



시험 성적서

TEST REPORT

페이지(page) : (1) / (총(Total) 90)

성적서 번호 Report No.		ICRT-TR-E222144-0A	
신청자 Client	기관명 Name	MaxiEcu sp. z o.o. sp. k.	
	주 소 Address	Stanislawy Fleszarowej-Muskat 7, 81-589 Gdynia, POLAND	
시험대상품목 Sample description		IV generation MaxiEcu interface	
모델명 Type designation		4GENBTM	
정 격 Ratings		DC 12 V	
시험장소 Place of test		☒ 고정시험(Inside test) ☐ 현장시험(Field test) 주소지(Address): 112, 113 Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea	
시험기간 Date of test		13. Jul. 2022 ~ 28. Jul. 2022	
시험방법/항목 Test Method/Item		FCC Part 15 Subpart C §15.247	
시험결과 Test Results		Refer to 3. Test Summary	
확 인 Affirmation	작성자 Tested by	기술책임자 Technical Manager	
	성 명 Name Yeong-Hwan, Hong (Signature)	성 명 Name Min-Gi, Son (Signature)	
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Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
ICRT-TR-E222144-0A	2022.08.22	Initial Issue	All



1. Applicant & Manufacturer & Test Laboratory Information

1.1 Applicant information

Applicant	MaxiEcu sp. z o.o. sp. k.
Address	Stanislawy Fleszarowej-Muskat 7, 81-589 Gdynia, POLAND
Contact Person	Marcin Popow
Telephone No.	48-586-760-267
Fax No.	-
E-mail	marcin@maxiecu.com

1.2 Manufacturer Information

Manufacturer	MaxiEcu sp. z o.o. sp. k
Address	Stanislawy Fleszarowej-Muskat 7, 81-589 Gdynia, POLAND

1.3 Test Laboratory Information

Conducted tests were performed at	
Laboratory	ICR Co., Ltd.
Address	112, Hwanggeum 3-ro 7beon-gil, Hagun-ri, Yangchon-eup, Gimpo-si, Gyeonggi-do, Korea
Telephone No.	+82-2-6351-9002
Fax No.	+82-2-6351-9007
RRA No.	KR0165
KOLAS No.	KT652



2. Equipment under Test(EUT) Information

2.1 General Information

Product Name	IV generation MaxiEcu interface
Brand Name	-
Model Name	4GENBTM
Additional Model Name	-
FCC ID	2A3CS4GENBTM
Power Supply	DC 12 V

2.2 Additional Information

Equipment Class	DTS-Digital Transmission System	
Device Type	Stand-alone	
Operating Frequency	802.11b/g/n(HT20)	2 412 MHz ~ 2 462 MHz
	802.11n(HT40)	2 422 MHz ~ 2 452 MHz
	Bluetooth LE	2 402 MHz ~ 2 480 MHz
RF Output Power	802.11b	10.97 dBm
	802.11g	9.48 dBm
	802.11n(HT20)	9.97 dBm
	802.11n(HT40)	6.59 dBm
	Bluetooth LE	2.60 dBm
Number of Channel	802.11b/g/n(HT20)	11
	802.11n(HT40)	7
	Bluetooth LE	40
Modulation Type	Bluetooth LE, 802.11b: DSSS 802.11g/n(HT20/HT40) : OFDM	
Antenna Type	Chip Antenna	
Antenna Gain	2 dBi	
Antenna Operating Mode	Single Antenna Equipment with only one antenna	



2.3 Mode of operation during the test

- The EUT is continuous transmission mode during the test with set to each of the Low Channel, Middle Channel, and High Channel at the worst case data rate. The worst case data rate for each modulation is determined 1 Mbps for IEEE 802.11b, 6 Mbps for IEEE 802.11g, 6.5 Mbps for HT20, 13 Mbps for HT40.

2.4 Modifications of EUT

- None



3. Test Summary

3.1 Test standards and results

FCC Part 15 Subpart C			
Clause	Test items	Applied	Results
§15.247 (a) (2)	6 dB Bandwidth	☒	PASS
§15.247 (b) (3)	Maximum Conducted Output Power	☒	PASS
§15.247 (e)	Power Spectral Density	☒	PASS
§15.247 (d)	Conducted Spurious Emission	☒	PASS
§15.247 (d) & §15.209 & §15.205	Radiated Spurious Emission	☒	PASS
§15.203	Antenna Requirement	☒	PASS

Note : This test report is prepared according to the requirements of ISO / IEC 17025.

3.2 Purpose of the test

- To determine whether the equipment under test fulfills the requirements of the standards stated in FCC Part 15 Subpart C Section 15.247.

3.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013.

Radiated testing was performed at a distance of 3 m from EUT to the antenna.

3.4 Configuration of Test System

3.4.1 Radiated emission test

Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m Semi Anechoic Chamber. The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.



3.5 Antenna requirement

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.

The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.5.1 Result: Pass

The transmitter has a **Chip Antenna**. The directional gain of the antenna is 2 **dBi**.



4. Used equipment on test

	Description	Model Name	Serial Number	Manufacturer	Next Cal. (cycle)
☒	Spectrum analyzer	FSW85	R&S	101306	2023-03-02 (1Y)
☒	Signal Generator	SMB100A	R&S	180607	2023-03-03 (1Y)
☒	DC Power Supply	XDL 35-5P	Sorensen	J00385373	2023-03-03 (1Y)
☒	10 dB Attenuator	WA54-10-11	Weinschel	-	2023-03-07 (1Y)
☒	Loop Antenna	HFH2-Z2	Rohde & Schwarz	100506	2023-07-05 (2Y)
☒	TRILOG BROADBAND ANTENNA	VULB9162	SCHWARZBECK	143	2022-12-08 (2Y)
☒	RF Pre Amplifier	SCU08	Rohde & Schwarz	100747	2023-04-13 (1Y)
☒	EMI Test Receiver	ESR7	Rohde & Schwarz	102034	2023-04-13 (1Y)
☒	Horn Antenna	HF907	Rohde & Schwarz	102556	2022-08-18 (1Y)
☒	RF Pre Amplifier	SCU18	Rohde & Schwarz	102342	2023-04-13 (1Y)
☒	EMI Test Receiver	ESR26	Rohde & Schwarz	101462	2023-04-13 (1Y)
☒	Horn Antenna	LB-42-10-C-KF	AIBFO Inc.	J202024625	2023-03-10 (1Y)
☒	PreAmplifier	AMF-4F-18265-35-8P-1	MITEQ	771846	2023-03-07 (1Y)

※ All test equipment used is calibration on a regular basis.



5. 6 dB Bandwidth

5.1 Operating environment

Temperature : 23 °C

Relative humidity : 47 %

5.2 Measurement method

Standard : §15.247 (a) (2)

5.3 Test data

Operating mode : Transmit mode

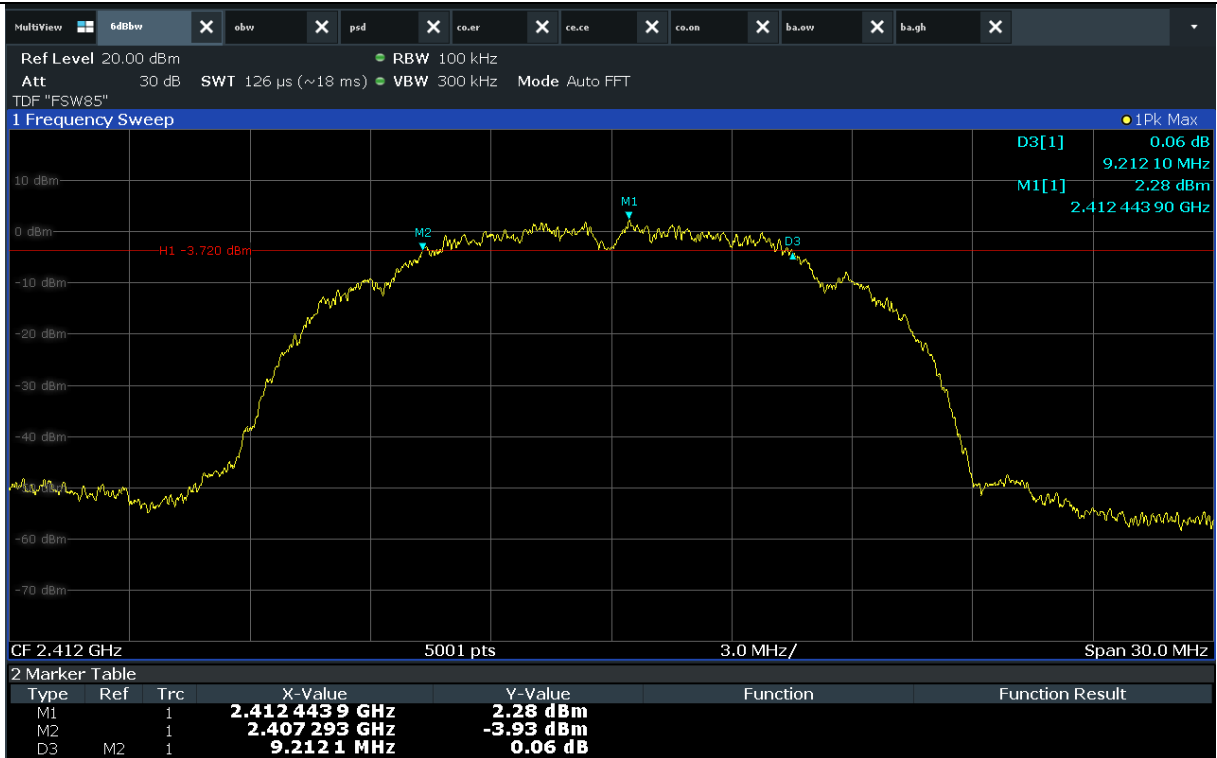
Test Result : Pass

5.3.1 Measured Results

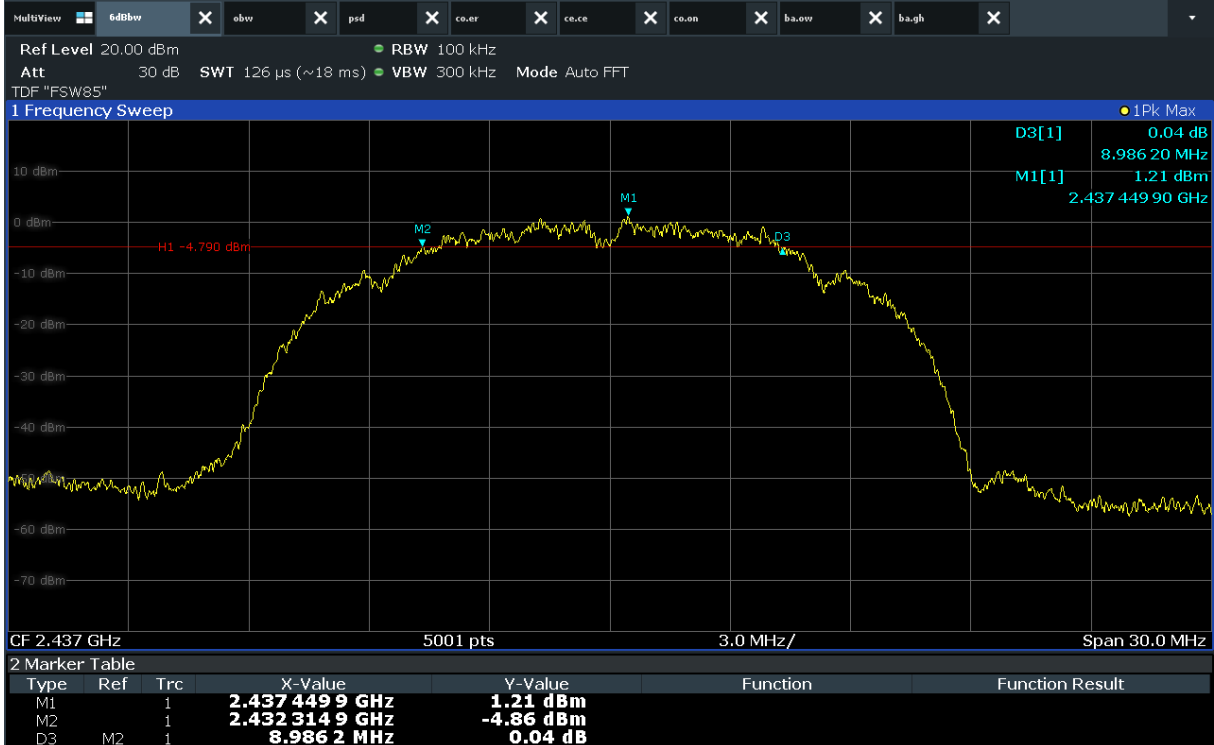
Modulation Type	Channel (Frequency)	Measured Value (MHz)	Limit (kHz)
802.11b	0 (2 412 MHz)	9.212	at least 500
	6 (2 437 MHz)	8.986	
	11 (2 462 MHz)	8.914	
802.11g	0 (2 412 MHz)	16.370	
	6 (2 437 MHz)	16.388	
	11 (2 462 MHz)	16.394	
802.11n(HT20)	0 (2 412 MHz)	17.324	
	6 (2 437 MHz)	17.318	
	11 (2 462 MHz)	17.018	
802.11n(HT40)	3 (2 422 MHz)	33.332	
	6 (2 437 MHz)	33.329	
	9 (2 452 MHz)	33.038	
Bluetooth LE	0 (2 402 MHz)	0.71	
	19 (2 440 MHz)	0.74	
	39 (2 480 MHz)	0.73	



