

FCC TEST REPORT

Test report No.: EMC- FCC- R0223
FCC ID: A3LNFA455
Type of equipment: Wireless LAN Module
Basic Model Name: NFA455
Applicant: Samsung Electronics Co., Ltd.
Max.RF Output Power: 15.12 dBm
FCC Rule Part(s): FCC Part 15 Subpart E 15.407
5 180 MHz ~ 5 240 MHz
5 260 MHz ~ 5 320 MHz
Frequency Range: 5 500 MHz ~ 5 700 MHz
5 745 MHz ~ 5 805 MHz
Test result: Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.

The results of testing in this report apply to the product/system which was tested only.

Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of receipt: 2015. 01. 19

Date of test: 2015. 02. 08 ~ 03. 04

Issued date: 2015. 03. 05

Tested by: 

SEO, SOO HYEON

Approved by: 

SON, MIN GI

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1. Client information

Applicant: Samsung Electronics Co., Ltd.
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Korea 443-742
Telephone number: +82-31-8062-4313
Contact person: Seo, Beom Hee / ally.seo@samsung.com

Manufacturer: Samsung Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,
Korea 443-742

2. Laboratory information

Address

EMC compliance Ltd.

480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-390, Korea
Telephone Number: 82-31-336-9919 Facsimile Number: 82-505-299-8311

Certificate

KOLAS No.: 231

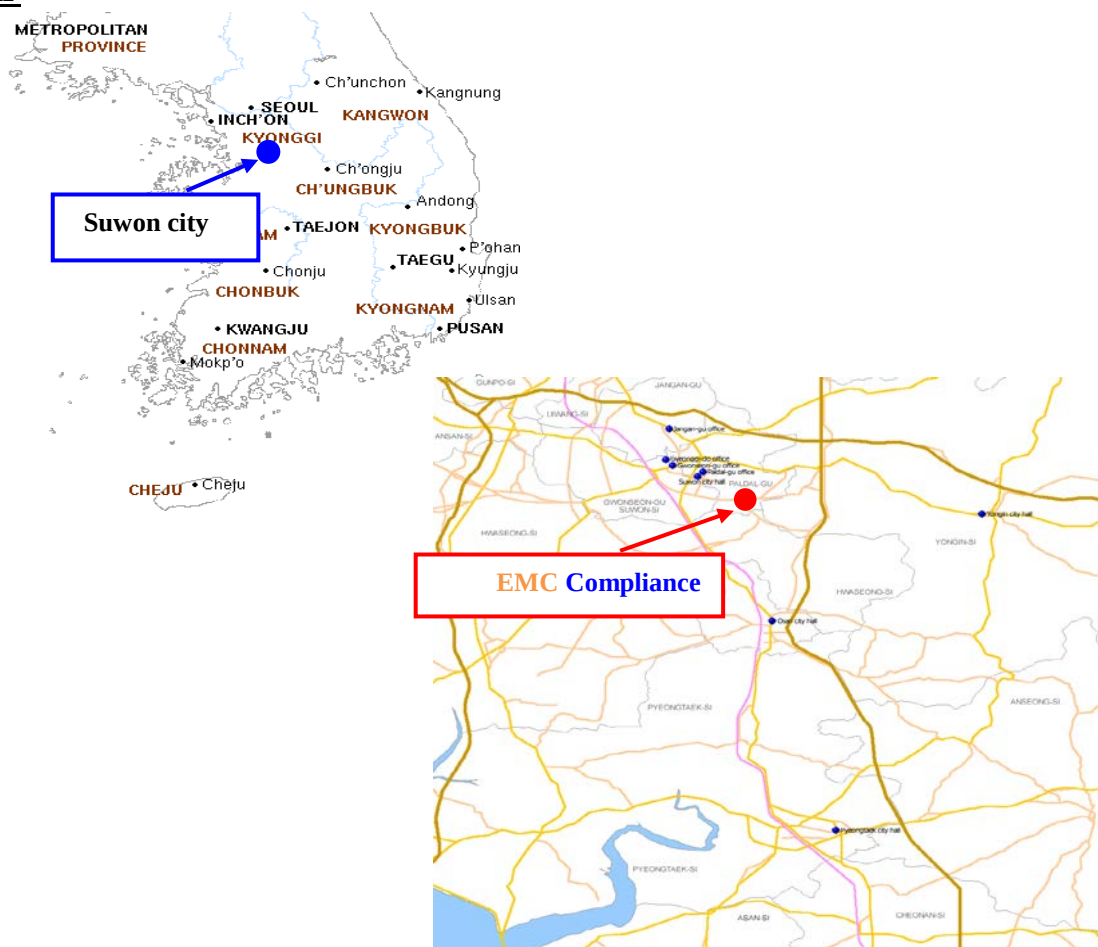
FCC Site Designation No: KR0040

FCC Site Registration No: 687132

VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849

IC Site Registration No.:8035A-2

SITE MAP



EMC compliance Ltd.

480-5, Sin-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
82-31-336-9919 (Main) 82-505-299-8311 (Fax)

3. Description of E.U.T.

3.1 Basic description

Applicant:	Samsung Electronics Co., Ltd.
Address of Applicant	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea 443-742
Manufacturer	Samsung Electronics Co., Ltd.
Address of Manufacturer	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea 443-742
Type of equipment	Wireless LAN Module
Basic Model	NFA455
Serial number	N/A

3.2 General description

Frequency Range	2 402 Mhz ~ 2 480 Mhz (Bluetooth, Bluetooth LE) 2 412 Mhz ~ 2 462 Mhz (802.11b/g/n_HT20) 2 422 Mhz ~ 2 452 Mhz (802.11n_HT40) 5 180 Mhz ~ 5 240 Mhz (802.11a/n/ac_HT20/VHT20)_Non DFS 5 190 Mhz ~ 5 230 Mhz (802.11n/ac_HT40/VHT40)_Non DFS 5 210 Mhz (802.11ac_VHT80)_Non DFS 5 260 Mhz ~ 5 320 Mhz (802.11a/n/ac_HT20/VHT20)_DFS 5 270 Mhz ~ 5 310 Mhz (802.11n/ac_HT40/VHT40)_DFS 5 290 Mhz (802.11ac_VHT80)_DFS 5 500 Mhz ~ 5 700 Mhz (802.11a/n/ac_HT20/VHT20)_DFS 5 510 Mhz ~ 5 670 Mhz (802.11n/ac_HT40/VHT40)_DFS 5 530 Mhz (802.11ac_VHT80)_DFS 5 745 Mhz ~ 5 805 Mhz (802.11a/n/ac_HT20/VHT20)_Non DFS 5 755 Mhz ~ 5 795 Mhz (802.11n/ac_HT40/VHT40)_Non DFS 5 775 Mhz (802.11ac_VHT80)_Non DFS
Type of Modulation	GFSK : Bluetooth, Bluetooth LE, $\pi/4$ DQPSK, 8DPSK : Bluetooth, CCK, OFDM : WIFI (2.4 G), OFDM : WIFI (5 G)
Number of Channels	2.0 GHz: 79 ch (Bluetooth), 40 ch (Bluetooth LE) 11 ch (802.11b/g/n_HT20) 5.0 GHz: 5 150 Mhz Band: 4 ch (802.11a/n/ac_HT20/VHT20) 2 ch (802.11n/ac_HT40/VHT40) 1 ch (802.11ac_VHT80) 5 250 Mhz Band: 4 ch (802.11a/n/ac_HT20/VHT20) 2 ch (802.11n/ac_HT40/VHT40) 1 ch (802.11ac_VHT80) 5 470 Mhz Band: 11 ch (11a/n/ac_HT20/VHT20) 5 ch (802.11n/ac_HT40/VHT40) 1 ch (802.11ac_VHT80) 5 725 Mhz Band: 4 ch (802.11a/n/ac_HT20/VHT20) 2 ch (802.11n/ac_HT40/VHT40) 1 ch (802.11ac_VHT80)
Type of Antenna	PCB Antenna
Antenna Gain	2 GHz: 0.57 dBi (Bluetooth, Bluetooth LE), -0.20 dBi (WiFi) 5 GHz: 5 150 Mhz Band: 0.95 dBi, 5 250 Mhz Band: 1.06 dBi 5 470 Mhz Band: 2.04 dBi, 5 725 Mhz Band: -1.08 dBi
Transmit Power	15.12 dBm
Power supply	DC 3.3 V*
H/W Version	V01
S/W Version	V01
Test S/W version	1.0.18
RF Power setting	Adjusting output power using QDART program

* Declared by the applicant.

3.3 Available channel list and frequency

5.0 GHz Band

* 802.11a/n/ac_HT20/VHT20

Frequency	Band 1	Band 2	Band 3	Band 4
Low frequency	5 180 MHz	5 260 MHz	5 500 MHz	5 745 MHz
Middle frequency	5 200 MHz	5 280 MHz	5 580 MHz	5 765 MHz
High frequency	5 240 MHz	5 320 MHz	5 700 MHz	5 805 MHz

* 802.11n/ac_HT40/VHT40

Frequency	Band 1	Band 2	Band 3	Band 4
Low frequency	5 190 MHz	5 270 MHz	5 510 MHz	5 755 MHz
Middle frequency	5 230 MHz	5 310 MHz	5 550 MHz	5 795 MHz
High frequency	-	-	5 670 MHz	-

* 802.11ac_VHT80

Frequency	Band 1	Band 2	Band 3	Band 4
Low frequency	5 210 MHz	5 290 MHz	5 530 MHz	5 775 MHz
Middle frequency	-	-	-	-
High frequency	-	-	-	-

3.4 Test Voltage

Mode	Voltage
Norminal voltage	DC 3.3 V

3.5 Duty Factor

Mode	Duty cycle [dB]	Duty cycle factor [dB]
802.11a	0.926	0.33
802.11n HT20	0.931	0.31
802.11n HT40	0.860	0.65
802.11ac VHT20	0.925	0.33
802.11ac VHT40	0.860	0.66
802.11ac VHT80	0.727	1.38

* Duty cycle factor= $10\log(1/\text{Duty cycle})$

4. Summary of test results

4.1 Standards & results

FCC Rule	IC Rule (RSS-GEN)	Parameter	Report Section	Test Result
15.203 15.407(a)(1)(2)(3)	-	Antenna Requirement	5.1	C
15.403(i),15.407(e)	RSS-210, A6.6	Bandwidth Measurement	5.2	C
15.407(a)(1)(2)	RSS-210, A9.2	Maximum Conducted Output Power	5.3	C
15.407(a)(1)(2)(5)	RSS-210, A9.2	Peak Power Spectral Density	5.4	C
15.205(a), 15.209(a), 15.407(b)(1), 15.407(b)(2), 15.407(b)(3)	RSS-210, A9.2 RSS-GEN, 8.9, 8.10	Spurious Emission, Band Edge and Restricted bands	5.6	C
15.407(g)	RSS-GEN, 6.11	Frequency Stability	5.7	C
15.207(a)	RSS-GEN, 8.8	Conducted Emissions	5.8	C
15.407(h)	RSS-210, A9.3	Dynamic Frequency Selection	5.9	C
Note: C = complies NC = Not complies NT = Not tested NA = Not Applicable				

* The general test methods used to test this device is ANSI C63.10:2013

4.2 Uncertainty

Measurement Item	Expanded Uncertainty $U = KU_c (K = 2)$	
Conducted RF power	± 1.36 dB	
Conducted Spurious Emissions	± 1.52 dB	
Radiated Spurious Emissions	30 MHz ~ 300 MHz:	+ 4.94 dB, - 5.06 dB
		+ 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz:	+ 4.97 dB, - 5.08 dB
		+ 4.84 dB, - 4.96 dB
Conducted Emissions	1 GHz ~ 40 GHz:	+ 6.03 dB, - 6.05 dB
	9 kHz ~ 150 kHz:	± 3.75 dB
	150 kHz ~ 30 MHz:	± 3.36 dB

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.407(a)(1)(2)(3), If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2 Result

-Complied

The transmitter has a PCB antenna.

The most highest total directional peak gain of the antenna among 1~4 Band is 2.04 dBi and it doesn't exceed 6.0 dBi.

5.2 Maximum Conducted Output Power

5.2.1 Regulation

According to §15.407(a) (1) (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2.2 Measurement Procedure

These test measurement settings are specified in section C of 789033 D02 General UNII Test Procedures.

5.2.2.1 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 section II.B.
- (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 percent).

5.2.4 Test Result

-Complied

*802.11a _5 150 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 180	13.30	0.33	13.63	24.00	10.37
5 200	13.53	0.33	13.86	24.00	10.14
5 240	14.11	0.33	14.44	24.00	9.56

*802.11a _5 250 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 260	13.81	0.33	14.14	24.00	9.86
5 280	14.01	0.33	14.34	24.00	9.66
5 320	13.82	0.33	14.15	24.00	9.85

*802.11a _5 470 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 500	13.61	0.33	13.94	24.00	10.06
5 580	13.84	0.33	14.17	24.00	9.83
5 700	13.36	0.33	13.69	24.00	10.31

*802.11a _5 725 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 745	13.21	0.33	13.54	30.00	16.46
5 765	13.12	0.33	13.45	30.00	16.55
5 805	13.72	0.33	14.05	30.00	15.95

*802.11n HT20_5 150 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 180	13.10	0.31	13.41	24.00	10.59
5 200	13.39	0.31	13.70	24.00	10.30
5 240	13.89	0.31	14.20	24.00	9.80

*802.11n HT20_5 250 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 260	13.42	0.31	13.73	24.00	10.27
5 280	13.76	0.31	14.07	24.00	9.93
5 320	13.51	0.31	13.82	24.00	10.18

*802.11n HT20_5 470 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 500	13.48	0.31	13.79	24.00	10.21
5 580	13.23	0.31	13.54	24.00	10.46
5 700	14.01	0.31	14.32	24.00	9.68

*802.11n HT20_5 725 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 745	13.47	0.31	13.78	30.00	16.22
5 765	13.76	0.31	14.07	30.00	15.93
5 805	13.62	0.31	13.93	30.00	16.07

*802.11n HT40_5 150 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 190	13.41	0.65	14.06	24.00	9.94
5 230	13.96	0.65	14.61	24.00	9.39

*802.11n HT40_5 250 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 270	13.40	0.65	14.05	24.00	9.95
5 310	13.91	0.65	14.56	24.00	9.44

*802.11n HT40_5 470 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 510	13.76	0.65	14.41	24.00	9.59
5 550	13.36	0.65	14.01	24.00	9.99
5 670	14.47	0.65	15.12	24.00	8.88

*802.11n HT40_5 725 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 755	13.40	0.65	14.05	30.00	15.95
5 795	13.48	0.65	14.13	30.00	15.87

*802.11ac VHT20_5 150 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 180	13.30	0.33	13.63	24.00	10.37
5 200	13.31	0.33	13.64	24.00	10.36
5 240	13.77	0.33	14.10	24.00	9.90

*802.11ac VHT20_5 250 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 260	13.16	0.33	13.49	24.00	10.51
5 280	13.84	0.33	14.17	24.00	9.83
5 320	13.54	0.33	13.87	24.00	10.13

*802.11ac VHT20_5 470 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 500	13.44	0.33	13.77	24.00	10.23
5 580	13.29	0.33	13.62	24.00	10.38
5 700	13.23	0.33	13.56	24.00	10.44

*802.11ac VHT20_5 725 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 745	13.48	0.33	13.81	30.00	16.19
5 765	13.61	0.33	13.94	30.00	16.06
5 805	13.36	0.33	13.69	30.00	16.31

*802.11ac VHT40_5 150 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 190	13.42	0.66	14.08	24.00	9.92
5 230	14.01	0.66	14.67	24.00	9.33

*802.11ac VHT40_5 250 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 270	13.64	0.66	14.30	24.00	9.70
5 310	14.06	0.66	14.72	24.00	9.28

*802.11ac VHT40_5 470 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 510	13.74	0.66	14.40	24.00	9.60
5 550	13.25	0.66	13.91	24.00	10.09
5 670	13.44	0.66	14.10	24.00	9.90

*802.11ac VHT40_5 725 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 755	13.31	0.66	13.97	30.00	16.03
5 795	13.47	0.66	14.13	30.00	15.87

*802.11ac VHT80_5 150 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 210	13.12	1.38	14.50	24.00	9.50

*802.11ac VHT80_5 250 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 290	13.19	1.38	14.57	24.00	9.43

*802.11ac VHT80_5 470 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 530	13.33	1.38	14.71	24.00	9.29

*802.11ac VHT80_5 725 Band

Frequency [MHz]	Average Power [dBm]	Duty Factor [dBm]	Result [dBm]	Limit [dBm]	Margin [dBm]
5 775	13.41	1.38	14.79	30.00	15.21

-NOTE:

1. Duty Factor : refer to 3.5
2. Result = Total power calculation(Average Power) + Duty Factor

5.3 Bandwidth Measurement

5.3.1 Regulation

According to §15.403,(i) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

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

5.3.2 Measurement Procedure

1.Emission Bandwidth (EBW)

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

2.Minimum Emission Bandwidth for the band 5.725 - 5.85 GHz

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.715-5.85 GHz.

The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

5.3.3 Test Result

-Complied

*802.11a

5 150 Band

Frequency	26 dB Bandwidth	OBW
5 180	19.46	16.26
5 200	19.14	16.26
5 240	19.22	16.26

5 250 Band

Frequency	26 dB Bandwidth	OBW
5 260	19.14	16.26
5 280	19.46	16.26
5 320	19.06	16.26

5 470 Band

Frequency	26 dB Bandwidth	OBW
5 500	19.18	16.22
5 580	21.14	16.38
5 700	22.06	16.46

5 725 Band

Frequency	6 dB Bandwidth	OBW
5 745	15.50	16.58
5 765	15.32	16.50
5 805	15.47	16.50

*802.11n HT20

5 150 Band

Frequency	26 dB Bandwidth	OBW
5 180	19.82	17.38
5 200	19.90	17.34
5 240	19.78	17.38

5 250 Band

Frequency	26 dB Bandwidth	OBW
5 260	19.82	17.38
5 280	19.74	17.38
5 320	19.78	17.38

5 470 Band

Frequency	26 dB Bandwidth	OBW
5 500	19.70	17.34
5 580	20.42	17.46
5 700	20.90	17.46

5 725 Band

Frequency	6 dB Bandwidth	OBW
5 745	15.70	17.46
5 765	15.29	17.58
5 805	15.45	17.50

*802.11n HT40

5 150 Band

Frequency	26 dB Bandwidth	OBW
5 190	41.16	35.96
5 230	41.56	35.96

5 250 Band

Frequency	26 dB Bandwidth	OBW
5 270	42.04	36.04
5 310	42.20	36.12

5 470 Band

Frequency	26 dB Bandwidth	OBW
5 510	42.12	36.04
5 550	41.88	36.04
5 670	41.48	36.04

5 725 Band

Frequency	6 dB Bandwidth	OBW
5 755	35.10	36.12
5 795	35.09	36.04

*802.11ac VHT20

5 150 Band

Frequency	26 dB Bandwidth	OBW
5 180	19.74	17.38
5 200	19.86	17.38
5 240	19.82	17.38

5 250 Band

Frequency	26 dB Bandwidth	OBW
5 260	19.66	17.38
5 280	19.46	17.38
5 320	19.82	17.38

5 470 Band

Frequency	26 dB Bandwidth	OBW
5 500	19.66	17.34
5 580	19.70	17.42
5 700	19.58	17.42

5 725 Band

Frequency	6 dB Bandwidth	OBW
5 745	15.15	17.38
5 765	15.15	17.94
5 805	15.45	17.62

*802.11ac VHT40

5 150 Band

Frequency	26 dB Bandwidth	OBW
5 190	42.12	36.04
5 230	42.84	36.04

5 250 Band

Frequency	26 dB Bandwidth	OBW
5 270	40.92	35.96
5 310	41.24	35.96

5 470 Band

Frequency	26 dB Bandwidth	OBW
5 510	43.00	36.04
5 550	41.24	36.04
5 670	41.32	36.04

5 725 Band

Frequency	6 dB Bandwidth	OBW
5 755	35.13	36.20
5 795	35.09	36.12

*802.11ac VHT80

5 150 Band

Frequency	26 dB Bandwidth	OBW
5 210	82.96	75.72

5 250 Band

Frequency	26 dB Bandwidth	OBW
5 290	82.96	75.12

5 470 Band

Frequency	26 dB Bandwidth	OBW
5 530	82.00	74.97

5 725 Band

Frequency	6 dB Bandwidth	OBW
5 775	75.13	75.28

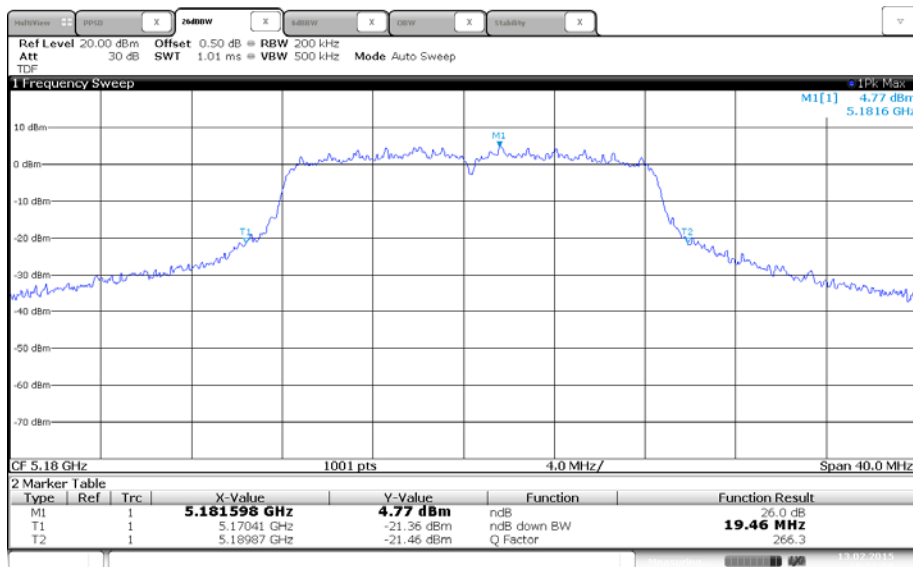
5.3.4 Test Plot

Figure 1. Plot of Bandwidth Measurement

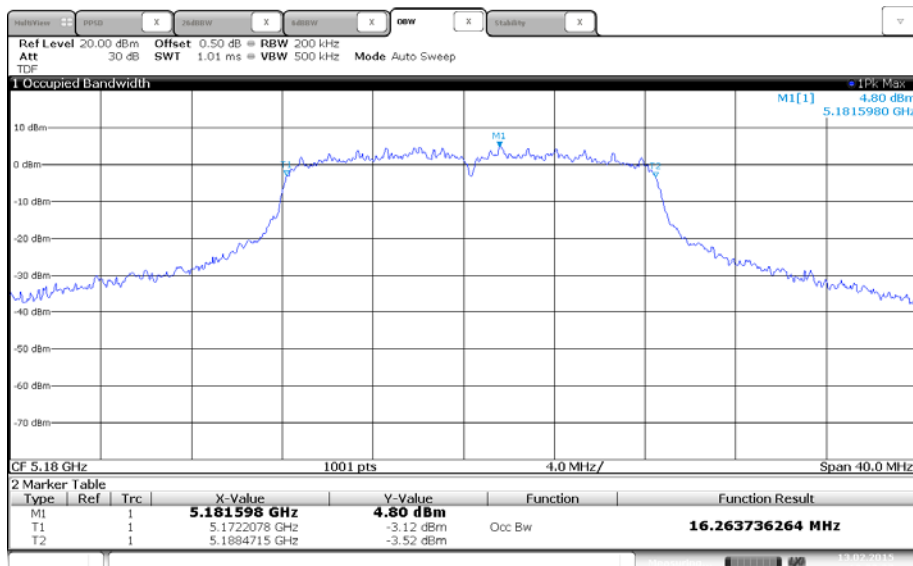
* 802.11a_5 150 Band (26 dB Bandwidth)

