



Engineering Solutions & Electromagnetic Compatibility Services

FCC & ISED Class 2 Permissive Change Report

L3Harris Corporation  
221 Jefferson Ridge Parkway  
Lynchburg, VA 24501

Model: XL-90D 7/8/900 MHz Data Radio

FCC ID: OWDTR-0167-E  
IC: 3636B-0167

August 16, 2024

Standards Referenced for this Report	
Part 2: 2023	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 15B: 2023	Radio Frequency Devices
Part 90: 2023	Private Land Portable Radio Services
ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
RSS-119 Issue 12	Land Mobile and Fixed Radio Transmitters and Receivers 27.41 to 960.0 MHz
ICES-003 Issue 7	Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement

Report Prepared By: Daniel W. Baltzell

Document Number: 2024046

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 standards referenced above.

Signature: 

Date: August 16, 2024

Typed/Printed Name: Desmond A. Fraser

Position: President

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This report replaces Report R1.1.*

*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.*

## Table of Contents

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1	Test Result Summary .....	4
2	General Information .....	4
2.1	Measurement Uncertainty .....	4
2.2	Test Facility .....	4
2.3	Related Submittal(s)/Grant(s) .....	4
2.4	Tested System Details .....	4
3	FCC Part 2.1046 (a): RF Power Output: Conducted; Part 90.635 Limitations on power and antenna height; ISED RSS-119 4.1: Transmitter Output Power .....	6
3.1	Test Procedure .....	6
3.2	Test Data .....	6
4	FCC Rules and Regulations §2.1051: Spurious Emissions at Antenna Terminals; §90.210: Emissions Masks; RSS-119 §4.2: Transmitter Unwanted Emissions .....	8
4.1	Test Procedure .....	8
4.2	Test Data .....	8
5	FCC Part 2.1053(a): Field Strength of Spurious Radiation; Part 90.543: Out of Band Emissions Limit; RSS-Gen 6.13: Transmitter Unwanted Emissions .....	9
5.1	Test Procedure .....	9
5.2	Test Data .....	9
6	FCC Rules and Regulations §2.1049(c)(1); §90.210; RSS-119 §5.8: Occupied Bandwidth .....	11
6.1	Test Procedure .....	11
6.2	Test Data .....	12
7	Conclusion .....	18

**Table of Figures**

---



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Figure 2-1: Configuration of Tested System.....	5
---	---

**Table of Tables**

---



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Table 2-1: Equipment Under Test (EUT).....	5
Table 3-1: RF Conducted Output Power – Measured.....	6
Table 3-2: Test Equipment Used For Testing RF Power Output – Conducted.....	7
Table 4-1: Test Equipment Used for Testing Spurious Emissions.....	8
Table 5-1: Environmental Conditions .....	9
Table 5-2: Field Strength of Spurious Radiation – 816.9875 MHz.....	9
Table 5-3: FCC Unintentional Digital/RX Emissions .....	10
Table 5-4: Test Equipment For Field Strength of Spurious Radiation and Unintentional Emissions.....	10
Table 6-1: Environmental Conditions .....	12
Table 6-2: Test Equipment Used for Testing Occupied Bandwidth .....	18

**Table of Plots**

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Plot 3-1: Conducted Antenna Port Peak Power – 816.9875 MHz.....	6
Plot 6-1: Occupied Bandwidth – HVD-SMR; 816.9875 MHz; Mask G .....	12
Plot 6-2: Occupied Bandwidth – C4FM; 816.9875 MHz; Mask D.....	13
Plot 6-3: Occupied Bandwidth – H-CPM (TDMA); 816.9875 MHz; Mask D .....	14
Plot 6-4: Occupied Bandwidth – HVD-SMR; 816.9875 MHz; 99% Bandwidth.....	15
Plot 6-5: Occupied Bandwidth – C4FM; 816.9875 MHz; 99% Bandwidth.....	16
Plot 6-6: Occupied Bandwidth – H-CPM (TDMA); 816.9875 MHz; 99% Bandwidth.....	17

**Table of Photographs**

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Photograph 1: Radiated Emissions (Spurious/Harmonics) Over 1 GHz, Front View .....	19
Photograph 2: Radiated Emissions (Spurious/Harmonics) Over 1 GHz, Back View .....	20
Photograph 3: Radiated Emissions (Spurious/Harmonics) Under 1 GHz, Front View .....	21
Photograph 4: Radiated Emissions (Spurious/Harmonics) Under 1 GHz, Back View .....	22
Photograph 5: Conducted Antenna Port Emissions .....	23

## 1 Test Result Summary

Test	FCC Reference	ISED Reference	Result
Spurious Emissions at Antenna Terminals	2.1051	RSS-119 4.2	Compliant
Field Strength Spurious Radiation	2.1053	RSS-Gen 6.13	Compliant
Occupied Bandwidth/Emission Masks	2.1049, 90.210	RSS-119 5.8	Compliant

## 2 General Information

The following Class 2 Permissive Change Report is prepared on behalf of L3Harris Corporation in accordance with the Federal Communications Commission and ISED rules and regulations. The Equipment Under Test (EUT) was the XL-90D; FCC ID: OWDTR-0167-E, IC: 3636B-0167.

All measurements contained in this application were conducted in accordance with the applicable sections of FCC Rules and Regulations CFR 47 Parts 2 and 90. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

### 2.1 Measurement Uncertainty

The measurement uncertainty complies with CISPR 16-4-2 limits and is not used to adjust measurements for compliance determination. Expanded uncertainty (U) for each scope, calculated per ANSI/NCSL Z540-2-1997 (R2002) with a type B evaluation, is provided in this RTL report. While this demonstrates RTL's commitment to transparency, compliance decisions are based solely on comparing measured values directly to the relevant standards' limits.

### 2.2 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc. 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170.