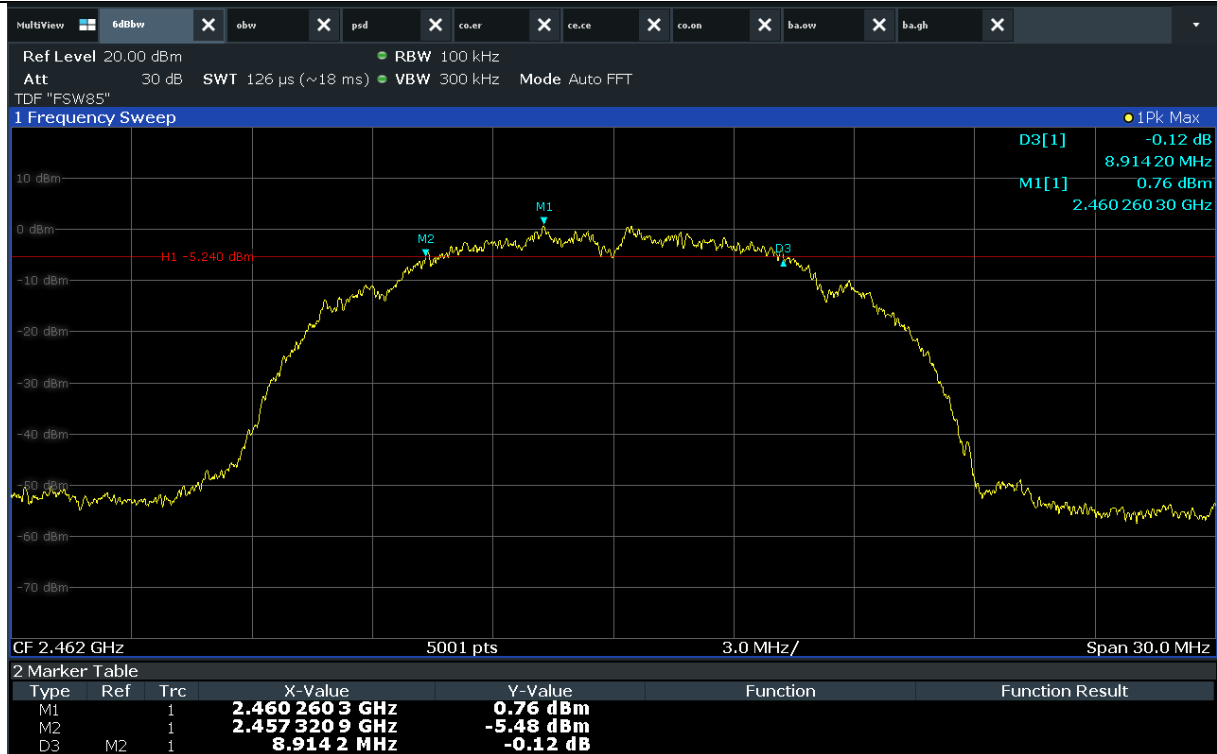
5.3.1.1 Measured Graph for 802.11b



Low CH



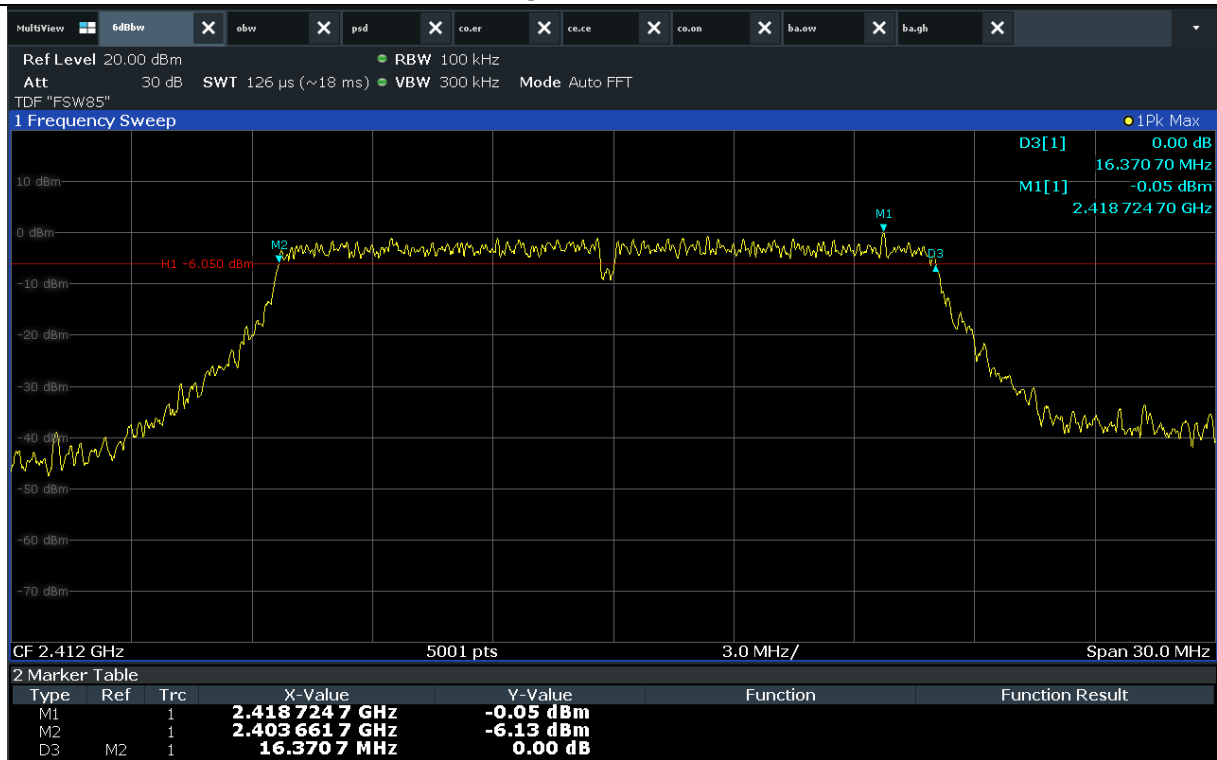
Mid CH



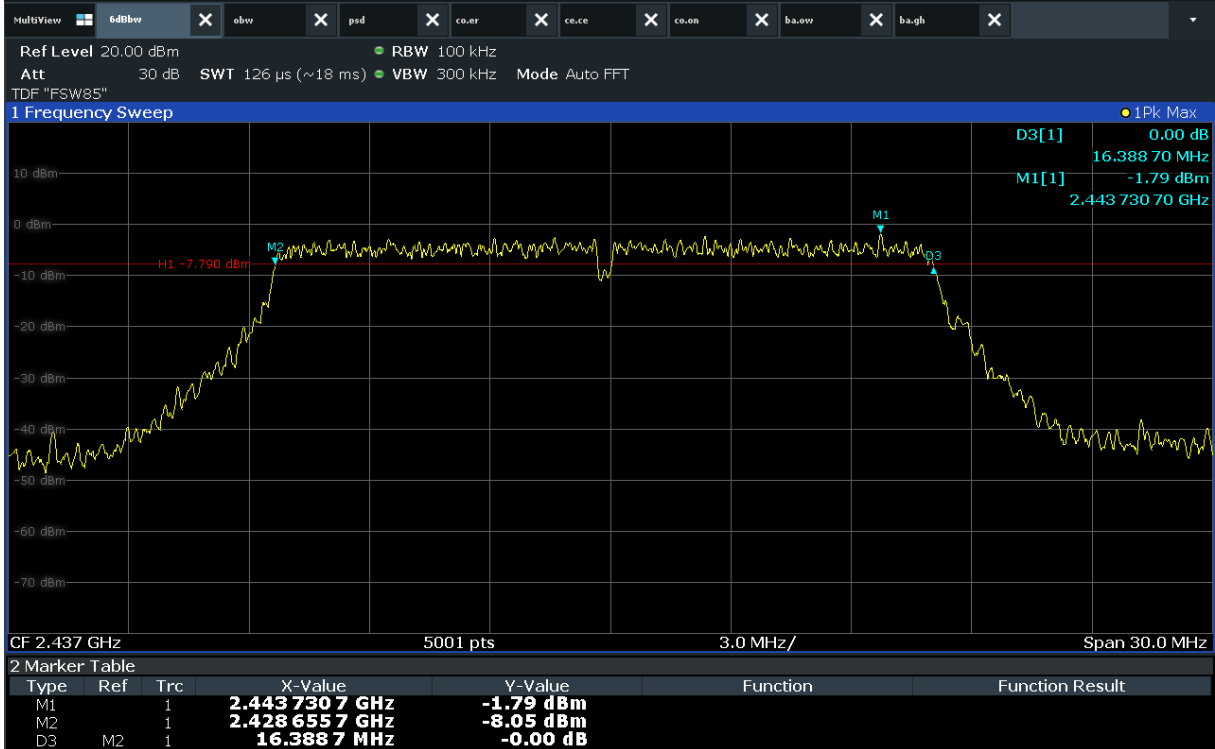
High CH



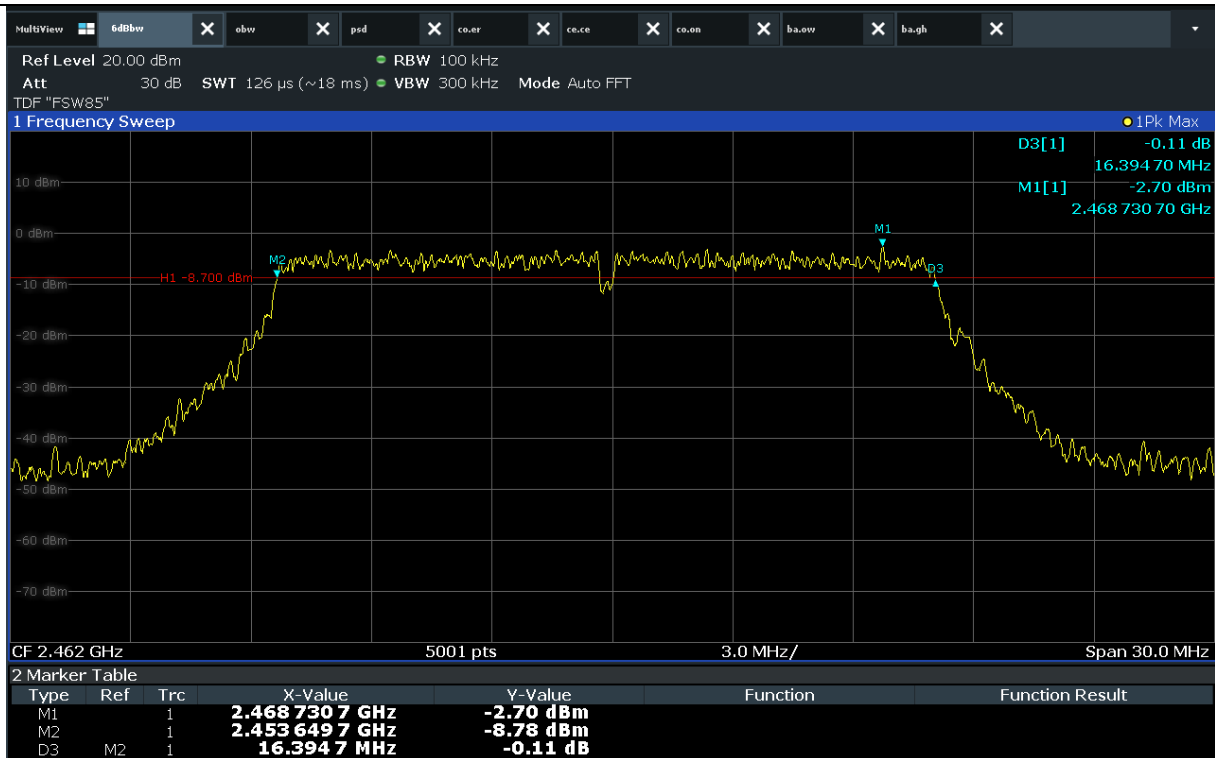
5.3.1.2 Measured Graph for 802.11g



Low CH



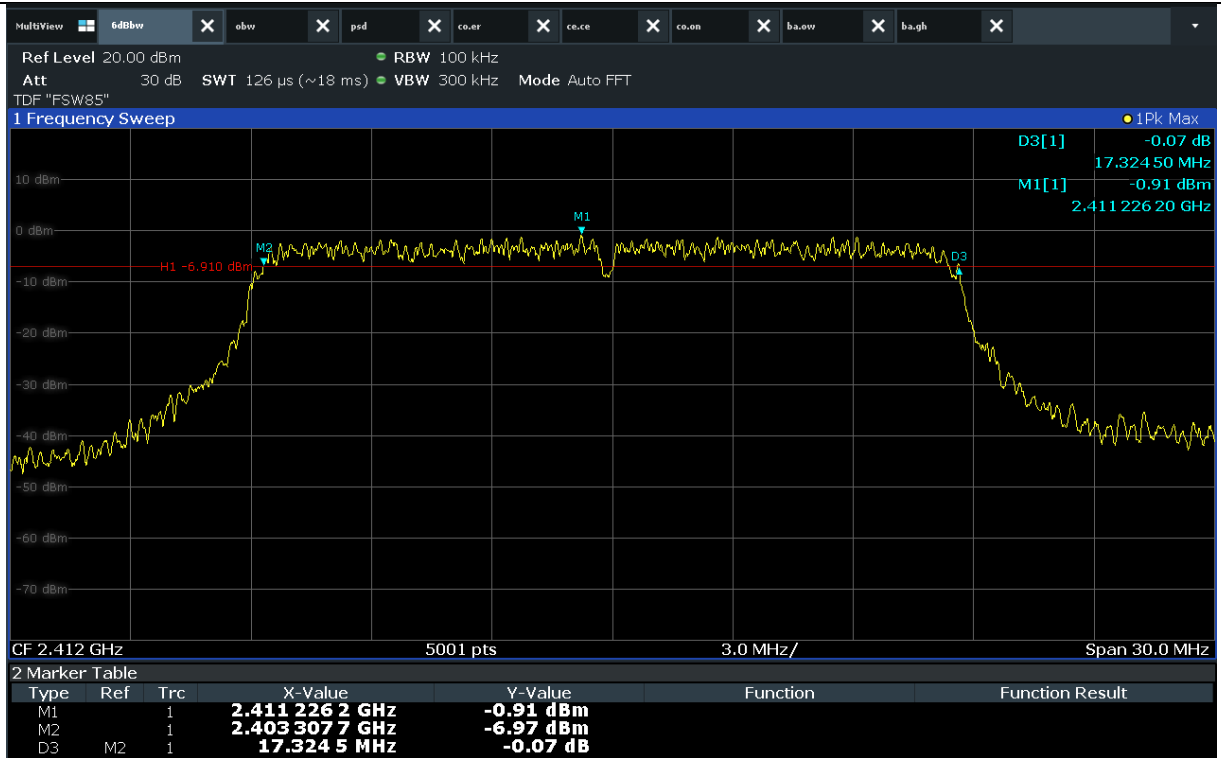
Mid CH



High CH



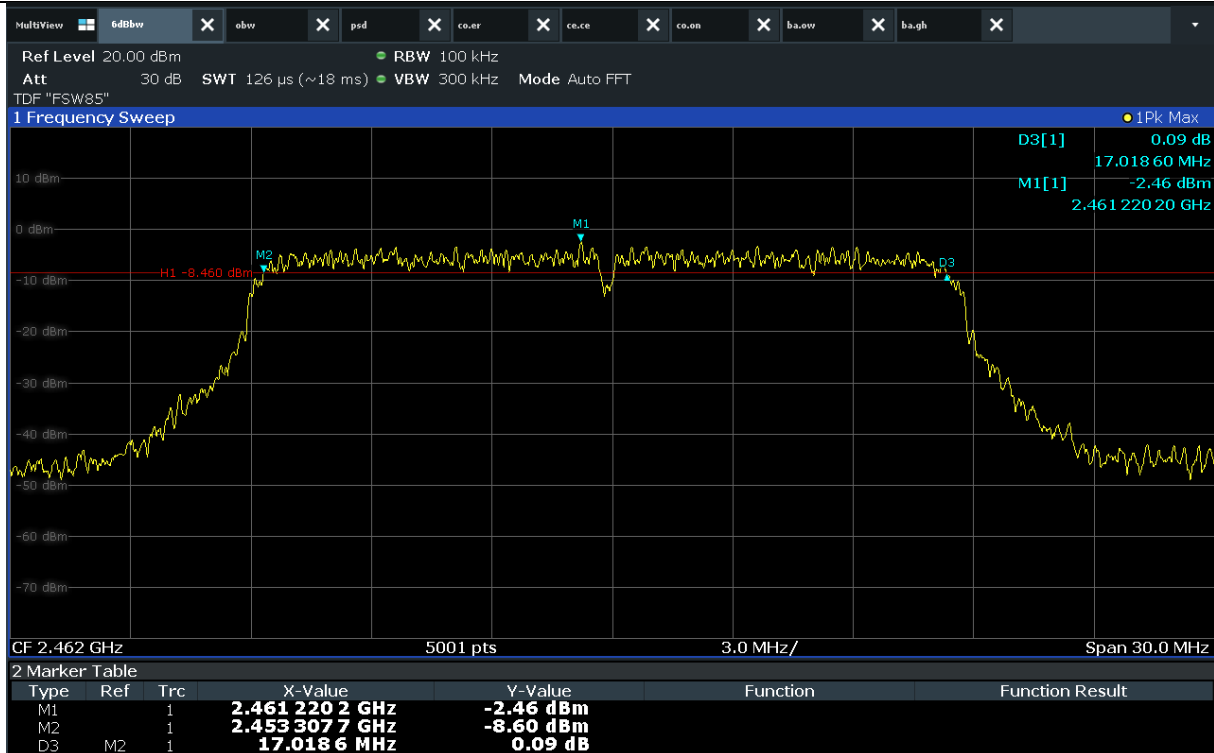
5.3.1.3 Measured Graph for 802.11n(HT20)



Low CH



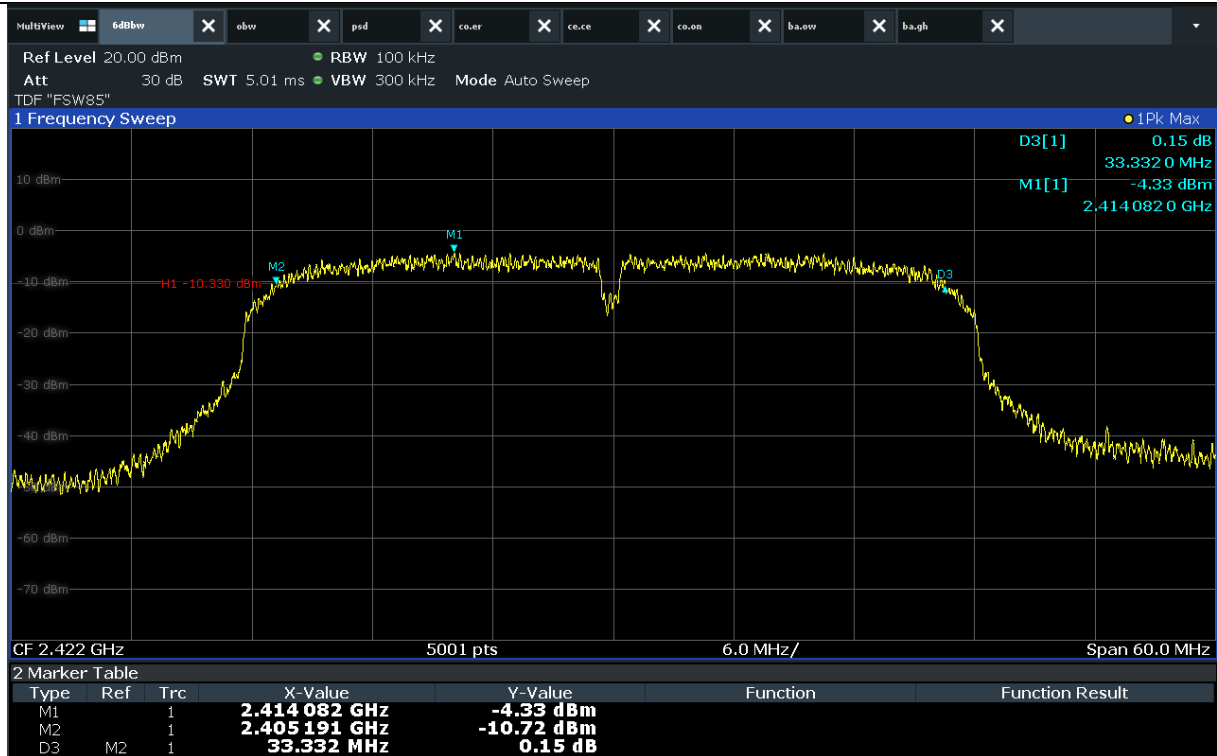
Mid CH



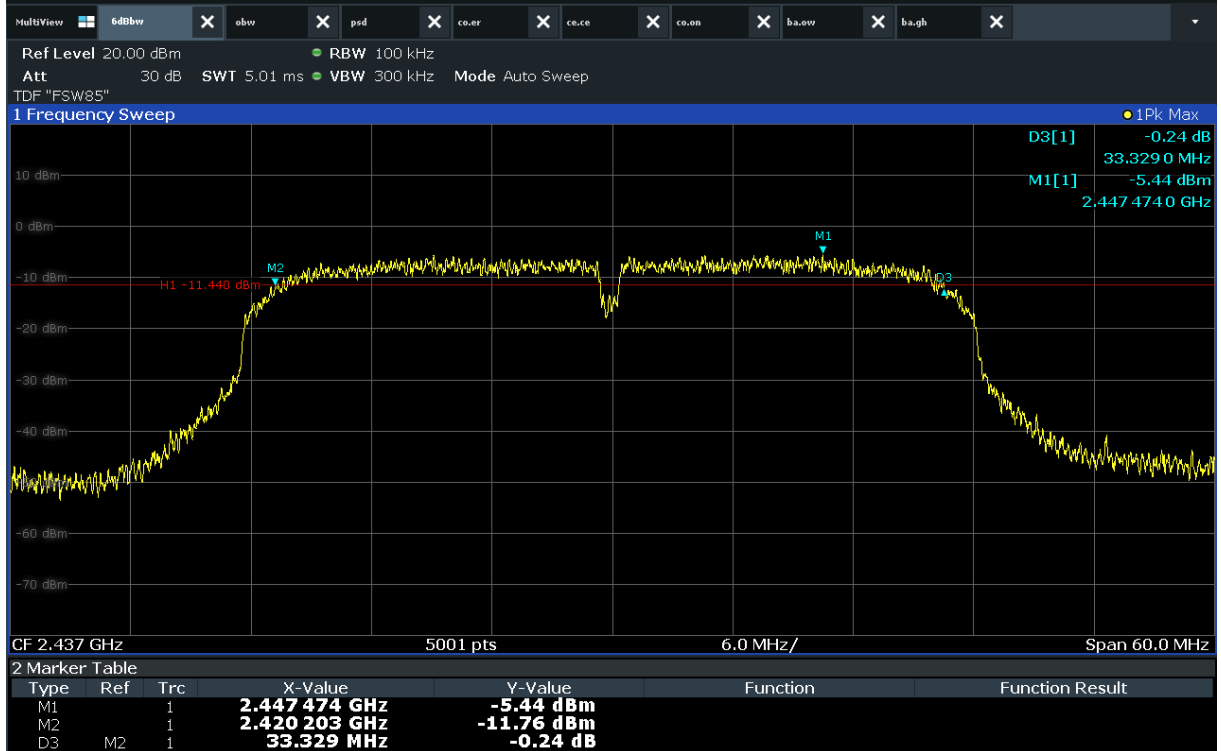
High CH



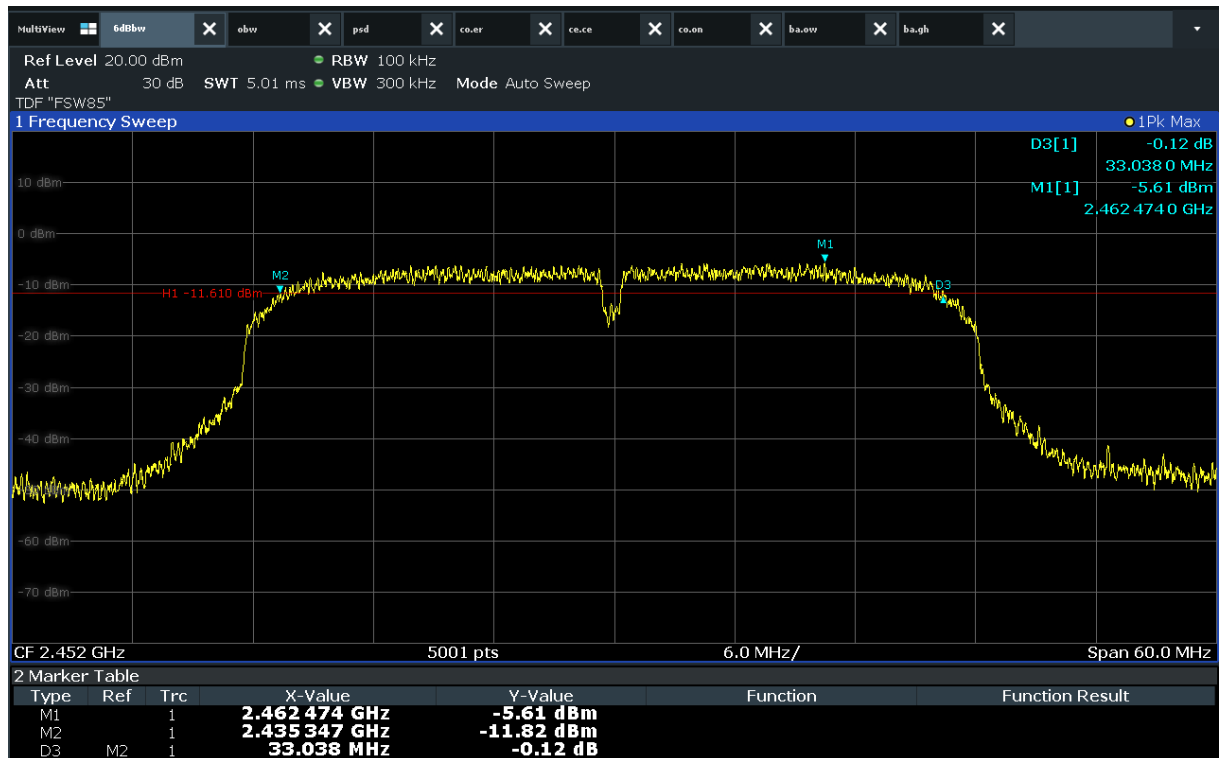
5.3.1.4 Measured Graph for 802.11n(HT40)



Low CH



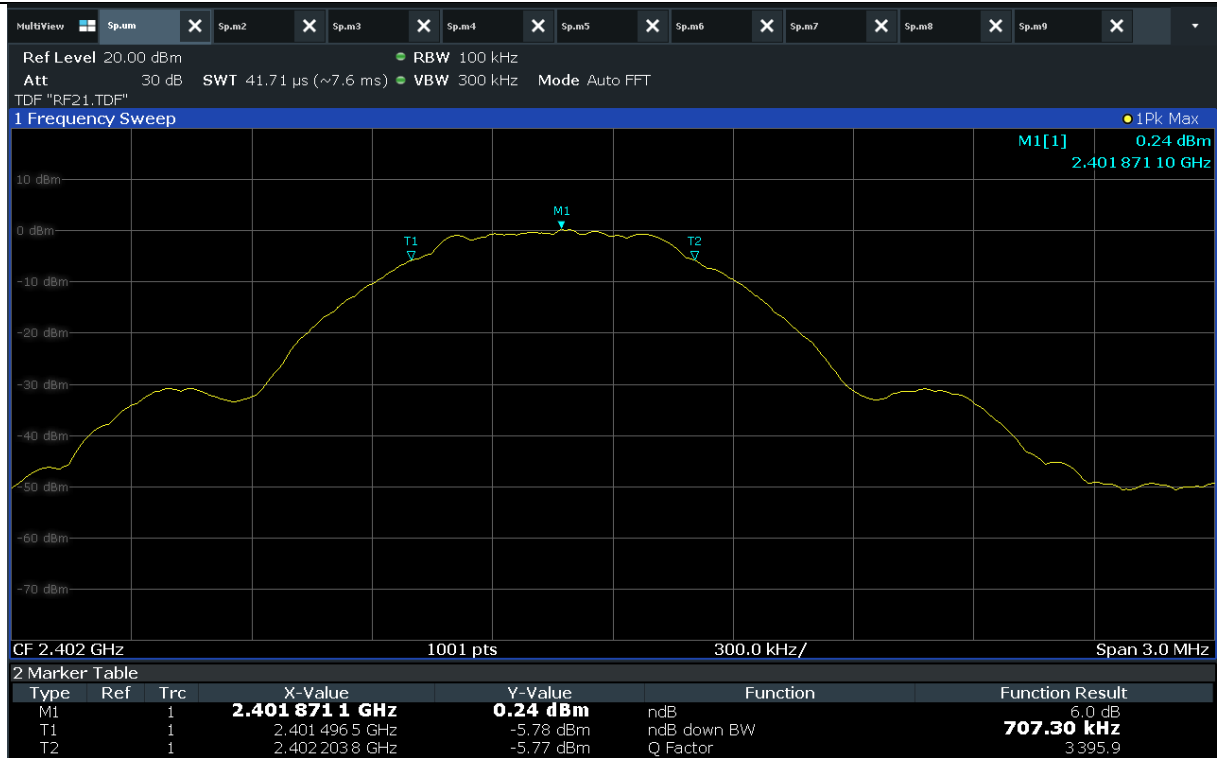
Mid CH



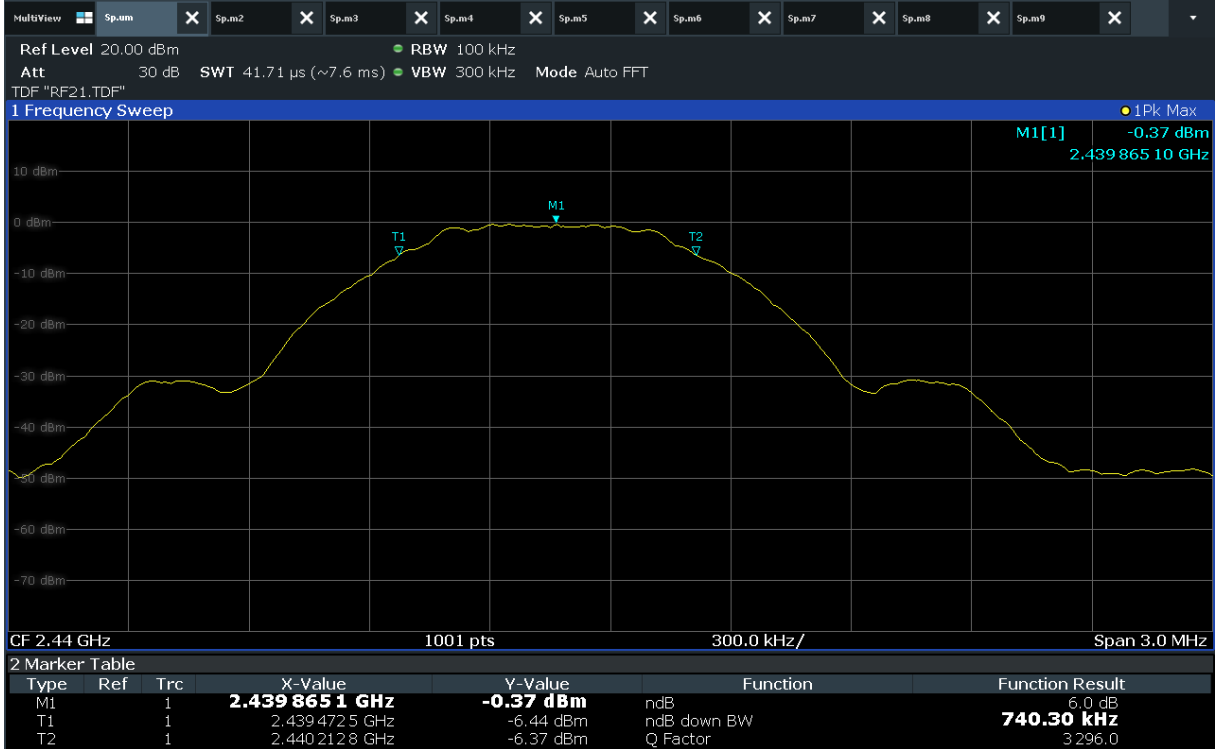
High CH



5.3.1.5 Measured Graph for Bluetooth LE



Low CH



Mid CH



High CH



6. Maximum Conducted Output Power

6.1 Operating environment

Temperature : 25 °C

Relative humidity : 46 %

6.2 Measurement method

Standard : §15.247 (b) (3)

6.3 Test data

Operating mode : Transmit mode

Test Result : Pass

6.3.1 Measured Results

Modulation Type	Channel (Frequency)	Measured Value (dBm)	Limit (dBm)
802.11b	1 (2 412 MHz)	10.97	30 (1 Watt)
	6 (2 437 MHz)	9.67	
	11 (2 462 MHz)	9.09	
802.11g	1 (2 412 MHz)	9.48	
	6 (2 437 MHz)	8.35	
	11 (2 462 MHz)	7.80	
802.11n(HT20)	1 (2 412 MHz)	9.97	
	6 (2 437 MHz)	8.94	
	11 (2 462 MHz)	8.22	
802.11n(HT40)	3 (2 422 MHz)	6.59	
	6 (2 437 MHz)	6.04	
	9 (2 452 MHz)	5.86	
Bluetooth LE	0 (2 402 MHz)	1.78	
	19 (2 440 MHz)	1.70	
	39 (2 480 MHz)	2.60	



