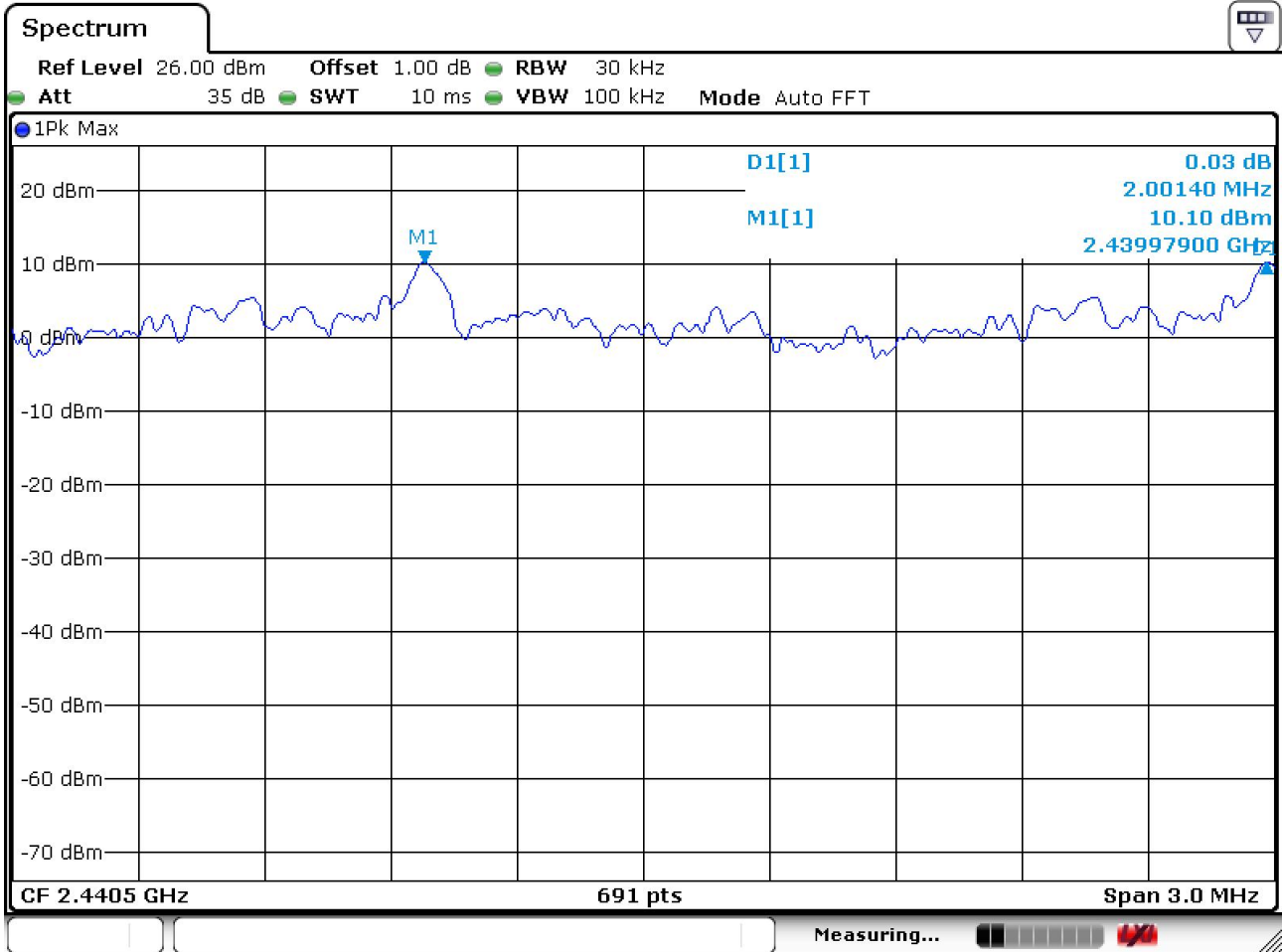


4.6.9 Test plots (UHD 2MHz 8PSK High Power)

4.6.9.1 Middle Channel



Date: 8.APR.2020 13:17:17



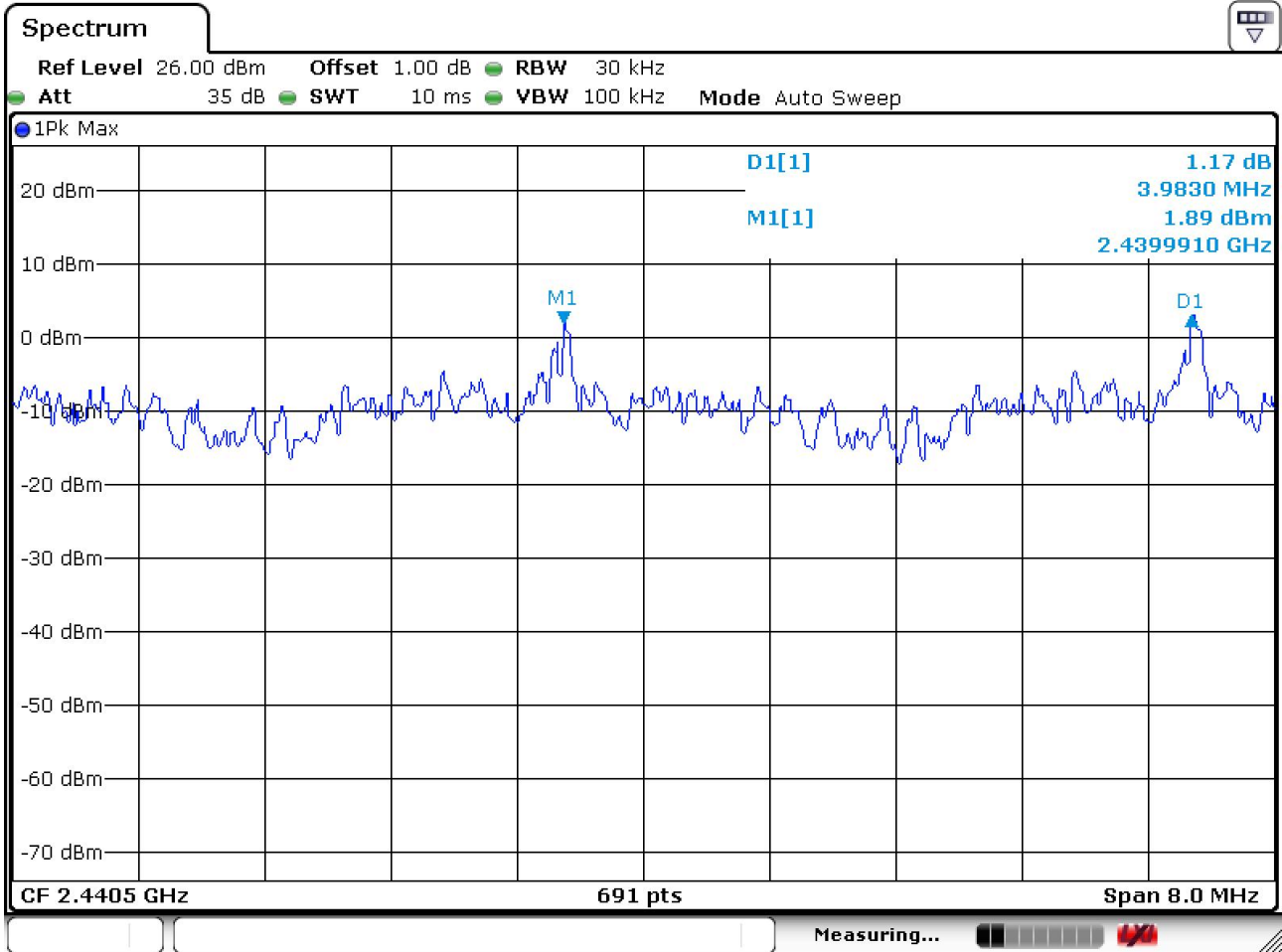
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4.6.10 Test plots (UHD 4MHz)

4.6.10.1 Middle Channel



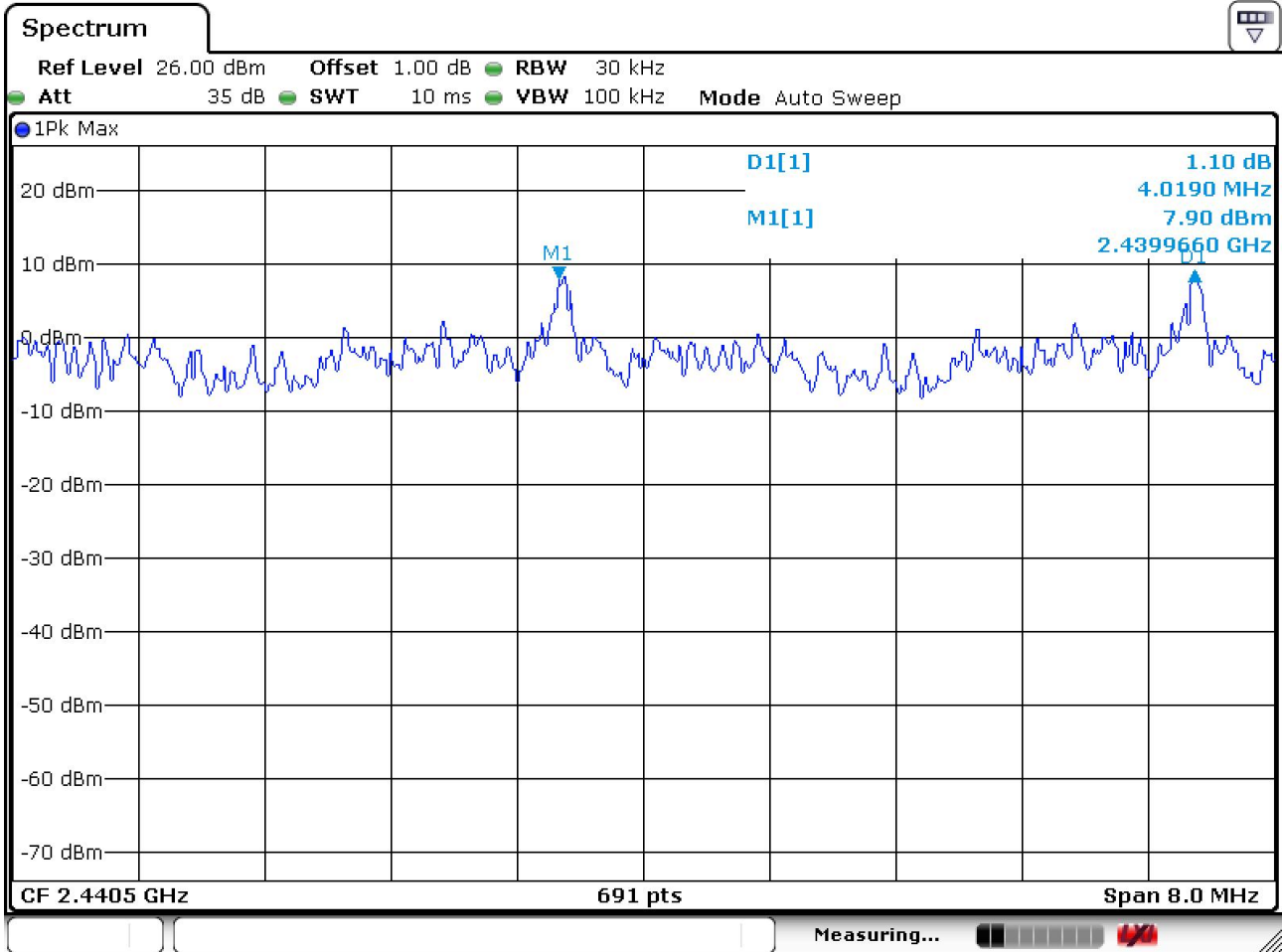
Date: 8.APR.2020 14:04:11



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4.6.11 Test plots (UHD 4MHz High Power)

4.6.11.1 Middle Channel



Date: 8.APR.2020 13:59:51



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4.7 Hopping Channel Number

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 Section 7.8.3
Test Setup:	
Limit:	At least 15 channels
Test Mode:	Hopping transmitting with all kind of modulation
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

