TEST REPORT

Eurofins KCTL Co.,Ltd. 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	Report No.: KR22-SRF0065-B Page (1) of (997)	eurofins | KCTL

1. Client

- Name : Kaonbroadband CO., LTD.
- Address : 884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
- Date of Receipt : 2022-02-10

2. Use of Report : Certification

3. Name of Product / Model : DOCSIS3.1 Gateway (IT) / CG3000BM

4. Manufacturer / Country of Origin : Kaonbroadband CO., LTD. / Korea

5. FCC ID : 2AXCW-CG3000BM

6. Date of Test : 2022-02-17 to 2022-04-28

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

8. Test method used : FCC Part 15 Subpart E, 15.407

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

Affirmation	Tested by Name : Euijung Kim (Signature)	Technical Manager Name : Heesu Ahn (Signature)

2022-08-25

Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2022-05-12	Originally issued	-
2022-07-15	Updated	4, 5, 17,114
2022-08-25	Updated	14, 17, 21, 23, 437

Note. The report No. KR22-SRF0065-A is superseded by the report No. KR22-SRF0065-B.

General remarks for test reports

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

(may be required by the product standard or client)

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

Procedure number, issue date and title:

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

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

CONTENTS

1. General information

Client	:	Kaonbroadband CO., LTD.
Address	:	884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
Manufacturer	:	Kaonbroadband CO., LTD.
Address	:	884-3, Seongnam-daero, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic 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
		CAB Identifier: KR0040, ISED Number: 8035A
		KOLAS No.: KT231

2. Device information

Equipment under test	:	DOCSIS3.1 Gateway (IT)
Model	:	CG3000BM
Derivative Model	:	CG3000B
Frequency range	:	2 412 ㎒ ~ 2 462 ㎒ (802.11b/g/n_HT20)
		2 422 ㎒ ~ 2 452 ㎒ (802.11n_H40)
		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)
Modulation technique	:	WIFI(802.11a/b/g/n/ac)_DSSS, OFDM
Number of channels	:	802.11b/g/n_HT20 : 11 ch (20 ㎒), 7 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 12 V
Antenna specification	:	PCB Antenna (33.5mm_150mm): 2.4 ㎓ ANT 0,1 / 5 ㎓ ANT 0,2,3 PCB Antenna (33.5mm_200mm): 2.4 ㎓ ANT 2 / 5 ㎓ ANT 1

Antenna gain	:	2.4 ㎓ band : ANT 0: 1.90 ㏈i, ANT 1: 1.90 ㏈i, ANT 2: 1.90 ㏈i
		UNII-1 ANT 0: 1.50 ㏈i , ANT 1: 1.60 ㏈i, ANT 2: 1.50 ㏈i, ANT 3: 1.50 ㏈i
		UNII-2A ANT 0: 1.60 ㏈i, ANT 1: 1.60 ㏈i , ANT 2: 1.60 ㏈i, ANT 3: 1.60 ㏈i
		UNII-2C ANT 0: 1.80 ㏈i, ANT 1: 2.00 ㏈i, ANT 2: 1.80 ㏈i, ANT 3: 1.80 ㏈i
		UNII-3 ANT 0: 2.00 ㏈i, ANT 1: 1.70 ㏈i, ANT 2: 2.00 ㏈i, ANT 3: 2.00 ㏈i
Software version	:	v1.01.12
Hardware version	:	REV1.0
Test device serial No.	:	N/A
Operation temperature	:	-20 ℃ ~ 50 ℃

Note. The Product equality letter includes detailed information about the differences between basic and derivative model.

2.1. Information about derivative model

The difference between basic model and derivative models is:
The basic and derivative model are the same mechanically, electrically.
All models are made up by same H/W, F/W.

The support card is different for each model.
Please refer to the below list.

	CG3000BM	CG3000B
DC DC location	Top side	Same as G3000BM, but with or without Polymer cap 1point
Docsis DX FILTER	No shield can	Shielded
DDR	1G	512M
Nand flash	512M	256M
Bottom heatsink	No Bottom heatsink	Bottom heatsink
ETH port TVS diode	TVS Diode	No TVS Diode

Both models were pre-investigated before testing, and the worst case among them was tested.
Worst case model: CG3000BM (Basic model)

2.2. Accessory information

Equipment	Manufacturer	Model	Serial No.	FCC ID
AC Adapter	MASS POWER	S042-1A120333VU	N/A	Input: 100-240 V, 50/60㎐/1.0 A Output: 12 V/3.33A

2.3. Simultaneous Tx Condition

Simultaneous Tx condition – RSDB

Mode	# of TX	5㎓ WLAN				2.4㎓ WLAN			Test Case
		ANT 0	ANT 1	ANT 2	ANT 3	ANT 0	ANT 1	ANT 2	
2.4㎓+5㎓ WLAN (RSDB MIMO)	7	O	O	O	O	O	O	O	O

2.4. Frequency/channel operations

This device contains the following capabilities:
2.4 ㎓ WIFI: WLAN 802.11b/g/n(HT20/HT40)
5 ㎓ WIFI: WLAN 802.11a/n(HT20/HT40)/ac(VHT20/VHT40/VHT80)

UNII-1

Ch.	Frequency (㎒)
36	5 180
44	5 220
48	5 240

UNII-2A

Ch.	Frequency (㎒)
52	5 260
60	5 300
64	5 320

UNII-2C

Ch.	Frequency (㎒)
100	5 500
116	5 580
140	5 700
144	5 720

UNII-3

Ch.	Frequency (㎒)
149	5 745
157	5 785
165	5 825

Table 2.4.1. 802.11a/n/ac_HT20/VHT20 mode

UNII-1

Ch.	Frequency (㎒)
38	5 190
46	5 230

UNII-2A

Ch.	Frequency (㎒)
54	5 270
62	5 310

UNII-2C

Ch.	Frequency (㎒)
102	5 510
110	5 550
134	5 670
142	5 710

UNII-3

Ch.	Frequency (㎒)
151	5 755
159	5 795

Table 2.4.2. 802.11n/ac_HT40/VHT40 mode

UNII-1

Ch.	Frequency (㎒)
42	5 210

UNII-2A

Ch.	Frequency (㎒)
58	5 290

UNII-2C

Ch.	Frequency (㎒)
106	5 530
122	5 610
138	5 690

UNII-3

Ch.	Frequency (㎒)
155	5 775

Table 2.4.3 802.11ac_VHT80 mode

2.5. RF power setting in TEST SW

Mode	Frequency(㎒)	RF Power setting value				
		ANT 0	ANT 1	ANT 2	ANT 3	4TX MIMO
a	5 180	45	45	45	45	45
	5 220	31	31	31	31	39
	5 240	31	31	31	31	39
	5 260	36	36	36	36	51
	5 300	36	36	36	36	51
	5 320	52	52	52	52	51
	5 500	47	47	47	47	52
	5 580	40	40	40	40	54
	5 700	45	45	45	45	58
	5 720	46	46	46	46	58
	5 745	36	36	36	36	37
	5 785	35	35	35	35	37
	5 825	35	35	35	35	37
n20	5 180	45	45	45	45	45
	5 220	35	35	35	35	38
	5 240	35	35	35	35	38
	5 260	37	37	37	37	50
	5 300	37	37	37	37	50
	5 320	50	50	50	50	50
	5 500	47	47	47	47	51
	5 580	40	40	40	40	53
	5 700	45	45	45	45	57
	5 720	46	46	46	46	57
	5 745	36	36	36	36	37
	5 785	36	36	36	36	37
	5 825	36	36	36	36	37
n40	5 190	44	44	44	44	47
	5 230	37	37	37	37	37
	5 270	40	40	40	40	44
	5 310	56	56	56	56	58
	5 510	50	50	50	50	56
	5 550	43	43	43	43	47
	5 670	48	48	48	48	50
	5 710	50	50	50	50	50
	5 755	42	42	42	42	41
	5 795	43	43	43	43	41

ac20	5 180	44	44	44	44	43
	5 220	36	34	34	34	37
	5 240	34	34	34	34	37
	5 260	36	36	36	36	50
	5 300	36	36	36	36	50
	5 320	46	46	46	46	50
	5 500	45	45	45	45	51
	5 580	39	39	39	39	53
	5 700	45	45	45	45	57
	5 720	46	46	46	46	57
	5 745	36	36	36	36	37
	5 785	36	36	36	36	37
	5 825	36	36	36	36	37
ac40	5 190	44	44	44	44	47
	5 230	37	37	37	37	37
	5 270	40	40	40	40	44
	5 310	55	55	55	55	51
	5 510	46	46	46	46	45
	5 550	43	43	43	43	47
	5 670	48	48	48	48	50
	5 710	50	50	50	50	50
	5 755	42	42	42	42	41
	5 795	43	43	43	43	41
ac80	5 210	42	42	42	42	44
	5 290	54	54	54	54	57
	5 530	53	53	53	53	53
	5 610	45	45	45	45	45
	5 690	48	48	48	48	46
	5 775	38	38	38	38	37

2.6. Duty Cycle Factor

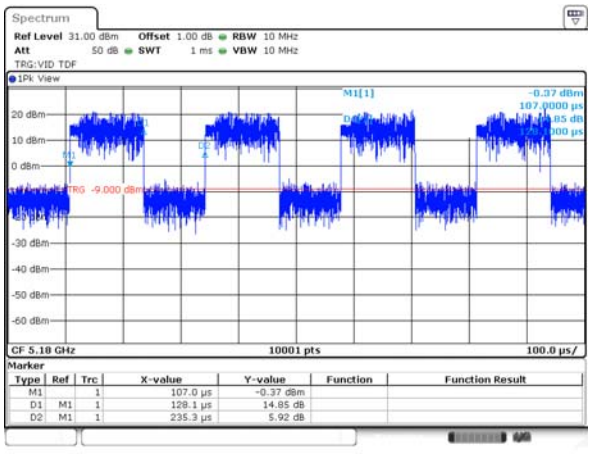
SISO

Test mode	T_{on} time (ms)	Period (ms)	Duty cycle		Duty cycle factor (dB)
			(Linear)	(%)	
802.11a	0.128 1	0.235 3	0.544 4	54.44	2.64
802.11n_HT20	0.144 0	0.243 3	0.591 9	59.19	2.28
802.11n_HT40	0.120 1	0.219 3	0.547 7	54.77	2.61
802.11ac_VHT20	0.152 0	0.181 4	0.837 9	83.79	0.77
802.11ac_VHT40	0.128 1	0.157 4	0.813 9	81.39	0.89
802.11ac_VHT80	0.120 0	0.149 4	0.803 2	80.32	0.95

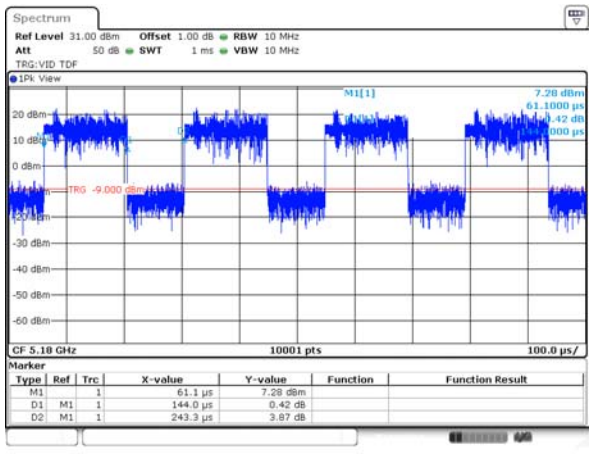
Notes.

1. Duty cycle (Linear) = T_{on} time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not applied as a continuous transmitter when the duty cycle is 98% or more.

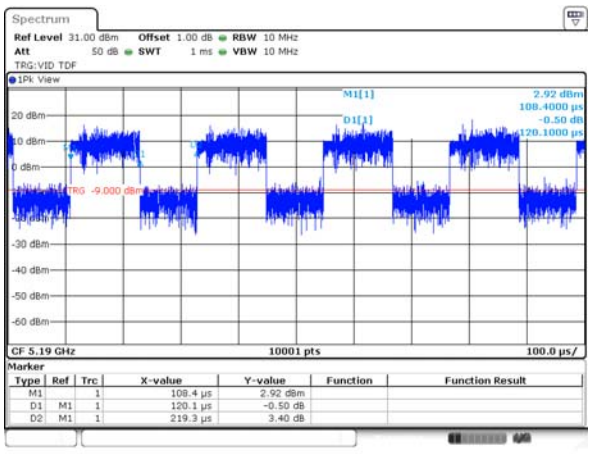
802.11a



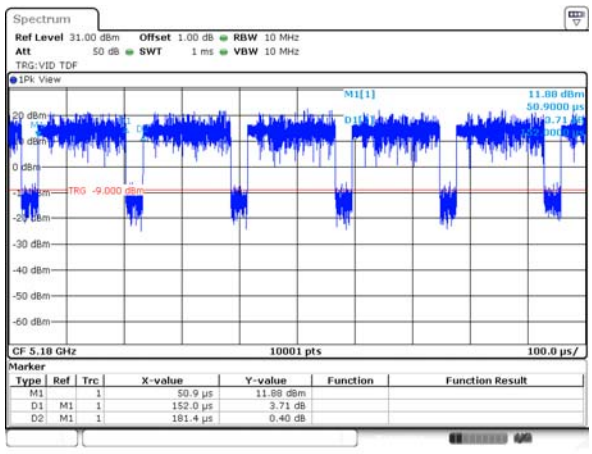
802.11n_HT20

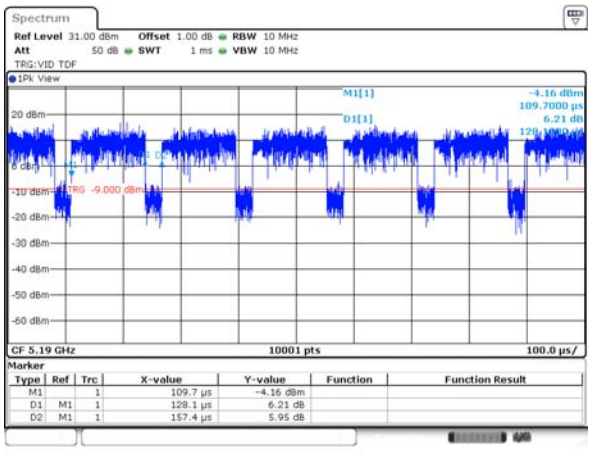
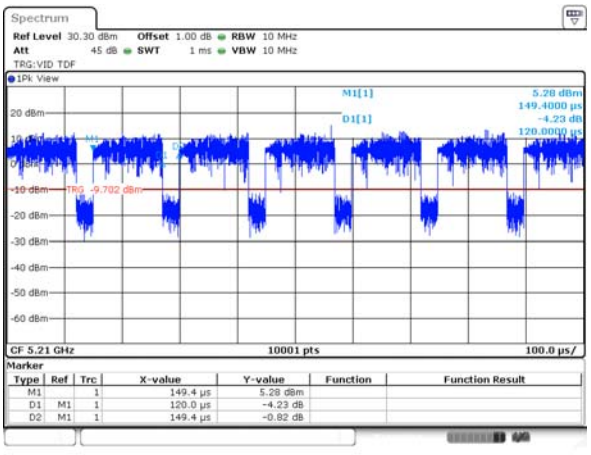


802.11n_HT40



802.11ac_VHT20



802.11ac_VHT40	802.11ac_VHT80
	

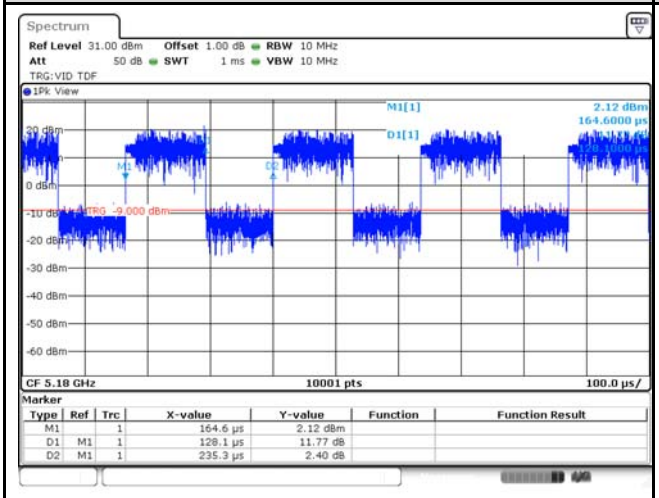
MIMO

Test mode	T_{on} time (ms)	Period (ms)	Duty cycle		Duty cycle factor (dB)
			(Linear)	(%)	
802.11a	0.128 1	0.235 3	0.544 4	54.44	2.64
802.11n_HT20	0.144 1	0.243 4	0.592 0	59.20	2.28
802.11n_HT40	0.119 8	0.219 3	0.546 3	54.63	2.63
802.11ac_VHT20	0.152 1	0.181 4	0.838 5	83.85	0.77
802.11ac_VHT40	0.128 1	0.157 4	0.813 9	81.39	0.89
802.11ac_VHT80	0.120 1	0.149 4	0.803 9	80.39	0.95

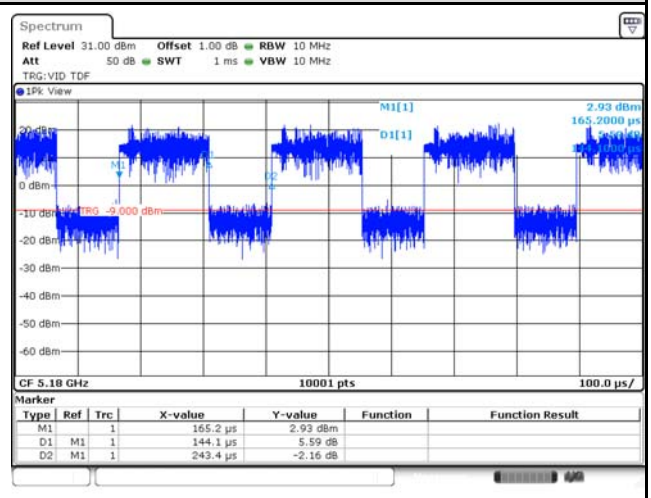
Notes.

1. Duty cycle (Linear) = T_{on} time / Period
2. DCF(Duty cycle factor) = 10log(1/duty cycle)
3. DCF is not applied as a continuous transmitter when the duty cycle is 98% or more.

