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in Y 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. The EUT only supports CDD and MIMO modes. SISO mode is not supported.
   - 11a : CDD mode
   - 11n/ac : CDD mode, MIMO (SDM) mode
6. The EUT does not operate simultaneous.

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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	1.76 dB	
Conducted spurious emissions	4.03 dB	
Radiated spurious emissions	9 kHz ~ 30 MHz:	2.28 dB
	30 MHz ~ 300 MHz	4.98 dB
	300 MHz ~ 1 000 MHz	5.14 dB
	1 GHz ~ 6 GHz	6.70 dB
	Above 6 GHz	6.60 dB
Conducted emissions	9 kHz ~ 150 kHz	3.66 dB
	150 kHz ~ 30 MHz	3.26 dB

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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	10.02	16 000	11.56
100	10.04	17 000	11.58
200	10.05	18 000	11.56
300	10.07	19 000	11.63
400	10.07	20 000	11.72
500	10.08	21 000	11.74
600	10.09	22 000	11.74
700	10.09	23 000	11.92
800	10.09	24 000	11.79
900	10.09	25 000	11.88
1 000	10.09	26 000	11.99
2 000	10.52	27 000	12.05
3 000	10.68	28 000	12.16
4 000	10.81	29 000	12.27
5 000	10.90	30 000	12.09
6 000	10.96	31 000	12.27
7 000	11.03	32 000	12.26
8 000	11.10	33 000	12.30
9 000	11.17	34 000	12.30
10 000	11.21	35 000	12.33
11 000	11.24	36 000	12.43
12 000	11.32	37 000	12.58
13 000	11.36	38 000	12.67
14 000	11.35	39 000	12.71
15 000	11.54	40 000	12.70

Note.
Offset(㏈) = RF cable loss(㏈) + Attenuator(㏈)

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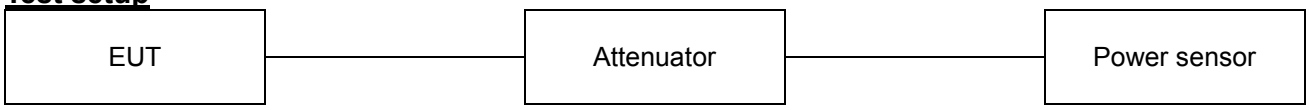
7. Test results

7.1. Maximum conducted output power

Test setup



Limit

According to §15.407(a)

Band	EUT category		Limit
UNII-1		Outdoor access point	1 W (30 dBm)
	√	Indoor access point	
		Fixed point-to-point access point	
		Client device	250 mW (24 dBm)
UNII-2A	-		250 mW or 11 dBm + 10logB*
UNII-2C	-		250 mW or 11 dBm + 10logB*
UNII-3	√		1 W (30 dBm)

Notes:

*FCC Limit B is the 26 dB emission bandwidth.

Test procedure

ANSI C63.10-2013-Section 12.3.3.2 and 14.2
KDB 789033 D02 v02r01 - Section E.3.a) or b)
KDB 662911 D01 v02r01 – Section E).1)

Test settings

◆ KDB 789033 D02 v02r01

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

(i) 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

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

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

(iv) Adjust the measurement in dBm 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.

◆ KDB 662911 D01 v02r01

Section E).1)
In-Band Power Measurements
The measure-and-sum technique shall be used for measuring in-band transmit power of a device. Total power is the sum of the conducted power levels measured at the various output ports

Notes:
A peak responding power sensor is used, where the power sensor system video bandwidth is greater than the occupied bandwidth of the EUT.

Test results

Test mode	Band	Frequency (㎒)	Measured output power					Limit (dBm)[2]
			Reading ANT0 (dBm)	Reading ANT1 (dBm)	Reading ANT2 (dBm)	Duty Factor (dB)	Result (dBm)[1]	
11a	UNII 1	5 180	8.27	7.74	7.85	0.23	12.96	29.29
		5 200	17.60	16.50	16.53	0.23	21.91	
		5 240	18.05	14.71	17.03	0.23	21.81	
	UNII 3	5 745	22.06	19.63	21.82	0.23	26.30	29.27
		5 785	22.20	20.26	21.93	0.23	26.55	
		5 825	22.34	19.79	21.89	0.23	26.47	
11n HT20	UNII 1	5 180	10.51	8.09	8.33	0.20	14.09	29.29
		5 200	18.93	16.70	15.29	0.20	22.21	
		5 240	17.73	16.11	16.19	0.20	21.71	
	UNII 3	5 745	21.77	19.20	21.48	0.20	25.93	29.27
		5 785	22.58	20.18	22.45	0.20	26.84	
		5 825	22.5	20.39	22.50	0.20	26.88	
11n HT40	UNII 1	5 190	12.28	11.05	11.53	0.44	16.86	29.29
		5 230	20.62	18.18	19.57	0.44	24.78	
	UNII 3	5 755	22.07	19.59	22.26	0.44	26.68	29.27
		5 795	22.04	19.86	22.31	0.44	26.74	
11ac VHT20	UNII 1	5 180	9.67	8.87	9.45	0.06	14.17	29.29
		5 200	17.06	15.62	16.39	0.06	21.23	
		5 240	17.32	15.55	15.67	0.06	21.09	
	UNII 3	5 745	21.61	19.42	21.54	0.06	25.80	29.27
		5 785	22.31	19.64	21.91	0.06	26.27	
		5 825	22.34	20.14	22.19	0.06	26.50	
11ac VHT40	UNII 1	5 190	9.67	8.87	9.45	0.14	14.25	29.29
		5 230	17.32	15.55	15.67	0.14	21.17	
	UNII 3	5 755	21.61	19.42	21.54	0.14	25.88	29.27
		5 795	22.34	20.14	22.19	0.14	26.58	
11ac VHT80	UNII 1	5 210	9.60	8.20	8.29	0.25	13.77	29.29
	UNII 3	5 775	16.10	13.52	16.09	0.25	20.42	29.27

Note.

1. Result(㏈m) = 10log($10^{(ANT0/10)}$ + $10^{(ANT1/10)}$ + $10^{(ANT2/10)}$) + Duty Factor (㏈)

2. Limitation calculation as below.

- UNII 1 = 30 – (6.71 – 6)= 30- 0.71 = 29.29 ㏈m *Directional Gain is 6.71 ㏈i
- UNII 3 = 30 – (6.73 – 6)= 30- 0.73 = 29.27 ㏈m *Directional Gain is 6.73 ㏈i

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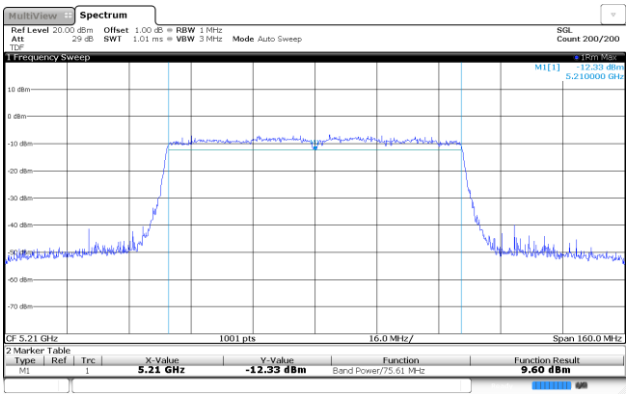
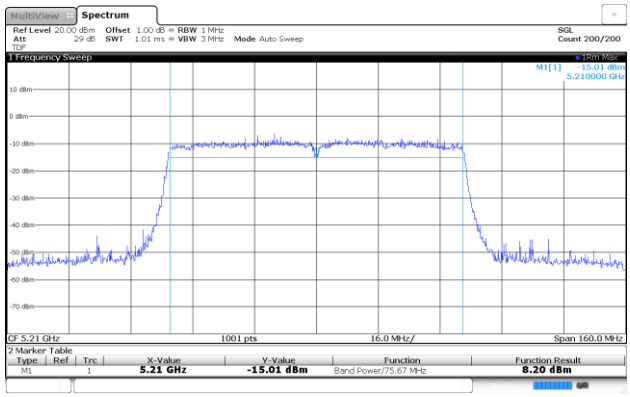
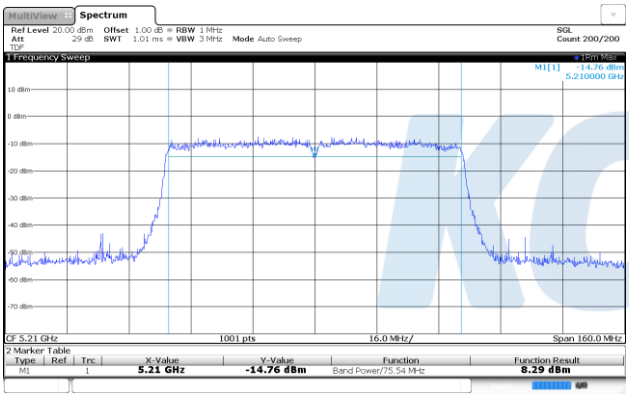
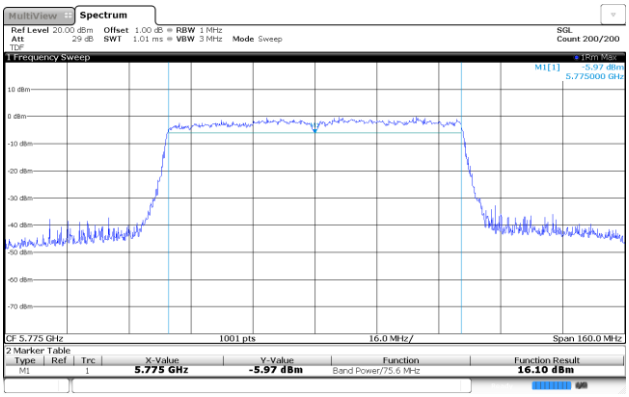
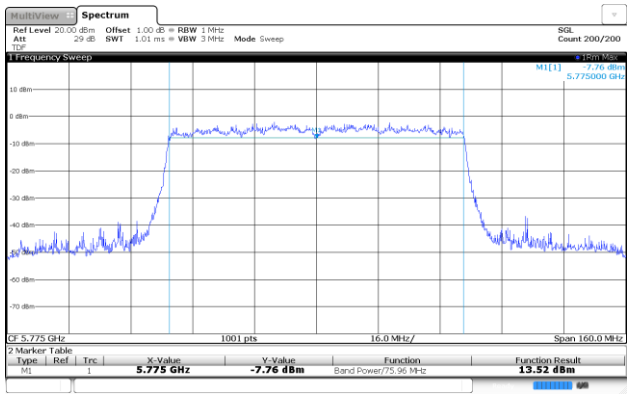
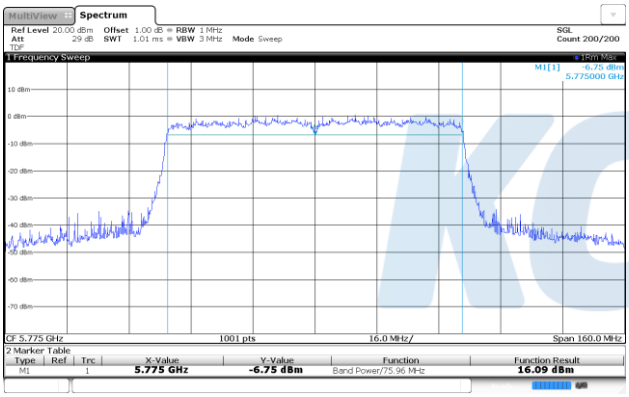
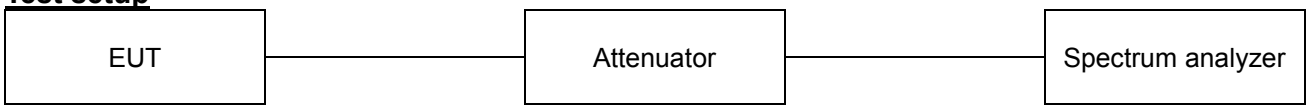
802.11ac VHT80_5 210 ㎒	
	
ANT0	ANT1
	Blank
ANT2	

802.11ac VHT80_5 775 ㎒	
	
ANT0	ANT1
	Blank
ANT2	

7.2. Maximum Power Spectral Density

Test setup



Limit

According to §15.407(a)

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:

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

Test procedure

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

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

   a) Set RBW≥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 kHz, add 10 log (500 kHz /RBW) to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
   d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
   e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

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

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Test results

Test mode	Band	Frequency (㎒)	Peak Power Spectral Density					Limit (dBm)[2]
			Reading ANT0 (dBm)	Reading ANT1 (dBm)	Reading ANT2 (dBm)	Duty Factor (dB)	Result [1] (dBm)	
11a	UNII 1	5 180	-2.76	-3.92	-2.99	0.23	1.81	16.29
		5 200	6.11	5.60	6.09	0.23	10.94	
		5 240	6.11	7.86	5.94	0.23	11.73	
	UNII 3	5 745	8.74	6.56	8.44	0.23	13.02	29.27
		5 785	9.00	6.98	8.72	0.23	13.32	
		5 825	9.31	7.71	8.45	0.23	13.54	
11n HT20	UNII 1	5 180	-1.21	-3.73	-2.65	0.20	2.56	16.29
		5 200	7.77	5.37	6.01	0.20	11.48	
		5 240	7.23	5.16	5.14	0.20	10.93	
	UNII 3	5 745	8.34	6.35	7.01	0.20	12.28	29.27
		5 785	8.51	7.51	8.03	0.20	13.01	
		5 825	9.07	7.31	8.33	0.20	13.27	
11n HT40	UNII 1	5 190	-1.26	-2.96	-1.27	0.44	3.45	16.29
		5 230	7.14	4.72	3.35	0.44	10.57	
	UNII 3	5 755	5.28	3.53	4.74	0.44	9.79	29.27
		5 795	5.53	4.18	4.71	0.44	10.05	
11ac VHT20	UNII 1	5 180	-0.44	-2.21	-0.82	0.06	3.74	16.29
		5 200	6.99	5.15	6.59	0.06	11.14	
		5 240	7.26	4.30	6.47	0.06	11.01	
	UNII 3	5 745	8.61	6.09	8.13	0.06	12.57	29.27
		5 785	9.05	7.01	7.85	0.06	12.88	
		5 825	9.14	7.56	7.81	0.06	13.06	
11ac VHT40	UNII 1	5 190	-3.82	-4.99	-4.06	0.14	0.65	16.29
		5 230	3.87	3.34	3.43	0.14	8.46	
	UNII 3	5 755	6.63	6.05	6.86	0.14	11.44	29.27
		5 795	7.59	6.16	6.83	0.14	11.81	
11ac VHT80	UNII 1	5 210	-7.12	-9.40	-7.57	0.27	-2.88	16.29
	UNII 3	5 775	-0.92	-3.04	-0.20	0.27	3.81	29.27

Note.

