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MEASUREMENT REPORT
FCC Part 15.247 Bluetooth

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
11/12/25 - 1/7/26
Test Report Issue Date:
1/9/2026
Test Site/Location:
Element Lab., Columbia, MD, USA
Test Report Serial No.:
1M2508270083-11-R1.A3L

FCC ID:	**A3LSMS947B**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-S947B/DS
Additional Model(s):	SM-S947B
EUT Type:	Portable Handset
Max. RF Output Power:	144.046 mW (21.59 dBm) Peak Conducted
Frequency Range:	2402 – 2480MHz
Type of Modulation:	GFSK, π/4-DQPSK, 8DPSK
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter (DSS)
Test Procedure(s):	ANSI C63.10:2020 + Cor. 1:2023, KDB 648474 D03 v01r04

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10:2020. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 1M2508270083-11-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M2508270083-11.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

TEST REPORT REVISION HISTORY

Rev. No.	Description	Issue Date	Revised By
-	Initial Release	1/8/2026	WKR0000005883
1	Addressed comments made by TCB reviewer	1/9/2026	WKR0000005883

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 Element Test Location

Measurements were conducted at the Element laboratory(ies) indicated in Section 1.3 below. All measurement facilities are compliant with the test site requirements specified in ANSI C63.4:2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- Element Washington DC LLC facility is a registered test laboratory with the site description on file with ISED (Wireless Test Lab number 2451B) and FCC (Designation Number US1113).

- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreements (MRAs).

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS947B**. The test data contained in this report pertains only to the emissions due to the EUT's Bluetooth transmitter.

- This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:
  - A) The hopping sequence is pseudorandom
  - B) All channels are used equally on average
  - C) The receiver input bandwidth equals the transmit bandwidth
  - D) The receiver hops in sequence with the transmit signal
- 15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.
- 15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate its channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.
- 15.247(h): The EUT employs Adaptive Frequency Hopping (AFH) which identifies sources of interference namely devices operating in 802.11 WLAN and excludes them from the list of available channels. The process of re-mapping reduces the number of test channels from 79 channels to a minimum number of 20 channels.

Test Device Serial No.: 2938M, 2948M, 2809M, 2846M, 2956M, 2974M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1), 802.11b/g/n/ac/ax/be, WLAN, 802.11a/n/ac/ax/be UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

Ch.	Frequency (MHz)
00	2402
:	:
39	2441
:	:
78	2480

Table 2-1. Frequency/ Channel Operations

Note: This device is capable of operating in hopping and non-hopping mode. The EUT can hop between 79 different channels in the 2400 – 2483.5MHz band.

2.3 Antenna Description

The manufacturer provided the antenna gains which can affect the validity of test results used for determination of compliance. The following antenna gains are used in this device per the "Unlicensed Band Antenna Gain" document provided by the client. This document is also included in the filing as a public exhibit.

Frequency [GHz]	Antenna-1 Gain (dBi)	Antenna-2 Gain (dBi)	Directional Antenna Gain (dBi)
2.4	-4.06	-5.58	-1.78

Table 2-2. Antenna Peak Gain

Note: This device is capable of operating in hopping and non-hopping mode. The EUT can hop between 79 different channels in the 2400 – 2483.5MHz band.

2.4 Test Configuration

The EUT was tested per the guidance of ANSI C63.10:2020. ANSI C63.10:2020 was also used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, and 7.8 for antenna port conducted emissions test setups. The worst case radiated emissions data is shown in this report.

The emissions below 1GHz and above 18GHz were tested with the highest transmitting power channel and the worst-case configuration.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report. The worst orientation was found to be Y-orientation (landscape).

For AC line conducted and radiated test below 1GHz, following configuration were investigated and EUT powered by AC/DC was the worst case.

- EUT powered by AC/DC adaptor via USB cable with wire charger
- EUT powered by host PC via USB cable with wire charger

π/4-DQPSK has been investigated and confirmed as not the worst case.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) FCC ID: EP-2400 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

2.5 Software and Firmware

The test was conducted with software/firmware version S947BXXU0AYKQ installed on the EUT.

2.6 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10:2020) was used in the measurement of the EUT.

Deviation from measurement procedure……..…….....None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The line-conducted facility is located inside a 7m x 3.66m x 2.7m shielded enclosure. The shielded enclosure is manufactured by AP Americas. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1-meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that the cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst-case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section7.12. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3-meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4:2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst-case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4:2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antennas of the EUT are **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10:2020. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

Table 5-1. Measurement Uncertainty Budget

6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurement antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	MD 1M 40	EMC Cable and Switch System	#N/A	Annual	#N/A	MD 1M 40
-	AP1-002	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	AP1-002
-	AP2-001	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	AP2-001
-	AP2-002	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	AP2-002
-	ETS-001	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	ETS-001
-	ETS-002	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	ETS-002
-	WL25-1	Conducted Cable Set (25GHz)	2/25/2025	Annual	2/25/2026	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	2/25/2025	Annual	2/25/2026	WL25-2
-	WL40-1	Conducted Cable Set (40GHz)	2/25/2025	Annual	2/25/2026	WL40-1
Agilent	N9038A	MXE EMI Receiver	11/10/2025	Annual	11/10/2026	MY51210133
Anritsu	MA24408A	POWER SENSOR	2/11/2025	Annual	2/11/2026	12776
EMCO	3115	Horn Antenna (1-18GHz)	9/6/2024	Biennial	9/6/2026	9704-5182
Espec	ESX-2CA	Environmental Chamber	11/20/2024	Biennial	11/20/2026	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	6/4/2025	Biennial	6/4/2027	125518
ETS-Lindgren	3164-05	Quad Ridge Horn (Small) 2 - 18GHz	6/4/2025	Biennial	6/4/2027	208255
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	4/21/2025	Biennial	4/21/2027	114451
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	6/6/2025	Annual	6/6/2026	MY52350166
Keysight Technologies	N9020A	MXA Signal Analyzer	6/4/2025	Annual	6/4/2026	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer	11/3/2025	Annual	11/3/2026	MY54490576
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	3/25/2025	Annual	3/25/2026	NMLC-2
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/25/2025	Annual	3/25/2026	101716
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	12/19/2025	Annual	12/19/2026	100342
Rohde & Schwarz	180-422-KF	Horn (18 - 40GHz)	10/9/2024	Biennial	10/9/2026	U157403-01
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	9/11/2024	Biennial	9/11/2026	A051107
Sunol	JB6	Bi-Log Antenna (30M - 5GHz)	3/24/2025	Biennial	3/24/2027	A082816

Table 6-1. Test Equipment Calibration Table

Note:

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
Equipment listed with “N/A under calibration information was not used to make calibrated measurements.

Component	Serial Number
MegaPhase Cable TM26-S1S1-36	18160103 003
Pasternack 6dB Attenuator PE7005-6	N/A

Table 6-2. WL25-1 Conducted Cable Set Components

Component	Serial Number
MiniCircuirs Cable CBL-2FT-SMSM+	77743
MCL 6dB Attenuator BW-S6W2+	1314

Table 6-3. WL25-2 Conducted Cable Set Components

Component	Serial Number
MegaPhase Cable TM40K1K1-36	18160102 001
MCL 10dB Attenuator BW-K10 2W44+	1902

Table 6-4. WL40-1 Conducted Cable Set Components

Component	Serial Number
Pasternack Cable RG214/U	111815
MegaPhase (CAGE 1GVT4) Cable GR18-N5N5-24	14042714 001

Table 6-5. ETS-001 EMC Cable and Switch System Components

Component	Serial Number
MegaPhase (CAGE 1GVT4) Cable GR18-N5N5-24	14042714 001
MegaPhase (CAGE 1GVT4) Cable NC29-N1N1-324	20502201 001
Rohde & Schwarz SF Unit	102134
Minicircuits Cable CBL=0.5M-NMNM+	15440

Table 6-6. ETS-002 EMC Cable and Switch System Components

Component	Serial Number
Sucoflex 106A Cable	501992
MegaPhase Cable N29-N1N1-324	20335606 001
Rohde & Schwarz SF Unit	102133
MiniCircuits Cable CBL-2FT-SMSM+	77745
MegaPhase Cable 10511-1	15034701 001
MiniCircuits Switch RC 2SPDT-A18	11703270 041
Sucoflex 104 Cable	320259/4
Sucoflex 104 Cable	321999/4
Sucoflex 104 Cable	321995/4

Table 6-7. AP1-002 EMC Cable and Switch System Components

Component	Serial Number
Flex Cable	P2A-0001
Micro-Coax Utilfex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-003
Chamber Passthrough	CP4/X12
Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-003
Micro-Coax Utiflex Cable UFB142A-0-0629-5GU200 MFR 6463	232069-001
Rohde & Schwarz TS-PR8 Pre-Amplifier	102335
Rohde & Schwarz OSP130 Open Switch and Control Unit	101181

Table 6-8. AP2-001 EMC Cable and Switch System Components

Component	Serial Number
MiniCircuits Cable CBL-0.5M-SMNM+	47261
Micro-Coax Utilfex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-001
Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-002
MegaPhase (CAGE 1GVT4) Cable NC29-N1N1-324	19046401 001
Megaphase (CAGE 1GVT4) Flex Cable 10511-1	15044701-006
Micro-Coax Utiflex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-002
Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-004
Micro-Coax Utiflex Cable UFB142A-0-0629-5GU200 MFR 64639	232069-001
Rohde & Schwarz SF Unit	102138
Rohde & Schwarz OSP130 Open Switch and Control Unit	101181
Micro-Coax Utilfex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-003
· Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-003
Rohde & Schwarz TS-PR8 Pre-Amplifier	102335

Table 6-9. AP2-002 EMC Cable and Switch System Components

Component	Serial Number
MegaPhase Cable TM40-K1K1-30	20233002-004
UTIPLEX Cable	64639 232063-001
Rohde & Schwarz Pre-amp RS-PR1840 18G-40G	9037.7670.02

Table 6-10. MD 1M 18-40 EMC Cable and Switch System Components

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMS947B

Method/System: Frequency Hopping Spread Spectrum (FHSS)

Number of Channels: 79

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(1)(iii)	20dB Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
15.247(b)(1)	Peak Transmitter Output Power	< 1 Watt if ≥ 75 non-overlapping channels used		PASS	Section 7.3
15.247(a)(1)	Channel Separation	> 2/3 of 20 dB BW for systems with Output Power < 125mW		PASS	Section 7.5
15.247(a)(1)(iii)	Number of Channels	> 15 Channels		PASS	Section 7.7
15.247(a)(1)(iii)	Time of Occupancy	< 0.4 sec in 31.6 sec period		PASS	Section 7.6
15.247(d)	Band Edge / Out-of-Band Emissions	Conducted > 20dBc		PASS	Section 7.4, Section 7.8
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-247 limits)	RADIATED	PASS	Section 7.9, Section 7.10, Section 7.11
15.207	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits (RSS-Gen [8.8] limits)	LINE CONDUCTED	PASS	Section 7.12

Table 7-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "BT Auto," Version 3.5.
5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Chamber Automation," Version 1.3.1.

7.2 20dB Bandwidth Measurement

Test Overview and Limit

The bandwidth at 20dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

Test Procedure Used

ANSI C63.10:2020 – Section 6.9.2

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 20dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 20. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% OBW
3. VBW ≥ 3 x RBW
4. Reference level set to keep signal from exceeding maximum input mixer level for linear operation.
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

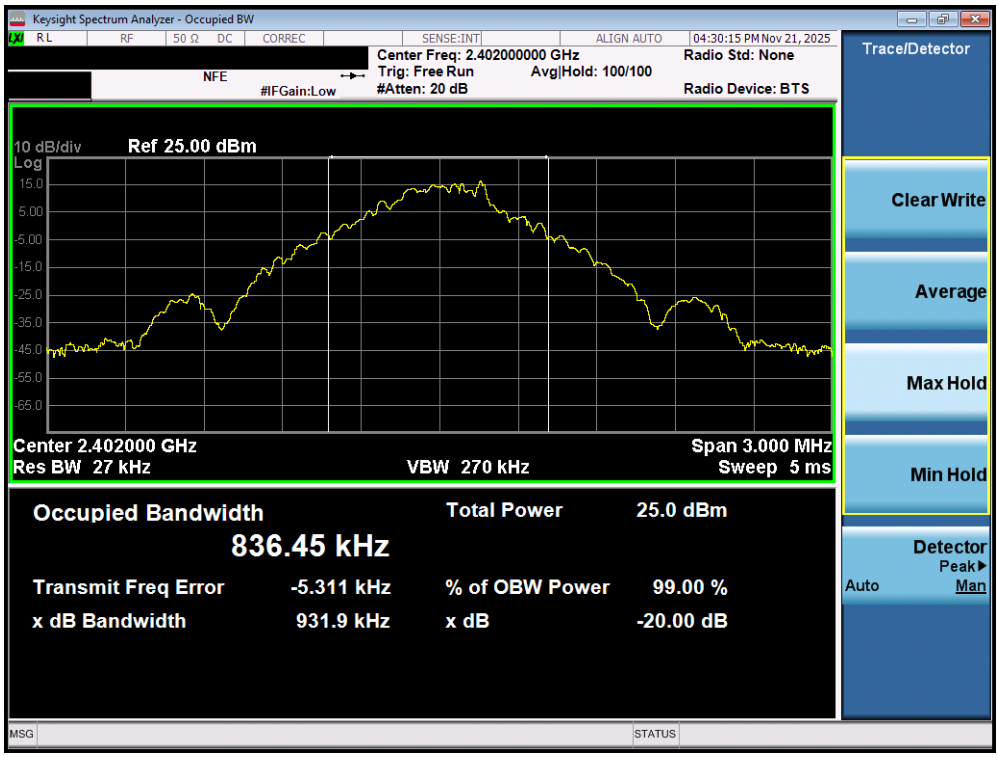
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

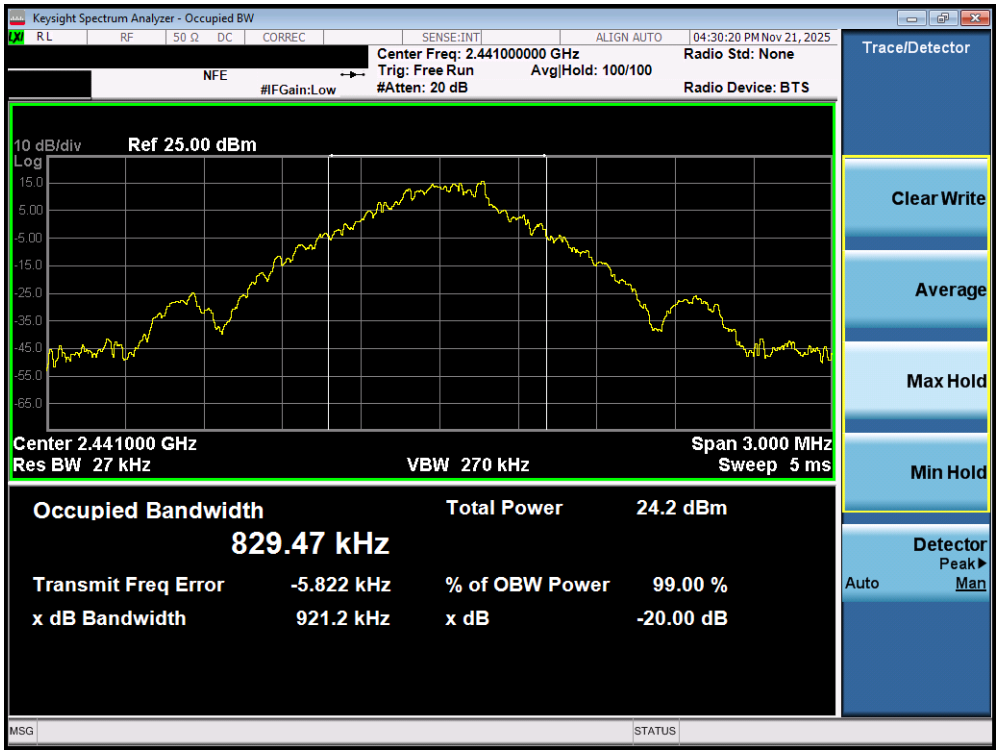
None

Frequency [MHz]	Data Rate [Mbps]	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	0	931.90
2441	1.0	39	921.20
2480	1.0	78	932.50
2402	2.0	0	1285.00
2441	2.0	39	1270.00
2480	2.0	78	1344.00
2402	3.0	0	1321.00
2441	3.0	39	1295.00
2480	3.0	78	1339.00

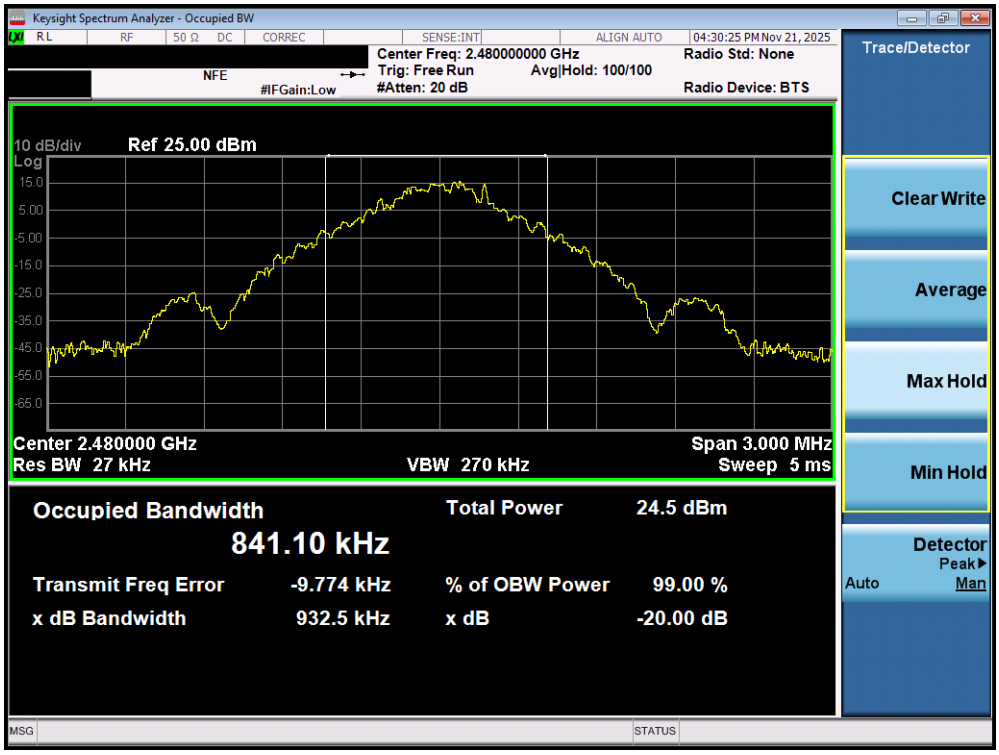
Table 7-2. Conducted 20dB Bandwidth Measurements – Ant 1



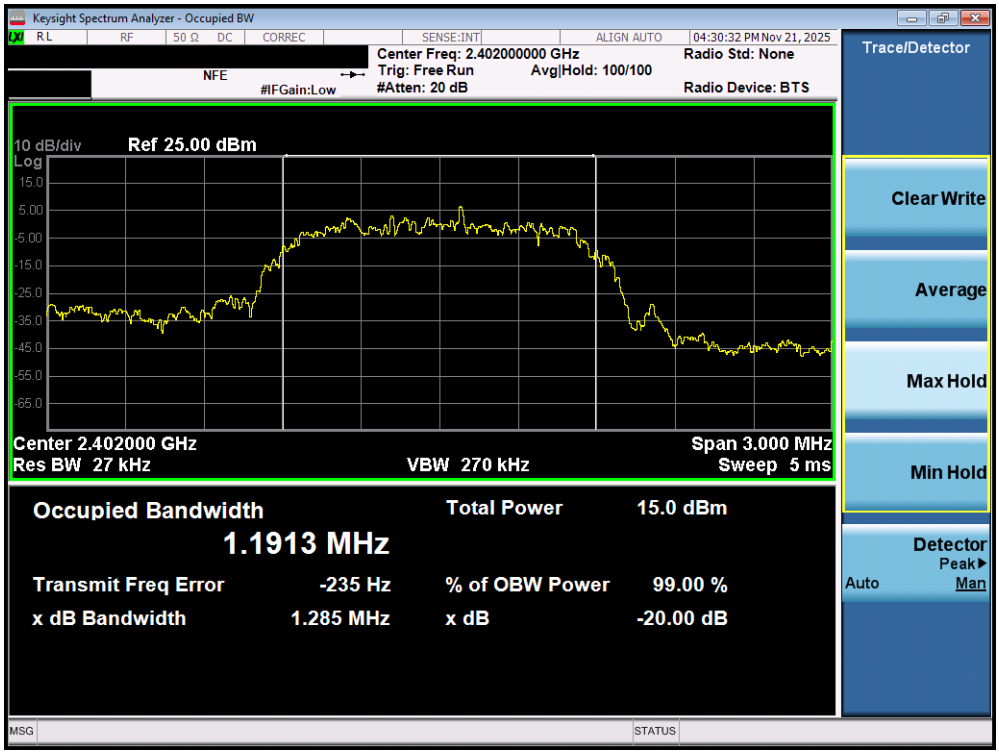
Plot 7-1. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 0) – Ant 1



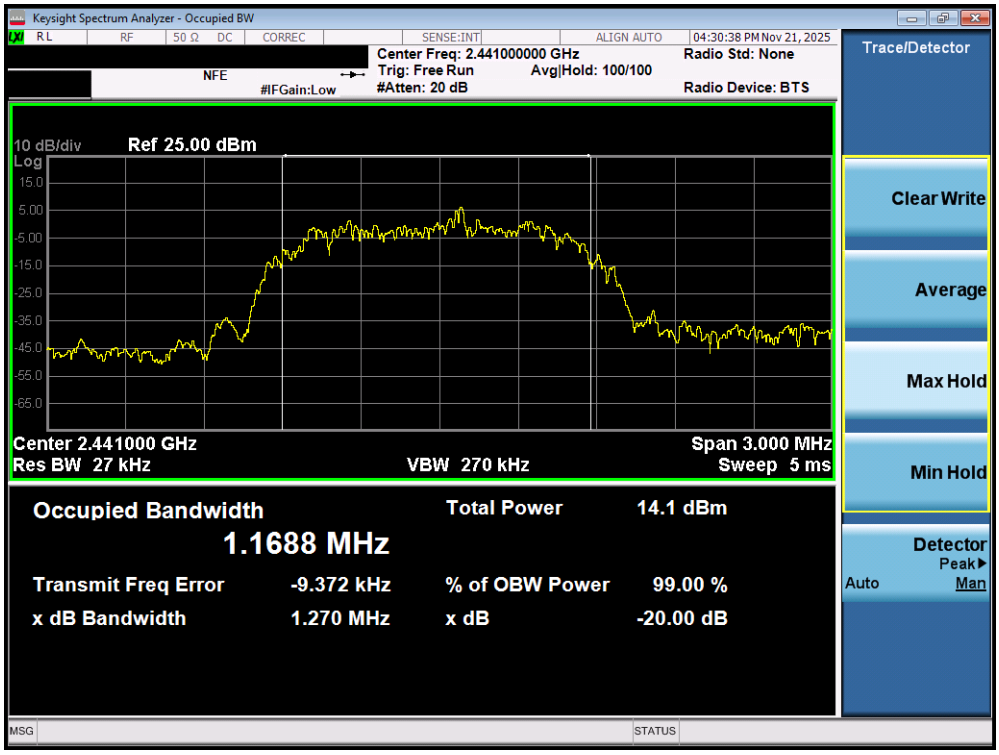
Plot 7-2. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 39) – Ant 1



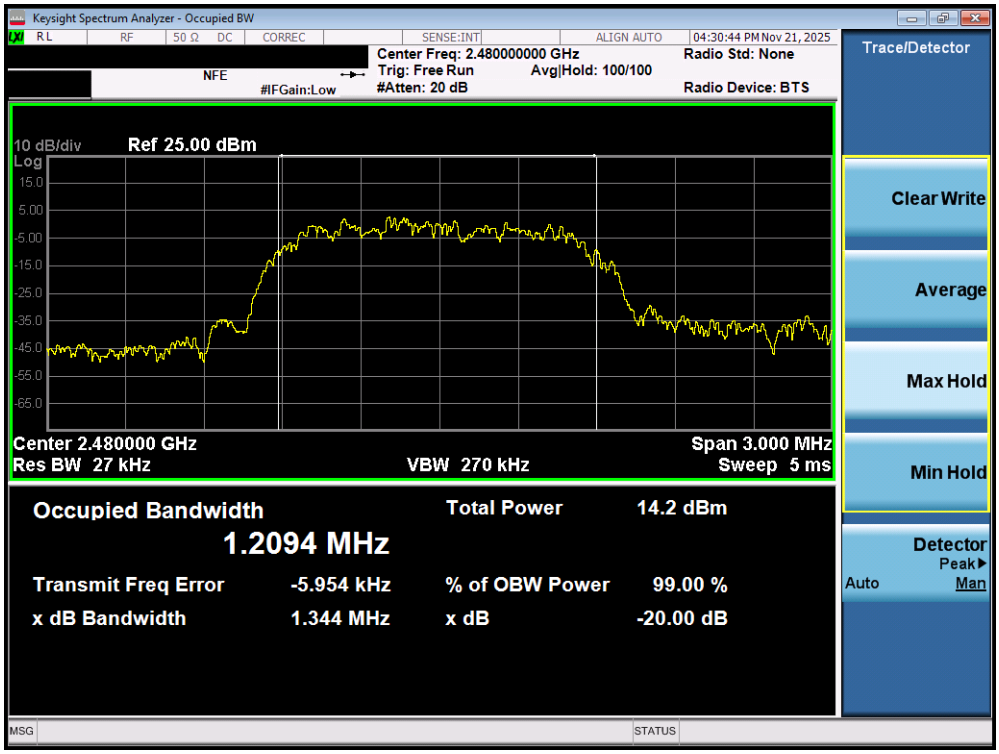
Plot 7-3. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 78) – Ant 1



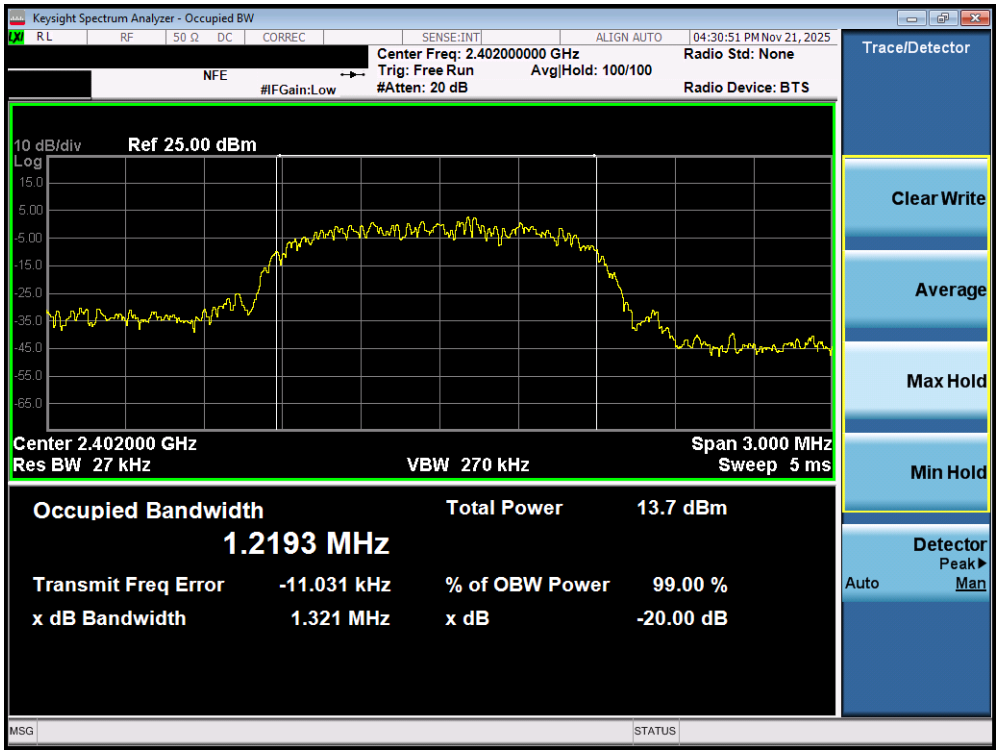
Plot 7-4. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 0) – Ant 1



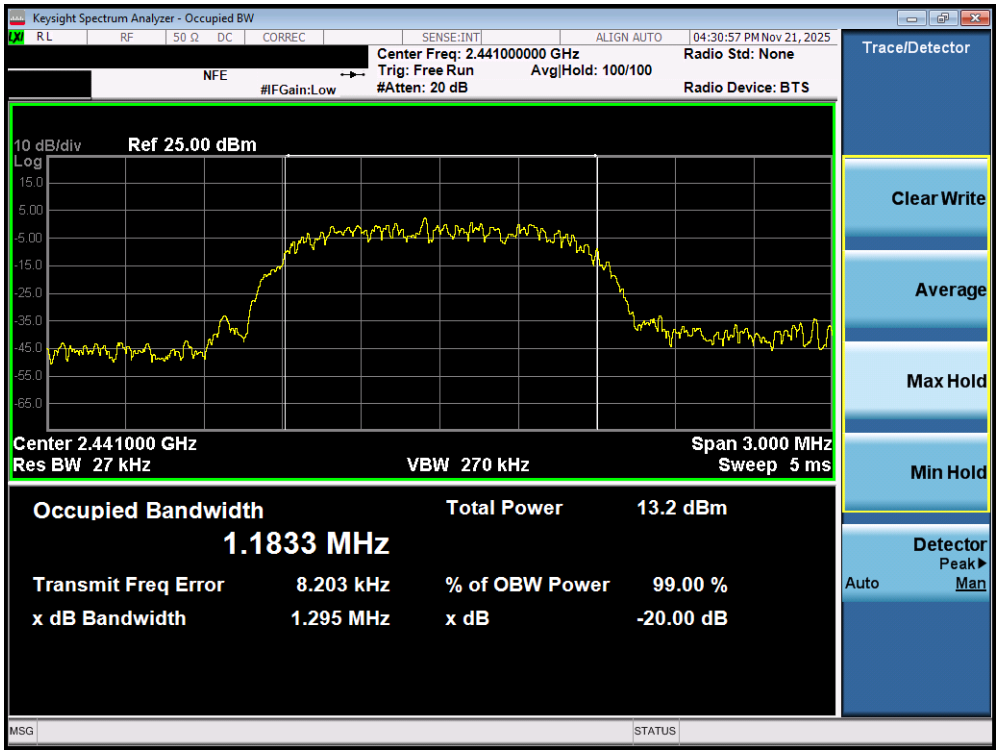
Plot 7-5. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 39) – Ant 1



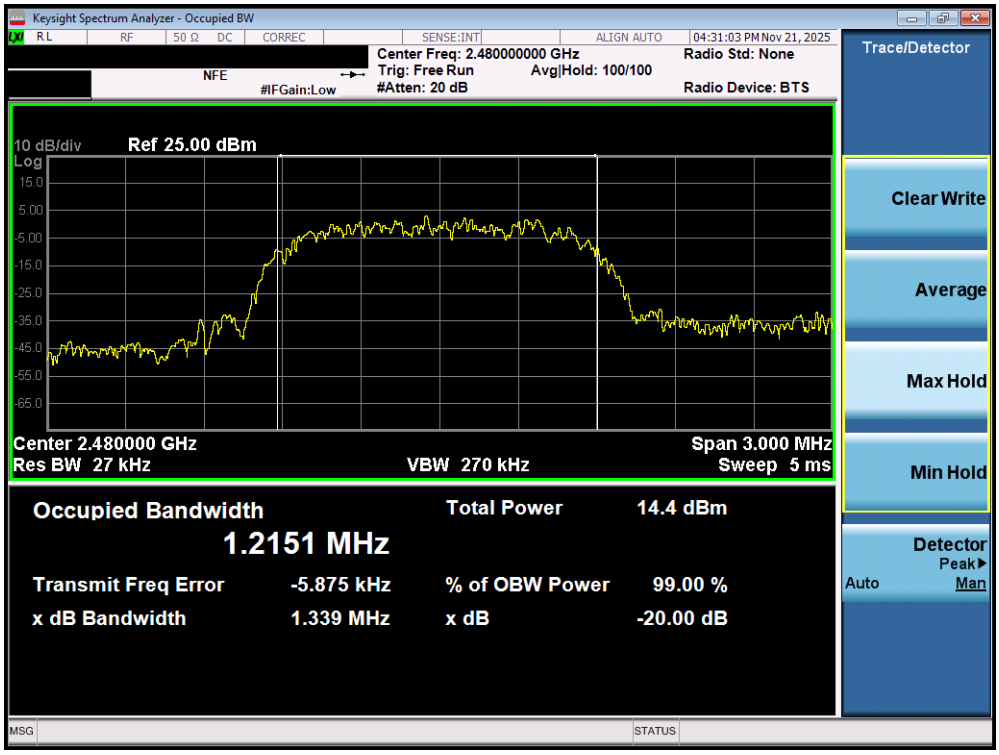
Plot 7-6. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 78) – Ant 1



Plot 7-7. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 0) – Ant 1



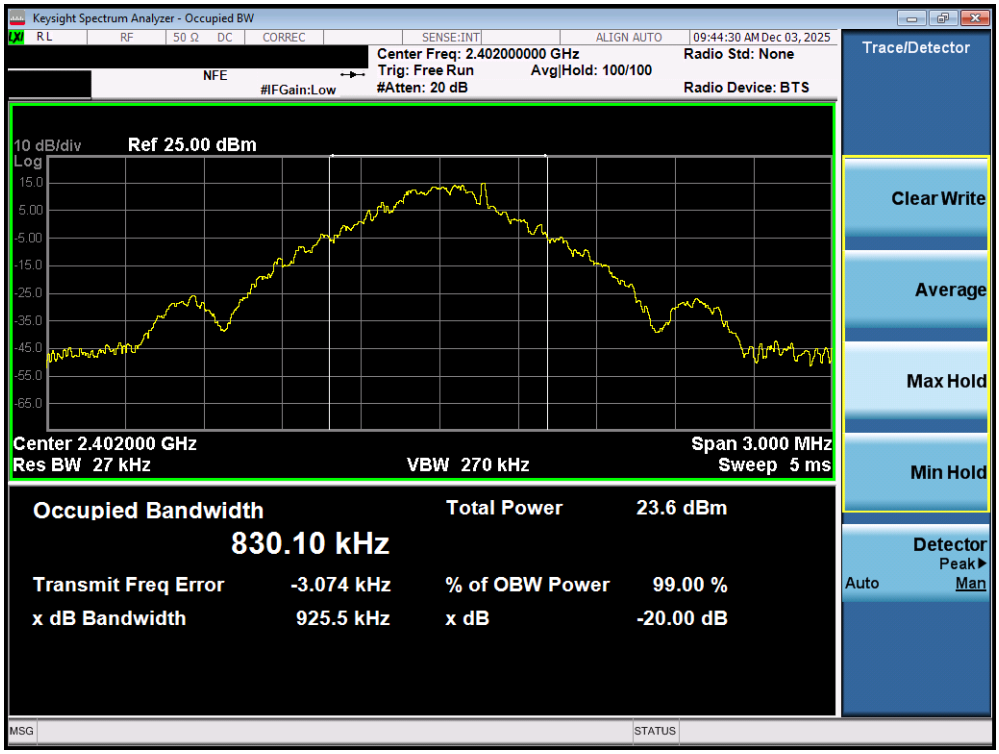
Plot 7-8. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 39) – Ant 1



