



Report No.: AAEMT/EMC/220826-02-09


# FCC RADIO TEST REPORT

Part 15 subpart E

**FCC ID: 2AZOI4XIHMR**

Report Reference No. .... : AAEMT/EMC/220826-02-09  
Date of issue ..... : 2023-05-08  
Testing Laboratory..... : AA Electro Magnetic Test Laboratory Private Limited  
Address ..... : Plot No 174, Udyog Vihar - Phase 4, Sector 18,  
Gurgaon, Haryana, India  
  
Applicant's name..... : HFCL Limited  
Address ..... : Plot no. 38, Institutional Area, Sector 32,Gurgaon -122001  
Manufacturer ..... : HFCL Limited  
Address..... : Plot no. 38, Institutional Area, Sector 32,Gurgaon -122001  
Test specification:  
Test item description..... : IO Wi-Fi 6 Dual Band 2x2:2 Home Mesh Router with  
Integrated Antenna (5dBi)  
Trade Mark..... :   
  
Model/Type reference ..... : ion4xi\_HMR  
Ratings ..... : 12VDC , 2.0A  
Declaration of Conformity: Declaration of conformity of the results is based as per the  
standard limits

Prepared By (+ signature) Ankur Kumar: 

Reviewed & Approved by: (+ signature)   
Dr. Lenin Raja (Authorized Representative)  
(/ lenin83/)

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## TEST REPORT DECLARE

Applicant	:	HFCL Limited
Address	:	Plot no. 38, Institutional Area, Sector 32,Gurgaon-122001
Equipment under Test	:	IO Wi-Fi 6 Dual Band 2x2:2 Home Mesh Router with Integrated Antenna (5 dBi)
Model No	:	ion4xi_HMR
Trade Mark	:	
Manufacturer	:	HFCL Limited
Address	:	Plot no. 38, Institutional Area, Sector 32,Gurgaon-122001

Test Standard Used: FCC Part 15E 15.407

Test procedure used: ANSI C63.10-2013 and KDB 789033 D02 General UNII Test Procedures New Rules v02r01 .

### We Declare:

The equipment described above is tested by AA Electro Magnetic Test Laboratory Private Limited and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and AA Electro Magnetic Test Laboratory Private Limited is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.**

<b>Report No:</b>	AAEMT/EMC/220826-02-09		
<b>Date of Test:</b>	Sep.26,2022 ~ Feb.21,2023	<b>Date of Report:</b>	May 08, 2023

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of AA Electro Magnetic Test Laboratory Private Limited


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## 1. SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below.		
FCC Part15 (15.407) , Subpart E		
Description of Test Item	Standard	Results
AC Power Line Conducted Emissions	FCC §15.207/ RSS-Gen	PASS
Spurious Radiated Emissions	FCC §15.209(a), 15.407(b)	PASS
26 dB and 99% Emission Bandwidth	FCC §15.407(a)	PASS
Maximum Conducted Output Power	FCC §407(a)(1)	PASS
Band Edges	FCC §2.1051, §15.407(b)	PASS
Power Spectral Density	FCC §15.407(a)(1)	PASS
Spurious Emissions at Antenna Terminals	FCC §2.1051, §15.407(b)	PASS
Antenna Requirement	FCC §15.203	PASS

## 2. GENERAL TEST INFORMATION

### 2.1. DESCRIPTION OF EUT

EUT Name	: IO Wi-Fi 6 Dual Band 2x2:2 Home Mesh Router with Integrated Antenna (5 dBi)		
Model Number	: ion4xi_HMR		
Power supply	: 12VDC  , 2.0A		
Operation frequency	: WiFi: 802.11a/n(HT20)/ac(VHT20)/ax(HE20): 5180MHz~5240MHz; 5745MHz~5825MHz 802.11n(HT40)/ac(VHT40)/ax(HE40): 5190MHz~5230MHz; 5755MHz~5795MHz 802.11ac(VHT80)/ax(HE80):5210MHz; 5775MHz		
Modulation	: 802.11a/n: BPSK/QPSK/16QAM/64QAM 802.11ac/ax: BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM		
Data Rate	: 802.11a:6,9,12,18,24,36,48,54Mbps; 802.11ac(VHT20):MCS0-MCS8 802.11ac(VHT40/80):MCS0-MCS9 802.11n(HT20):MCS0-MCS7; 802.11n(HT40):MCS0-MCS7; 802.11ax(HE20/40/80):MCS0-MCS11		
Antenna Type	: Integrated Antenna		
Antenna gain	: 5dBi		
Antenna Function Description:	802.11a/n(HT20)/ac (VHT20)/ax(HE20)	5180MHz~5240MHz	Chain 0 Chain 1
	802.11n(HT40)/ac (VHT40)/ax(HE40)	5190MHz~5230MHz	
	802.11ac(VHT80)/ax (HE80)	5210MHz	
	802.11a/n(HT20)/ac (VHT20)/ax(HE20)	5745MHz~5825MHz	Chain 0 Chain 1
	802.11n(HT40)/ac (VHT40)/ax(HE40)	5755MHz~5795MHz	
	802.11ac(VHT80)/ax (HE80)	5775MHz	
H/W No.	: B3		
S/W No.	: 2.0.4.22		
Battery	: N/A		
Date of Receipt	: Aug. 26, 2022		

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Condition of Sample on receipt	Good / Satisfactory / Fit for Testing
Opinions and Interpretations:	See the specific Note / Annexure if any in the whole /full report.
Note:	1 .For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. Antenna gain and antenna type provided by manufacturer.

Channel List							
802.11a/n/ac/ax (20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	44	5220	48	5240
149	5745	153	5765	157	5785	161	5805
165	5825	--	--	--	--	--	--
802.11n/ac/ax (40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230	151	5755	159	5795
802.11ac/ax (80MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	-	-	-	-	155	5775

## 2.2. ACCESSORIES OF EUT

Description of Accessories	Shielded Type	Ferrite Core	Length
12VDC Adapter	-	-	-

## 2.3. ASSISTANT EQUIPMENT USED FOR TEST

Description of Assistant equipment	Manufacturer	Model number or Type	EMC Compliance	SN
Laptop	DELL	Latitude 3490	-	5M2Z1W2
DC Power Supply	JUNKE	JK15040K	-	6SJ2T02



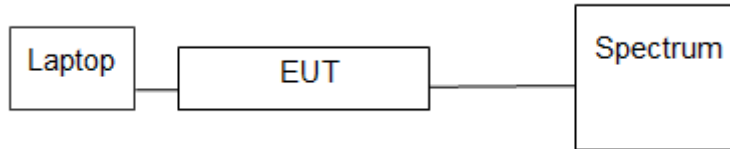
### 3. EQUIPMENTS LIST FOR ALL TEST ITEMS

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal.DueDate
1	Spectrum Analyzer	Rohde and Schwarz	FSP	101163	2022/02/08	2024/02/07
2	Loop antenna	DAZE Beijing	ZN30900C	18052	2021/09/15	2023/09/15
3	Hi power horn antenna	DAZE Beijing	ZN30700	18012	2021/09/15	2023/09/15
4	Horn antenna	DAZE Beijing	ZN30702	18006	2022/03/23	2023/03/22
5	Horn antenna	DAZE Beijing	ZN30703	18005	2021/09/15	2023/09/15
6	Pre amplifier	KELIANDA	LNA-0009295	-	2023/01/13	2024/01/13
7	Pre amplifier	KELIANDA	CF-00218	-	2023/01/13	2024/01/13
8	Biconical Antenna	DAZE Beijing	ZN30505C	17038	2021/09/15	2023/09/15
9	EMI-RECEIVER	Schwarzbeck	FCKL	1528194	2023/01/13	2024/01/13
10	LISN	Kyoritsu	KNW-407	8-1789-5	2023/01/13	2024/01/13
11	Network-LISN	SCHWAR ZBECK	NNBM8125	81251314	2023/01/13	2024/01/13
12	Network-LISN	SCHWAR ZBECK	NNBM8125	81251315	2023/01/13	2024/01/13
13	PULSELIMITER	Rohde and Schwarz	ESH3-Z2	100681	2023/01/13	2024/01/13
14	50Ω Coaxial Switch	DAIWA	1565157	-	2023/01/13	2024/01/13
15	50Ω Coaxial Switch	-	-	-	2023/01/13	2024/01/13
16	Wireless signal power meter	DARE!!	RPR3006W	RFSW190220	2023/01/13	2024/01/13
17	Signal Generator	KEYSIGHT	N5181A	512071	2023/01/13	2024/01/13
18	RF Vector Signal Generator	Keysight	N5182B	512094	2023/01/13	2024/01/13
19	Spectrum analyzer	R&S	FSV-40N	101385	2023/01/13	2024/01/13

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20	Radio Communication Tester	R&S	CMW 500	124589	2021/09/15	2023/09/15
21	Signal Generator	R&S	SMP02	837017/004 836593/005	2021/09/15	2023/09/15
22	DC Regulated Power Supply	Metravi	RPS-3005	669076	2022/12/13	2023/12/12
23	Climatic Chamber	Sunrise Scientific Instruments	-	-	2022/11/22	2023/11/21
24	Attenuators	AGILENT	8494B	-	-	-
25	Attenuators	AGILENT	8495B	-	-	-

### 3.1. BLOCK DIAGRAM OF EUT CONFIGURATION FOR TEST



### 3.2. TEST ENVIRONMENT CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

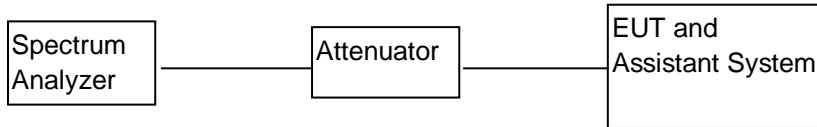
### 3.3. MEASUREMENT UNCERTAINTY

No.	Item	Uncertainty
1	Conducted Emission Test	2.70dB
2	Radiated Emission Test	3.09dB
3	RF power, conducted	2.46dB
4	RF power density, conducted	2.24dB
5	Spurious emissions, conducted	2.71dB
6	All emissions, radiated(<1G)	3.08dB
7	All emissions, radiated(>1G)	3.09dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 4. POWER SPECTRAL DENSITY TEST

### 4.1. BLOCK DIAGRAM OF TEST SETUP



### 4.2. APPLIED PROCEDURES / LIMIT

**According to FCC §15.407(a)(3)**

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omni directional 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.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, 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.

For the band 5.725-5.85 GHz

For the band 5.725-5.85 GHz, 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..

### 4.3. TEST PROCEDURE

( For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set  $RBW \geq 1/T$ , where T is defined in section II.B.1.a).
- b) Set  $VBW \geq 3 RBW$ .
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10\log(500\text{kHz}/RBW)$  to the measured result, whereas  $RBW (< 500 \text{ KHz})$  is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10\log(1\text{MHz}/RBW)$  to the measured result, whereas  $RBW (< 1 \text{ MHz})$  is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since  $RBW=100 \text{ KHz}$  is available on nearly all spectrum analyzers.

**4.4. TEST RESULT:CHAIN 0**

CH. No.	Frequency	power density (dBm/MHz)	Limit (dBm/MHz)	Result
TX 802.11a Mode				
CH36	5180	10.16	17	Pass
CH44	5220	7.65	17	Pass
CH48	5240	9.75	17	Pass
TX 802.11n20 Mode				
CH36	5180	8.78	17	Pass
CH44	5220	8.75	17	Pass
CH48	5240	9.26	17	Pass
TX 802.11n40 Mode				
CH38	5190	5.63	17	Pass
CH46	5230	6.76	17	Pass
TX 802.11ac20 Mode				
CH36	5180	9.03	17	Pass
CH44	5220	8.96	17	Pass
CH48	5240	4.94	17	Pass
TX 802.11ac40 Mode				
CH38	5190	4.77	17	Pass
CH46	5230	6.79	17	Pass
TX 802.11ac80 Mode				
CH42	5210	3.42	17	Pass
TX 802.11ax20 Mode				
CH36	5180	8.02	17	Pass
CH44	5220	8.26	17	Pass
CH48	5240	4.53	17	Pass
TX 802.11ax40 Mode				
CH38	5190	5.49	17	Pass
CH46	5230	4.56	17	Pass
TX 802.11ax80 Mode				
CH42	5210	1.68	17	Pass

**TEST RESULT:CHAIN 1**

CH. No.	Frequency	power density (dBm/MHz)	Limit (dBm/MHz)	Result
TX 802.11a Mode				
CH36	5180	8.26	11	Pass
CH44	5220	4.22	11	Pass
CH48	5240	3.89	11	Pass
TX 802.11n20 Mode				
CH36	5180	7.47	11	Pass
CH44	5220	4.26	11	Pass
CH48	5240	3.55	11	Pass
TX 802.11n40 Mode				
CH38	5190	3.71	11	Pass
CH46	5230	0.32	11	Pass
TX 802.11ac20 Mode				
CH36	5180	3.52	11	Pass
CH44	5220	2.66	11	Pass
CH48	5240	2.39	11	Pass
TX 802.11ac40 Mode				
CH38	5190	3.57	11	Pass
CH46	5230	0.59	11	Pass
TX 802.11ac80 Mode				
CH42	5210	-1.62	11	Pass
TX 802.11ax20 Mode				
CH36	5180	5.78	11	Pass
CH44	5220	3.19	11	Pass
CH48	5240	2.45	11	Pass
TX 802.11ax40 Mode				
CH38	5190	4.60	11	Pass
CH46	5230	1.95	11	Pass
TX 802.11ax80 Mode				
CH42	5210	-0.60	11	Pass

**TEST RESULT:CHAIN 0**

CH. No.	Frequency	Limit (dBm/500KHz)	Limit (dBm/500KHz)	Result
TX 802.11a Mode				
CH 149	5745	9.00	30	Pass
CH 157	5785	7.73	30	Pass
CH 165	5825	8.16	30	Pass
TX 802.11n20 Mode				
CH 149	5745	7.44	30	Pass
CH 157	5785	8.57	30	Pass
CH 165	5825	7.24	30	Pass
TX 802.11n40 Mode				
CH151	5755	4.48	30	Pass
CH159	5795	4.88	30	Pass
TX 802.11ac20 Mode				
CH 149	5745	8.52	30	Pass
CH 157	5785	7.69	30	Pass
CH 165	5825	7.23	30	Pass
TX 802.11ac40 Mode				
CH151	5755	5.49	30	Pass
CH159	5795	6.14	30	Pass
TX 802.11ac80 Mode				
CH155	5775	1.36	30	Pass
TX 802.11ax20 Mode				
CH 149	5745	7.96	30	Pass
CH 157	5785	6.55	30	Pass
CH 165	5825	6.35	30	Pass
TX 802.11ax40 Mode				
CH151	5755	4.13	30	Pass
CH159	5795	3.36	30	Pass
TX 802.11ax80 Mode				
CH155	5775	1.33	30	Pass



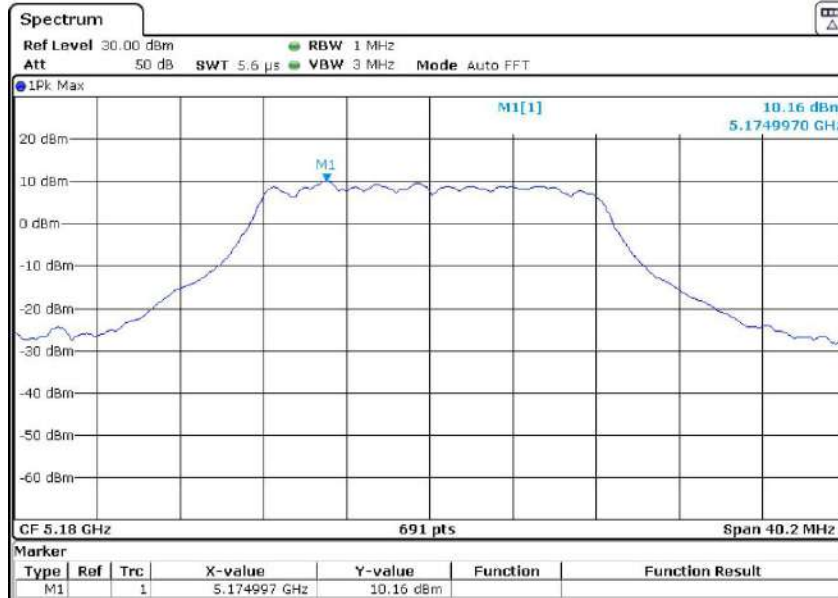
**TEST RESULT:CHAIN 1**

CH. No.	Frequency	Limit (dBm/500KHz)	Limit (dBm/500KHz)	Result
TX 802.11a Mode				
CH 149	5745	6.56	30	Pass
CH 157	5785	7.08	30	Pass
CH 165	5825	6.78	30	Pass
TX 802.11n20 Mode				
CH 149	5745	8.33	30	Pass
CH 157	5785	8.16	30	Pass
CH 165	5825	7.52	30	Pass
TX 802.11n40 Mode				
CH151	5755	5.54	30	Pass
CH159	5795	5.13	30	Pass
TX 802.11ac20 Mode				
CH 149	5745	8.07	30	Pass
CH 157	5785	9.34	30	Pass
CH 165	5825	8.34	30	Pass
TX 802.11ac40 Mode				
CH151	5755	5.72	30	Pass
CH159	5795	4.01	30	Pass
TX 802.11ac80 Mode				
CH155	5775	2.01	30	Pass
TX 802.11ax20 Mode				
CH 149	5745	8.66	30	Pass
CH 157	5785	9.62	30	Pass
CH 165	5825	10.01	30	Pass
TX 802.11ax40 Mode				
CH151	5755	6.68	30	Pass
CH159	5795	6.27	30	Pass
TX 802.11ax80 Mode				
CH155	5775	2.76	30	Pass

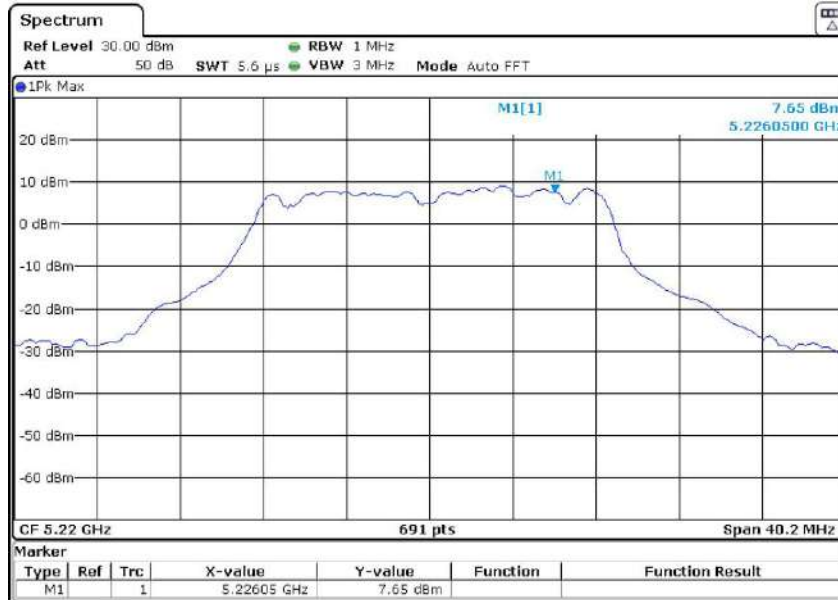
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Test plots as followed: CHAIN 0

802.11a  
Channel: 36

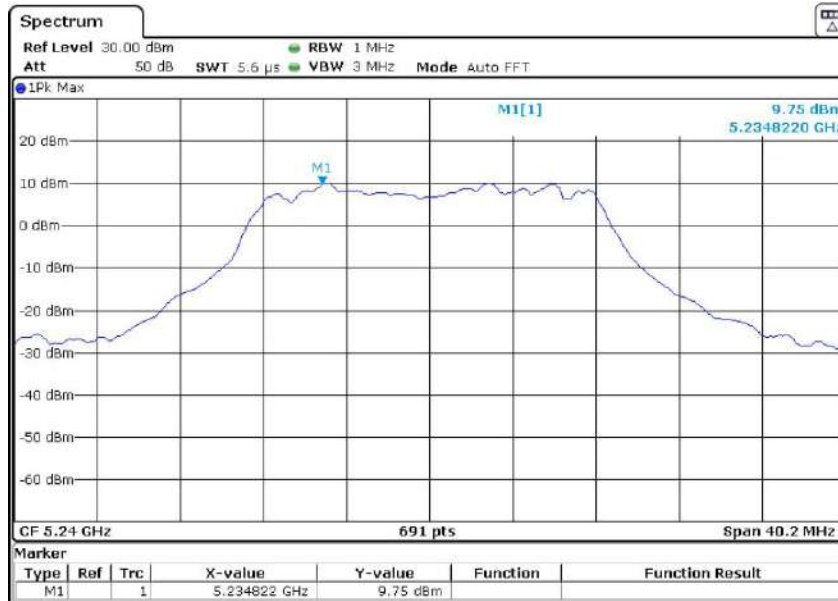


Channel: 44

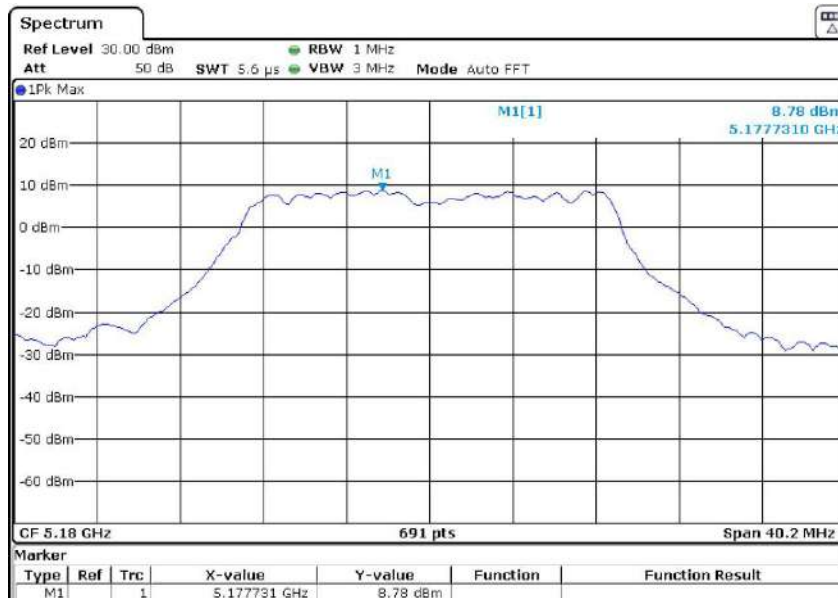


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Channel: 48

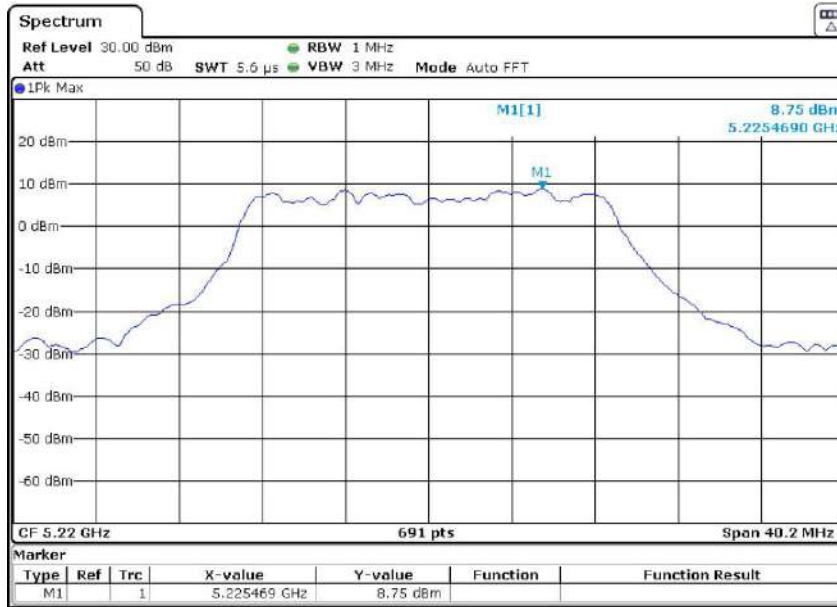


802.11n20  
Channel: 36

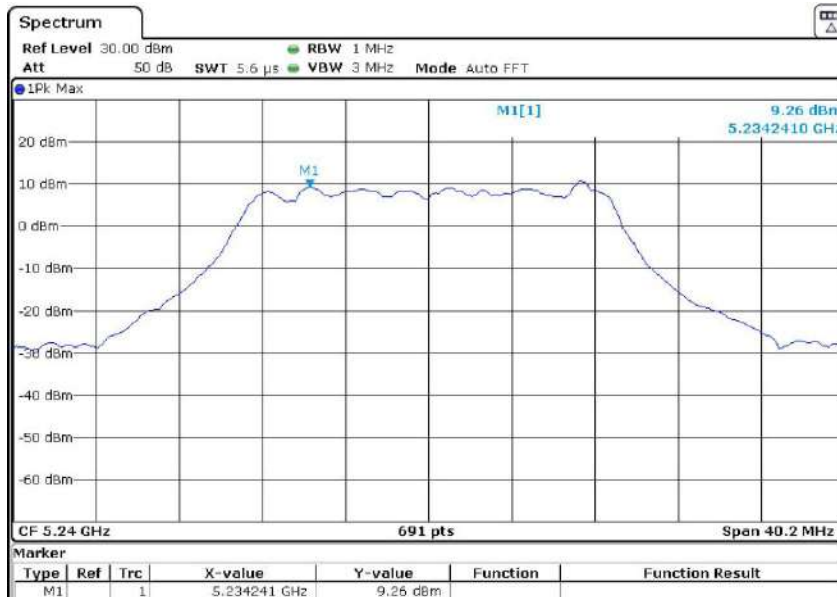


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Channel: 44

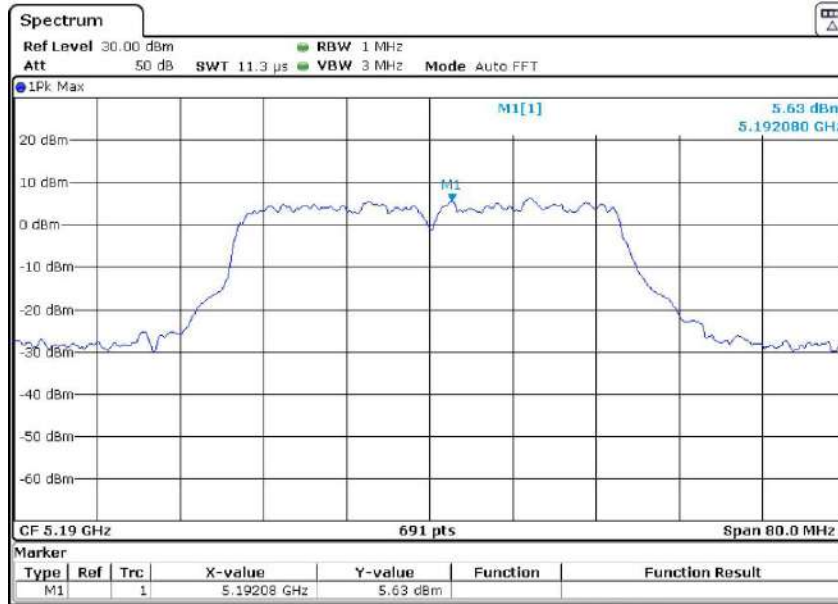


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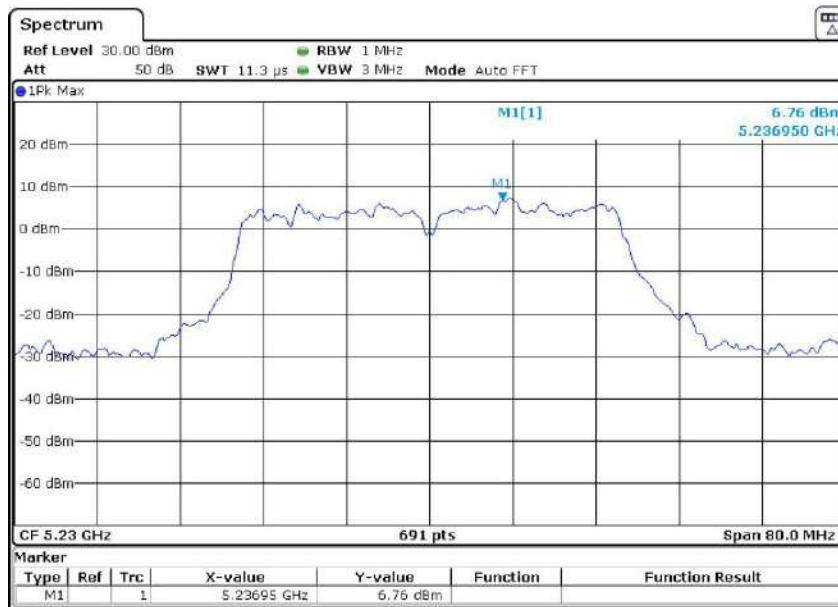


