FCC TEST REPORT

Application No:	ZR/2020/40002
Applicant:	vivo Mobile Communication Co., Ltd.
Address of Applicant:	#283, BBK Road, Wusha,Chang'An, DongGuan City, China
Manufacturer:	vivo Mobile Communication Co., Ltd.
Address of Manufacturer	#283, BBK Road, Wusha,Chang'An, DongGuan City, China
EUT Description:	Mobile phone
Model No.:	vivo 1938
Trade Mark:	vivo
FCC ID:	2AUCY-V1938
Standards:	47 CFR FCC Part 2, Subpart J 47 CFR FCC Part 15, Subpart C 47 CFR FCC Part 15, Subpart E
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02 FCC KDB 558074 D01 DTS Meas Guidance v0502 KDB 662911 D01 Multiple Transmitter Output v02r01 KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 KDB 905462 D03 Client Without DFS New Rules v01r02 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices
Date of Receipt:	2020/4/3
Date of Test:	2020/4/3 to 2020/5/11
Date of Issue:	2021/4/28
Test Result:	**PASS ***

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

1 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2020/5/11		Original
01		2021/4/28	Eason Wang	1. Add test site Information 2.Modify data conversion error of antenna height 3.Update equipment list

This report supersedes our previous report ZR/2020/4000205, issued on 2020-05-11, which is hereby deemed null and void.

Authorized for issue by:		
Prepared By		Eason Wang **(Eason Wang) /Engineer**
Checked By		David Chen **(David Chen) /Reviewer**

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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 Clause 4.5	Pass	A
	5250-5350	15.403(i) 15.407(a)(2)				
	5470-5725	15.403(i) 15.407(a)(2)				
	5725-5850	15.403(i) 15.407(e)	≥ 500 kHz.			
Occupied Bandwidth	5150-5250	KDB 789033 D02§ D	No limit.		Pass	A
	5250-5350					
	5470-5725					
	5725-5850					
Duty Cycle	5150-5850	--	No limit.		Pass	A
Maximum Conducted Output Power	5150-5250	15.407(a)(1) 15.407(a)(4)	FCC < 250mW (avg during transmission)	Clause 4.3		A
	5250-5350	15.407(a)(2) 15.407(a)(4)	<MIN{250mW,11dBm+10*lg(EBW)} (avg during transmission)			
	5470-5725	15.407(a)(2) 15.407(a)(4)	<MIN{250mW,11dBm+10*lg(EBW)} (avg during transmission)			
	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		A
	5250-5350	15.407(a)(2) 15.407(a)(4)	<11dBm/MHz (avg during transmission)			
	5470-5725	15.407(a)(2) 15.407(a)(4)	<11dBm/MHz (avg during transmission)			
	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	Clause 4.7	Pass	B

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Test Item	Band	FCC Rule	Requirements	Test Result	Verdict	Test Lab*
			(AV&PK).			
	5250-5350	15.407(b)(2) 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. 5.25-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).			
	5470-5750	15.407(b)(3) 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. 5.47-5.725 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).			
	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			

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Test Item	Band	FCC Rule	Requirements	Test Result	Verdict	**Test Lab***
			75 MHz above or below the band edges. F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).			
Unwanted Emissions in the Restricted Bands (Radiated)	5150-5250 5250-5350 5470-5725 5725-5850	15.209		Clause 4.8	Pass	B
AC Power Line Conducted Emissions	5150-5250 5250-5350 5470-5725 5725-5850	15.207		Clause 4.2	Pass	B
Frequency Stability	5150-5250 5250-5350 5470-5600 5650-5725 5725-5850	15.209		Clause 4.9	Pass	A
Dynamic Frequency Selection	5250-5350 5470-5725	47 CFR Part 15, Subpart E 15.407	Channel Move Time:10 Seconds Transmission Time: milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. Non-occupancy period: Minimum 30 minutes	Clause 4.10	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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3 General Information

3.1 Client Information

Applicant:	vivo Mobile Communication Co., Ltd.
Address of Applicant:	#283, BBK Road, Wusha, Chang'An, DongGuan City, China
Manufacturer:	vivo Mobile Communication Co., Ltd.
Address of Manufacturer:	#283, BBK Road, Wusha, Chang'An, DongGuan City, China

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, Jason Chen

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 phone
Model No.:	vivo 1938
Trade Mark:	vivo
Hardware Version:	MP_0.1
Software Version:	PD1987F_EX_A_2.7.1
IEEE 802.11 WLAN Mode Supported:	☒ 802.11a (20 MHz channel bandwidth) ; ☒ 802.11n (20 MHz channel bandwidth); ☒ 802.11n (40 MHz channel bandwidth); ☒ 802.11ac (20 MHz channel bandwidth); ☒ 802.11ac (40 MHz channel bandwidth); ☒ 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): 5250MHz to 5350MHz IEEE 802.11n(HT20/40)/ ac(HT20/40/80): 5470MHz to 5725MHz IEEE 802.11n(HT20/40)/ ac(HT20/40/80): 5725MHz to 5850MHz
Type of Modulation:	OFDM
DFS mode:	☐Master ☐ Slave with radar detection ☒Slave without radar detection
Sample Type:	☒ Portable Device, ☐Module
Antenna Type:	☐ External, ☒ IFA
Antenna Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3
Smart System	☒ SISO (for 802.11a/n/ac), ☐ MIMO (for 802.11n/ac), ☐ Diversity (for 802.11a) : Tx & Rx
Antenna Gain:	-0.90
Power Supply	☒ AC/DC Adapter; ☒ Battery; ☐ PoE; ☐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 II-2A:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5260
	The Middle channel	5280
	The Highest channel	5320
IEEE 802.11n/ac 40MHz	The Lowest channel	5270
	The Highest channel	5310
IEEE 802.11ac 80MHz	The Middle channel	5290

For UNII Band II-2C:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5500
	The Middle channel	5580
	The Highest channel	5700
IEEE 802.11n/ac 40MHz	The Lowest channel	5510
	The Middle channel	5500
	The Highest channel	5670
IEEE 802.11ac 80MHz	The Lowest channel	5500
	The Highest channel	5580

For UNII Band III:

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5745
	The Middle channel	5785

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	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

3.5 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	101.32 KPa
Test mode:	
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

Test Requirement:	47 CFR Part 15 Section 15.203
The antenna is IFA antenna and no consideration of replacement. The best case gain of the antenna is -0.9dBi.	

4.2 Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	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.		
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 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. 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, 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. 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.		

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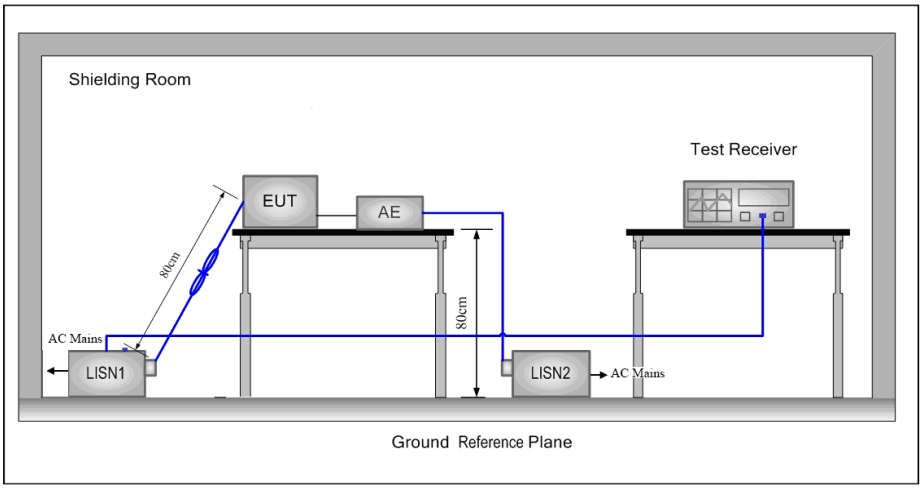
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Final Test Mode:	Through Pre-scan, find the 6Mbps of rate of 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer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

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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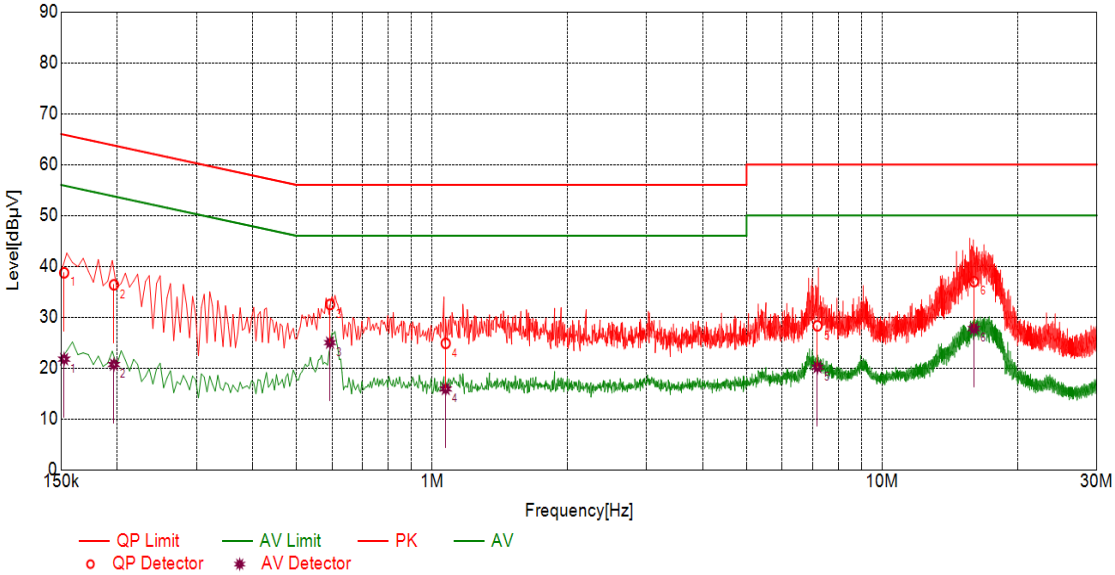
Live Line:



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	0.1524	10.10	38.73	65.87	27.14	21.75	55.87	34.12	L
2	0.1966	10.10	36.37	63.76	27.39	20.69	53.76	33.07	L
3	0.5938	10.10	32.50	56.00	23.50	25.00	46.00	21.00	L
4	1.0731	10.10	24.86	56.00	31.14	15.90	46.00	30.10	L
5	7.1862	10.10	28.30	60.00	31.70	20.19	50.00	29.81	L
6	15.9950	10.11	37.01	60.00	22.99	27.77	50.00	22.23	L

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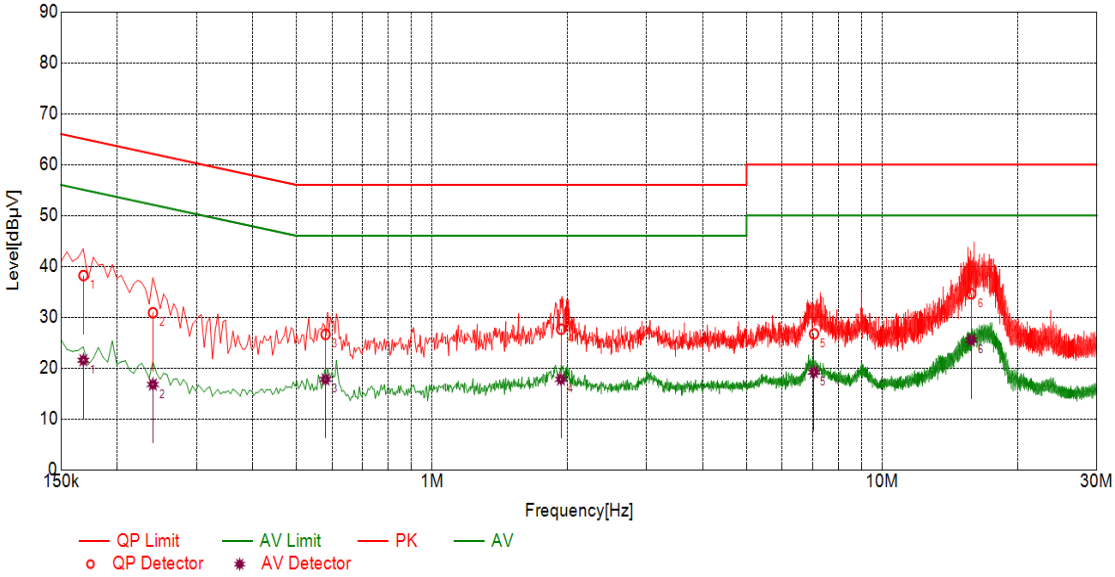
Neutral Line:



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	0.1682	10.10	38.19	65.05	26.86	21.54	55.05	33.51	N
2	0.2400	10.10	30.87	62.10	31.23	16.77	52.10	35.33	N
3	0.5803	10.10	26.62	56.00	29.38	17.78	46.00	28.22	N
4	1.9358	10.10	27.65	56.00	28.35	17.78	46.00	28.22	N
5	7.0582	10.10	26.73	60.00	33.27	19.21	50.00	30.79	N
6	15.7822	10.11	34.63	60.00	25.37	25.51	50.00	24.49	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

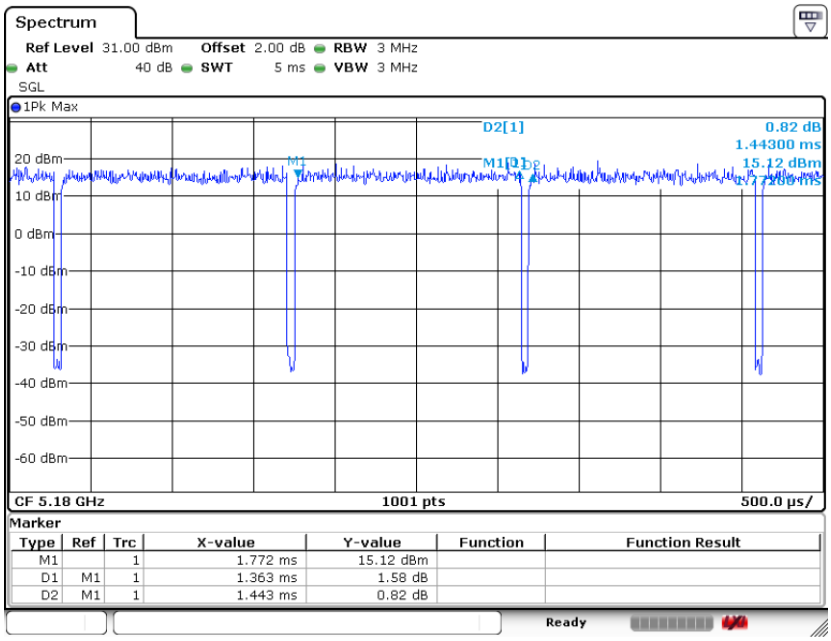
4.3.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11A	Ant 1: CH149, CH157, CH165	94.46
11N20	Ant 1: CH149, CH157, CH165	93.32
11N40	Ant 1: CH151, CH159	88.44
11AC20	Ant 1: CH149, CH157, CH165	94.98
11AC40	Ant 1: CH151, CH159	88.88
11AC80	Ant 1: CH155	78.17

4.3.1 Test Plots

4.3.1.1 ANT1

4.3.1.1.1 11A



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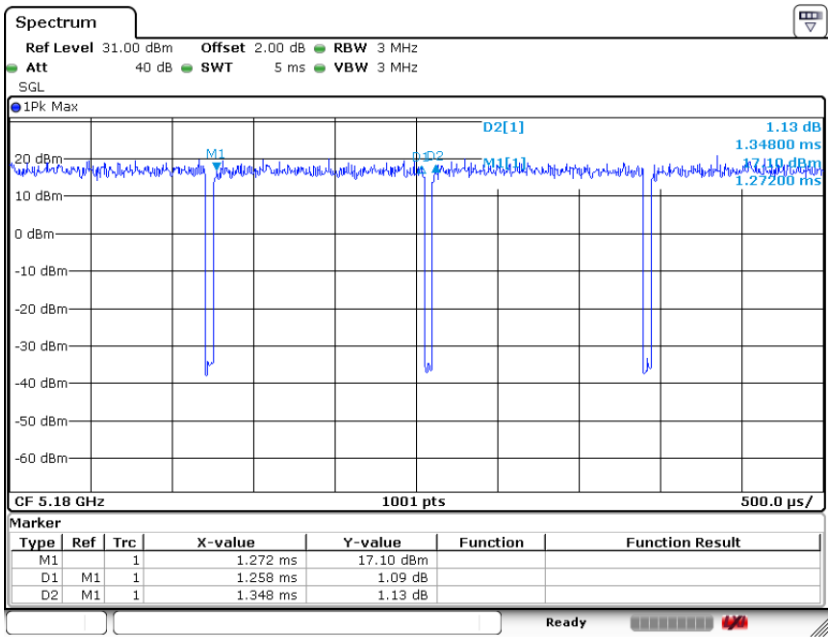
4.3.1.1.2 11N20



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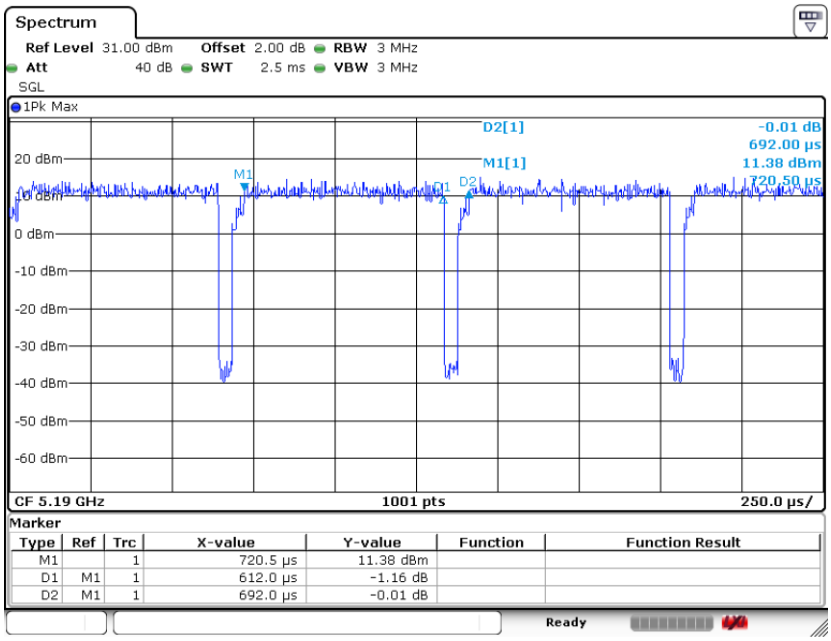
4.3.1.1.3 11N40



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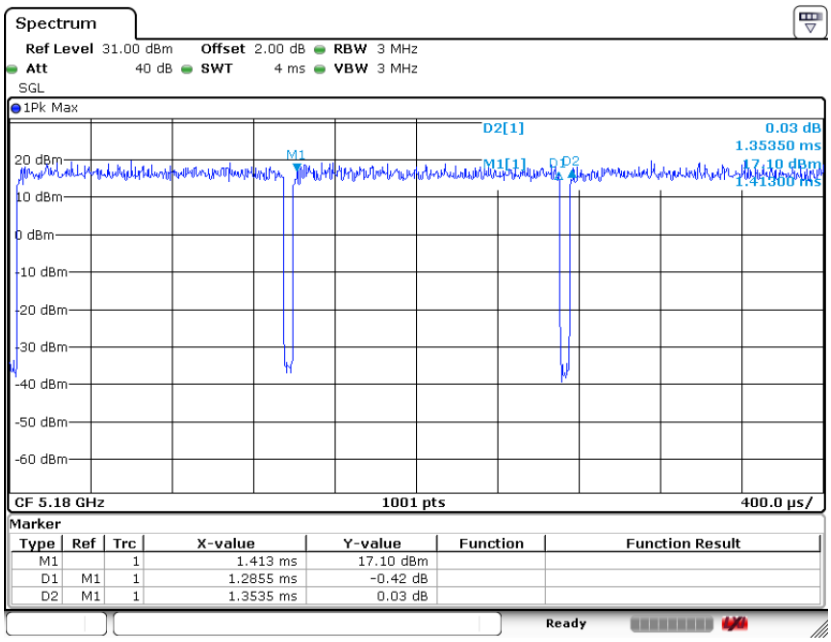
4.3.1.1.4 11AC20



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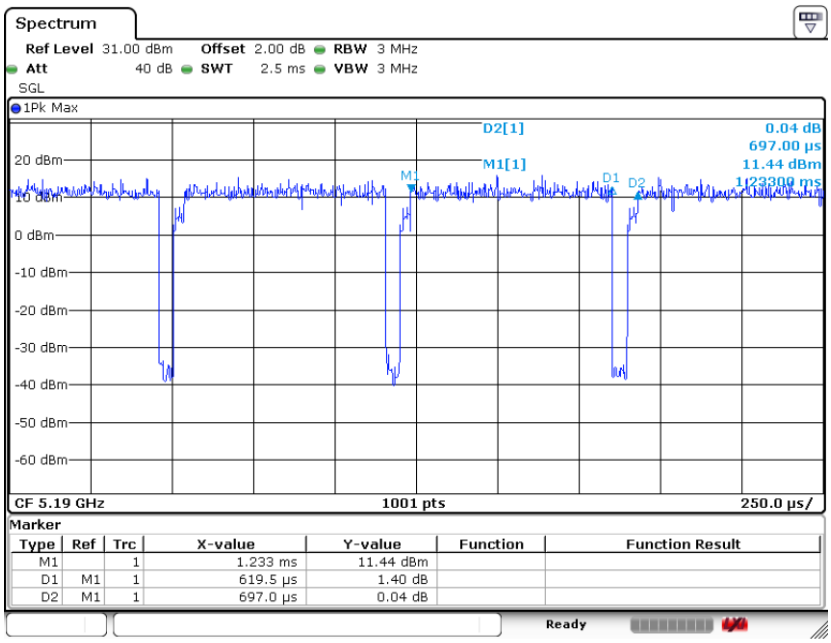
4.3.1.1.5 11AC40



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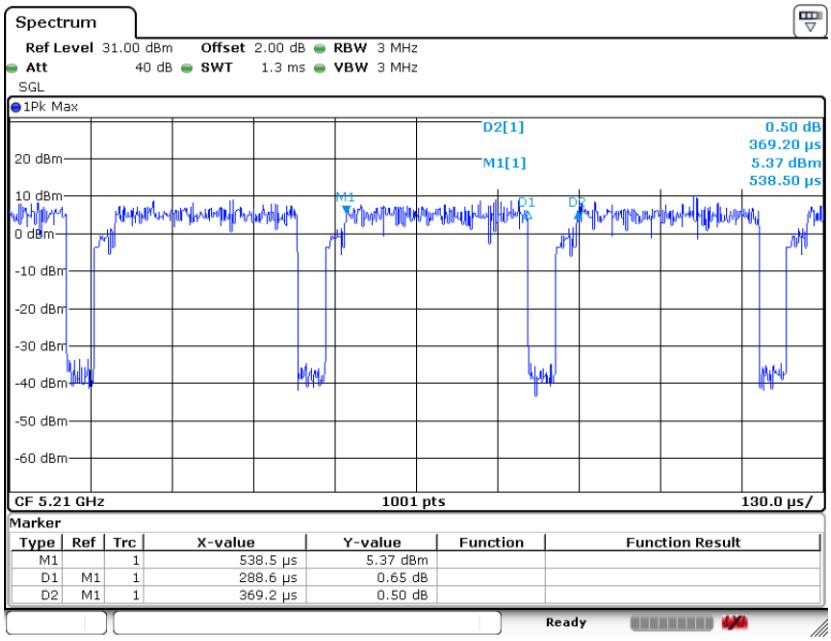
4.3.1.1.6 11AC80



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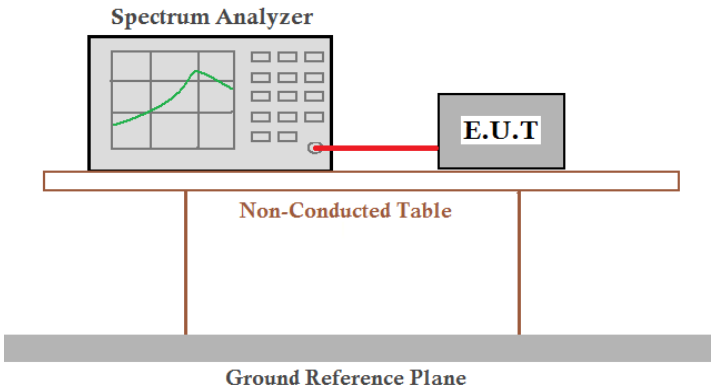
4.4 Conducted Output Power

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:	Through Pre-scan, find that 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:	Frequency Band / Limit
	5150-5250MHz / Not exceed 250mW(24dBm)
	5250-5350MHz / The lesser of 250mW(24dBm) or 11+ 10logB
	5470-5725MHz / The lesser of 250mW(24dBm) or 11+ 10logB
	5725-5850MHz / Not exceed 1W(30dBm)
	*Where B is the 26dB emission bandwidth in MHz
Test Results:	Pass

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4.4.1 Test Results for Conducted Output Power

Test Mode	Test Channel	Frequency [MHz]	Antenna Port	Meas. Level (Cond.) [dBm]	Verdict
11A20	36	5180	ANT 1	11.67	PASS
	44	5220	ANT 1	12.08	PASS
	48	5240	ANT 1	11.67	PASS
	52	5260	ANT 1	11.78	PASS
	60	5300	ANT 1	11.78	PASS
	64	5320	ANT 1	11.93	PASS
	100	5500	ANT 1	11.48	PASS
	116	5580	ANT 1	10.98	PASS
	140	5700	ANT 1	11.3	PASS
	149	5745	ANT 1	11.15	PASS
	157	5785	ANT 1	11.27	PASS
	165	5825	ANT 1	11.36	PASS
11N20	36	5180	ANT 1	11.98	PASS
	44	5220	ANT 1	11.57	PASS
	48	5240	ANT 1	11.71	PASS
	52	5260	ANT 1	11.75	PASS
	60	5300	ANT 1	11.78	
	64	5320	ANT 1	11.68	PASS
	100	5500	ANT 1	11.28	PASS
	116	5580	ANT 1	10.91	PASS
	140	5700	ANT 1	11.18	PASS
	149	5745	ANT 1	11.34	PASS
	157	5785	ANT 1	11.15	PASS
	165	5825	ANT 1	11.3	PASS
11N40	38	5190	ANT 1	11.94	PASS
	46	5230	ANT 1	11.75	PASS
	54	5270	ANT 1	12	PASS
	62	5310	ANT 1	11.84	PASS

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	102	5510	ANT 1	11.43	PASS
	110	5550	ANT 1	11.29	PASS
	134	5670	ANT 1	11.5	PASS
	151	5755	ANT 1	11.27	PASS
	159	5795	ANT 1	11.36	PASS
11AC20	36	5180	ANT 1	11.41	PASS
	44	5220	ANT 1	11.51	PASS
	48	5240	ANT 1	11.66	PASS
	52	5260	ANT 1	11.62	PASS
	60	5300	ANT 1	11.62	PASS
	64	5320	ANT 1	11.79	PASS
	100	5500	ANT 1	11.34	PASS
	116	5580	ANT 1	10.92	PASS
	140	5700	ANT 1	11.2	PASS
	149	5745	ANT 1	11.08	PASS
	157	5785	ANT 1	11.1	PASS
	165	5825	ANT 1	11.26	
11AC40	38	5190	ANT 1	11.91	PASS
	46	5230	ANT 1	11.76	PASS
	54	5270	ANT 1	11.97	PASS
	62	5310	ANT 1	11.88	PASS
	102	5510	ANT 1	11.3	PASS
	110	5550	ANT 1	11.13	PASS
	134	5670	ANT 1	11.47	PASS
	151	5755	ANT 1	11.25	PASS
	159	5795	ANT 1	11.35	PASS
11AC80	42	5210	ANT 1	12.15	PASS
	58	5290	ANT 1	12.19	PASS
	106	5530	ANT 1	11.79	PASS
	122	5610	ANT 1	11.56	PASS
	155	5775	ANT 1	11.78	PASS

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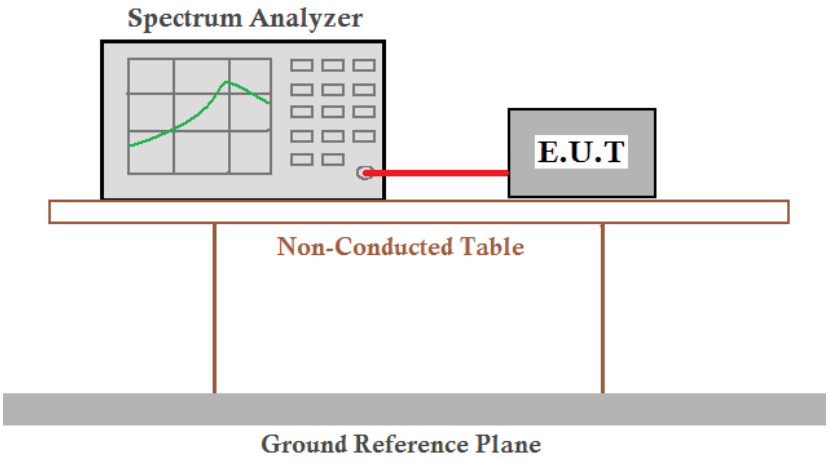
4.5 26dB Emission Bandwidth

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

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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	20.34	PASS
	44	5220	ANT 1	20.34	PASS
	48	5240	ANT 1	20.4	PASS
	52	5260	ANT 1	20.34	PASS
	60	5300	ANT 1	20.28	PASS
	64	5320	ANT 1	20.37	PASS
	100	5500	ANT 1	20.46	PASS
	116	5580	ANT 1	20.25	PASS
	140	5700	ANT 1	20.34	PASS
11N20	36	5180	ANT 1	20.67	PASS
	44	5220	ANT 1	20.7	PASS
	48	5240	ANT 1	20.82	PASS
	52	5260	ANT 1	20.61	PASS
	60	5300	ANT 1	20.64	PASS
	64	5320	ANT 1	20.7	PASS
	100	5500	ANT 1	20.64	PASS
	116	5580	ANT 1	20.79	PASS
	140	5700	ANT 1	20.64	PASS
11N40	38	5190	ANT 1	41.1	PASS
	46	5230	ANT 1	40.86	PASS
	54	5270	ANT 1	41.04	PASS
	62	5310	ANT 1	40.98	PASS
	102	5510	ANT 1	40.98	PASS
	110	5550	ANT 1	41.28	PASS
	134	5670	ANT 1	41.16	PASS
11AC20	36	5180	ANT 1	20.61	PASS
	44	5220	ANT 1	20.64	PASS
	48	5240	ANT 1	20.61	PASS
	52	5260	ANT 1	20.61	PASS
	60	5300	ANT 1	20.64	PASS
	64	5320	ANT 1	20.7	PASS
	100	5500	ANT 1	20.79	PASS
	116	5580	ANT 1	20.7	PASS
	140	5700	ANT 1	20.7	PASS
11AC40	38	5190	ANT 1	40.86	PASS
	46	5230	ANT 1	41.1	PASS

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	54	5270	ANT 1	40.92	PASS
	62	5310	ANT 1	41.28	PASS
	102	5510	ANT 1	41.04	PASS
	110	5550	ANT 1	41.16	PASS
	134	5670	ANT 1	41.16	PASS
11AC80	42	5210	ANT 1	81.92	PASS
	58	5290	ANT 1	81.44	PASS
	106	5530	ANT 1	81.6	PASS
	122	5610	ANT 1	81.76	PASS

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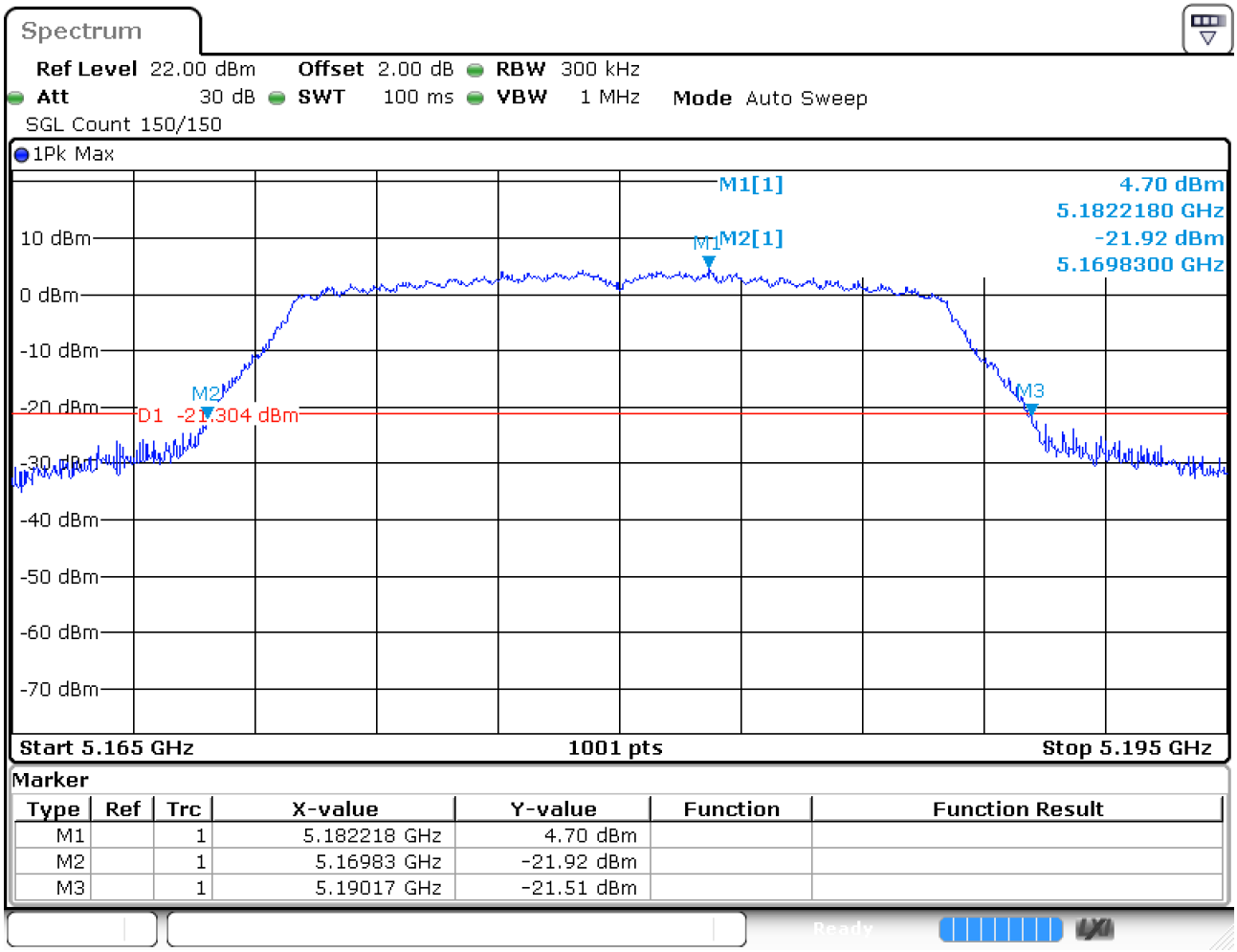
4.5.2 Plots for 26dB Emission Bandwidth