ISED CAB ID: US0079, Company Number: 2956A

### 2.3 Related Submittal(s)/Grant(s)

This is a Class 2 Permissive Change to add frequency range 816-817 MHz to the existing FCC grant and ISED certificate for the following Transmit Mode / Emission Designators:

### 2.4 Tested System Details

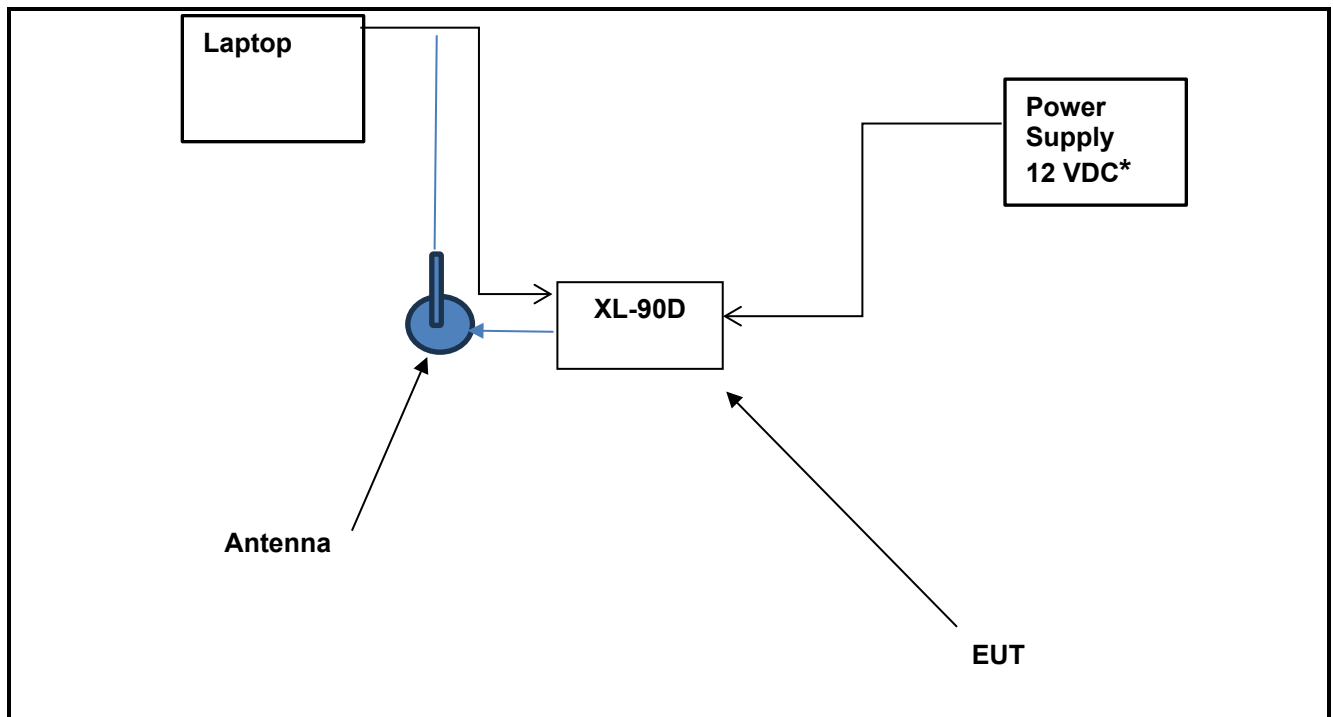
The test sample was received on June 21, 2024. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

The device was programmed for multiple test patterns, commands using various modes were used.

**Table 2-1: Equipment Under Test (EUT)**

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Modem	L3Harris Corporation	XL-90D	A40333000344	OWDTR-0167-E	24439
Modem	L3Harris Corporation	XL-90D	A40333000345	OWDTR-0167-E	24437
Dual Band 764-870 MHz 5 dB Gain Antenna	L3Harris Corporation	N/A	AN-225001-005	N/A	24436

**Figure 2-1: Configuration of Tested System**



\* EUT power input range is 9 to 57 VDC. 12 VDC was used for all testing presented in this report.

### 3 FCC Part 2.1046 (a): RF Power Output: Conducted; Part 90.635 Limitations on power and antenna height; ISED RSS-119 4.1: Transmitter Output Power