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**802.11n40**  
Channel: 38

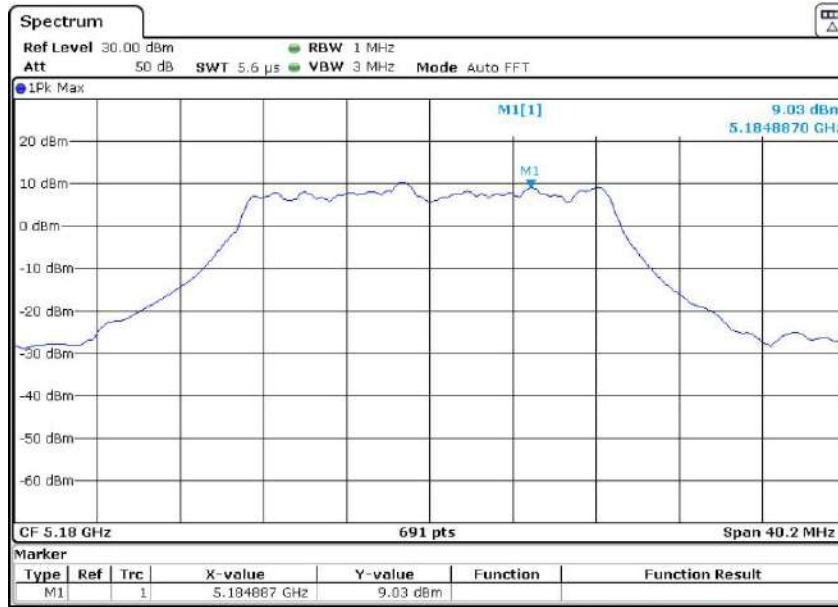


Channel: 46

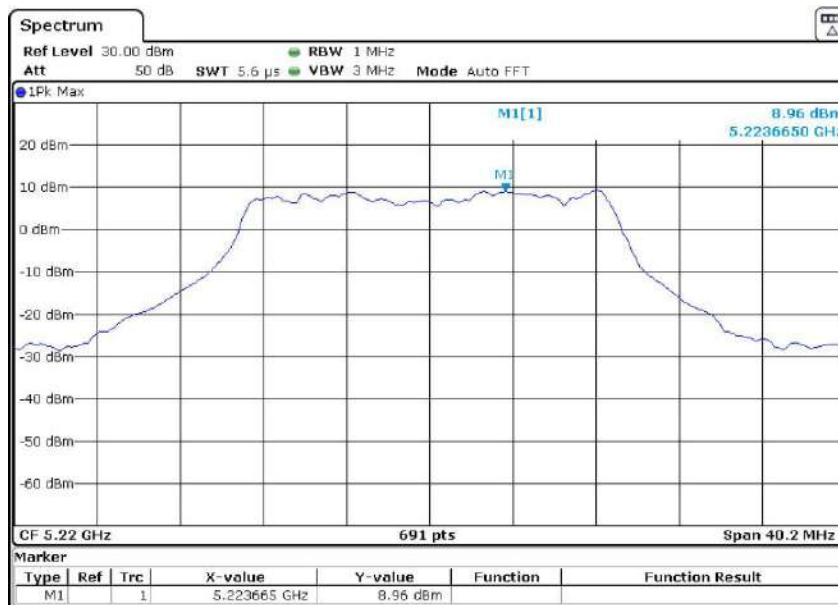


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802.11ac20  
Channel: 36

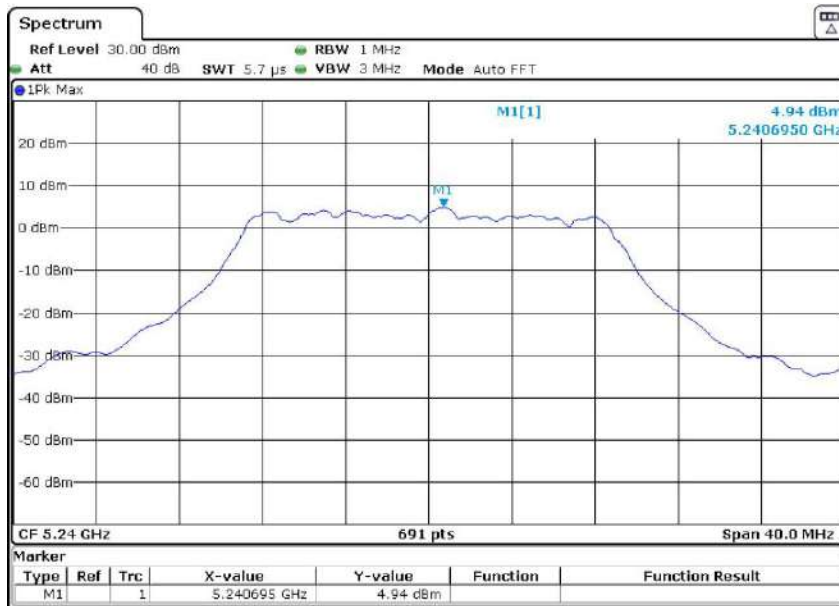


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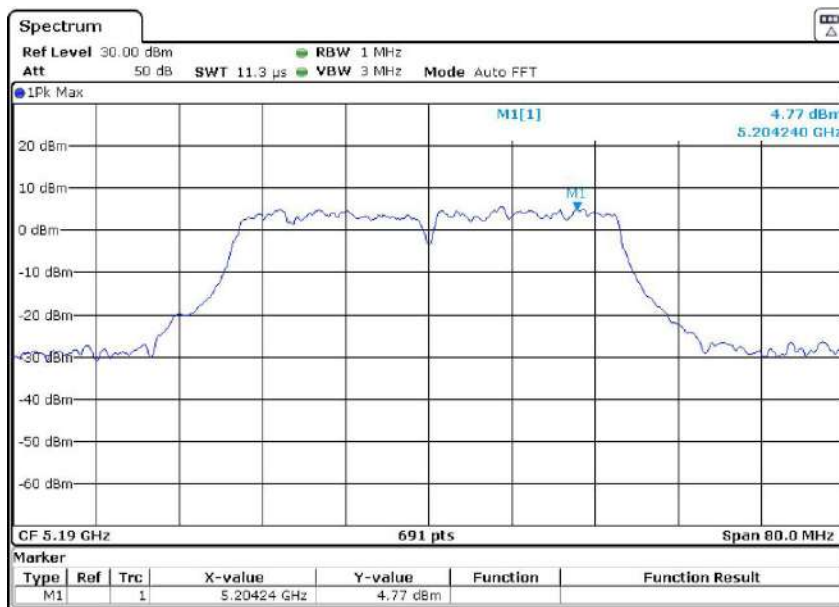


Report No.: AAEMT/EMC/220826-02-09

Channel: 48



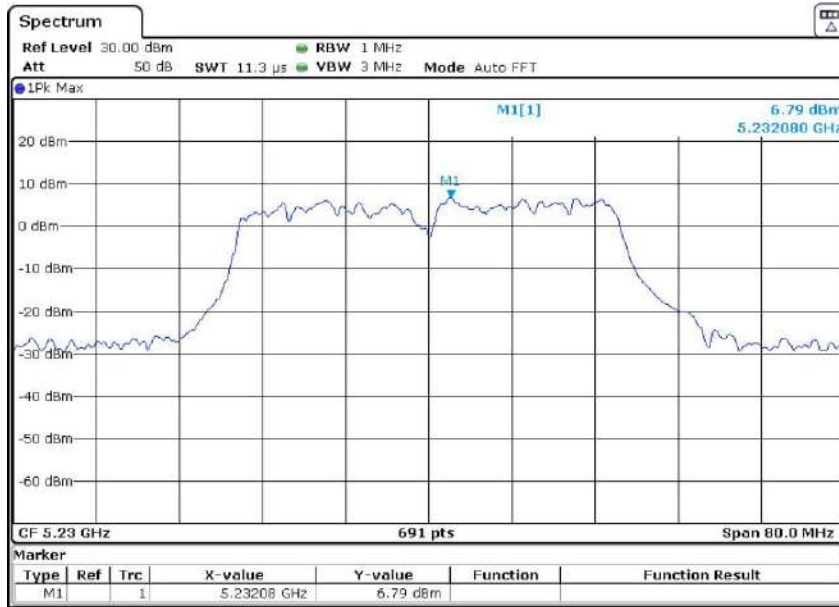
802.11ac40  
 Channel: 38





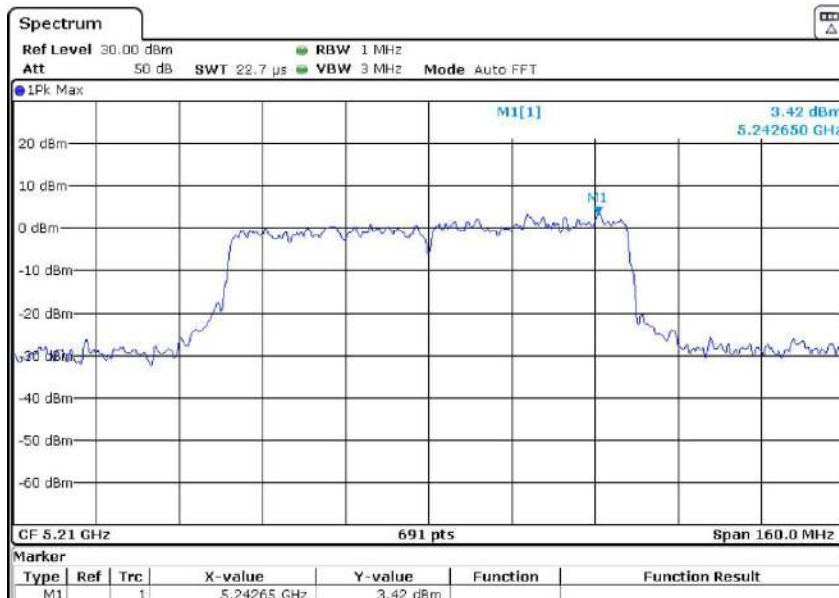
Report No.: AAEMT/EMC/220826-02-09

Channel: 46



802.11ac80

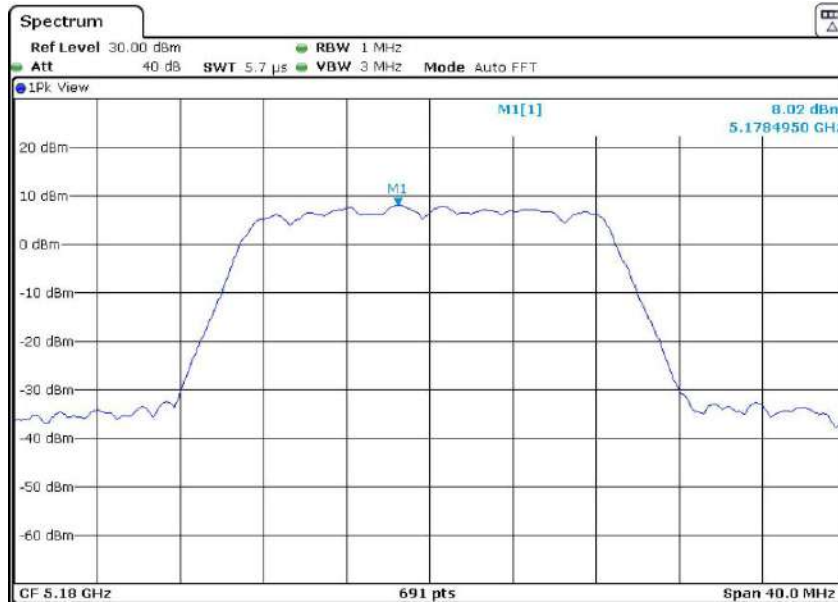
Channel: 42





Report No.: AAEMT/EMC/220826-02-09

802.11ax20  
Channel: 36

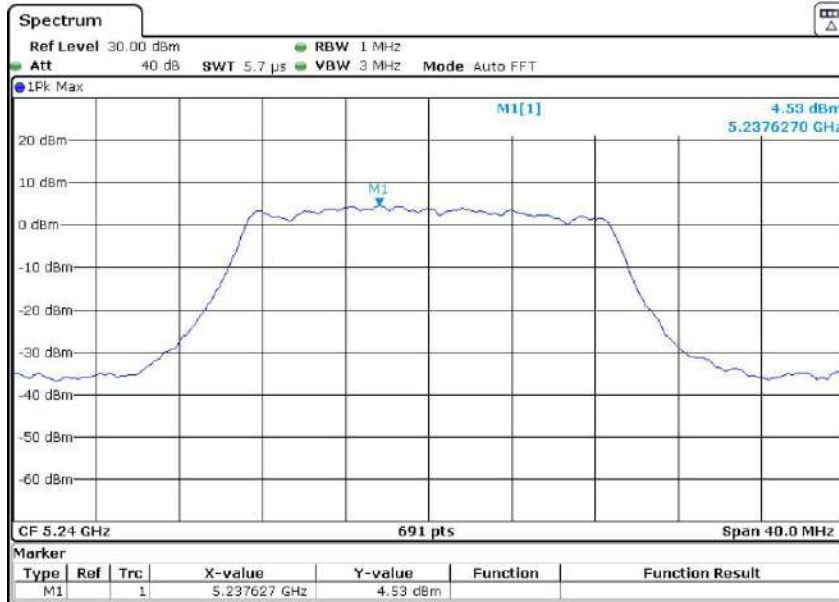


Channel: 44



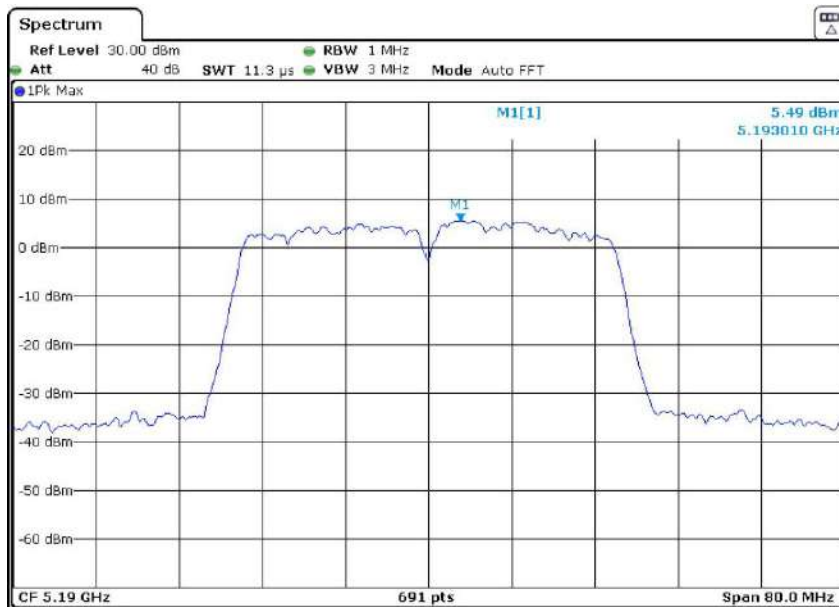
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Channel: 48



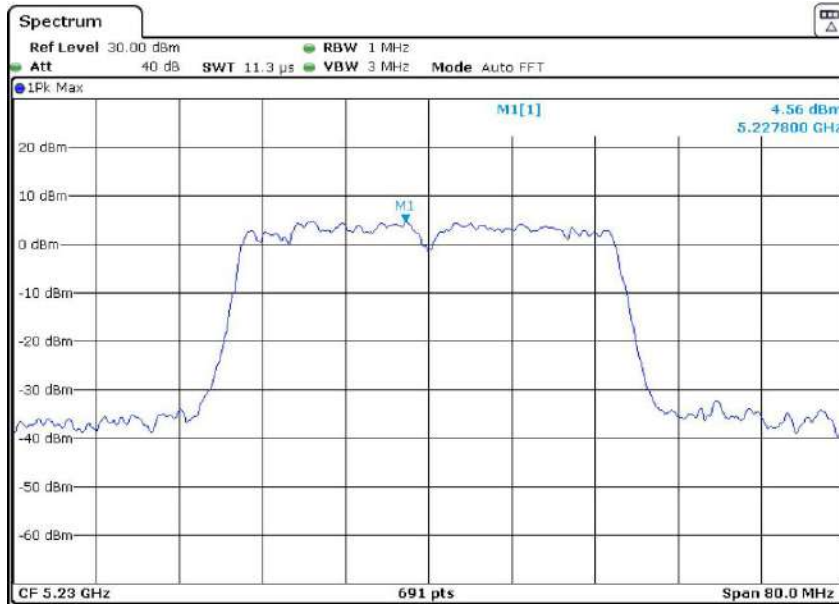
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Channel: 38



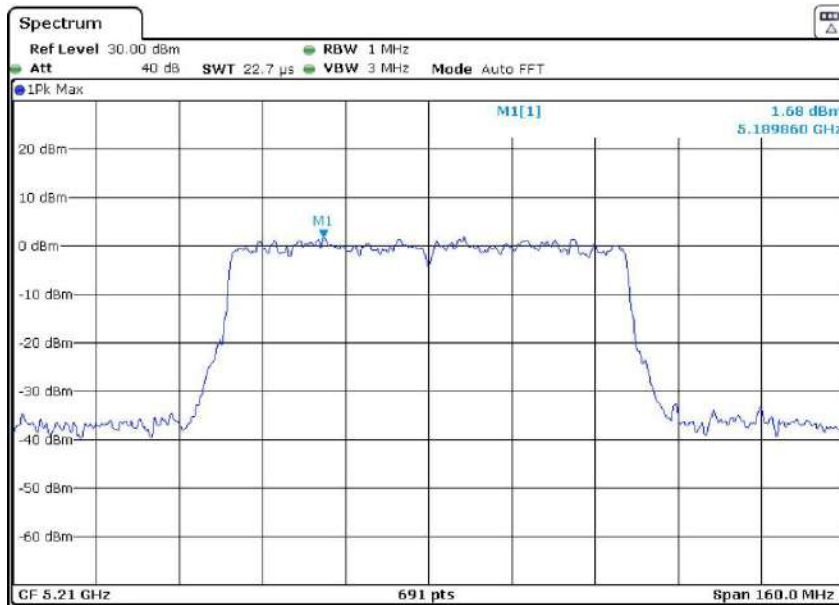
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Channel: 46



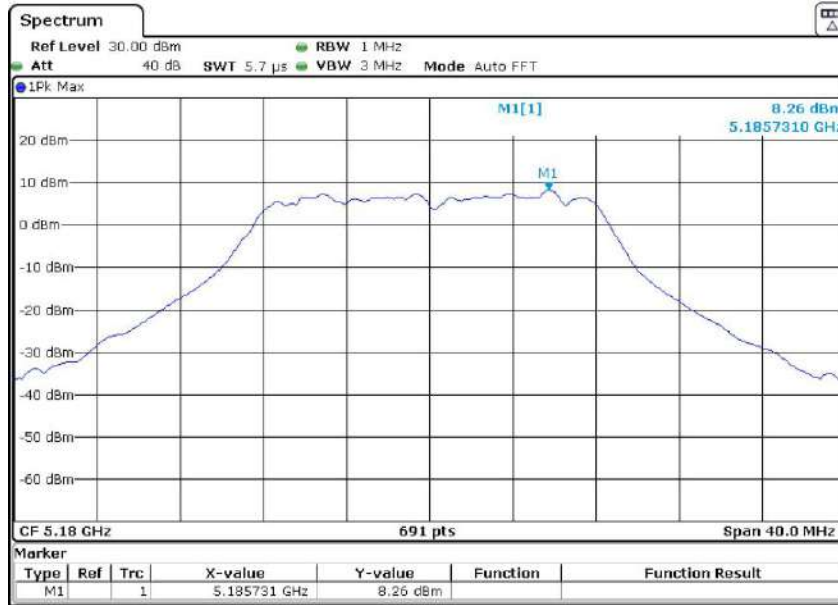
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Channel: 42

