

## FCC TEST REPORT

<b>Application No:</b>	ZR/2020/90032
<b>Applicant:</b>	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
<b>Address of Applicant:</b>	Floor 21, Block A, Coolpad Building, Intersection of Keyuan Avenue and Baoshen Road, North High-Tech Industrial Park, Nanshan District, Shenzhen
<b>Manufacturer:</b>	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
<b>Address of Manufacturer:</b>	Floor 21, Block A, Coolpad Building, Intersection of Keyuan Avenue and Baoshen Road, North High-Tech Industrial Park, Nanshan District, Shenzhen
<b>EUT Description:</b>	Mobile Hotspot
<b>Model No.:</b>	CP337AS
<b>Trade Mark:</b>	coolpad
<b>FCC ID:</b>	R38YLCP337AS
<b>Standards:</b>	47 CFR FCC Part 2, Subpart J 47 CFR FCC Part 15, Subpart E KDB 789033 D02 General UNII Test Procedures New Rules v02 FCC KDB 558074 D01 DTS Meas Guidance v0502
<b>Test Method:</b>	ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices
<b>Date of Receipt:</b>	2020/10/8
<b>Date of Test:</b>	2020/10/21 to 2020/12/31
<b>Date of Issue:</b>	2021/4/18
<b>Test Result:</b>	<b>PASS *</b>

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang  
Wireless Laboratory Manager

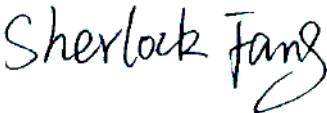



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# 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021/1/5		Original
02		2021/4/18	Sherlock Fang	1.Add test site Information 2. Modify data conversion error of antenna height 3.Update equipment list

This report supersedes our previous report ZR/2020/9003203, issued on 2021-01-05, which is hereby deemed null and void.

Authorized for issue by:	
Prepared By	 <hr/> (Sherlock Fang) / Engineer
Checked By	 <hr/> (Jim Huang) / Reviewer



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## Contents

<b>1</b>	<b>VERSION.....</b>	<b>2</b>
<b>2</b>	<b>TEST SUMMARY.....</b>	<b>4</b>
<b>3</b>	<b>GENERAL INFORMATION.....</b>	<b>7</b>
3.1	CLIENT INFORMATION.....	7
3.2	TEST LOCATION.....	7
3.3	TEST FACILITY.....	8
3.4	GENERAL DESCRIPTION OF EUT.....	9
3.5	TEST ENVIRONMENT AND MODE.....	11
<b>4</b>	<b>TEST RESULTS AND MEASUREMENT DATA.....</b>	<b>12</b>
4.1	ANTENNA REQUIREMENT.....	12
4.2	CONDUCTED EMISSIONS.....	12
4.3	DUTY CYCLE.....	16
4.3.1	Test Results.....	16
4.3.1	Test Plots.....	16
4.4	CONDUCTED OUTPUT POWER.....	21
4.4.1	Test Results for Conducted Output Power.....	22
4.5	26dB EMISSION BANDWIDTH.....	23
4.5.1	Test Results for 26dB Emission Bandwidth.....	24
4.5.2	Plots for 26dB Emission Bandwidth.....	25
4.6	6dB EMISSION BANDWIDTH.....	38
4.6.1	Test Results for 6dB Emission Bandwidth.....	39
4.6.2	Plots for 6dB Emission Bandwidth.....	40
4.7	99% OCCUPIED BANDWIDTH.....	53
4.7.1	Test Results for 99% Occupied Bandwidth.....	54
4.7.2	Plots for 99% Occupied Bandwidth.....	55
4.8	POWER SPECTRAL DENSITY.....	83
4.8.1	Test Results For Power Density.....	84
4.8.2	Test plots For Power Density.....	85
4.9	RADIATED SPURIOUS EMISSIONS.....	113
4.9.1	Radiated emission below 1GHz.....	115
4.9.2	Transmitter emission above 1GHz.....	117
4.10	RESTRICTED BANDS AROUND FUNDAMENTAL FREQUENCY.....	173
4.10.1	Test plots.....	175
4.11	FREQUENCIES STABILITY.....	221
4.11.1	Frequency Error vs. Voltage:.....	221
4.11.2	Frequency Error vs. Temperature:.....	221
<b>5</b>	<b>MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2).....</b>	<b>222</b>
<b>6</b>	<b>EQUIPMENT LIST.....</b>	<b>223</b>
<b>7</b>	<b>PHOTOGRAPHS - EUT TEST SETUP DETAILS.....</b>	<b>225</b>



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## 2 Test Summary

Test Item	Band	FCC Rule	Requirements	Test Result	Verdict	Test Lab*
Emission Bandwidth	5150-5250	15.403(i) 15.407(a)(1)	No limit.	Clause 4.4	Pass	A
	5725-5850	15.403(i) 15.407(e)	≥ 500 kHz.			
Occupied Bandwidth	5150-5250	KDB 789033 D02§ D	No limit.	Clause 4.5	Pass	A
	5725-5850					
Duty Cycle	5150-5850	--	No limit.			
Maximum Conducted Output Power	5150-5250	15.407(a)(1) 15.407(a)(4)	FCC < 250mW (avg during transmission)	Clause 4.3	Pass	A
	5725-5850	15.407(a)(3)	< 1W (avg during transmission)			
maximum Power Spectral Density	5150-5250	15.407(a)(1) 15.407(a)(4)	<11dBm/MHz (avg during transmission)	Clause 4.6		
	5725-5850	15.407(a)(3) 15.407(a)(4)	<30dBm/500KHz (avg during transmission)			
Unwanted Emissions that fall Outside of the Restricted Bands(Radiated)	5150-5250	15.407(b)(1) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).	Clause 4.7	Pass	B
	5725-5850	15.407(b)(4) 15.407(b)(6) 15.407(b)(7) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP) F≥1GHz & out-restricted:(QP) a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges; b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges; c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges. F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).			



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Test Item	Band	FCC Rule	Requirements	Test Result	Verdict	Test Lab*
Unwanted Emissions in the Restricted Bands (Radiated)	5150-5250 5725-5850	15.209	---	Clause 4.8	Pass	B
AC Power Line Conducted Emissions	5150-5250 5725-5850	15.207	---	Clause 4.2	Pass	B
Frequency Stability	5150-5250 5725-5850	15.209	---	Clause 4.9	Pass	A

Remark: All test were performed by Lab A and B.  
Parts of test items above were subcontracted to Lab B.  
Lab A SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch  
Lab B SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.



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**Remark:**

The differences between Main Supply and Secondary Supply are showed in the following table.

Main Supply:

Part Name	Model Name	supplier
Battery	CPLD-440	Jiade
Memory	FS702B2R1DH2A2KDE	FORESEE
PCB	CP337AS MAINBOARD P3-ZH	Zhihao

Secondary Supply:

Part Name	Model Name	supplier
Battery	CPLD-440	Ganfeng
Memory	NM1282KSLAXAL-3B	Nanya
PCB	CP337AS MAINBOARD P3_SUNTAK	Suntak

**Note:**

According to the difference description above, only the worst case data displayed in this report.



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### 3 General Information

#### 3.1 Client Information

Applicant:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address of Applicant:	Floor 21, Block A, Coolpad Building, Intersection of Keyuan Avenue and Baoshen Road, North High-Tech Industrial Park, Nanshan District, Shenzhen
Manufacturer:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address of Manufacturer:	Floor 21, Block A, Coolpad Building, Intersection of Keyuan Avenue and Baoshen Road, North High-Tech Industrial Park, Nanshan District, Shenzhen

#### 3.2 Test Location

##### Lab A:

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057
Test engineer:	Dee Zheng, Mike Hu

##### Lab B:

Company:	SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.
Address:	1/F, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi China
Post code:	710086
Test engineer:	Ben Huang, Leah Chen



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### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### Lab A:

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

#### Lab B:

- **A2LA (Certificate No. 4854.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

- **FCC –Designation Number: CN1271**



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### 3.4 General Description of EUT

EUT Description:	Mobile Hotspot
Model No.:	CP337AS
Trade Mark:	coolpad
Hardware Version:	P3
Software Version:	3.18.054.P3.201216.CP337AS
IEEE 802.11 WLAN Mode Supported:	<input checked="" type="checkbox"/> 802.11a (20 MHz channel bandwidth) ; <input checked="" type="checkbox"/> 802.11n (20 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11n (40 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11ac (20 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11ac (40 MHz channel bandwidth); <input checked="" type="checkbox"/> 802.11ac (80 MHz channel bandwidth);
Operation Frequency:	IEEE 802.11n(HT20/40)/ ac(HT20/40/80/): 5150MHz to 5250MHz IEEE 802.11n(HT20/40)/ ac(HT20/40/80): 5725MHz to 5850MHz
Type of Modulation:	OFDM
Sample Type:	<input type="checkbox"/> Portable Device, <input checked="" type="checkbox"/> Module
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated
Antenna Ports	<input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
Smart System	<input checked="" type="checkbox"/> SISO (for 802.11a/n/ac), <input type="checkbox"/> MIMO (for 802.11n/ac), <input type="checkbox"/> Diversity (for 802.11a) : Tx & Rx
Antenna Gain:	-3dBi,
Power Supply	<input checked="" type="checkbox"/> AC/DC Adapter; <input type="checkbox"/> PoE;; <input type="checkbox"/> Other:

**Remark:**

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency Range of Operation Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre



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For UNII Band I:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5180
	The Middle channel	5200
	The Highest channel	5240
IEEE 802.11n/ac 40MHz	The Lowest channel	5190
	The Highest channel	5230
IEEE 802.11ac 80MHz	The Middle channel	5210

For UNII Band III:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5745
	The Middle channel	5785
	The Highest channel	5825
IEEE 802.11n/ac 40MHz	The Lowest channel	5755
	The Highest channel	5795
IEEE 802.11ac 80MHz	The Middle channel	5775



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### 3.5 Test Environment and Mode

<b>Operating Environment:</b>	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	101.32 KPa
<b>Test mode:</b>	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.



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## 4 Test results and Measurement Data

### 4.1 Antenna Requirement

<b>Test Requirement:</b>	47 CFR Part 15 Section 15.203
The antenna is integrated antenna and no consideration of replacement. The best case gain of the antenna is -3dBi.	

### 4.2 Conducted Emissions

<b>Test Requirement:</b>	47 CFR Part 15 Section 15.407(b)		
<b>Test Method:</b>	ANSI C63.10: 2013		
<b>Test Frequency Range:</b>	150kHz to 30MHz		
<b>Limit:</b>	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li> </ol>		



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<p>Test Setup:</p>	
<p>Exploratory Test Mode:</p>	<p>Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.</p>
<p>Final Test Mode:</p>	<p>Through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>

**Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

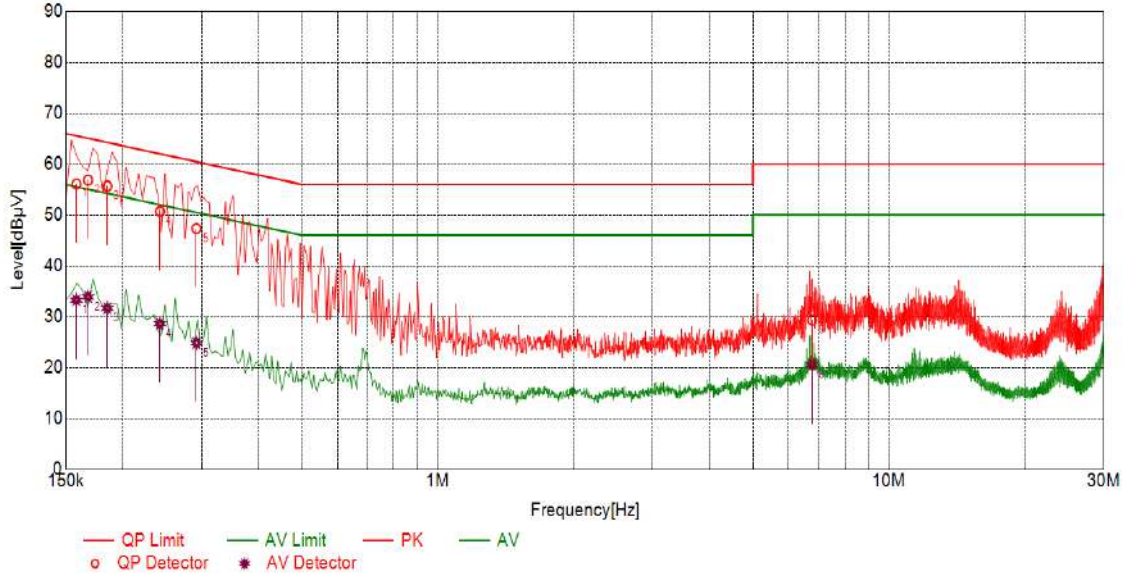
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



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Live Line:



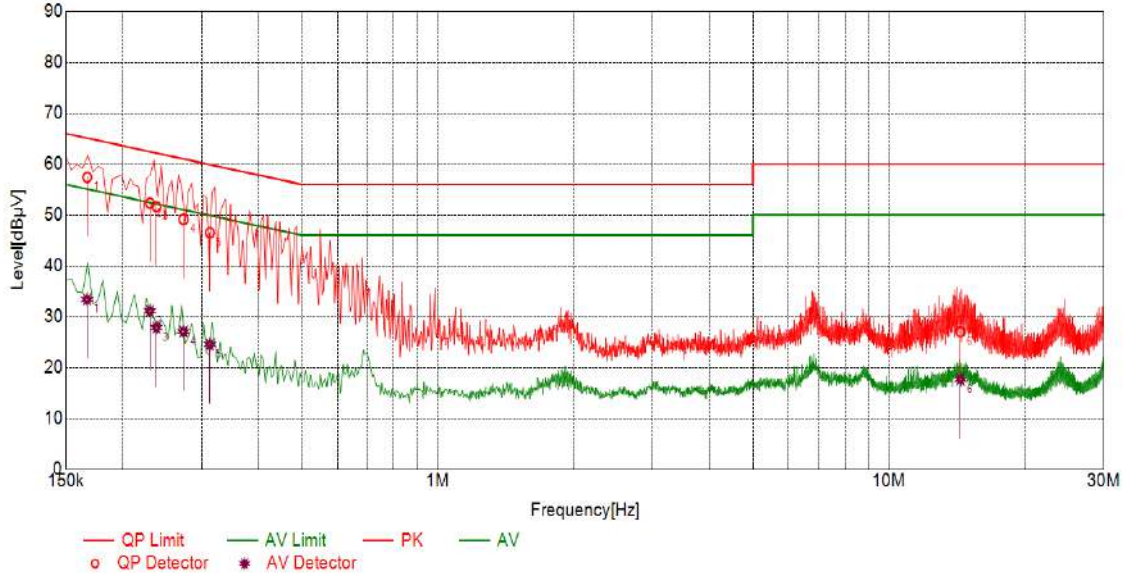
Test Graph

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1584	10.10	56.08	65.55	9.47	33.26	55.55	22.29	L
2	0.1682	10.10	56.85	65.05	8.20	33.91	55.05	21.14	L
3	0.1857	10.10	55.67	64.22	8.55	31.65	54.22	22.57	L
4	0.2428	10.10	50.70	62.00	11.30	28.60	52.00	23.40	L
5	0.2920	10.10	47.31	60.47	13.16	24.81	50.47	25.66	L
6	6.7693	10.10	29.30	60.00	30.70	20.56	50.00	29.44	L



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Neutral Line:



Test Graph

Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Type
1	0.1674	10.10	57.39	65.09	7.70	33.37	55.09	21.72	N
2	0.2306	10.10	52.32	62.43	10.11	31.11	52.43	21.32	N
3	0.2384	10.10	51.62	62.15	10.53	27.83	52.15	24.32	N
4	0.2737	10.10	49.12	61.01	11.89	27.08	51.01	23.93	N
5	0.3130	10.10	46.50	59.89	13.39	24.53	49.89	25.36	N
6	14.4211	10.11	27.03	60.00	32.97	17.68	50.00	32.32	N

Remarks:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.



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### 4.3 Duty Cycle

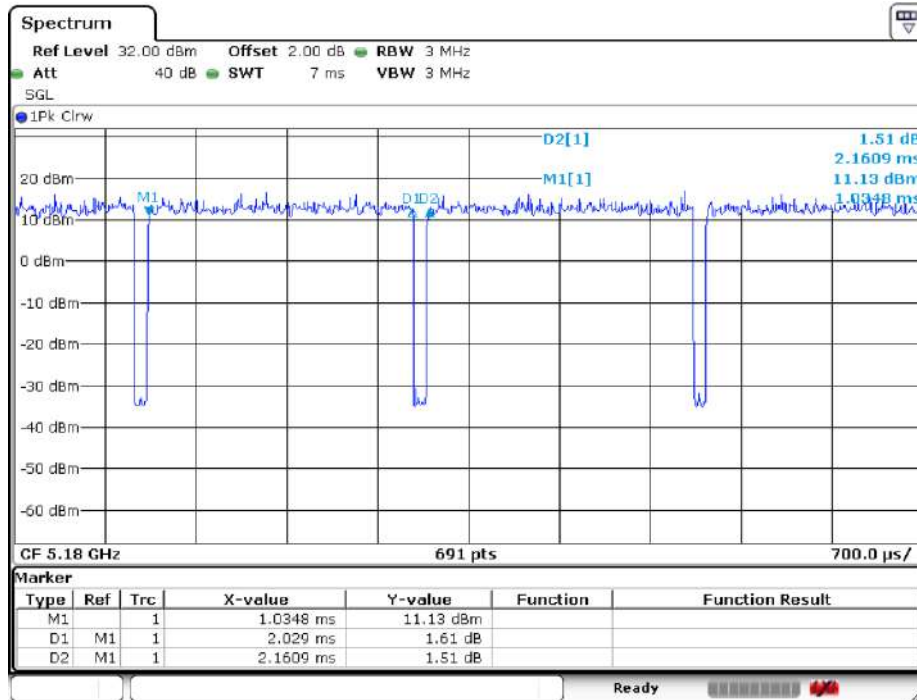
#### 4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11A	Ant 1: CH149, CH157, CH165	
11N20	Ant 1: CH149, CH157, CH165	
11N40	Ant 1: CH151, CH159	
11AC20	Ant 1: CH149, CH157, CH165	
11AC40	Ant 1: CH151, CH159	
11AC80	Ant 1: CH155	

#### 4.3.1 Test Plots

##### 4.3.1.1 ANT1

##### 4.3.1.1.1 11A



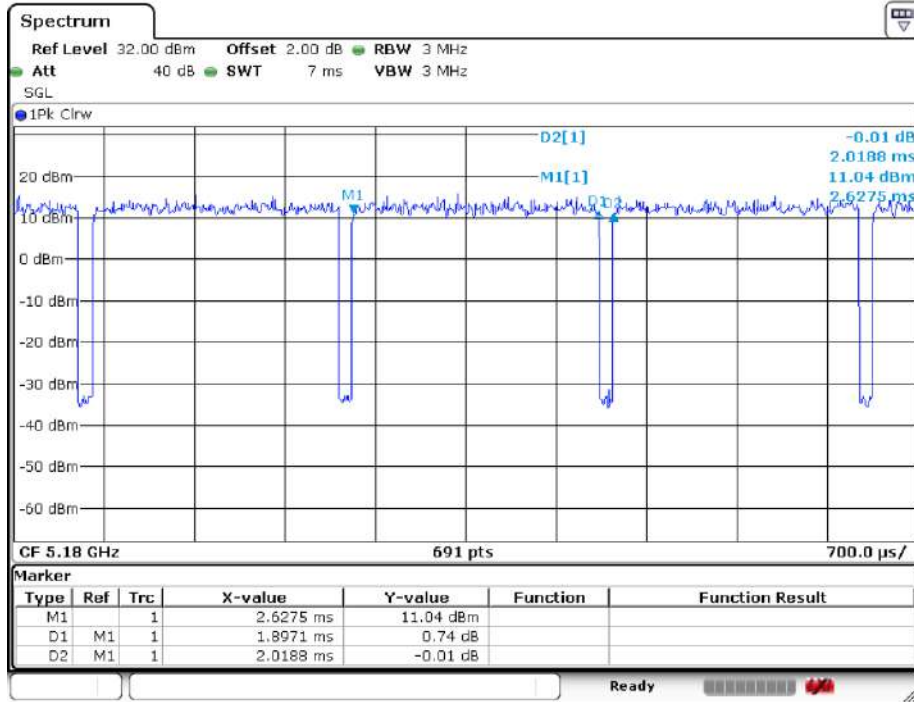
Date: 29.SEP.2020 09:30:47



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**4.3.1.1.2 11N20**

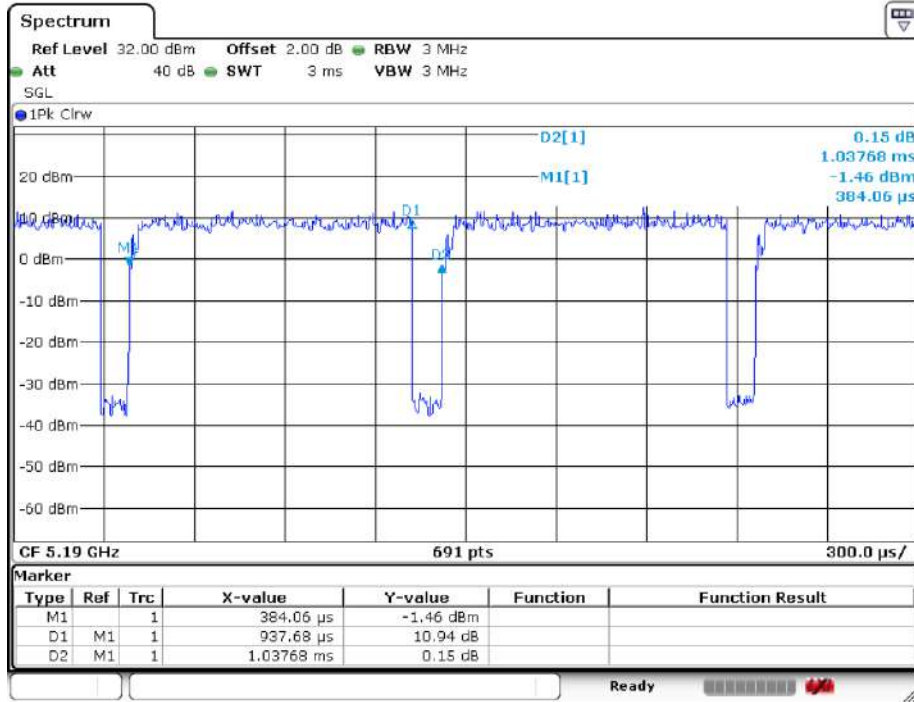


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**4.3.1.1.3 11N40**

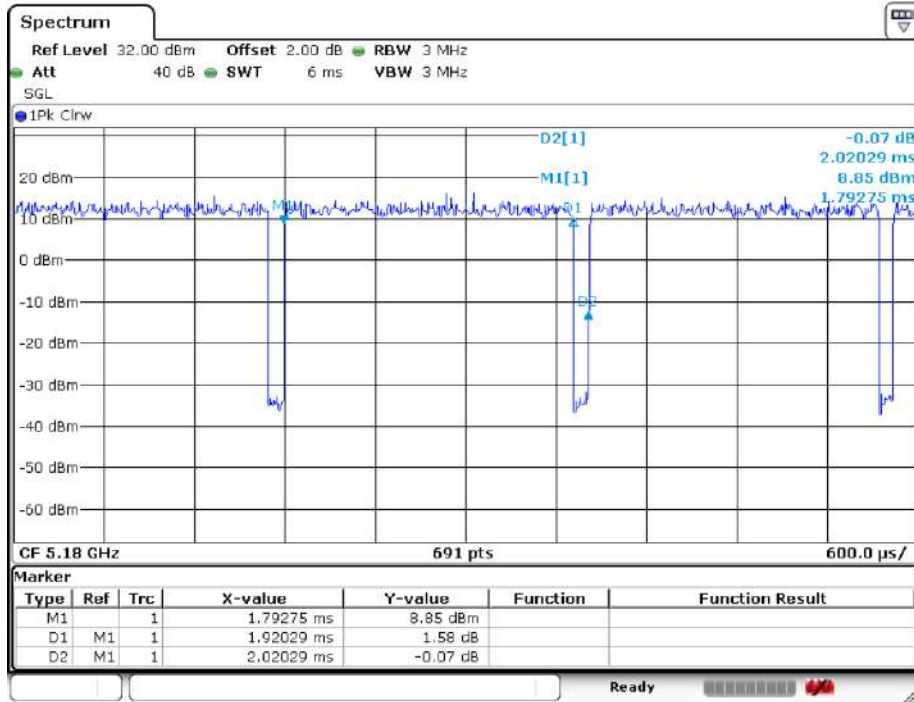


Date: 29.SEP.2020 09:35:58



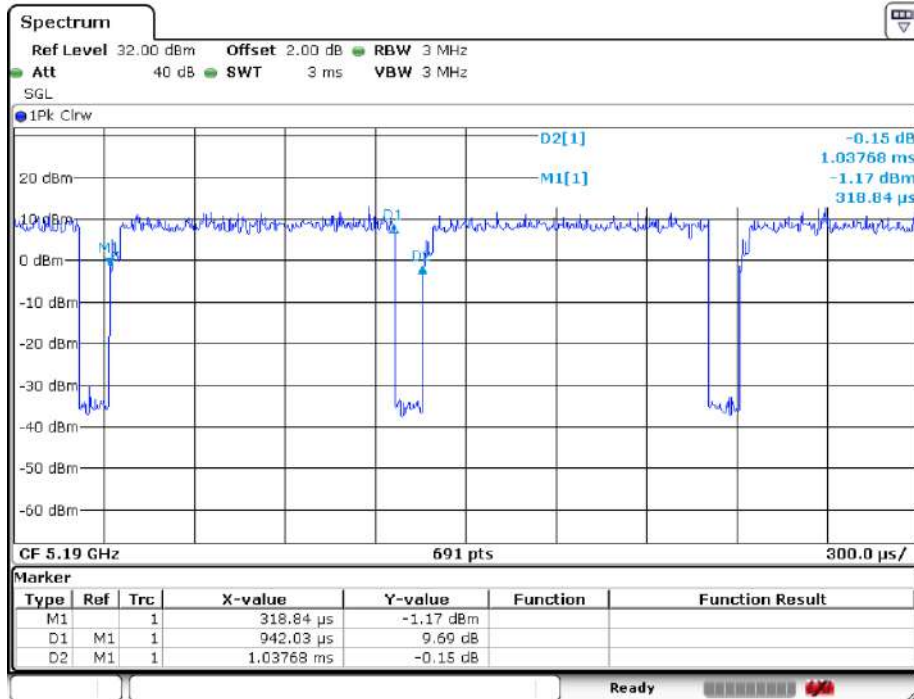
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4.3.1.1.4 11AC20



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4.3.1.1.5 11AC40

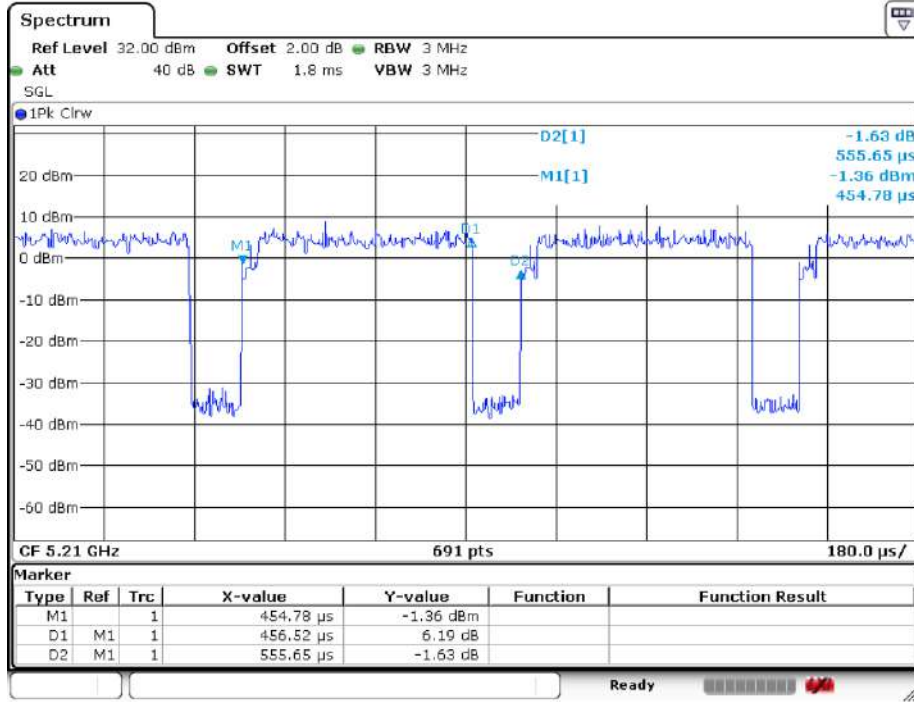


Date: 29.SEP.2020 09:34:58



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4.3.1.1.6 11AC80



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### 4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013	
Test Setup:		
Test Instruments:	Refer to section 5.10 for details	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	<p>Through Pre-scan, find that</p> <p>6Mbps of rate is the worst case of 802.11a;</p> <p>MCS0 of rate is the worst case of 802.11n(HT20);</p> <p>MCS0 of rate is the worst case of 802.11n(HT40);</p> <p>MCS0 of rate is the worst case of 802.11ac(HT20);</p> <p>MCS0 of rate is the worst case of 802.11ac(HT40);</p> <p>MCS0 of rate is the worst case of 802.11ac(HT80)</p> <p>Only the worst case is recorded in the report.</p>	
Limit:	Frequency Band	Limit
	5150-5250MHz	Not exceed 250mW(24dBm)
	5725-5850MHz	Not exceed 1W(30dBm)
	*Where B is the 26dB emission bandwidth in MHz	
Test Results:	Pass	



**4.4.1 Test Results for Conducted Output Power**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Meas. Level (Cond.) [dBm]	Meas. Level (EIRP.) [dBm]	Verdict
11A20	36	5180	ANT 1	13.95	10.95	PASS
	44	5220	ANT 1	13.82	10.82	PASS
	48	5240	ANT 1	13.79	10.79	PASS
	149	5745	ANT 1	13.52	10.52	PASS
	157	5785	ANT 1	13.45	10.45	PASS
	165	5825	ANT 1	13.34	10.34	PASS
11N20	36	5180	ANT 1	13.72	10.72	PASS
	44	5220	ANT 1	13.56	10.56	PASS
	48	5240	ANT 1	13.54	10.54	PASS
	149	5745	ANT 1	12.24	9.24	PASS
	157	5785	ANT 1	13.18	10.18	PASS
	165	5825	ANT 1	13.07	10.07	PASS
11N40	38	5190	ANT 1	13.85	10.85	PASS
	46	5230	ANT 1	13.68	10.68	PASS
	151	5755	ANT 1	11.81	8.81	PASS
	159	5795	ANT 1	12.74	9.74	PASS
11AC20	36	5180	ANT 1	13.68	10.68	PASS
	44	5220	ANT 1	13.56	10.56	PASS
	48	5240	ANT 1	13.54	10.54	PASS
	149	5745	ANT 1	12.2	9.2	PASS
	157	5785	ANT 1	13.14	10.14	PASS
	165	5825	ANT 1	13.03	10.03	PASS
11AC40	38	5190	ANT 1	13.87	10.87	PASS
	46	5230	ANT 1	13.73	10.73	PASS
	151	5755	ANT 1	12.51	9.51	PASS
	159	5795	ANT 1	12.75	9.75	PASS
11AC80	42	5210	ANT 1	13.44	10.44	PASS
	155	5775	ANT 1	9.41	6.41	PASS



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### 4.5 26dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate is the worst case of 802.11a; MCS0 of rate is the worst case of 802.11n(HT20); MCS0 of rate is the worst case of 802.11n(HT40); MCS0 of rate is the worst case of 802.11ac(HT20); MCS0 of rate is the worst case of 802.11ac(HT40); MCS0 of rate is the worst case of 802.11ac(HT80). Only the worst case is recorded in the report.
Limit:	No restriction limits
Test Results:	Pass



**4.5.1 Test Results for 26dB Emission Bandwidth**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	26dB Emission Bandwidth [MHz]	Verdict
11A20	36	5180	ANT 1	20.07	PASS
	44	5220	ANT 1	19.95	PASS
	48	5240	ANT 1	19.95	PASS
11N20	36	5180	ANT 1	20.7	PASS
	44	5220	ANT 1	20.85	PASS
	48	5240	ANT 1	20.64	PASS
11N40	38	5190	ANT 1	40.98	PASS
	46	5230	ANT 1	41.16	PASS
11AC20	36	5180	ANT 1	20.88	PASS
	44	5220	ANT 1	20.7	PASS
	48	5240	ANT 1	21	PASS
11AC40	38	5190	ANT 1	41.04	PASS
	46	5230	ANT 1	41.28	PASS
11AC80	42	5210	ANT 1	83.68	PASS

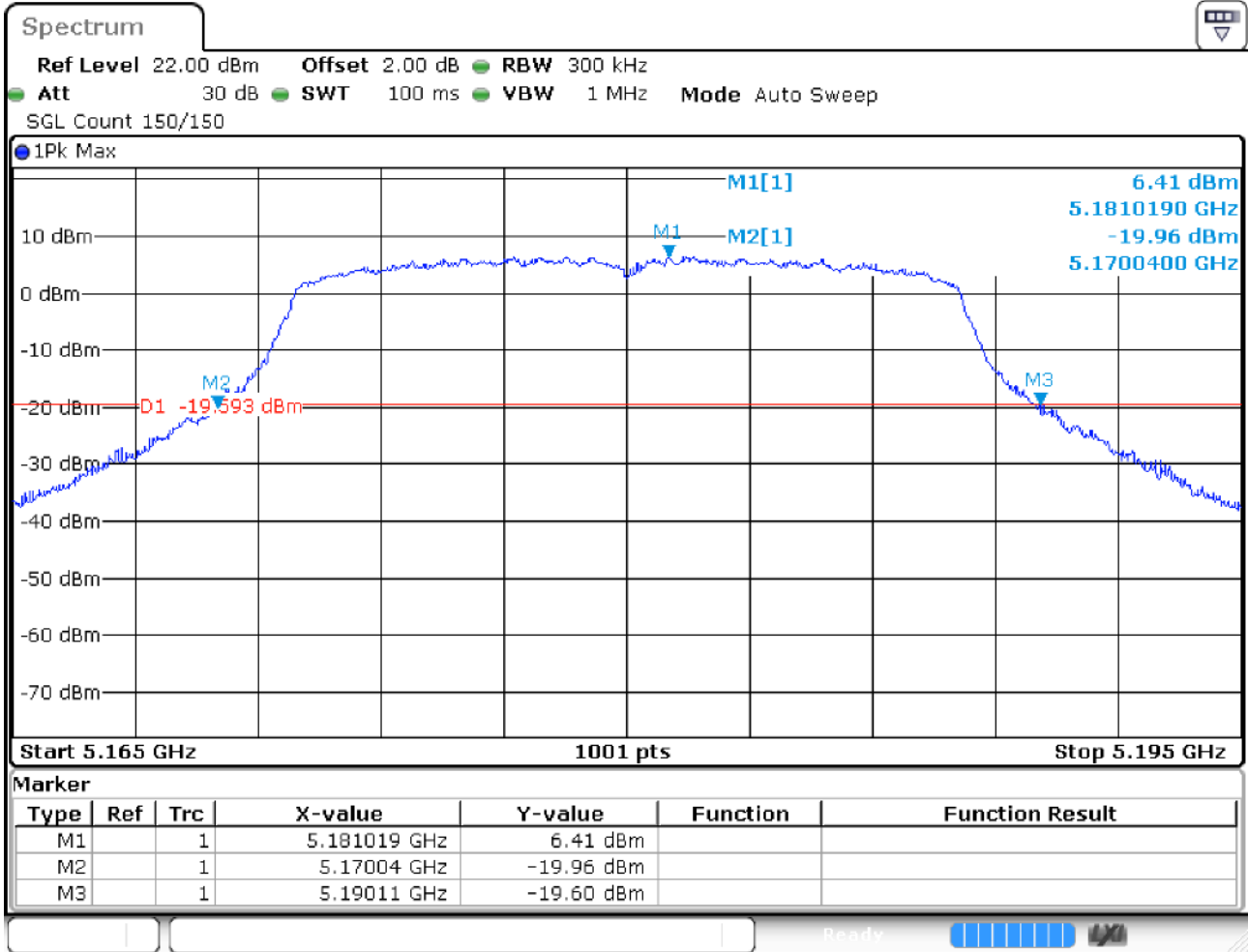


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### 4.5.2 Plots for 26dB Emission Bandwidth

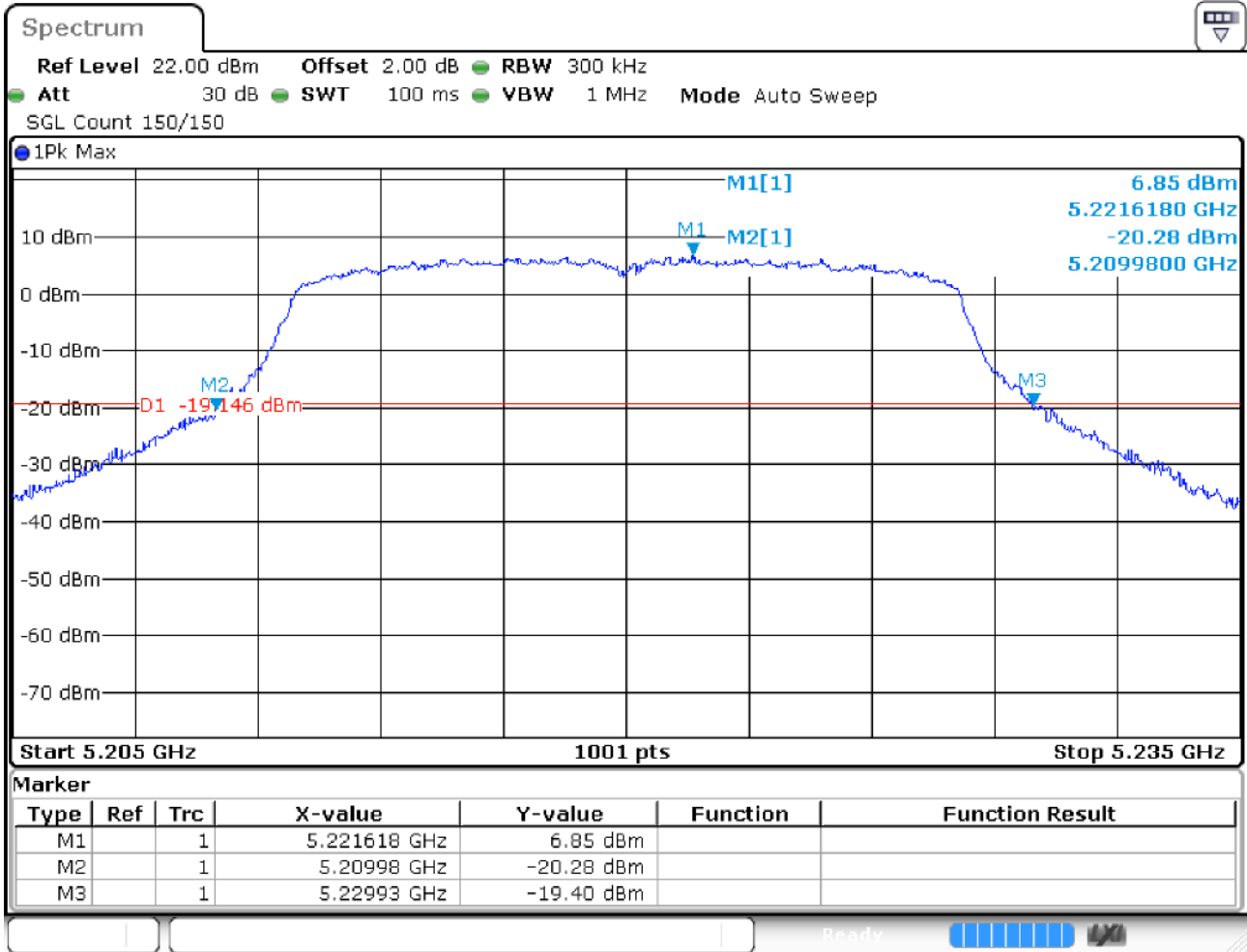
#### 4.5.2.1 11A20\_36 ANT 1



Date: 29.SEP.2020 10:02:32



**4.5.2.2 11A20\_44 ANT 1**

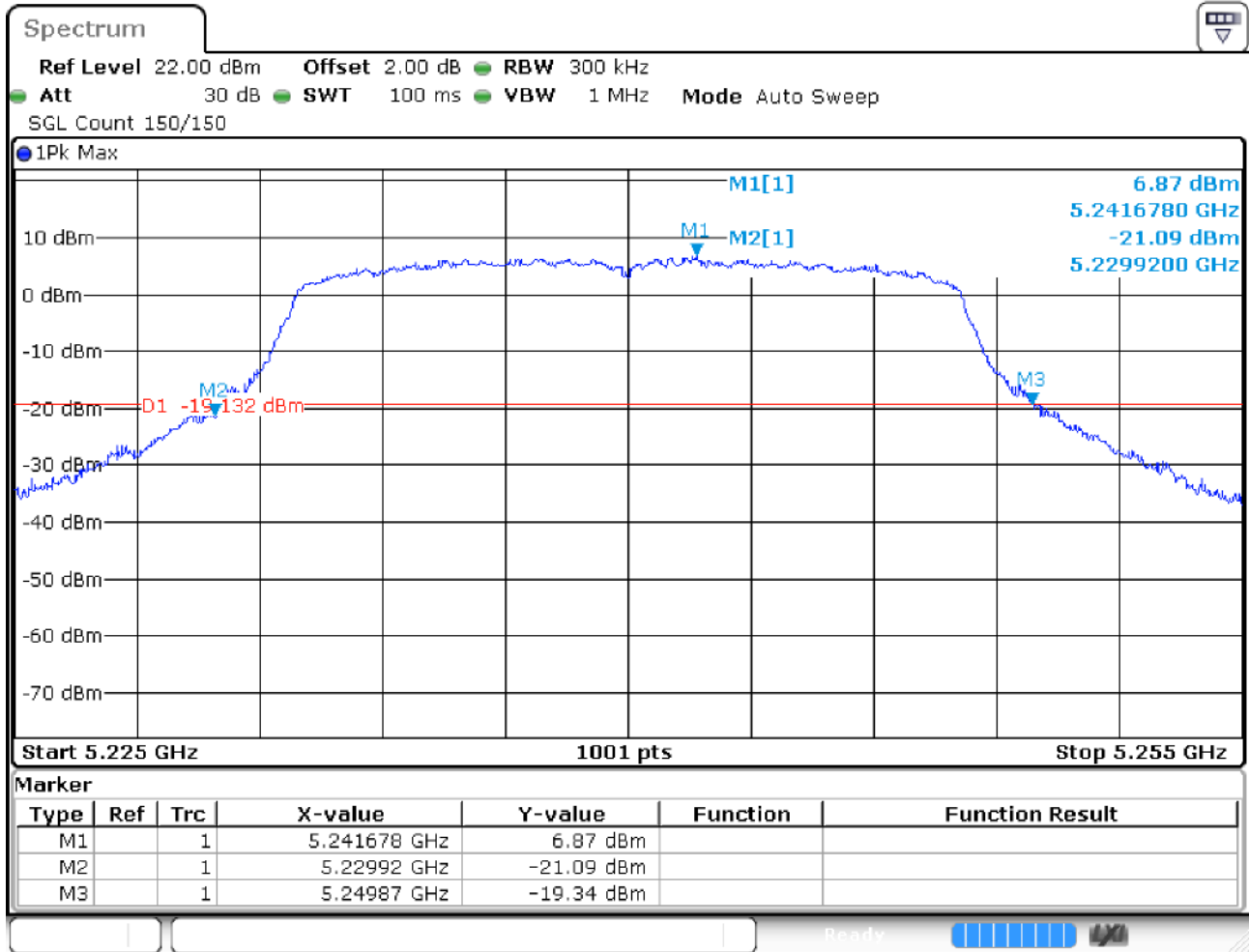


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4.5.2.3 11A20\_48 ANT 1



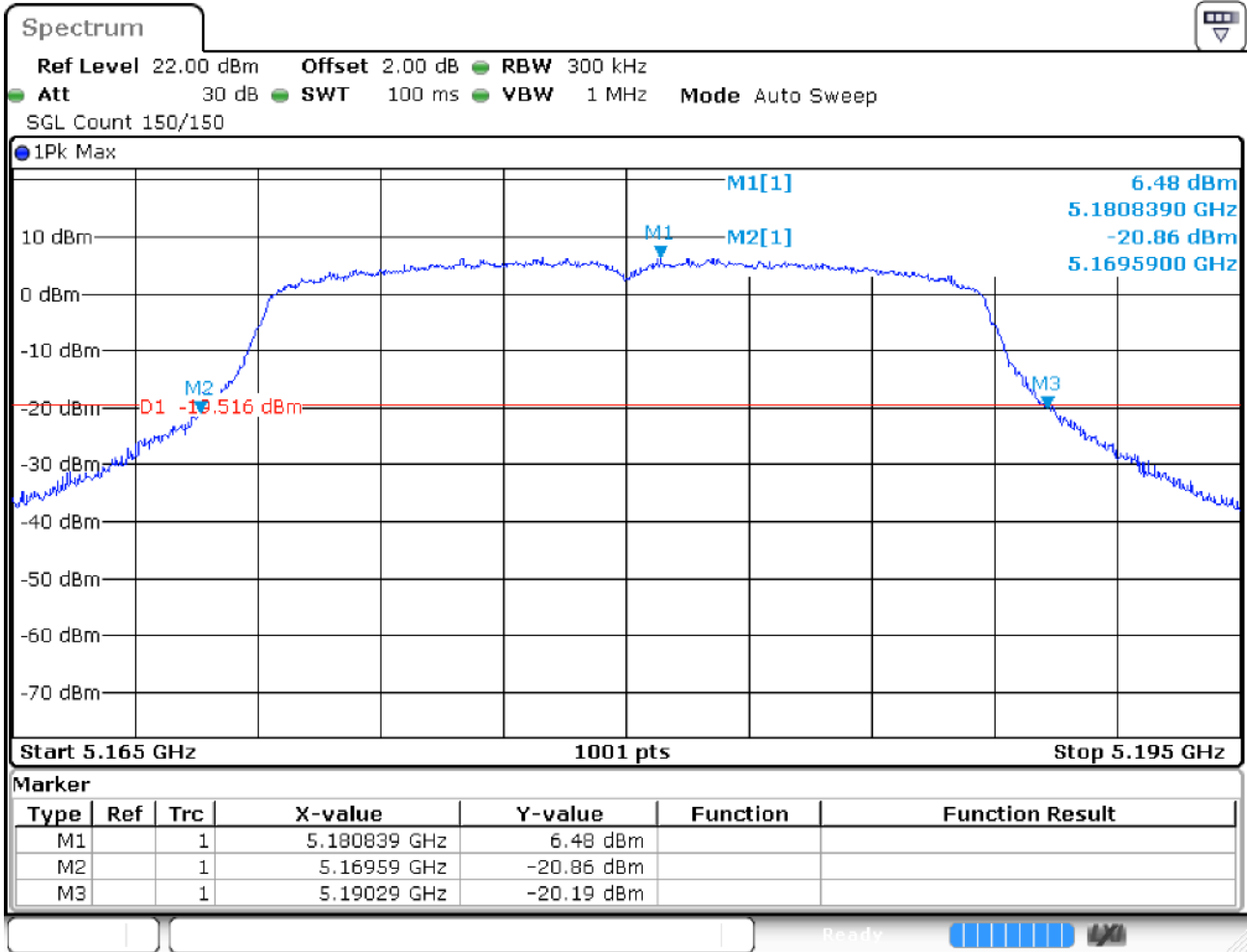
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**4.5.2.4 11N20\_36 ANT 1**



