

RADIO TEST REPORT

Product : Wi-Fi/BT Transceiver

Model Name : WCHA42M

FCC ID : A3LWCHA42M

Test Regulation : FCC 47 CFR Part 15 Subpart C (Section 15.247)

Received Date : 2025/10/01

Test Date : 2025/10/04 ~ 2025/11/20

Issued Date : 2025/12/11

Applicant : Samsung Electronics Co Ltd
19 Chapin Rd., Building D, Pine Brook New Jersey, 07058
United States

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan

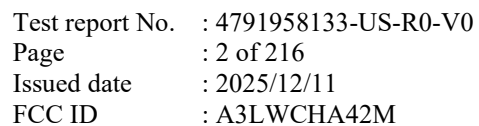


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Underwriters Laboratories Taiwan Co., Ltd.

Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Telephone : +886-2-7737-3000
Facsimile (FAX) : +886-3-583-7948

Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1



Original Test Report No.: 4791958133-US-R0-V0

Underwriters Laboratories Taiwan Co., Ltd.

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1. Attestation of Test Results

APPLICANT

COMPANY NAME: Samsung Electronics Co Ltd
ADDRESS: 19 Chapin Rd., Building D, Pine Brook New Jersey, 07058 United States

MANUFACTURER

COMPANY NAME: Samsung Electronics Co., Ltd.
ADDRESS: 129 Samsung-ro, Yeongtong-gu, Suwon-Si Gyeonggi-do 16677 Korea (Republic Of Korea)

FACTORY

COMPANY NAME 1: CHEMTRONICS Co., Ltd
ADDRESS: 35, Hyeongjero, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea

COMPANY NAME 2: CHEMTROVINA COMPANY LIMITED
ADDRESS: Nhon Trach 2-Loc Khang IZ, Hiep Phuoc Town, Nhon Trach District, Dong Nai Province, Vietnam

COMPANY NAME 3: SJIT CO., LTD.
ADDRESS: #54-11, Dongtanhana 1gil, Hwaseong-si, Gyeonggi-Do, Korea

COMPANY NAME 4: SJIT VINA Co., Ltd.
ADDRESS: Lot X2, Ho Nai Industrial Zone, Ho Nai 3 commune, Trang Bom District, Dong Nai Province, Vietnam

COMPANY NAME 5: Chengdu Xuguang Technology Co., Ltd.
ADDRESS: Building 1, Floors 1-2 and Building 2, Wenbai Avenue No.998, Baihe Street, Economic and Technological Development Zone (Longquanyi District), Chengdu City, Sichuan Province, P.R.China

COMPANY NAME 6: XUGUANG TECHNOLOGY (VIENAM) COMPANY LIMITED
ADDRESS: Factory No. 4, Lot CN1, An Duong Industrial Park, Hong Phong Commune, An Duon District, Hai Phong City, Vietnam

EUT DESCRIPTION: Wi-Fi/BT Transceiver

BRAND: Samsung

MODEL: WCHA42M

SAMPLE STAGE: Mass-Production Test Sample

DATE of TESTED: 2025/10/04 ~ 2025/11/20

APPLICABLE STANDARDS

STANDARD	Test Results
FCC 47 CFR PART 15 Subpart C (Section 15.247)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Cindy Hsin
Project Handler

Date : 2025/12/11

Approved and Authorized By:

Eric Lee
Senior Laboratory Engineer

Date : 2025/12/11

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Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)	Conducted Output Power	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Antenna Port Emission	PASS
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS
15.207	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS

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3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2020+Cor.1-2023+C63.10a-2024+Errata to C63.10a-2024 and KDB 662911 D01 Multiple Transmitter Output v02r01.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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5. Measurement Uncertainty

For statement of conformity, Simple acceptance (Section 3.1.4 of IEC Guide 115) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Determining compliance based on the results of the compliance measurement, not considering measurement instrumentation uncertainty.

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	3.0 dB
RF Conducted	9 kHz - 40GHz	2.4 dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	1.9 dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	5.6 dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	4.6 dB

6. Equipment under Test

6.1. Description of EUT

Product	Wi-Fi/BT Transceiver
Brand Name	Samsung
Model Name	WCHA42M
Normal Voltage	5Vdc from Host

Operating Frequency	2412MHz ~ 2472MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 4096QAM, 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM / OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to MCS15 802.11ax: up to MCS11 802.11be: up to MCS13
Resource Unit (RU)	Single RU: 26-tone, 52-tone, 106-tone, 242-tone Multi-RU (Small RU): 52-tone + 26-tone, 106-tone + 26-tone
Maximum Output Power	2412MHz ~ 2472MHz: 20.89 dBm
Sample ID	Conducted Test:8975534 Radiated Test:8975527

Note:

- EUT provides a complete 2Tx port and 2Rx port. Please refer to the following working transmission conditions:

Modulation Mode	Tx Function	Rx Function
802.11b	1Tx Diversity	2Rx
802.11g	1Tx Diversity	2Rx
802.11n(HT20)	2Tx / 1Tx Diversity	2Rx
802.11ax(HE20)	2Tx / 1Tx Diversity	2Rx
802.11ax (RU26/52/106/242)	2Tx / 1Tx Diversity	2Rx
802.11be(EHT20)	2Tx / 1Tx Diversity	2Rx
802.11be (RU26/52/106/242) (MRU52+26/106+26)	2Tx / 1Tx Diversity	2Rx

*The modulation and bandwidth are similar for 802.11n mode,802.11ac mode for 20MHz bandwidth system, therefore investigated one worst case to representative mode in test report.

*The modulation and bandwidth are similar for 802.11ax mode,802.11be mode for 20MHz bandwidth system, therefore investigated one worst case to representative mode in test report.

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2. The power index setting for the 1Tx SISO mode is configured the same as for the 2Tx MIMO mode; Verify that the total power in 2Tx MIMO mode is 3 dB higher than in SISO mode, therefore, the test results only present the MIMO mode (except for 11b and 11g).
3. The output power test method is measured using ANSI C63.10:2020_11.9.2.3.2 Method AVGPM-G.
4. The EUT supports OFDMA Partial RU(Single RU/Multi-RU) mode, therefore partial RU all combinations were investigated and the worst case scenario was identified.
5. The WCHA42M comes in two versions, V1.0 and V2.0. The only difference between these two versions is the acceleration sensor and related R/C parts. Version V2.0 includes the acceleration sensor and related R/C parts but V1.0 does not. Therefore, only the worst case of fully configured version V2.0 was tested.

6. The EUT OFDMA RU mode index refers as below.

Tones offset	#RU Index									
26 Subcarrier	0	1	2	3	4	5	6	7	8	
52 Subcarrier	37		38			39		40		
106 Subcarrier	53					54				
242 Subcarrier/20MHz	61									

7. The EUT MRU mode index refers as below.

Small RU	20MHz Bandwidth								
Tones Number	0	1	2	3	4	5	6	7	8
MRU 52+26(78-tone)		70				72			
			71						
MRU 106+26(132-tone)	82								
					83				

8. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual, the laboratory shall not be held responsible.

6.2. Channel List

13 channels are provided for WLAN 20MHz bandwidth system:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442	-	-

6.3. Test Condition

Test Item	Test Site No.	Environmental	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	22~26°C/ 62~68%RH	5Vdc	2025/10/04~ 2025/11/20	WaterNil Guan
Radiated Spurious Emission	966-2	22~26°C/ 62~68%RH	5Vdc	2025/10/04~ 2025/11/07	Rex Chen
AC power Line Conducted Emission	SR1	24°C/ 63%RH	120Vac/ 60Hz	2025/11/04	Rex Chen

Sample Calculation:

Antenna Port Conducted Measurement:

- Where relevant, the follow sample calculation is provided:
Result Value (dBm) = Reading Value (dBm) + Attenuator Factor (dB) + Cable Loss (dB).
Example: Result Value (10dBm) = Reading Value (-2dBm) + Attenuator Factor (10dB) + Cable Loss(2dB).
*Test plot only shown the “Result Value”.

Radiated Spurious Emission:

- Where relevant, the follow sample calculation is provided:
Result Value (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
Example: Result Value (34.5dBuV/m) = Reading Value (40.1dBuV) + Antenna Factor (18.7dB/m) + Cable Loss (4.2dB) - Preamp Factor (28.5dB).

AC power Line Conducted Emission:

- Where relevant, the follow sample calculation is provided:
Result Value (dBuV) = Reading Value (dBuV) + Correction Factor (dB).
Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).
Example: Result Value (53.7dBuV) = Reading Value (35.1dBuV) + Insertion loss(18.1dB) + Cable loss(0.5dB).

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6.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Frequency Range	Brand Name	Model Name	Maximum Gain (dBi)	Ant. Type	Connector Type
ANT0	Chain0	2400 ~ 2480MHz 5150 ~ 5925MHz 5925 ~ 6525MHz 6525 ~ 7125MHz	HANYANG ANTENNA	WCHA42M	0.21 1.71 1.79 -0.64	Chip	None
ANT1	Chain1	2400 ~ 2480MHz 5150 ~ 5925MHz 5925 ~ 6525MHz 6525 ~ 7125MHz	HANYANG ANTENNA	WCHA42M	-2.33 0.5 1.8 1.41	Chip	None

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual, the laboratory shall not be held responsible.

6.5. Test Mode Applicability and Tested Channel Detail

Test Item	Mode	Modulation Technology	Tx Function	Test Channel	RU/MRU Index	Data Rate
Radiated Bandedge	802.11b	DSSS	1Tx	1,6,11,12,13	-	1 Mbps
	802.11g	OFDM	1Tx	1,6,11,12,13	-	6 Mbps
	802.11n (HT20)	OFDM	2Tx	1,6,11,12,13	-	MCS0
	802.11be (EHT20)	OFDM / OFDMA	2Tx	1,6,11,12,13	-	MCS0 Nss1
	802.11be (EHT20) 26-tone RU	OFDMA	2Tx	1,6,11,12,13	0,0,8,8,8	MCS0 Nss1
	802.11be (EHT20) 52-tone RU	OFDMA	2Tx	1,6,11,12,13	37,37,40,40,40	MCS0 Nss1
	802.11be (EHT20) 106-tone RU	OFDMA	2Tx	1,6,11,12,13	53,53,54,54,54	MCS0 Nss1
	802.11be (EHT20) 52+26-tone MRU	OFDMA	2Tx	1,6,11,12,13	70,70,72,72,72	MCS0 Nss1
	802.11be (EHT20) 106+26-tone MRU	OFDMA	2Tx	1,6,11,12,13	82,82,83,83,83	MCS0 Nss1
Radiated Emissions (Above 1GHz)	802.11b	DSSS	1Tx	1,6,11,12,13	-	1 Mbps
	802.11g	OFDM	1Tx	1,6,11,12,13	-	6 Mbps
	802.11be (EHT20)	OFDM	2Tx	1,6,11,12,13	-	MCS0 Nss1
	802.11be (EHT20) 26-tone RU	OFDMA	2Tx	1,6,11,12,13	0,0,8,8,8	MCS0 Nss1
	802.11be (EHT20) 52-tone RU	OFDMA	2Tx	1,6,11,12,13	37,37,40,40,40	MCS0 Nss1
	802.11be (EHT20) 52+26-tone MRU	OFDMA	2Tx	1,6,11,12,13	70,70,72,72,72	MCS0 Nss1
Radiated Emissions (Below 1GHz)	802.11b	DSSS	1Tx	11	-	1 Mbps
	802.11g	OFDM	1Tx	11	-	6 Mbps
	802.11be (EHT20)	OFDM	2Tx	11	-	MCS0 Nss1
	802.11be (EHT20) 26-tone RU	OFDM	2Tx	11	8	MCS0 Nss1
AC Power Line Conducted Emission	802.11b	DSSS	1Tx	6	-	1 Mbps
	802.11be (EHT20) 26-tone RU	OFDMA	2Tx	11	-	MCS0 Nss1

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Test Item	Mode	Modulation Technology	Tx Function	Test Channel	RU/MRU Index	Data Rate
Antenna Port Conducted Measurement	802.11b	DSSS	1Tx	1,6,11,12,13	-	1 Mbps
	802.11g	OFDM	1Tx	1,6,11,12,13	-	6 Mbps
	802.11n (HT20)	OFDM	2Tx	1,6,11,12,13	-	MCS0
	802.11be (EHT20)	OFDM	2Tx	1,6,11,12,13	-	MCS0 Nss1
	802.11be (EHT20) 26-tone RU	OFDMA	2Tx	1,6,11,12,13	0,0,8,8,8	MCS0 Nss1
	802.11be (EHT20) 52-tone RU	OFDMA	2Tx	1,6,11,12,13	37,37,40,40,40	MCS0 Nss1
	802.11be (EHT20) 106-tone RU	OFDMA	2Tx	1,6,11,12,13	53,53,54,54,54	MCS0 Nss1
	802.11be (EHT20) 52+26-tone MRU	OFDMA	2Tx	1,6,11,12,13	70,70,72,72,72	MCS0 Nss1
	802.11be (EHT20) 106+26-tone MRU	OFDMA	2Tx	1,6,11,12,13	82,82,83,83,83	MCS0 Nss1

- Full RU (Resource Unit) 242-tone RU mode and SU(Single User) mode have no difference in physical waveform. This report has reported on the SU mode with highest output power.
- Both 1Tx SISO and 2Tx MIMO have been investigated and confirmed MIMO was the worst case set for radiated band edge, spurious emission and conducted emission tests except 11b & 11g.
- The fundamental of the EUT was investigated in three orthogonal axes X-Y/Y-Z/X-Z, it was determined that X-Y plane was worst-case. Therefore, all final radiated testing was performed with the EUT in X-Y plane.
- 802.11b & 802.11g 1Tx has transmitter port Chain 0 and Chain 1, The worst case of conducted output power was found in the Chain 0, and therefore only the test data of the was recorded in this report.
- The radiated spurious emission test was performed in all test modes. The worst case was 1Tx 802.11b and 802.11g, and 2Tx worse case was 802.11be(EHT20) SU and 26/52/106 tone-RU, therefore, only the worst case data is shown in this report to represent all test modes.
- In the transmit mode, 802.11b channel 6 and 802.11be(EHT20) RU26 channel 11 has the highest RF output power. Therefore, the AC conduction was performed using this worst-case mode.
- In the transmit mode, 802.11b/802.11g channel 11 and 802.11be(EHT20) / RU26 channel 11 has the worst case of Tx spurious emission (above 1GHz). Therefore, all final tests for the spurious emission (below 1GHz) were performed using this worst-case mode.
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

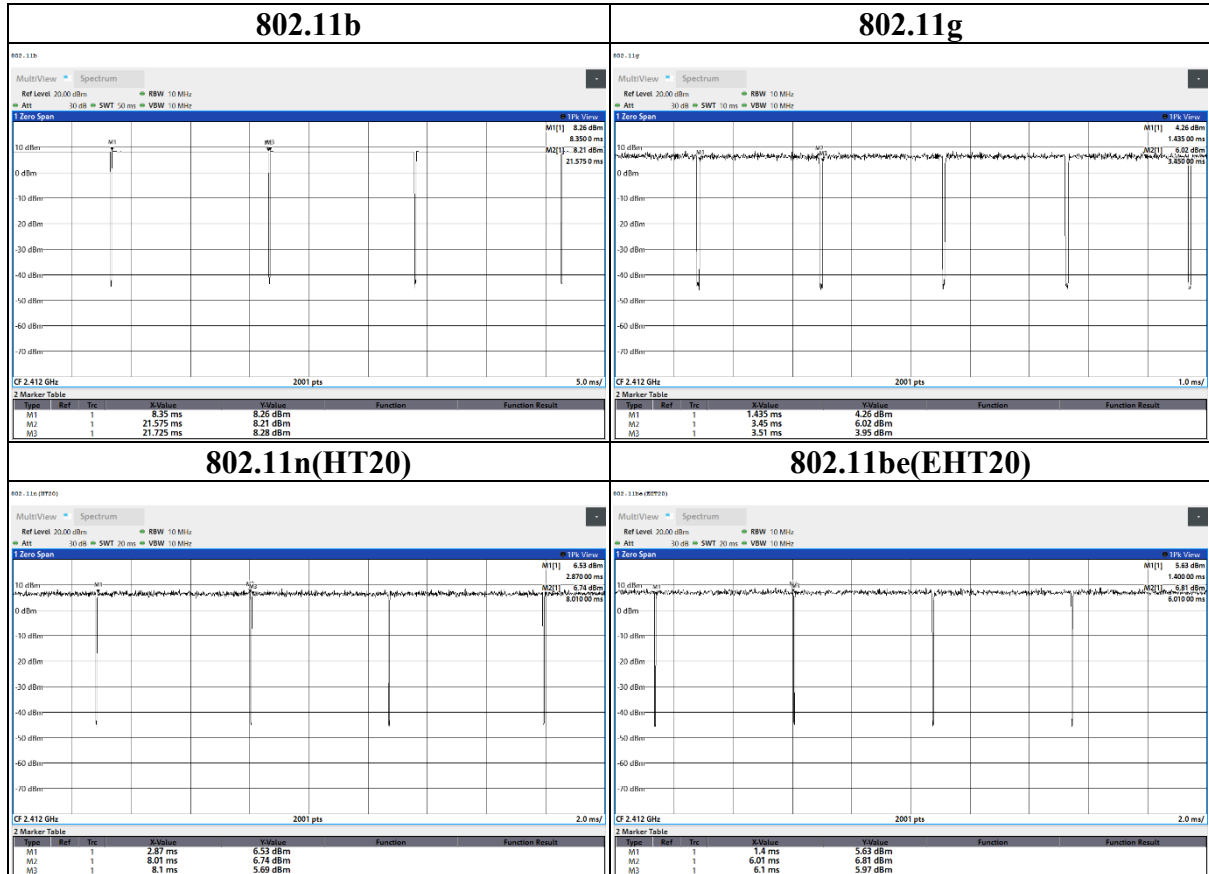
Simultaneously transmission condition:

Condition	Technology	Technology	Technology
1	BT EDR	WLAN (2.4GHz) 1Tx	WLAN (5GHz) 1Tx
2	BT EDR	WLAN (2.4GHz) 1Tx	WLAN (6GHz) 1Tx
3	BT EDR	WLAN (2.4GHz) 2Tx	-
4	BT EDR	WLAN (5GHz) 2Tx	-
5	BT EDR	WLAN (6GHz) 2Tx	-