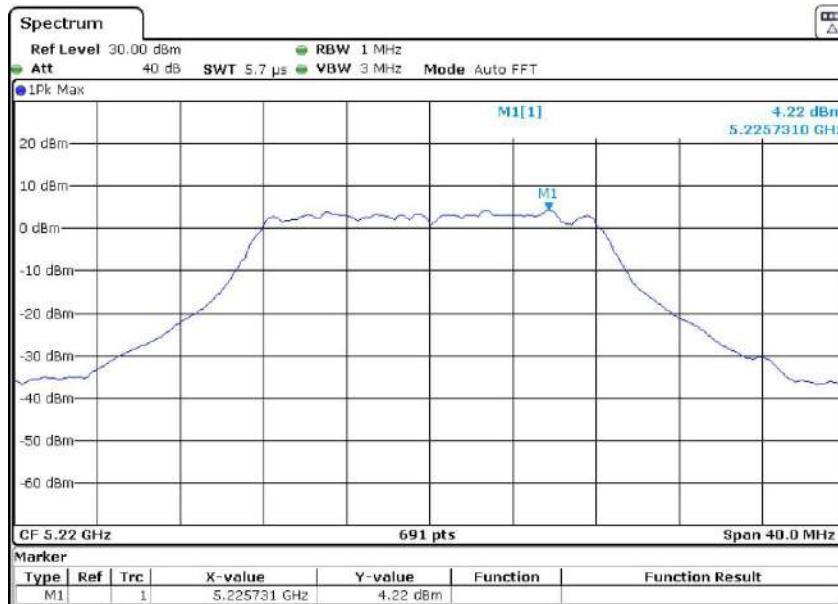


Test plots as followed: CHAIN 1

802.11a  
Channel: 36



Channel: 44



Report No.: AAEMT/EMC/220826-02-09

Channel: 48

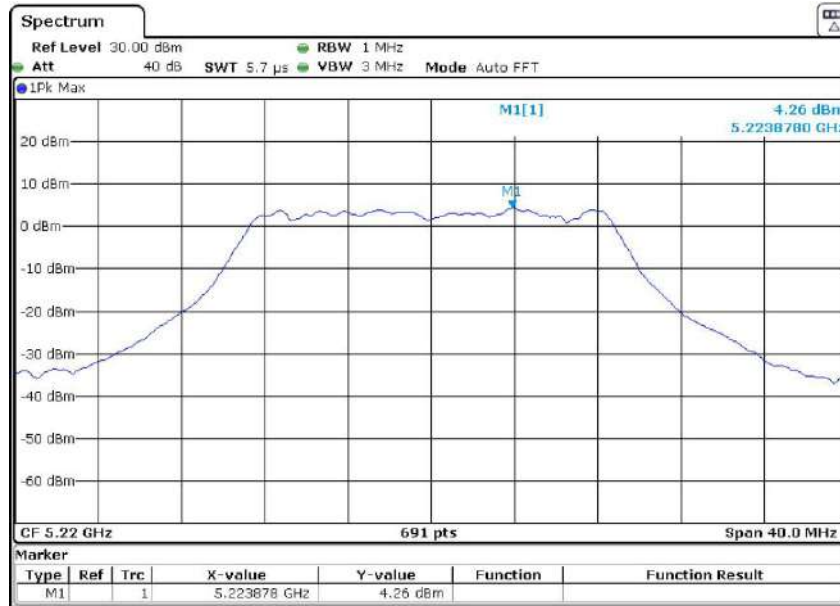


802.11n20  
 Channel: 36



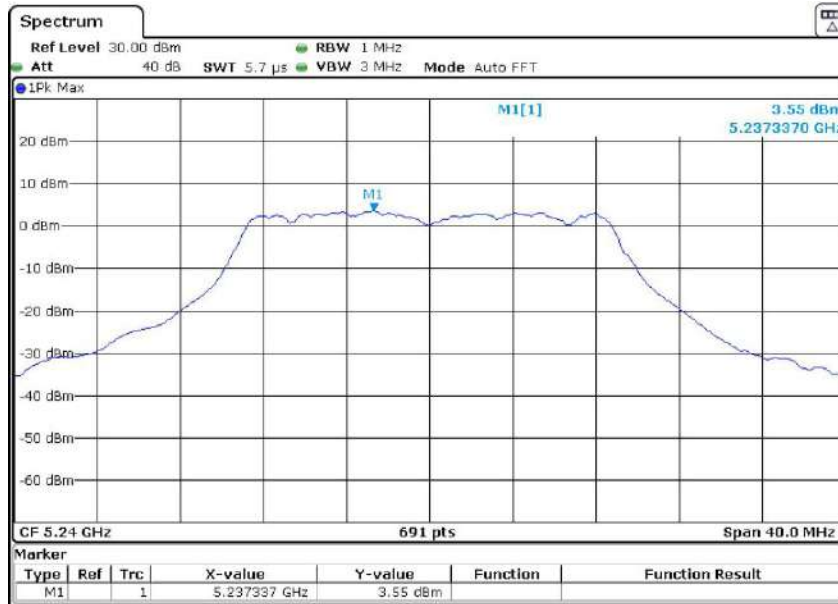
Report No.: AAEMT/EMC/220826-02-09

Channel: 44



Report No.: AAEMT/EMC/220826-02-09

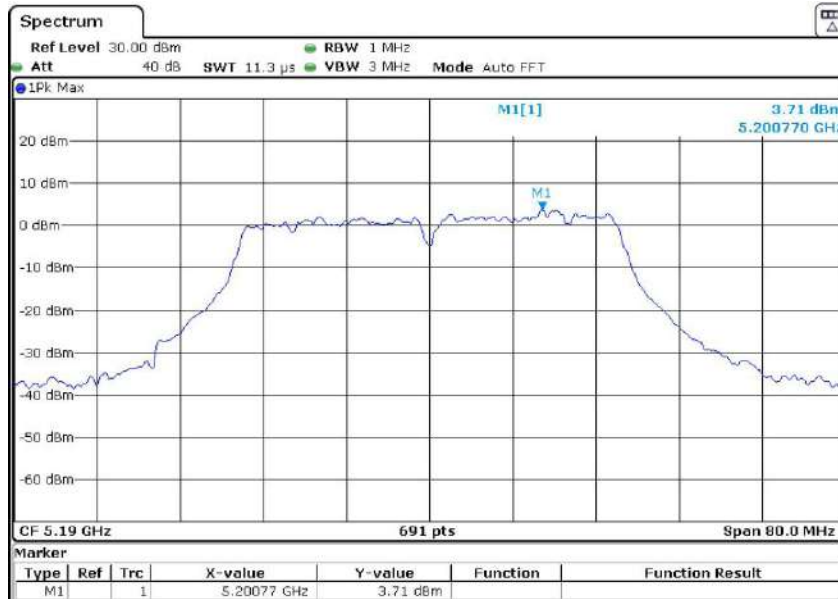
Channel: 48



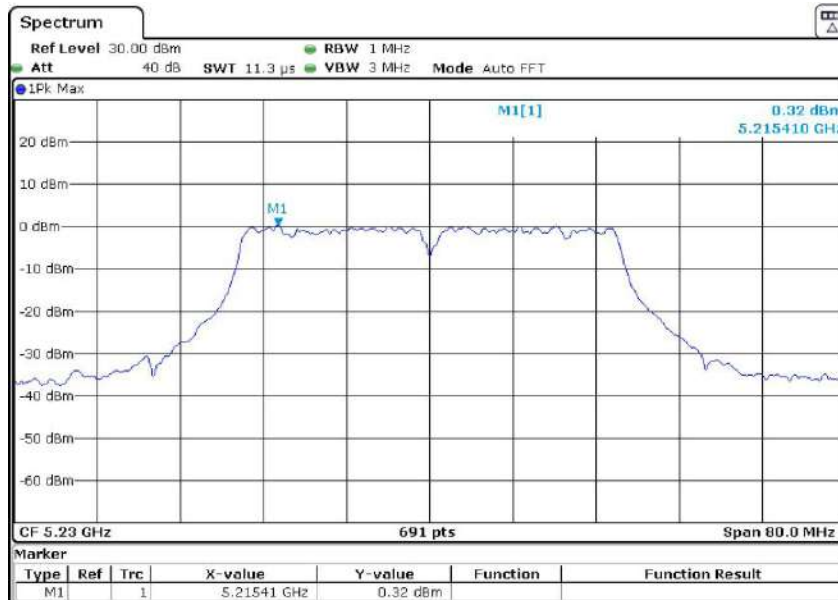


Report No.: AAEMT/EMC/220826-02-09

**802.11n40**  
Channel: 38



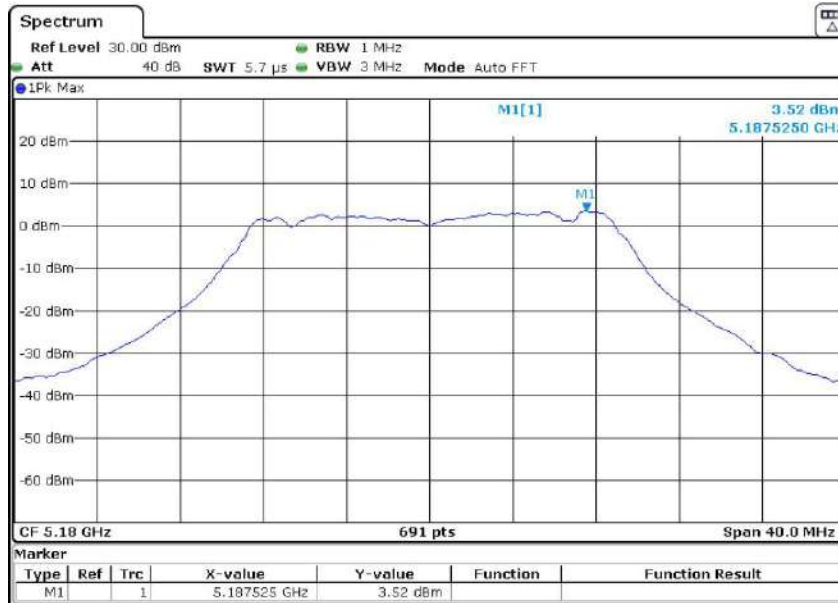
Channel: 46



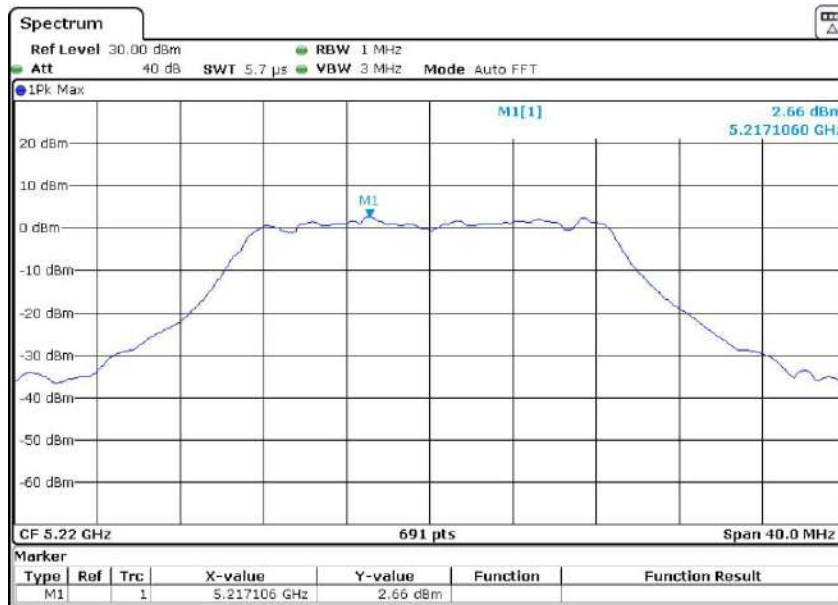


Report No.: AAEMT/EMC/220826-02-09

802.11ac20  
Channel: 36

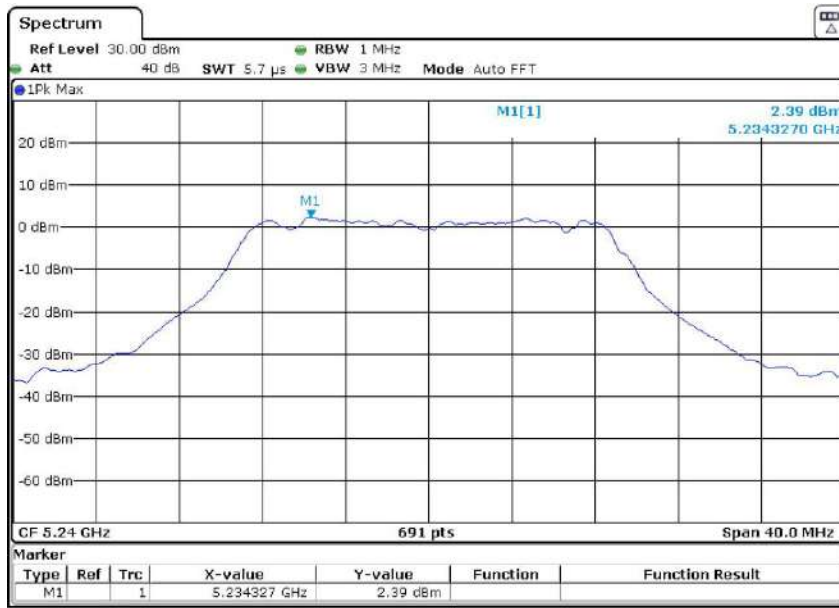


Channel: 44

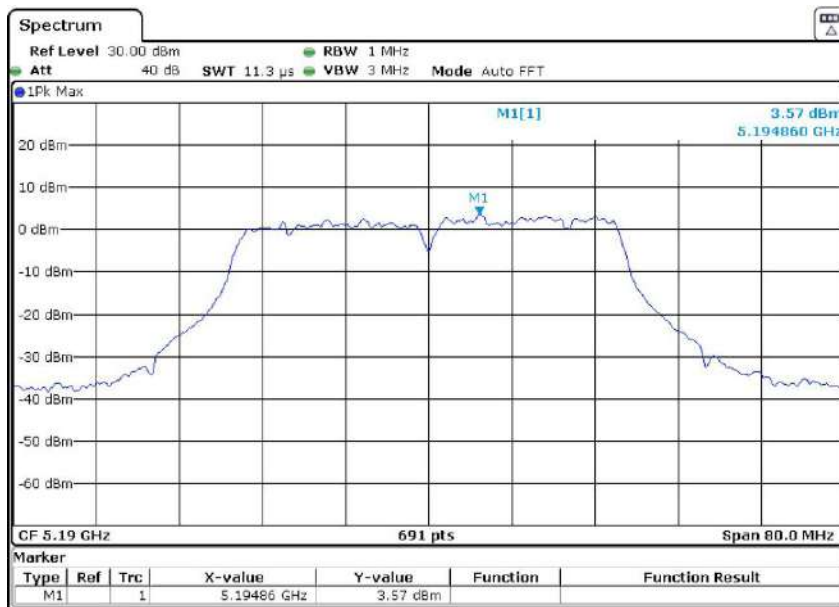


Report No.: AAEMT/EMC/220826-02-09

Channel: 48

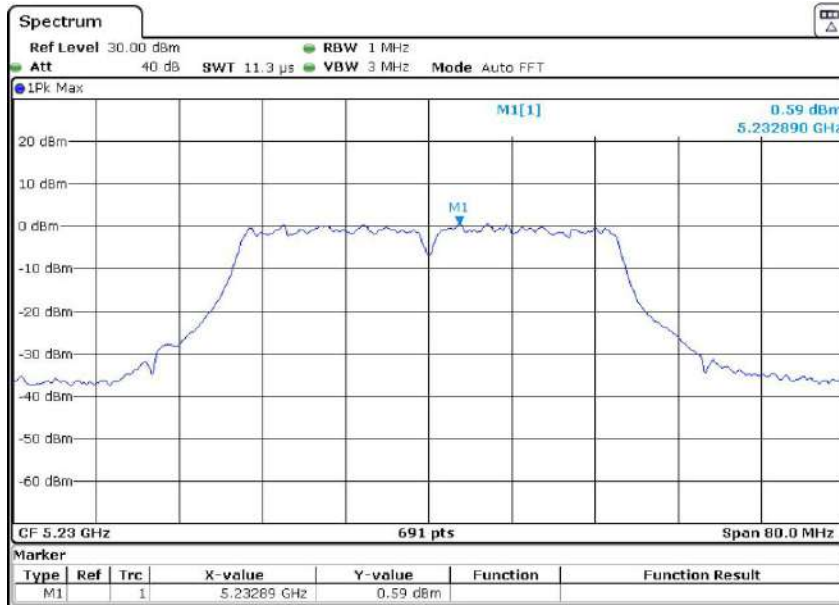


802.11ac40  
 Channel: 38



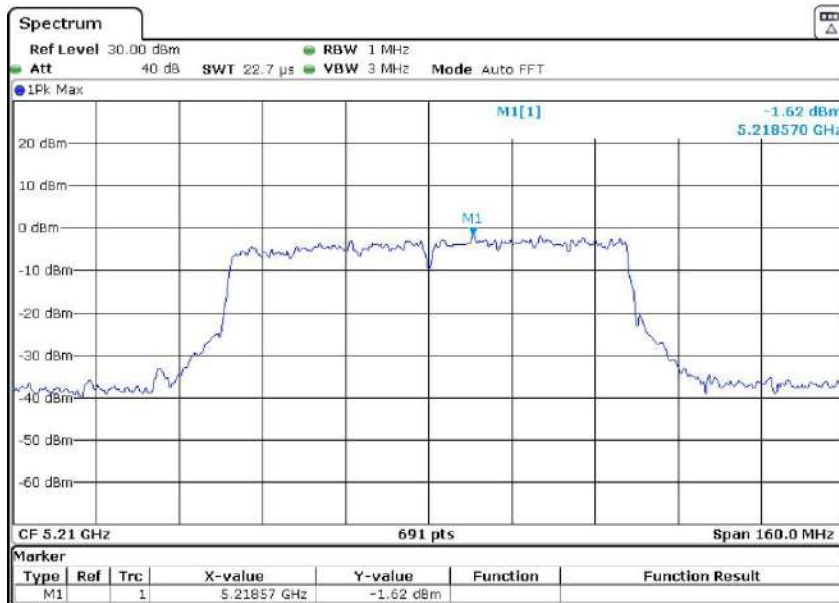
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Channel: 46



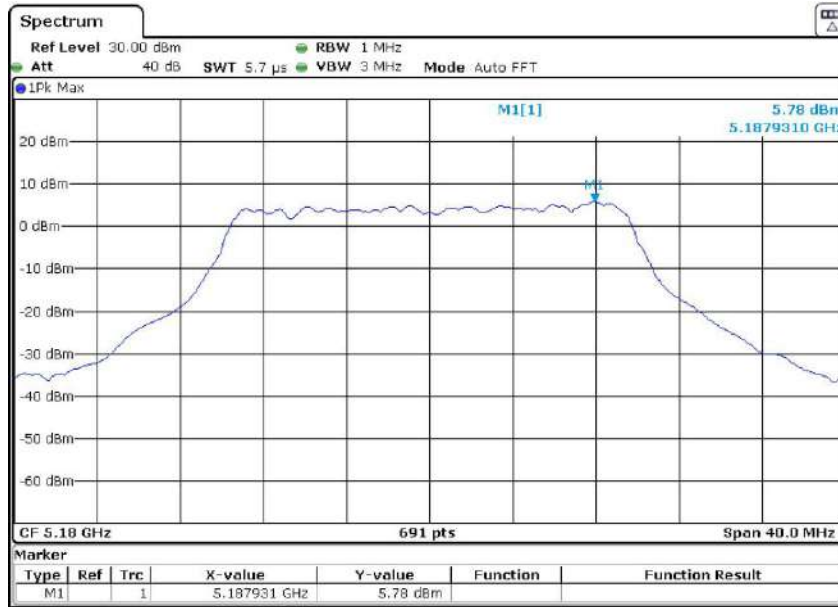
802.11ac80

Channel: 42

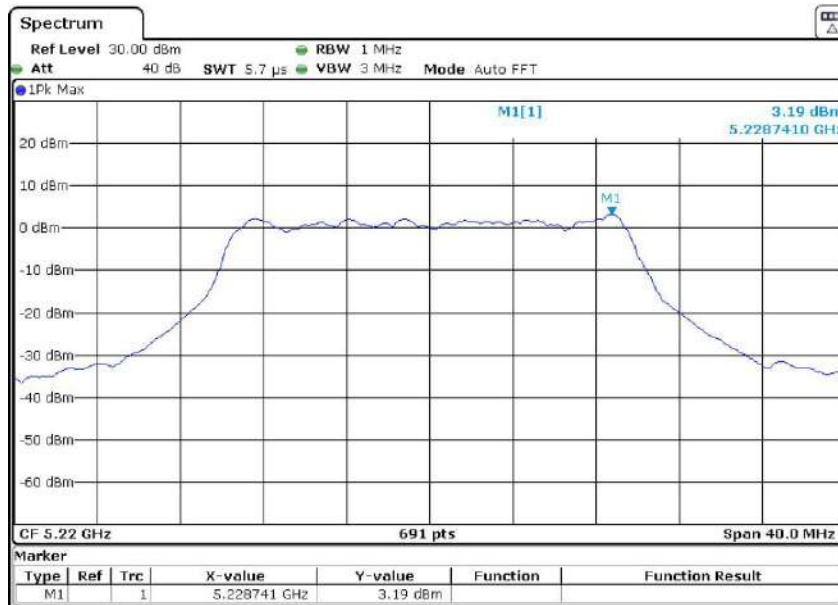


Report No.: AAEMT/EMC/220826-02-09

802.11ax20  
Channel: 36

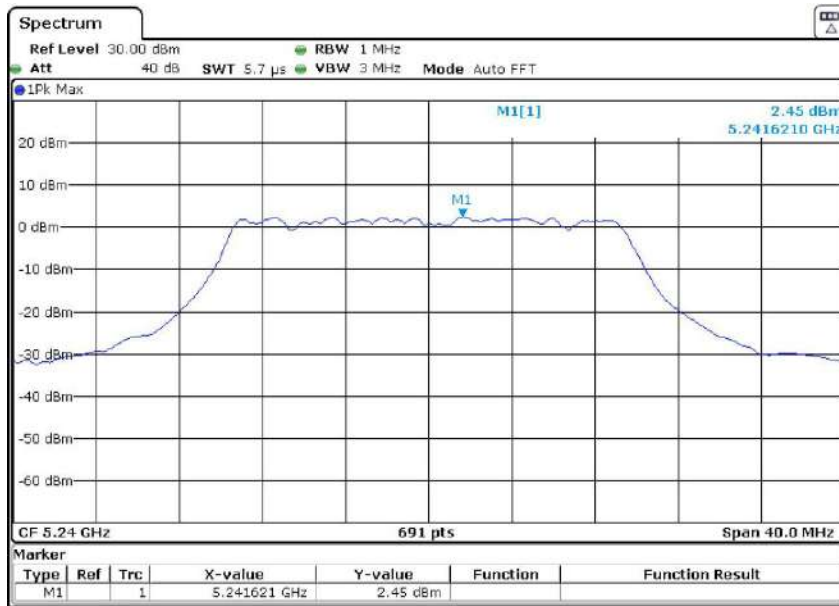


Channel: 44



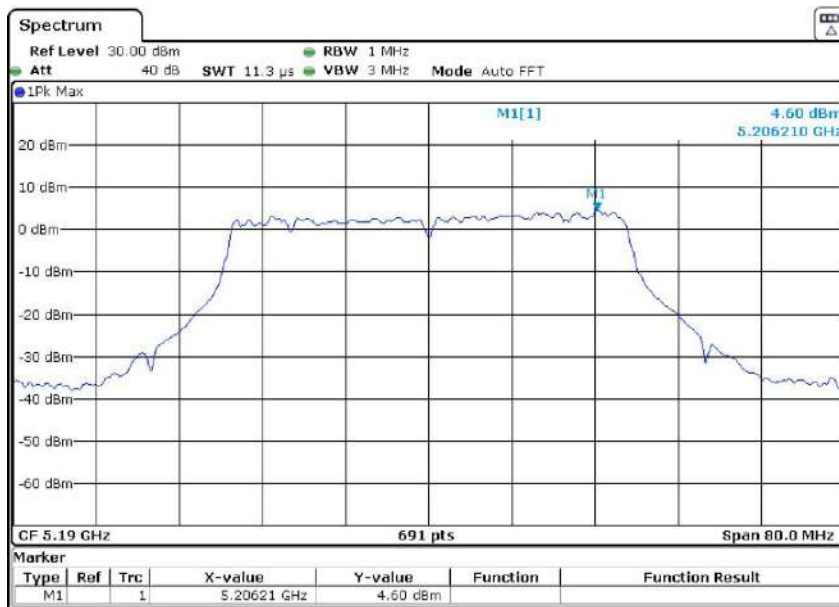
Report No.: AAEMT/EMC/220826-02-09

Channel: 48



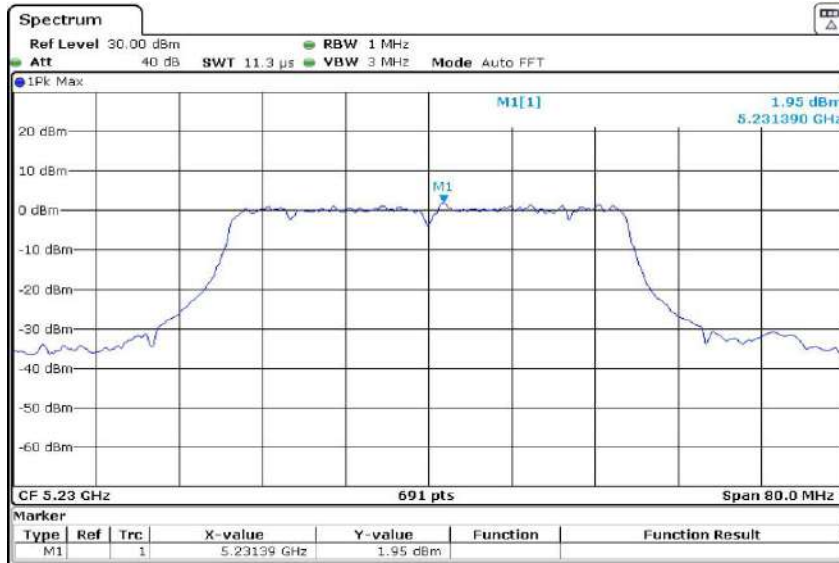
802.11ax40

Channel: 38



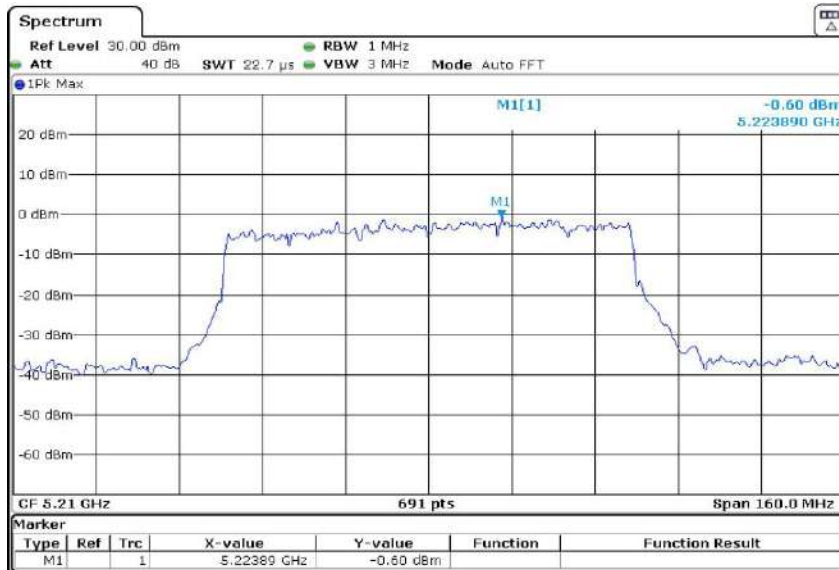
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Channel: 46