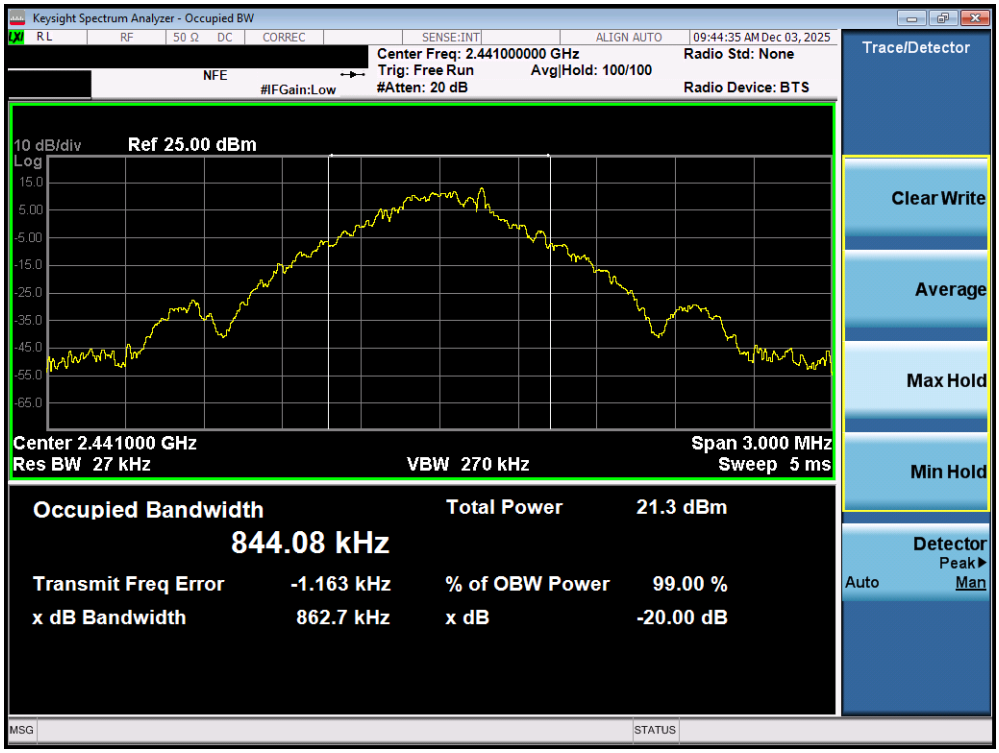
Plot 7-9. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 78) – Ant 1

Frequency [MHz]	Data Rate [Mbps]	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	0	925.50
2441	1.0	39	862.70
2480	1.0	78	937.90
2402	2.0	0	1311.00
2441	2.0	39	1293.00
2480	2.0	78	1339.00
2402	3.0	0	1293.00
2441	3.0	39	1301.00
2480	3.0	78	1276.00

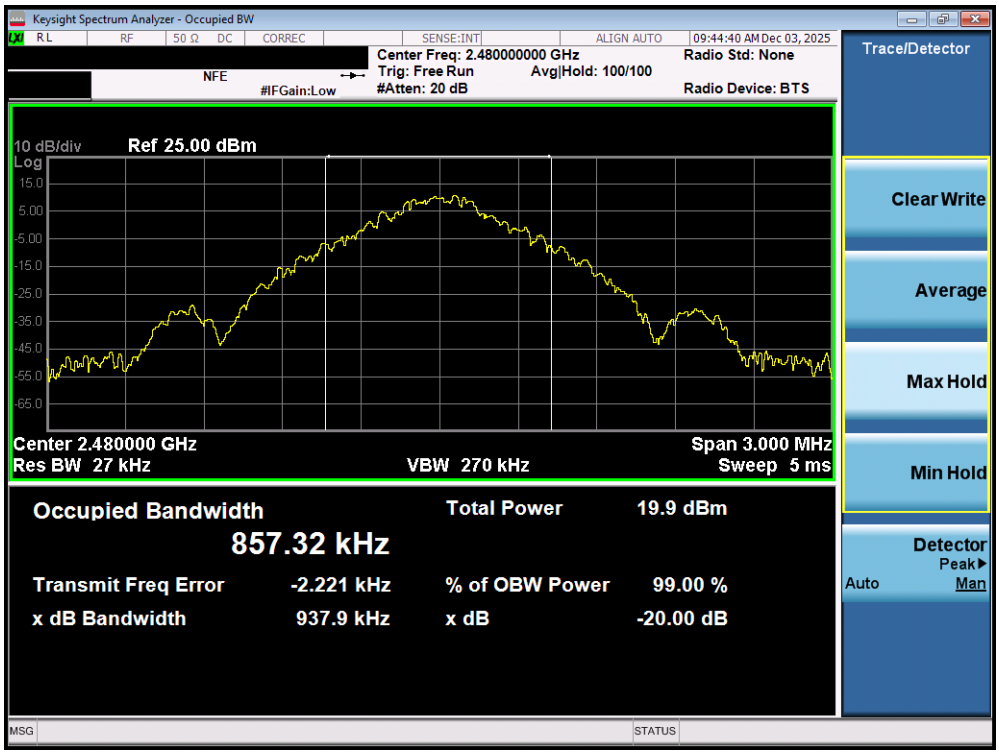
Table 7-3. Conducted 20dB Bandwidth Measurements – Ant 2



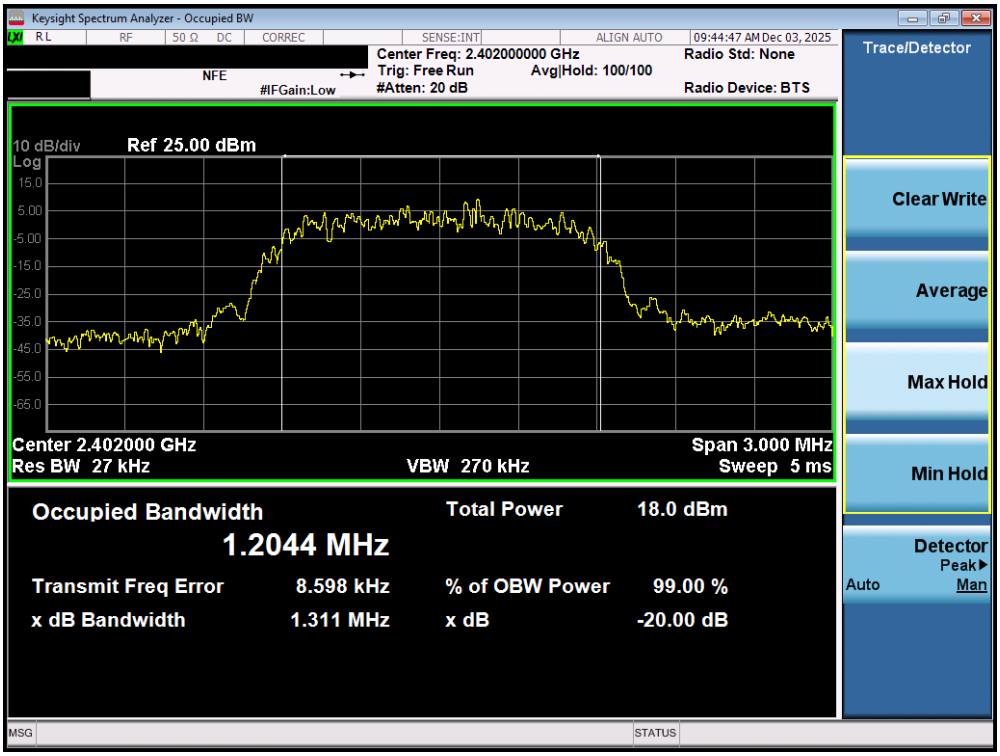
Plot 7-10. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 0) – Ant 2



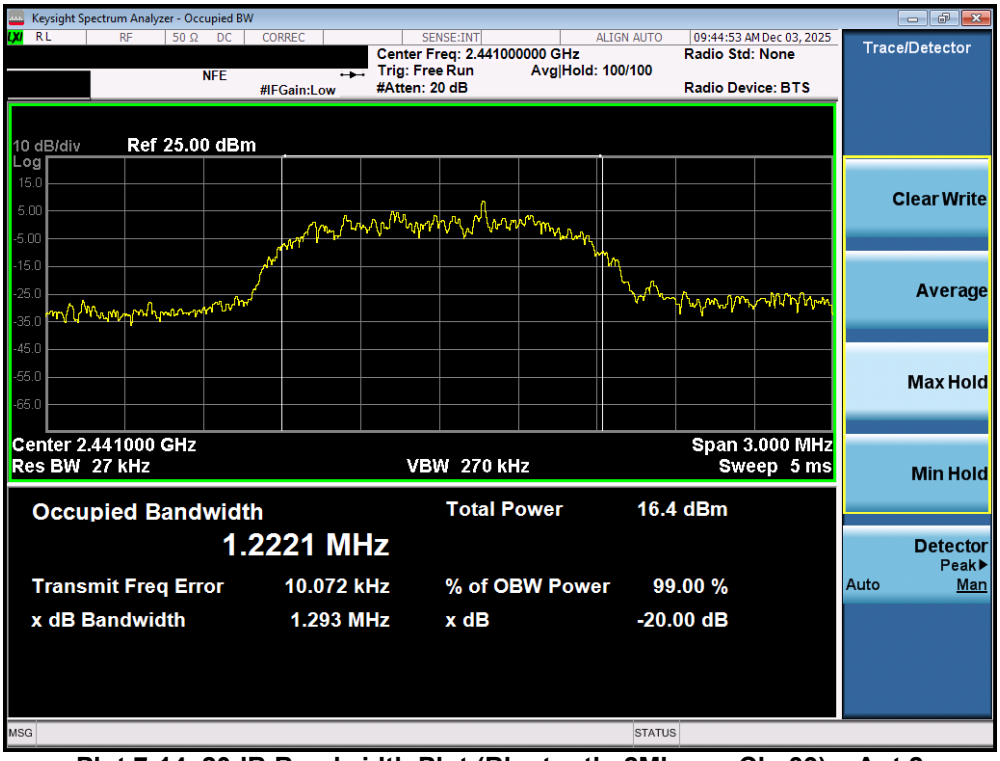
Plot 7-11. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 39) – Ant 2



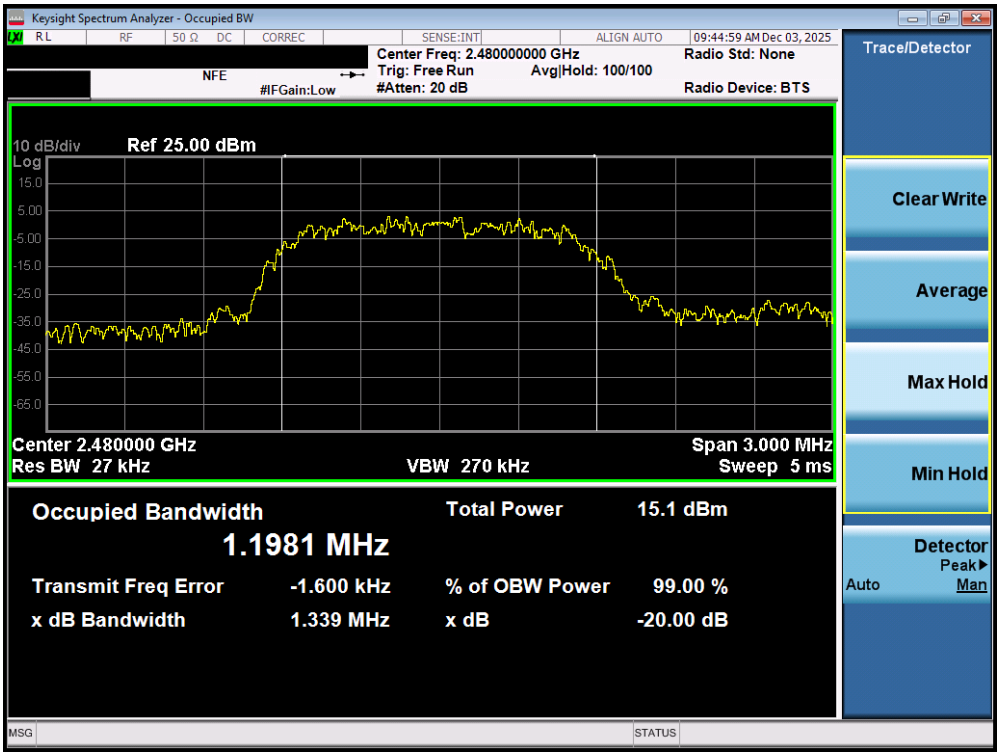
Plot 7-12. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 78) – Ant 2



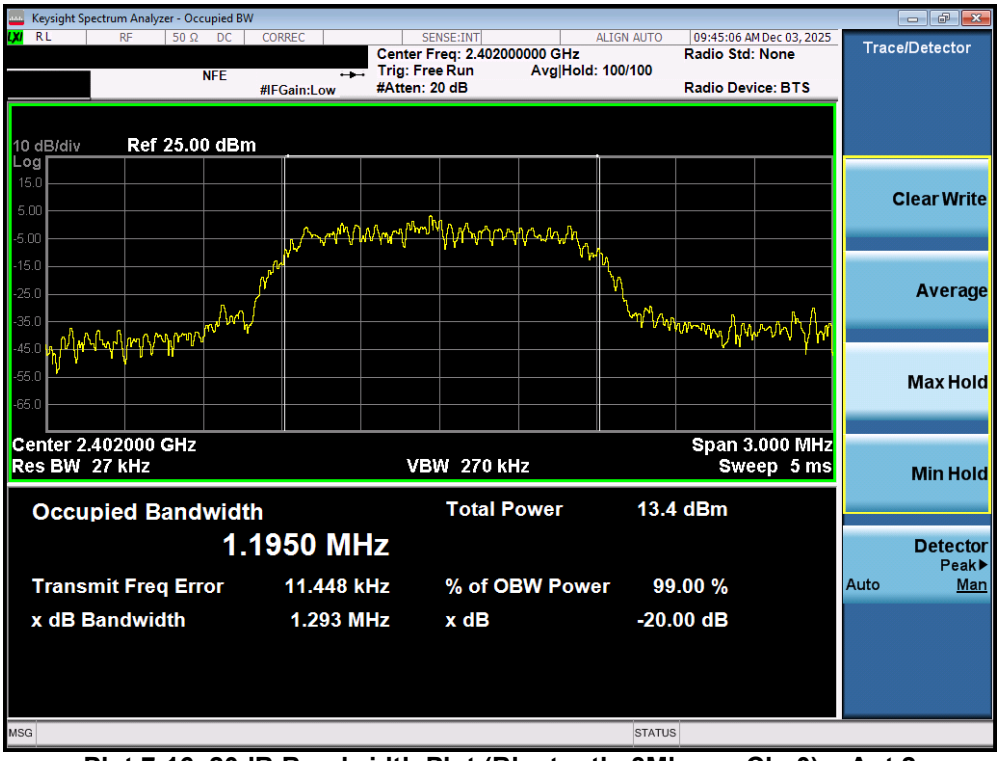
Plot 7-13. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 0) – Ant 2



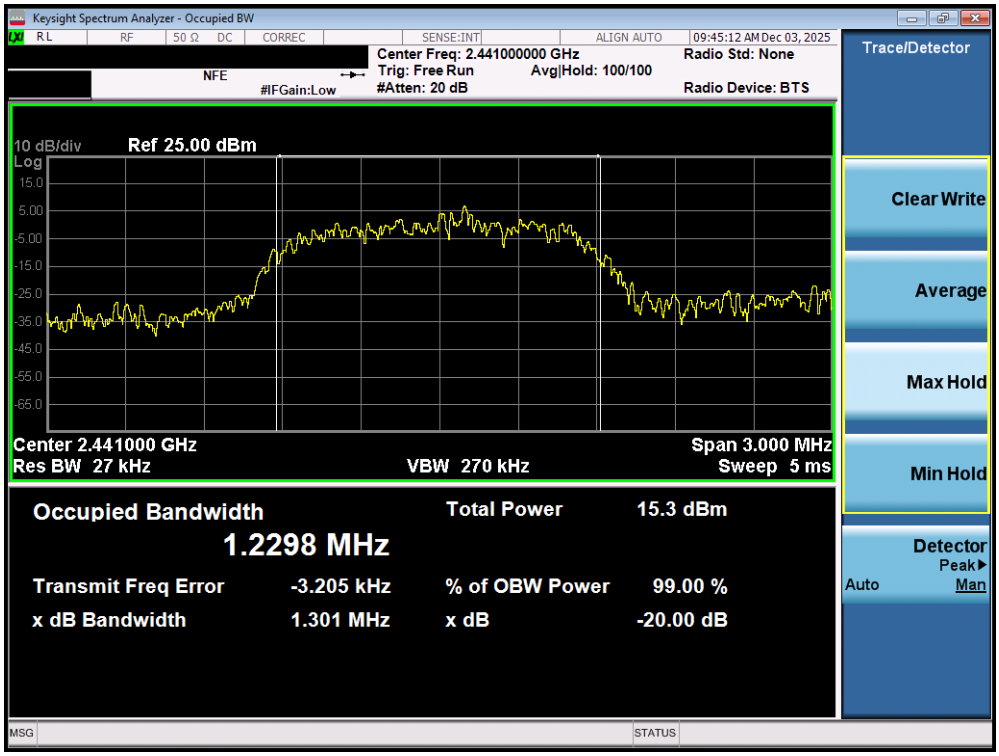
Plot 7-14. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 39) – Ant 2



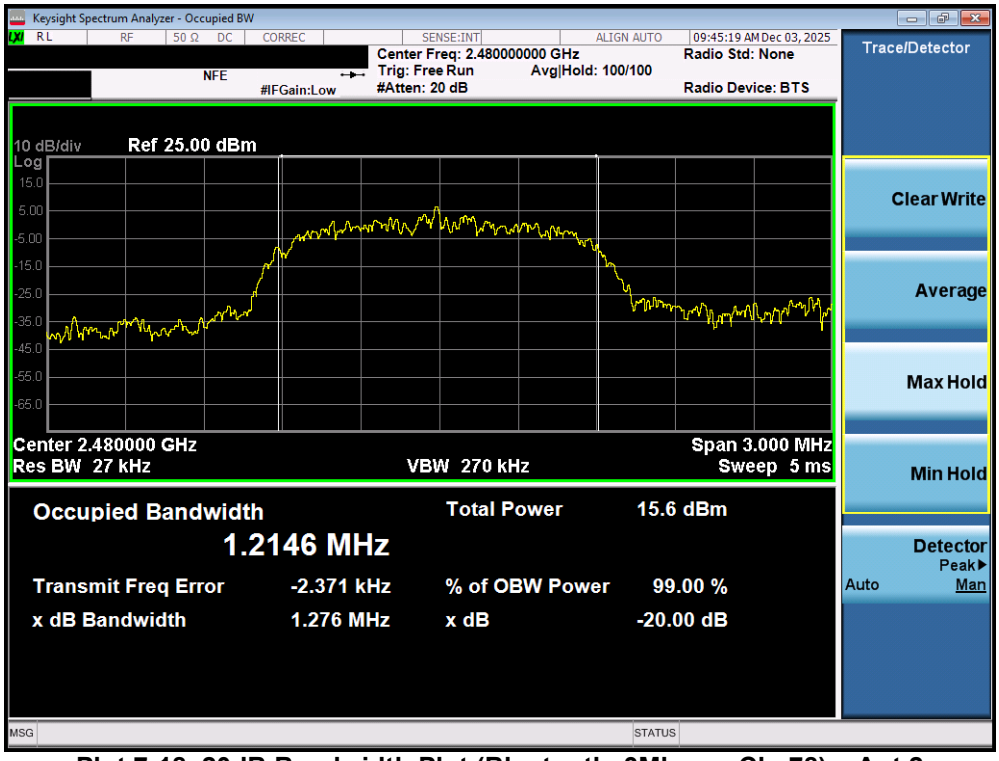
Plot 7-15. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 78) – Ant 2



Plot 7-16. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 0) – Ant 2



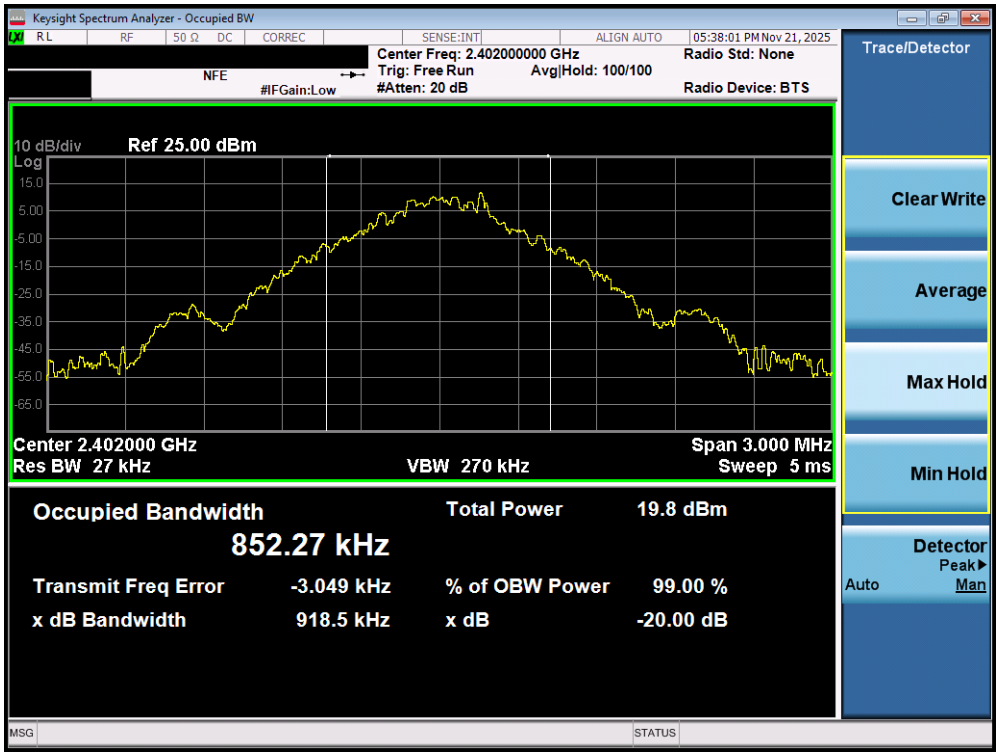
Plot 7-17. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 39) – Ant 2



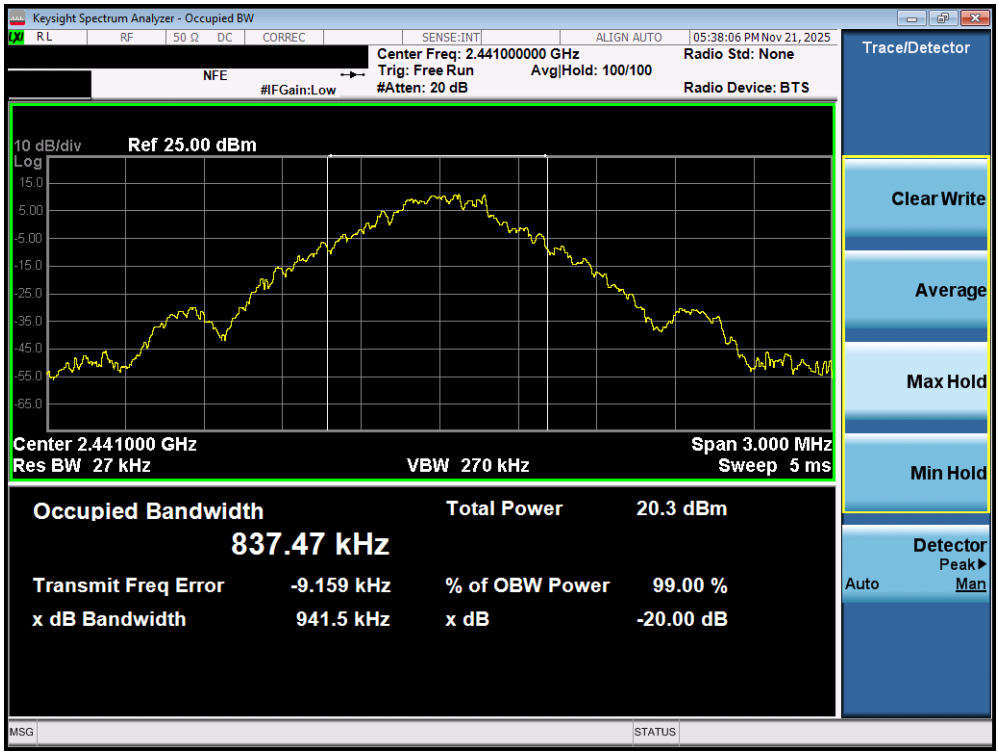
Plot 7-18. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 78) – Ant 2

Frequency [MHz]	Data Rate [Mbps]	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	0	918.50
2441	1.0	39	941.50
2480	1.0	78	931.30
2402	2.0	0	1282.00
2441	2.0	39	1328.00
2480	2.0	78	1313.00
2402	3.0	0	1323.00
2441	3.0	39	1315.00
2480	3.0	78	1322.00

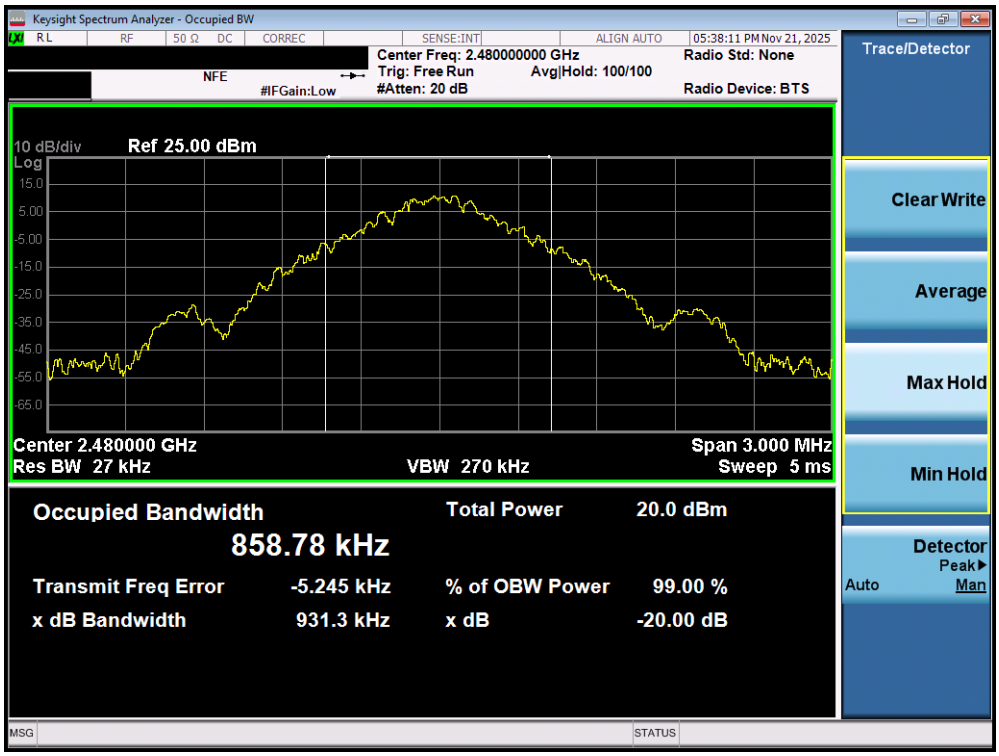
Table 7-4. Conducted 20dB Bandwidth Measurements – Dual Ant 1



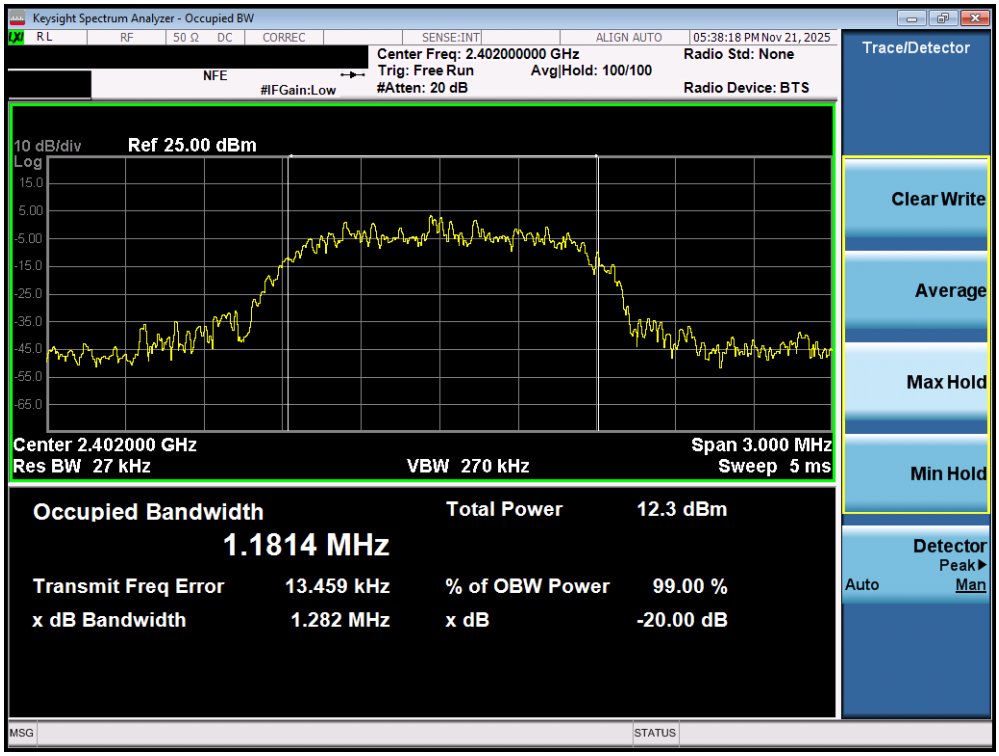
Plot 7-19. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 0) – Dual Ant 1



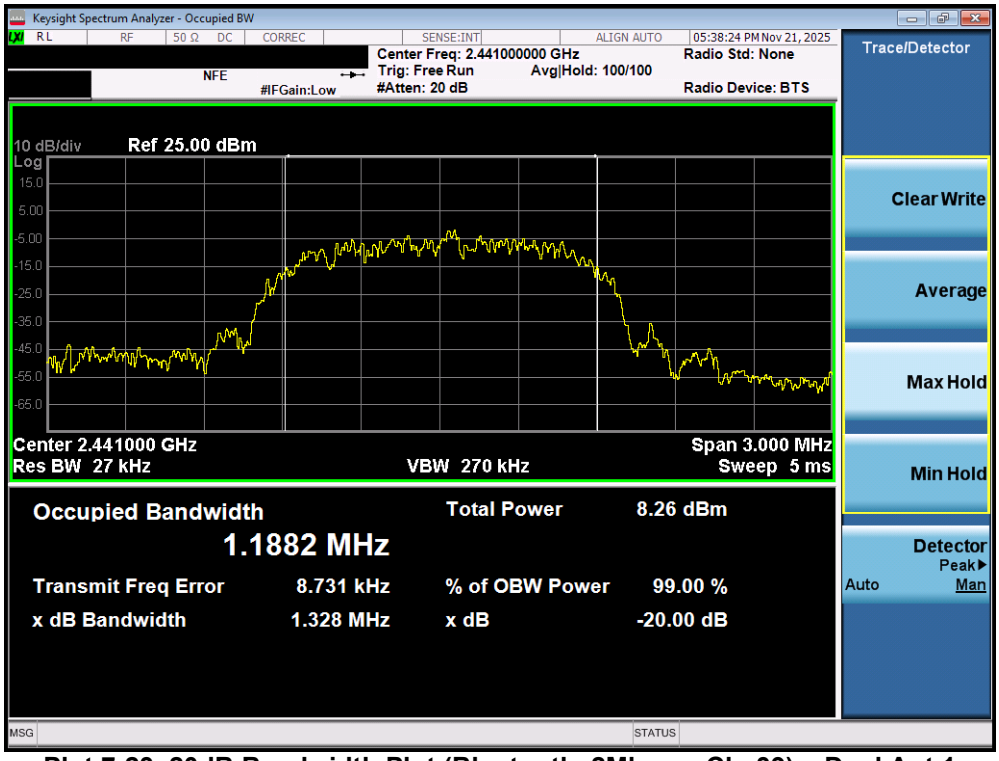
Plot 7-20. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 39) – Dual Ant 1



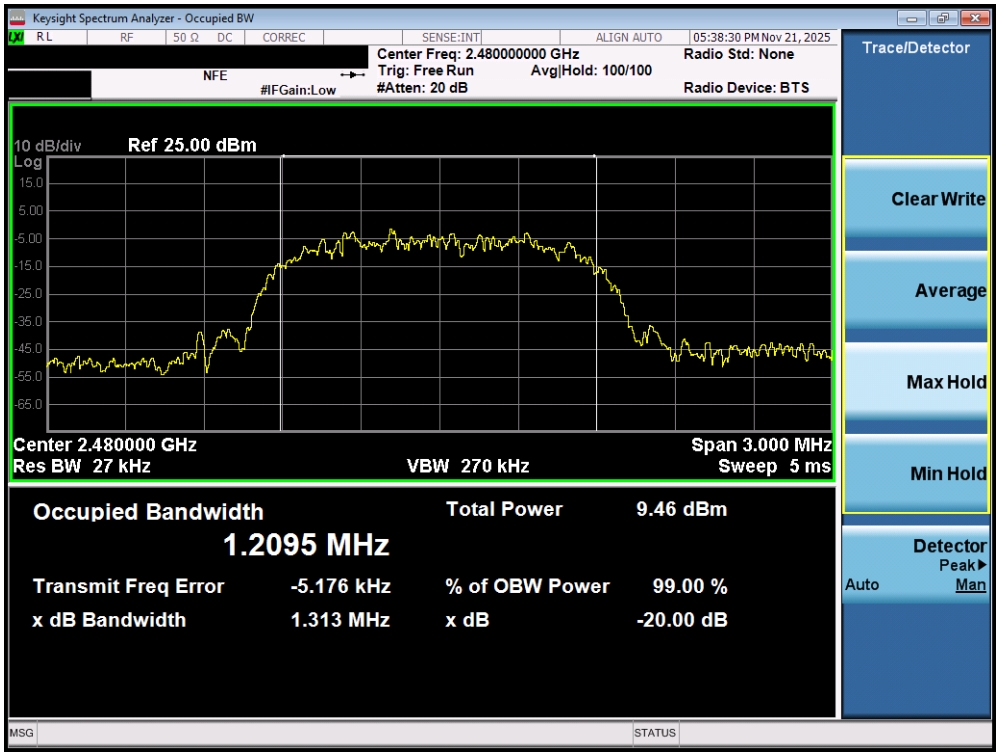
Plot 7-21. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 78) – Dual Ant 1