#### 3.1 Test Procedure

ANSI C63.26, section 5.2

#### 3.2 Test Data

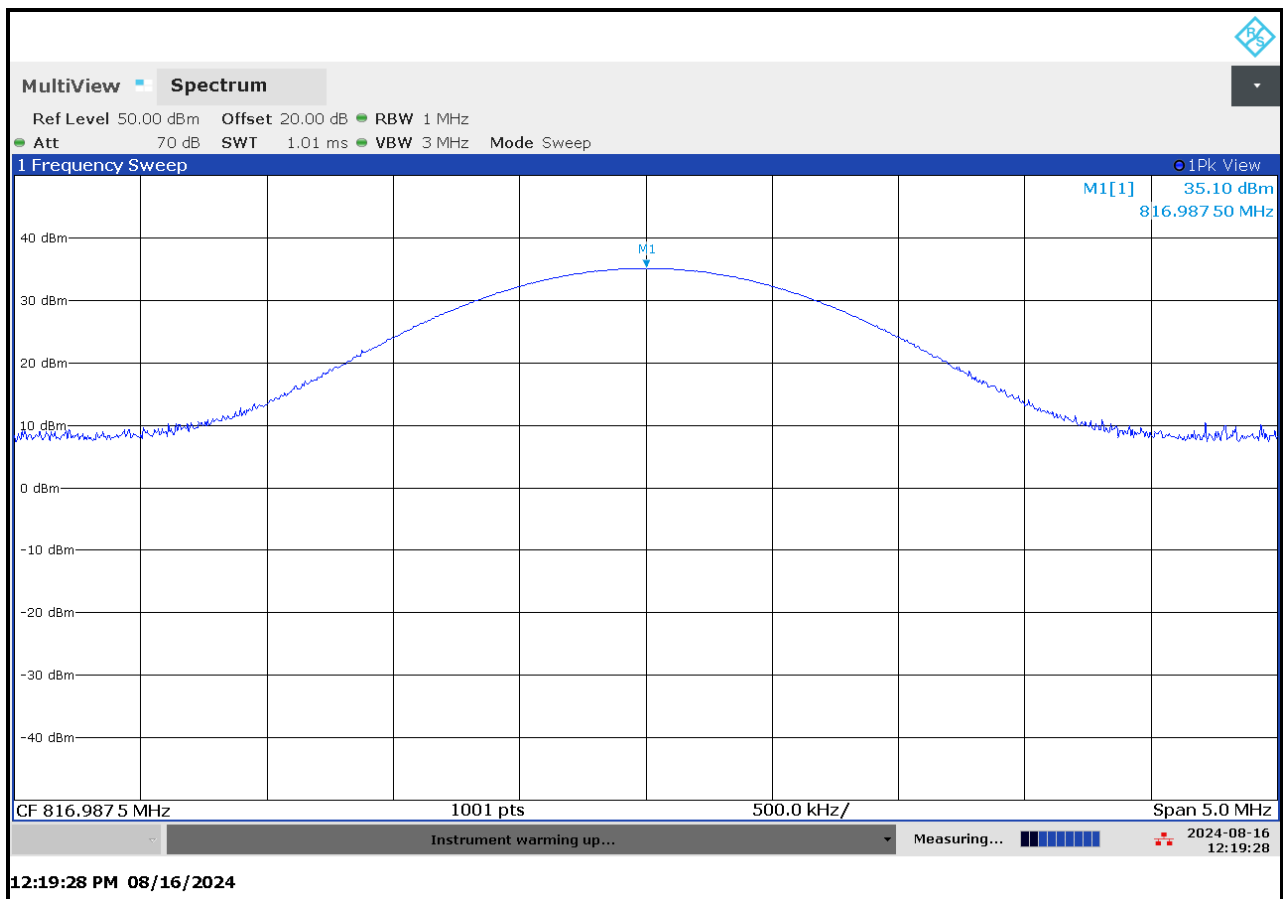
**Table 3-1: RF Conducted Output Power – Measured**

Frequency (MHz)	Rated High Power (dBm)	Rated High Power (W)	High Power (dBm)	High Power (W)	Low Power (dBm)	Low Power (W)
816.9875	35.1	3.2	35.0	3.2	27.2	0.5

Note: Data presented is for analog mode. All other modes were investigated and found to have equivalent power within measurement tolerances.

Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.8 dB

**Plot 3-1: Conducted Antenna Port Peak Power – 816.9875 MHz**



**Results: Pass**

**Table 3-2: Test Equipment Used For Testing RF Power Output – Conducted**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901773	Rohde & Schwarz	FSW50	Analyzer	101021	02/02/2025
901523	MA/COM	2082-6174-20	20 dB Attenuator (2W, DC-4GHz)	N/A	12/02/2024

**Test Personnel:**

Daniel W. Baltzell		August 16, 2024
EMC Test Engineer	Signature	Date of Test

**4 FCC Rules and Regulations §2.1051: Spurious Emissions at Antenna Terminals; §90.210: Emissions Masks; RSS-119 §4.2: Transmitter Unwanted Emissions**

**4.1 Test Procedure**

The transmitter is terminated with a 50 Ω load and interfaced with a signal analyzer. The device uses digital modulation modulated to its maximum extent using a pseudo random data sequence.

**4.2 Test Data**

Frequency range of measurement per Part 2.1057: 9 kHz to 10x $f_c$ .

Limit:  $P(\text{dBm}) - (43 + 10 \times \text{LOG } P(\text{W}))$

The worst case (unwanted emissions) channels are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

No Emissions were found greater than 20 dB below the limit.

**Table 4-1: Test Equipment Used for Testing Spurious Emissions**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901672	Rohde & Schwarz	FSW	Spectrum Analyzer	833063/13	05/30/2025
901338	Weinschel Corp	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2025
901128	Par Electronics	806-902 (25W)	UHF Notch Filter	N/A	05/14/2026

**Test Personnel:**

Daniel W. Baltzell EMC Test Engineer	 Signature	June 27, 2024 Date of Test
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**5 FCC Part 2.1053(a): Field Strength of Spurious Radiation; Part 90.543: Out of Band Emissions Limit; RSS-Gen 6.13: Transmitter Unwanted Emissions**

**5.1 Test Procedure**

ANSI C63.26, section 5.5.

The device uses digital modulation modulated to its maximum extent using a pseudo-random data sequence.

The spurious emissions levels were measured, and the device under test was replaced by a substitution antenna connected to a signal generator. This signal generator level was then corrected by subtracting the cable loss from the substitution antenna to the signal generator, and the gain of the antenna (dBi) was added to achieve the EIRP level, then converted from the corrected signal generator level (dBm) to dBc and compared to the limit.

For Power measurement in Table 4.2 below, power was measured using ANSI C63.26, section 5.2. This measurement method is the same method used in the original application filing.