4.7.1 Test Results

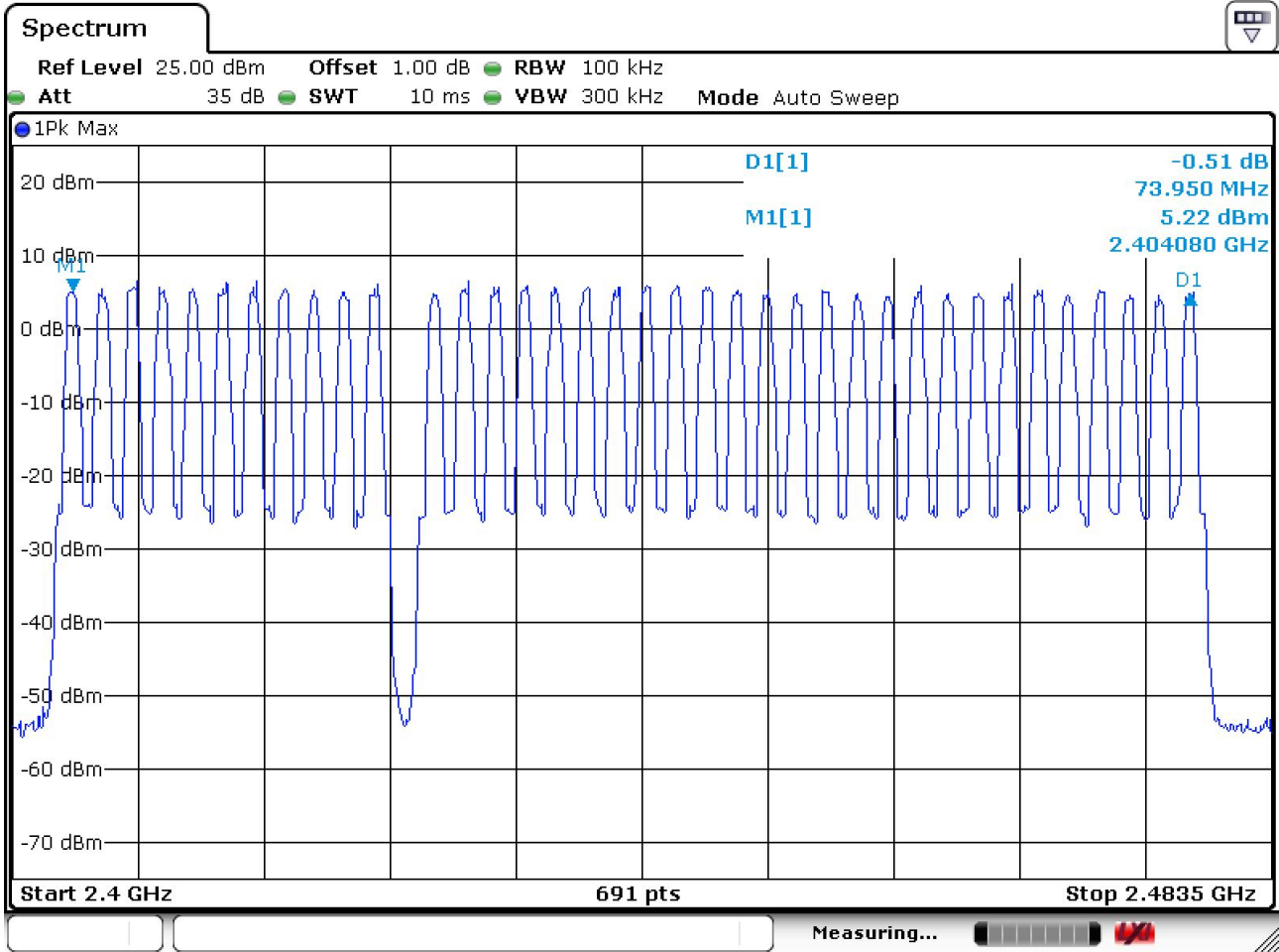
Mode	Test channel	Hopping channel numbers	Limit	Result
1MHz	Middle	37	≥15	Pass
1MHz High Power	Middle	37	≥15	Pass
2MHz	Middle	37	≥15	Pass
2MHz High Power	Middle	37	≥15	Pass
UHD 2MHz	Middle	37	≥15	Pass
UHD 2MHz High Power	Middle	37	≥15	Pass
UHD 2MHz 8PSK	Middle	37	≥15	Pass
UHD 2MHz 8PSK High Power	Middle	37	≥15	Pass
UHD 4MHz	Middle	19	≥15	Pass
UHD 4MHz High Power	Middle	19	≥15	Pass



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4.7.2 Test plots (1MHz)

4.7.2.1 Middle Channel



Date: 8.APR.2020 10:08:44



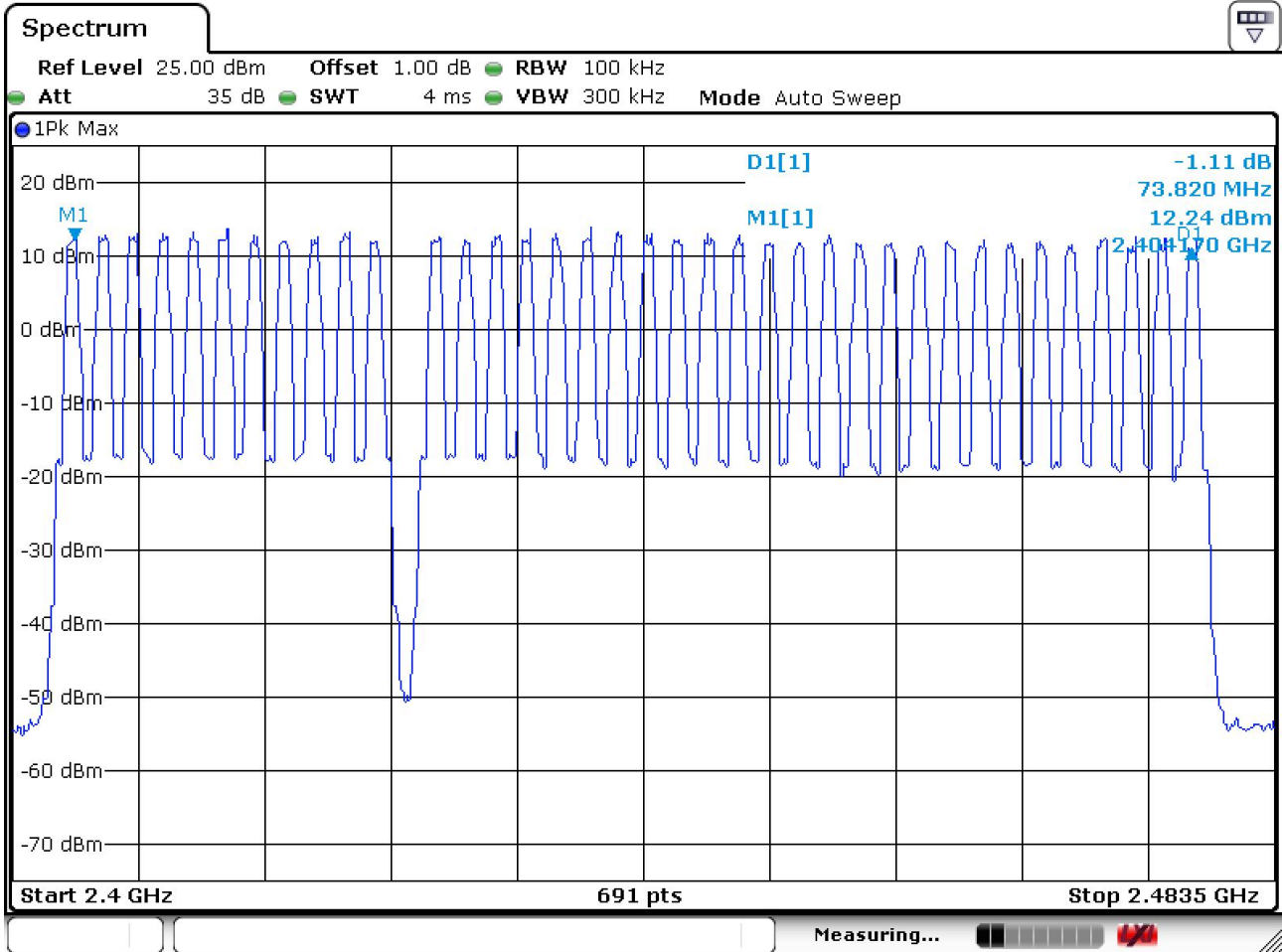
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4.7.3 Test plots (1MHz High Power)

4.7.3.1 Middle Channel



Date: 8.APR.2020 10:20:40

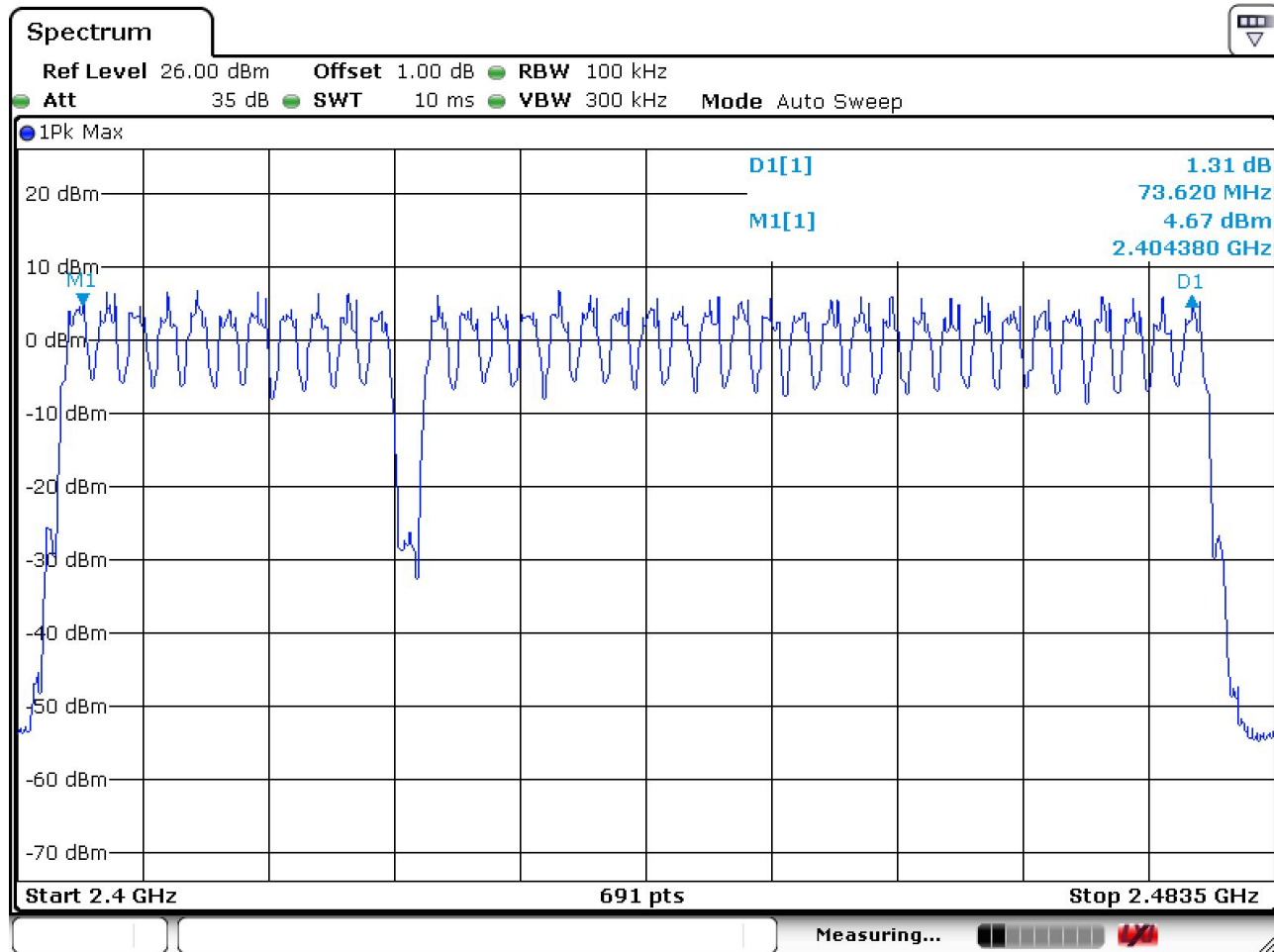


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4.7.4 Test plots (2MHz)