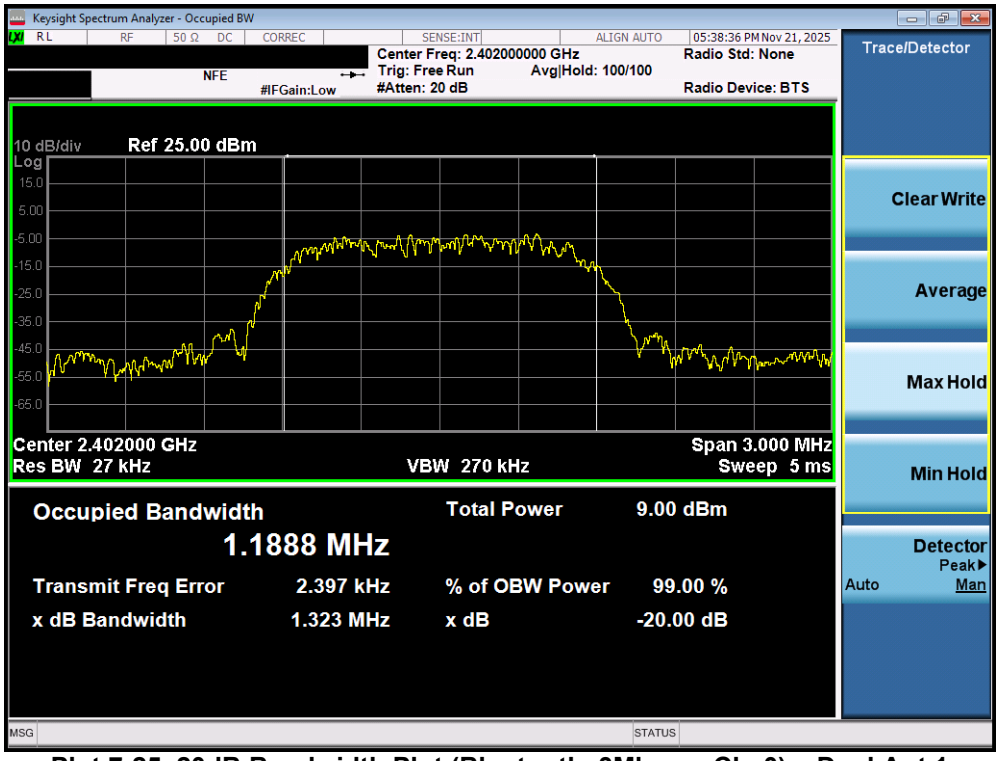
Plot 7-22. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 0) – Dual Ant 1



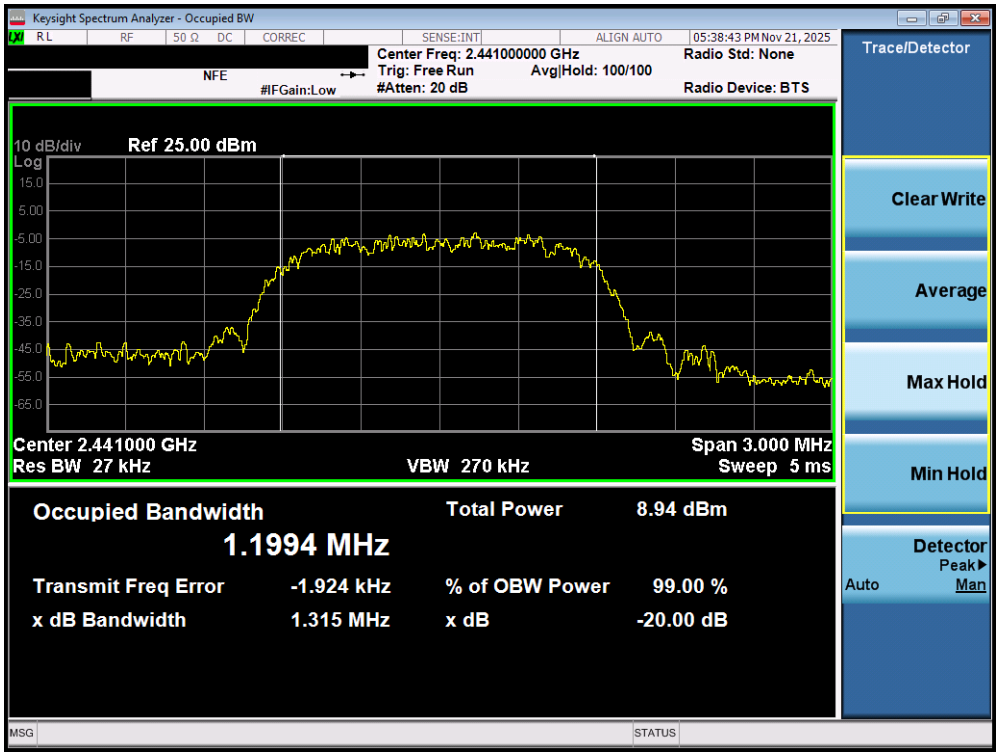
Plot 7-23. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 39) – Dual Ant 1



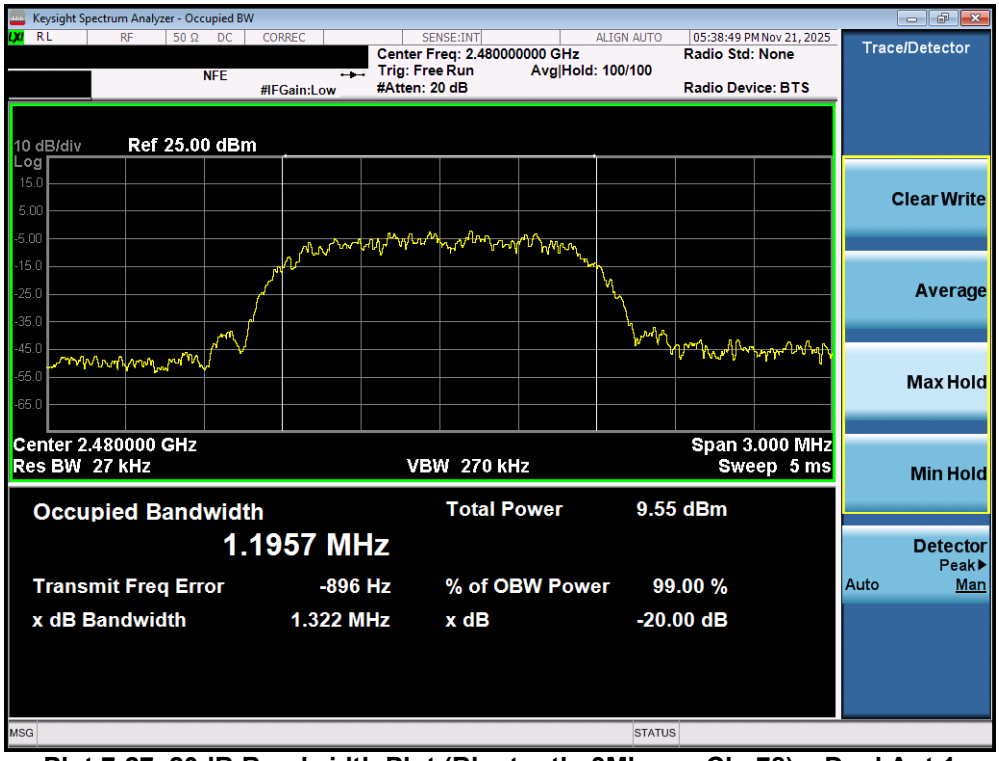
Plot 7-24. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 78) – Dual Ant 1



Plot 7-25. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 0) – Dual Ant 1



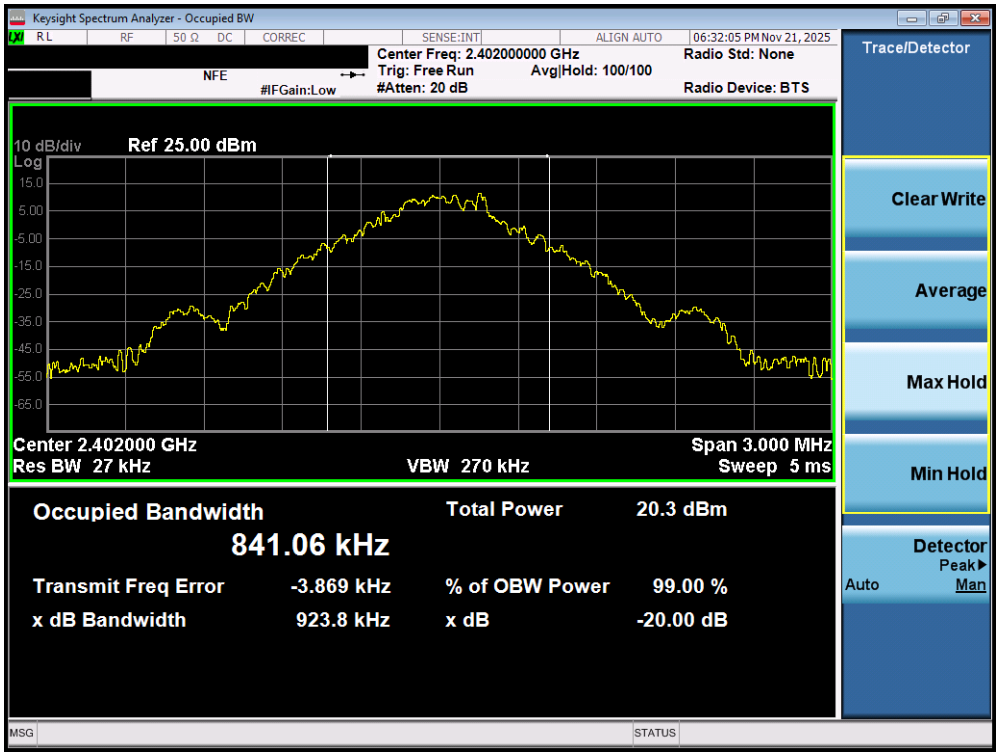
Plot 7-26. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 39) – Dual Ant 1



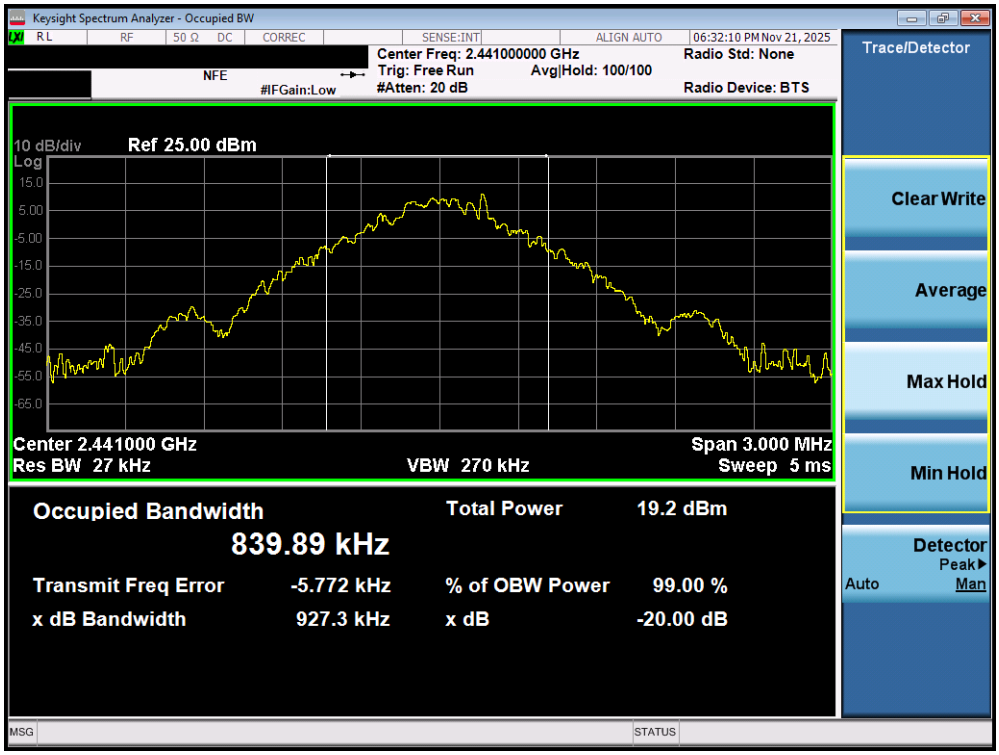
Plot 7-27. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 78) – Dual Ant 1

Frequency [MHz]	Data Rate [Mbps]	Channel No.	20dB Bandwidth Test Results [kHz]
2402	1.0	0	923.80
2441	1.0	39	927.30
2480	1.0	78	925.60
2402	2.0	0	1331.00
2441	2.0	39	1296.00
2480	2.0	78	1311.00
2402	3.0	0	1337.00
2441	3.0	39	1255.00
2480	3.0	78	1339.00

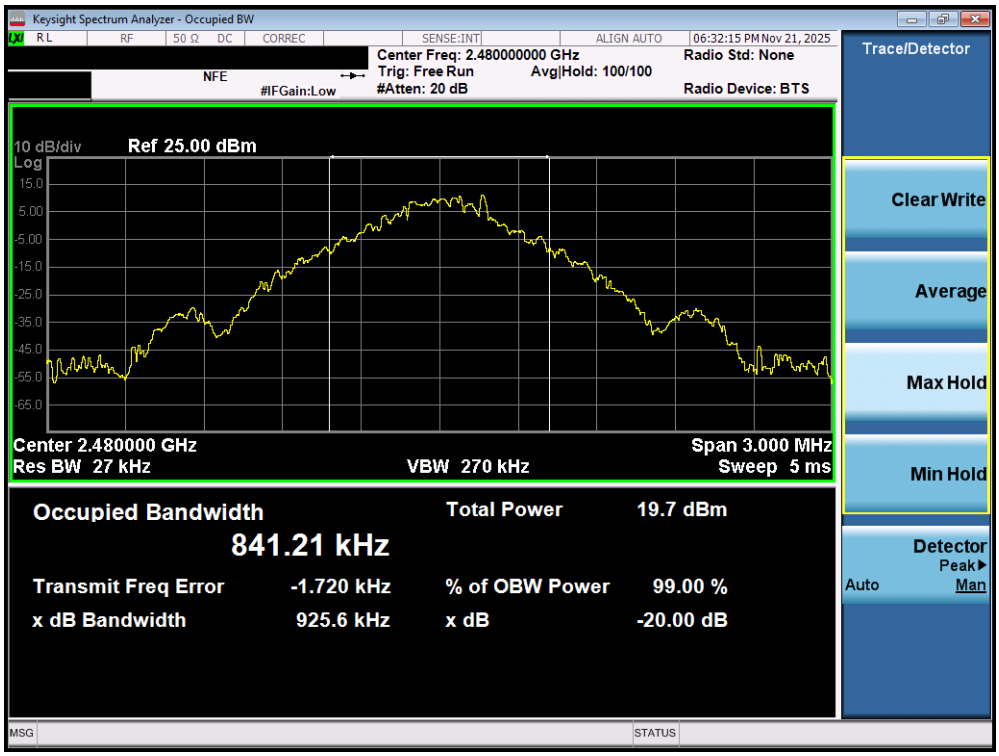
Table 7-5. Conducted 20dB Bandwidth Measurements – Dual Ant 2



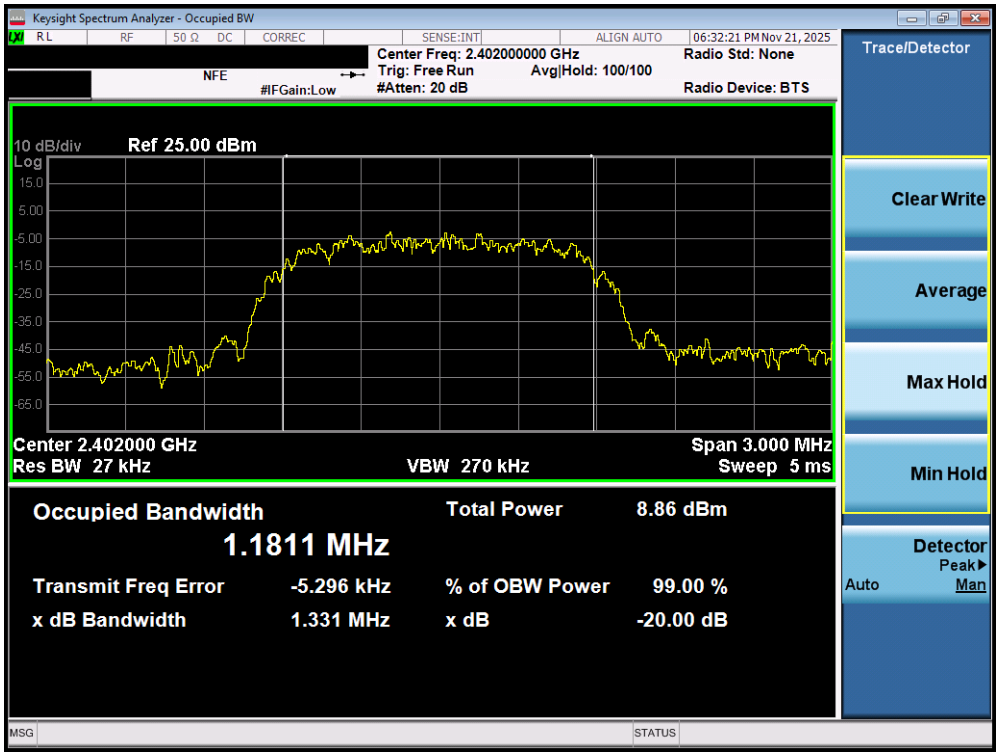
Plot 7-28. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 0) – Dual Ant 2



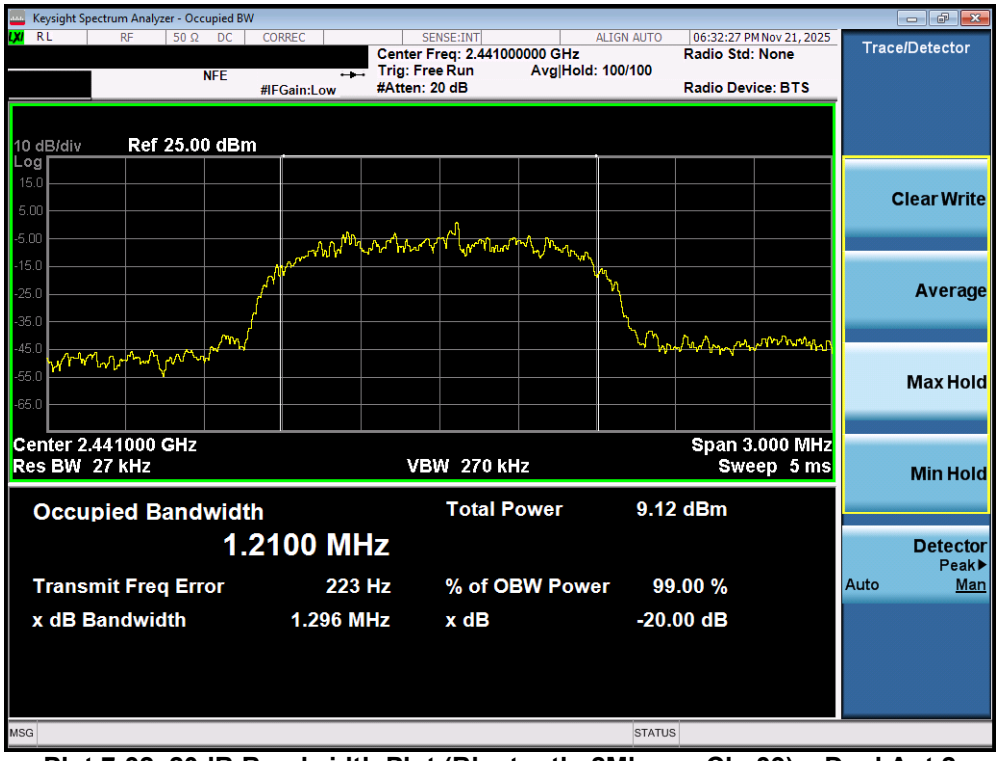
Plot 7-29. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 39) – Dual Ant 2



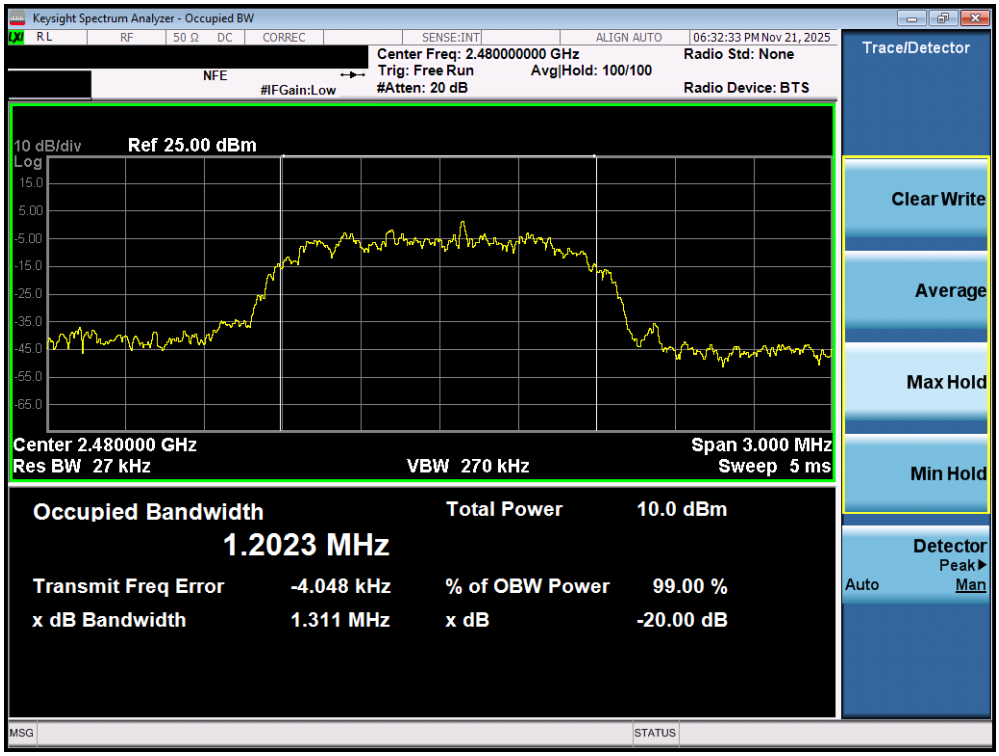
Plot 7-30. 20dB Bandwidth Plot (Bluetooth, 1Mbps – Ch. 78) – Dual Ant 2



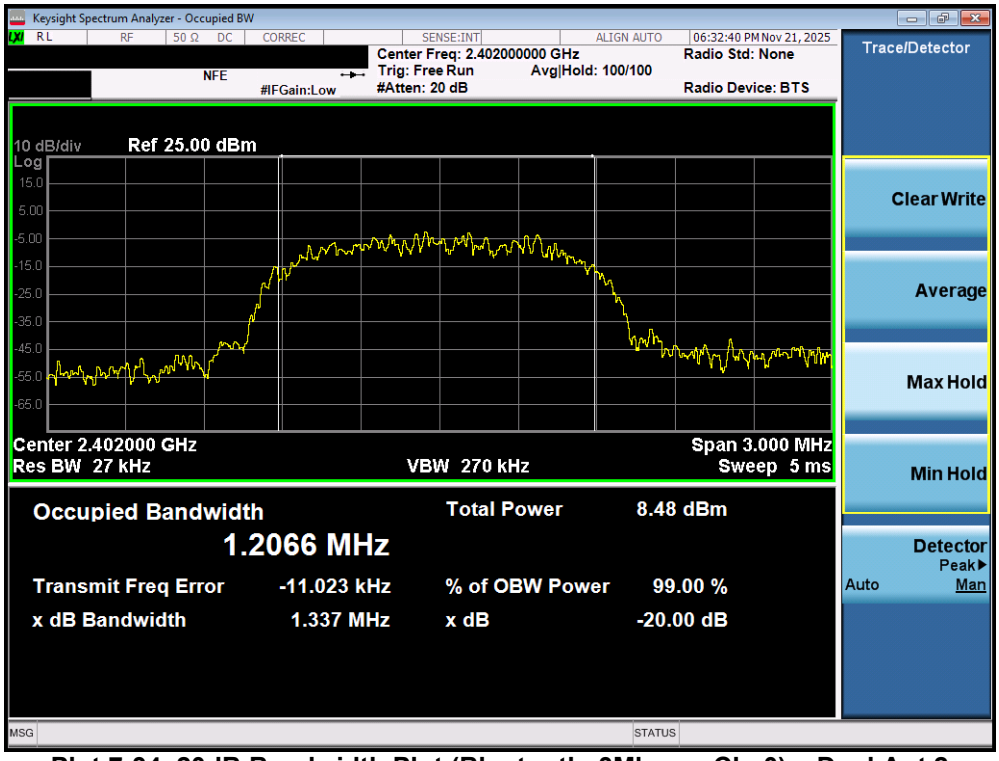
Plot 7-31. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 0) – Dual Ant 2



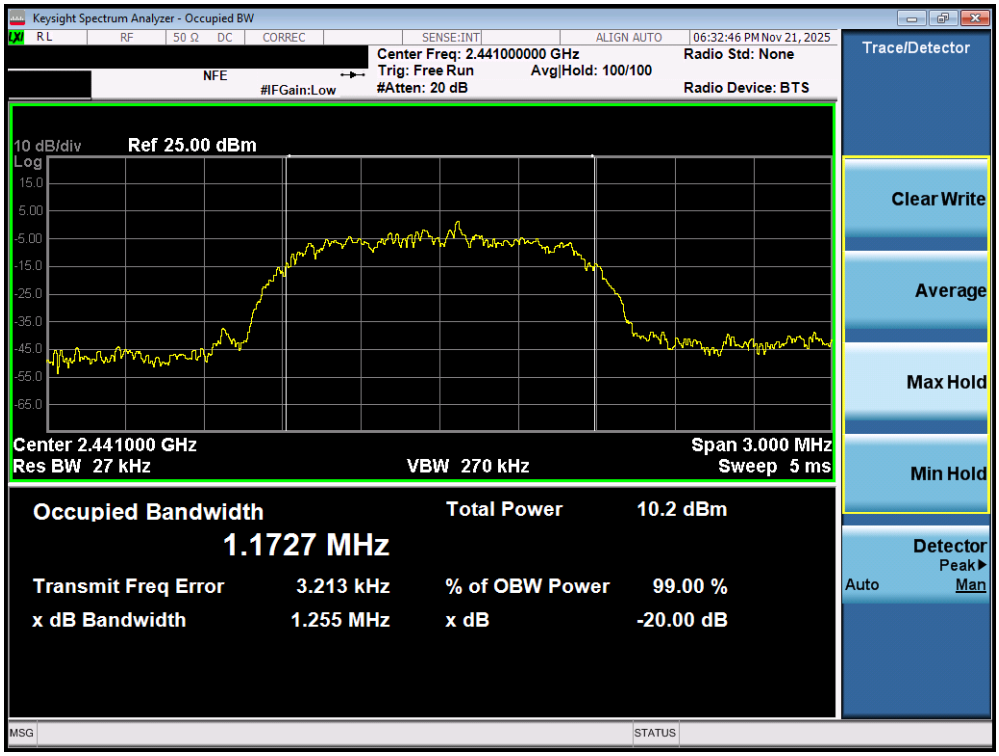
Plot 7-32. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 39) – Dual Ant 2



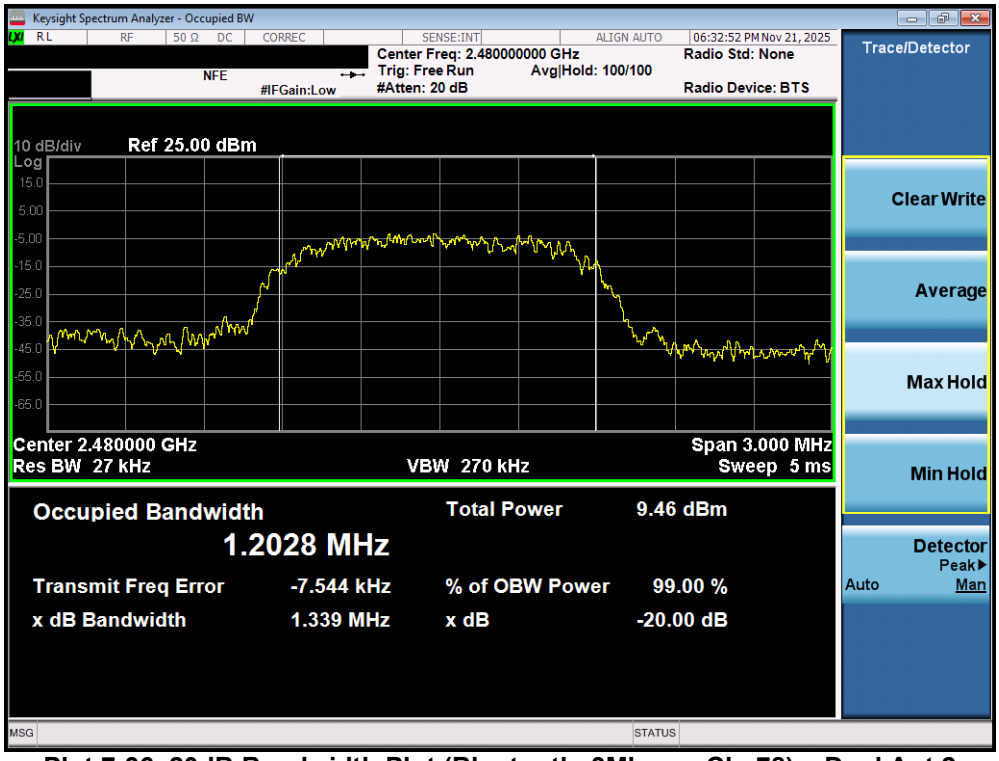
Plot 7-33. 20dB Bandwidth Plot (Bluetooth, 2Mbps – Ch. 78) – Dual Ant 2



Plot 7-34. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 0) – Dual Ant 2



Plot 7-35. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 39) – Dual Ant 2



Plot 7-36. 20dB Bandwidth Plot (Bluetooth, 3Mbps – Ch. 78) – Dual Ant 2

7.3 Output Power Measurement

Test Overview and Limits

Measurement is made while the EUT is operating in non-hopping transmission mode. The powers shown below were measured using a spectrum analyzer with a Bluetooth signaling test set (Agilent Model: N4010A) used only to maintain a Bluetooth link with the EUT. Average power measurements are performed using the analyzer's "burst power" function with RBW = 3MHz. The burst power function triggers on a single set burst set to maximum power and measures the maximum average power on the on-time.

The maximum permissible output power is 1 Watt. The e.i.r.p. shall not exceed 4W per RSS-247.

