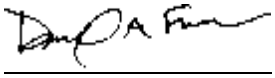
Certification Application Report
FCC Part 15.247 & ISED RSS-247

Test Lab:		Applicant:	
Rhein Tech Laboratories, Inc. Phone: 703-689 0368 360 Herndon Parkway www.rheintech.com Suite 1400 Herndon, VA 20170		L3Harris Technologies 221 Jefferson Ridge Parkway Lynchburg, VA 24501 USA	
FCC ID/ IC	OWDTR-0166-E/ 3636B-0166	**Test Report Date**	April 18, 2023
Platform	N/A	**RTL Work Order #**	2022003
Model / HVIN	XL-95P V/U / XL-x5-V/U	**RTL Quote Number**	QRTL22-003A
American National Standard Institute	ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
FCC Classification	DSS – Part 15 Spread Spectrum Transmitter		
FCC Rule Part(s)	FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz (10-01-21)		
ISED Standards	RSS-247 Issue 2: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices RSS-Gen Issue 5 Amendments 1/2: General Requirements for Compliance of Radio Apparatus		
Frequency Range (MHz)	**Output Power (mW) Peak Conducted**	**Frequency Tolerance**	**Emission Designator**
2402-2480	1.6	N/A	N/A

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, ANSI C63.10, and ISED RSS-247 and RSS-Gen.

Signature:  Date: April 18, 2023

Typed/Printed Name: Desmond A. Fraser Position: President

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANAB.
Refer to certificate and scope of accreditation AT-1445.
This report replaces R1.2.

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1 General Information

1.1 Scope

Applicable Standards

- FCC Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz
- ISED RSS-247: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices
- ISED RSS-Gen Issue 5 Amendments 1/2: General Requirements for Compliance of Radio Apparatus

1.2 Description of EUT

Equipment Under Test	Portable Radio
Model	XL-95P Multi-Band Portable, V/U
Power Supply	7.4 VDC
Modulation Type	FHSS
Frequency Range	2402–2480 MHz

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170.

ISED CAB ID: US0079, Company Number: 2956A.

1.4 Related Submittal(s)/Grant(s)

This is an original certification application for L3Harris Technologies XL-95P Multi-Band Portable V/U Radio, HVIN: XL-x5-V/U, FCC ID: OWDTR-0166-E, IC: 3636B-0166.

1.5 Modifications

No modifications were required for compliance.

2 Test Information

2.1 Description of Test Modes

In accordance with FCC 15.31(m), and because the EUT utilizes an operating band greater than 10 MHz, the following frequencies were tested:

Table 2-1: Test Frequencies

Channel (#)	FHSS Frequency (MHz)
0	2402
17	2440
39	2480

2.2 Exercising the EUT

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. The EUT was provided with software to continuously transmit during testing. The carrier was also checked to verify that information was being transmitted, and all modes were investigated, and the worst-case mode was used for final testing (GFSK and PN15 test pattern). There were no deviations from the test standard(s) and/or methods. The test results reported relate only to the item tested.

2.3 Test Result Summary

Table 2-2: Test Result Summary – FCC Part 15, Subpart C (Section 15.247); RSS-247, RSS-Gen

FCC	ISED	Test	Result
FCC 15.207	RSS-Gen 8.8	AC Conducted Emissions	Pass
FCC 15.209	RSS-247 5.5; RSS-Gen 8.9, 8.10	Radiated Emissions	Pass
FCC 15.247(a)(1)	RSS-247 5.1(a)	20 dB Bandwidth	Pass
FCC 15.247(a)(1)	RSS-247 5.1(b)	Carrier Frequency Separation	Pass
FCC 15.247(a)(1)(iii)	RSS-247 5.1(d)	Hopping Characteristics	Pass
FCC 15.247(a)(1)(iii)	RSS-247 5.1(d)	Average Time of Occupancy	Pass
FCC 15.247(b)(1)	RSS-247 5.4(b); RSS-Gen 6.12	Maximum Peak Power Output	Pass
FCC 15.247(d)	RSS-247 5.5; RSS-Gen 6.13	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	RSS-247 5.5	Band Edge Measurement	Pass
N/A	RSS-Gen 6.7	99% Bandwidth	Pass

2.4 Tested System Details

The test samples were received on December 10, 2020 and August 22, 2022. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following tables.

Table 2-3: Equipment Under Test (EUT)

Part	Manufacturer	Model / HVIN	Serial Number	FCC ID	RTL Bar Code
Handheld Radio (conducted)	L3Harris Technologies	XL-95P 7/800 MHz	A40198E2A016	OWDTR-0162-E	23756
Radio (radiated)	L3Harris Technologies	XL-95P V/U	A40199E24A-001	OWDTR-0166-E	24159
Radio (radiated)	L3Harris Technologies	XL-95P V/U	A40199E24A-002	OWDTR-0166-E	24216

Table 2-4: Support Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Laptop	ASUS	N550J	F2N0CY33003067G	N/A	N/A

Table 2-5: Auxiliary Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Handheld Mic	L3Harris Technologies	N/A	01HE3327	N/A	23762

2.5 Configuration of Tested System

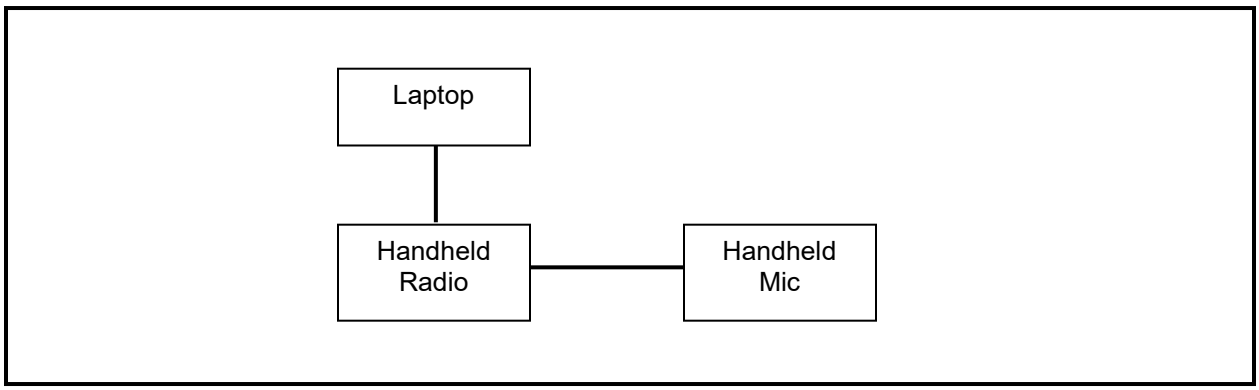


Figure 2-1: Configuration of System Under Test

3 Peak Output Power – FCC 15.247(b)(1); RSS-247 5.4(b), RSS-Gen 6.12

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using an Agilent Analyzer. The following settings were used:

1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel (5 MHz used)
2) RBW >20 dB bandwidth of the emission being measured (2 MHz used)
3) VBW ≥RBW (3 MHz used)
4) Sweep: Auto
5) Detector function: Peak
6) Trace: Max hold. The trace was allowed to stabilize, and the marker-to-peak function was used to set the marker to the peak of the emission.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	10/04/2024

3.2 Power Output Test Results

Table 3-2: Power Output Test Data – GFSK

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
0	2402	2.1	30.0	-27.9
17	2440	2.0	30.0	-28.0
39	2480	2.1	30.0	-27.9

Table 3-3: Power Output Test Data – 2EDR

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
0	2402	-0.6	30.0	-30.6
17	2440	0.0	30.0	-30.0
39	2480	0.4	30.0	-29.6

Table 3-4: Power Output Test Data – 3EDR

Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
0	2402	-1.0	30.0	-31.0
17	2440	0.1	30.0	-29.9
39	2480	0.7	30.0	-29.3

Highest conducted peak power measured: 2.1 dBm ≈ 1.6 mW

$P(Watts) = 10^{(dBm / 10)} / 1000$

Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Khue Do / Daniel W. Baltzell		December 28, 2020, April 14, 2023
Test Engineer	Signature	Dates of Test

4 Compliance with the Band Edge – FCC 15.247(d); RSS-247 5.5

4.1 Band Edge Test Procedure

The transmitter output was connected to the spectrum analyzer. Peak and average detector conducted plots were taken with a suitable span and traces to display hopping and non-hopping modes. The measurement was performed from the highest peak in the restricted band (within 2 MHz), and the result was compared to the restricted band limit (54 dBµV/m average, 74 dBµV/m peak). An analyzer offset of the site correction factor was used to yield comparable results to the limit in dBuV/m.

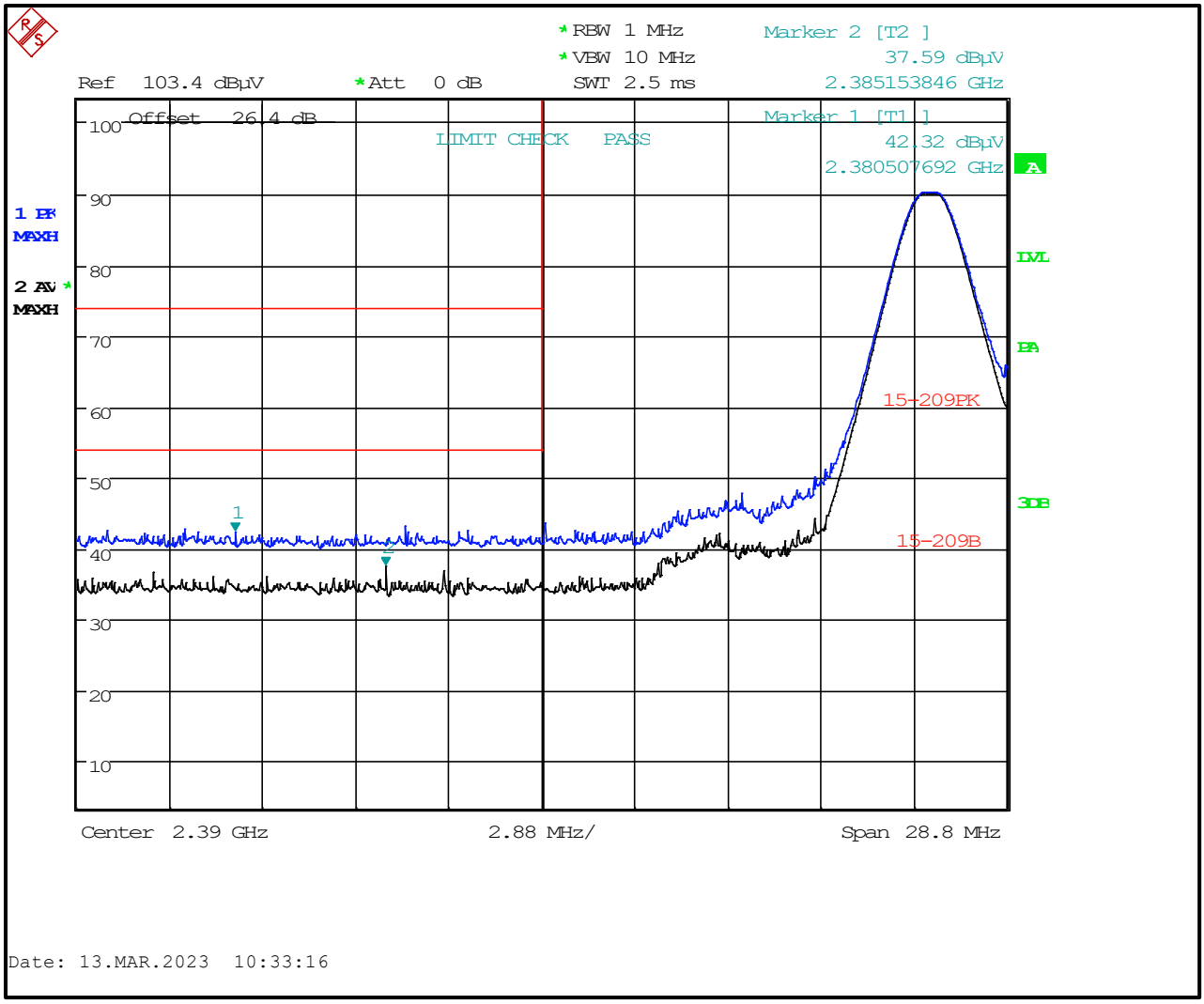
Table 4-1: Band Edge Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2024
901727	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 36"	NA	11/30/2023
900772	EMCO	3161-02	Horn Antenna (2.0–4.0 GHz)	9804-1044	08/05/2024

