TEST REPORT

Report Number: R15980274-E5a

Applicant	:	Samsung Electronics Co Ltd 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Model	:	SM-S942U, SM-S942U1
FCC ID	:	A3LSMS942U
EUT Description	:	GSM/WCDMA/LTE/NR/SCS/NTN Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax/be, WPT and NFC
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 4 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2026-01-07

Prepared by:
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CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-11-25	Initial Issue	Manish Baral
V2	2025-12-12	Section 9.7, remeasured Low Channel average power for GFSK and DQPSK.	Jeff Moser
V3	2026-01-07	Corrected max. powers listed in Section 6.2.	Jeff Moser

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Samsung Electronics Co Ltd 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
EUT DESCRIPTION:	GSM/WCDMA/LTE/NR/SCS/NTN Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax/be, WPT and NFC
MODEL:	SM-S942U, SM-S942U1
SERIAL NUMBER:	YHK0046M, YHK0177M, YHK0082M, YHK0065M, YHK0076M, YHK0074M, YHK0129M, YHK0161M, YHK0165M
SAMPLE RECEIPT DATE:	2025-09-09, 2025-09-11, 2025-09-19, 2025-09-22, 2025-10-01, 2025-10-07
DATE TESTED:	2025-09-30 to 2025-11-03, 2025-12-12

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Refer to Section 2
ISED RSS-247 Issue 4	Refer to Section 2
ISED RSS-GEN Issue 5 + A1 + A2	Refer to Section 2

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released For
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Operations Manager
Consumer Technology Division
UL LLC

Prepared By:

Manish Baral
Engineer
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UL LLC

2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL LLC is only responsible for correctly integrating customer-provided data with measurements performed by UL LLC.
Below is a list of the data provided by the customer:
1. Antenna gain and type (section 6.3)
2. Supported Data-Rates and Power Settings. Orientation of Operation (Section 6.5)
Software, Firmware and Hardware Versions of EUT (section 6.4)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 11.6.
See Comment	RSS-GEN 6.7	20dB BW/99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	RSS-247 (6.2.1) (b) (6.2.3.1) (a)	Hopping Frequency Separation	Compliant	None.
15.247 (a)(1)(iii)	RSS-247 (6.2.3.1) (b)	Number of Hopping Channels	Compliant	None.
15.247 (a)(1)(iii)	RSS-247 (6.2.3.1) (b)	Average Time of Occupancy	Compliant	None.
15.247 (b)(1)	RSS-247 (6.2.3.2)	Output Power	Compliant	None.
See Comment		Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	RSS-247 (6.6)	Conducted Spurious Emissions	Compliant	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Compliant	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2020+A1:2024+Corr:2023, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A1 + A2, and RSS-247 Issue 4.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, Certificate Number 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 2800 Suite Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	27265	825374

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	ULab
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, All Ranges	6.01 dB
Time Domain Measurements	3.39%
Temperature	0.57˚C
Humidity	3.39%
DC Supply Voltages	0.57%

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE/NR/SCS/NTN Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax/be, WPT and NFC. This report covers testing of BT.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

C0

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	16.54	45.08
2402 - 2480	Enhanced DQPSK	20.32	107.65
2402 - 2480	Enhanced 8PSK	16.64	46.13

C1

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	15.86	38.55
2402 - 2480	Enhanced DQPSK	18.14	65.16
2402 - 2480	Enhanced 8PSK	19.91	97.95

MIMO

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	16.53	44.98
2402 - 2480	Enhanced DQPSK	16.05	40.27
2402 - 2480	Enhanced 8PSK	16.27	42.36

Note: GFSK, DQPSK, 8PSK average Power are all investigated, for C1 and MIMO. The GFSK & 8PSK Powers are the worst case. For C0 all modes/rates were tested because QPSK is worse than 8PSK. Testing is based on these modes to showing compliance. For average power data please refer to section 9.7

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

For Chain 0 the radio utilizes an inverted F antenna, with a maximum gain of -2.88 dBi

For Chain 1 the radio utilizes a slot antenna, with a maximum gain of -3.9 dBi

6.4. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the single channel, mode and data rate with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle (spurious only) and high channels. Radiated Spurious emissions were tested for modes with worst-case power and PSD.

For SISO Chain 0 (Antenna 1), the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that the X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

For SISO Chain 1 (Antenna 2), the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

For MIMO, the fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

For SISO on Chain 0, All modes were tested (GFSK, 8PSK, and QPSK) because QPSK has higher power readings than 8PSK. For SISO C1 and MIMO, only GFSK and 8PSK were tested because power between QPSK and 8PSK had similar power readings.

Note – Worst-Case mode declared by client was DH5. Power for all modes was investigated but only peak and average power for DH5 is included to reduce report size.

This report covers 2 models, the model differences and the representative model is shown below:

Representative Model	Difference	Derivative Model
		SM-S942U1
SM-S942U	Hardware	Same as SM-S942U
	Software	Different UI

6.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Adapter	Flextronics	G-1000-US	Na	na

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB-C	1	USB-C	Shielded	<3m	Phone to power adapter

TEST SETUP

The EUT is configured using its own built in software

SETUP DIAGRAMS

Refer to R15980274-EP1 for setup diagrams

7. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2020+A1:2024 Section 11.6

Occupied BW (20dB): ANSI C63.10-2020+A1:2024 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2020+A1:2024 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10-2020+A1:2024 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2020+A1:2024 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2020+A1:2024 Section 7.8.4

Peak Output Power: ANSI C63.10-2020+A1:2024 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2020+A1:2024 Section 7.8.7

Conducted Band-Edge: ANSI C63.10-2020+A1:2024 Section 6.10.4

Radiated Band-edge: ANSI C63.10-2020+A1:2024 Section 6.10.5

Radiated Spurious Emissions: ANSI C63.10-2020+A1:2024 Sections 6.3 to 6.6 and 7.8.8

AC Power-line conducted emissions: ANSI C63.10-2020+A1:2024, Section 6.2.

8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
135144	Active Loop Antenna	ETS-Lindgren	6502	2024-10-02	2025-10-31
	30-1000 MHz				
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2024-01-30	2026-01-30
	1-18 GHz				
135143	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2024-02-07	2026-02-07
	18-40 GHz				
91186	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2024-05-16	2026-05-16
	Gain-Loss Chains				
91974	Gain-loss string: 0.009-30MHz	Various	Various	2025-05-31	2026-05-31
91976	Gain-loss string: 25-1000MHz	Various	Various	2025-05-31	2026-05-31
91979	Gain-loss string: 1-18GHz	Various	Various	2025-05-31	2026-05-31
135999	Gain-loss string: 18-40GHz	Various	Various	2025-05-31	2026-05-31
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2025-05-12	2026-05-12
90416	Spectrum Analyzer	Keysight	N9030A	2025-07-31	2026-07-31
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
241205	Environmental Meter	Fisher Scientific	15-077-963	2025-08-05	2027-08-05

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 2				
90410	Spectrum Analyzer **MY54410168**	Keysight Technologies	N9030A	2025-07-10	2026-07-10
211055	Real-Time Peak Power Sensor 50MHz to 8GHz **12002**	Boonton	RTP5000	2025-07-30	2026-07-30
211056	Real-Time Peak Power Sensor 50MHz to 8GHz **12001**	Boonton	RTP5000	2025-07-30	2026-07-30
248881	Environmental Meter **240303668**	Control Company	06-662-4	2024-04-10	2026-04-10
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	-	-
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	-	-
	Additional Equipment used				
BT0001	CBT Tester	Rohde & Schwarz	1153.9000.35	NA	NA
259603	Conducted Switch Box	UL	CSB	2025-03-12	2026-03-12
226561	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2025-04-01	2026-04-01
259679	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C27S-10	2025-06-25	2026-06-25

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2025-04-17	2026-04-17
179892	Environmental Meter	Fisher Scientific	15-077-963	2025-08-5	2026-08-06
80391	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2025-09-29	2026-09-29
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2025-7-30	2026-07-30
52859	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2025-7-30	2026-07-30
PS216	AC Power Source	Elgar	CW2501M	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
90416	Spectrum Analyzer **MY54490254**	Keysight Technologies	N9030A	2025-07-31	2026-07-31
179892	Environmental Meter **161024885**	Fisher Scientific	15-077-963	2025-08-05	2026-08-05
SOFTEMI	Antenna Port Software	UL	Version 2024.2.23	-	-
	Conducted Room 2				
211055	Real-Time Peak Power Sensor 50MHz to 8GHz **12002**	Boonton	RTP5000	2025-07-30	2026-07-30
211056	Real-Time Peak Power Sensor 50MHz to 8GHz **12001**	Boonton	RTP5000	2025-07-30	2026-07-30
248881	Environmental Meter **240303668**	Control Company	06-662-4	2024-04-10	2026-04-10
Power Software	Boonton Power Analyzer	Boonton	Version 3.0.13.0	-	-
	Additional Equipment used				
245262	Conducted Switch Box	UL	CSB	2025-03-14	2026-03-14
259680	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C27S-10	2025-08-11	2026-08-11
259681	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C27S-10	2025-08-11	2026-08-11

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

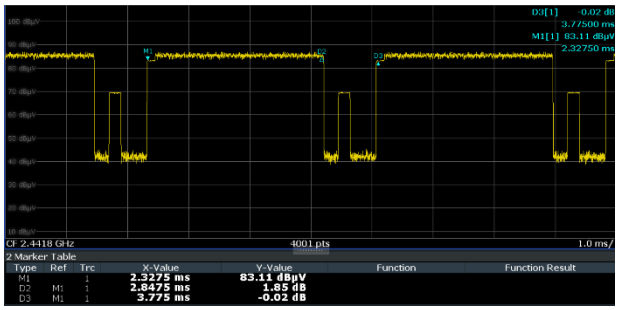
ANSI C63.10, Section 11.6: Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
Bluetooth GFSK	2.870	3.760	0.763	76.3298	1.17	0.348
Bluetooth QPSK	2.870	3.760	0.763	76.3298	1.17	0.348
Bluetooth 8PSK	2.848	3.775	0.754	75.4305	1.22	0.351

DUTY CYCLE PLOTS

BLUETOOTH GFSK



BLUETOOTH 8PSK

BLUETOOTH QPSK

Note – Same analyzer settings were used for 8PSK as were for GFSK/DQPSK.

9.2. 20 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

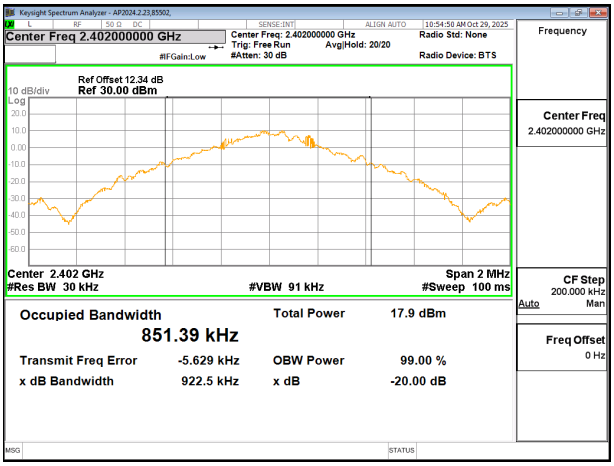
The transmitter output is connected to a spectrum analyzer. The RBW is set to 1-5% of the 20 dB or 99% Occupied bandwidth. The VBW is set to at least 3x RBW. The sweep time is coupled.

RESULTS

9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna 1

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.9225	0.85139
Mid	2441	0.8895	0.8521
High	2480	0.9196	0.85375



LOW CHANNEL

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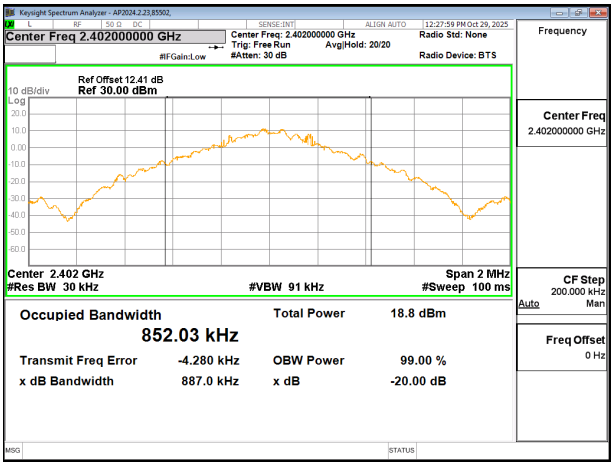
Antenna 2

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.887	0.85203
Mid	2441	0.8887	0.84965
High	2480	0.8859	0.85033



LOW CHANNEL

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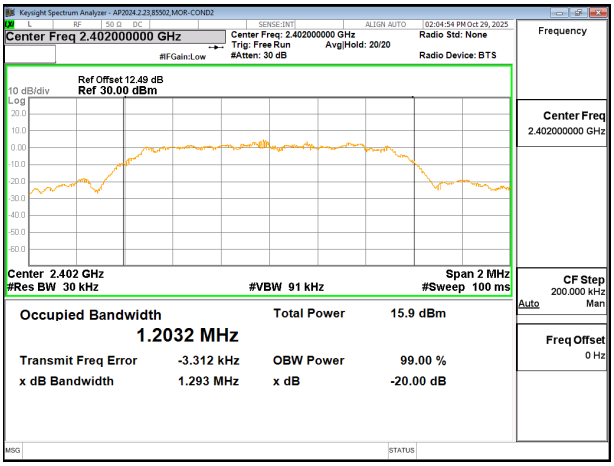
9.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.293	1.2032
Mid	2441	1.307	1.1871
High	2480	1.308	1.1914



LOW CHANNEL

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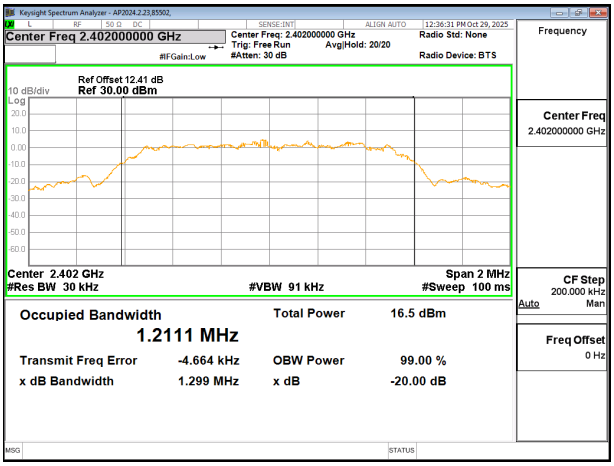
Antenna 2

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.299	1.2111
Mid	2441	1.313	1.1946
High	2480	1.297	1.1878



LOW CHANNEL

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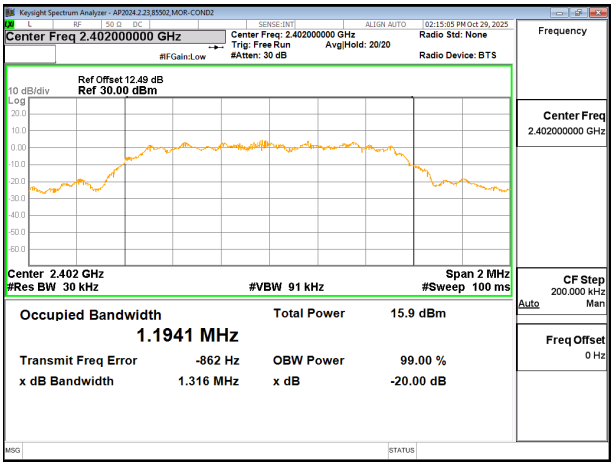
9.2.3. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

Antenna 1

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.316	1.1941
Mid	2441	1.321	1.1763
High	2480	1.328	1.1799



LOW CHANNEL

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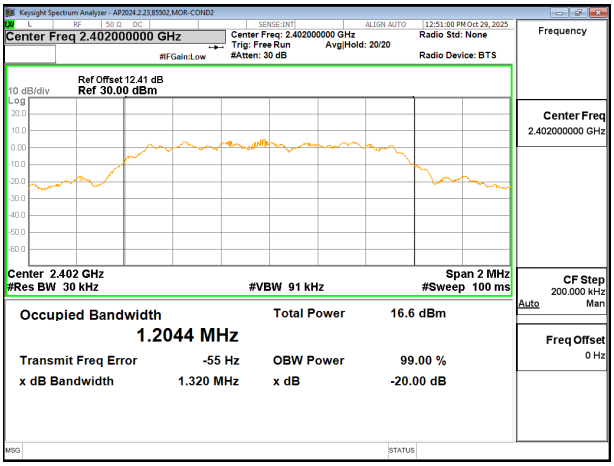
Antenna 2

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.32	1.2044
Mid	2441	1.329	1.1808
High	2480	1.329	1.1767



LOW CHANNEL

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9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (6.2.1) (b), (6.2.3.1) (a)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

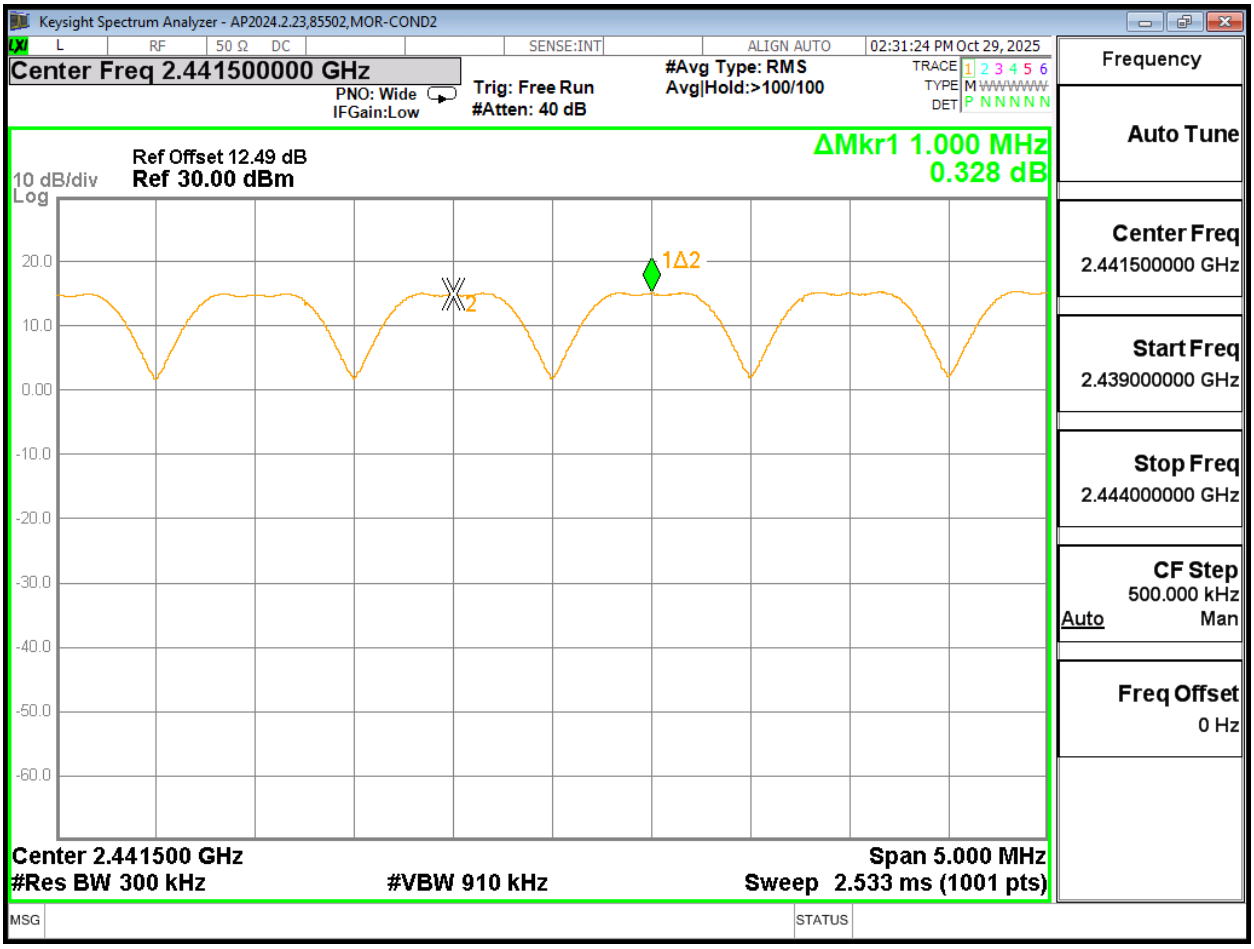
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to VBW >= RBW. The sweep time is coupled.

