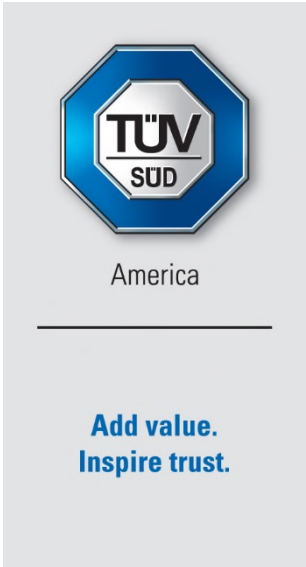


# FCC Wireless Report on the Testing of the

CINCH Systems  
RF-UT-EI-SMOKE-319-S

FCC ID: 2ABBZ-R-QS5130-840  
IC ID: 11817A-RQS5130840

In accordance with:  
FCC 47 CFR Part 15.231  
ISED RSS-210 Issue 11, June 2024



Prepared for: Cinch Systems, Inc  
12075 43rd St NE Ste 300  
St Michael MN 55376

## COMMERCIAL-IN-CONFIDENCE

Document Number: NC721003871.1 | Issue: 1

SIGNATURE			
NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Sean Sellergren	Sr. EMC Engineer	Authorized Signatory	27 September

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD America, Inc. document control rules.

FCC Accreditation Designation Number US1148 New Brighton, MN Test Laboratory	Innovation, Science, and Economic Development Canada Accreditation Site Number 4512A New Brighton, MN Test Laboratory
--	---

**EXECUTIVE SUMMARY**  
A sample of this product was tested and found to be compliant with the standards listed above and the tests shown in Table 1.3.1 of this report.

 A2LA Cert. No. 2955.11	<b>DISCLAIMER AND COPYRIGHT</b> This non-binding report has been prepared by TÜV SÜD America with all reasonable skill and care. The document is confidential to the potential Client and TÜV SÜD America. No part of this document may be reproduced without the prior written approval of TÜV SÜD America. © TÜV SÜD.
	<b>ACCREDITATION</b> Our A2LA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our A2LA Accreditation.

TÜV SÜD America Inc  
141 14th Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



## Contents

<b>1</b>	<b>Report Summary .....</b>	<b>3</b>
1.1	Report Modification Record.....	3
1.2	Introduction.....	3
1.3	Scope of Testing .....	4
1.4	Summary of Results .....	4
1.5	Product Information .....	5
1.6	Deviations from the Standard.....	6
1.7	EUT Modification Record .....	6
1.8	Test Location.....	6
<b>2</b>	<b>Test Details .....</b>	<b>7</b>
2.1	Antenna Requirements.....	7
2.2	Deactivation Period .....	8
2.3	Pulse Polling or Supervision Transmissions & Duty Cycle of Transmitter .....	10
2.4	Radiated Fundamental Field Strength .....	15
2.5	Radiated Spurious Emissions .....	21
2.6	Occupied Bandwidth .....	26
<b>3</b>	<b>Diagram of Test Setups .....</b>	<b>29</b>
<b>4</b>	<b>Accreditation, Disclaimers and Copyright.....</b>	<b>31</b>



# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

**Table 1.1-1 – Modification Record**

Issue	Description of Change	Date of Issue
1	First Issue	27 September 2024

## 1.2 Introduction

Applicant	CINCH Systems
Manufacturer	CINCH Systems
Applicant’s Email Address	Mark.cawley@cincysystems.com
Model Number(s)	QS5130-840
Serial Number(s)	E7E72E [RUNTIME CODE] 31392D [(CC) OR Constant Carrier Code]
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15.231 ISED RSS-210 Issue 11, June 2024
Order Number	721003871
Date of Receipt of EUT	19 <sup>th</sup> September 2024
Start of Test	19 <sup>th</sup> September 2024
Finish of Test	20 <sup>th</sup> September 2024
Related Document(s)	ANSI C63.10 2013 ISED RSS-GEN Issue 5 Amendment 2, February 2021



**1.3 Scope of Testing**

To perform certification testing to confirm that the wireless device(s) meet the requirements of the applicable standards and guidance documents.

**1.4 Summary of Results**

A summary of the tests carried out in accordance with the specifications shown below.

**Table 1.4-1 – Summary of Results**

Report Section	Specification Clause		Test Description	Accreditation	Base Standard
2.1	15.203	RSS-GEN	Antenna Requirements	A2LA	FCC Part 15.203
2.2	15.231(a)(1), (2)	RSS-210 A.1.1 a, b	Deactivation Period	A2LA	ANSI C63.10:2013
2.3	15.231(a)(3)	RSS-210 A.1.1 c	Polling or Supervision Transmissions & Duty Cycle of Transmitter	A2LA	ANSI C63.10:2013
2.4	15.231(b)(1), (e)	RSS-210 A.1.2; A.1.4	Field Strength of Fundamental	A2LA	ANSI C63.10:2013
2.5	15.231(b)(1), (e)	RSS-210 A.1.2; A.1.4	Field Strength of Emissions	A2LA	ANSI C63.10:2013
2.6	15.231(c)	RSS-210 A.1.3	Occupied Bandwidth	A2LA	ANSI C63.10:2013



**Table 1.4-2 – Test Accreditation**

Test Name	Name of Tester(s)	Results / Comments
Antenna Requirements	Duranta K. Barua	Pass
Deactivation Period	Duranta K. Barua	Pass
Polling or Supervision Transmissions & Duty Cycle of Transmitter	Duranta K. Barua	Pass
Field Strength of Fundamental	Duranta K. Barua	Pass
Field Strength of Emissions	Duranta K. Barua	Pass
Occupied Bandwidth	Duranta K. Barua	Pass

**1.5 Product Information**

**1.5.1 Technical Description**

The Equipment Under Test (EUT): Transmitters for periodic operations. transmission of control signals such as those used with alarm security systems.

**Table 1.5-1 – Wireless Module Technical Information**

Detail	Description
FCC ID	2ABBZ-R-QS5130-840
IC ID	11817A-RQS5130840
Transceiver Model #	QS5130-840
Operating Frequency	319.5 MHz
Modulation Format	OOK
Antenna Type / Gain:	Integral / 2.35 dBi

A full description and detailed product specification details are available from the manufacturer.

**Table 1.5-2 – Cable Descriptions**

Cable/Port	Description
n/a	n/a

**Table 1.5-3 – Support Equipment Descriptions**

Make/Model	Description
n/a	n/a



**1.5.2 Modes of Operation**

**Table 1.5-4 – Test Frequencies & Modes of Operation**

Channel	Frequency (MHz)
Single Channel Operation	319.5 MHz

**1.6 Deviations from the Standard**

No deviations from the applicable test standard were made during testing.

**1.7 EUT Modification Record**

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

**Table 1.7-1 – Modification Record**

Modification State	Description of Modification fitted to EUT	Modification Fitted By	Date Modification Fitted
0	Initial State	-	-

**1.8 Test Location**

TÜV SÜD conducted the following tests at our New Brighton, MN Test Laboratory.  
Office address:

TÜV SÜD America  
141 14th Street NW  
New Brighton, MN 55112 USA



## 2 Test Details

### 2.1 Antenna Requirements

#### 2.1.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, 15.203  
RSS-GEN Issue 5

#### 2.1.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

#### 2.1.3 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Note: Above statement is taken from FCC Part 15 Subpart C §15.203

**Table 2.1-1 – Antenna Used In EUT**

Antenna Type	Connection Type	Antenna Gain
Integral	n/a	2.35dBi

**Note:** The Antenna is a piece of wire and used in monopole arrangement. Antenna is permanently attached to the units. Antenna does not used reverse polarity connectors. The antenna and antenna connector are fully contained within the EUT and are inaccessible to the end user.



