



Solutions

# TEST REPORT

**Test Report No.: UL-RPT-RP-14866348-816**

**Applicant \*** : CHERUBINI S.p.A.  
**Model No. / PMN \*** : POP  
**FCC / ISED ID \*** : FCC ID: 2AOG9POP2023  
IC: 23480-POP2023  
**HVIN \*:** : POP PLUS  
**Technology** : SRD (433.92 MHz)  
**Test Standard(s)** : **FCC Parts 15.209(a) & 15.231**  
**Innovation, Science and Economic Development Canada**  
**RSS-210 Issue 10 December 2019 & RSS-Gen Issue 5 April 2018**  
For details of applied tests refer to test result summary

1. This test report shall not be reproduced in full or partial, without the written approval of UL International Germany GmbH.
2. The results in this report apply only to the sample tested.
3. The test results in this report are traceable to the national or international standards.
4. **Test Report Version 2.0 supersede Version 1.5 with immediate effect**  
Test Report No. UL-RPT-RP-14866348-816 Version 2.0 Issue Date 25 September 2024 replaces  
Test Report No. UL-RPT-RP-14866348-816 Version 1.5, Issue Date 05 July 2024, which is no longer valid.
5. Result of the tested sample: **PASS**
6. All information marked with a (\*) were provided by customer / applicant or authorized representative

Prepared by: Muhammad Faiq Khan  
Title: Project Engineer  
Date: 25 September 2024

Approved by: Rachid Acharkaoui  
Title: Operations Manager  
Date: 25 September 2024



Deutsche  
Akkreditierungsstelle  
D-PL-19381-02-00

This laboratory is accredited by DAkkS.  
The tests reported herein have been performed in  
accordance with its' terms of accreditation.

**UL INTERNATIONAL GERMANY GMBH**

Hedelfinger Str. 61  
70327 Stuttgart, Germany  
STU.CTECHLab@ul.com

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## **1. Customer Information \***

### **1.1.Applicant Information**

<b>Company Name:</b>	CHERUBINI S.p.A.
<b>Company Address:</b>	via Adige, 55, 25081 Bedizzole BS, Italy
<b>Contact Person:</b>	Fabio Medelin
<b>Contact Phone No.:</b>	+39 0306872039
<b>Contact E-Mail Address:</b>	Fabio.medelin@cherubini.it

### **1.2.Manufacturer Information**

<b>Company Name:</b>	CHERUBINI S.p.A.
<b>Company Address:</b>	via Adige, 55, 25081 Bedizzole BS, Italy
<b>Contact Person:</b>	Fabio Medelin
<b>Contact Phone No.:</b>	+39 0306872039
<b>Contact E-Mail Address:</b>	Fabio.medelin@cherubini.it

## 2. Summary of Testing

### 2.1. General Information

#### Applied Standards

<b>Specification Reference:</b>	47CFR15.231
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Radio Frequency Devices) - Section 15.231
<b>Specification Reference:</b>	47CFR15.209
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.209
<b>Specification Reference:</b>	RSS-Gen Issue 5, April 2018, Amendment 2 (February 2021)
<b>Specification Title:</b>	General Requirements for Compliance of Radio Apparatus
<b>Specification Reference:</b>	RSS-210 Issue 10 December 2019, Amendment (April 2020)
<b>Specification Title:</b>	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

#### Location

<b>Location of Testing:</b>	UL International Germany GmbH Hedelfinger Str. 61 70327 Stuttgart Germany
<b>Test Firm Registration:</b>	399704
<b>Company Number:</b>	22511
<b>CABID:</b>	DE0008

#### Date information

<b>Order Date:</b>	26 June 2023
<b>EUT arrived:</b>	13 November 2023
<b>Test Dates:</b>	24 November 2023 to 22 April 2024
<b>EUT returned:</b>	-/-

## 2.2. Summary of Test Results

FCC reference	ISED reference	Measurement	Complied	Did not comply	Not performed	Not applicable
Part 15.207	RSS-Gen 8.8	Transmitter AC Conducted Emissions <sup>(1)</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Part 15.203	-	Antenna Requirement <sup>(2)</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.231(a)	RSS-210 A.1.1	Transmitter behaviour (Periodic Operation)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.231(b)	RSS-Gen 6.12 RSS-210 A.1.2	Transmitter Fundamental Field Strength	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.231(c)	-	20 dB Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-	RSS-210 A.1.3	99% Occupied Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.209 / Part 15.231 (b)	RSS-Gen RSS-210 A.1.2	Transmitter Radiated Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Decision rule:**  
Where not otherwise specified or communicated in writing, statements of conformity (e.g. Pass/Fail) are established according to the following decision rule: considering the ILAC G8:2019 chapter 4.2.1 (simple acceptance rule). This leads to a maximum 50% of false accept or false reject when the measured value equals the tolerance limit. See ILAC-G8:09/2019 for further details.

### Note(s):

1. Test not applicable since EUT is a battery powered device.
2. According to customer declaration the EUT uses an integral PCB antenna. The antenna is not replaceable thus meeting the requirements of FCC 15.203.

## 2.3. Methods and Procedures

<b>Reference:</b>	ANSI C63.10-2013
<b>Title:</b>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
<b>Reference:</b>	ANSI C63.4-2014
<b>Title:</b>	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

## 2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT) \***

<b>Brand Name:</b>	CHERUBINI
<b>Model No. / PMN:</b>	POP
<b>Serial Number:</b>	Test sample #3 (Radiated Test Sample)
<b>Hardware Version Number:</b>	CH05061-01
<b>Firmware Version Number:</b>	2.102
<b>HVIN:</b>	POP PLUS
<b>FVIN:</b>	N/A
<b>FCC ID:</b>	2AOG9POP2023
<b>ISED Certification No.:</b>	IC: 23480-POP2023

#### **3.2. Description of EUT \***

The equipment under test was a Remote controller for tubular motors supporting SRD 433.92 MHz technology

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing \***

<b>Tested Technology:</b>	SRD
<b>Category of Equipment:</b>	Transmitter
<b>Channel Spacing:</b>	Single channel device
<b>Transmit Frequency Range:</b>	433.92 MHz
<b>Power supply Requirement(s):</b>	2 x 1.5V DC via AAA Alkaline battery
<b>Antenna Type:</b>	Integrated Loop Antenna
<b>Max. Fundamental Field Strength (Average):</b>	75.91 dB $\mu$ V/m @ 3m

**3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

**A. Support Equipment (In-house)**

Item	Description	Brand Name	Model Name or Number	Serial Number
1	-/-	-/-	-/-	-/-

**B. . Support Equipment (Manufacturer supplied) \***

Item	Description	Brand Name	Model Name or Number	Serial Number
1	-/-	-/-	-/-	-/-



## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Continuous transmitting modulated carrier at maximum power.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- The EUT was configured to transmit a continuous modulated carrier with maximum power by default

#### **EUT Power supply:**

- The EUT was powered via 2 x 1.5V DC via AAA Alkaline battery.

#### **Radiated Measurements:**

- Before starting final radiated spurious emission measurements “worst case verification” with the EUT in Standing, Laying & 45° tilting-position was performed by Lab.
- The EUT in Standing-position was found to be the worst case therefore this report includes relevant results.
- Radiated measurements below 30 MHz were performed with the EUT positioned on the turn table and rotating 360 degrees while the loop antenna height was set to 100 cm.
- Radiated measurements above 30 MHz were performed with the EUT positioned on the turn table and rotating 360 degrees while the antenna height varies from 1 to 4 m over the measurement frequency range.
- R&S®EMC32 Measurement Software V11.30.00 was used for the radiated spurious emission measurements.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 6 *Measurement Uncertainty* for details.