Test Procedure Used

ANSI C63.10:2020 – Section 7.8.5

Test Settings

Peak Power Measurement

1. Span = approximately 5x 20dB bandwidth, centered on hopping channel
2. RBW > 20dB bandwidth of emission being measured
3. VBW ≥ RBW
4. Sweep = auto
5. Detector = peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

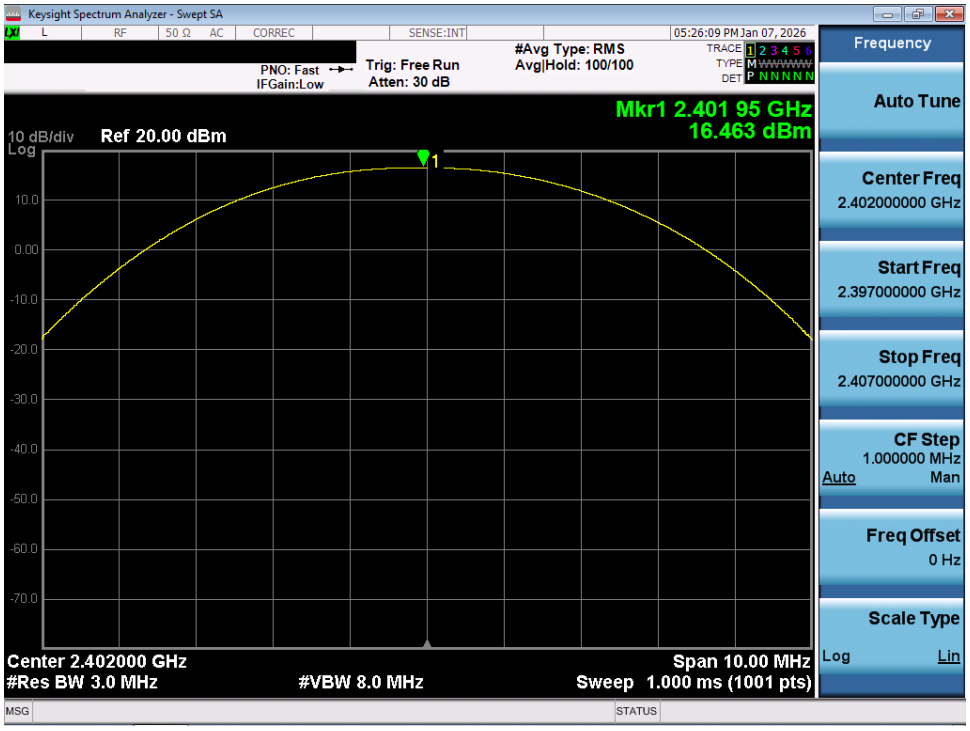
Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

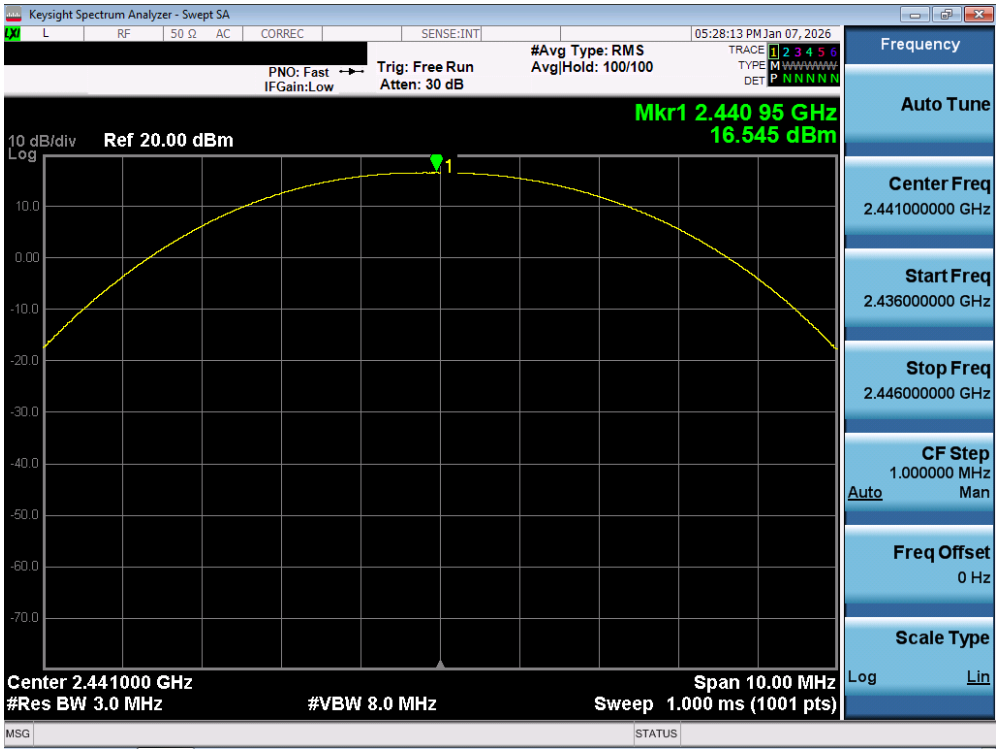
Figure 7-2. Test Instrument & Measurement Setup

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Peak Conducted Power		Avg Conducted Power		Ant. Gain [dBi]	EIRP [dBm]	Limit [dBm]	Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]				
2402	1.0	0	16.46	44.289	16.25	42.170	-4.06	12.40	36.02	-23.62
2441	1.0	39	16.55	45.134	16.39	43.521	-4.06	12.49	36.02	-23.54
2480	1.0	78	16.63	45.973	16.46	44.208	-4.06	12.57	36.02	-23.46
2402	2.0	0	16.48	44.473	13.83	24.166	-4.06	12.42	36.02	-23.60
2441	2.0	39	16.43	43.985	13.73	23.627	-4.06	12.37	36.02	-23.65
2480	2.0	78	16.60	45.740	14.04	25.351	-4.06	12.54	36.02	-23.48
2402	3.0	0	16.82	48.084	13.67	23.302	-4.06	12.76	36.02	-23.26
2441	3.0	39	16.89	48.820	13.78	23.895	-4.06	12.83	36.02	-23.19
2480	3.0	78	17.30	53.703	14.09	25.615	-4.06	13.24	36.02	-22.78

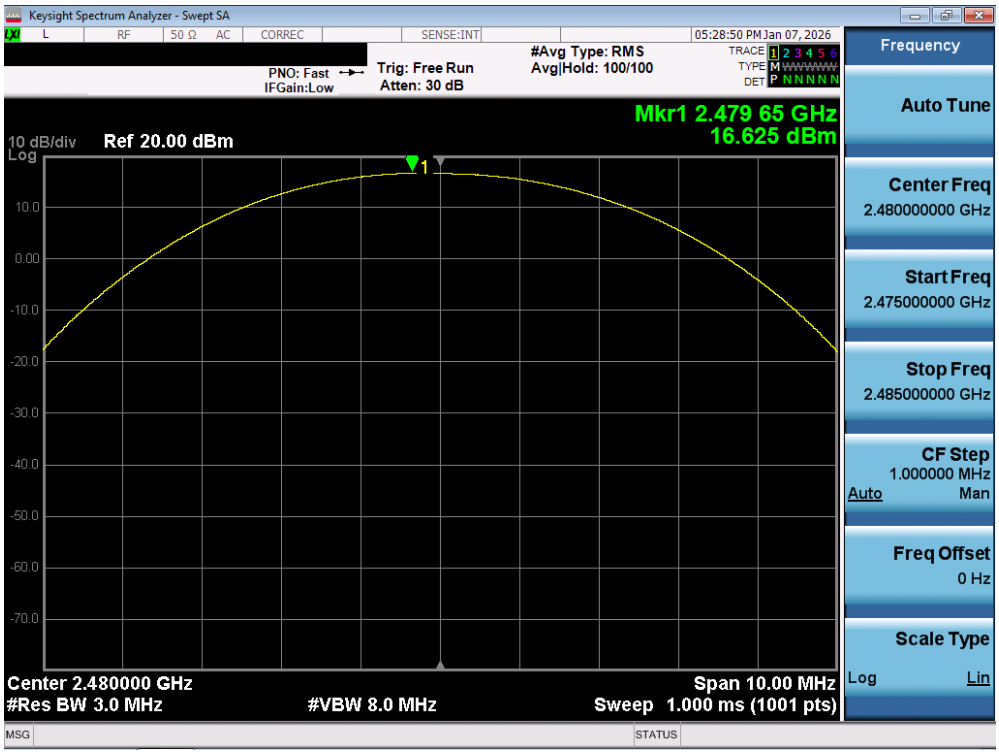
Table 7-6. Conducted Output Power Measurements – Ant 1



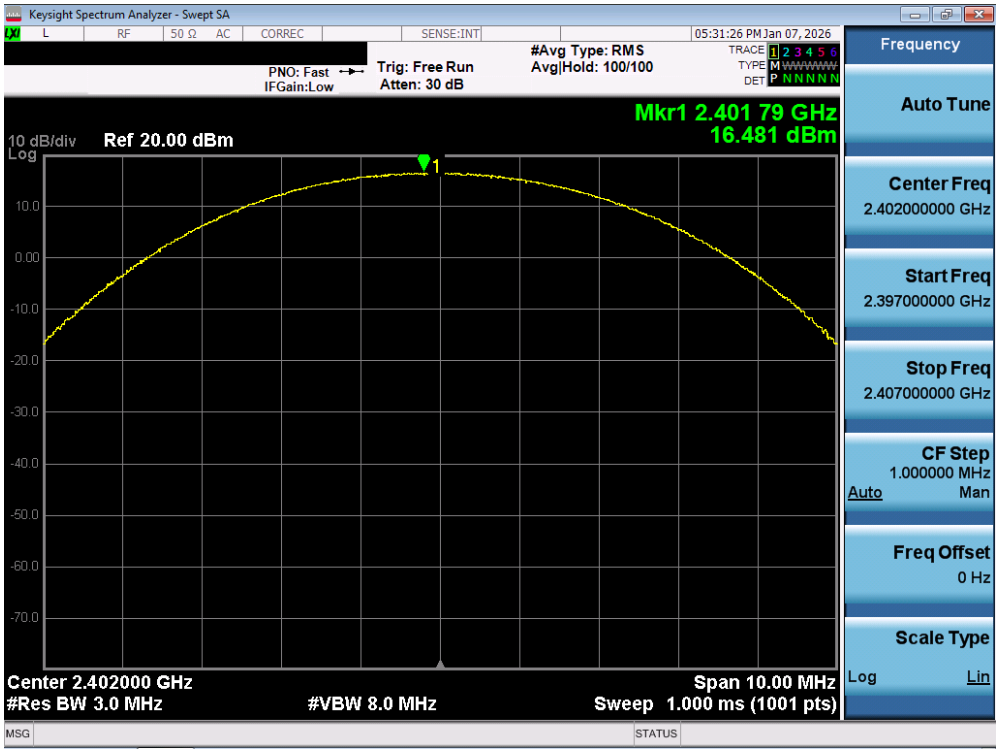
Plot 7-37. Peak Conducted Power (1Mbps – Ch. 0) – Ant 1



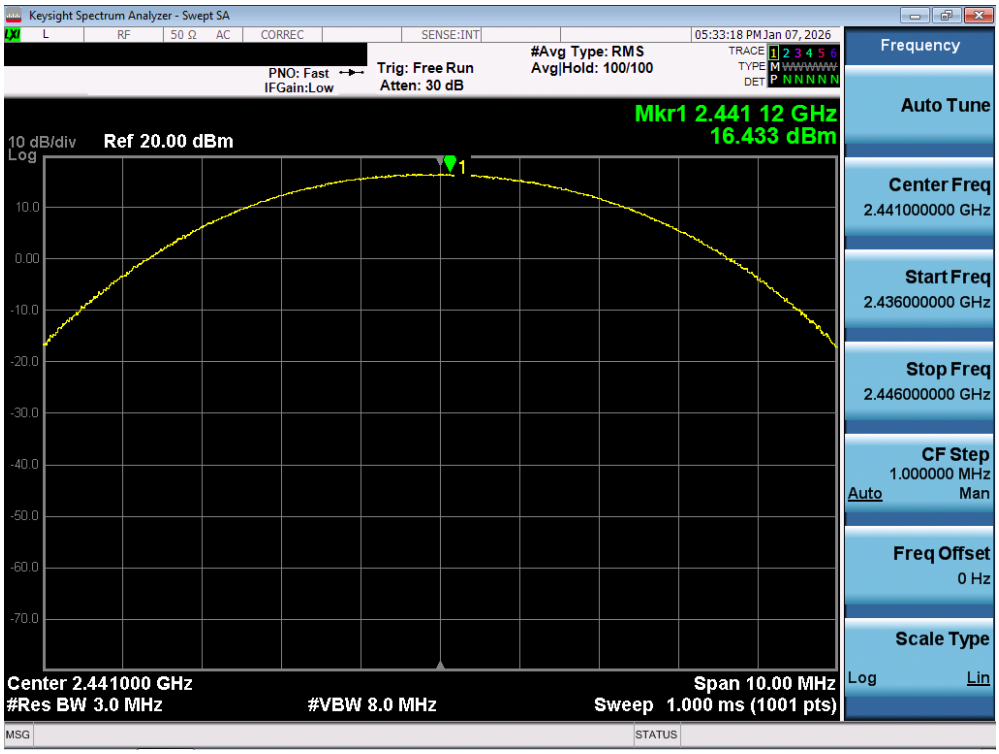
Plot 7-38. Peak Conducted Power (1Mbps – Ch. 39) – Ant 1



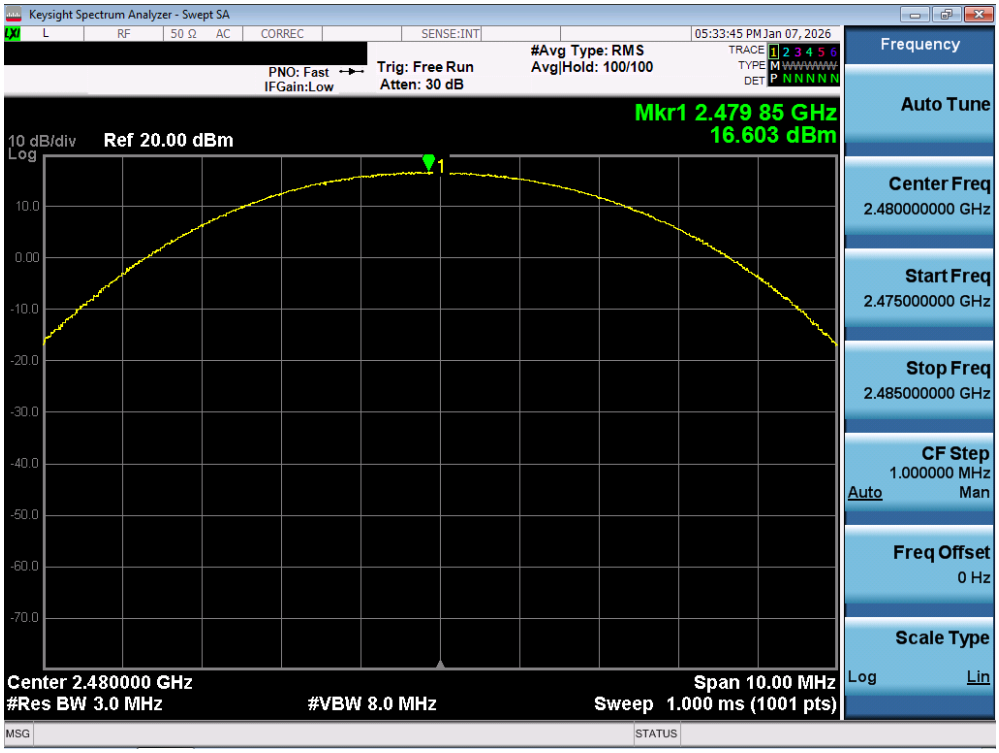
Plot 7-39. Peak Conducted Power (1Mbps – Ch. 78) – Ant 1



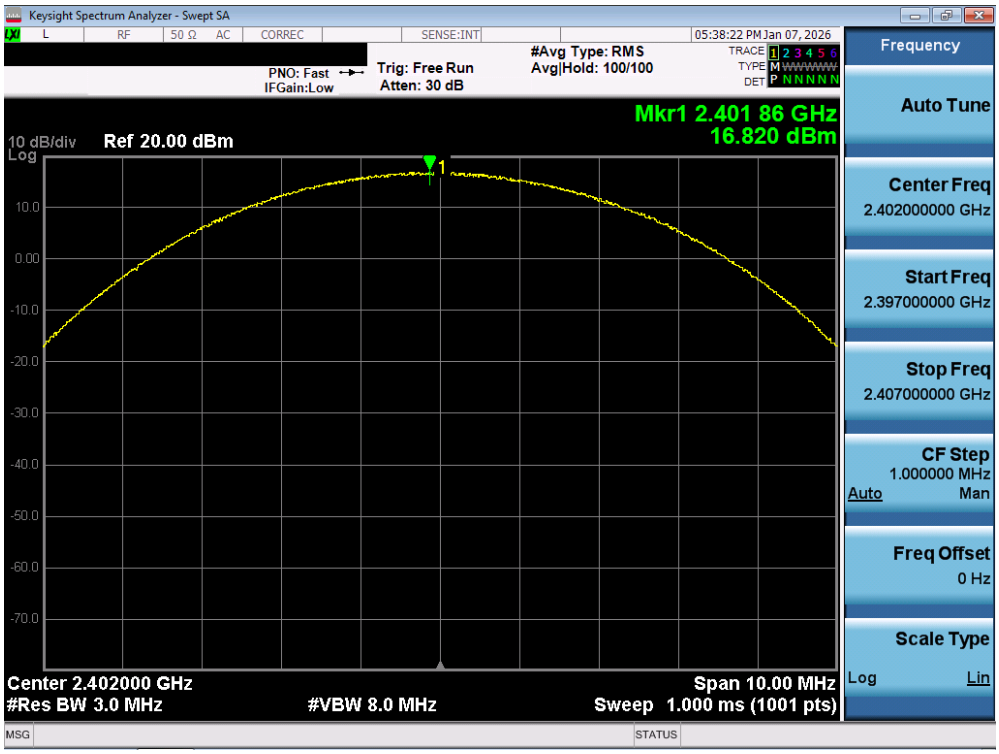
Plot 7-40. Peak Conducted Power (2Mbps – Ch. 0) – Ant 1



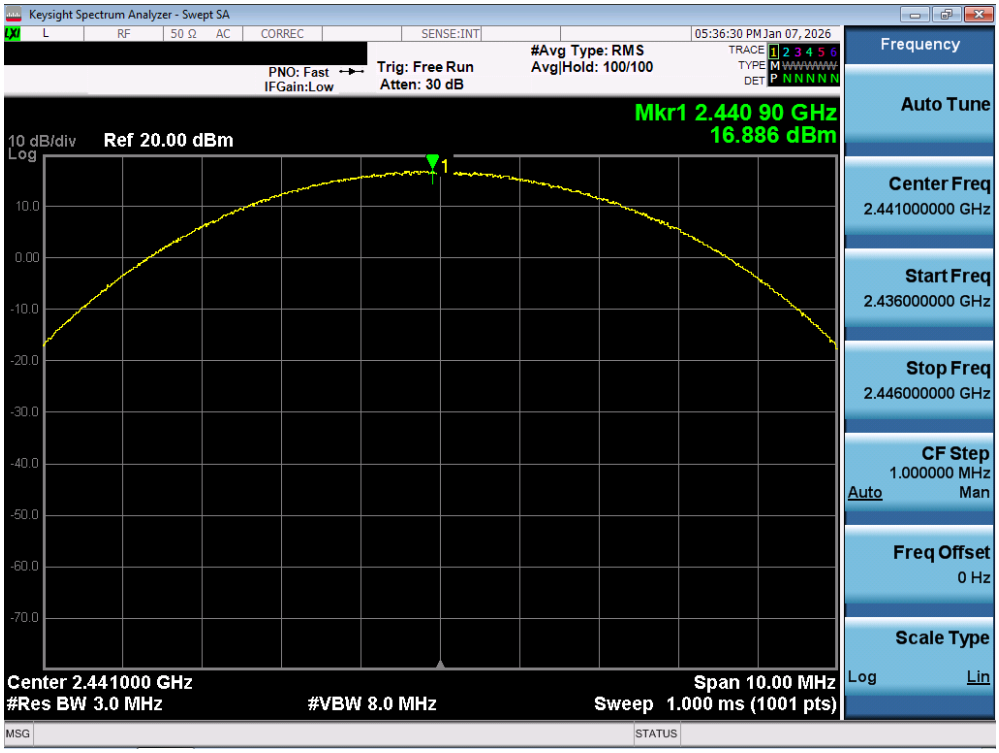
Plot 7-41. Peak Conducted Power (2Mbps – Ch. 39) – Ant 1



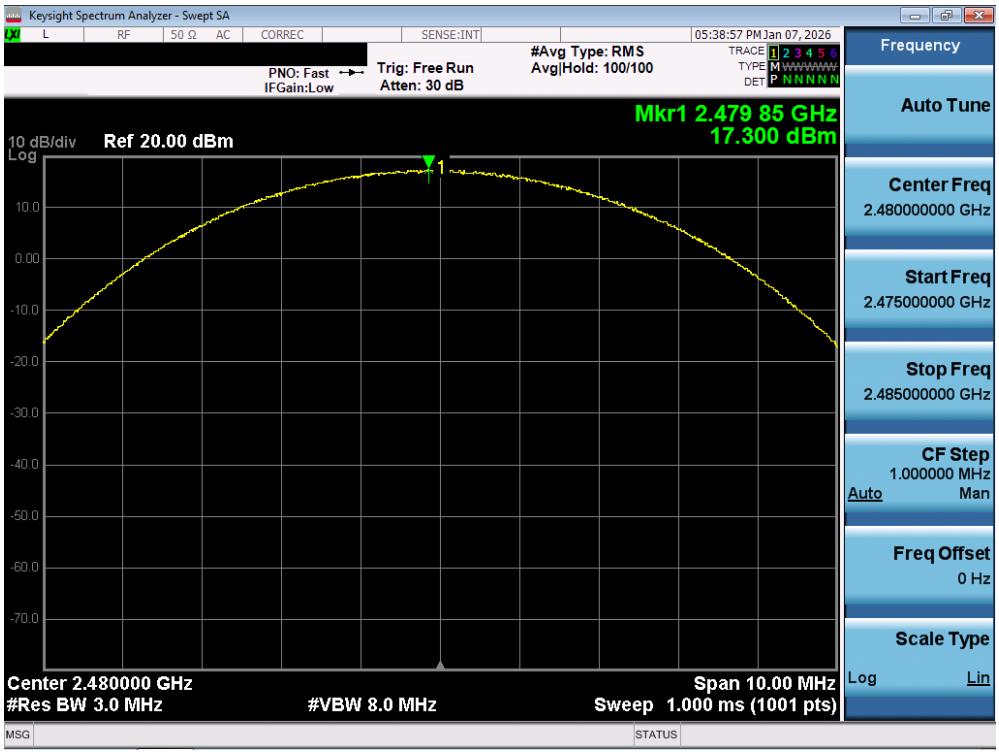
Plot 7-42. Peak Conducted Power (2Mbps – Ch. 78) – Ant 1



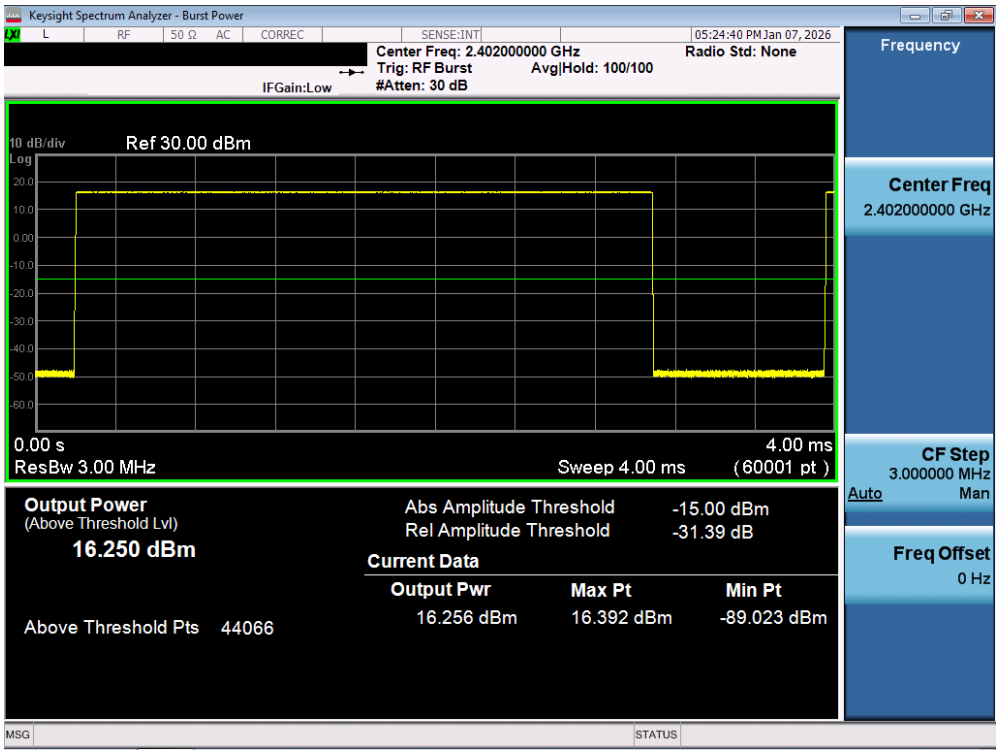
Plot 7-43. Peak Conducted Power (3Mbps – Ch. 0) – Ant 1



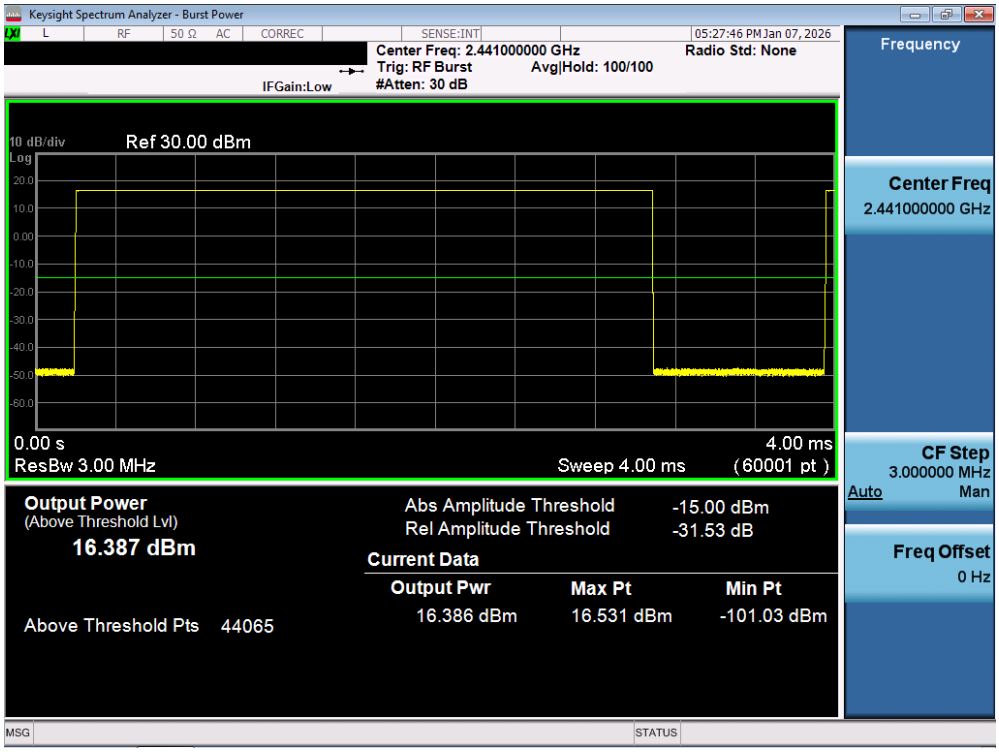
Plot 7-44. Peak Conducted Power (3Mbps – Ch. 39) – Ant 1



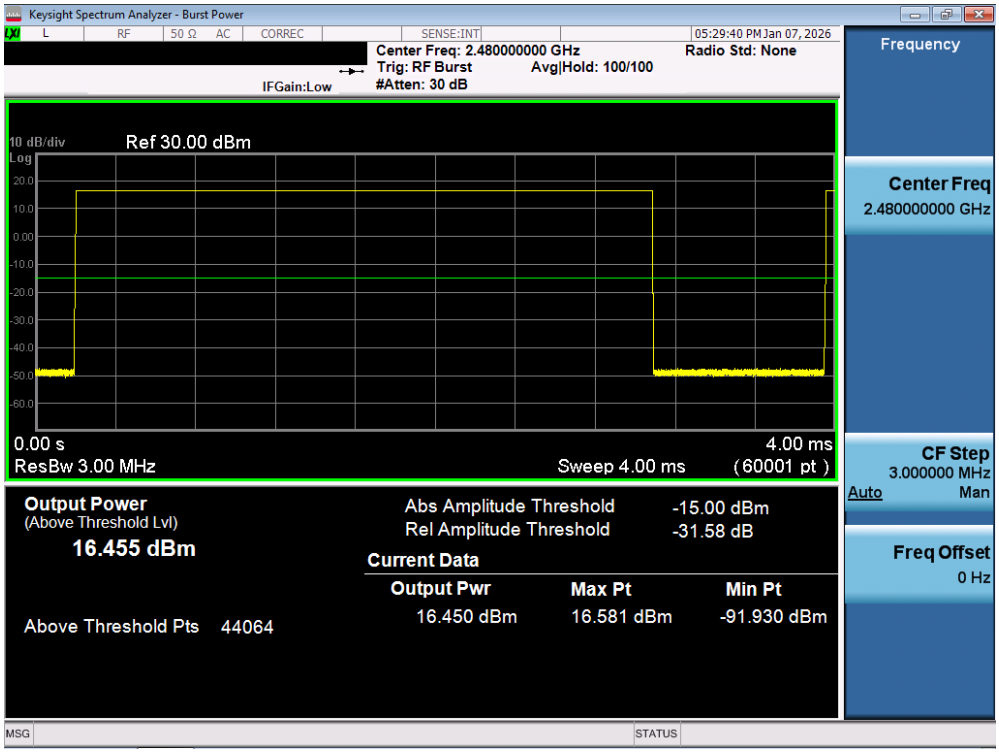
Plot 7-45. Peak Conducted Power (3Mbps – Ch. 78) – Ant 1



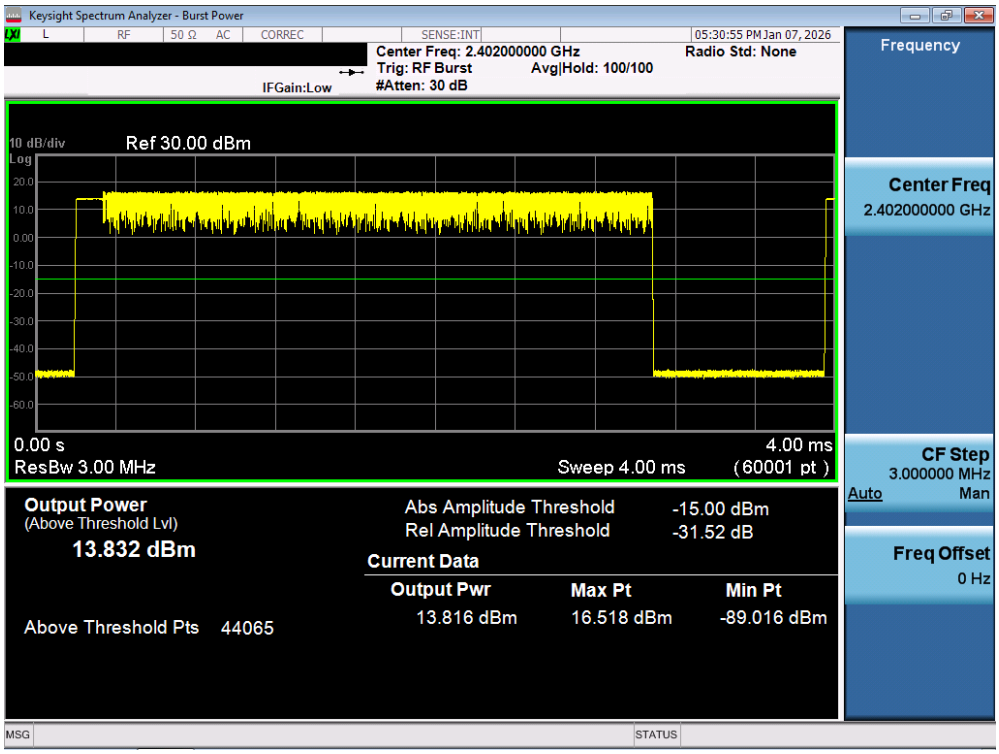
Plot 7-46. Average Conducted Power (1Mbps – Ch. 0) – Ant 1



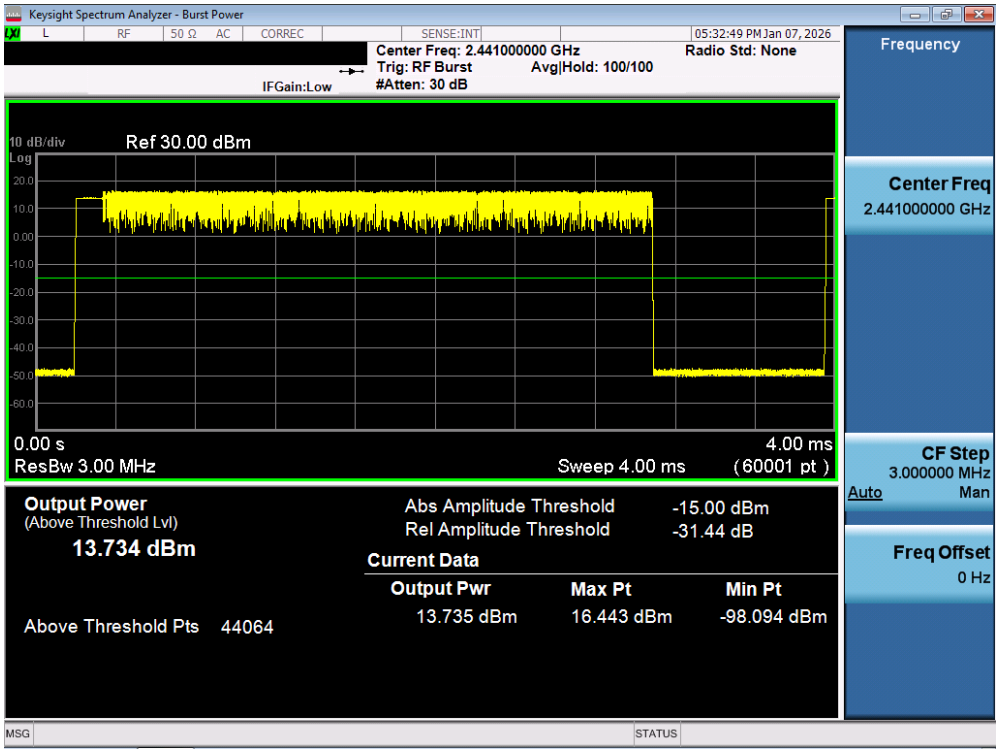
Plot 7-47. Average Conducted Power (1Mbps – Ch. 39) – Ant 1



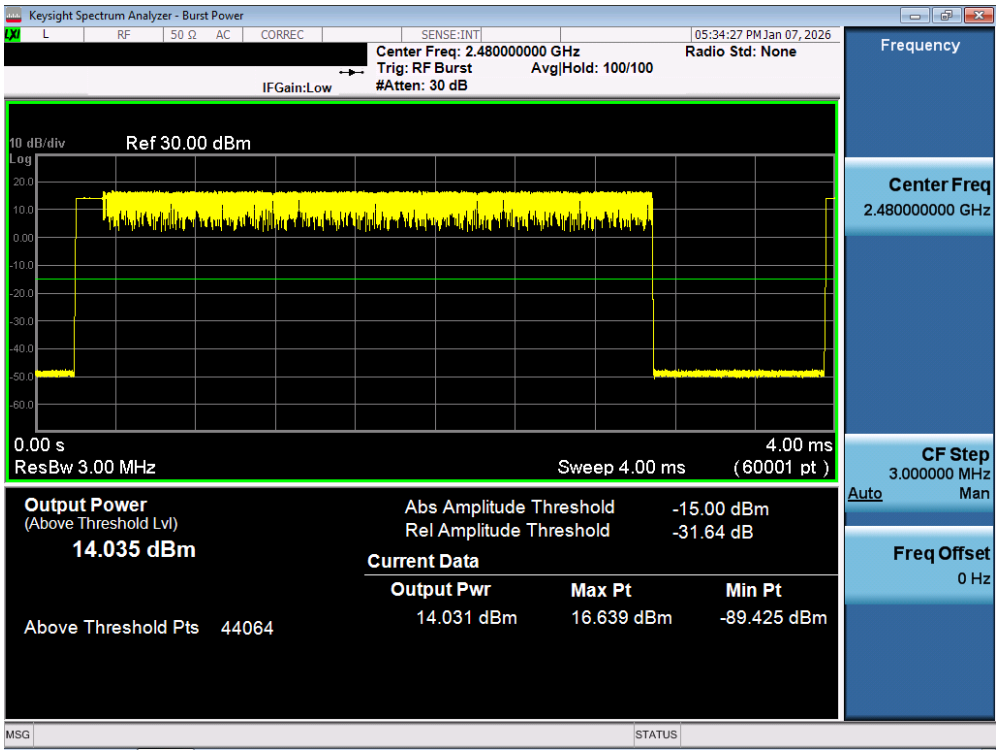
Plot 7-48. Average Conducted Power (1Mbps – Ch. 78) – Ant 1