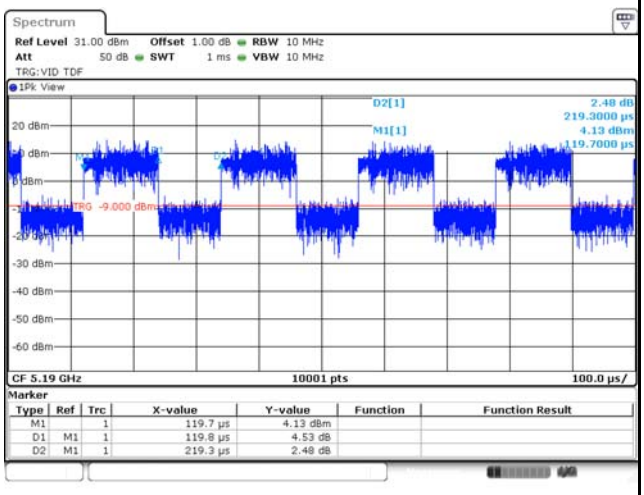
802.11a



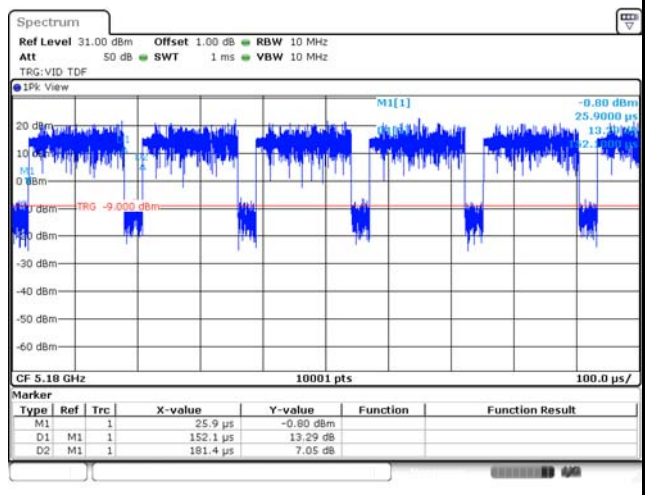
802.11n_HT20

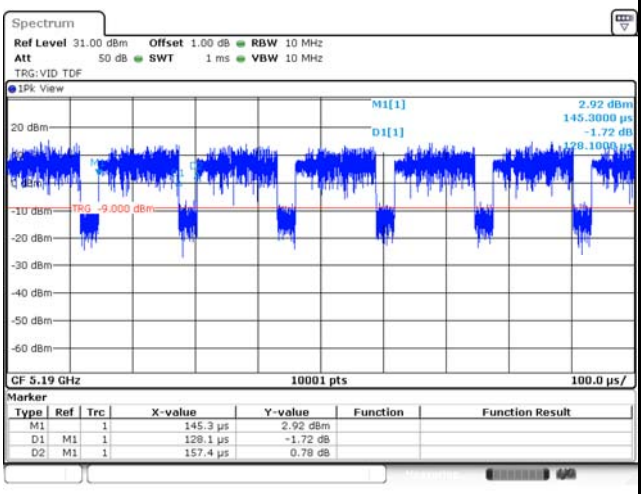
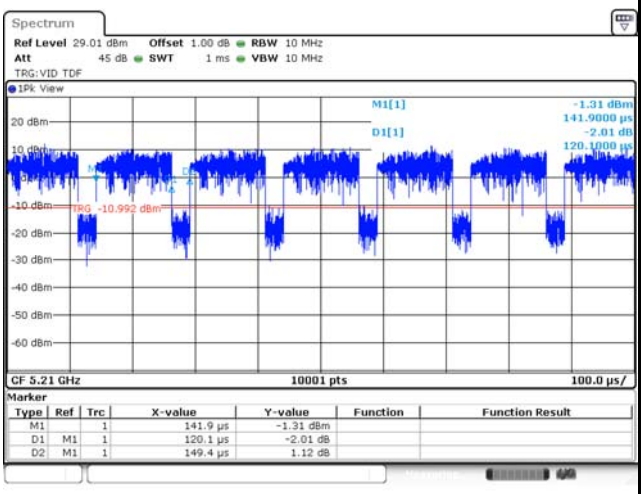


802.11n_HT40



802.11ac_VHT20



802.11ac_VHT40	802.11ac_VHT80
	

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 PCB Antenna.
- The E.U.T Complies with the requirement of §15.203, §15.407

3.1. Antenna information

Mode	SISO				CDD	MIMO
	ANT 0	ANT 1	ANT 2	ANT 3	ANT 0 + 1 + 2 + 3	ANT 0 + 1 + 2 + 3
802.11a	√	√	√	√	√	X
802.11n HT20	√	√	√	√	√	√
802.11n HT40	√	√	√	√	√	√
802.11ac VHT20	√	√	√	√	√	√
802.11ac VHT40	√	√	√	√	√	√
802.11ac VHT80	√	√	√	√	√	√

√ = Support, ×= Not support

Note.

1. This device employs SISO and CDD, MIMO technology output power as ANT 0 and ANT 1 and ANT 2 and ANT 3.

3.2. Directional Gain Calculations

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

3.2.1. Directional Antenna Gain with equal gain

Band	ANT 0 Gain (dBi)	ANT 1 Gain (dBi)	ANT 2 Gain (dBi)	ANT 3 Gain (dBi)	PSD Directional Gain (dBi)	Power Directional Gain (dBi)
UNII 1	1.50	1.60	1.50	1.50	7.55	1.60
UNII 2A	1.60	1.60	1.60	1.60	7.62	1.60
UNII 2C	1.80	2.00	1.80	1.80	7.87	2.00
UNII 3	2.00	1.70	2.00	2.00	7.95	2.00

Note.

1. If all transmit signals are completely correlated, then

Directional gain = $G_{ANT\ MAX}$ + Array Gain.

- For PSD measurements on all devices Array gain = 10 log (N_{ANT} / N_{SS}) dB
- For Power measurements on IEEE 802.11 devices Array gain = 0 dB For $N_{ANT} \leq 4$.

4. Summary of tests

FCC Part section(s)	Parameter	Test condition	Test results
15.407(a)	Maximum conducted output power	Conducted	Pass
15.407(a)	Maximum power spectral density		Pass
15.407(a)	26 dB bandwidth		Pass
15.407(e)	6 dB bandwidth		Pass
15.207(a)	AC Conducted emissions		Pass
15.407(d), 15.205(a), 15.209(a)	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. According to ANSI C63.10 6.3.1, the fundamental of the EUT was investigated in two orthogonal orientations X, Y. It was determined that X orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in X orientation.
   (EUT: wireless access points)
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 supports SISO and MIMO modes.
6. The worst-case data rates were:
   802.11a mode : 6Mbps
   802.11n/ac_HT20 mode : MCS0 / MCS0NSS1
   802.11n/ac_HT40 mode : MCS0 / MCS0NSS1
   802.11ac_VHT80 mode : MCS0 / MCS0NSS1

5. Measurement uncertainty

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

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

Parameter	Expanded uncertainty (±)	
Conducted RF power	0.9 dB	
Conducted spurious emissions	1.1 dB	
Radiated spurious emissions	Below 30 ㎒:	2.4 dB
	30 ㎒ ~ 1 000 ㎒	2.3 dB
	1 000 ㎒ ~ 18 000 ㎒	5.6 dB
	Above 18 000 ㎒	5.7 dB
Conducted emissions	9 ㎑ ~ 150 ㎑	1.6 dB
	150 ㎑ ~ 30 ㎒	1.7 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.

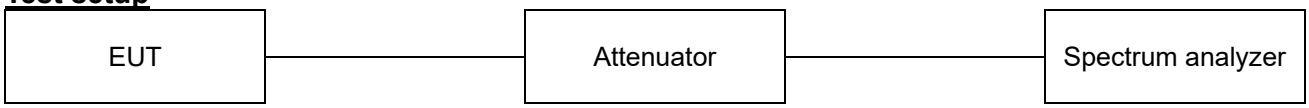
Frequency (㎒)	Factor(㏈)	Frequency (㎒)	Factor(㏈)
30	10.01	9 000	11.61
50	10.03	10 000	11.79
100	10.08	11 000	11.76
200	10.16	12 000	11.87
300	10.22	13 000	12.22
400	10.26	14 000	12.06
500	10.32	15 000	12.16
600	10.35	16 000	12.19
700	10.39	17 000	12.29
800	10.42	18 000	12.41
900	10.46	19 000	12.49
1 000	10.42	20 000	12.43
2 000	10.67	21 000	12.65
3 000	10.85	22 000	12.84
4 000	11.06	23 000	12.75
5 000	11.20	24 000	12.67
6 000	11.30	25 000	12.92
7 000	11.41	26 000	12.99
8 000	11.49	26 500	12.84

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

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 (23.98 dBm)
UNII-2A	√		250 mW or 11 dBm + 10logB*
UNII-2C	√		250 mW or 11 dBm + 10logB*
UNII-3	√		1 W (30 dBm)

According to §15.407(h)(1), Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).

(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

Note.:

*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.2.d) or e)
KDB 662911 D01 v02r01 – Section E).1)

Test settings
Used test method is Section E.2.d)

◆ 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

Test mode	Band	Frequency (㎒)	Measured output power									
			Reading ANT 0 (dBm)	Reading ANT 1 (dBm)	Reading ANT 2 (dBm)	Reading ANT 3 (dBm)	DCF (dB)	Result ANT 0 (dBm)[1)]	Result ANT 1 (dBm)[1)]	Result ANT 2 (dBm)[1)]	Result ANT 3 (dBm)[1)]	Limit (dBm)
11a	UNII 1	5 180	12.24	12.80	11.47	10.75	2.64	14.88	15.44	14.11	13.39	30.00
		5 220	19.14	19.96	18.74	18.45		21.78	22.60	21.38	21.09	
		5 240	19.66	20.38	19.46	18.65		**22.30**	**23.02**	**22.10**	**21.29**	
	UNII 2A	5 260	17.52	18.42	17.67	16.36		**20.16**	21.06	20.31	19.00	23.98
		5 300	17.48	18.61	18.11	16.77		20.12	21.25	**20.75**	19.41	
		5 320	9.52	11.24	10.29	9.10		12.16	13.88	12.93	11.74	
	UNII 2C	5 500	11.86	14.12	12.97	11.97		14.50	16.76	15.61	14.61	23.98
		5 580	16.62	18.35	17.76	16.60		19.26	20.99	20.40	19.24	
		5 700	16.24	17.19	17.10	15.60		18.88	19.83	19.74	18.24	
	UNII 3	5 745	19.56	19.62	19.67	18.50		22.20	22.26	22.31	21.14	30.00
		5 785	19.63	19.38	19.18	18.47		22.27	22.02	21.82	21.11	
		5 825	19.57	19.53	19.06	18.38		22.21	22.17	21.70	21.02	
11n HT20	UNII 1	5 180	12.88	13.38	12.15	11.75	2.28	15.16	15.66	14.43	14.03	30.00
		5 220	18.38	18.92	18.03	17.51		20.66	21.20	20.31	19.79	
		5 240	18.83	19.45	18.58	18.03		21.11	21.73	20.86	20.31	
	UNII 2A	5 260	17.61	18.68	17.77	16.87		19.89	20.96	20.05	19.15	23.98
		5 300	17.68	19.00	18.15	17.16		19.96	**21.28**	20.43	19.44	
		5 320	10.98	12.76	11.77	10.74		13.26	15.04	14.05	13.02	
	UNII 2C	5 500	12.46	14.88	13.56	12.87		14.74	17.16	15.84	15.15	23.98
		5 580	17.26	18.97	18.44	17.32		19.54	**21.25**	**20.72**	19.60	
		5 700	16.93	17.69	17.67	16.28		19.21	19.97	19.95	18.56	
	UNII 3	5 745	20.20	20.38	20.25	19.12		**22.48**	**22.66**	**22.53**	**21.40**	30.00
		5 785	19.65	19.72	19.30	18.78		21.93	22.00	21.58	21.06	
		5 825	19.62	19.72	19.18	18.72		21.90	22.00	21.46	21.00	
11n HT40	UNII 1	5 190	10.74	12.49	9.59	11.17	2.61	13.35	15.10	12.20	13.78	30.00
		5 230	17.17	18.25	16.98	16.13		19.78	20.86	19.59	18.74	
	UNII 2A	5 270	15.52	17.10	15.83	15.01		18.13	19.71	18.44	17.62	23.98
		5 310	8.10	9.63	8.74	7.63		10.71	12.24	11.35	10.24	
	UNII 2C	5 510	10.64	12.40	11.74	10.88		13.25	15.01	14.35	13.49	23.98
		5 550	14.69	16.79	15.90	14.86		17.30	19.40	18.51	17.47	
		5 670	13.88	15.17	14.86	13.41		16.49	17.78	17.47	16.02	
	UNII 3	5 755	17.65	18.20	17.88	16.42		20.26	20.81	20.49	19.03	30.00
		5 795	16.25	17.14	15.94	15.31		18.86	19.75	18.55	17.92	
11ac VHT20	UNII 1	5 180	14.80	15.22	13.72	13.42	0.77	15.57	15.99	14.49	14.19	30.00
		5 220	19.84	20.56	19.34	18.91		20.61	21.33	20.11	19.68	
		5 240	20.25	21.06	20.10	19.41		21.02	21.83	20.87	20.18	
	UNII 2A	5 260	19.11	19.98	19.20	18.55		19.88	20.75	19.97	19.32	23.98

		5 300	19.10	20.27	19.66	18.85		19.87	21.04	20.43	**19.62**	
		5 320	14.59	16.17	15.30	13.99		15.36	16.94	16.07	14.76	
	UNII 2C	5 500	15.13	17.29	16.30	15.36		15.90	18.06	17.07	16.13	
		5 580	19.10	20.46	19.87	19.09		**19.87**	21.23	20.64	**19.86**	23.98
		5 700	18.15	19.05	18.95	17.47		18.92	19.82	19.72	18.24	
	UNII 3	5 745	21.41	21.59	21.45	20.41		22.18	22.36	22.22	21.18	
		5 785	20.89	20.91	20.46	19.84		21.66	21.68	21.23	20.61	30.00
		5 825	20.82	21.13	20.34	19.75		21.59	21.90	21.11	20.52	
11ac VHT40	UNII 1	5 190	12.28	13.94	10.97	12.46		13.17	14.83	11.86	13.35	
		5 230	18.72	19.57	18.36	18.01		19.61	20.46	19.25	18.90	30.00
	UNII 2A	5 270	17.37	18.59	17.54	16.93		18.26	19.48	18.43	17.82	
		5 310	10.22	11.51	10.76	9.74		11.11	12.40	11.65	10.63	30.00
	UNII 2C	5 510	14.01	16.00	14.97	14.26	0.89	14.90	16.89	15.86	15.15	
		5 550	16.25	18.58	17.63	16.37		17.14	19.47	18.52	17.26	23.98
		5 670	15.54	17.00	16.26	15.08		16.43	17.89	17.15	15.97	
	UNII 3	5 755	19.32	19.65	19.26	18.32		20.21	20.54	20.15	19.21	
		5 795	18.13	18.66	17.65	17.18		19.02	19.55	18.54	18.07	30.00
11ac VHT80	UNII 1	5 210	11.97	13.87	10.86	12.30		12.92	14.82	11.81	13.25	30.00
	UNII 2A	5 290	9.98	11.74	10.48	9.35		10.93	12.69	11.43	10.30	23.98
	UNII 2C	5 530	11.17	13.44	12.09	11.15	0.95	12.12	14.39	13.04	12.10	
		5 610	15.74	17.61	16.71	15.51		16.69	18.56	17.66	16.46	23.98
	UNII 3	5 775	21.21	21.30	21.27	19.75		22.16	22.25	22.22	20.70	30.00

Note.
1. Result(dBm) = Reading (dBm) + Duty Cycle Factor (dB)

2. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 ㎽ (26.99 dBm) for FCC.
Maximum e.i.r.p(dBm) = Maximum output power(dBm) + Ant gain (dBi)
UNII 2A 11n HT20 / ANT 1 / 5 300 ㎒ = 21.28 (dBm) + 1.60 (dBi) = 22.88 (dBm)
UNII 2C 11n HT20 / ANT 1 / 5 580 ㎒ = 21.25 (dBm) + 2.00 (dBi) = 23.25 (dBm)

4TX MIMO

Test mode	Band	Frequency (㎒)	Measured output power						
			Reading ANT 0 (dBm)	Reading ANT 1 (dBm)	Reading ANT 2 (dBm)	Reading ANT 3 (dBm)	DCF (dB)	Result 4TX MIMO (dBm)[1)]	Limit (dBm)
11a	UNII 1	5 180	11.81	12.44	11.25	11.10	2.64	20.34	30.00
		5 220	15.24	16.36	15.08	14.99		24.12	
		5 240	15.70	16.80	15.79	15.52		24.64	
	UNII 2A	5 260	9.41	10.70	9.77	9.25		18.48	23.98
		5 300	9.49	11.02	10.60	9.66		18.90	
		5 320	9.44	11.22	10.51	9.87		18.97	
	UNII 2C	5 500	9.09	11.25	10.40	9.64		18.83	23.98
		5 580	9.40	11.48	10.58	9.40		18.97	
		5 700	9.30	10.83	10.29	8.75		18.53	
	UNII 3	5 745	18.67	19.37	19.02	18.18		27.49	30.00
		5 785	18.15	18.76	18.25	18.10		26.98	
		5 825	18.18	18.78	18.24	18.13		27.00	
11n HT20	UNII 1	5 180	12.53	12.95	10.22	11.67	2.28	20.26	30.00
		5 220	16.39	17.35	16.11	15.98		24.79	
		5 240	16.83	17.46	16.81	16.46		25.20	
	UNII 2A	5 260	10.44	11.56	10.65	10.08		19.01	23.98
		5 300	10.47	11.92	11.34	10.44		19.38	
		5 320	10.41	11.84	11.39	10.71		19.42	
	UNII 2C	5 500	10.11	12.04	11.48	10.53		19.40	23.98
		5 580	10.35	12.48	11.59	10.26		19.57	
		5 700	10.25	11.77	11.15	9.80		19.11	
	UNII 3	5 745	19.48	19.92	19.58	18.85		**27.77**	30.00
		5 785	18.79	19.23	18.97	18.47		27.17	
		5 825	18.93	19.32	18.92	18.53		27.23	
11n HT40	UNII 1	5 190	8.70	11.45	7.97	9.65	2.63	18.29	30.00
		5 230	16.00	17.44	16.21	15.86		25.07	
	UNII 2A	5 270	13.40	14.31	13.51	12.71		**22.17**	23.98
		5 310	6.38	7.95	7.64	6.20		15.76	
	UNII 2C	5 510	7.29	9.22	8.81	7.53		16.94	23.98
		5 550	11.97	14.05	13.61	12.45		21.75	
		5 670	12.44	13.42	13.66	12.11		21.60	
	UNII 3	5 755	17.55	17.92	17.84	16.79		26.19	30.00
		5 795	16.59	17.15	16.36	16.23		25.24	
11ac VHT20	UNII 1	5 180	14.75	15.78	14.44	13.89	0.77	21.56	30.00
		5 220	18.06	19.00	17.89	17.74		24.99	
		5 240	18.49	19.37	18.52	18.22		**25.46**	
	UNII 2A	5 260	12.32	13.30	12.07	12.03		19.25	23.98

		5 300	12.19	13.49	12.66	12.26		19.47	
		5 320	12.10	13.71	12.91	12.39		19.61	
	UNII 2C	5 500	11.67	13.93	13.00	12.19		19.57	
		5 580	11.86	14.68	13.24	11.88		19.86	23.98
		5 700	12.17	13.00	12.77	11.60		19.20	
	UNII 3	5 745	20.28	21.22	20.91	20.19		27.46	
		5 785	19.59	20.63	19.88	19.61		26.73	30.00
		5 825	19.44	20.59	19.71	19.48		26.62	
11ac VHT40	UNII 1	5 190	10.51	12.27	9.21	11.09	0.89	17.82	30.00
		5 230	17.48	18.39	17.46	17.00		24.53	
	UNII 2A	5 270	14.34	16.01	15.11	13.73		21.80	23.98
		5 310	11.04	12.60	12.18	11.13		18.70	
	UNII 2C	5 510	13.72	15.46	14.81	13.66		21.39	
		5 550	13.48	15.16	14.88	13.64		21.27	23.98
		5 670	13.64	14.99	14.89	13.41		21.21	
	UNII 3	5 755	18.69	19.28	19.04	18.27		25.75	30.00
		5 795	17.97	18.69	17.86	17.66		24.98	
11ac VHT80	UNII 1	5 210	10.26	12.34	9.60	10.78	0.95	17.84	30.00
	UNII 2A	5 290	7.60	8.68	8.46	7.43		15.04	23.98
	UNII 2C	5 530	10.19	12.03	11.74	10.29		18.11	23.98
		5 610	14.96	16.57	16.36	14.67		**22.69**	
	UNII 3	5 775	20.45	20.45	19.84	19.52		27.05	30.00

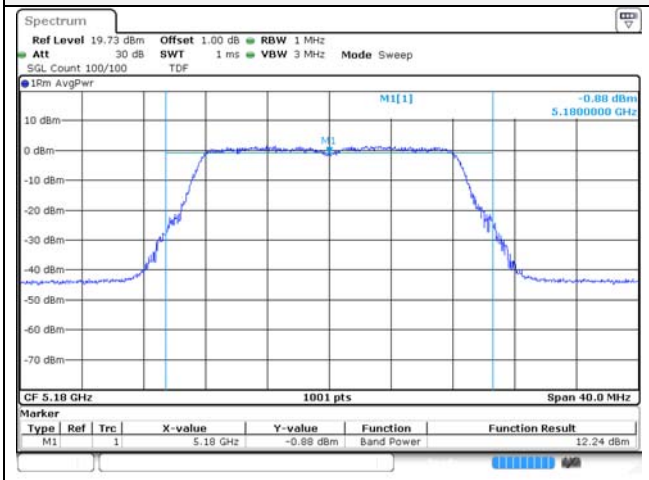
Note.