RESULTS

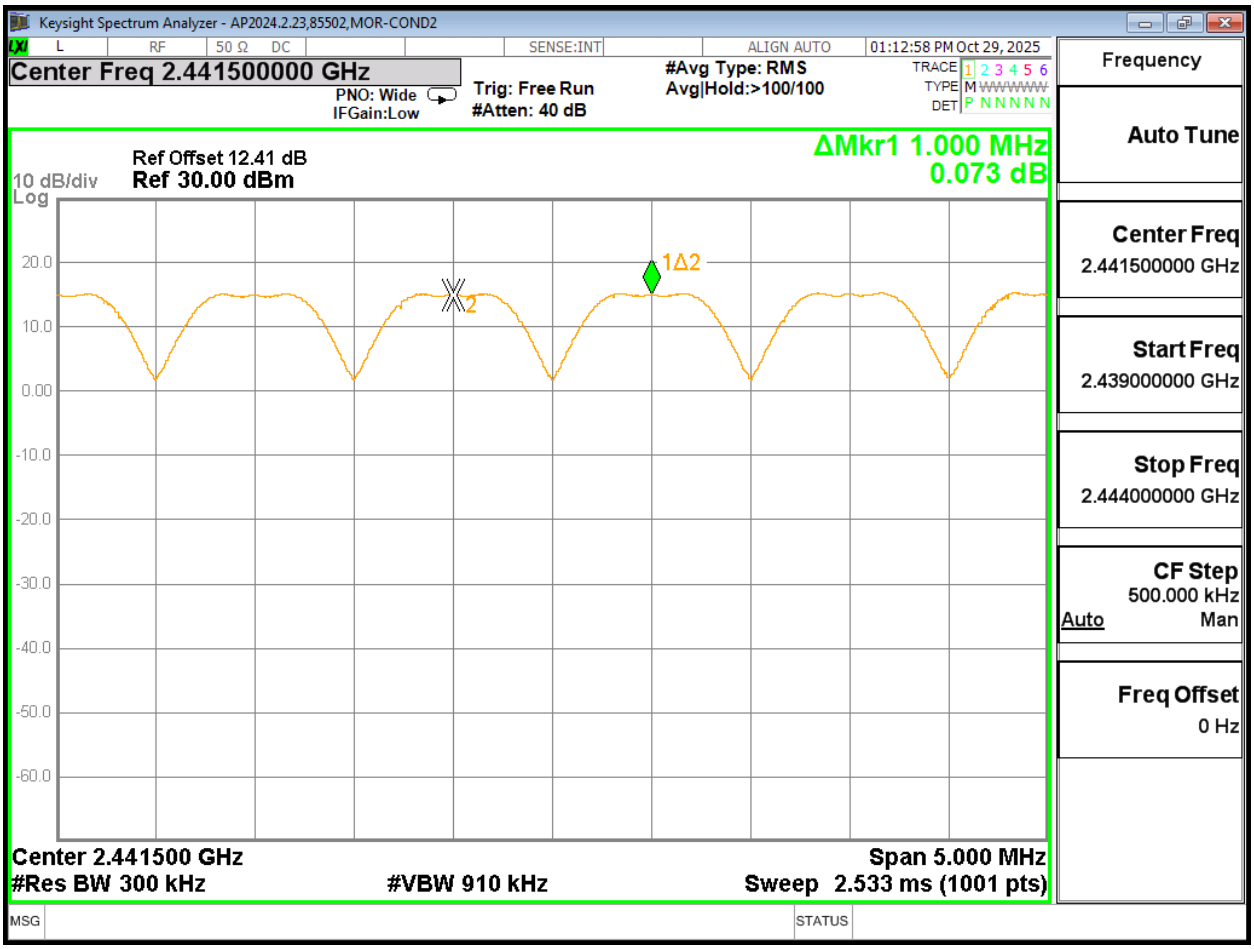
9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna 1



HOPPING FREQUENCY SEPARATION PLOT

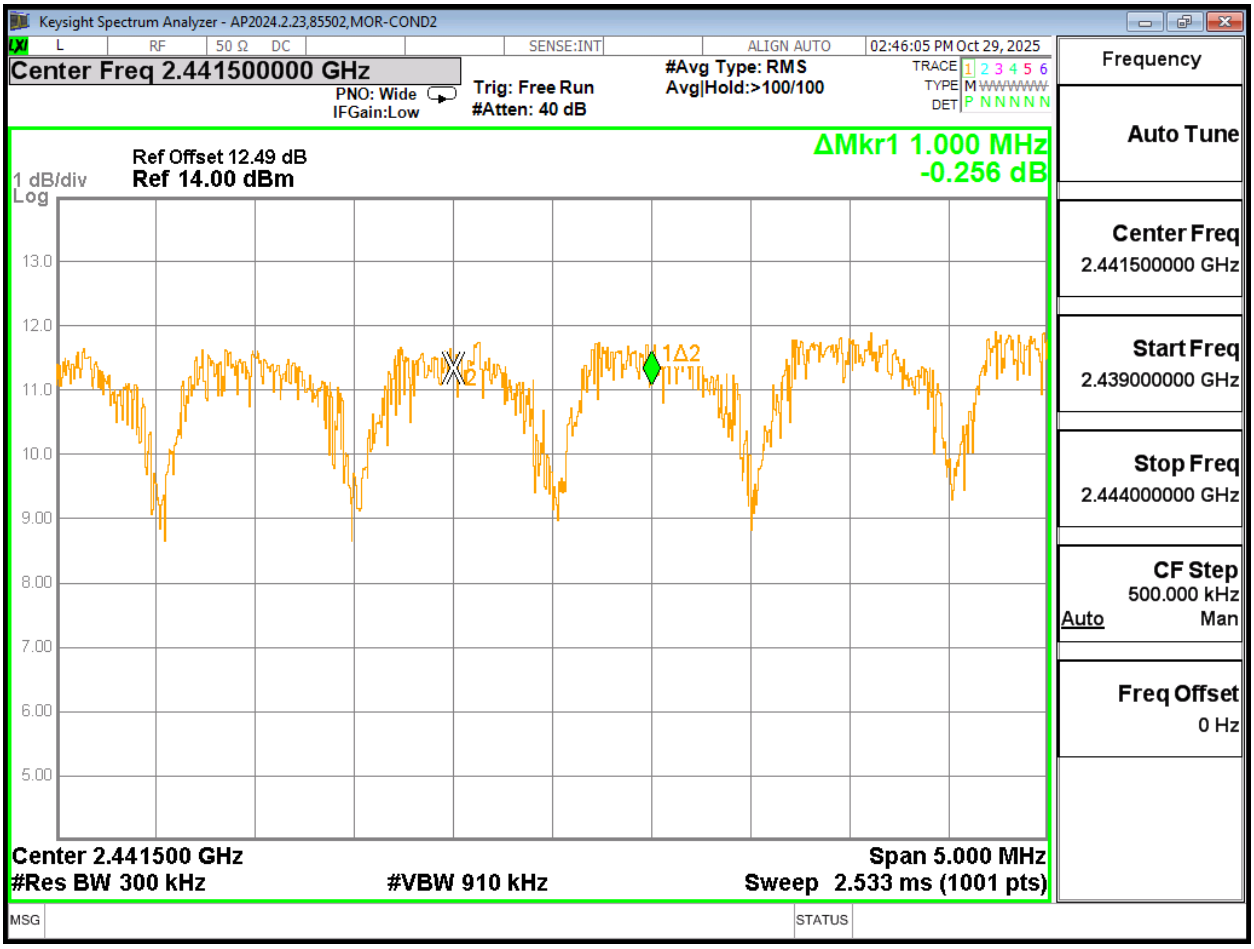
Antenna 2



HOPPING FREQUENCY SEPARATION PLOT

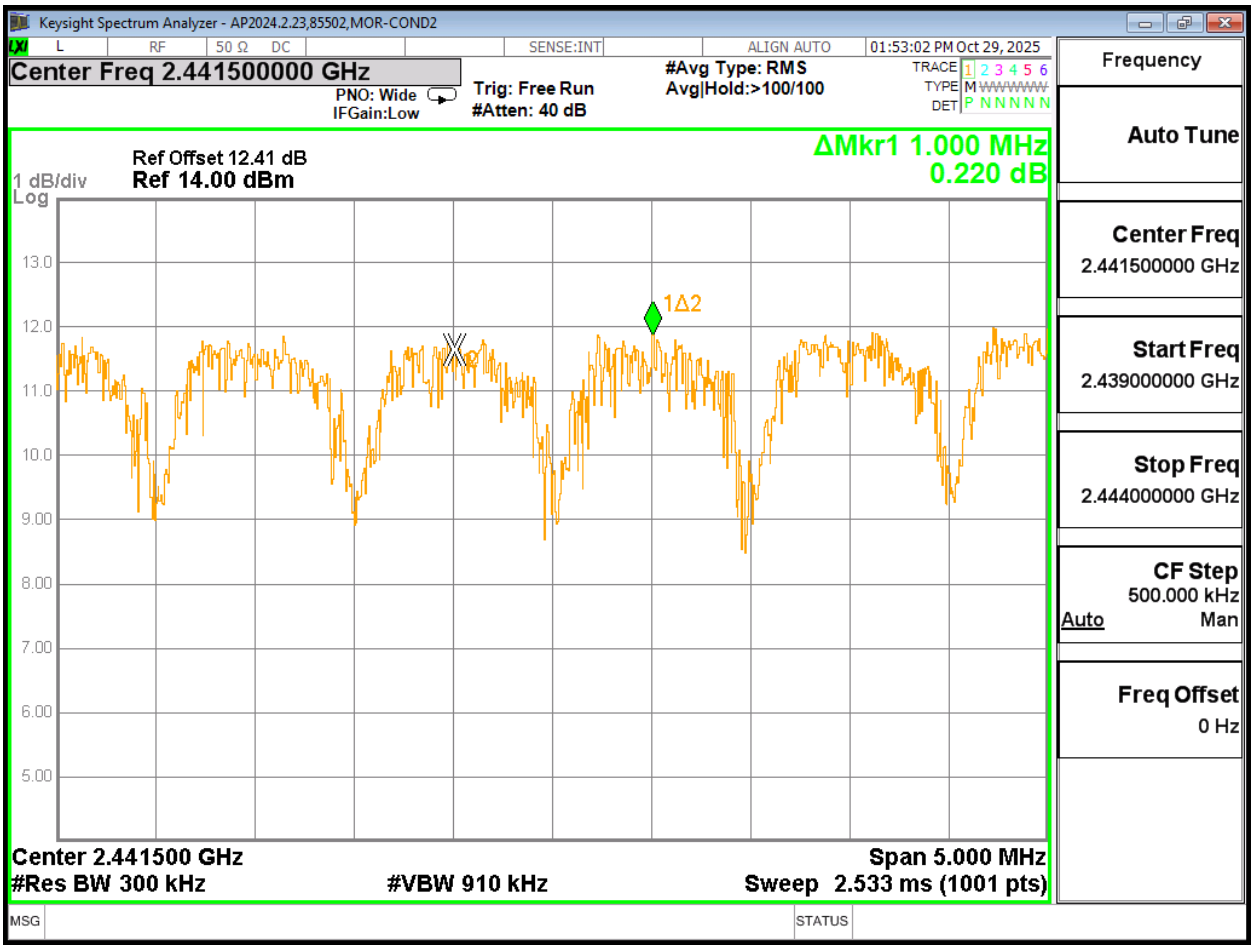
9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1



HOPPING FREQUENCY SEPARATION PLOT

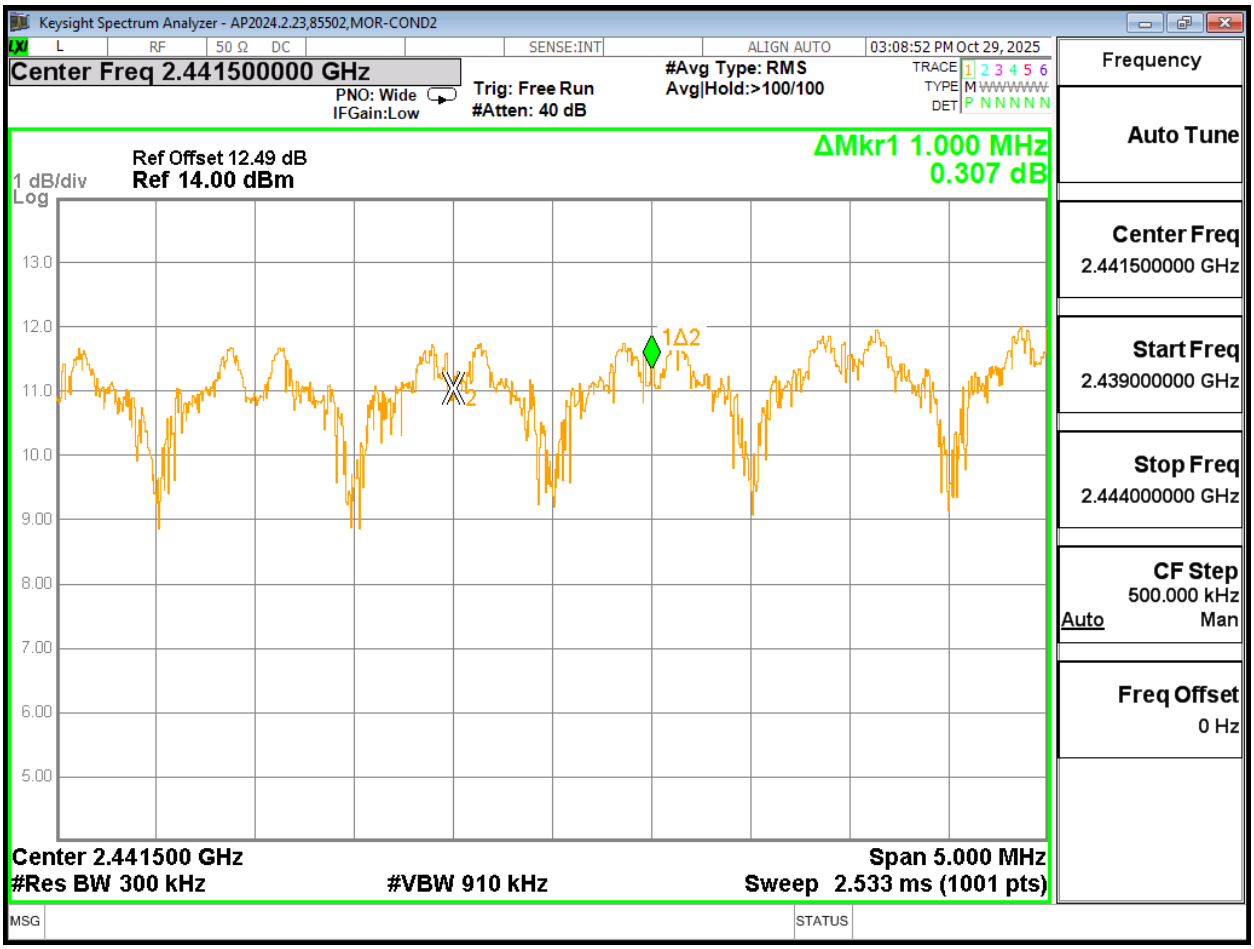
Antenna 2



HOPPING FREQUENCY SEPARATION PLOT

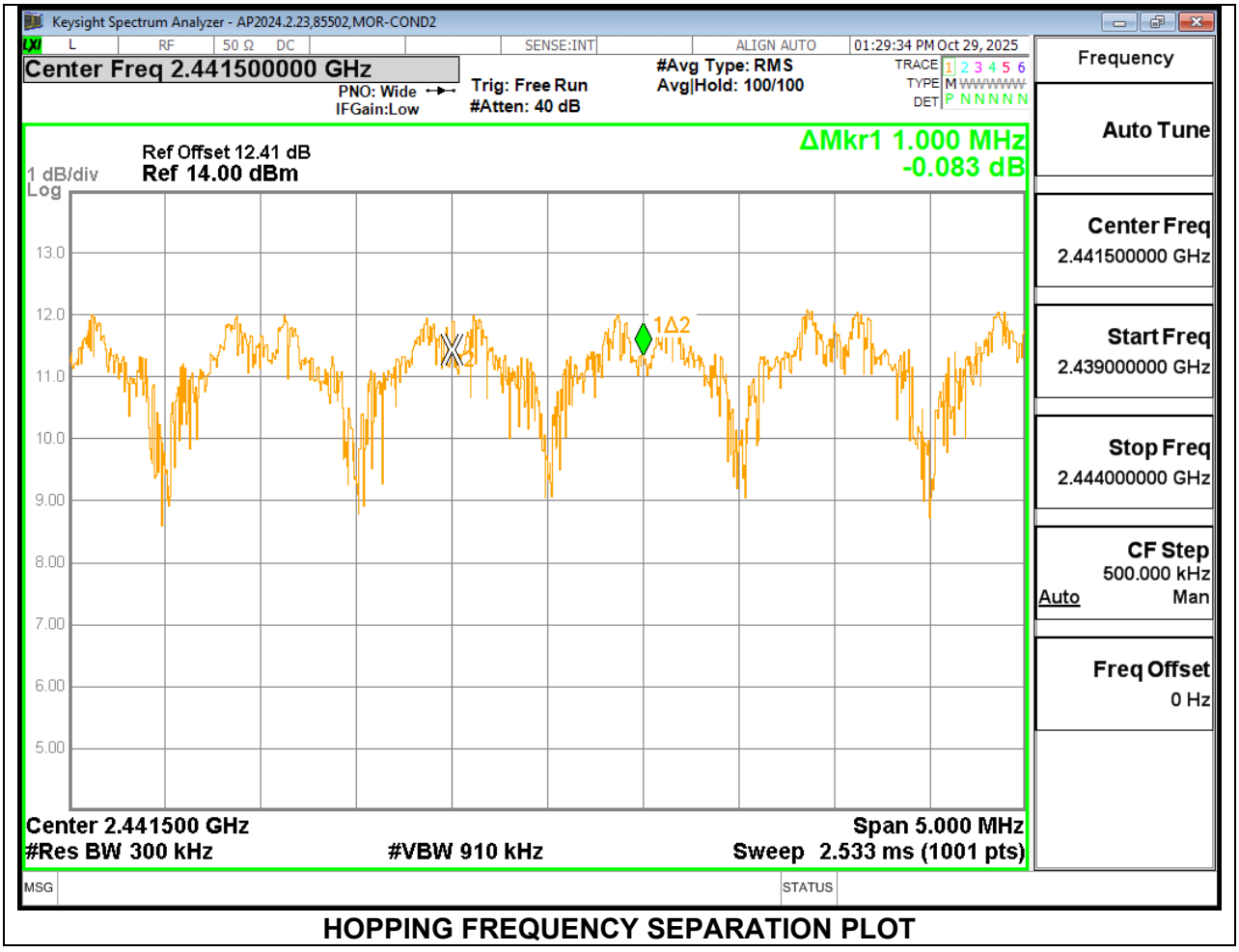
9.3.3. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

Antenna 1



HOPPING FREQUENCY SEPARATION PLOT

Antenna 2



HOPPING FREQUENCY SEPARATION PLOT

9.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (6.2.3.1) (b)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

TEST PROCEDURE

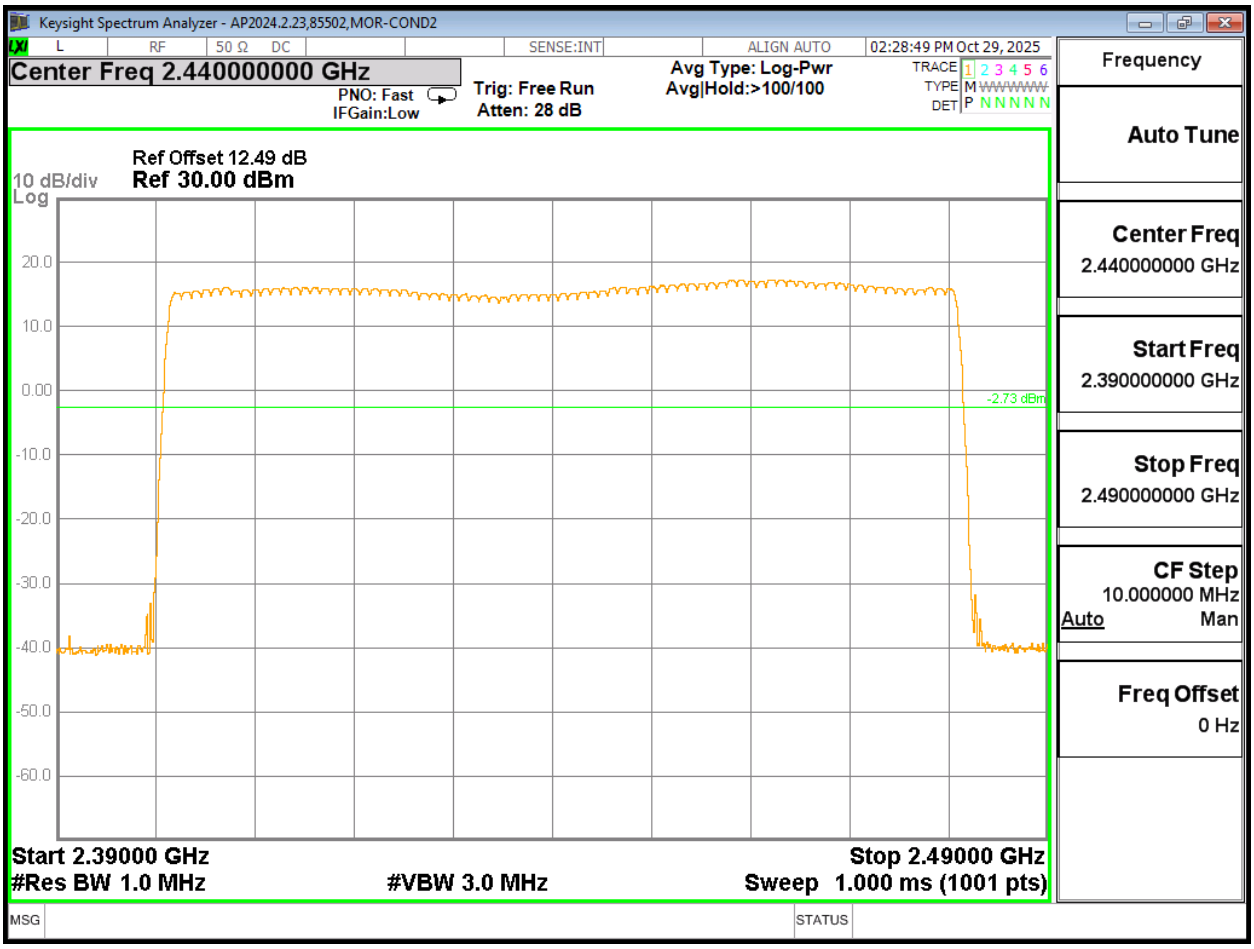
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