4.5.2.1 11A20_36 ANT 1



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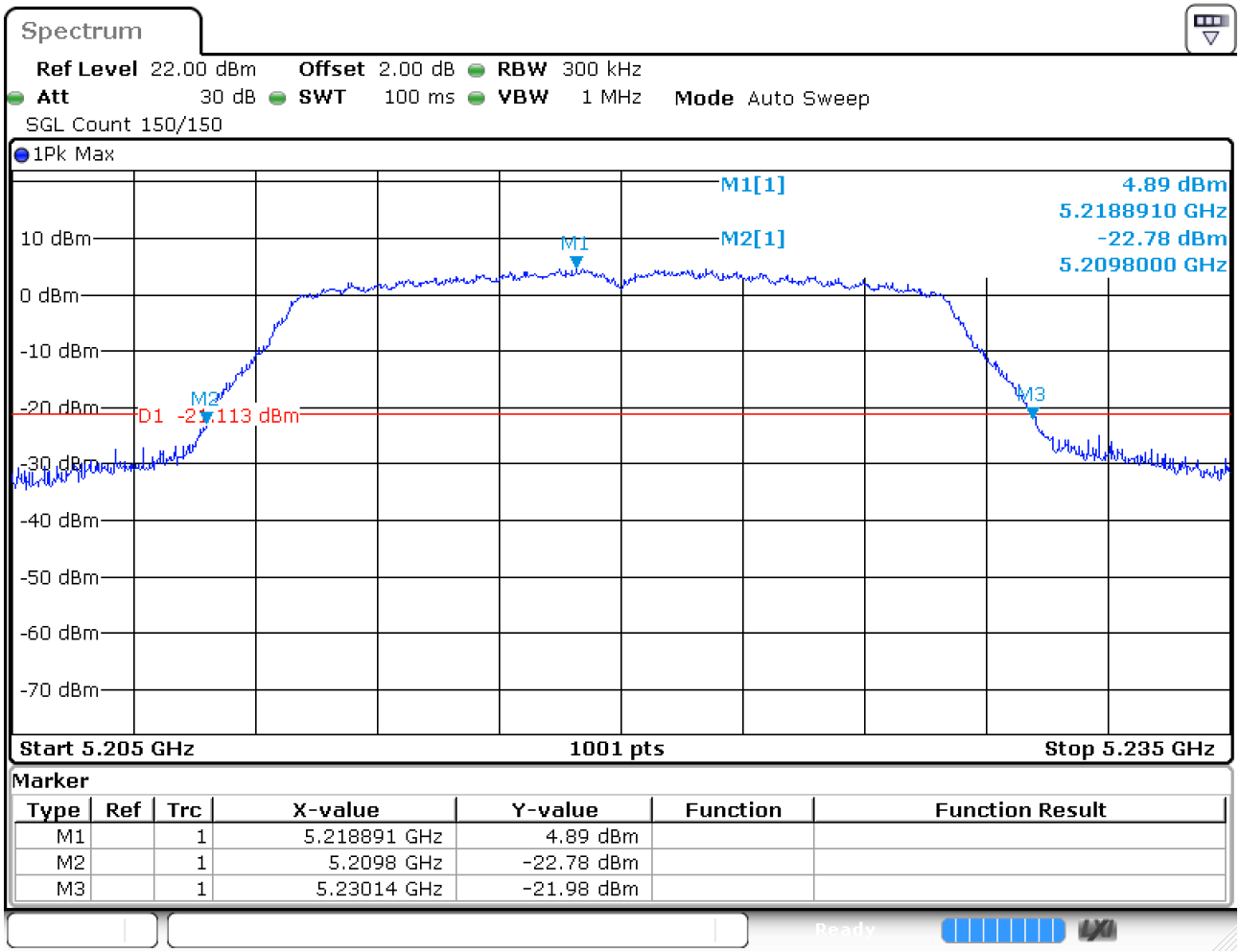
4.5.2.2 11A20_44 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.218891 GHz	4.89 dBm		
M2		1	5.2098 GHz	-22.78 dBm		
M3		1	5.23014 GHz	-21.98 dBm		

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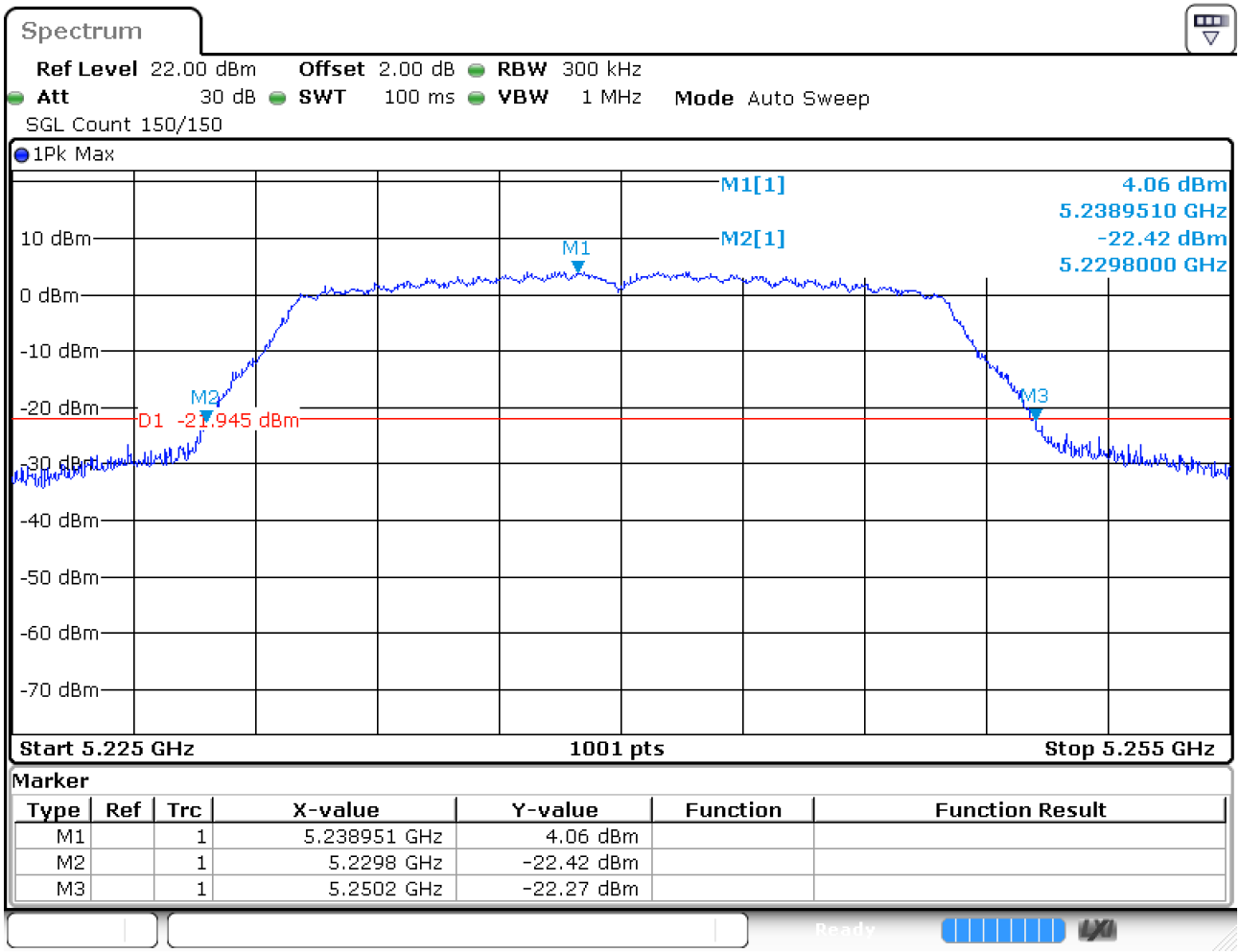
4.5.2.3 11A20_48 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.238951 GHz	4.06 dBm		
M2		1	5.2298 GHz	-22.42 dBm		
M3		1	5.2502 GHz	-22.27 dBm		

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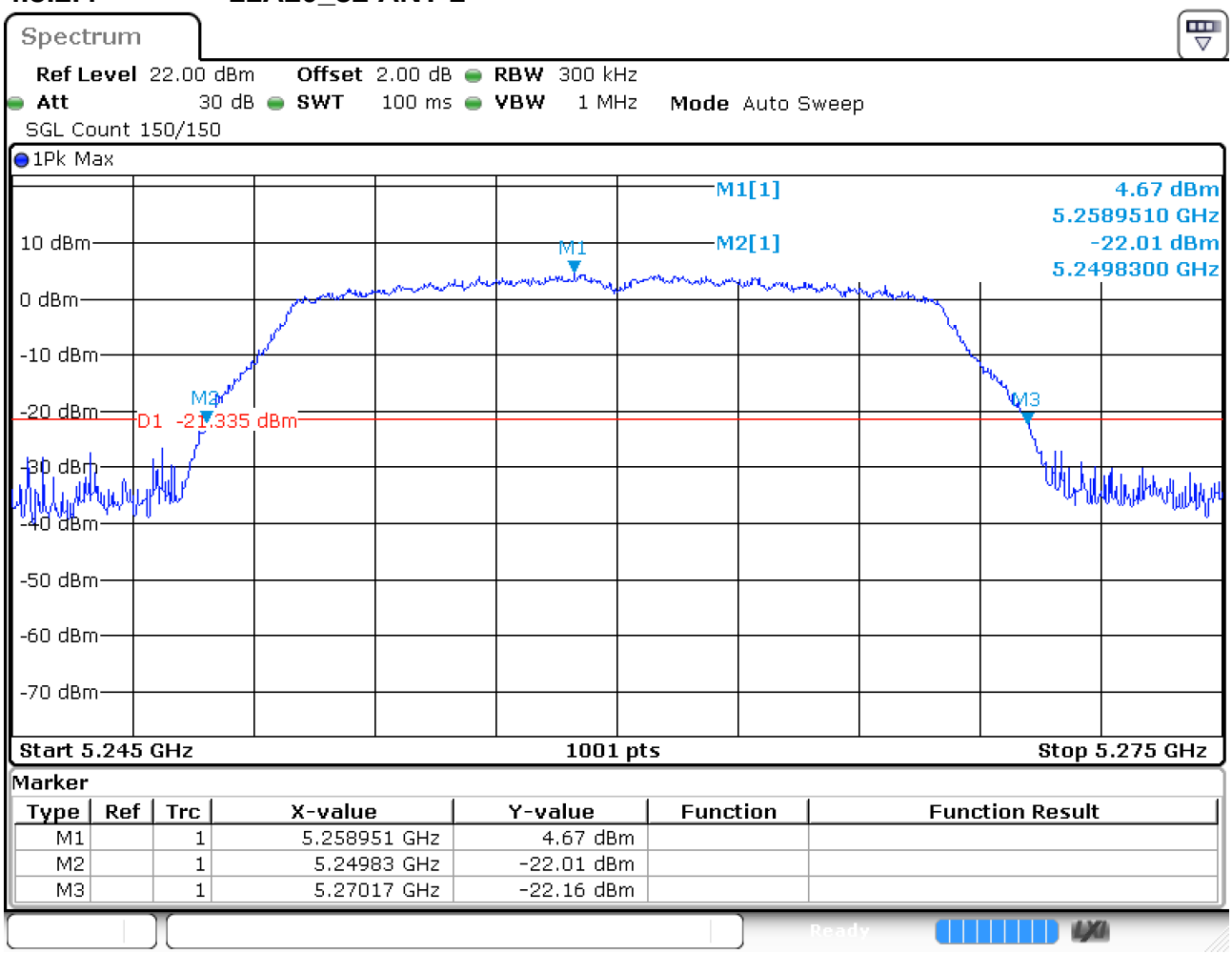
4.5.2.4 11A20_52 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.258951 GHz	4.67 dBm		
M2		1	5.24983 GHz	-22.01 dBm		
M3		1	5.27017 GHz	-22.16 dBm		

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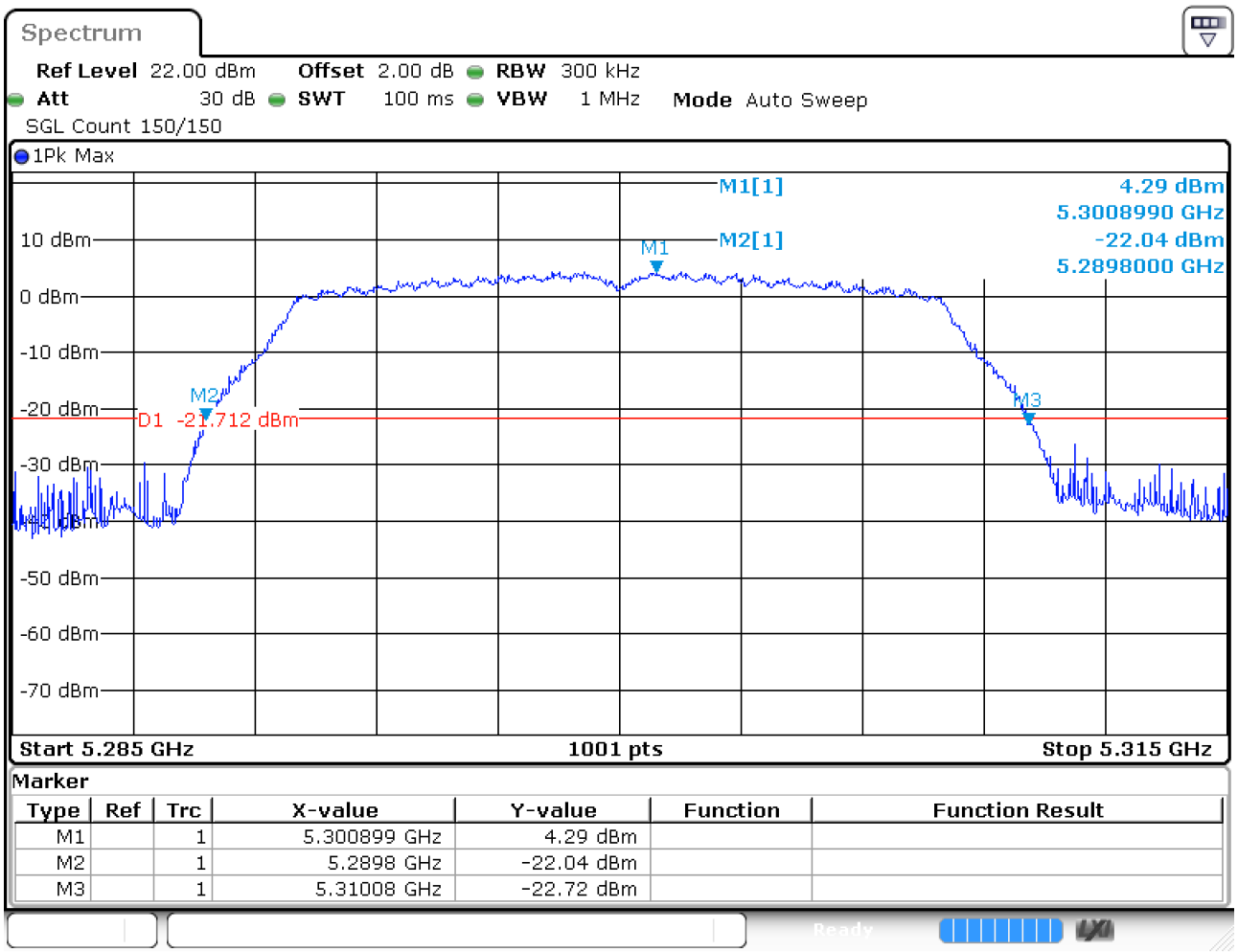
4.5.2.5 11A20_60 ANT 1



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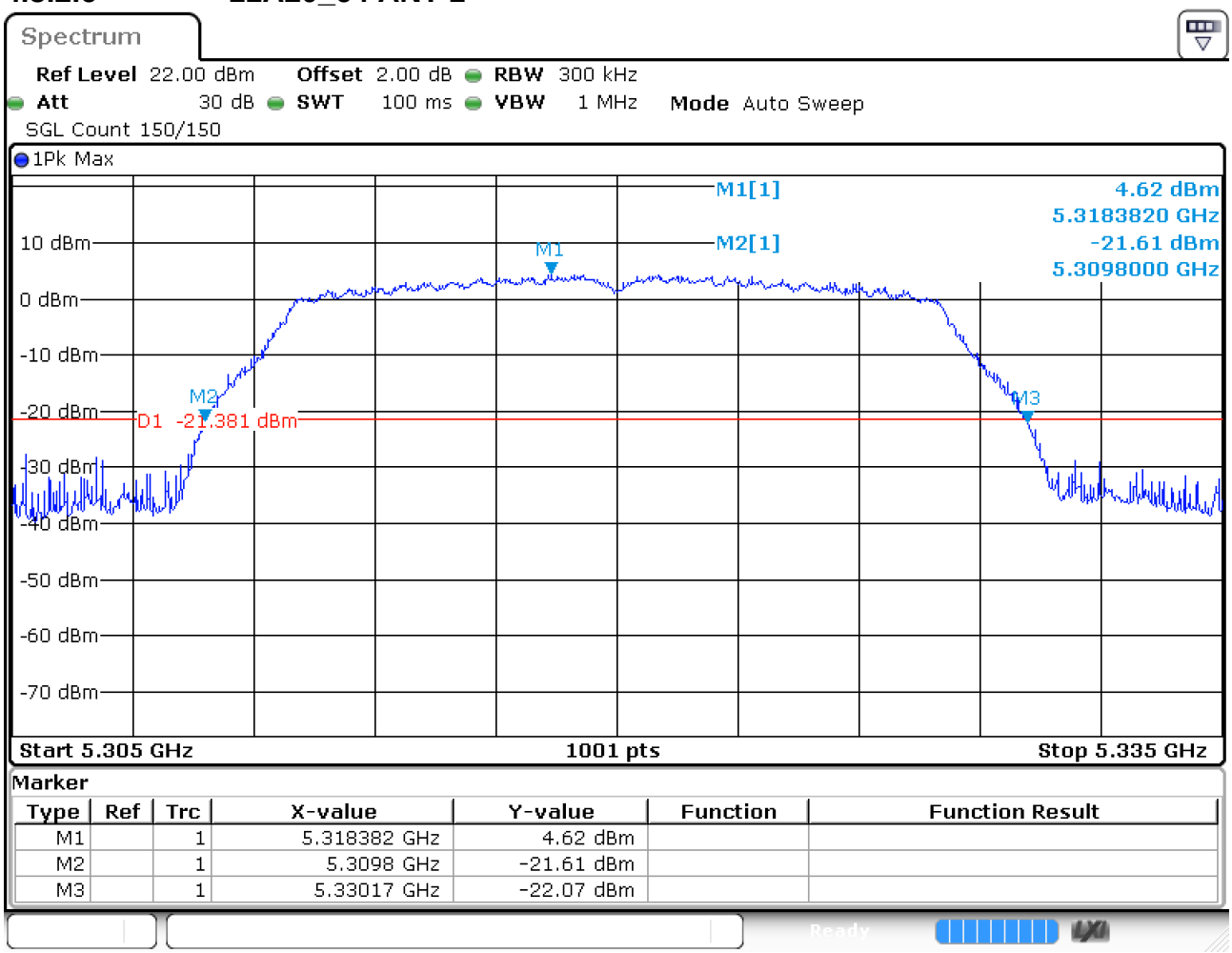
4.5.2.6 11A20_64 ANT 1



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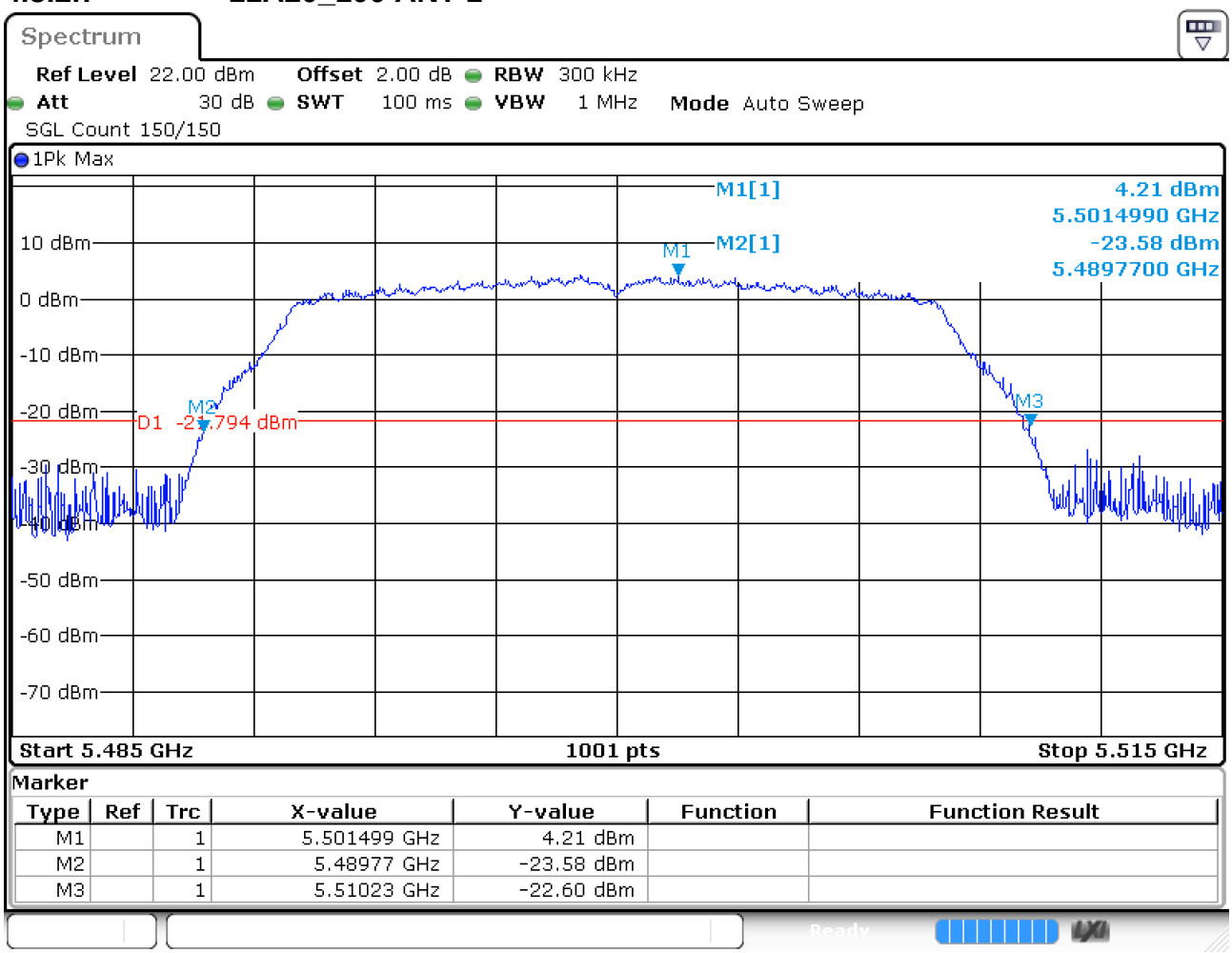
4.5.2.7 11A20_100 ANT 1



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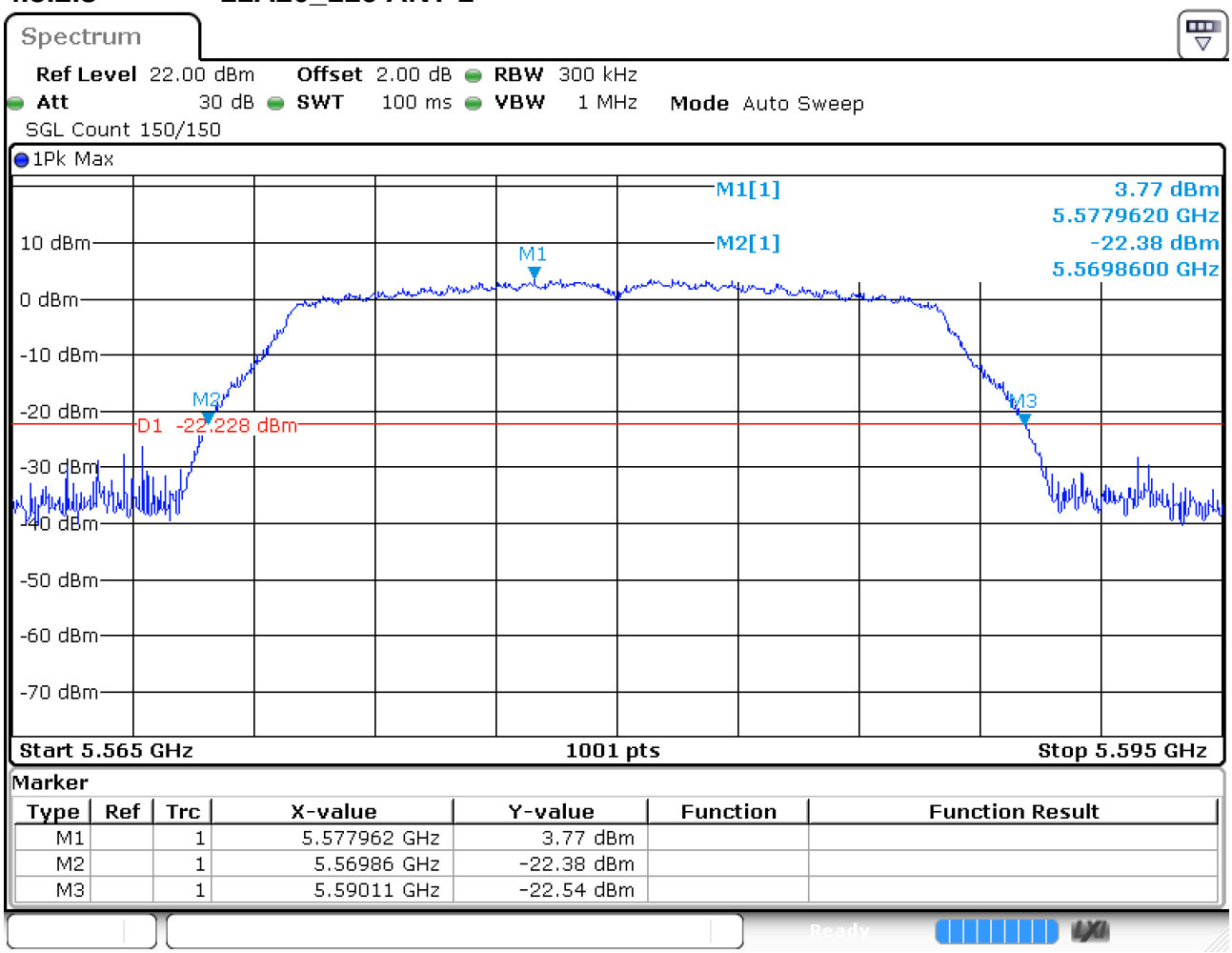
4.5.2.8 11A20_116 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.577962 GHz	3.77 dBm		
M2		1	5.56986 GHz	-22.38 dBm		
M3		1	5.59011 GHz	-22.54 dBm		

Date: 5.MAY.2020 09:43:02

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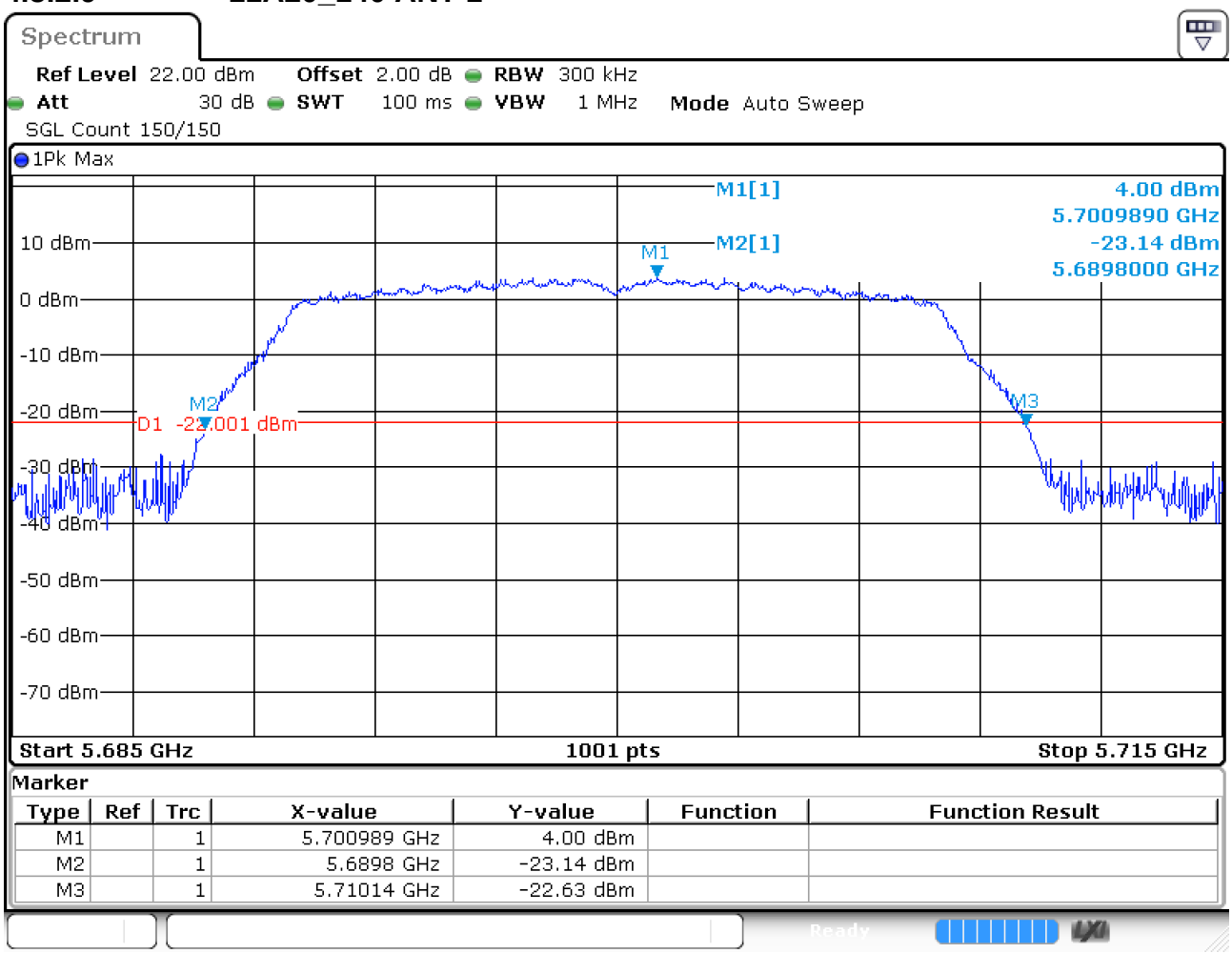
4.5.2.9 11A20_140 ANT 1