## **2.2 Deactivation Period**

### **2.2.1 Specification Reference**

FCC 47 CFR Part 15.231(a)(1), (2)  
ISED RSS-210 A.1.1 a, b

### **2.2.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state “0”, as noted in §1.6.

### **2.2.3 Date of Test**

19<sup>th</sup> September 2024

### **2.2.4 Test Method**

The spectrum analyzer was video triggered to sweep on the TX of the device. Sweep time was set equal to or greater than the specified time for periodic operation. The device was manually activated and to confirm that it ceases transmission within the specified time of deactivation.

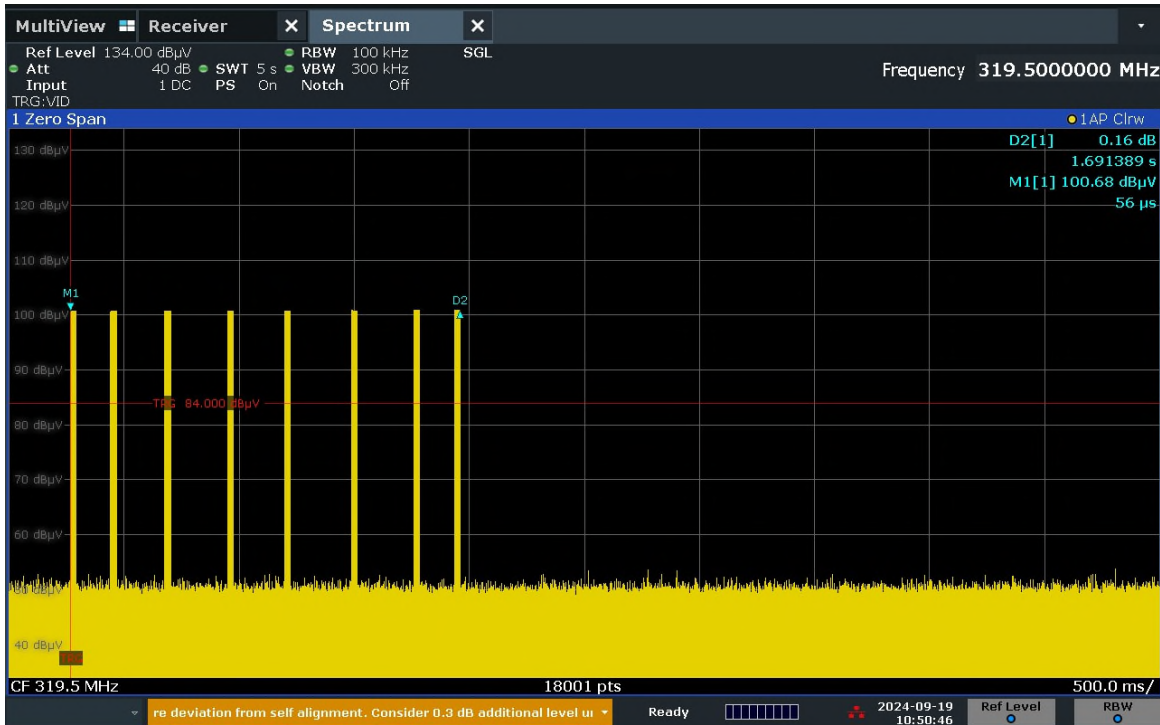
### **2.2.5 Environmental Conditions**

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.





## 2.2.6 Test Results



10:50:47 AM 09/19/2024

**Figure 2-1 – Deactivation Period**

**Test Summary:** The EUT operated as intended before, during, and after testing. The deactivation period is 1.69 seconds and within the 5 second requirement.

**Test Result: Pass**

## 2.2.7 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.2-1 – Deactivation Period Test Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
WRLE10564	EMCO/EMC Test	Near Field Probe	7405	7405-902	Y	N/A	N/A
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/02/2023	10/02/2024

Cal Code G = Calibration performed by an accredited outside source.

Cal Code B = Calibration verification performed internally.

Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

TÜV SÜD America Inc  
 141 14<sup>th</sup> Street NW  
 New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



## 2.3 Pulse Polling or Supervision Transmissions & Duty Cycle of Transmitter

### 2.3.1 Specification Reference

FCC 47 CFR Part 15.231(a)(3)  
ISED RSS-210 A.1.1 c

### 2.3.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

### 2.3.3 Date of Test

19<sup>th</sup> September 2024

### 2.3.4 Test Method

#### Duty cycle:

The EUT switches, controls, or input data streams were adjusted to ensure that the EUT is transmitting or encoded to obtain the “worst-case” pulse ON time. A radiated, direct connection (i.e., conducted) or a “near-field” coupling method was used to assess the EUT. The RBW was adjusted to be equal or larger than the occupied bandwidth of the signal; the center frequency of the spectrum analyzer was set to the center of the RF signal, and the spectrum analyzer was put into Time Domain analysis (Zero Hz Span). The Sweep Time was adjusted to obtain at least a 100 ms period of time on the horizontal display axis of the spectrum analyzer.

The EUT pulse train is **periodic** (i.e., consists of a series of pulses that repeat in a characteristic pattern over a constant time period), and the period (T) is less than or equal to 100 ms. The Trigger was set to capture at least one period of the pulse train, including any blanking intervals. Total maximum pulse “On time” (tON) over one period of the pulse train was determined by summing the duration of all of the pulses within the pulse train [i.e.,  $tON = \sum(t_1 + t_2 + \dots + t_n)$ ], and the duty cycle was then determined by dividing the total maximum “On time” by the period of the pulse train (tON/T).

The duty cycle correction factor was then determined by applying the following equation to the duty cycle determined in the preceding steps:

$$20 * \text{Log}(\text{numeric duty cycle}) = \text{Duty Correction (dB)}$$

### 2.3.5 Environmental Conditions

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.



**2.3.6 Test Results**

**Table 2.3-1 – Duty Cycle Results**

Burst Name / Number	Pulse Width (µs)	Occurrences in Period	Total On-time (µs)
1	477.89	1	477.89
2	120.22	78	9,377.16
		<b>TOTAL</b>	9,855.05

Total On-Time: **9,855.05 µs**

Aperiodic Duty Cycle:  $9.85505 \text{ ms} / 100 \text{ ms} = 0.0985505 = \mathbf{9.8\%}$

Duty Correction Factor:  $20 * \text{Log}(0.098) = \mathbf{-20.176 \text{ dB}}$

**Test Summary:** Periodic transmissions at regular predetermined intervals were verified to not exist, except where regulatory requirements allow polling or supervision transmissions, including data, to determine system integrity. In addition to this test data, compliance is addressed by an attestation supported by the equipment theory of operation.

Duty cycle will be used to convert peak measurements to average.