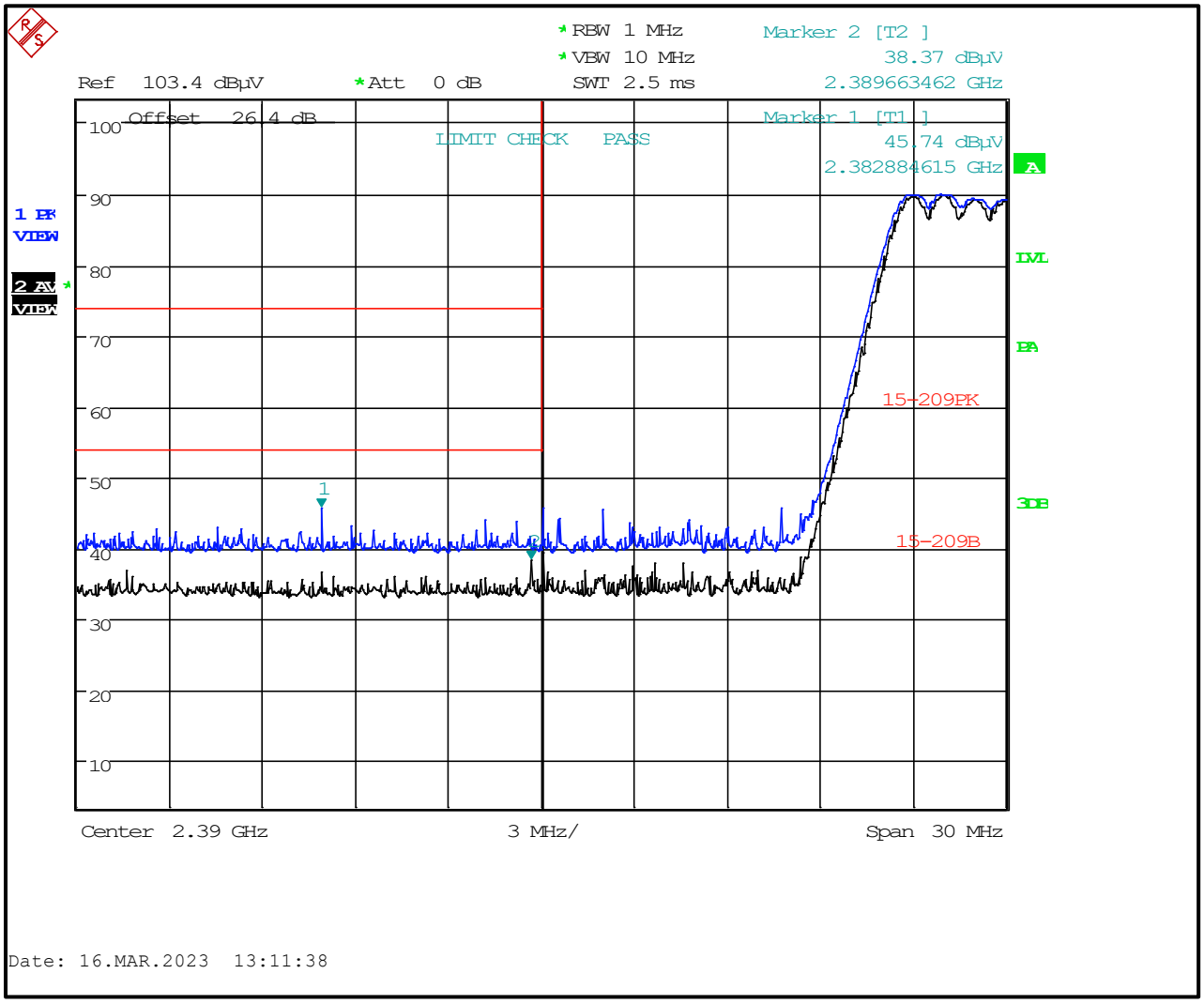
4.2 Restricted Band Edge Test Results

Band Edge Plots

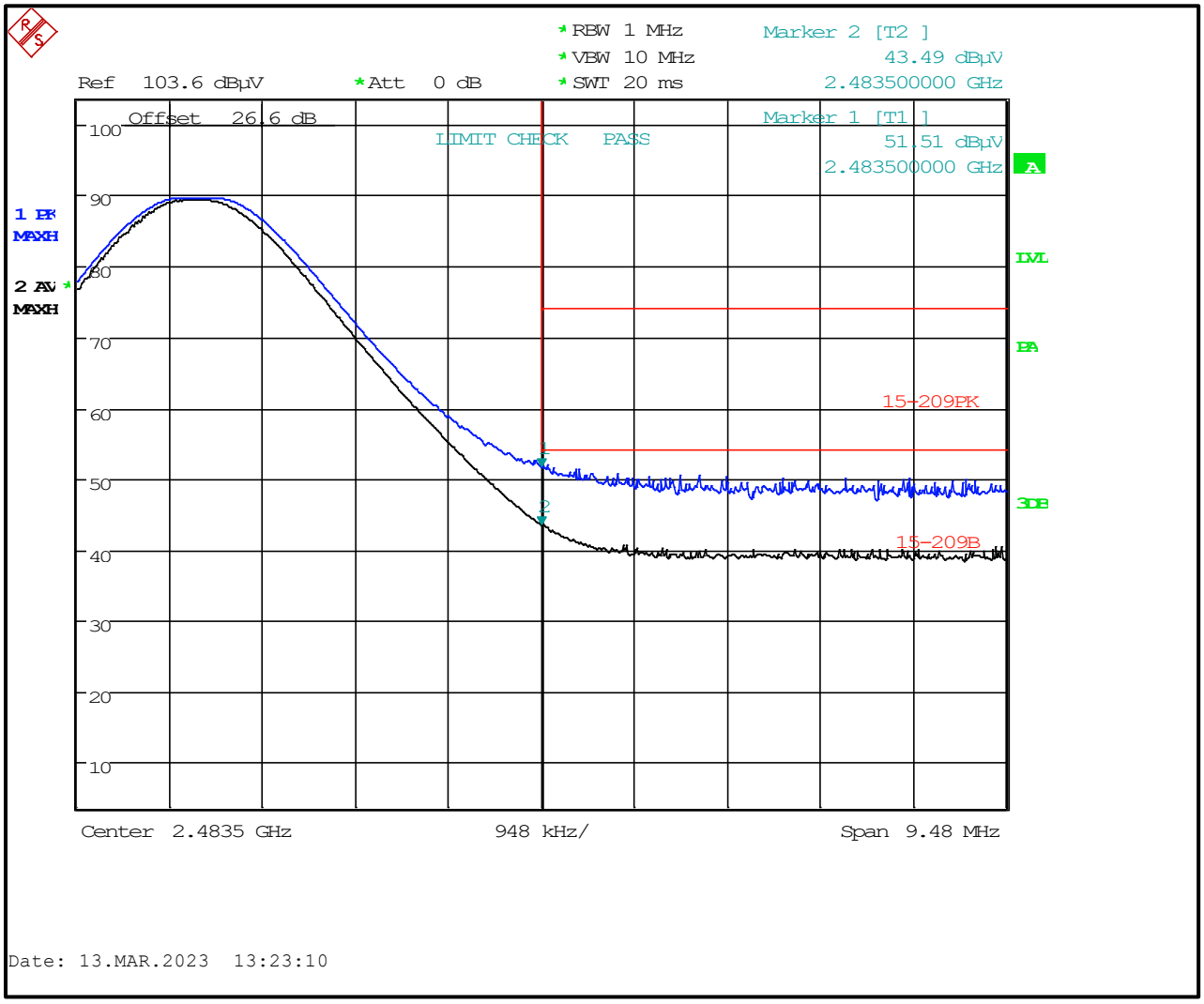
Plot 4-1: Lower Band Edge



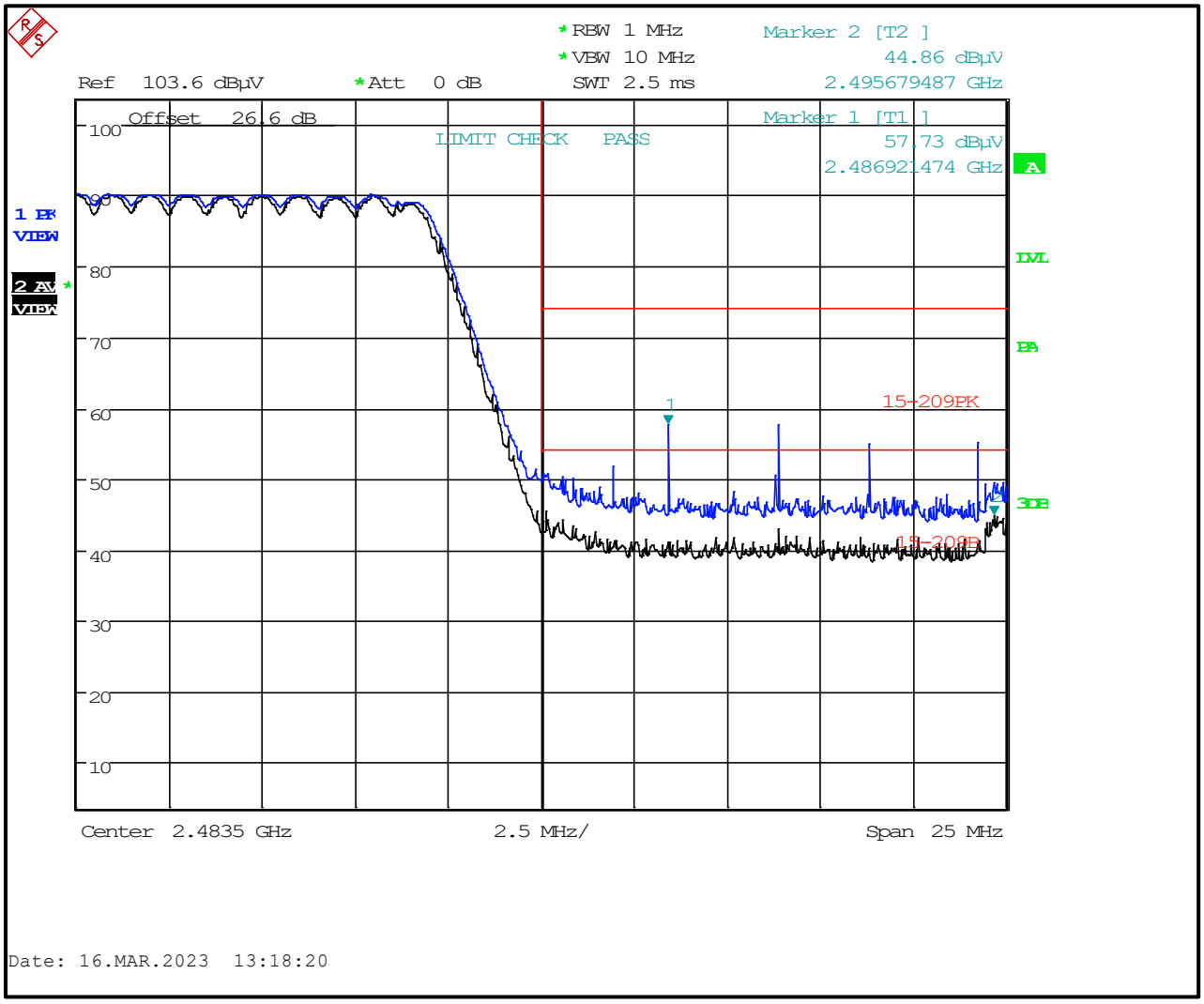
Plot 4-2: Lower Band Edge - Hopping



Plot 4-3: Upper Band Edge



Plot 4-4: Upper Band Edge - Hopping



Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Daniel W. Baltzell		March 13-16, 2023
Test Engineer	Signature	Dates of Test

5 Antenna Conducted Spurious Emissions – FCC 15.247(d); RSS-247 5.5, RSS-Gen 6.13

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(d) were measured from the EUT antenna port using a 50-ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. The modulated carrier was identified at the following frequencies: 2402 MHz, 2440 MHz and 2480 MHz.

Table 5-1: Antenna Conducted Spurious Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	03/18/2021

5.2 Antenna Conducted Spurious Emissions Test Results

No harmonics or spurs were found within 20 dB (note that we are reporting power as peak) of the limit from 30 MHz to the 10th harmonic of the carrier frequency; per 2.1051 no data is being reported.

Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Khue Do		December 15, 2020
Test Engineer	Signature	Date of Test

6 Bandwidths – FCC 15.247(a)(1); RSS-247 5.1(a); RSS-Gen 6.7

6.1 Bandwidth Test Procedure

The 20 dB and 99% bandwidths per FCC 15.247(a)(1), RSS-247 5.1 and RSS-Gen 6.7 were measured using a 50-ohm spectrum analyzer.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

• The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

• The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

• The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied/x dB bandwidth if the device is not transmitting continuously.

• The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied/x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Table 6-1: Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	10/04/2024

6.2 Modulated Bandwidth Test Results

Table 6-2: Modulated Bandwidth Test Data – GFSK

Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
2402	0.878	0.860
2440	0.874	0.850
2480	0.876	0.854

Table 6-3: Modulated Bandwidth Test Data – 2EDR

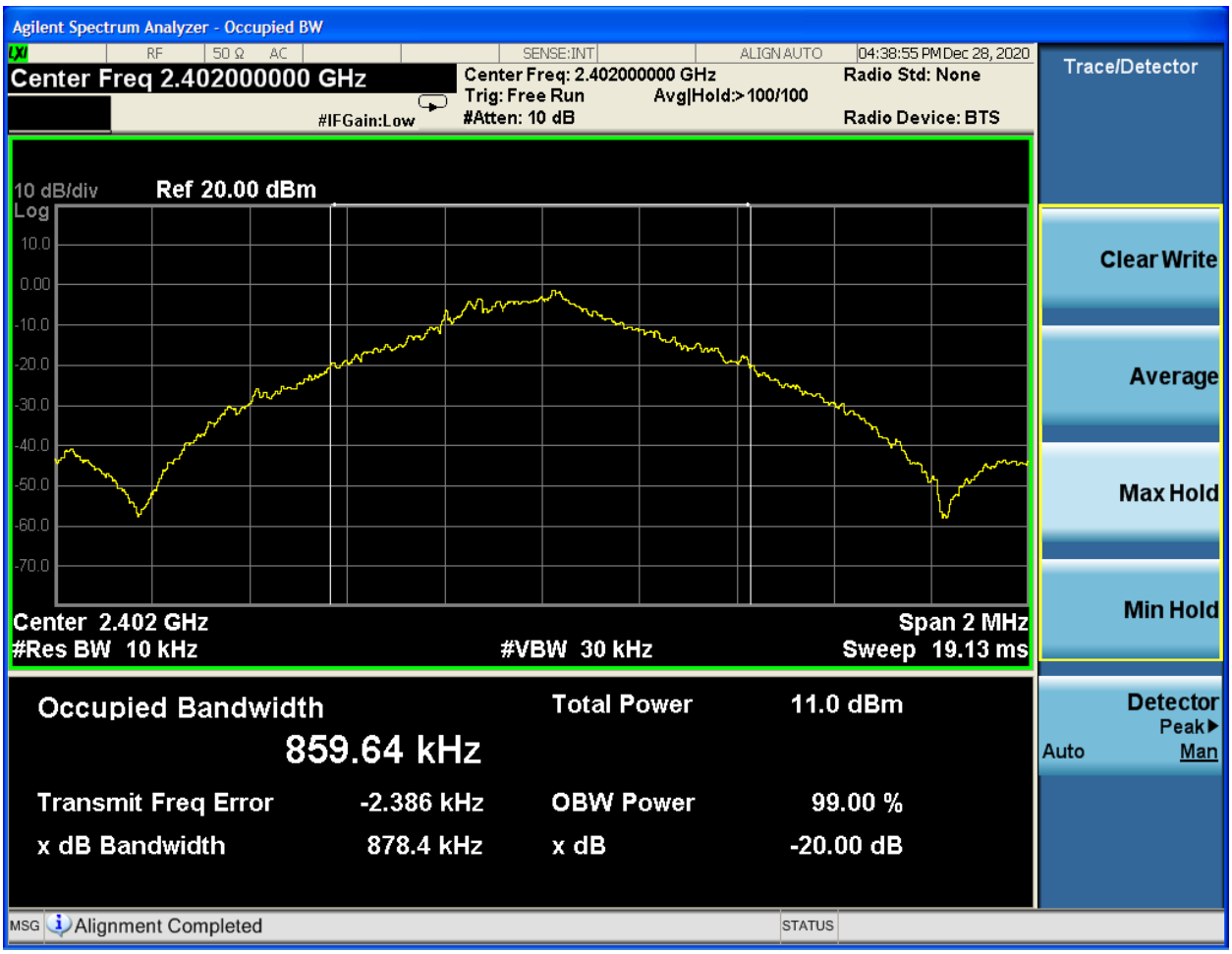
Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
2402	1.365	1.196
2440	1.343	1.218
2480	1.369	1.224