4.7.4.1 Middle Channel



Date: 8.APR.2020 10:29:10

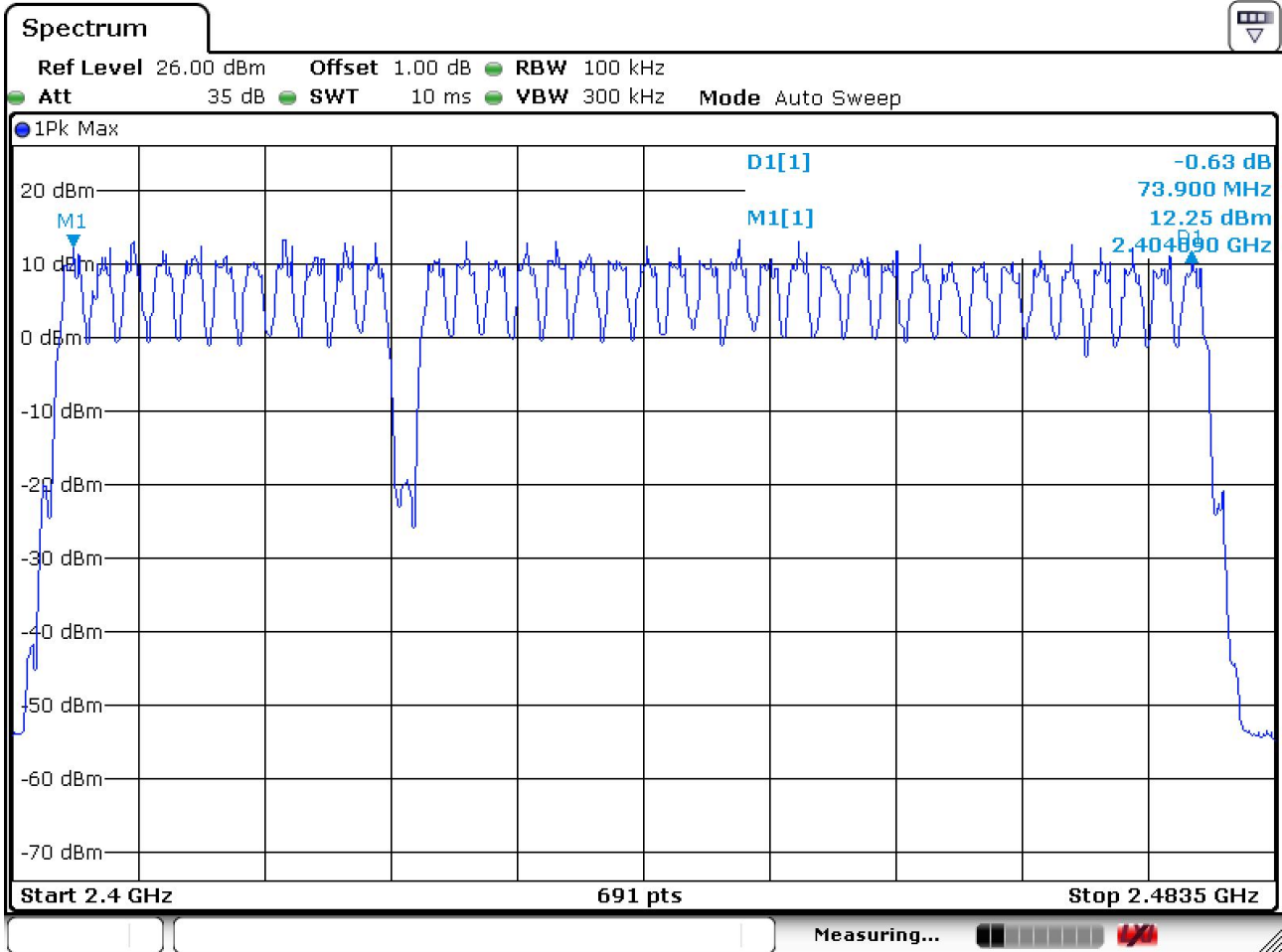


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4.7.5 Test plots (2MHz High Power)

4.7.5.1 Middle Channel



Date: 8.APR.2020 10:37:40

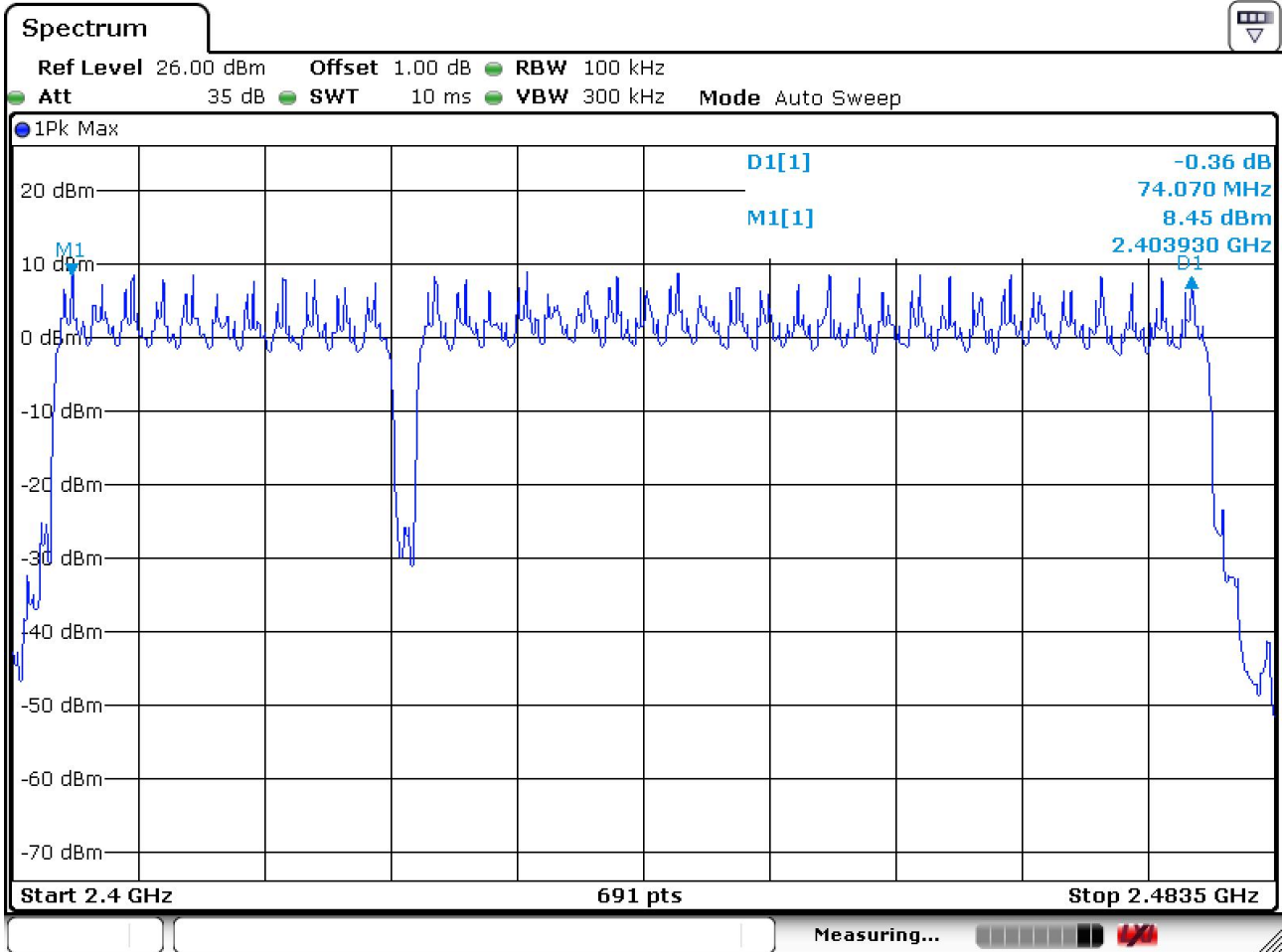


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4.7.6 Test plots (UHD 2MHz)

4.7.6.1 Middle Channel



Date: 8.APR.2020 11:48:53

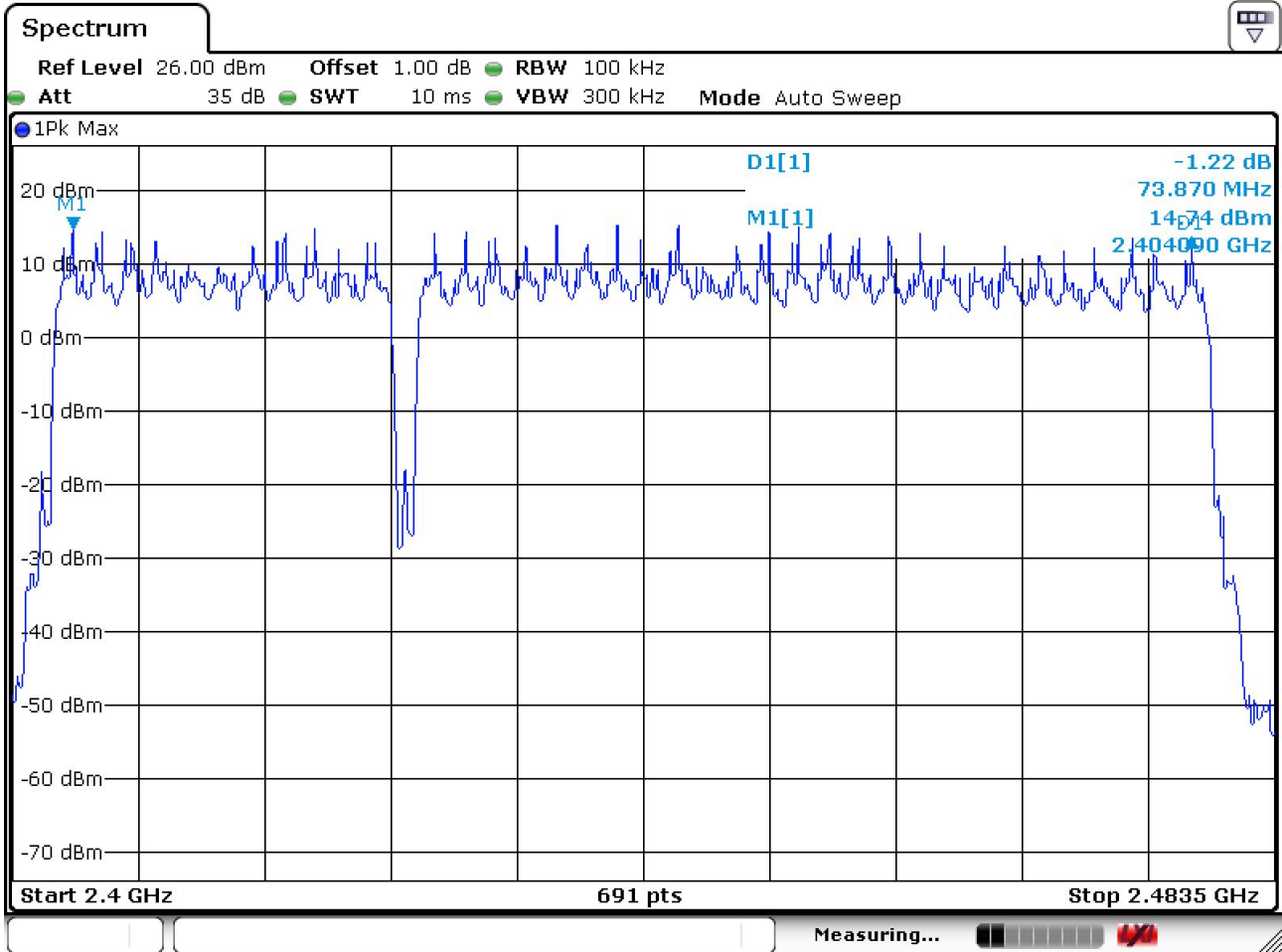


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4.7.7 Test plots (UHD 2MHz High Power)