**Test Result: Pass**

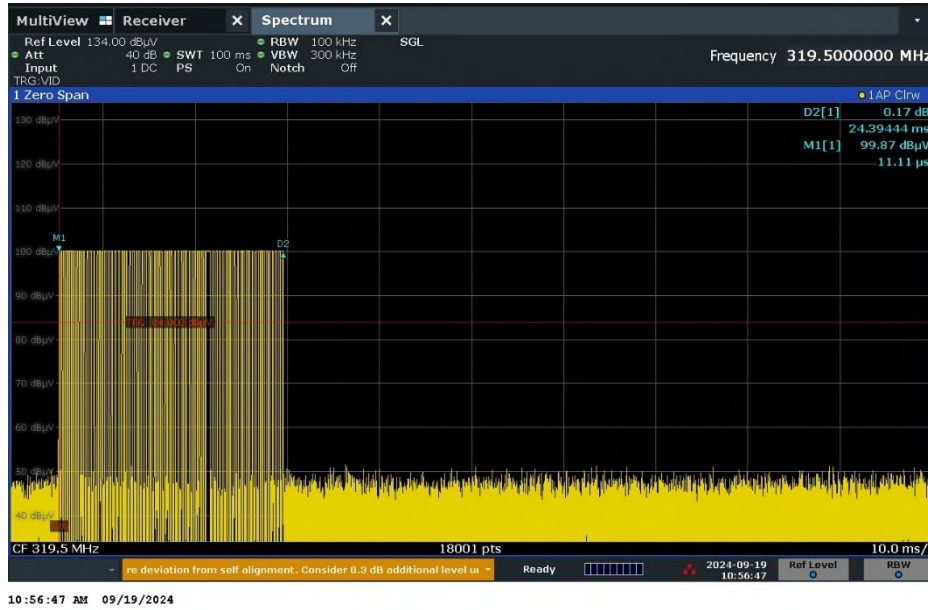


Figure 2-2 – Pulse within 100ms

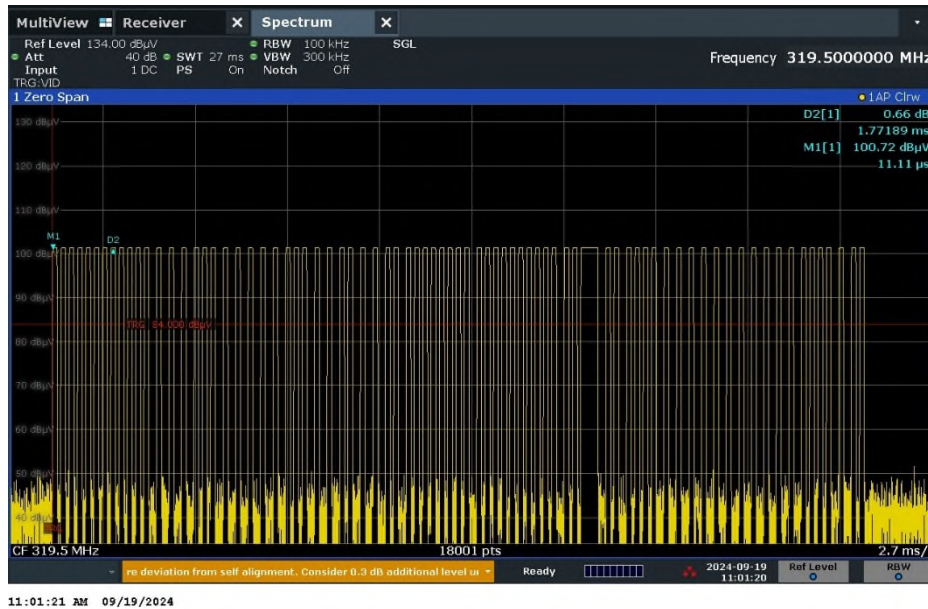


Figure 2-3 – Total Number of Pulses Within 100ms

TÜV SÜD America Inc  
141 14<sup>th</sup> Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)

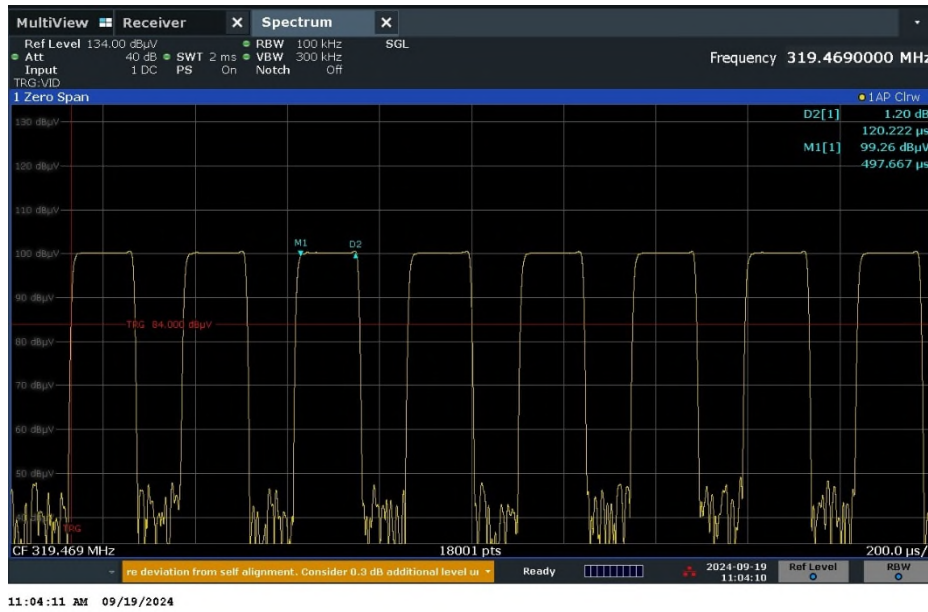


Figure 2-4 – Pulse Width 1

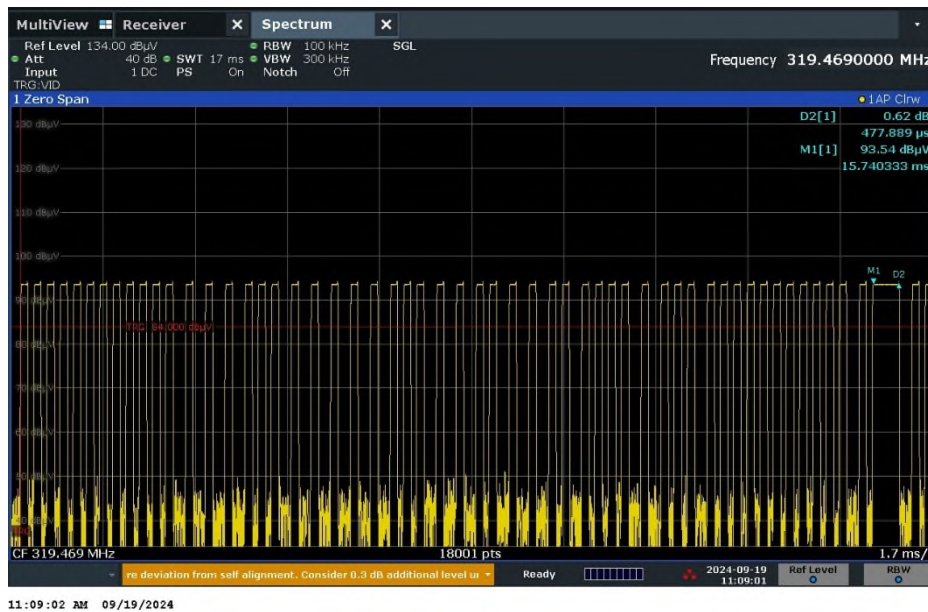


Figure 2-5 – Pulse Width 2

TÜV SÜD America Inc  
141 14<sup>th</sup> Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



**2.3.7 Test Location and Test Equipment Used**

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.3-2 – Supervision Transmissions & Duty Cycle of Transmitter Test Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
WRLE10564	EMCO/EMC Test	Near Field Probe	7405	7405-902	Y	N/A	N/A
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/02/2023	10/02/2024

Cal Code G = Calibration performed by an accredited outside source.  
 Cal Code B = Calibration verification performed internally.  
 Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



## **2.4 Radiated Fundamental Field Strength**

### **2.4.1 Specification Reference**

FCC 47 CFR Part 15.231(b)(1)  
ISED RSS-210 A.1.2; A.1.4

### **2.4.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state “0”, as noted in §1.6.

### **2.4.1 Date of Test**

19<sup>th</sup> September 2024

### **2.4.2 Test Method**

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8 m above a reference ground plane for 30-1000 MHz and 1.5m above the ground plane for above 1 GHz.

For all frequency ranges the final readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. For final measurements a manual measurement using the spectrum analyzer was used. All corrections factors, including the duty cycle value, were added as an offset to provide a corrected output power value.

### **2.4.3 Environmental Conditions**

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.



**2.4.4 Additional Observations**

The highest frequency to which the DUT was measured in accordance with §15.33(a)(1).