1. Result(dBm) = 10log($10^{(ANT\ 0/10)}$ + $10^{(ANT\ 1/10)}$ + $10^{(ANT\ 2/10)}$ + $10^{(ANT\ 3/10)}$) + Duty Cycle Factor (dB)

2. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 ㎽ (26.99 dBm) for FCC.
Maximum e.i.r.p(dBm) = Maximum output power(dBm) + Maximum Ant gain (dBi)
UNII 2A 11n HT40 / MIMO / 5 270 ㎒ = 22.17 (dBm) + 1.60 (dBi) = 23.77 (dBm)
UNII 2C 11ac VHT80 / MIMO / 5 610 ㎒ = 22.69 (dBm) + 2.00 (dBi) = 24.69 (dBm)

SISO ANT 0

UNII-1 / 802.11a / 5 180 ㎒



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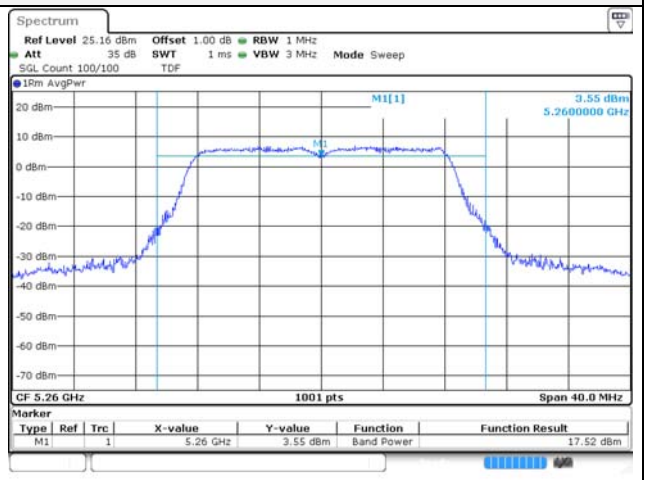

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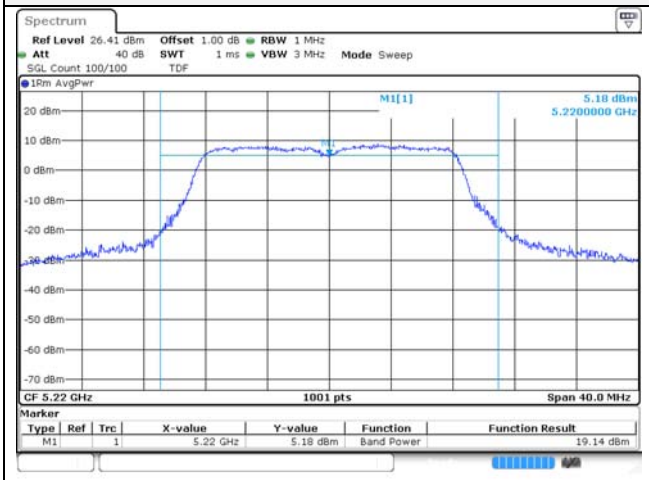

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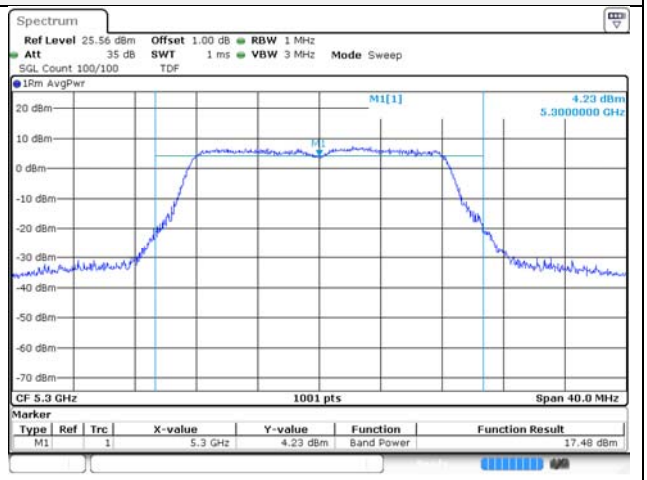

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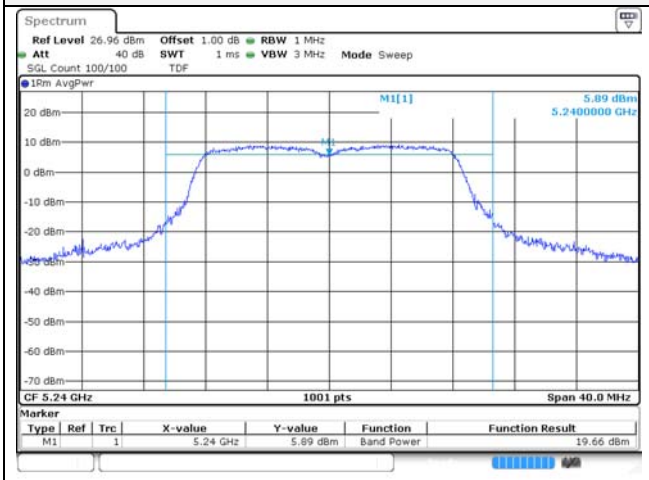

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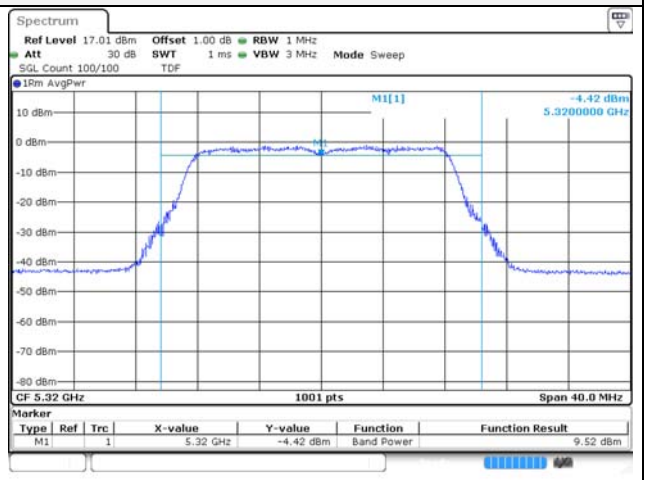
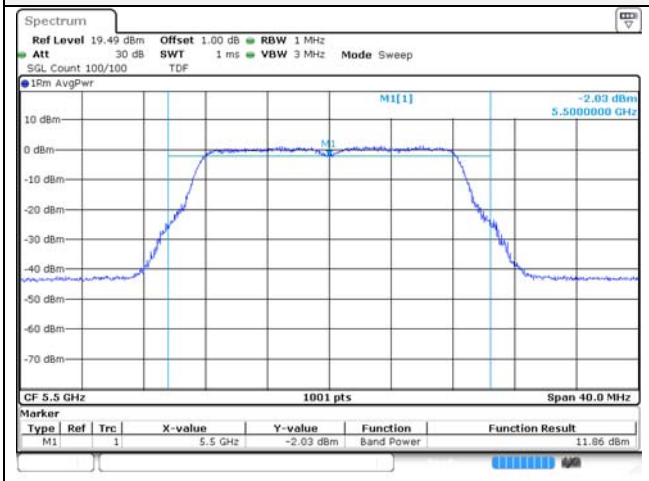
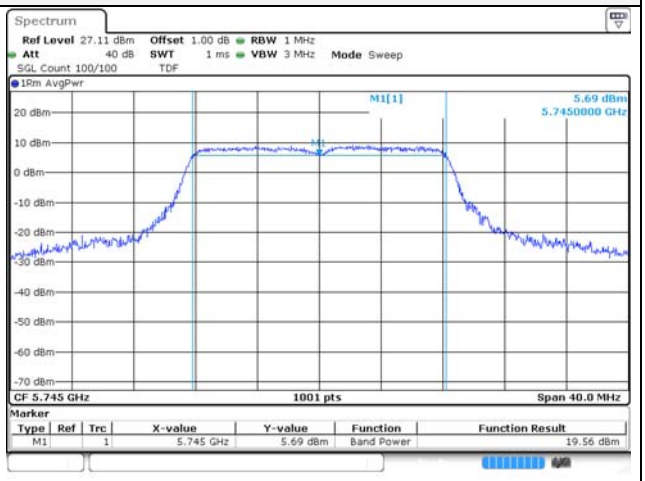


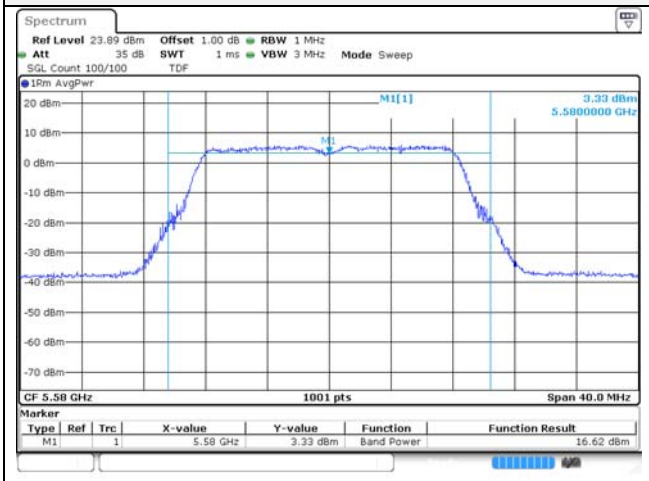
UNII-2C / 802.11a / 5 500 ㎒



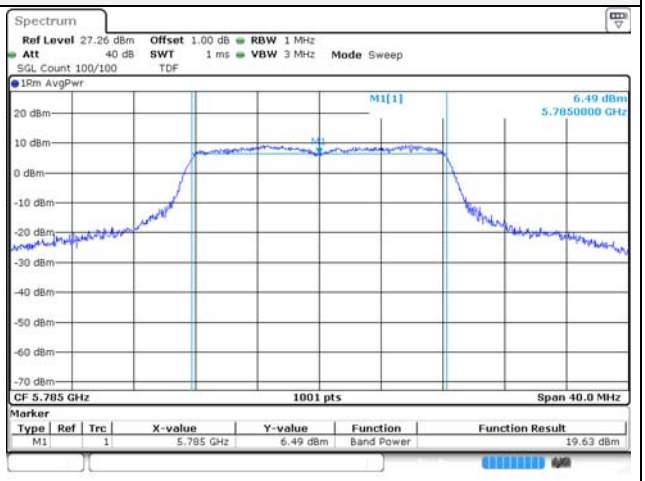
UNII-3 / 802.11a / 5 745 ㎒



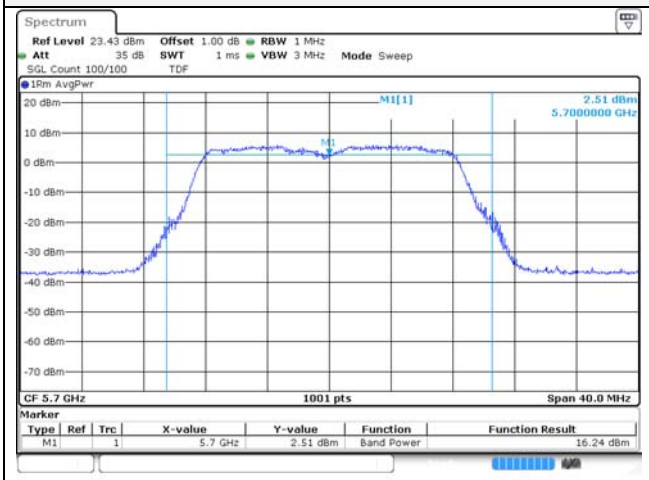
UNII-2C / 802.11a / 5 580 ㎒



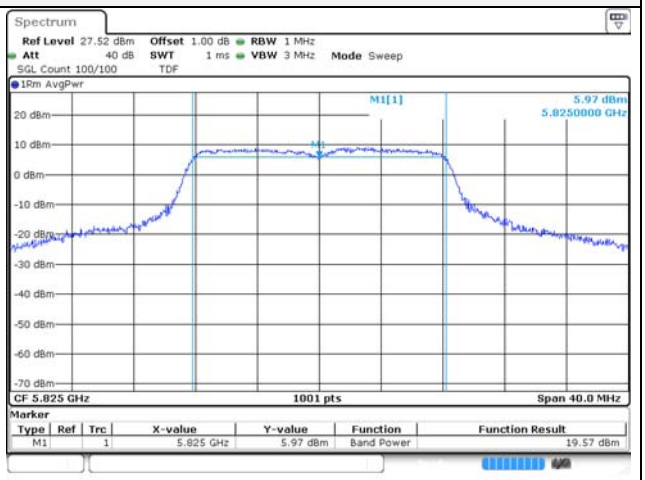
UNII-3 / 802.11a / 5 785 ㎒



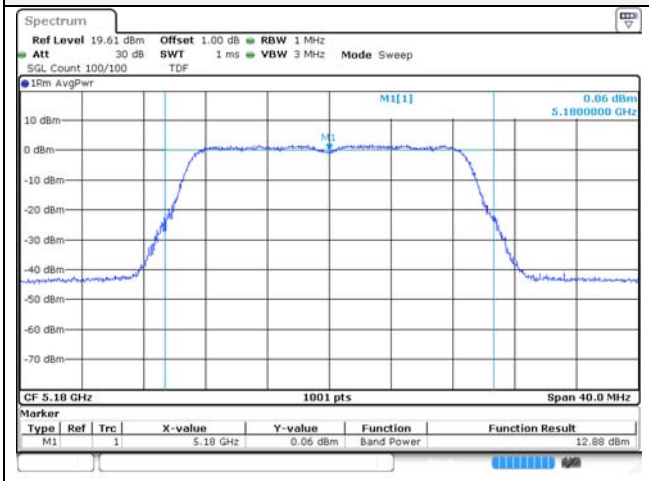
UNII-2C / 802.11a / 5 700 ㎒



UNII-3 / 802.11a / 5 825 ㎒



UNII-1 / 802.11n HT20 / 5 180 ㎒



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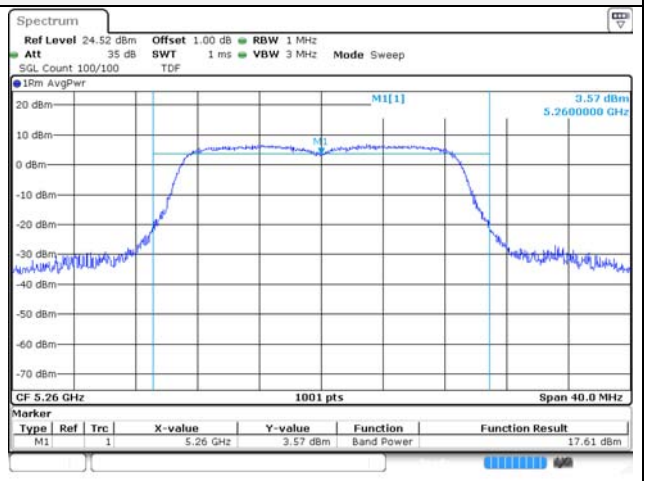

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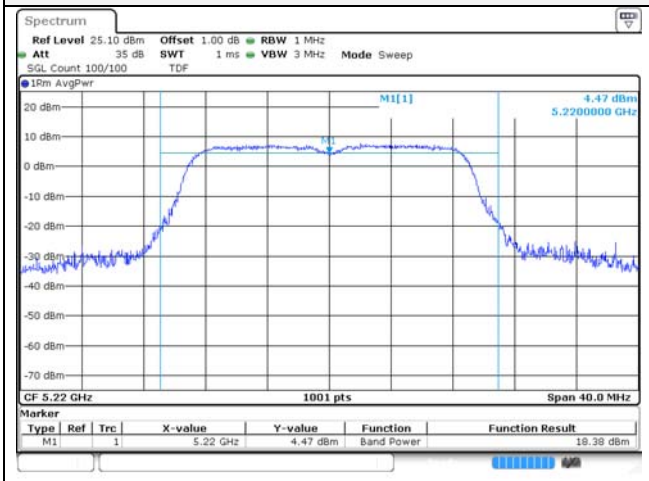