Table 6-4: Modulated Bandwidth Test Data – 3EDR

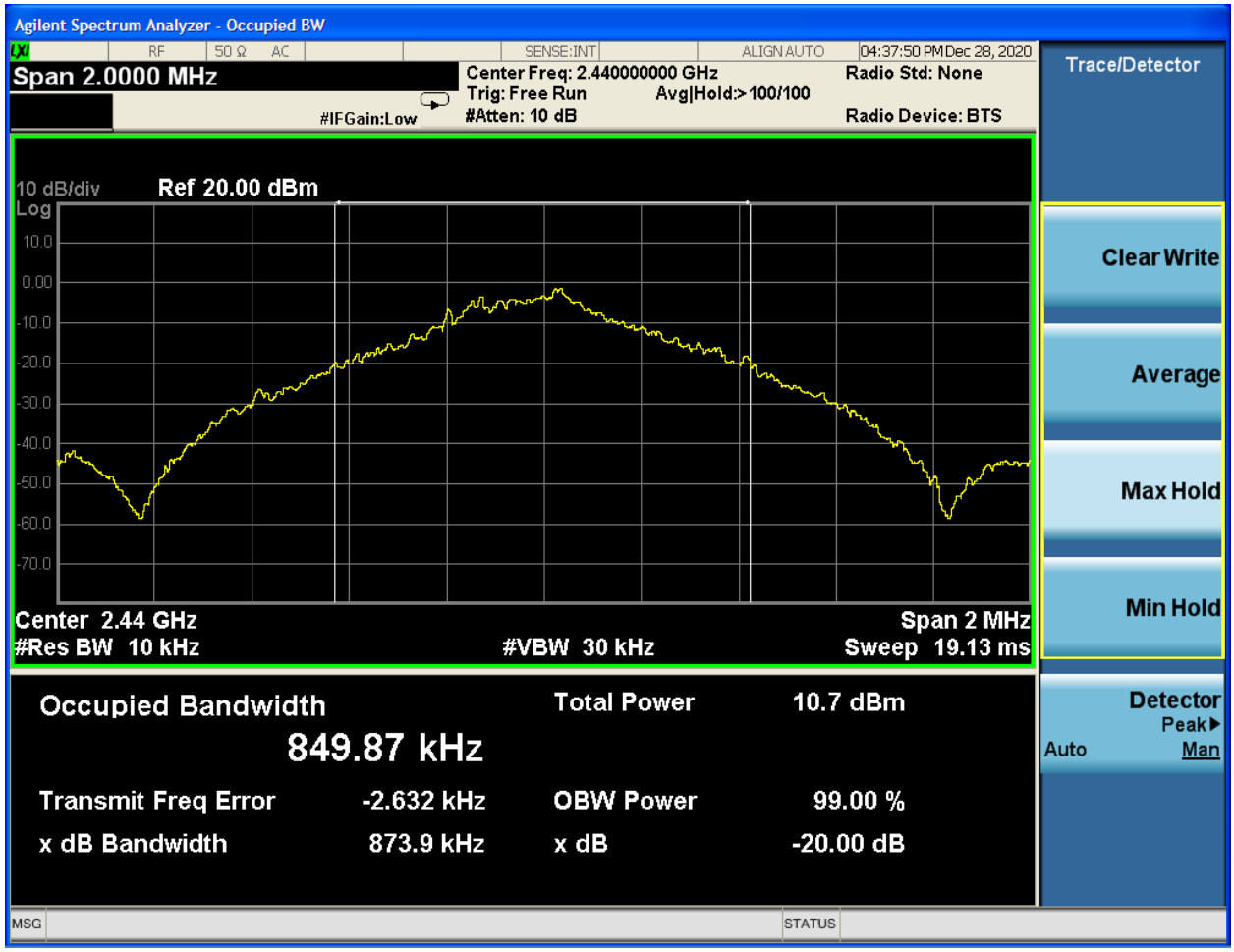
Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
2402	1.372	1.202
2440	1.349	1.218
2480	1.372	1.224

6.3 Bandwidth Plots

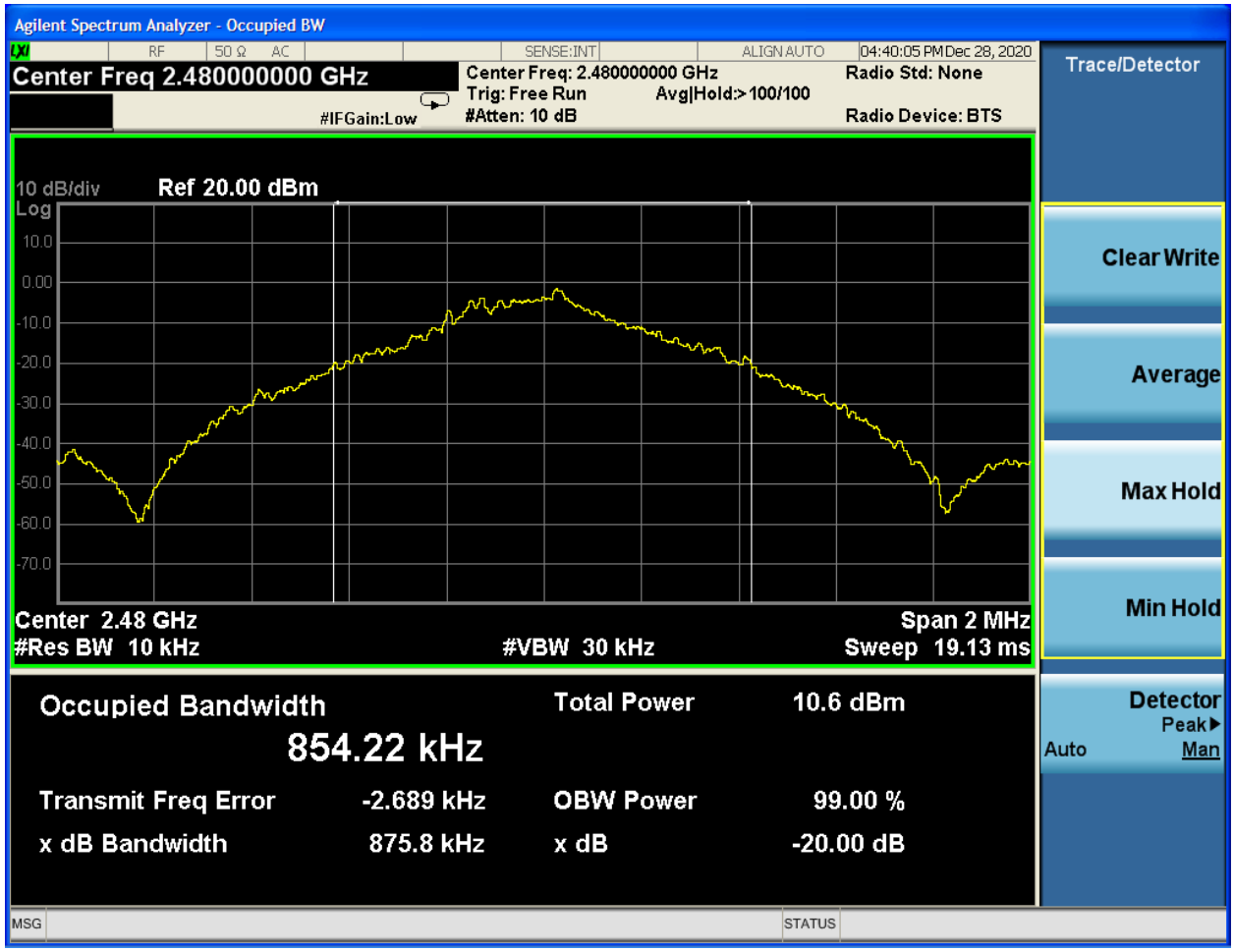
Plot 6-1: 20 dB and 99% Bandwidth – 2402 MHz – GFSK



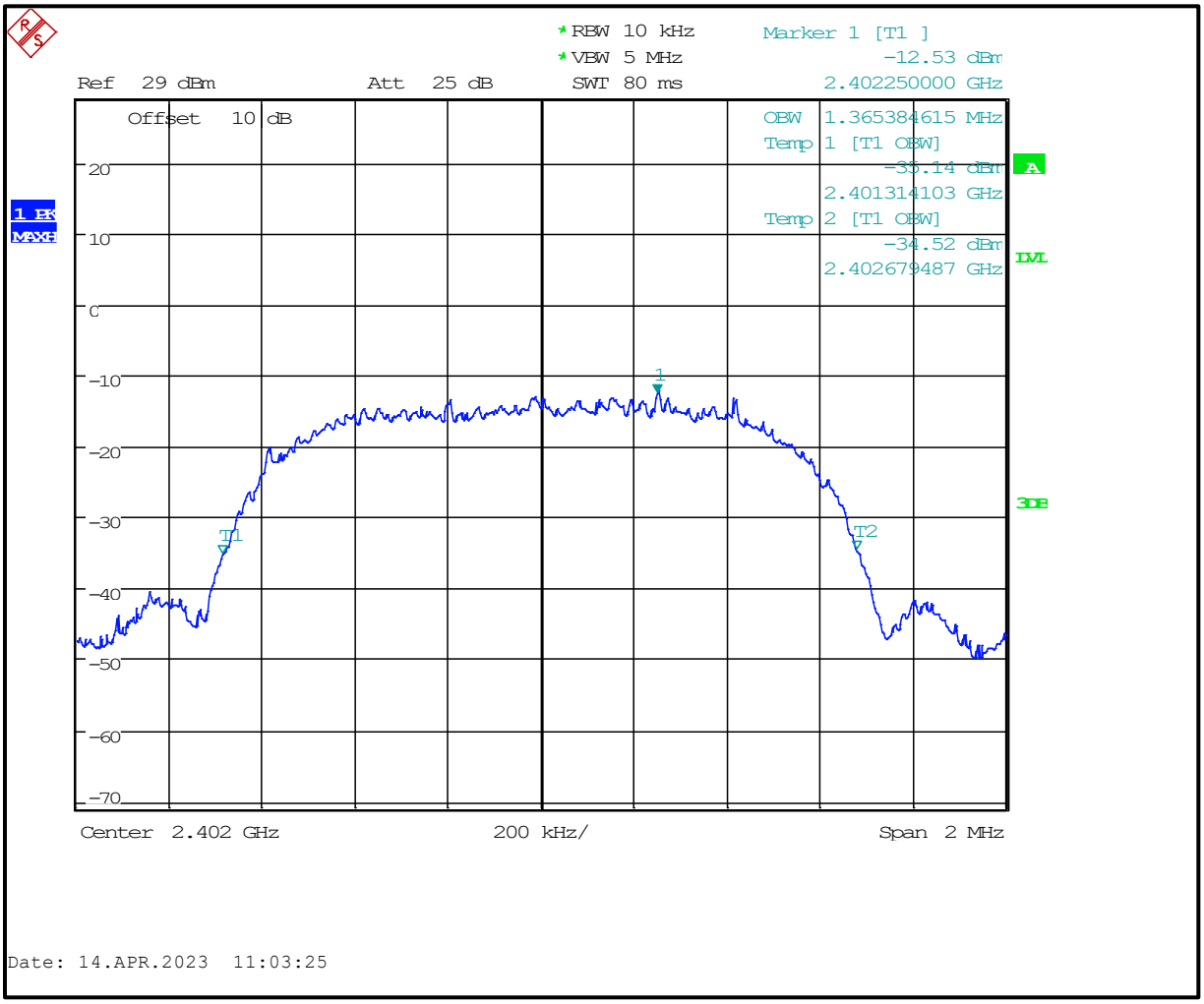
Plot 6-2: 20 dB and 99% Bandwidth – 2440 MHz – GFSK



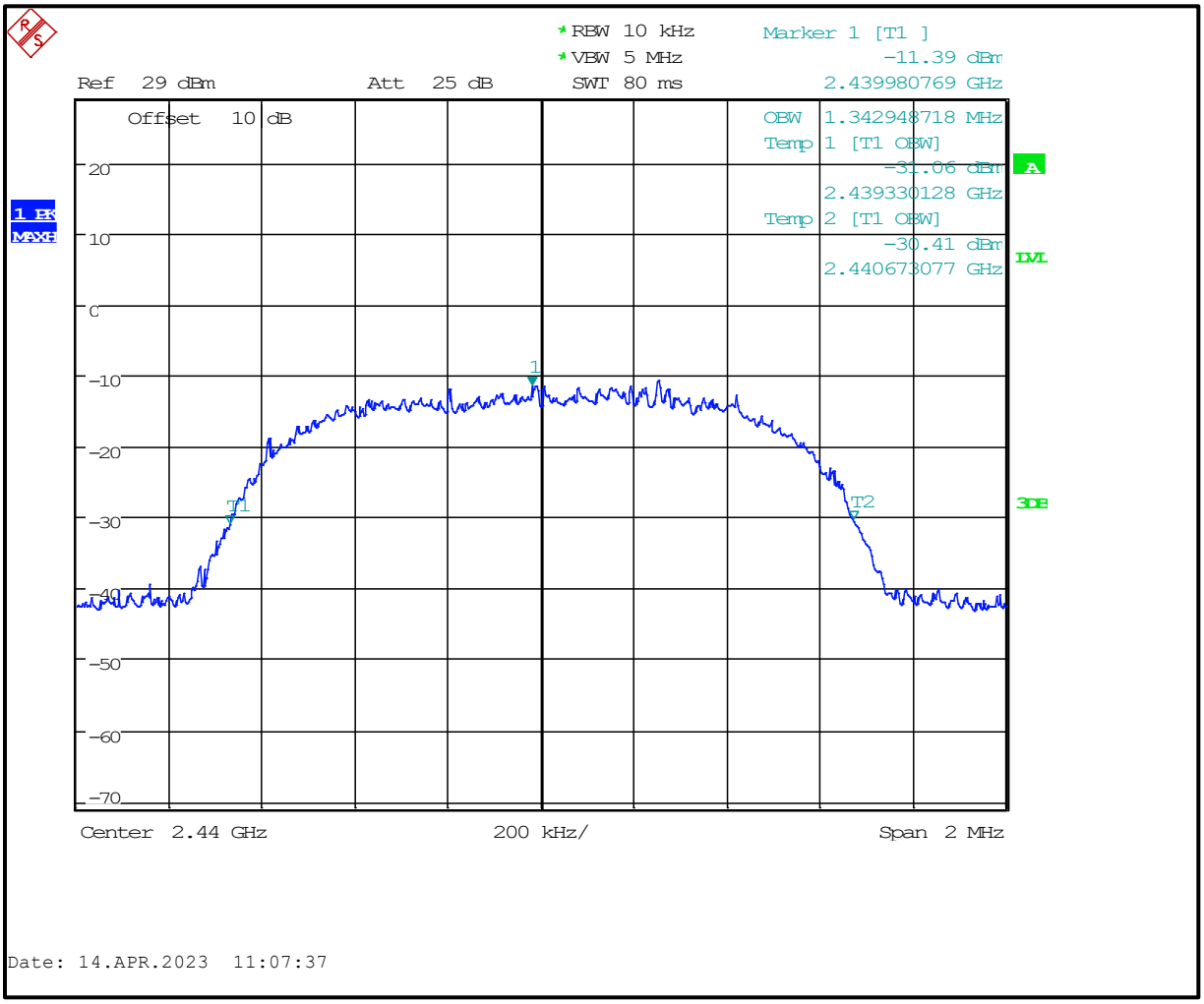
Plot 6-3: 20 dB and 99% Bandwidth – 2480 MHz – GFSK