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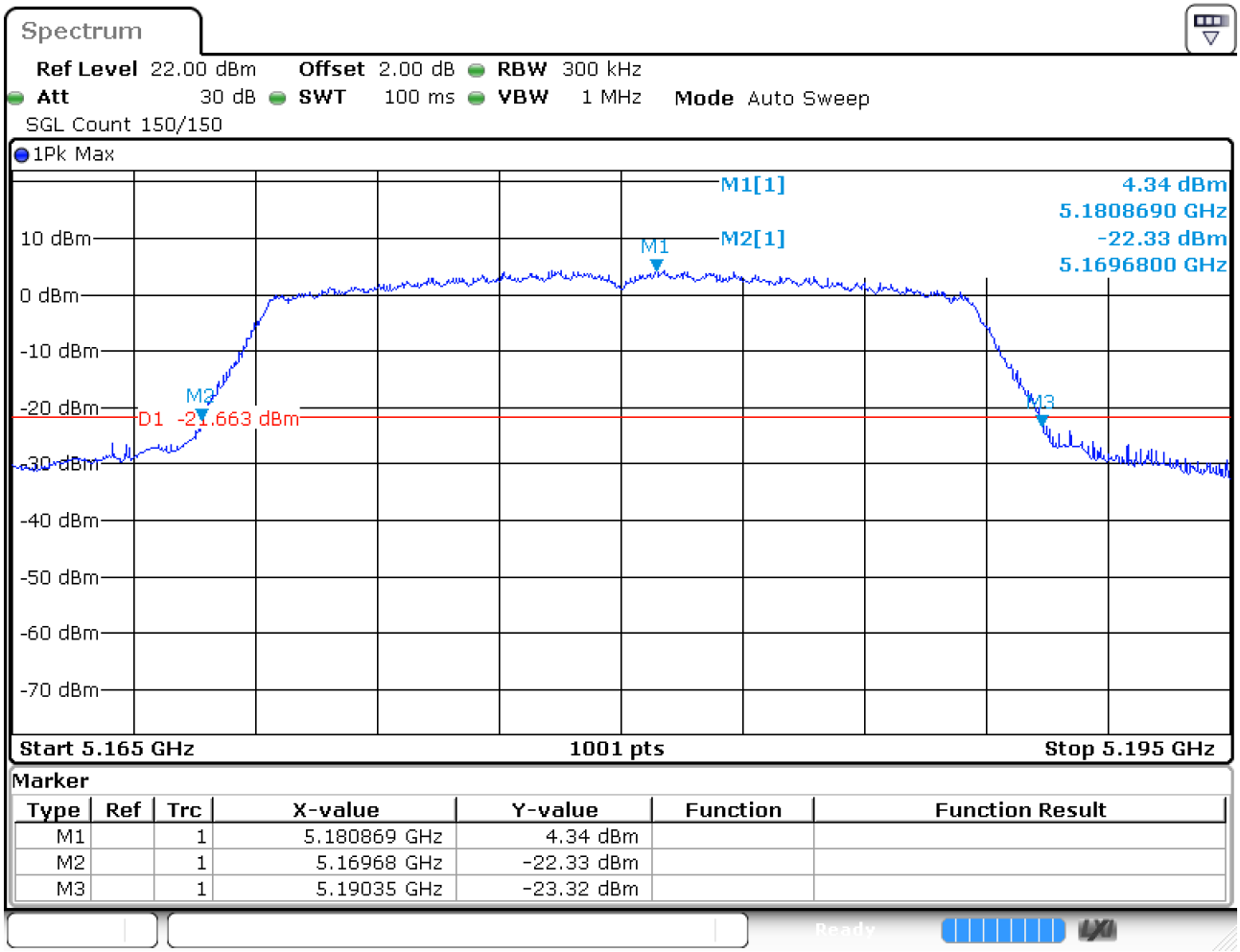
4.5.2.10 11N20_36 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.180869 GHz	4.34 dBm		
M2		1	5.16968 GHz	-22.33 dBm		
M3		1	5.19035 GHz	-23.32 dBm		

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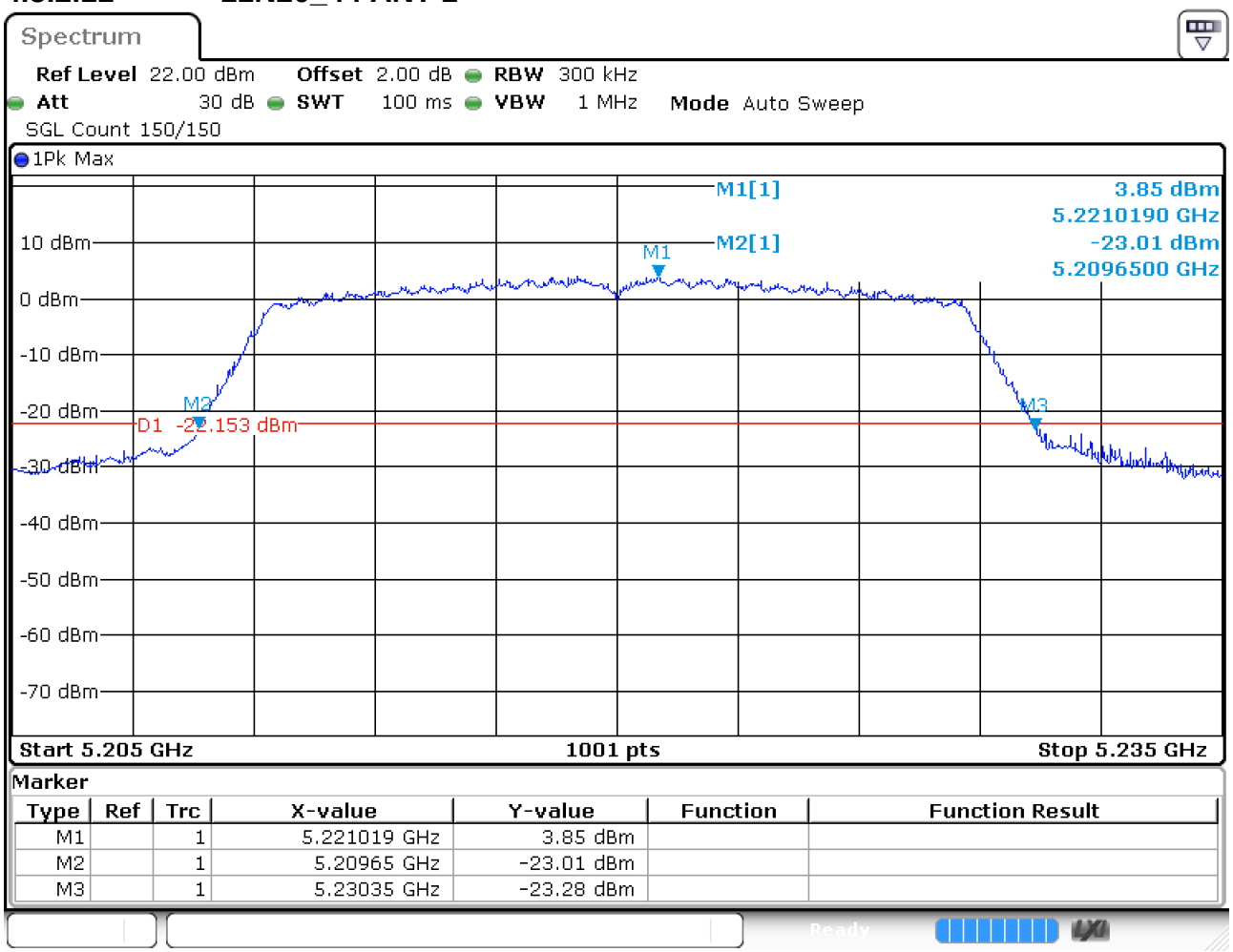
4.5.2.11 11N20_44 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.221019 GHz	3.85 dBm		
M2		1	5.20965 GHz	-23.01 dBm		
M3		1	5.23035 GHz	-23.28 dBm		

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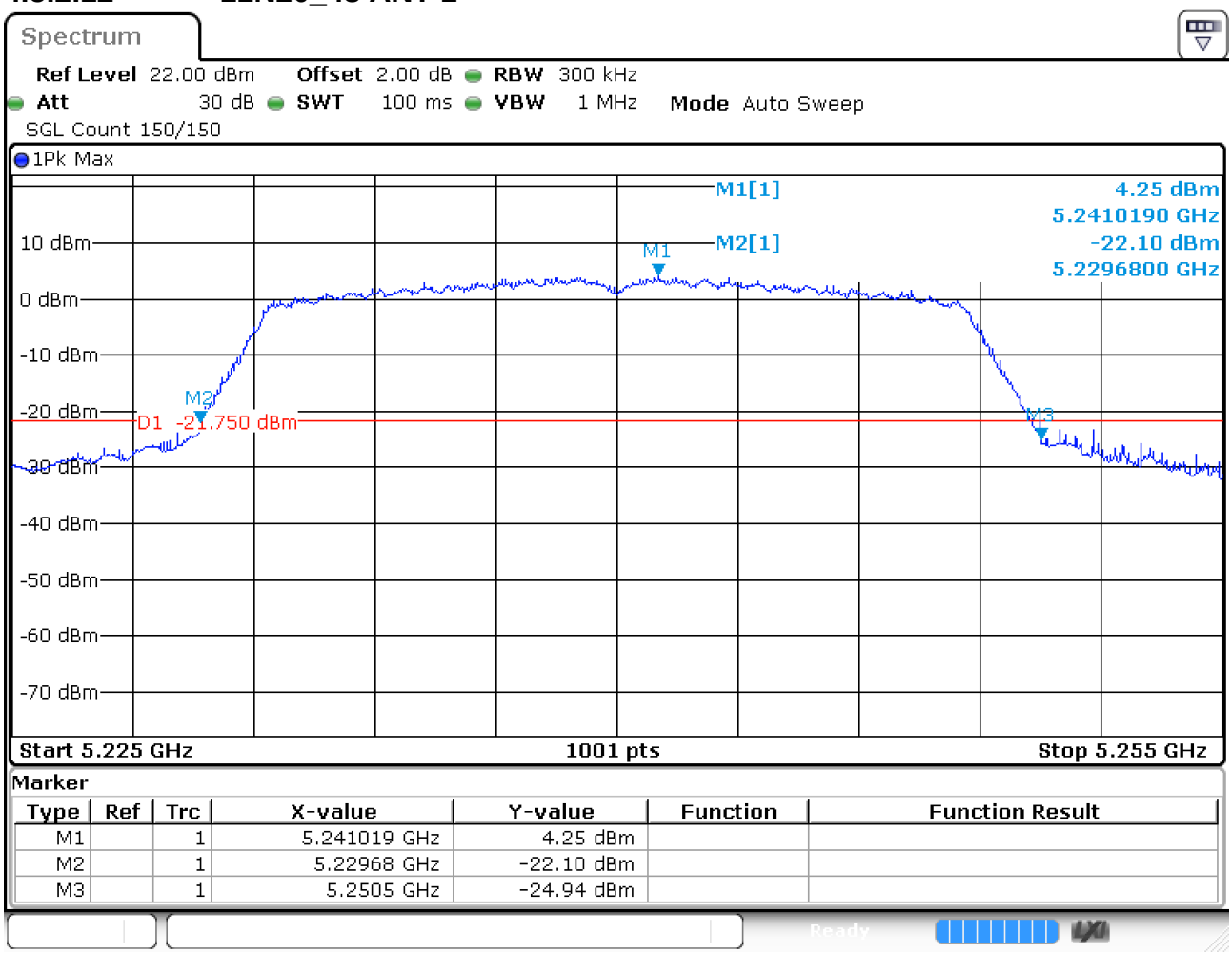
4.5.2.12 11N20_48 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.241019 GHz	4.25 dBm		
M2		1	5.22968 GHz	-22.10 dBm		
M3		1	5.2505 GHz	-24.94 dBm		

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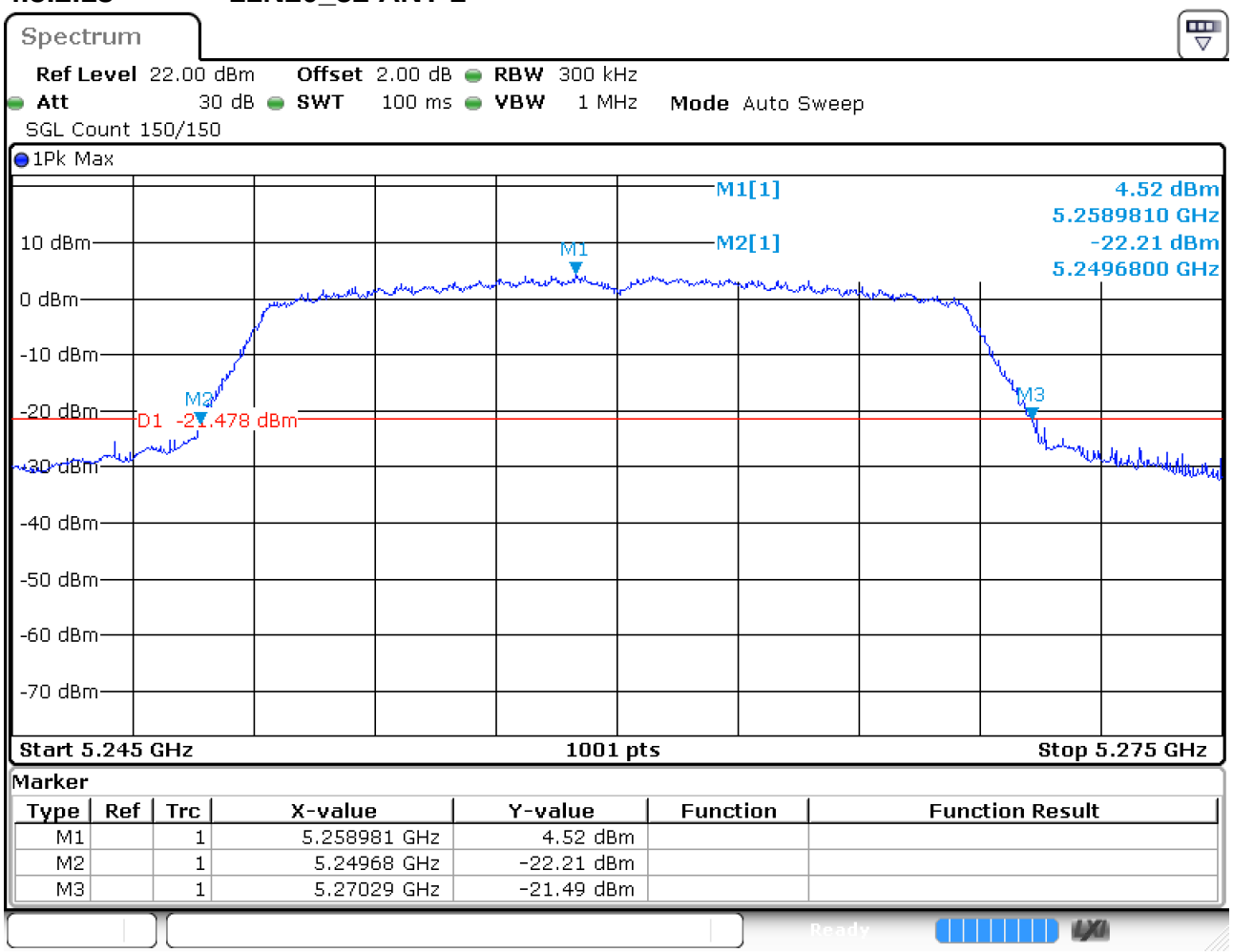
4.5.2.13 11N20_52 ANT 1



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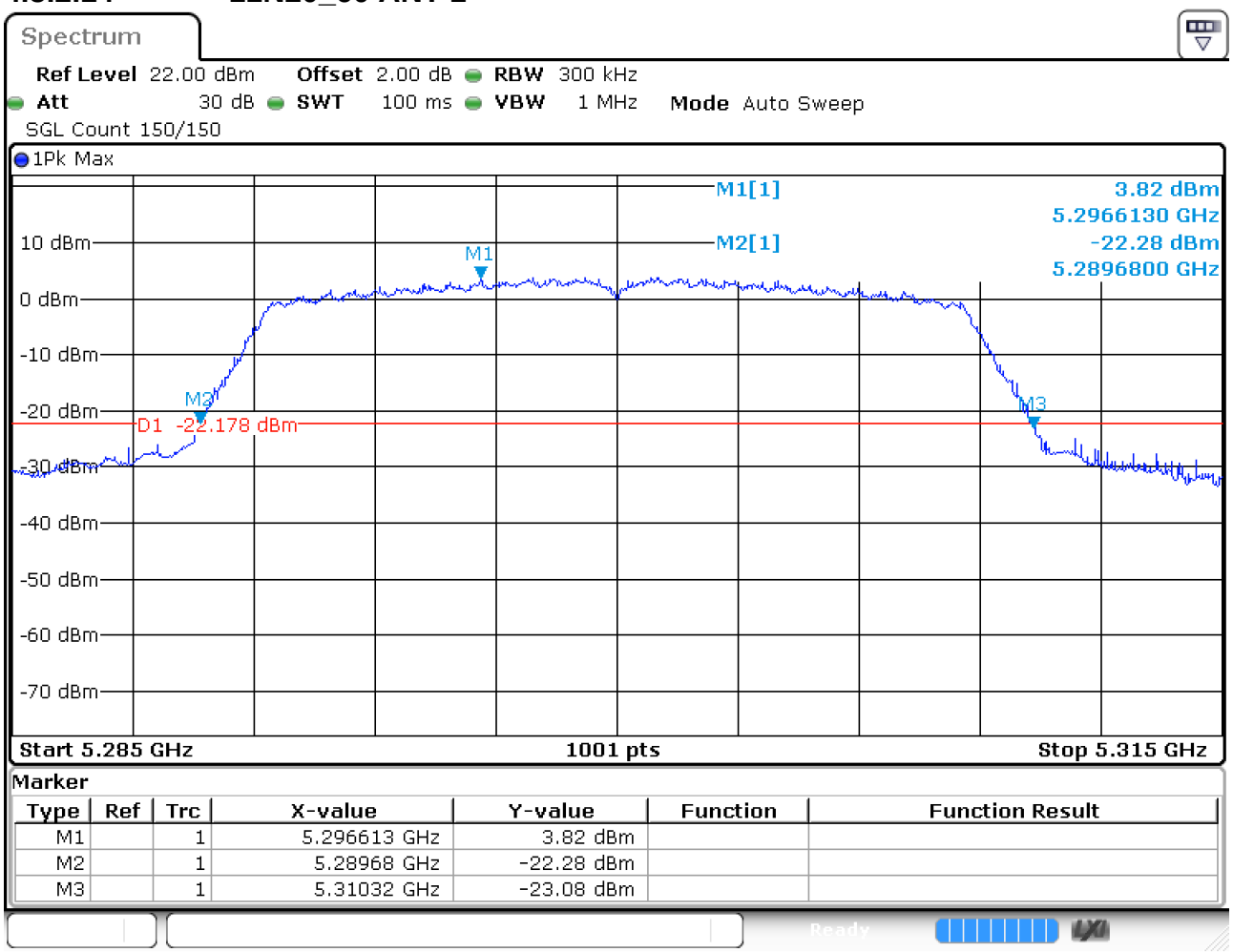
4.5.2.14 11N20_60 ANT 1



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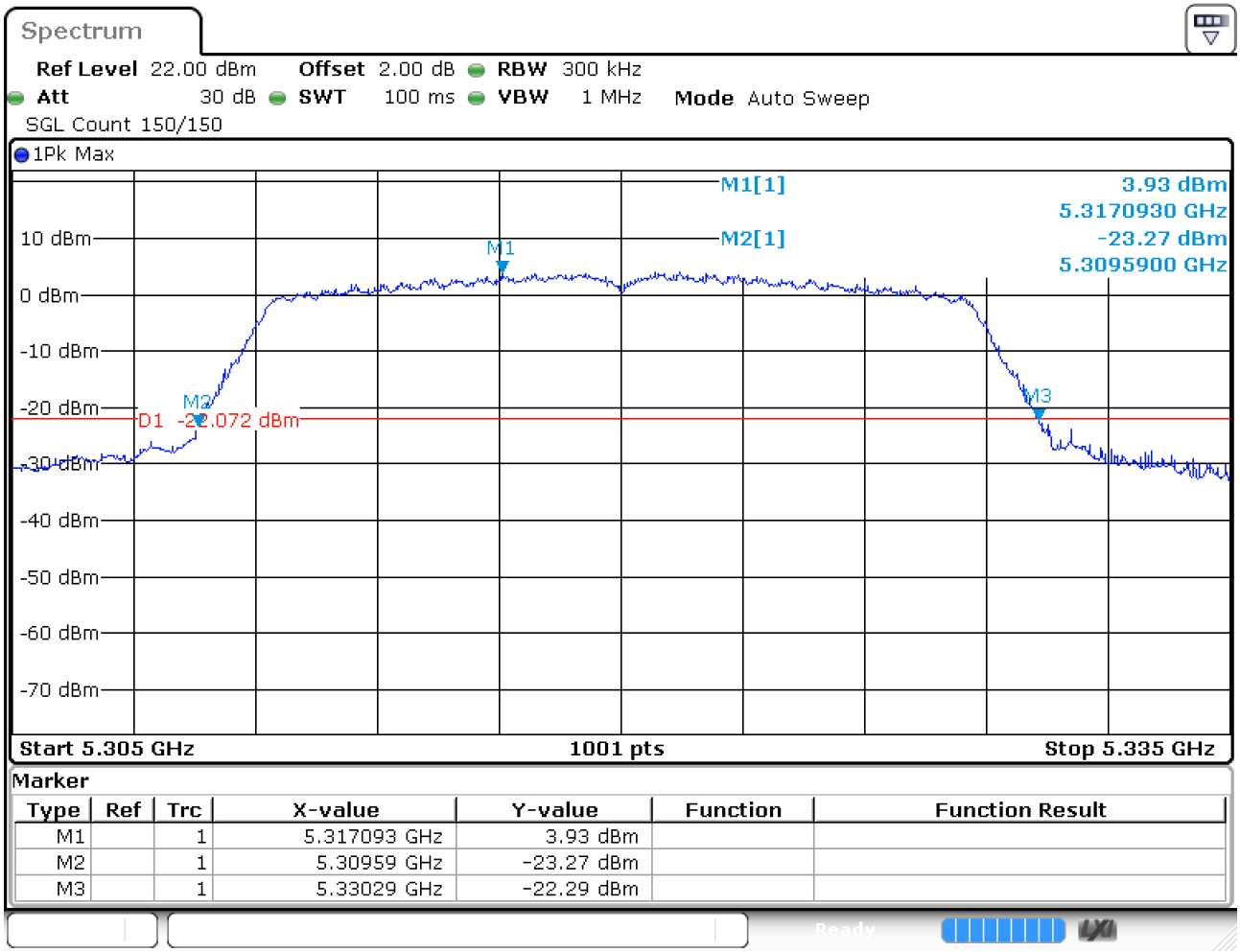
4.5.2.15 11N20_64 ANT 1



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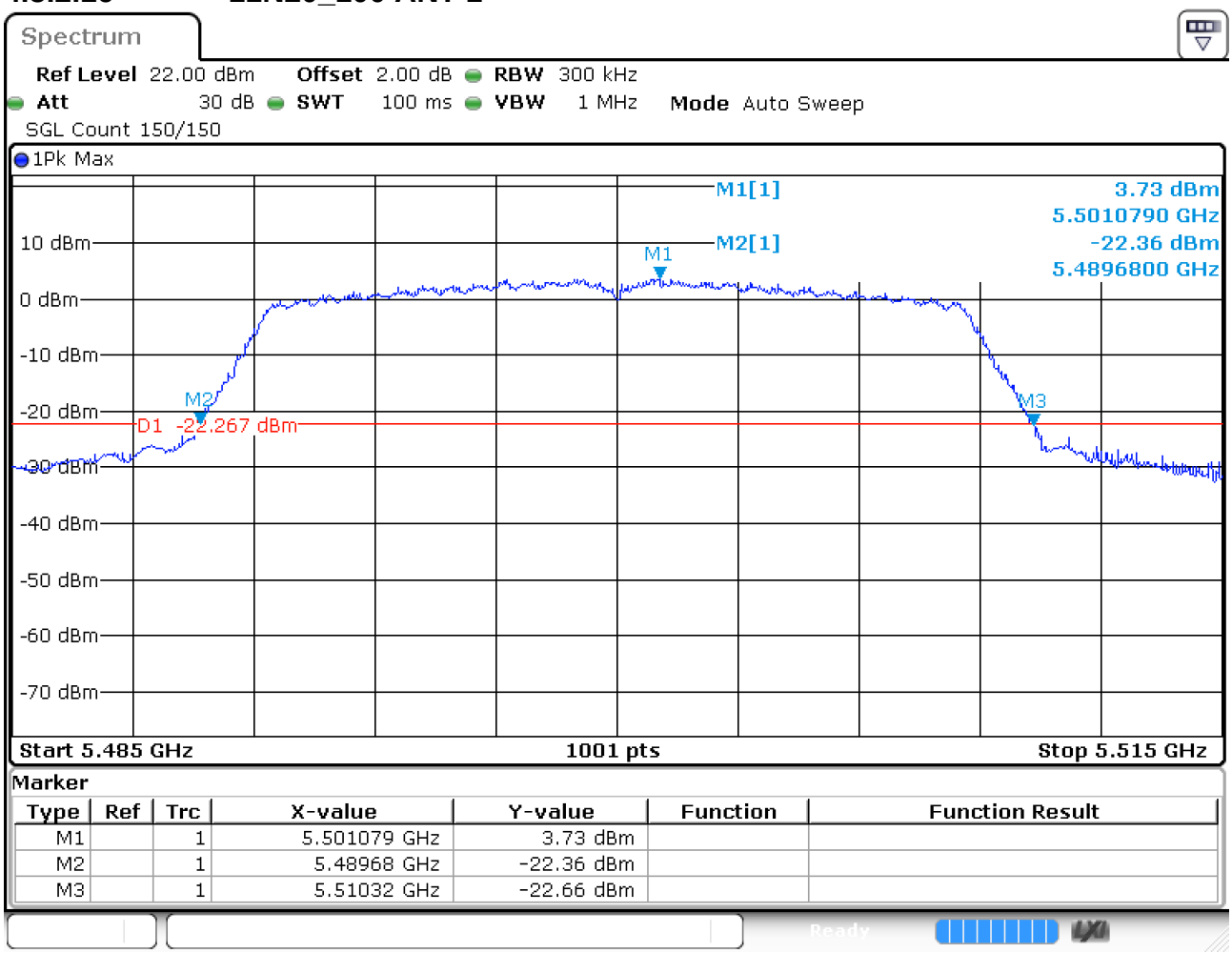
4.5.2.16 11N20_100 ANT 1



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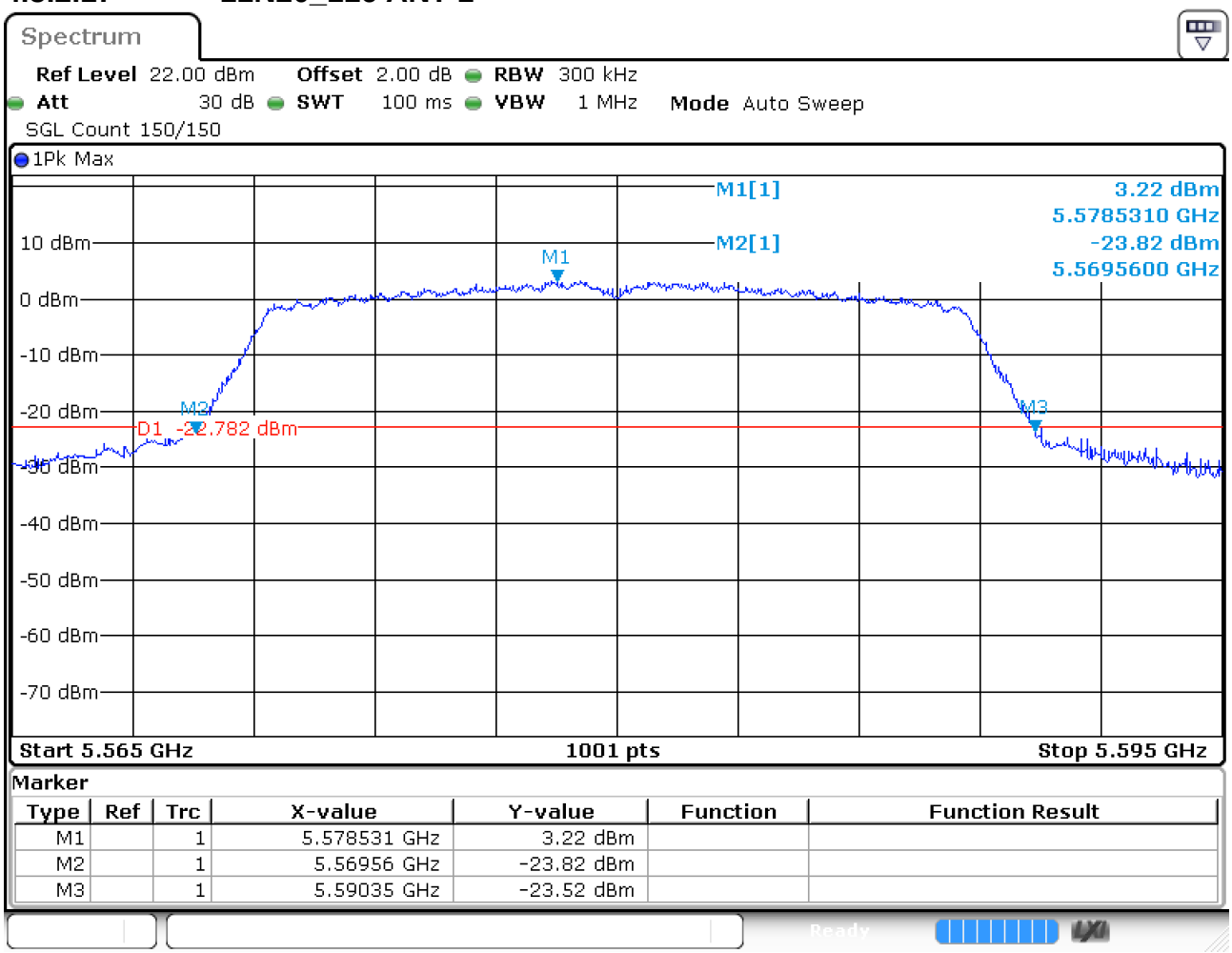
4.5.2.17 11N20_116 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.578531 GHz	3.22 dBm		
M2		1	5.56956 GHz	-23.82 dBm		
M3		1	5.59035 GHz	-23.52 dBm		

Date: 5.MAY.2020 10:02:32

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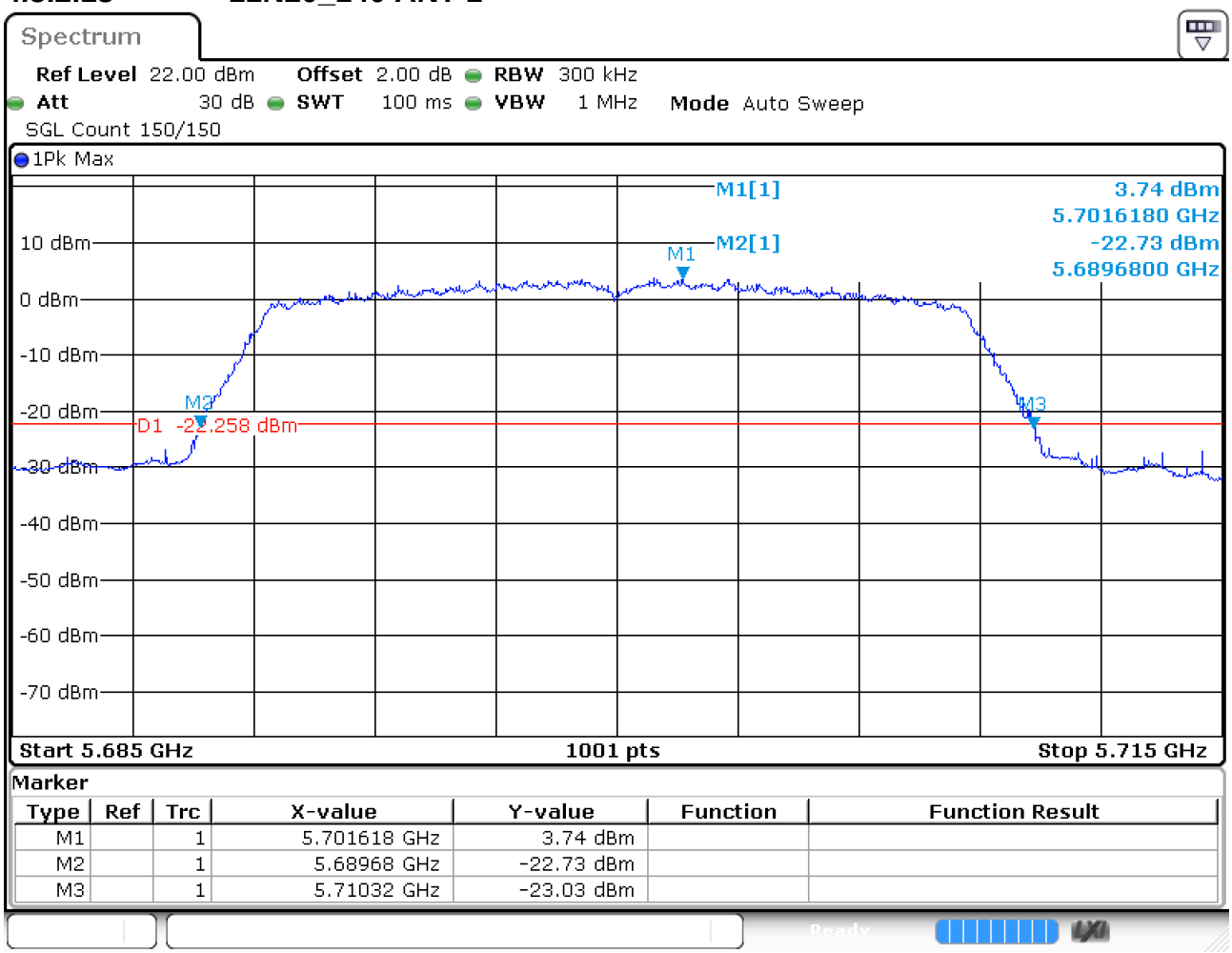
4.5.2.18 11N20_140 ANT 1