**5.2 Test Data**

**Table 5-1: Environmental Conditions**

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
July 2, 2024	28.3	32	101.3

**Table 5-2: Field Strength of Spurious Radiation – 816.9875 MHz**

**Conducted Power 35.0 dBm; 3.2 W; Limit = 50+10LogP = 55.0 dBc**

Frequency (MHz)	Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Substitution Antenna Normalized Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
1633.975	31.7	-38.0	0.4	6.6	66.8	-11.8
2450.963	46.5	-31.3	.3.4	7.3	59.3	-4.3
3267.950	15.7	-60.2	0.5	7.1	88.6	-33.6
4084.938	21.0	-48.9	0.6	8.0	76.5	-21.5
4901.925	15.9	-54.3	0.7	8.8	81.2	-26.2
5718.913	15.8	-54.0	0.9	9.1	80.8	-25.8
6535.900	16.3	-53.2	1.0	9.7	79.5	-24.5
7352.888	15.6	-51.7	1.1	8.7	79.1	-24.1
8169.875	15.8	-50.9	1.2	9.3	77.8	-22.8

**Table 5-3: FCC Unintentional Digital/RX Emissions**

Frequency (MHz)	Analyzer Level (dBuV)	Site Correction Factor (dB/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
48.128	18.7	12.7	31.4	40.0	-8.6
84.200	11.5	12.2	23.7	40.0	-16.3
164.800	26.3	15.3	41.6	43.5	-1.9
321.300	9.3	20.5	29.8	46.0	-16.2
385.000	2.7	22.2	24.9	46.0	-21.1
525.000	1.8	26.6	28.4	46.0	-17.6
687.000	-3.2	29.4	26.2	46.0	-19.8

Measurement uncertainty: 30 MHz to 6 GHz =  $\pm 4.8$  dB; from 6 GHz and above =  $\pm 5.2$  dB. This measurement uncertainty is expanded for a 95% confidence level received with a coverage factor k=2 for the entire frequency range.

**Table 5-4: Test Equipment For Field Strength of Spurious Radiation and Unintentional Emissions**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter antenna mast, polarizing	OATS1	N/A
901729	Insulated Wire Inc.	KPS-1503-3150-KPR	SMK RF Cables 20'	NA	12/29/2024
901242	Rhein Tech Laboratories	WRT-000-0003	Wood rotating table	N/A	N/A
901669	ETS-Lindgren	3142E	Biconilog Antenna (30 MHz – 6000 MHz)	00166065	07/11/2025
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	08/05/2024
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	08/05/2024
901582	Rohde & Schwarz	1167.0000.02	Signal Generator	101903	05/27/2027
901773	Rohde & Schwarz	FSW50	Analyzer	101021	05/30/2025
901650	ETS-Lindgren	3117	Double Ridged Guide Antenna (1 - 18 GHz)	00152091	07/09/2025

**Results: PASS**

**Test Personnel:**

Daniel W. Baltzell  
 Test Engineer



Signature

July 2, 2024  
 Date of Tests

## 6 FCC Rules and Regulations §2.1049(c)(1); §90.210; RSS-119 §5.8: Occupied Bandwidth

### 6.1 Test Procedure

Notes: FCC 90.210 specifies masks G and H for the 800 MHz band operation of this equipment; RSS-119 specifies Mask G; all data is presented on the following pages.

#### FCC §90.210

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
Below 25 <sup>1</sup>	A or B	A or C
25-50	B	C
72-76	B	C
150-174 <sup>2</sup>	B, D, or E	C, D or E
150 paging only	B	C
220-222	F	F
421-512 <sup>2 5</sup>	B, D, or E	C, D, or E
450 paging only	B	G
806-809/851-854 <sup>6</sup>	B	H
809-824/854-869 <sup>3 5</sup>	B, D	D, G.
896-901/935-940	I	J
902-928	K	K
929-930	B	G
4940-4990 MHz	L or M	L or M
5895-5925 <sup>4</sup>		
All other bands	B	C

<sup>1</sup> Equipment using single sideband J3E emission must meet the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.

<sup>2</sup> Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.

<sup>3</sup> Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of § 90.691 of this chapter.

<sup>4</sup> DSRCS Roadside Units in the 5895-5925 MHz band are governed under [subpart M of this part](#).

<sup>5</sup> Equipment designed to operate on 25 kilohertz bandwidth channels must meet the requirements of either Emission Mask B or G, whichever is applicable, while equipment designed to operate on 12.5 kilohertz bandwidth channels must meet the requirements of Emission Mask D. Equipment designed to operate on 25 kilohertz bandwidth channels may alternatively meet the Adjacent Channel Power limits of § 90.221.