Date: 29.SEP.2020 10:30:07

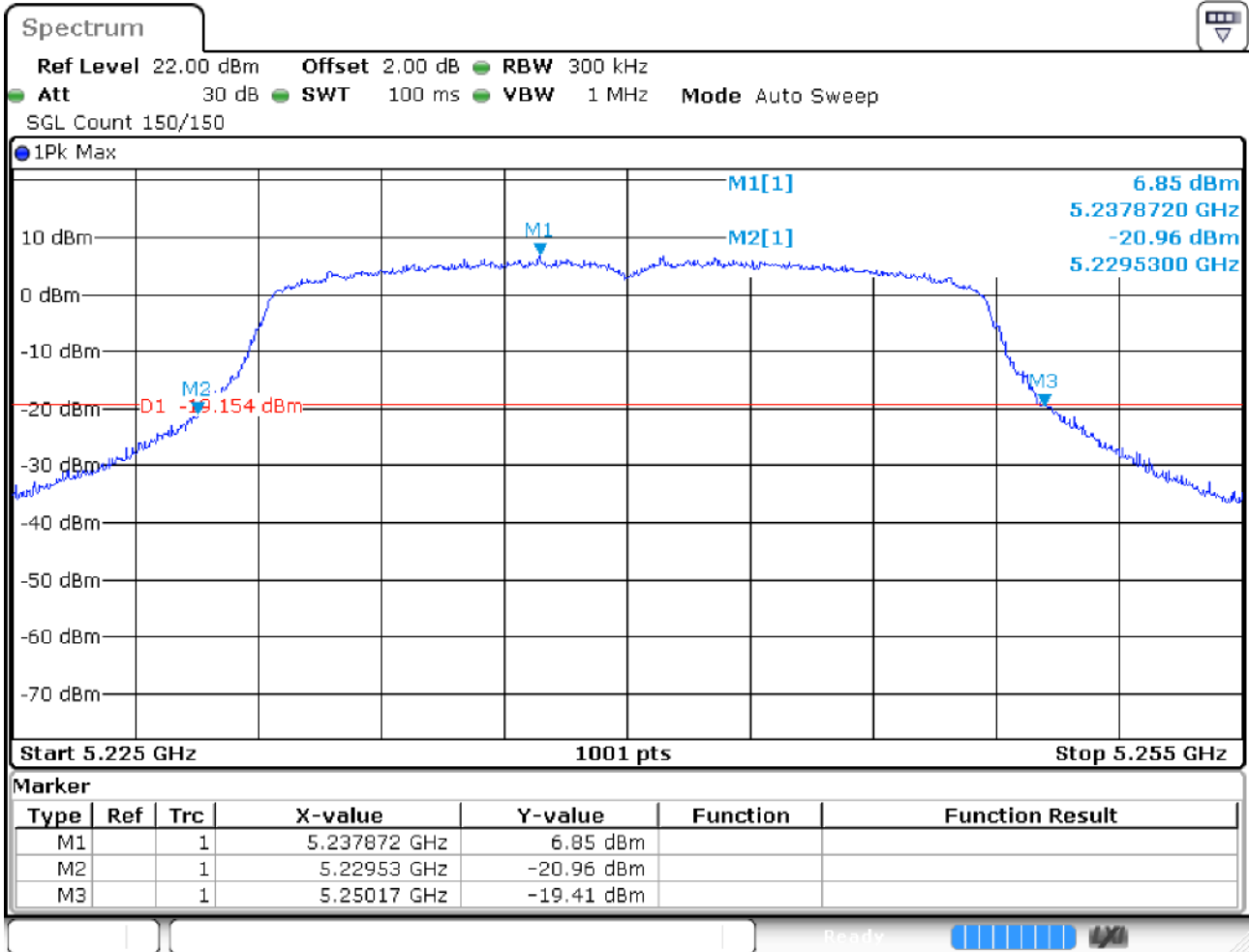


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**4.5.2.5 11N20\_48 ANT 1**

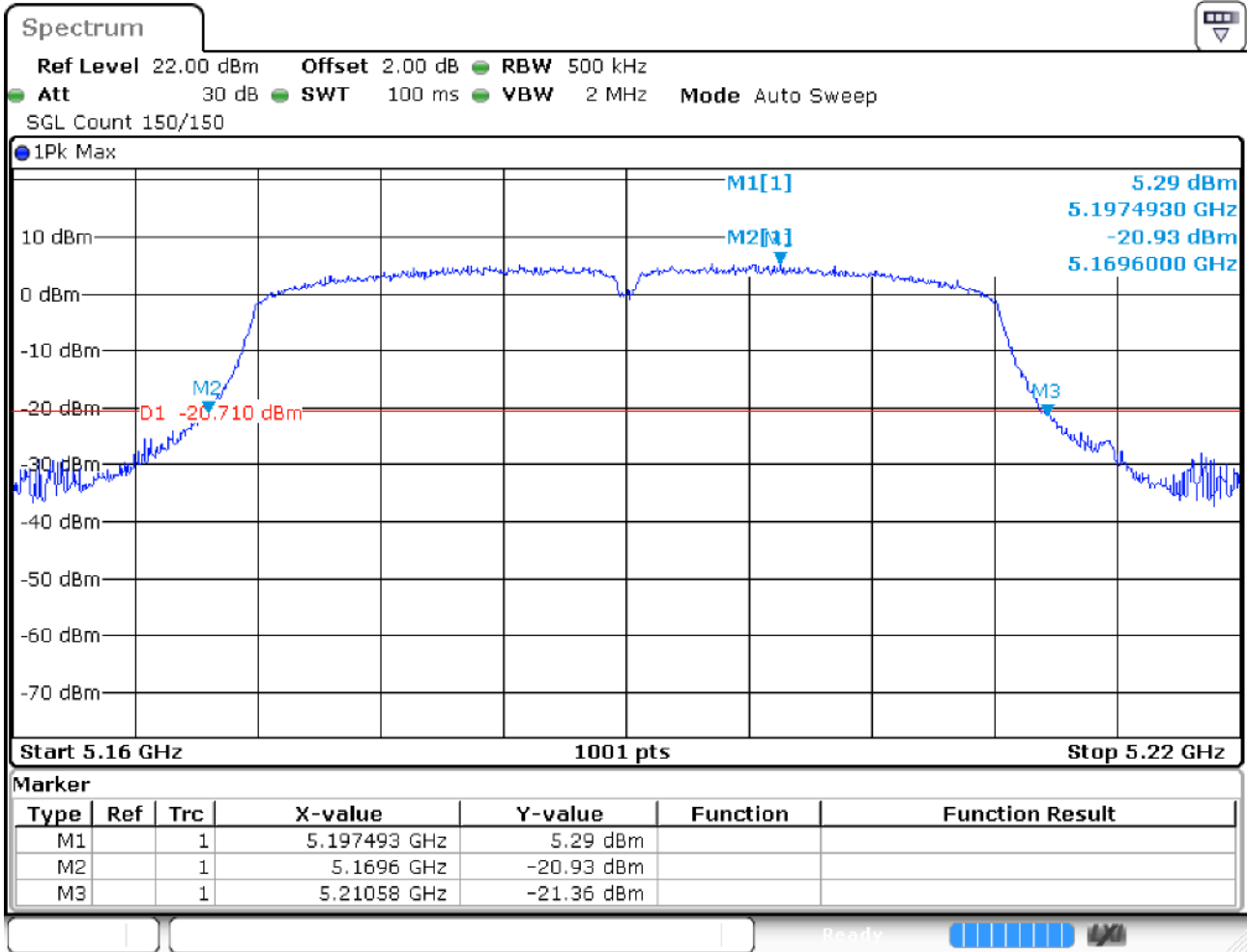


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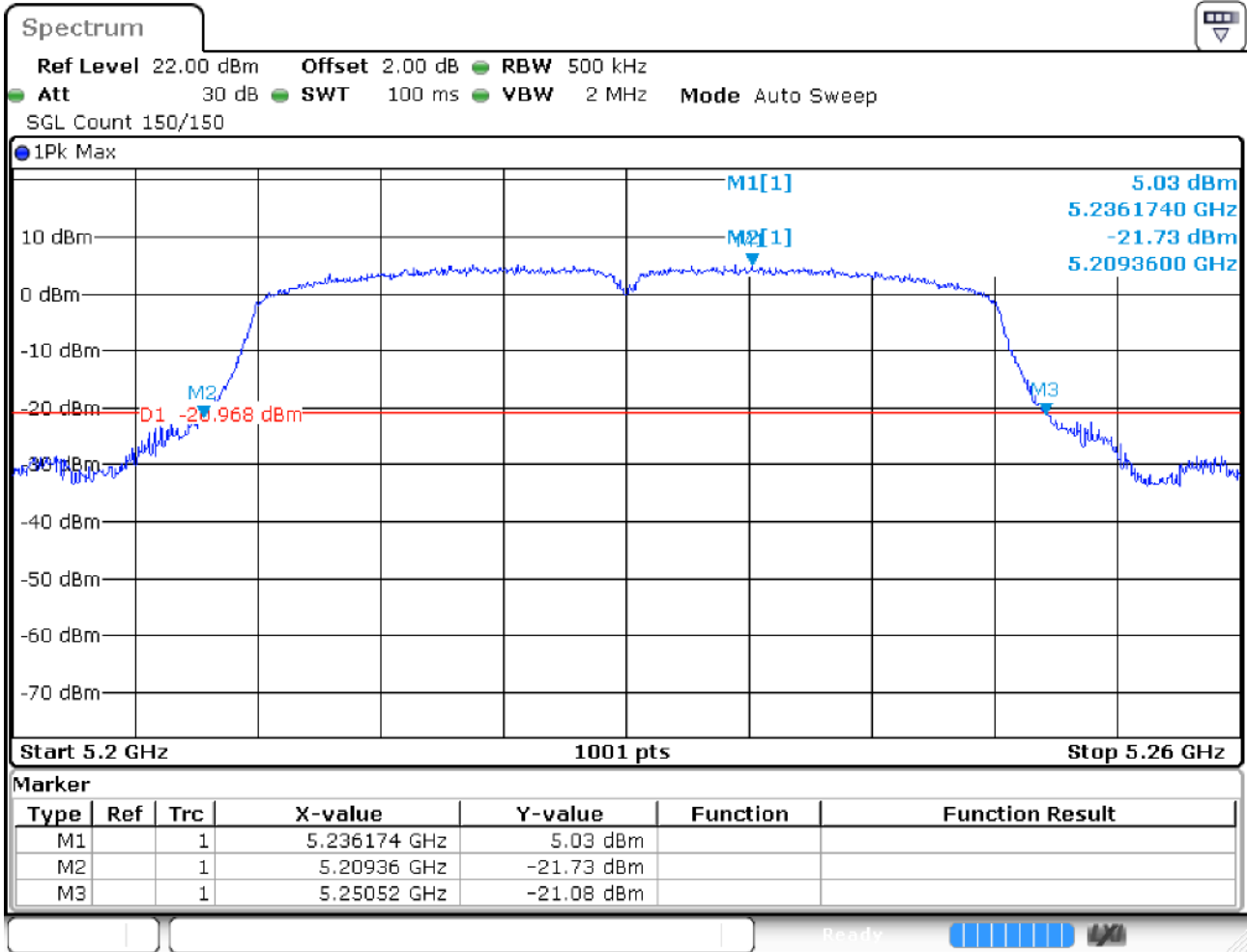
**4.5.2.6 11N40\_38 ANT 1**



Date: 29.SEP.2020 10:41:12



**4.5.2.7 11N40\_46 ANT 1**



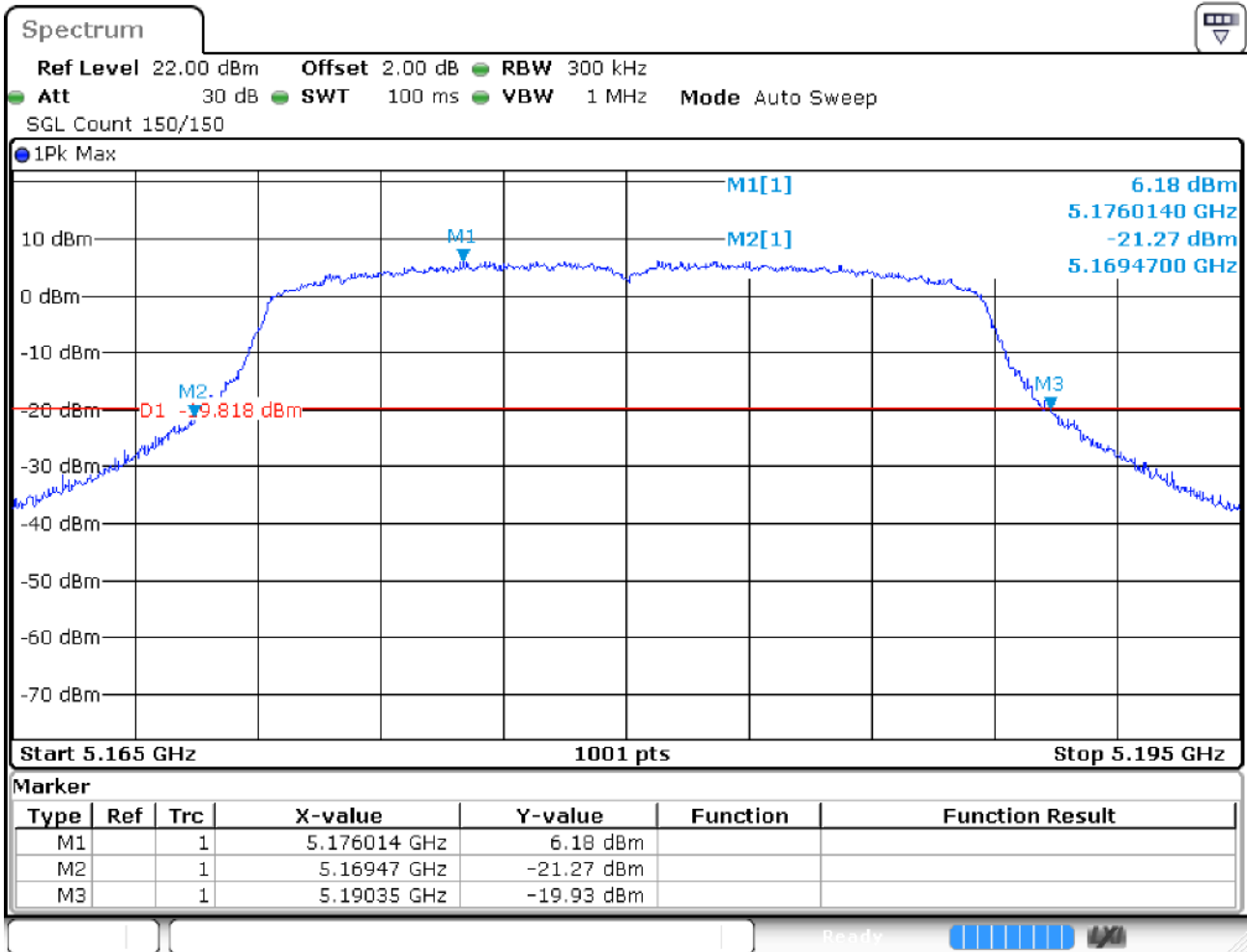
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**4.5.2.8 11AC20\_36 ANT 1**



Date: 29.SEP.2020 10:48:40

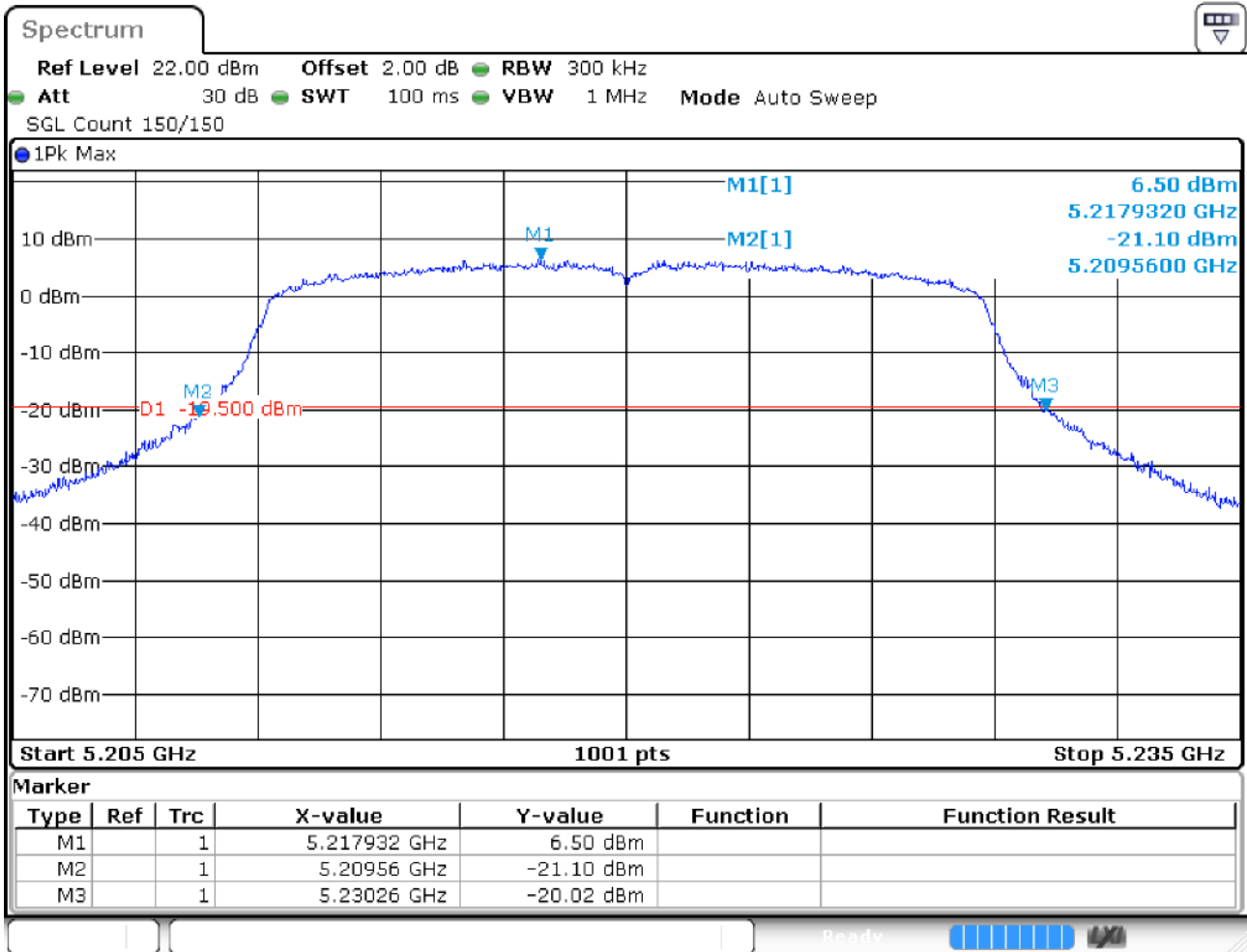


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4.5.2.9 11AC20\_44 ANT 1



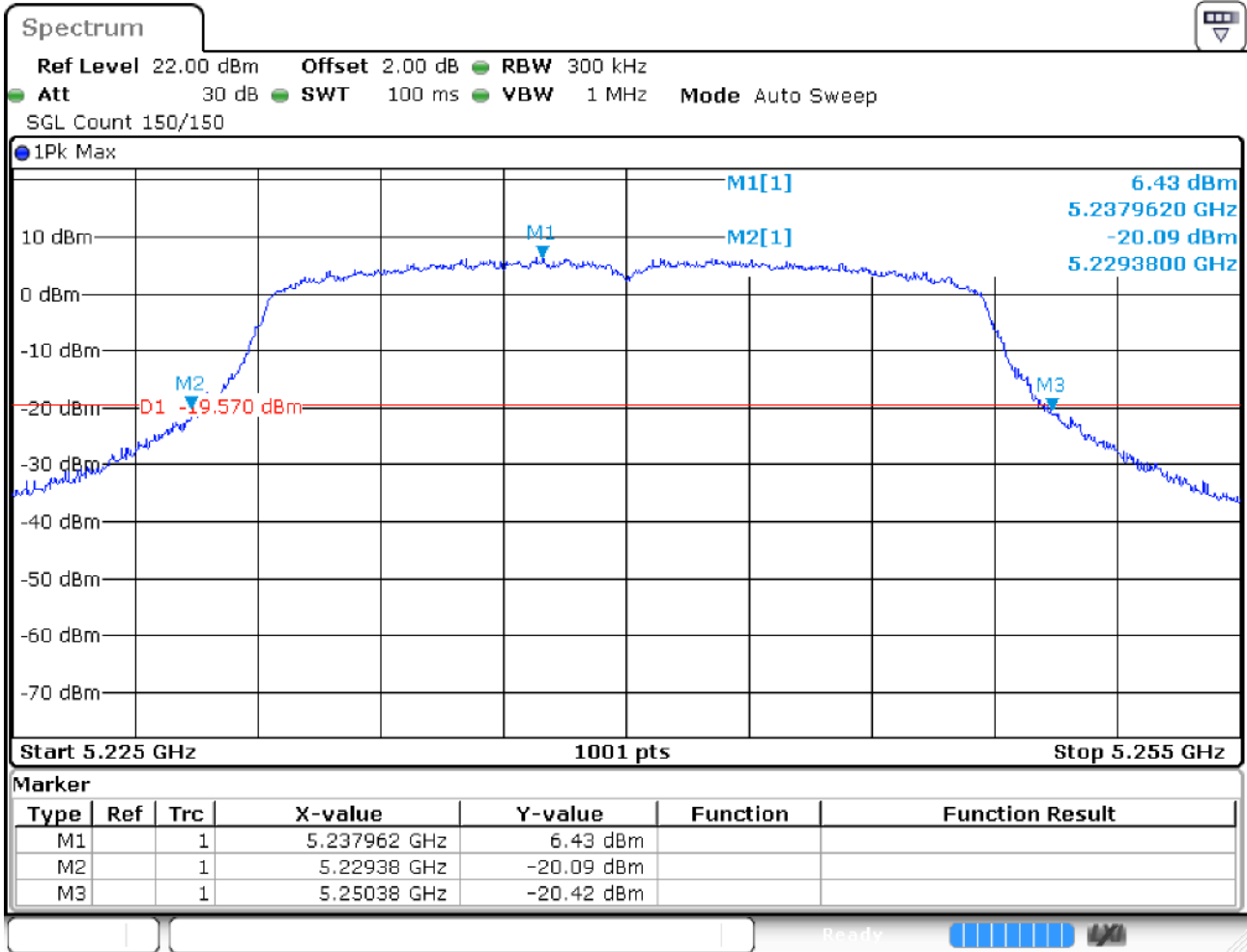
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**4.5.2.10 11AC20\_48 ANT 1**



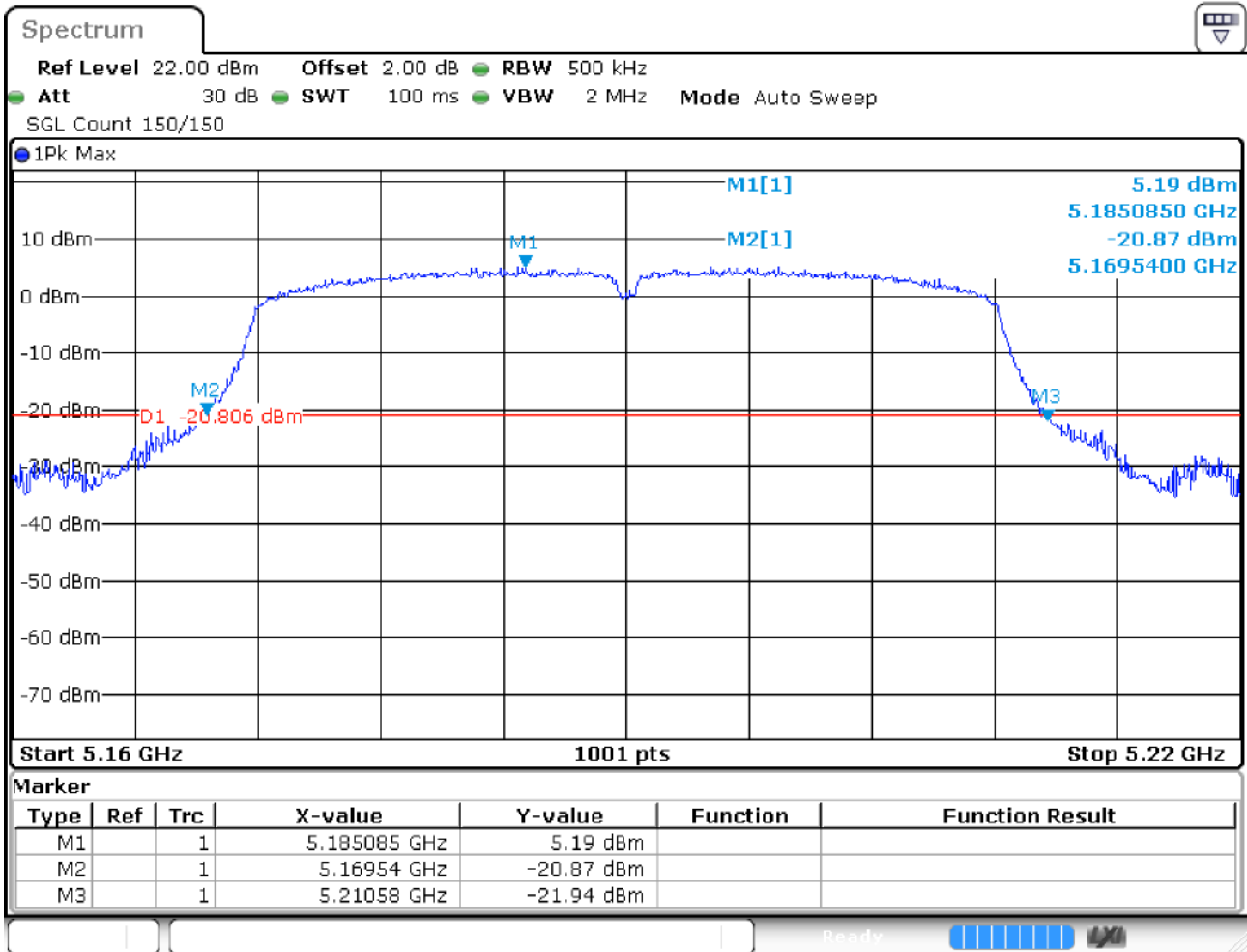
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4.5.2.11 11AC40\_38 ANT 1



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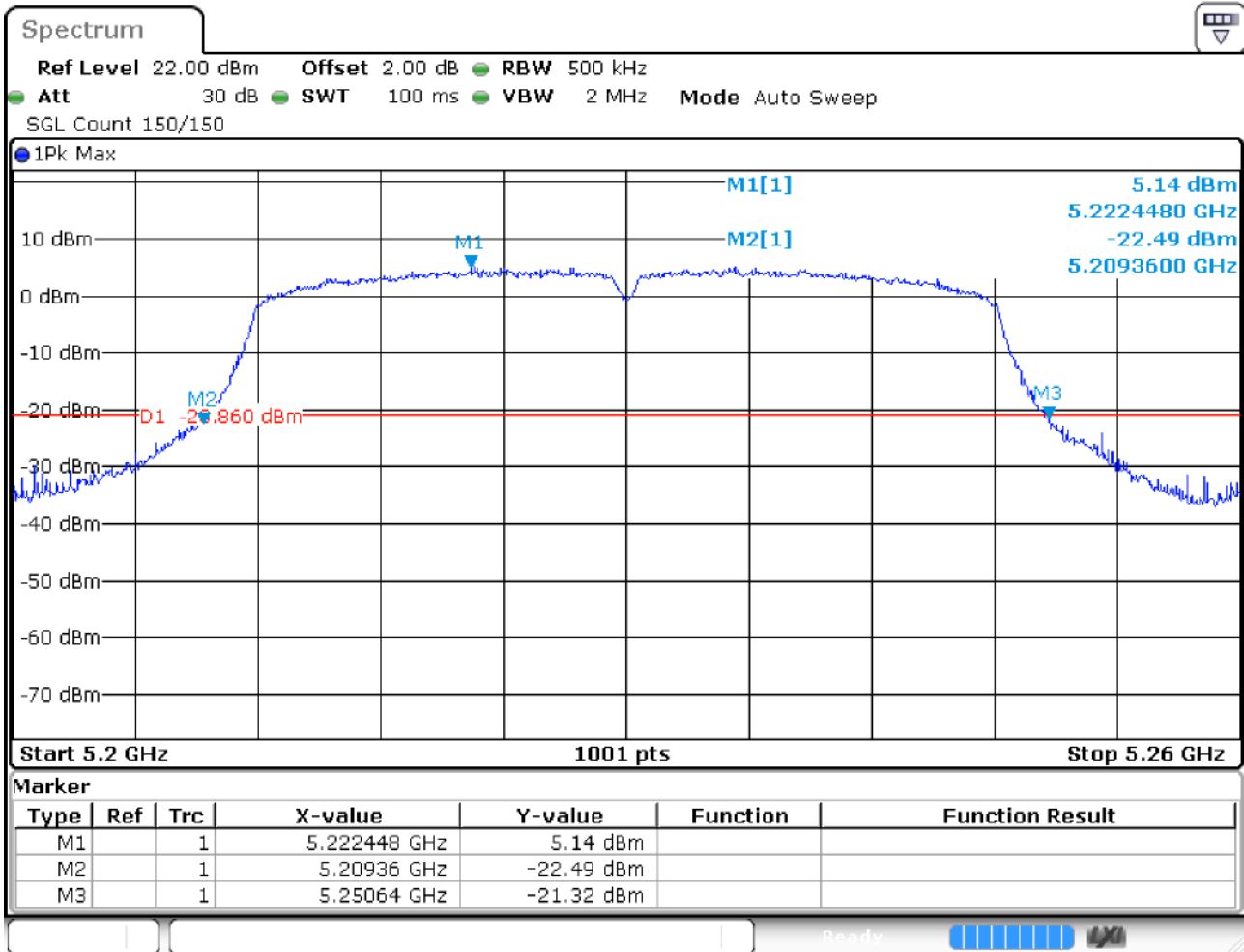


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4.5.2.12 11AC40\_46 ANT 1



Date: 29.SEP.2020 11:00:31

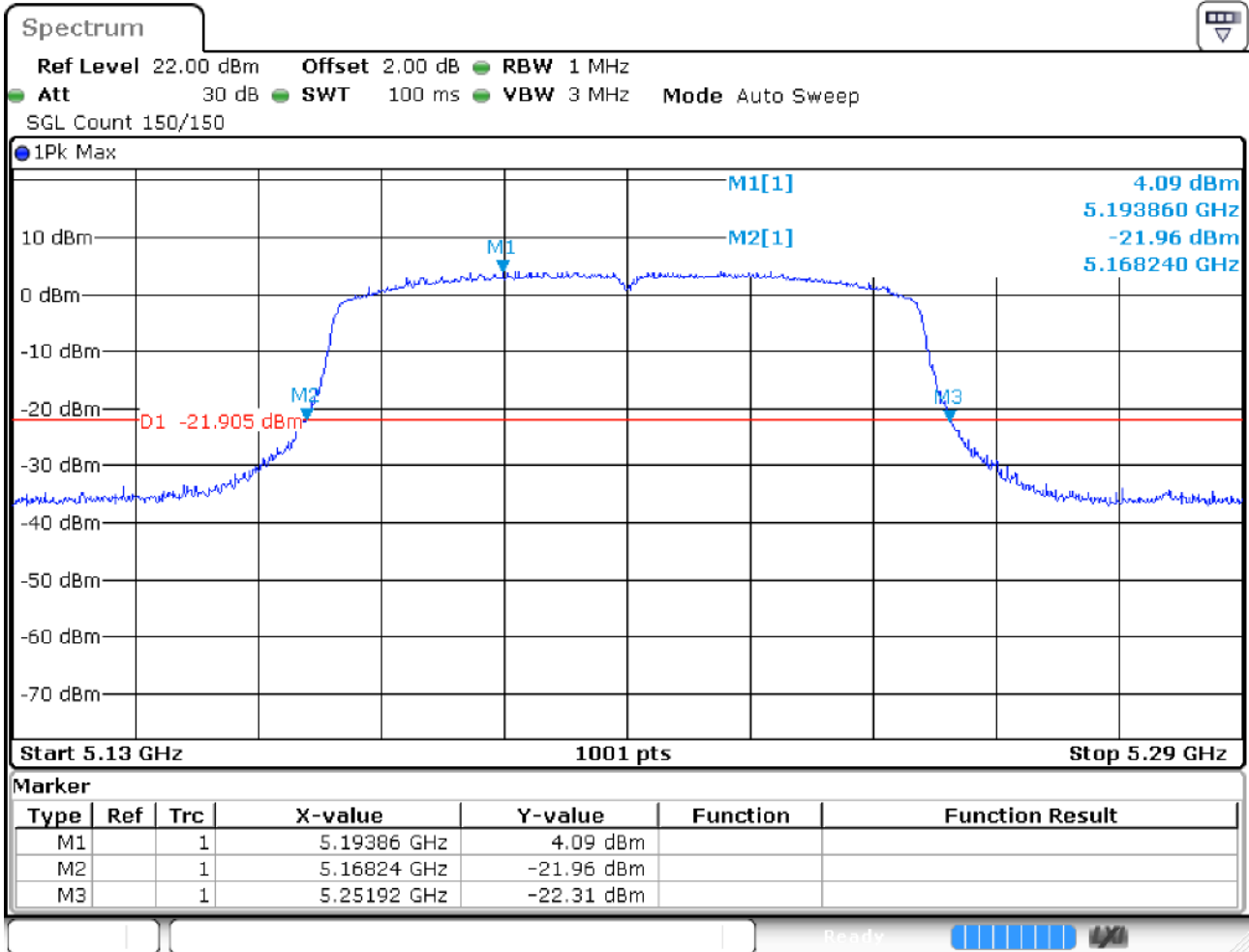


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**4.5.2.13 11AC80\_42 ANT 1**



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### 4.6 6dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(e)	
Test Method:	ANSI C63.10: 2013	
Test Setup:		
Test Instruments:	Refer to section 5.10 for details	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	<p>Through Pre-scan, find the</p> <ul style="list-style-type: none"> <li>6Mbps of rate is the worst case of 802.11a;</li> <li>MCS0 of rate is the worst case of 802.11n(HT20);</li> <li>MCS0 of rate is the worst case of 802.11n(HT40);</li> <li>MCS0 of rate is the worst case of 802.11ac(HT20);</li> <li>MCS0 of rate is the worst case of 802.11ac(HT40);</li> <li>MCS0 of rate is the worst case of 802.11ac(HT80).</li> </ul> <p>Only the worst case is recorded in the report.</p>	
Limit:	Frequency Band	Limit
	5725-5850MHz	At least 500kHz
Test Results:	Pass	



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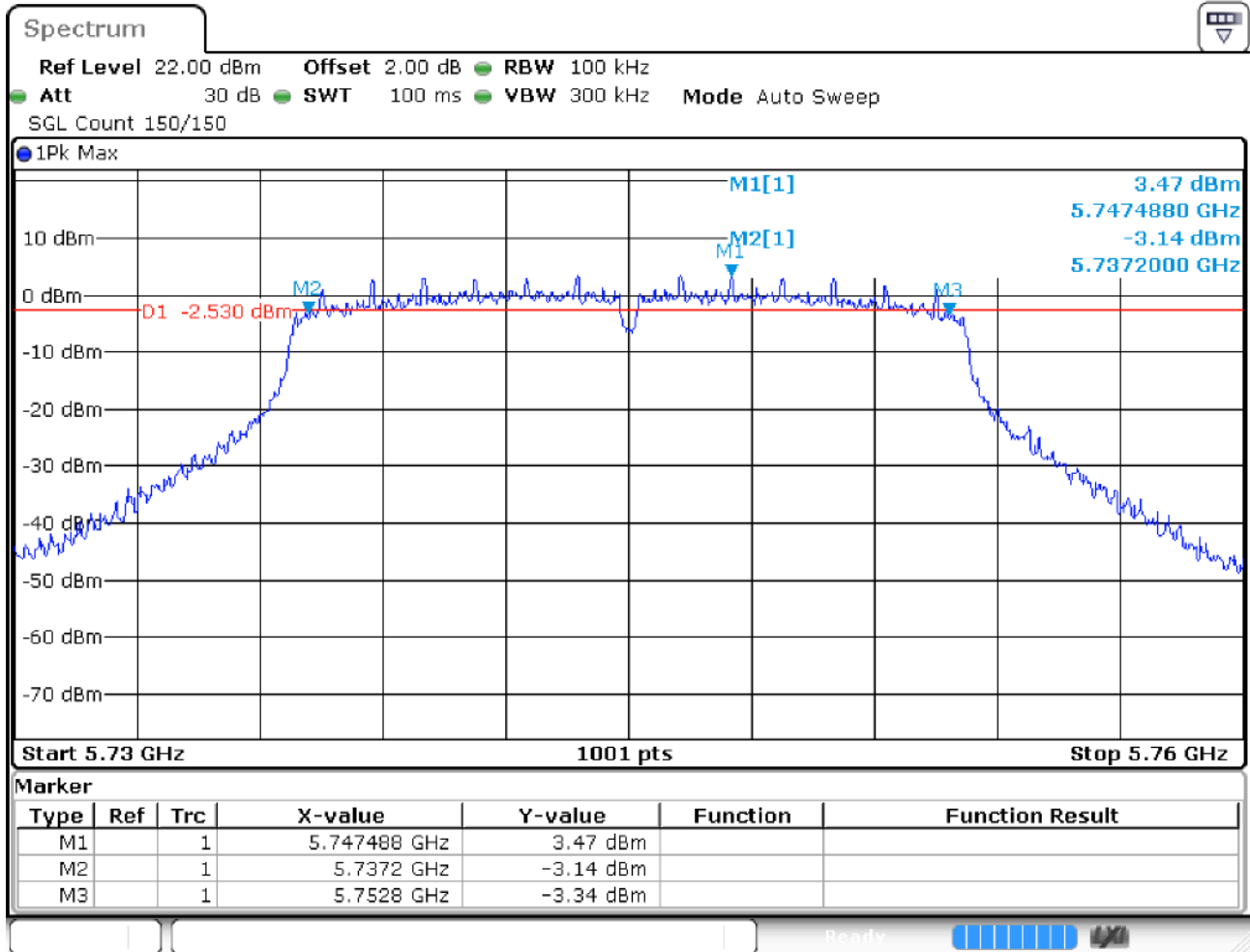
**4.6.1 Test Results for 6dB Emission Bandwidth**

Test Mode	Test Channel	Frequency [MHz]	ANT	6dB Emission Bandwidth [MHz]	Verdict
11A20	149	5745	ANT 1	15.6	PASS
	157	5785	ANT 1	15.6	PASS
	165	5825	ANT 1	15.6	PASS
11N20	149	5745	ANT 1	15.18	PASS
	157	5745	ANT 1	15.18	PASS
	165	5825	ANT 1	15.51	PASS
11N40	151	5755	ANT 1	35.28	PASS
	159	5795	ANT 1	35.28	PASS
11AC20	149	5745	ANT 1	15.39	PASS
	149	5785	ANT 1	15.18	PASS
	165	5825	ANT 1	15.39	PASS
11AC40	151	5755	ANT 1	35.28	PASS
	159	5795	ANT 1	35.28	PASS
11AC80	155	5775	ANT 1	75.52	PASS



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**4.6.2 Plots for 6dB Emission Bandwidth**  
**4.6.2.1 11A20\_149 ANT 1**