-5 180 MHz

EBW

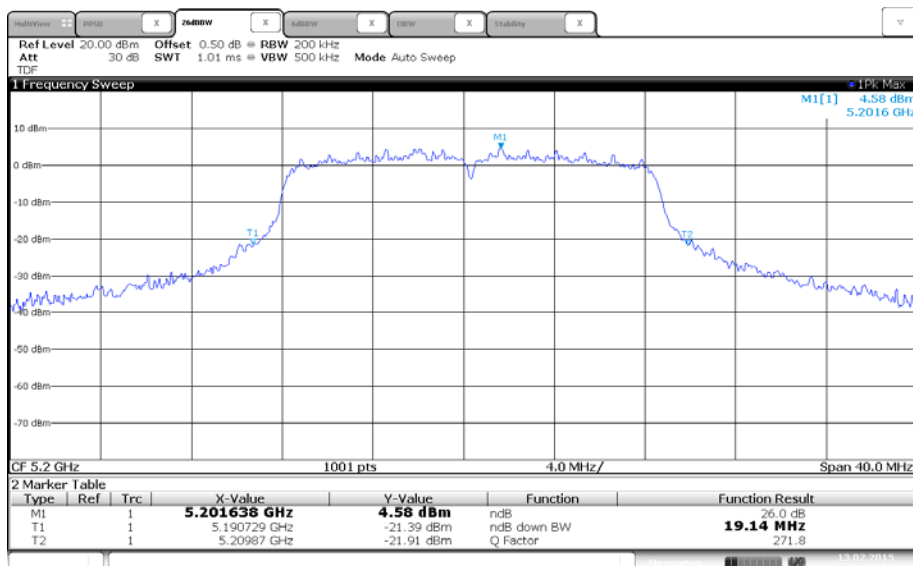


OBW

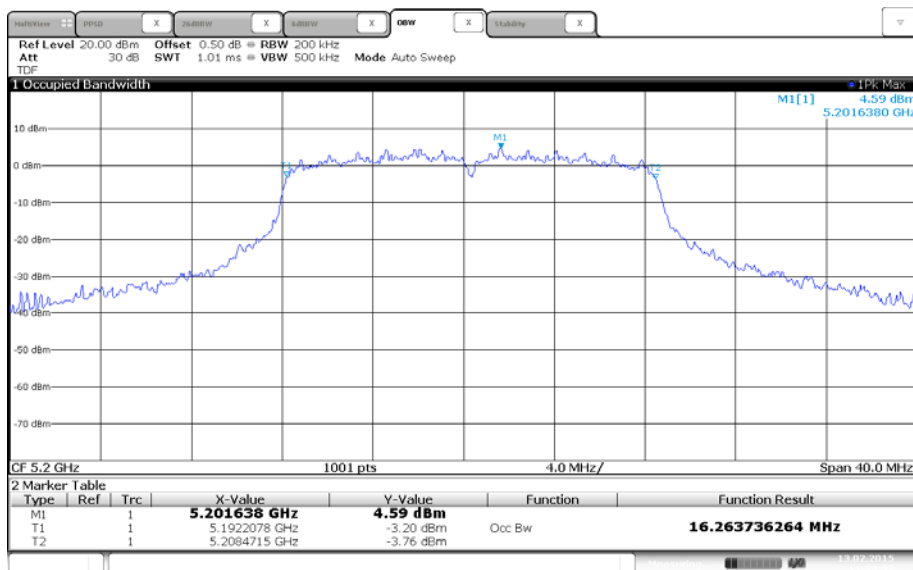


-5 200 MHz

EBW

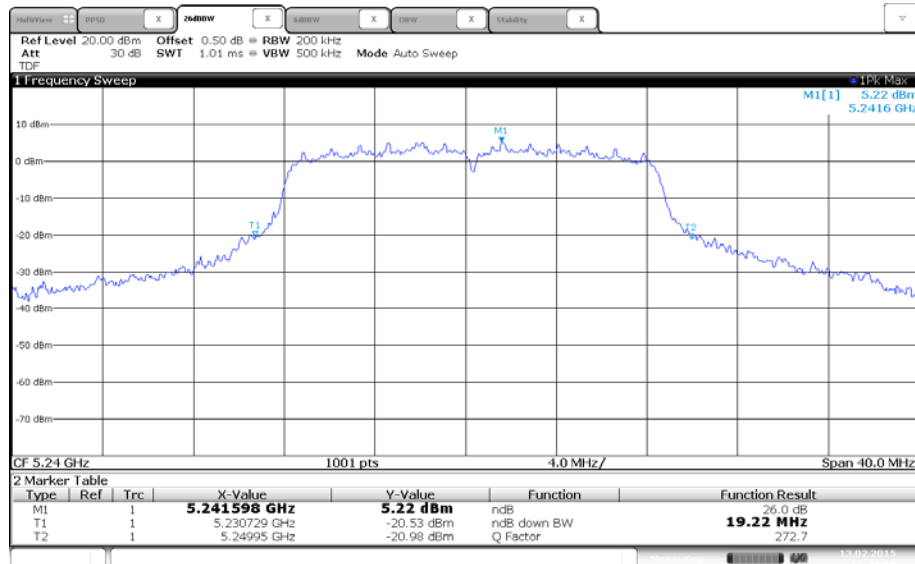


OBW

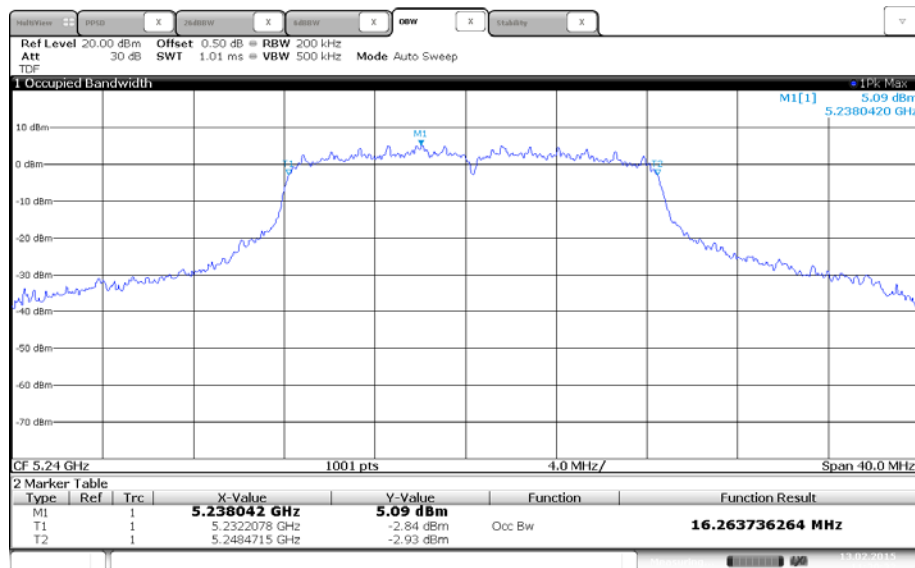


-5 240 MHz

EBW



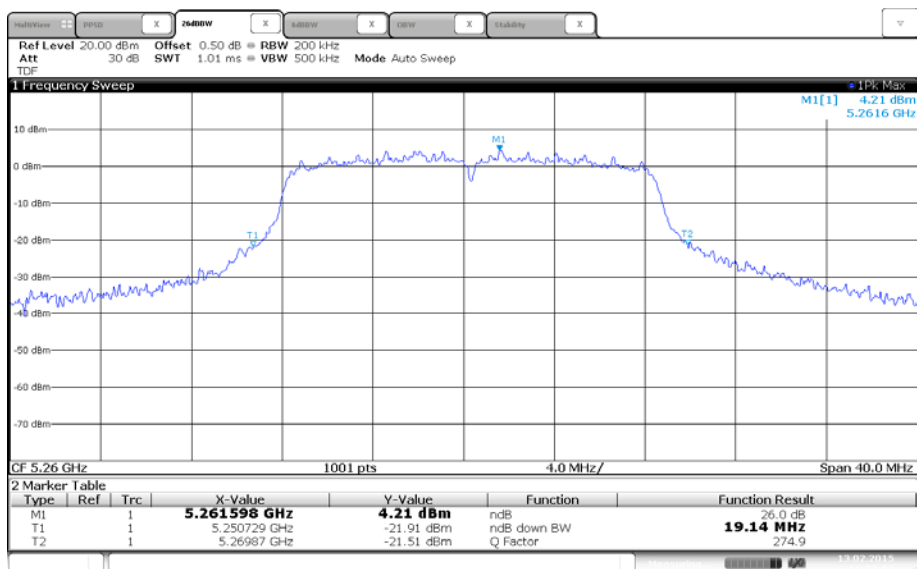
OBW



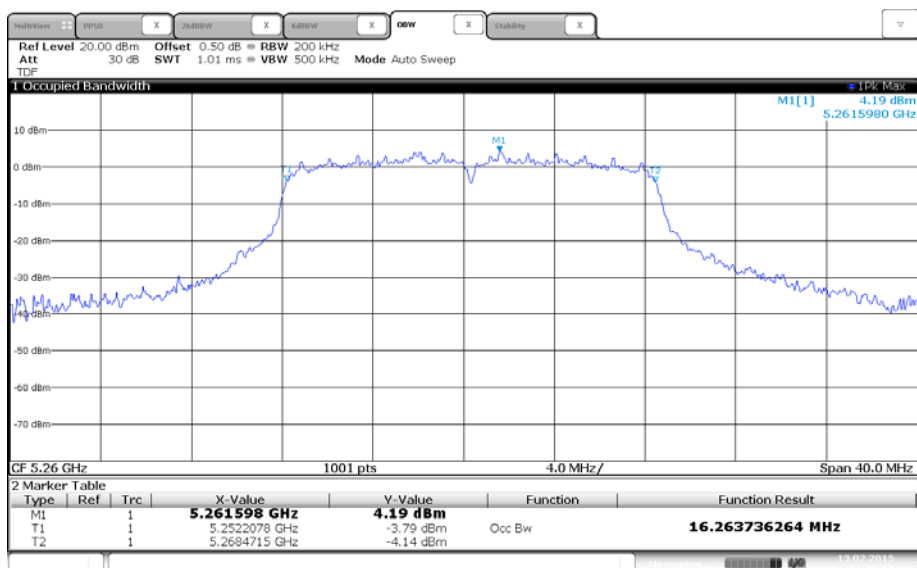
* 802.11a_5 250 Band (26 dB Bandwidth)

-5 260 MHz

EBW

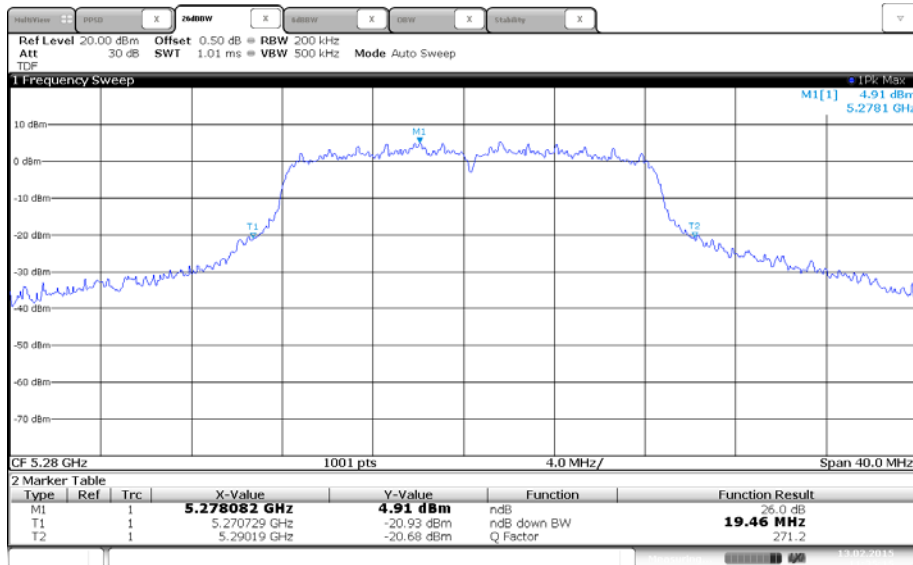


OBW

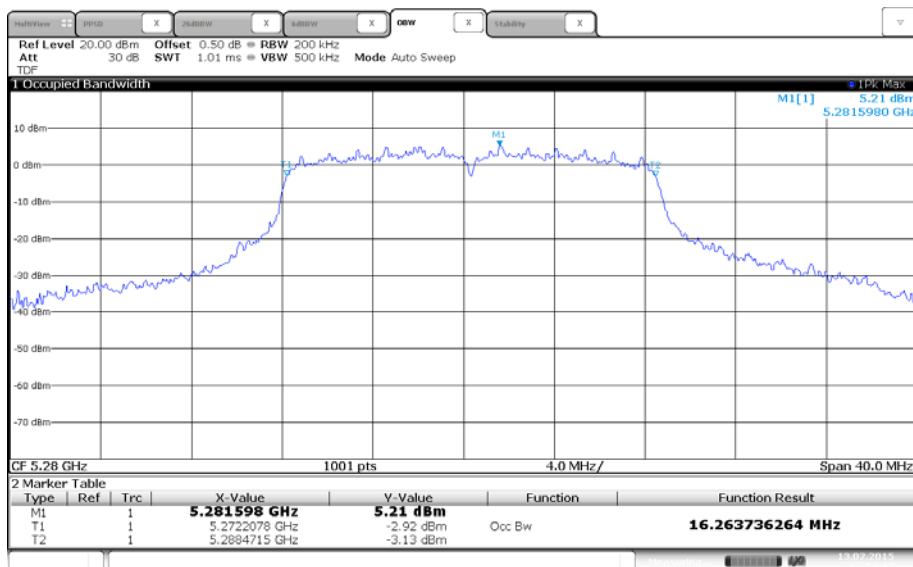


-5 280 MHz

EBW

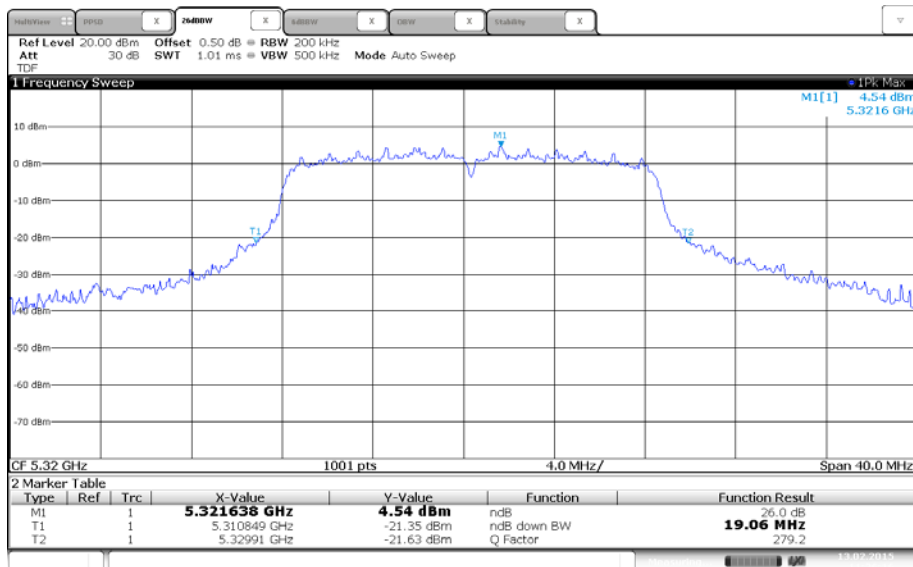


OBW

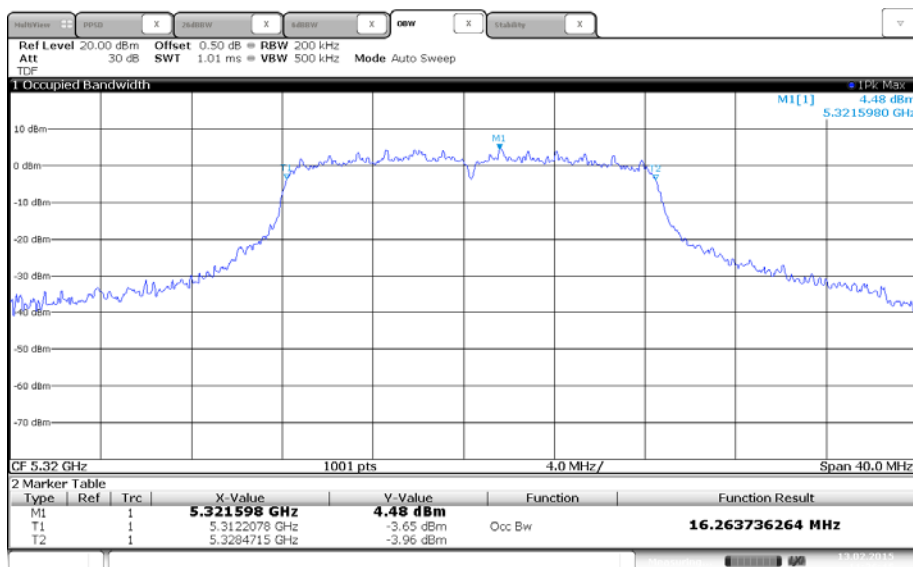


-5 320 MHz

EBW



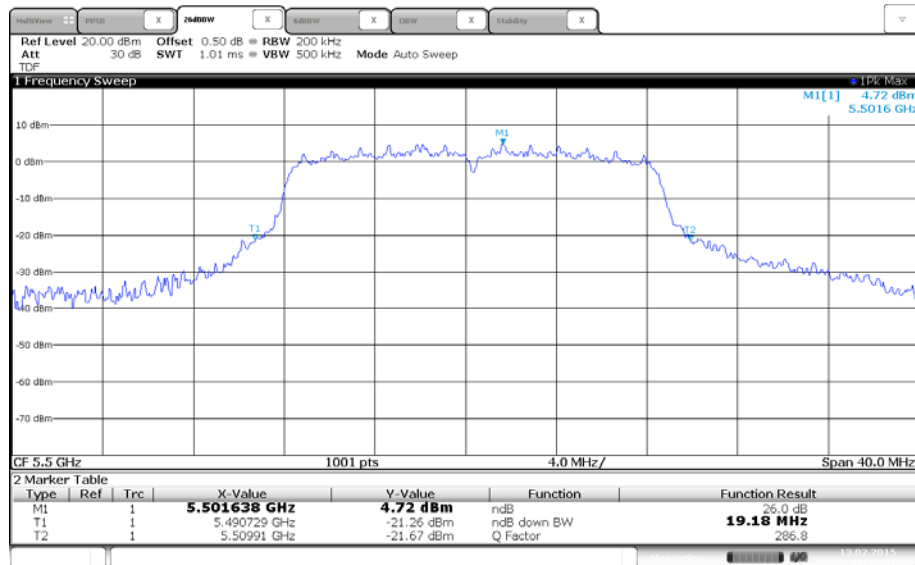
OBW



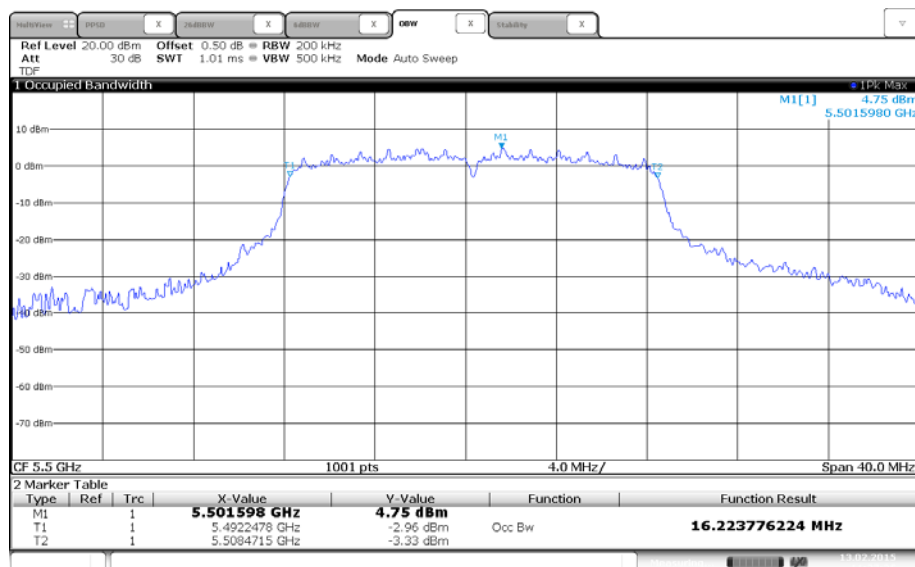
* 802.11a _5 470 Band (26 dB Bandwidth)

-5 500 MHz

EBW

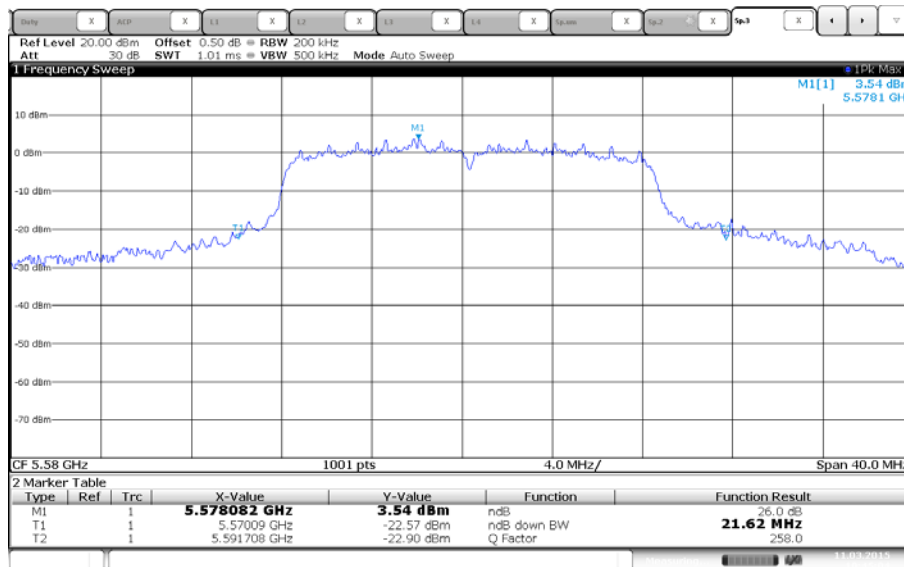


OBW

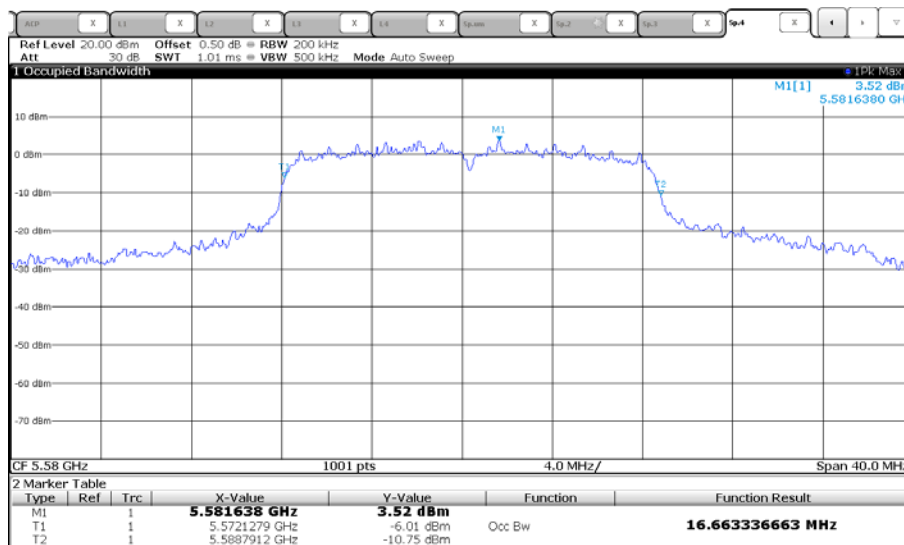


-5 580 MHz

EBW

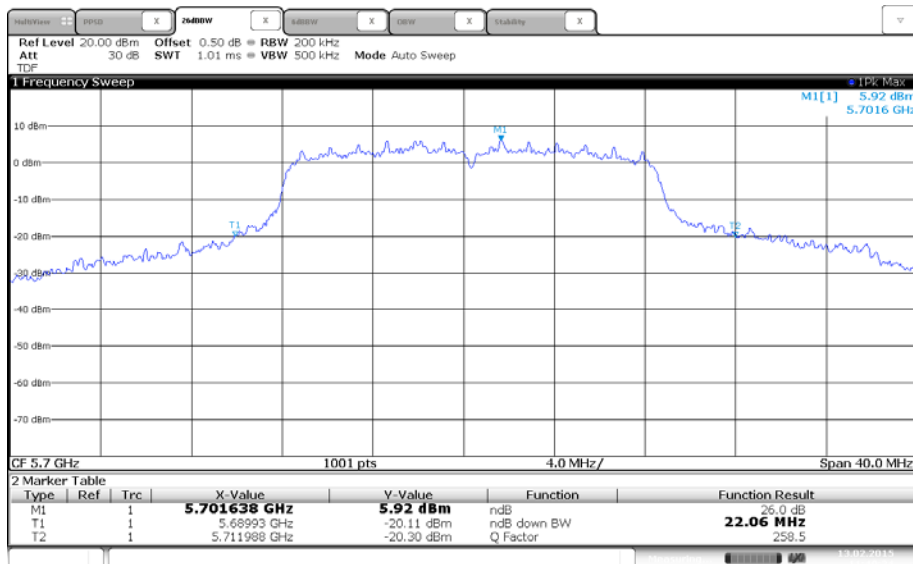


OBW

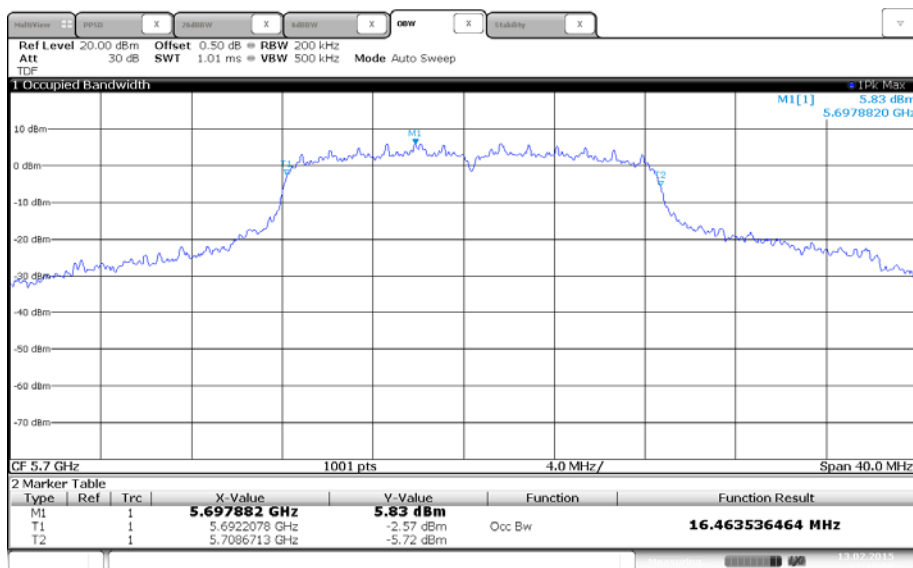


-5 700 MHz

EBW



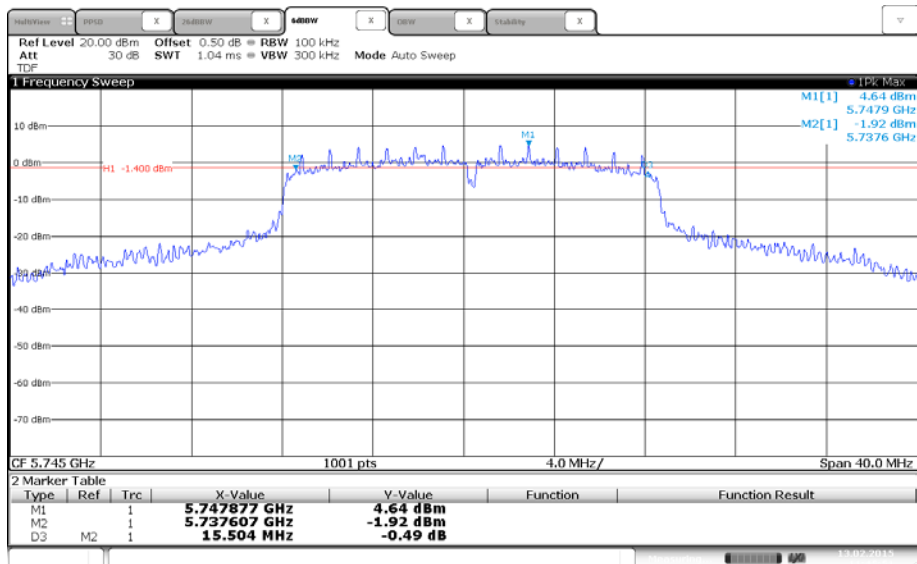
OBW



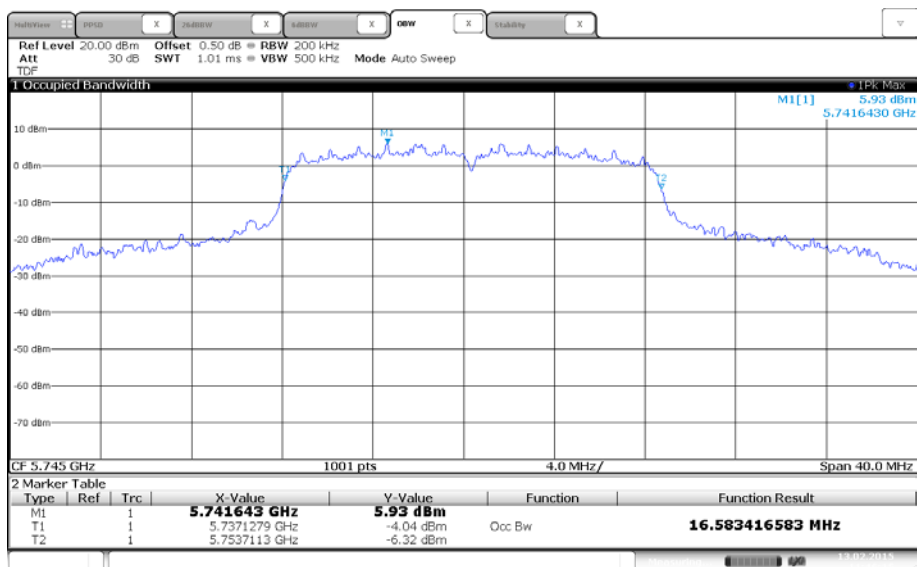
* 802.11a_5 725 Band (6 dB Bandwidth)