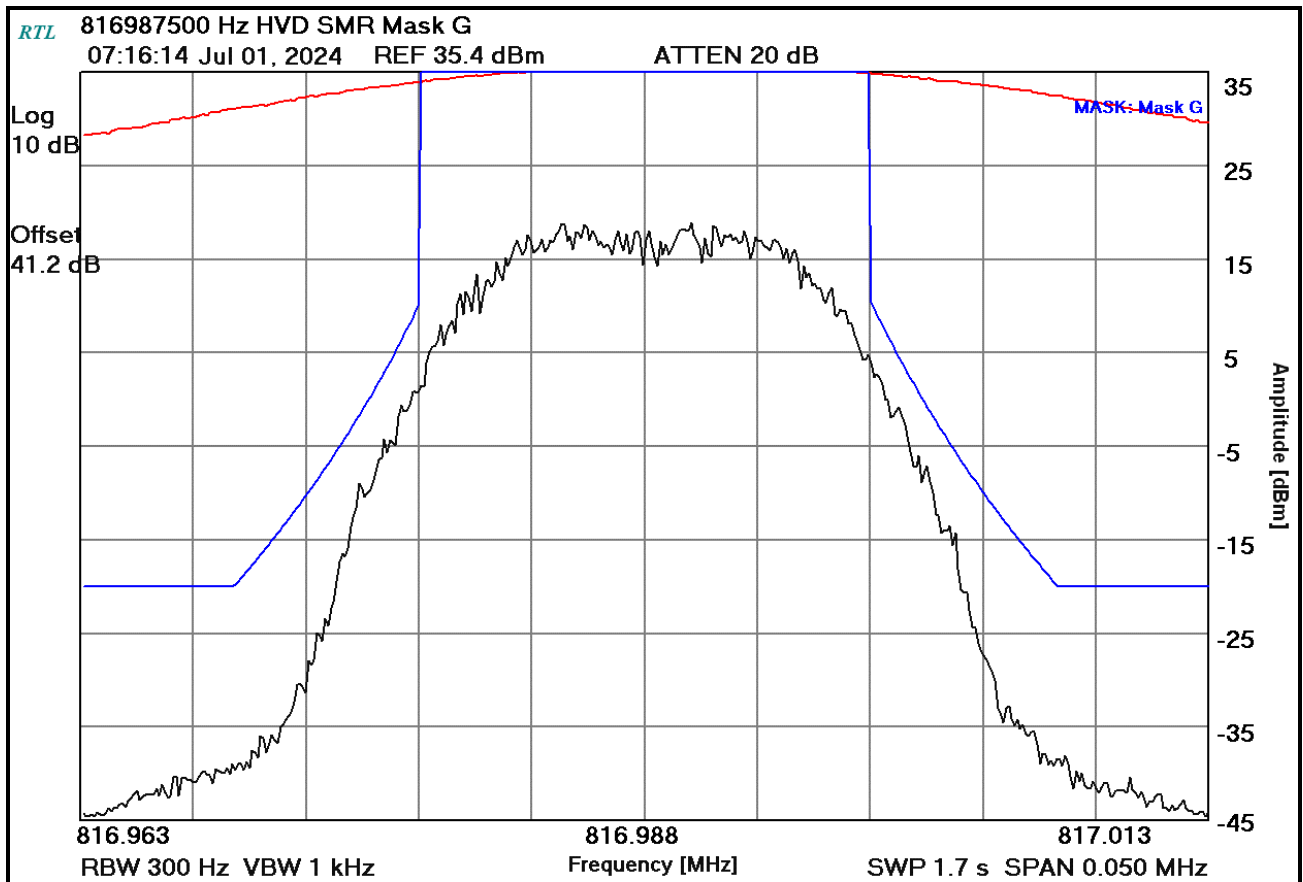
<sup>6</sup> Transmitters utilizing analog emissions that are equipped with an audio low-pass filter must meet Emission Mask B. All transmitters utilizing digital emissions and those transmitters using analog emissions without an audio low-pass filter must meet Emission Mask H.

## 6.2 Test Data

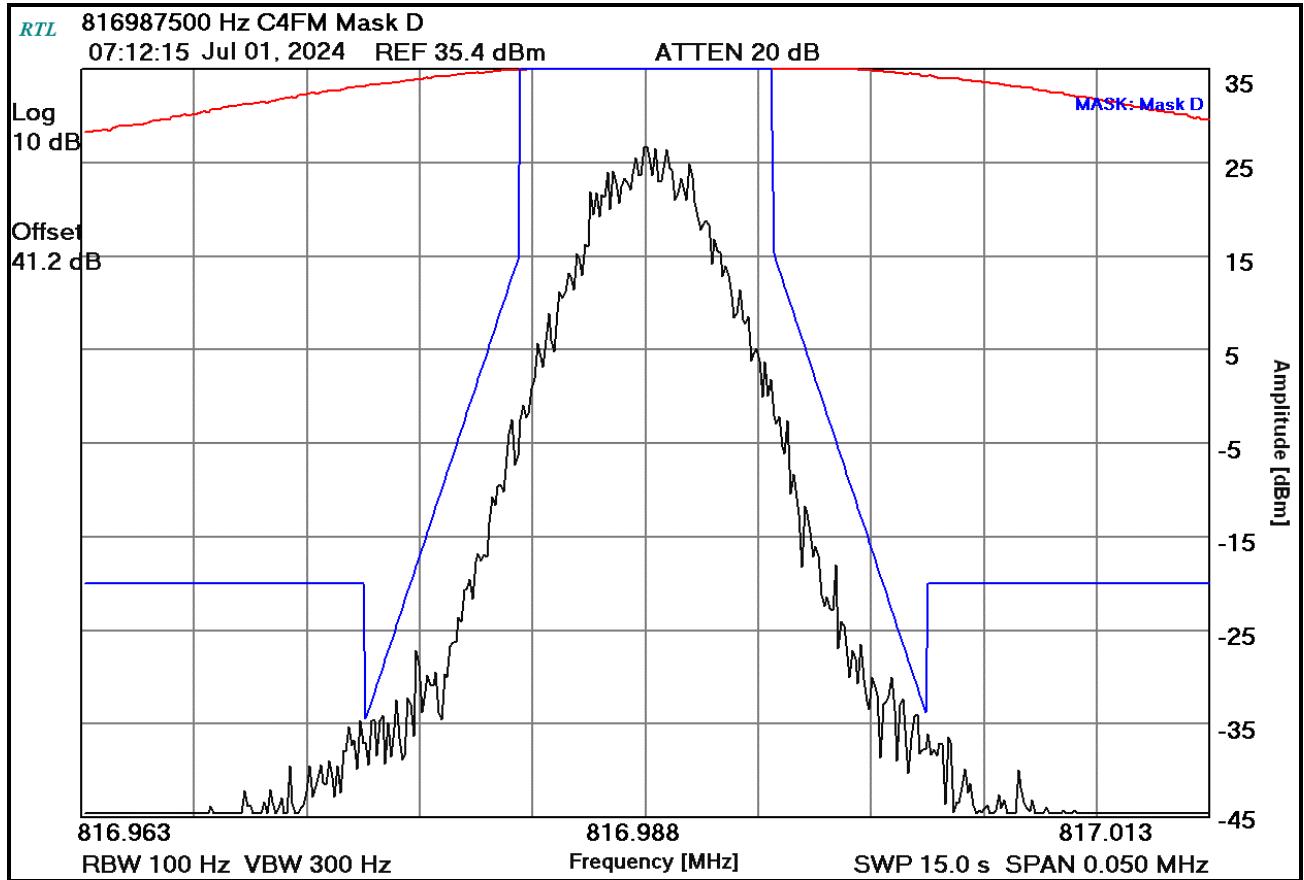
Table 6-1: Environmental Conditions

Date	Temperature (°C)	Humidity (%)	Atmospheric Pressure (kPa)
July 1, 2024	30	24.6	100.9