Automated measurements used BAT-EMC (v2022.0.27.0) software. Measurements were done at a 3m distance. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

**2.4.5 Sample Computation (Radiated Emissions)**

Measuring equipment raw measurement (dBµV) @ 30 MHz		20.0
Correction Factor (dB)	Cable 2	0.24
	TEMC00011 (antenna)	18.70
Reported Quasi-peak Final Measurement (dBµV/m) @ 30 MHz		38.94

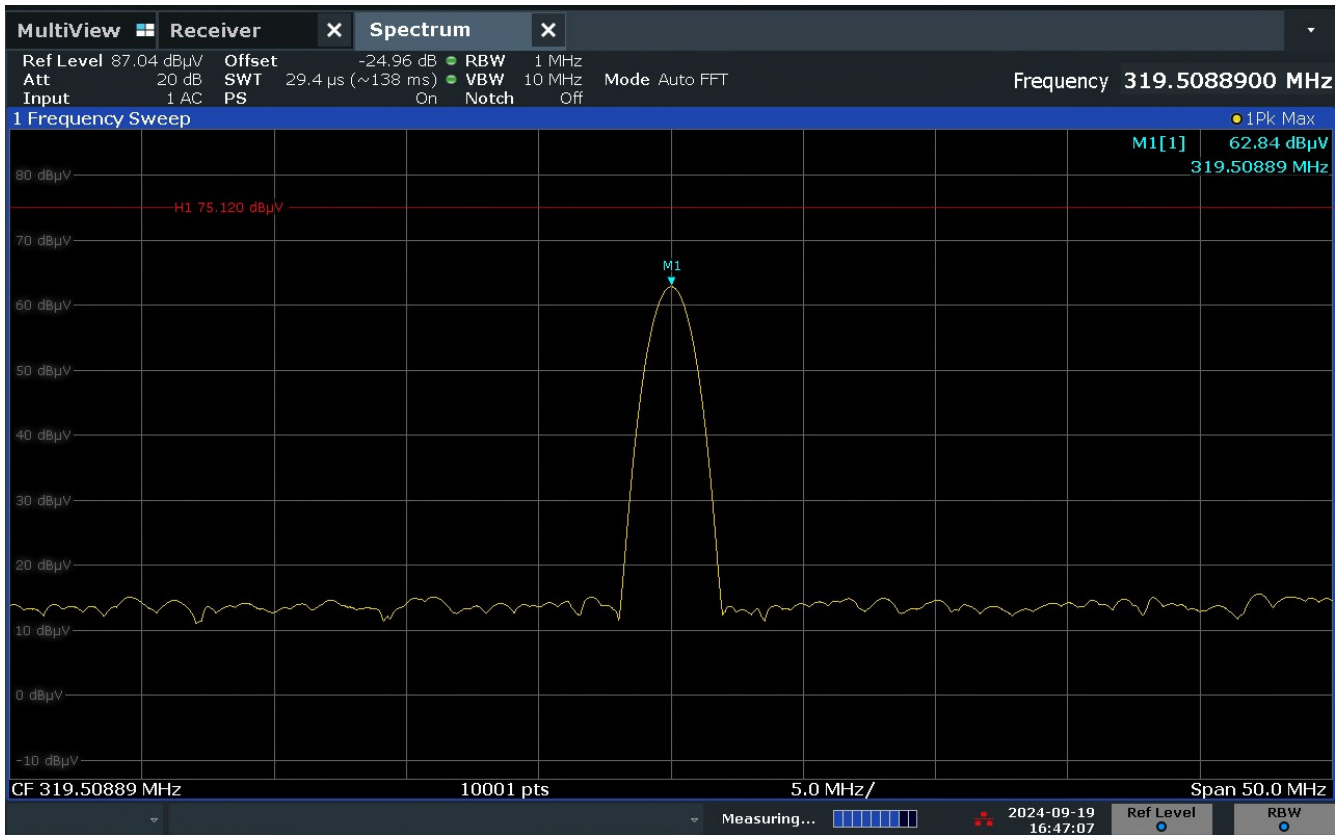
**2.4.6 Test Results**

**Test Summary:** Measurements were done with the EUT in 3 orthogonal axes to determine the worst case.

**Test Result: Pass**

See data below for detailed results.





04:47:08 PM 09/19/2024

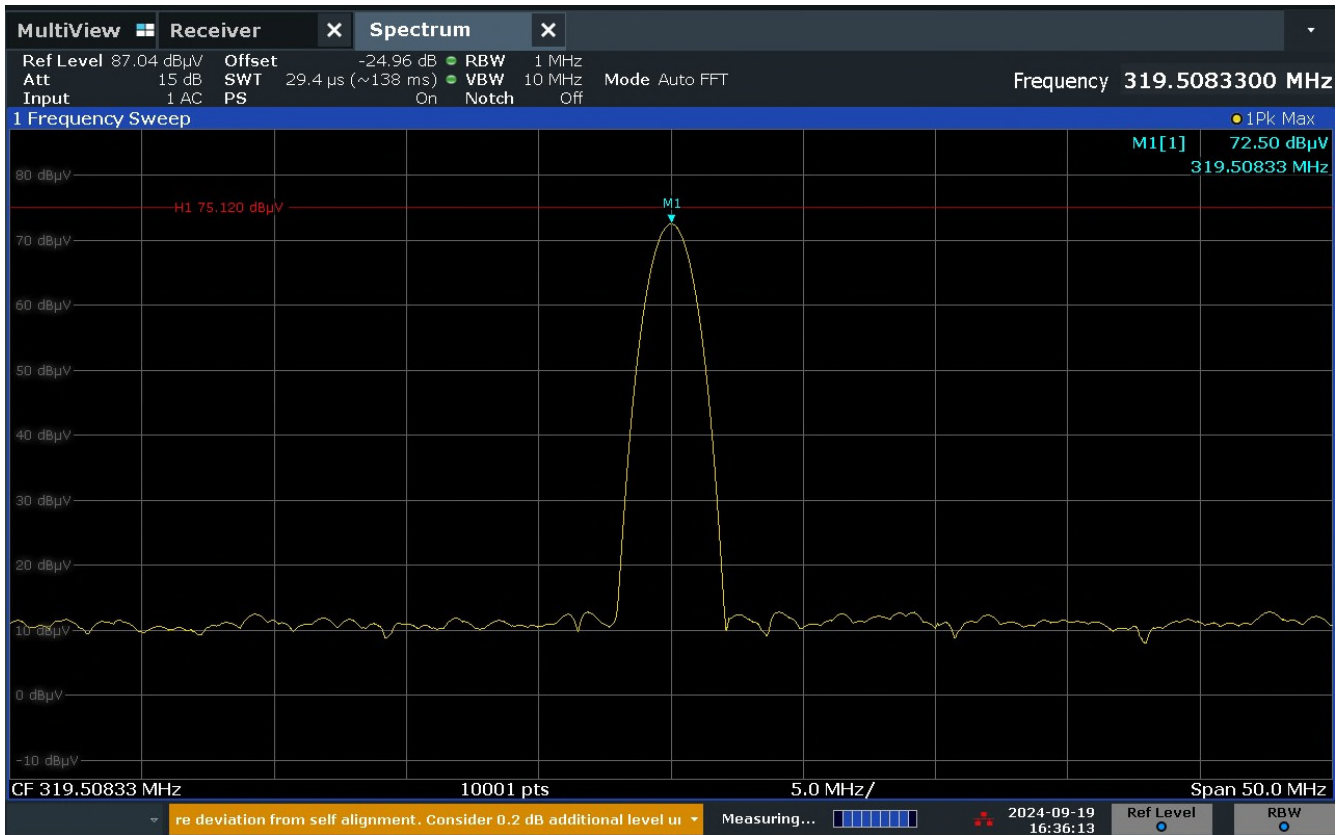
Figure 2-6 – Fundamental Field Strength – X-Axis

Frequency (MHz)	Detector Type	Correction Factor (dB)	Test Distance (m)	Average Fundamental Radiated Field Strength (dBuV/m)	Average Fundamental Radiated limit (dBuV/m)	Margin (dB)
319.50	Peak	-24.96	3	62.84	75.120	-12.28

Note: Correction factor includes duty cycle correction factor as described in Section 2.3 of this test report.

