



Radio Test Report

Circadia Health, Inc. The Circadia CX00 System CX00

47 CFR Part 15.247 Effective Date 1st October 2025

DTS: Digital Transmission System

Test Date: 12th May 2026 to 26th May 2026

Report Number: 39540-5-26 Issue 01

The testing was carried out by Kiwa Ltd trading as Kiwa Electrical Compliance, an independent test house, at their test facility located at:

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Certificate of Test 39540-5

The equipment noted below has been fully tested by Kiwa Electrical Compliance and, where appropriate, conforms to the relevant subpart of 47 CFR Part 15.247. This is a certificate of test only and should not be confused with an equipment authorisation. Other standards may also apply.

Equipment:	The Circadia CX00 System
Model Number:	CX00
Unique Serial Number:	Rad emissions: b8f862e89648 Conducted Sample: b8f862e88b54
Applicant:	Circadia Health, Inc. 507 South Douglas Street El Segundo, California 90245, United States
Proposed FCC ID:	2BPIS-CX00
Full measurement results are detailed in Report Number:	39540-5-26 Issue 01
Test Standards:	47 CFR Part 15.247 Effective Date 1st October 2025 DTS: Digital Transmission System

NOTE:

With reference to the Rule part detailed, not all tests within the Rule part have been applied at the request of the applicant.

Certain tests were not performed based upon applicant's declarations. Certain other requirements are subject to applicant's declaration only and have not been tested/verified. For details refer to section 3 of this report. Contains FCC ID's: 2ANPO00NRF9151. This report pertains to only the 2.4 GHz WiFi functionality of the EUT.

DEVIATIONS:

No deviations have been applied.

This test certificate relates only to the unit tested as identified by a unique serial number and in the condition at the time it was tested. It does not relate to any other similar equipment and performance of the product before or after the test cannot be guaranteed. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of unit not meeting the intentions of the standard or the requirements of the Federal Regulations, particularly under different conditions to those during testing. Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Date of Test: 12th May 2026 to 26th May 2026

Test Engineer:
Jack Chilvers

Jack Chilvers

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2 Equipment under test (EUT)

2.1 Equipment specification

Applicant	Circadia Health, Inc. 507 South Douglas Street El Segundo California 90245, United States	
Manufacturer of EUT	Circadia Health, Inc	
Full Name of EUT	The Circadia CX00 System	
Model Number of EUT (HVIN)	CX00	
Serial Number of EUT	Rad emissions: b8f862e89648 Conducted Sample: b8f862e88b54	
Date Received	28th April 2026	
Date of Test:	12th May 2026 to 26th May 2026	
Date Report Issued	8th July 2026	
Main Function	The Circadia CX00 System is a contactless system that uses radar to monitor respiratory rate (RR), heart rate (HR), motion, and presence of a patient in its detection range.	
EUT Specification	Height	57 mm
	Width	57 mm
	Depth	13.7 mm
	Weight	0.025 kg
	Voltage	5V DC
	Current	2 Amps
EUT Supplied PSU	Manufacturer	Circadia Health, Inc
	Model number	HNBM050200WU
	Serial number	Not stated
	Input voltage	100 - 240V AC 50/60Hz
	Input current	0.35A MAX
	Output	5V DC, 2 Amp

2.2 Applicant declarations for testing

General Parameters	
EUT Normal use position	Wall mounted
Choice of model(s) for type tests	Sample
Antenna details	1 integral on chip. Gain 1.5 dBi peak, -1 dBi average
Antenna port	No
Baseband Data port (yes/no)?	No
Highest Signal generated in EUT	61.5GHz (Radar)
Lowest Signal generated in EUT	32.768 kHz
Hardware Version (HVIN)	Rev 6M
Firmware Version (FVIN)	V6.0.0.0
Type of Equipment	Multi-radio
Technology Type	FMCW Radar, Wi-Fi and Cellular
Geo-location (yes/no)	No
TX Parameters	
Alignment range – transmitter	Radar: 58.0 GHz - 61.5 GHz Wi-Fi: 2412-2483.5 MHz LTE: 700 - 2100 MHz
EUT Declared Modulation Parameters	Wi-Fi IEEE 802.11, LTE-Cat M1, 60 GHz Radar FMCW
EUT Declared Power level	LTE: 23 dBm Wi-Fi: 16.5 dBm Radar: 5 dBm
EUT Declared Signal Bandwidths	Radar: Single channel, WIFI: 5 MHz Spacing, LTE: 1.4MHz
EUT Declared Channel Spacings	Radar: Not applicable, single channel WIFI: 5 MHz Spacing LTE: Band dependant
EUT Declared Duty Cycle	See section 5.13 of this report
Unmodulated carrier available?	No
Declared frequency stability	Wi-Fi: ±10 ppm, LTE: ≤ ±0.1 ppm, Radar: ±20 ppm
RX Parameters	
Alignment range – receiver	Radar: 58.0 GHz - 61.5 GHz Wi-Fi: 2412-2483.5 MHz LTE: 700 - 2100 MHz
EUT Declared RX Signal Bandwidth	Radar: Single channel, WIFI: 5 MHz Spacing, LTE: 1.4MHz
FCC Parameters	
FCC Transmitter Class	FCC DTS: Digital Transmission System

General Wi-Fi / BT / ZigBee Parameters			
Specific Technology Type	WIFI		
Dynamic frequency selection employed	No		
TPC	No		
FHSS / Non-FHSS	Non-FHSS		
Minimum performance criteria for blocking (BER)	Not Applicable		
Number of antennas and type used	1 integral on chip. Gain 1.5 dBi peak, -1 dBi average		
Beamforming	No		
MIMO	No		
Supported data rates	802.11b	1M	20 MHz
	802.11b	2M	20 MHz
	802.11b	5.5 M	20 MHz
	802.11b	11M	20 MHz
	802.11g	6 M	20 MHz
	802.11g	9 M	20 MHz
	802.11g	12 M	20 MHz
	802.11g	18 M	20 MHz
	802.11g	24 M	20 MHz
	802.11g	36 M	20 MHz
	802.11g	48 M	20 MHz
	802.11g	54 M	20 MHz
	802.11n	Mcs0	20 MHz
	802.11n	Mcs1	20 MHz
	802.11n	Mcs2	20 MHz
	802.11n	Mcs3	20 MHz
	802.11n	Mcs4	20 MHz
	802.11n	Mcs5	20 MHz
	802.11n	Mcs6	20 MHz
	802.11n	Mcs7	20 MHz
	802.11n	Mcs0	40 MHz
	802.11n	Mcs1	40 MHz
	802.11n	Mcs2	40 MHz
	802.11n	Mcs3	40 MHz
	802.11n	Mcs4	40 MHz
	802.11n	Mcs5	40 MHz
	802.11n	Mcs6	40 MHz
	802.11n	Mcs7	40 MHz

2.3 Functional description

The Circadia CX00 System is a contactless system that uses radar to monitor respiratory rate (RR), heart rate (HR), motion, and presence of a patient in its detection range.

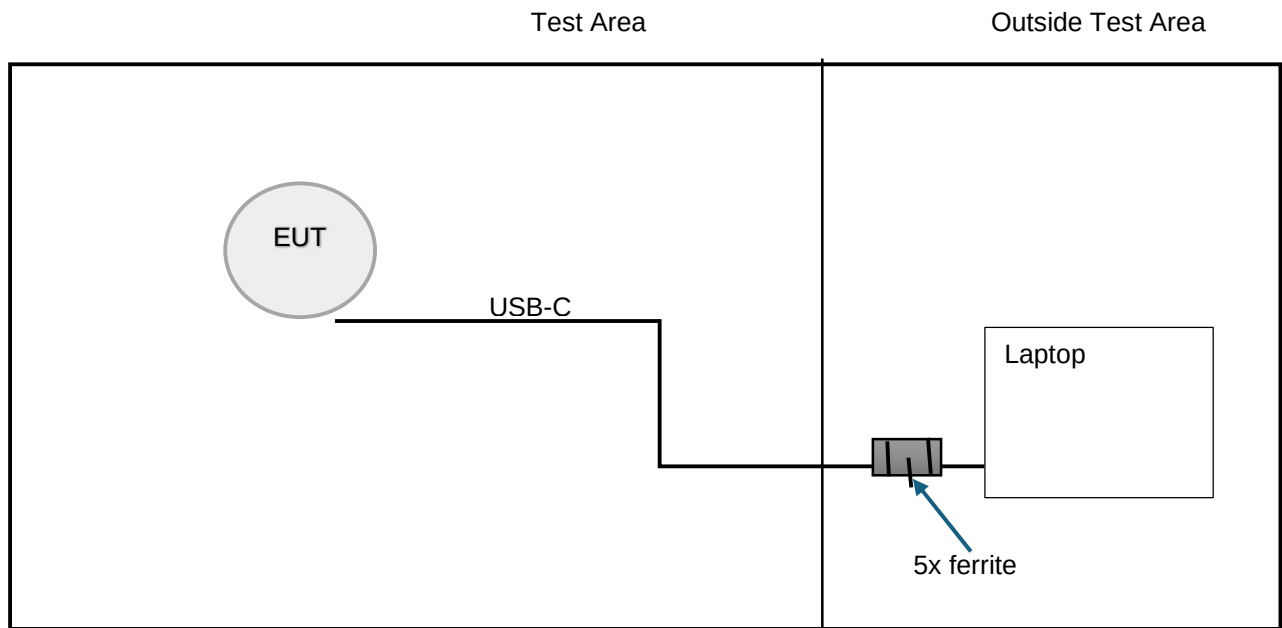
2.4 Modes of operation

Mode Reference	Description	Used for testing
Mode 1	Chan 2412 MHz, 802.11b 1M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 2	Chan 2437 MHz, 802.11b 1M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 3	Chan 2462 MHz, 802.11b 1M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 4	Chan 2412 MHz, 802.11b 2M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 5	Chan 2437 MHz, 802.11b 2M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 6	Chan 2462 MHz, 802.11b 2M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 7	Chan 2412 MHz, 802.11b 5.5M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 8	Chan 2437 MHz, 802.11b 5.5M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 9	Chan 2462 MHz, 802.11b 5.5M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 10	Chan 2412 MHz, 802.11b 11M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 11	Chan 2437 MHz, 802.11b 11M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 12	Chan 2462 MHz, 802.11b 11M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 13	Chan 2412 MHz, 802.11g 6M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 14	Chan 2437 MHz, 802.11g 6M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 15	Chan 2462 MHz, 802.11g 6M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 16	Chan 2412 MHz, 802.11g 9M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 17	Chan 2437 MHz, 802.11g 9M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 18	Chan 2462 MHz, 802.11g 9M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 19	Chan 2412 MHz, 802.11g 12M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 20	Chan 2437 MHz, 802.11g 12M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 21	Chan 2462 MHz, 802.11g 12M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 22	Chan 2412 MHz, 802.11g 18M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 23	Chan 2437 MHz, 802.11g 18M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 24	Chan 2462 MHz, 802.11g 18M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 25	Chan 2412 MHz, 802.11g 24M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 26	Chan 2437 MHz, 802.11g 24M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 27	Chan 2462 MHz, 802.11g 24M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 28	Chan 2412 MHz, 802.11g 36M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 29	Chan 2437 MHz, 802.11g 36M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 30	Chan 2462 MHz, 802.11g 36M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 31	Chan 2412 MHz, 802.11g 48M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 32	Chan 2437 MHz, 802.11g 48M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 33	Chan 2462 MHz, 802.11g 48M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 34	Chan 2412 MHz, 802.11g 54M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 35	Chan 2437 MHz, 802.11g 54M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 36	Chan 2462 MHz, 802.11g 54M, 20MHz BW, 3.5dB Atten set.	Yes
Mode 37	Chan 2412 MHz, 802.11n Mcs0, 20MHz BW, 3.5dB Atten set.	Yes
Mode 38	Chan 2437 MHz, 802.11n Mcs0, 20MHz BW, 3.5dB Atten set.	Yes
Mode 39	Chan 2462 MHz, 802.11n Mcs0, 20MHz BW, 3.5dB Atten set.	Yes
Mode 40	Chan 2412 MHz, 802.11n Mcs1, 20MHz BW, 3.5dB Atten set.	Yes
Mode 41	Chan 2437 MHz, 802.11n Mcs1, 20MHz BW, 3.5dB Atten set.	Yes
Mode 42	Chan 2462 MHz, 802.11n Mcs1, 20MHz BW, 3.5dB Atten set.	Yes
Mode 43	Chan 2412 MHz, 802.11n Mcs2, 20MHz BW, 3.5dB Atten set.	Yes
Mode 44	Chan 2437 MHz, 802.11n Mcs2, 20MHz BW, 3.5dB Atten set.	Yes
Mode 45	Chan 2462 MHz, 802.11n Mcs2, 20MHz BW, 3.5dB Atten set.	Yes

Mode 46	Chan 2412 MHz, 802.11n Mcs3, 20MHz BW, 3.5dB Atten set.	Yes
Mode 47	Chan 2437 MHz, 802.11n Mcs3, 20MHz BW, 3.5dB Atten set.	Yes
Mode 48	Chan 2462 MHz, 802.11n Mcs3, 20MHz BW, 3.5dB Atten set.	Yes
Mode 49	Chan 2412 MHz, 802.11n Mcs4, 20MHz BW, 3.5dB Atten set.	Yes
Mode 50	Chan 2437 MHz, 802.11n Mcs4, 20MHz BW, 3.5dB Atten set.	Yes
Mode 51	Chan 2462 MHz, 802.11n Mcs4, 20MHz BW, 3.5dB Atten set.	Yes
Mode 52	Chan 2412 MHz, 802.11n Mcs5, 20MHz BW, 3.5dB Atten set.	Yes
Mode 53	Chan 2437 MHz, 802.11n Mcs5, 20MHz BW, 3.5dB Atten set.	Yes
Mode 54	Chan 2462 MHz, 802.11n Mcs5, 20MHz BW, 3.5dB Atten set.	Yes
Mode 55	Chan 2412 MHz, 802.11n Mcs6, 20MHz BW, 3.5dB Atten set.	Yes
Mode 56	Chan 2437 MHz, 802.11n Mcs6, 20MHz BW, 3.5dB Atten set.	Yes
Mode 57	Chan 2462 MHz, 802.11n Mcs6, 20MHz BW, 3.5dB Atten set.	Yes
Mode 58	Chan 2412 MHz, 802.11n Mcs7, 20MHz BW, 3.5dB Atten set.	Yes
Mode 59	Chan 2437 MHz, 802.11n Mcs7, 20MHz BW, 3.5dB Atten set.	Yes
Mode 60	Chan 2462 MHz, 802.11n Mcs7, 20MHz BW, 3.5dB Atten set.	Yes
Mode 61	Chan 2422 MHz, 802.11n Mcs0, 40MHz BW, 3.5dB Atten set.	Yes
Mode 62	Chan 2437 MHz, 802.11n Mcs0, 40MHz BW, 3.5dB Atten set.	Yes
Mode 63	Chan 2452 MHz, 802.11n Mcs0, 40MHz BW, 3.5dB Atten set.	Yes
Mode 64	Chan 2422 MHz, 802.11n Mcs1, 40MHz BW, 3.5dB Atten set.	Yes
Mode 65	Chan 2437 MHz, 802.11n Mcs1, 40MHz BW, 3.5dB Atten set.	Yes
Mode 66	Chan 2452 MHz, 802.11n Mcs1, 40MHz BW, 3.5dB Atten set.	Yes
Mode 67	Chan 2422 MHz, 802.11n Mcs2, 40MHz BW, 3.5dB Atten set.	Yes
Mode 68	Chan 2437 MHz, 802.11n Mcs2, 40MHz BW, 3.5dB Atten set.	Yes
Mode 69	Chan 2452 MHz, 802.11n Mcs2, 40MHz BW, 3.5dB Atten set.	Yes
Mode 70	Chan 2422 MHz, 802.11n Mcs3, 40MHz BW, 3.5dB Atten set.	Yes
Mode 71	Chan 2437 MHz, 802.11n Mcs3, 40MHz BW, 3.5dB Atten set.	Yes
Mode 72	Chan 2452 MHz, 802.11n Mcs3, 40MHz BW, 3.5dB Atten set.	Yes
Mode 73	Chan 2422 MHz, 802.11n Mcs4, 40MHz BW, 3.5dB Atten set.	Yes
Mode 74	Chan 2437 MHz, 802.11n Mcs4, 40MHz BW, 3.5dB Atten set.	Yes
Mode 75	Chan 2452 MHz, 802.11n Mcs4, 40MHz BW, 3.5dB Atten set.	Yes
Mode 76	Chan 2422 MHz, 802.11n Mcs5, 40MHz BW, 3.5dB Atten set.	Yes
Mode 77	Chan 2437 MHz, 802.11n Mcs5, 40MHz BW, 3.5dB Atten set.	Yes
Mode 78	Chan 2452 MHz, 802.11n Mcs5, 40MHz BW, 3.5dB Atten set.	Yes
Mode 79	Chan 2422 MHz, 802.11n Mcs6, 40MHz BW, 3.5dB Atten set.	Yes
Mode 80	Chan 2437 MHz, 802.11n Mcs6, 40MHz BW, 3.5dB Atten set.	Yes
Mode 81	Chan 2452 MHz, 802.11n Mcs6, 40MHz BW, 3.5dB Atten set.	Yes
Mode 82	Chan 2422 MHz, 802.11n Mcs7, 40MHz BW, 3.5dB Atten set.	Yes
Mode 83	Chan 2437 MHz, 802.11n Mcs7, 40MHz BW, 3.5dB Atten set.	Yes
Mode 84	Chan 2452 MHz, 802.11n Mcs7, 40MHz BW, 3.5dB Atten set.	Yes

Note: For all the above modes the 60 GHz radar contained within the EUT was in continuous operation.

2.5 Emissions configuration



The unit was powered from an ancillary laptop. The EUT would normally be powered from an AC/DC supply however due to the customer test modes it had to be powered via the laptop so it could be programmed via the ESP32 software.

For conducted tests the internal antenna was unsoldered and a UFL connector was fitted in its place. The unit was configured with engineering menus in ESP32 software to allow permanent transmit and receive modes of the device on the top, middle and bottom channels as stated within section 2.4 of this report.

The power settings for each channel were as stated below:-

20 MHz

Low Channel (2412 MHz) = Power level- 3.5dB Attenuation set

Mid Channel (2437 MHz) only = Power level- 3.5dB Attenuation set

High Channel (2462 MHz) only = Power level- 3.5dB Attenuation set

40 MHz

Low Channel (2422 MHz) = Power level- 3.5dB Attenuation set

Mid Channel (2437 MHz) only = Power level- 3.5dB Attenuation set

High Channel (2452 MHz) only = Power level- 3.5dB Attenuation set

For all tests, the 60 GHz radar contained within the EUT was in continuous operation.

2.5.1 Signal leads

Port Name	Cable Type	Connected
USB-C	USB	Yes

3 Summary of test results

The Circadia CX00 System , CX00 was tested for compliance to the following standard(s):

47 CFR Part 15.247 Effective Date 1st October 2025
DTS: Digital Transmission System

Any compliance statements are made reliant on (a) the application of the product and use of the assigned band being acceptable to the FCC and (b) the modes of operation as instructed to us by the Customer based on their specific knowledge of the application and functionality of the EUT. Whilst every effort is made to assure quality of testing, type tests are not exhaustive and although no non-conformances may be found, this doesn't exclude the possibility of equipment not meeting the intentions of the standard or the essential requirements of the directive, particularly under different conditions to those during testing. Statements of compliance, where measurements were made, do not include the measurement uncertainty. The measurement uncertainty, where stated, is the expanded uncertainty based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Title	References	Results
Transmitter Tests		
1. AC power line conducted emissions	47 CFR Part 15.247 Part 15.207	PASSED
2. Radiated emissions 9 - 150 kHz	47 CFR Part 15.247 Part 15.209	PASSED
3. Radiated emissions 150 kHz - 30 MHz	47 CFR Part 15.247 Part 15.209	PASSED
4. Radiated emissions 30 MHz -1 GHz	47 CFR Part 15.247 Part 15.247(d) & 15.209	PASSED
5. Radiated emissions above 1 GHz	47 CFR Part 15.247 Part 15.247(d) & 15.209	PASSED
6. Effective radiated power field strength	47 CFR Part 15.247 Part 15.247	NOT APPLICABLE ¹
7. Band Edge Compliance	47 CFR Part 15.247 Part 15.215 & 15.247(d)	PASSED
8. Occupied bandwidth	47 CFR Part 15.247 Part 15.247(a)(2)/15.215	PASSED
9. Maximum Average conducted output power	47 CFR Part 15.247 Part 15.247(b3)	PASSED
10. Maximum Peak conducted output power	47 CFR Part 15.247 Part 15.247	NOT APPLICABLE ¹
11. Maximum Power Spectral Density	47 CFR Part 15.247 Part 15.247(e)	PASSED
12. Antenna power conducted emissions	47 CFR Part 15.247 Part 15.247(d)	NOT APPLICABLE ²
13. Duty cycle	47 CFR Part 15.247 Part 15.35(c)	PASSED ⁴
14. FHSS carrier frequency separation	47 CFR Part 15.247 Part 15.247	NOT APPLICABLE ³
15. Average time of occupancy	47 CFR Part 15.247 Part 15.247	NOT APPLICABLE ³
16. Number of Hop Channels	47 CFR Part 15.247 Part 15.247	NOT APPLICABLE ³

¹ Maximum average conducted power performed.

² The EUT was tested for radiated emissions with its dedicated antenna in position.

³ EUT does not employ FHSS technology

⁴ No limits apply, however duty cycle measurement performed to verify correction factors for average emissions.

4 Specifications

The tests were performed and operated in accordance with Kiwa Electrical Compliance procedures and the relevant standards listed below.

4.1 Relevant standards

Ref.	Standard Number	Version	Description
4.1.1	47 CFR Part 15.247	2025	Part 15 - Radio Frequency Devices - Subpart C - Intentional Radiators 15.247 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
4.1.2	ANSI C63.10	2020	American National Standard for Testing Unlicensed Wireless Devices
4.1.3	ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
4.1.4	KDB 558074 D01 v05r02	2019	Federal Communications Commission Office of Engineering and Technology Laboratory Division; Guidance for compliance measurements on Digital Transmission System, Frequency Hopping Spread Spectrum system and Hybrid system devices operating under section 15.247 of the FCC rules

4.2 Deviations

No deviations were applied

4.3 Test fixtures

In order to measure RF parameters at temperature extremes, the EUT was tested in a temperature-controlled chamber as follows:

A temporary RF port was created for testing.

5 Tests, methods and results

5.1 AC power line conducted emissions

5.1.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.207 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.2 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.207 [Reference 4.1.1 of this report]

5.1.2 Configuration of EUT

The EUT was placed on a wooden table 0.8m above the ground plane and connected to a LISN via a 1m mains cable.

Details of the Peripheral and Ancillary Equipment connected for this test are listed in section 10.

During the initial scan, mode 2 was found to be worst case mode of operation. Therefore full tests were performed using this mode.

5.1.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment listed in the 'Test Equipment' Section. Measurements were made on the live and neutral conductors using both average and quasi-peak detection.

At all signals within 10dB of the limit were investigated.

Tests were performed in Test Site F.

5.1.4 Test equipment

E010, E035, ZSW1, E624, E411

See Section 8 for more details

5.1.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102 kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Mid channel	2437 MHz

Plot refs
39540-5 Cond 1 AC Live 150k-30M Average
39540-5 Cond 1 AC Live 150k-30M Quasi-Peak
39540-5 Cond 1 AC Neutral 150k-30M Average
39540-5 Cond 1 AC Neutral 150k-30M Quasi-Peak

Table of signals measured for Cond 1 AC Live 150k-30M

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP -Lim (dB)	AV Amp (dBuV)	AV -Lim (dB)
1	0.178	55.7	49.0	-15.6	40.2	-14.4
2	0.210	49.1	47.7	-15.5	36.6	-16.6
3	0.245	47.2	43.1	-18.8	31.6	-20.3
4	0.245	47.5	43.2	-18.7	31.8	-20.1
5	0.489	38.7	36.0	-20.2	28.3	-17.9
6	0.535	41.6	39.0	-17.0	29.9	-16.1
7	0.660	34.8	31.6	-24.4	22.7	-23.3
8	0.988	32.6	29.6	-26.4	22.2	-23.8
9	3.131	35.0	28.3	-27.7	18.6	-27.4
10	3.445	38.1	33.1	-22.9	24.7	-21.3
11	3.689	40.1	35.6	-20.4	26.3	-19.7
12	4.042	36.2	32.3	-23.7	23.9	-22.1
13	4.724	37.6	28.4	-27.6	20.1	-25.9
14	6.987	39.0	34.2	-25.8	25.7	-24.3
15	10.226	38.6	35.5	-24.5	25.5	-24.5
16	14.159	41.6	37.0	-23.0	29.2	-20.8
17	15.496	48.2	43.6	-16.4	35.4	-14.6
18	21.028	44.4	38.8	-21.2	30.8	-19.2
19	23.298	44.1	40.5	-19.5	33.7	-16.3
20	24.000	43.4	40.6	-19.4	30.9	-19.1

Table of signals measured for Cond 1 AC Neutral 150k-30M

Signal No.	Freq (MHz)	Peak Amp (dBuV)	QP Amp (dBuV)	QP -Lim (dB)	AV Amp (dBuV)	AV -Lim (dB)
1	0.171	53.2	51.4	-13.5	39.3	-15.6
2	0.175	54.7	51.6	-13.1	41.1	-13.6
3	0.175	55.4	51.4	-13.3	40.4	-14.3
4	0.210	51.2	47.5	-15.7	36.3	-16.9
5	0.247	44.6	42.6	-19.3	30.1	-21.8
6	0.281	40.9	39.1	-21.7	28.0	-22.8
7	0.317	38.5	36.1	-23.7	25.1	-24.7
8	0.496	38.2	36.0	-20.1	27.0	-19.1
9	0.532	41.2	39.6	-16.4	30.3	-15.7
10	0.656	35.4	30.9	-25.1	22.5	-23.5
11	3.725	39.4	34.8	-21.2	25.7	-20.3
12	6.750	38.0	35.0	-25.0	25.0	-25.0
13	9.461	36.7	33.1	-26.9	24.6	-25.4
14	16.254	49.9	42.5	-17.5	33.4	-16.6
15	21.261	44.6	39.4	-20.6	31.4	-18.6
16	24.264	43.4	36.0	-24.0	28.7	-21.3

No discernible difference was noted in emissions between channels (exploratory measurements); therefore the final measurements are presented for TX mid channel mode only.

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

LIMITS:

15.207: as given in the above tables / drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
150kHz to 30MHz $\pm 3.40\text{dB}$ (UE71),

5.2 Radiated emissions 9 - 150 kHz

5.2.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.4 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.209/15.247(d) [Reference 4.1.1 of this report]

5.2.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed powered via an ancillary laptop.

The EUT was operated in Modes 1 to 3.

5.2.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

Measurements were made in a semi-anechoic chamber (pre-scan) with any final measurements required performed on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment was rotated 360 degrees to record the worst case emissions.

All signals within 10dB of the limit were investigated.

Tests were performed using Test Site M.

5.2.4 Test equipment

TMS81, ZSW1, E624, E411

See Section 8 for more details

5.2.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102 kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Low channel	2412 MHz

Plot refs
39540-5 Rad 1 9k-150kHz Para Low Chan
39540-5 Rad 1 9k-150kHz Perp Low Chan

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Mid channel	2437 MHz

Plot refs
39540-5 Rad 1 9k-150kHz Para Mid Chan
39540-5 Rad 1 9k-150kHz Perp Mid Chan

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
High channel	2462 MHz

Plot refs
39540-5 Rad 1 9k-150kHz Para High Chan
39540-5 Rad 1 9k-150kHz Perp High Chan

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20/30dB from the level of the fundamental / meet the general limits of 15.209.

The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
(TMS81): 9kHz to 30MHz $\pm 3.11\text{dB}$ (UE30),

5.3 Radiated emissions 150 kHz - 30 MHz

5.3.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.4 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.209/15.247(d) [Reference 4.1.1 of this report]

5.3.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed powered via an ancillary laptop.

The EUT was operated in Modes 1 to 3.

5.3.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

Measurements were made in a semi-anechoic chamber (pre-scan) with any final measurements required performed on an OATS without a ground plane. The antenna was placed 1m above the ground. The equipment was rotated 360 degrees to record the worst case emissions.

All signals within 10dB of the limit were investigated.

Tests were performed using Test Site M.

5.3.4 Test equipment

TMS81, ZSW1, E624, E411

See Section 8 for more details

5.3.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102 kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Low channel	2412 MHz

Plot refs
39540-5 Rad 1 150k-30MHz Para
39540-5 Rad 1 150k-30MHz Perp

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Mid channel	2437 MHz

Plot refs
39540-5 Rad 2 150k-30MHz Para
39540-5 Rad 2 150k-30MHz Perp

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
High channel	2462 MHz

Plot refs
39540-5 Rad 3 150k-30MHz Para
39540-5 Rad 3 150k-30MHz Perp

Peak detector “Max held” Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20/30dB from the level of the fundamental / meet the general limits of 15.209.

The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
(TMS81): 9kHz to 30MHz $\pm 3.11\text{dB}$ (UE30),

5.4 Radiated emissions 30 MHz -1 GHz

5.4.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.247(d) & 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.5 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.247(d) & 15.209 [Reference 4.1.1 of this report]

5.4.2 Configuration of EUT

The EUT was placed on a 0.8 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed powered via an ancillary laptop.

The EUT was operated in Modes 1 to 3.

5.4.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

The equipment was rotated 360 degrees and the measuring antenna scanned 1 – 4 metres in both horizontal and vertical polarisations to record any worst case emissions.

All signals within 10dB of the limit were investigated.

Tests were performed using Test Site M.

5.4.4 Test equipment

LPE364, E743, CB02, E443, NSA-M, ZSW1, E624, E411

See Section 8 for more details

5.4.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102 kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Low channel	2412 MHz

Plot refs
39540-5 Rad 1 VHF Horiz Low Chan
39540-5 Rad 1 VHF Vert Low Chan
39540-5 Rad 1 UHF Horiz Low Chan
39540-5 Rad 1 UHF Vert Low Chan

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Mid channel	2437 MHz

Plot refs
39540-5 Rad 1 VHF Horiz Mid Chan
39540-5 Rad 1 VHF Vert Mid Chan
39540-5 Rad 1 UHF Horiz Mid Chan
39540-5 Rad 1 UHF Vert Mid Chan

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
High channel	2462 MHz

Plot refs
39540-5 Rad 1 VHF Horiz High Chan
39540-5 Rad 1 VHF Vert High Chan
39540-5 Rad 1 UHF Horiz High Chan
39540-5 Rad 1 UHF Vert High Chan

Table of signals measured for Rad 1 Horizontal Signal List

Signal No.	Freq (MHz)	Peak Amp (dBuV/m)	QP Amp (dBuV/m)	QP -Lim (dB)
1	33.098	34.8	28.6	-11.4
2	33.756	35.9	30.2	-9.8
3	34.288	34.3	28.4	-11.6
4	35.109	33.7	27.1	-12.9
5	37.467	30.3	23.3	-16.7
6	38.210	31.6	25.4	-14.6
7	38.976	30.7	24.7	-15.3
8	39.603	29.9	23.5	-16.5

Table of signals measured for Rad 1 Vertical Signal List

Signal No.	Freq (MHz)	Peak Amp (dBuV/m)	QP Amp (dBuV/m)	QP -Lim (dB)
1	34.319	34.6	29.1	-10.9
2	38.241	38.0	33.2	-6.8
3	38.836	38.1	32.4	-7.6
4	44.143	36.3	31.9	-8.1
5	45.593	37.6	32.5	-7.5
6	50.805	36.3	31.4	-8.6
7	51.558	36.8	32.2	-7.8
8	53.603	33.6	28.4	-11.6
9	56.668	33.3	28.4	-11.6
10	69.224	32.1	28.0	-12.0
11	73.676	32.8	28.2	-11.8

12	81.754	33.1	28.6	-11.4
13	86.301	37.0	32.0	-8.0
14	90.091	35.5	30.5	-13.0
15	95.070	34.8	30.9	-12.6
16	97.639	34.4	29.9	-13.6
17	313.670	31.9	26.0	-20.0
18	521.187	33.1	27.1	-18.9
19	627.570	35.5	28.2	-17.8

Peak detector "Max held" Analyser plots against the Quasi-Peak / Average limit line(s) can be found in Section 6 of this report.

No discernible difference was noted in emissions between channel settings (exploratory measurements), therefore final measurements are presented for TX mid channel mode only for these test ranges.

LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

15.247(d) other emissions, outside the intentional band, must be attenuated by at least 20/30dB from the level of the fundamental / meet the general limits of 15.209.

The general limits of 15.209 are as drawn on the respective plots.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
30MHz - 40MHz ± 10.67 dB (UE82), (For Site M) (ANSI): 40MHz - 50MHz ± 6.11 dB (UE83), 50MHz - 1GHz ± 6.48 dB (UE84),

5.5 Radiated emissions above 1 GHz

5.5.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.247(d) & 15.209 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.6 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.247(d) & 15.209 [Reference 4.1.1 of this report]

5.5.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres. The EUT was rotated in all three orthogonal planes. Radiated Emissions testing was performed powered via an ancillary laptop.

The EUT was operated in Modes 1 to 3.

5.5.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.

Measurements were made in a semi-anechoic chamber with appropriate absorbing material for use in this range. Horn antennas were used at heights where the whole of the EUT was contained within the main beam. Emissions pre-scans were performed, including Antenna height scanning to determine any worst-case maximised emissions for final test. Final tests were performed with the antenna in worst case position. The EUT was rotated through 360 degrees to record the worst case emissions. A measurement distance of 3m was used between the test range 1 - 6GHz, 1.2m was used in the test range 6 - 18GHz and 0.3m was used in the test range 18 - 40GHz.

A all signals within 20dB of the limit were investigated.

Tests were performed using Test Site B.

5.5.4 Test equipment

E296-2, E330, E412, E428, E856, E904, E972, P240, TMS78, TMS79

See Section 8 for more details

5.5.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102kPa

Setup Table

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Low channel	2412 MHz

Spurious Frequency (MHz)	Measured Peak Level (dBµV/m)	Difference to Peak Limit (dB)	Measured Average Level (dBµV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
4824	50.56	-23.44	45.43	-8.57	Side	Vertical
4824	50.67	-23.33	42.08	-11.92	Flat	Horizontal

Plots
1-3 GHz 2412 MHz 802.11g Vert Upright
1-3 GHz 2412 MHz 802.11g Horiz Flat
3-6 GHz 2412 MHz 802.11g Vert Upright
3-6 GHz 2412 MHz 802.11g Horiz Flat
6-10 GHz 2412 MHz 802.11g Vert upright
6-10 GHz 2412 MHz 802.11g Horiz Flat
10-12.5 GHz 2412 MHz 802.11g Vert upright
10-12.5 GHz 2412 MHz 802.11g Horiz Flat
12.5-15 GHz 2412 MHz 802.11g Vert Upright
12.5-15 GHz 2412 MHz 802.11g Horiz Flat
15-18 GHz 2412 MHz 802.11g Vert Upright
15-18 GHz 2412 MHz 802.11g Horiz Flat
18-22 GHz 2412 MHz 802.11g Vert Upright
18-22 GHz 2412 MHz 802.11g Horiz Flat
22-24 GHz 2412 MHz 802.11g Vert Upright
22-24 GHz 2412 MHz 802.11g Horiz Side
24-26.5 GHz 2412 MHz 802.11g Vert Upright
24-26.5 GHz 2412 MHz 802.11g Horiz Side
26.5-28 GHz 2412 MHz 802.11g Vert Upright
26.5-28 GHz 2412 MHz 802.11g Horiz Flat
28-31 GHz 2412 MHz 802.11g Vert Side
28-31 GHz 2412 MHz 802.11g Horiz Flat
31-34 GHz 2412 MHz 802.11g Vert Upright
31-34 GHz 2412 MHz 802.11g Horiz Flat
34-38 GHz 2412 MHz 802.11g Vert Upright
34-38 GHz 2412 MHz 802.11g Horiz Flat
38-40 GHz 2412 MHz 802.11g Vert Upright
38-40 GHz 2412 MHz 802.11g Horiz Flat

Setup Table

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Mid channel	2437 MHz

Spurious Frequency (MHz)	Measured Peak Level (dBµV/m)	Difference to Peak Limit (dB)	Measured Average Level (dBµV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
4874	50.64	-23.36	44.69	-9.31	Side	Vertical
4874	50.81	-23.19	42.08	-11.92	Flat	Horizontal

Plots						
1-3 GHz 2437 MHz 802.11g Vert Upright						
1-3 GHz 2437 MHz 802.11g Horiz Flat						
3-6 GHz 2437 MHz 802.11g Vert Upright						
3-6 GHz 2437 MHz 802.11g Horiz Flat						
6-10 GHz 2437 MHz 802.11g Vert upright						
6-10 GHz 2437 MHz 802.11g Horiz Flat						
10-12.5 GHz 2437 MHz 802.11g Vert upright						
10-12.5 GHz 2437 MHz 802.11g Horiz Flat						
12.5-15 GHz 2437 MHz 802.11g Vert Upright						
12.5-15 GHz 2437 MHz 802.11g Horiz Flat						
15-18 GHz 2437 MHz 802.11g Vert Upright						
15-18 GHz 2437 MHz 802.11g Horiz Flat						
18-22 GHz 2437 MHz 802.11g Vert Upright						
18-22 GHz 2437 MHz 802.11g Horiz Flat						
22-24 GHz 2437 MHz 802.11g Vert Upright						
22-24 GHz 2437 MHz 802.11g Horiz Side						
24-26.5 GHz 2437 MHz 802.11g Vert Upright						
24-26.5 GHz 2437 MHz 802.11g Horiz Side						
26.5-28 GHz 2437 MHz 802.11g Vert Upright						
26.5-28 GHz 2437 MHz 802.11g Horiz Flat						
28-31 GHz 2437 MHz 802.11g Vert Side						
28-31 GHz 2437 MHz 802.11g Horiz Flat						
31-34 GHz 2437 MHz 802.11g Vert Upright						
31-34 GHz 2437 MHz 802.11g Horiz Flat						
34-38 GHz 2437 MHz 802.11g Vert Upright						
34-38 GHz 2437 MHz 802.11g Horiz Flat						
38-40 GHz 2437 MHz 802.11g Vert Upright						
38-40 GHz 2437 MHz 802.11g Horiz Flat						

Setup Table

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
High channel	2462 MHz

Spurious Frequency (MHz)	Measured Peak Level (dBµV/m)	Difference to Peak Limit (dB)	Measured Average Level (dBµV/m)	Difference to Average Limit (dB)	EUT Polarisation	Antenna Polarisation
4924	49.57	-24.43	44.39	-9.61	Side	Vertical
4924	52.3	-21.7	41.78	-12.22	Flat	Horizontal

Plots
1-3 GHz 2462 MHz 802.11g Vert Upright
1-3 GHz 2462 MHz 802.11g Horiz Flat
3-6 GHz 2462 MHz 802.11g Vert Upright
3-6 GHz 2462 MHz 802.11g Horiz Flat
6-10 GHz 2462 MHz 802.11g Vert upright
6-10 GHz 2462 MHz 802.11g Horiz Flat
10-12.5 GHz 2462 MHz 802.11g Vert upright
10-12.5 GHz 2462 MHz 802.11g Horiz Flat
12.5-15 GHz 2462 MHz 802.11g Vert Upright
12.5-15 GHz 2462 MHz 802.11g Horiz Flat
15-18 GHz 2462 MHz 802.11g Vert Upright
15-18 GHz 2462 MHz 802.11g Horiz Flat
18-22 GHz 2462 MHz 802.11g Vert Upright
18-22 GHz 2462 MHz 802.11g Horiz Flat
22-24 GHz 2462 MHz 802.11g Vert Upright
22-24 GHz 2462 MHz 802.11g Horiz Side
24-26.5 GHz 2462 MHz 802.11g Vert Upright
24-26.5 GHz 2462 MHz 802.11g Horiz Side
26.5-28 GHz 2462 MHz 802.11g Vert Upright
26.5-28 GHz 2462 MHz 802.11g Horiz Flat
28-31 GHz 2462 MHz 802.11g Vert Side
28-31 GHz 2462 MHz 802.11g Horiz Flat
31-34 GHz 2462 MHz 802.11g Vert Upright
31-34 GHz 2462 MHz 802.11g Horiz Flat
34-38 GHz 2462 MHz 802.11g Vert Upright
34-38 GHz 2462 MHz 802.11g Horiz Flat
38-40 GHz 2462 MHz 802.11g Vert Upright
38-40 GHz 2462 MHz 802.11g Horiz Flat

Peak detector “Max held” Analyser plots against the Average limit line can be found in Section 6 of this report.

LIMITS:

15.209 limits are applicable in the restricted bands of 15.205 with the relevant detector.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: 1GHz to 3GHz ±4.81dB (UE77), 3GHz to 6GHz ±4.81dB (UE78), 6GHz to 12.5GHz ±5.39dB (UE79), 12GHz to 18GHz ±5.38dB (UE80), 18GHz to 26.5GHz ±6.02dB (UE110), 26.5GHz to 40GHz ±4.2dB (UE33)

5.6 Effective radiated power field strength

NOT APPLICABLE: Conducted power performed.

5.7 Band Edge Compliance

5.7.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.215 & 15.247(d) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.10 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.209(a) & 15.247(d) [Reference 4.1.1 of this report]

5.7.2 Configuration of EUT

The EUT was placed on a 1.5 metres high turntable. The front edge of the EUT was initially positioned facing the antenna. The EUT was measured at a distance of 3 metres.

The EUT was operated in Mode 1 and Mode 3 and Mode 4 and Mode 6 and Mode 13 and Mode 15 and Mode 36 and Mode 37 and Mode 39 and Mode 49 and Mode 61 and Mode 63 and Mode 75 and Mode 76.

5.7.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The emission from the EUT was maximised before taking any plots/measurements. For restricted band edge average measurements trace averaging was used using a minimum of 100 averages followed by duty cycle correction back to 100%, per ANSI C63.10 Clause 11.12.2.5.2.

Tests were performed using Test Site B.

5.7.4 Test equipment

E412, E428, E904, P240

See Section 8 for more details

5.7.5 Test results

Temperature of test environment	24°C
Humidity of test environment	24%
Pressure of test environment	105kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz (802.11b 1M)
High channel	2462 MHz (802.11b 1M)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	53.87	54.82
Restricted band edge Peak Plot	Restricted BE PK 2412 MHz 802.11b 1M 20MHz BW	Restricted BE PK 2462 MHz 802.11b 1M 20MHz BW
Restricted Average Level measured (dBuV/m)	40.66	44.71
Restricted band edge Average Plot	Restricted BE AVG 2412 MHz 802.11b 1M 20MHz BW	Restricted BE AVG 2462 MHz 802.11b 1M 20MHz BW

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-50.59	-56.95
Authorised Band Edge Plot	Authorised BE PK 2412 MHz 802.11b 1M 20MHz BW	Authorised BE PK 2462 MHz 802.11b 1M 20MHz BW

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz (802.11b 2M)
High channel	2462 MHz (802.11b 2M)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	42.87	45.58
Restricted band edge Peak Plot	Restricted BE PK 2412 MHz 802.11b 2M 20MHz BW	Restricted BE PK 2462 MHz 802.11b 2M 20MHz BW
Restricted Average Level measured (dBuV/m)	31.85	33.01
Restricted band edge Average Plot	Restricted BE AVG 2412 MHz 802.11b 2M 20MHz BW	Restricted BE AVG 2462 MHz 802.11b 2M 20MHz BW

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-51.93	-55.87
Authorised Band Edge Plot	Authorised BE PK 2412 MHz 802.11b 2M 20MHz BW	Authorised BE PK 2462 MHz 802.11b 2M 20MHz BW

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz (802.11g 6M)
High channel	2462 MHz (802.11g 6M)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	62.33	60.32
Restricted band edge Peak Plot	Restricted BE PK 2412 MHz 802.11g 6M 20MHz BW	Restricted BE PK 2462 MHz 802.11g 6M 20MHz BW
Restricted Average Level measured (dBuV/m)	47.18	46.92
Restricted band edge Average Plot	Restricted BE AVG 2412 MHz 802.11g 6M 20MHz BW	Restricted BE AVG 2462 MHz 802.11g 6M 20MHz BW

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-43.13	-49.98
Authorised Band Edge Plot	Authorised BE PK 2412 MHz 802.11g 6M 20MHz BW	Authorised BE PK 2462 MHz 802.11g 6M 20MHz BW

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	Not Applicable
High channel	2462 MHz (802.11g 54M)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	Not Tested	43.87
Restricted band edge Peak Plot	Not Tested	Restricted BE PK 2462 MHz 802.11g 54M 20MHz BW
Restricted Average Level measured (dBuV/m)	Not Tested	33.66
Restricted band edge Average Plot	Not Tested	Restricted BE AVG 2462 MHz 802.11g 54M 20MHz BW

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	Not Tested	-48.42
Authorised Band Edge Plot	Not Tested	Authorised BE PK 2462 MHz 802.11g 54M 20MHz BW

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz (802.11n Mcs0)
High channel	2462 MHz (802.11n Mcs0)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	59.36	58.03
Restricted band edge Peak Plot	Restricted BE PK 2412 MHz 802.11n Mcs0 20MHz BW	Restricted BE PK 2462 MHz 802.11n Mcs0 20MHz BW
Restricted Average Level measured (dBuV/m)	45.93	46.94
Restricted band edge Average Plot	Restricted BE AVG 2412 MHz 802.11n Mcs0 20MHz BW	Restricted BE AVG 2462 MHz 802.11n Mcs0 20MHz BW.spt

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-42.36	-48.22
Authorised Band Edge Plot	Authorised BE PK 2412 MHz 802.11n Mcs0 20MHz BW	Authorised BE PK 2462 MHz 802.11n Mcs0 20MHz BW

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz (802.11n Mcs7)
High channel	Not Applicable

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	44.91	Not Tested
Restricted band edge Peak Plot	Restricted BE PK 2412 MHz 802.11n Mcs7 20MHz BW	Not Tested

Restricted Average Level measured (dBuV/m)	34.82	Not Tested
Restricted band edge Average Plot	Restricted BE AVG 2412 MHz 802.11n Mcs7 20MHz BW	Not Tested

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-44.16	Not Tested
Authorised Band Edge Plot	Authorised BE PK 2412 MHz 802.11n Mcs7 20MHz BW	Not Tested

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	40 MHz
Low channel	2422 MHz (802.11n Mcs0)
High channel	2452 MHz (802.11n Mcs0)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	60.2	57.66
Restricted band edge Peak Plot	Restricted BE PK 2422 MHz 802.11n Mcs0 40MHz BW	Restricted BE PK 2452 MHz 802.11n Mcs0 40MHz BW
Restricted Average Level measured (dBuV/m)	48.62	46.04
Restricted band edge Average Plot	Restricted BE AVG 2422 MHz 802.11n Mcs0 40MHz BW	Restricted BE AVG 2452 MHz 802.11n Mcs0 40MHz BW

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-39.42	-45.7
Authorised Band Edge Plot	Authorised BE PK 2422 MHz 802.11n Mcs0 40MHz BW	Authorised BE PK 2452 MHz 802.11n Mcs0 40MHz BW

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	40 MHz
Low channel	2422 MHz (802.11n Mcs5)
High channel	2452 MHz (802.11n Mcs4)

Restricted Band Edges	Low channel	High channel
Restricted Peak Level measured (dBuV/m)	50.57	47.77
Restricted band edge Peak Plot	Restricted BE PK 2422 MHz 802.11n Mcs5 40MHz BW	Restricted BE PK 2452 MHz 802.11n Mcs4 40MHz BW
Restricted Average Level measured (dBuV/m)	37.09	36.52
Restricted band edge Average Plot	Restricted BE AVG 2422 MHz 802.11n Mcs5 40MHz BW	Restricted BE AVG 2452 MHz 802.11n Mcs4 40MHz BW

Authorised Band Edges	Low channel	High channel
Authorised Band Edge (dBc) value measured	-40.74	-44.45

Authorised Band Edge Plot	Authorised BE PK 2422 MHz 802.11n Mcs5 40MHz BW	Authorised BE PK 2452 MHz 802.11n Mcs4 40MHz BW
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Analyser plots for the Band Edge Compliance can be found in Section 6 of this report. These show the requirement of 15.247(d) are met at the band edges of 2400 and 2483.5 MHz. Restricted band edge plots are also shown in section 6.

The tables list the field strengths observed in the adjacent restricted bands, which are required to meet the tighter 15.209 limits.

Performed on the worst case power and band width for each modulation type.

LIMITS:

AV = 54dBuV/m at band edges

PK = 74dBuV/m at band edges

The restricted band edges closest to the EUT frequency of 2400-2483.5MHz are 2390 & 2483.5MHz. Further wider span plots have been taken to show the fact that there are no spurious emissions above the restricted limits of 15.209.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
(All Sites) (CISPR & ANSI): 1GHz to 3GHz ± 4.81 dB (UE77)

5.8 Occupied bandwidth

5.8.1 Test methods

Test Requirements:	47 CFR Part 15.247(a)(2)/15.215 [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 6.9/11.8 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.247(a)(2) [Reference 4.1.1 of this report]

5.8.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the temporary RF port. The EUT was operated in Modes 1 to 84.

5.8.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. A 100kHz RBW, 3x VBW, auto sweep time and max hold settings were used for the 6dB bandwidth.

Tests were performed using Test Site A.

5.8.4 Test equipment

E255, E367, E420, E755

See Section 8 for more details

5.8.5 Test results

Temperature of test environment	20°C
Humidity of test environment	20%
Pressure of test environment	102kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz, 802.11b 2M
Mid channel	2437 MHz, 802.11b 2M
High channel	2462 MHz, 802.11b 2M

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (MHz)	9.463	9.877	9.706
Plot for 6 dB Bandwidth Result (MHz)	39540-5 2412 MHz 802.11b 2M 20 MHz	39540-5 2437 MHz 802.11b 2M 20 MHz	39540-5 2462 MHz 802.11b 2M 20 MHz
Operating frequency (MHz)	2412	2437	2462
6 dB FLOW Worst case (MHz)	2407.2685	2432.0615	2457.147
6 dB FHIGH Worst case (MHz)	2416.7315	2441.9385	2466.853

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set

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Channel Spacing	20 MHz
Low channel	2412 MHz, 802.11g 6M
Mid channel	2437 MHz, 802.11g 54M
High channel	2462 MHz, 802.11g 54M

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (MHz)	16.51	16.5	16.45
Plot for 6 dB Bandwidth Result (MHz)	39540-5 2412 MHz 802.11g 6M 20 MHz	39540-5 2437 MHz 802.11g 54M 20 MHz	39540-5 2462 MHz 802.11g 54M 20 MHz
Operating frequency (MHz)	2412	2437	2462
6 dB FLOW Worst case (MHz)	2403.745	2428.75	2453.775
6 dB FHIGH Worst case (MHz)	2420.255	2445.25	2470.225

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Low channel	2412 MHz, 802.11n Mcs4
Mid channel	2437 MHz, 802.11n Mcs7
High channel	2462 MHz, 802.11n Mcs0

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (MHz)	17.29	17.32	17.39
Plot for 6 dB Bandwidth Result (MHz)	39540-5 2412 MHz 802.11n Mcs7 20 MHz	39540-5 2437 MHz 802.11n Mcs7 20 MHz	39540-5 2462 MHz 802.11n Mcs0 20 MHz
Operating frequency (MHz)	2412	2437	2462
6 dB FLOW Worst case (MHz)	2403.355	2428.34	2453.305
6 dB FHIGH Worst case (MHz)	2420.645	2445.66	2470.695

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	40 MHz
Low channel	2422 MHz, 802.11n Mcs5
Mid channel	2437 MHz, 802.11n Mcs4
High channel	2452 MHz, 802.11n Mcs4

	Low channel	Mid channel	High channel
6 dB Bandwidth Result (MHz)	35.74	35.8	35.86
Plot for 6 dB Bandwidth Result (MHz)	39540-5 2422 MHz 802.11n Mcs5 40 MHz	39540-5 2437 MHz 802.11n Mcs4 40 MHz	39540-5 2452 MHz 802.11n Mcs4 40 MHz
Operating frequency (MHz)	2422	2437	2452
6 dB FLOW Worst case (MHz)	2404.13	2419.1	2434.07
6 dB FHIGH Worst case (MHz)	2439.87	2454.9	2469.93

Analyser plots for the 6dB bandwidth can be found in Section 6 of this report

LIMITS:

15.247(a)(2) The minimum 6dB bandwidth shall be at least 500kHz.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
± 0.17 % (UR19B),

5.9 Maximum Average conducted output power

5.9.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.247(b3) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 11 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.247(b)(3) [Reference 4.1.1 of this report]

5.9.2 Configuration of EUT

The EUT was measured on a bench using a power meter connected to the temporary RF port.

The EUT was set to each mode in turn (see section 2.4) and highest power levels for each modulation scheme recorded.

The EUT was operated in Mode 1 to Mode 84 for this test.

5.9.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below.
Power meter reading stated is maximum power observed using a burst power head

5.9.4 Test equipment

E255, E367, E910

See Section 8 for more details

5.9.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Low channel	2412 MHz
Mid channel	2437 MHz
High channel	2462 MHz

Test conditions		Carrier Power (dBm)	Carrier Power (dBm)	Carrier Power (dBm)
		Low channel	Mid channel	High channel
Temp Ambient	Volts Nominal	17.80	17.70	17.30
Maximum TX Power observed (dBm)		17.80	17.70	17.30

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11g 6M
Low channel	2412 MHz
Mid channel	2437 MHz
High channel	2462 MHz

Test conditions		Carrier Power (dBm)	Carrier Power (dBm)	Carrier Power (dBm)
		Low channel	Mid channel	High channel
Temp Ambient	Volts Nominal	17.10	17.00	16.60
Maximum TX Power observed (dBm)		17.10	17.00	16.60

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11n Mcs0
Low channel	2412 MHz
Mid channel	2437 MHz
High channel	2462 MHz

Test conditions		Carrier Power (dBm)	Carrier Power (dBm)	Carrier Power (dBm)
		Low channel	Mid channel	High channel
Temp Ambient	Volts Nominal	16.50	16.30	16.10
Maximum TX Power observed (dBm)		16.50	16.30	16.10

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	40 MHz
Mod Scheme	802.11n Mcs0
Low channel	2422 MHz
Mid channel	2437 MHz
High channel	2452 MHz

Test conditions		Carrier Power (dBm)	Carrier Power (dBm)	Carrier Power (dBm)
		Low channel	Mid channel	High channel
Temp Ambient	Volts Nominal	15.90	16.20	16.10
Maximum TX Power observed (dBm)		15.90	16.20	16.10

LIMITS:

15.247(b)(3)

For systems using digital modulation in the 902-928, 2400-2483.5 or 5725-5850 MHz bands 1 Watt.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows:
<3 GHz ± 0.56 dB (UR02D),

5.10 Maximum Peak conducted output power

NOT APPLICABLE: Maximum average conducted power performed.