In accordance with DAkkS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

**5.2. Test Results**

**5.2.1. Transmitter behaviour (Periodic Operation)**

**Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	14 February 2024
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 9		

<b>FCC Reference:</b>	Part 15.231(a)
<b>ISED Reference:</b>	RSS-210 A.1.1

**Environmental Conditions:**

<b>Temperature (°C):</b>	21.9
<b>Relative Humidity (%):</b>	42.6

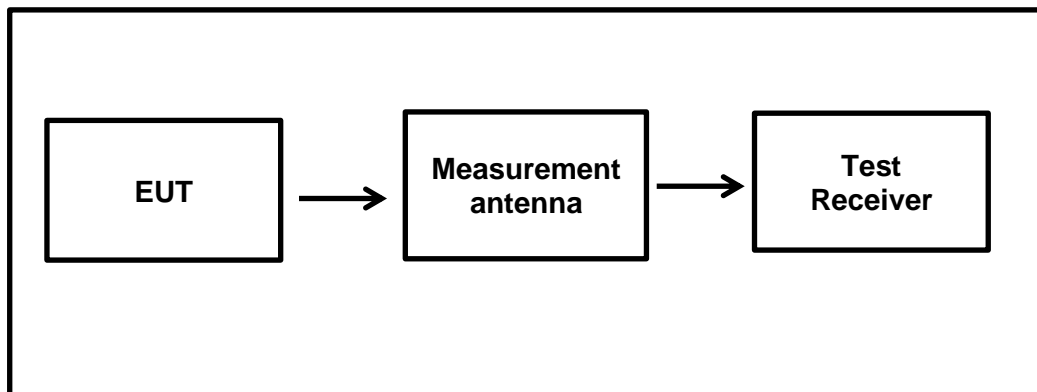
**Settings of the Instrument:**

<b>RBW/VBW</b>	200 kHz / 1 MHz
<b>Span</b>	Zero-span
<b>Sweep time</b>	1s
<b>Detector</b>	Auto Peak

**Notes:**

1. The zero-span mode of the spectrum analyzer was used to determine the ON and OFF time of the transmitter after the Transmit button was released to switch off the transmission.
2. The manually operated transmitter shall automatically deactivate the transmission within not more than 5 seconds after the Transmit button was released.

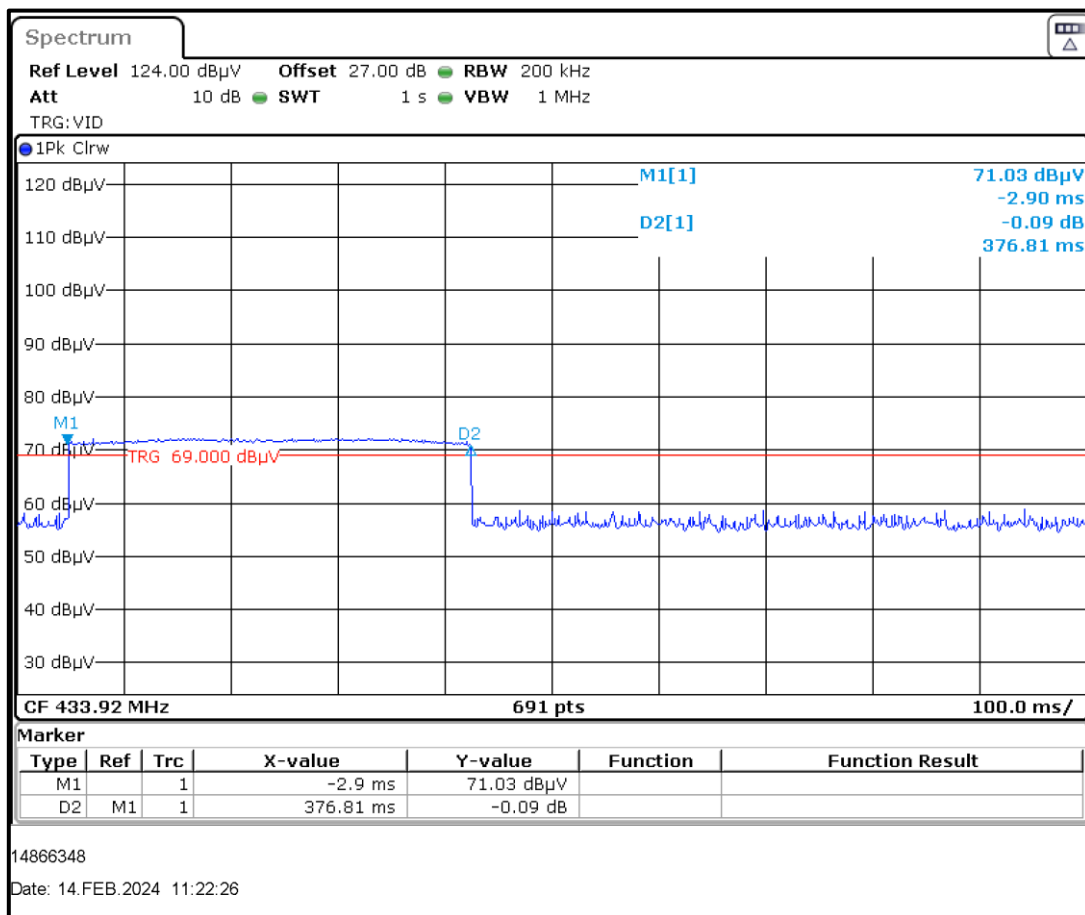
**Test Setup:**



**Transmitter behaviour (Periodic Operation) (continued)**

**Results: Active 433.92 MHz**

Channel Frequency	Maximum Deactivate Time (ms)	Limit (s)	Result
433.92 MHz	376.81	<5	Complied



**433.92 MHz**

**Result: Pass**

**5.2.2. Radiated Field Strength**

**Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	14 February 2024 and 22 April 2024
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 1/2		

<b>FCC Reference:</b>	FC 47 CFR Part 15.231(b)
<b>ISED Reference:</b>	RSS-Gen 6.12 RSS-210 A.1.2
<b>Test Method Used:</b>	ANSI C63.10 Section 6.5

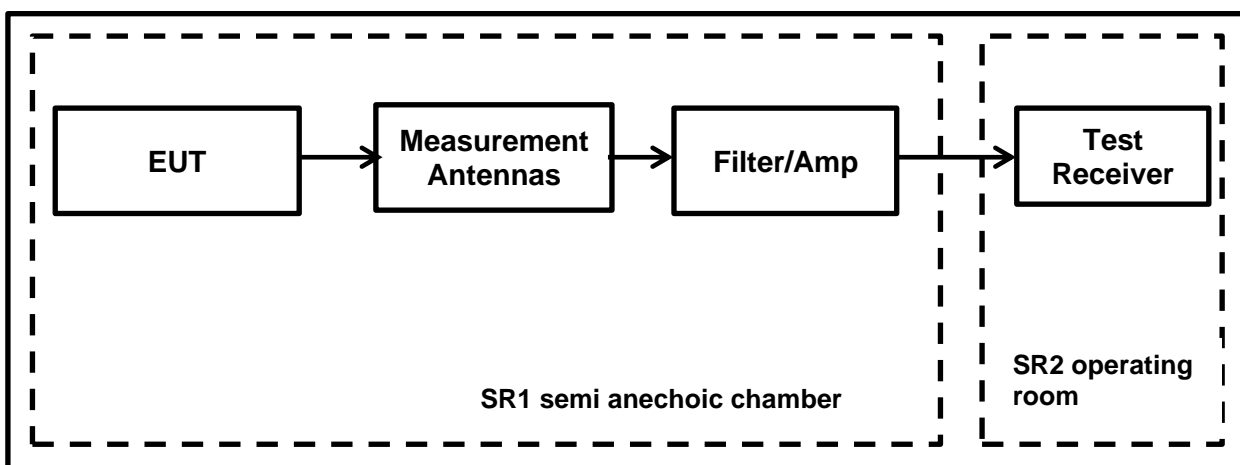
**Environmental Conditions:**

<b>Temperature (°C):</b>	20.1 to 21.3
<b>Relative Humidity (%):</b>	39.0 to 42.1

**Note(s):**

1. Measurement was performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m.
2. The measurement of the radiated field strength on fundamental frequency was performed on 14 February 2024 and Duty cycle measurements were performed on 22 April 2024.
3. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A Peak detector was used and sweep time was set to auto.
4. The Field strength limit was calculated using below formula for 433.92 MHz frequency.
  - For 260-470 MHz: Field Strength (µV/m) = (41.67 x f) - 7083