4.7.7.1 Middle Channel



Date: 8.APR.2020 11:55:27

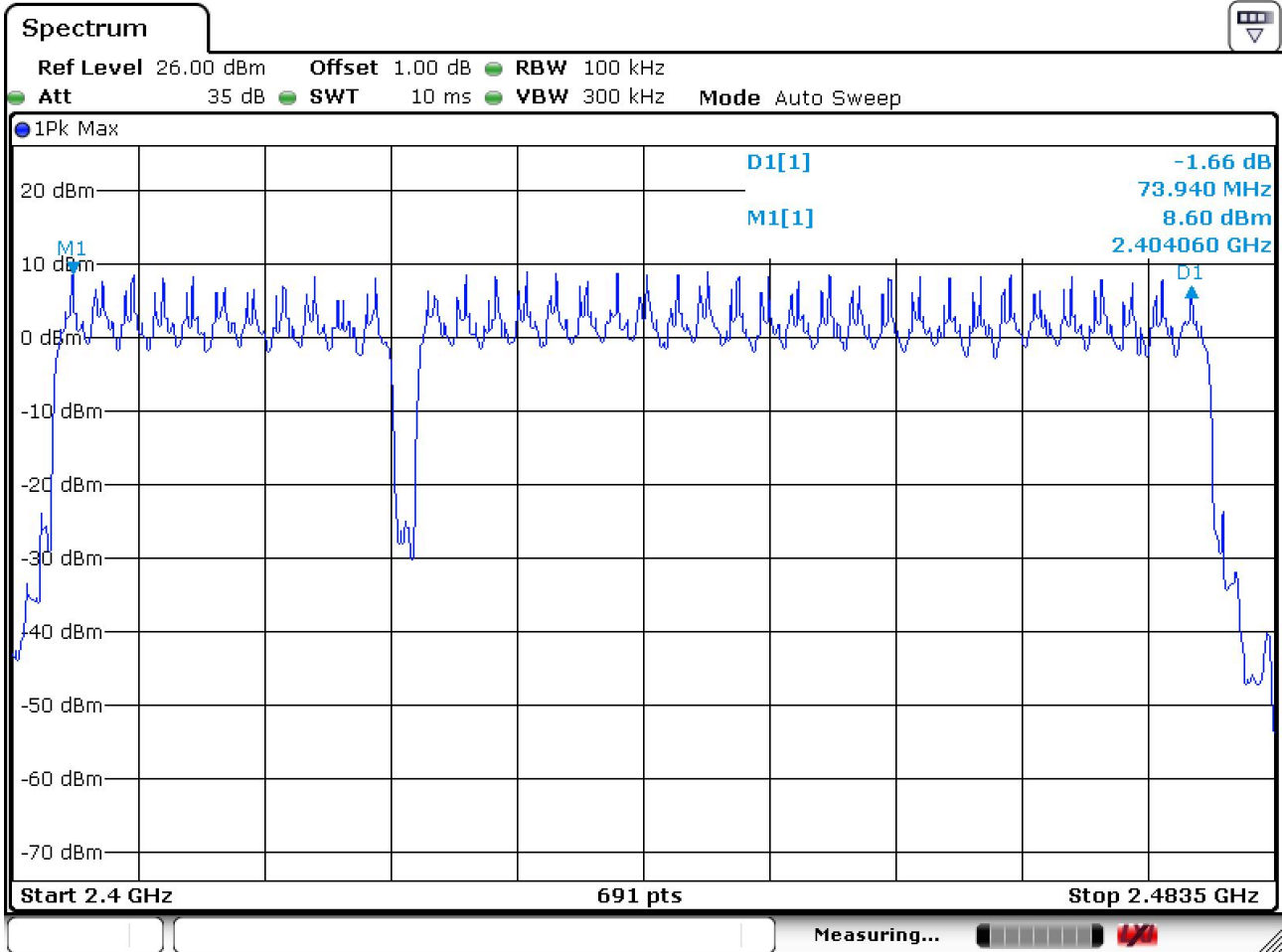


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4.7.8 Test plots (UHD 2MHz 8PSK)

4.7.8.1 Middle Channel



Date: 8.APR.2020 13:03:48

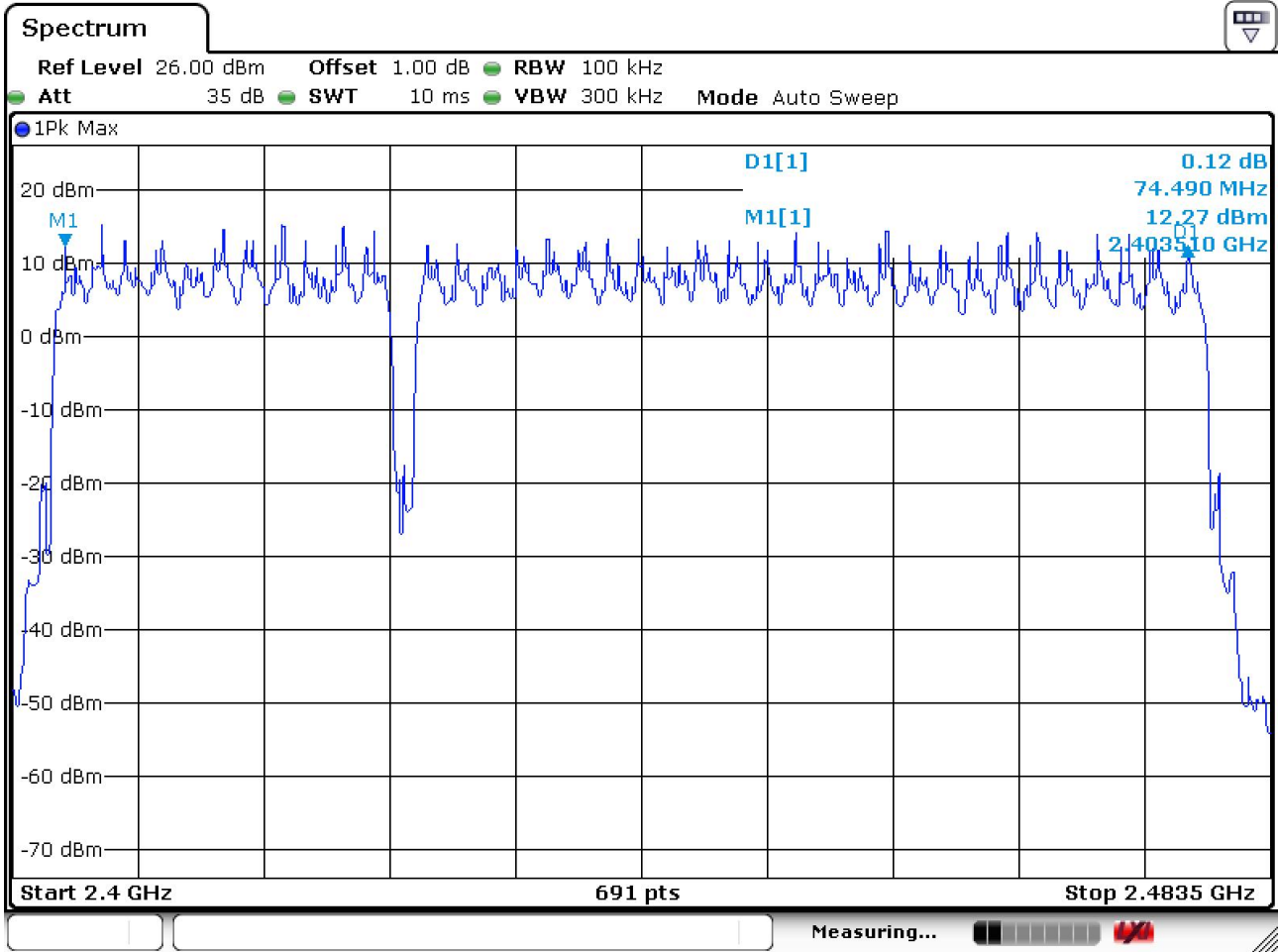


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4.7.9 Test plots (UHD 2MHz 8PSK High Power)

4.7.9.1 Middle Channel



Date: 8.APR.2020 13:16:40



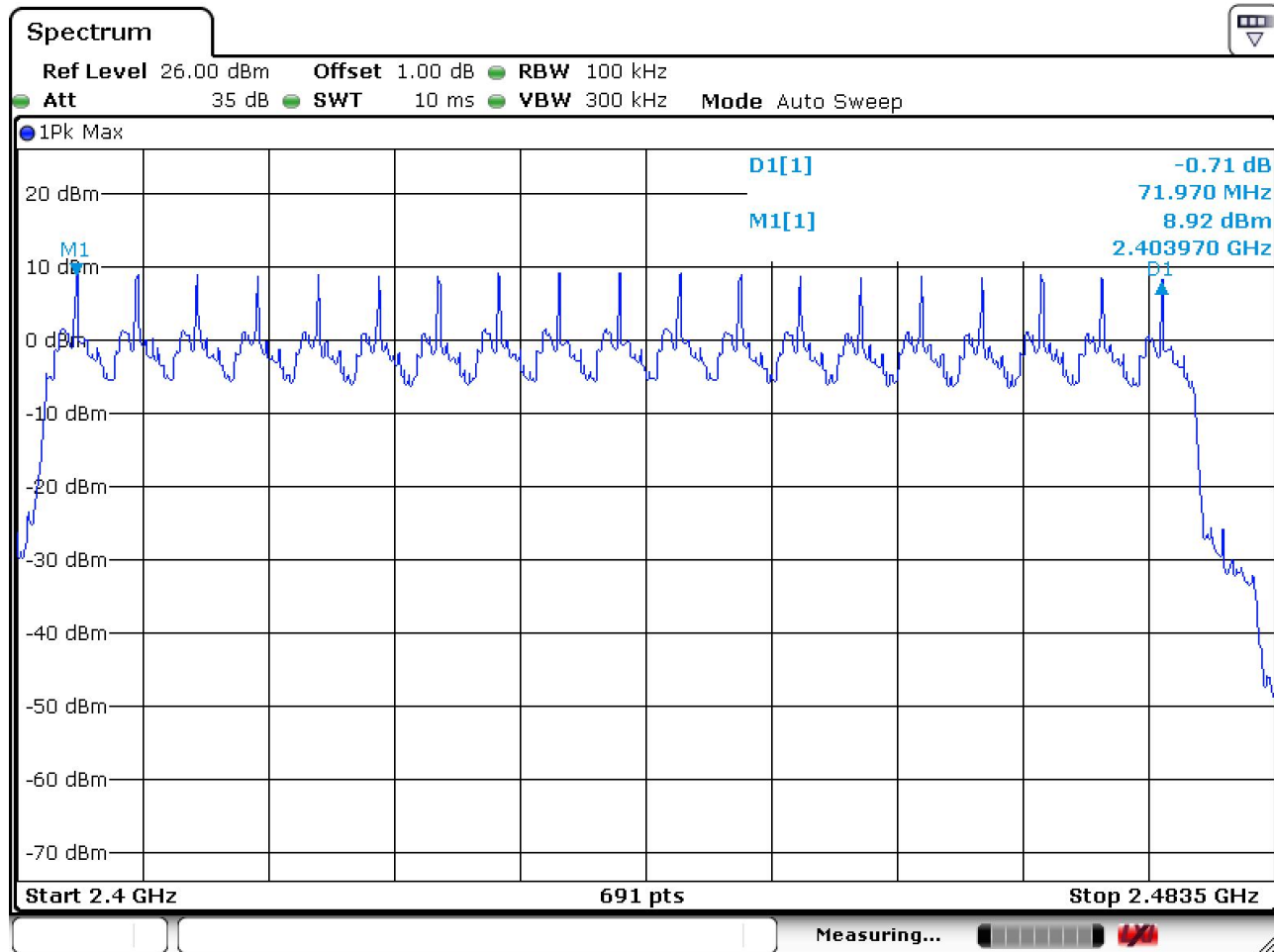
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4.7.10 Test plots (UHD 4MHz)

4.7.10.1 Middle Channel



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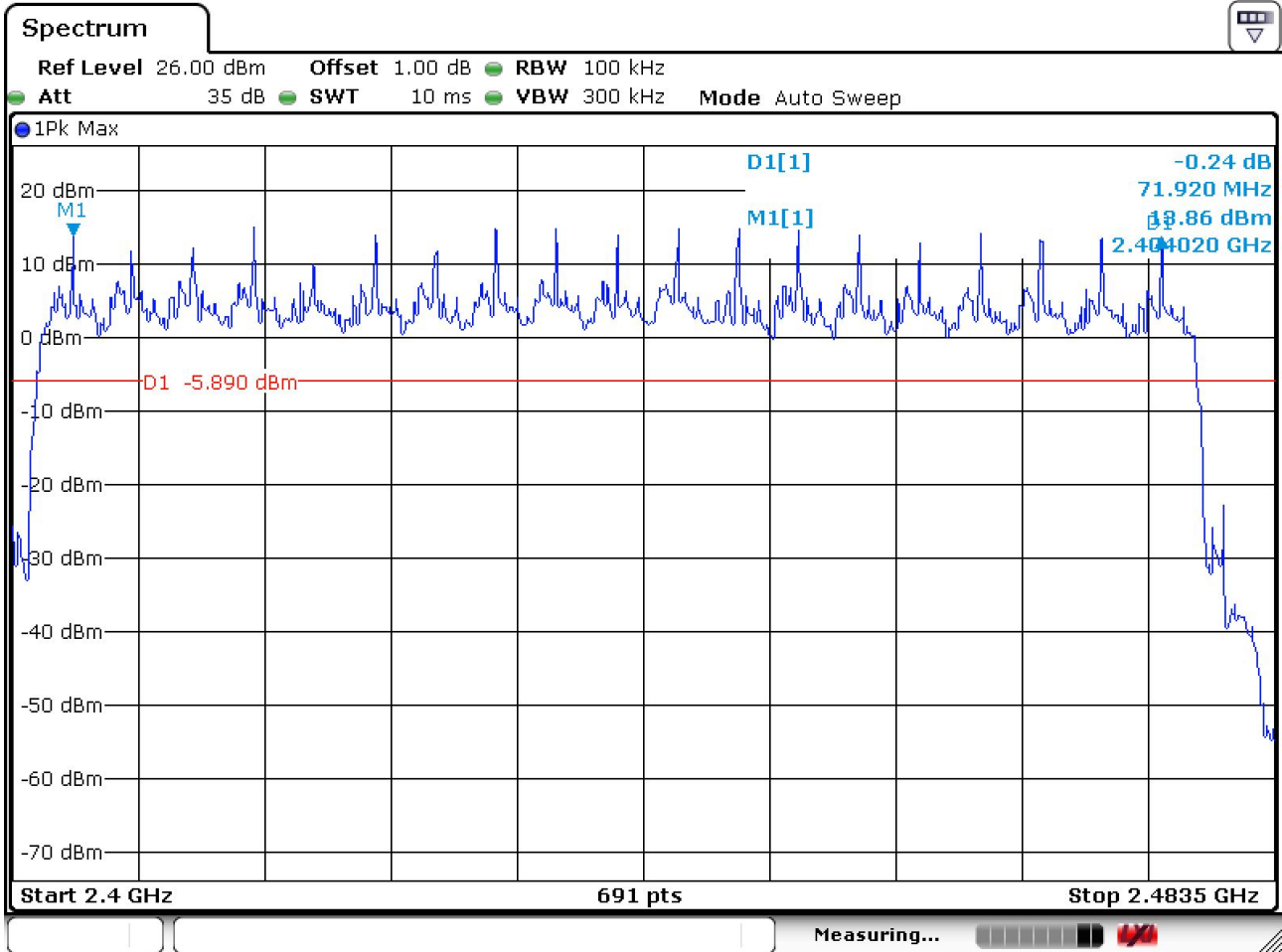
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4.7.11 Test plots (UHD 4MHz High Power)