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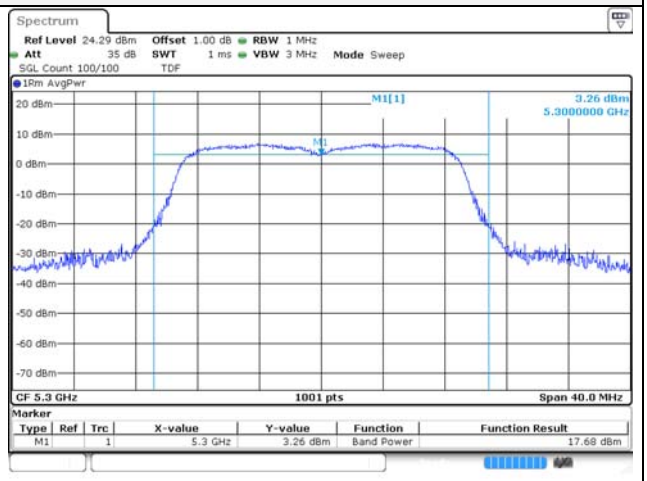

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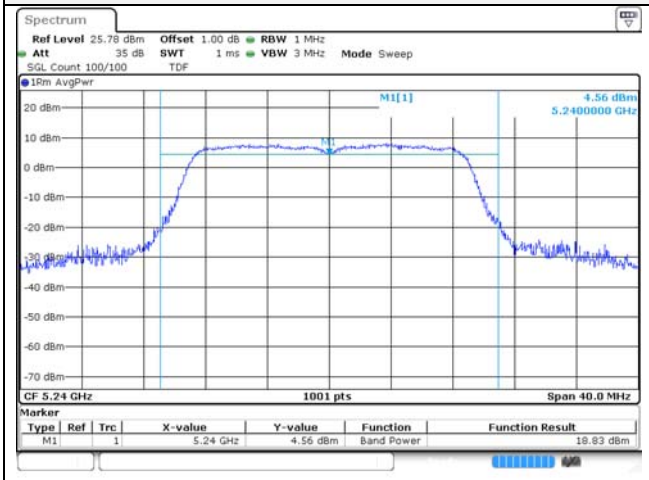
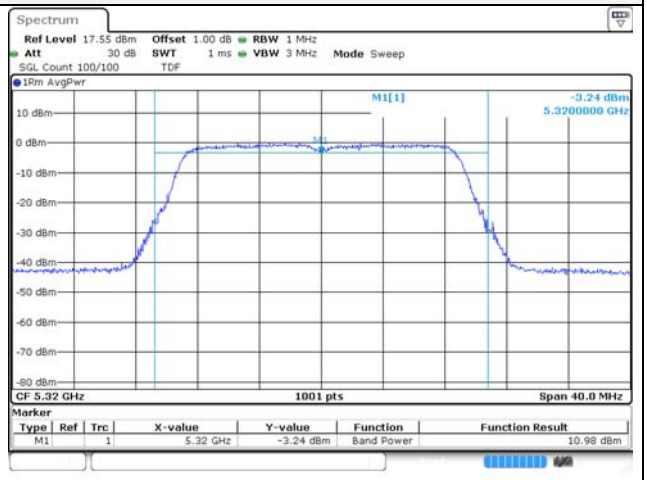
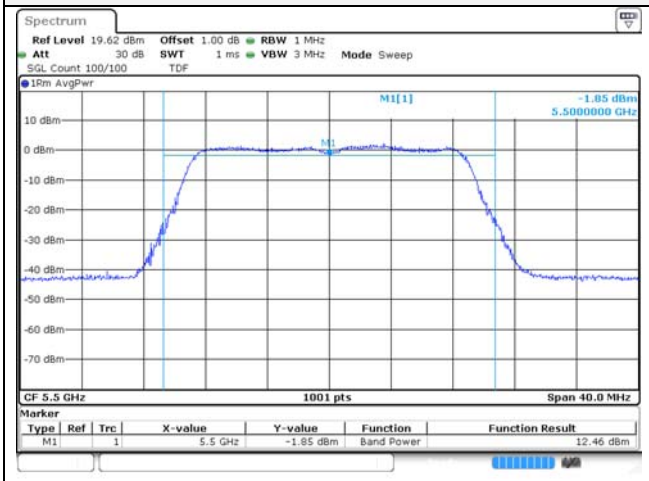


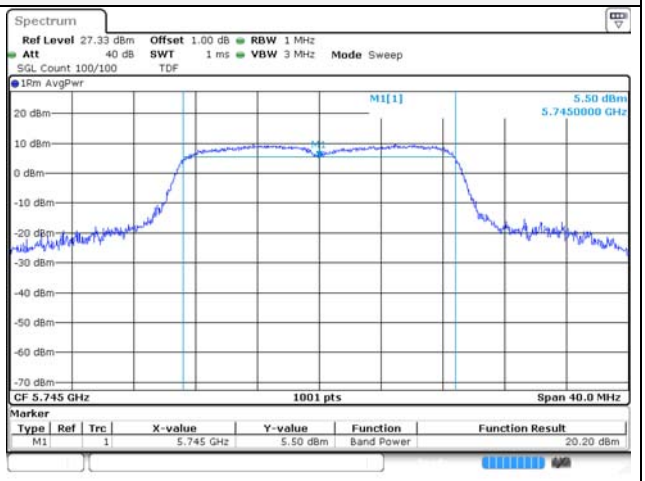
UNII-2A / 802.11n HT20 / 5 320 ㎒



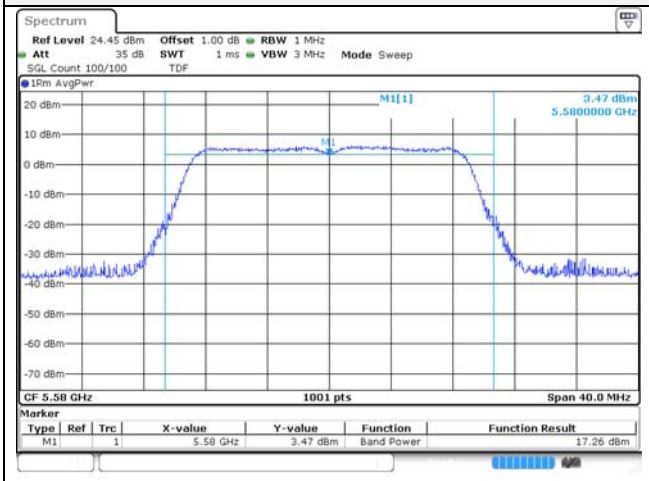
UNII-2C / 802.11n HT20 / 5 500 ㎒



UNII-3 / 802.11n HT20 / 5 745 ㎒



UNII-2C / 802.11n HT20 / 5 580 ㎒



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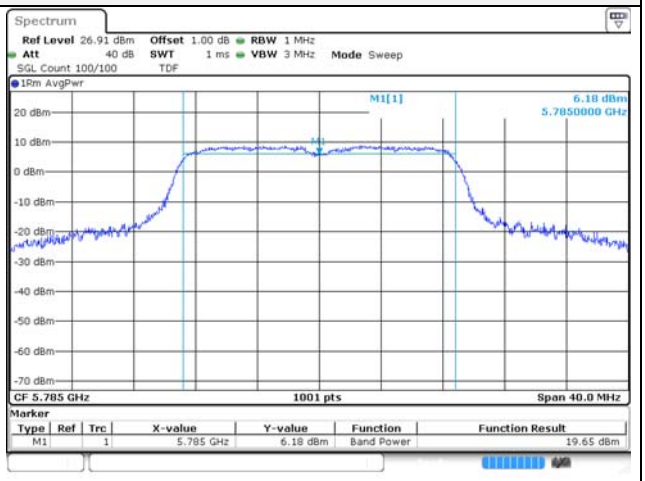
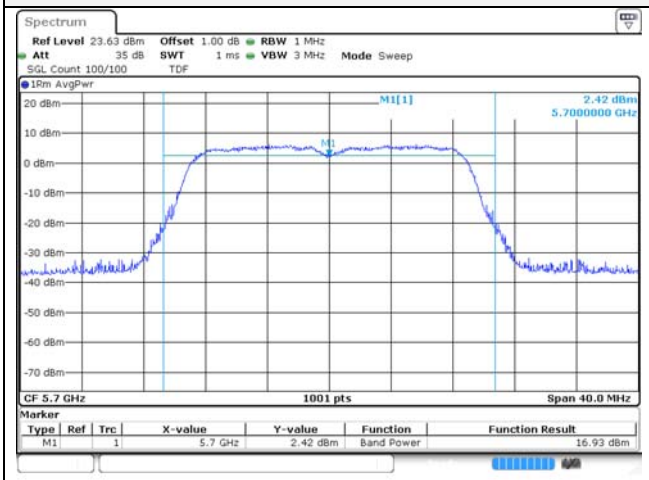
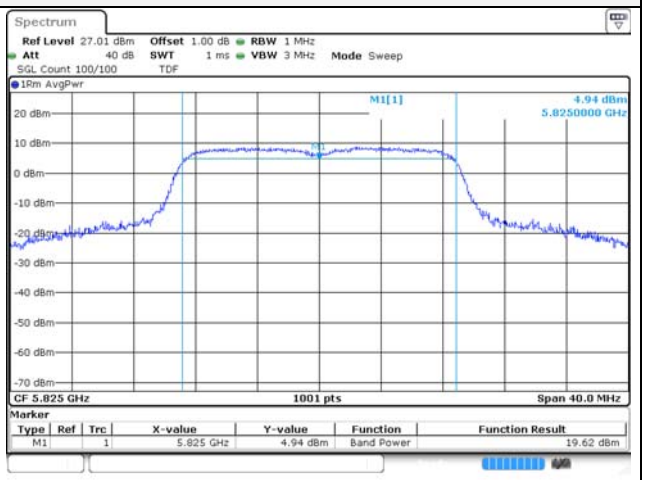


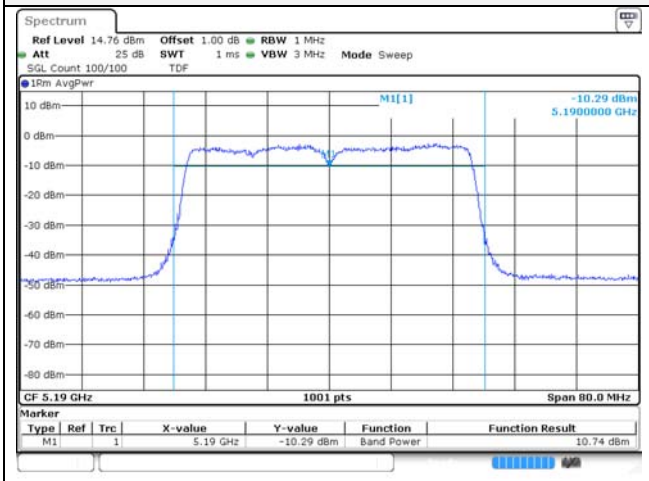
UNII-2C / 802.11n HT20 / 5 700 ㎒



UNII-3 / 802.11n HT20 / 5 825 ㎒



UNII-1 / 802.11n HT40 / 5 190 ㎒



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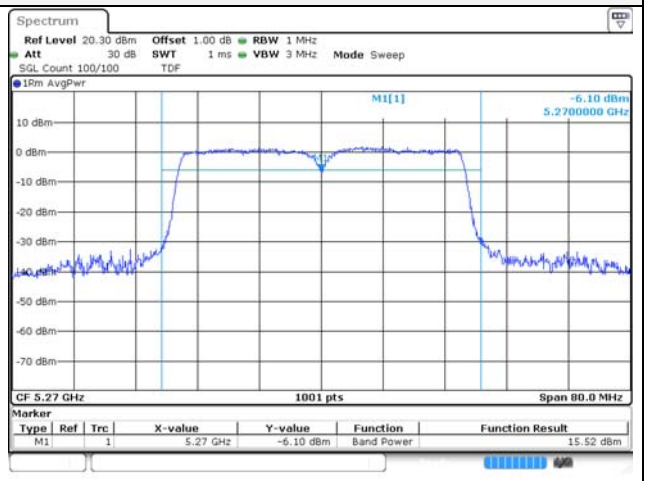

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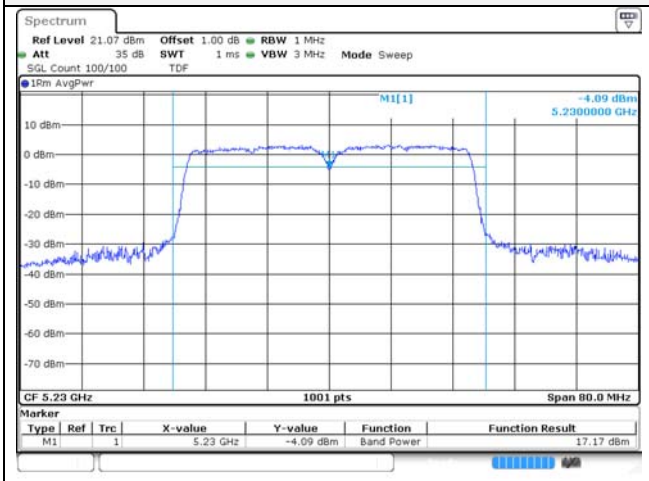

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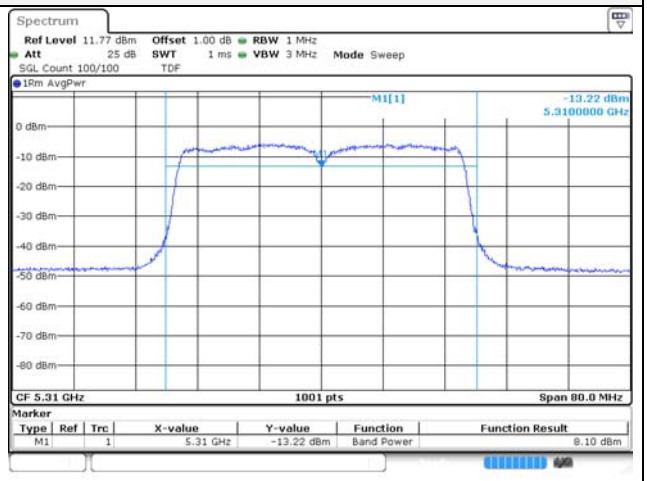

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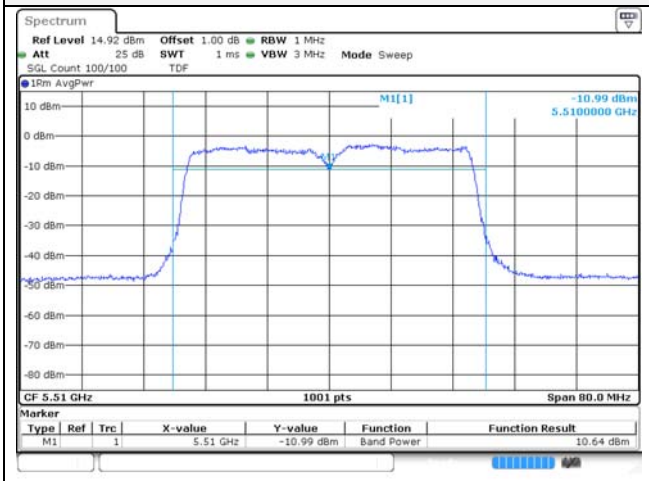
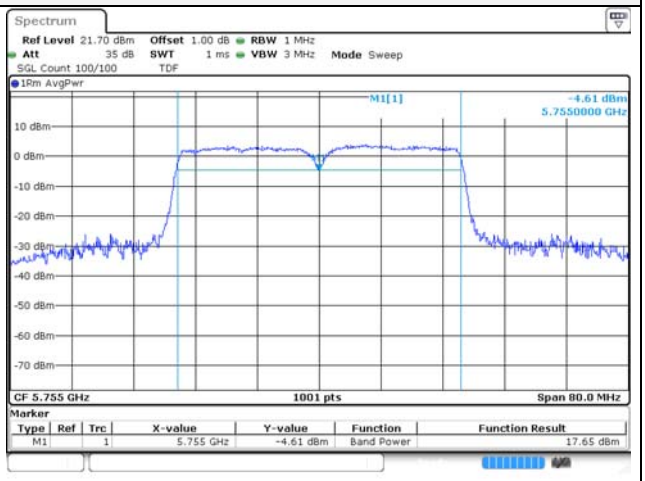


UNII-3 / 802.11n HT40 / 5 755 ㎒



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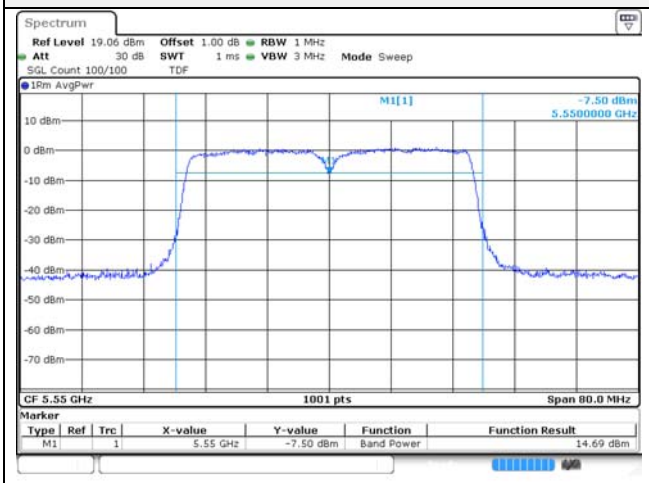

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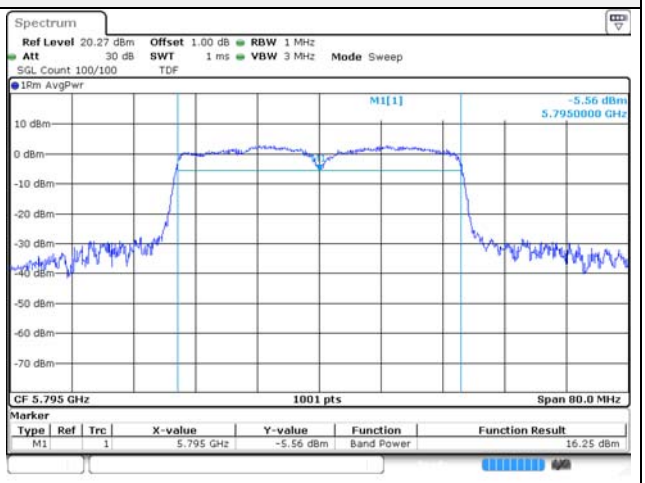

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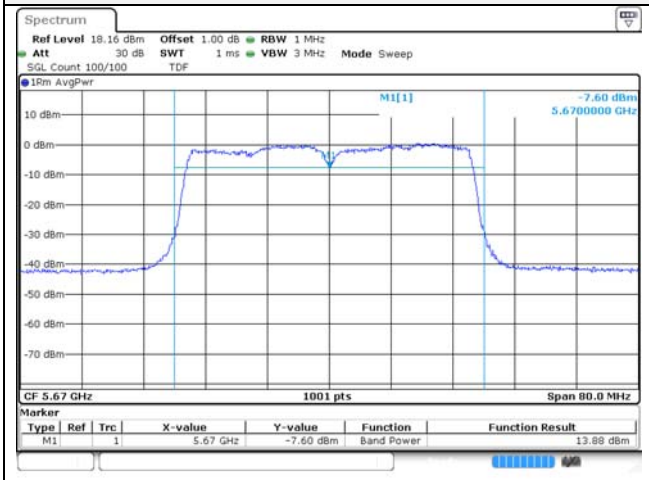