-5 745 MHz

6 dB Bandwidth

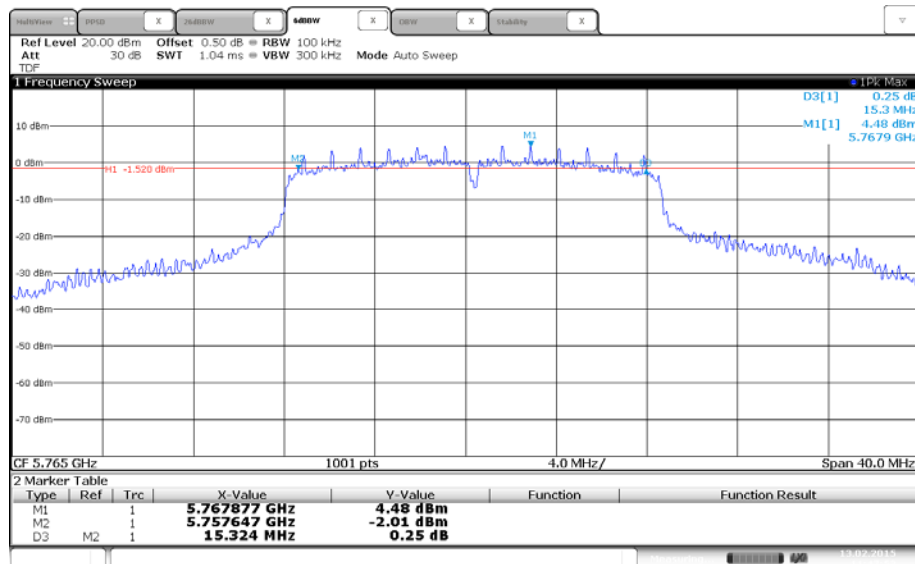


OBW

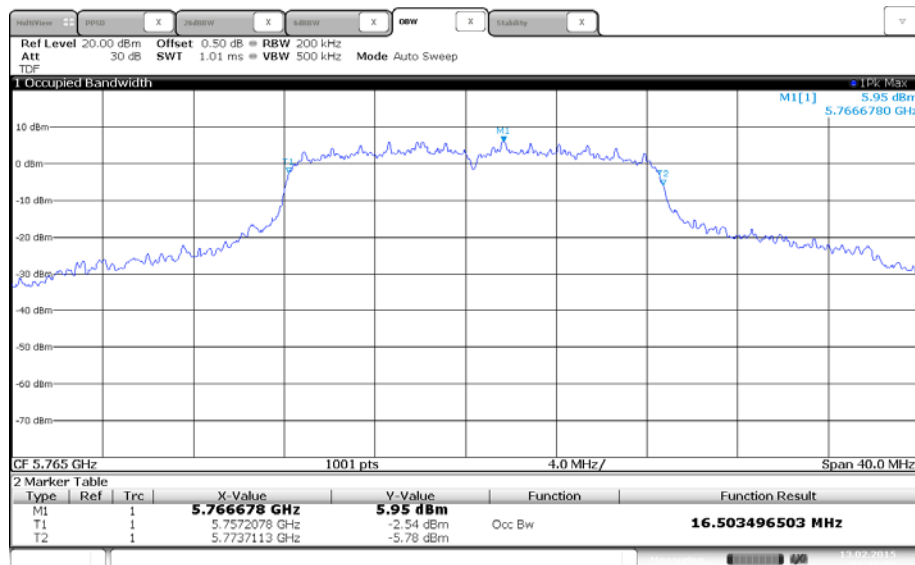


-5 765 MHz

6 dB Bandwidth

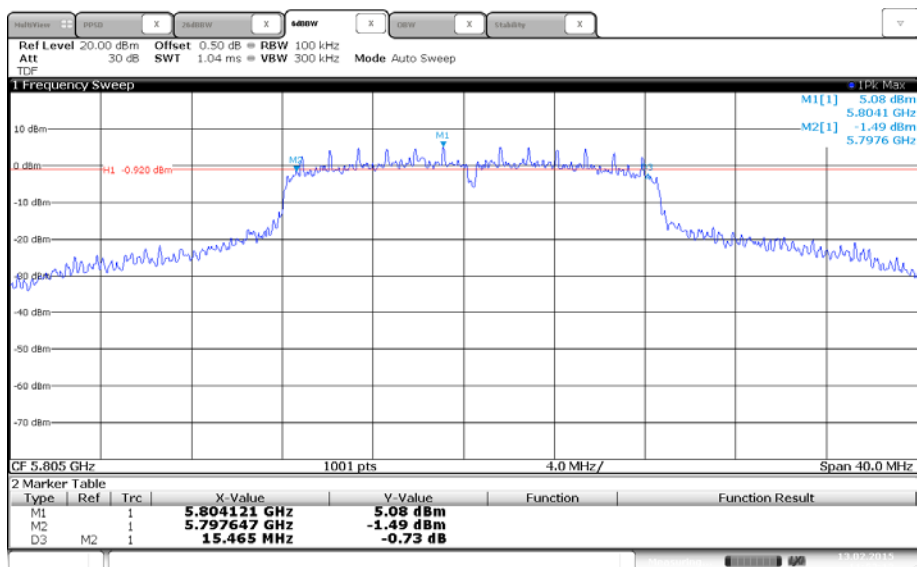


OBW

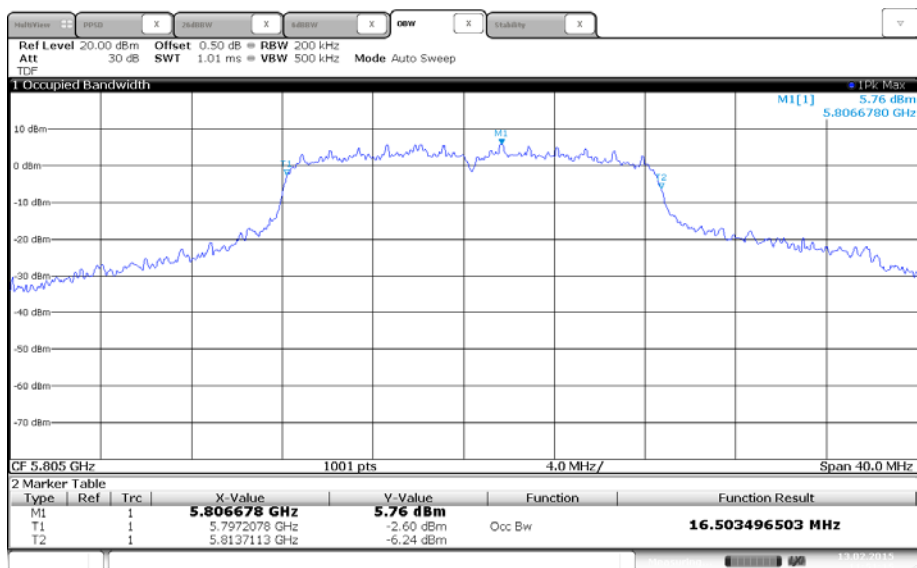


-5 805 MHz

6 dB Bandwidth



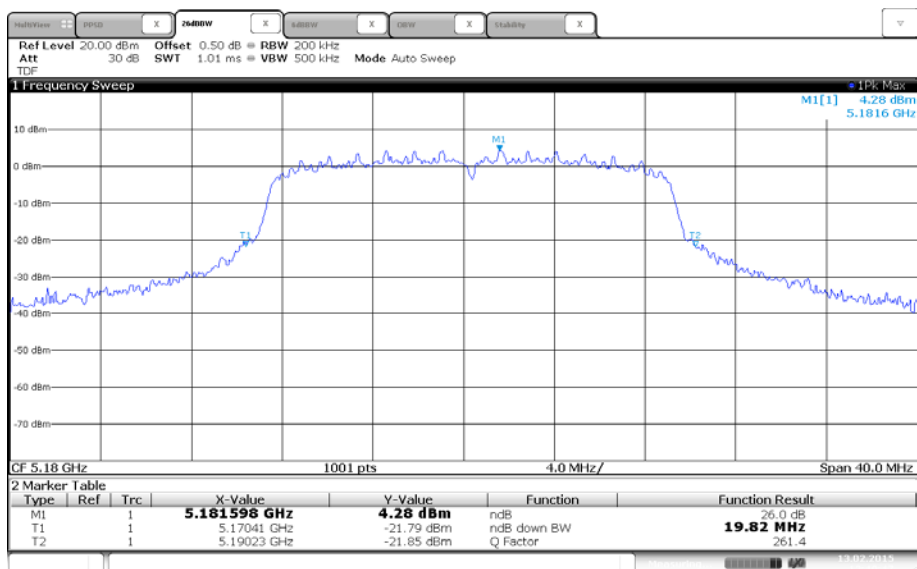
OBW



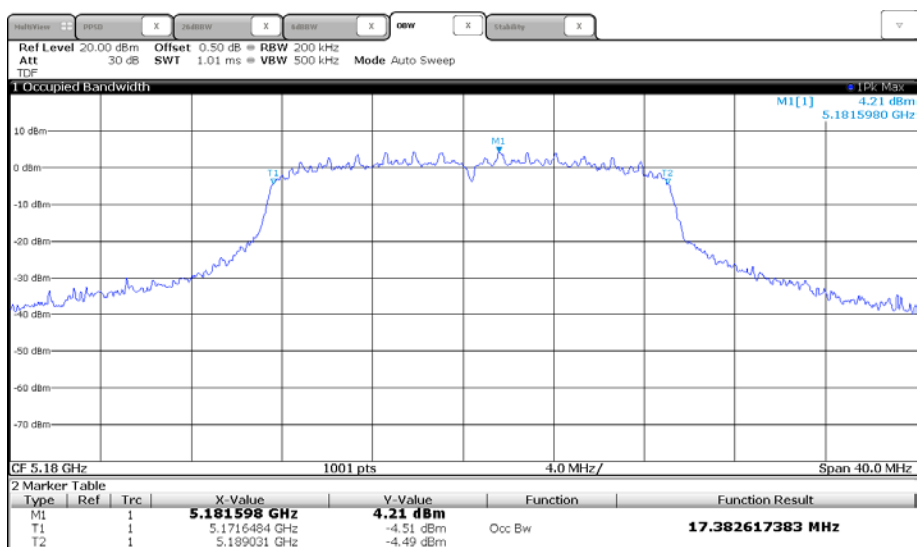
* 802.11n HT20_5 150 Band (26 dB Bandwidth)

-5 180 MHz

EBW

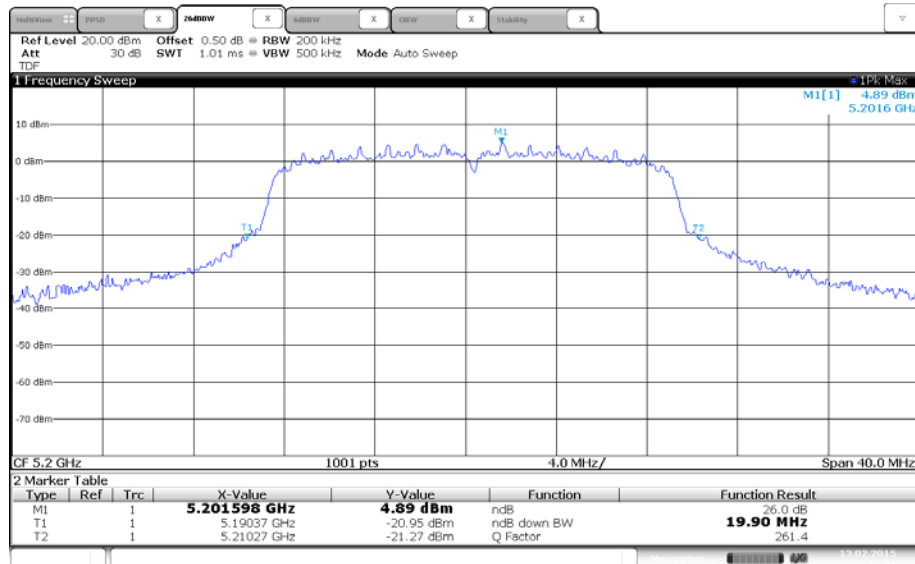


OBW

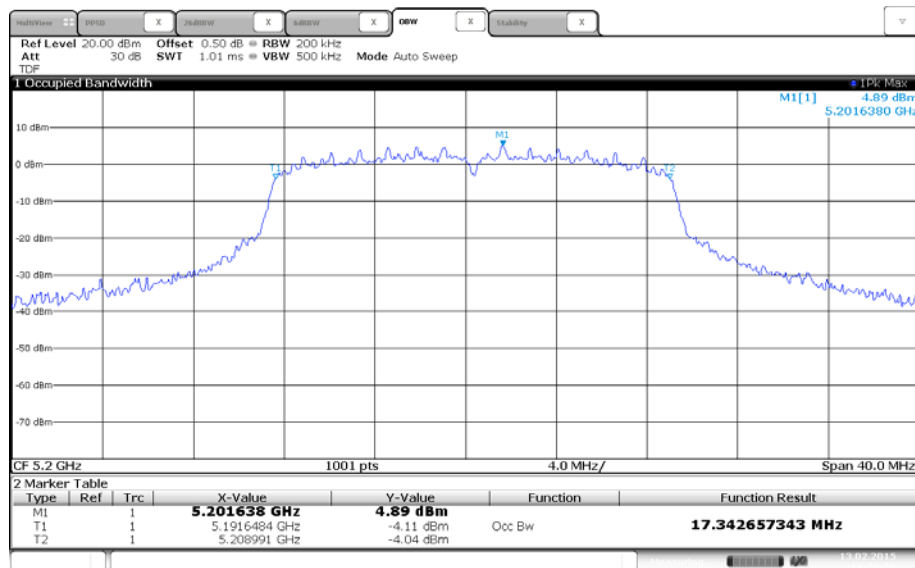


-5 200 MHz

EBW

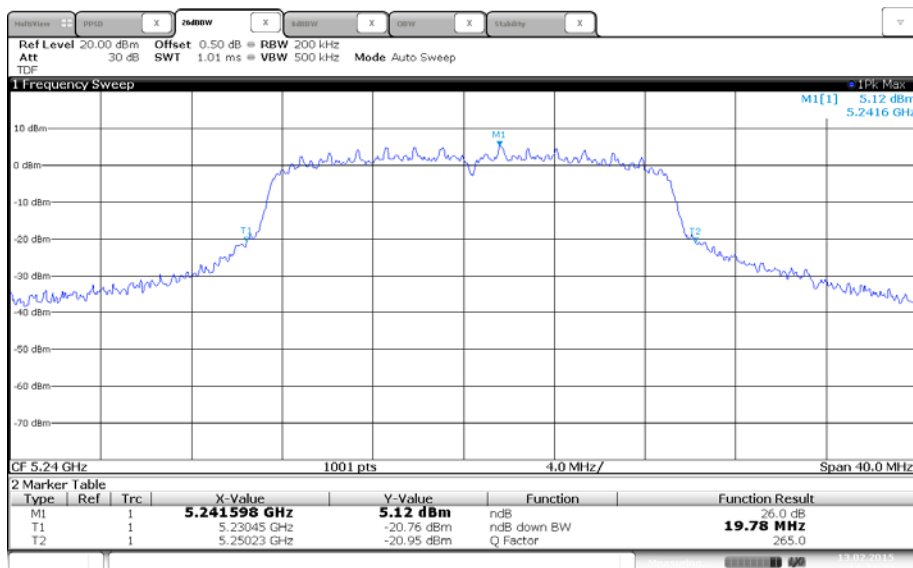


OBW

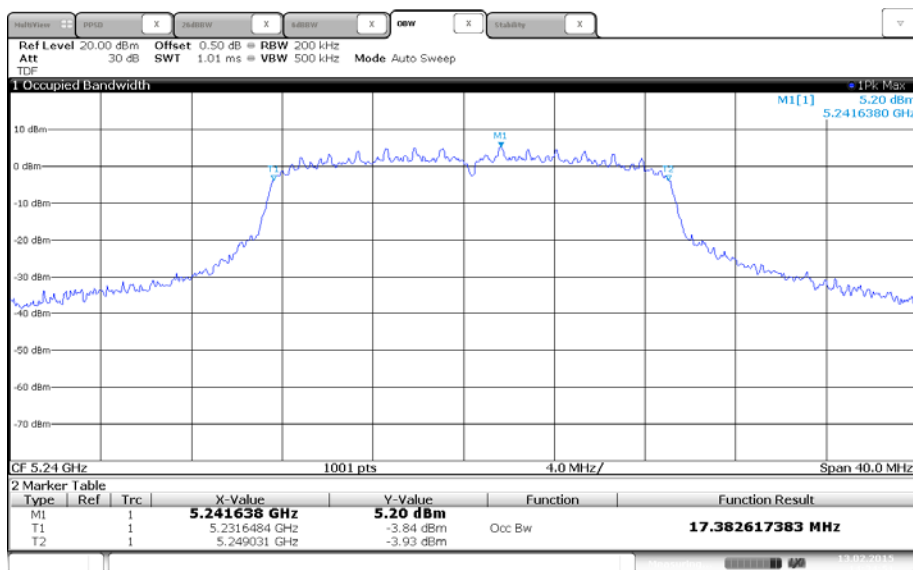


-5 240 MHz

EBW



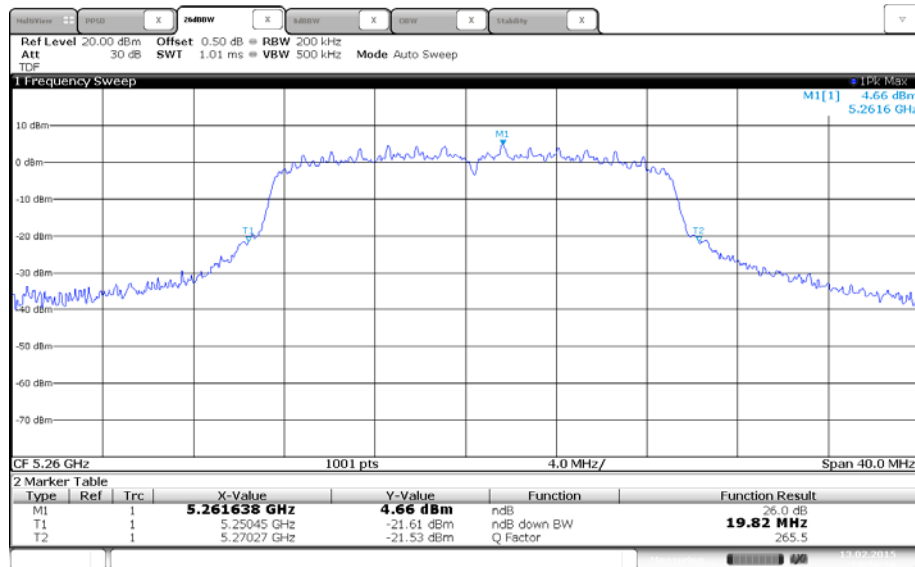
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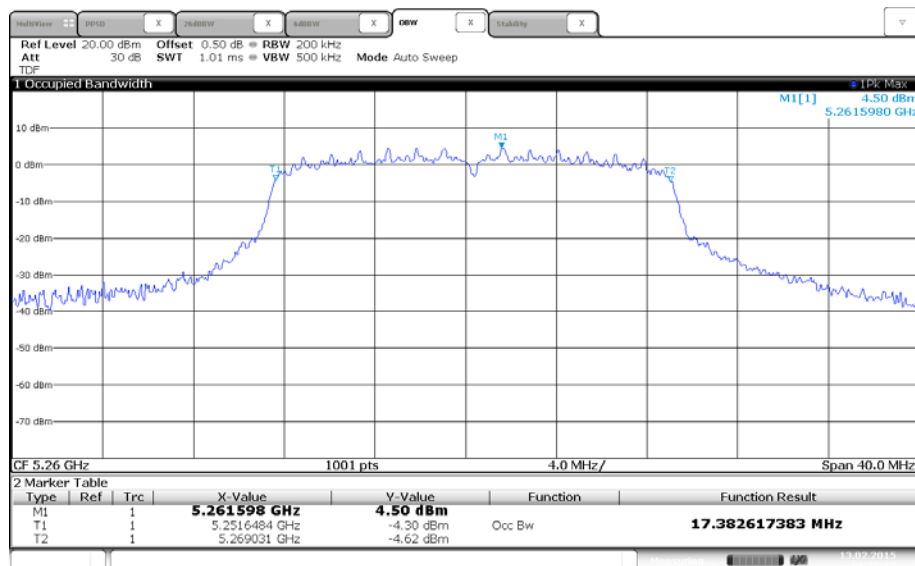
* 802.11n HT20_5 250 Band (26 dB Bandwidth)