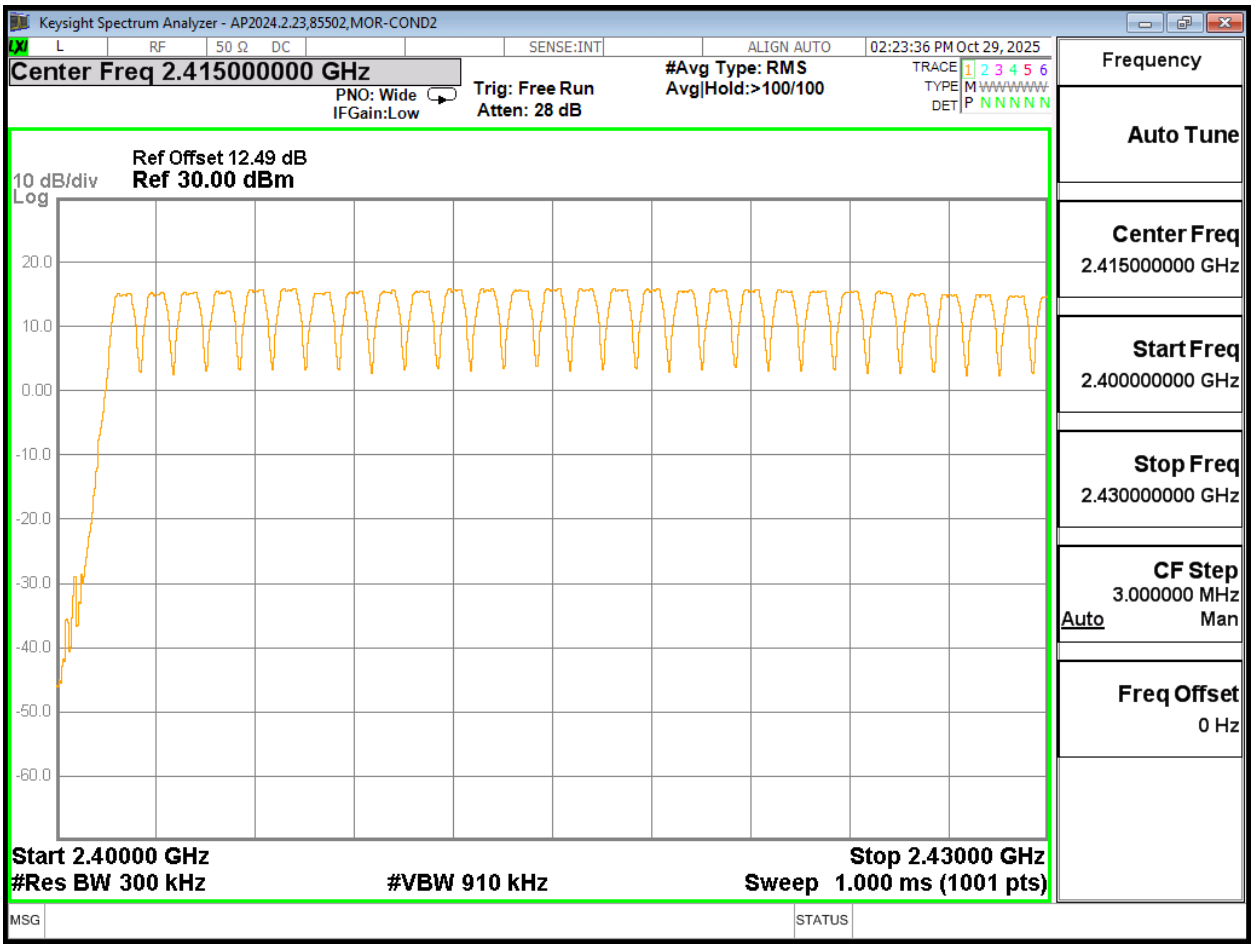
Normal Mode: 79 Channels Observed

9.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

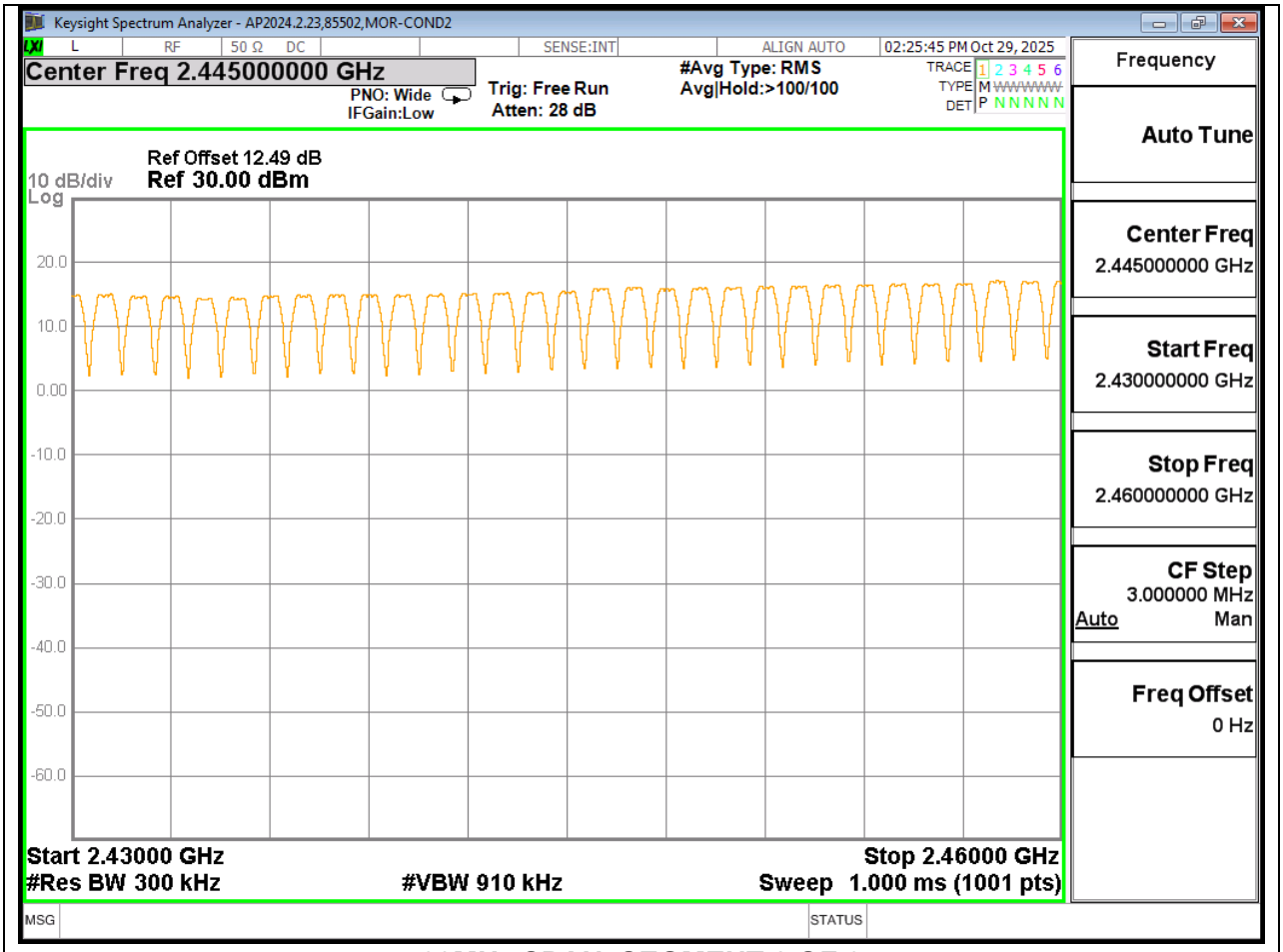
Antenna 1



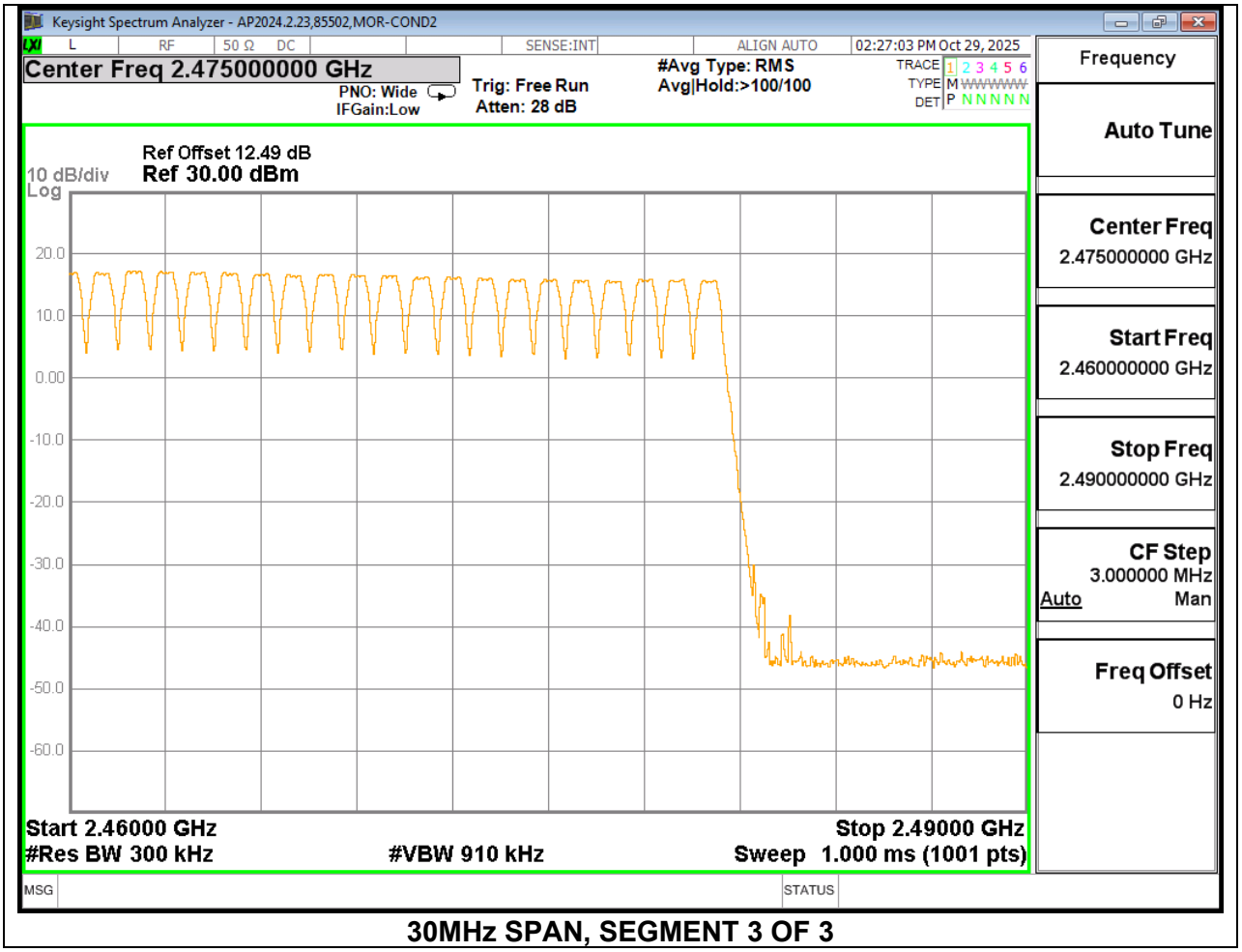
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

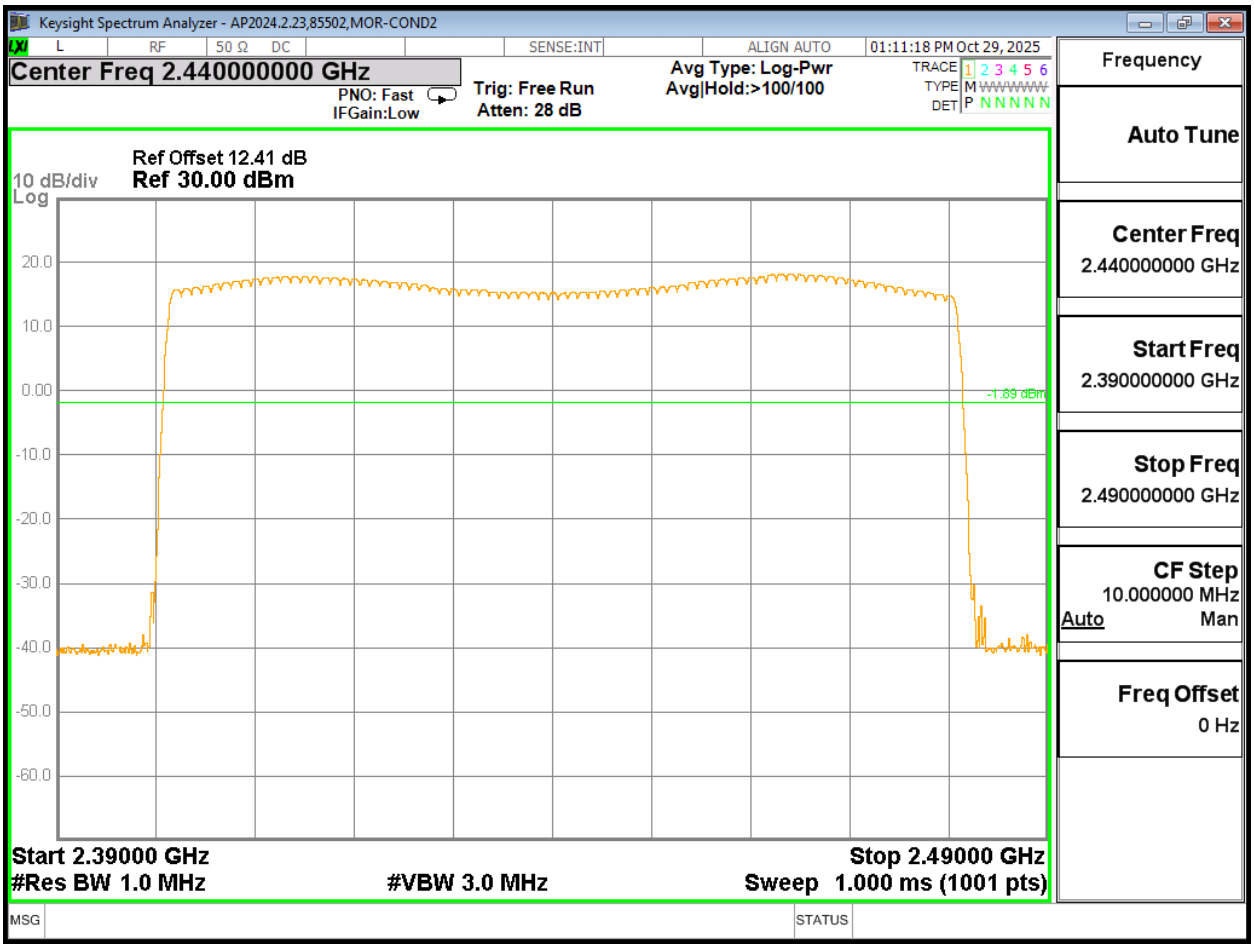


30MHz SPAN, SEGMENT 2 OF 3

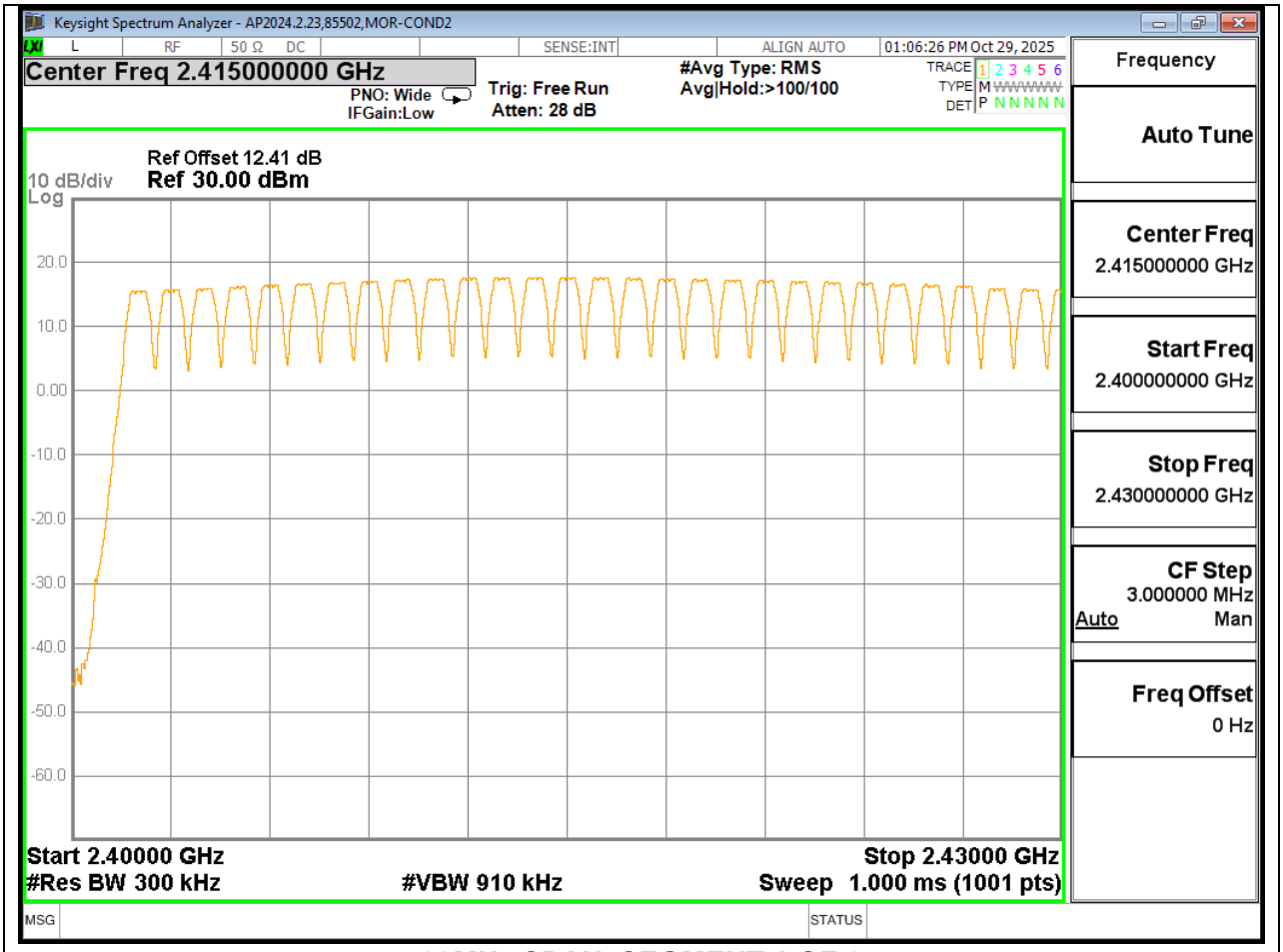


30MHz SPAN, SEGMENT 3 OF 3

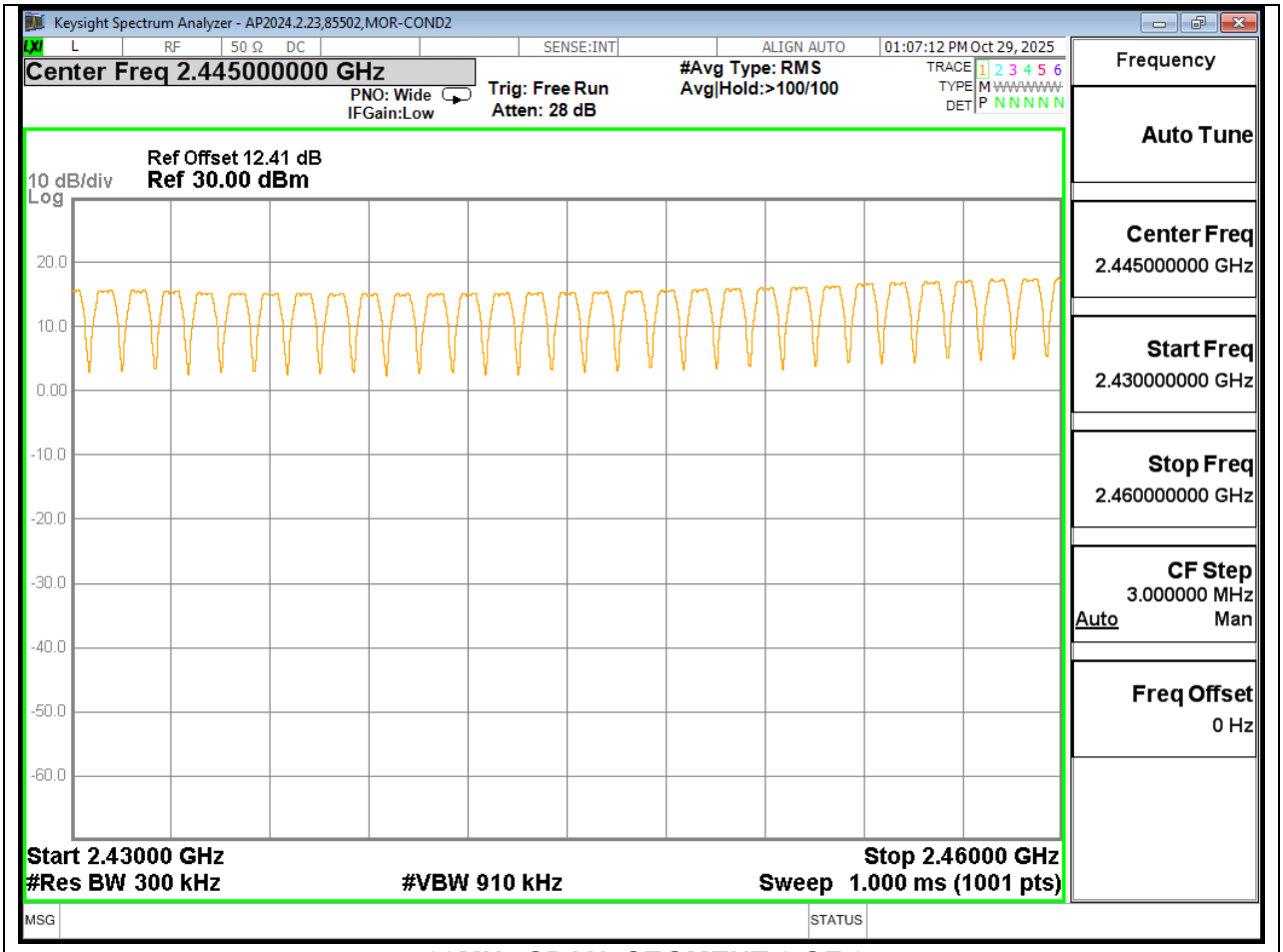
Antenna 2



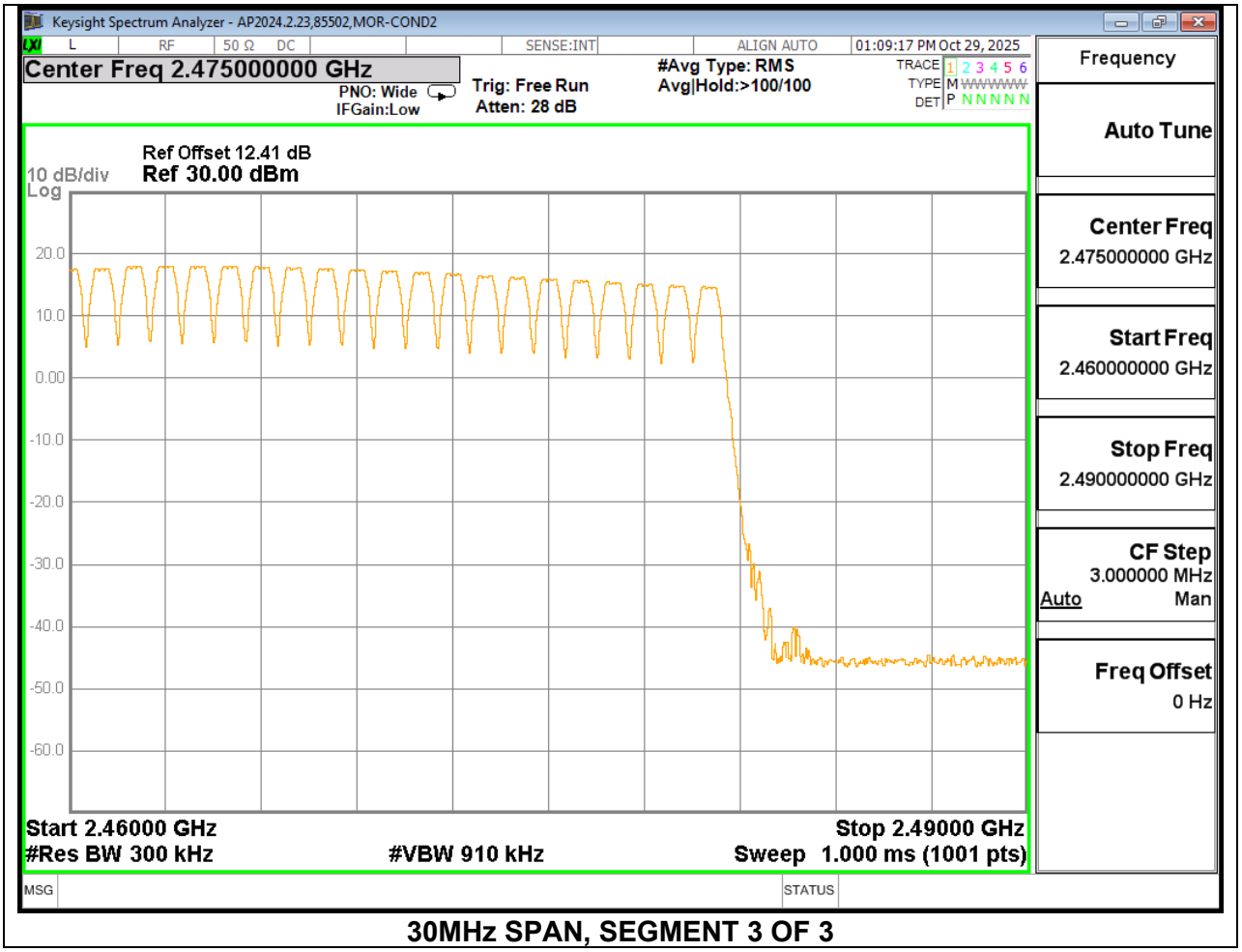
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3