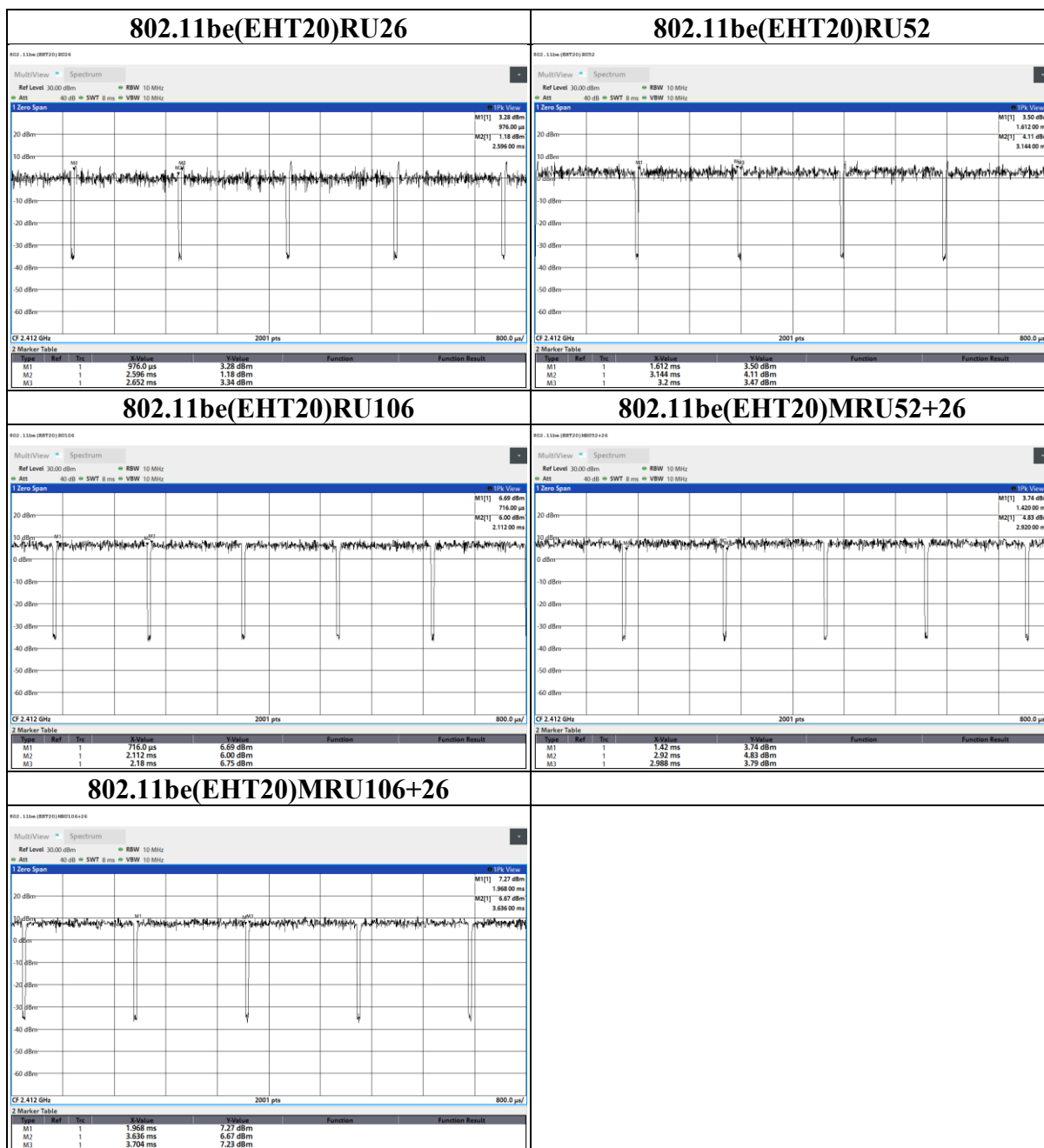
Note : The emission of the simultaneous operation has been evaluated and no non-compliance was found.

6.6. Duty cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle	Duty Factor (dB)	VBW Set (above 1GHz)
802.11b	13.225	13.375	0.9888	N/A	10Hz
802.11g	2.015	2.075	0.9711	0.13	510Hz
802.11n(HT20)	5.140	5.230	0.9828	N/A	10Hz
802.11be(EHT20)	4.610	4.700	0.9809	N/A	10Hz



Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle	Duty Factor (dB)	VBW Set (above 1GHz)
802.11be(EHT20)RU26	1.620	1.676	0.9666	0.15	1kHz
802.11be(EHT20)RU52	1.532	1.588	0.9647	0.16	1kHz
802.11be(EHT20)RU106	1.396	1.464	0.9536	0.21	1kHz
802.11be(EHT20)MRU52+26	1.500	1.568	0.9566	0.19	1kHz
802.11be(EHT20)MRU106+26	1.668	1.736	0.9608	0.17	1kHz



7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070818	2025/3/12	2026/3/11
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2024/12/24	2025/12/23
Loop Antenna	ETS lindgren	6502	00213440	2024/12/11	2025/12/10
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2024/12/30	2025/12/29
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2024/11/27	2025/11/26
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2024/12/18	2025/12/17
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2025/5/12	2026/5/11
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2025/1/13	2026/1/12
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2025/4/7	2026/4/6
Cables (9k-18 GHz)	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2024/11/22	2025/11/21
Cables (18-40GHz)	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2024/11/22	2025/11/21

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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Antenna Port Conducted Measurement					
Signal Analyzer	Rohde & Schwarz	FSVA3044	101281	2025/3/5	2026/3/4
Signal Analyzer	Rohde & Schwarz	FSV40	101490	2025/6/17	2026/6/16
Attenuator	EMCI	EMC-40ATK2W10	17002	2024/11/13	2025/11/12
				2025/10/28	2026/10/27
USB Power Sensor	Anritsu	MA24408A	12031	2025/6/24	2026/6/23
Temperature & Humidity Test Chamber	GIANT FORCE	GTH-150- 40-CP-AR	MAA1701-010	2025/2/25	2026/2/24
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2025/9/18	2026/9/17
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2025/5/27	2026/5/26
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2025/8/27	2026/8/26
Cables	TITAN	CFD200	T0732ACFD 20020A300-2	2025/4/21	2026/4/20

UL Software		
Description	Name	Version
Radiated measurement	e3	6.191211 (V6)
Conducted measurement	RF-Conducted-FCC 15247	ver 1.0
AC power Line Conducted Emission	EZ_EMG	UL-3A1.2

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8. Description of Test Setup

Tx Mode

Support Equipment

ID	Equipment	Brand Name	Model Name	S/N	Remark
A	Laptop	MSI	MS-13Q2	K2402N0015485	Provide by Lab
B	Test Tool	N/A	N/A	N/A	Supplied by Client

I/O Cables

ID	Equipment	Brand Name	Model Name	Length (m)	Remark
1	Flexible Cable	N/A	N/A	0.95	Supplied by Client

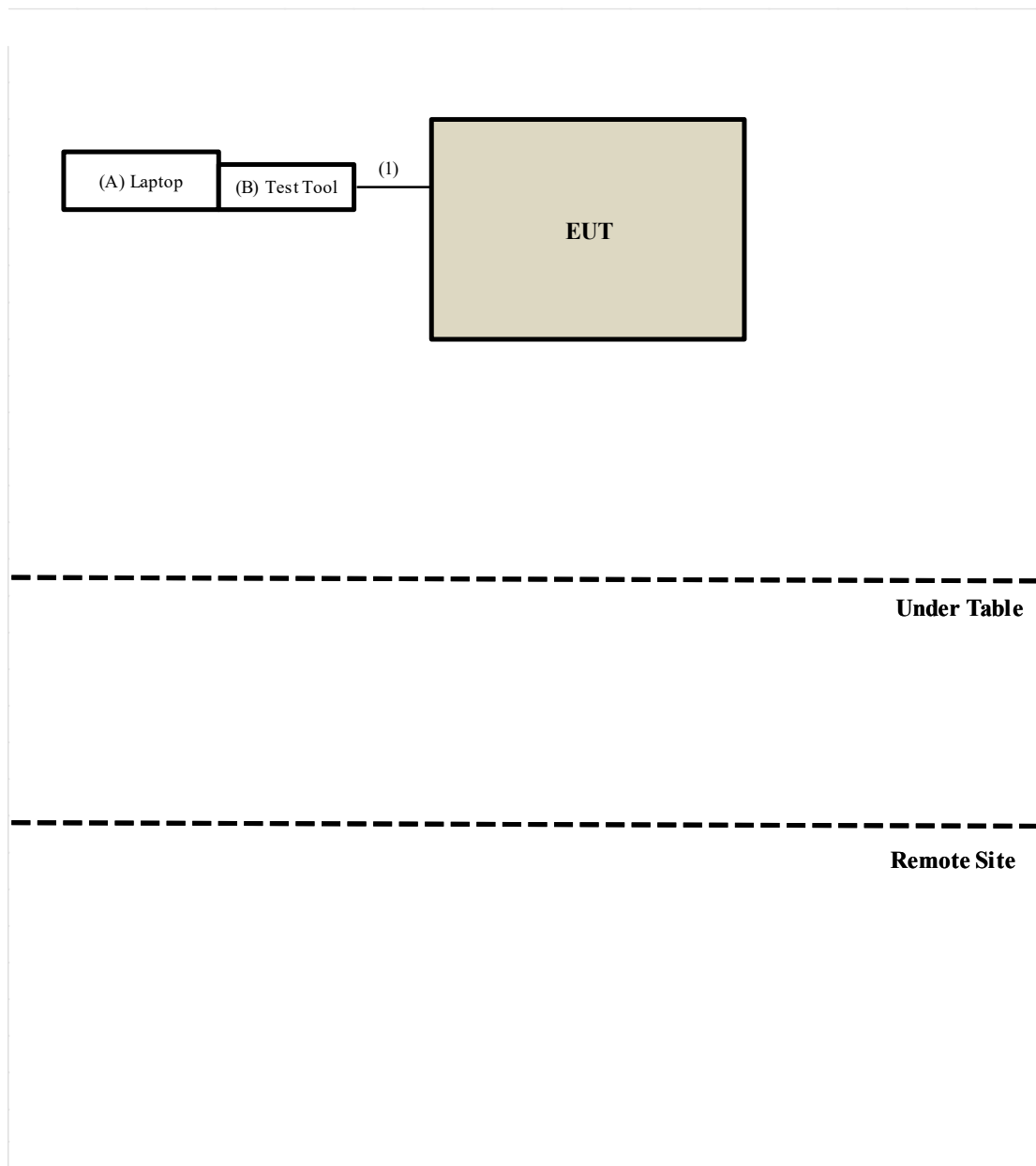
Test Setup

The EUT was worked in engineering mode to transmit signal.

Controlled using a bespoke application (MT7925 QA 0.0.2.104) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

Setup Diagram for Test

Tx Mode



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9. Test Results

9.1. 6dB Bandwidth

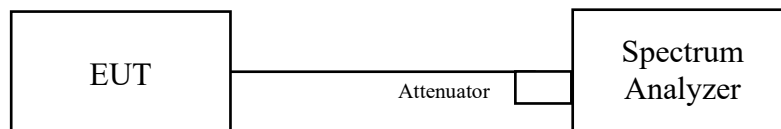
Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

- Set resolution bandwidth (RBW) = Range of 1% to 5% of the OBW but not less than 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

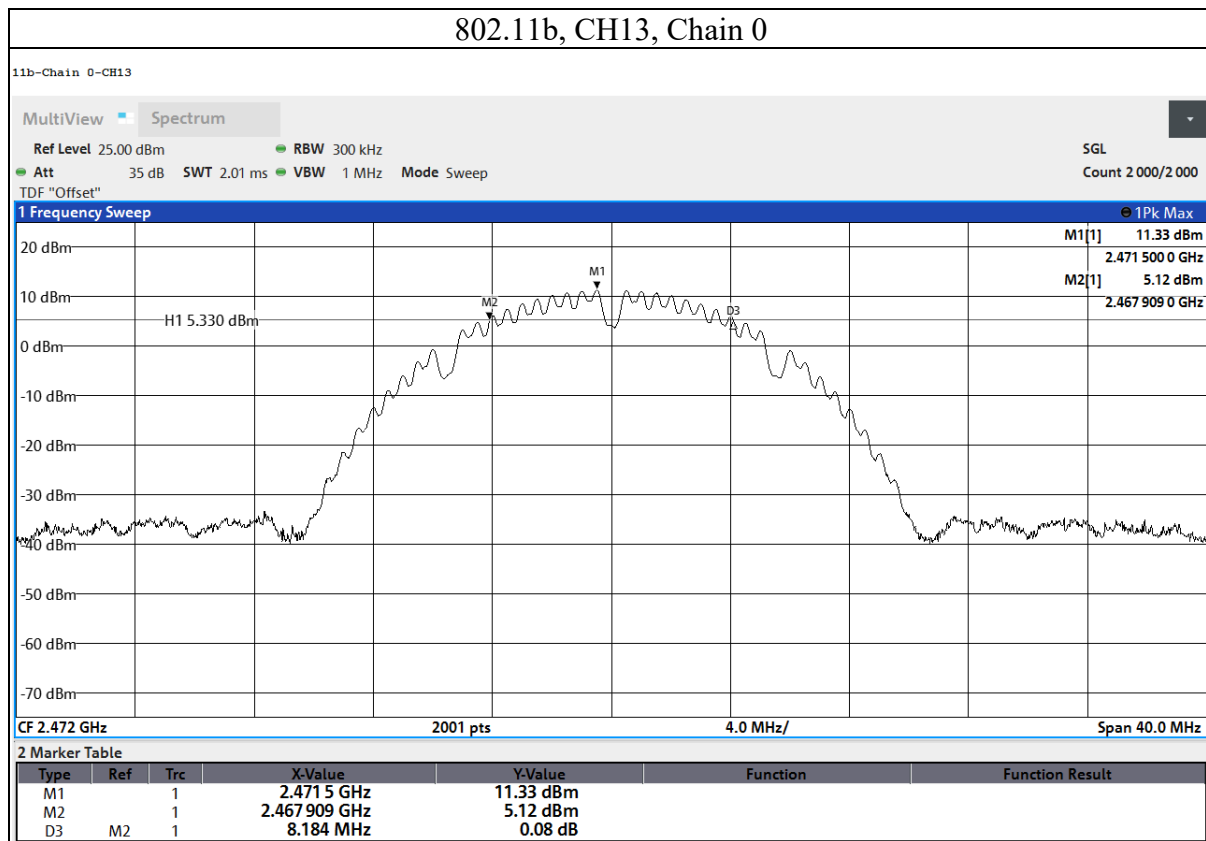
Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Test Data

Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
			Chain 0		
802.11b	1	2412	8.593	0.5	PASS
	6	2437	8.185	0.5	PASS
	11	2462	8.185	0.5	PASS
	12	2467	8.186	0.5	PASS
	13	2472	8.184	0.5	PASS



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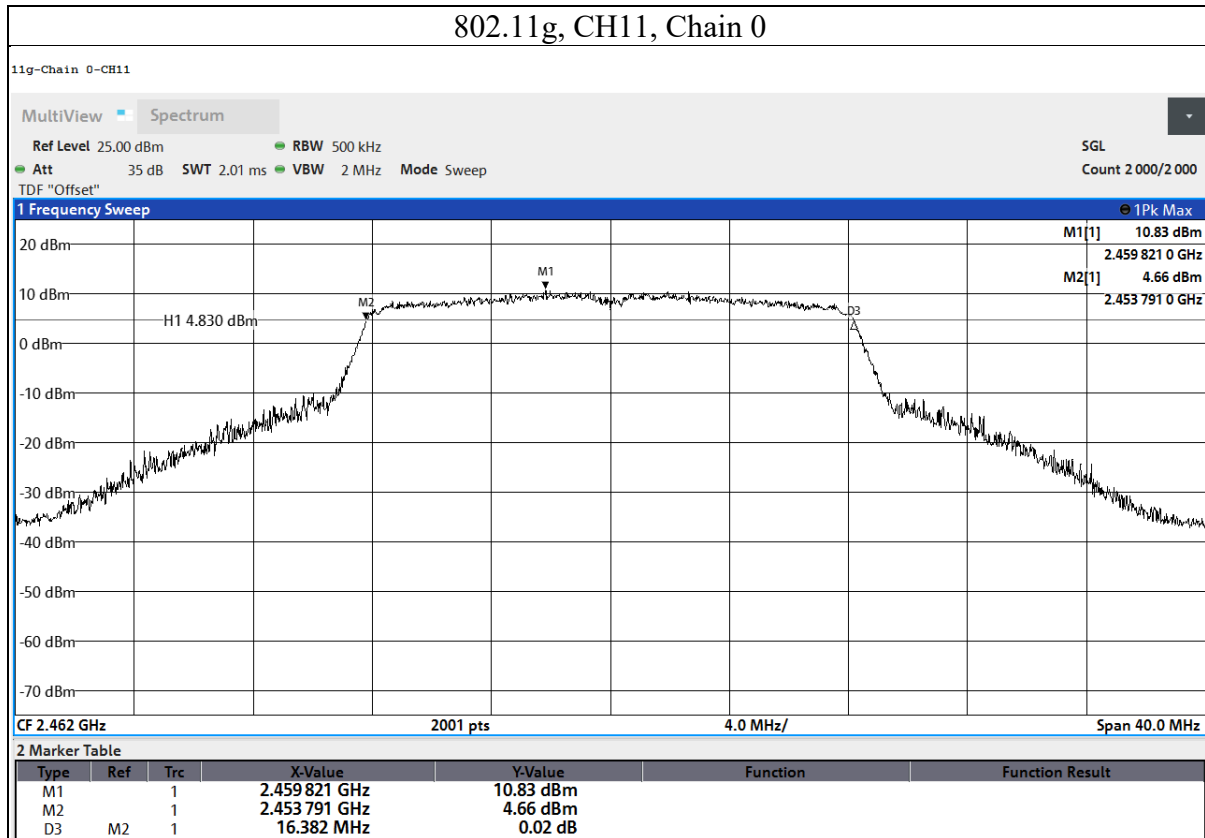
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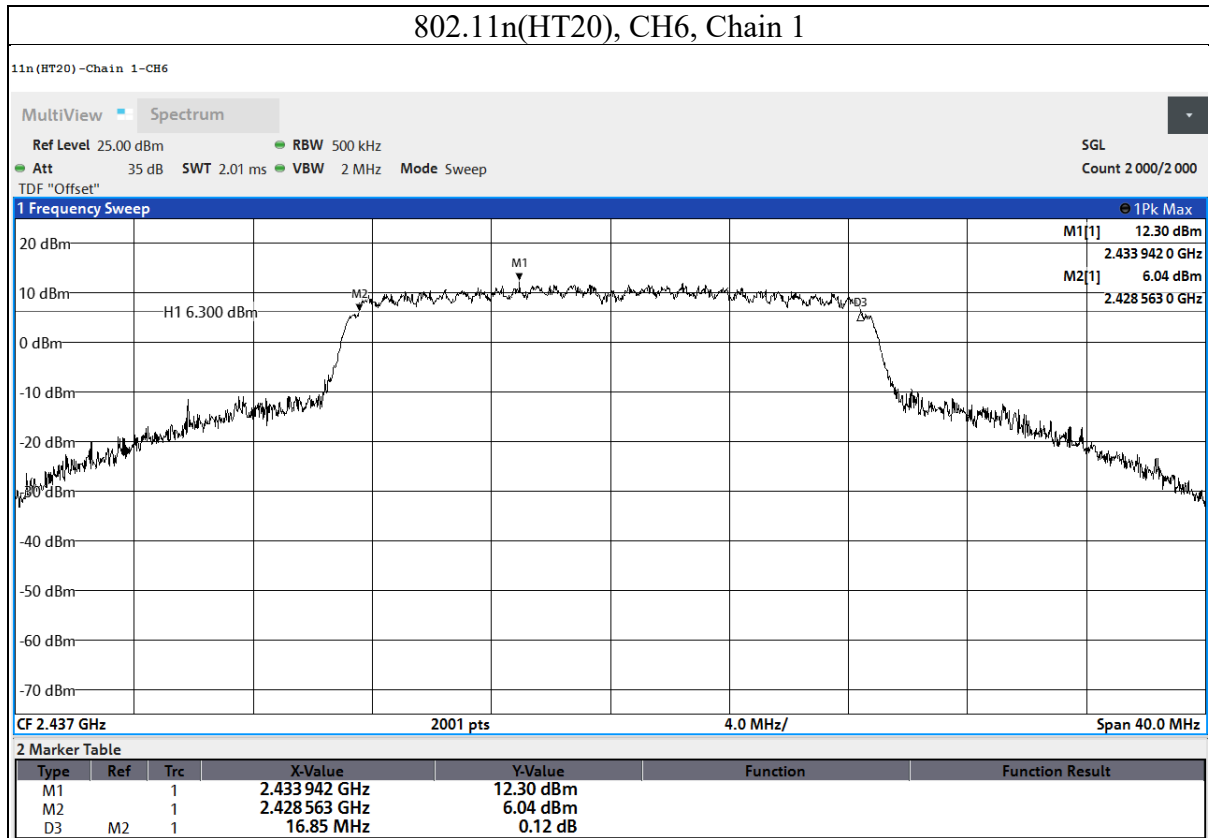
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Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
			Chain 0		
802.11g	1	2412	16.417	0.5	PASS
	6	2437	16.391	0.5	PASS
	11	2462	16.382	0.5	PASS
	12	2467	16.410	0.5	PASS
	13	2472	16.411	0.5	PASS



Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11n(HT20)	1	2412	17.567	17.025	0.5	PASS
	6	2437	17.644	16.850	0.5	PASS
	11	2462	17.434	17.081	0.5	PASS
	12	2467	17.164	16.884	0.5	PASS
	13	2472	17.200	17.076	0.5	PASS



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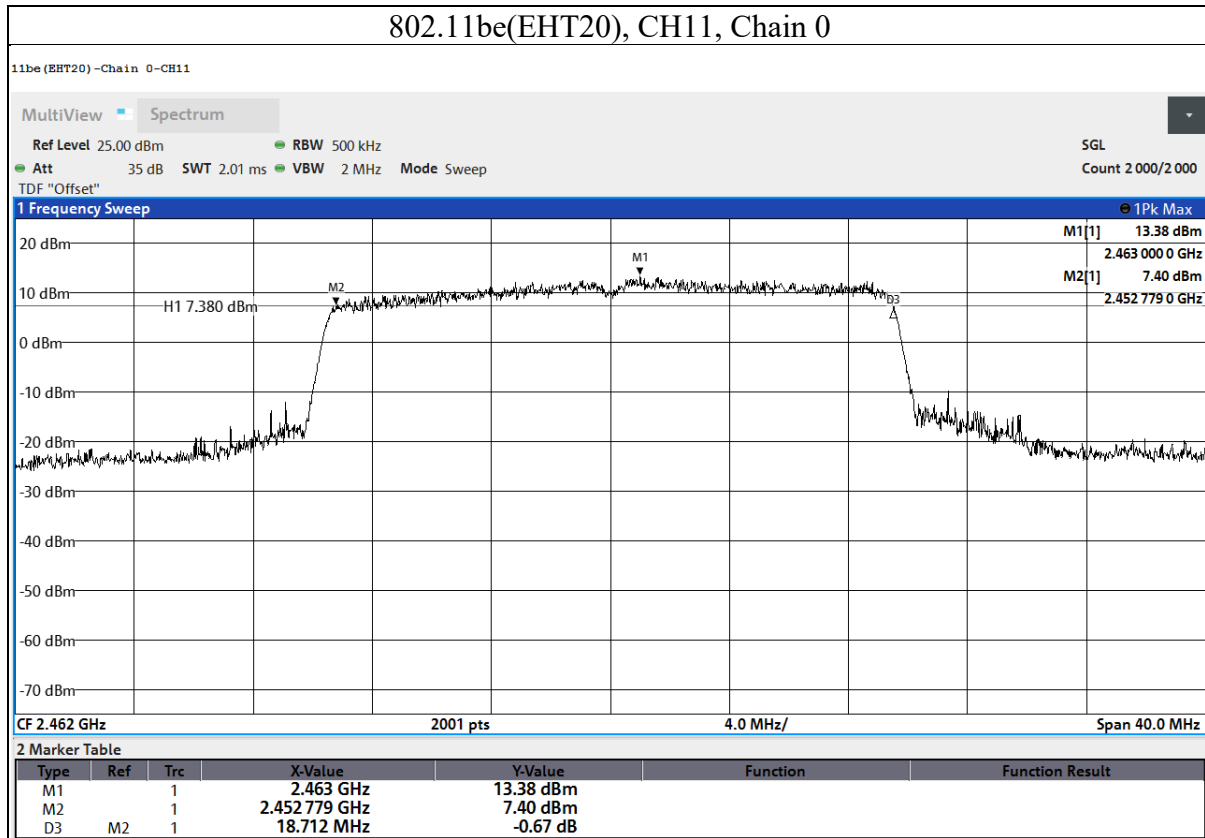
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Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11be(EHT20)	1	2412	18.751	18.927	0.5	PASS
	6	2437	18.890	18.833	0.5	PASS
	11	2462	18.712	18.820	0.5	PASS
	12	2467	18.789	18.893	0.5	PASS
	13	2472	18.743	18.853	0.5	PASS



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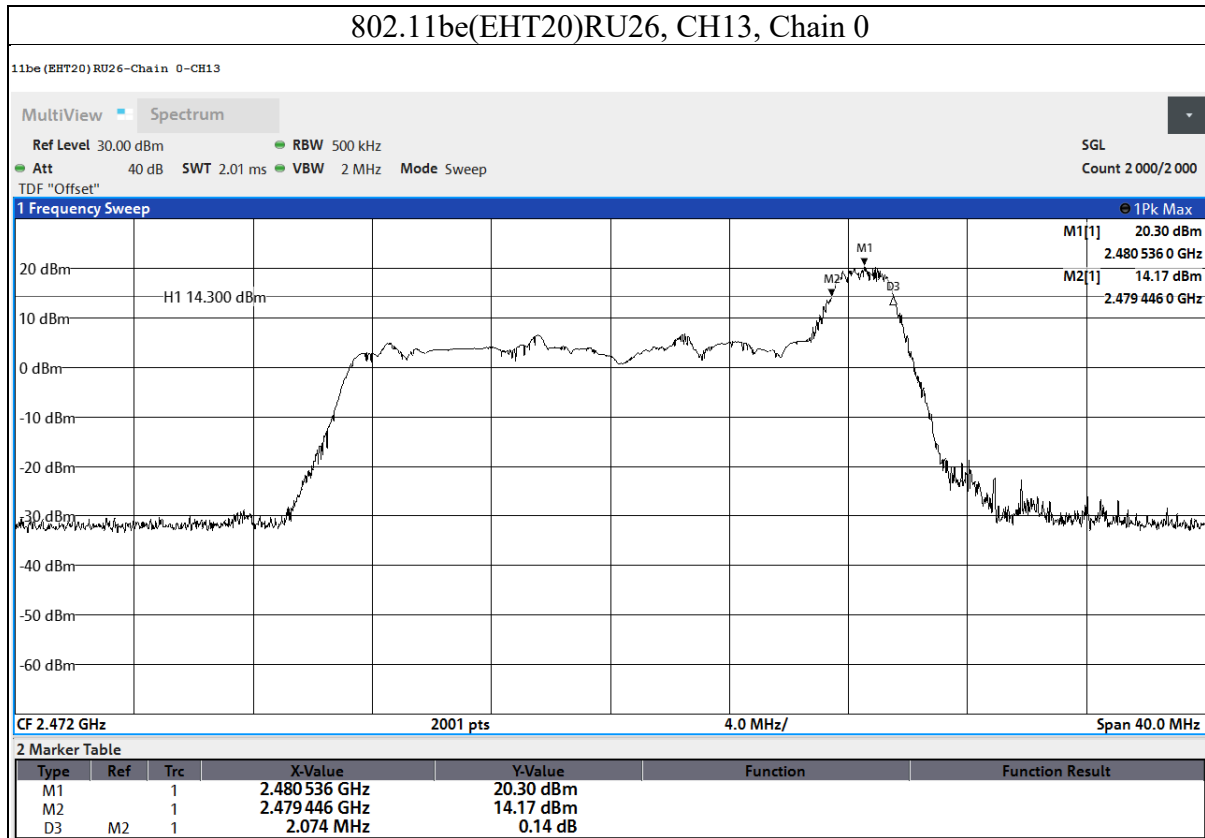
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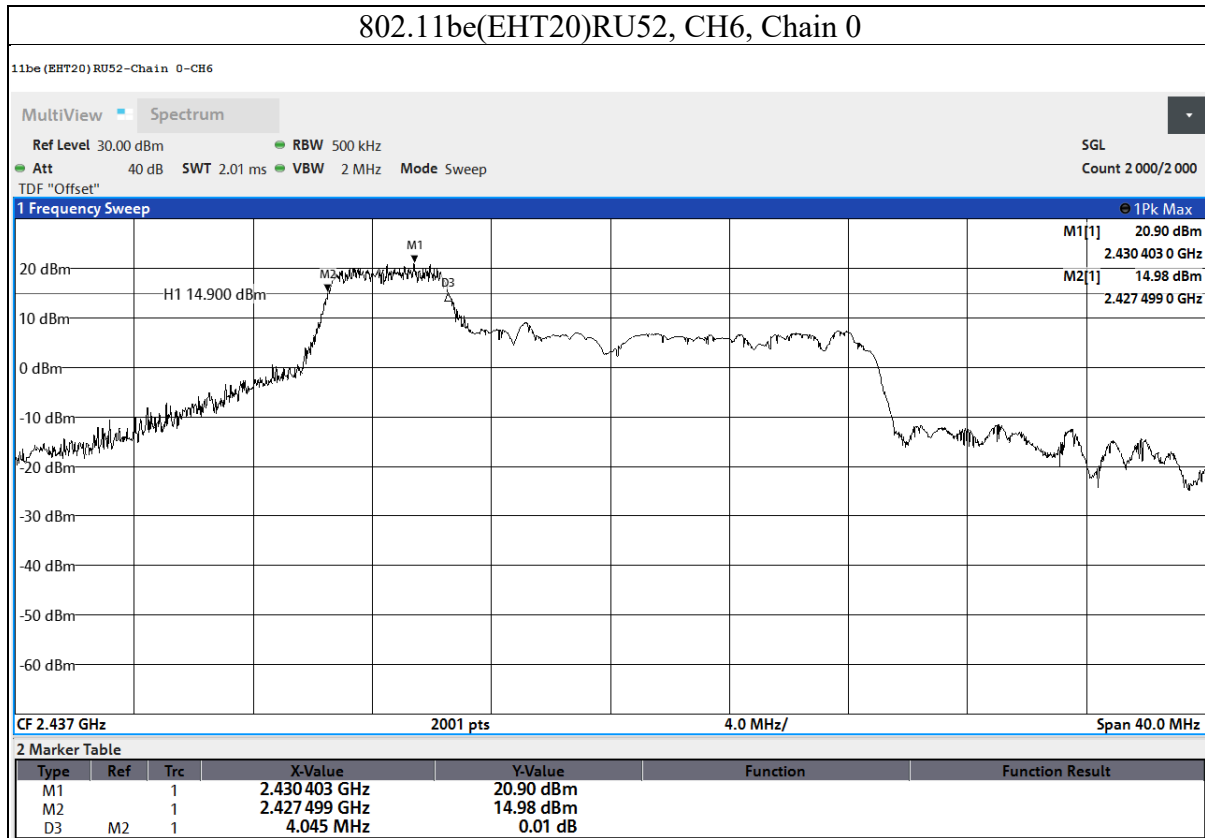
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Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11be(EHT20) RU26	1	2412	2.140	2.169	0.5	PASS
	6	2437	2.119	2.147	0.5	PASS
	11	2462	2.086	2.154	0.5	PASS
	12	2467	2.132	2.129	0.5	PASS
	13	2472	2.074	2.113	0.5	PASS



Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11be(EHT20) RU52	1	2412	4.265	4.153	0.5	PASS
	6	2437	4.045	4.184	0.5	PASS
	11	2462	4.078	4.181	0.5	PASS
	12	2467	4.120	4.156	0.5	PASS
	13	2472	4.139	4.071	0.5	PASS



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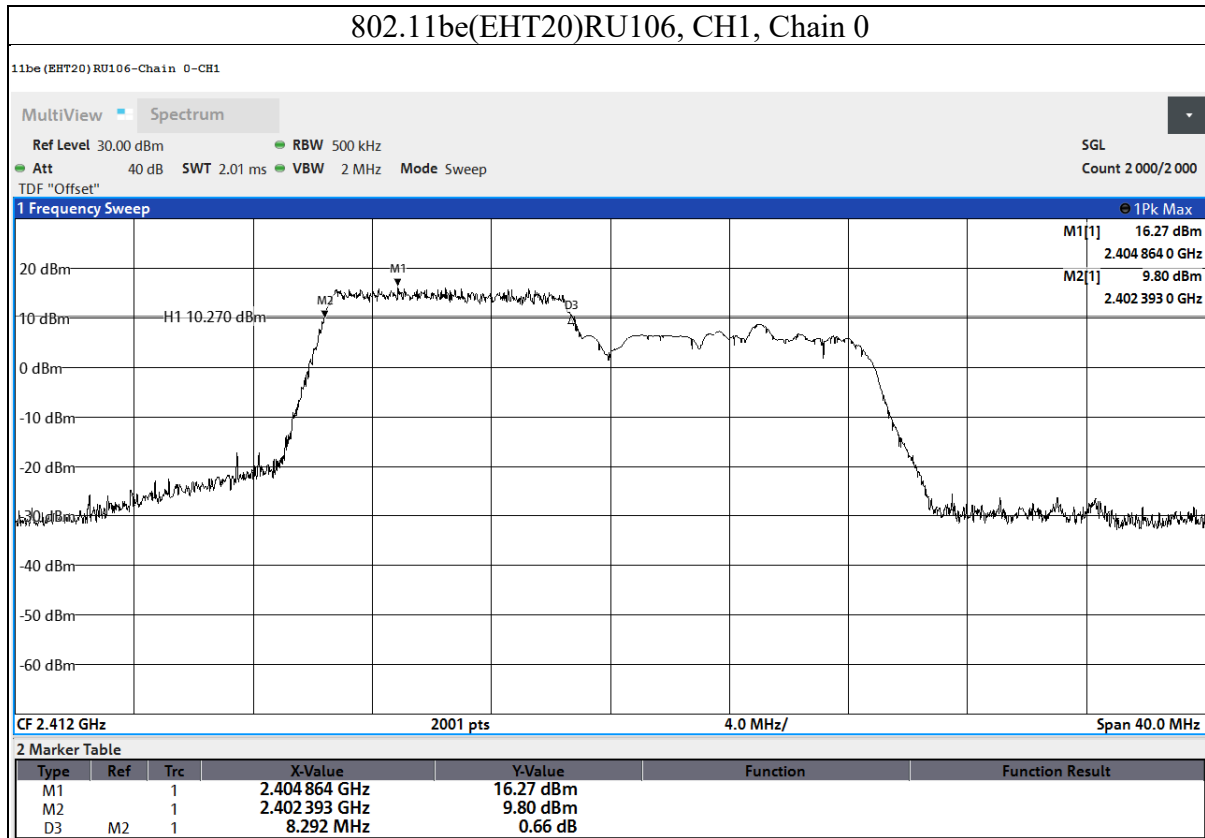
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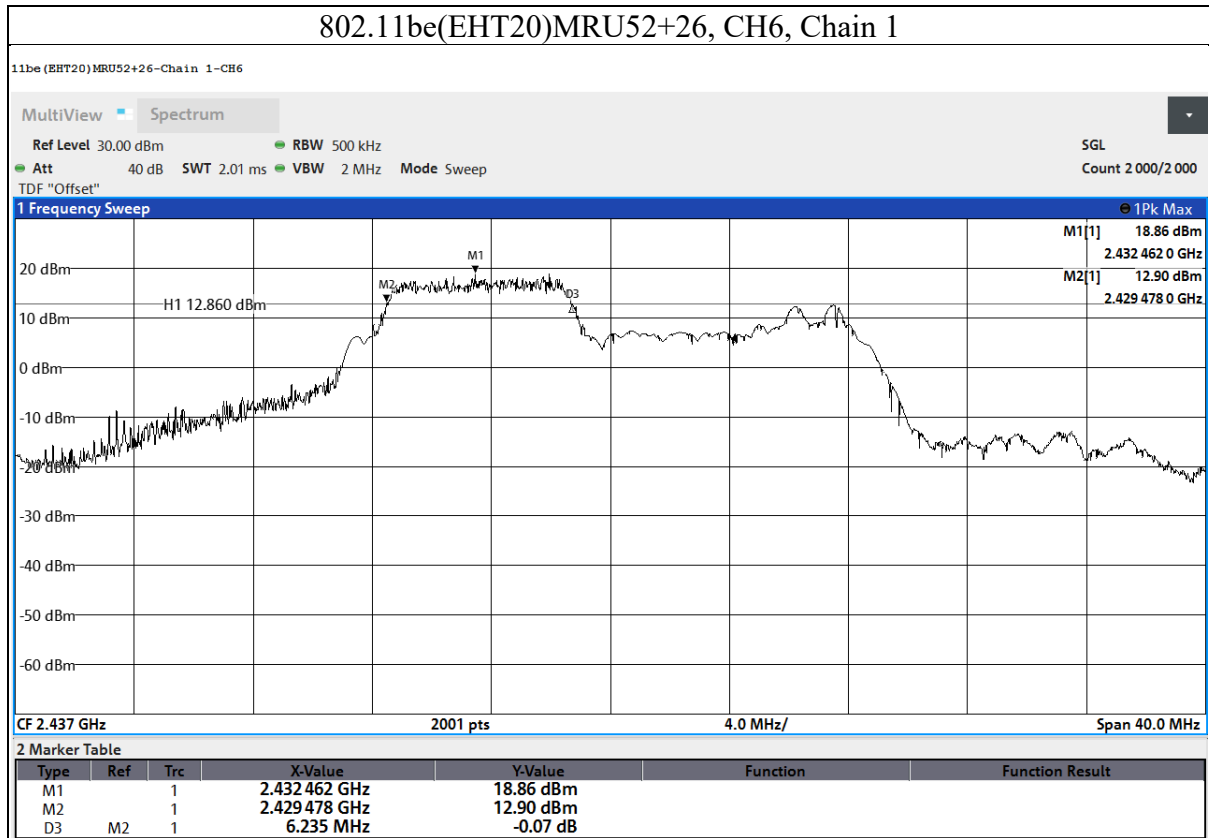
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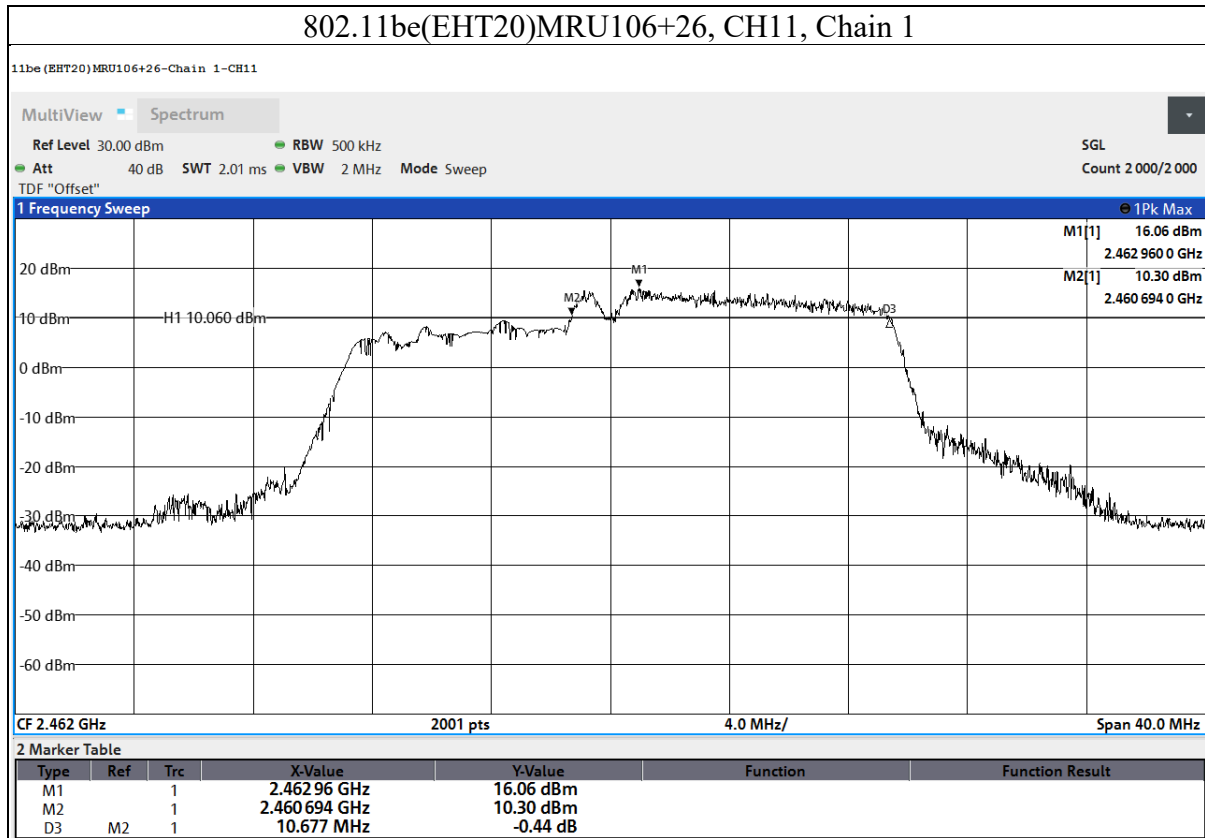
Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11be(EHT20) RU106	1	2412	8.292	17.078	0.5	PASS
	6	2437	8.323	17.309	0.5	PASS
	11	2462	8.496	8.390	0.5	PASS
	12	2467	8.430	8.296	0.5	PASS
	13	2472	8.420	16.000	0.5	PASS



Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11be(EHT20) MRU52+26	1	2412	6.295	15.149	0.5	PASS
	6	2437	6.333	6.235	0.5	PASS
	11	2462	6.371	6.415	0.5	PASS
	12	2467	6.258	6.373	0.5	PASS
	13	2472	6.319	6.275	0.5	PASS



Mode	CH	Freq (MHz)	6dB BW (MHz)		Limit (MHz)	Result
			Chain 0	Chain 1		
802.11be(EHT20) MRU106+26	1	2412	10.689	10.845	0.5	PASS
	6	2437	10.751	10.777	0.5	PASS
	11	2462	10.815	10.677	0.5	PASS
	12	2467	10.872	10.784	0.5	PASS
	13	2472	10.820	10.911	0.5	PASS



9.2. Conducted Output Power

Requirements

For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

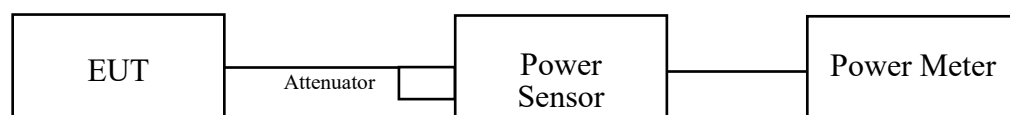
Note:

1. P_{Out} = maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi, B is the 26 dB emission bandwidth in megahertz
2. If EUT with Multiple Transmitter Output:
 - a. Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / N_{\text{ant}}]$ dBi.
Nant: Number of Transmit Antennas
G1, G2,..., Gn: Gain of Individual Antennas
Example: two antenna and gain 5 dBi / 3dBi, so if it was used for TxBF power measurement
Directional Gain = $10 \log[(105/20 + 103/20)^2 / 2]$ dBi = 7.07 dBi
 - b. Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices, CDD
Array Gain = 0 dB (i.e., no array gain) for $N_{\text{ANT}} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
Array Gain = $5 \log(N_{\text{ANT}}/N_{\text{SS}})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{\text{ANT}} \geq 5$.
Example: Maximum antenna gain = 5 dBi and $N_{\text{ANT}} \leq 4$, so if it was used for CDD power measurement
Directional Gain = 5 dBi + Array Gain = 5 dBi + 0 dB = 5 dBi
 - c. For power measurement of KDB 662911 is used with multiple transmitter output. Total conducted power is the sum of the conducted power levels measured at the various output ports.

Test Procedure

A power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

Test Setup



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

Test Data

Mode	CH	Freq. (MHz)	AVG Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Result
			Chain 0	Chain 1				
802.11b	1	2412	18.84	-	76.56	18.84	30	PASS
	6	2437	18.85	-	76.736	18.85	30	PASS
	11	2462	19.15	-	82.224	19.15	30	PASS
	12	2467	19.07	-	80.724	19.07	30	PASS
	13	2472	19.09	-	81.096	19.09	30	PASS
802.11g	1	2412	15.74	-	37.497	15.74	30	PASS
	6	2437	15.77	-	37.757	15.77	30	PASS
	11	2462	16.17	-	41.4	16.17	30	PASS
	12	2467	16.06	-	40.365	16.06	30	PASS
	13	2472	16.02	-	39.994	16.02	30	PASS
802.11n(HT20)	1	2412	15.82	16.17	79.616	19.01	30	PASS
	6	2437	15.82	16.74	85.31	19.31	30	PASS
	11	2462	16.38	16.31	86.298	19.36	30	PASS
	12	2467	16.12	16.34	83.946	19.24	30	PASS
	13	2472	14.7	14.89	60.395	17.81	30	PASS
802.11be(EHT20)	1	2412	16.06	16.35	83.56	19.22	30	PASS
	6	2437	16.56	16.45	89.536	19.52	30	PASS
	11	2462	16.33	16.6	88.716	19.48	30	PASS
	12	2467	15.77	16.06	78.163	18.93	30	PASS
	13	2472	14.45	14.61	56.754	17.54	30	PASS
802.11be(EHT20) RU26	1	2412	16.75	18.37	116.145	20.65	30	PASS
	6	2437	16.67	17.78	106.414	20.27	30	PASS
	11	2462	18.62	16.99	122.744	20.89	30	PASS
	12	2467	16.83	17.84	108.893	20.37	30	PASS
	13	2472	14.3	15.04	58.884	17.7	30	PASS
802.11be(EHT20) RU52	1	2412	17.63	17.11	109.396	20.39	30	PASS
	6	2437	16.67	17.55	103.276	20.14	30	PASS
	11	2462	16.72	18.03	110.408	20.43	30	PASS
	12	2467	16.83	17.79	108.393	20.35	30	PASS
	13	2472	14	12.98	44.978	16.53	30	PASS
802.11be(EHT20) RU106	1	2412	16.7	17.99	109.648	20.4	30	PASS
	6	2437	17.76	16.96	109.396	20.39	30	PASS
	11	2462	17.91	16.88	110.662	20.44	30	PASS
	12	2467	17.78	16.88	108.643	20.36	30	PASS
	13	2472	12.82	13.32	40.644	16.09	30	PASS
802.11be(EHT20) MRU52+26	1	2412	16.98	16.81	97.949	19.91	30	PASS
	6	2437	16.6	18.03	109.144	20.38	30	PASS
	11	2462	17.89	17	111.686	20.48	30	PASS
	12	2467	17.66	16.97	108.143	20.34	30	PASS
	13	2472	14.7	15.3	63.387	18.02	30	PASS
802.11be(EHT20) MRU106+26	1	2412	17.12	17.03	102.094	20.09	30	PASS
	6	2437	16.5	17.51	100.925	20.04	30	PASS
	11	2462	17.63	16.92	107.152	20.3	30	PASS
	12	2467	16.74	17.36	101.625	20.07	30	PASS
	13	2472	13.85	13.44	46.345	16.66	30	PASS

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9.3. Power Spectral Density

Requirements

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz (If $G_{TX} > 6$ dBi, then $PSD = 8 - (G_{TX} - 6)$).

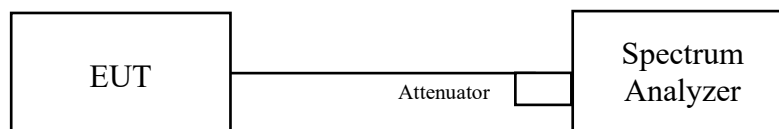
Note:

1. PSD = power spectral density that the same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz.
2. G_{TX} = the maximum transmitting antenna directional gain in dBi.
3. If EUT with Multiple Transmitter Output:
 - a. Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / Nant]$ dBi.
Nant: Number of Transmit Antennas
 $G1, G2, \dots, Gn$: Gain of Individual Antennas
Example: two antenna and gain 5 dBi / 3dBi, so if it was used for power density measurement
Directional Gain = $10 \log[(10^{5/20} + 10^{3/20})^2 / 2]$ dBi = 7.07 dBi
 - b. "PSD per chain" of the report shown is maximum value for each chain, at the "Total PSD" is summing entire spectra across corresponding frequency bins on the various outputs by computer, refer KDB 662911 Method a) for calculating total power density.
 - c. Method a) of power density measurement of KDB 662911 is used for calculating total power density with multiple transmitter output. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

Test procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times RBW$.
- e. Detector = AVG.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

Test Setup

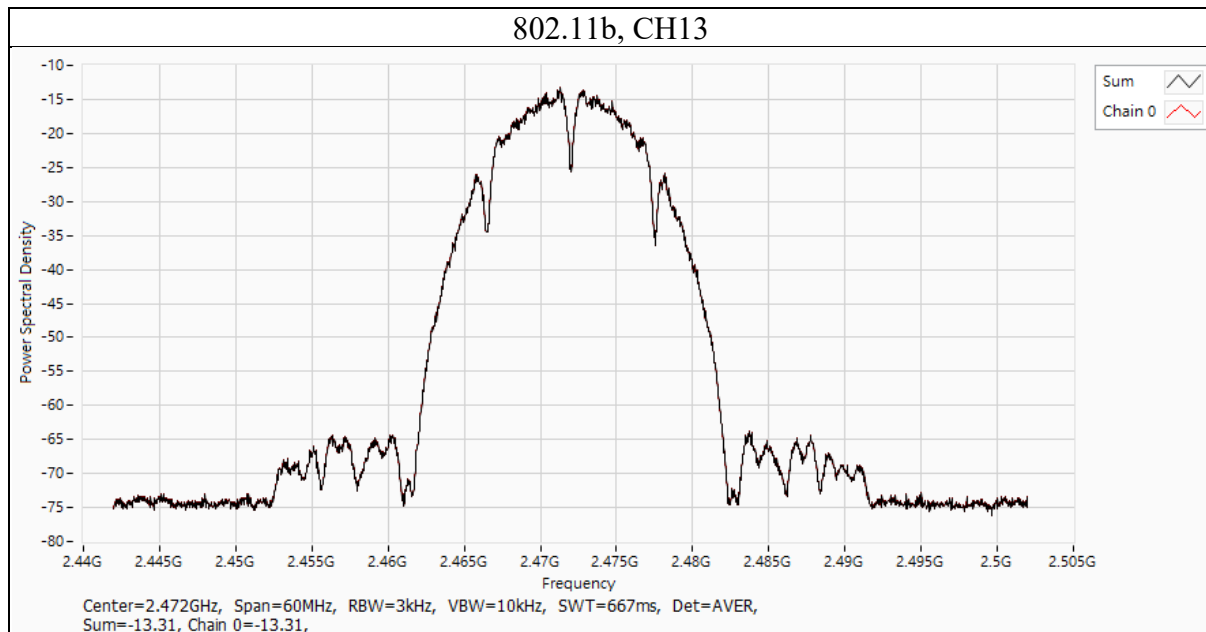


The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Test Data

Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b	1	2412	0.21	-13.55	8	PASS
	6	2437	0.21	-15	8	PASS
	11	2462	0.21	-13.38	8	PASS
	12	2467	0.21	-13.32	8	PASS
	13	2472	0.21	-13.31	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)
			Chain 0
802.11b	1	2412	-13.55
	6	2437	-15
	11	2462	-13.38
	12	2467	-13.32
	13	2472	-13.31



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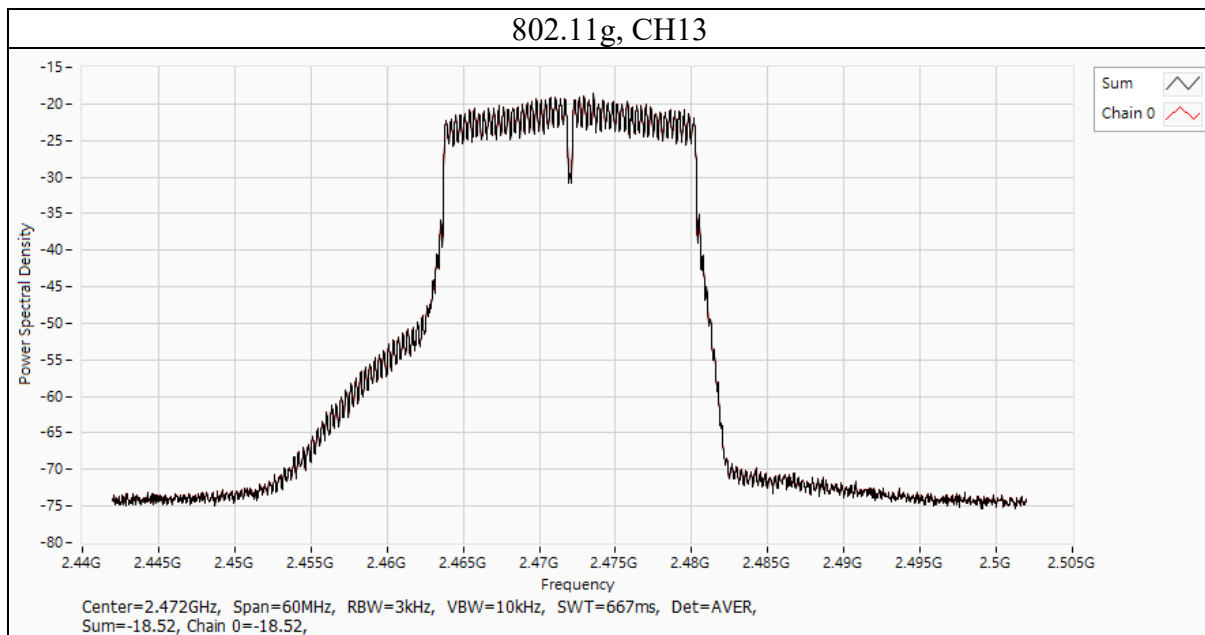
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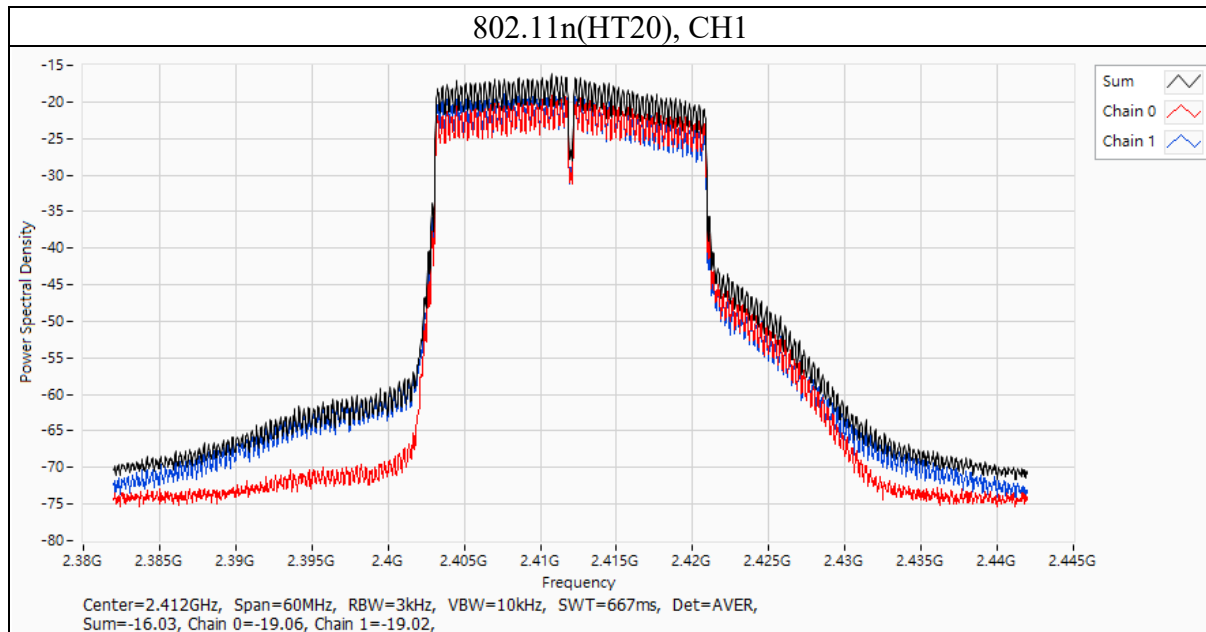
Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11g	1	2412	0.21	-19.43	8	PASS
	6	2437	0.21	-18.88	8	PASS
	11	2462	0.21	-18.73	8	PASS
	12	2467	0.21	-18.65	8	PASS
	13	2472	0.21	-18.52	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)
			Chain 0
802.11g	1	2412	-19.43
	6	2437	-18.88
	11	2462	-18.73
	12	2467	-18.65
	13	2472	-18.52