**Test Setup:**

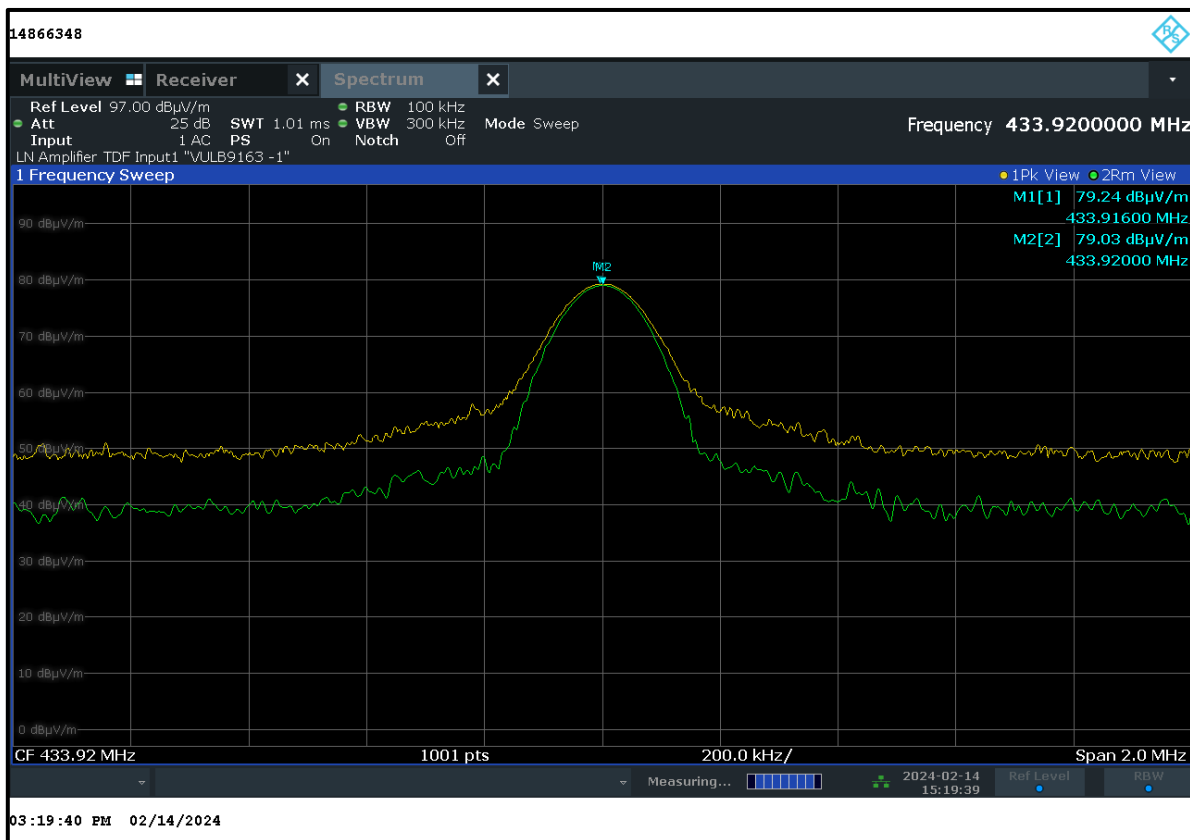


**Transmitter Radiated Field Strength (continued)**

**Results: Transmitter active**

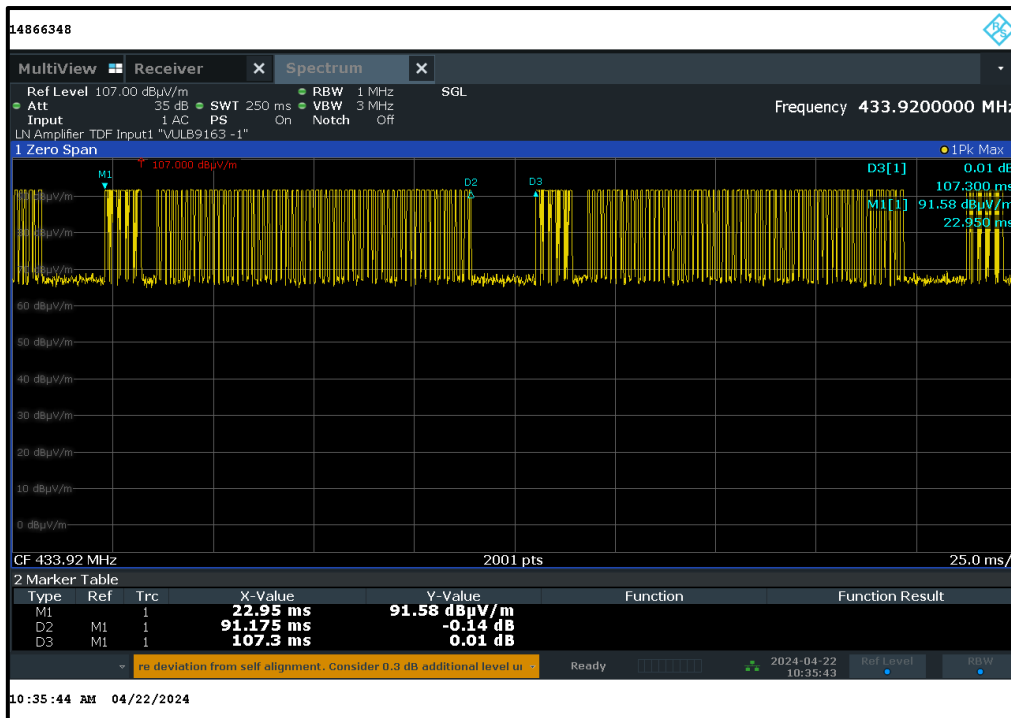
Frequency (MHz)	Antenna Polarisation	Peak Level (dB $\mu$ V/m)	Duty cycle correction factor	Calculated Average Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
433.92	Vertical	79.24	-6.04	73.20	80.82	7.62