1. Result(㏈m) = 10log($10^{(ANT0/10)}$ + $10^{(ANT1/10)}$ + $10^{(ANT2/10)}$) + Duty Factor (㏈)

2. Limitation calculation as below.

- UNII 1 = 17 – (6.71 – 6)= 17 - 0.71 = 16.29 ㏈m/㎒ *Directional Gain is 6.71 ㏈i
- UNII 3 = 30 – (6.73 – 6)= 30 - 0.73 = 29.27 ㏈m/500 ㎑ *Directional Gain is 6.73 ㏈i

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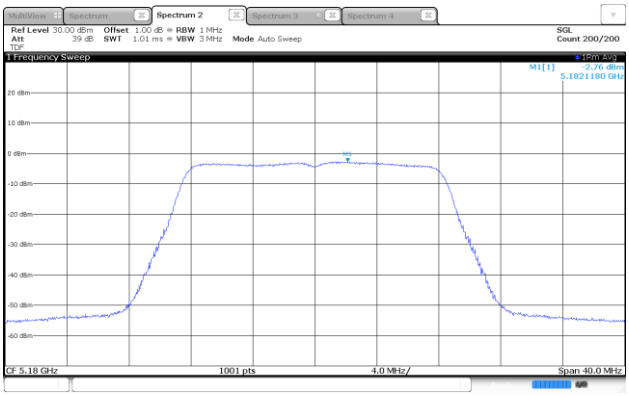	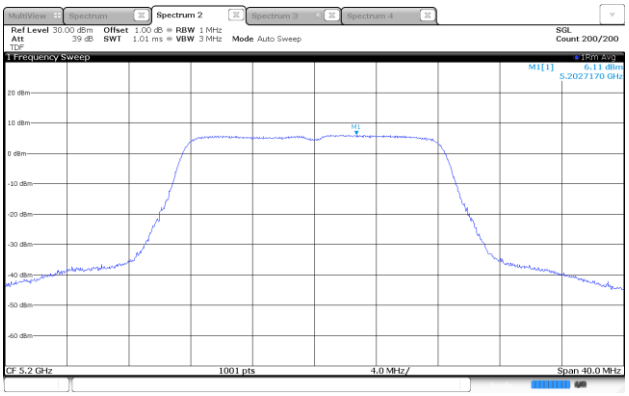
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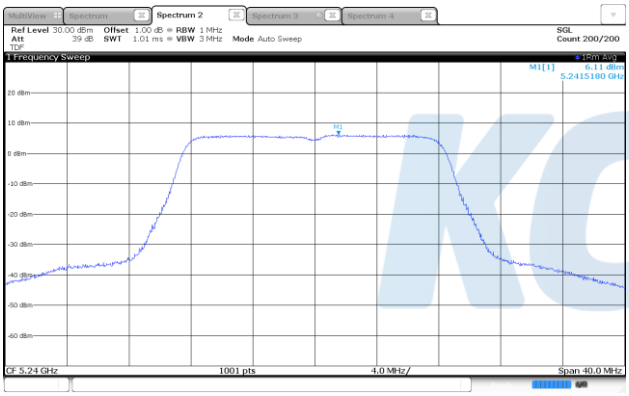	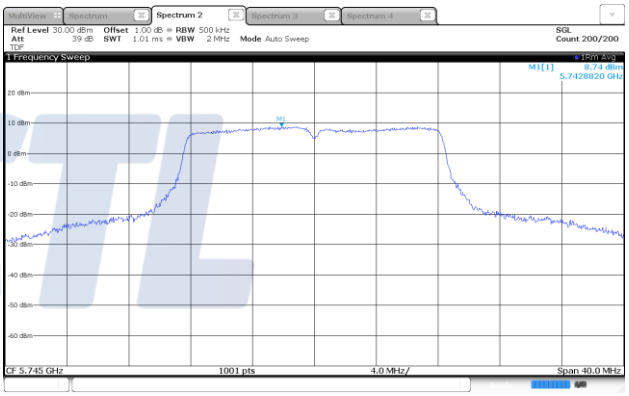
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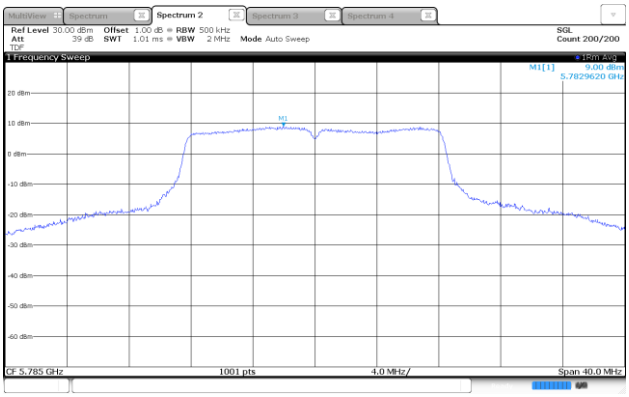	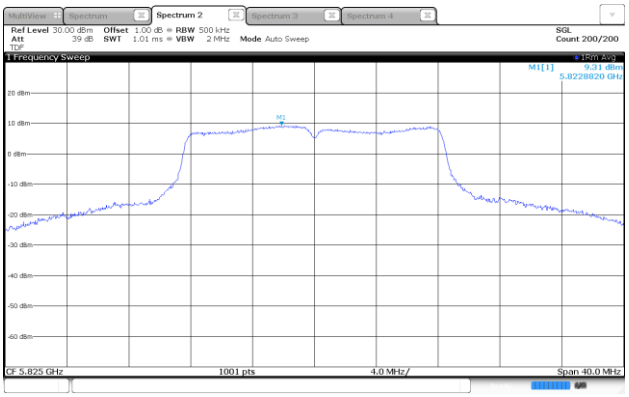
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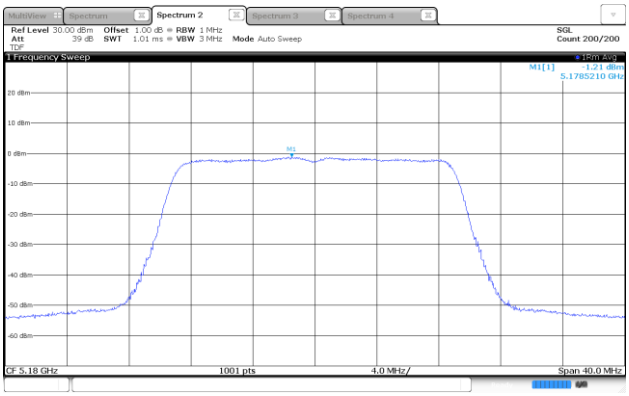	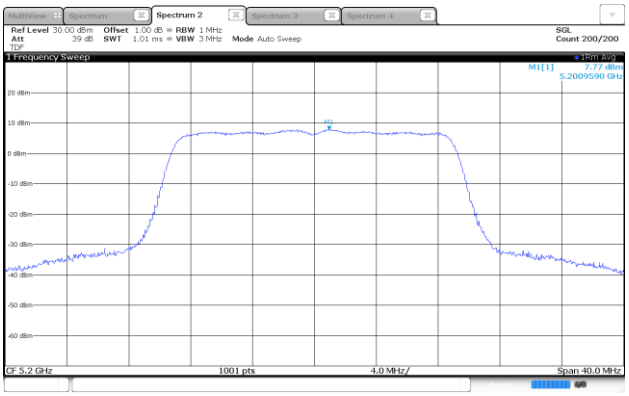
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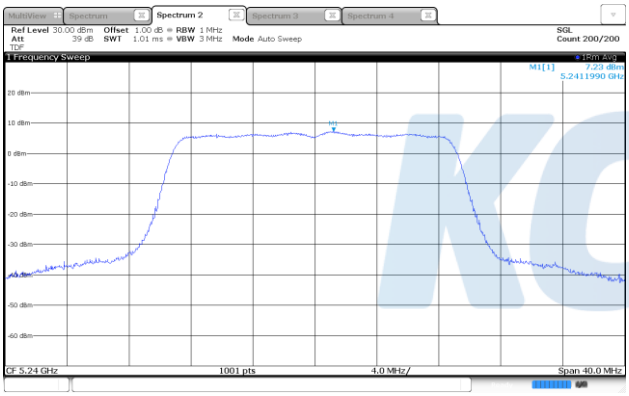	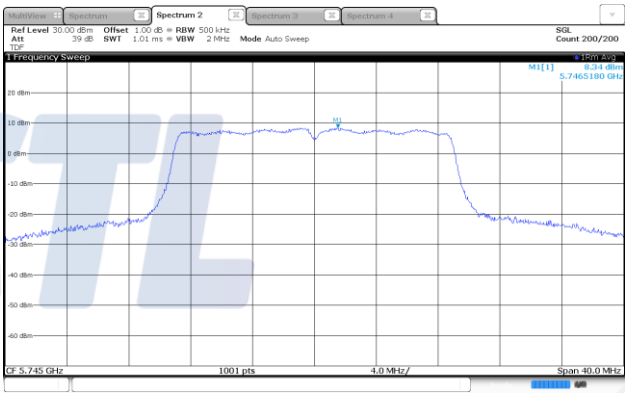
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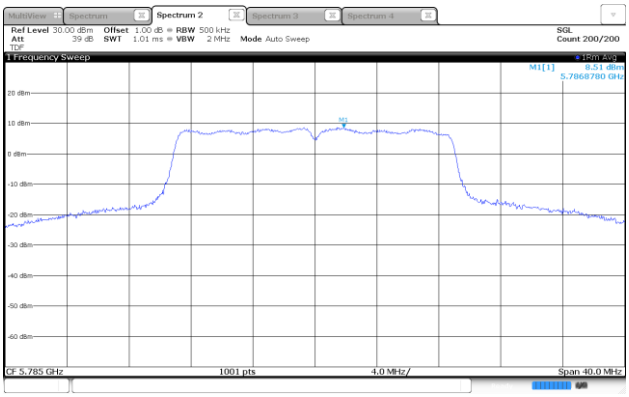	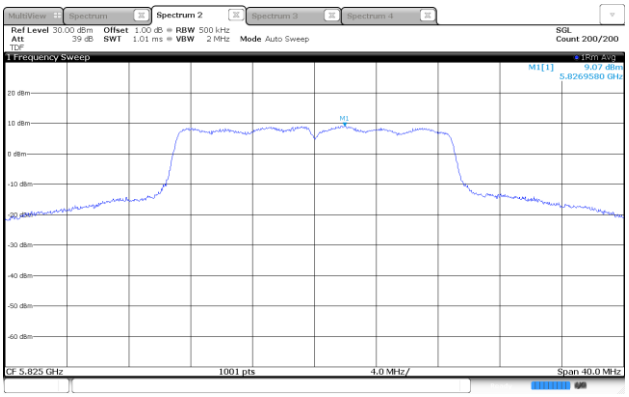
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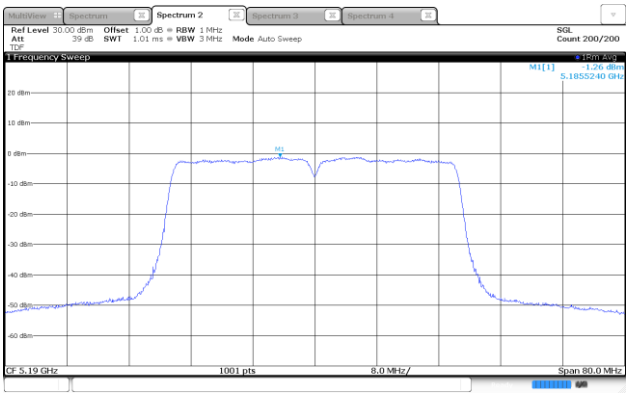	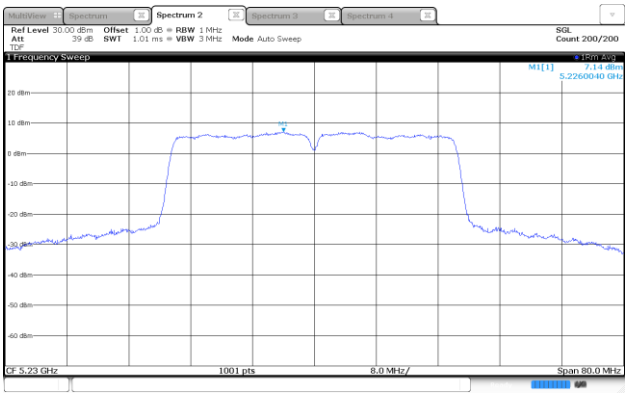
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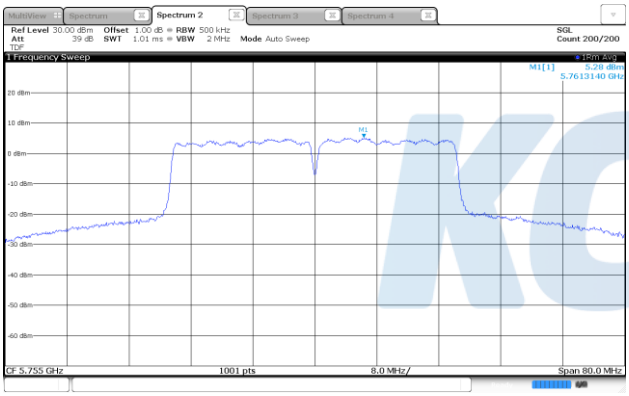	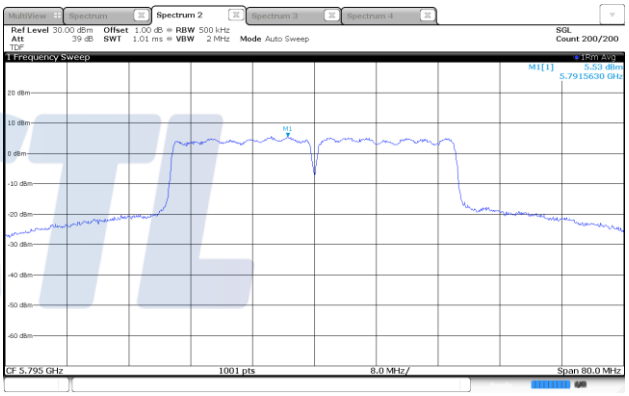
5 755 ㎒	5 795 ㎒