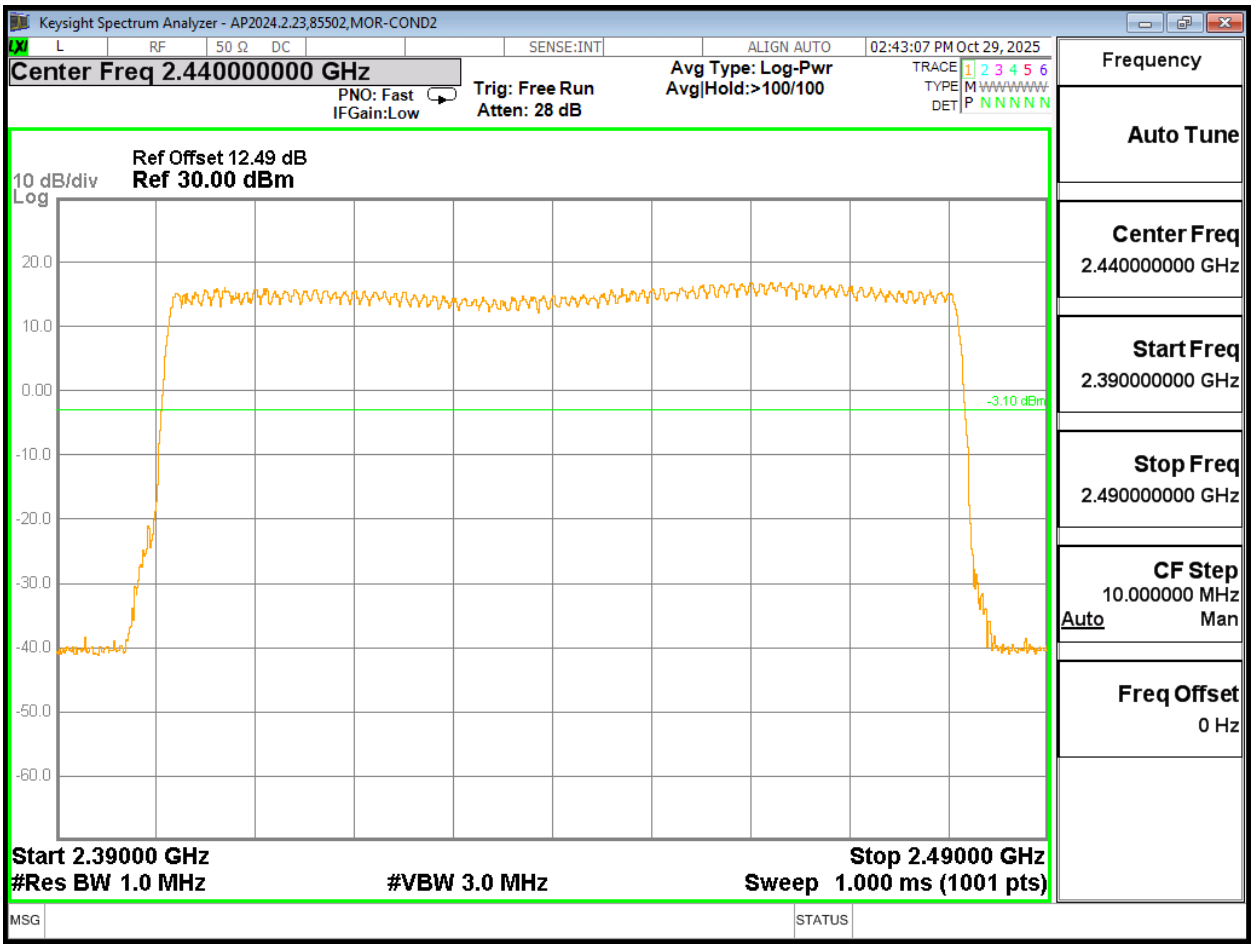
30MHz SPAN, SEGMENT 2 OF 3



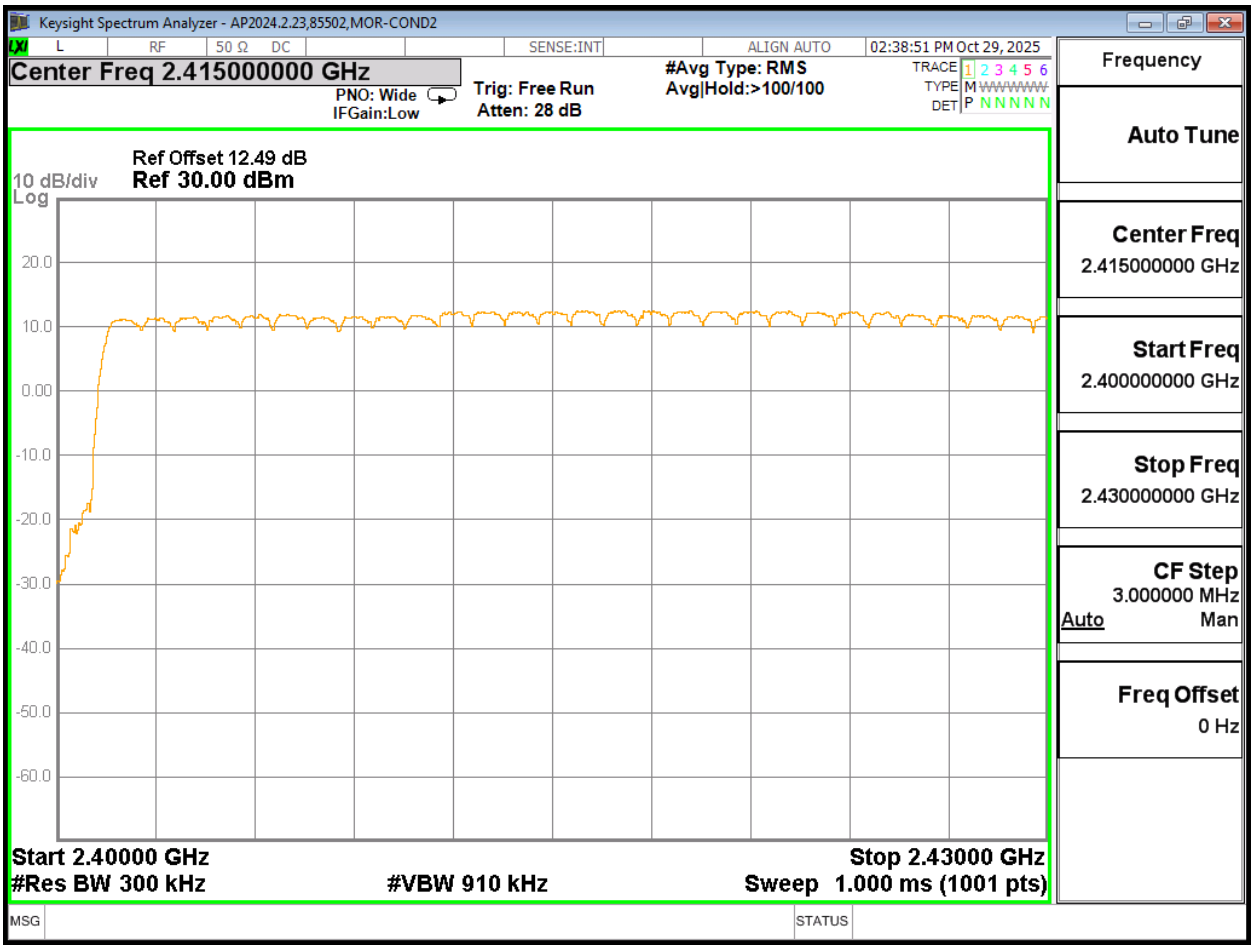
30MHz SPAN, SEGMENT 3 OF 3

9.4.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

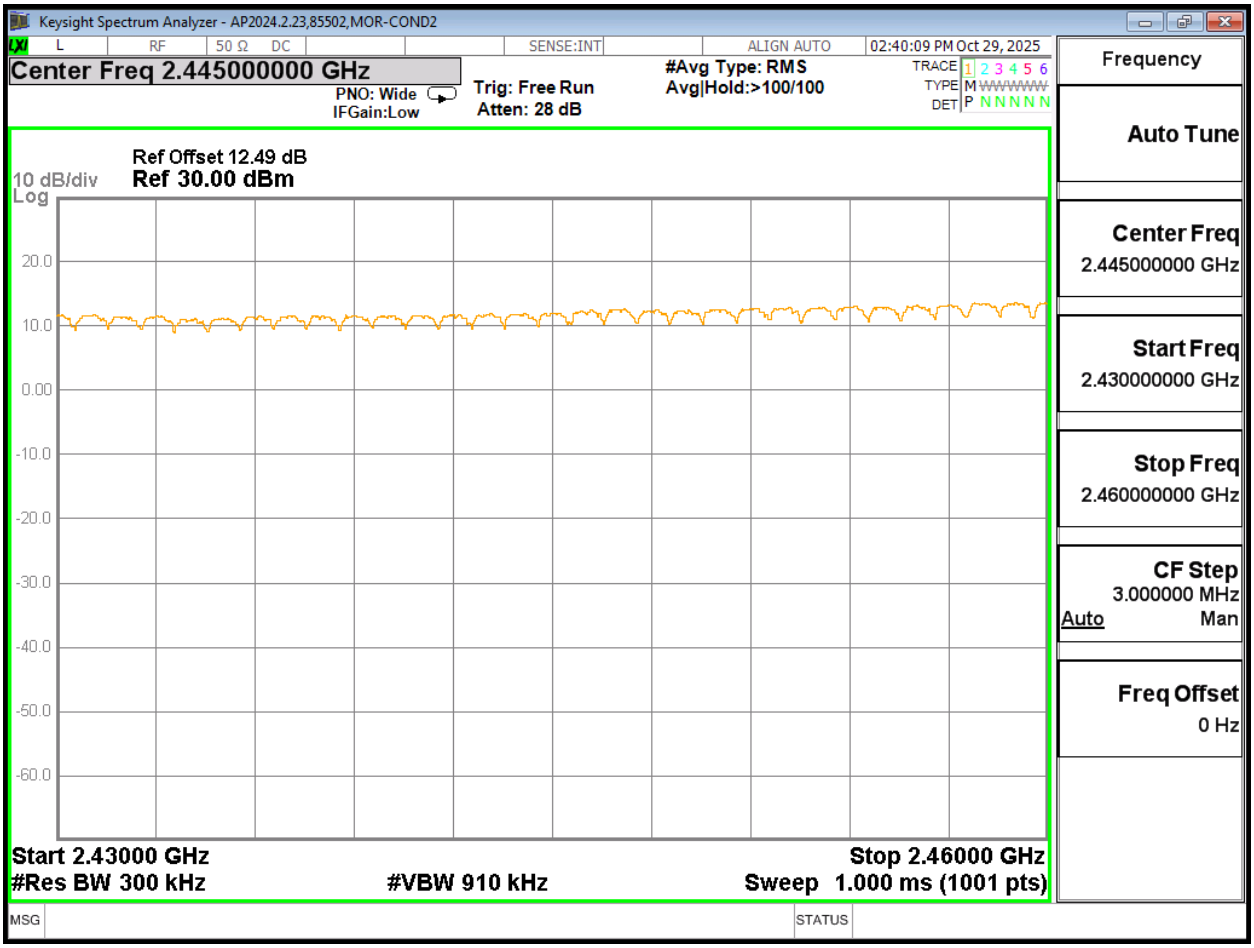
Antenna 1



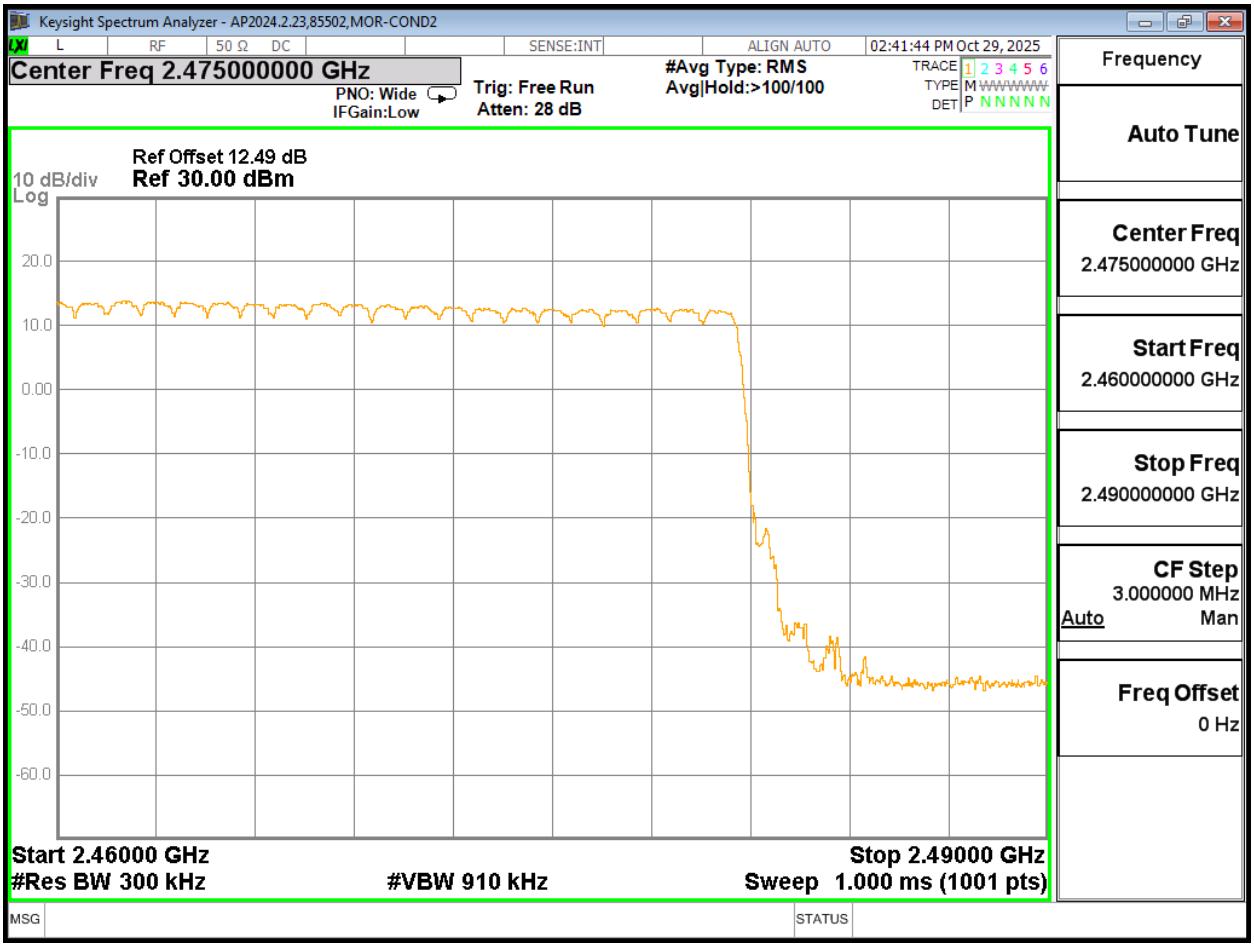
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