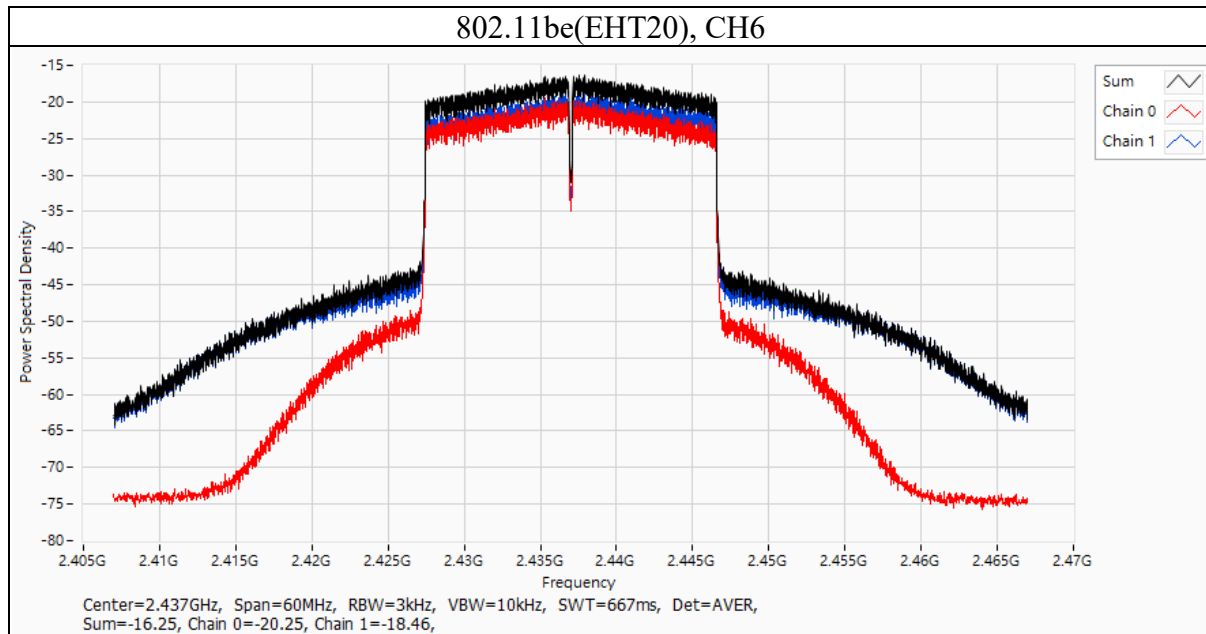
Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11n(HT20)	1	2412	2.04	-16.03	8	PASS
	6	2437	2.04	-16.19	8	PASS
	11	2462	2.04	-16.12	8	PASS
	12	2467	2.04	-16.29	8	PASS
	13	2472	2.04	-17.64	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11n(HT20)	1	2412	-19.06	-18.99
	6	2437	-19	-19.01
	11	2462	-18.88	-18.46
	12	2467	-18.9	-18.95
	13	2472	-20.46	-20.37



Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11be(EHT20)	1	2412	2.04	-16.56	8	PASS
	6	2437	2.04	-16.25	8	PASS
	11	2462	2.04	-16.37	8	PASS
	12	2467	2.04	-16.93	8	PASS
	13	2472	2.04	-18.26	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11be(EHT20)	1	2412	-19.75	-19.23
	6	2437	-19.54	-18.46
	11	2462	-19.08	-19.18
	12	2467	-19.73	-19.56
	13	2472	-21.16	-21.14



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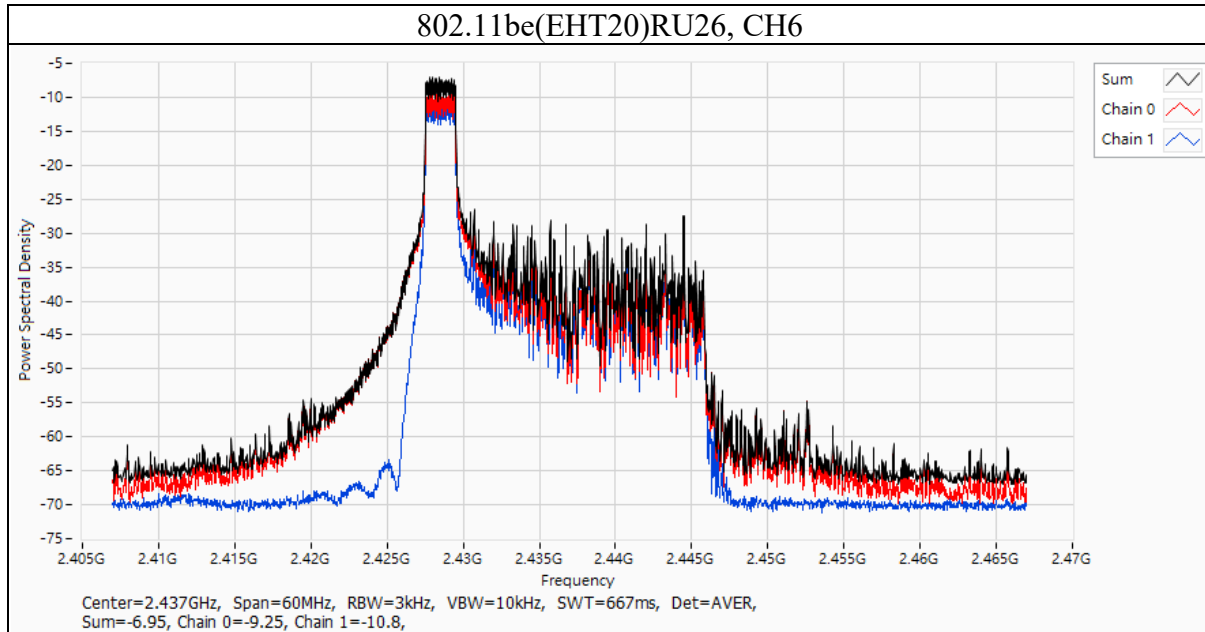
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Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11be(EHT20)RU26	1	2412	2.04	-7.15	8	PASS
	6	2437	2.04	-6.95	8	PASS
	11	2462	2.04	-7.24	8	PASS
	12	2467	2.04	-7.11	8	PASS
	13	2472	2.04	-9.55	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11be(EHT20)RU26	1	2412	-9.86	-10.17
	6	2437	-9.13	-10.69
	11	2462	-10.31	-9.27
	12	2467	-9.49	-10.59
	13	2472	-11.93	-12.91



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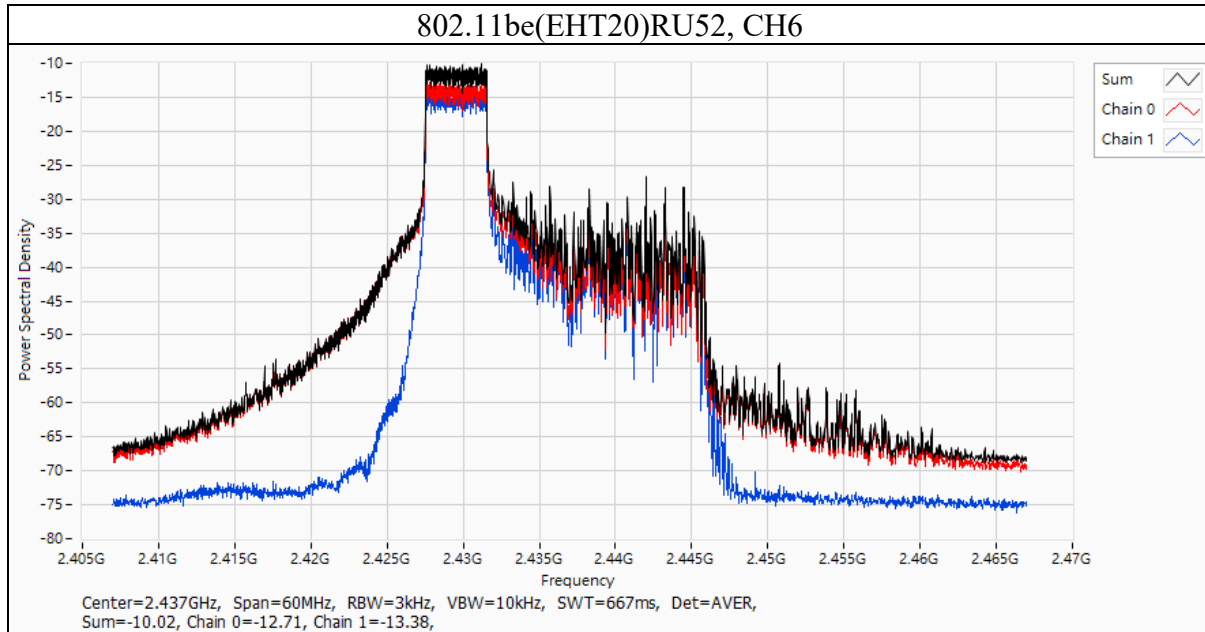
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Facsimile (FAX) :+886-3-583-7948

Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

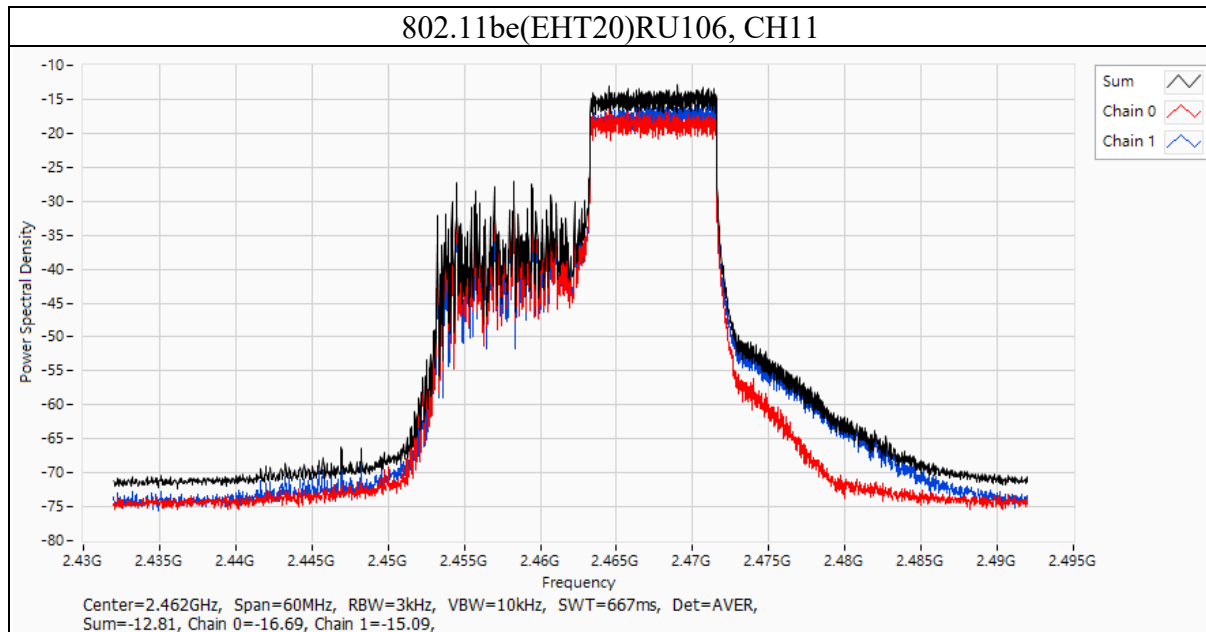
Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11be(EHT20)RU52	1	2412	2.04	-10.32	8	PASS
	6	2437	2.04	-10.02	8	PASS
	11	2462	2.04	-10.05	8	PASS
	12	2467	2.04	-10.17	8	PASS
	13	2472	2.04	-14.5	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11be(EHT20)RU52	1	2412	-13.37	-12.99
	6	2437	-12.59	-13.38
	11	2462	-12.29	-13.55
	12	2467	-12.5	-13.77
	13	2472	-16.86	-17.64



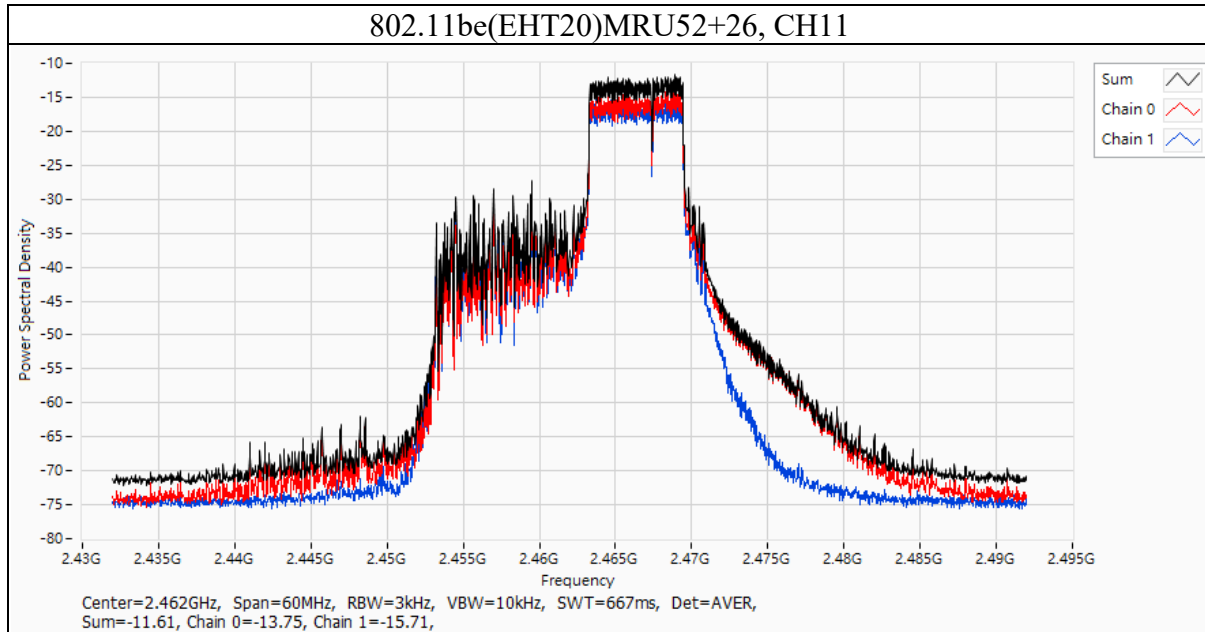
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802.11be(EHT20)RU106	1	2412	2.04	-13.32	8	PASS
	6	2437	2.04	-13.1	8	PASS
	11	2462	2.04	-12.81	8	PASS
	12	2467	2.04	-13.4	8	PASS
	13	2472	2.04	-16.96	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11be(EHT20)RU106	1	2412	-16.13	-16.28
	6	2437	-15.38	-16.43
	11	2462	-16.41	-15.09
	12	2467	-16.72	-15.77
	13	2472	-19.32	-20.54



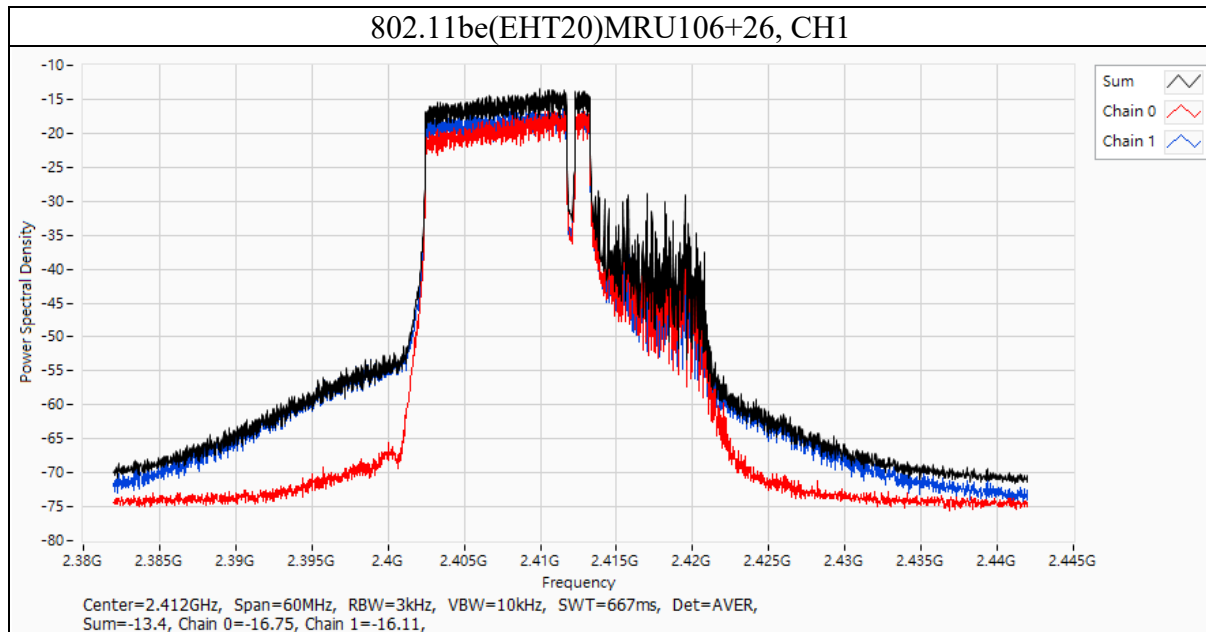
Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11be(EHT20)MRU52+26	1	2412	2.04	-12.2	8	PASS
	6	2437	2.04	-12.2	8	PASS
	11	2462	2.04	-11.61	8	PASS
	12	2467	2.04	-11.88	8	PASS
	13	2472	2.04	-13.87	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11be(EHT20)MRU52+26	1	2412	-14.83	-15.18
	6	2437	-15.47	-14.48
	11	2462	-13.75	-15.15
	12	2467	-14.3	-15.17
	13	2472	-17.27	-16.53



Mode	CH	Freq (MHz)	Directional Gain (dBi)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11be(EHT20)MRU106+26	1	2412	2.04	-13.4	8	PASS
	6	2437	2.04	-13.54	8	PASS
	11	2462	2.04	-13.44	8	PASS
	12	2467	2.04	-13.69	8	PASS
	13	2472	2.04	-16.93	8	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz)	
			Chain 0	Chain 1
802.11be(EHT20)MRU106+26	1	2412	-16.46	-16.11
	6	2437	-16.24	-16.52
	11	2462	-16.19	-16.64
	12	2467	-16.31	-16.23
	13	2472	-19.84	-19.64



9.4. Conducted Out of Band Emission

Requirements

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b) (3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209 (a) is not required.