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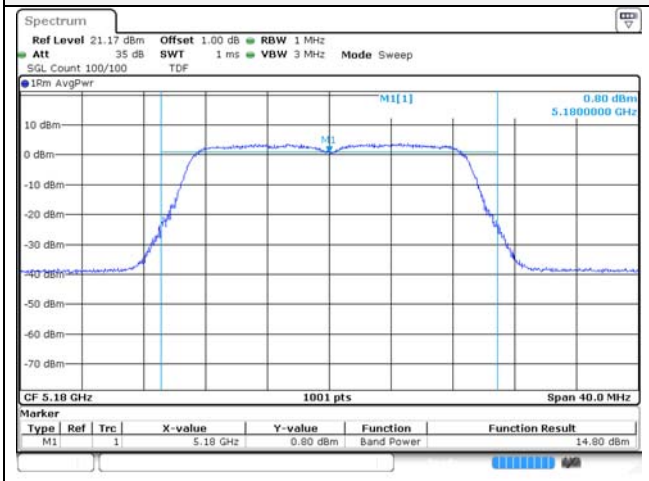
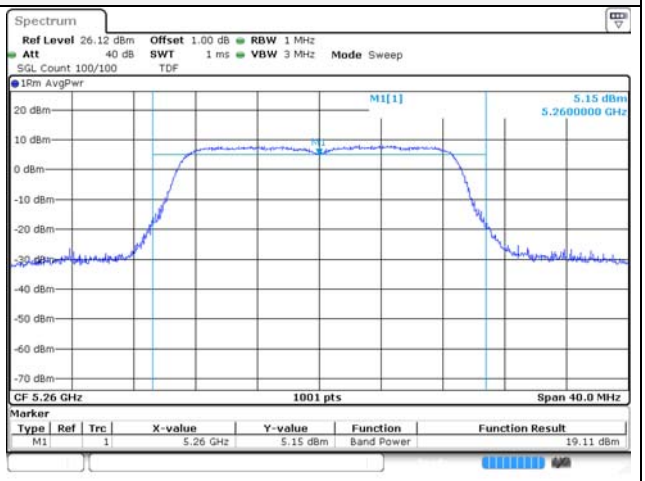
UNII-1 / 802.11ac VHT20 / 5 180 ㎒



UNII-2A / 802. 11ac VHT20 / 5 260 ㎒



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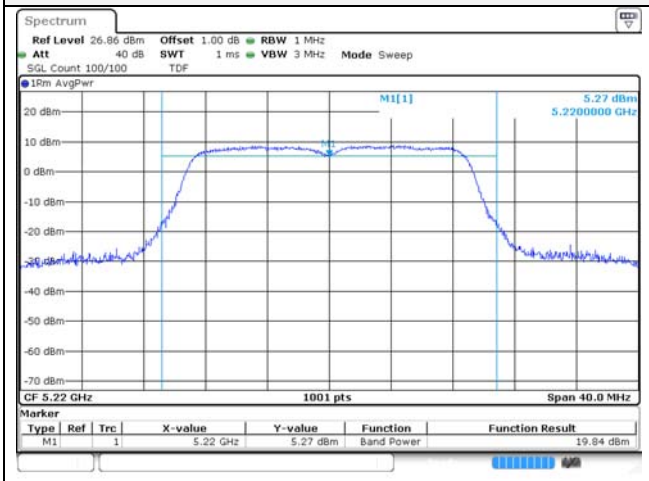

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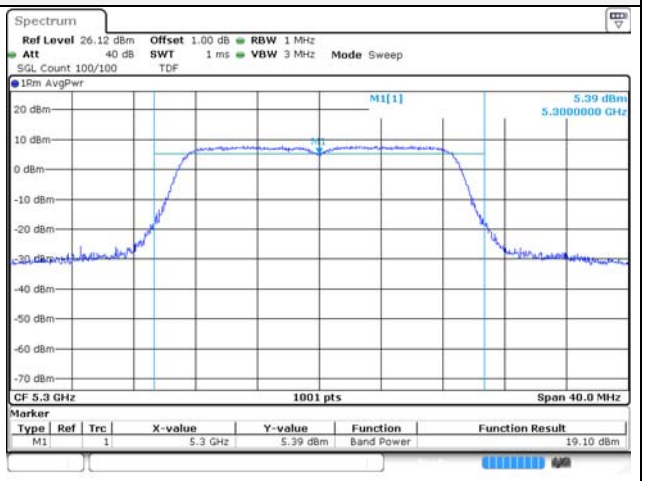

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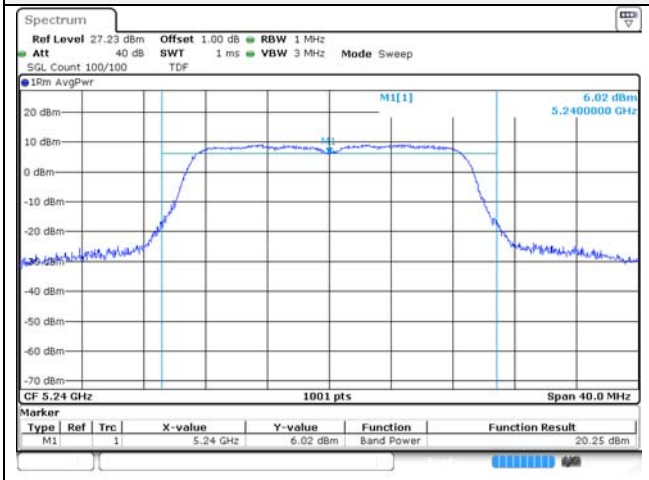

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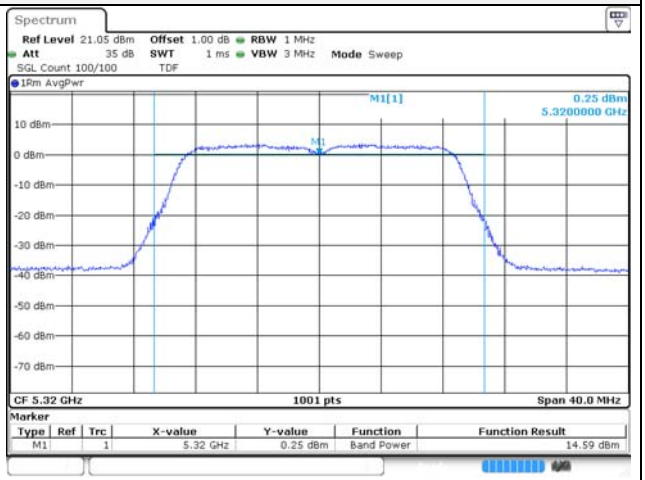

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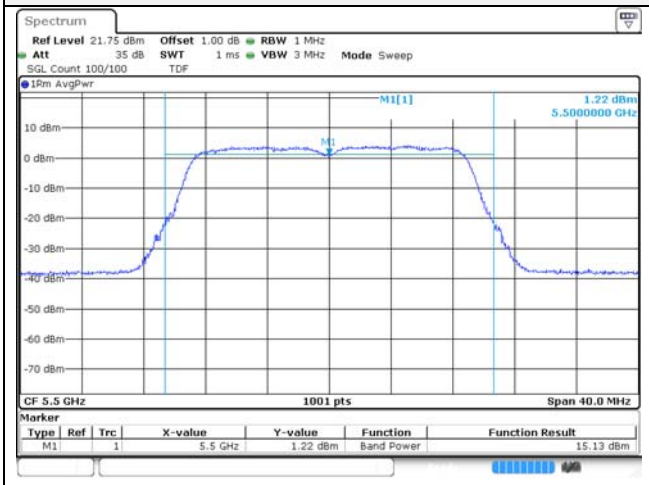

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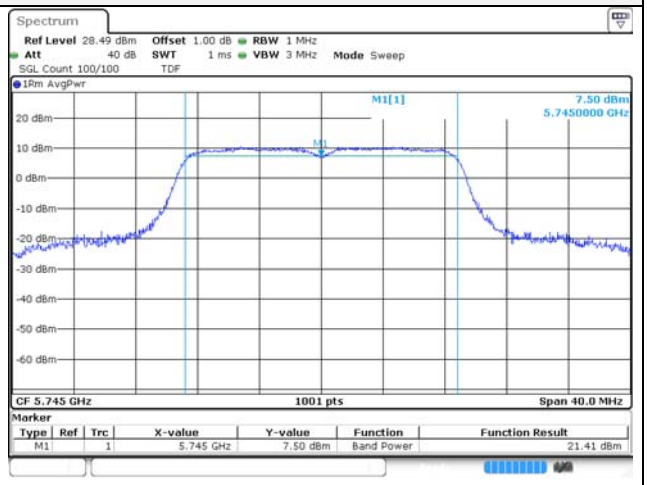

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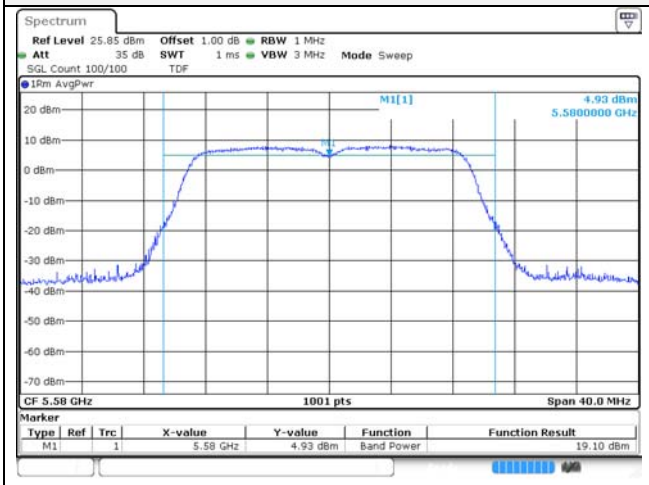

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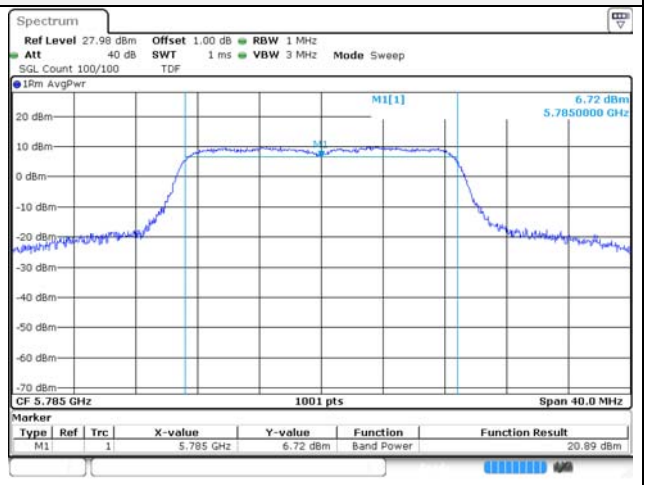

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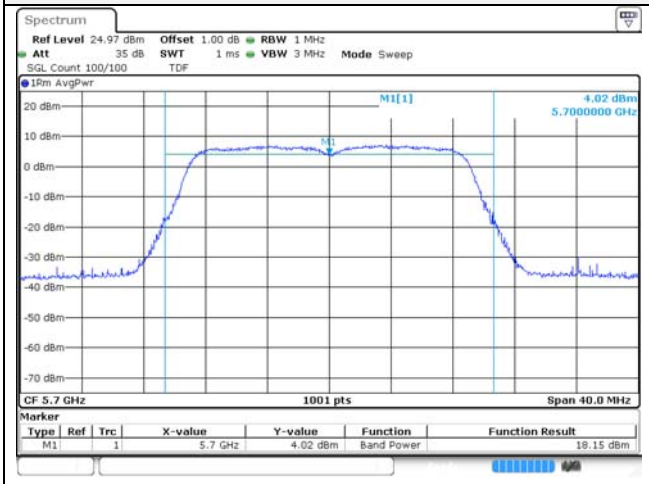

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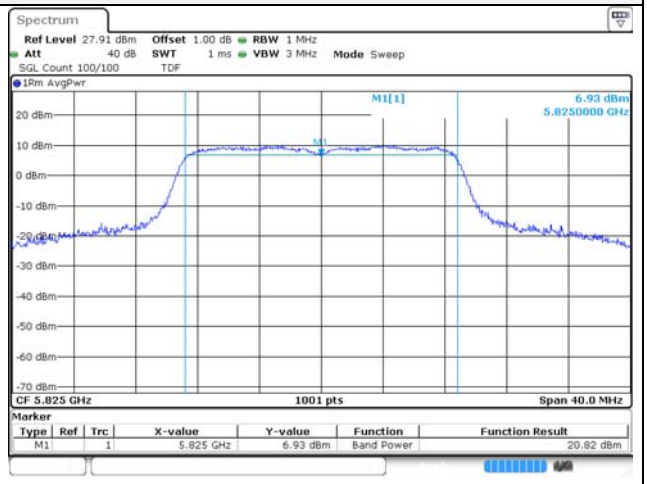
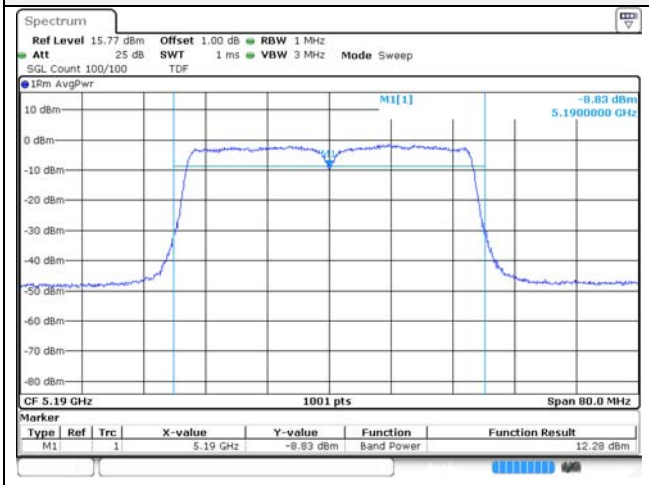
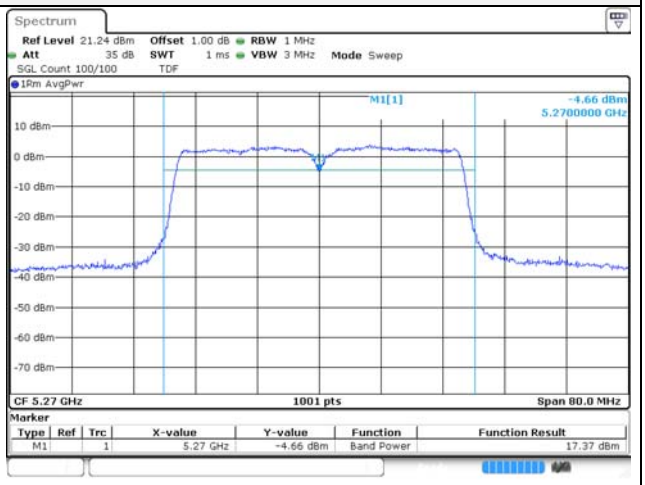
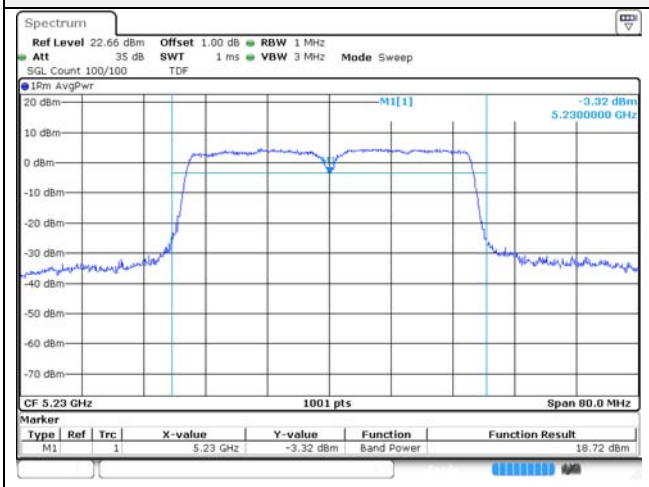
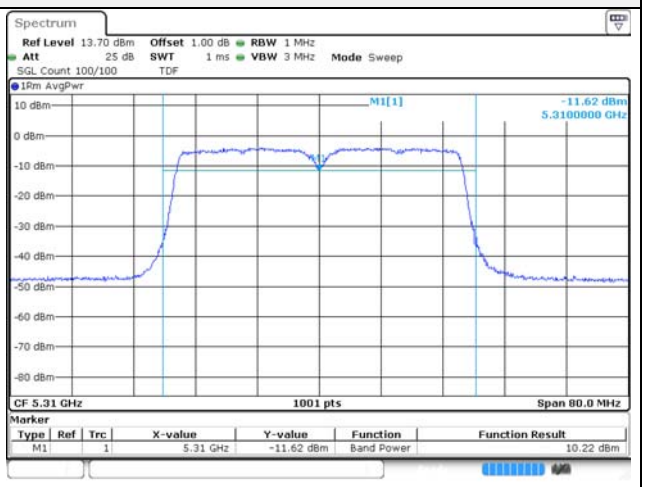


UNII-1 / 802.11ac VHT40 / 5 190 ㎒	UNII-2A / 802.11ac VHT40 / 5 270 ㎒
	
UNII-1 / 802.11ac VHT40 / 5 230 ㎒	**UNII-2A / 802.11ac VHT40 / 5 310 ㎒**
	

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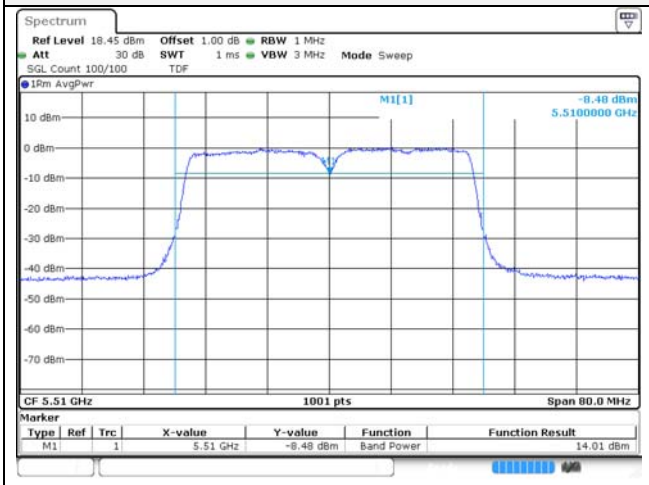