802.11ax80

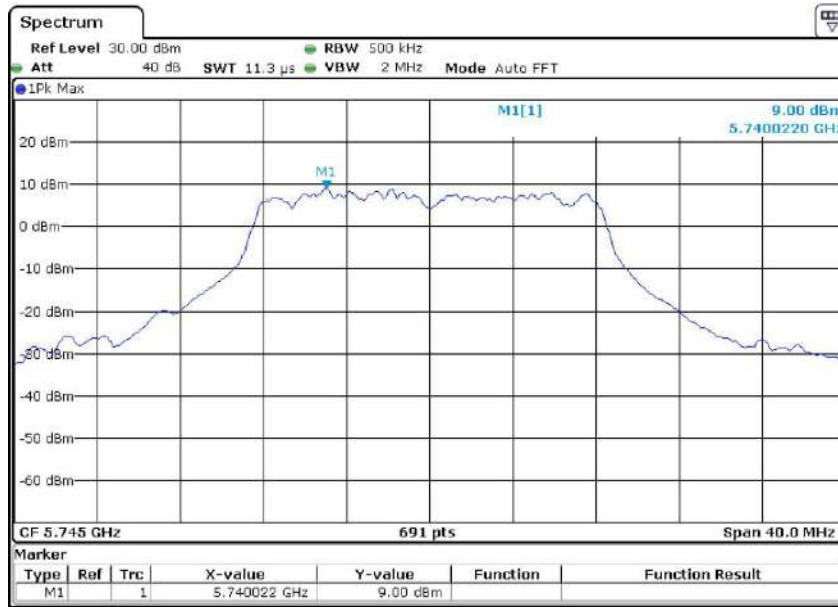
Channel: 42



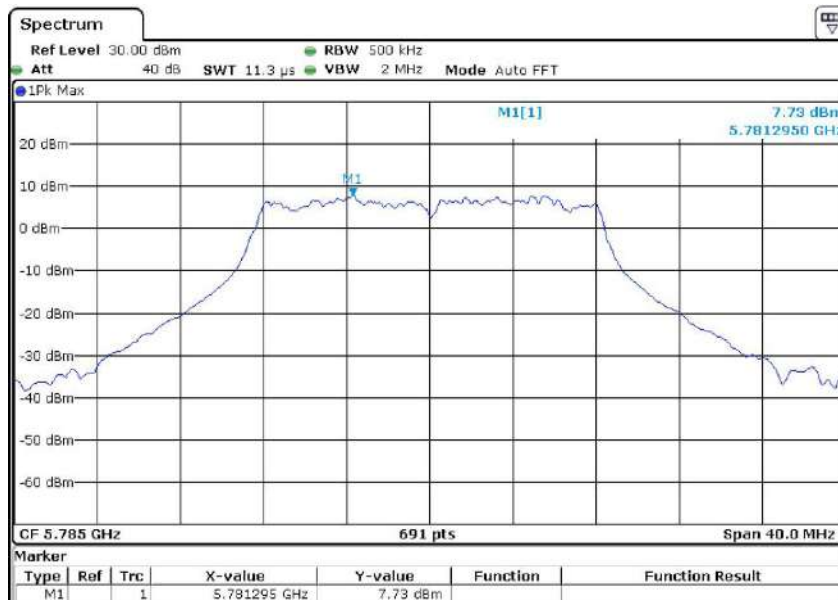


Test plots as followed: CHAIN 0

802.11a  
Channel: 149

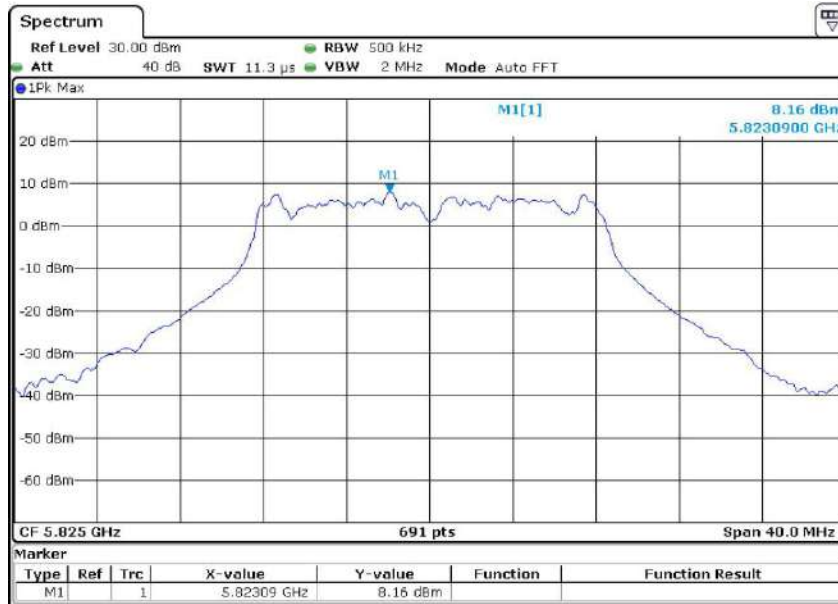


Channel: 157



Report No.: AAEMT/EMC/220826-02-09

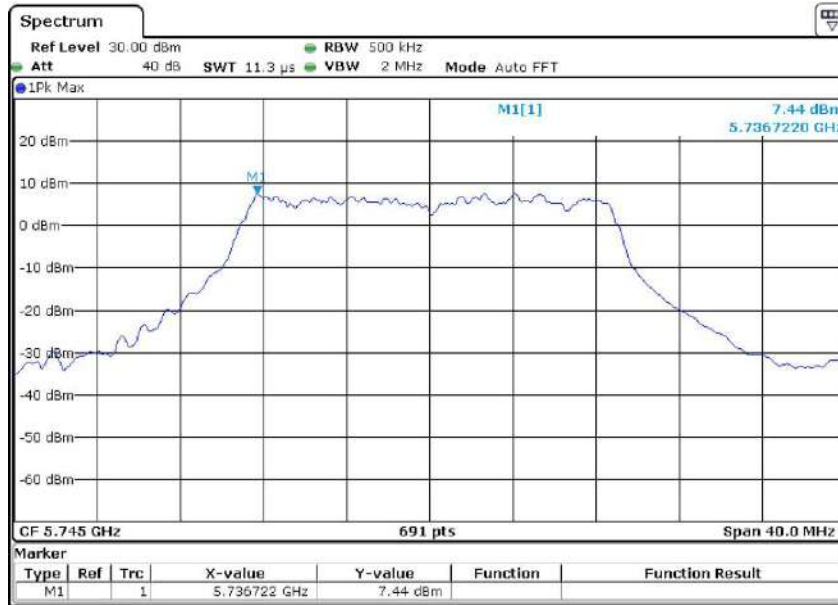
Channel: 165



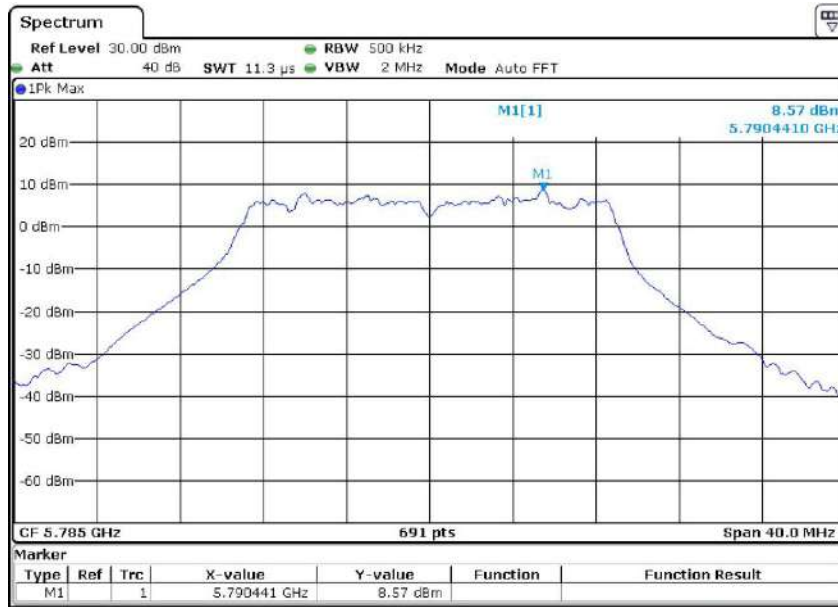


Report No.: AAEMT/EMC/220826-02-09

**802.11n20**  
Channel: 149

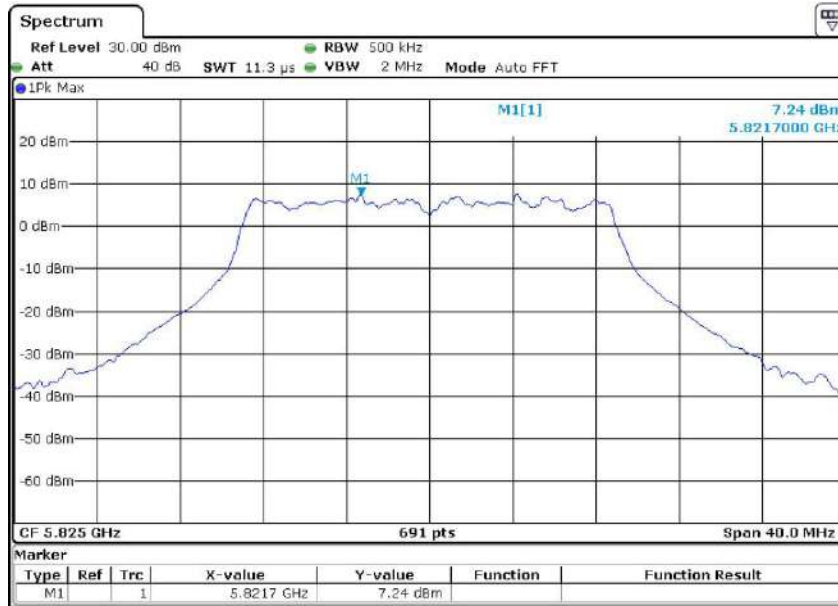


Channel: 157



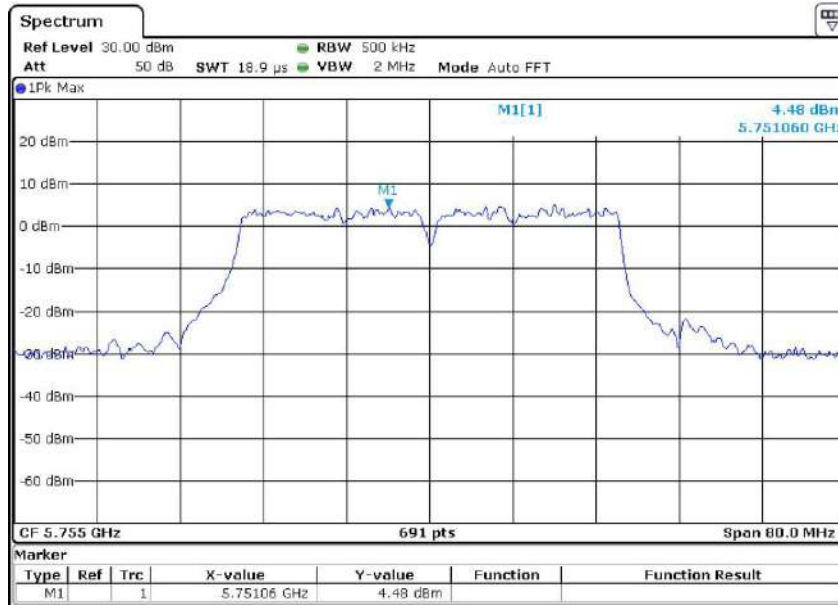
Report No.: AAEMT/EMC/220826-02-09

Channel: 165

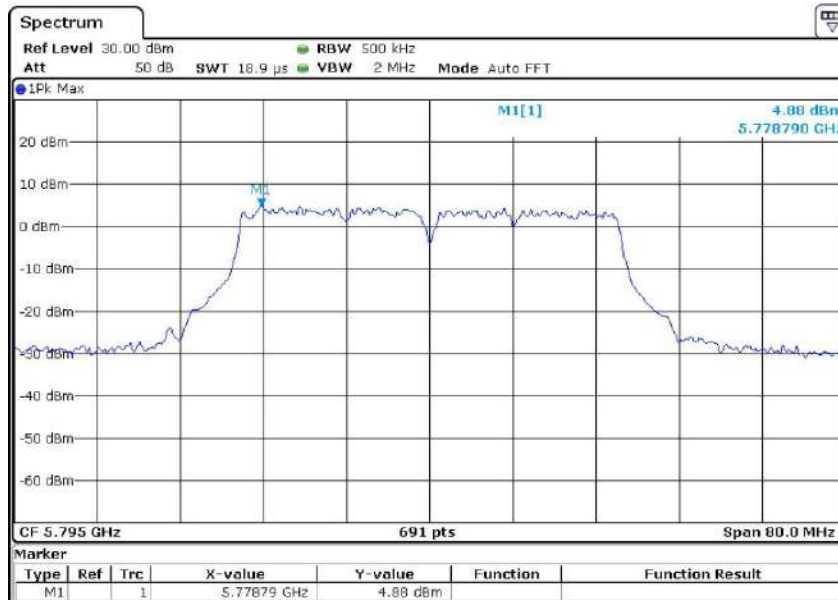


Report No.: AAEMT/EMC/220826-02-09

802.11n40  
Channel: 151

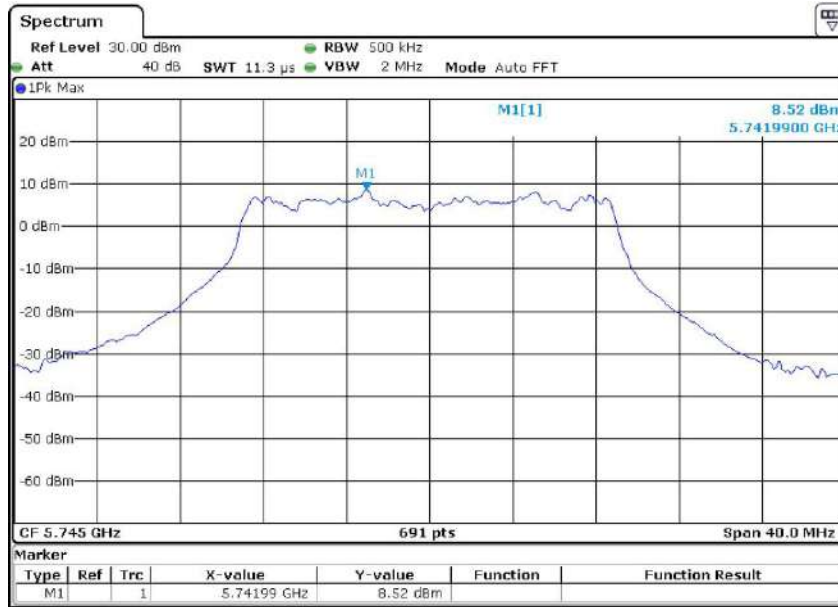


Channel: 159

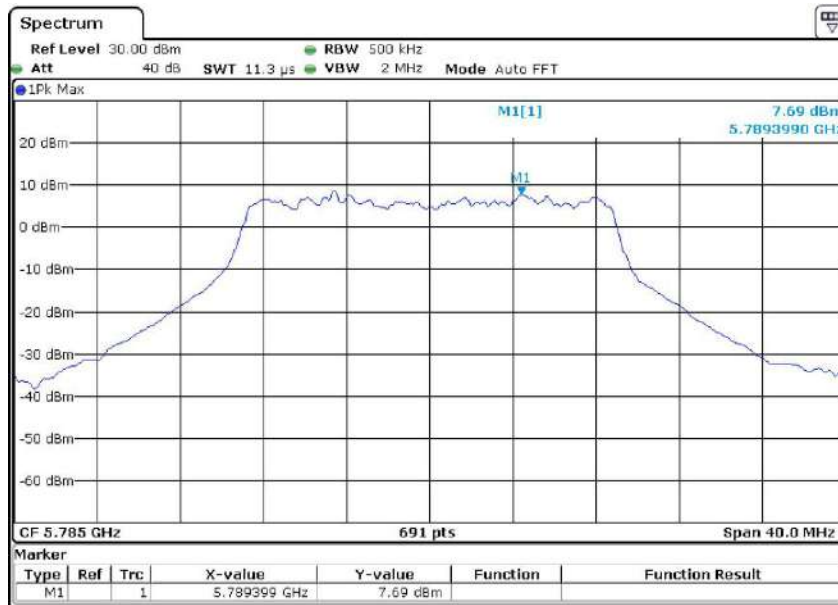


Report No.: AAEMT/EMC/220826-02-09

802.11ac20  
Channel: 149

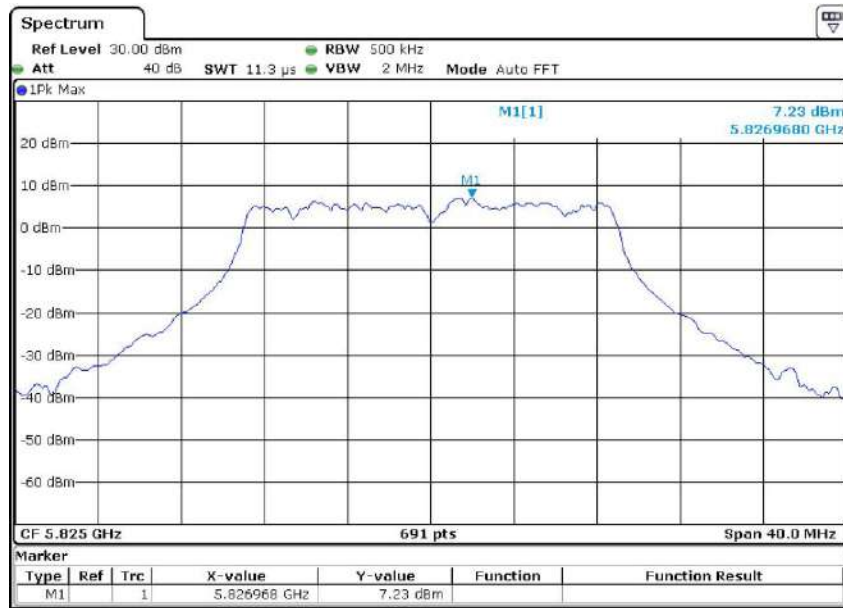


Channel: 157



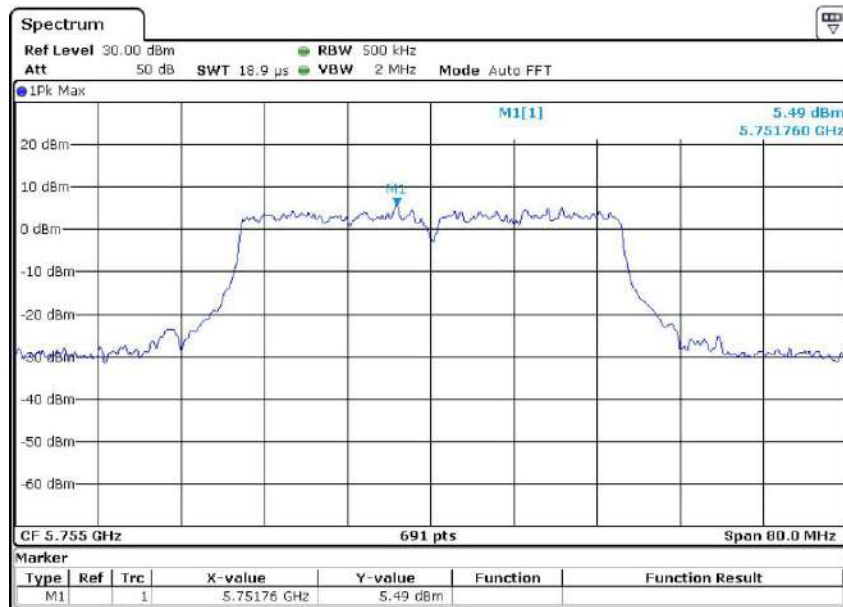
Report No.: AAEMT/EMC/220826-02-09

Channel: 165



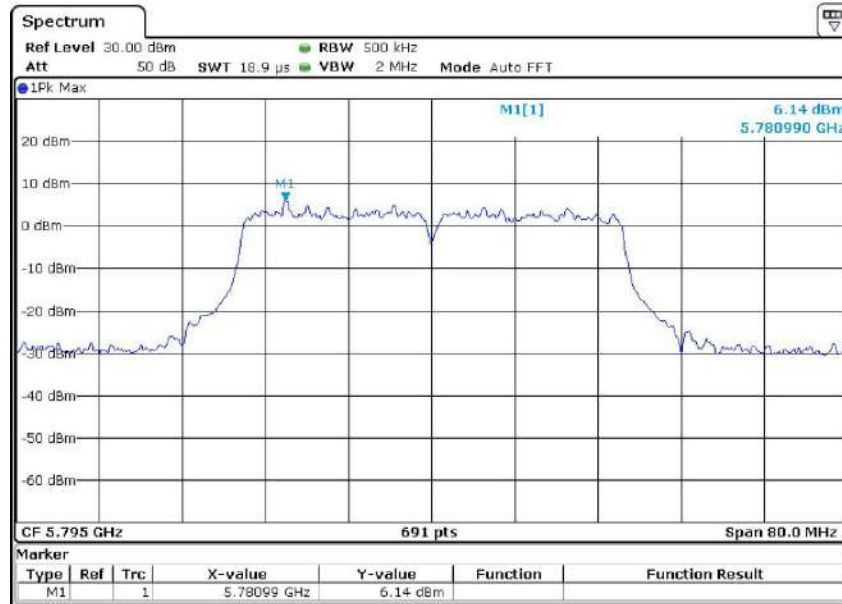
802.11ac40

Channel: 151



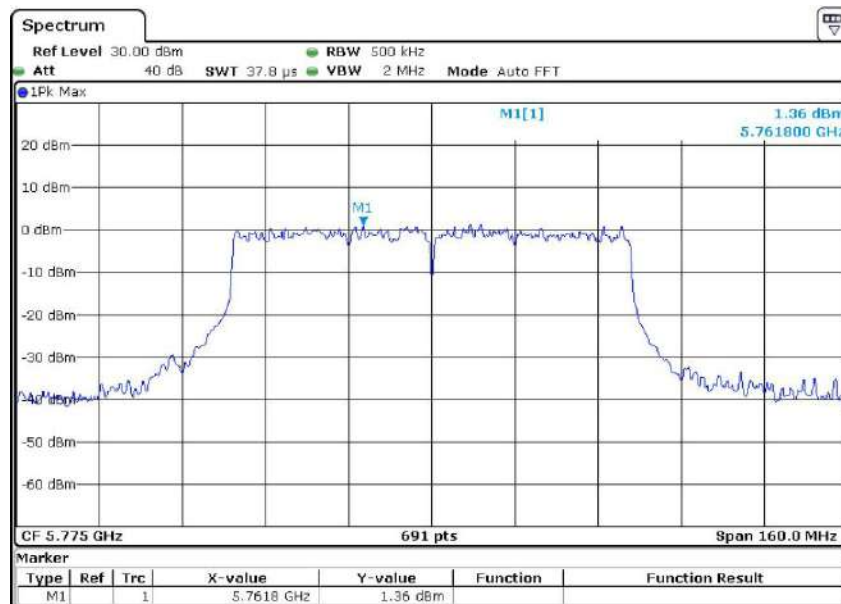
Report No.: AAEMT/EMC/220826-02-09

Channel: 159



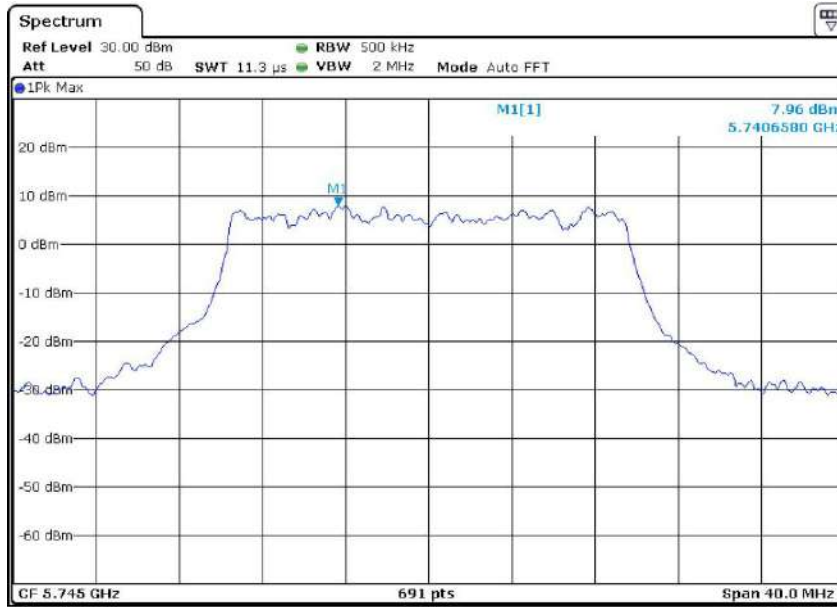
802.11ac80

Channel: 155

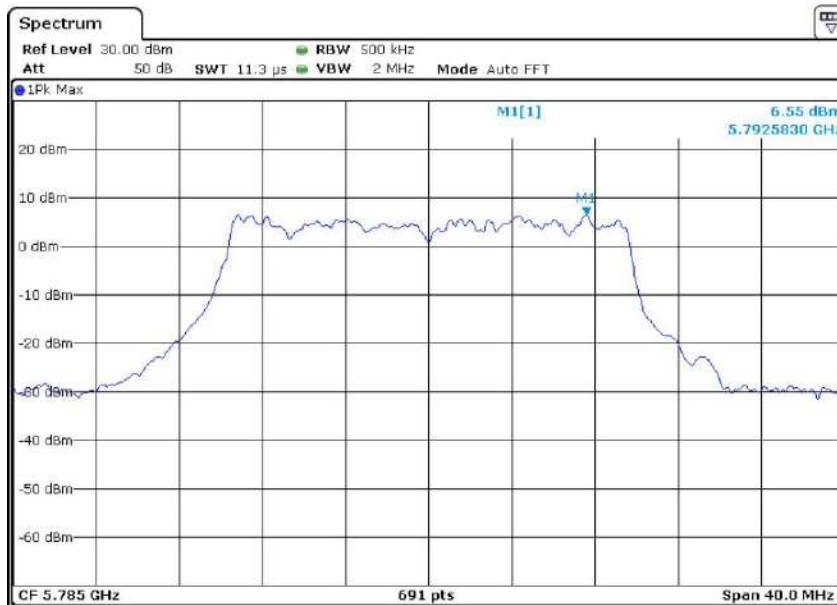


Report No.: AAEMT/EMC/220826-02-09

802.11ax20  
Channel: 149



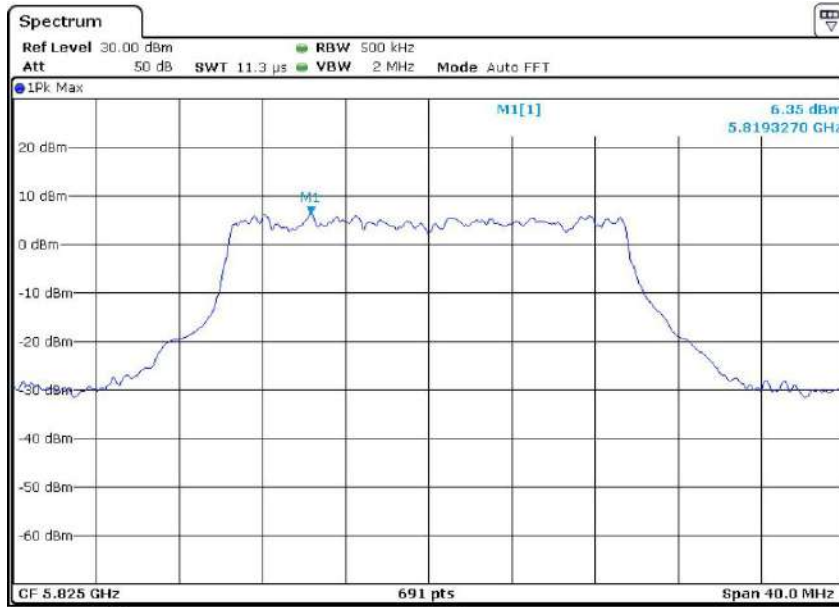
Channel: 157



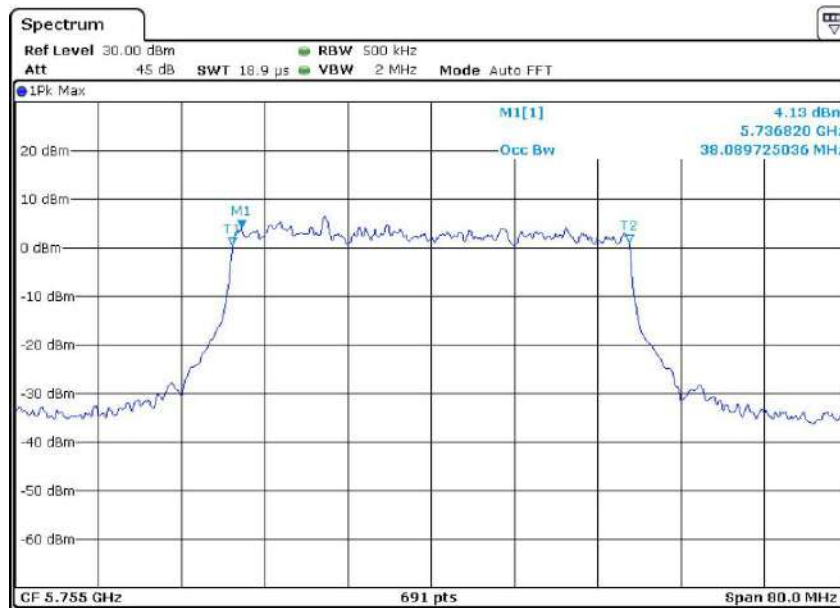


Report No.: AAEMT/EMC/220826-02-09

Channel: 165



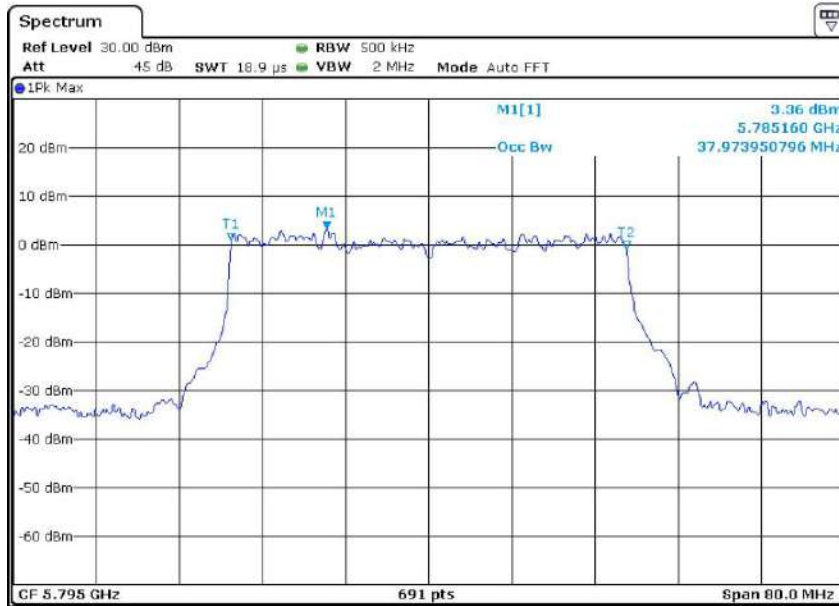
802.11ax40  
 Channel: 151



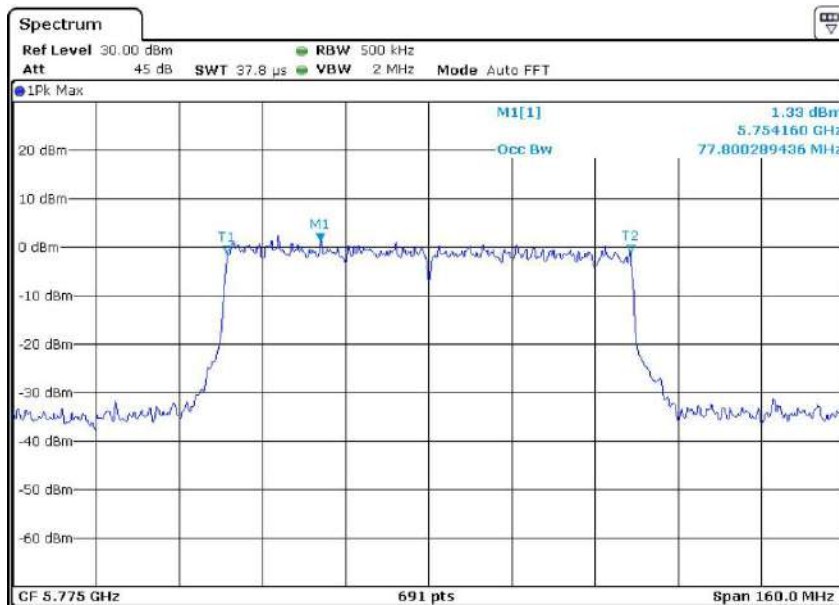


Report No.: AAEMT/EMC/220826-02-09

Channel: 159



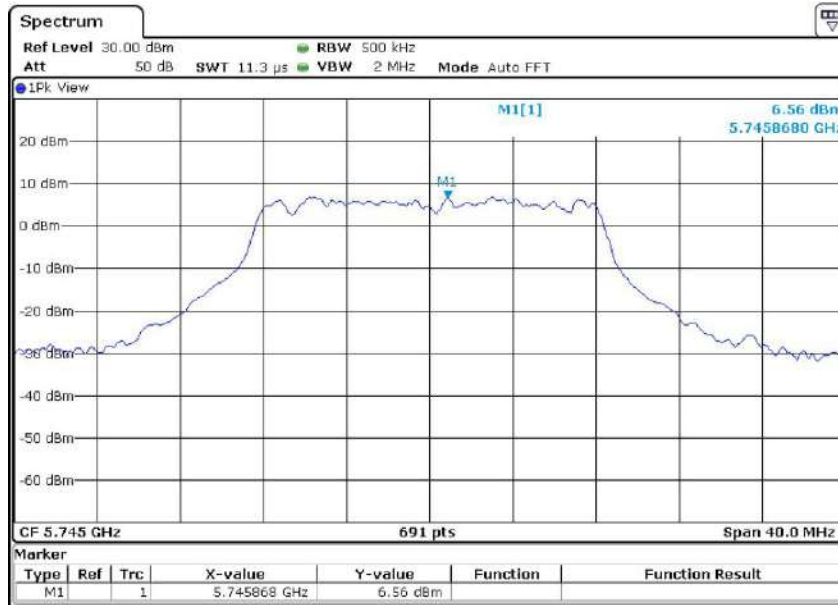
802.11ax80  
 Channel: 155



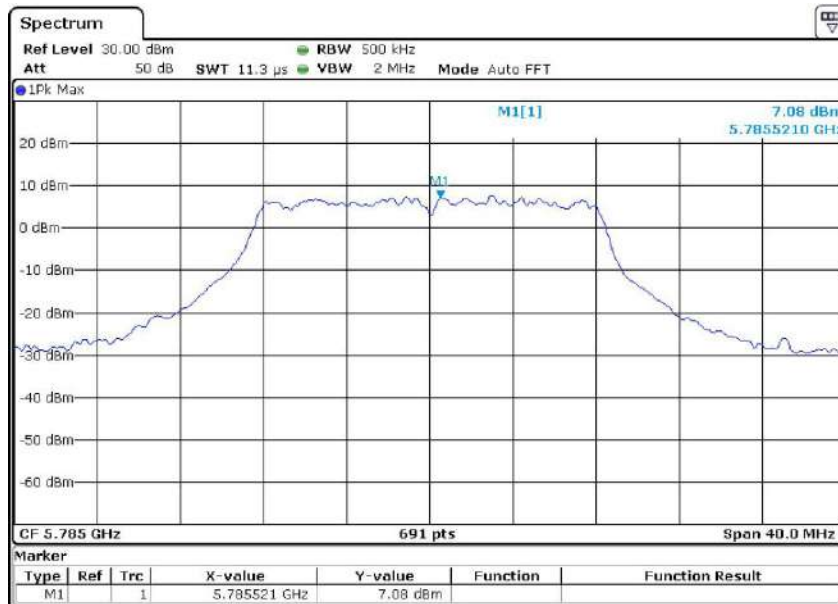
Report No.: AAEMT/EMC/220826-02-09

Test plots as followed: CHAIN 1

**802.11a**  
Channel: 149

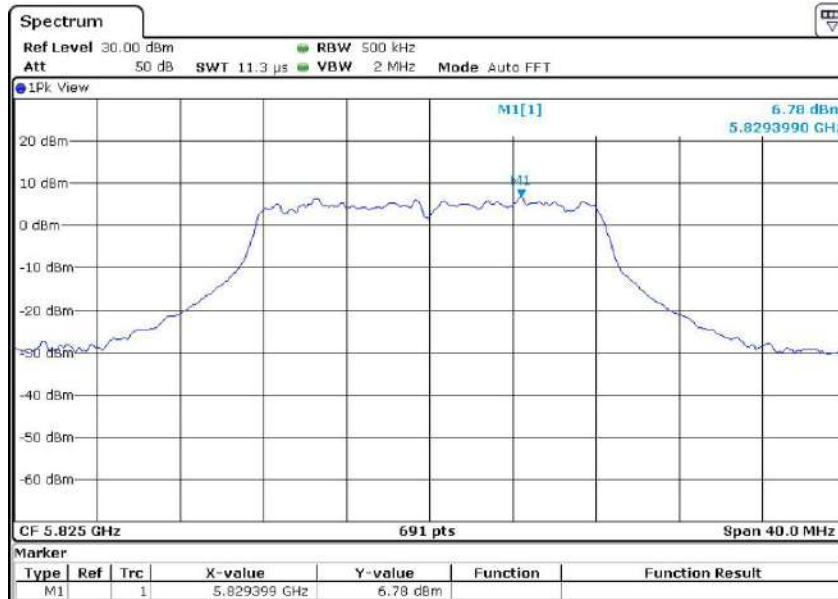


Channel: 157



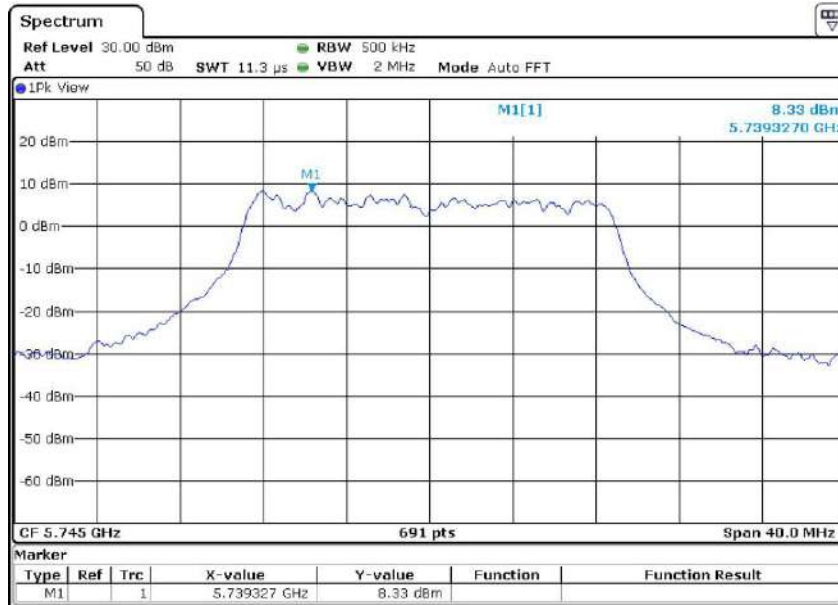
Report No.: AAEMT/EMC/220826-02-09

Channel: 165

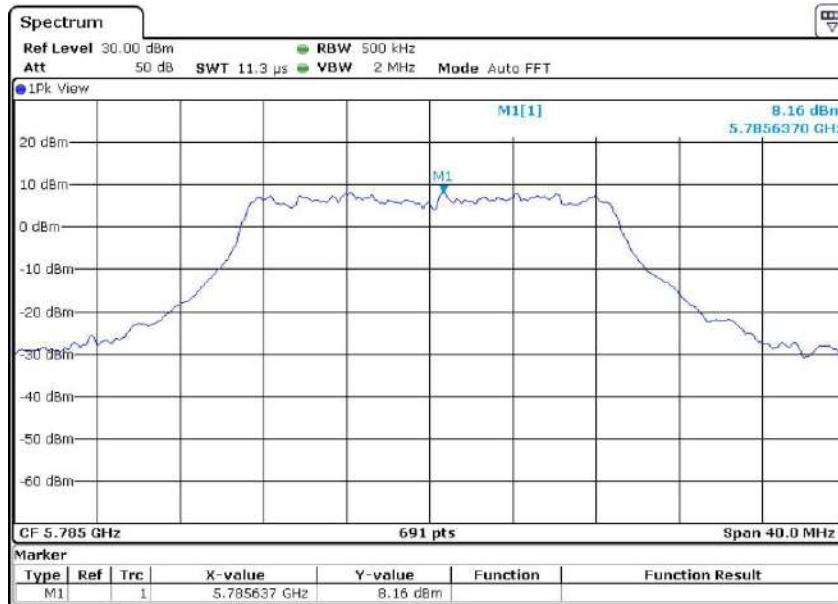


Report No.: AAEMT/EMC/220826-02-09

**802.11n20**  
Channel: 149

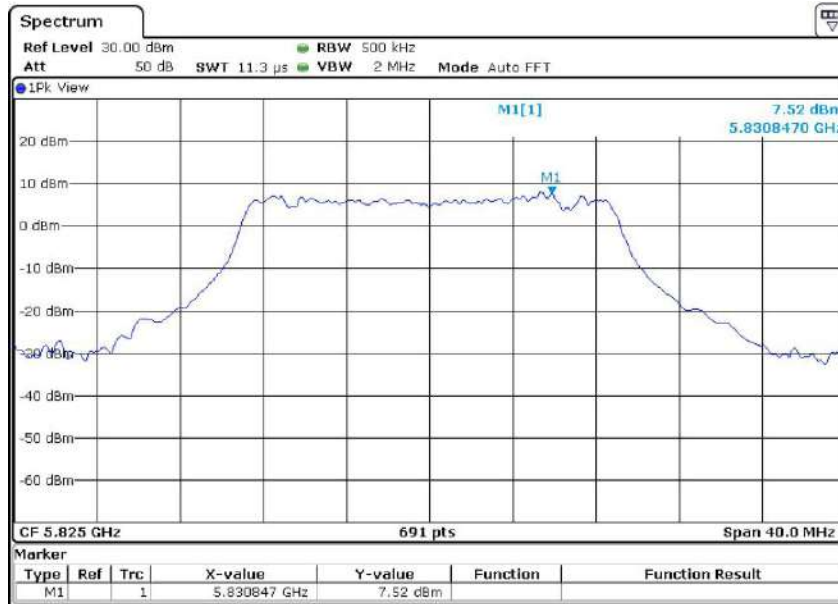


Channel: 157



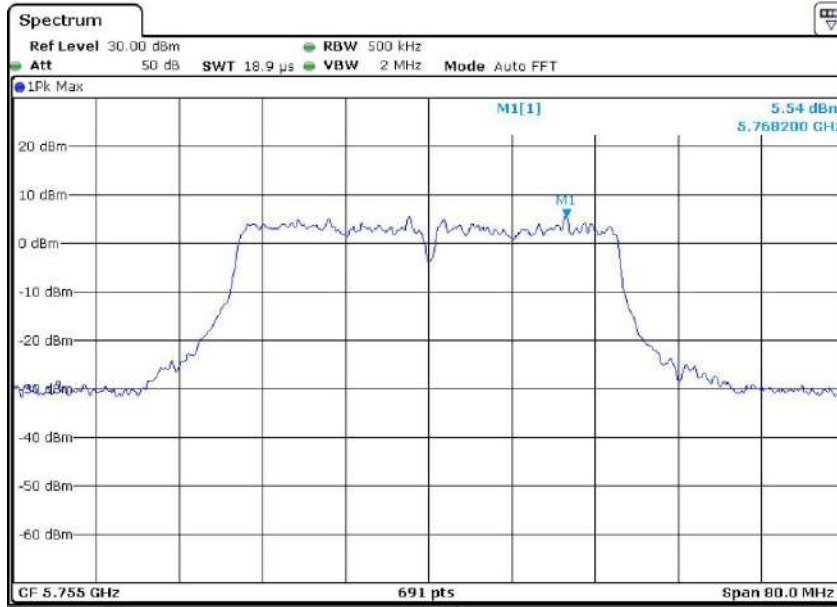
Report No.: AAEMT/EMC/220826-02-09

Channel: 165

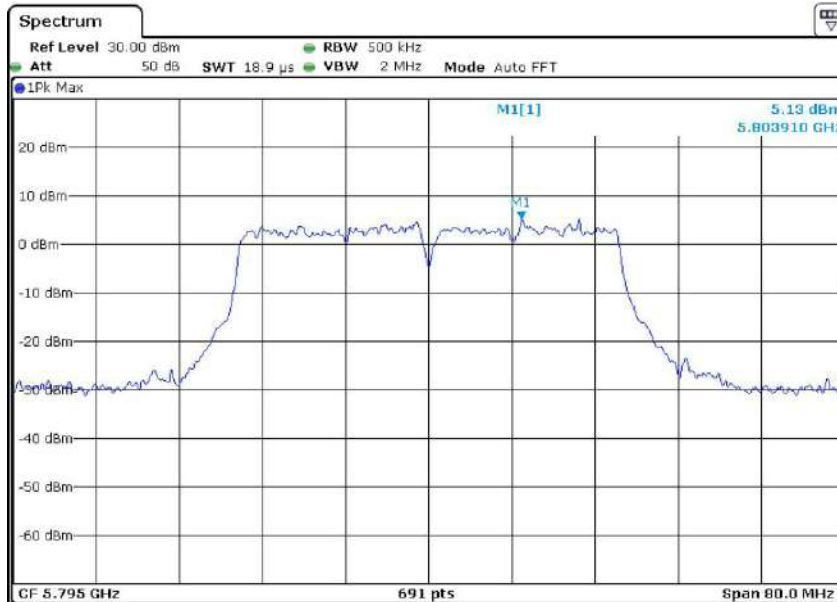


Report No.: AAEMT/EMC/220826-02-09

**802.11n40**  
Channel: 151

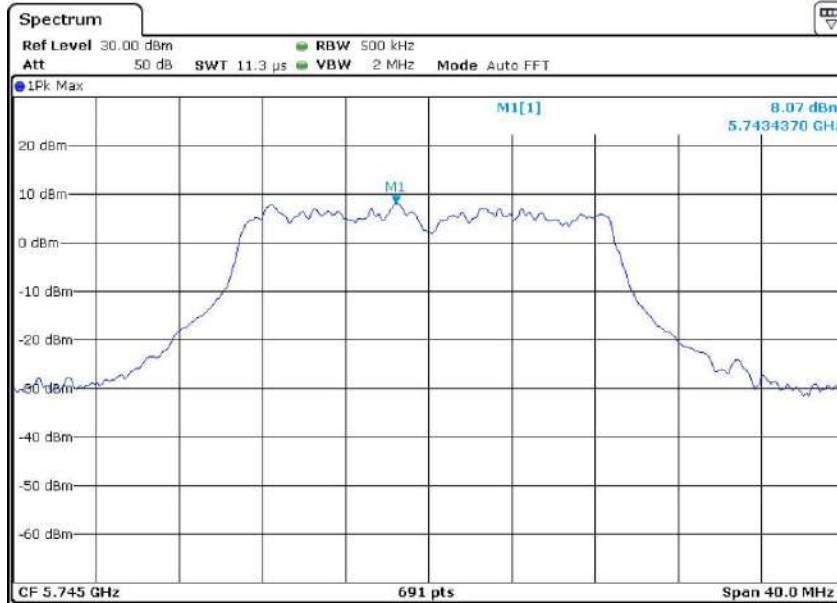


Channel: 159



Report No.: AAEMT/EMC/220826-02-09

802.11ac20  
Channel: 149



Channel: 157



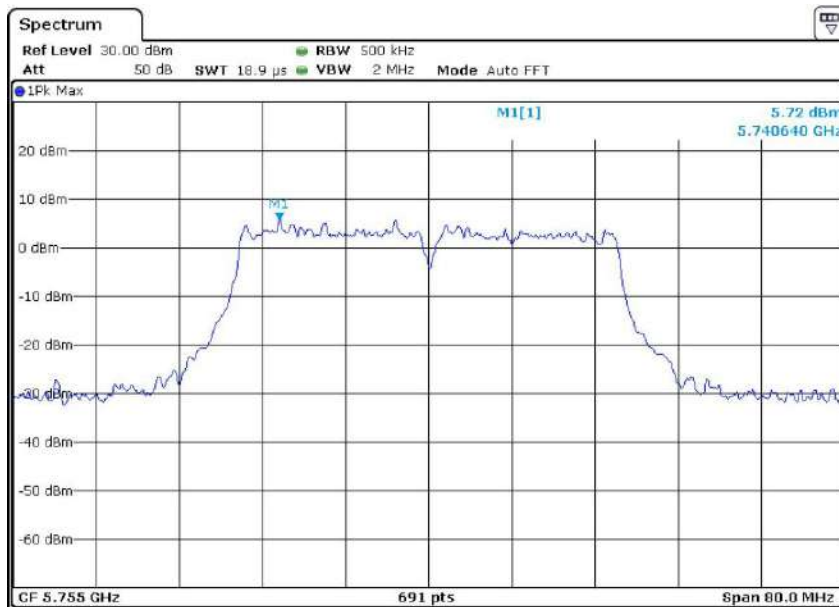


Report No.: AAEMT/EMC/220826-02-09

Channel: 165



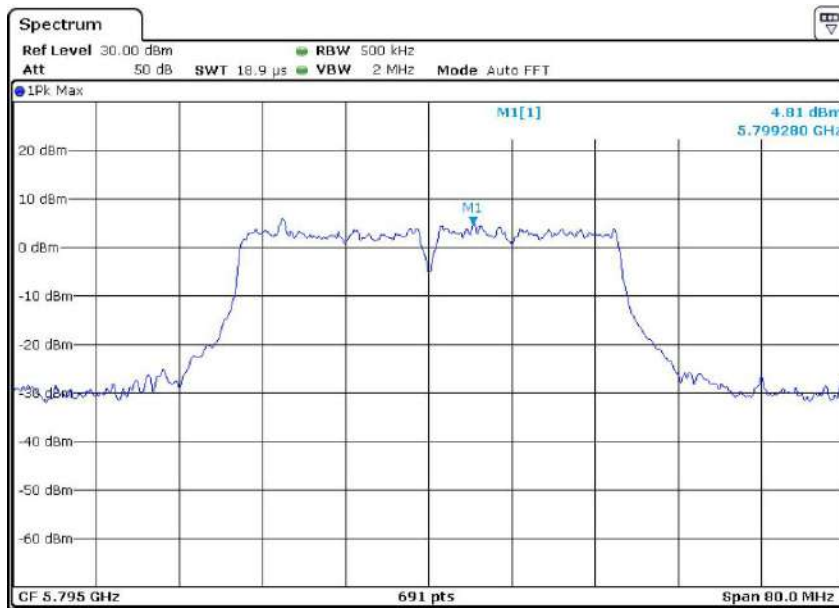
802.11ac40  
Channel: 151





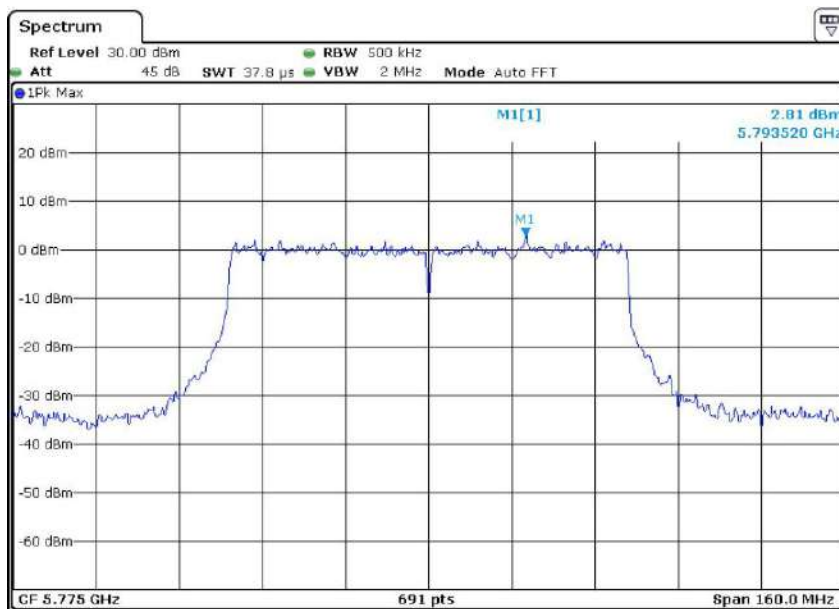
Report No.: AAEMT/EMC/220826-02-09

Channel: 159



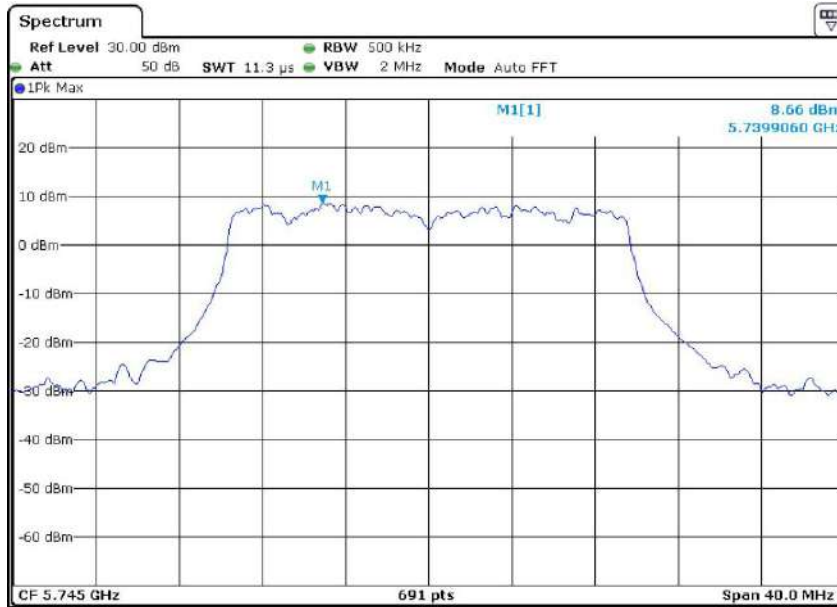
802.11ac80

Channel: 155

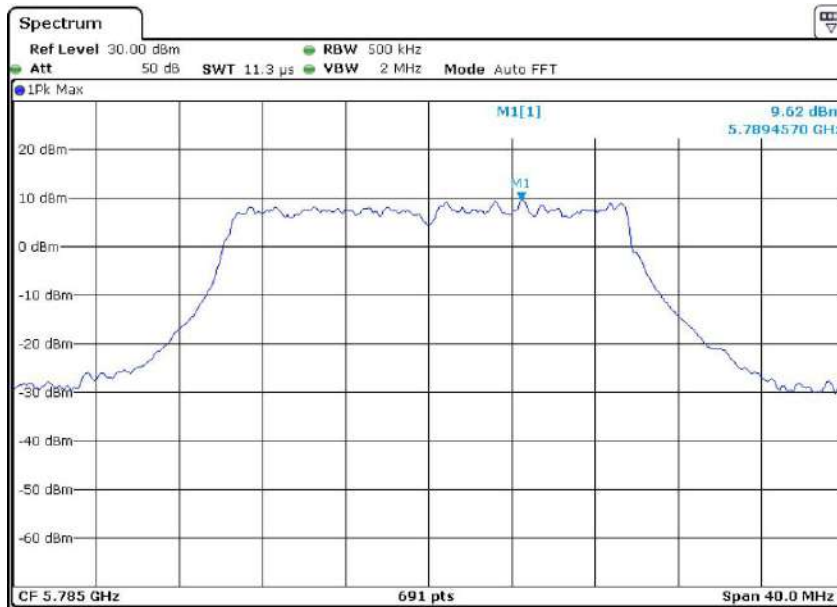


Report No.: AAEMT/EMC/220826-02-09

802.11ax20  
Channel: 149

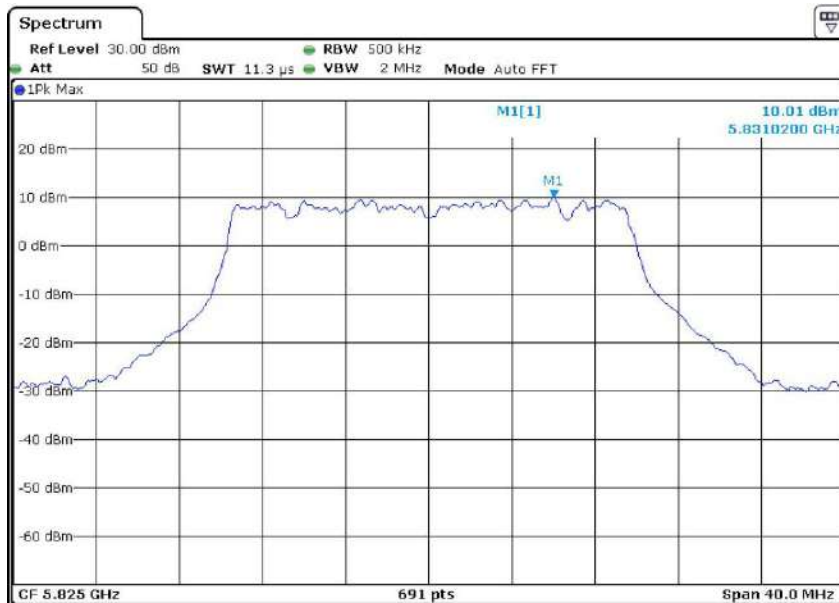


Channel: 157



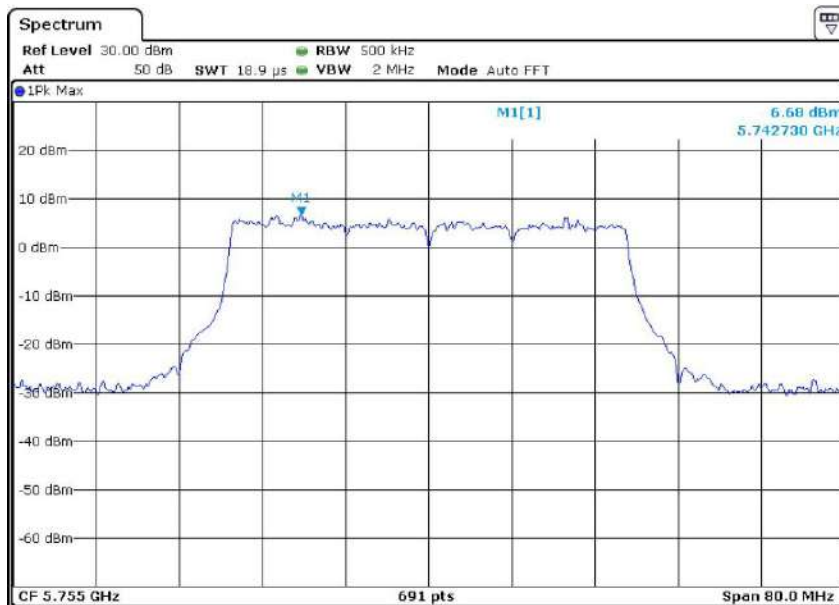
Report No.: AAEMT/EMC/220826-02-09

Channel: 165



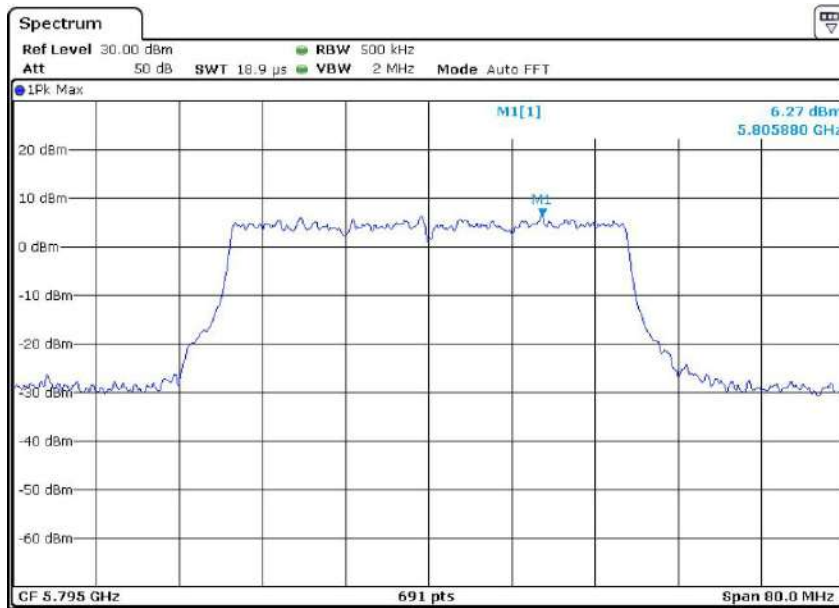
802.11ax40

Channel: 151



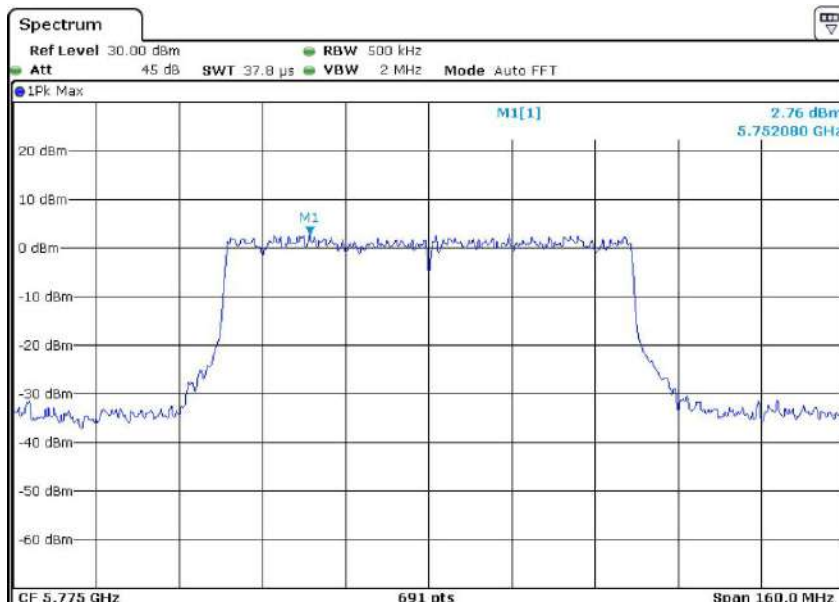
Report No.: AAEMT/EMC/220826-02-09

Channel: 159



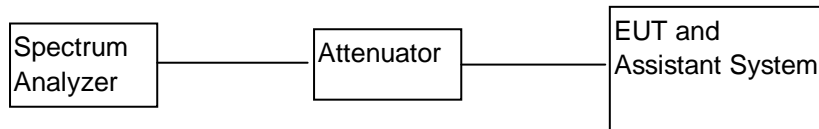
802.11ax80

Channel: 155