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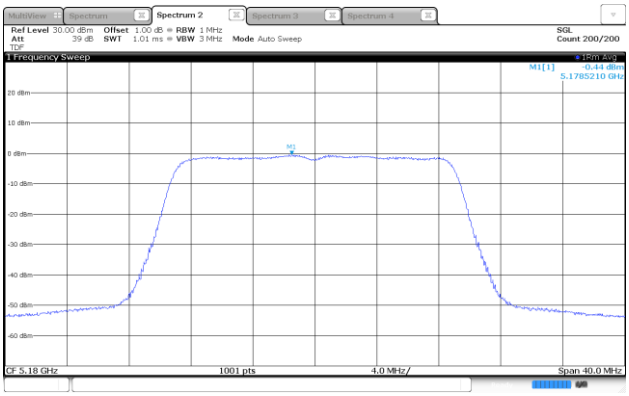	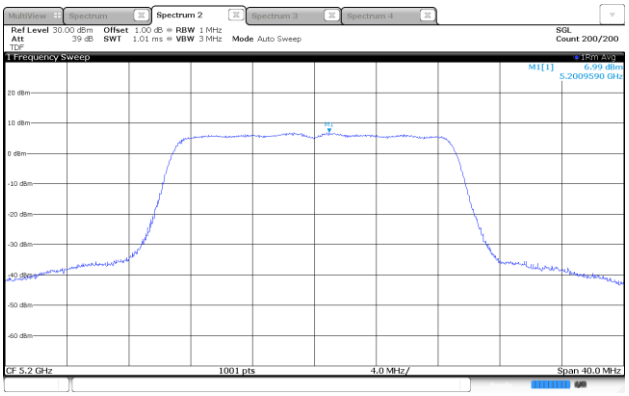
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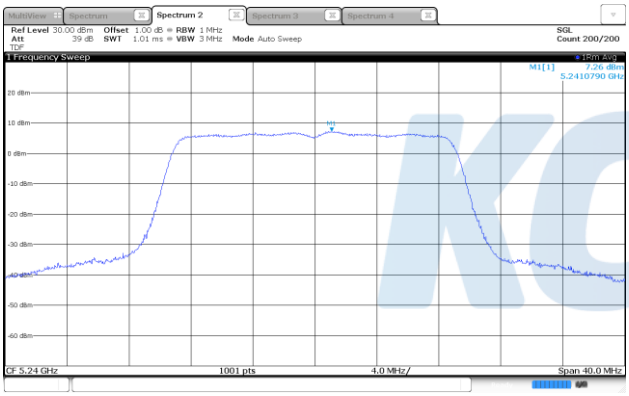	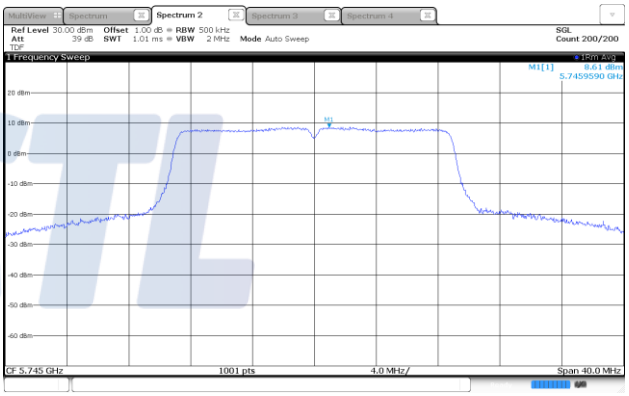
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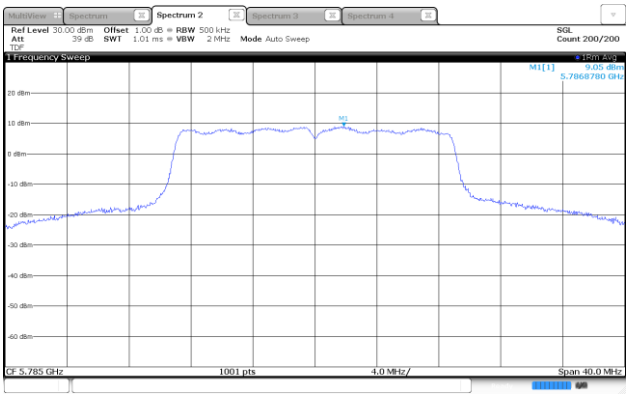	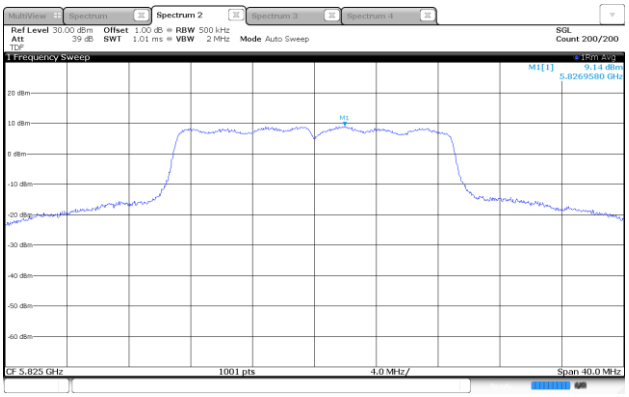
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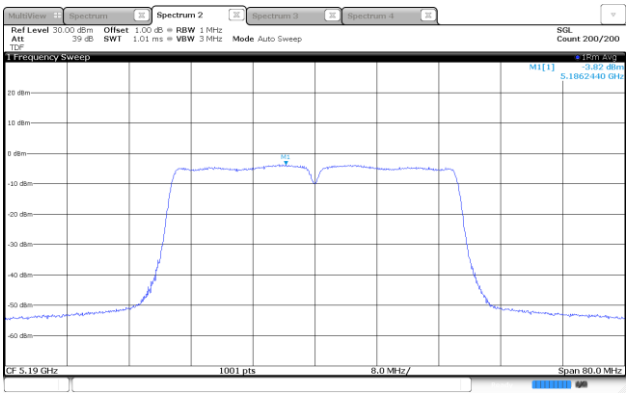	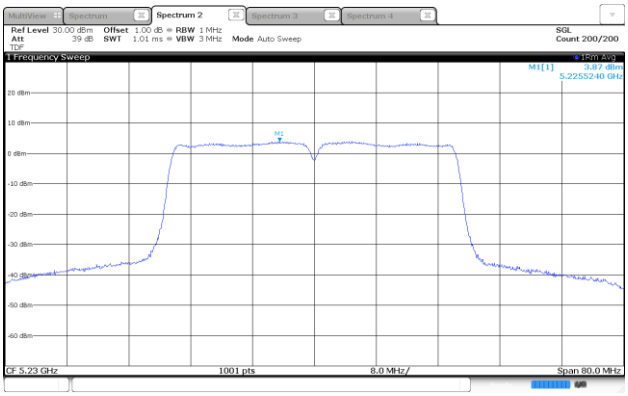
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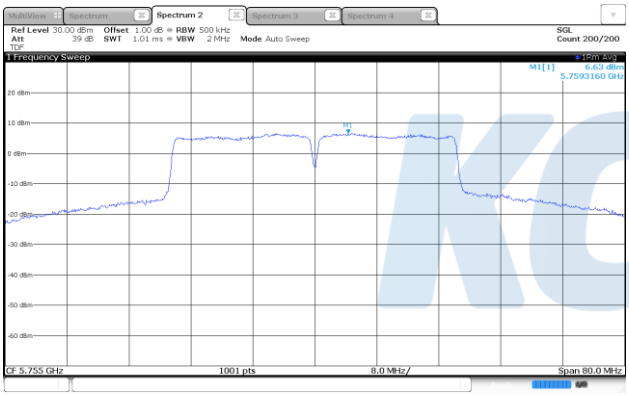	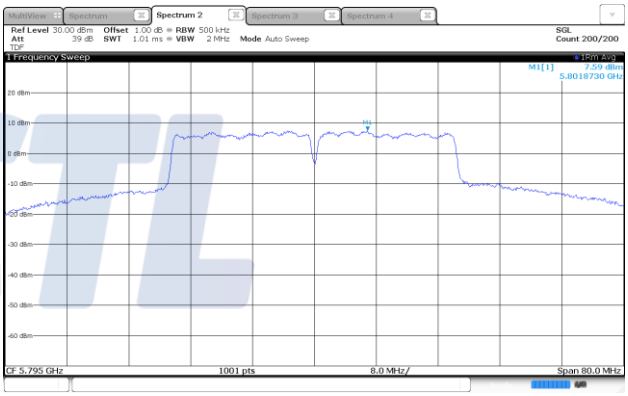
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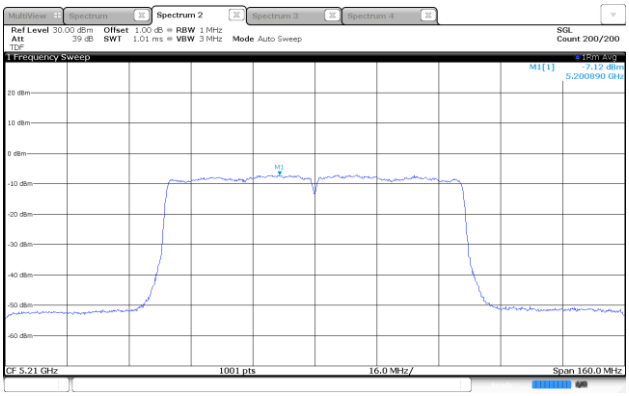	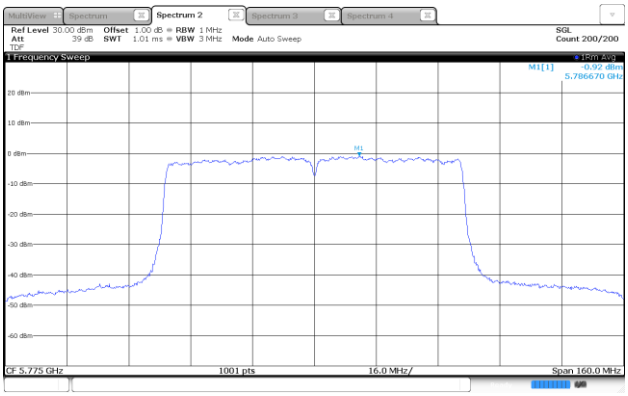
5 210 ㎒	5 775 ㎒