Result: **Pass**

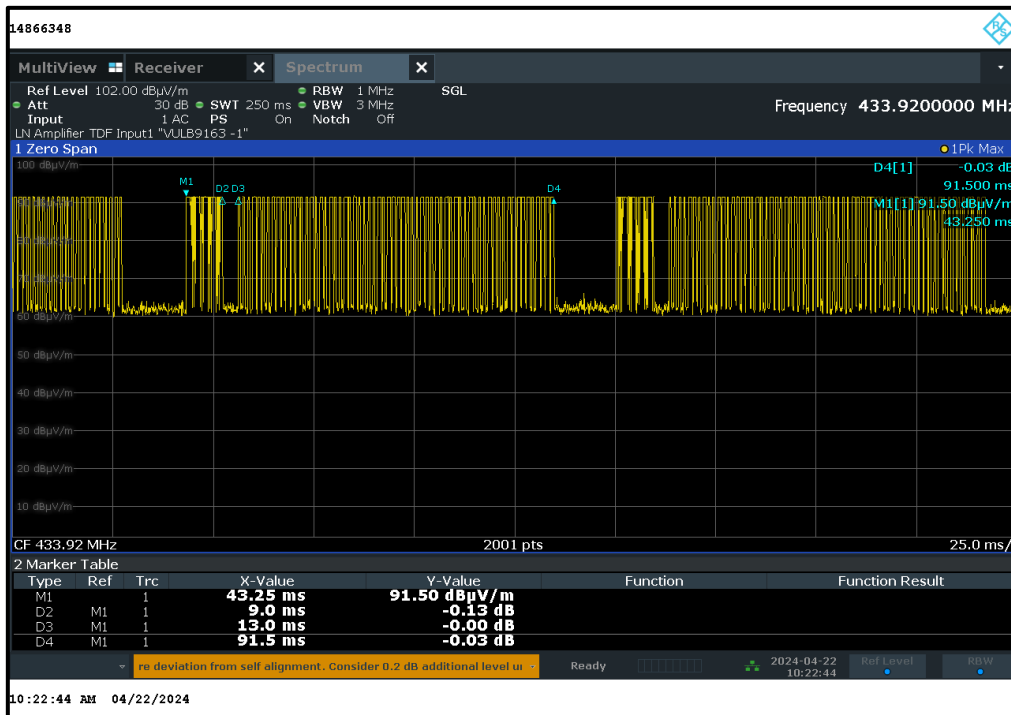


**Transmitter Radiated Field Strength (continued)**

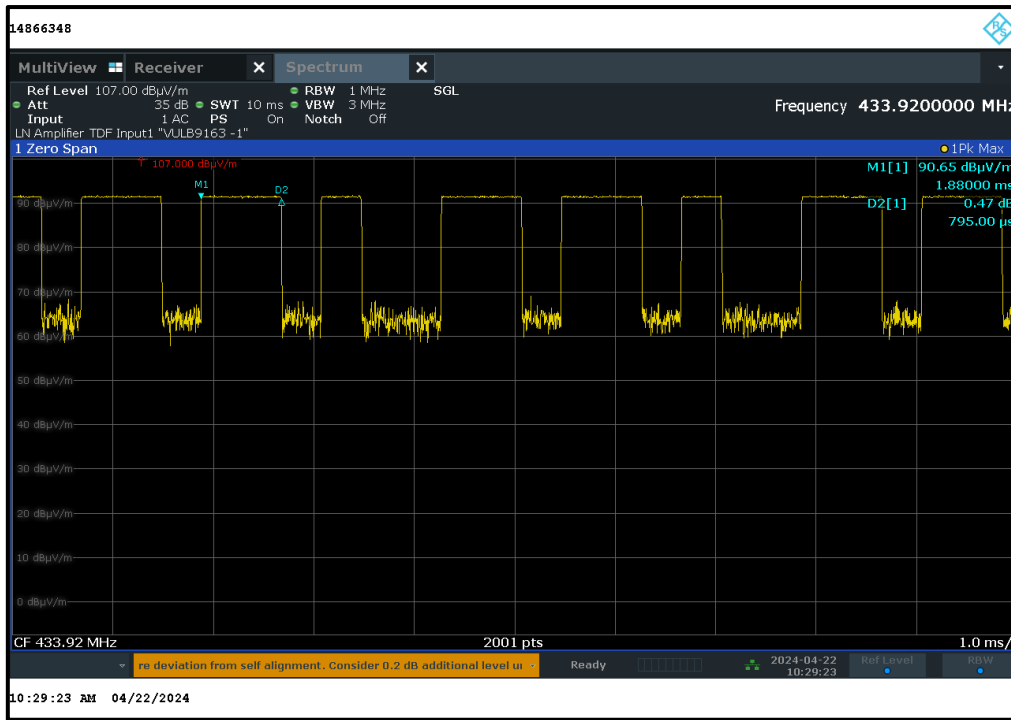
**Duty cycle:**



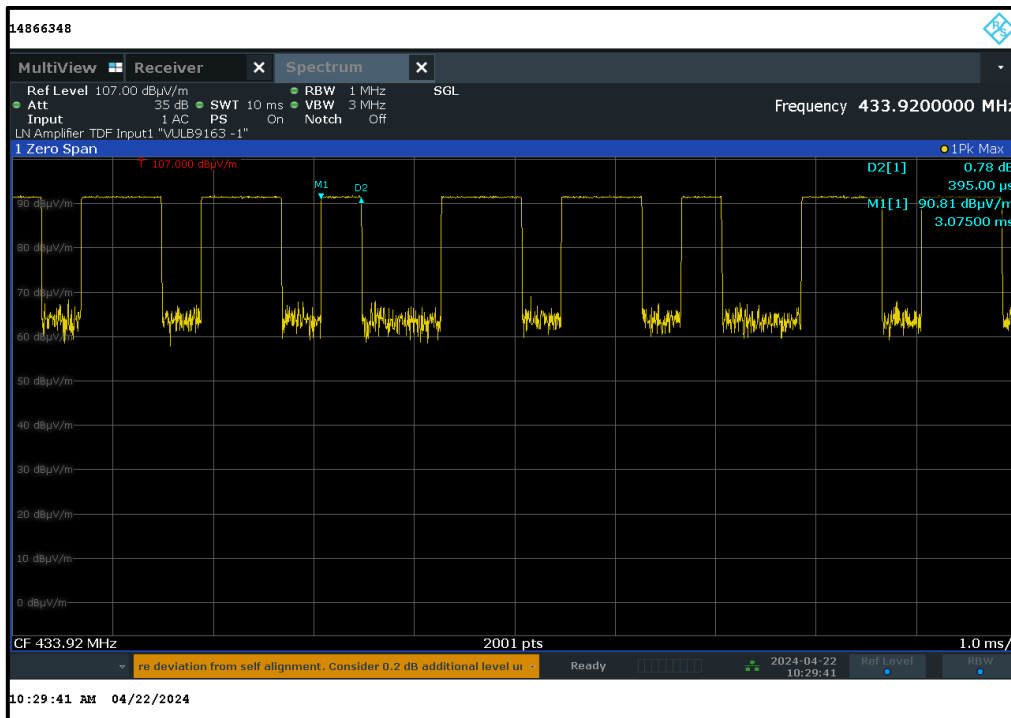
**Time Period**



**T<sub>on</sub> Time**



Time for one pulse



Time for second pulse

Total ON Time	Time Period	Duty cycle	Duty cycle Correction factor
49.87 ms	100 ms	49.87 %	6.04

$$T_{ON} = (0.395 * 29 + 0.795 * 37 + 9) \text{ ms} = 49.87 \text{ ms}$$



**5.2.3. Transmitter 20 dB Bandwidth**

**Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	22 April 2024
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 1/2		

<b>FCC Reference:</b>	Part 15.231(c)
<b>Test Method Used:</b>	ANSI C63.10 Section 6.9.2

**Environmental Conditions:**

<b>Temperature (°C):</b>	20.1
<b>Relative Humidity (%):</b>	39.0

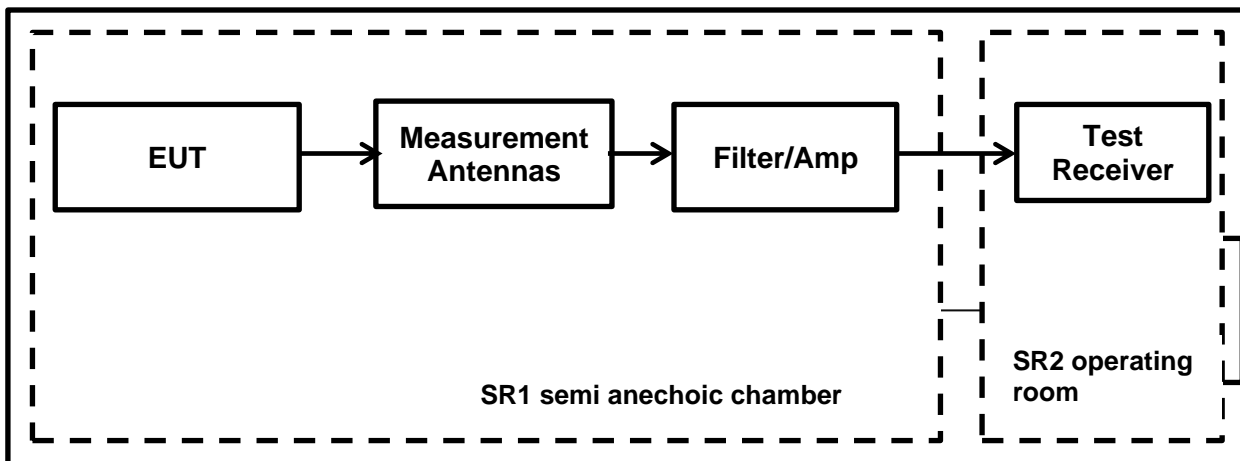
**Settings of the Instrument:**

<b>RBW/VBW</b>	1 kHz / 3 kHz
<b>Span</b>	250 kHz
<b>Sweep time</b>	Auto
<b>Detector</b>	MaxPeak

**Notes:**

1. The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
2. For the frequency 433.92 MHz the 20 dB Bandwidth limit is calculated to be 1.084MHz.