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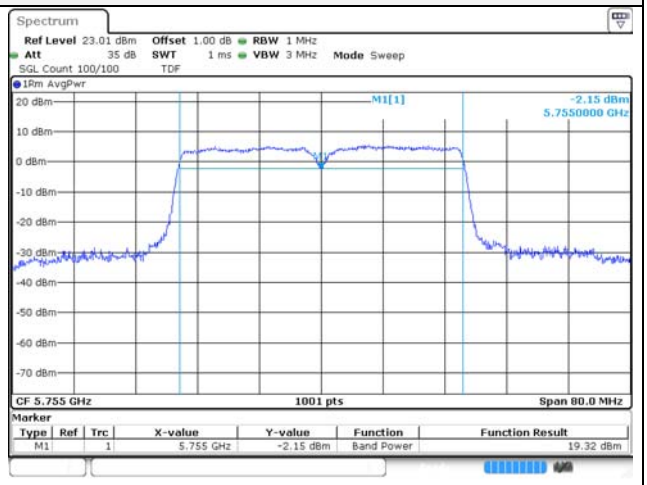

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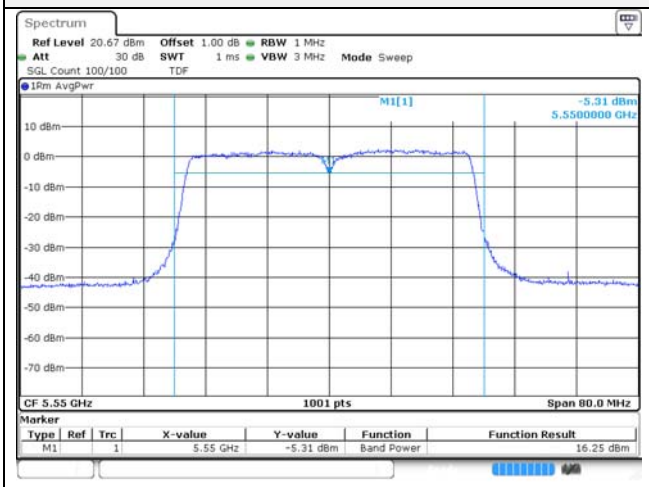

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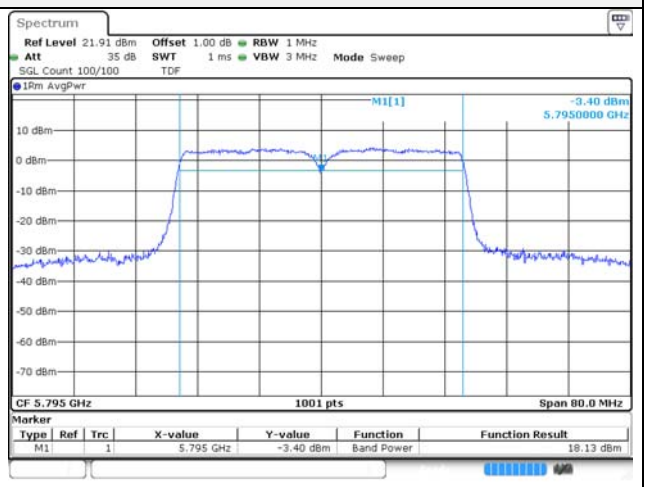
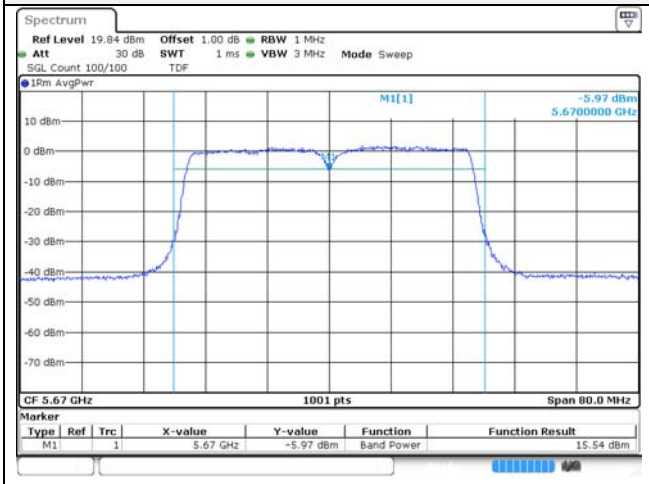


UNII-2C / 802.11ac VHT40 / 5 670 ㎒



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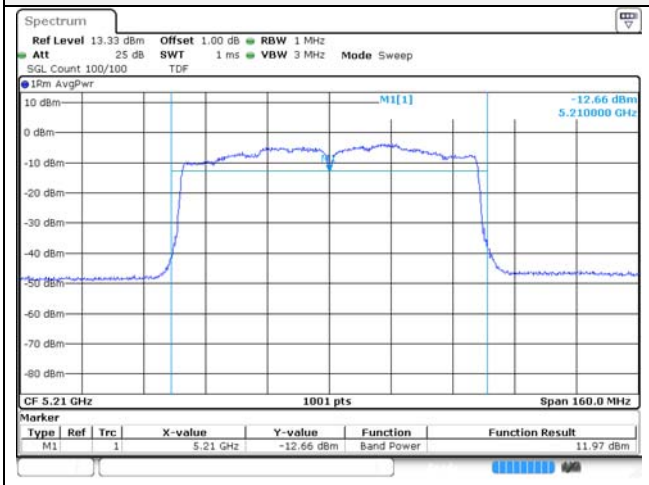
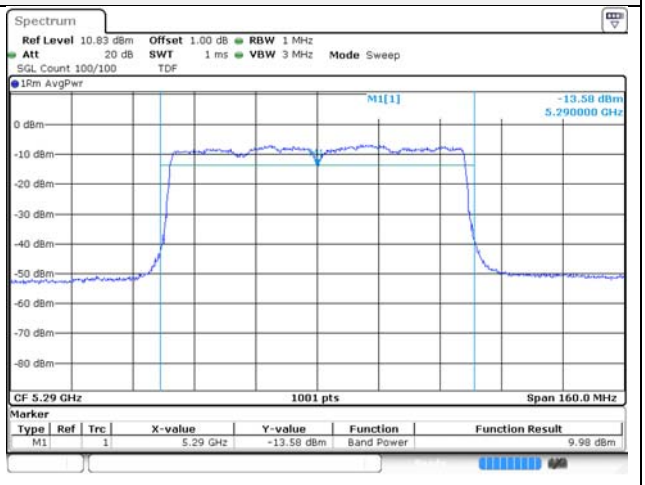
UNII-1 / 802.11ac VHT80 / 5 210 ㎒	UNII-2A / 802.11ac VHT80 / 5 290 ㎒
	
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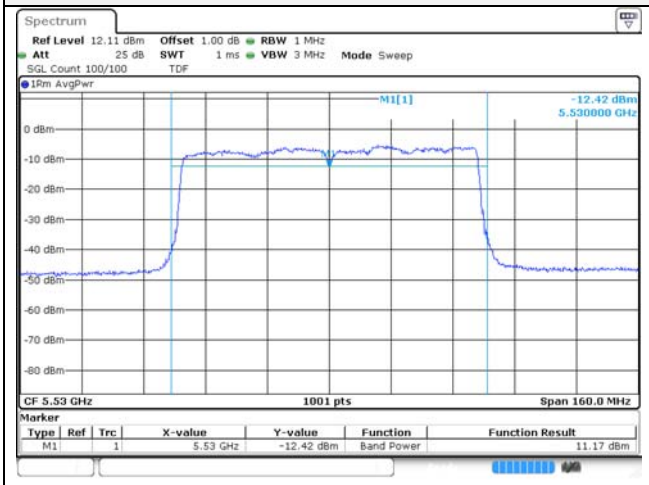	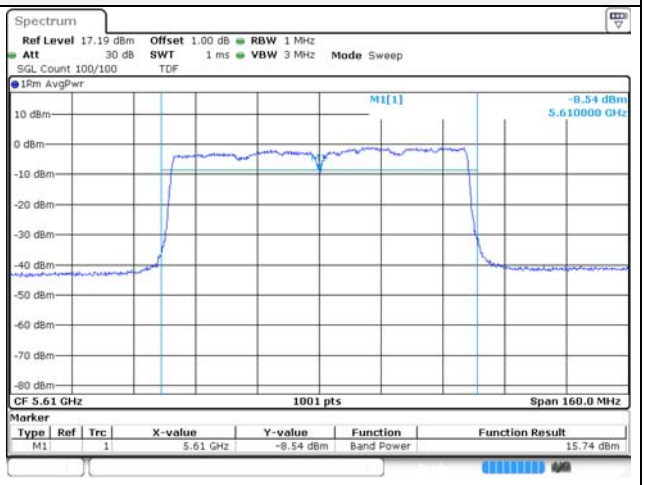
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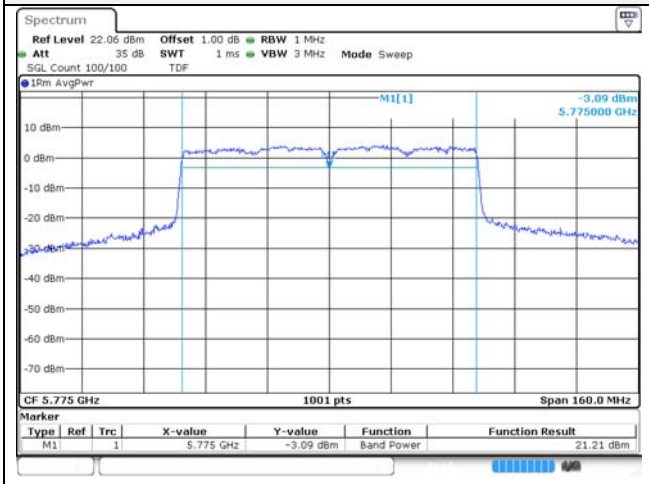
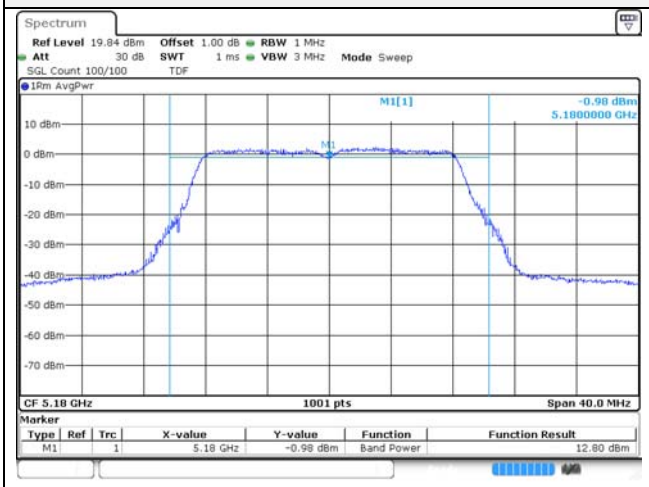
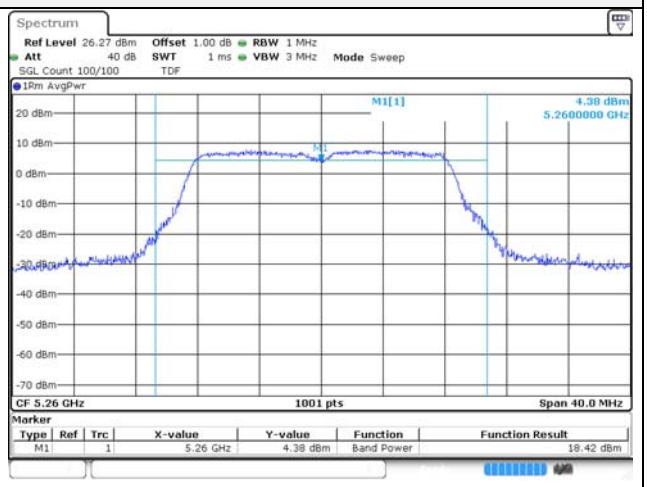
	Blank

SISO ANT 1

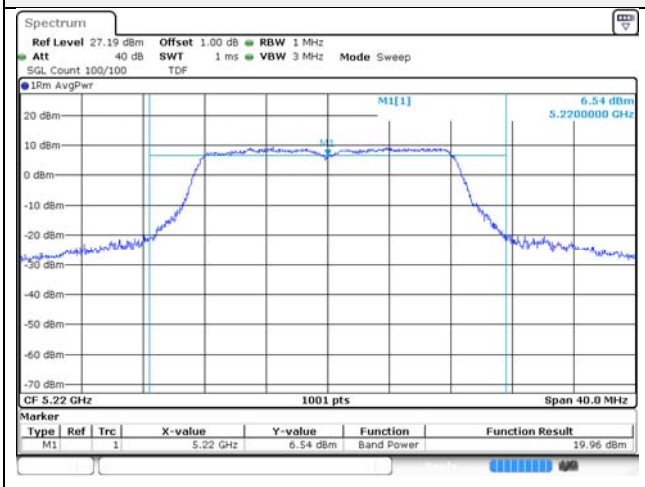
UNII-1 / 802.11a / 5 180 ㎒



UNII-2A / 802.11a / 5 260 ㎒



UNII-1 / 802.11a / 5 220 ㎒



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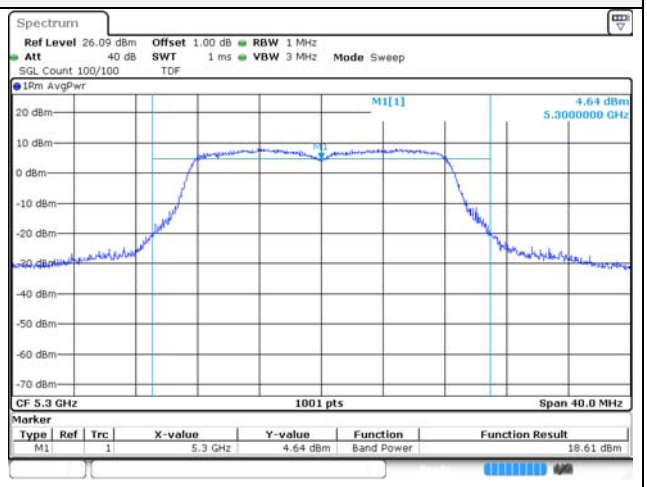

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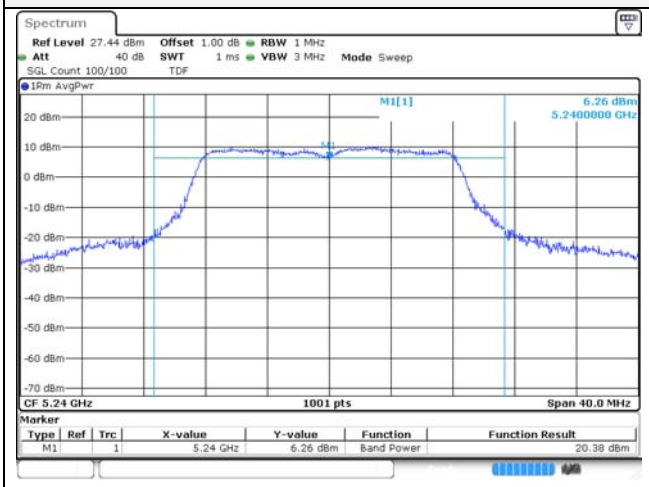

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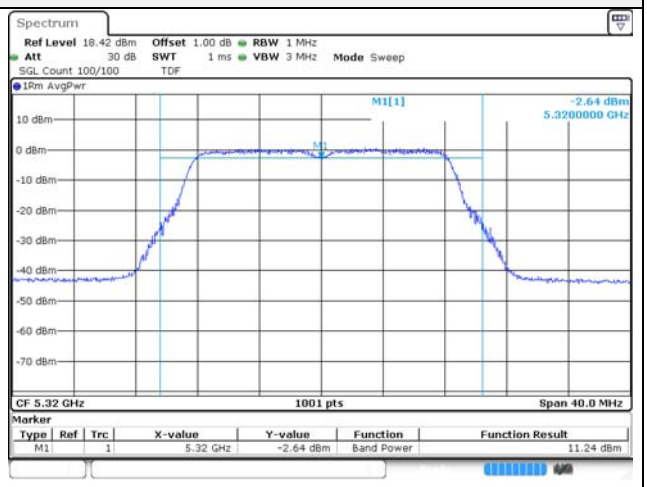

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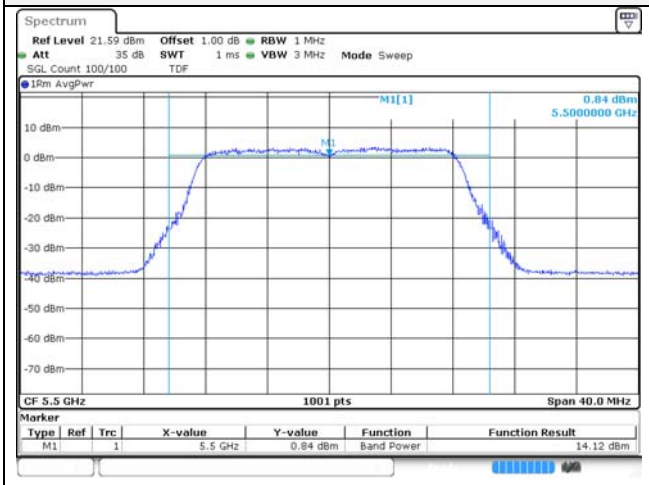
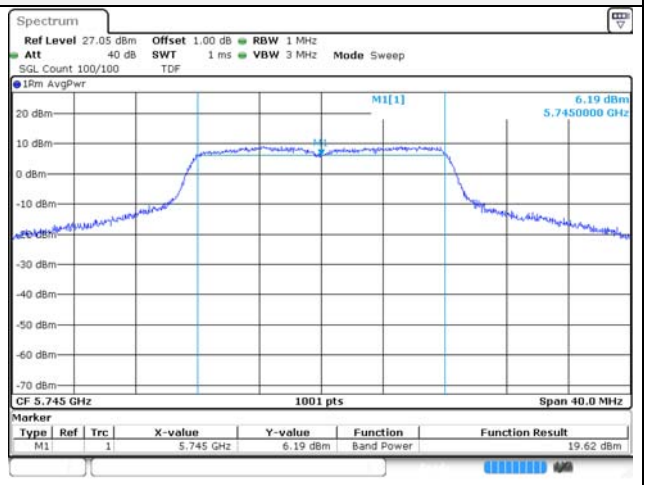