5.11 Maximum Power Spectral Density

5.11.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.247(e) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 11.10 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.247(e) [Reference 4.1.1 of this report]

5.11.2 Configuration of EUT

The EUT was configured as for the Average power test. The EUT was operated in Mode 1 to 3, Mode 13 to 15, Mode 37 to 39 and Mode 61 to 63 for this test.

5.11.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The emission from the EUT was maximised before taking any plots. PEP was recorded in the required span and bandwidth. Once the peak was found, the span was reduced and the measurement repeated to confirm the result. Measurements & plots were taken with the span set to at least 1.5 times the measured DTS bandwidth for each modulation scheme setting. Tests were performed using Test Site A.

5.11.4 Test equipment

E255, E367, H071

See Section 8 for more details

5.11.5 Test results

Temperature of test environment	20°C
Humidity of test environment	50%
Pressure of test environment	102kPa

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11b 1M
Low channel	2412 MHz
Mid channel	2437 MHz
High channel	2462 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-13.89	-14.64	-13.57
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-21.89	-22.64	-21.57
RF Ant port 1 PSD Plot reference	39540-5 2412 MHz 20 MHz 802.11b 1M	39540-5 2437 MHz 20 MHz 802.11b 1M	39540-5 2462 MHz 20 MHz 802.11b 1M

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11g 6M
Low channel	2412 MHz
Mid channel	2437 MHz
High channel	2462 MHz

	Low channel	Mid channel	High channel
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RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-14.38	-15.01	-15.53
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-22.38	-23.01	-23.53
RF Ant port 1 PSD Plot reference	39540-5 2412 MHz 20 MHz 802.11g 6M	39540-5 2437 MHz 20 MHz 802.11g 6M	39540-5 2462 MHz 20 MHz 802.11g 6M

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	20 MHz
Mod Scheme	802.11n Mcs0
Low channel	2412 MHz
Mid channel	2437 MHz
High channel	2462 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-14.89	-15.49	-15.79
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-22.89	-23.49	-23.79
RF Ant port 1 PSD Plot reference	39540-5 2412 MHz 20 MHz 802.11n Mcs0	39540-5 2437 MHz 20 MHz 802.11n Mcs0	39540-5 2462 MHz 20 MHz 802.11n Mcs0

Band	2400-2483.5 MHz
Power Level	3.5 dB Attenuation set
Channel Spacing	40 MHz
Mod Scheme	802.11n Mcs0
Low channel	2422 MHz
Mid channel	2437 MHz
High channel	2452 MHz

	Low channel	Mid channel	High channel
RF Ant port 1 Measured PSD conducted (dBm/3kHz)	-16.52	-16.64	-16.93
PSD Limit (dBm/3kHz)	8	8	8
RF Ant port 1 Margin (dB)	-24.52	-24.64	-24.93
RF Ant port 1 PSD Plot reference	39540-5 2422 MHz 40 MHz 802.11n Mcs0	39540-5 2437 MHz 40 MHz 802.11n Mcs0	39540-5 2452 MHz 40 MHz 802.11n Mcs0

Performed on the worst case power result for each modulation type.

Any Analyser plots can be found in Section 6 of this report.

LIMITS:

15.247(e) +8dBm/3kHz.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: measurement function ± 0.97 dB, marker method ± 0.97 dB (UR66A), measurement function ± 2.85 dB, marker method ± 2.35 dB (UR66C), measurement function ± 5.20 dB, marker method ± 4.71 dB (UR66D),

5.12 Antenna power conducted emissions

NOT APPLICABLE: The EUT was tested for radiated emissions with its dedicated antenna in position.

5.13 Duty cycle

5.13.1 Test methods

Test Requirements:	47 CFR Part 15.247 Part 15.35(c) [Reference 4.1.1 of this report]
Test Method:	ANSI C63.10 Clause 7.5 [Reference 4.1.2 of this report]
Limits:	47 CFR Part 15.247 Part 15.35c [Reference 4.1.1 of this report]

5.13.2 Configuration of EUT

The EUT was measured on a bench using a spectrum analyser connected to the temporary RF port. The EUT was operated in Modes 1-84 mode.

5.13.3 Test procedure

Tests were made in accordance with FCC Part 15 using the measuring equipment noted below. The centre frequency of the analyser was set to that of the transmitter, and the span set to zero. The sweep time was adjusted so that either the pulse width or the periodic operation could be observed.& Measurements were performed test in site A

5.13.4 Test equipment

E255, E367, H071

See Section 8 for more details

5.13.5 Test results

Temperature of test environment 20°C
Humidity of test environment 50%
Pressure of test environment 102kPa

Band
Power Level

			Duty Cycle %
802.11b	1M	20 MHz	99.9
802.11b	2M	20 MHz	99.8
802.11b	5.5 M	20 MHz	99.5
802.11b	11M	20 MHz	99.1
802.11g	6 M	20 MHz	99.5
802.11g	9 M	20 MHz	99.2
802.11g	12 M	20 MHz	98.9
802.11g	18 M	20 MHz	98.4
802.11g	24 M	20 MHz	97.9
802.11g	36 M	20 MHz	96.9
802.11g	48 M	20 MHz	96
802.11g	54 M	20 MHz	95.5
802.11n	Mcs0	20 MHz	99.4
802.11n	Mcs1	20 MHz	98.9
802.11n	Mcs2	20 MHz	98.3
802.11n	Mcs3	20 MHz	97.7
802.11n	Mcs4	20 MHz	96.8
802.11n	Mcs5	20 MHz	95.7
802.11n	Mcs6	20 MHz	95.3
802.11n	Mcs7	20 MHz	94.8
802.11n	Mcs0	40 MHz	98.4
802.11n	Mcs1	40 MHz	97.2
802.11n	Mcs2	40 MHz	96
802.11n	Mcs3	40 MHz	95
802.11n	Mcs4	40 MHz	96.2
802.11n	Mcs5	40 MHz	91
802.11n	Mcs6	40 MHz	91.4
802.11n	Mcs7	40 MHz	90.7

LIMITS:

These results show that the duty cycle correction for average emissions is therefore $20\log(90.7/100) = -0.848$ dB.

No limits apply, however duty cycle measurement performed to verify correction factors for average emissions.

These results show that the EUT has PASSED this test.

The uncertainty gives a 95% confidence interval in the measurement. Expanded uncertainty (K=2) is as follows: PSA, ± 0.061 %, PXA, ± 0.026 % (UR71B),

5.14 FHSS carrier frequency separation

NOT APPLICABLE: EUT does not employ FHSS technology

5.15 Average time of occupancy

NOT APPLICABLE: EUT does not employ FHSS technology

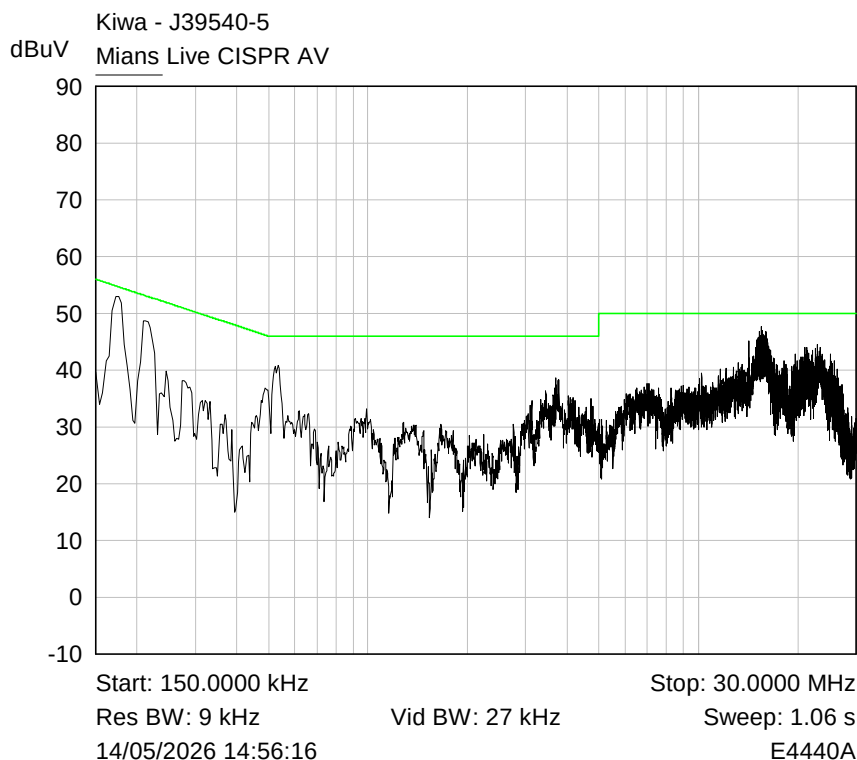
5.16 Number of Hop Channels

NOT APPLICABLE: EUT does not employ FHSS technology

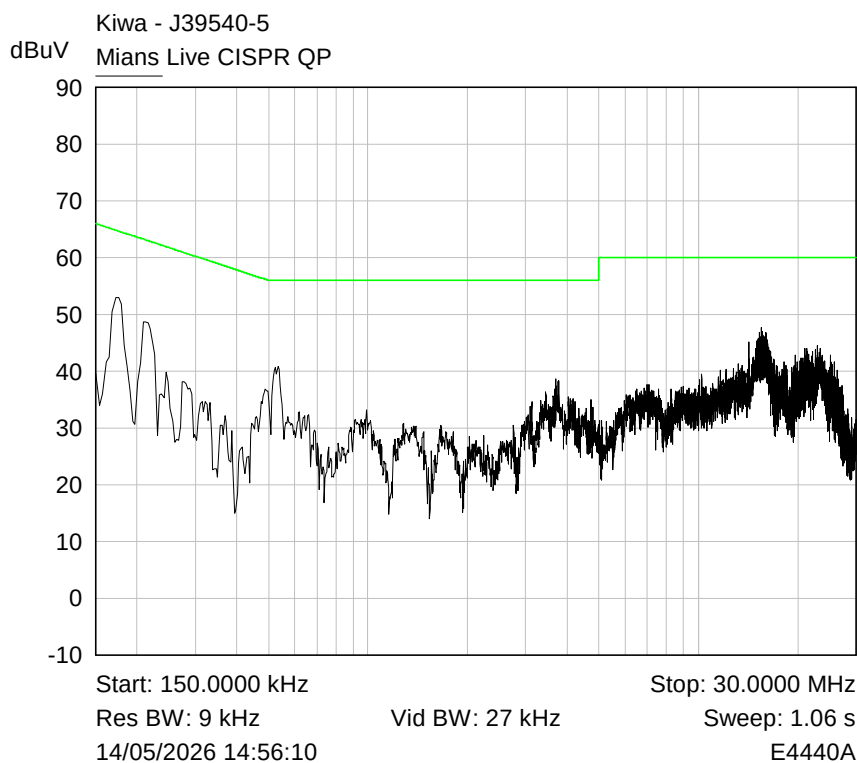
6 Plots/Graphical results

6.1 AC power line conducted emissions

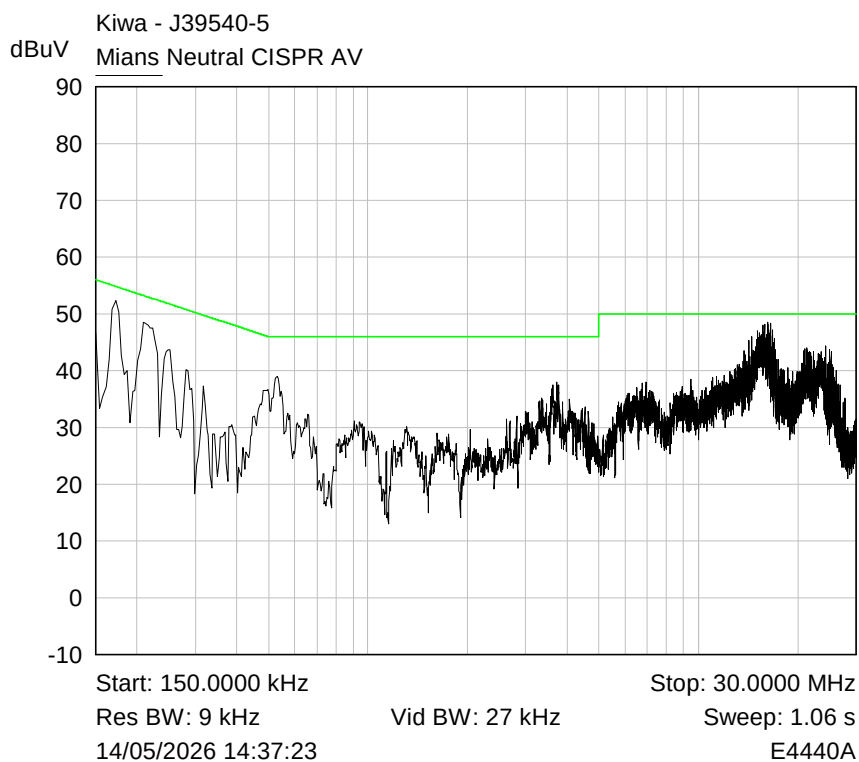
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b 1M, Channel 2437 MHz



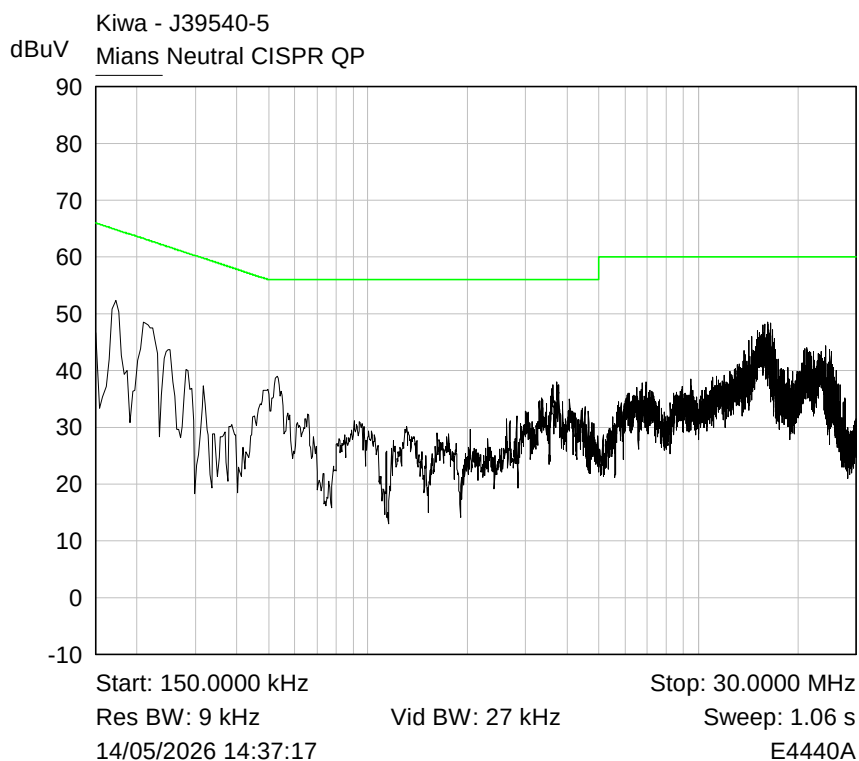
Plot of Live150k-30M Average



Plot of Live150k-30M Quasi-Peak



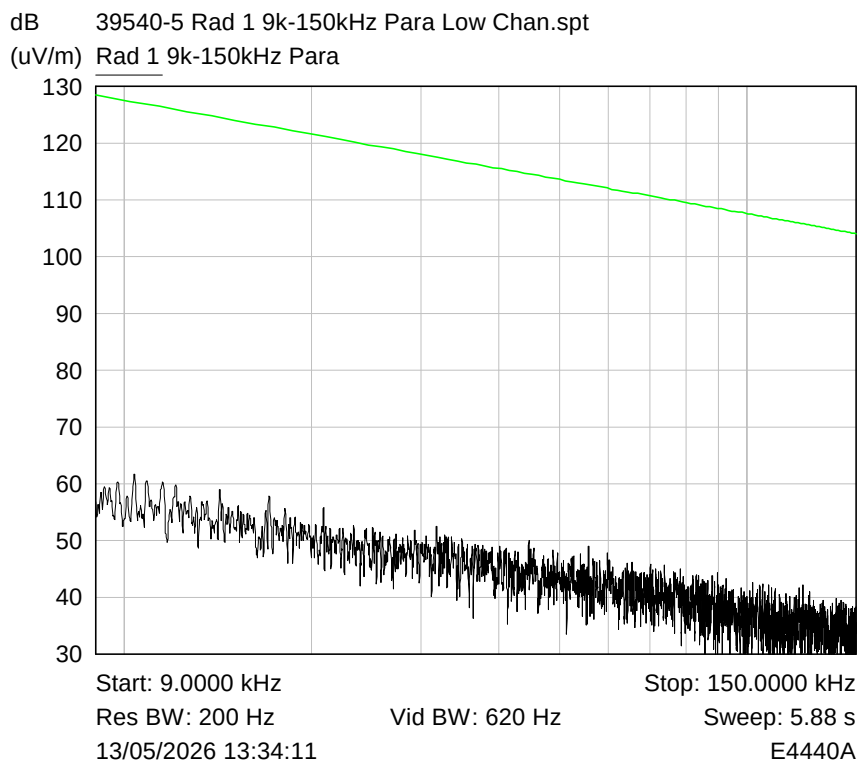
Plot of Neutral150k-30M Average



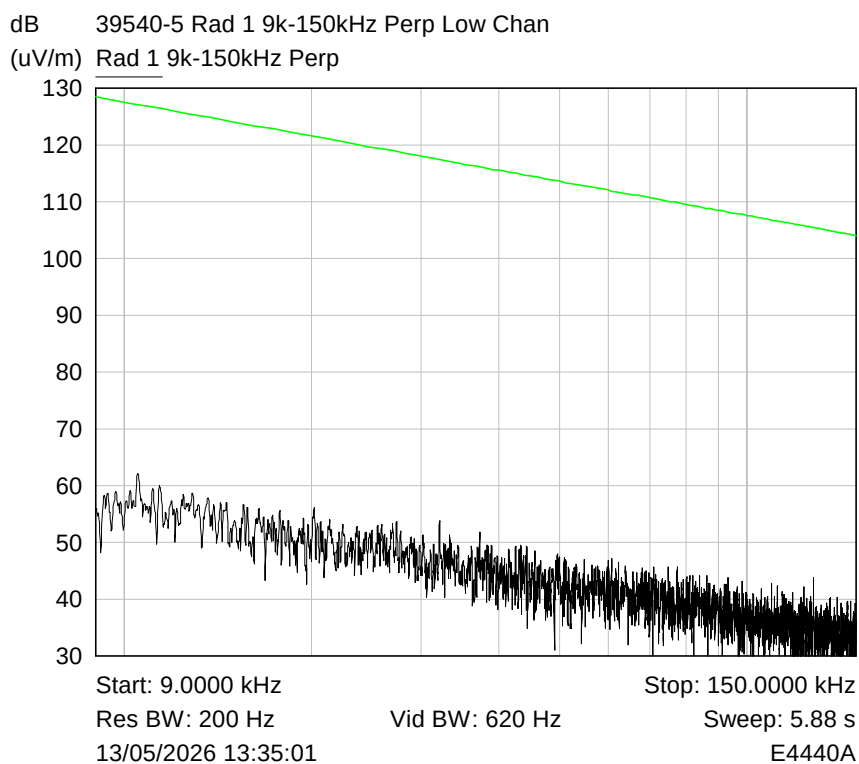
Plot of Neutral150k-30M Quasi-Peak

6.2 Radiated emissions 9 - 150 kHz

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2412 MHz

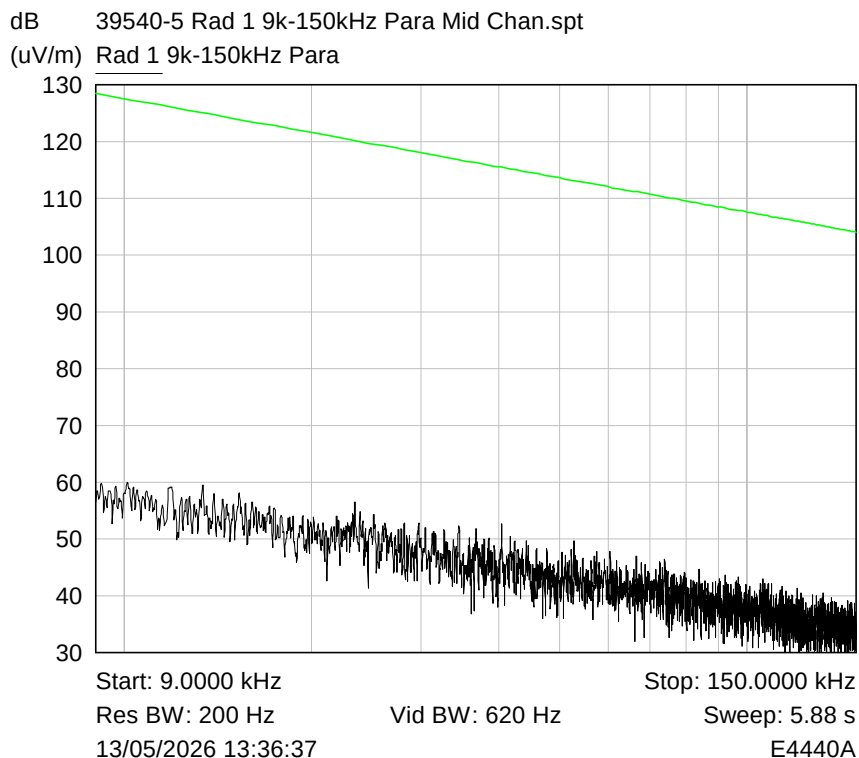


Plot of 9k-150kHz Parallel

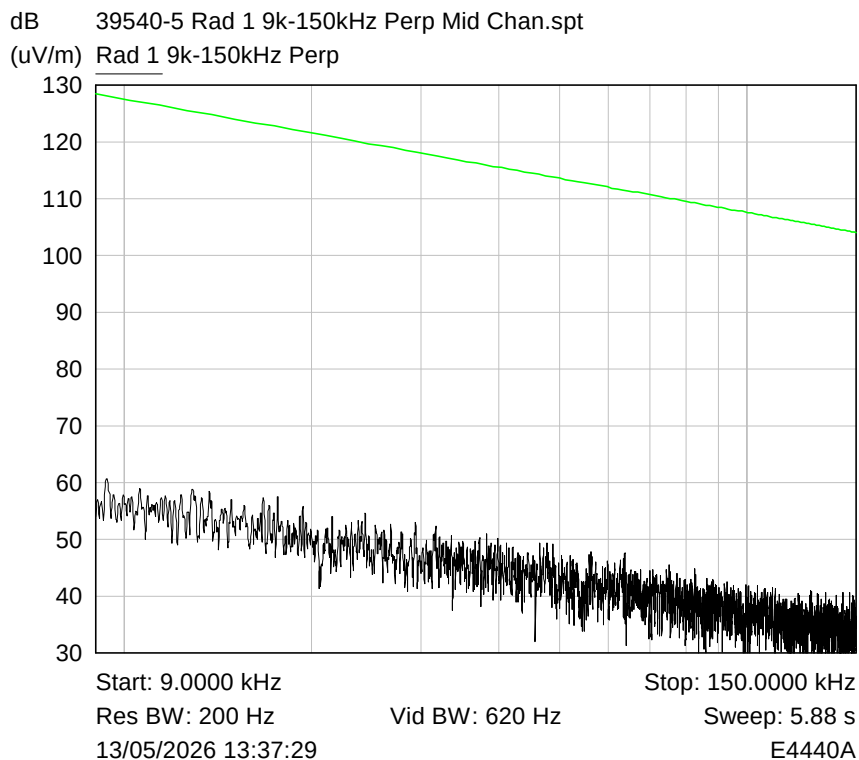


Plot of 9k-150kHz Perpendicular

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2437 MHz

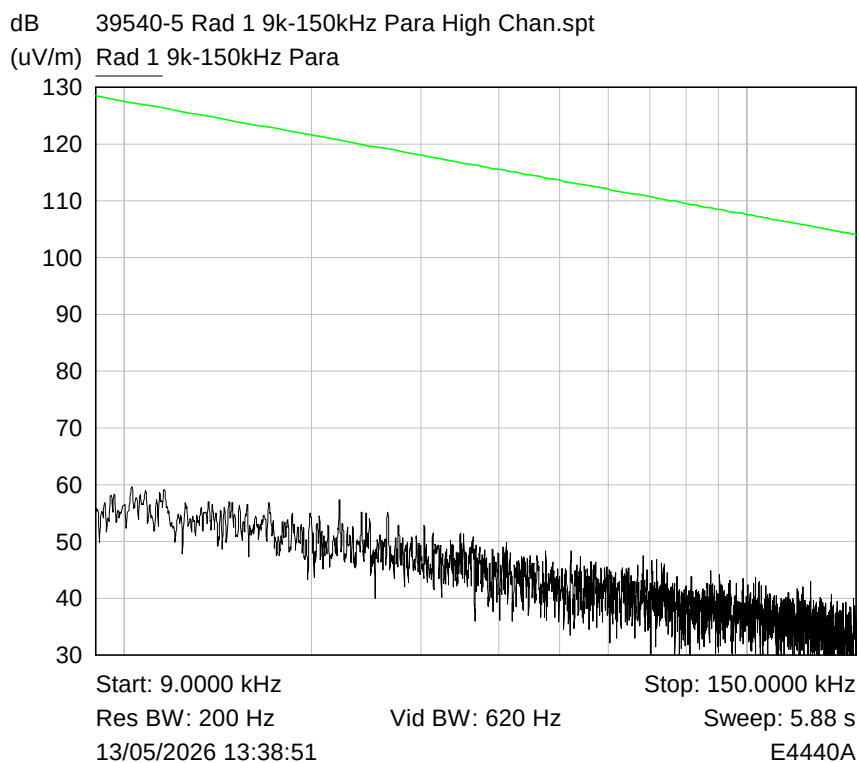


Plot of 9k-150kHz Parallel

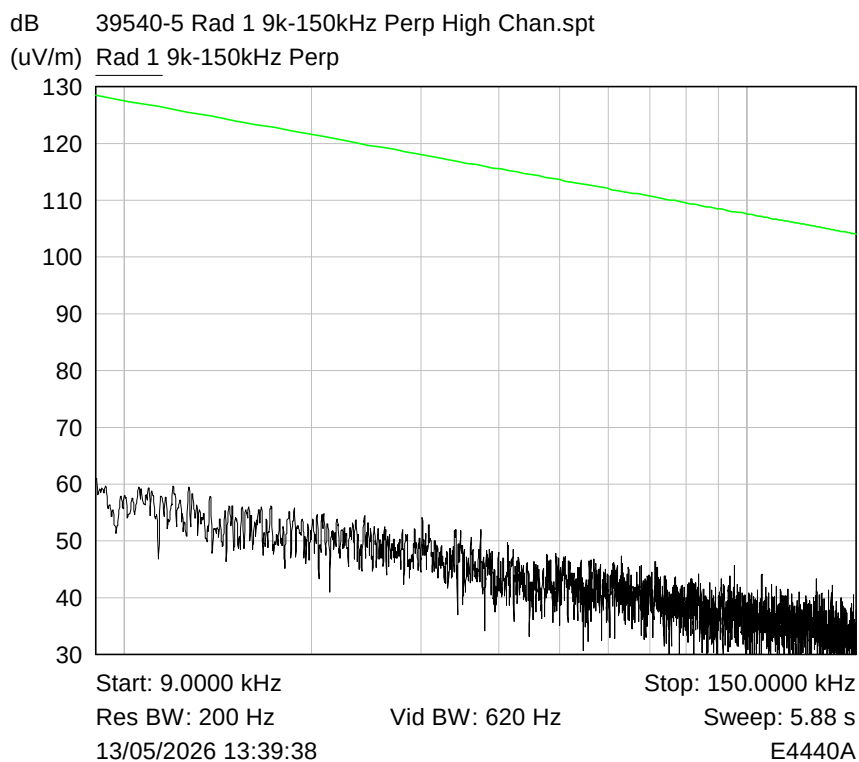


Plot of 9k-150kHz Perpendicular

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2462 MHz



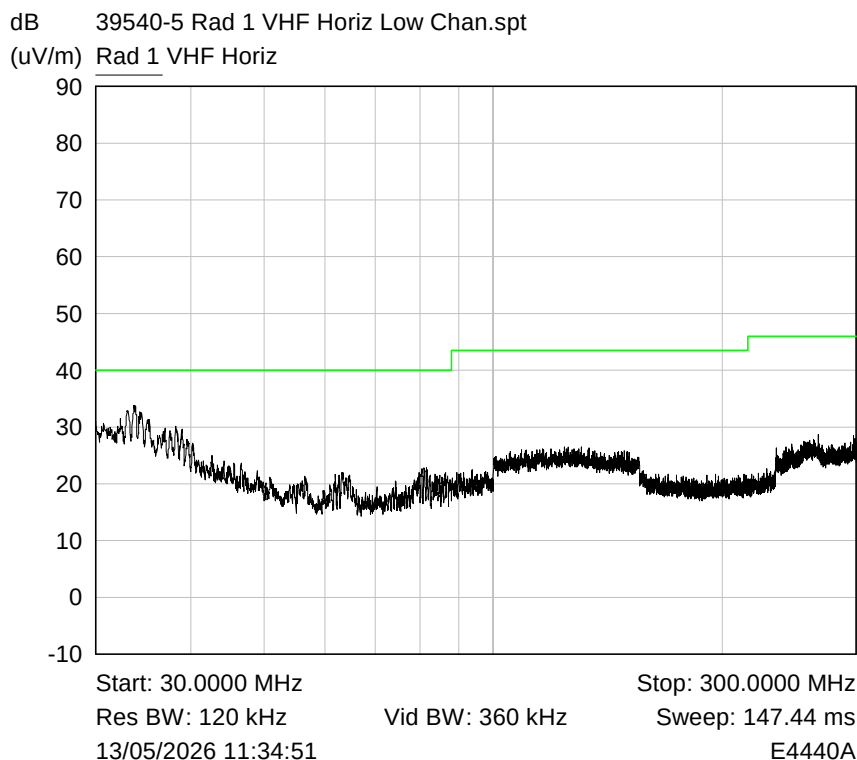
Plot of 9k-150kHz Parallel



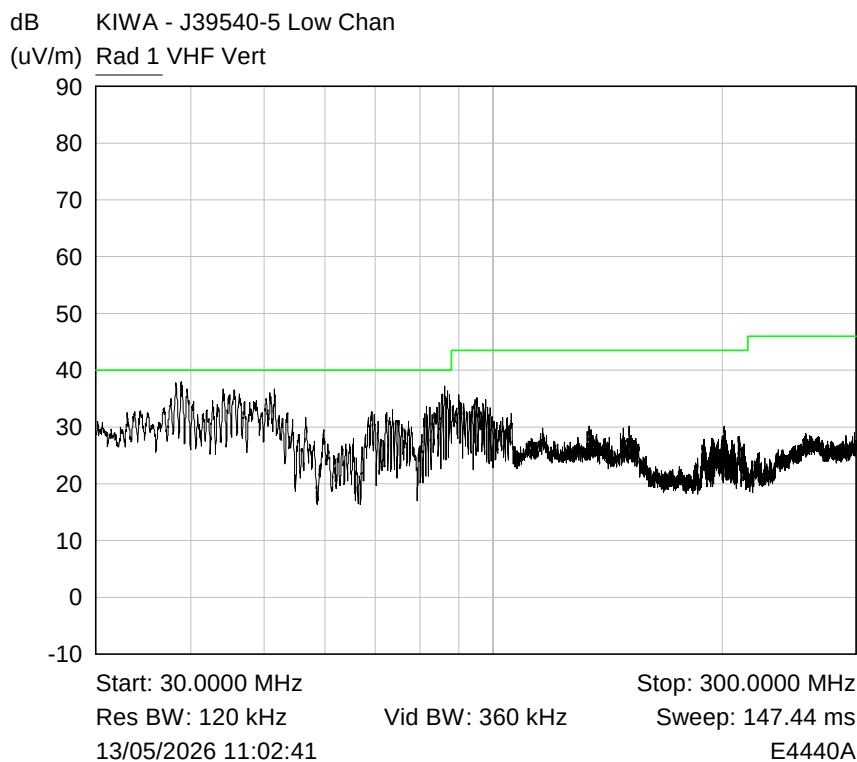
Plot of 9k-150kHz Perpendicular

6.3 Radiated emissions 30 MHz -1 GHz

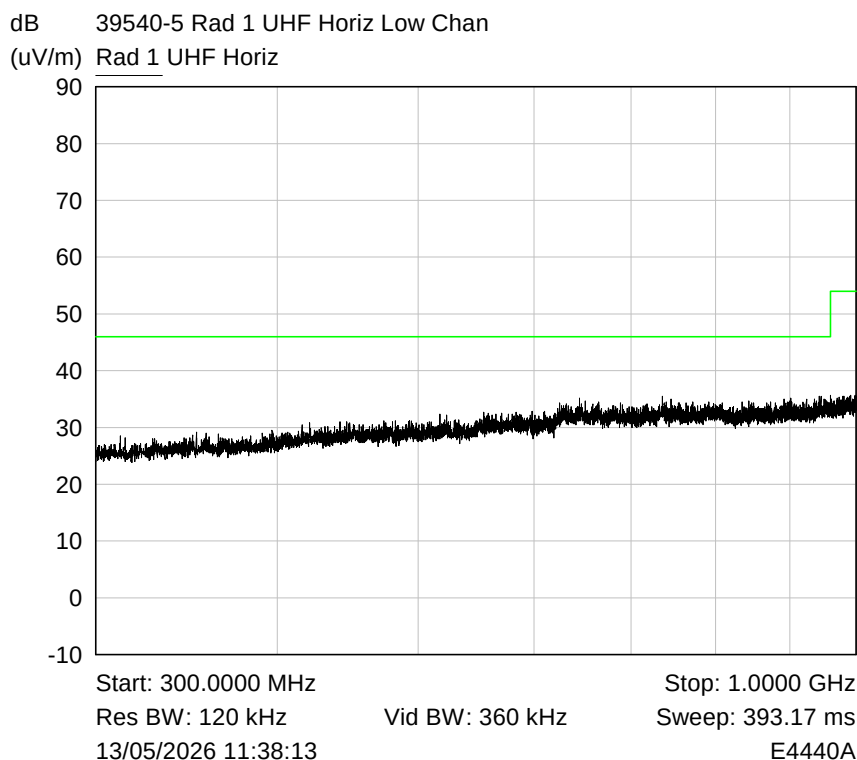
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2412 MHz



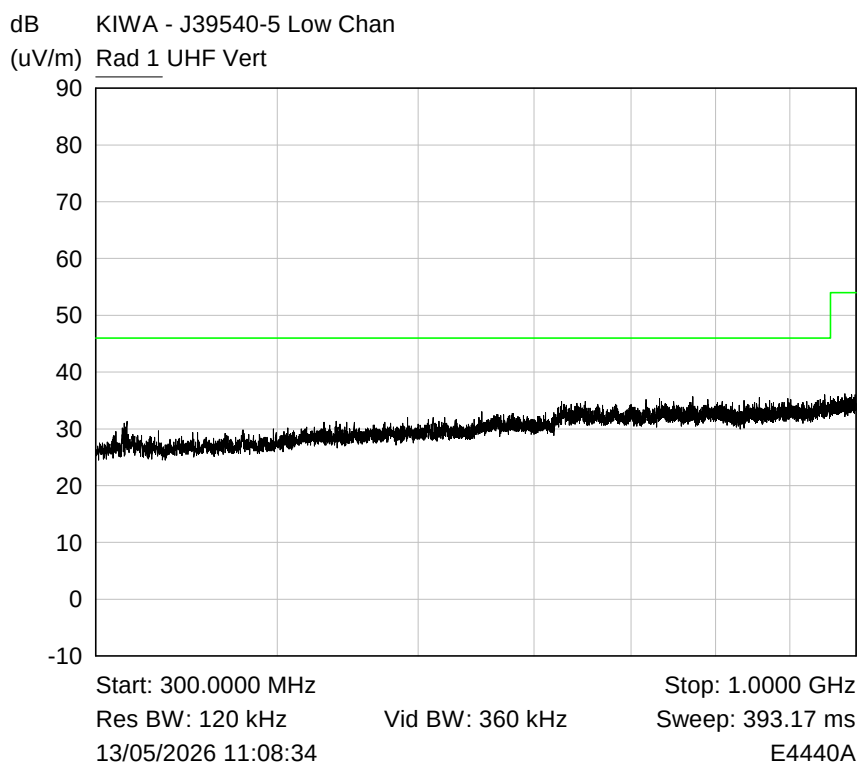
Plot of Peak emissions for VHF Horizontal against the QP limit line.



Plot of Peak emissions for VHF Vertical against the QP limit line.

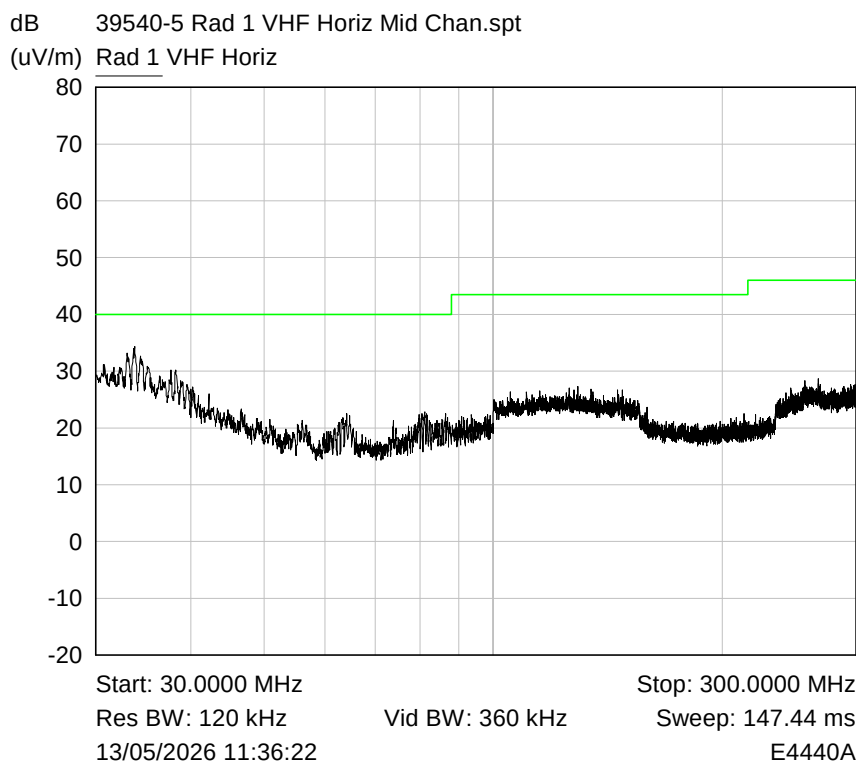


Plot of Peak emissions for UHF Horizontal against the QP limit line.

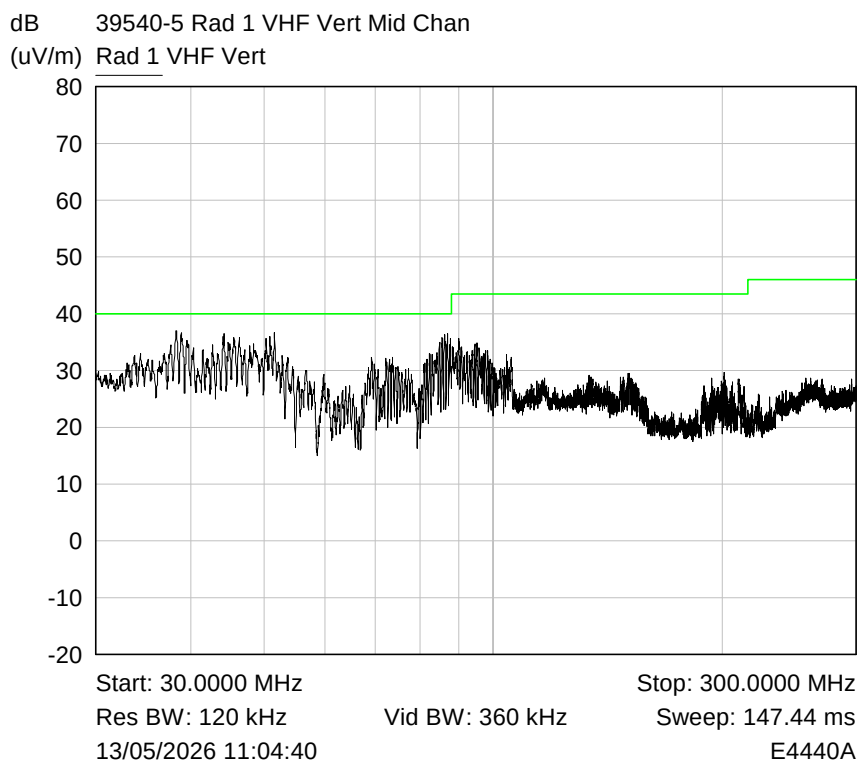


Plot of Peak emissions for UHF Vertical against the QP limit line.

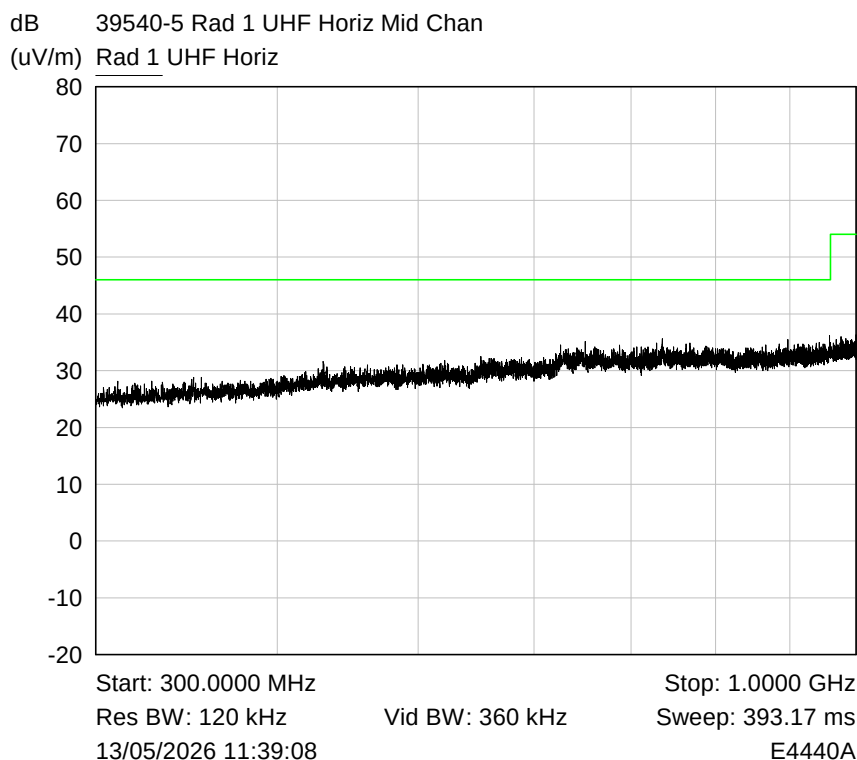
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2437 MHz



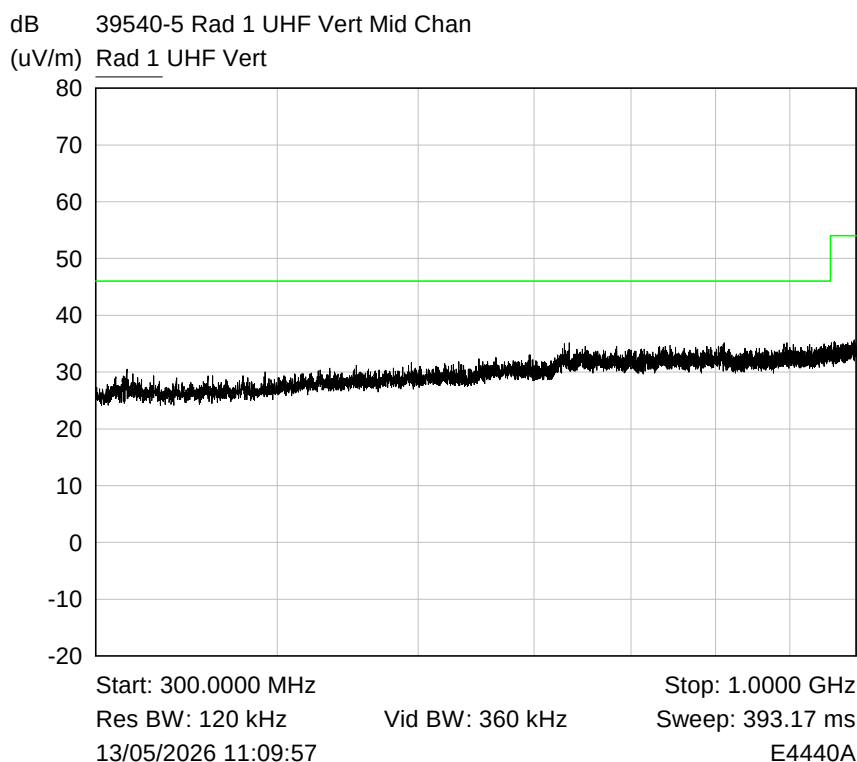
Plot of Peak emissions for VHF Horizontal against the QP limit line.



Plot of Peak emissions for VHF Vertical against the QP limit line.

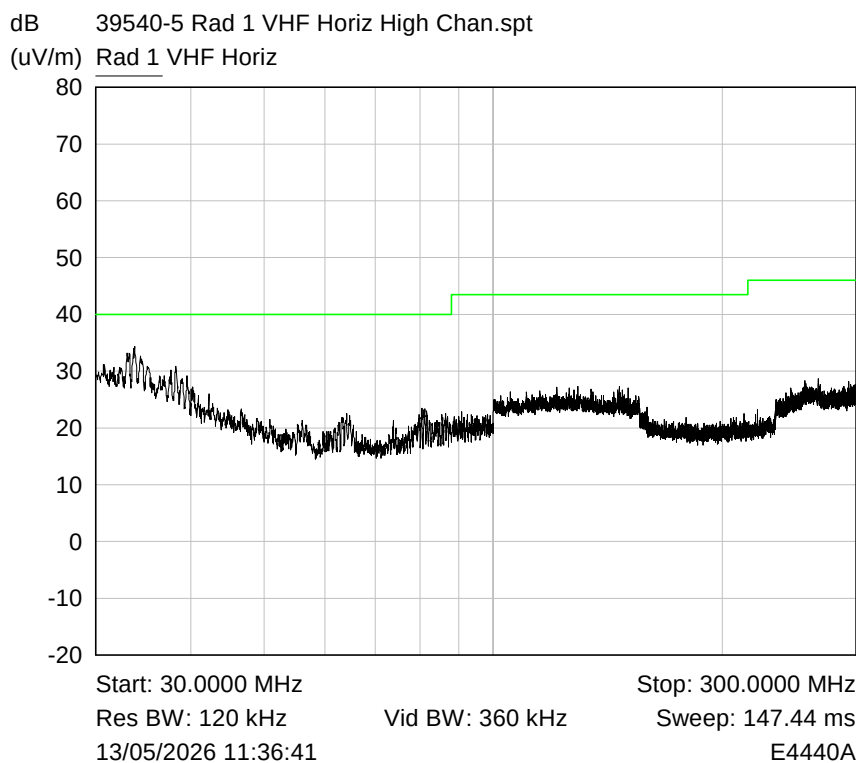


Plot of Peak emissions for UHF Horizontal against the QP limit line.

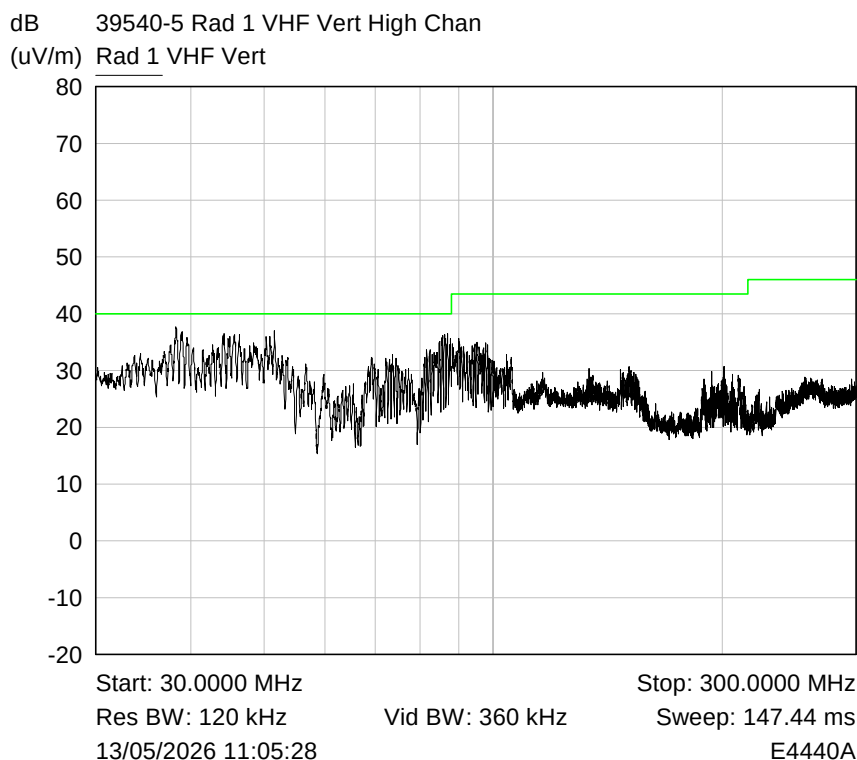


Plot of Peak emissions for UHF Vertical against the QP limit line.

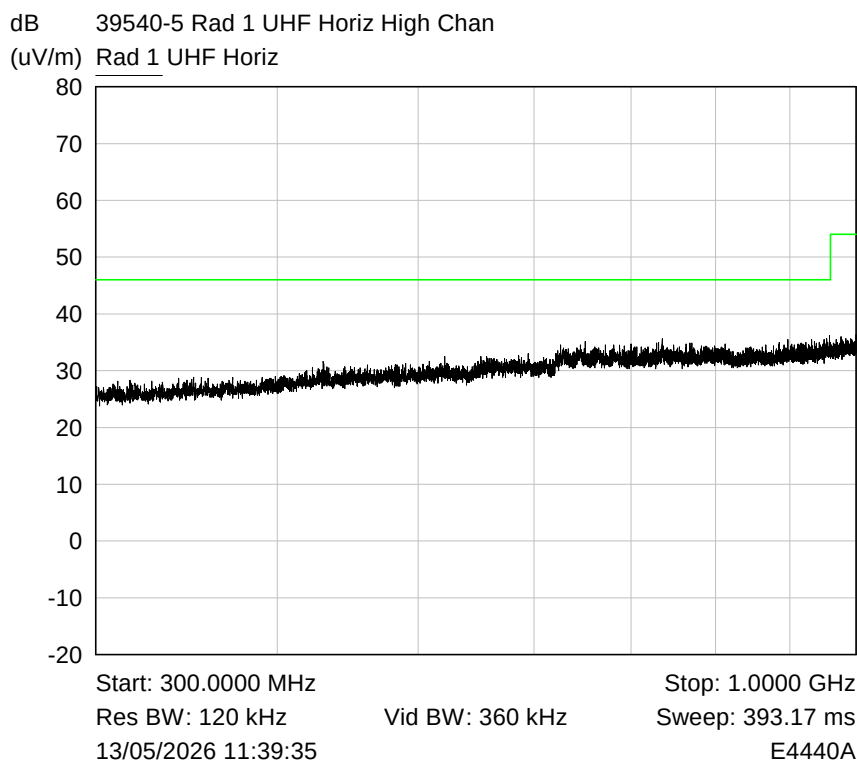
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2462 MHz



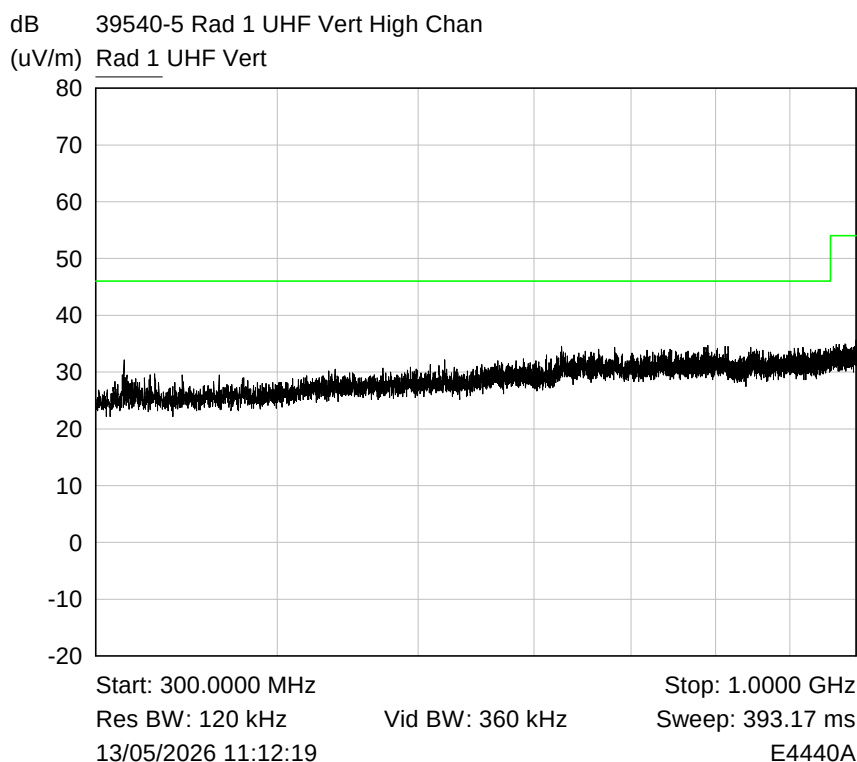
Plot of Peak emissions for VHF Horizontal against the QP limit line.



Plot of Peak emissions for VHF Vertical against the QP limit line.



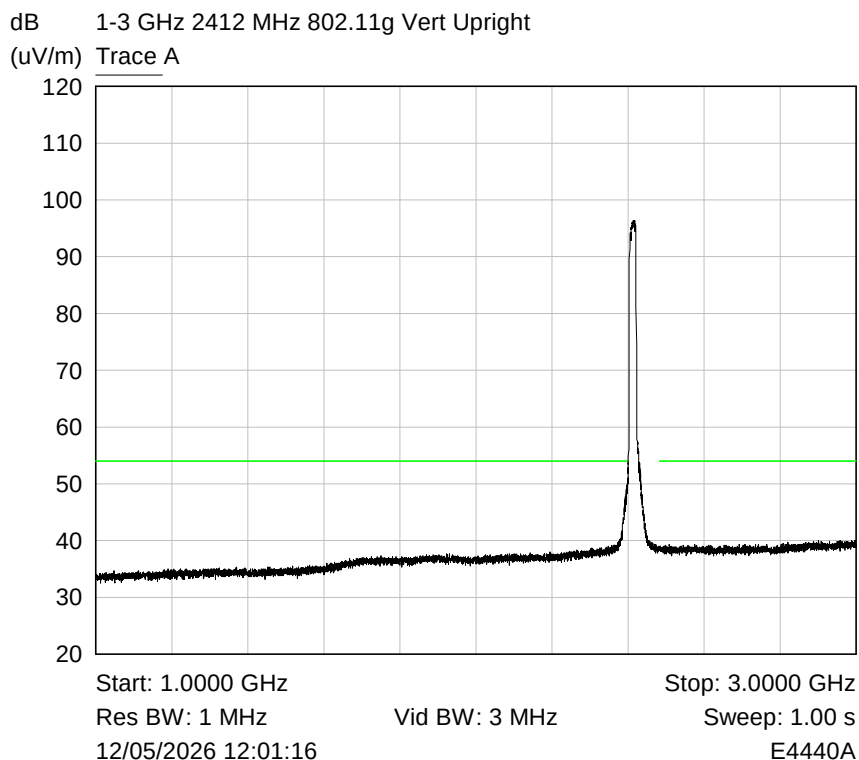
Plot of Peak emissions for UHF Horizontal against the QP limit line.



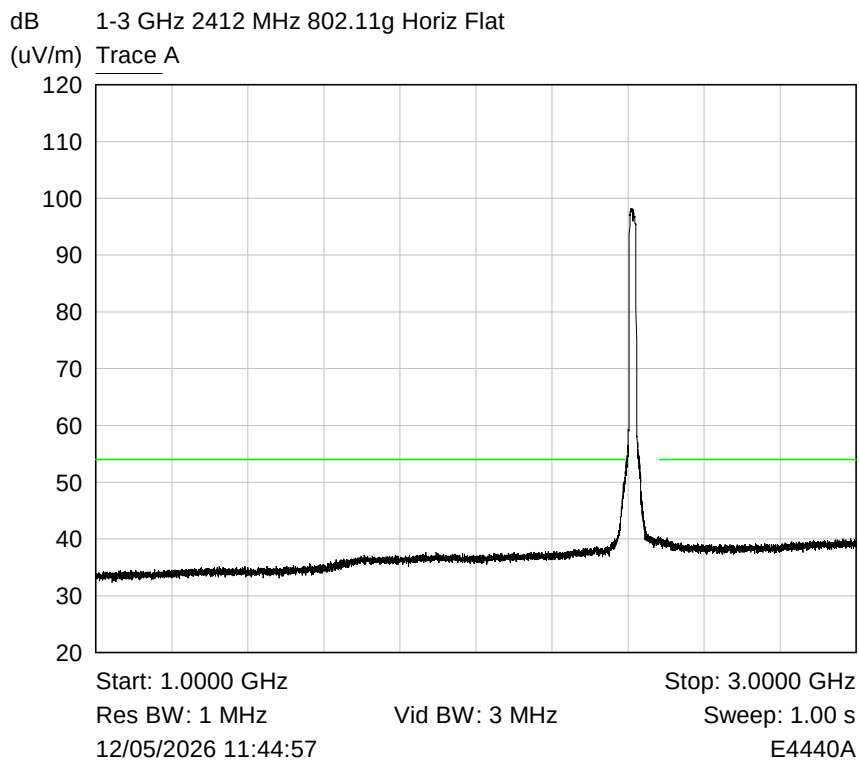
Plot of Peak emissions for UHF Vertical against the QP limit line.

6.4 Radiated emissions above 1 GHz

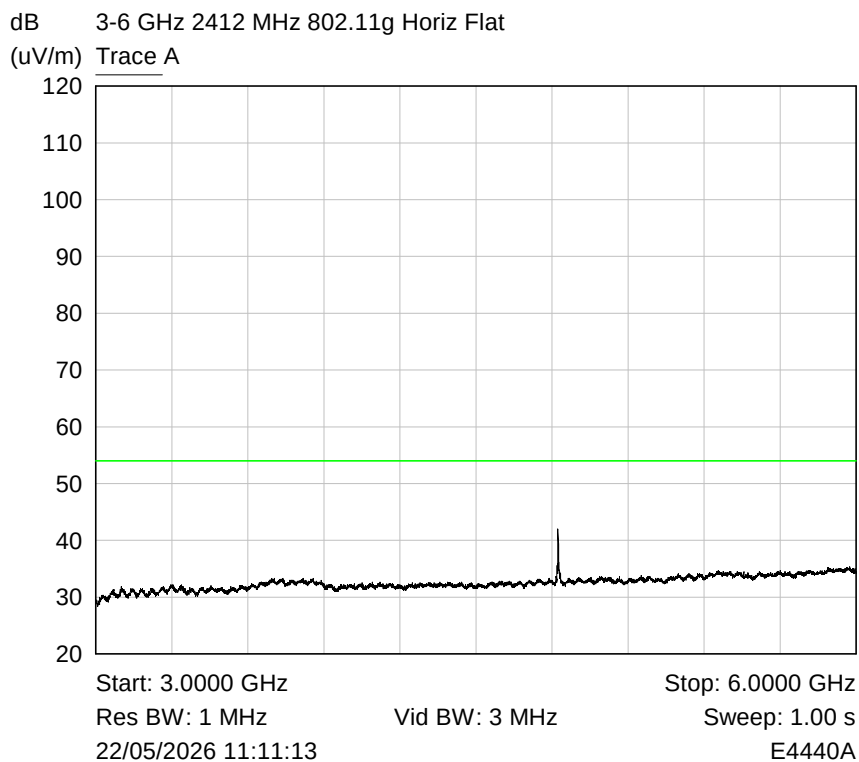
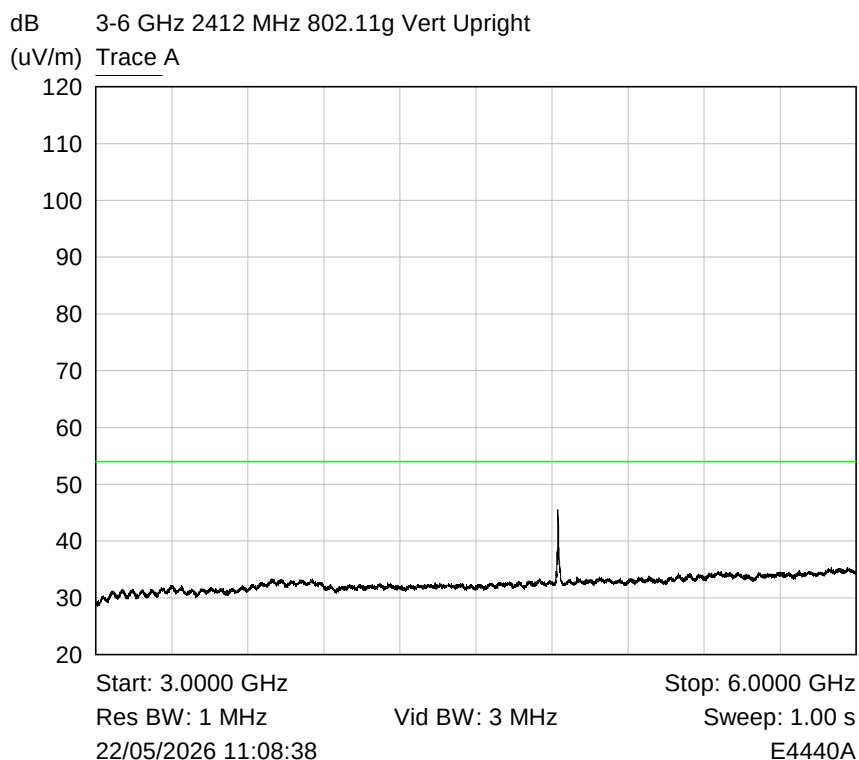
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2412 MHz

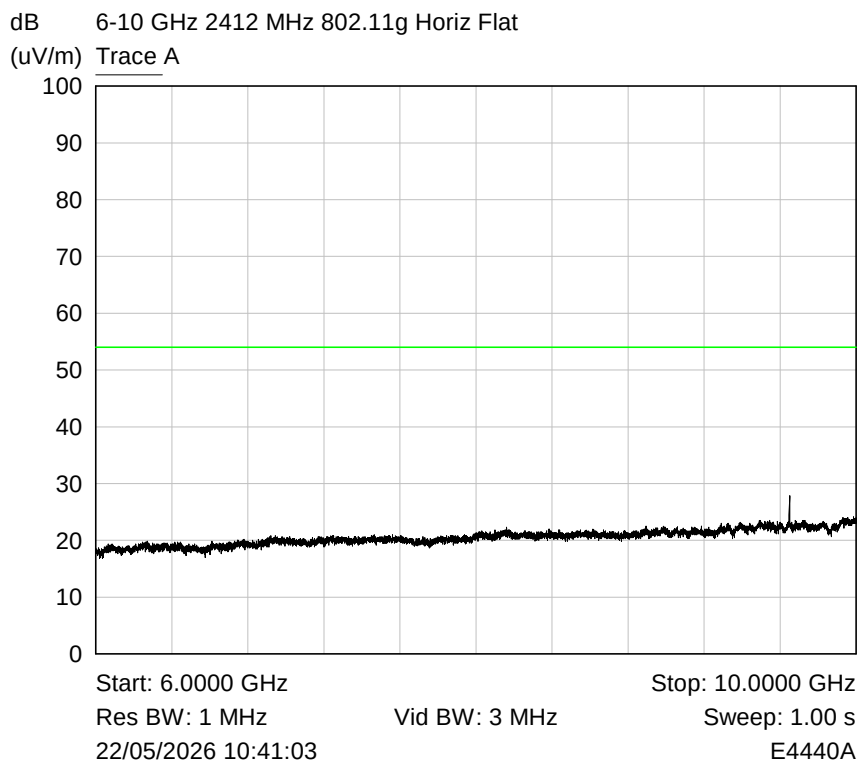
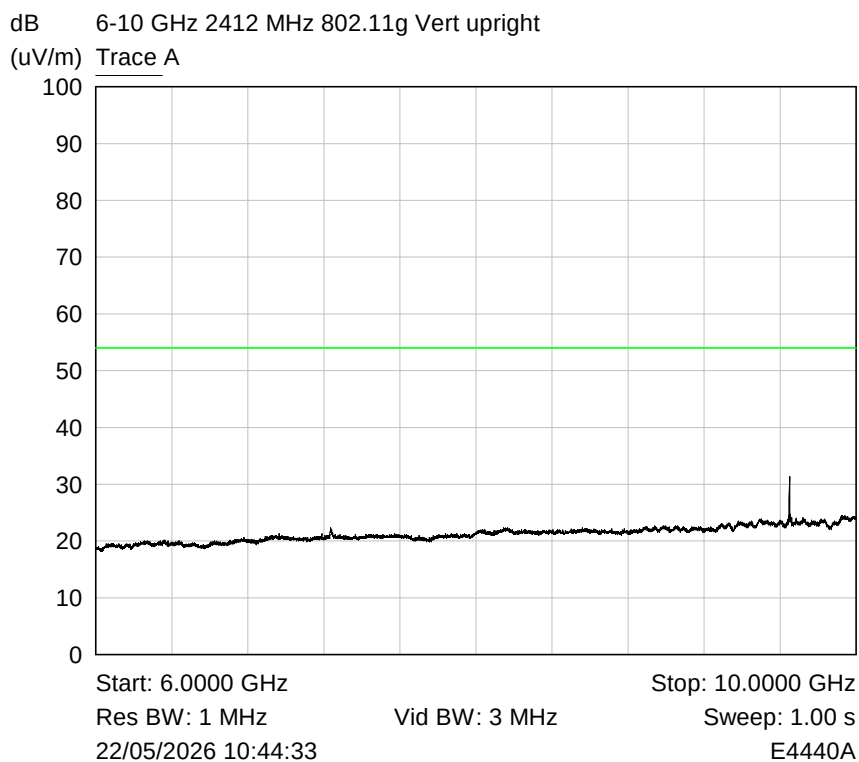


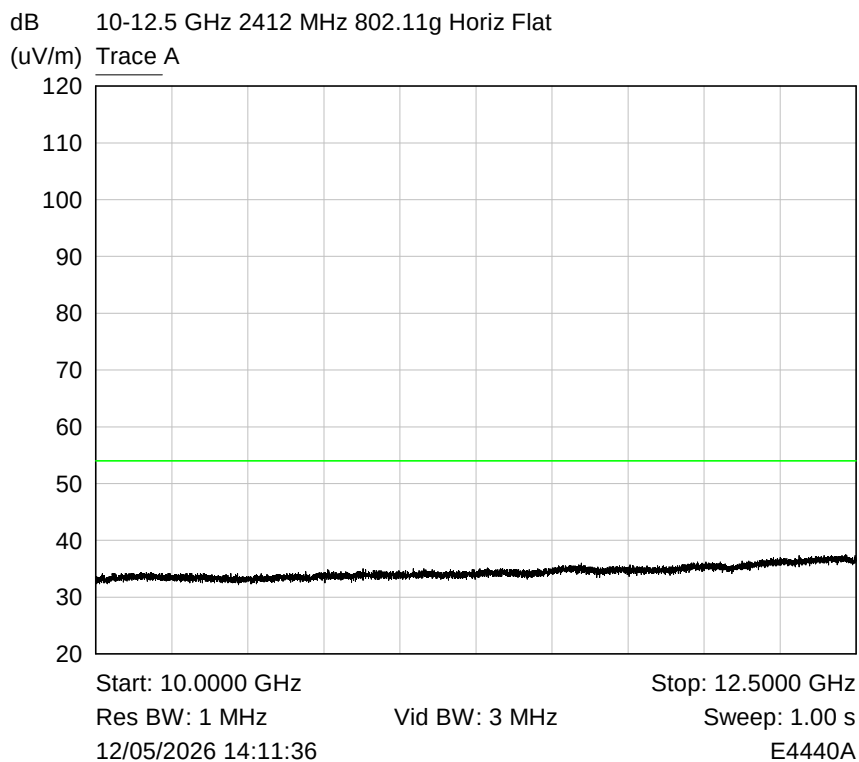
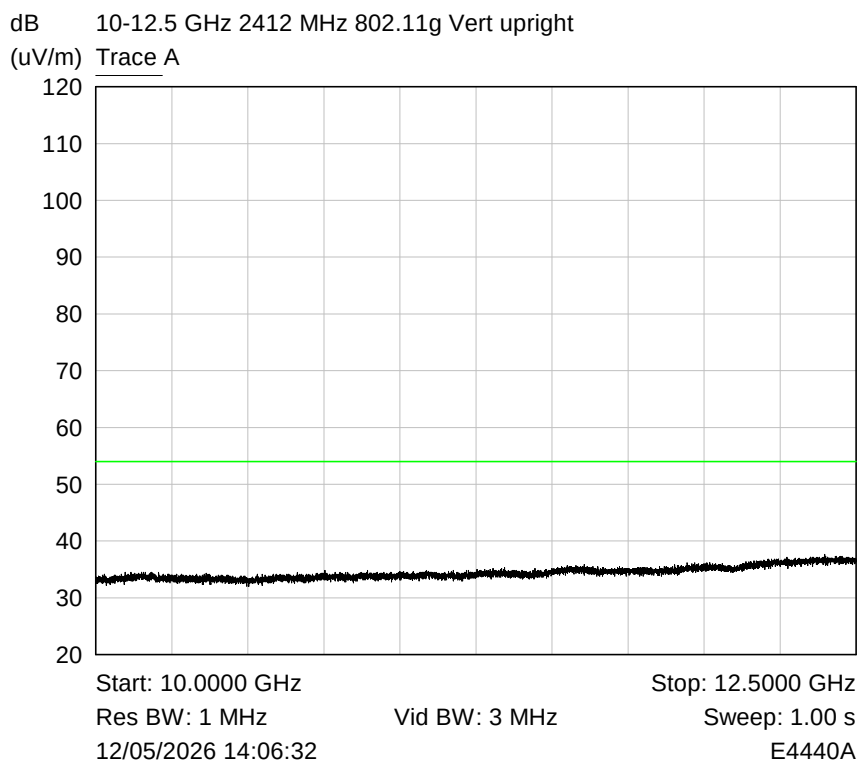
Note: Plot shows intentional transmission on 2412 MHz

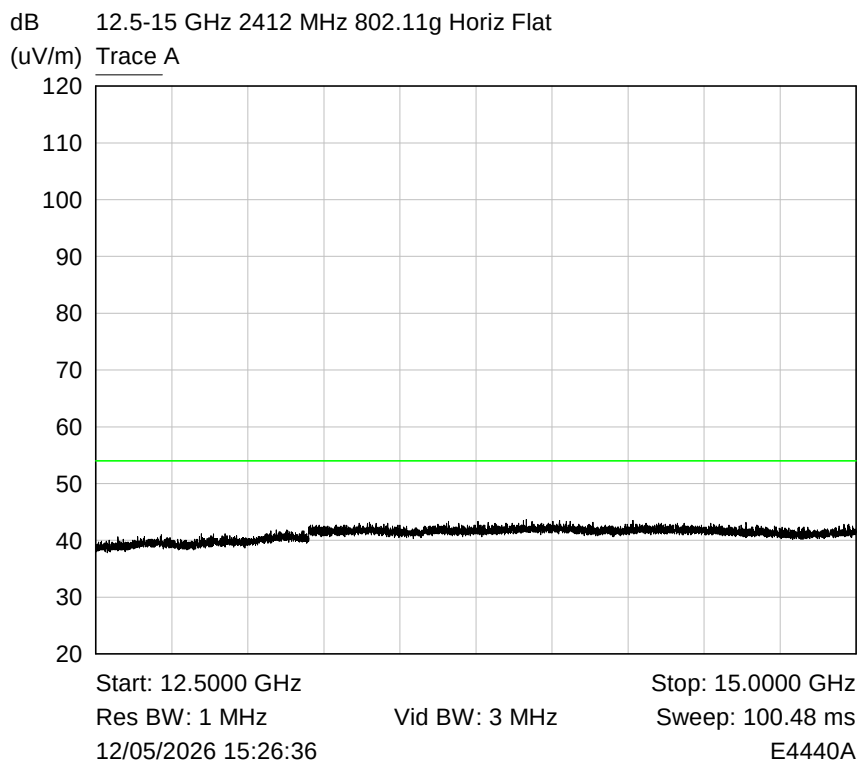
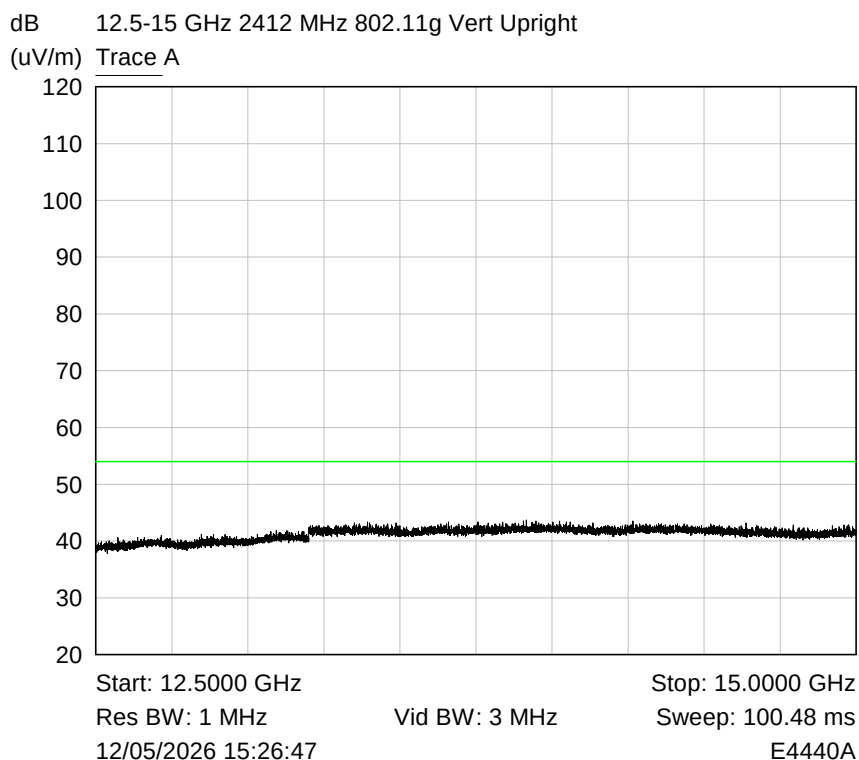


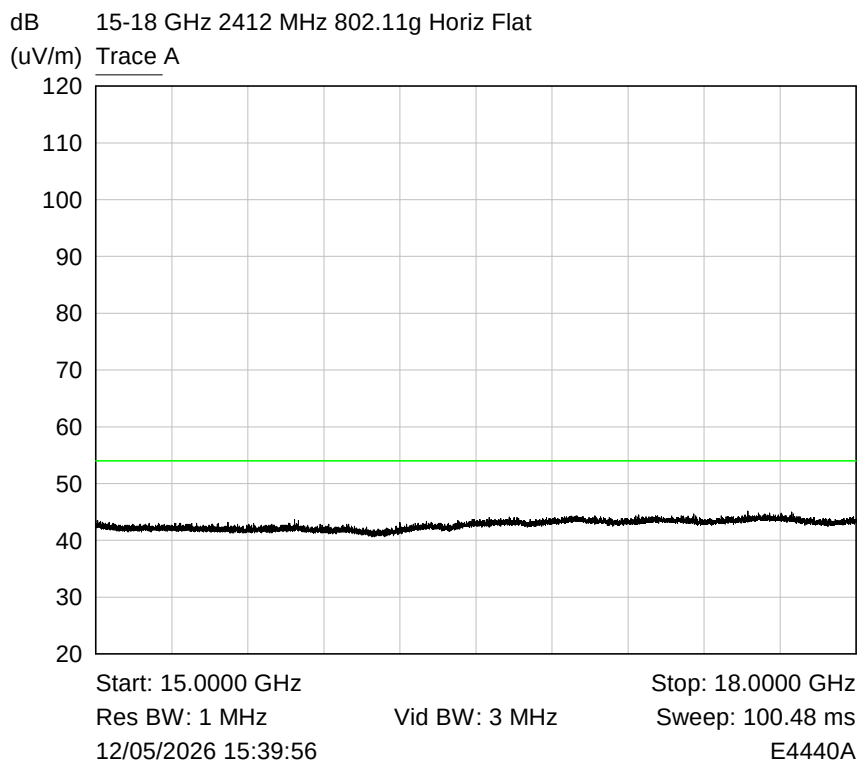
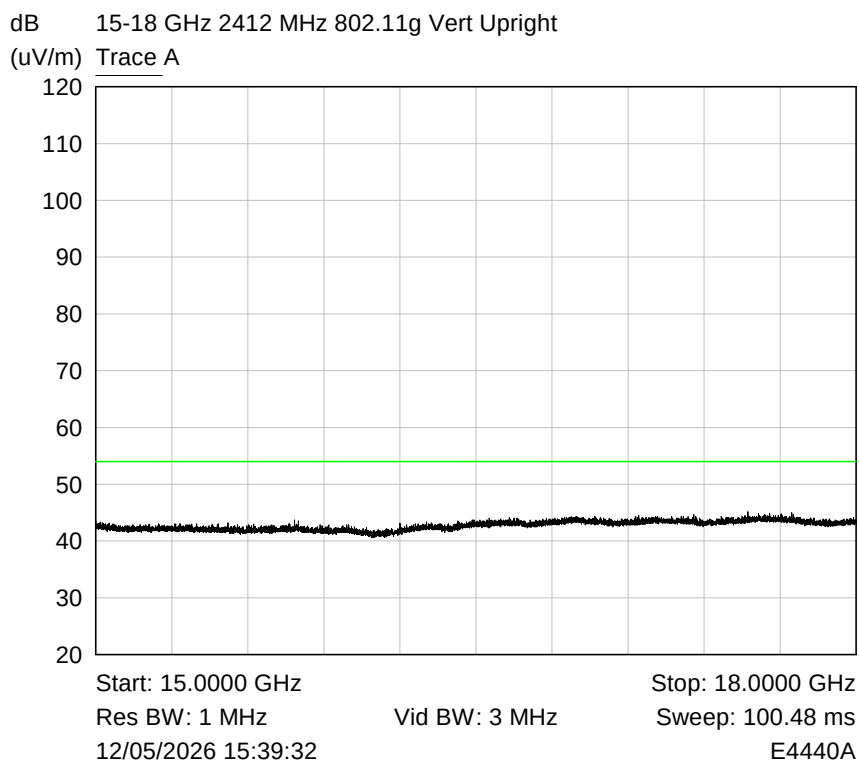
Note: Plot shows intentional transmission on 2412 MHz

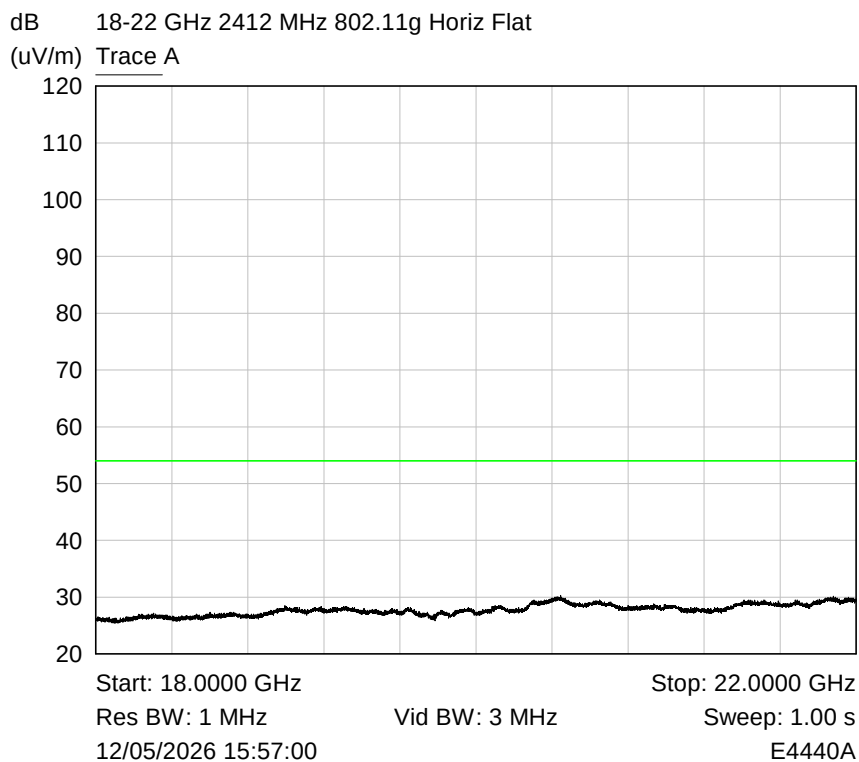
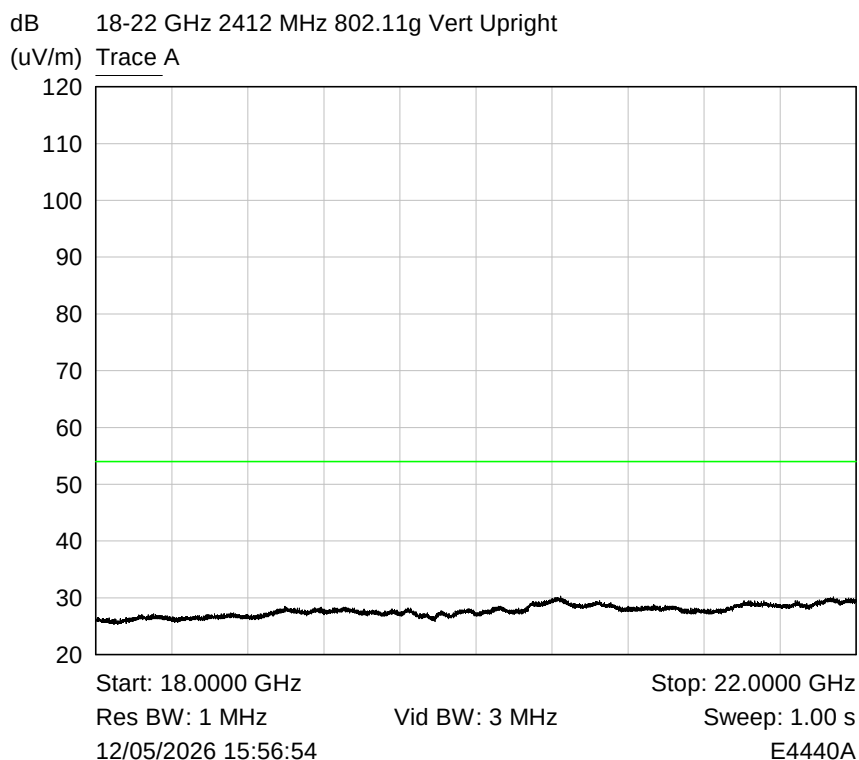


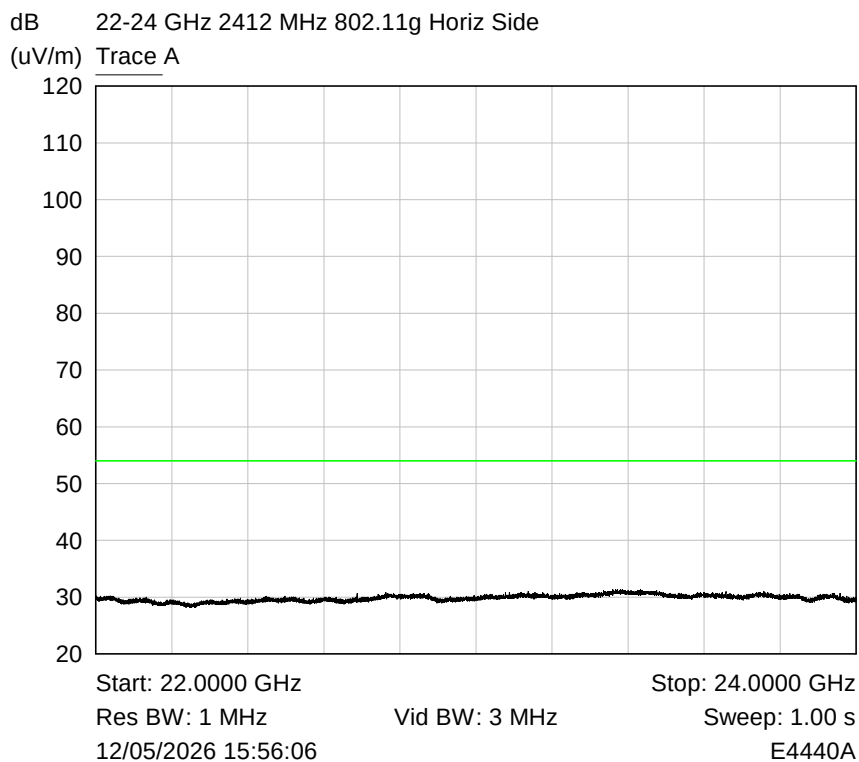
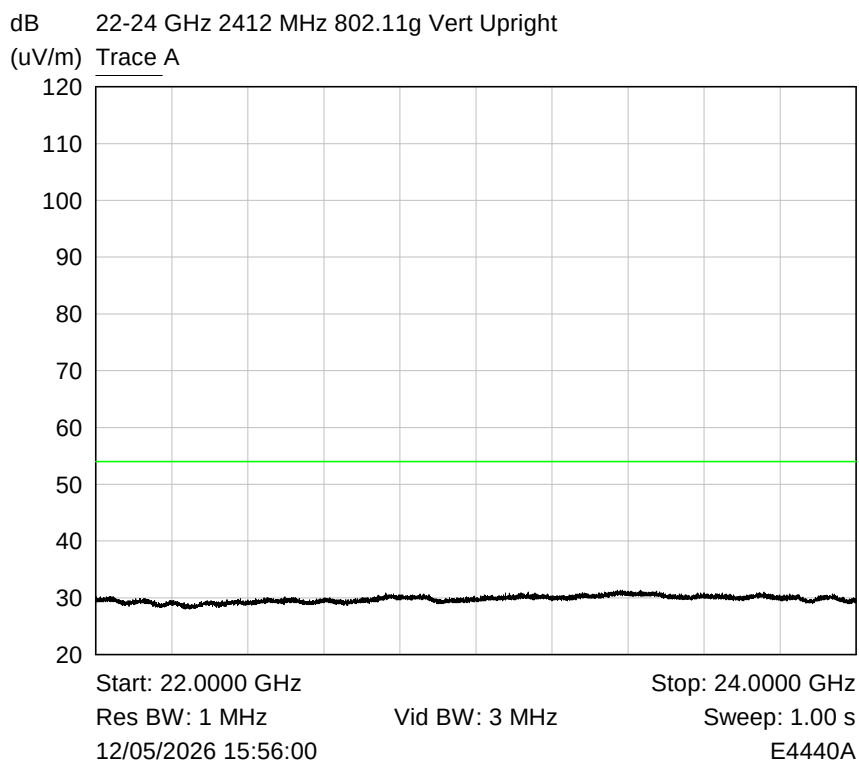


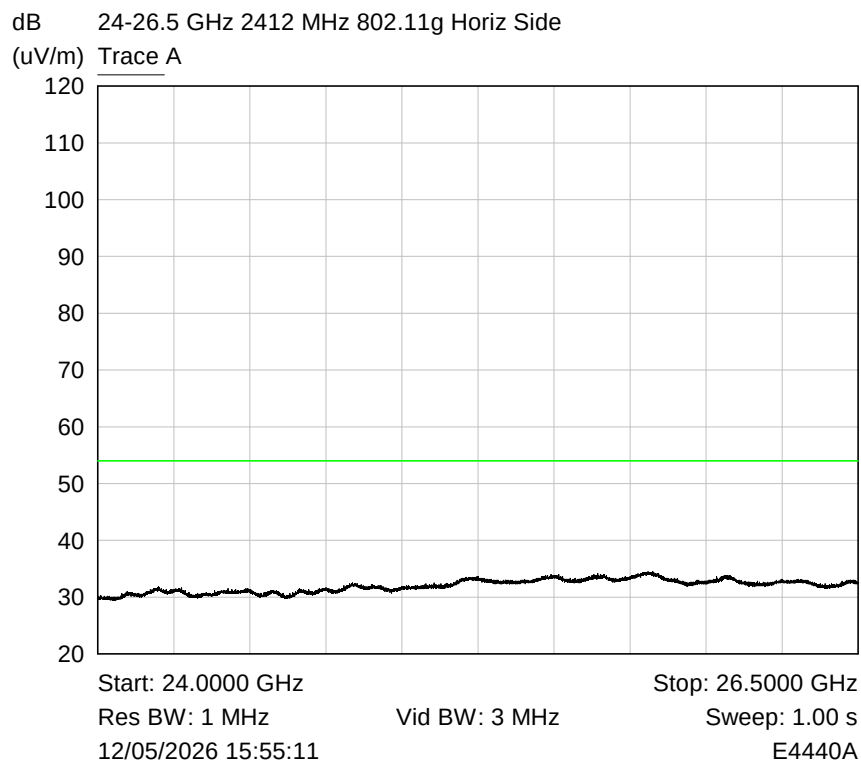
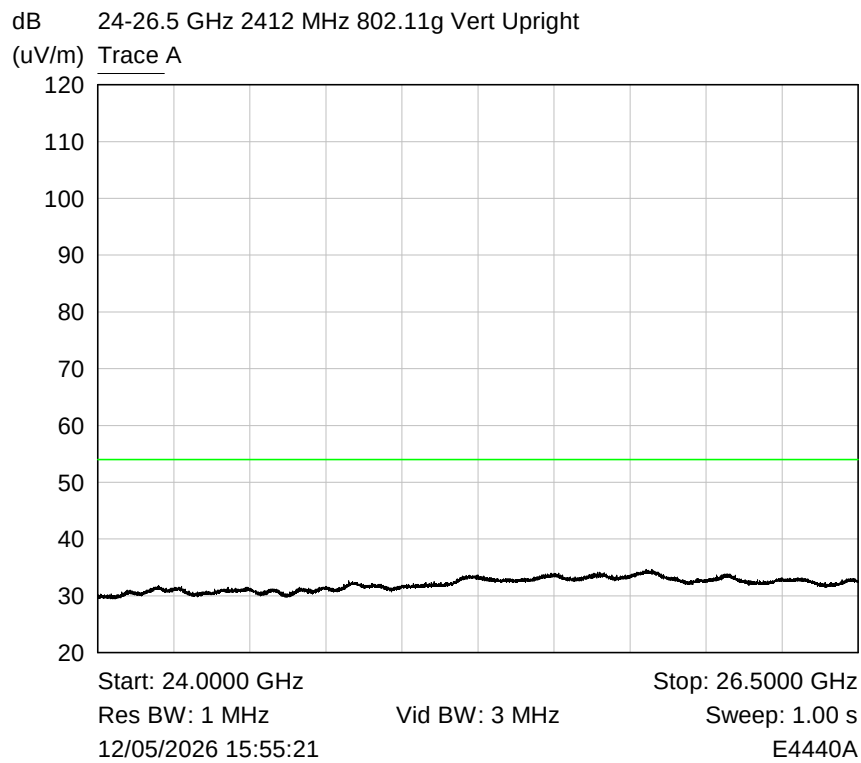


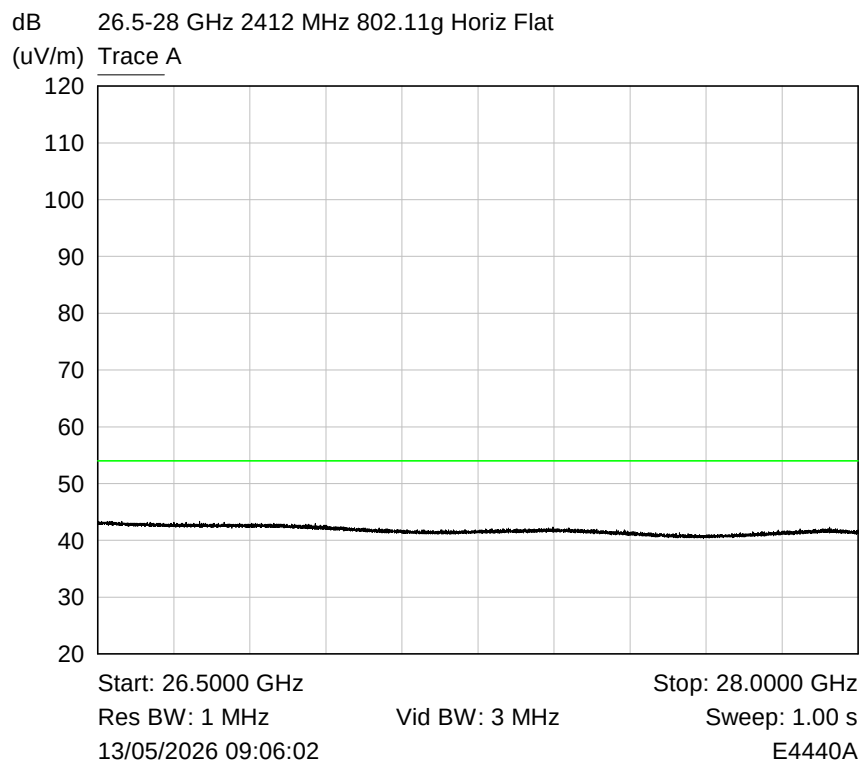
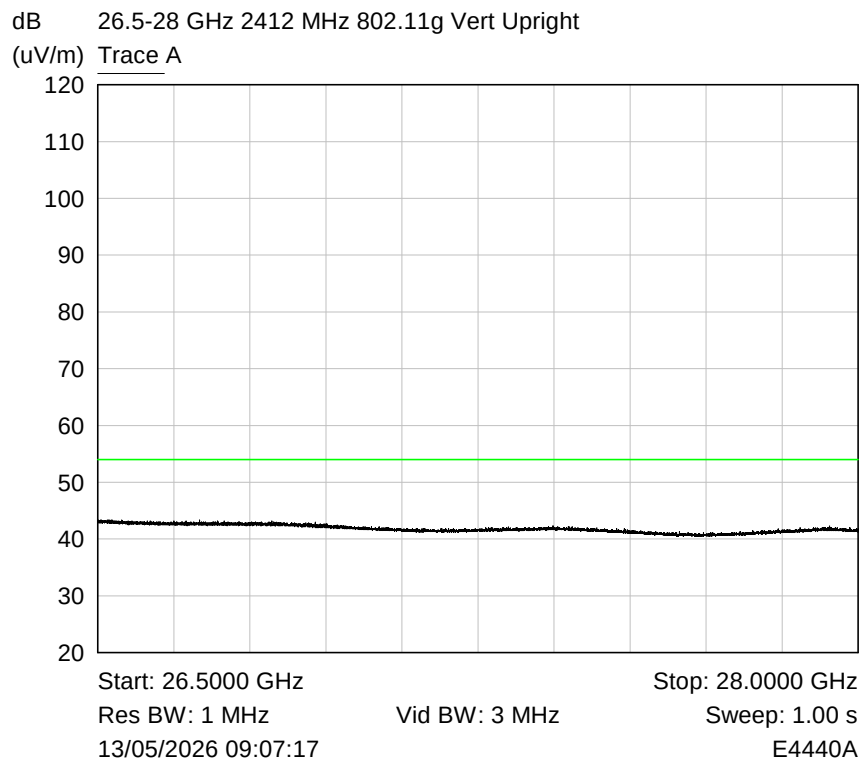


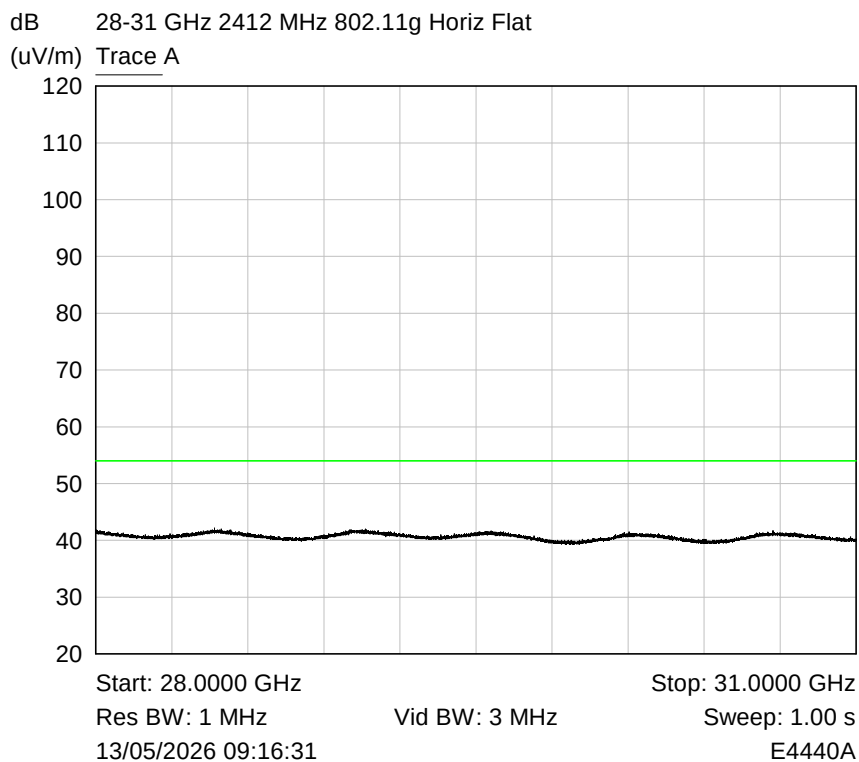
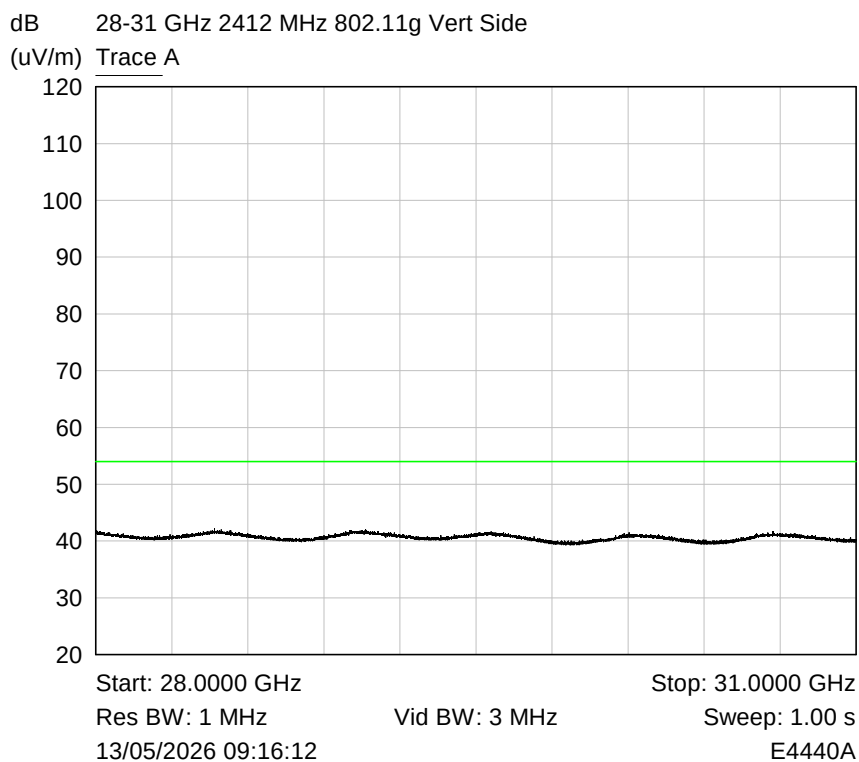


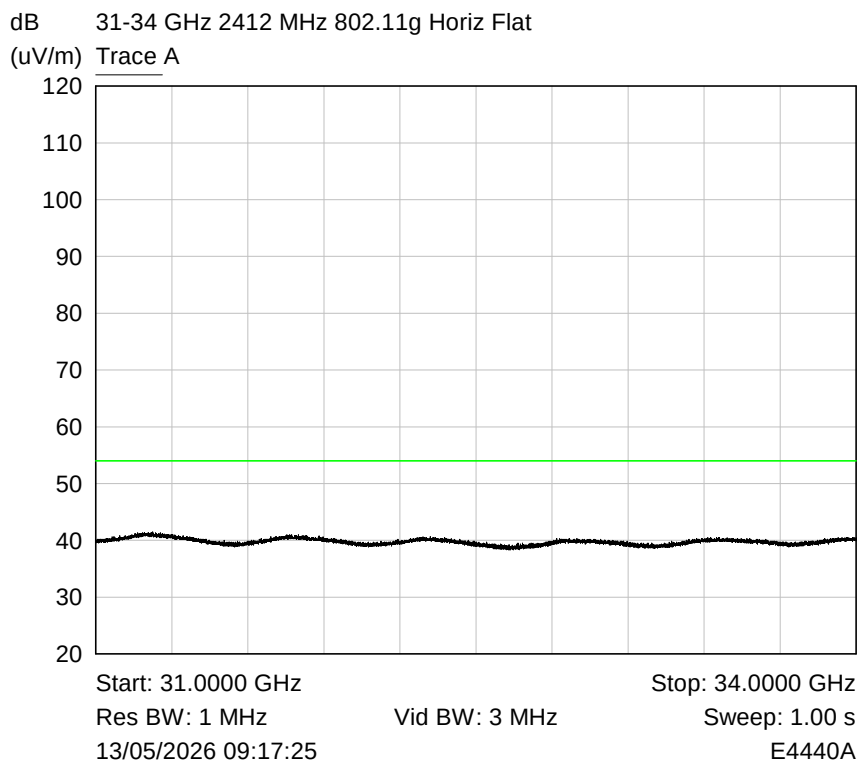
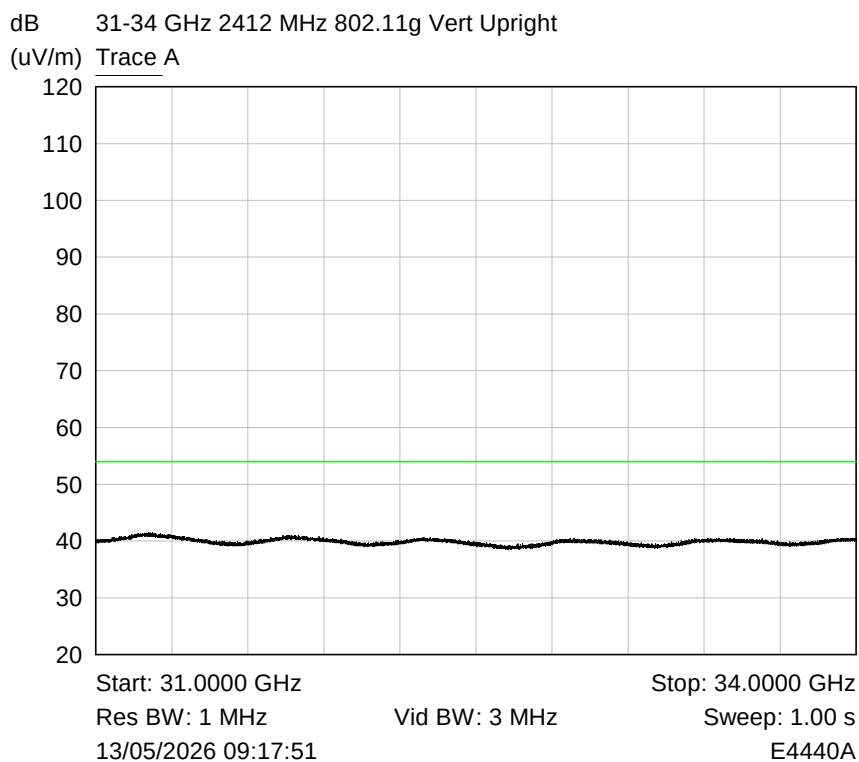


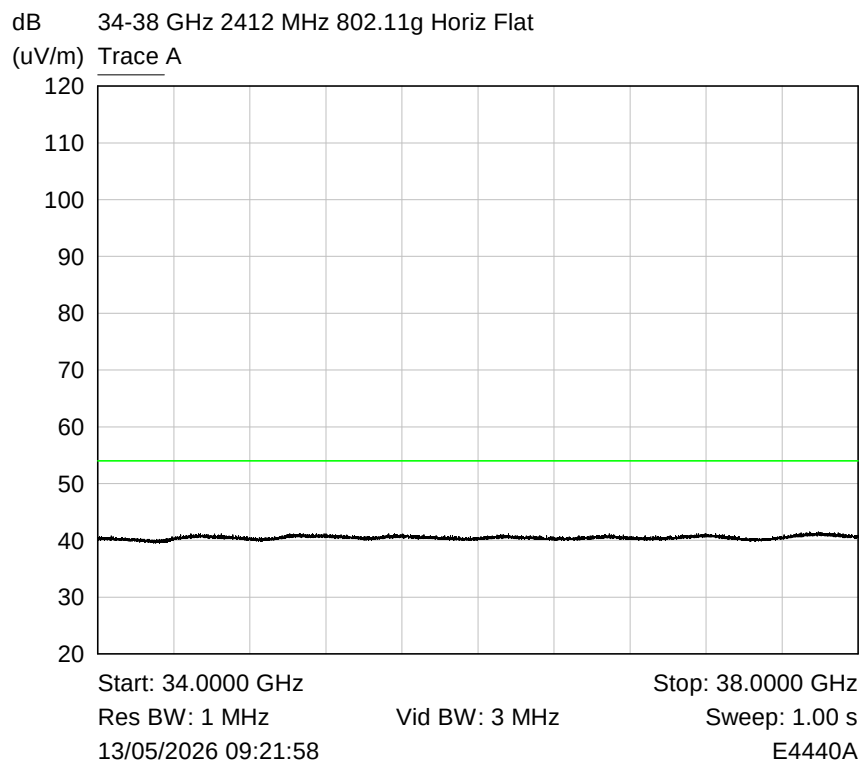
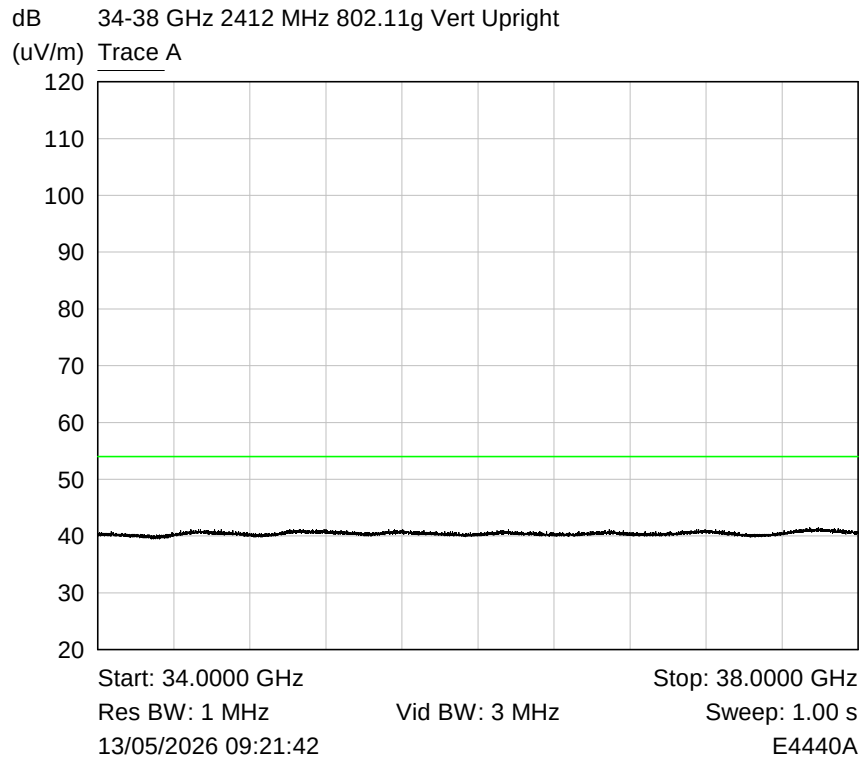


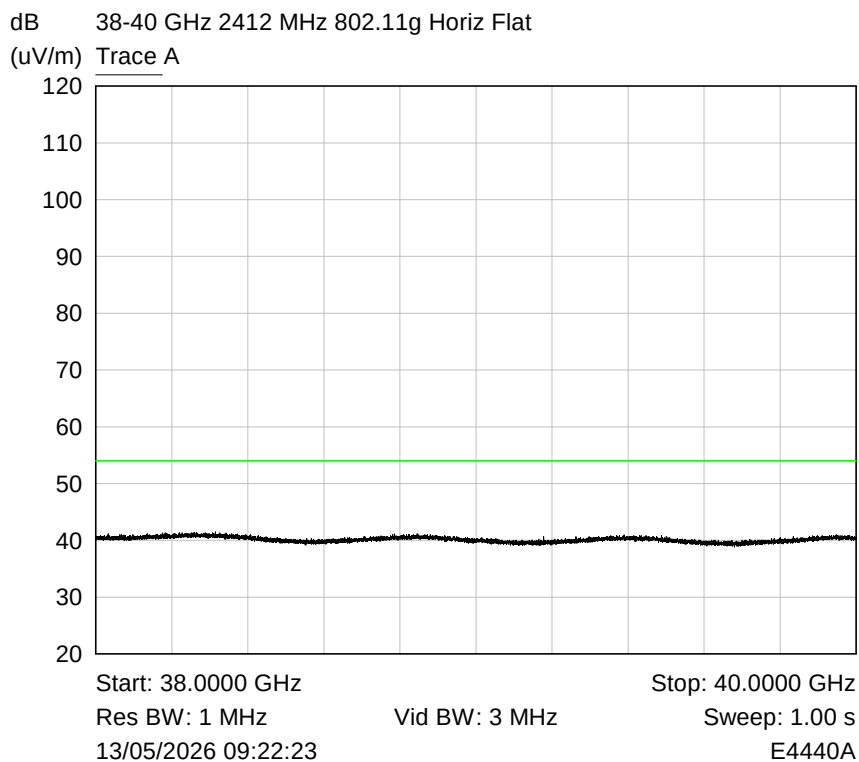
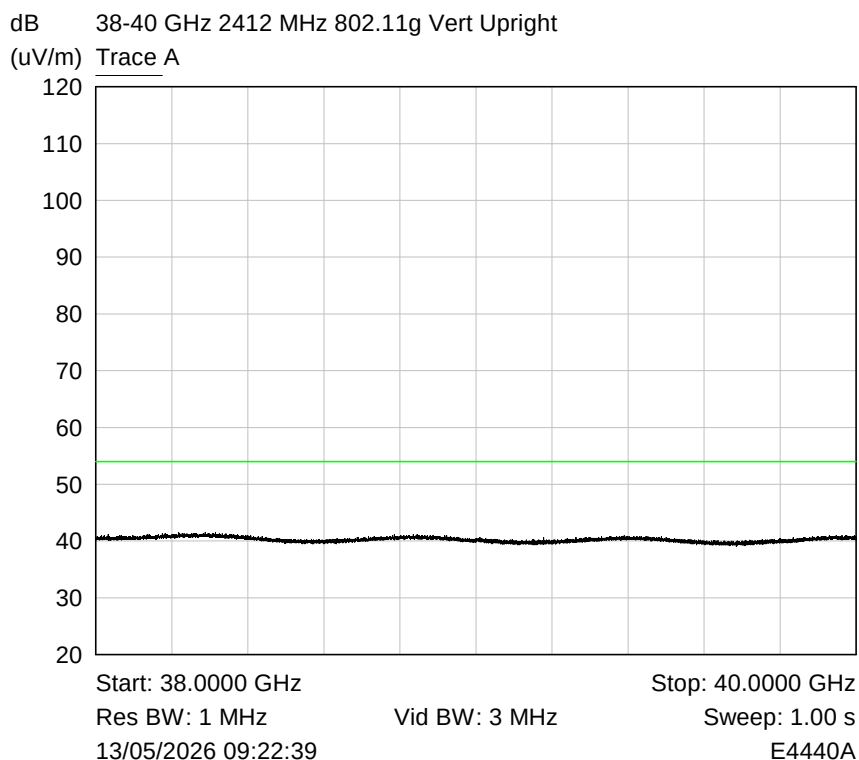




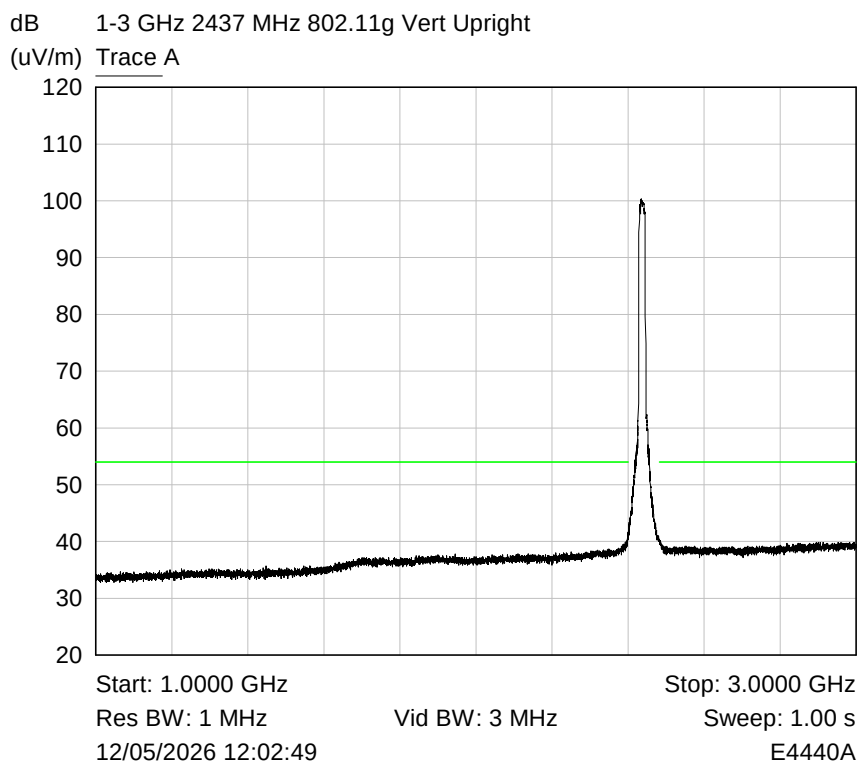




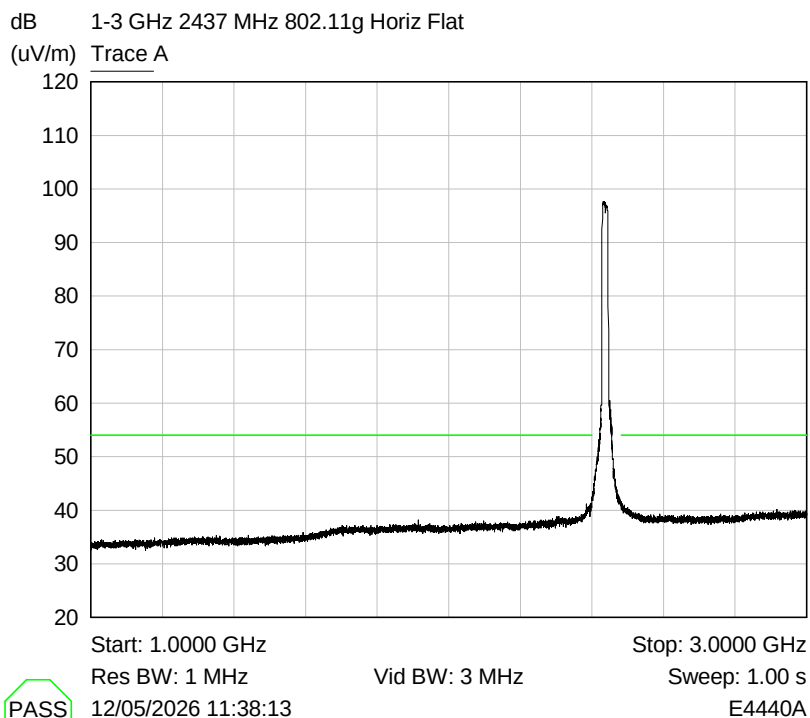




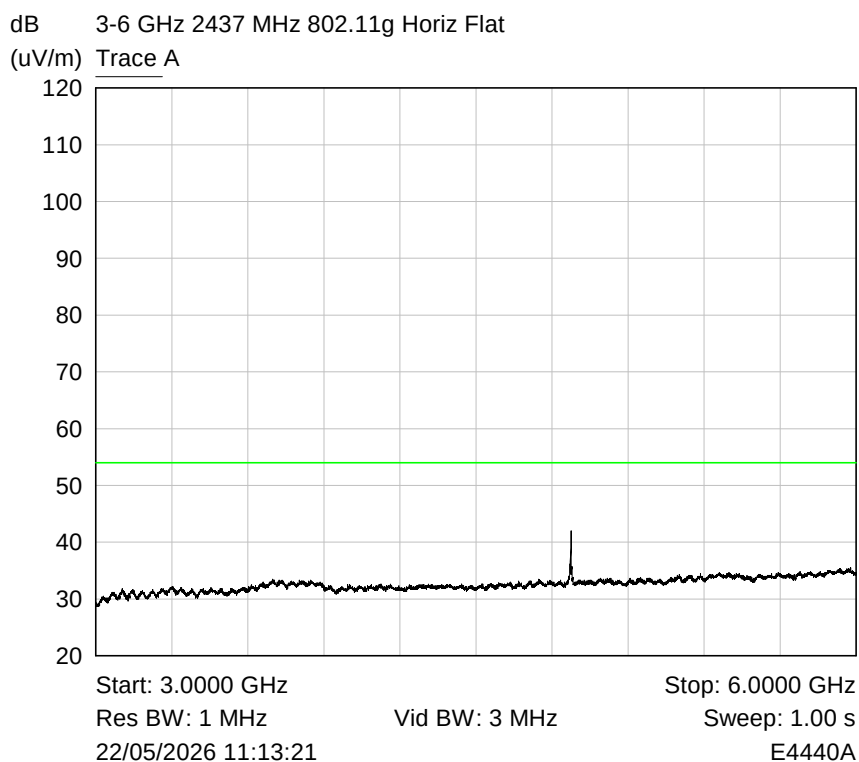
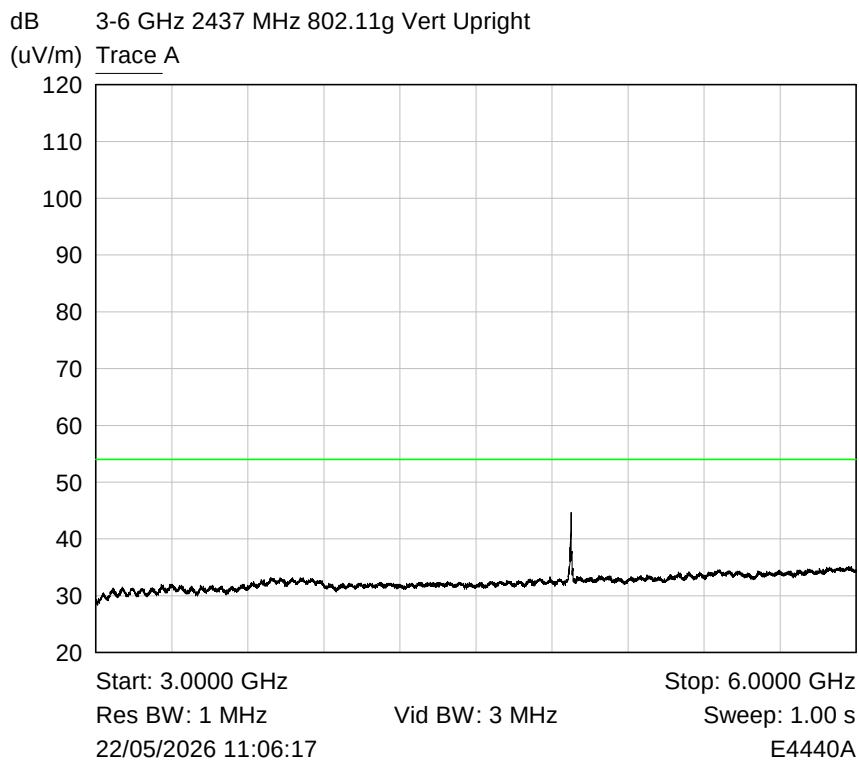
RF Parameters: Band 2400-2483.5 MHz, Power 14 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2437 MHz

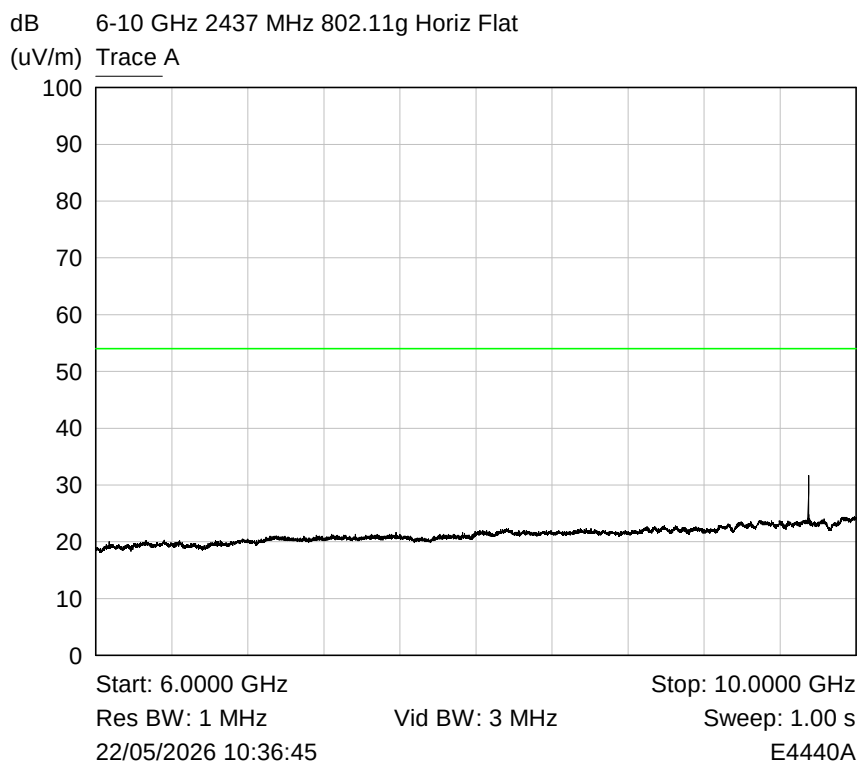
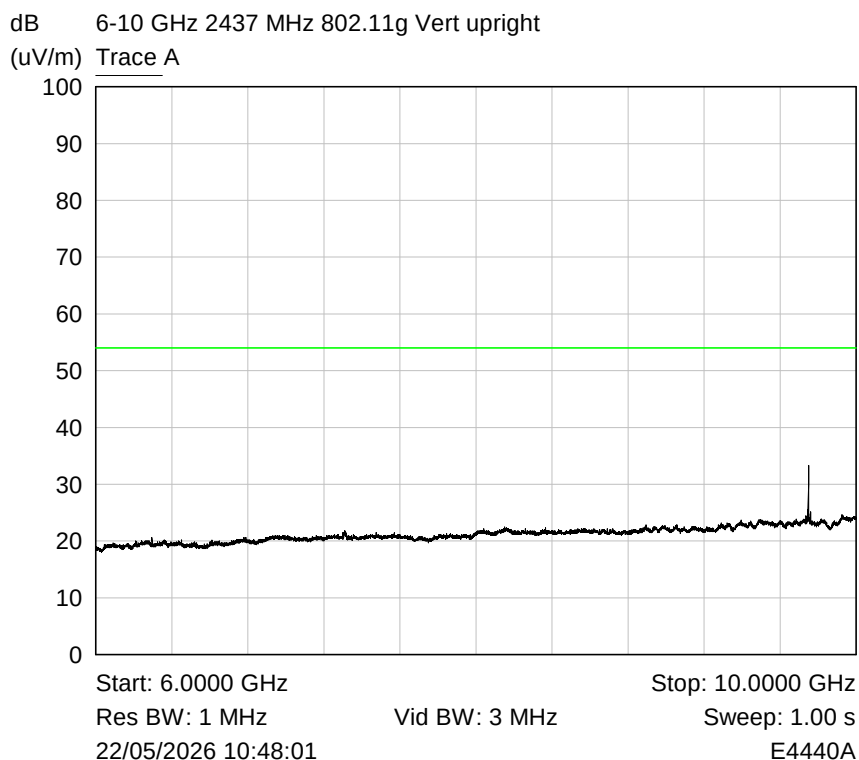


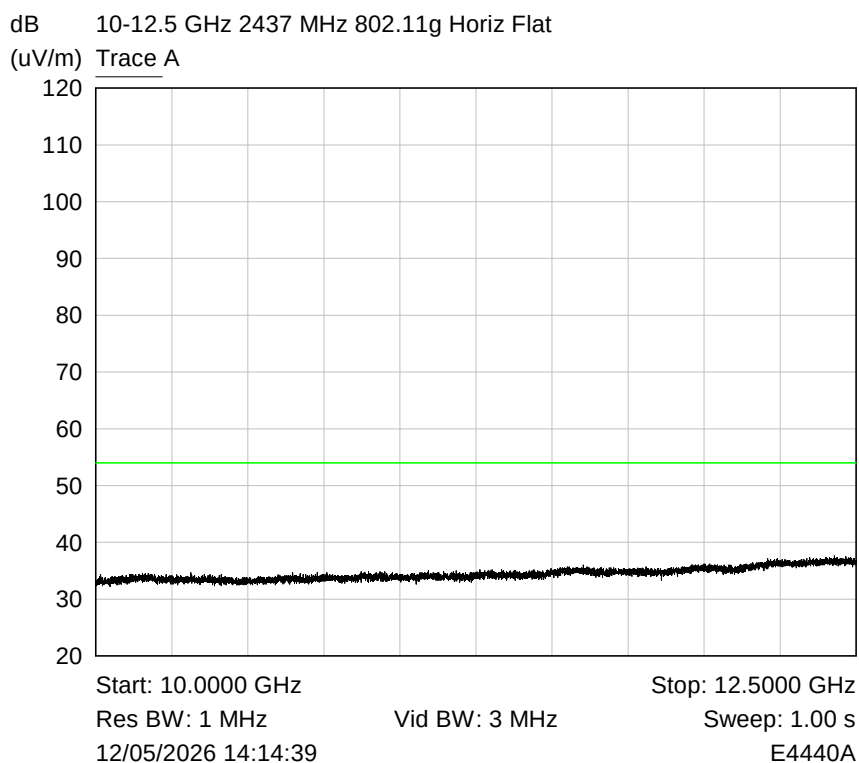
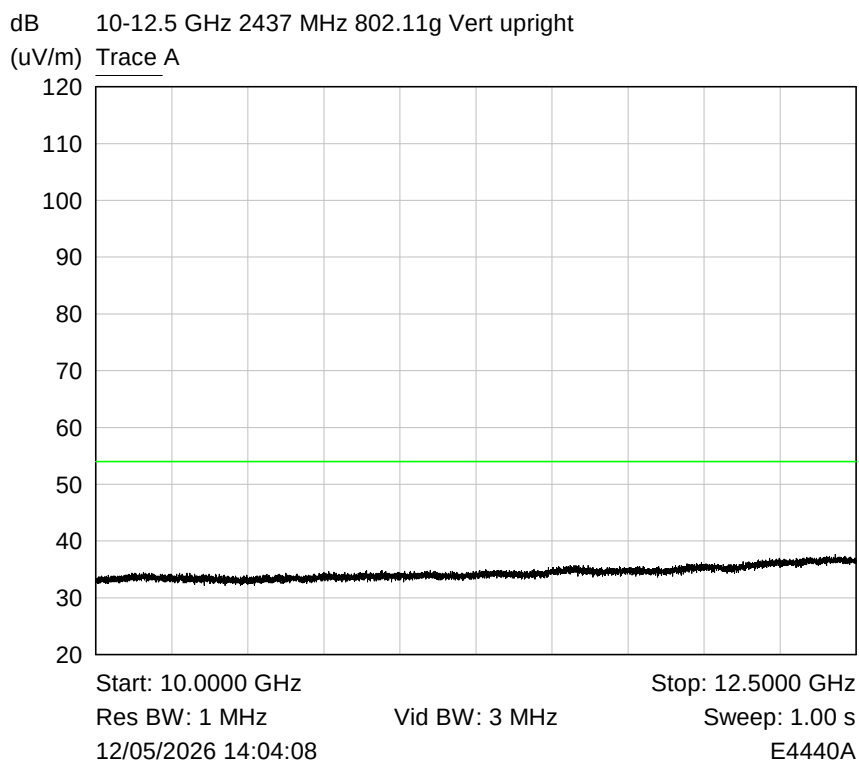
Note: Plot shows intentional transmission on 2437 MHz

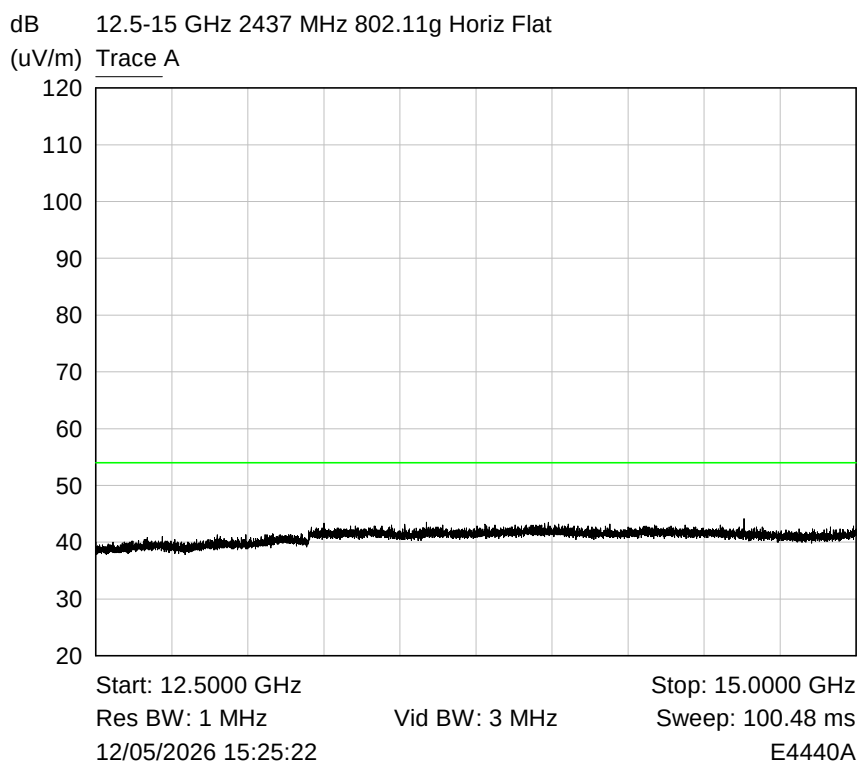
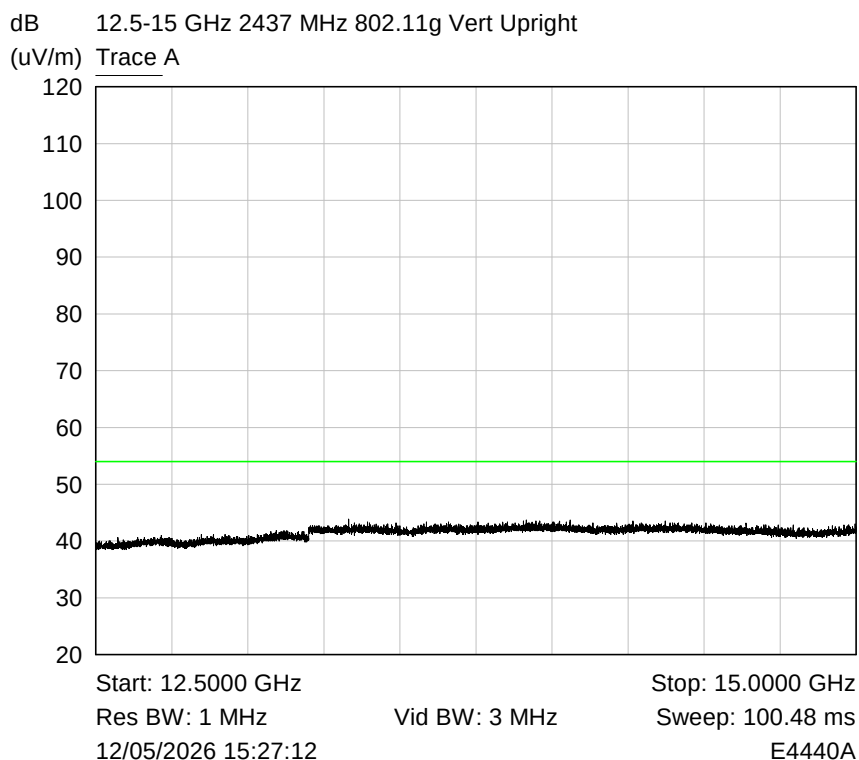


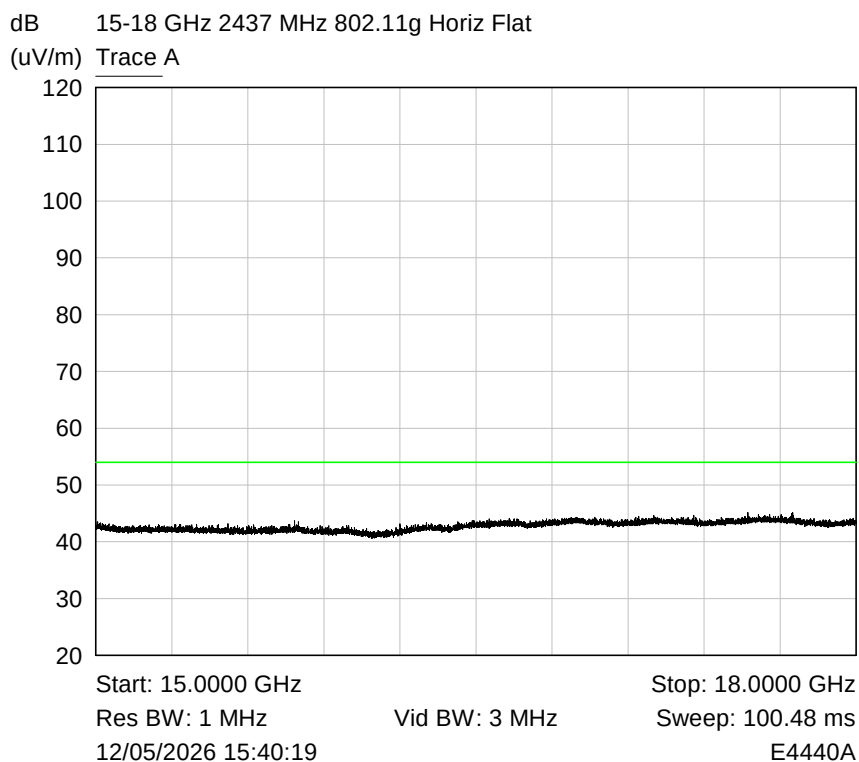
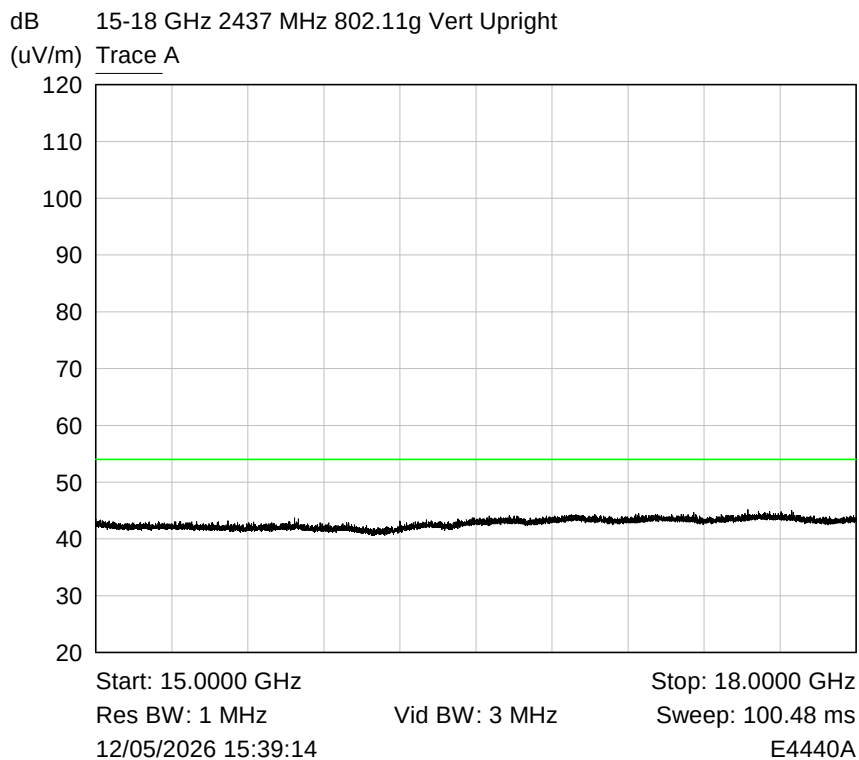
Note: Plot shows intentional transmission on 2437 MHz

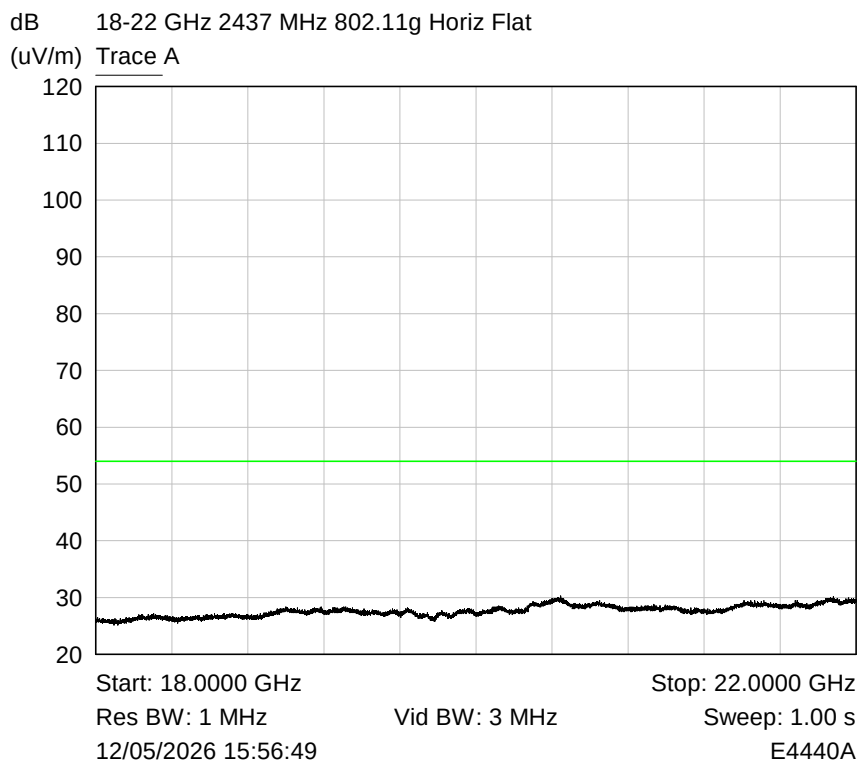
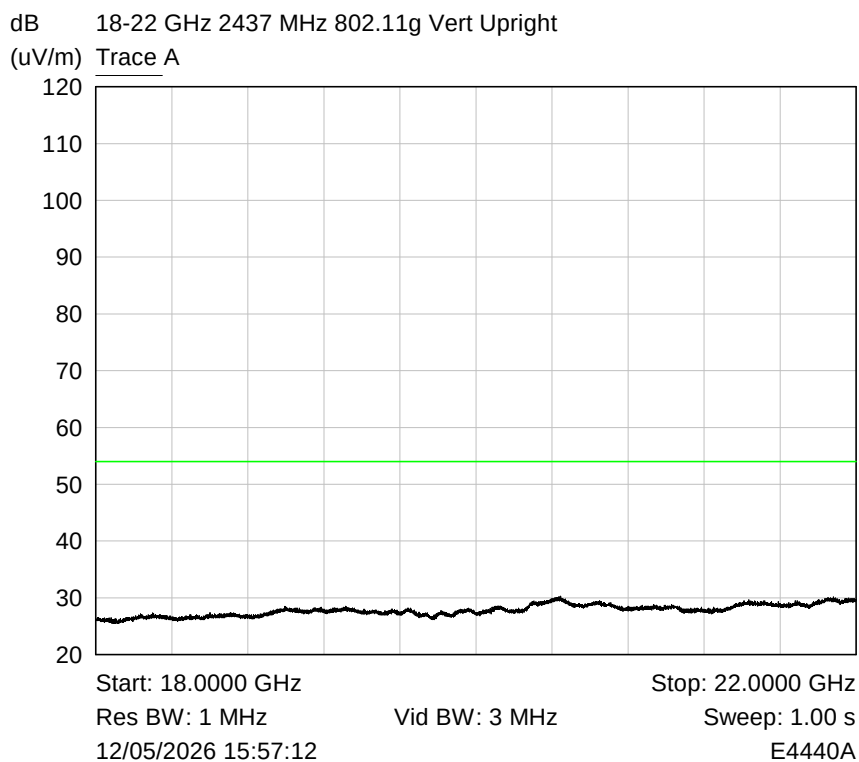


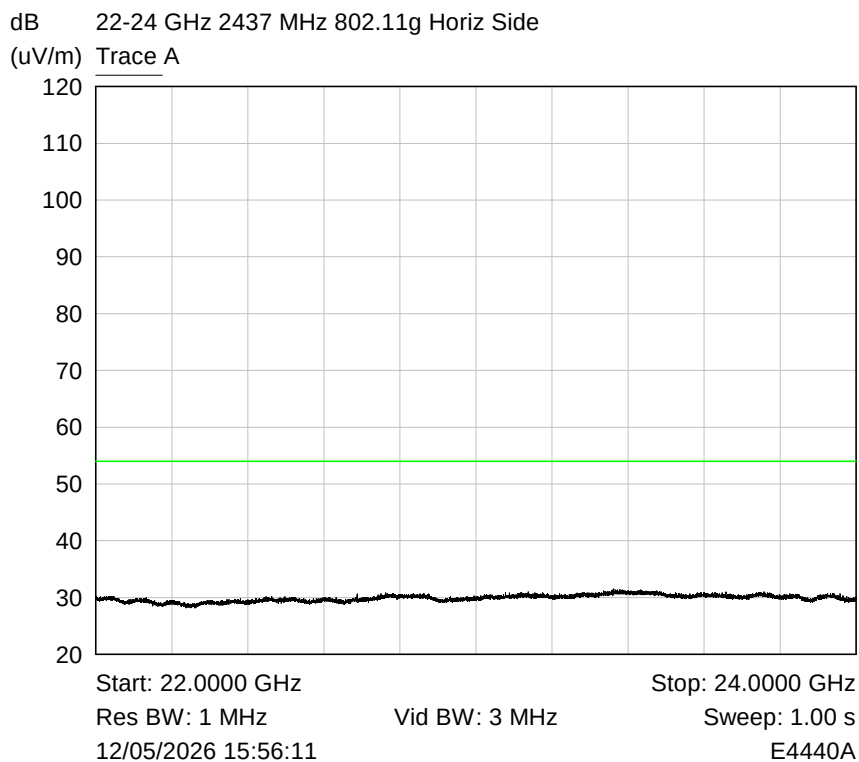
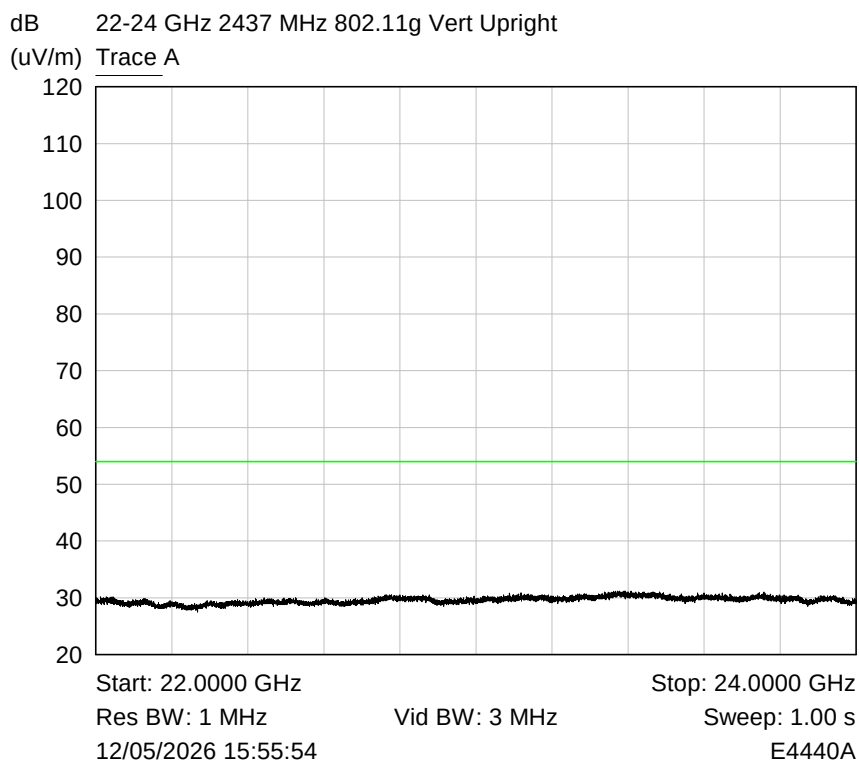


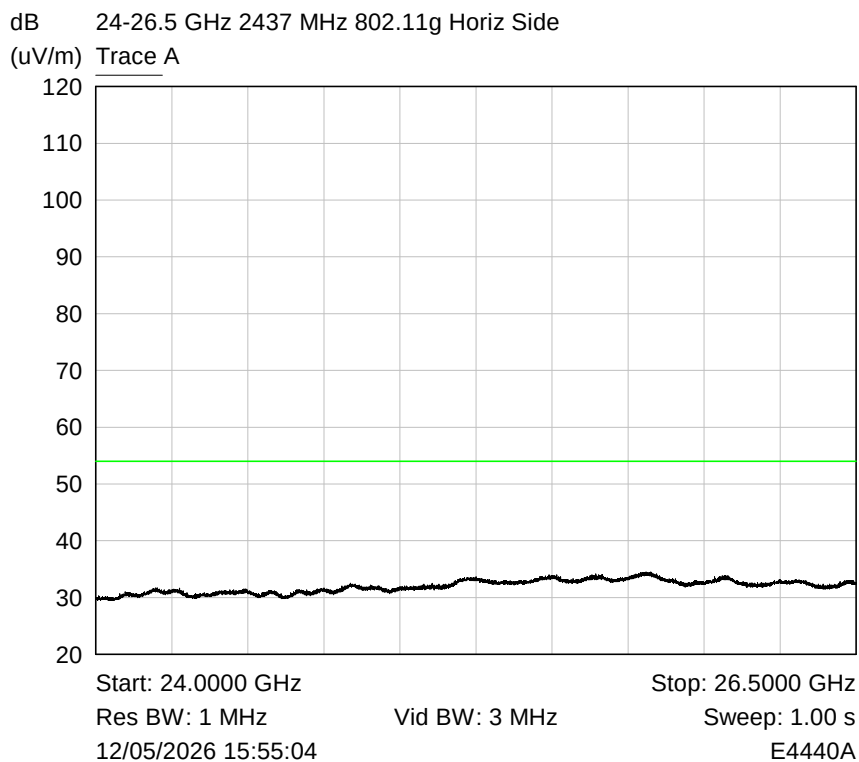
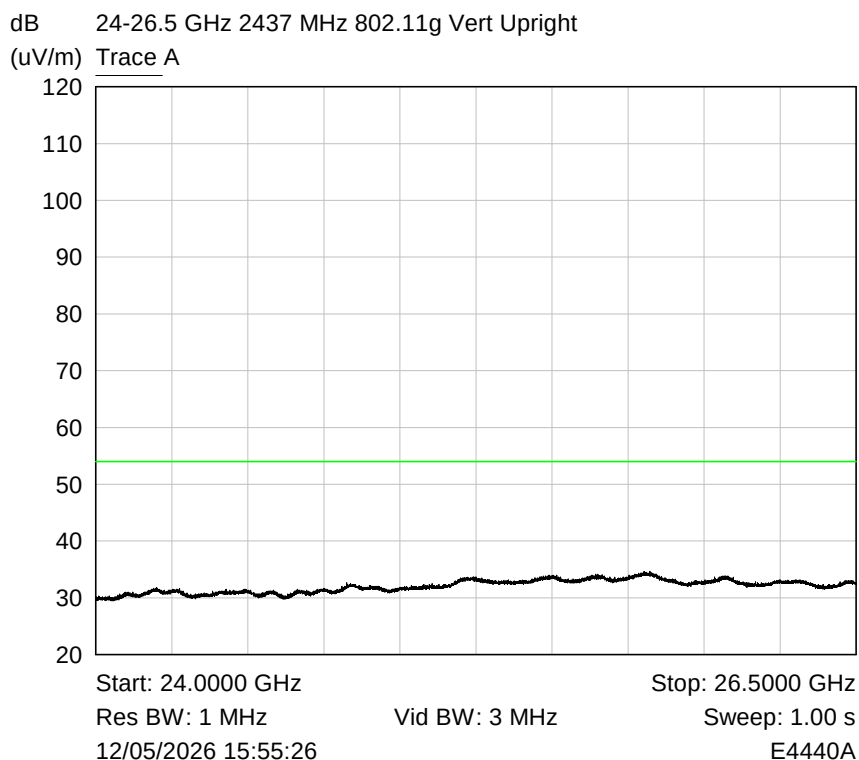


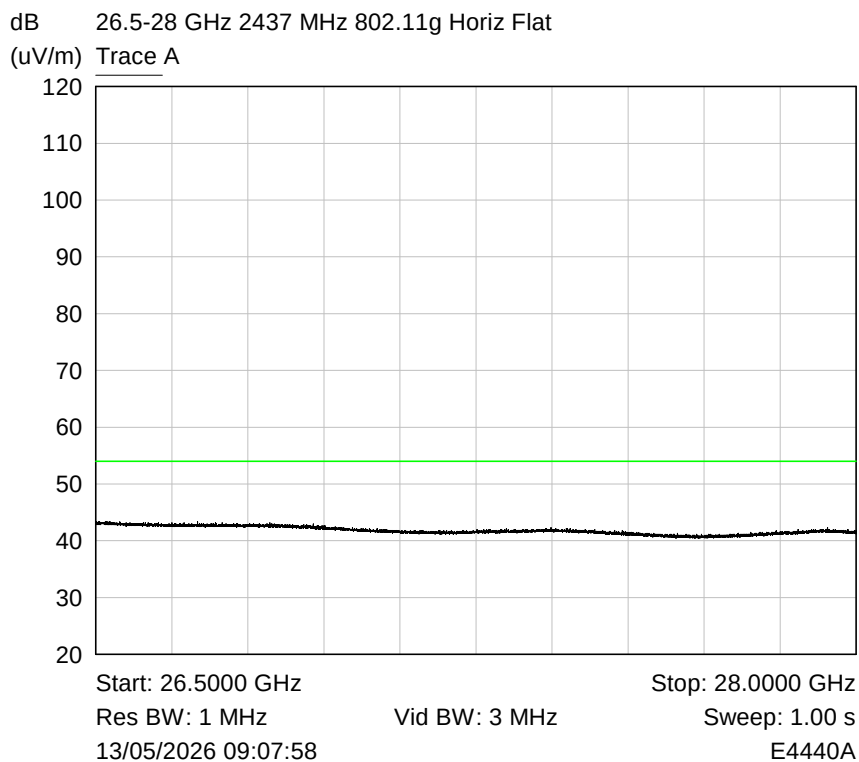
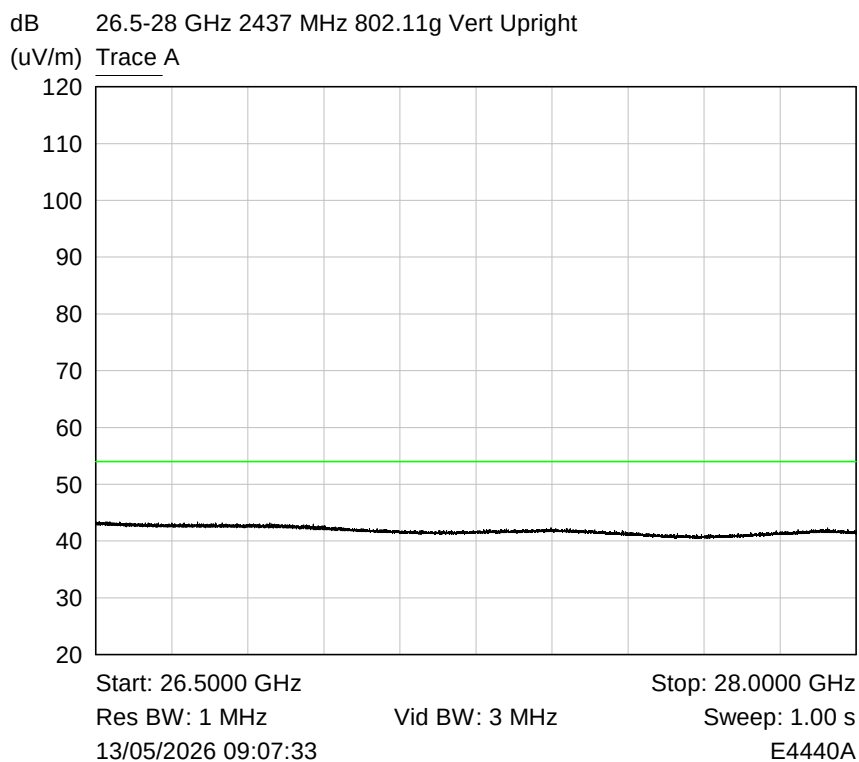


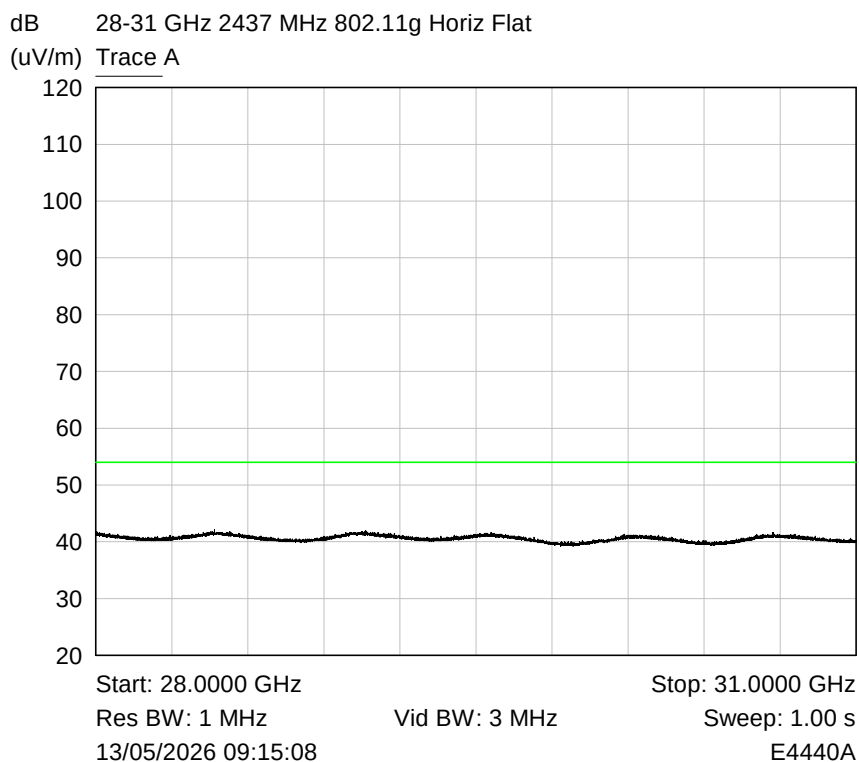
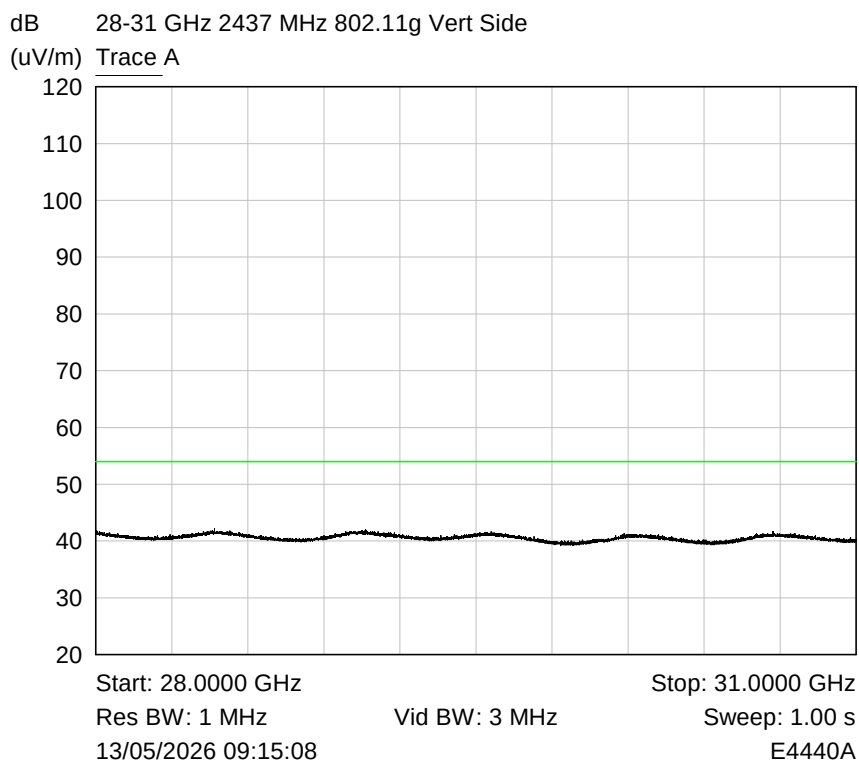


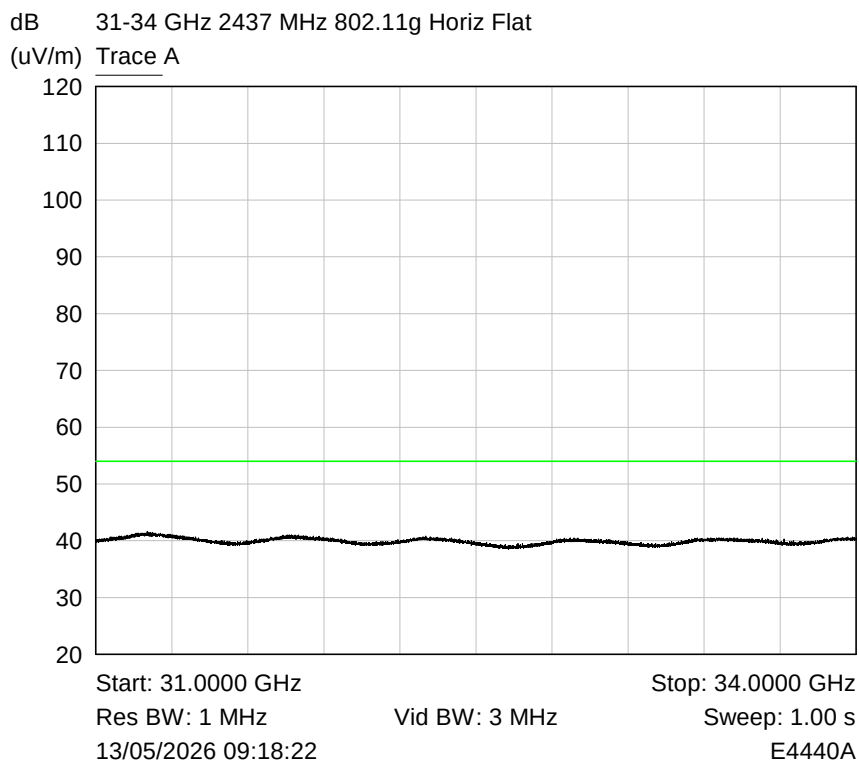
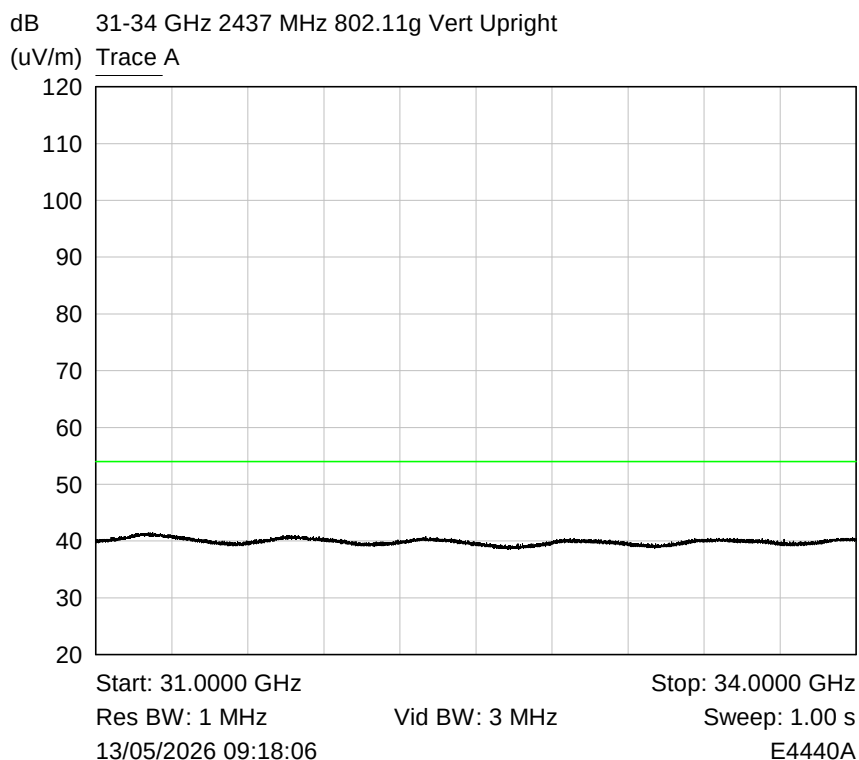






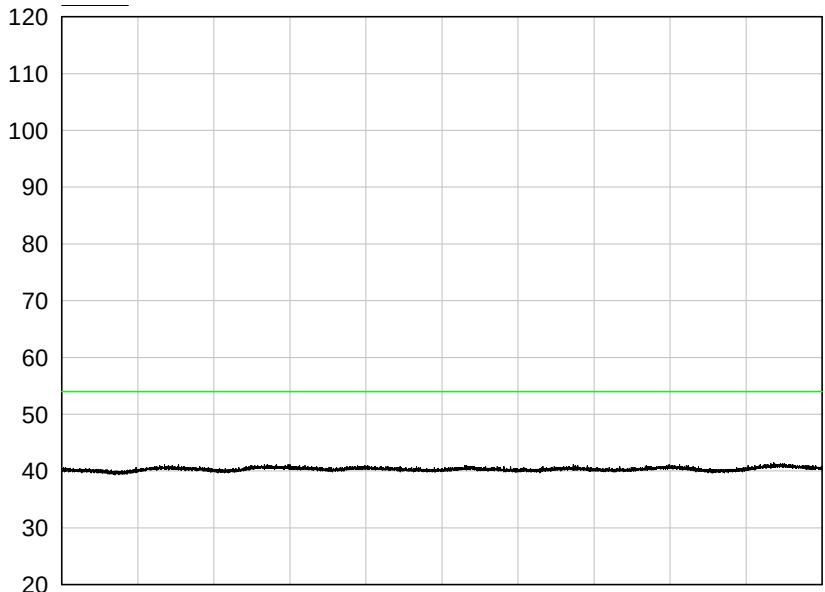






dB 34-38 GHz 2437 MHz 802.11g Vert Upright

(uV/m) Trace A



Start: 34.0000 GHz

Stop: 38.0000 GHz

Res BW: 1 MHz

Vid BW: 3 MHz

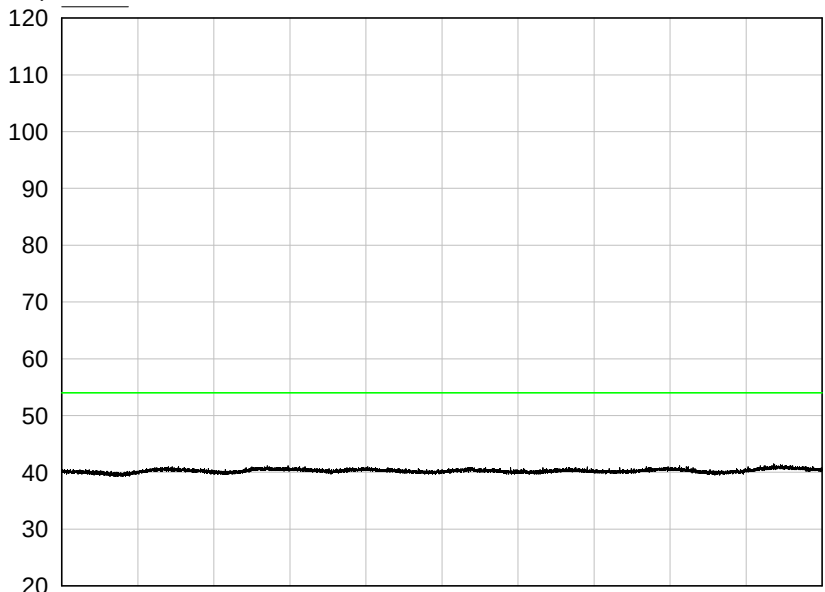
Sweep: 1.00 s

13/05/2026 09:20:51

E4440A

dB 34-38 GHz 2437 MHz 802.11g Horiz Flat

(uV/m) Trace A



Start: 34.0000 GHz

Stop: 38.0000 GHz

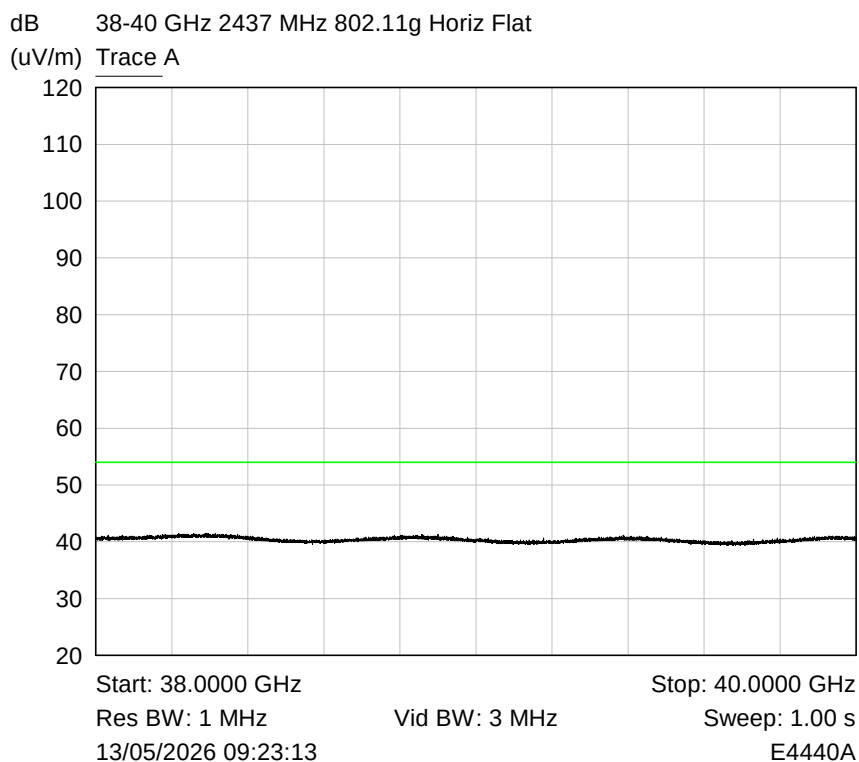
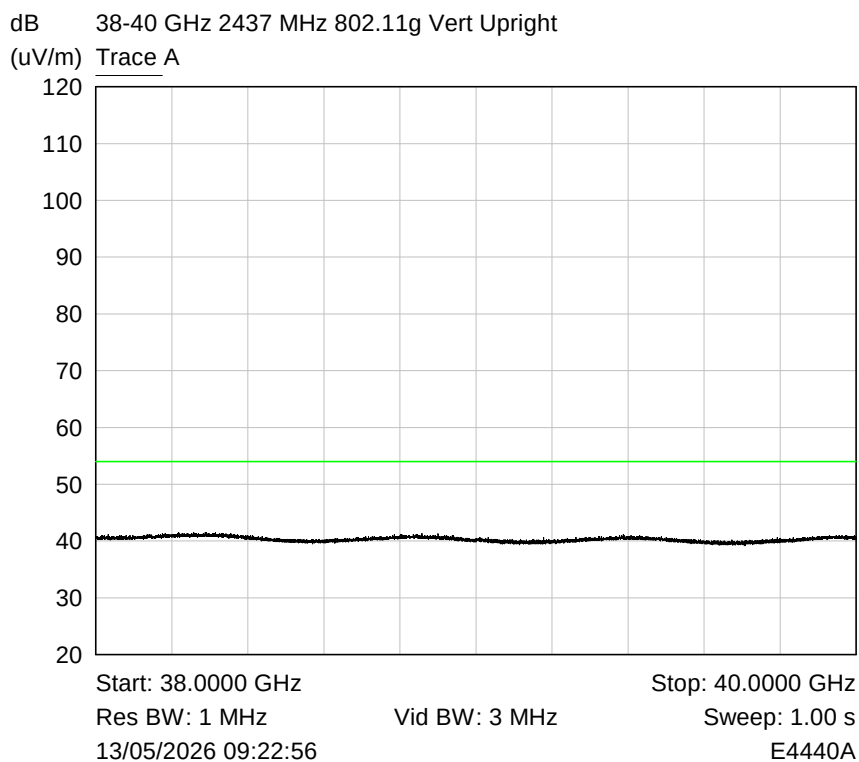
Res BW: 1 MHz

Vid BW: 3 MHz

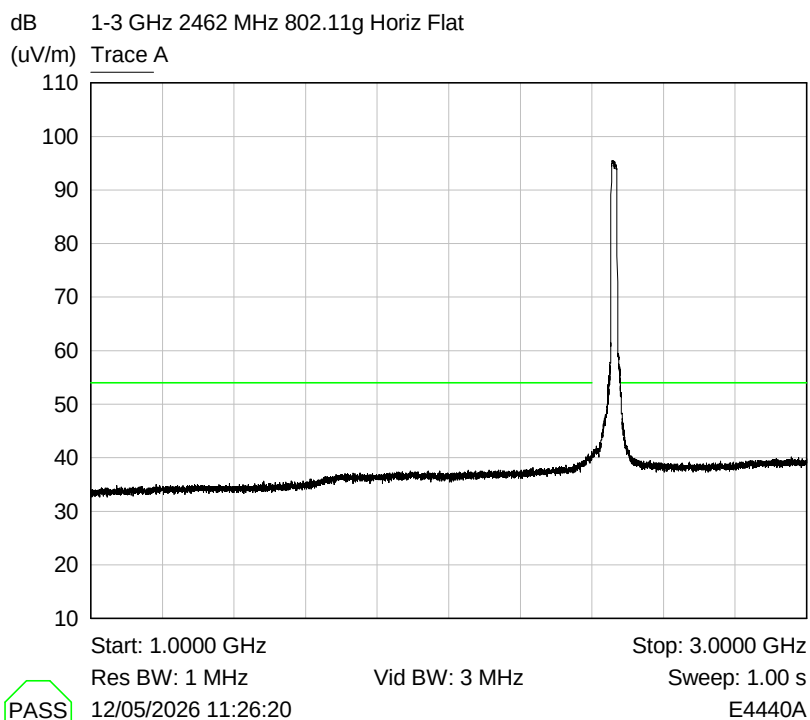
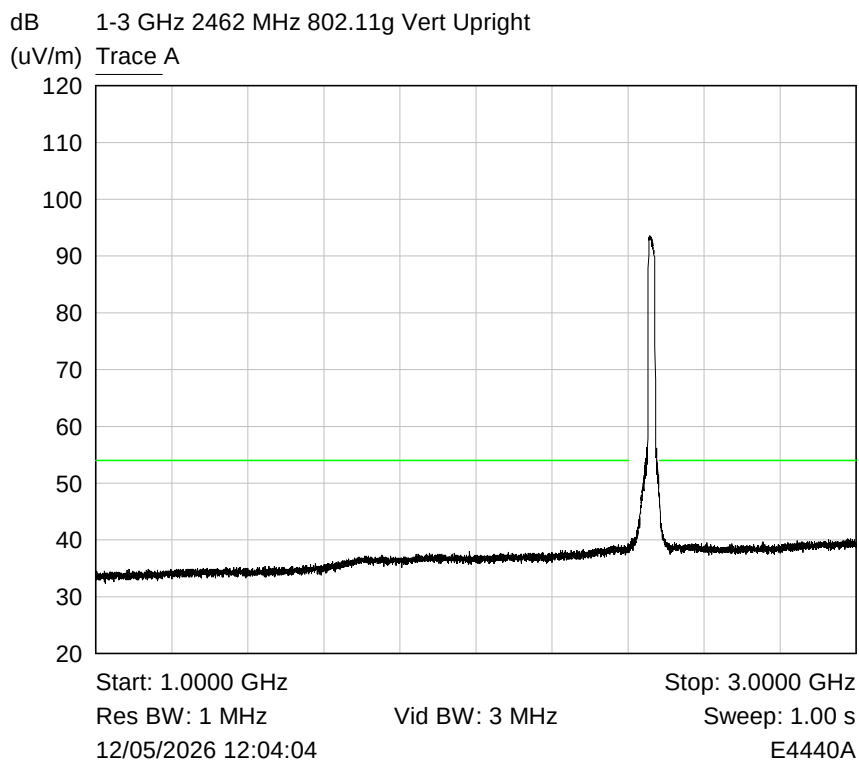
Sweep: 1.00 s

13/05/2026 09:20:35

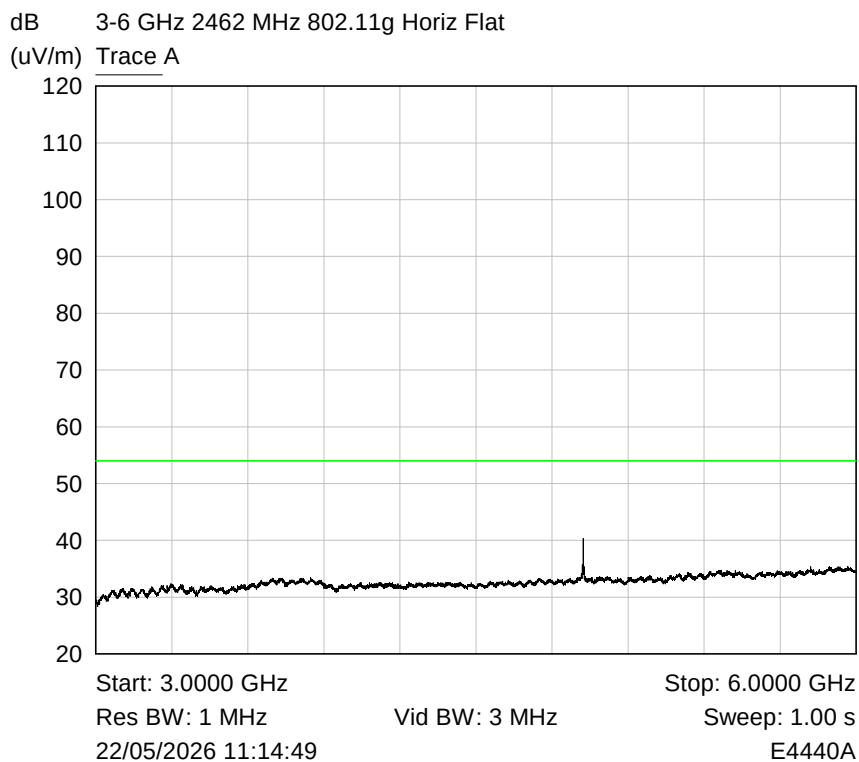
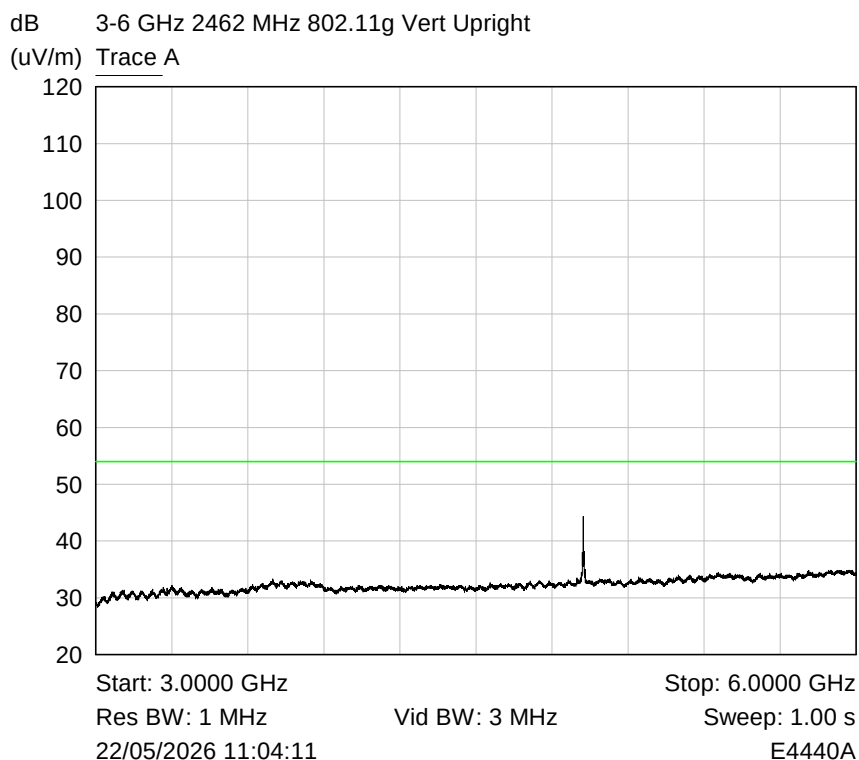
E4440A

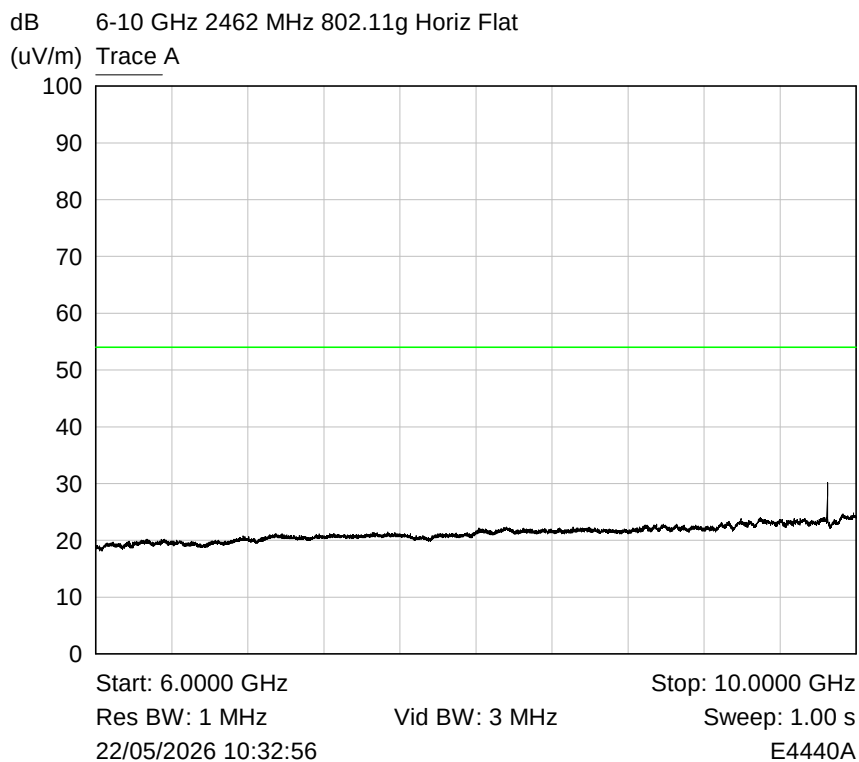
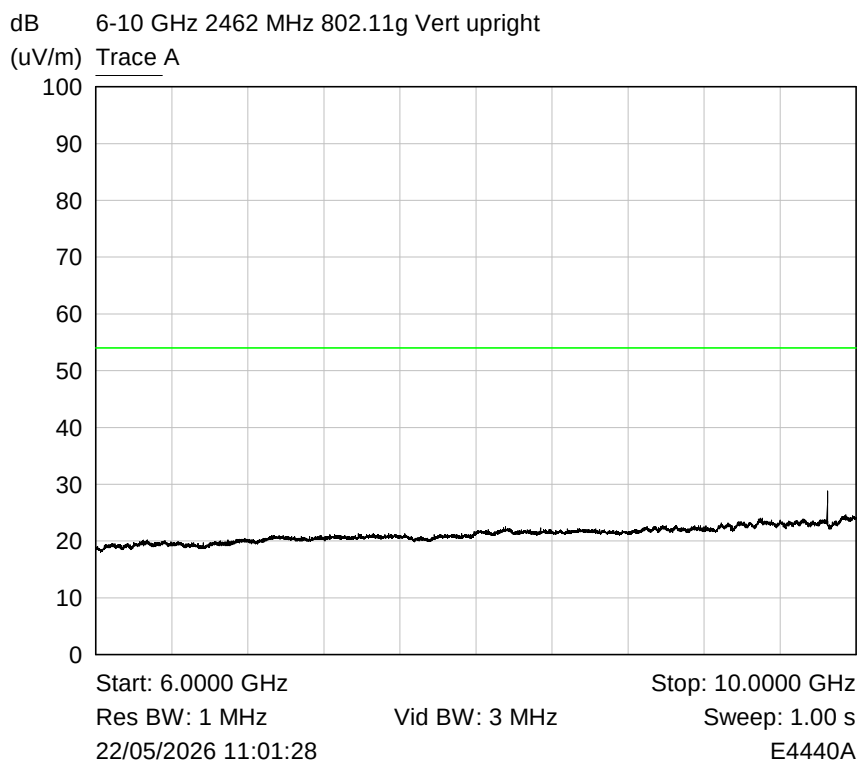


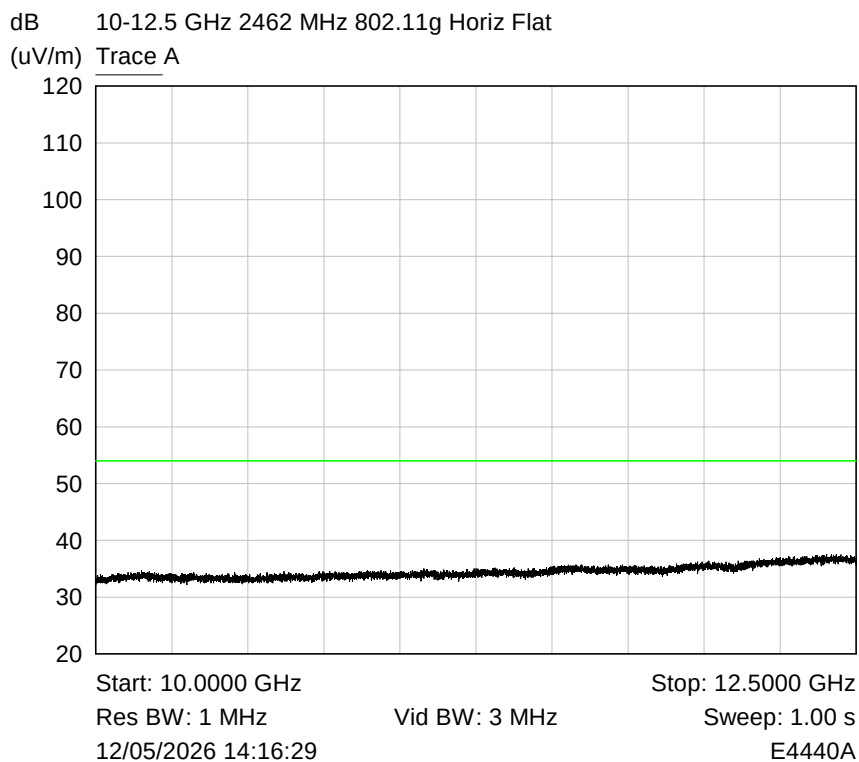
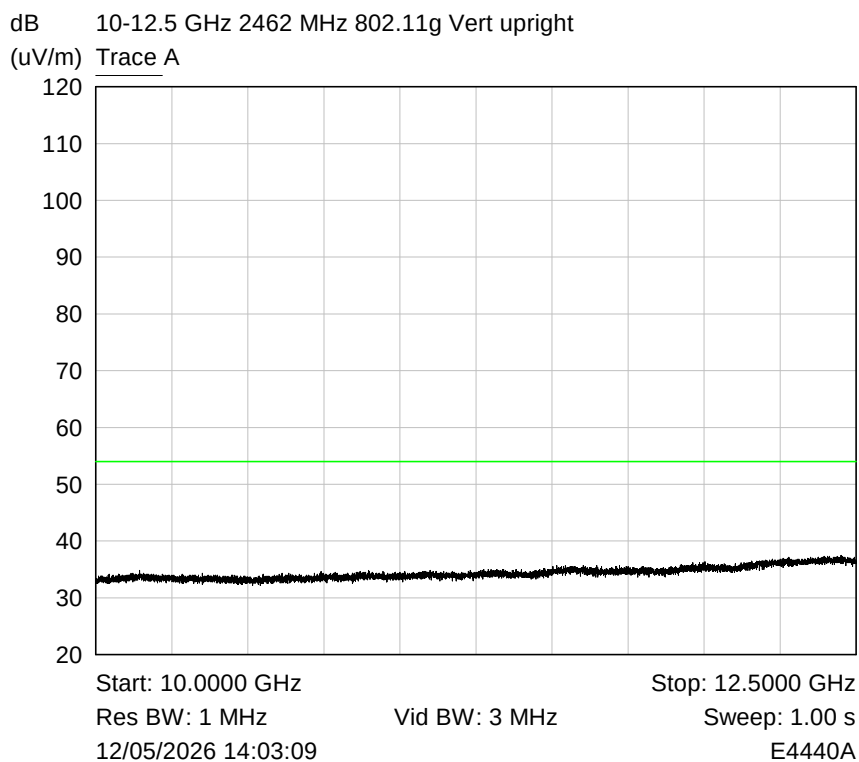
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2462 MHz

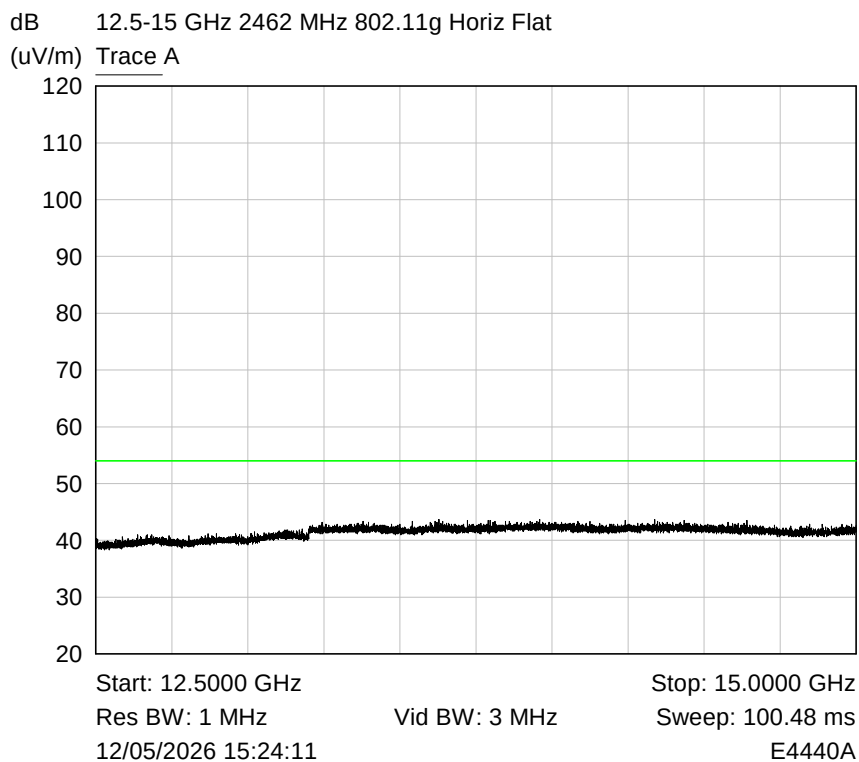
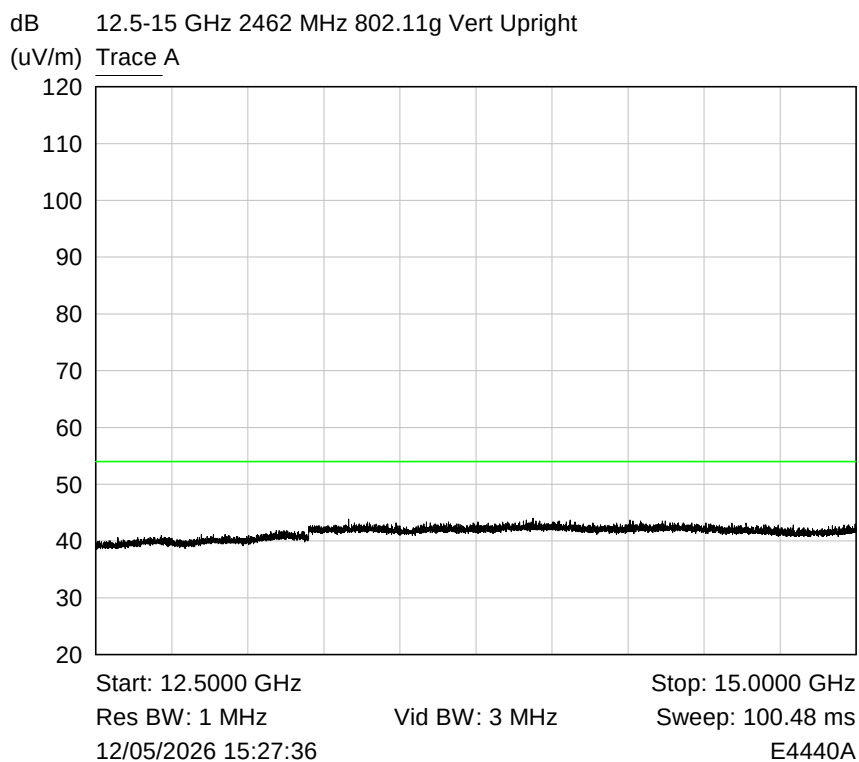


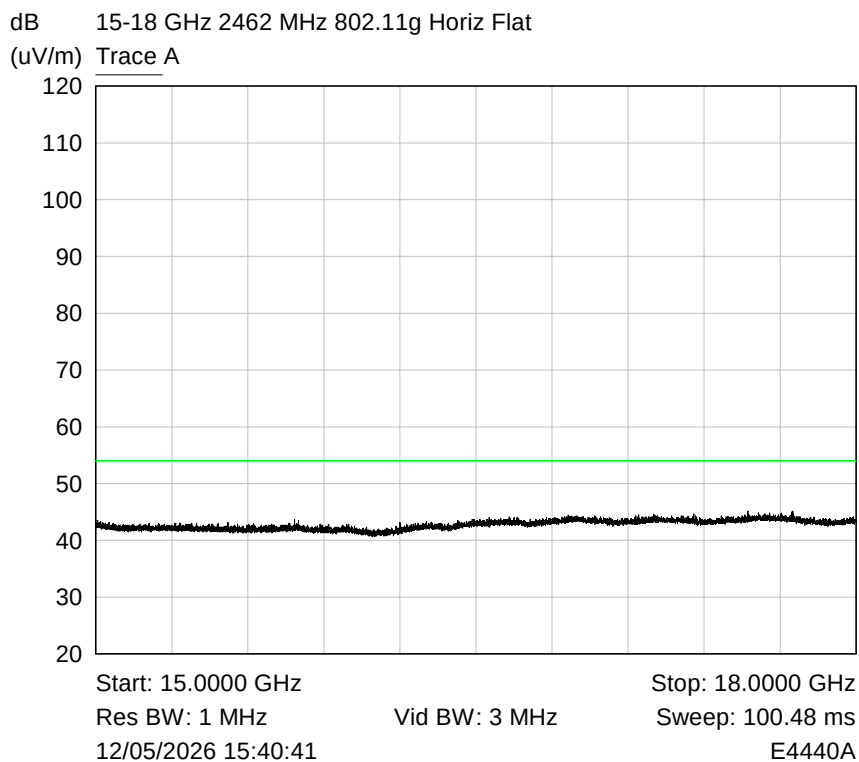
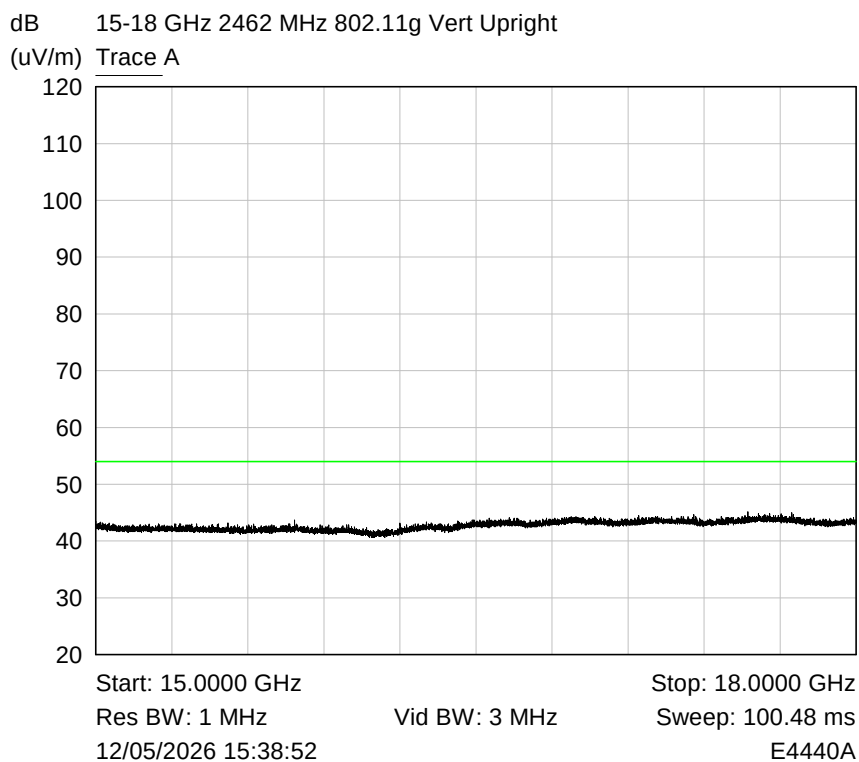
PASS

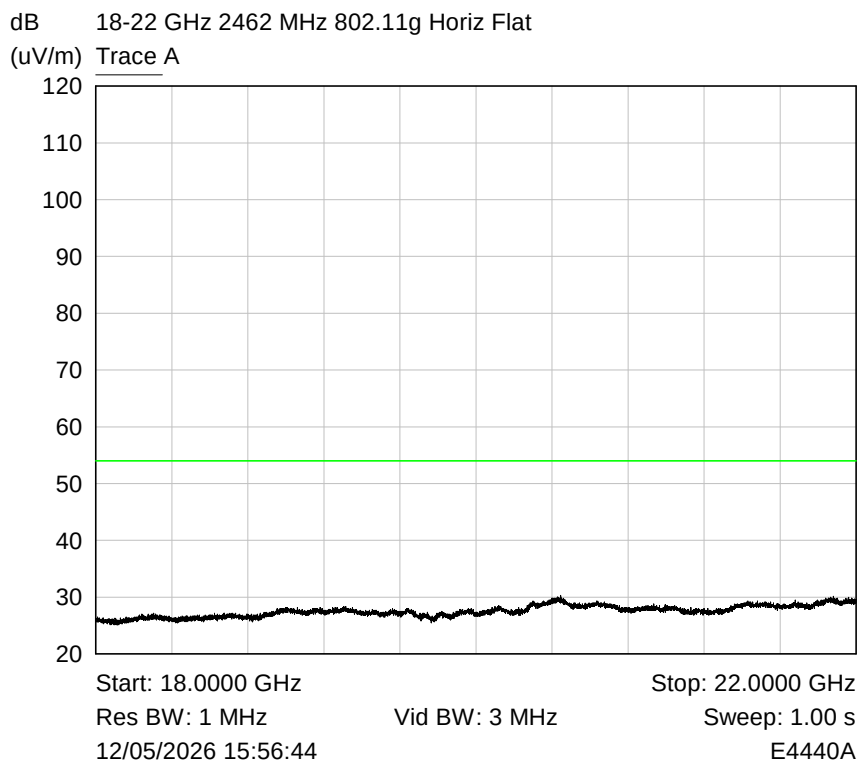
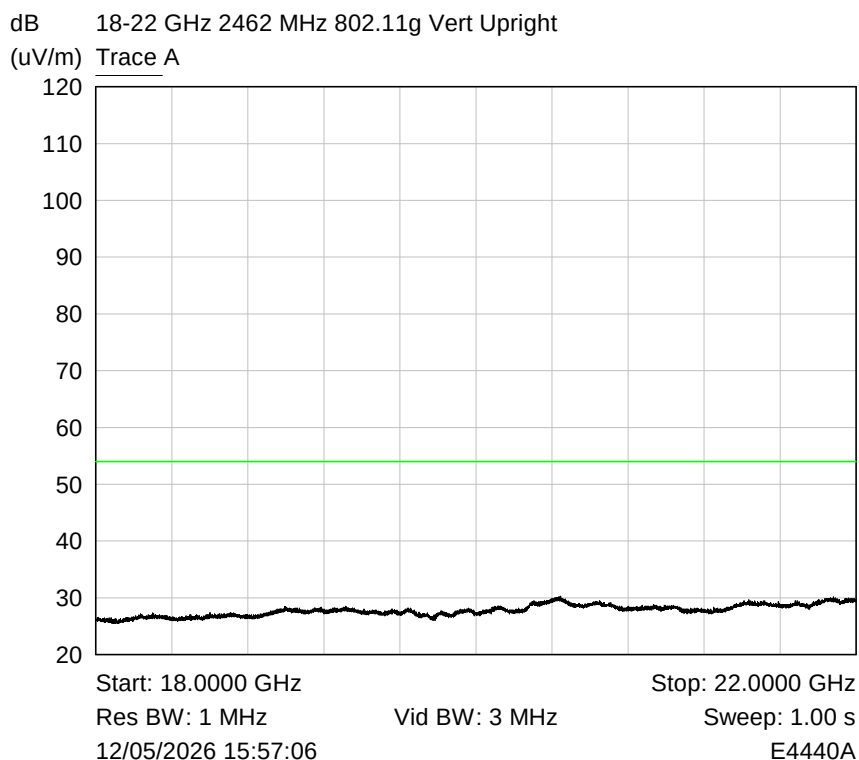


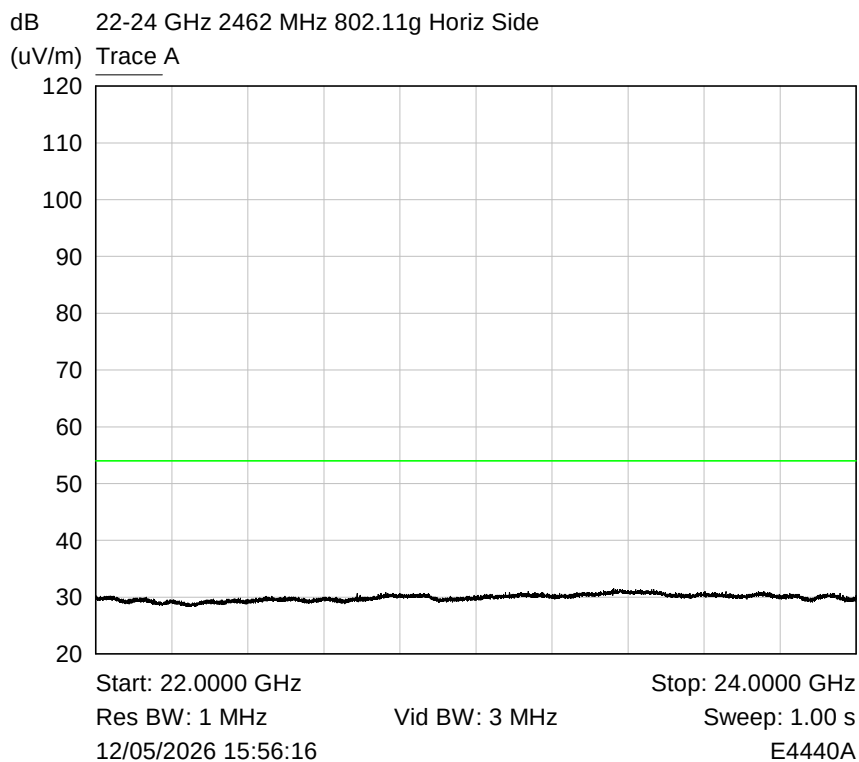
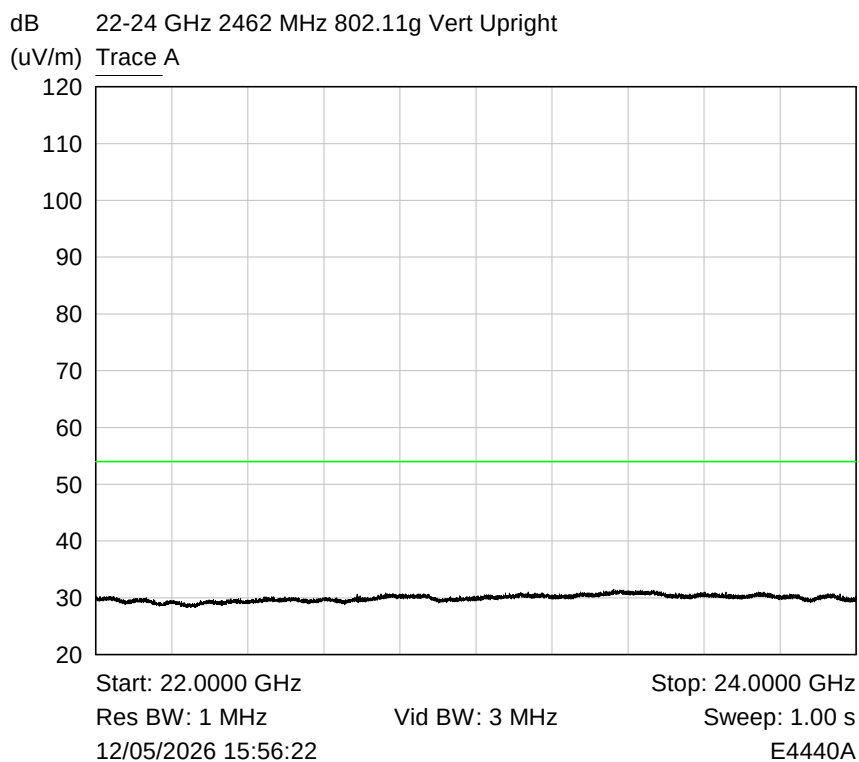


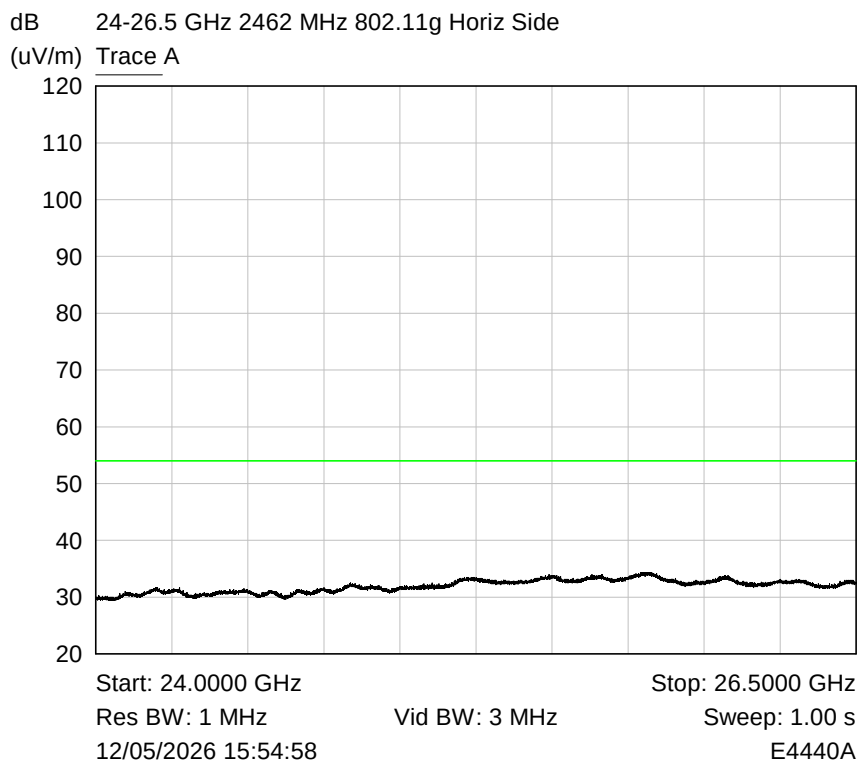
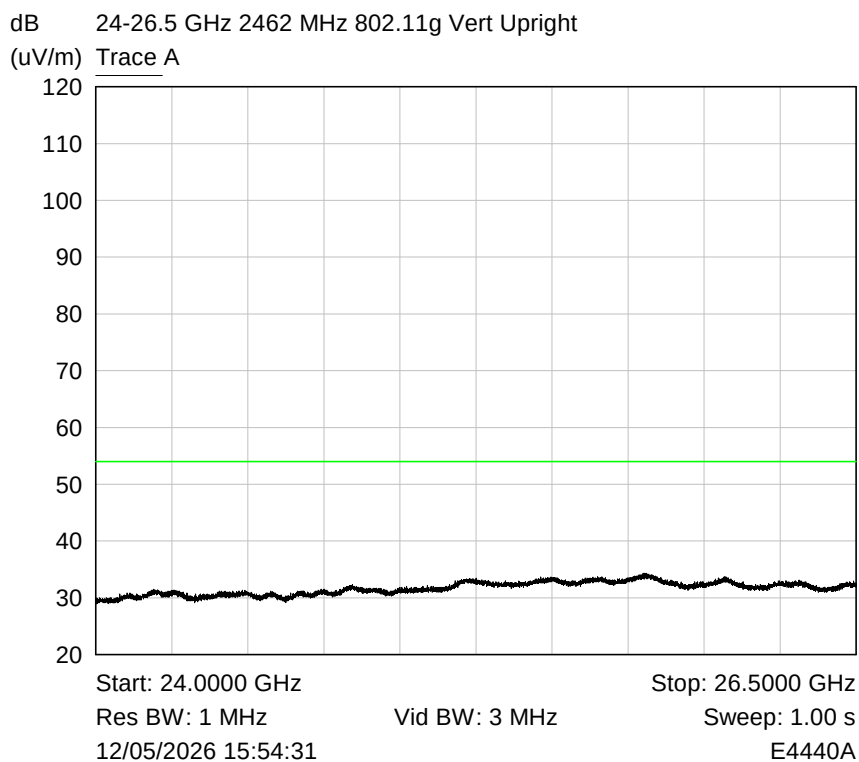


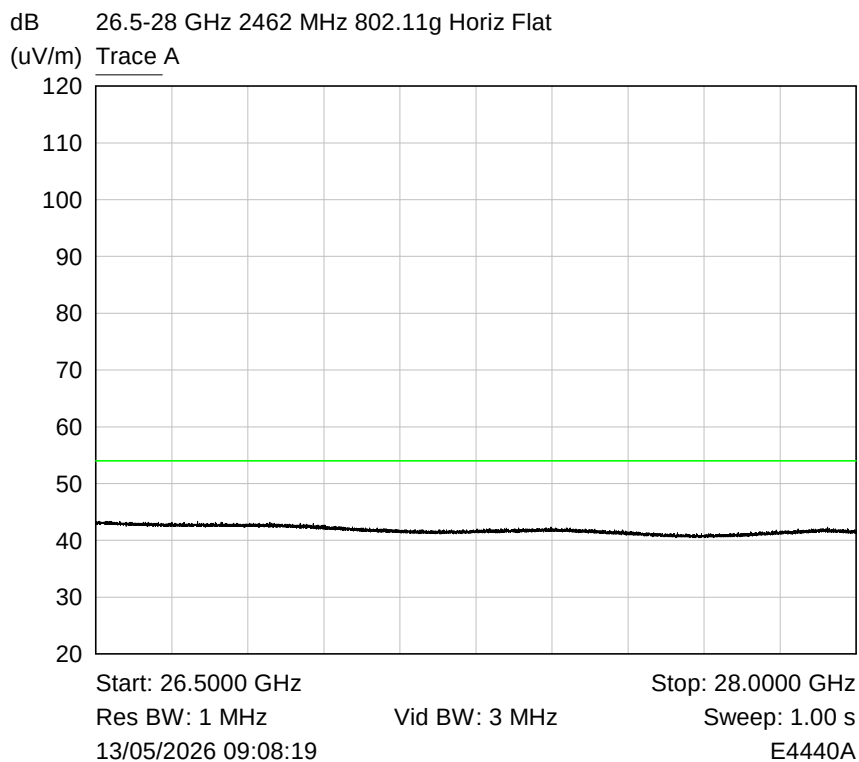
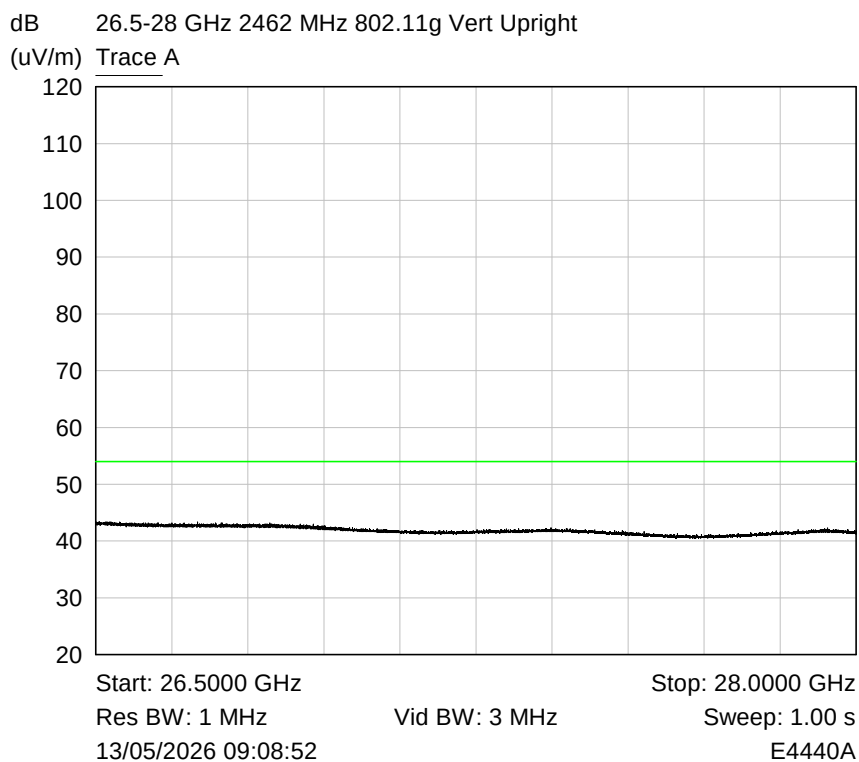


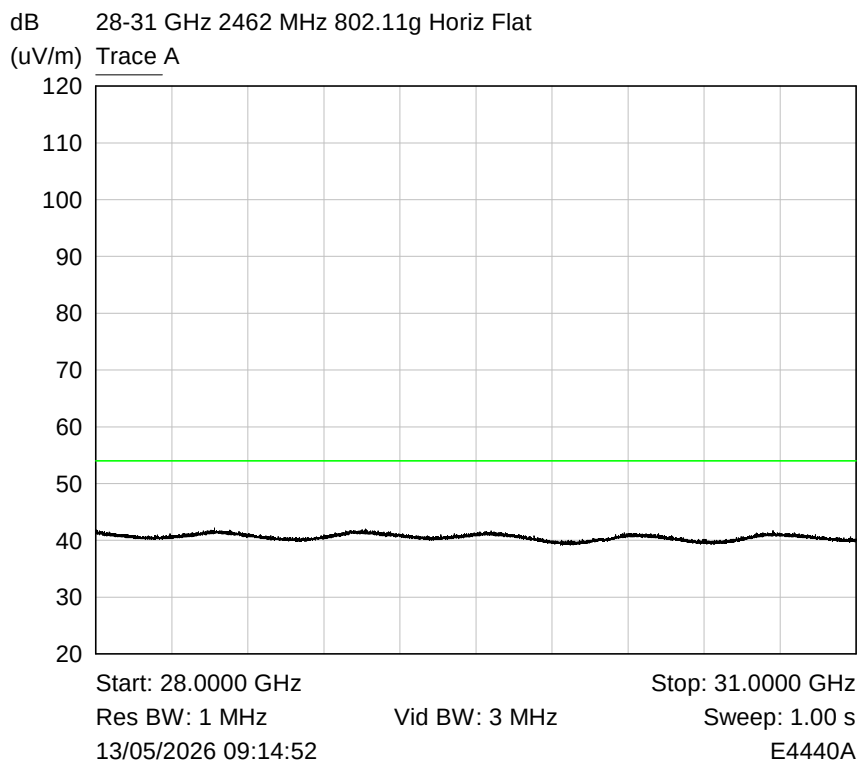
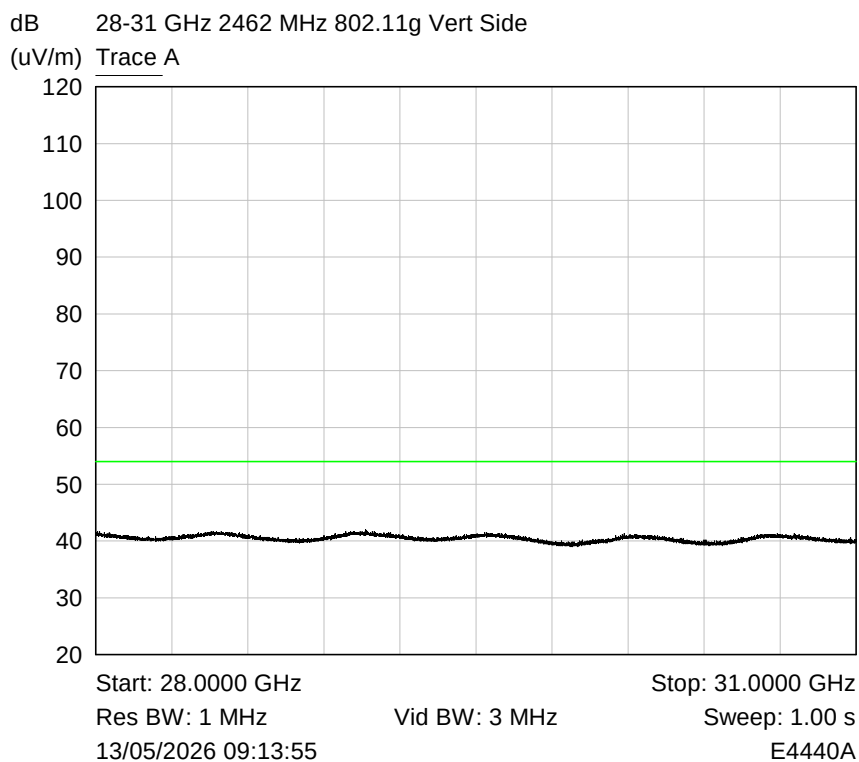


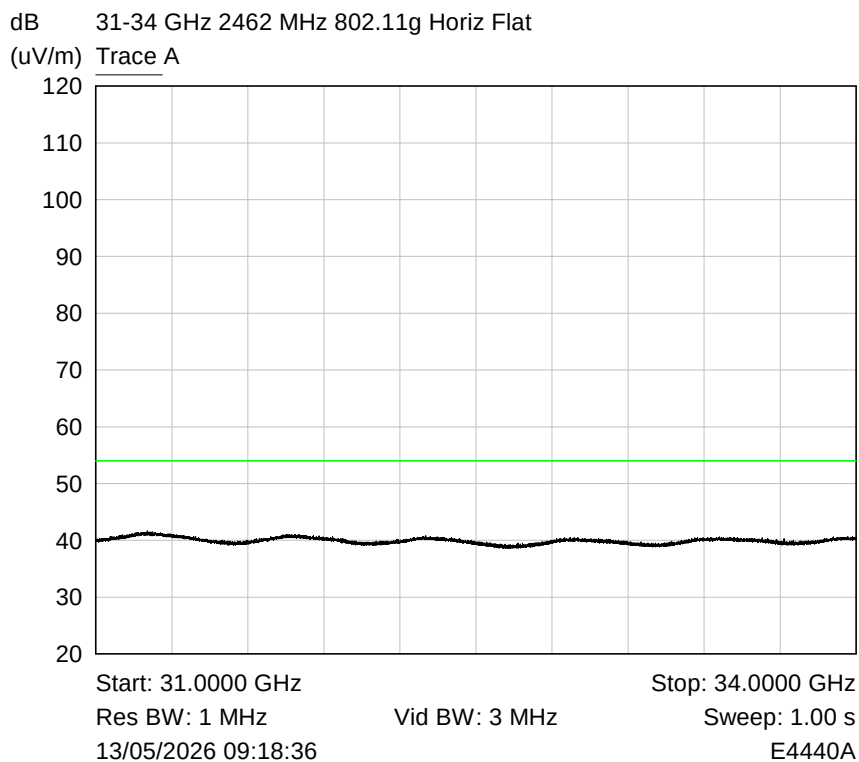
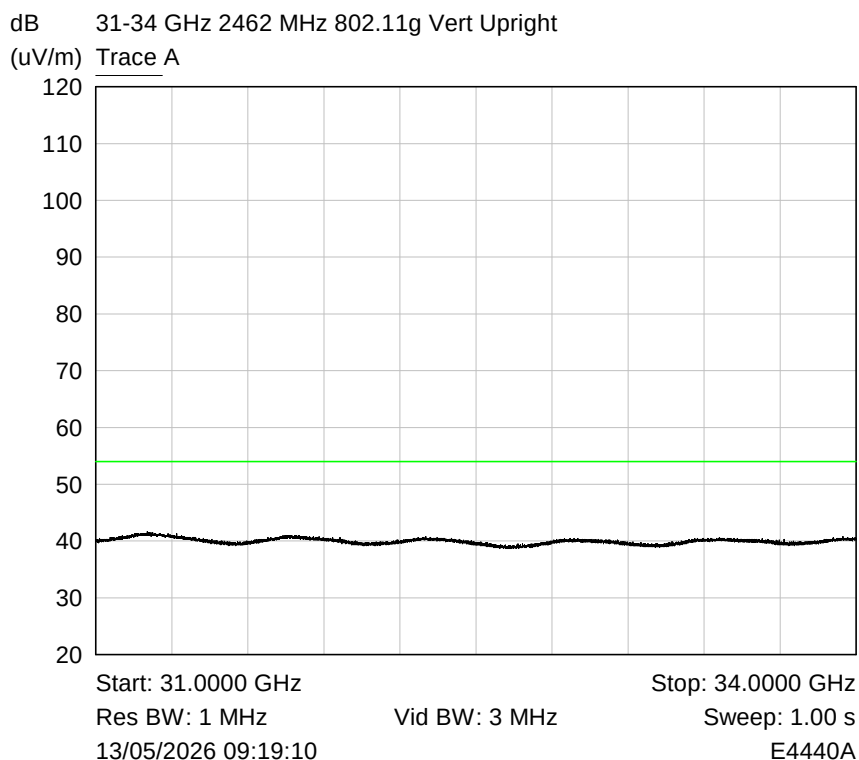


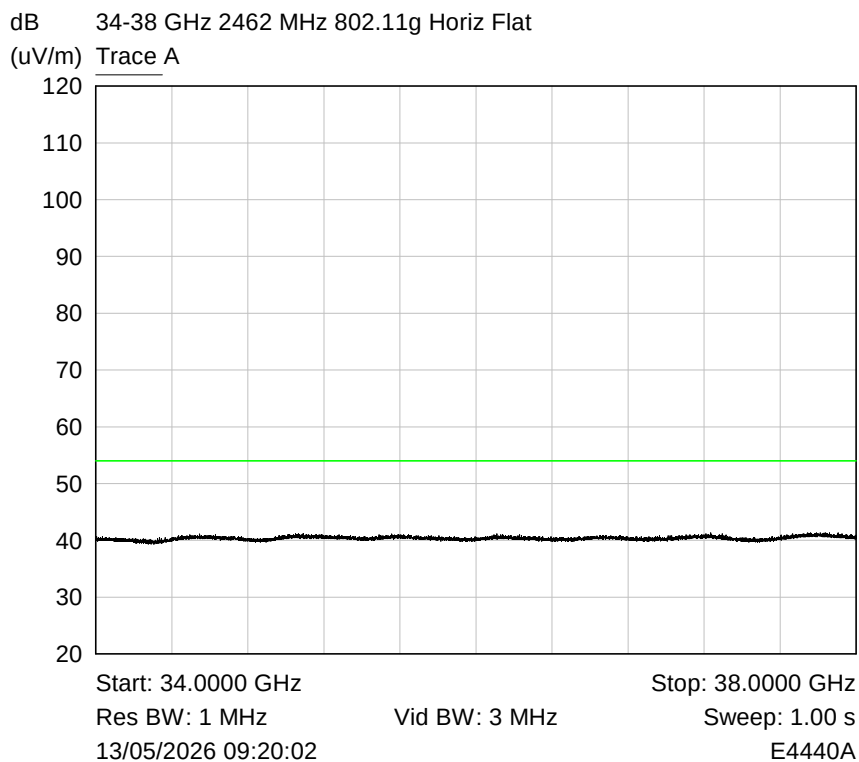
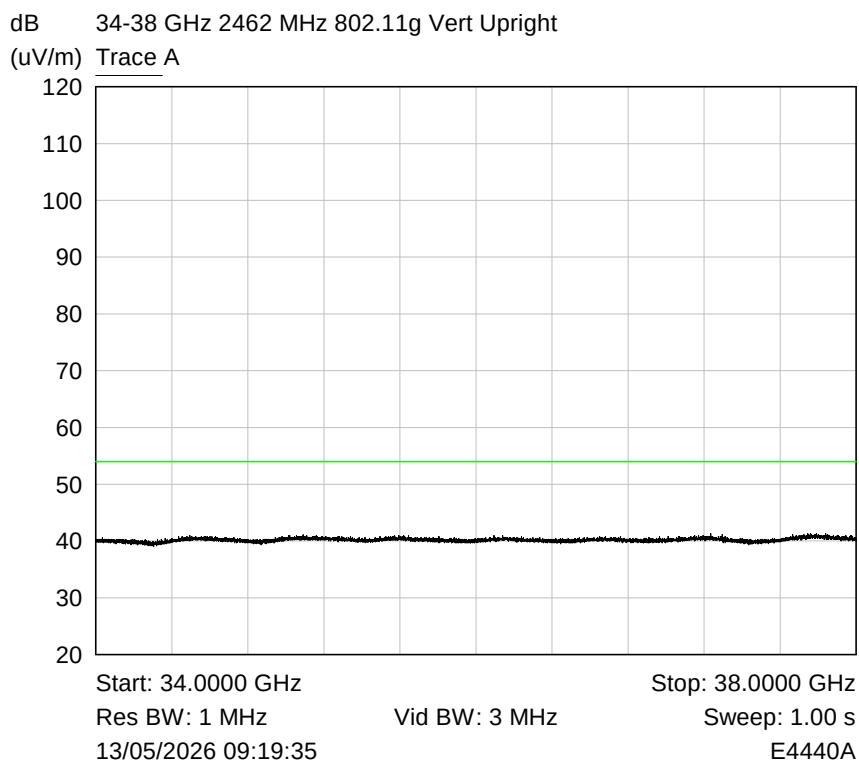


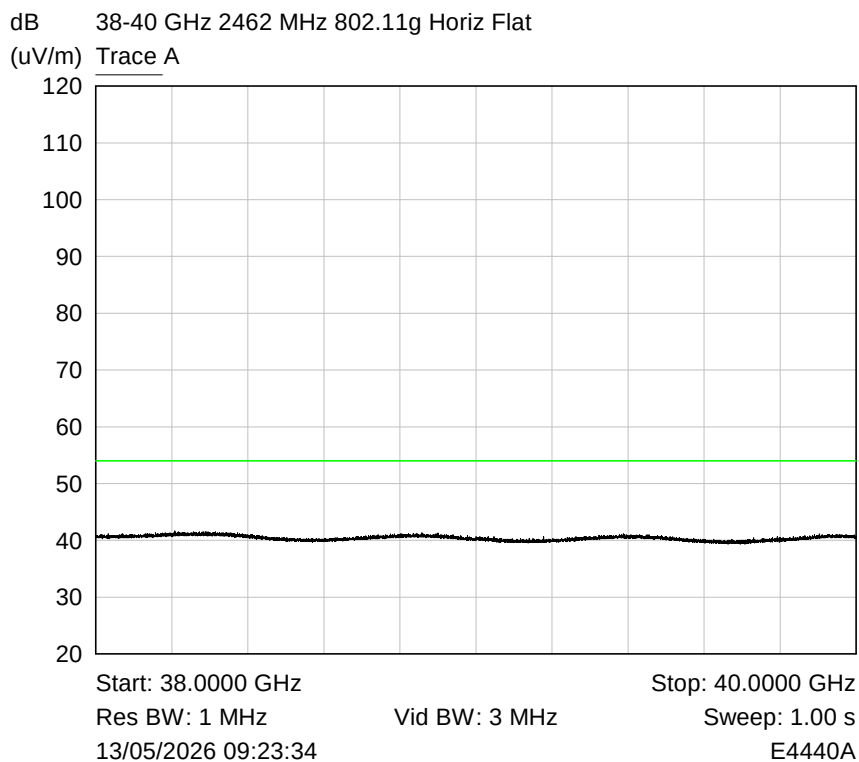
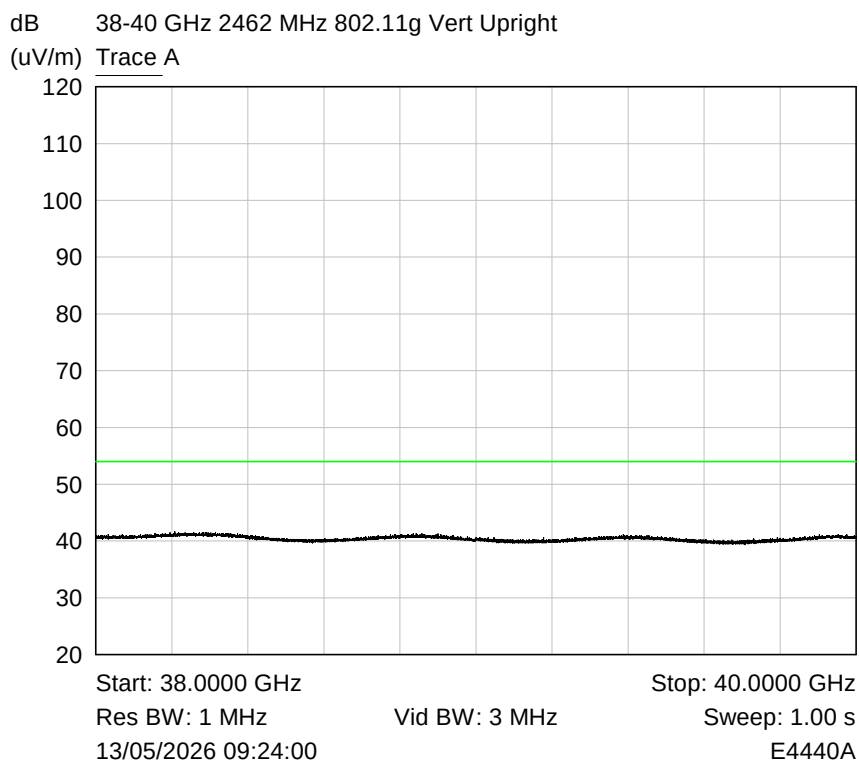






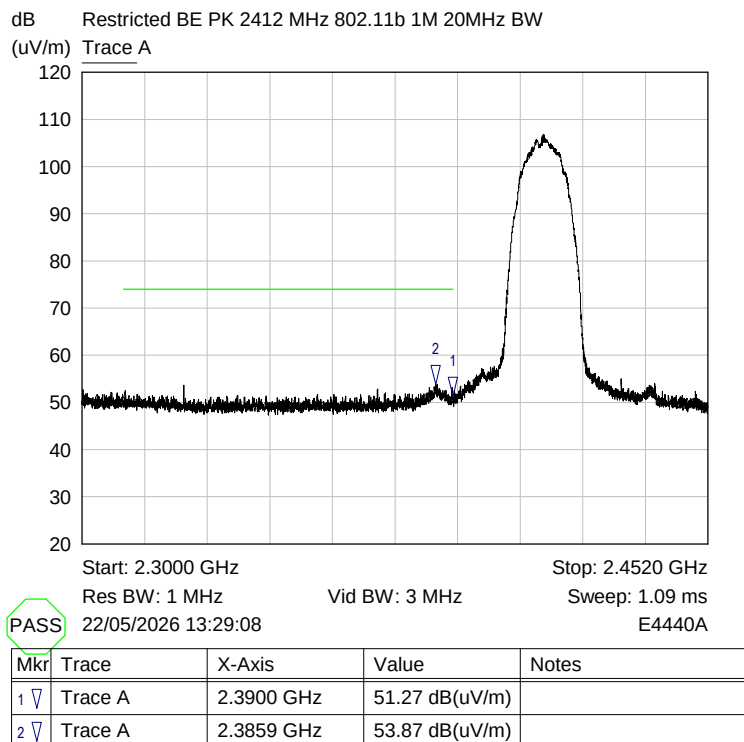




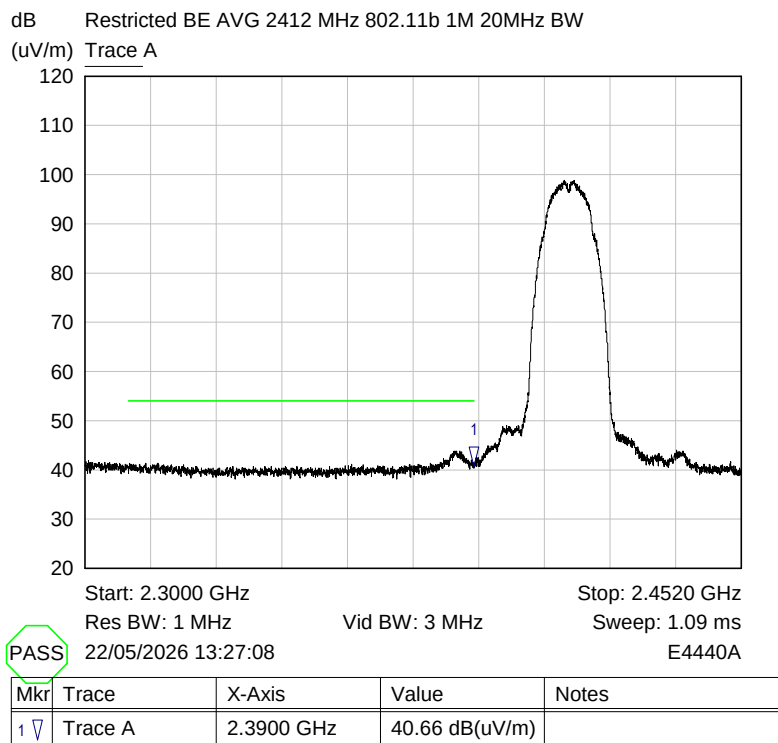


6.5 Band Edge Compliance

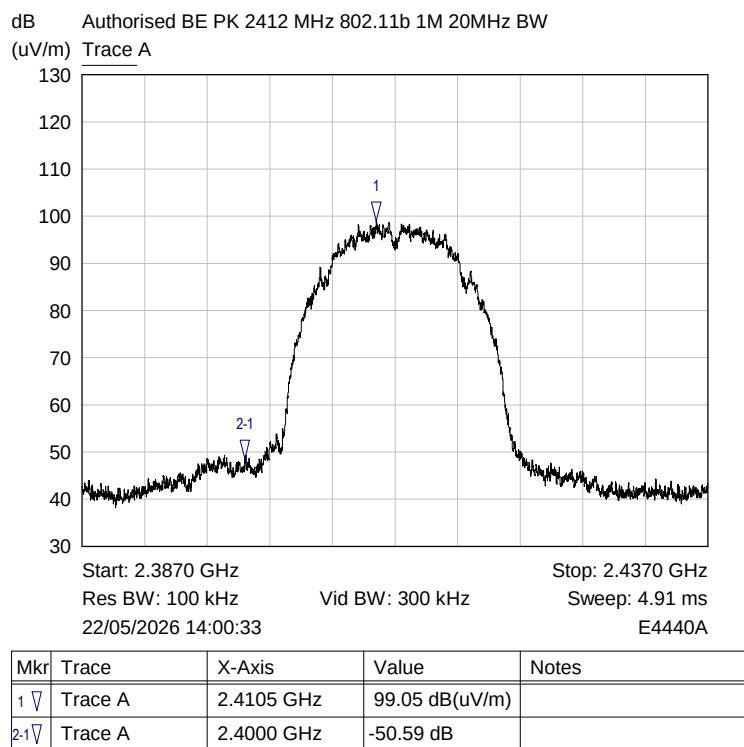
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b 1M, Channel 2412 MHz



Restricted band edge Peak Plot

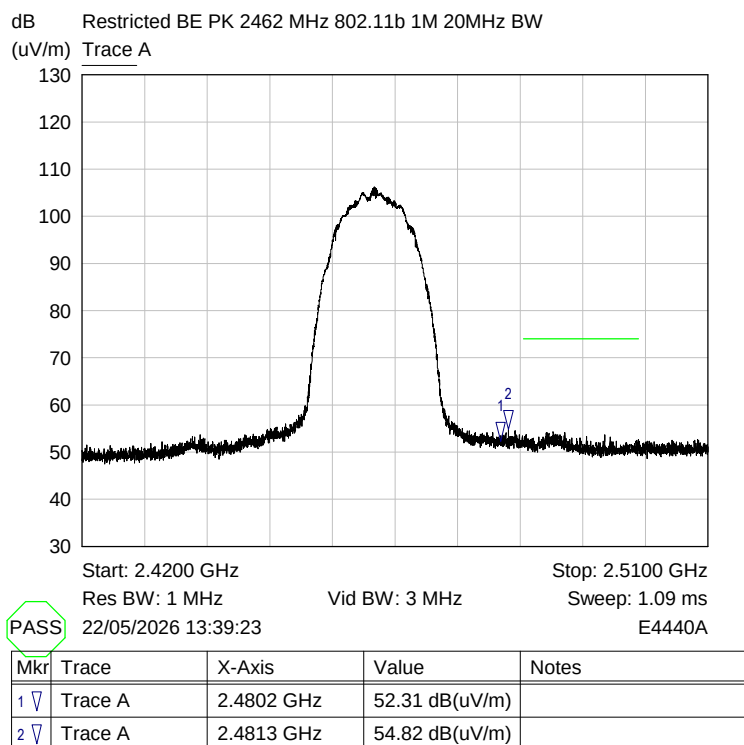


Restricted band edge Average Plot

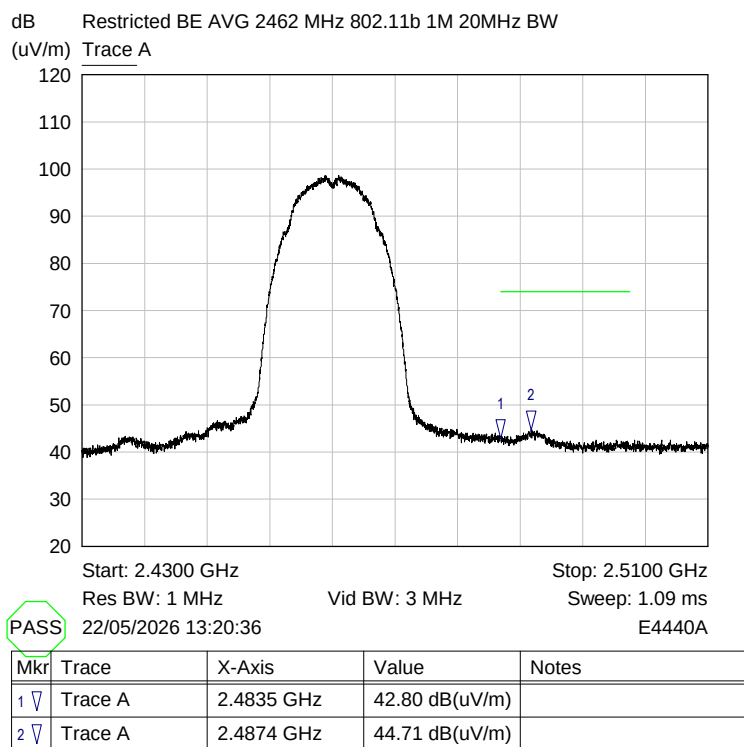


Authorised Band Edge Plot

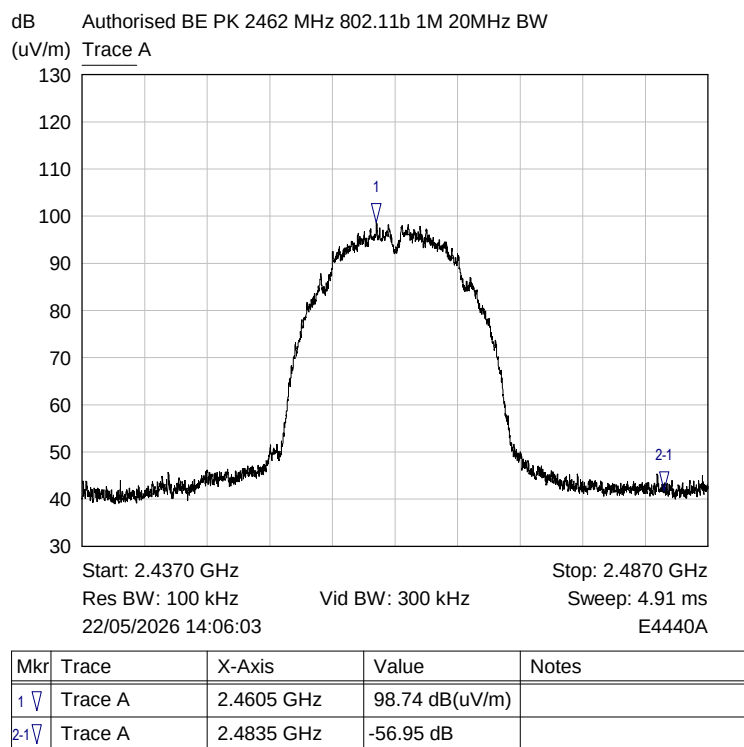
RF Parameters: Band 2400-2483.5 MHz, Power 14 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b 1M, Channel 2437 MHz



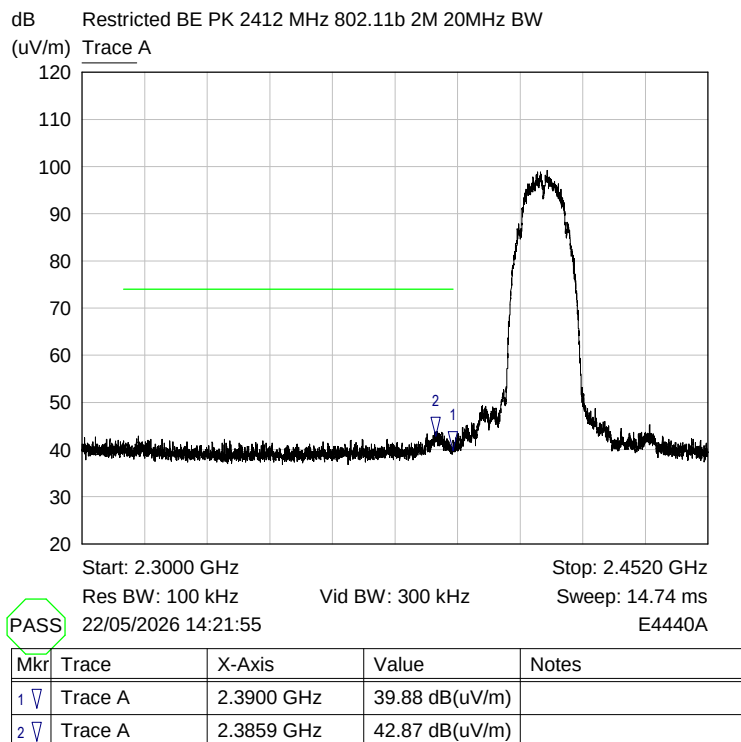
Restricted band edge Peak Plot



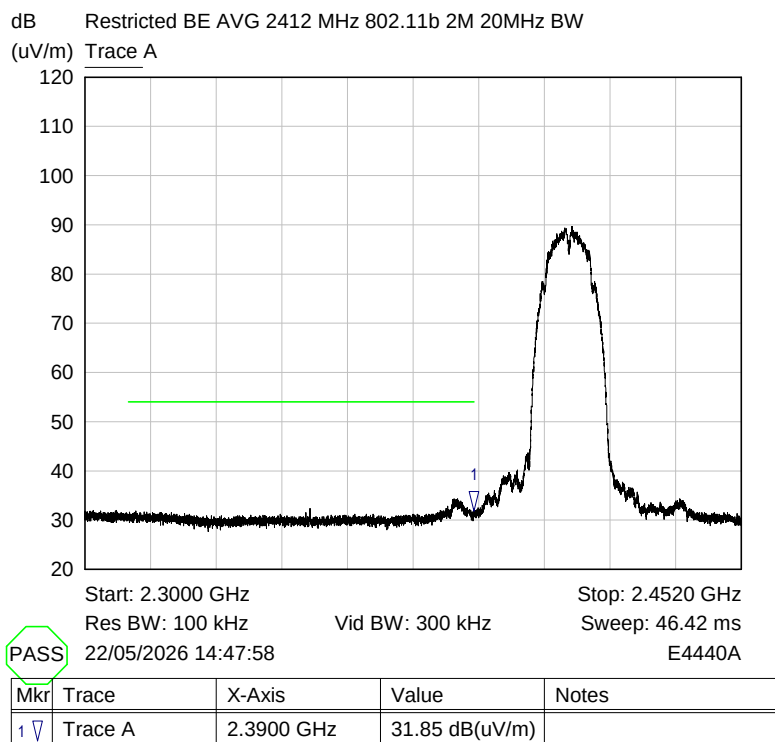
Restricted band edge Average Plot



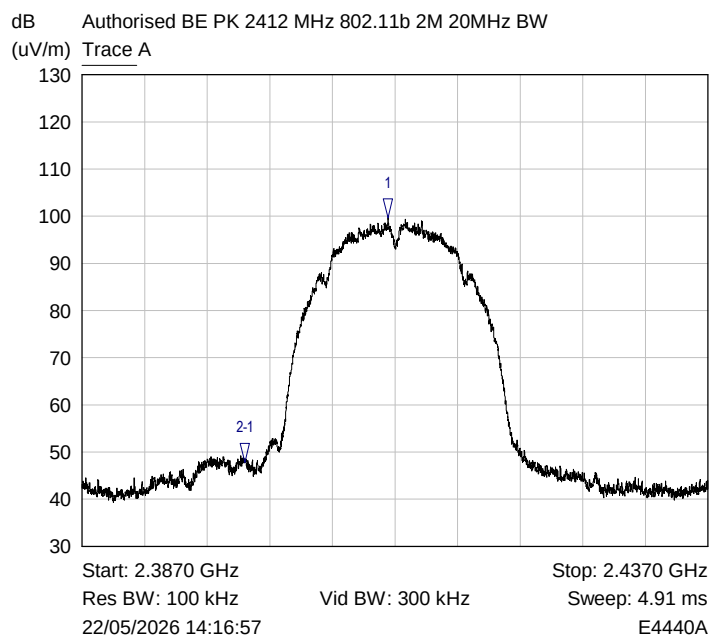
Authorised Band Edge Plot



Restricted band edge Peak Plot

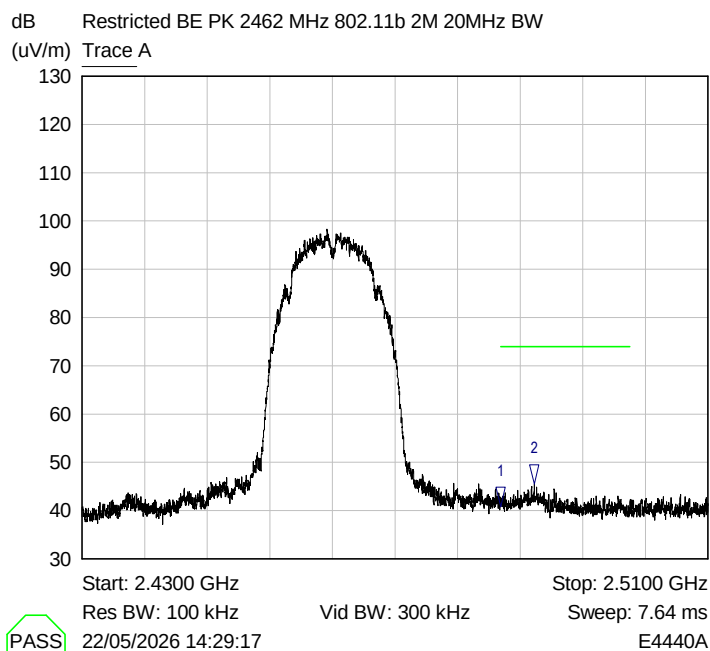


Restricted band edge Average Plot



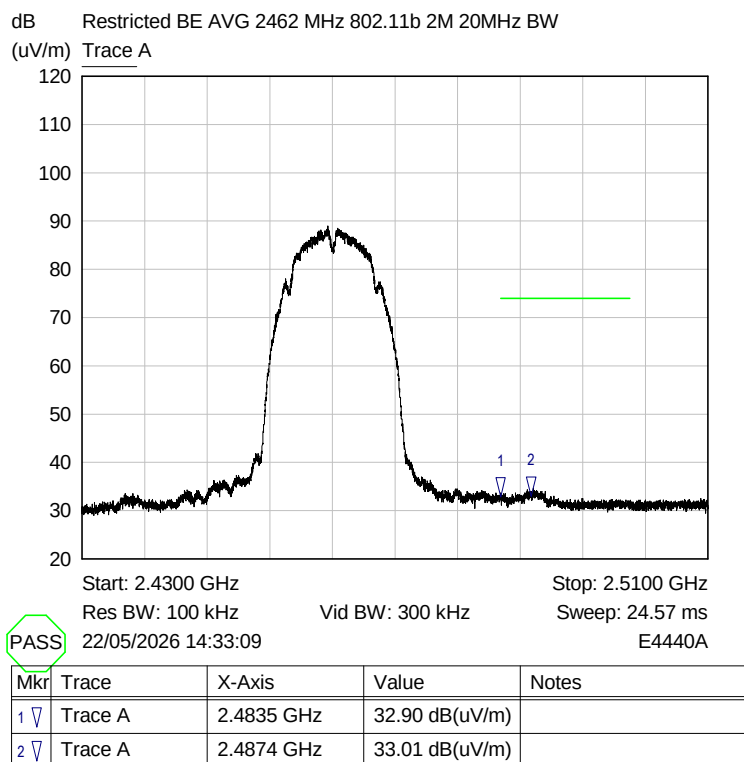
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4114 GHz	99.73 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-51.93 dB	

Authorised Band Edge Plot

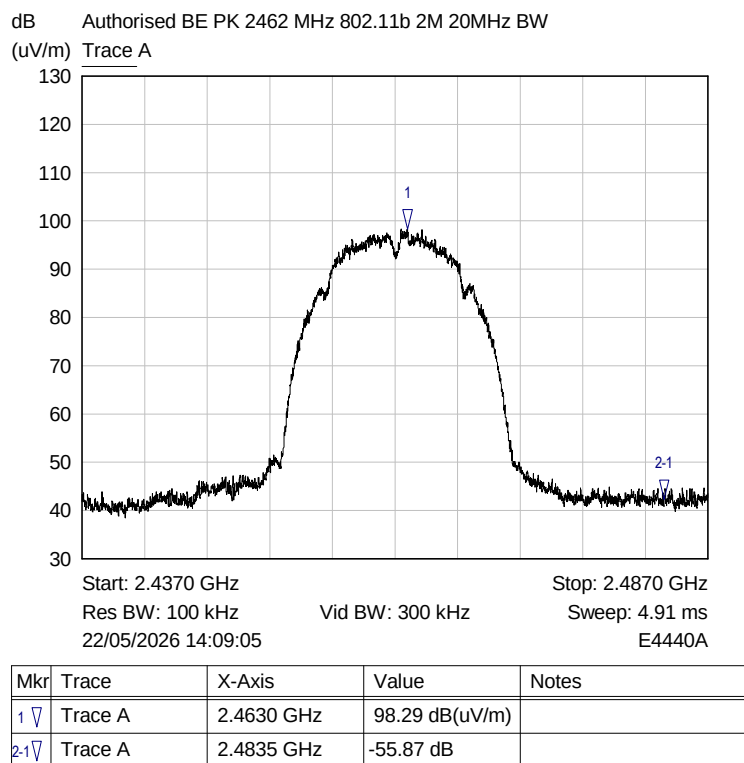


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	40.84 dB(uV/m)	
2 ▽	Trace A	2.4878 GHz	45.58 dB(uV/m)	

Restricted band edge Peak Plot

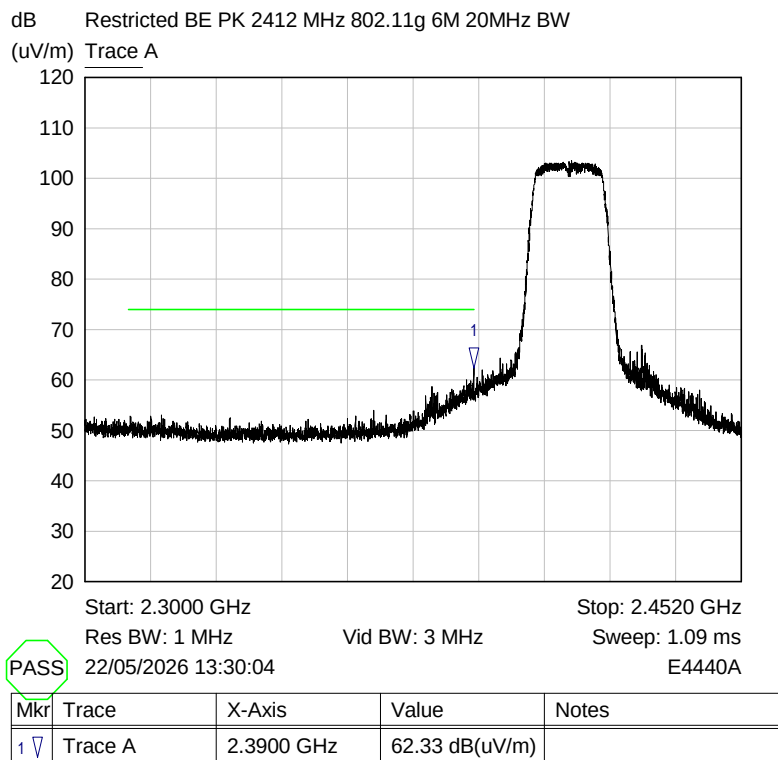


Restricted band edge Average Plot

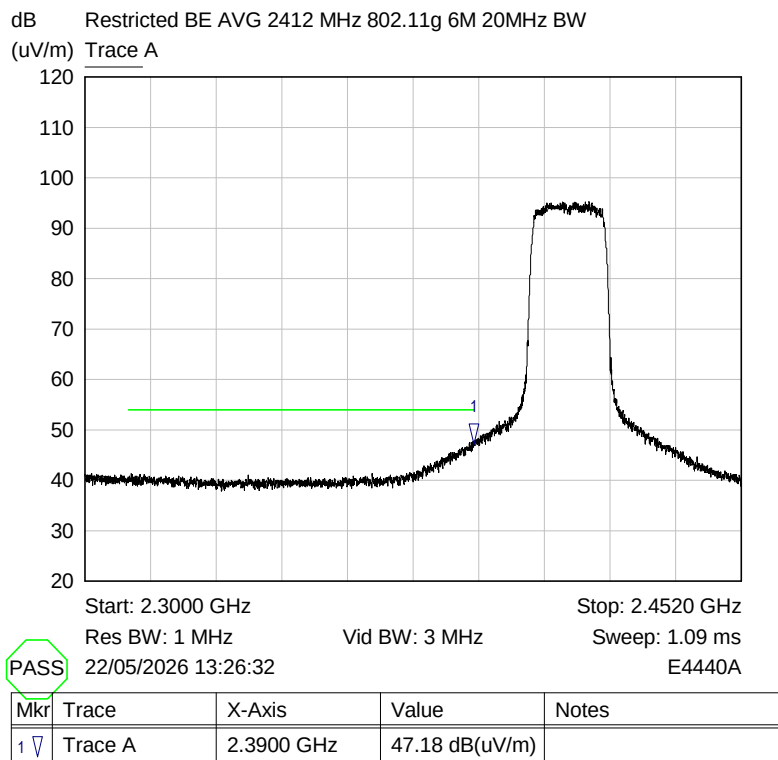


Authorised Band Edge Plot

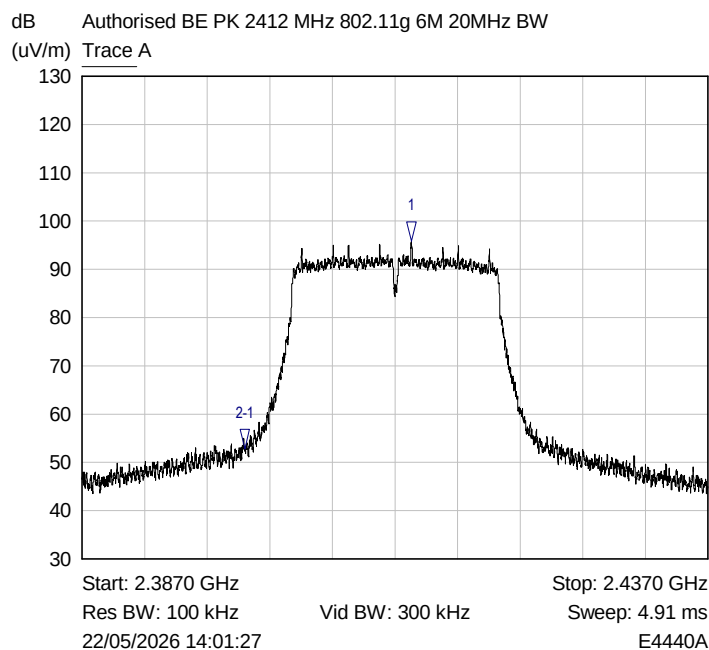
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g M, Channel 2412 MHz



Restricted band edge Peak Plot



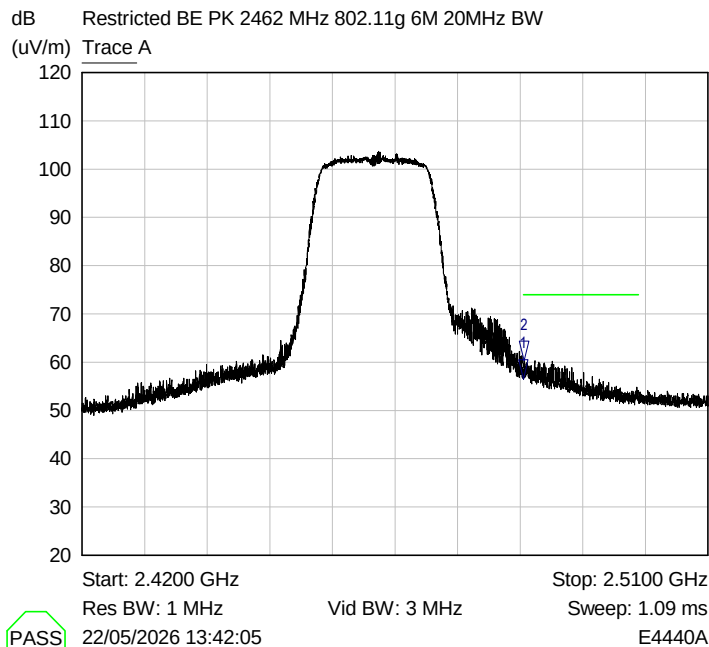
Restricted band edge Average Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4133 GHz	95.89 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-43.13 dB	

Authorised Band Edge Plot

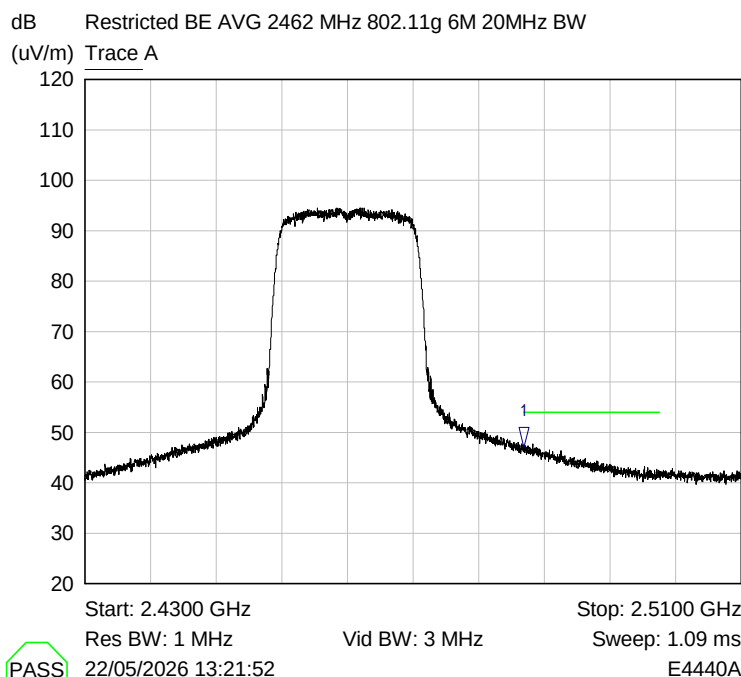
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g M, Channel 2437 MHz



PASS

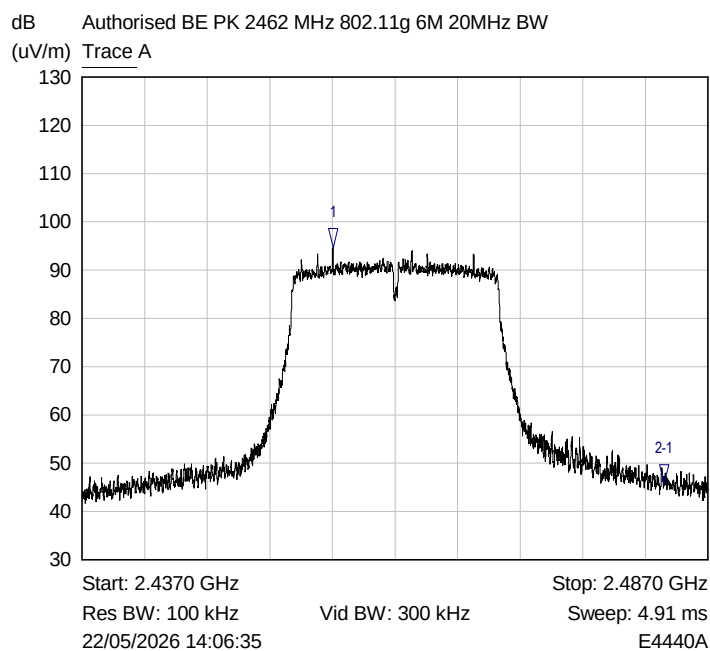
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	56.58 dB(uV/m)	
2 ▽	Trace A	2.4836 GHz	60.32 dB(uV/m)	

Restricted band edge Peak Plot



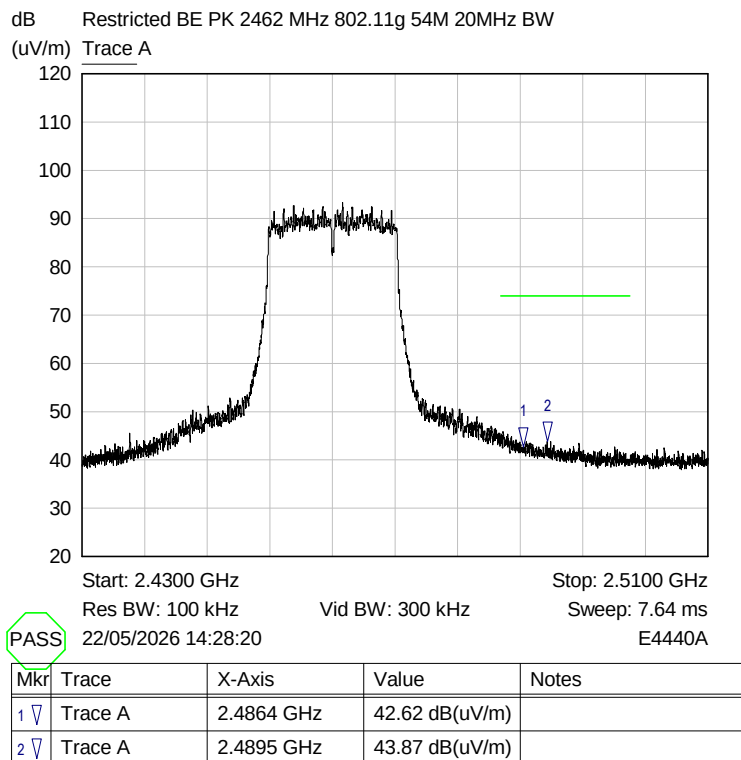
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	46.92 dB(uV/m)	

Restricted band edge Average Plot

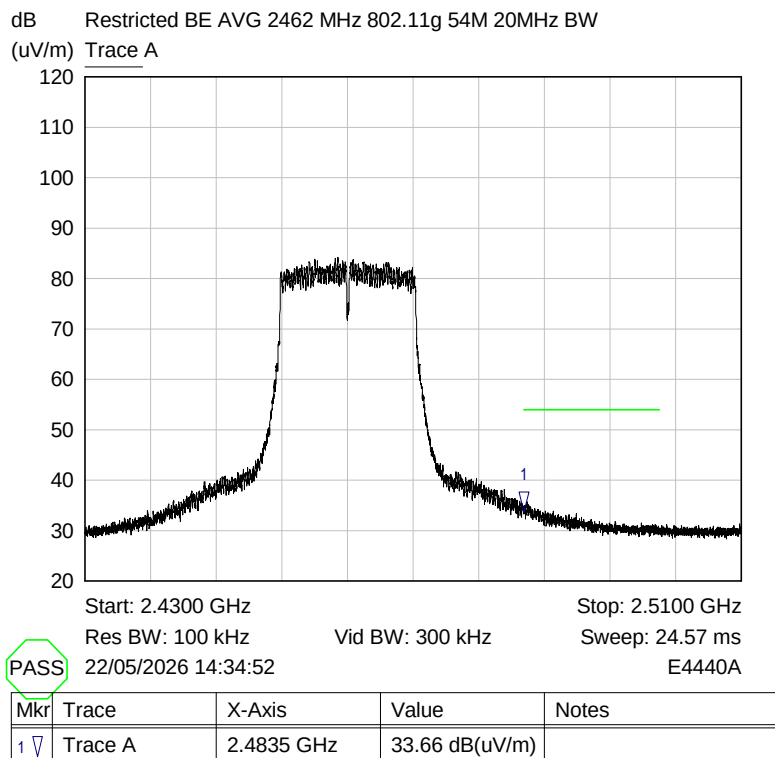


Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4570 GHz	94.61 dB(uV/m)	
2-1 ▽	Trace A	2.4835 GHz	-48.98 dB	

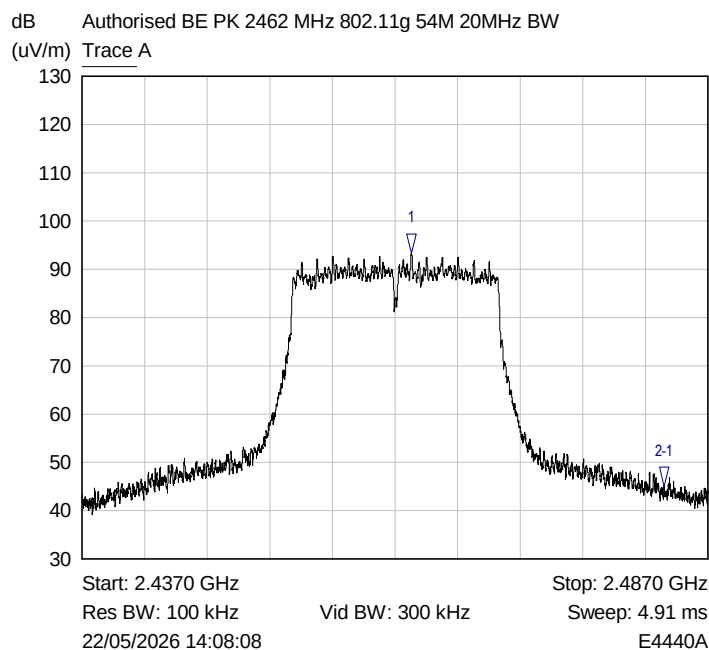
Authorised Band Edge Plot



Restricted band edge Peak Plot



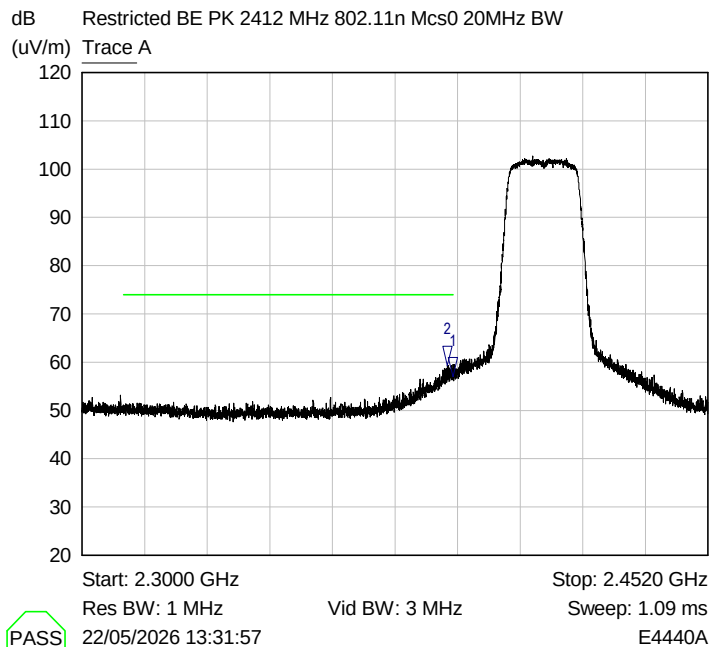
Restricted band edge Average Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4633 GHz	93.37 dB(uV/m)	
2-1 ▽	Trace A	2.4835 GHz	-48.42 dB	

Authorised Band Edge Plot

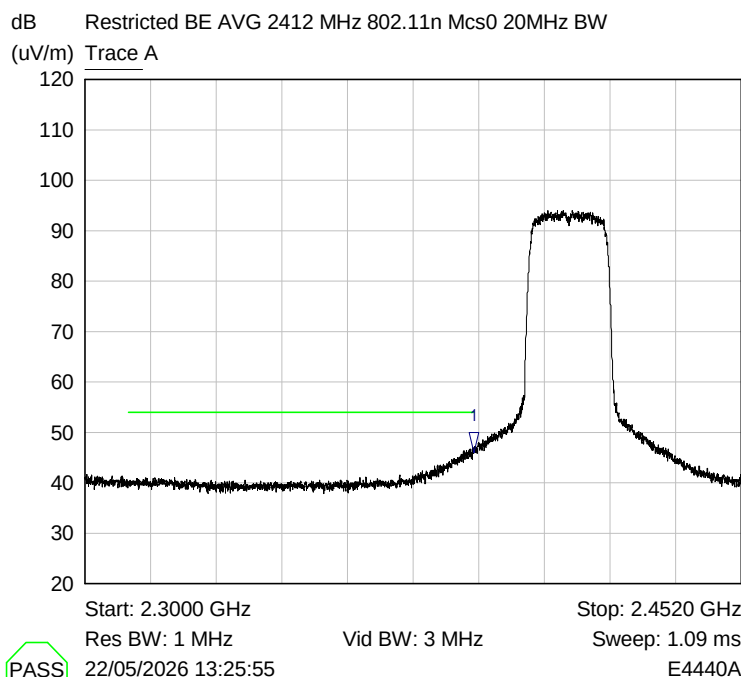
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2412 MHz



PASS

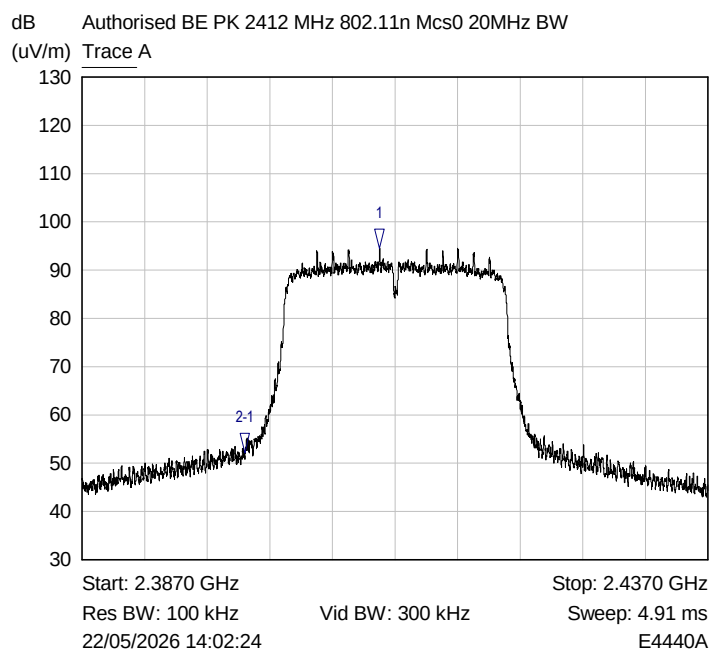
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	56.95 dB(uV/m)	
2 ▽	Trace A	2.3888 GHz	59.36 dB(uV/m)	

Restricted band edge Peak Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	45.93 dB(uV/m)	

Restricted band edge Average Plot



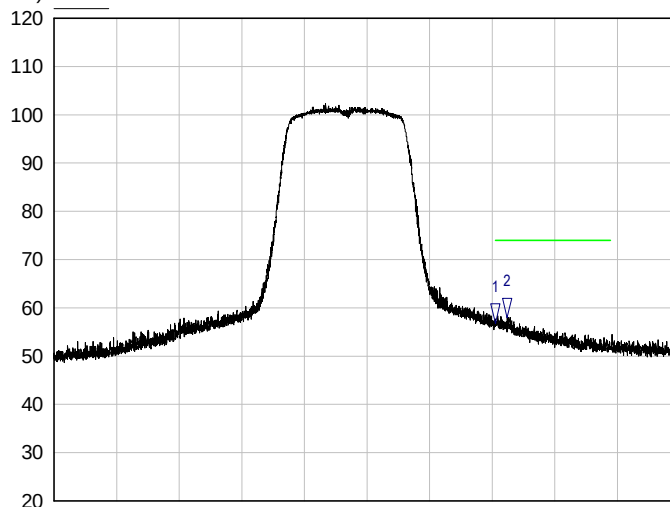
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4108 GHz	94.49 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-42.36 dB	

Authorised Band Edge Plot

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2437 MHz

dB Restricted BE PK 2462 MHz 802.11n Mcs0 20MHz BW

(uV/m) Trace A



Start: 2.4200 GHz

Stop: 2.5100 GHz

Res BW: 1 MHz

Vid BW: 3 MHz

Sweep: 1.09 ms

22/05/2026 13:45:27

E4440A

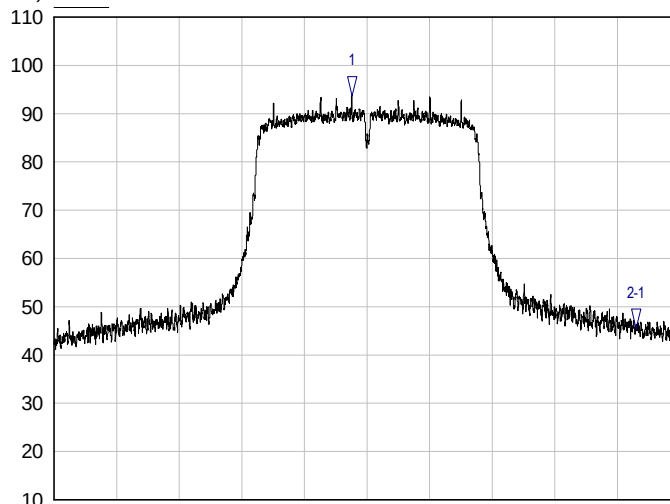
PASS

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	56.89 dB(uV/m)	
2 ▽	Trace A	2.4852 GHz	58.03 dB(uV/m)	

Restricted band edge Peak Plot

dB Authorised BE PK 2462 MHz 802.11n Mcs0 20MHz BW

(uV/m) Trace A



Start: 2.4370 GHz

Stop: 2.4870 GHz

Res BW: 100 kHz

Vid BW: 300 kHz

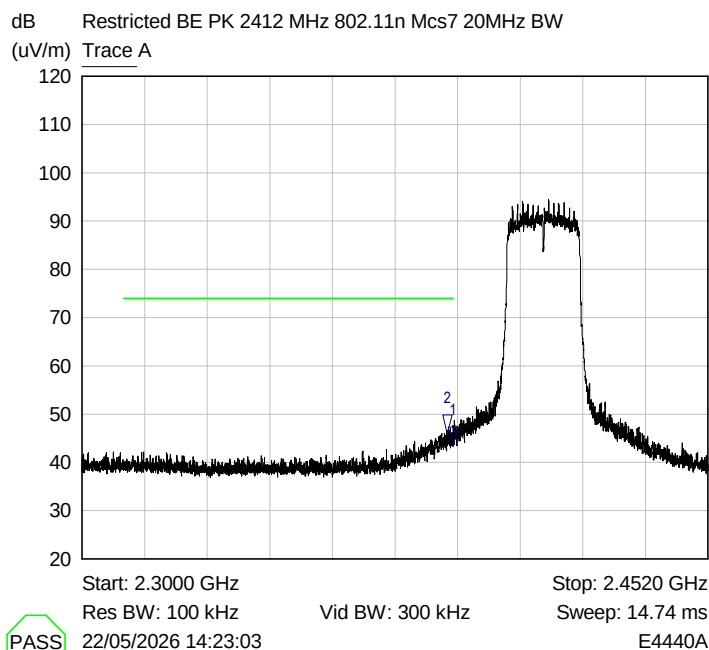
Sweep: 4.91 ms

22/05/2026 14:07:12

E4440A

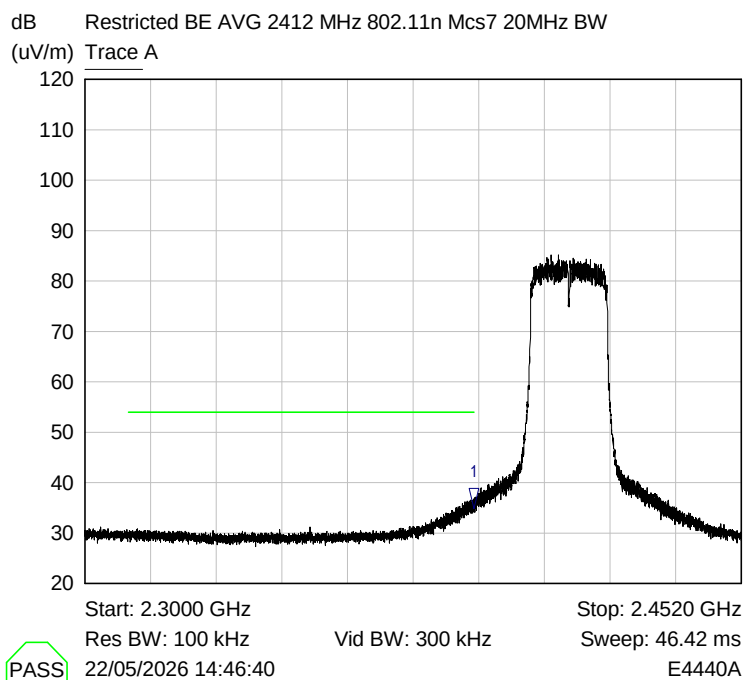
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4608 GHz	93.73 dB(uV/m)	
2-1 ▽	Trace A	2.4835 GHz	-48.22 dB	

Authorised Band Edge Plot



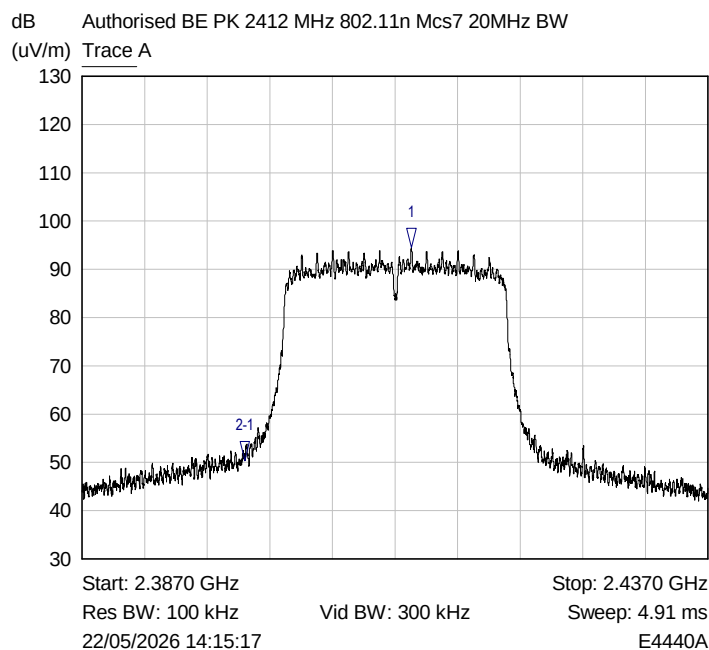
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	43.29 dB(uV/m)	
2 ▽	Trace A	2.3888 GHz	45.91 dB(uV/m)	

Restricted band edge Peak Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	34.82 dB(uV/m)	

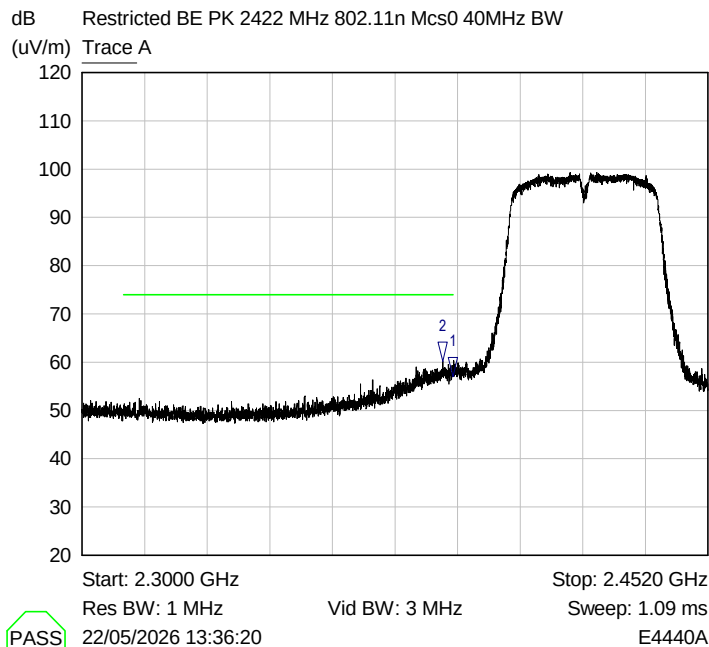
Restricted band edge Average Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4133 GHz	94.55 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-44.16 dB	

Authorised Band Edge Plot

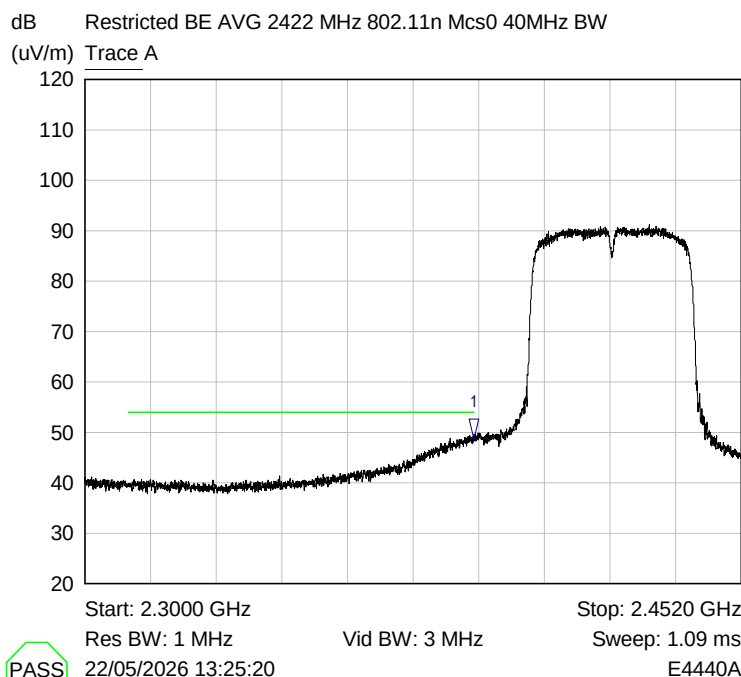
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2412 MHz



PASS

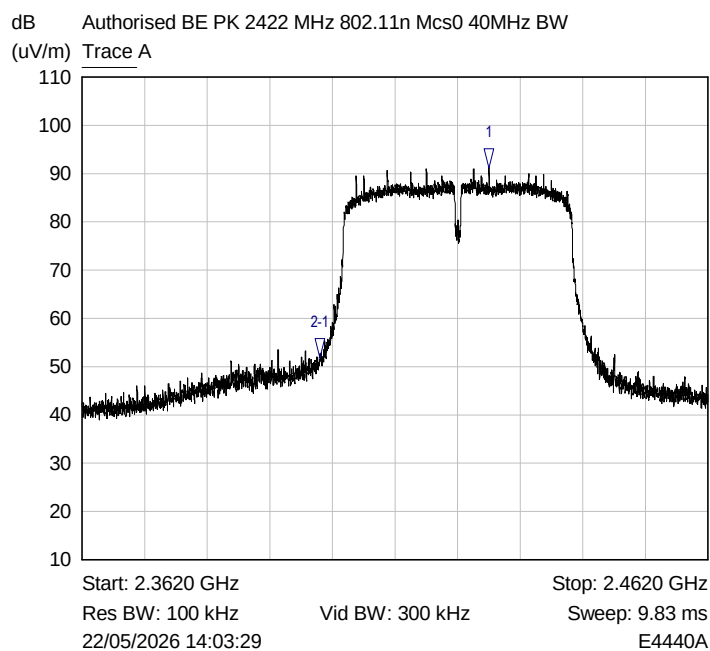
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	57.05 dB(uV/m)	
2 ▽	Trace A	2.3876 GHz	60.20 dB(uV/m)	

Restricted band edge Peak Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	48.62 dB(uV/m)	

Restricted band edge Average Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4270 GHz	91.24 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-39.42 dB	

Authorised Band Edge Plot

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2437 MHz

dB Restricted BE PK 2452 MHz 802.11n Mcs0 40MHz BW

(uV/m) Trace A



Start: 2.4200 GHz

Stop: 2.5100 GHz

Res BW: 1 MHz

Vid BW: 3 MHz

Sweep: 1.09 ms

22/05/2026 13:37:34

E4440A

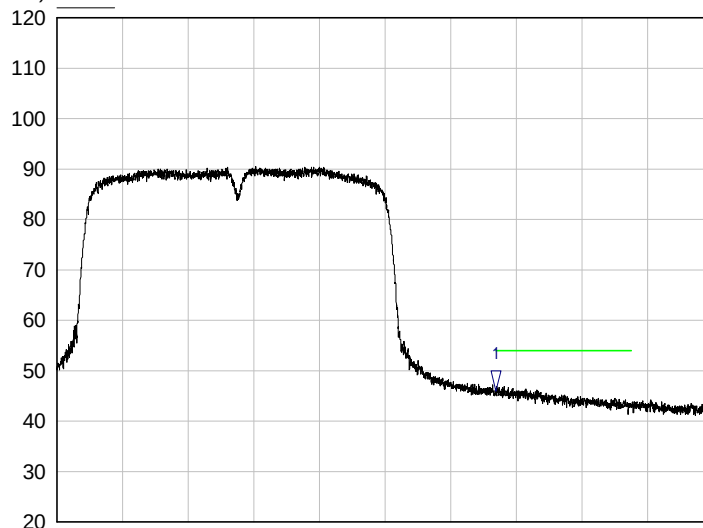
PASS

Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	55.80 dB(uV/m)	
2 ▽	Trace A	2.4841 GHz	57.66 dB(uV/m)	

Restricted band edge Peak Plot

dB Restricted BE AVG 2452 MHz 802.11n Mcs0 40MHz BW

(uV/m) Trace A



Start: 2.4300 GHz

Stop: 2.5100 GHz

Res BW: 1 MHz

Vid BW: 3 MHz

Sweep: 1.09 ms

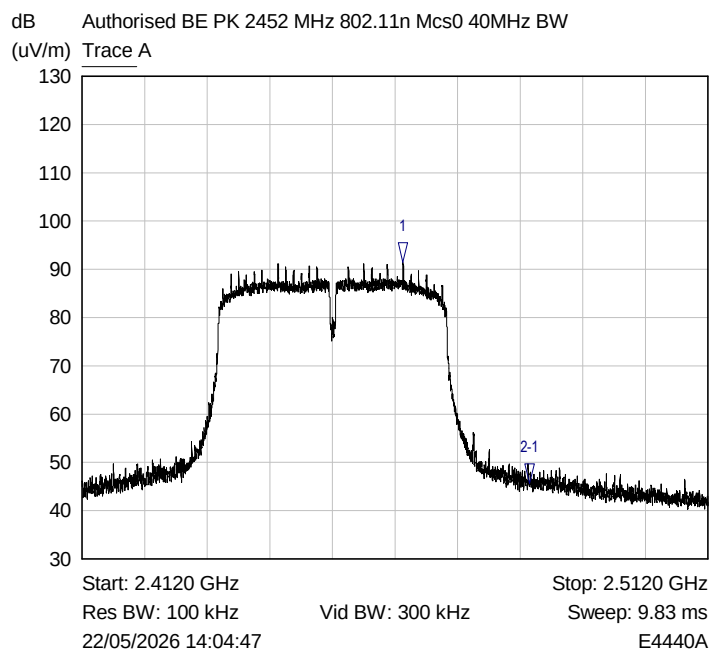
22/05/2026 13:24:03

E4440A

PASS

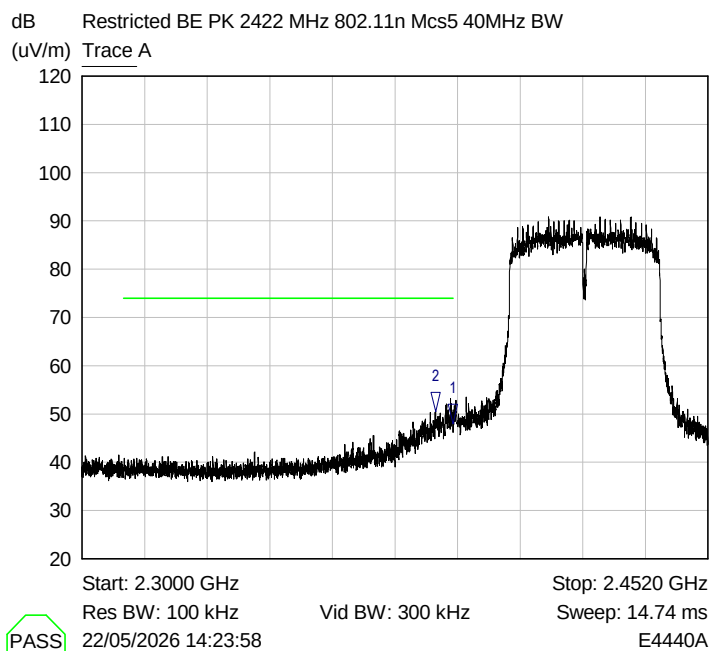
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	46.04 dB(uV/m)	

Restricted band edge Average Plot



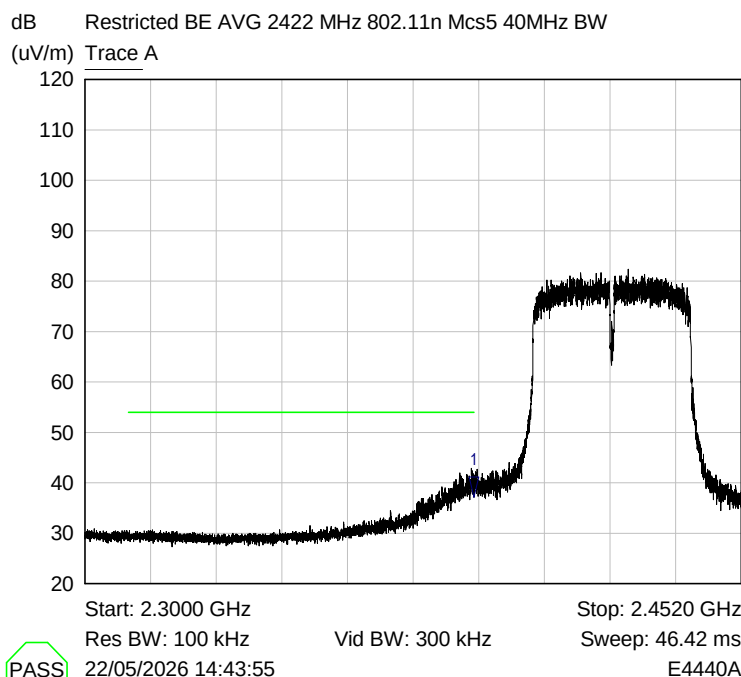
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4633 GHz	91.43 dB(uV/m)	
2-1 ▽	Trace A	2.4835 GHz	-45.70 dB	

Authorised Band Edge Plot



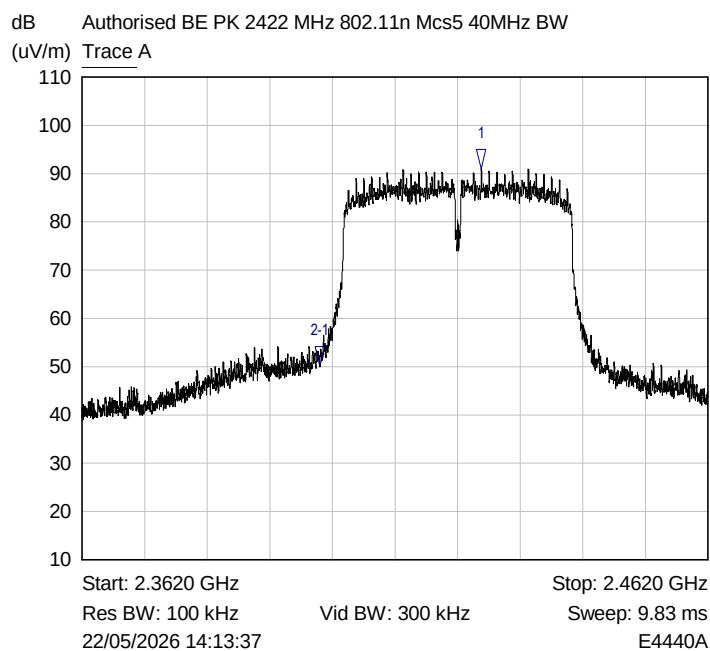
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	48.02 dB(uV/m)	
2 ▽	Trace A	2.3858 GHz	50.57 dB(uV/m)	

Restricted band edge Peak Plot



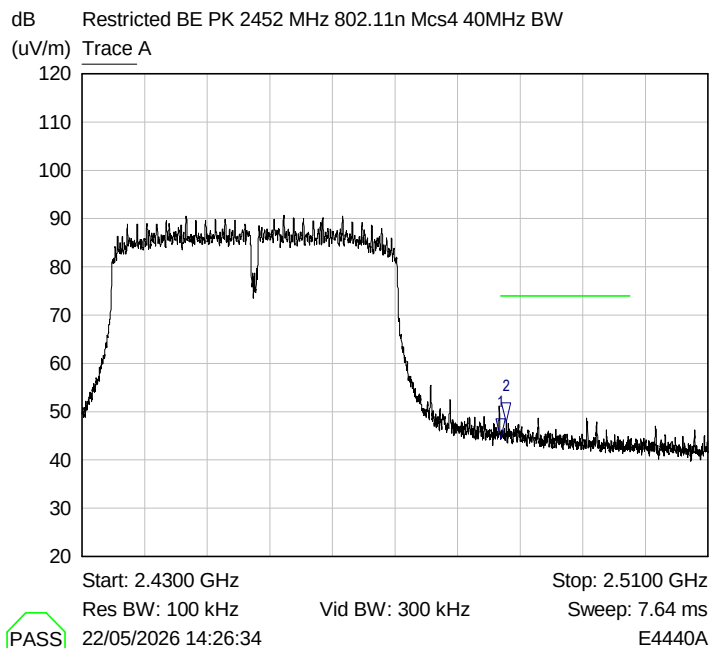
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.3900 GHz	37.09 dB(uV/m)	

Restricted band edge Average Plot



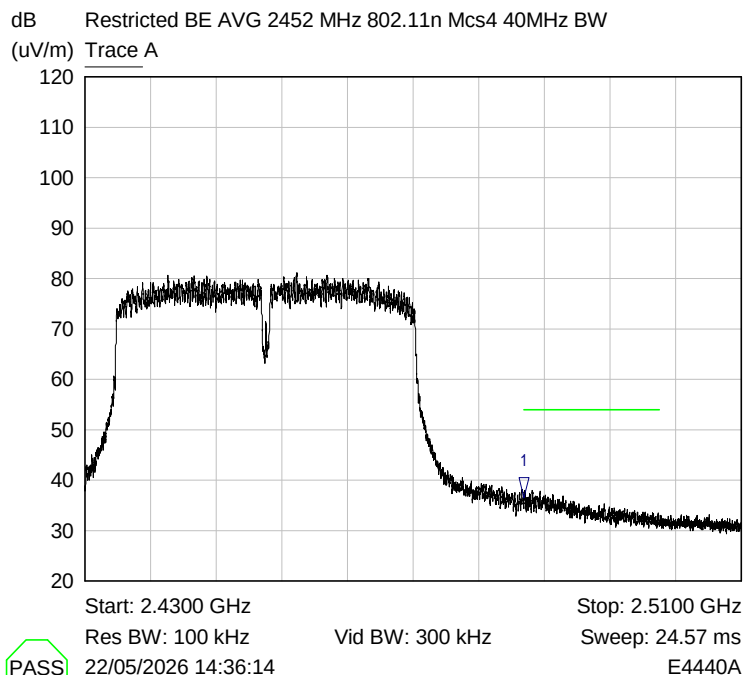
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4258 GHz	90.99 dB(uV/m)	
2-1 ▽	Trace A	2.4000 GHz	-40.74 dB	

Authorised Band Edge Plot



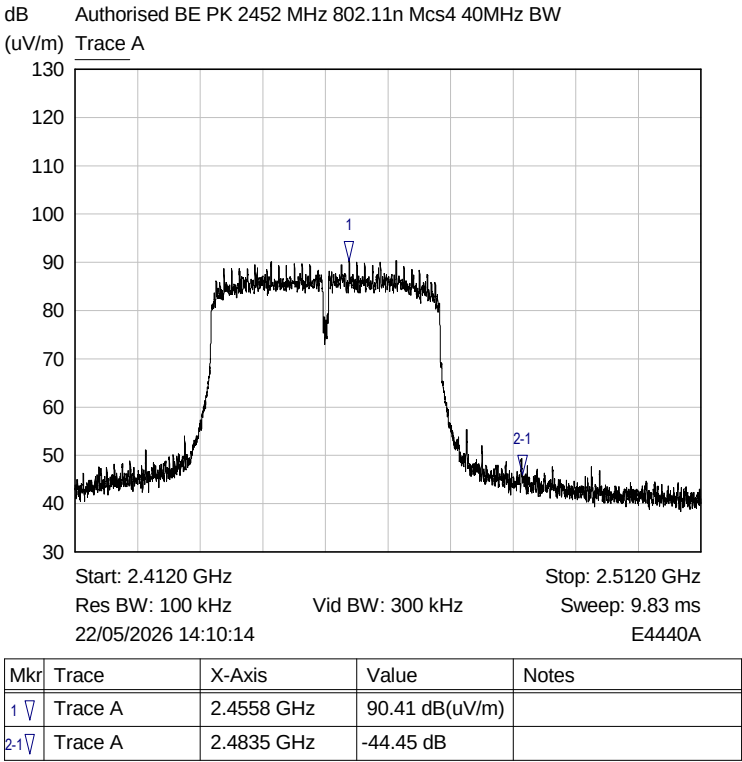
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	44.52 dB(uV/m)	
2 ▽	Trace A	2.4842 GHz	47.77 dB(uV/m)	

Restricted band edge Peak Plot



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	2.4835 GHz	36.52 dB(uV/m)	

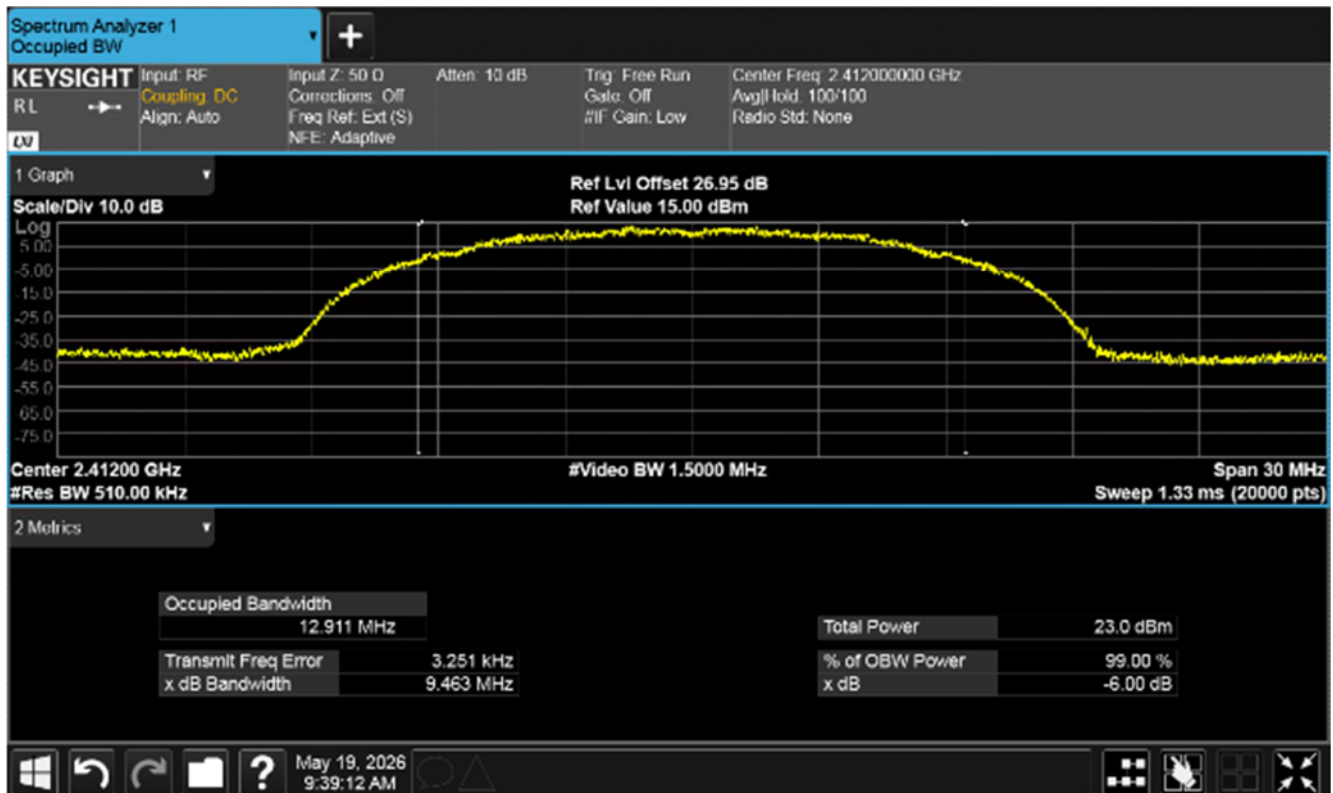
Restricted band edge Average Plot



Authorised Band Edge Plot

6.6 Occupied bandwidth

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b, Channel 2412 MHz



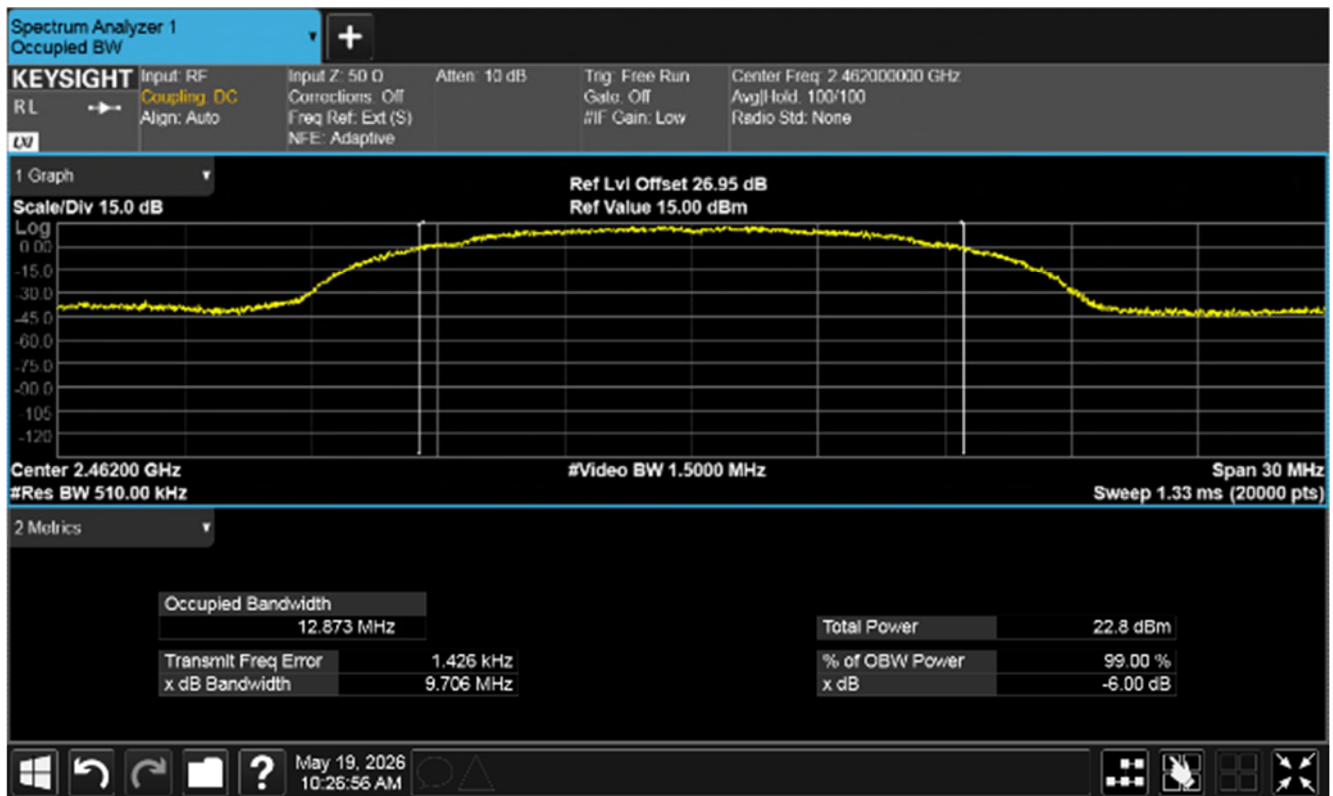
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b, Channel 2437 MHz



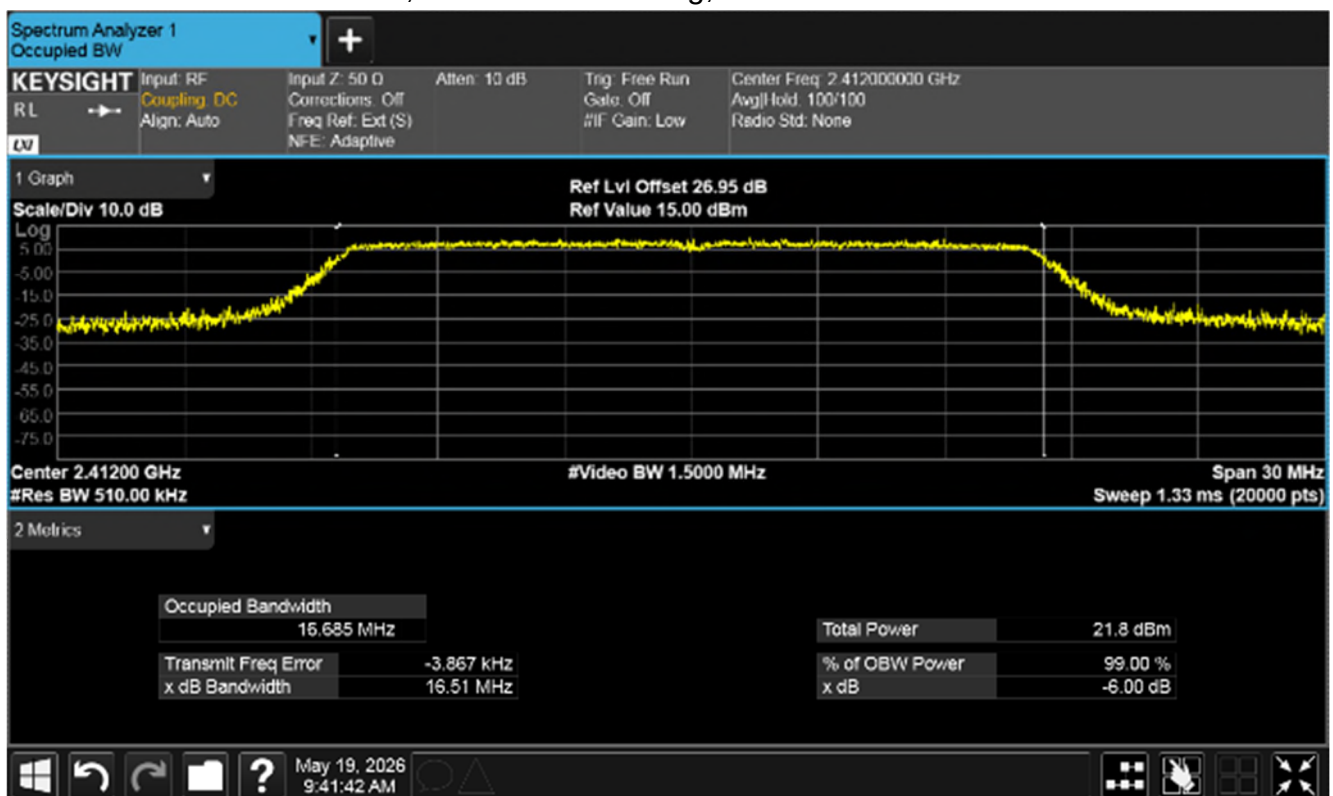
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b, Channel 2462 MHz



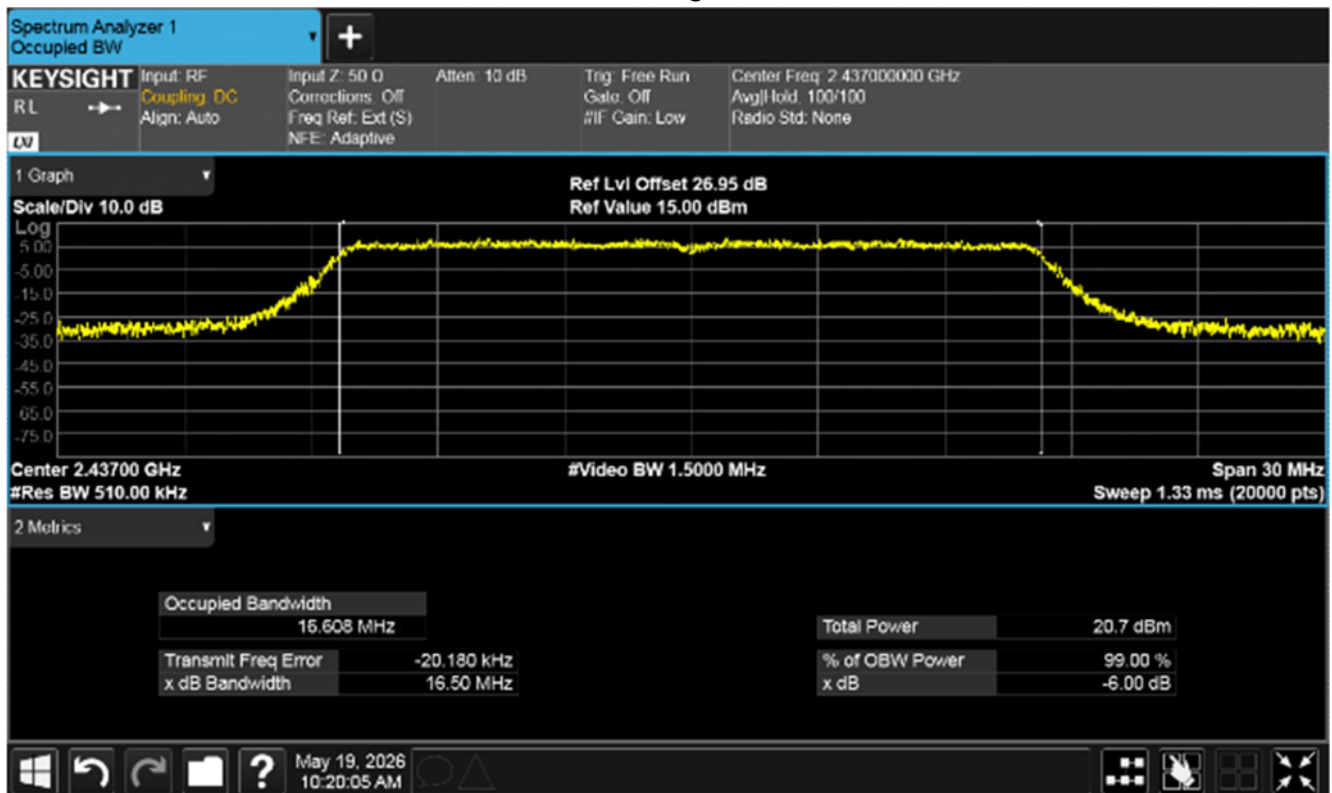
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2412 MHz



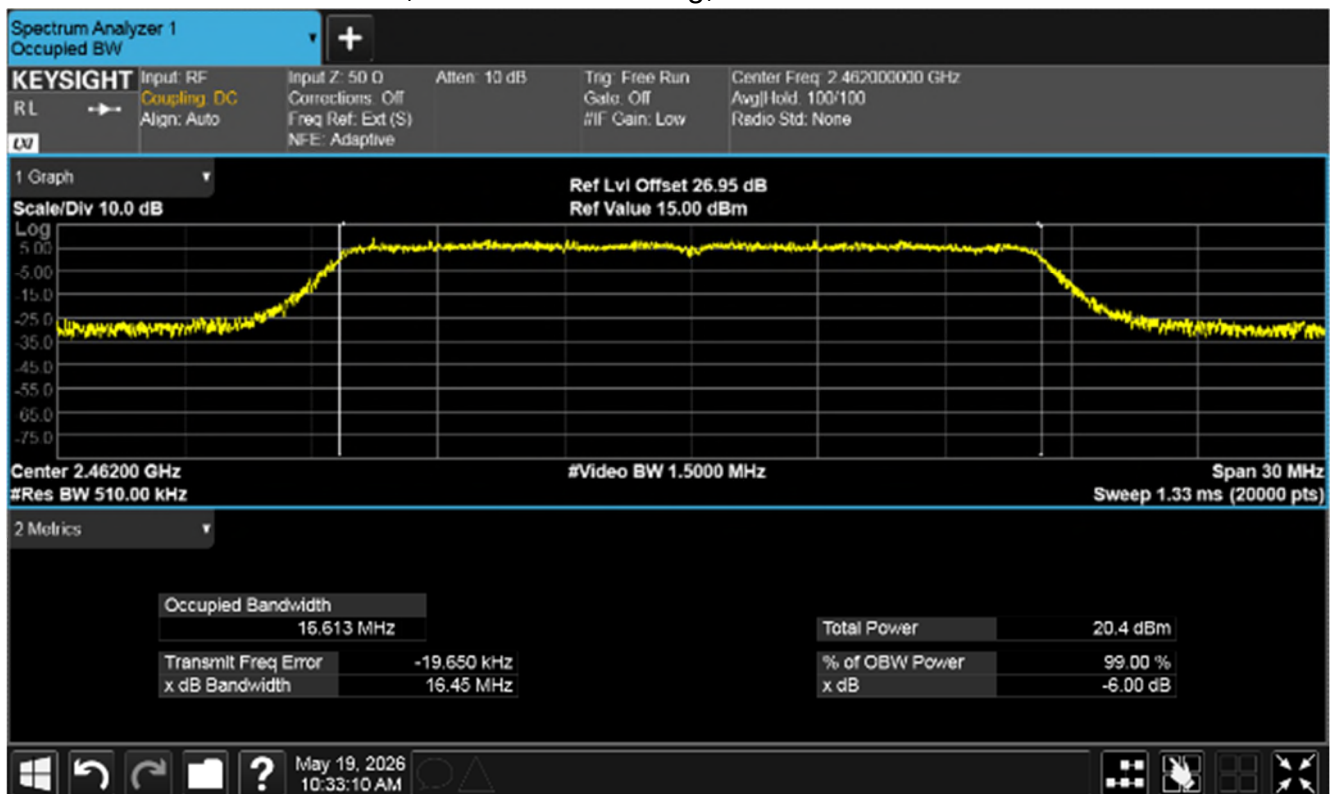
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2437 MHz



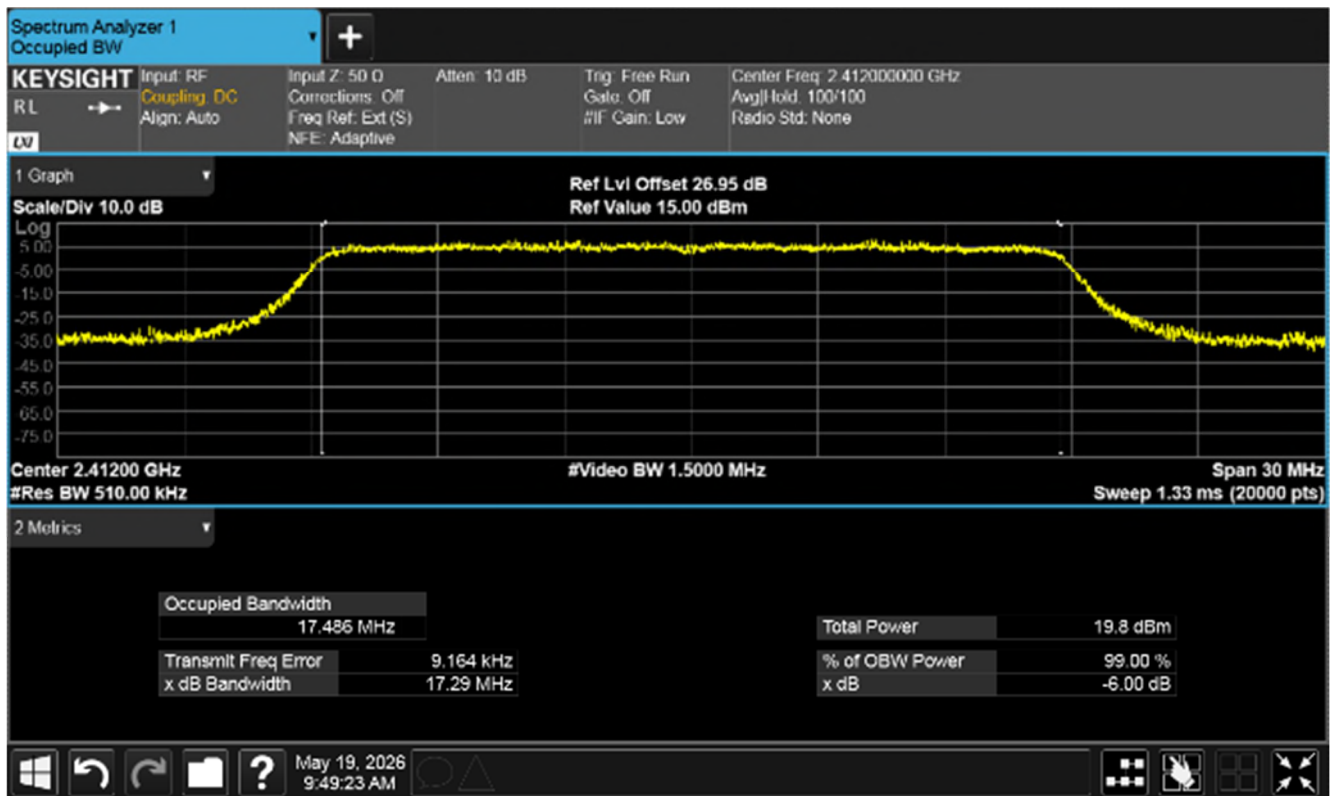
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g, Channel 2462 MHz



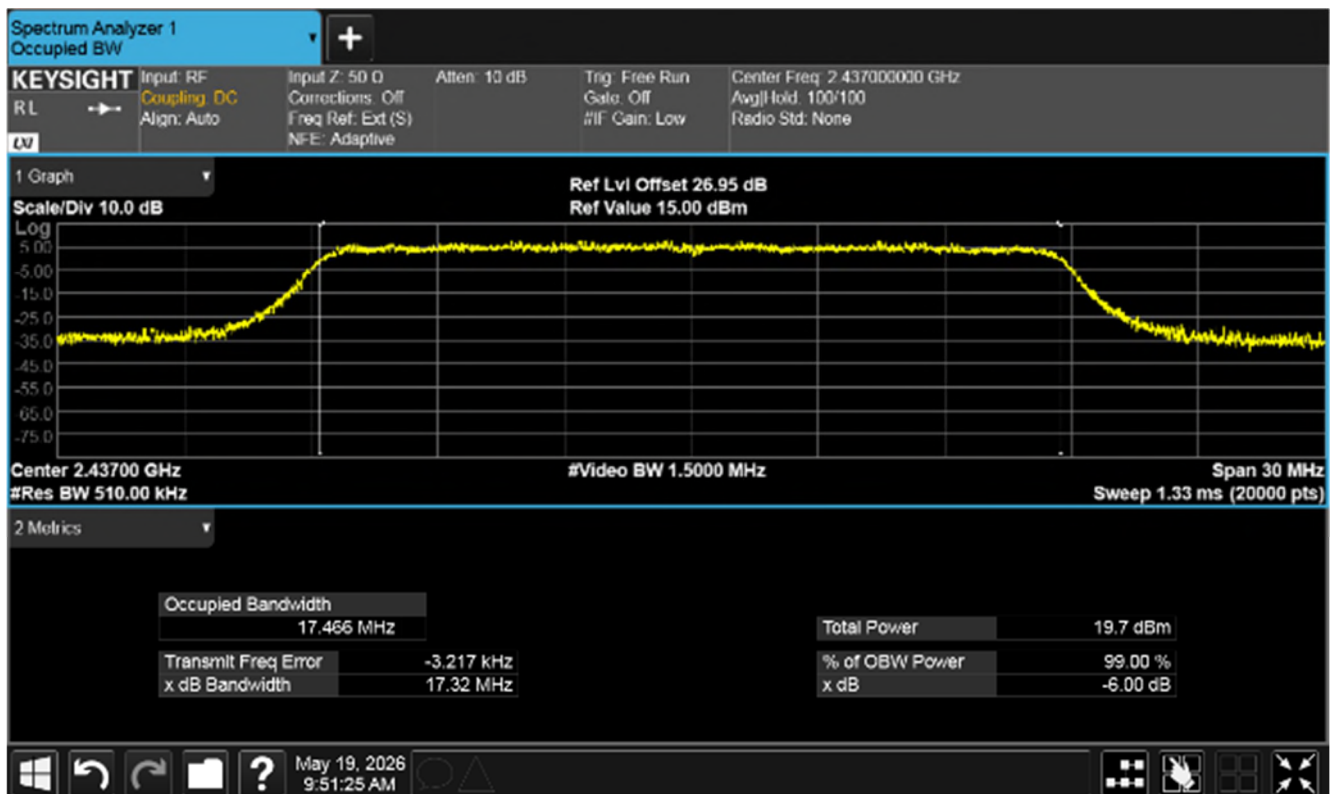
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n, Channel 2412 MHz



Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n, Channel 2437 MHz



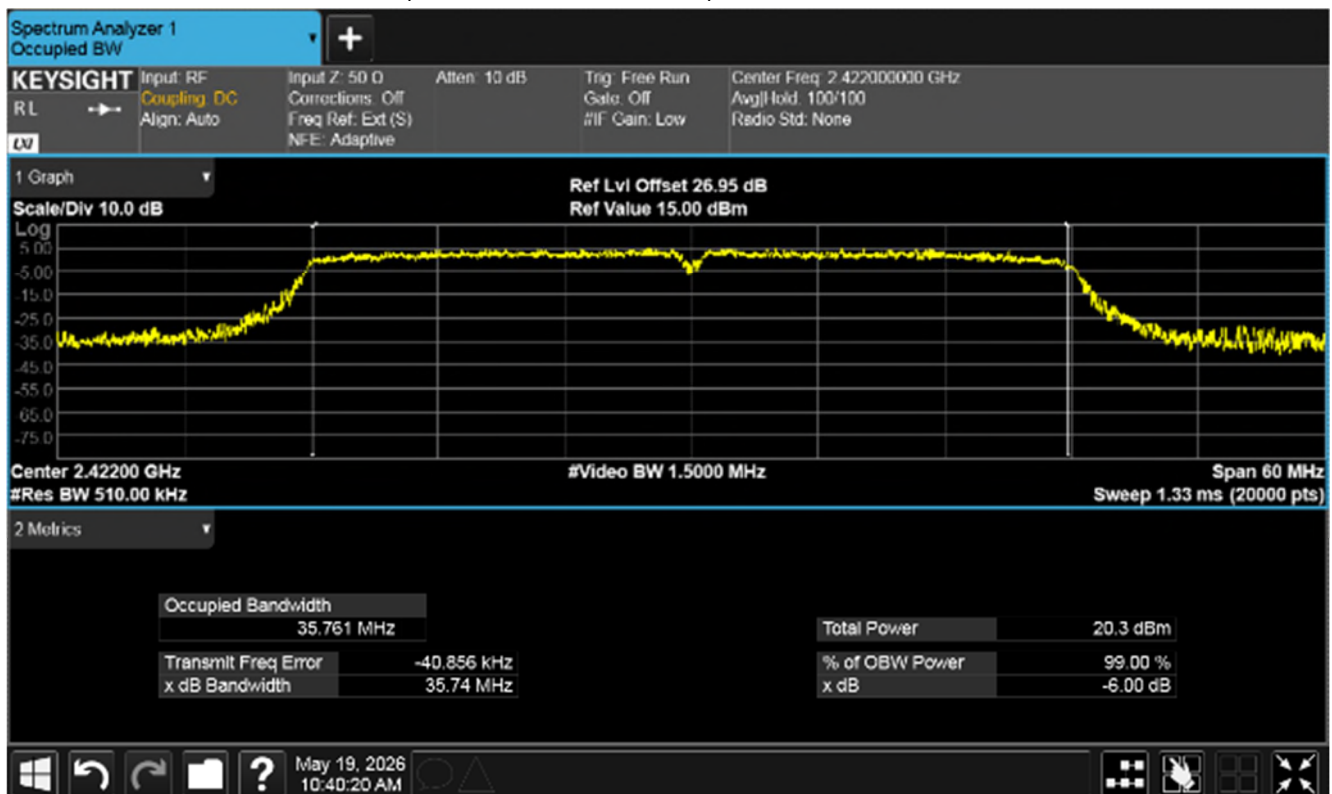
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n, Channel 2462 MHz



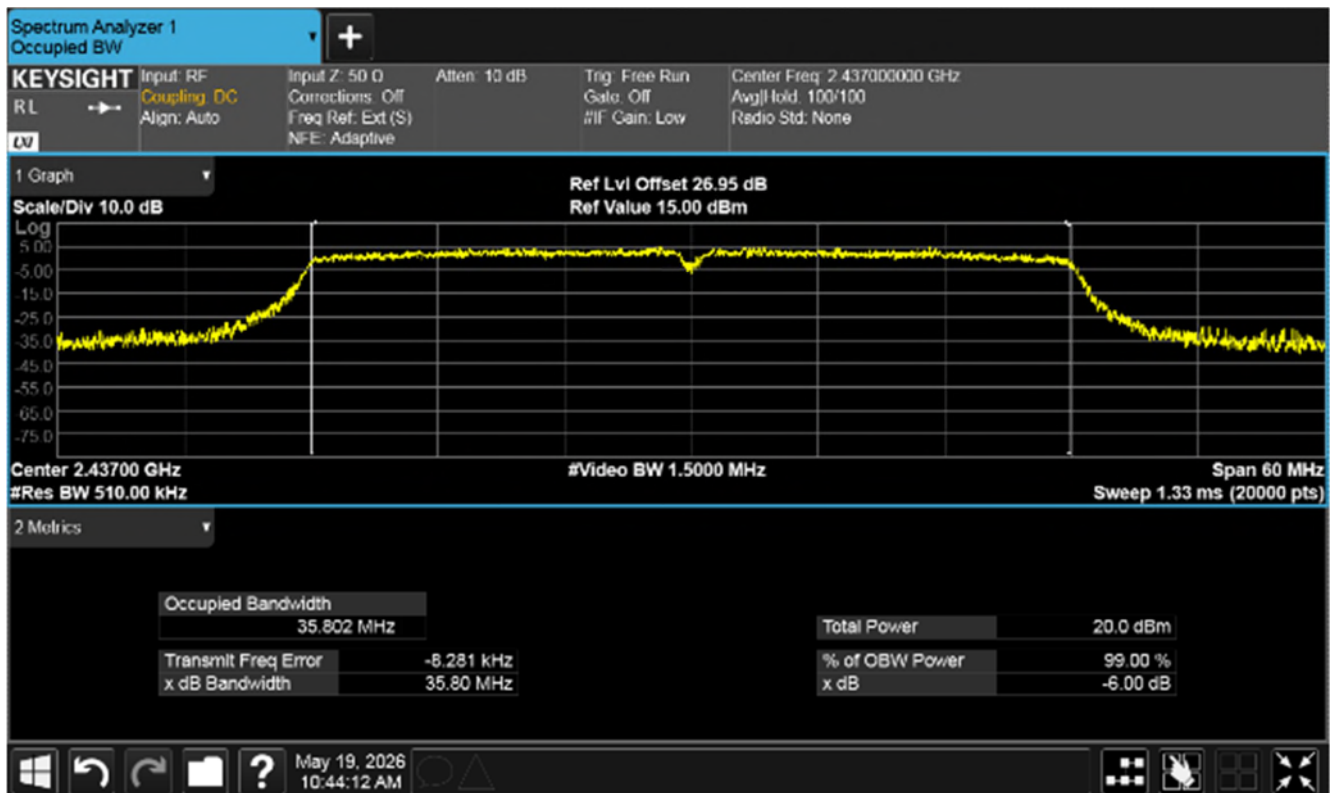
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 40 MHz, Modulation 802.11n, Channel 2422 MHz



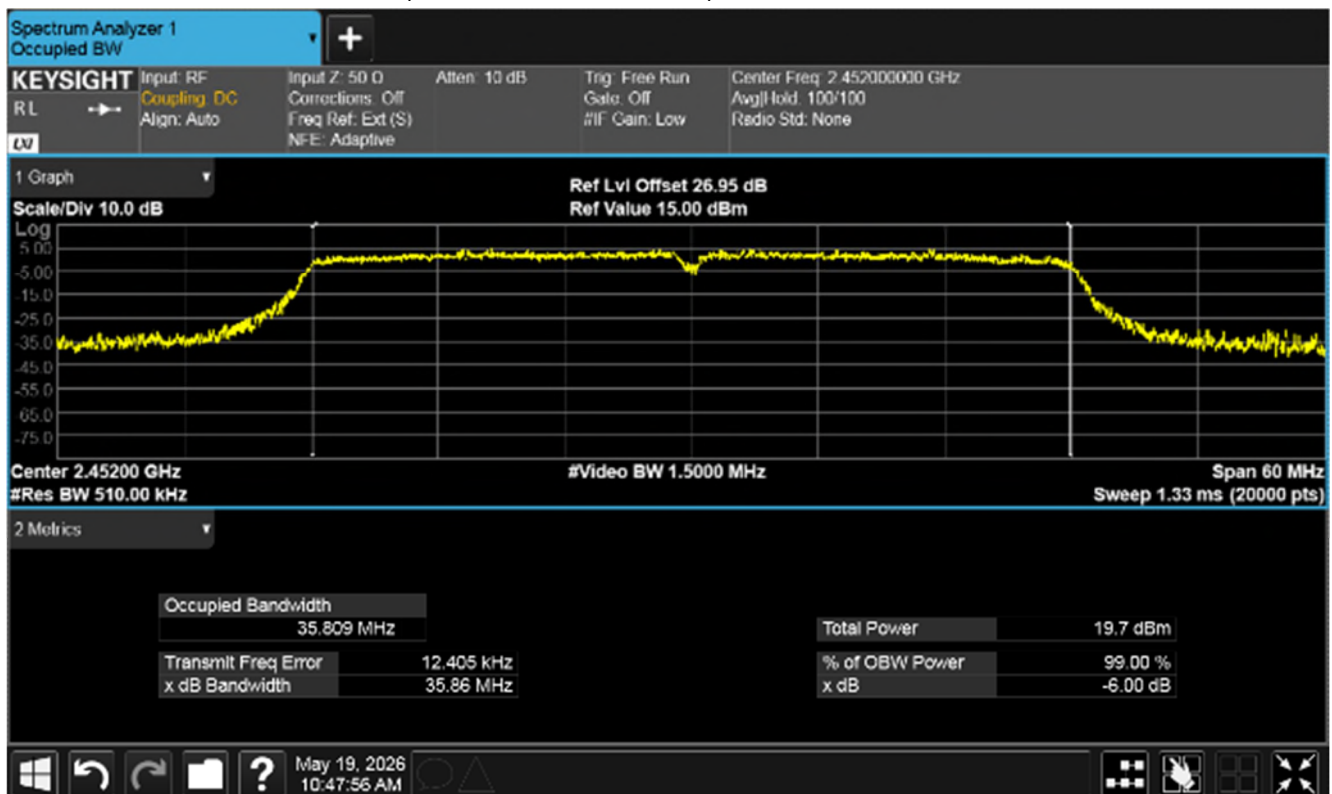
Plot for 6 dB Bandwidth Result (MHz)

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 40 MHz, Modulation 802.11n, Channel 2437 MHz



Plot for 6 dB Bandwidth Result (MHz)

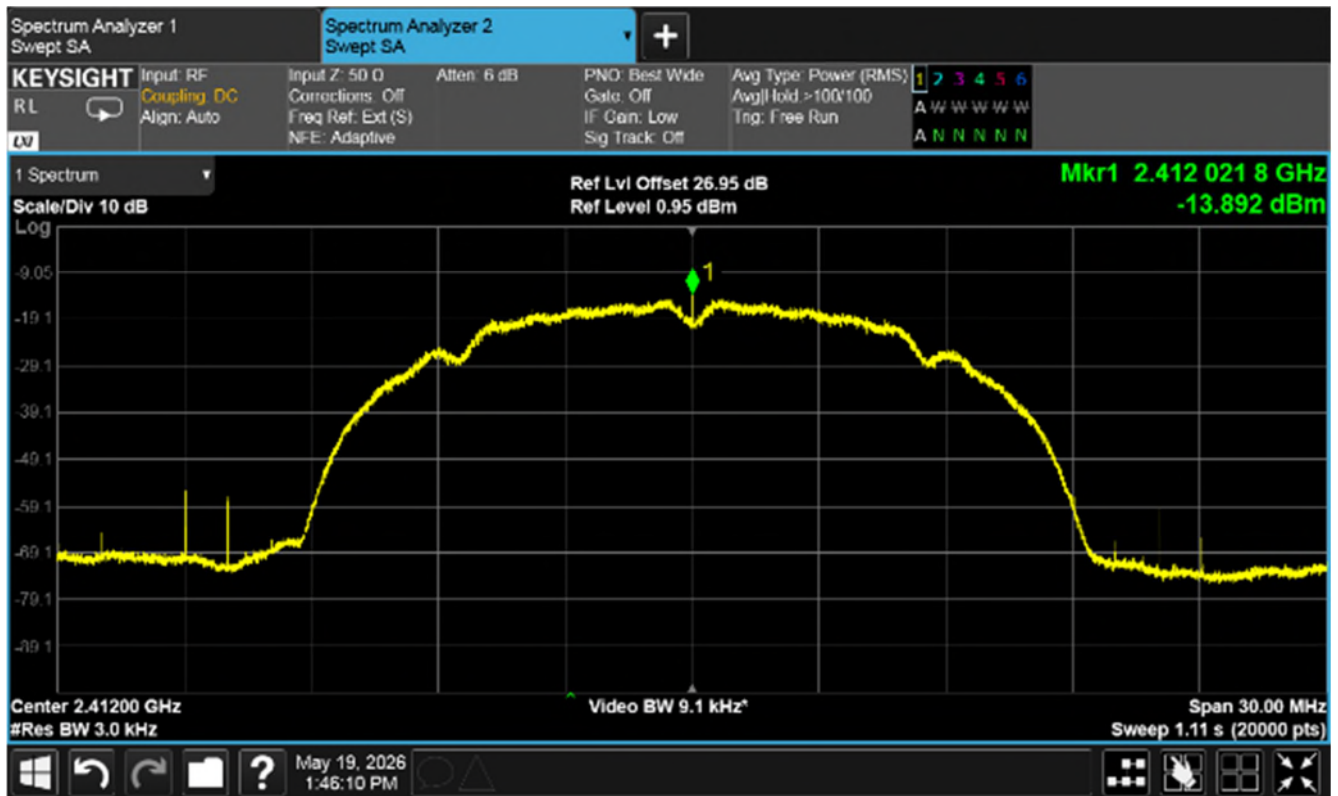
RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 40 MHz, Modulation 802.11n, Channel 2452 MHz



Plot for 6 dB Bandwidth Result (MHz)

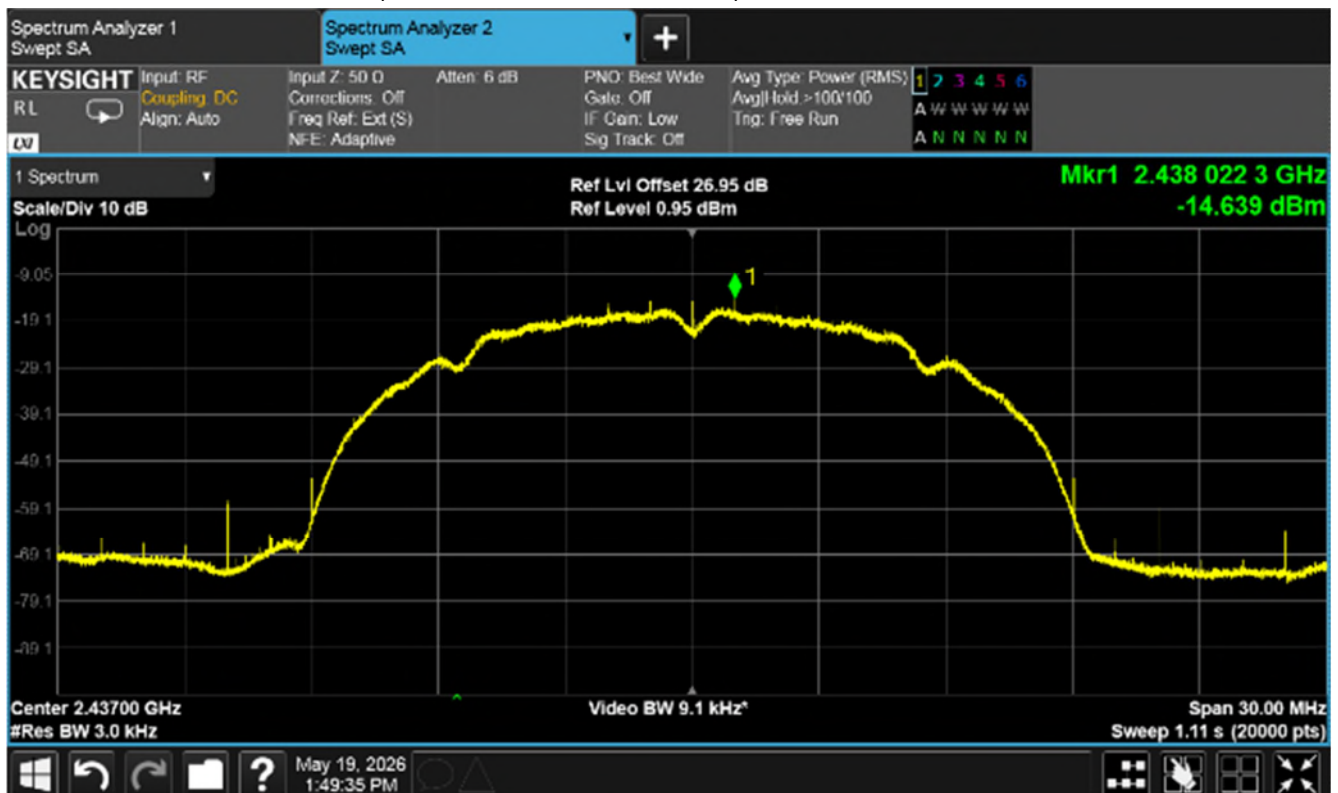
6.7 Maximum Power Spectral Density

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b 1M, Channel 2412 MHz



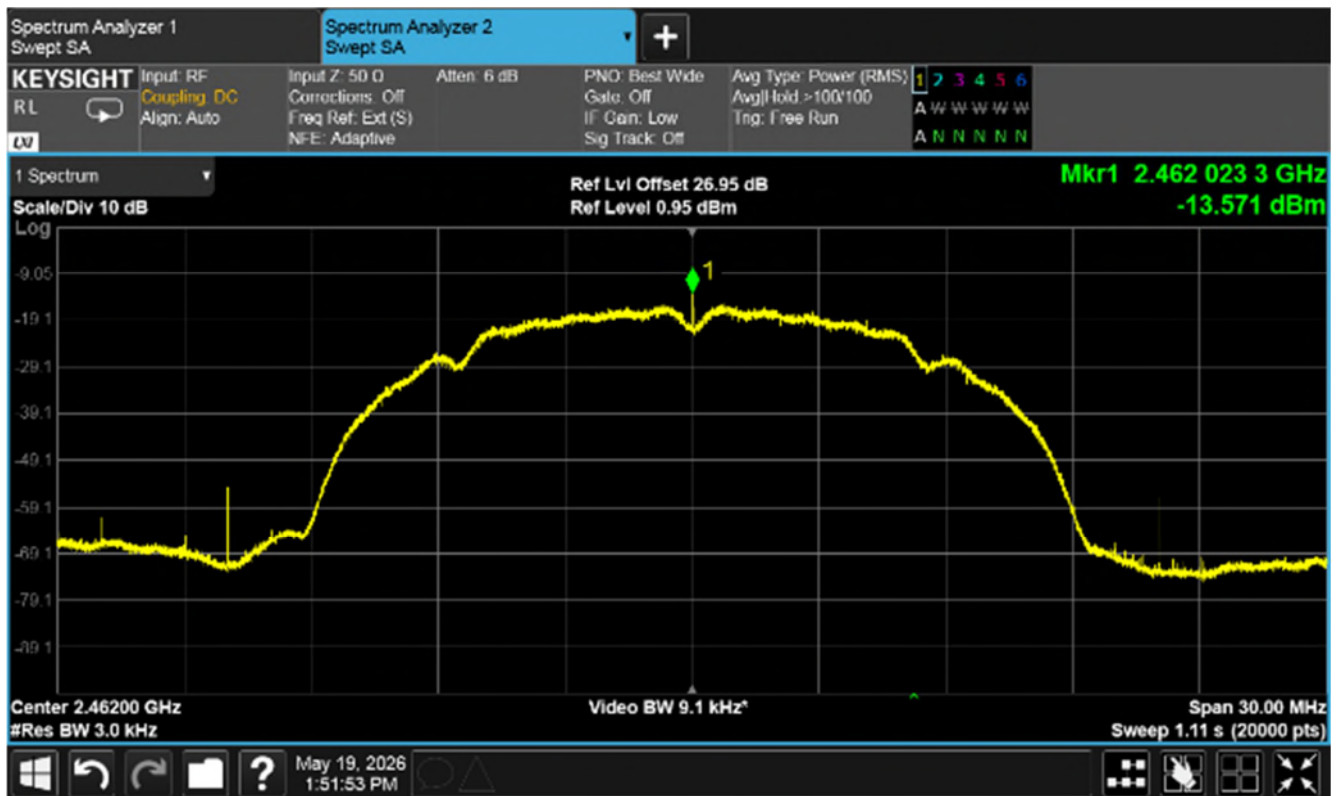
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b 1M, Channel 2437 MHz



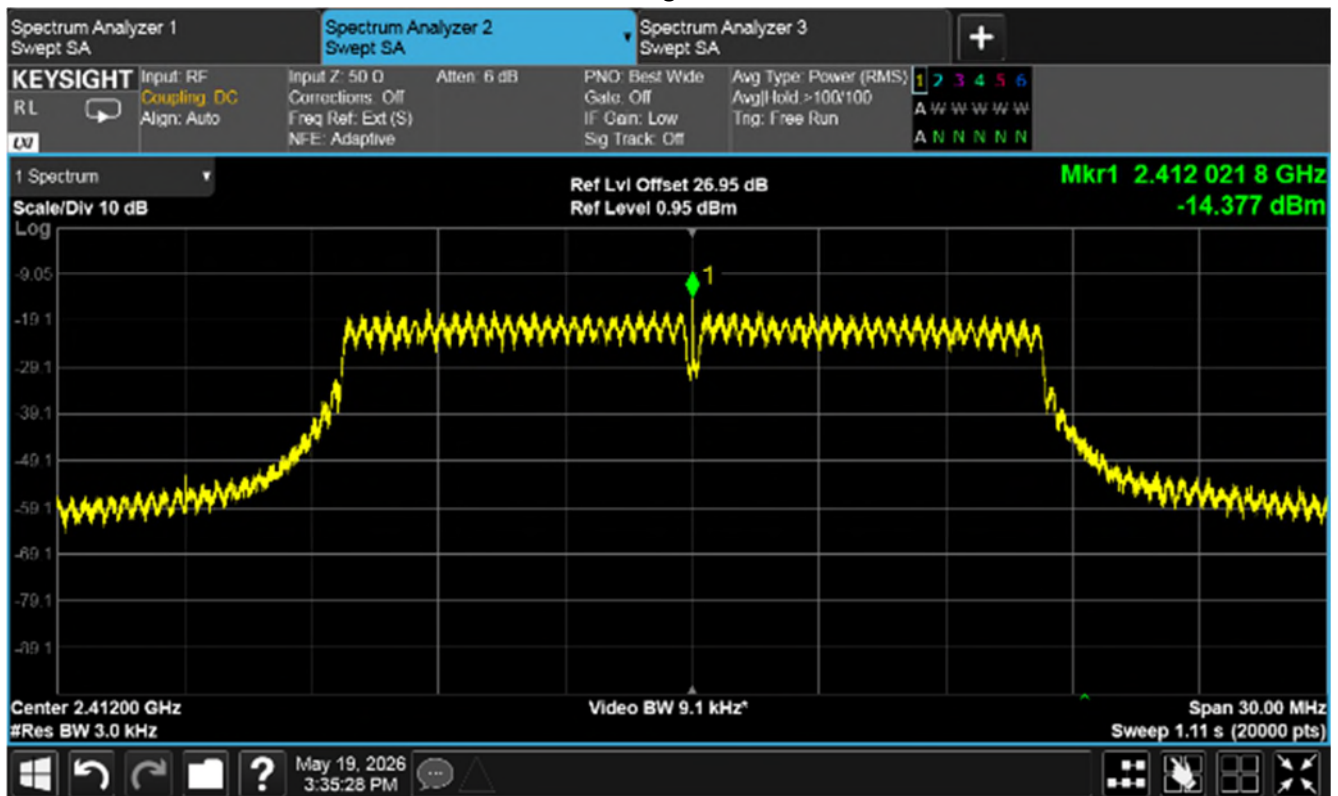
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11b 1M, Channel 2462 MHz



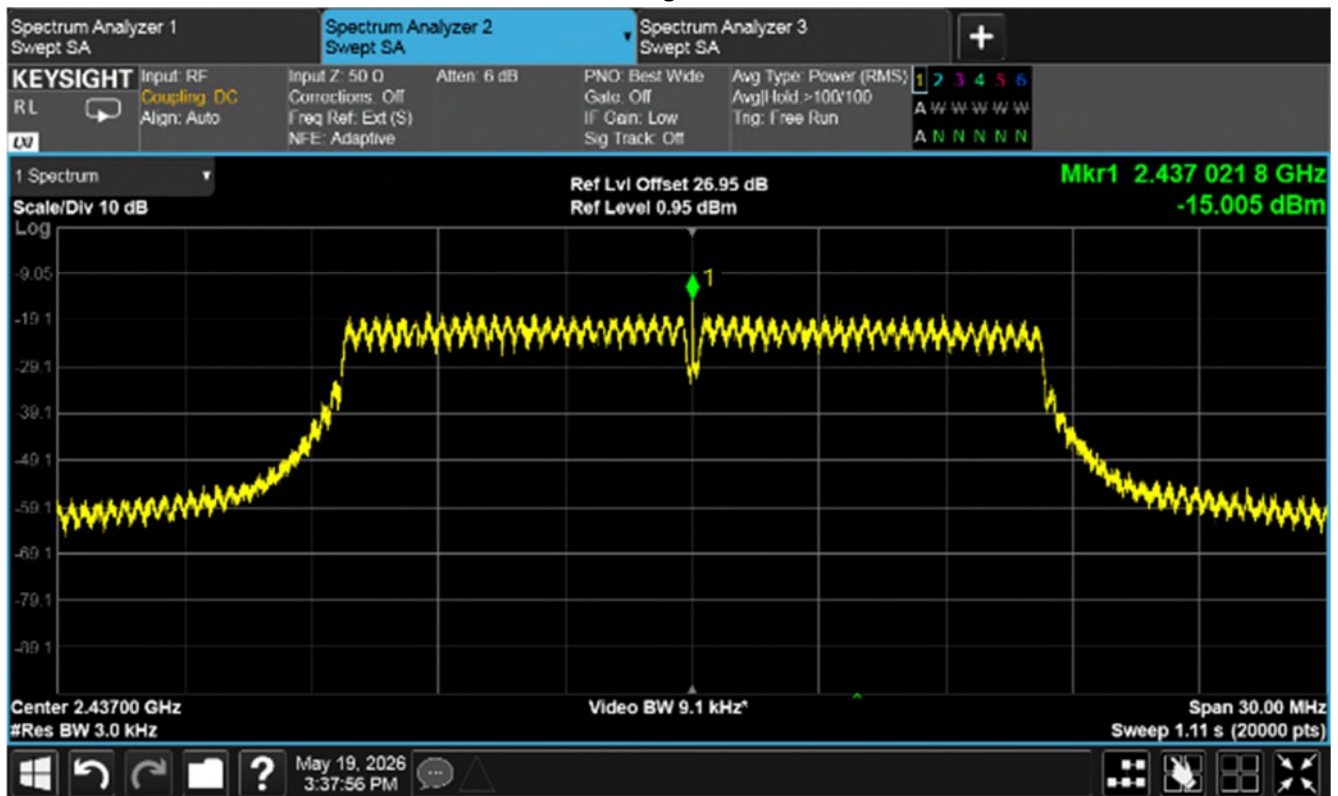
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g 6M, Channel 2412 MHz



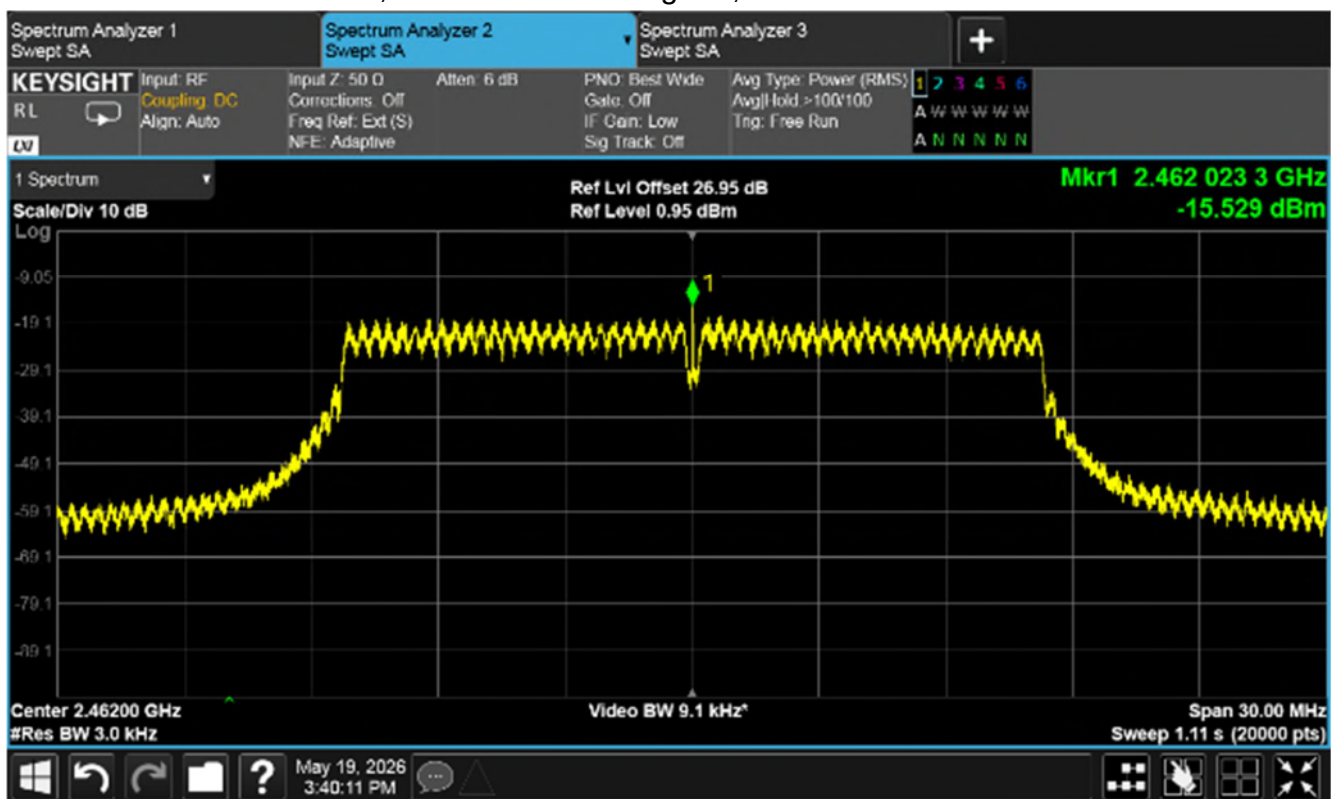
RF Ant port 1 PSD Plot reference

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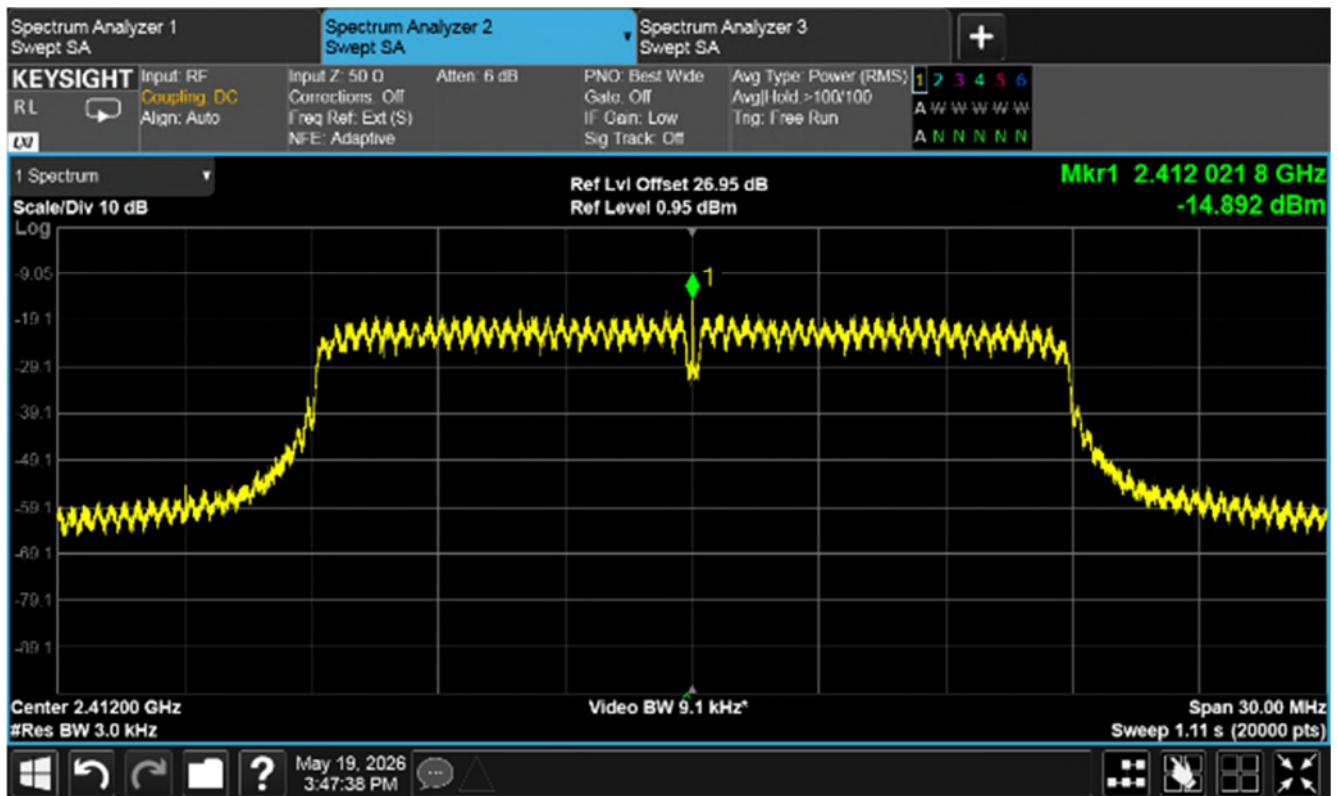
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11g 6M, Channel 2462 MHz



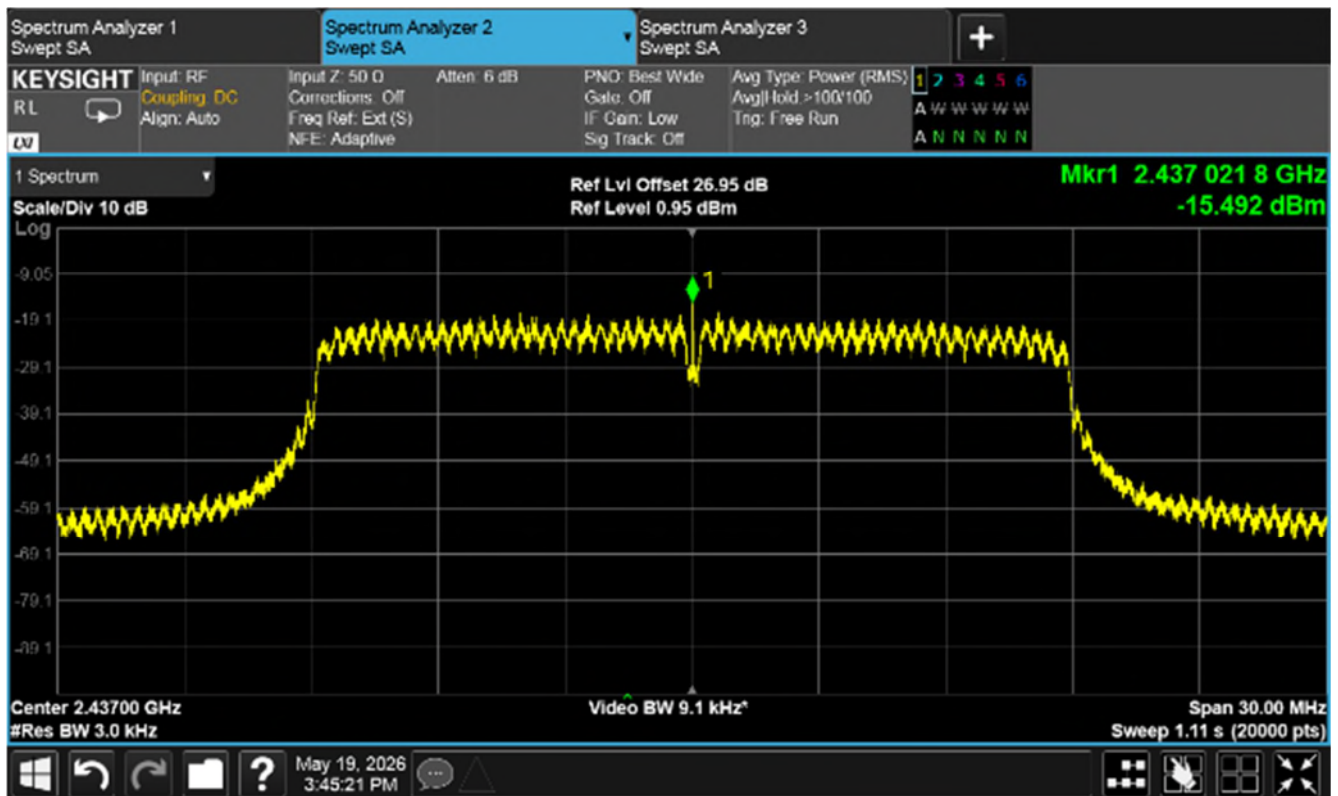
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2412 MHz



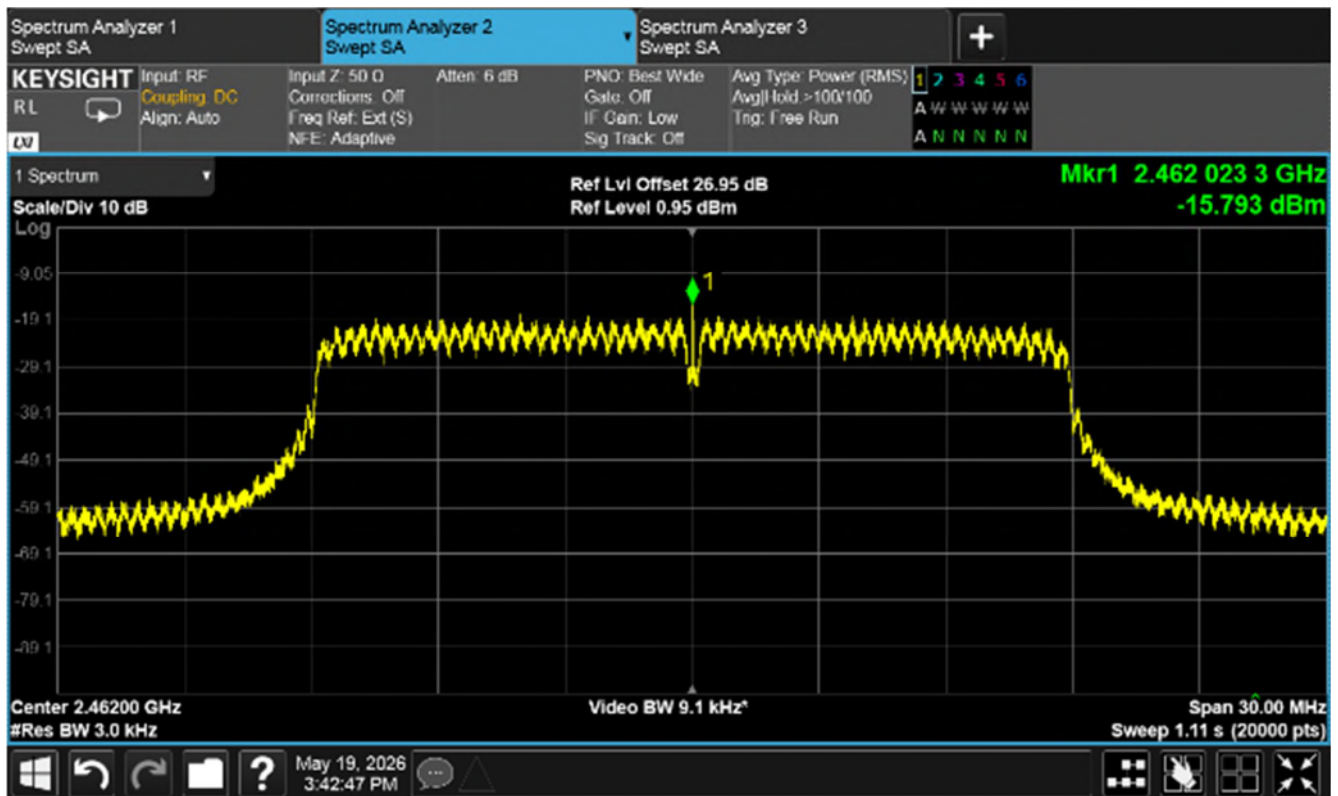
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2437 MHz



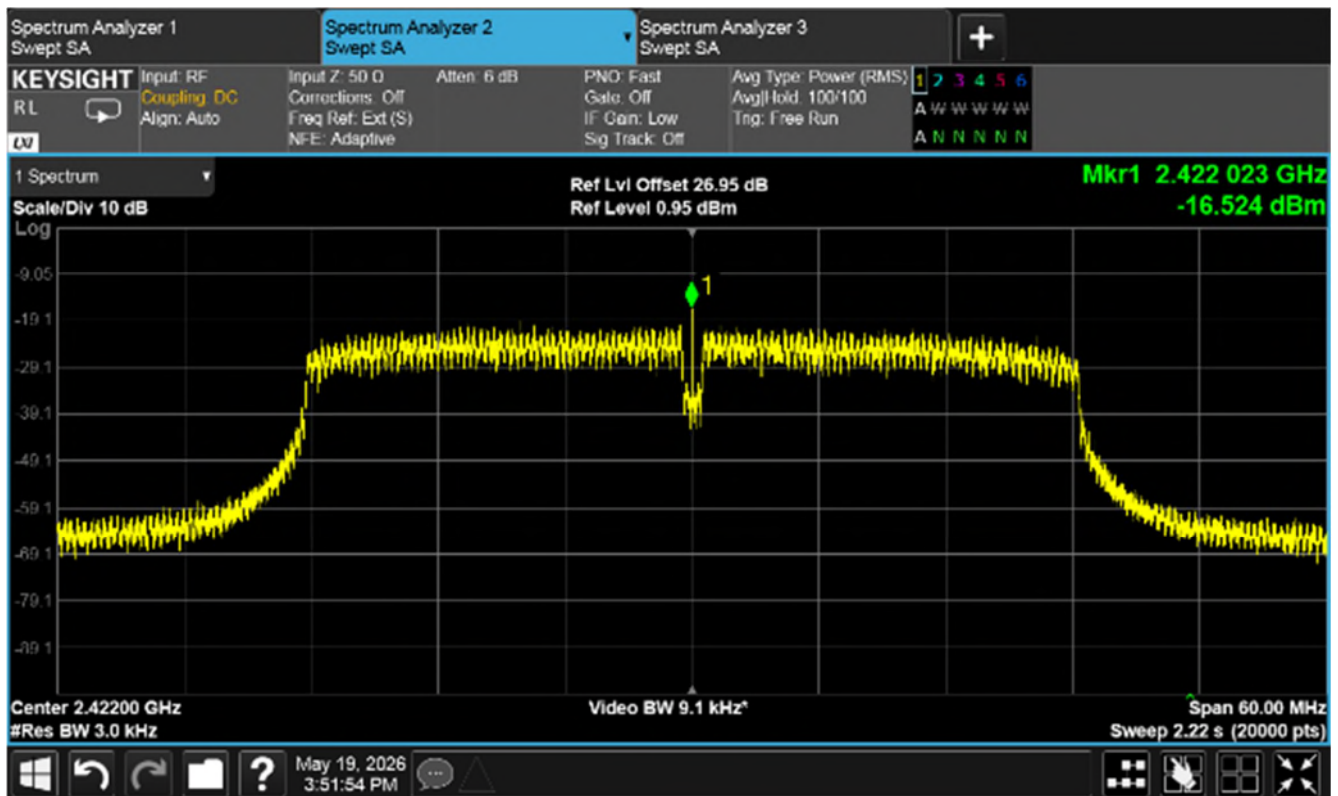
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 20 MHz, Modulation 802.11n Mcs0, Channel 2462 MHz



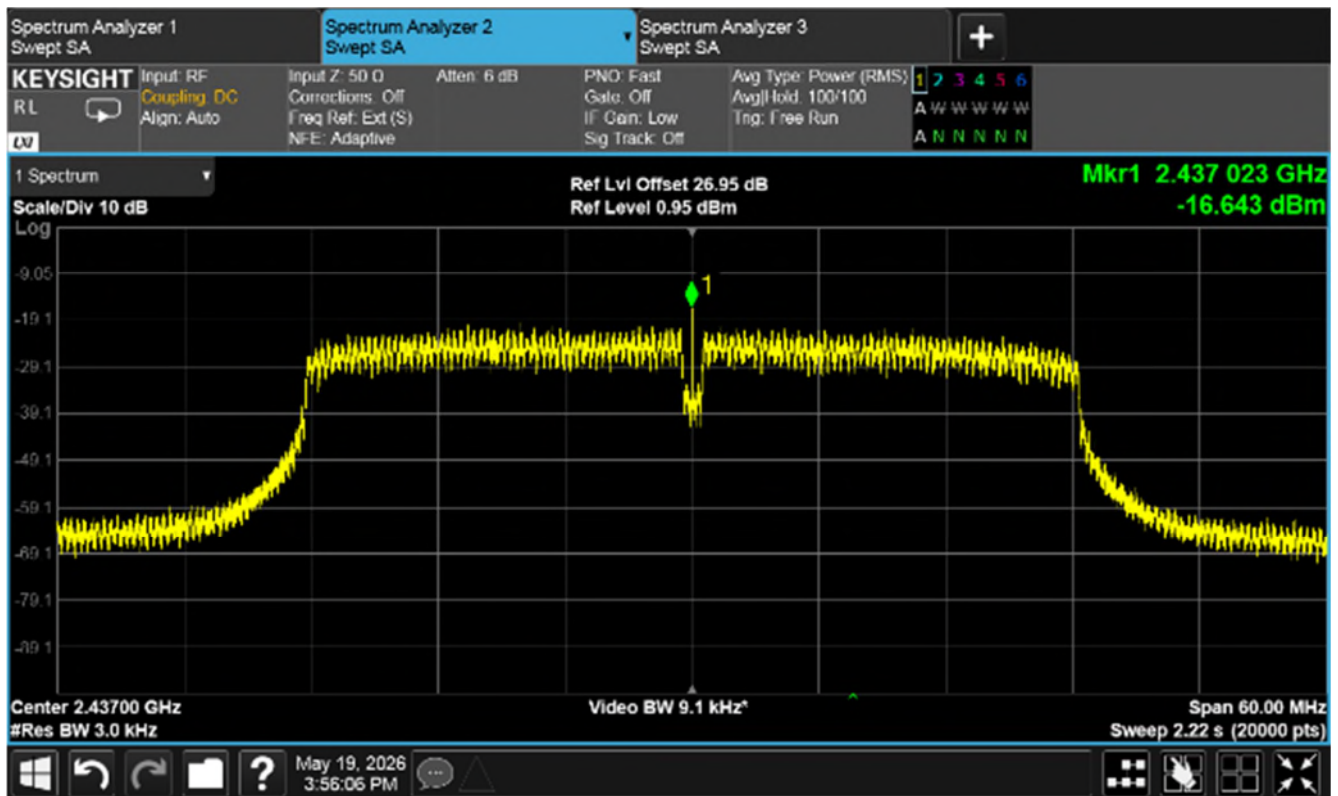
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 40 MHz, Modulation 802.11n Mcs0, Channel 2422 MHz



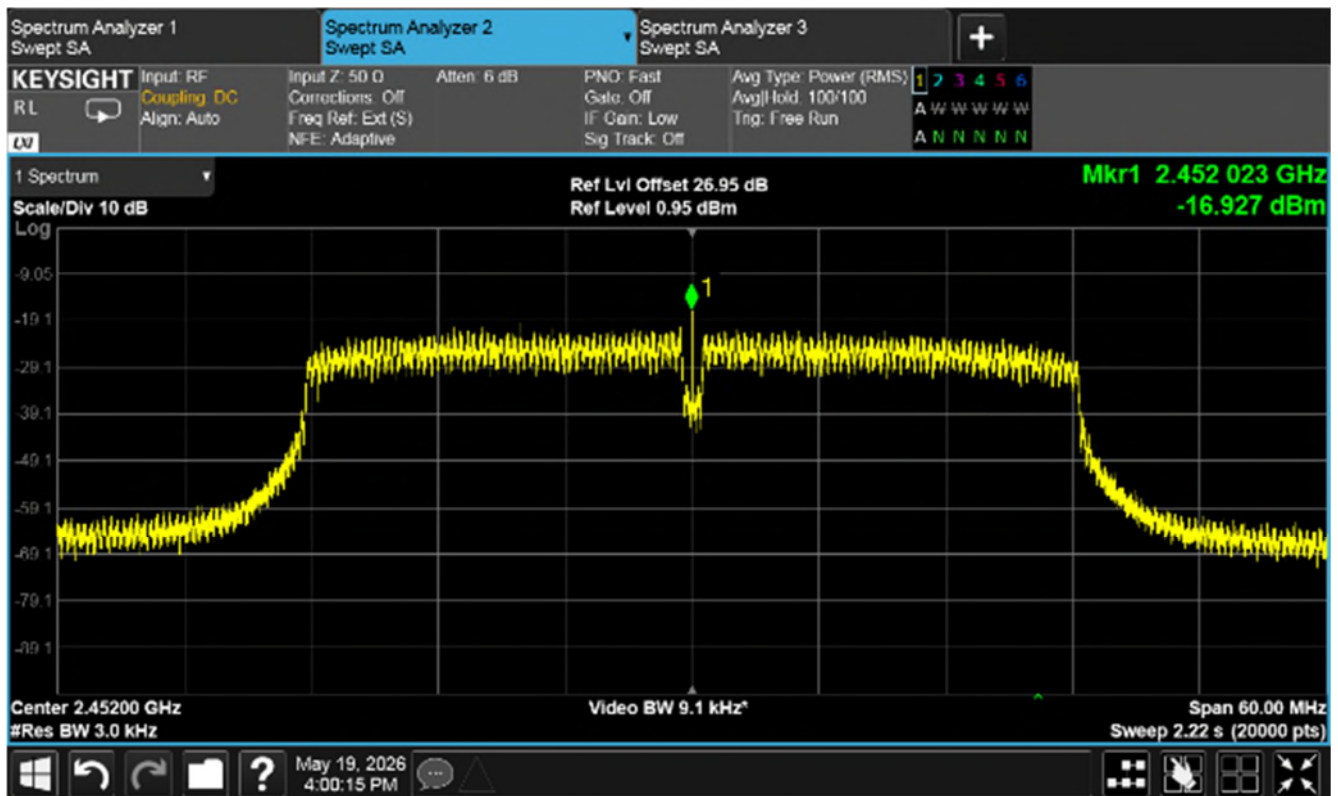
RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 40 MHz, Modulation 802.11n Mcs0, Channel 2437 MHz



RF Ant port 1 PSD Plot reference

RF Parameters: Band 2400-2483.5 MHz, Power 3.5 dB Attenuation set, Channel Spacing 40 MHz, Modulation 802.11n Mcs0, Channel 2452 MHz



RF Ant port 1 PSD Plot reference

7 Explanatory Notes

7.1 Explanation of Table of Signals Measured

Measurements are made as required by the standard. These measurements are made and recorded using detectors, either peak, quasi peak or average dependant on the test. A table of results has been given following the relevant plots. This table looks similar to the one illustrated below dependant on the measurements required by the test: -

Signal No.	Freq (MHz)	Peak Amp (dBμV)	Pk – Lim 1 (dB)	QP Amp (dBμV)	QP - Lim1 (dB)	Av Amp (dBμV)	Av - Lim1 (dB)
1	12345	54.9	-10.5	48	-12.6	37.6	-14.4

Column One - Labelled Signal No. is an incremental number that the receiver has given to each signal that has been measured.

Column Two - Labelled Freq (MHz) is the approximate frequency of the signal received.

Column Three - Labelled Peak Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the peak detector.

Column Four - Labelled Pk - Lim1 (dB) is the difference in level from the peak signal given to the active limit line. If this column appears in the table the peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Five - Labelled QP Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the quasi-peak detector.

Column Six - Labelled QP - Lim1 (dB) is the difference in level from the quasi-peak signal given to the active limit line. If this column appears in the table the quasi-peak detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Column Seven - Labelled Av Amp (dBμV) is the level of received signal that was measured in dB above 1μV using the average detector.

Column Eight - Labelled Av - Lim1 (dB) is the difference in level from the average signal given to the active limit line. If this column appears in the table the average detector measurement is required by the standard for this test. The results entered in this column indicate the signal level relative to the compliance limit required. Negative numbers indicate that the product is compliant.

Only signals highlighted in red are deemed to exceed the limit of the detector required.

7.2 Explanation of limit line calculations for radiated measurements

The limits given in the test standard are normally expressed as absolute values (e.g. in μV/m at a specified distance), whereas the measured values are expressed as peak, quasi peak or average values in dBμV/m referenced to the measuring instrument inputs. Kiwa Electrical Compliance calibrate the test set-up to account for any path losses, antenna gains, etc. so that the value read at the receiver relates directly to the absolute value required, except that it is expressed in dB relative to one microVolt and may need to take account of any alternative measuring distance used. Examples:

(a) limit of 500 μV/m equates to $20.\log(500) = 54$ dB μV/m.

(b) limit of 300 μV/m at 10m equates to $20.\log(300 \cdot 10/3) = 60$ dB μV/m at 3m

(c) limit of 30 $\mu\text{V/m}$ at 30m, but below 30MHz, equates to $20.\log(30) + 40.\log(30/3) = 69.5 \text{ dB}\mu\text{V/m}$ at 3m, as extrapolation factor below 30MHz is 40dB/decade per 15.31(f)(2).

The measurement receiver used for emissions testing, performs the field strength (FS) calculations automatically.

The receiver combines the signal amplitude (RA), Antenna Factor (AF) and Cable Loss (CL) factors for the frequency to be measured.

Example calculation: - FS = RA + AF + CL.

Receiver amplitude (RA)	Antenna factor (3m) (AF)	Cable loss (CL)	Field strength result (3m) (FS)
20dBuV	25 dB	3 dB	48dBuV/m

Additional calculation examples per ANSI C63.10 clause 9.4 – 9.6 equations 21, 22, 25 & 26:

Equation 21: $E_{\text{Linear}} = 10^{((E_{\log} - 120)/20)}$

And therefore equation 21 transposed is: $E_{\log} = 20 \times \log(E_{\text{Linear}}) + 120$

Where:

E_{Linear} is the field strength of the emission in V/m

$E_{\log}$ is the field strength of the emissions in dB $\mu\text{V/m}$

Equation 22: $\text{EIRP} = 21.98 - 20\log(\lambda) + 20\log(d_{\text{Meas}}) + P - G$

Where:

EIRP is equivalent isotropically radiated power in dBm

λ is the wavelength of the emission under investigation ($300/f(\text{MHz})$) in m

d_{Meas} is the measurement distance in metres

P is the power measured at the output of the measurement antenna, in dBm

G is the gain of the measurement antenna in dBi

Equation 25: $\text{PD} = \text{EIRP}_{\text{Linear}} / 4\pi d^2$

And therefore equation 25 transposed is: $\text{EIRP}_{\text{Linear}} = \text{PD} \times 4\pi d^2$

Where:

PD is the power density at distance specified by the limit, in W/m²

$\text{EIRP}_{\text{Linear}}$ is the equivalent isotropically radiated power in Watts

d is the distance at which the power density limit is specified in metres

Equation 26: $\text{PD} = E_{\text{Spec limit}}^2 / 377$

And therefore equation 26 transposed is: $E_{\text{Spec limit}} = \sqrt{\text{PD} \times 377}$

Where:

PD is the power density at distance specified by the limit, in W/m²

$E_{\text{Spec limit}}$ is the field strength at the distance specified by the limit in V/m

Example:

Radiated spurious emissions limit at 3metres of 90pW/cm².

$90\text{pW/cm}^2 \times 100^2 = 0.9 \mu\text{W/m}^2 = (\text{EIRP Linear})$

Equation 25 transposed: $0.9 \times 10^{-6} \times 4 \times \pi \times 3^2 = 0.0001017876 \text{ W}$

And

Equation 26 transposed: $E_{\text{Spec limit}} = \sqrt{(0.9 \times 10^{-6} \times 377)} = 0.01842 \text{ V/m}$.

And

Equation 21 transposed: $E_{\log} = 20\log(0.01842) + 120 = 85.3\text{dB}\mu\text{V/m} @ 3\text{m}$.