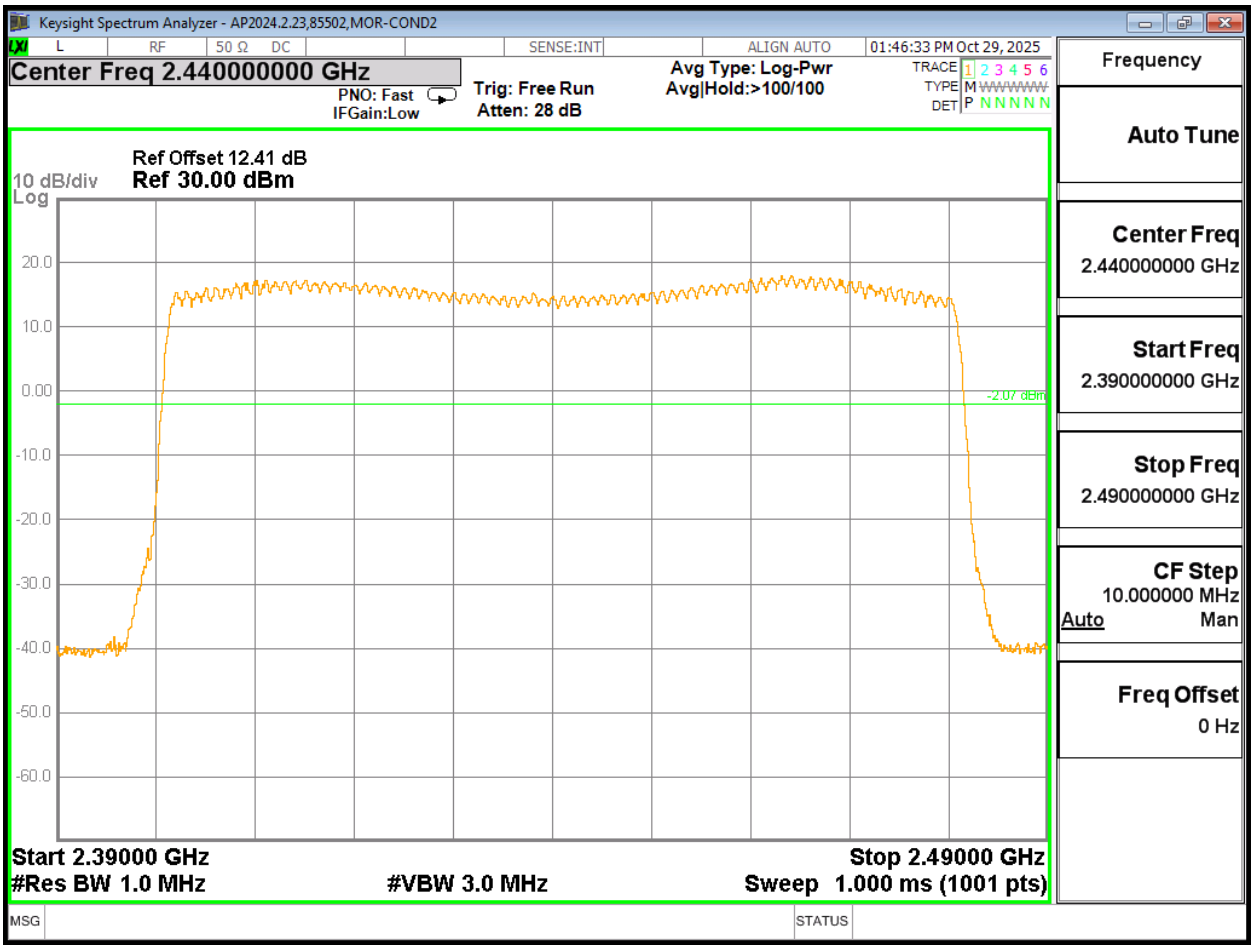


30MHz SPAN, SEGMENT 2 OF 3

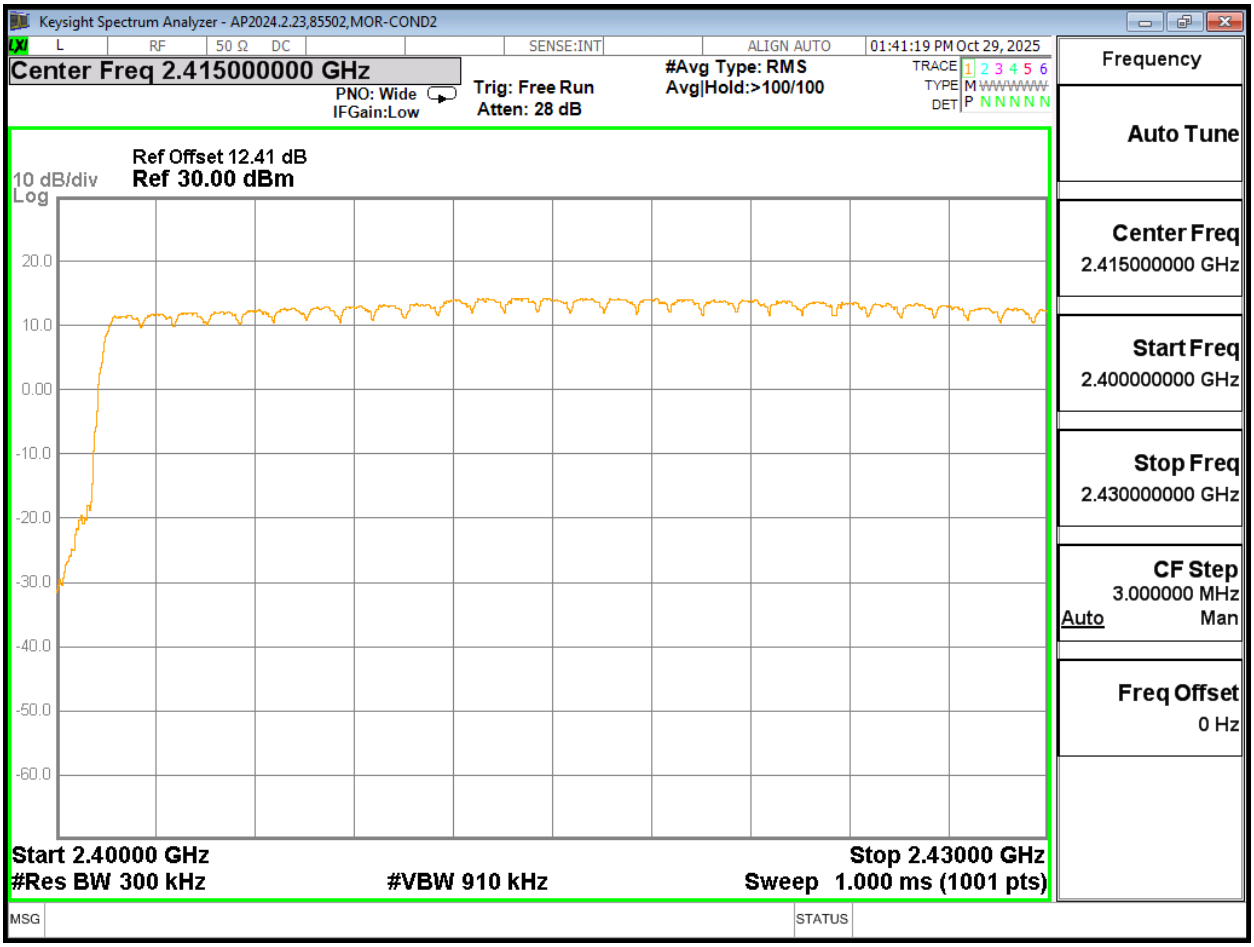


30MHz SPAN, SEGMENT 3 OF 3

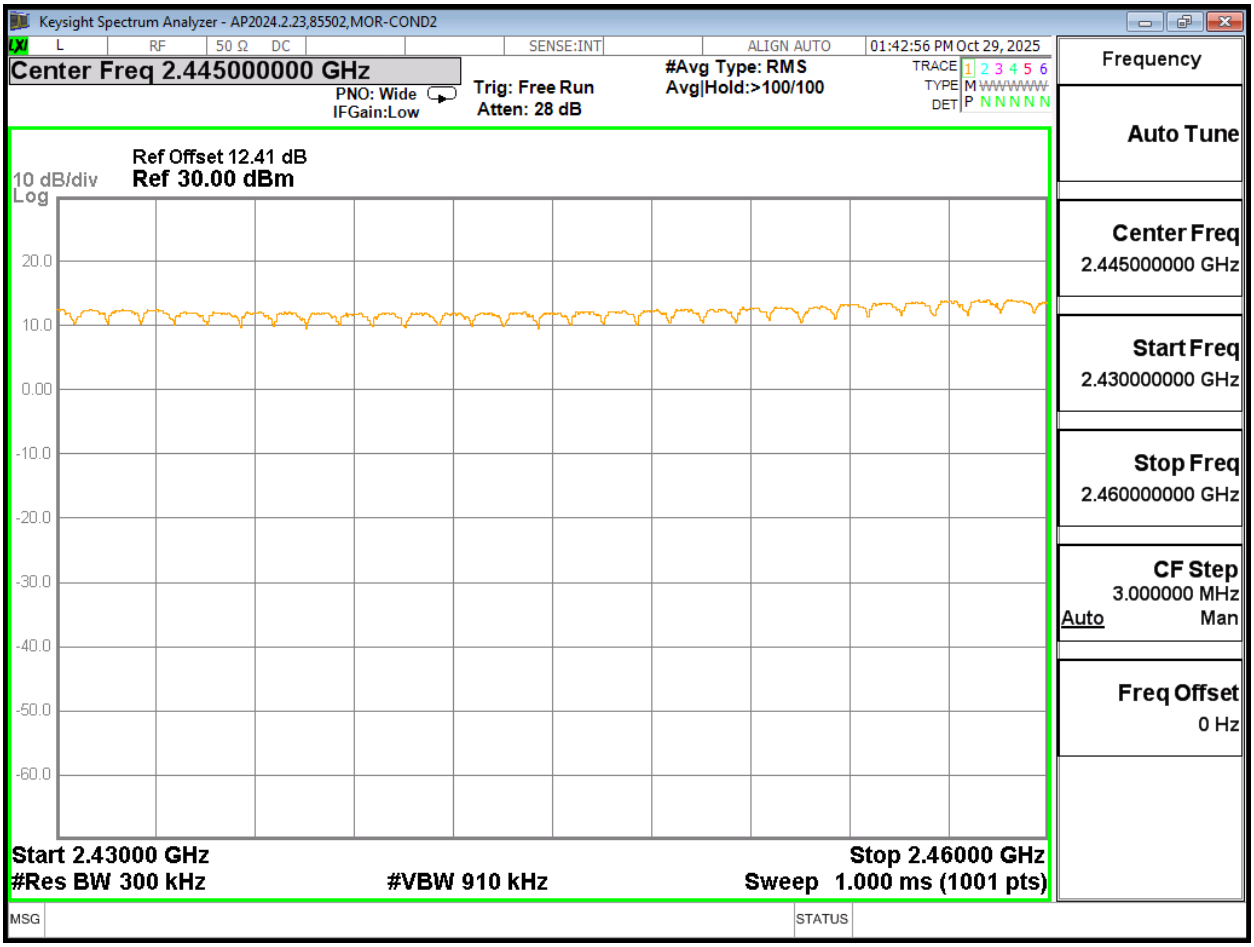
Antenna 2



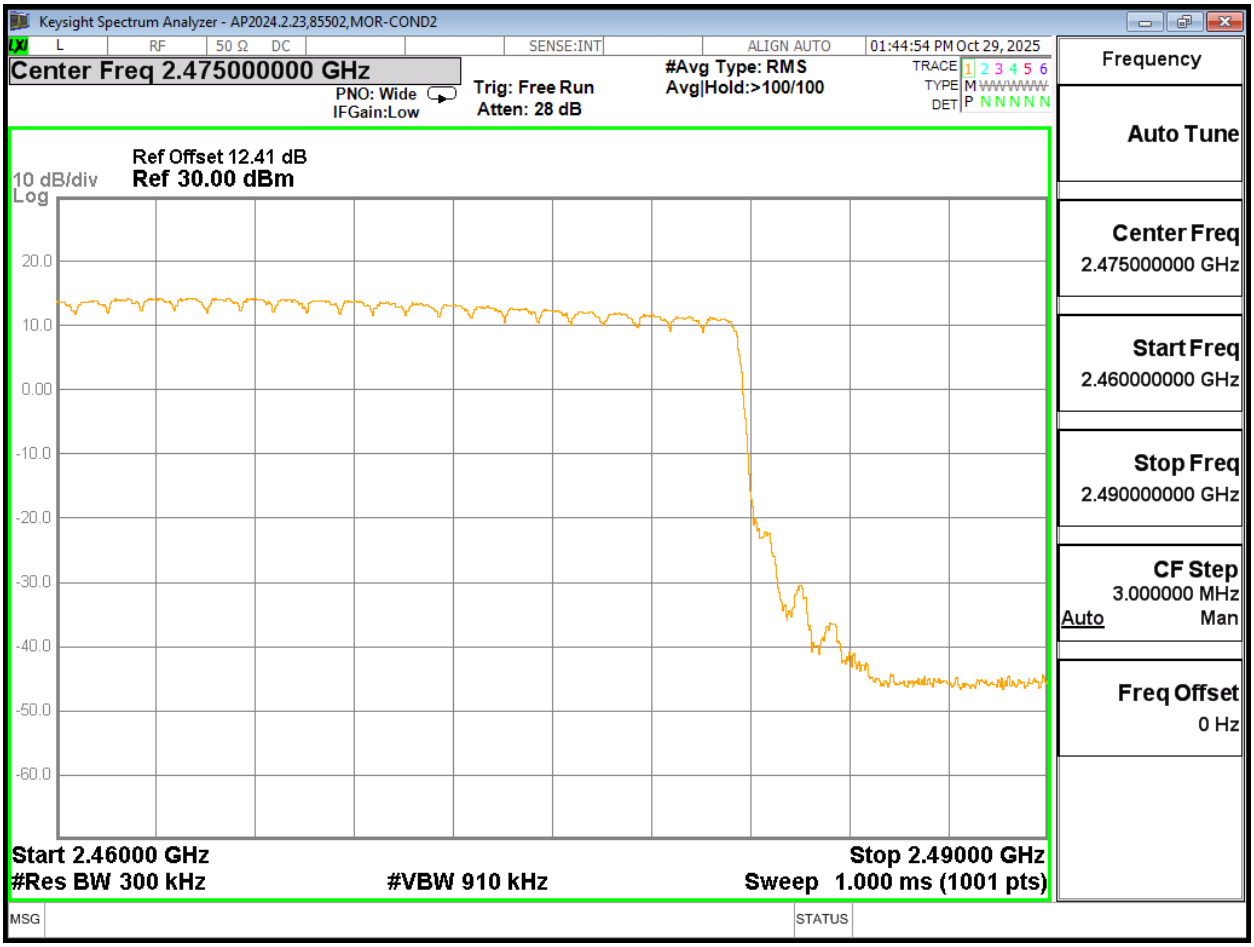
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3



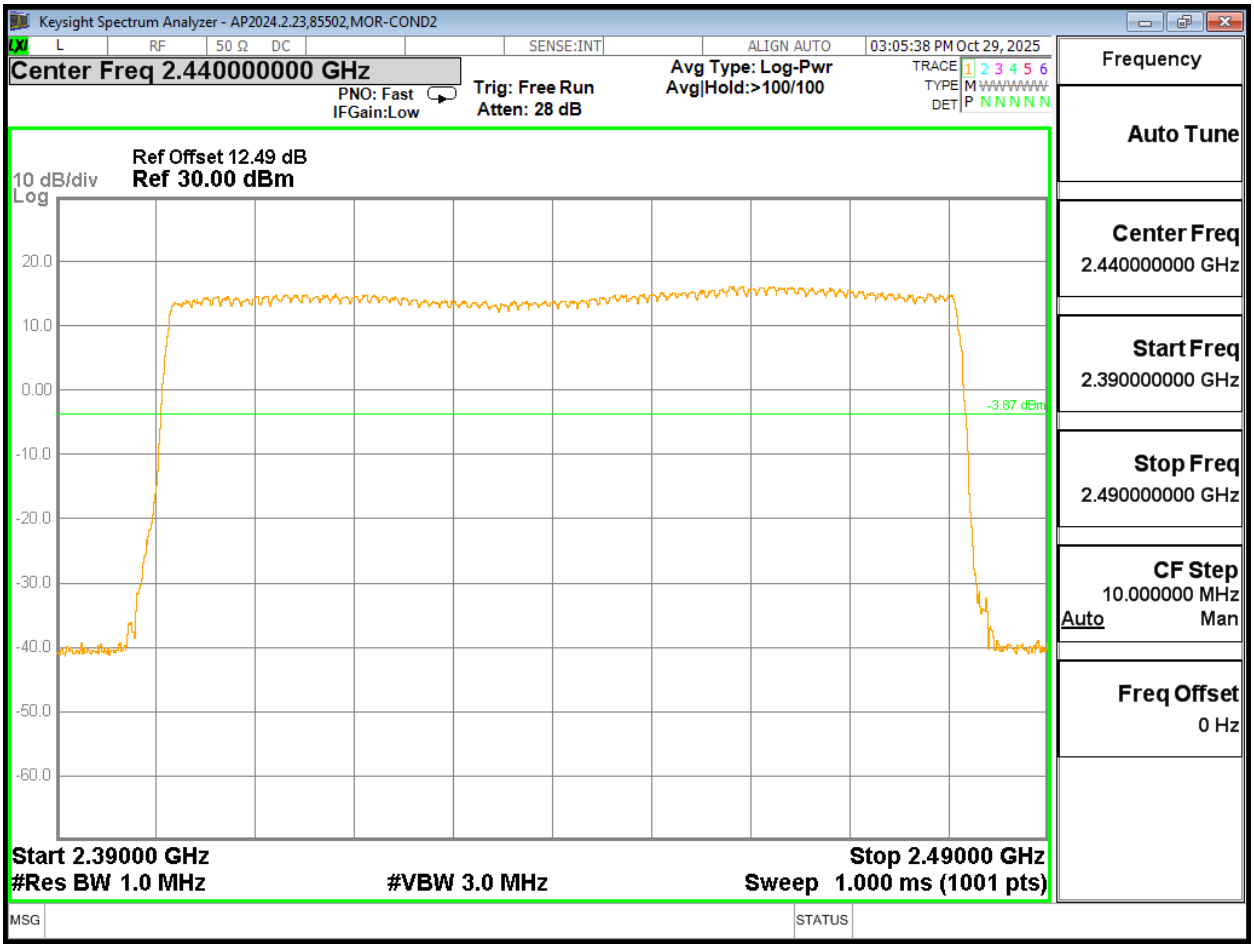
30MHz SPAN, SEGMENT 2 OF 3



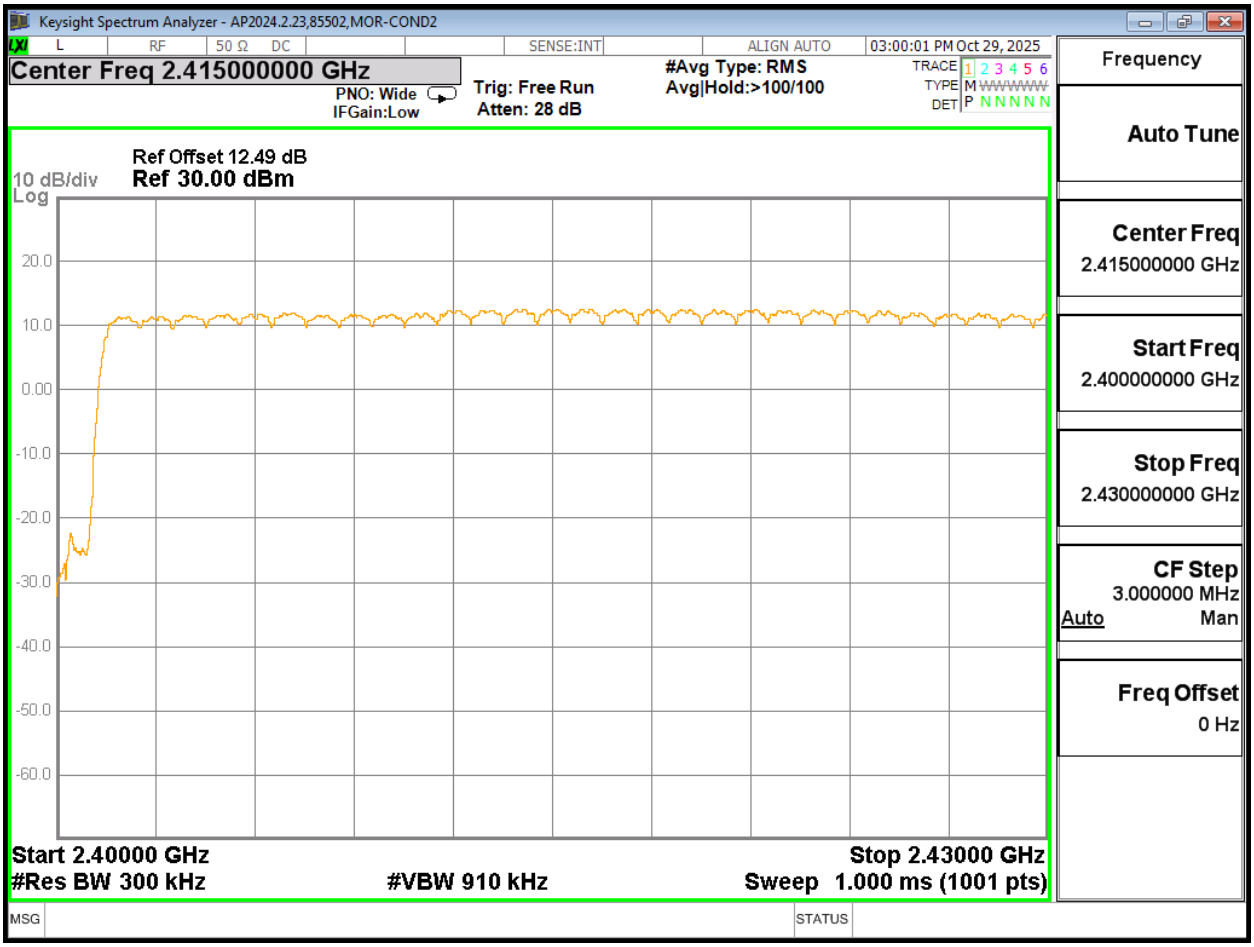
30MHz SPAN, SEGMENT 3 OF 3

9.4.3. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

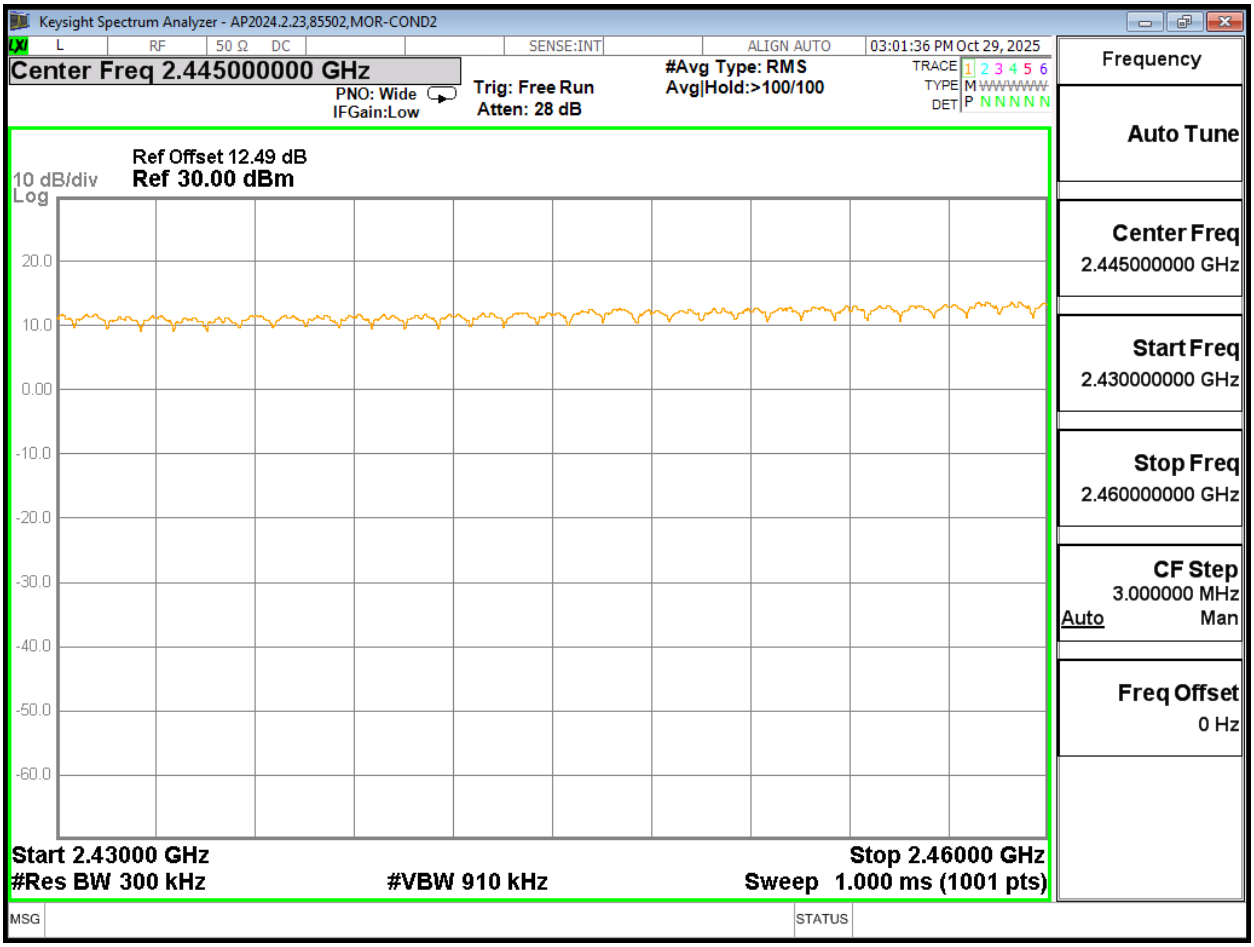
Antenna 1



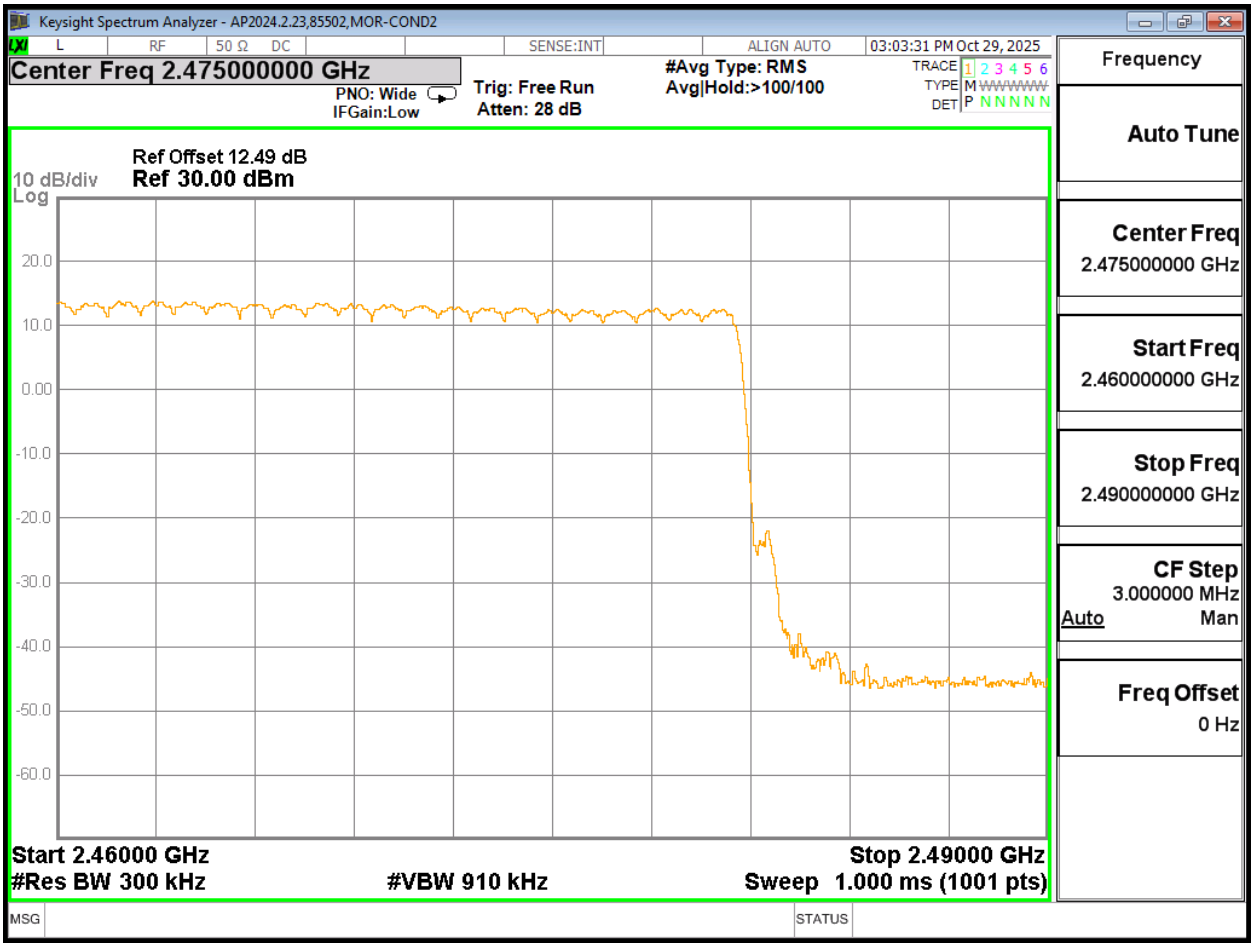
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