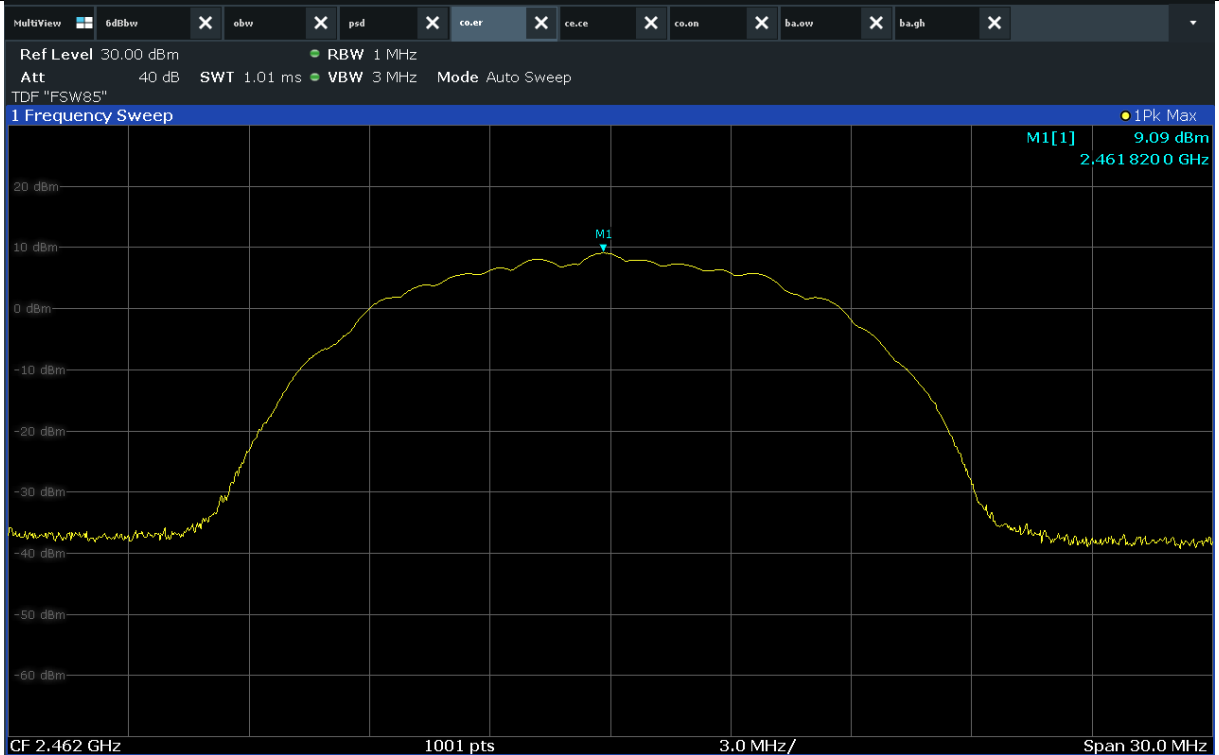
6.3.1.1 Measured Graph for 802.11b



Low CH



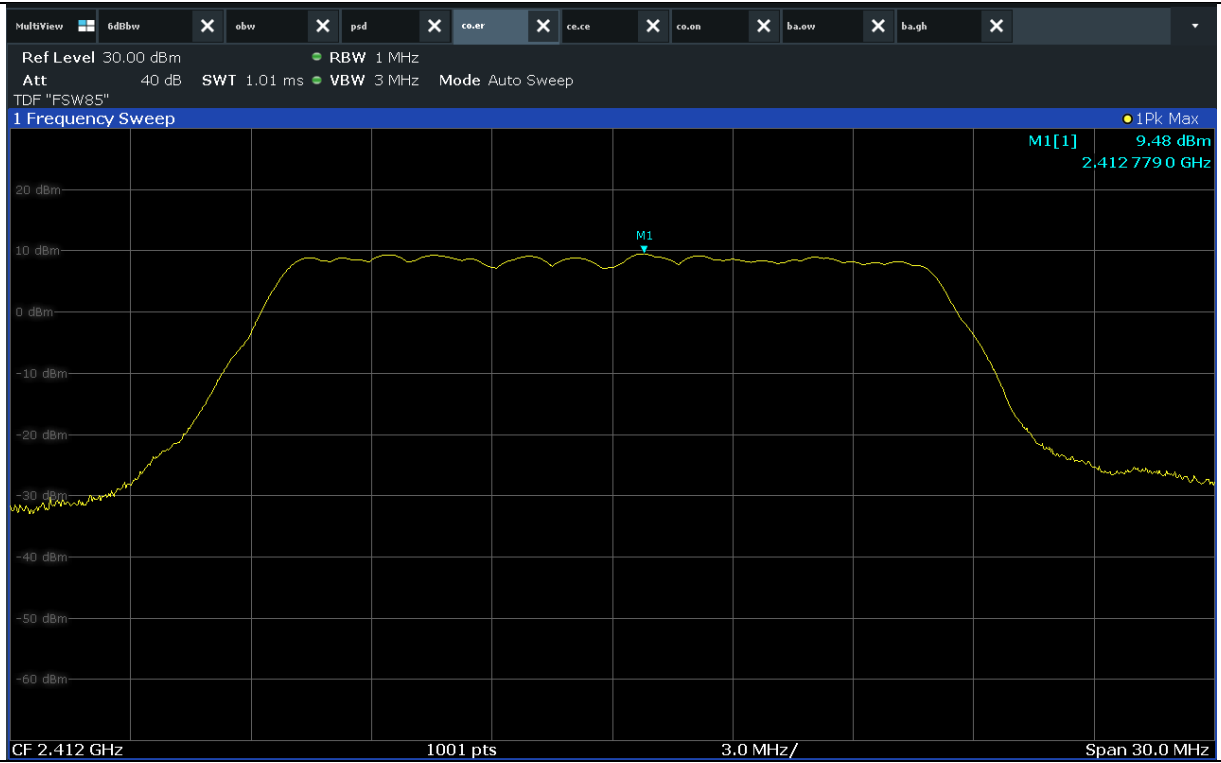
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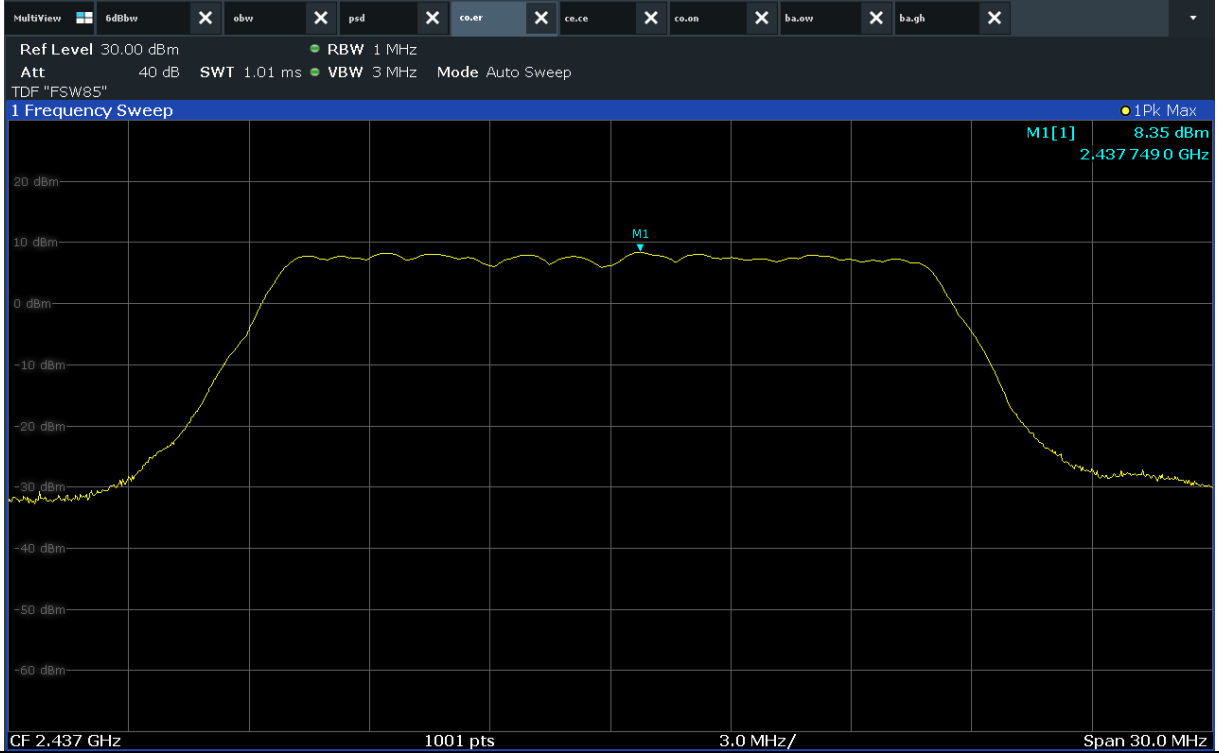
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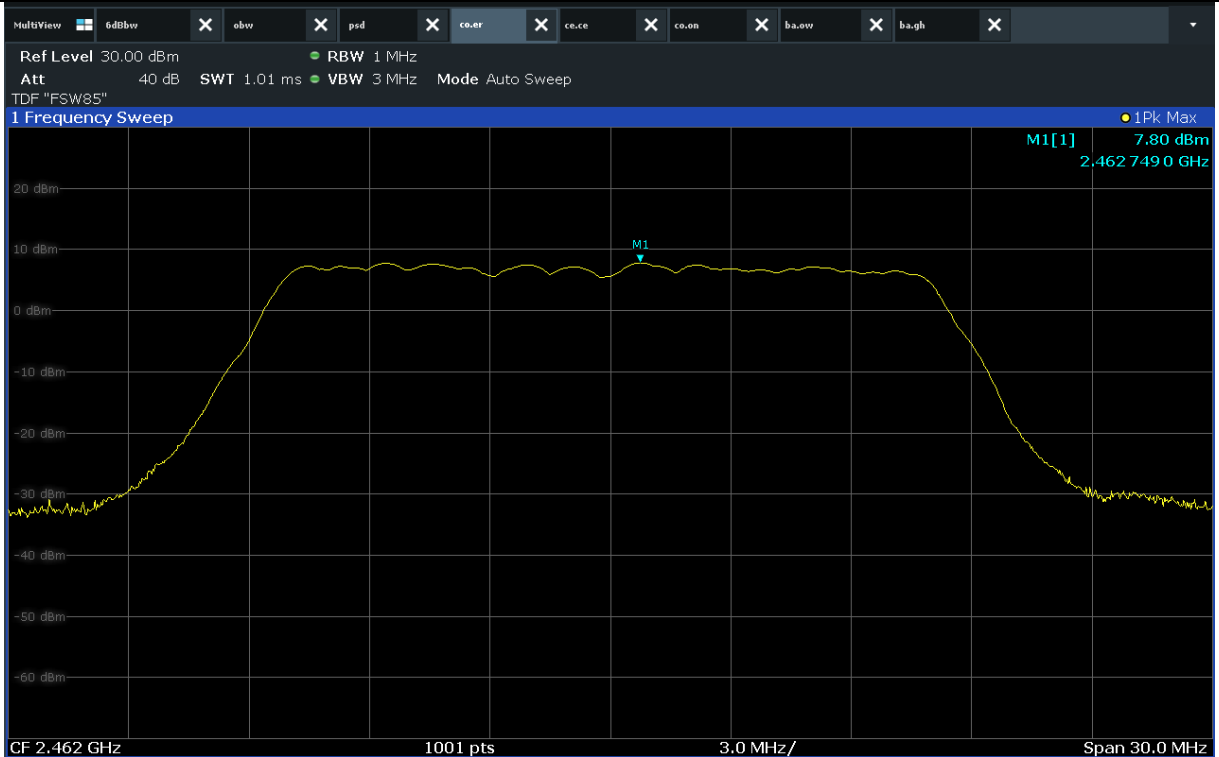
6.3.1.2 Measured Graph for 802.11g



Low CH



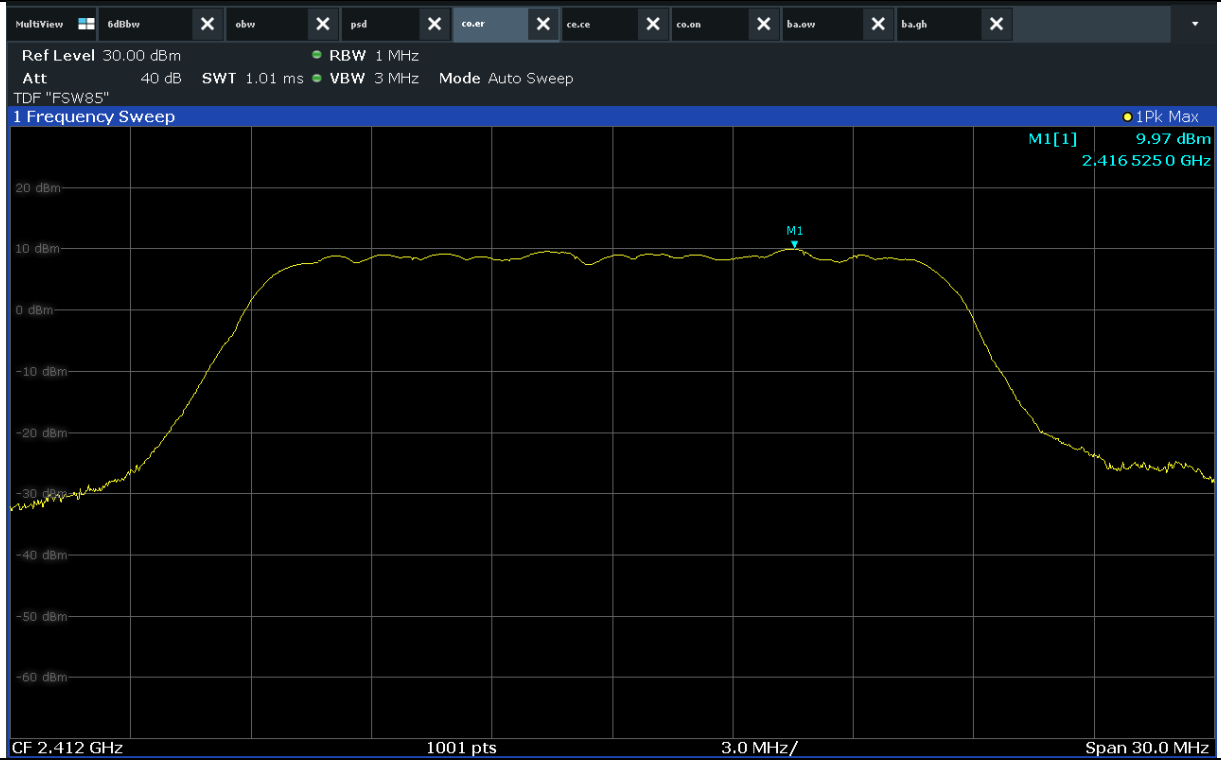
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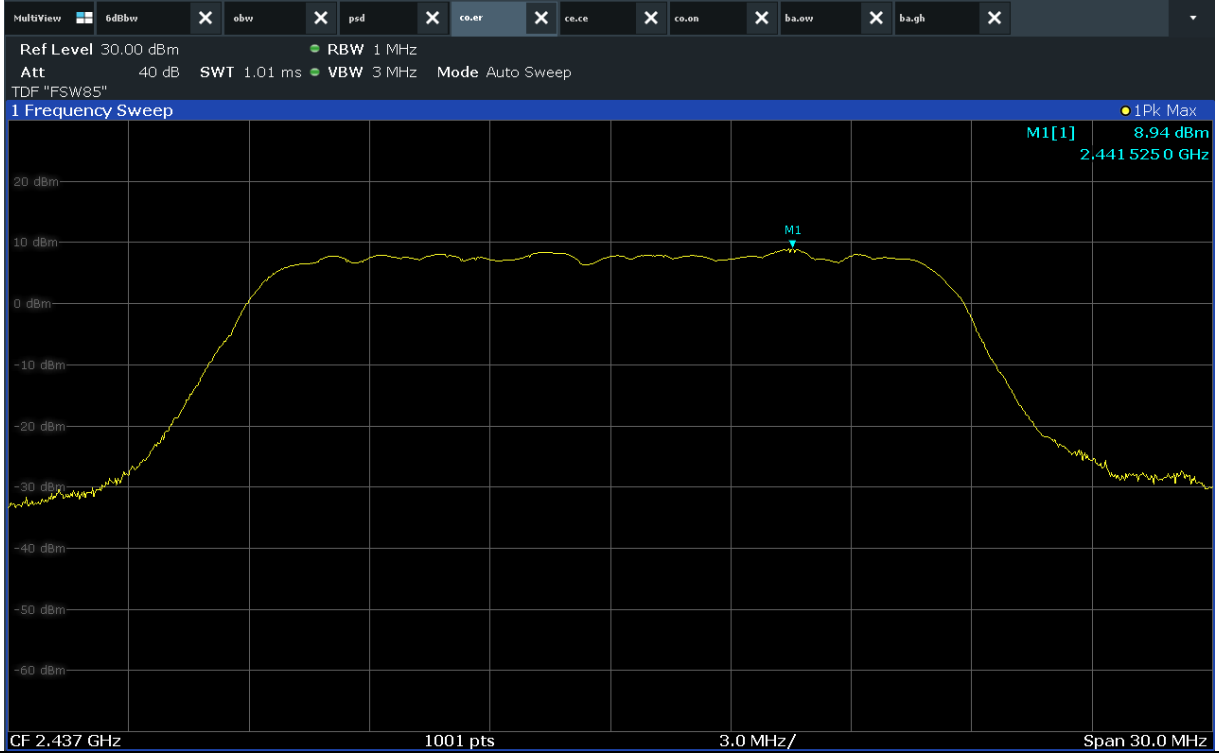
High CH



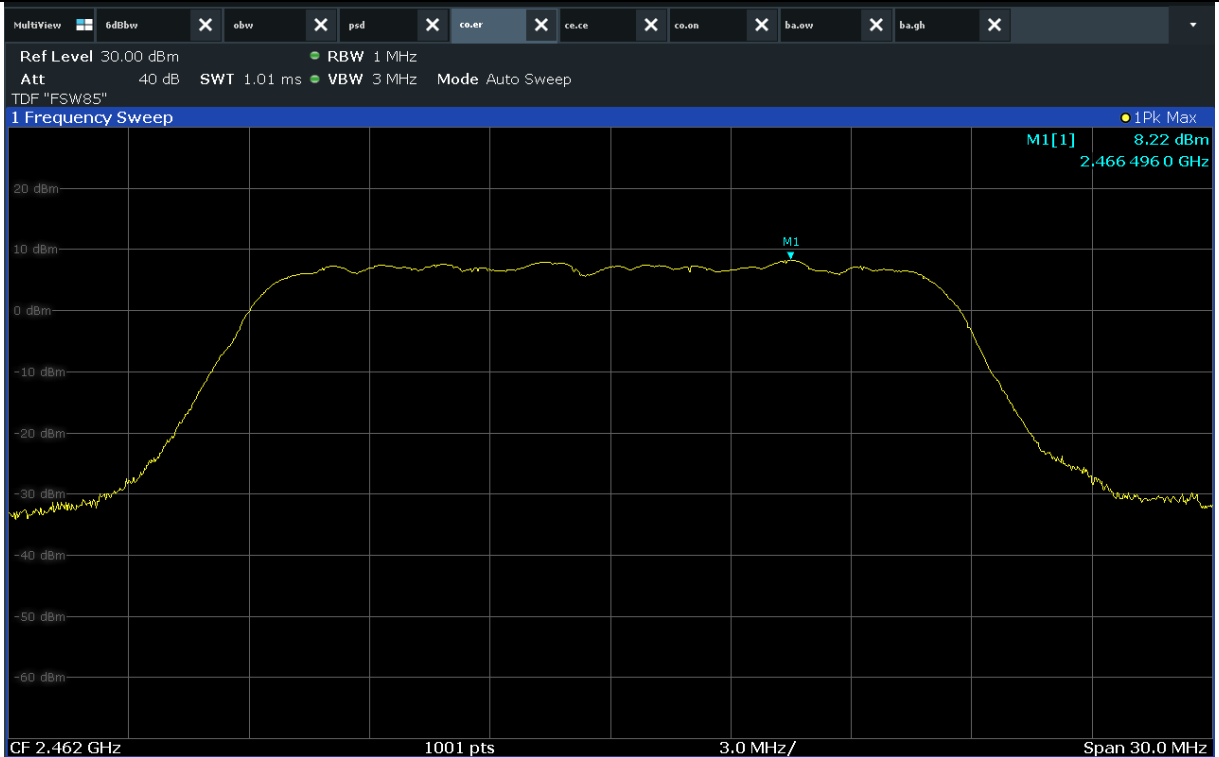
6.3.1.3 Measured Graph for 802.11n(HT20)



Low CH



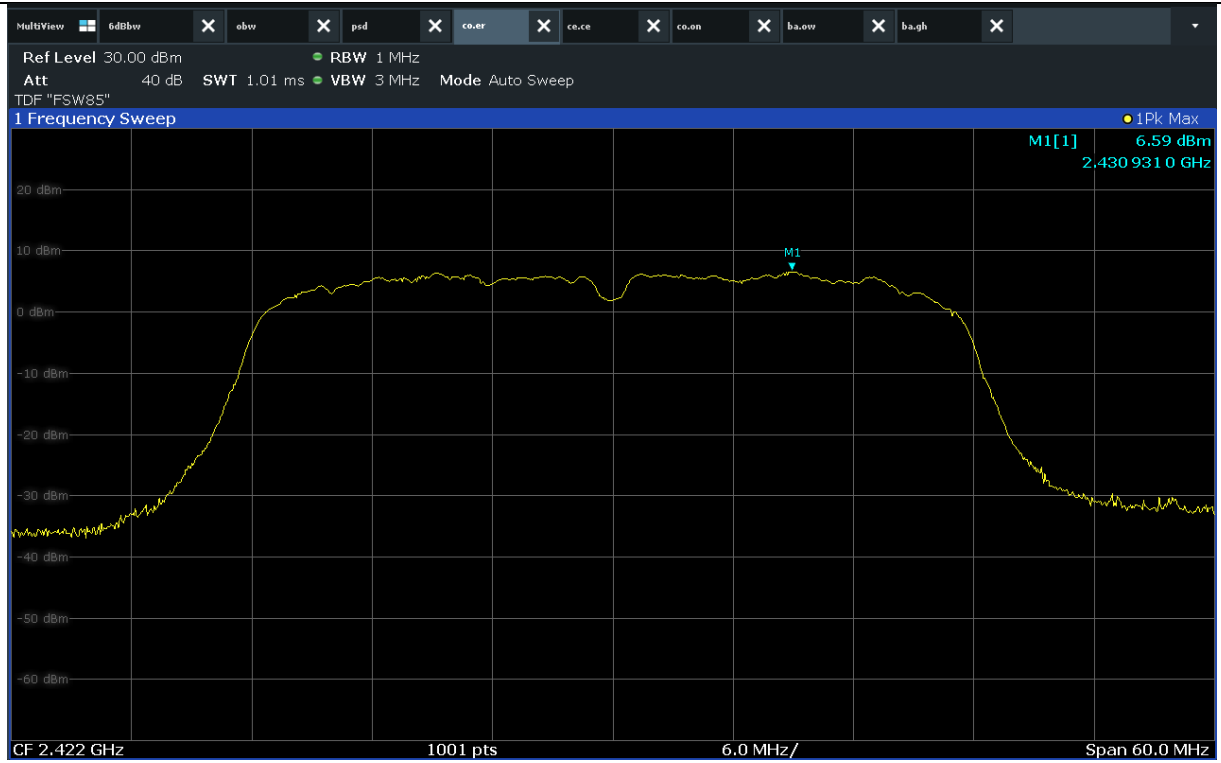
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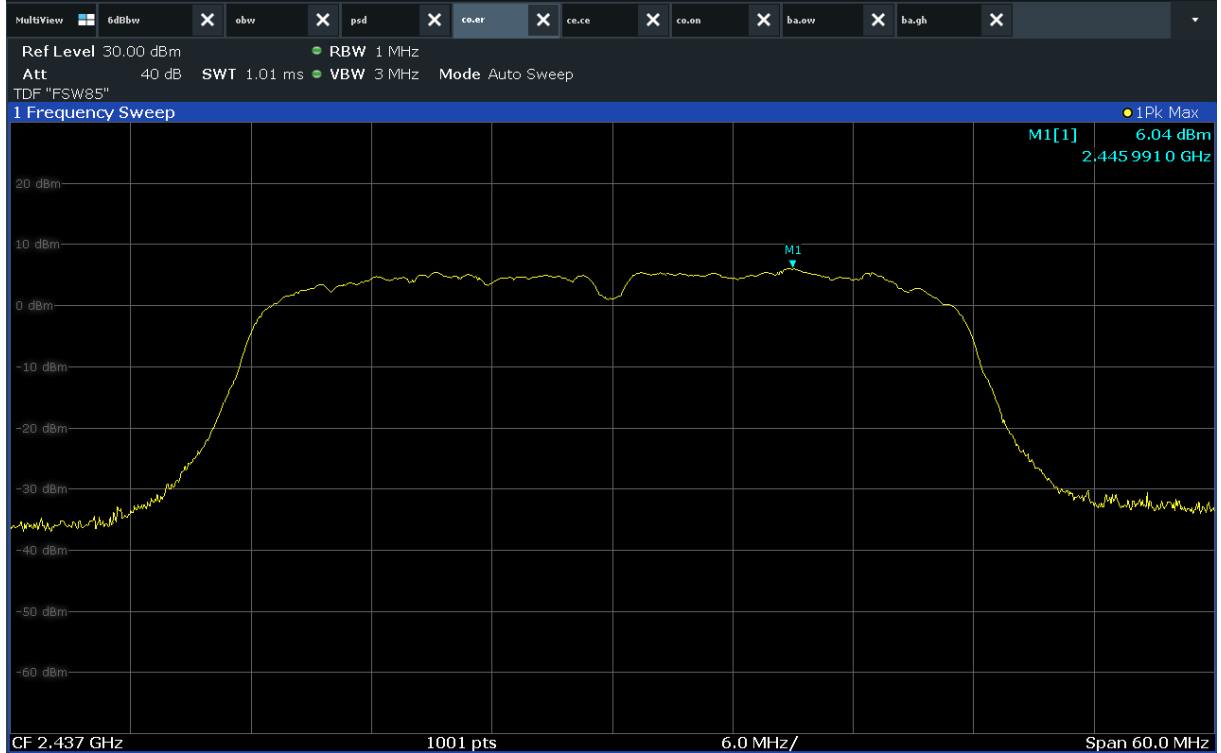
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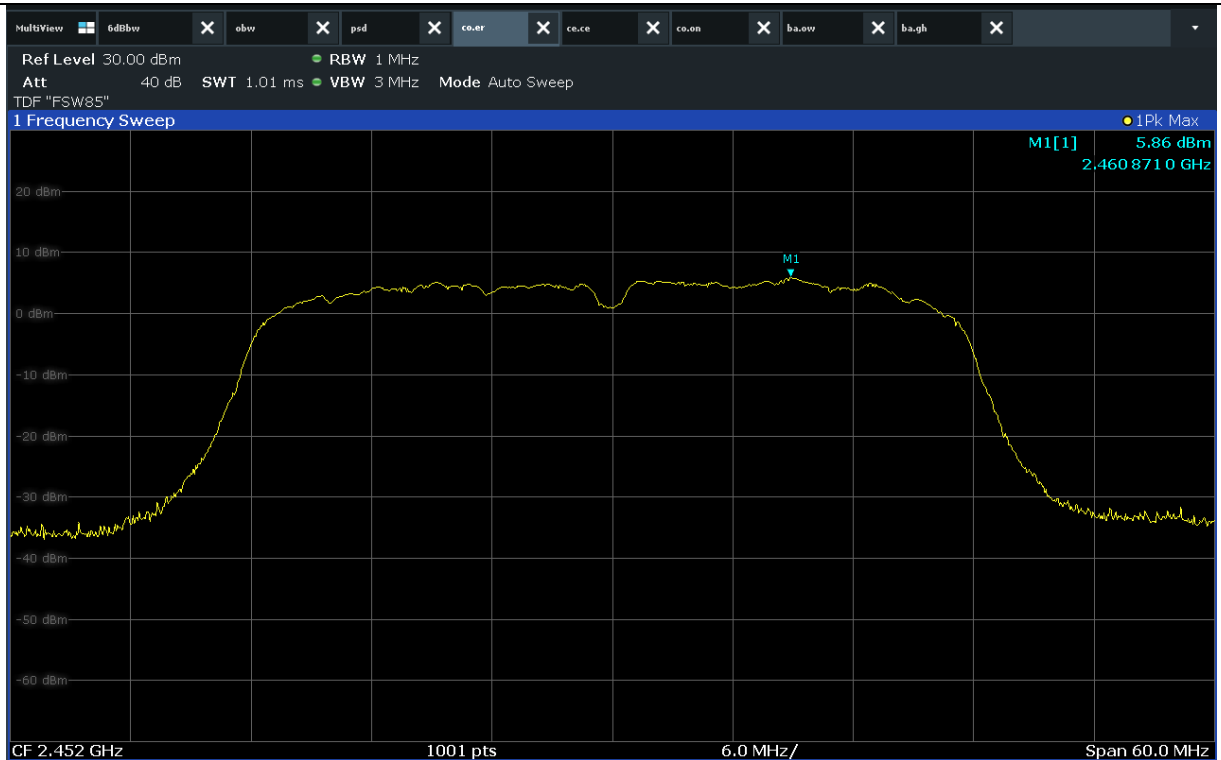
6.3.1.4 Measured Graph for 802.11n(HT40)