UNII-3 / 802.11a / 5 745 ㎒



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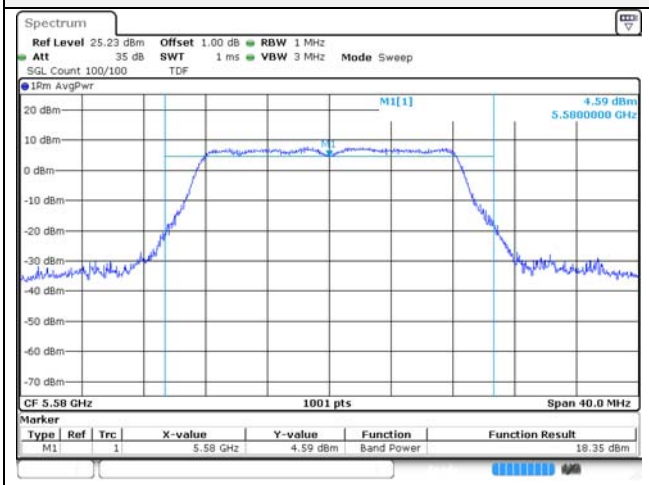
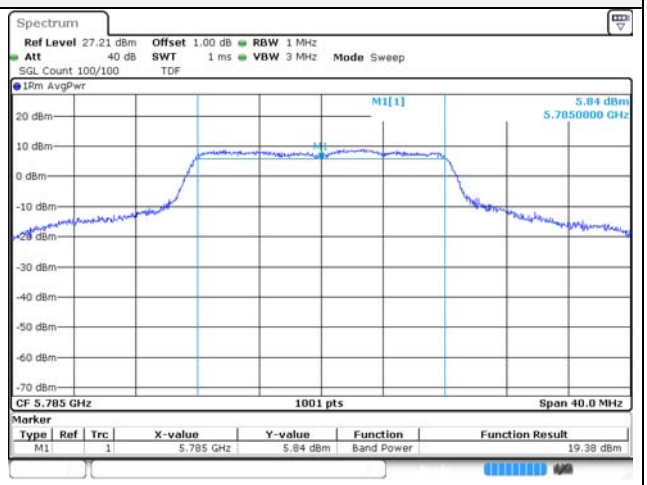


UNII-3 / 802.11a / 5 785 ㎒



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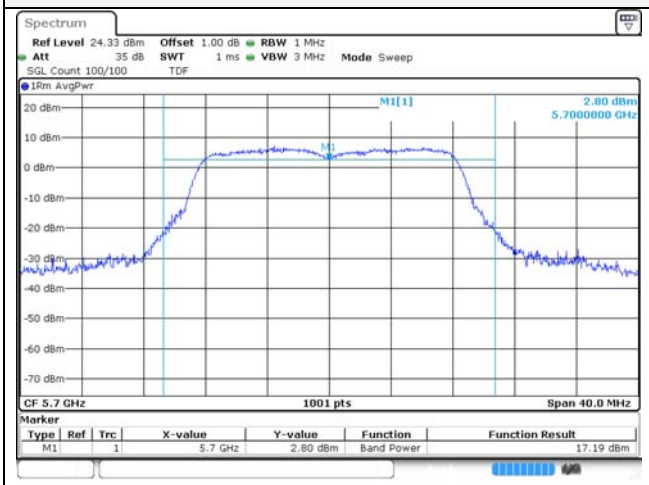

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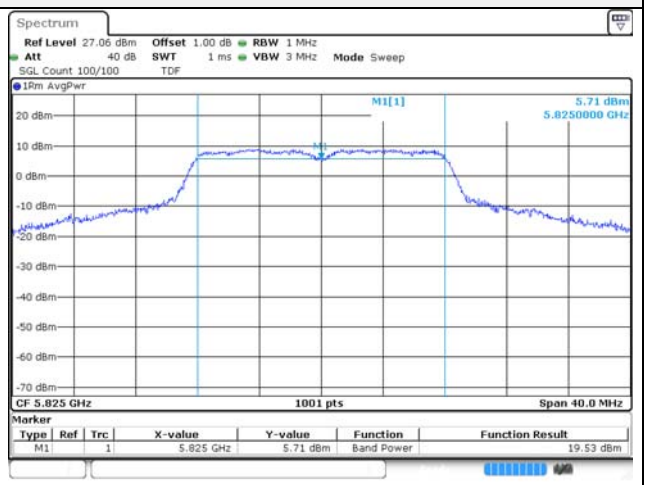

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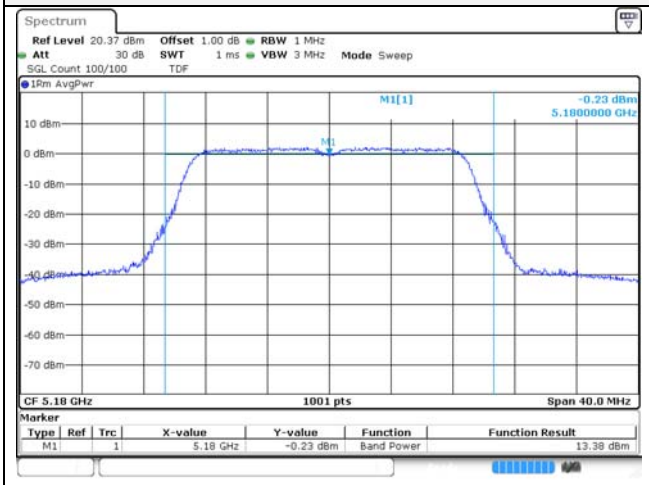

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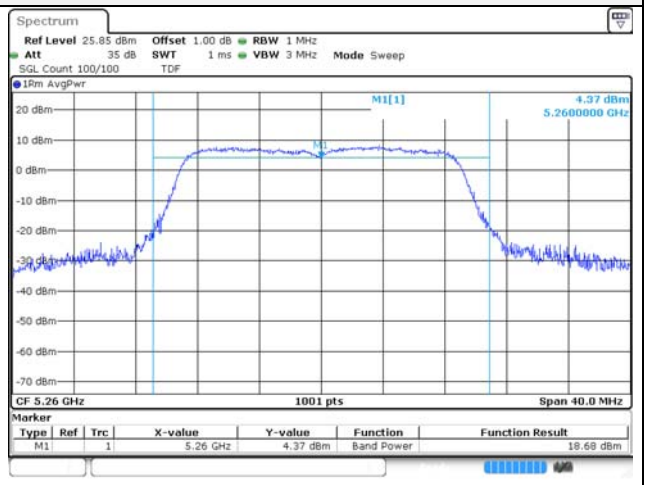
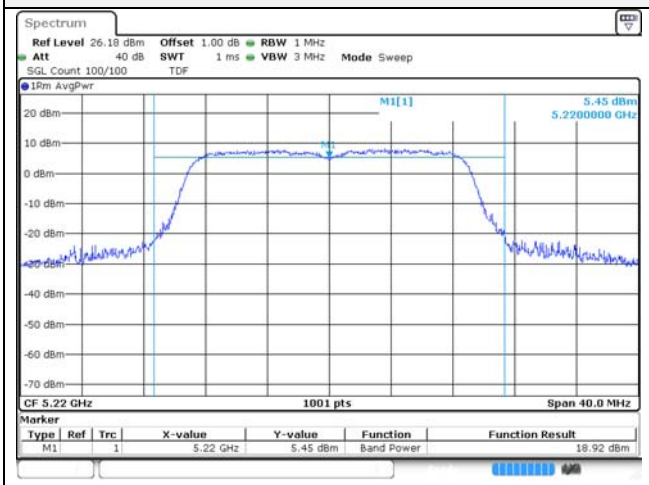


UNII-1 / 802.11n HT20 / 5 220 ㎒



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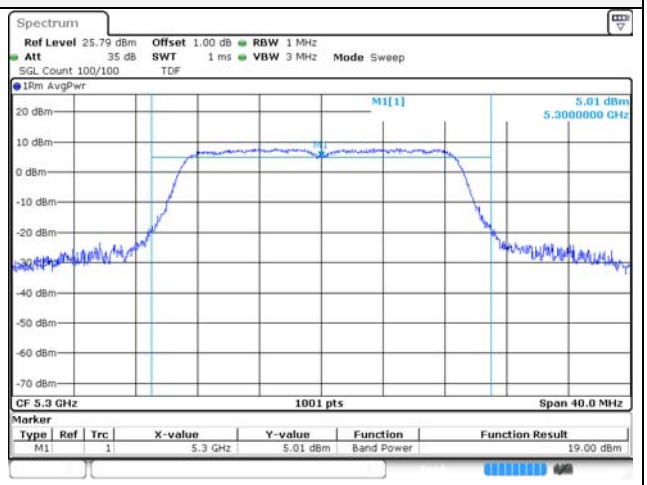

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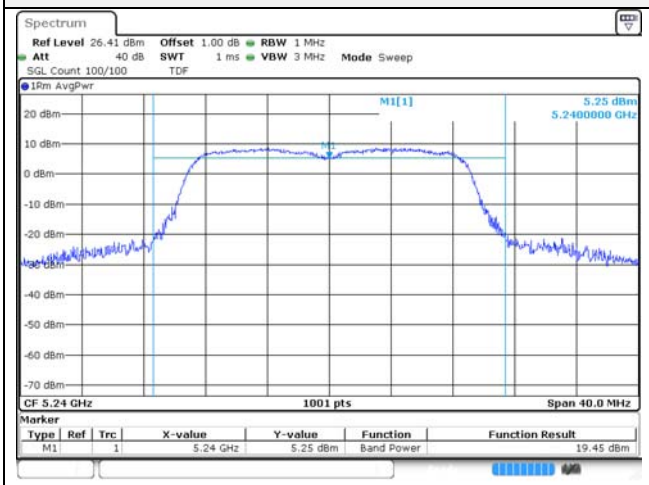

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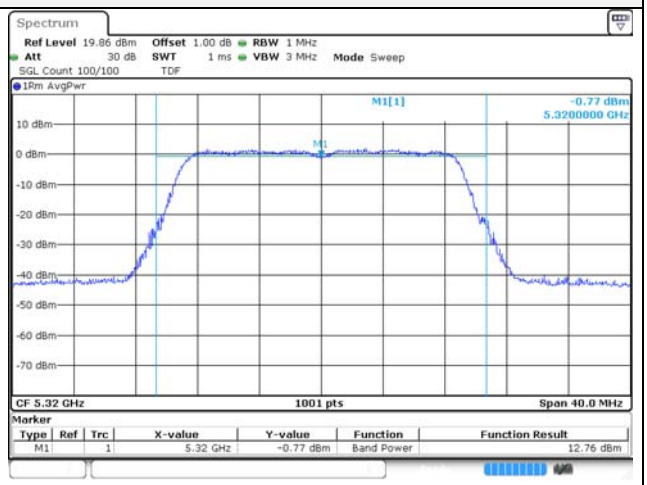

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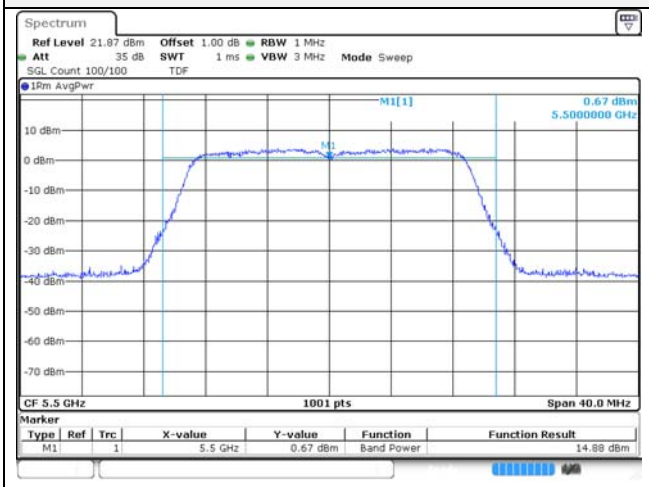

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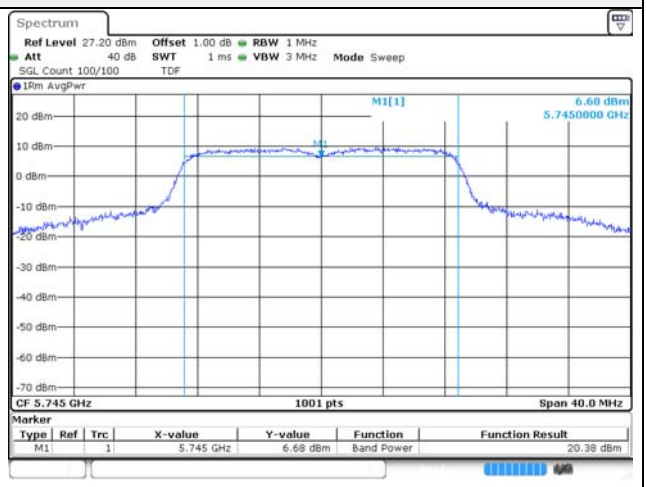

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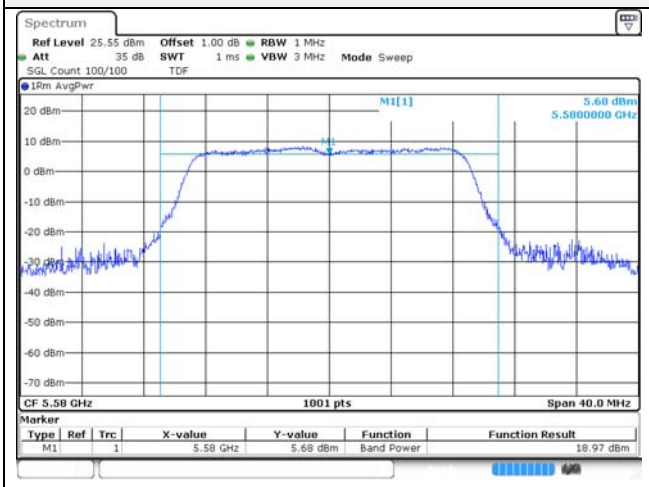

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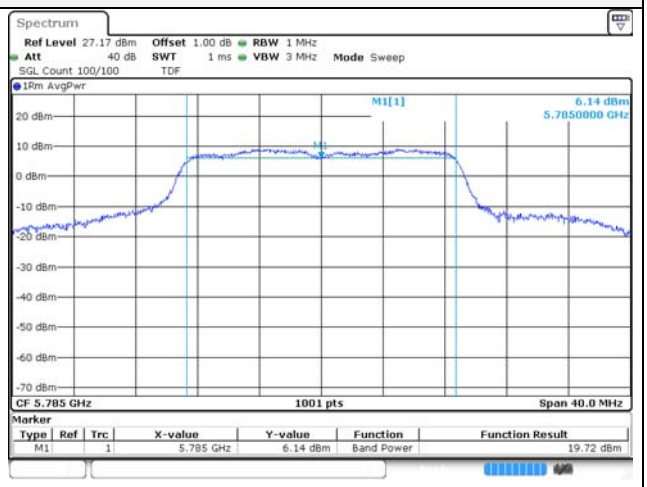

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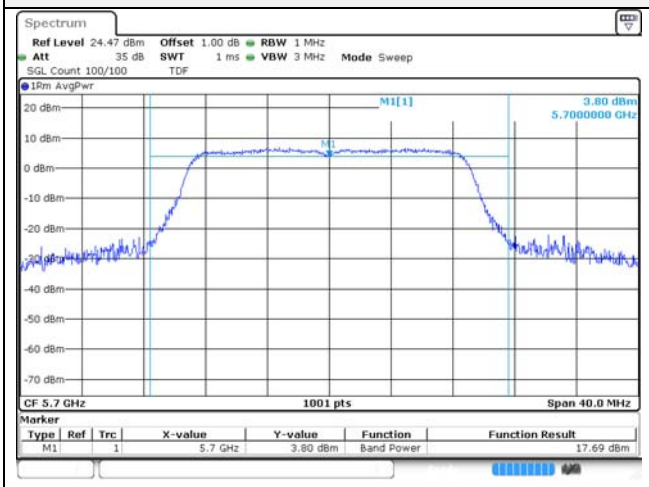

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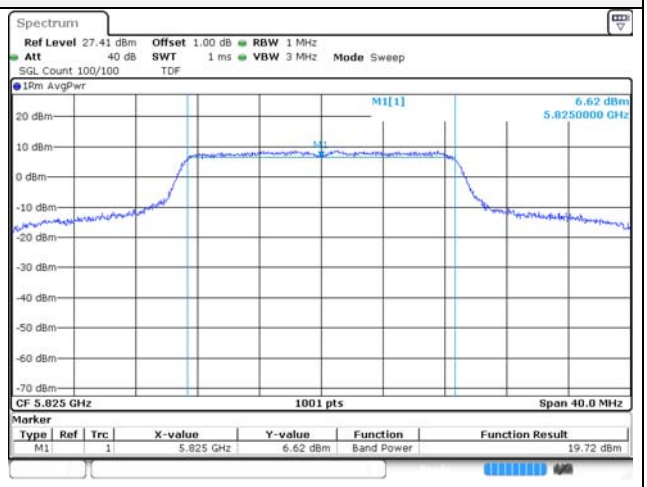

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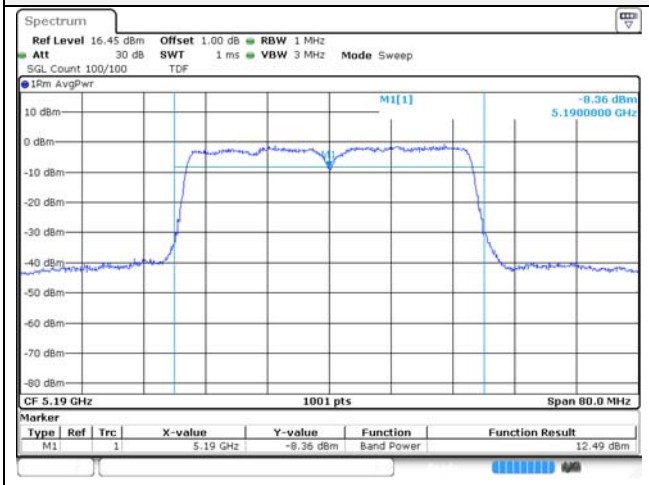

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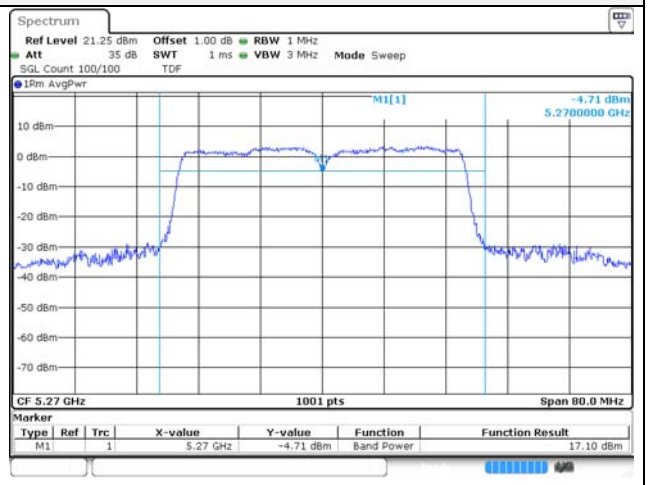