## 5. 26 dB & 99% Emission Bandwidth

### 5.1 BLOCK DIAGRAM OF TEST SETUP



### 5.2 APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

### 5.3. TEST PROCEDURE

- 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%.

The following procedure shall be used for measuring (99 %) power bandwidth:

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

frequencies.

**5.4. TEST RESULT: CHAIN 0**

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)				99% Occupied Bandwidth (MHz)			
		802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)
36	5180.00	20.955	22.113	21.766	22.634	16.497	17.829	17.829	19.044
44	5220.00	20.203	21.766	21.766	21.881	16.555	17.829	17.829	19.044
48	5240.00	20.492	21.939	21.302	21.881	16.497	17.771	17.829	19.160
CH. No.	Frequency (MHz)	6dB Occupied Bandwidth (MHz)				99% Occupied Bandwidth (MHz)			
		802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)
149	5745.00	16.498	17.829	17.829	19.103	16.555	17.771	17.829	19.102
157	5785.00	16.498	17.713	17.829	19.103	16.555	17.829	17.771	19.102
165	5825.00	16.498	17.771	17.771	19.161	16.497	17.829	17.771	19.044

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)
38	5190.00	41.72	43.18	43.07	36.584	36.584	37.973
46	5230.00	42.6	43.88	43.07	36.700	36.468	37.973
CH. No.	Frequency (MHz)	6dB Occupied Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)
151	5755.00	36.58	36.58	38.21	36.353	36.468	38.089
159	5795.00	36.58	36.58	38.44	36.584	36.584	38.089

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
		802.11ac (VHT80)	802.11ax (HE80)	802.11ac (VHT80)	802.11ax (HE80)
42	5210.00	91.69	84.75	76.179	77.337
CH. No.	Frequency (MHz)	6dB Occupied Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
		802.11ac (VHT80)	802.11ax (HE80)	802.11ac (VHT80)	802.11ax (HE80)
155	5775.00	74.33	77.57	76.410	77.800

**TEST RESULT: CHAIN 1**

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)				99% Occupied Bandwidth (MHz)			
		802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)
36	5180.00	20.087	22.229	21.65	22.171	16.555	17.829	17.829	19.044
44	5220.00	20.26	22.518	21.592	21.65	16.555	17.829	17.829	18.986
48	5240.00	20.434	22.171	21.881	22.287	16.497	17.771	17.771	19.044
CH. No.	Frequency (MHz)	6dB Occupied Bandwidth (MHz)				99% Occupied Bandwidth (MHz)			
		802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)
149	5745.00	16.498	17.829	17.829	19.161	16.613	17.771	17.771	19.044
157	5785.00	16.498	17.771	17.771	19.161	16.553	17.829	17.829	19.160
165	5825.00	16.498	17.829	17.829	19.161	16.497	17.829	17.887	19.102

CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)
38	5190.00	44.92	44.69	43.76	36.816	36.700	37.973
46	5230.00	43.42	43.53	44.11	36.816	36.468	37.973
CH. No.	Frequency (MHz)	6dB Occupied Bandwidth (MHz)			99% Occupied Bandwidth (MHz)		
		802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)
151	5755.00	36.58	36.585	38.09	36.468	36.468	37.973
159	5795.00	36.58	22.0	38.32	36.584	36.584	38.205

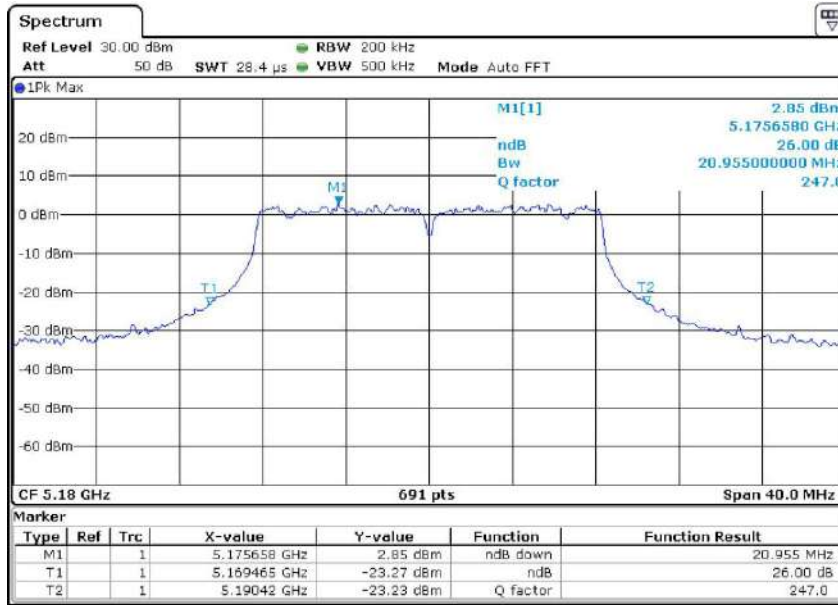
CH. No.	Frequency (MHz)	26dB Occupied Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
		802.11ac (VHT80)	802.11ax (HE80)	802.11ac (VHT80)	802.11ax (HE80)
42	5210.00	84.98	86.37	75.947	77.337
CH. No.	Frequency (MHz)	6dB Occupied Bandwidth (MHz)		99% Occupied Bandwidth (MHz)	
		802.11ac (VHT80)	802.11ax (HE80)	802.11ac (VHT80)	802.11ax (HE80)
155	5775.00	76.41	77.57	76.179	77.105