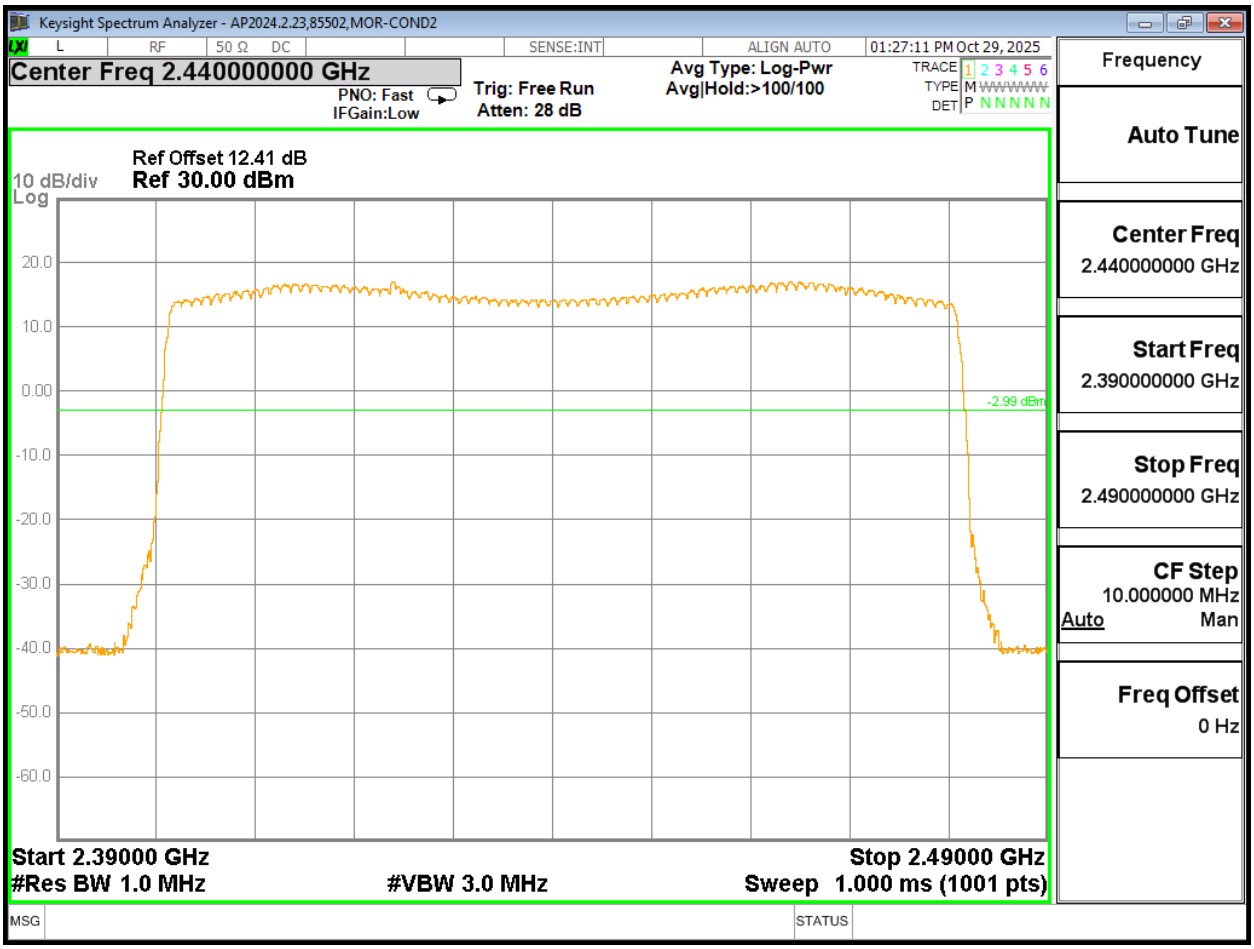


30MHz SPAN, SEGMENT 2 OF 3

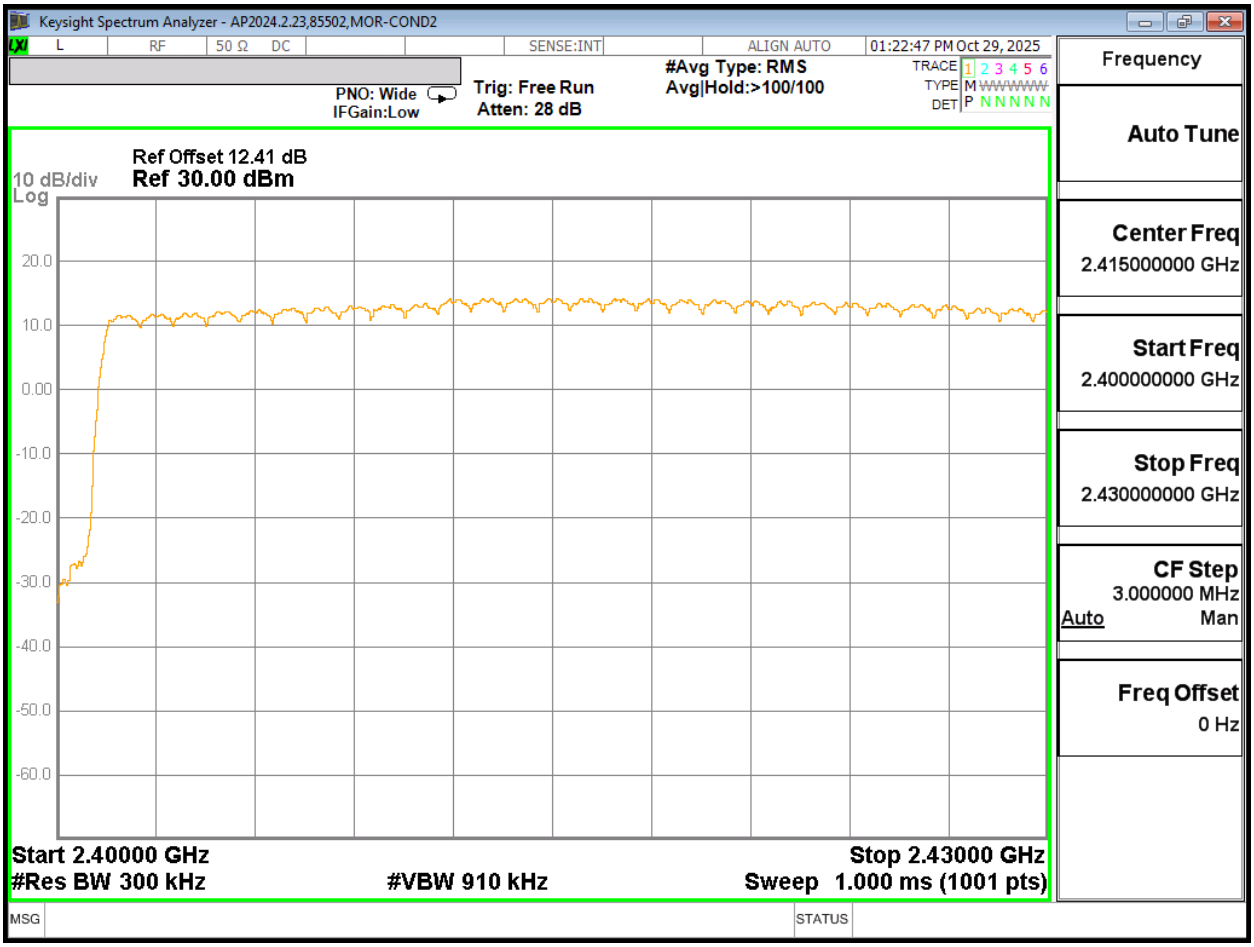


30MHz SPAN, SEGMENT 3 OF 3

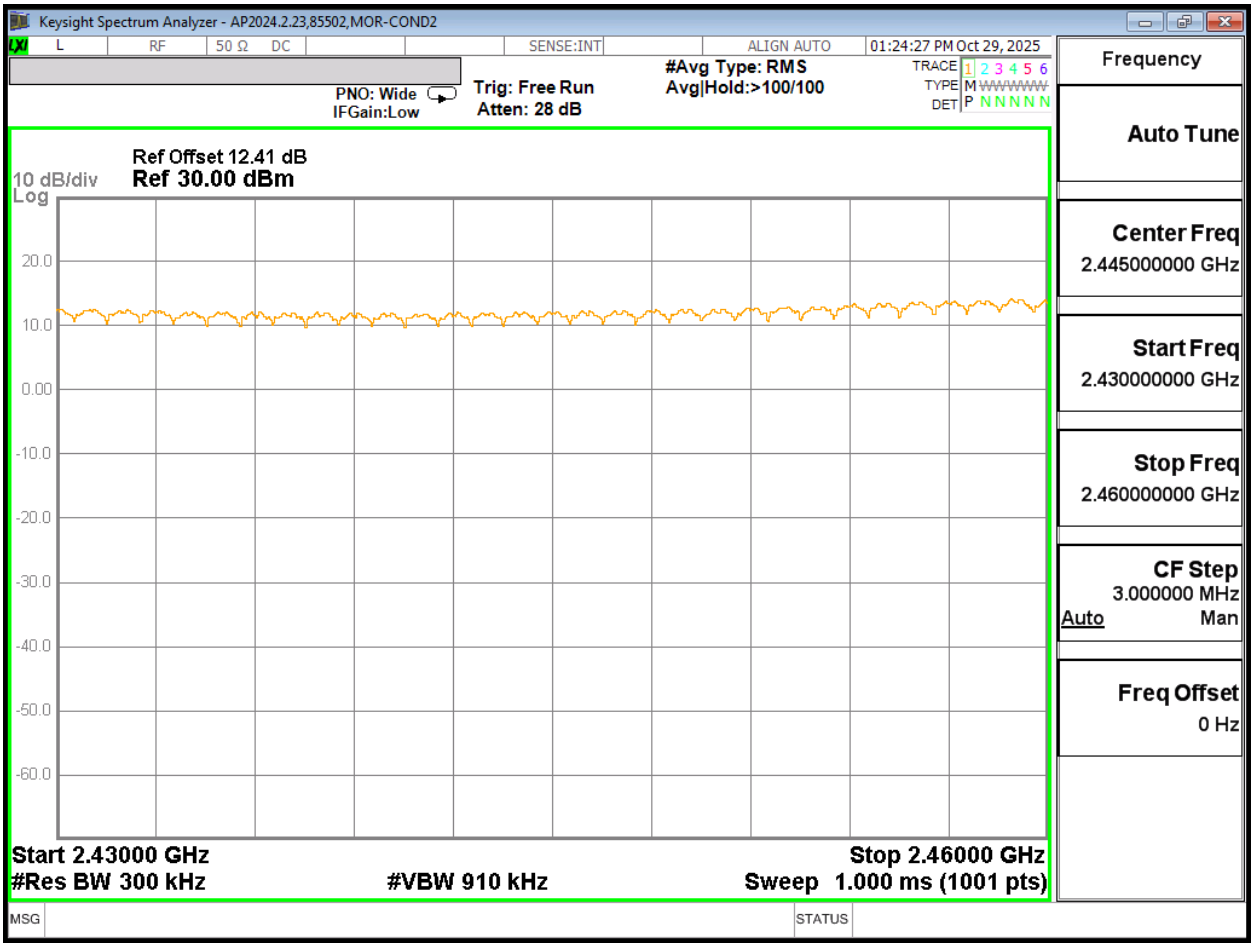
Antenna 2



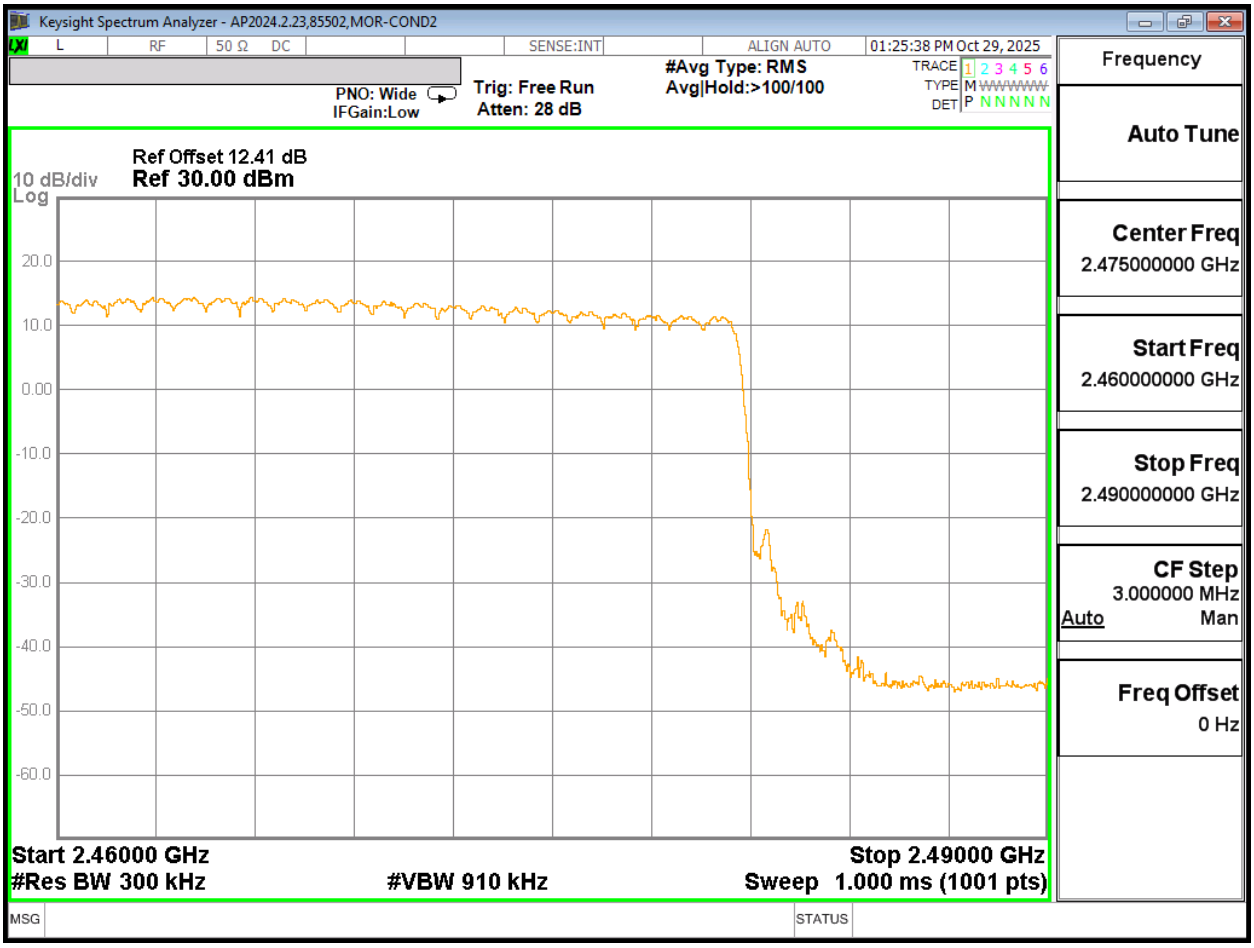
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3



30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

9.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (6.2.3.1) (b)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16-second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 31.6 second period (79 channels * 0.4 s) is equal to 10 * (# of pulses in 3.16 s) * pulse width.

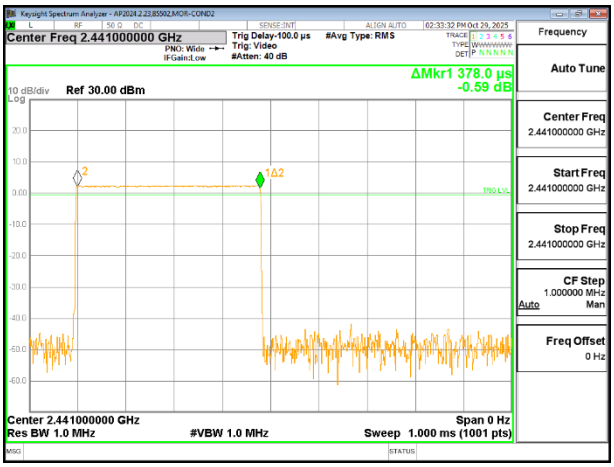
For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to 10 * (# of pulses in 0.8 s) * pulse width.

RESULTS

9.5.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

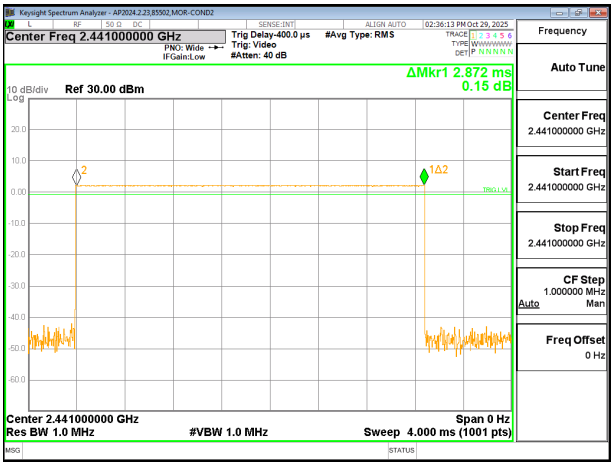
Antenna 1

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.378	32	0.1210	0.4	-0.2790
DH3	1.632	17	0.2774	0.4	-0.1226
DH5	2.872	12	0.3446	0.4	-0.0554
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.378	8	0.03024	0.4	-0.3698
DH3	1.632	4.25	0.06936	0.4	-0.3306
DH5	2.872	3	0.08616	0.4	-0.3138

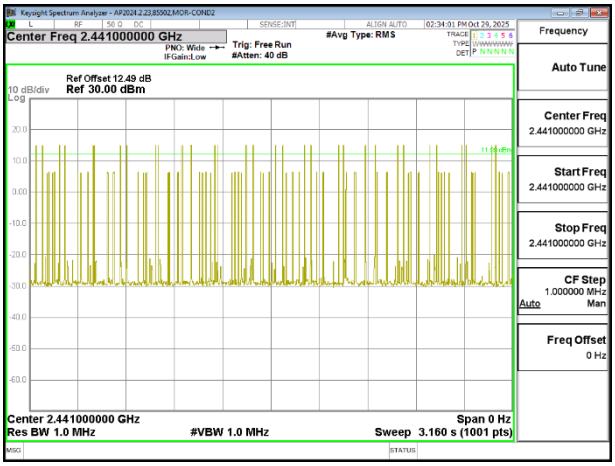


PULSE WIDTH – DH1

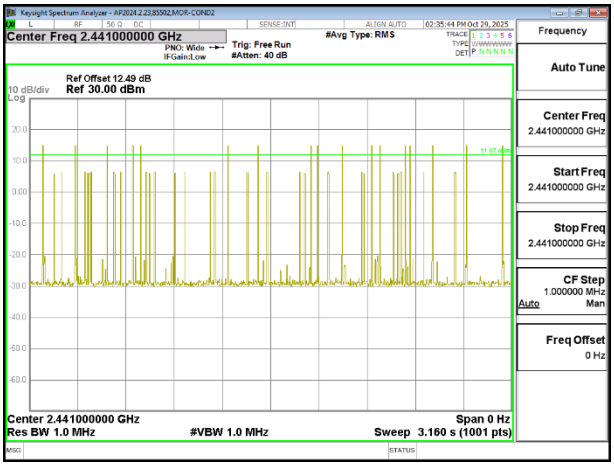
PULSE WIDTH – DH3



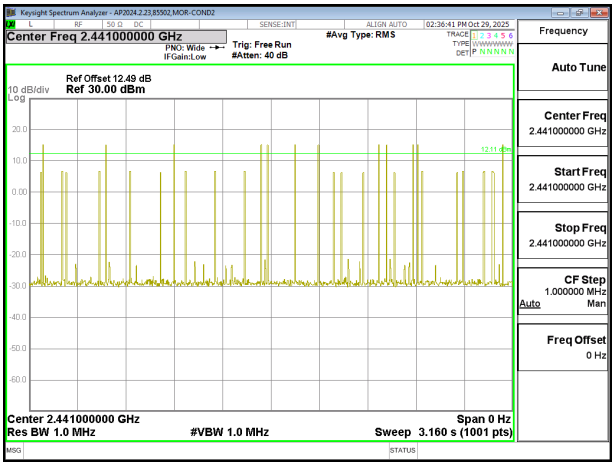
PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



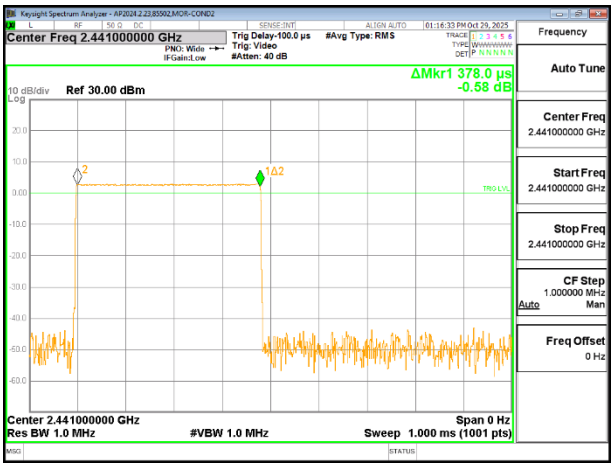
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