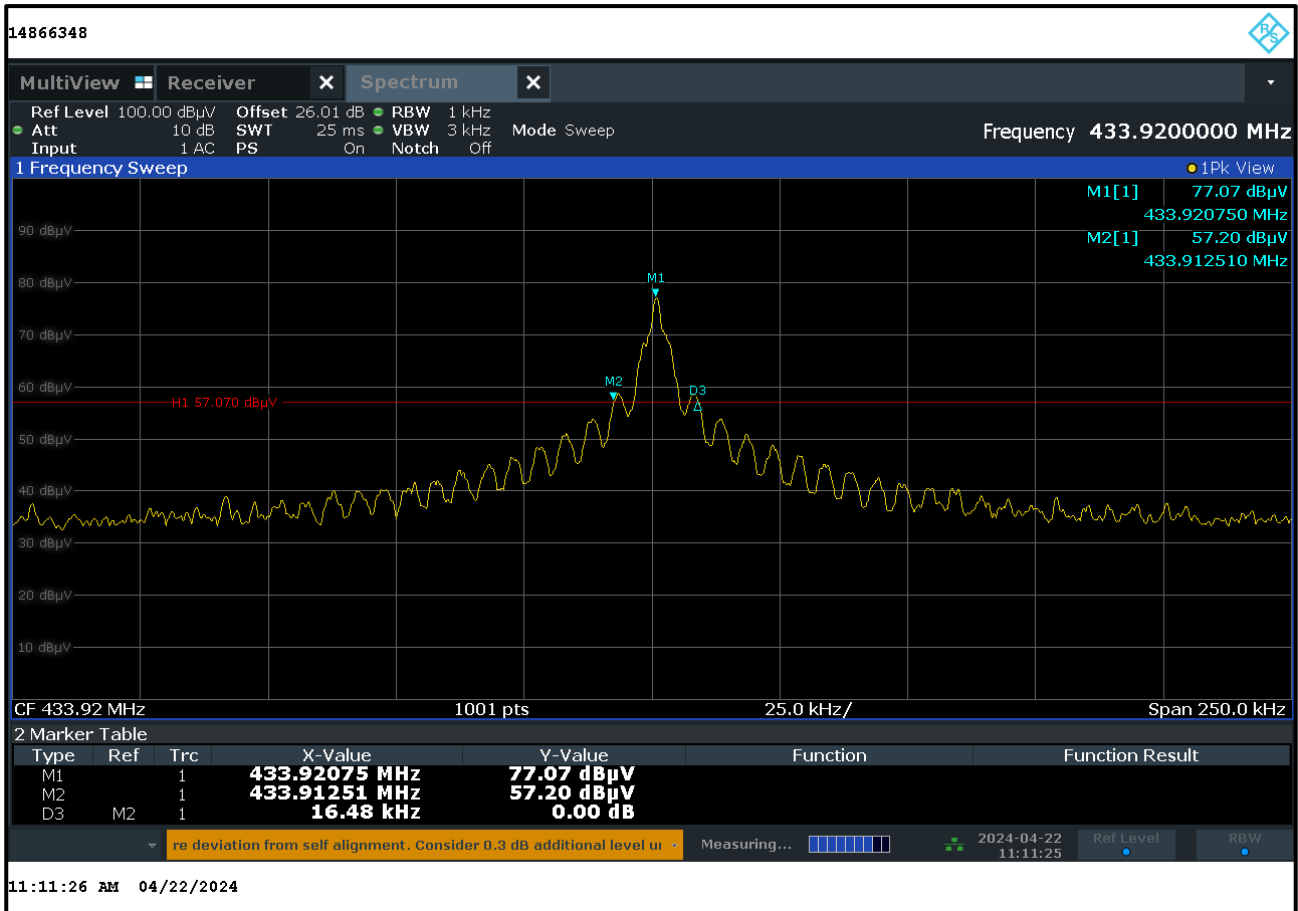
**Test Setup:**



**Transmitter 20 dB Bandwidth (continued)**

**Results: Active 433.92 MHz**

Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
433.92	16.48	1084	1067.52	Complied



433.92 MHz

Result: **Pass**

**5.2.4. Transmitter 99 % Emission Bandwidth**

**Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	22 April 2024
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 1/2		

<b>ISED Reference:</b>	RSS-210 A.1.3
<b>Test Method Used:</b>	RSS-Gen 6.7

**Environmental Conditions:**

<b>Temperature (°C):</b>	20.1
<b>Relative Humidity (%):</b>	39.0

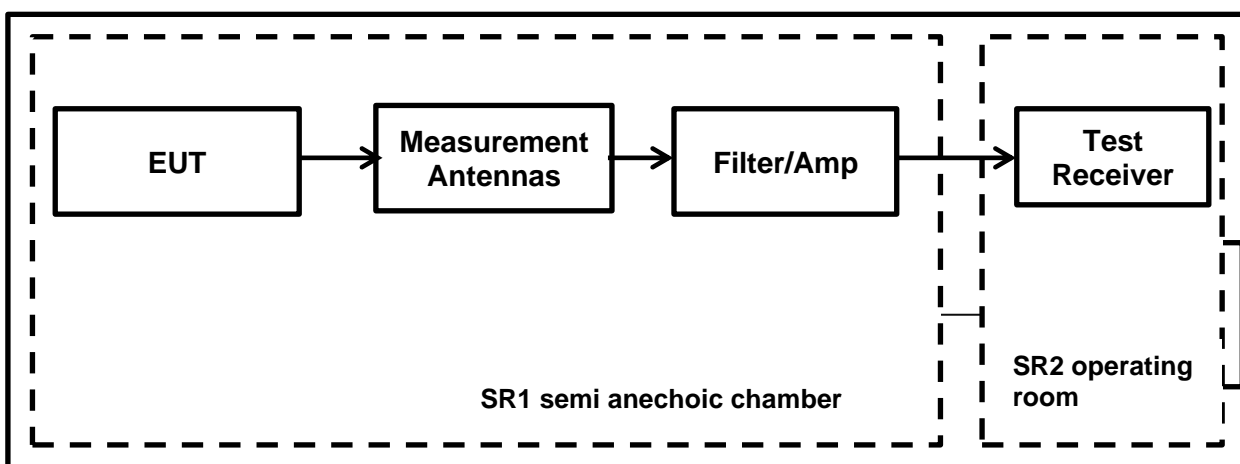
**Settings of the Instrument**

<b>RBW/VBW</b>	1 kHz / 3 kHz
<b>Span</b>	250 kHz
<b>Sweep time</b>	Auto
<b>Detector</b>	MaxPeak

**Notes:**

1. The occupied bandwidth of momentarily operated devices shall be less than or equal to 0.25% of the centre frequency for devices operating between 70MHz and 900MHz. For devices operating above 900MHz, the occupied bandwidth shall be less than or equal to 0.5% of the centre frequency.
2. For the frequency 433.92 MHz the 99% Bandwidth limit is calculated to be 1.084MHz.

**Test Setup:**





**5.2.5. Transmitter Radiated Spurious Emissions****Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	24 November 2023
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 1/2		
<b>FCC Reference:</b>	FCC 47 CFR §15.231(b), & 15.209(a)		
<b>ISED Reference:</b>	RSS-Gen 6.12, RSS-210 (c)		
<b>Test Method Used:</b>	ANSI C63.10:2013 Sections 6.3 and 6.4		
<b>Frequency Range:</b>	9 kHz to 30 MHz		

**Environmental Conditions:**

<b>Temperature (°C):</b>	20.3
<b>Relative Humidity (%):</b>	44.4

**Note(s):**

- As allowed by ANSI C63.10 clause 5.2 an alternative test site that can demonstrate equivalence to a open area test site may be used. Therefore, the measurement was performed in a Semi Anechoic Chamber. (The OATS / SAC comparison data is available upon request).
- FCC rule part 15.209(a) specifies limits at 300 m / 30 m in  $\mu\text{V}/\text{m}$  but RSS-GEN specifies limits at 300 m / 30 m in  $\mu\text{A}/\text{m}$ . The relevant limits are the same after accounting for E-field to H-field correction.
  - The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of  $377 \Omega$ .
  - For example, the measurement frequency X KHz resulted in a level of Y  $\text{dB}\mu\text{V}/\text{m}$ , which is equivalent to  $Y - 51.5 = Z \text{ dB}\mu\text{A}/\text{m}$ , which has the same margin, W dB, to the corresponding RSS-GEN Section 8.9, Table 6 limit as it has to the 15.209(a) limit.
- The limits are specified at a test distances of 30 and 300 metres. However, as specified in FCC Section 15.31 (f)(2) & ANSI C63.10 clause 6.4.3, measurements may be performed at a closer distance and the measured level extrapolated to the specified measurement distance using the method described in clauses 6.4.4, specifically sub-clause 6.4.4.1 which specifies that the measured level shall be extrapolated to the specified distance by conservatively presuming that the field strength decays at 40 dB/decade.
- The measured values at 3 m were extrapolated to the required measurement distances of 300 m and 30 m and compared the specified limits at those distances as follows:
  - 9 kHz- 490 kHz: measured value extrapolated from 3 m to 300 m by subtracting 80 dB at 40 dB /decade.
  - 490 kHz-30 MHz: measured value extrapolated from 3 m to 30 m by subtracting 40 dB at 40 dB /decade.

The results table shows both the measured levels at 3 m and the same measurement values extrapolated to the actual measurement distance for the limits specified at 30 and 300 metres.