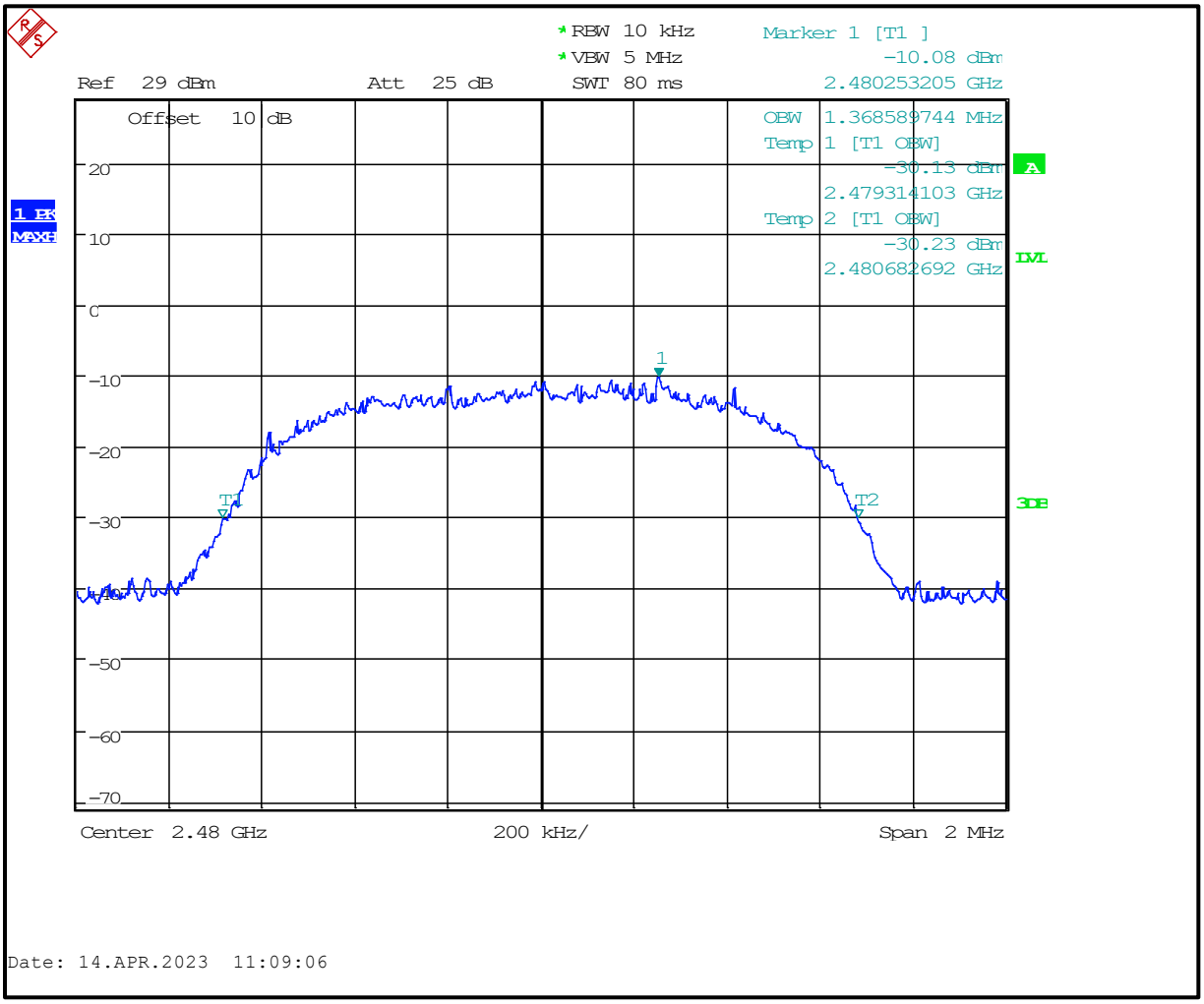
Plot 6-4: 20 dB Bandwidth – 2402 MHz – 2EDR



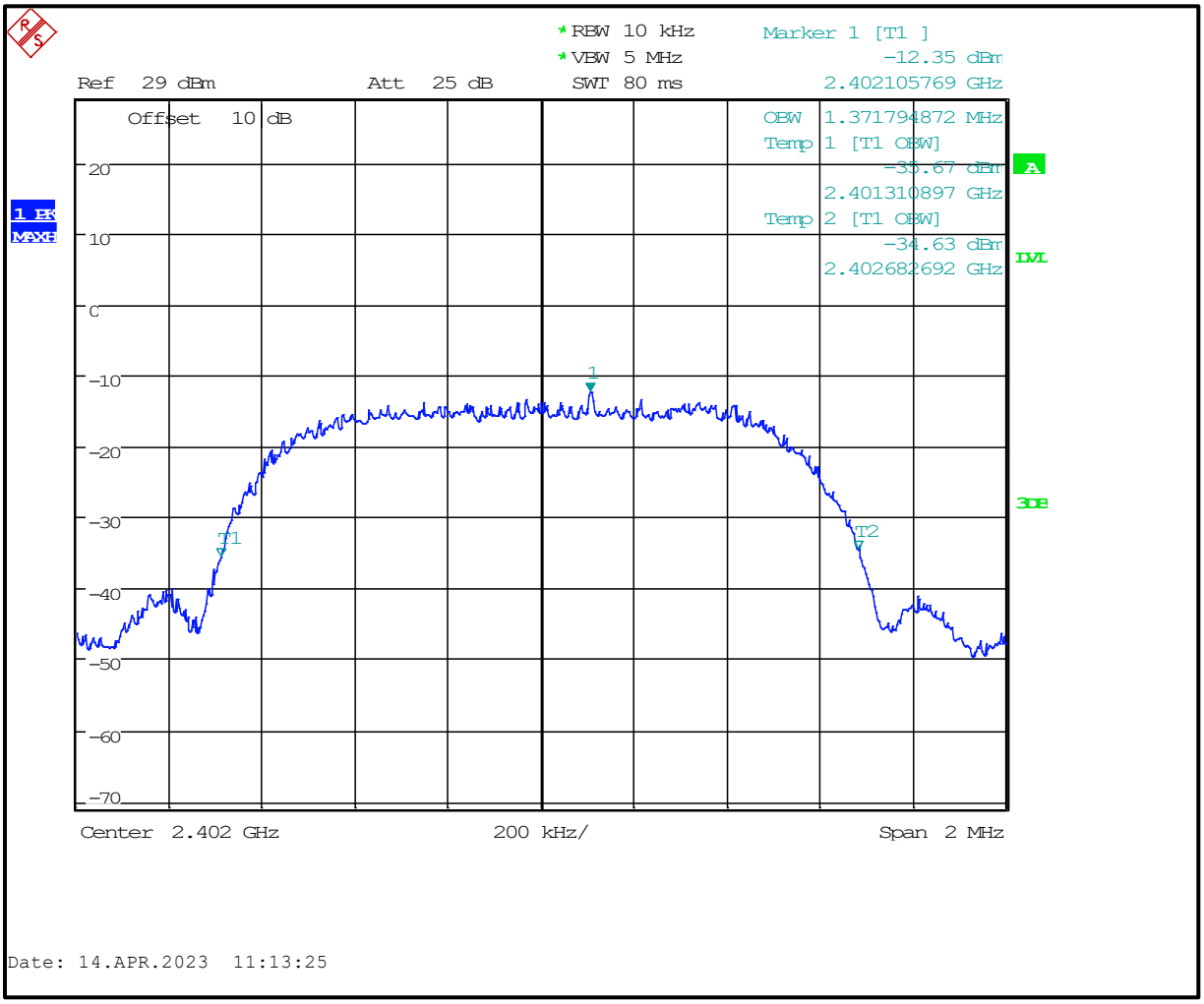
Plot 6-5: 20 dB Bandwidth – 2440 MHz – 2EDR



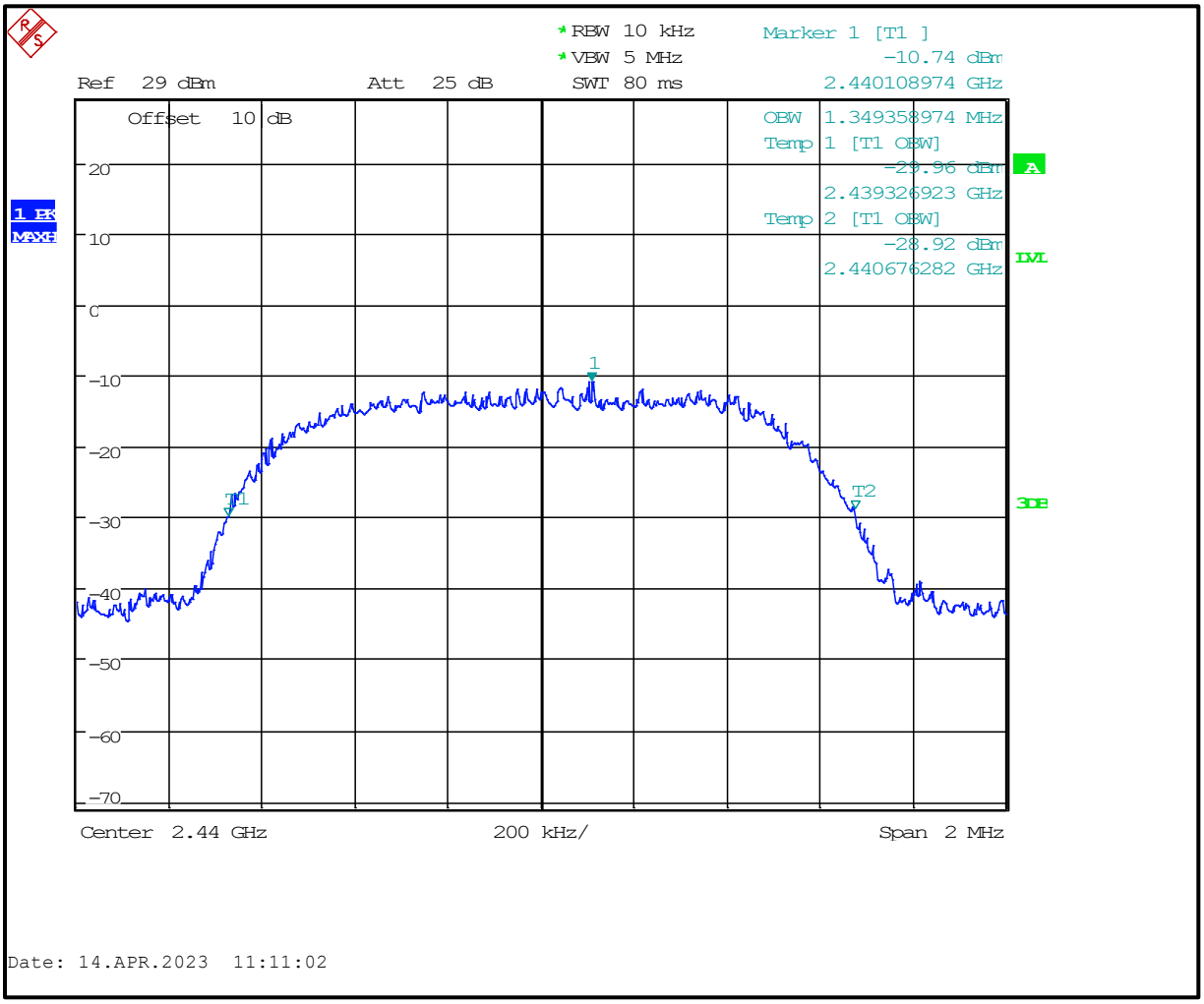
Plot 6-6: 20 dB Bandwidth – 2480 MHz – 2EDR



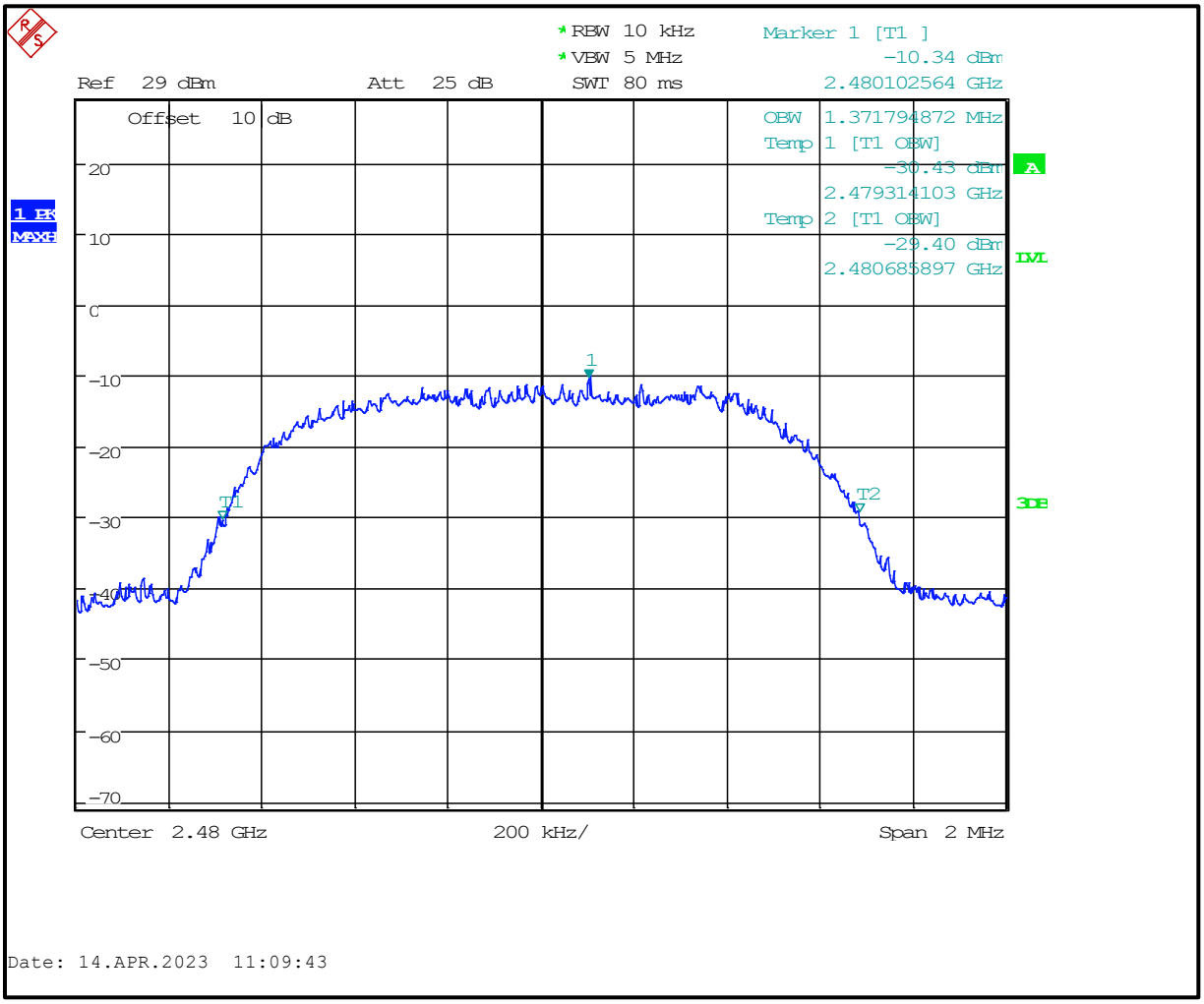
Plot 6-7: 20 dB Bandwidth – 2402 MHz – 3EDR