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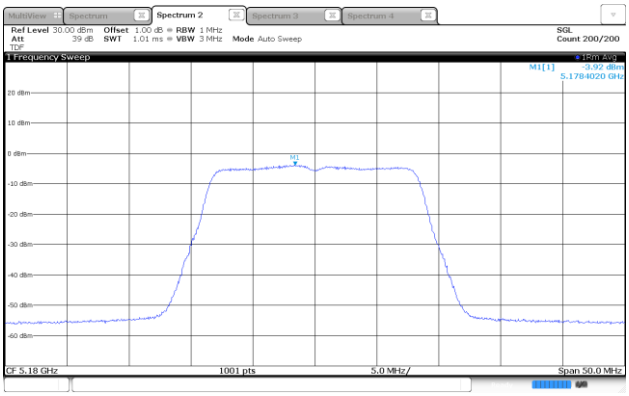	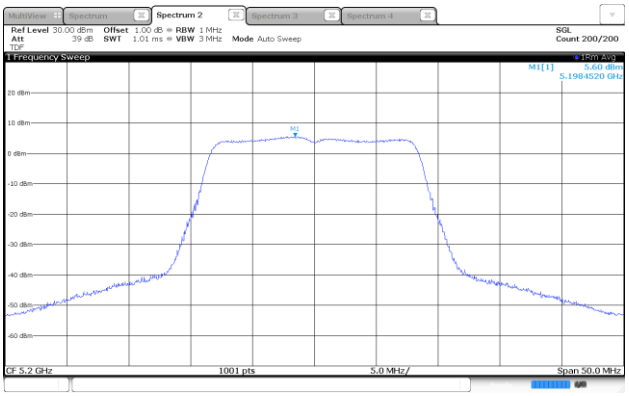
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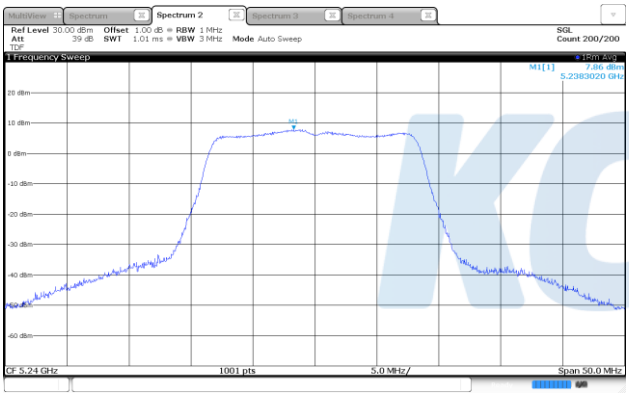	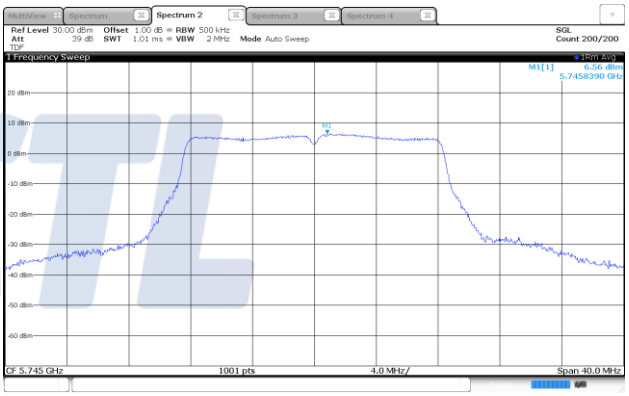
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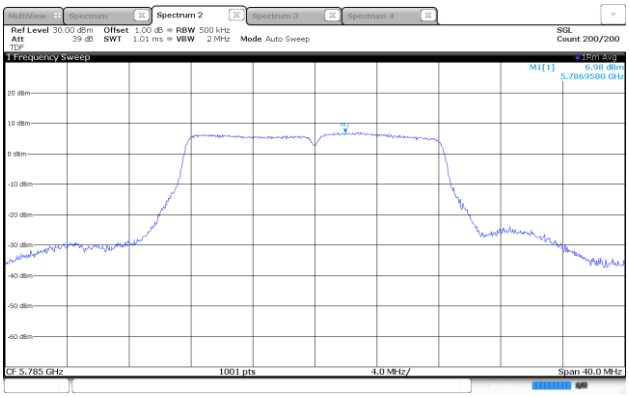	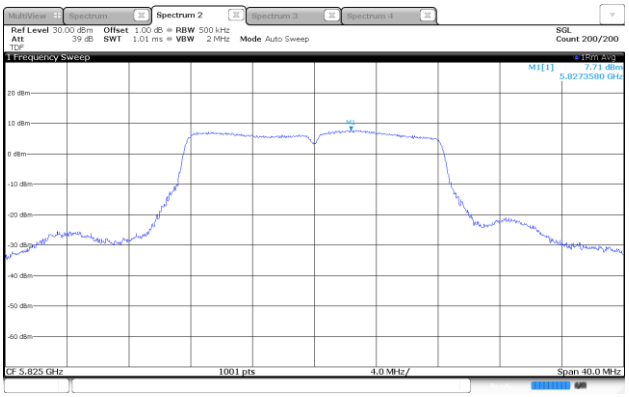
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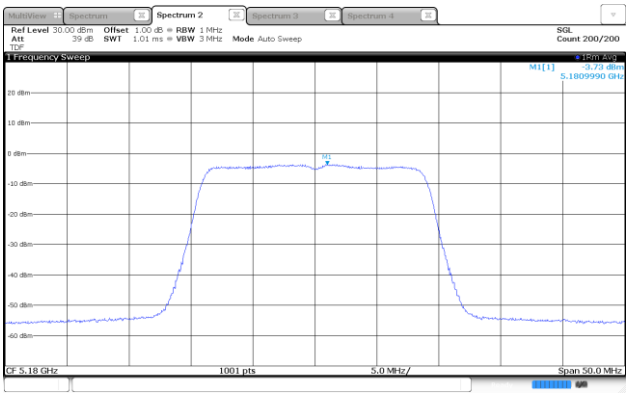	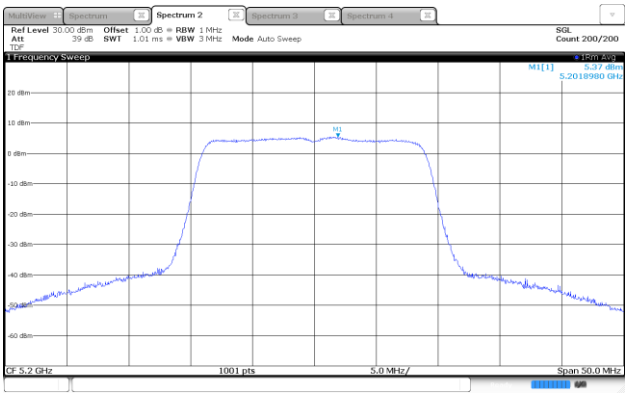
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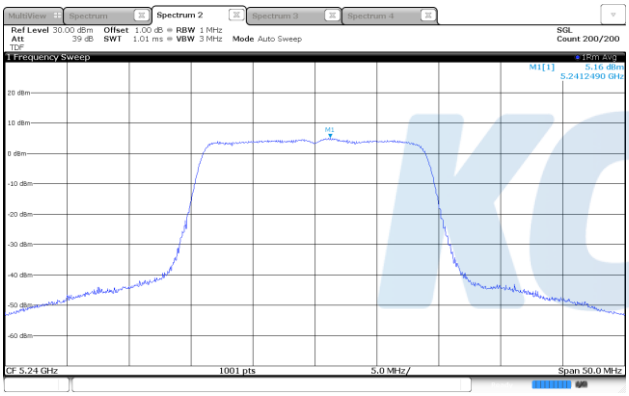	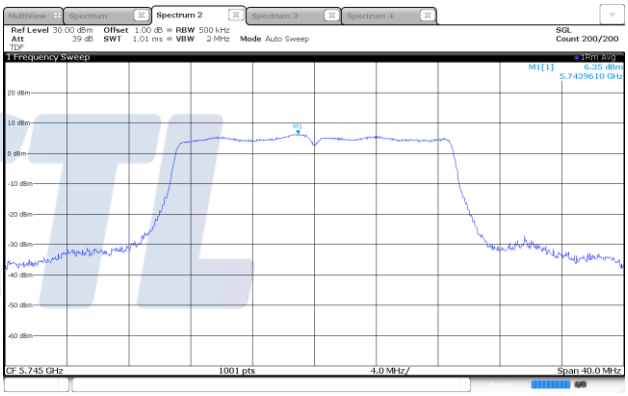
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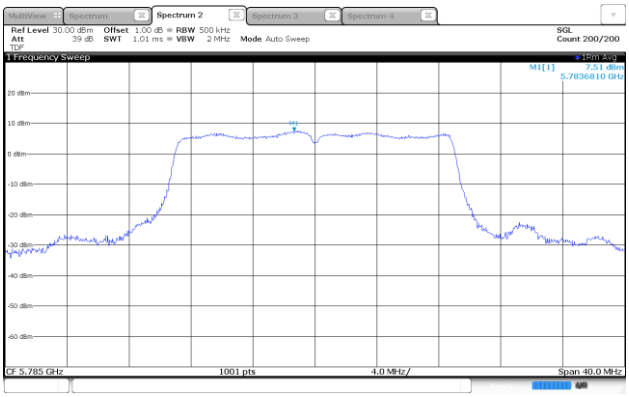	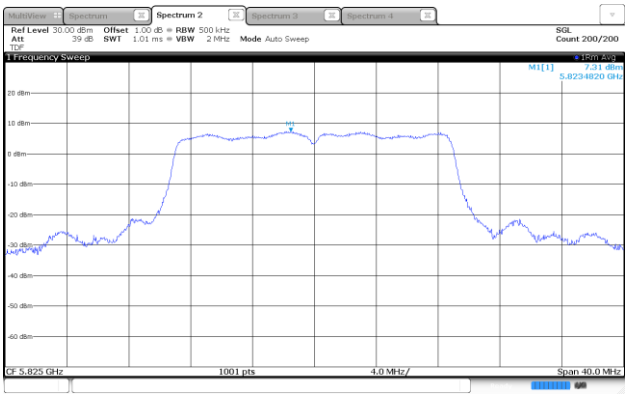
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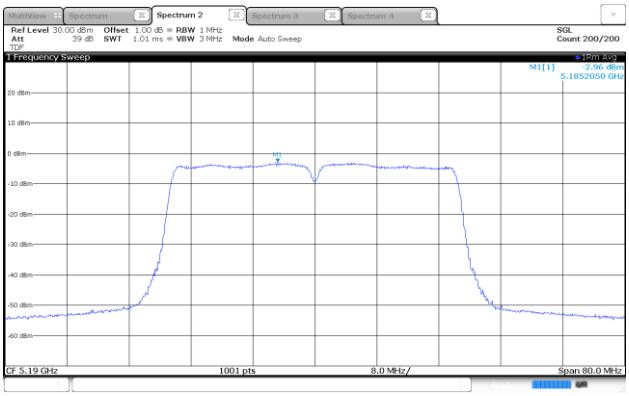	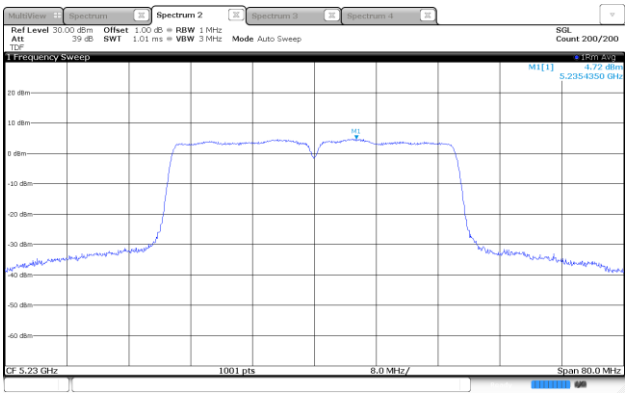
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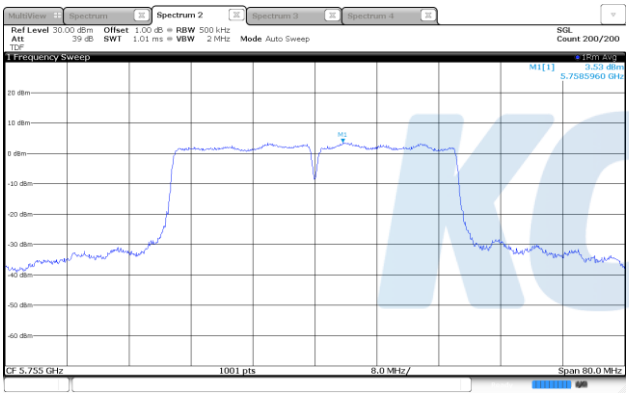	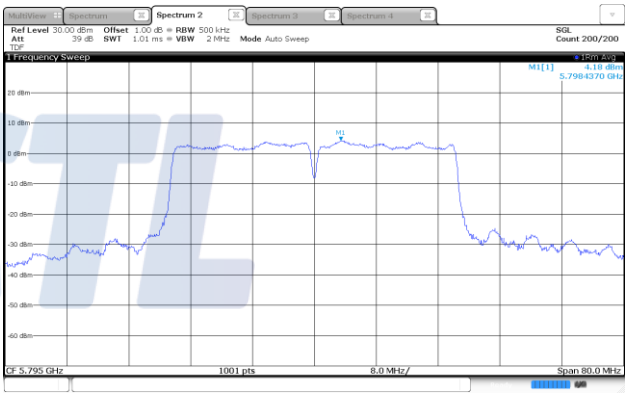
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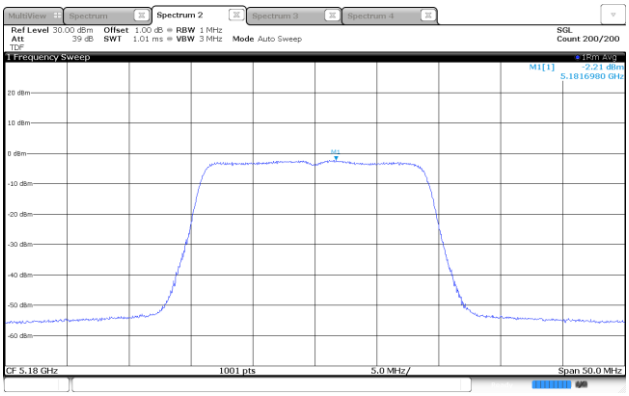	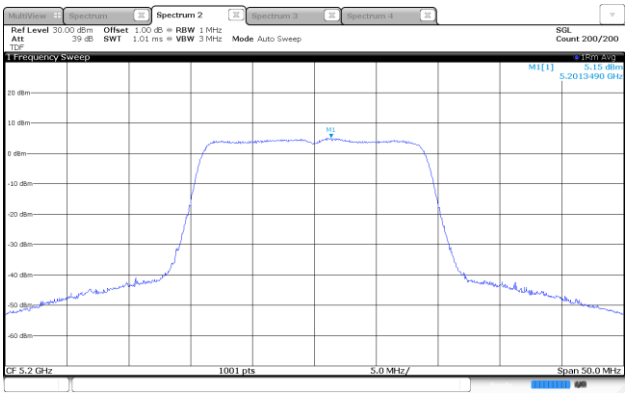
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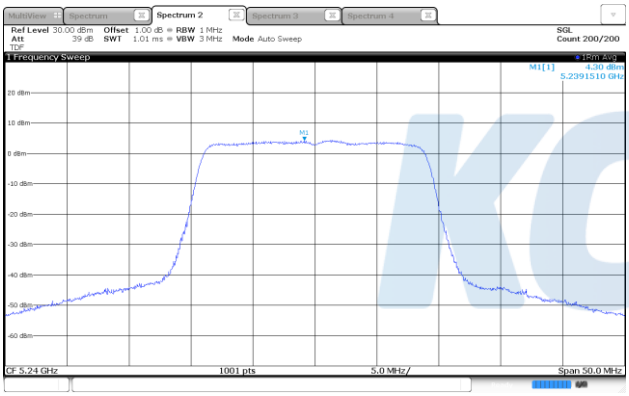	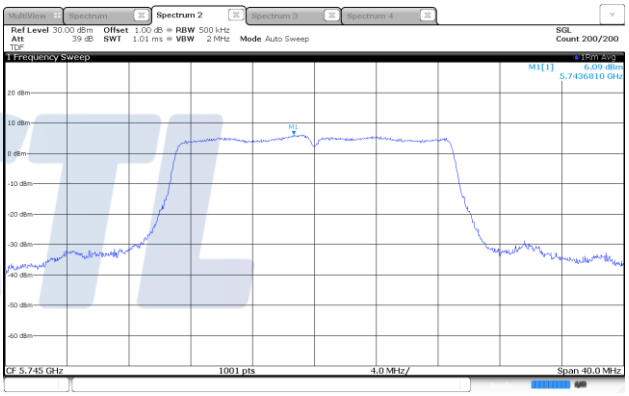
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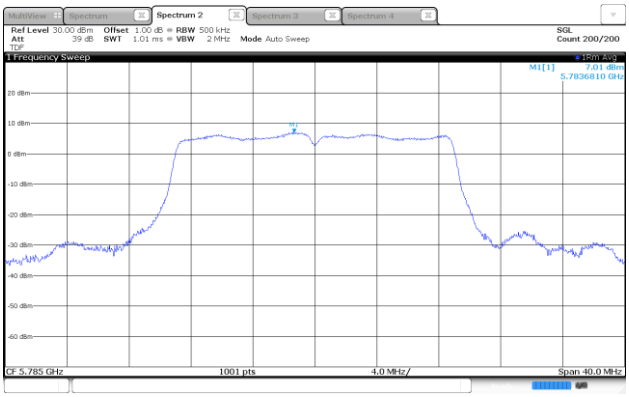	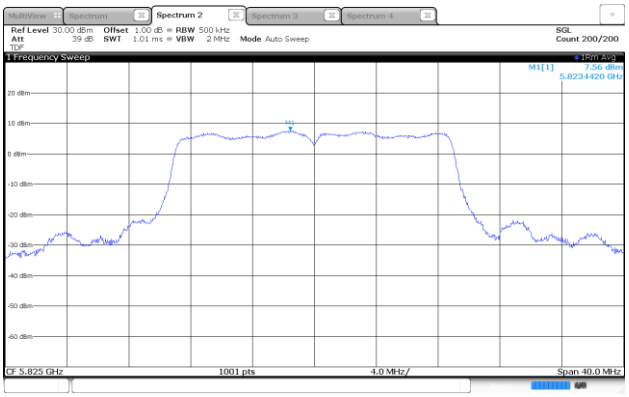
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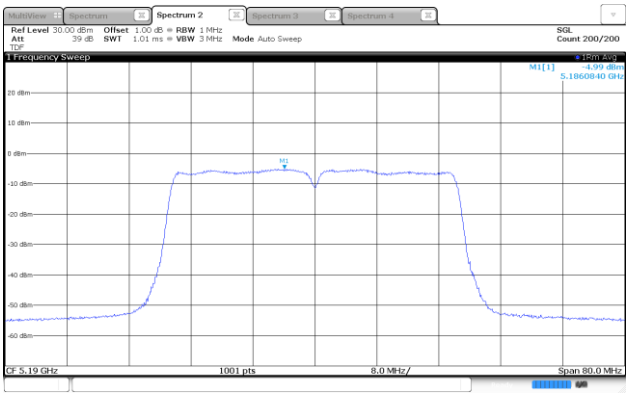
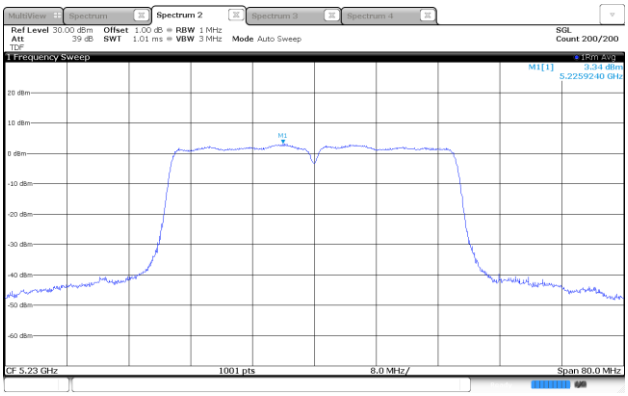
ANT1_802.11ac VHT40	
	