TÜV SÜD America Inc  
 141 14<sup>th</sup> Street NW  
 New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



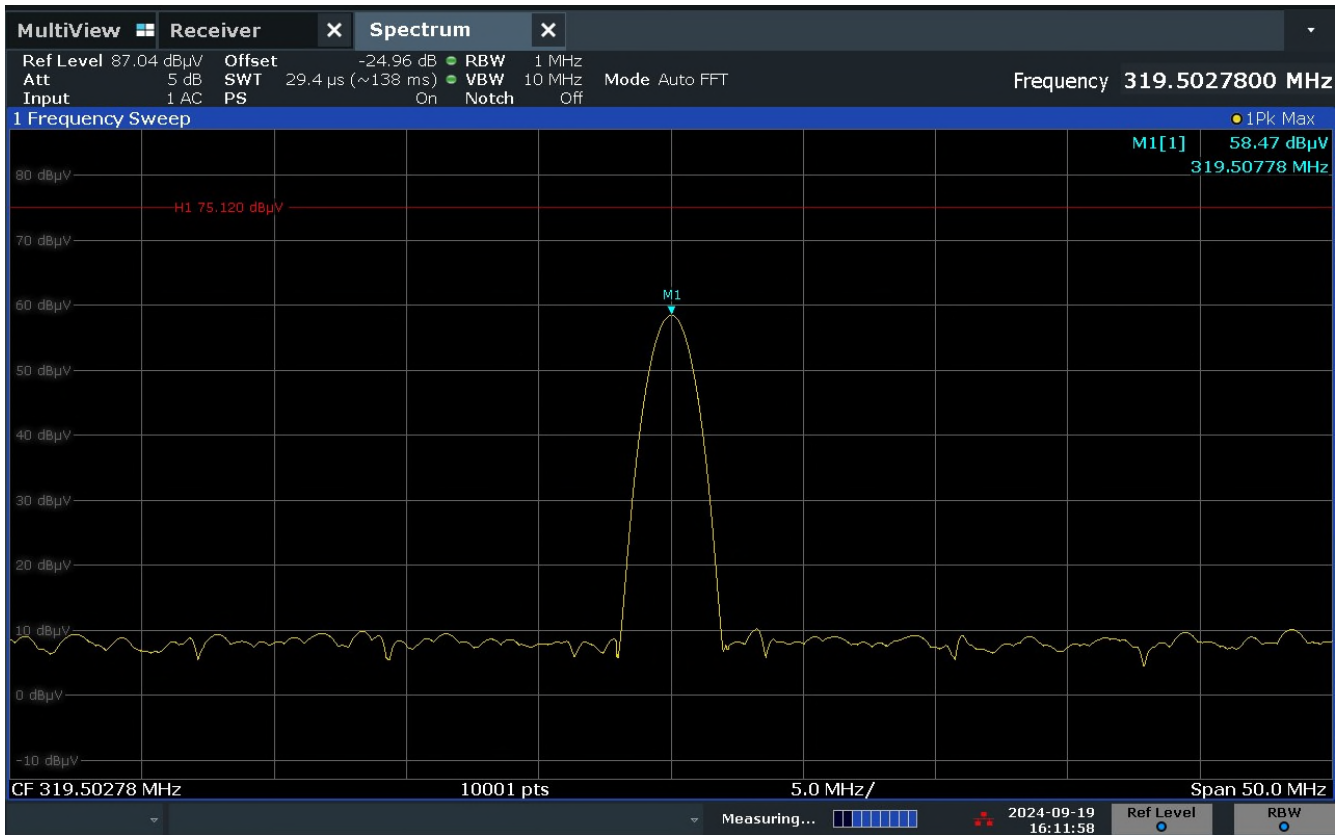
04:36:14 PM 09/19/2024

Figure 2-7 – Fundamental Field Strength – Y-Axis

Frequency (MHz)	Detector Type	Correction Factor (dB)	Test Distance (m)	Average Fundamental Radiated Field Strength (dBuV/m)	Average Fundamental Radiated limit (dBuV/m)	Margin (dB)
319.50	Peak	-24.96	3	72.50	75.120	-2.62

TÜV SÜD America Inc  
 141 14<sup>th</sup> Street NW  
 New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



04:11:58 PM 09/19/2024

Figure 2-8 – Fundamental Field Strength – Z-Axis

Frequency (MHz)	Detector Type	Correction Factor (dB)	Test Distance (m)	Average Fundamental Radiated Field Strength (dBuV/m)	Average Fundamental Radiated limit (dBuV/m)	Margin (dB)
319.50	Peak	-24.96	3	58.47	75.120	-16.65

TÜV SÜD America Inc  
 141 14<sup>th</sup> Street NW  
 New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



**2.4.7 Test Location and Test Equipment Used**

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.4-1 – Radiated Emissions Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE11142	Hewlett-Packard	Preamplifier, 0.1 to 1300 MHz	8447D	2727A05370	B	10/19/2023	10/19/2024
NBLE11645	Schwarzbeck	Antenna, Trilog Broadband, 30-7000 MHz	VULB 9162	0254	G	04/25/2023	04/25/2025
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/02/2023	10/02/2024

Cal Code G = Calibration performed by an accredited outside source.  
 Cal Code B = Calibration verification performed internally.  
 Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



## **2.5 Radiated Spurious Emissions**

### **2.5.1 Specification Reference**

FCC 47 CFR Part 15.231(b)(1), (e)  
ISED RSS-210 A.1.2; A.1.4

### **2.5.2 Equipment Under Test and Modification State**

As shown in §1.4 with modification state “0”, as noted in §1.6.

### **2.5.3 Date of Test**

20<sup>th</sup> December 2024

### **2.5.4 Test Method**

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8 m above a reference ground plane for 30-1000 MHz and 1.5m above the ground plane for above 1 GHz.

For all frequency ranges a pre-scan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance.

For all frequency ranges the final readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. The pre-calculated duty cycle factor was included in the correction factor to provide a corrected peak measurement.

The EUT was assessed against the limits specified in FCC 47 CFR Part 15C §15.231(b).

### **2.5.5 Environmental Conditions**

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.



**2.5.6 Additional Observations**

Automated measurements used BAT-EMC (v2022.0.27.0) software. Measurements were done at a 3m distance. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

**2.5.7 Sample Computation (Radiated Emissions)**

Measuring equipment raw measurement (dBµV/m) @ 30 MHz		20.0
Correction Factor (dB)	Cable 2	0.24
	TEMC00011 (antenna)	18.70
Reported Quasi-peak Final Measurement (dBµV/m) @ 30 MHz		38.94

**2.5.8 Test Results**

**Test Summary:** The duty cycle correction factor as shown in this report was used as part of the overall measurement correction factor. The EUT was tested only in the worst-case axis orientation based on the radiated output power measurements, Z axis was determined as worst-case orientation. EUT operated as intended before, during, and after testing.