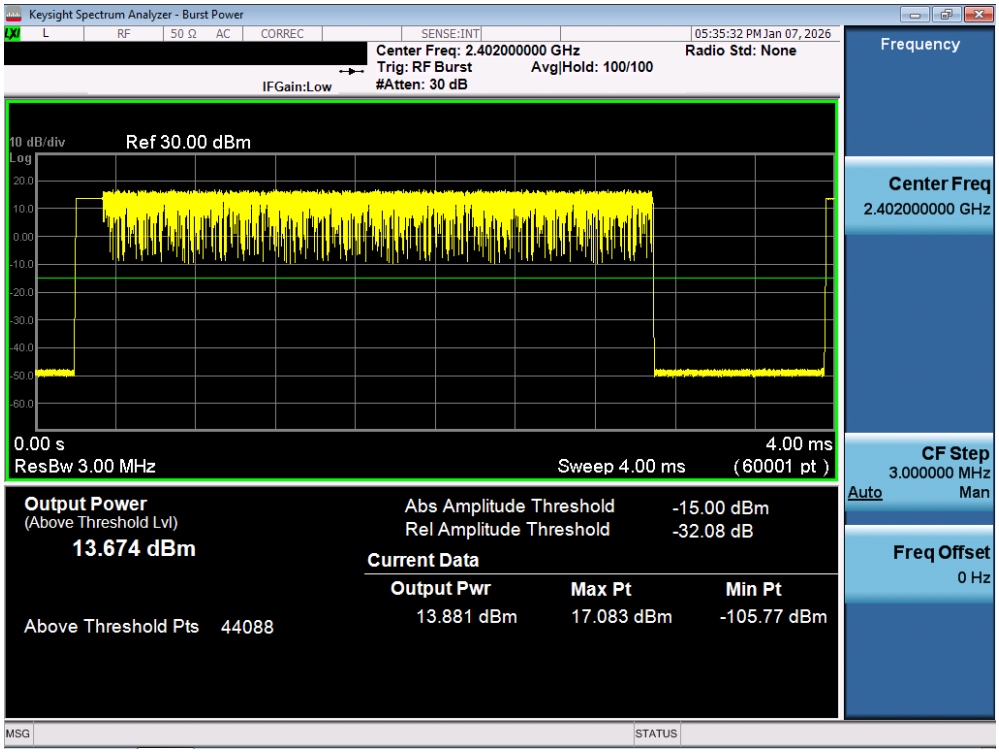
Plot 7-49. Average Conducted Power (2Mbps – Ch. 0) – Ant 1



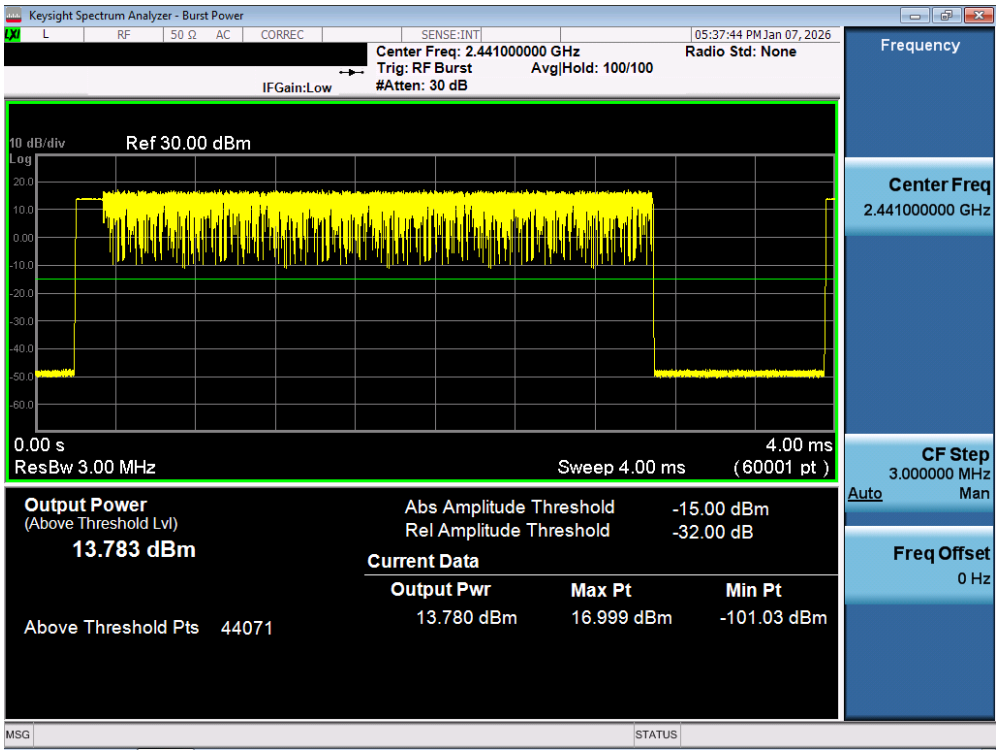
Plot 7-50. Average Conducted Power (2Mbps – Ch. 39) – Ant 1



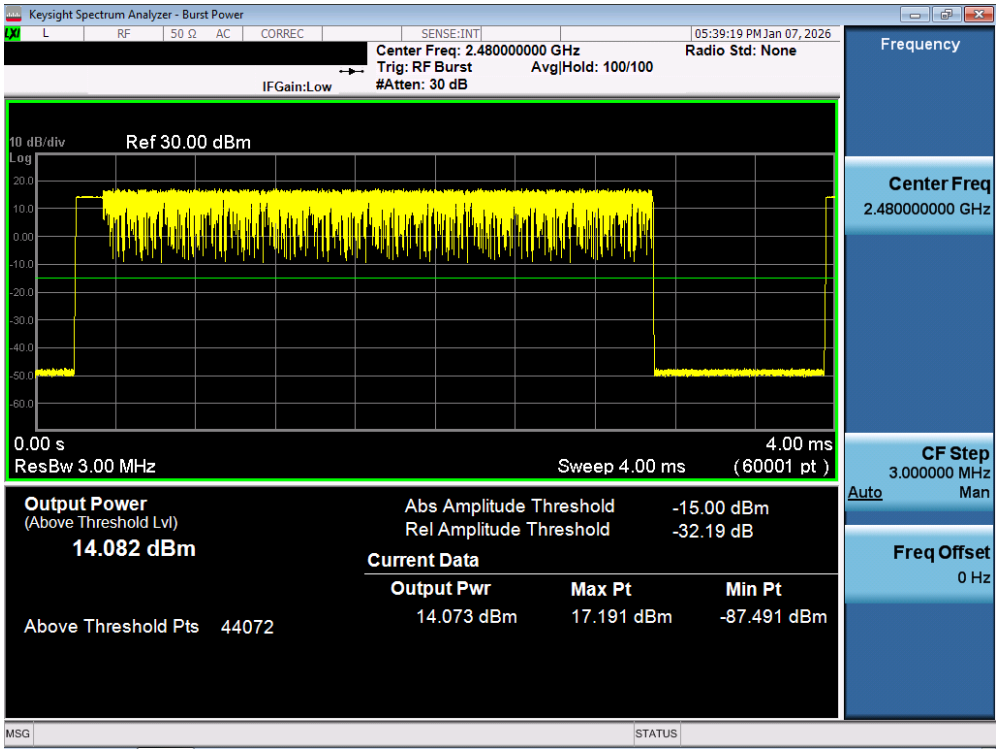
Plot 7-51. Average Conducted Power (2Mbps – Ch. 78) – Ant 1



Plot 7-52. Average Conducted Power (3Mbps – Ch. 0) – Ant 1



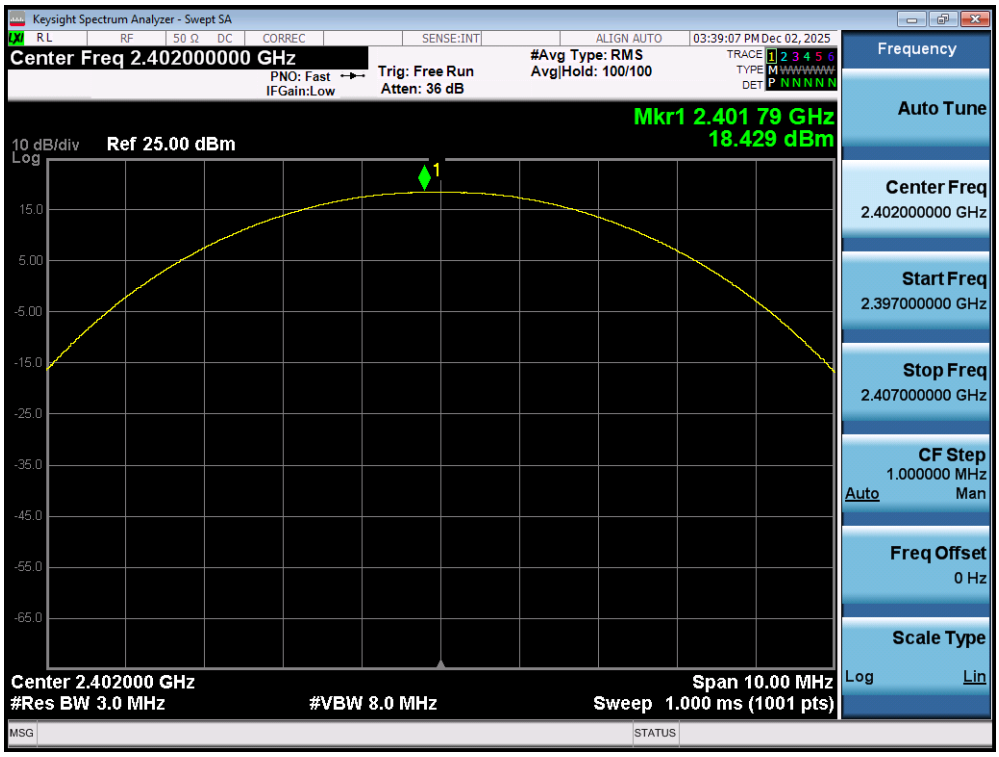
Plot 7-53. Average Conducted Power (3Mbps – Ch. 39) – Ant 1



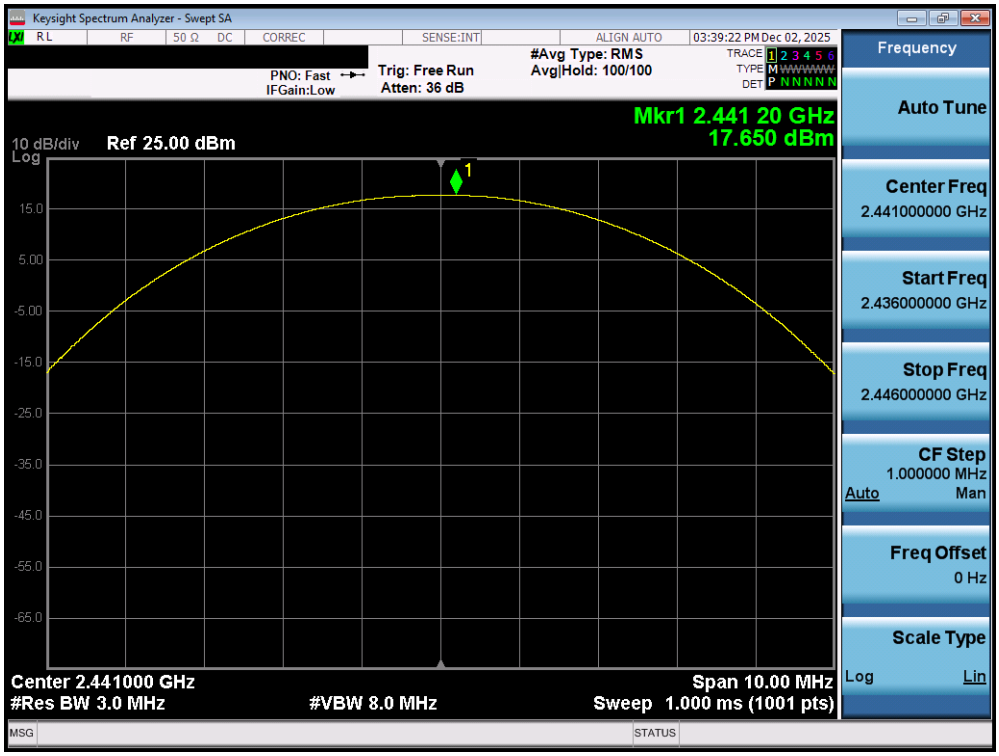
Plot 7-54. Average Conducted Power (3Mbps – Ch. 78) – Ant 1

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Peak Conducted Power		Avg Conducted Power		Ant. Gain [dBi]	EIRP [dBm]	Limit [dBm]	Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]				
2402	1.0	0	18.43	69.647	17.90	61.690	-5.58	12.85	36.02	-23.17
2441	1.0	39	17.65	58.210	17.28	53.422	-5.58	12.07	36.02	-23.95
2480	1.0	78	18.11	64.714	17.81	60.354	-5.58	12.53	36.02	-23.49
2402	2.0	0	18.89	77.482	15.48	35.336	-5.58	13.31	36.02	-22.71
2441	2.0	39	17.72	59.129	14.84	30.484	-5.58	12.14	36.02	-23.88
2480	2.0	78	18.20	65.993	15.45	35.098	-5.58	12.62	36.02	-23.41
2402	3.0	0	21.59	144.046	15.60	36.278	-5.58	16.01	36.02	-20.02
2441	3.0	39	18.36	68.580	14.91	30.987	-5.58	12.78	36.02	-23.24
2480	3.0	78	18.78	75.422	15.52	35.619	-5.58	13.20	36.02	-22.83

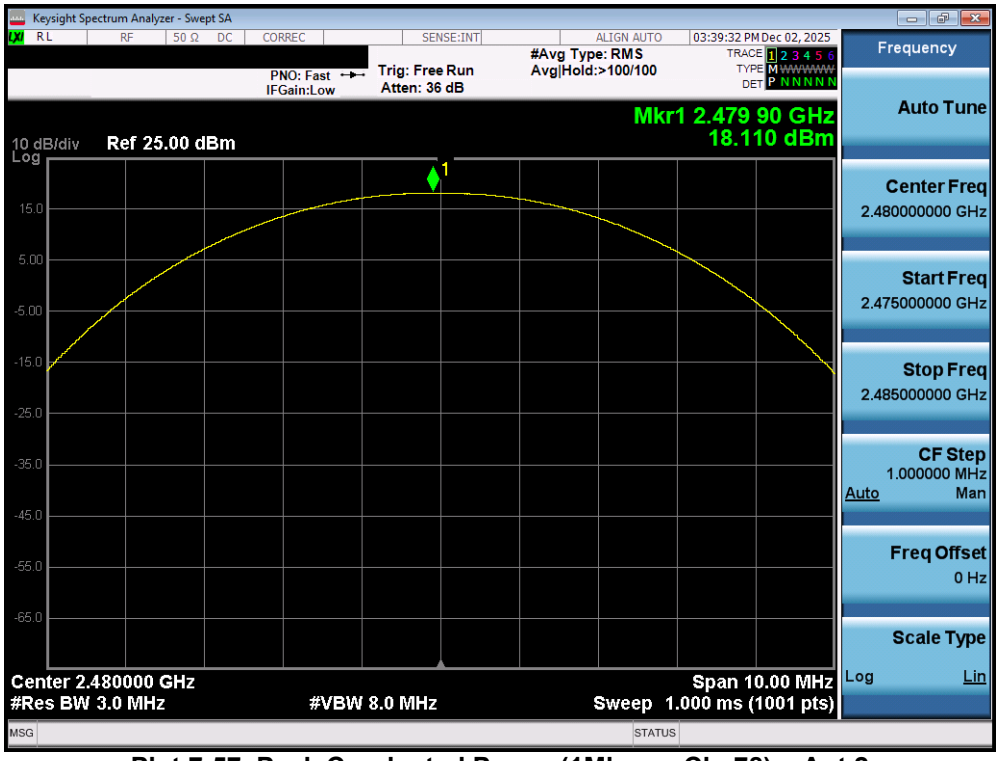
Table 7-7. Conducted Output Power Measurements – Ant 2



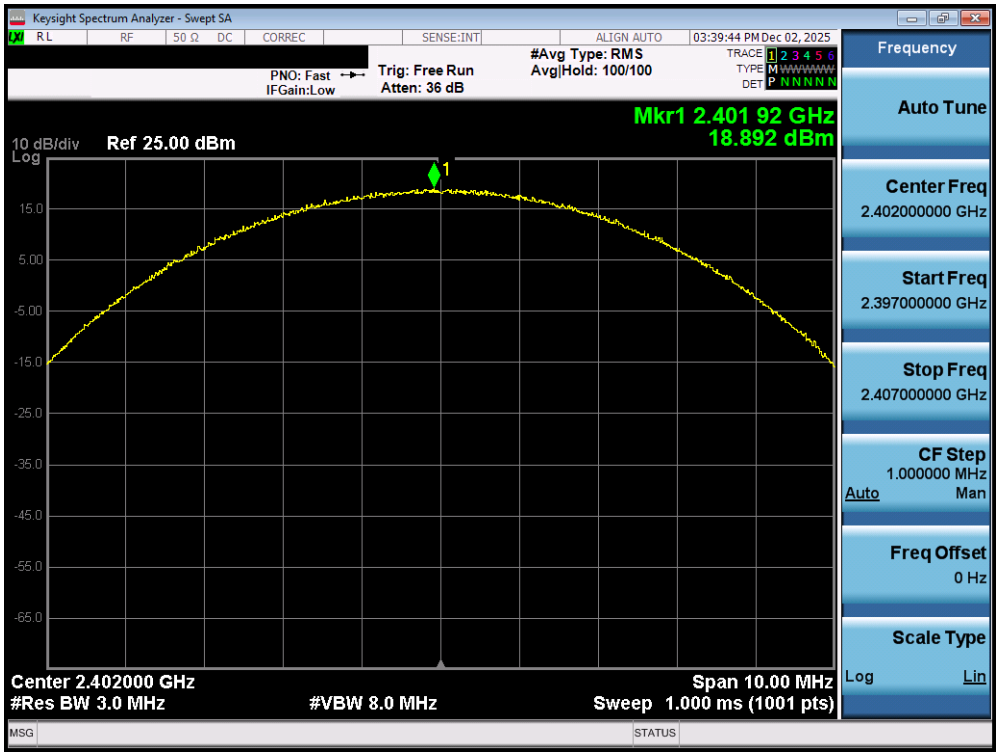
Plot 7-55. Peak Conducted Power (1Mbps – Ch. 0) – Ant 2



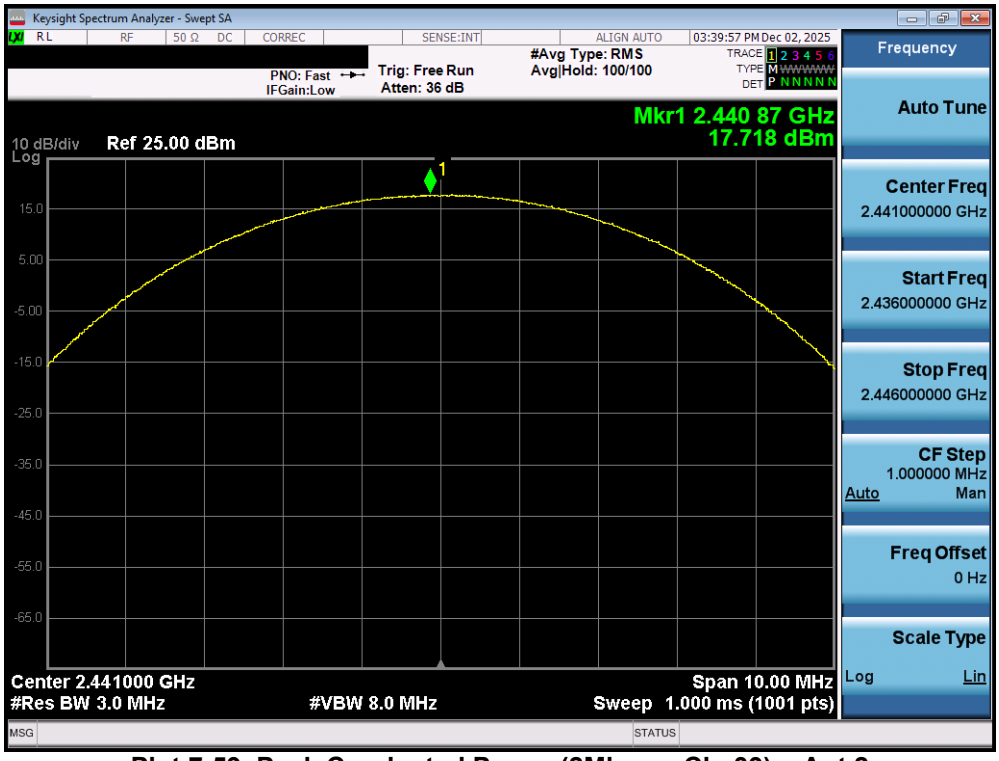
Plot 7-56. Peak Conducted Power (1Mbps – Ch. 39) – Ant 2



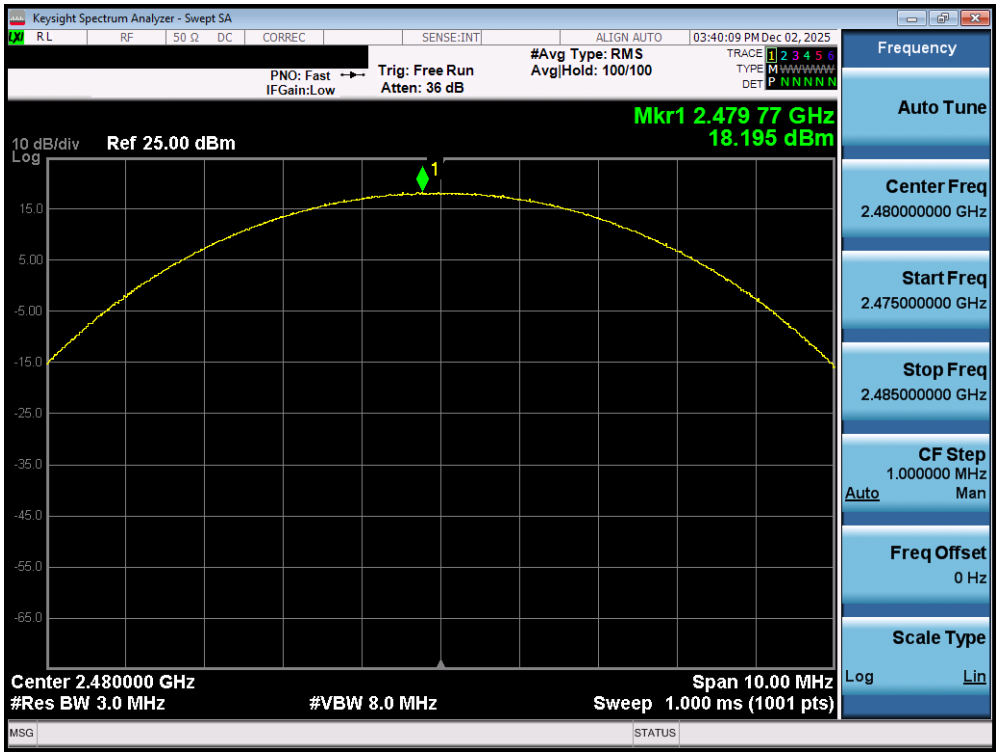
Plot 7-57. Peak Conducted Power (1Mbps – Ch. 78) – Ant 2



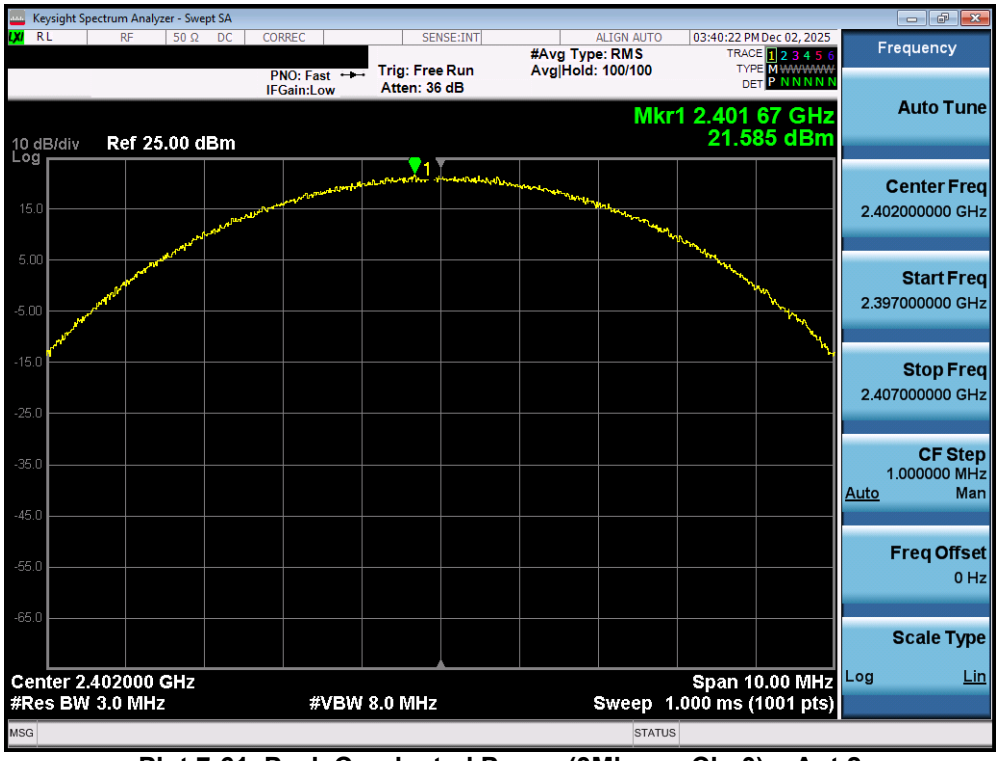
Plot 7-58. Peak Conducted Power (2Mbps – Ch. 0) – Ant 2



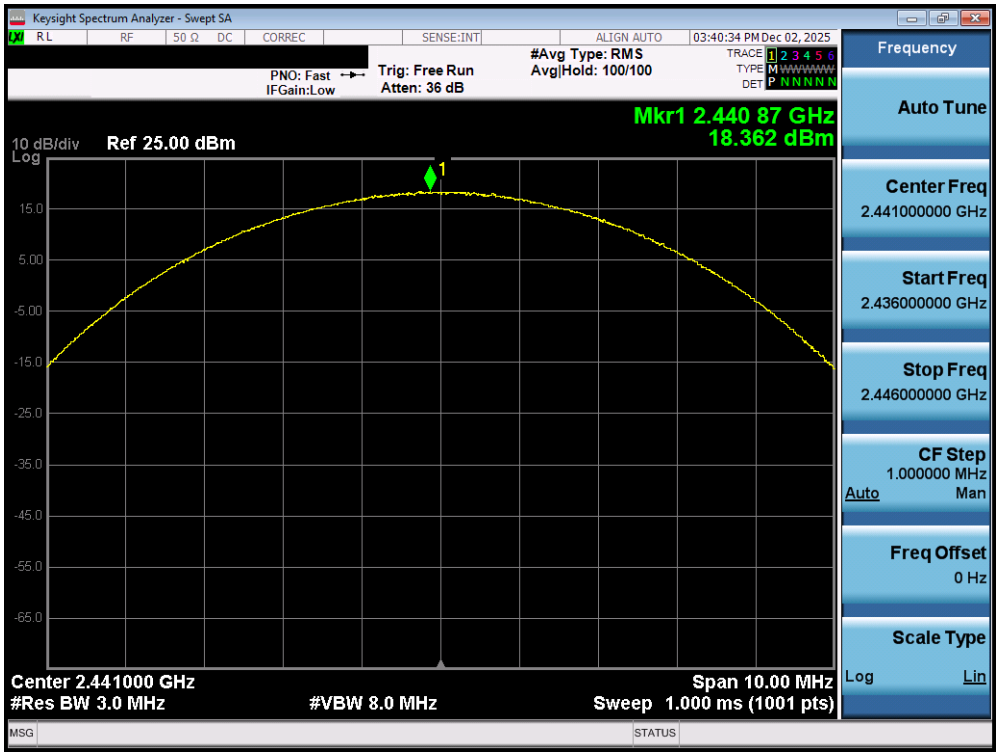
Plot 7-59. Peak Conducted Power (2Mbps – Ch. 39) – Ant 2



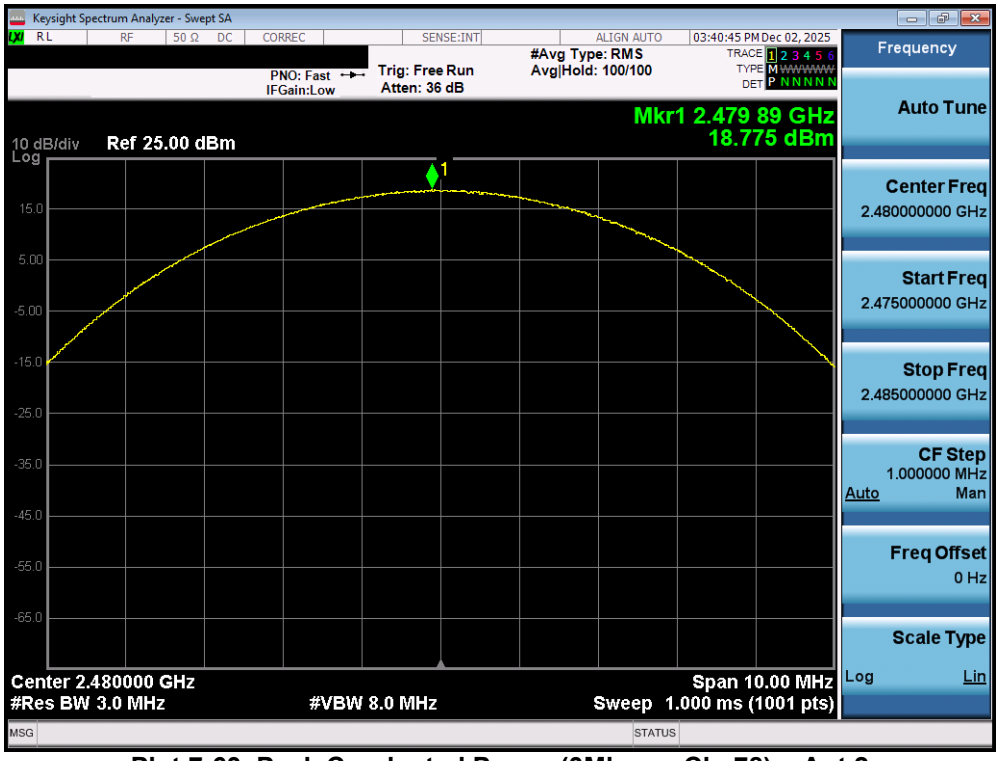
Plot 7-60. Peak Conducted Power (2Mbps – Ch. 78) – Ant 2



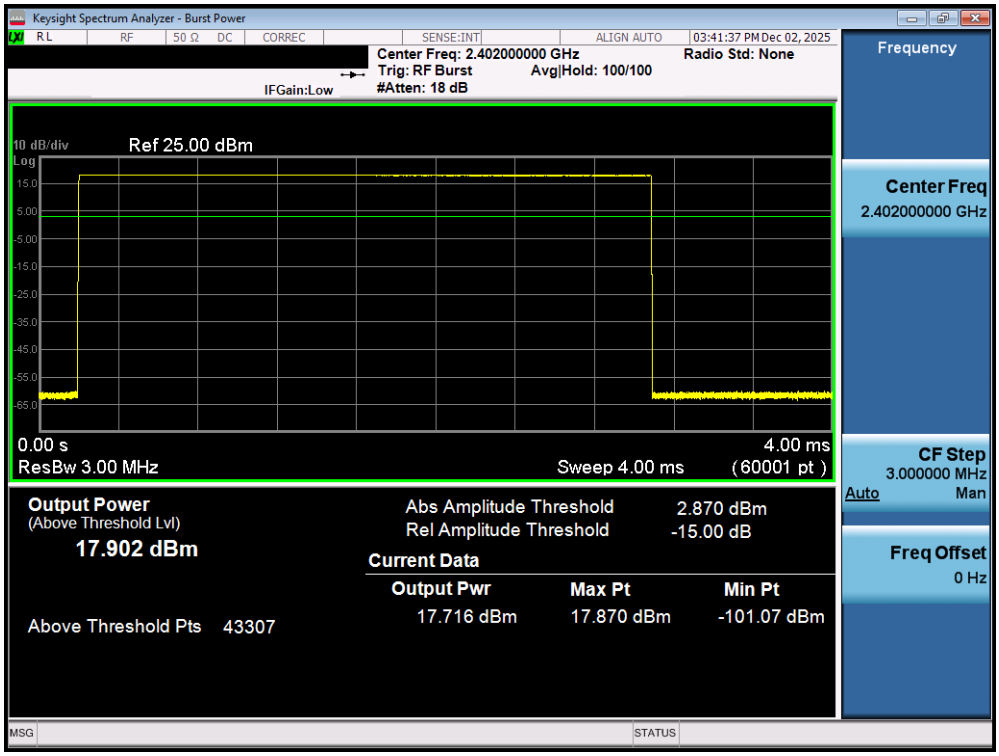
Plot 7-61. Peak Conducted Power (3Mbps – Ch. 0) – Ant 2