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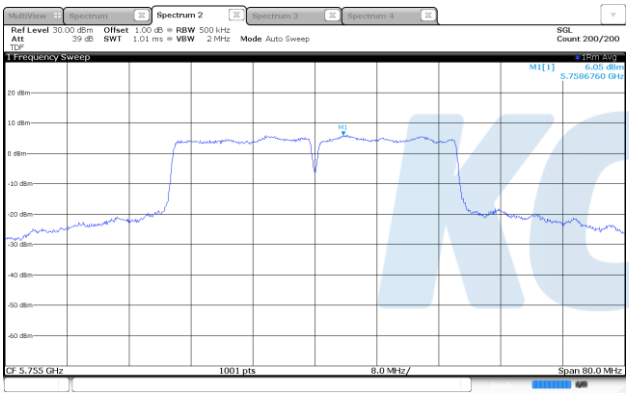	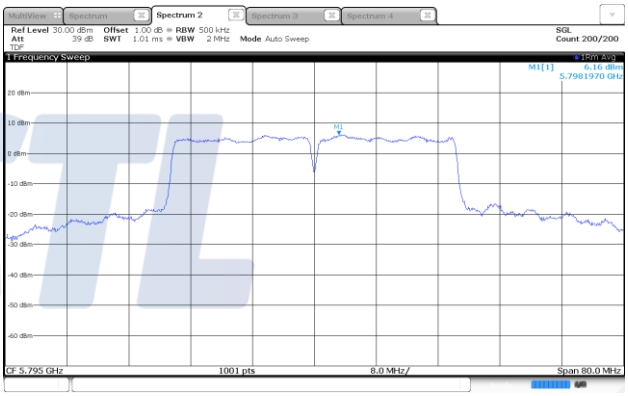
5 755 ㎒	5 795 ㎒
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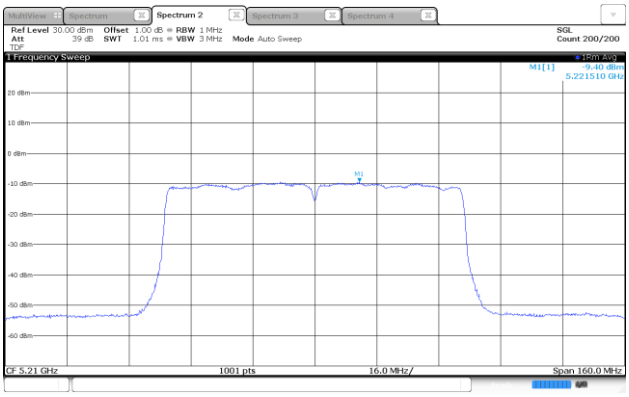	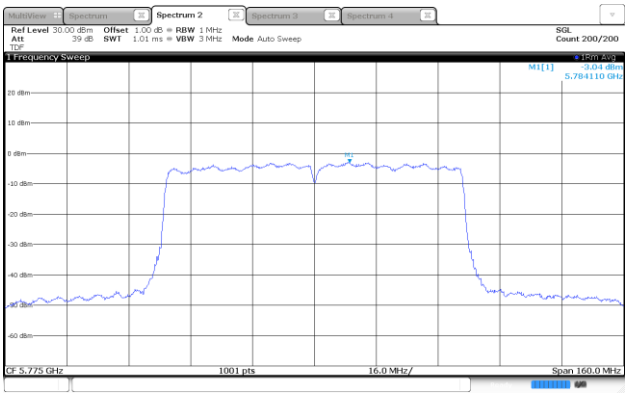
5 210 ㎒	5 775 ㎒

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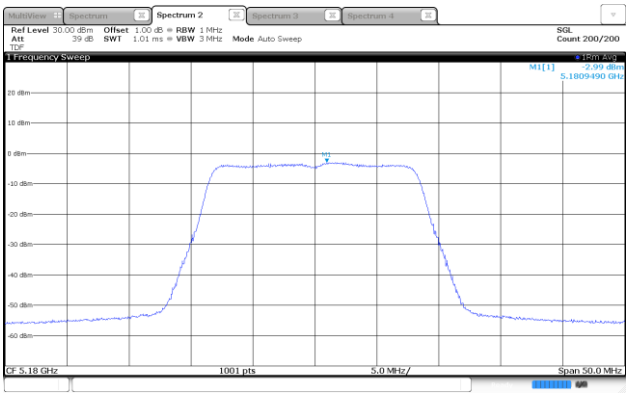
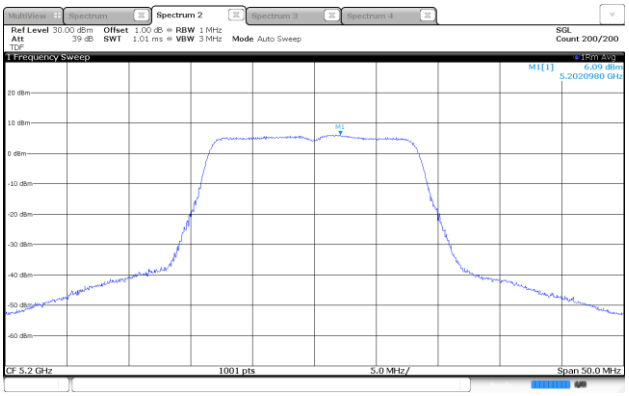
Ant2_802.11a	
	
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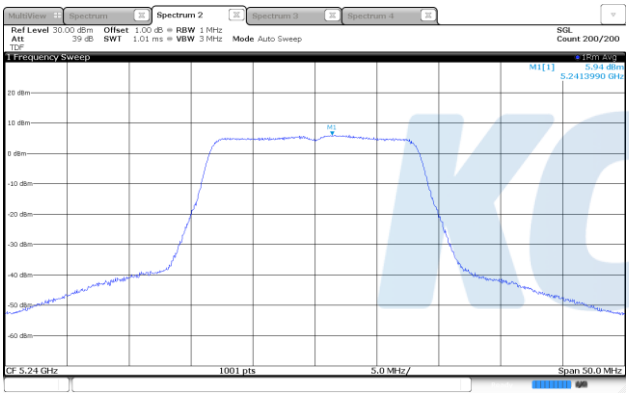	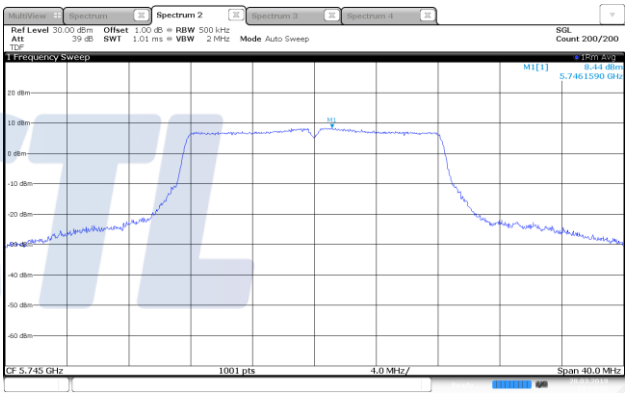
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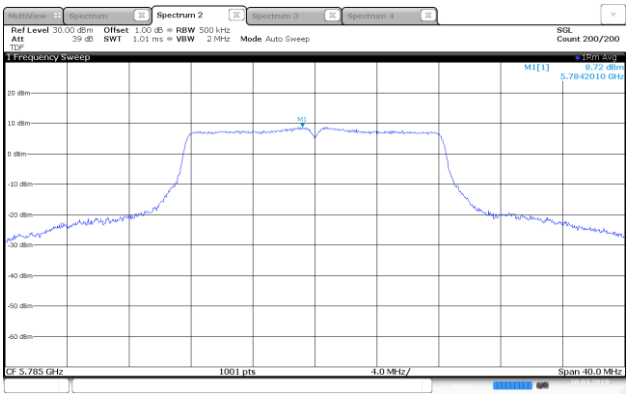	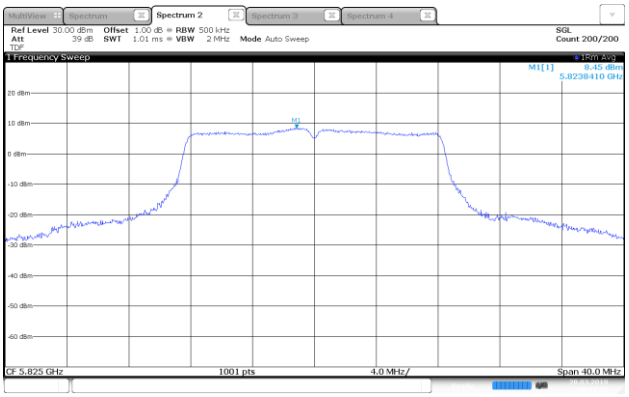
5 785 ㎒	5 825 ㎒

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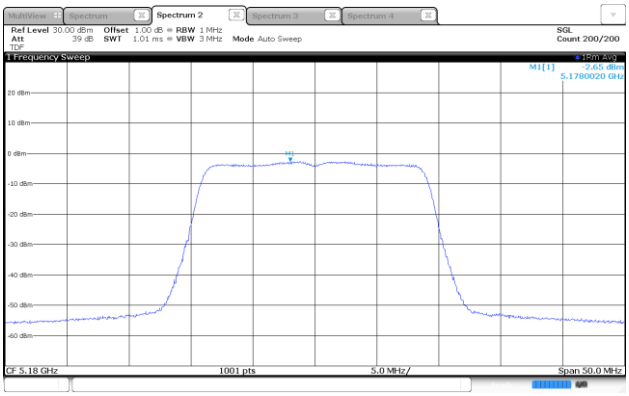
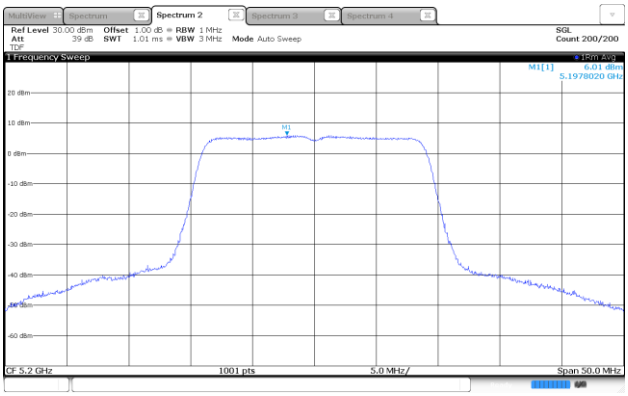
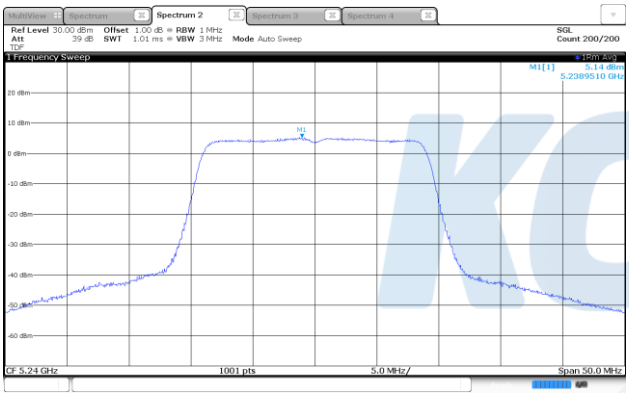
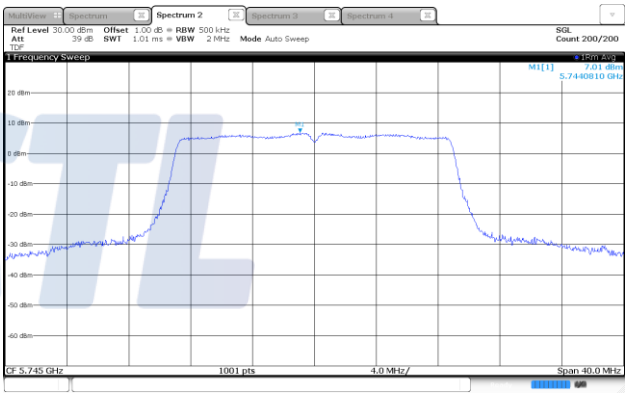
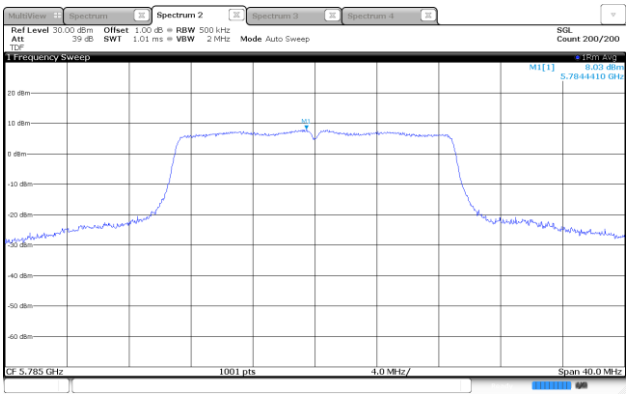
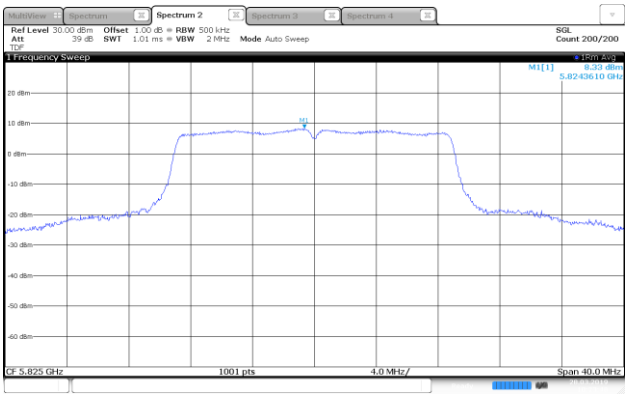
Ant2_802.11n HT20	
	