-5 260 MHz

EBW

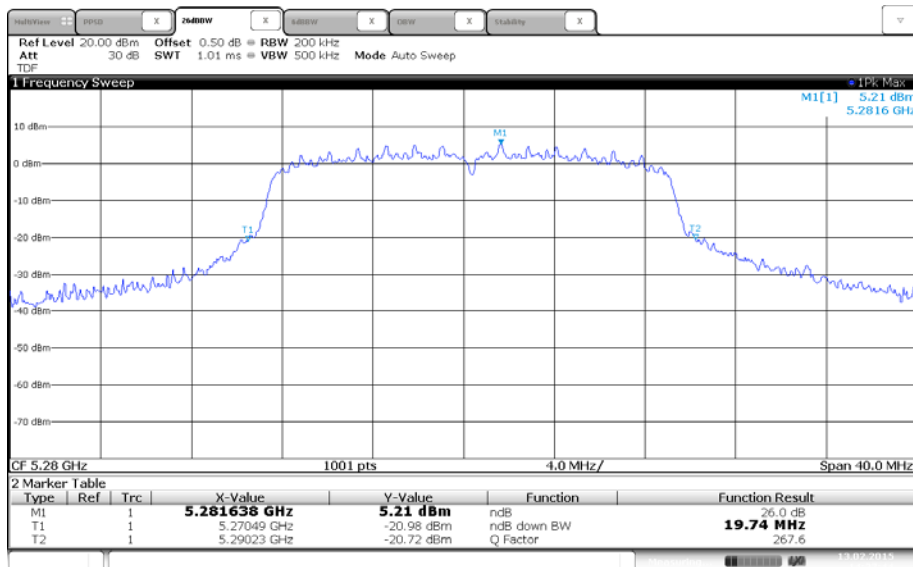


OBW

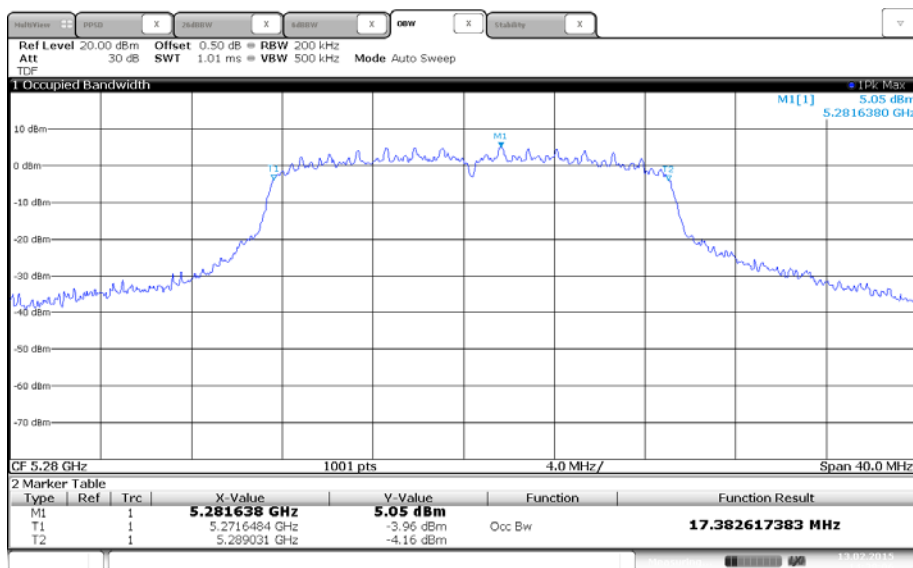


-5 280 MHz

EBW

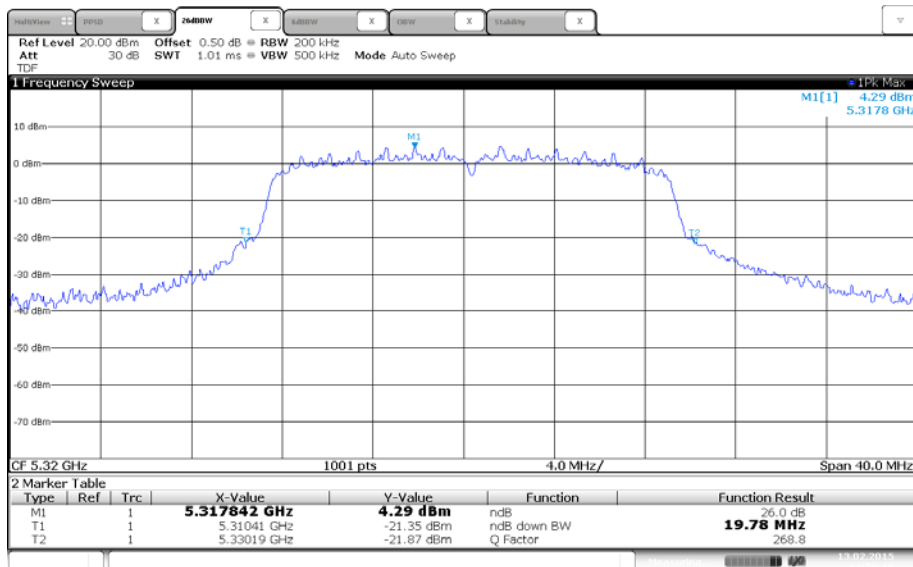


OBW

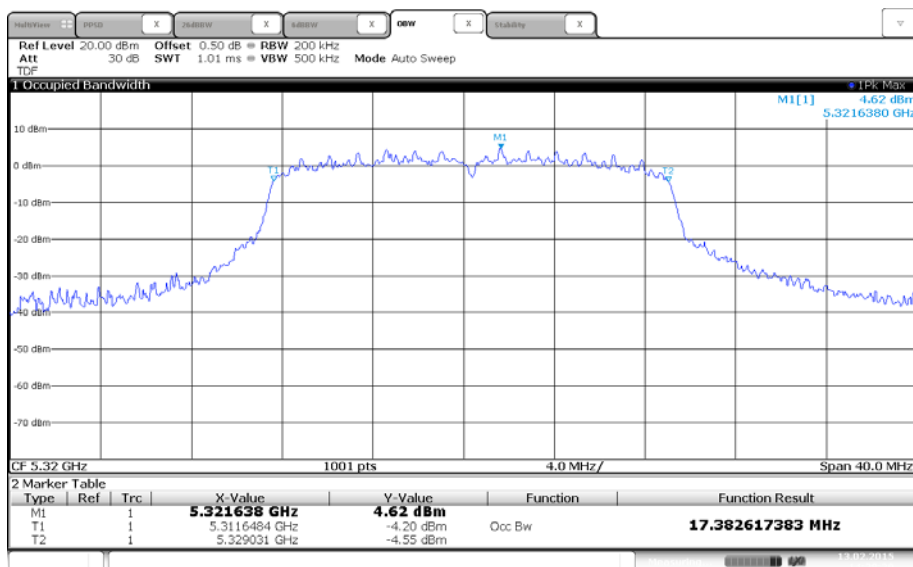


-5 320 MHz

EBW



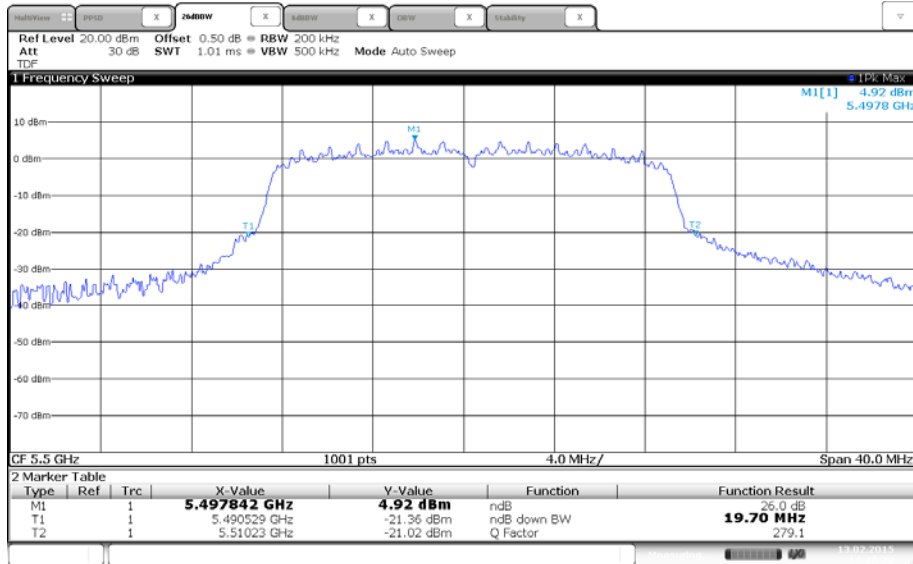
OBW



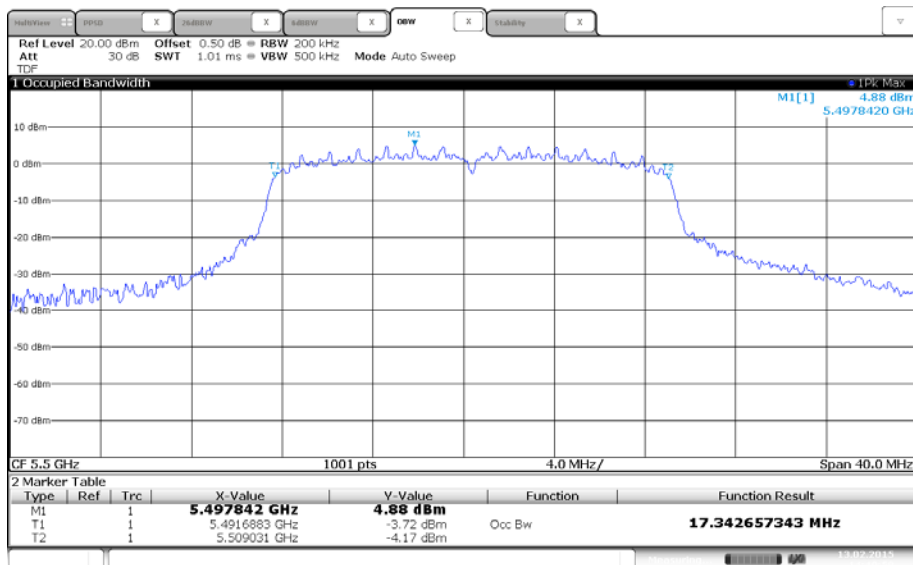
* 802.11n HT20_5 470 Band (26 dB Bandwidth)

-5 500 MHz

EBW

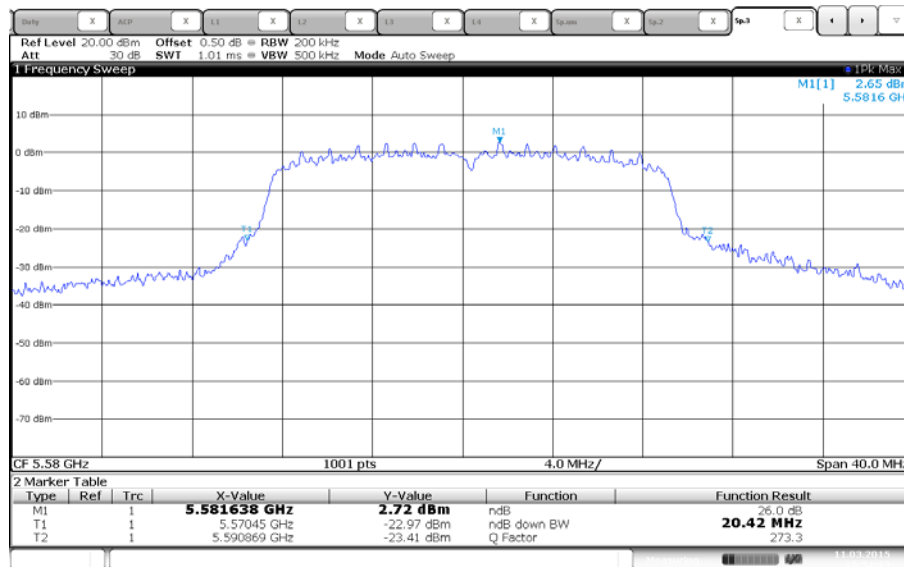


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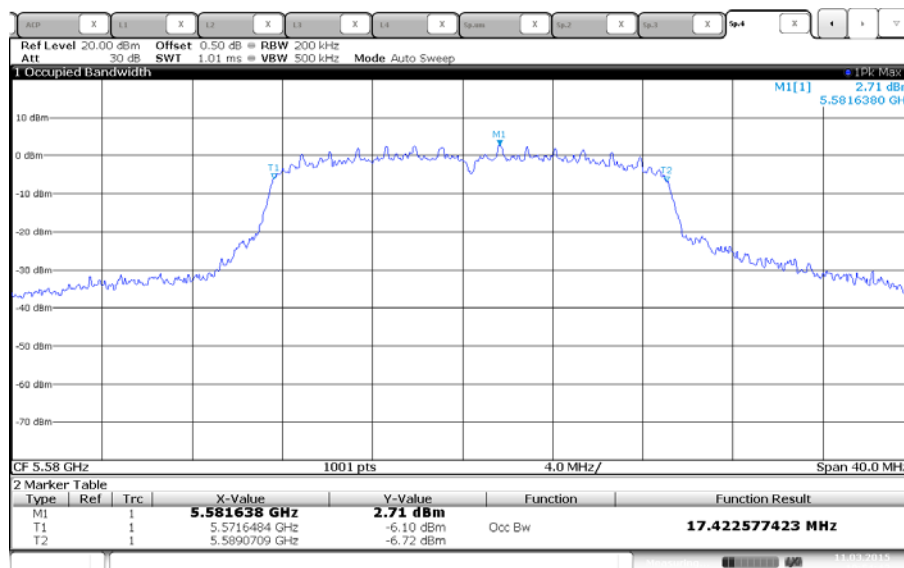


-5 580 MHz

EBW

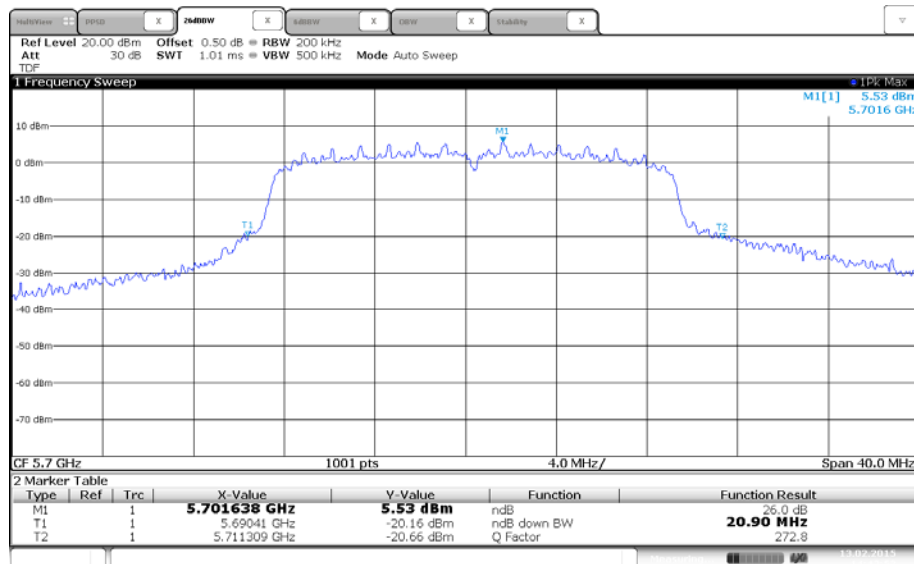


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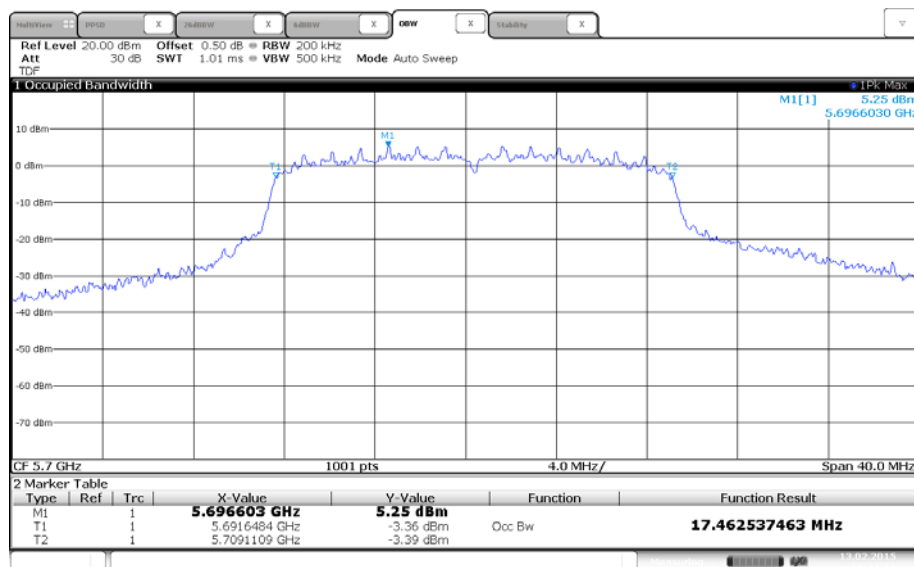


-5 700 MHz

EBW



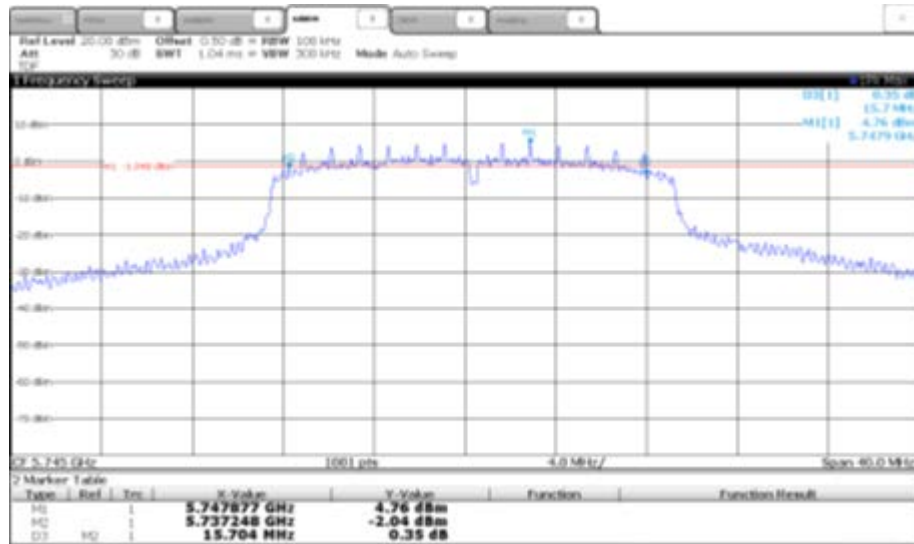
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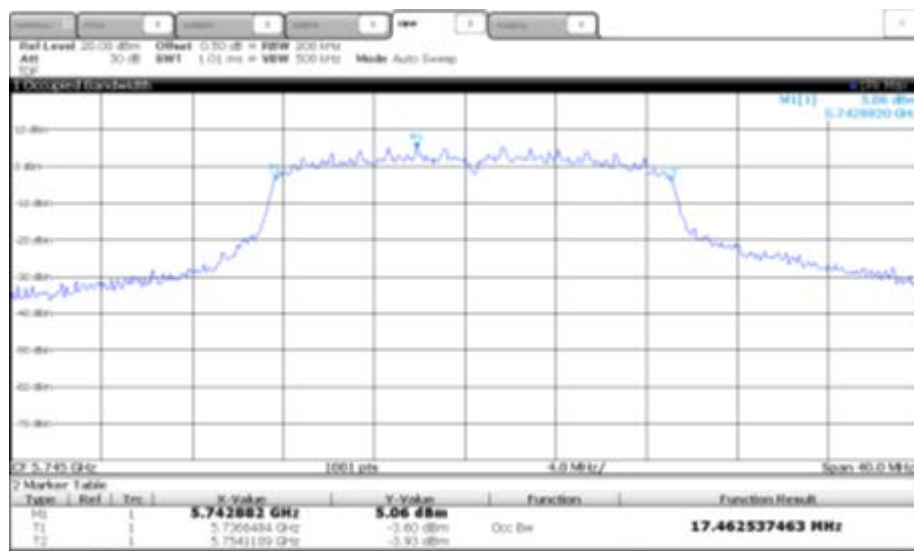
* 802.11n HT20_5 725 Band (6 dB Bandwidth)

-5 745 MHz

6 dB Bandwidth

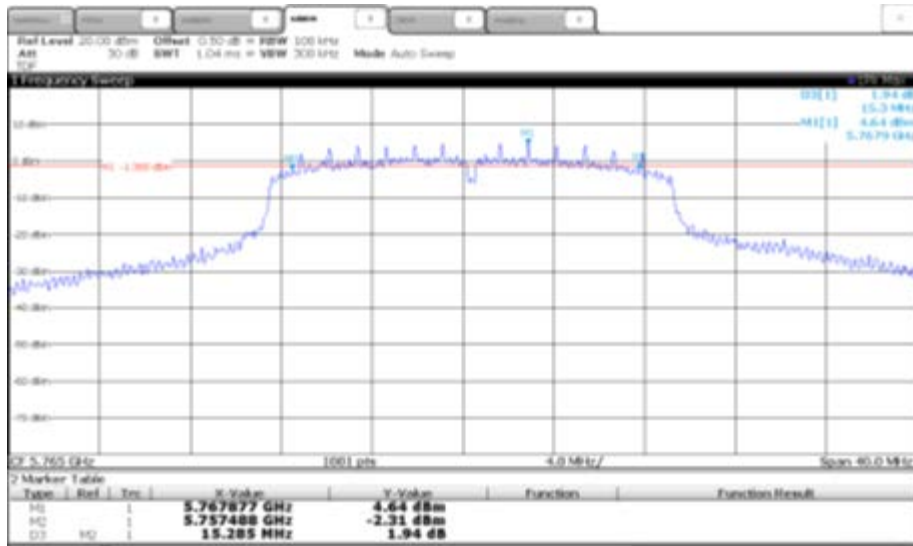


OBW

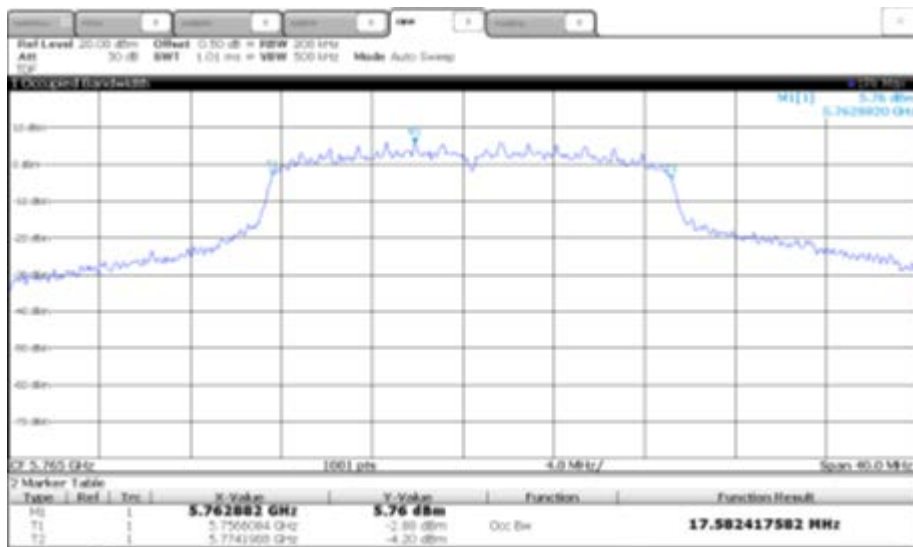


-5 765 MHz

6 dB Bandwidth

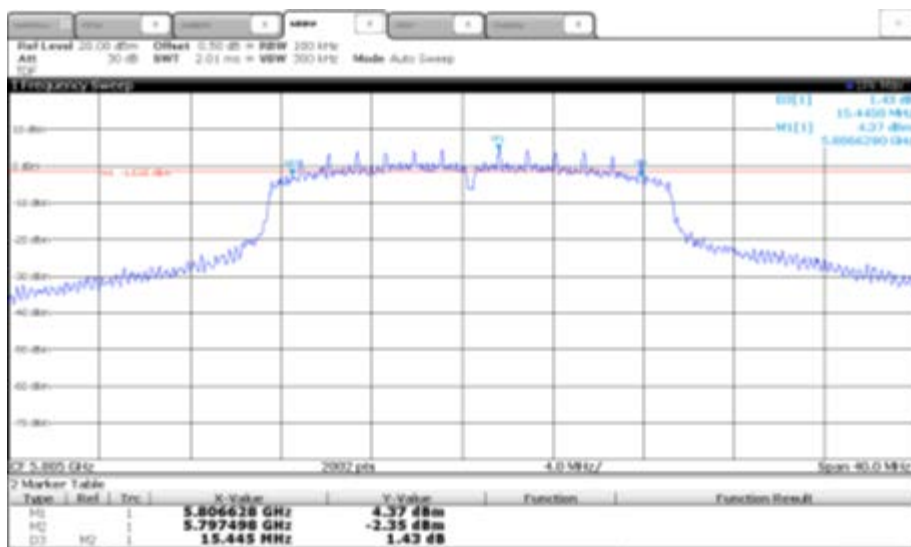


OBW

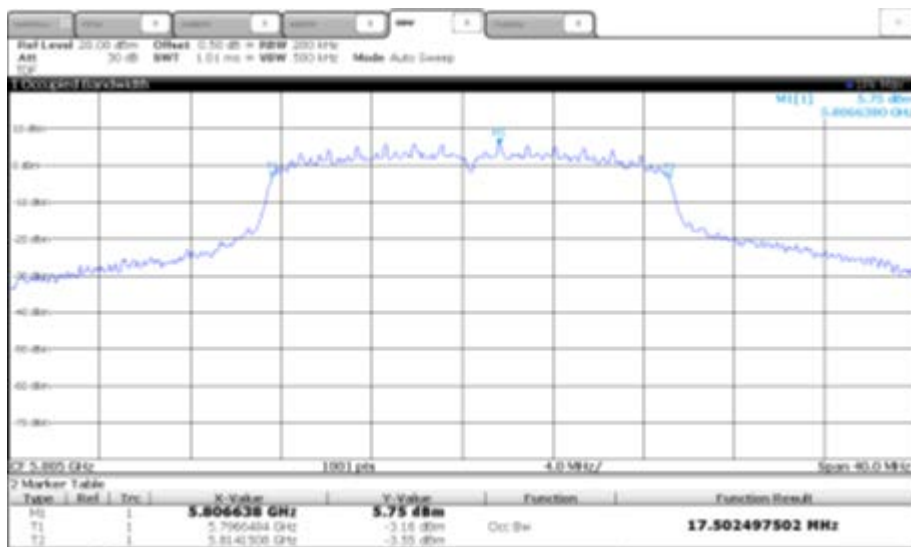


-5 805 MHz

6 dB Bandwidth



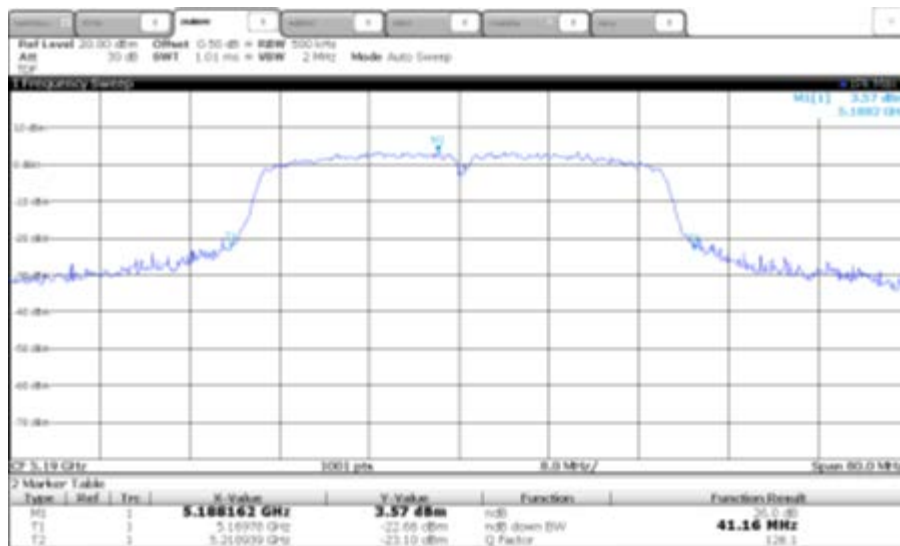
OBW



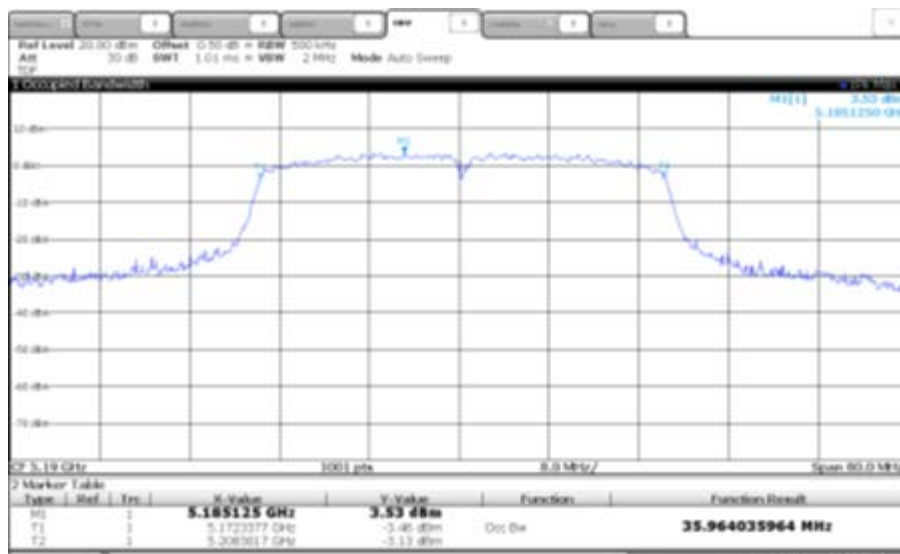
* 802.11n HT40_5 150 Band (26 dB Bandwidth)