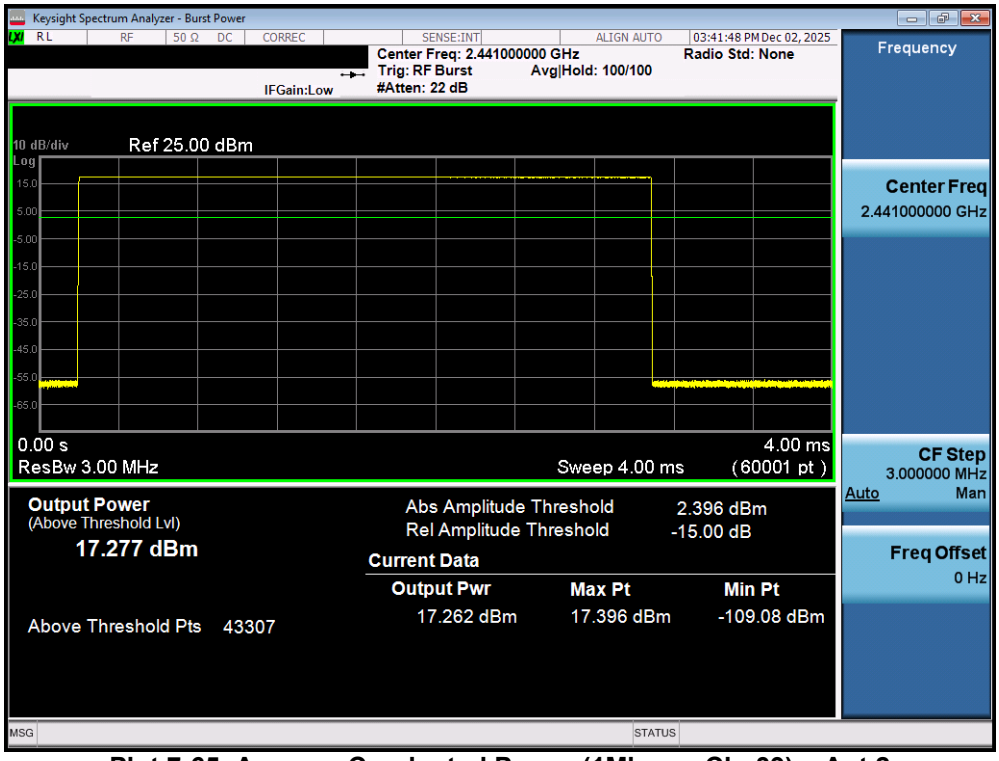
Plot 7-62. Peak Conducted Power (3Mbps – Ch. 39) – Ant 2



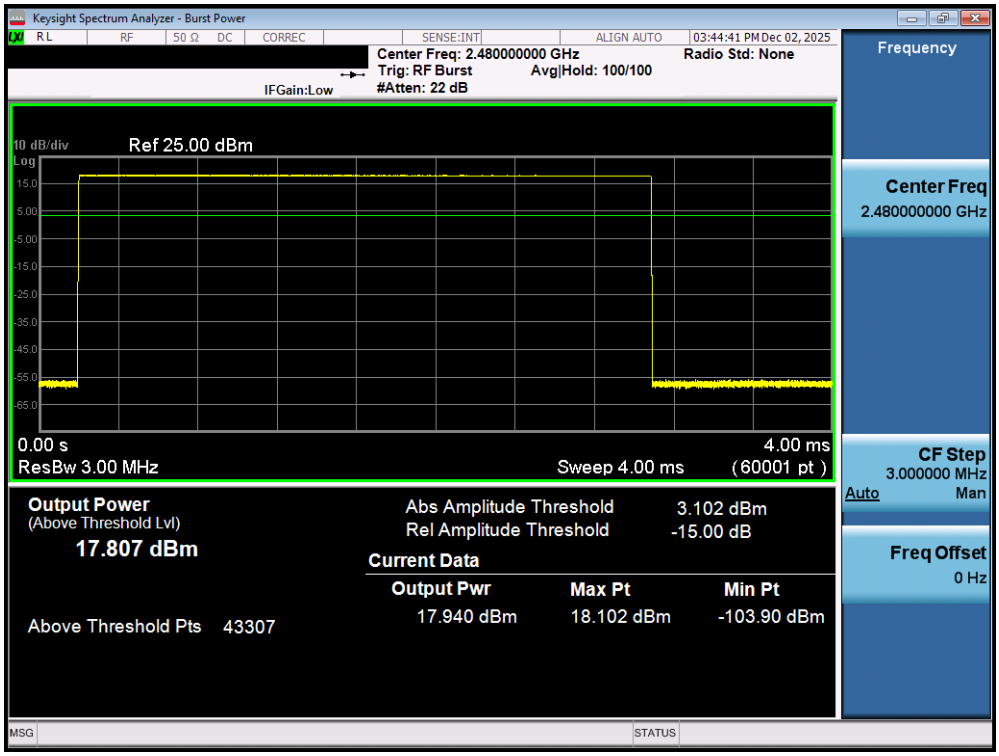
Plot 7-63. Peak Conducted Power (3Mbps – Ch. 78) – Ant 2



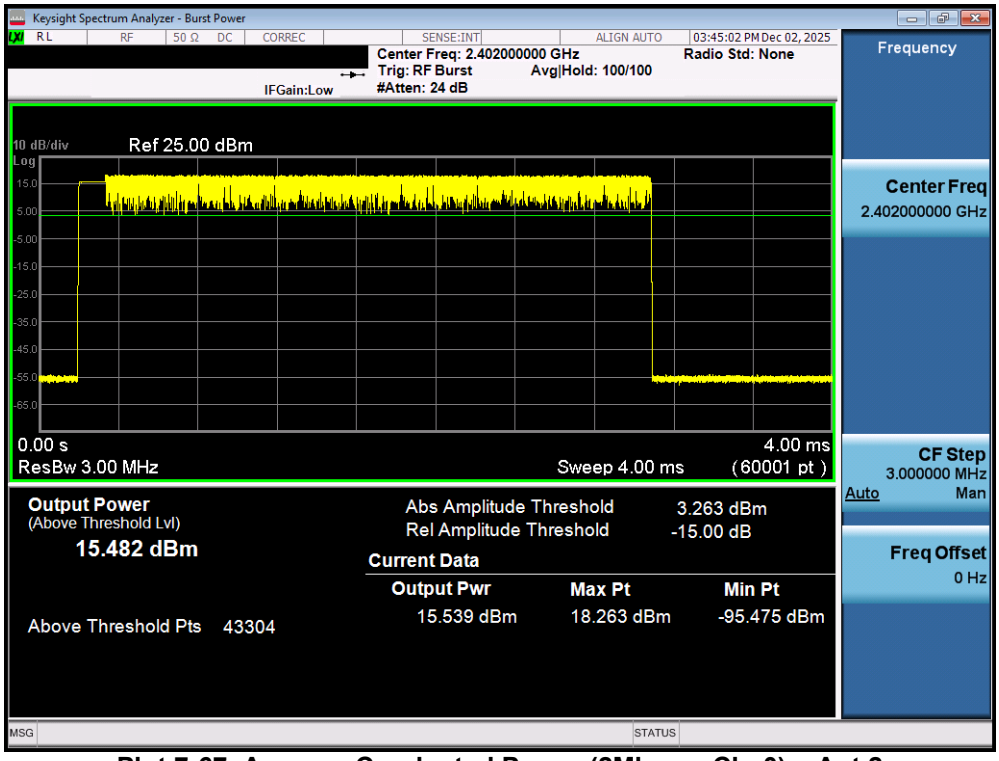
Plot 7-64. Average Conducted Power (1Mbps – Ch. 0) – Ant 2



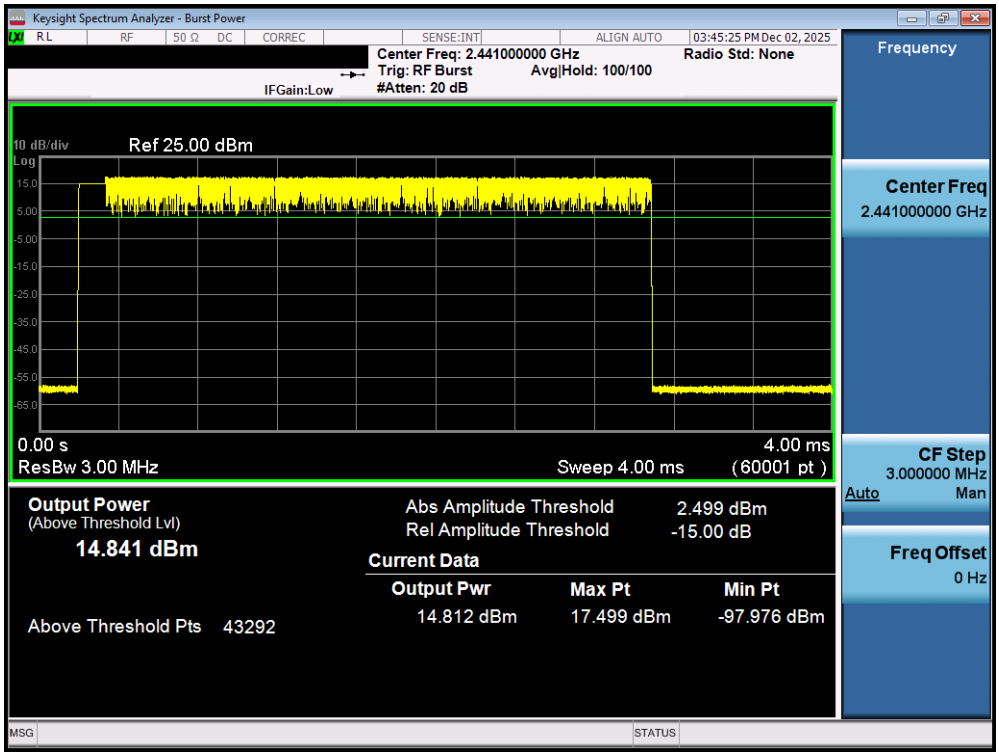
Plot 7-65. Average Conducted Power (1Mbps – Ch. 39) – Ant 2



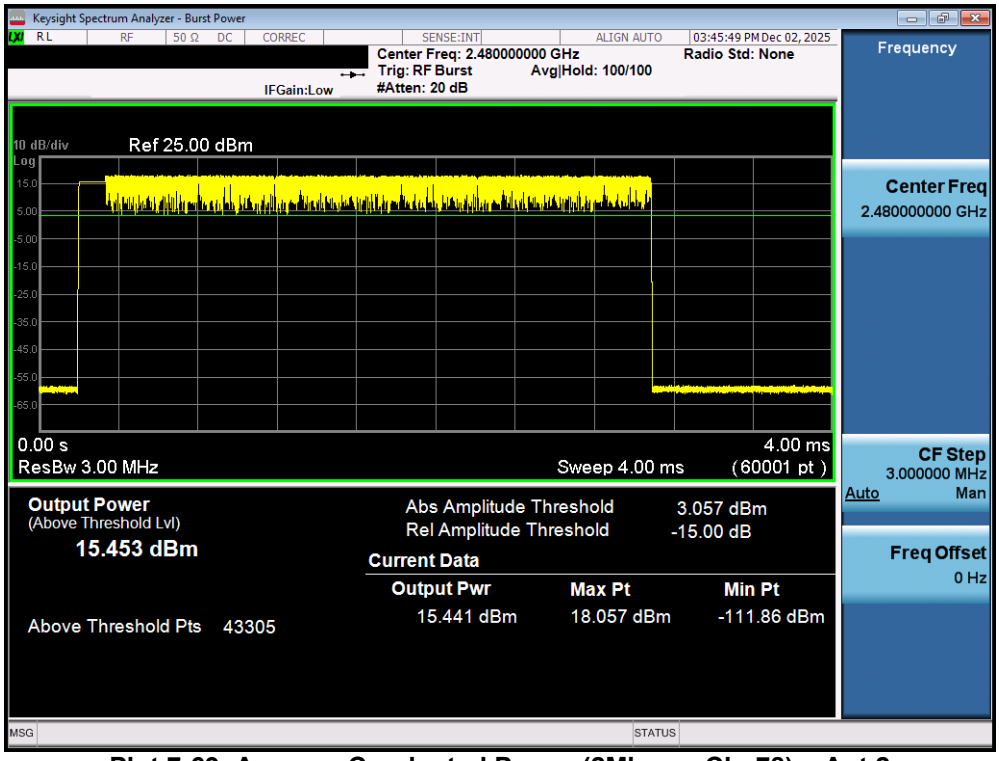
Plot 7-66. Average Conducted Power (1Mbps – Ch. 78) – Ant 2



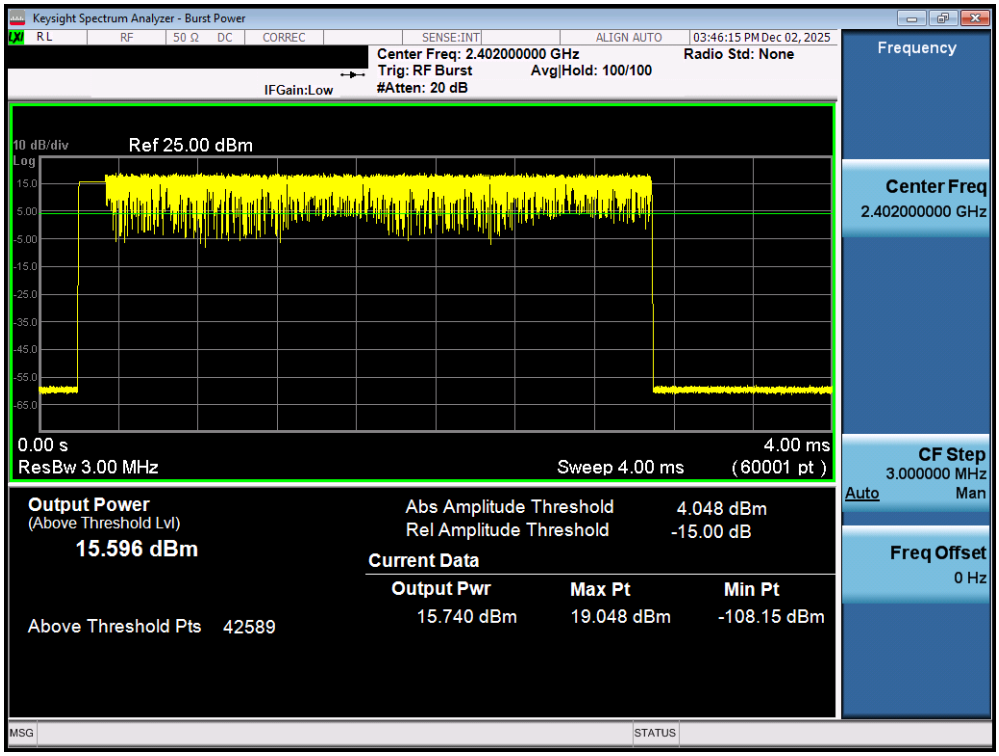
Plot 7-67. Average Conducted Power (2Mbps – Ch. 0) – Ant 2



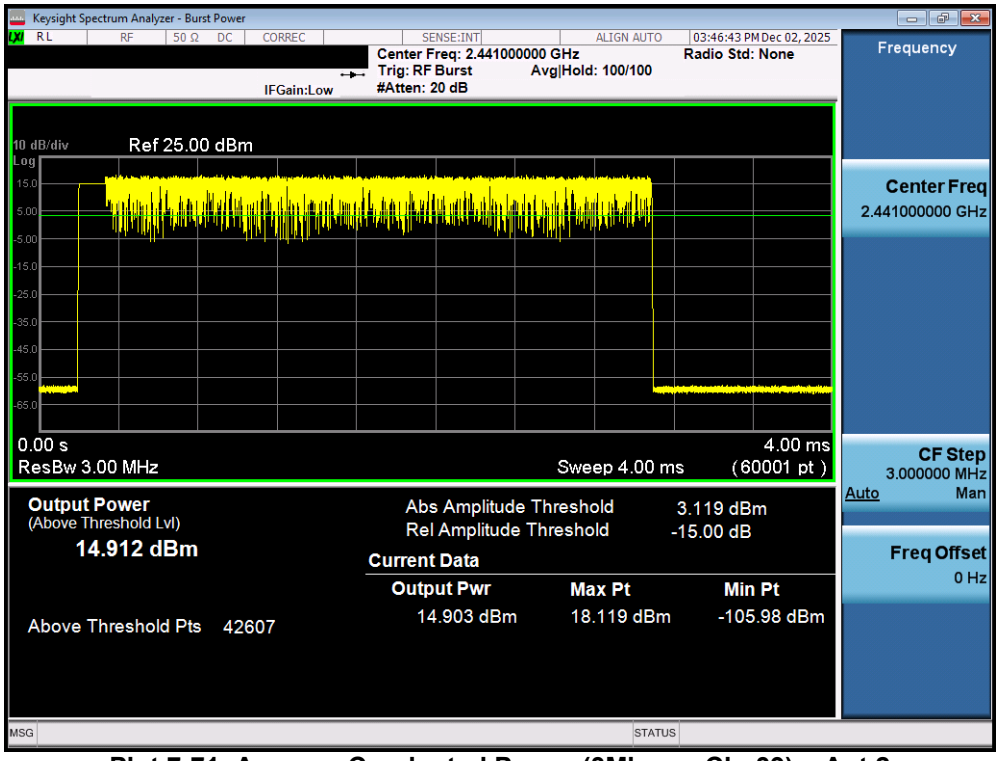
Plot 7-68. Average Conducted Power (2Mbps – Ch. 39) – Ant 2



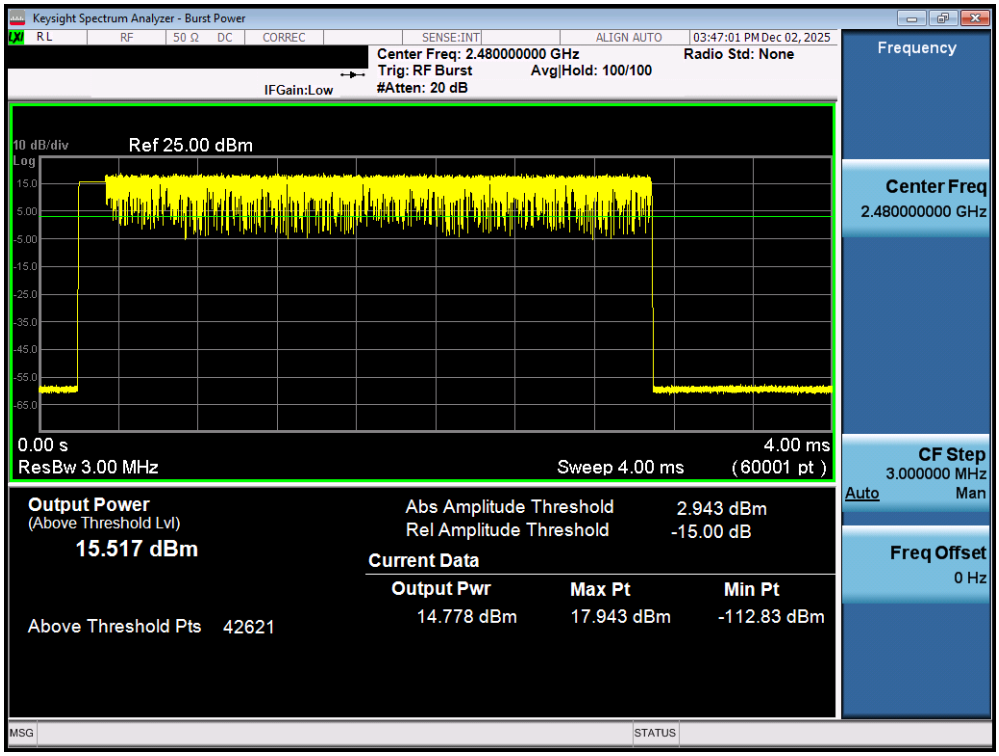
Plot 7-69. Average Conducted Power (2Mbps – Ch. 78) – Ant 2



Plot 7-70. Average Conducted Power (3Mbps – Ch. 0) – Ant 2



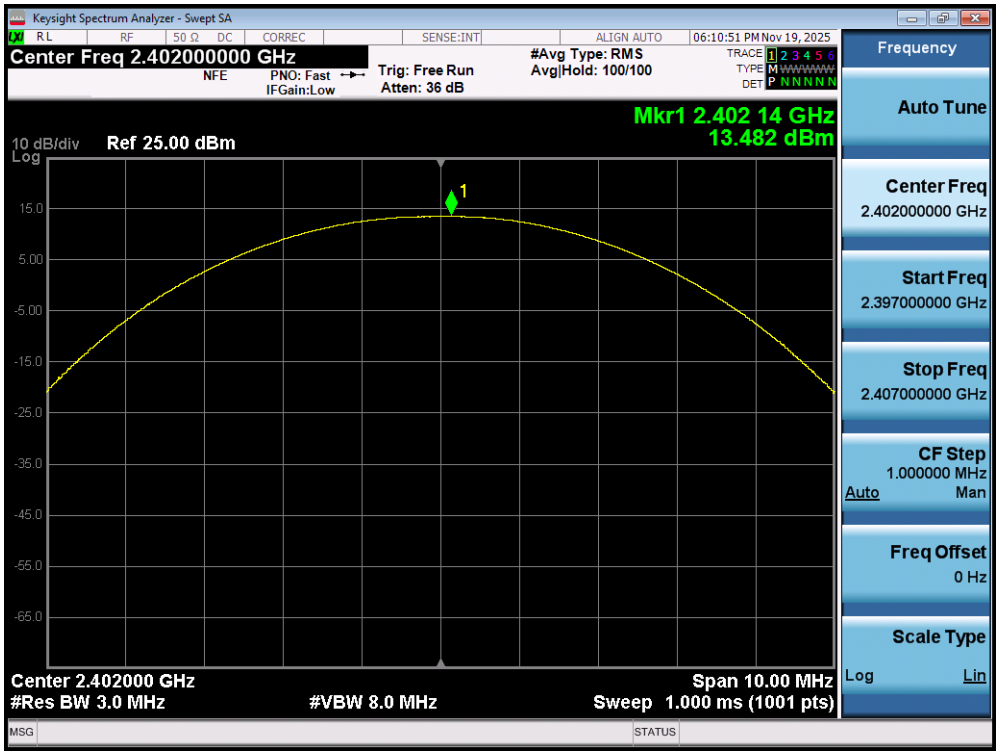
Plot 7-71. Average Conducted Power (3Mbps – Ch. 39) – Ant 2



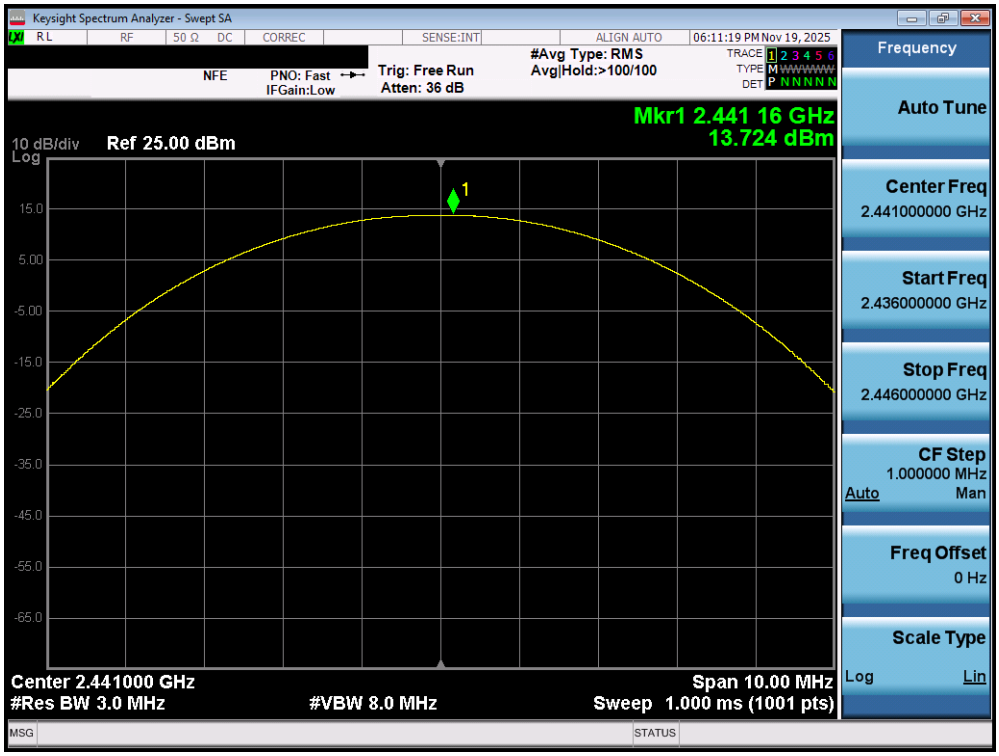
Plot 7-72. Average Conducted Power (3Mbps – Ch. 78) – Ant 2

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Peak Conducted Power - ANT1		Avg Conducted Power - ANT1		Peak Conducted Power - ANT2		Avg Conducted Power - ANT2		Peak Conducted Power - DUAL		Avg Conducted Power - DUAL		Ant. Gain [dBi]	EIRP [dBm]	Limit [dBm]	Margin [dB]
			[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]				
2402	1.0	0	13.48	22.295	13.31	21.447	13.77	23.807	13.64	23.095	16.64	46.101	16.49	44.542	-1.78	14.86	36.02	-21.16
2441	1.0	39	13.72	23.572	13.69	23.370	12.46	17.612	12.41	17.403	16.15	41.184	16.10	40.773	-1.78	14.37	36.02	-21.65
2480	1.0	78	13.96	24.912	13.83	24.170	12.96	19.783	12.83	19.190	16.50	44.695	16.37	43.360	-1.78	14.72	36.02	-21.30
2402	2.0	0	12.70	18.629	9.43	8.771	13.26	21.203	10.43	11.034	16.00	39.833	12.97	19.805	-1.78	14.22	36.02	-21.80
2441	2.0	39	11.76	14.993	9.26	8.433	12.23	16.711	9.91	9.802	15.01	31.704	12.61	18.235	-1.78	13.23	36.02	-22.79
2480	2.0	78	12.39	17.338	9.62	9.159	13.01	20.012	9.89	9.757	15.72	37.350	12.77	18.916	-1.78	13.94	36.02	-22.08
2402	3.0	0	13.36	21.692	9.53	8.976	13.85	24.261	10.54	11.320	16.62	45.953	13.07	20.295	-1.78	14.84	36.02	-21.18
2441	3.0	39	12.39	17.338	9.45	8.810	12.53	17.910	9.99	9.980	15.47	35.248	12.74	18.791	-1.78	13.69	36.02	-22.33
2480	3.0	78	12.93	19.634	9.39	8.687	13.44	22.090	9.93	9.847	16.20	41.724	12.68	18.534	-1.78	14.42	36.02	-21.60

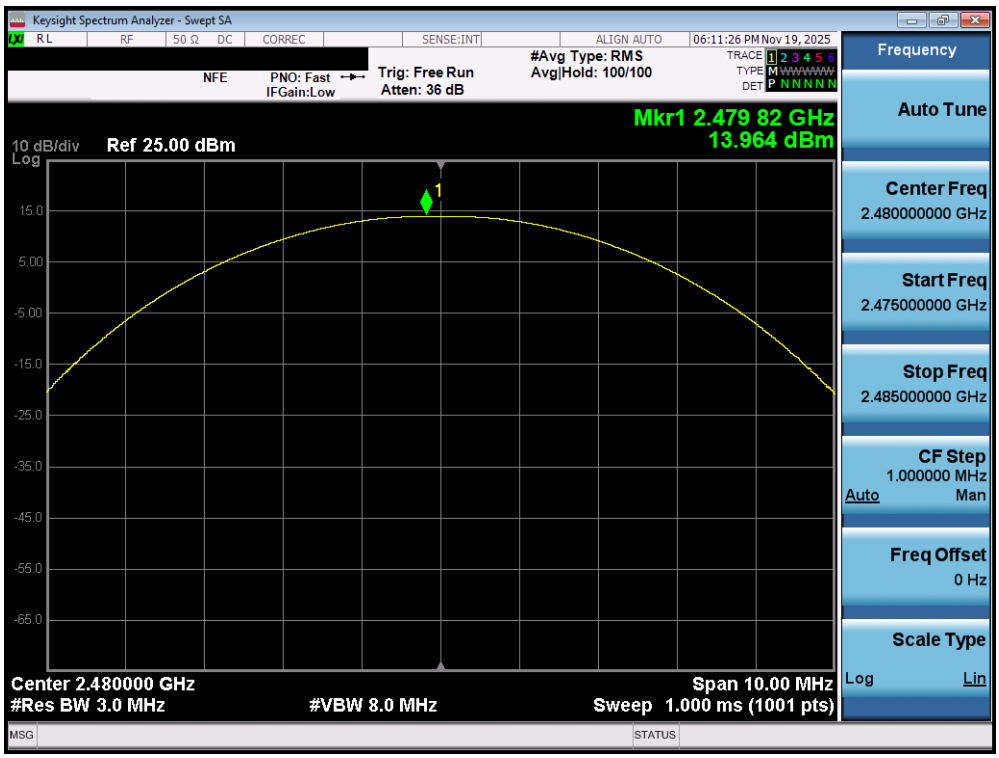
Table 7-8. Conducted Output Power Measurements – Dual



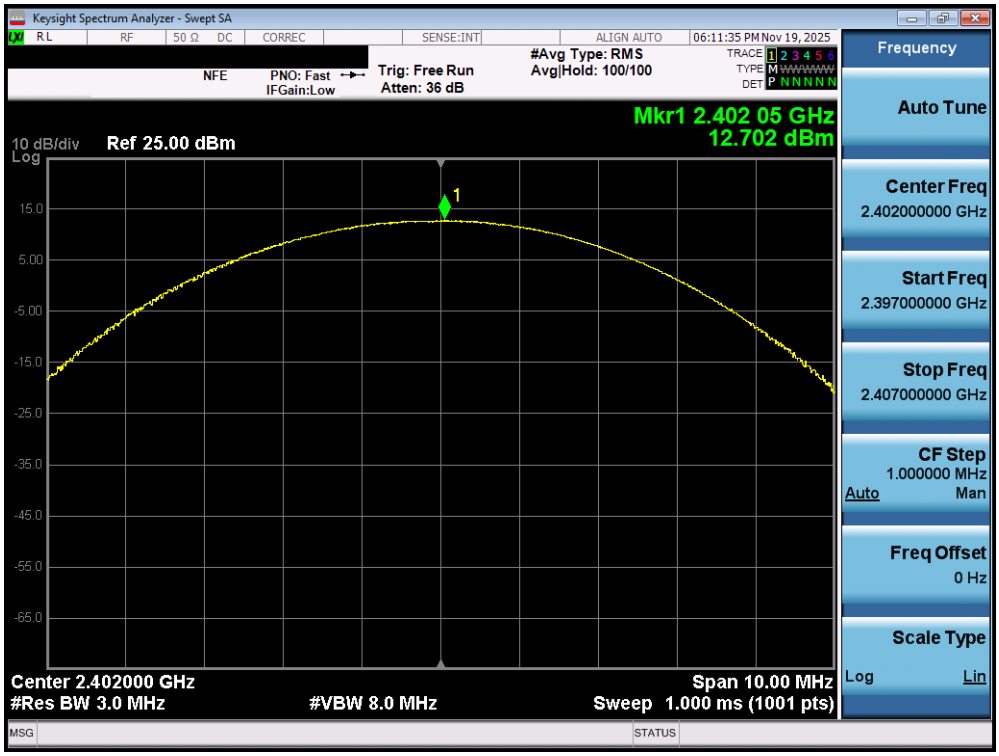
Plot 7-73. Peak Conducted Power (1Mbps – Ch. 0) – Dual Ant 1



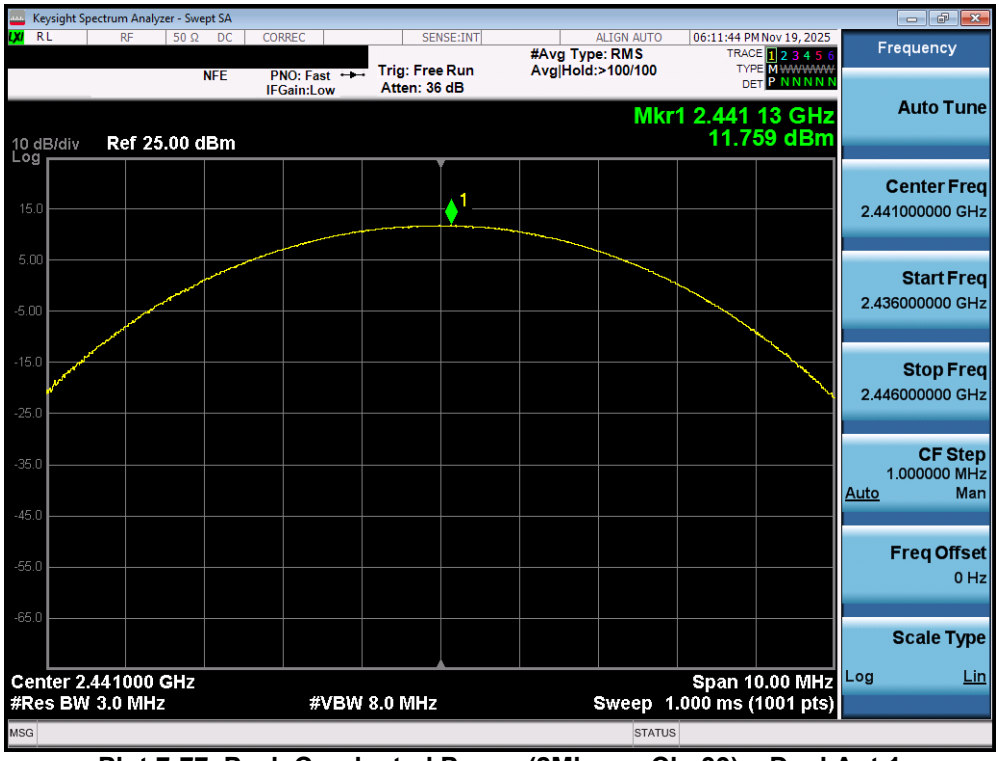
Plot 7-74. Peak Conducted Power (1Mbps – Ch. 39) – Dual Ant 1