5 180 ㎒	5 200 ㎒
	
5 240 ㎒	5 745 ㎒
	
5 785 ㎒	5 825 ㎒

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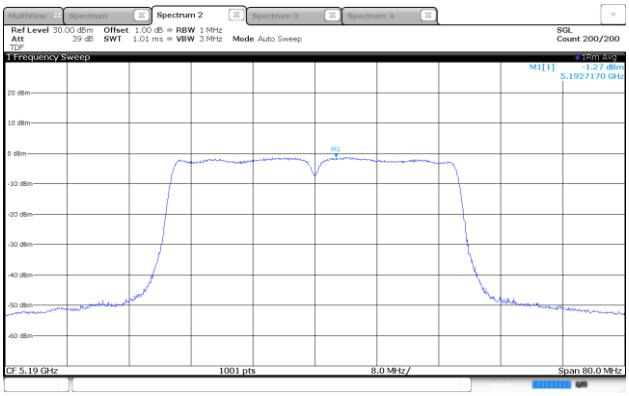
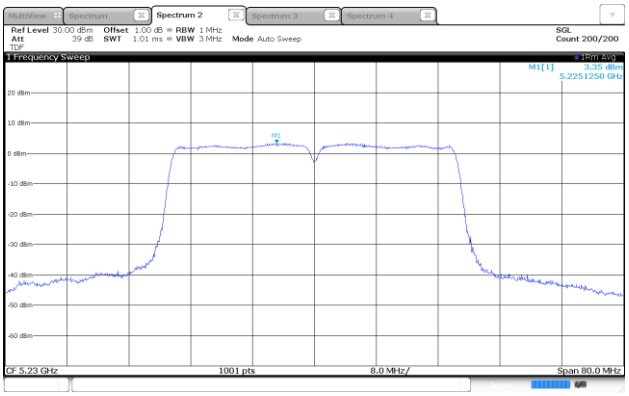
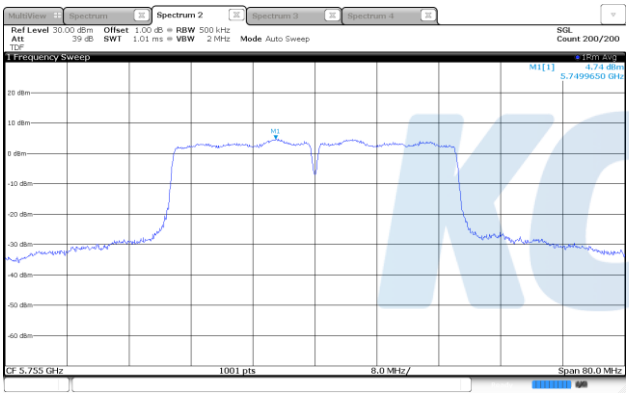
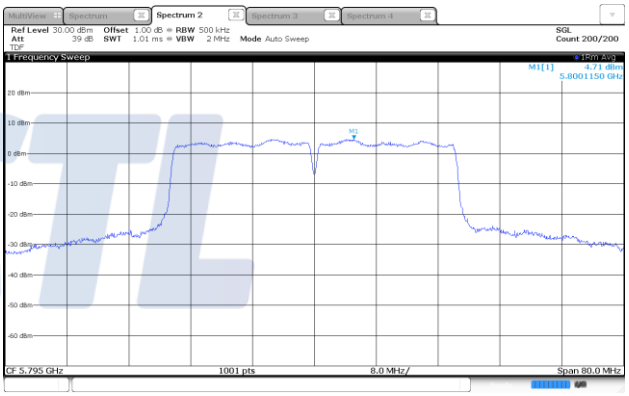
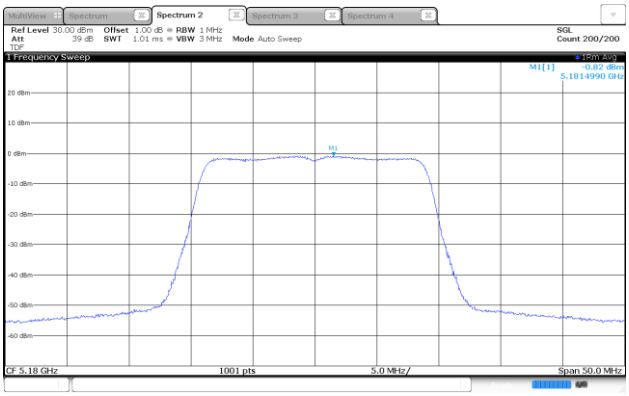
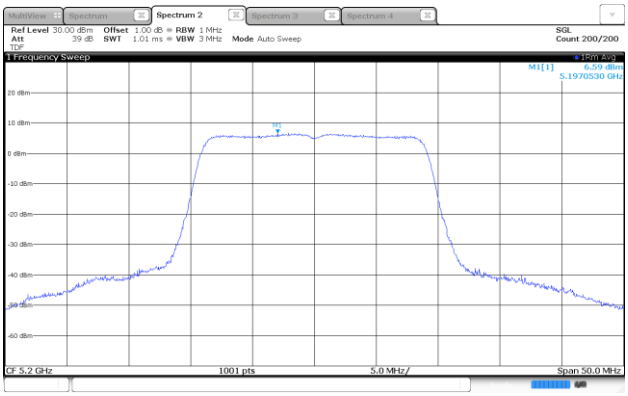
	
5 190 ㎒	5 230 ㎒
	
5 755 ㎒	5 795 ㎒

Ant2_802.11ac VHT20	
	
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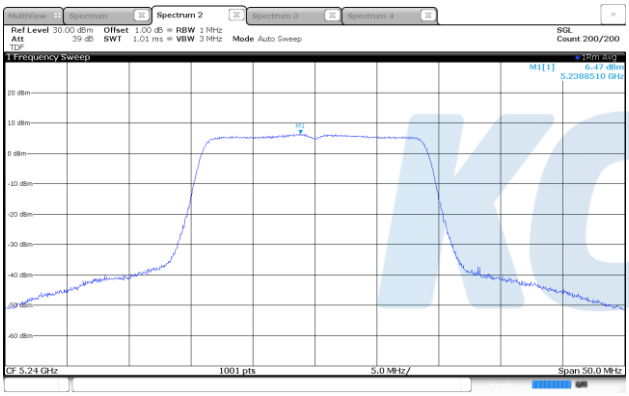
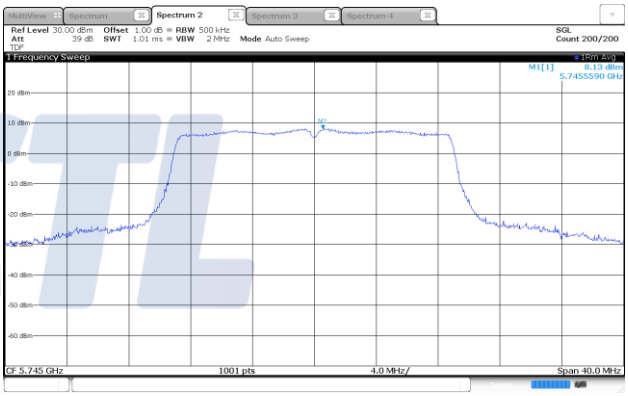
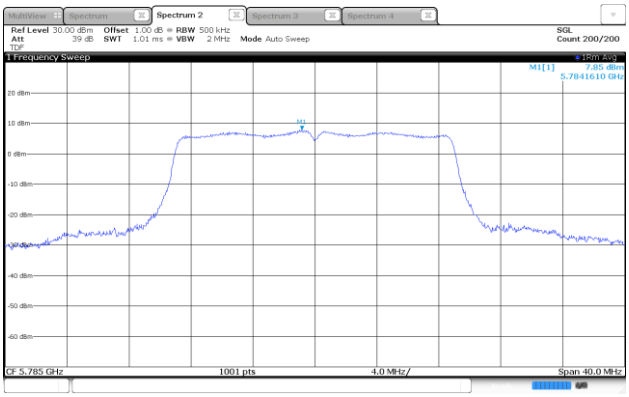
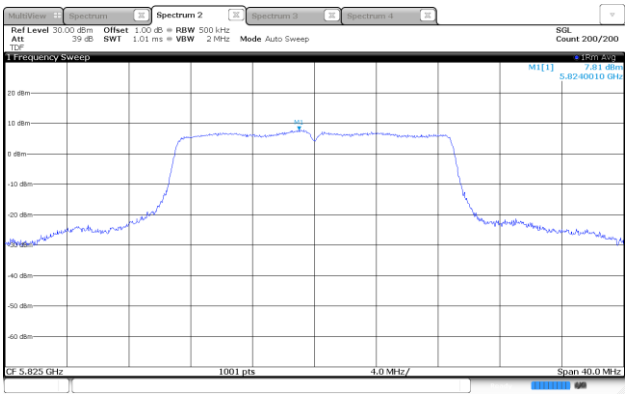
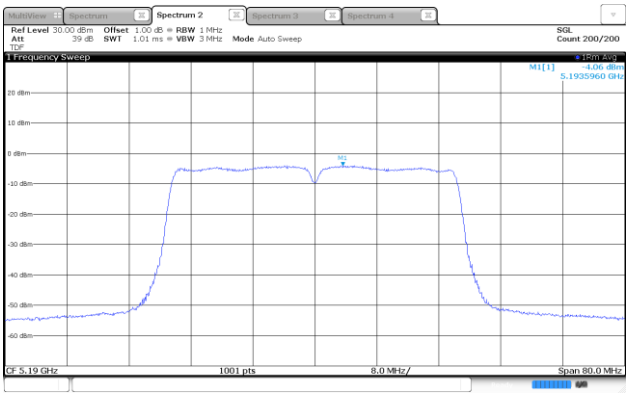
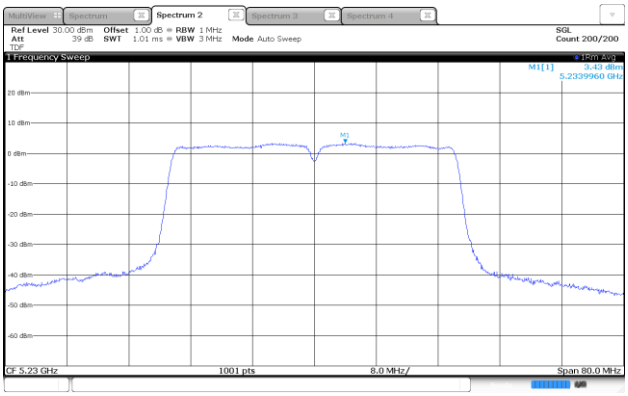
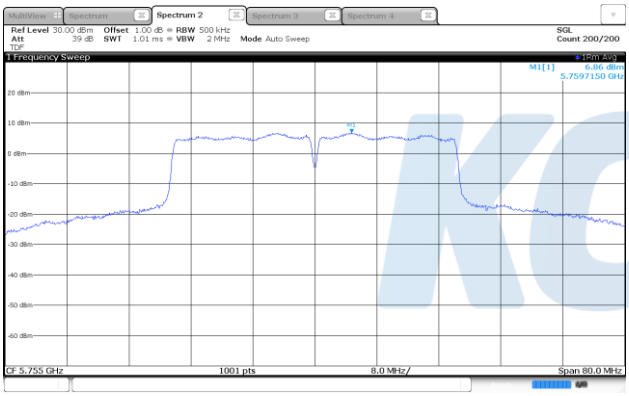
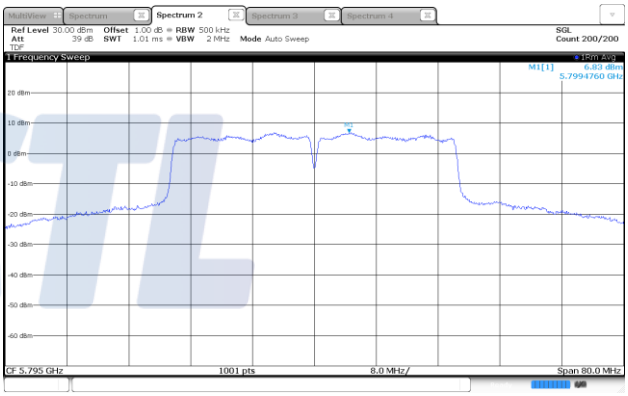
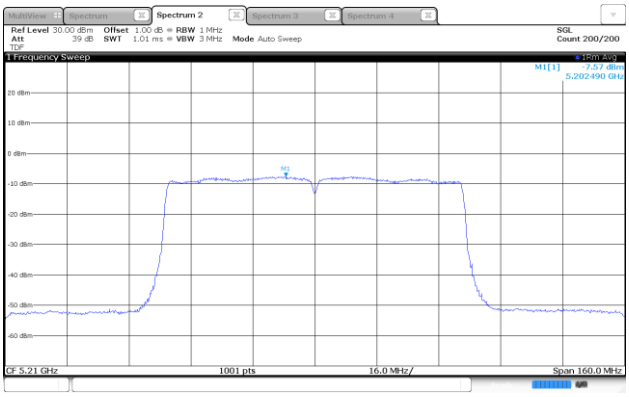
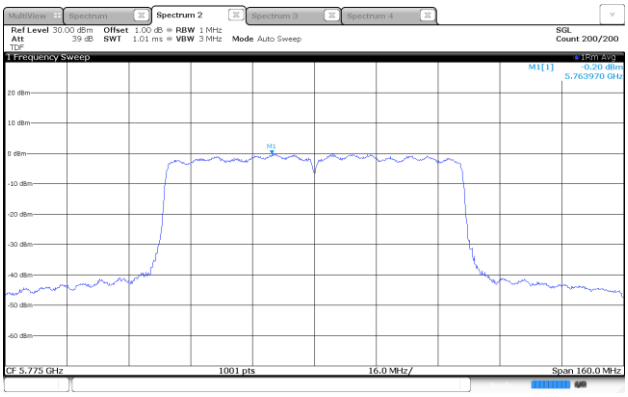
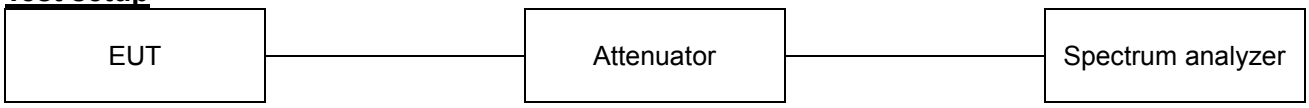
	