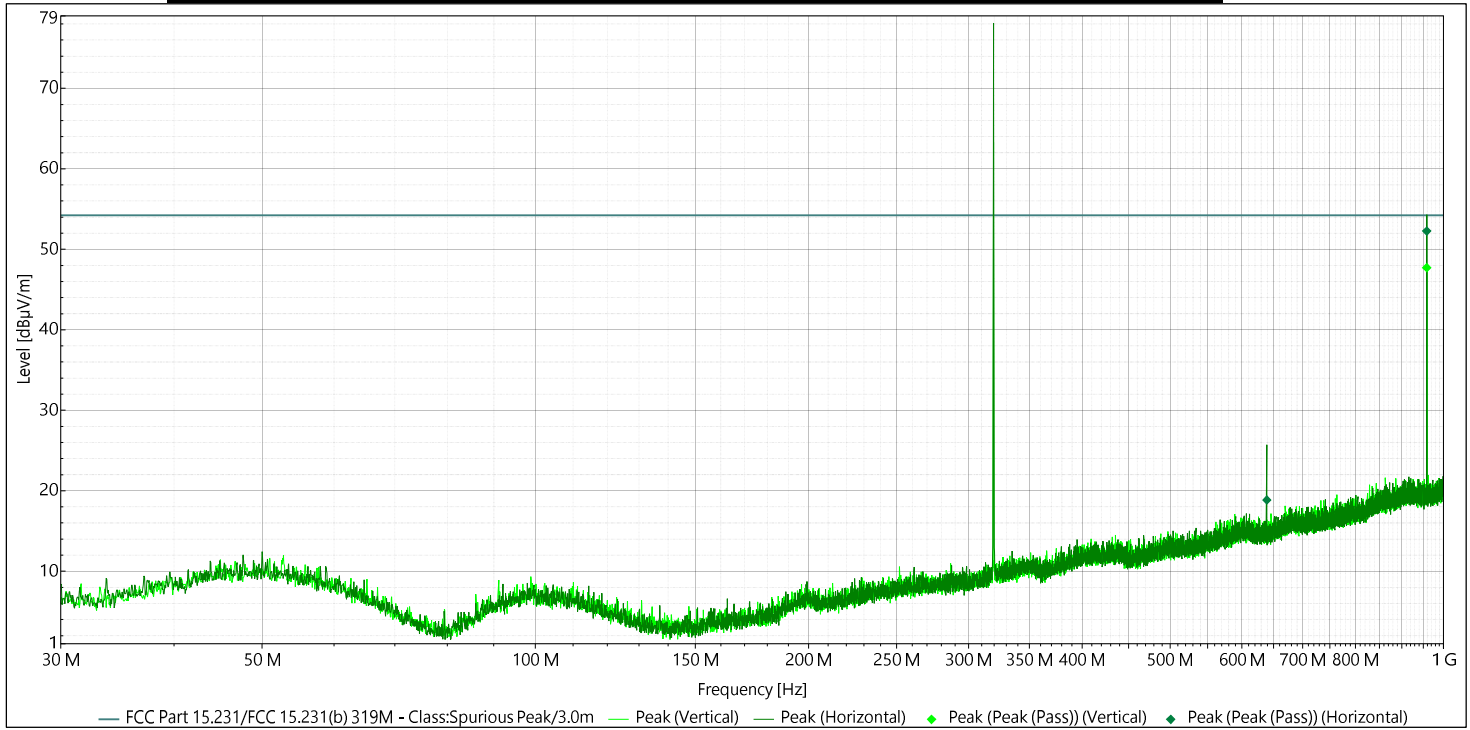
**Test Result: Pass**

See data below for detailed results.



### Spurious Emissions 30M-1GHz

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
30 MHz - 1 GHz	3m	Vertical	100 kHz	18001 Pts	Auto
30 MHz - 1 GHz	3m	Horizontal	100 kHz	18001 Pts	Auto



**Limit:** FCC Part 15.231/FCC 15.231(b) 319M      **Test Date:** 9/20/2023      **Test Results:** Pass

Test Notes: Duty cycle correction factor of -20.176 dB was included in the overall measurement correction.

**Figure 2-9 – RE Spurious Emissions 30-1000 MHz**

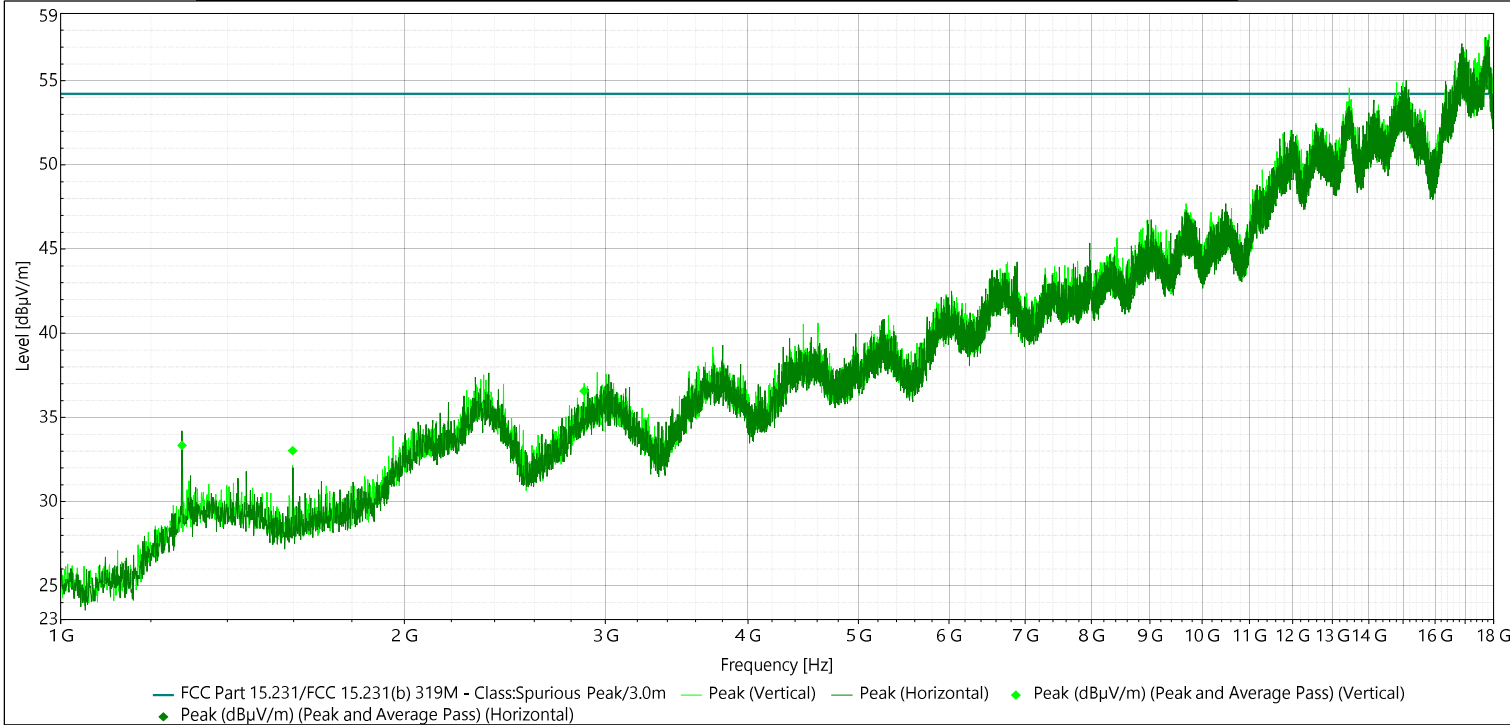
**Table 2.5-1 – RE Spurious Emissions 30-1000 MHz**

Frequency (MHz)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
958.505	47.72	54.22	-6.50	221.00	1.34	Vertical	Pass
639.052	18.86	54.22	-35.36	84.00	1.55	Horizontal	Pass
958.559	52.27	54.22	-1.95	110.00	1.00	Horizontal	Pass



### Spurious Emissions 1GHz-18GHz

Frequency Range	Antenna Distance	Antenna Polarization	RBW	Step Size	Sweep Time
1 GHz - 18 GHz	3m	Vertical	1 MHz	18001 Pts	Auto
1 GHz - 18 GHz	3m	Horizontal	1 MHz	18001 Pts	Auto



**Limit:** FCC Part 15.231/FCC 15.231(b) 319M  
**Test Date:** 9/20/2023  
**Test Results:** Pass

Test Notes: Duty cycle correction factor of -20.176 dB was included in the overall measurement correction.