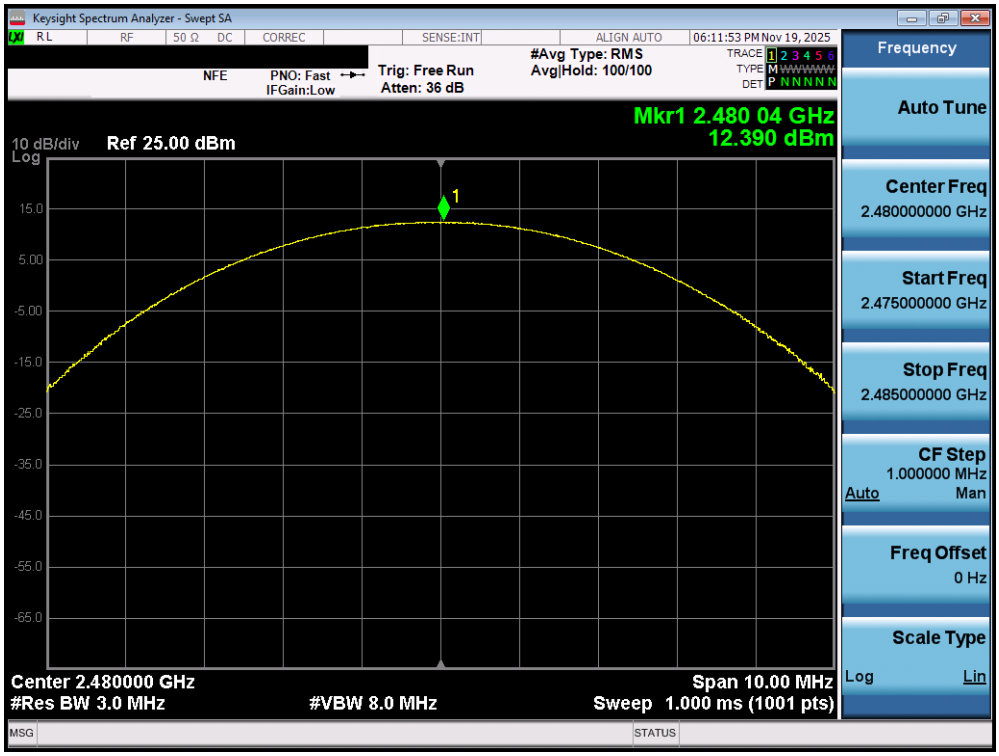
Plot 7-75. Peak Conducted Power (1Mbps – Ch. 78) – Dual Ant 1



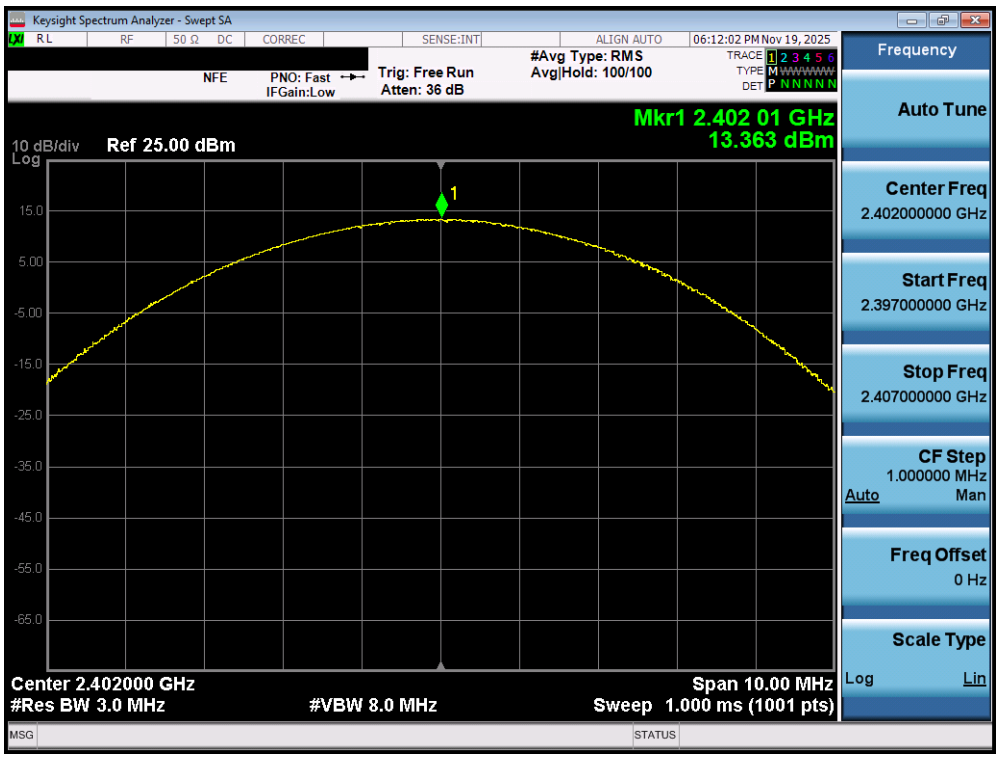
Plot 7-76. Peak Conducted Power (2Mbps – Ch. 0) – Dual Ant 1



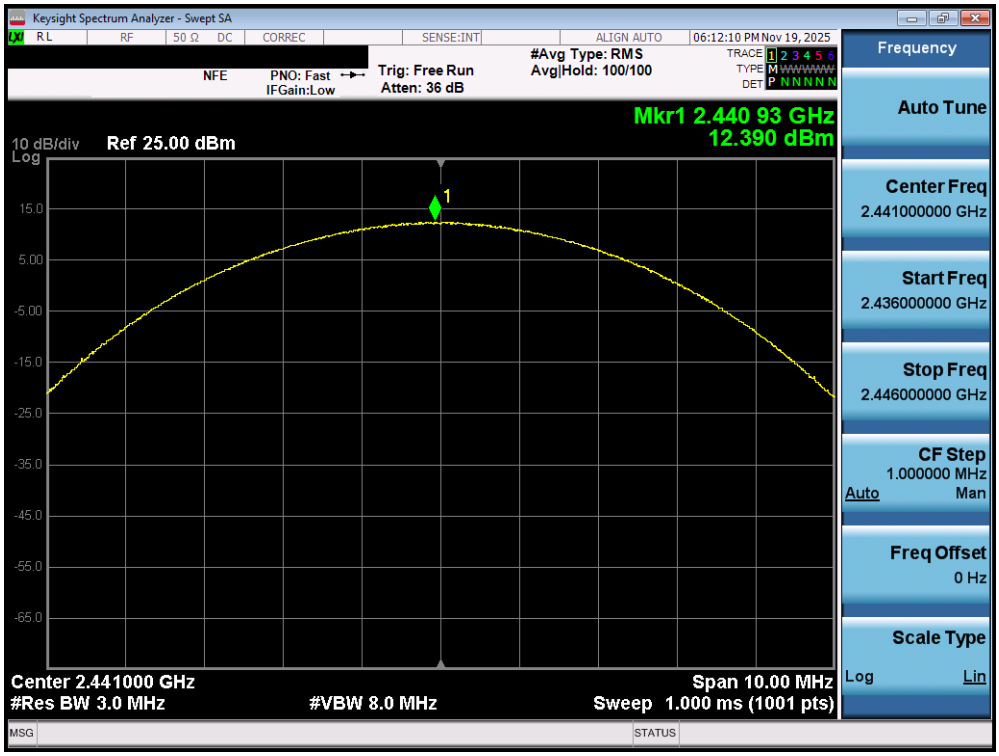
Plot 7-77. Peak Conducted Power (2Mbps – Ch. 39) – Dual Ant 1



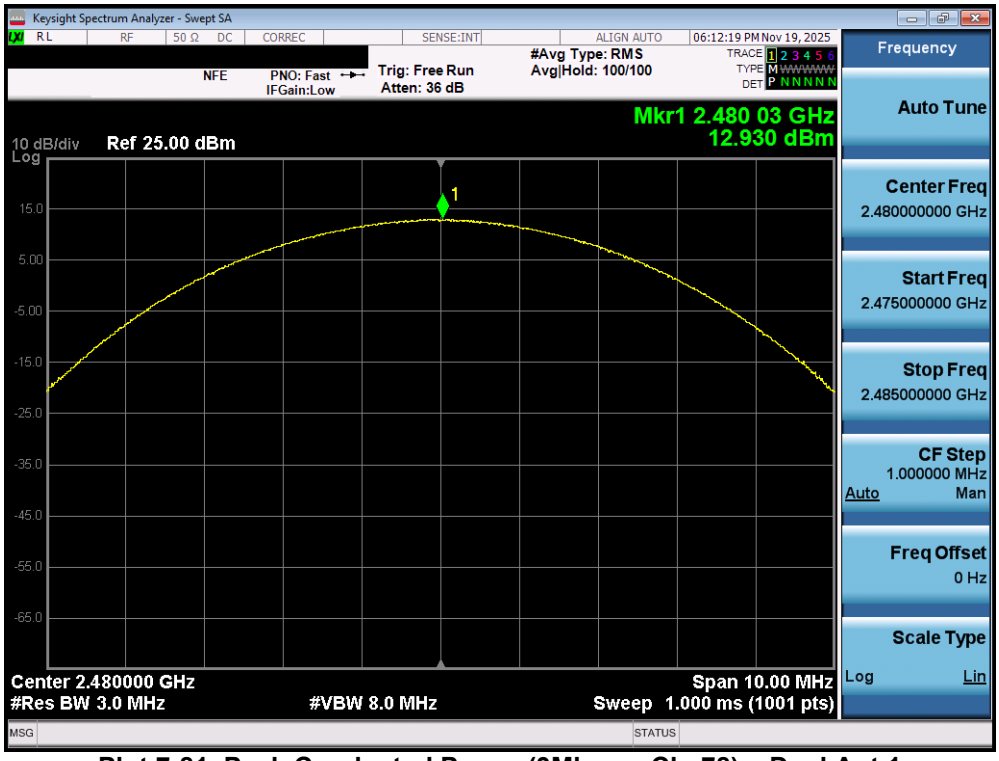
Plot 7-78. Peak Conducted Power (2Mbps – Ch. 78) – Dual Ant 1



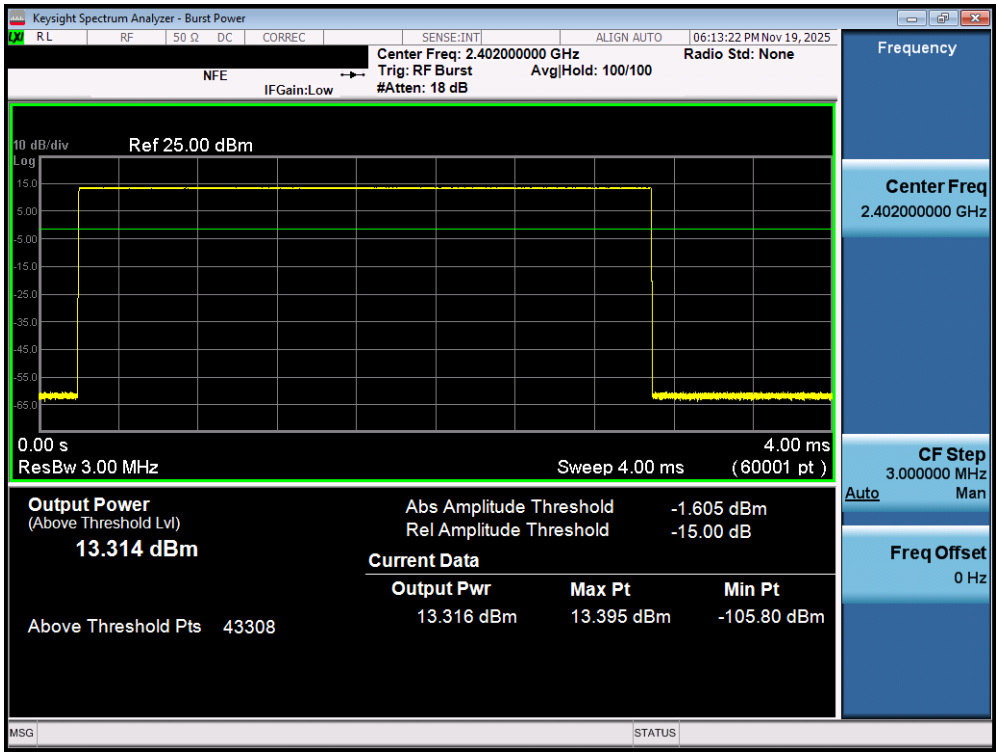
Plot 7-79. Peak Conducted Power (3Mbps – Ch. 0) – Dual Ant 1



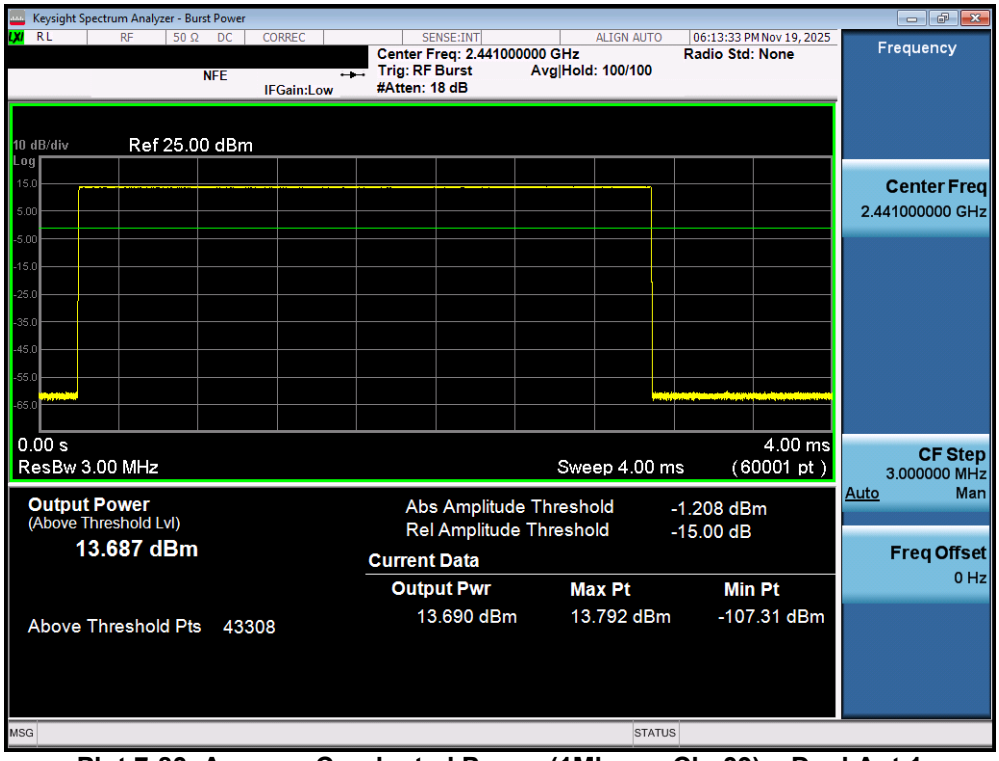
Plot 7-80. Peak Conducted Power (3Mbps – Ch. 39) – Dual Ant 1



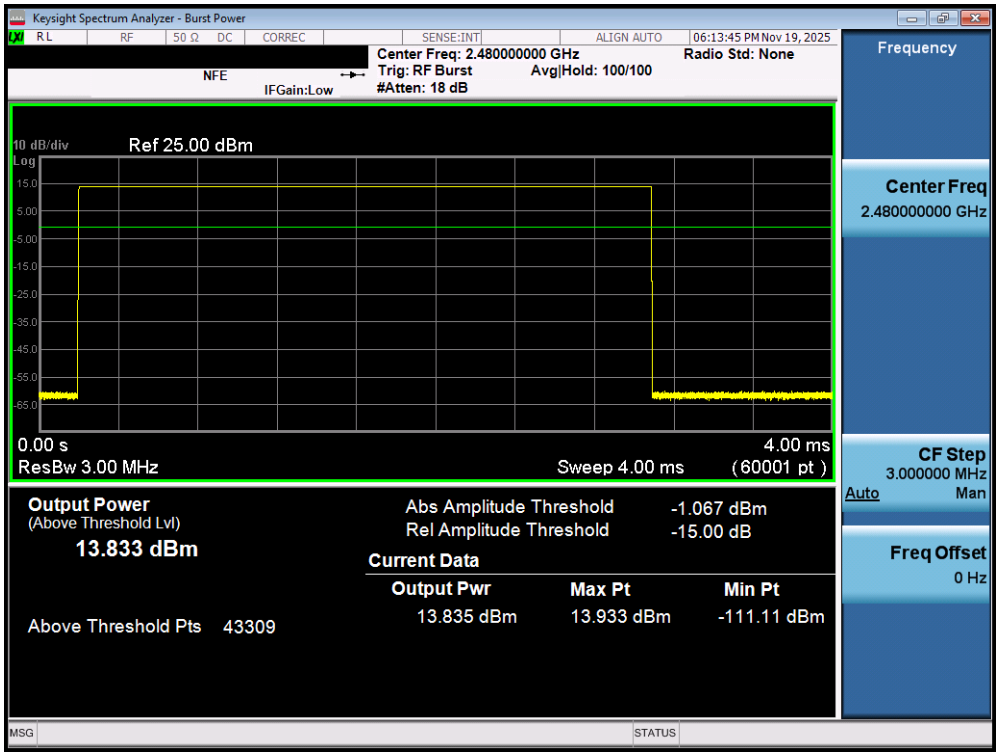
Plot 7-81. Peak Conducted Power (3Mbps – Ch. 78) – Dual Ant 1



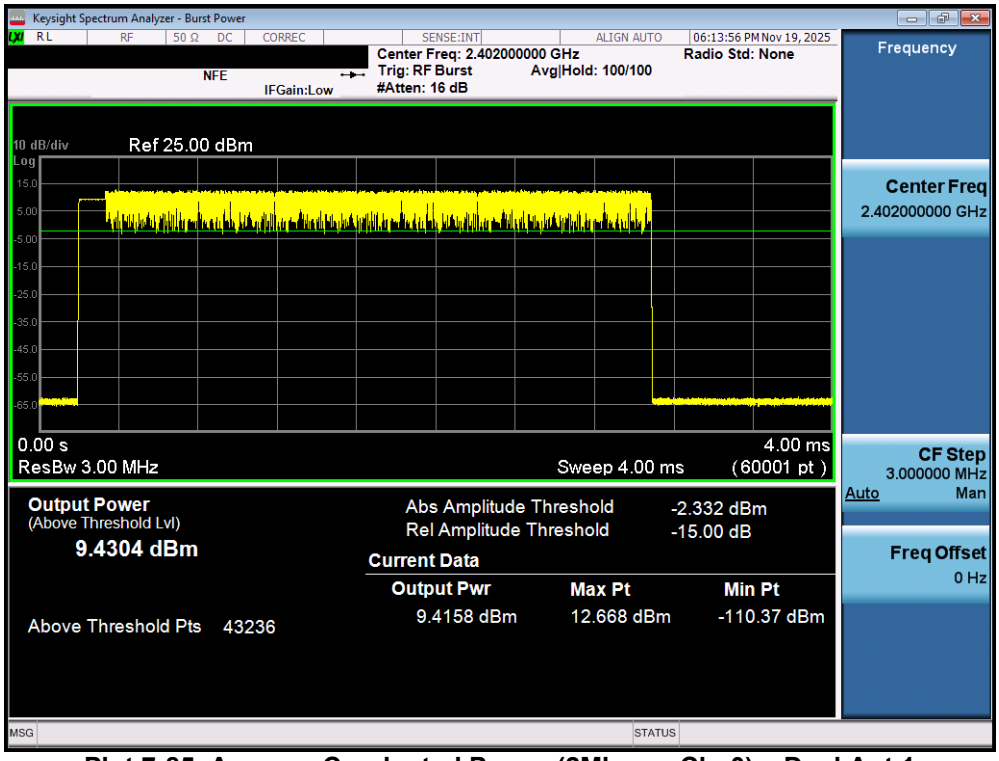
Plot 7-82. Average Conducted Power (1Mbps – Ch. 0) – Dual Ant 1



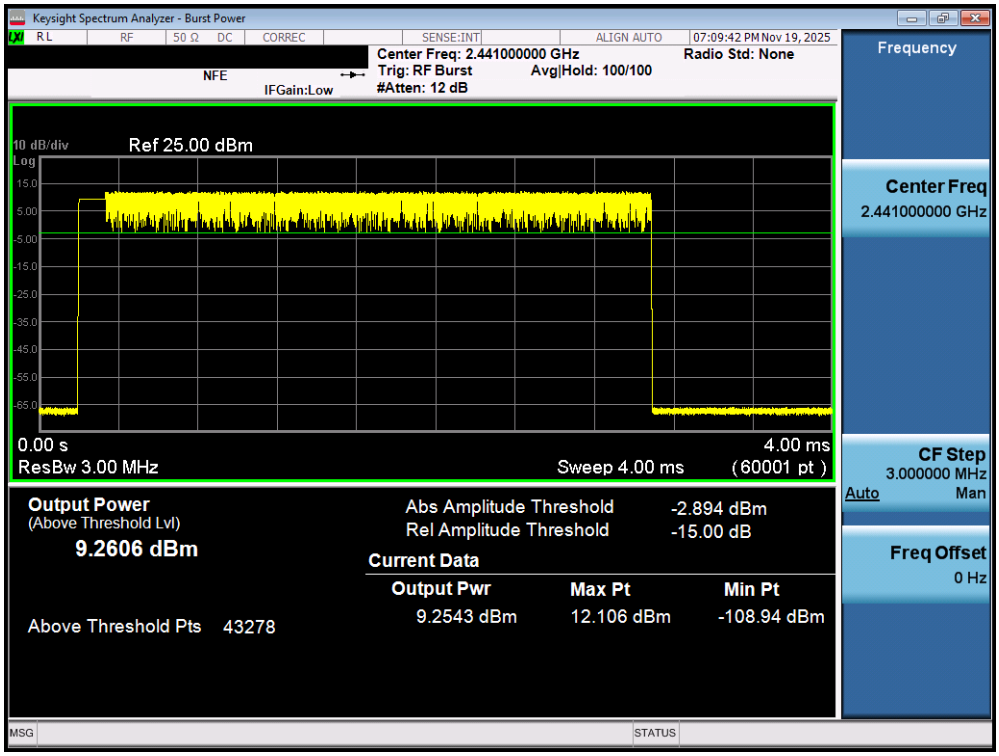
Plot 7-83. Average Conducted Power (1Mbps – Ch. 39) – Dual Ant 1



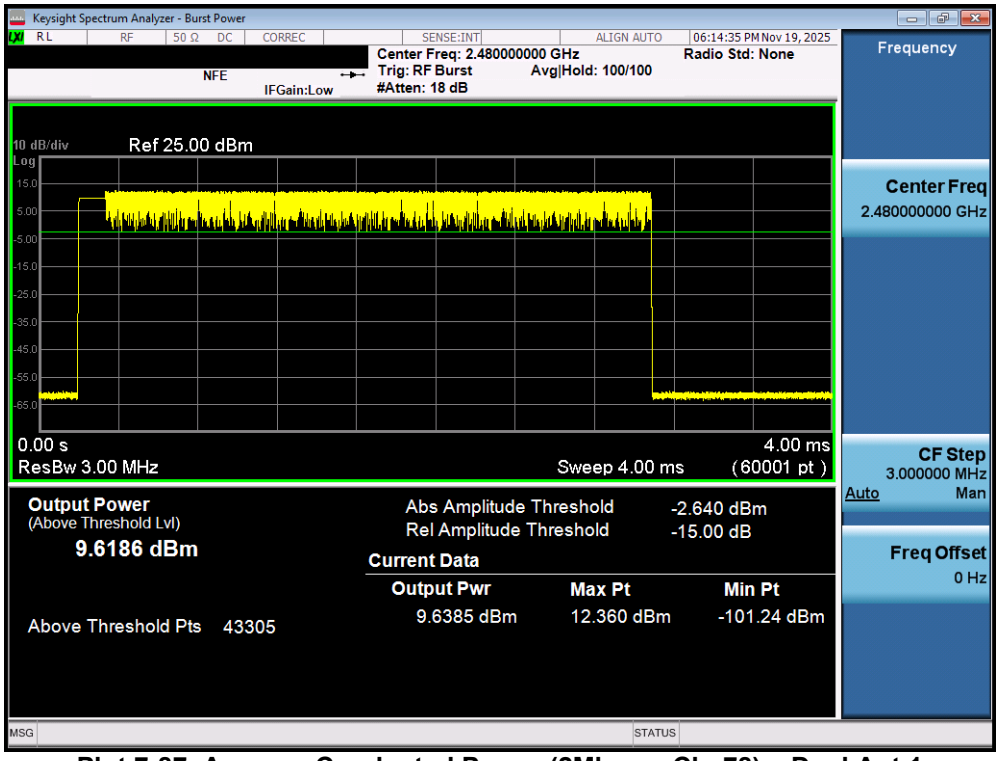
Plot 7-84. Average Conducted Power (1Mbps – Ch. 78) – Dual Ant 1



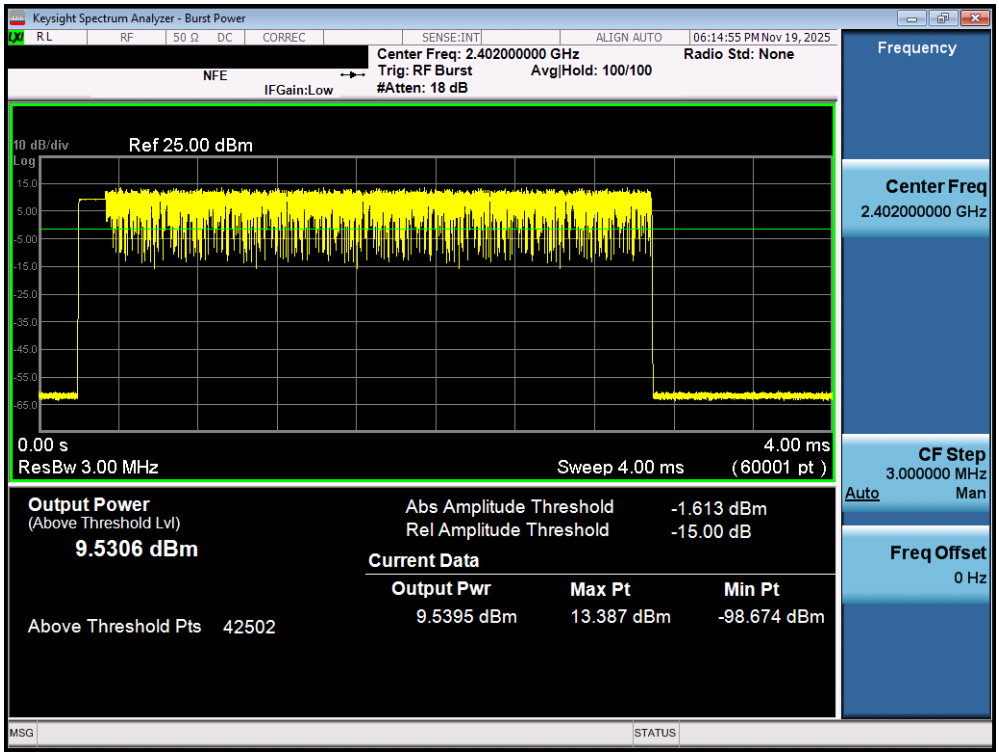
Plot 7-85. Average Conducted Power (2Mbps – Ch. 0) – Dual Ant 1



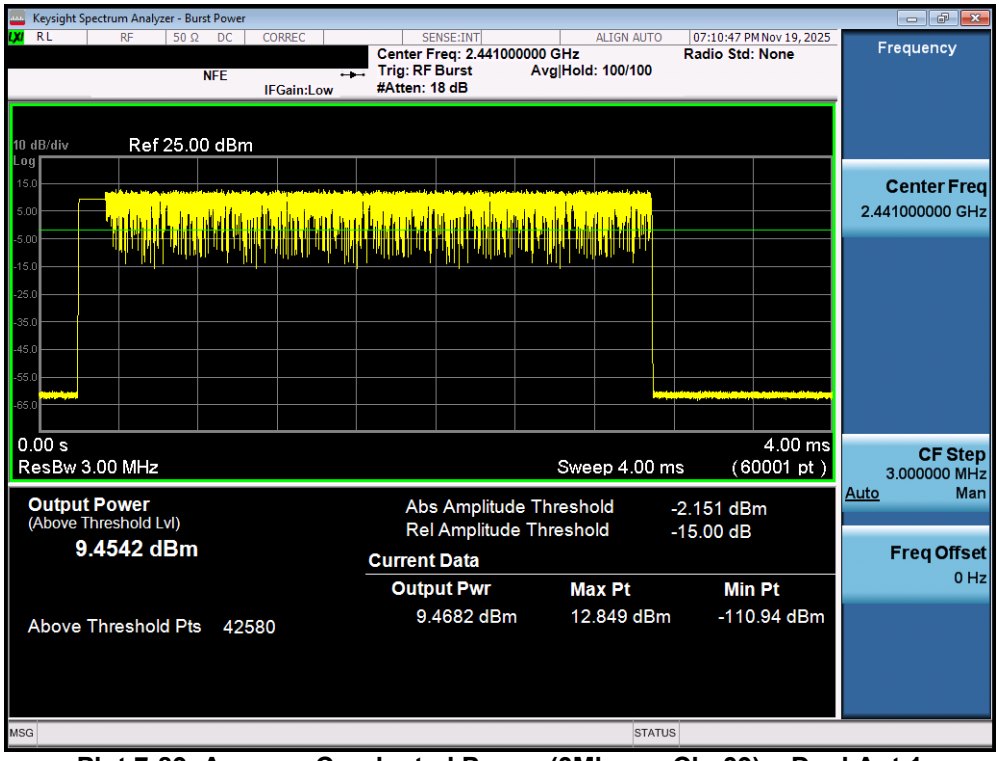
Plot 7-86. Average Conducted Power (2Mbps – Ch. 39) – Dual Ant 1



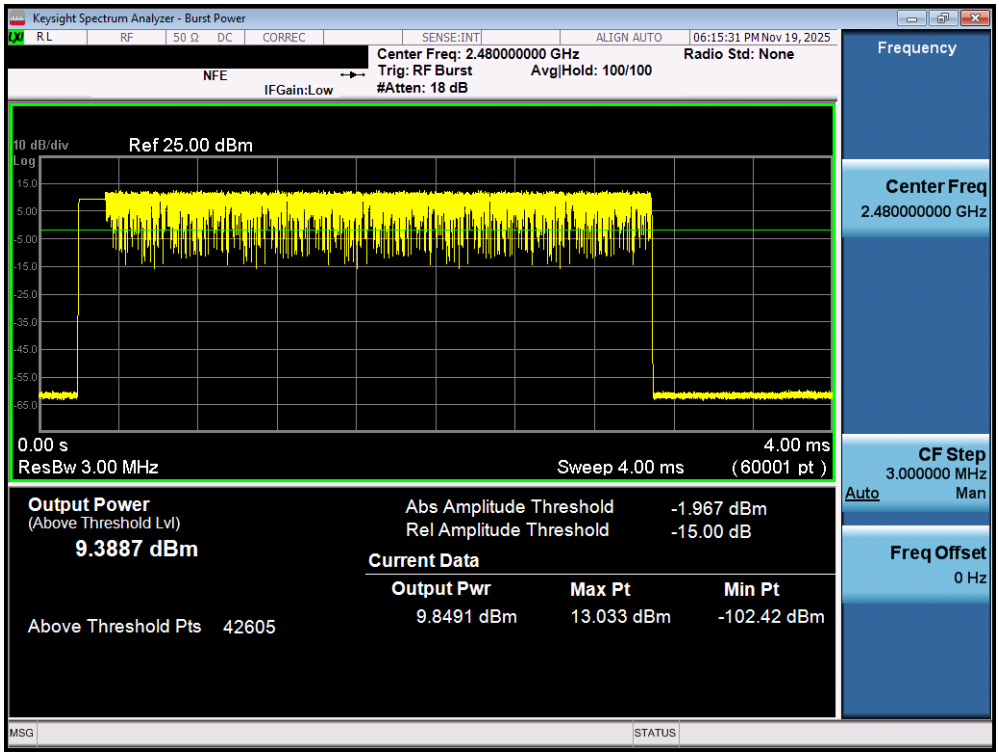
Plot 7-87. Average Conducted Power (2Mbps – Ch. 78) – Dual Ant 1



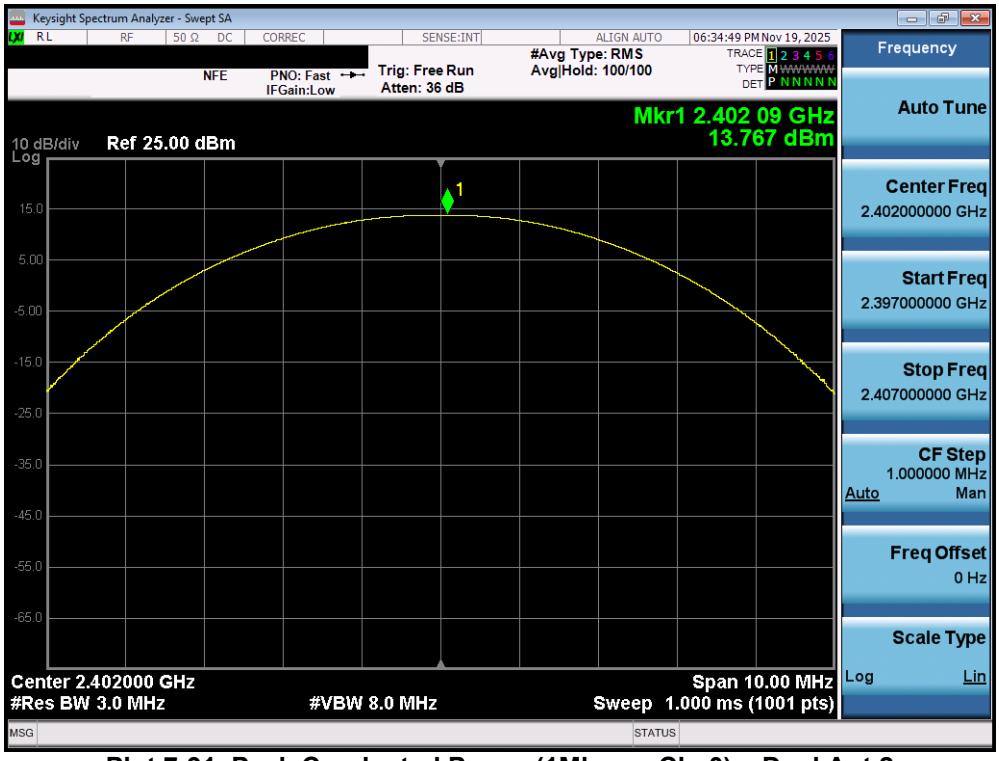
Plot 7-88. Average Conducted Power (3Mbps – Ch. 0) – Dual Ant 1