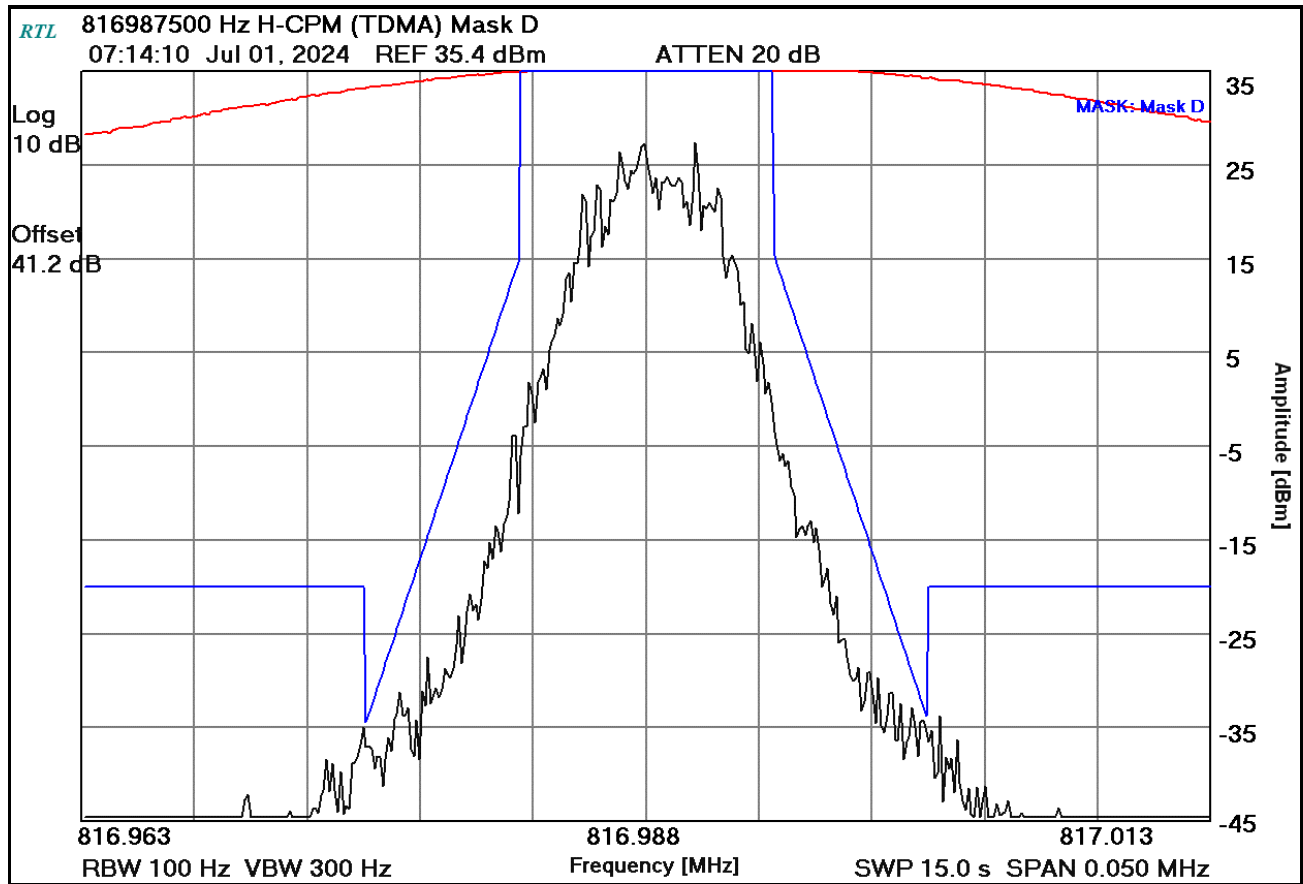
Plot 6-1: Occupied Bandwidth – HVD-SMR; 816.9875 MHz; Mask G