-5 190 MHz

EBW

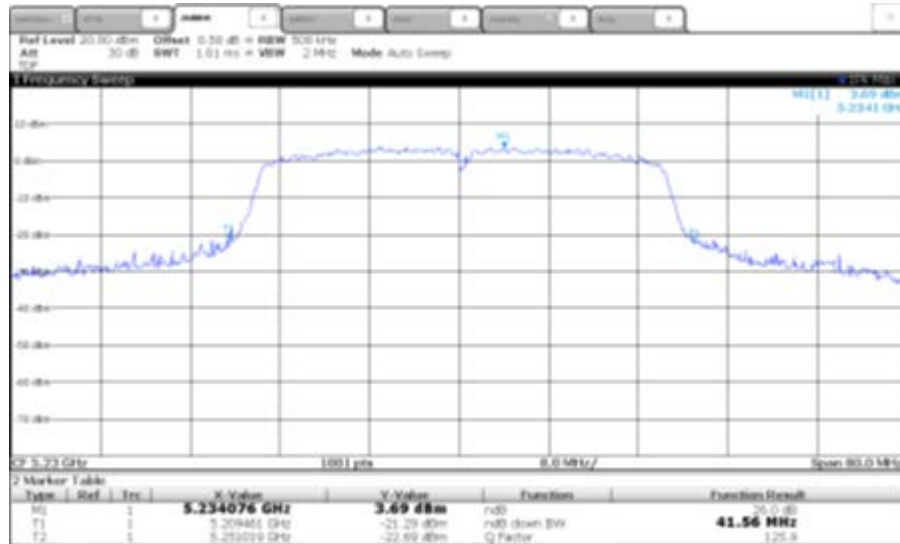


OBW

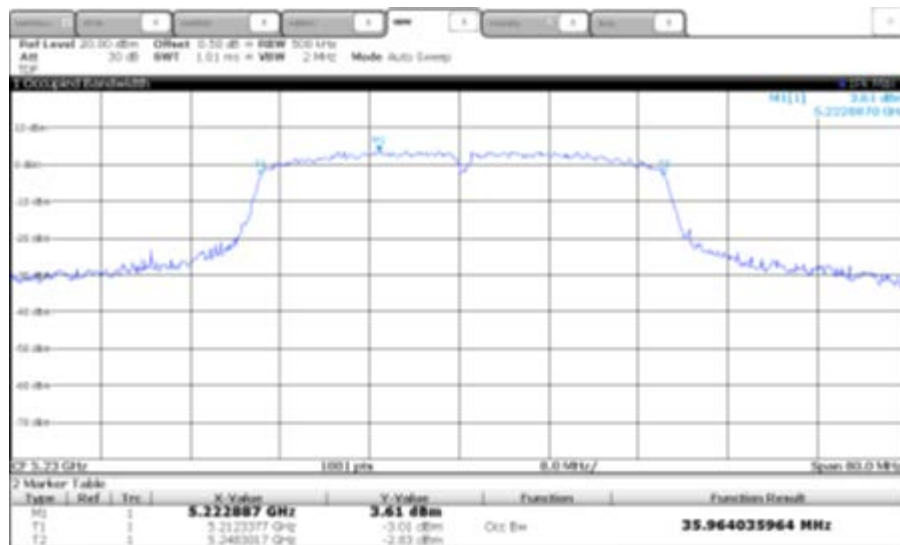


-5 230 MHz

EBW



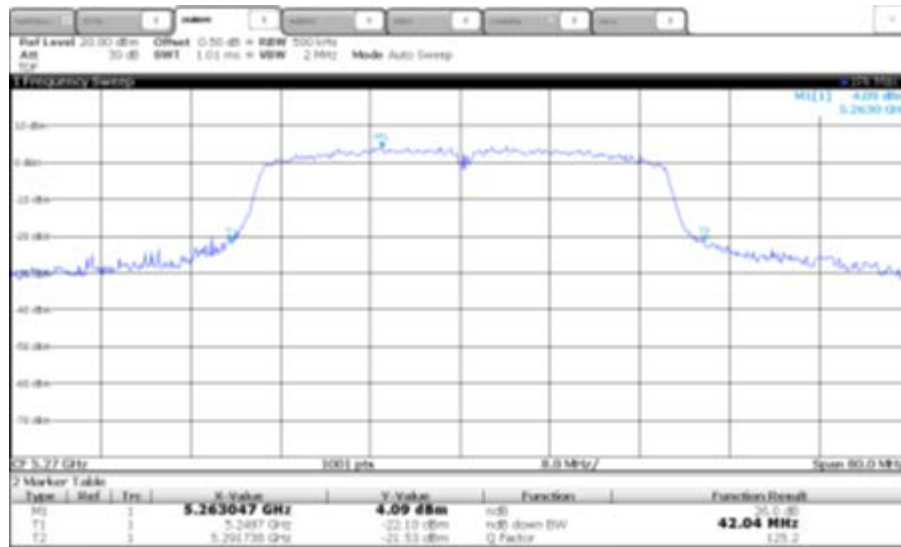
OBW



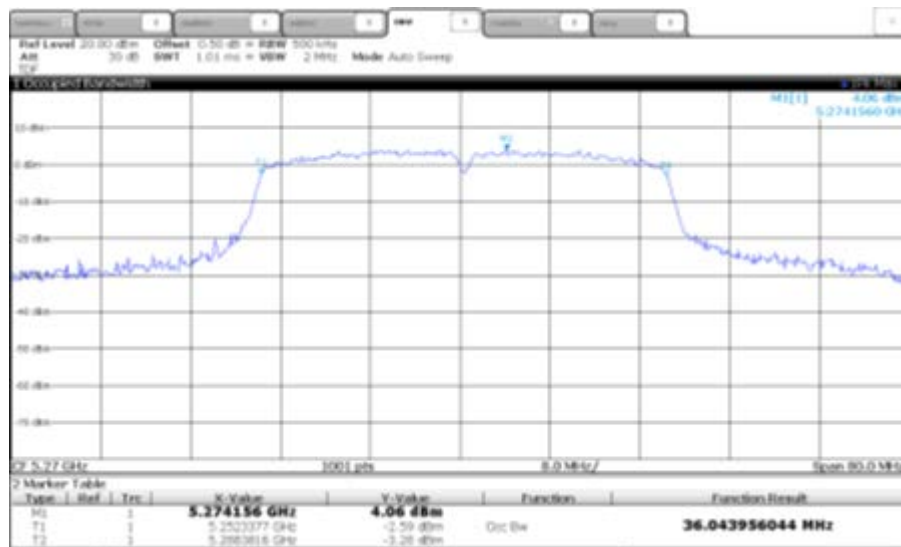
* 802.11n HT40_ 5 250 Band (26 dB Bandwidth)

-5 270 MHz

EBW

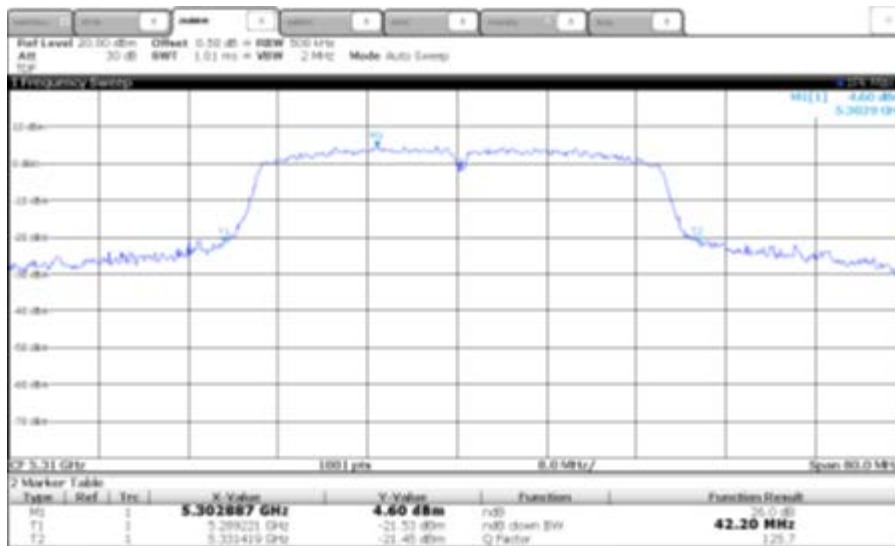


OBW

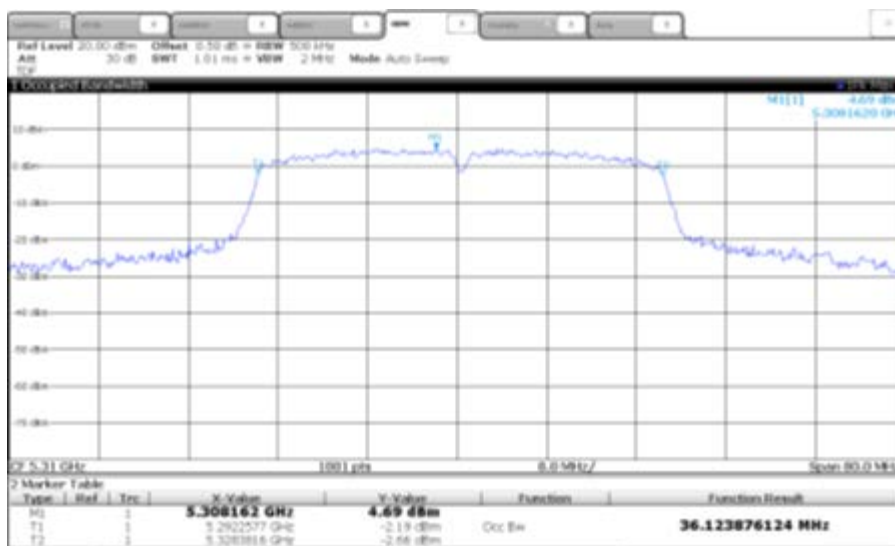


-5 310 MHz

EBW



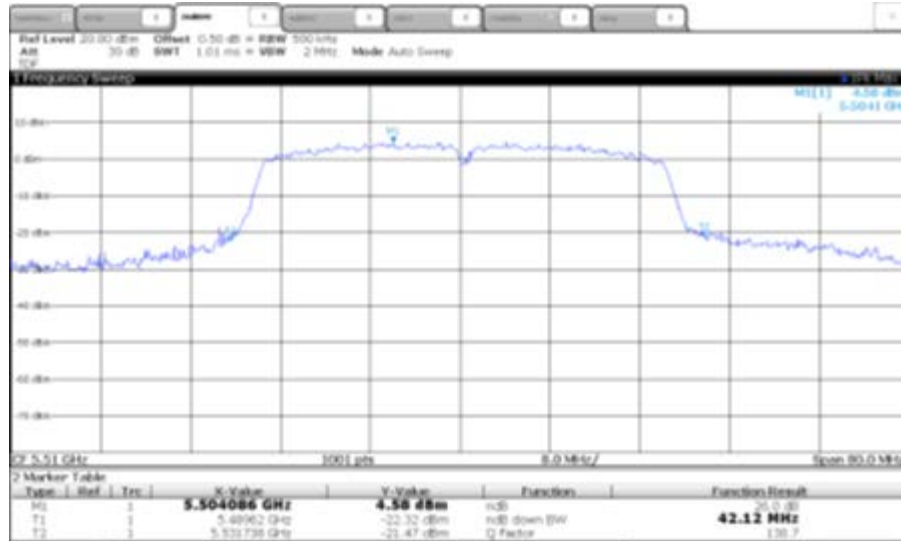
OBW



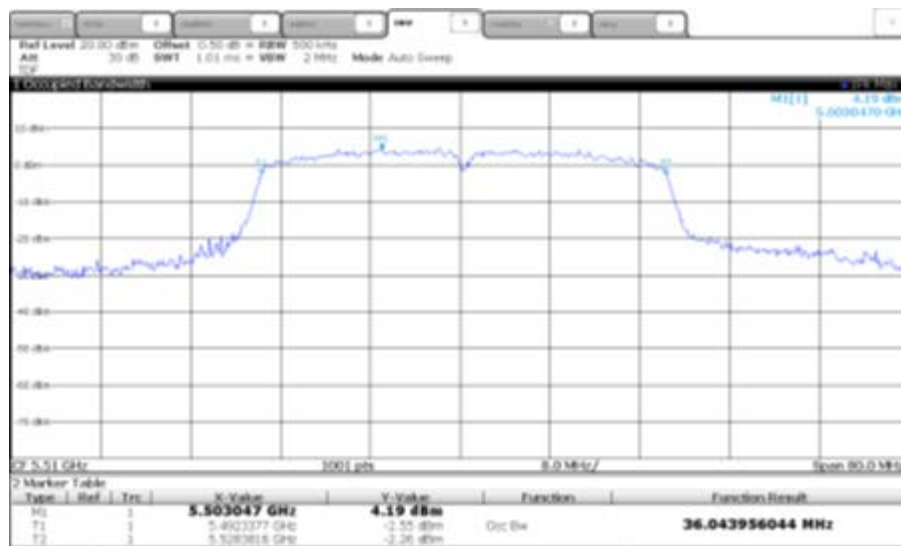
* 802.11n HT40_5 470 Band (26 dB Bandwidth)

-5 510 MHz

EBW

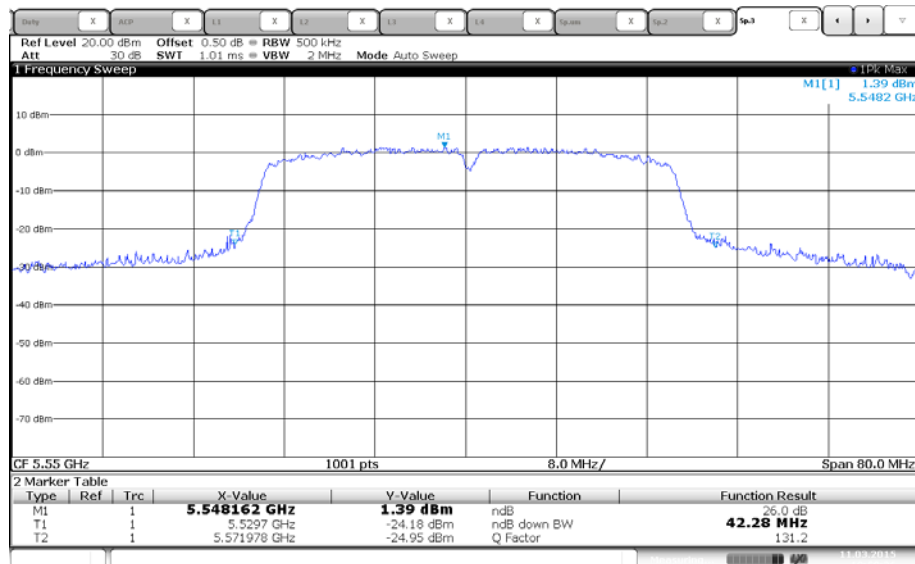


OBW

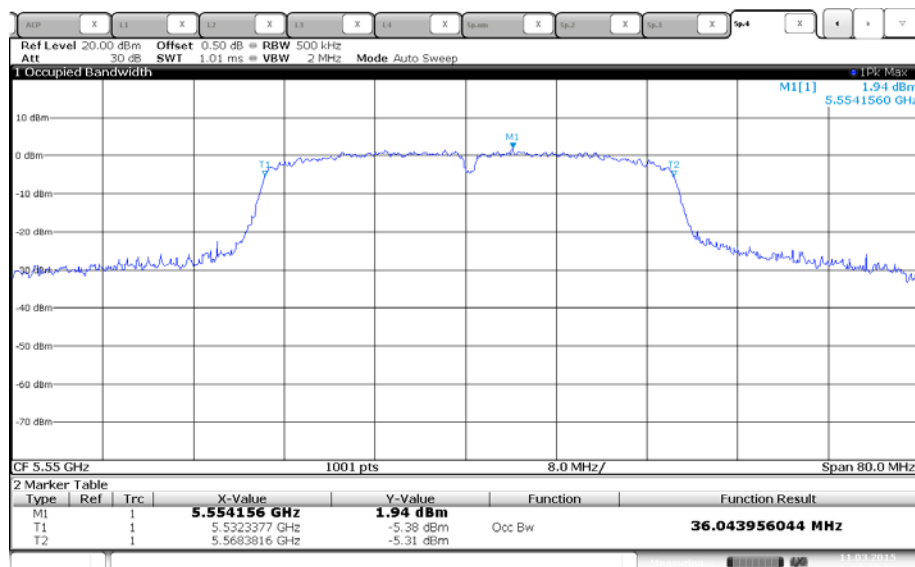


-5 550 MHz

EBW

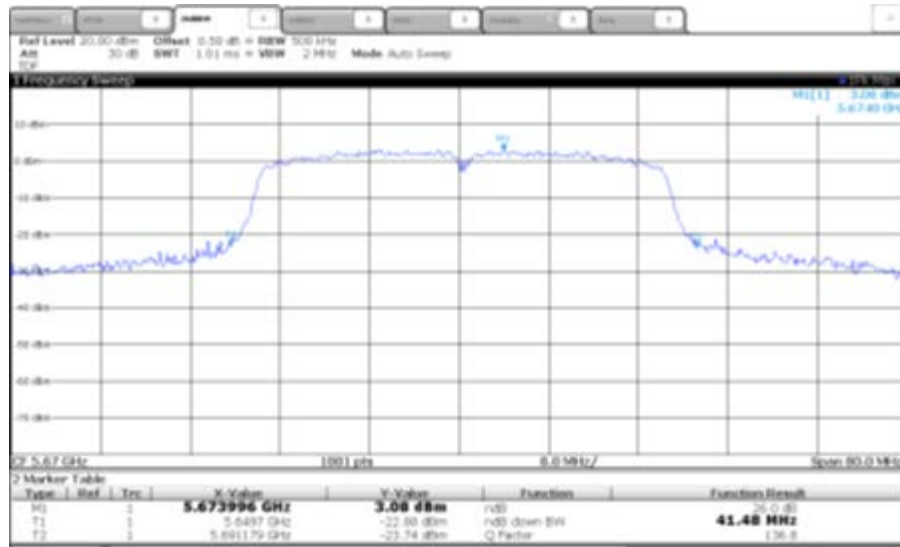


OBW

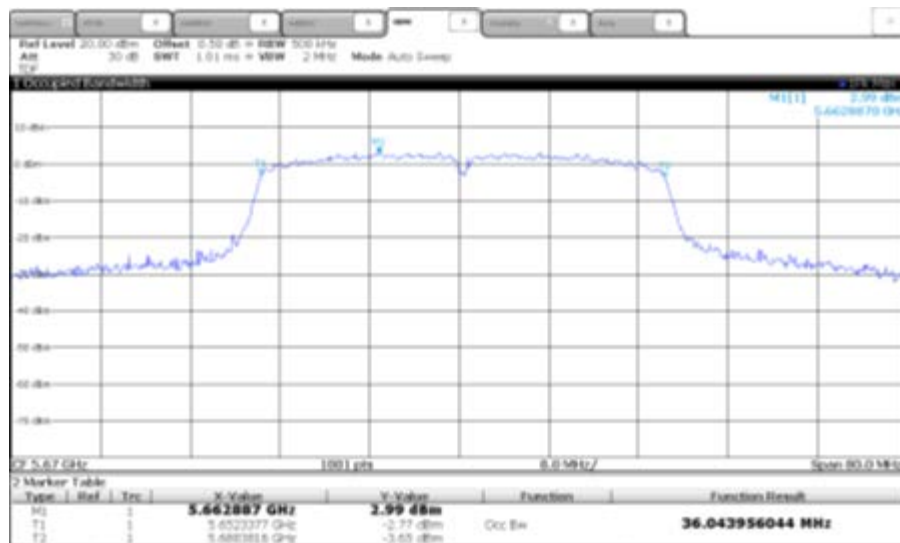


-5 670 MHz

EBW



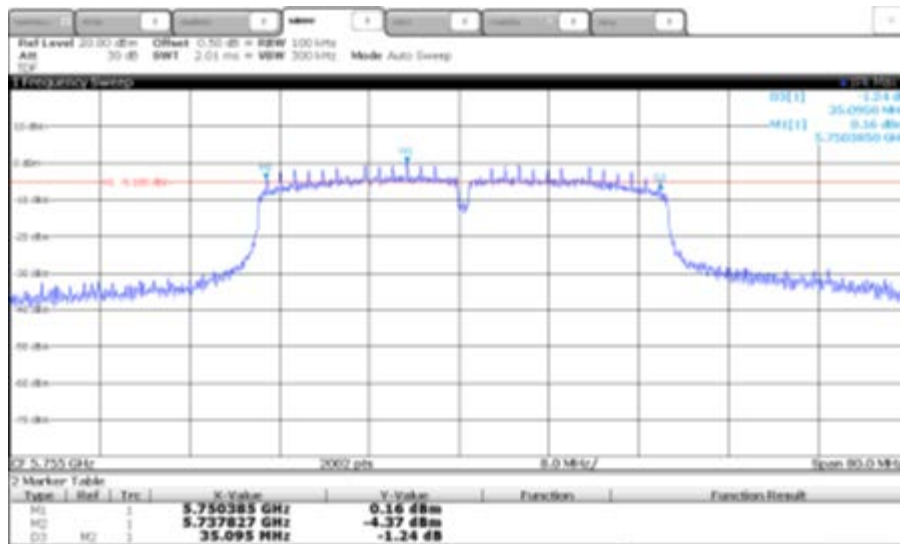
OBW



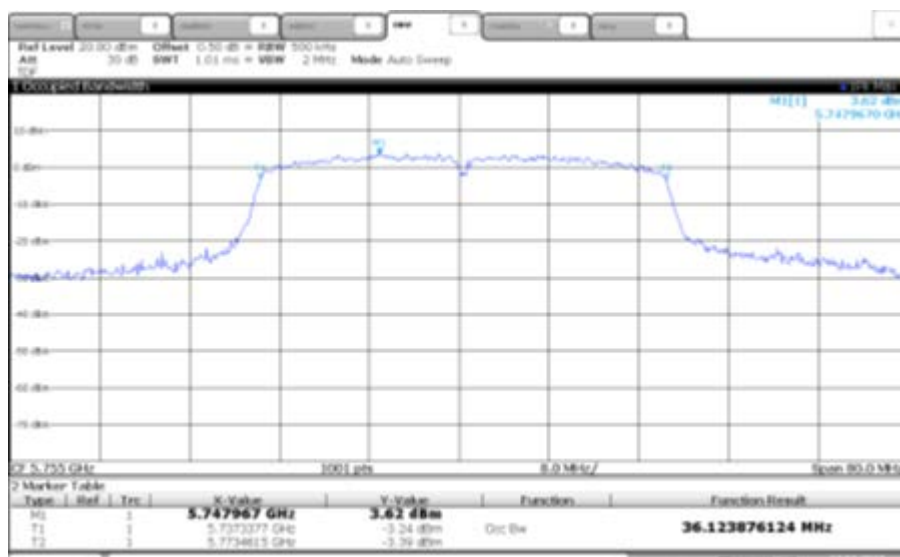
* 802.11n HT40_5 725 Band (6 dB Bandwidth)