Figure 2-10 – RE Spurious Emissions 1-18 GHz

Table 2.5-2 – RE Spurious Emissions 1-18 GHz

Frequency (MHz)	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
1277.666	33.34	54.22	-20.88	267.00	4.00	Vertical	Pass
1596.888	33.03	54.22	-21.19	93.00	1.00	Vertical	Pass
2874.722	36.57	54.22	-17.65	132.00	1.00	Vertical	Pass
17196.277	54.03	54.22	-0.19	0.00	1.00	Horizontal	Pass

TÜV SÜD America Inc  
 141 14<sup>th</sup> Street NW  
 New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)





**2.5.9 Test Location and Test Equipment Used**

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.5-3 – Radiated Emissions Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE11085	Inmet	Attenuator, 10 dB	18N20W-10dB	11085	B	09/02/2023	09/02/2024
NBLE11142	Hewlett-Packard	Preamplifier, 0.1 to 1300 MHz	8447D	2727A05370	B	10/19/2023	10/19/2024
WRLE11519	Com-Power Corp.	Preamplifier, 500 MHz-18 GHz	PAM-118A	18040002	B	01/23/2023	01/23/2024
NBLE11630	ETS-Lindgren	Antenna, 1-18 GHz	3117	00218816	G	09/27/2022	09/27/2024
NBLE11645	Schwarzbeck	Antenna, Trilog Broadband, 30-7000 MHz	VULB 9162	0254	G	04/25/2023	04/25/2025
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/02/2023	10/02/2024

Cal Code G = Calibration performed by an accredited outside source.  
 Cal Code B = Calibration verification performed internally.  
 Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



## 2.6 Occupied Bandwidth

### 2.6.1 Specification Reference

FCC 47 CFR Part 15.231(c)  
ISED RSS-210 A.1.3

### 2.6.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

### 2.6.3 Date of Test

19<sup>th</sup> December 2024

### 2.6.4 Test Method

The center frequency of the Spectrum Analyzer was set to the nominal EUT channel center frequency. The span range for the spectrum analyzer was set between  $2 \times$  to  $5 \times$  the EBW (or OBW). The RBW was set to 1% to 5% of the anticipated OBW, and the VBW shall be set  $\geq 3 \times$  RBW. The reference level of the spectrum analyzer was set to accommodate the maximum input amplitude level, with the detection mode set to peak, and trace mode set to max hold. The OBW automatic measurement function in the spectrum analyzer was utilized to produce either the Power Bandwidth or XdB down Bandwidth.

### 2.6.5 Environmental Conditions

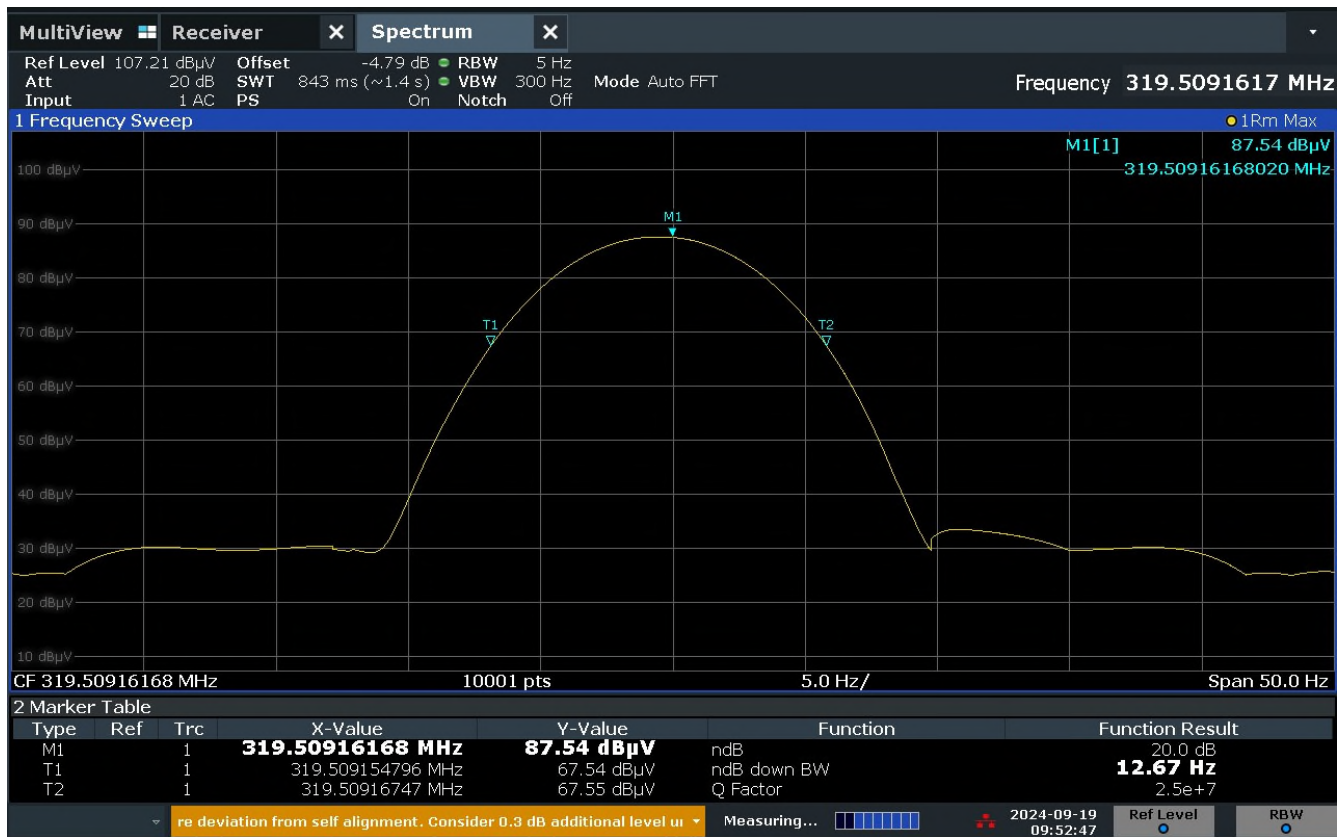
The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.



### 2.6.6 Test Results

Table 2.6-1 – Occupied Bandwidth

Frequency (MHz)	Occupied Bandwidth Type	Occupied Bandwidth (Hz)	Limit (kHz)
319.50	20 dB down	12.67	0.25% of centre Freq = 798.75



09:52:47 AM 09/19/2024

Figure 2-11 – Occupied Bandwidth

TÜV SÜD America Inc  
 141 14<sup>th</sup> Street NW  
 New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



**2.6.7 Test Location and Test Equipment Used**

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.6-2 – Conducted Emissions Test Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE11142	Hewlett-Packard	Preamplifier, 0.1 to 1300 MHz	8447D	2727A05370	B	10/19/2023	10/19/2024
NBLE11645	Schwarzbeck	Antenna, Trilog Broadband, 30-7000 MHz	VULB 9162	0254	G	04/25/2023	04/25/2025
NBLE11754	Rohde & Schwarz	Receiver, 1 Hz-44 GHz	ESW44	103037	G	10/02/2023	10/02/2024

Cal Code G = Calibration performed by an accredited outside source.  
 Cal Code B = Calibration verification performed internally.  
 Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