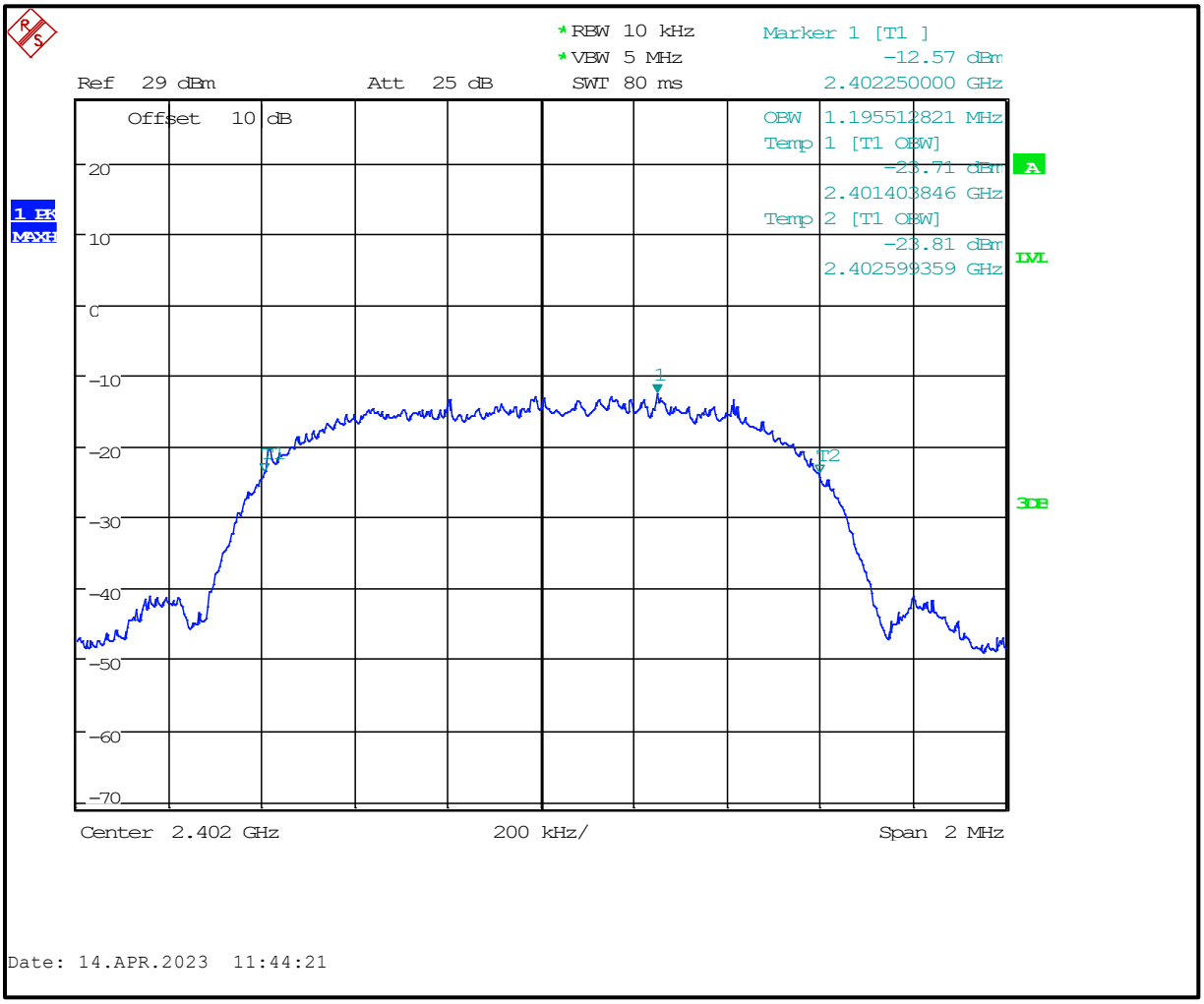
Plot 6-8: 20 dB Bandwidth – 2440 MHz – 3EDR



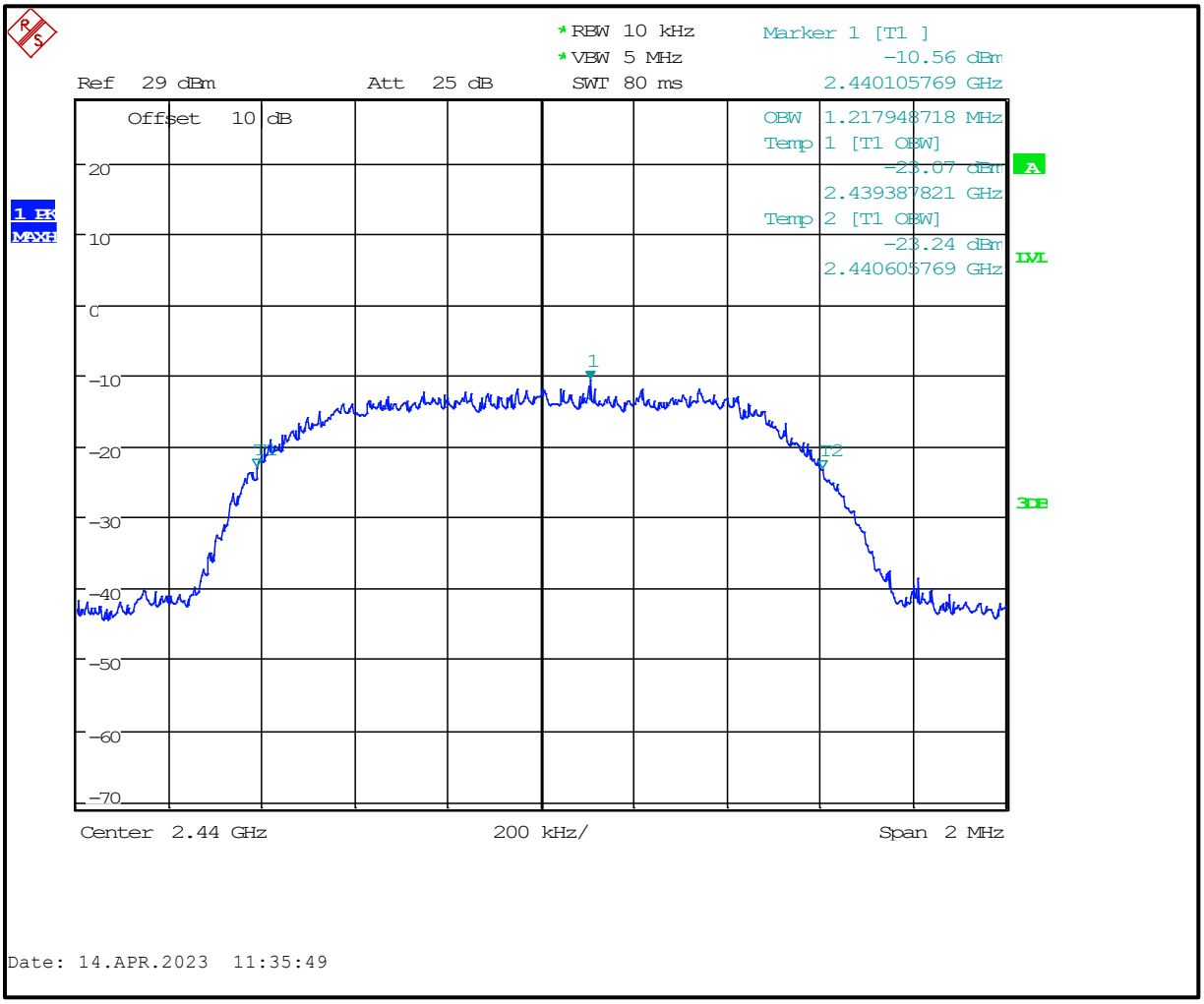
Plot 6-9: 20 dB Bandwidth – 2480 MHz – 3EDR



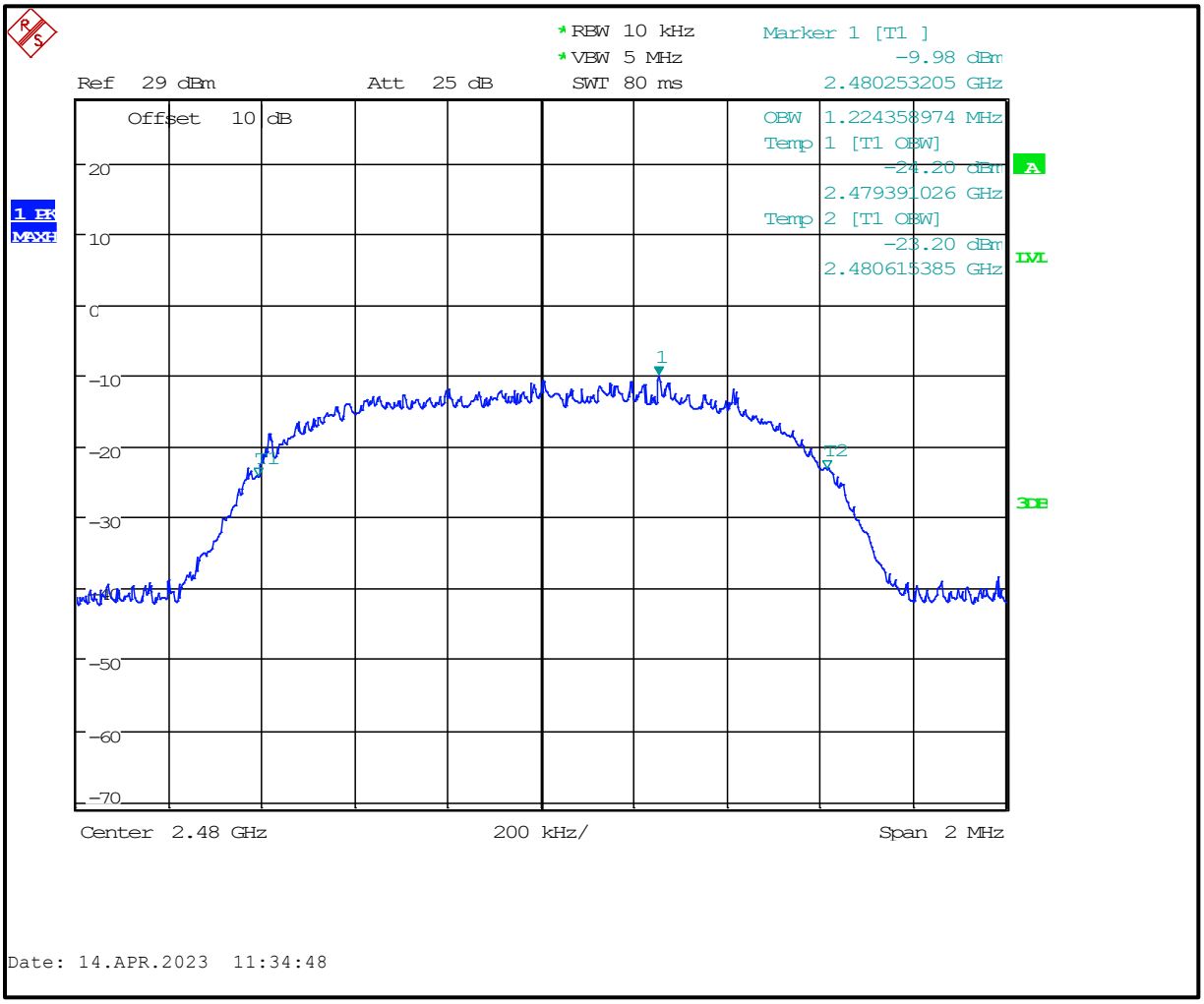
Plot 6-10: 99% Bandwidth – 2402 MHz – 2EDR



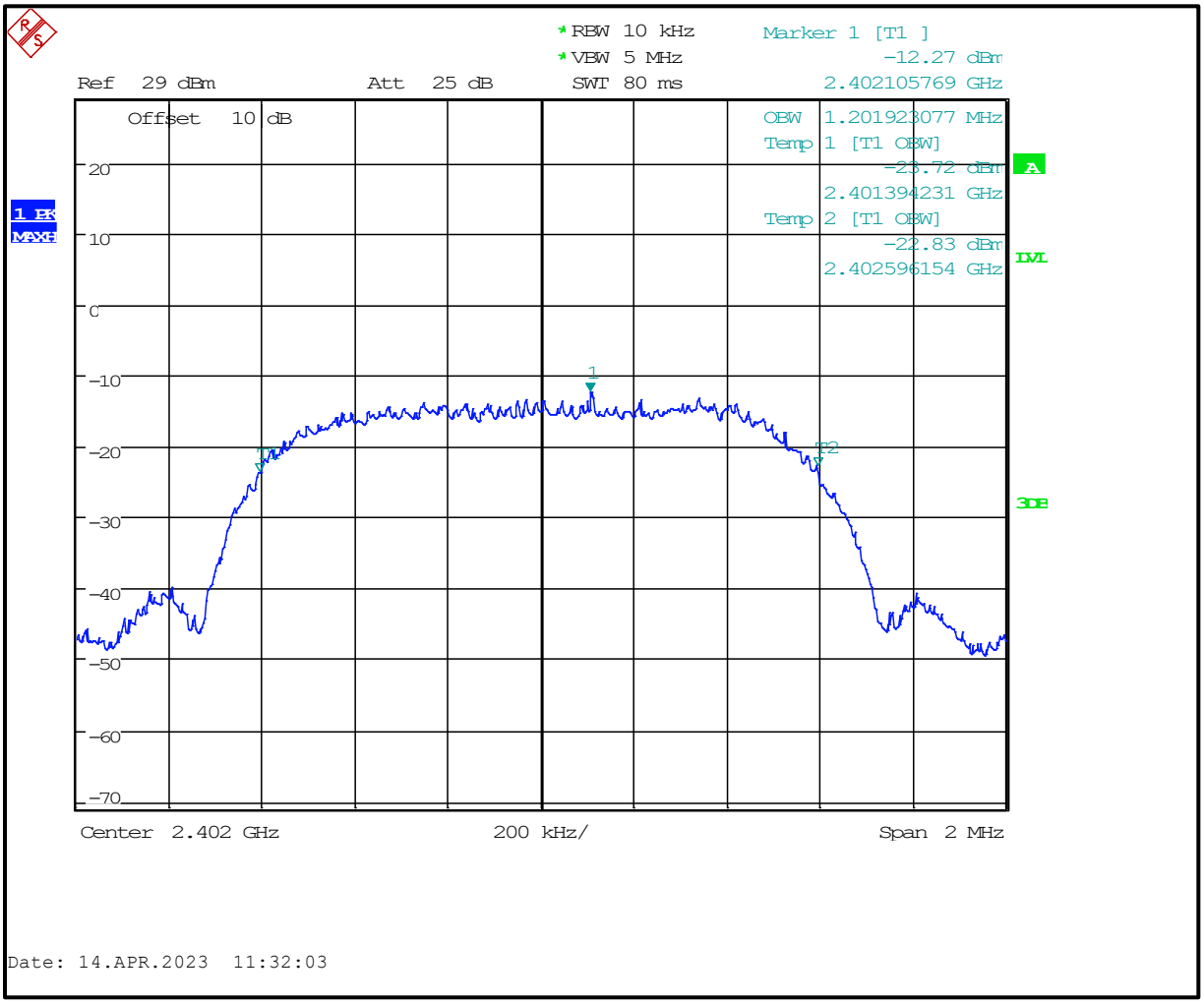
Plot 6-11: 99% Bandwidth – 2440 MHz – 2EDR