-5 755 MHz

6 dB Bandwidth

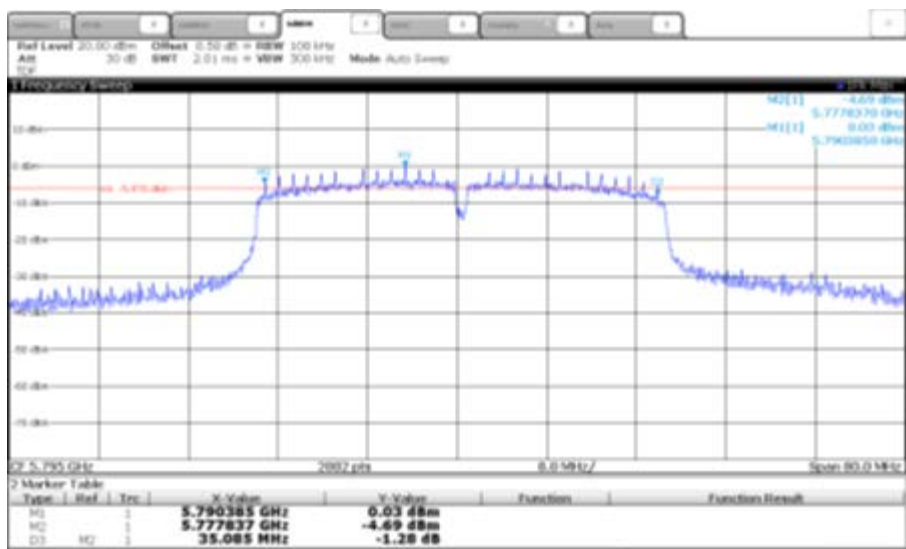


OBW

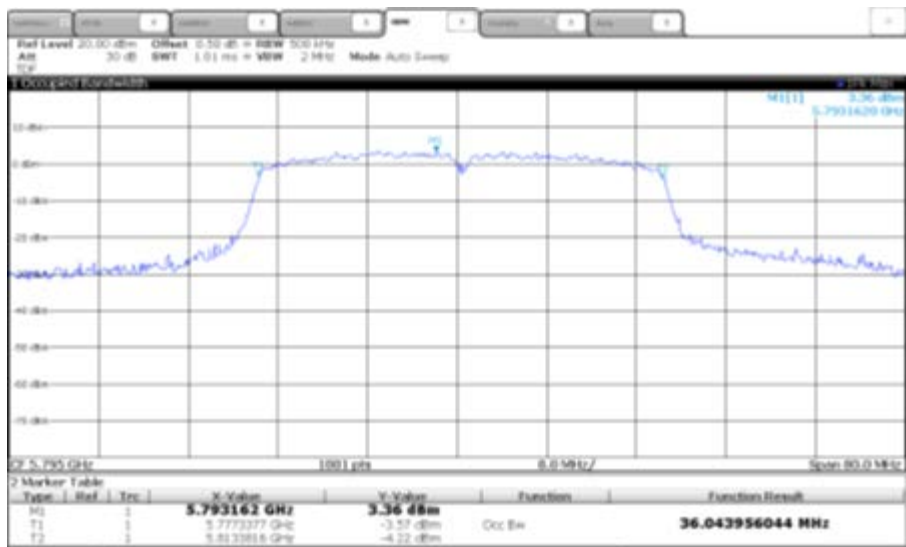


-5 795 MHz

6 dB Bandwidth



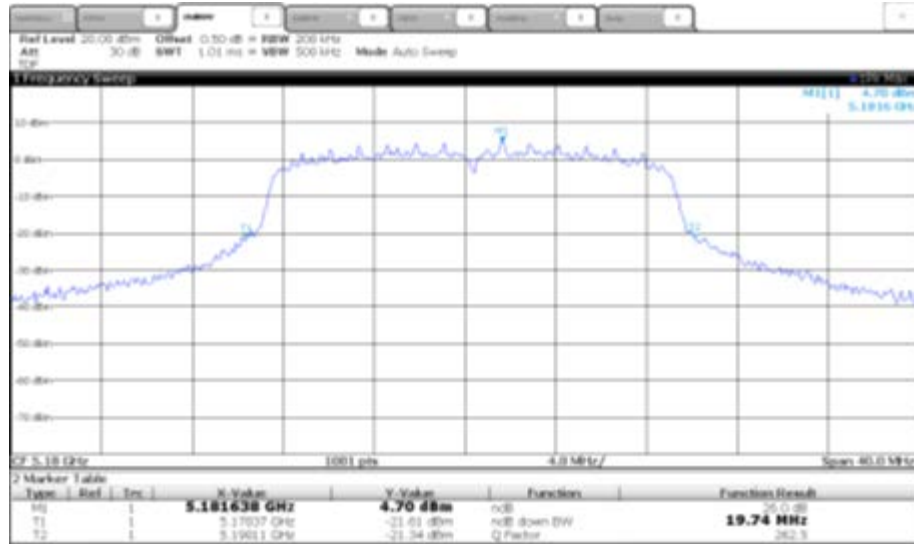
OBW



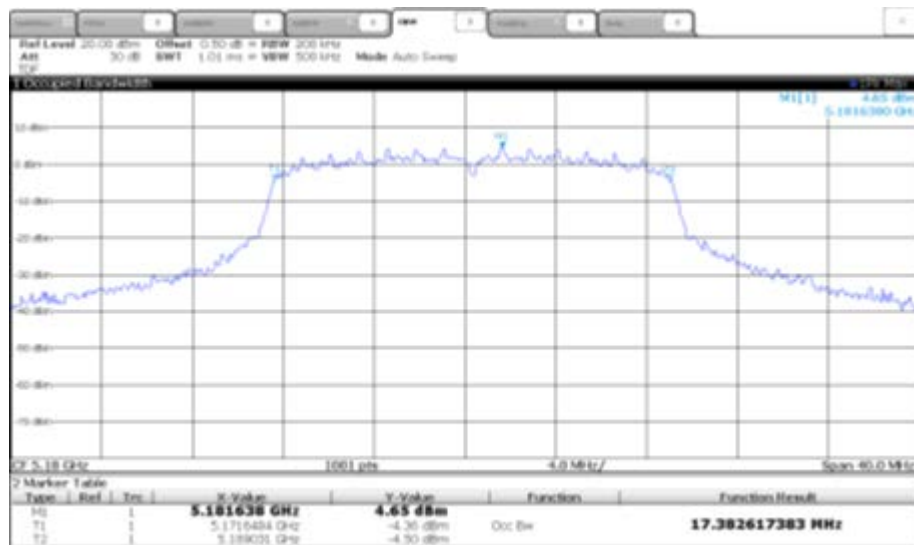
* 802.11ac VHT20_5 150 Band (26 dB Bandwidth)

-5 180 MHz

EBW

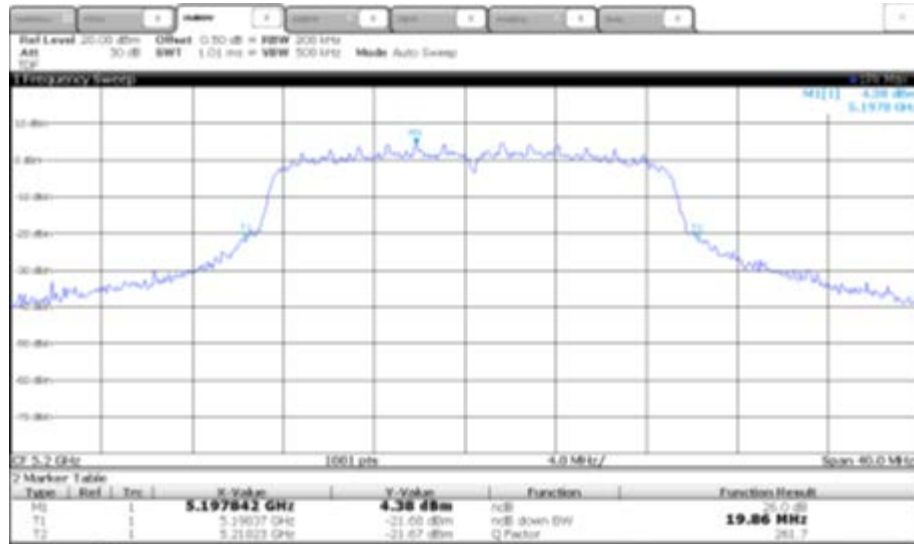


OBW

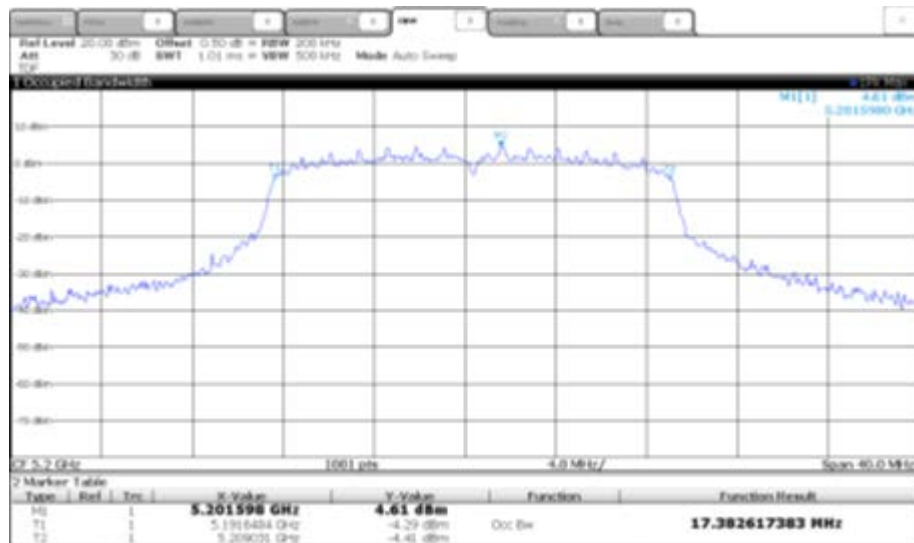


-5 200 MHz

EBW

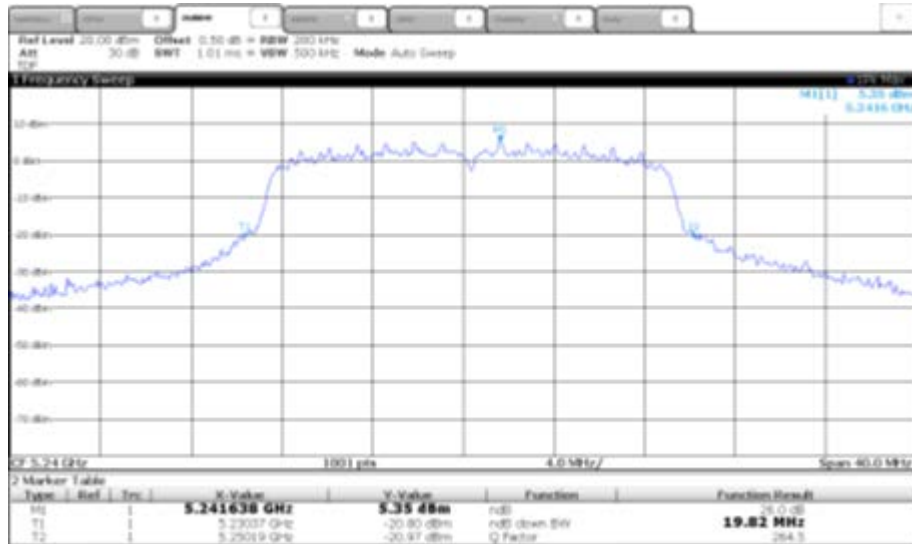


OBW

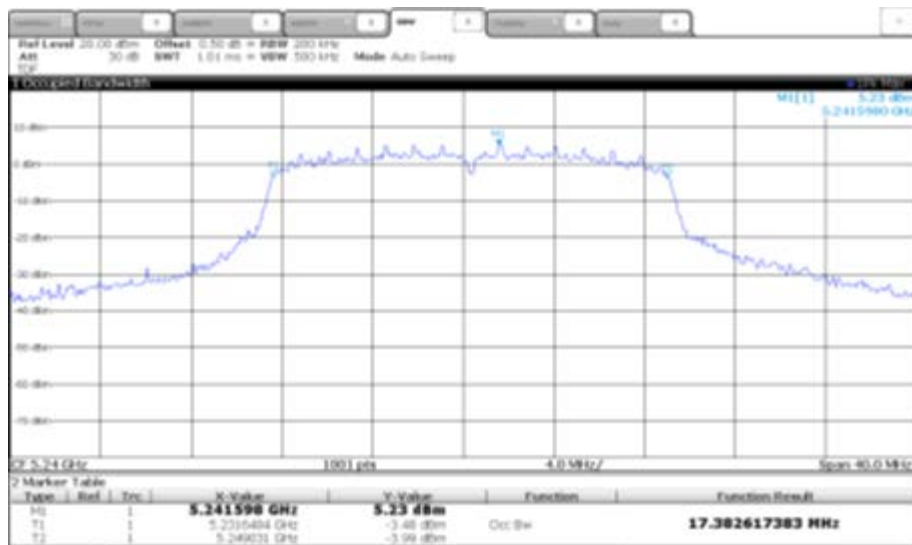


-5 240 MHz

EBW



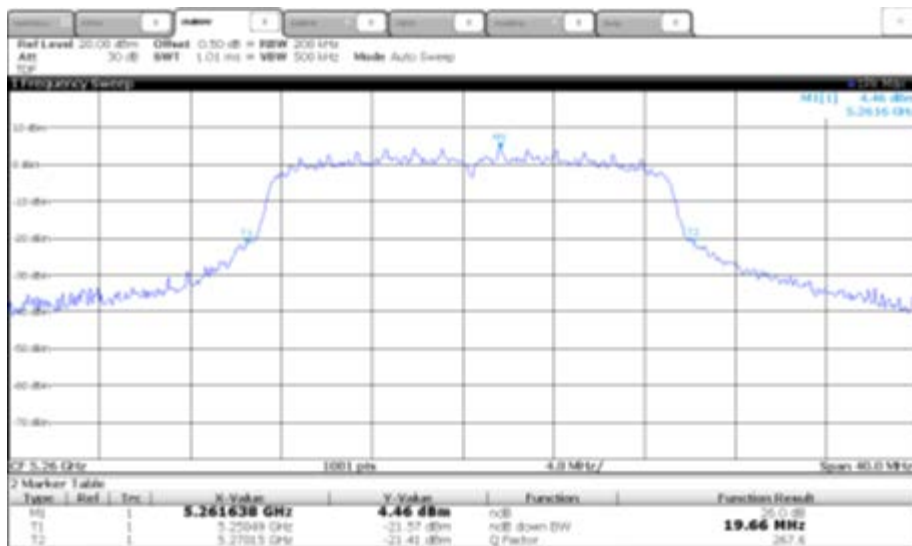
OBW



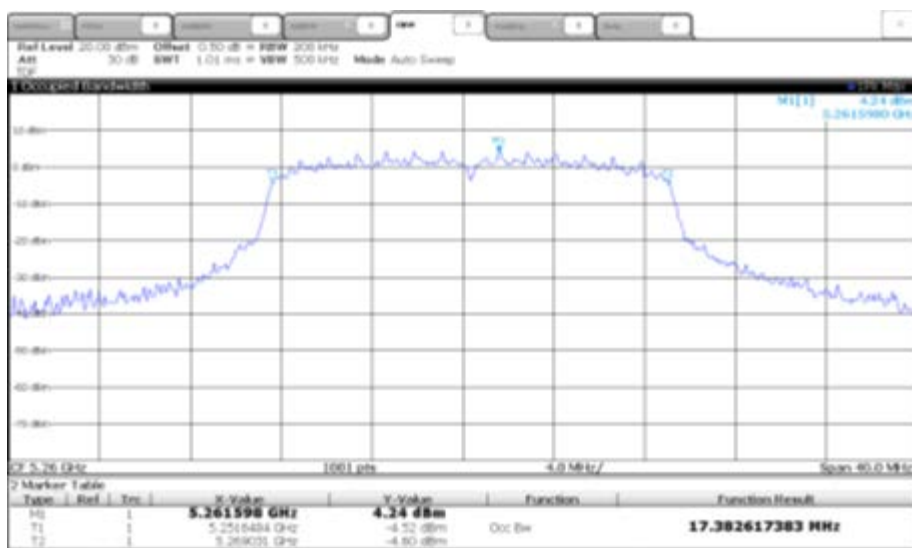
* 802.11ac VHT20_5 250 Band (26 dB Bandwidth)

-5 260 MHz

EBW

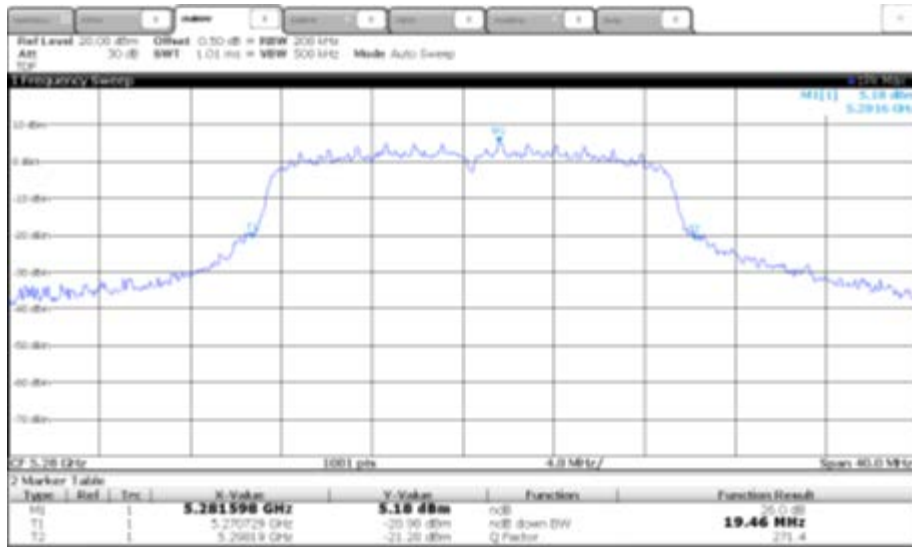


OBW

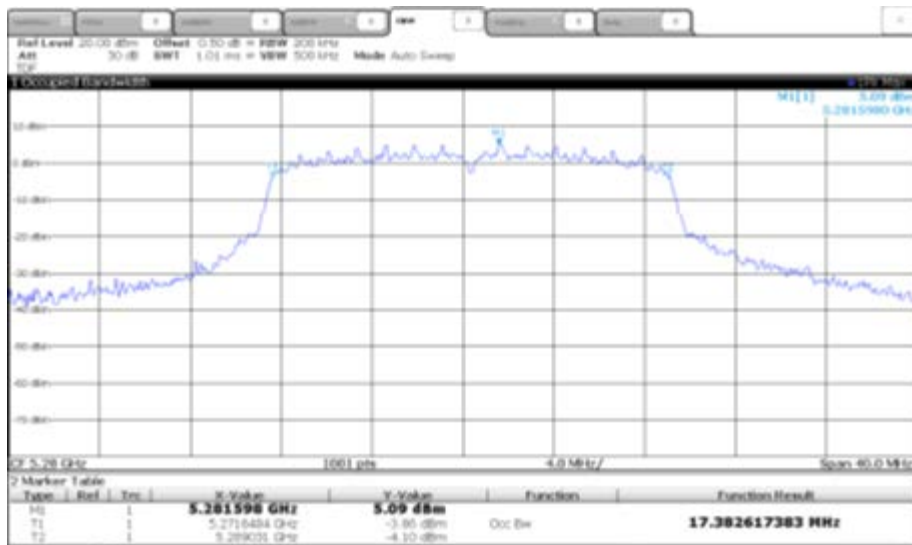


-5 280 MHz

EBW

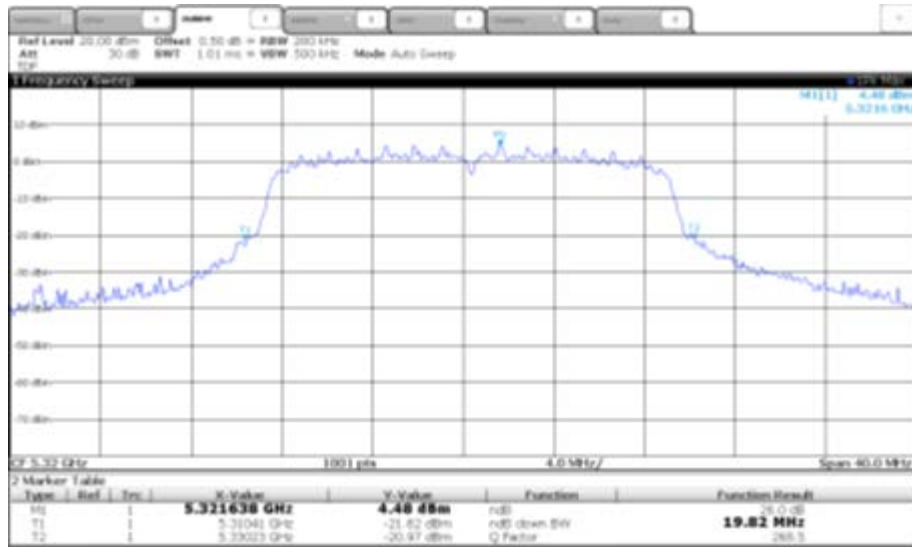


OBW

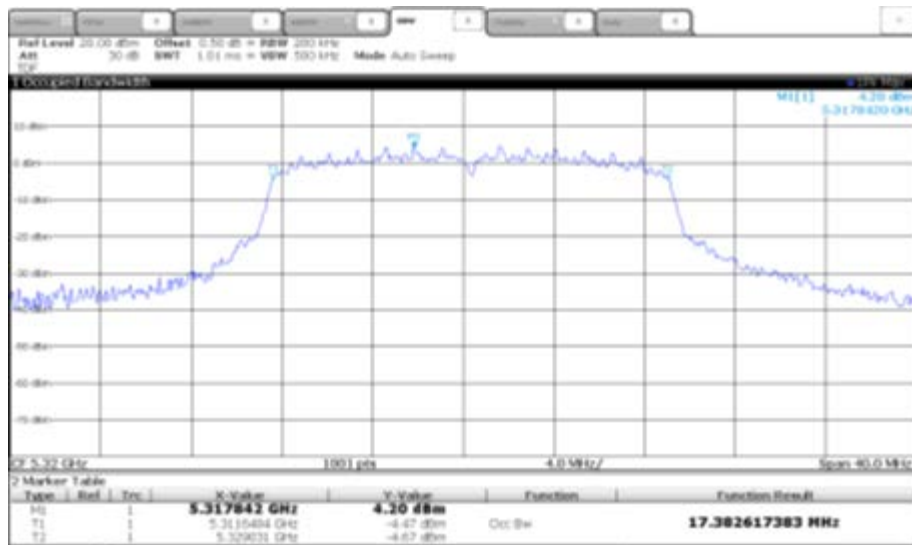


-5 320 MHz

EBW



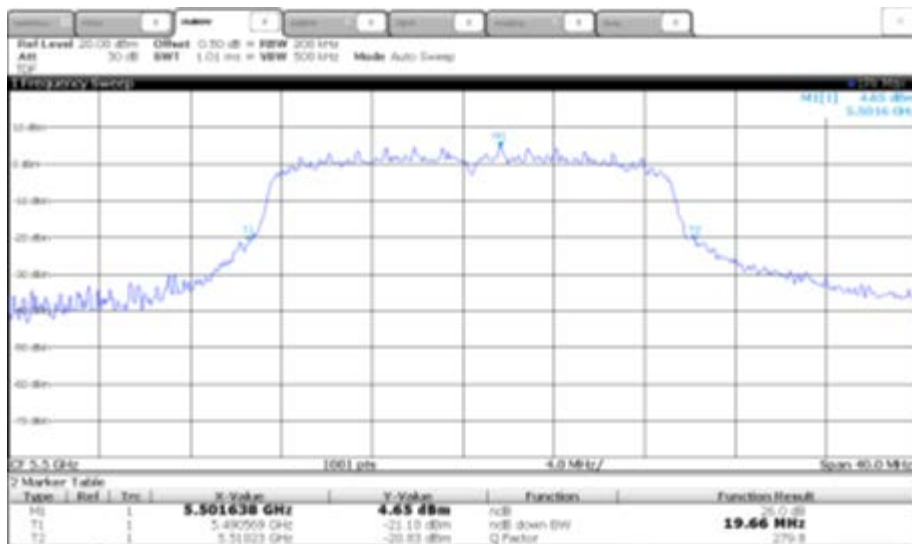
OBW



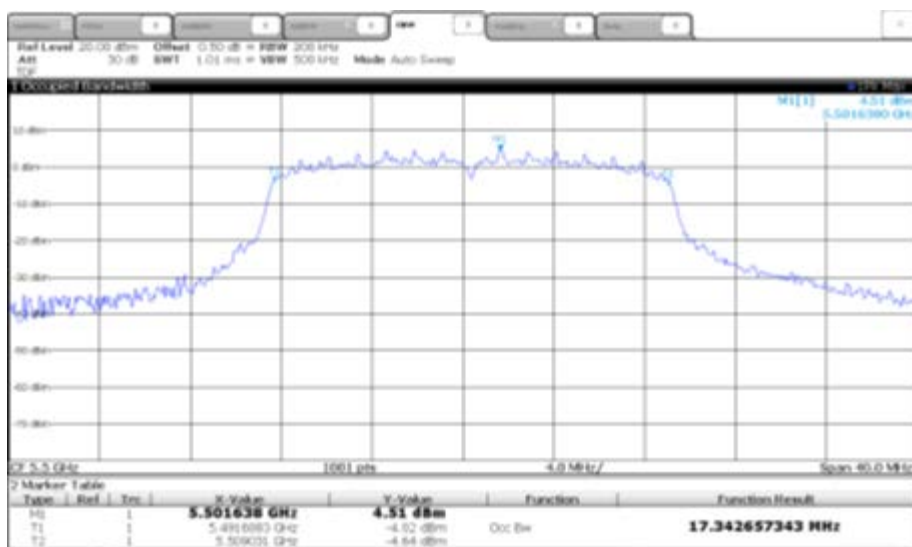
* 802.11ac VHT20_5 470 Band (26 dB Bandwidth)