### 3 Diagram of Test Setups

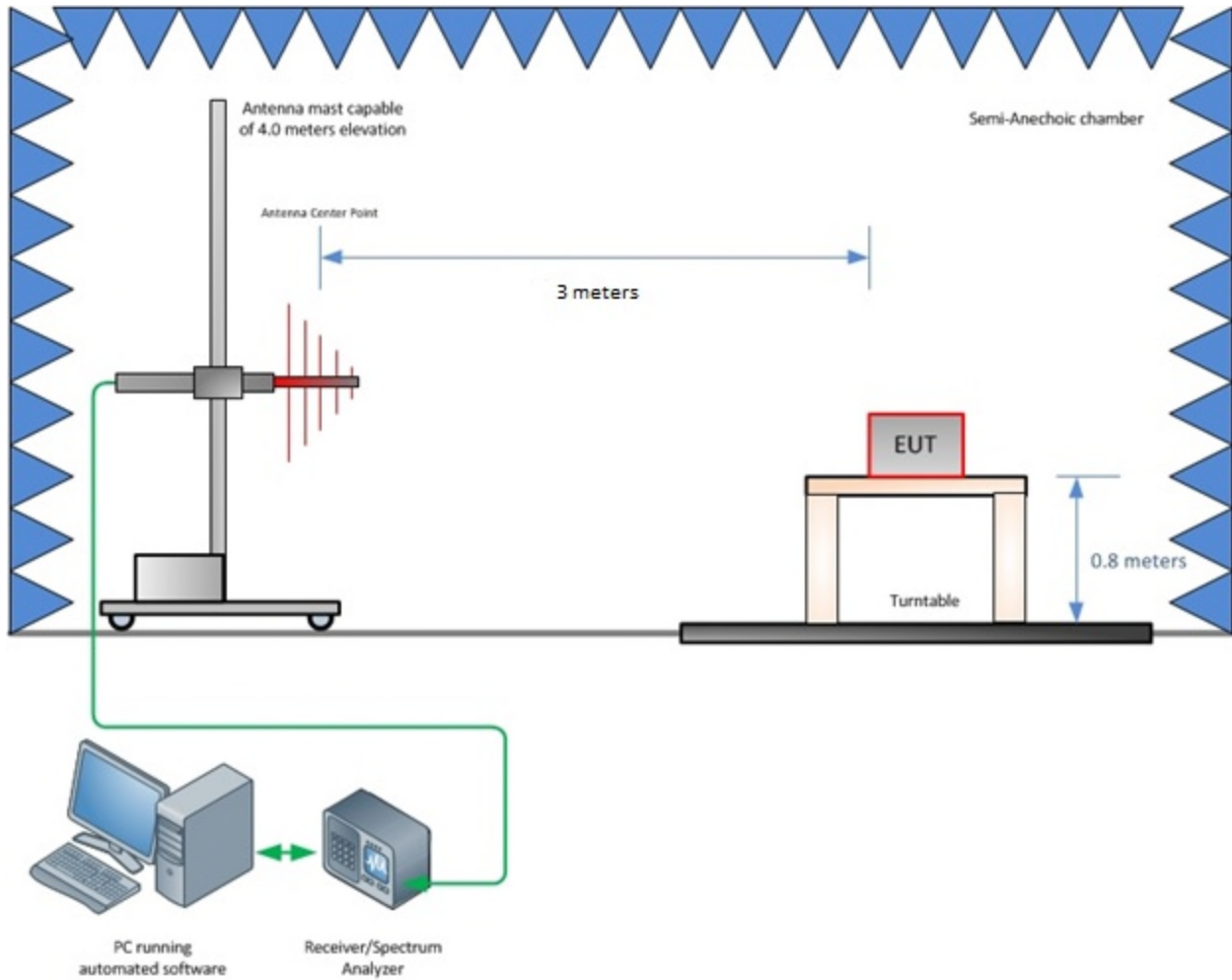
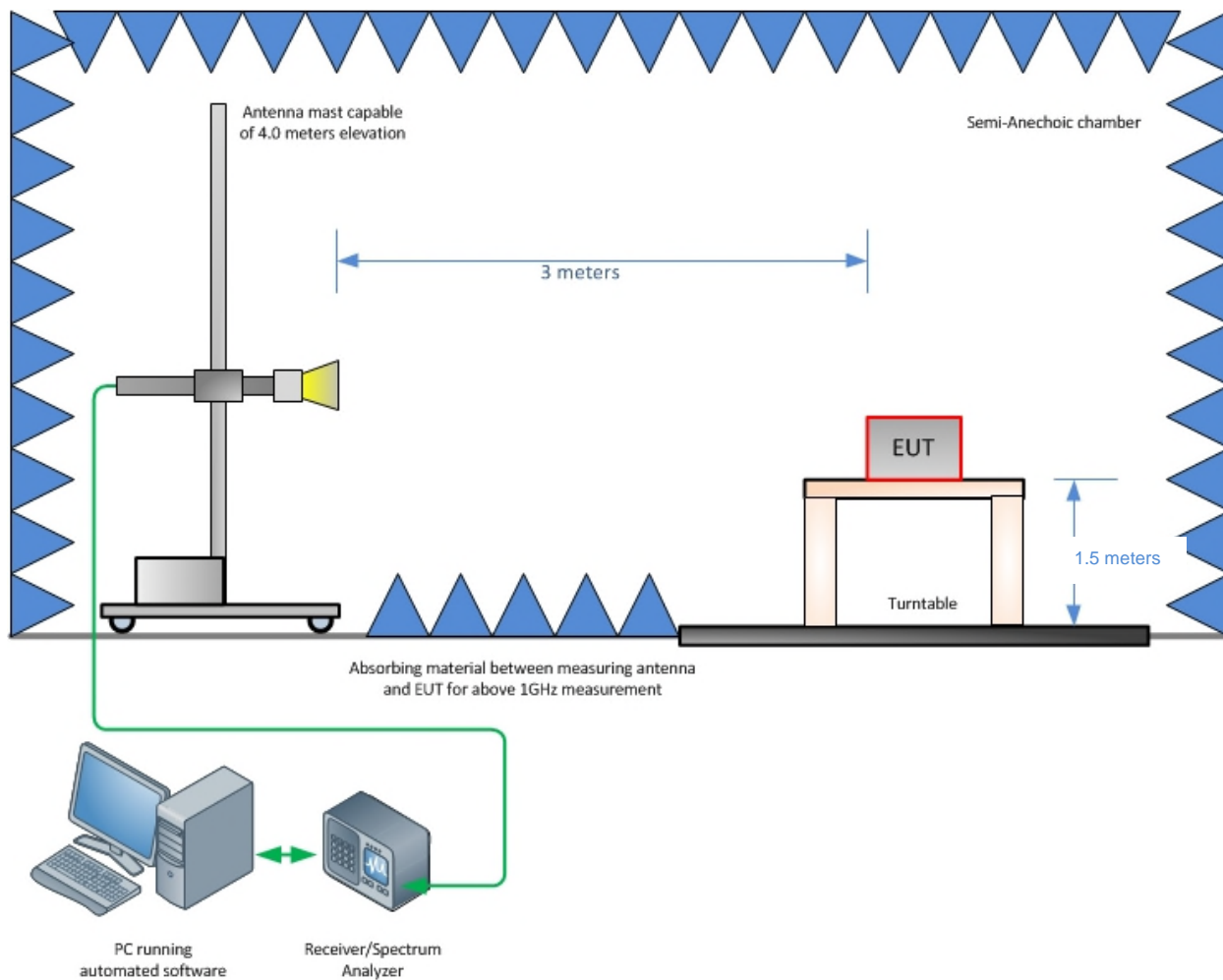


Figure 3-1 – Radiated Emissions Test Setup up to 1 GHz



**Figure 3-2 – Radiated Emissions Test Setup above 1 GHz**



## 4 Accreditation, Disclaimers and Copyright

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

### STATEMENT OF MEASUREMENT UNCERTAINTY – Emissions

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. This test system has a measurement uncertainty of  $\pm 3.30$  dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. This test system for 30 MHz-1000 MHz has a measurement uncertainty of  $\pm 5.88$  dB and above 1 GHz a measurement uncertainty of  $\pm 4.47$  dB. The measurement uncertainty values for conducted and radiated emissions meet the requirements as expressed in CISPR 16-4-2. The equipment comprising the test systems is calibrated on an annual basis.

### TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated to meet test method standard requirements and/or manufacturer's specifications