4.7.11.1 Middle Channel



Date: 8.APR.2020 13:56:50



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4.8 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013 Section 7.8.4
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	0.4 Second
Test Results:	Pass

4.8.1 Test Results

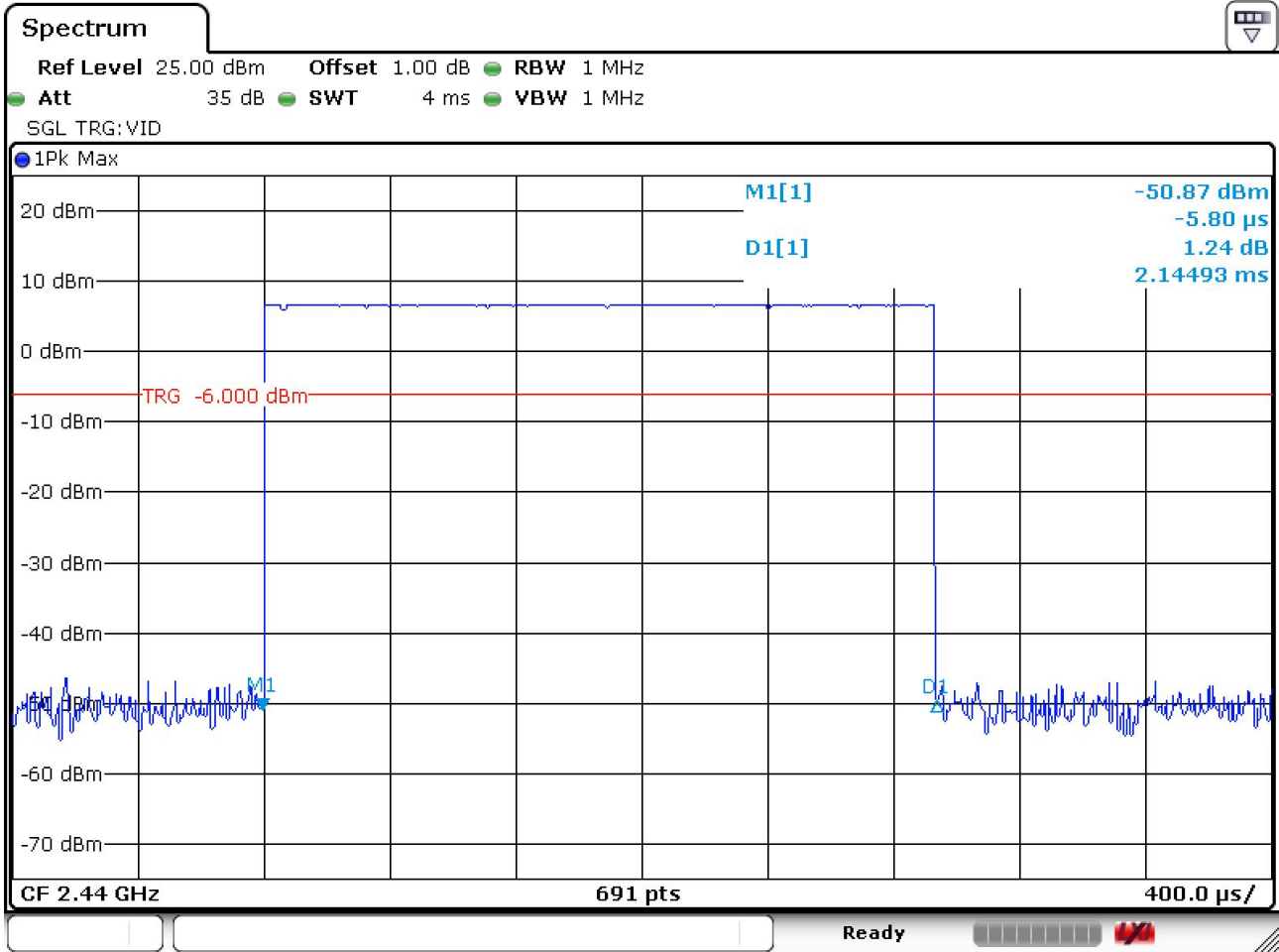
Operation Modes	On time (ms) on one channel
1MHz	2.145
1MHz High Power	2.156
2MHz	1.087
2MHz High Power	1.090
UHD 2MHz	0.581
UHD 2MHz High Power	0.583
UHD 2MHz 8PSK	0.405
UHD 2MHz 8PSK High Power	0.409
UHD 4MHz	0.306
UHD 4MHz High Power	0.308



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4.8.2 Test plots (1MHz)

4.8.2.1 Middle Channel



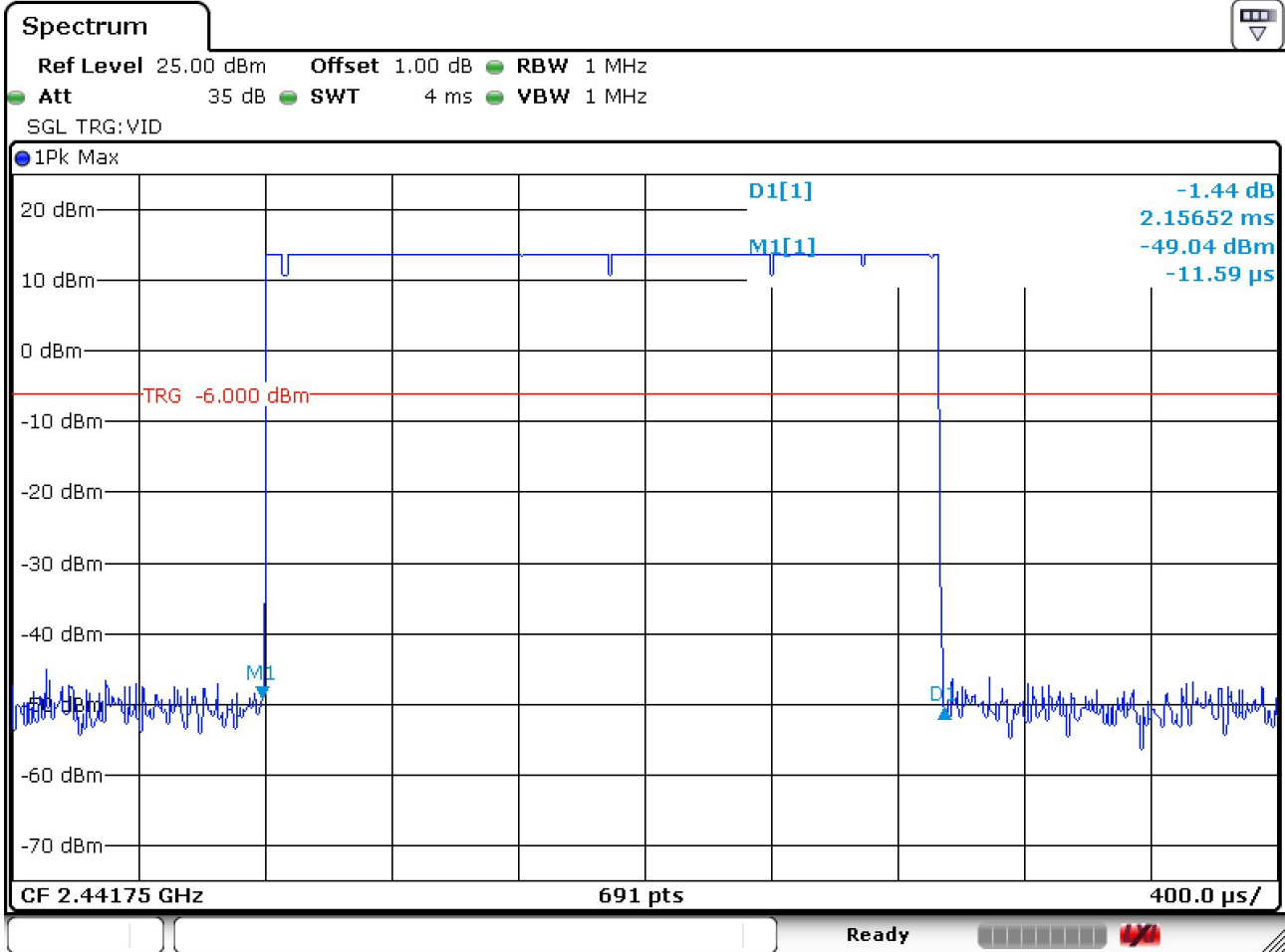
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4.8.3 Test plots (1MHz High Power)

4.8.3.1 Middle Channel



Date: 8.APR.2020 10:21:35



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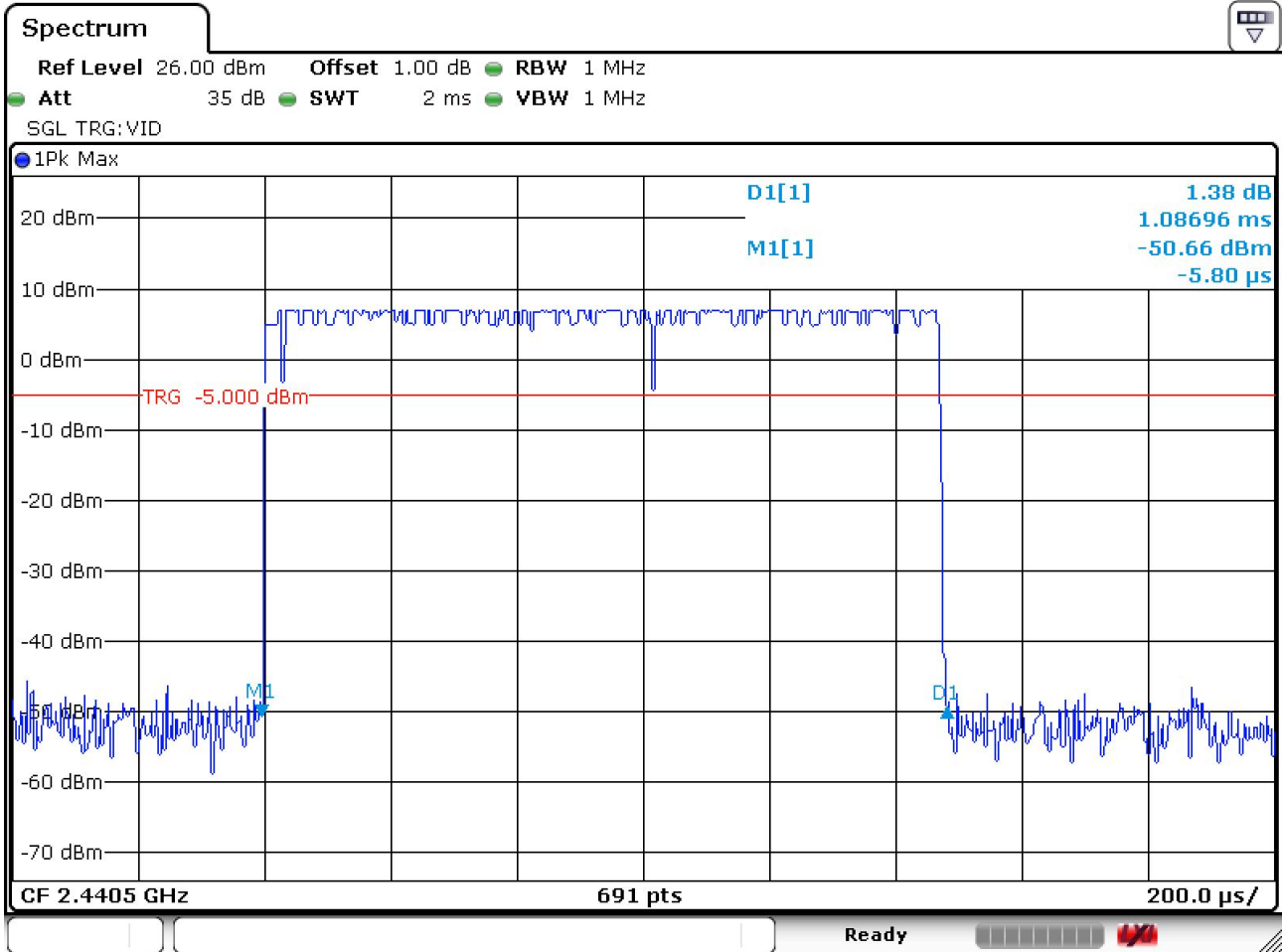
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4.8.4 Test plots (2MHz)

4.8.4.1 Middle Channel



Date: 8.APR.2020 10:31:04

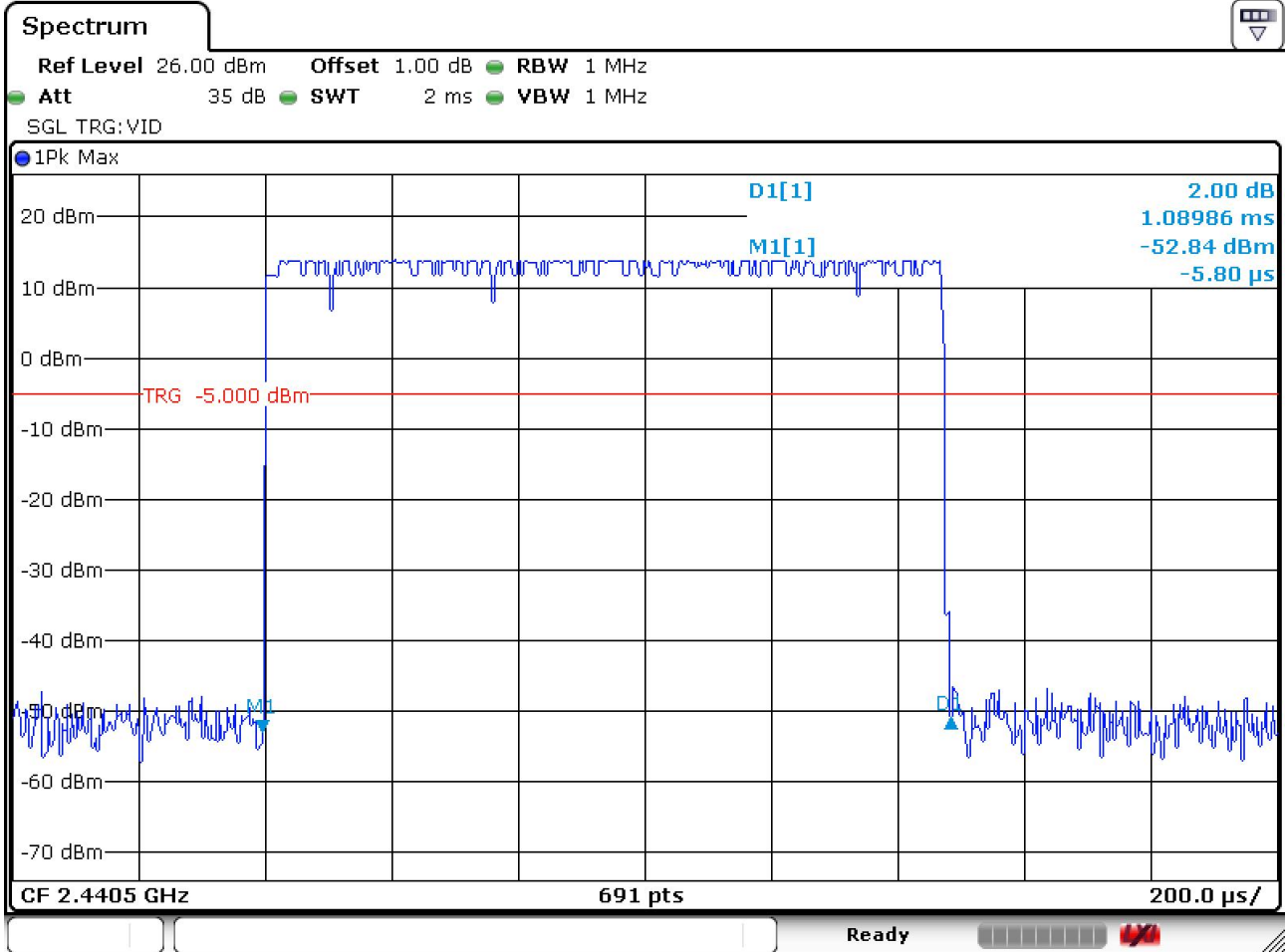


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4.8.5 Test plots (2MHz High Power)

4.8.5.1 Middle Channel



Date: 8.APR.2020 10:31:54

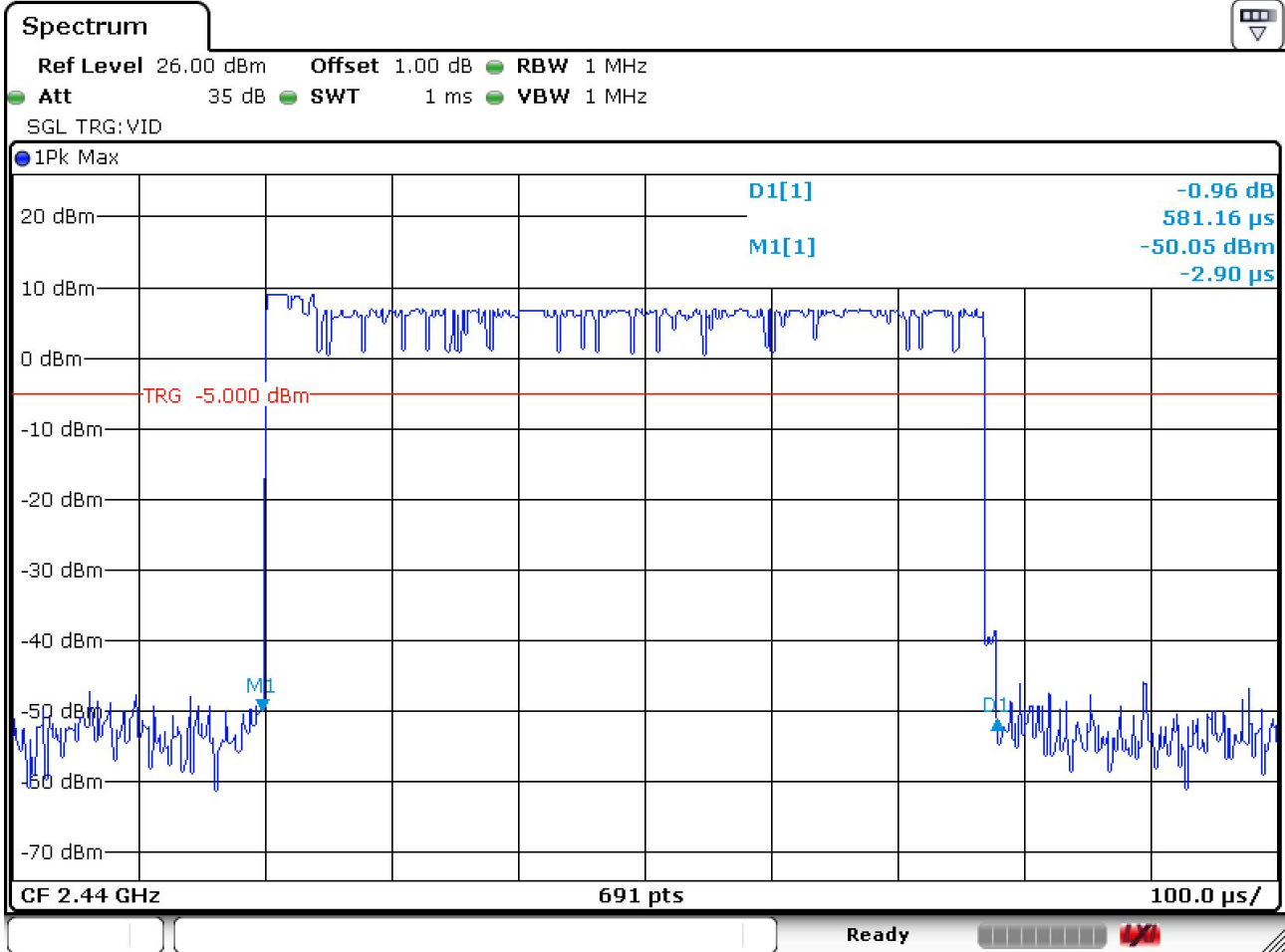


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4.8.6 Test plots (UHD 2MHz)

4.8.6.1 Middle Channel



Date: 8.APR.2020 11:52:58

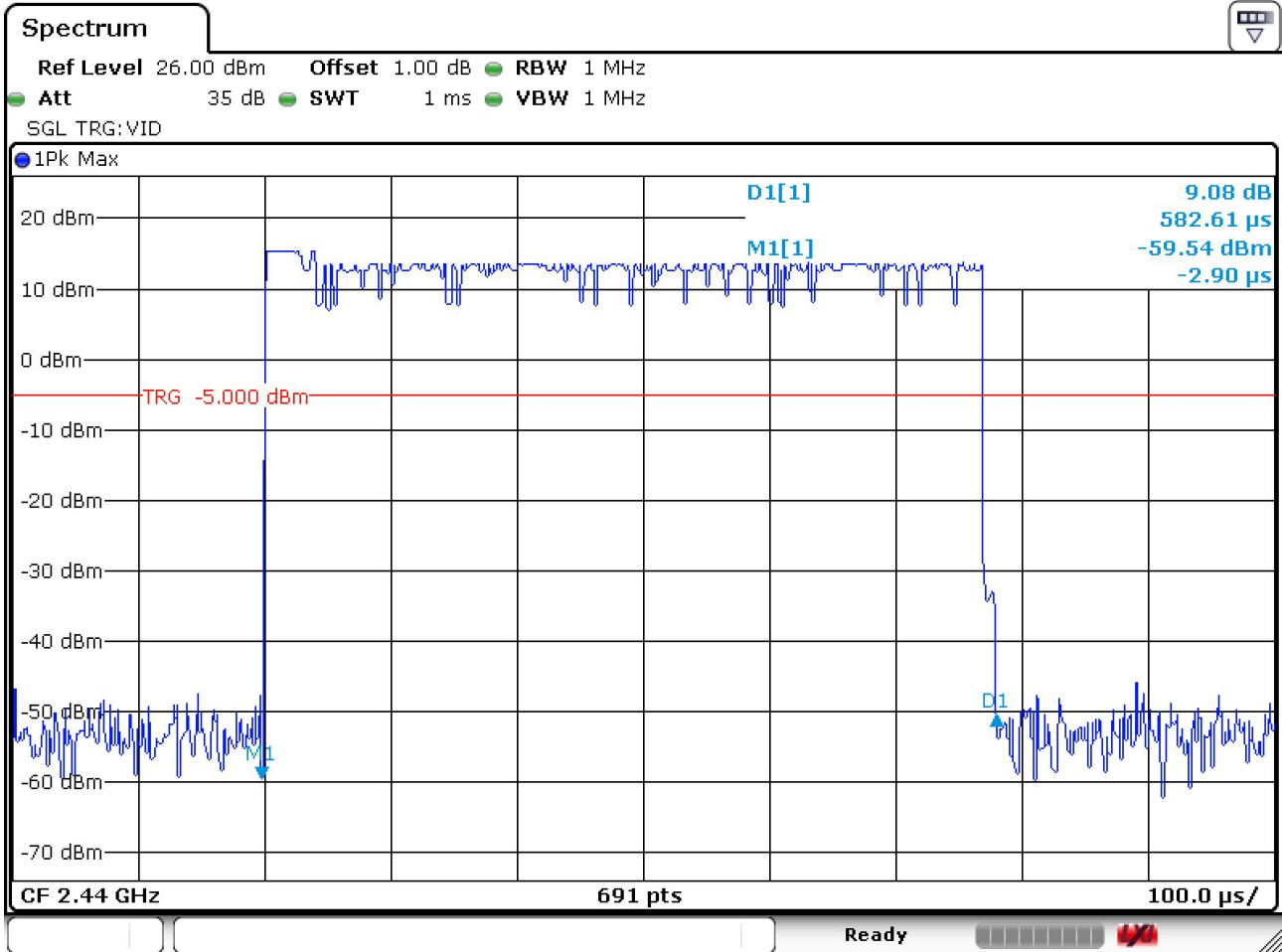


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4.8.7 Test plots (UHD 2MHz High Power)

4.8.7.1 Middle Channel



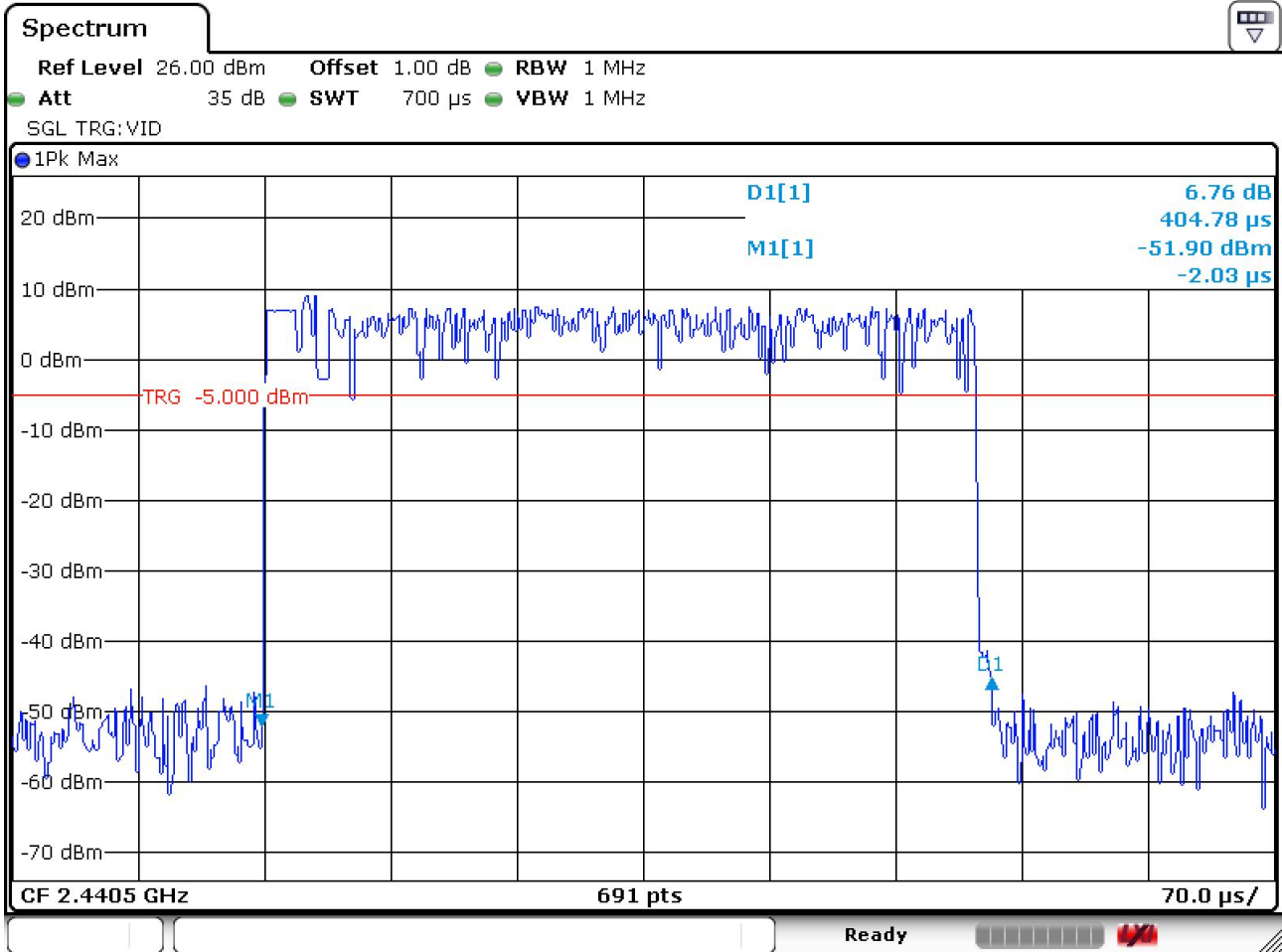
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4.8.8 Test plots (UHD 2MHz 8PSK)

4.8.8.1 Middle Channel



Date: 8.APR.2020 13:06:44

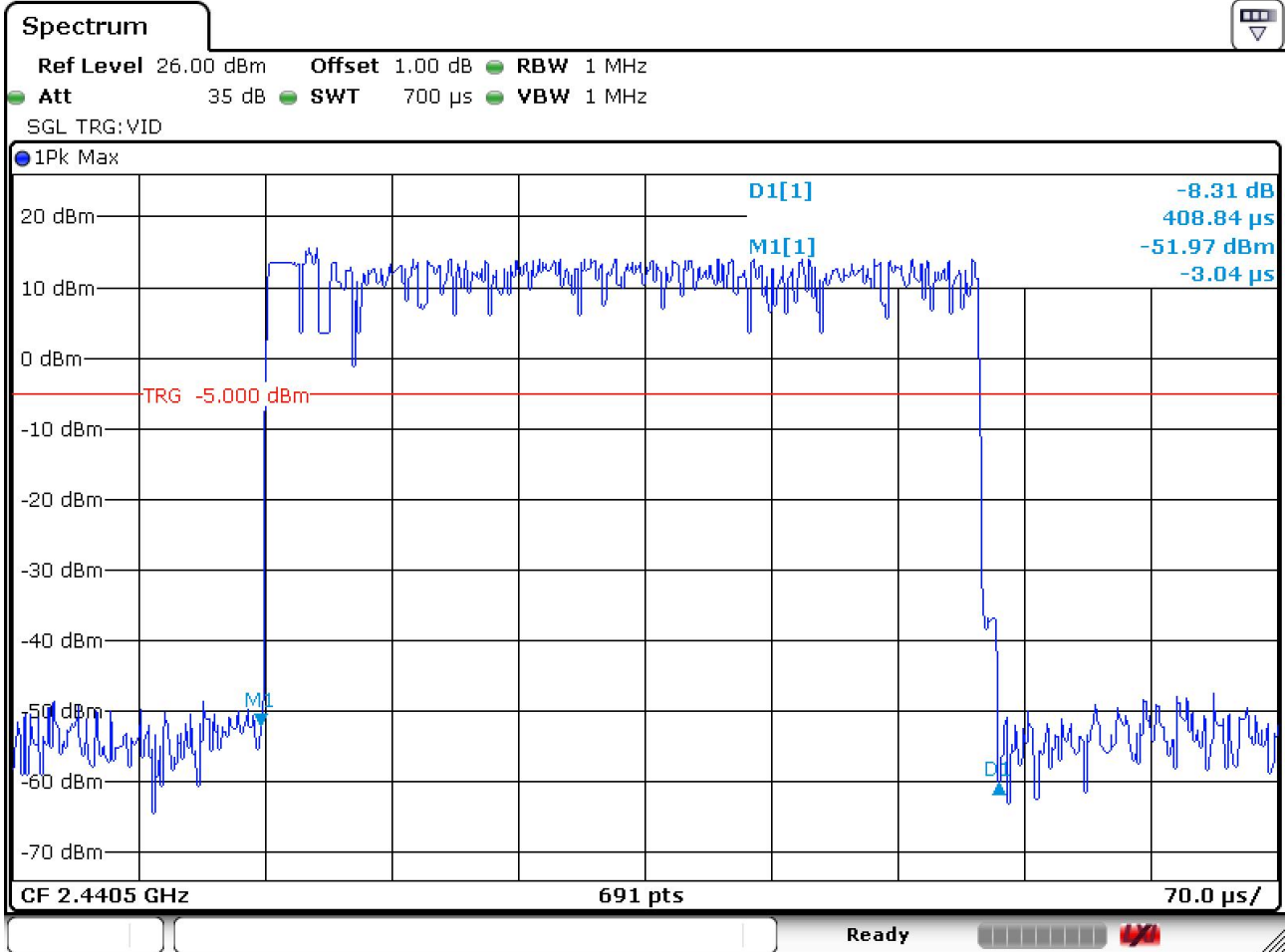


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4.8.9 Test plots (UHD 2MHz 8PSK High Power)

4.8.9.1 Middle Channel



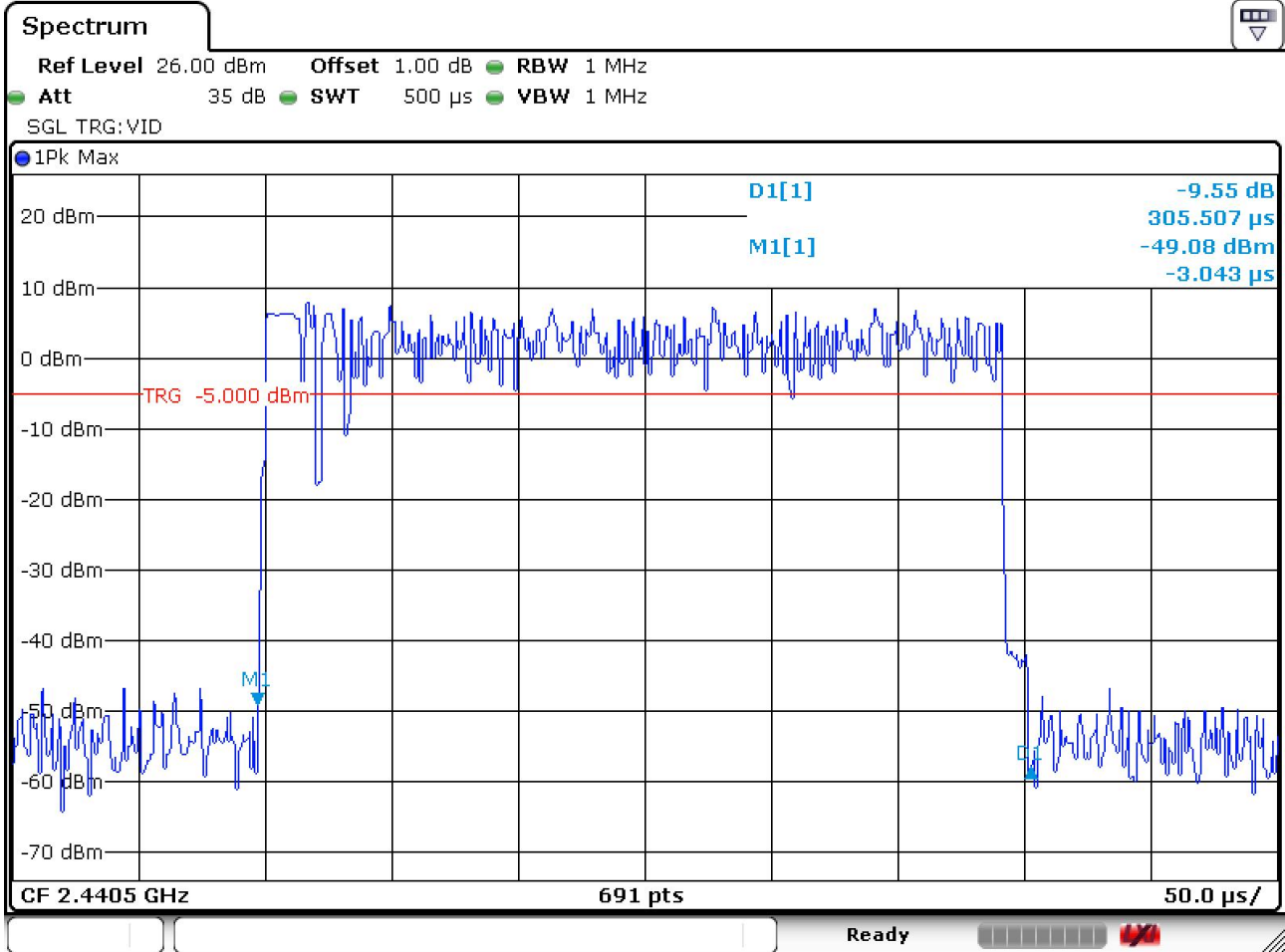
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4.8.10 Test plots (UHD 4MHz)

4.8.10.1 Middle Channel



Date: 8.APR.2020 13:20:15

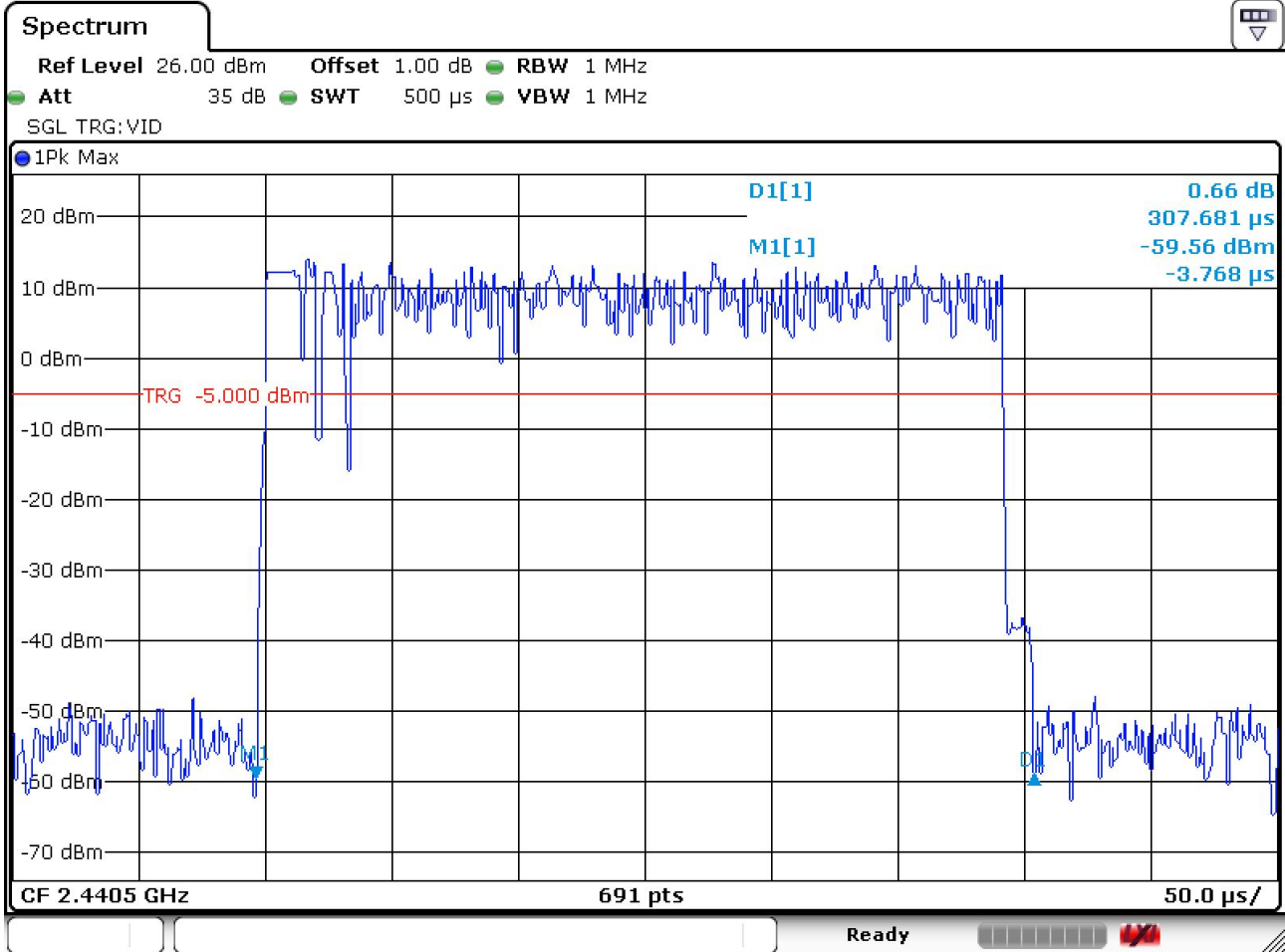


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4.8.11 Test plots (UHD 4MHz High Power)

4.8.11.1 Middle Channel



Date: 8.APR.2020 14:02:10



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Bluetooth Time of Occupancy Calculation

Typically, Bluetooth 1x/EDR mode has a channel hopping rate of 1600 hops/s, since 1x/EDR modes use 5 transmit and 1 receive slot, for a total of 6 slots, the Bluetooth transmitter is actually hopping at a rate of $1600/6=266.67$ hops/slot

$400\text{ms} \times 39 \text{ Channel} = 15.6 \text{ s}$ (Time of Occupancy Limit)

Worst case BT has 266.67 hops/second (for 1x/EDR modes with 3-DH5 operation)

$266.67 \text{ hops/second}/39 \text{ channels}=6.84 \text{ hops/second}$ (# of hops/second on one channel)

$6.84 \text{ hops/second}/\text{channel} \times 15.6 \text{ seconds}=106.67 \text{ hops}$ (#hops over a 15.6 second period)

$106.67 \text{ hops} \times 2.156 \text{ ms/channel} = 229.98 \text{ ms}$ (worst case dwell time for one channel in 1x/EDR modes)

With AFH, the number of channels is reduced to a minimum of 20 channels and the channel hopping rate is reduced by 50% to 800hops/s, AFH mode also uses 6 slots so the Bluetooth transmitter hops at a rate of $800/6=133.3$ hops/s/slot

$400\text{ms} \times 20 \text{ Channel} = 8 \text{ s}$ (Time of Occupancy Limit)

Worst case BT has 133.3 hops/second/slot (for AFH mode with 3-DH5 operation)

$133.3 \text{ hops/second}/20 \text{ channels}=6.67 \text{ hops/second}$ (#hops/second on one channel)

$6.67 \text{ hops/second} \times 8 \text{ seconds}=53.34 \text{ hops}$ (#hops over a 8 seconds period)

$53.34 \text{ hops} \times 2.156 \text{ ms/channel}=115.00 \text{ ms}$ (worst case dwell time for one channel in AFH mode)



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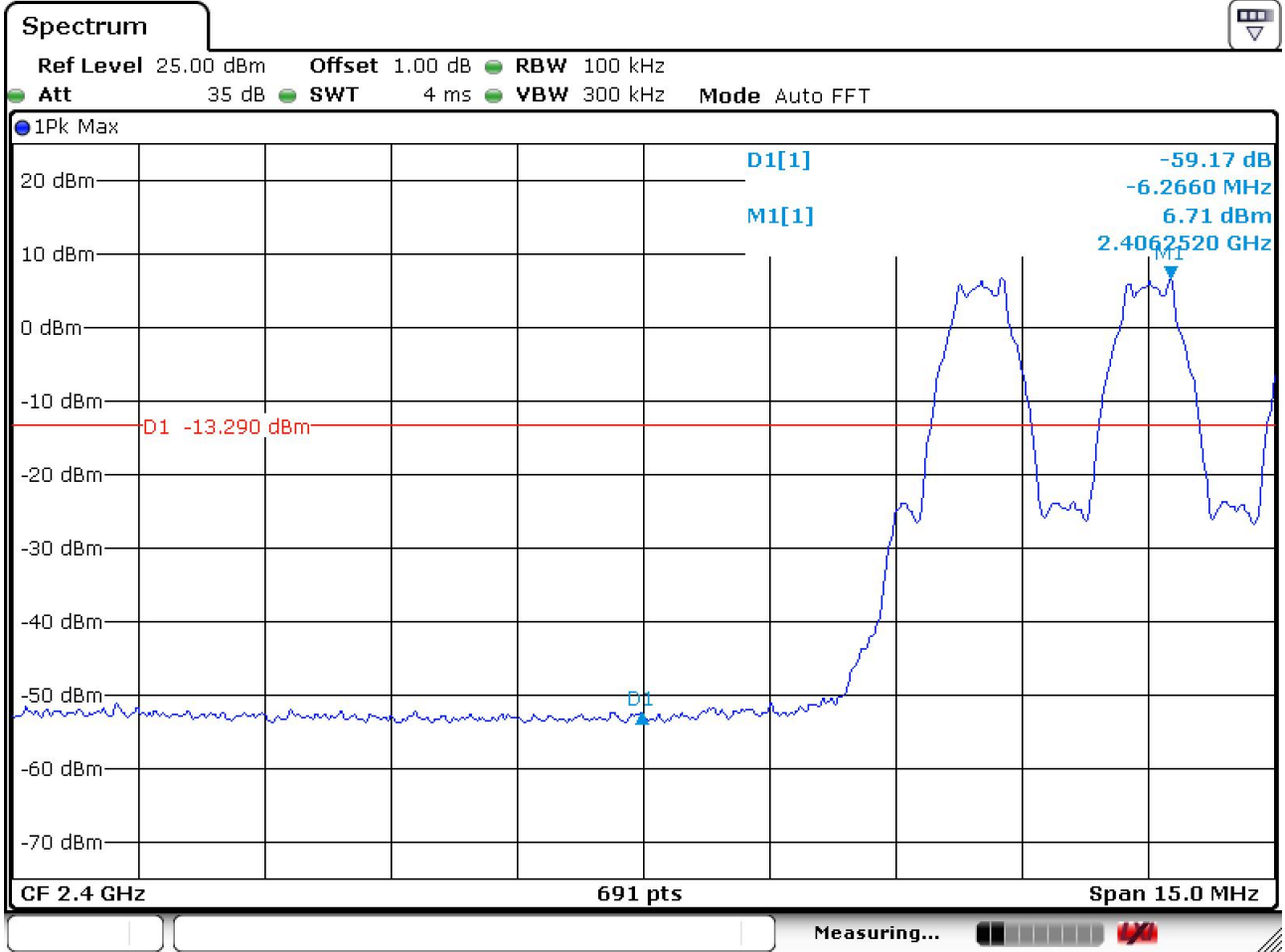
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4.9 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2013 Section 7.8.6
Test Setup:	
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of $\pi/4$ DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



4.9.1 Test plots (1MHz)
4.9.1.1 Lowest Channel_Hopping ON



Date: 8.APR.2020 10:14:34

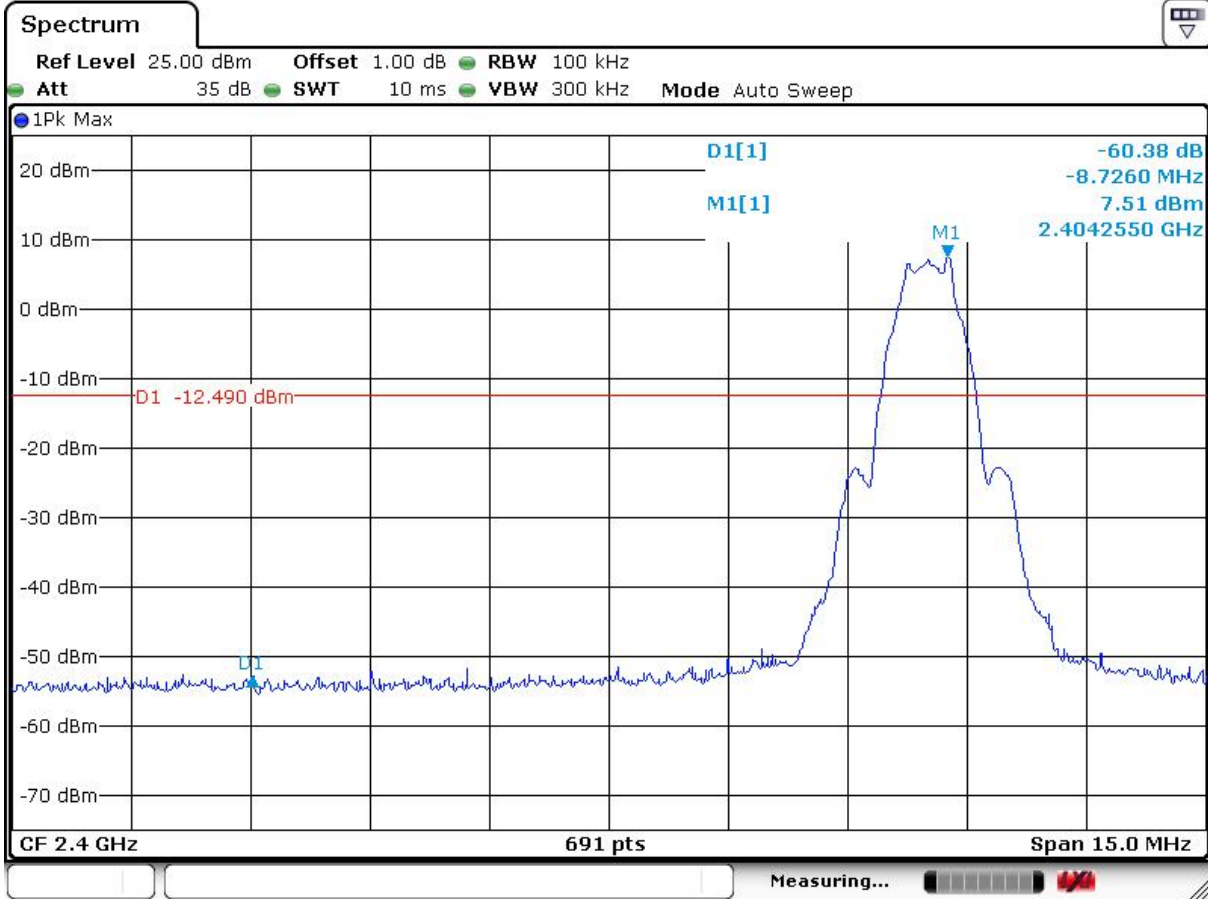


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4.9.1.2 Lowest Channel_Hopping OFF



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