-5500 MHz

EBW

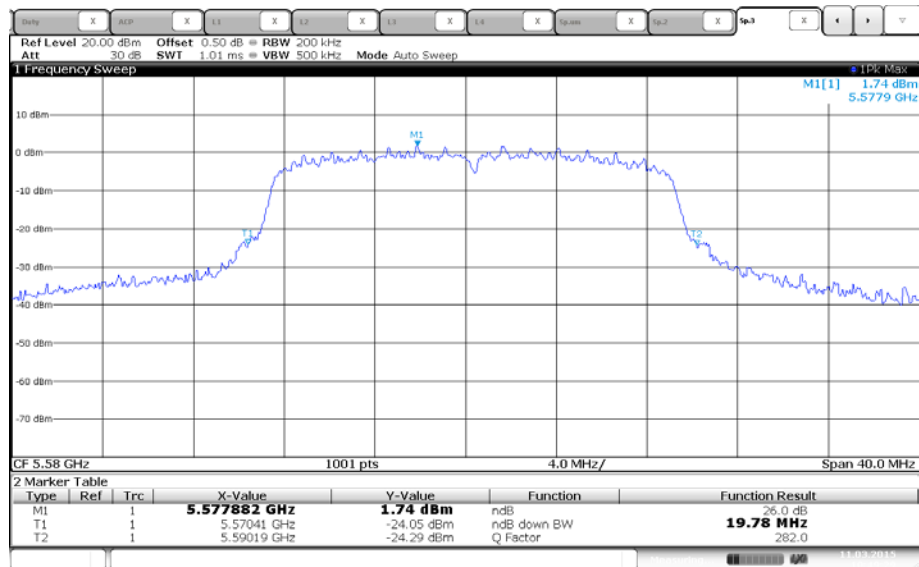


OBW

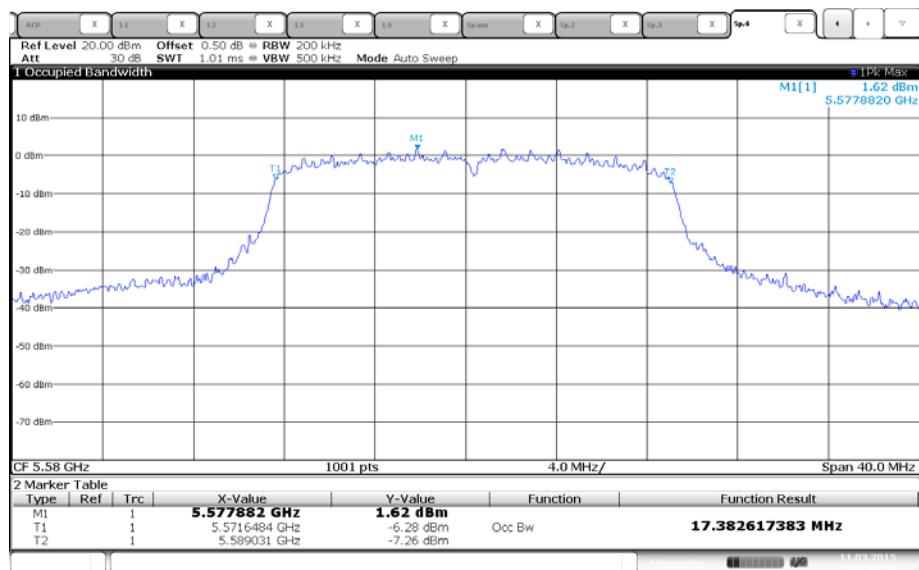


-5 580 MHz

EBW

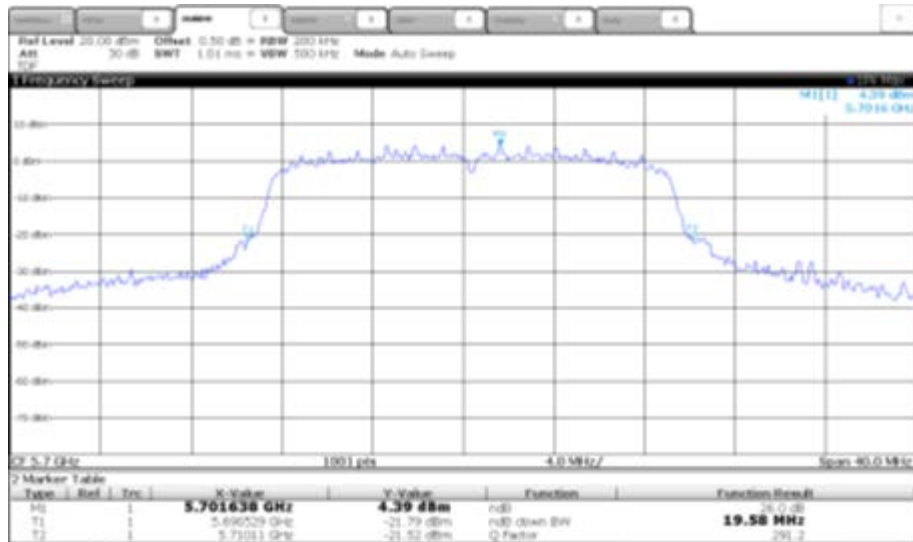


OBW

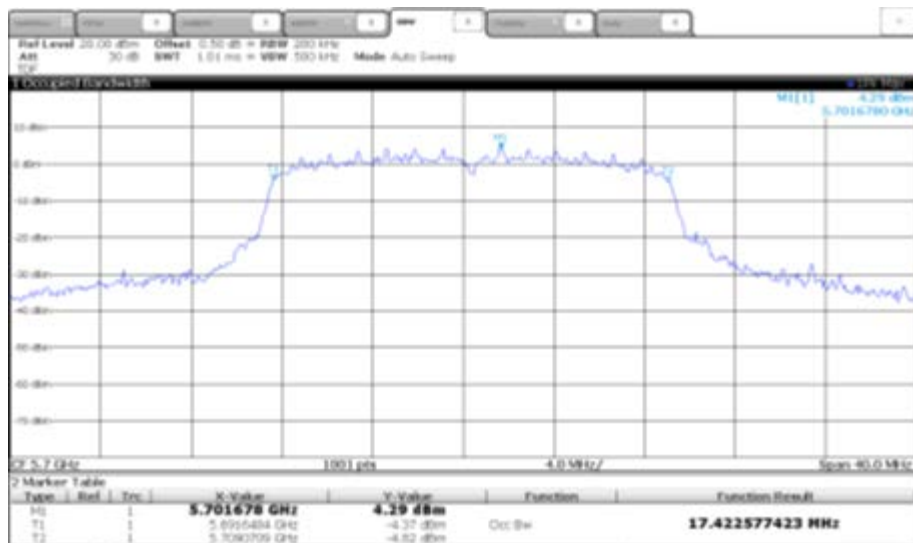


-5 700 MHz

EBW



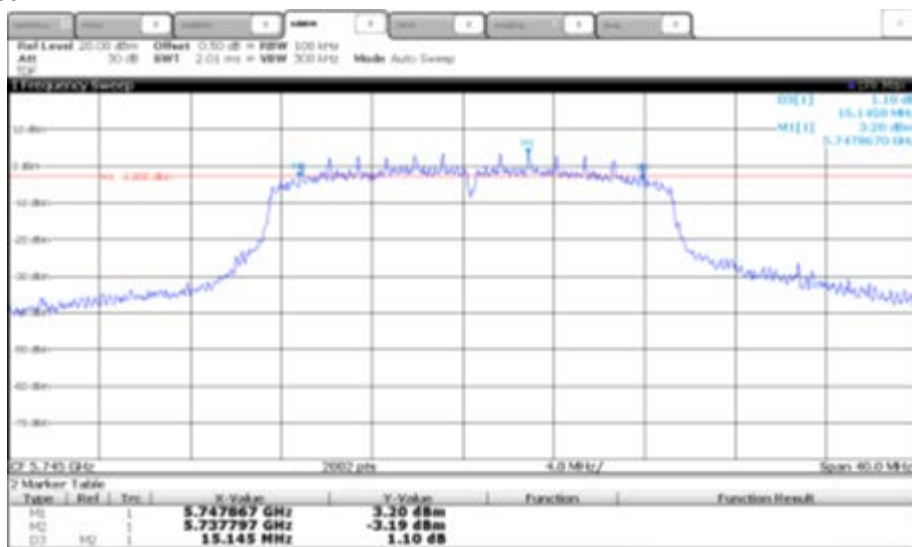
OBW



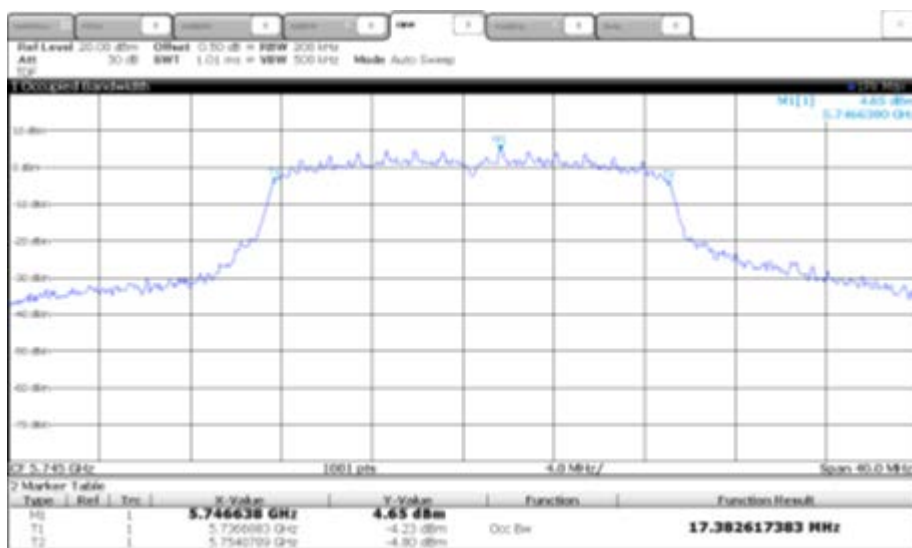
* 802.11ac VHT20_5 725 Band (6 dB Bandwidth)

-5 745 MHz

6 dB Bandwidth

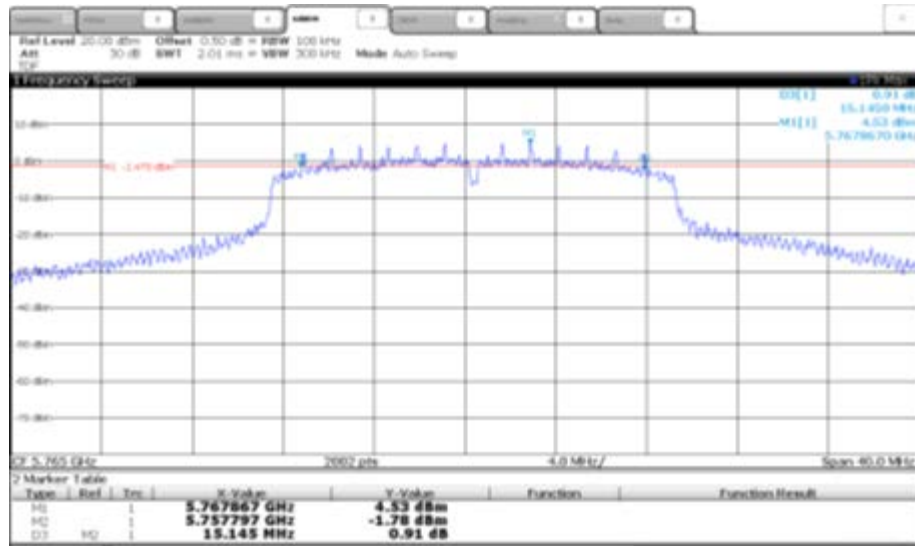


OBW

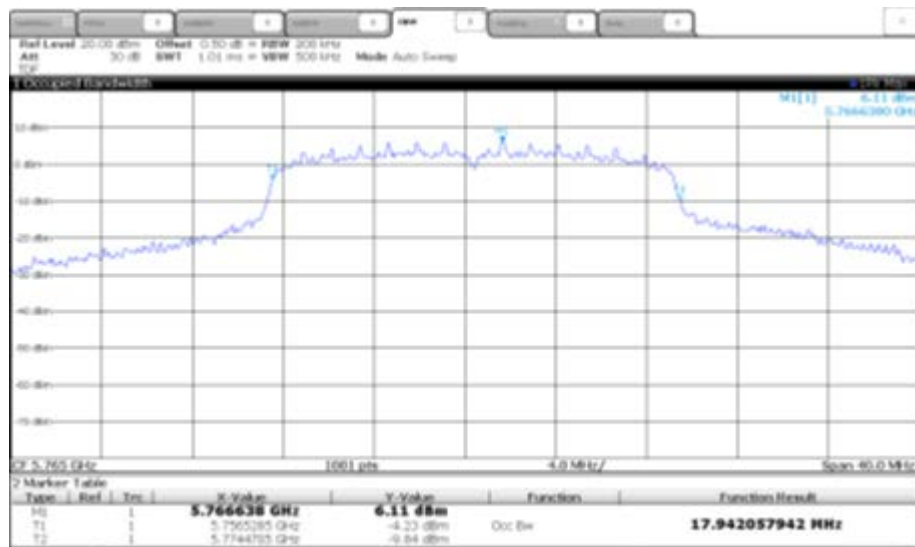


-5 765 MHz

6 dB Bandwidth

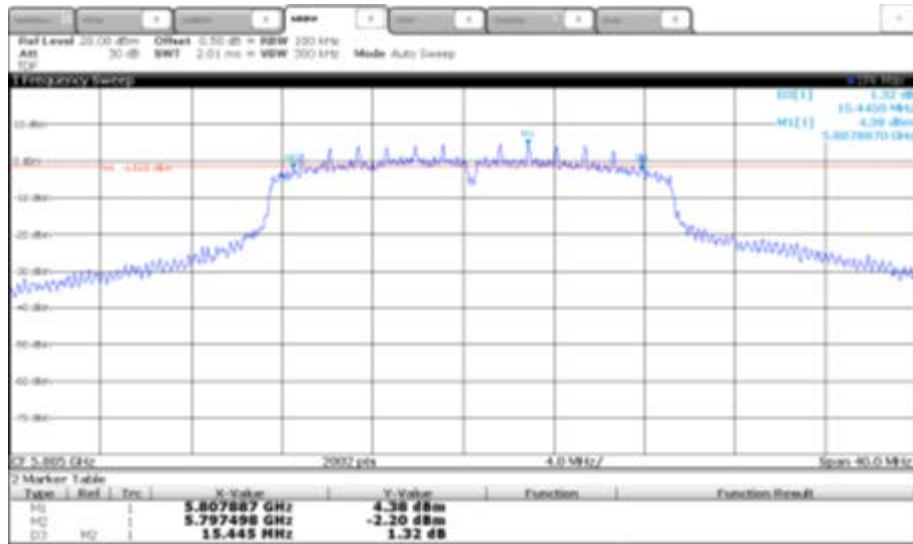


OBW

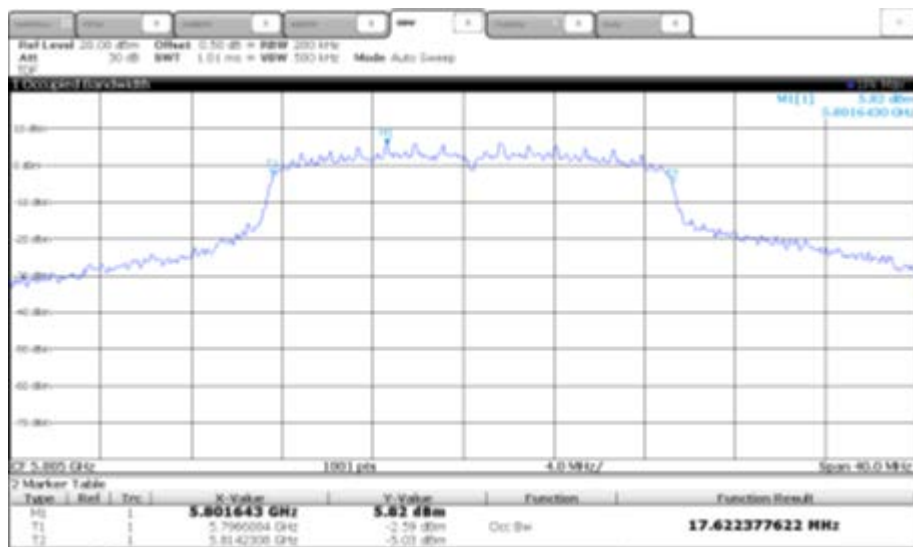


-5 805 MHz

6 dB Bandwidth



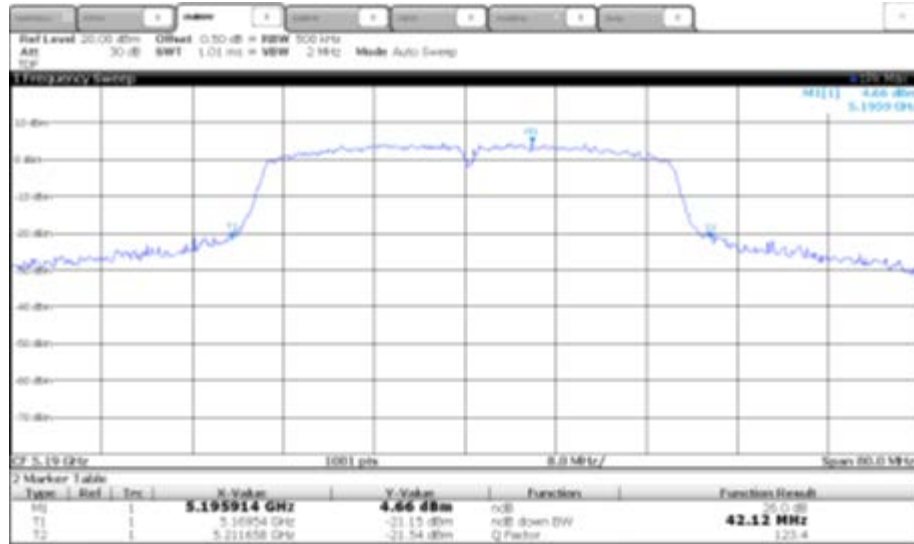
OBW



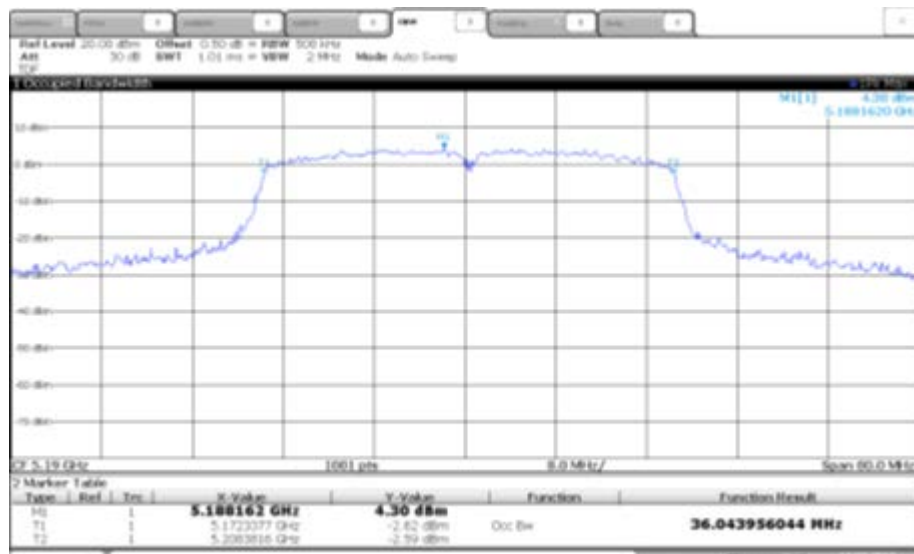
* 802.11ac VHT40_5 150 Band (26 dB Bandwidth)

-5 190 MHz

EBW

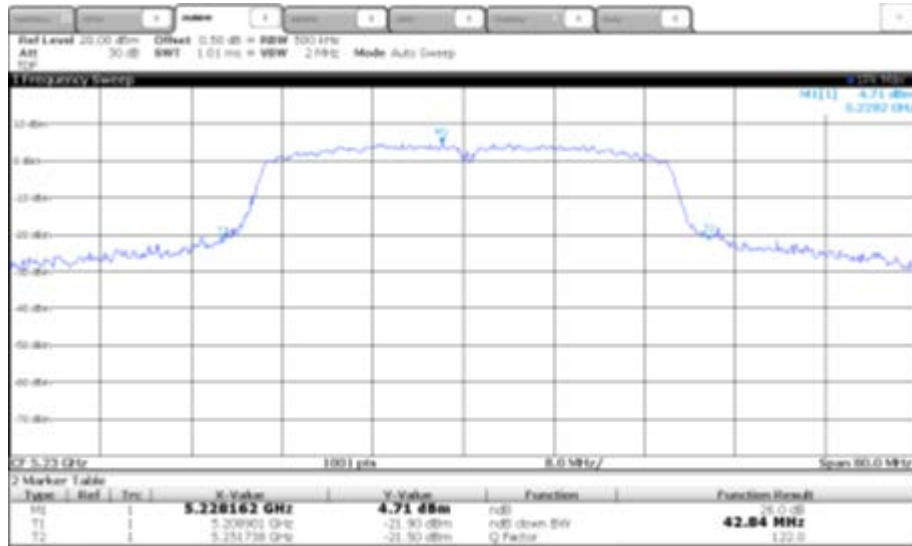


OBW

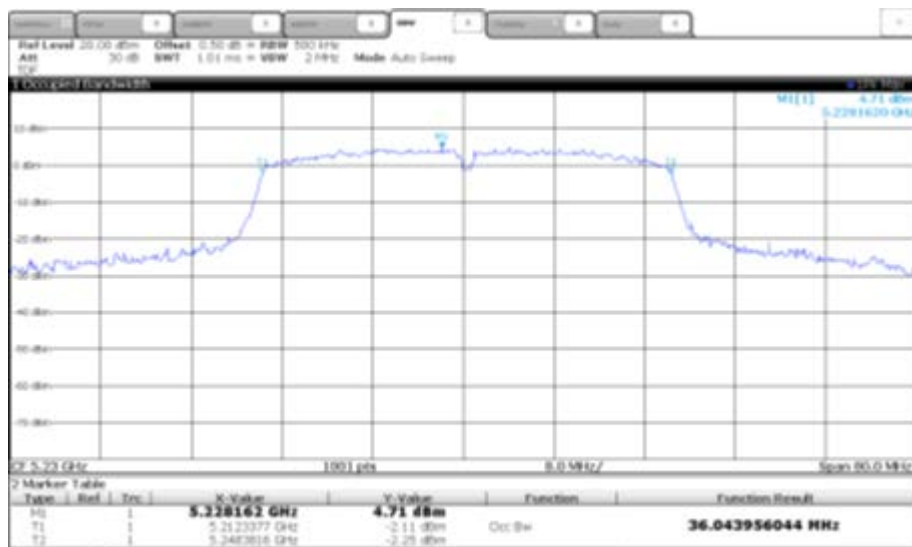


-5 230 MHz

EBW



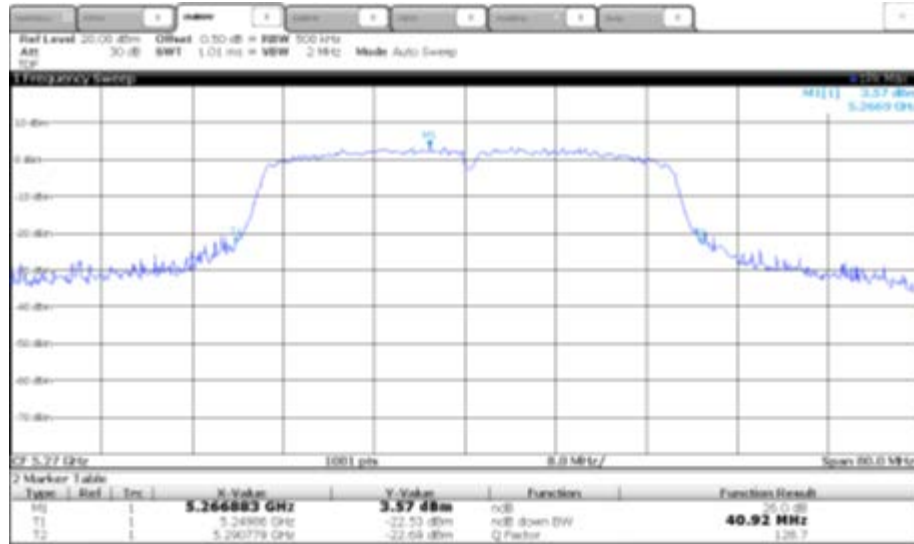
OBW



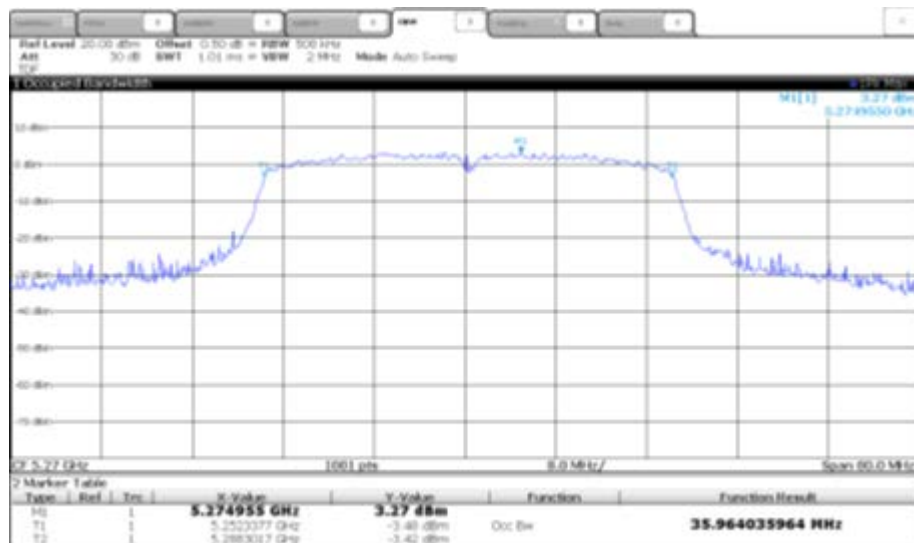
* 802.11ac VHT40_5 250 Band (26 dB Bandwidth)