5 240 ㎒	5 745 ㎒
	
5 785 ㎒	5 825 ㎒

ANT2_802.11ac VHT40	
	
5 190 ㎒	5 230 ㎒
	
5 755 ㎒	5 795 ㎒
ANT0_802.11ac VHT80	
	
5 210 ㎒	5 775 ㎒

7.3. 26 dB Bandwidth & 99% Occupied Bandwidth

Test setup



Limit

N/A

Test procedure

26dBbandwidth

KDB 789033 D02 v02r01 - Section C.1

99% bandwidth

KDB 789033 D02 v02r01 - Section D

Test settings

26 dB Bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. 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

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1% to 5% of the OBW
4. Set VBW ≥ 3 x RBW
5. 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.
6. Use the 99% power bandwidth function of the instrument (if available).
7. 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.

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Test results

26 dB bandwidth

Test mode	Frequency(㎒)	Measured Bandwidth ANT0 (㎒z)	Measured Bandwidth ANT1 (㎒z)	Measured Bandwidth ANT2 (㎒z)
11a	5 180	20.03	19.94	20.14
	5 200	19.98	19.90	20.14
	5 240	20.08	19.90	20.10
11n HT20	5 180	20.53	20.34	20.3
	5 200	20.48	20.38	20.34
	5 240	20.48	20.22	20.42
11n HT40	5 190	39.16	39.08	39.00
	5 230	39.32	39.16	39.08
11ac VHT20	5 180	20.58	20.30	20.46
	5 200	20.48	20.30	20.38
	5 240	20.53	20.30	20.42
11ac VHT40	5 190	39.32	39.00	39.00
	5 230	39.40	39.08	39.00
11ac VHT80	5 210	80.24	79.92	79.92

99% bandwidth

Test mode	Frequency(㎒)	Occupied Bandwidth (99% BW) ANT0 (㎒z)	Occupied Bandwidth (99% BW) ANT1 (㎒z)	Occupied Bandwidth (99% BW) ANT2 (㎒z)
11a	5 240	16.82	16.81	16.72
11n HT20	5 240	17.86	17.77	17.76
11n HT40	5 230	36.27	36.21	36.20
11ac VHT20	5 240	17.88	17.75	17.78
11ac VHT40	5 230	36.19	36.21	36.19
11ac VHT80	5 210	75.61	75.67	75.54

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26 dB bandwidth

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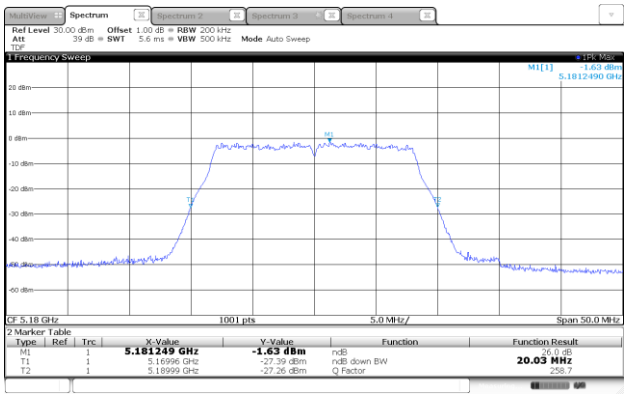	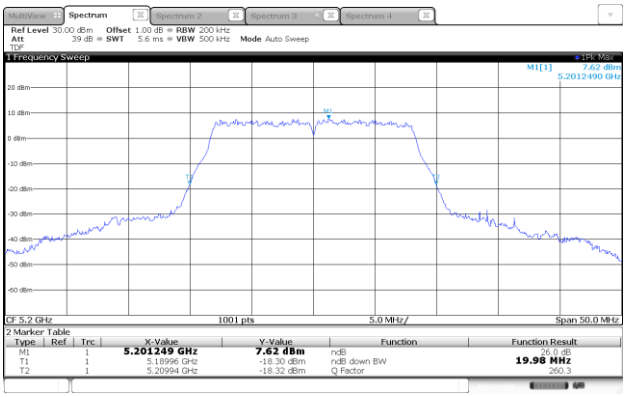
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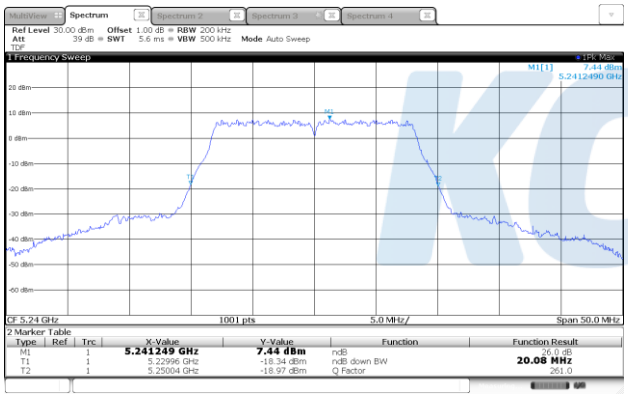	Blank
5 240 ㎒	

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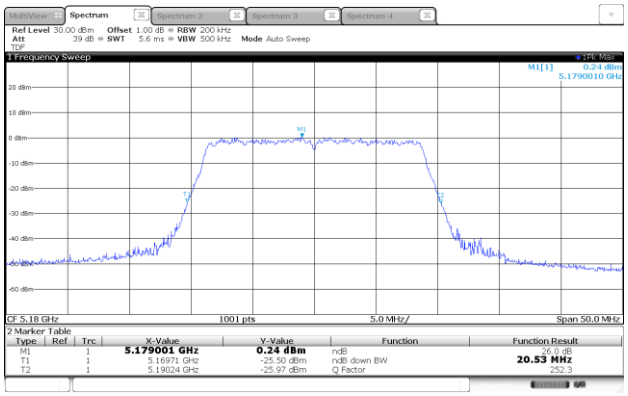
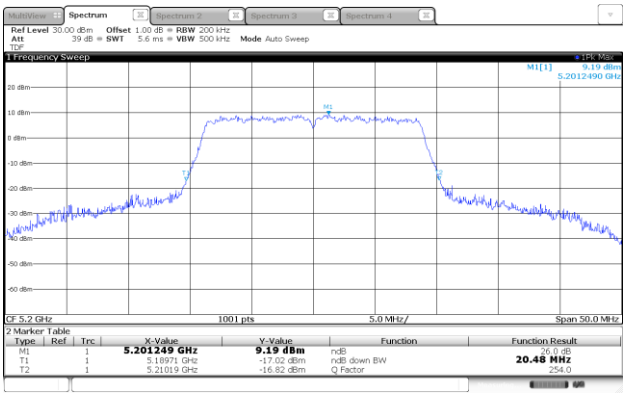
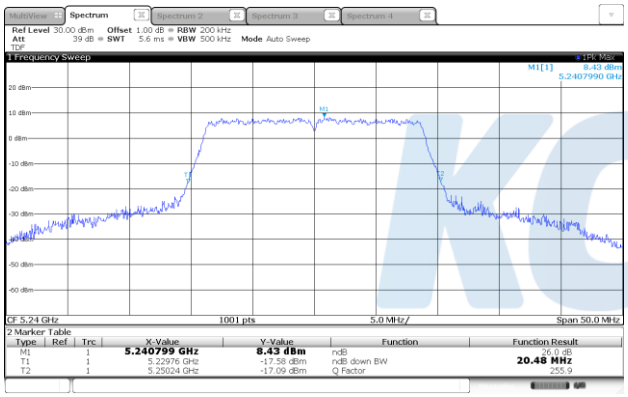
	
5 180 ㎒	5 200 ㎒
	Blank
5 240 ㎒	
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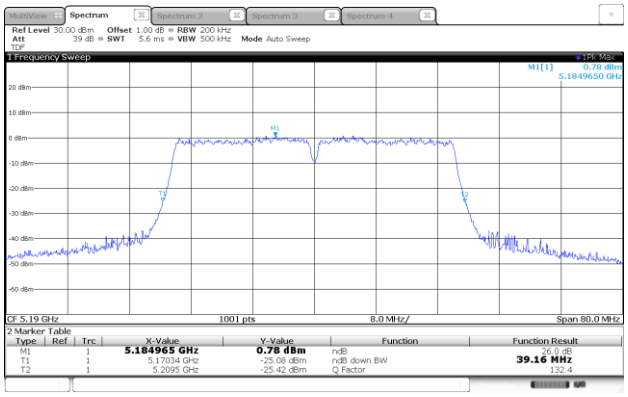
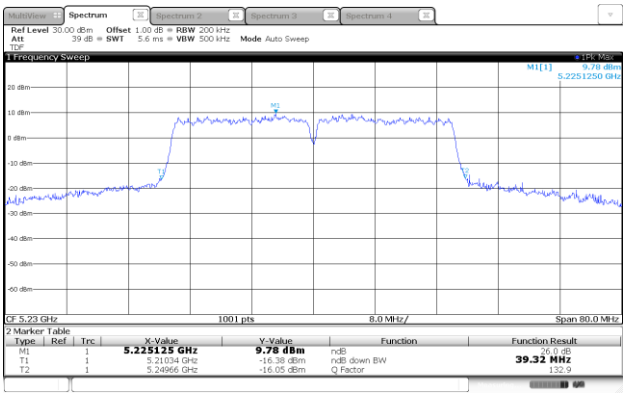
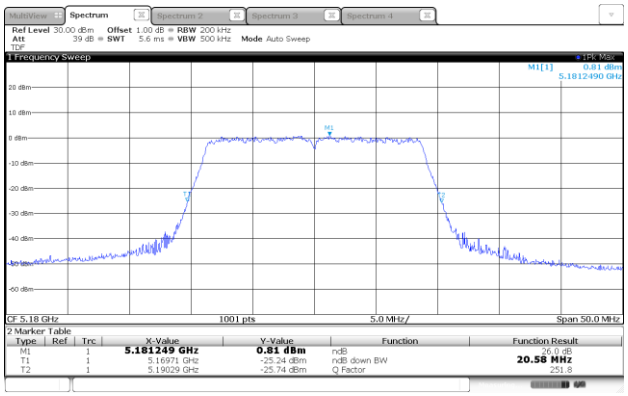
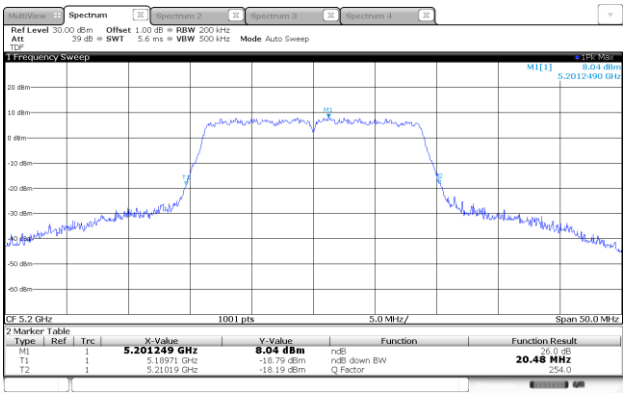
	