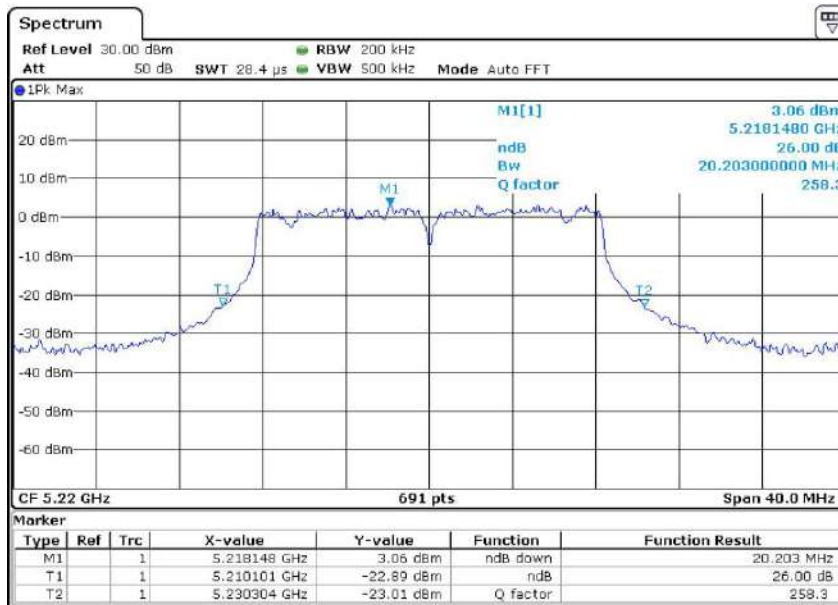
Report No.: AAEMT/EMC/220826-02-09

Test plots as followed: CHAIN 0

26dB BW 802.11a  
Channel: 36



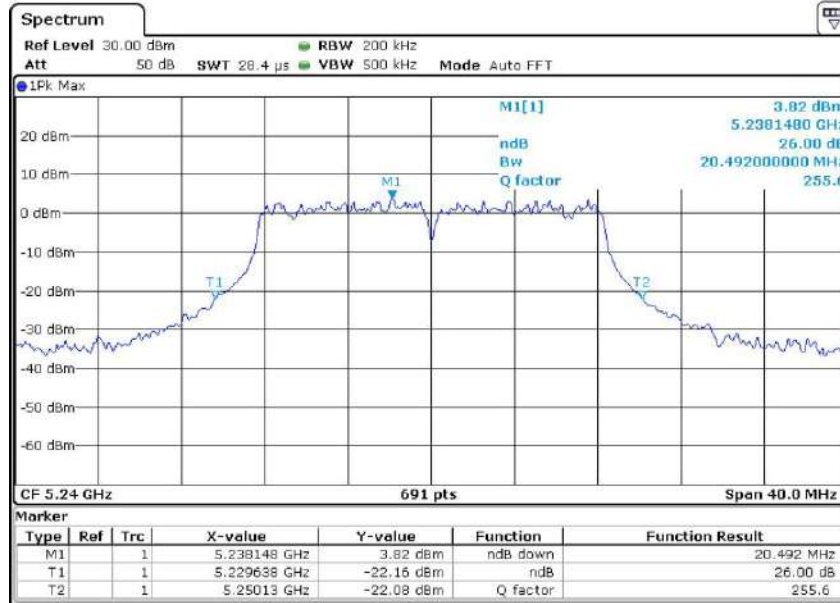
Channel: 44





Report No.: AAEMT/EMC/220826-02-09

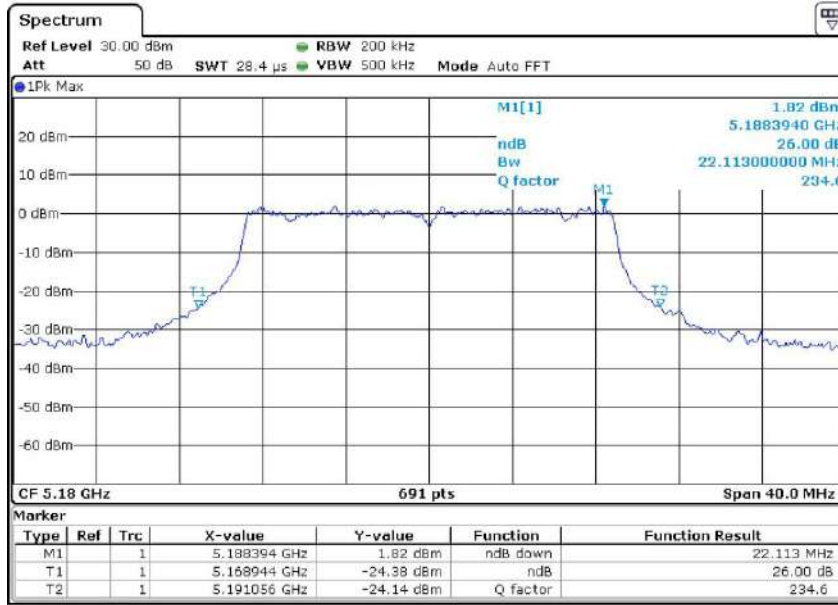
Channel: 48



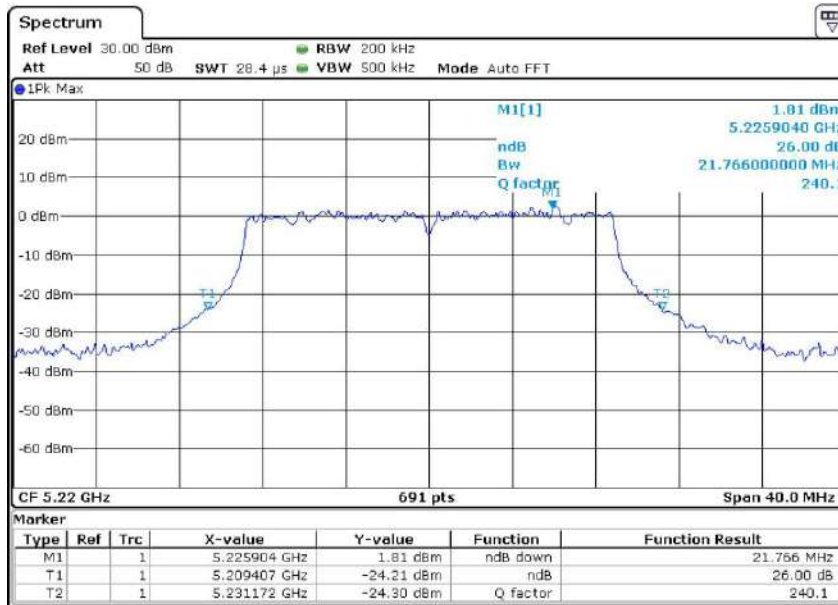
Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11n20**

Channel: 36

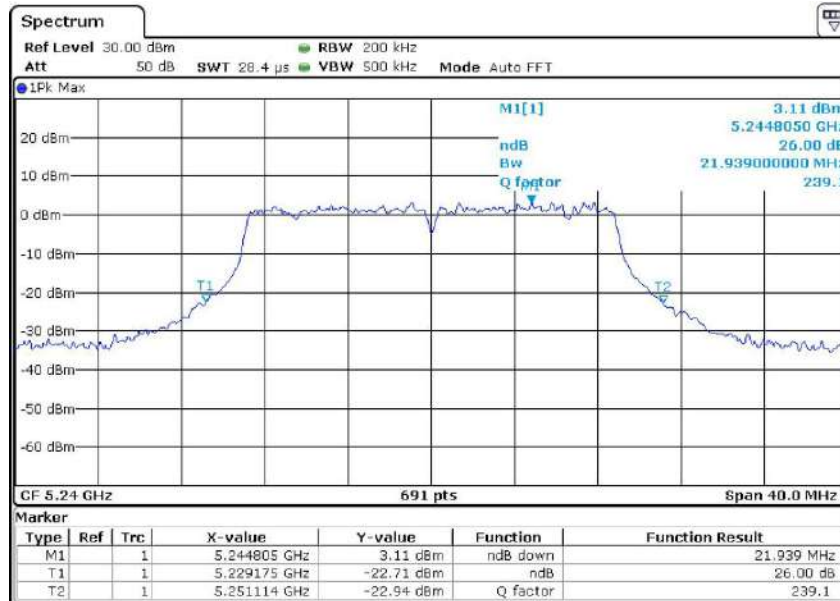


Channel: 44



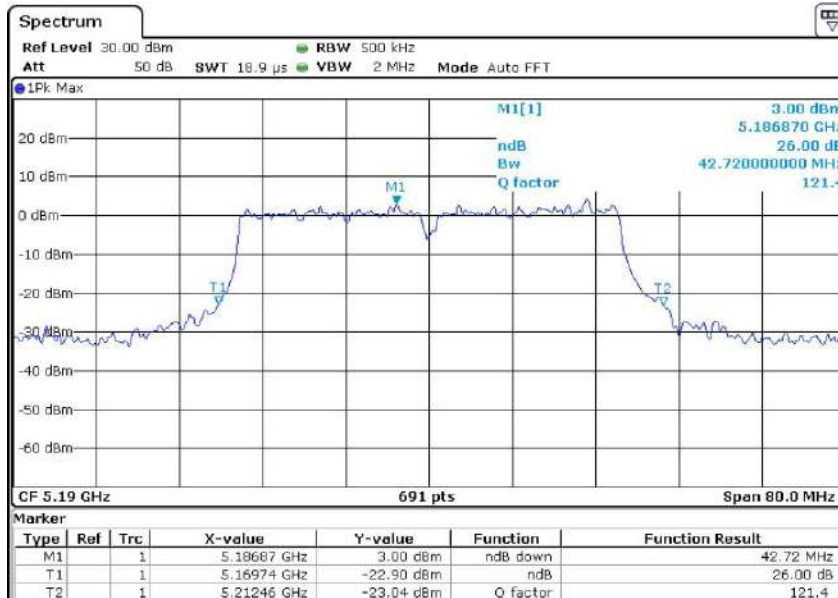
Report No.: AAEMT/EMC/220826-02-09

Channel: 48

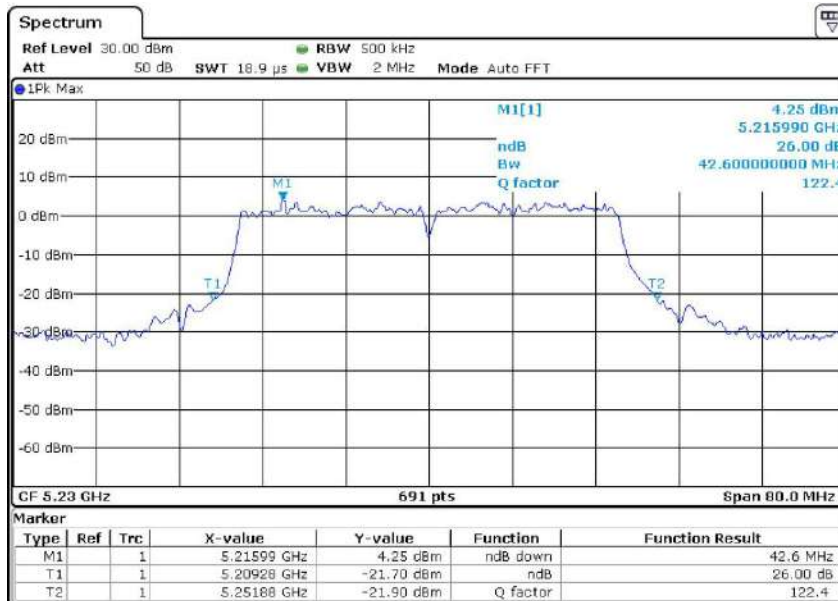


Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11n40**  
Channel: 38



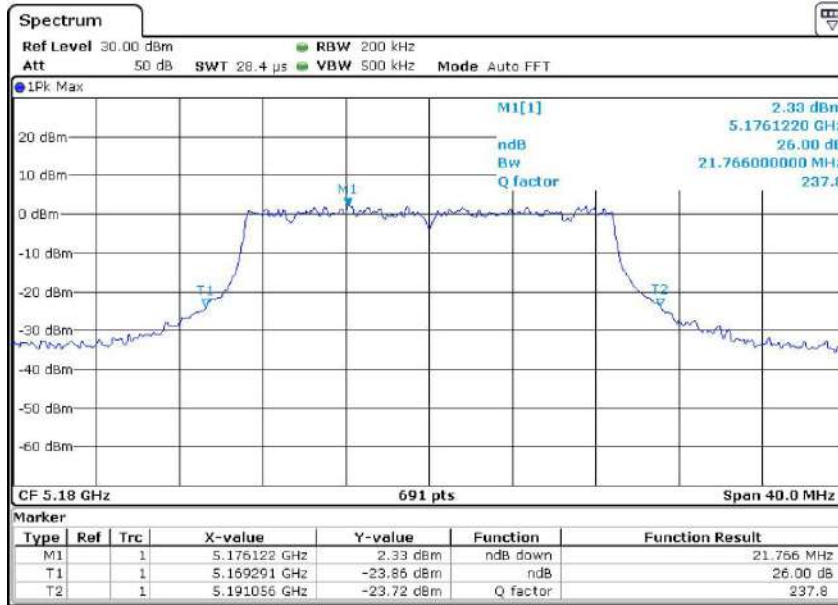
Channel: 46



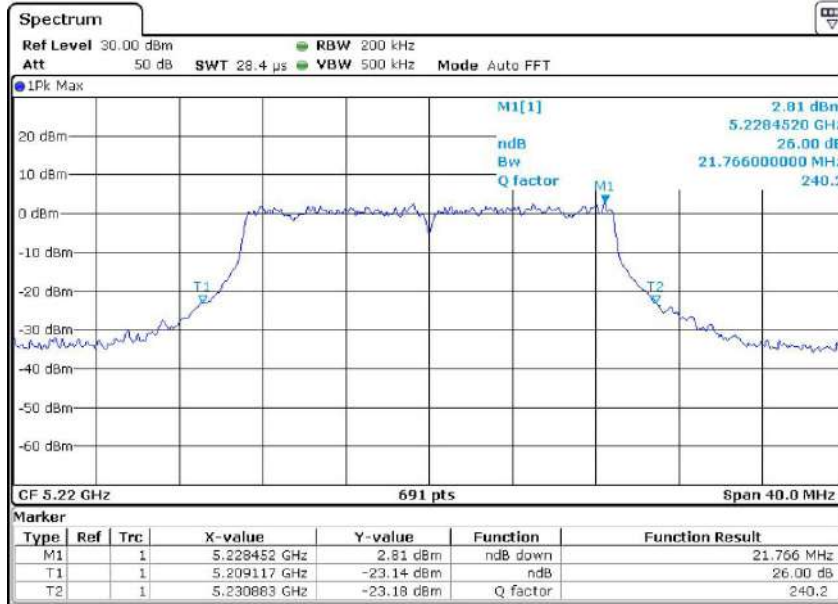
Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11ac20

Channel: 36

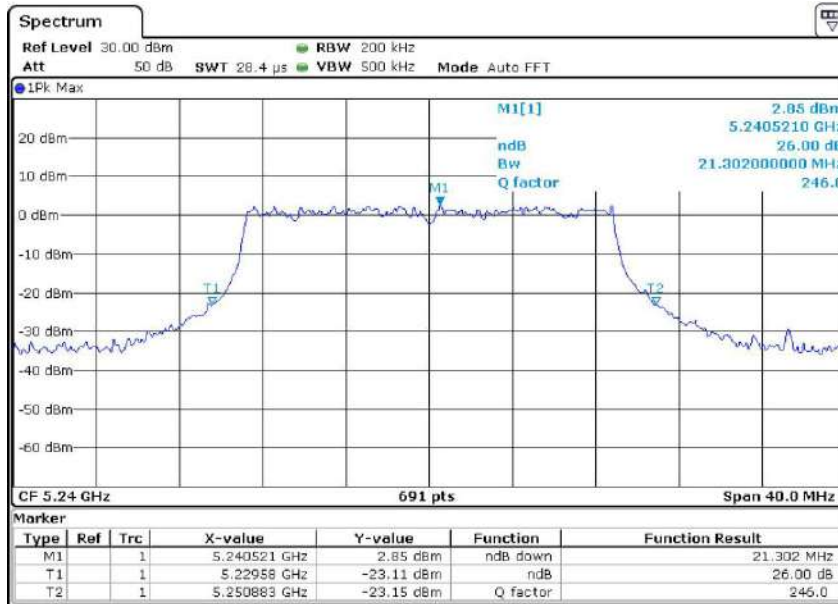


Channel: 44



Report No.: AAEMT/EMC/220826-02-09

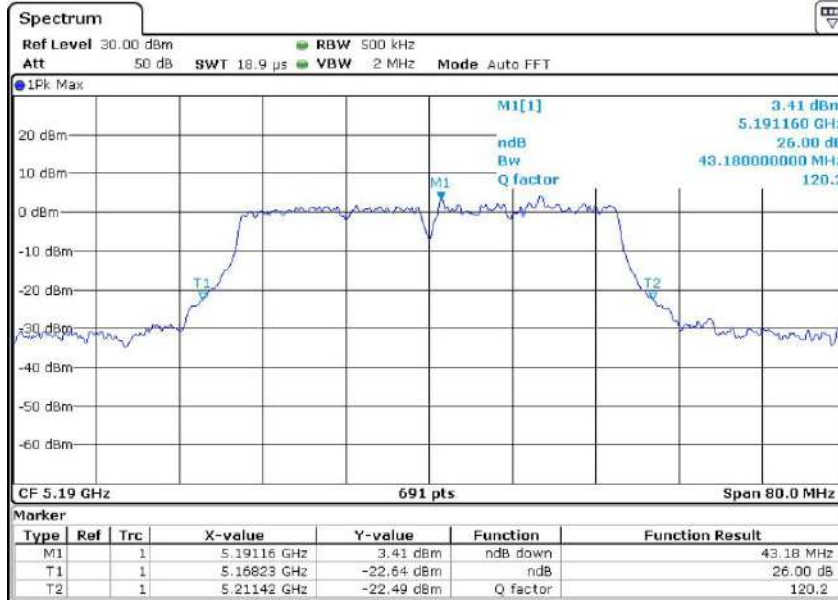
Channel: 48



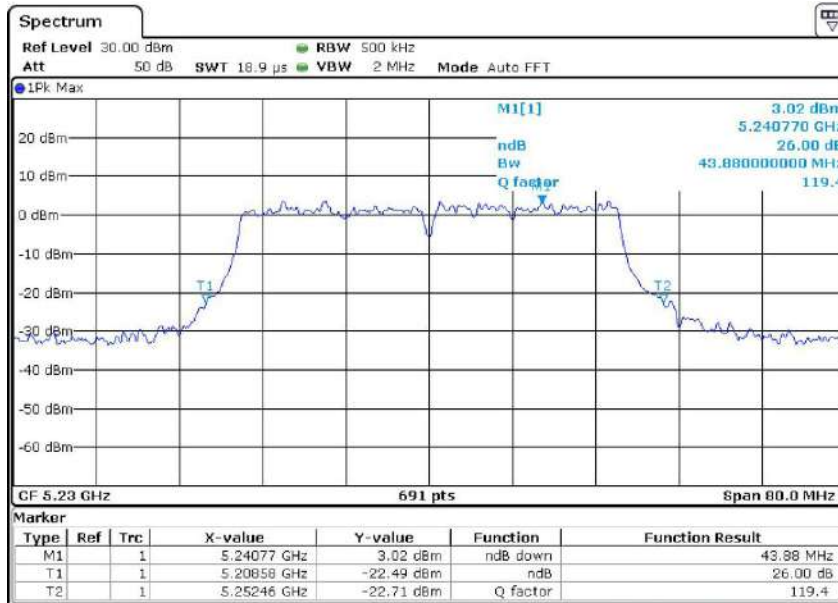


Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11ac40**  
Channel: 38



Channel: 46

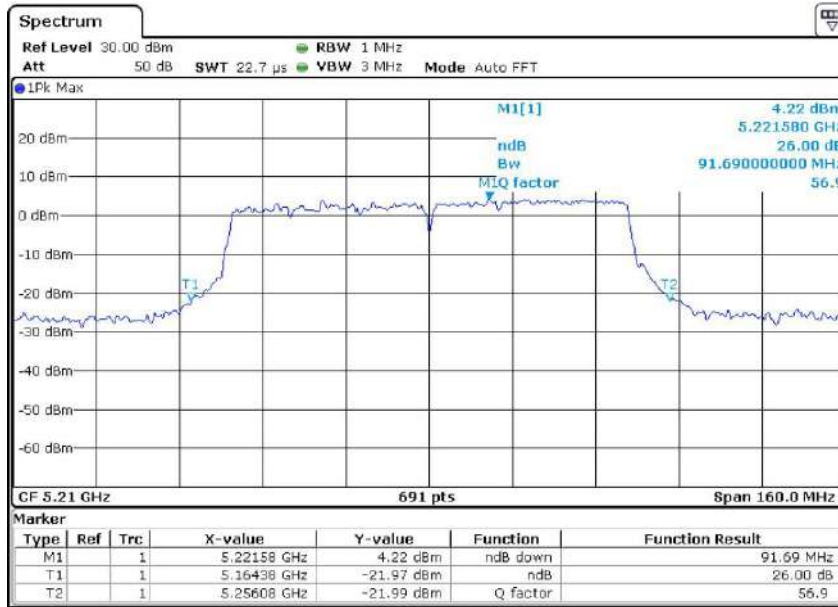




Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11ac80

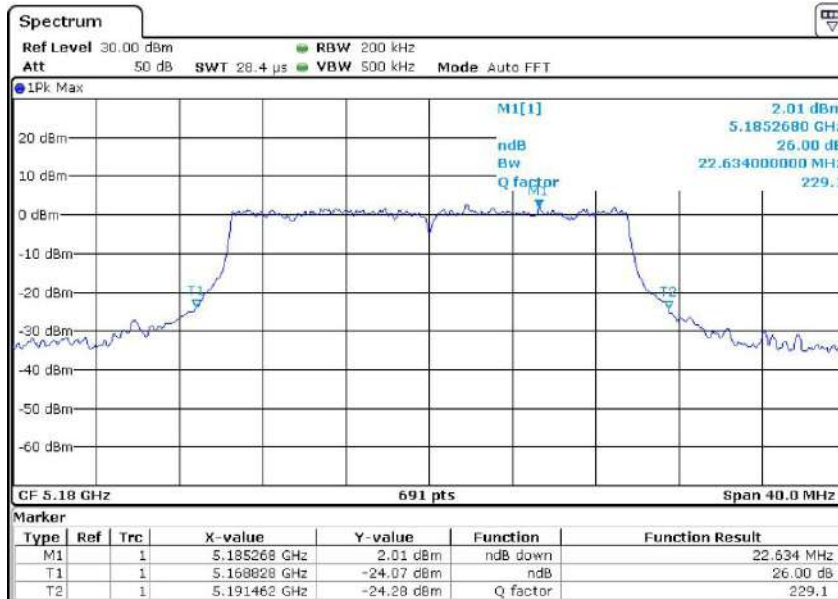
Channel: 42



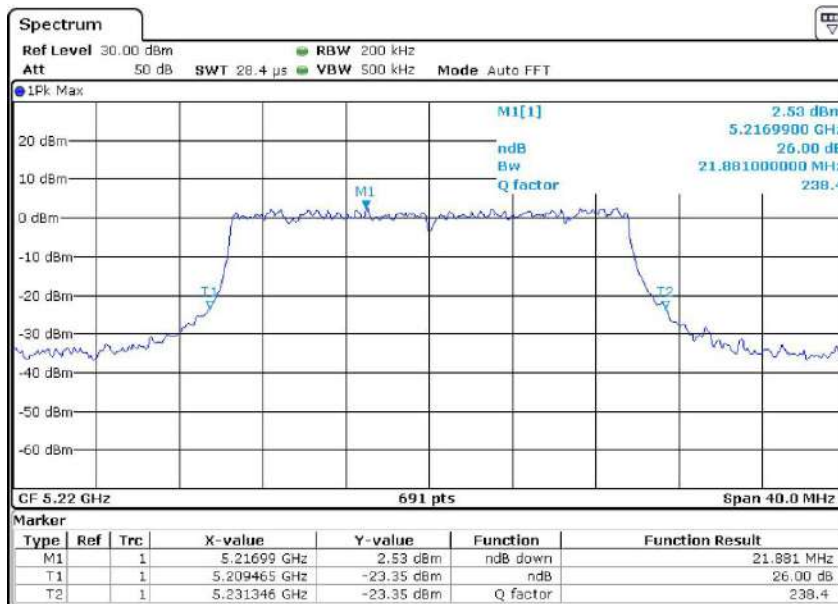
Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11ax20