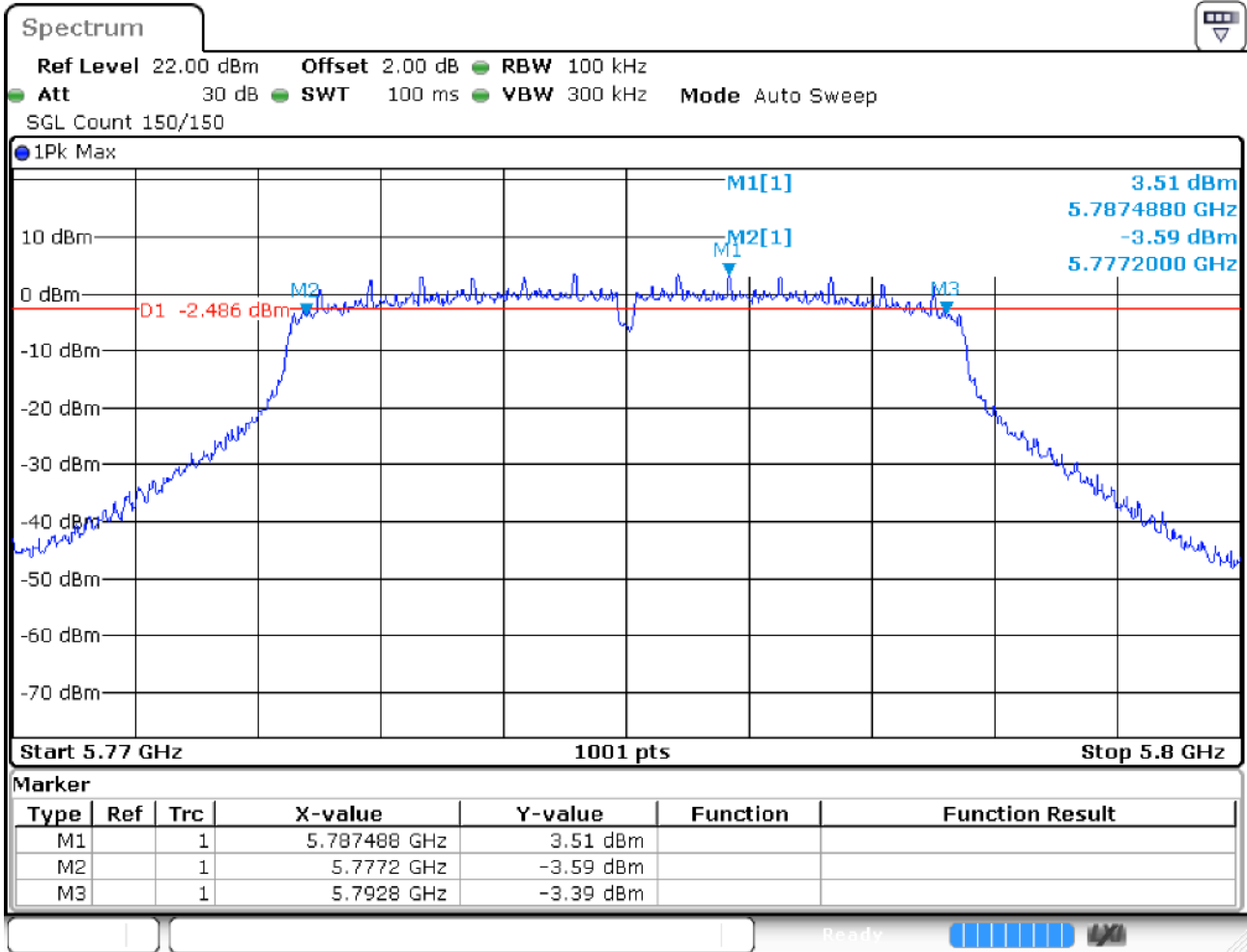
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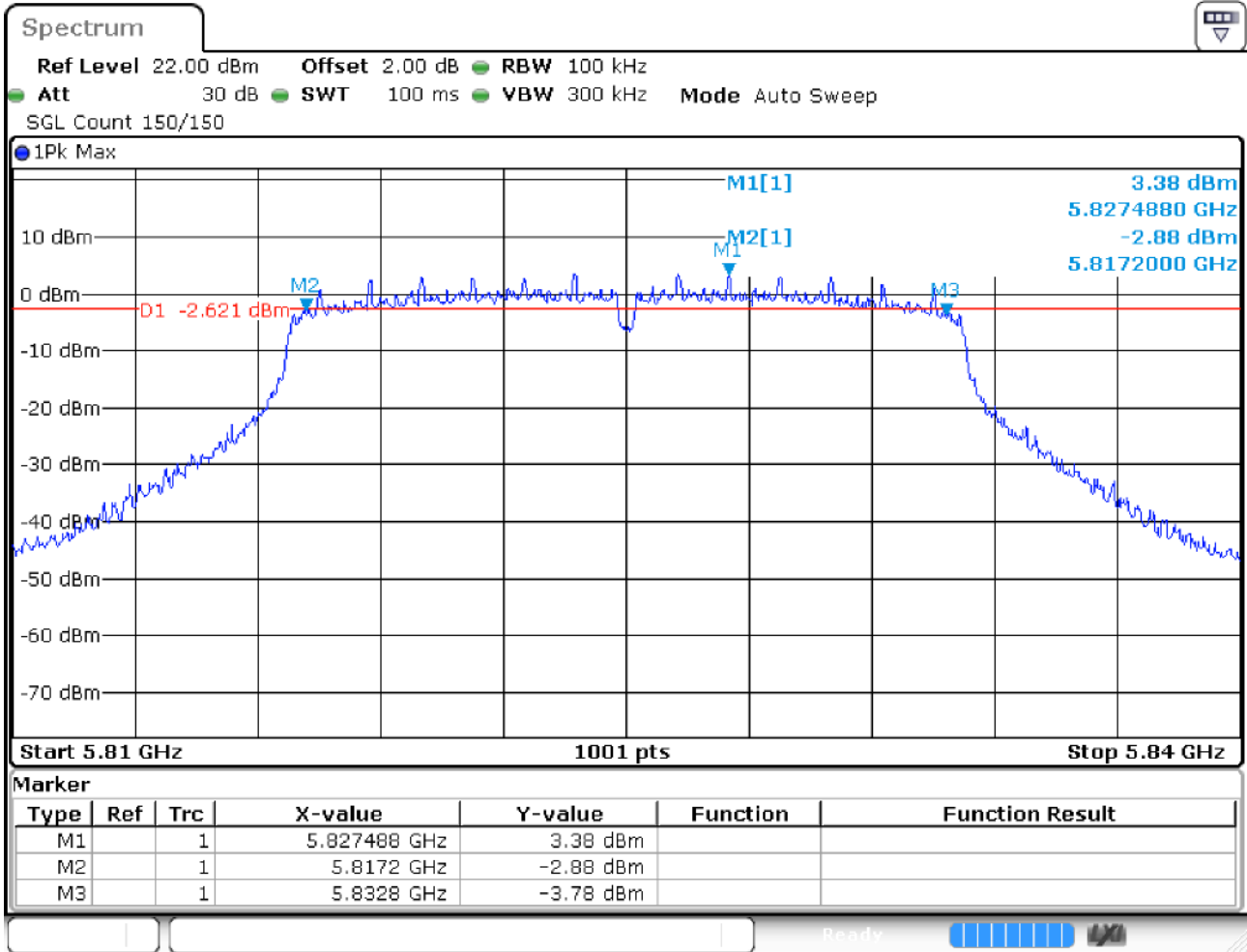
4.6.2.2 11A20\_157ANT 1



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4.6.2.3 11A20\_165 ANT 1



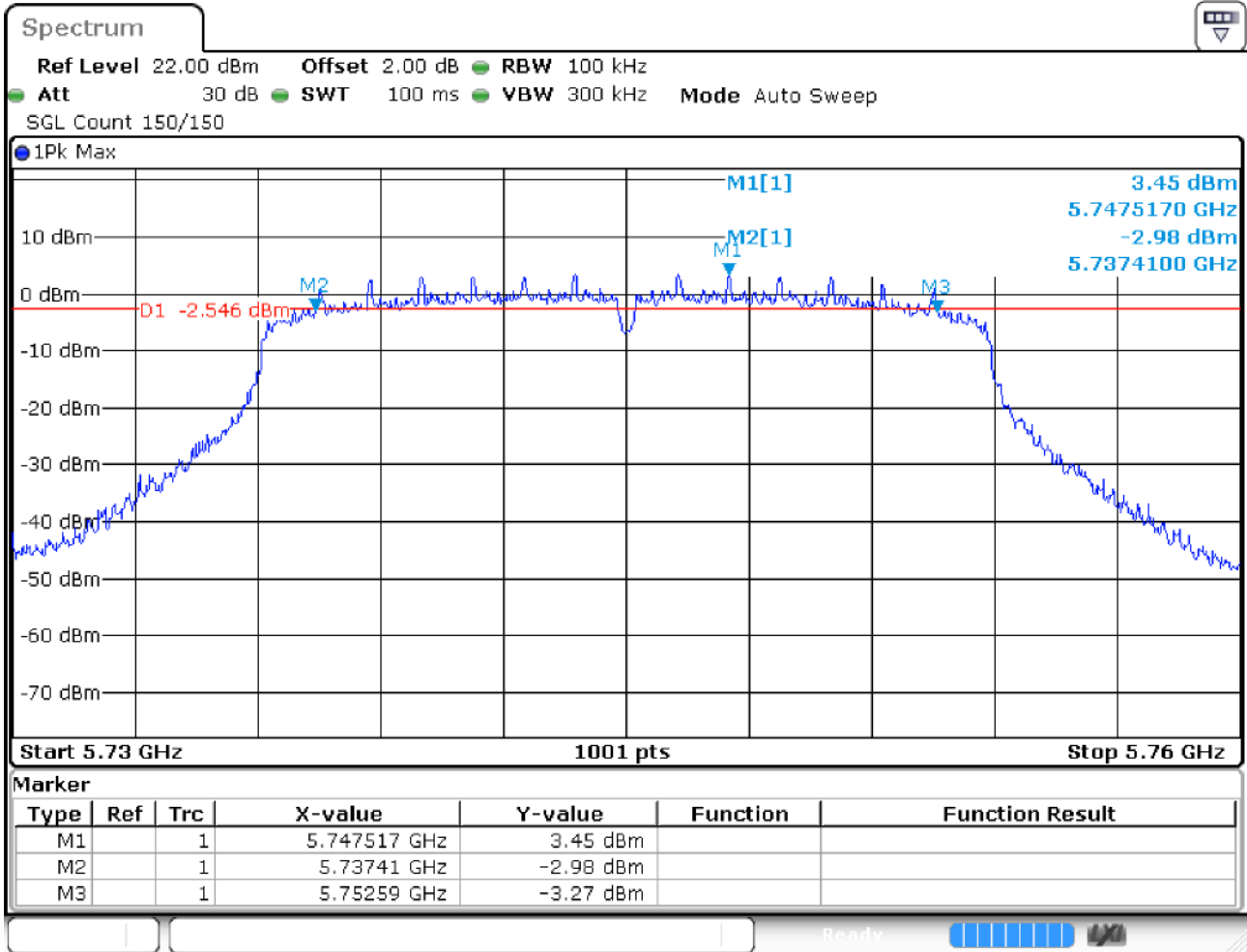
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4.6.2.4 11N20\_149 ANT 1

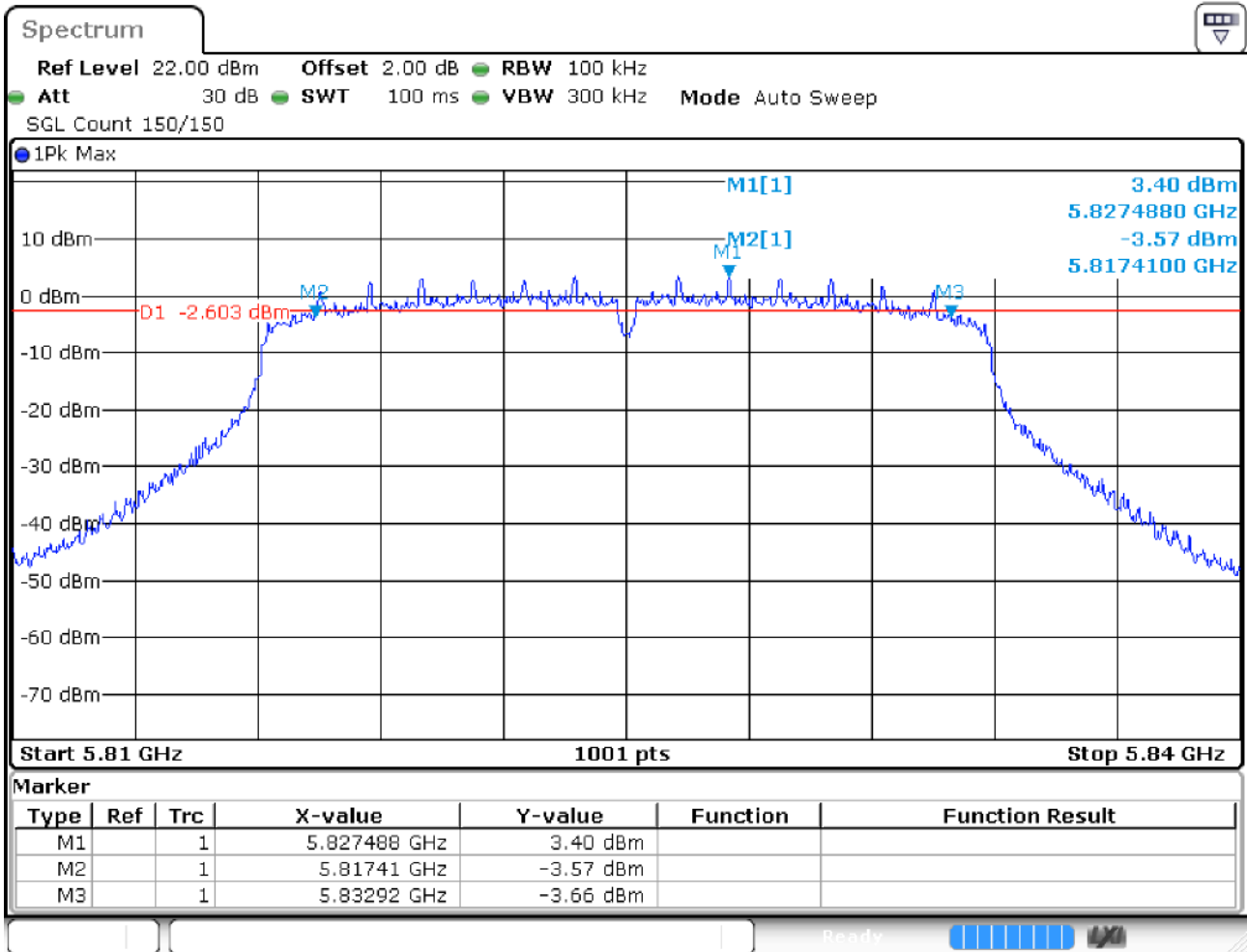


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4.6.2.5 11N20\_165 ANT 1

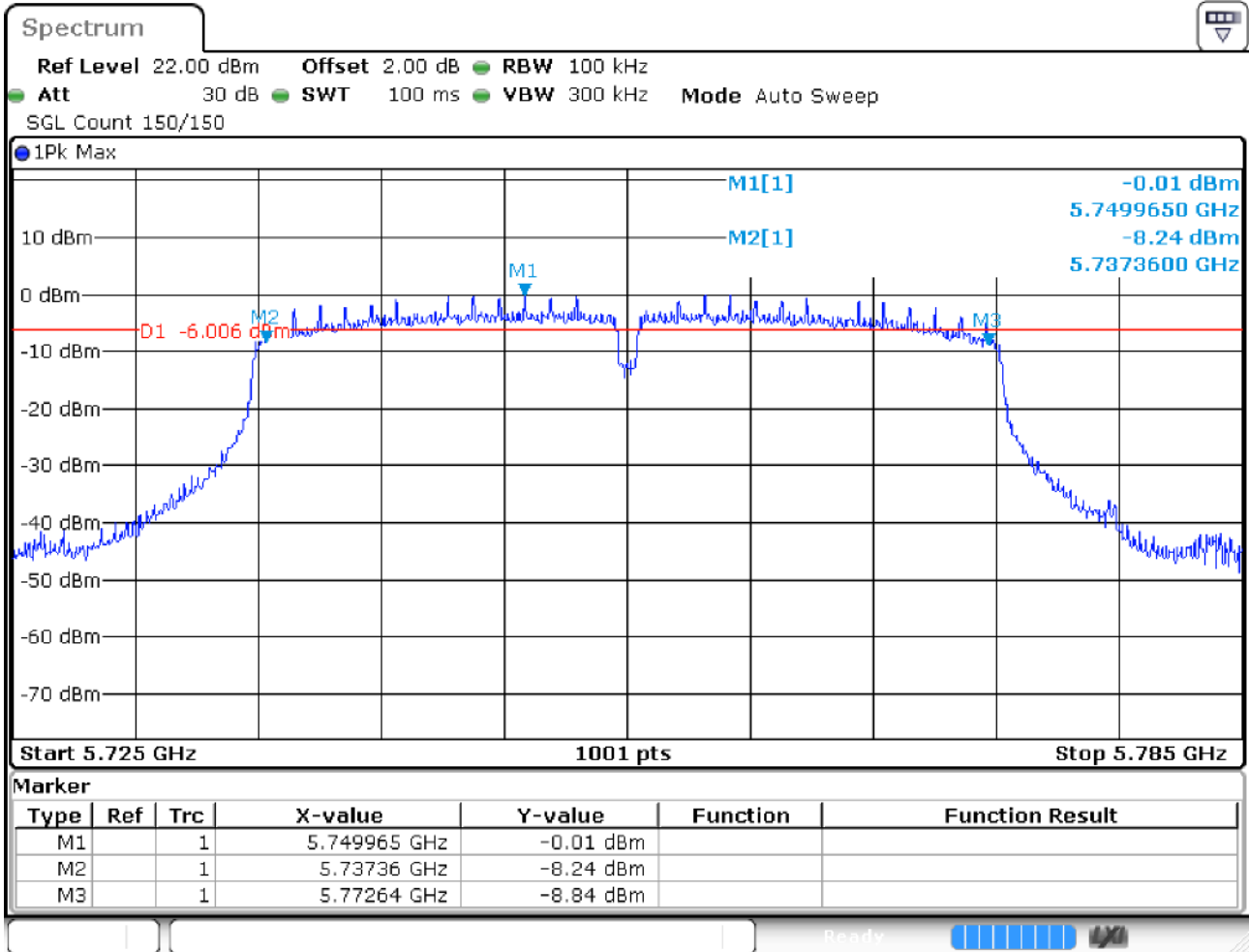


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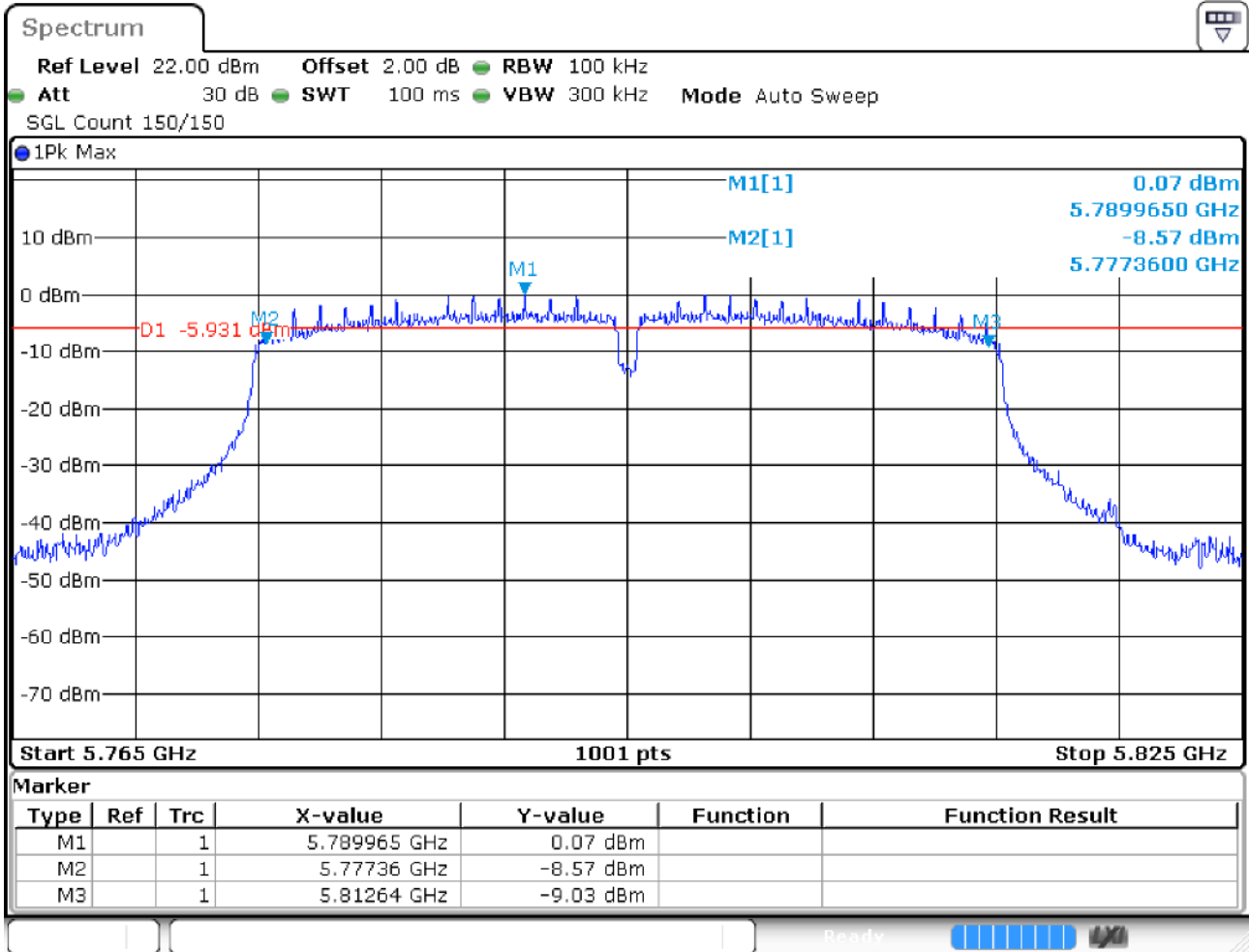
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Date: 29.SEP.2020 10:44:32



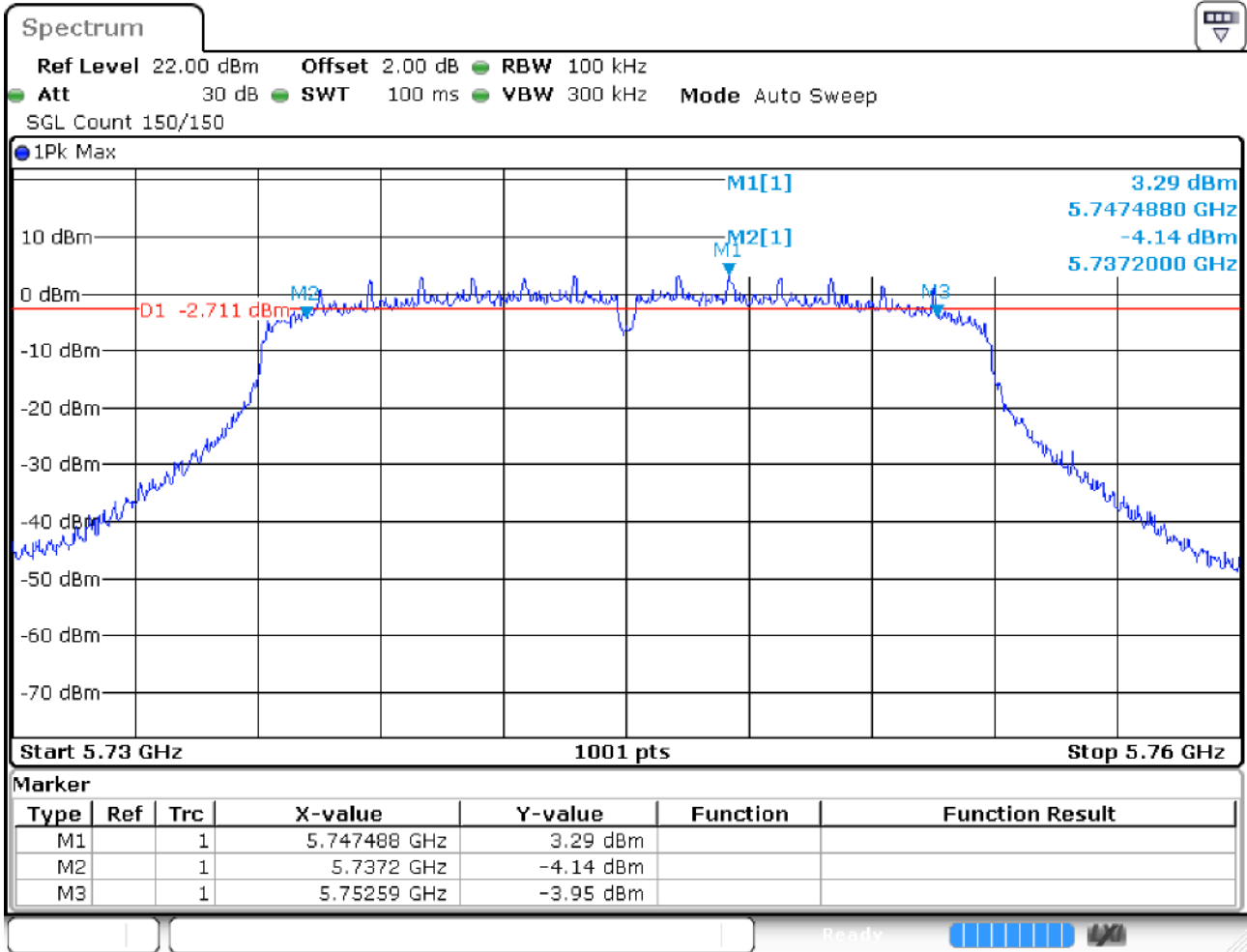
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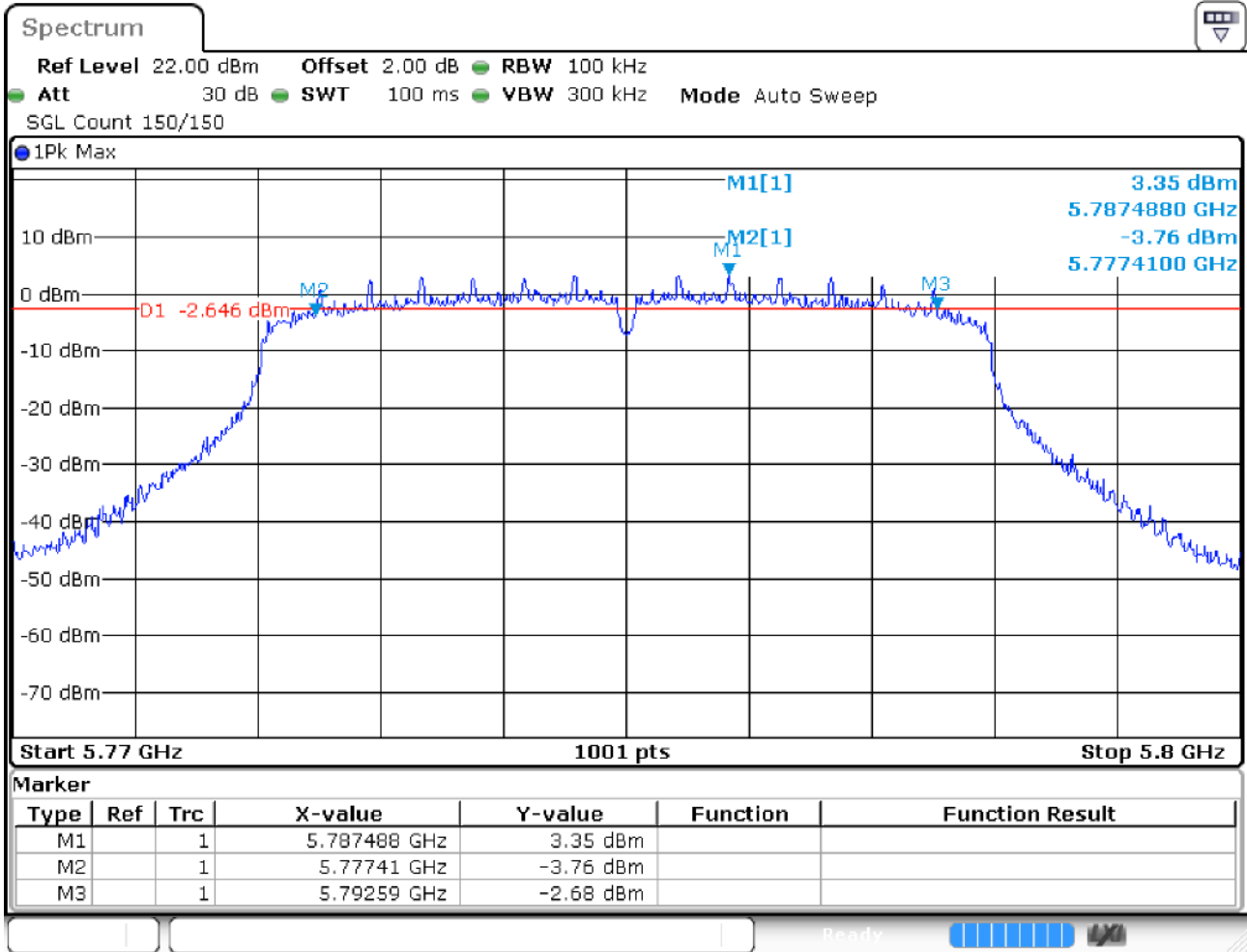
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Date: 29.SEP.2020 10:53:33



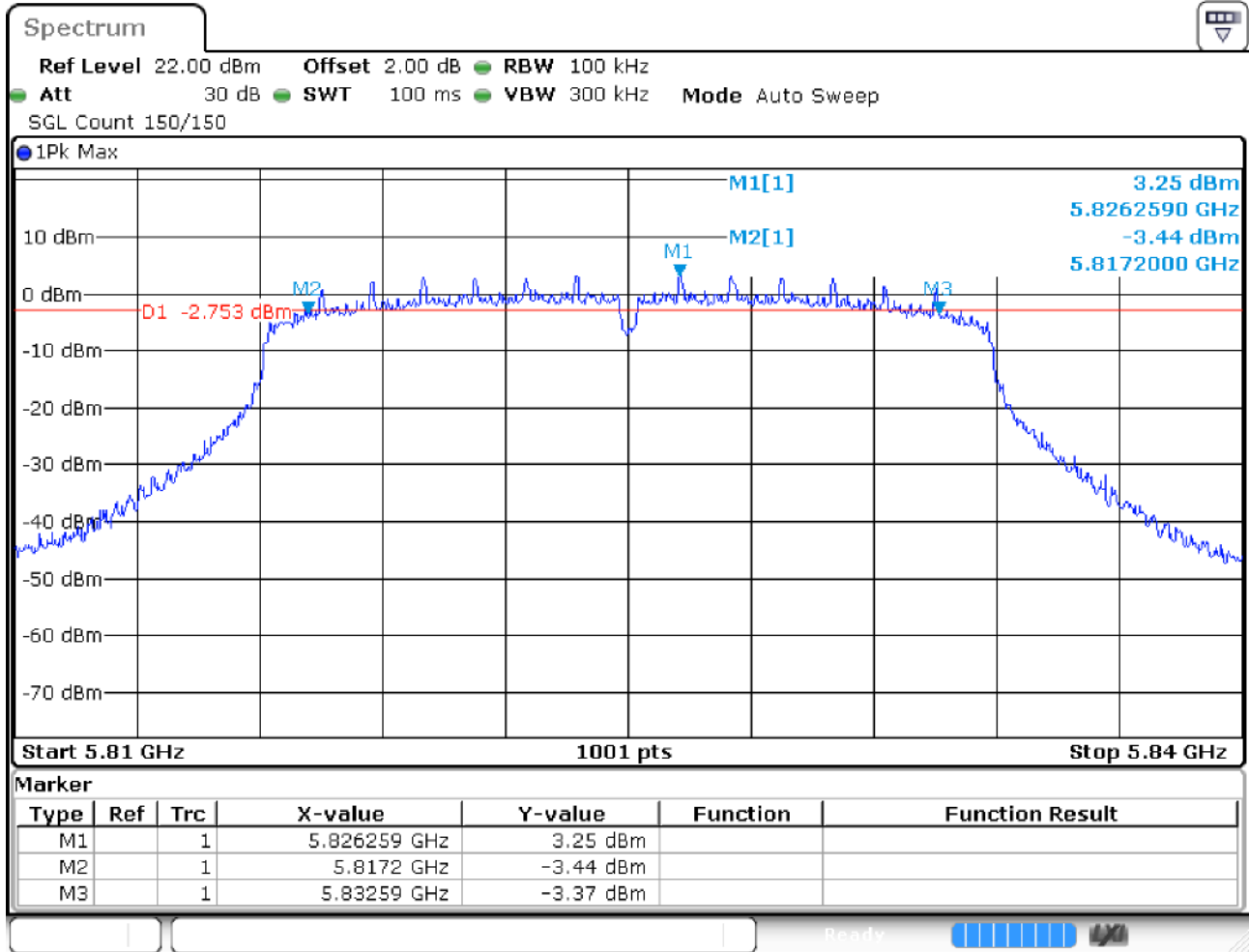
**4.6.2.9 11AC20\_157 ANT 1**



Date: 29.SEP.2020 10:55:09



4.6.2.10 11AC20\_165 ANT 1



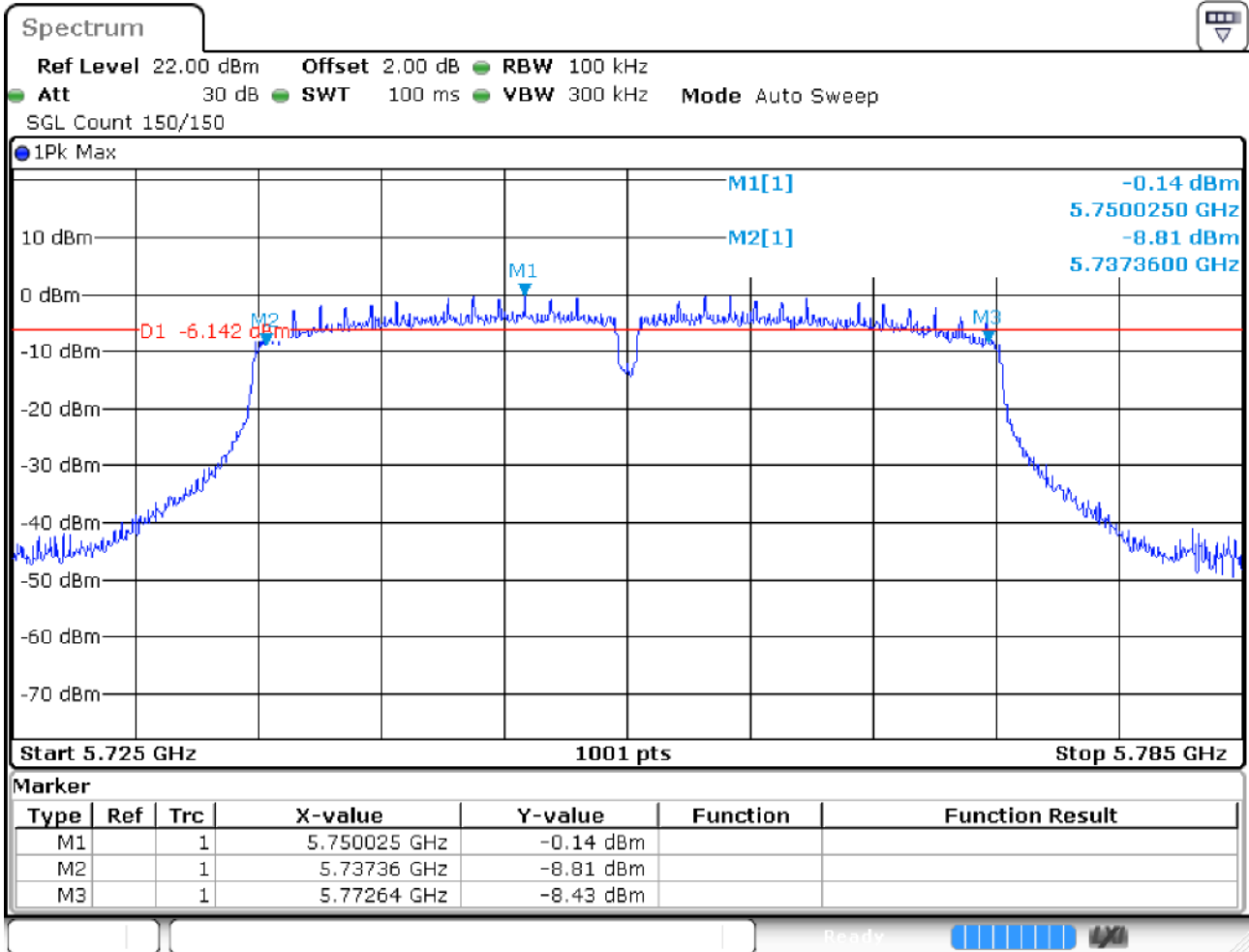
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4.6.2.11 11AC40\_151 ANT 1



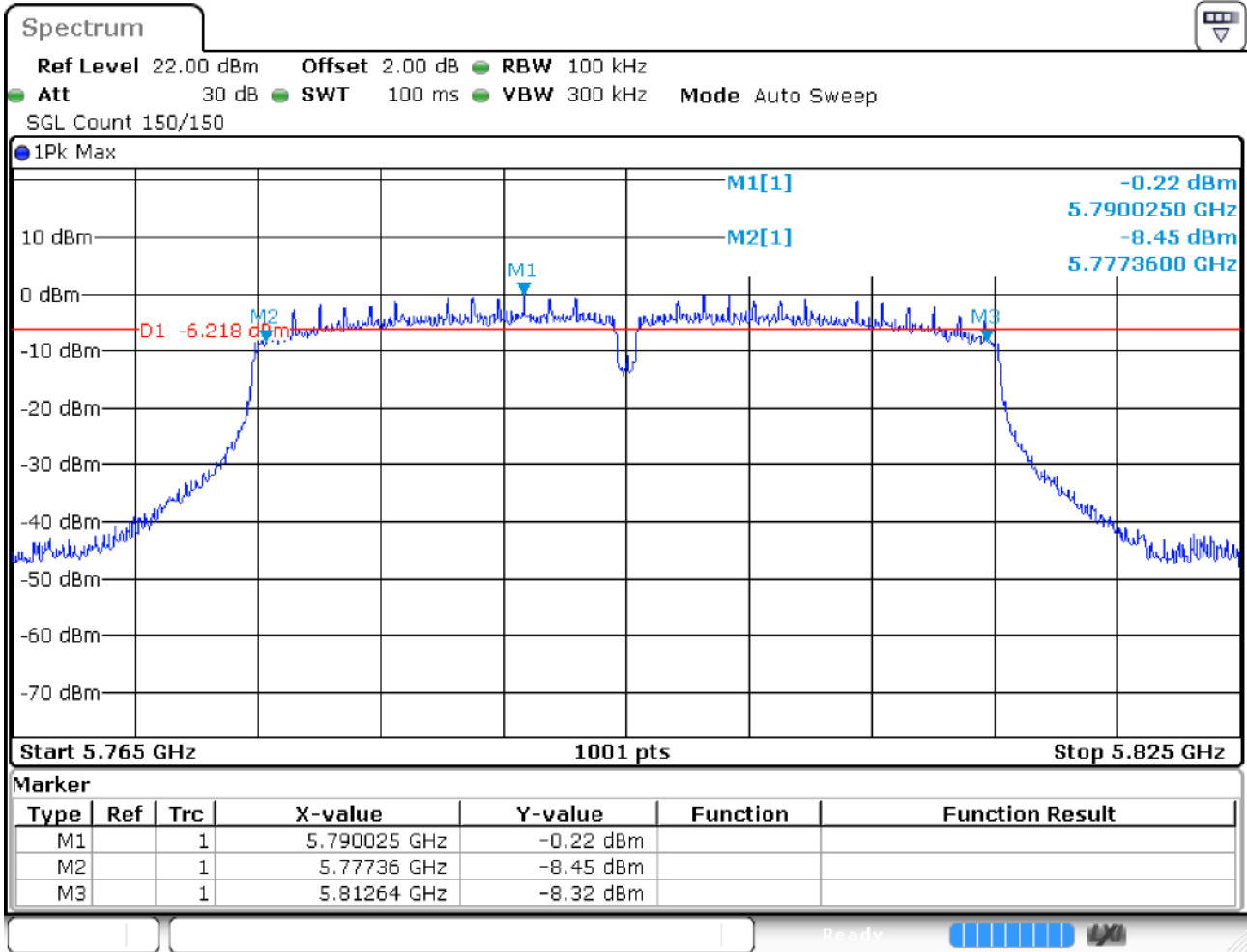
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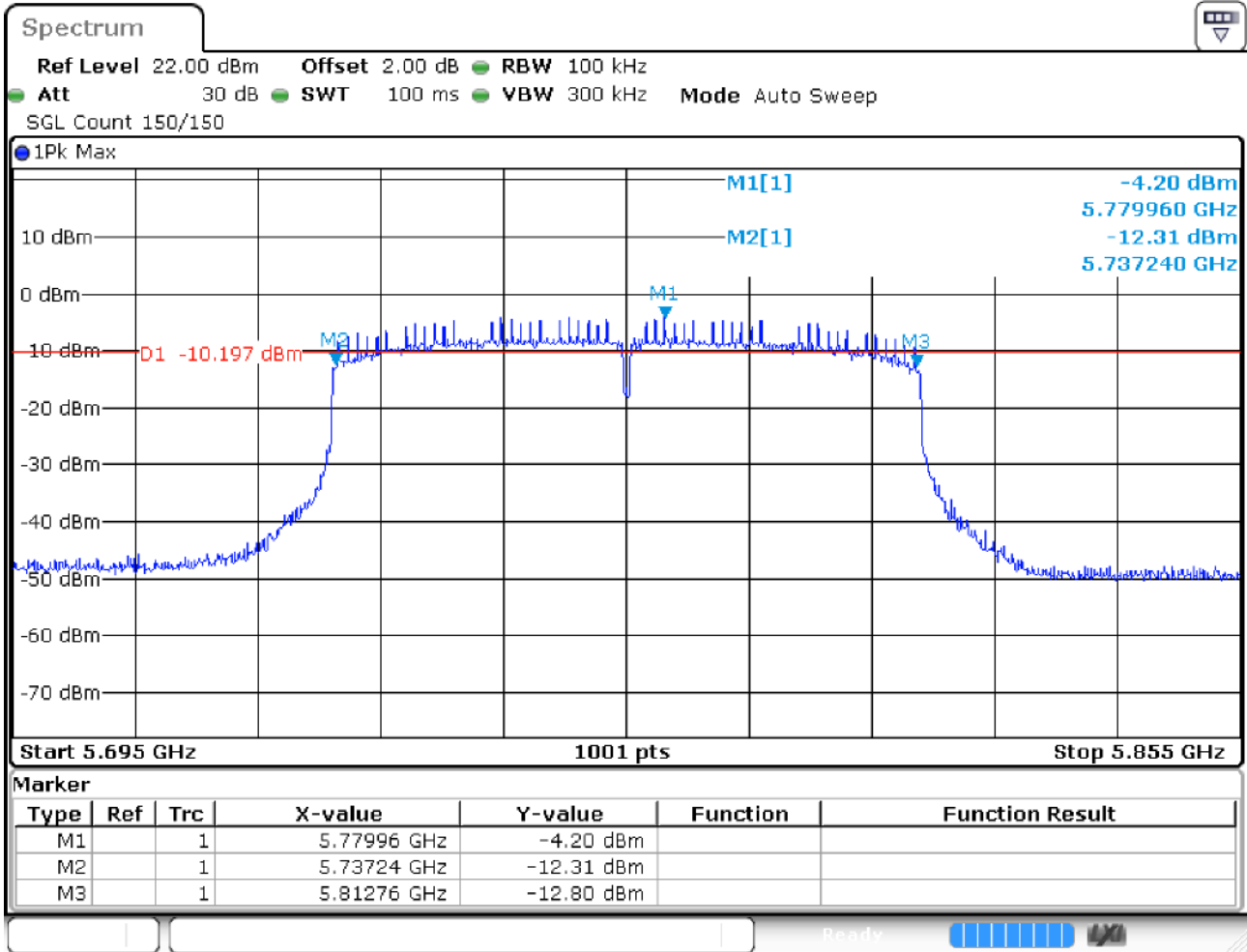
**4.6.2.12 11AC40\_159 ANT 1**