5 190 ㎒	5 230 ㎒

ANT0_802.11ac VHT20	
	
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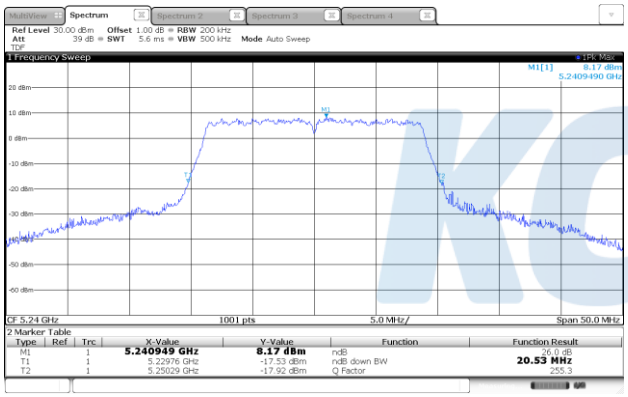	Blank
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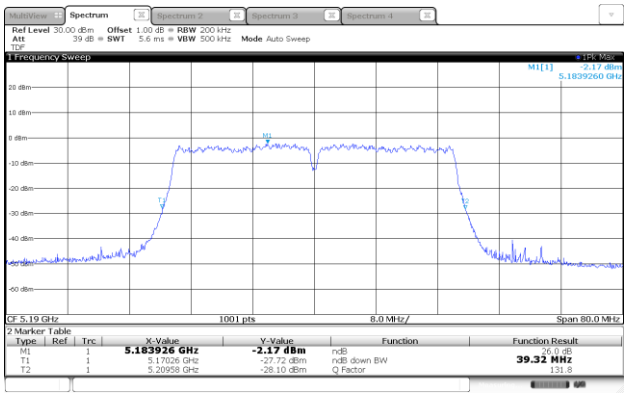	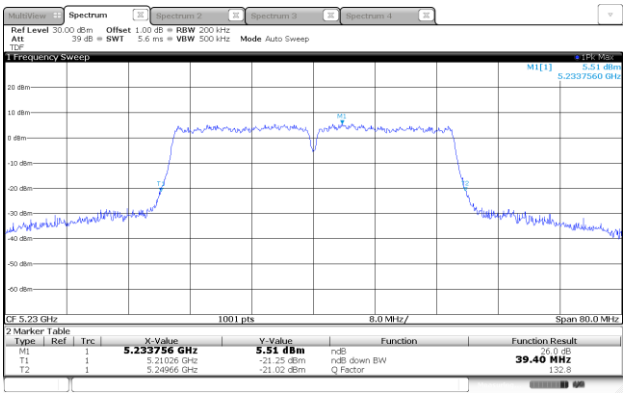
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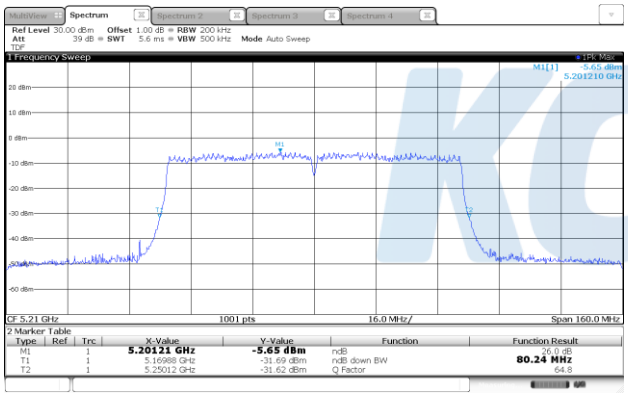	Blank
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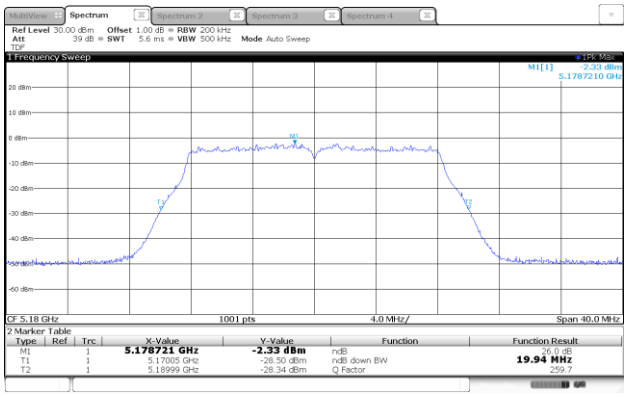	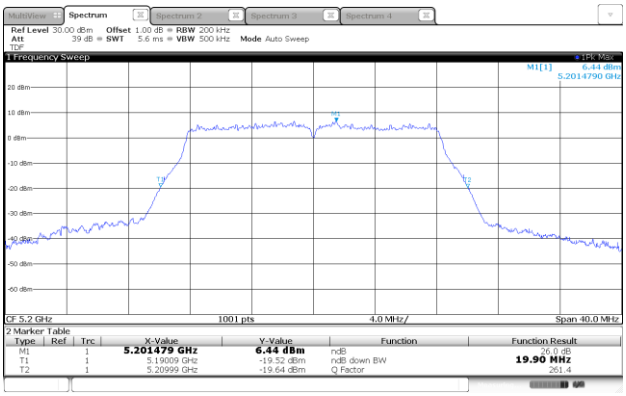
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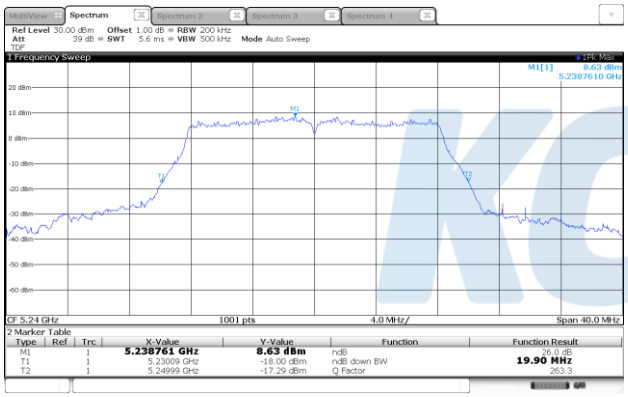	Blank
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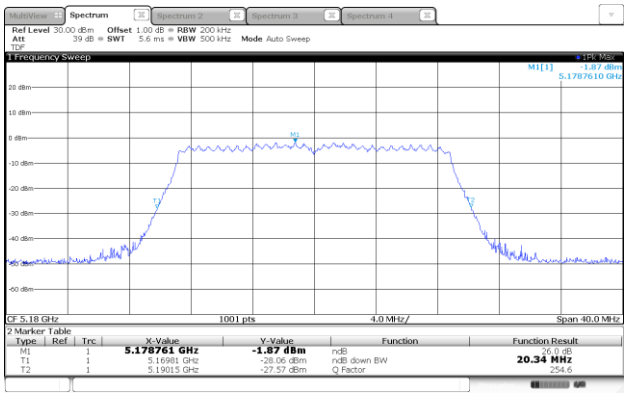	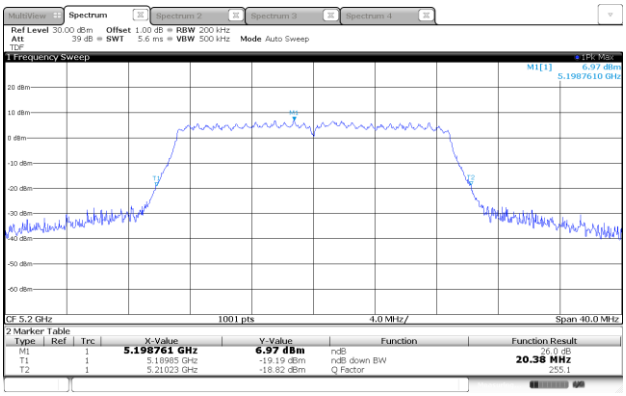
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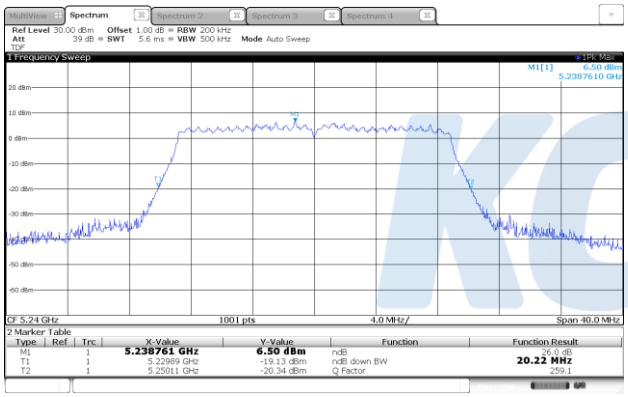	Blank
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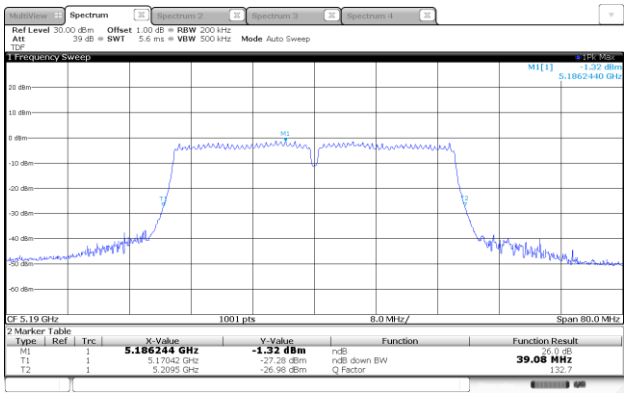	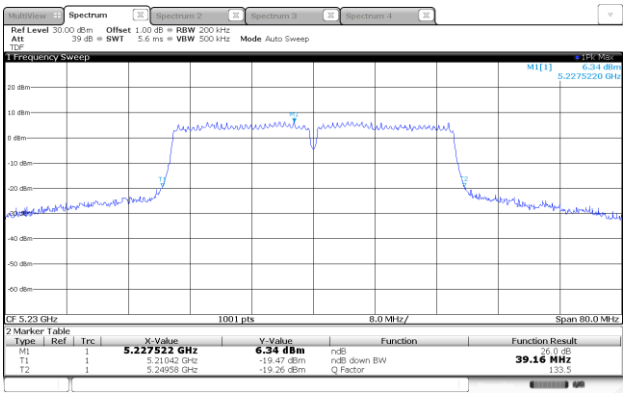
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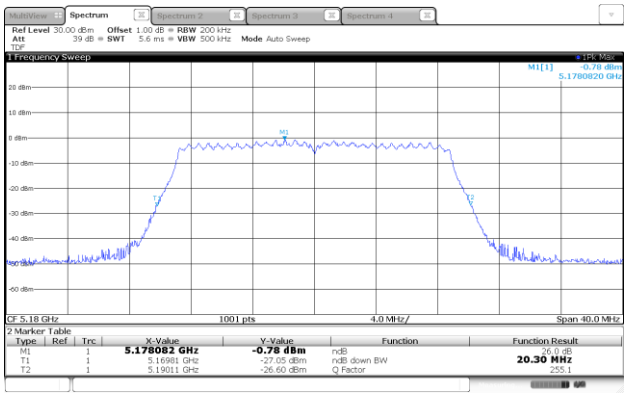	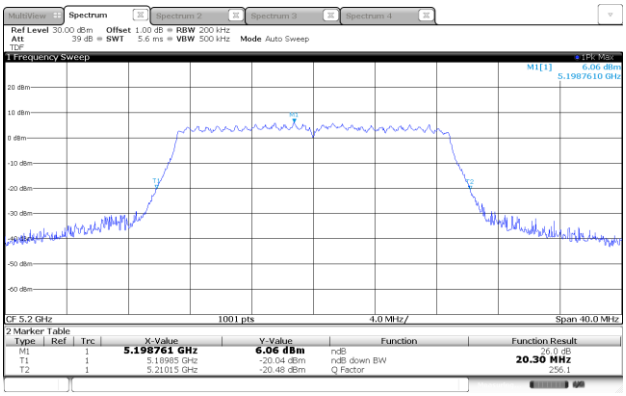
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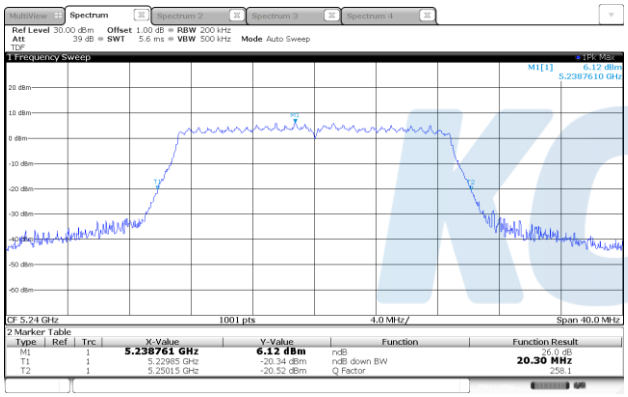	Blank
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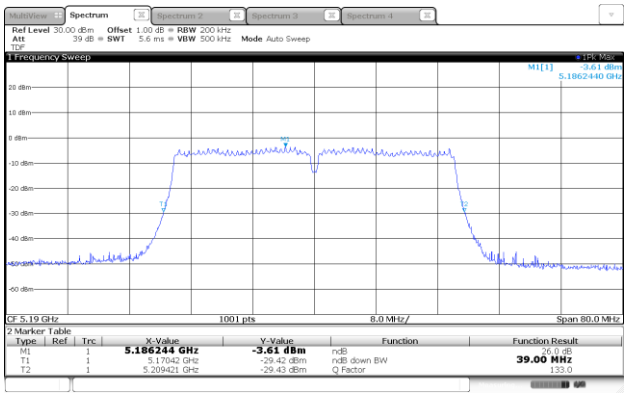	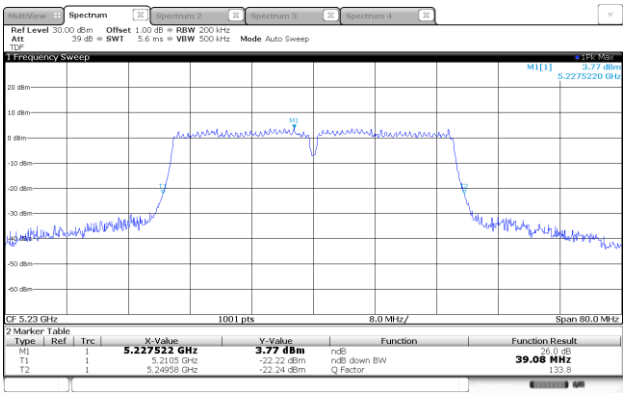
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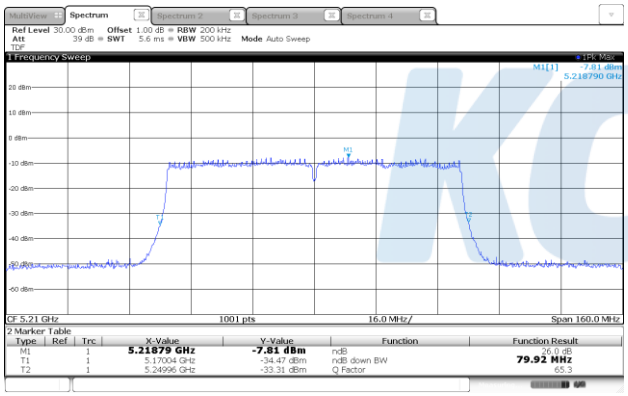	Blank
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