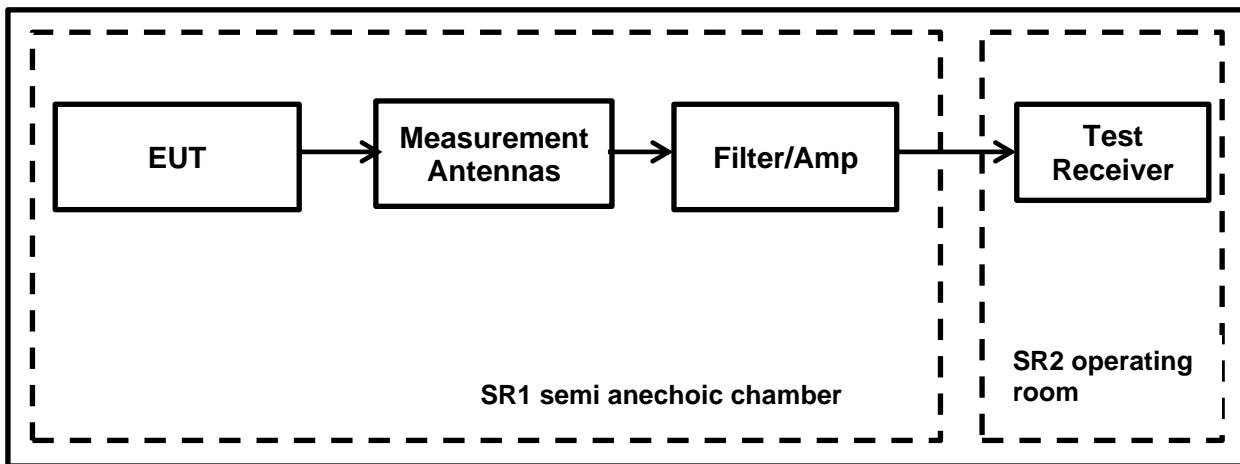
Conversely, the limit line shown on the spectrum plot was extrapolated to 3 m from 300 m and 30 m using the 40 dB /decade rule.
- The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.

## **Transmitter Radiated Spurious Emission test setup**

### **Note(s):**

6. Measurements below 30 MHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. The measurement loop antenna height was 100 cm.
7. Pre-scans were performed and markers placed on highest measured levels. Test receiver was set to:
  - Frequency range: 9 kHz-150 kHz : RBW: 300 Hz / VBW: 1 kHz
  - Frequency range: 150 kHz – 30 MHz: RBW: 10 kHz /VBW: 30 kHz
  - Detector: Peak detector
  - Trace Mode: Max Hold

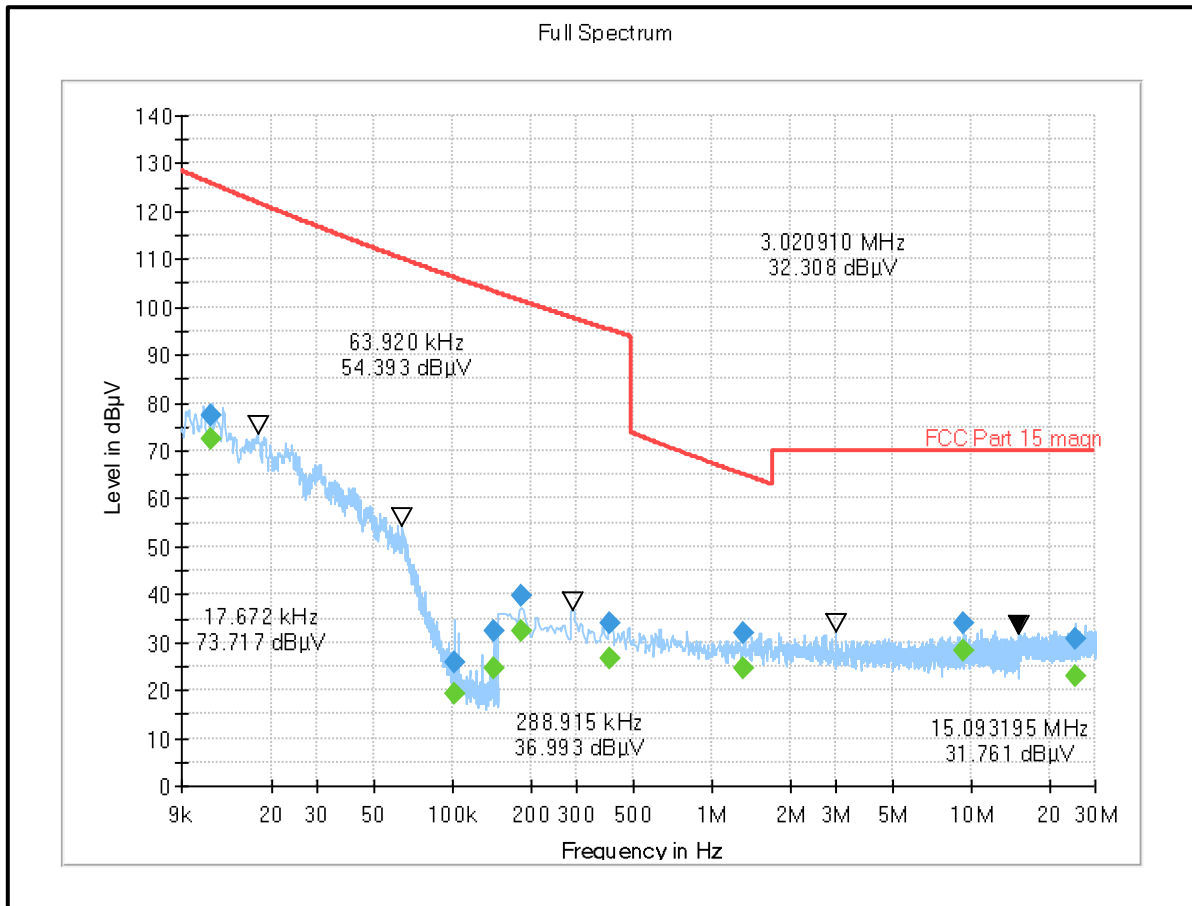
### **Test Setup:**



**Transmitter Radiated Emissions (continued)**

**Results: Transmitter active**

Frequency (MHz)	Loop Antenna Orientation	Level @ 3m (dBµV/m)	Extrapolated Level (dBµV/m)	Limit (dBµV/m)	Limit Distance (m)	Margin (dB)	Result
0.011750	90° to EUT	77.31	-2.69	45.83	300	48.52	Complied
0.101426	90° to EUT	25.72	-54.28	26.19	300	80.47	Complied
0.145136	0° to EUT	32.19	-47.81	23.23	300	71.04	Complied
0.183075	0° to EUT	39.78	-40.22	21.36	300	61.58	Complied
0.401370	90° to EUT	33.82	-46.18	15.29	300	61.47	Complied
1.330.778	90° to EUT	32.12	-7.88	24.99	30	32.87	Complied
9.264.888	0° to EUT	33.85	-6.15	30.00	30	36.15	Complied
25.343.270	90° to EUT	30.83	-9.17	30.00	30	39.17	Complied



**Result: Pass**

**Transmitter Radiated Emissions (continued)**

**Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	22 November 2023
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 1/2		

<b>FCC Reference:</b>	FCC 47 CFR §15.231(b), & 15.209(a)
<b>ISED Reference:</b>	RSS-Gen 6.12, RSS-210 (c)
<b>Test Method Used:</b>	ANSI C63.10:2013 Sections 6.3 and 6.5
<b>Frequency Range:</b>	30 MHz to 1000 MHz

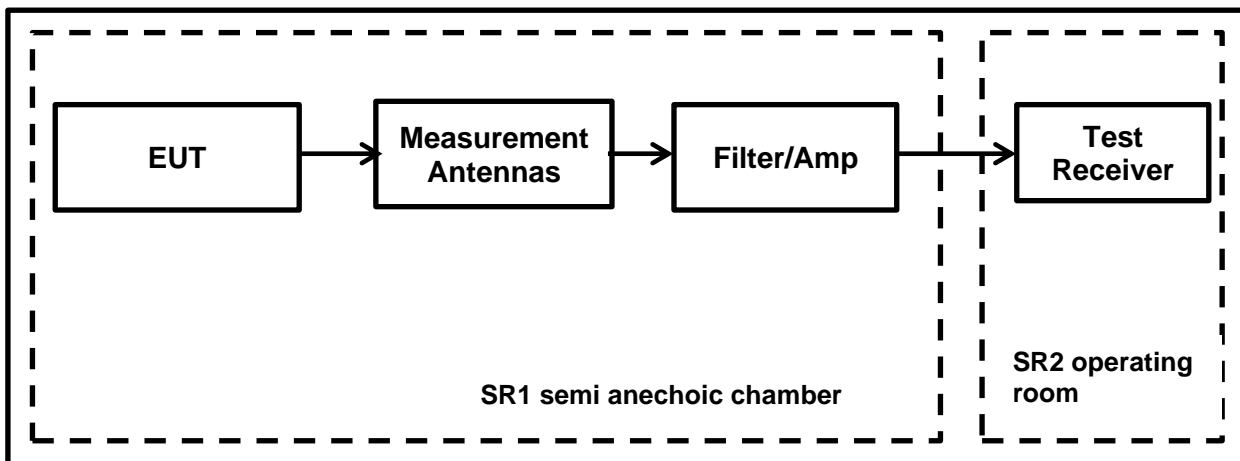
**Environmental Conditions:**

<b>Temperature (°C):</b>	19.2
<b>Relative Humidity (%):</b>	44.0

**Note(s):**

1. Measurements below 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m.
2. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
3. The peak at approx. 434 MHz is the fundamental frequency of the transmitter.
4. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.

**Test Setup:**

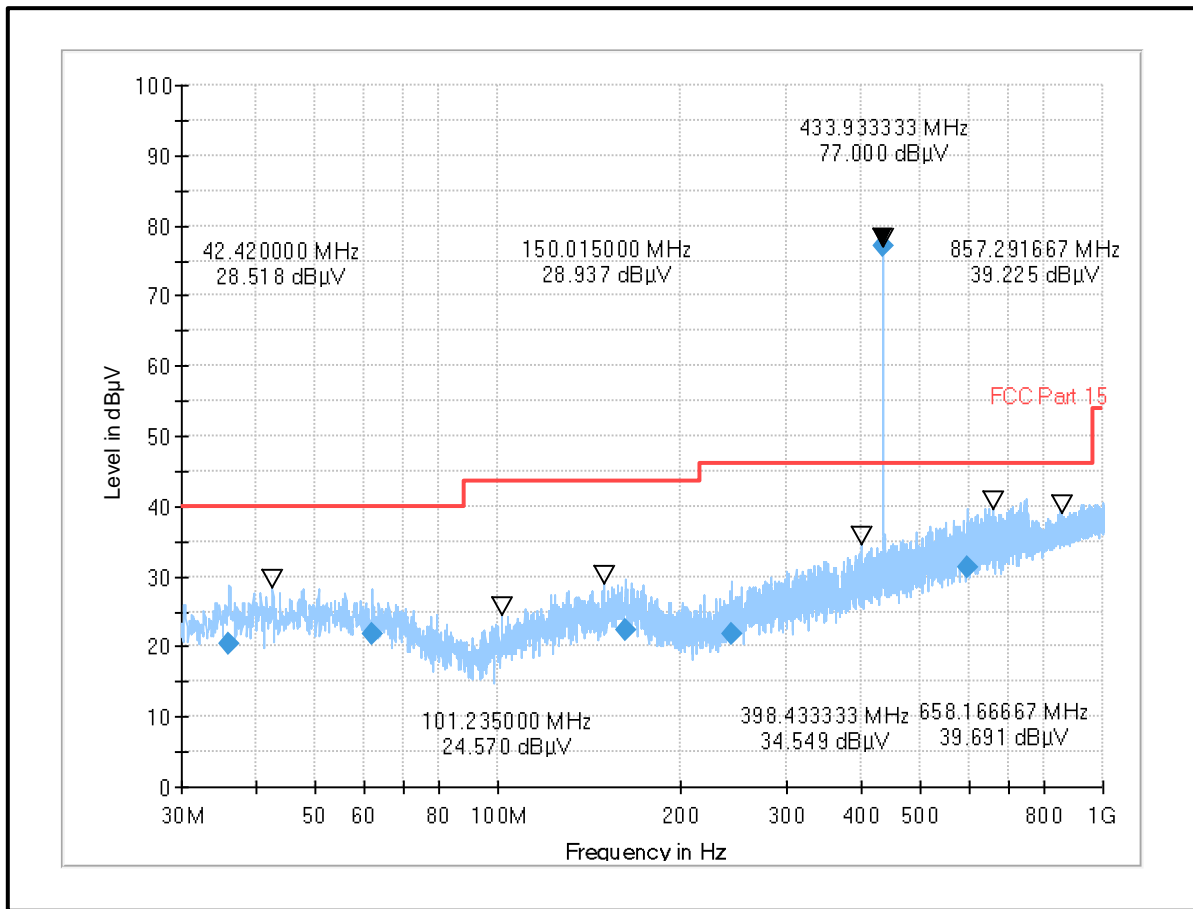




**Transmitter Radiated Emissions (continued)**

**Results: Transmitter active**

Frequency (MHz)	Antenna Polarization	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
36.030000	Horizontal	20.47	40.00	19.53	Complied
62.040000	Horizontal	21.86	40.00	18.14	Complied
162.075000	Vertical	22.45	43.50	21.05	Complied
243.525000	Vertical	21.81	46.00	24.19	Complied
598.208333	Horizontal	31.40	46.00	14.60	Complied



**Result: Pass**

**Transmitter Radiated Emissions (continued)**

**Test Summary:**

<b>Test Engineer:</b>	Muhammad Faiq Khan	<b>Test Date:</b>	24 November 2023
<b>Test Sample Serial Number:</b>	Test sample #3 (Radiated Test Sample)		
<b>Test Site Identification</b>	SR 1/2		

<b>FCC Reference:</b>	FCC 47 CFR §15.231(b), & 15.209(a)
<b>ISED Reference:</b>	RSS-Gen 6.12, RSS-210 (c)
<b>Test Method Used:</b>	ANSI C63.10:2013 Sections 6.3 and 6.6
<b>Frequency Range:</b>	1 GHz to 5 GHz

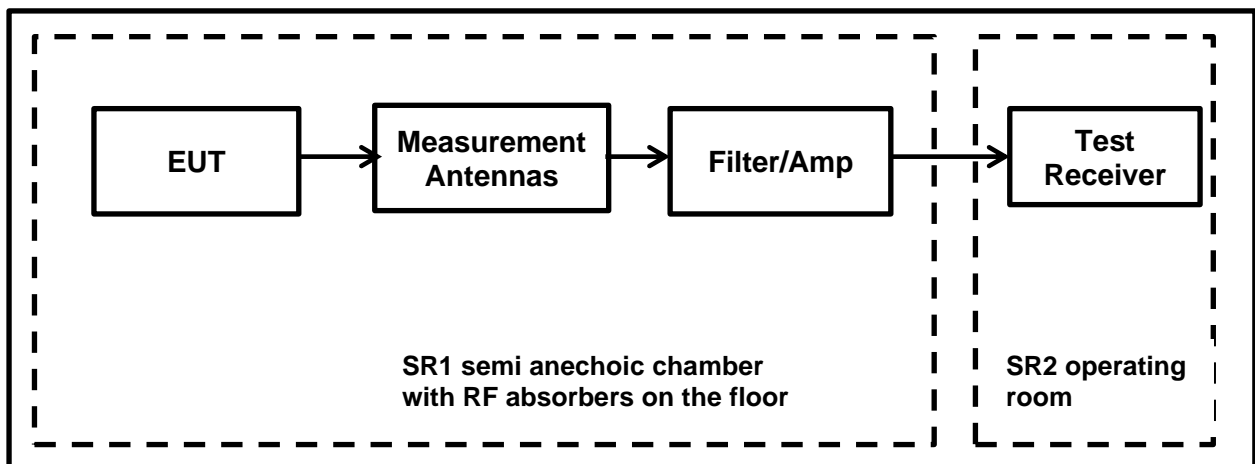
**Environmental Conditions:**

<b>Temperature (°C):</b>	20.3
<b>Relative Humidity (%):</b>	44.4

**Notes:**

1. Pre-scans above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with RF absorbers on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 m above the test chamber floor, in line with the EUT.
2. Final measurements above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m.
3. Pre-scans were performed, and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz the sweep time was set to auto.
4. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.

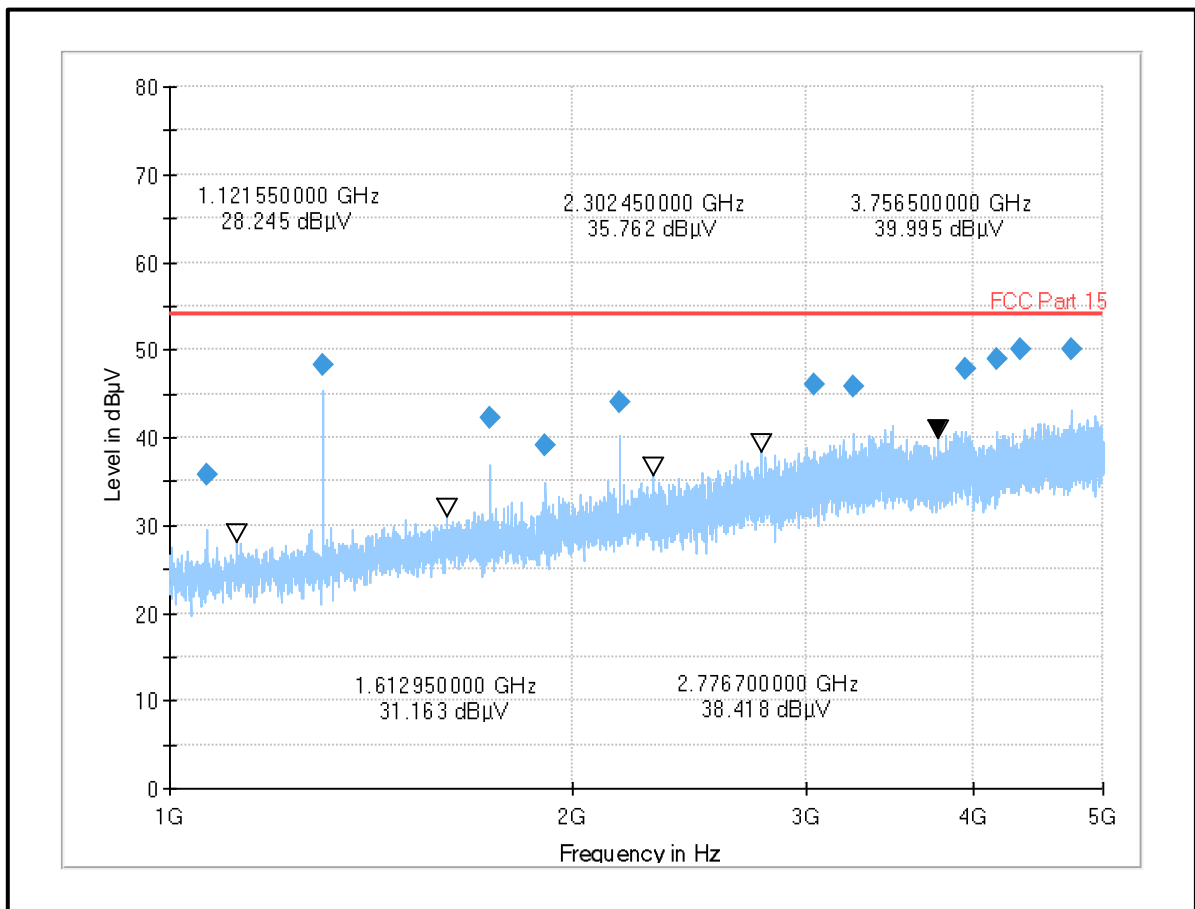
**Test Setup:**



**Transmitter Radiated Emissions (continued)**

**Results: Transmitter active**

Frequency (MHz)	Antenna Polarization	MaxPeak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
1066.950000	Horizontal	35.70	54.00	18.30	Complied
1301.600000	Vertical	48.34	54.00	5.66	Complied
1735.800000	Vertical	42.21	54.00	11.79	Complied
1912.925000	Vertical	39.01	54.00	14.99	Complied
2170.000000	Vertical	44.09	54.00	9.91	Complied
3037.333333	Vertical	45.96	54.00	8.04	Complied
3251.000000	Horizontal	45.75	54.00	8.25	Complied
3950.500000	Vertical	47.71	54.00	6.29	Complied
4159.750000	Horizontal	48.96	54.00	5.04	Complied
4339.250000	Vertical	50.00	54.00	4.00	Complied
4730.500000	Vertical	50.06	54.00	3.94	Complied



**Result: Pass**

## 6. Measurement Uncertainty

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Confidence Level (%)	Calculated Uncertainty
Fundamental Field Strength	95%	±3.10 dB
20 dB Bandwidth	95%	±0.87 %
99% Occupied Bandwidth	95%	±0.87 %
Radiated Spurious Emissions	95%	±3.10 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

## 7. Used equipment

### Test site: SR 1/2

ID	Manufacturer	Type	Model	Serial	Calibration Date	Cal. Cycle (months)
1	Rohde & Schwarz	Antenna, Loop	HFH2-Z2	831247/012	18/07/2023	36
377	BONN Elektronik	Amplifier, Low Noise Pre	BLMA 0118-1A	025294B	18/07/2023	12
460	Deisel	Turntable	DT 4250 S	n/a	n/a	n/a
465	Schwarzbeck	Antenna, Trilog Broadband	VULB 9168	9168-240	02/09/2020	42
496	Rohde & Schwarz	Antenna, log. - periodical	HL050	100297	22/08/2022	24
588	Maturo	Controller	NCD	029/7180311	n/a	n/a
591	Rohde & Schwarz	Receiver	ESU 40	100244/040	13/07/2023	12
669	Rohde & Schwarz	EMI Test Receiver	ESW 44	103087	13/07/2023	18
608	Rohde & Schwarz	Switch Matrix	OSP 120	101227	lab verification	n/a
628	Maturo	Antenna mast	CAM 4.0-P	224/19590716	n/a	n/a
629	Maturo	Kippeinrichtung	KE 2.5-R-M	MAT002	n/a	n/a
-/	Testo	Thermo-Hygrometer	608-H1	01	lab verification	n/a
328	SPS	AC/DC power distribution system	PAS 5000	A2464 00/2 0200	lab verification	n/a
1603665	Siemens Matsushita Components	semi-anechoic chamber SR1/2	-/	B83117-A1421-T161	n/a	n/a
681	Maturo	Antenna mast, tilting	BAM4.5-P	402/0718.1	n/a	n/a

### Test site: SR 9

ID	Manufacturer	Type	Model	Serial	Calibration Date	Cal. Cycle (months)
625	Schwarzbeck	Antenna, H-field	HFSL 7101	109	lab verification only relative measurements	n/a
637	Rohde & Schwarz	Spectrum Analyser	FSV40	101587	12/07/2023	12
327	SPS	AC/DC power distribution system	PAS 5000	A2464 00/1 0200	lab verification	n/a
-/	Testo	Thermo-Hygrometer	608-H1	07	lab verification	n/a
645	Weiss Umwelttechnik	Climatic Chamber	LabEvent T/110/70/3	5822619794 0010	lab verification	n/a

### 8. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	28	-	Initial Version
1.1	1	Front	Model No. / PMN, HVIN, IC and standard updated
	4	1	Company address updated
	6	2.2	Summary table updated
	7	3.1	Identification of EUT table updated
	8	3.4	Additional info table updated
	11	5.2.1	Notes updated
	12	5.2.1	Result table updated
	13 - 16	5.2.2	Measurement results and notes updated
	17 - 18	5.2.3	Measurement results and notes updated
	19 - 20	5.2.4	Measurement results and notes updated
1.2	21, 24 & 26	5.2.5	Notes and standards updated
	8	3.4	Additional info table updated
	14	5.2.2	Results table updated
	21 - 22	5.2.5	Notes updated
1.3	23	5.2.5	Results table updated
	23	5.2.5	Results table updated
1.4	8	3.4	Additional info table updated
	23	5.2.5	Results table updated
1.5	1	Front	Model No. / PMN and HVIN updated
	7	3.1	Model No. / PMN and HVIN updated
1.5	1	Front	HVIN updated
	7	3.1	HVIN updated
<b>Test Report Version 2.0 supersede Version 1.5 with immediate effect</b> Test Report No. UL-RPT-RP-14866348-816 Version 2.0 Issue Date 25 September 2024 replaces Test Report No. UL-RPT-RP-14866348-816 Version 1.5, Issue Date 05 July 2024, which is no longer valid.			
2.0	Page No(s)	Clause	Details
	13	5.2.2	Notes updated
	14 & 16	5.2.2	Measurement results table updated

**END of Test Report**