-5 270 MHz

EBW

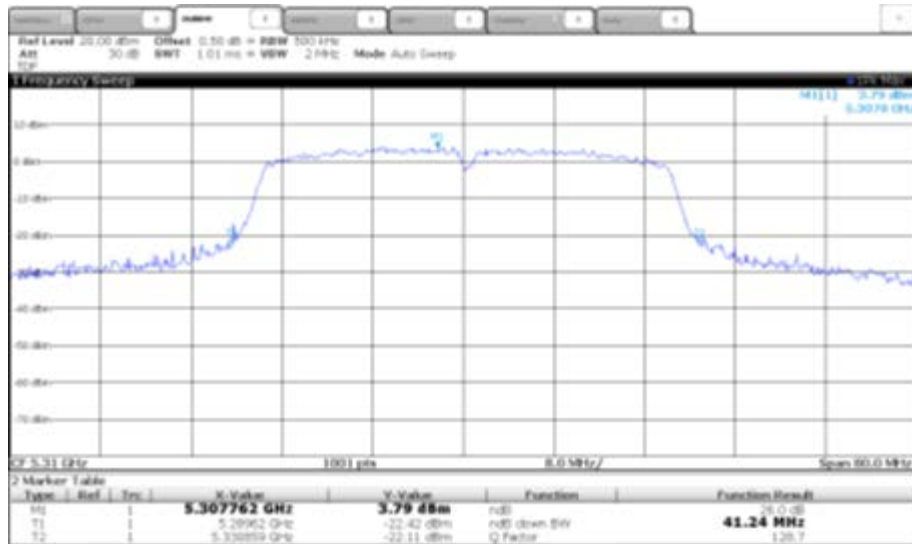


OBW

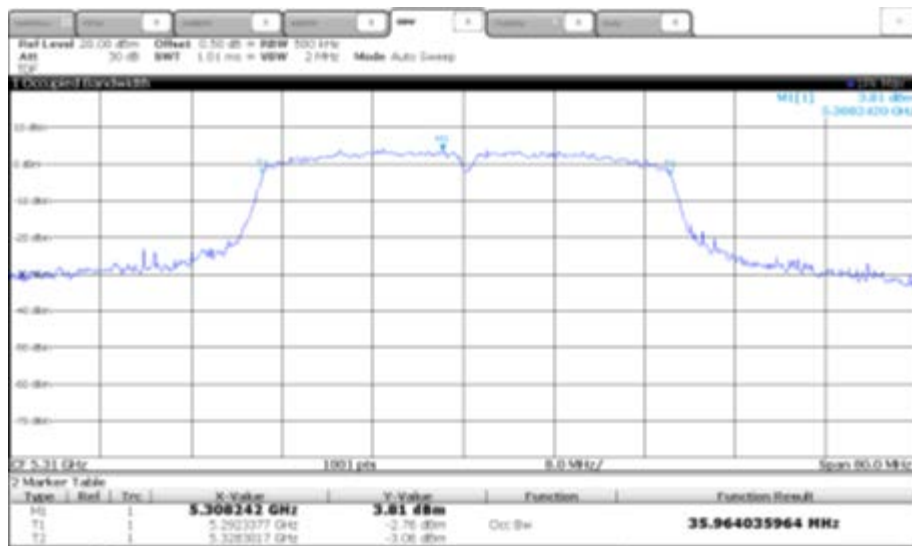


-5 310 MHz

EBW



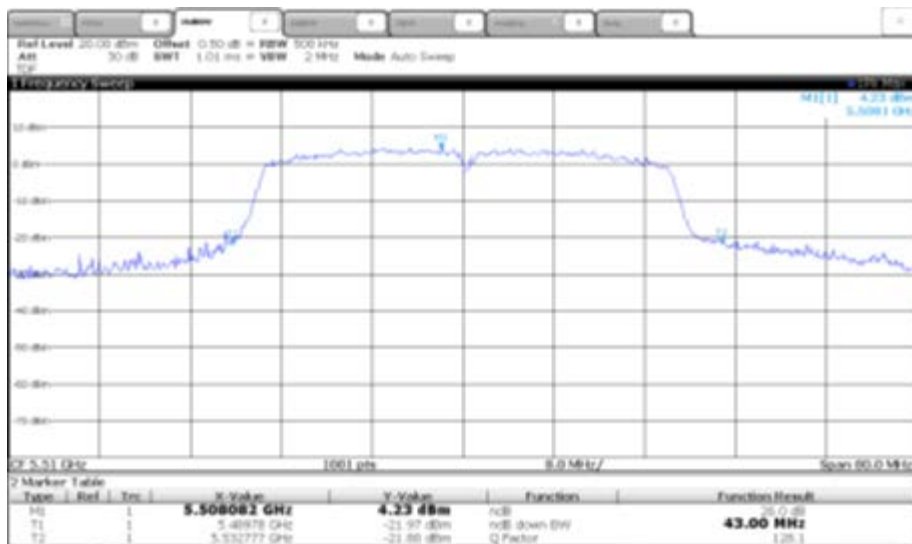
OBW



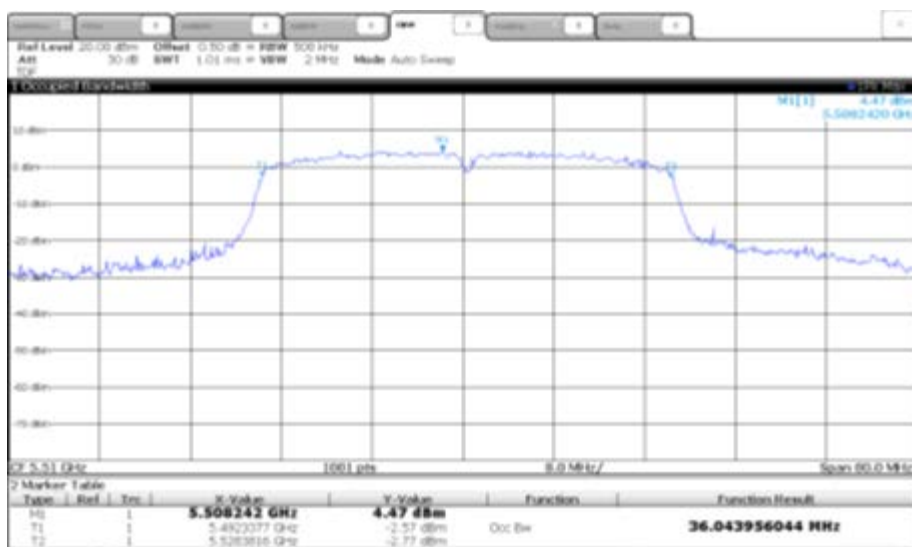
* 802.11ac VHT40_5 470 Band (26 dB Bandwidth)

-5 510 MHz

EBW

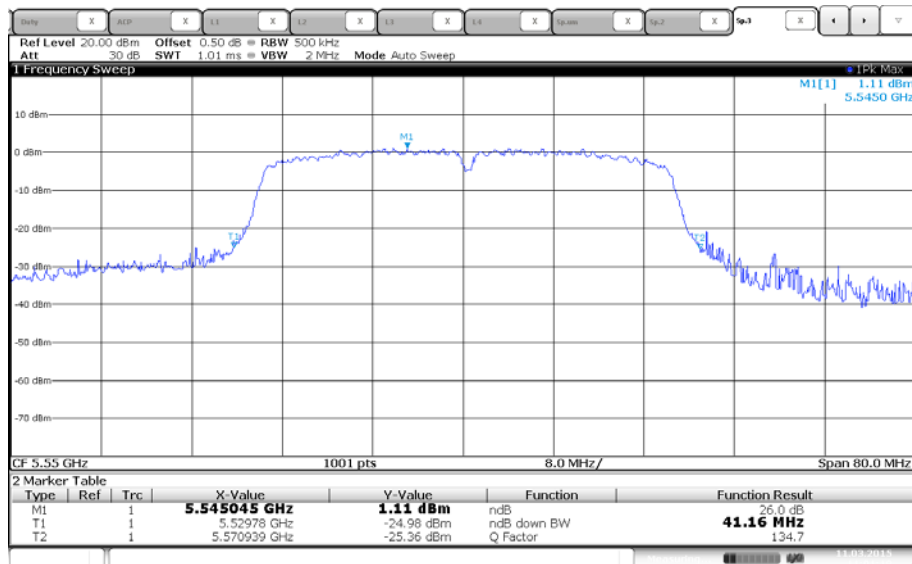


OBW

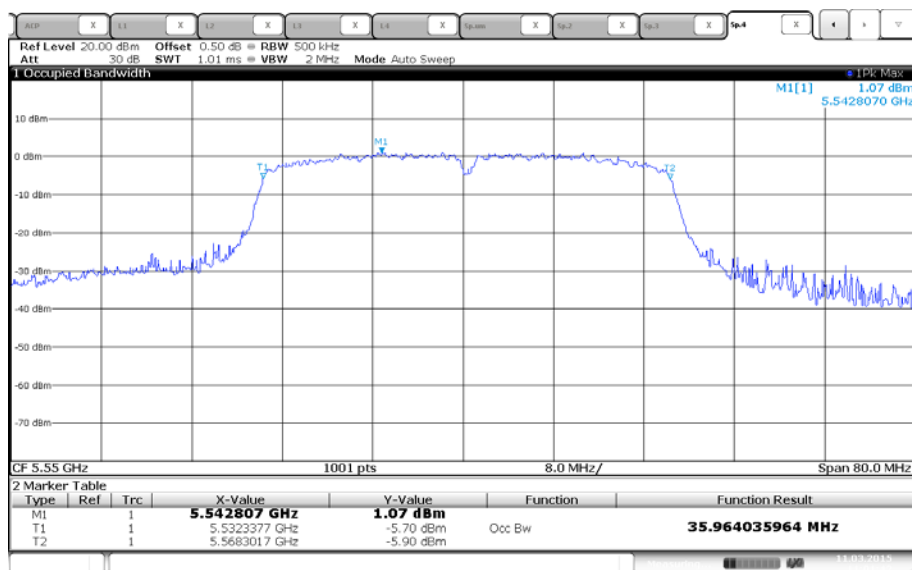


-5 550 MHz

EBW

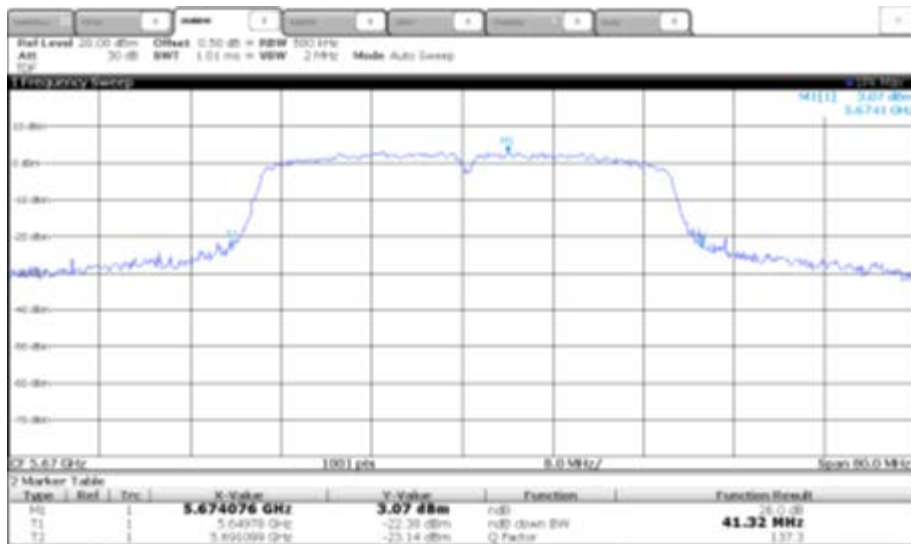


OBW

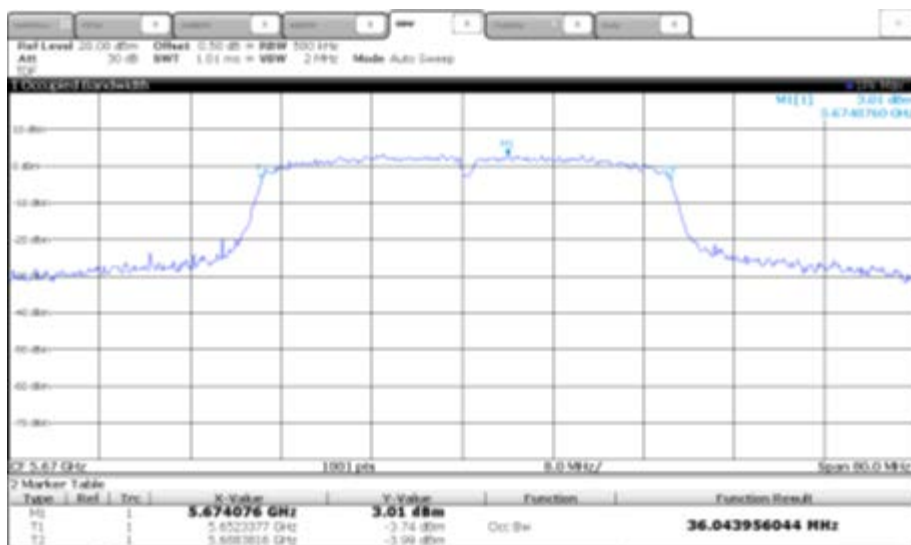


-5 670 MHz

EBW



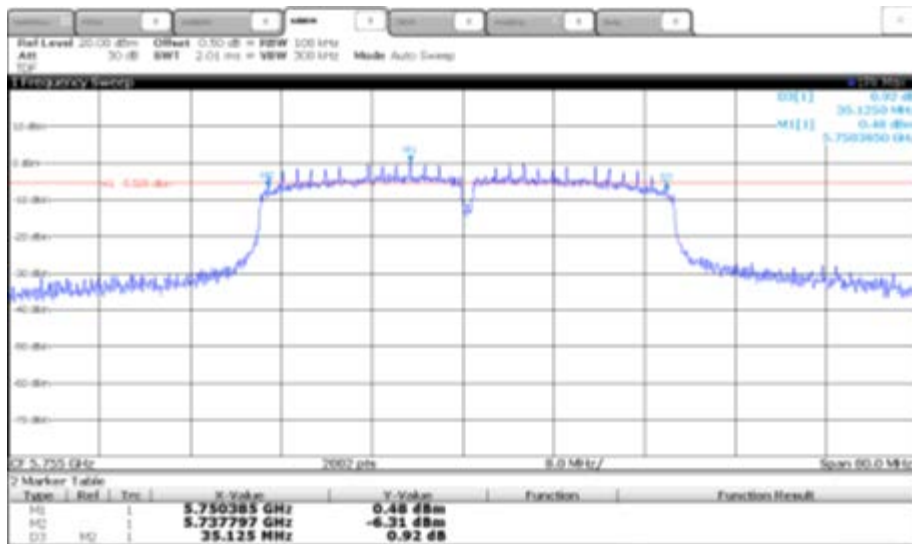
OBW



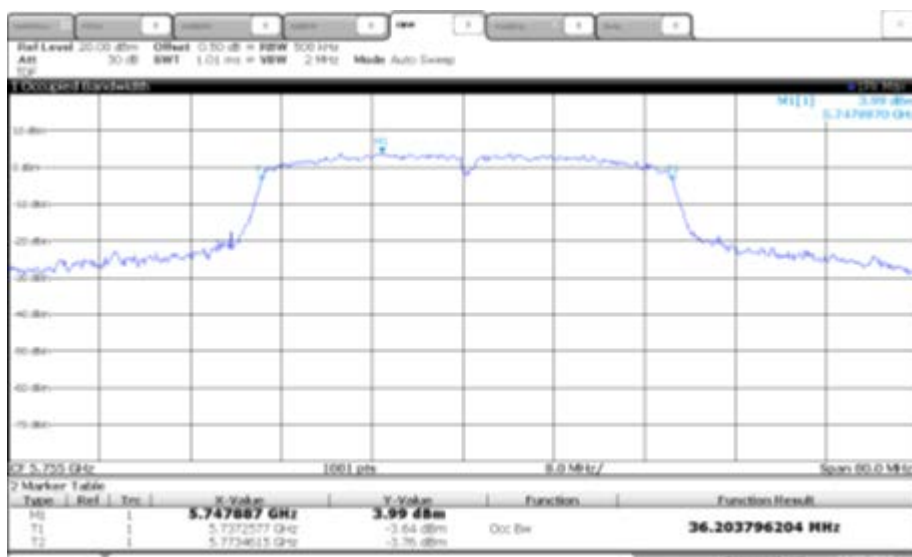
* 802.11ac VHT40_5 725 Band (6 dB Bandwidth)

-5 755 MHz

6 dB Bandwidth

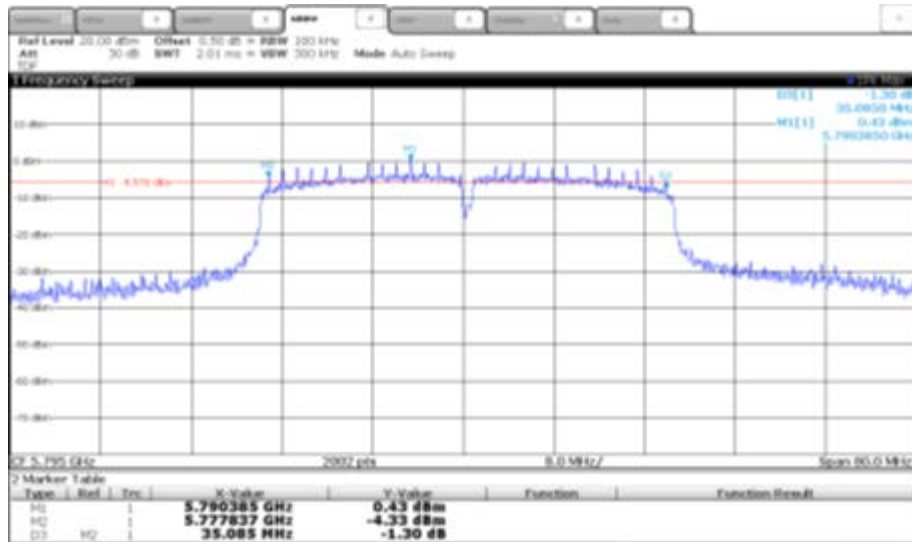


OBW

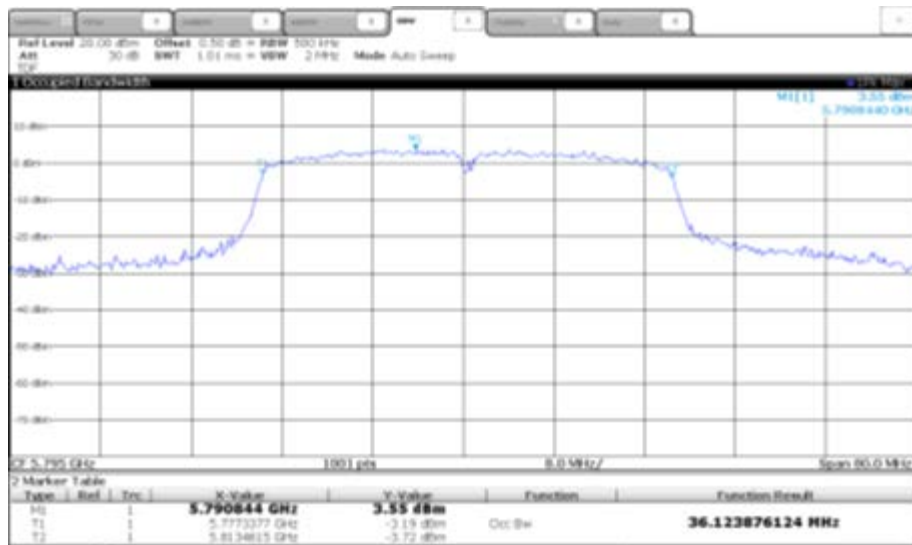


-5 795 MHz

6 dB Bandwidth



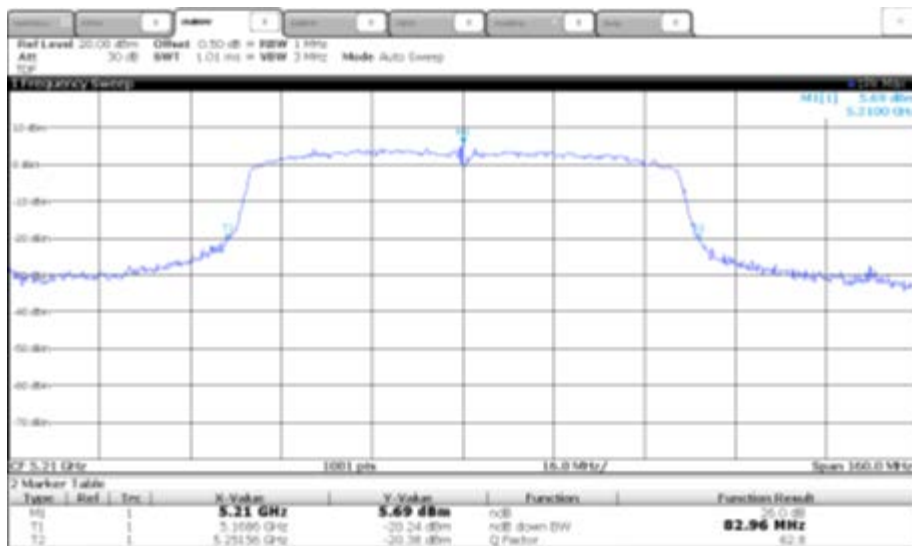
OBW



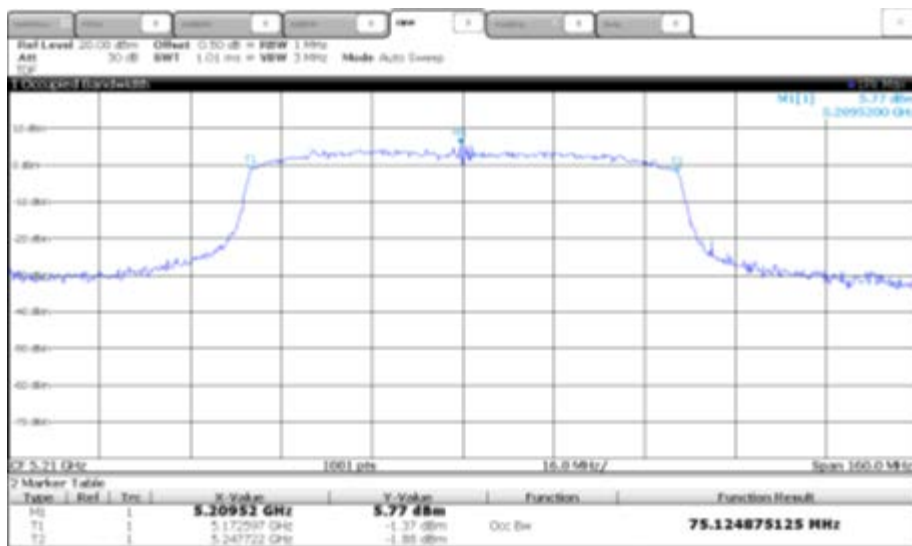
* 802.11ac HT80_5 150 Band (26 dB Bandwidth)

-5 210 MHz

EBW



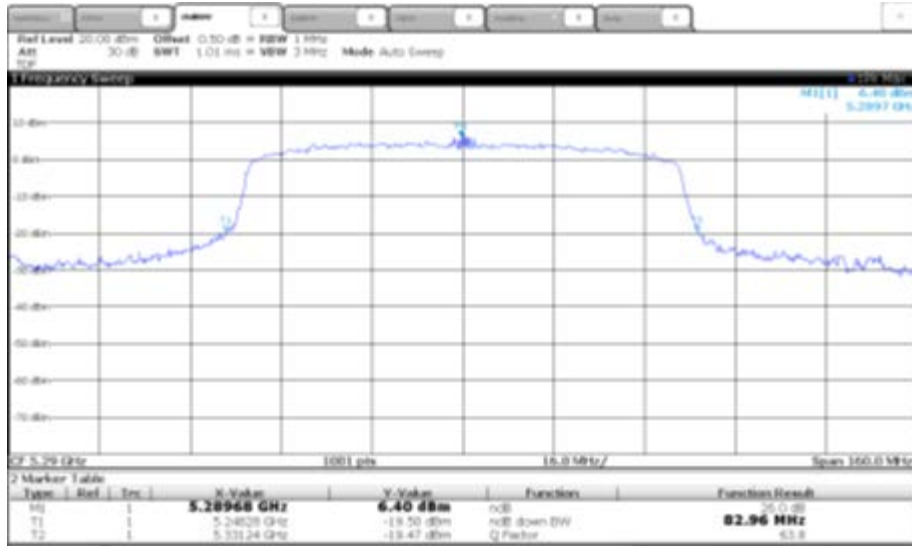
OBW



* 802.11ac HT80_5 250 Band (26 dB Bandwidth)

-5 290 MHz

EBW



OBW