Low CH



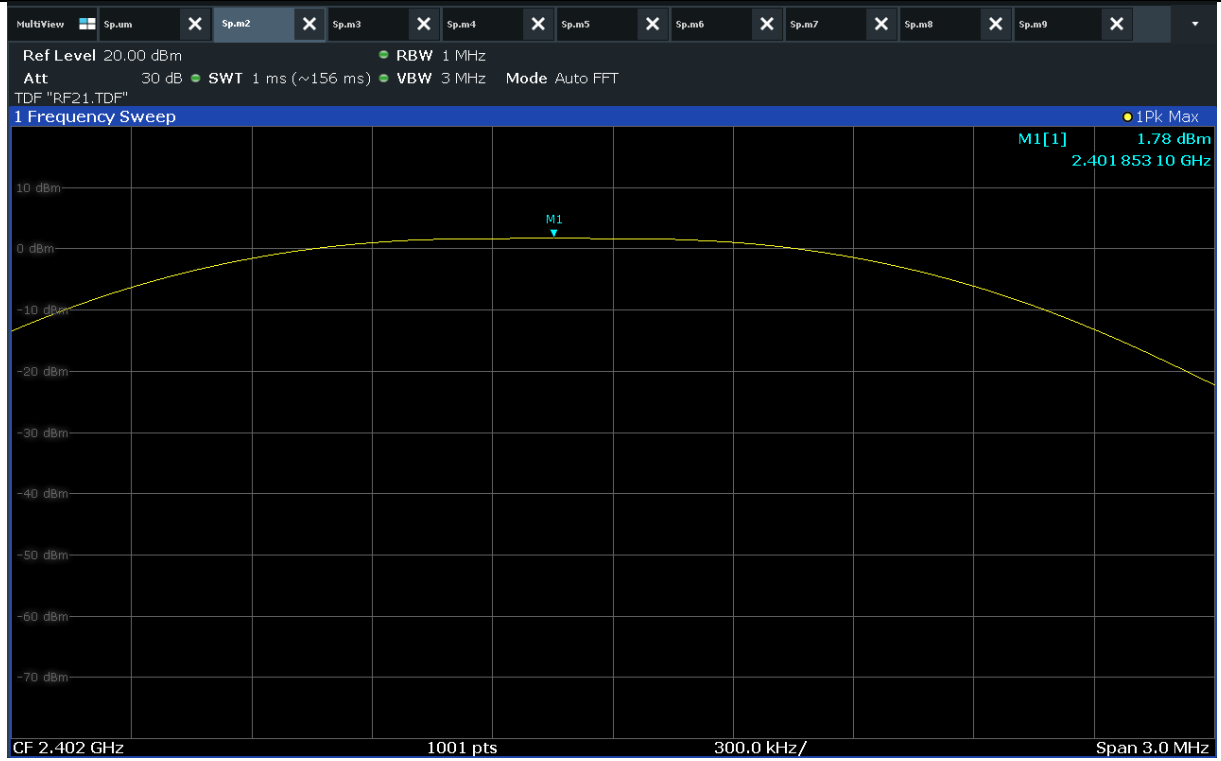
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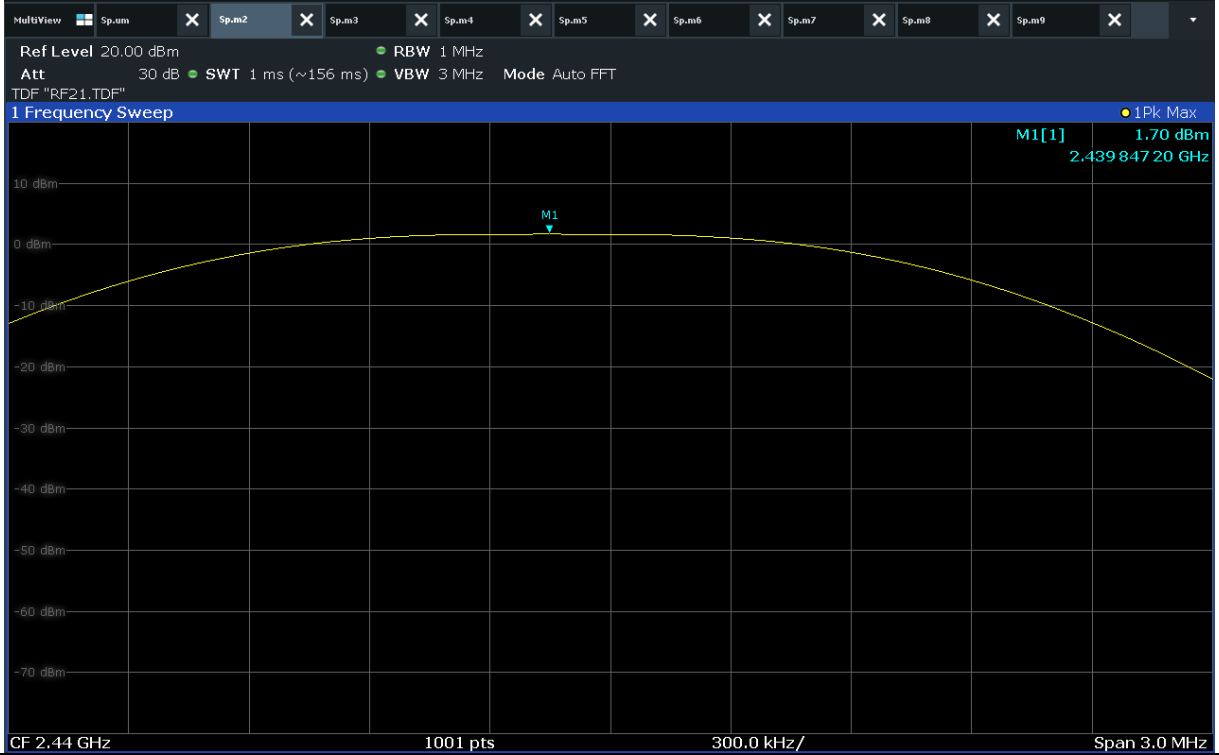
High CH



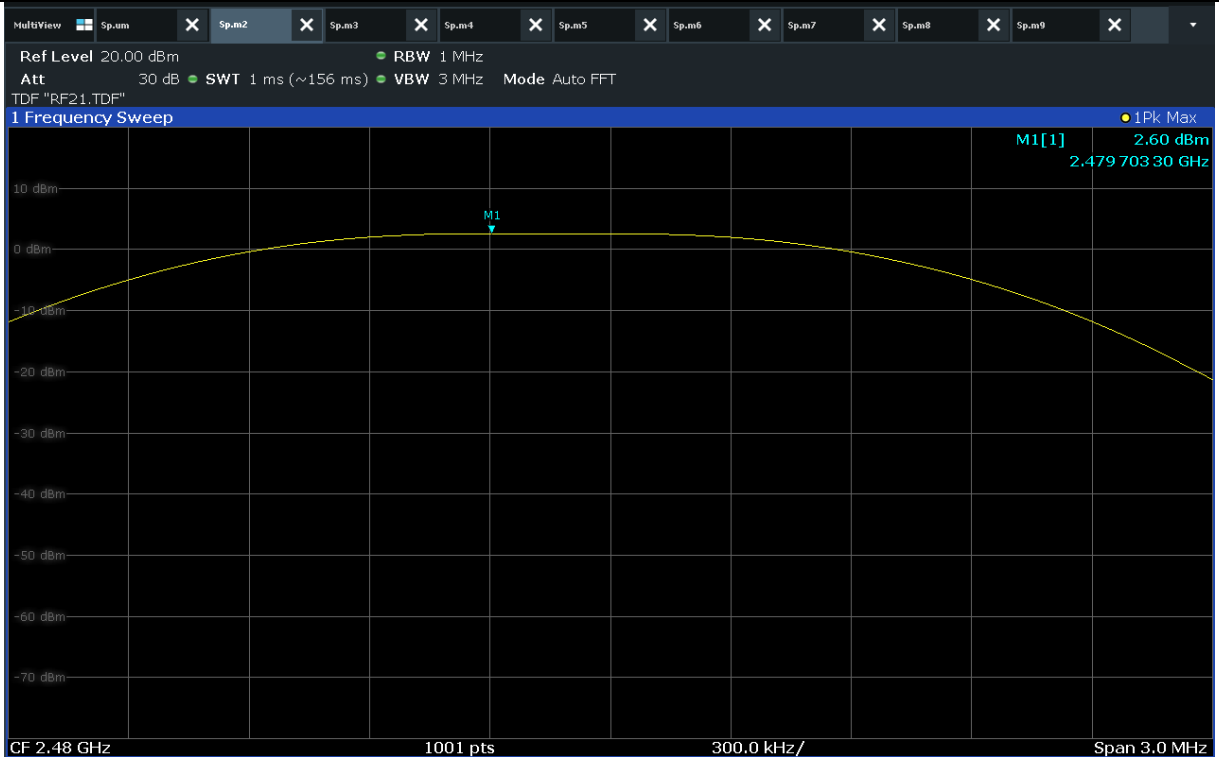
6.3.1.5 Measured Graph for Bluetooth LE



Low CH



Mid CH



High CH



7. Power Spectral Density

7.1 Operating environment

Temperature : 25 °C

Relative humidity : 46 %

7.2 Measurement method

Standard : §15.247 (e)

7.3 Test data

Operating mode : Transmit mode

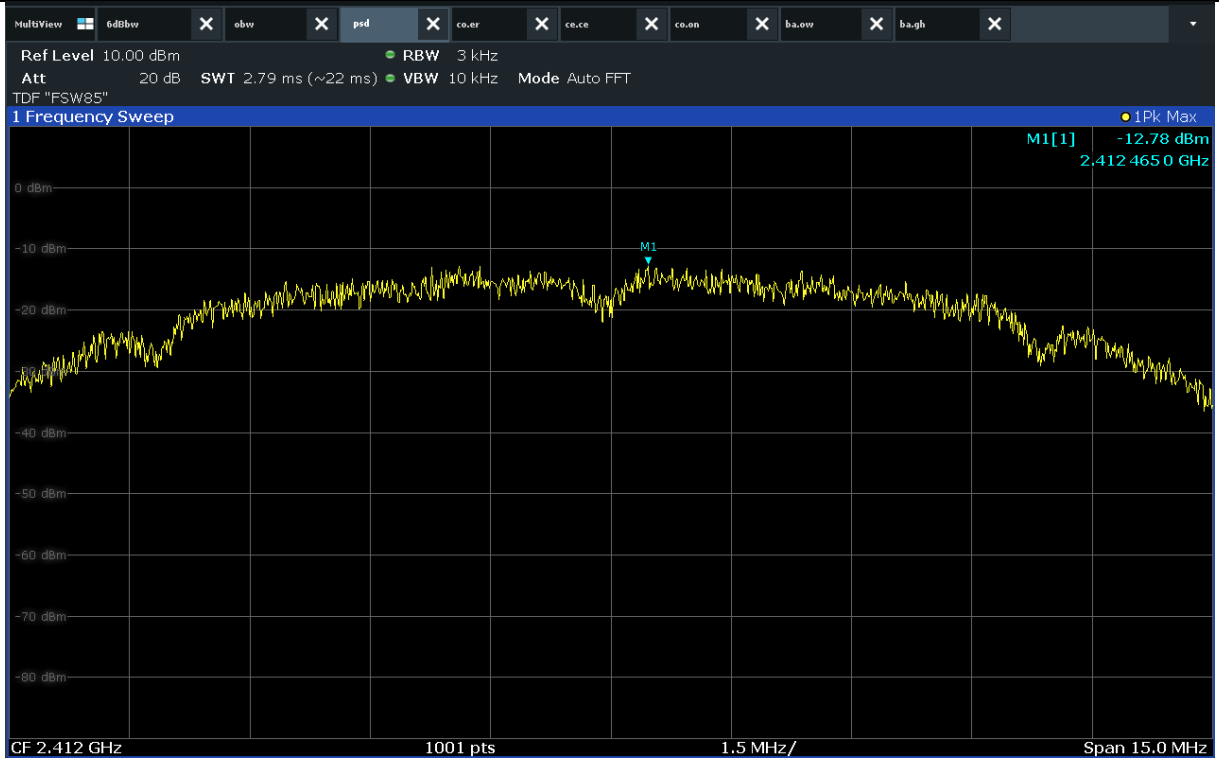
Test Result : Pass

7.3.1 Measured Results

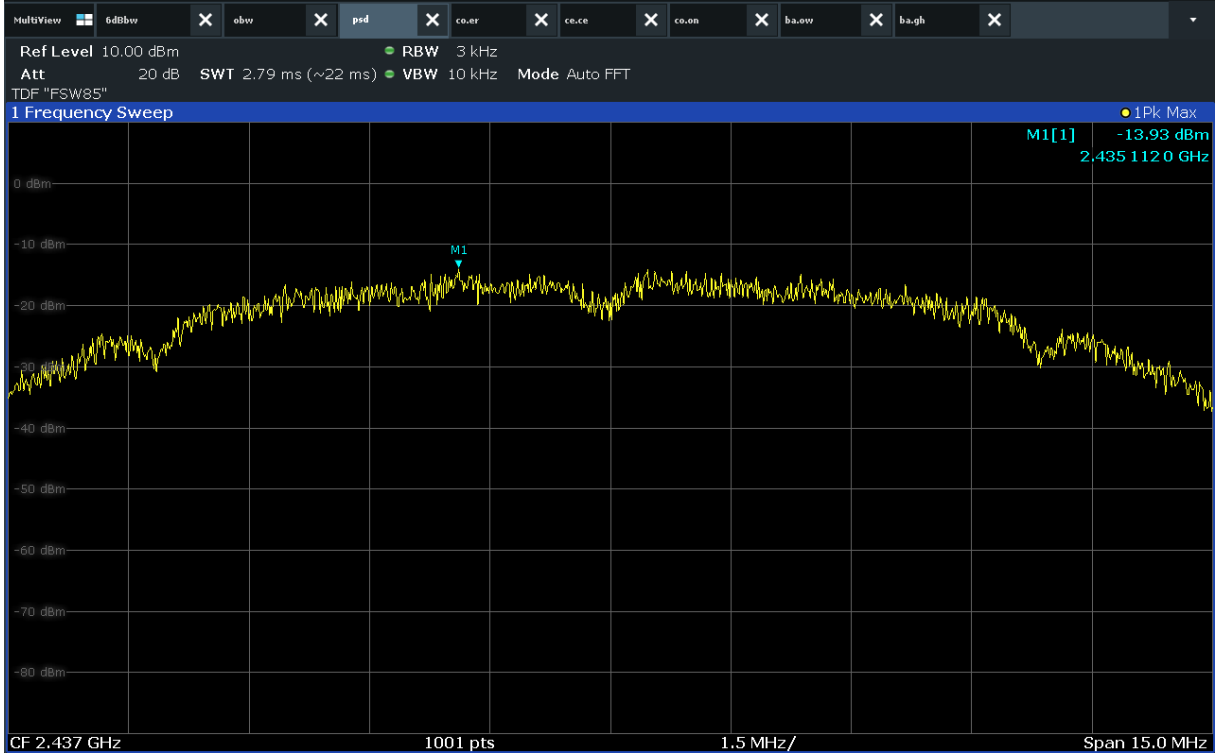
Modulation Type	Channel (Frequency)	Highest signal level (dBm)	Limit (dBm/3kHz)
802.11b	1 (2 412 MHz)	-12.78	8
	6 (2 437 MHz)	-13.93	
	11 (2 462 MHz)	-14.42	
802.11g	1 (2 412 MHz)	-16.10	
	6 (2 437 MHz)	-17.21	
	11 (2 462 MHz)	-17.88	
802.11n(HT20)	1 (2 412 MHz)	-15.67	
	6 (2 437 MHz)	-16.80	
	11 (2 462 MHz)	-17.44	
802.11n(HT40)	3 (2 422 MHz)	-17.84	
	6 (2 437 MHz)	-19.36	
	9 (2 452 MHz)	-18.40	
Bluetooth LE	0 (2 402 MHz)	-14.75	
	19 (2 440 MHz)	-13.91	
	39 (2 480 MHz)	-12.88	



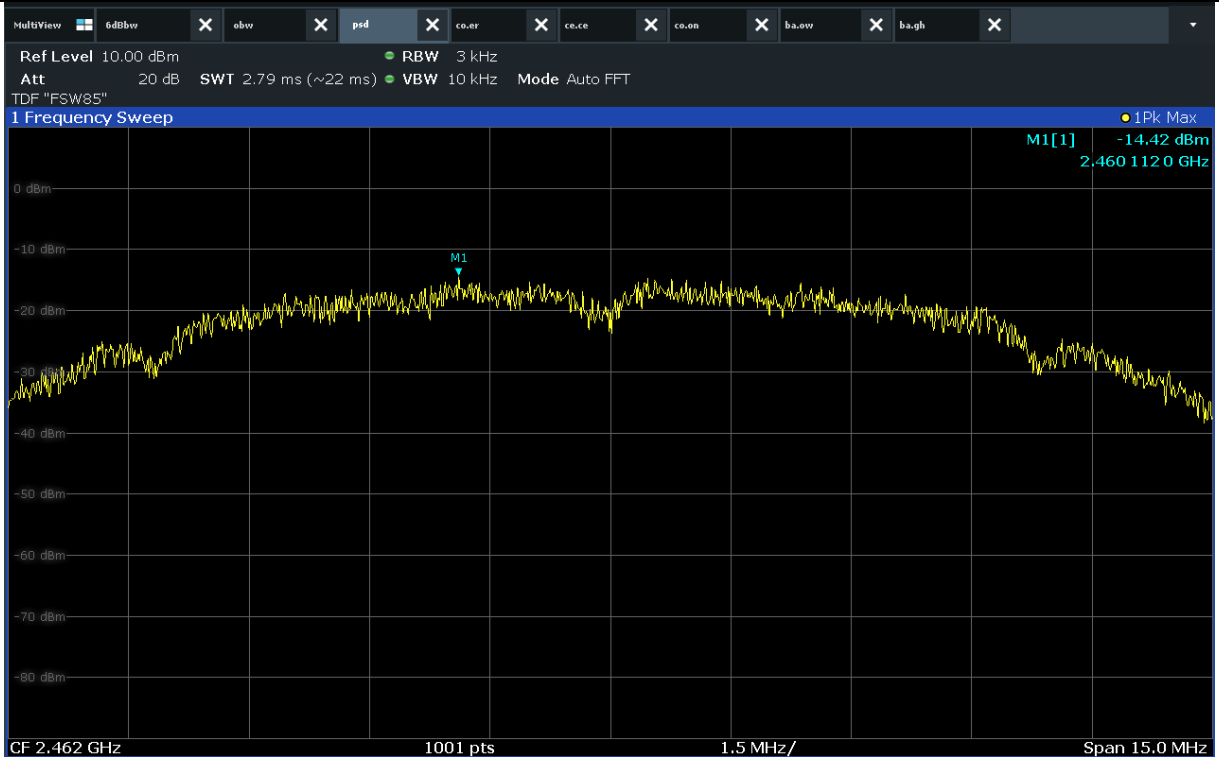
7.3.1.1 Measured Graph for 802.11b



Low CH



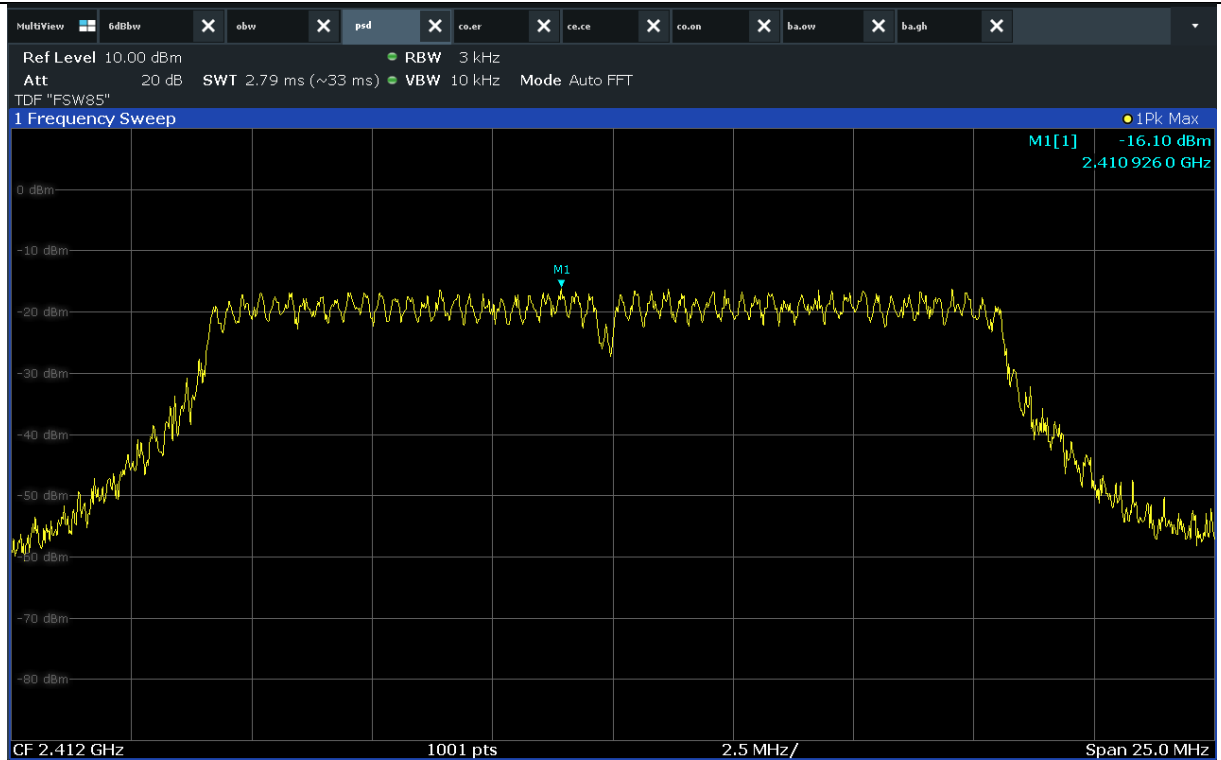
Mid CH



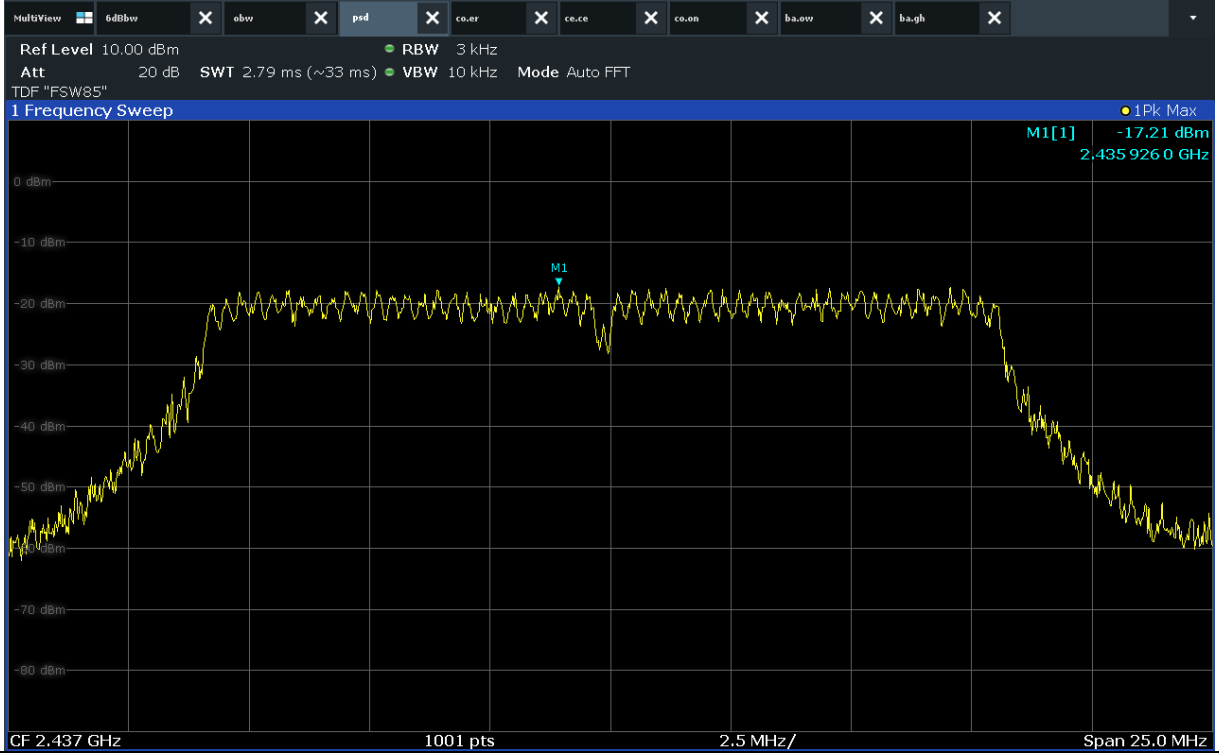
High CH



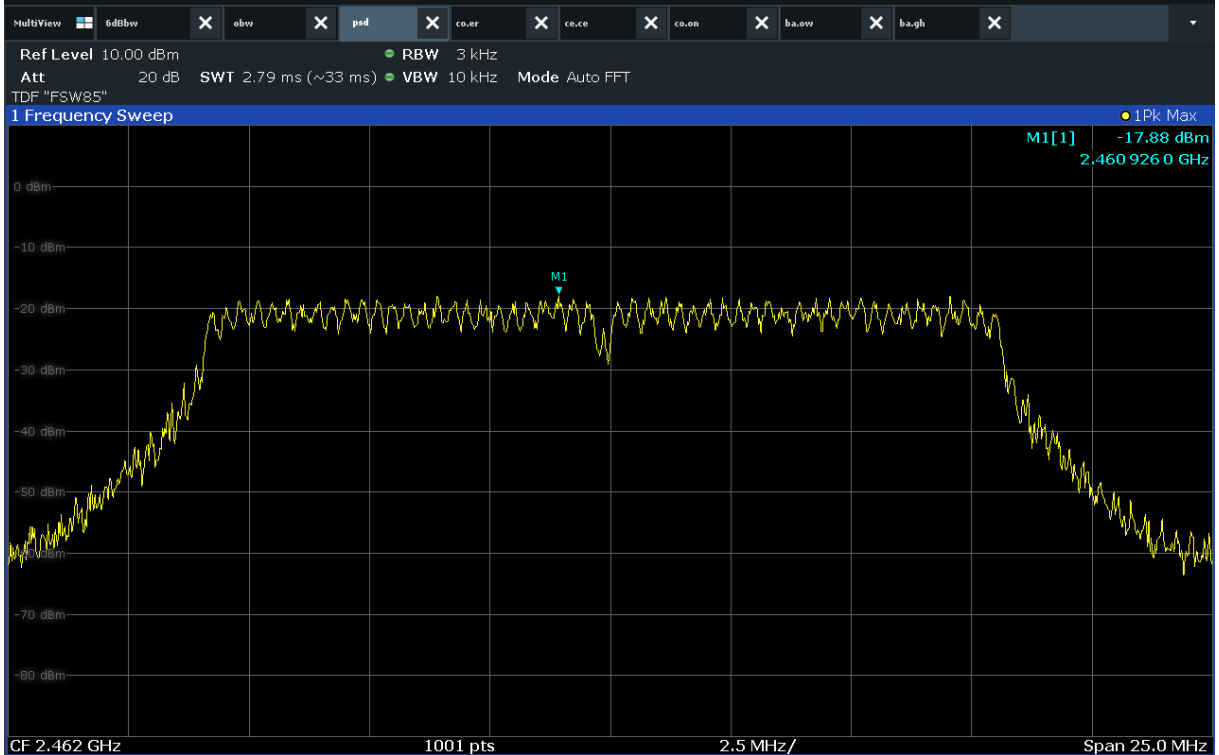
7.3.1.2 Measured Graph for 802.11g



Low CH



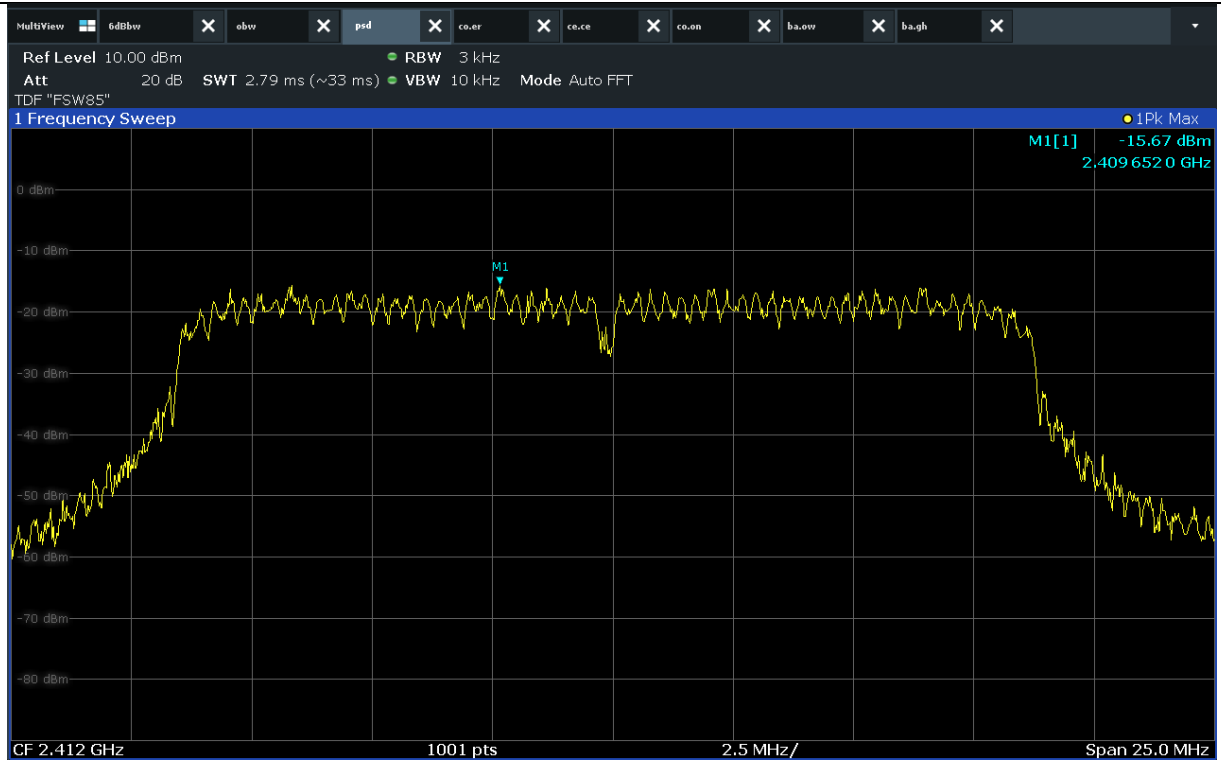
Mid CH



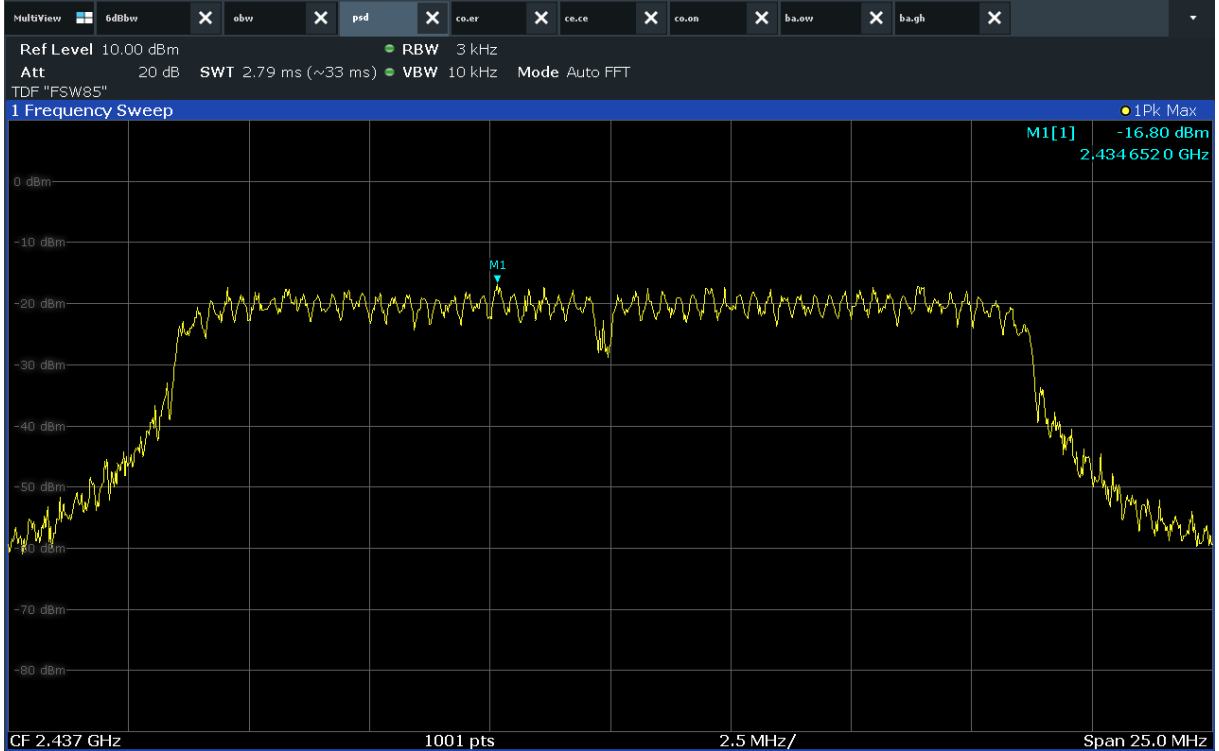
High CH



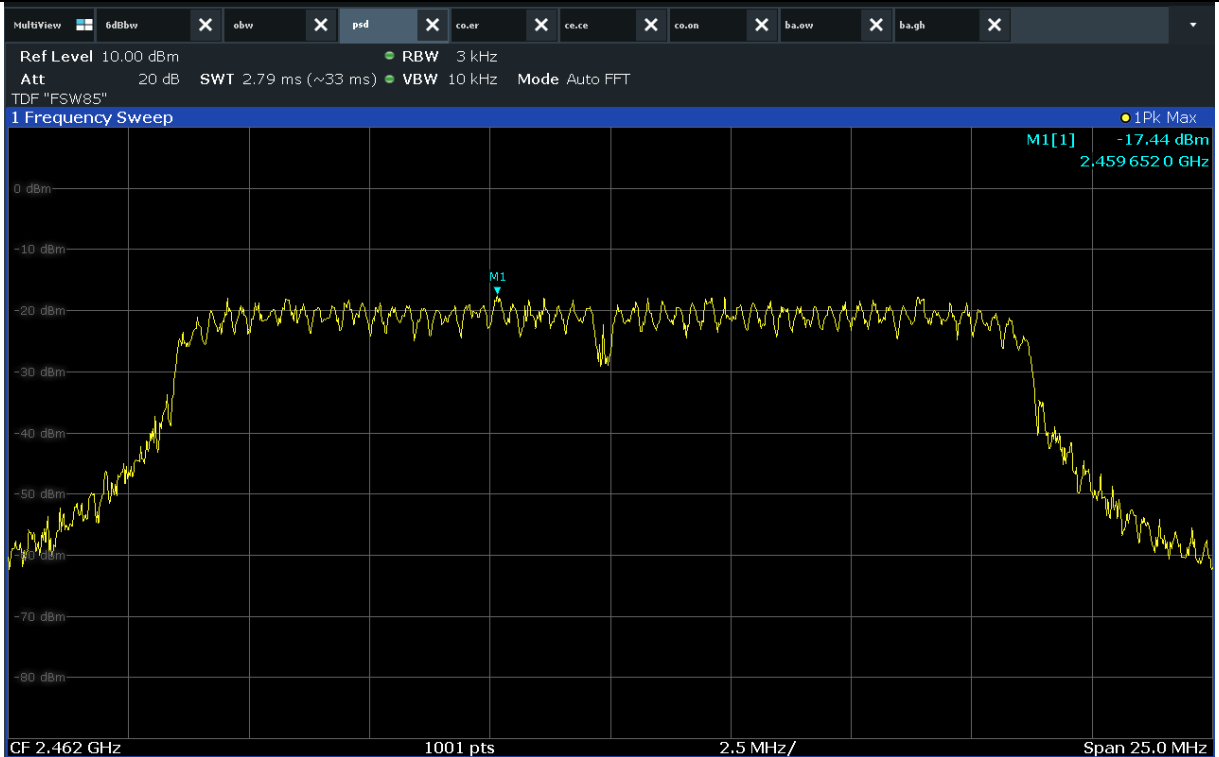
7.3.1.3 Measured Graph for 802.11n(HT20)



Low CH



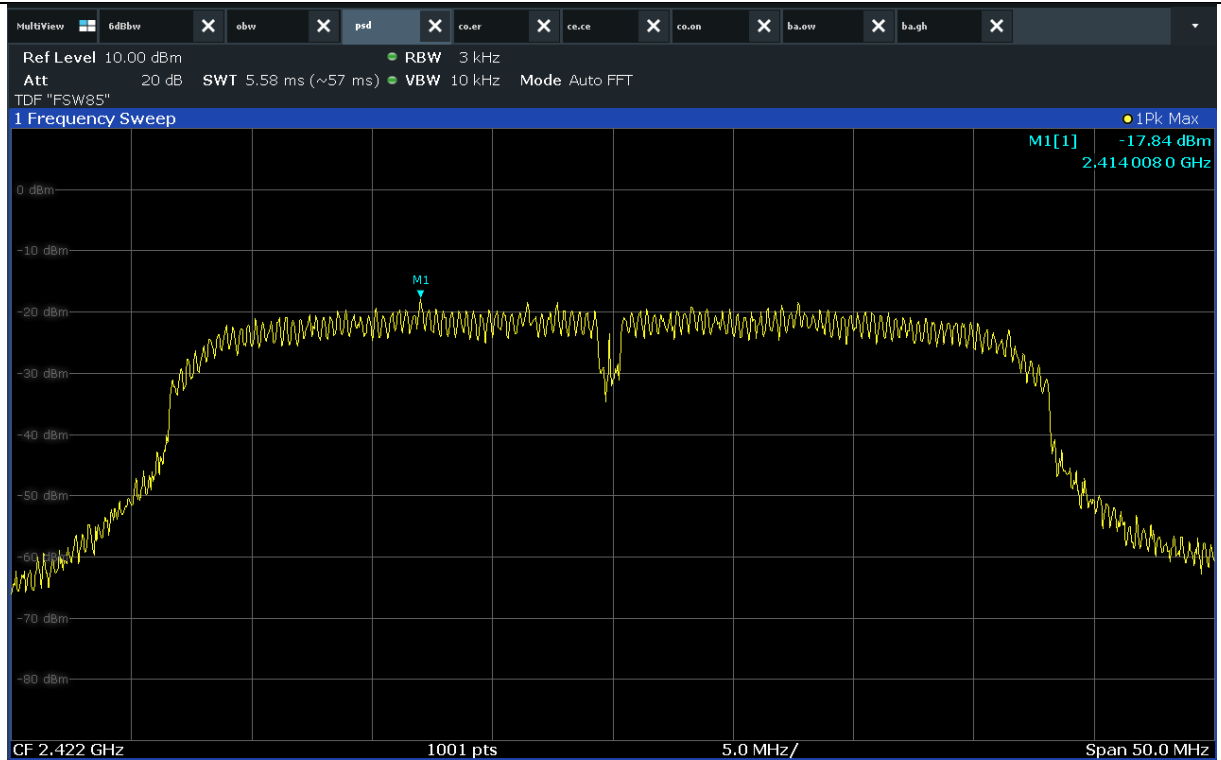
Mid CH



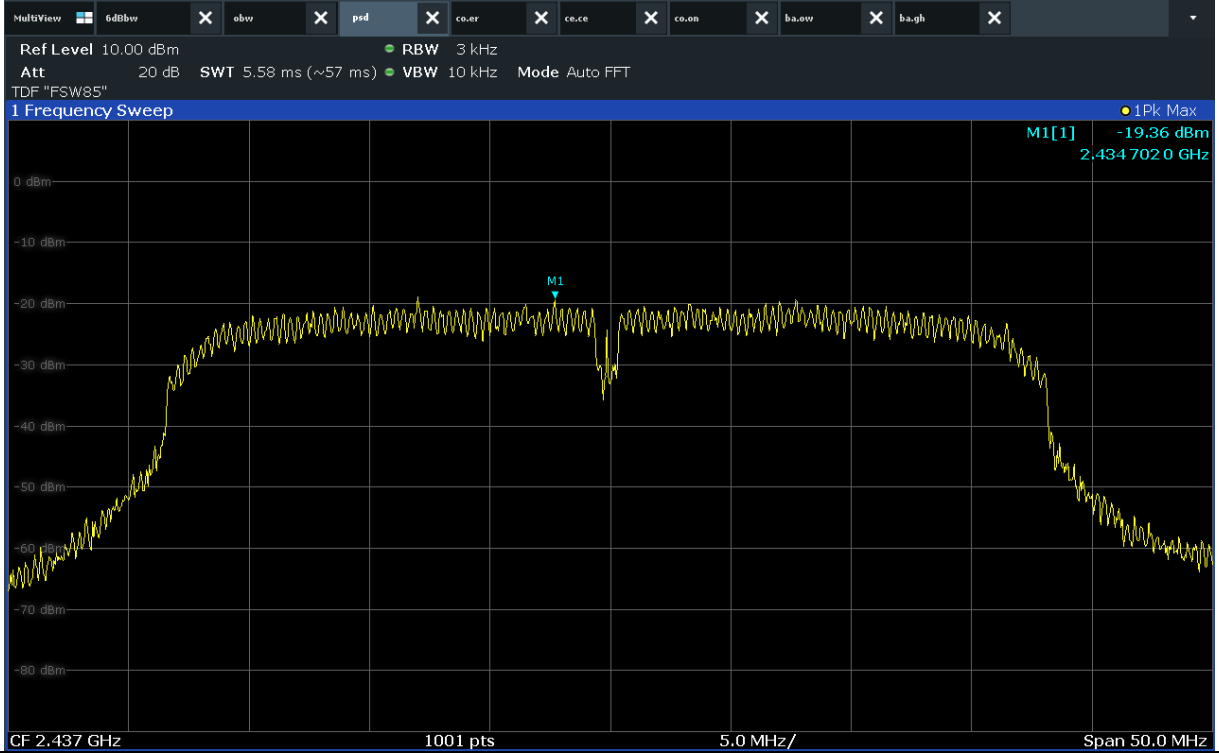
High CH



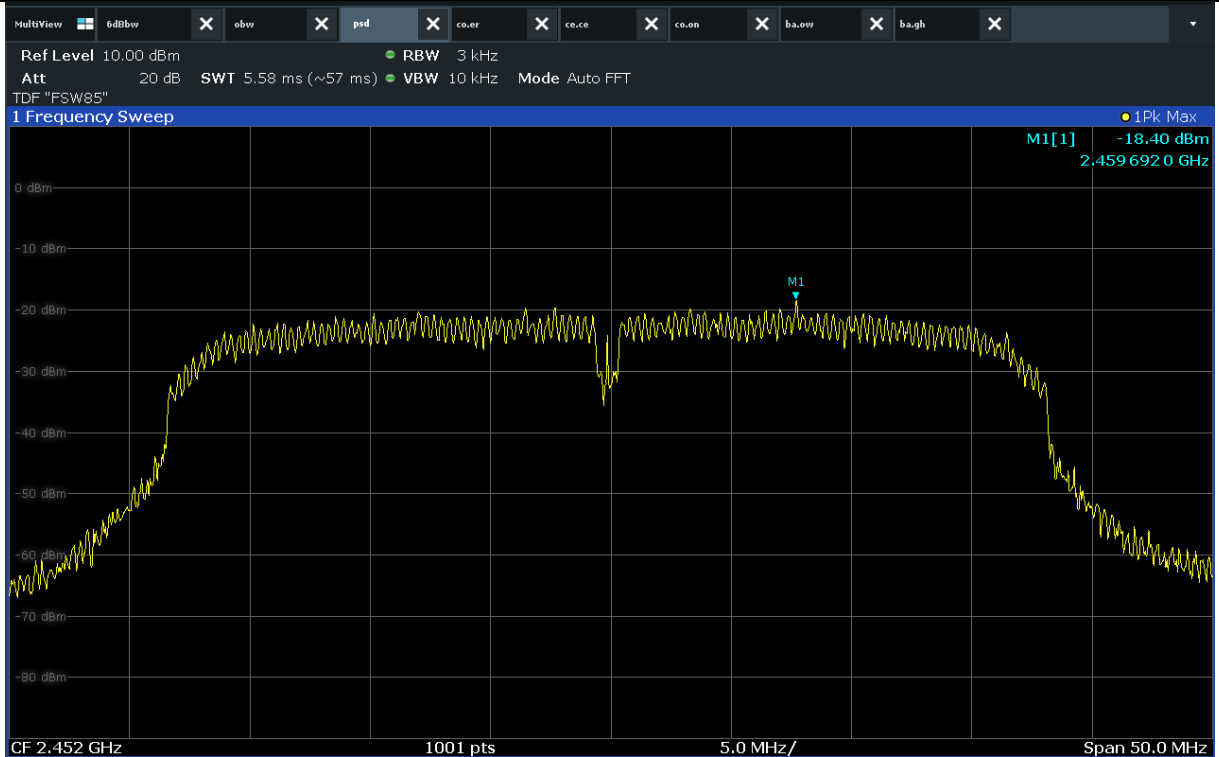
7.3.1.4 Measured Graph for 802.11n(HT40)



Low CH



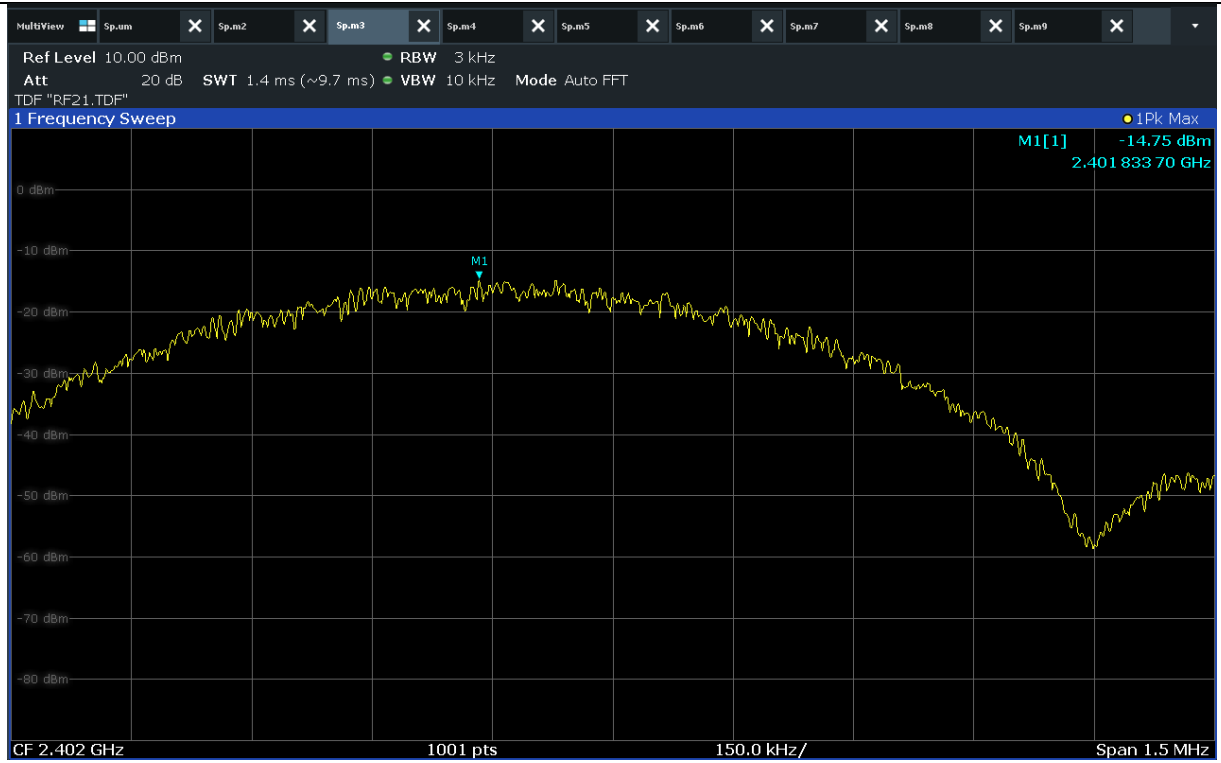
Mid CH



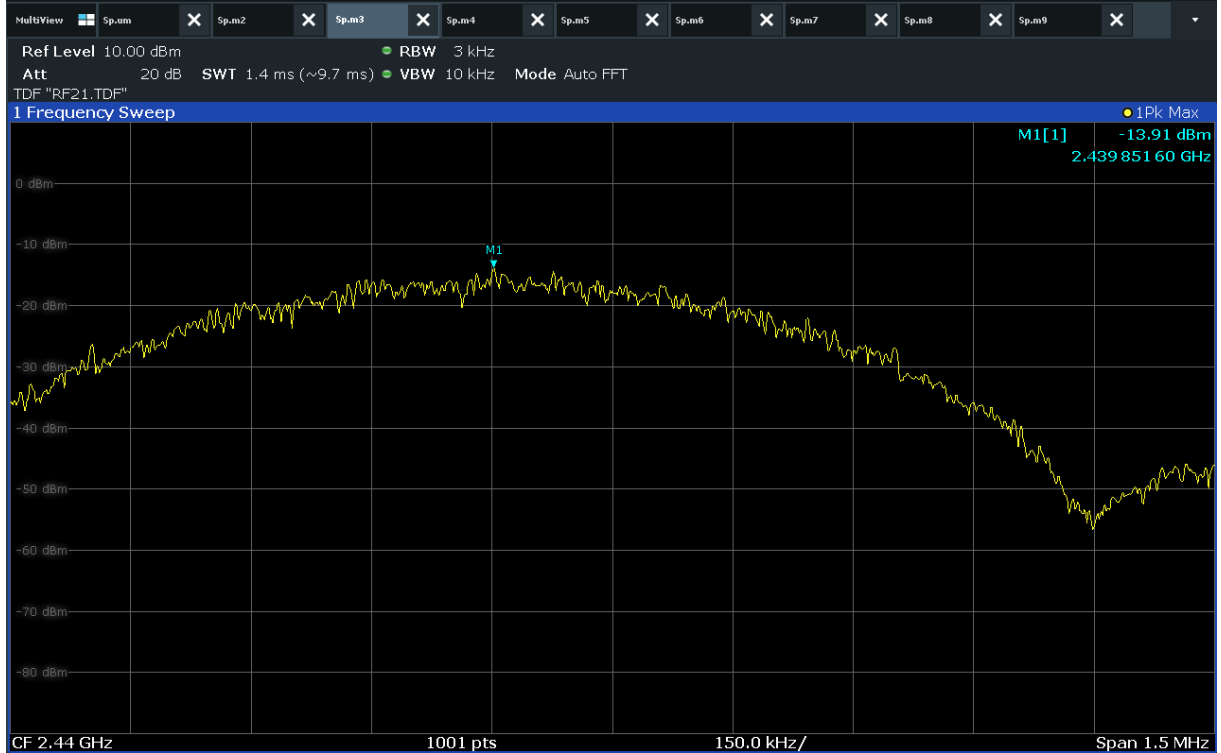
High CH



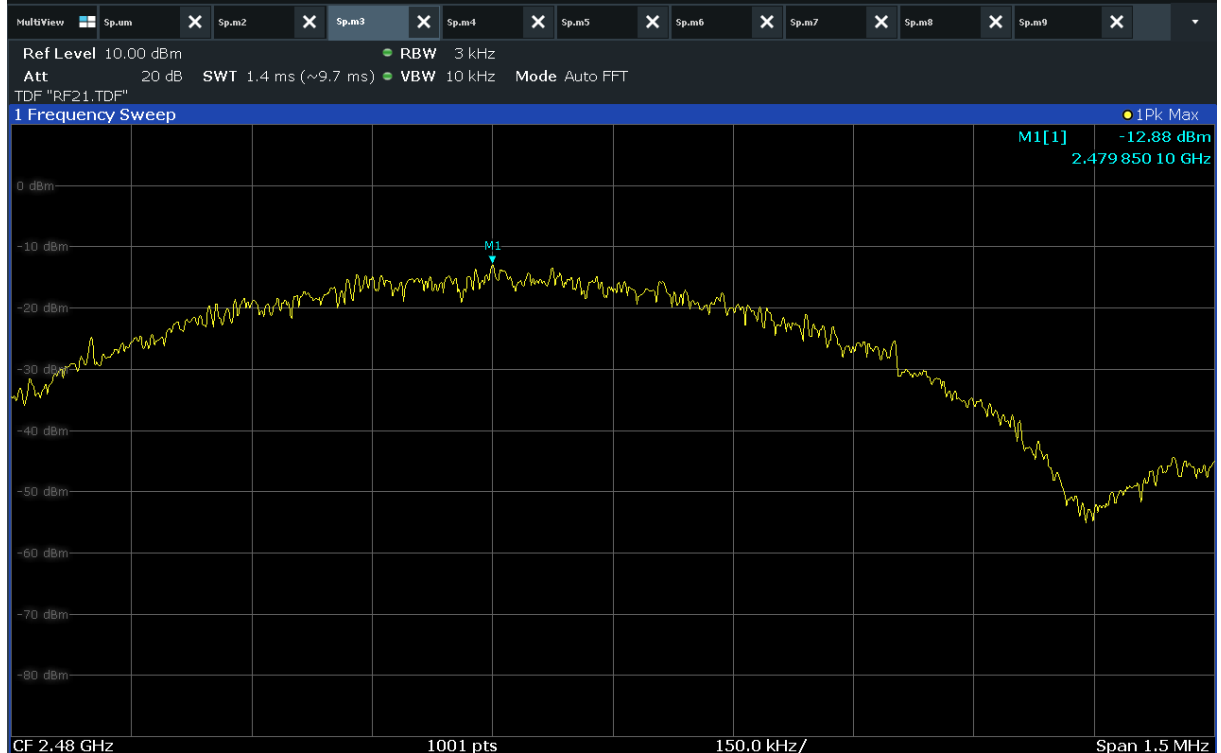
7.3.1.5 Measured Graph for Bluetooth LE



Low CH



Mid CH



High CH



8. Conducted Spurious Emission

8.1 Operating environment

Temperature : 25 °C

Relative humidity : 46 %

8.2 Measurement method

Standard : §15.247 (d)

8.3 Test data

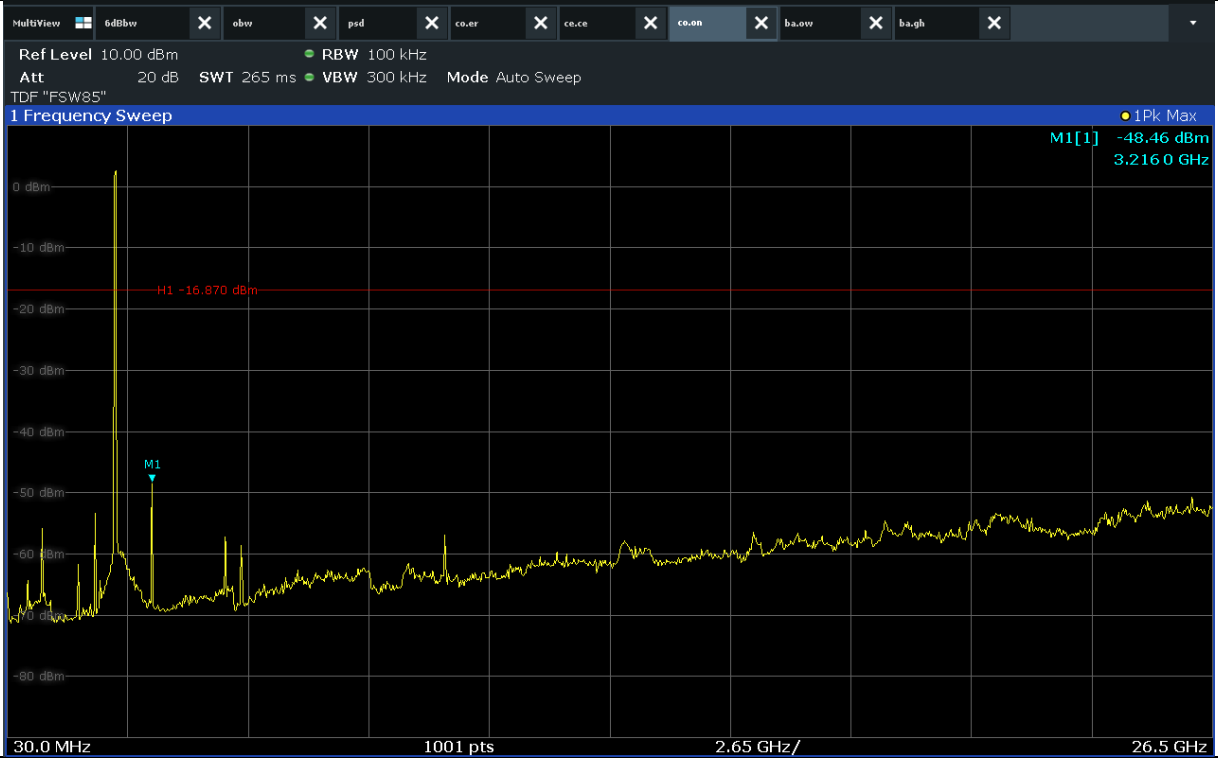
Operating mode : Transmit mode

Test Result : Pass

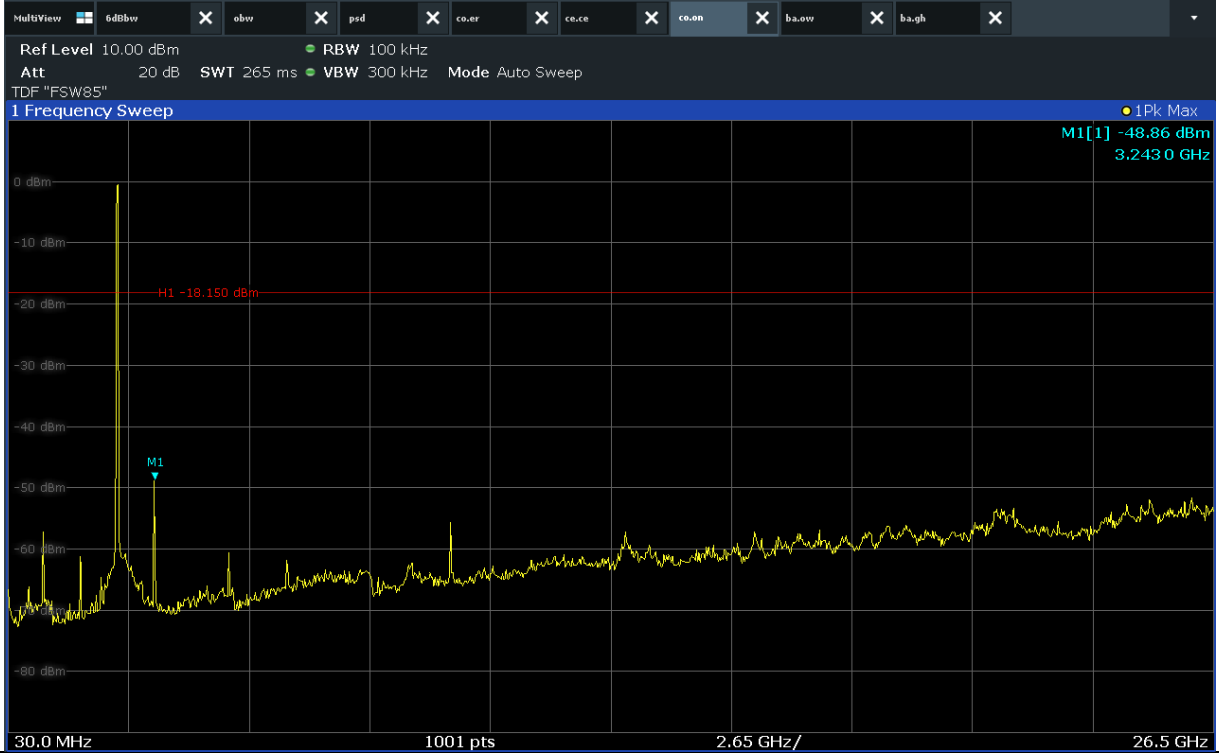
8.3.1 Measured Results



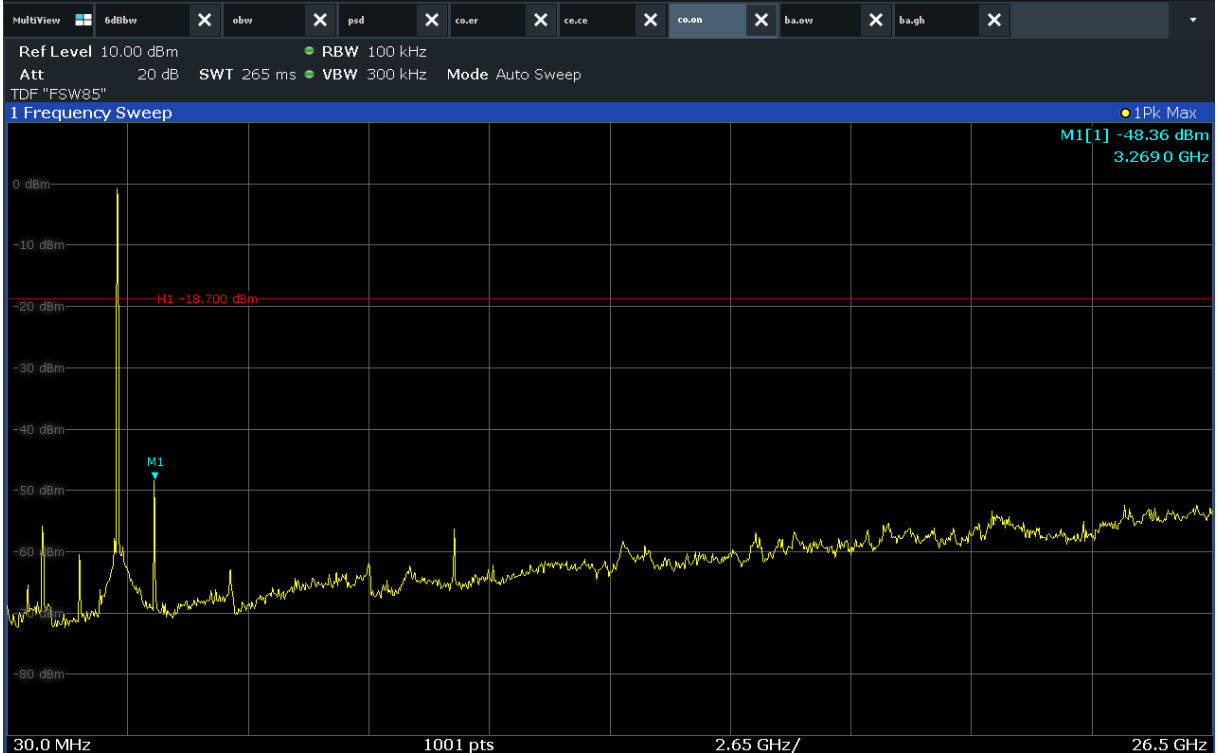
8.3.1.1 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11b



Low CH



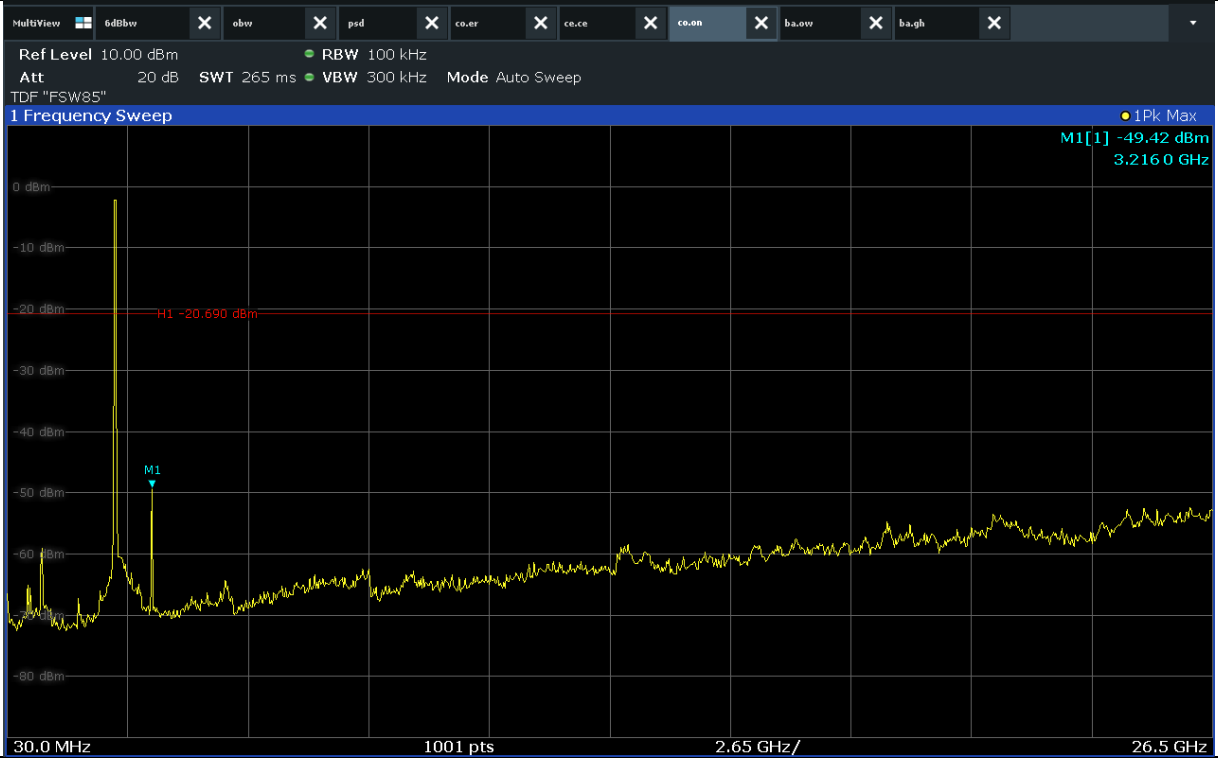
Mid CH



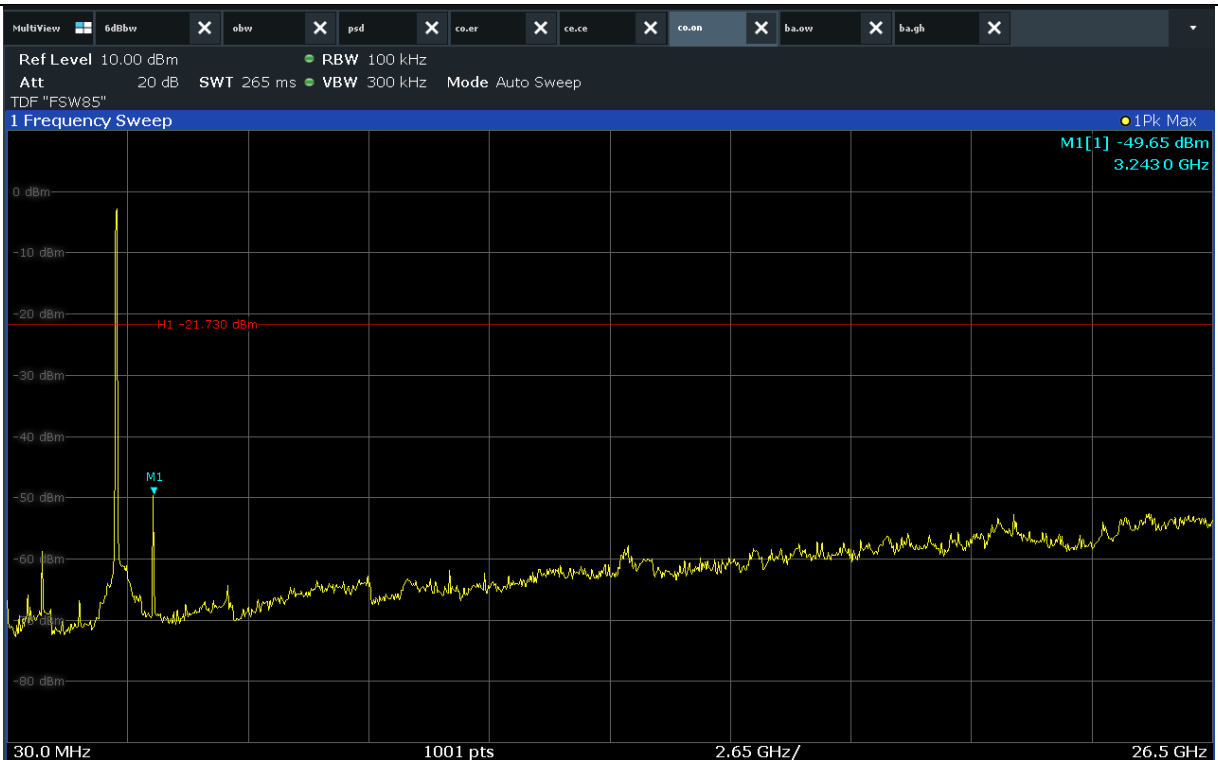
High CH



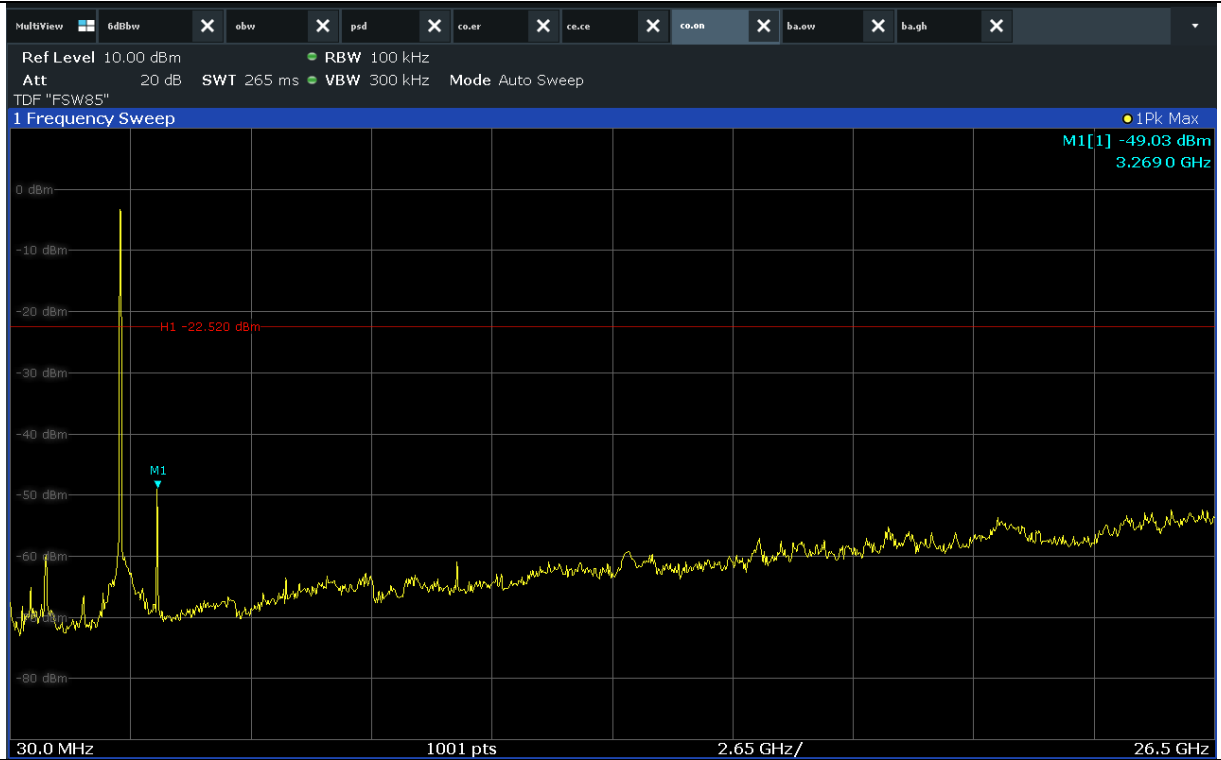
8.3.1.2 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11g



Low CH

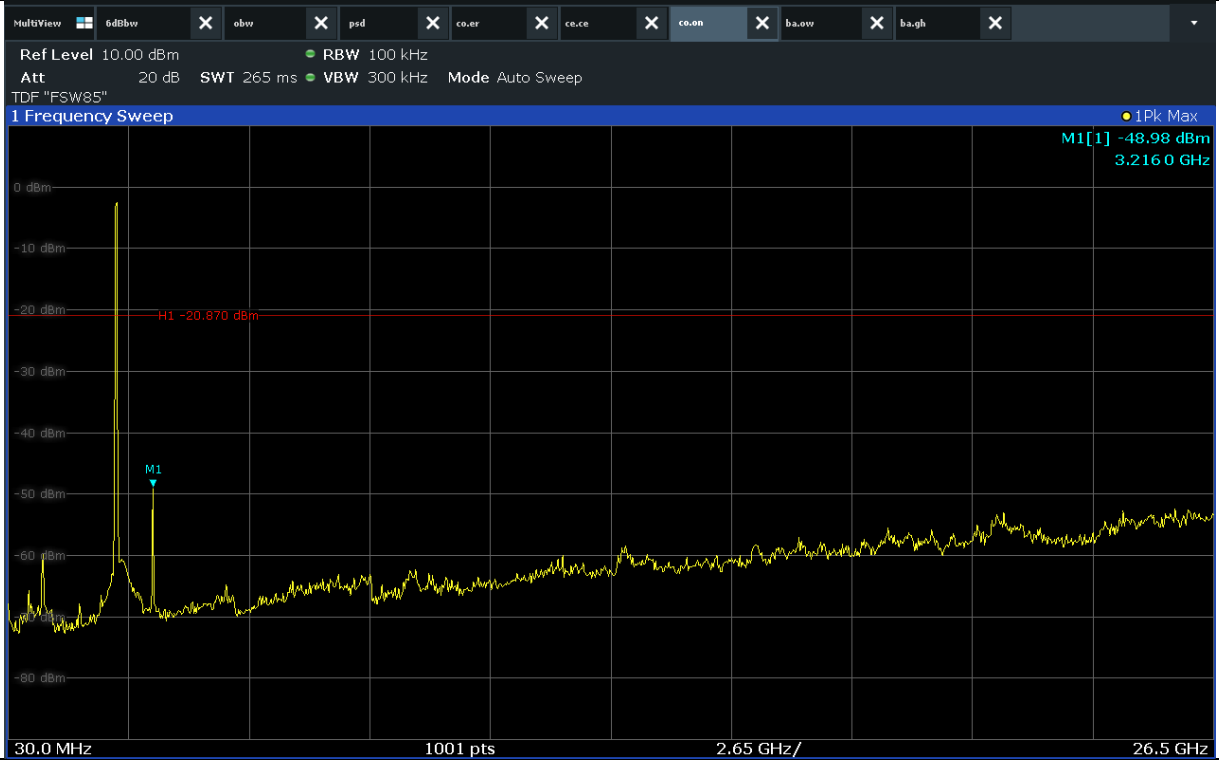


Mid CH

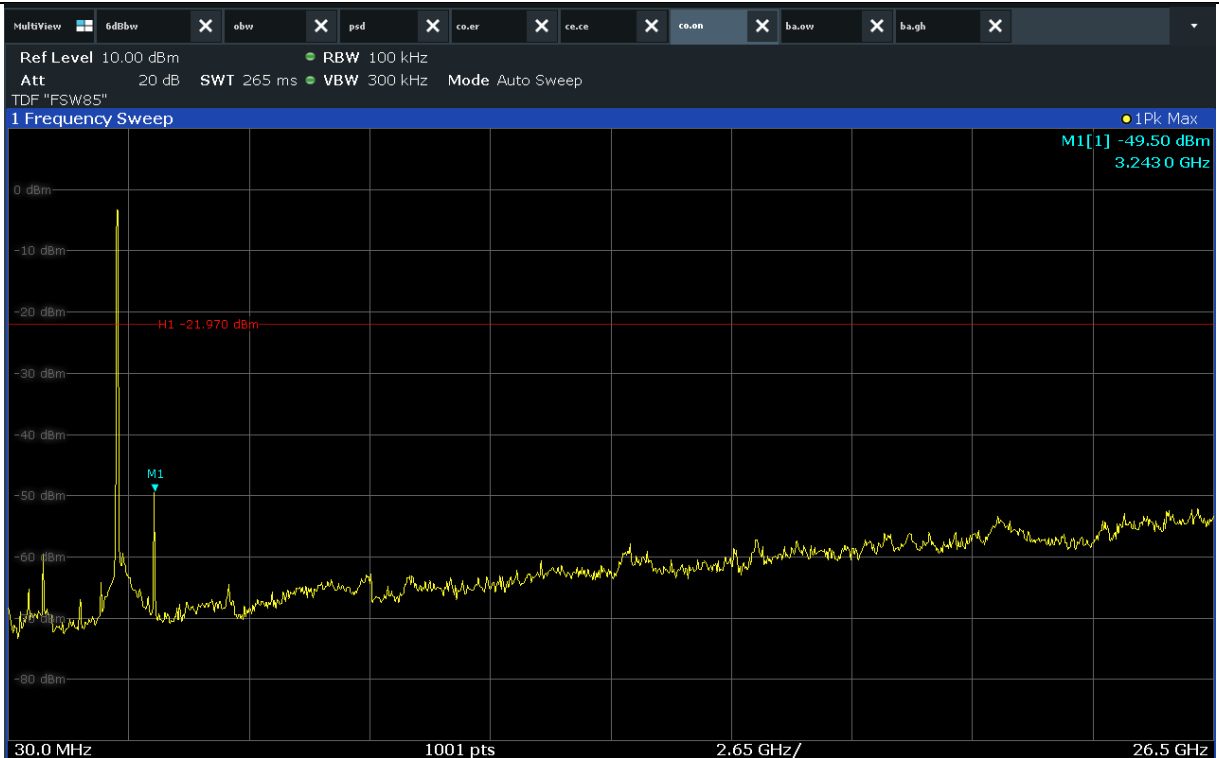




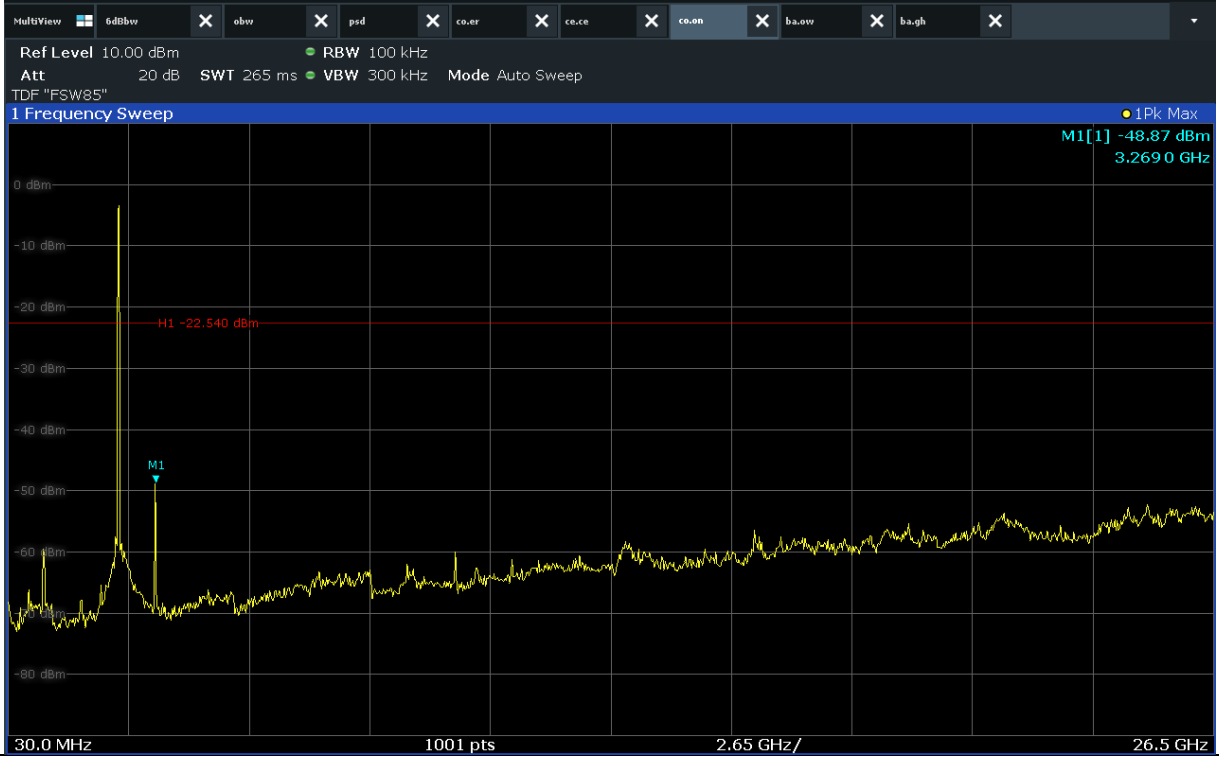
8.3.1.3 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11n(HT20)



Low CH

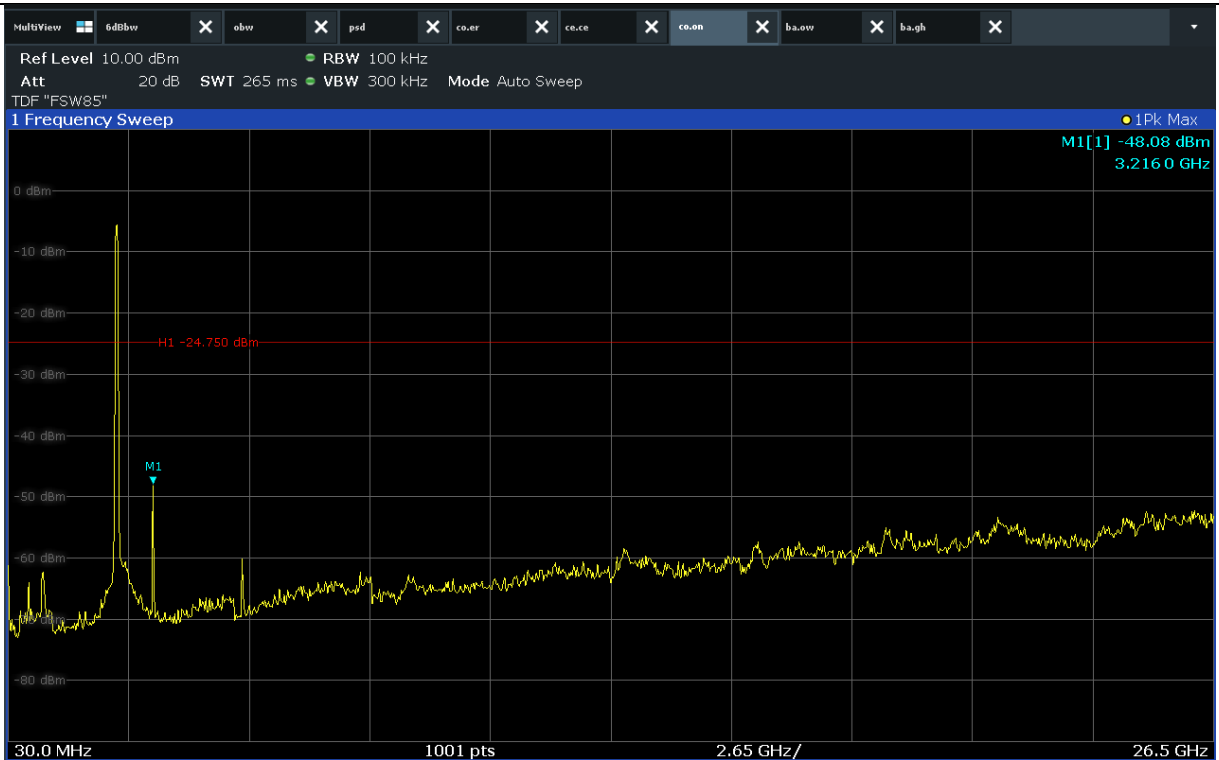


Mid CH

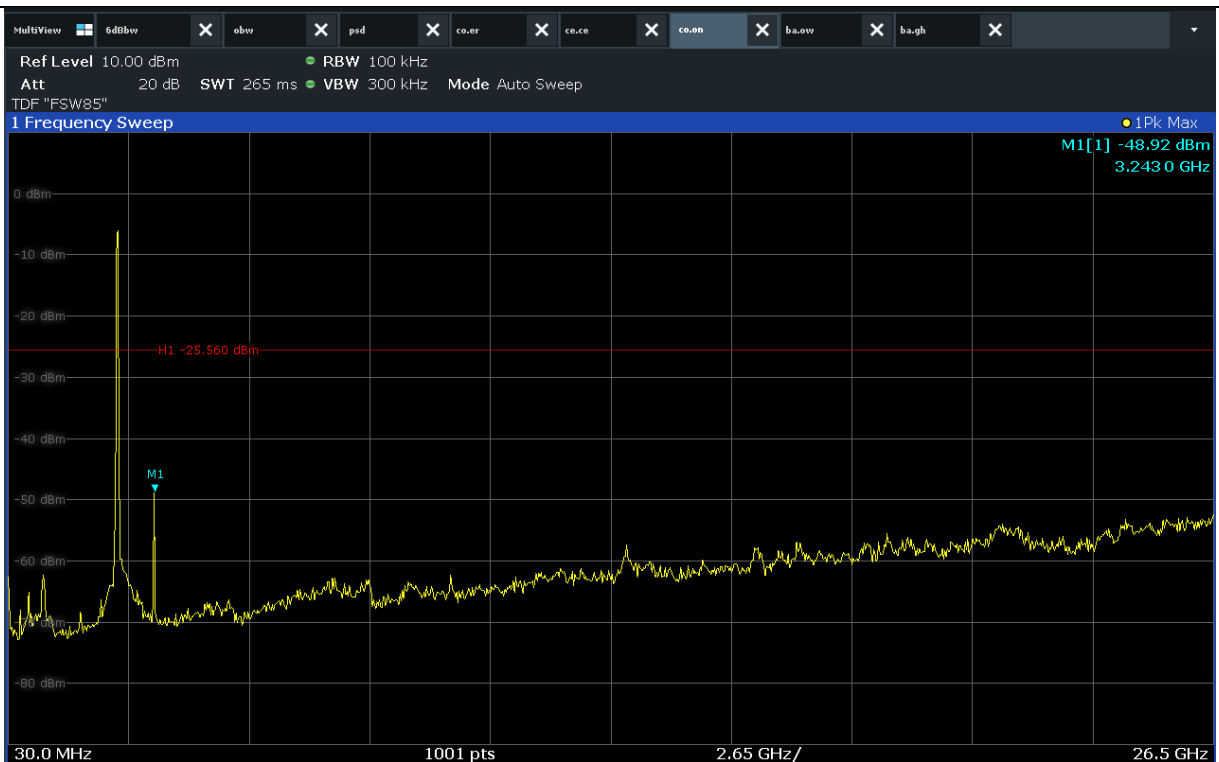




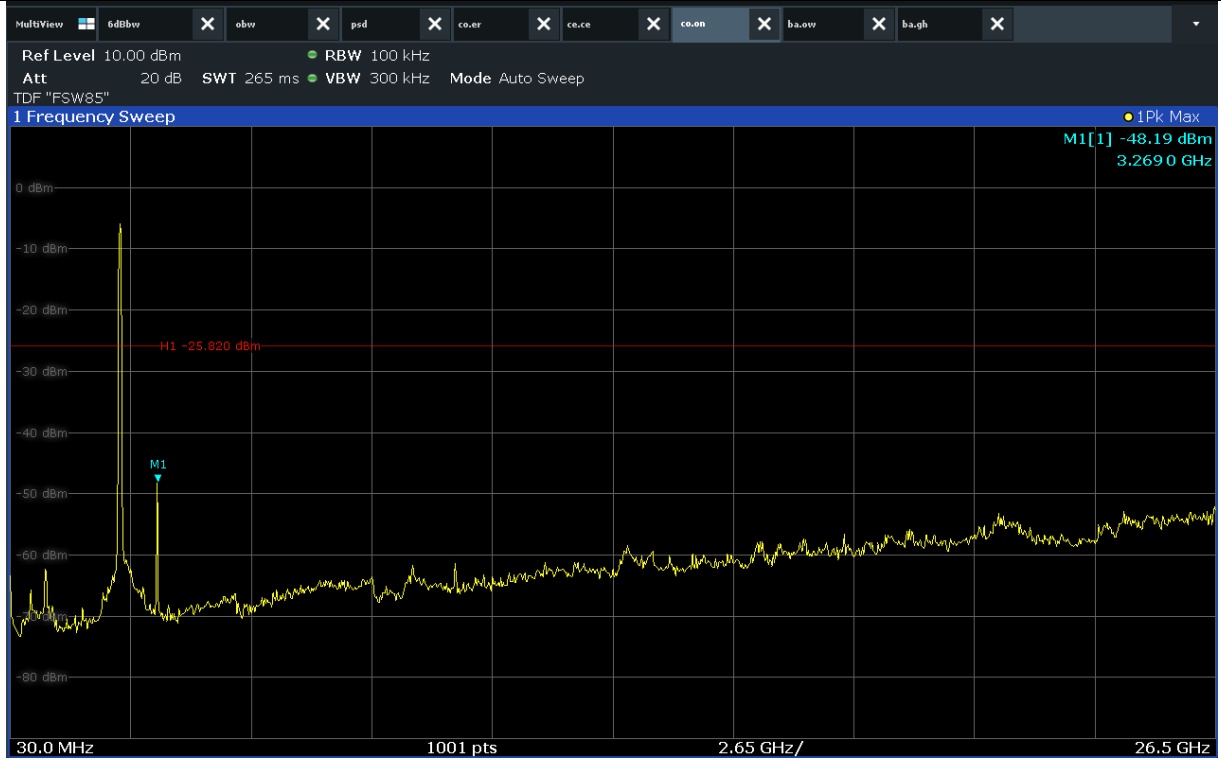
8.3.1.4 Unwanted Emissions In Non-Restricted Frequency Bands for 802.11n(HT40)



Low CH



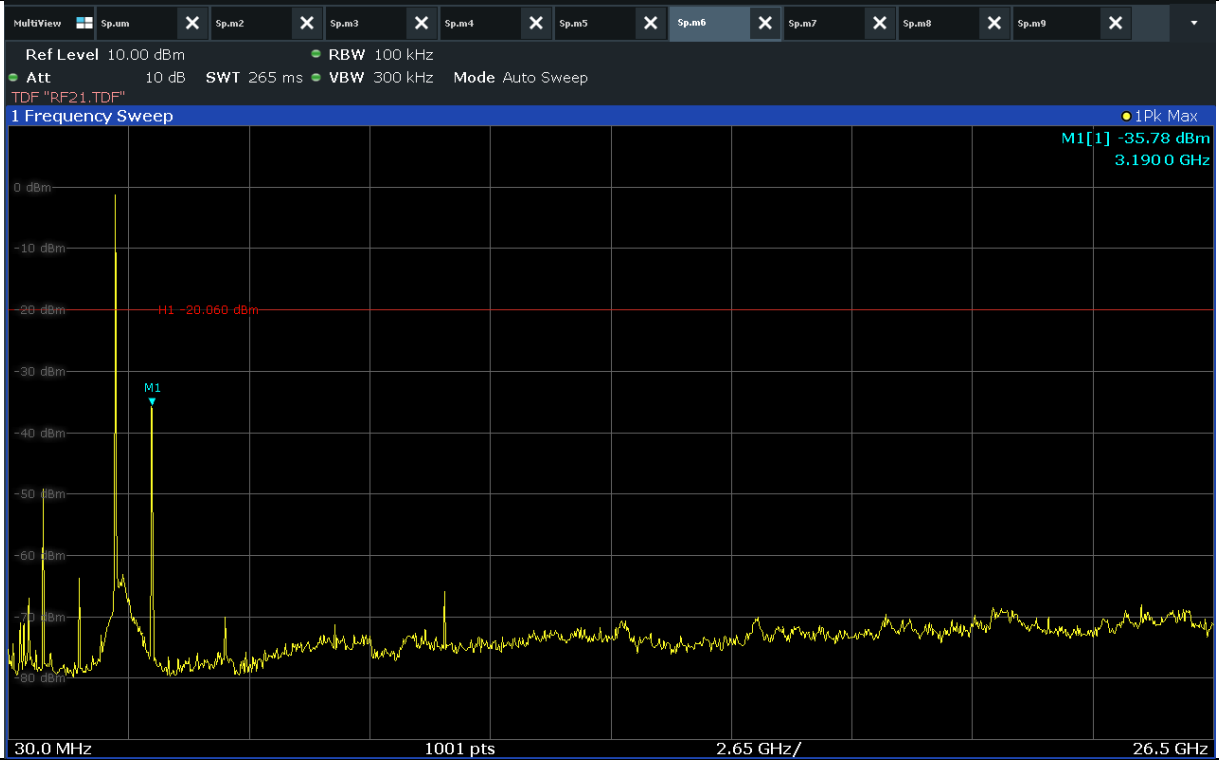
Mid CH



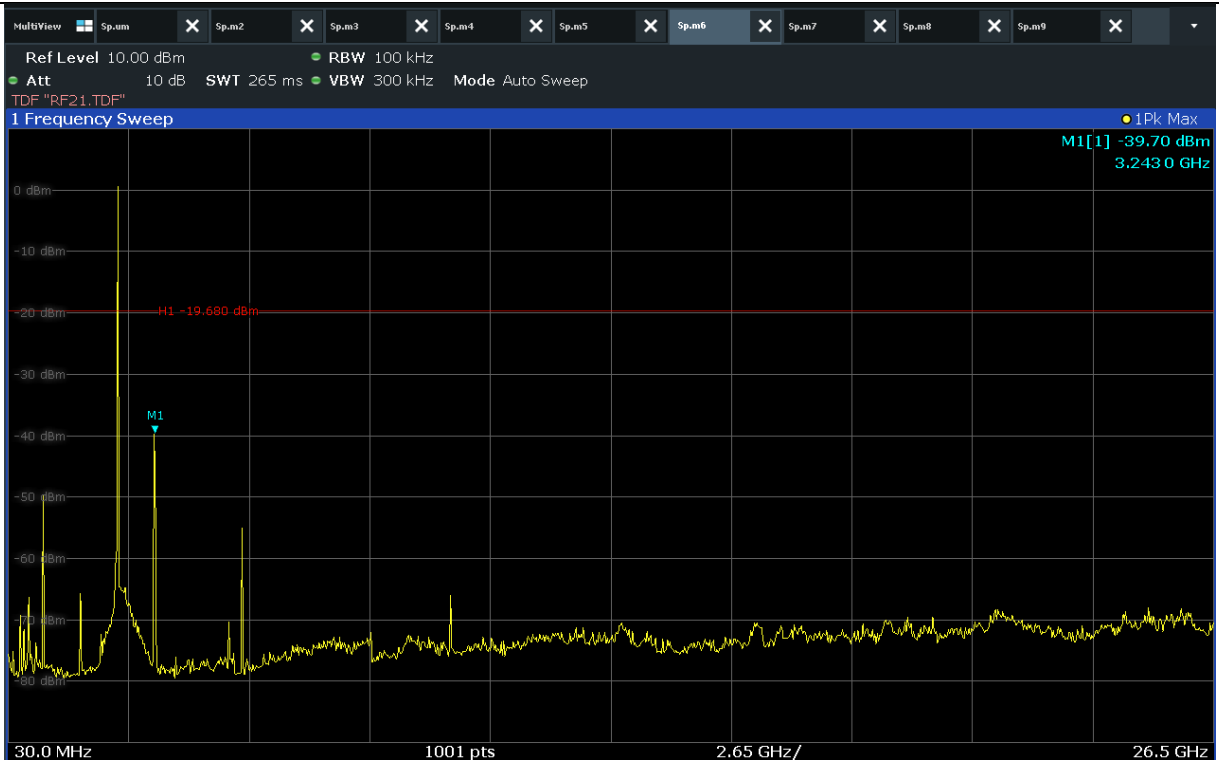
High CH



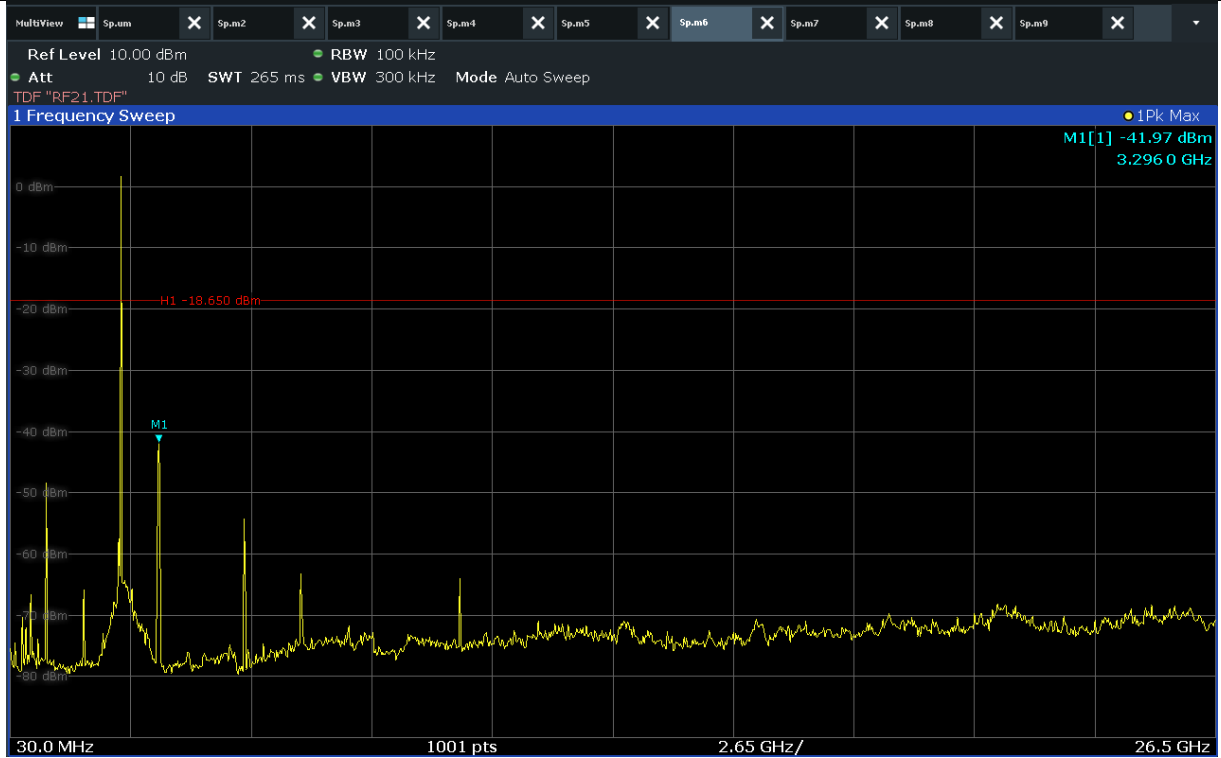
8.3.1.5 Unwanted Emissions In Non-Restricted Frequency Bands for Bluetooth LE