Date: 5.MAY.2020 10:04:11

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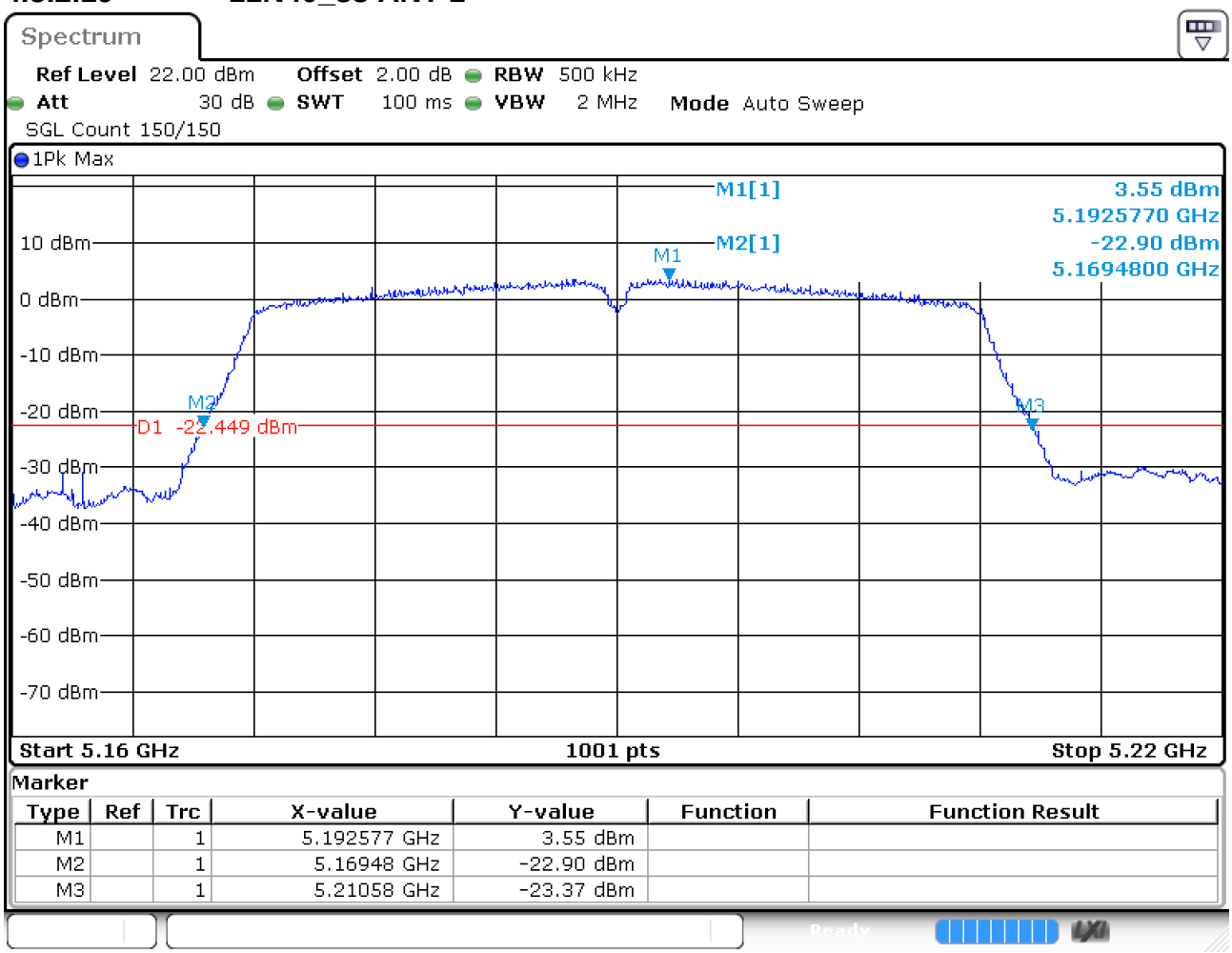
4.5.2.19 11N40_38 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.192577 GHz	3.55 dBm		
M2		1	5.16948 GHz	-22.90 dBm		
M3		1	5.21058 GHz	-23.37 dBm		

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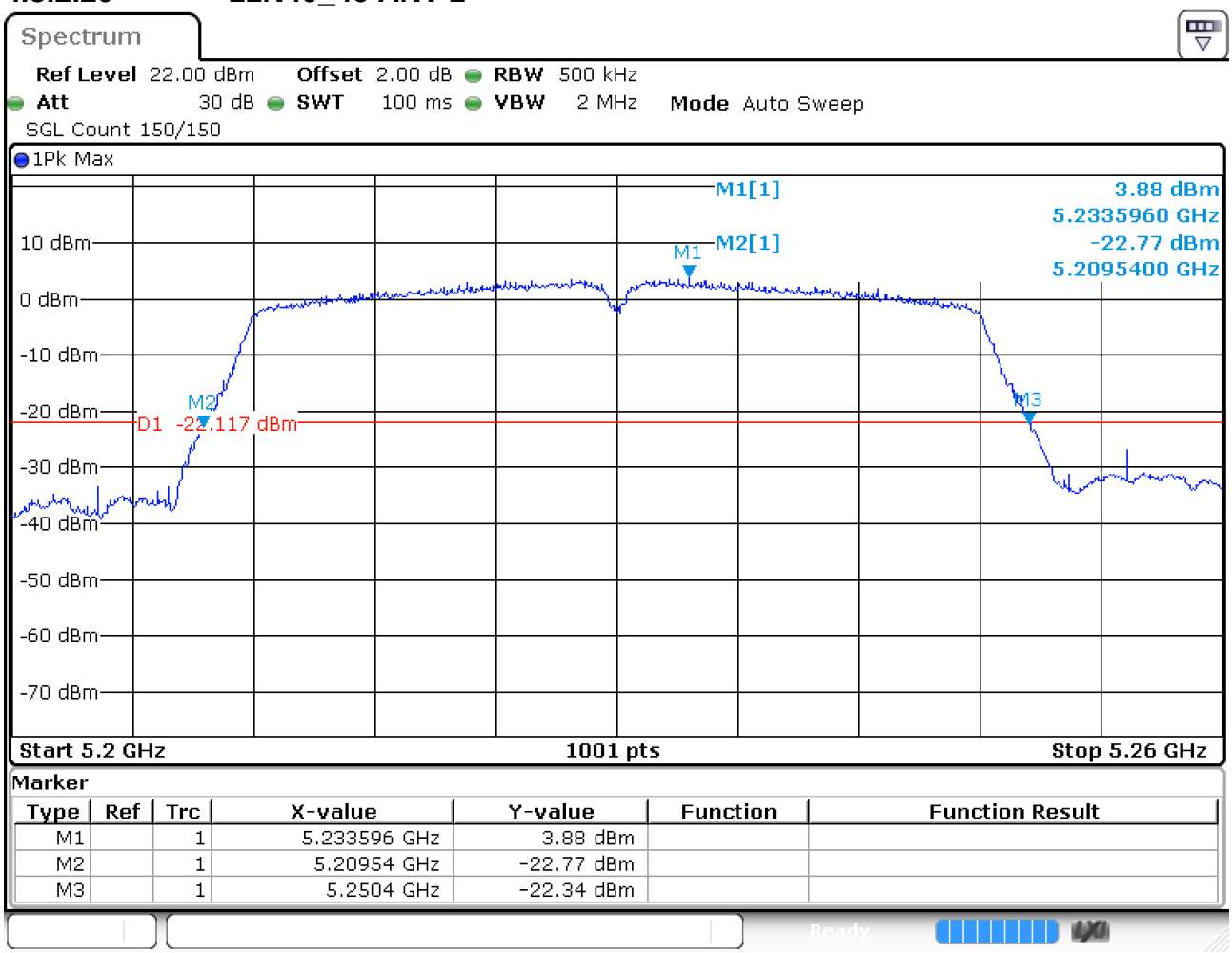
4.5.2.20 11N40_46 ANT 1



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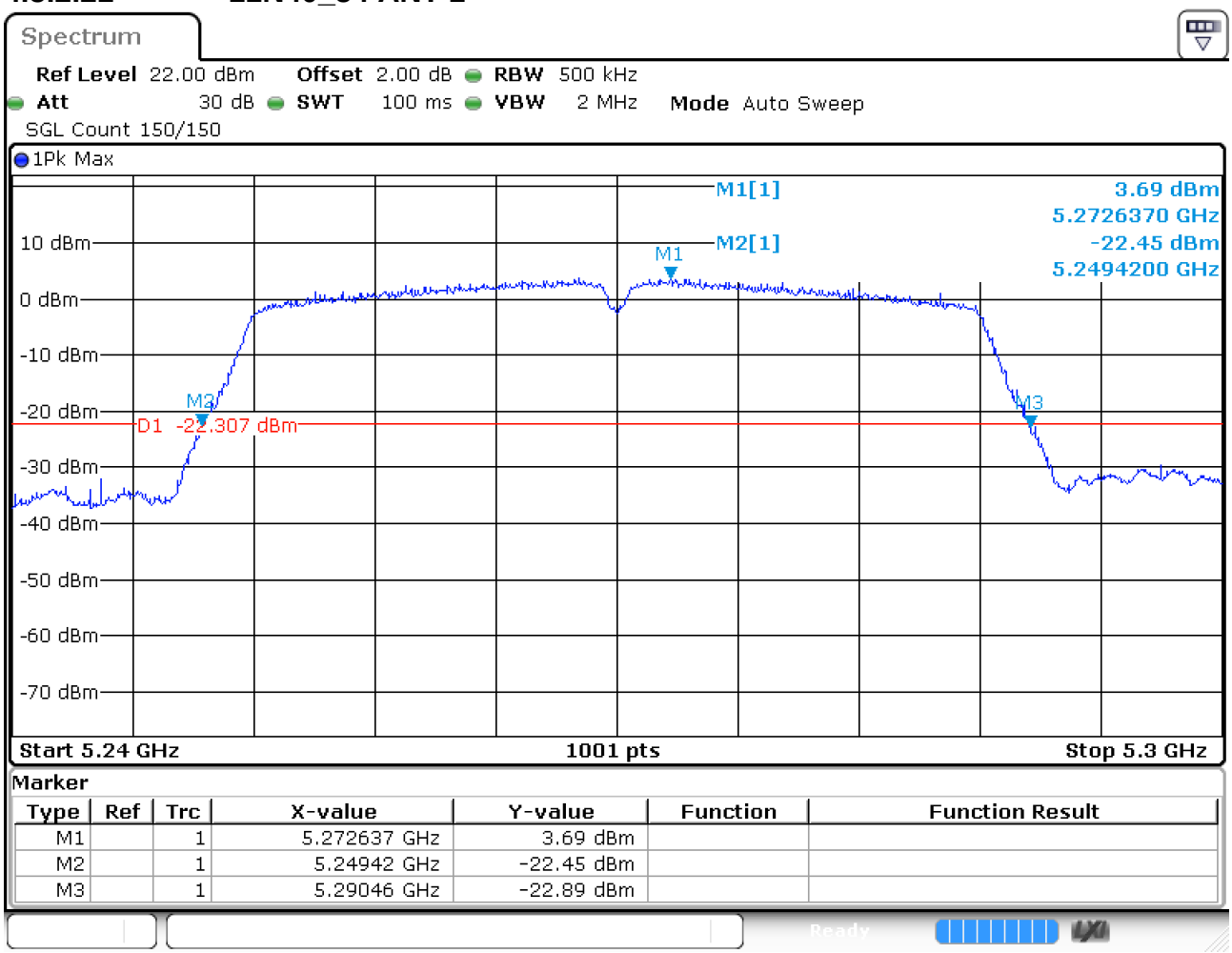
4.5.2.21 11N40_54 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.272637 GHz	3.69 dBm		
M2		1	5.24942 GHz	-22.45 dBm		
M3		1	5.29046 GHz	-22.89 dBm		

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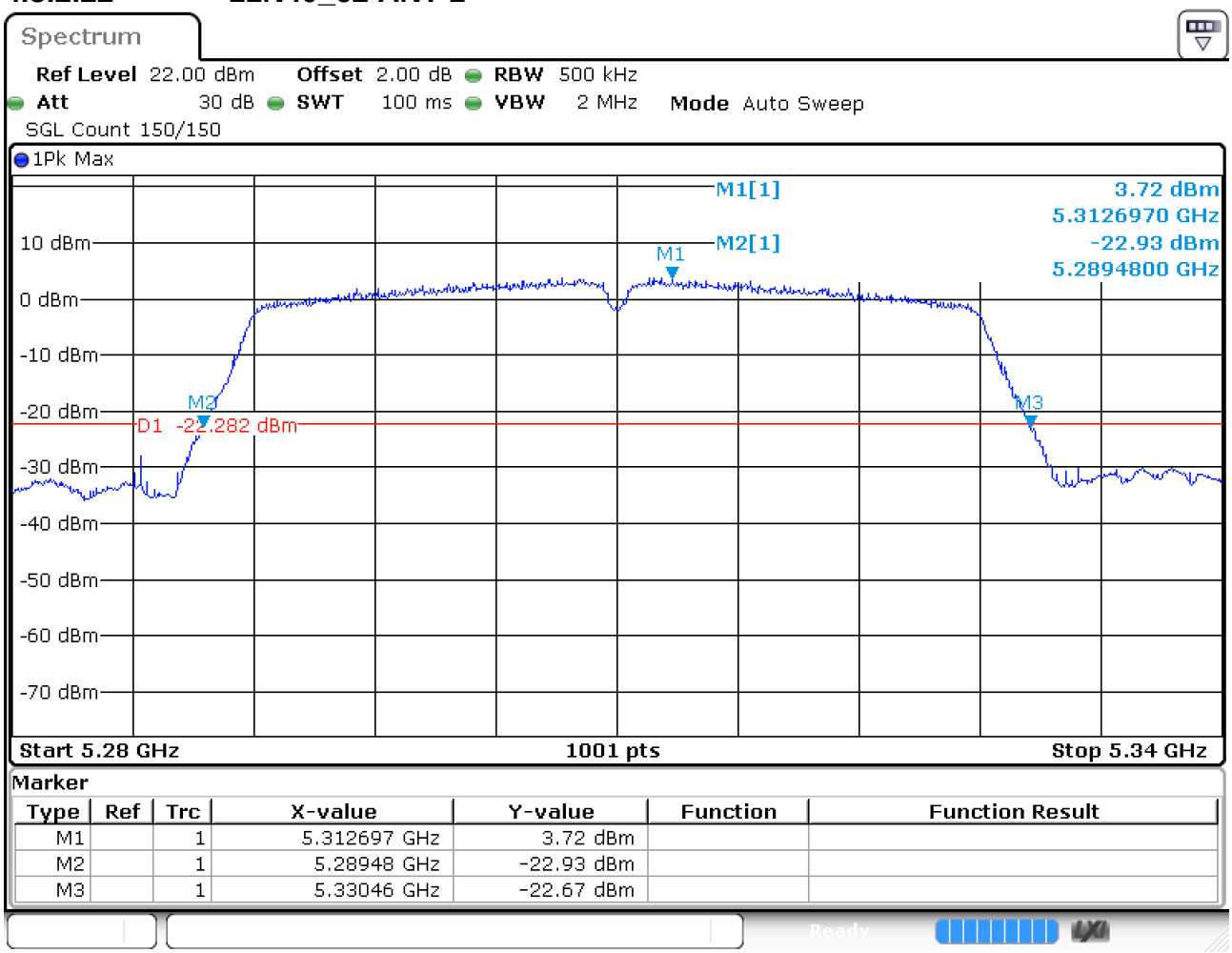
4.5.2.22 11N40_62 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.312697 GHz	3.72 dBm		
M2		1	5.28948 GHz	-22.93 dBm		
M3		1	5.33046 GHz	-22.67 dBm		

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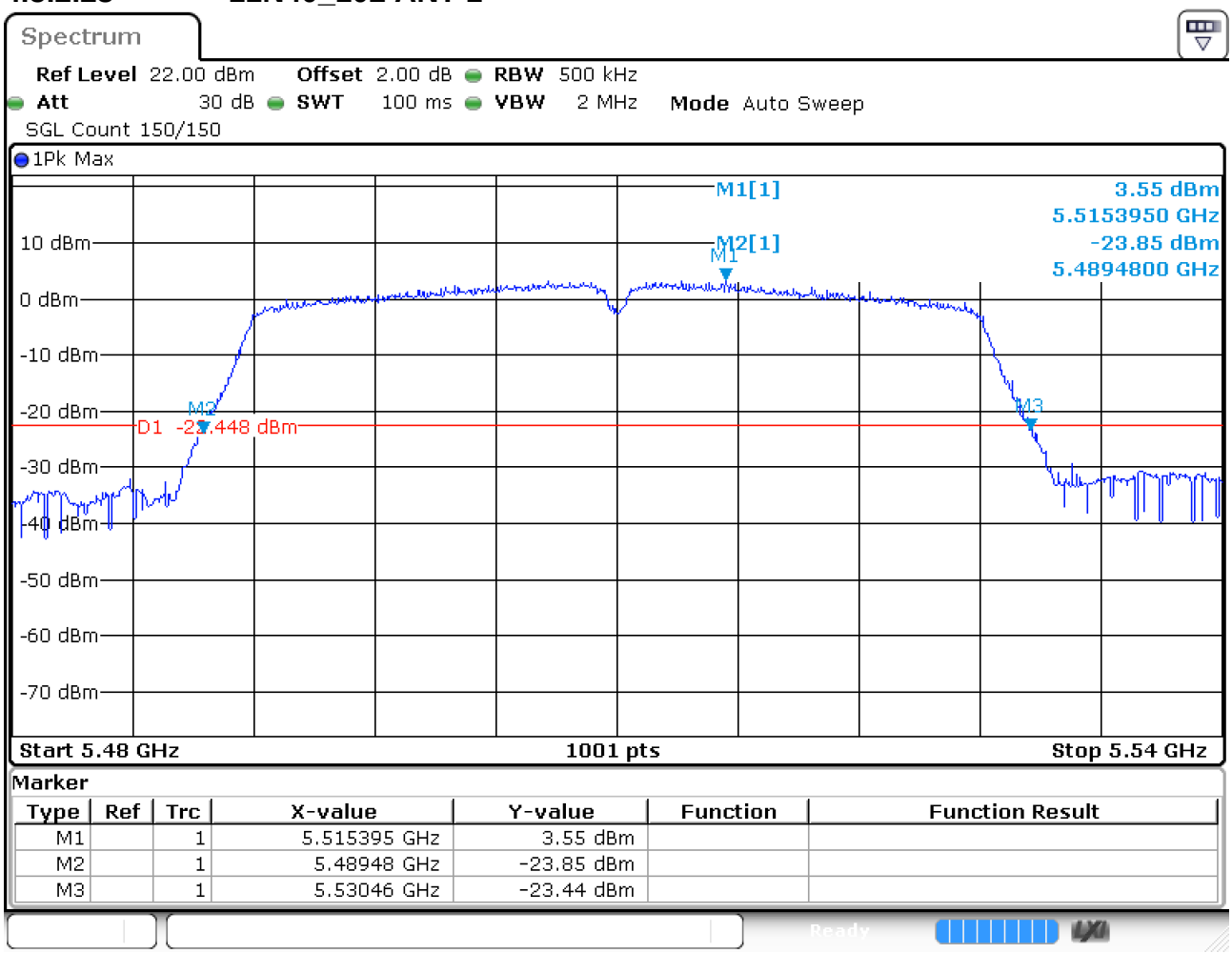
4.5.2.23 11N40_102 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.515395 GHz	3.55 dBm		
M2		1	5.48948 GHz	-23.85 dBm		
M3		1	5.53046 GHz	-23.44 dBm		

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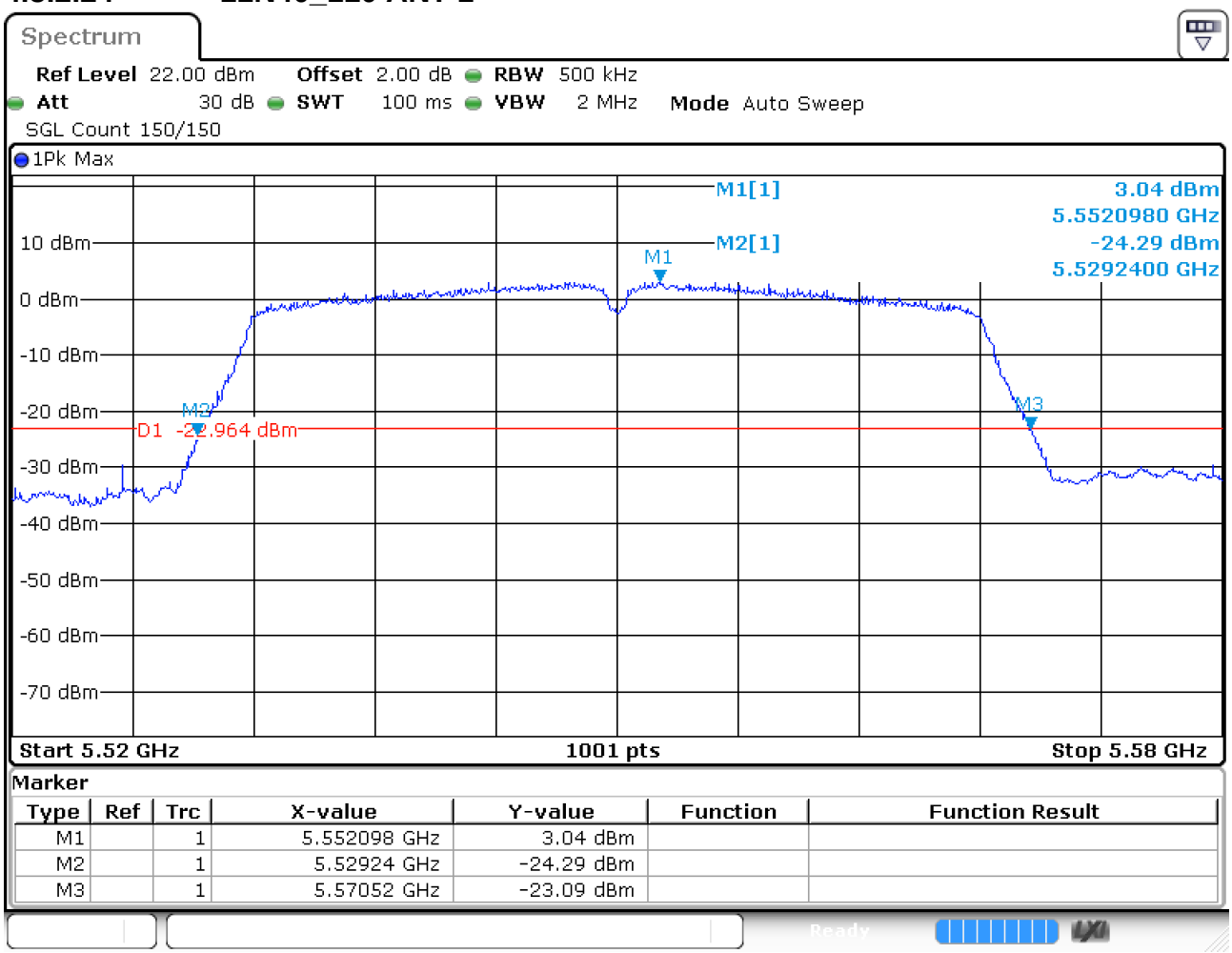
4.5.2.24 11N40_110 ANT 1



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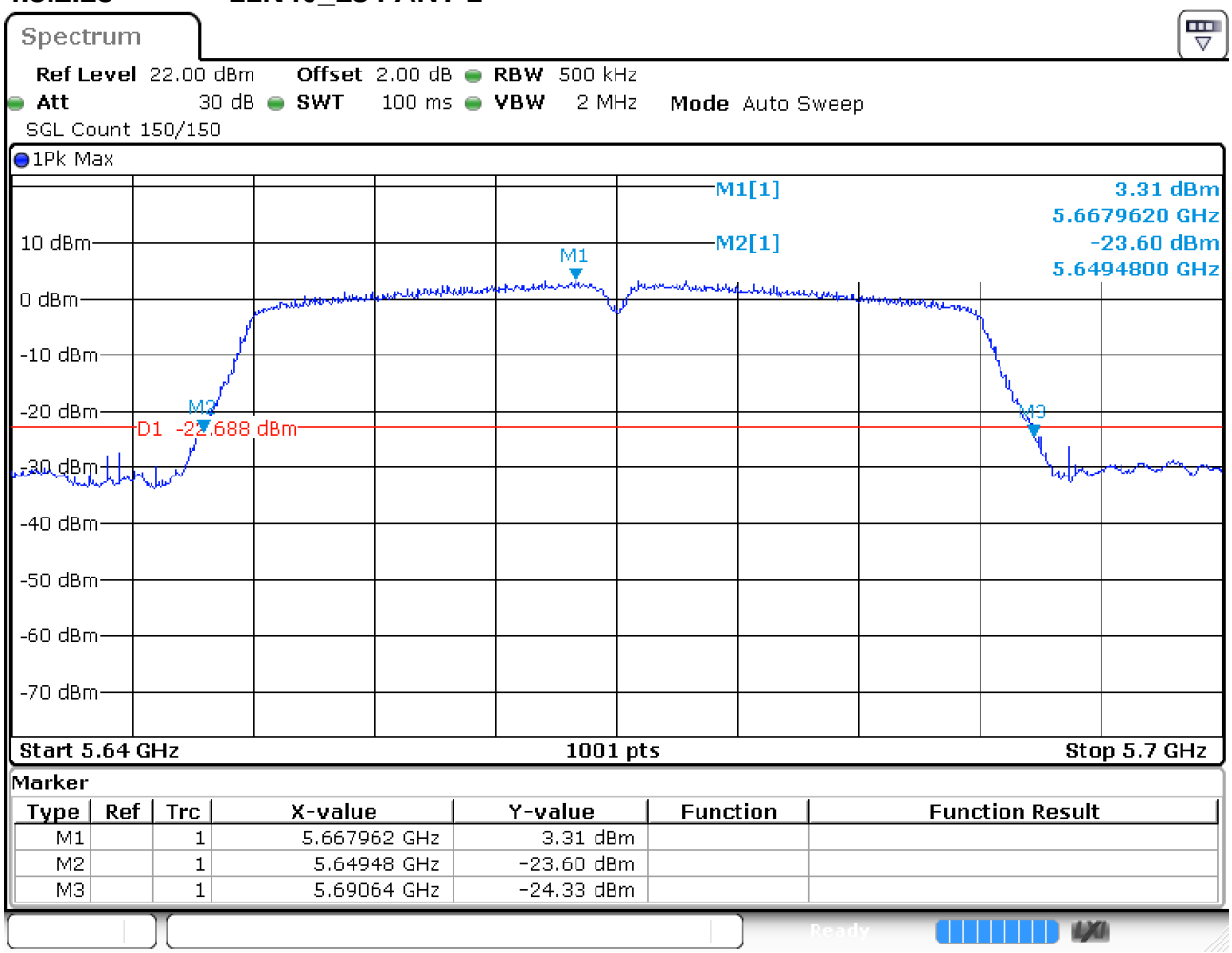
4.5.2.25 11N40_134 ANT 1



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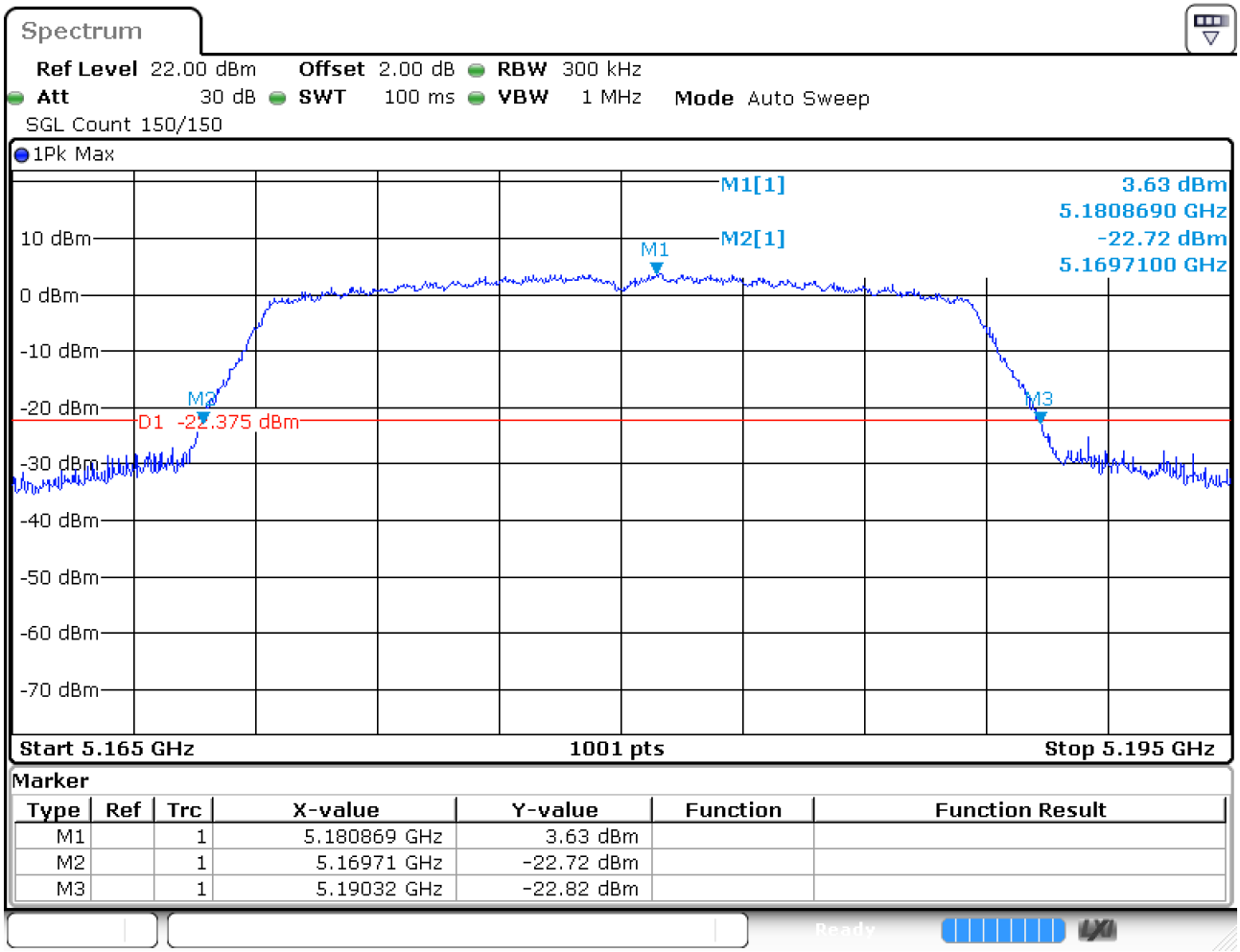
4.5.2.26 11AC20_36 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.180869 GHz	3.63 dBm		
M2		1	5.16971 GHz	-22.72 dBm		
M3		1	5.19032 GHz	-22.82 dBm		

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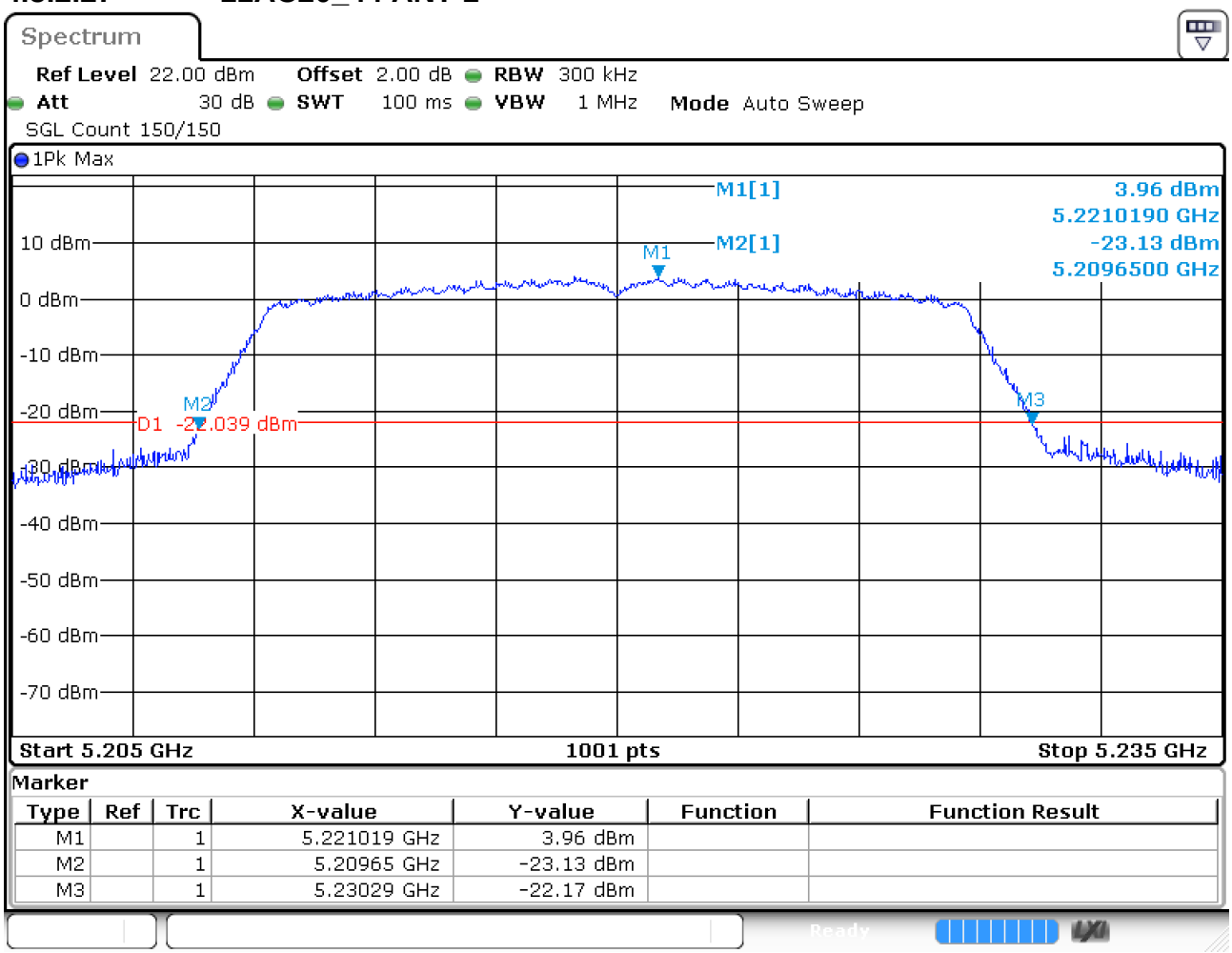
4.5.2.27 11AC20_44 ANT 1