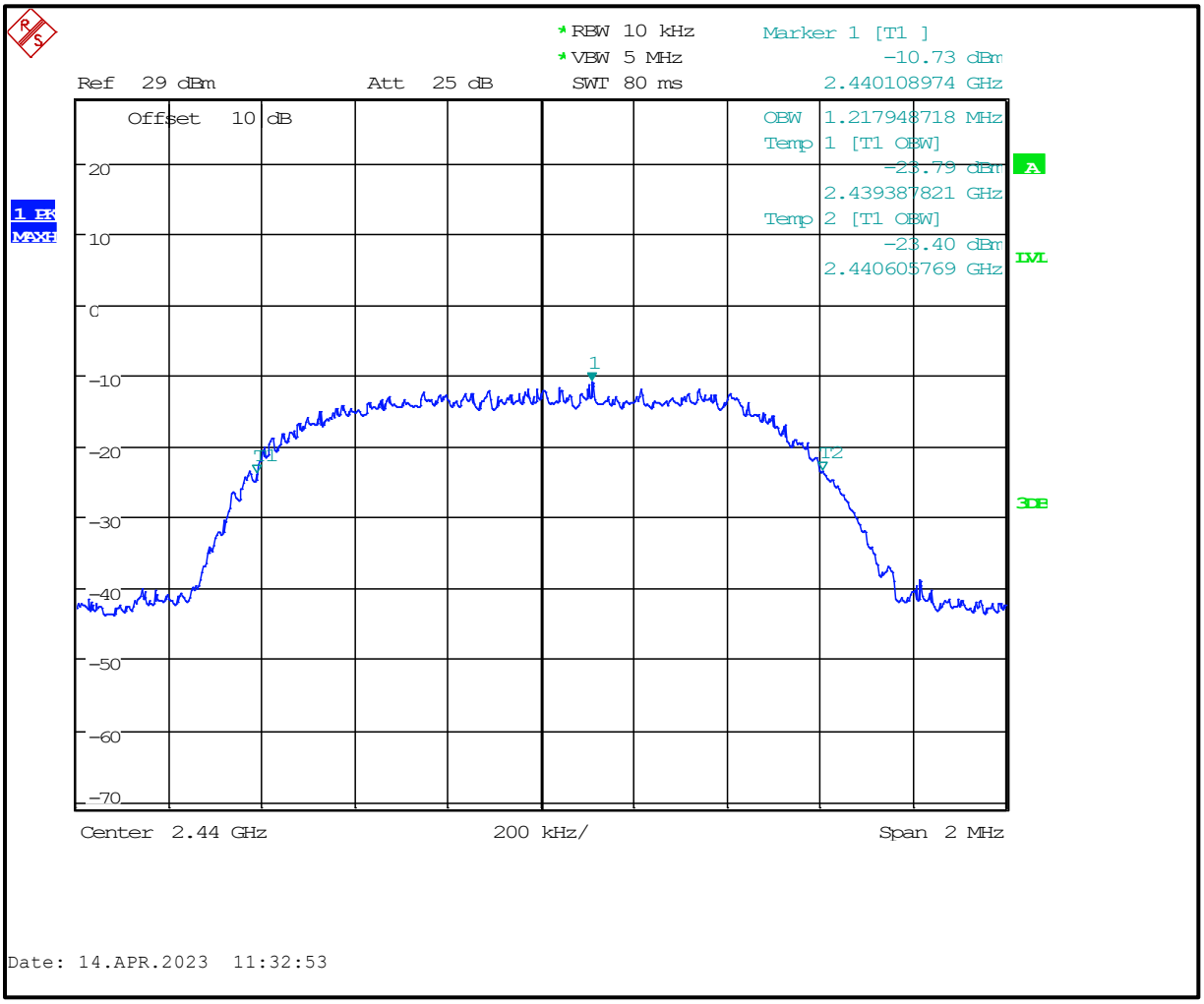
Plot 6-12: 99% Bandwidth – 2480 MHz – 2EDR



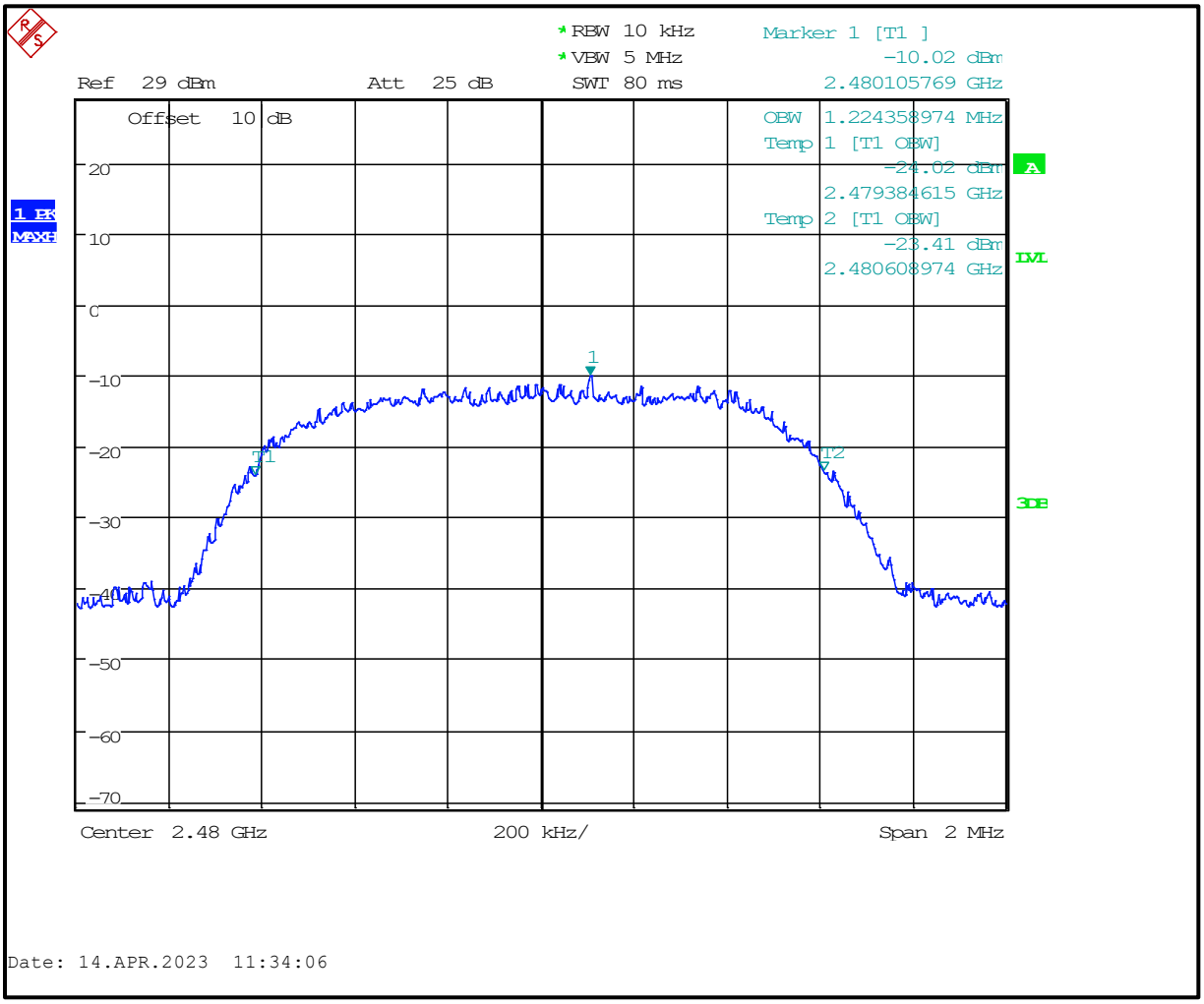
Plot 6-13: 99% Bandwidth – 2402 MHz – 3EDR



Plot 6-14: 99% Bandwidth – 2440 MHz – 3EDR



Plot 6-15: 99% Bandwidth – 2480 MHz – 3EDR



Measurement uncertainty: ±1 x 10^{-6} Hz. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Test Personnel:

Khue Do / Daniel W. Baltzell		December 28, 2020 April 14, 2023
Test Engineer	Signature	Dates of Test

7 Carrier Frequency Separation – FCC 15.247(a)(1); RSS-247 5.1(b)

7.1 Carrier Frequency Separation Test Procedure

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.

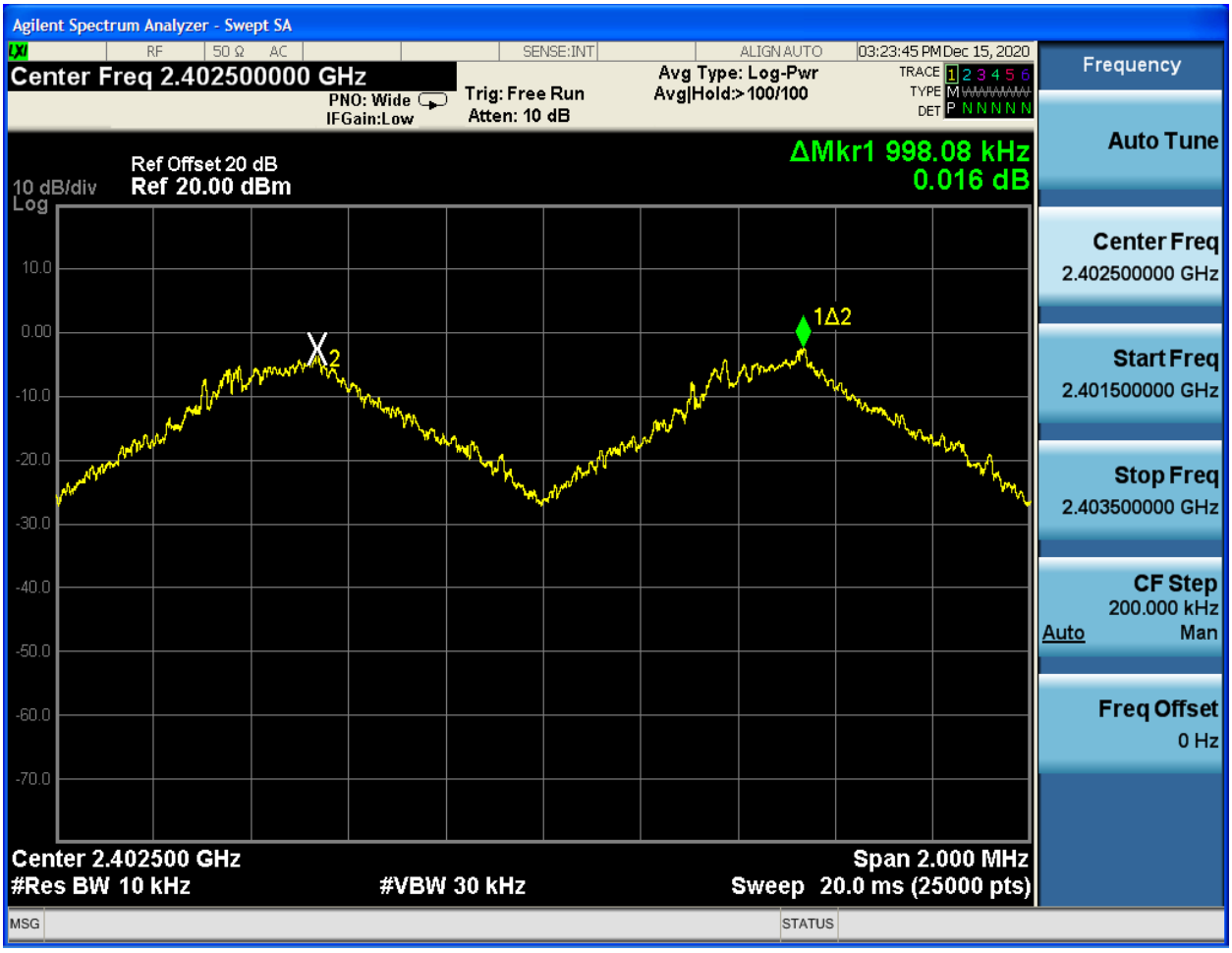
Measured frequency separation = 0.998 MHz

Table 7-1: Carrier Frequency Separation Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	03/18/2021

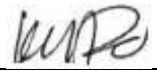
7.2 Carrier Frequency Separation Test Data

Plot 7-1: Carrier Frequency Separation



Frequency uncertainty: ±1 x 10^{-6} Hz. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Test Personnel:

Khue Do		December 15, 2020
Test Engineer	Signature	Date of Test

8 Hopping Characteristics – FCC 15.247(a)(1)(iii); RSS-247 5.1(d)

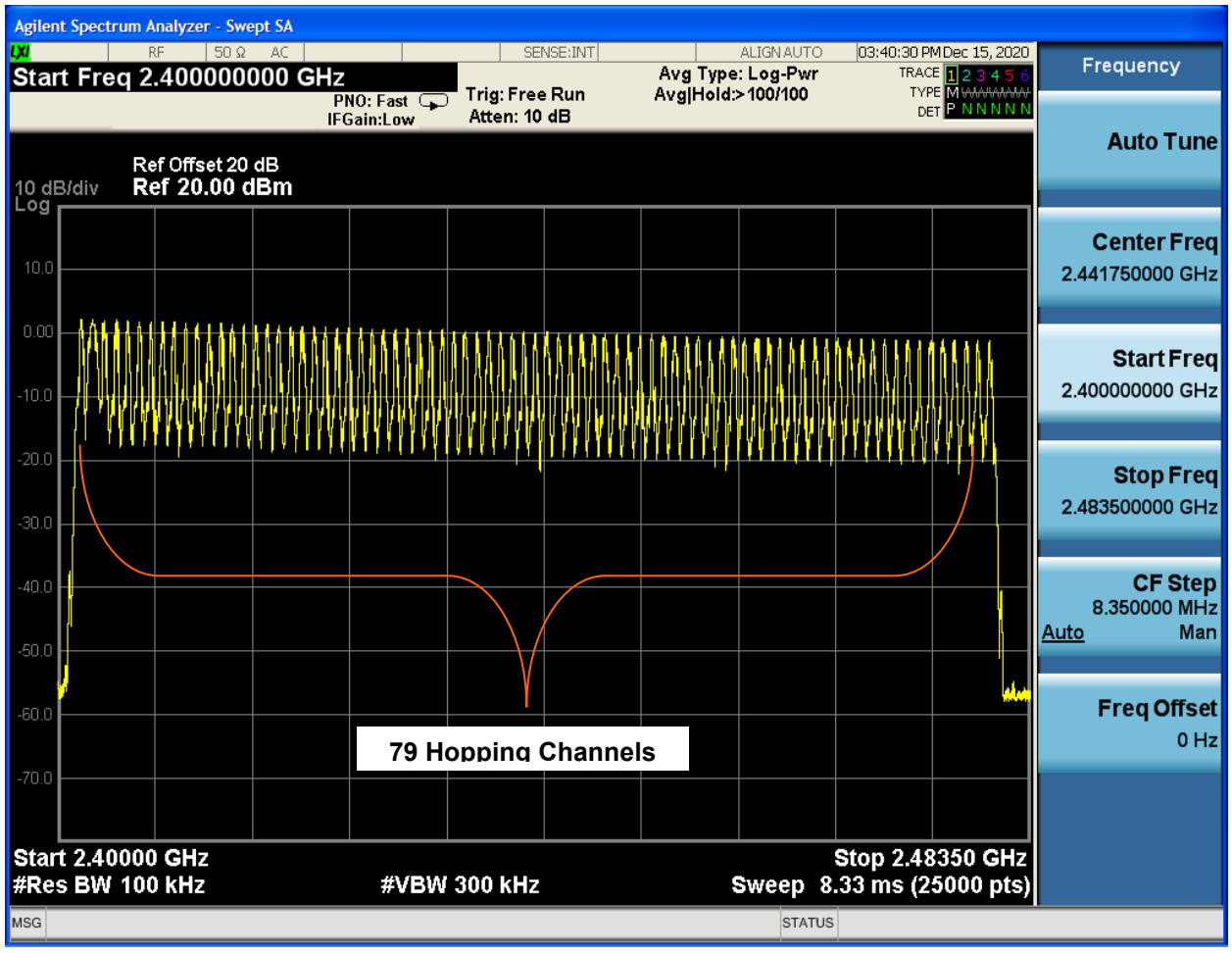
8.1 Hopping Characteristics Test Procedure

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels is used.

Table 8-1: Hopping Characteristics Test Equipment

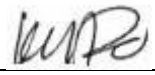
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	03/18/2021

Plot 8-1: Number of Hopping Frequencies



Frequency uncertainty: ±1 x 10^{-6} Hz. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Test Personnel:

Khue Do		December 15, 2020
Test Engineer	Signature	Date of Test

8.2 Average Time of Occupancy – FCC 15.247(a)(1)(iii); RSS-247 5.1(d)

The spectrum analyzer gate function was used to determine the pulse width using the gate start and stop times, with a zero span to capture a pulse from the device under test. The delta response was used to measure the dwell time for this pulse. The sweep was then set to single sweep for 31.6 s.

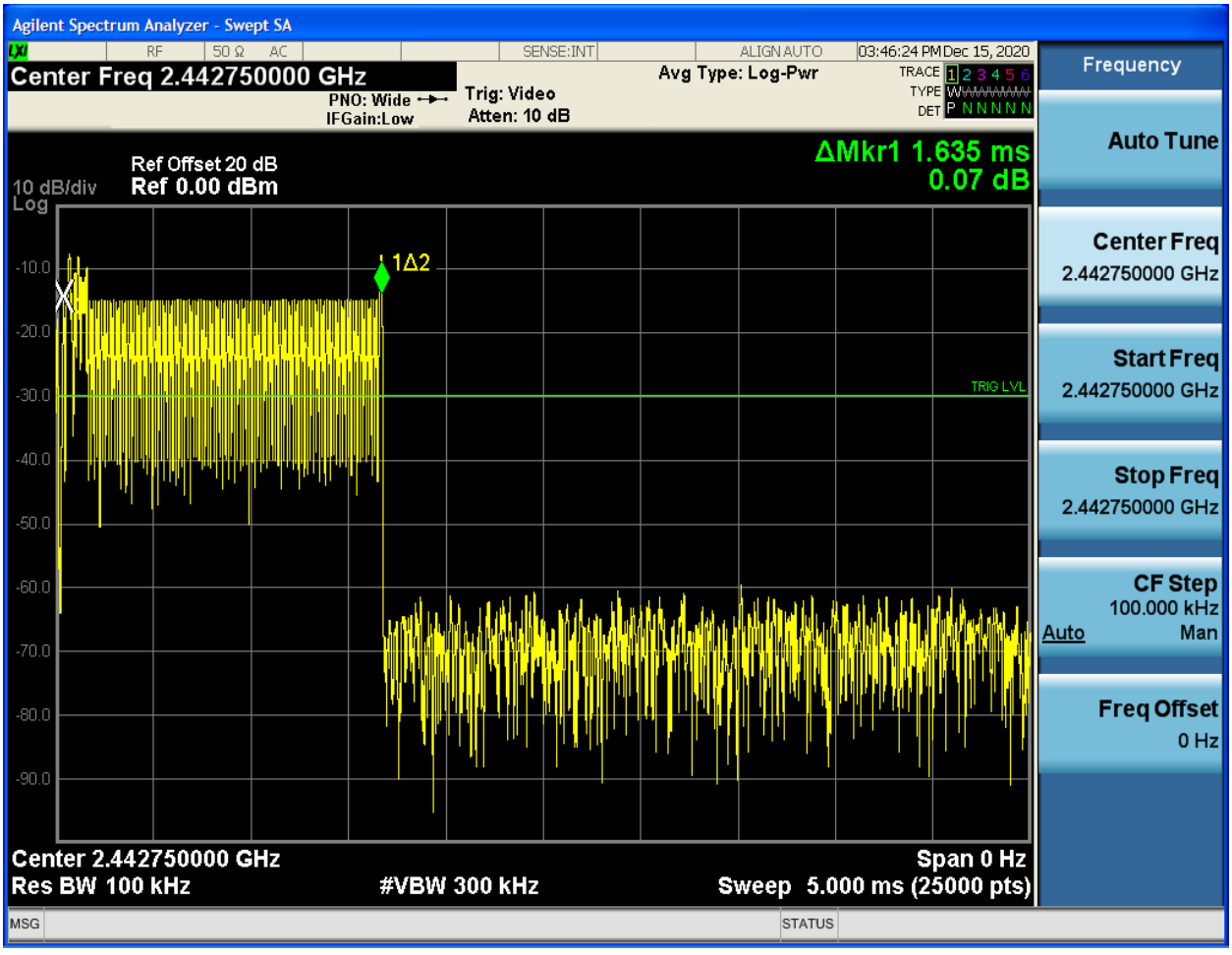
The number of pulses in 31.6 s was 205.

The average time of occupancy in the above period (31.6 s) is equal to 205 pulses x 1.635 ms = 335.175 ms, which meets the limit as defined by 15.247(a)(1)(iii) of 0.4 seconds.

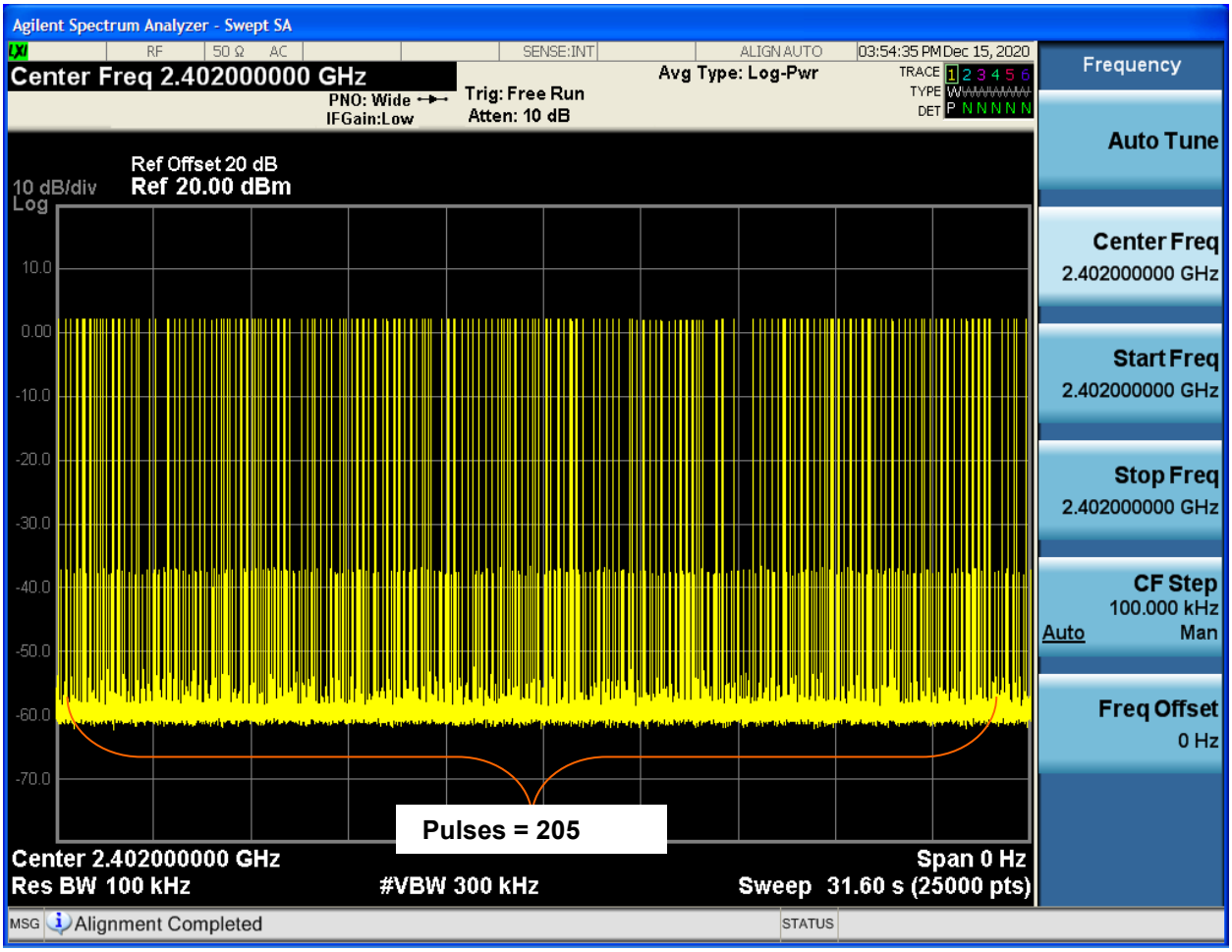
Table 8-2: Average Time of Occupancy Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	03/18/2021

Plot 8-2: Time of Occupancy (Dwell Time)



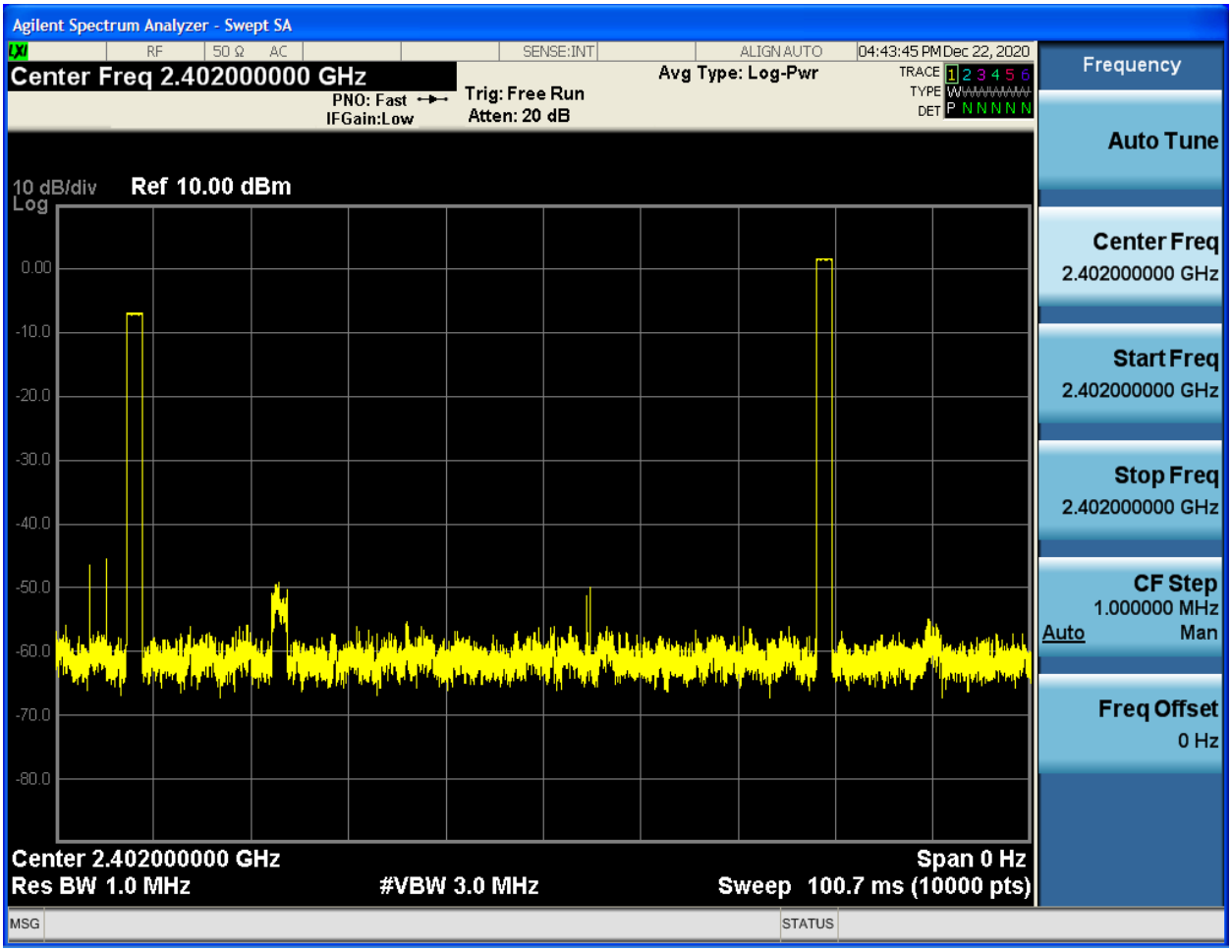
Plot 8-3: Time of Occupancy (Dwell Time 31.6 Second Sweep)



Number of pulses in 31.6 seconds: 205

The pulse width of 1.635 ms x 205 = 335.175 ms; less than the limit of 400 ms.