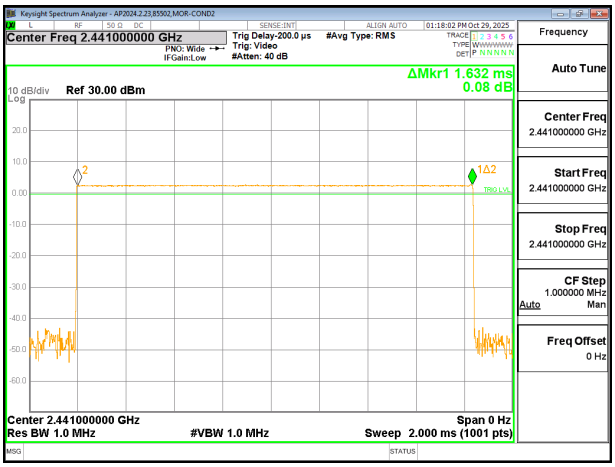
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

Antenna 2

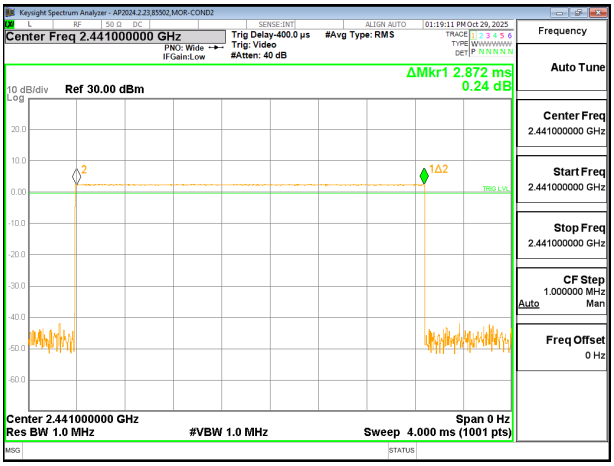
DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
DH1	0.378	32	0.1210	0.4	-0.2790
DH3	1.632	14	0.2285	0.4	-0.1715
DH5	2.872	6	0.1723	0.4	-0.2277
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.378	8	0.03024	0.4	-0.3698
DH3	1.632	3.5	0.05712	0.4	-0.3429
DH5	2.872	1.5	0.04308	0.4	-0.3569



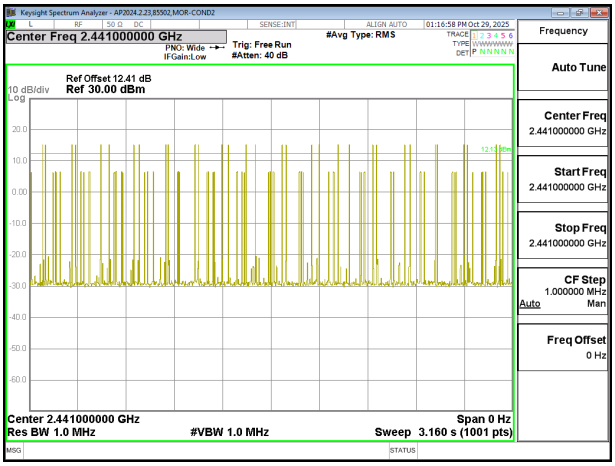
PULSE WIDTH – DH1



PULSE WIDTH – DH3

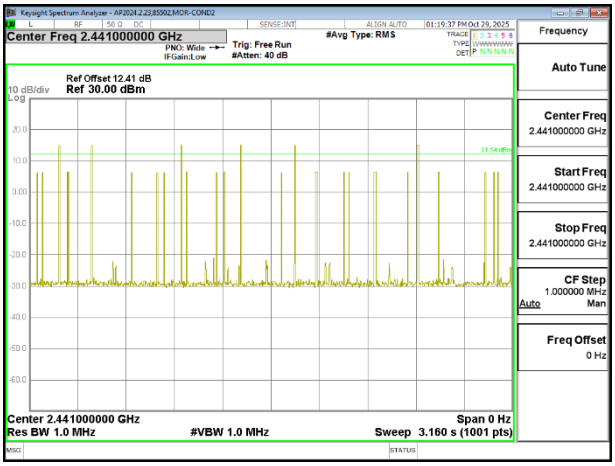


PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



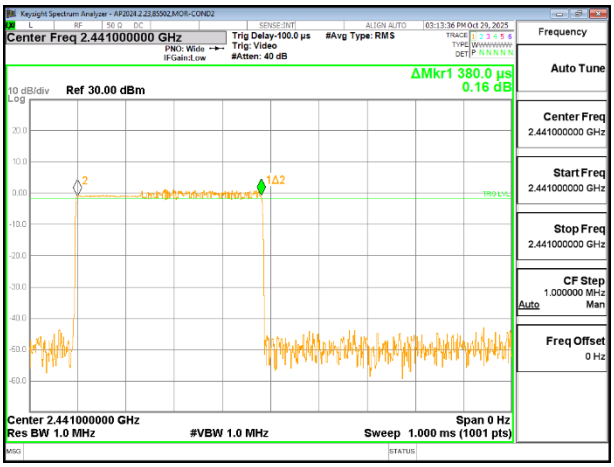
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

9.5.2. BLUETOOTH ENHANCED DATA RATE QPSK MODULATION

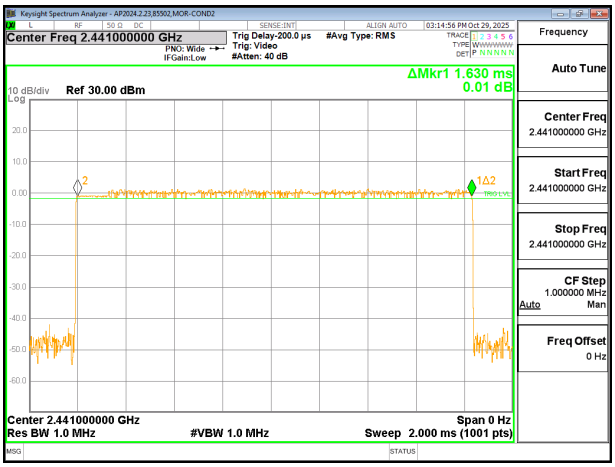
Antenna 1

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DQPSK Normal Mode					
2DH1	0.38	32	0.1216	0.4	-0.2784
2DH3	1.63	17	0.2771	0.4	-0.1229
2DH5	2.872	7	0.20104	0.4	-0.19896

Note: for AFH(DQPSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.

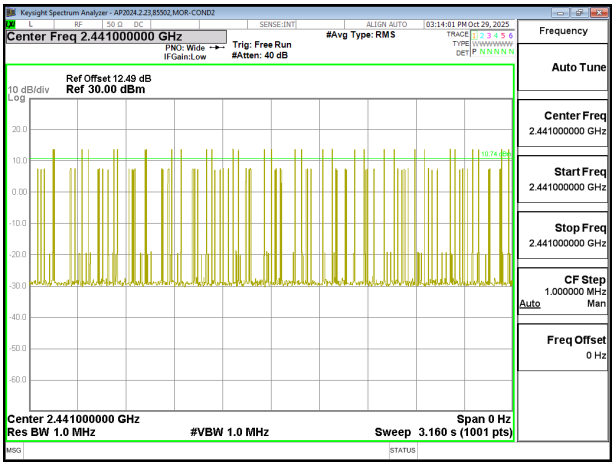


PULSE WIDTH – 2DH1

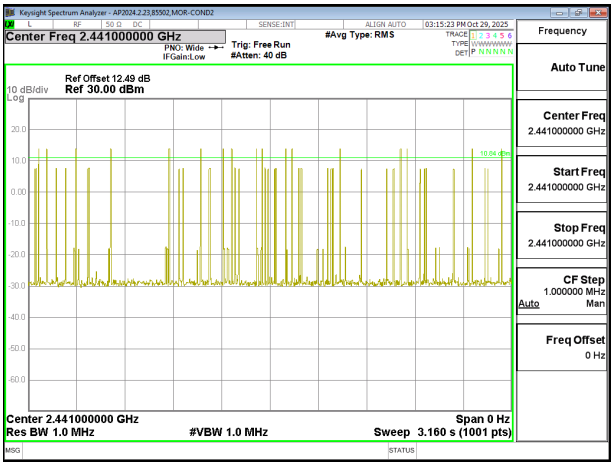


PULSE WIDTH – 2DH3

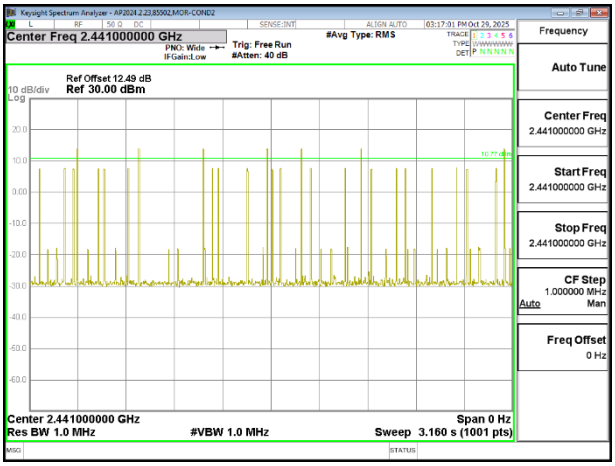
PULSE WIDTH – 2DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH3

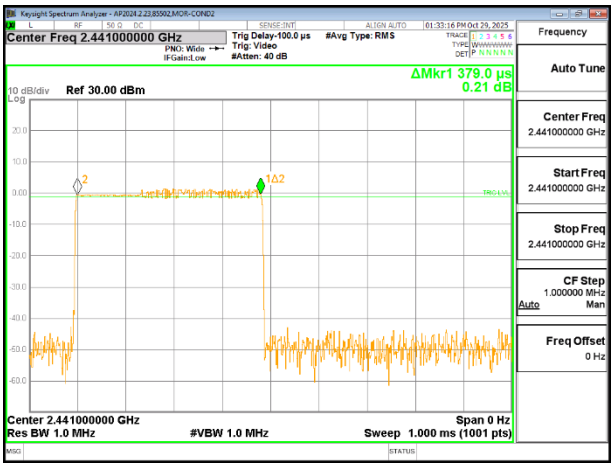


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH5

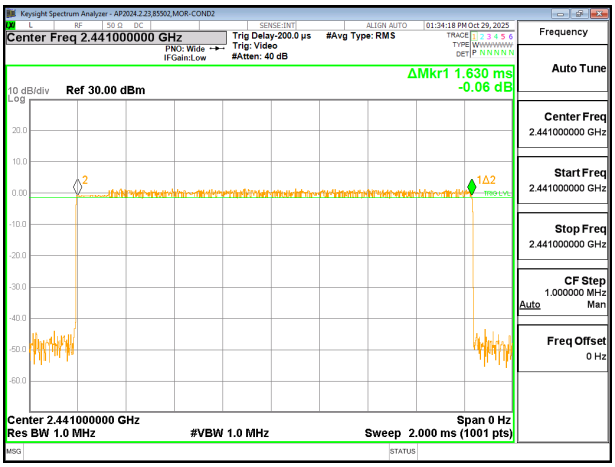
Antenna 2

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
DQPSK Normal Mode					
2DH1	0.379	32	0.12128	0.4	-0.27872
2DH3	1.63	18	0.2934	0.4	-0.1066
2DH5	2.868	10	0.2868	0.4	-0.1132

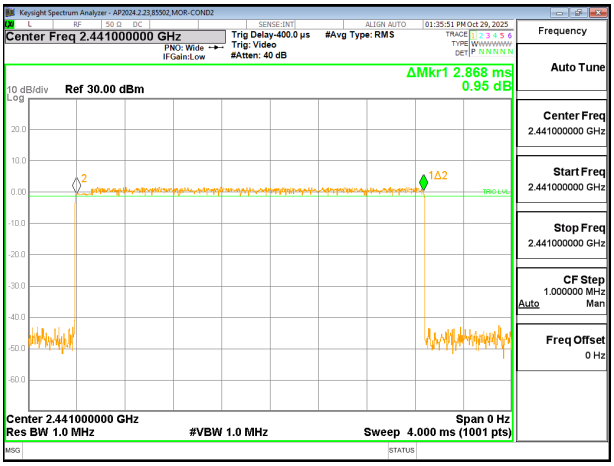
Note: for AFH(DQPSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.



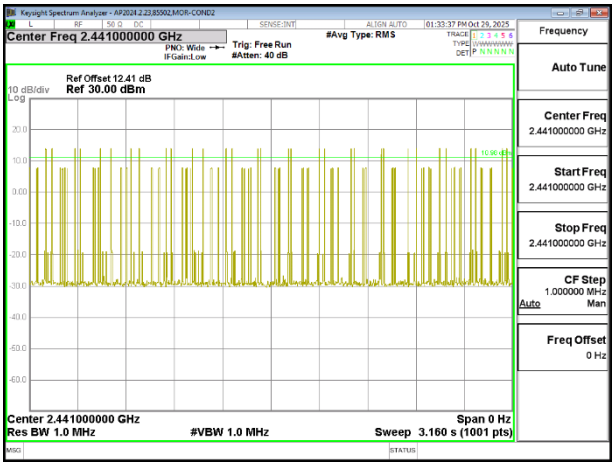
PULSE WIDTH – 2DH1



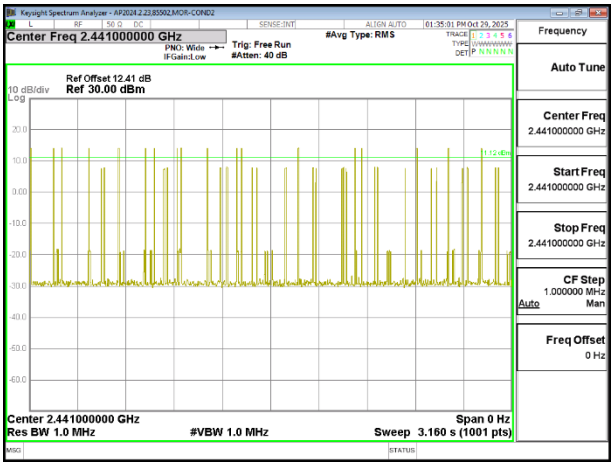
PULSE WIDTH – 2DH3



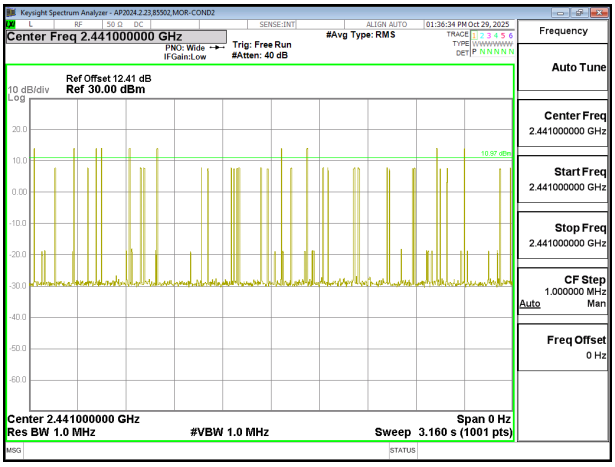
PULSE WIDTH – 2DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH3



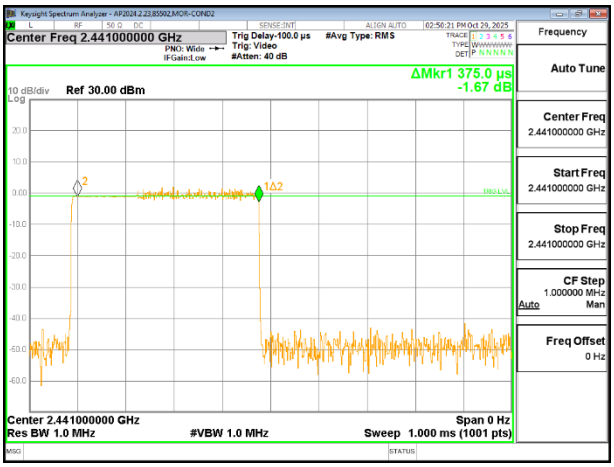
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 2DH5

9.5.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

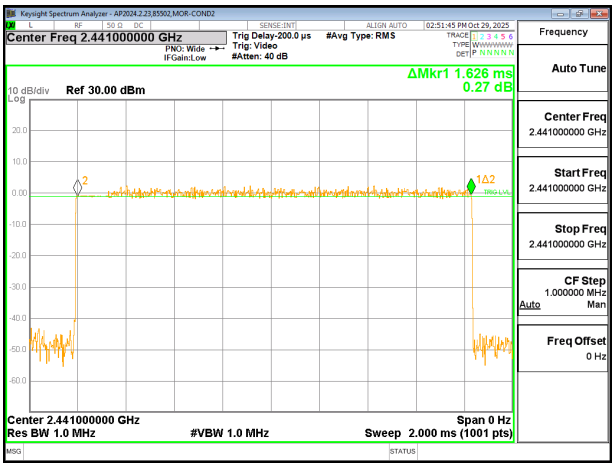
Antenna 1

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
3DH1	0.375	32	0.12	0.4	-0.28
3DH3	1.626	15	0.2439	0.4	-0.1561
3DH5	2.888	9	0.25992	0.4	-0.14008

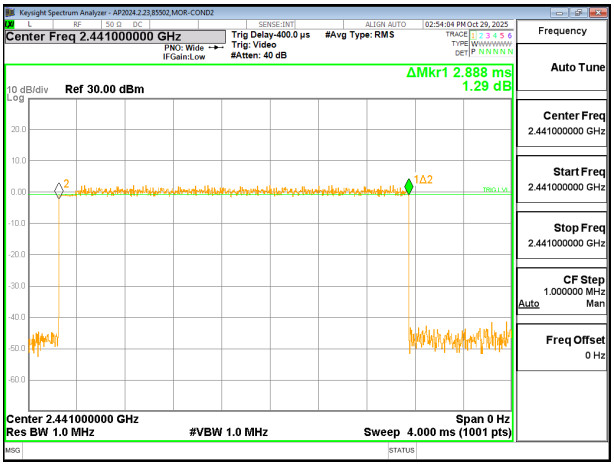
Note: for AFH(8PSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.



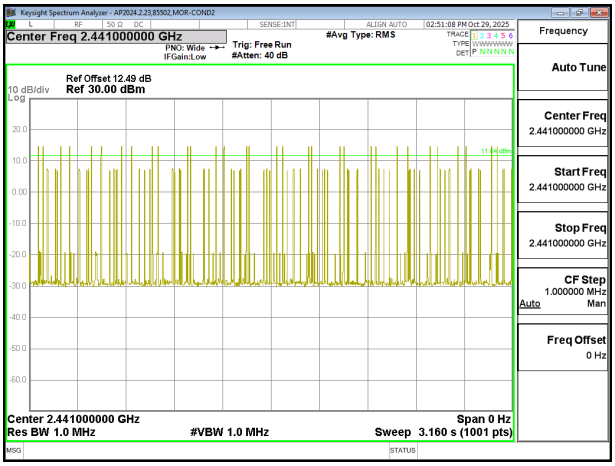
PULSE WIDTH – 3DH1



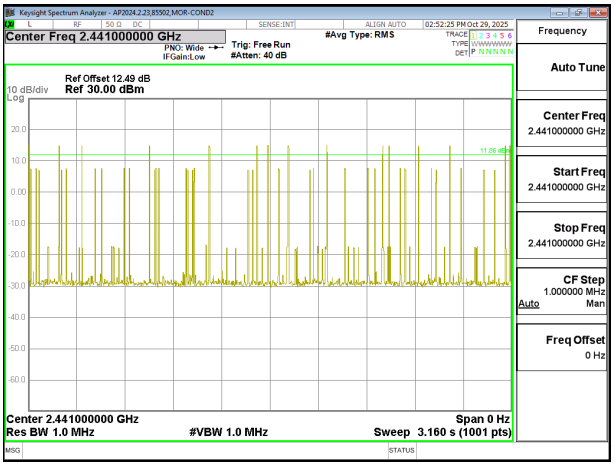
PULSE WIDTH – 3DH3



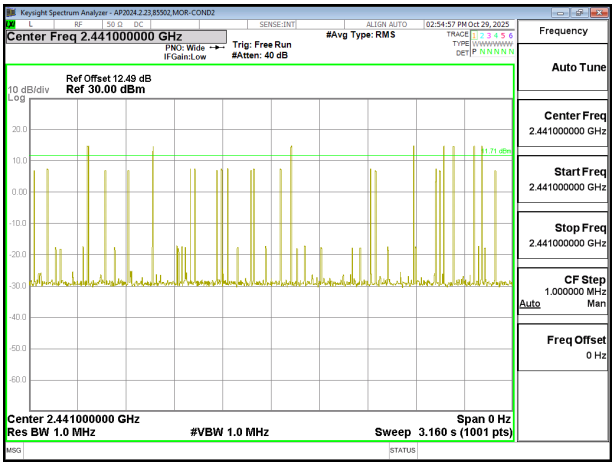
PULSE WIDTH – 3DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH3

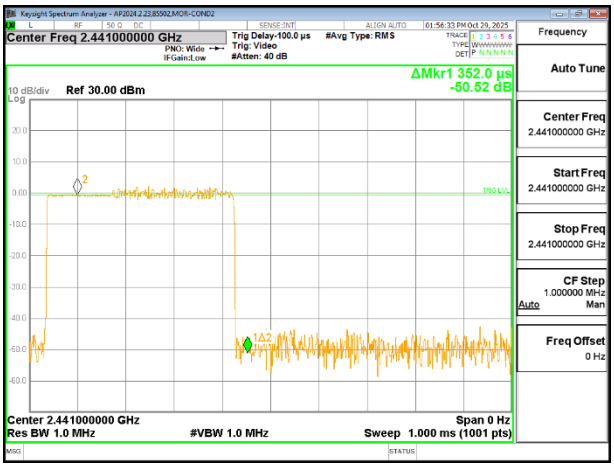


NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH5

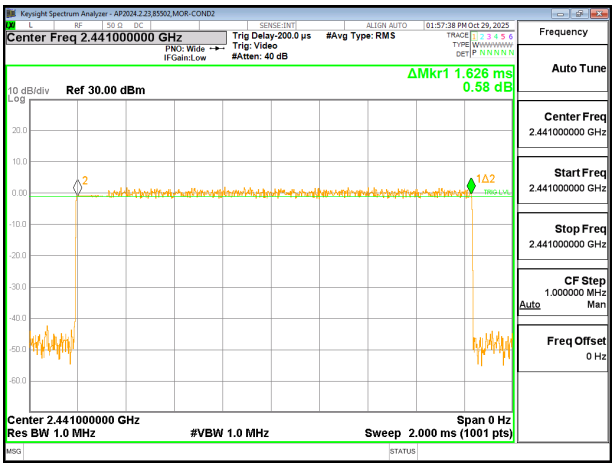
Antenna 2

DH Packet	Pulse Width (msec)	Number of Pulses in 3.16 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
8PSK Normal Mode					
3DH1	0.352	32	0.11264	0.4	-0.28736
3DH3	1.626	14	0.22764	0.4	-0.17236
3DH5	2.868	5	0.1434	0.4	-0.2566

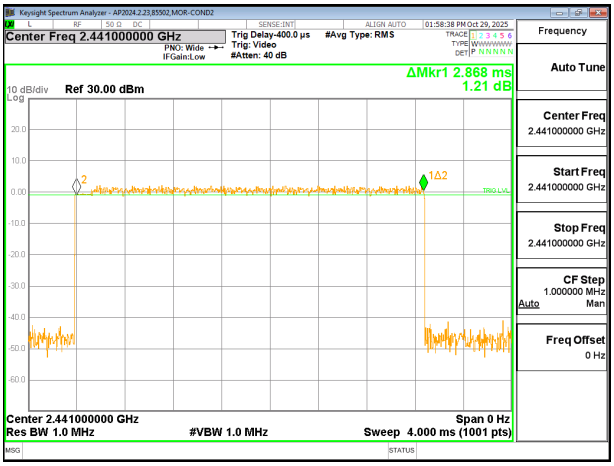
Note: for AFH(8PSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.