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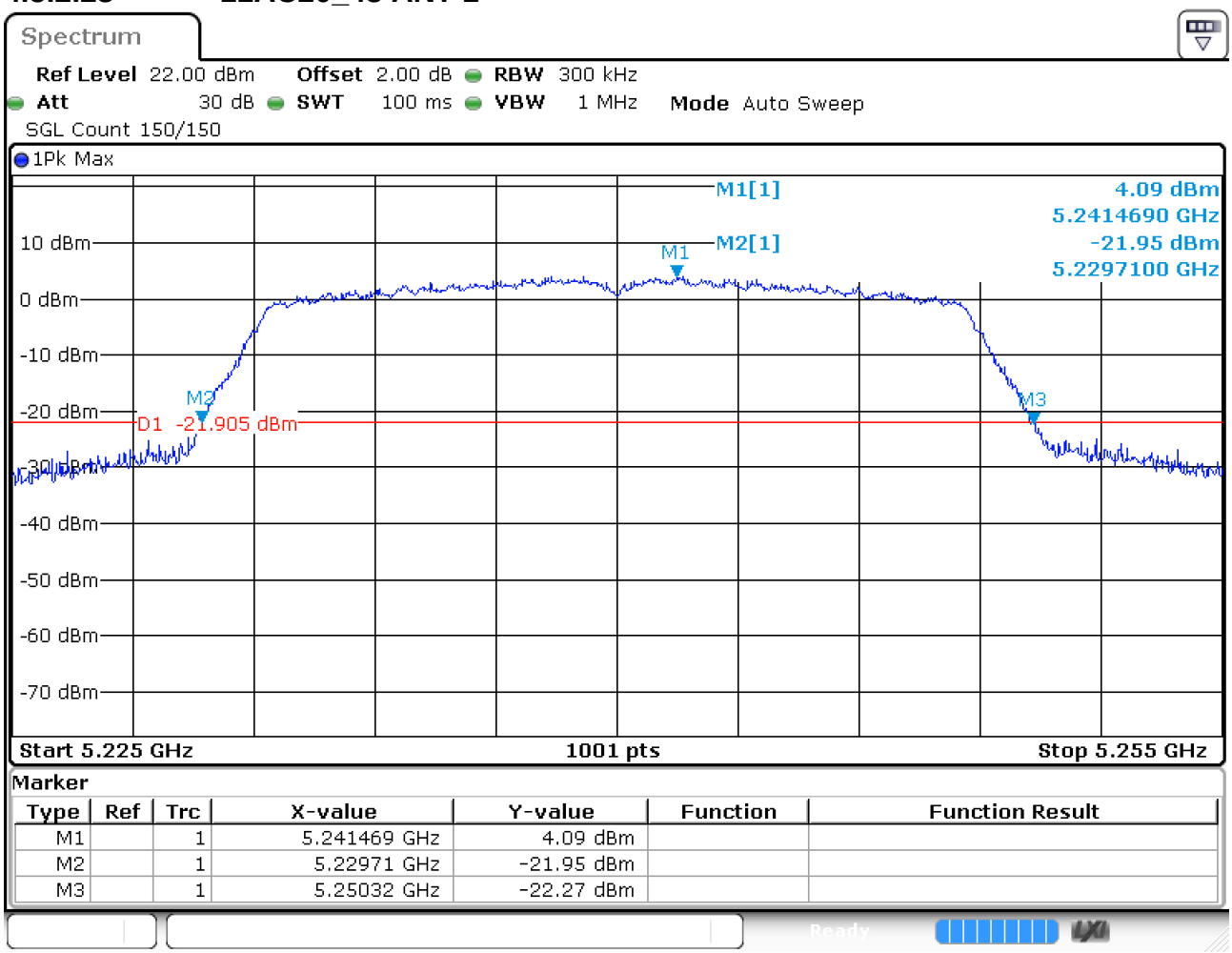
4.5.2.28 11AC20_48 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.241469 GHz	4.09 dBm		
M2		1	5.22971 GHz	-21.95 dBm		
M3		1	5.25032 GHz	-22.27 dBm		

Date: 5.MAY.2020 10:32:54

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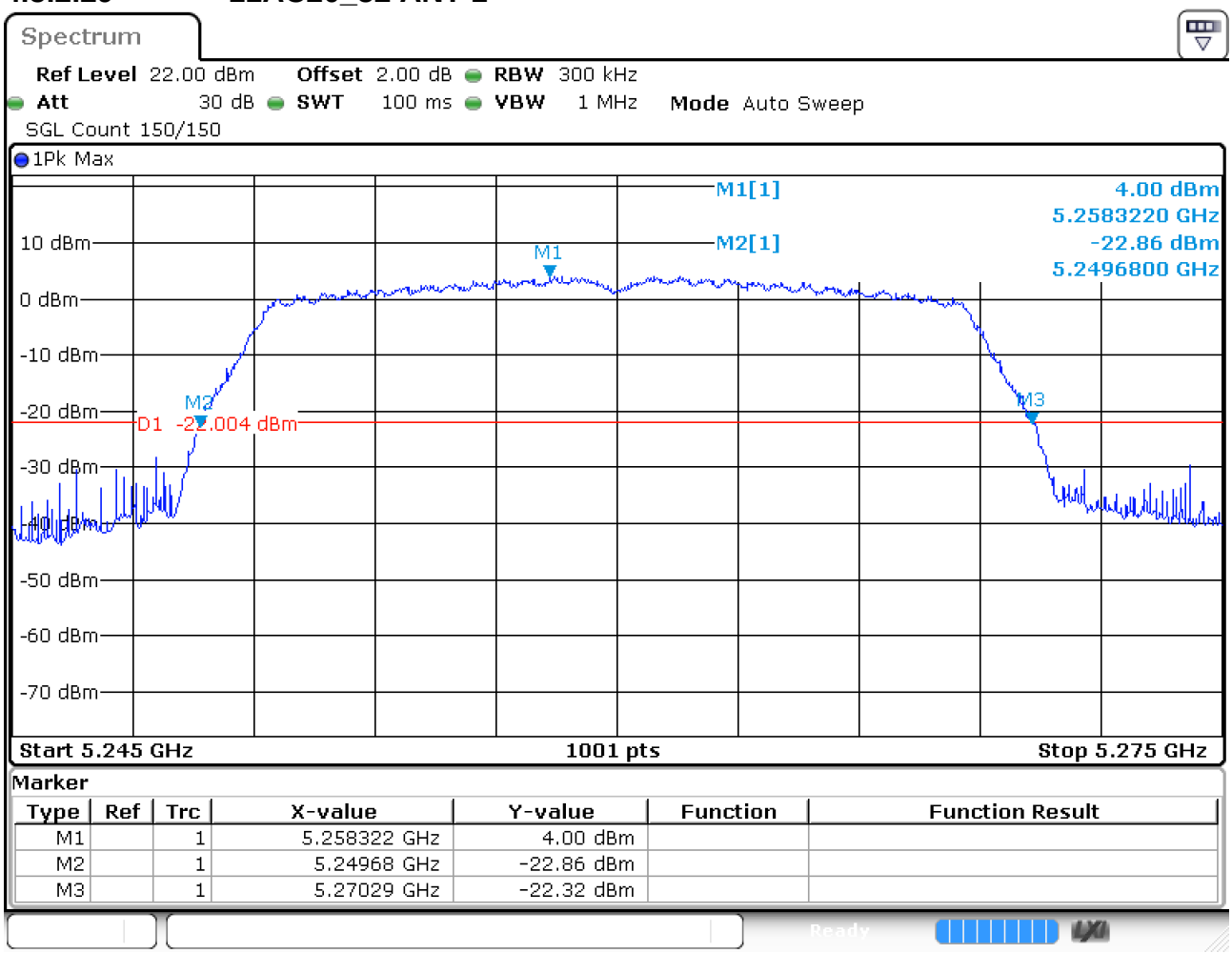
4.5.2.29 11AC20_52 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.258322 GHz	4.00 dBm		
M2		1	5.24968 GHz	-22.86 dBm		
M3		1	5.27029 GHz	-22.32 dBm		

Date: 5.MAY.2020 10:36:20

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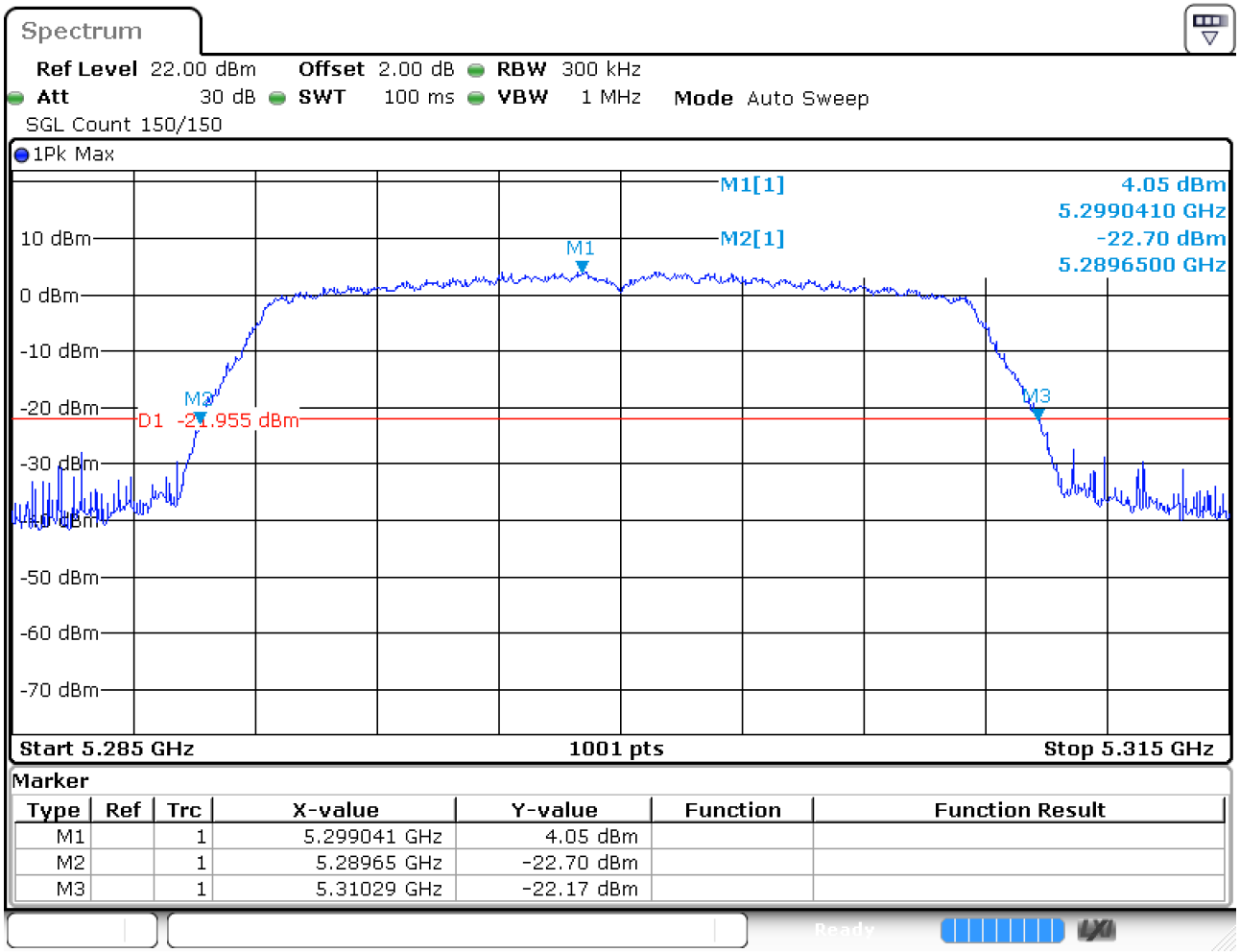
4.5.2.30 11AC20_60 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.299041 GHz	4.05 dBm		
M2		1	5.28965 GHz	-22.70 dBm		
M3		1	5.31029 GHz	-22.17 dBm		

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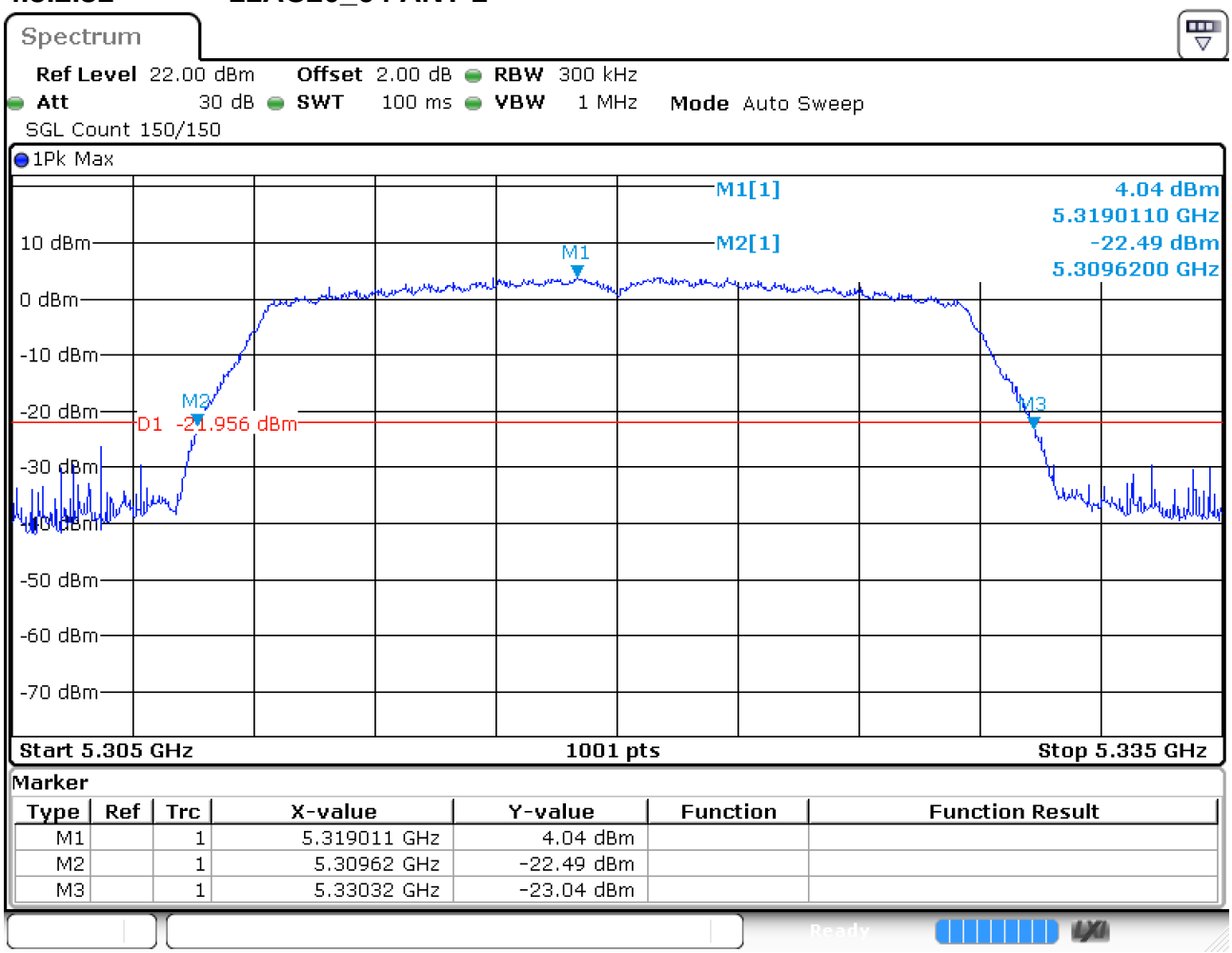
4.5.2.31 11AC20_64 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.319011 GHz	4.04 dBm		
M2		1	5.30962 GHz	-22.49 dBm		
M3		1	5.33032 GHz	-23.04 dBm		

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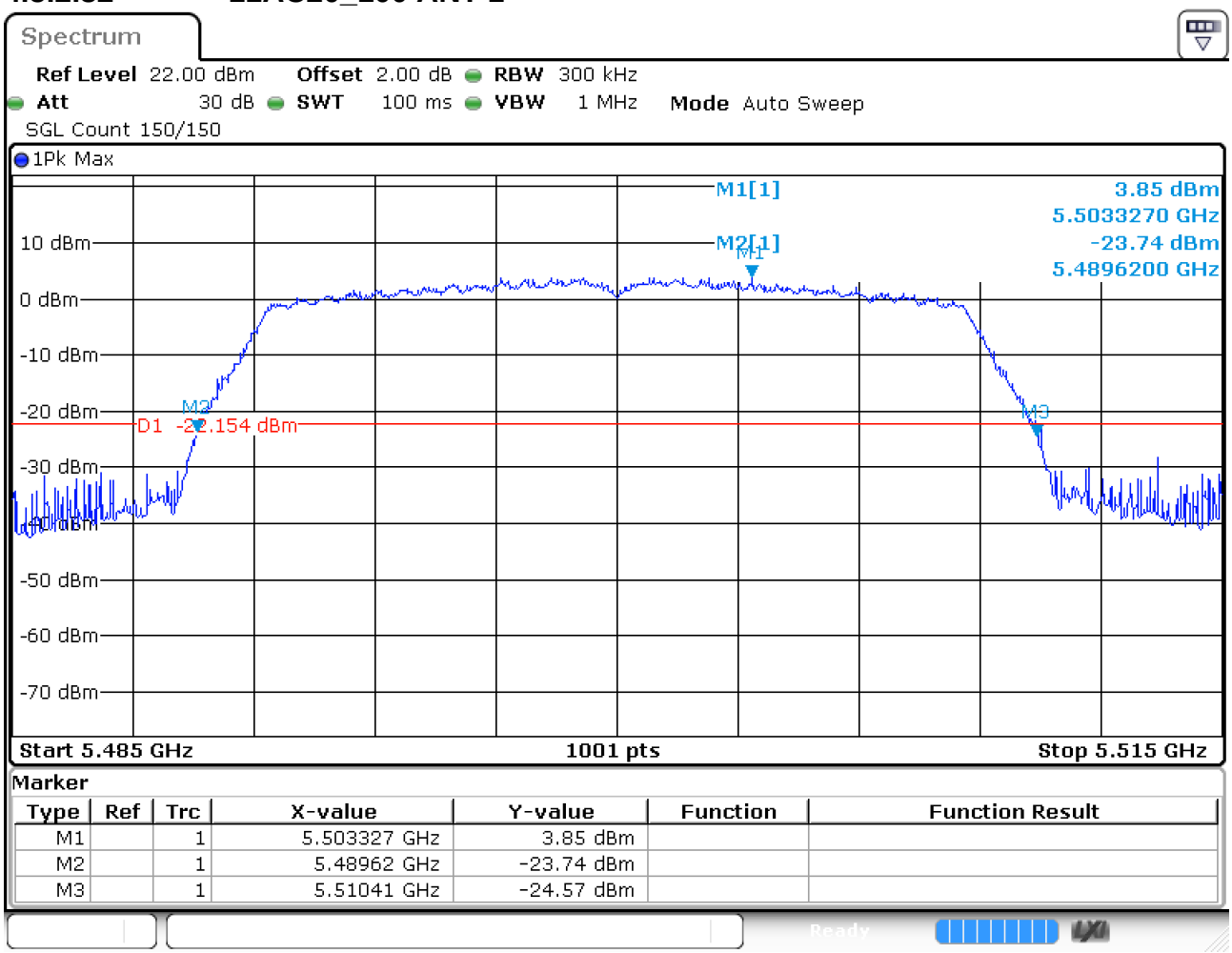
4.5.2.32 11AC20_100 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.503327 GHz	3.85 dBm		
M2		1	5.48962 GHz	-23.74 dBm		
M3		1	5.51041 GHz	-24.57 dBm		

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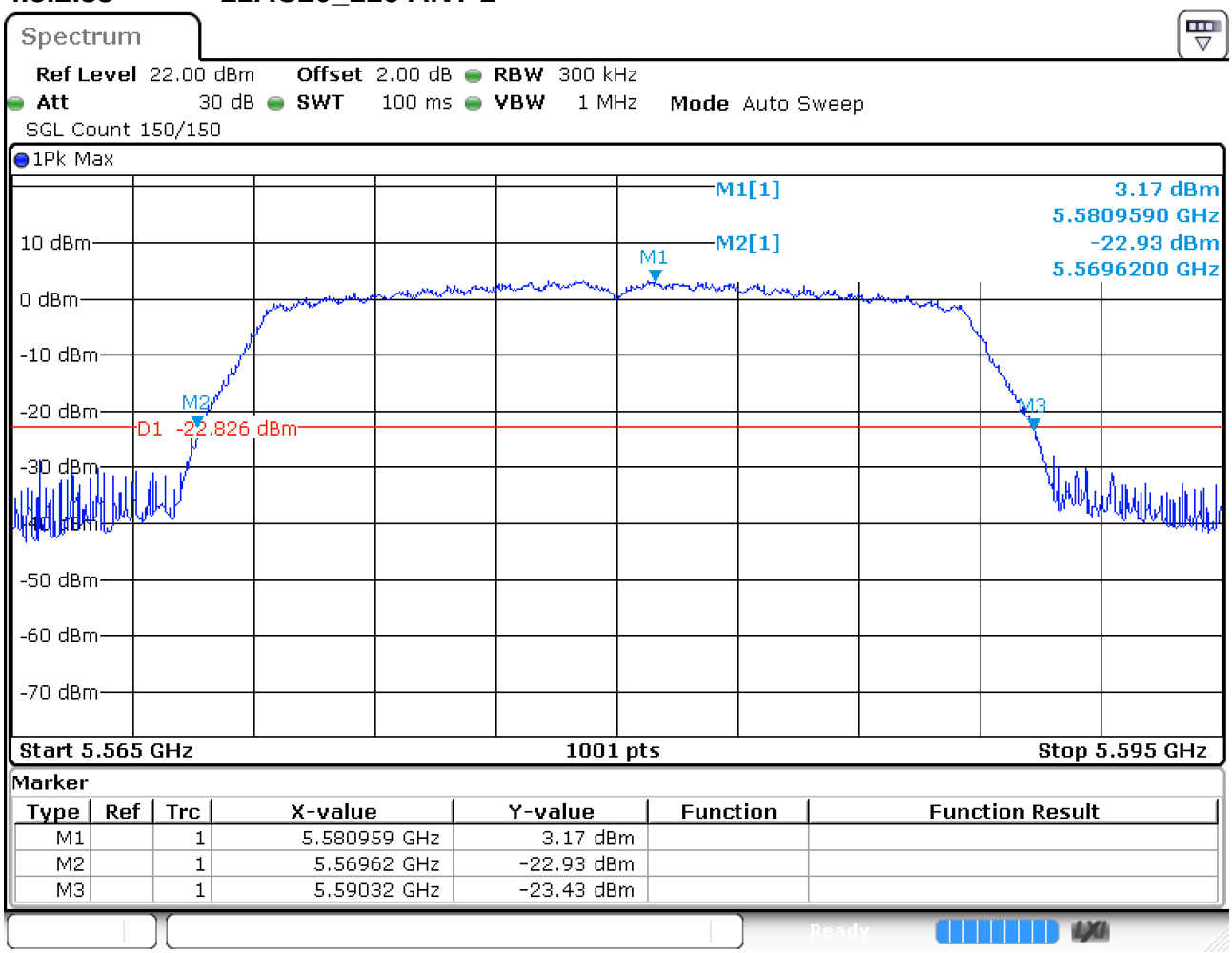
4.5.2.33 11AC20_116 ANT 1



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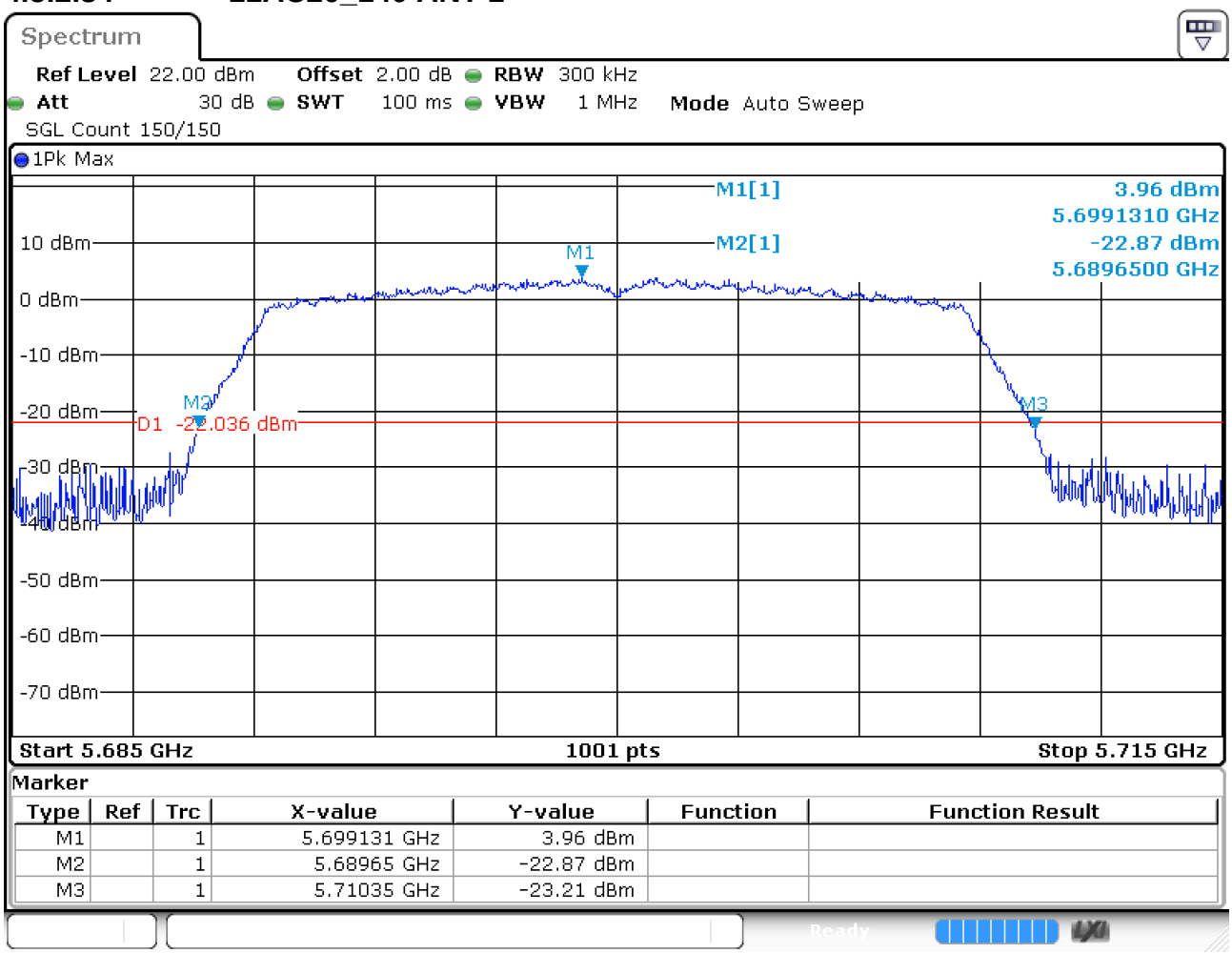
4.5.2.34 11AC20_140 ANT 1



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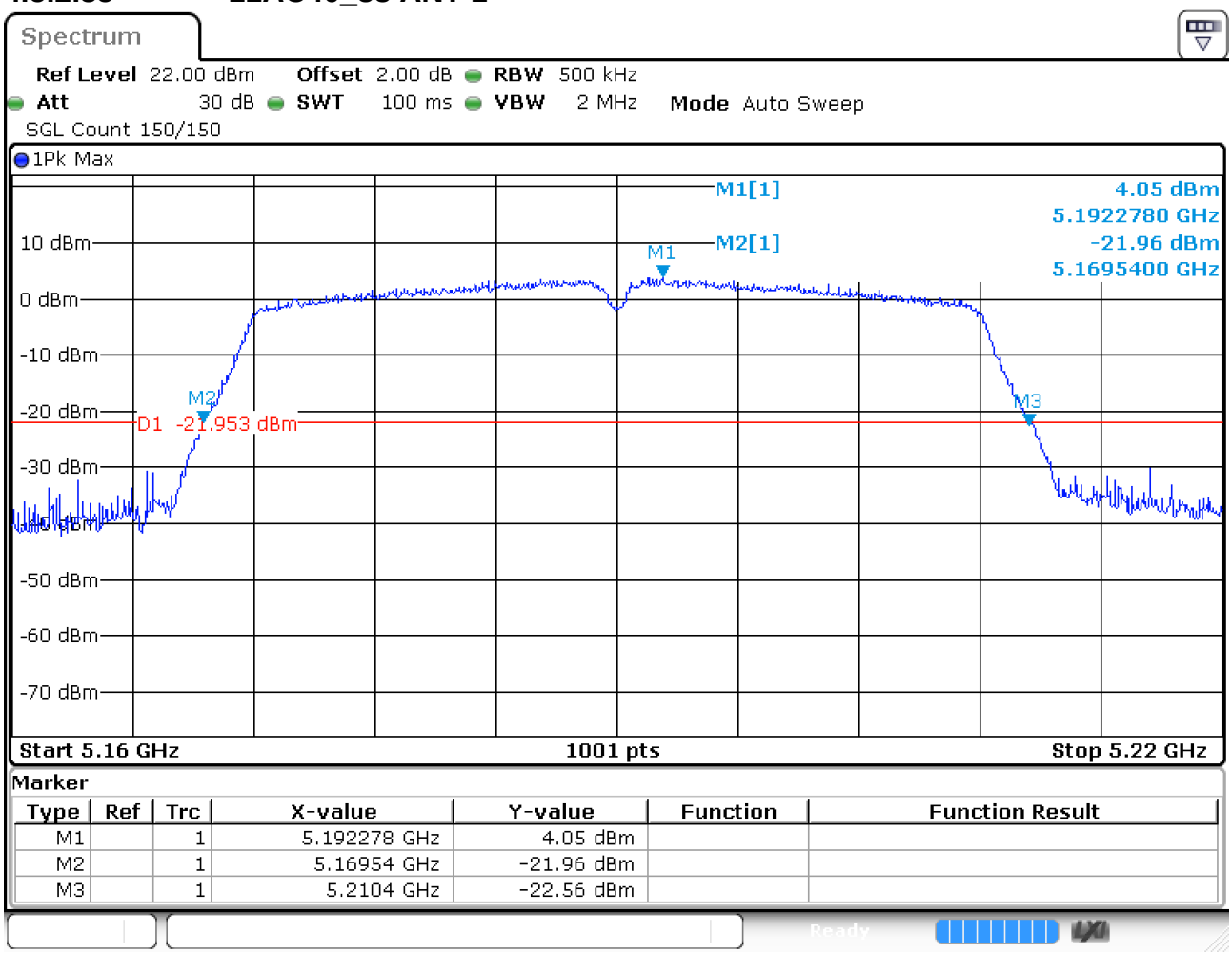
4.5.2.35 11AC40_38 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.192278 GHz	4.05 dBm		
M2		1	5.16954 GHz	-21.96 dBm		
M3		1	5.2104 GHz	-22.56 dBm		

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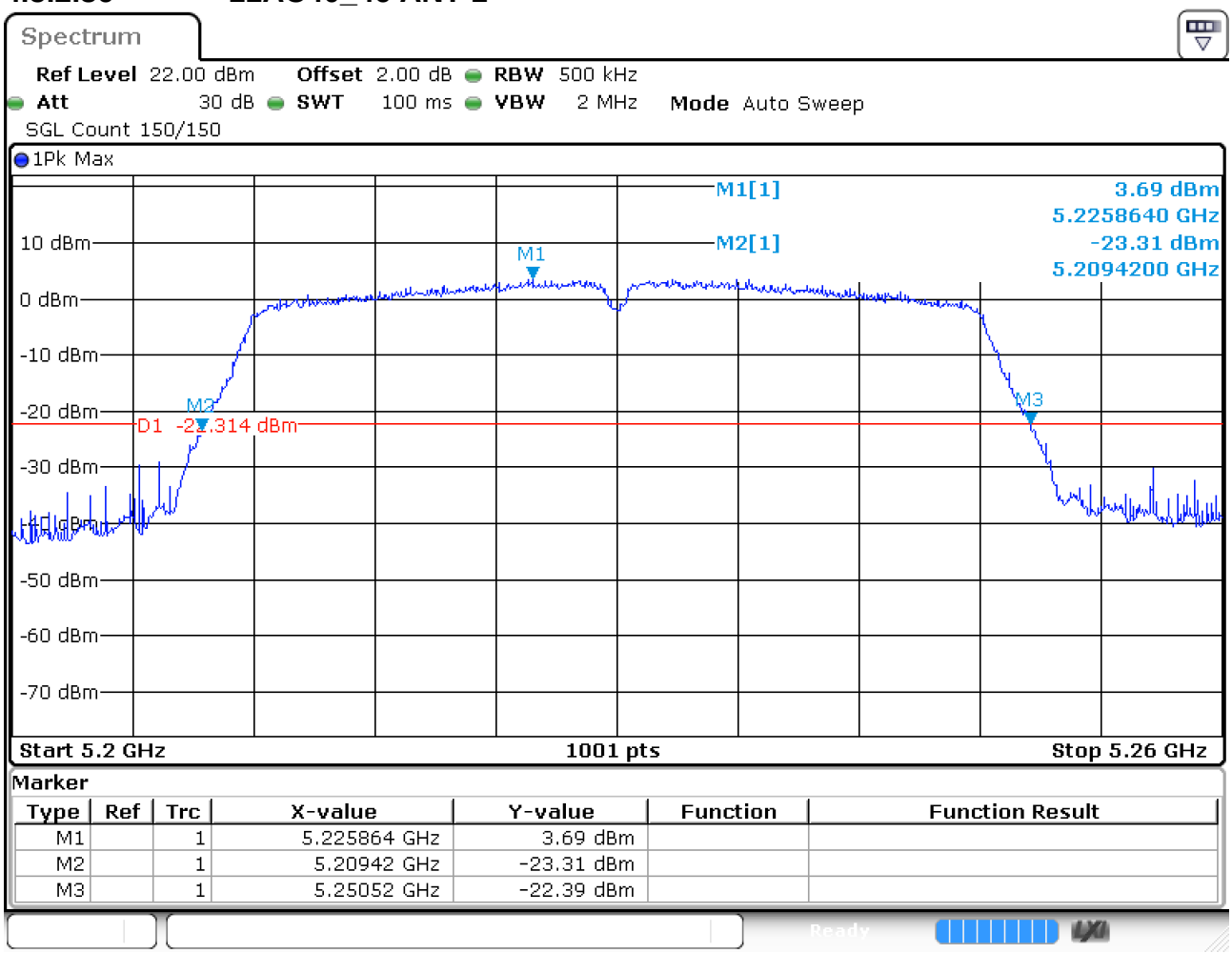
4.5.2.36 11AC40_46 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.225864 GHz	3.69 dBm		
M2		1	5.20942 GHz	-23.31 dBm		
M3		1	5.25052 GHz	-22.39 dBm		

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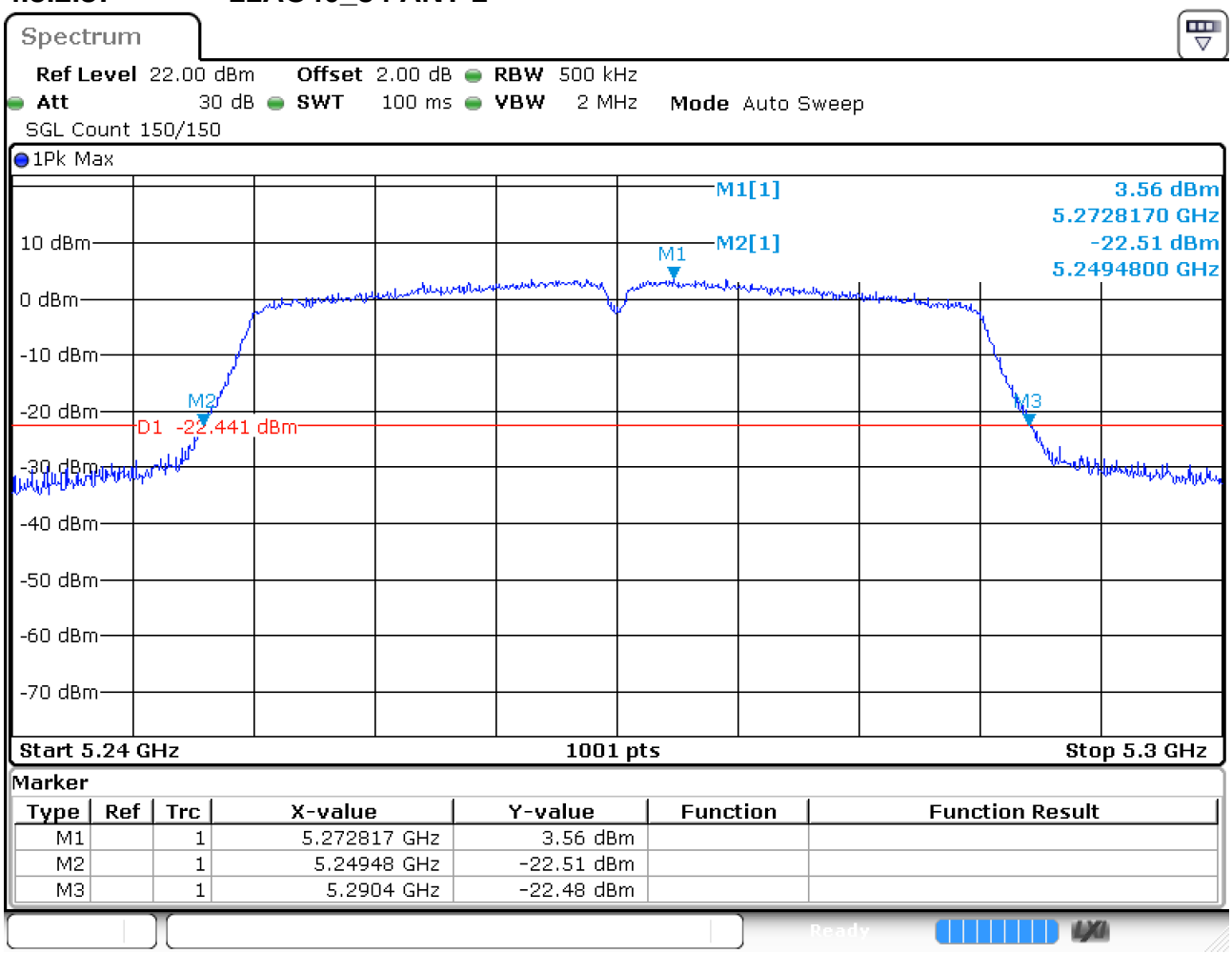
4.5.2.37 11AC40_54 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.272817 GHz	3.56 dBm		
M2		1	5.24948 GHz	-22.51 dBm		
M3		1	5.2904 GHz	-22.48 dBm		

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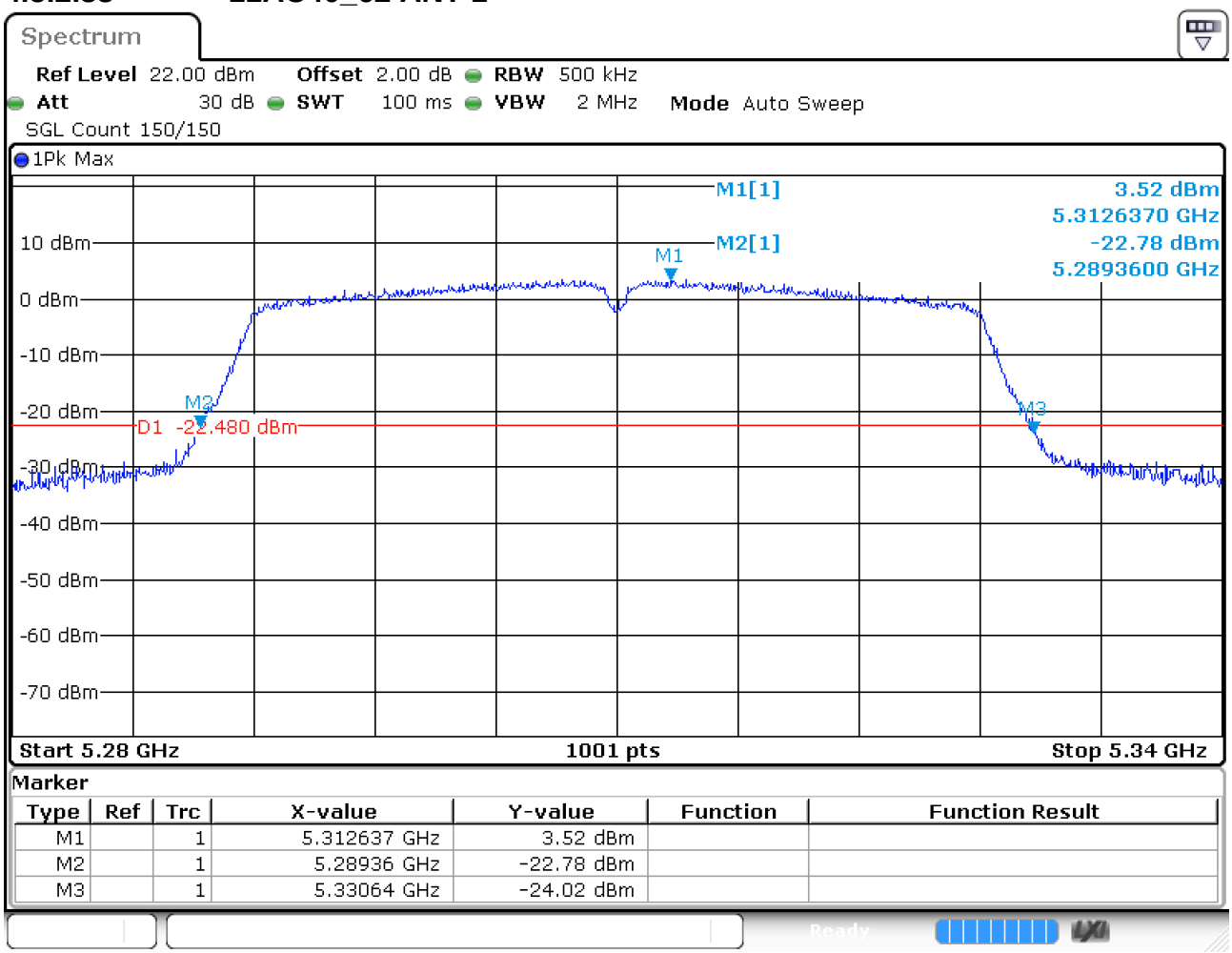
4.5.2.38 11AC40_62 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.312637 GHz	3.52 dBm		
M2		1	5.28936 GHz	-22.78 dBm		
M3		1	5.33064 GHz	-24.02 dBm		

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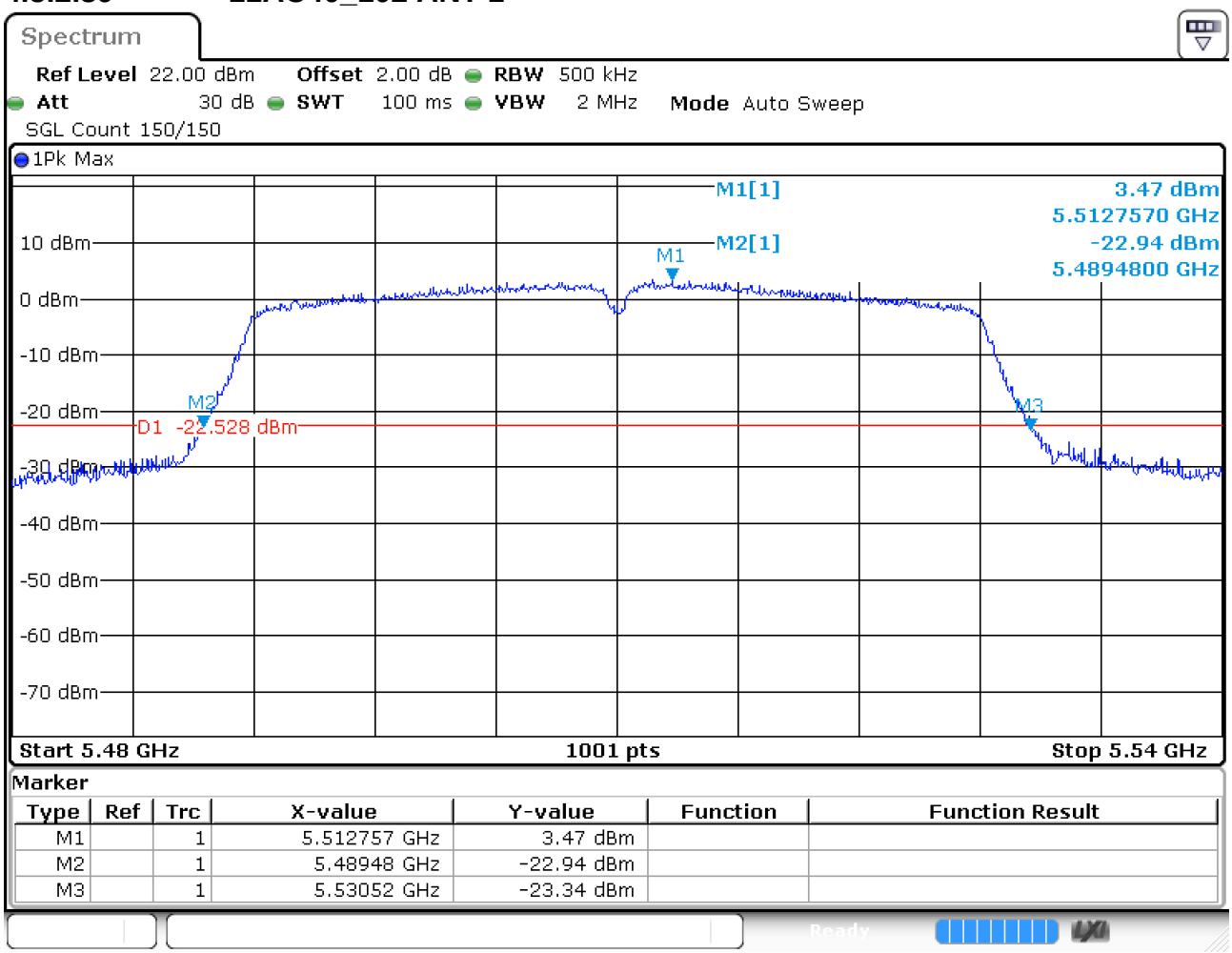
4.5.2.39 11AC40_102 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.512757 GHz	3.47 dBm		
M2		1	5.48948 GHz	-22.94 dBm		
M3		1	5.53052 GHz	-23.34 dBm		

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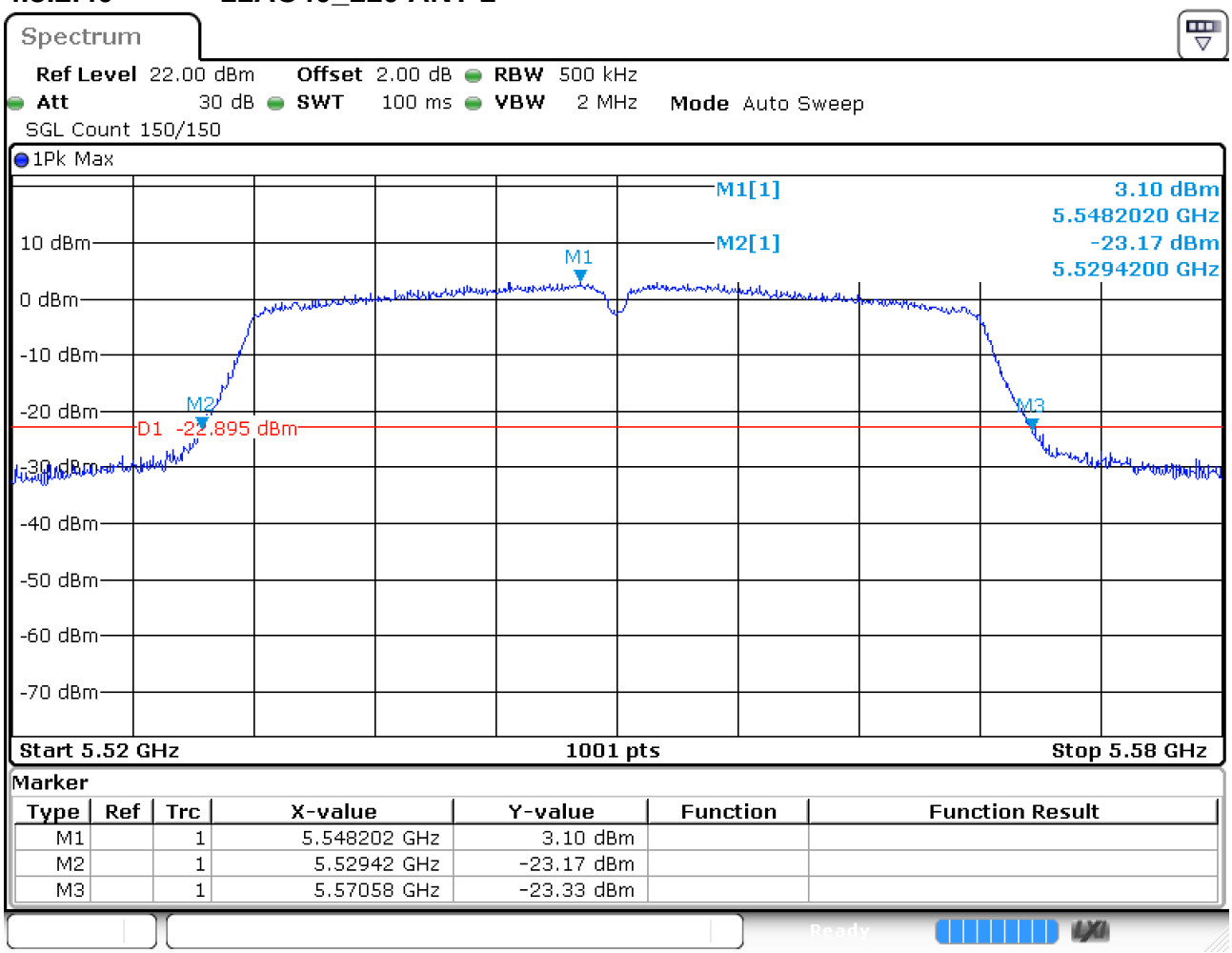
4.5.2.40 11AC40_110 ANT 1



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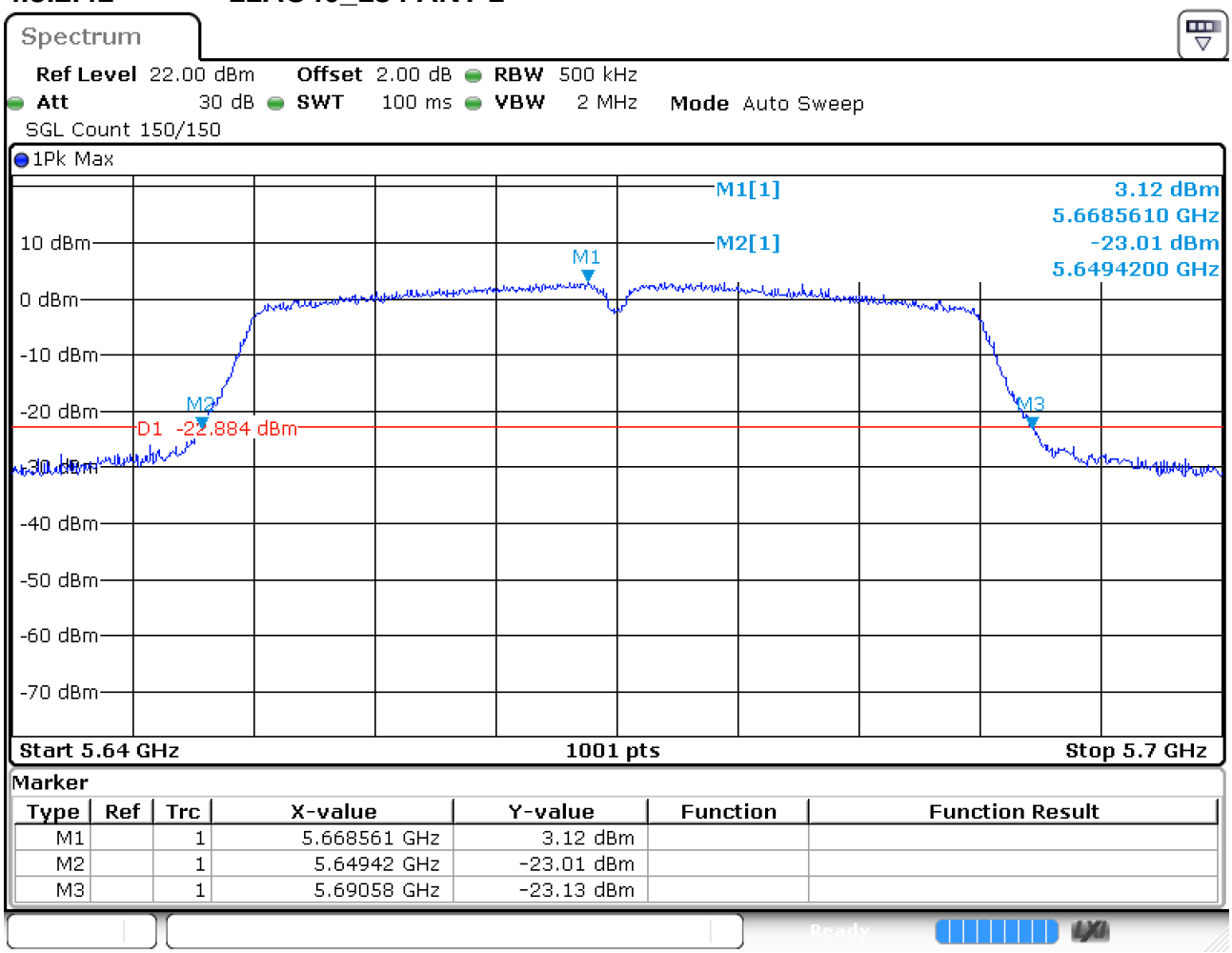
4.5.2.41 11AC40_134 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.668561 GHz	3.12 dBm		
M2		1	5.64942 GHz	-23.01 dBm		
M3		1	5.69058 GHz	-23.13 dBm		

Date: 5.MAY.2020 10:58:49

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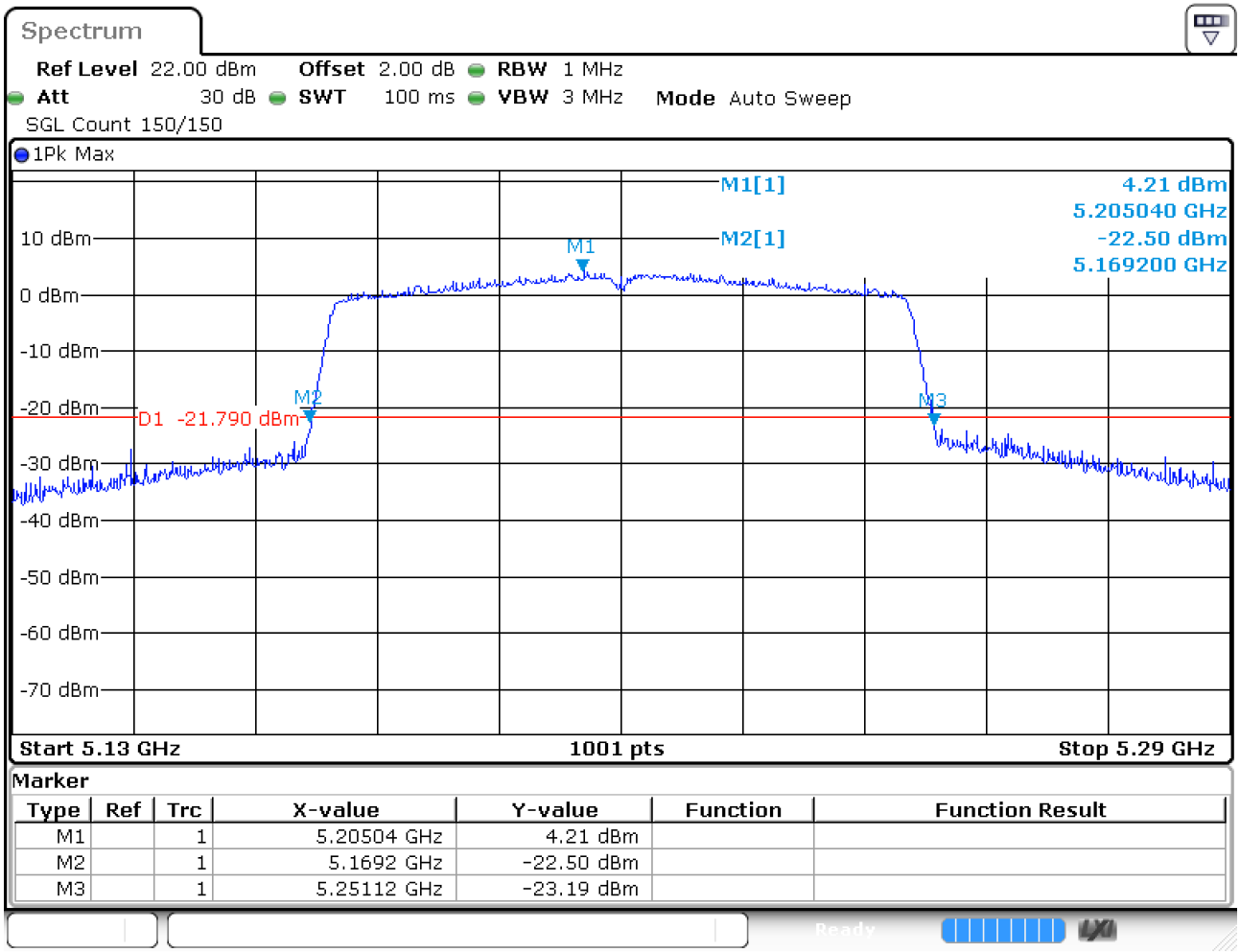
4.5.2.42 11AC80_42 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.20504 GHz	4.21 dBm		
M2		1	5.1692 GHz	-22.50 dBm		
M3		1	5.25112 GHz	-23.19 dBm		

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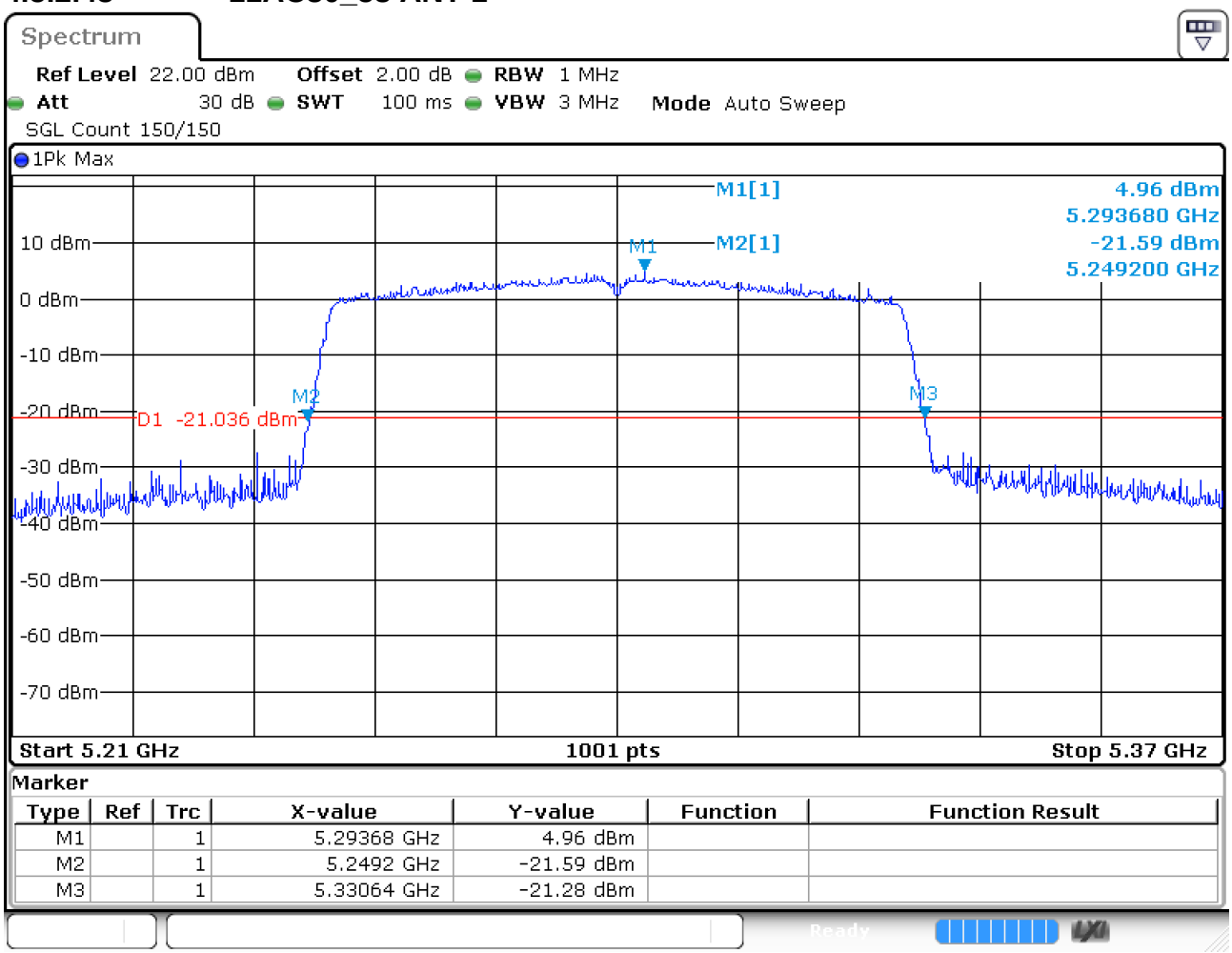
4.5.2.43 11AC80_58 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.29368 GHz	4.96 dBm		
M2		1	5.2492 GHz	-21.59 dBm		
M3		1	5.33064 GHz	-21.28 dBm		

Date: 5.MAY.2020 11:06:35

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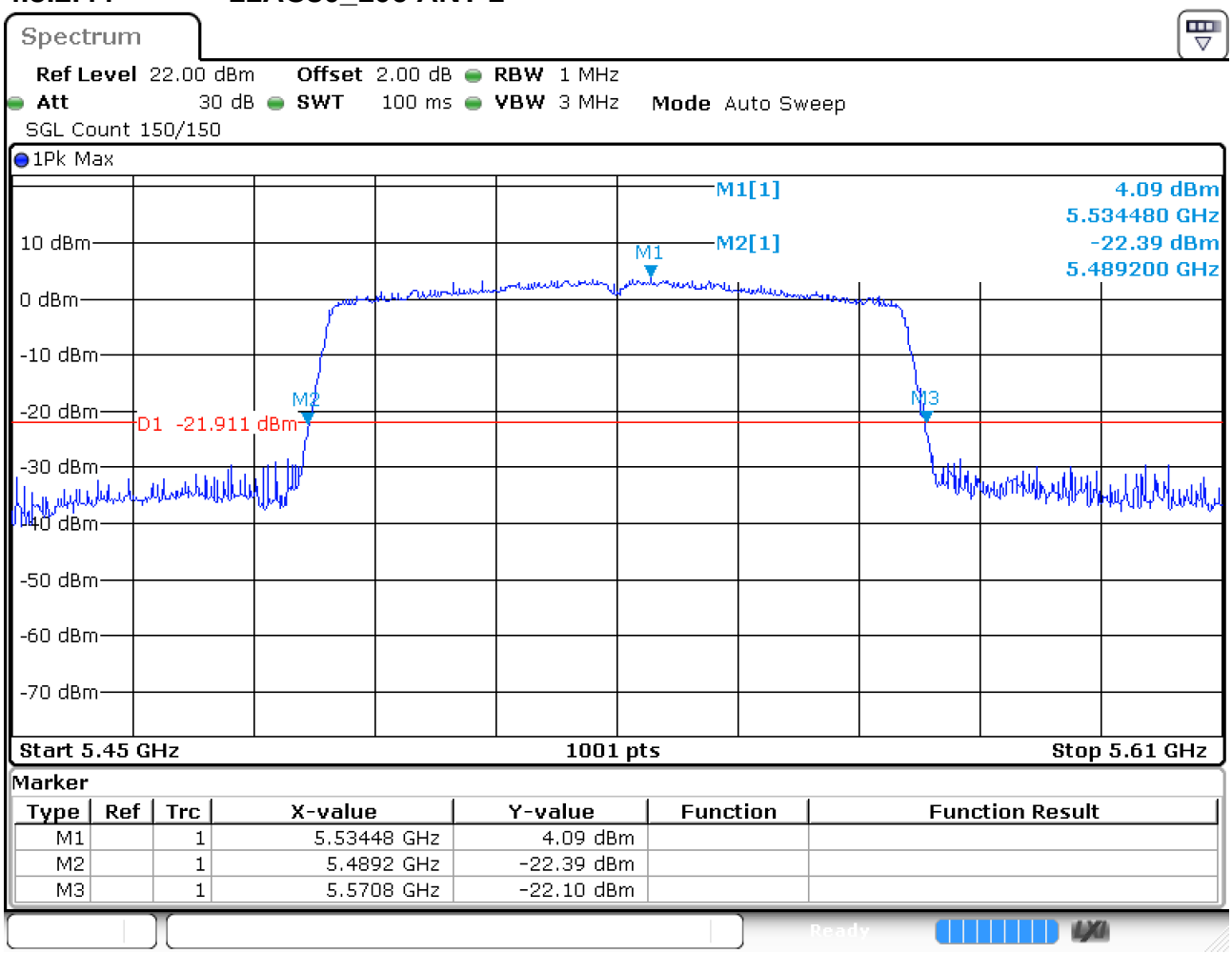
4.5.2.44 11AC80_106 ANT 1



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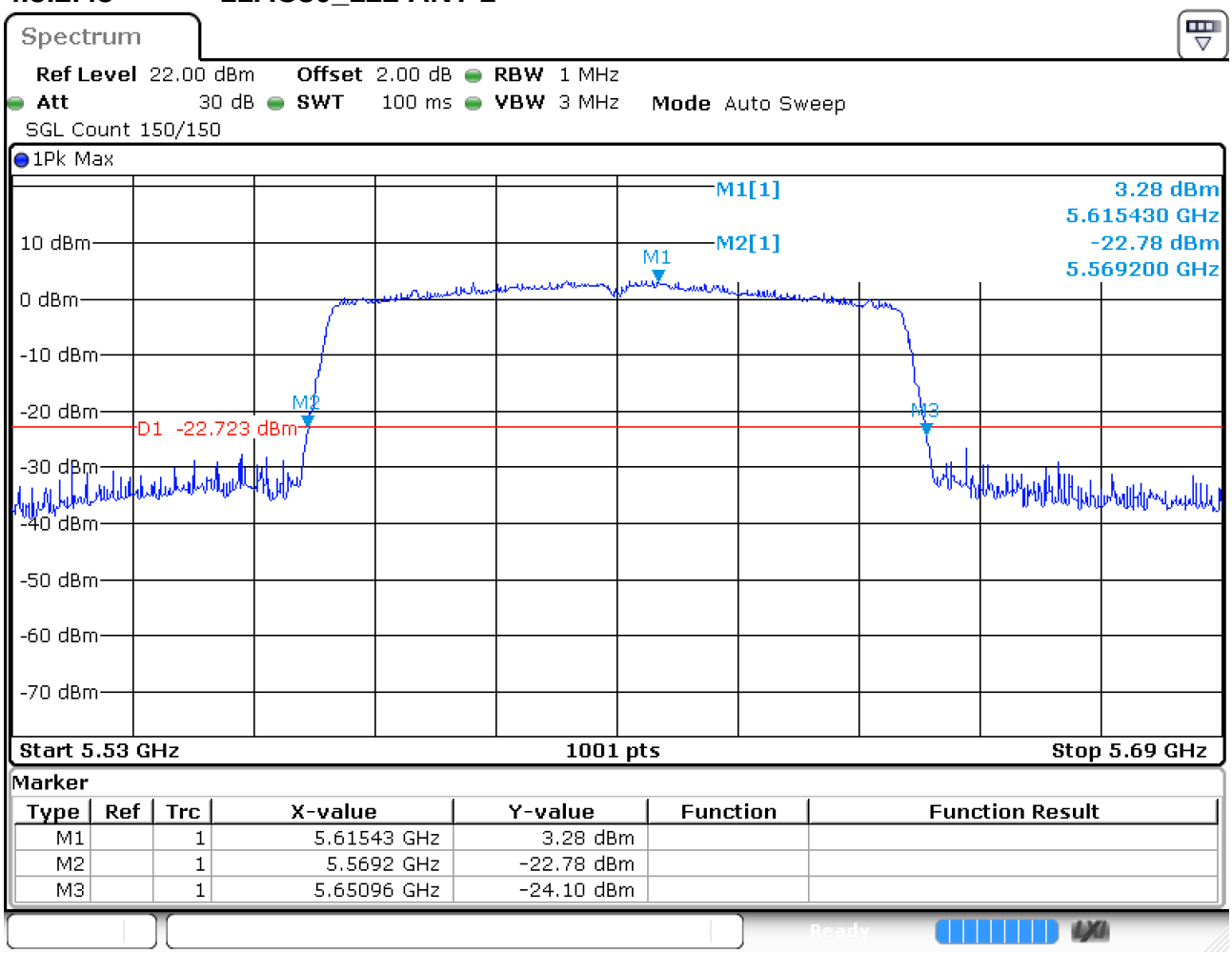
4.5.2.45 11AC80_122 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.61543 GHz	3.28 dBm		
M2		1	5.5692 GHz	-22.78 dBm		
M3		1	5.65096 GHz	-24.10 dBm		

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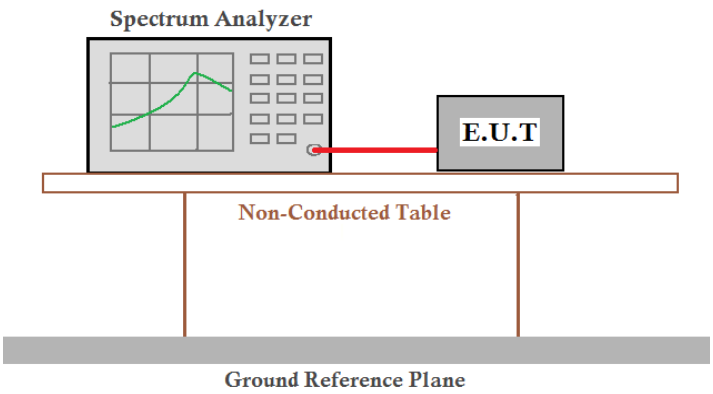
4.6 6dB Emission Bandwidth

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:	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:	Frequency Band	Limit
	5725-5850MHz	At lease 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	15.39	PASS
	165	5825	ANT 1	15.21	PASS
11N20	149	5745	ANT 1	15.21	PASS
	165	5825	ANT 1	15.21	PASS
11N40	151	5755	ANT 1	35.22	PASS
	159	5795	ANT 1	35.22	PASS
11AC20	149	5745	ANT 1	15.21	PASS
	165	5825	ANT 1	15.21	PASS
11AC40	151	5755	ANT 1	35.22	PASS
	159	5795	ANT 1	35.22	PASS
11AC80	155	5775	ANT 1	75.52	PASS

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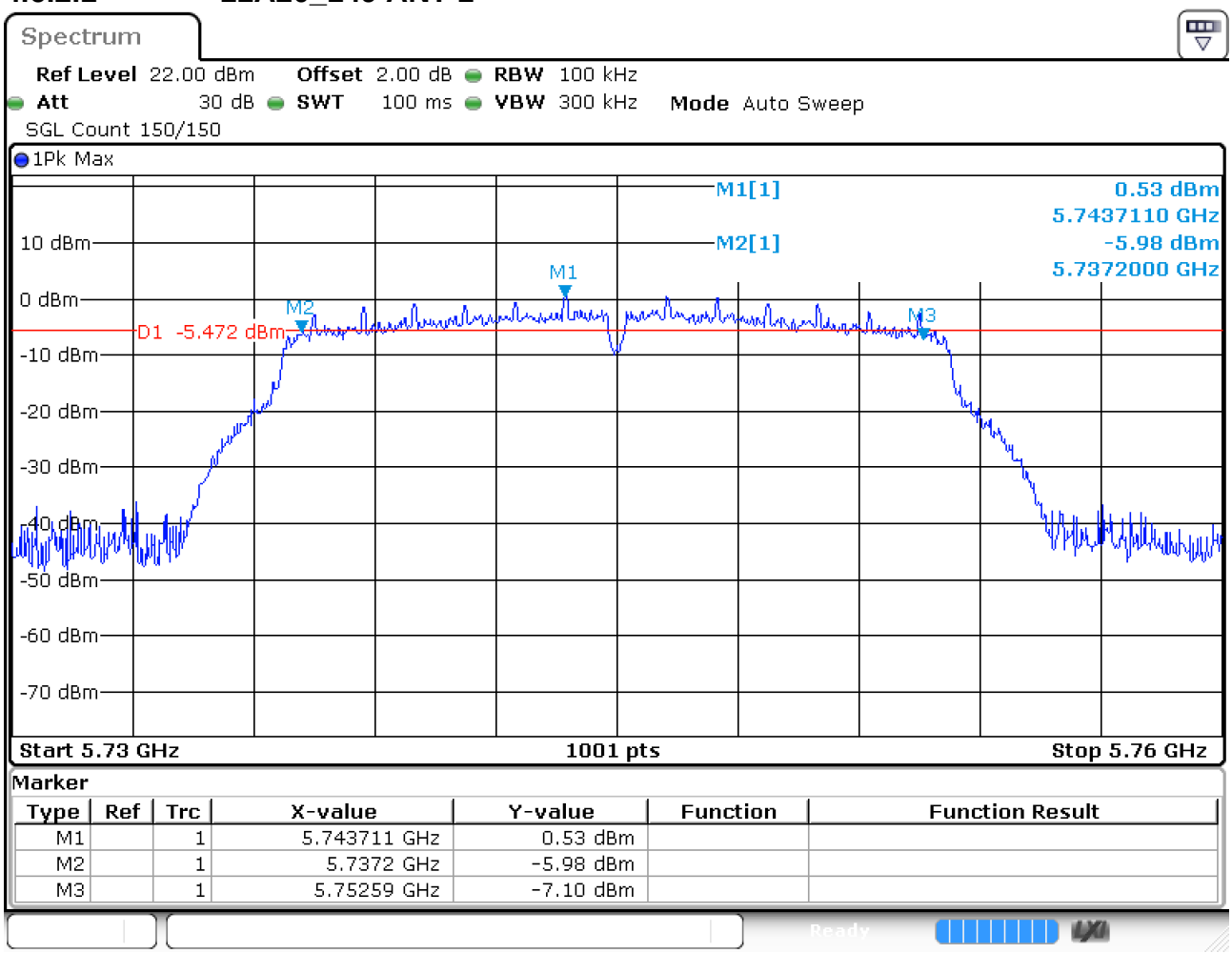
4.6.2 Plots for 6dB Emission Bandwidth

4.6.2.1 11A20_149 ANT 1



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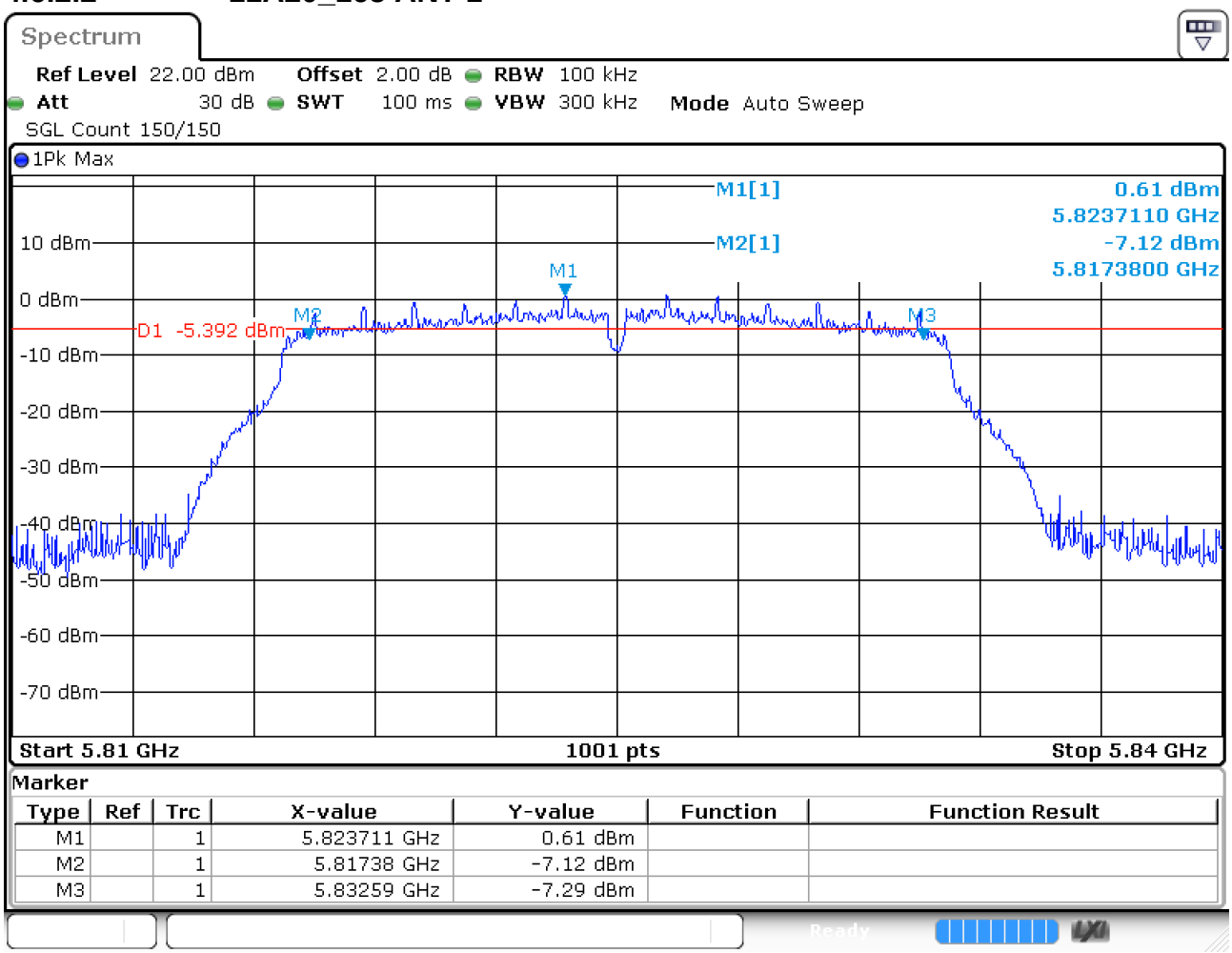
4.6.2.2 11A20_165 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.823711 GHz	0.61 dBm		
M2		1	5.81738 GHz	-7.12 dBm		
M3		1	5.83259 GHz	-7.29 dBm		

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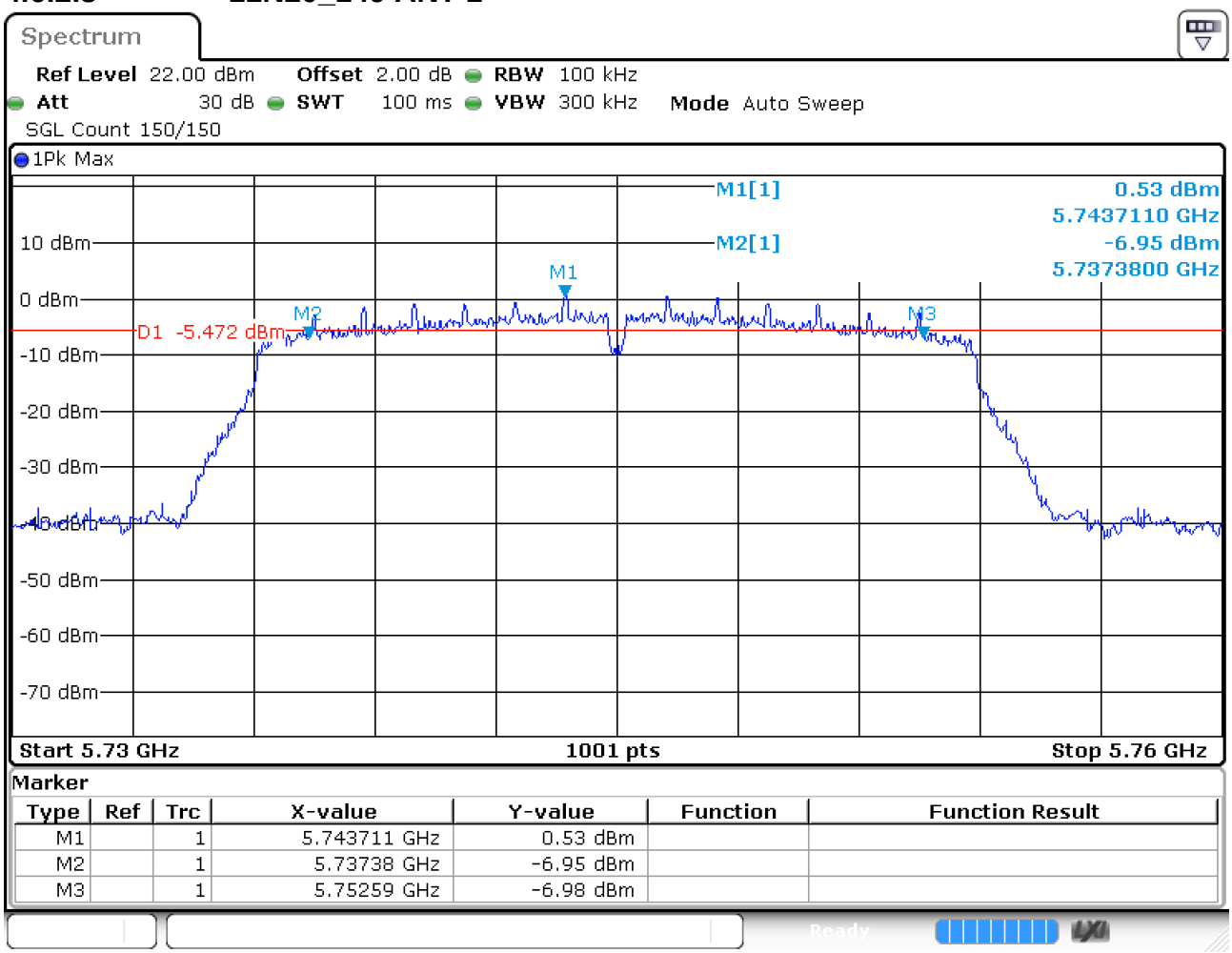
4.6.2.3 11N20_149 ANT 1



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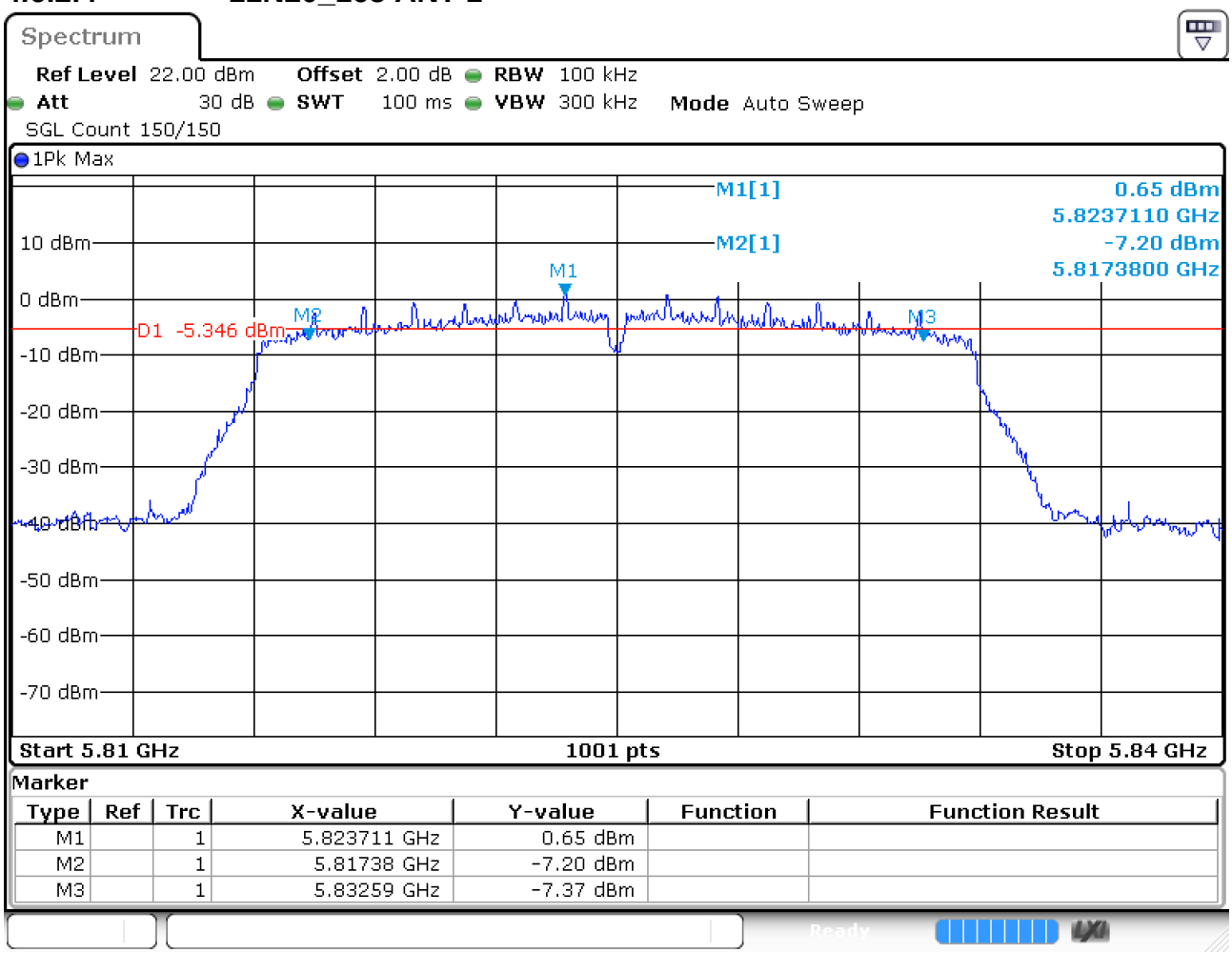
4.6.2.4 11N20_165 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.823711 GHz	0.65 dBm		
M2		1	5.81738 GHz	-7.20 dBm		
M3		1	5.83259 GHz	-7.37 dBm		

Date: 5.MAY.2020 10:08:47

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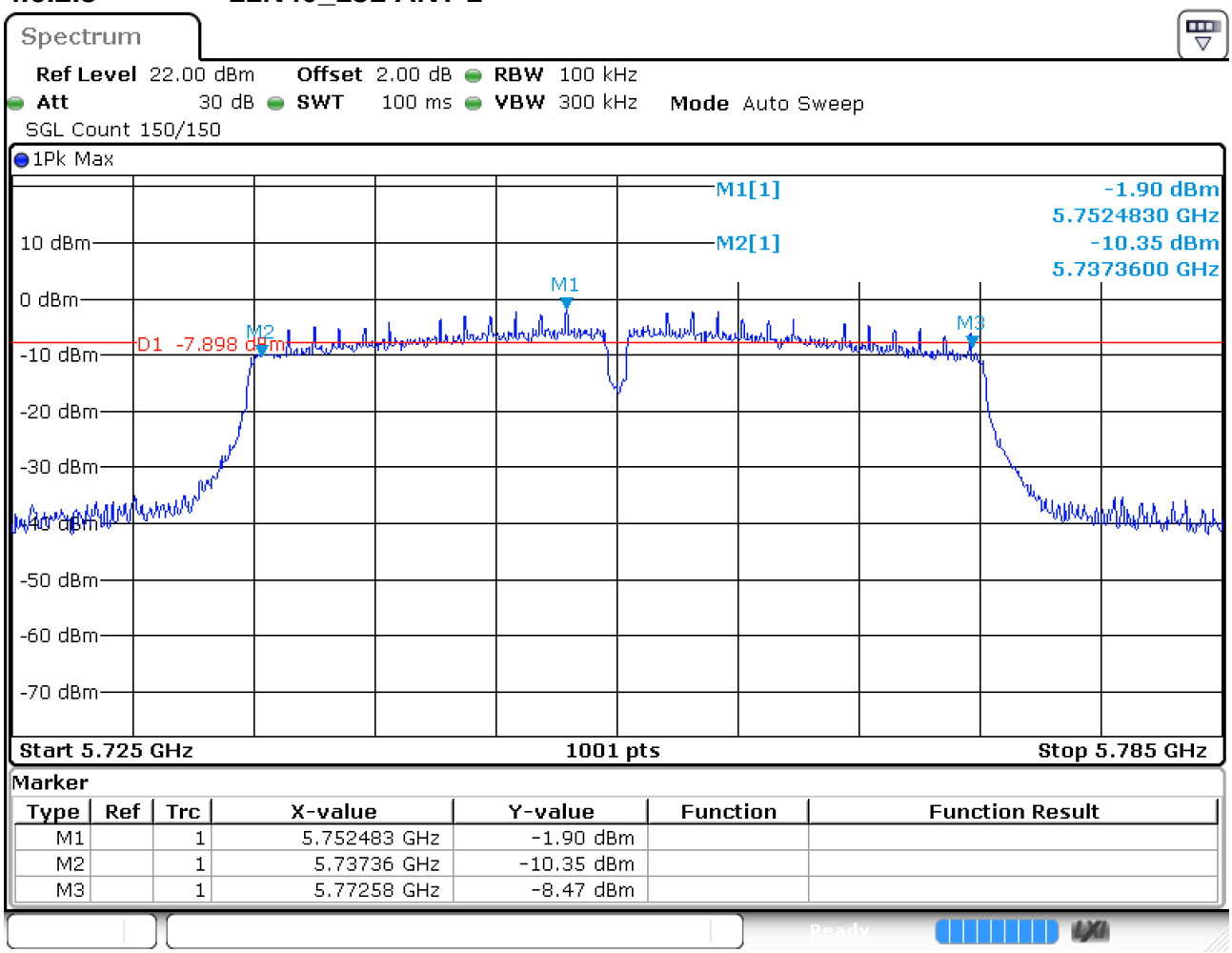
4.6.2.5 11N40_151 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.752483 GHz	-1.90 dBm		
M2		1	5.73736 GHz	-10.35 dBm		
M3		1	5.77258 GHz	-8.47 dBm		

Date: 5.MAY.2020 10:26:32

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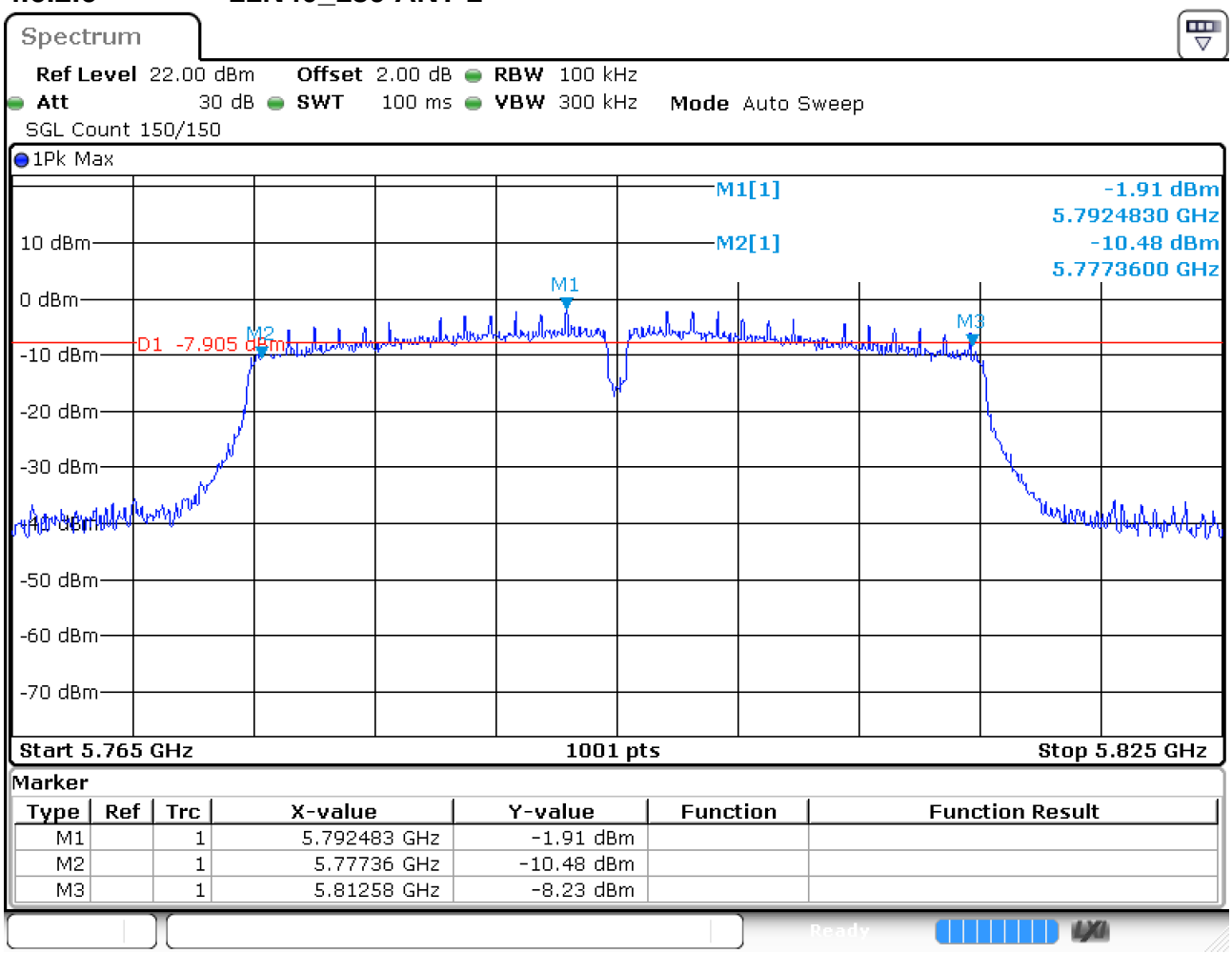
4.6.2.6 11N40_159 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.792483 GHz	-1.91 dBm		
M2		1	5.77736 GHz	-10.48 dBm		
M3		1	5.81258 GHz	-8.23 dBm		

Date: 5.MAY.2020 10:28:12

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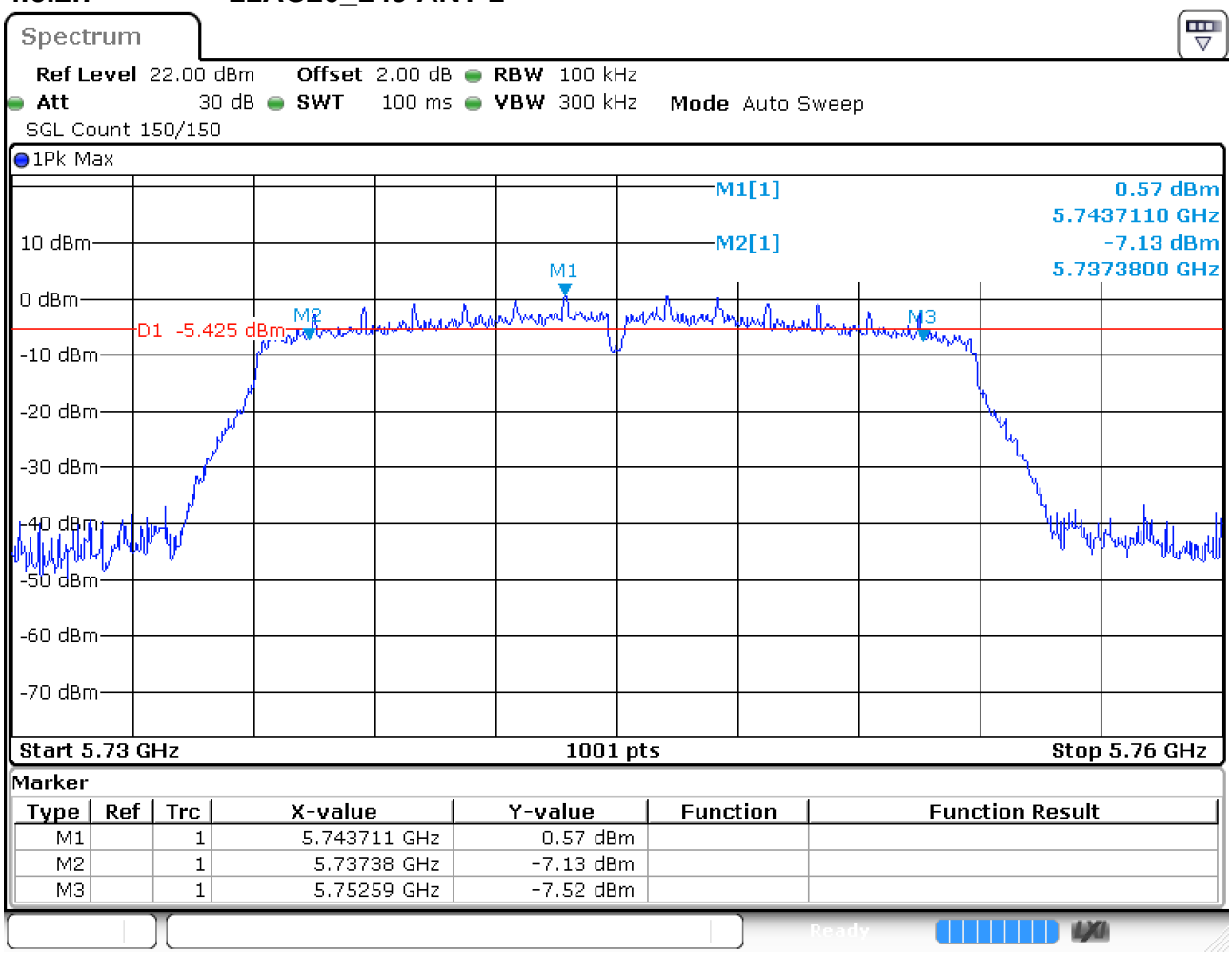
4.6.2.7 11AC20_149 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.743711 GHz	0.57 dBm		
M2		1	5.73738 GHz	-7.13 dBm		
M3		1	5.75259 GHz	-7.52 dBm		

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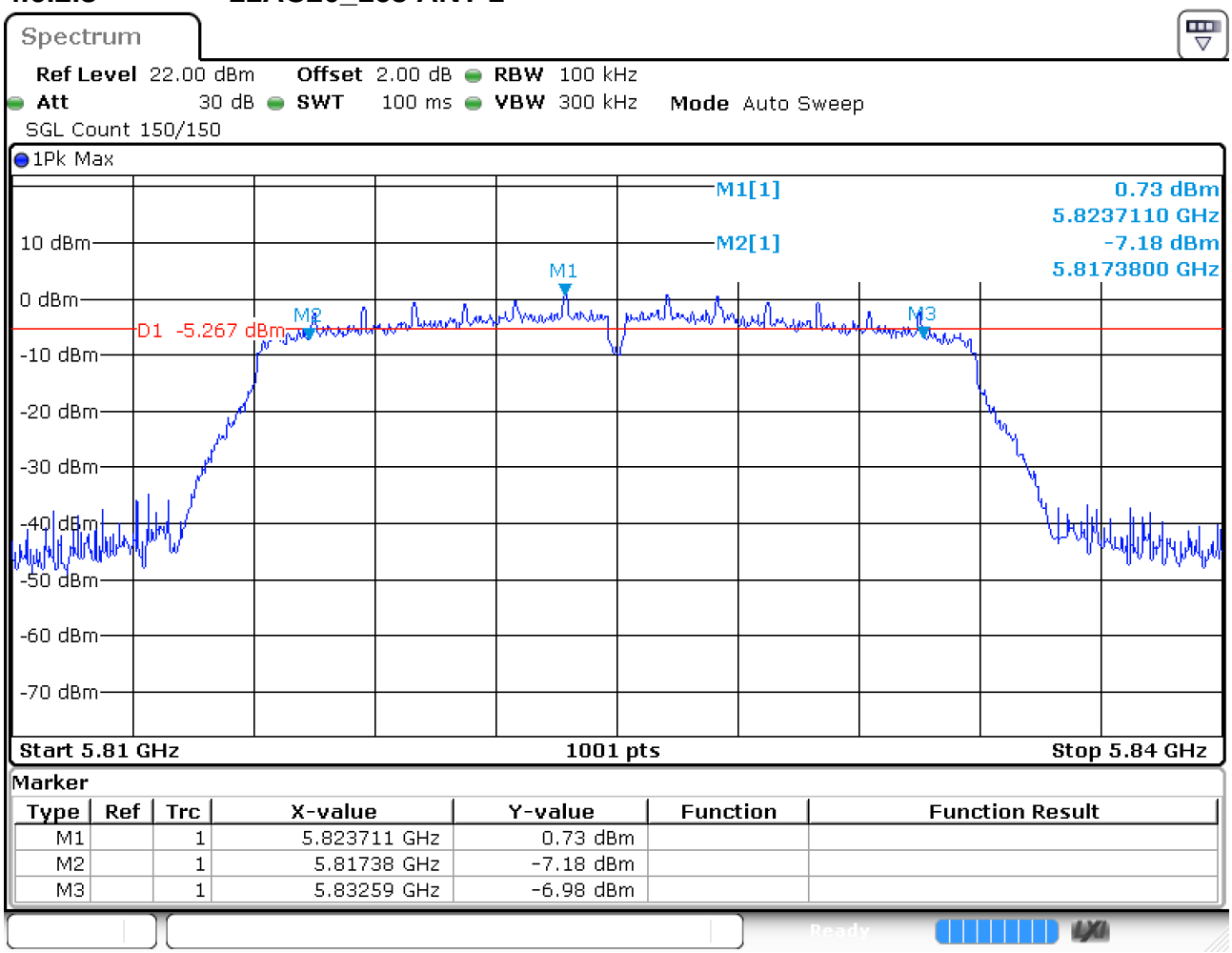
4.6.2.8 11AC20_165 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.823711 GHz	0.73 dBm		
M2		1	5.81738 GHz	-7.18 dBm		
M3		1	5.83259 GHz	-6.98 dBm		

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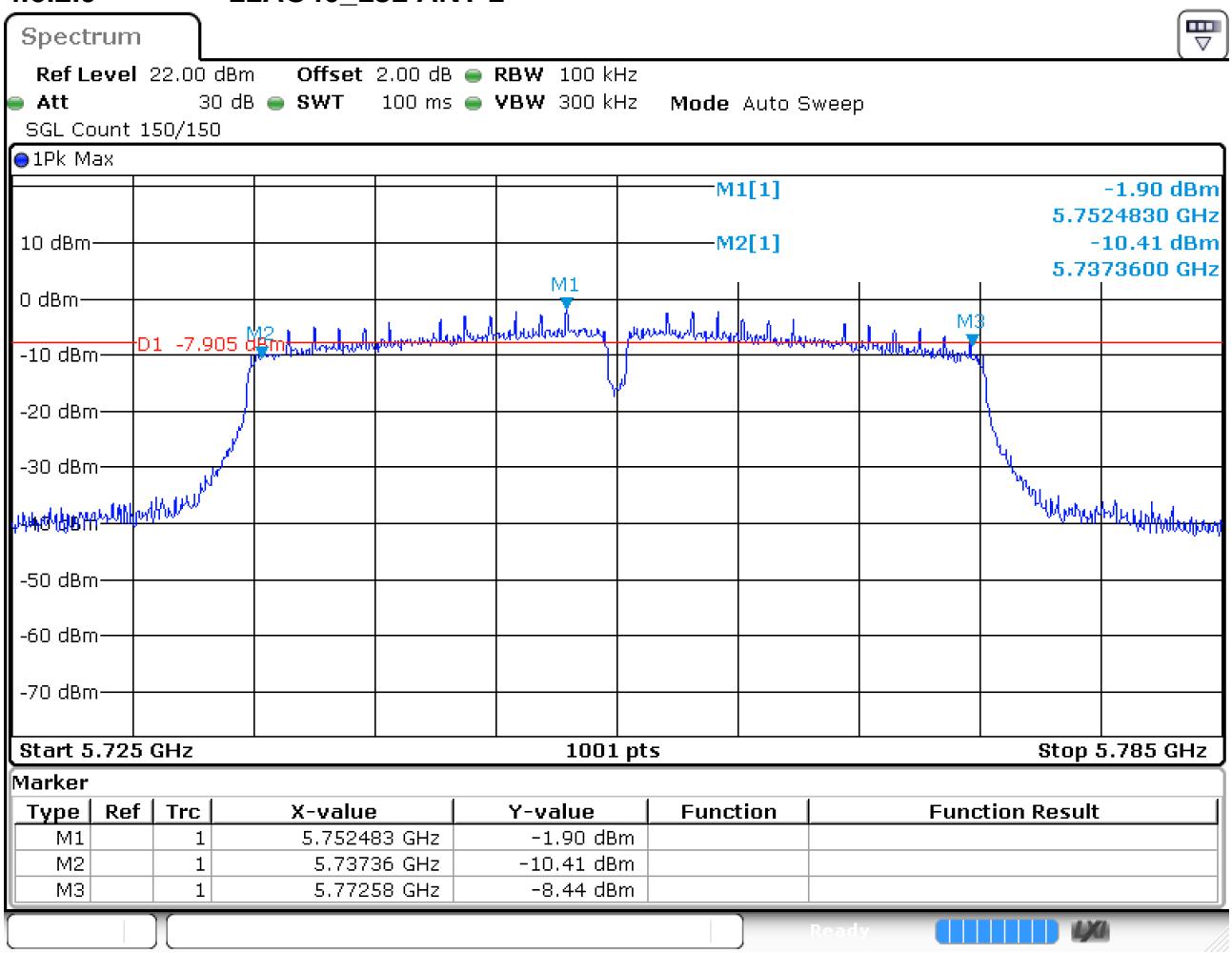
4.6.2.9 11AC40_151 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.752483 GHz	-1.90 dBm		
M2		1	5.73736 GHz	-10.41 dBm		
M3		1	5.77258 GHz	-8.44 dBm		

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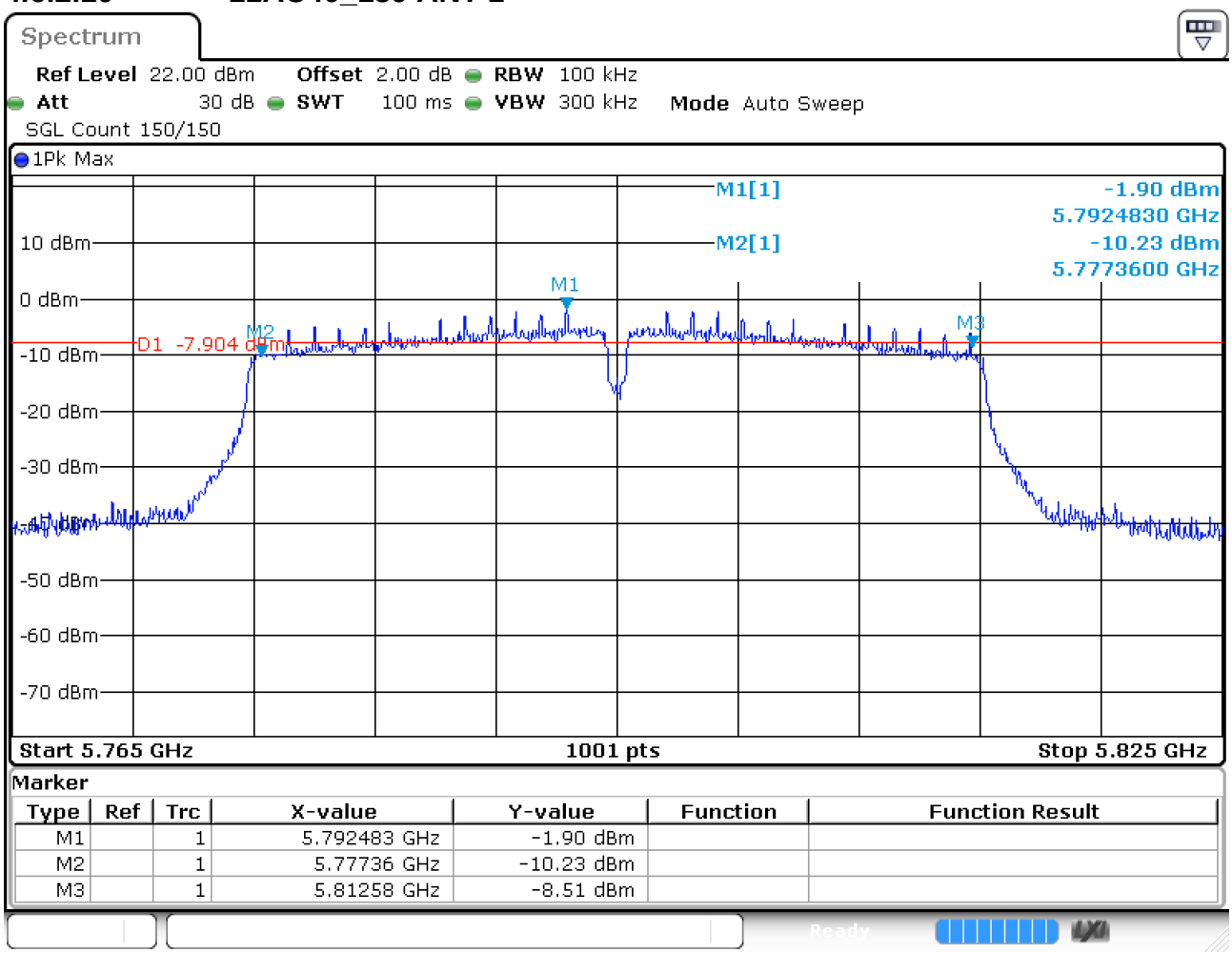
4.6.2.10 11AC40_159 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.792483 GHz	-1.90 dBm		
M2		1	5.77736 GHz	-10.23 dBm		
M3		1	5.81258 GHz	-8.51 dBm		

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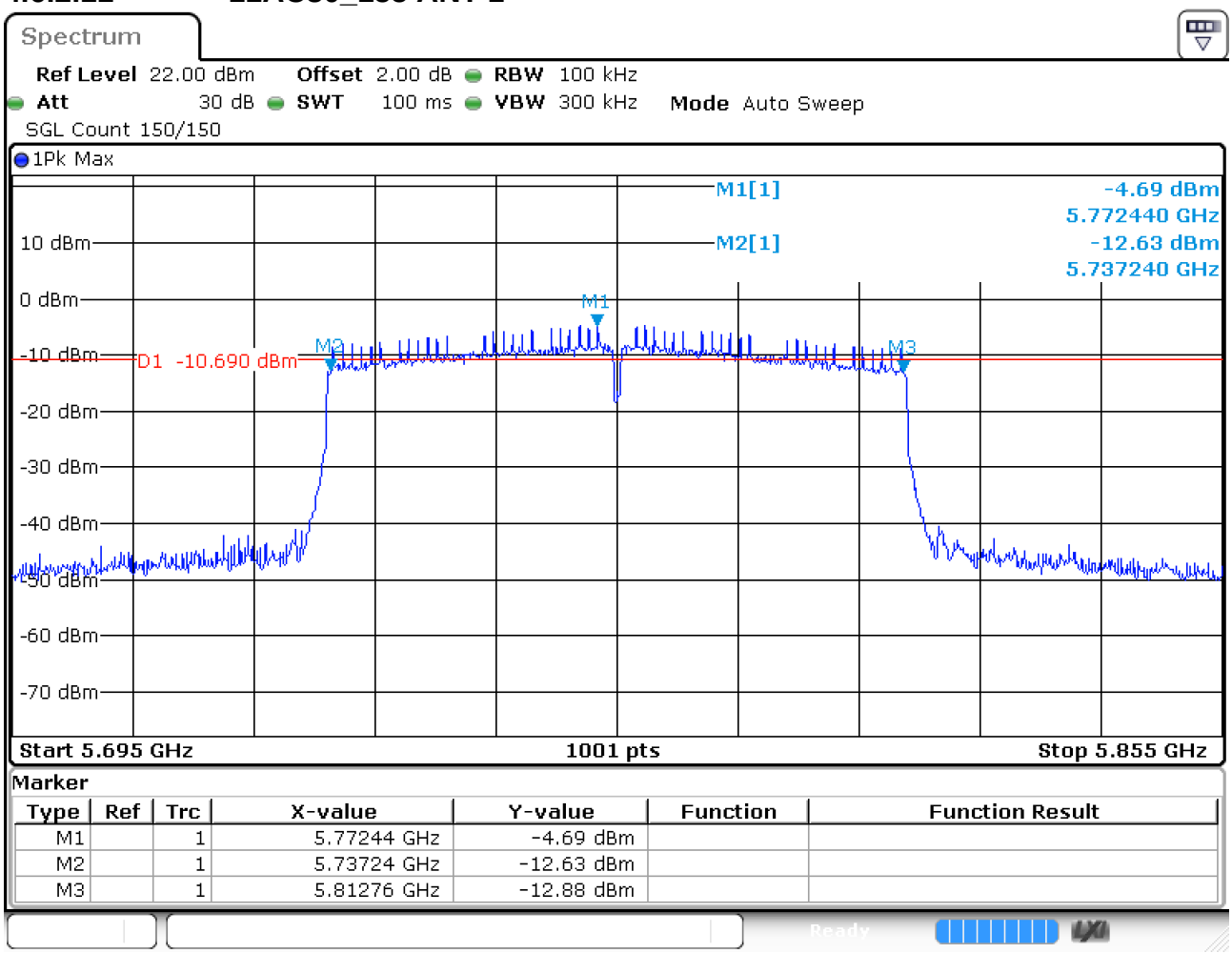
4.6.2.11 11AC80_155 ANT 1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.77244 GHz	-4.69 dBm		
M2		1	5.73724 GHz	-12.63 dBm		
M3		1	5.81276 GHz	-12.88 dBm		

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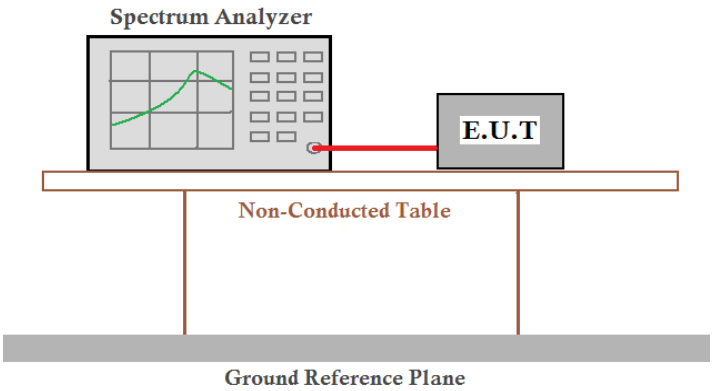
4.7 99% Occupied Bandwidth

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:	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:	Frequency Band	Limit
	5725-5850MHz	At lease 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	16.7832	PASS
	44	5220	ANT 1	16.7532	PASS
	48	5240	ANT 1	16.7532	PASS
	52	5260	ANT 1	16.7532	PASS
	60	5300	ANT 1	16.7532	PASS
	64	5320	ANT 1	16.7532	PASS
	100	5500	ANT 1	16.7532	PASS
	116	5580	ANT 1	16.7532	PASS
	140	5700	ANT 1	16.7832	PASS
	149	5745	ANT 1	16.7832	PASS
	157	5785	ANT 1	16.7832	PASS
	165	5825	ANT 1	16.7832	PASS
11N20	36	5180	ANT 1	17.7722	PASS
	44	5220	ANT 1	17.7423	PASS
	48	5240	ANT 1	17.7722	PASS
	52	5260	ANT 1	17.7722	PASS
	60	5300	ANT 1	17.7722	
	64	5320	ANT 1	17.7722	PASS
	100	5500	ANT 1	17.7722	PASS
	116	5580	ANT 1	17.8022	PASS
	140	5700	ANT 1	17.7722	PASS
	149	5745	ANT 1	17.7423	PASS
	157	5785	ANT 1	17.7722	PASS
	165	5825	ANT 1	17.7722	PASS
11N40	38	5190	ANT 1	36.2038	PASS
	46	5230	ANT 1	36.1439	PASS
	54	5270	ANT 1	36.1439	PASS
	62	5310	ANT 1	36.2637	PASS
	102	5510	ANT 1	36.2038	PASS
	110	5550	ANT 1	36.1439	PASS
	134	5670	ANT 1	36.2038	PASS
	151	5755	ANT 1	36.2038	PASS
	159	5795	ANT 1	36.2637	PASS
11AC20	36	5180	ANT 1	17.7423	PASS
	44	5220	ANT 1	17.7722	PASS

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	48	5240	ANT 1	17.7722	PASS
	52	5260	ANT 1	17.7423	PASS
	60	5300	ANT 1	17.7722	PASS
	64	5320	ANT 1	17.7722	PASS
	100	5500	ANT 1	17.7423	PASS
	116	5580	ANT 1	17.7123	PASS
	140	5700	ANT 1	17.7423	PASS
	149	5745	ANT 1	17.7423	PASS
	157	5785	ANT 1	17.7722	PASS
	165	5825	ANT 1	17.7722	PASS
11AC40	38	5190	ANT 1	36.2038	PASS
	46	5230	ANT 1	36.0839	PASS
	54	5270	ANT 1	36.1439	PASS
	62	5310	ANT 1	36.2038	PASS
	102	5510	ANT 1	36.2038	PASS
	110	5550	ANT 1	36.2038	PASS
	134	5670	ANT 1	36.2637	PASS
	151	5755	ANT 1	36.2637	PASS
	159	5795	ANT 1	36.2038	PASS
11AC80	42	5210	ANT 1	75.4046	PASS
	58	5290	ANT 1	75.1648	PASS
	106	5530	ANT 1	75.2847	PASS
	122	5610	ANT 1	75.2847	PASS
	155	5775	ANT 1	75.2847	PASS

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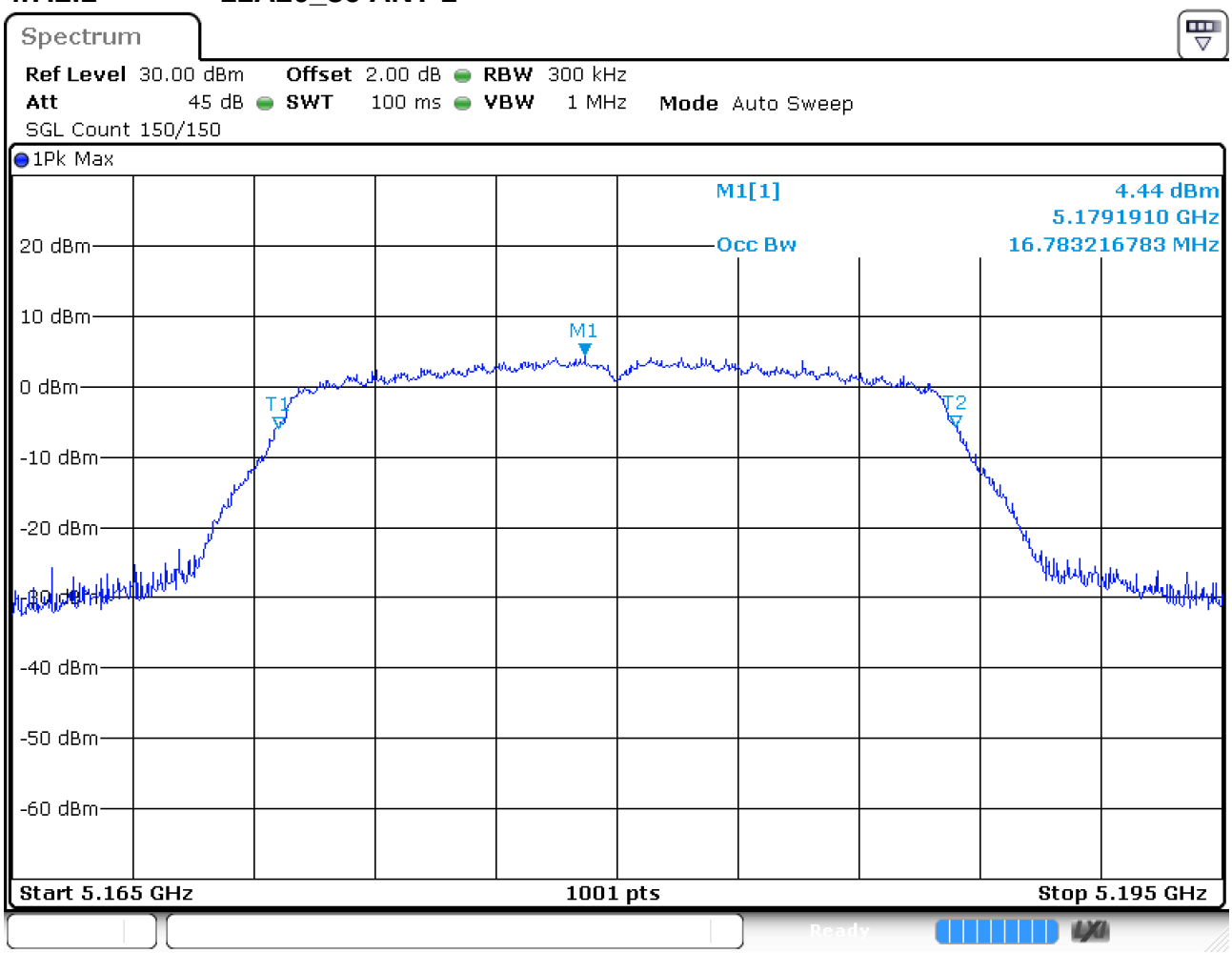
4.7.2 Plots for 99% Occupied Bandwidth

4.7.2.1 11A20_36 ANT 1



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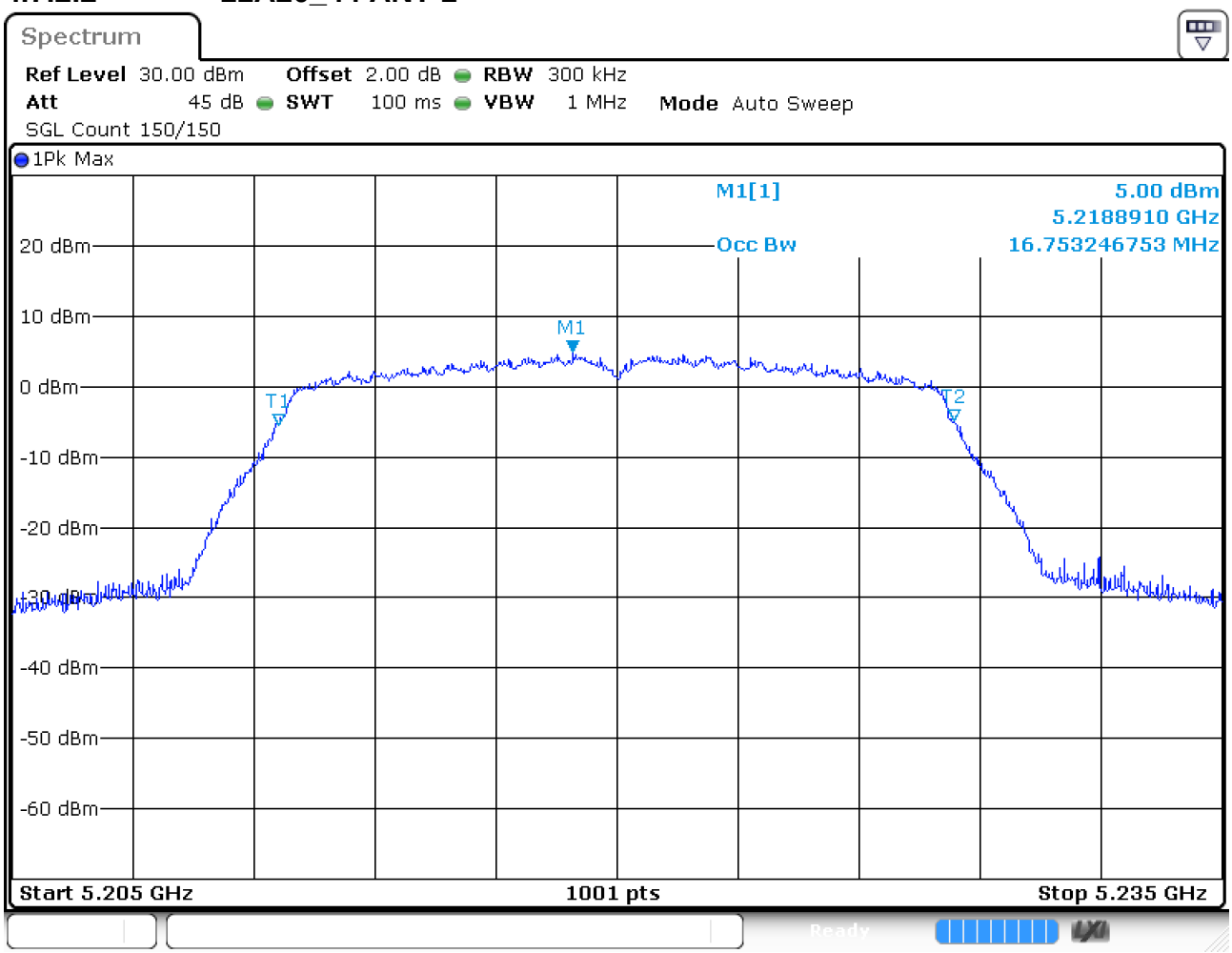
4.7.2.2 11A20_44 ANT 1



Date: 5.MAY.2020 09:34:18

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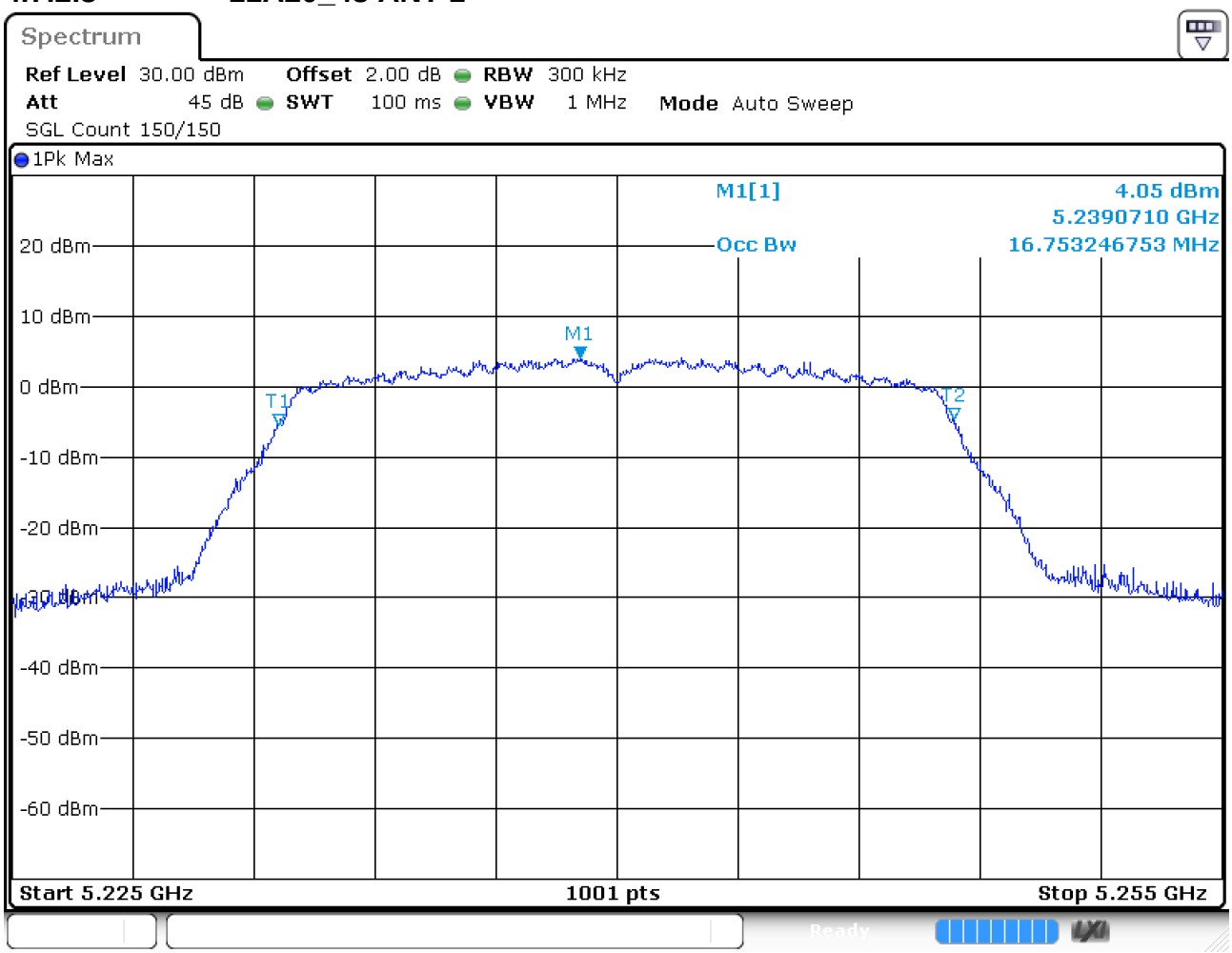
4.7.2.3 11A20_48 ANT 1



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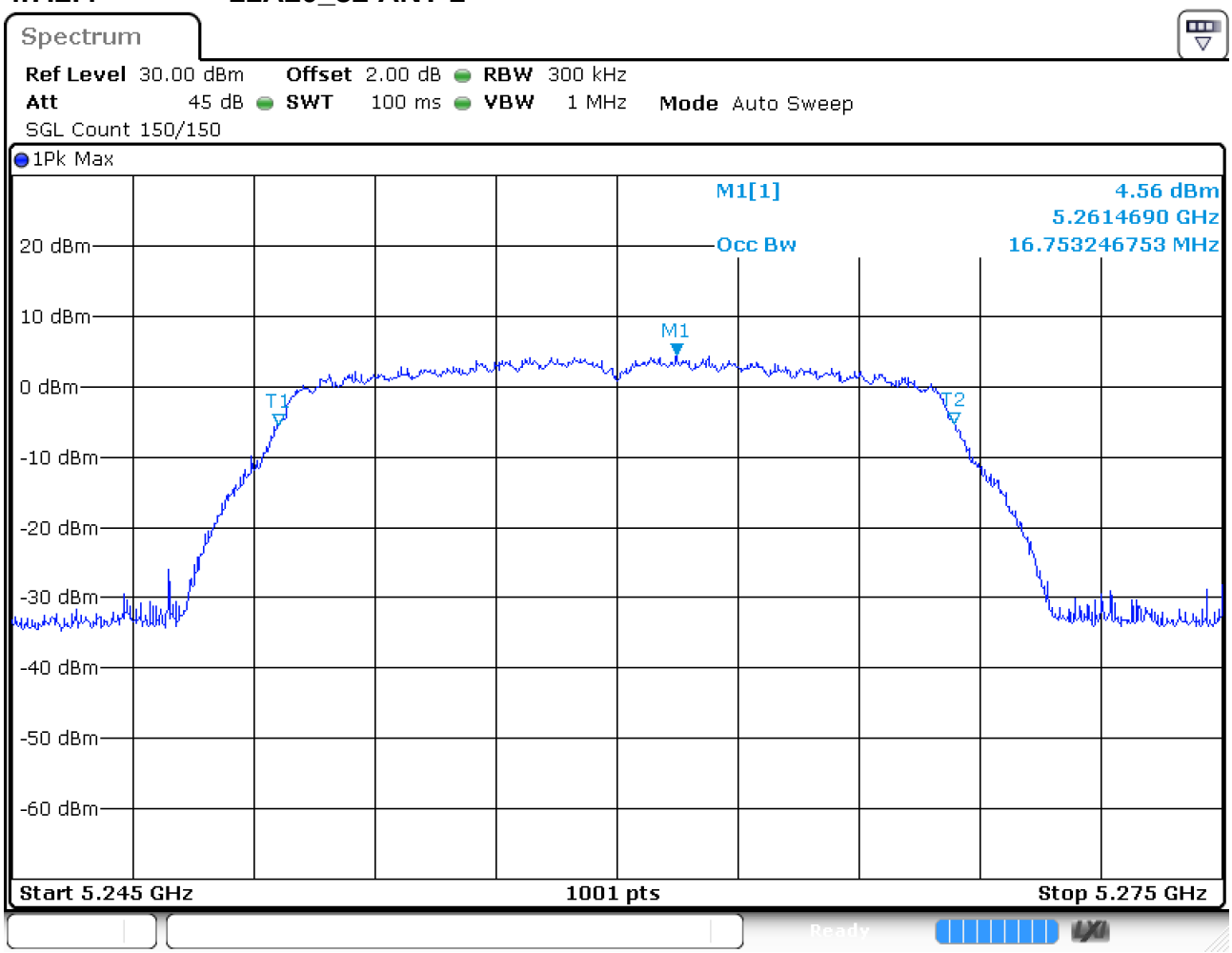
4.7.2.4 11A20_52 ANT 1



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