Channel: 36

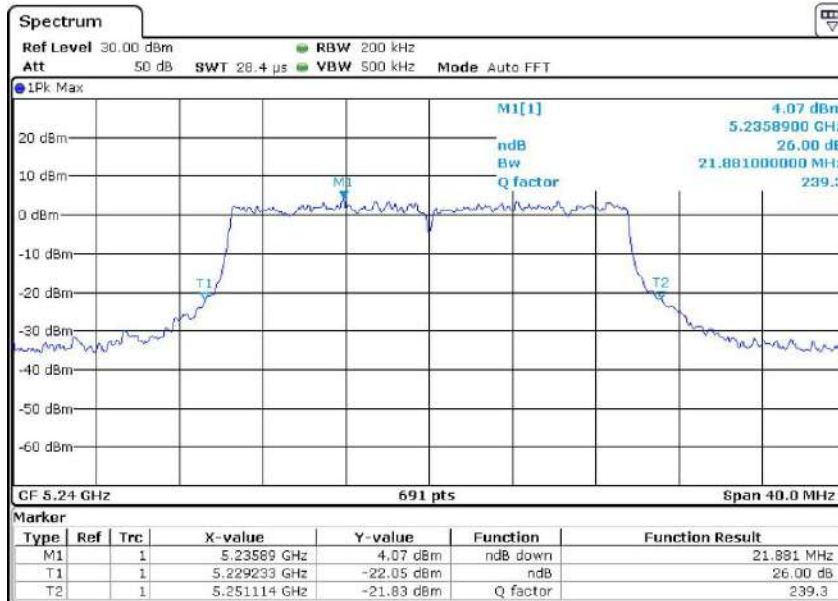


Channel: 44



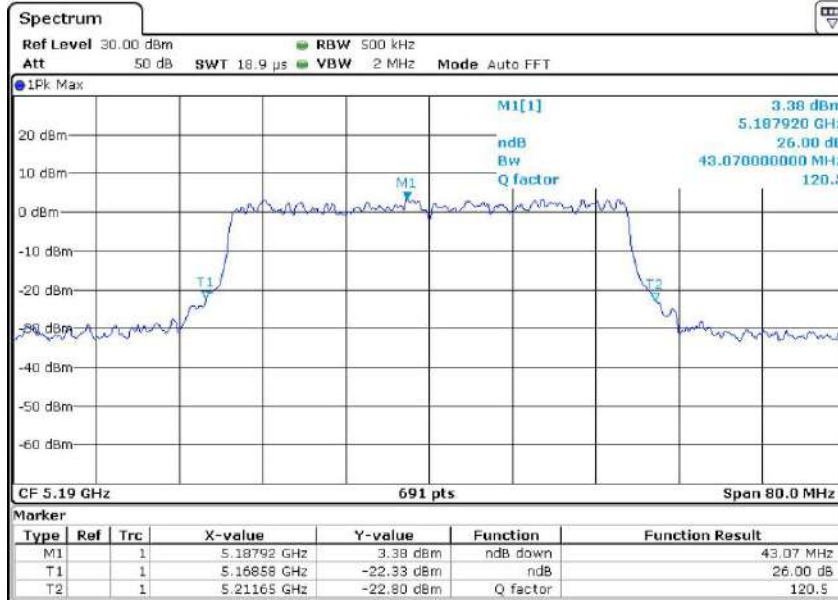
Report No.: AAEMT/EMC/220826-02-09

Channel: 48

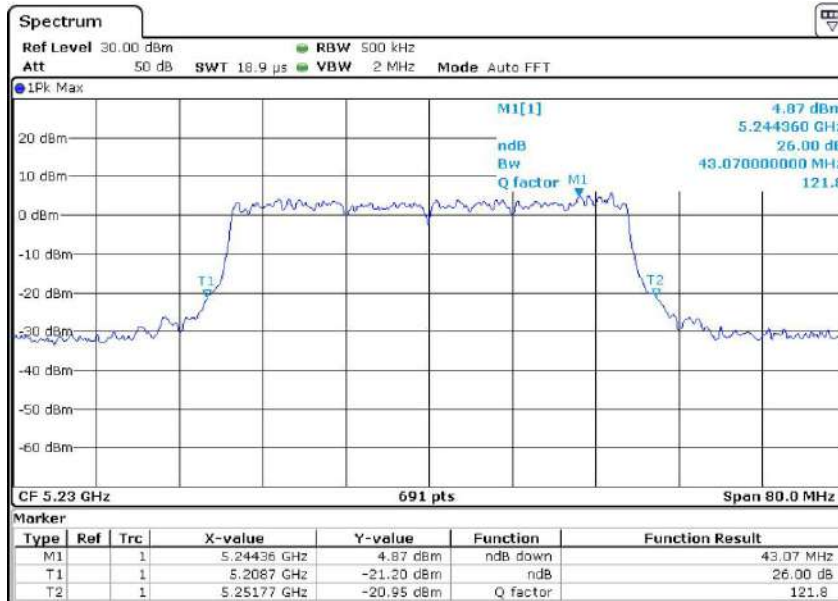


Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11ax40**  
Channel: 38



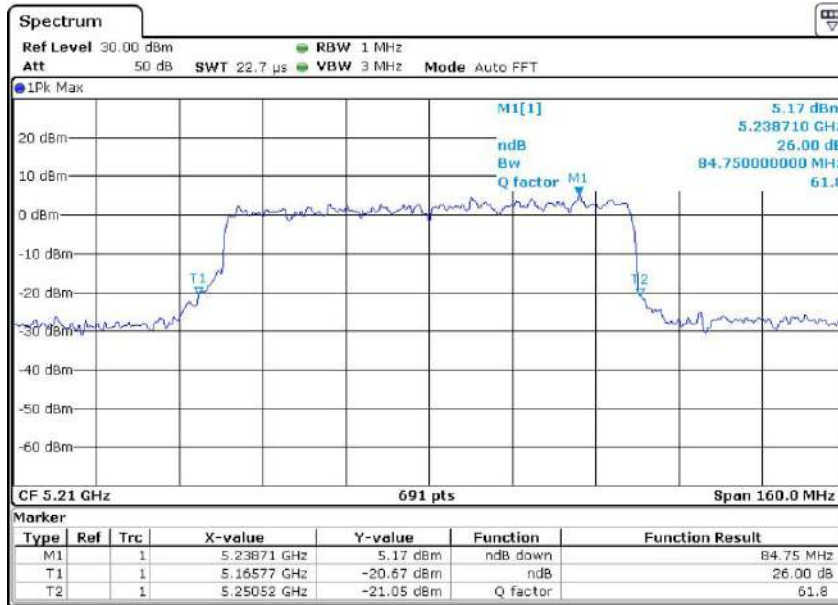
Channel: 46



Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11ax80

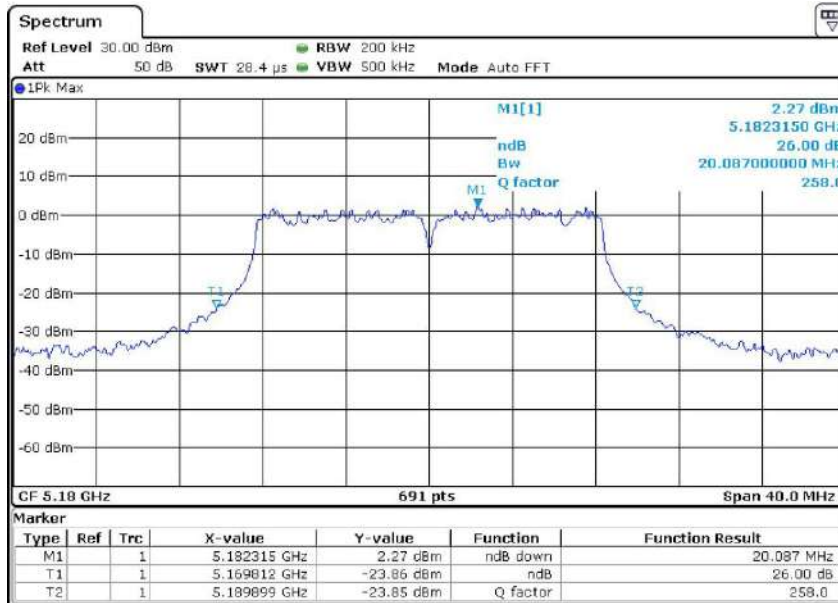
Channel: 42



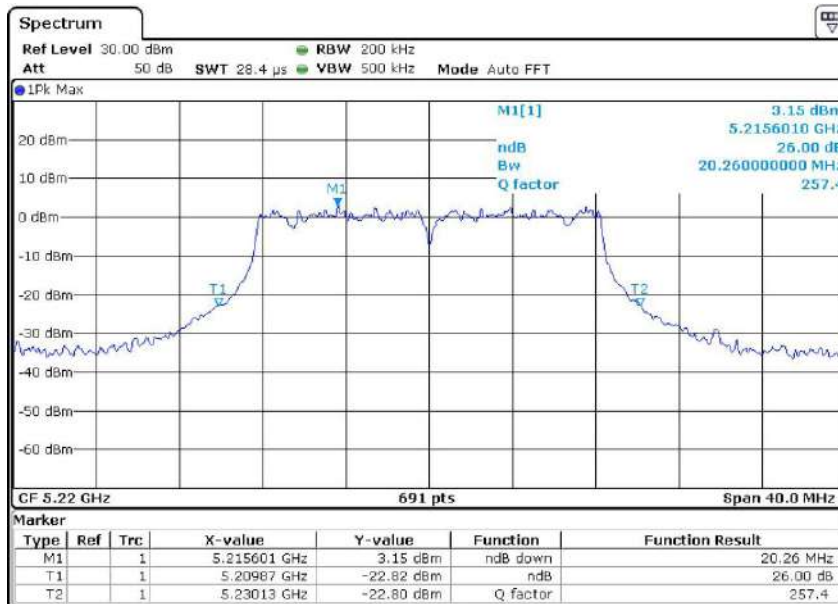
Report No.: AAEMT/EMC/220826-02-09

Test plots as followed: CHAIN 1

26dB BW 802.11a  
Channel: 36

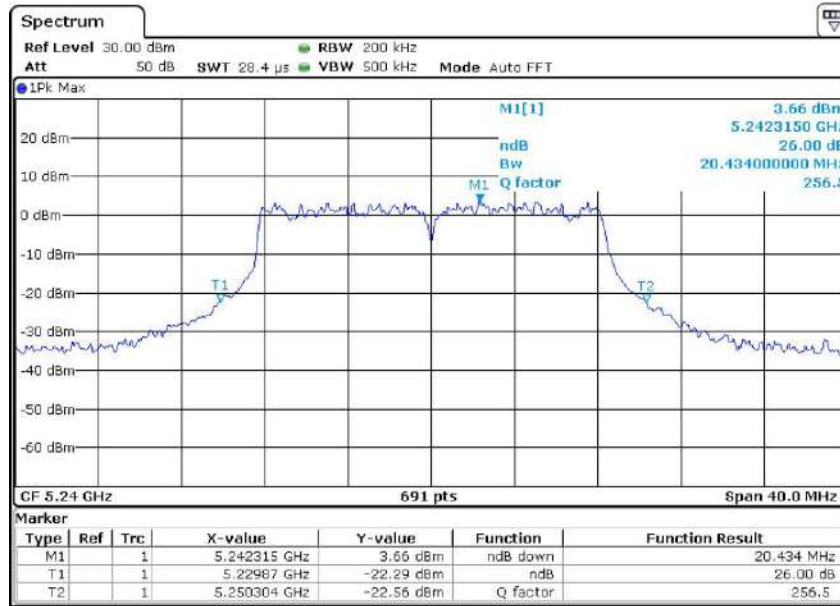


Channel: 44



Report No.: AAEMT/EMC/220826-02-09

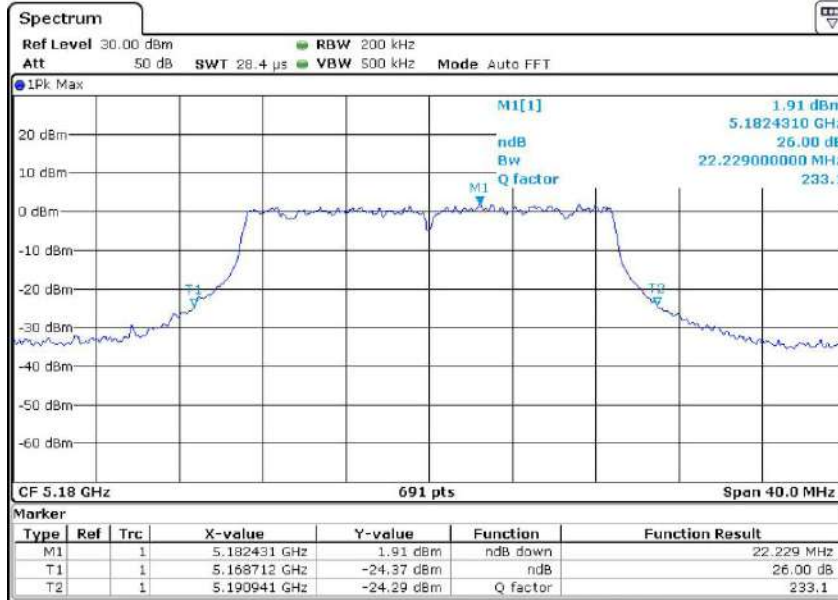
Channel: 48



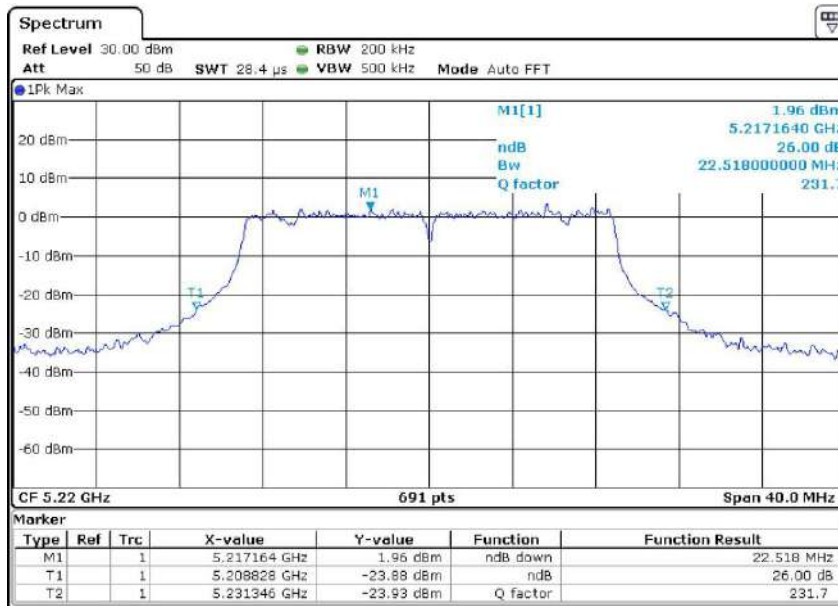


Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11n20  
Channel: 36

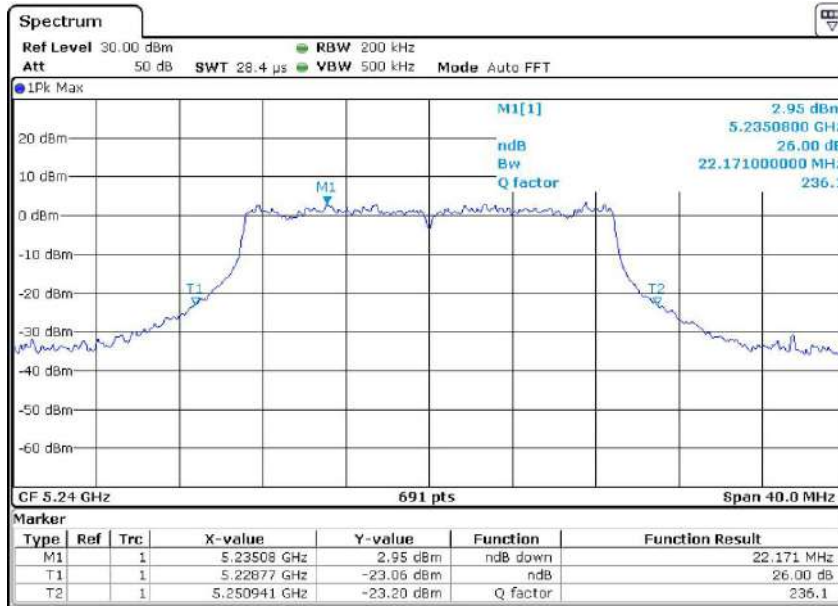


Channel: 44



Report No.: AAEMT/EMC/220826-02-09

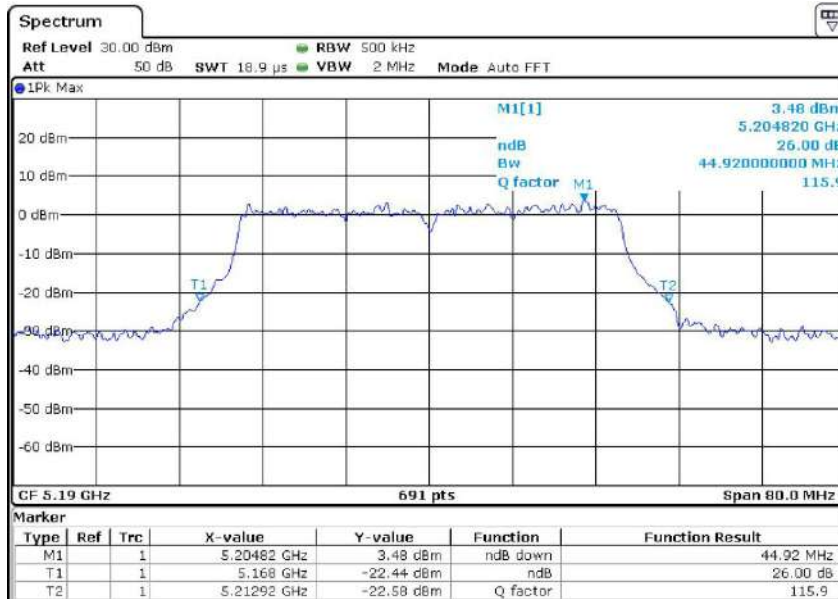
Channel: 48



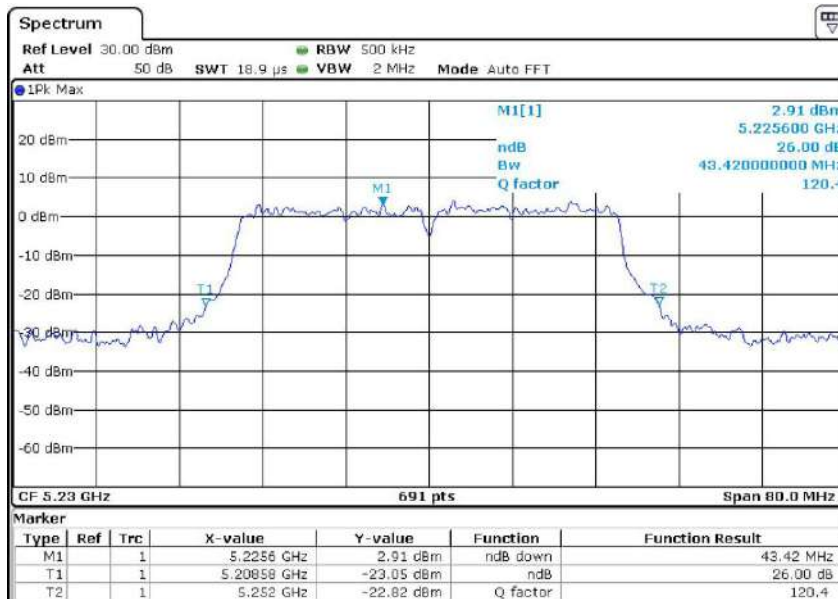
Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11n40

Channel: 38



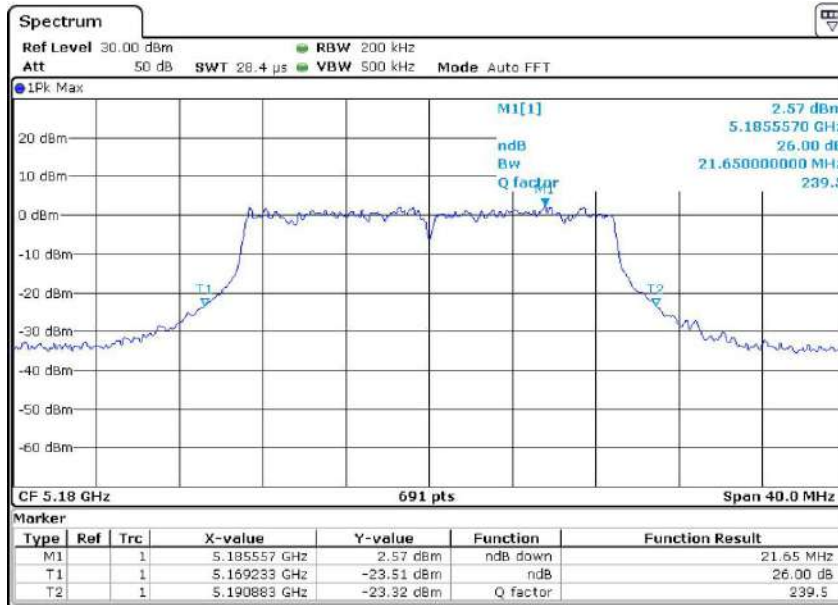
Channel: 46



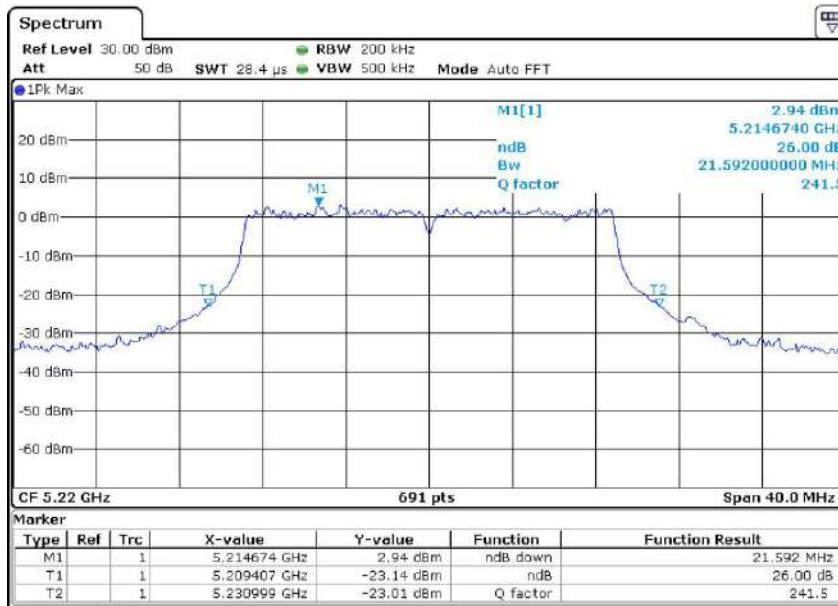
Report No.: AAEMT/EMC/220826-02-09

26dB BW 802.11ac20

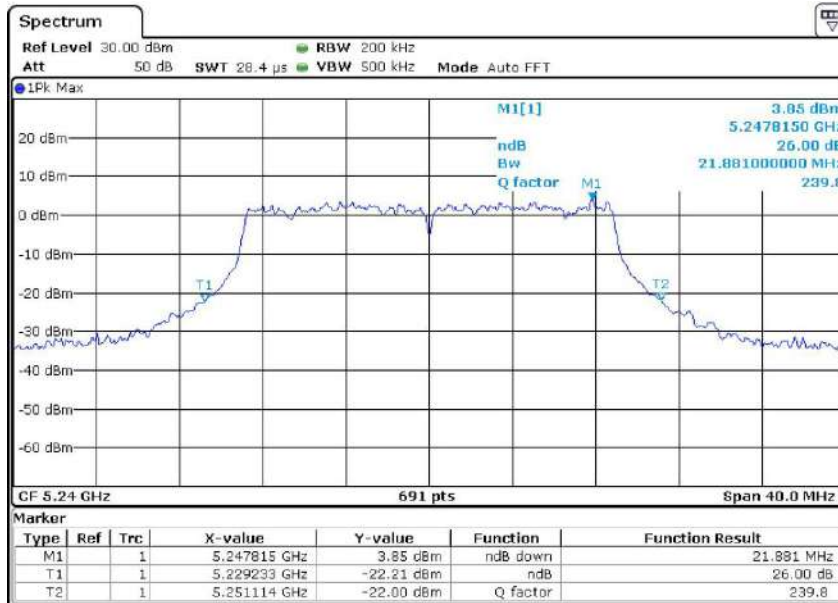
Channel: 36



Channel: 44



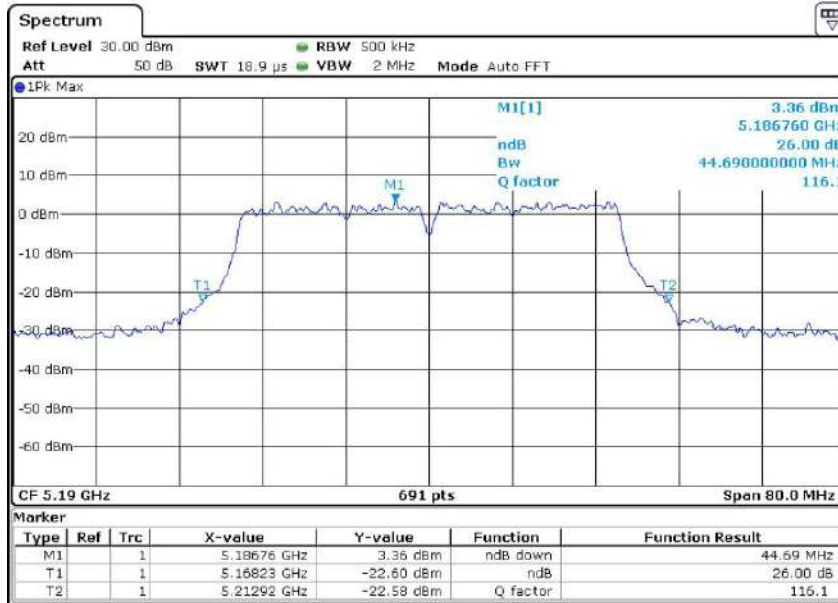
Channel: 48



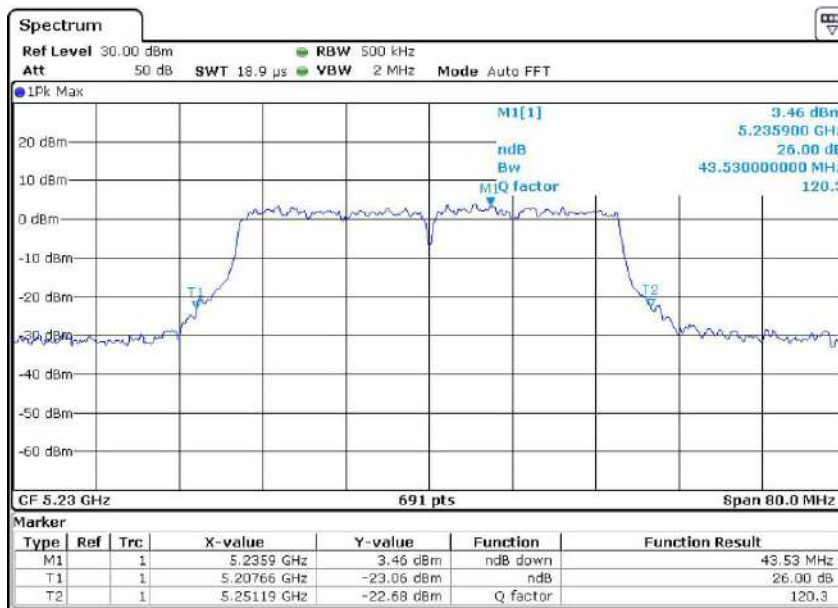
Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11ac40**

Channel: 38



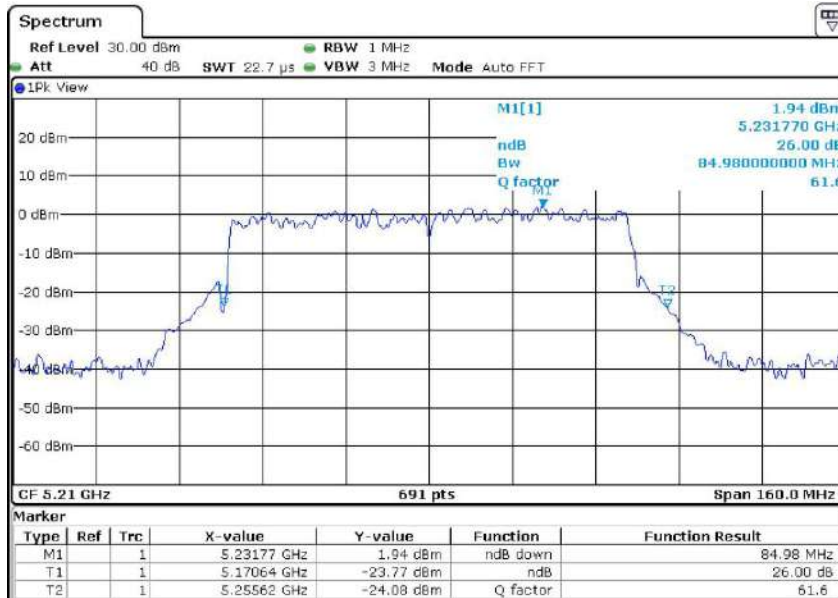
Channel: 46





Report No.: AAEMT/EMC/220826-02-09

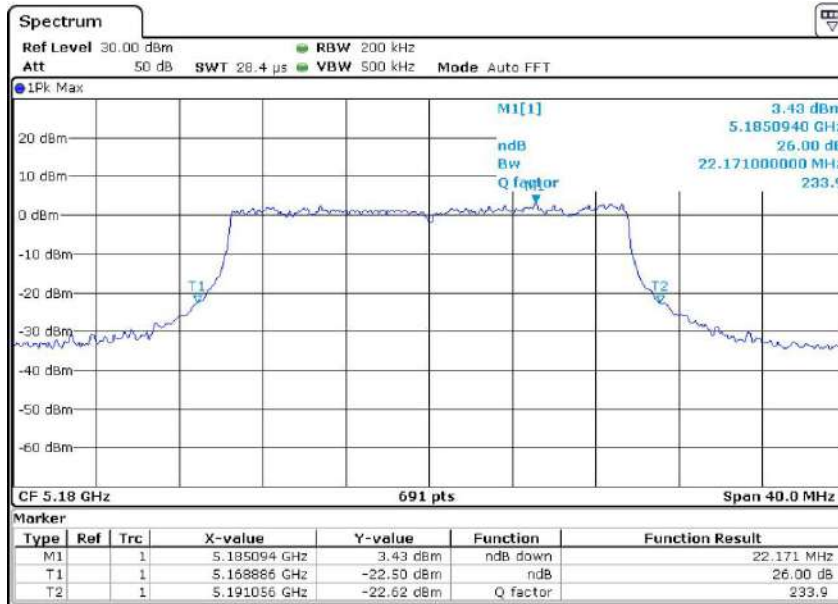
**26dB BW 802.11ac80**  
Channel: 42



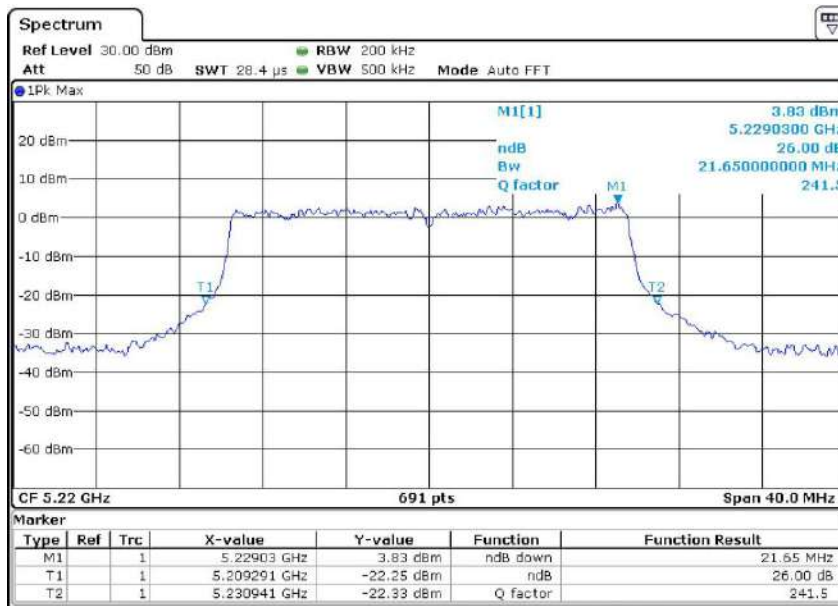


Report No.: AAEMT/EMC/220826-02-09

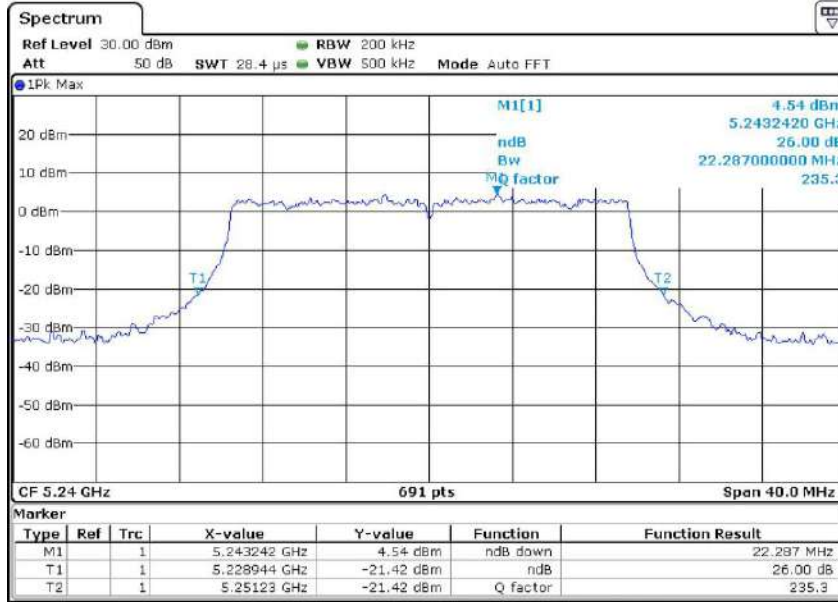
**26dB BW 802.11ax20**  
Channel: 36



Channel: 44



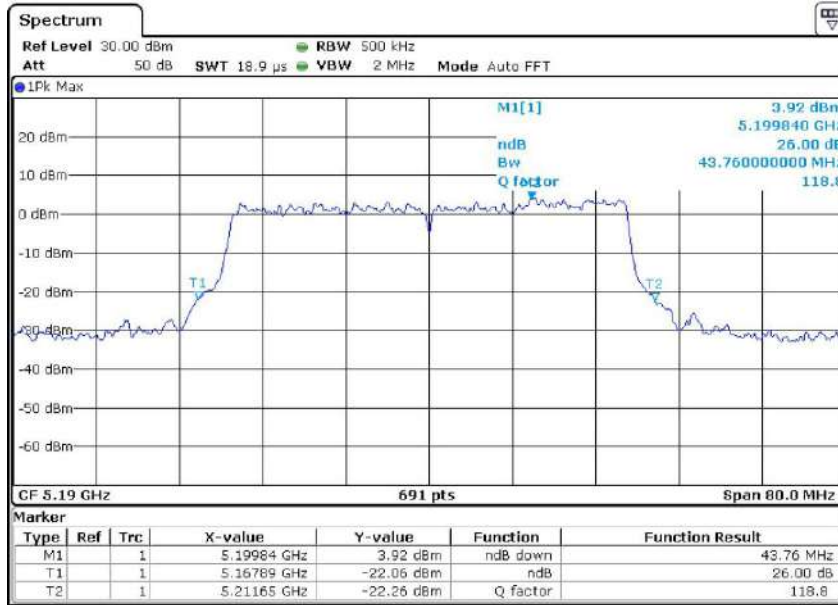
Channel: 48



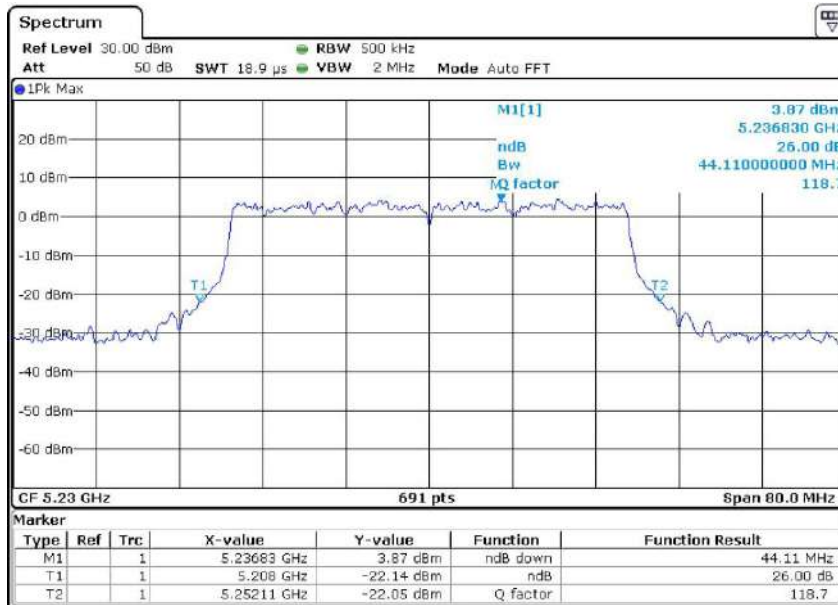
Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11ax40**

Channel: 38

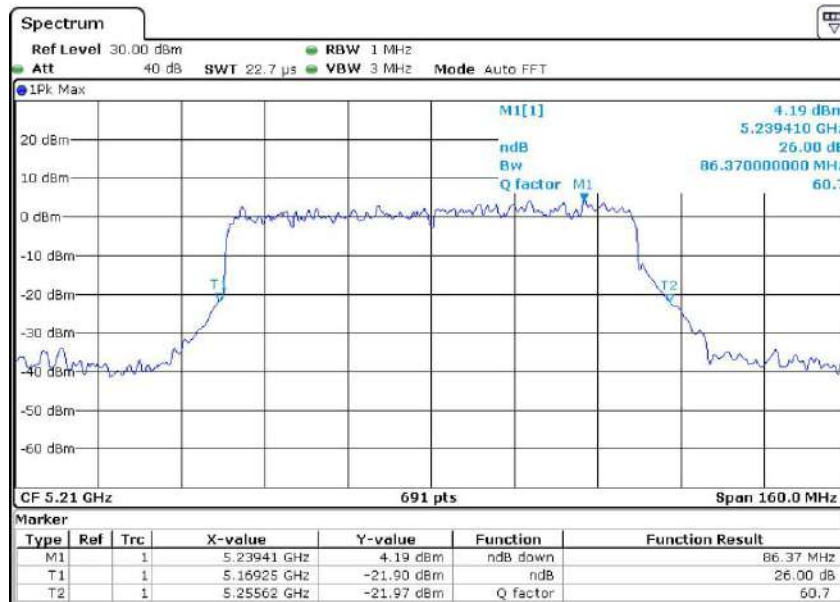


Channel: 46



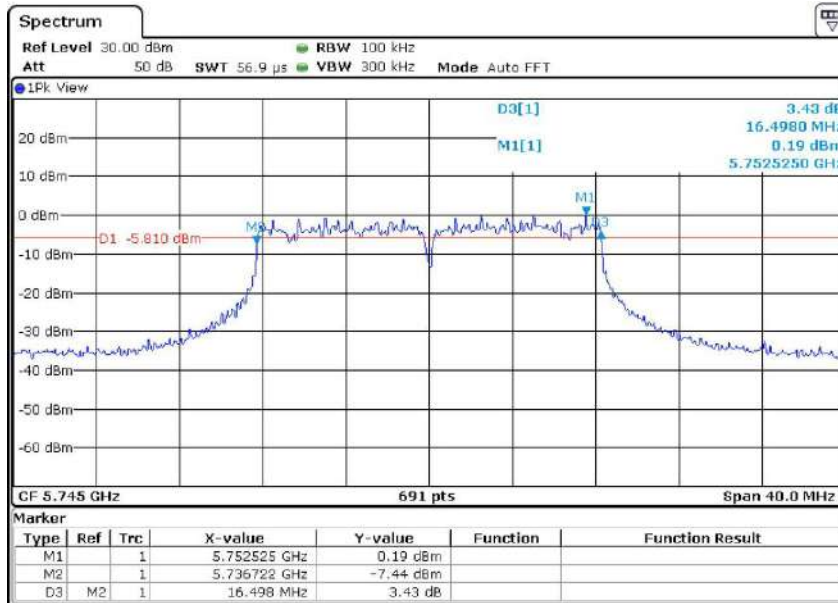
Report No.: AAEMT/EMC/220826-02-09

**26dB BW 802.11ax80**  
Channel: 42

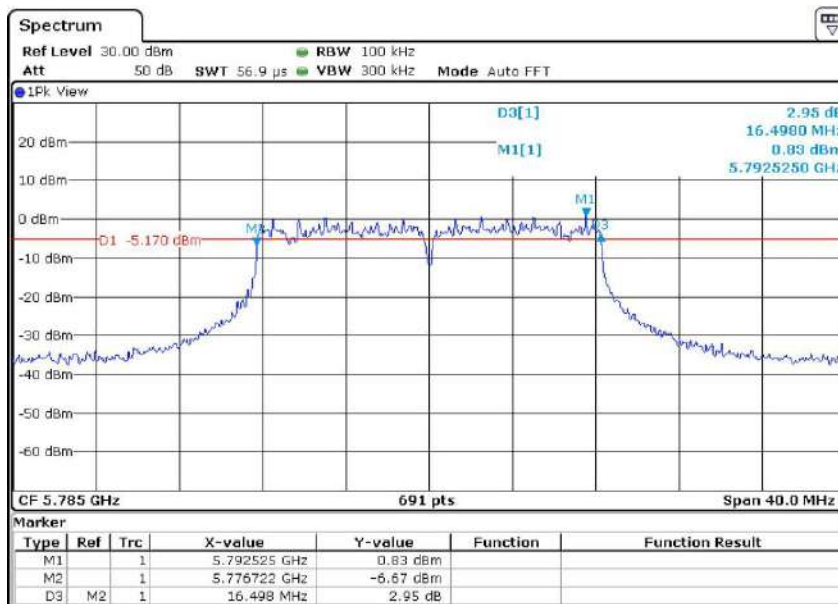


Test plots as followed: CHAIN 0

6dB BW 802.11a  
Channel: 149

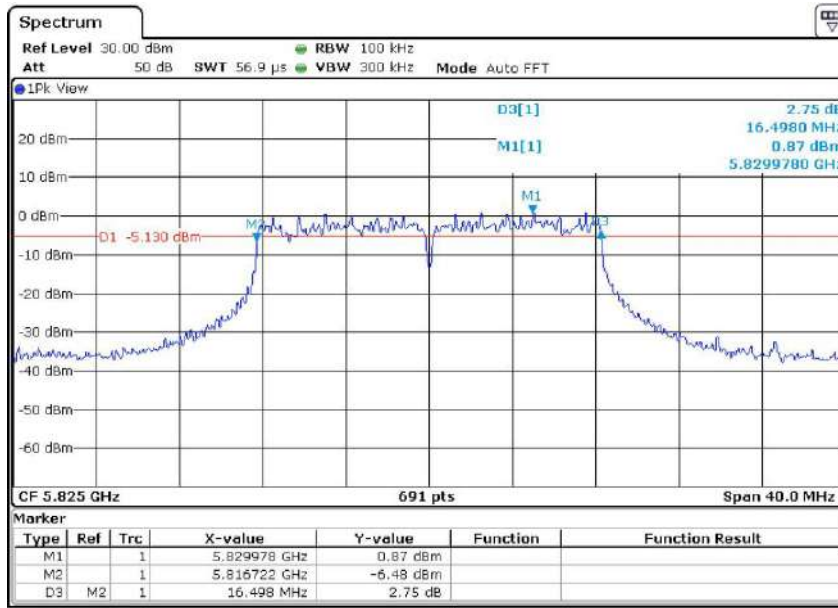


Channel: 157



Report No.: AAEMT/EMC/220826-02-09

Channel: 165

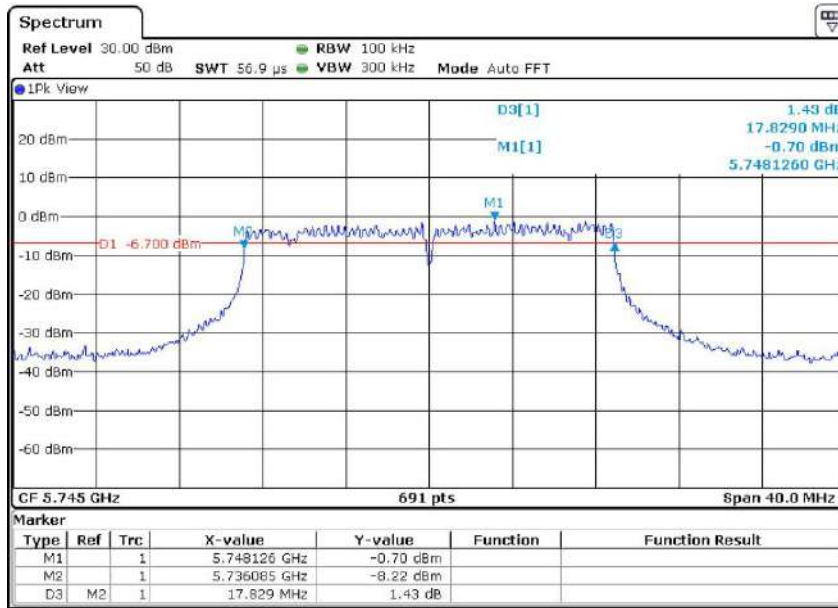




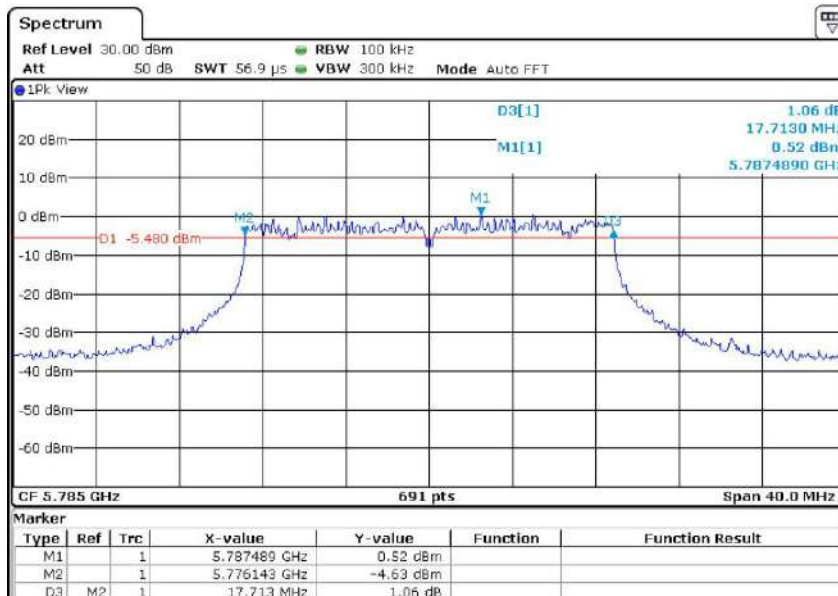
Report No.: AAEMT/EMC/220826-02-09

6dB BW 802.11n20

Channel: 149



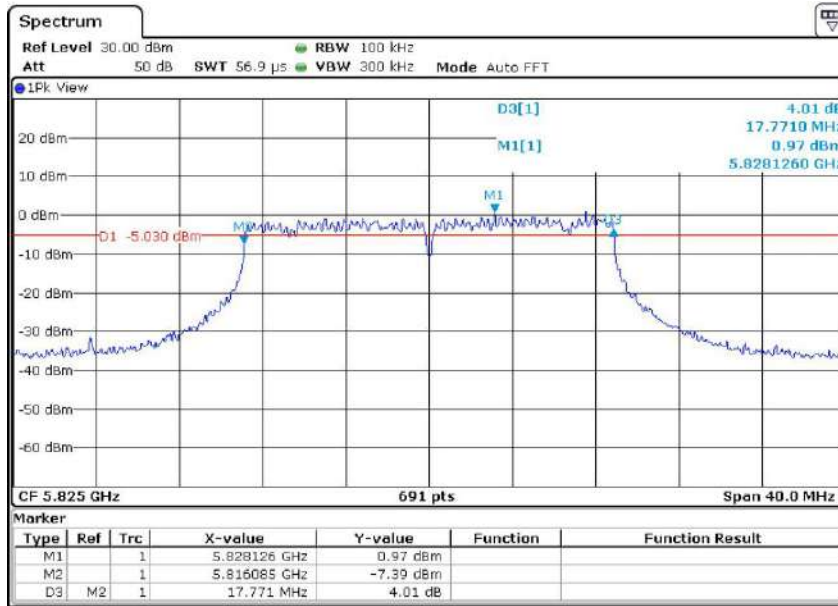
Channel: 157



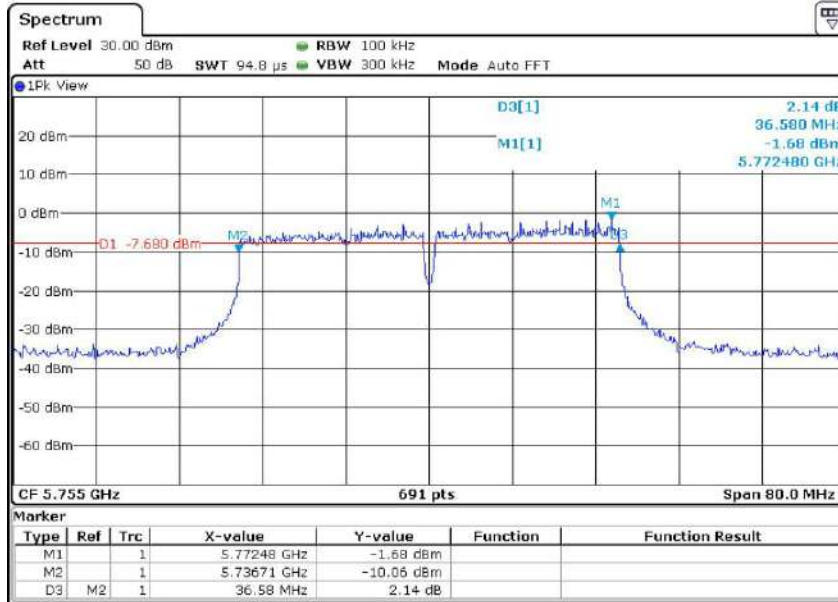


Report No.: AAEMT/EMC/220826-02-09

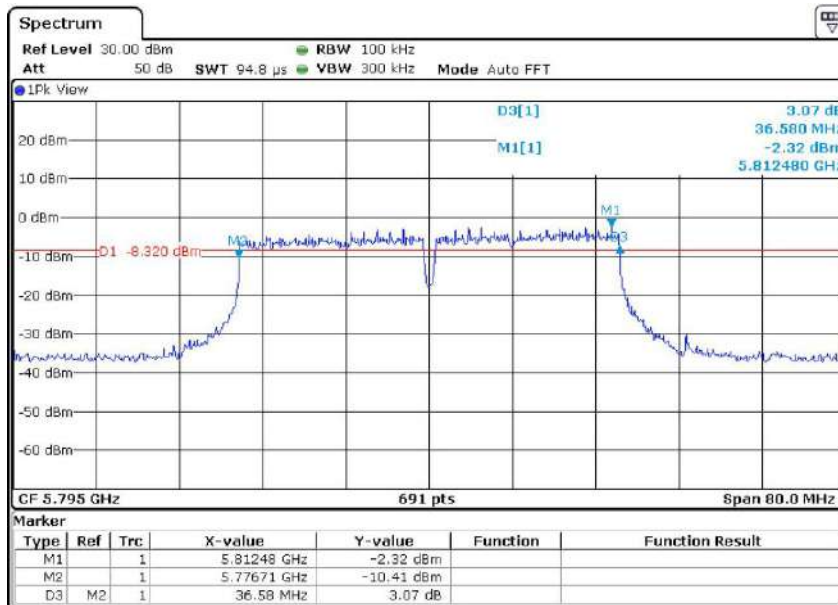
Channel: 165



6dB BW 802.11n40  
Channel: 151



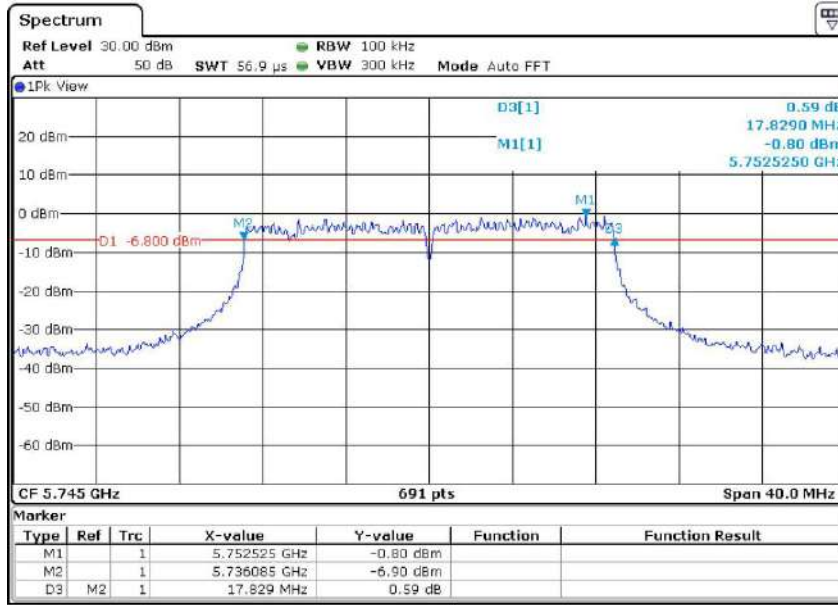
Channel: 159



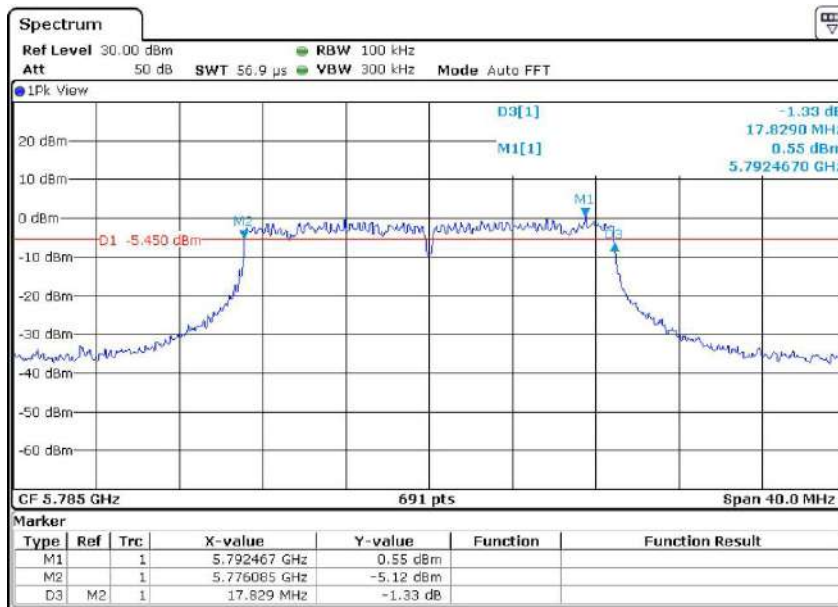
Report No.: AAEMT/EMC/220826-02-09

6dB BW 802.11ac20

Channel: 149

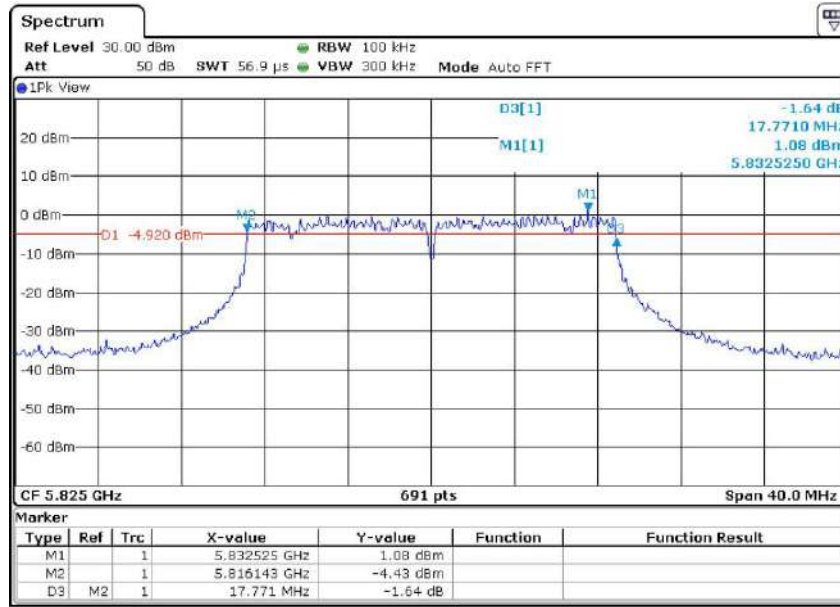


Channel: 157



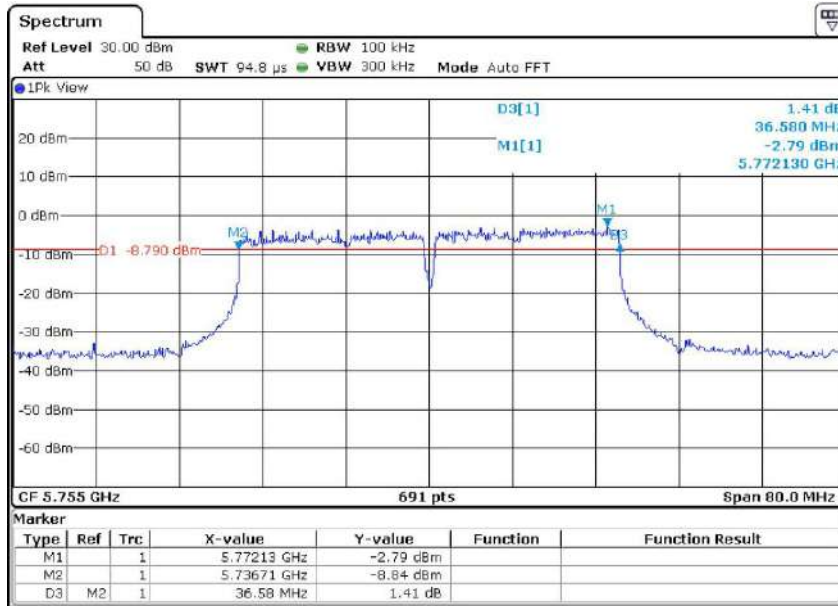
Report No.: AAEMT/EMC/220826-02-09

Channel: 165

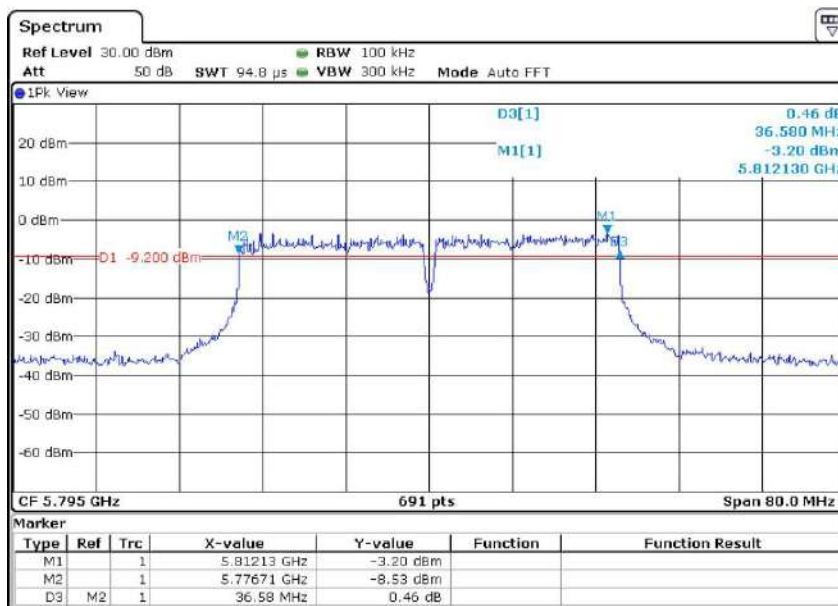


Report No.: AAEMT/EMC/220826-02-09

6dB BW 802.11ac40  
Channel: 151

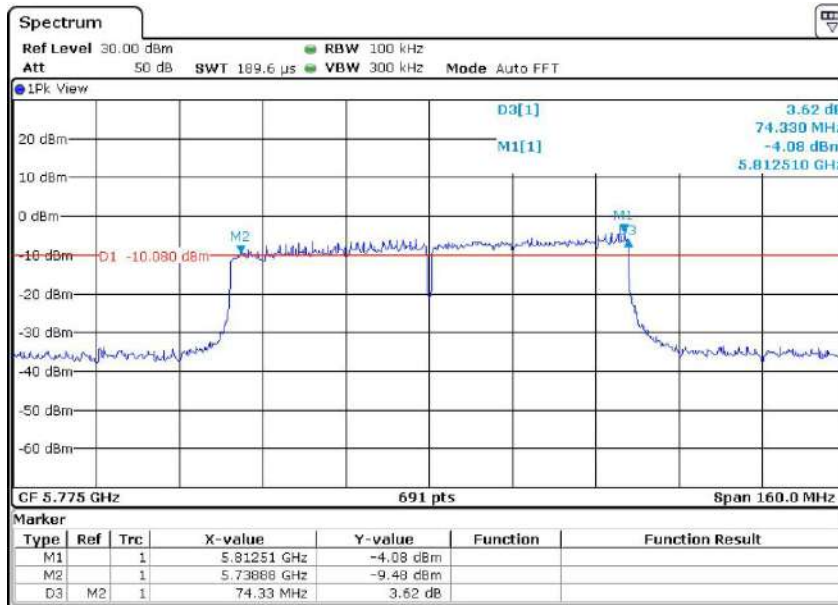


Channel: 159



Report No.: AAEMT/EMC/220826-02-09

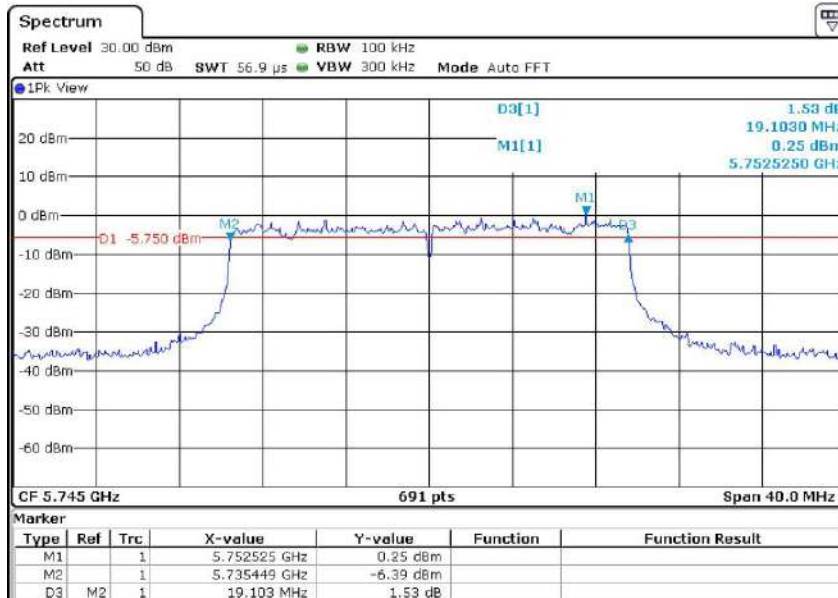
6dB BW 802.11ac80  
Channel: 155



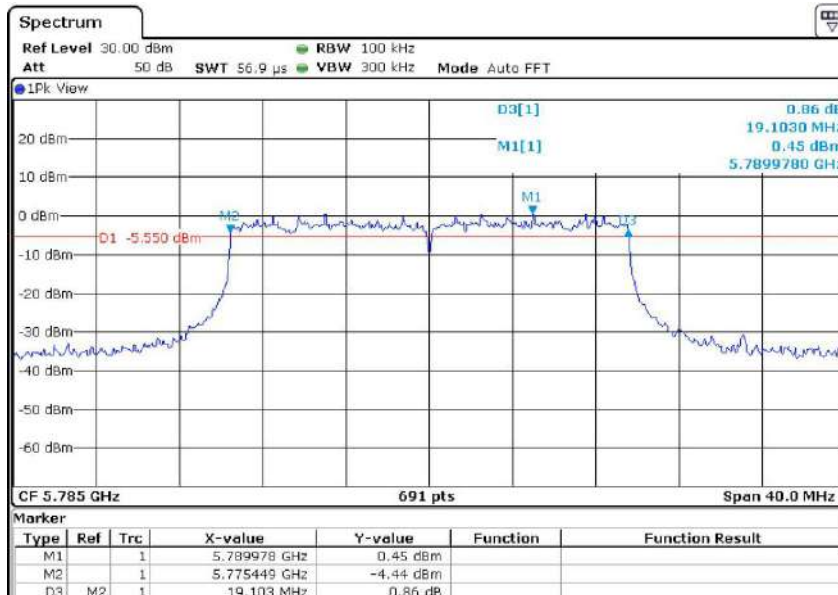


Report No.: AAEMT/EMC/220826-02-09

6dB BW 802.11ax20  
Channel: 149



Channel: 157





Report No.: AAEMT/EMC/220826-02-09

Channel: 165