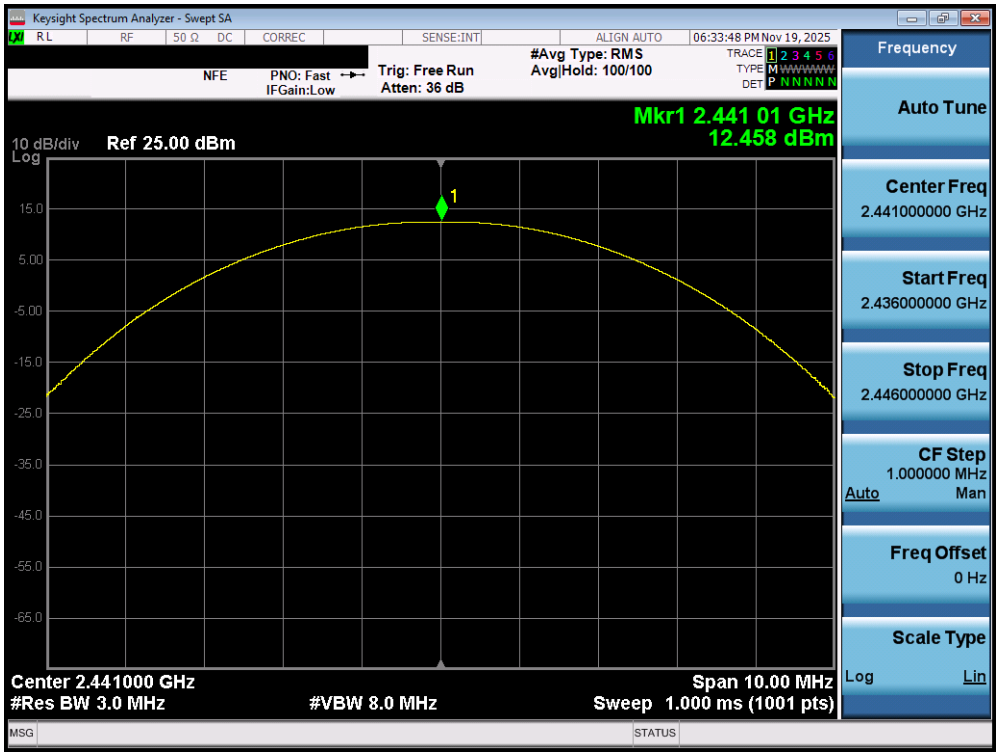
Plot 7-89. Average Conducted Power (3Mbps – Ch. 39) – Dual Ant 1



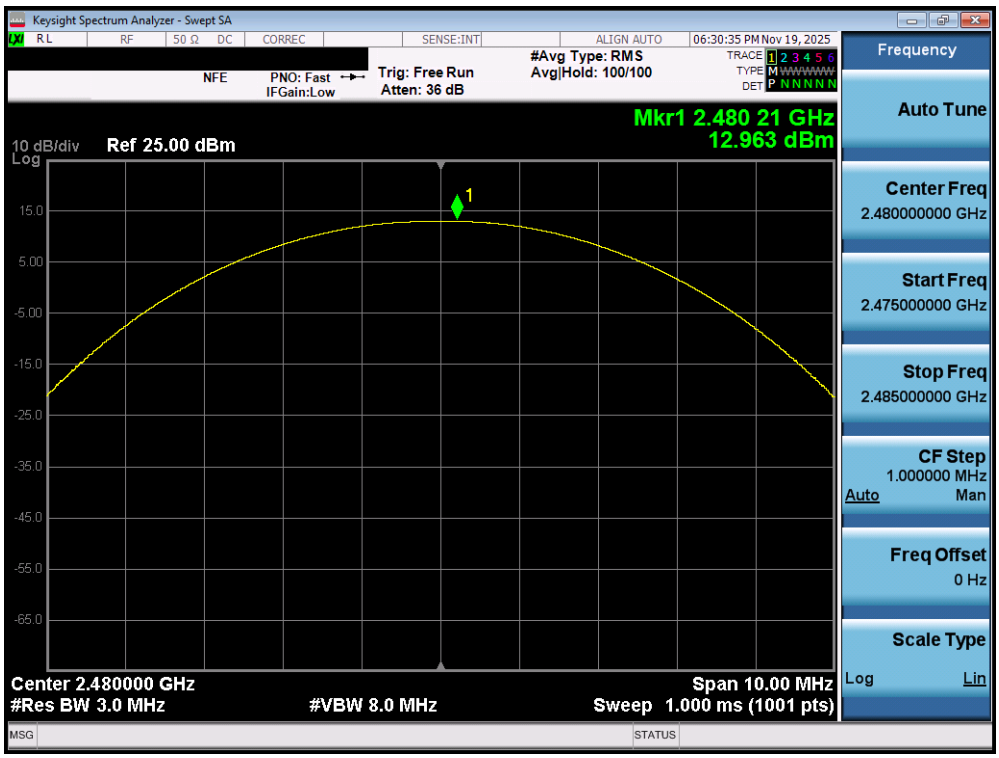
Plot 7-90. Average Conducted Power (3Mbps – Ch. 78) – Dual Ant 1



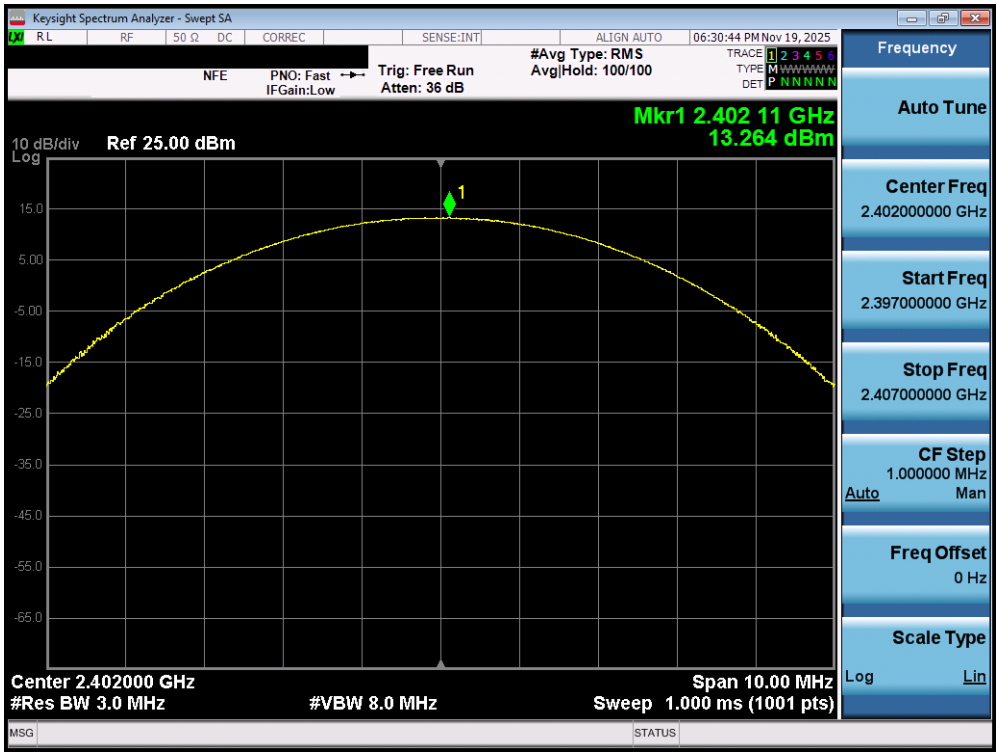
Plot 7-91. Peak Conducted Power (1Mbps – Ch. 0) – Dual Ant 2



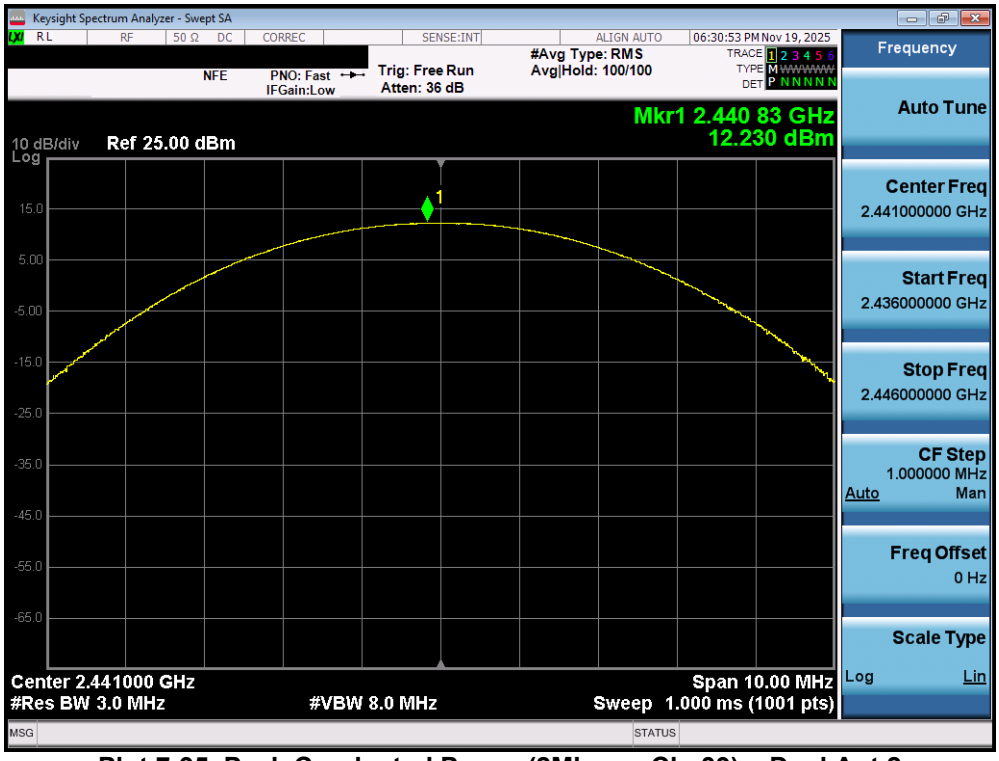
Plot 7-92. Peak Conducted Power (1Mbps – Ch. 39) – Dual Ant 2



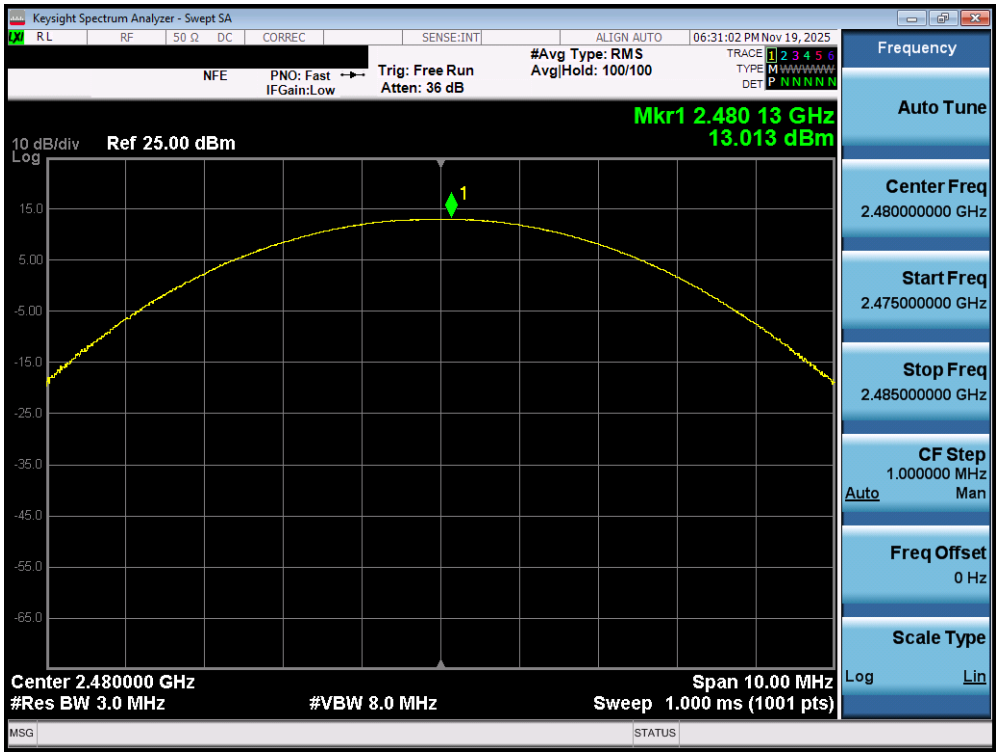
Plot 7-93. Peak Conducted Power (1Mbps – Ch. 78) – Dual Ant 2



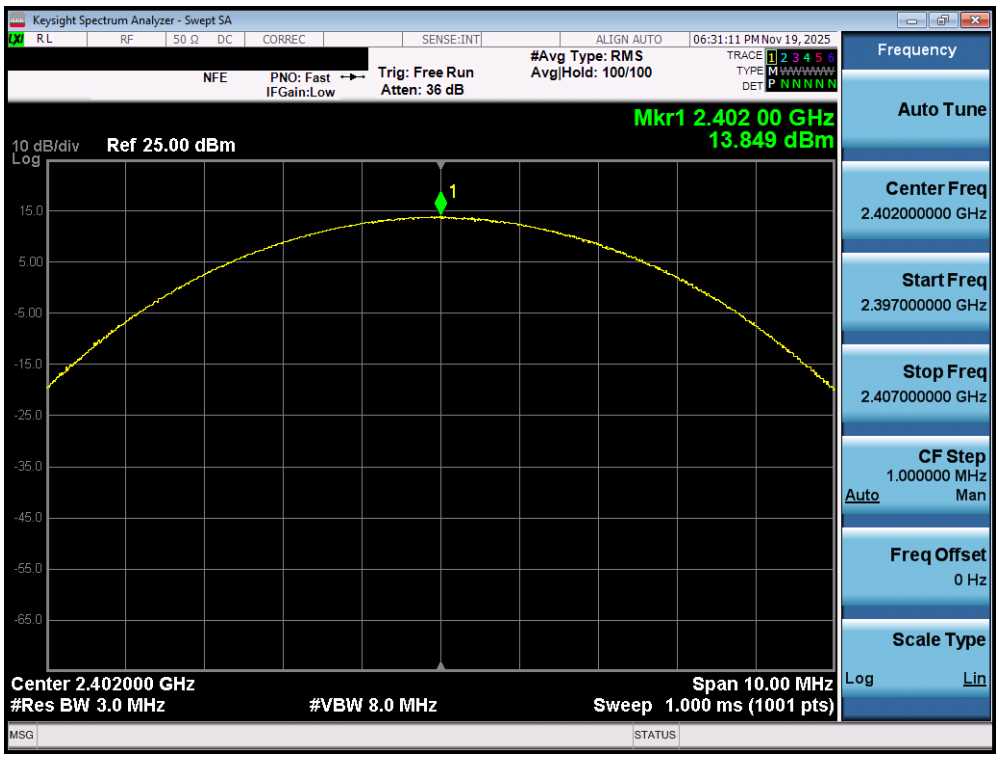
Plot 7-94. Peak Conducted Power (2Mbps – Ch. 0) – Dual Ant 2



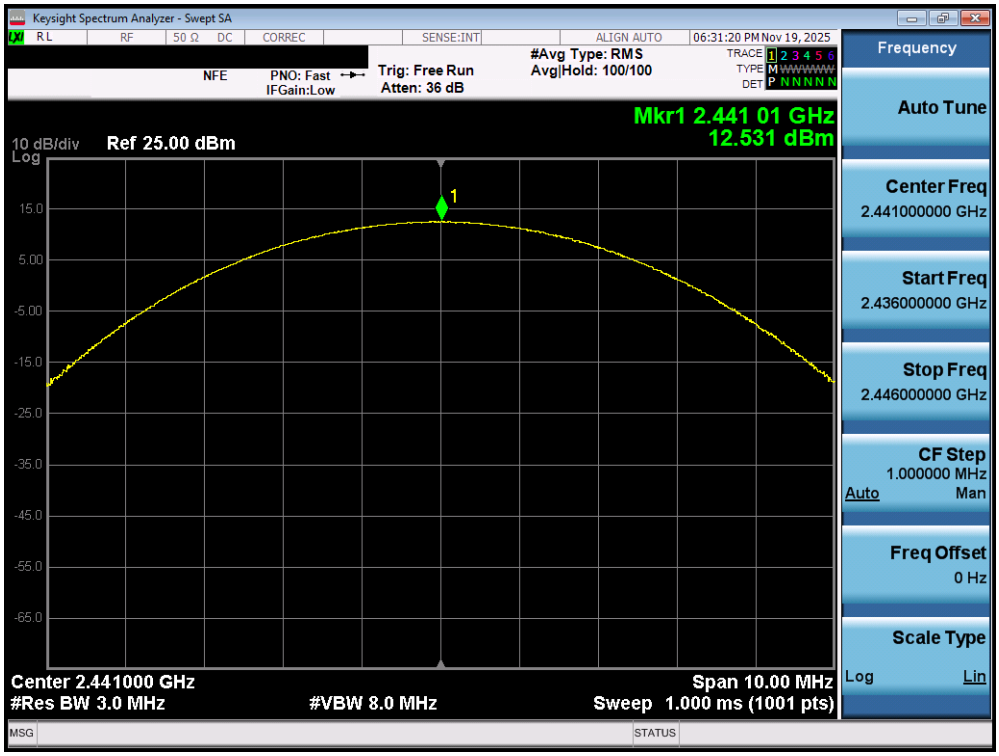
Plot 7-95. Peak Conducted Power (2Mbps – Ch. 39) – Dual Ant 2



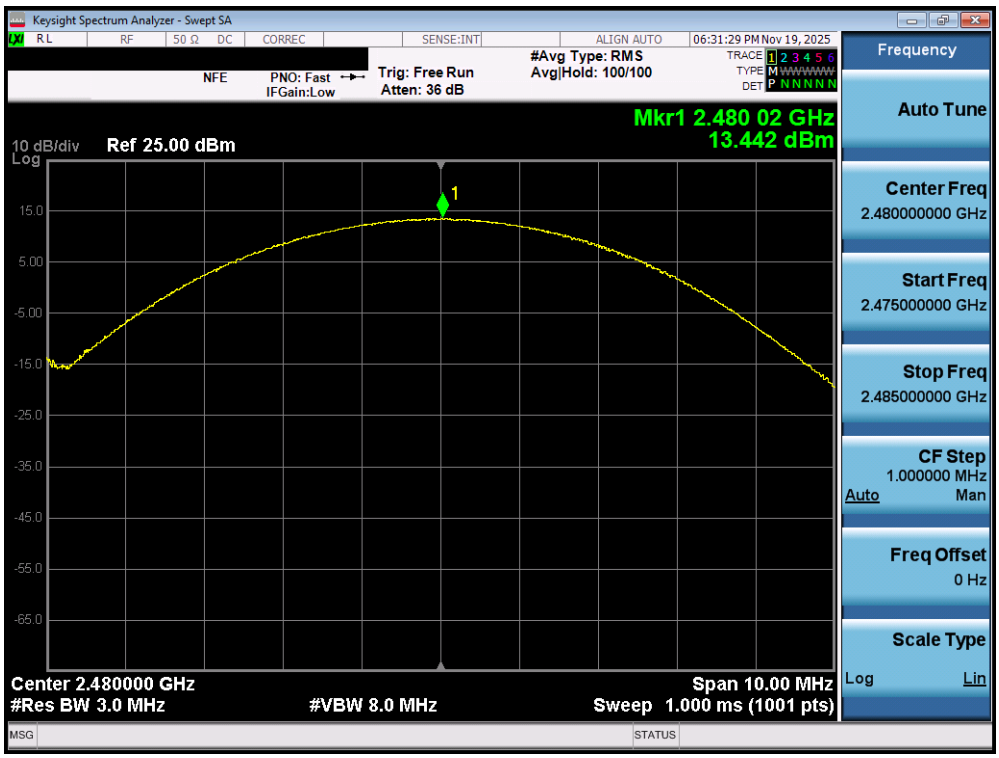
Plot 7-96. Peak Conducted Power (2Mbps – Ch. 78) – Dual Ant 2



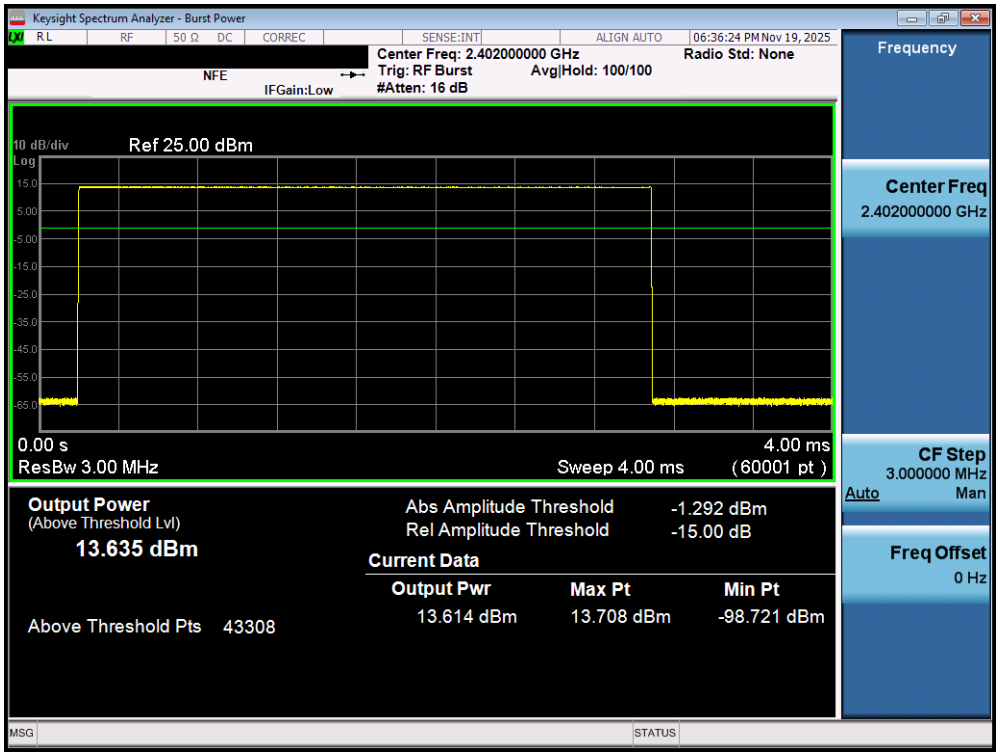
Plot 7-97. Peak Conducted Power (3Mbps – Ch. 0) – Dual Ant 2



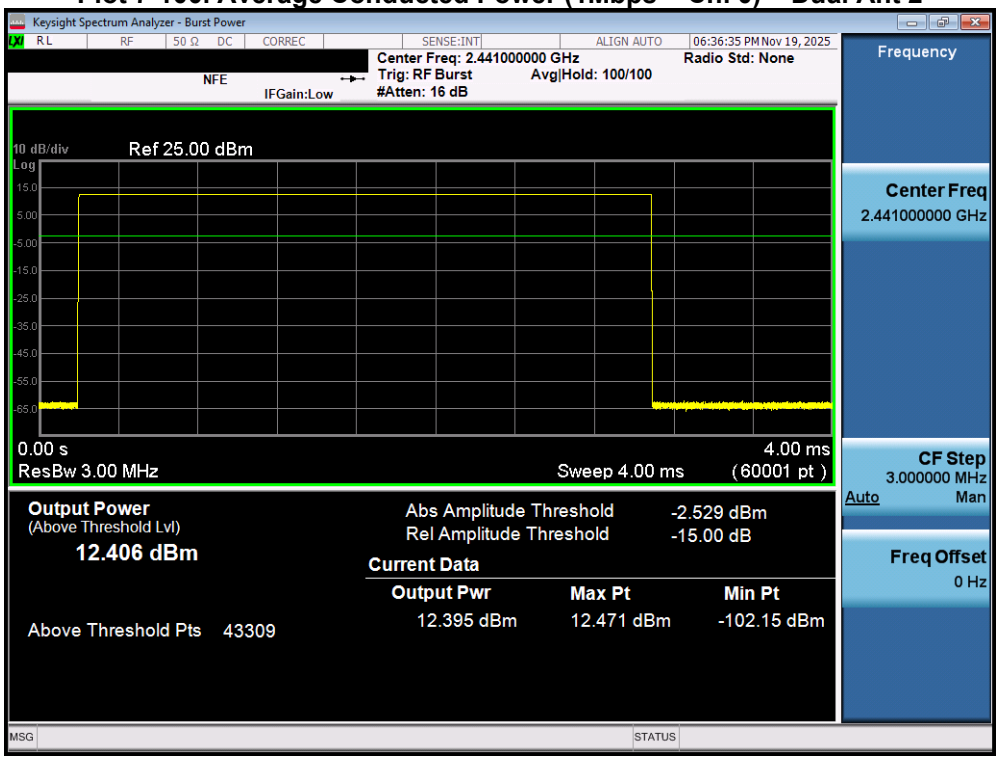
Plot 7-98. Peak Conducted Power (3Mbps – Ch. 39) – Dual Ant 2



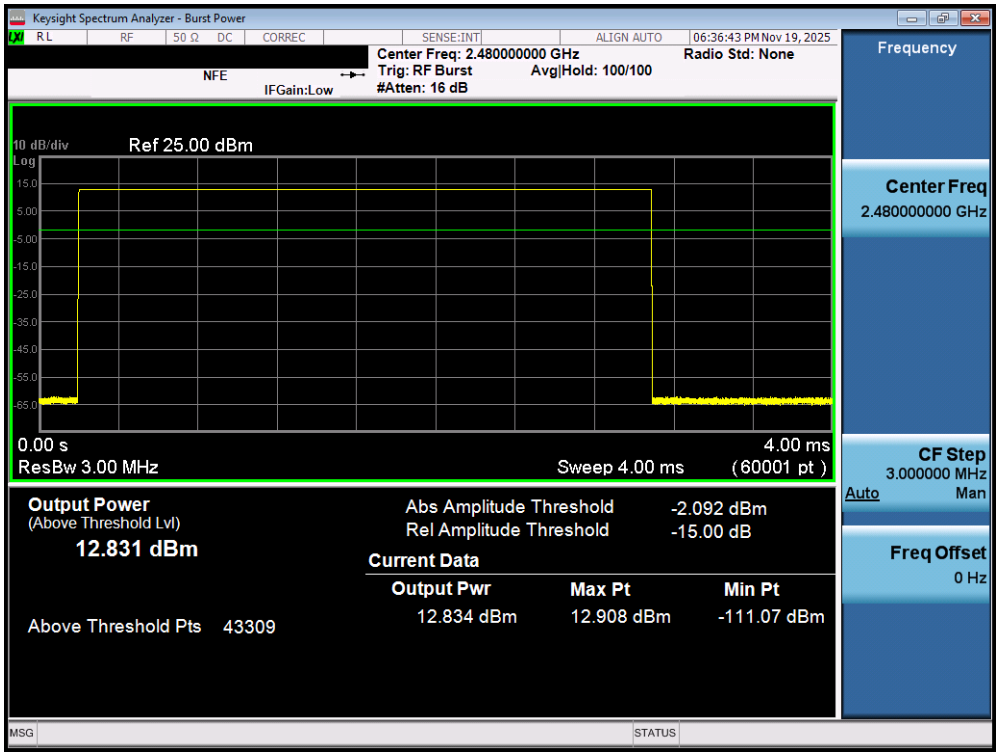
Plot 7-99. Peak Conducted Power (3Mbps – Ch. 78) – Dual Ant 2



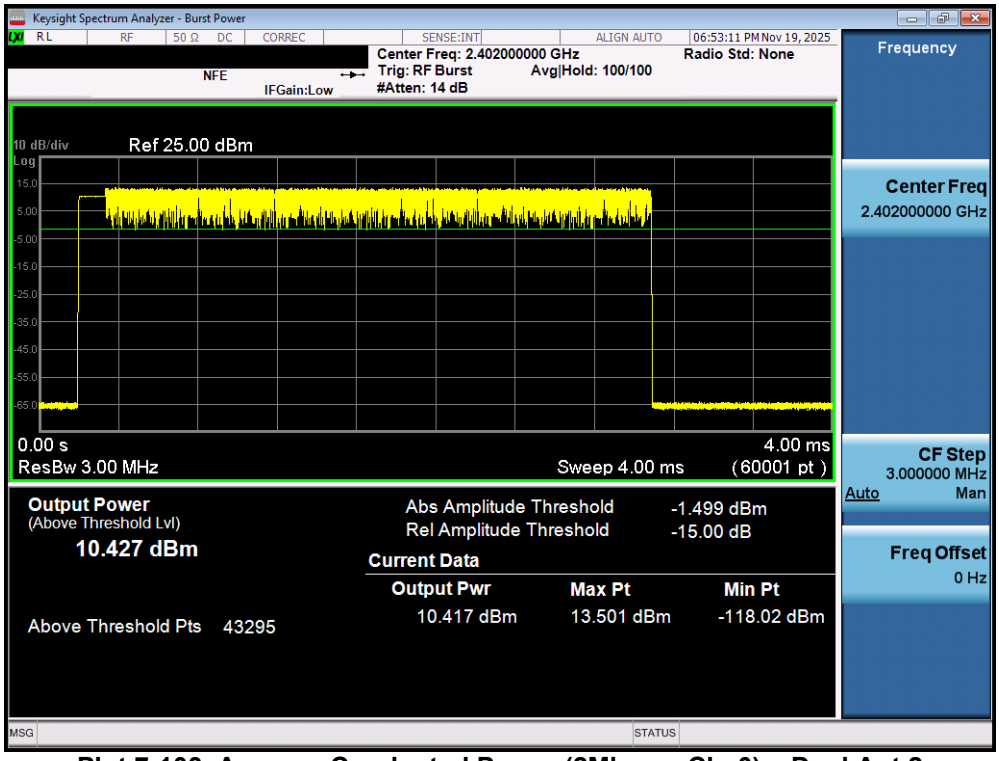
Plot 7-100. Average Conducted Power (1Mbps – Ch. 0) – Dual Ant 2



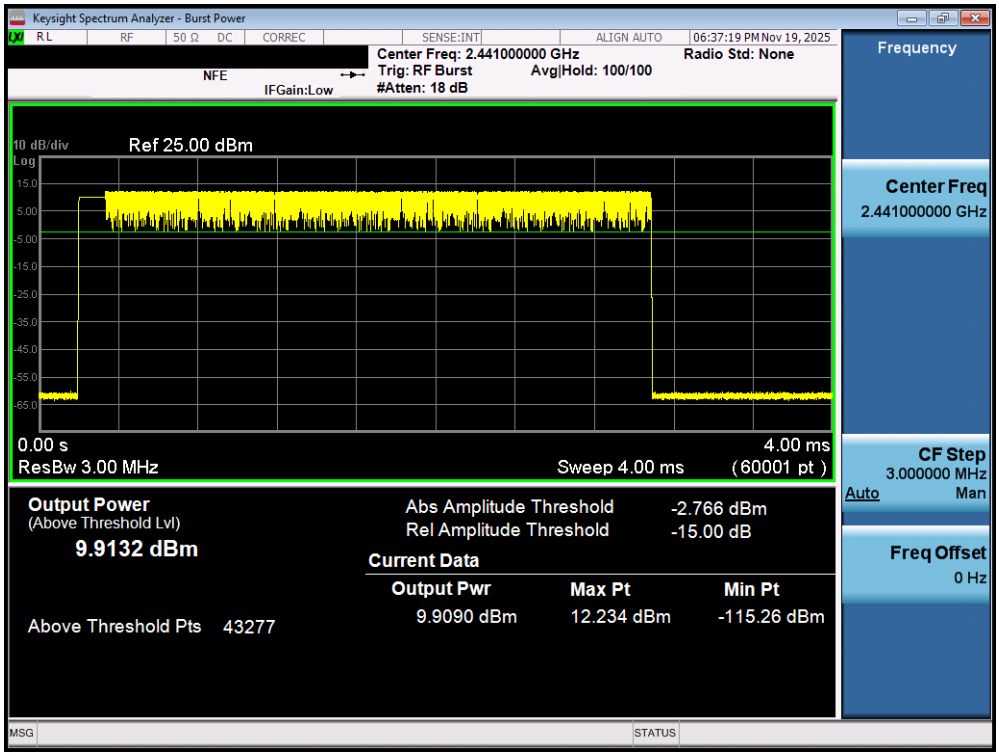
Plot 7-101. Average Conducted Power (1Mbps – Ch. 39) – Dual Ant 2



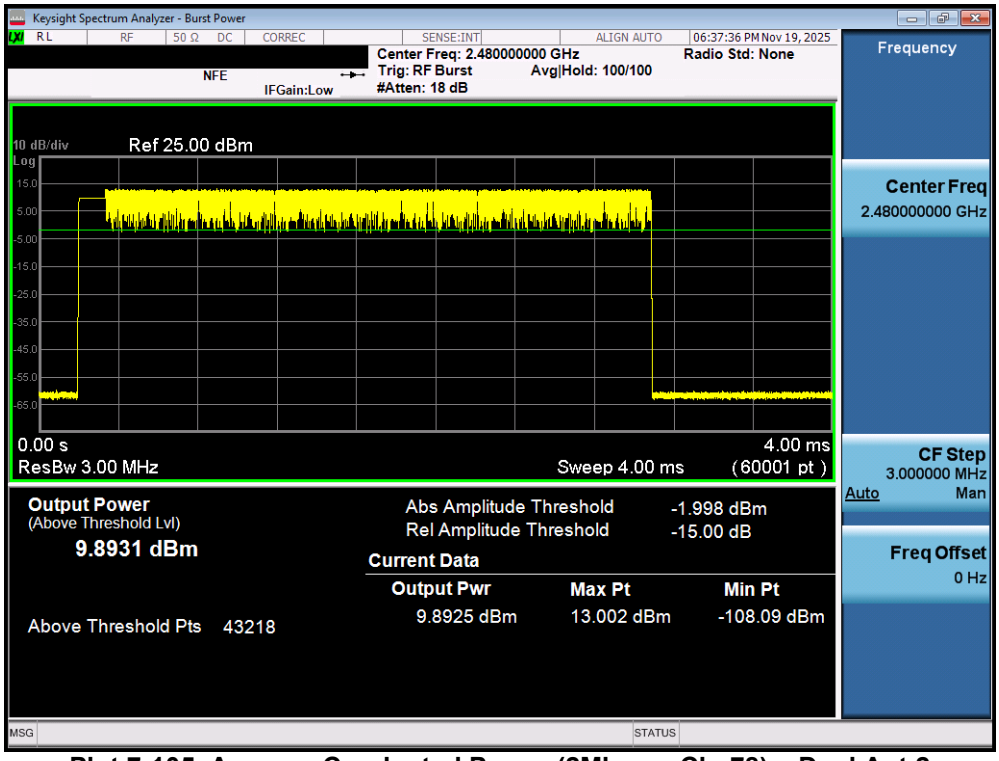
Plot 7-102. Average Conducted Power (1Mbps – Ch. 78) – Dual Ant 2



Plot 7-103. Average Conducted Power (2Mbps – Ch. 0) – Dual Ant 2



Plot 7-104. Average Conducted Power (2Mbps – Ch. 39) – Dual Ant 2



Plot 7-105. Average Conducted Power (2Mbps – Ch. 78) – Dual Ant 2