Plot 8-4: Duty Cycle in 100 ms



Duty Cycle = Pulse Width * Number of Pulses (in 100 ms window)

Duty Cycle = 1.635 ms * 2 = 3.270% = 0.0327

Results: Pass

Frequency uncertainty: ±1 x 10^{-6} Hz. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Test Personnel:

Khue Do		December 15 and 22, 2020
Test Engineer	Signature	Dates of Test

9 AC Conducted Emissions – FCC 15.207; RSS-Gen 8.8

9.1 Conducted Emissions Test Procedure

The powerline conducted emissions measurement were performed in a Series 81 Type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 cm high. Power was fed to the EUT through a 50 Ω/ 50 µH Line Impedance Stabilization Network (LISN). The EUT LISN was fed power through an AC filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed AC power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers a DC power supply which powers the EUT.

The spectrum analyzer (SA) was connected to the AC line through an isolation transformer. The 50 Ω output of the LISN was connected to the SA input through a Solar 100 kHz high-pass filter. The filter is used to prevent overload of the SA from noise below 100 kHz. Conducted emission levels were measured on each current-carrying line with the SA operating in the CISPR quasi-peak (QPK) mode or peak (PK) mode if applicable.

The SA's 6 dB bandwidth was set to 9 kHz. Video bandwidth (VBW) filter less than 10 times the resolution bandwidth (RBW) is not used. Average (AVG) measurements are performed in linear mode using a 10 kHz RBW, 1 Hz VBW, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limits were measured and recorded.

The EUT was paired to a laptop via Bluetooth connection.

9.2 Conducted Emissions Limits

Table 9-1: Conducted Emissions Limits per FCC Part 15.207

Frequency (MHz)	QPK (dBµV)	AVG (dBµV)
0.15 – 0.50	66 – 56	56 – 46
0.5 – 5.0	56	46
5 – 30	60	50

Table 9-2: Conducted Emissions Test Equipment

RTL Barcode	Part	Manufacture	Model	Serial Number	Calibration Due Date
900339	Quasi-Peak Adapter (30 Hz–1 GHz)	Hewlett Packard	85650A	2521A00743	04/24/2021
900728	High Pass Filter	Solar Electronics Co.	Type 8130	947305	04/30/2023
900968	Spectrum Analyzer (10 kHz–1.5 GHz)	Hewlett Packard	8567A	2602A00160	04/30/2021
900970	Spectrum Analyzer Display	Hewlett Packard	85662A	2542A11239	04/30/2021
901083	Line Impedance Stabilization Network	AFJ International	LS16	16010020080	02/16/2023
N/A	Test Software	ETS Lindgren	TILE! 7	7.1.3.20	N/A

9.3 Conducted Emissions Test Results

Plot 9-1: Conducted Emissions, AC, Neutral

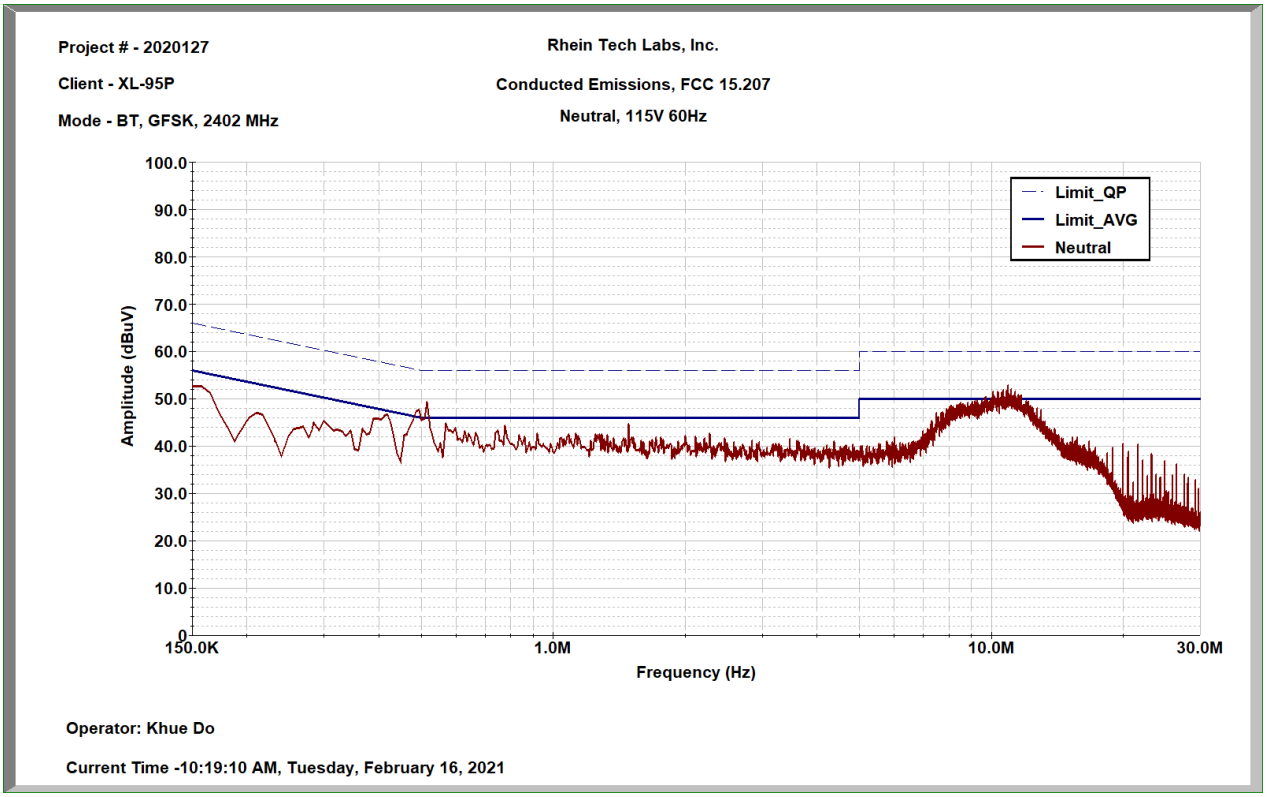


Table 9-3: Conducted Emissions Test Result, AC, Neutral

Frequency (MHz)	Detector Type	Emission (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.510	AVG	17.7	46.0	-28.3	Pass
0.510	QPK	34.8	56.0	-21.2	Pass
9.936	AVG	19.5	50.0	-30.5	Pass
9.936	QPK	26.1	60.0	-33.9	Pass

Plot 9-2: Conducted Emissions, AC, Line

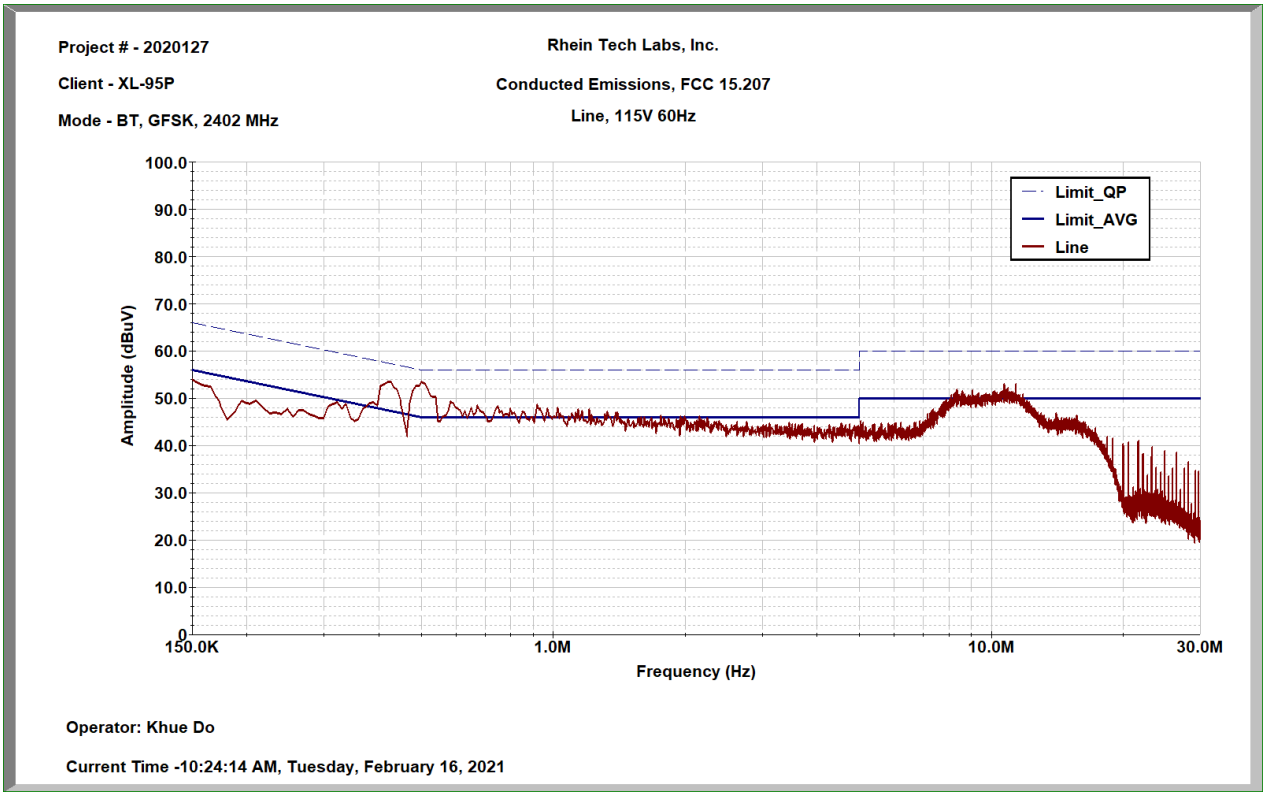


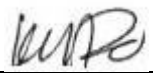
Table 9-4: Conducted Emissions Test Result, AC, Line

Frequency (MHz)	Detector Type	Emission (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.522	AVG	24.2	46.0	-21.8	Pass
0.522	QPK	40.0	56.0	-16.0	Pass
9.668	AVG	28.9	50.0	-21.1	Pass
9.668	QPK	33.3	60.0	-26.7	Pass

Measurement uncertainty: ±3.6 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Khue Do		February 16, 2021
Test Engineer	Signature	Date of Test

10 Radiated Emissions – FCC 15.209; RSS-247 5.5; RSS-Gen 8.9, 8.10

10.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	2400/f (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any circumstances of modulation.

10.2 Radiated Emissions Measurement Test Procedure

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 10^{th} harmonic of the highest fundamental transmitter frequency (24.8 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Duty Cycle correction:

Average Level (dBµV/m) = Peak Level (dBµV/m) + (20 * LOG(Duty Cycle))

DC ≈ 3.27%, please refer to Plot 8-4.

Table 10-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna (2.0–4.0 GHz)	9804-1044	08/05/2024
900321	EMCO	3161-03	Horn Antennas (4.0–8.2 GHz)	9508-1020	08/05/2024
900323	EMCO	3160-7	Horn Antennas (8.2–12.4 GHz)	9605-1054	08/05/2024
900356	EMCO	3160-08	Horn Antenna (12.4–18.0 GHz)	9607-1044	08/05/2024
901218	EMCO	3160-09	Horn Antenna (18-26.5 GHz)	960281-003	08/05/2024
901669	ETS-Lindgren	3142E	Biconilog Antenna (30 MHz–6000 MHz)	00166065	07/11/2025
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2024
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	10/04/2024
901723	Hewlett Packard	8449B	Amplifier (1–26.5 GHz)	3008A00762	11/22/2023
900905	Rhein Tech Laboratories, Inc.	PR-1040	Amplifier (10 MHz–2 GHz)	1006	01/30/2024

10.3 Radiated Emissions Test Results

Table 10-2: Radiated Emissions Harmonics/Spurious – GFSK - 2402 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4804.0	17.8	34.0	51.8	74.0	-22.2
12010.0	3.9	44.8	48.7	74.0	-25.3
19216.0	2.8	53.7	56.5	74.0	-17.5

Table 10-3: Radiated Emissions Harmonics/Spurious – GFSK - 2402 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4804.0*	-11.9	34.0	22.1	54.0	-31.9
12010.0*	-25.8	44.8	19.0	54.0	-35.0
19216.0*	-26.9	53.7	26.8	54.0	-27.2

*Note: Duty cycle correction was used on the peak measurement levels to obtain the average levels.

Table 10-4: Radiated Emissions Harmonics/Spurious – GFSK - 2440 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4880.0	21.4	34.0	55.4	74.0	-18.6
7320.0	12.7	36.5	49.2	74.0	-24.8
12200.0	3.6	44.8	48.4	74.0	-25.6
19520.0	2.3	54.0	56.3	74.0	-17.7

Table 10-5: Radiated Emissions Harmonics/Spurious – GFSK - 2440 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4880.0*	-8.3	34.0	25.7	54.0	-28.3
7320.0*	-17.0	36.5	19.5	54.0	-34.5
12200.0*	-26.1	44.8	18.7	54.0	-35.3
19520.0*	-27.4	54.0	26.6	54.0	-27.4

*****Note: Duty cycle correction was used on the peak measurement levels to obtain the average levels.

Table 10-6: Radiated Emissions Harmonics/Spurious – GFSK - 2480 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4960.0	21.2	34.1	55.3	74.0	-18.7
7440.0	12.6	36.6	49.2	74.0	-24.8
12400.0	2.3	48.0	50.3	74.0	-23.7
19840.0	2.4	54.2	56.6	74.0	-17.4
22320.0	0.7	56.1	56.8	74.0	-17.2

Table 10-7: Radiated Emissions Harmonics/Spurious – GFSK - 2480 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4960.0*	-8.5	34.1	25.6	54.0	-28.4
7440.0*	-17.1	36.6	19.5	54.0	-34.5
12400.0*	-27.4	48.0	20.6	54.0	-33.4
19840.0*	-27.3	54.2	26.9	54.0	-27.1
22320.0*	-29.0	56.1	27.1	54.0	-26.9

***Note: Duty cycle correction was used on the peak measurement levels to obtain the average levels.

Measurement uncertainty: ±4.6 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Dan Baltzell		March 13-15, 2023
Test Engineer	Signature	Dates of Test

11 Conclusion

The data in this DSS measurement report shows that the EUT as tested, L3Harris Technologies, XL-95P Multi-Band Portable, V/U, HVIN: XL-x5-V/U, FCC ID: OWDTR-0166-E, IC: 3636B-0166, complies with the applicable requirements of FCC Parts 2 and 15 and ISED RSS-247 and RSS-Gen.