Low CH



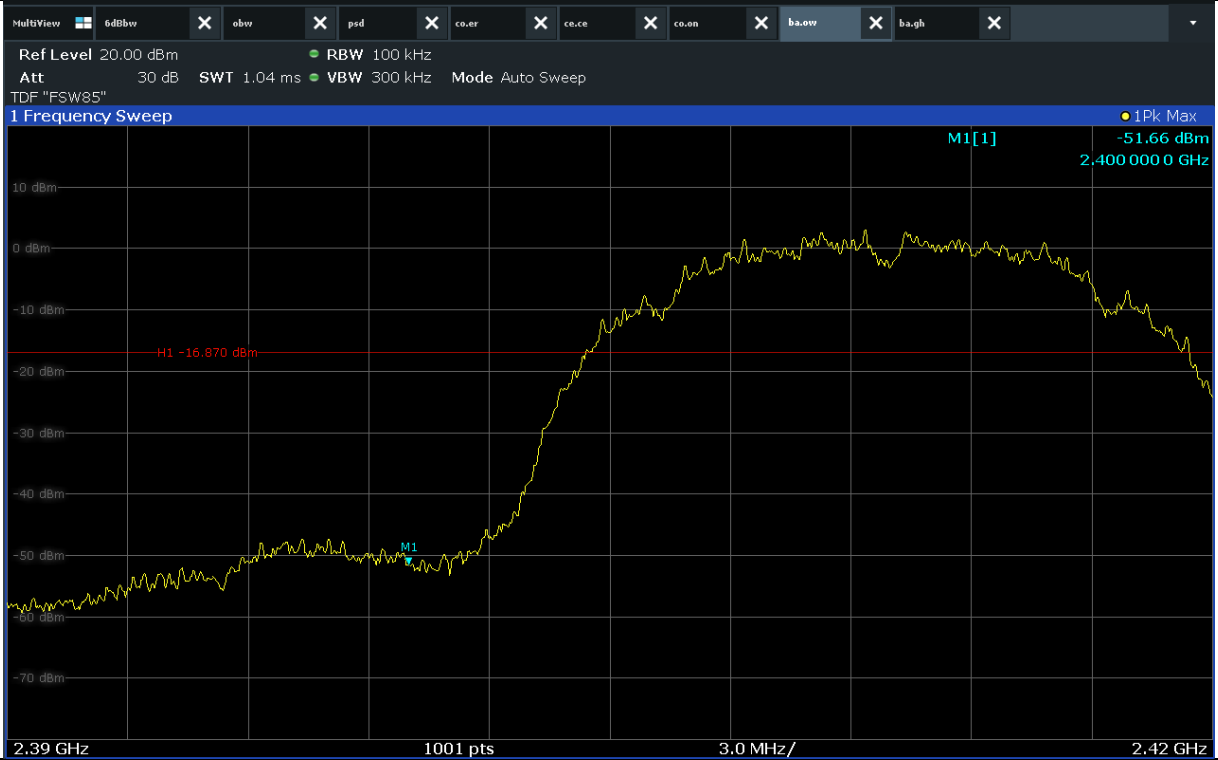
Mid CH



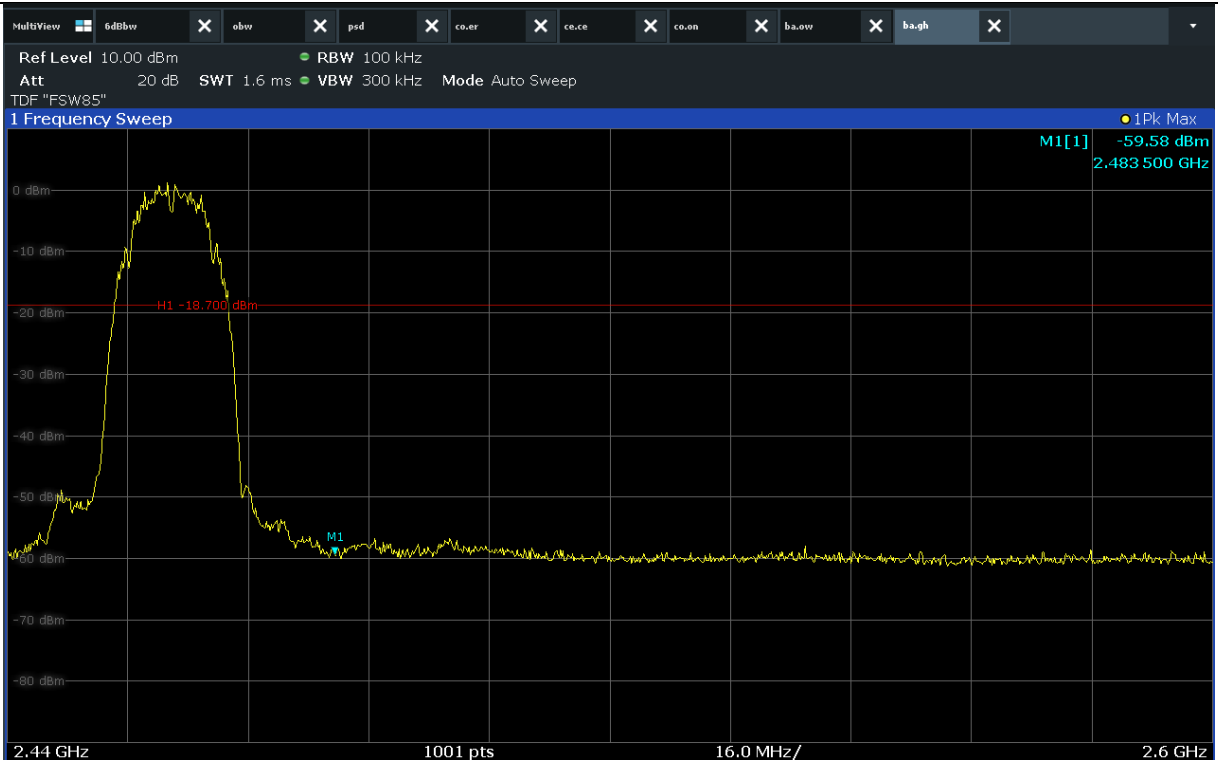
High CH



8.3.1.6 Band Edge for 802.11b



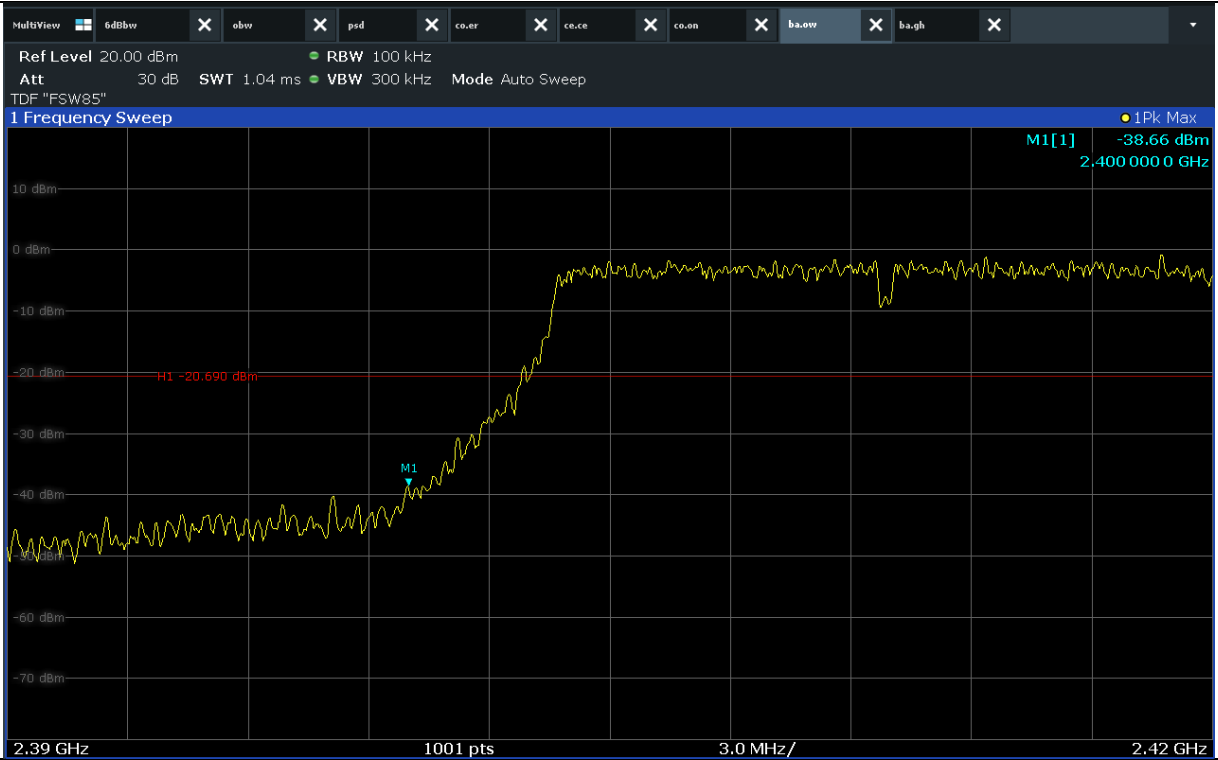
Low CH



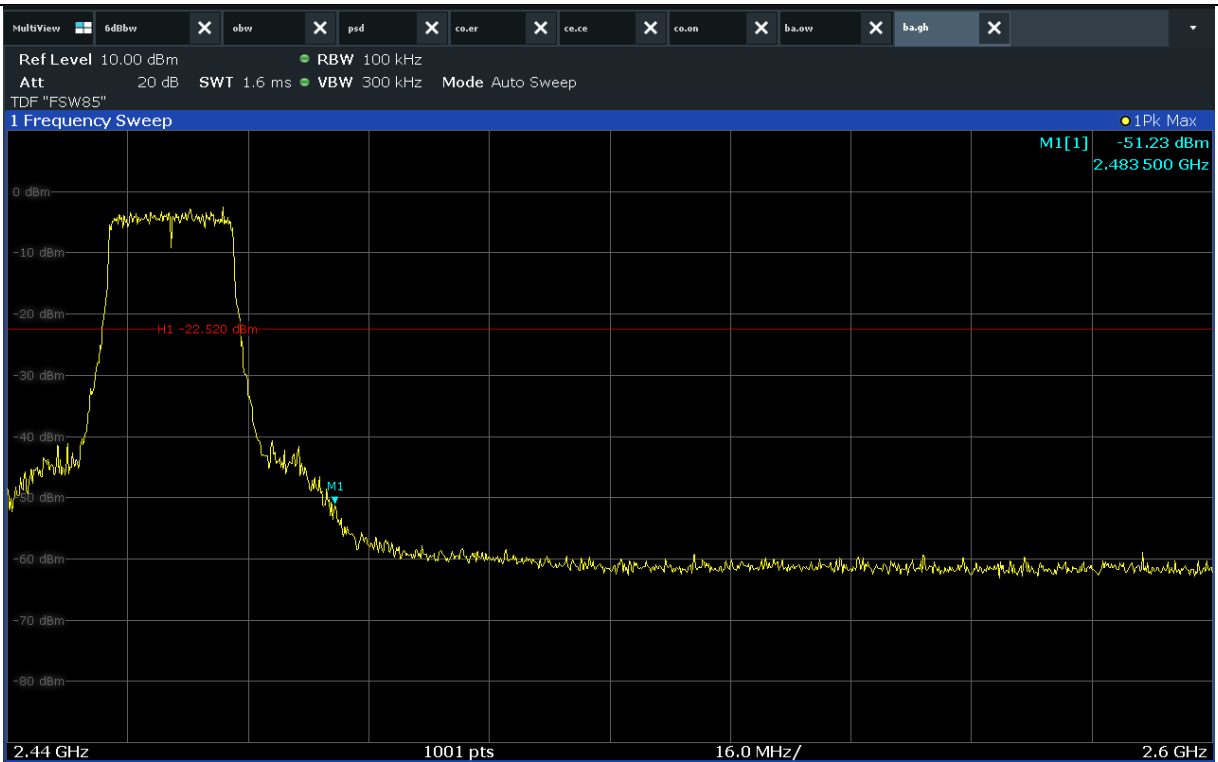
High CH



8.3.1.7 Band Edge for 802.11g

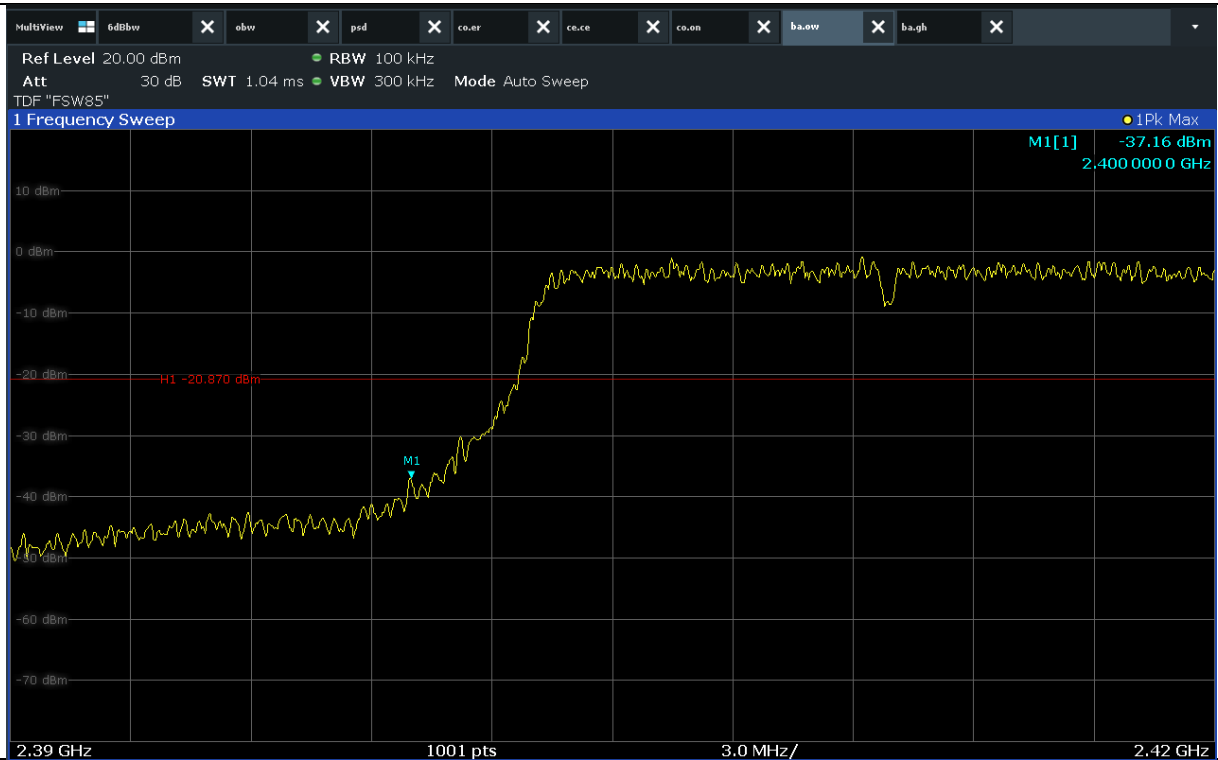


Low CH

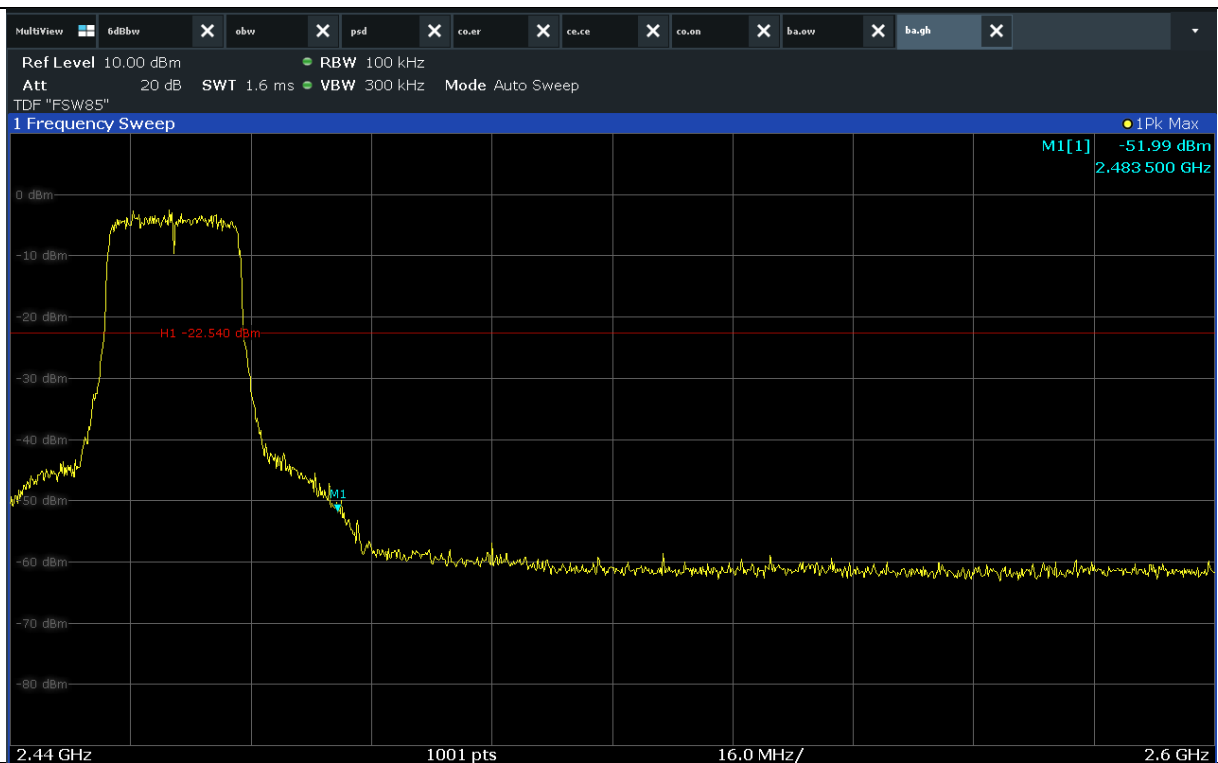


High CH

8.3.1.8 Band Edge for 802.11n(HT20)



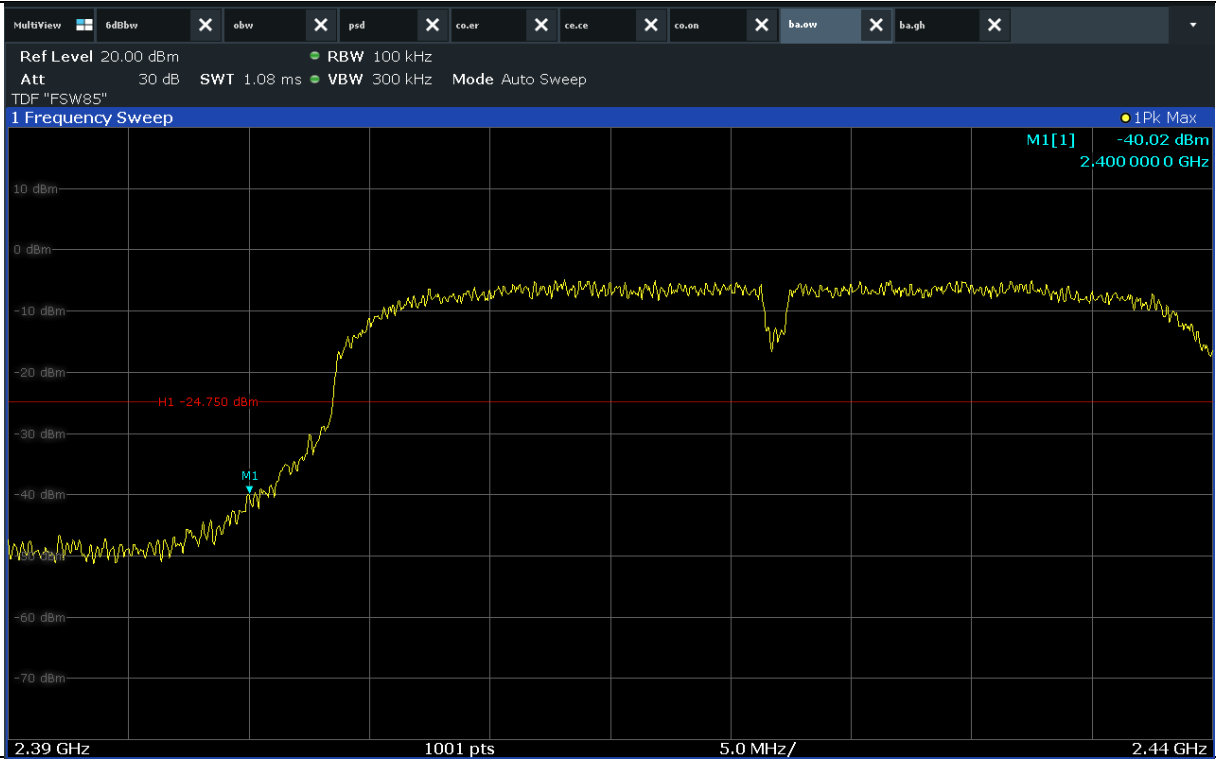
Low CH



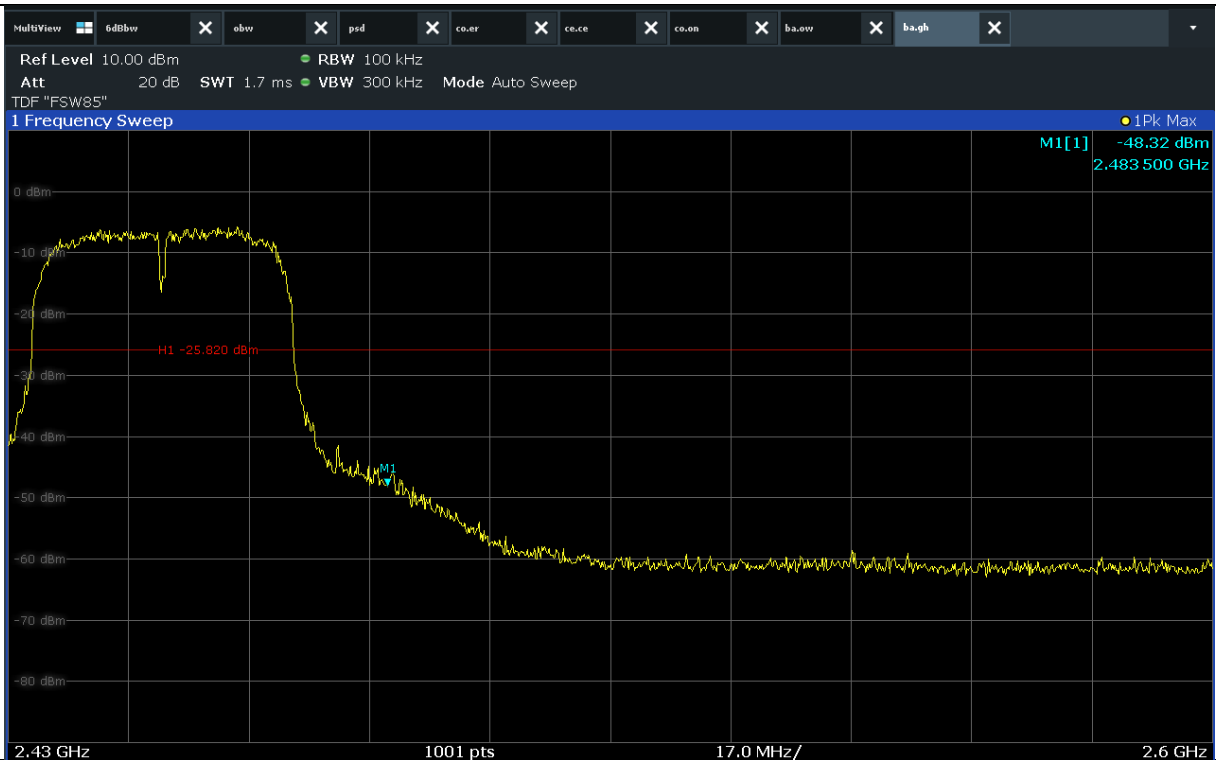
High CH



8.3.1.9 Band Edge for 802.11n(HT40)



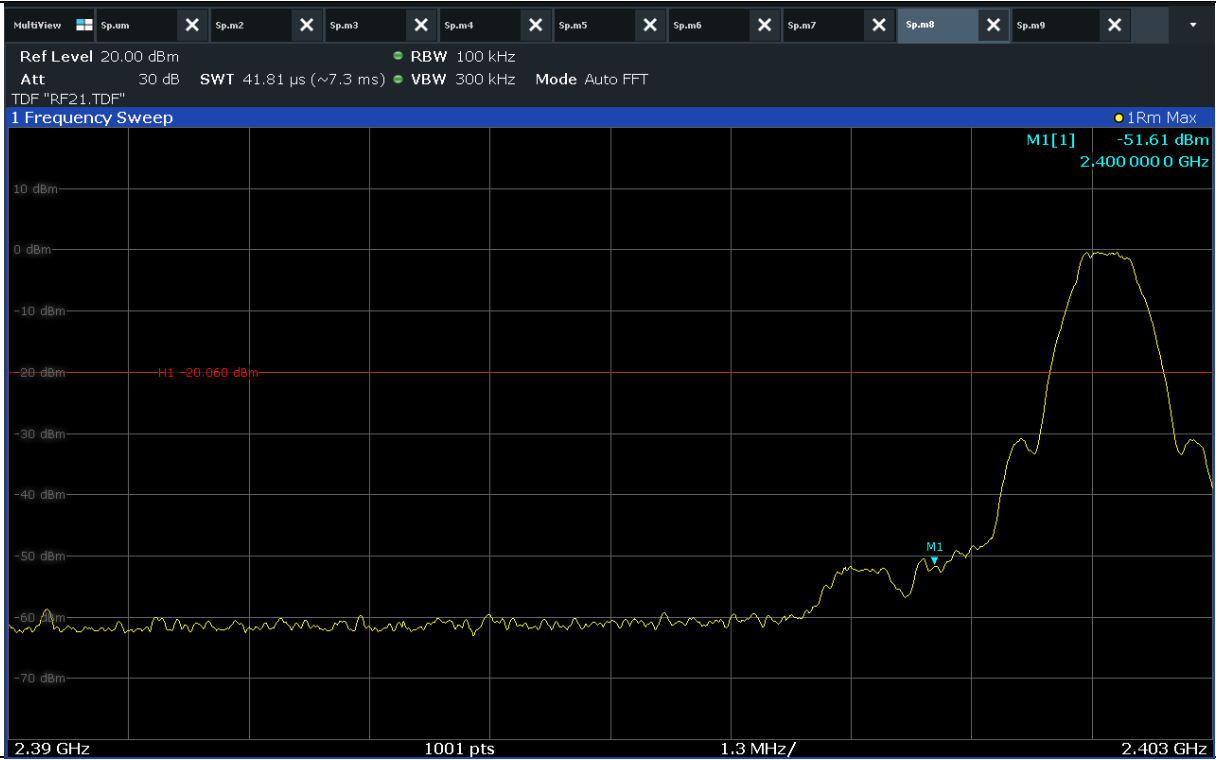
Low CH



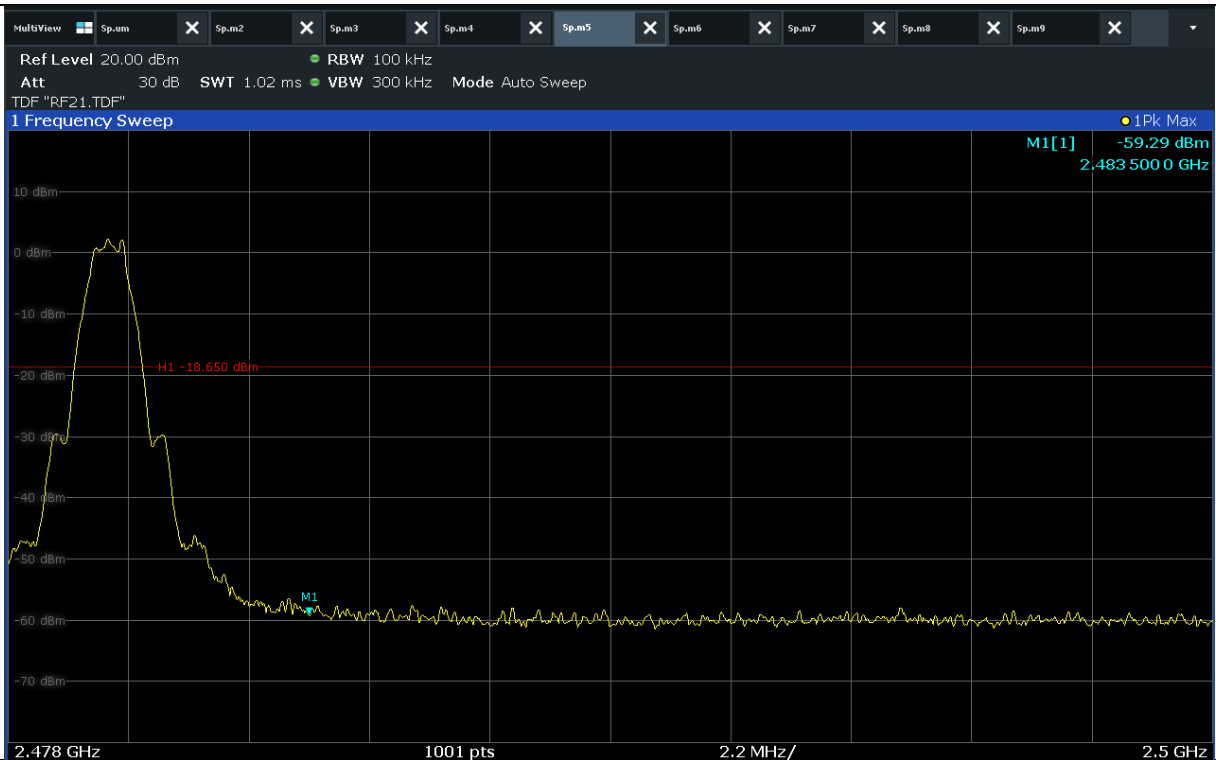
High CH



8.3.1.10 Band Edge for Bluetooth LE



Low CH



High CH