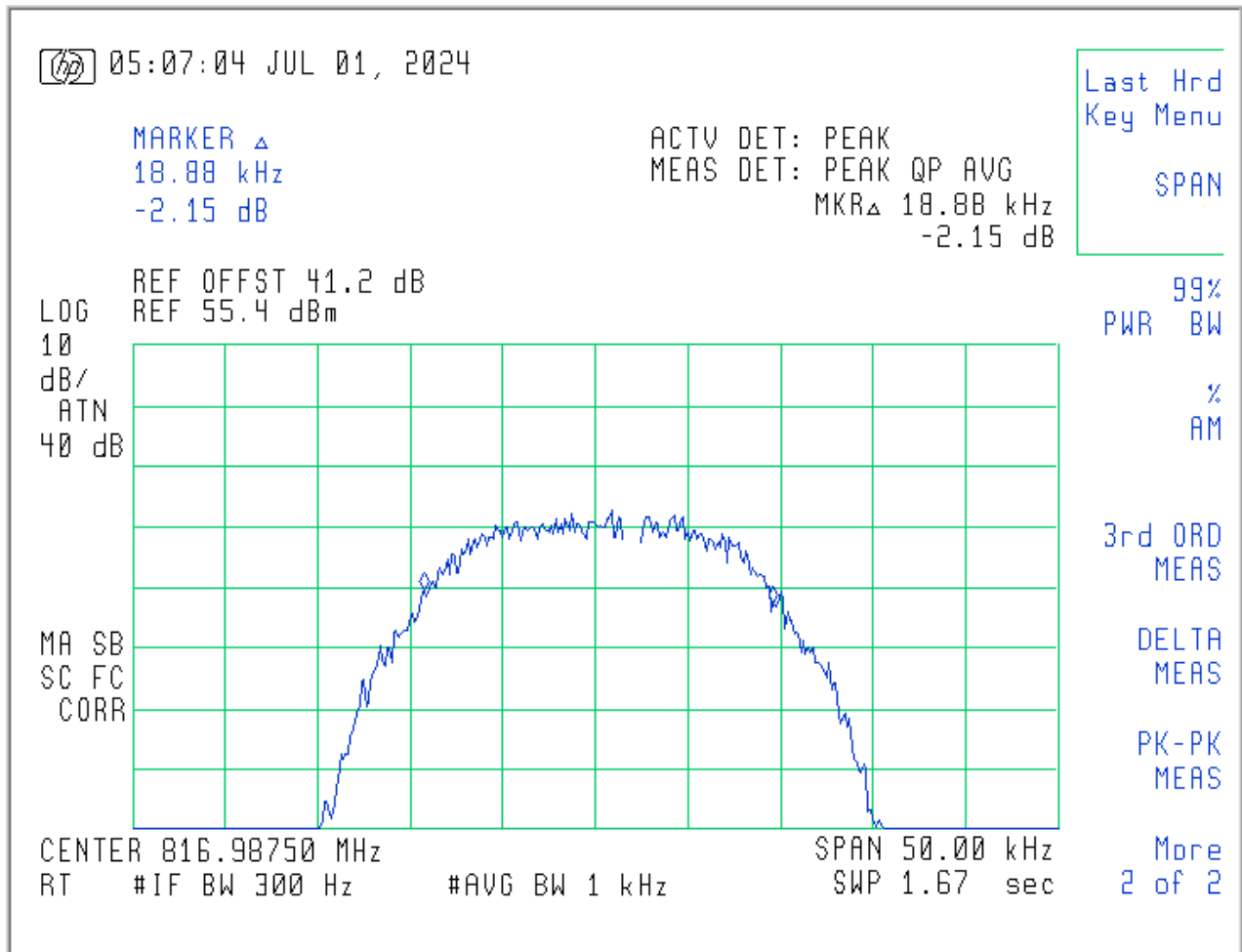
**Plot 6-2: Occupied Bandwidth – C4FM; 816.9875 MHz; Mask D**



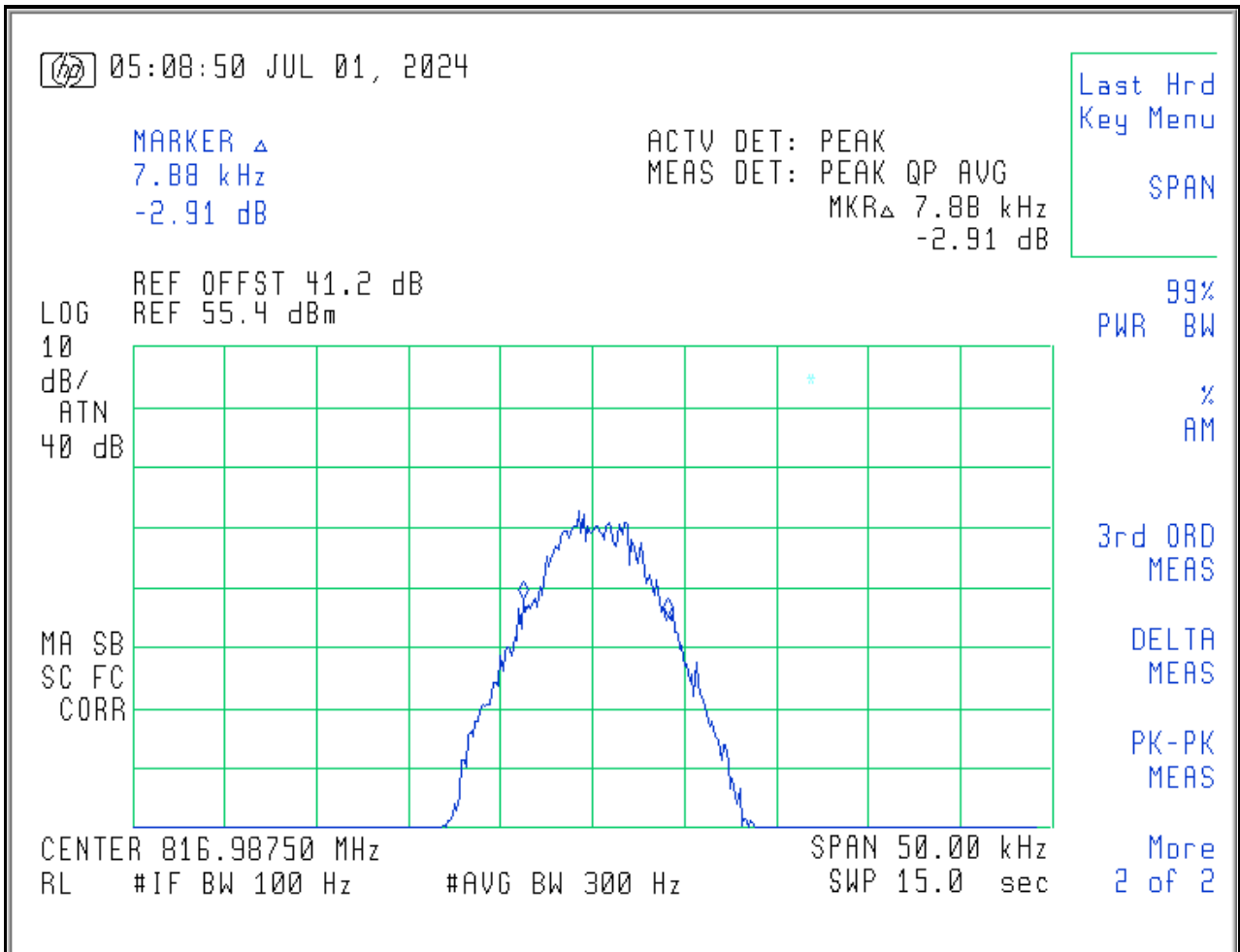
**Plot 6-3: Occupied Bandwidth – H-CPM (TDMA); 816.9875 MHz; Mask D**