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4.6.2.13 11AC80\_155 ANT 1



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 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

### 4.7 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(e)	
Test Method:	ANSI C63.10: 2013	
Test Setup:		
Test Instruments:	Refer to section 5.10 for details	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	<p>Through Pre-scan, find the</p> <ul style="list-style-type: none"> <li>6Mbps of rate is the worst case of 802.11a;</li> <li>MCS0 of rate is the worst case of 802.11n(HT20);</li> <li>MCS0 of rate is the worst case of 802.11n(HT40);</li> <li>MCS0 of rate is the worst case of 802.11ac(HT20);</li> <li>MCS0 of rate is the worst case of 802.11ac(HT40);</li> <li>MCS0 of rate is the worst case of 802.11ac(HT80).</li> </ul> <p>Only the worst case is recorded in the report.</p>	
Limit:	Frequency Band	Limit
	5725-5850MHz	At least 500kHz
Test Results:	Pass	



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**4.7.1 Test Results for 99% Occupied Bandwidth**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Occupied Bandwidth [MHz]	Verdict
11A20	36	5180	ANT 1	16.3037	PASS
	44	5220	ANT 1	16.3037	PASS
	48	5240	ANT 1	16.3037	PASS
	149	5745	ANT 1	16.2737	PASS
	157	5785	ANT 1	16.2737	PASS
	165	5825	ANT 1	16.2737	PASS
11N20	36	5180	ANT 1	17.4126	PASS
	44	5220	ANT 1	17.4126	PASS
	48	5240	ANT 1	17.4126	PASS
	149	5745	ANT 1	17.4126	PASS
	157	5785	ANT 1	17.3826	PASS
	165	5825	ANT 1	17.3826	PASS
11N40	38	5190	ANT 1	35.9041	PASS
	46	5230	ANT 1	35.8442	PASS
	151	5755	ANT 1	35.9041	PASS
	159	5795	ANT 1	35.9041	PASS
11AC20	36	5180	ANT 1	17.4126	PASS
	44	5220	ANT 1	17.4126	PASS
	48	5240	ANT 1	17.4126	PASS
	149	5745	ANT 1	17.4126	PASS
	157	5785	ANT 1	17.3826	PASS
	165	5825	ANT 1	17.3826	PASS
11AC40	38	5190	ANT 1	35.9041	PASS
	46	5230	ANT 1	35.9041	PASS
	151	5755	ANT 1	35.9041	PASS
	159	5795	ANT 1	35.9041	PASS
11AC80	42	5210	ANT 1	75.045	PASS
	155	5775	ANT 1	75.1648	PASS



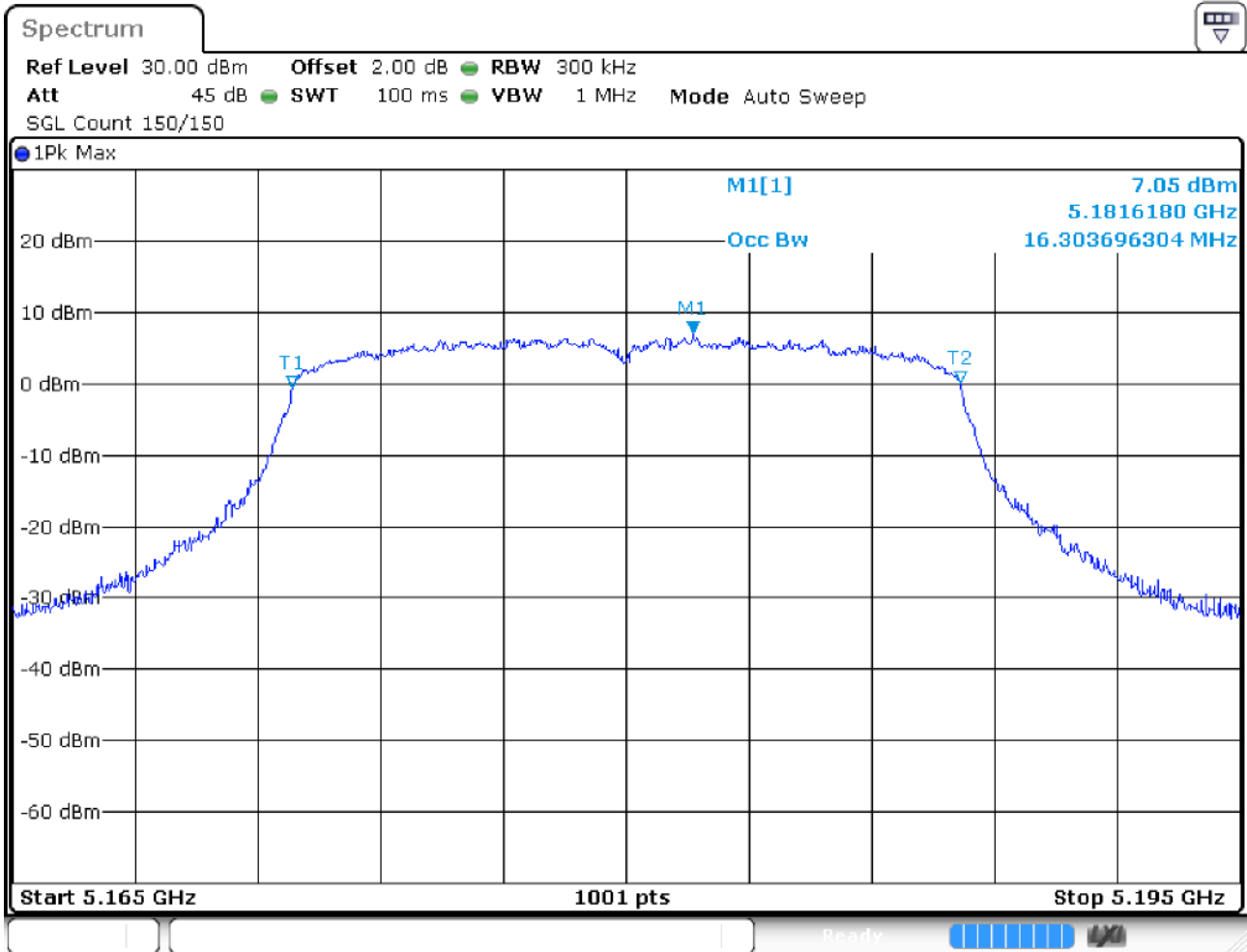
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### 4.7.2 Plots for 99% Occupied Bandwidth

#### 4.7.2.1 11A20\_36 ANT 1



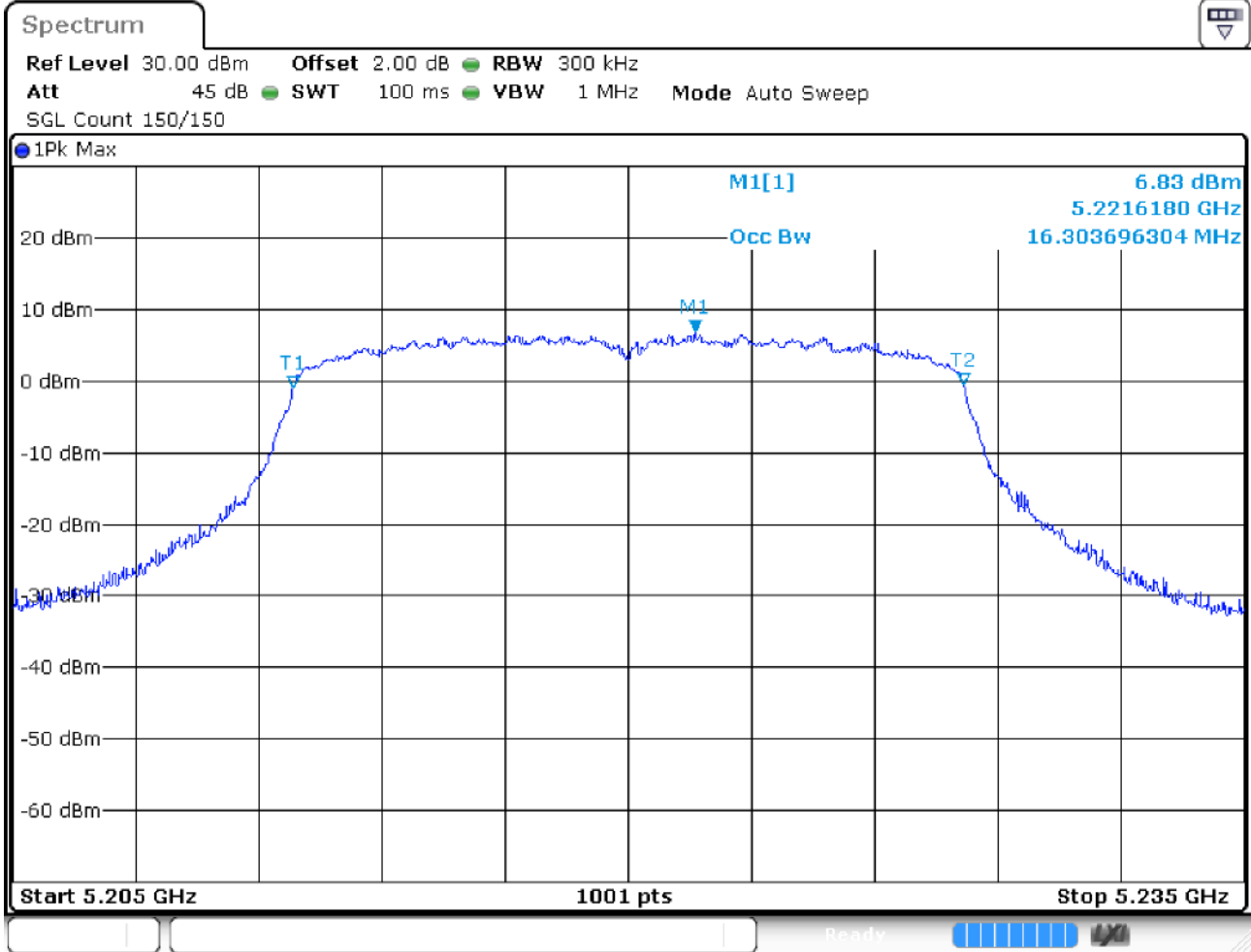
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**4.7.2.2 11A20\_44 ANT 1**

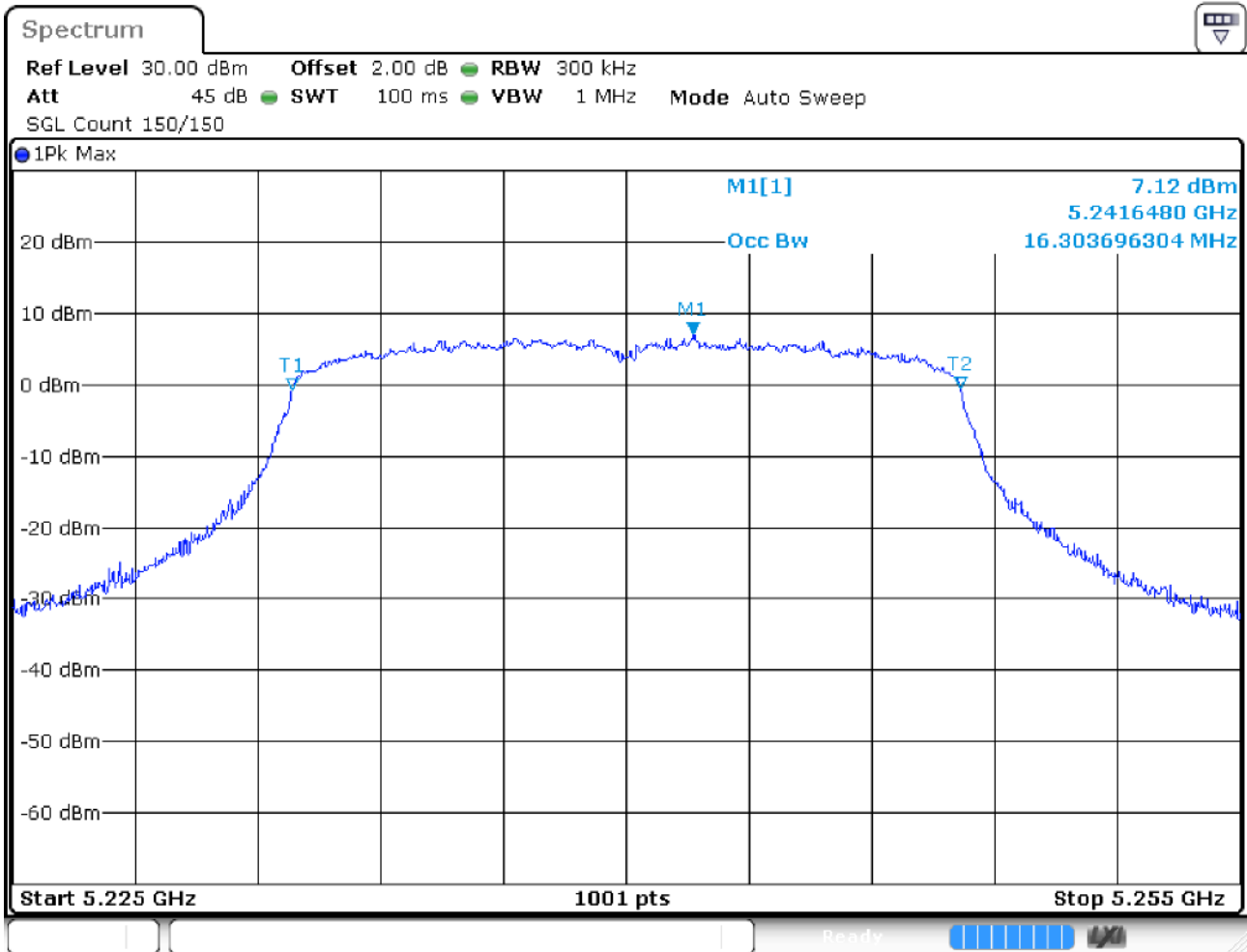


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4.7.2.3 11A20\_48 ANT 1

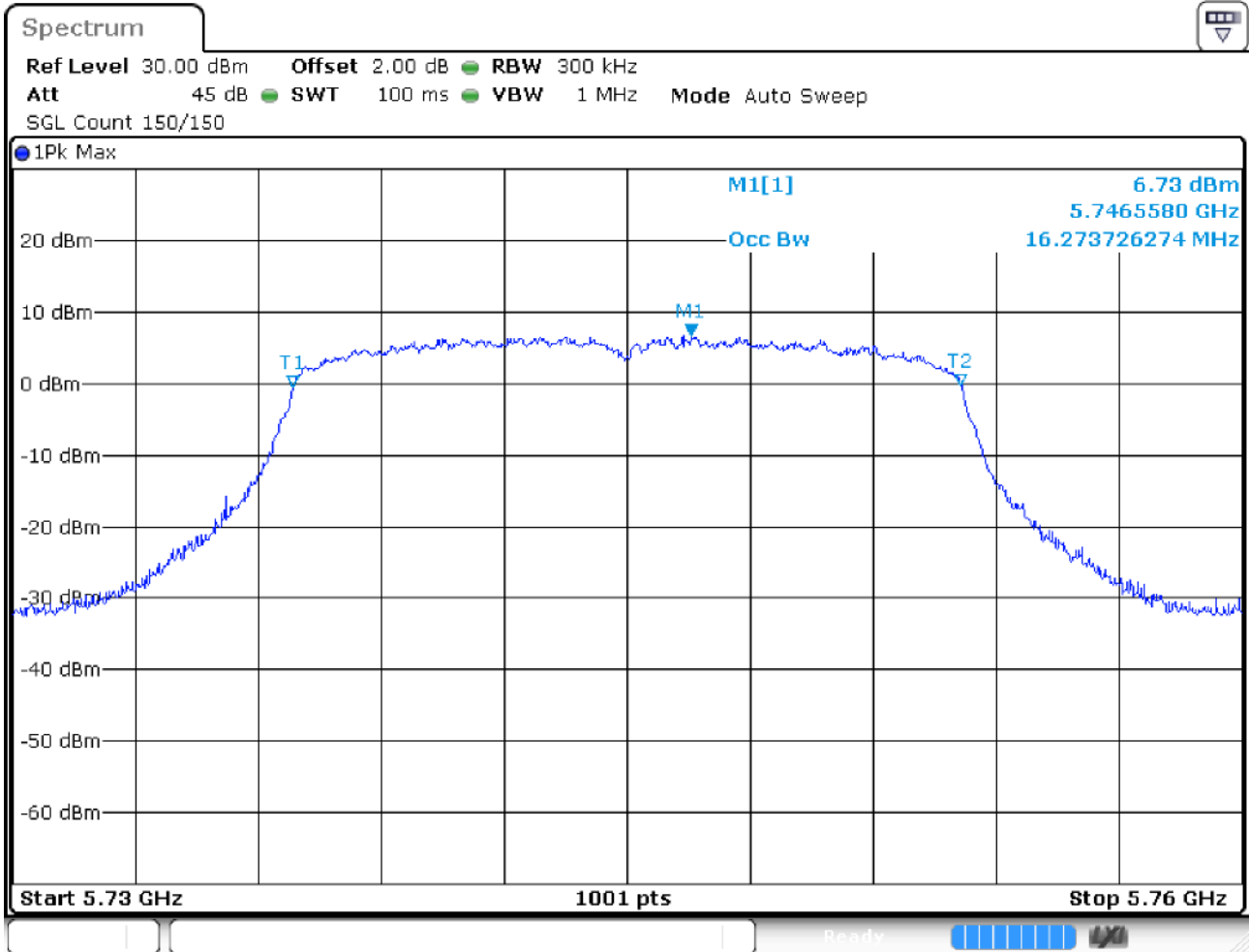


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4.7.2.4 11A20\_149 ANT 1

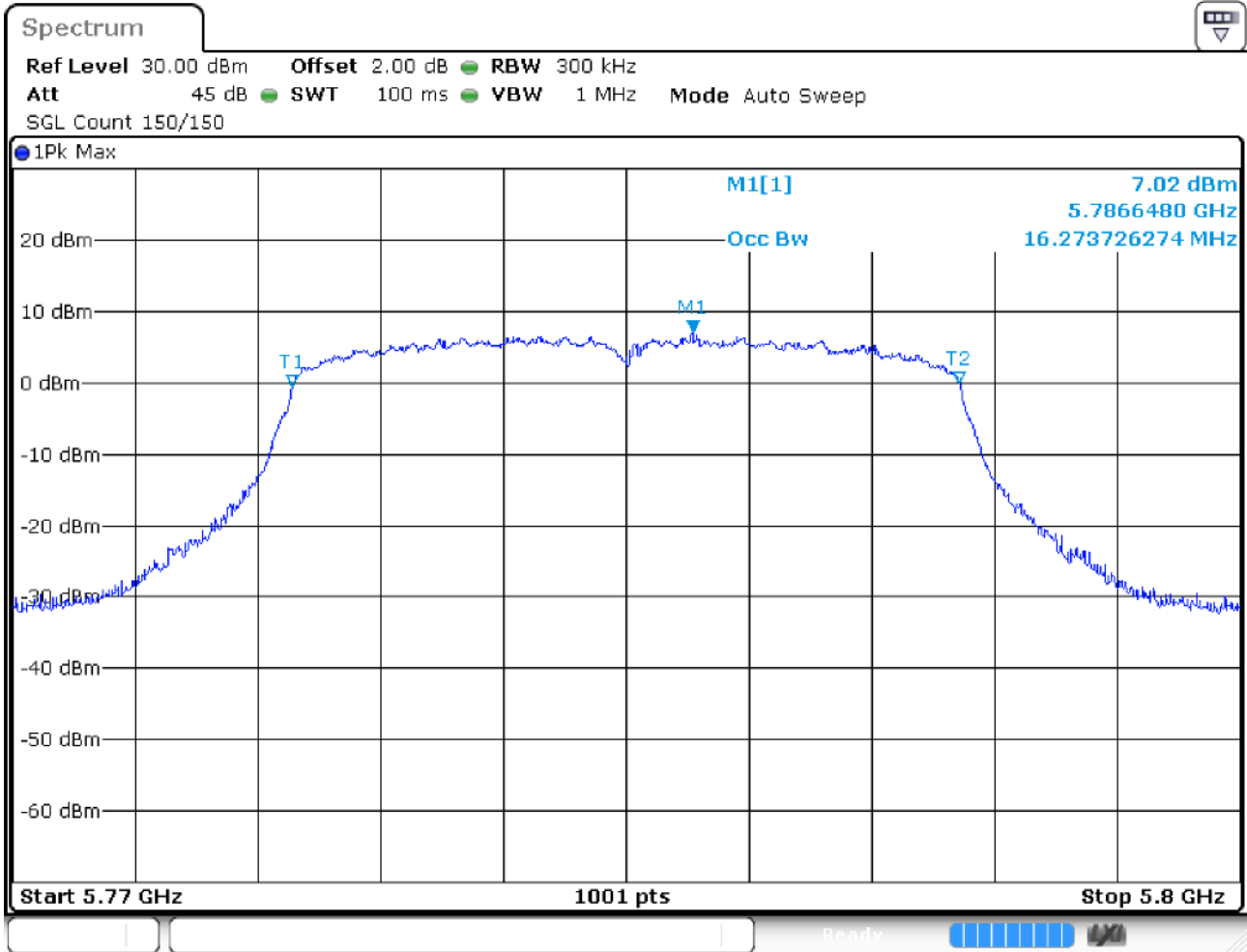


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**4.7.2.5 11A20\_157 ANT 1**



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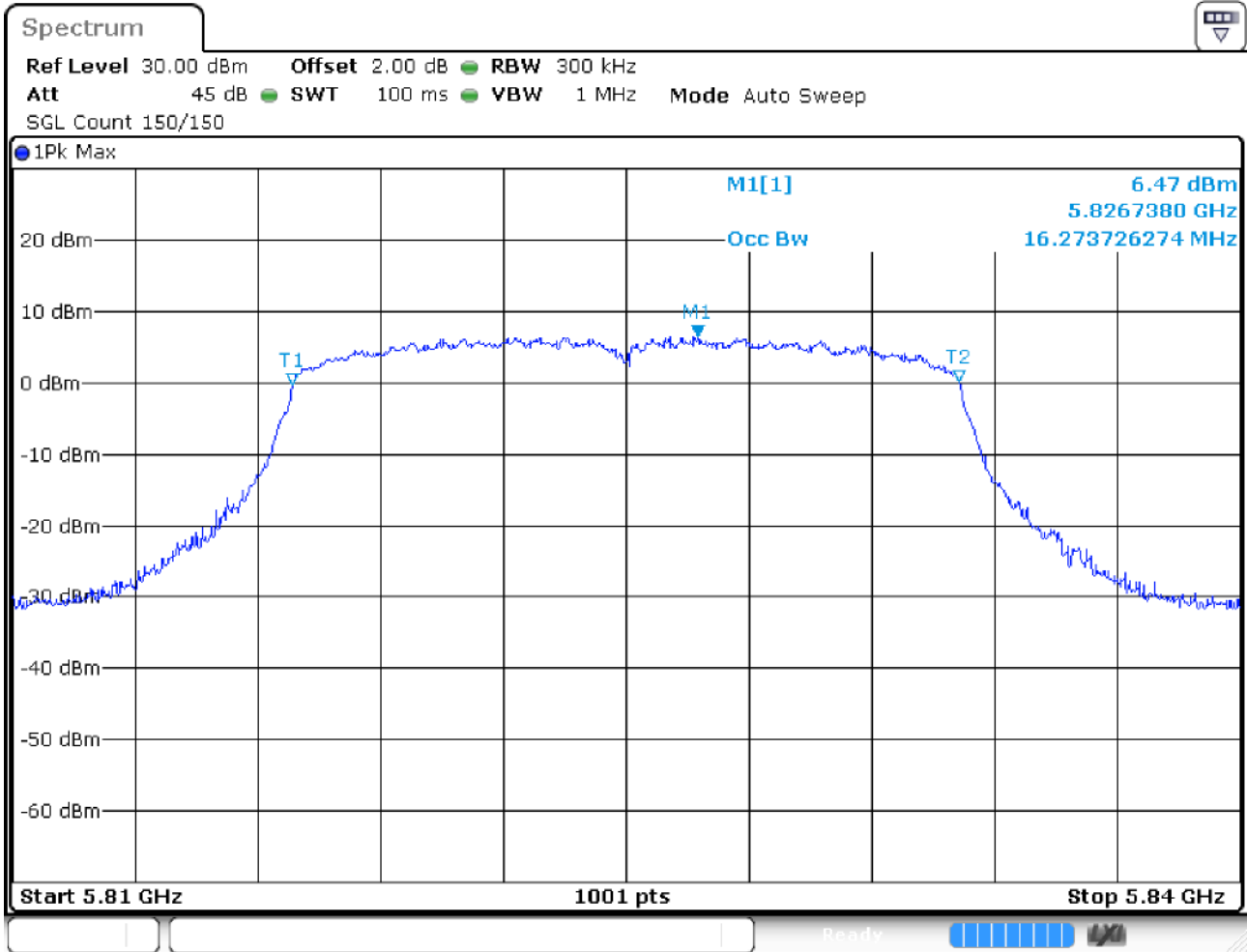


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**4.7.2.6 11A20\_165 ANT 1**



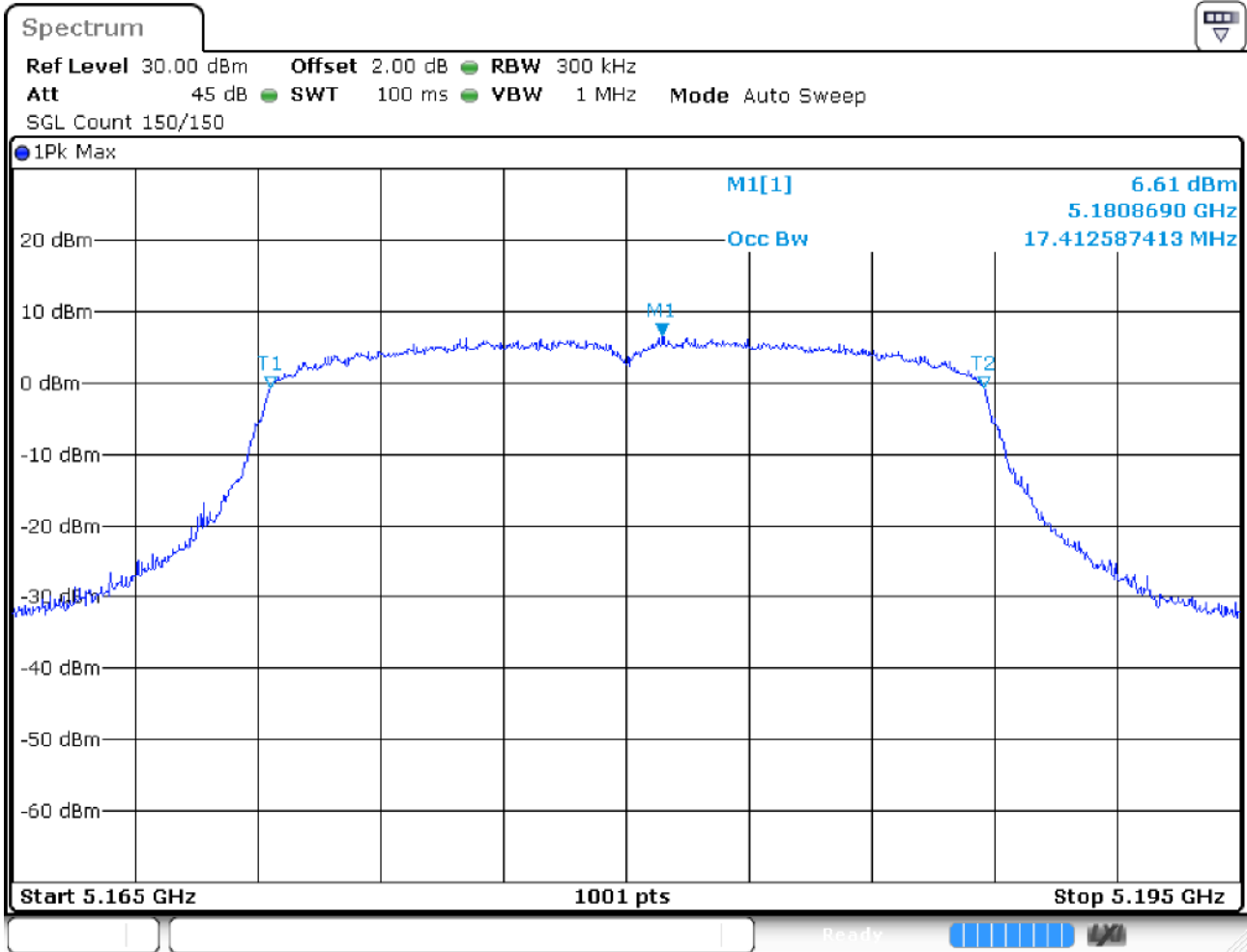
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4.7.2.7 11N20\_36 ANT 1



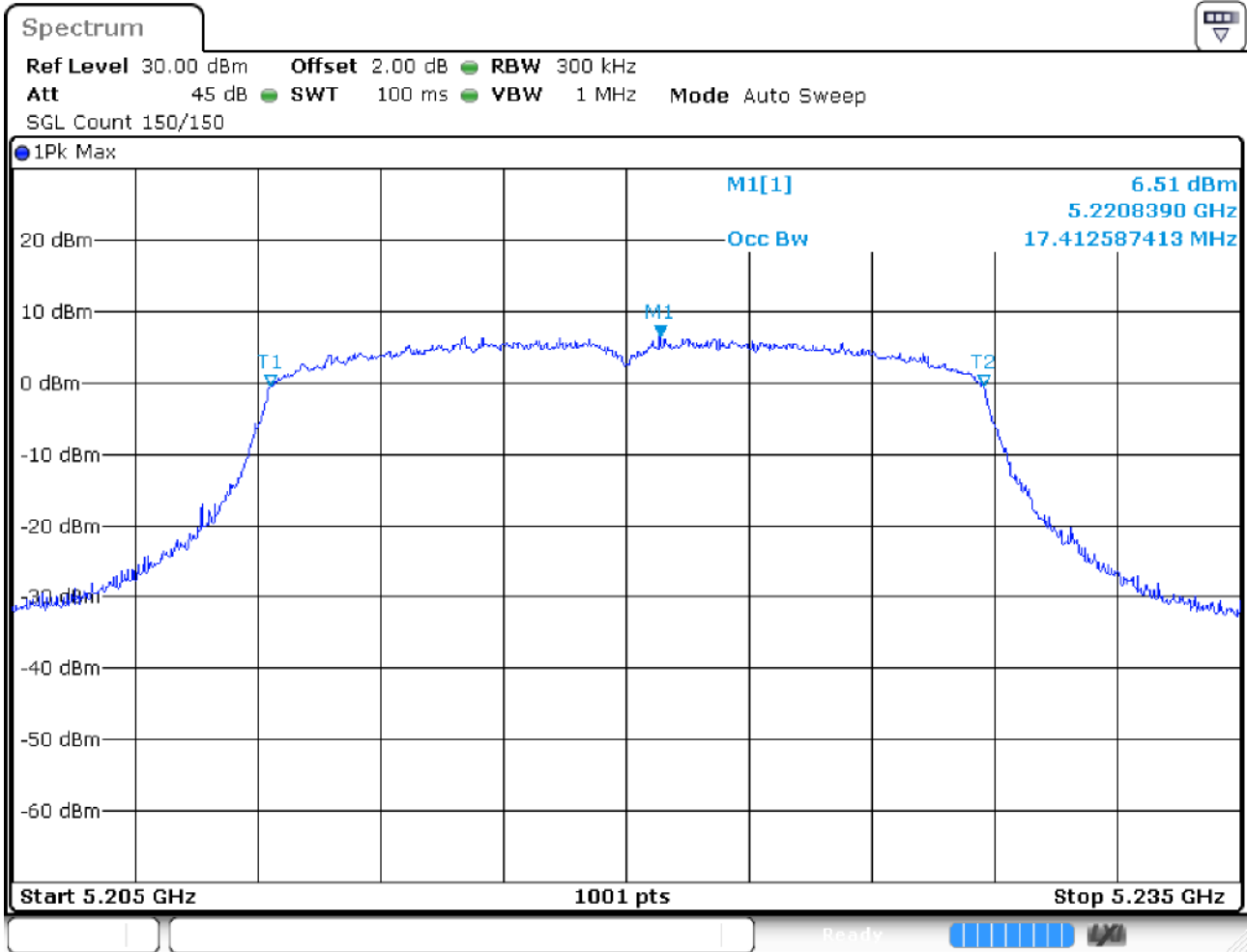
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**4.7.2.8 11N20\_44 ANT 1**



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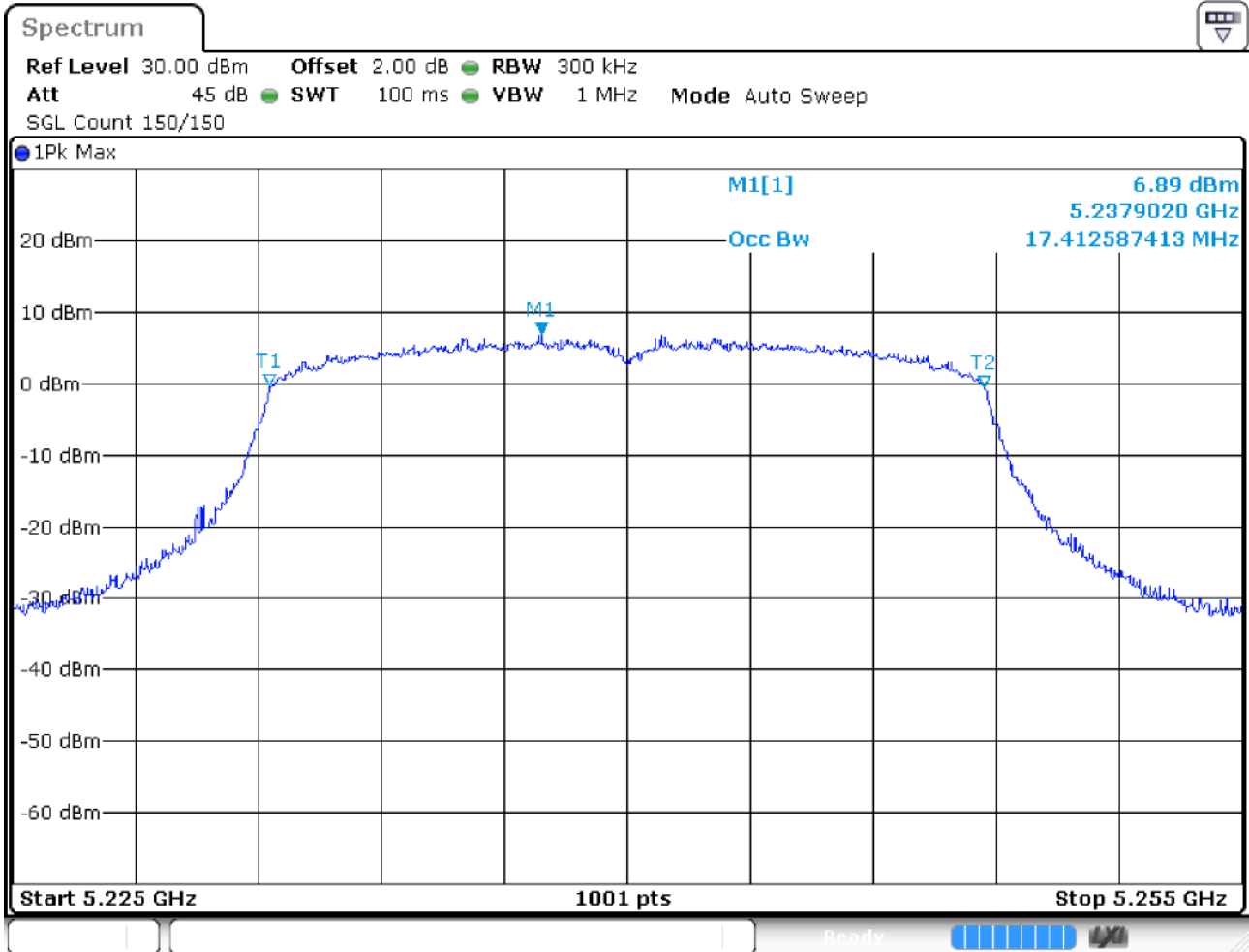


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**4.7.2.9 11N20\_48 ANT 1**



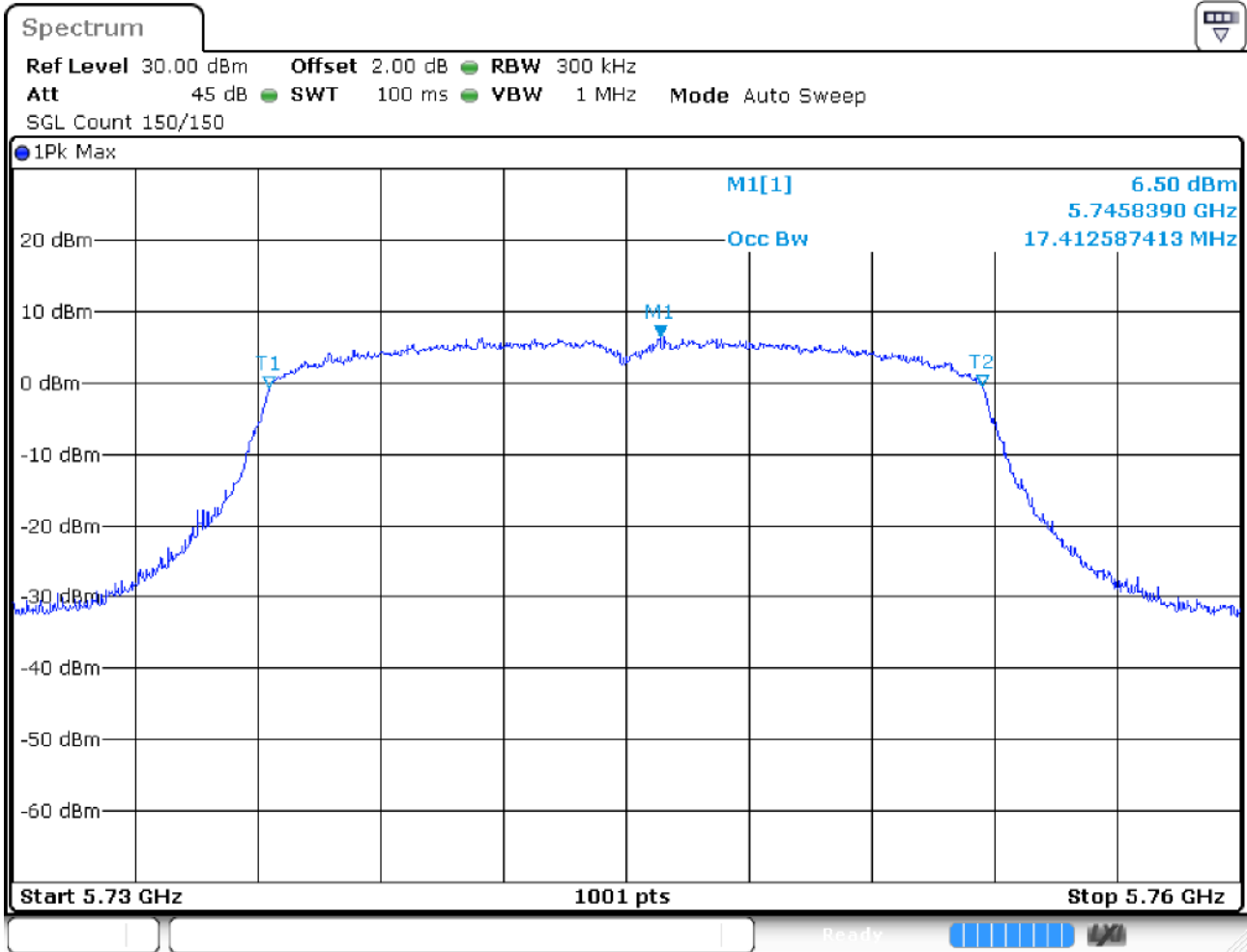
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4.7.2.10 11N20\_149 ANT 1



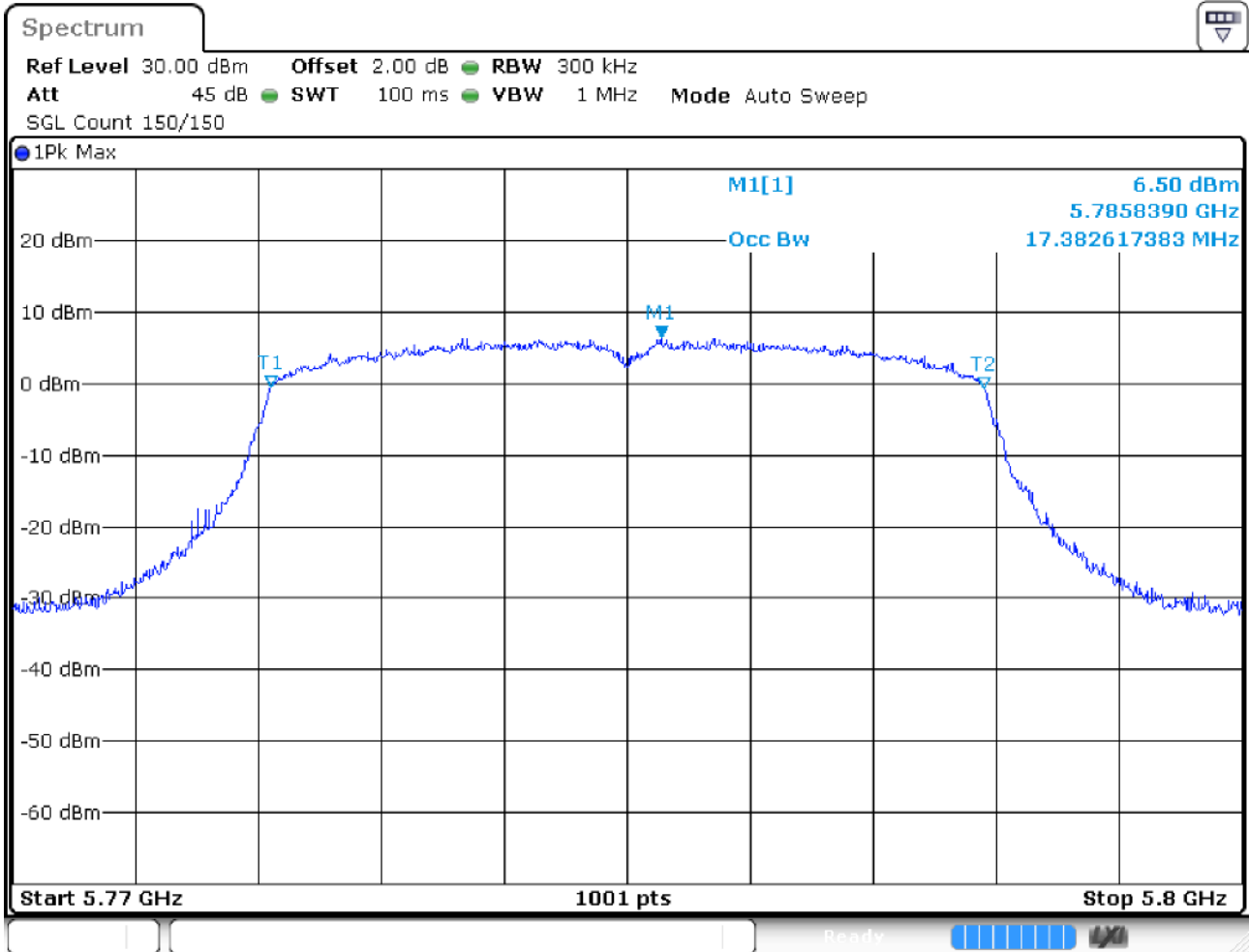
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**4.7.2.11 11N20\_157 ANT 1**

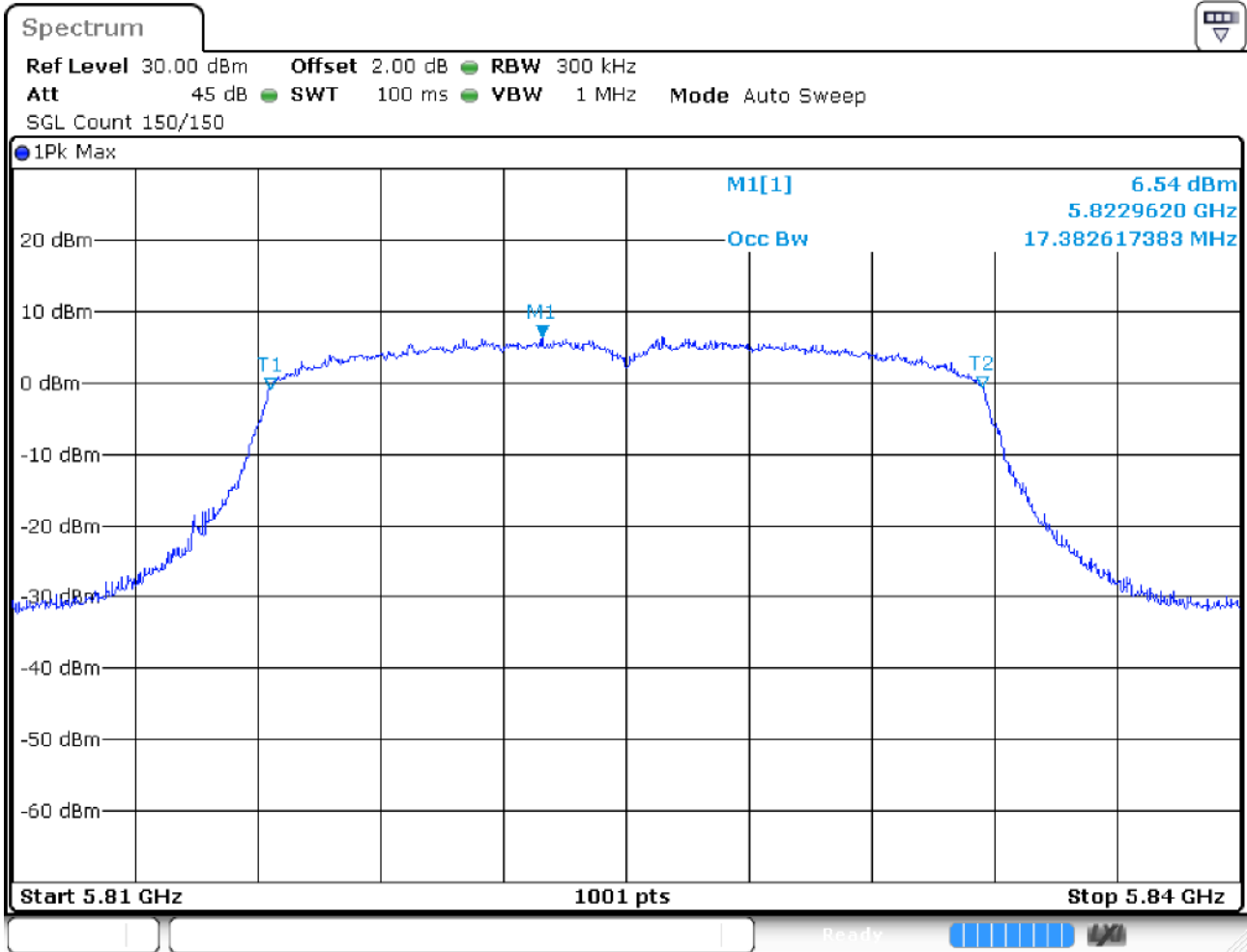


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**4.7.2.12 11N20\_165 ANT 1**



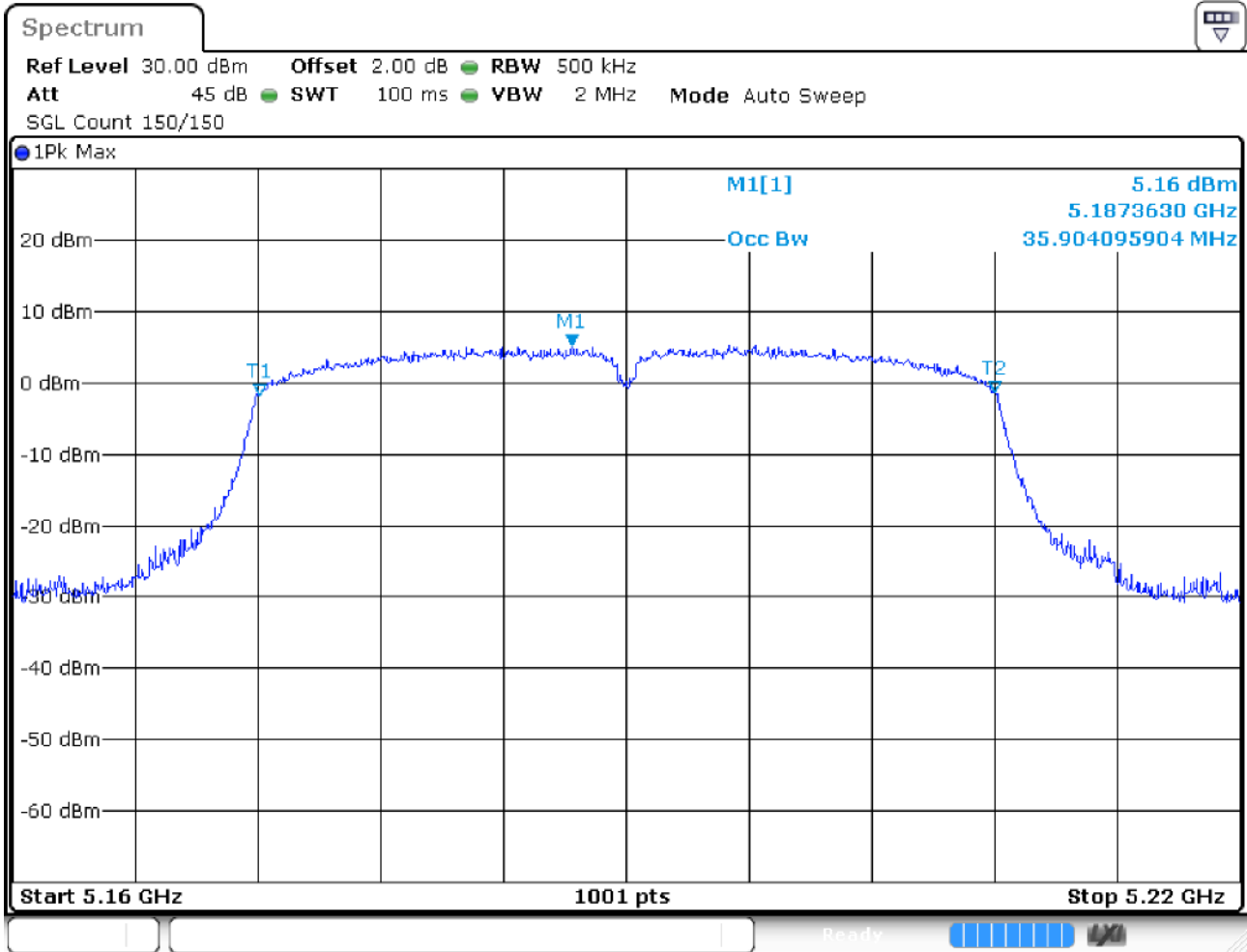
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**4.7.2.13 11N40\_38 ANT 1**

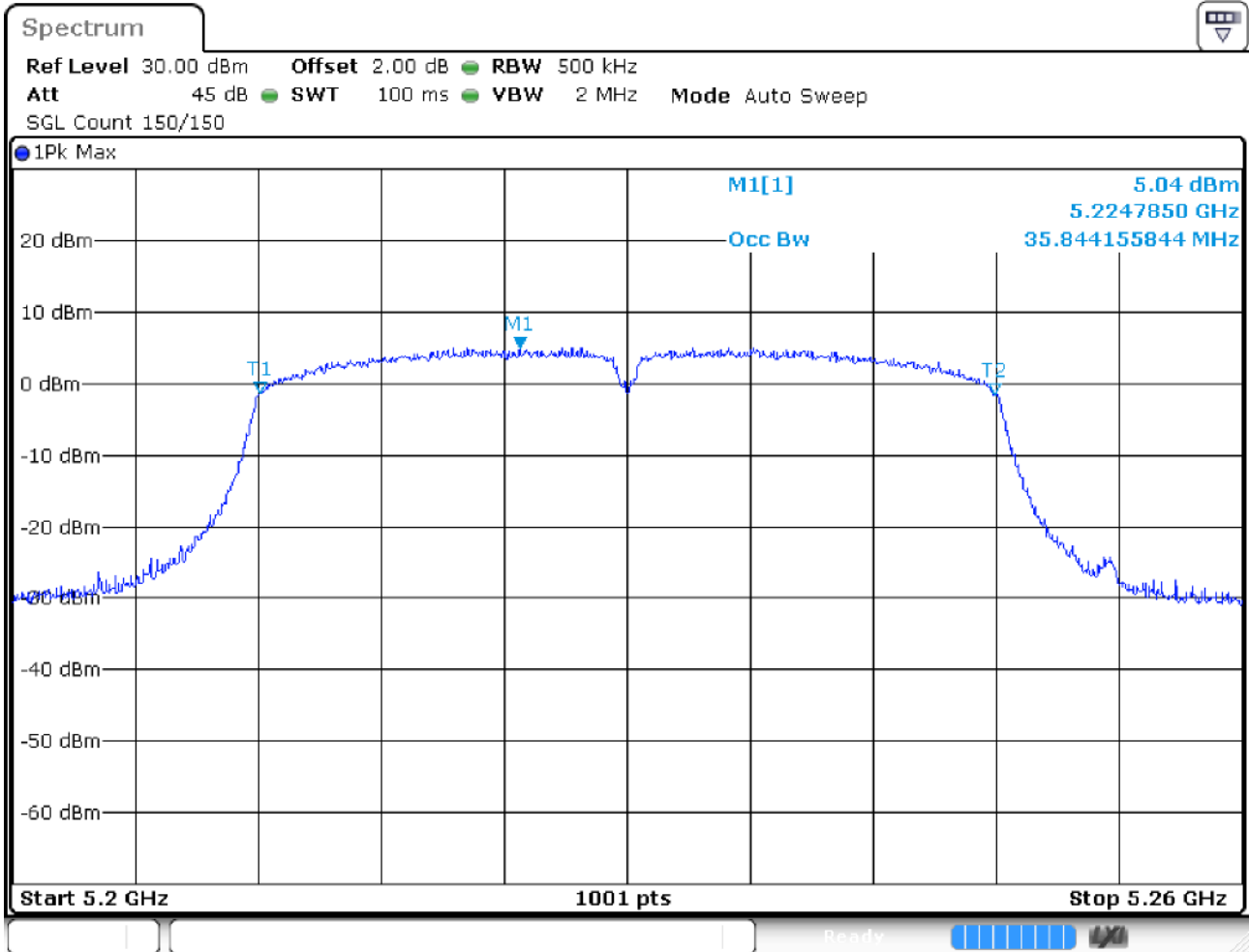


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**4.7.2.14 11N40\_46 ANT 1**



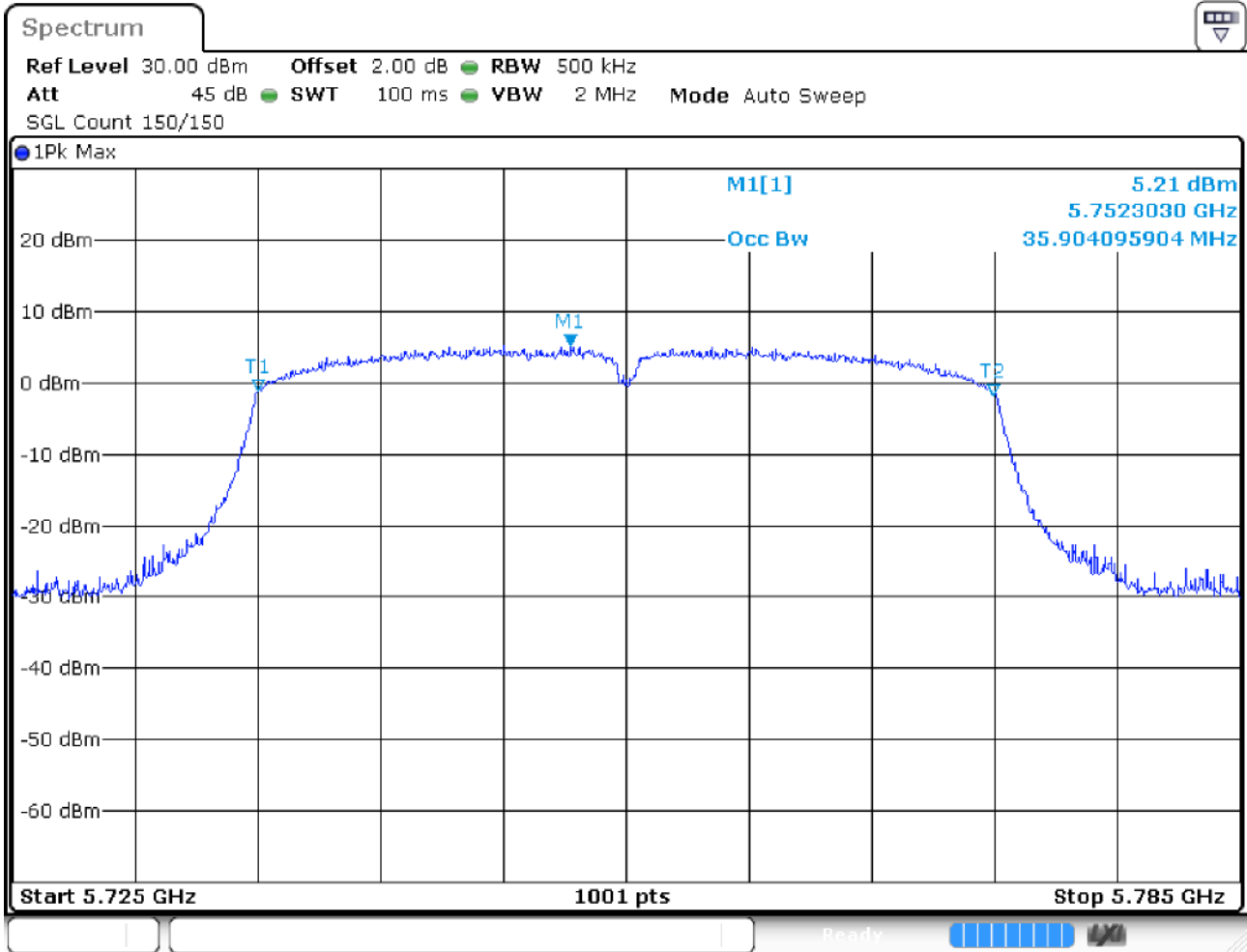
Date: 29.SEP.2020 10:43:08



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**4.7.2.15 11N40\_151 ANT 1**



Date: 29.SEP.2020 10:44:52

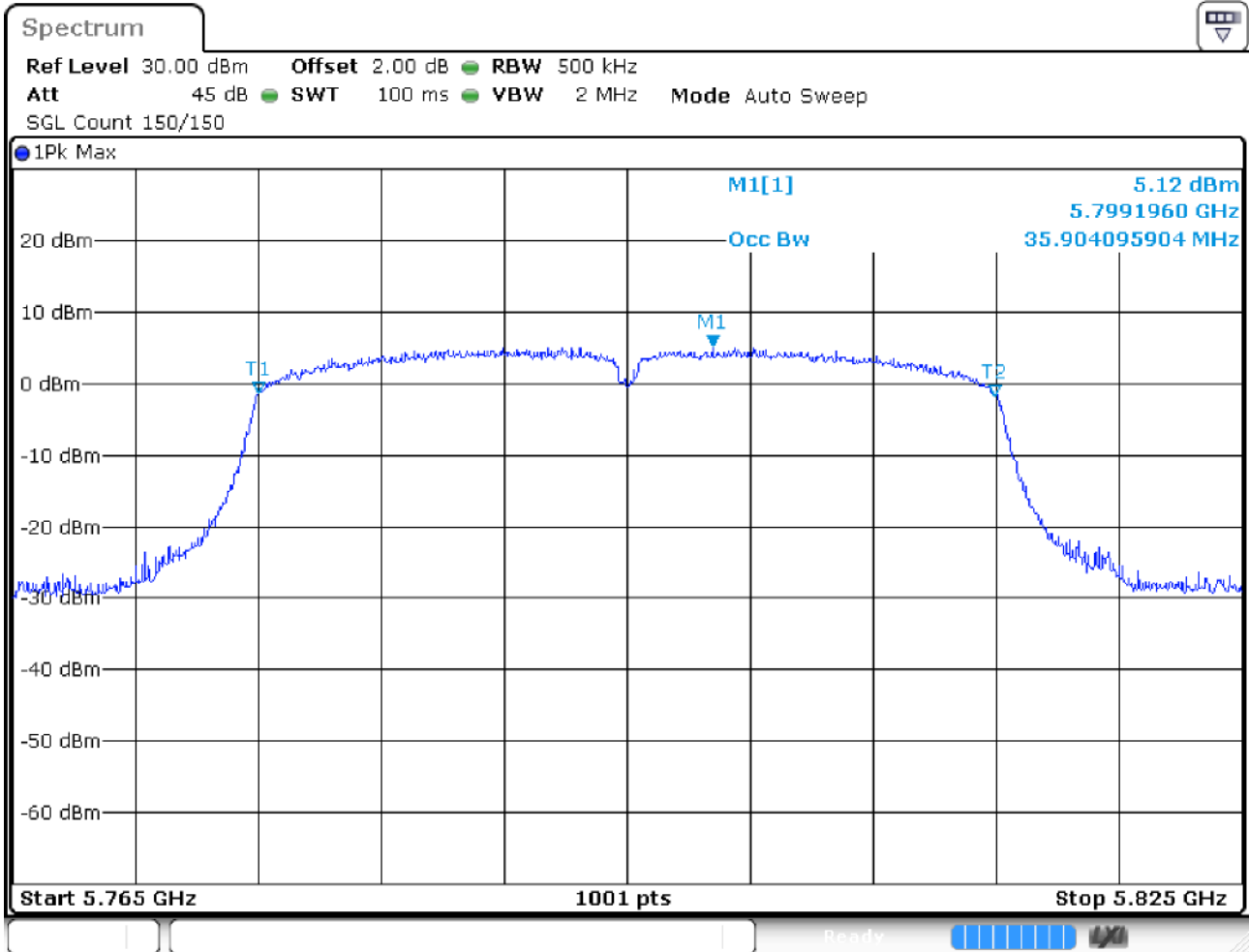


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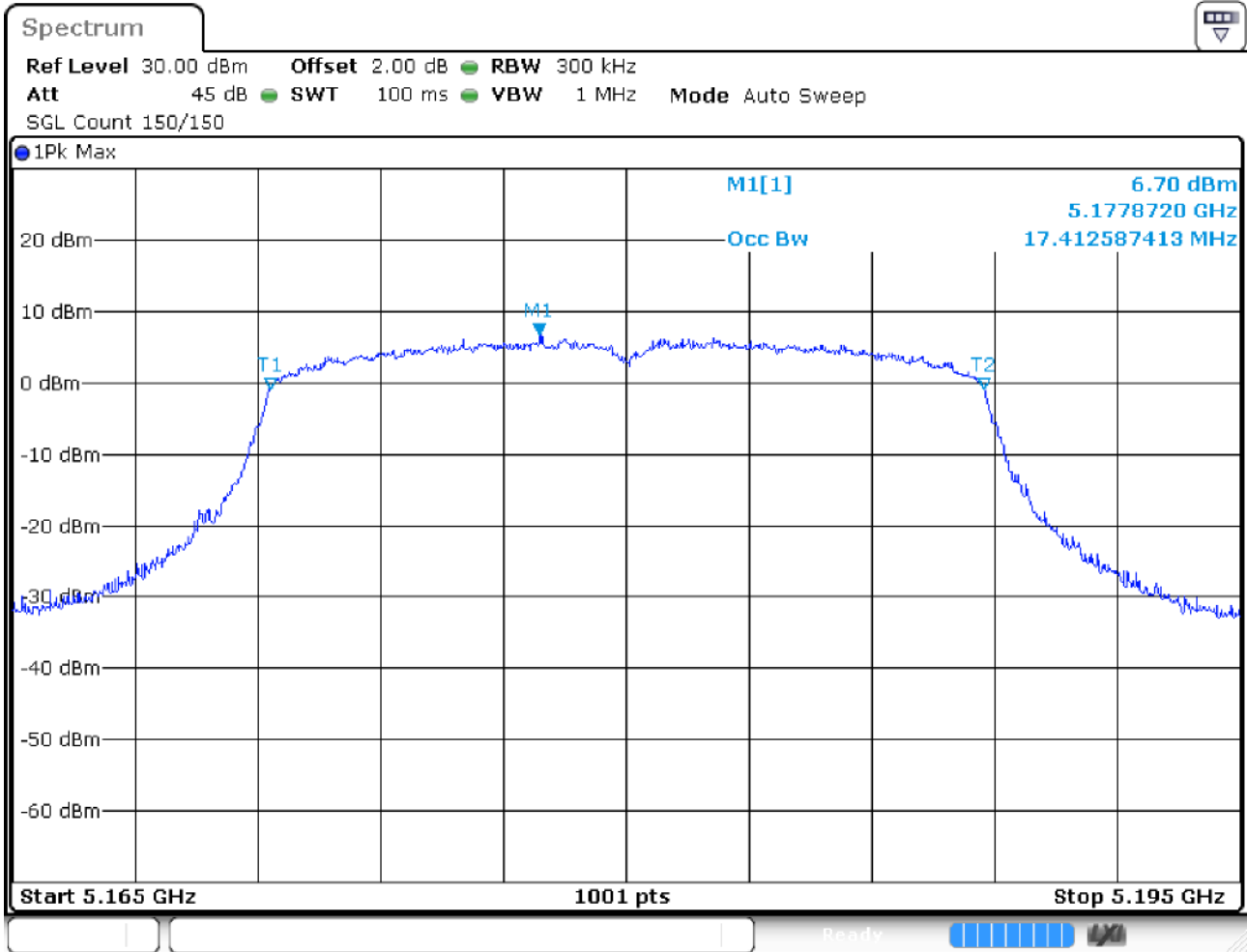
4.7.2.16 11N40\_159 ANT 1



Date: 29.SEP.2020 10:46:30



**4.7.2.17 11AC20\_36 ANT 1**



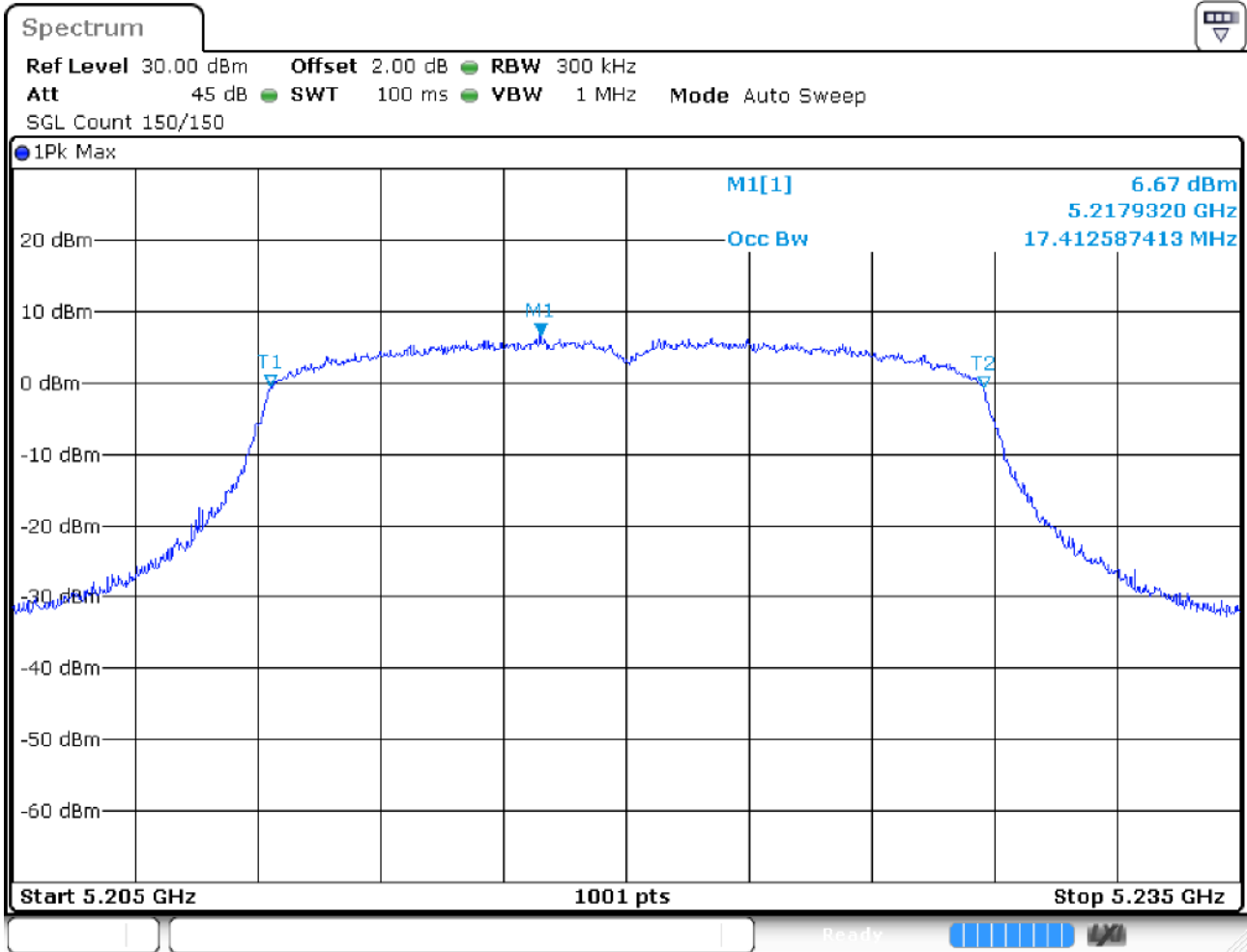
Date: 29.SEP.2020 10:49:02



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4.7.2.18 11AC20\_44 ANT 1

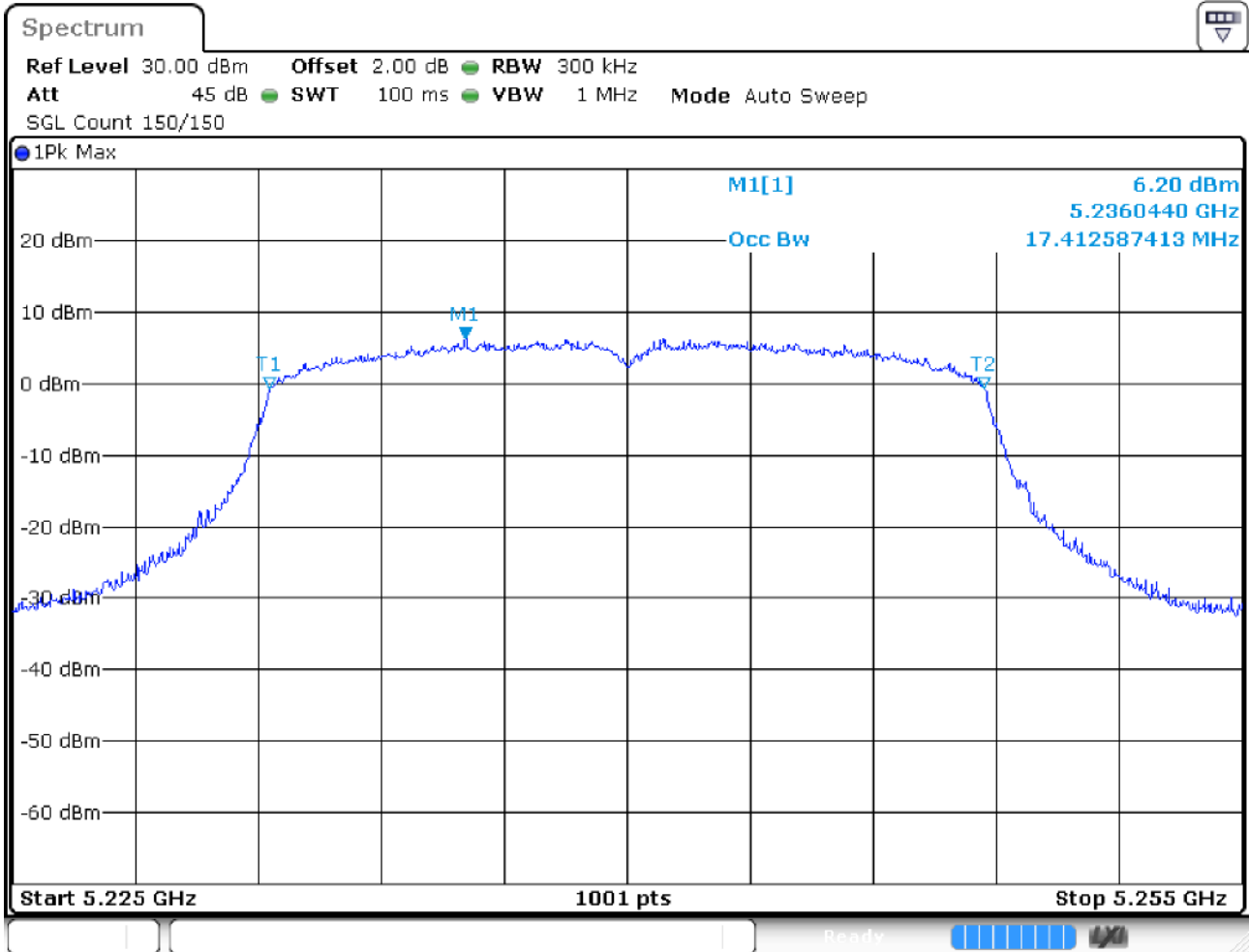


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**4.7.2.19 11AC20\_48 ANT 1**

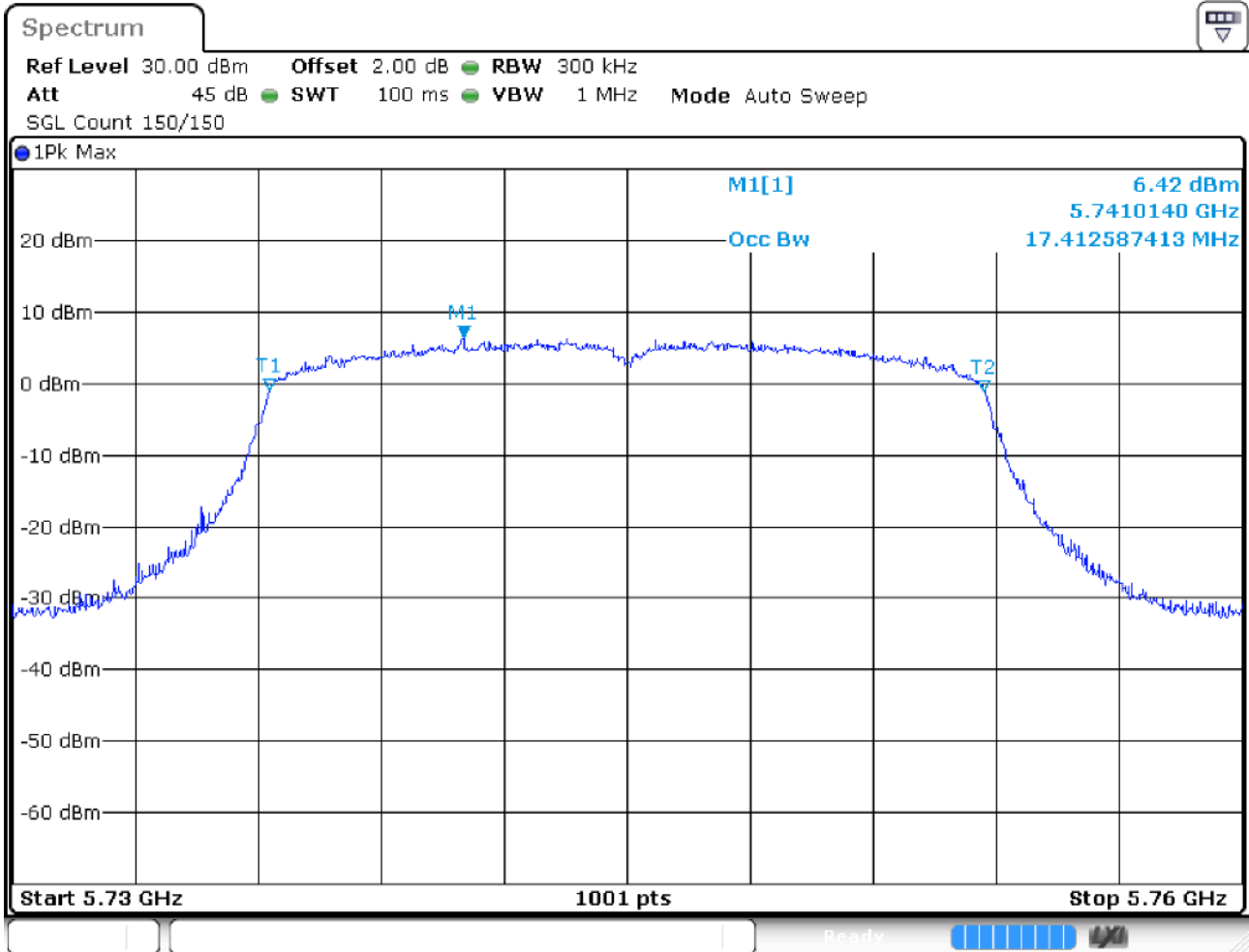


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**4.7.2.20 11AC20\_149 ANT 1**



Date: 29.SEP.2020 10:53:53

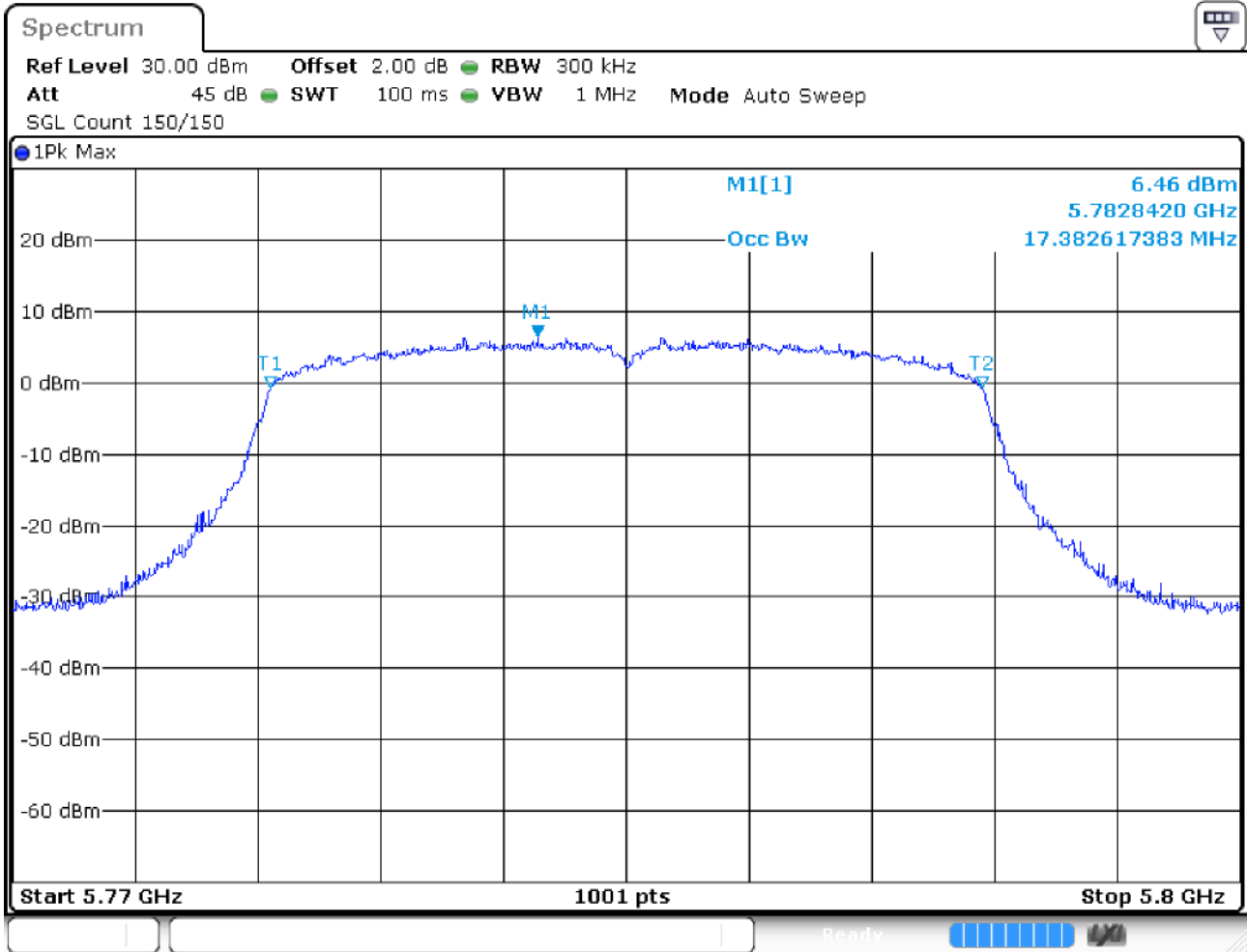


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**4.7.2.21 11AC20\_157 ANT 1**

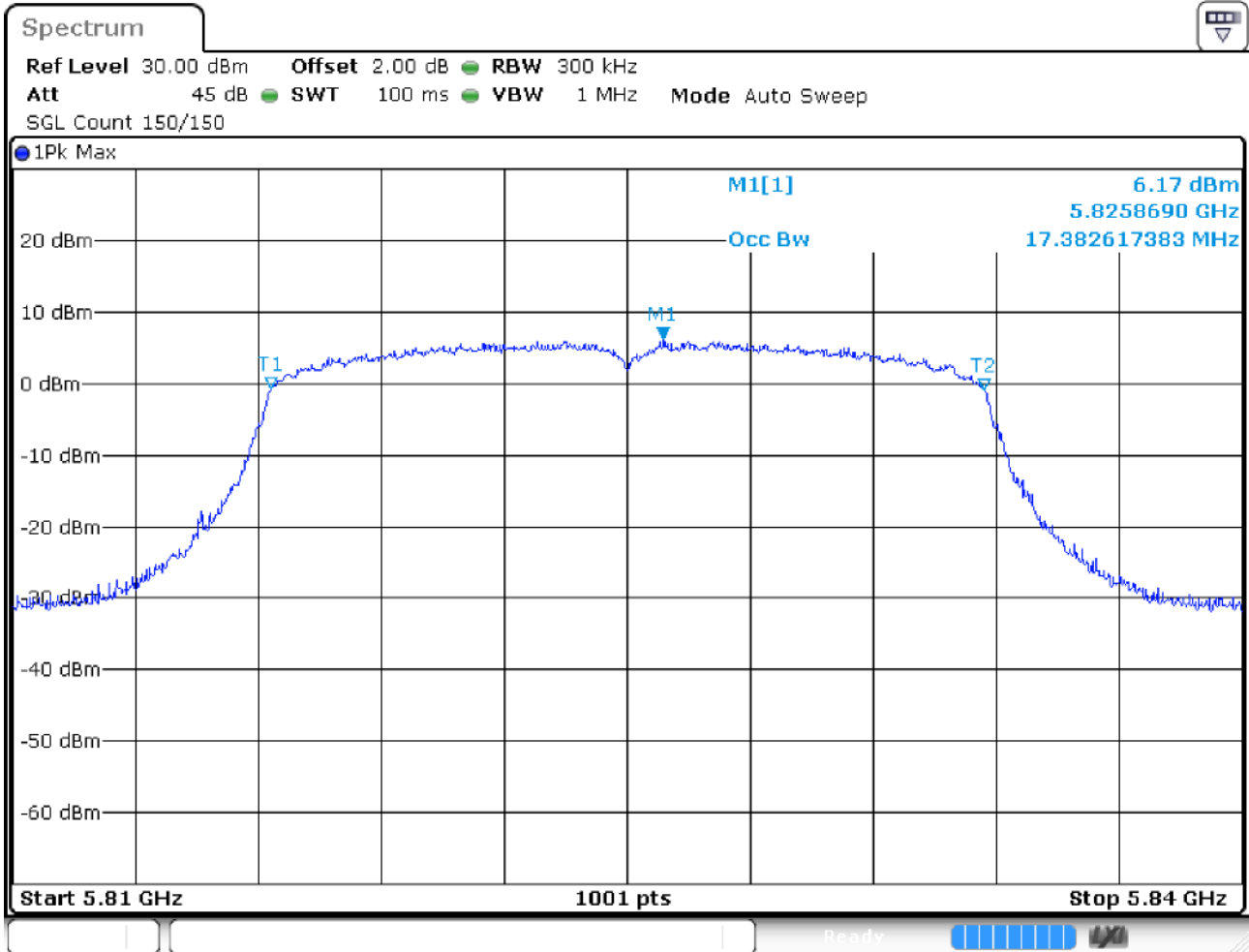


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**4.7.2.22 11AC20\_165 ANT 1**



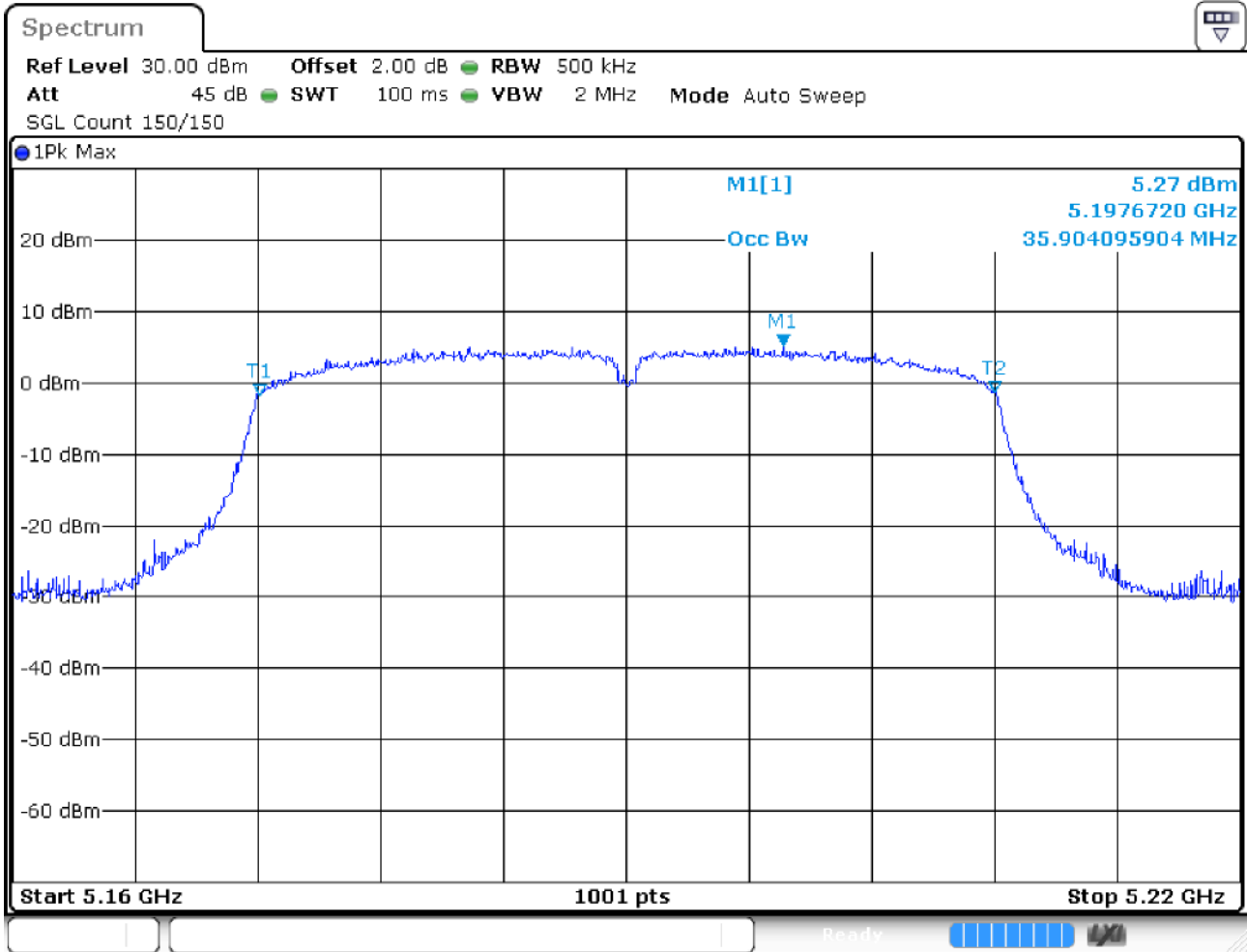
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**4.7.2.23 11AC40\_38 ANT 1**

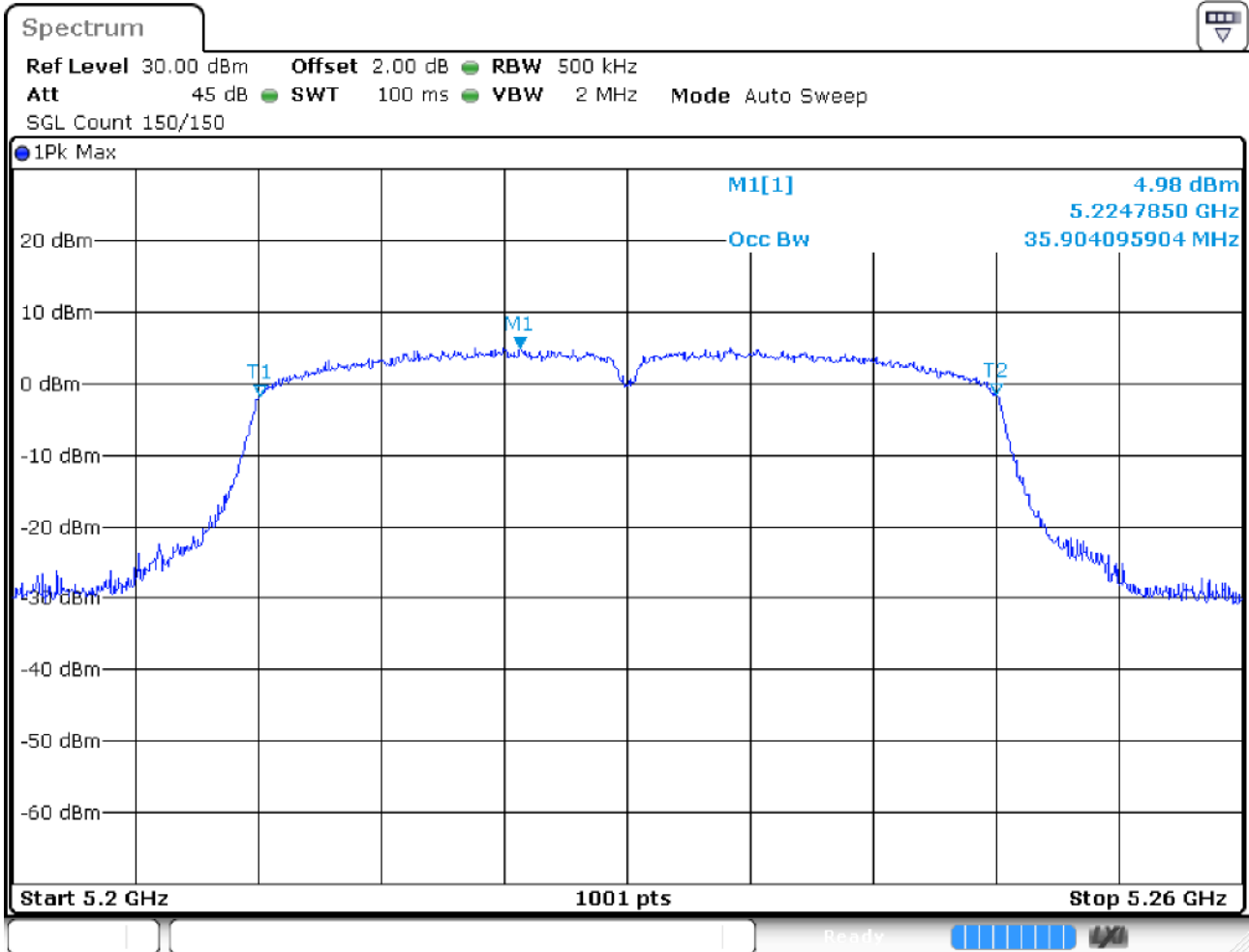


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**4.7.2.24 11AC40\_46 ANT 1**



Date: 29.SEP.2020 11:00:53

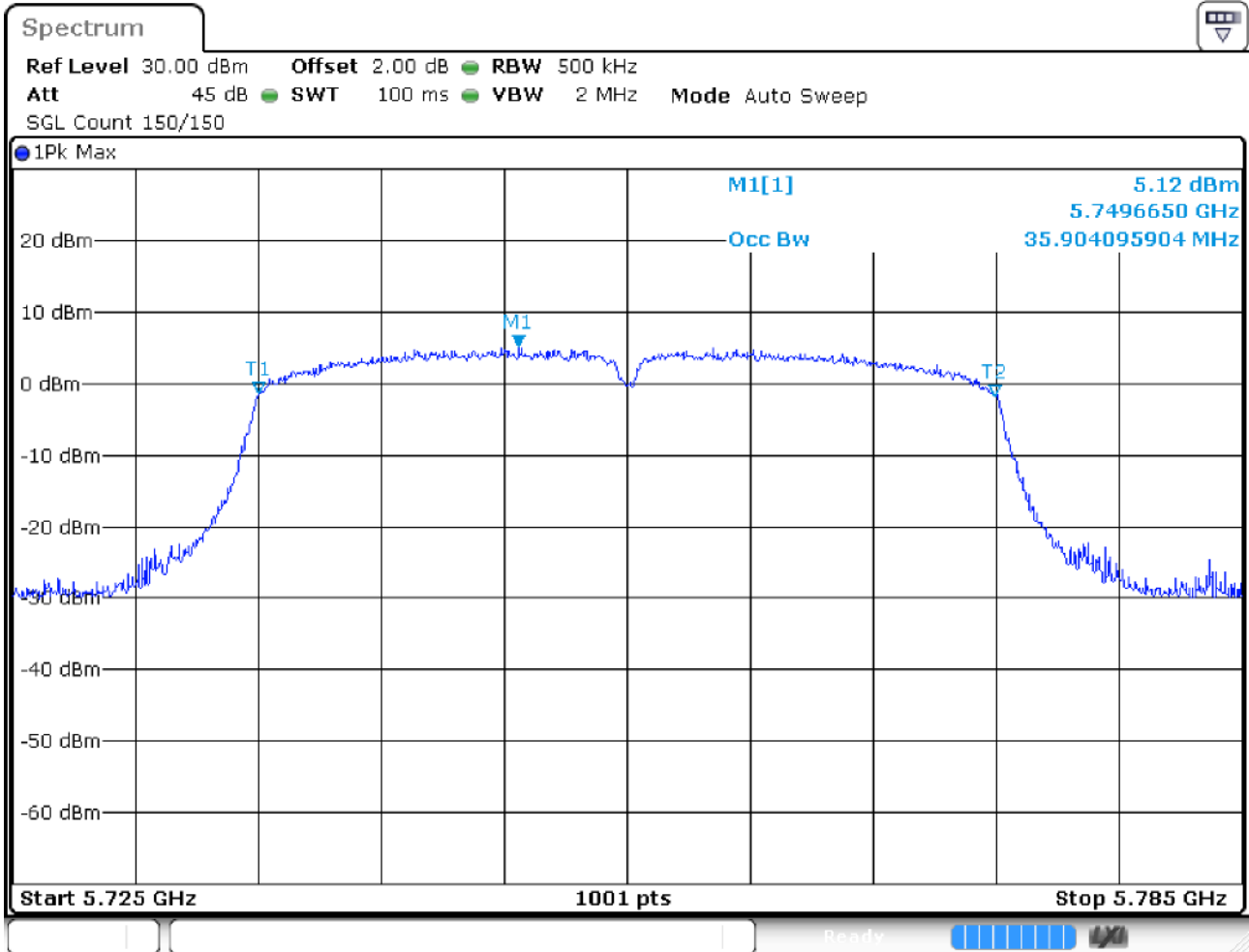


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**4.7.2.25 11AC40\_151 ANT 1**



Date: 29.SEP.2020 11:02:42

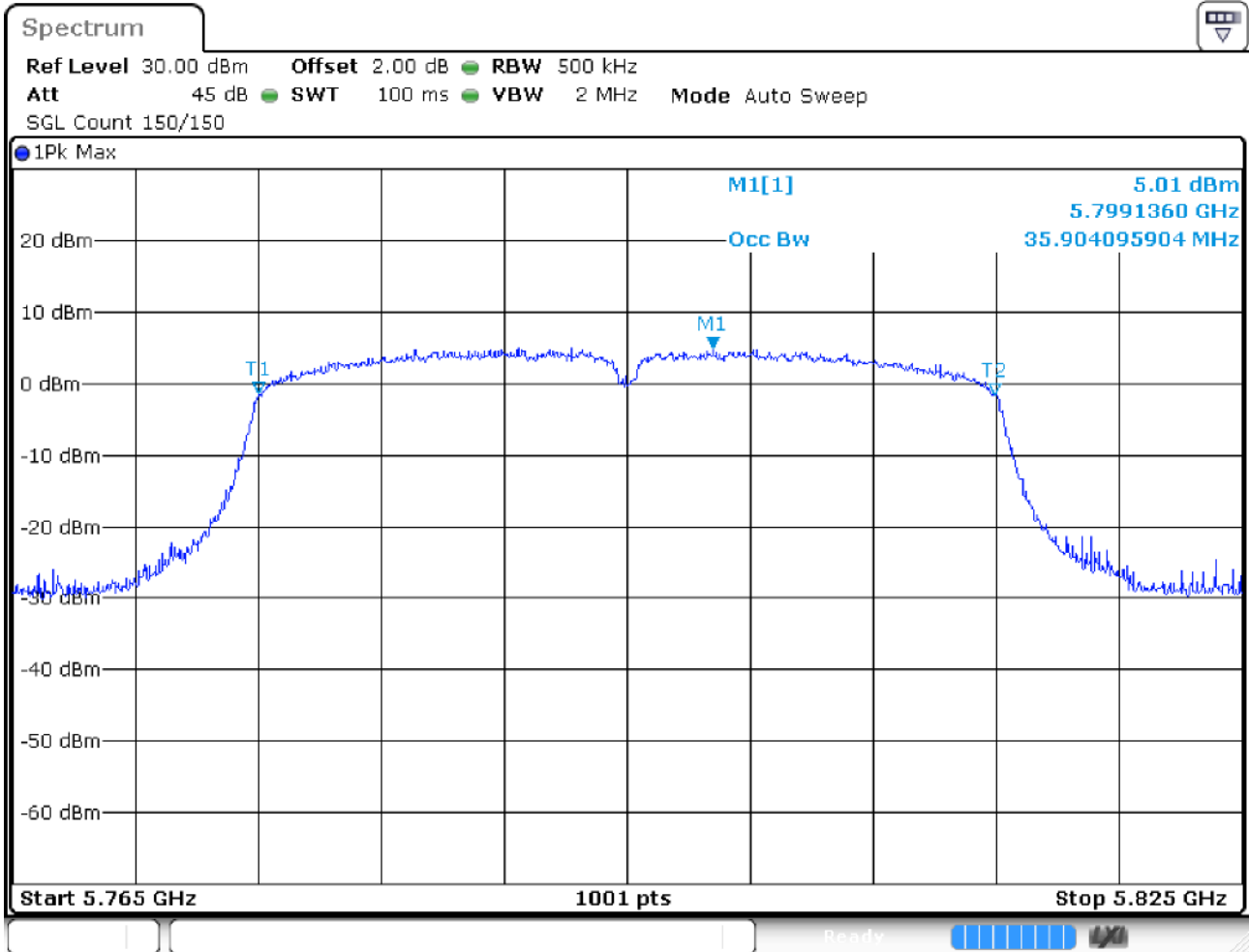


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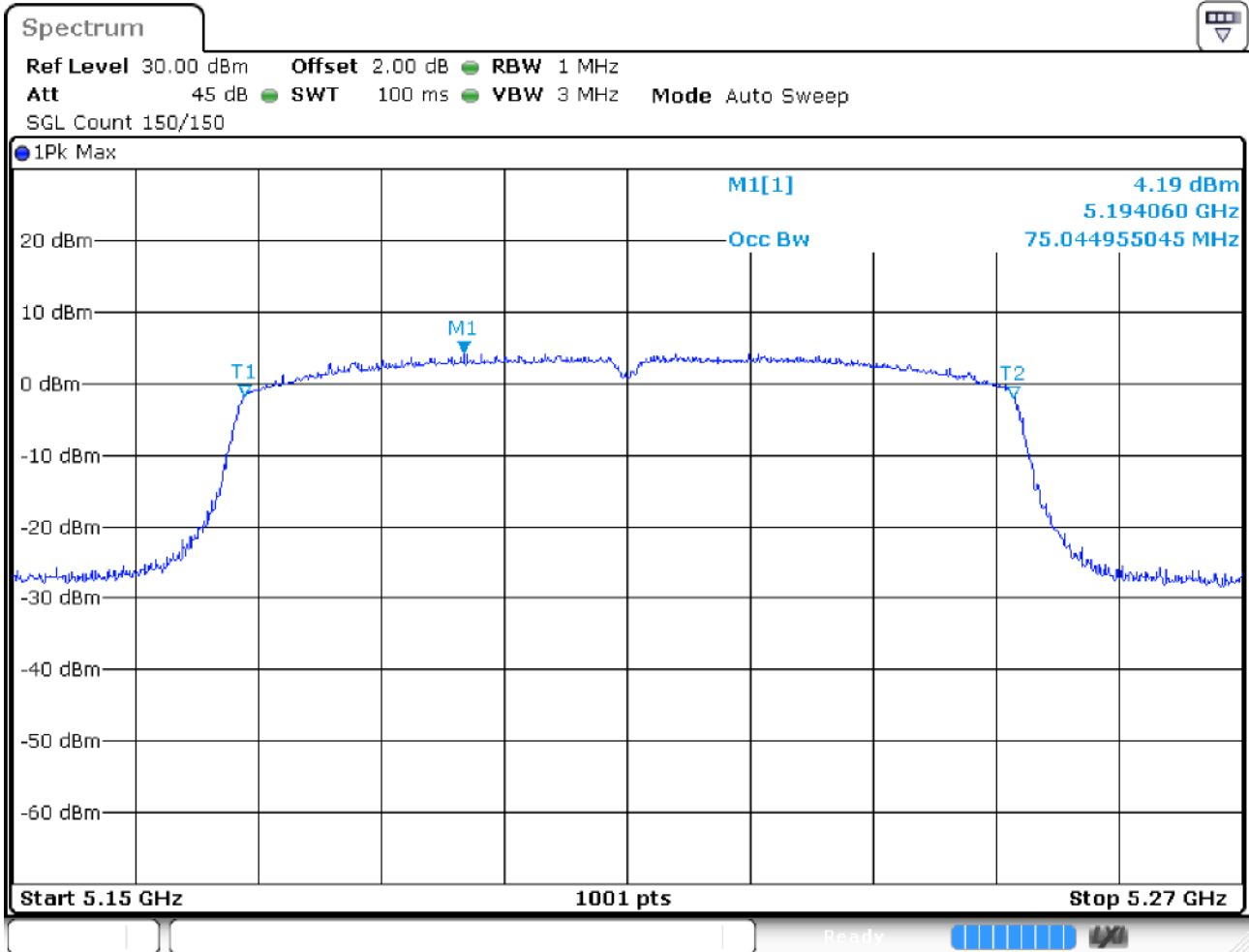
**4.7.2.26 11AC40\_159 ANT 1**



Date: 29.SEP.2020 11:04:42



**4.7.2.27 11AC80\_42 ANT 1**



Date: 29.SEP.2020 11:07:20

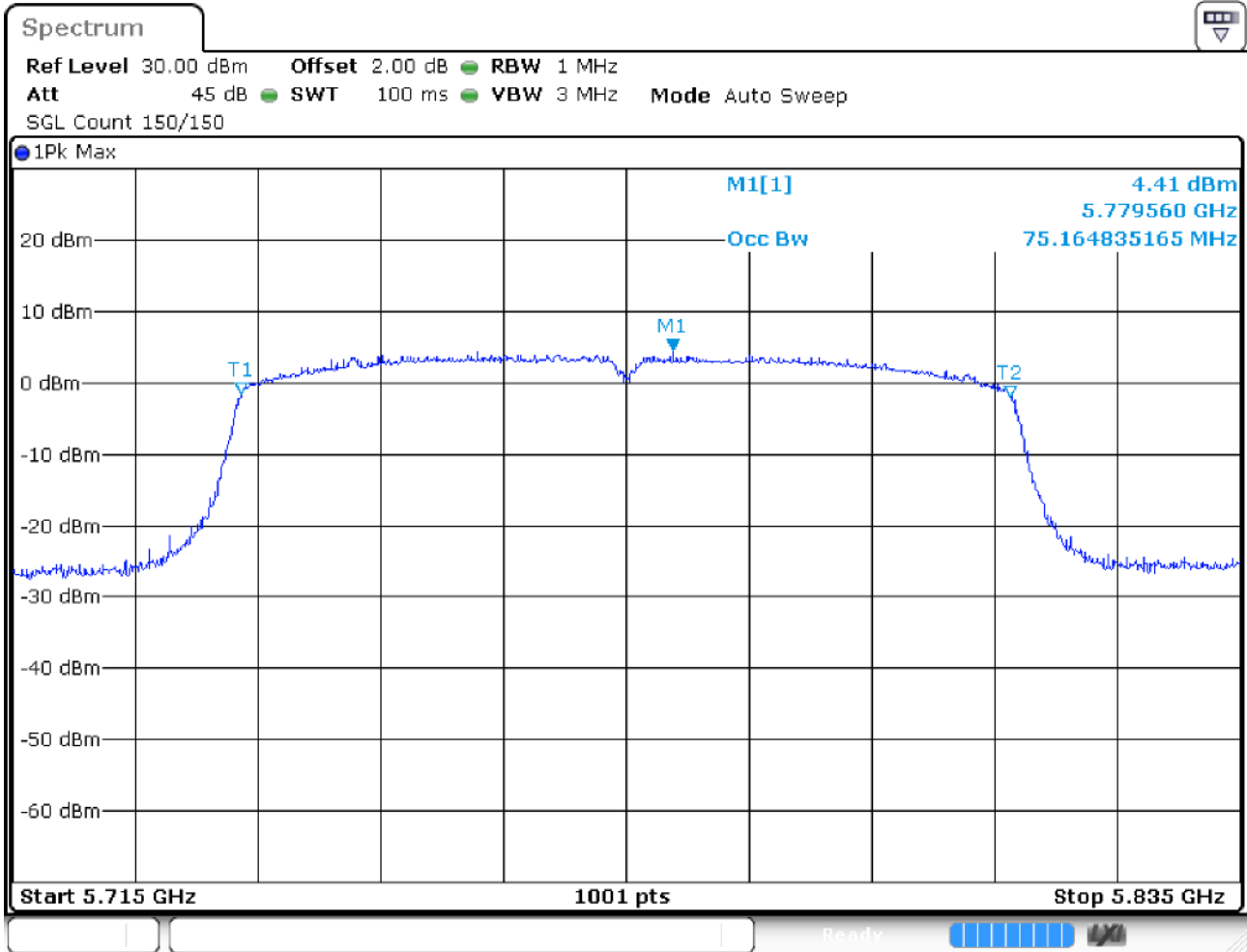


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**4.7.2.28 11AC80\_155 ANT 1**



Date: 29.SEP.2020 11:10:20



### 4.8 Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)	
Test Method:	ANSI C63.10: 2013	
Test Setup:		
Test Instruments:	Refer to section 5.10 for details	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	<p>Through Pre-scan, find the</p> <p>6Mbps of rate is the worst case of 802.11a;</p> <p>MCS0 of rate is the worst case of 802.11n(HT20);</p> <p>MCS0 of rate is the worst case of 802.11n(HT40);</p> <p>MCS0 of rate is the worst case of 802.11ac(HT20);</p> <p>MCS0 of rate is the worst case of 802.11ac(HT40);</p> <p>MCS0 of rate is the worst case of 802.11ac(HT80).</p> <p>Only the worst case is recorded in the report.</p>	
Limit:	Frequency Band	Limit
	5150-5250MHz	The power spectral density less than 11dBm/1MHz
	5725-5850MHz	The power spectral density less than <30dBm/500KHz
Test Results:	Pass	



**4.8.1 Test Results For Power Density**

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Meas. Level (Cond.) [dBm/500KHz]	Verdict
11A20	36	5180	ANT 1	3.06	PASS
	44	5220	ANT 1	3.12	PASS
	48	5240	ANT 1	3.14	PASS
	149	5745	ANT 1	-0.04	PASS
	157	5785	ANT 1	0.23	PASS
	165	5825	ANT 1	0.13	PASS
11N20	36	5180	ANT 1	2.71	PASS
	44	5220	ANT 1	2.71	PASS
	48	5240	ANT 1	2.75	PASS
	149	5745	ANT 1	-0.21	PASS
	157	5785	ANT 1	-0.2	PASS
	165	5825	ANT 1	-0.32	PASS
11N40	38	5190	ANT 1	-0.82	PASS
	46	5230	ANT 1	-0.95	PASS
	151	5755	ANT 1	-3.77	PASS
	159	5795	ANT 1	-3.73	PASS
11AC20	36	5180	ANT 1	2.54	PASS
	44	5220	ANT 1	2.56	PASS
	48	5240	ANT 1	2.54	PASS
	149	5745	ANT 1	-0.44	PASS
	157	5785	ANT 1	-0.36	PASS
	165	5825	ANT 1	-0.5	PASS
11AC40	38	5190	ANT 1	-0.96	PASS
	46	5230	ANT 1	-1.06	PASS
	151	5755	ANT 1	-4.07	PASS
	159	5795	ANT 1	-3.95	PASS
11AC80	42	5210	ANT 1	-5.46	PASS
	155	5775	ANT 1	-8.39	PASS

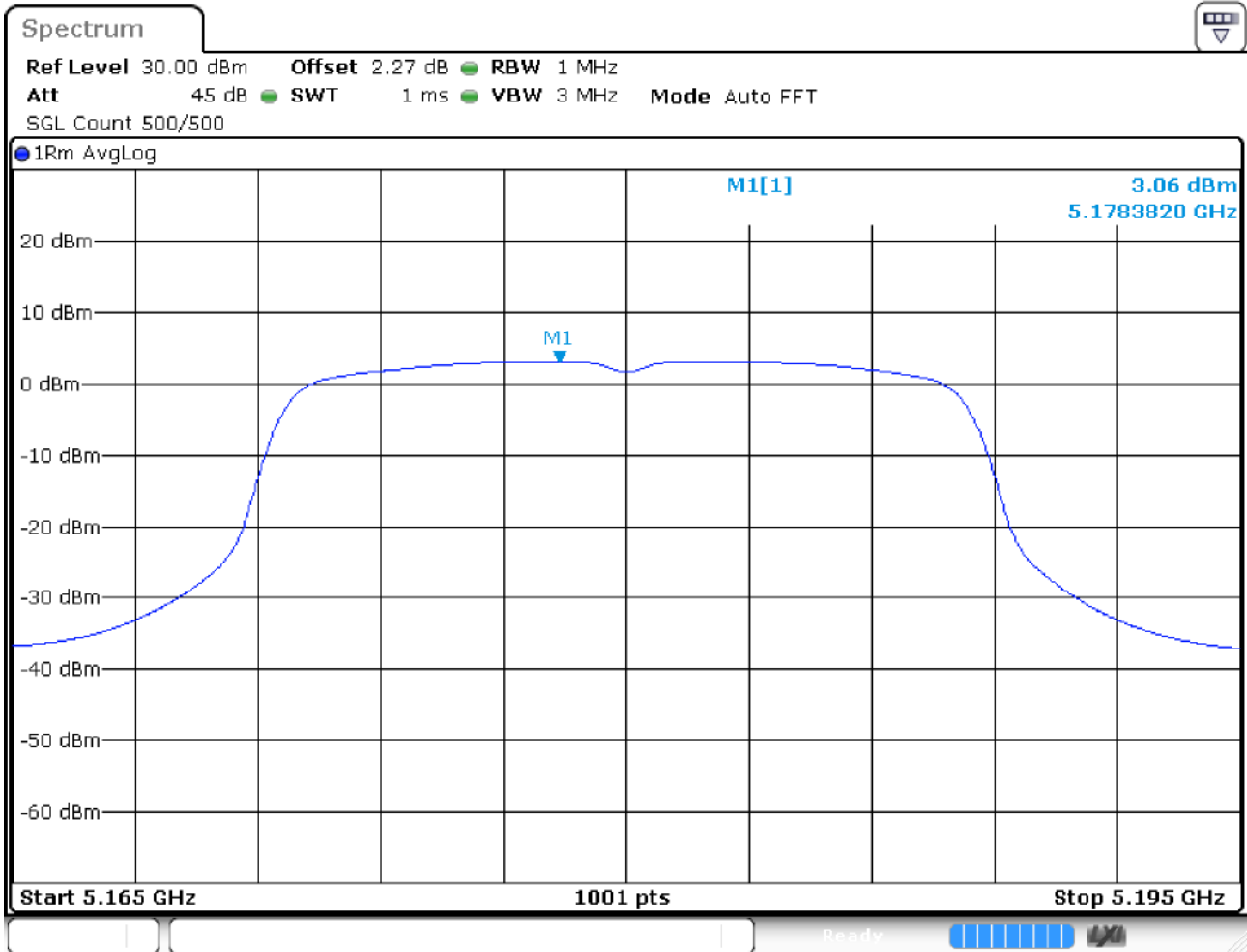


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### 4.8.2 Test plots For Power Density

#### 4.8.2.1 11A20\_36 ANT 1



Date: 29.SEP.2020 10:03:31

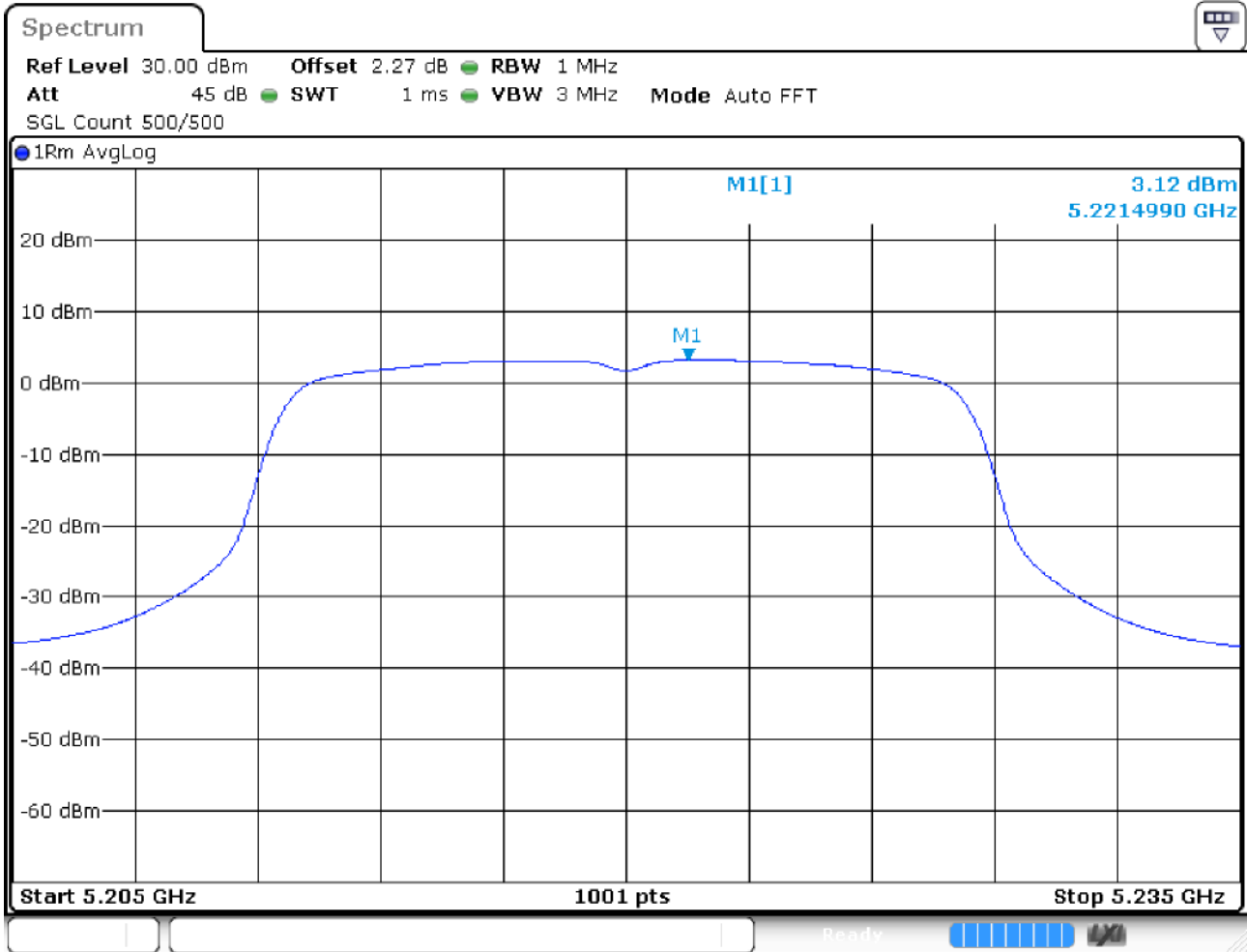


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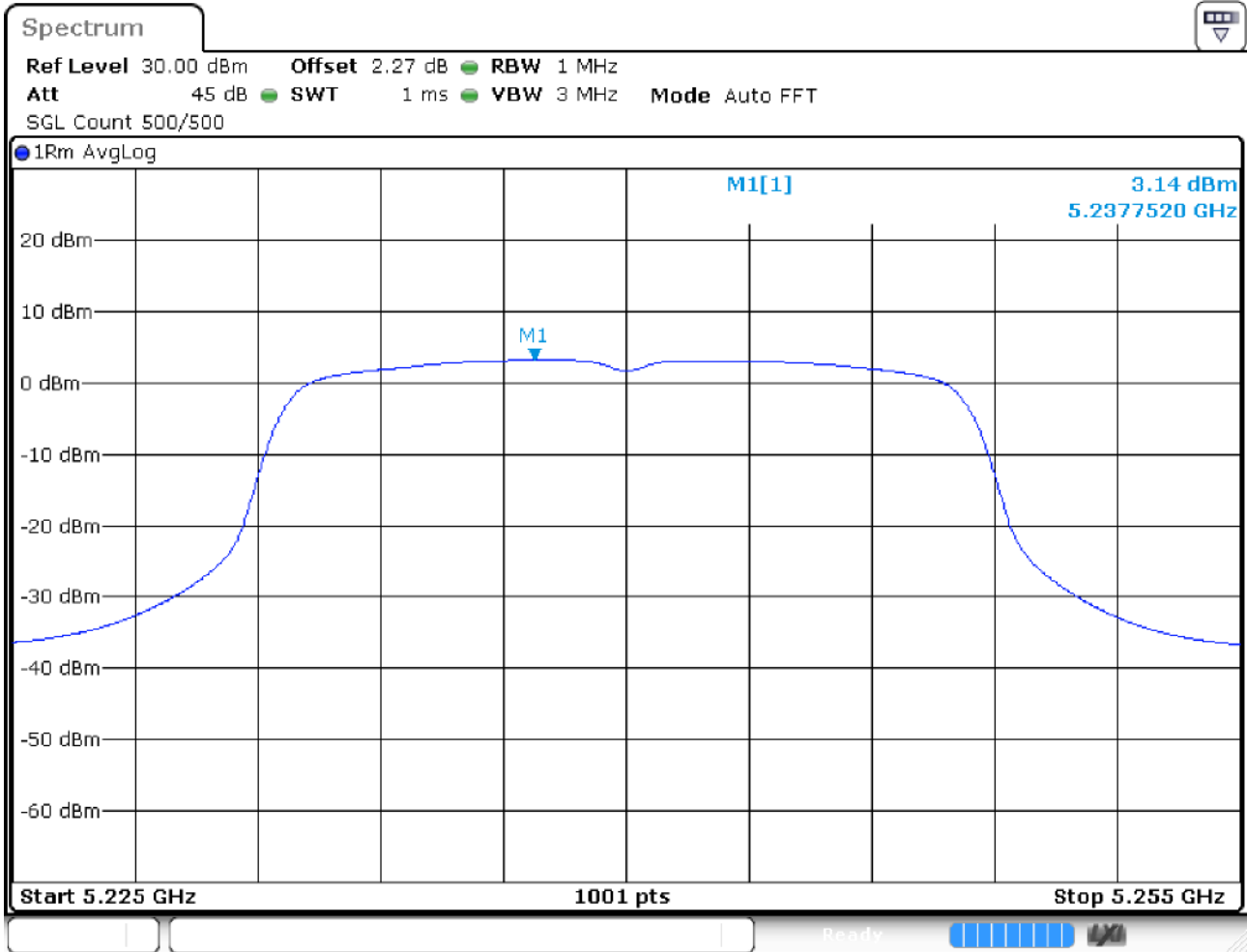
**4.8.2.2 11A20\_44 ANT 1**



Date: 29.SEP.2020 10:10:48



**4.8.2.3 11A20\_48 ANT 1**

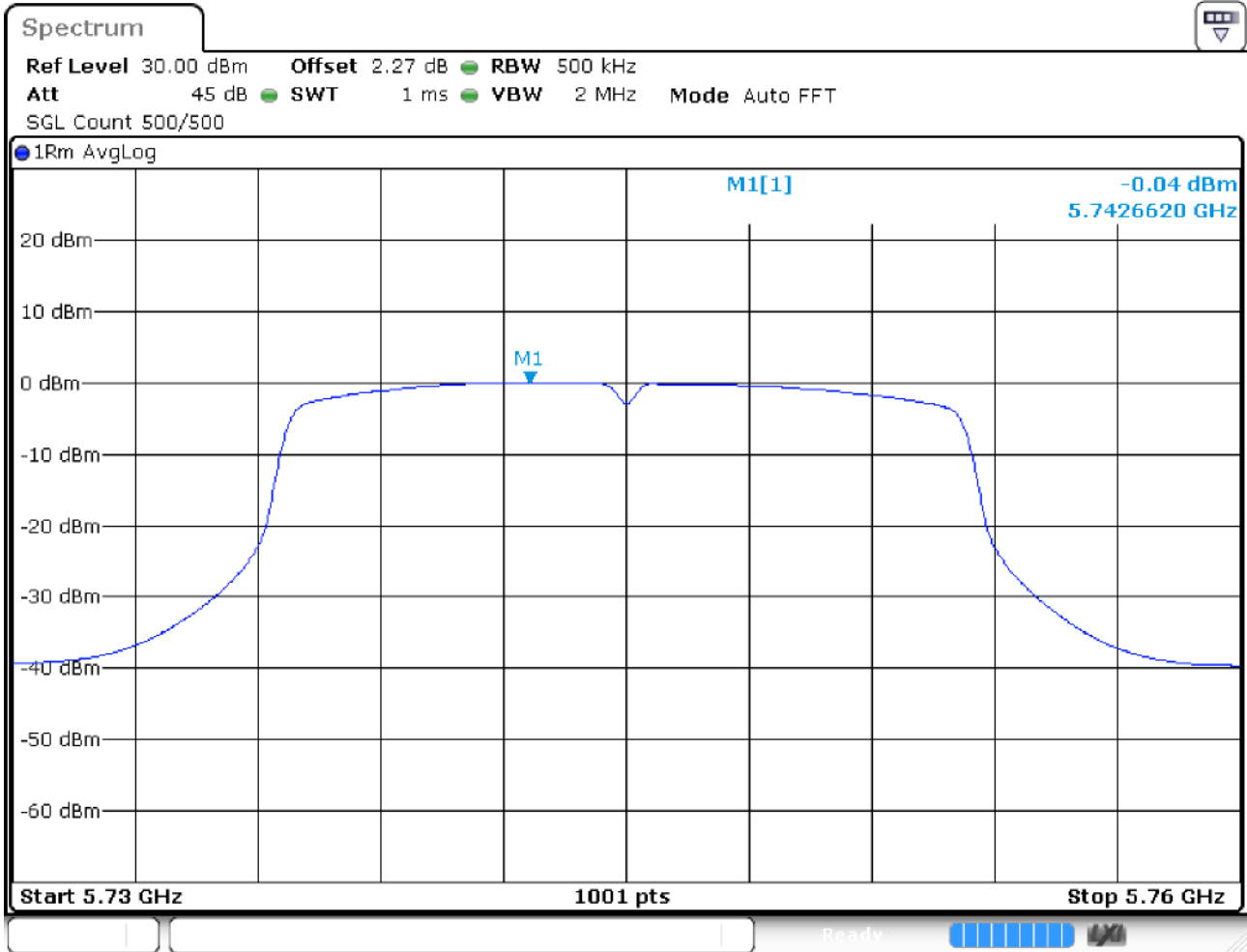


Date: 29.SEP.2020 10:14:00



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**4.8.2.4 11A20\_149 ANT 1**



Date: 29.SEP.2020 10:25:12



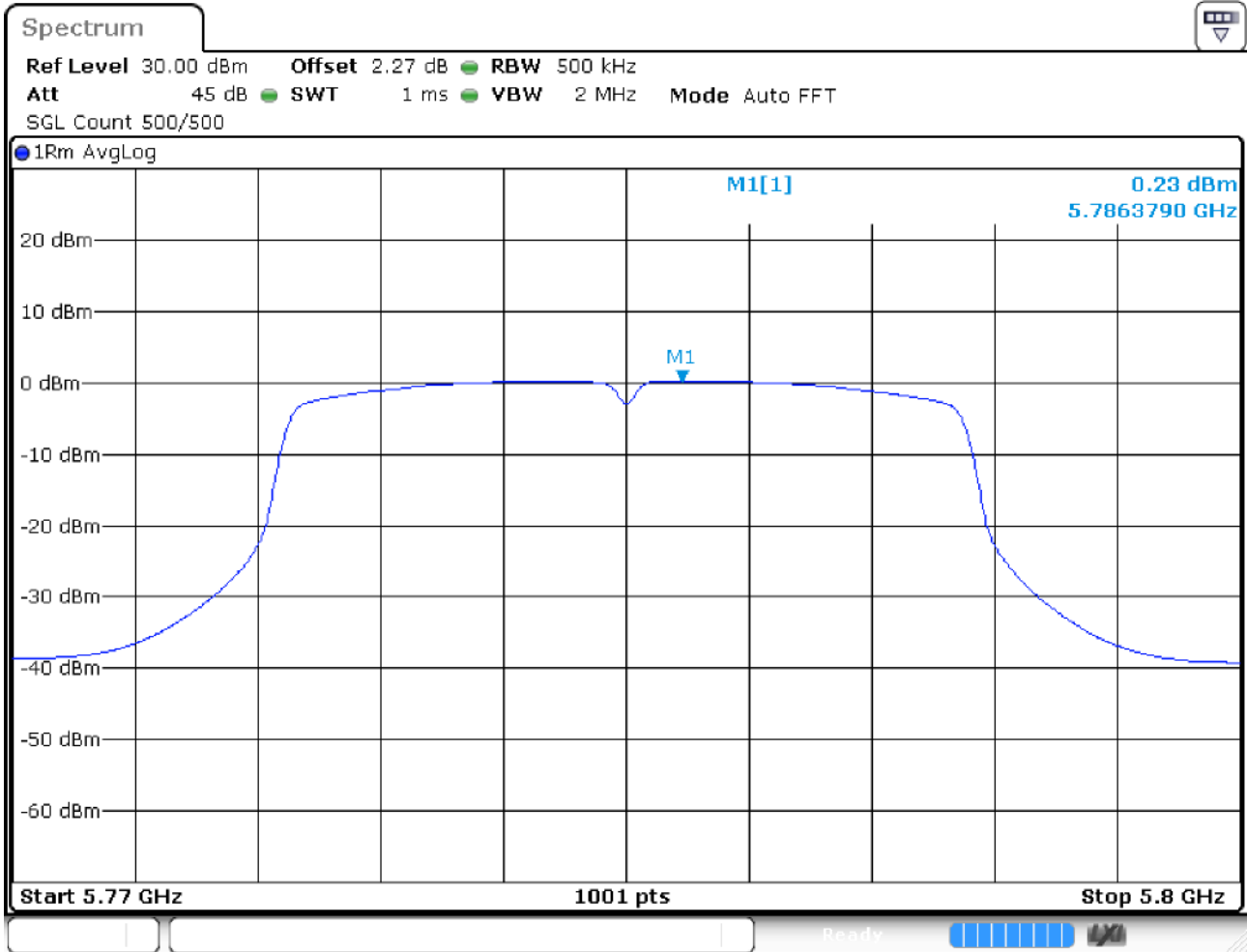
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**4.8.2.5 11A20\_157 ANT 1**



Date: 29.SEP.2020 10:27:04



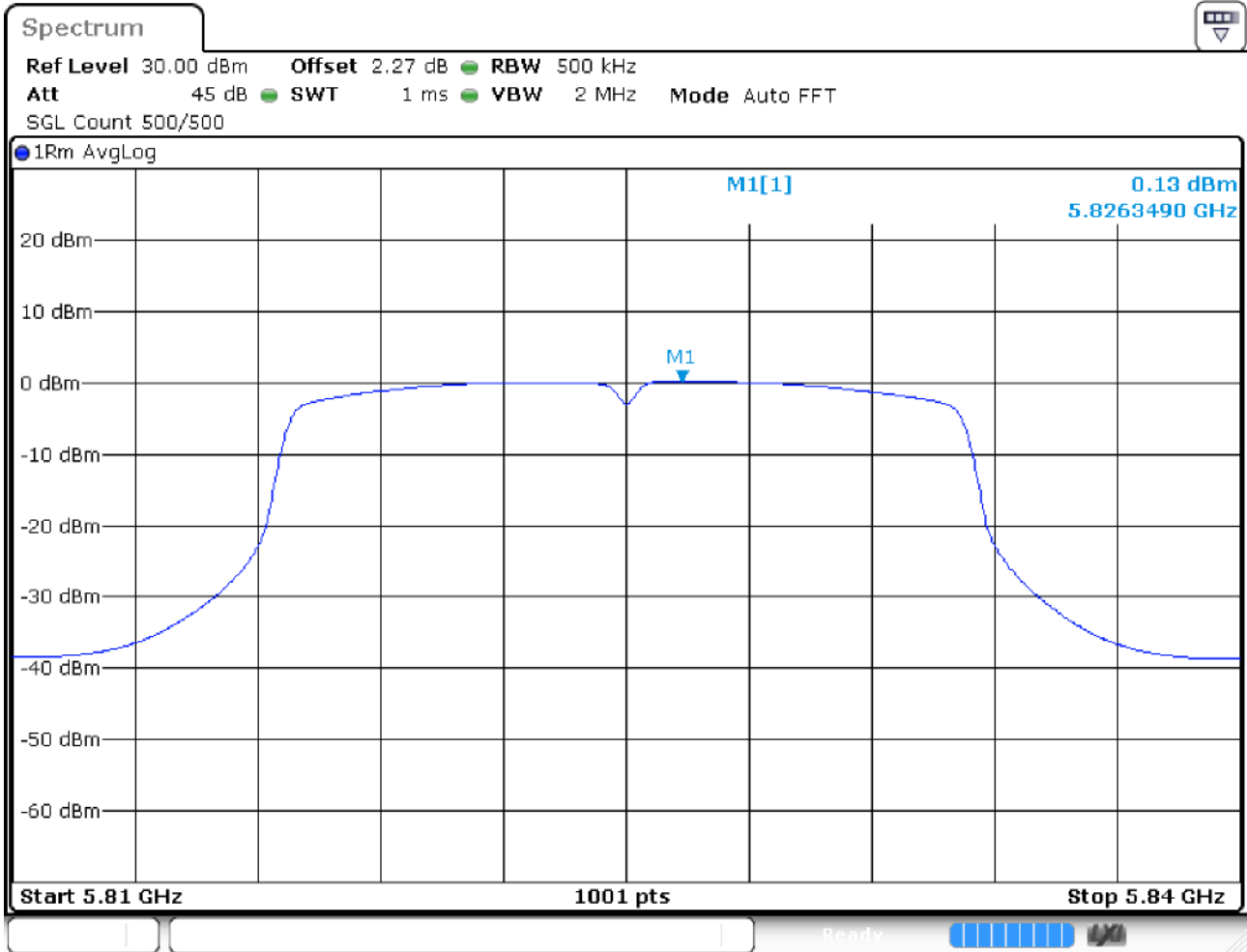
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**4.8.2.6 11A20\_165 ANT 1**

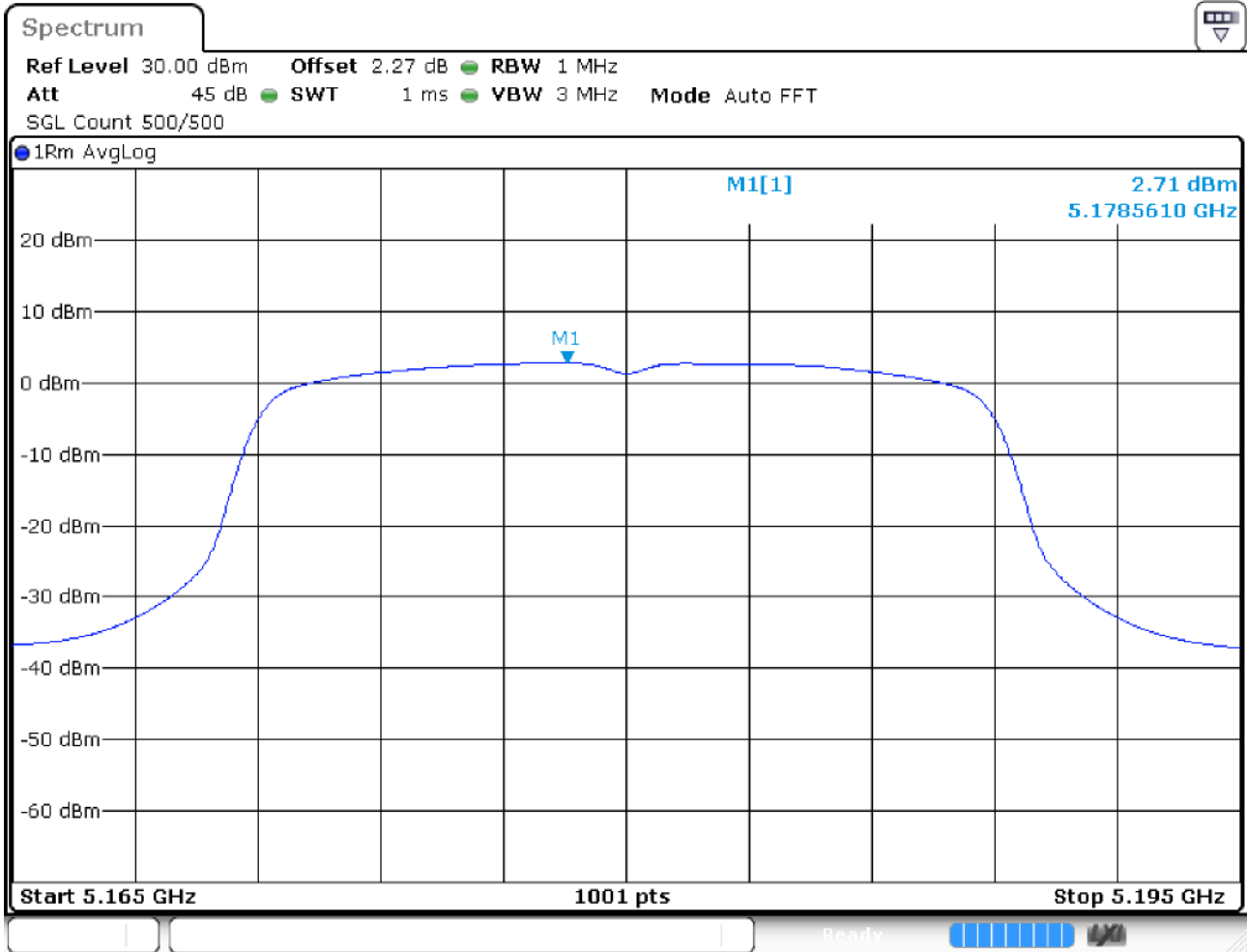


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**4.8.2.7 11N20\_36 ANT 1**



Date: 29.SEP.2020 10:30:53

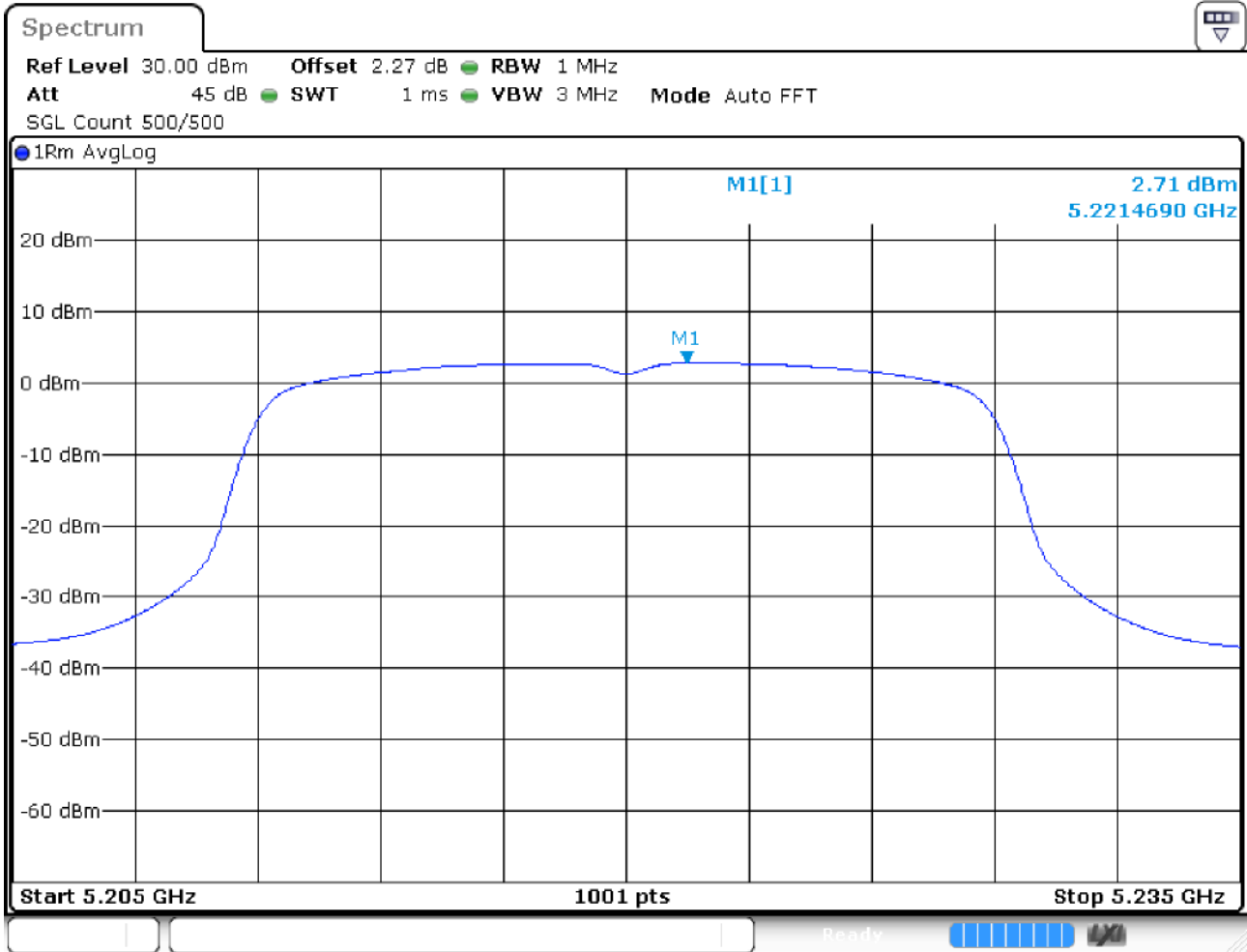


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**4.8.2.8 11N20\_44 ANT 1**



Date: 29.SEP.2020 10:32:35

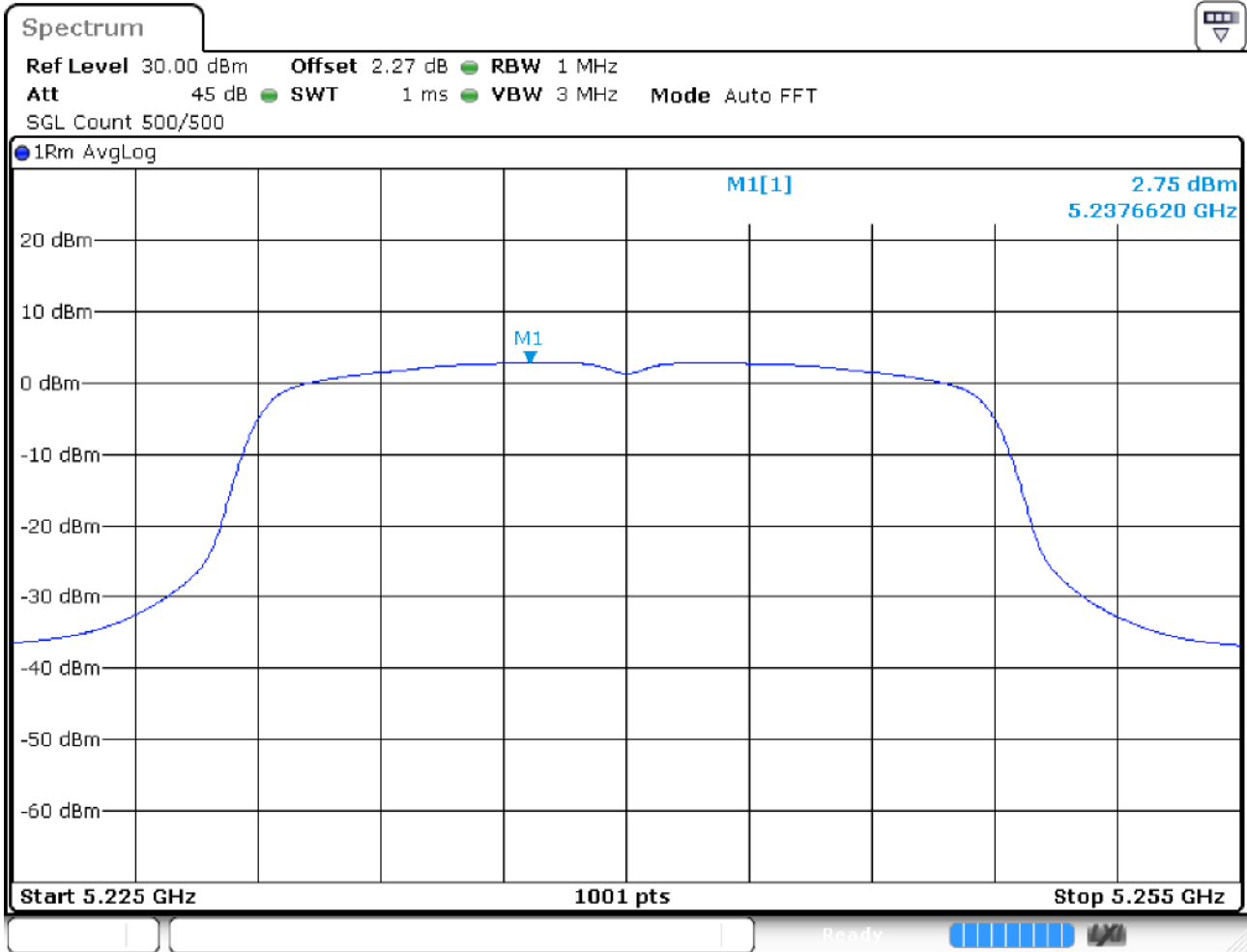


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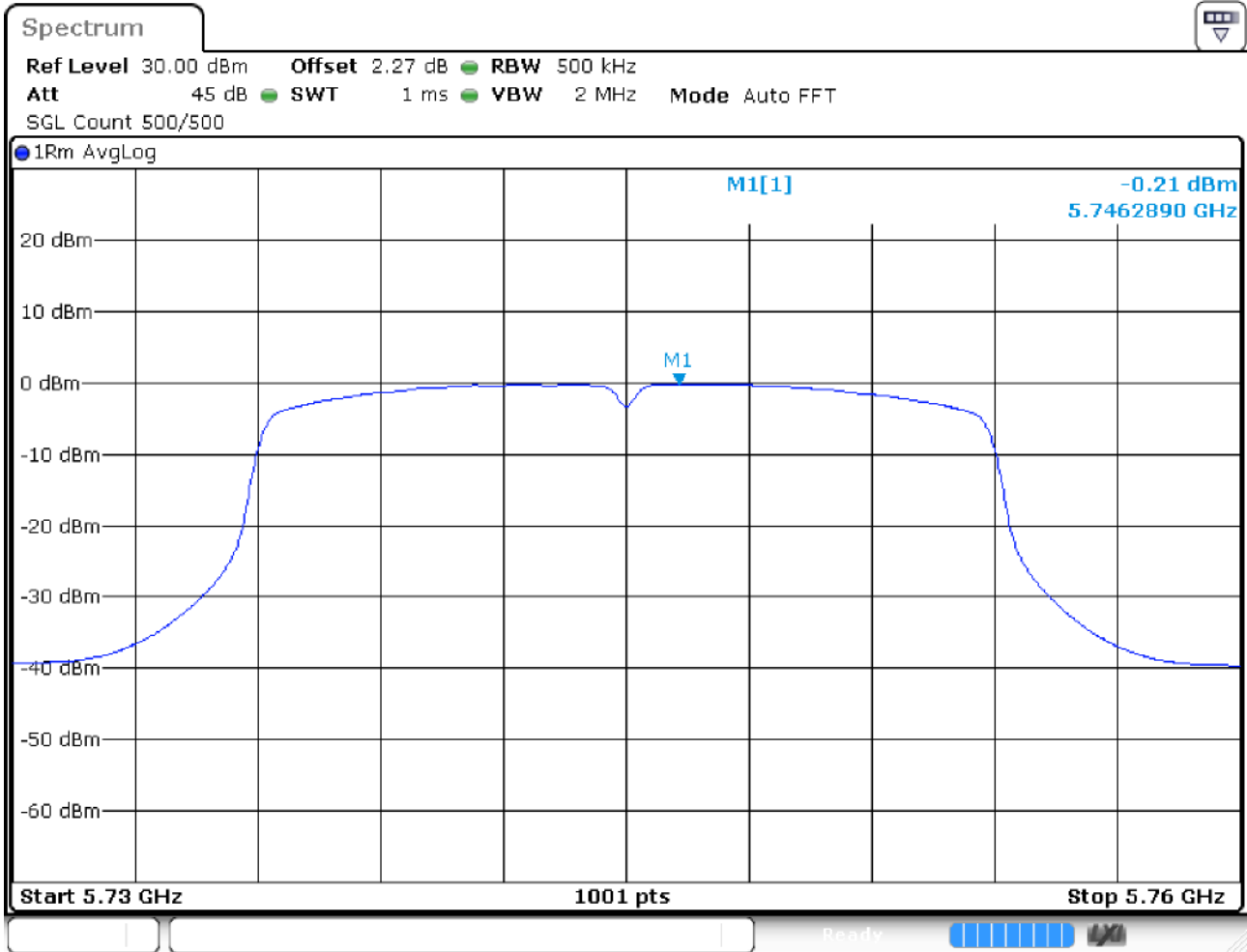
4.8.2.9 11N20\_48 ANT 1



Date: 29.SEP.2020 10:34:07



**4.8.2.10 11N20\_149 ANT 1**



Date: 29.SEP.2020 10:36:04



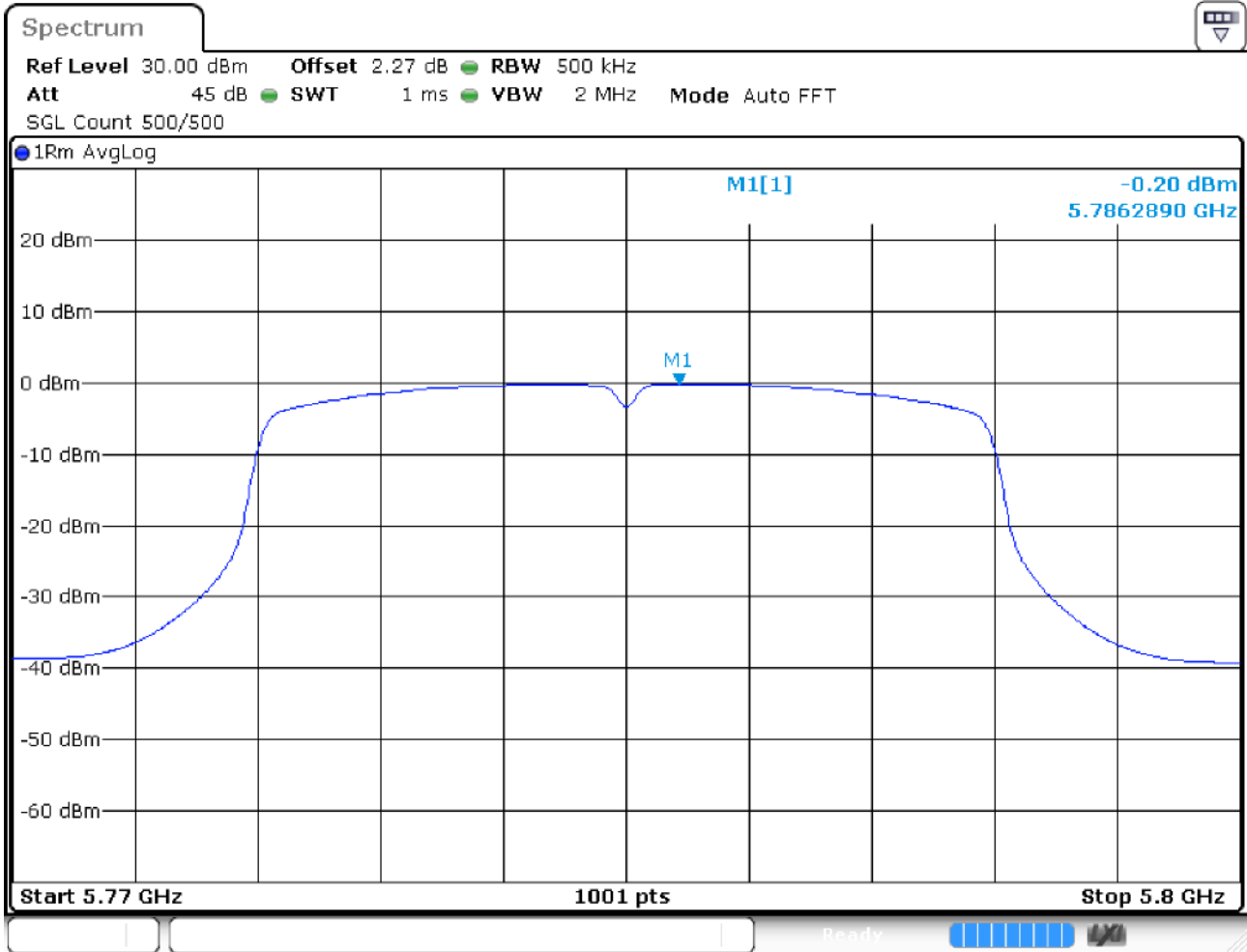
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**4.8.2.11 11N20\_157 ANT 1**

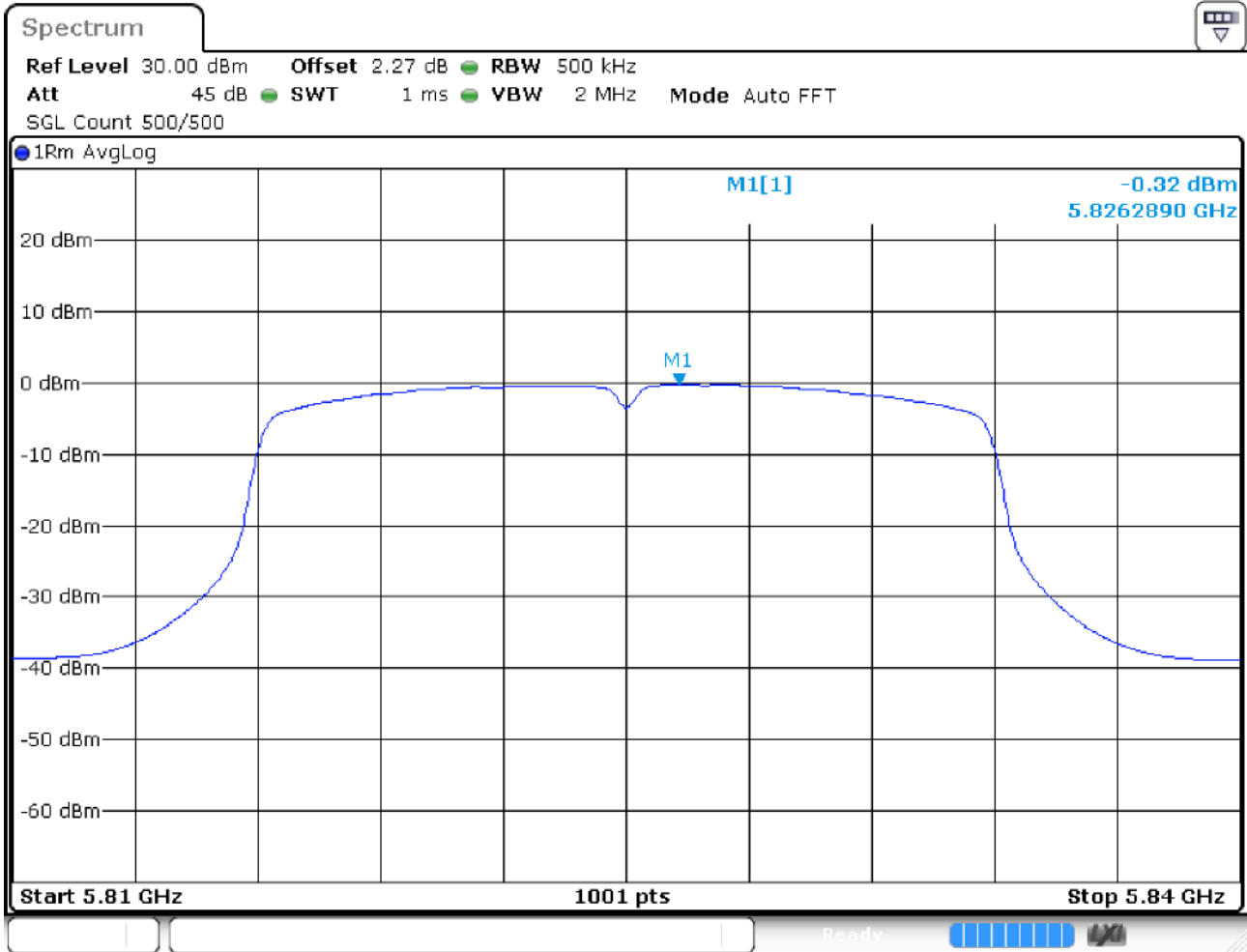


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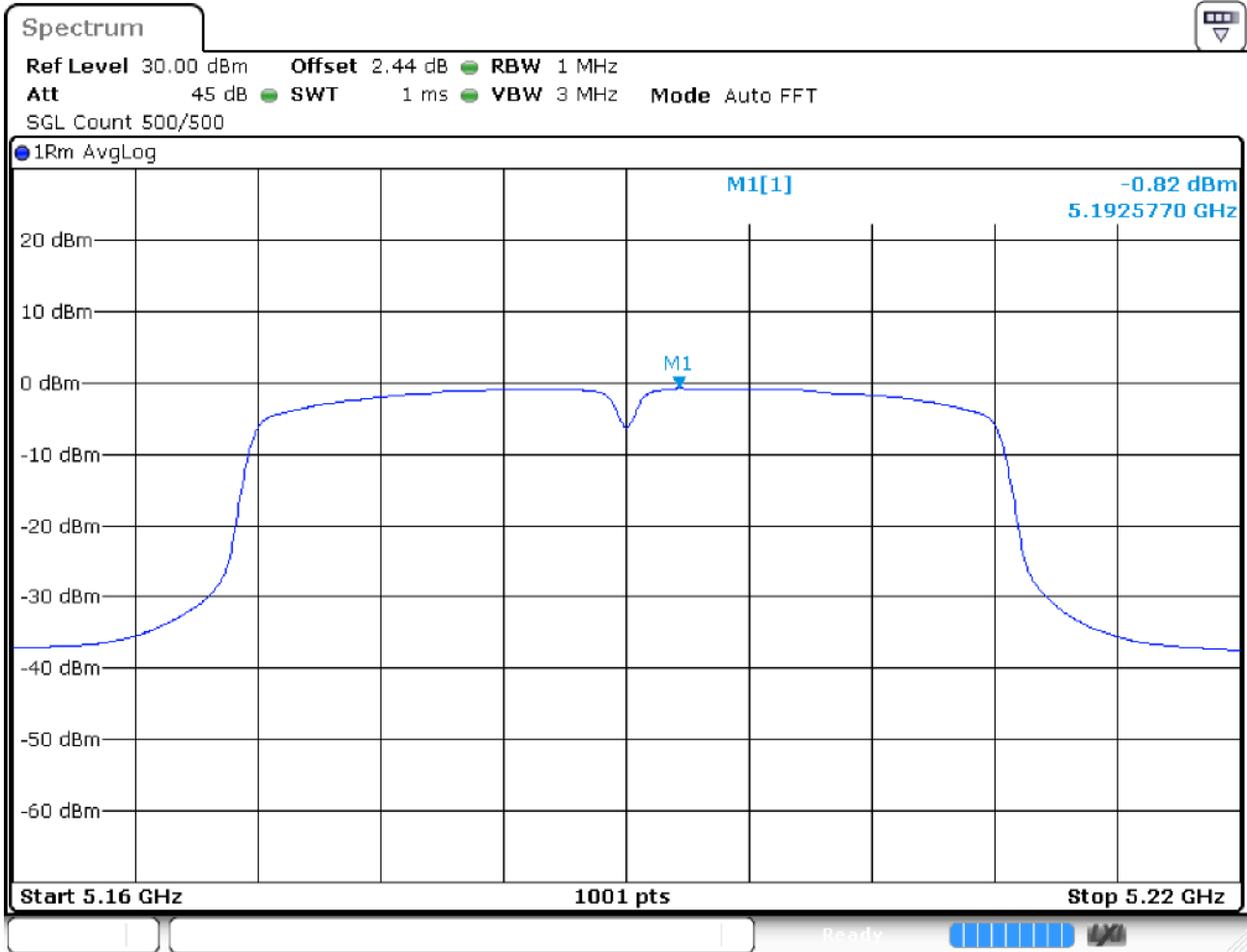
**4.8.2.12 11N20\_165 ANT 1**



Date: 29.SEP.2020 10:39:13



**4.8.2.13 11N40\_38 ANT 1**



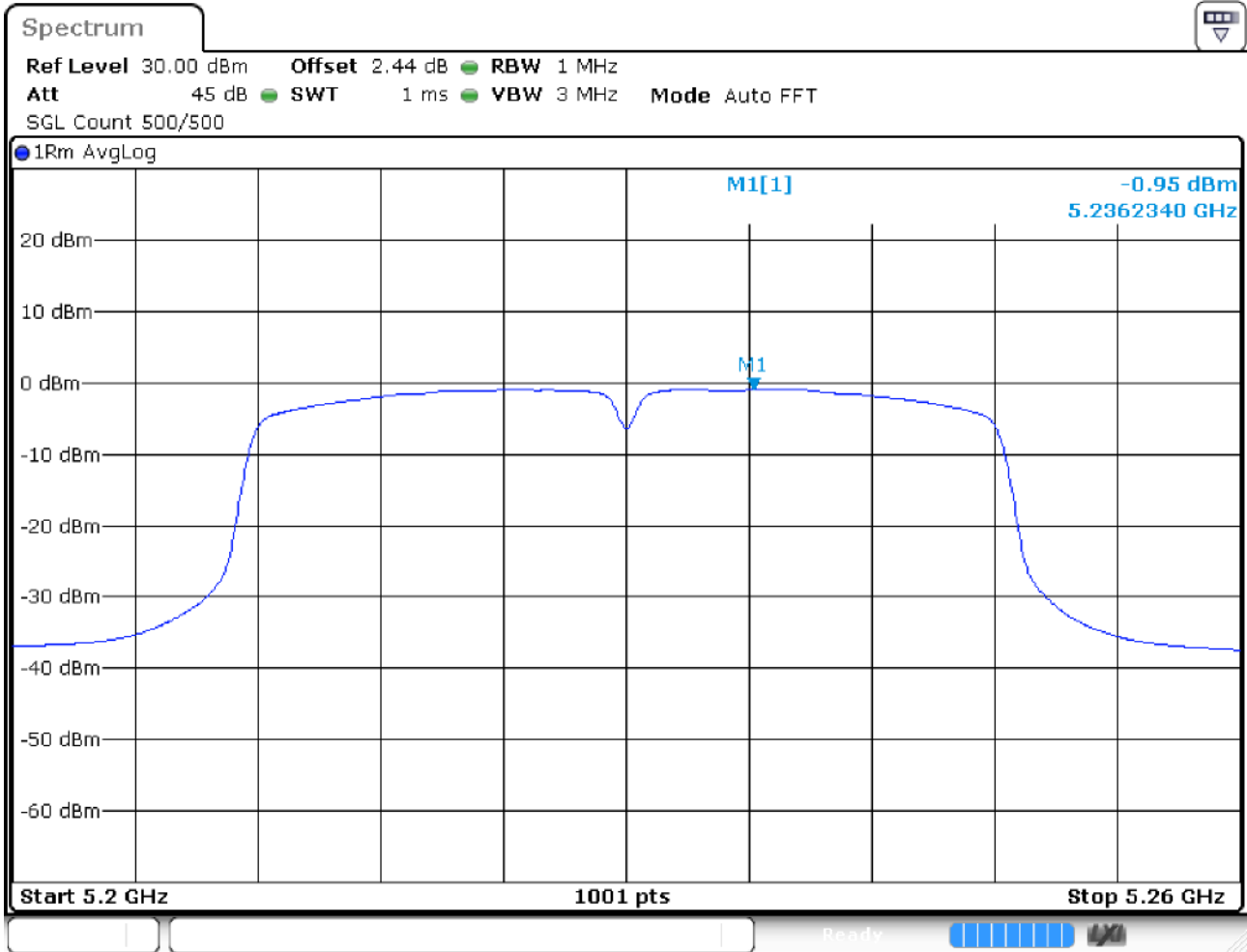
Date: 29.SEP.2020 10:41:58



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**4.8.2.14 11N40\_46 ANT 1**



Date: 29.SEP.2020 10:43:34

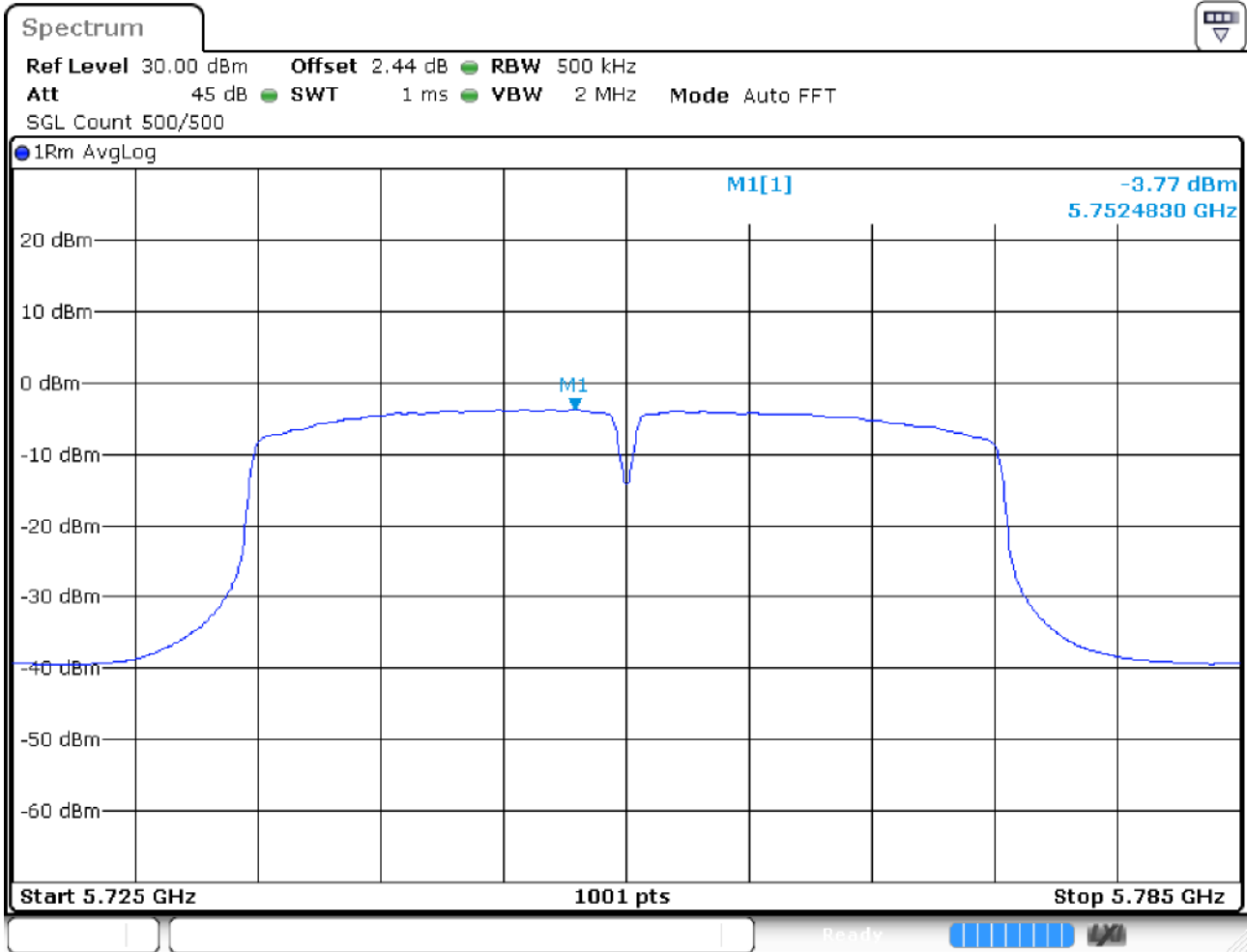


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**4.8.2.15 11N40\_151 ANT 1**



Date: 29.SEP.2020 10:45:25



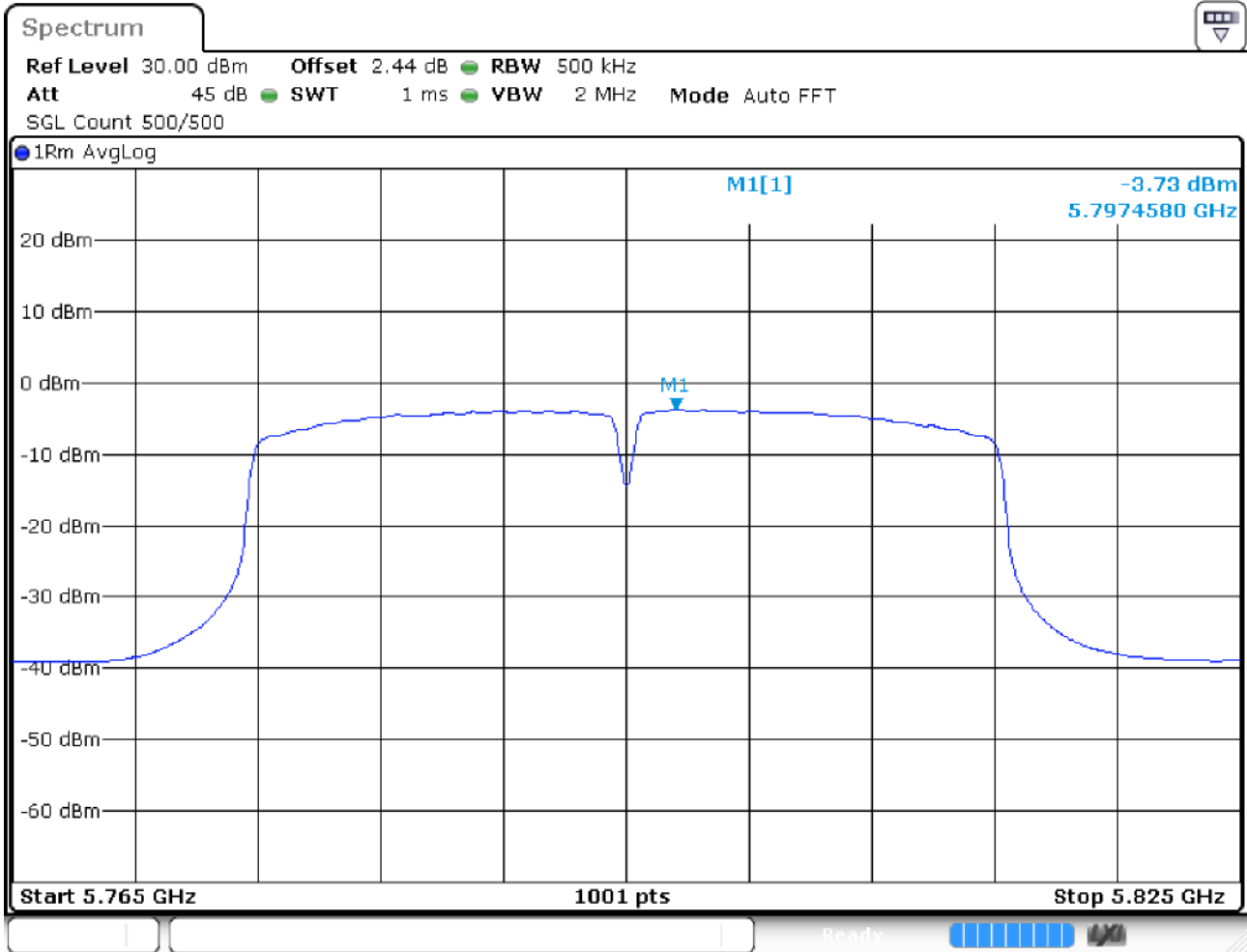
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**4.8.2.16 11N40\_159 ANT 1**

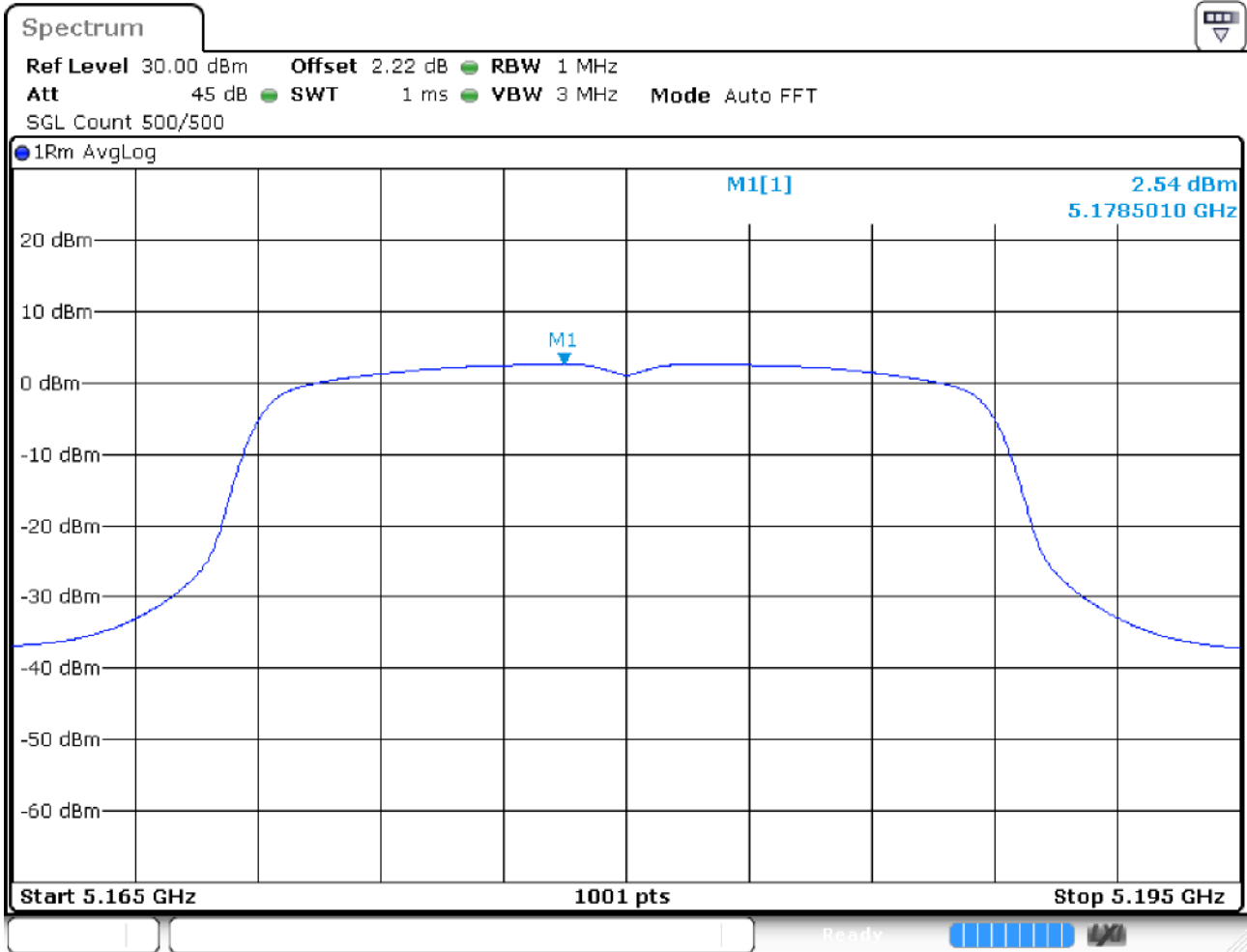


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**4.8.2.17 11AC20\_36 ANT 1**



Date: 29.SEP.2020 10:49:26

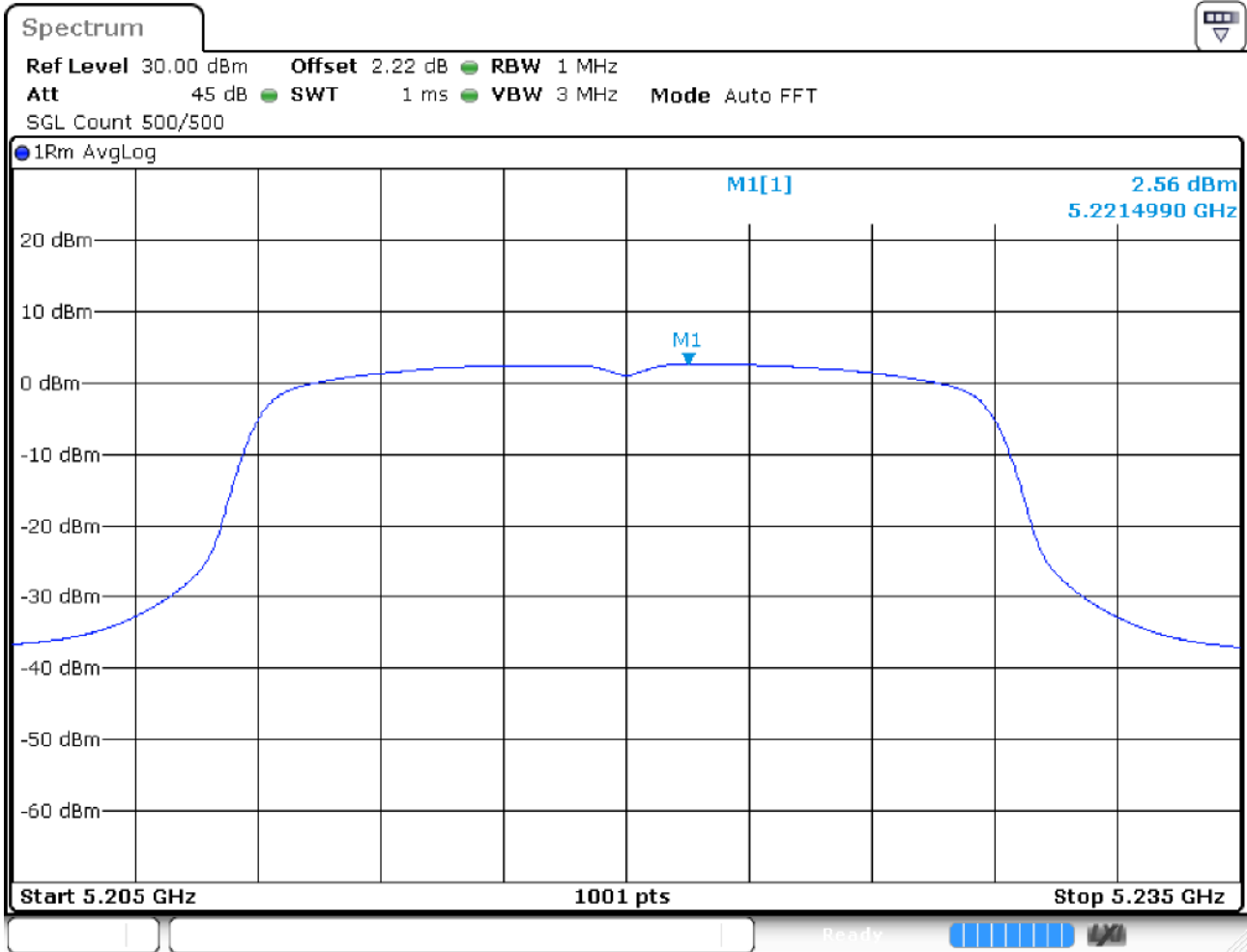


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**4.8.2.18 11AC20\_44 ANT 1**



Date: 29.SEP.2020 10:51:02

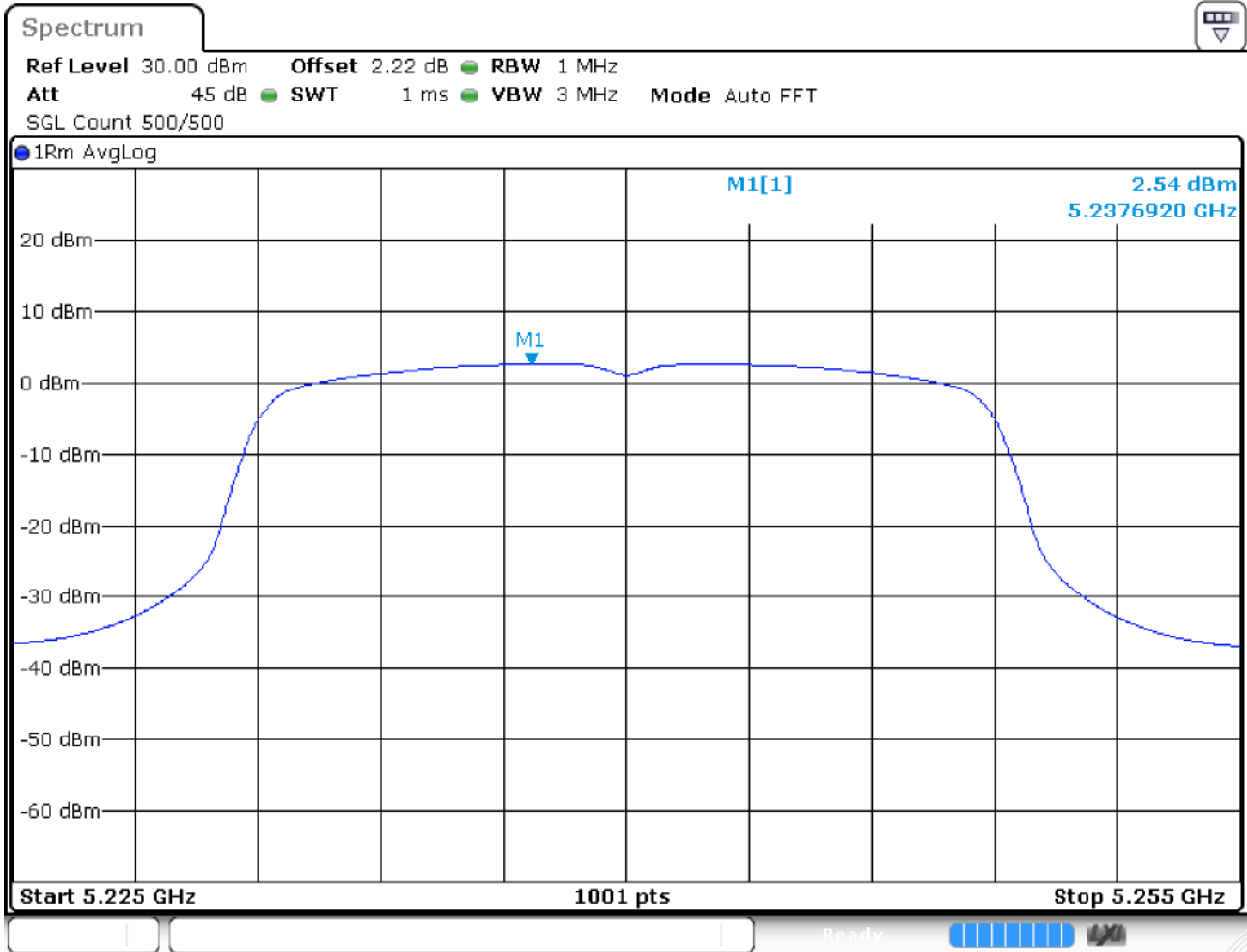


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**4.8.2.19 11AC20\_48 ANT 1**



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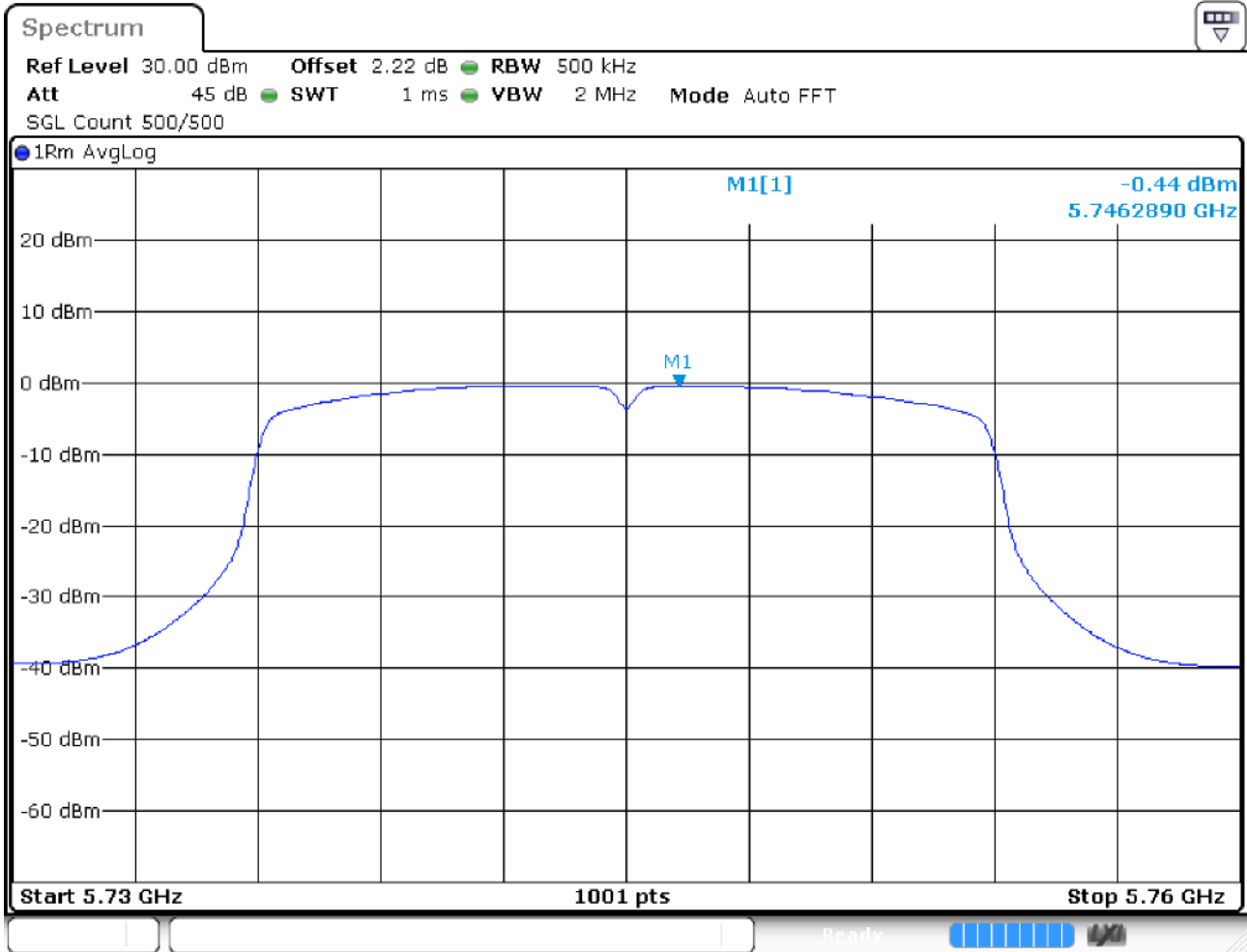


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**4.8.2.20 11AC20\_149 ANT 1**



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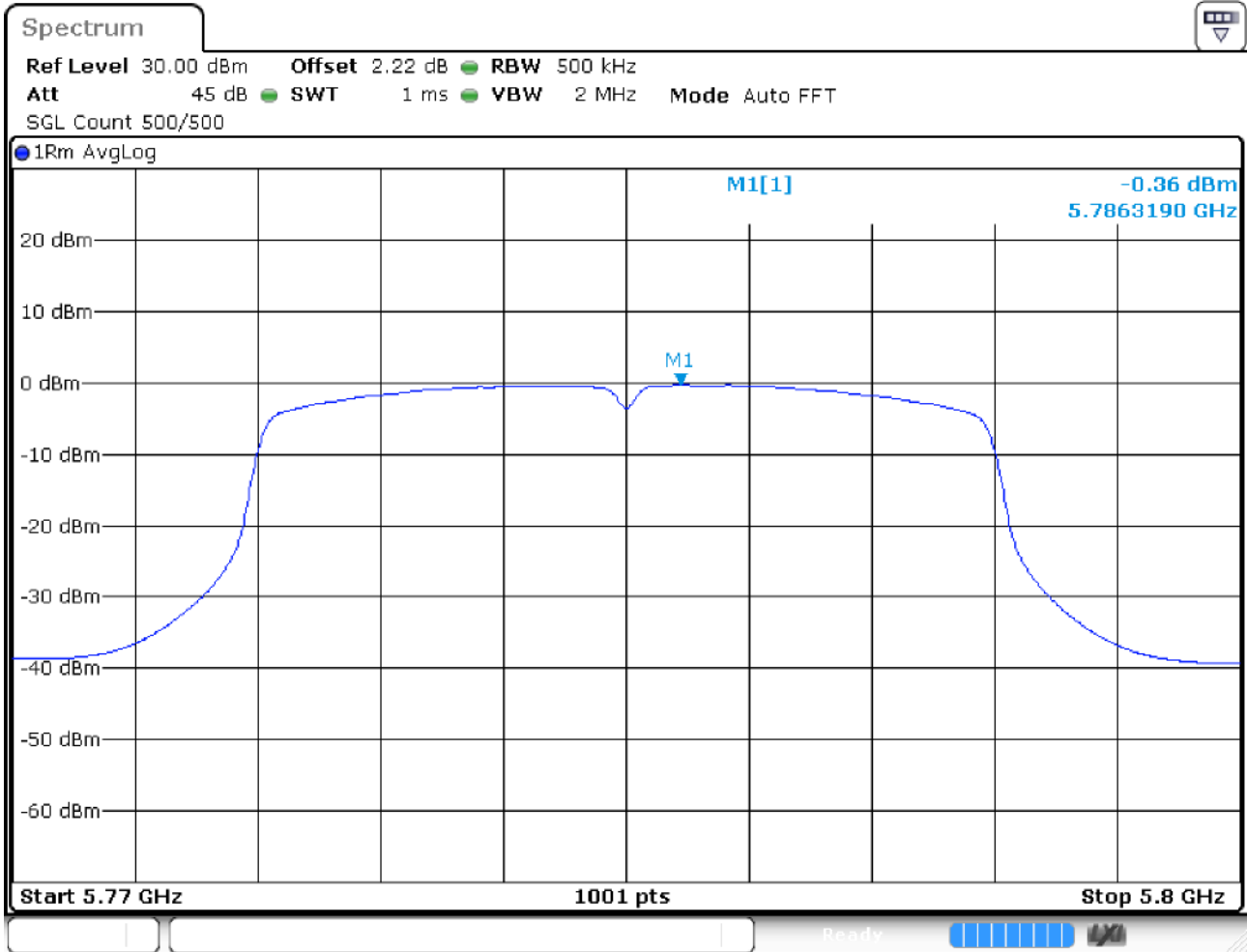
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**4.8.2.21 11AC20\_157 ANT 1**



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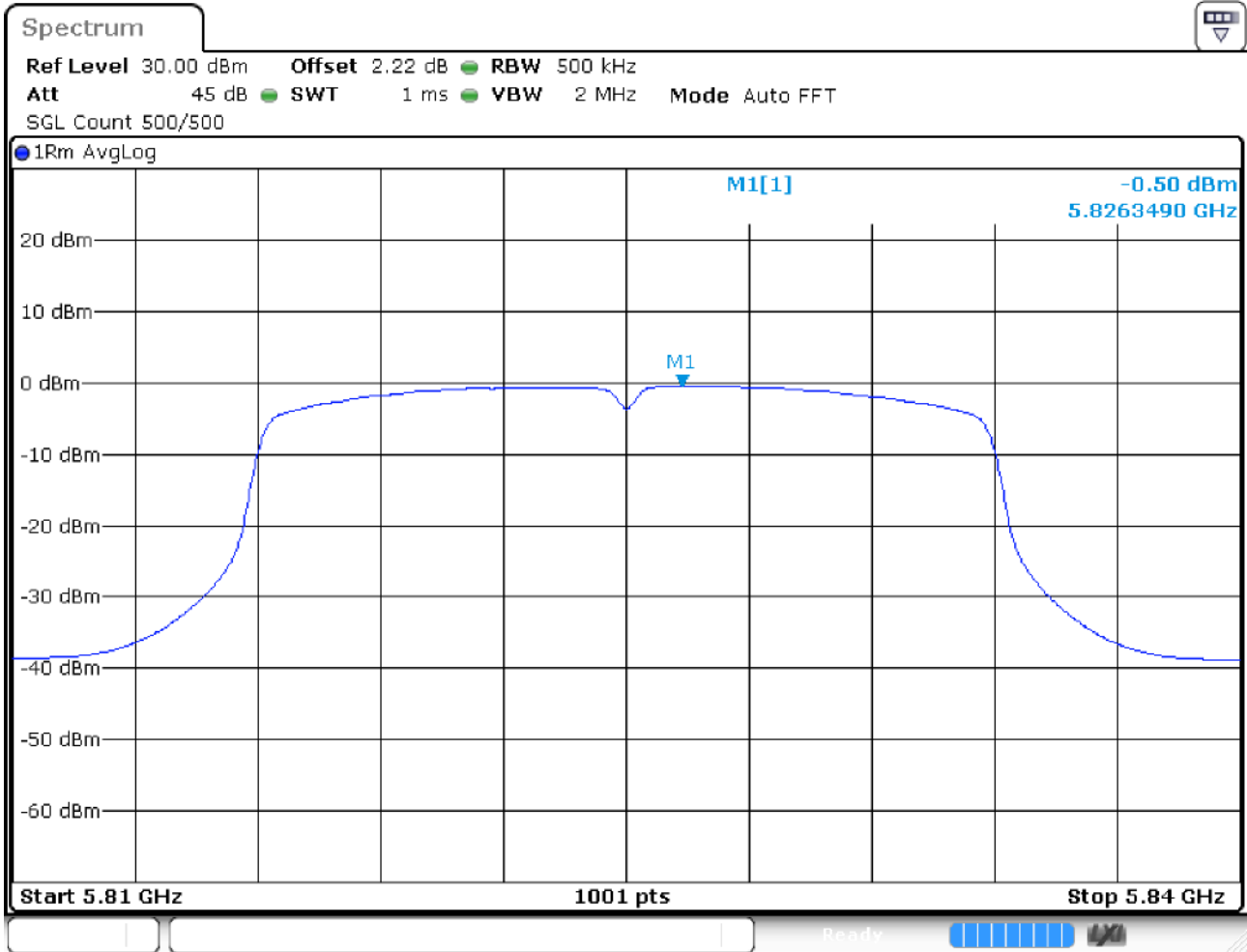


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**4.8.2.22 11AC20\_165 ANT 1**



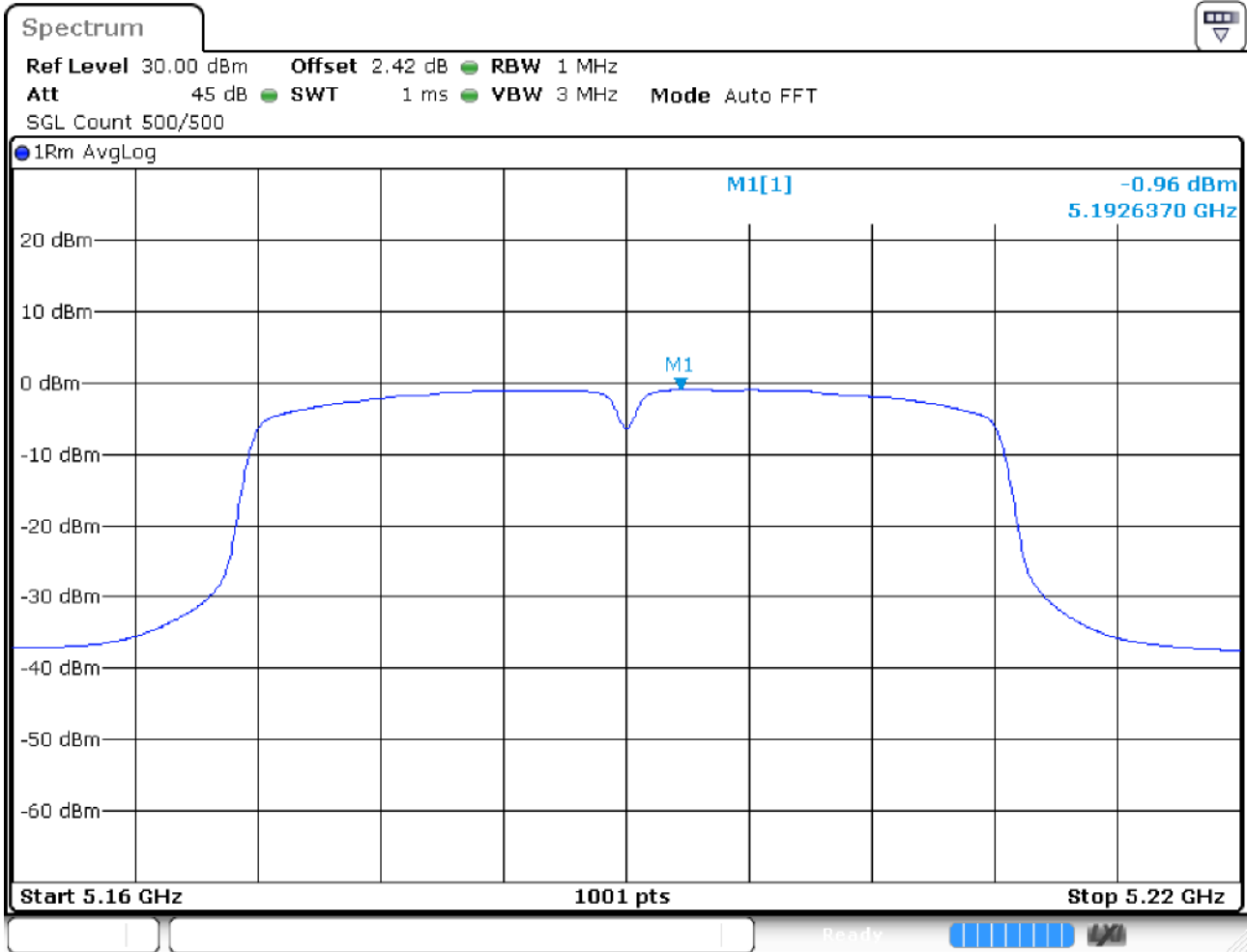
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**4.8.2.23 11AC40\_38 ANT 1**



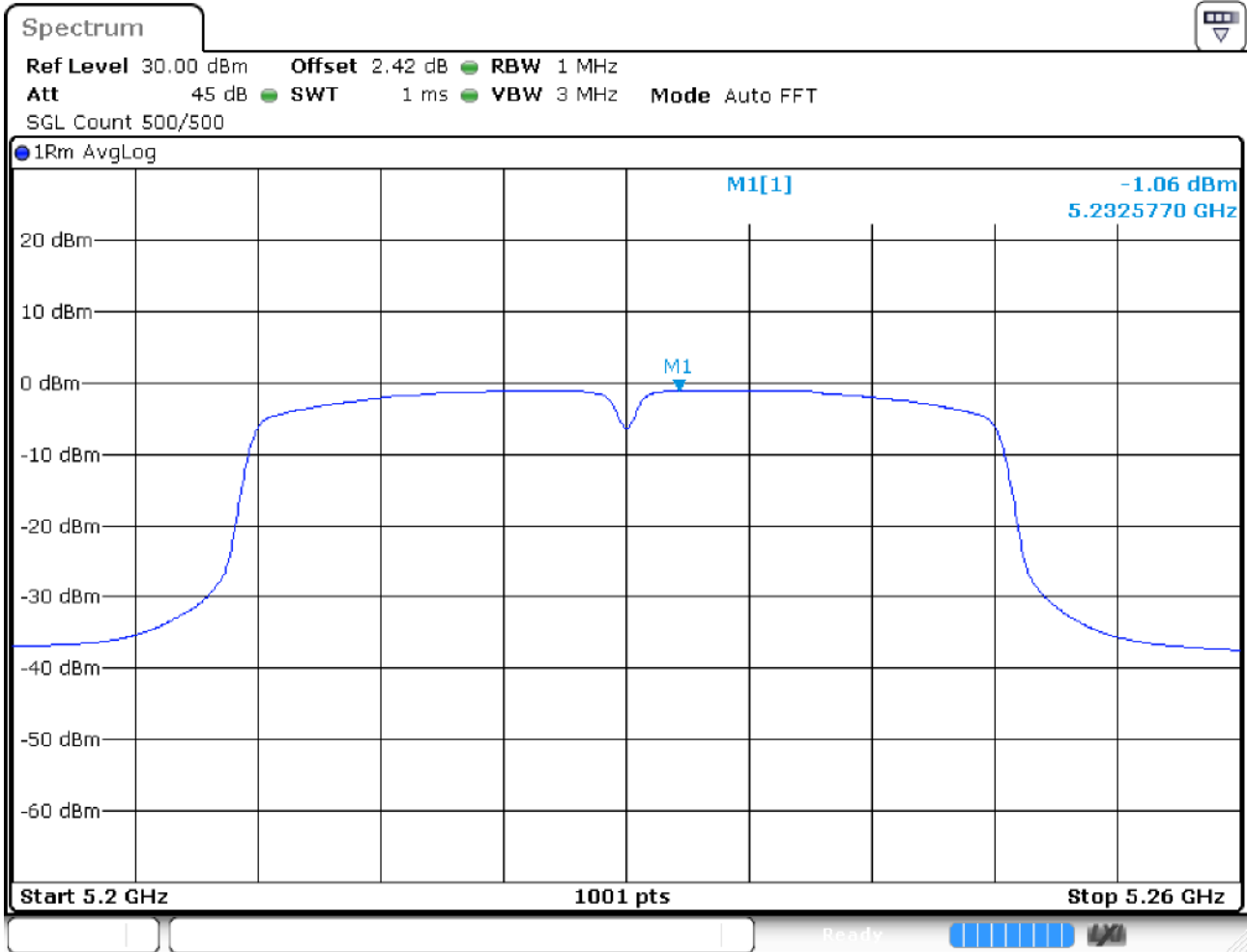
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**4.8.2.24 11AC40\_46 ANT 1**



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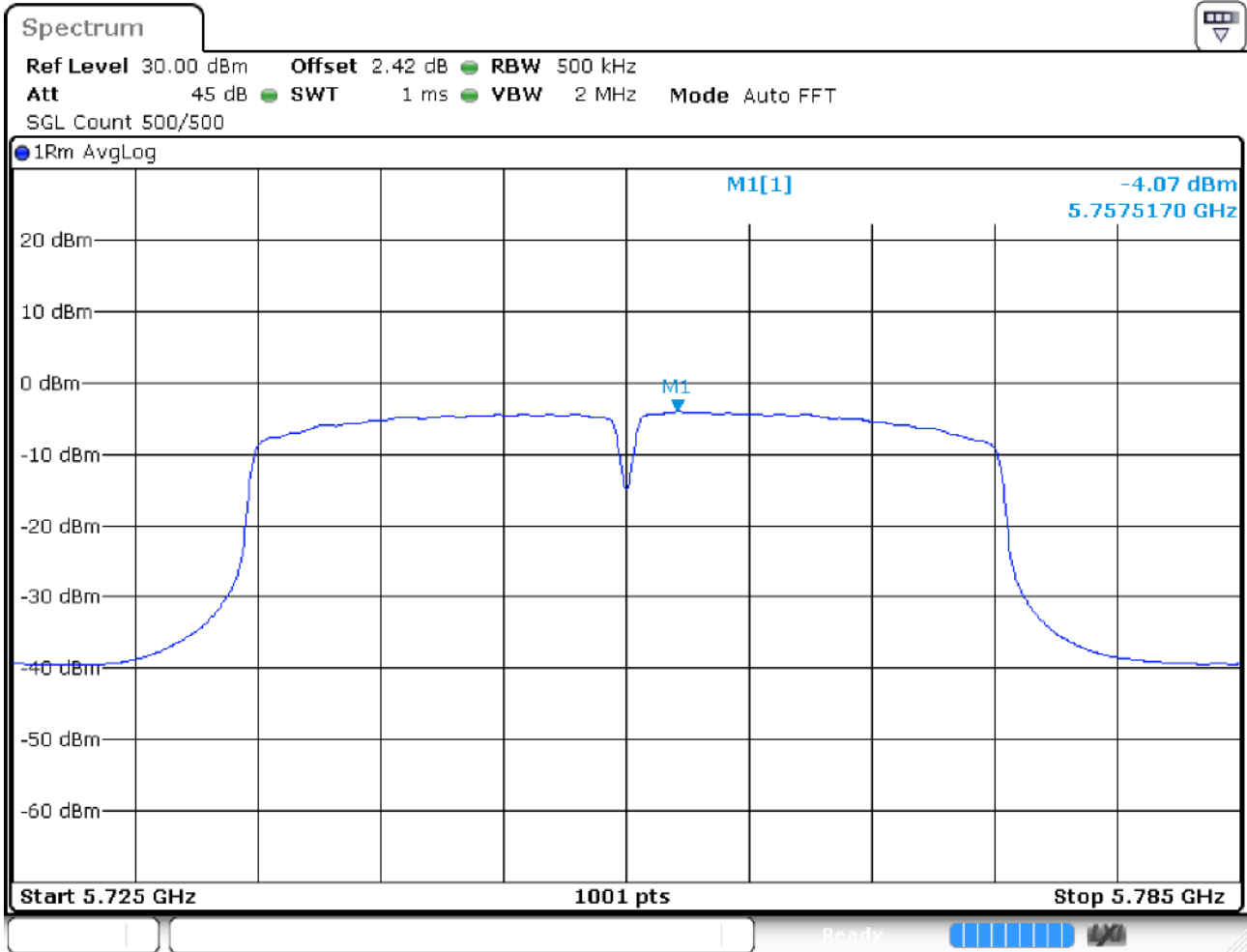


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**4.8.2.25 11AC40\_151 ANT 1**



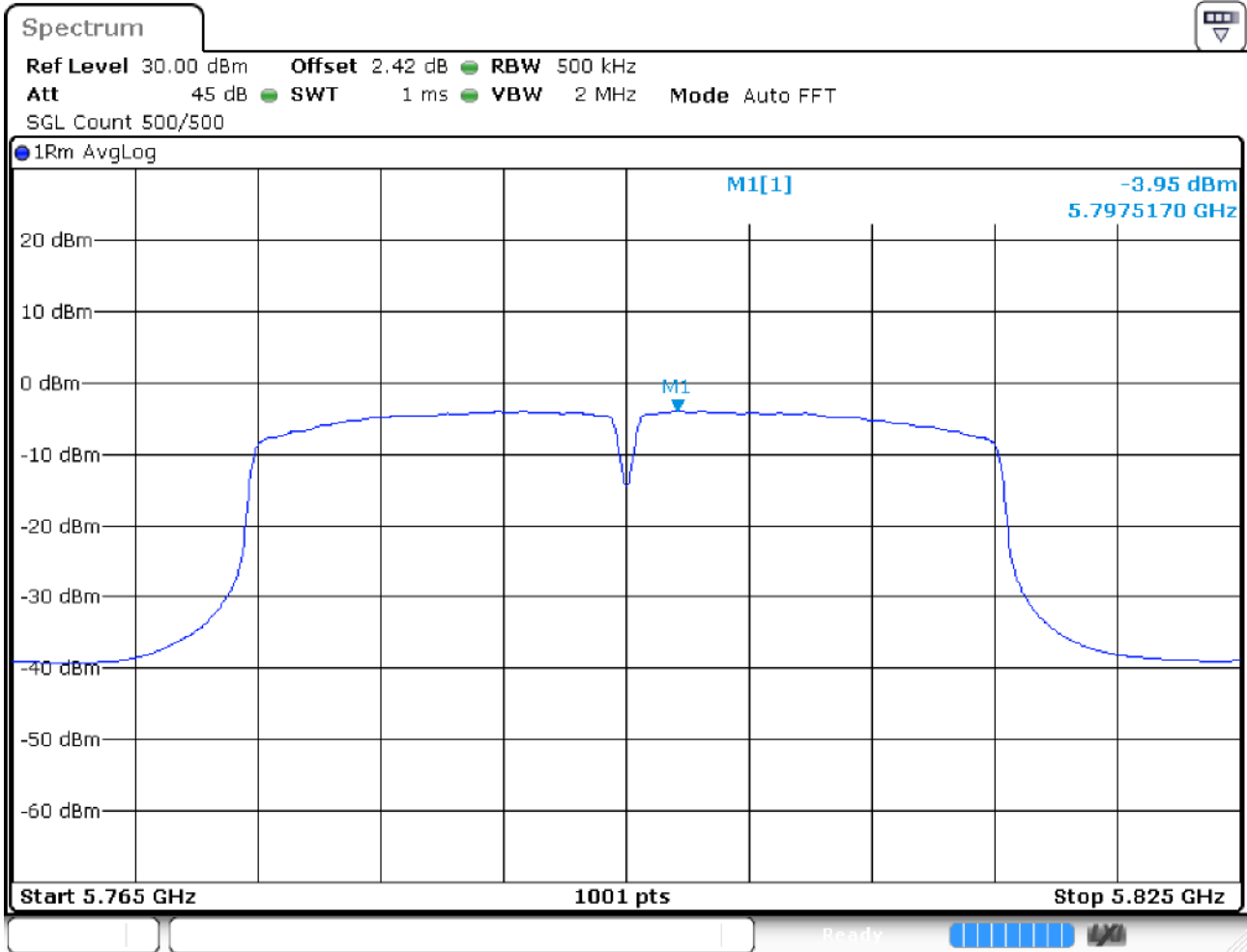
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4.8.2.26 11AC40\_159 ANT 1

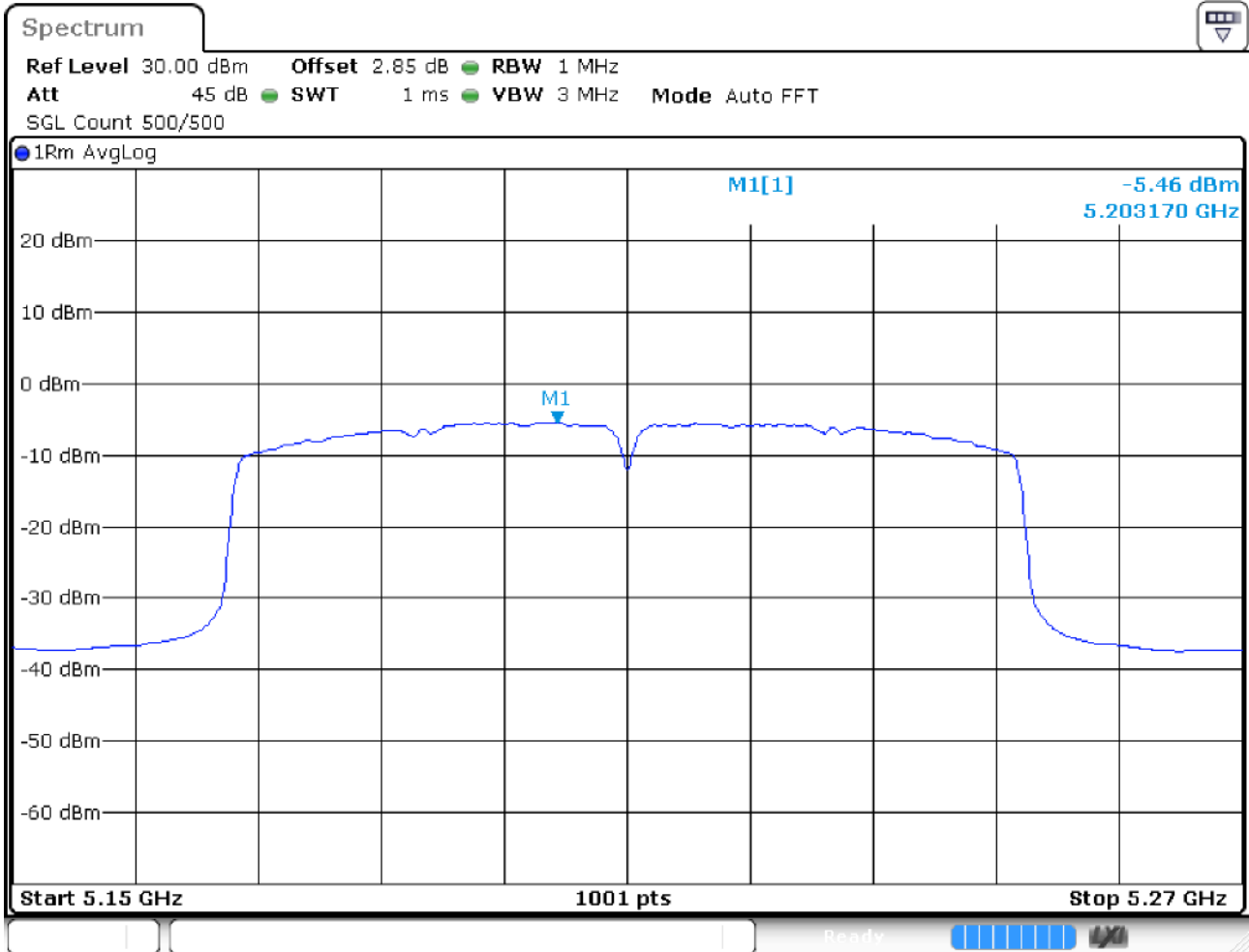


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**4.8.2.27 11AC80\_42 ANT 1**

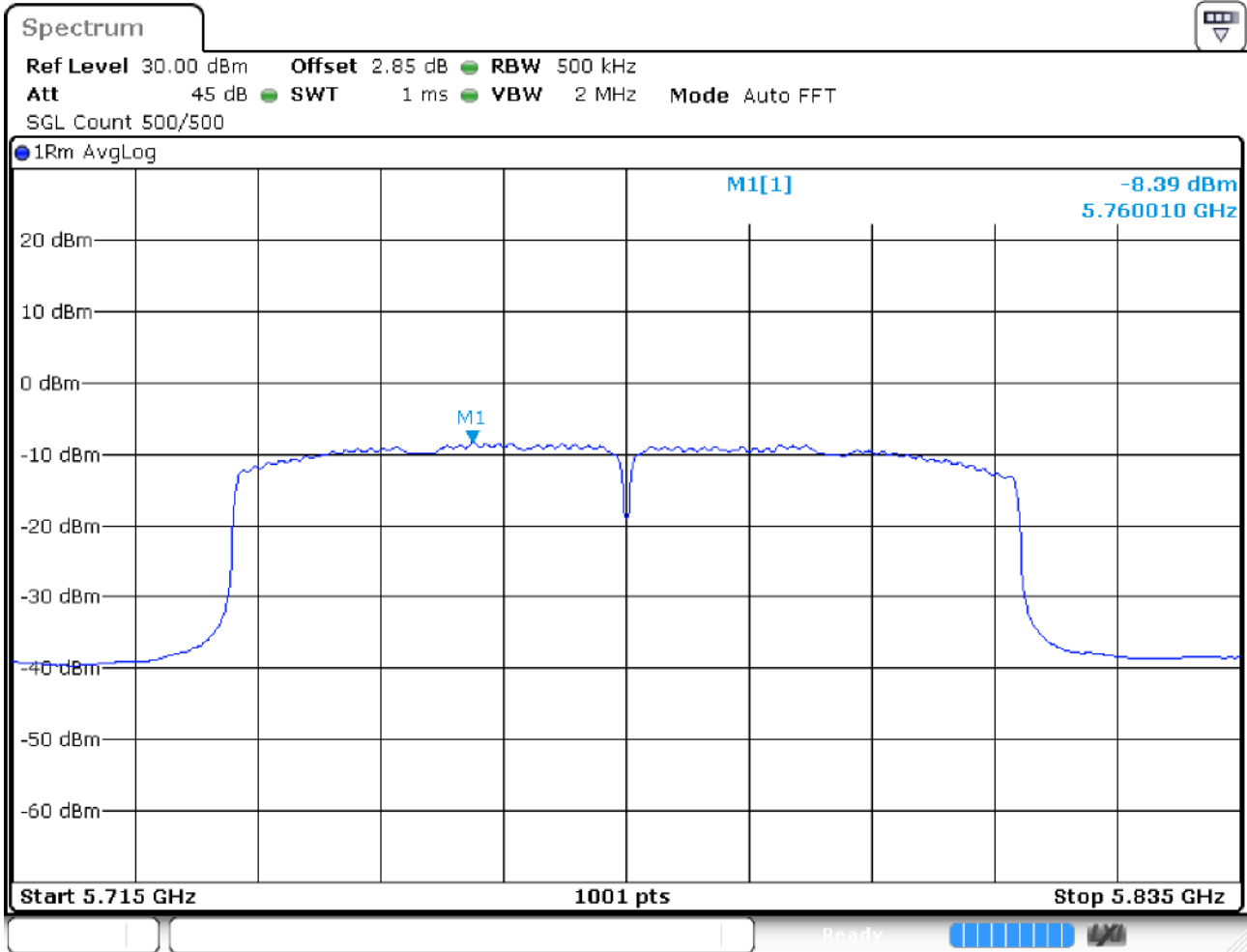


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**4.8.2.28 11AC80\_155 ANT 1**



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### 4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)
Test Method:	ANSI C63.10: 2013
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)
Test Setup:	

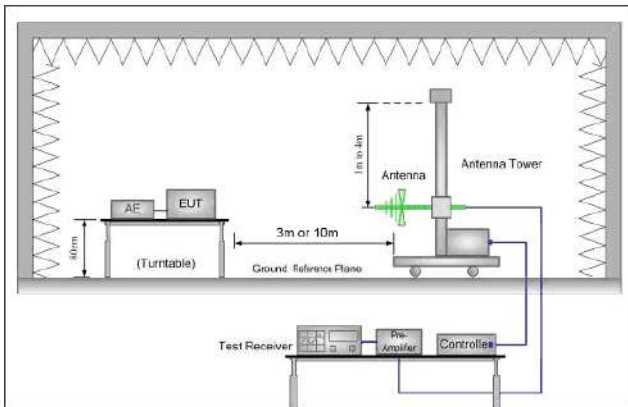


Figure 1. 30MHz to 1GHz

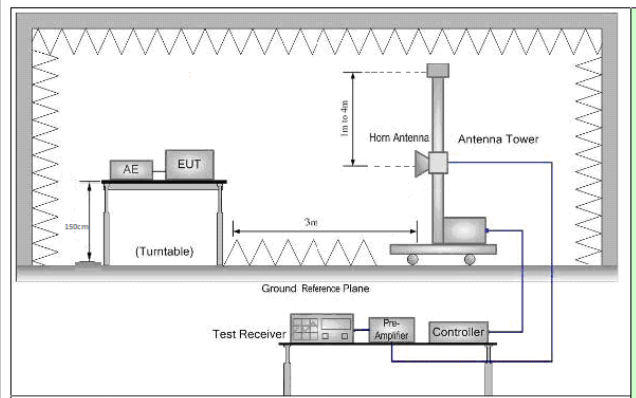


Figure 2. Above 1 GHz

<p><b>Test Procedure:</b></p>	<ol style="list-style-type: none"> <li>For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>Test the EUT in the outermost channels.</li> <li>The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</li> </ol>
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