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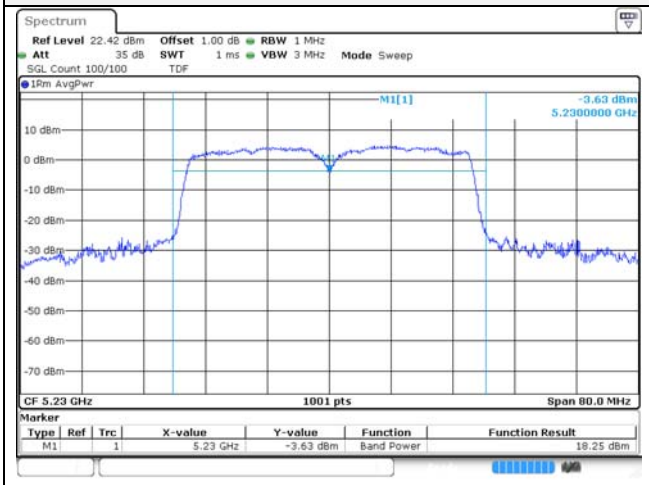

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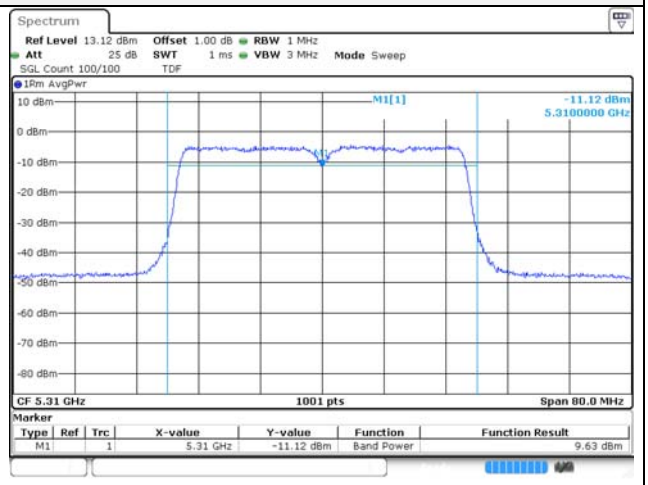

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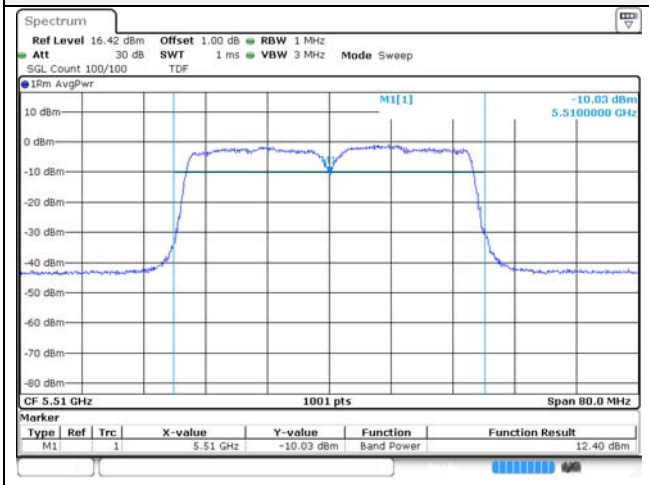

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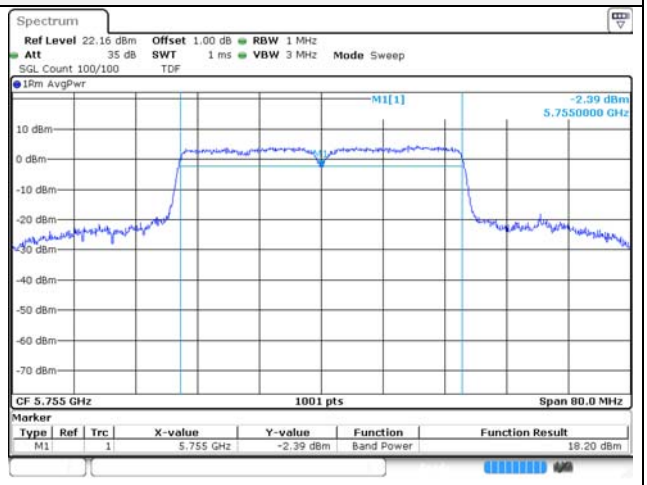

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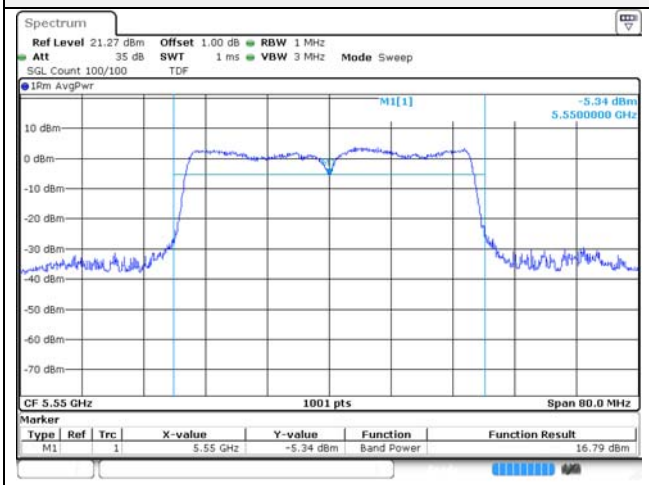

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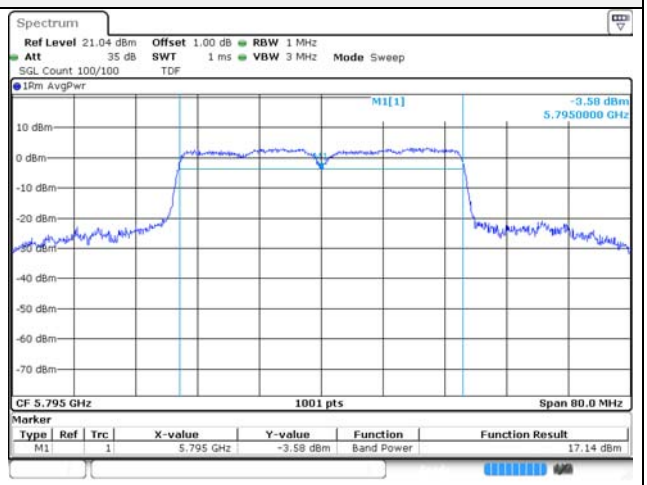

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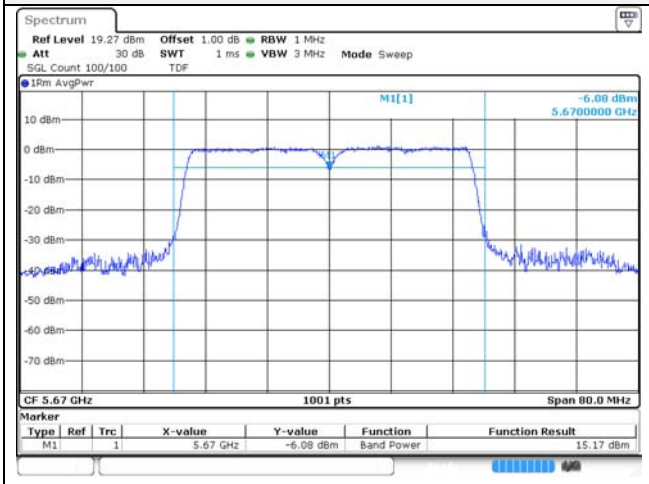

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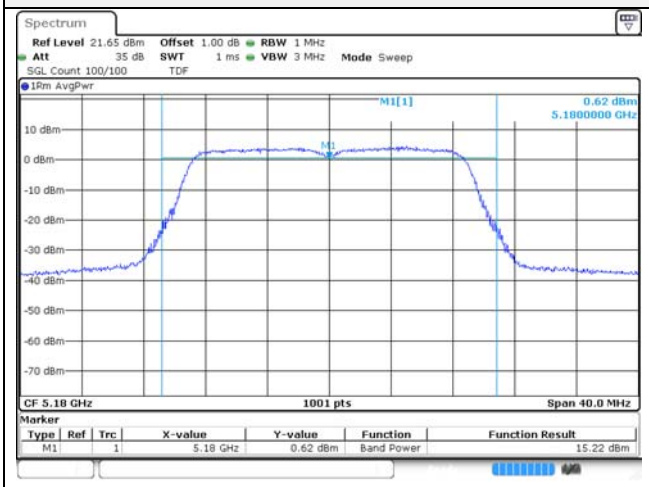
UNII-1 / 802.11ac VHT20 / 5 180 ㎒



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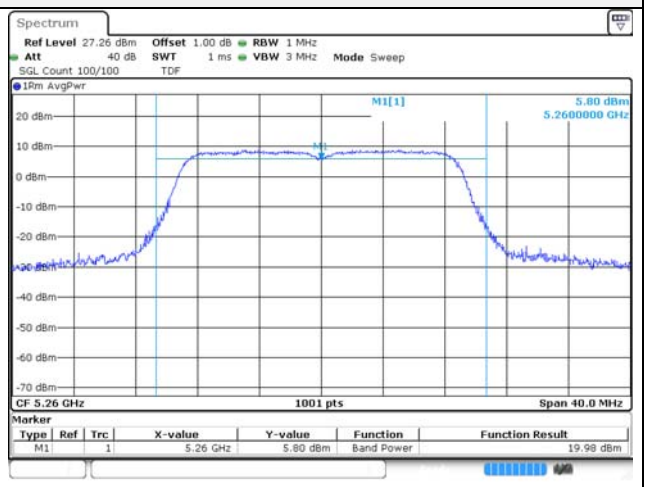
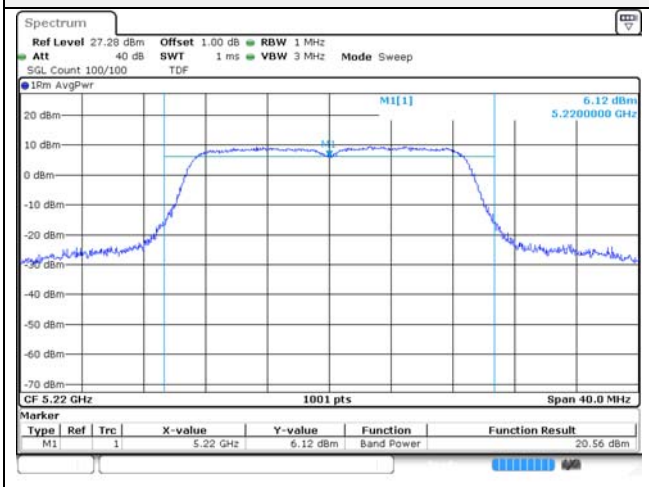


UNII-1 / 802. 11ac VHT20 / 5 220 ㎒



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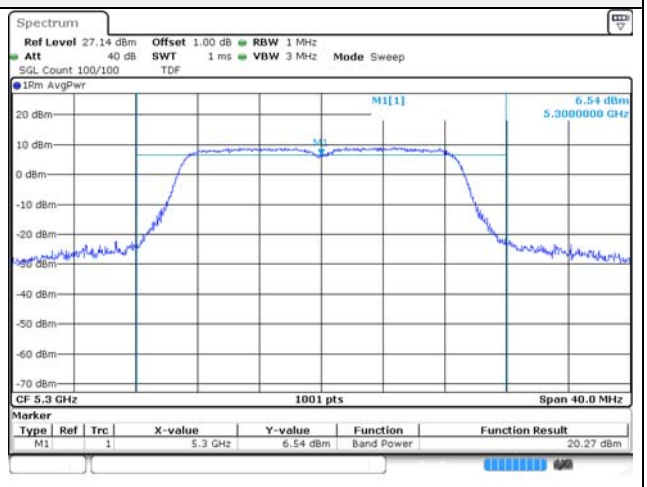
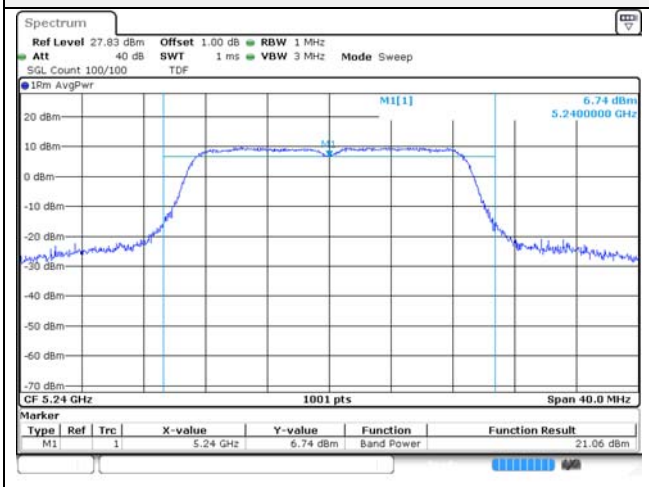


UNII-1 / 802. 11ac VHT20 / 5 240 ㎒



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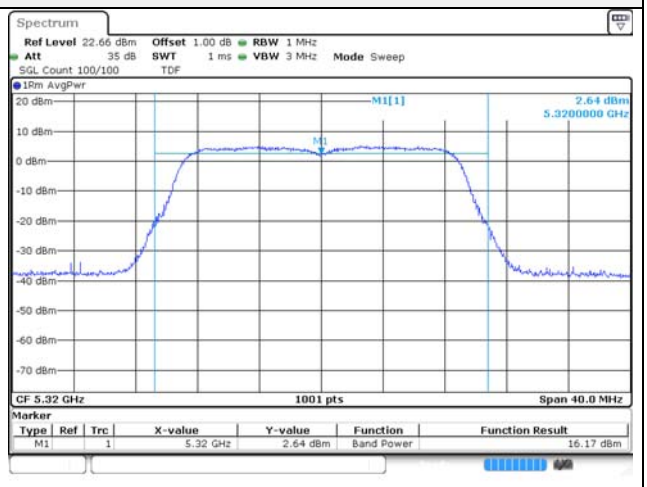

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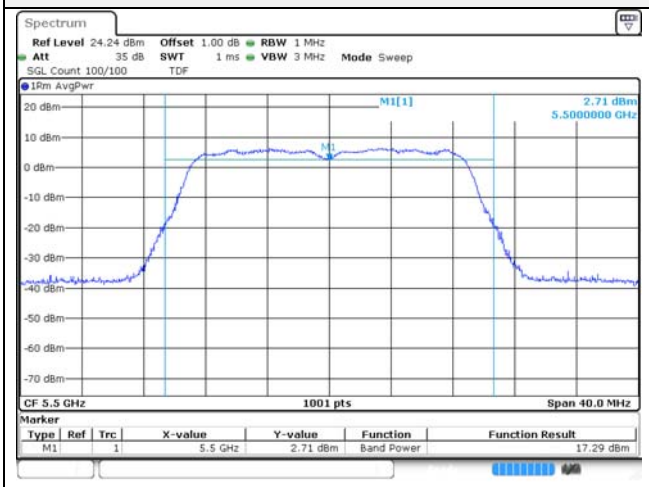
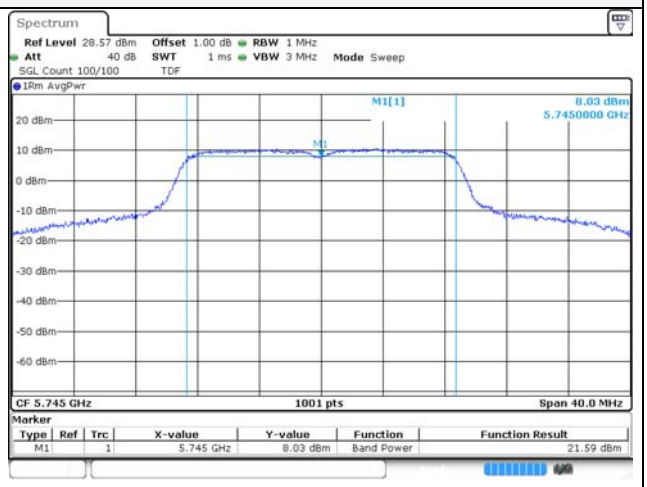


UNII-3 / 802.11ac VHT20 / 5 745 ㎒



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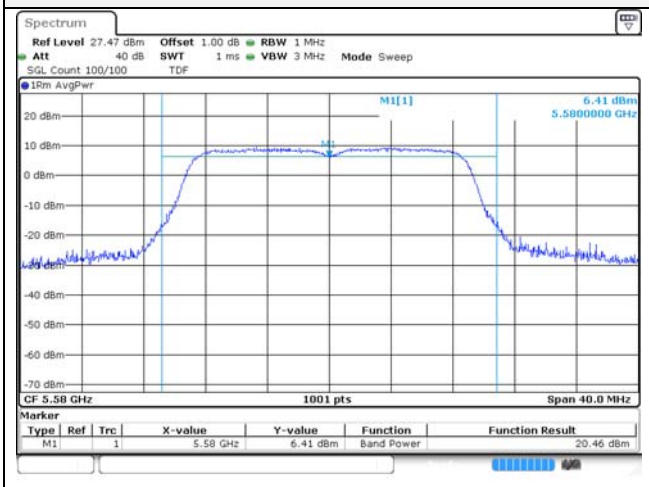

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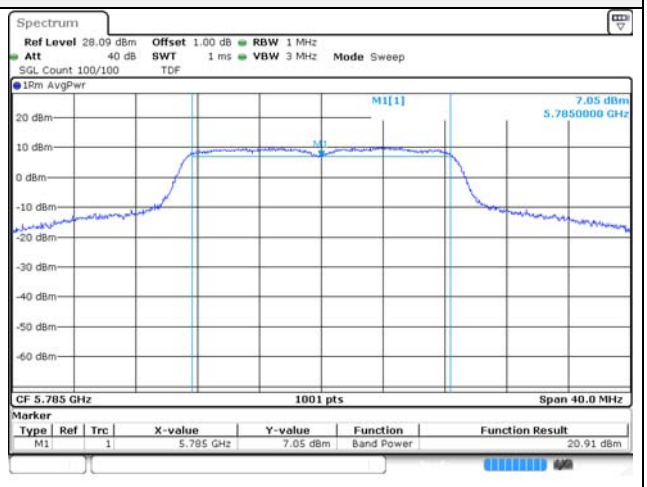

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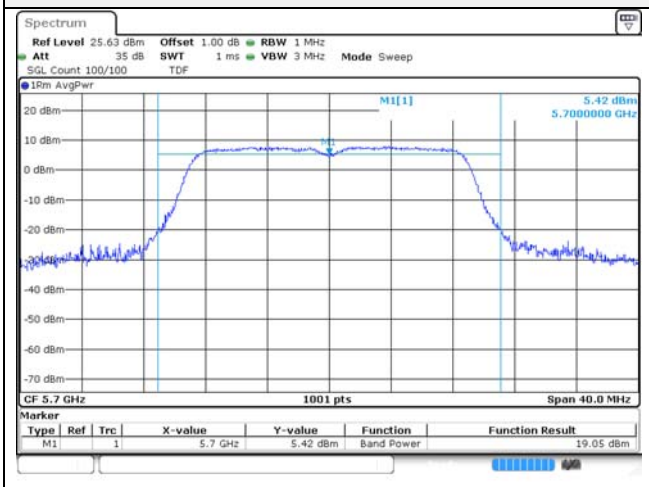

UNII-3 / 802.11ac VHT20 / 5 825 ㎒