Test procedure

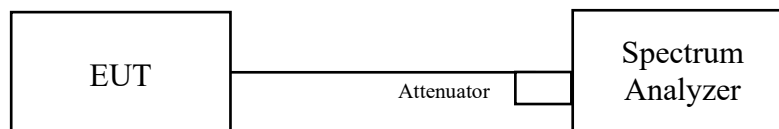
Measurement Procedure REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure OOBE

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

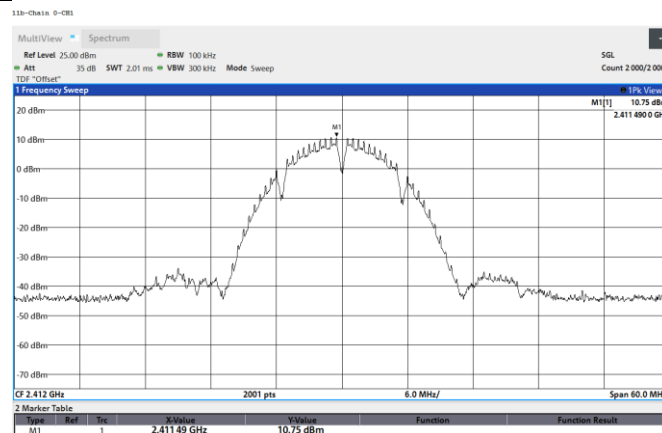
Test Setup



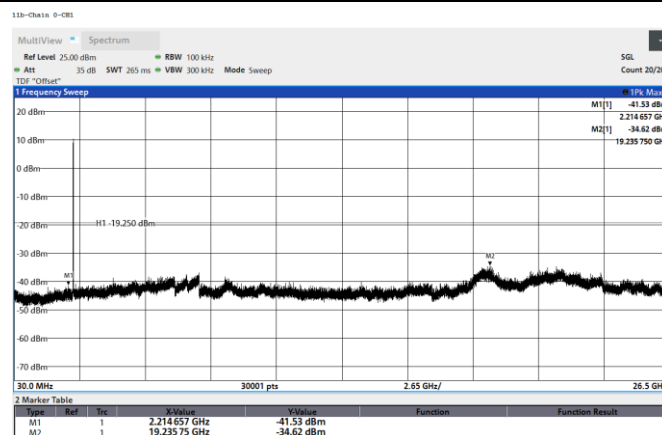
The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Test Data

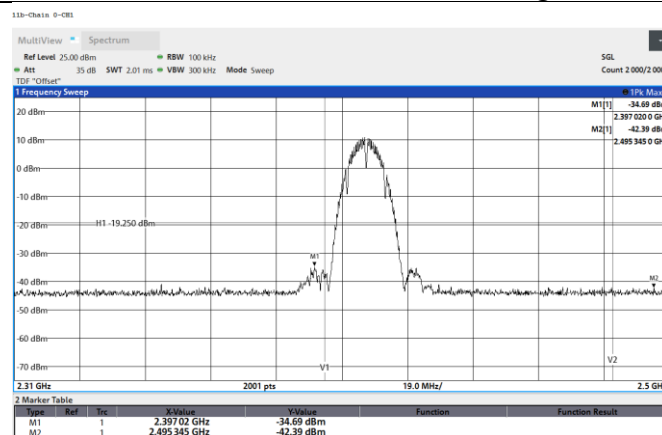
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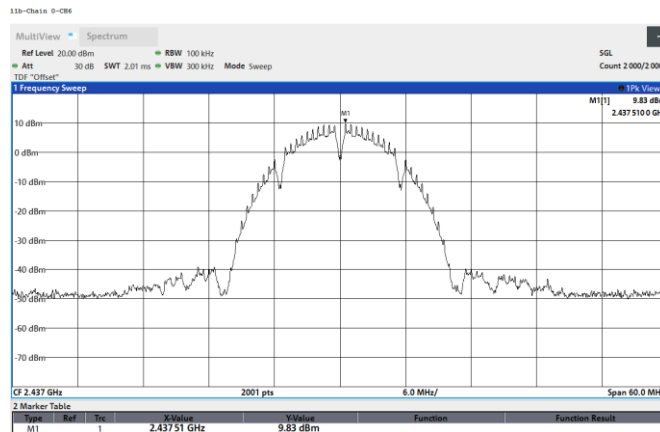
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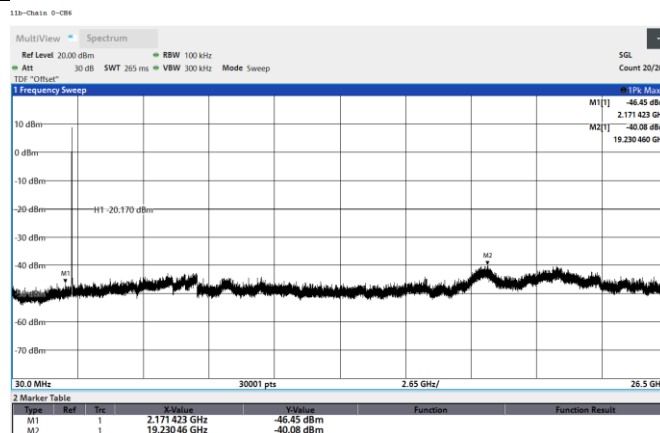
802.11b, CH1, Chain 0, Band edge



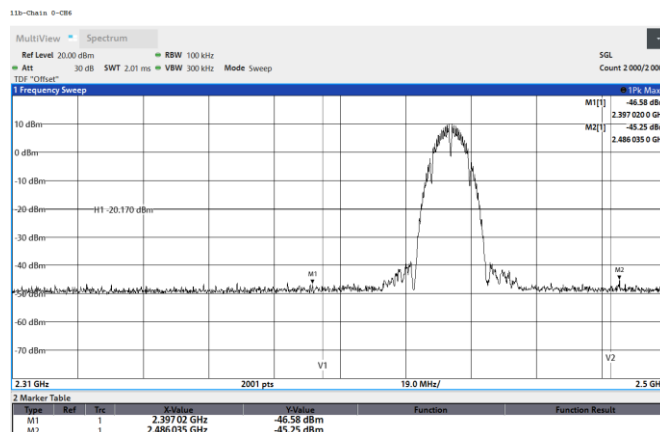
802.11b, CH6, Chain 0, Reference



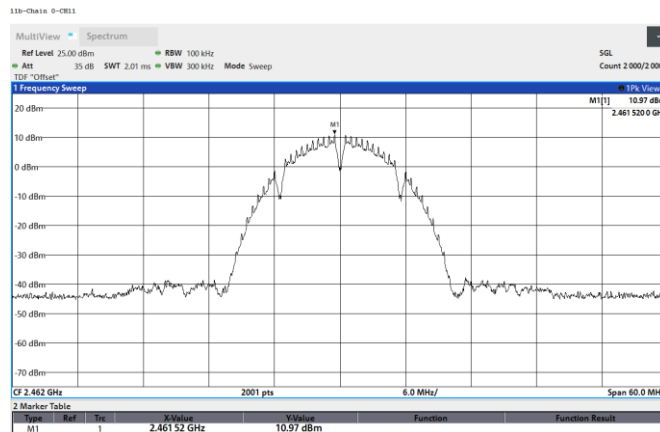
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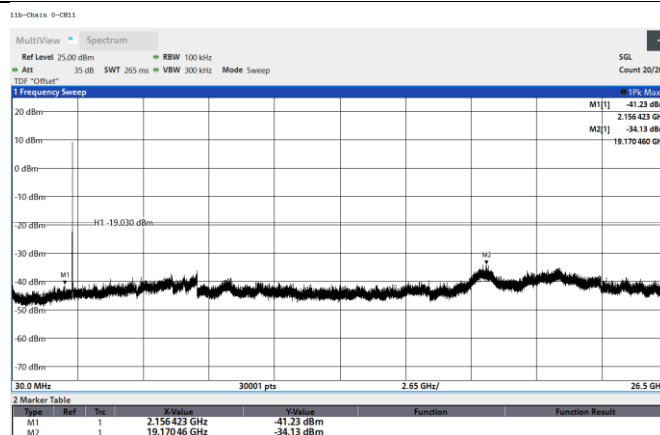
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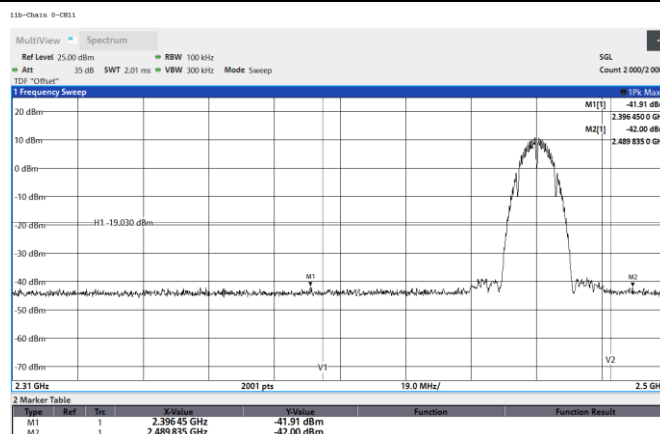
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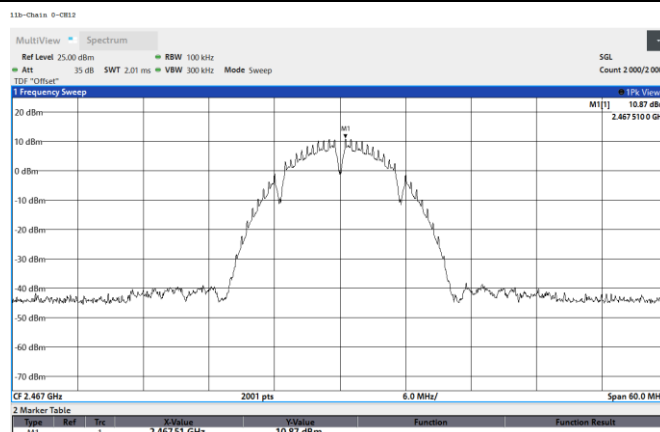
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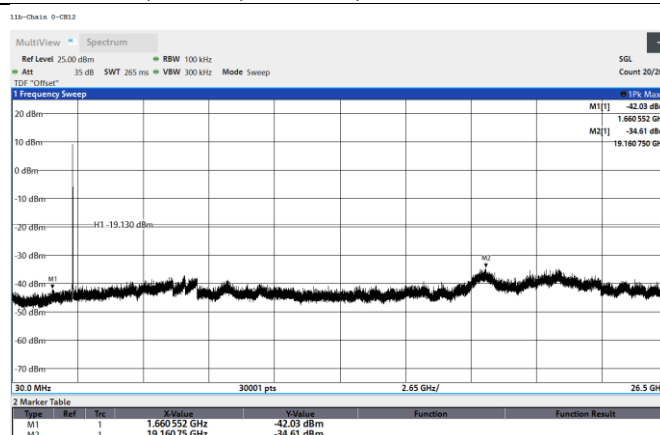
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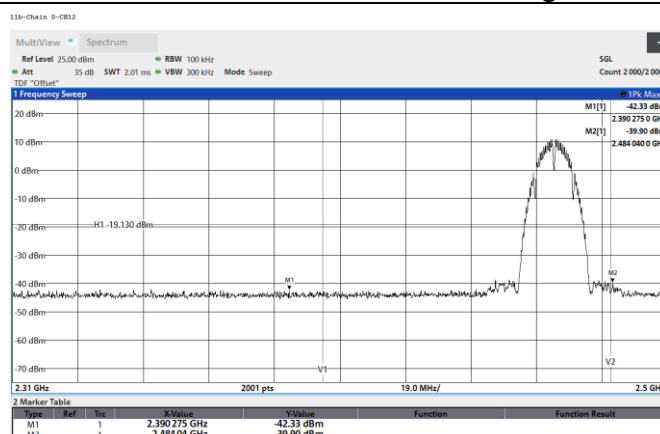
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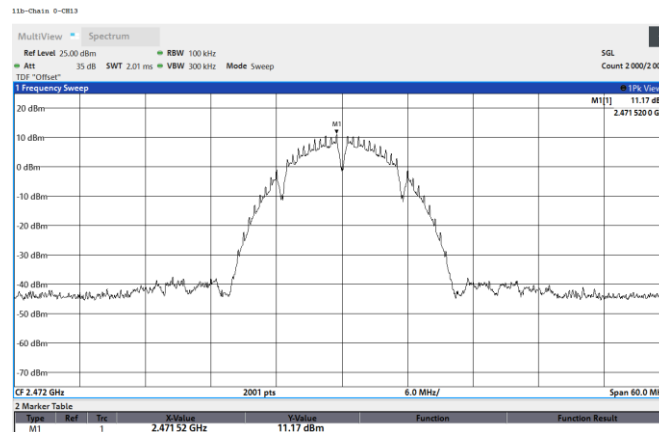
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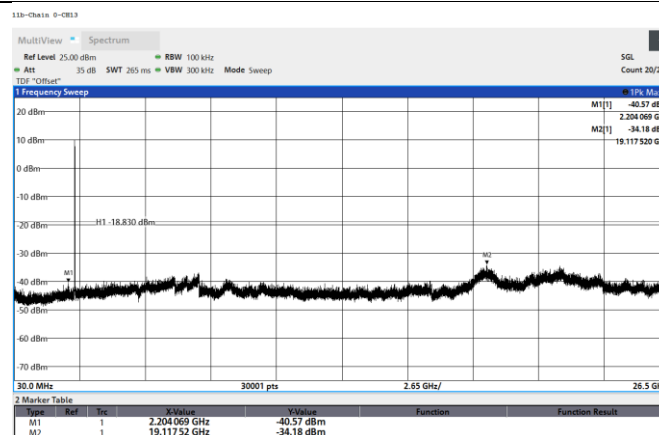
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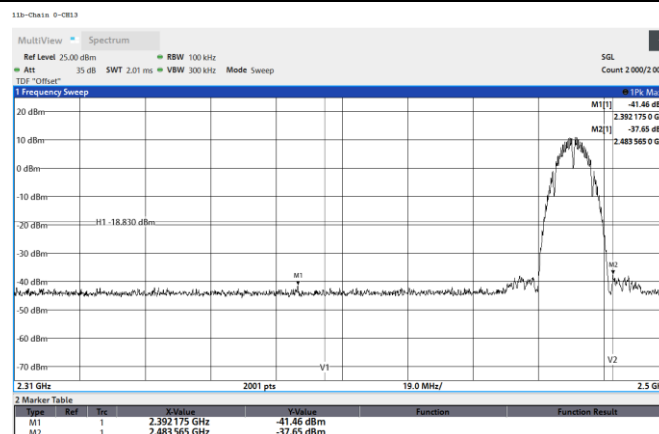
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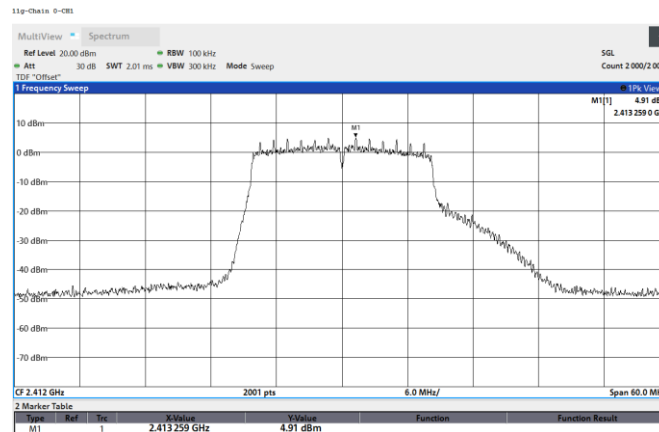
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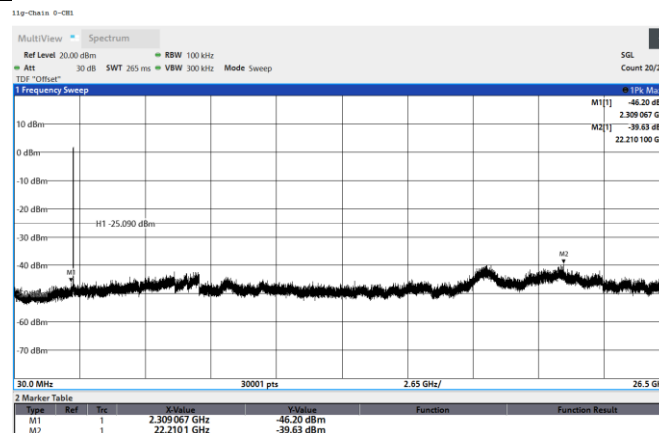
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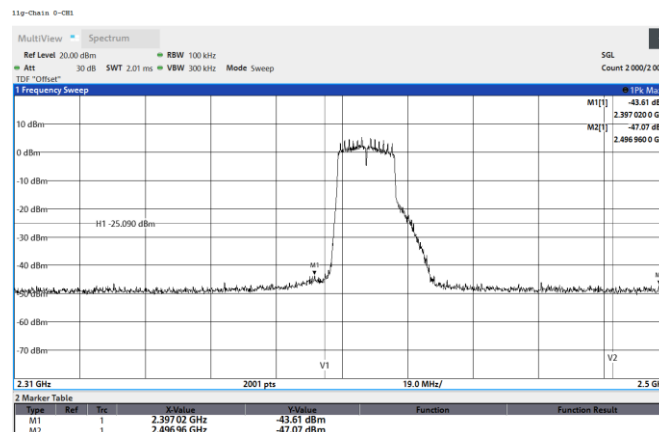
802.11g, CH1, Chain 0, Reference



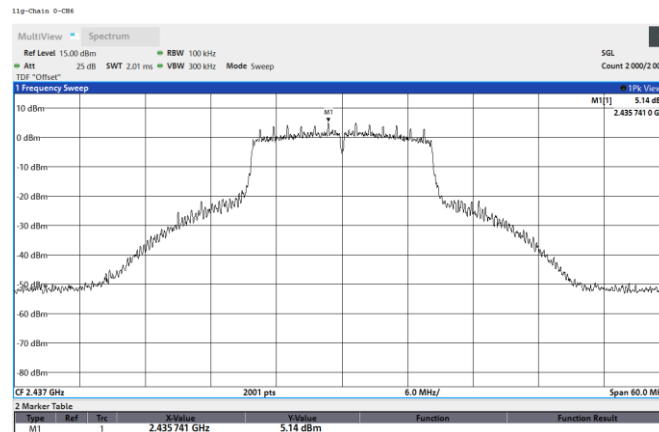
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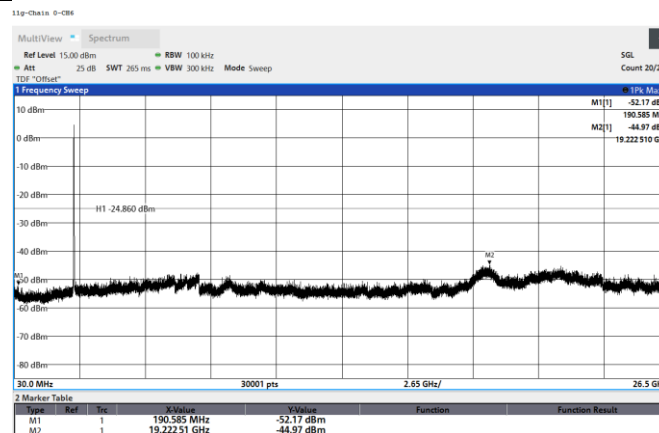
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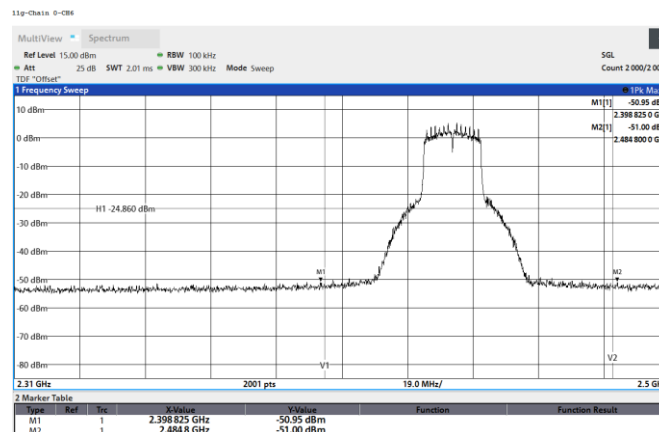
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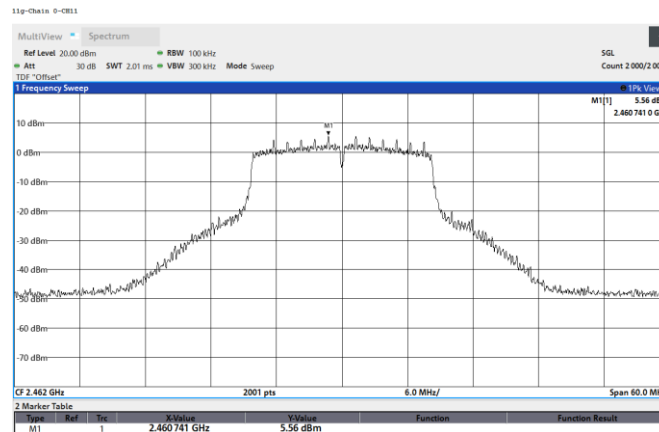
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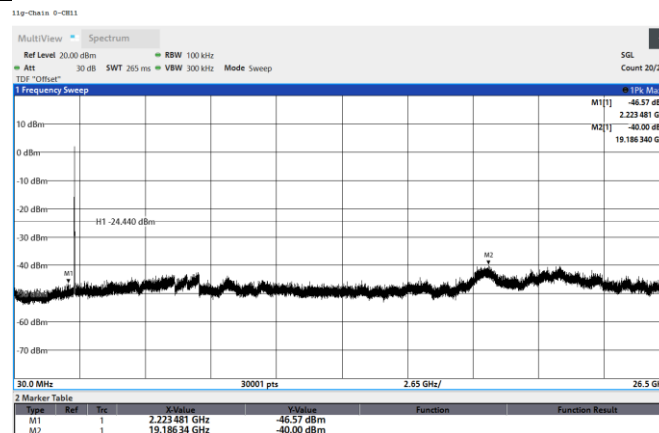
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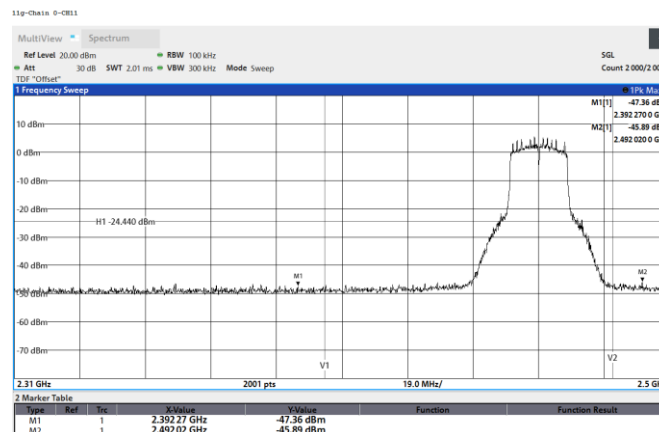
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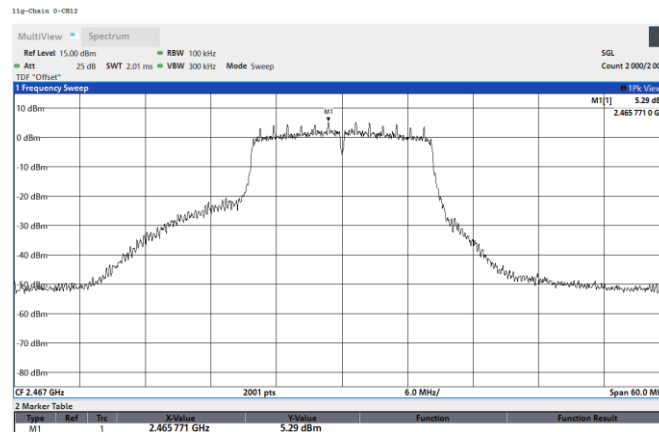
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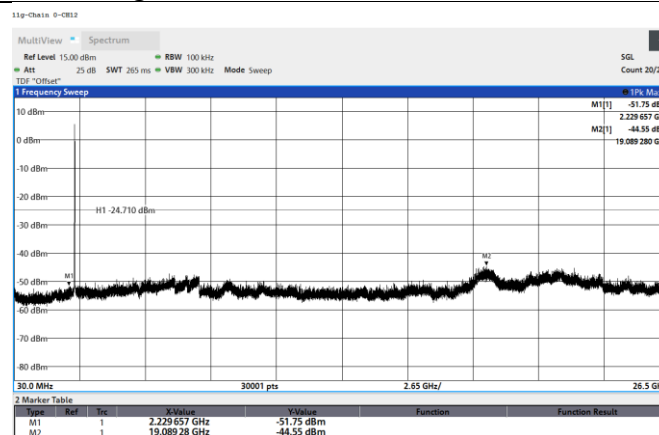
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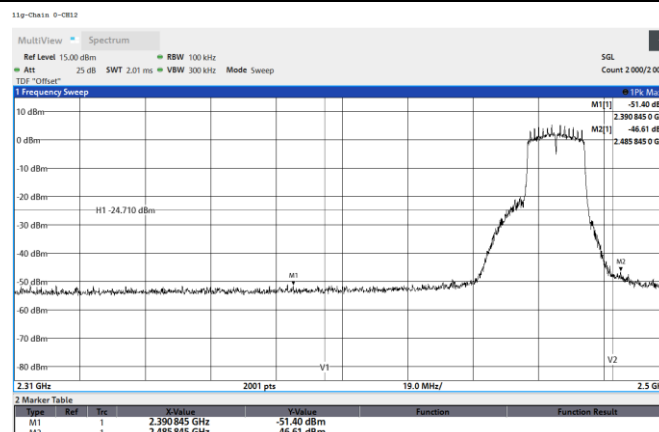
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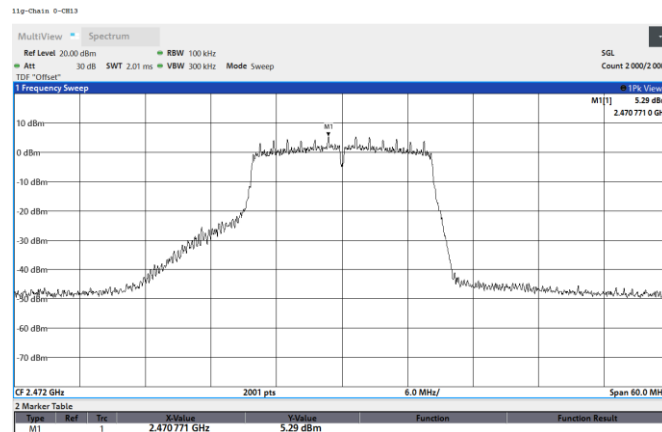
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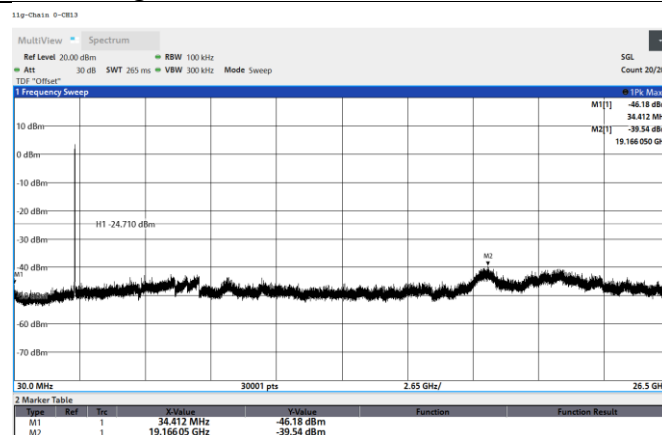
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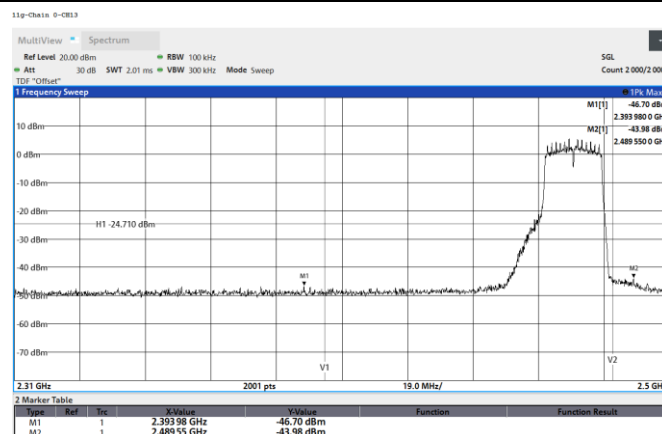
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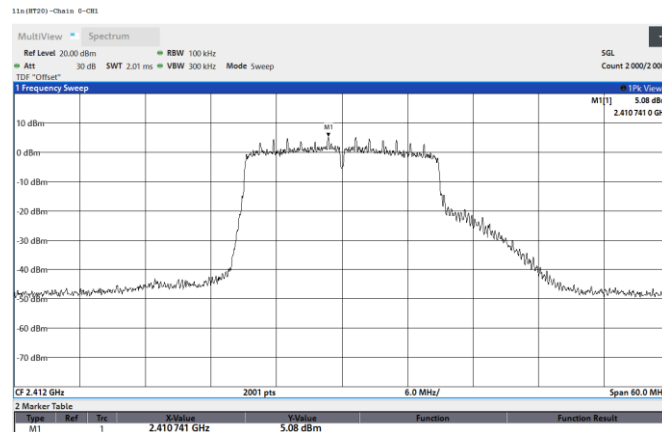
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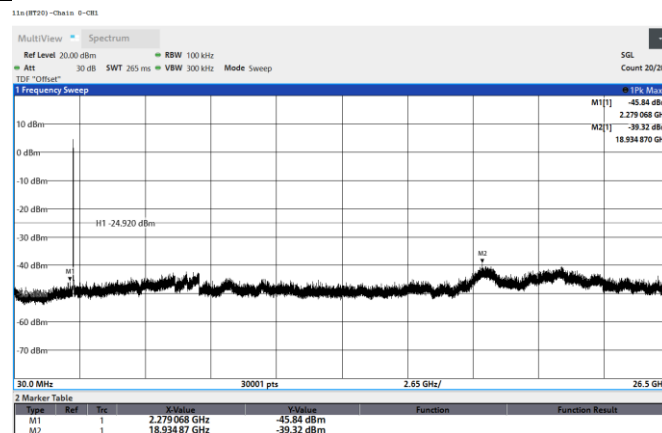
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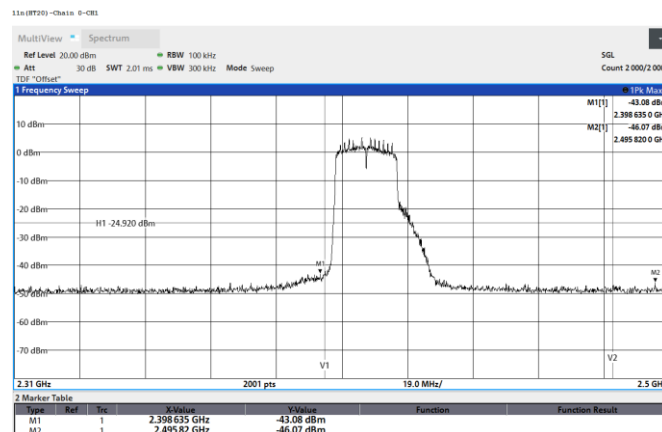
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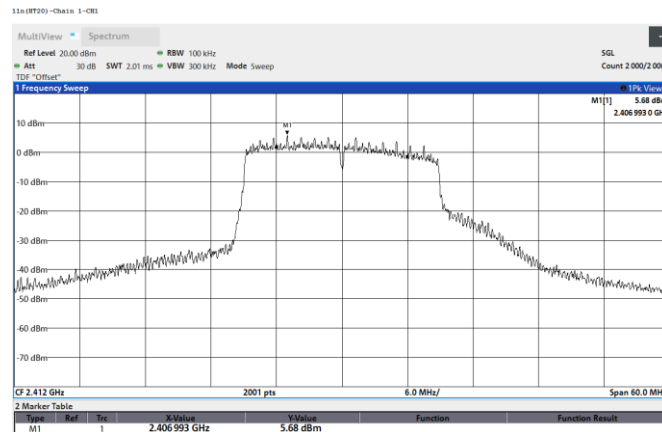
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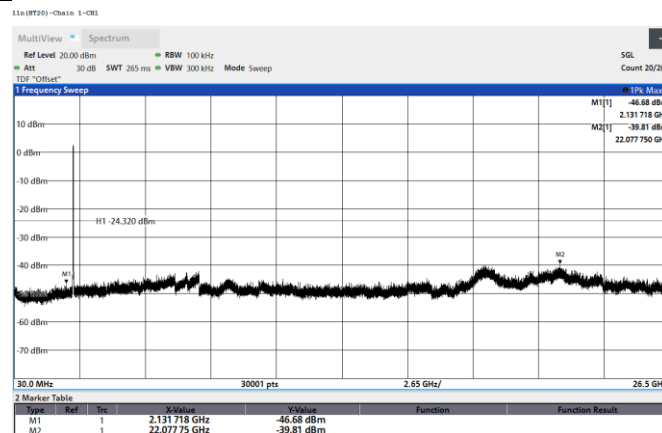
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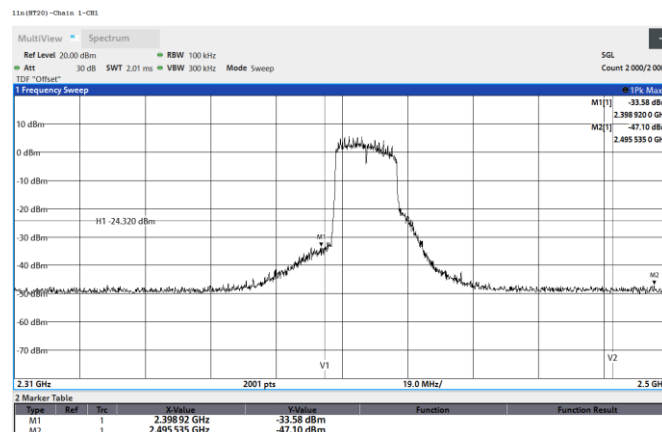
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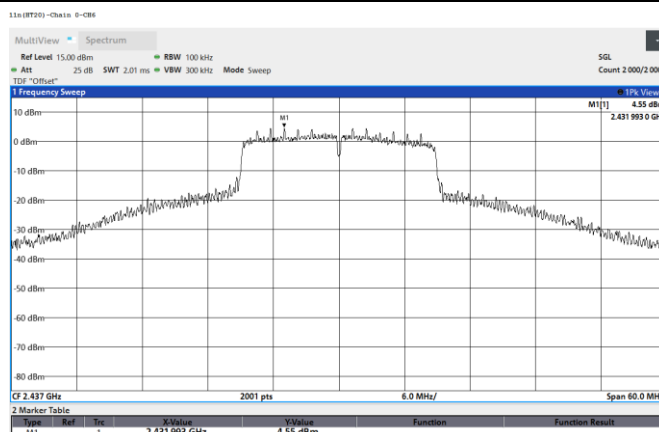
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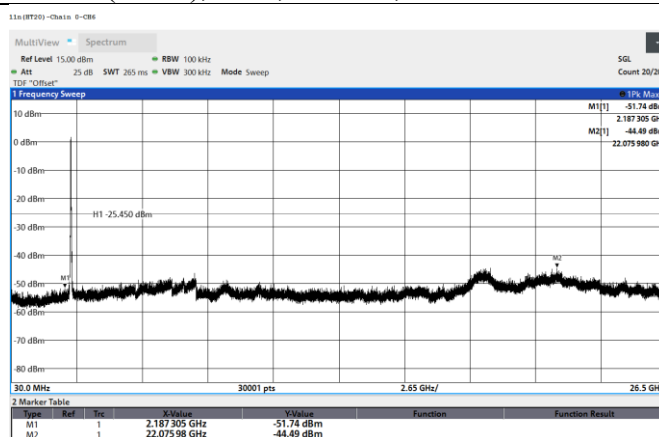
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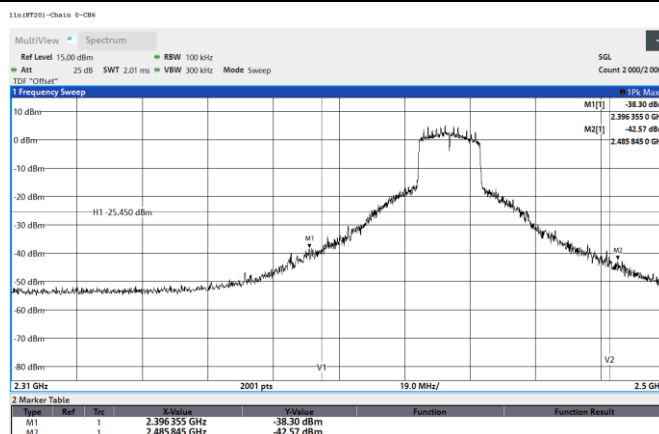
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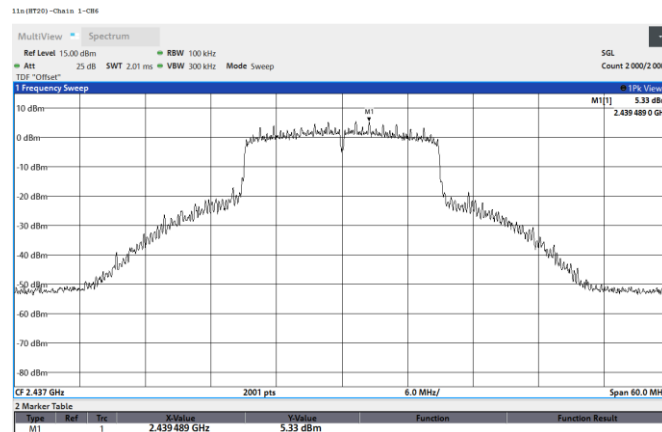
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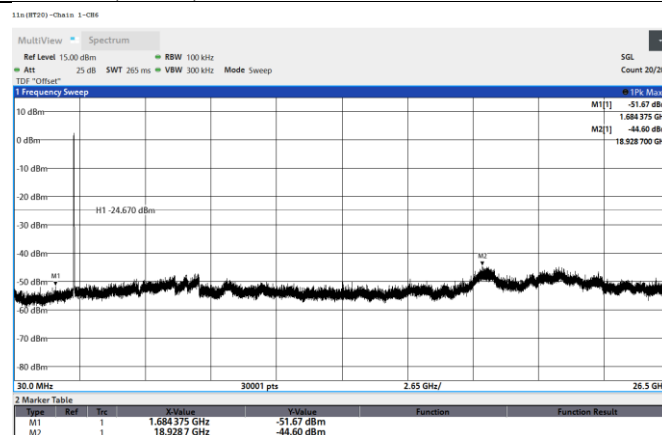
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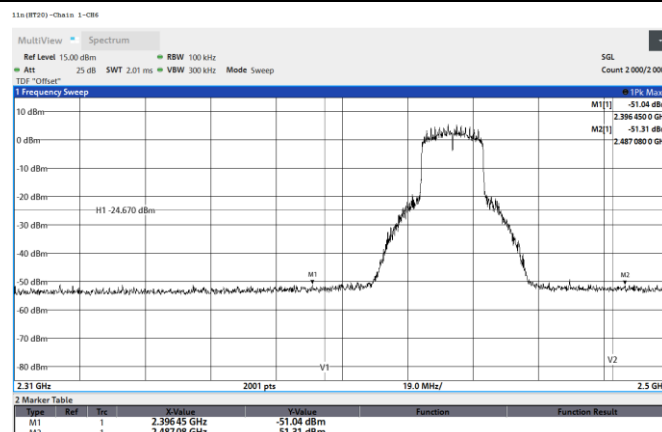
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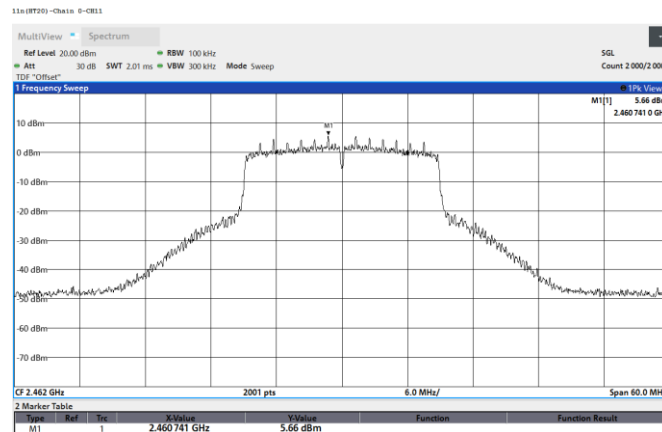
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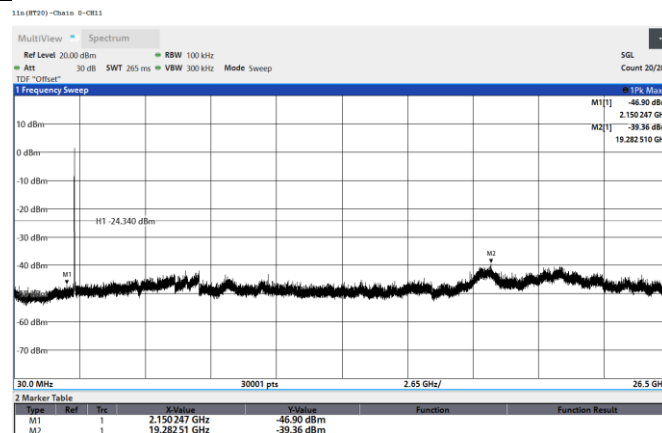
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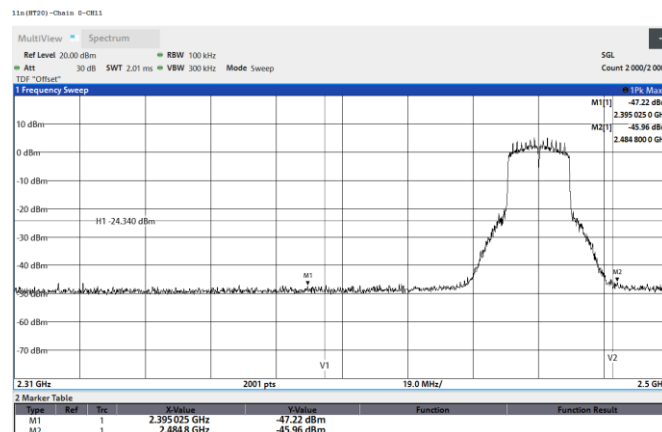
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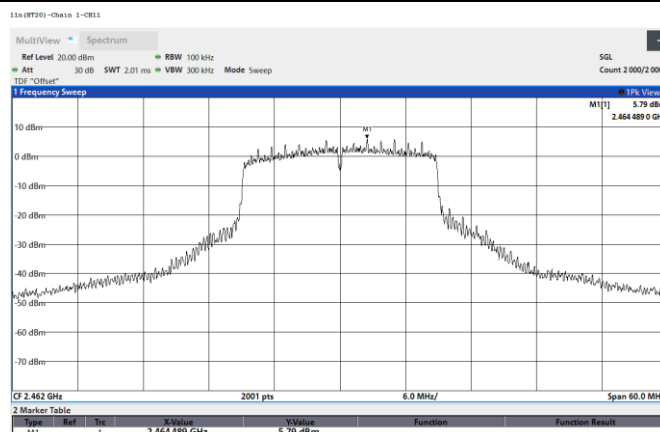
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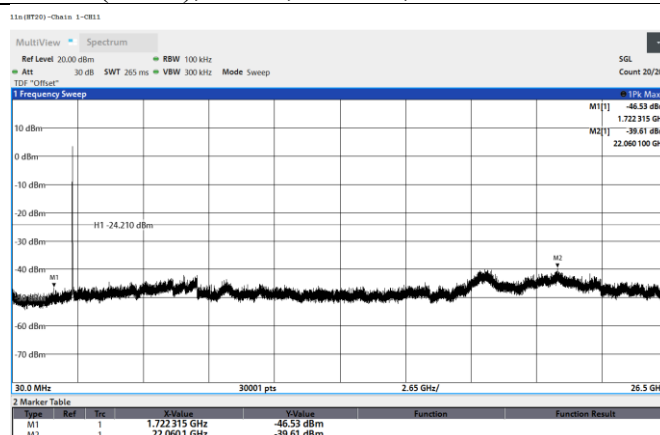
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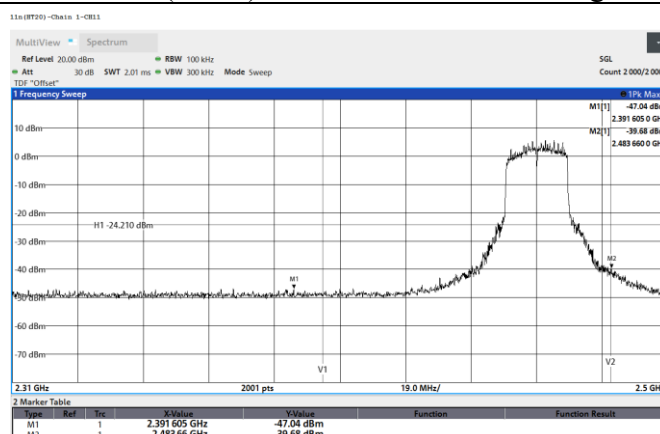
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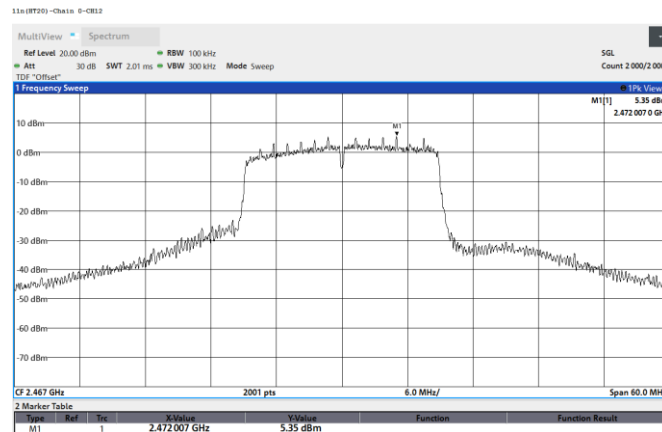
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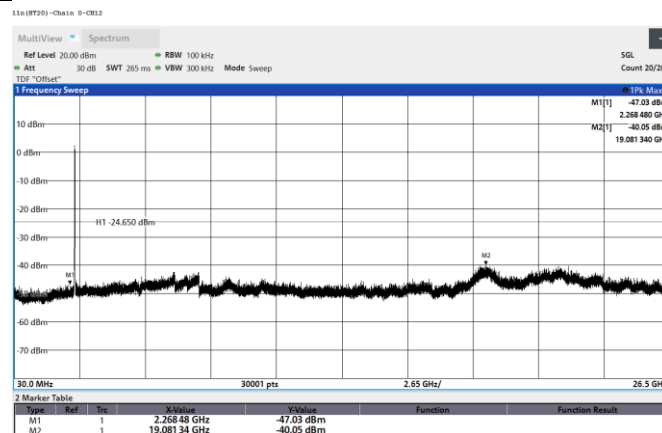
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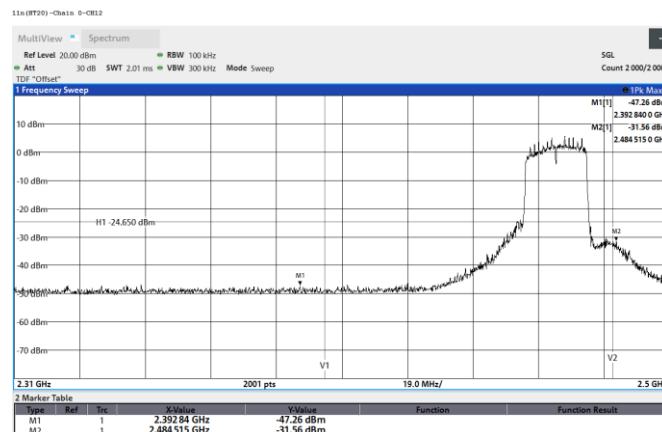
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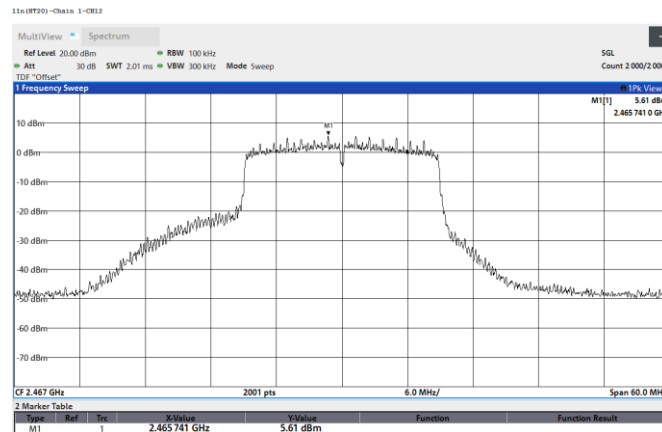
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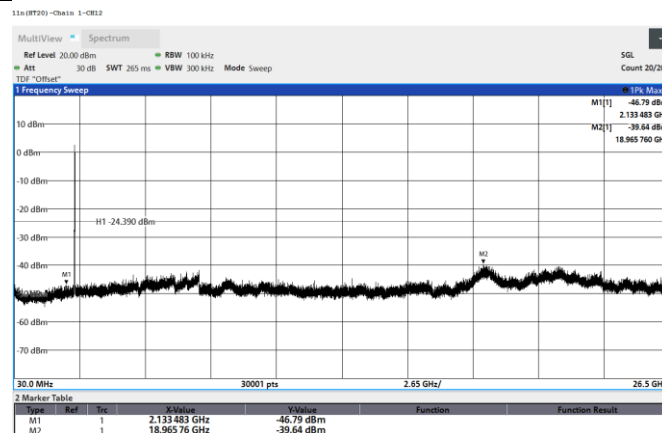
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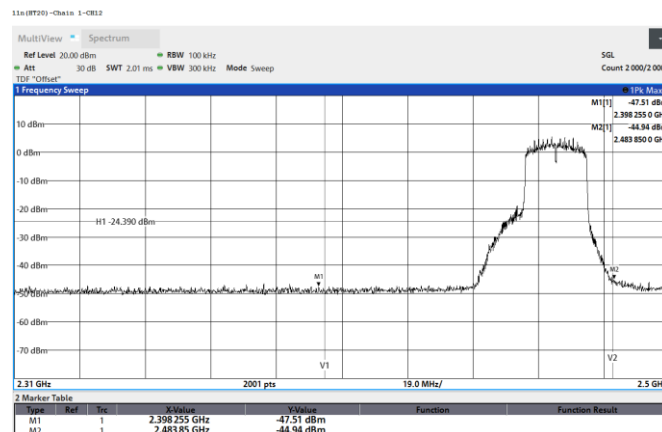
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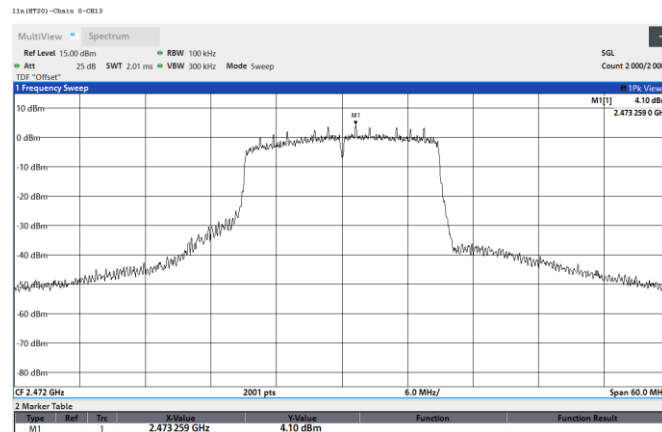
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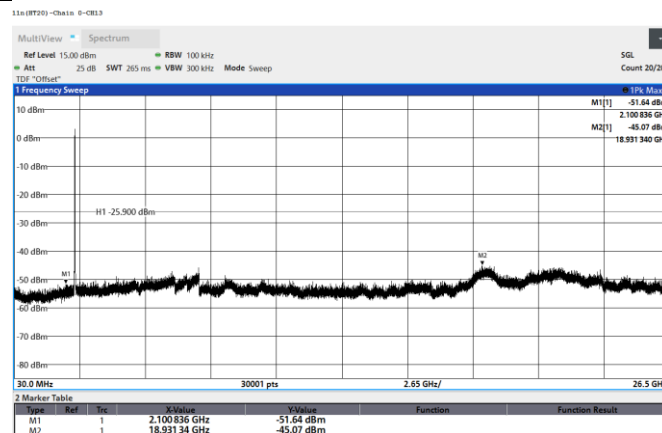
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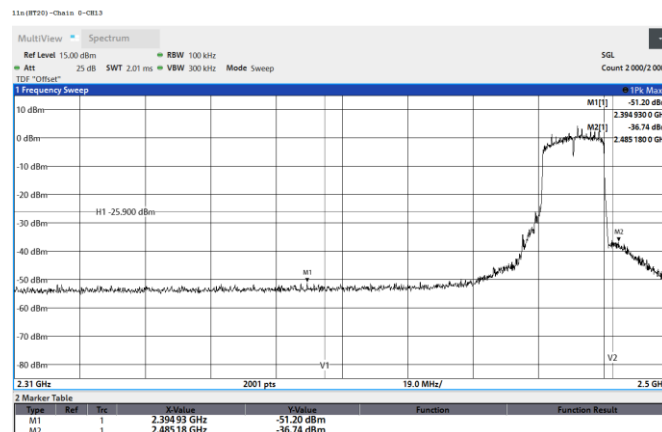
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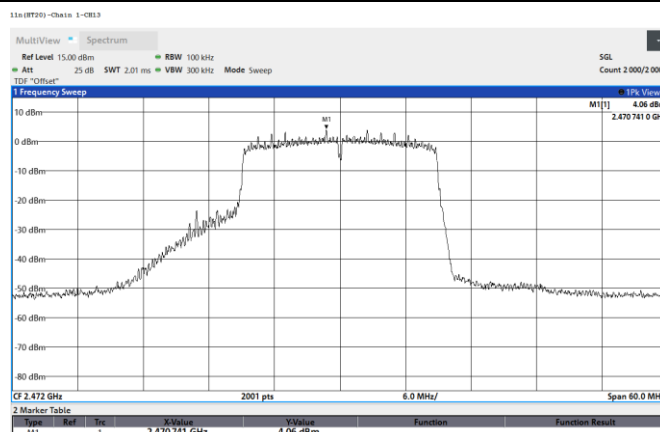
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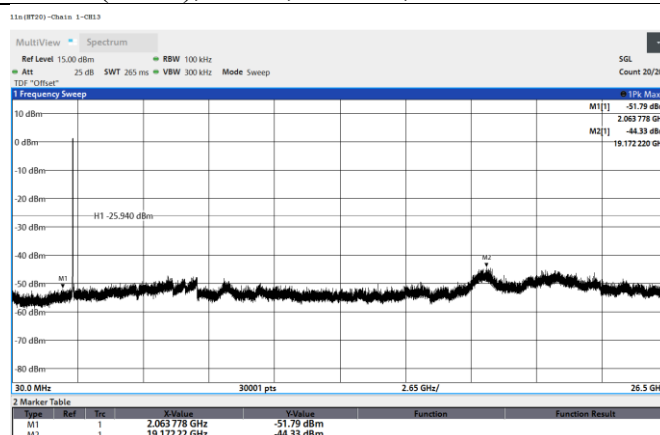
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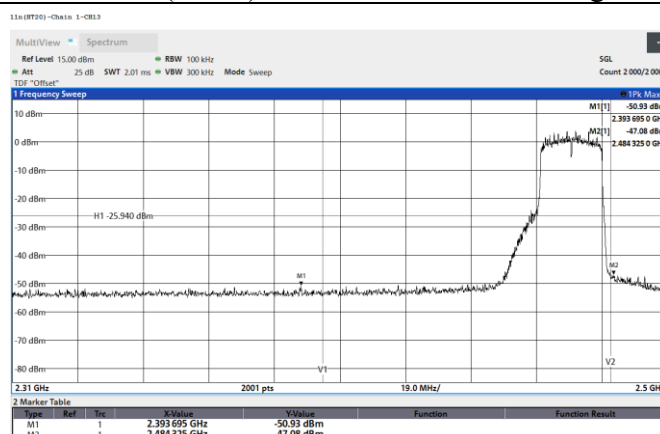
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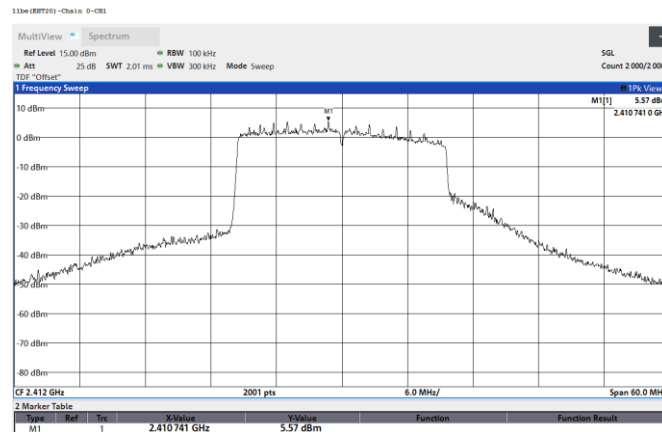
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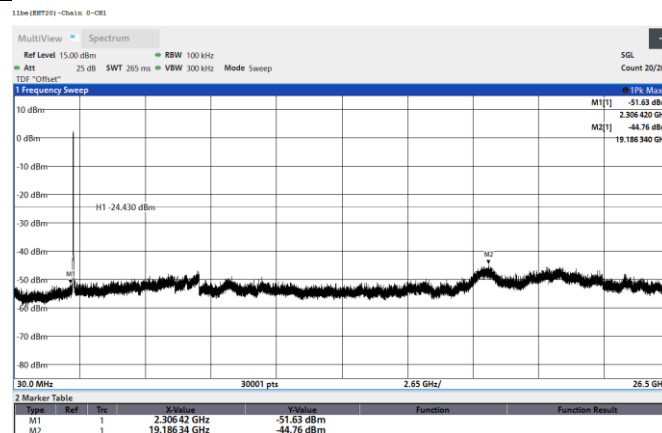
802.11n(HT20), CH13, Chain 1, Band edge



802.11be(EHT20), CH1, Chain 0, Reference



802.11be(EHT20), CH1, Chain 0, Conducted Emission



802.11be(EHT20), CH1, Chain 0, Band edge