**Plot 6-4: Occupied Bandwidth – HVD-SMR; 816.9875 MHz; 99% Bandwidth**

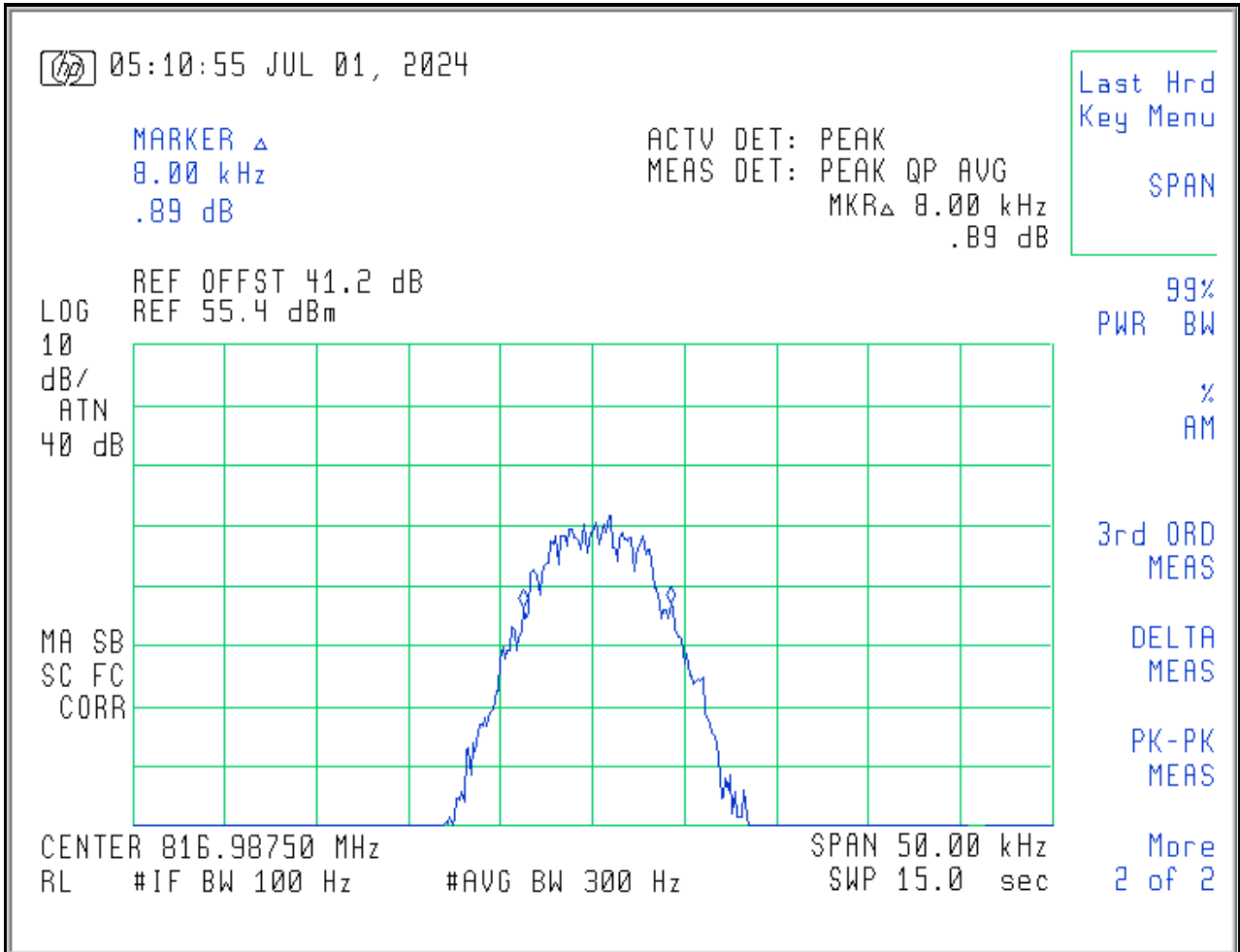


**Plot 6-5: Occupied Bandwidth – C4FM; 816.9875 MHz; 99% Bandwidth**





**Plot 6-6: Occupied Bandwidth – H-CPM (TDMA); 816.9875 MHz; 99% Bandwidth**




Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty:  $\pm 0.5$  Hz

**Results: Pass**

**Table 6-2: Test Equipment Used for Testing Occupied Bandwidth**

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	09/16/2024
900914	Hewlett Packard	85460A	RF Filter Section, 100 kHz to 6.5 GHz	3330A00107	09/16/2024
901338	Weinschel Corp	46-40-34	Attenuator (DC-18GHz, 40 dB, 25W)	BM0556	02/07/2025

**Test Personnel:**

<p>_____          Daniel W. Baltzell          Test Engineer</p>	 Signature	<p>_____          July 1, 2024          Date of Test</p>
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**7 Conclusion**

The data in this Class 2 measurement report shows that the L3Harris Corporation XL-90D; FCC ID: OWDTR-0167-E, IC: 3636B-0167, complies with the applicable requirements of FCC Parts 90 and 2, and ISED RSS-119 for a Class 2 permissive change.