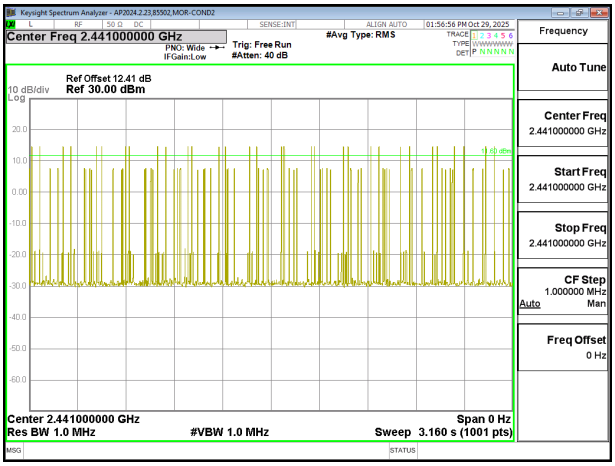
PULSE WIDTH – 3DH1



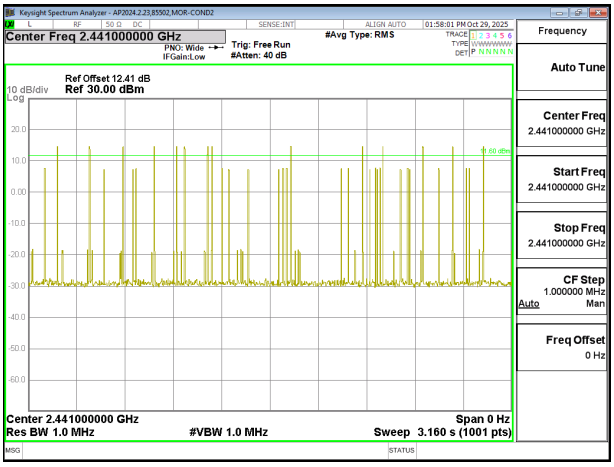
PULSE WIDTH – 3DH3



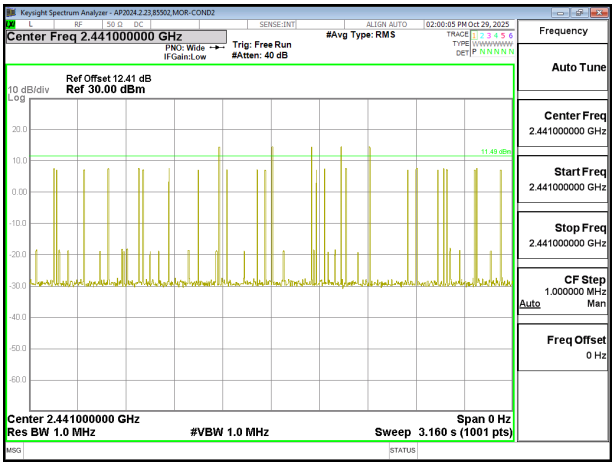
PULSE WIDTH – 3DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH5

9.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)

RSS-247 (6.2.3.2)

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Peak output power was read directly from power meter.

RESULTS

9.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna 1

Tested By:	105900/84740
Date:	2025-25-09

DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.54	21	-4.46
Middle	2441	16.25	21	-4.75
High	2480	15.94	21	-5.06

Antenna 2

Tested By:	105900/84740
Date:	2025-25-09

DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	15.40	21	-5.60
Middle	2441	15.86	21	-5.14
High	2480	15.59	21	-5.41

MIMO

Tested By:	105900/84740
Date:	2025-25-09

DH5

Channel	Frequency (MHz)	Output Power C0 (dBm)	Output Power C1 (dBm)	Output Power Total (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.94	12.29	15.13	21	-5.87
Middle	2441	11.94	14.67	16.53	21	-4.47
High	2480	11.90	14.65	16.50	21	-4.50

9.6.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1

Tested By:	105900/84740
Date:	2025-25-09

3-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.35	21	-4.65
Middle	2441	16.64	21	-4.36
High	2480	15.77	21	-5.23

Antenna 2

Tested By:	105900/84740
Date:	2025-25-09

3-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	19.91	21	-1.09
Middle	2441	18.41	21	-2.59
High	2480	17.17	21	-3.83

MIMO

Tested By:	105900/84740
Date:	2025-25-09

3-DH5

Channel	Frequency (MHz)	Output Power C0 (dBm)	Output Power C1 (dBm)	Output Power Total (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.31	11.24	16.05	21	-4.95
Middle	2441	14.31	11.88	16.27	21	-4.73
High	2480	14.31	11.77	16.23	21	-4.77

9.6.3. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Antenna 1

Tested By:	105900/84740
Date:	2025-25-09

2-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	20.32	21	-0.68
Middle	2441	16.64	21	-4.36
High	2480	15.26	21	-5.74

Antenna 2

Tested By:	105900/84740
Date:	2025-25-09

2-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	18.14	21	-2.86
Middle	2441	17.13	21	-3.87
High	2480	14.80	21	-6.20

MIMO

Tested By:	105900/84740
Date:	2025-25-09

2-DH5

Channel	Frequency (MHz)	Output Power C0 (dBm)	Output Power C1 (dBm)	Output Power Total (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.07	11.69	16.05	21	-4.95
Middle	2441	13.85	12.04	16.05	21	-4.95
High	2480	14.31	10.04	15.69	21	-5.31

9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

RESULTS

9.7.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna 1

Tested By:	105900/84740
Date:	2025-25-09, 2025-12-12

DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	15.67	21	-5.33
Middle	2441	15.83	21	-5.17
High	2480	15.48	21	-5.52

Antenna 2

Tested By:	105900/84740
Date:	2025-25-09

DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	15.06	21	-5.94
Middle	2441	15.57	21	-5.44
High	2480	15.29	21	-5.72

MIMO

Tested By:	105900/84740
Date:	2025-25-09

DH5

Channel	Frequency (MHz)	Output Power C0 (dBm)	Output Power C1 (dBm)	Output Power Total (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.50	11.86	14.69	21	-6.31
Middle	2441	11.49	12.10	14.81	21	-6.19
High	2480	11.49	10.83	14.18	21	-6.82

9.7.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Antenna 1

Tested By:	105900/84740
Date:	2025-25-09

3-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	10.69	21	-10.31
Middle	2441	12.37	21	-8.63
High	2480	12.15	21	-8.86

Antenna 2

Tested By:	105900/84740
Date:	2025-25-09

3-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	12.30	21	-8.70
Middle	2441	12.90	21	-8.10
High	2480	12.25	21	-8.75

MIMO

Tested By:	105900/84740
Date:	2025-25-09

3-DH5

Channel	Frequency (MHz)	Output Power C0 (dBm)	Output Power C1 (dBm)	Output Power Total (dBm)	Limit (dBm)	Margin (dB)
Low	2402	9.99	8.92	12.49	21	-8.51
Middle	2441	9.83	8.86	12.38	21	-8.62
High	2480	9.75	7.15	11.65	21	-9.35

9.7.3. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Antenna 1

Tested By:	105900/84740
Date:	2025-25-09, 2025-12-12

2-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	12.71	21	-8.29
Middle	2441	12.99	21	-8.01
High	2480	12.18	21	-8.82

Antenna 2

Tested By:	105900/84740
Date:	2025-25-09

2-DH5

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	12.31	21	-8.69
Middle	2441	12.89	21	-8.12
High	2480	11.69	21	-9.32

MIMO

Tested By:	105900/84740
Date:	2025-25-09

2-DH5

Channel	Frequency (MHz)	Output Power C0 (dBm)	Output Power C1 (dBm)	Output Power Total (dBm)	Limit (dBm)	Margin (dB)
Low	2402	8.39	9.06	11.75	21	-9.25
Middle	2441	9.39	9.00	12.21	21	-8.79
High	2480	9.80	8.60	12.25	21	-8.75

9.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)
RSS-247 6.6
Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz.The video bandwidth is set to 300 kHz.

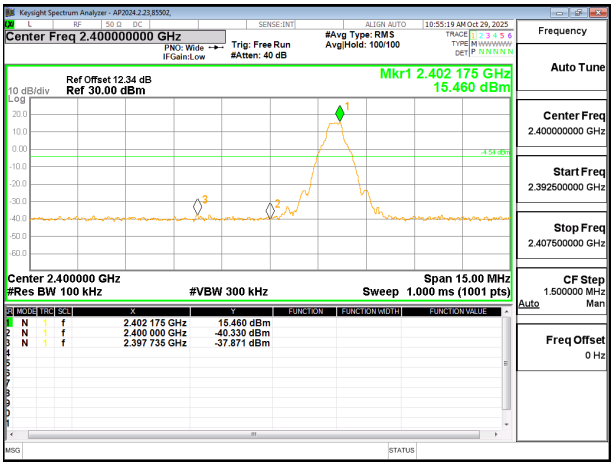
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

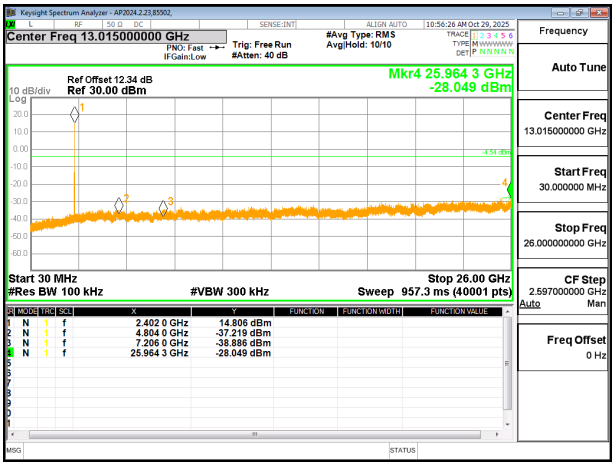
RESULTS

9.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

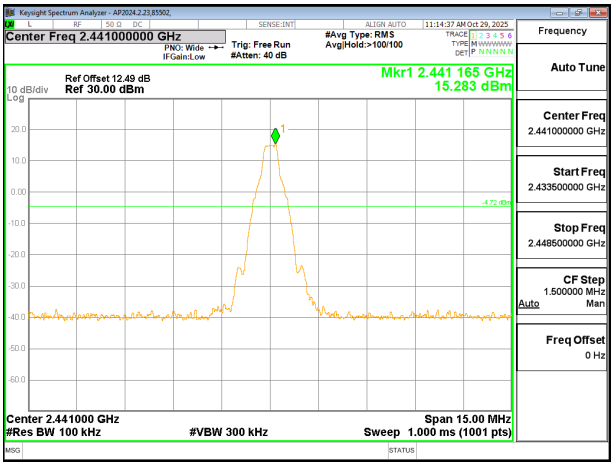
SPURIOUS EMISSIONS, NON-HOPPING C0



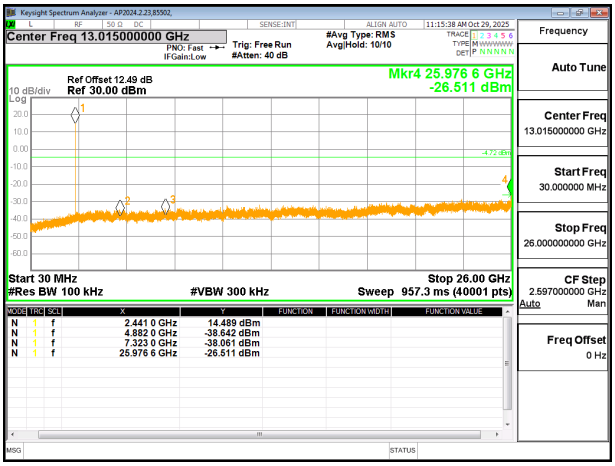
LOW CHANNEL BANDEDGE



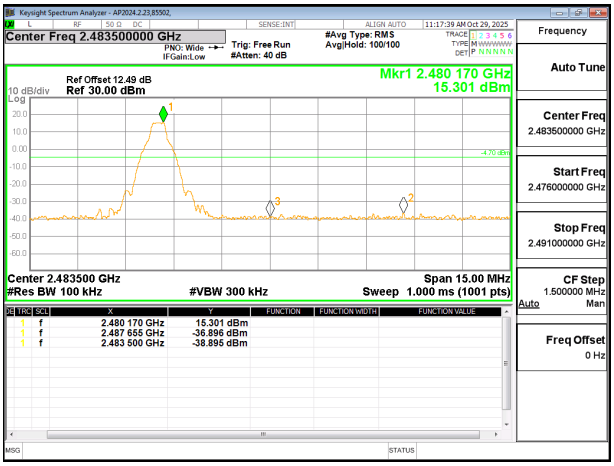
OUT-OF-BAND LOW CHANNEL



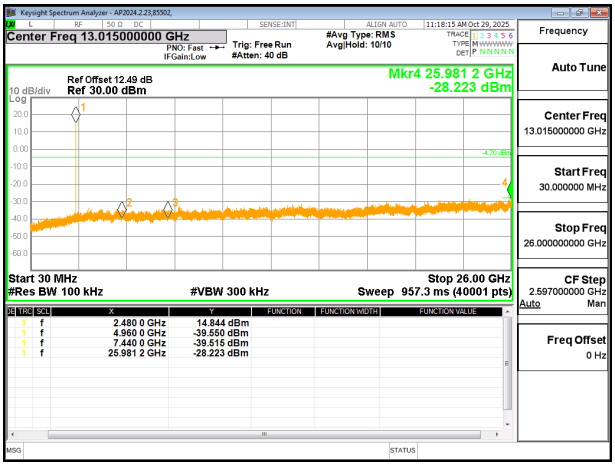
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

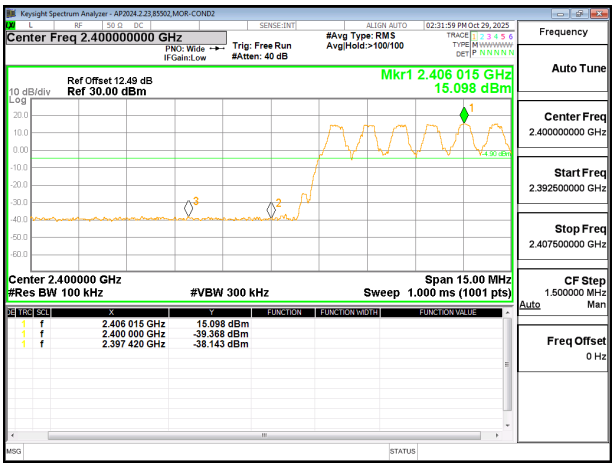


HIGH CHANNEL BANDEDGE

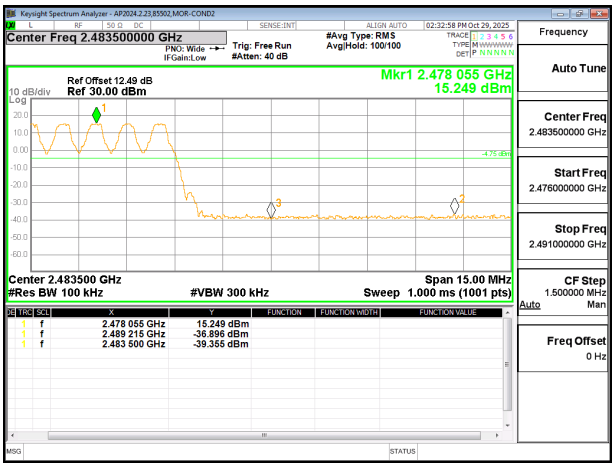


OUT-OF-BAND HIGH CHANNEL

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON C0

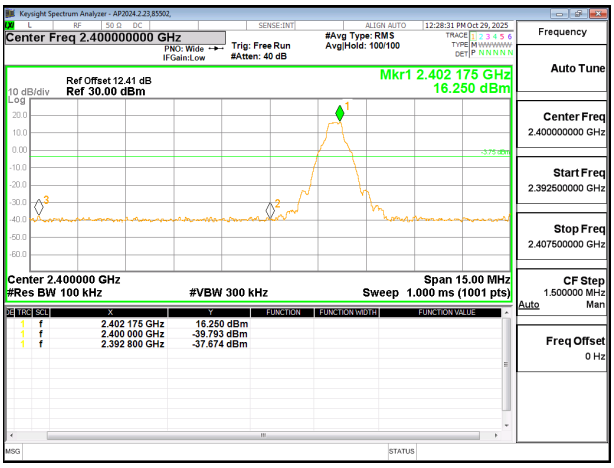


LOW BANDEDGE

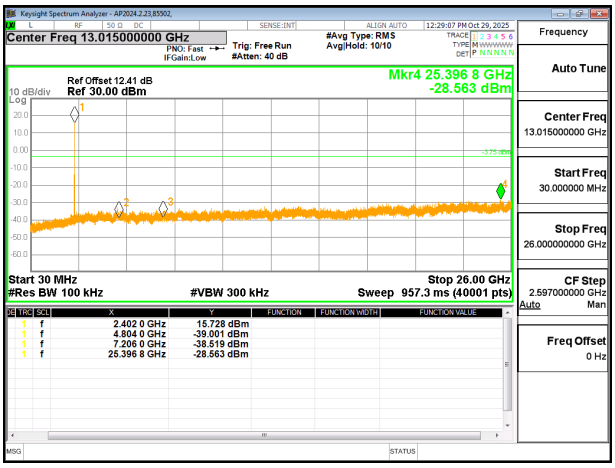


HIGH BANDEDGE

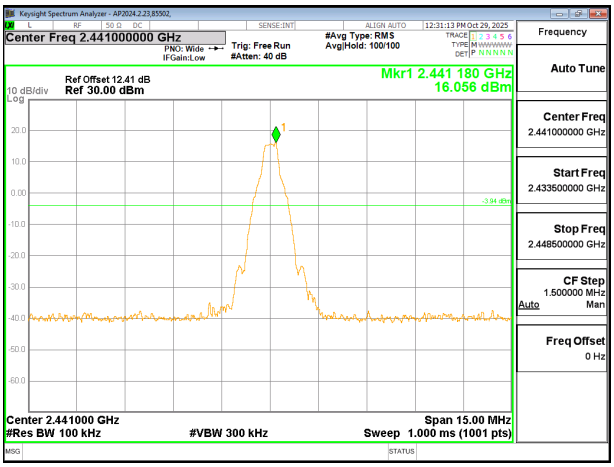
SPURIOUS EMISSIONS, NON-HOPPING C1



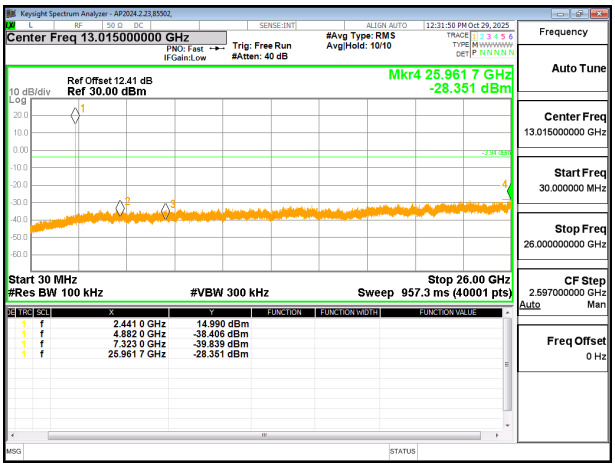
LOW CHANNEL BANDEDGE



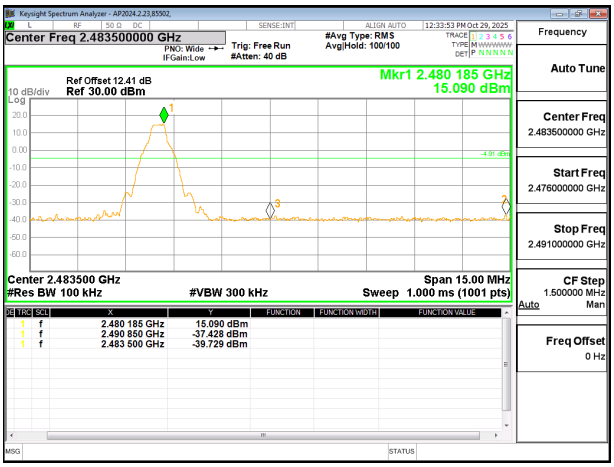
OUT-OF-BAND LOW CHANNEL



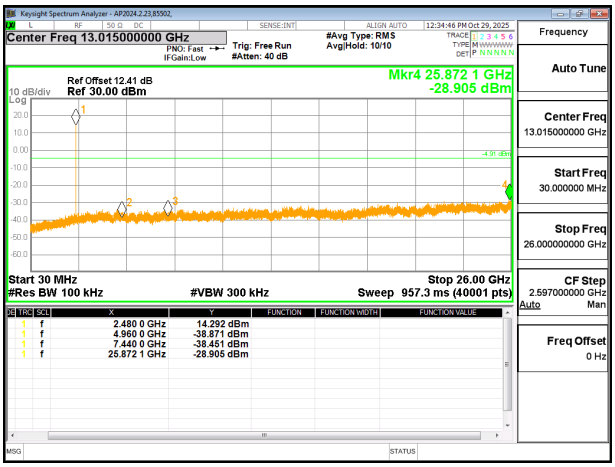
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL